# Handbook of INORGANIC CONPOUNDS

# SECOND EDITION

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PERRY

DALE L.

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## Preface to the Second Edition

During the past several years, inorganic compounds have played a greater role in not only inorganic chemistry but related disciplines as well. These include materials chemistry, with its own subdisciplines such as catalysts, solar materials, superconductors, photonic materials, nuclear radiation detection materials, and inorganic thin films, among many others. This book provides a base set of inorganic compounds that are both inherently important themselves and important for a wide variety of applications that already have been realized and for many that have not, at least to this date.

There are several criteria for the selection of the compounds. Many are very significant with respect to their applications in both basic and applied research; this is true not only for chemical research but also for related fields such as biochemistry and materials science. Other compounds have been included because they are or can be precursors in processes for preparing important materials. Examples are the use of the precursors in sol–gel, vacuumdeposition, and hydrothermal crystallization as steps in a larger preparative procedure. A third reason for inclusion is to provide rapid access to basic compounds such as oxides, halides, sulfides, and other commonly used chemical compounds for a large variety of needs and applications.

As was true with the first edition of this handbook, it was not possible to include every inorganic compound or all the important data associated with them. The *Handbook of Inorganic Compounds* consists of data for 3326 selected gas, liquid, and solid compounds, with an attempt to include representative compounds of several different classes of compounds. Choices of compounds were based on criteria such as inclusion of the compounds in various handbooks of laboratory chemicals, discussion in recent research publications, compounds important to inorganic materials chemistry, and comments of the Advisory Committee guiding the production of the first edition of the handbook.

Compounds included in this book are mainly the chemical elements, binary compounds of the elements with anions such as sulfate and chloride, and metal salts of some simple organic acids. If a compound has more than one form, then each form may be listed individually. A typical example is that of separate listings for an anhydrous compound and its hydrates. Another example is the separate listing of the three calcium carbonates. With some exceptions, minerals (i.e., listed by their mineral names; many exist in nature as inorganic compounds and may be tabulated as such here in the *Handbook*), organometallic compounds, metallic alloys, noncrystalline materials, coordination complexes, and nonstoichiometric

compounds (such as many naturally occurring minerals) are not included in this handbook.

The format for presenting information has both numerical data and descriptive information. The data are solubility, melting point, boiling point, density, thermal conductivity, and thermal expansion coefficient. Other data may also be included, for example, vapor pressure, viscosity, hardness, lattice parameters, electrical resistivity, Poisson's ratio, and dielectric constant. There may also be thermodynamic values, mainly enthalpy of vaporization, fusion, and sublimation. However, thermodynamic values for the individual compounds such as enthalpy of formation are not covered in this handbook. Descriptive information for the various compounds is organized into three categories: form, for example, color and particle size; preparation or manufacturing procedure; and commercial or other uses. Also, because of constraints on space and interest in compactness needed for a one volume treatise, no detailed structural data are presented.

Much effort has been made to obtain as many significant numerical values related to physical and chemical constants for each compound as possible. Thus, the reader is saved considerable time in looking for the basic properties from many sources. This handbook is intended to be useful to chemists, chemical engineers, materials scientists, and other scientists who need

- Basic, essential property data for compounds that they wish to use in their database compilations, research, and applications work.
- American Chemical Society (ACS) Chemical Abstract Registry Numbers (RN's, or CAS numbers) for computer and other searches. An effort has been made to include CAS numbers for both hydrated chemical compounds and their parent anhydrous compounds.
- 3. A tabulation of molecular weights for calculations. In this handbook, molecular weights have been calculated to three decimal places in all cases.
- 4. The synthesis of inorganic compounds and materials.
- 5. Vendor information for obtaining commercial samples and batches of inorganic compounds.

Complementary physical and chemical data for inorganic compounds can be found in a number of additional reference books, including the Handbook of Chemistry and Physics (91st Edition), Perry's Chemical Engineers' Handbook (8th Edition), the Kirk-Othmer Encyclopedia of Chemical Technology (5th Edition), the Merck Index (14th Edition), Comprehensive Inorganic Chemistry, Gmelin Handbook of Inorganic and Organometallic Chemistry (8th Edition), Lange's Handbook of Chemistry (70th Edition), and Hawley's Condensed Chemical Dictionary (15th Edition). Increasingly, many of them are available online, both as electronic volumes and as journals in virtual libraries. Specialty data source references to the elements also are available, including Thermochemical Data of Elements and Compounds, Transition Metal Chemistry, Polyhedron (and older issues of its predecessor, Journal of Inorganic and Nuclear Chemistry), Coordination Chemistry Reviews, and Inorganic Chemistry. More recent information and data can be found in open research journals such as the Journal of Chemical and Engineering Data, Journal of Solution Chemistry, Journal of Material Research, Journal of Organometallic Chemistry, Journal of the American Ceramic Society, Chemistry of Materials, Chemical Reviews, Material Research Society [MRS] Bulletin, Solid-State Ionics, and Journal of the Electrochemical Society.

And, there have been several upgrades in this second edition relative to the first edition. In line with the dramatic growth of the Internet since the first edition was published in 1995, a number of aspects have been upgraded with respect to Web sites for vendors in the references. The major vendors were used for compound data in the first edition for the data themselves and as intentional sources for commercial venues from which to purchase compounds in a variety of forms and purities. Additionally, a separate section has been added that lists major reference volumes concerning the field of inorganic chemistry itself.

I wish to thank Sidney Phillips, my coeditor of the first edition of this handbook, for his hard work on the first edition. His professional background and scientific judgment were invaluable for producing this book. Additionally, I wish to thank David Lide for his tremendous assistance in both the first edition of this handbook and the present one. Conversations with him have been extremely useful with respect to chemical databases in general and the production of the present volume.

And, finally, I would like to thank Hilary Rowe and Fiona Mcdonald at CRC for their really huge role in directing this effort. Without their editorial guidance, this volume would not be possible. **Dale L. Perry** received his PhD in inorganic chemistry from the University of Houston, Houston, Texas. He was a Welch Postdoctoral Fellow and a National Science Postdoctoral Fellow at Rice University. He was a Miller Fellow in chemistry at the University of California, Berkeley, California. He has been on the scientific staff in chemistry at Lawrence Berkeley National Laboratory, University of California, being appointed a senior scientist in chemistry at the same institution.

His research interests are in solid-state inorganic synthesis and spectroscopy, inorganic systems that include those of transition, main group, lanthanide, and actinide metal ions. The classes of compounds and materials on which his research has focused include metal ion-organic complexes, inorganic thin films, semiconductors, superconductors, mixed metal ion oxide catalysts, inorganic crystals, inorganic scintillation materials, and inorganic polymers. He has authored and coauthored over 300 contributed and invited scientific presentations, refereed journal publications, and numerous invited seminars at universities, national laboratories, and industry. He has edited and authored several books, including Instrumental Surface Analysis of Geologic Materials, Applications of Analytical Techniques to the Characterization of Materials, and Applications of Synchrotron Radiation Techniques to Materials Science. He has conducted workshops related to the characterization of inorganic materials and analysis using x-ray photoelectron, Auger, infrared, Raman, nuclear magnetic resonance, and Mossbauer spectroscopy.

Dr. Perry's honors include a Sigma Xi National Research Award and Traineeship, a Miller Fellowship, a Beyer Award, and a National Science Foundation Fellowship. He is a member of the American Chemical Society, American Association for the Advancement of Science, Materials Research Society, the Society for Applied Spectroscopy, and the Royal Society of Chemistry (London). He is also a fellow of both the Royal Society of Chemistry (London) and American Association for the Advancement of Science. He has been a member of the Committee for Corporate Participation in the Materials Research Society and both a member and a chairman of the Chemistry and Engineering Materials Subdivision in the Industrial & Engineering (I & EC) Division of the American Chemical Society.

In addition to research, he has been a member of several ad hoc panels for the U.S. Department of Energy related to instrumentation needs in both heavy metal chemical research and research as it pertains to heavy metals, their chemistry, and materials science related to them. He is an organizer of symposia concerning the application of spectroscopy to materials research, synthesis and characterization of inorganic materials, and the application of surface spectroscopy to materials studies. He has also been very active as a principal investigator and mentor to Hispanic, Native American, and African American students in the Center for Science and Engineering Education at Lawrence Berkeley National Laboratory. He was the winner of the Outstanding Mentor Award for Undergraduate Research Program, U.S. Department of Energy, in 2002.

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#### Solubility Data:

Boris Krumgalz Israel Oceanographie & Limnological Research Tel Shikmona P.O.B. 8030 Haifa, Israel 31080 Phone: 04-515202 FAX: 04-511911

#### **Barium and Cerium Data:**

Mariska Scholten Delft University of Technology P.O.B. 5045 Julianalaan 136 2628 BL Delft The Netherlands Phone: 31 (0) 15-782615 FAX: 31 (0) 15-782655

#### Sodium Silicates Data:

Barry Schenker Occidental Chemical Corporation P.O.B. 344 Niagara Falls, New York 14302-0344 Phone: (800) 733-1165

#### Lanthanide and Ruthenium Data:

Joseph A. Rard Lawrence Livermore National Laboratory University of California Livermore, California 94550 Phone: (925) 422-1100

#### **Computer Work:**

Daniel J. Phillips Camatx/Basic Chemistry 171 El Toyonal Orinda, California 94563 Phone: (510) 254-7717 FAX: (510) 253-1358

#### **Barium and Cerium Data:**

Joop Schoonman Delft University of Technology P.O.B. 5045 Julianalaan 136 2628 BL Delft The Netherlands Phone: 31 (0) 15-782615 FAX: 31 (0) 15-782655

#### **Consistency of Data:**

David R. Lide CRC Press, Inc. 13901 Riding Loop Dr. Gaithersburg, Maryland 20878 Phone: (301) 738-7147 FAX: (301) 738-7147

#### **Oxide Solubility Data:**

Steven E. Ziemniak Knolls Atomic Power Laboratory P.O.B. 1072 Schnectady, New York 12301 Phone: (518) 395-4000 FAX: (518) 395-4422

#### **Data Collections of Radioactive Inorganic Compounds:**

Gerald English CCIS, Inc. 3785 Highland Road Lafayette, California 94549 Phone: (925) 283-5708 FAX: (510) 486-5757

# Organization of Data for the Compounds

References to sources of the data are given in the form [XXXYY], where XXX represents the principal author or work and YY represents the last two digits of the year of the work.

**Compound:** Commonly used name of inorganic compound. **Formula:** Commonly used chemical formula.

- **Molecular Formula:** Modified Hill system in which carbon is always listed first, followed by hydrogen (if any) and then other elements in alphabetical order. If there is no carbon, then the elements are given in alphabetical order. Stoichiometry is always shown in the usual subscript form.
- **Molecular Weight:** Consistently calculated from the stoichiometry of the formula to three decimal places, using atomic weights from *Pure & Applied Chemistry*, *81*, 2131–2156 (2009). Significant figures are not taken into account.
- **CAS RN:** Chemical Abstracts Service (CAS) Registry Number (RN). Where possible, the CAS RN for the compound with hydrated waters is given, as well as that for the anhydrous compound.
- **Properties:** Consists of all or some of the following basic chemical data: crystalline form with lattice parameters; color; gas, liquid, or solid; vapor pressure; hardness; viscosity; dielectric constant; electrical resistivity; Poisson's ratio; enthalpy of vaporization; enthalpy of fusion; preparation; uses.

- Solubility: Concentration of compound in solvent under the stated conditions. The solvent is usually water unless otherwise stated; efforts have been made to include the equilibrium solid phase. Abbreviations for solvents are identical to those used in Reference [CRC10], *CRC Handbook of Chemistry and Physics*, W. M. Haynes, Ed., CRC Press, Inc., 91st edition, Boca Raton, FL (2010–2011).
- Density: Density of the solid, liquid, or gas.
- Melting Point: Temperature at which the pure solid becomes liquid.
- **Boiling Point:** Temperature at which the pure liquid becomes gas.
- **Reactions:** Limited generally to phase changes, decomposition, and hydrolytic reactions.
- **Thermal Conductivity:** Property of the compound that attributes a numerical value to its capability to transmit heat.
- **Thermal Expansion Coefficient:** Change in volume or length per degree change in temperature. [This is an important property for ceramics.]

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# **Glossary of Terms**

Reference: "Abbreviated List of Quantities, Units and Symbols in Physical Chemistry," IUPAC, Blackwell Scientific Publications, Oxford, England (1987). "Standard Practice for Use of the International System of Units," ASTME 380-92, Philadelphia, PA 19103 (1992). *Handbook of Chemistry and Physics*, 91st edition, W. M. Haynes, Editor, CRC Press, Inc., Boca Raton, FL 33431 (2010–2011).

, (comma):	and, and also, in	liq:	liquid
<b>→:</b>	giving, yielding	m:	meter
<:	below	micro:	E – 06
>:	above	min:	minute(s)
~:	approximately	mL:	milliliter
μ:	micro, E – 06	mm:	millimeter
10 <sup>-n</sup> :	exponent to number, n	mol:	mole
a, b, c:	lattice parameters	monocl:	monoclinic
aq:	aqueous	mp:	melting point
atm:	atmosphere, atmospheric	MPa:	megapascal
bcc:	body-center(ed) cubic	mW:	milliwatt
bluish:	having a tinge of blue; somewhat blue	nm:	nanometer
bp:	boiling point	off-white:	a yellowish or grayish white
Btu:	British thermal unit	ohm•cm:	ohm centimeter
cal:	calorie	ortho-rhomb:	orthorhombic
CAS RN:	Chemical Abstracts Service Registry	ortho:	orthorhombic
	Number	Pa:	pascal
cm:	centimeter	powd:	powder(s)
cone:	concentrated	reddish:	having a tinge of red
cp:	centipoise	rhomb:	rhombic
cryst:	crystal(s), crystalline	sec:	second(s)
cub:	cubic	s:	soluble
deliq:	deliquescent	sl:	slightly
dil:	dilute	soln:	solution
E+or -:	exponent(10 <sup>+ or -</sup> )	t <sub>1/2</sub> :	half-life
eV:	electron volt	$\mathbf{T}_{\mathbf{C}}, \mathbf{T}_{\mathbf{K}}$ :	superconducting transition temperature
fcc:	face-centered cubic	temp:	temperature
fp:	freezing point	tetr:	tetragonal
GPa:	gigapascal	trie:	triclinic
h:	hour(s)	trig:	trigonal
hex:	hexagonal	V:	very
hygr:	hygroscopic	V:	volt
i:	insoluble	W:	watt
J:	joule	W/(m⋅K):	$W m^{-1} K^{-1}$
K:	Kelvin	[XXXYY]:	Reference to the source publication;
k:	kilo		XXX denotes first three letters of work
kgf:	kilogram force		or senior author, YY denotes last two
kJ:	kilojoule		digits of the year of publication

# **Conversion of Units**

References: "Abbreviated List of Quantities, Units and Symbols in Physical Chemistry," IUPAC, Blackwell Scientific Publications, Oxford, England (1987). "Standard Practice for Use of the International System of Units," ASTM E 380-92, Philadelphia, PA 19103 (1992).

Å (angstrom) × E – 01 = nm atm × 1.013 250 E+05 = Pa bar × 1.000 000 E+05 = Pa Btu in./(h ft<sup>2</sup> °F) × 1.441 314 E – 01 = W/(m · K) Btu (thermochemical) × 1.054 35 E+03 = J cal/(cm · s · °C) × 4.184 000 E+02 = W/(m · K) cal (thermochemical) × 4.184 = J cp × 1.000 000 E – 03 = Pa · s g/cm<sup>3</sup> × 1.000 000 E+03 = kg/m<sup>3</sup> g × 1.000 000 E+03 = kg J × E+03 = kJ

kgf/mm<sup>2</sup>×9.806 650 E+06=Pa kcal×4.184=kJ m×E×09=nm mm Hg (0°C)×1.333 22 E+02=Pa ohm·cm×1.000 000 E - 02=ohm·m Pa×E+09=GPa W/(m·K)=0.1 mW/(cm·K) W/(m·K)=100 W/(cm·K) °C=(°F - 32)/(1.8) °C=K - 273.15

# Table of Atomic Weights of the Elements—2007\*

The following 2007 Table of Standard Atomic Weights was prepared at a meeting in Pisa, Italy, July 30–31, 2007, under the auspices of the Commission on Atomic Weights and Isotopic Abundances, Inorganic Chemistry Division, and the chairmanship of Prof. T. P. Ding.

#### INTRODUCTION

Atomic weights represent the bedrock of calculations for reactions, stoichiometries, and other numerical applications regarding the elements of the periodic table.

The detail and the number of significant figures in the IUPAC Table of Standard Atomic Weights usually exceed the needs and interests of most users, who are more interested in the use of abbreviated, short, accurate tables that have validity to the precision limit of their interests. The Commission on Atomic Weights and Isotopic Abundances in 1987, therefore, decided to prepare for publication a revised and updated version of the 1981 Table of Atomic Weights abridged to five significant figures or fewer where uncertainties do not warrant even five-figure accuracy. Additional upgraded tables were published in 1993, 1995, 1997, 1999, 2001, and 2005.

The complete table is given here with the knowledge that the quoted values for these elements will change slightly from year to year, something that has been shown to occur historically with previous versions of the table. It should be understood that the atomic-weight values for many elements are still uncertain by more than one unit in their last significant figure. Moreover, for additional elements, the indicated uncertainty range in the unabridged table here includes values that, when rounded to five significant figures, would show a change in the fifth figure. For some of these elements, minor changes in their best standard atomic weight to five significant figures could occasionally be required as more accurate values become available as a result of the biennial revision of the unabridged table. Most annotated warnings of anomalous geological occurrences, isotopically altered materials, and variability of radioactive elements are relevant even in the abridged table. There are older tables of atomic weights that are abridged to only five significant figures, based on older table values. These are quite useful for workers who do not need the atomic-weight values to more significant figures. Too, many of the values with respect to five significant figures are in fairly good agreement with the values in this table, especially since most workers do not need the greater precision.

This table may be freely reprinted provided it includes the annotations, the rubric at the head of the table, and the IUPAC primary reference sources are acknowledged.

Atomic weights are here quoted to all significant figures included in the most recent (2007) table of atomic weights. The dependable accuracy is more limited either by the combined uncertainties of the best published atomicweight determinations or by the variability of isotopic composition in normal terrestrial occurrences (the latter applied to elements associated with Footnote # 1 in the table). The last significant figure of each tabulated value is considered reliable to ±1 except when a larger singledigit uncertainty is inserted in parentheses following the atomic weight. Neither the highest nor the lowest actual atomic weight of any normal sample is thought likely to differ from the tabulated value by more than the assigned uncertainty. However, the tabulated values do not apply either to samples of highly exceptional isotopic composition arising from most unusual geological occurrences (for elements associated with Footnotes # 1 and # 2) or to those who isotopic composition has been artificially altered. Such might even be found in commerce without disclosure of that modification (for elements associated with Footnotes # 3 and # 4). Some elements have no stable isotope and are generally represented in this table by just one of the element's commonly known radioisotopes in brackets (Footnote # 5), with a corresponding relative atomic mass in the atomic-weight column. However, three elements in this grouping (Th, Pa, and U) do have a characteristic terrestrial isotopic composition, and for these an atomic weight is tabulated. For more detailed information, users should refer to the full IUPAC Table of Standard Atomic Weights, as is found in the biennial reports of the Commission on Atomic Weights and Isotopic Abundances. The most recent table (2007) was published in Pure Appl. Chem., 81, 2131-2156 (2009), with only very slight changes to a few elements since the tabulation that was included in the first edition of this handbook. The new values are incorporated in the following table.

The group of elements with the highest atomic numbers in the periodic table that have been identified only recently in the last few decades have not been extensively studied or even named, Elements 113–118. Element 112, copernicium, has had its name officially, formally accepted in the most recent issue (March 2010) of *Pure and Applied Chemistry* (**Footnote # 6**).

<sup>\*</sup> Michael E. Wieser and Michael Berglund, Pure Appl. Chem., 81, 2131-2156 (2009), [MM09] in Literature Cited.

#### Table of Standard Atomic Weights-2007

	Name	Symbol	Atomic Weight	Footnotes
1	Hydrogen	Н	1.00794(7)	1, 2, 3
2	Helium	He	4.002602(2)	1, 2
3	Lithium	Li	6.941(2)	1, 2, 3, 4
4	Beryllium	Be	9.012182(3)	
5	Boron	В	10.811(7)	1, 2, 3
6	Carbon	С	12.0107(8)	1, 2
7	Nitrogen	Ν	14.0067(2)	1, 2
8	Oxygen	0	15.9994(3)	1, 2
9	Fluorine	F	18.9984032(5)	
10	Neon	Ne	20.1797(6)	1, 3
11	Sodium (Natrium)	Na	22.98976928(2)	
12	Magnesium	Mg	24.3050(6)	
13	Aluminum	Al	26.9815386(8)	
14	Silicon	Si	28.0855(3)	2
15	Phosphorus	Р	30.973762(2)	
16	Sulfur	S	32.065(5)	1, 2
17	Chlorine	CI	35.453(2)	3
18	Argon	Ar	39.948(1)	1, 2
19	Potassium (Kalium)	К	39.0983(1)	1
20	Calcium	Ca	40.078(4)	1
21	Scandium	Sc	44.955912(6)	
22	Titanium	Ti	47.867(1)	
23	Vanadium	V	50.9415(1)	
24	Chromium	Cr	51.9961(6)	
25	Manganese	Mn	54.938045(5)	
26	Iron	Fe	55.845(2)	
27	Cobalt	Co	58.9331	
28	Nickel	Ni	58.69344	
29	Copper	Cu	63.546(3)	2
30	Zinc	Zn	65.38(2)	
31	Gallium	Ga	69.723(1)	
32	Germanium	Ge	72.64(1)	
33	Arsenic	As	74.92160(2)	
34	Selenium	Se	78.96(3)	
35	Bromine	Br	79.904(1)	
36	Krypton	Kr	83.798(2)	1, 3
37	Rubidium	Rb	85.4678((3)	1
38	Strontium	Sr	87.62(1)	1, 2
39	Yttrium	Y	88.90585(2)	
40	Zirconium	Zr	91.224(2)	1
41	Niobium	Nb	92.90638(2)	
42	Molybdenum	Мо	95.96(2)	1
43	Technetium	Tc	[98]	5
44	Ruthenium	Ru	101.07(2)	1
45	Rhodium	Rh	102.90550(2)	
46	Palladium	Pd	106.42(1)	1
47	Silver	Ag	107.8682(2)	1
48	Cadmium	Cd	112.411(8)	1
49	Indium	In	114.818(3)	
50	Tin	Sn	118.710(7)	1

Table of Standard	Atomic '	Weiahts—	2007	(continued)

			.5 2007 (0011111	icu)
	Name	Symbol	Atomic Weight	Footnotes
51	Antimony (Stibium)	Sb	121.760(1)	1
52	Tellurium	Те	127.60(3)	1
53	lodine	I	126.90447(3)	
54	Xenon	Xe	131.29(3)	1, 3
55	Cesium	Cs	132.9094(1)	
56	Barium	Ва	137.327(7)	
57	Lanthanum	U	138.90547(7)	1
58	Cerium	Ce	140.116(1)	1
59	Praseodymium	Pr	140.90765(2)	
60	Neodymium	Nd	144.242(3)	1
61	Promethium	Pm	[145]	5
62	Samarium	Sm	150.36(2)	1
63	Europium	Eu	151.964(1)	1
64	Gadolinium	Gd	157.25(3)	1
65	Terbium	Tb	158.92535(2)	
66	Dysprosium	Dy	162.500(1)	1
67	Holmium	Ho	164.93032(2)	
68	Erbium	Er	167.259(3)	1
69	Thulium	Tm	168.93421(2)	
70	Ytterbium	Yb	173.054(5)	1
71	Lutetium	Lu	174.9668(1)	1
72	Hafnium	Hf	178.49(2)	
73	Tantalum	Та	180.94788(2)	
74	Tungsten (Wolfram)	W	183.84(1)	
75	Rhenium	Re	186.207(1)	
76	Osmium	Os	190.23(3)	1
77	Iridium	lr	192.217(3)	
78	Platinum	Pt	195.084(9)	
79	Gold	Au	196.966569(4)	
80	Mercury	Hg	200.59(2)	
81	Thallium	TI	204.3833(2)	
82	Lead	Pb	207.2(1)	1, 2
83	Bismuth	Bi	208.98040(1)	
84	Polonium	Po	[209]	5
85	Astatine	At	[210]	5
86	Radon	Rn	[222]	5
87	Francium	Fr	[223]	5
88	Radium	Ra	[226]	5
89	Actinium	Ac	[227]	5
90	Thorium	Th	232.03806(2)	1, 5
91	Protactinium	Pa	231.03588(2)	5
92	Uranium	U	238.02891(3)	1, 3, 5
93	Neptunium	Np	[237]	5
94	Plutonium	Pu	[244]	5
95	Americium	Am	[243]	5
96	Curium	Cm	[247]	5
97	Berkelium	Bk	[247]	5
98	Californium	Cf	[251]	5
99	Einsteinium	Es	[252]	5

#### Table of Standard Atomic Weights—2007 (continued)

	Name	Symbol	Atomic Weight	Footnotes
100	Fermium	Fm	[257]	5
101	Mendelevium	Md	[258]	5
102	Nobelium	No	[259]	5
103	Lawrencium	Lr	[262]	5
104	Rutherfordium	Rf	[265]	5
105	Dubnium	Db	[268]	5
106	Seaborgium	Sg	[271]	5
107	Bohrium	Bh	[272]	5
108	Hassium	Hs	[270]	5
109	Meitnerium	Mt	[276]	5
110	Darmstadtium	Ds	[281]	5
111	Roentgenium	Rg	[280]	5
112	Copernicium	Cn	[285]	5, 6
113	Ununtrium	Uut	[284]	5, 6
114	Ununquadium	Uuq	[289]	5, 6
115	Ununpentium	Uup	[288]	5, 6
116	Ununhexium	Uuh	[293]	5, 6
118	Ununoctium	Uuo	[294]	5, 6

#### FOOTNOTES

- <sup>1</sup> Geological specimens are known in which the element has an isotopic composition outside the limits for normal material. The difference between the atomic weight of the element in such specimens and that given in the table may exceed the stated uncertainty.
- <sup>2</sup> Range in isotopic composition of normal terrestrial material prevents a more precise value being given; the tabulated value should be applicable to any normal material.
- <sup>3</sup> Modified isotopic compositions may be found in commercially available material because it has been subject to an undisclosed or inadvertent isotopic fractionation. Substantial deviations in atomic weight of the element from that given in the table can occur.
- <sup>4</sup> Commercially available lithium materials have atomic weights that range between 6.939 and 6.996; if a more accurate value is required, it must be determined for the specific material [range quoted for 1995 Table 6.94 and 6.99].
- <sup>5</sup> Element has no stable nuclides. The value enclosed in brackets, for example, [209], indicates the mass number of the longest-lived isotope of the element. However, three such elements (Th, Pa, and U) do have a characteristic terrestrial isotopic composition, and for these an atomic weight is tabulated.
- <sup>6</sup> The names and symbols for elements 113–118 are under review. The temporary system recommended by J. Chatt [*Pure Appl. Chem.*, *51*, 381–384 (1979)] is used above. The name for Element 112, copernicium, has been finally approved by the International Union of Pure and Applied Chemistry (IUPAC) [K. Tatsumi and J. Corish, *Pure Appl. Chem.*, *82*, 753–755 (2010)] http://www.iupac.org/news/archives/2010/ Element\_112\_Press\_Release.pdf

# **Selected Reference Books for Inorganic Chemistry**

For in-depth coverage of subtopics in the field, one must go to individual monographs and specialty volumes. The following books have been selected as representative, standard treatises on the subject of inorganic chemistry.

- Advanced Inorganic Chemistry (6th Edition), F. Albert Cotton, Carlos A. Murillo, and M. Bachmann, Wiley-Interscience, 1999. [ISBN-13: 978-0471199571]
- Chemistry of the Elements (2nd Edition), A. Earnshaw and N. Greenwood, Butterworth-Heinemann, 1997. [ISBN-13: 978-0750633659]
- Concepts and Models of Inorganic Chemistry (3rd Edition), B. E. Douglas, D. H. McDaniel, and J. J. Alexander, Wiley, 1994. [ISBN-13: 978-0471629788]
- Concise Inorganic Chemistry (5th Edition), J. D. Lee, Wiley-Blackwell, 1999. [ISBN-13: 978-0632052936]
- Descriptive Inorganic Chemistry (5th Edition), G. Rayner-Canham and T. Overton, W. H. Freeman, 2009. [ISBN-13: 978-1429218146]
- Descriptive Inorganic, Coordination, and Solid State Chemistry (2nd Edition), G. E. Rodgers, Brooks Cole, 2002. [ISBN-13: 978-0125920605]

- Inorganic Chemistry (4th Edition), D. Shriver and P. Atkins, Oxford University Press, 2006. [ISBN-13: 978-0716748786]
- Inorganic Chemistry (4th Edition), G. L. Miessler and D. A. Tarry, Prentice Hall, 2010. [ISBN-13: 978-0136128663]
- Inorganic Chemistry, G. Wulfsberg, University Science Books, 2000. [ISBN-13: 978-1891389016]
- Inorganic Chemistry, J. E. House, Academic Press, 2008. [ISBN-13: 978-0123567864]
- *Inorganic Chemistry: Principles of Structure and Reactivity* (4th Edition), J. E. Huheey, E. A. Keiter and R. L. Keiter, Prentice Hall, 1997. [ISBN-13: 978-0060429959]
- Inorganic Structural Chemistry (Inorganic Chemistry: A Textbook Series) (2nd Edition), U. Muller, Wiley, 2006. [ISBN-13: 978-0470018651]
- Introduction to Modern Inorganic Chemistry (6th Edition), R. A. Mackay and W. Henderson, CRC Press, 2002. [ISBN-13: 978-0748764204]

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# **Inorganic Compound Data**

#### 1

**Compound:** Acetylferrocene **Formula:** CH<sub>3</sub>COC<sub>5</sub>H<sub>4</sub>FeC<sub>5</sub>H<sub>5</sub> **Molecular Formula:** C<sub>12</sub>H<sub>12</sub>FeO **Molecular Weight:** 228.074- **CAS RN:** 1271-55-2 **Properties:** orange cryst [STR93] **Melting Point, °C:** 83 [STR93]

#### 2

Compound: Actinium Formula: Ac Molecular Formula: Ac Molecular Weight: 227 CAS RN: 7440-34-8

Properties: silvery white metal; fcc, a=0.5311 nm; t<sub>1/2</sub> of <sup>227</sup>Ac is 21.8 years; a decay product of <sup>235</sup>U; stable, colorless solution for Ac<sup>+++</sup>; ionic radius Ac<sup>+++</sup>, 0.1119 nm; enthalpy of vaporization 293 kJ/mol; chemistry closely follows that of lanthanum; first discovered in 1899 by Diebierne; preparation: by transmutation of radium: <sup>226</sup>Ra+n→<sup>227</sup>Ra+γ<sup>227</sup>Ra→<sup>227</sup>Ac [KIR78] [KAT86] [HAW93]
Density, g/cm<sup>3</sup>: 10.07 (25°C) [KIR91]
Melting Point, °C: 1100 [KIR91]
Boiling Point, °C: ~3300 [MER06]

#### 3

Compound: Actinium bromide Formula: AcBr<sub>3</sub> Molecular Formula: AcBr<sub>3</sub> Molecular Weight: 467 CAS RN: 33689-81-5 Properties: white; hex, a=0.806 nm, c=0.468 nm; preparation: by reacting Ac<sub>2</sub>O<sub>3</sub> with AlBr<sub>3</sub> at 750°C [CIC73] [KAT86] Solubility: s H<sub>2</sub>O [CRC10] Density, g/cm<sup>3</sup>: 5.85 [KAT86] Melting Point, °C: sublimes at 800 [CRC10]

#### 4

Compound: Actinium chloride Formula:  $AcCl_3$ Molecular Formula:  $AcCl_3$ Molecular Weight: 333 CAS RN: 22986-54-5 Properties: white cryst; hex, a=0.762 nm, c=0.455 nm; preparation: by reacting  $Ac(OH)_3$ with  $CCl_4$  at 500°C [KAT86] [KIR78] Density, g/cm<sup>3</sup>: 4.81 [KIR78] Melting Point, °C: sublimes at 900 [CRC10]

#### 5

Compound: Actinium fluoride Formula:  $AcF_3$ Molecular Formula:  $AcF_3$ Molecular Weight: 284 CAS RN: 33689-80-4 Properties: white cryst; hex, a=0.741 nm, c=0.755 nm; preparation: from the reaction  $Ac^{+++}+3F^{-}=AcF_3$  at 25°C [KIR78] [KAT86] Solubility: i H<sub>2</sub>O [CRC10] Density, g/cm<sup>3</sup>: 7.88 [KIR78]

#### 6

Compound: Actinium hydride Formula: AcH<sub>2</sub> Molecular Formula: AcH<sub>2</sub> Molecular Weight: 229 CAS RN: 60936-81-4 Properties: black; cub, fluorite structure, a=0.5670 nm [CIC73] Density, g/cm<sup>3</sup>: 8.35 [CIC73]

#### 7

**Compound:** Actinium hydroxide **Formula:** Ac(OH)<sub>3</sub> **Molecular Formula:** AcH<sub>3</sub>O<sub>3</sub> **Molecular Weight:** 278 CAS RN: 12249-30-8 Properties: white [CRC10] Solubility: i H<sub>2</sub>O [CRC10]

#### 8

Compound: Actinium iodide Formula: AcI<sub>3</sub> Molecular Formula: AcI<sub>3</sub> Molecular Weight: 608 CAS RN: 33689-82-6 Properties: white [CRC10] Solubility: s H<sub>2</sub>O [CRC10] Melting Point, °C: sublimes at 700–800 [CRC10]

#### 9

Compound: Actinium oxalate decahydrate Formula:  $Ac_2(C_2O_4)_3 \cdot 10H_2O$ Molecular Formula:  $C_6H_{20}Ac_2O_{22}$ Molecular Weight: 898 CAS RN: 12002-61-8 Properties: monocl, a = 1.126 nm, b = 0.997 nm, c = 1.065 nm; obtained by adding soluble oxalate to soluble Ac<sup>+++</sup> solution at 25°C [KAT86] Solubility: i H<sub>2</sub>O [CRC10] Density, g/cm<sup>3</sup>: 2.68 [KAT86]

#### 10

Compound: Actinium oxide Formula: Ac<sub>2</sub>O<sub>3</sub> Molecular Formula: Ac<sub>2</sub>O<sub>3</sub> Molecular Weight: 502 CAS RN: 12002-61-8 Properties: white cryst; hex, a=0.407 nm, c=0.629 nm; preparation: from decomposition of actinium oxalate at 1100°C [KIR78] [KAT86] Solubility: i H<sub>2</sub>O [CRC10] Density, g/cm<sup>3</sup>: 9.19 [KIR78]

#### 11

Compound: Actinium oxybromide Formula: AcOBr Molecular Formula: AcBrO Molecular Weight: 323 CAS RN: 49848-33-1 Properties: tetr, a=0.427 nm, c=0.740 nm; preparation: by reacting AcBr<sub>3</sub> with NH<sub>3</sub> and H<sub>2</sub>O at 1000°C [KAT86] Density, g/cm<sup>3</sup>: 7.89 [KAT86]

#### 12

**Compound:** Actinium oxychloride **Formula:** AcOCl

Molecular Formula: AcClO Molecular Weight: 278 CAS RN: 49848-29-5 Properties: white, tetr, a=0.424 nm, c=0.708 nm; preparation: by reacting AcCl<sub>3</sub> with H<sub>2</sub>O at 1000°C [KAT86] [CIC73] Density, g/cm<sup>3</sup>: 7.23 [KAT86]

#### 13

Compound: Actinium oxyfluoride Formula: AcOF Molecular Formula: AcFO Molecular Weight: 262 CAS RN: 49848-24-0 Properties: white; cub, a=0.5931 nm; preparation: by reaction of AcF<sub>3</sub> with NH<sub>3</sub> and H<sub>2</sub>O at 900°C-1000°C [KAT86] Density, g/cm<sup>3</sup>: 8.28 [KAT86]

#### 14

**Compound:** Actinium phosphate hemihydrate **Formula:**  $AcPO_4 \cdot 1/2H_2O$  **Molecular Formula:**  $AcHO_{4.5}P$  **Molecular Weight:** 331 **CAS RN:** 7778-39-4 **Properties:** hex, a = 0.721 nm, c = 0.664 nm; preparation: by precipitation of a soluble  $Ac^{+++}$ salt with a solution of  $PO_4^-$  [KAT86] **Density, g/cm<sup>3</sup>:** 5.48 [KAT86]

#### 15

Compound: Actinium sulfide Formula:  $Ac_2S_3$ Molecular Formula:  $Ac_2S_3$ Molecular Weight: 550 CAS RN: 50647-18-2 Properties: bcc, a=0.897 nm; preparation: by reaction between  $Ac_2O_3$  and  $H_2S$  at 1400°C [KAT86] [CIC73] Density, g/cm<sup>3</sup>: 6.75 [KAT86]

#### 16

Compound: Aluminum Formula: Al Molecular Formula: Al Molecular Weight: 26.981539 CAS RN: 7429-90-5 Properties: silvery white, ductile, metal; fcc, a=0.40496 nm; forms corrosion-resistant oxide film of ~5 nm thickness in moist air; enthalpy of fusion 10.71 kJ/mol; enthalpy of sublimation 314.0 kJ/ mol; enthalpy of vaporization 294 kJ/mol; electrical resistivity 2.6548 μohm · cm; tensile strength 6800 psi; hardness 2.9 Mohs; ionic radius of Al<sup>+++</sup> 0.050 nm; used in mirrors, beverage cans, buildings and construction [CIC73] [KIR78] [HAW93] [CER91] Solubility: i H<sub>2</sub>O, conc HNO<sub>3</sub> [HAW93] Density, g/cm<sup>3</sup>: 2.70 [MER06] Melting Point, °C: 660.37 [ALD94] Boiling Point, °C: 2517.66 [JAN85] Reactions: reacts with dil HCl, H<sub>2</sub>SO<sub>4</sub>, KOH, NaOH to evolve hydrogen [MER06] Thermal Conductivity, W/(m·K): 236 (0°C), 237 (25°C), 240 (100°C) [HO72] Thermal Expansion Coefficient: linear coefficient (30°C–300°C) 24.9 × 10<sup>-6</sup>/°C [CIC73]

17

**Compound:** Aluminum acetate **Synonym:** aluminum triacetate **Formula:** Al(CH<sub>3</sub>COO)<sub>3</sub> **Molecular Formula:** C<sub>6</sub>H<sub>9</sub>AlO<sub>6</sub> **Molecular Weight:** 204.115

CAS RN: 139-12-8

**Properties:** white powd; preparation: by heating aluminum or AlCl<sub>3</sub> with an acetic acid solution containing acetic anhydride; uses: as an antiseptic, an astringent, and in antiperspirant applications; there is a hydroxyaluminum diacetate, CAS RN 142-03-0 [CIC73] [HAW93] [ALD94]

**Solubility:** s H<sub>2</sub>O [HAW93]

Melting Point, °C: decomposes with moisture [CRC10] Reactions: minus acetic anhydride at 120°C–140°C, forming basic acetates [CIC73]

#### 18

**Compound:** Aluminum acetylacetonate Synonyms: 2,4-pentanedione, aluminum(III) derivative Formula: Al[CH<sub>3</sub>COCH=C(O)CH<sub>3</sub>]<sub>3</sub> Molecular Formula: C<sub>15</sub>H<sub>21</sub>AlO<sub>6</sub> Molecular Weight: 324.310 CAS RN: 13963-57-0 **Properties:** white powd or monocl cryst; preparation: by reacting AlCl<sub>3</sub> and acetylacetone; uses: to vapor deposit aluminum and as a catalyst [HAW93] [CIC73] [STR93] Solubility: i H<sub>2</sub>O; s benzene, alcohol [CIC73] [HAW93] Density, g/cm<sup>3</sup>: 1.27 [CRC10] Melting Point, °C: 189 [HAW93] Boiling Point, °C: 315 [HAW93] Reactions: decomposes at 320°C; sublimes at 150°C (1 mm Hg) [STR93]

#### 19

**Compound:** Aluminum ammonium sulfate dodecahydrate **Formula:**  $AlNH_4(SO_4)_2 \cdot 12H_2O$  Molecular Formula: AlH<sub>28</sub>NO<sub>20</sub>S<sub>2</sub> Molecular Weight: 453.329 CAS RN: 7784-26-1 Properties: colorless cryst or powd [CRC10] Solubility: s H<sub>2</sub>O; i EtOH [CRC10] Density: 1.65 [CRC10] Melting Point, °C: 94.5 [CRC10] Boiling Point, °C: decomposes at 280 [CRC10]

#### 20

**Compound:** Aluminum ammonium sulfate **Formula:**  $AlNH_4(SO_4)_2$ **Molecular Formula:**  $AlH_4NO_8S_2$ **Molecular Weight:** 237.146 **CAS RN:** 7784-25-0 **Properties:** white powd [CRC10] **Solubility:** sl s H<sub>2</sub>O; i EtOH [CRC10]

#### 21

Compound: Aluminum antimonide Formula: AlSb Molecular Formula: AlSb Molecular Weight: 148.739 CAS RN: 25152-52-7 **Properties:** electronic dielectric constant 10.2; enthalpy of fusion 58.6 kJ/mol; cryst, lattice constant 0.61361 nm; band gap 1.68 eV at 0K and 1.58 eV at 300 K; mobility (300 K)  $200 \text{ cm}^2/(\text{V} \cdot \text{s})$  electrons,  $420 \text{ cm}^2/(\text{V} \cdot \text{s})$  holes; effective mass 0.12 electrons and 0.98 holes; preparation: by fusion of Al and Sb, followed by purification using zone melting; uses: semiconductor research [CIC73] [MER06] [KIR82] Density, g/cm<sup>3</sup>: 4.15 [CIC73] Melting Point, °C: 1050 [MER06] Thermal Conductivity,  $W/(m \cdot K)$ : 60 (25°C) [CRC10] **Thermal Expansion Coefficient:** 4.2×10<sup>-6</sup>/K [CRC10]

#### 22

Compound: Aluminum arsenide Formula: AlAs Molecular Formula: AlAs Molecular Weight: 101.903 CAS RN: 22831-42-1 Properties: -20 mesh powd with 99.5% purity; semiconductor; band gap, 2.13 eV (22°C); electronic dielectric constant, 10.3; lattice constant a=0.5662 nm; enthalpy of fusion 24.5 kJ/mol; uses: in rectifiers, transistors, and thermistors [CIC73] [ALF93] [HAW93] Density, g/cm<sup>3</sup>: 3.81 [CIC73]

Melting Point, °C: 1740 [CIC73]

#### 23

Compound: Aluminum borate

Synonyms: eremeyevite, jeremejevite Formula:  $2Al_2O_3 \cdot B_2O_3$ Molecular Formula:  $Al_4B_2O_9$ Molecular Weight: 273.543

CAS RN: 11121-16-7

**Properties:** white, granular powd or cryst needles; prepared by heating Al<sub>2</sub>O<sub>3</sub> with B<sub>2</sub>O<sub>3</sub>; used in glass and ceramics [HAW93] [MER06]

Solubility: i H<sub>2</sub>O with decomposition

[HAW93] [MER06]

Melting Point, °C: ~1050 [MER06] [CIC73]

**Reactions:** forms  $2Al_2O_3 \cdot B_2O_3$  at 1000°C, and  $9Al_2O_3 \cdot 2B_2O_3$  at 1100° [MER06]

#### 24

**Compound:** Aluminum borohydride **Synonym:** aluminum tetrahydroborate **Formula:** Al(BH<sub>4</sub>)<sub>3</sub> **Molecular Formula:** AlB<sub>3</sub>H<sub>12</sub> **Molecular Weight:** 71.510 **CAS RN:** 16962-07-5

Properties: volatile; liq; enthalpy of vaporization 30 kJ/mol; ignites spontaneously in air; can be formed by reacting sodium borohydride and aluminum chloride in the presence of small quantity of tributyl phosphate; used as a reducing agent and as a fuel for jet engines and rockets [HAW93] [MER06] [CRC10]Solubility: reacts vigorously with H<sub>2</sub>O

and HCl evolving H<sub>2</sub> [MER06] Melting Point, °C: -64.5 [MER06] Boiling Point, °C: 44.5 [MER06]

#### 25

Compound: Aluminum bromate nonahydrate
Formula: Al(BrO<sub>3</sub>)<sub>3</sub>·9H<sub>2</sub>O
Molecular Formula: AlBr<sub>3</sub>H<sub>18</sub>O<sub>18</sub>
Molecular Weight: 572.826
CAS RN: 11126-81-1
Properties: white cryst; hygr; can be obtained from mixing aq solutions of Al<sub>2</sub>(SO<sub>4</sub>)<sub>3</sub> and Ba(BrO<sub>3</sub>)<sub>2</sub>, followed by crystallization [CIC73] [CRC10]
Solubility: s H<sub>2</sub>O; sl s acids [CRC10]
Melting Point, °C: 62 [CIC73]
Boiling Point, °C: decomposes at >100 [CIC73]

#### 26

**Compound:** Aluminum bromide **Formula:** AlBr<sub>3</sub> **Molecular Formula:** AlBr<sub>3</sub>

# Molecular Weight: 266.694

CAS RN: 7727-15-3

Properties: white to yellow-red; trig cryst or powd; very hygr; fumes strongly in air; enthalpy of sublimation 35.9 kJ/mol; enthalpy of fusion 11.25 kJ/mol; enthalpy of vaporization 23.5 kJ/mol; can be prepared by heating Al and Br<sub>2</sub>; used as an acid catalyst for organic syntheses, similar to AlCl<sub>3</sub>, but is more reactive and more soluble in organic solvents [CIC73] [MER06] [KIR78] [CRC10]
Solubility: reacts with H<sub>2</sub>O violently [KIR78]
Density, g/cm<sup>3</sup>: 3.01 [KIR78]; 2.64, 100°C (liq) [STR93]
Melting Point, °C: 97.45 [KIR78]
Boiling Point, °C: sublimes at 256 [CIC73]

#### 27

Compound: Aluminum bromide hexahydrate Formula:  $A1Br_3 \cdot 6H_2O$ Molecular Formula:  $A1Br_3H_{12}O_6$ Molecular Weight: 374.785 CAS RN: 7784-11-4 Properties: colorless to sl yellow; deliq; may be prepared by dissolution of Al or aluminum hydroxide in HBr, followed by precipitation; used as an acid catalyst [MER06] [K1R78] Solubility: s H<sub>2</sub>O, alcohol [MER06] Density, g/cm<sup>3</sup>: 2.54 [HAW93] Melting Point, °C: 93 [MER06] Boiling Point, °C: decomposes at 135 [CRC10]

#### 28

Compound: Aluminum carbide
Formula: Al<sub>4</sub>C<sub>3</sub>
Molecular Formula: C<sub>3</sub>Al<sub>4</sub>
Molecular Weight: 143.959
CAS RN: 1299-86-1
Properties: yellow hex cryst or olive green powd; can be prepared by reacting stoichiometric amounts of Al and C in the absence of both oxygen and nitrogen at ~1000°C; used to generate methane and to manufacture AlN [MER06] [ALF93] [CIC73]
Solubility: decomposes with the evolution of CH<sub>4</sub> in H<sub>2</sub>O [MER06]
Density, g/cm<sup>3</sup>: 2.36 [MER06]
Melting Point, °C: 2100 [MER06]
Boiling Point, °C: decomposes at >2200 [MER06]

#### 29

**Compound:** Aluminum chlorate **Formula:** Al(ClO<sub>3</sub>)<sub>3</sub> **Molecular Formula:** AlCl<sub>3</sub>O<sub>9</sub> **Molecular Weight:** 277.332

#### CAS RN: 15477-33-5

Properties: colorless cryst; deliq; occurs as hexahydrate and nonahydrate; evaporation of an aq solution yields the nonahydrate; used as a disinfectant and to prevent yellowing of acrylic fibers [CIC73] [MER06] [HAW93]
Solubility: s H<sub>2</sub>O, alcohol [HAW93]
Melting Point, °C: decomposes [CRC10]

#### 30

Compound: Aluminum chlorate nonahydrate Synonym: mallebrin Formula: Al(ClO<sub>3</sub>)<sub>3</sub>·9H<sub>2</sub>O Molecular Formula: AlCl<sub>3</sub>H<sub>18</sub>O<sub>18</sub> Molecular Weight: 439.472 CAS RN: 15477-33-5 Properties: deliq cryst; obtained by mixing Ba(ClO<sub>4</sub>)<sub>2</sub> and Al<sub>2</sub>(SO<sub>4</sub>)<sub>3</sub> solution, followed by evaporation [CIC73] [MER06] Solubility: s H<sub>2</sub>O, alcohol [MER06]

#### 31

Compound: Aluminum chloride Formula: AlCl<sub>3</sub> Molecular Formula: AlCl<sub>3</sub> Molecular Weight: 133.340 CAS RN: 7446-70-0 Properties: white or light yellow; cryst or powd; hygr; hex; odor of HCl; exists as dimer at <327°C; triple point 192.5°C (233 kPa); enthalpy of sublimation of dimer  $Al_2Cl_6$  (25°C) 115.73 kJ/mol; enthalpy of solution at 20°C is -325.1 kJ/mol; enthalpy of fusion 35.40 kJ/ mol; can be made by reacting HCl and Al at ~150°C; used as an acid catalyst, in cracking petroleum, and in the manufacture of rubbers and lubricants [CIC73] [KIR78] [ALF93] **Solubility:** dissolves violently in H<sub>2</sub>O evolving HCl [MER06]; g/100 g soln  $H_2O: 30.84 \pm$ 0.25 (0°C), 31.10 (25°C), 33.23 (98°C), equilibrium solid phase, AlCl<sub>3</sub> · 6H<sub>2</sub>O [KRU93]; s HCl, ether, ethanol [KIR78] Density, g/cm<sup>3</sup>: 2.44 [KIR78] Boiling Point, °C: sublimes at 181.2 [KIR78] **Reactions:** Al<sub>2</sub>Cl<sub>6</sub> (dimer)  $\rightarrow$  2AlCl<sub>3</sub> >327°C [KIR78]

#### 32

**Compound:** Aluminum chloride hexahydrate **Formula:** AlCl<sub>3</sub>·6H<sub>2</sub>O **Molecular Formula:** AlCl<sub>3</sub>H<sub>12</sub>O<sub>6</sub> **Molecular Weight:** 241.431 **CAS RN:** 7784-13-6 Properties: cryst powd; white or yellow; deliq; preparation: by dissolution of Al(OH)<sub>3</sub> in conc HCl, followed by cooling to 0°C and addition of gaseous HCl; uses: to preserve wood, disinfect stables, and in deodorants and antiperspirants [MER06] [HAW93] [KIR78]
Solubility: 1 g/0.9 mL H<sub>2</sub>O; s alcohol [MER06]; gAl<sub>2</sub>O<sub>3</sub>/100 mL at 35°C in each of the following solvents: 15.91 H<sub>2</sub>O, 9.43 methanol, 4.77 ethanol, 6.04 ethylene glycol [OKA91]
Density, g/cm<sup>3</sup>: 2.398 [STR93]
Melting Point, °C: decomposes at 100 [ALF93]

#### 33

Compound: Aluminum chromate Synonym: aluminum oxide-chromium oxide Formula:  $Al_2O_3 \cdot Cr_2O_3$ Molecular Formula:  $Al_2Cr_2O_6$ Molecular Weight: 253.952 CAS RN: 57921-51-4 Properties: yellow amorphous solid; fused 98 wt%  $Al_2O_3$ , 2 wt%  $Cr_2O_3$ ; -200, +325 mesh and -325 mesh, +10 µm of 99% purity; used in ceramics [KIR78] [CER91]

#### 34

Compound: Aluminum citrate Formula: AlC<sub>6</sub>H<sub>5</sub>O<sub>7</sub> Molecular Formula: C<sub>6</sub>H<sub>5</sub>AlO<sub>7</sub> Molecular Weight: 216.084 CAS RN: 31142-56-0 Properties: white powd or scales; study of complex formation in [LOP84] [MER06] Solubility: dissolves slowly in cold H<sub>2</sub>O, s hot H<sub>2</sub>O, ammonia [MER06]

#### 35

Compound: Aluminum diacetate Synonym: aluminum subacetate Formula:  $Al(CH_3COO)_2(OH)$ Molecular Formula:  $C_4H_7AlO_5$ Molecular Weight: 162.079 CAS RN: 142-03-0 Properties: white, amorphous powd or curdy precipitate; can be produced by reacting sodium aluminate solution with acetic acid; used as a mordant in dyeing, to manufacture color lakes, to waterproof and fireproof fabrics, in antiperspirant formulations, and as a disinfectant by embalmers [MER06] [CIC73]

**Solubility:** i H<sub>2</sub>O when dried at 100°C [MER06]

**Compound:** Aluminum diboride **Formula:** AlB<sub>2</sub> **Molecular Formula:** AlB<sub>2</sub> **Molecular Weight:** 48.604

CAS RN: 12041-50-8

Properties: powd; made by reaction of the elements above 600°C; high neutron absorption; used as a nuclear shielding material [HAW93] [CIC73]
Solubility: s dil HCl [CIC73]
Density, g/cm<sup>3</sup>: 3.19 [ALF93]
Melting Point, °C: decomposes to

AlB<sub>12</sub> at >920 [CIC73]

#### 37

Compound: Aluminum distearate
Formula: Al(OH)[CH<sub>3</sub>(CH<sub>2</sub>)<sub>16</sub>COO]<sub>2</sub>
Molecular Formula: C<sub>36</sub>H<sub>71</sub>AlO<sub>5</sub>
Molecular Weight: 610.939
CAS RN: 637-12-7
Properties: white powd; preparation in [KIR78]; used as a thickener for paints, inks, and greases, and as a water repellent and lubricant [HAW93]
Solubility: i H<sub>2</sub>O, alcohol, ether; forms gel with aliphatic and aromatic hydrocarbons [HAW93]
Density, g/cm<sup>3</sup>: 1.009 [HAW93]

Melting Point, °C: 145 [HAW93]

#### 38

Compound: Aluminum dodecaboride Formula: AlB<sub>12</sub> Molecular Formula: AlB<sub>12</sub> Molecular Weight: 156.714 CAS RN: 12041-54-2 Properties: 3–8 μm powd; high neutron absorption [ALF93] [HAW93] Solubility: s hot HNO<sub>3</sub>; i acid, alkalies [CRC10] [CIC73] Density, g/cm<sup>3</sup>: 2.55 [CRC10] Melting Point, °C: decomposes to boron and carbon at 1900 [CIC73]

#### 39

**Compound:** Aluminum ethoxide **Synonym:** aluminum ethylate **Formula:** Al(C<sub>2</sub>H<sub>5</sub>O)<sub>3</sub> **Molecular Formula:** C<sub>6</sub>H<sub>15</sub>AlO<sub>3</sub> **Molecular Weight:** 162.165 **CAS RN:** 555-75-9 Properties: liq that slowly solidifies to a white powd; sensitive to moisture; prepared from a reaction of Al with ethanol in the presence of catalytic amounts of I<sub>2</sub> and HgCl<sub>2</sub>; used as a polymerization catalyst and to reduce aldehydes and ketones [MER06] [STR93] [HAW93]
Solubility: sl s in high boiling organic solvents [HAW93]
Density, g/cm<sup>3</sup>: 1.142 (20°C) [CRC10]
Melting Point, °C: 130 [STR93]
Boiling Point, °C: 210 (10 mm Hg) [STR93]

#### 40

Compound: Aluminum fluoride Synonym: aluminum trifluoride Formula: AlF<sub>3</sub> Molecular Formula: AlF<sub>3</sub> Molecular Weight: 83.977 CAS RN: 7784-18-1 **Properties:** hex white powd or 99.5% pure highly dense 3-6 mm sintered pieces; enthalpy of fusion 98.0 kJ/mol; dielectric constant 6; formed by heating  $(NH_4)_3AlF_6$  in nitrogen; used in electrolyte for production of Al, in ceramics as a flux in metallurgy and to inhibit fermentation, and as an evaporation material and sputtering target for preparation of low index films [CIC73] [KIR78] [STR93] [MER06] [CER91] [CRC10] **Solubility:** g/100 g soln H<sub>2</sub>O: 0.25 (0°C), 0.50 (25°C), 1.64 (100°C), equilibrium solid phase AlF<sub>3</sub>·3H<sub>2</sub>O [KRU93] Density, g/cm<sup>3</sup>: 3.10 [KIR78] Melting Point, °C: 1290 [COT88] **Reactions:** transition from  $\alpha$  to  $\beta$  at 455°C; dissociates at 776°C [ROB78]

#### 41

**Compound:** Aluminum fluoride monohydrate **Synonym:** fluellite **Formula:**  $AlF_3 \cdot H_2O$  **Molecular Formula:**  $AlF_3H_2O$  **Molecular Weight:** 101.992 **CAS RN:** 32287-65-3 **Properties:** ortho-rhomb [MER06] **Solubility:** sl s  $H_2O$  [CRC10] **Density, g/cm<sup>3</sup>:** 2.17 [MER06]

#### 42

**Compound:** Aluminum fluoride trihydrate Formula:  $AlF_3 \cdot 3H_2O$ Molecular Formula:  $AlF_3H_6O_3$ Molecular Weight: 138.023 CAS RN: 15098-87-0 Properties: white hygr; cryst powd [HAW93] [STR93] Solubility: sl s H<sub>2</sub>O [HAW93] Density, g/cm<sup>3</sup>: 1.914 [STR93] Reactions: minus H<sub>2</sub>O at both 100°C and 200°C [MER06]

#### 43

Compound: Aluminum hexafluorosilicate nonahydrate Synonym: aluminum silicofluoride Formula:  $Al_2(SiF_6)_3 \cdot 9H_2O$ Molecular Formula:  $Al_2F_{18}H_{18}O_9Si_3$ Molecular Weight: 642.329 CAS RN: 17099-70-6 Properties: hex prisms; occurs naturally as topaz; used to protect and preserve construction materials and in the manufacture of glass [MER06] [HAW93] Solubility: s H<sub>2</sub>O, decomposes in hot H<sub>2</sub>O [MER06] Melting Point, °C: decomposes at ~1000 [MER06] Reactions: minus H<sub>2</sub>O at <500°C [MER06]

#### 44

Compound: Aluminum hydride
Formula: AlH<sub>3</sub>
Molecular Formula: AlH<sub>3</sub>
Molecular Weight: 30.005
CAS RN: 7784-21-6
Properties: colorless, nonvolatile solid; can be obtained by reacting an ether solution of AlCl<sub>3</sub> with LiH; used as a catalyst for organic polymerization processes [MER06]
Solubility: evolves H<sub>2</sub> in H<sub>2</sub>O [HAW93]
Melting Point, °C: decomposes at 160 [HAW93]

#### 45

Compound: Aluminum hydroxide Formula: Al(OH)<sub>3</sub> Molecular Formula: AlH<sub>3</sub>O<sub>3</sub> Molecular Weight: 78.004 CAS RN: 21645-51-2 Properties: white, bulky, amorphous powd; forms gels if in prolonged contact with H<sub>2</sub>O; absorbs CO<sub>2</sub>; many uses such as an absorbent and emulsifier, in ion-exchange chromatography, as a mordant in dyeing [MER06] [ALF93] Solubility: i H<sub>2</sub>O; s acids, alkalies [MER06] Density, g/cm<sup>3</sup>: 2.42 [HAW93] Pagations: minus H O at 300°C [CPC10]: forms

**Reactions:** minus H<sub>2</sub>O at 300°C [CRC10]; forms gel on contact with H<sub>2</sub>O [MER06]

#### 46

Compound: Aluminum hydroxide( $\beta'$ ) Synonym: nordstrandite Formula:  $\beta'$ -Al(OH)<sub>3</sub> Molecular Formula: AlH<sub>3</sub>O<sub>3</sub> Molecular Weight: 78.004 CAS RN: 12752-71-0 Properties: tric, a=0.875 nm, b=0.507 nm, c=1.024 nm [KIR78]

#### 47

Compound: Aluminum hydroxide( $\alpha$ ) Synonym: gibbsite Formula:  $\alpha$ -Al(OH)<sub>3</sub> Molecular Formula: AlH<sub>3</sub>O<sub>3</sub> Molecular Weight: 78.004 CAS RN: 14762-49-3 Properties: white, pearly vitreous; hardness 2.5–3.5 Mohs; monocl: a=0.868 nm, b=0.507 nm, c=0.972 nm; tricl: a=1.733 nm, b=1.008 nm, c=0.973 nm [KIR78] Density, g/cm<sup>3</sup>: monocl: 2.441; tricl: 2.42 [KIR78] [ROB78] Reactions: transition to boehmite at 103°C [ROB78]

#### 48

Compound: Aluminum hydroxide( $\beta$ ) Synonym: bayerite Formula:  $\beta$ -Al(OH)<sub>3</sub> Molecular Formula: AlH<sub>3</sub>O<sub>3</sub> Molecular Weight: 78.004 CAS RN: 20257-20-9 Properties: monocl, a=0.506 nm, b=0.867 nm, c=0.471 nm; used to make  $\eta$ -alumina catalyst [KIR78] Density, g/cm<sup>3</sup>: 2.53 [KIR78]

#### 49

Compound: Aluminum hydroxychloride Synonym: aluminum chlorohydroxide Formula:  $Al_2(OH)_5Cl \cdot 2H_2O$ Molecular Formula:  $Al_2ClH_9O_7$ Molecular Weight: 210.483 CAS RN: 1327-41-9 Properties: glassy solid; prepared by electrolysis of Al solutions; used as an antiperspirant and in medicine [MER06] Solubility: s H<sub>2</sub>O, forms sl turbid colloidal solution [MER06]

#### 50

**Compound:** Aluminum hydroxystearate **Formula:** Al(OH)[OOC(CH<sub>2</sub>)<sub>10</sub>CH<sub>2</sub>O(CH<sub>2</sub>)<sub>5</sub>CH<sub>3</sub>]<sub>2</sub> **Molecular Formula:**  $C_{36}H_{71}AlO_7$ **Molecular Weight:** 642.938 **CAS RN:** 637-12-7

Properties: white powd; preparation in [KIR78]; used to weatherproof leather and cement, to lubricate plastics and rope, and in paints and inks [HAW93]
Density, g/cm<sup>3</sup>: 1.045 [HAW93]
Melting Point, °C: 155 [HAW93]

#### 51

Compound: Aluminum hypophosphite Formula:  $Al(H_2PO_2)_3$ Molecular Formula:  $AlH_6O_6P_3$ Molecular Weight: 221.948 CAS RN: 7784-22-7 Properties: cryst powd; can be made by precipitation with slow heating from a solution of an aluminum salt with 50% hypophosphorus acid at 80°C–90°C; used in finishes for acrylonitrile polymer fibers [MER06] [CIC73] Solubility: i H<sub>2</sub>O; s warm NaOH; decomposes in H<sub>2</sub>SO<sub>4</sub> and HC1 [MER06] Reactions: decomposes at ~220°C

evolving phosphine [MER06]

#### 52

**Compound:** Aluminum iodide **Formula:** AlI<sub>3</sub> **Molecular Formula:** AlI<sub>3</sub> **Molecular Weight:** 407.695 **CAS RN:** 7784-23-8

Properties: solid; white leaflets, if pure; yellowish to brownish black lumps; fumes in moist air; strong exothermic reaction with H<sub>2</sub>O; enthalpy of sublimation 112.1 kJ/mol; enthalpy of fusion 15.90 kJ/mol; enthalpy of vaporization 32.2 kJ/mol; can be prepared by heating Al and I<sub>2</sub> in a sealed tube; used as a catalyst for organic reactions [CIC73] [MER06] [HAW93] [CRC10]
Solubility: reacts violently with H<sub>2</sub>O [KIR78]
Density, g/cm<sup>3</sup>: 3.98 [KIR78]
Melting Point, °C: 191 [KIR78]
Boiling Point, °C: sublimes at 381–382 [CIC73]

#### 53

**Compound:** Aluminum iodide hexahydrate **Formula:**  $AlI_3 \cdot 6H_2O$  Molecular Formula: AlH<sub>12</sub>I<sub>3</sub>O<sub>6</sub>
Molecular Weight: 515.786
CAS RN: 10090-53-6
Properties: yellowish cryst powd; deliq; can be obtained from a reaction between Al or Al(OH)<sub>3</sub> and HI; there is a AlI<sub>3</sub> · 15H<sub>2</sub>O [MER06] [KIR78]
Solubility: s H<sub>2</sub>O, alcohol, ether [MER06]
Density, g/cm<sup>3</sup>: 2.63 [CRC10]
Melting Point, °C: decomposes at 185 [CRC10]

#### 54

Compound: Aluminum isopropoxide Synonym: aluminum isopropylate Formula: Al[OCH(CH<sub>3</sub>)<sub>2</sub>]<sub>3</sub> Molecular Formula: C<sub>9</sub>H<sub>21</sub>AlO<sub>3</sub> Molecular Weight: 204.245 CAS RN: 555-31-7 Properties: hygr white solid; prepared from a reaction between aluminum and isopropyl alcohol with HgCl<sub>2</sub> catalyst; used to prepare aluminum soaps, as a waterproofing finish for textiles, and to synthesize aluminum titanate [MER06] [YAM89] Solubility: decomposed by H<sub>2</sub>O; s ethanol, isopropanol, benzene, toluene, chloroform, carbon tetrachloride [MER06] Density, g/cm<sup>3</sup>: 1.0346 (20°C) [CRC10] Melting Point, °C: 119 [MER06] Boiling Point, °C: 141 [CRC10]

#### 55

Compound: Aluminum lactate Synonym: aluctyl Formula: Al(C<sub>3</sub>H<sub>5</sub>O<sub>3</sub>)<sub>3</sub> Molecular Formula: C<sub>9</sub>H<sub>15</sub>AlO<sub>9</sub> Molecular Weight: 294.194 CAS RN: 18917-91-4 Properties: powd; preparation: lactic acid and AlCl<sub>3</sub>; used in foam fire extinguishers and in dental impression materials [MER06] [ALF95] Solubility: v s H<sub>2</sub>O [MER06]

#### 56

Compound: Aluminum metaphosphate
Formula: Al(PO<sub>3</sub>)<sub>3</sub>
Molecular Formula: AlO<sub>9</sub>P<sub>3</sub>
Molecular Weight: 263.898
CAS RN: 32823-06-6
Properties: colorless powd; tetr; used as a component of glazes, enamels, and glasses, and in high-temp insulating cement [CRC10] [HAW93]

Solubility: i H<sub>2</sub>O [HAW93]

**Density, g/cm<sup>3</sup>:** 2.780 [ALD94] **Melting Point, °C:** ~1527 [HAW93]

#### 57

**Compound:** Aluminum molybdate **Formula:** Al<sub>2</sub>(MoO<sub>4</sub>)<sub>3</sub> **Molecular Formula:** Al<sub>2</sub>Mo<sub>3</sub>O<sub>12</sub> **Molecular Weight:** 533.776 **CAS RN:** 15123-80-5 **Properties:** -325 mesh powd with 99% purity [ALF93]

#### 58

Compound: Aluminum monopalmitate
Formula: Al(OH)<sub>2</sub>C<sub>16</sub>H<sub>31</sub>O<sub>2</sub>
Molecular Formula: C<sub>16</sub>H<sub>33</sub>AlO<sub>4</sub>
Molecular Weight: 316.418
CAS RN: 555-35-1
Properties: white powd; made by heating aluminum hydroxide with palmitic acid and H<sub>2</sub>O, followed by filtration and drying; used to waterproof leather, paper, and textiles, and to thicken lubricating oils, also used in varnishes and as a food additive [HAW93]
Solubility: i H<sub>2</sub>O, alcohol; gels in hydrocarbons [HAW93]
Density, g/cm<sup>3</sup>: 1.072 [HAW93]
Melting Point, °C: 200 [HAW93]

#### 59

**Compound:** Aluminum monostearate **Formula:** Al(OH)<sub>2</sub>[CH<sub>3</sub>(CH<sub>2</sub>)<sub>16</sub>COO] **Molecular Formula:** C<sub>18</sub>H<sub>37</sub>AlO<sub>4</sub> **Molecular Weight:** 344.472 **CAS RN:** 7047-84-9

**Properties:** faint odor; white to yellowish white powd; prepared by mixing solutions of sodium stearate and a soluble aluminum salt; used in paints, inks, greases, waxes, to thicken lubricating oils, for waterproofing [HAW93]

Solubility: i H<sub>2</sub>O; forms gel with aliphatic and aromatic hydrocarbons [HAW93]
Density, g/cm<sup>3</sup>: 1.020 [HAW93]
Melting Point, °C: 155 [PFA93]

#### 60

**Compound:** Aluminum nitrate nonahydrate **Formula:**  $Al(NO_3)_3 \cdot 9H_2O$ **Molecular Formula:**  $AlH_{18}N_3O_{18}$ **Molecular Weight:** 375.134 **CAS RN:** 7784-27-2 Properties: white, hygr cryst; monocl, a = 1.086 nm, b=0.959 nm, c = 1.383 nm; prepared by adding lead nitrate solution to aluminum sulfate solution; used in leather tanning, as a corrosion inhibitor and as an antiperspirant [MER06] [CIC73] [STR93]
Solubility: 67.3 g/100 mL H<sub>2</sub>O (25°C) [CIC73]; gAl<sub>2</sub>O<sub>3</sub>/100 mL, 35°C, in the following solvents: methanol 14.45, ethanol 8.63, ethylene glycol 18.32 [OKA91]
Density, g/cm<sup>3</sup>: 1.72 [CIC73]
Melting Point, °C: 73 [MER06]

- Boiling Point, °C: decomposes at 135 [MER06]
- **Reactions:** decomposes to oxides of Al and N<sub>2</sub> at 500°C [KIR78]

#### 61

Compound: Aluminum nitride Formula: AlN Molecular Formula: AlN Molecular Weight: 40.989 CAS RN: 24304-00-5 Properties: powd or bluish white cryst; hex or orthorhomb; hex, a=0.311 nm, c=0.4975 nm; has odor of NH<sub>3</sub> in moist air; hardness 9–10 Mohs; band gap 4.26 eV; manufactured by heating bauxite in flowing nitrogen at 1500°C for 8h; semiconductor material, used in steel manufacturing, as a crucible to grow cryst of gallium arsenide, and as a 99.8% sputtering target to prepare diodes and integrated circuits [MER06] [CIC73] [ALF93] [MIT87] [CER91] **Solubility:** decomposes in  $H_2O$  to  $Al(OH)_3 + NH_3$ ; decomposes in acids and alkalies [MER06] [CRC10]

- **Density, g/cm<sup>3</sup>:** 3.05 [MER06]
- Melting Point, °C: 2150–2200 [MER06]
- **Reactions:** sublimes at 2000°C; decomposes to Al gas and  $N_2$  from 1340°C to 1654°C [CRC10] [JAN85]
- Thermal Conductivity, W/(m·K): 30 [KIR81]
- **Thermal Expansion Coefficient:** coefficient is 4.03×10<sup>-6</sup>/°C [KIR81]

#### 62

Compound: Aluminum oleate

Synonyms: 9-octadecanoic acid, aluminum(III) salt

Formula: Al[CH<sub>3</sub>(CH<sub>2</sub>)<sub>7</sub>CH=CH(CH<sub>2</sub>)<sub>7</sub>COO]<sub>3</sub>

**Molecular Formula:** C<sub>54</sub>H<sub>99</sub>AlO<sub>6</sub>

Molecular Weight: 871.358

- CAS RN: 688-37-9
- **Properties:** yellowish mass; formed from freshly precipitated aluminum hydroxide and oleic acid; used as a lacquer for metals in oil or turpentine solutions and as drier and waterproofing agent for paints [MER06]

Solubility: i H<sub>2</sub>O; s alcohol, benzene, ethanol, oil, turpentine [MER06]
Density, g/cm<sup>3</sup>: 1.01 [KIR78]
Melting Point, °C: 120 [KIR78]

#### 63

Compound: Aluminum oxalate monohydrate Formula: Al<sub>2</sub>(C<sub>2</sub>O<sub>4</sub>)<sub>3</sub>·H<sub>2</sub>O Molecular Formula: C<sub>6</sub>H<sub>2</sub>Al<sub>2</sub>O<sub>13</sub> Molecular Weight: 336.037 CAS RN: 814-87-9 Properties: white powd; used as a mordant to print textiles and to dye cotton [MER06]

**Solubility:** i H<sub>2</sub>O, alcohol; s acids [MER06]

#### 64

Compound: Aluminum oxide Synonyms: native aluminum oxide, bauxite Formula: Al<sub>2</sub>O<sub>3</sub> Molecular Formula: Al<sub>2</sub>O<sub>3</sub> Molecular Weight: 101.961 CAS RN: 1344-28-1 **Properties:** white powd; hex; hardness 8.8 Mohs; electrical resistivity at  $300^{\circ}$ C ~  $1.2 \times 10^{+13}$ ohm  $\cdot$  cm; used as an adsorbent (see corundum); evaporated material of 99.99% purity is used as a high temp dielectric to protect aluminum mirrors and as a support for specimens in electron diffraction [MER06] [CER91] **Solubility:** i H<sub>2</sub>O; sl s alkalies [MER06] Density, g/cm<sup>3</sup>: 3.965 [ALF93] Melting Point, °C: 2045 [ALF93] Boiling Point, °C: 2980 [ALF93] Thermal Conductivity, W/(m·K): 28.9 (100°C),

21.2 (200°C), 12.5 (400°C), 8.70 (600°C), 6.86 (800°C), 5.86 (1000°C), 5.27 (1200°C) [HO72]

#### 65

Compound: Aluminum oxide( $\alpha$ ) Synonym: corundum Formula:  $\alpha$ -Al<sub>2</sub>O<sub>3</sub> Molecular Formula: Al<sub>2</sub>O<sub>3</sub> Molecular Weight: 101.961 CAS RN: 1302-74-5 Properties: naturally occurring; white rhomb cryst, a=0.47591 nm, c=1.2894 nm; impedance 384-410 MPa  $\cdot$  s/m; hardness 9 Mohs; enthalpy of fusion 111.1 kJ/mol; used as an abrasive powd, in grinding wheels, and in crucible form to melt metals; some precious stones are forms of

corundum, which contain traces of other metals including ruby (chromium) and sapphire (cobalt) [JAN85] [ROB67] [VIE91] [KIR78] [CER91] Solubility: i H<sub>2</sub>O; v sl s acids, alkalies [HAW93] Density, g/cm<sup>3</sup>: 3.987 [ROB78] Melting Point, °C: 2054 [CRC10] Boiling Point, °C: 2980 [CRC10] Thermal Expansion Coefficient: ⊥ *c*-axis: 100°C (0.044), 200°C (0.112), 400°C (0.278), 600°C (0.455), 800°C (0.632), 1000°C (0.815), 1200°C (0.998) [CLA66]

#### 66

Compound: Aluminum oxide( $\gamma$ ) Formula:  $\gamma$ -A1<sub>2</sub>O<sub>3</sub> Molecular Formula: A1<sub>2</sub>O<sub>3</sub> Molecular Weight: 101.961 CAS RN: 1344-28-1 Properties: -60 mesh with 96% purity; white powd; a=0.562 nm, b=0.780 nm; enthalpy of fusion 78.49 kJ/mol [JAN85] [STR93] [BHA78] [KIR78] [ALF93] Solubility: i H<sub>2</sub>O; sl s acids, alkalies [CRC10] Density, g/cm<sup>3</sup>: 3.97 [STR93] Melting Point, °C: 2018 [ROB78] Boiling Point, °C: 2980 [STR93]

#### 67

Compound: Aluminum oxide( $\delta$ ) Formula:  $\delta$ -Al<sub>2</sub>O<sub>3</sub> Molecular Formula: Al<sub>2</sub>O<sub>3</sub> Molecular Weight: 101.961 CAS RN: 1344-28-1 Properties: ortho-rhomb: a=0.425 nm, b=1.275 nm, c=1.021 nm; tetr: a=0.796 nm, c=2.34 nm; enthalpy of fusion 93.3 kJ/mol [JAN85] [KIR78] Density, g/cm<sup>3</sup>: 3.2 [KIR78] Melting Point, °C: 2035 [JAN85] Reactions: transition from  $\delta$  to  $\alpha$  in two steps: from 800°C to 1100°C and at 1200°C [JAN85]

#### 68

Compound: Aluminum oxide( $\kappa$ ) Formula:  $\kappa$ -Al<sub>2</sub>O<sub>3</sub> Molecular Formula: Al<sub>2</sub>O<sub>3</sub> Molecular Weight: 101.961 CAS RN: 1344-28-1 Properties: hex, a = 0.971 nm, c = 1.786 nm; enthalpy of fusion 91.2 kJ/mol [JAN85] [KIR78] Density, g/cm<sup>3</sup>: 3.1–3.3 [KIR78] Melting Point, °C: 2040 (fusion) [JAN85] Reactions: transition from  $\kappa$  to  $\alpha$  ~1200°C [JAN85]

#### 69

**Compound:** Aluminum oxyhydroxide(α) **Synonym:** boehmite

**Formula:** α-AlO(OH) **Molecular Formula:** AlHO<sub>2</sub>

Molecular Weight: 59.989

CAS RN: 1318-23-6

**Properties:** white; ortho-rhomb; a=0.286 nm,

b=1.2227 nm, c=0.380 nm; hardness is 3.5–4 Mohs; obtained by hydrothermal reaction of hydroxide slurries at 200°C–250°C [KIR78] [ROB67]; solubility data are in [BOU93] and [PHI93]
Solubility: i H<sub>2</sub>O; s hot acids, hot alkalies [CRC10]

Density, g/cm<sup>3</sup>: 3.07 [ROB78]

**Reactions:** transforms to diaspore at 227°C, dehydrates to corundum at 400°C [LAU73]

#### 70

Compound: Aluminum oxyhydroxide(β) Synonym: diaspore Formula: β-AlO(OH) Molecular Formula: AlHO<sub>2</sub> Molecular Weight: 59.989 CAS RN: 14457-84-2 Properties: ortho-rhomb; a=0.439 nm, b=0.942 nm, c=0.284 nm; hardness is 6.5–7 Mohs; stable from 275°C–425°C [KIR78] Solubility: i H<sub>2</sub>O; s hot acids, hot alkalies [CRC10] Density, g/cm<sup>3</sup>: 3.44 [KIR78] Reactions: dehydrates to corundum at 400°C [LAU73]

71

Compound: Aluminum palmitate
Synonyms: hexadecanoic acid, aluminum(III) salt
Formula: Al[CH<sub>3</sub>(CH<sub>2</sub>)<sub>14</sub>COO]<sub>3</sub>
Molecular Formula: C<sub>48</sub>H<sub>93</sub>AlO<sub>6</sub>
Molecular Weight: 793.244
CAS RN: 555-35-1
Properties: white to yellow powd; made by heating aluminum hydroxide, palmitic acid, and water; used to thicken petroleum and lubricants and for water proofing fabrics [MER06] [HAW93]

Solubility: i H<sub>2</sub>O, alcohol; s petroleum ether [MER06]
Density, g/cm<sup>3</sup>: 1.095 (dihydroxy monopalmitate) [CRC10]
Melting Point, °C: 200 (dihydroxy monopalmitate) [CRC10]

#### 72

**Compound:** Aluminum perchlorate **Formula:** Al(ClO<sub>4</sub>)<sub>3</sub> **Molecular Formula:** AlCl<sub>3</sub>O<sub>12</sub> **Molecular Weight:** 325.329 **CAS RN:** 14452-39-2 Properties: can be prepared by evaporation of solutions of AlCl<sub>3</sub> and AgClO<sub>4</sub> in methanol or benzene, with subsequent evaporation at 150°C; forms hydrates with 3, 6, 9, and 15 waters of hydration; finds use in studies of cation–ligand interactions, e.g., hydrolysis products [CIC73]
Solubility: g/100 g soln, H<sub>2</sub>O: 54.87 (0°C), 64.62 (91.5°C); equilibrium solid phase Al(ClO<sub>4</sub>)<sub>3</sub>·9H<sub>2</sub>O [KRU93]

#### 73

**Compound:** Aluminum perchlorate nonahydrate **Formula:**  $Al(ClO_4)_3 \cdot 9H_2O$ **Molecular Formula:**  $AlCl_3H_{18}O_{21}$ **Molecular Weight:** 487.470 **CAS RN:** 81029-06-3 **Properties:** white cryst [STR93] **Density, g/cm<sup>3</sup>:** 2.0 [STR93] **Melting Point, °C:** 82 [ALF93]

#### 74

Compound: Aluminum phosphate Synonyms: berlinite, aluminum orthophosphate Formula: AlPO<sub>4</sub> **Molecular Formula:** AlO<sub>4</sub>P Molecular Weight: 121.953 CAS RN: 7784-30-7 **Properties:** white; rhomb plates; cryst, a = 0.4942 nm, c = 1.097 nm, isomorphous with quartz; naturally occurring; can be prepared by mixing a solution of aluminum sulfate and sodium phosphate; used as a flux for ceramics, in dental cements, for special glasses [MER06] [CRC10] [HAW93] Solubility: i H<sub>2</sub>O; v sl s HCl, HNO<sub>3</sub> [MER06] Density, g/cm<sup>3</sup>: 2.56 [MER06] Melting Point, °C: >1460 [MER06] **Reactions:**  $\alpha$ -AlPO<sub>4</sub> form is stable below 584°C [LAU87]

#### 75

Compound: Aluminum phosphate dihydrate Synonym: variscite Formula:  $AIPO_4 \cdot 2H_2O$ Molecular Formula:  $AIH_4O_6P$ Molecular Weight: 157.984 CAS RN: 7784-30-7 Properties: rhomb; green; hardness 3.5–4.5 Mohs;  $AIPO_4 \cdot xH_2O$  can be prepared as a gelatinous precipitate by adding a neutral solution of an Al salt to a solution of an alkali metal phosphate [CIC73] [CRC10] Solubility: i H<sub>2</sub>O; sl s HNO<sub>3</sub>, HCl [CIC73] Density, g/cm<sup>3</sup>: 2.57 [CIC73] Melting Point, °C: 1850 [CIC73]

#### 76

Compound: Aluminum phosphate trihydroxide Synonym: angelite Formula: Al<sub>2</sub>(PO<sub>4</sub>)(OH)<sub>3</sub> Molecular Formula: Al<sub>2</sub>H<sub>3</sub>O<sub>7</sub>P Molecular Weight: 199.954 CAS RN: 12004-29-4 Properties: naturally occurring mineral; colorless, white, yellowish-white or rose; monocl; hardness 4.5–5 Mohs [CRC10] [MER06] Density, g/cm<sup>3</sup>: 2.696 [CRC10]

#### 77

Compound: Aluminum phosphide Synonyms: celphos, detia, phostoxin Formula: AIP Molecular Formula: AlP Molecular Weight: 57.956 CAS RN: 20859-73-8 Properties: dark gray or yellow powd; cub, a=0.5467 nm; band gap 2.42 eV; reacts readily in moist air to produce phosphine; electronic dielectric constant 8.5; can be prepared from red phosphorus and aluminum powd; used as a fumigant, as a source of phosphine, and in semiconductor work [CIC73] [MER06] Solubility: reacts with H<sub>2</sub>O to produce phosphine [MER06] Density, g/cm<sup>3</sup>: 2.40 [MER06] Melting Point, °C: >1000 [MER06] Thermal Conductivity, W/(m·K): 92.0 [CRC10]

#### 78

Compound: Aluminum selenide Formula: Al<sub>2</sub>Se<sub>3</sub> Molecular Formula: Al<sub>2</sub>Se<sub>3</sub> Molecular Weight: 290.843 CAS RN: 1302-82-5 Properties: 6.5 mm and down black pieces or yellowish to light brown powd; unstable in air; formed by reaction of stoichiometric amounts of Al and Se at 1000°C; used to prepare H<sub>2</sub>Se for semiconductor work; a=0.389 nm,

c=0.630 nm [STR93] [MER06] [CIC73] Solubility: decomposed by H<sub>2</sub>O, acids [MER06] Density, g/cm<sup>3</sup>: 3.437 [MER06]

#### 79

**Compound:** Aluminum silicate **Synonym:** metakaolinite

Formula: A1<sub>2</sub>O<sub>3</sub>·2SiO<sub>2</sub> Molecular Formula: A1<sub>2</sub>O<sub>7</sub>Si<sub>2</sub> Molecular Weight: 222.128 CAS RN: 1302-76-7 Properties: white powd [STR93] Density, g/cm<sup>3</sup>: 2.60 (dickite) [ROB78] Reactions: forms mullite and SiO<sub>2</sub> at 1200°C [BAB85]; forms amorphous aluminosilicate at 980°C [CHA90]

#### 80

Compound: Aluminum silicate Synonym: sillimanite Formula:  $Al_2O_3 \cdot SiO_2$ Molecular Formula:  $Al_2O_5Si$ Molecular Weight: 162.041 CAS RN: 12141-45-6 Properties: ortho, a=0.78483 nm, b=0.7673 nm, c=0.57711 nm [ROB67] Density, g/cm<sup>3</sup>: 3.247 [ROB78] Reactions: forms mullite and SiO<sub>2</sub> from 1345°C to 1550°C [CLA66] Thermal Expansion Coefficient: 100°C (0.088), 200°C (0.215), 400°C (0.531), 1000°C (1.979) [CLA66]

#### 81

Compound: Aluminum silicate Synonym: andalusite Formula:  $Al_2O_3 \cdot SiO_2$ Molecular Formula:  $Al_2O_5Si$ Molecular Weight: 162.041 CAS RN: 12183-80-1 Properties: gray, greenish, reddish, or bluish; hardness 7–7.5; used in dental cements and the glass industry, in enamels, ceramics, and as a paint filler [MER06] [HAW93] Density, g/cm<sup>3</sup>: 3.145 [ROB78] Reactions: forms mullite and SiO<sub>2</sub> from 1325°C to 1410°C [CLA66] Thermal Expansion Coefficient: 100°C (0.151), 200°C (0.417), 1000°C (3.606) [CLA66]

#### 82

**Compound:** Aluminum silicate **Synonym:** mullite **Formula:**  $3Al_2O_3 \cdot 2SiO_2$ **Molecular Formula:**  $Al_6O_{13}Si_2$ **Molecular Weight:** 426.048 **CAS RN:** 1302-93-8 **Properties:** colorless; rhomb, a = 0.7557 nm, b = 0.76876 nm, c = 0.28842 nm; hardness: hot pressed 13.6 GPa, sintered 12.7 GPa; indentation microfracture 2.02 MPa · m<sup>1/2</sup>; submicrometer powd can be prepared by hydrolysis of mixed alkoxides, followed by drying and calcining up to 1600°C; sinter, microstructure [SOM91]; phases equilibria in mullite [PAS88]; other data in [HIR89] [ROB67] [MIZ89]

**Solubility:** i H<sub>2</sub>O, acids, HF [CRC10]

Density, g/cm<sup>3</sup>: theoretical 3.17 [MIZ89]

- Melting Point, °C: 1750 [JAN85]
- **Thermal Conductivity, W/(m·K):** 100°C (5.39), 200°C (4.89), 4000°C (4.18), 600°C (3.81), 800°C (3.59), 1000°C (3.43) [HO72]
- **Thermal Expansion Coefficient:** 100°C (0.070), 200°C (0.188), 400°C (0.471), 600°C (0.786), 800°C (1.121), 1000°C (1.439) [CLA66]

#### 83

Compound: Aluminum silicate Synonym: kyanite Formula:  $Al_2O_3 \cdot SiO_2$ Molecular Formula:  $Al_2O_5Si$ Molecular Weight: 162.041 CAS RN: 12141-46-7 Properties: mineral; tricl, a=0.7123 nm, b=0.7848 nm, c=0.5564 nm [ROB67] [HAW93] Density, g/cm<sup>3</sup>: 3.247 [CRC10] Reactions: forms mullite and SiO<sub>2</sub> from 1000°C to 1325°C [CLA66] Thermal Expansion Coefficient: 100°C (0.127), 200°C (0.360), 400°C (0.890), 600°C (1.478), 800°C (2.081), 1000°C (2.687) [CLA66]

#### 84

Compound: Aluminum silicate dihydrate Synonyms: kaolin, China clay Formula:  $Al_2O_3 \cdot 2SiO_2 \cdot 2H_2O$ Molecular Formula:  $Al_2H_4O_9Si_2$ Molecular Weight: 258.161 CAS RN: 1332-58-7 Properties: white to yellowish or grayish fine powd; high lubricity, feels slippery to touch; tricl, a=0.5055 nm, b=0.8959 nm, c=1.4736 nm;used as a filler and coating for paper and rubber, in paint [STR93] [HAW93] Solubility: i H<sub>2</sub>O, dil acids and alkali hydroxides [HAW93]

Density, g/cm<sup>3</sup>: 2.594 [ROB78]

**Reactions:** transforms to metakaolinite about 525°C [BAB85]

#### 85

**Compound:** Aluminum stearate **Formula:**  $Al(C_{18}H_{35}O_2)_3$  **Molecular Formula:**  $C_{54}H_{105}AlO_6$  **Molecular Weight:** 877.390 **CAS RN:** 637-12-7 **Properties:** white powd [CRC10] **Solubility:** i H<sub>2</sub>O, EtOH, eth; s alk [CRC10] **Density:** 1.070 **Melting Point, °C:** 115 [CRC10]

#### 86

Compound: Aluminum sulfate Synonyms: alum, pearl alum Formula:  $Al_2(SO_4)_3$ Molecular Formula: Al<sub>2</sub>O<sub>12</sub>S<sub>3</sub> Molecular Weight: 342.154 CAS RN: 10043-01-3 Properties: white, lustrous cryst; can be prepared by treating kaolin, aluminum hydroxide or bauxite with sulfuric acid, followed by filtration and crystallization; used in tanning leather as a mordant for dyeing, to purify water, and to waterproof and fireproof cloth [MER06] [HAW93] **Solubility:** g/100 g soln, H<sub>2</sub>O: 27.50 (0°C), 27.82 (25°C), 43.9 (99.2°C); equilibrium solid phase, Al<sub>2</sub>(SO<sub>4</sub>)<sub>3</sub> · 16H<sub>2</sub>O [KRU93] Density, g/cm<sup>3</sup>: 1.61 [MER06] Melting Point, °C: decomposes at 770 [ALD94] **Reactions:** decomposes to  $\gamma$ -Al<sub>2</sub>O<sub>3</sub> and SO<sub>3</sub> from 580°C to 900°C [KIR78]

#### 87

Compound: Aluminum sulfate octadecahydrate Synonyms: alunogen, cake alum Formula: Al<sub>2</sub>(SO<sub>4</sub>)<sub>3</sub> · 18H<sub>2</sub>O Molecular Formula: Al<sub>2</sub>H<sub>36</sub>O<sub>30</sub>S<sub>3</sub> Molecular Weight: 666.429 CAS RN: 7784-31-8 Properties: colorless; monocl; used in paper industry and in water treatment [KIR78] [STR93] Solubility: anhydrous/100 g, H<sub>2</sub>O: 27.5 (0°C), 27.8 (25°C), 46.9 (103.2°C) [KIR78]; gAl<sub>2</sub>O<sub>3</sub>/100 mL at 35°C in the following solvents: methanol 2.89, ethanol 0.45, ethylene glycol 8.76 [OKA91] Density, g/cm<sup>3</sup>: 1.69 [KIR78] Melting Point, °C: decomposes at 86.5 [STR93] **Reactions:** minus 15H<sub>2</sub>O from 40°C to 250°C; minus 3H<sub>2</sub>O from 250°C to 400°C [KIR78]

#### 88

Compound: Aluminum sulfide Formula:  $Al_2S_3$ Molecular Formula:  $Al_2S_3$ Molecular Weight: 150.161 CAS RN: 1302-81-4 Properties: yellowish gray powd; hex, a = 0.642 nm, c = 1.783 nm;  $H_2S$  odor; decomposes in moist air; formed by heating stoichiometric amounts of Al and S at 700°C–100°C; used as a semiconductor [CIC73] [MER06] Solubility: decomposes in  $H_2O$  [MER06] Density, g/cm<sup>3</sup>: 2.32 [CIC73] Melting Point, °C: 1100 [MER06] Reactions: sublimes at 1500°C in  $N_2$  atm;  $\alpha \rightarrow \gamma$ transition at 1000°C [CRC10] [JAN85]

#### 89

Compound: Aluminum tartrate Synonyms: 2,3-dihydroxybutanedioic acid, aluminum(III) salt Formula:  $Al_2(C_4H_4O_6)_3$ Molecular Formula:  $C_{12}H_{12}Al_2O_{18}$ Molecular Weight: 498.179 CAS RN: 815-78-1 Properties: odorless granules; used in dyeing textiles [MER06] Solubility: s H<sub>2</sub>O, dissolves faster in hot H<sub>2</sub>O; s ammonia [MER06]

#### 90

Compound: Aluminum telluride Formula: Al<sub>2</sub>Te<sub>3</sub> Molecular Formula: Al<sub>2</sub>Te<sub>3</sub> Molecular Weight: 436.763 CAS RN: 12043-29-7 Properties: dark gray or black cryst; a=0.407 nm, c=0.693 nm; electrical resistivity (27°C) 0.0054 ohm ⋅ cm; can be formed by reacting Al and Te at 1000°C; used in semiconductor work [CIC73] [STR93] Density, g/cm<sup>3</sup>: 4.5 [CIC73] Melting Point, °C: decomposes [ALF93]

#### 91

Compound: Aluminum tellurite Formula: Al<sub>2</sub>(TeO<sub>3</sub>)<sub>3</sub> Molecular Formula: Al<sub>2</sub>O<sub>9</sub>Te<sub>3</sub> Molecular Weight: 580.758 CAS RN: 58500-12-2 Properties: reacted product, -80 mesh particle size; 99% purity [CER91]

#### 92

Compound: Aluminum thiocyanate Formula: Al(CNS)<sub>3</sub> Molecular Formula: C<sub>3</sub>AlN<sub>3</sub>S<sub>3</sub> Molecular Weight: 201.233 CAS RN: 538-17-0 Properties: yellowish powd; aq solution used as mordant in the dye industry and in pottery manufacturing [MER06] [HAW93] Solubility: s H<sub>2</sub>O; i alcohol, ether [HAW93]

#### 93

Compound: Aluminum titanate Synonym: tielite Formula: Al<sub>2</sub>TiO<sub>5</sub> Molecular Formula: Al<sub>2</sub>O<sub>5</sub>Ti Molecular Weight: 181.827 CAS RN: 12004-39-6 Properties: -100 mesh with 99.5% purity; orthorhomb, pseudobrookite; preparation: sol-gel [PRA92], by reaction of equimolar amounts of Al<sub>2</sub>O<sub>3</sub> and TiO<sub>2</sub> at 1300°C, then sintering at 1400°C for 4h [PER89]; cryst structure in [FIE87]; other references [ALF93] [FRE87] Density, g/cm<sup>3</sup>: 3.73 [ROB78] Melting Point, °C: 1860 [HOL73] Reactions: decomposes at 800°C–1300°C to corundum and rutile, which recombine to tielite >1300°C [PAR90] Thermal Expansion Coefficient: -2×10<sup>-6</sup>/°C (24°C-1000°C) [PAR90]

#### 94

Compound: Aluminum tristearate
Synonym: aluminum stearate
Formula: Al[CH<sub>3</sub>(CH<sub>2</sub>)<sub>16</sub>COO]<sub>3</sub>
Molecular Formula: C<sub>54</sub>H<sub>105</sub>AlO<sub>6</sub>
Molecular Weight: 877.406
CAS RN: 637-12-7
Properties: white powd; prepared by reacting stearic acid with aluminum salts; used in waterproofing fabrics and ropes, in paint, and varnish driers [MER06] [HAW93]
Solubility: i H<sub>2</sub>O, alcohol, and ether; s alkali; forms gel with aliphatic and aromatic hydrocarbons [HAW93]
Density, g/cm<sup>3</sup>: 1.070 [HAW93]
Melting Point, °C: 115 [HAW93]

#### 95

**Compound:** Aluminum tungstate **Formula:** Al<sub>2</sub>(WO<sub>4</sub>)<sub>3</sub>

Molecular Formula: Al<sub>2</sub>O<sub>12</sub>W<sub>3</sub> Molecular Weight: 797.476 CAS RN: 15123-82-7 **Properties:** -325 mesh with 99% purity; white powd [ALF93] [STR93]

#### 96

Compound: Aluminum zirconate Formula:  $Al_2O_3 \cdot 3ZrO_2$ Molecular Formula: Al<sub>2</sub>O<sub>9</sub>Zr<sub>3</sub> Molecular Weight: 471.630 CAS RN: 70692-95-4

**Properties:** high fracture toughened ceramic material at room temp due to a dispersion of tetr ZrO<sub>2</sub> particles in an alumina matrix; can be prepared by plasma synthesis from the vapor phase by injecting mixtures of AlCl<sub>3</sub> and ZrCl<sub>4</sub> vapor in an argon-oxygen plasma, resulting in powd consisting of a mixture of  $\delta$ -Al<sub>2</sub>O<sub>3</sub> and tetr ZrO<sub>2</sub>; reacted product, -100 mesh; 99% purity; reaction sintering with mullite in [DES91]; other references [CER91] [KOH88], wear coating [GEI92]

#### 97

Compound: Aluminum zirconium Formula: Al<sub>2</sub>Zr Molecular Formula: Al<sub>2</sub>Zr Molecular Weight: 145.187 CAS RN: 12004-50-1 Properties: -100 mesh with 99% purity; powd [ALF93] Melting Point, °C: 1645 [ALF93]

#### 98

**Compound:** Chlorodiethylaluminum Formula: AlCl(C<sub>2</sub>H<sub>5</sub>)<sub>2</sub> Molecular Formula: C<sub>4</sub>H<sub>10</sub>AlCl Molecular Weight: 120.557 CAS RN: 96-10-6 **Properties:** col liq [CRC10] Solubility: reac H<sub>2</sub>O [CRC10] Density, g/cm<sup>3</sup>: 0.96 [CRC10]

#### 99

**Compound:** Chlorodiisobutylaluminum Formula:  $AlCl(C_4H_9)_2$ Molecular Formula: C<sub>6</sub>H<sub>18</sub>AlCl Molecular Weight: 176.664 CAS RN: 1779-25-5 **Properties:** hygr col liq [CRC10] Solubility: s eth, hx [CRC10]

Density, g/cm<sup>3</sup>: 0.95 [CRC10] Melting Point, °C: -40 [CRC10]

#### 100

Compound: Dichloromethylaluminum Formula: AlCl<sub>2</sub>CH<sub>3</sub> Molecular Formula: CH<sub>3</sub>AlCl<sub>2</sub> Molecular Weight: 112.923 CAS RN: 917-65-7 Properties: cryst [CRC10] Solubility: Soluble bz, eth, hydrocarbon solvents [CRC10] Melting Point, °C: 72.7 [CRC10] Boiling Point, °C: 95 [CRC10]

#### 101

Compound: Americium Formula: Am Molecular Formula: Am Molecular Weight: 243 CAS RN: 7440-35-9 **Properties:** silvery metal with two forms;  $\alpha$ -Am: hex, a = 0.3468 nm, c = 1.1241 nm;  $\beta$ -Am: cub, a=0.4894 nm;  $t_{1/2}^{241}$ Am=433 years,  $t_{1/2}$  $^{242}$ Am = 152 h, t<sub>1/2</sub>  $^{243}$ Am = 7400 years; Am<sup>+++</sup> stable in aq solution; enthalpy of vaporization 230kJ/ mol; enthalpy of fusion 14.4 kJ/mol; enthalpy of sublimation 276 kJ/mol; ionic radius of Am<sup>+++</sup> is 0.0982 nm; can be prepared from <sup>241</sup>Pu; used to diagnose thyroid disorders [KIR78] [CIC73] Solubility: s dil acids [CRC10] **Density, g/cm<sup>3</sup>:** α-Am: 13.67; β-Am: 13.65 [CIC73] Melting Point, °C: 1173 [KIR91] Boiling Point, °C: 2011 [KIR91] **Reactions:**  $\alpha$  transforms to  $\beta$  at 1079°C [CIC73]

#### 102

Compound: Americium bromide Formula: AmBr<sub>3</sub> Molecular Formula: AmBr<sub>3</sub> Molecular Weight: 483 CAS RN: 14933-38-1 **Properties:** white; ortho-rhomb; a=0.4064 nm, b=1.2661 nm, c=0.9144 nm [CIC73] Solubility: s H<sub>2</sub>O [CRC10] Density, g/cm<sup>3</sup>: 6.85 [KIR78] Melting Point, °C: sublimes [CRC10]

#### 103

Compound: Americium carbonate dihydrate Formula:  $Am_2(CO_3)_3 \cdot 2H_2O$ Molecular Formula: C<sub>3</sub>H<sub>4</sub>Am<sub>2</sub>O<sub>11</sub>

CAS RN: 18421-71-1 Molecular Weight: 702 Properties: a=1.409 nm [CIC73]

#### 104

Compound: Americium chloride Formula: AmCl<sub>3</sub> Molecular Formula: AmCl<sub>3</sub> Molecular Weight: 349 CAS RN: 13464-46-5 Properties: pink; hex, a=0.7382 nm, c=0.4214 nm [KIR78] Density, g/cm<sup>3</sup>: 5.87 [KIR78] Melting Point, °C: 715 [KIR91]

#### 105

Compound: Americium fluoride Synonym: americium trifluoride Formula: AmF<sub>3</sub> Molecular Formula: AmF<sub>3</sub> Molecular Weight: 300 CAS RN: 13708-80-0 Properties: pink; hex, a=0.7044 nm, c=0.7225 nm [CIC73] Solubility: i H<sub>2</sub>O [CRC10] Density, g/cm<sup>3</sup>: 9.53 [KIR78] Melting Point, °C: 1393 [KIR91]

#### 106

**Compound:** Americium hydride **Formula:** AmH<sub>3</sub> **Molecular Formula:** AmH<sub>3</sub> **Molecular Weight:** 246 **CAS RN:** 13774-24-8 **Properties:** black; hex, a=0.377 nm, c=0.675 nm [CIC73] **Density, g/cm<sup>3</sup>:** 9.76 [CIC73]

#### 107

**Compound:** Americium hydroxide **Formula:**  $Am(OH)_3$  **Molecular Formula:**  $AmH_3O_3$  **Molecular Weight:** 294 **CAS RN:** 23323-79-7 **Properties:** hex, a=0.6426 nm, c=0.3745 nm [CIC73]

#### 108

**Compound:** Americium iodide **Formula:** AmI<sub>3</sub> **Molecular Formula:** AmI<sub>3</sub> **Molecular Weight:** 624 CAS RN: 13813-47-3 Properties: yellow; ortho-rhomb, a=0.742 nm, c=2.055 nm [KIR78] Solubility: s H<sub>2</sub>O [CRC10] Density, g/cm<sup>3</sup>: 6.9 [CRC10] Melting Point, °C: ~950 [KIR91]

#### 109

Compound: Americium oxide( $\alpha$ ) Formula:  $\alpha$ -Am<sub>2</sub>O<sub>3</sub> Molecular Formula: Am<sub>2</sub>O<sub>3</sub> Molecular Weight: 534 CAS RN: 12254-64-7 Properties: tan; hex, a=0.3805 nm, c=0.696 nm [KIR78] Solubility: s mineral acids [CRC10] Density, g/cm<sup>3</sup>: 11.77 [KIR78]

#### 110

**Compound:** Americium oxide( $\beta$ ) **Formula:**  $\beta$ -Am<sub>2</sub>O<sub>3</sub> **Molecular Formula:** Am<sub>2</sub>O<sub>3</sub> **Molecular Weight:** 534 **CAS RN:** 12254-64-7 **Properties:** reddish brown; cub, a = 1.103 nm [KIR78] **Density, g/cm<sup>3</sup>:** 10.57 [KIR78]

#### 111

Compound: Americium oxychloride Formula: AmOCl Molecular Formula: AmClO Molecular Weight: 294 CAS RN: 37961-19-6 Properties: cryst; a=0.400 nm, b=0.678 nm [BRO73]

#### 112

Compound: Americium phosphate Formula: AmPO<sub>4</sub> Molecular Formula: AmO<sub>4</sub>P Molecular Weight: 338 CAS RN: 14933-41-6 Properties: monocl, a=0.673 nm, b=0.693 nm, c=0.641 nm [CIC73]

#### 113

**Compound:** Americium sulfide **Formula:** Am<sub>2</sub>S<sub>3</sub> **Molecular Formula:** Am<sub>2</sub>S<sub>3</sub> **Molecular Weight:** 582 **CAS RN:** 12446-46-7 **Properties:** bcc, a=0.845 nm [CIC73]

#### 114

Compound: Americium(IV) fluoride Formula: AmF<sub>4</sub> Molecular Formula: AmF<sub>4</sub> Molecular Weight: 319 CAS RN: 15947-41-8 Properties: tan; monocl, a=1.254 nm, b=1.052 nm, c=0.820 nm [KIR78] Density, g/cm<sup>3</sup>: 7.23 [KIR78]

#### 115

Compound: Americium(IV) oxide Formula: AmO<sub>2</sub> Molecular Formula: AmO<sub>2</sub> Molecular Weight: 275 CAS RN: 12005-67-3 Properties: black; cub, a=0.5374 nm [KIR78] Solubility: s mineral acids [CRC10] Density, g/cm<sup>3</sup>: 11.68 [KIR78]

#### 116

**Compound:** Ammonia **Formula:** NH<sub>3</sub> **Molecular Formula:** H<sub>3</sub>N **Molecular Weight:** 17.031 **CAS RN:** 7664-41-7

Properties: colorless gas; very pungent odor; critical pressure 111.5 atm; critical temp 132.4°C; vapor pressure of liq 8.5 atm (20°C); enthalpy of vaporization 23.33 kJ/mol; enthalpy of fusion 5.66 kJ/mol; autoignition temp 690°C; produced by reaction of steam forced through incandescent coke; used in the manufacture of nitric acid, explosives, synthetic fibers, nitrides, fertilizers, and in electronics and refrigeration [MER06] [HAW93] [AIR87]
Solubility: s H<sub>2</sub>O: 47% (0°C), 31% (25°C), 28% (50°C) [MER06]
Density, g/cm<sup>3</sup>: 0.5967 (air = 1.0000) [MER06]
Boiling Point, °C: -73.35 at 1 atm [MER06]

**Reactions:** mixtures of NH<sub>3</sub> and air can explode when ignited [MER06]

#### 117

**Compound:** Ammonium 12-molybdophosphate hydrate **Synonym:** ammonium phosphomolybdate **Formula:**  $(NH_4)_3PMo_{12}O_{40} \cdot xH_2O$  **Molecular Formula:**  $H_{12}Mo_{12}N_3O_{40}P$  (anhydrous) **Molecular Weight:** 1834.345 (anhydrous) **CAS RN:** 12026-66-3 Properties: yellow, cryst powd; prepared by reacting ammonium molybdate with phosphoric and nitric acids; used as a reagent in ion-exchange columns, and as a photographic additive [HAW93]
Solubility: v sl s H<sub>2</sub>O; s alkali; i alcohol, acids [HAW93]
Melting Point, °C: decomposes [CRC10]

#### 118

**Compound:** Ammonium acetate Synonyms: acetic acid, ammonium salt Formula: CH<sub>3</sub>COONH<sub>4</sub> Molecular Formula: C<sub>2</sub>H<sub>7</sub>NO<sub>2</sub> Molecular Weight: 77.084 CAS RN: 631-61-8 Properties: white cryst; deliq; prepared from acetic acid and ammonia by exact neutralization to pH 7.0; finds use in analytical chemistry, drugs, and textile dyeing; specific gravity of aq solutions in % of CH<sub>3</sub>COONH<sub>4</sub>: 10% (1.022), 20% (1.042), 30% (1.062), 40% (1.077), 50% (1.092) [MER06] [KIR78] **Solubility:** 148 g/100 g H<sub>2</sub>O (4°C) [KIR78] Density, g/cm<sup>3</sup>: 1.073 [KIR78] Melting Point, °C: 114 [MER06] Boiling Point, °C: decomposes [KIR78]

#### 119

Compound: Ammonium aluminum sulfate Synonym: burnt ammonium alum Formula:  $NH_4Al(SO_4)_2$ Molecular Formula:  $AlH_4NO_8S_2$ Molecular Weight: 237.148 CAS RN: 7784-25-0 Properties: white powd [MER06] Solubility: g  $NH_4Al(SO_4)_2/100$  g  $H_2O$ : 2.10 (0°C), 5.00 (10°), 7.74 (20°C), 10.9 (30°), 14.9 (40°C), 26.7 (60°C) [LAN05] Density, g/cm<sup>3</sup>: 2.45 [CRC10] Melting Point, °C: decomposes at 280 [KIR78] Reactions: forms  $\delta$ -Al<sub>2</sub>O<sub>3</sub> at 1000°C-1250°C [KIR78]

#### 120

Compound: Ammonium aluminum sulfate dodecahydrate Synonym: ammonium alum Formula: NH<sub>4</sub>Al(SO<sub>4</sub>)<sub>2</sub> · 12H<sub>2</sub>O Molecular Formula: AlH<sub>28</sub>NO<sub>20</sub>S<sub>2</sub> Molecular Weight: 453.331

CAS RN: 7784-26-1

**Properties:** colorless, cryst, white granules or powd; obtained by crystallization from a mixture of ammonium and aluminum sulfates; used to purify drinking water, in baking powd, for dyeing fabrics, and fireproofing [MER06] [HAW93] [KIR78]
Solubility: 1 g/7 mL H<sub>2</sub>O; 1 g/0.5 mL hot H<sub>2</sub>O [MER06]; s glycerol; i alcohol [HAW93]
Density, g/cm<sup>3</sup>: 1.65 [MER06]
Melting Point, °C: 94.5 [MER06]
Boiling Point, °C: decomposes above 280 [MER06]
Reactions: minus 10H<sub>2</sub>O (250°C) forms γ-Al<sub>2</sub>O<sub>3</sub> (1000°C-1250°C) [MER06] [KIR78]

121

Compound: Ammonium arsenate hydrate Synonym: ammonium orthoarsenate Formula:  $(NH_4)_3AsO_4 \cdot xH_2O$ Molecular Formula:  $AsH_{12}N_3O_4$  (anhydrous) Molecular Weight: 193.035 (anhydrous) CAS RN: 13462-93-6 Properties: -6 mesh with 99.9% purity; x = 3: ortho [CER91] [CRC10] Reactions: minus NH<sub>3</sub> on heating [CRC10]

122

Compound: Ammonium azide Formula:  $NH_4N_3$ Molecular Formula:  $H_4N_4$ Molecular Weight: 60.059 CAS RN: 12164-94-2 Properties: ortho-rhomb, a=0.893 nm, b=0.864 nm, c=0.380 nm [CIC73] Solubility: g  $NH_4N_3/100$  g  $H_2O$ : 16.0 (0°C), 25.3 (20°C), 37.1 (40°C) [LAN05] Density, g/cm<sup>3</sup>: 1.346 [CIC73] Melting Point, °C: 160 [CIC73] Boiling Point, °C: explodes at 134 [CIC73]

## 123

Compound: Ammonium benzoate
Synonyms: benzoic acid, ammonium salt
Formula: C<sub>6</sub>H<sub>5</sub>COONH<sub>4</sub>
Molecular Formula: C<sub>7</sub>H<sub>9</sub>NO<sub>2</sub>
Molecular Weight: 139.154
CAS RN: 1863-63-4
Properties: white cryst or powd; manufactured from benzoic acid and ammonia; used in medicine and as a preservative for latex [HAW93] [MER06]
Solubility: 1 g/4.7 mL H<sub>2</sub>O, 1 g/1.2 mL hot H<sub>2</sub>O [MER06]; s alcohol, glycerol [HAW93]
Density, g/cm<sup>3</sup>: 1.26 [MER06]
Melting Point, °C: 198 [MER06]

**Boiling Point, °C:** sublimes at 160 [HAW93]

**Reactions:** gradually loses NH<sub>3</sub> in air [MER06]

## 124

**Compound:** Ammonium bimalate **Synonyms:** hydroxybutanedioic acid, monoammonium salt **Formula:**  $NH_4OOCCH_2CH(OH)COOH$  **Molecular Formula:**  $C_4H_9NO_5$  **Molecular Weight:** 151.119 **CAS RN:** 5972-71-4 **Properties:** ortho-rhomb cryst [MER06] **Solubility:** s 3 parts  $H_2O$ , sl s alcohol [MER06] **Density, g/cm<sup>3</sup>:** 1.15 [MER06] **Melting Point,** °C: 160–161 [MER06]

## 125

Compound: Ammonium bromide Formula: NH<sub>4</sub>Br Molecular Formula: BrH<sub>4</sub>N Molecular Weight: 97.943 CAS RN: 12124-97-9 Properties: colorless cryst or yellowish white powd; tetr, a=0.4034 nm; vapor pressure, kPa: 7.3 (300°C), 13.3 (320°C), 41.2 (360°C), 73.4 (380°C), 115.4 (400°C); prepared by reacting HBr and NH<sub>4</sub>OH; used to make AgBr salts for photography, in medicine, engraving, textile finishing, and as a fire-retardant material [CIC73] [HAW93] [KIR78] Solubility: g/100 g soln, H<sub>2</sub>O: 37.5 (0°C), 43.9 (25°C), 57.4 (100°C) [KRU93]; g/100 g H<sub>2</sub>O: 60.6 (0°C); 75.5 (20°C), 145.6 (100°C) [KIR78]; s alcohol [HAW93] Density, g/cm3: 2.429 [CIC73] Melting Point, °C: sublimes at 452 [CIC73] Boiling Point, °C: 235 in vacuum [CIC73]

## 126

Compound: Ammonium caprylate
Synonym: octanoic acid ammonium salt
Formula: C<sub>7</sub>H<sub>15</sub>COONH<sub>4</sub>
Molecular Formula: C<sub>8</sub>H<sub>19</sub>NO<sub>2</sub>
Molecular Weight: 161.245
CAS RN: 5972-76-9
Properties: hygr; monocl cryst; prepared by reacting caprylic acid and ammonia; used in photographic emulsions and as an insecticide [MER06]
Solubility: s acetic acid, ethanol [MER06]
Melting Point, °C: 70–85 [MER06]
Reactions: easily hydrolyzed in H<sub>2</sub>O [MER06]

### 127

**Compound:** Ammonium carbamate **Formula:** NH<sub>2</sub>COONH<sub>4</sub> **Molecular Formula:** CH<sub>6</sub>N<sub>2</sub>O<sub>2</sub> **Molecular Weight:** 78.071 **CAS RN:** 1111-78-0 Properties: cryst powd; ammonia odor; white; rhomb; very volatile; forms urea when heated; made from liq NH<sub>3</sub> and solid CO<sub>2</sub>; used as a fertilizer [HAW93] [MER06]
Solubility: v s H<sub>2</sub>O; s alcohol [MER06]
Melting Point, °C: volatilizes ~60 [MER06]
Reactions: gradually evolves NH<sub>3</sub> in air [MER06]

128

Compound: Ammonium carbonate
Synonym: normal ammonium carbonate
Formula: (NH<sub>4</sub>)<sub>2</sub>CO<sub>3</sub>
Molecular Formula: CH<sub>8</sub>N<sub>2</sub>O<sub>3</sub>
Molecular Weight: 96.086
CAS RN: 506-87-6
Properties: powd or lumps; colorless cryst; prepared by passing CO<sub>2</sub> gas through NH<sub>4</sub>OH solution, to crystallize the carbonate [ALF93] [ALD94] [KIR78]
Solubility: 20 g/100 g saturated solution in water (25°C) [MER06]
Melting Point, °C: decomposes at 58 [CIC73]

## 129

Compound: Ammonium cerium(III) nitrate tetrahydrate Synonym: cerous ammonium nitrate Formula:  $(NH_4)_2Ce(NO_3)_5 \cdot 4H_2O$ Molecular Formula:  $CeH_{16}N_7O_{19}$ Molecular Weight: 558.278 CAS RN: 15318-60-2 Properties: large, colorless, transparent, monocl cryst [CRC10] [MER06] Solubility: g/100 g anhydrous, H<sub>2</sub>O: 242 (10°C), 276 (20°C), 318 (30°), 376 (40°), 681 (60°C) [LAN05] Melting Point, °C: 74 [CRC10]

## 130

Compound: Ammonium cerium(III) sulfate tetrahydrate
Synonym: cerous ammonium sulfate
Formula: (NH<sub>4</sub>)Ce(SO<sub>4</sub>)<sub>2</sub>·4H<sub>2</sub>O
Molecular Formula: CeH<sub>12</sub>NO<sub>12</sub>S<sub>2</sub>
Molecular Weight: 422.342
CAS RN: 21995-38-0
Properties: prepared by slow evaporation of a solution containing stoichiometric amounts of cerous and ammonium sulfates; monocl cryst [MER06]
Solubility: g/100 g anhydrous, H<sub>2</sub>O: 5.53 (20°C), 4.49 (30°C), 3.48 (40°C), 2.02 (60°C), 1.33 (80°C) [LAN05]
Density, g/cm<sup>3</sup>: 2.523 (octahydrate) [CRC10]

## Reactions: anhydrous at 150°C [CRC10]

### 131

Compound: Ammonium cerium(IV) nitrate Synonym: ceric ammonium nitrate Formula:  $(NH_4)_2Ce(NO_3)_6$ Molecular Formula: CeH<sub>8</sub>N<sub>8</sub>O<sub>18</sub> Molecular Weight: 548.222 CAS RN: 16774-21-3 Properties: small, reddish orange cryst; precipitates from ceric nitrate solution containing excess nitric acid, on addition of NH<sub>4</sub>NO<sub>3</sub>; has been used as an oxidizing agent in analytical chemistry and as a catalyst for polymerization of olefins [ALF93] [MER06] [KIR78]

**Solubility:** g/100 g H<sub>2</sub>O: 135 (20°C), 150 (30°C), 169 (40°C), 213 (60°C) [LAN05]; s alcohol, i conc HNO<sub>3</sub> [HAW93]

## 132

**Compound:** Ammonium cerium(IV) sulfate dihydrate **Synonym:** ceric ammonium sulfate dihydrate **Formula:**  $(NH_4)_4Ce(SO_4)_4 \cdot 2H_2O$ **Molecular Formula:**  $CeH_{20}N_4O_{18}S_4$ **Molecular Weight:** 632.556 **CAS RN:** 10378-47-9

**Properties:** cryst powd; oxidizing agent; precipitates from a solution of ceric sulfate and ammonium sulfate; anhydrous compound, 13840-04-5, exists [ALF93] [ALD93] [KIR78]

### 133

Compound: Ammonium chlorate
Formula: NH<sub>4</sub>ClO<sub>3</sub>
Molecular Formula: ClH<sub>4</sub>NO<sub>3</sub>
Molecular Weight: 101.490
CAS RN: 10192-29-7
Properties: colorless or white cryst; oxidizing agent; obtained as a product of the reaction of solutions of ammonium chloride and sodium chlorate; can be used as an explosive [HAW93]
Solubility: g/100 g H<sub>2</sub>O: 28.7 (0°C), 115 (75°C) [CIC73]
Density, g/cm<sup>3</sup>: 1.80 [CIC73]
Melting Point, °C: explodes at 102 [CIC73]

## 134

**Compound:** Ammonium chloride **Synonyms:** ammonium muriate, sal ammoniac **Formula:** NH<sub>4</sub>Cl **Molecular Formula:** ClH<sub>4</sub>N **Molecular Weight:** 53.492 **CAS RN:** 12125-02-9 Properties: white; cub cryst, a=0.3866 nm; enthalpy of formation 317 kJ/mol; enthalpy of sublimation 165.7 kJ/mol; vapor pressure, kPa, at temp shown: 6.5 (250°C), 17.9 (280°C), 33.5 (300°C), 60.9 (320°C), 101.1 (338°C); prepared by mixing ammonium sulfate and sodium chloride solutions; used in batteries, as a soldering flux, in electroplating [CIC73] [HAW93] [KIR78]

Solubility: g/100 g H<sub>2</sub>O: 29.4 (0°C), 39.3 (25°C), 77.3 (100°C); equilibrium solid phase, NH<sub>4</sub>Cl [KRU93] Density, g/cm<sup>3</sup>: 1.527 [CIC73]

Molting Doint °C: sublimes without

**Melting Point, °C:** sublimes without melting [MER06] **Reactions:** decomposes at 520°C [CIC73]

### 135

**Compound:** Ammonium chromate(VI) **Synonym:** ammonium enromate **Formula:** (NH<sub>4</sub>)<sub>2</sub>CrO<sub>4</sub>

Molecular Formula: CrH<sub>8</sub>N<sub>2</sub>O<sub>4</sub>

Molecular Weight: 152.071

CAS RN: 7788-98-9

- **Properties:** yellow cryst; obtained by adding NH<sub>4</sub>OH to ammonium dichromate solution, followed by crystallization; used as a mordant in dyeing and as a corrosion inhibitor [HAW93] [KIR78]
- **Solubility:** g/100 g soln, H<sub>2</sub>O: 19.9 (0°C), 27.02 (25°C), 41.20 (75°C) [KRU93] [MER06]; i alcohol [HAW93]

Density, g/cm<sup>3</sup>: 1.90 [KIR78]

**Melting Point, °C:** decomposes at 185 [MER06] **Reactions:** minus some NH<sub>3</sub> in air [MER06]

## 136

**Compound:** Ammonium chromic sulfate dodecahydrate **Synonym:** ammonium chrome alum **Formula:**  $(NH_4)Cr(SO_4)_2 \cdot 12H_2O$ 

Molecular Formula: CrH<sub>28</sub>NO<sub>20</sub>S<sub>2</sub>

Molecular Weight: 478.345

CAS RN: 10022-47-6

**Properties:** green powd or deep violet cryst; can be crystallized from a solution of chromic sulfate and ammonium sulfate; used as a mordant for dyeing and in tanning [HAW93] [MER06]

**Solubility:** g/100 g anhydrous, H<sub>2</sub>O: 3.95 (0°C), 18.8 (30°C), 32.6 (40°C) [LAN05]; sl s alcohol [HAW93]

Density, g/cm<sup>3</sup>: hydrated form: 1.72 [HAW93]

Melting Point, °C: hydrated form: 94 [HAW93]

**Reactions:** minus  $9H_2O$  on melting, minus

12H<sub>2</sub>O by 300°C [MER06]

# 137

**Compound:** Ammonium citrate tribasic **Formula:** H<sub>4</sub>NOOCCH<sub>2</sub>C(OH)(COONH<sub>4</sub>)CH<sub>2</sub>COONH<sub>4</sub> Molecular Formula: C<sub>6</sub>H<sub>17</sub>N<sub>3</sub>O<sub>7</sub> Molecular Weight: 243.217 CAS RN: 3458-72-8 Properties: structure Melting Point, °C: decomposes at 185 [ALD94]

### 138

Compound: Ammonium cobalt(II) phosphate monohydrate
Synonym: cobaltous ammonium phosphate
Formula: NH<sub>4</sub>CoPO<sub>4</sub>·H<sub>2</sub>O
Molecular Formula: CoH<sub>6</sub>NO<sub>5</sub>P
Molecular Weight: 189.959
CAS RN: 14590-13-7
Properties: red to violet powd or monocl; results from a reaction between a cobalt(II) salt and ammonium phosphate; used as a pigment in ceramic glass and to indicate temp in textile industry [MER06]
Solubility: i H<sub>2</sub>O; s acids [MER06]

## 139

Compound: Ammonium cobalt(II) sulfate hexahydrate Synonym: cobaltous ammonium sulfate Formula:  $(NH_4)_2Co(SO_4)_2 \cdot 6H_2O$ Molecular Formula:  $CoH_{20}N_2O_{14}S_2$ Molecular Weight: 395.229 CAS RN: 13586-38-4 Properties: red; monocl prismatic cryst [MER06] Solubility: g  $(NH_4)_2Co(SO_4)_2/100$  g  $H_2O$ : 6.0 (0°C), 9.5 (10°C), 13.0 (20°C), 17.0 (30°C), 22.0 (40°C), 33.5 (60°C), 49.0 (80°C), 58.0 (90°C), 75.1 (100°C) [LAN05]; i alcohol [MER06] Density, g/cm<sup>3</sup>: 1.902 [HAW93]

### 140

**Compound:** Ammonium copper(II) chloride dihydrate **Synonym:** cupric ammonium chloride dihydrate **Formula:**  $2NH_4Cl \cdot CuCl_2 \cdot 2H_2O$ **Molecular Formula:**  $Cl_4CuH_{12}N_2O_2$ 

Molecular Weight: 277.464

CAS RN: 10060-13-6

- **Properties:** blue to bluish green cryst; tetr; preparation: by evaporating a solution containing a stoichiometric amount of NH<sub>4</sub>Cl and CuCl<sub>2</sub>; has been used as an analytical reagent; anhydrous material has yellow, hygr rhombohedral cryst [MER06]
- **Solubility:** g 2NH<sub>4</sub>Cl · CuCl<sub>2</sub>/100 g H<sub>2</sub>O: 28.2 (0°C), 32.0 (10°C), 35.0 (20°C), 38.3 (30°C), 43.8 (40°C), 56.6 (60°C), 76.5 (80°C), 76.5 (90°C) [LAN05]; s alcohol [MER06]

Density, g/cm<sup>3</sup>: 1.993 [STR93]

# Melting Point, °C: decomposes at >120 [MER06] [STR93] Reactions: minus 2H<sub>2</sub>O over range 110°C–120°C [MER06]

## 141

Compound: Ammonium cyanide
Formula: NH<sub>4</sub>CN
Molecular Formula: CH<sub>4</sub>N<sub>2</sub>
Molecular Weight: 44.056
CAS RN: 12211-52-8
Properties: colorless cryst solid; readily decomposes; can be formed by mixing ammonium sulfate solution with barium cyanide solution [KIR78]
Solubility: v s H<sub>2</sub>O [KIR78]
Density, g/cm<sup>3</sup>: 1.02 (100°C) [CRC10]
Melting Point, °C: decomposes at 36 [CRC10]
Reactions: decomposes to NH<sub>3</sub> and HCN at 36°C [KIR78]

## 142

Compound: Ammonium dichromate(VI) Synonym: ammonium dichromate Formula: (NH<sub>4</sub>)<sub>2</sub>Cr<sub>2</sub>O<sub>7</sub> Molecular Formula: Cr<sub>2</sub>H<sub>8</sub>N<sub>2</sub>O<sub>7</sub> Molecular Weight: 252.065 CAS RN: 7789-09-5 Properties: reddish orange cryst; monocl; can be prepared from ammonium sulfate and sodium dichromate, followed by crystallization from the solution; used as a mordant for dyeing, in leather tanning, oil purification, photography [HAW93] [KIR78] Solubility: g/100 g H<sub>2</sub>O: 18.2 (0°C), 25.5 (10°C), 35.6 (20°C), 46.5 (30°C), 58.5 (40°C), 156 (100°C) [LAN05]; g/100 g soln, H<sub>2</sub>O: 15.37 (0°C), 28.615 (25°C), 60.89 (100°C) [KRU93]; s alcohol [HAW93] Density, g/cm3: 2.155 [KIR78] Melting Point, °C: decomposes at 180 [KIR78] Reactions: decomposes with swelling and evolution of heat and N<sub>2</sub> [MER06]

# 143

Compound: Ammonium dihydrogen arsenate Formula: NH<sub>4</sub>H<sub>2</sub>AsO<sub>4</sub> Molecular Formula: AsH<sub>6</sub>NO<sub>4</sub> Molecular Weight: 158.975 CAS RN: 13462-93-6 Properties: cryst [ALF93] Solubility: g/100 g H<sub>2</sub>O: 33.74 (0°C), 48.67 (20°C), 122.4 (90°C); equilibrium solid phase, NH<sub>4</sub>H<sub>2</sub>AsO<sub>4</sub> [KRU93] **Density, g/cm<sup>3</sup>:** 2.311 [ALF93] **Melting Point, °C:** 300, with decomposition [ALF93]

## 144

Compound: Ammonium dihydrogen phosphate Synonym: ammonium phosphate monobasic Formula: (NH<sub>4</sub>)H<sub>2</sub>PO<sub>4</sub> **Molecular Formula:** H<sub>6</sub>NO<sub>4</sub>P Molecular Weight: 115.026 CAS RN: 7722-76-1 Properties: odorless cryst or white powd; made from ammonia and phosphoric acid; used with sodium bicarbonate as baking powd and for fireproofing materials such as paper, wood, and fiberboard [MER06] [HAW93] **Solubility:** g/100 g soln,  $H_2O$ :  $17.8 \pm 0.8 (0^{\circ}C)$ ,  $28.8 \pm 0.4 (25^{\circ}C), 72.4 \pm 7.0 (100^{\circ}C)$ [KRU93]; i alcohol [HAW93] Density, g/cm<sup>3</sup>: 1.803 [HAW93] Melting Point, °C: 190 [STR93]

### 145

Compound: Ammonium dimolybdate
Synonym: ammonium molybdenum dioxide
Formula: (NH<sub>4</sub>)<sub>2</sub>Mo<sub>2</sub>N<sub>2</sub>O<sub>7</sub>
Molecular Formula: H<sub>8</sub>Mo<sub>2</sub>N<sub>2</sub>O<sub>7</sub>
Molecular Weight: 339.953
CAS RN: 27546-07-2
Properties: white powd; obtained by crystallization from a solution of MoO<sub>3</sub> containing excess NH<sub>3</sub>; used as a high purity source for the preparation of Mo metal [KIR81] [ALF93]
Density, g/cm<sup>3</sup>: 3.1 [ALF95]

### 146

Compound: Ammonium dithiocarbamate Synonym: ammonium sulfocarbamate Formula: NH<sub>2</sub>CSS(NH<sub>4</sub>) Molecular Formula: CH<sub>6</sub>N<sub>2</sub>S<sub>2</sub> Molecular Weight: 110.204 CAS RN: 513-74-6 Properties: yellow, lustrous; ortho-rhomb; decomposes in air, odor of H<sub>2</sub>S; prepared from carbon disulfide and ammonia; used to precipitate metals and metal sulfides, and in the synthesis of heterocyclic compounds [MER06] Solubility: s H<sub>2</sub>O [MER06] Density, g/cm<sup>3</sup>: 1.451 [MER06] Melting Point, °C: decomposes at 99 [MER06] Reactions: reversible exothermic transition at 63°C [MER06]

147

## **Compound:** Ammonium ferric chromate **Synonym:** ferric ammonium chromate **Formula:** (NH<sub>4</sub>)Fe(CrO<sub>4</sub>)<sub>2</sub> **Molecular Formula:** Cr<sub>2</sub>FeH<sub>4</sub>NO<sub>8</sub> **Molecular Weight:** 305.871 **CAS RN:** 7789-08-4

Properties: carmine red microcryst powd; can be prepared by adding ammonia to a solution of CrO<sub>3</sub> and ferric nitrate hexahydrate [MER06]
Solubility: i H<sub>2</sub>O [MER06]

### 148

**Compound:** Ammonium ferric citrate **Synonym:** ferric ammonium citrate **Molecular Formula:**  $C_6H_{5+4y}Fe_xN_yO_7$ 

CAS RN: 1185-57-5

**Properties:** undetermined structure; reddishbrown granules, red scales, or brownish-yellow powd, and green form; deliq; light sensitive; preparation: Fe(OH)<sub>3</sub> addition to aq solution of citric acid and ammonia; uses: blueprints, photography, for iron deficiency [MER06]

**Solubility:** v s H<sub>2</sub>O, i alcohol [MER06]

**Reactions:** light causes reduction to

ferrous salt [MER06]

### 149

**Compound:** Ammonium ferric oxalate trihydrate **Synonym:** ferric ammonium oxalate trihydrate **Formula:**  $(NH_4)_3Fe(C_2O_4)_3 \cdot 3H_2O$ **Molecular Formula:**  $C_6H_{18}FeN_3O_{15}$ **Molecular Weight:** 428.065 **CAS RN:** 13268-42-3

Properties: bright green; monocl, hygr, prismatic cryst; sensitive to light; prepared by addition of ammonium binoxalate and ferric hydroxide; used in blueprint photography, and to color aluminum and aluminum alloys [ALD93] [MER06] [HAW93]
Solubility: v s H<sub>2</sub>O; i alcohol [MER06]

Density, g/cm<sup>3</sup>: 1.780 [ALD93]

**Melting Point, °C:** decomposes at 160–170 [MER06] **Reactions:** minus 3H<sub>2</sub>O by 100°C [MER06]

## 150

**Compound:** Ammonium ferric sulfate dodecahydrate Synonym: ferric alum Formula:  $(NH_4)Fe(SO_4)_2 \cdot 12H_2O$ Molecular Formula:  $FeH_{28}NO_{20}S_2$ Molecular Weight: 482.194 CAS RN: 10138-04-2 Properties: colorless to pale violet; effloresces; octahedral cryst; prepared by mixing solutions of ferric sulfate and ammonium sulfate with subsequent evaporation and crystallization; used in medicine, as a mordant to dye textiles, and as an astringent [HAW93] [MER06] [STR93]
Solubility: v s H<sub>2</sub>O; i alcohol [MER06]
Density, g/cm<sup>3</sup>: 1.71 [MER06]
Melting Point, °C: 39–41 [ALD94]
Reactions: minus 12H<sub>2</sub>O at 230°C [HAW93]

## 151

**Compound:** Ammonium ferricyanide trihydrate **Synonym:** ammonium hexacyanoferrate(III) trihydrate **Formula:**  $(NH_4)_3Fe(CN)_6 \cdot 3H_2O$ **Molecular Formula:**  $C_6H_{18}FeN_9O_3$ **Molecular Weight:** 320.113 **CAS RN:** 14221-48-8 **Properties:** red cryst; sensitive to light [MER06] **Solubility:** s H<sub>2</sub>O [MER06]

# 152

Compound: Ammonium ferrous sulfate hexahydrate
Synonyms: Mohr's salt, ferrous ammonium sulfate
Formula: (NH<sub>4</sub>)<sub>2</sub>Fe(SO<sub>4</sub>)<sub>2</sub>. 6H<sub>2</sub>O
Molecular Formula: FeH<sub>20</sub>N<sub>2</sub>O<sub>14</sub>S<sub>2</sub>
Molecular Weight: 392.141
CAS RN: 10045-89-3
Properties: pale bluish green cryst powd; slowly oxidizes and effloresces in air; sensitive to light; prepared from a mixture of ferrous sulfate and ammonium sulfate solutions, with subsequent evaporation and crystallization; used in analytical chemistry and in metallurgy [HAW93] [MER06] [STR93] [ALF93]
Solubility: g/100 g H<sub>2</sub>O: 12.5 (0°C), 17.2

(10°C), 26.4 (20°C), 33 (30°C), 46 (40°C);

i alcohol [MER06] [LAN05]

Density, g/cm<sup>3</sup>: 1.865 [HAW93]

Melting Point, °C: decomposes at 100–110 [HAW93]

#### 153

Compound: Ammonium fluoride

**Formula:** NH<sub>4</sub>F

Molecular Formula:  $FH_4N$ 

Molecular Weight: 37.037

CAS RN: 12125-01-8

**Properties:** white, deliq cryst; hex, a = 0.439 nm, c = 0.702 nm; tends to lose NH<sub>3</sub> to form the more stable NH<sub>4</sub>F·HF; can be obtained by adding ammonia to an ice cold 40% HF solution; NH<sub>4</sub>F is used as a laboratory reagent [KIR78] [CIC73] Solubility: g/100 g soln, H<sub>2</sub>O: 41.72 (0°C), 45.5  $\pm$  0.3 (25°C), 54.05 (80°C) [KRU93] Density, g/cm<sup>3</sup>: 1.009 [CIC73] Melting Point, °C: decomposes [CIC73] Reactions: decomposed by hot water to NH<sub>3</sub> and HF [MER06]

## 154

Compound: Ammonium fluoroborate **Synonym:** ammonium tetrafluoroborate Formula: NH<sub>4</sub>BF<sub>4</sub> **Molecular Formula:** BF<sub>4</sub>H<sub>4</sub>N Molecular Weight: 104.844 CAS RN: 13826-83-0 **Properties:** white powd; ortho-rhomb below  $205^{\circ}$ C, a = 0.7278 nm, b = 0.9072 nm, c = 0.5678 nm; cub above 205°C; can be prepared by reacting ammonia gas with fluoroboric acid [KIR78] [ALF93] Solubility: g/100 mL H<sub>2</sub>O: 3.09 (-1.0°C), 5.26 (-1.5°C), 10.85 (-2.7°C), 12.20 (0°C), 25 (16°C), 25.83 (25°C), 44.09 (50°C), 67.50 (75°C), 98.93 (100°C), 113.7 (108.5°C); s HF 19.89% (0°C) [KIR78] Density, g/cm<sup>3</sup>: 1.871 [HAW93] Melting Point, °C: decomposes at 487 [KIR78]; sublimes at 220 [ALF93]

# 155

**Compound:** Ammonium fluorosulfonate **Formula:** NH<sub>4</sub>SO<sub>3</sub>F **Molecular Formula:** FH<sub>4</sub>NO<sub>3</sub>S **Molecular Weight:** 117.101 **CAS RN:** 13446-08-7 **Properties:** long, colorless needles [KIR78] **Solubility:** s H<sub>2</sub>O, alcohol, methanol [KIR78] **Melting Point,** °C: 245 [KIR78]

## 156

Compound: Ammonium formate
Synonyms: formic acid, ammonium salt
Formula: HCOONH<sub>4</sub>
Molecular Formula: CH<sub>5</sub>NO<sub>2</sub>
Molecular Weight: 63.056
CAS RN: 540-69-2
Properties: deliq cryst or white powd; formed by reaction of ammonia and formic acid; has been used to precipitate metals [HAW93] [STR93]
Solubility: g/100 g H<sub>2</sub>O: 102 (0°C), 143 (20°C), 204 (40°C), 311 (60°C), 533 (80°C) [LAN05]; s alcohol [HAW93]
Density, g/cm<sup>3</sup>: 1.26 [HAW93]

Melting Point, °C: 119–121 [STR93] Boiling Point, °C: decomposes at 180 [CRC10]

## 157

**Compound:** Ammonium germanium oxalate hydrate **Synonym:** ammonium tris(oxalato)germanate **Formula:**  $(NH_4)_2Ge(C_2O_4)_3 \cdot xH_2O$ **Molecular Formula:**  $C_6H_8GeN_2O_{12}$  (anhydrous) **Molecular Weight:** 372.745 (anhydrous) **CAS RN:** 67786-11-2 **Properties:** hygr [ALD94]

### 158

**Compound:** Ammonium heptafluorotantalate **Formula:** (NH<sub>4</sub>)<sub>2</sub>TaF<sub>7</sub> **Molecular Formula:** F<sub>7</sub>H<sub>8</sub>N<sub>2</sub>Ta **Molecular Weight:** 350.014 **CAS RN:** 12022-02-5 **Properties:** hygr [ALD93]

#### 159

**Compound:** Ammonium hexabromoosmiate(IV) **Formula:** (NH<sub>4</sub>)<sub>2</sub>OsBr<sub>6</sub> **Molecular Formula:** Br<sub>6</sub>H<sub>8</sub>N<sub>2</sub>Os **Molecular Weight:** 705.731 **CAS RN:** 24598-62-7 **Properties:** black powd [ALF93]

#### 160

**Compound:** Ammonium hexabromoplatinate(IV) **Formula:** (NH<sub>4</sub>)<sub>2</sub>PtBr<sub>6</sub> **Molecular Formula:** Br<sub>6</sub>H<sub>8</sub>N<sub>2</sub>Pt **Molecular Weight:** 710.581 **CAS RN:** 17363-02-9 **Properties:** reddish brown powd [ALF93] **Density, g/cm<sup>3</sup>:** 4.26 [ALD94] **Melting Point, °C:** decomposes at 145 [ALF93]

## 161

**Compound:** Ammonium hexachloroiridate(III) **Formula:** (NH<sub>4</sub>)<sub>3</sub>IrCl<sub>6</sub> **Molecular Formula:** Cl<sub>6</sub>H<sub>12</sub>IrN<sub>3</sub> **Molecular Weight:** 459.048 **CAS RN:** 15752-05-3 **Properties:** olive green powd [ALF93]

## 162

Compound: Ammonium hexachloroiridate(III) monohydrate Formula:  $(NH_4)_3IrCl_6 \cdot H_2O$  Molecular Weight: 477.063 CAS RN: 29796-57-4 Properties: hygr [ALD93]

## 163

24

Compound: Ammonium hexachloroiridate(IV) Formula:  $(NH_4)_2IrCl_6$ Molecular Formula:  $Cl_6H_8IrN_2$ Molecular Weight: 441.010 CAS RN: 16940-92-4 Properties: black cryst powd [ALD93] [STR93] Solubility: g/100 g H<sub>2</sub>O: 0.556 (0°C), 0.706 (10°C), 0.77 (20°C), 1.21 (30°C), 1.57 (40°C), 2.46 (60°C), 4.38 (80°C), decomposes (90°C) [LAN05] Density, g/cm<sup>3</sup>: 2.856 [ALD93] Melting Point, °C: decomposes [STR93]

164

Compound: Ammonium hexachloroosmiate(IV)
Synonym: ammonium osmium chloride
Formula: (NH<sub>4</sub>)<sub>2</sub>OsCl<sub>6</sub>
Molecular Formula: Cl<sub>6</sub>H<sub>8</sub>N<sub>2</sub>Os
Molecular Weight: 439.023
CAS RN: 12125-08-5
Properties: red powd or dark red octahedral cryst [MER06]
Solubility: s H<sub>2</sub>O, alcohol [MER06]
Density, g/cm<sup>3</sup>: 2.930 [ALD93]
Melting Point, °C: sublimes at 170 [ALF93]

### 165

**Compound:** Ammonium hexachloropalladate(IV) **Formula:** (NH<sub>4</sub>)<sub>2</sub>PdCl<sub>6</sub> **Molecular Formula:** Cl<sub>6</sub>H<sub>8</sub>N<sub>2</sub>Pd **Molecular Weight:** 355.213 **CAS RN:** 19168-23-1 **Properties:** hygr; reddish brown cryst [ALF93] [STR93] **Density, g/cm<sup>3</sup>:** 2.418 [STR93] **Melting Point, °C:** decomposes [STR93]

## 166

Compound: Ammonium hexachloroplatinate(IV) Synonym: ammonium chloroplatinate Formula: (NH<sub>4</sub>)<sub>2</sub>PtCl<sub>6</sub> Molecular Formula: Cl<sub>6</sub>H<sub>8</sub>N<sub>2</sub>Pt Molecular Weight: 443.873 CAS RN: 16919-58-7 Properties: cub, reddish orange cryst or yellow powd [KIR82] [MER06] Solubility: g/100 g H<sub>2</sub>O: 0.289 (0°C), 0.374 (10°C), 0.499 (20°C), 0.637 (30°C), 0.815 (40°C), 1.44 (60°C), 2.16 (80°C), 2.61 (90°C), 3.36 (100°C) [LAN05]; i alcohol [HAW93]
Density, g/cm<sup>3</sup>: 3.065 [ALD93]
Melting Point, °C: decomposes at >380 [KIR81]

### 167

Compound: Ammonium hexachlororhodate(III) monohydrate Formula: (NH<sub>4</sub>)<sub>3</sub>RhCl<sub>6</sub>·H<sub>2</sub>O Molecular Formula: Cl<sub>6</sub>H<sub>14</sub>N<sub>3</sub>ORh Molecular Weight: 387.752 CAS RN: 15336-18-2 Properties: red hygr cryst [STR93] [ALF95]

### 168

**Compound:** Ammonium hexachlororuthenate(IV) **Formula:** (NH<sub>4</sub>)<sub>2</sub>RuCl<sub>6</sub> **Molecular Formula:** Cl<sub>6</sub>H<sub>8</sub>N<sub>2</sub>Ru **Molecular Weight:** 349.863 **CAS RN:** 18746-63-9 **Properties:** red cryst [ALF93]

## 169

Compound: Ammonium hexacyanoferrate(II) monohydrate Synonym: ammonium ferrocyanide Formula:  $(NH_4)_4Fe(CN)_6 \cdot H_2O$ Molecular Formula:  $C_6H_{18}FeN_{10}O$ Molecular Weight: 302.120 CAS RN: 14481-29-9 Properties: yellowish green powd; hygr; light sensitive [STR93] [ALD94]; a trihydrate with similar properties is listed in [CRC10] and [MER06] Solubility: trihydrate s H<sub>2</sub>O [MER06] Melting Point, °C: decomposes [MER06] Reactions: minus NH<sub>3</sub> on exposure to air and light [MER06]

### 170

**Compound:** Ammonium hexafluoroaluminate **Synonym:** ammonium aluminum fluoride **Formula:**  $(NH_4)_3AIF_6$  **Molecular Formula:**  $AIF_6H_{12}N_3$  **Molecular Weight:** 195.087 **CAS RN:** 7784-19-2 **Properties:** white powd; cub; does not attack glass; preparation:  $NH_4F$  and  $Al(OH)_3$ ; uses: preparation of pure  $NH_4F$  [STR93] [MER06] **Solubility:** s H<sub>2</sub>O [MER06] Density, g/cm<sup>3</sup>: 1.78 [MER06] Melting Point, °C: thermally stable to above 100 [MER06]

## 171

**Compound:** Ammonium hexafluorogallate **Formula:**  $(NH_4)_3GaF_6$  **Molecular Formula:**  $F_6GaH_{12}N_3$  **Molecular Weight:** 237.828 **CAS RN:** 14639-94-2 **Properties:** octahedra; preparation: reaction of Ga(OH)<sub>3</sub>,

HF, NH<sub>4</sub>F; uses: preparation of GaF<sub>3</sub> [MER06] **Reactions:** heating in air forms Ga<sub>2</sub>O<sub>3</sub>, forms GaN

if heated in a vacuum at 200°C [MER06]

### 172

Compound: Ammonium hexafluorogermanate Formula: (NH<sub>4</sub>)<sub>2</sub>GeF<sub>6</sub> Molecular Formula: F<sub>6</sub>GeH<sub>8</sub>N<sub>2</sub> Molecular Weight: 222.677 CAS RN: 16962-47-3 Properties: white cryst [HAW93] Solubility: s H<sub>2</sub>O; i alcohol [HAW93] Density, g/cm<sup>3</sup>: 2.564 [HAW93] Melting Point, °C: sublimes at 380 [HAW93]

## 173

Compound: Ammonium hexafluorophosphate Formula: (NH<sub>4</sub>)PF<sub>6</sub> Molecular Formula: F<sub>6</sub>H<sub>4</sub>NP Molecular Weight: 163.003 CAS RN: 16941-11-0 Properties: white cryst; square leaflets or tables; cub [MER06] [STR93] Solubility: 74.8 g/100 mL H<sub>2</sub>O (20°C) [MER06] Density, g/cm<sup>3</sup>: 2.180 [MER06] Melting Point, °C: decomposes at 58 [CIC73]

## 174

Compound: Ammonium hexafluorosilicate Synonym: cryptohalite Formula: (NH<sub>4</sub>)<sub>2</sub>SiF<sub>6</sub> Molecular Formula: F<sub>6</sub>H<sub>8</sub>N<sub>2</sub>Si Molecular Weight: 178.153 CAS RN: 16919-19-0 Properties: white, odorless, cryst powd; cub or trig; used in soldering flux, to etch glass, and in pesticides [MER06] Solubility: s H<sub>2</sub>O; i alcohol [MER06] [HAW93] Density, g/cm<sup>3</sup>: 2.011 [ALD93] Melting Point, °C: decomposes [ALF93]

#### 175

**Compound:** Ammonium hexafluorotitanate dihydrate **Formula:**  $(NH_4)_2TiF_6 \cdot 2H_2O$  **Molecular Formula:**  $F_6H_{12}N_2O_2Ti$  **Molecular Weight:** 233.964 **CAS RN:** 16962-40-6 **Properties:** white cryst [STR93] **Melting Point,** °C: decomposes [CRC10]

## 176

Compound: Ammonium hydrogen acetate Synonym: ammonium acetate double salt Formula: (NH<sub>4</sub>)H(CH<sub>3</sub>COO)<sub>2</sub> Molecular Formula: C<sub>4</sub>H<sub>11</sub>NO<sub>4</sub> Molecular Weight: 137.136 CAS RN: 631-61-8 Properties: prepared by dissolving ammonium acetate in hot acetic acid; the product crystallizes as long, deliq needles [KIR78] Solubility: v s H<sub>2</sub>O [KIR78] Melting Point, °C: 66 [KIR78]

### 177

Compound: Ammonium hydrogen arsenate
Formula: (NH<sub>4</sub>)<sub>2</sub>HAsO<sub>4</sub>
Molecular Formula: AsH<sub>9</sub>N<sub>2</sub>O<sub>4</sub>
Molecular Weight: 176.004
CAS RN: 7784-44-3
Properties: white powd, efflorescing in air with loss of NH<sub>3</sub> [HAW93]
Solubility: s H<sub>2</sub>O, decomposed by hot H<sub>2</sub>O [HAW93]
Density, g/cm<sup>3</sup>: 1.99 [HAW93]
Melting Point, °C: decomposes [CRC10]

## 178

Compound: Ammonium hydrogen borate trihydrate
Formula: (NH<sub>4</sub>)HB<sub>4</sub>O<sub>7</sub>·3H<sub>2</sub>O
Molecular Formula: B<sub>4</sub>H<sub>11</sub>NO<sub>10</sub>
Molecular Weight: 228.332
CAS RN: 10135-84-9
Properties: colorless cryst; effloresces evolving NH<sub>3</sub>; obtained by the reaction of NH<sub>4</sub>OH and boric acid, then cryst of product; used to fireproof materials [HAW93]
Solubility: s H<sub>2</sub>O [HAW93]
Density, g/cm<sup>3</sup>: 2.38–2.95 [HAW93]

## 179

**Compound:** Ammonium hydrogen carbonate **Synonym:** ammonium bicarbonate

Formula: NH<sub>4</sub>HCO<sub>3</sub> Molecular Formula: CH<sub>5</sub>NO<sub>3</sub> Molecular Weight: 79.056

CAS RN: 1066-33-7

- **Properties:** white cryst; vapor pressure, kPa: 59 (25.4°C), 122 (34.2°C), 201 (40.7°C), 278 (45.0°C), 395 (50.0°C), 72.1 (54.0°C), 108.4 (59.2°C); manufactured by passing CO<sub>2</sub> gas through NH<sub>4</sub>OH solution, which evolves heat, followed by crystallization of ammonium bicarbonate; used as a leavening agent for cookies, crackers, and in fire-extinguisher materials [HAW93] [KIR78]
- **Solubility:** g/100 g soln, H<sub>2</sub>O: 10.6 (0°C); 19.9 (25°C); 78.0 (100°C); equilibrium solid phase, NH<sub>4</sub>HCO<sub>3</sub> [KRU93]; i alcohol [HAW93]
- Density, g/cm<sup>3</sup>: 1.586 [KIR78]
- Melting Point, °C: 107.5 (v rapid heating) [MER06]

Boiling Point, °C: sublimes at ~60 with

decomposition [MER06]

**Reactions:** decomposed by hot  $H_2O$  [MER06]

### 180

Compound: Ammonium hydrogen citrate
Synonym: diammonium citrate
Formula: (NH<sub>4</sub>)<sub>2</sub>HC<sub>6</sub>H<sub>5</sub>O<sub>7</sub>
Molecular Formula: C<sub>6</sub>H<sub>14</sub>N<sub>2</sub>O<sub>7</sub>
Molecular Weight: 226.186
CAS RN: 3012-65-5
Properties: granules or cryst; white; stable in air; used in metal cleaning applications [KIR78] [MER06]
Solubility: 100 g/100 mL H<sub>2</sub>O at 25°C; sl s alcohol; i ether [KIR78]
Density, g/cm<sup>3</sup>: 1.48 [MER06]

### 181

Compound: Ammonium hydrogen fluoride Synonym: ammonium bifluoride Formula: NH<sub>4</sub>HF<sub>2</sub> Molecular Formula: F<sub>2</sub>H<sub>5</sub>N Molecular Weight: 57.044 CAS RN: 1341-49-7 Properties: white, deliq flakes; ortho-rhomb cryst; enthalpy of fusion 19.1 kJ/mol; enthalpy of vaporization 65.3 kJ/mol; enthalpy of solution 20.3 kJ/mol; enthalpy of dissociation to form NH<sub>3</sub> and HF 141.4 kJ/mol; can be prepared by dehydration of NH<sub>4</sub>F solutions; can be used as a less hazardous substitute for HF [KIR78] [MER06] [HAW93] Solubility: 41.5% in H<sub>2</sub>O at 25°C; 1.73% in 90% alcohol at 25°C [KIR78] [HAW93] Density, g/cm<sup>3</sup>: 1.50 [KIR78] Melting Point, °C: 126.1 [KIR78] Boiling Point, °C: 239.5 [KIR78]

## 182

**Compound:** Ammonium hydrogen oxalate hemihydrate **Synonym:** ammonium binoxalate **Formula:**  $NH_4HC_2O_4 \cdot 1/2H_2O$  **Molecular Formula:**  $C_2H_6NO_{45}$  **Molecular Weight:** 116.022 **CAS RN:** 37541-72-3 **Properties:** monohydrate: rhomb; uses: removes ink stains [MER06] **Solubility:** monohydrate: s 25 parts H<sub>2</sub>O; sl s alcohol [MER06] **Melting Point,** °C: decomposes at 220 [ALD93]

## 183

Compound: Ammonium hydrogen oxalate monohydrate
Synonym: ammonium binoxalate monohydrate
Formula: NH<sub>4</sub>OOCCOOH · H<sub>2</sub>O
Molecular Formula: C<sub>2</sub>H<sub>7</sub>NO<sub>5</sub>
Molecular Weight: 125.081
CAS RN: 5972-72-5
Properties: colorless rhomb cryst; obtained from solution of NH<sub>4</sub>OH and oxalic acid, then cryst; used to remove ink from fabrics [HAW93] [MER06]
Solubility: s 25 parts H<sub>2</sub>O [MER06]
Density, g/cm<sup>3</sup>: 1.56 [MER06]
Melting Point, °C: decomposed by heating [HAW93]

### 184

Compound: Ammonium hydrogen phosphate Synonym: ammonium phosphate dibasic Formula:  $(NH_4)_2HPO_4$ Molecular Formula:  $H_9N_2O_4P$ Molecular Weight: 132.055 CAS RN: 7783-28-0 Properties: cryst or powd; gradually loses about 8% NH<sub>3</sub> when exposed to air [MER06] Solubility: g/100 g soln, H<sub>2</sub>O: 36.4 (0°C), 41.0 (25°C), 58.6 (100°C); equilibrium solid phase (NH<sub>4</sub>)<sub>2</sub>HPO<sub>4</sub> [KRU93] Density, g/cm<sup>3</sup>: 1.619 [ALF93] Melting Point, °C: decomposes at 155 [ALF93]

## 185

Compound: Ammonium hydrogen phosphite monohydrate Formula:  $(NH_4)_2HPO_3 \cdot H_2O$ Molecular Formula:  $H_{11}N_2O_4P$ Molecular Weight: 134.072 CAS RN: 51503-61-8 Properties: deliq cryst [MER06] Solubility: s  $H_2O$  [MER06] Density, g/cm<sup>3</sup>: 1.619 (anhydrous) [CRC10] Melting Point, °C: decomposes at 155 (anhydrous) [CRC10]

## 186

Compound: Ammonium hydrogen sulfate
Synonym: ammonium bisulfate
Formula: (NH<sub>4</sub>)HSO<sub>4</sub>
Molecular Formula: H<sub>5</sub>NO<sub>4</sub>S
Molecular Weight: 115.111
CAS RN: 7803-63-6
Properties: white powd; cryst, deliq; used as catalyst in organic syntheses and in hair wave formulations [HAW93] [STR93] [MER06]
Solubility: 100 g/100 g H<sub>2</sub>O (0°C) [CIC73]; i acetone, alcohol [HAW93]
Density, g/cm<sup>3</sup>: 1.78 [CIC73]
Melting Point, °C: 146.9 [CIC73]

#### 187

Compound: Ammonium hydrogen sulfide Synonyms: ammonium hydrosulfide, ammonium bisulfide Formula: NH<sub>4</sub>HS **Molecular Formula:** H<sub>5</sub>NS Molecular Weight: 51.113 CAS RN: 12124-99-1 Properties: white; tetr or ortho-rhomb; vapor pressure 99.7 kPa at 32.1°C; readily sublimes; produced from stoichiometric amounts of NH<sub>3</sub> and H<sub>2</sub>S at 0°C [MER06] [KIR78] Solubility:  $128.1 \text{ g}/100 \text{ g H}_2\text{O}$  (0°C), decomposes in hot H<sub>2</sub>O [CIC73]; i ether, benzene [KIR78] Density, g/cm<sup>3</sup>: 1.17 [CIC73] Melting Point, °C: 118 [CIC73] Reactions: decomposes to H<sub>2</sub>S and NH<sub>3</sub> at room temp [MER06]

#### 188

Compound: Ammonium hydrogen sulfite Synonym: ammonium bisulfite Formula:  $(NH_4)HSO_3$ Molecular Formula:  $H_5NO_3S$ Molecular Weight: 99.111 CAS RN: 10192-30-0 Properties: cryst; available commercially only in solution form; uses: preservative [MER06] Solubility: g/100 g soln,  $H_2O$ : 72.2 ± 0.4 (0°C), 78.41 (25°C), 85.4 ± 0.7 (60°C); equilibrium solid phase,  $(NH_4)_2S_2O_5$  [KRU93] Density, g/cm<sup>3</sup>: 2.03 [CIC73] Melting Point, °C: sublimes at 150 [CIC73]

### 189

Compound: Ammonium hydrogen tartrate Synonym: ammonium bitartrate Formula: (NH<sub>4</sub>)OOCCH(OH)CH(OH)COOH Molecular Formula: C<sub>4</sub>H<sub>9</sub>NO<sub>6</sub> Molecular Weight: 167.118 CAS RN: 3095-65-6 Properties: white, odorless cryst; used in baking powd [HAW93] [MER06] Solubility: g/100 g H<sub>2</sub>O: 1.00 (0°C), 1.88 (10°C), 2.70 (20°C) [LAN05]; s acids, alkalies; i alcohol [HAW93] Density, g/cm<sup>3</sup>: 1.68 [MER06] Melting Point, °C: decomposes [CRC10]

## 190

Compound: Ammonium hydrogen tetraborate dihydrate
Formula: (NH<sub>4</sub>)HB<sub>4</sub>O<sub>7</sub> · 2H<sub>2</sub>O
Molecular Formula: B<sub>4</sub>H<sub>9</sub>NO<sub>9</sub>
Molecular Weight: 210.317
CAS RN: 12228-86-3
Properties: cryst [ALF93]
Melting Point, °C: decomposes (tetraborate) [CRC10]

#### 191

Compound: Ammonium hydroxide Synonym: ammonia solution Formula: NH<sub>4</sub>OH Molecular Formula: H<sub>5</sub>NO Molecular Weight: 35.046 CAS RN: 1336-21-6 Properties: colorless liq; strong odor of ammonia; dissolved NH<sub>3</sub> concentration ranges up to 30% [HAW93] Density, g/cm<sup>3</sup>: 0.900 [ALD94]

#### 192

Compound: Ammonium hypophosphite Formula: NH<sub>4</sub>H<sub>2</sub>PO<sub>2</sub> Molecular Formula: H<sub>6</sub>NO<sub>2</sub>P Molecular Weight: 83.028 CAS RN: 7803-65-8 Properties: hygr; deliq cryst or white granules; uses: catalyst in the manufacture of polyamide [MER06] Solubility: g/100 mL H<sub>2</sub>O: 83 (room temp) [KRU93]; s alcohol [HAW93] Density, g/cm<sup>3</sup>: 1.634 [CRC10] Melting Point, °C: on heating, decomposes evolving phosphine gas [MER06]

### 193

Compound: Ammonium iodate Formula: NH<sub>4</sub>IO<sub>3</sub> Molecular Formula: H<sub>4</sub>INO<sub>3</sub> Molecular Weight: 192.941 CAS RN: 13446-09-8 Properties: white, granular powd; oxidizing agent [HAW93] Solubility: g/100 mL H<sub>2</sub>O: 2.06 (15°C), 14.5 (101°C) [CRC10] Density, g/cm<sup>3</sup>: 3.309 [CRC10] Melting Point, °C: decomposes at 150 [CRC10] [ALF93]

# 194

Compound: Ammonium iodide Formula: NH<sub>4</sub>I **Molecular Formula:** H<sub>4</sub>IN Molecular Weight: 144.943 CAS RN: 12027-06-4 Properties: white, odorless, very hygr; tetr; yellow to brown on exposure to air due to liberation of some iodine; vapor pressure, kPa: 31.3 (360°C), 54.1 (380°C), 89.8 (400°C), 101.1 (405°C); enthalpy of fusion 21.00 kJ/mol; formed by reacting NH<sub>3</sub> with I<sub>2</sub>; finds some use in photography [KIR78] [MER06] [CRC10] Solubility: g/100 g soln, H<sub>2</sub>O: 60.55 (0°C), 64.65 (25°C), 71.3 (100°C); equilibrium solid phase NH<sub>4</sub>I [KRU93]; g/100 g H<sub>2</sub>O: 154.2 (0°C), 172.3 (20°C), 250.3 (100°C) [KIR78]; s alcohol [HAW93] Density, g/cm<sup>3</sup>: 2.514 [CIC73] Melting Point, °C: partly decomposes and sublimes if heated [MER06] Boiling Point, °C: 220 in vacuum [CIC73]

195

Compound: Ammonium magnesium chloride hexahydrate Synonym: carnallite Formula:  $NH_4Cl \cdot MgCl_2 \cdot 6H_2O$ Molecular Formula:  $Cl_3H_{16}MgNO_6$ Molecular Weight: 256.793 CAS RN: 39733-35-2 Properties: deliq cryst [MER06] Solubility: s in 6 parts  $H_2O$  [MER06] Density, g/cm<sup>3</sup>: 1.456 [CRC10] Reactions: minus  $2H_2O$ , 100°C [CRC10]

## 196

**Compound:** Ammonium mercuric chloride dihydrate **Synonym:** mercuric ammonium chloride

Formula: (NH<sub>4</sub>)<sub>2</sub>HgCl<sub>4</sub>·2H<sub>2</sub>O
Molecular Formula: Cl<sub>4</sub>H<sub>12</sub>HgN<sub>2</sub>O<sub>2</sub>
Molecular Weight: 440.852
CAS RN: 33445-15-7
Properties: powd; uses: ointment for chronic eczema, antifungal [MER06]
Solubility: s H<sub>2</sub>O [MER06]

### 197

 $\label{eq:compound: Ammonium metatungstate hexahydrate} Formula: (NH_4)_6W_7O_{24} \cdot 6H_2O \\ \mbox{Molecular Formula: } H_{36}N_6O_{30}W_7 \\ \mbox{Molecular Weight: } 1887.188 \\ \mbox{CAS RN: } 12028-48-7 \\ \mbox{Properties: white cryst; formula also given as} \\ (NH_4)_6H_2W_{12}O_{40} \mbox{ and } (NH_4)_6W_{12}O_{39} \cdot 4H_2O; \\ \mbox{preparation: reaction of NH_4OH with tungstic acid; } \\ \mbox{uses: to prepare tungsten alloys and ammonium } \\ \mbox{photungstate [HAW93] [STR93] [ALD94]} \\ \mbox{Solubility: s } H_2O; \mbox{ i alcohol [HAW93]} \\ \end{tabular}$ 

## 198

Compound: Ammonium metavanadate Synonym: ammonium vanadate Formula:  $NH_4VO_3$ Molecular Formula:  $H_4NO_3V$ Molecular Weight: 116.979 CAS RN: 7803-55-6 Properties: white or sl yellow cryst powd; loses  $H_2O$  and  $NH_3$  on heating; obtained by precipitation with  $NH_4C1$  from alkaline  $V_2O_5$  solutions; used as a catalyst in dyes and varnishes [HAW93] [MER06] Solubility: g/100 g  $H_2O$ : 0.48 (20°C), 0.84 (30°C), 1.32 (40°C), 2.42 (60°C) [LAN05] Density, g/cm<sup>3</sup>: 2.326 [HAW93] Melting Point, °C: decomposes at 210 [HAW93]

### 199

Compound: Ammonium molybdate tetrahydrate Synonym: ammonium molybdate(VI) Formula:  $(NH_4)_6Mo_7O_{24} \cdot 4H_2O$ Molecular Formula:  $H_{32}Mo_7N_6O_{28}$ Molecular Weight: 1235.857 CAS RN: 12054-85-2 Properties: colorless, sl greenish or yellowish cryst; obtained by crystallization from a solution of MoO<sub>3</sub> with excess NH<sub>3</sub>; used to prepare specialty catalysts [KIR81] [MER06] Solubility: s 2.3 parts H<sub>2</sub>O [MER06]; i alcohol [HAW93] Density, g/cm<sup>3</sup>: 2.498 [ALD93] Melting Point, °C: decomposes [HAW93]

#### 200

Compound: Ammonium nickel chloride hexahydrate
Synonym: nickel ammonium chloride
Formula: NH<sub>4</sub>Cl·NiCl<sub>2</sub>·6H<sub>2</sub>O
Molecular Formula: Cl<sub>3</sub>H<sub>16</sub>NNiO<sub>6</sub>
Molecular Weight: 291.181
CAS RN: 16122-03-5
Properties: green cryst; deliq; obtained from salt solutions by crystallization; used as a dye mordant and for metal finishing [KIR81] [HAW93]

Solubility: s H<sub>2</sub>O [HAW93]

Density, g/cm<sup>3</sup>: 1.65 [HAW93]

## 201

Compound: Ammonium nickel sulfate hexahydrate Synonym: nickel ammonium sulfate Formula:  $(NH_4)_2SO_4 \cdot NiSO_4 \cdot 6H_2O$ Molecular Formula:  $H_{20}N_2NiO_{14}S_2$ Molecular Weight: 394.989 CAS RN: 7785-20-8 Properties: bluish green cryst; decomposes on heating; obtained from an aq solution by crystallization; used as a dye mordant and in metal finishing

[KIR81] [MER06] [HAW93] [ALF93]

**Solubility:** g (NH<sub>4</sub>)<sub>2</sub>Ni(SO<sub>4</sub>)<sub>2</sub>/100 g H<sub>2</sub>O: 1.00 (0°C), 4.00 (10°C), 6.50 (20°C), 9.20 (30°C), 12.0 (40°C), 17.0 (60°C) [LAN05]; i alcohol [HAW93] **Density, g/cm<sup>3</sup>:** 1.923 [MER06]

## 202

Compound: Ammonium nitrate Formula: NH<sub>4</sub>NO<sub>3</sub> Molecular Formula: H<sub>4</sub>N<sub>2</sub>O<sub>3</sub> Molecular Weight: 80.043 CAS RN: 6484-52-2 **Properties:** white, transparent, hygr cryst; vapor pressure of saturated NH<sub>4</sub>NO<sub>3</sub> solutions, kPa: 0.85 (10°C), 1.5 (20°C), 2.5 (30°C), 3.9 (40°C); five cryst forms, stable at:  $\alpha$ , < –18°C; β, -18°C-32.1°C; γ, 32.1°C-84.2°C; δ, 84.2°C–125.2°C; ε, 125.7°C–169.6°C; enthalpy of fusion 6.40 kJ/mol; enthalpy of neutralization 51.8 kJ/mol; manufactured by neutralization of HNO<sub>3</sub> solutions with NH<sub>3</sub>; used as a fertilizer and in explosives [MER06] [KIR78] [CRC10] **Solubility:** g/100 g soln, H<sub>2</sub>O: 54.2 (0°C), 68.2 (25°C), 90.3 (100°C); equilibrium solid phase NH<sub>4</sub>NO<sub>3</sub> [KRU93] Density, g/cm<sup>3</sup>: 1.725 [CIC73]

Melting Point, °C: 169.6 [CRC10]
Boiling Point, °C: 210 (11 mm Hg) [CIC73]
Reactions: decomposes ~210°C to H<sub>2</sub>O+N<sub>2</sub>O [MER06]
Thermal Expansion Coefficient: coefficient of expansion is 0.000920 (20°C), 0.001113 (100°C) [KIR78]

#### 203

Compound: Ammonium nitrite
Formula: NH<sub>4</sub>NO<sub>2</sub>
Molecular Formula: H<sub>4</sub>N<sub>2</sub>O<sub>2</sub>
Molecular Weight: 64.044
CAS RN: 13446-48-5
Properties: white-yellowish cryst; uncertain stability; can be made by adding a solution of barium nitrite to ammonium sulfate solution [KIR78] [CRC10]
Solubility: g/100 g soln, H<sub>2</sub>O: 56.0 (1.4°C), 64.3 (19.15°C); equilibrium solid phase NH<sub>4</sub>NO<sub>2</sub> [KRU93]
Density, g/cm<sup>3</sup>: 1.69 [CIC73]
Melting Point, °C: explodes at 60–70, producing N<sub>2</sub>, H<sub>2</sub>O, and other products [KIR78] [CIC73]

# 204

**Compound:** Ammonium nitroferricyanide **Synonym:** ammonium nitroprusside **Formula:**  $(NH_4)_2Fe(CN)_5NO$ **Molecular Formula:**  $C_5H_8FeN_8O$ **Molecular Weight:** 252.017 **CAS RN:** 14402-70-1 **Properties:** red to brownish red cryst [MER06] **Solubility:** s H<sub>2</sub>O, alcohol [MER06]

### 205

**Compound:** Ammonium O,O-diethyldithiophosphate **Formula:**  $(C_2H_5O)_2P(S)SNH_4$  **Molecular Formula:**  $C_4H_{14}NO_2PS_2$  **Molecular Weight:** 203.267 **CAS RN:** 1068-22-0 **Properties:** cryst [ALF95] **Melting Point,** °C: 164–165 [ALF95]

## 206

**Compound:** Ammonium oleate **Synonym:** ammonium soap **Formula:** CH<sub>3</sub>(CH<sub>2</sub>)<sub>7</sub>CH=CH(CH<sub>2</sub>)<sub>7</sub>COONH<sub>4</sub> **Molecular Formula:** C<sub>18</sub>H<sub>37</sub>NO<sub>2</sub> **Molecular Weight:** 299.498 **CAS RN:** 544-60-5

**Properties:** yellowish brown paste, softens at 10°C–13°C; used to emulsify products, and in cosmetics [MER06] [HAW93]

**Solubility:** s H<sub>2</sub>O (27°C); sl s acetone [MER06] **Melting Point,** °C: 21–22 [MER06]

#### 207

**Compound:** Ammonium oxalate **Synonyms:** ethanedioic acid, diammonium salt **Formula:**  $(NH_4)_2C_2O_4$ **Molecular Formula:**  $C_2H_8N_2O_4$ 

Molecular Weight: 124.097

#### CAS RN: 1113-38-8

**Properties:** colorless cryst; used as an analytical chemistry reagent, to manufacture oxalates, for removing rust and scale [HAW93]

**Solubility:** g/100 g soln, H<sub>2</sub>O: 2.31 (0°C), 4.95 (25°C), 25.73 (100°C) [KRU93]

Density, g/cm<sup>3</sup>: 1.5 [ALF93]

### 208

Compound: Ammonium oxalate monohydrate
Synonyms: ethanedioic acid, diammonium salt monohydrate
Formula: (NH<sub>4</sub>)<sub>2</sub>C<sub>2</sub>O<sub>4</sub>·H<sub>2</sub>O
Molecular Formula: C<sub>2</sub>H<sub>10</sub>N<sub>2</sub>O<sub>5</sub>
Molecular Weight: 142.111
CAS RN: 6009-70-7
Properties: white, granular, odorless cryst; orthorhomb; used in analytical chemistry and to remove rust [MER06] [ALF93] [HAW93]
Solubility: 1 g/20 mL H<sub>2</sub>O, 2.6 mL boiling H<sub>2</sub>O [MER06]
Density, g/cm<sup>3</sup>: 1.502 [HAW93]

Melting Point, °C: decomposes on heating [HAW93]

## 209

Compound: Ammonium palmitate Synonyms: hexadecanoic acid, ammonium salt Formula: CH<sub>3</sub>(CH<sub>2</sub>)<sub>14</sub>COONH<sub>4</sub> Molecular Formula: C<sub>16</sub>H<sub>35</sub>NO<sub>2</sub> Molecular Weight: 273.460 CAS RN: 593-26-0 Properties: yellowish white powd, softens at 3°C–4°C [MER06] Solubility: s H<sub>2</sub>O [MER06]; s hot alcohols, benzene [HAW93] Melting Point, °C: 21–23 [MER06]

## 210

**Compound:** Ammonium pentaborate tetrahydrate Formula:  $(NH_4)B_5O_8 \cdot 4H_2O$ Molecular Formula:  $B_5H_{12}NO_{12}$ Molecular Weight: 272.150 CAS RN: 12229-12-8 Properties: two cryst forms: ortho-rhomb (α) and monocl (β); very stable with respect to loss of NH<sub>3</sub>, losing less than 1% NH<sub>3</sub> at 50°C and only 2% at 200°C; prepared from an aq solution of NH<sub>3</sub> and boric acid; used in flameproofing formulations [HAW93] [KIR78]
Solubility: % anhydrous by weight, H<sub>2</sub>O: 4.00 (0°C), 8.03 (25°C), 14.4 (50°C), 30.3 (90°C) [KIR78]
Density, g/cm<sup>3</sup>: 1.58 [KIR78]
Reactions: minus 75% of the H<sub>2</sub>O content at 50°C [KIR78]

# 211

Compound: Ammonium pentachlororhodate(III) monohydrate Formula: (NH<sub>4</sub>)<sub>2</sub>RhCl<sub>5</sub>·H<sub>2</sub>O Molecular Formula: Cl<sub>5</sub>H<sub>10</sub>N<sub>2</sub>ORh Molecular Weight: 334.261 CAS RN: 63771-33-5 Properties: red cryst [ALF93] Melting Point, °C: 210–230, decomposes [ALF93]

## 212

Compound: Ammonium pentachlororuthenate(III) monohydrate Formula:  $(NH_4)_2RuCl_5 \cdot H_2O$ Molecular Formula:  $Cl_5H_{10}N_2ORu$ Molecular Weight: 332.425 CAS RN: 68133-88-0 Properties: cryst powd [ALF93]

### 213

Compound: Ammonium pentachlorozincate Synonym: zinc ammonium chloride Formula: (NH<sub>4</sub>)<sub>3</sub>ZnCl<sub>5</sub> Molecular Formula: Cl<sub>5</sub>H<sub>12</sub>N<sub>3</sub>Zn Molecular Weight: 296.769 CAS RN: 14639-98-6 Properties: ortho-rhomb cryst; hygr; uses: manufacture of dry cell batteries, welding flux, soldering, galvanizing [MER06] Solubility: v s H<sub>2</sub>O [MER06] Density, g/cm<sup>3</sup>: 1.81 [MER06] Melting Point, °C: sublimes at 340 [MER06]

#### 214

**Compound:** Ammonium perchlorate **Formula:** NH<sub>4</sub>ClO<sub>4</sub> **Molecular Formula:** ClH<sub>4</sub>NO<sub>4</sub> **Molecular Weight:** 117.490 **CAS RN:** 7790-98-9 Properties: white cryst; oxidizing agent; ortho-rhomb, a=0.9202 nm, b=0.5816 nm, c=0.7449 nm; prepared from NH<sub>4</sub>OH, HCl and sodium chlorate with subsequent cryst; cub >240°C, a=0.763 nm; used as an oxidizer in rocket propellants [CIC73] [HAW93] [ALD93] [KIR79] [ALF93] Solubility: g/100 g soln, H<sub>2</sub>O: 10.8 (0°C), 19.8 (25°C), 46.9 (100°C); mol/kg H<sub>2</sub>O: 1.019 (0°C), 2.122 (25°C) [KRU93] Density, g/cm<sup>3</sup>: 1.95 [CIC73] Melting Point, °C: can explode; decomposed by heating [MER06] [ALD93] Reactions: transition from ortho-rhomb to cub at 513 K [KIR79]

## 215

Compound: Ammonium permanganate
Formula: NH₄MnO₄
Molecular Formula: H₄MnNO₄
Molecular Weight: 136.975
CAS RN: 13446-10-1
Properties: dark purple; rhomb; oxidizing agent [KIR78]
Solubility: g/100 g H₂O: 8 (15°C), 86 (25°C) [KIR78]
Density, g/cm<sup>3</sup>: 2.22 [KIR78]
Melting Point, °C: decomposes above 70 [KIR78]

## 216

Compound: Ammonium peroxydisulfate Synonym: ammonium persulfate Formula: (NH<sub>4</sub>)<sub>2</sub>S<sub>2</sub>O<sub>8</sub> Molecular Formula: H<sub>8</sub>N<sub>2</sub>O<sub>8</sub>S<sub>2</sub> Molecular Weight: 228.204 CAS RN: 7727-54-0 Properties: odorless, plate-like or prismatic cryst; monocl; strong oxidizing agent [MER06] Solubility: g/100 g soln, H<sub>2</sub>O: 37.0 (0°C), 45.5 (25°C), 62.0 (80°C) [KRU93] Density, g/cm<sup>3</sup>: 1.982 [ALF93] Melting Point, °C: decomposes on heating

forming  $O_2$  and  $(NH_4)_2S_2O_7$  [MER06]

## 217

Compound: Ammonium perrhenate Synonym: ammonium perrhenate(VII) Formula: NH<sub>4</sub>ReO<sub>4</sub> Molecular Formula: H<sub>4</sub>NO<sub>4</sub>Re Molecular Weight: 268.244 CAS RN: 13598-65-7 Properties: colorless powd; weak oxidizing agent [HAW93] [ALF93] Solubility: sl s cold H<sub>2</sub>O; s hot H<sub>2</sub>O [HAW93] Density, g/cm<sup>3</sup>: 3.97 [ALD93] Melting Point, °C: decomposes at 365 [HAW93]

#### 218

Compound: Ammonium phosphate dibasic
Synonym: diammonium hydrogen phosphate
Formula: (NH<sub>4</sub>)<sub>2</sub>HPO<sub>4</sub>
Molecular Formula: H<sub>9</sub>N<sub>2</sub>O<sub>4</sub>P
Molecular Weight: 132.07
CAS RN: 7883-28-0
Properties: odorless cryst or powd; used to fireproof textiles, paper, wood, and vegetable fibers, to impregnate lamp wicks, and in soldering fluxes [MER06]
Solubility: 1 g/1.7 mL H<sub>2</sub>O, 1 g in 0.5 mL boiling H<sub>2</sub>O [MER06]
Density, g/cm<sup>3</sup>: 1.619 [ALD94]
Melting Point, °C: decomposes at 155 [CRC10]

## 219

**Compound:** Ammonium phosphomolybdate **Synonym:** ammonium molybdophosphate **Formula:**  $(NH_4)_3PO_4 \cdot 12MoO_3$ **Molecular Formula:**  $H_{12}Mo_{12}N_3O_{40}P$ **Molecular Weight:** 1876.345 **CAS RN:** 54723-94-3 **Properties:** heavy, yellow, cryst powd [MER06] **Solubility:** 0.2 g/L H<sub>2</sub>O (20°C) [MER06] **Melting Point,** °C: decomposes [ALF93]

#### 220

**Compound:** Ammonium phosphotungstate dihydrate **Synonym:** ammonium tungstophosphate **Formula:**  $(NH_4)_3PO_4 \cdot 12WO_3 \cdot 2H_2O$  **Molecular Formula:**  $H_{16}N_3O_{42}PW_{12}$  **Molecular Weight:** 2967.176 **CAS RN:** 1311-90-6 **Properties:** microcryst powd [MER06] **Solubility:** 0.15 g/L H<sub>2</sub>O (20°C) [MER06]

### 221

Compound: Ammonium picrate Synonym: ammonium carbazoate Formula:  $(NH_4)C_6H_2N_3O_7$ Molecular Formula:  $C_6H_6N_4O_7$ Molecular Weight: 246.137 CAS RN: 131-74-8 Properties: bright yellow; ortho-rhomb; explodes easily from heat or shock [MER06] Solubility: 1 g/100 mL H<sub>2</sub>O (20°C) [MER06] **Density, g/cm<sup>3</sup>:** 1.72 [MER06] **Reactions:** explodes at 423 [CRC10]

## 222

**Compound:** Ammonium polysulfide **Formula:**  $(NH_4)_2S_x$  **Molecular Formula:**  $(NH_4)_2S_x$  **CAS RN:** 9080-17-5 **Properties:** exists only in solution; yellow unstable

solution with an odor of H<sub>2</sub>S; prepared by dissolving H<sub>2</sub>S gas in 28% NH<sub>4</sub>OH solution, then dissolving excess sulfur; used as an analytical chemistry reagent and as an insect spray [HAW93] **Reactions:** decomposed by acids, evolving H<sub>2</sub>S [HAW93]

## 223

Compound: Ammonium salicylate Synonyms: salicylic acid, monoammonium salt Formula:  $(NH_4)C_7H_5O_3$ Molecular Formula:  $C_7H_9NO_3$ Molecular Weight: 155.153 CAS RN: 528-94-9 Properties: odorless, lustrous cryst or white, cryst powd; discolors on exposure to light; loses some NH<sub>3</sub> on long exposure to air [MER06] Solubility: 1 g/1 mL H<sub>2</sub>O [MER06] Boiling Point of 336.3°C: sublimes [CRC10]

# 224

Compound: Ammonium selenate Formula: (NH<sub>4</sub>)<sub>2</sub>SeO<sub>4</sub> Molecular Formula: H<sub>8</sub>N<sub>2</sub>O<sub>4</sub>Se Molecular Weight: 179.035 CAS RN: 7783-21-3 Properties: white powd; colorless; monocl cryst; used to mothproof [HAW93] [MER06] [STR93] Solubility: g/100 g soln, H<sub>2</sub>O: 54.02 (25°C) [KRU93]; i alcohol [HAW93] Density, g/cm<sup>3</sup>: 2.194 [MER06] Melting Point, °C: decomposed by heating [MER06]

#### 225

Compound: Ammonium selenite
Formula: (NH<sub>4</sub>)<sub>2</sub>SeO<sub>3</sub>
Molecular Formula: H<sub>8</sub>N<sub>2</sub>O<sub>3</sub>Se
Molecular Weight: 163.035
CAS RN: 7783-19-9
Properties: white or sl reddish cryst; deliq; used to color glass [HAW93] [MER06]
Solubility: g/100 g soln, H<sub>2</sub>O: 49.21 (1°C), 54.70 (25°C), 69.08 (70°C); equilibrium solid phase, (NH<sub>4</sub>)<sub>2</sub>SeO<sub>3</sub>H<sub>2</sub>O [KRU93]
Melting Point, °C: decomposes [MER06]

### 226

Compound: Ammonium sesquicarbonate Synonym: hartshorn Formula: NH<sub>2</sub>COONH<sub>4</sub>·NH<sub>4</sub>HCO<sub>3</sub> Molecular Formula: C<sub>2</sub>H<sub>11</sub>N<sub>3</sub>O<sub>5</sub> Molecular Weight: 157.126 CAS RN: 10361-29-2 Properties: mixture of ammonium bicarbonate and ammonium carbamate; colorless; hard translucent cryst with ammonia odor; obtained from a mixture of ammonium sulfate and calcium carbonate by sublimation; used in baking powd, as a mordant in dyeing, and as an expectorant; changes to bicarbonate in air [MER06] [HAW93] Solubility: slowly s in 4 parts H<sub>2</sub>O, decomposes in hot H<sub>2</sub>O, evolving NH<sub>3</sub> and CO<sub>2</sub> [MER06] [HAW93] Melting Point, °C: volatilizes at ~60 [MER06]

### 227

Compound: Ammonium stearate Synonyms: octadecanoic acid, ammonium salt Formula: CH<sub>3</sub>(CH<sub>2</sub>)<sub>16</sub>COONH<sub>4</sub> Molecular Formula: C<sub>18</sub>H<sub>39</sub>NO<sub>2</sub> Molecular Weight: 301.514 CAS RN: 1002-89-7 Properties: yellowish white powd, softens at 1.7°C-4.4°C; used in vanishing creams, brushless shaving, and other cosmetics [MER06] [HAW93] Solubility: s H<sub>2</sub>O [MER06]; s hot toluene [HAW93] Density, g/cm<sup>3</sup>: 0.89 [HAW93] Melting Point, °C: 21–24 [MER06]

### 228

Compound: Ammonium sulfamate Synonyms: sulfamic acid, monoammonium salt Formula: (NH<sub>4</sub>)NH<sub>2</sub>SO<sub>3</sub> Molecular Formula: H<sub>6</sub>N<sub>2</sub>O<sub>3</sub>S Molecular Weight: 114.125 CAS RN: 7773-06-0 Properties: white, hygr cryst; made by reacting urea with fuming sulfuiric acid; used to flameproof textiles and in metal finishing [HAW93] [MER06] Solubility: v s H<sub>2</sub>O [MER06] Melting Point, °C: 131 [MER06] Boiling Point, °C: decomposes at 160 [HAW93]

#### 229

**Compound:** Ammonium sulfate **Synonym:** mascagnite **Formula:** (NH<sub>4</sub>)<sub>2</sub>SO<sub>4</sub> **Molecular Formula:** H<sub>8</sub>N<sub>2</sub>O<sub>4</sub>S

## Molecular Weight: 132.141

## CAS RN: 7783-20-2

Properties: brownish gray to white, odorless, orthorhomb cryst; manufactured from NH<sub>3</sub> and sulfuric acid; used as a nitrogen fertilizer, for water treatment, and as a food additive [MER06] [HAW93]
Solubility: g/100 g soln, H<sub>2</sub>O: 41.35 (0°C); 43.30 (25°C), 50.61 (100°C); equilibrium solid phase, (NH<sub>4</sub>)<sub>2</sub>SO<sub>4</sub> [KRU93]; 70.6 g/100 g H<sub>2</sub>O (0°C), 103.8 g/100 g H<sub>2</sub>O (100°C); i alcohol, acetone [KIR78]
Density, g/cm<sup>3</sup>: 1.77 [MER06]
Melting Point, °C: decomposes at >280 [MER06]

### 230

Compound: Ammonium sulfide

Formula: (NH<sub>4</sub>)<sub>2</sub>S

Molecular Formula: H<sub>8</sub>N<sub>2</sub>S

Molecular Weight: 68.143

CAS RN: 12135-76-1

Properties: yellowish orange liq; cryst below -18°C; stable only below -18°C, at higher temperatures loses NH<sub>3</sub> to form NH<sub>4</sub>HS and polysulfides; made from NH<sub>3</sub> and H<sub>2</sub>S; used in textile industry and photography [STR93] [MER06] [KIR78] [HAW93]
Solubility: s H<sub>2</sub>O, alcohol, alkalies [HAW93]
Density, g/cm<sup>3</sup>: 0.997 [ALD94]
Melting Point, °C: decomposes [HAW93]
Reactions: evolves NH<sub>3</sub> to form hydrosulfide

above –18°C [KIR78]

## 231

**Compound:** Ammonium sulfite **Formula:**  $(NH_4)_2SO_3$  **Molecular Formula:**  $H_8N_2O_3S$  **Molecular Weight:** 116.140 **CAS RN:** 17026-44-7 **Properties:** white hygr cryst [CRC10] **Solubility:** 64.2 g/100 g H<sub>2</sub>O [CRC10]

### 232

**Compound:** Ammonium sulfite monohydrate **Synonyms:** sulfurous acid, diammonium salt **Formula:**  $(NH_4)_2SO_3 \cdot H_2O$ **Molecular Formula:**  $H_{10}N_2O_4S$ **Molecular Weight:** 134.156 **CAS RN:** 7783-11-1

**Properties:** colorless cryst; loses H<sub>2</sub>O and gradually oxidizes to (NH<sub>4</sub>)<sub>2</sub>SO<sub>4</sub> when heated in air; hygr; used in medicine, metal lubricants, as a chemical reducing agent [MER06] [HAW93]

**Solubility:** g anhydrous/100 g soln, H<sub>2</sub>O: 32.40 (0°C), 39.29 (25°C), 60.44 (100°C); equilibrium phase: monohydrate (0,25°C), anhydrous (100°C) [KRU93] Density, g/cm<sup>3</sup>: 1.41 [HAW93] Melting Point, °C: sublimes with decomposition at 150 [HAW93]

# 233

Compound: Ammonium tartrate Synonyms: tartaric acid, diammonium salt Formula:  $(NH_4)_2C_4H_4O_6$ Molecular Formula:  $C_4H_{12}N_2O_6$ Molecular Weight: 184.148 CAS RN: 3164-29-2 Properties: white cryst; decomposes when heated; used in medicine and in industry [HAW93] Solubility: g/100 g H<sub>2</sub>O: 45.0 (0°C), 55.0 (10°C), 63.0 (20°C), 70.5 (30°C), 76.5 (40°C), 86.9 (60°C) [LAN05]; s alcohol [HAW93] Density, g/cm<sup>3</sup>: 1.601 [HAW93] Melting Point, °C: decomposes [CRC10]

### 234

Compound: Ammonium tellurate Synonym: ammonium tellurate(VI) Formula: (NH<sub>4</sub>)<sub>2</sub>TeO<sub>4</sub> Molecular Formula: H<sub>8</sub>N<sub>2</sub>O<sub>4</sub>Te Molecular Weight: 227.675 CAS RN: 13453-06-0 Properties: -60 mesh with 99.5% purity; white powd [ALF93] [STR93] Density, g/cm<sup>3</sup>: 3.024 [STR93] Melting Point, °C: decomposes [STR93]

#### 235

Compound: Ammonium tetraborate tetrahydrate
Synonym: ammonium borate
Formula: (NH<sub>4</sub>)<sub>2</sub>B<sub>4</sub>O<sub>7</sub>·4H<sub>2</sub>O
Molecular Formula: B<sub>4</sub>H<sub>16</sub>N<sub>2</sub>O<sub>11</sub>
Molecular Weight: 263.377
CAS RN: 12228-87-4
Properties: tetr colorless cryst; unstable, has an appreciable ammonia vapor pressure; uses: fireproofing wood and textiles [MER06] [STR93] [KIR78]
Solubility: % anhydrous by weight (H<sub>2</sub>O): 3.75 (0°C), 9.00 (25°C), 21.2 (50°C), 52.7 (90°C) [KIR78]
Density, g/cm<sup>3</sup>: 1.58 [KIR78]
Melting Point, °C: decomposes [CRC10]

### 236

**Compound:** Ammonium tetrachloroaluminate **Synonym:** aluminum ammonium chloride **Formula:** NH<sub>4</sub>AlCl<sub>4</sub> **Molecular Formula:** AlCl<sub>4</sub>H<sub>4</sub>N Molecular Weight: 186.831
CAS RN: 7784-14-7
Properties: white cryst; preparation: from AlCl<sub>3</sub> and NH<sub>4</sub>Cl; finds use in treating furs [MER06] [HAW93]
Solubility: s H<sub>2</sub>O, ether [MER06]
Melting Point, °C: 304 [MER06]

## 237

Compound: Ammonium tetrachloroaurate(III) hydrate Formula: (NH₄)AuCl₄ · xH₂O Molecular Formula: AuCl₄H₄N (anhydrous) Molecular Weight: 356.816 (anhydrous) CAS RN: 13874-04-9 Properties: yellow cryst [STR93] Melting Point, °C: 520 [ALD93]

## 238

Compound: Ammonium tetrachloropalladate(II)
Formula: (NH<sub>4</sub>)<sub>2</sub>PdCl<sub>4</sub>
Molecular Formula: Cl<sub>4</sub>H<sub>8</sub>N<sub>2</sub>Pd
Molecular Weight: 284.308
CAS RN: 13820-40-1
Properties: reddish brown powd; olive green cryst [STR93] [ALF93]
Density, g/cm<sup>3</sup>: 2.17 [ALD93]
Melting Point, °C: decomposes [CRC10]

### 239

Compound: Ammonium tetrachloroplatinate(II) Synonym: ammonium platinous chloride Formula: (NH<sub>4</sub>)<sub>2</sub>PtCl<sub>4</sub> Molecular Formula: Cl<sub>4</sub>H<sub>8</sub>N<sub>2</sub>Pt Molecular Weight: 372.968 CAS RN: 13820-41-2 Properties: dark ruby red cryst; used in photography [HAW93] [MER06] Solubility: s H<sub>2</sub>O [MER06]; i alcohol [HAW93] Density, g/cm<sup>3</sup>: 2.936 [ALD93] Melting Point, °C: decomposes at 140–150 [HAW93]

## 240

**Compound:** Ammonium tetrachlorozincate **Formula:**  $(NH_4)_2ZnCl_4$  **Molecular Formula:**  $Cl_4H_8N_2Zn$  **Molecular Weight:** 243.298 **CAS RN:** 14639-97-5 **Properties:** white, ortho plates; hygr [CRC10] **Density, g/cm<sup>3</sup>:** 1.879 [CRC10] **Melting Point, °C:** decomposes at 150 [CRC10]

### 241

**Compound:** Ammonium tetrafluoroantimonate(III) **Formula:** NH<sub>4</sub>SbF<sub>4</sub> **Molecular Formula:** F<sub>4</sub>H<sub>4</sub>NSb **Molecular Weight:** 215.789 **CAS RN:** 14972-90-8 **Properties:** white powd [STR93]

### 242

**Compound:** Ammonium tetrafluoroborate **Formula:** NF<sub>4</sub>BF<sub>4</sub> **Molecular Formula:** BF<sub>8</sub>N **Molecular Weight:** 104.844 **CAS RN:** 13826-83-0 **Properties:** white powd; ortho [CRC10] **Density, g/cm<sup>3</sup>:** 1.871 [CRC10] **Melting Point, °C:** decomposes at 487 [CRC10]

## 243

Compound: Ammonium tetranitrodiamminecobaltate(III) Synonym: Erdmann's salt Formula:  $NH_4[Co(NH_3)_2(NO_2)_4]$ Molecular Formula:  $CoH_{10}N_7O_8$ Molecular Weight: 295.054 CAS RN: 13600-89-0 Properties: reddish, pale brown rhomb [KIR79] [MER06] Solubility: s H<sub>2</sub>O [LID94] Density, g/cm<sup>3</sup>: 1.876 [KIR79]

## 244

Compound: Ammonium tetrathiocyanodiammonochromate(III) monohydrate Synonym: Reinecke salt Formula:  $NH_4[Cr(NH_3)_2(SCN)_4] \cdot H_2O$ Molecular Formula:  $C_4H_{12}CrN_7OS_4$ Molecular Weight: 354.446 CAS RN: 13573-16-5 Properties: dark red cryst or red powd; can be produced by fusion of ammonium thiocyanate with ammonium dichromate; used to precipitate primary and secondary amines and as a reagent for mercury [MER06] Solubility: sl s cold  $H_2O$ , s hot  $H_2O$ ; can decompose in aq solutions [MER06] Melting Point, °C: decomposes at 268–272 [ALD94]

### 245

**Compound:** Ammonium tetrathiomolybdate Formula:  $(NH_4)_2MoS_4$ Molecular Formula:  $H_8MoN_2S_4$ Molecular Weight: 260.281 CAS RN: 15060-55-6

**Properties:** dark red cryst powd; preparation: by passing H<sub>2</sub>S through a solution of ammonium molybdate [STR93] [ALF93] [KIR81]

## 246

**Compound:** Ammonium tetrathiotungstate Formula: (NH<sub>4</sub>)<sub>2</sub>WS<sub>4</sub> Molecular Formula: H<sub>8</sub>N<sub>2</sub>S<sub>4</sub>W Molecular Weight: 348.181

CAS RN: 13862-78-7

Properties: orange cryst powd; H<sub>2</sub>S odor; sensitive to heat; commonly made by adding NH<sub>3</sub> to a solution of tungstic acid, followed by saturation with H<sub>2</sub>S; can be used as a source of WS<sub>2</sub> by decomposition in a nonoxidizing atm [KIR83] [HAW93]
Solubility: s H<sub>2</sub>O, ammonia solutions [HAW93]

**Density, g/cm<sup>3</sup>:** 2.71 [ALD93] **Melting Point, °C:** decomposes [HAW93]

### 247

**Compound:** Ammonium tetrathiovandate(IV) **Formula:** (NH<sub>4</sub>)<sub>3</sub>VS<sub>4</sub> **Molecular Formula:** H<sub>12</sub>N<sub>3</sub>S<sub>4</sub>V **Molecular Weight:** 233.321 **CAS RN:** 14693-56-2 **Properties:** dark violet cryst [STR93]

# 248

Compound: Ammonium thiocyanate Synonym: ammonium rhodanide Formula: NH<sub>4</sub>SCN Molecular Formula: CH<sub>4</sub>N<sub>2</sub>S Molecular Weight: 76.122 CAS RN: 1762-95-4 Properties: colorless; deliq cryst; formed from solution of NH<sub>4</sub>CN with sulfur on boiling; used as fertilizer, in chemicals, and for dyeing fabrics [MER06] [HAW93] Solubility: g/100 g soln, H<sub>2</sub>O: 64.95 (26.33°C), 81.73 (71.53°C); equilibrium solid phase, NH<sub>4</sub>SCN [KRU93]; s alcohol, acetone, ammonia solutions [HAW93] Density, g/cm3: 1.3057 [HAW93] Melting Point, °C: ~149 [MER06] Boiling Point, °C: decomposes at 170 [HAW93]

### 249

Compound: Ammonium thiosulfate Synonym: ammonium hyposulfite Formula:  $(NH_4)_2S_2O_3$ Molecular Formula:  $H_8N_2O_3S_2$ Molecular Weight: 148.207 CAS RN: 7783-18-8 Properties: white cryst; used in photography, fungicides, silver plating, and hair wave preparations [MER06] [HAW93] Solubility: 103.3 g/100 g H<sub>2</sub>O at 100°C [CIC73] Density, g/cm<sup>3</sup>: 1.679 [ALD93] Melting Point, °C: decomposes at 150 [MER06]

# 250

Compound: Ammonium titanium oxalate monohydrate Synonym: ammonium bis(oxalato)oxotitanate(IV) Formula:  $(VH_4)_2TiO(C_2O_4)_2 \cdot H_2O$ Molecular Formula:  $C_4H_{10}N_2O_{10}Ti$ Molecular Weight: 293.997 CAS RN: 10580-03-7 Properties: hygr cryst; used as a mordant to dye leather and cellulosic fabrics [HAW93] [MER06] [ALD93] Solubility: v s  $H_2O$  [MER06]

## 251

**Compound:** Ammonium tungstate(VI) **Formula:**  $(NH_4)_{10}W_{12}O_{41}$  **Molecular Formula:**  $H_{40}N_{10}O_{41}W_{12}$  **Molecular Weight:** 3042.44 **CAS RN:** 11120-25-5 **Properties:** cryst powd [CRC10] **Solubility:** s H<sub>2</sub>O; i EtOH [CRC10] **Density, g/cm<sup>3</sup>:** 2.3 [CRC10]

#### 252

Compound: Ammonium tungstate pentahydrate Synonym: ammonium tungstate(VI) Formula:  $(NH_4)_{10}W_{12}O_{41} \cdot 5H_2O$ Molecular Formula:  $H_{50}N_{10}O_{46}W_{12}$ Molecular Weight: 3132.516 CAS RN: 1311-93-9 Properties: 99.999% pure plates or cryst powd; usually prepared by crystallization from a boiling solution [ALF93] [MER06] Solubility: v s H<sub>2</sub>O [MER06] Density, g/cm<sup>3</sup>: 2.3 [ALF93]

## 253

**Compound:** Ammonium uranate(VI) **Synonym:** ammonium diuranate

Formula:  $(NH_4)_2U_2O_7$ Molecular Formula:  $H_8N_2O_7U_2$ Molecular Weight: 624.131 CAS RN: 7783-22-4 Properties: -80 mesh with 99.5% purity; reddish yellow amorphous powd [MER06] [CER91] Solubility: i H<sub>2</sub>O [MER06]

### 254

**Compound:** Ammonium uranium fluoride **Formula:**  $UO_2(NH_4)_3F_5$  **Molecular Formula:**  $F_5H_{12}N_3O_2U$  **Molecular Weight:** 419.135 **CAS RN:** 18433-40-4 **Properties:** green-yellow monocl cryst [CRC10]

#### 255

Compound: Ammonium valerate Synonyms: pentanoic acid, ammonium salt Formula:  $CH_3(CH_2)_3COONH_4$ Molecular Formula:  $C_5H_{13}NO_2$ Molecular Weight: 119.164 CAS RN: 42739-38-8 Properties: very hygr cryst; used to flavor foods [HAW93] [MER06] Solubility: v s  $H_2O$  [MER06] Melting Point, °C: 108 [MER06]

## 256

Compound: Ammonium zirconyl carbonate dihydrate
Synonym: zirconium ammonium carbonate
Formula: (NH<sub>4</sub>)<sub>3</sub>ZrOH(CO<sub>3</sub>)<sub>3</sub> · 2H<sub>2</sub>O
Molecular Formula: C<sub>3</sub>H<sub>17</sub>N<sub>3</sub>O<sub>12</sub>Zr
Molecular Weight: 378.404
CAS RN: 12616-24-9
Properties: large prisms from H<sub>2</sub>O; unstable in air, gradually evolving CO<sub>2</sub> and NH<sub>3</sub>; aq solution decomposes rapidly above 60°C; used in paper and textile water repellents [HAW93] [MER06]
Solubility: s H<sub>2</sub>O [MER06]; decomposed by dil acid, alkalies [HAW93]
Density, g/cm<sup>3</sup>: aq solution: 1.238 [MER06]

#### 257

Compound: Antimony Synonym: stibium Formula: Sb Molecular Formula: Sb Molecular Weight: 121.757 CAS RN: 7440-36-0 Properties: silver-white metal available with 99.999% purity; hex, a=0.4307 nm, c=1.1273 nm; hardness 3.0-3.5 Mohs; enthalpy of fusion 19.866 kJ/mol; enthalpy of vaporization 195.1 kJ/mol; electronegativity 1.82; electrical resistivity (0°C)  $37 \mu$ ohm · cm; uses: in alloys such as solder, type metal, and bearings, and as an evaporated semiconductor film [KIR78] [COT88] [CER91] **Solubility:** oxidized by HNO<sub>3</sub> [HAW93] Density, g/cm<sup>3</sup>: 6.697 [KIR78] Melting Point, °C: 630.7 [KIR78] Boiling Point, °C: 1587 [KIR78]; 1635, 1440 [MER06] Reactions: forms SbCl<sub>3</sub> and SbCl<sub>5</sub> from reaction of Sb and Cl<sub>2</sub> [KIR78] Thermal Conductivity, W/(m·K): 25.5 (0°C), 24.4 (25°C), 21.9 (100°C) [KIR78] [HO72] Thermal Expansion Coefficient: coefficient of linear expansion at 20°C is  $8-11 \times 10^{-6}$  m/(m·°C) [KIR78]

#### 258

Compound: Antimony arsenide Formula: Sb<sub>3</sub>As Molecular Formula: AsSb<sub>3</sub> Molecular Weight: 440.193 CAS RN: 12255-36-6 Properties: 6 mm pieces and smaller of 99.999% purity [CER91]

## 259

Compound: Antimony iodide sulfide Formula: SbIS Molecular Formula: ISSb Molecular Weight: 280.727 CAS RN: 13816-38-1 Properties: dark red; -20 mesh [CRC10] [ALF95] Solubility: i H<sub>2</sub>O [CRC10] Melting Point, °C: 392 [CRC10] Boiling Point, °C: decomposes [CRC10]

### 260

Compound: Antimony phosphide Formula: SbP Molecular Formula: PSb Molecular Weight: 152.731 CAS RN: 53120-23-3 Properties: black powd; -100 mesh with 99.5% purity [CER91] [AES93]

#### 261

**Compound:** Antimony(III) acetate **Synonym:** antimony triacetate

Formula: Sb(CH<sub>3</sub>COO)<sub>3</sub>
Molecular Formula: C<sub>6</sub>H<sub>9</sub>O<sub>6</sub>Sb
Molecular Weight: 298.893
CAS RN: 3643-76-3
Properties: off-white powd; can be prepared by dissolution of Sb(III) salt in acetic acid, followed by crystallization [KIR78] [STR93]

#### 262

Compound: Antimony(III) bromide Synonym: antimony tribromide Formula: SbBr<sub>3</sub> Molecular Formula: Br<sub>3</sub>Sb Molecular Weight: 361.472 CAS RN: 7789-61-9 Properties: yellow deliq cryst; enthalpy of vaporization 59 kJ/mol; entropy of vaporization at 560°C is 94.9 J/(mol·K); prepared by reacting Sb and Br<sub>2</sub>; used as a mordant [HAW93] [KIR78] [CRC10] Solubility: decomposed by H<sub>2</sub>O; s dil HCl, HBr [HAW93] [MER06] Density, g/cm<sup>3</sup>: 4.148 [HAW93] Melting Point, °C: 96.0 [KIR78]

Boiling Point, °C: 280 [CRC10]

## 263

**Compound:** Antimony(III) chloride **Synonym:** antimony trichloride **Formula:** SbCl<sub>3</sub> **Molecular Formula:** Cl<sub>3</sub>Sb **Molecular Weight:** 228.118 **CAS RN:** 10025-91-9

- **Properties:** colorless, ortho-rhomb cryst; very hygr; enthalpy of vaporization 45.19 kJ/mol; entropy of vaporization at 496°C is 93.3 J/(mol  $\cdot$  K); enthalpy of fusion 12.70 kJ/mol; can be prepared from Sb or Sb<sub>2</sub>O<sub>3</sub> and conc HCl; used as a catalyst to chlorinate olefins and to polymerize hydrocarbons [HAW93] [KIR78] [CRC10]
- **Solubility:** g/100 g soln, H<sub>2</sub>O: 601.6 (0°C), 988.1 (25°C), infinite (72°C); solid phase at equilibrium: SbCl<sub>3</sub> [KRU93]; s CHCl<sub>3</sub> (22%), CCl<sub>4</sub> (13%), CS<sub>2</sub> and benzene [KIR78] **Density, g/cm<sup>3</sup>:** 3.14 [MER06]

Melting Point, °C: 73.4 [KIR78] Boiling Point, °C: 220.3 [CRC10] Reactions: gradual hydrolysis to SbOCl in H<sub>2</sub>O [MER06]

## 264

**Compound:** Antimony(III) fluoride **Synonym:** antimony trifluoride **Formula:** SbF<sub>3</sub> **Molecular Formula:** F<sub>3</sub>Sb

## Molecular Weight: 178.755 CAS RN: 7783-56-4 Properties: white to gray powd; hygr; ortho-rhomb; enthalpy of fusion 21.4 kJ/mol; entropy of fusion $38.2 \text{ J/(mol} \cdot \text{K})$ ; enthalpy of vaporization at 298°C is 102.8 kJ/mol; entropy of vaporization at $25^{\circ}$ C is $175.8 \text{ kJ/(mol} \cdot \text{K})$ ; vapor pressure at mp is 26.34 kPa; slowly hydrolyzes in H<sub>2</sub>O; can be prepared by dissolution of $Sb_2O_3$ in anhydrous HF; used as a fluorinating agent for organic compounds [HAW93] [KIR78] Solubility: g/100 g H<sub>2</sub>O: 384.7 (0°C), 492.4 (25°C); 154 g/100 mL in methanol; i benzene, chlorobenzene, heptane [KRU93] [KIR78] Density, g/cm3: 4.379 [MER06] Melting Point, °C: 292 [COT88] **Boiling Point, °C:** 319 [STR93] **Reactions:** transforms from SbF<sub>3</sub> to Sb<sub>3</sub>O<sub>2</sub>(OH)<sub>2</sub>F<sub>3</sub>, then SbOF at 100°C [KIR78]

### 265

**Compound:** Antimony(III) hydride **Synonym:** stibine

Formula: SbH<sub>3</sub>

- **Molecular Formula:** H<sub>3</sub>Sb
- Molecular Weight: 124.784

CAS RN: 7803-52-3

- Properties: colorless gas; slowly decomposes at room temp, readily at 200°C; flammable material; enthalpy of vaporization 21.3 kJ/mol; distibine, Sb<sub>2</sub>H<sub>4</sub>, 14939-42-5, has been reported; preparation: by adding acid to a metal antimonide; used as η-type gas dopant in Si semiconductors [KIR78] [CRC10]
  Solubility: sl s H<sub>2</sub>O; s CS<sub>2</sub>, ethanol [KIR78]
- **Density, g/cm<sup>3</sup>:** 4.344 (air=1.000), 15°C;
- liq at bp 2.204 [KIR78]
- Melting Point, °C: –88 [KIR78]
- Boiling Point, °C: –17 [KIR78]
- **Reactions:** decomposes at  $200^{\circ}$ C to Sb+H<sub>2</sub> [KIR78]

#### 266

Compound: Antimony(III) iodide Synonym: antimony triiodide Formula: SbI<sub>3</sub> Molecular Formula: I<sub>3</sub>Sb Molecular Weight: 502.473 CAS RN: 7790-44-5 Properties: ruby red trig cryst; volatile at high temperatures; enthalpy of fusion at 444°C is 22.7 kJ/mol; entropy of fusion at 444°C is 51.5 J/(mol·K); enthalpy of sublimation 101.6 kJ/mol at 298°C; enthalpy of vaporization 68.6 kJ/mol; can be obtained by reacting Sb and I<sub>2</sub> [MER06] [HAW93] [KIR78] [CRC10] Solubility: decomposed in H<sub>2</sub>O; s CS<sub>2</sub>, HCl; i alcohol, CHCl<sub>3</sub> [HAW93]
Density, g/cm<sup>3</sup>: 4.921 [MER06]
Melting Point, °C: 170.5 [KIR78]
Boiling Point, °C: 401 [CRC10]
Reactions: decomposed by water and air to SbOI [MER06]

#### 267

Compound: Antimony(III) iodide sulfide Formula: SbIS Molecular Formula: ISSb Molecular Weight: 280.729 CAS RN: 13816-38-1 Properties: dark red prisms/needles [CRC10] Melting point 400°C [CRC10]

## 268

Compound: Antimony(III) nitrate Formula: Sb(NO<sub>3</sub>)<sub>3</sub> Molecular Formula: N<sub>3</sub>O<sub>9</sub>Sb Molecular Weight: 307.775 CAS RN: 20328-96-5 Properties: can be obtained by dissolution of Sb(III) salt in HNO<sub>3</sub> solution, followed by crystallization [KIR78] Solubility: hydrolyzes [KIR78]

## 269

Compound: Antimony(III) oxide Synonym: valentinite Formula: Sb<sub>2</sub>O<sub>3</sub> Molecular Formula: O<sub>3</sub>Sb<sub>2</sub> Molecular Weight: 291.518 CAS RN: 1317-98-2 Properties: colorless; ortho-rhomb; stable above 570°C [KIR78] Density, g/cm<sup>3</sup>: 5.67 [KIR78] Melting Point, °C: 656 [KIR78] Boiling Point, °C: 1425 [KIR78]

## 270

**Compound:** Antimony(III) oxide **Synonyms:** antimony trioxide, antimony white **Formula:** Sb<sub>2</sub>O<sub>3</sub> **Molecular Formula:** O<sub>3</sub>Sb<sub>2</sub> **Molecular Weight:** 291.518 **CAS RN:** 1309-64-4 Properties: white, odorless, cryst powd; obtained by igniting Sb in air; used to flameproof materials and in paints; evaporated material of 99.9% purity used in dielectric interference filter for ultraviolet radiation [HAW93] [CER91]
Solubility: sl s H<sub>2</sub>O; i organic solvents [KIR78]; s conc HCl, H<sub>2</sub>SO<sub>4</sub>, alkalies [HAW93]
Density, g/cm<sup>3</sup>: 5.67 [HAW93]
Melting Point, °C: 656 [KIR78]
Boiling Point, °C: 1425 [KIR78]; sublimes at 1550 [STR93]

### 271

Compound: Antimony(III) oxide
Synonym: senarmontite
Formula: Sb<sub>2</sub>O<sub>3</sub>
Molecular Formula: O<sub>3</sub>Sb<sub>2</sub>
Molecular Weight: 291.518
CAS RN: 12412-52-1
Properties: colorless; cub; stable below 570°C; can be prepared by heating Sb in air; used as a flame retardant for fabrics and as a catalyst [KIR78]
Solubility: v sl s H<sub>2</sub>O; i organic solvents [KIR78]
Density, g/cm<sup>3</sup>: 5.2 [KIR78]
Melting Point, °C: 656, in absence of O<sub>2</sub> [KIR78]
Boiling Point, °C: 1425, partial sublimation [KIR78]

### 272

**Compound:** Antimony(III) oxychloride **Formula:** SbOCl **Molecular Formula:** ClOSb **Molecular Weight:** 173.212 **CAS RN:** 7791-08-4 **Properties:** white, monocl cryst [CRC10] **Solubility:** reac H<sub>2</sub>O; i EtOH, eth **Density, g/cm<sup>3</sup>:** 5.7

#### 273

Compound: Antimony(III) perchlorate trihydrate Formula:  $Sb(ClO_4)_3 \cdot 3H_2O$ Molecular Formula:  $Cl_3H_6O_{15}Sb$ Molecular Weight: 474.157 CAS RN: 65277-48-7 Properties: can be prepared by dissolution of Sb(III) salt in perchloric acid, followed by crystallization [KIR78] Solubility: hydrolyzes [KIR78]

### 274

**Compound:** Antimony(III) phosphate **Formula:** SbPO<sub>4</sub>

Molecular Formula: O<sub>4</sub>PSb Molecular Weight: 216.731 CAS RN: 12036-46-3 Properties: can be prepared by dissolving Sb(III) compound in H<sub>3</sub>PO<sub>4</sub>, followed by crystallization [KIR78] Solubility: hydrolyzes [KIR78]

## 275

**Compound:** Antimony(III) potassium oxalate trihydrate **Formula:**  $K_3Sb(C_2O_4)_3 \cdot 3H_2O$  **Molecular Formula:**  $C_6H_6K_3O_{15}Sb$  **Molecular Weight:** 557.158 **CAS RN:** 5965-33-3 (anhydrous compound) **Properties:** cryst powd (CRC10] **Solubility:** s  $H_2O$  [CRC10]

### 276

Compound: Antimony(III) selenide Synonym: antimony triselenide Formula: Sb<sub>2</sub>Se<sub>3</sub> Molecular Formula: Sb<sub>2</sub>Se<sub>3</sub> Molecular Weight: 480.400 CAS RN: 1315-05-5 Properties: gray powd; obtained by passing H<sub>2</sub>Se through a solution of potassium antimonyl tartrate [MER06] Solubility: v sl s H<sub>2</sub>O [MER06] Melting Point, °C: 611 [MER06]

### 277

Compound: Antimony(III) sulfate
Synonym: antimonous sulfate
Formula: Sb<sub>2</sub>(SO<sub>4</sub>)<sub>3</sub>
Molecular Formula: O<sub>12</sub>S<sub>3</sub>Sb<sub>2</sub>
Molecular Weight: 531.711
CAS RN: 7446-32-4
Properties: white, cryst powd; deliq; can be obtained by dissolution of Sb(III) salt in H<sub>2</sub>SO<sub>4</sub>, followed by crystallization; used in matches and pyrotechnics [MER06] [KIR78] [HAW93]
Solubility: s H<sub>2</sub>O, but can form insol basic salt [MER06]
Density, g/cm<sup>3</sup>: 3.62 [HAW93]

## 278

**Compound:** Antimony(III) sulfide **Synonym:** antimony orange **Formula:** Sb<sub>2</sub>S<sub>3</sub> **Molecular Formula:** S<sub>3</sub>Sb<sub>2</sub>

# Molecular Weight: 339.718

CAS RN: 1345-04-6

Properties: black cryst (stibnite) or amorphous reddish orange powd; amorphous material prepared by passing H<sub>2</sub>S through SbCl<sub>3</sub> solution; used in the form of 99.9% pure material as a sputtering target to produce infrared filter with high index in red part of visible spectrum, used in pyrotechnics, certain matches, in manufacturing ruby glass; the nonahydrate is a lemon-yellow cryst [KIR78] [HAW93] [CER91]
Solubility: i H<sub>2</sub>O, s conc HCl [MER06]
Density, g/cm<sup>3</sup>: 4.562 [HAW93]
Melting Point, °C: 550 [KIR78]
Boiling Point, °C: ~1150 [STR93]

#### 279

Compound: Antimony(III) telluride Synonym: antimony tritelluride Formula: Sb<sub>2</sub>Te<sub>3</sub> Molecular Formula: Sb<sub>2</sub>Te<sub>3</sub> Molecular Weight: 626.314 CAS RN: 1327-50-0 Properties: gray; 3–12 mm fused pieces of 99.999% purity [CER91] [CRC10] Density, g/cm<sup>3</sup>: 6.5 [ALD94] Melting Point, °C: 629 [CRC10]

#### 280

Compound: Antimony(IV) oxide
Synonym: antimony tetroxide
Formula: β-Sb<sub>2</sub>O<sub>4</sub>
Molecular Formula: O<sub>4</sub>Sb<sub>2</sub>
Molecular Weight: 307.518
CAS RN: 1332-81-6
Properties: monocl; formed by heating valentinite in dry air at 1130°C; composed of half Sb(III) and half Sb(V); used as an oxidation catalyst [STR93] [KIR78]
Density, g/cm<sup>3</sup>: 5.82 [CRC10]
Melting Point, °C: vaporizes [KIR78]
Reactions: minus O at 930 [CRC10]

## 281

Compound: Antimony(IV) oxide Synonym: cervantite Formula:  $\alpha$ -Sb<sub>2</sub>O<sub>4</sub> Molecular Formula: O<sub>4</sub>Sb<sub>2</sub> Molecular Weight: 307.518 CAS RN: 1332-81-6 Properties: colorless; ortho-rhomb; composition half Sb(III), half Sb(V); formed by heating valentinite in air at 460°C–540°C; used as an oxidation catalyst [STR93] [KIR78]
Density, g/cm<sup>3</sup>: 4.07 [KIR78]
Melting Point, °C: vaporizes [KIR78]

### 282

**Compound:** Antimony(V) chloride **Synonym:** antimony pentachloride **Formula:** SbCl<sub>5</sub> **Molecular Formula:** Cl<sub>5</sub>Sb **Molecular Weight:** 299.024 **CAS RN:** 7647-18-9

- Properties: reddish yellow or colorless (if pure), hygr oily liq; fumes in air; enthalpy of vaporization at 449°C is 43.45 kJ/mol; entropy of vaporization at 449°C is 95.44 J/(mol·K); made by action of chlorine on molten SbCl<sub>3</sub>; useful for providing chlorine for reactions such as formation of ICl from I<sub>2</sub>; decomposes if distilled [HAW93] [KIR78] [MER06]
  Solubility: hydrolyzes in H<sub>2</sub>O; s HCl [MER06]
  Density, g/cm<sup>3</sup>: 2.34 [HAW93]
  Melting Point, °C: 3.2 [KIR78]
- Boiling Point, °C: 68 (1.82 kPa), 176 (extrapolated) [KIR78]

## 283

**Compound:** Antimony(V) fluoride **Formula:** SbF<sub>5</sub> **Molecular Formula:** F<sub>5</sub>Sb **Molecular Weight:** 216.752 **CAS RN:** 127386-54-3 **Properties:** hygr visc liq [CRC10] **Solubility:** reac H<sub>2</sub>O **Density, g/cm<sup>3</sup>:** 3.10 [CRC10] **Melting Point, °C:** 8.3 [CRC10] **Boiling Point, °C:** 141 [CRC10]

#### 284

Compound: Antimony(V) dichlorotrifluoride Formula: SbCl<sub>2</sub>F<sub>3</sub> Molecular Formula: Cl<sub>2</sub>F<sub>3</sub>Sb Molecular Weight: 249.660 CAS RN: 7791-16-4 Properties: viscous liq; made by reacting SbF<sub>3</sub> and Cl<sub>2</sub>; used as a catalyst in fluorocarbon manufacturing [MER06] [HAW93]

## 285

**Compound:** Antimony(V) fluoride **Synonym:** antimony pentafluoride

Formula: SbF<sub>5</sub> Molecular Formula: F<sub>5</sub>Sb Molecular Weight: 216.752 CAS RN: 7783-70-2 **Properties:** colorless, hygr, viscous liq; viscosity 460 mPa  $\cdot$  s at 20°C; tendency to polymerize, can be prevented by addition of 1% anhydrous HF; can be prepared by direct fluorination of SbF<sub>3</sub> or Sb powd; used as a catalyst in fluorinating reactions [HAW93] [KIR78] **Solubility:** reacts vigorously with H<sub>2</sub>O, becoming hydrolyzed [HAW93] [KIR78] **Density, g/cm<sup>3</sup>:** 3.145 (15.5°C) [KIR78] Melting Point, °C: 7 [KIR78] Boiling Point, °C: 142.7 [KIR78] **Reactions:** reacts with I<sub>2</sub>, S, NO<sub>2</sub>, graphite [KIR78]

### 286

Compound: Antimony(V) oxide
Synonym: antimony pentoxide
Formula: Sb<sub>2</sub>O<sub>5</sub>
Molecular Formula: O<sub>5</sub>Sb<sub>2</sub>
Molecular Weight: 323.517
CAS RN: 1314-60-9
Properties: yellowish powd; cub; always somewhat hydrated; prepared by reacting Sb or Sb<sub>2</sub>O<sub>3</sub> with conc HNO<sub>3</sub>; used as a flame retardant for textiles [HAW93] [MER06]
Solubility: sl s H<sub>2</sub>O, i HNO<sub>3</sub>; dissolves slowly in warm HCl, KOH [MER06]
Density, g/cm<sup>3</sup>: 3.78 [MER06]
Melting Point, °C: decomposes [MER06]
Reactions: loses oxygen at 300°C [MER06]

### 287

Compound: Antimony(V) oxide hydrate Synonym: antimonio acid Formula: Sb<sub>2</sub>O<sub>5</sub>·xH<sub>2</sub>O Molecular Formula: O<sub>5</sub>Sb<sub>2</sub> (anhydrous) Molecular Weight: 323.517 (anhydrous) CAS RN: 12712-36-6 Properties: cub yellowish powd; material with approximate composition Sb<sub>2</sub>O<sub>5</sub>·3-1/2H<sub>2</sub>O is prepared by hydrolysis of SbCl<sub>5</sub> [KIR78] [MER06] Solubility: sl s H<sub>2</sub>O; i HNO<sub>3</sub>; s KOH [KIR78] Density, g/cm<sup>3</sup>: 3.78 [MER06] Reactions: forms cub white Sb<sub>6</sub>O<sub>13</sub>~700°C [KIR78]

## 288

**Compound:** Antimony(V) oxychloride **Synonym:** basic antimony chloride **Formula:** SbOCl Molecular Formula: ClOSb
Molecular Weight: 173.212
CAS RN: 7791-08-4
Properties: white, monocl cryst or powd; can be prepared by adding SbCl<sub>3</sub> to water; used in flameproofing textiles [HAW93] [MER06] [KIR78]
Solubility: hydrolyzed by H<sub>2</sub>O; s HC1 [MER06]; i alcohol, ether [HAW93]
Melting Point, °C: decomposes at 170 [HAW93]
Reactions: heating to 250°C gives Sb<sub>2</sub>O<sub>5</sub>Cl<sub>2</sub>, to >320°C gives Sb<sub>2</sub>O<sub>3</sub> [MER06]

### 289

**Compound:** Antimony(V) sulfide **Synonym:** golden sulfide of antimony **Formula:** Sb<sub>2</sub>S<sub>5</sub> **Molecular Formula:** S<sub>5</sub>Sb<sub>2</sub>

Molecular Weight: 403.850

### CAS RN: 1315-04-4

**Properties:** yellow to orange to red solid; amorphous; odorless; can be formed by boiling Sb<sub>2</sub>S<sub>3</sub> and sulfur in alkaline media, followed by precipitation with HCl; finds use as a red pigment and in the vulcanization of rubber [HAW93] [KIR78]

Solubility: i H<sub>2</sub>O; s HCl to evolve H<sub>2</sub>S [MER06]

**Density, g/cm<sup>3</sup>:** 4.12 [STR93]

Melting Point, °C: decomposes at 75 [STR93]

### 290

Compound: Argon Formula: Ar Molecular Formula: Ar Molecular Weight: 39.948 CAS RN: 7440-37-1

Properties: colorless, odorless, tasteless inert gas; air contains 9.340 μL/L of argon; enthalpy of vaporization 6.469 kJ/mol; enthalpy of fusion 1.12 kJ/ mol; sonic velocity (101.32 kPa, 0°C) 307.8 m/s; viscosity (101.32 kPa, 25°C) 22.64 Pa · s; critical temp -122.29°C; critical pressure 48.3 atm; crystallizes as fcc; triple point, -189.37°C; used as a carrier gas and for sputtering/VLSI [KIR78] [MER06] [CRC10]
Solubility: 33.6 mL/1000 g H<sub>2</sub>O (20°C) [KIR78]; Henry's law constants, k×10<sup>-4</sup>: 3.974 (25.0°C), 5.359 (65.1°C), 5.342 (91.1°C), 3.812 (222.7°C), 2.541 (267.3°C), 1.870 (287.9°C) [POT78]

Density, g/cm<sup>3</sup>: gas, 101.3 kPa, 0°C, 0.0017838

[K3R78]; solid, 1.623 at triple point [MER06]

- Melting Point, °C: –189.35 [CRC10]
- **Boiling Point, °C:** -185.87 [KIR78]

**Thermal Conductivity, W/(m·K):** gas (101.32 kPa, 0°C): 1.694 [KIR78]

#### 291

Compound: Argon fluoride Formula: ArF Molecular Formula: ArF Molecular Weight: 58.946 CAS RN: 56617-31-3 Properties: unstable gas; used as a light emitting source in lasers [KIR78]

# 292

**Compound:** Arsenic(α) **Formula:** α-As

Molecular Formula: As

Molecular Weight: 74.92159

CAS RN: 7440-38-2

**Properties:** gray, shiny, brittle, metallic looking; rhomb, a=0.376 nm, c=1.0548 nm; oxidizes to As<sub>2</sub>O<sub>3</sub> in air; hardness 3.5 Mohs; enthalpy of fusion 27.44 kJ/mol; enthalpy of sublimation 31.974 kJ/mol; specific heat (25°C) 24.6 J/(mol · K); electrical resistivity (0°C)  $26 \mu ohm \cdot cm$ ; electronegativity 2.20; used in semiconductors [KIR78] [MER06] [COT88] [CER91] [CRC10] **Solubility:** i H<sub>2</sub>O; s conc HNO<sub>3</sub> [KIR78] Density, g/cm<sup>3</sup>: 5.778 [KIR78] Melting Point, °C: 817.1, 28 atm [ALD94] Boiling Point, °C: sublimes at 615 [KIR78] **Reactions:** reacts with conc HNO<sub>3</sub>  $\rightarrow$  H<sub>3</sub>AsO<sub>4</sub> [KIR78] Thermal Conductivity, W/(m·K): 50.2 (25°C) [ALD94] Thermal Expansion Coefficient: 20°C, linear coefficient of thermal expansion is  $5.6 \,\mu m/(m \cdot ^{\circ}C)$  [KIR78]

### 293

Compound: Arsenic(β)
Formula: β-As
Molecular Formula: As
Molecular Weight: 74.92159
CAS RN: 7440-38-2
Properties: dark gray amorphous solid; electrical resistivity 107 ohm · cm [KIR78]
Density, g/cm<sup>3</sup>: 4.700 [KIR78]
Melting Point, °C: sublimes [KIR78]
Reactions: transformation from amorphous to cryst at 280°C [KIR78]

# 294

**Compound:** Arsenic acid **Formula:** H<sub>3</sub>AsO<sub>4</sub> **Molecular Formula:** AsH<sub>3</sub>O<sub>4</sub> **Molecular Weight:** 141.944 **CAS RN:** 7778-39-4 **Properties:** Exists only in solution [CRC10]

#### 295

**Compound:** Arsenic acid hemihydrate **Formula:**  $H_3AsO_4 \cdot 0.5H_2O$  **Molecular Formula:**  $AsH_4O_{4.5}$  **Molecular Weight:** 150.951 **CAS RN:** 7778-39-4 **Properties:** white, hygr cryst [CRC10] **Solubility:** v s  $H_2O$ , EtOH [CRC10] **Density, g/cm<sup>3</sup>:** 2.5 [CRC10] **Melting Point, °C:** 36.1 [CRC10]

### 296

Compound: Arsenic disulfide
Synonym: realgar
Formula: As<sub>4</sub>S<sub>4</sub>
Molecular Formula: As<sub>4</sub>S<sub>4</sub>
Molecular Weight: 427.950
CAS RN: 12279-90-2
Properties: red or orange solid; naturally occurring mineral; can be manufactured by heating iron pyrites and arsenopyrite; used in pyrotechnics [KIR78]
Solubility: i H<sub>2</sub>O, hot HCl; s warm alkali [KIR78]
Density, g/cm<sup>3</sup>: 3.5 [MER06]
Melting Point, °C: 307 [KER78]
Boiling Point, °C: 565 [KIR78]
Reactions: transforms to black allotropic modification at 267°C [KIR78]

## 297

**Compound:** Arsenic(III) ethoxide **Formula:**  $As(C_2H_5O)_3$  **Molecular Formula:**  $C_6H_{15}AsO_6$  **Molecular Weight:** 210.103 **CAS RN:** 3141-12-6 **Properties:** liq **Density, g/cm<sup>3</sup>:** 1.21 [CRC10] **Boiling Point, °C:** 166 [CRC10]

## 298

Compound: Arsenic hemiselenide
Formula: As<sub>2</sub>Se
Molecular Formula: As<sub>2</sub>Se
Molecular Weight: 228.803
CAS RN: 1303-35-1
Properties: black cryst with metallic luster; formed by melting stoichiometric amounts of As and Se in nitrogen atm; used in glass manufacturing [MER06]
Solubility: i most solvents; decomposed by boiling alkali hydroxides [MER06]

## 299

**Compound:** Arsenic(II) iodide **Synonym:** arsenic diiodide **Formula:** AsI<sub>2</sub> **Molecular Formula:** AsI<sub>2</sub> **Molecular Weight:** 328.731 **CAS RN:** 13770-56-4 **Properties:** red solid; formula also given as As<sub>2</sub>I<sub>4</sub> [KIR78] **Solubility:** s organic solvents [KIR78] **Melting Point,** °C: 130 [KIR78] **Reactions:** with H<sub>2</sub>O  $\rightarrow$  AsI<sub>3</sub> and As [KIR78]

## 300

Compound: Arsenic(II) sulfide Synonym: realgar Formula:  $As_2S_2$ Molecular Formula:  $As_2S_2$ Molecular Weight: 213.975 CAS RN: 1303-32-8 Properties: reddish brown monocl powd;  $\alpha$  and  $\beta$  forms [CRC10] [ALF95] Density, g/cm<sup>3</sup>:  $\alpha$ : 3.506;  $\beta$ : 3.254 [CRC10] Melting Point, °C: 360 [ALF95] Boiling Point, °C: 565 [ALF95] Reactions:  $\alpha$  to  $\beta$  at 267°C [CRC10]

#### 301

Compound: Arsenic(III) bromide Synonym: arsenic tribromide Formula: AsBr<sub>3</sub> Molecular Formula: AsBr<sub>3</sub> Molecular Weight: 314.634 CAS RN: 7784-33-0 Properties: colorless to yellow lumps; delig; ortho-rhomb; fumes in moist air; enthalpy of vaporization 41.8 kJ/mol; enthalpy of fusion 11.70 kJ/mol; dielectric constant 8.33 (35°C); can be formed from As and Br<sub>2</sub> dissolved in CS<sub>2</sub>; used in analytical chemistry and in medicine [STR93] [KIR78] [MER06] [CRC10] Solubility: decomposed in H<sub>2</sub>O, forming HBr, As<sub>2</sub>O<sub>3</sub>; miscible with ether, benzene [MER06] Density, g/cm<sup>3</sup>: 3.66 [KIR78] Melting Point, °C: 31.1 [CRC10] Boiling Point, °C: 221 [KIR78]

#### 302

**Compound:** Arsenic(III) chloride **Synonym:** arsenic trichloride **Formula:** AsCl<sub>3</sub> **Molecular Formula:** AsCl<sub>3</sub>

# Molecular Weight: 181.280

# CAS RN: 7784-34-1

- **Properties:** colorless or pale yellow oily liq; fumes in air; enthalpy of vaporization 35.01 kJ/mol; enthalpy of fusion 10.10 kJ/mol; decomposed by ultraviolet light; may be obtained by reaction of As and Cl<sub>2</sub>; used as an intermediate in organic preparations and in ceramics [MER06] [KIR78] [HAW93] [CRC10]
- Solubility: decomposed by H<sub>2</sub>O, giving As(OH)<sub>3</sub> and HCl products [MER06], s conc HCl and most organic solvents [HAW93]
  Density, g/cm<sup>3</sup>: 2.205 [KIR78]
  Melting Point, °C: -16 [MER06]
  Boiling Point, °C: 130.2 [MER06]

#### 303

Compound: Arsenic(III) fluoride Synonym: arsenic trifluoride Formula: AsF<sub>3</sub> **Molecular Formula:** AsF<sub>3</sub> Molecular Weight: 131.917 CAS RN: 7784-35-2 **Properties:** colorless liq; fumes in air; enthalpy of vaporization 29.7 kJ/mol; enthalpy of fusion 10.40 kJ/mol; can be prepared by fluorinating  $As_2O_3$  with  $H_2SO_4$  and  $CaF_2$ ; used as a fluorinating agent and to synthesize AsFs [MER06] [KIR78] [CRC10] **Solubility:** hydrolyzed by H<sub>2</sub>O; s alcohol, ether, benzene [MER06] Density, g/cm<sup>3</sup>: 2.666 [KIR78] Melting Point, °C: -5.9 [CRC10] Boiling Point, °C: 57.8 [CRC10]

## 304

Compound: Arsenic(III) iodide Synonym: arsenic triiodide Formula: AsI<sub>3</sub> Molecular Formula: AsI<sub>3</sub> Molecular Weight: 455.635 CAS RN: 7784-45-4 **Properties:** red powd; enthalpy of formation -58.2 kJ/mol; entropy 213.0 J/(mol · K); enthalpy of vaporization 59.3 kJ/mol; decomposes slowly in air at 100°C, rapidly at 200°C, to give As,  $I_2$ ,  $As_2O_3$ ; made by precipitation from a hot AsCl<sub>3</sub>-HCl solution by the addition of KI [KIR78] [STR93] Solubility: 1 g/12 mL H<sub>2</sub>O; not easily hydrolyzed [MER06] [KIR78] Density, g/cm<sup>3</sup>: 4.39 (15°C) [KIR78]

Melting Point, °C: 140 [COT88] Boiling Point, °C: 424 [CRC10]

### 305

Compound: Arsenic(III) oxide
Synonym: arsenolite
Formula: As<sub>2</sub>O<sub>3</sub>
Molecular Formula: As<sub>2</sub>O<sub>3</sub>
Molecular Weight: 197.841
CAS RN: 1327-53-3
Properties: white, odorless and tasteless powd; cub; may be obtained by strongly heating As in air or by roasting arsenopyrite, FeAsS; used in pigments, ceramic enamels, insecticide [HAW93] [KIR78]
Solubility: 1.7 g/100 g H<sub>2</sub>O (25°C); s acids and alkalies [KIR78]; s glycerol [HAW93]
Density, g/cm<sup>3</sup>: 3.865 [HAW93]
Melting Point, °C: 275 [KIR78]
Reactions: sublimes freely above 135°C [KIR78]

### 306

Compound: Arsenic(III) oxide Synonym: claudetite Formula: As<sub>2</sub>O<sub>3</sub> Molecular Formula: As<sub>2</sub>O<sub>3</sub> Molecular Weight: 197.841 CAS RN: 1327-53-3 **Properties:** white powd; monocl; thermodynamically stable form; can be prepared by ignition of As in air; used as a pigment in ceramics and as a decolorizing agent in glass [HAW93] [STR93] [KIR78] **Solubility:** g/100 g H<sub>2</sub>O: 1.20 (0°C), 1.49 (10°C), 1.82 (20°C), 2.31 (30°C), 2.93 (40°C), 4.31 (60°C), 6.11 (80°C), 8.2 (100°C) [LAN05]; s dil HCl [MER06] Density, g/cm<sup>3</sup>: 3.738 [STR93] Melting Point, °C: 313 [MER06] Boiling Point, °C: 465 [MER06] **Reactions:** sublimes when slowly heated [MER06]

### 307

Compound: Arsenic(III) selenide Synonym: arsenic triselenide Formula: As<sub>2</sub>Se<sub>3</sub> Molecular Formula: As<sub>2</sub>Se<sub>3</sub> Molecular Weight: 386.723 CAS RN: 1303-36-2 Properties: black cryst; dark brown solid; preparation: from melted As and Se; uses: vacuum deposition [CER91] [STR93] [MER06] Solubility: i H<sub>2</sub>O; s HNO<sub>3</sub> [MER06] Density, g/cm<sup>3</sup>: 4.75 [MER06] Melting Point, °C: 260 [MER06]; ~360 [STR93]

### 308

**Compound:** Arsenic(III) sulfide **Synonyms:** orpiment, arsenic trisulfide **Formula:** As<sub>2</sub>S<sub>3</sub> **Molecular Formula:** As<sub>2</sub>S<sub>3</sub>

Molecular Weight: 246.041

**CAS RN:** 1303-33-9

**Properties:** yellow or orange powd; forms when As<sub>2</sub>O<sub>3</sub> is heated with sulfur; used as a pigment, reducing agent, and in the form of 99.9% or 99.99% material as a sputtering target to produce adherent, stable, nonhygr, antireflection films on germanium and silicon [HAW93] [KIR78] [MER06] [CER91]

Solubility: i H<sub>2</sub>O; s alkalies, slowly s HCl; decomposes in HNO<sub>3</sub> [MER06]
Density, g/cm<sup>3</sup>: 3.46 [MER06]
Melting Point, °C: 320 [KIR78]
Boiling Point, °C: 707 [KIR78]
Reactions: transition to red form at 170°C [HAW93]

## 309

Compound: Arsenic(III) telluride Synonym: arsenic tritelluride Formula: As<sub>2</sub>Te<sub>3</sub> Molecular Formula: As<sub>2</sub>Te<sub>3</sub> Molecular Weight: 532.643 CAS RN: 12044-54-1 Properties: black cryst; uses: vacuum deposition [CER91] [STR93] Density, g/cm<sup>3</sup>: 6.50 [STR93] Melting Point, °C: 621 [STR93]

## 310

Compound: Arsenic(V) acid hemihydrate Formula: H<sub>3</sub>AsO<sub>4</sub> · 1/2H<sub>2</sub>O Molecular Formula: AsH<sub>4</sub>O<sub>45</sub> Molecular Weight: 150.951 CAS RN: 7778-39-4 Properties: white translucent; hygr cryst; acid,  $K_1 = 5.6 \times 10^{-3}, K_2 = 1.7 \times 10^{-7}, K_3 = 3.0 \times 10^{-12};$ loses water above 300°C forming the anhydrous  $As_2O_3$ ; can be obtained by treating  $As_2O_3$ with conc HNO<sub>3</sub>; used in glassmaking, wood treatment [HAW93] [KIR78] [MER06] **Solubility:** v s H<sub>2</sub>O, alcohol, glycerol [MER06] Density, g/cm<sup>3</sup>: 2–2.5 [HAW93] Melting Point, °C: 35.5 [HAW93] **Reactions:** minus H<sub>2</sub>O forming H<sub>4</sub>AsO<sub>7</sub> at 100°C; forms HAsO<sub>3</sub> >100°C [KIR78]

# 311

**Compound:** Arsenic(V) fluoride **Synonym:** arsenic pentafluoride

Formula: AsF<sub>5</sub>
Molecular Formula: AsF<sub>5</sub>
Molecular Weight: 169.914
CAS RN: 7784-36-3
Properties: colorless gas; condenses to yellow liq; forms white clouds in moist air; enthalpy of vaporization 20.8 kJ/mol; dielectric constant, 12.8 (20°C); can be formed by reacting AsF<sub>3</sub> with fluorine; used as a doping agent for electroconductive polymers [HAW93] [KIR78] [MER06] [CRC10]
Solubility: hydrolyzed quickly in H<sub>2</sub>O; s alcohol, benzene, ether [MER06]
Density, g/cm<sup>3</sup>: liq: 2.33 at bp [KIR78]
Melting Point, °C: -88.7 [KIR78]
Boiling Point, °C: -53.2 [CRC10]

### 312

Compound: Arsenic(V) oxide Synonym: arsenic pentoxide Formula: As<sub>2</sub>O<sub>5</sub> Molecular Formula: As<sub>2</sub>O<sub>5</sub> Molecular Weight: 229.840 CAS RN: 1303-28-2 Properties: white, amorphous lumps or powd; uncertain structure; oxidizing agent, can liberate Cl<sub>2</sub> from HCl; deliq; obtained by reaction of As or As<sub>2</sub>O<sub>3</sub> with O<sub>2</sub> under pressure; used as an insecticide, in

the manufacture of colored glass, and for weed control [HAW93] [STR93] [KIR78] [MER06] Solubility: g/100 g H<sub>2</sub>O: 59.5 (0°C), 62.1 (10°C), 65.8

(20°C), 69.8 (30°C), 71.2 (40°C), 73.0 (60°C), 75.1 (80°C), 76.7 (100°C) [LAN05]; s alcohol [MER06] **Density, g/cm<sup>3</sup>:** 4.32 [STR93]

Melting Point, °C: 315 decomposes [STR93]

### 313

Compound: Arsenic(V) selenide Synonym: arsenic pentaselenide Formula: As<sub>2</sub>Se<sub>5</sub> Molecular Formula: As<sub>2</sub>Se<sub>5</sub> Molecular Weight: 544.643 CAS RN: 1303-37-3 Properties: black, brittle solid; metallic luster; obtained when stoichiometric amounts of As and Se are melted in a nitrogen atm [MER06] Solubility: i H<sub>2</sub>O, dil acids; s alkali hydroxides [MER06] Melting Point, °C: decomposes on heating in air [MER]

### 314

**Compound:** Arsenic(V) sulfide **Synonym:** arsenic pentasulfide

Formula: As<sub>2</sub>S<sub>5</sub>
Molecular Formula: As<sub>2</sub>S<sub>5</sub>
Molecular Weight: 310.173
CAS RN: 1303-34-0
Properties: yellow or orange powd; stable in air up to 95°C; can be prepared by fusing As and S or by passing H<sub>2</sub>S through HCl solution of arsenic acid; used as a paint pigment, in light filters [HAW93] [KIR78]
Solubility: g/L soln, H<sub>2</sub>O: 0.00136 (0°C) [KRU93]
Melting Point, °C: decomposes [KIR78]
Reactions: decomposes to As<sub>2</sub>S<sub>3</sub> and S >95°C [KIR78]

## 315

**Compound:** Arsenious acid **Formula:** H<sub>3</sub>AsO<sub>3</sub> **Molecular Formula:** AsH<sub>3</sub>O<sub>3</sub> **Molecular Weight:** 125.944

CAS RN: 13464-58-9

**Properties:** exists only in solution; is a weak acid,  $K = 8 \times 10^{-16}$ ; structure: HO(OH)AsOH; preparation: 1 g As<sub>2</sub>O<sub>3</sub>, 5 mL dil HCl, dil to 100 mL with H<sub>2</sub>O; uses: for skin and blood disorders in animals [MER06] [KIR78]

## 316

**Compound:** Arsine **Synonym:** arsenic trihydride **Formula:** AsH<sub>3</sub> **Molecular Formula:** AsH<sub>3</sub> **Molecular Weight:** 77.946 **CAS RN:** 7784-42-1

Properties: colorless gas; garlic-like odor; highly toxic; critical temp 105.4°C; critical pressure 6.60 MPa; enthalpy of vaporization 16.69 kJ/mol; decomposes at 230°C; formed by reaction of Zn, HCl, and As compound, and by hydride reduction, e.g., NaBH<sub>4</sub> in NaOH solution; used in organic synthesis, has some use in electronics industry [HAW93] [KIR78] [KIR80] [AIR87] [KOR91] [CRC10]
Solubility: mL/100 g H<sub>2</sub>O (760 mm): 42 (0°C), 30 (10°C), 28 (20°C) [LAN05]

Density, g/cm<sup>3</sup>: liq: (−64.3°C) 1.640; gas: 2.695 g/L [KIR78] [KIR80] Melting Point, °C: −116.3 [KIR78] Boiling Point, °C: −62.4 [KIR78]

Reactions: becomes hydrated to

AsH<sub>3</sub> $\cdot$ 6H<sub>2</sub>O at -10°C [KIR78]

#### 317

**Compound:** Astatine **Formula:** At

Molecular Formula: At Molecular Weight: 210 CAS RN: 7440-68-8 Properties: radioactive cryst halogen with 20 isotopes; heaviest of the halogens; <sup>209</sup>At,  $t_{1/2}$ =5.5 h; <sup>210</sup>At,  $t_{1/2}$ =8.3 h; more metallic than iodine; preparation: from Bi by  $\alpha$ -particle bombardment; possible medical uses, concentrates in thyroid gland [HAW93] [MER06] Solubility: s organic solvents [MER06] Melting Point, °C: 302 [CRC10] Boiling Point, °C: 337 (estimated) [CRC10]

#### 318

Compound: Barium Formula: Ba Molecular Formula: Ba Molecular Weight: 137.327 CAS RN: 7440-39-3 **Properties:** yellow-silver soft metal; bcc, a=0.5025 nm; enthalpy of fusion 7.66 kJ/ mol; enthalpy of vaporization 149.20 kJ/mol; vapor pressure, kPa: 0.00133 (629°C), 1.33 (1050°C), 101.3 (1640°C); easily air oxidized; Gruneisen parameter -0.2; electrical resistivity 29.4  $\mu$ ohm  $\cdot$  cm for the pure element; electron work function 2.11 eV; Ba++ radius 0.143 nm; electronegativity 1.02 [CIC73] [KIR91] [MER06] Solubility: s with H<sub>2</sub> evolution in cold H<sub>2</sub>O and hot H<sub>2</sub>O; sl s alcohol; i benzene [CRC10] Density, g/cm<sup>3</sup>: 3.62 [CIC73] Melting Point, °C: 729 [KNA91] Boiling Point, °C: 1640 [KIR91] Thermal Conductivity, W/(m·K): 18.4 (25°C) [CRC10] Thermal Expansion Coefficient: coefficient of linear expansion  $1.85 \times 10^{-5}$  m/(m · °C) [KIR91]

### 319

Compound: Barium 2-ethylhexanoate Formula: [CH<sub>3</sub>(CH<sub>2</sub>)<sub>3</sub>CHC<sub>2</sub>H<sub>5</sub>COO]<sub>2</sub>Ba Molecular Formula: C<sub>16</sub>H<sub>30</sub>BaO<sub>4</sub> Molecular Weight: 423.739 CAS RN: 2457-01-4 Properties: precursor used in the preparation of thin-film superconductors [ALD94] Melting Point, °C: >300 [ALD93]

### 320

**Compound:** Barium acetate **Synonyms:** acetic acid, barium salt **Formula:**  $Ba(CH_3COO)_2$ **Molecular Formula:**  $C_4H_6BaO_4$ 

#### Molecular Weight: 255.417

### CAS RN: 543-80-6

- Properties: white powd; crystallizes from H<sub>2</sub>O as a trihydrate below 24.7°C, as a monohydrate from 24.7°C to 41°C, and as an anhydrous material above 41°C; can be prepared from acetic acid and either BaCO<sub>3</sub> or BaS, followed by crystallization and dehydration [KIR78] [STR93]
- Solubility: g/100 g H<sub>2</sub>O: 58.8 (0.3°C), 78.1 (24.1°C), 74.8 (99.2°C); solid equilibrium phase, Ba(CH<sub>3</sub>COO)<sub>2</sub> · 3H<sub>2</sub>O (0.3 and 24.1°C), Ba(CH<sub>3</sub>COO)<sub>2</sub> (99.2°C) [KRU93] Density, g/cm<sup>3</sup>: 2.47 [KIR78]

### 321

Compound: Barium acetate monohydrate
Synonyms: acetic acid, barium salt monohydrate
Formula: Ba(CH<sub>3</sub>COO)<sub>2</sub>·H<sub>2</sub>O
Molecular Formula: C<sub>4</sub>H<sub>8</sub>BaO<sub>5</sub>
Molecular Weight: 273.432
CAS RN: 5908-64-5
Properties: white cryst; made by the addition of acetic acid to barium sulfide solution, followed by evaporation and crystallization; used as a chemical reagent and as a textile mordant, used in paint and varnish driers [HAW93]
Solubility: 1 g/1.5 mL cold or boiling H<sub>2</sub>O; 1 g/700 mL alcohol [MER06]

Density, g/cm<sup>3</sup>: 2.19 [KIR78]

**Melting Point, °C:** decomposes [HAW93] **Reactions:** minus H<sub>2</sub>O 110°C [MER06]

### 322

Compound: Barium acetylacetonate octahydrate
Synonyms: 2,4-pentanedione, barium derivative octahydrate
Formula: Ba[CH<sub>3</sub>COCH=C(O)CH<sub>3</sub>]<sub>2</sub>·8H<sub>2</sub>O
Molecular Formula: C<sub>10</sub>H<sub>30</sub>BaO<sub>12</sub>
Molecular Weight: 479.668
CAS RN: 12084-29-6
Properties: hygr powd [STR93] [ALD93]
Melting Point, °C: decomposes at 123 [ALD93]

## 323

Compound: Barium aluminate Formula: BaO · Al<sub>2</sub>O<sub>3</sub> Molecular Formula: Al<sub>2</sub>BaO<sub>4</sub> Molecular Weight: 255.288 CAS RN: 12004-04-5 Properties: nepheline-type structure; -100 mesh, 99.5% purity; a=0.5224 nm, c=0.8792 nm [TAY91b] [CER91] [CRC10] Melting Point, °C: 1827 [KNA91]

#### Thermal Expansion Coefficient: from 25°C

to 100°C (0.18), 200°C (0.45), 400°C (0.96), 600°C (1.50), 800°C (2.01), 1000°C (2.52), 1200°C (3.06) [TAY91b]

#### 324

**Compound:** Barium aluminate **Formula:** 3BaO · Al<sub>2</sub>O<sub>3</sub> **Molecular Formula:** Al<sub>2</sub>Ba<sub>3</sub>O<sub>6</sub> **Molecular Weight:** 561.940 **CAS RN:** 11129-08-1 **Properties:** gray mass [HAW93] **Solubility:** s H<sub>2</sub>O, acid [HAW93] **Melting Point, °C:** 1750 [KNA91]

### 325

Compound: Barium aluminide Formula: BaAl<sub>4</sub> Molecular Formula: Al<sub>4</sub>Ba Molecular Weight: 245.253 CAS RN: 12672-79-6 Properties: 6 mm pieces and smaller [CER91]

#### 326

Compound: Barium antimonide Formula: Ba<sub>3</sub>Sb<sub>2</sub> Molecular Formula: Ba<sub>3</sub>Sb<sub>2</sub> Molecular Weight: 655.501 CAS RN: 55576-04-0 Properties: 6 mm pieces and smaller [CER91]

#### 327

Compound: Barium arsenide Formula: Ba<sub>3</sub>As<sub>2</sub> Molecular Formula: As<sub>2</sub>Ba<sub>3</sub> Molecular Weight: 561.824 CAS RN: 12255-50-4 Properties: brown; 6 mm pieces and smaller [CRC10] [CER91] Density, g/cm<sup>3</sup>: 4.1 [CRC10]

#### 328

Compound: Barium azide Formula:  $Ba(N_3)_2$ Molecular Formula:  $BaN_6$ Molecular Weight: 221.367 CAS RN: 18810-58-7 Properties: cryst solid; monocl, a=0.622 nm, b=2.929 nm, c=0.702 nm;  $M-N_3$  bond length 0.2937 nm; unstable and can explode when heated or on impact; used in high explosives [CIC73] [HAW93] [CRC10] **Solubility:** g/100 g H<sub>2</sub>O: 12.5 (0°C), 16.1 (10°C), 17.4 (20°C) [LAN05]; alcohol 0.17 (16°C), i ether [CRC10] **Density, g/cm<sup>3</sup>:** 2.936 [HAW93] **Boiling Point, °C:** explodes [CRC10] **Reactions:** evolves N<sub>2</sub> at 120°C [HAW93]

#### 329

Compound: Barium bis(2,2,6,6-tetramethyl-3,5-heptanedionate) hydrate
Formula: [(CH<sub>3</sub>)<sub>3</sub>CCOCH=C(O)C(CH<sub>3</sub>)<sub>3</sub>]<sub>2</sub>Ba·xH<sub>2</sub>O
Molecular Formula: C<sub>22</sub>H<sub>38</sub>BaO<sub>4</sub> (anhydrous)
Molecular Weight: 503.866 (anhydrous)
CAS RN: 17594-47-7
Properties: used in the preparation of superconducting thin films [ALD94]
Melting Point, °C: 175–180 [ALD94]

330

Compound: Barium bismuth oxide Formula: BaBi(III)<sub>0.5</sub>Bi(V)<sub>0.5</sub>O<sub>3</sub> Molecular Formula: BaBiO<sub>3</sub> Molecular Weight: 394.305 CAS RN: 12785-50-1 Reactions: transitions: monocl to hex at 132°C; hex to cub at 440°C [TAY85] Thermal Expansion Coefficient: from 25°C to: 100°C (0.15); 200°C (0.45); 400°C (1.26);

600°C (2.10); 800°C (3.96) [TAY85]

331

Compound: Barium bromate Formula: Ba(BrO<sub>3</sub>)<sub>2</sub> Molecular Formula: BaBr<sub>2</sub>O<sub>6</sub> Molecular Weight: 393.131 CAS RN: 13967-90-3 Properties: can be prepared from potassium bromate and barium chloride [MER06] Solubility: g/100 g soln, H<sub>2</sub>O: 0.286 (0°C), 0.788 (25°C); 5.39 (99.65°C); equilibrium solid phase Ba(BrO<sub>3</sub>)<sub>2</sub> [KRU93]

## 332

**Compound:** Barium bromate monohydrate Formula:  $Ba(BrO_3)_2 \cdot H_2O$ Molecular Formula:  $BaBr_2H_2O_7$ Molecular Weight: 411.147 CAS RN: 10326-26-8 Properties: white, monocl cryst or powd; obtained by addition of bromine to hot barium hydroxide solution, followed by crystallization; used as an oxidizing agent and corrosion inhibitor [HAW93] [MER06]
Solubility: g/100 mL: 0.44 (10°C), 0.96 (30°C), 5.39 (100°C) [MER06]; i alcohol [HAW93]
Density, g/cm<sup>3</sup>: 3.99 [MER06]
Melting Point, °C: decomposes at 260 [MER06]

#### 333

Compound: Barium bromide
Formula: BaBr<sub>2</sub>
Molecular Formula: BaBr<sub>2</sub>
Molecular Weight: 297.135
CAS RN: 10553-31-8
Properties: white powd; hygr; -20 mesh 99.9% and 99.995% purity; enthalpy of fusion 31.96 kJ/mol; made by reacting barium carbonate and hydrobromic acid [KIR78] [ALD94] [CIC73] [STR93] [CER91]
Solubility: g/100 g soln, H<sub>2</sub>O: 47.5(0°C), 50.0 (25°C), 57.8 (100°C); equilibrium solid phase, BaBr<sub>2</sub> · 2H<sub>2</sub>O [KRU93]
Density, g/cm<sup>3</sup>: 4.781 [KIR78]
Melting Point, °C: 857 [KNA91]
Boiling Point, °C: 1835 [KNA91]

### 334

**Compound:** Barium bromide dihydrate **Formula:**  $BaBr_2 \cdot 2H_2O$ Molecular Formula: BaBr<sub>2</sub>H<sub>4</sub>O<sub>2</sub> Molecular Weight: 333.166 CAS RN: 7791-28-8 Properties: white cryst; can be obtained from HBr and BaS solutions, followed by crystallization; used in manufacturing bromides [HAW93] [STR93] **Solubility:** g/100 g H<sub>2</sub>O: 98 (0°C), 101 (10°C), 104 (20°C), 109 (30°C), 114 (40°C), 123 (60°C), 135 (80°C), 149 (100°C) [LAN05] Density, g/cm<sup>3</sup>: 3.58 [KIR78] Melting Point, °C: see anhydrous BaBr<sub>2</sub> **Boiling Point**, °C: decomposes [CIC73] **Reactions:** minus H<sub>2</sub>O at 75°C; minus 2H<sub>2</sub>O at 100°C [KIR78]

#### 335

**Compound:** Barium calcium tungstate **Synonym:** barium calcium tungsten oxide **Formula:** Ba<sub>2</sub>CaWO<sub>6</sub> **Molecular Formula:** Ba<sub>2</sub>CaO<sub>6</sub>W **Molecular Weight:** 594.568 **CAS RN:** 15552-14-4 **Properties:** -325 mesh 99.9% purity [ALF93] **Melting Point, °C:** decomposes at 1420 [ALF93]

## 336

Compound: Barium carbide Formula: BaC<sub>2</sub> Molecular Formula: C<sub>2</sub>Ba Molecular Weight: 161.349 CAS RN: 50813-65-5 Properties: gray tetr; -8 mesh 99.5% purity [CER91] [CRC10] Solubility: decomposes in H<sub>2</sub>O yielding acetylene, HC≡CH; decomposed in acids [CRC10] Density, g/cm<sup>3</sup>: 3.74 [CRC10] Melting Point, °C: decomposes [KNA91]

### 337

**Compound:** Barium carbonate **Synonym:** witherite **Formula:** α-BaCO<sub>3</sub> **Molecular Formula:** CBaO<sub>3</sub> **Molecular Weight:** 197.336 **CAS RN:** 513-77-9

**Properties:** white, heavy powd; rhomb; witherite is naturally occurring mineral; hardness 3.0-3.75 Mohs; manufactured by precipitation from a solution of BaS by Na<sub>2</sub>CO<sub>3</sub> at 60°C–70°C; used to remove sulfates from chlor-alkali cells, in brickmaking, in oil well industry, to produce barium titanate, as a ceramic flux, and in radiation-resistant glass for color television [HAW93] [CIC73] [KIR78]

**Solubility:** g/1000 g H<sub>2</sub>O: 0.0180 (25°C) [KRU93]; s acid, NH<sub>4</sub>Cl; i alcohol [CRC10]

**Density, g/cm<sup>3</sup>:** 4.2865 [MER06]

Melting Point, °C: 174 (90 atm), 811 (1 atm) [HAW93] Reactions: ~ at 1300°C decomposes into BaO

and CO<sub>2</sub> [MER06]

## 338

Compound: Barium chlorate Formula: Ba(ClO<sub>3</sub>)<sub>2</sub> Molecular Formula: BaCl<sub>2</sub>O<sub>6</sub> Molecular Weight: 304.228 CAS RN: 13477-00-4 Properties: -80 mesh 99.9% purity; prepared by electrolysis of BaCl<sub>2</sub> solutions; monohydrate: colorless monocl [CER91] [CRC10] [MER06] Solubility: 27.5 g/100 g soln (25°C); 67 g/100 g soln (100°C) [CIC73] Density, g/cm<sup>3</sup>: monohydrate: 3.18 [CRC10] Reactions: monohydrate: minus H<sub>2</sub>O at 120°C, minus O at 250°C [CRC10]

### 339

Compound: Barium chlorate monohydrate Formula: Ba(ClO<sub>3</sub>)<sub>2</sub>·H<sub>2</sub>O Molecular Formula: BaCl<sub>2</sub>H<sub>2</sub>O<sub>7</sub> Molecular Weight: 322.244 CAS RN: 10294-38-9 Properties: monocl, prismatic, white cryst; combustible, used in fireworks, explosives, and as a textile mordant [MER06] Solubility: g/100 g H<sub>2</sub>O: 20.3 (0°C), 26.9 (10°C), 33.9 (20°C), 41.6 (30°C), 49.7 (40°C), 66.7 (60°C), 84.8 (80°C), 105 (100°C); s HC1 [LAN05] [MER06] Density, g/cm<sup>3</sup>: 3.179 [MER06] Melting Point, °C: 414 [MER06] Reactions: minus H<sub>2</sub>O at 120°C; evolves oxygen at 250°C [MER06]

## 340

Compound: Barium chloride Formula: α-BaCl<sub>2</sub> Molecular Formula: BaCl<sub>2</sub> Molecular Weight: 208.232 CAS RN: 10361-37-2 Properties: white powd; two forms: monocl, cub; enthalpy of fusion 16.00 kJ/mol [KIR78] [STR93] [CIC73] [CRC10] Solubility: g/100 g soln, H<sub>2</sub>O: 23.8 (0°C), 27.1  $(25^{\circ}C)$ ,  $37.0 \pm 0.3 (100^{\circ}C)$ ; solid phase, BaCl<sub>2</sub>·2H<sub>2</sub>O (100°C) [KRU93] Density, g/cm<sup>3</sup>: 3.856 [KIR78] Melting Point, °C: 960 [KNA91] Boiling Point, °C: 1560 [KNA91] **Reactions:** transition  $\alpha$  (monocl) to  $\beta$  (cub) at 925°C [SCH93] [KIR78]

## 341

Compound: Barium chloride dihydrate
Formula: BaCl<sub>2</sub>·2H<sub>2</sub>O
Molecular Formula: BaCl<sub>2</sub>H<sub>4</sub>O<sub>2</sub>
Molecular Weight: 244.263
CAS RN: 10326-27-9
Properties: white monocl; manufactured from BaS and HCl, followed by evaporation; used to make barium pigments and as a flux for Mg metal [KIR78]
Solubility: 31.7 g/100 g H<sub>2</sub>O (0°C), 35.8 g/100 g H<sub>2</sub>O (20°C), 58.7 g/100 g H<sub>2</sub>O (100°C); i alcohol [LAN05] [KIR78] [HAW93]
Density, g/cm<sup>3</sup>: 3.097 [KIR78]
Reactions: minus 2H<sub>2</sub>O at 113°C [KIR78]

### 342

Compound: Barium chloride fluoride Formula: BaClF Molecular Formula: BaClF Molecular Weight: 191.788 CAS RN: 13718-55-3 Properties: white cryst [CRC10]

## 343

Compound: Barium chromate
Synonyms: lemon chrome, baryta yellow
Formula: BaCrO<sub>4</sub>
Molecular Formula: BaCrO<sub>4</sub>
Molecular Weight: 253.321
CAS RN: 10294-40-3
Properties: heavy, yellow powd; rhomb, monocl; prepared from BaCl<sub>2</sub> and Na<sub>2</sub>CrO<sub>4</sub> solutions, followed by filtering resulting precipitate; used in safety matches, as a corrosion inhibitor [MER06] [HAW93]
Solubility: g/L soln, H<sub>2</sub>O: 0.002 (0°C), 0.00291 (25°C) [KRU93]
Density, g/cm<sup>3</sup>: 4.50 [MER06]
Melting Point, °C: decomposes [KIR78]

# 344

Compound: Barium chromate(V) Formula: Ba<sub>3</sub>(CrO<sub>4</sub>)<sub>2</sub> Molecular Formula: Ba<sub>3</sub>Cr<sub>2</sub>O<sub>8</sub> Molecular Weight: 643.968 CAS RN: 12345-14-1 Properties: greenish black cryst [KIR78] Solubility: s, decomposing in H<sub>2</sub>O; s dil acids [KIR78]

# 345

**Compound:** Barium citrate monohydrate **Formula:**  $Ba_3(C_6H_5O_7)_2 \cdot H_2O$  **Molecular Formula:**  $C_{12}H_{12}Ba_3O_{15}$  **Molecular Weight:** 808.195 **CAS RN:** 512-25-4 (anhydrous parent compound) **Properties:** gray white cryst [CRC10] **Solubility:** Soluble in  $H_2O$  and acid

# 346

**Compound:** Barium copper yttrium oxide-I **Formula:** BaCuY<sub>2</sub>O<sub>5</sub> **Molecular Formula:** BaCuO<sub>6</sub>Y<sub>2</sub> **Molecular Weight:** 485.682 **CAS RN:** 82642-06-6 **Properties:** green cryst; not superconducting [CRC10]

#### 347

Compound: Barium copper yttrium oxide-II Formula: Ba<sub>2</sub>Cu<sub>3</sub>YO<sub>7</sub> Molecular Formula: Ba<sub>2</sub>Cu<sub>3</sub>O<sub>7</sub>Y Molecular Weight: 666.194 CAS RN: 109064-29-1 Properties: black solid; high-temp superconductor [CRC10]

## 348

**Compound:** Barium copper yttrium oxide-III **Formula:** Ba<sub>2</sub>Cu<sub>4</sub>YO<sub>8</sub> **Molecular Formula:** Ba<sub>2</sub>Cu<sub>4</sub>O<sub>8</sub>Y **Molecular Weight:** 745.739 **CAS RN:** 107539-20-8 **Properties:** high-temp superconductor [CRC10]

#### 349

**Compound:** Barium copper yttrium oxide-IV **Formula:**  $Ba_4Cu_7Y_2O_{15}$ **Molecular Formula:**  $Ba_4Cu_7O_{15}Y_2$ **Molecular Weight:** 1411.933 **CAS RN:** 124365-83-9 **Properties:** high-temp superconductor [CRC10]

### 350

Compound: Barium cyanide Formula: Ba(CN)<sub>2</sub> Molecular Formula: C<sub>2</sub>BaN<sub>2</sub> Molecular Weight: 189.362 CAS RN: 542-62-1 Properties: white, cryst powd; slowly decomposes in air; obtained by reaction of HCN and barium hydroxide, followed by crystallization; used in metallurgy and electroplating [HAW93] [MER06] Solubility: 80.0 g/100 mL H<sub>2</sub>O (14°C) [CRC10]; s alcohol [HAW93]

#### 351

Compound: Barium dichromate dihydrate Formula:  $BaCr_2O_7 \cdot 2H_2O$ Molecular Formula:  $BaCr_2H_4O_9$ Molecular Weight: 389.346 CAS RN: 10031-16-0 Properties: brownish red needles; used in ceramics [KIR78] Solubility: decomposed in  $H_2O$  [KIR78] Melting Point, °C: decomposes [CRC10] Reactions: minus  $2H_2O$  at 120°C [CRC10]

### 352

**Compound:** Barium diphenylamine-4-sulfonate **Synonyms:** diphenylamine-4-sulfonic acid, barium salt **Formula:**  $(C_6H_5NHC_6H_4SO_3)_2Ba$  **Molecular Formula:**  $C_{24}H_{20}BaO_6S_2$  **Molecular Weight:** 633.878 **CAS RN:** 6211-24-1 **Properties:** white, cryst leaflets; prepared by

acetylation and subsequent sulfonation of diphenylamine; used as an oxidation/reduction indicator [ALD94] [HAW93] [MER06] Solubility: sl s H<sub>2</sub>O [MER06]

### 353

**Compound:** Barium disilicate **Formula:** BaSi<sub>2</sub>O<sub>5</sub> **Molecular Formula:** BaO<sub>5</sub>Si<sub>2</sub> **Molecular Weight:** 273.495 **CAS RN:** 12650-28-1 **Properties:** white, ortho cryst [CRC10] **Density, g/cm<sup>3</sup>:** 3.7 [CRC10] **Melting Point, °C:** 1420 [CRC10]

## 354

Compound: Barium dithionate dihydrate
Synonym: barium hyposulfate dihydrate
Formula: Ba(SO<sub>3</sub>)<sub>2</sub> · 2H<sub>2</sub>O
Molecular Formula: BaH<sub>4</sub>O<sub>8</sub>S<sub>2</sub>
Molecular Weight: 333.486
CAS RN: 13845-17-5
Properties: colorless cryst; prepared from barium hydroxide and manganese dithionate [HAW93]
Solubility: s in four parts H<sub>2</sub>O; sl s alcohol [MER06]
Density, g/cm<sup>3</sup>: 4.54 [MER06]
Reactions: minus SO<sub>2</sub> at >150°C forming BaSO<sub>4</sub> [MER06]

## 355

Compound: Barium ferrite Formula: BaFe<sub>12</sub>O<sub>19</sub> Molecular Formula: BaFe<sub>12</sub>O<sub>19</sub> Molecular Weight: 1111.456 CAS RN: 11138-11-7 Properties: powd, -325 mesh 98% purity; used as a permanent magnet material [HAW93] [CER91]

## 356

**Compound:** Barium ferrocyanide hexahydrate **Synonym:** barium hexacyanoferrate(II) **Formula:**  $Ba_2Fe(CN)_6 \cdot 6H_2O$ **Molecular Formula:**  $C_6H_{12}Ba_2FeN_6O_6$ **Molecular Weight:** 594.696 CAS RN: 13821-06-2

Properties: yellow, becomes colorless with loss of H<sub>2</sub>O; rectangular monocl [MER06]
Solubility: 0.17 g/100 mL (288 K) H<sub>2</sub>O; i alcohol [CRC10]
Density, g/cm<sup>3</sup>: 2.666 [CRC10]
Reactions: minus H<sub>2</sub>O (40°C); decomposes, losing HCN, at 80°C [MER06]

#### 357

Compound: Barium fluoride Formula: BaF<sub>2</sub> Molecular Formula: BaF<sub>2</sub> Molecular Weight: 175.324 CAS RN: 7787-32-8 Properties: white, cub cryst or 99.9% pure 3–6 mm melted pieces; enthalpy of fusion 23.36 kJ/mol;

melted pieces; enthalpy of fusion 23.36 kJ/mol; enthalpy of vaporization 347.3 kJ/mol; may be prepared by reacting barium carbonate with HF solution; used as a component in welding flux and to produce infrared transparent films [KIR78] [CIC73] [HAW93] [MER06] [CER91] **Solubility:** g/L soln, H<sub>2</sub>O: 1.586 (10°C), 1.617 ± 0.003 (25°C); s HCl, HNO<sub>3</sub> [KRU93] [MER06]

Density, g/cm<sup>3</sup>: 4.83 [MER06] Melting Point, °C: 1354 [HAW93]

Boiling Point, °C: 2260 [CIC73]

#### 358

**Compound:** Barium formate **Formula:** Ba(CHO<sub>2</sub>)<sub>2</sub> **Molecular Formula:** C<sub>2</sub>H<sub>2</sub>BaO<sub>4</sub> **Molecular Weight:** 227.362 **CAS RN:** 541-43-5 **Properties:** cryst **Solubility:** s H<sub>2</sub>O; i EtOH [CRC10] **Density, g/cm<sup>3</sup>:** 3.21 [CRC10]

#### 359

Compound: Barium hexaboride Synonym: barium boride Formula: BaB<sub>6</sub> Molecular Formula: B<sub>6</sub>Ba Molecular Weight: 202.193 CAS RN: 12046-08-1 Properties: metallic black cub; -100 mesh 99.5% purity [CER91] [CRC10] Solubility: i H<sub>2</sub>O; s HNO<sub>3</sub>; i HC1 [CRC10] Density, g/cm<sup>3</sup>: 4.36 [CRC10] Melting Point, °C: 2070 [KIR78]

### 360

**Compound:** Barium hexafluorogermanate **Formula:**  $BaGeF_6$ 

Molecular Formula: BaF<sub>6</sub>Ge Molecular Weight: 323.927 CAS RN: 60897-63-4 Properties: white, cryst solid [HAW93] Density, g/cm<sup>3</sup>: 4.56 [HAW93] Melting Point, °C: ~665 [HAW93] Reactions: decomposes to BaF<sub>2</sub> and GeF<sub>4</sub> [HAW93]

### 361

Compound: Barium hexafluorosilicate Formula: BaSiF<sub>6</sub> Molecular Formula: BaF<sub>6</sub>Si Molecular Weight: 279.403 CAS RN: 17125-80-3 Properties: white, ortho-rhomb needles; prolonged contact with water induces hydrolysis, which is accelerated by alkali; formed from BaCl<sub>2</sub> and H<sub>2</sub>SiF<sub>6</sub>; used in ceramics and insecticides [HAW93] [MER06] Solubility: 0.015 g/100 mL H<sub>2</sub>O (0°C), 0.0235 (25°C), 0.091 (100°C) [MER06] Density, g/cm<sup>3</sup>: 4.29 [MER06] Melting Point, °C: decomposes at 300 [MER06]

## 362

Compound: Barium hydride Formula: BaH<sub>2</sub> Molecular Formula: BaH<sub>2</sub> Molecular Weight: 139.343 CAS RN: 13477-09-3 Properties: gray cryst; -60 mesh with 99.7% purity; sensitive to moisture; resembles CaH<sub>2</sub> in properties [KIR80] [CER91] [STR93] Solubility: decomposes in water to Ba(OH)<sub>2</sub>+H<sub>2</sub>; decomposes in acids [CRC10] Density, g/cm<sup>3</sup>: 4.16 [KIR80] Melting Point, °C: decomposes at 675 [STR93] Boiling Point, °C: ~1673 [CRC10]

#### 363

Compound: Barium hydrogen phosphate
Synonyms: barium phosphate, dibasic
Formula: BaHPO<sub>4</sub>
Molecular Formula: BaHO<sub>4</sub>P
Molecular Weight: 233.306
CAS RN: 10048-98-3
Properties: cryst, white powd; used as a flame retardant and in phosphors [STR93] [MER06] [HAW93]
Solubility: i H<sub>2</sub>O; s dil HCl or HNO<sub>3</sub> [MER06]
Density, g/cm<sup>3</sup>: 4.16 [MER06]
Melting Point, °C: decomposes at 410 [CRC10]

### 364

Compound: Barium hydrosulfide Formula:  $Ba(HS)_2$ Molecular Formula:  $BaH_2S_2$ Molecular Weight: 203.475 CAS RN: 25417-81-6 Properties: yellow cryst; hygr; preparation: reaction of  $H_2S$  with BaS, followed by precipitation of  $Ba(HS)_2 \cdot 4H_2O$  by alcohol and dehydration [KIR78] [HAW93] Solubility: g/100 g H<sub>2</sub>O soln: 0°C (32.6); 20°C (32.8); 100°C (43.7) [KIR78]

## 365

Compound: Barium hydrosulfide tetrahydrate
Formula: Ba(HS)<sub>2</sub> · 4H<sub>2</sub>O
Molecular Formula: BaH<sub>10</sub>O<sub>4</sub>S<sub>2</sub>
Molecular Weight: 275.536
CAS RN: 12230-74-9
Properties: yellow rhomb; obtained by passing H<sub>2</sub>S through BaS solution, followed by addition of alcohol and subsequent crystallization [KIR78]
Solubility: g/100 g, H<sub>2</sub>O: 32.6 (0°C), 32.8 (20°C), 43.7 (100°C) [KIR78]
Melting Point, °C: decomposes at 50 [KIR78]

## 366

Compound: Barium hydroxide
Synonyms: caustic baryta, anhydrous barium hydroxide
Formula: Ba(OH)<sub>2</sub>
Molecular Formula: BaH<sub>2</sub>O<sub>2</sub>
Molecular Weight: 171.342
CAS RN: 17194-00-2
Properties: white powd, hygr; enthalpy of fusion 16.70 kJ/mol [CRC10] [STR93]
Solubility: g/100 g soln, H<sub>2</sub>O: 1.67 (0°C), 4.68 (25°C), 101.4 (80°C); solid phase, Ba(OH)<sub>2</sub> · 8H<sub>2</sub>O [KRU93]
Melting Point, °C: 408 [KNA91]
Boiling Point, °C: decomposes at 1032 (calculated) [KNA91]

## 367

**Compound:** Barium hydroxide monohydrate **Formula:**  $Ba(OH)_2 \cdot H_2O$  **Molecular Formula:**  $BaH_4O_3$  **Molecular Weight:** 189.357 **CAS RN:** 22326-55-2 **Properties:** white powd; formed when barium hydroxide

octahydrate is "boiled dry" in CO<sub>2</sub> free atm; used in manufacturing oil and grease additives, soaps, and in refining beet sugar [KIR78] [MER06] [HAW93]

**Solubility:** sl s H<sub>2</sub>O; s acids [HAW93]

**Density, g/cm<sup>3</sup>:** 3.743 [MER06] **Reactions:** minus H<sub>2</sub>O <407°C, dehydrates to BaO at ~800°C [KIR78]

368

**Compound:** Barium hydroxide octahydrate Formula:  $Ba(OH)_2 \cdot 8H_2O$ Molecular Formula:  $BaH_{18}O_{10}$ Molecular Weight: 315.464 CAS RN: 12230-71-6

- Properties: white, monocl cryst; rapidly absorbs CO<sub>2</sub> from air; vapor pressure at mp 30.3 kPa; prepared by dissolution of BaO in hot water, followed by crystallization; used as plastic stabilizer, an additive in papermaking, a pigment dispersant, and to protect limestone materials from deterioration [KIR78] [STR93] [MER06]
- **Solubility:** g Ba(OH)<sub>2</sub>/100 g soln: 1.65 (0°C), 3.76 (20°C), 48.5 (78°C) [KIR78]
- Density, g/cm<sup>3</sup>: 2.18 [KIR78]
- Melting Point, °C: 77.9, melts in waters of crystallization [KIR78]

369

Compound: Barium hypophosphite monohydrate
Formula: Ba(H<sub>2</sub>PO<sub>2</sub>)<sub>2</sub>·H<sub>2</sub>O
Molecular Formula: BaH<sub>6</sub>O<sub>5</sub>P<sub>2</sub>
Molecular Weight: 285.320
CAS RN: 14871-79-5
Properties: monocl platelets; can be prepared by reacting white phosphorus and barium hydroxide; used in nickel plating; anhydrous material, Ba(H<sub>2</sub>PO<sub>2</sub>)<sub>2</sub>, is a white, odorless, cryst powd [MER06] [HAW93]
Solubility: g/100 mL: 28.6 (17°C), 33.3 (100°C); i alcohol [MER06]
Density, g/cm<sup>3</sup>: 2.90 [MER06]
Melting Point, °C: decomposes at 100–150 [CRC10]

370

Compound: Barium iodate Formula:  $Ba(IO_3)_2$ Molecular Formula:  $BaI_2O_6$ Molecular Weight: 487.132 CAS RN: 10567-69-8 Properties: white, cryst powd [HAW93] Solubility: g/L soln, H<sub>2</sub>O: 0.395 (25°C) [KRU93]; g/100 g H<sub>2</sub>O: 0.035 (20°C), 0.046 (30°C), 0.057 (40°C) [LAN05] Density, g/cm<sup>3</sup>: 5.23 [HAW93] Melting Point, °C: decomposes at 476 [HAW93]

### 371

Compound: Barium iodate monohydrate Formula:  $Ba(IO_3)_2 \cdot H_2O$ Molecular Formula:  $BaH_2I_2O_7$ Molecular Weight: 505.148 CAS RN: 7787-34-0 Properties: cryst [MER06] Solubility: s in 3350 parts  $H_2O$  (25°C), 625 parts boiling  $H_2O$ ; s HCl, HNO<sub>3</sub>; i alcohol [MER06] Density, g/cm<sup>3</sup>: 5.00 [MER06] Reactions: minus  $H_2O$  at 130°C [MER06]

# 372

Compound: Barium iodide Formula:  $BaI_2$ Molecular Formula:  $BaI_2$ Molecular Weight: 391.136 CAS RN: 13718-50-8 Properties: off-white powd; hygr; enthalpy of fusion 26.53 kJ/mol [CIC73] [STR93] [CRC10] Solubility: g/100 g soln, H<sub>2</sub>O: 62.5 (0°C), 68.8 (25°C), 73.35 (98.9°C); solid phase,  $2BaI_2 \cdot 15H_2O$  (0°C, 25°C),  $BaI_2 \cdot 2H_2O + BaI_2 \cdot H_2O$  (98.9°C) [KRU93] Density, g/cm<sup>3</sup>: 5.15 [KIR78] Melting Point, °C: 711 [CIC73] Boiling Point, °C: decomposes [CIC73]

## 373

Compound: Barium iodide dihydrate
Formula: BaI<sub>2</sub> · 2H<sub>2</sub>O
Molecular Formula: BaH<sub>4</sub>I<sub>2</sub>O<sub>2</sub>
Molecular Weight: 427.167
CAS RN: 7787-33-9
Properties: colorless, odorless cryst; rapidly becomes reddish in air due to liberation of iodine; prepared from HI and barium hydroxide solutions with subsequent crystallization from hot solutions; used to prepare other iodides [MER06] [HAW93]
Solubility: g BaI<sub>2</sub>/100 g soln: 169.4 (0°C), 271.0 (100°C) [KIR78]; g/100 g H<sub>2</sub>O: 182 (0°C), 223 (20°C), 301 (100°C) [LAN05]
Density, g/cm<sup>3</sup>: 4.917 [KIR78]
Melting Point, °C: 740 [HAW93]

Reactions: minus 2H<sub>2</sub>O at 150°C [KIR78]

### 374

**Compound:** Barium lead oxide **Formula:** BaPbO<sub>3</sub> **Molecular Formula:** BaO<sub>3</sub>Pb **Molecular Weight:** 392.525 **CAS RN:** 12047-25-5 Properties: monocl [TAY85]

Reactions: transition from monocl to hex (127°C); from hex to cub (423°C) [TAY85] Thermal Expansion Coefficient: from 25°C to: 500°C (1.29); 600°C (1.62); 800°C (2.22) [TAY85]

### 375

Compound: Barium manganate(VI)
Synonym: manganese green
Formula: BaMnO<sub>4</sub>
Molecular Formula: BaMnO<sub>4</sub>
Molecular Weight: 256.263
CAS RN: 7787-35-1
Properties: greenish gray cryst; sensitive to moisture; uses: oxidizes primary and secondary alcohols to carbonyl compounds, paint pigment [HAW93] [STR93] [ALD93]
Solubility: disproportionates in H<sub>2</sub>O to Ba(MnO<sub>4</sub>)<sub>2</sub>+MnO<sub>2</sub> [MER06]
Density, g/cm<sup>3</sup>: 4.85 [MER06]

## 376

**Compound:** Barium metaborate dihydrate **Synonym:** barium borate dihydrate **Formula:**  $Ba(BO_2)_2 \cdot 2H_2O$ **Molecular Formula:**  $B_2BaH_4O_6$ **Molecular Weight:** 258.977 **CAS RN:** 23436-05-7

**Properties:** prepared by precipitation by adding sodium metaborate solution to a solution of barium chloride at 90°C–95°C; at room temp the tetrahydrate precipitates; finds use as a fire retardant for paints, plastics, textiles, and paper products [KIR78]

Solubility: 12.5 g/L of BaO⋅B<sub>2</sub>O<sub>3</sub>⋅4H<sub>2</sub>O in H<sub>2</sub>O (25°C) [KIR78] Reactions: dehydrates above 140°C [KIR78]

## 377

Compound: Barium metaborate monohydrate
Synonym: barium borate monohydrate
Formula: Ba(BO<sub>2</sub>)<sub>2</sub>·H<sub>2</sub>O
Molecular Formula: B<sub>2</sub>BaH<sub>2</sub>O<sub>5</sub>
Molecular Weight: 240.962
CAS RN: 26124-86-7
Properties: white powd; manufactured from a solution of BaS and sodium tetraborate; used to add mold, corrosion, and fire resistance to paint [KIR78]
Solubility: 0.3% H<sub>2</sub>O [KIR78]
Density, g/cm<sup>3</sup>: 3.25-3.35 [KIR78]

### Melting Point, °C: >900 [KIR78]

### 378

Compound: Barium metaphosphate Formula: Ba(PO<sub>3</sub>)<sub>2</sub> Molecular Formula: BaO<sub>6</sub>P<sub>2</sub> Molecular Weight: 295.271 CAS RN: 13466-20-1 Properties: white powd; used in glasses, porcelain, and enamel [HAW93] Solubility: i H<sub>2</sub>O; slowly dissolves in acids [HAW93] Melting Point, °C: 1560 [ALF93]

#### 379

Compound: Barium metasilicate
Synonym: monobarium silicate
Formula: BaSiO<sub>3</sub>
Molecular Formula: BaO<sub>3</sub>Si
Molecular Weight: 213.411
CAS RN: 13255-26-0
Properties: colorless, rhomb powd; can be formed by heating BaO, BaCO<sub>3</sub>, or BaSO<sub>4</sub> to white heat with SiO<sub>2</sub>, which also forms 3BaO · SiO<sub>2</sub>. The tribarium silicate hydrolyzes to form BaSiO<sub>3</sub> and Ba(OH)<sub>2</sub>, which is the basis for the Deguide process; used in ceramics [KIR78] [HAW93]
Solubility: i H<sub>2</sub>O; s acids [HAW93]
Density, g/cm<sup>3</sup>: 4.4 [STR93]
Melting Point, °C: 1605 [KNA91]

#### 380

Compound: Barium molybdate Formula: BaMoO<sub>4</sub> Molecular Formula: BaMoO<sub>4</sub> Molecular Weight: 297.265 CAS RN: 7787-37-3 Properties: white powd; scheelite structure, c/a=2.29; used in electronic and optical equipments and in paint pigments for protective coatings [HAW93] [MER06] [KIR81] Solubility: 0.0055 g/100 g H<sub>2</sub>O [KIR81] Density, g/cm<sup>3</sup>: 4.975 [KIR81] Melting Point, °C: 1450 [KNA91]

## 381

Compound: Barium niobate Synonym: barium niobate(V) Formula: Ba(NbO<sub>3</sub>)<sub>2</sub> Molecular Formula: BaNb<sub>2</sub>O<sub>6</sub> Molecular Weight: 419.136 CAS RN: 12009-14-2 Properties: yellow hex or ortho; -100 mesh, 99.9% purity [CER91] [LID94]
**Density, g/cm<sup>3</sup>:** 2.8 [LID94] **Melting Point, °C:** 1450 [LID94]

## 382

Compound: Barium nitrate Synonym: nitrobarite Formula: Ba(NO<sub>3</sub>)<sub>2</sub> Molecular Formula: BaN<sub>2</sub>O<sub>6</sub> Molecular Weight: 261.336 CAS RN: 10022-31-8 Properties: white, cryst powd; prepared from BaCO<sub>3</sub> suspension and HNO<sub>3</sub>, followed by crystallizatio

- suspension and HNO<sub>3</sub>, followed by crystallization; used in pyrotechnics, green flares, tracer bullets, and detonators [STR93] [MER06] [KIR78] Solubility: g/100 g soln, H<sub>2</sub>O: 4.72 (0°C), 9.27 (25°C),
- 25.6 (100°C); solid phase, Ba(NO<sub>3</sub>)<sub>2</sub> [KRU93] **Density, g/cm<sup>3</sup>:** 3.24 [KIR78]

Melting Point, °C: 592 [KIR78]

**Reactions:** decomposes above 590°C [MER06]

## 383

Compound: Barium nitride Formula: Ba<sub>3</sub>N<sub>2</sub> Molecular Formula: Ba<sub>3</sub>N<sub>2</sub> Molecular Weight: 439.994 CAS RN: 12047-79-9 Properties: yellowish brown; -20 mesh, 99.7% purity [CER91] [CIC73] Solubility: decomposed in H<sub>2</sub>O [CRC10] Density, g/cm<sup>3</sup>: 4.78 [ALF93] Boiling Point, °C: 1000, vacuum [ALF93]

### 384

Compound: Barium nitrite Formula: Ba(NO<sub>2</sub>)<sub>2</sub> Molecular Formula: BaN<sub>2</sub>O<sub>4</sub> Molecular Weight: 229.338 CAS RN: 13465-94-6 Properties: colorless, hex [CRC10] Solubility: 67.5 g/100 mL (20°C) H<sub>2</sub>O; sl s alcohol [CRC10] Density, g/cm<sup>3</sup>: 3.234 [KIR78] Melting Point, °C: 267 [KIR78] Reactions: decomposes at 270°C to BaO, NO, and N<sub>2</sub> [KIR78]

# 385

**Compound:** Barium nitrite monohydrate Formula:  $Ba(NO_2)_2 \cdot H_2O$ Molecular Formula:  $BaH_2N_2O_5$ Molecular Weight: 247.353 CAS RN: 7787-38-4 Properties: white to yellowish, hex, cryst powd; crystallized from a stoichiometric solution of BaCl<sub>2</sub> and NaNO<sub>2</sub>; used as a corrosion inhibitor, in explosives, and for diazotization [HAW93] [KIR78]
Solubility: g Ba(NO<sub>2</sub>)<sub>2</sub>/100 g H<sub>2</sub>O: 54.8 (0°C), 319 (100°C) [KIR78]; s alcohol [HAW93]
Density, g/cm<sup>3</sup>: 3.173 [KIR78]
Melting Point, °C: decomposes at 217 [HAW93]
Reactions: minus H<sub>2</sub>O at 116°C [KIR78]

# 386

Compound: Barium oxalate Synonyms: ethanedioic acid, barium salt Formula:  $BaC_2O_4$ Molecular Formula:  $C_2BaO_4$ Molecular Weight: 225.347 CAS RN: 516-02-9 Properties: white powd, 99.999% purity [ALF93] Solubility: g/1000 g soln, H<sub>2</sub>O: 0.053 (0°C), 0.1087 (25°C), 0.285 (73°C); solid phase,  $BaC_2O_4 \cdot 2H_2O$  [KRU93] Density, g/cm<sup>3</sup>: 2.658 [STR93] Melting Point, °C: decomposes at 400 [STR93]

#### 387

Compound: Barium oxalate monohydrate Synonyms: ethanedioic acid, barium salt monohydrate Formula:  $BaC_2O_4 \cdot H_2O$ Molecular Formula:  $C_2H_2BaO_5$ Molecular Weight: 243.362 CAS RN: 13463-22-4 Properties: white, cryst powd; used in pyrotechnics, as an analytical reagent [HAW93] Solubility: s in 10,000 parts cold H<sub>2</sub>O, 5,000 parts boiling H<sub>2</sub>O; s dil HCl, HNO<sub>3</sub> [MER06] Density, g/cm<sup>3</sup>: 2.66 [MER06]

#### 388

Compound: Barium oxide Synonym: barium monoxide Formula: BaO Molecular Formula: BaO Molecular Weight: 153.326 CAS RN: 1304-28-5 Properties: white to yellowish white powd; reacts with atm CO<sub>2</sub> and H<sub>2</sub>O forming hydroxide and carbonate, with evolution of heat; two forms: cub, hex, a=0.55391 nm; enthalpy of fusion 59.00 kJ/ mol; made by heating BaCO<sub>3</sub> and carbon; uses: dehydrate solvents, additive in detergents, and lubricating oils [CIC73] [HAW93] [KIR78] [CRC10] Solubility: 3.48 g/100 mL (0°C) H<sub>2</sub>O; s dil acids, alcohol; i acetone, NH<sub>3</sub> [CRC10] Density, g/cm<sup>3</sup>: 5.72 (cub), 5.32 (hex) [KIR78]
Melting Point, °C: 2013 [CRC10]
Boiling Point, °C: ~2000 [KIR78]
Reactions: BaO+O<sub>2</sub>(g)=BaO<sub>2</sub> at 500°C [KIR78]
Thermal Expansion Coefficient: from 25°C to: 100°C (0.33); 200°C (0.78); 400°C (1.77); 600°C (2.91); 800°C (4.08); 1000°C (5.25); 1200°C (6.51) [TAY84a]

#### 389

Compound: Barium perchlorate
Formula: Ba(ClO<sub>4</sub>)<sub>2</sub>
Molecular Formula: BaCl<sub>2</sub>O<sub>8</sub>
Molecular Weight: 336.227
CAS RN: 13465-95-7
Properties: colorless, hex cryst; uses: efficient desiccant [ALD93] [CRC10] [ALF93]
Solubility: g/100 g soln, H<sub>2</sub>O: 67.3 (0°C), 74.3 (20°C), 84.9 (100°C); solid phase, Ba(ClO<sub>4</sub>)<sub>2</sub> · 3H<sub>2</sub>O [KRU93]; s 125 g/100 g ethanol (25°C) [CIC73]
Density, g/cm<sup>3</sup>: 3.20 [ALF93]
Melting Point, °C: 505 [ALD93]

# 390

Compound: Barium perchlorate trihydrate
Formula: Ba(ClO<sub>4</sub>)<sub>2</sub> · 3H<sub>2</sub>O
Molecular Formula: BaCl<sub>2</sub>H<sub>6</sub>O<sub>11</sub>
Molecular Weight: 390.273
CAS RN: 10294-39-0
Properties: colorless cryst; oxidizing agent; used in the manufacture of explosives and in rocket fuels [HAW93] [MER06] [STR93]
Solubility: g/100 g H<sub>2</sub>O: 239 (0°C), 336 (20°C), 653 (100°C); s methanol [HAW93] [LAN05]
Density, g/cm<sup>3</sup>: 2.74 [HAW93]

# 391

Compound: Barium permanganate
Formula: Ba(MnO<sub>4</sub>)<sub>2</sub>
Molecular Formula: BaMn<sub>2</sub>O<sub>8</sub>
Molecular Weight: 375.198
CAS RN: 7787-36-2
Properties: brownish violet to black cryst; oxidizing agent; used as a disinfectant, in dry cell batteries [HAW93]
Solubility: 62.5 g/100 mL (10°C) H<sub>2</sub>O; decomposed by alcohol [MER06] [CRC10]
Density, g/cm<sup>3</sup>: 3.77 [MER06]
Melting Point, °C: decomposes at 200 [CRC10]

### 392

**Compound:** Barium peroxide **Synonym:** barium dioxide

**Formula:** BaO<sub>2</sub> **Molecular Formula:** BaO<sub>2</sub> Molecular Weight: 169.326 CAS RN: 1304-29-6 **Properties:** white or gravish white, heavy powd, -80 mesh 99% pure; decomposes slowly in air; oxidizing agent; can be prepared by heating BaO in oxygen or air at 500°C; used to bleach materials and to decolorize glass [HAW93] [MER06] [KIR78] [CER91] Solubility: i H<sub>2</sub>O, but slowly decomposed by contact with H<sub>2</sub>O [MER06] Density, g/cm<sup>3</sup>: 4.96 [MER06] Melting Point, °C: decomposes at 450 [STR93] **Reactions:** decomposes at 700°C by reaction:  $BaO_2$  to  $BaO + O_2$  [KIR78]

### 393

Compound: Barium potassium chromate
Synonym: Pigment E
Formula: BaK<sub>2</sub>(CrO<sub>4</sub>)<sub>2</sub>
Molecular Formula: BaCr<sub>2</sub>K<sub>2</sub>O<sub>8</sub>
Molecular Weight: 447.511
CAS RN: 27133-66-0
Properties: pale yellow solid; has lower chloride and sulfate content than other chromate pigments; prepared by reacting K<sub>2</sub>Cr<sub>2</sub>O<sub>7</sub> and BaCO<sub>3</sub> at 500°C; used in paints to protect Fe and steel from corrosion and to form strong and elastic paint films [HAW93] [KIR78]
Solubility: g/100 g H<sub>2</sub>O: 57.2 (0°C), 57.5 (30°C), 82.7 (100°C) [LAN05]
Density, g/cm<sup>3</sup>: 3.65 [KIR78]

### 394

Compound: Barium pyrophosphate Formula:  $Ba_2P_2O_7$ Molecular Formula:  $Ba_2O_7P_2$ Molecular Weight: 448.597 CAS RN: 13466-21-2 Properties: white powd; rhomb [CRC10] [HAW93] Solubility: 0.01 g/100 mL H<sub>2</sub>O; s acids, NH<sub>4</sub> salts [CRC10] [HAW93] Density, g/cm<sup>3</sup>: 3.9 [CRC10]

#### 395

Compound: Barium selenate Formula: BaSeO<sub>4</sub> Molecular Formula: BaO<sub>4</sub>Se Molecular Weight: 280.285 CAS RN: 7787-41-9 Properties: ortho-rhomb cryst; preparation: heating BaCO<sub>3</sub> and Se [MER06] Solubility: g/L soln; H<sub>2</sub>O; 0.081 (25°C); s HCl, i HNO<sub>3</sub> [MER06] [KRU93]
Density, g/cm<sup>3</sup>: 4.75 [MER06]
Reactions: heating causes decomposition [MER06]

## 396

Compound: Barium selenide Formula: BaSe Molecular Formula: BaSe Molecular Weight: 216.287 CAS RN: 1304-39-8 Properties: cub microcryst powd, -20 mesh 99.5% purity; turns red in air; used in semiconductors and photocells [HAW93] [CER91] [MER06] Solubility: decomposed by H<sub>2</sub>O [MER06] Density, g/cm<sup>3</sup>: 5.02 [MER06]

### 397

Compound: Barium selenite Formula: BaSeO<sub>3</sub> Molecular Formula: BaO<sub>3</sub>Se Molecular Weight: 264.285 CAS RN: 13718-59-7 Properties: solid [ALD93] Solubility: g/100 g soln, H<sub>2</sub>O: 0.005 (0°C), 0.005 (25°C); solid phase, BaSeO<sub>3</sub> [KRU93]

# 398

Compound: Barium silicate Synonym: pentabarium octasilicate Formula:  $5BaO \cdot 8SiO_2$ Molecular Formula:  $Ba_5O_{21}Si_8$ Molecular Weight: 1247.306 CAS RN: 12650-28-1 Properties: a=3.365 nm, b=0.4697 nm, c=1.3896 nm [TAY88a] Melting Point, °C: 1445 [TAY88a] Thermal Expansion Coefficient: from 25°C to: 100°C (0.21), 200°C (0.51), 400°C (1.29), 600°C (2.19), 800°C (3.24), 1000°C (4.47), 1200°C (5.85) [TAY88a]

## 399

Compound: Barium silicate Synonym: sanbornite Formula: BaO<sub>2</sub>SiO<sub>2</sub> Molecular Formula: BaO<sub>5</sub>Si<sub>2</sub> Molecular Weight: 273.495 CAS RN: 12650-28-1 Properties: monocl, a=2.3206 nm, b=0.4661 nm, c=1.3613 nm [TAY87] Density, g/cm<sup>3</sup>: 3.70 [LID94] Melting Point, °C: 1420 [TAY87] **Thermal Expansion Coefficient:** from 25°C

to: 100°C (0.27), 200°C (0.66), 400°C (1.44), 600°C (2.22), 800°C (3.06), 1000°C (3.90), 1200°C (4.74) [TAY87]

# 400

Compound: Barium silicate Synonym: dibarium trisilicate Formula:  $2BaO \cdot 3SiO_2$ Molecular Formula:  $Ba_2O_8Si_3$ Molecular Weight: 486.906 CAS RN: 14871-82-0 Properties: a = 1.246 nm, b = 0.4687 nm, c = 1.3950 nm [TAY88a] Melting Point, °C: 1446 [TAY88a] Thermal Expansion Coefficient: from 25°C to: 100°C (0.11), 200°C (0.25), 400°C (0.54), 600°C (0.84), 800°C (1.13), 1000°C (1.43) [TAY88a]

#### 401

Compound: Barium silicide Formula: BaSi<sub>2</sub> Molecular Formula: BaSi<sub>2</sub> Molecular Weight: 193.498 CAS RN: 1304-40-1 Properties: metallic gray lumps, 6 mm pieces and smaller, 98% pure; quite permanent in dry air, but decomposed by moisture to evolve H<sub>2</sub>; metallurgic use to deoxidize steel [HAW93] [MER06] [CER91] Melting Point, °C: 1180 [STR93]

#### 402

Compound: Barium sodium niobium oxide
Formula: Ba<sub>2</sub>NaNb<sub>5</sub>O<sub>15</sub>
Molecular Formula: Ba<sub>2</sub>NaNb<sub>5</sub>O<sub>15</sub>
Molecular Weight: 1002.167
CAS RN: 12323-03-4
Properties: white powd of 99.999% purity; electrooptical cryst; used to produce coherent green light in lasers [HAW93] [ALF93]
Melting Point, °C: 1483 [ALD94]

# 403

**Compound:** Barium stannate **Formula:** BaSnO<sub>3</sub> **Molecular Formula:** BaO<sub>3</sub>Sn **Molecular Weight:** 304.035 **CAS RN:** 12009-18-6 **Properties:** white cub cryst [CRC10] **Solubility:** sl s H<sub>2</sub>O [CRC10] **Density, g/cm<sup>3</sup>:** 7.24 [CRC10]

#### 404

Compound: Barium stannate trihydrate Formula: BaSnO<sub>3</sub> · 3H<sub>2</sub>O Molecular Formula: BaH<sub>6</sub>O<sub>6</sub>Sn Molecular Weight: 358.081 CAS RN: 12009-18-6

Properties: anhydrous, 51404-76-3, -325 mesh 99% pure; cub, a=0.4117 nm; trihydrate is white, cryst powd; used in the production of special ceramic insulations requiring dielectric properties [HAW93] [TAY85] [CER91]

Solubility: sl s H<sub>2</sub>O, s HCl [HAW93]

Thermal Expansion Coefficient: from 25°C to: 100°C (0.18), 200°C (0.45), 400°C (1.02), 600°C (1.62), 800°C (2.31), 1000°C (3.00), 1200°C (3.78) [TAY85]

## 405

Compound: Barium stearate Formula: Ba[CH<sub>3</sub>(CH<sub>2</sub>)<sub>16</sub>COO]<sub>2</sub> Molecular Formula: C<sub>36</sub>H<sub>70</sub>BaO<sub>4</sub> Molecular Weight: 704.277 CAS RN: 6865-35-6 Properties: white powd; used as a waterproofing agent, lubricant in metal working, and in wax compounding [HAW93] [STR93] Solubility: i H<sub>2</sub>O, alcohol [HAW93] Density, g/cm3: 1.145 [HAW93] Melting Point, °C: 160 [HAW93]

## 406

**Compound:** Barium strontium niobium oxide Formula: BaSr(NbO<sub>3</sub>)<sub>4</sub> Molecular Formula: BaNb<sub>4</sub>O<sub>12</sub>Sr Molecular Weight: 788.566 CAS RN: 37185-09-4 **Properties:** –325 mesh white powd [ALF93]

## 407

Compound: Barium strontium tungsten oxide Formula: Ba<sub>2</sub>SrWO<sub>6</sub> Molecular Formula: Ba<sub>2</sub>O<sub>6</sub>SrW Molecular Weight: 642.110 CAS RN: 14871-56-8 Properties: -325 mesh powd, 99.9% purity; sensitive to moisture [ALD94] [ALF93] Melting Point, °C: 1400 [ALD94]

## 408

Compound: Barium sulfate Synonym: barite

Formula: BaSO<sub>4</sub> Molecular Formula: BaO<sub>4</sub>S Molecular Weight: 233.391 CAS RN: 7727-43-7 **Properties:** white or yellowish, odorless and tasteless rhomb powd; hardness 3-3.5 Mohs; enthalpy of fusion 40.60 kJ/mol; obtained from mining; used in drilling muds in the form of an aq suspension, to lubricate and cool drill bits, and to plaster walls of drill holes [HAW93] [KIR78] [CRC10] Solubility: g/L soln, H<sub>2</sub>O: 0.00115 (0°C), 0.00223 (25°C), 0.0039 (100°C); s conc H<sub>2</sub>SO<sub>4</sub> [KRU93] [KIR78] Density, g/cm3: 4.50 [KIR78] Melting Point, °C: 1350 [CRC10] Boiling Point, °C: decomposes at 1580 [KIR78] **Reactions:** transition from rhomb to monocl at 1150°C [KIR78] Thermal Expansion Coefficient: (volume) 100°C (0.434), 200°C (1.023), 400°C (2.381) [CLA66]

#### 409

Compound: Barium sulfide Formula: BaS Molecular Formula: BaS Molecular Weight: 169.393 CAS RN: 21109-95-5 Properties: heavy, grayish-white or pale yellow powd; -100 mesh, 99% purity; used as depilatory, in luminous paints and in vulcanization of rubber [MER06] [CER91] **Solubility:** g/100 g soln, H<sub>2</sub>O: 2.88 (0°C), 8.95 (25°C), 60.29 (100°C) [KRU93] Density, g/cm<sup>3</sup>: 4.36 [MER06] Melting Point, °C: >2000 [MER06] Reactions: slowly oxidizes in air [MER06]

## 410

Compound: Barium sulfide Synonym: black ash Formula: BaS Molecular Formula: BaS Molecular Weight: 169.393 CAS RN: 21109-95-5 Properties: black powd; colorless cub if pure; oxidizes in air; black ash is a commercial product produced by the reduction of BaSO<sub>4</sub> with carbon at 1000°C-1250°C; used as a precursor to produce BaCO<sub>3</sub>, BaCl<sub>2</sub>, and other Ba compounds, as a flame retardant, to dehair hides; other sulfides are: Ba<sub>2</sub>S<sub>3</sub>, 5311-28-7; BaS<sub>2</sub>, 12230-99-8; BaS<sub>3</sub>, 12231-01-5; BaS<sub>4</sub> · H<sub>2</sub>O, 12248-67-8; BaS<sub>5</sub>; and BaS·6H<sub>2</sub>O [HAW93] [STR93] [MER06] [KIR78] Density, g/cm<sup>3</sup>: 4.25 [KIR78]

Melting Point, °C: 1200 [STR93] Reactions: in H<sub>2</sub>O: 2BaS+2H<sub>2</sub>O=Ba(HS)<sub>2</sub>+Ba(OH)<sub>2</sub> [KIR78]

## 411

**Compound:** Barium sulfite **Formula:** BaSO<sub>3</sub> **Molecular Formula:** BaO<sub>3</sub>S **Molecular Weight:** 217.391 **CAS RN:** 7787-39-5

Properties: white powd, cub (hex) cryst; oxidizes gradually in air to BaSO<sub>4</sub>; formed by reacting a soluble sulfite and soluble barium salt; used in paper manufacturing and in analysis [MER06] [KIR78] [HAW93]
Solubility: 0.0197 g/100 g H<sub>2</sub>O (20°C); 0.0018 g/100 g

(80°C); s dil HCl [KIR78] [HAW93]

Density, g/cm<sup>3</sup>: 4.44 [LID94]

Melting Point, °C: decomposed by heat [HAW93]

# 412

**Compound:** Barium tantalate **Formula:** Ba(TaO<sub>3</sub>)<sub>2</sub> **Molecular Formula:** BaO<sub>6</sub>Ta<sub>2</sub> **Molecular Weight:** 595.219 **CAS RN:** 12047-34-6 **Properties:** -100 mesh 99% pure solid [CER91]

## 413

Compound: Barium tartrate Formula: BaC<sub>4</sub>H<sub>4</sub>O<sub>6</sub> Molecular Formula: C<sub>4</sub>H<sub>4</sub>BaO<sub>6</sub> Molecular Weight: 285.399 CAS RN: 5908-81-6 Properties: white cryst; used in pyrotechnics [HAW93] Solubility: s 3400 parts H<sub>2</sub>O; i alcohol [MER06] Density, g/cm<sup>3</sup>: 2.98 [HAW93]

# 414

Compound: Barium telluride Formula: BaTe Molecular Formula: BaTe Molecular Weight: 264.927 CAS RN: 12009-36-8 Properties: -20 and -28 mesh yellow powd, 99.5% pure; cub [CER91] [ALF93] [CRC10] Density, g/cm<sup>3</sup>: 5.13 [CRC10]

## 415

**Compound:** Barium tetracyanoplatinate(II) tetrahydrate Formula:  $BaPt(CN)_4 \cdot 4H_2O$  Molecular Formula: C<sub>4</sub>H<sub>8</sub>BaN<sub>4</sub>O<sub>4</sub>Pt
Molecular Weight: 508.540
CAS RN: 13755-32-3
Properties: yellow powd; large dichroic cryst; yellowish green by transmitted light, bluish violet by reflected light; used in x-ray screens [HAW93] [MER06] [STR93]
Solubility: s in about 35 parts H<sub>2</sub>O, more in hot H<sub>2</sub>O; i alcohol [HAW93] [MER06]
Density, g/cm<sup>3</sup>: 2.076 [STR93]; 3.05 [MER06]
Reactions: minus 2H<sub>2</sub>O at 100°C [HAW93]

# 416

Compound: Barium tetraiodomercurate(II) Synonym: mercuric barium iodide Formula: BaHgI<sub>4</sub> Molecular Formula: BaHgI<sub>4</sub> Molecular Weight: 845.535 CAS RN: 10048-99-4 Properties: yellow or reddish, deliq cryst [MER06] Solubility: v s H<sub>2</sub>O, alcohol [MER06]

## 417

Compound: Barium thiocyanate Formula:  $Ba(SCN)_2$ Molecular Formula:  $C_2BaN_2S_2$ Molecular Weight: 253.494 CAS RN: 2092-17-3 Properties: deliq cryst [MER06] Solubility: v s H<sub>2</sub>O, s acetone, methanol, ethanol [MER06]; g/100g soln, H<sub>2</sub>O: 62.63 (25°C); solid phase, Ba(SCN)<sub>2</sub>·3H<sub>2</sub>O [KRU93]

## 418

Compound: Barium thiocyanate trihydrate Formula:  $Ba(SCN)_2 \cdot 3H_2O$ Molecular Formula:  $C_2H_6BaN_2O_3S_2$ Molecular Weight: 307.540 CAS RN: 68016-36-4 Properties: white cryst; needles from  $H_2O$ , deliq [STR93] [MER06] Solubility: g/100 mL: 4.3 (20°C)  $H_2O$ ; 35.0 (20°C) alcohol [CRC10] Density, g/cm<sup>3</sup>: 2.286 [CRC10] Reactions: loses  $H_2O$  at 160°C [CRC10]

### 419

**Compound:** Barium thiosulfate **Formula:** BaS<sub>2</sub>O<sub>3</sub> **Molecular Formula:** BaO<sub>3</sub>S<sub>2</sub> Molecular Weight: 249.455 CAS RN: 35112-53-9 Properties: white, cryst powd [CRC10] Solubility: i EtOH; 0.2<sup>20</sup> g/100 g H<sub>2</sub>O [CRC10] Melting Point, °C: decomposes at 220 [CRC10]

#### 420

Compound: Barium thiosulfate monohydrate
Synonym: barium hyposulfite monohydrate
Formula: BaS<sub>2</sub>O<sub>3</sub> · H<sub>2</sub>O
Molecular Formula: BaH<sub>2</sub>O<sub>4</sub>S<sub>2</sub>
Molecular Weight: 267.473
CAS RN: 7787-40-8
Properties: white, cryst powd; used in explosives, luminous paints, matches, varnishes, and photography [MER06] [HAW93]
Solubility: v sl s H<sub>2</sub>O; i alcohol [HAW93] [MER06]
Density, g/cm<sup>3</sup>: 3.5 [HAW93]
Melting Point, °C: decomposed by heat [HAW93]

421

Compound: Barium titanate Formula:  $BaO \cdot 2TiO_2$ Molecular Formula:  $BaO_5Ti_2$ Molecular Weight: 313.084 CAS RN: 12009-27-5 Thermal Expansion Coefficient: from 25°C to: 100°C (0.21), 200°C (0.48), 400°C (1.20), 600°C(1.95) [TOU77]

422

Compound: Barium titanate Formula:  $BaO \cdot 4TiO_2$ Molecular Formula:  $BaO_9Ti_4$ Molecular Weight: 472.842 CAS RN: 12009-31-3 Properties: ortho-rhomb [WU88] Density, g/cm<sup>3</sup>: 4.55 [WU88] Thermal Expansion Coefficient: 100°C (0.18), 200°C (0.42), 400°C (0.96), 600°C (1.53) [TOU77]

## 423

**Compound:** Barium titanate **Synonym:** barium metatitanate **Formula:** BaTiO<sub>3</sub> **Molecular Formula:** BaO<sub>3</sub>Ti **Molecular Weight:** 233.192 **CAS RN:** 12047-27-7 Properties: white powd or sintered lumps; two forms: tetr, a=0.39932 nm, c=0.40347 nm; dielectric constant ~4000; preparation: by calcining and sintering barium carbonate and anatase powd at 1300°C–1450°C, by hydrothermal synthesis, and sol-gel process using Ti(IV) isopropylate; used in ferroelectric ceramic materials, as an evaporated ceramic at 99.995% purity in dielectric films and thin film capacitors [HAW93] [STR93] [KIR83] [CER91] [CHA90] [PHU89]Solubility: i H<sub>2</sub>O [CRC10]Density, g/cm<sup>3</sup>: tetr, 6.017; hex, 5.806 [KNA91]

- **Reactions:** transition from hex to tetr  $(-5^{\circ}C)$ ; from tetr to cub (120°C) [TAY85]
- **Thermal Expansion Coefficient:** from 25°C to: 100°C (0.12), 200°C (0.36), 400°C (1.02), 600°C (1.80), 800°C (2.61), 1000°C (3.48), 1200°C (4.44) [TAY85]

## 424

Compound: Barium titanium silicate Synonym: benitoite Formula:  $BaO \cdot TiO_2 \cdot 3SiO_2$ Molecular Formula:  $BaO_9Si_3Ti$ Molecular Weight: 413.446 CAS RN: 15491-35-7 Properties: gemstone; a=0.6643 nm, c=0.9757 nm [TAY88b] [LAN05] Solubility: s HF [LAN05] Density, g/cm<sup>3</sup>: 3.6 [LAN05] Thermal Expansion Coefficient: from 25°C to: 100°C (0.09), 200°C (0.21), 400°C (0.48), 600°C (0.72), 800°C (0.99), 1000°C (1.23) [TAY88b]

## 425

Compound: Barium tungstate Synonym: barium white Formula: BaWO<sub>4</sub> Molecular Formula: BaO<sub>4</sub>W Molecular Weight: 385.165 CAS RN: 7787-42-0 Properties: white powd, -200 mesh, 99.9% purity; tetr, a = 0.5614 nm, c = 1.2715 nm; used in x-ray photography and as a pigment [STR93] [HAW93] [TAY86] [CER91] Solubility: i H<sub>2</sub>O [HAW93] Density, g/cm<sup>3</sup>: 5.04 [HAW93] Thermal Expansion Coefficient: from 25°C to: 100°C (0.27), 200°C (0.63), 400°C (1.35), 600°C (2.04), 800°C (2.76), 1000°C (3.45), 1200°C(4.14) [TAY86]

### 426

**Compound:** Barium uranium oxide **Synonym:** barium uranate

Formula: BaU<sub>2</sub>O<sub>7</sub>
Molecular Formula: BaO<sub>7</sub>U<sub>2</sub>
Molecular Weight: 725.381
CAS RN: 10380-31-1
Properties: orange or yellow powd; used in painting on porcelain [MER06]
Solubility: i H<sub>2</sub>O, s acids [MER06]

#### 427

**Compound:** Barium vanadate **Formula:** Ba<sub>3</sub>(VO<sub>4</sub>)<sub>2</sub> **Molecular Formula:** Ba<sub>3</sub>O<sub>8</sub>V<sub>2</sub> **Molecular Weight:** 641.859 **CAS RN:** 39416-30-3 **Properties:** -200 mesh, 99.9% pure [CER91] **Melting Point,** °C: 707 [KNA91]

### 428

**Compound:** Barium yttrium tungsten oxide **Formula:** Ba<sub>3</sub>Y<sub>3</sub>WO<sub>9</sub> **Molecular Formula:** Ba<sub>3</sub>O<sub>9</sub>WY<sub>3</sub> **Molecular Weight:** 1006.534 **CAS RN:** 37265-86-4 **Properties:** -325 mesh, 99.9% purity [ALF93] **Melting Point, °C:** decomposes at 1470 [ALF93]

## 429

Compound: Barium zirconate
Formula: BaZrO<sub>3</sub>
Molecular Formula: BaO<sub>3</sub>Zr
Molecular Weight: 276.549
CAS RN: 12009-21-1
Properties: light gray or white powd, -100, +200 mesh 99% purity; a=0.4193 nm; used in the manufacture of white silicone rubber compounds [HAW93] [TAY85] [CER91]
Solubility: i H<sub>2</sub>O, alkalies; sl s acids [HAW93]
Density, g/cm<sup>3</sup>: 5.52 [HAW93]
Melting Point, °C: 2500 [ALF93]
Thermal Expansion Coefficient: from 25°C to: 100°C (0.18), 200°C (0.42), 400°C (0.90), 600°C (1.38), 800°C (1.86), 1000°C (2.34) [TAY85]

# 430

Compound: Barium zirconium phosphate Formula:  $Ba_{0.5}Zr_2(PO_4)_3$ Molecular Formula:  $Ba_{0.5}SO_{12}P_3Zr_2$ Molecular Weight: 536.026 CAS RN: 82045-86-1 Properties: NASICON structure, a=0.8642 nm, c=2.398 nm [TAY91a] **Thermal Expansion Coefficient:** from 25°C to: 100°C (0.03), 200°C (0.06), 400°C (0.13), 600°C (0.20), 800°C (0.27), 1000°C (0.34) [TAY91a]

## 431

 $\label{eq:compound: Barium zirconium silicate} Formula: BaO \cdot ZrO_2 \cdot SiO_2 \\ \mbox{Molecular Formula: BaO_5SiZr} \\ \mbox{Molecular Weight: } 336.634\beta \\ \mbox{CAS RN: } 13708-68-4 \\ \mbox{Properties: white powd; uses: in producing electrical} \\ \mbox{resistor ceramics and in glass opacifiers [HAW93]} \\ \mbox{Solubility: i } H_2O, alkalies; sl s acids; s HF [HAW93] \\ \end{tabular}$ 

## 432

**Compound:** Berkelium( $\alpha$ ) Formula: α-Bk Molecular Formula: Bk Molecular Weight: 247 CAS RN: 7440-40-6 **Properties:** metal; hex, a = 0.3416 nm, c = 1.1069 nm; in trivalent state, its properties are close to that of Ce+++; ionic radius of Bk+++ is 0.096 nm, of Bk<sup>++++</sup> is 0.0860 nm; enthalpy of vaporization 382 kJ/mol; enthalpy of fusion 7.92 kJ/mol; first discovered in 1949 [KIR78] [KAT86] [MER06] Density, g/cm<sup>3</sup>: 14.78 (25°C) [KIR78] Melting Point, °C: 1050 [KIR91] Boiling Point, °C: ~2630 [KAT86] Reactions: transfroms from hex to cub ~930°C [KAT86]

# 433

Compound: Berkelium(β) Formula: β-Bk Molecular Formula: Bk Molecular Weight: 247 CAS RN: 7440-40-6 Properties: discovered in 1949; fcc, a=0.4997 nm; stable <986°C [KIR78] Density, g/cm<sup>3</sup>: 13.25 (25°C) [KIR78] Melting Point, °C: 986 [MER06] Boiling Point, °C: ~2630 [KAT86]

# 434

Compound: Beryllium Synonym: glucinium Formula: Be Molecular Formula: Be Molecular Weight: 9.012182 CAS RN: 7440-41-7 **Properties:** metal; two forms,  $\alpha$ : gray; hex, a = 0.22856 nm, b = 0.35832 nm, c/a = 0.15677 nm; $\beta$ : bcc, a=0.2551 nm; enthalpy of fusion 7.90 kJ/mol; enthalpy of sublimation ~320 kJ/ mol; enthalpy of vaporization 230-310kJ/ mol; electrical resistivity at  $25^{\circ}$ C is  $4.266 \times 10^{-8}$ ohm · m; velocity of sound 12,600 m/s; reflectivity, white light, 50%-55%; used in semiconductor junctions [CIC73] [KIR78] [CER91] [CRC10] **Solubility:** s acids except HNO<sub>3</sub>; s alkalies [HAW93] Density, g/cm<sup>3</sup>: 1.8477 [CIC73] Melting Point, °C: 1278 [COT88] Boiling Point, °C: 2970 [KIR78] **Reactions:** transformation  $\alpha$  to  $\beta$  at 1250°C [CIC73] Thermal Conductivity, W/(m·K): 190 (25°C), 170 (100°C), 150 (200°C), 130 (400°C), 75 (800°C) [KIR78] Thermal Expansion Coefficient: coefficient of linear expansion, K<sup>-1</sup>: 25°C-100°C,  $11.5 \times 10^{-6}$ ;  $25^{\circ}$ C-200°C,  $12.7 \times 10^{-6}$ ;

#### 435

**Compound:** Beryllium acetate **Synonyms:** acetic acid, beryllium salt **Formula:** Be(CH<sub>3</sub>COO)<sub>2</sub> **Molecular Formula:** C<sub>4</sub>H<sub>6</sub>BeO<sub>4</sub> **Molecular Weight:** 127.101 **CAS RN:** 543-81-7

25°C-400°C, 14.8×10<sup>-6</sup> [KIR78]

Properties: white cryst; preparation: can be crystallized from hot acetic acid in pure form; uses: source of pure beryllium salts; formula also given as Be<sub>4</sub>O(CH<sub>3</sub>COO)<sub>6</sub> [MER06] [HAW93]
Solubility: s hot H<sub>2</sub>O, with hydrolysis; i alcohol [MER06]
Reactions: decomposes at 60°C–100°C [MER06]

## 436

Compound: Beryllium acetylacetonate Synonyms: 2,4-pentanedione, beryllium derivative Formula: Be[CH<sub>3</sub>COCH=C(O)CH<sub>3</sub>)<sub>2</sub> Molecular Formula:  $C_{10}H_{14}BeO_4$ Molecular Weight: 207.231 CAS RN: 10210-64-7 Properties: monocl cryst powd [MER06] [STR93] Solubility: i H<sub>2</sub>O, hydrolyzed in boiling H<sub>2</sub>O [MER06]; v s alcohol, ether [HAW93] Density, g/cm<sup>3</sup>: 1.168 [MER06] Melting Point, °C: 108 [MER06] Boiling Point, °C: 270 [MER06]

### 437

**Compound:** Beryllium aluminate **Synonym:** chrysoberyl

Formula: BeAl<sub>2</sub>O<sub>4</sub>
Molecular Formula: Al<sub>2</sub>BeO<sub>4</sub>
Molecular Weight: 126.973
CAS RN: 12004-06-7
Properties: ortho-rhomb; enthalpy of fusion 176 kJ/mol [JAN71] [CIC73]
Density, g/cm<sup>3</sup>: 3.76 [CRC10]
Melting Point, °C: 1870 [JAN71]

## 438

Compound: Beryllium aluminum silicate Synonym: beryl Formula:  $3BeO \cdot Al_2O_3 \cdot 6SiO_2$ Molecular Formula:  $Al_2Be_3O_{18}Si_6$ Molecular Weight: 537.502 CAS RN: 1302-52-9 Properties: gemstone; green or blue; chief ore for beryllium; hex, a = 0.9188 nm, c = 0.9189 nm [CIC73] [KIR78] Density, g/cm<sup>3</sup>: 2.66 [CRC10] Melting Point, °C: 1410 [CRC10] Thermal Expansion Coefficient: (volume) 100°C (0.061), 200°C (0.079) [CLA66]

#### 439

**Compound:** Beryllium basic acetate Formula:  $Be_4O(CH_3COO)_6$ Molecular Formula: C<sub>12</sub>H<sub>18</sub>Be<sub>4</sub>O<sub>13</sub> Molecular Weight: 406.316 CAS RN: 1332-52-1 Properties: white cryst; can be crystallized in very pure form from acetic acid; tetrahedra when crystallized from chloroform; used as a source of pure Be salts [HAW93] [MER06] Solubility: i H<sub>2</sub>O, hydrolyzed by hot H<sub>2</sub>O and dil acids; s glacial acetic acid, chloroform, and other organic solvents except alcohol and ether [MER06] [HAW93] Density, g/cm<sup>3</sup>: 1.25 [MER06]; 1.360 [ALD93] Melting Point, °C: 285–286 [MER06] Boiling Point, °C: 330–331 [MER06]

# 440

**Compound:** Beryllium basic carbonate **Formula:**  $Be_3(OH)_2(CO_3)_2$ **Molecular Formula:**  $C_2H_2Be_3O_8$ **Molecular Weight:** 181.069 **CAS RN:** 66104-24-3 **Properties:** white powd [CRC10] **Solubility:** i H<sub>2</sub>O; s acid, alk [CRC10]

## 441

Compound: Beryllium boride-I Formula: Be<sub>4</sub>B Molecular Formula: BBe<sub>4</sub> Molecular Weight: 46.859 CAS RN: 12536-52-6 Properties: refractory materials; -80 mesh with 98% purity Melting Point, °C: 1160 [CRC10]

# 442

**Compound:** Beryllium boride-II **Formula:** Be<sub>2</sub>B **Molecular Formula:** BBe<sub>2</sub> **Molecular Weight:** 28.835 **CAS RN:** 12536-51-5 **Properties:** pink cryst [CRC10] **Melting Point, °C:** 1520 [CRC10]

## 443

**Compound:** Beryllium boride-III Formula: BeB<sub>2</sub> Molecular Formula: B<sub>2</sub>Be Molecular Weight: 30.634 CAS RN: 12228-40-9 Properties: refrac solid [CRC10] Melting Point, °C: 1970 [CRC10]

### 444

**Compound:** Beryllium boride-IV **Formula:**  $BeB_6$  **Molecular Formula:**  $B_6Be$  **Molecular Weight:** 73.878 **CAS RN:** 12429-94-6 **Properties:** red solid [CRC10] **Solubility:** Insoluble in H<sub>2</sub>O and EtOH **Melting Point, °C:** 2070 [CRC10]

### 445

Compound: Beryllium borohydride Synonym: beryllium tetrahydroborate Formula: Be(BH<sub>4</sub>)<sub>2</sub> Molecular Formula: B<sub>2</sub>BeH<sub>8</sub> Molecular Weight: 38.698 CAS RN: 17440-85-6 Properties: spontaneously flammable; obtained by reaction of diborane with dimethylberyllium [MER06] Solubility: vigorous reaction with H<sub>2</sub>O, HCl, evolving H<sub>2</sub> [MER06] HANDBOOK OF INORGANIC COMPOUNDS, SECOND EDITION

Melting Point, °C: sublimes at 91.3 [MER06] Boiling Point, °C: decomposes at >123 [MER06]

## 446

Compound: Beryllium bromide Formula: BeBr<sub>2</sub> Molecular Formula: BeBr<sub>2</sub> Molecular Weight: 168.820 CAS RN: 7787-46-4 Properties: ortho-rhomb; very hygr; -80 mesh, 99% purity; enthalpy of fusion 9.80 kJ/mol; made by reaction of Be and Br<sub>2</sub> at 500°C-700°C [KIR78] [CER91] [MER06] [CRC10] Solubility: v s H<sub>2</sub>O [MER06] Density, g/cm<sup>3</sup>: 3.465 [MER06] Melting Point, °C: 508 [CRC10] Boiling Point, °C: 520 [MER06] Reactions: sublimes at 473°C [MER06]

## 447

Compound: Beryllium carbide Formula: Be<sub>2</sub>C Molecular Formula: CBe<sub>2</sub> Molecular Weight: 30.035 CAS RN: 506-66-1 Properties: brick red or yellowish red octahedra; hard, refractory material; -200 mesh, 98% purity; prepared by hot pressing mixture of Be and C to 900°C; used in nuclear-reactor cores [CER91] [HAW93] [KIR78] [MER06] Solubility: decomposed very slowly by H<sub>2</sub>O; hydrolysis yields methane and beryllium hydroxide [KIR78] [MER06] Density, g/cm<sup>3</sup>: 1.90 [MER06] Melting Point, °C: decomposes at >2100 [MER06]

### 448

**Compound:** Beryllium carbonate tetrahydrate **Formula:**  $BeCO_3 \cdot 4H_2O$  **Molecular Formula:**  $CH_8BeO_7$  **Molecular Weight:** 141.083 **CAS RN:** 60883-64-9 **Properties:** unstable unless kept under CO<sub>2</sub> atm; obtained by passing CO<sub>2</sub> through aq suspension of  $Be(OH)_2$  [KIR78]

# 449

**Compound:** Beryllium chloride **Formula:** BeCl<sub>2</sub> **Molecular Formula:** BeCl<sub>2</sub> **Molecular Weight:** 79.917

#### CAS RN: 7787-47-5

Properties: white to faint yellow powd, and sublimed fibers and clumps of 99.5% purity; very deliq; ortho-rhomb cryst; hydrolyzed by water vapor; enthalpy of vaporization 105 kJ/mol; enthalpy of fusion 8.66 kJ/mol; prepared by heating BeO, Cl<sub>2</sub>, and C at 600°C–800°C [KIR78] [MER06] [CRC10]
Solubility: v s H<sub>2</sub>O with evolution of heat [MER06]: g/100 g soln, H<sub>2</sub>O: 40.35 (0°C), 41.72 (25°C); solid phase, BeCl<sub>2</sub>·4H<sub>2</sub>O [KRU93]; s alcohol, benzene, ether [HAW93]
Density, g/cm<sup>3</sup>: 1.90 [MER06]
Melting Point, °C: 405 [DOU83]
Boiling Point, °C: ~550 [DOU83]
Reactions: sublimes in vacuum at 300°C [MER06]

#### 450

Compound: Beryllium fluoride Formula: BeF<sub>2</sub> Molecular Formula: BeF<sub>2</sub> Molecular Weight: 47.009 CAS RN: 7787-49-7 Properties: 0.25 in. pieces and down; two forms; glassy, hygr; tetr when heated above 230°C; glassy form crystallizes spontaneously to quartz modification; enthalpy of fusion 4.76 kJ/ mol; made by thermal decomposition of (NH<sub>4</sub>)<sub>2</sub>BeF<sub>6</sub> [STR93] [KIR78] [MER06] Solubility: v s H<sub>2</sub>O [MER06]; sl s alcohol [HAW93] **Density, g/cm<sup>3</sup>:** 1.986 [MER06] Melting Point, °C: 552 [CRC10] Boiling Point, °C: sublimes at 1036 under 1 mm Hg [MER06] **Reactions:** transition from  $\alpha$  to  $\beta$  form at 227°C [KIR78]

# 451

Compound: Beryllium formate Synonyms: formic acid, beryllium salt Formula:  $Be(OOCH)_2$ Molecular Formula:  $C_2H_2BeO_4$ Molecular Weight: 99.048 CAS RN: 1111-71-3 Properties: powd [MER06] Solubility: very slowly hydrolyzed by  $H_2O$  [MER06] Reactions: forms  $Be_4O(HCOO)_6 > 250^{\circ}C$ , which sublimes at  $\sim 320^{\circ}C$  [MER06]

## 452

**Compound:** Beryllium hydride **Formula:** BeH<sub>2</sub> **Molecular Formula:** BeH<sub>2</sub> **Molecular Weight:** 11.028

### **CAS RN:** 7787-52-2

Properties: white, amorphous solid; inert to laboratory air; can be prepared by continuous thermal decomposition of a di-t-butylberyllium ethyl ether complex in a boiling hydrocarbon; has found use as rocket fuel and as a moderator for nuclear reactors [KIR80] [MER06]
Solubility: reacts slowly with H<sub>2</sub>O, rapidly with dil acids evolving H<sub>2</sub>(g) [MER06]
Density, g/cm<sup>3</sup>: 0.65 [LID94]
Reactions: rapid H<sub>2</sub>(g) evolution at 220°C [MER06]

## 453

**Compound:** Beryllium hydrogen phosphate **Formula:** BeHPO<sub>4</sub> **Molecular Formula:** BeHO<sub>4</sub>P **Molecular Weight:** 104.991 **CAS RN:** 13598-15-7 **Properties:** cryst [CRC10] **Solubility:** i H<sub>2</sub>O

## 454

Compound: Beryllium hydroxide(α)
Formula: Be(OH)<sub>2</sub>
Molecular Formula: BeH<sub>2</sub>O<sub>2</sub>
Molecular Weight: 43.027
CAS RN: 13327-32-7
Properties: amorphous powd or cryst; ortho-rhomb; prepared by precipitation from beryllium acetate solution with alkali [HAW93] [MER06] [KIR78]
Solubility: v sl s H<sub>2</sub>O, dil alkali; s hot NaOH, acids [MER06]
Density, g/cm<sup>3</sup>: 1.92 [MER06]
Reactions: minus H<sub>2</sub>O at >950°C [KIR78]

#### 455

Compound: Beryllium hydroxide(β)
Formula: Be(OH)<sub>2</sub>
Molecular Formula: BeH<sub>2</sub>O<sub>2</sub>
Molecular Weight: 43.027
CAS RN: 13327-32-7
Properties: white powd; tetr; metastable; decomposes to oxide at 138°C [KIR78] [HAW93]
Solubility: i H<sub>2</sub>O; s acids, alkalies [HAW93]
Reactions: transition from β to α after months of standing [KIR78]

#### 456

**Compound:** Beryllium iodide **Formula:** BeI<sub>2</sub> **Molecular Formula:** BeI<sub>2</sub>

# Molecular Weight: 262.821 CAS RN: 7787-53-3 Properties: -60 mesh, 99.5% pure and needles;

very hygr; enthalpy of vaporization 70.5 kJ/ mol; enthalpy of fusion 21.00 kJ/mol; obtained by reaction of Be and I<sub>2</sub> at 500°C–700°C [CER91] [KIR78] [MER06] [CRC10]
Solubility: reacts violently with H<sub>2</sub>O giving off HI [MER06]
Density, g/cm<sup>3</sup>: 4.325 [CRC10]
Melting Point, °C: 510 [CRC10]
Boiling Point, °C: 590 [CRC10]

## 457

Compound: Beryllium nitrate trihydrate
Formula: Be(NO<sub>3</sub>)<sub>2</sub> · 3H<sub>2</sub>O
Molecular Formula: BeH<sub>6</sub>N<sub>2</sub>O<sub>9</sub>
Molecular Weight: 187.068
CAS RN: 13597-99-4
Properties: white to sl yellow; deliq; prepared from BeO and HNO<sub>3</sub> solution, followed by evaporation and crystallization; used as a reagent [HAW93] [MER06]
Solubility: g Ba(NO<sub>3</sub>)<sub>2</sub>/100 g H<sub>2</sub>O: 97 (0°C), 108 (20°C), 178 (60°C); s alcohol [LAN05] [HAW93]
Density, g/cm<sup>3</sup>: 1.557 [CRC10]
Melting Point, °C: ~60 [MER06]
Boiling Point, °C: decomposes at 100–200 [HAW93]

### 458

Compound: Beryllium nitride
Formula: Be<sub>3</sub>N<sub>2</sub>
Molecular Formula: Be<sub>3</sub>N<sub>2</sub>
Molecular Weight: 55.050
CAS RN: 1304-54-7
Properties: hard white to grayish white; refractory; cub, a=0.814 nm; obtained from a reaction of Be and NH<sub>3</sub> at 1100°C [KIR78] [HAW93] [CIC73]
Solubility: decomposes slowly in H<sub>2</sub>O, quickly in acids and alkalies to evolve NH<sub>3</sub> [MER06]
Density, g/cm<sup>3</sup>: 2.71 [LID94]
Melting Point, °C: decomposes at 2200 [KIR78]
Boiling Point, °C: volatile [MER06]
Reactions: oxidized in air at 600°C [MER06]

# 459

**Compound:** Beryllium oxalate trihydrate **Formula:**  $BeC_2O_4 \cdot 3H_2O$  **Molecular Formula:**  $C_2H_6BeO_7$  **Molecular Weight:** 151.078 **CAS RN:** 15771-43-4

**Properties:** rhomb; obtained by evaporating a solution of Be(OH)<sub>2</sub> in excess oxalic acid; used to prepare ultra pure BeO [CRC10] [KIR78]

Solubility: g/100 g soln, H<sub>2</sub>O: 63.2 (25°C) [KRU93] Melting Point, °C: 2200 [CRC10] Boiling Point, °C: decomposes at 2240 [CRC10] Reactions: decomposes to BeO above 320°C [KIR78]

## 460

Compound: Beryllium oxide Synonym: beryllia Formula: BeO Molecular Formula: BeO Molecular Weight: 25.011 CAS RN: 1304-56-9 Properties: light, amorphous, white powd; insulates electrically like a ceramic, conducts heat like a metal; electrical resistivity, >1 ×  $10^{+16}$  ohm  $\cdot$  m; hardness 9 Mohs; tensile strength 150 MPa; compressive strength 1400 MPa; Poisson's ratio 0.164-0.380; modulus of rupture 250 MPa; modulus of elasticity 345 GPa; made from Be(OH)<sub>2</sub> and H<sub>2</sub>SO<sub>4</sub>; enthalpy of fusion 85.00 kJ/mol; used in electron tubes, resistor cores [HAW93] [MER06] [STR93] [KIR78] [CRC10] Solubility: v sl s H<sub>2</sub>O; slowly s conc acid, alkali [MER06] Density, g/cm<sup>3</sup>: 3.01 [STR93] Melting Point, °C: 2507 [CRC10] Boiling Point, °C: 4300 [STR93] Thermal Conductivity, W/(m·K): 25°C (290-330); 100°C (190-220); 500°C (65.4); 1000°C (20.3) [KIR80] [KIR78] Thermal Expansion Coefficient: coefficient of thermal expansion at 100°C is  $9.7 \times 10^{-6}$ /K; at 500°C is 13.3×10<sup>-6</sup>/K [KIR78]

## 461

Compound: Beryllium perchlorate tetrahydrate Formula:  $Be(ClO_4)_2 \cdot 4H_2O$ Molecular Formula:  $BeCl_2H_8O_{12}$ Molecular Weight: 279.974 CAS RN: 7787-48-6 Properties: very hygr cryst; retains waters of crystallization tenaciously [MER06] Solubility: g/100 g soln, H<sub>2</sub>O: 59.5 (25°C); solid phase,  $Be(ClO_4)_2 \cdot 4H_2O$  [KRU93]

# 462

Compound: Beryllium selenate tetrahydrate Formula: BeSeO<sub>4</sub>·4H<sub>2</sub>O Molecular Formula: BeH<sub>8</sub>SeO<sub>8</sub> Molecular Weight: 224.031 CAS RN: 10039-31-3 Properties: colorless, ortho-rhomb cryst [CRC10] [MER06] Solubility: v s H<sub>2</sub>O [MER06] Density, g/cm<sup>3</sup>: 2.03 [MER06] Reactions: minus 2H<sub>2</sub>O at 100°C; minus 4H<sub>2</sub>O at 300°C [MER06]

### 463

Compound: Beryllium sulfate Formula:  $BeSO_4$ Molecular Formula:  $BeO_4S$ Molecular Weight: 105.076 CAS RN: 13510-49-1 Properties: colorless cryst [HAW93] Solubility: g/100 g soln, H<sub>2</sub>O: 26.69 (0°C), 29.22 (25°C), 45.28 (100°C); solid phase, BeSO<sub>4</sub>·4H<sub>2</sub>O [KRU93]; i alcohol [HAW93] Density, g/cm<sup>3</sup>: 2.443 [CRC10] Melting Point, °C: decomposes at 550–600 [CRC10]

## 464

Compound: Beryllium sulfate dihydrate Formula:  $BeSO_4 \cdot 2H_2O$ Molecular Formula:  $BeH_4O_6S$ Molecular Weight: 141.106 CAS RN: 14215-00-0 Properties: forms when the tetrahydrate is heated at 92°C [KIR78] Reactions: minus  $2H_2O$  at 400°C; decomposes to BeO ~650°C [KIR78]

#### 465

Compound: Beryllium sulfate tetrahydrate Formula:  $BeSO_4 \cdot 4H_2O$ Molecular Formula:  $BeH_8O_8S$ Molecular Weight: 177.137 CAS RN: 7787-56-6 Properties: colorless cryst, lump 99.9% purity; produced from  $Be(OH)_2$  and  $H_2SO_4$  solution, followed by fractional crystallization; used to produce BeO for ceramics [KIR78] [HAW93] Solubility: v s  $H_2O$  [MER06] Density, g/cm<sup>3</sup>: 1.71 [MER06] Reactions: minus  $2H_2O \sim 100^{\circ}C$  [MER06]

# 466

Compound: Beryllium sulfide Formula: BeS Molecular Formula: BeS Molecular Weight: 41.079 CAS RN: 13598-22-6 Properties: regular; –100 mesh with 99% purity [CRC10] [CER91] [ALF93] **Solubility:** decomposes in H<sub>2</sub>O [CRC10] **Density, g/cm<sup>3</sup>:** 2.36 [CRC10]

#### 467

**Compound:** Bis(cyclopentadienyl)ruthenium **Synonym:** ruthenocene **Formula:**  $(C_5H_5)_2Ru$  **Molecular Formula:**  $C_{10}H_{10}Ru$  **Molecular Weight:** 231.259 **CAS RN:** 1287-13-4 **Properties:** light yellow cryst [STR93] **Melting Point, °C:** 194–198 [STR93]

## 468

**Compound:** Bis(diethylamino)chlorophosphine **Formula:**  $[(C_2H_5)_2N]_2PCI$  **Molecular Formula:**  $C_8H_{20}CIN_2P$  **Molecular Weight:** 210.687 **CAS RN:** 685-83-6 **Properties:** liq [ALF95] **Boiling Point,** °C: 124–125 (15 mm Hg) [ALF95]

#### 469

**Compound:** Bismuth Formula: Bi Molecular Formula: Bi Molecular Weight: 208.980373 CAS RN: 7440-69-9 Properties: grayish white, soft, brittle metal, 99.999% vacuum deposition grade; rhomb, a = 0.47457 nm; enthalpy of fusion 11.30 kJ/mol; enthalpy of vaporization 151 kJ/mol; Poisson's ratio 0.33; electrical resistivity (20°C)  $129 \mu ohm \cdot cm$ ; Brinell hardness 7; electronegativity 1.67; used in ferromagnetic and resistive films, in pharmaceuticals and medicine [KIR78] [MER06] [CRC10] [COT88] [CER91] [ALD94] Solubility: s dil HNO<sub>3</sub>, conc HCl [MER06] Density, g/cm<sup>3</sup>: 9.808 (25°C) [KIR78] Melting Point, °C: 271.4 [KIR78] Boiling Point, °C: 1564 [KIR78] Thermal Conductivity, W/(m·K): 7.92 (25°C) [ALD94] Thermal Expansion Coefficient: (volume) 100°C (0.37) [CLA66]

#### 470

**Compound:** Bismuth acetate **Formula:** Bi(CH<sub>3</sub>COO)<sub>3</sub> **Molecular Formula:** C<sub>6</sub>H<sub>9</sub>BiO<sub>6</sub> **Molecular Weight:** 386.113 **CAS RN:** 22306-37-2 Properties: white cryst 99.999% pure; sensitive to moisture [ALF93] [STR93] [ALD93]
Solubility: i H<sub>2</sub>O [CRC10]
Melting Point, °C: decomposes [CRC10]

#### 471

Compound: Bismuth antimonide Formula: BiSb Molecular Formula: BiSb Molecular Weight: 330.740 CAS RN: 12323-19-2 Properties: 99.99% pure cryst; used as a semiconductor material in the form of a single cryst [HAW93] [ALF93] Melting Point, °C: 475 [ALF93]

## 472

**Compound:** Bismuth arsenate **Formula:** BiAsO<sub>4</sub> **Molecular Formula:** AsBiO<sub>4</sub> **Molecular Weight:** 347.900 **CAS RN:** 13702-38-0 **Properties:** white, monocl cryst [CRC10] **Solubility:** i H<sub>2</sub>O; sl conc HNO<sub>3</sub> [CRC10] **Density, g/cm<sup>3</sup>:** 7.14 [CRC10]

### 473

Compound: Bismuth basic carbonate hemihydrate
Synonym: bismuth subcarbonate
Formula: (BiO)<sub>2</sub>CO<sub>3</sub> · 1/2H<sub>2</sub>O
Molecular Formula: CHBi<sub>2</sub>O<sub>5.5</sub>
Molecular Weight: 518.976
CAS RN: 5892-10-4
Properties: odorless, tasteless, white powd; light sensitive; used in a mixture with other compounds in glazes for ceramics and to give a pearly surface for plastics [ALD93] [ALF93] [CRC10] [MER06]
Solubility: i H<sub>2</sub>O; s mineral acids, glacial acetic acid [MER06]
Density, g/cm<sup>3</sup>: 6.86 [ALF93]
Boiling Point, °C: decomposes [CRC10]

# 474

Compound: Bismuth basic dichromate
Formula: Bi<sub>2</sub>O<sub>3</sub> · 2CrO<sub>3</sub>
Molecular Formula: Bi<sub>2</sub>Cr<sub>2</sub>O<sub>9</sub>
Molecular Weight: 665.948
CAS RN: 1304-75-2
Properties: reddish orange, amorphous powd; preparation: reaction between Bi(NO<sub>3</sub>)<sub>3</sub> and potassium chromate [HAW93]
Solubility: i H<sub>2</sub>O; s acids, alkalies [HAW93]

#### 475

Compound: Bismuth bromide Synonym: bismuth tribromide Formula: BiBr<sub>3</sub> Molecular Formula: BiBr<sub>2</sub> Molecular Weight: 448.692 CAS RN: 7787-58-8 Properties: yellowish cryst, -60 mesh 99.999% purity; odor of HBr; hygr; enthalpy of fusion 21.8 kJ/mol; enthalpy of sublimation 115 kJ/mol; enthalpy of vaporization 75.4 kJ/mol; can be prepared by dissolution of Bi<sub>2</sub>O<sub>3</sub> in conc HBr solution, followed by dewatering in gentle stream of N2 and distillation [CER91] [KIR78] [CRC10] [HAW93] [MER06] Solubility: decomposed by H<sub>2</sub>O forming BiOBr; s dil HCl, acetone, ether; i alcohol [HAW93] [KIR78] [MER06] Density, g/cm3: solid: 5.72; liq 4.572 at 271.5°C [KIR78] Melting Point, °C: 218 [MER06] Boiling Point, °C: 453 [CRC10]

#### 476

**Compound:** Bismuth chloride Synonym: bismuth trichloride Formula: BiCl<sub>3</sub> Molecular Formula: BiCl<sub>2</sub> Molecular Weight: 315.338 CAS RN: 7787-60-2 Properties: white to yellowish, very deliq cryst, -60 mesh 99.99% and 99.9% purity; HCl odor; enthalpy of fusion 10.90 kJ/mol; enthalpy of sublimation 114 kJ/mol; enthalpy of vaporization at bp 72.61 kJ/ mol; a preparation is by chlorination of molten metal; used as a catalyst for organic reactions [KIR78] [HAW93] [MER06] [CER91] [CRC10] Solubility: decomposed by H<sub>2</sub>O forming BiOCl [HAW93] [MER06]; s acids; i alcohol [HAW93] Density, g/cm<sup>3</sup>: 4.75 [MER06] Melting Point, °C: 230 [CRC10] Boiling Point, °C: 447 [CRC10] Reactions: sublimes at ~430°C [MER06]

## 477

**Compound:** Bismuth chloride monohydrate **Synonym:** bismuth trichloride monohydrate **Formula:**  $BiCl_3 \cdot H_2O$ **Molecular Formula:**  $BiCl_3H_2O$ **Molecular Weight:** 333.353 **CAS RN:** 39483-74-4 **Properties:** 99.99% pure cryst [ALF93] **Density, g/cm<sup>3</sup>:** 4.75 [ALF93] Melting Point, °C: 230–232 [ALF93] Boiling Point, °C: 447 [ALF93]

### 478

Compound: Bismuth citrate
Formula: BiC<sub>6</sub>H<sub>5</sub>O<sub>7</sub>
Molecular Formula: C<sub>6</sub>H<sub>5</sub>BiO<sub>7</sub>
Molecular Weight: 398.082
CAS RN: 813-93-4
Properties: white powd; preparation: boiling bismuth subnitrate and citric acid solution; used in medicine [HAW93]
Solubility: i H<sub>2</sub>O; s ammonia; sl s alcohol [HAW93]
Density, g/cm<sup>3</sup>: 3.458 [HAW93]
Melting Point, °C: decomposes [CRC10]

## 479

Compound: Bismuth fluoride Synonym: bismuth trifluoride Formula: BiF<sub>3</sub> Molecular Formula: BiF<sub>3</sub> Molecular Weight: 265.975 CAS RN: 7787-61-3 Properties: white to gray powd, -60 mesh of 99.9% and 99.999% purity; moisture sensitive; can be obtained by dissolving either bismuth oxide or oxyfluoride in HF, followed by careful evaporation; enthalpy of fusion 21.6 kJ/mol; enthalpy of sublimation 201 kJ/mol; used to prepare BiF<sub>5</sub> [KIR78] [MER06] [CER91] [ALD93] [CRC10] Solubility: 0.00503 mol/L in H<sub>2</sub>O [KIR78] Density, g/cm<sup>3</sup>: 8.3 [MER06] Melting Point, °C: 725 [COT88] Boiling Point, °C: 900 [KIR78] **Reactions:** volatilizes at >730°C, slowly, without decomposition [MER06]

# 480

Compound: Bismuth germanium oxide Formula: 2Bi<sub>2</sub>O<sub>3</sub> · 3GeO<sub>2</sub> Molecular Formula: Bi<sub>4</sub>Ge<sub>3</sub>O<sub>12</sub> Molecular Weight: 1245.744 CAS RN: 12233-56-6 Properties: white chips or powd, 99.99995% purity [ALF93]

### 481

**Compound:** Bismuth hexafluoroacetylacetonate **Synonym:** bismuth hexafluoro-2,4-pentanedionate **Formula:**  $Bi(CF_3COCHCOCF_3)_3$ **Molecular Formula:**  $C_{15}H_3BiF_{18}O_6$  Molecular Weight: 830.132 CAS RN: 142617-56-9 Properties: powd [CRC10] Melting Point, °C: 96 [CRC10]

## 482

Compound: Bismuth hydride Synonym: bismuthine Formula: BiH<sub>3</sub> Molecular Formula: BiH<sub>3</sub> Molecular Weight: 212.004 CAS RN: 18288-22-7 Properties: colorless gas, unstable at room temp and rapidly decomposes to Bi and H<sub>2</sub>; can be prepared by disproportionation of either methylor ethyl-bismuthine; enthalpy of vaporization about 25.15 kJ/mol; finds use in manufacturing Ge or Si semiconductors [MER06] [KIR78] Density, g/cm<sup>3</sup>: 9.303 g/L [LID94] Melting Point, °C: ~67 [LID94] Boiling Point, °C: ~16.8 [MER06]

# 483

Compound: Bismuth hydroxide
Formula: Bi(OH)<sub>3</sub>
Molecular Formula: BiH<sub>3</sub>O<sub>3</sub>
Molecular Weight: 260.002
CAS RN: 10361-43-0
Properties: white to yellowish white, amorphous powd; used in plutonium separation, as an absorbent for rutin and quercetin [HAW93] [MER06]
Solubility: i H<sub>2</sub>O [MER06]; s acids [HAW93]
Density, g/cm<sup>3</sup>: 4.962 [MER06]
Reactions: readily loses one H<sub>2</sub>O to form metahydroxide [MER06]

## 484

Compound: Bismuth hydroxide nitrate oxide Synonym: bismuth subnitrate Formula:  $4BiNO_3(OH)_2 \cdot BiO(OH)$ Molecular Formula:  $Bi_5H_9N_4O_{22}$ Molecular Weight: 1461.987 CAS RN: 1304-85-4 Properties: odorless, tasteless, heavy, sl hygr, microcryst powd, 98 + % [MER06] [ALF93] Solubility: i H<sub>2</sub>O; s dil HNO<sub>3</sub>, HCl [MER06] Reactions: decomposes at 260°C [ALF93]

# 485

**Compound:** Bismuth iodide **Synonym:** bismuth triiodide

Formula: BiI<sub>3</sub>
Molecular Formula: BiI<sub>3</sub>
Molecular Weight: 589.693
CAS RN: 7787-64-6
Properties: black, minute, hex cryst or gray powd, -20 mesh and -40 mesh 99.999% and 99.9% purity; metallic sheen; enthalpy of fusion 39.1 kJ/mol; enthalpy of sublimation 134.3 kJ/mol; sensitive to moisture; prepared from Bi and I<sub>2</sub>; used in analytical chemistry [HAW93] [MER06] [STR93] [ALF93]

Solubility: i H<sub>2</sub>O, decomposed by hot H<sub>2</sub>O, s alcohol and HI, KI solutions [HAW93]
Density, g/cm<sup>3</sup>: 5.778 [MER06]
Melting Point, °C: 408.6 [KIR78]
Boiling Point, °C: 542 [KIR78]
Reactions: sublimes at 439°C; decomposes at 500°C [MER06]

## 486

Compound: Bismuth iron molybdenum oxide Formula: Bi<sub>3</sub>FeMo<sub>2</sub>O<sub>12</sub> Molecular Formula: Bi<sub>3</sub>FeMo<sub>2</sub>O<sub>12</sub> Molecular Weight: 1066.659 CAS RN: 59393-06-5 Properties: -325 mesh powd; used as an oxidation catalyst [ALF93]

### 487

Compound: Bismuth molybdate Synonym: bismuth molybdenum oxide Formula: Bi<sub>2</sub>(MoO<sub>4</sub>)<sub>3</sub> Molecular Formula: Bi<sub>2</sub>Mo<sub>3</sub>O<sub>12</sub> Molecular Weight: 897.774 CAS RN: 51898-99-8 Properties: colorless trig; hygr; -200 mesh and -325 mesh powd; used as an oxidation catalyst [CRC10] [CER91] [ALF93] Density, g/cm<sup>3</sup>: 5.95 [LID94] Melting Point, °C: decomposes at 30 [CRC10]

## 488

Compound: Bismuth molybdenum oxide Formula: Bi<sub>2</sub>MoO<sub>6</sub> Molecular Formula: Bi<sub>2</sub>MoO<sub>6</sub> Molecular Weight: 609.897 CAS RN: 13565-96-3 Properties: -325 mesh powd; used as an oxidation catalyst [ALF93] Density, g/cm<sup>3</sup>: 9.32 [KIR78]

### 489

**Compound:** Bismuth nitrate pentahydrate **Formula:**  $Bi(NO_3)_3 \cdot 5H_2O$  Molecular Formula: BiH<sub>10</sub>N<sub>3</sub>O<sub>14</sub>
Molecular Weight: 485.071
CAS RN: 10035-06-0
Properties: lustrous, clear, colorless, hygr cryst, 99.999% purity; acid taste; odor of HNO<sub>3</sub>; used to prepare other bismuth salts, in luminous paints and enamels [HAW93] [MER06] [STR93] [ALF93]
Solubility: decomposed by H<sub>2</sub>O to subnitrate; s dil HNO<sub>3</sub> and glycerol, acetone [HAW93]
Density, g/cm<sup>3</sup>: 2.83 [MER06]
Boiling Point, °C: decomposes 75–80 [HAW93]

# **490**

Compound: Bismuth oleate
Synonyms: oleic acid, bismuth salt
Formula: [CH<sub>3</sub>(CH<sub>2</sub>)<sub>7</sub>CH=CH(CH<sub>2</sub>)<sub>7</sub>COO]<sub>3</sub>Bi
Molecular Formula: C<sub>54</sub>H<sub>99</sub>BiO<sub>6</sub>
Molecular Weight: 1053.356
CAS RN: 52951-38-9
Properties: yellowish brown, soft granular mass; obtained from Bi<sub>2</sub>O<sub>3</sub>, oleic acid, and acetic anhydride; used in catalysts for manufacturing aldehydes and alcohols by oxo process [MER06] [HAW93]
Solubility: i H<sub>2</sub>O; s ether, s in about 1500 parts benzene [MER06] [HAW93]

#### 491

**Compound:** Bismuth oxalate **Formula:**  $Bi_2(C_2O_4)_3$  **Molecular Formula:**  $C_6Bi_2O_{12}$  **Molecular Weight:** 682.018 **CAS RN:** 6591-55-5 **Properties:** white powd [CRC10] **Solubility:** i H<sub>2</sub>O, EtOH; s dil acid [CRC10]

#### 492

Compound: Bismuth oxide Formula:  $Bi_2O_3$ Molecular Formula:  $Bi_2O_3$ Molecular Weight: 465.959 CAS RN: 1304-76-3 Properties: yellow, heavy, odorless powd or monocl cryst, of various grades: -30 mesh of 99.9999% purity, 3–12 mm pieces (sintered); used to enamel cast iron, in ceramic coloring, as an evaporated material and sputtering target for beam splitting, and as a base coating for gold films, which are used as transparent heating elements on glass [HAW93] [MER06] [CER91] Solubility: i H<sub>2</sub>O [MER06]; s acids [HAW93] Density, g/cm<sup>3</sup>: 8.9 [STR93] Melting Point, °C: 817 [STR93] Boiling Point, °C: 1890 [STR93]

# 493

Compound: Bismuth oxybromide
Synonym: bismuth bromide oxide
Formula: BiOBr
Molecular Formula: BiBrO
Molecular Weight: 304.883
CAS RN: 7787-57-7
Properties: colorless cryst or amorphous powd; used in manufacture of dry cell cathodes [MER06] [CRC10]
Solubility: i H<sub>2</sub>O, alcohol; s HCl, HBr, and HNO<sub>3</sub> [MER06]
Density, g/cm<sup>3</sup>: 8.082 (15°C) [CRC10]
Melting Point, °C: melts at red heat [MER06]

## 494

Compound: Bismuth oxychloride Synonym: bismuth chloride oxide Formula: BiOC1 Molecular Formula: BiClO Molecular Weight: 260.432 CAS RN: 7787-59-9 Properties: white 99.999% fine powd or tetr cryst; used in face powd, to manufacture artificial pearls, in dry cell cathodes [MER06] [ALF93] Solubility: i H<sub>2</sub>O [MER06] Density, g/cm<sup>3</sup>: 7.72 [MER06] Melting Point, °C: melts at low red heat [MER06]

### 495

Compound: Bismuth oxyiodide
Synonym: bismuth iodide oxide
Formula: BiOI
Molecular Formula: BiIO
Molecular Weight: 351.883
CAS RN: 7787-63-5
Properties: brick red, heavy, odorless powd or coppercolored cryst; used in manufacturing dry cell cathodes and as an anti-infective [MER06]
Solubility: i H<sub>2</sub>O, alcohol, chloroform; s HCl; decomposed by HNO<sub>3</sub> or alkali [MER06]
Density, g/cm<sup>3</sup>: 7.92 [MER06]
Melting Point, °C: fuses at red heat with partial decomposition [MER06]

## 496

**Compound:** Bismuth oxynitrate **Synonym:** bismuth subnitrate **Formula:** BiONO<sub>3</sub> **Molecular Formula:** BiNO<sub>4</sub> Molecular Weight: 286.985
CAS RN: 10361-46-3
Properties: heavy, white powd; sl hygr; uses: cosmetics, ceramic glasses, and enamel fluxes; there is a 99.99+% pure monohydrate, CAS RN 13595-83-0 [HAW93] [ALD94]
Solubility: i H<sub>2</sub>O, alcohol; s acids [HAW93]
Density, g/cm<sup>3</sup>: 4.928 [HAW93]
Melting Point, °C: 260, decomposing [HAW93]

#### 497

**Compound:** Bismuth oxyperchlorate monohydrate **Formula:**  $BiOClO_4 \cdot H_2O$ **Molecular Formula:**  $BiClH_2O_6$ **Molecular Weight:** 342.445 **CAS RN:** 44584-78-3 **Properties:** white, cryst powd [STR93] [ALF93]

#### **498**

Compound: Bismuth pentafluoride Synonym: bismuth(V) fluoride Formula:  $BiF_5$ Molecular Formula:  $BiF_5$ Molecular Weight: 303.972 CAS RN: 7787-62-4 Properties: long, white needles; body-centered tetr cryst; very sensitive to moisture; discolors quickly in moist air; can be formed by fluorinating  $BiF_3$  or Bi metal at 120°C; used as a fluorinating agent [KIR78] [MER06] Solubility: violent reaction with H<sub>2</sub>O to form  $BiF_3$  and ozone [MER06] Density, g/cm<sup>3</sup>: 5.55 [MER06] Melting Point, °C: 151 [KIR78] Boiling Point, °C: 230 [KIR78]

## 499

Compound: Bismuth phosphate
Formula: BiPO<sub>4</sub>
Molecular Formula: BiO<sub>4</sub>P
Molecular Weight: 303.951
CAS RN: 10049-01-1
Properties: odorless powd or monocl cryst; used as an antacid, to recover plutonium, and in optical glass [HAW93] [MER06]
Solubility: sl s H<sub>2</sub>O; s conc HNO<sub>3</sub>, HCl [MER06]
Density, g/cm<sup>3</sup>: 6.323 [MER06]
Melting Point, °C: does not melt on heating [MER06]

#### 500

**Compound:** Bismuth potassium iodide **Formula:**  $BiK_4I_7$  Molecular Formula: BiI<sub>7</sub>K<sub>4</sub> Molecular Weight: 1253.704 CAS RN: 41944-01-8 Properties: red cryst [CRC10] Solubility: reac H<sub>2</sub>O; s alk iodide soln [CRC10]

# 501

**Compound:** Bismuth selenide **Synonym:** guanajuatite **Formula:** Bi<sub>2</sub>Se<sub>3</sub> **Molecular Formula:** Bi<sub>2</sub>Se<sub>3</sub> **Molecular Weight:** 654.841 **CAS RN:** 12068-69-8 **Properties:** black cryst, 1–6 mm pieces (fused) of

99.999% purity; rhomb and hex; decomposes when heated in air, by conc HNO<sub>3</sub> and by aqua regia; used in semiconductors and in the form of a 99 or 99.999% pure material used as a sputtering target to produce multilayer thin films and magneto-resistant films [HAW93] [MER06] [CER91]

Solubility: i H<sub>2</sub>O [MER06] Density, g/cm<sup>3</sup>: 7.70 [MER06] Melting Point, °C: 710 [MER06] Thermal Conductivity, W/(m·K): 2.4 [CRC10]

502

Compound: Bismuth stannate Formula: Bi<sub>2</sub>O<sub>3</sub> · 2SnO<sub>2</sub> Molecular Formula: Bi<sub>2</sub>O<sub>7</sub>Sn<sub>2</sub> Molecular Weight: 767.377 CAS RN: 12338-09-9 Properties: -200 mesh, 99.9% purity [CER91] Reactions: pentahydrate: minus 5H<sub>2</sub>O at ~140°C [HAW93]

## 503

Compound: Bismuth stannate pentahydrate Formula:  $Bi_2O_3 \cdot 3SnO_2 \cdot 5H_2O$ Molecular Formula:  $Bi_2H_{10}O_{14}Sn_3$ Molecular Weight: 1008.162 CAS RN: 12777-45-6 Properties: light-colored cryst; used in ceramic capacitor such as barium titanate [HAW93] Solubility: i H<sub>2</sub>O [HAW93] Reactions: minus 5H<sub>2</sub>O at ~140°C [HAW93]

## 504

Compound: Bismuth strontium calcium copper oxide (1112) Synonym: supercon 1112 Formula: BiSrCaCu<sub>2</sub>O<sub>x</sub>
Molecular Formula: BiCaCuSr<sub>2</sub>O<sub>y</sub>
CAS RN: 114901-61-0
Properties: 99.999% and 99.99% pure 20μm powd; dry processed from 99.999% pure oxides and carbonates [STR93]

## 505

Compound: Bismuth strontium calcium copper oxide (2212)
Synonym: supercon 2212
Formula: Bi<sub>2</sub>Sr<sub>2</sub>CaCu<sub>2</sub>O<sub>8</sub>
Molecular Formula: Bi<sub>2</sub>CaCu<sub>2</sub>O<sub>8</sub>Sr<sub>2</sub>
Molecular Weight: 888.366
CAS RN: 114901-61-0
Properties: O<sub>8</sub> can be O<sub>8.15</sub> to O<sub>8.20</sub>; superconductor; 99%–99.9% pure, 20µm powd; dry processed from 99%–99.9% oxides and carbonates; intermediate precursor available as fine agglomerate and ballmilled powd; T<sub>c</sub> 85 K [STR93] [ASM93] [ALF93]
Density, g/cm<sup>3</sup>: 6.40 [ALD93]

# 506

Compound: Bismuth strontium calcium copper oxide (2223) Synonym: supercon 2223 Formula:  $Bi_2Sr_2Ca_2Cu_3O_{10}$ Molecular Formula:  $Bi_2Ca_2Cu_3O_{10}Sr_2$ Molecular Weight: 1023.989 CAS RN: 114901-61-0 Properties: superconductor; 99.999% and 99.9% pure 20µm powd; dry processed from 99.999% and ACS grades, respectively, of oxides and carbonates;  $T_c$  110 K; for  $Bi_2Sr_2Ca_3Cu_4O_{12}$ ,  $T_c$  is <120 K [STR93] [ASM93]

# 507

Compound: Bismuth subacetate Synonym: bismuth acetate oxide Formula: CH<sub>3</sub>COOBiO Molecular Formula: C<sub>2</sub>H<sub>3</sub>BiO<sub>3</sub> Molecular Weight: 284.024 CAS RN: 5142-76-7 Properties: thin cryst plates; slight acetic acid odor [MER06] Solubility: i H<sub>2</sub>O; s glacial acetic acid [MER06]

#### 508

**Compound:** Bismuth subnitrate **Formula:**  $Bi_5O(OH)_9(NO_3)_4$ **Molecular Formula:**  $Bi_5H_9N_4O_{22}$ **Molecular Weight:** 1461.987 **CAS RN:** 1304-85-4 **Properties:** hygr cryst powd [CRC10] Solubility: i H<sub>2</sub>O, EtOH; s dil acid [CRC10] Density, g/cm<sup>3</sup>: 4.928 [CRC10] Melting Point, °C: decomposes at 260 [CRC10]

## 509

Compound: Bismuth sulfate **Formula:**  $Bi_2(SO_4)_3$ Molecular Formula: Bi<sub>2</sub>O<sub>12</sub>S<sub>3</sub> Molecular Weight: 706.152 CAS RN: 7787-68-0 **Properties:** white needles or powd; used in the analysis of other metal sulfates [HAW93] **Solubility:** i H<sub>2</sub>O, alcohol; s dil HCl, HNO<sub>3</sub> [HAW93] **Density, g/cm<sup>3</sup>:** 5.08 [HAW93] Melting Point, °C: decomposes at 405 [HAW93]

#### 510

Compound: Bismuth sulfide **Synonyms:** bismuth glance, stibnite Formula: Bi<sub>2</sub>S<sub>3</sub> Molecular Formula: Bi<sub>2</sub>S<sub>3</sub> Molecular Weight: 514.159 CAS RN: 1345-07-9 Properties: blackish brown, -200 mesh 99.9% and 99.999% purity; ortho-rhomb bipyramidal cryst; hardness 2 Mohs [HAW93] [MER06] [CER91] Solubility: i H<sub>2</sub>O; s HNO<sub>3</sub>, HCl [MER06] Density, g/cm<sup>3</sup>: 7.6–7.8 [HAW93] Melting Point, °C: decomposes at 685 [STR93] [ALF93]

### 511

Compound: Bismuth telluride **Synonym:** tetradymite Formula: Bi<sub>2</sub>Te<sub>3</sub> Molecular Formula: Bi<sub>2</sub>Te<sub>3</sub> Molecular Weight: 800.761

CAS RN: 1304-82-1

**Properties:** gray hex platelets, various grades: 1–6 mm pieces (fused) -325 mesh powd, 99.999% purity; preparation: by heating stoichiometric quantities of Bi and Te at 475°C in a vacuum for several days; used as a semiconductor; resistivity 0.00033 ohm  $\cdot$  cm; energy gap 0.15 eV [MER06] [CER91] [A1F93]

**Solubility:** i H<sub>2</sub>O, alcohol [HAW93]

Density, g/cm<sup>3</sup>: 7.642 [MER06]

Melting Point, °C: 585 [MER06]

Thermal Conductivity, W/(m·K): 3.0 [CRC10]

# 512

**Compound:** Bismuth tetroxide Synonym: bismuth peroxide

Formula: Bi<sub>2</sub>O<sub>4</sub> Molecular Formula: Bi<sub>2</sub>O<sub>4</sub> Molecular Weight: 481.959 CAS RN: 12048-50-9 **Properties:** reddish orange to yellowish brown, heavy powd, -200 mesh as the dehydrate; used as a lubricant for metal-extrusion dies [HAW93] [MER06] [CER91] **Solubility:** slowly decomposed by H<sub>2</sub>O [MER06] Density, g/cm<sup>3</sup>: 5.6 [HAW93] Melting Point, °C: 305 [HAW93]

# 513

Compound: Bismuth titanate **Formula:**  $Bi_2O_3 \cdot 4TiO_2$ Molecular Formula: Bi<sub>2</sub>O<sub>11</sub>Ti<sub>4</sub> Molecular Weight: 785.422 CAS RN: 12233-34-0 Properties: -325 mesh, 10µm average or less or 99.9% purity; used as sputtering target for

beam splitter and base coating for gold films to prepare heating elements on glass [CER91]

#### 514

**Compound:** Bismuth titanate Formula:  $Bi_2O_3 \cdot 2TiO_2$ Molecular Formula: Bi<sub>2</sub>O<sub>7</sub>Ti<sub>2</sub> Molecular Weight: 625.723

CAS RN: 12048-51-0

**Properties:** white powd, -325 mesh 99.9% purity; used as sputtering target for beam splitter and base coating for gold films as heating elements on glass; there are two other compounds: Bi<sub>4</sub>Ti<sub>3</sub>O<sub>12</sub> (12010-77-4) and Bi<sub>2</sub>Ti<sub>4</sub>O<sub>11</sub> (12233-34-0) [CER91] [STR93]

#### 515

Compound: Bismuth tungstate Formula:  $Bi_2(WO_4)_3$ Molecular Formula: Bi<sub>2</sub>O<sub>12</sub>W<sub>3</sub> Molecular Weight: 1161.479 CAS RN: 13595-87-4 Properties: off-white powd, -200 mesh of 99.9% purity [CER91] [STR93]

#### 516

Compound: Bismuth vanadate Synonym: pucherite **Formula:**  $Bi_2O_3 \cdot V_2O_5$  or  $BiVO_4$ **Molecular Formula:** Bi<sub>2</sub>O<sub>8</sub>V<sub>2</sub> Molecular Weight: 647.839

CAS RN: 14059-33-7 Properties: reddish green; rhomb; –200 mesh, 99.9% purity [CRC10] [CER91] Density, g/cm<sup>3</sup>: 6.25 [CRC10]

#### 517

Compound: Bismuth zirconate Formula:  $2Bi_2O_3 \cdot 3ZrO_2$ Molecular Formula:  $Bi_4O_{12}Zr_3$ Molecular Weight: 1301.586 CAS RN: 37306-42-6 Properties: reacted powd, -325 mesh, 5µm or less with 99% purity [CER91]

#### 518

Compound: Borane carbonyl Formula: BH<sub>3</sub>CO Molecular Formula: CBH<sub>3</sub>O Molecular Weight: 41.845 CAS RN: 13205-44-2 Properties: col gas [CRC10] Density, g/L: 1.710 [CRC10] Solubility: reac H<sub>2</sub>O [CRC10] Melting Point, °C: -137 [CRC10] Boiling Point, °C: -64 [CRC10]

#### 519

Compound: Borazole
Synonyms: borazine, s-triazoborzane
Formula: B<sub>3</sub>N<sub>3</sub>H<sub>6</sub>
Molecular Formula: B<sub>3</sub>H<sub>6</sub>N<sub>3</sub>
Molecular Weight: 80.501
CAS RN: 6569-51-3
Properties: inorganic analog of benzene; colorless liq; preparation: heating equimolar mixture of ammonia and BH<sub>3</sub> at 250°C–300°C for 30 min [MER06] [HAW93]
Solubility: hydrolyzes, evolving boron hydrides [HAW93]
Density, g/cm<sup>3</sup>: 0.824 (0°C) [HAW93]
Melting Point, °C: -58 [HAW93]
Boiling Point, °C: 53 [HAW93]

# 520

**Compound:** Orthoboric acid **Synonym:** sassolite **Formula:** B(OH)<sub>3</sub> **Molecular Formula:** BH<sub>3</sub>O<sub>3</sub> **Molecular Weight:** 61.833 **CAS RN:** 10043-35-3

**Properties:** colorless, odorless cryst or white powd; tricl; used in borosilicate glass, as an ointment and eyewash [MER06] [HAW93] [KIR78] Solubility: g/100 g soln in H<sub>2</sub>O: 2.52 (0°C); 4.72 (20°C); 27.53 (100°C) [KIR78] Density, g/cm<sup>3</sup>: 1.5172 [KIR78]; 1.435 [STR93] Melting Point, °C: 171 [JAN85]

#### 521

**Compound:** Metaboric acid-α-Form **Formula:** HBO<sub>2</sub> **Molecular Formula:** BHO<sub>2</sub> **Molecular Weight:** 43.818 **CAS RN:** 13460-50-9 **Properties:** col ortho cryst; hygr [CRC10] **Solubility:** s H<sub>2</sub>O **Density, g/cm<sup>3</sup>:** 1.784 [CRC10] **Melting Point, °C:** 176 [CRC10]

#### 522

**Compound:** Metaboric acid-β-Form **Formula:** HBO<sub>2</sub> **Molecular Formula:** BHO<sub>2</sub> **Molecular Weight:** 43.818 **CAS RN:** 13460-50-9 **Properties:** col monocl cryst; hygr [CRC10] **Solubility:** s H<sub>2</sub>O **Density, g/cm<sup>3</sup>:** 2.045 **Melting Point, °C:** 201 [CRC10]

### 523

**Compound:** Metaboric acid-γ-Form **Formula:** HBO<sub>2</sub> **Molecular Formula:** HBO<sub>2</sub> **Molecular Weight:** 43.818 **CAS RN:** 13460-50-9 **Properties:** col cub cryst [CRC10] **Density, g/cm<sup>3</sup>:** 2.487 [CRC10] **Melting Point, °C:** 236 [CRC10]

#### 524

Compound: Boron Formula: B Molecular Formula: B Molecular Weight: 10.811 CAS RN: 7440-42-8 Properties: black hard solid; polymorphic; α: rhomb;

clear red cryst, almost as hard as diamond; β: rhomb; black; α': tetr; black; opaque cryst; enthalpy of vaporization 480 kJ/mol; enthalpy of fusion 50.20 kJ/ mol; Young's modulus of filamentary boron 3040– 3330 MPa; tensile strength of filamentary boron 3450–4830 MPa; amorphous: black or dark brown powd; hardness 11 Mohs [MER06] [KIR78] [CRC10] Solubility: i H<sub>2</sub>O [MER06]
Density, g/cm<sup>3</sup>: α: 2.46; β: 2.35; α': 2.31; amorphous: 2.350 [MER06]
Melting Point, °C: 2190 [KIR78]
Boiling Point, °C: 3660 [KIR78]
Thermal Conductivity, W/(m·K): 31.8 (0°C); 27.4 (25°C); 18.8 (100°C) [HO72]

#### 525

Compound: Boron arsenide Formula: BAs Molecular Formula: BAs Molecular Weight: 85.733 CAS RN: 12005-69-5 Properties: brown cub cryst [CRC10] Density, g/cm<sup>3</sup>: 5.22 [CRC10] Melting Point, °C: decomposes at 1100 [CRC10]

# 526

**Compound:** Boron carbide **Synonym:** norbide **Formula:** B<sub>4</sub>C **Molecular Formula:** CB<sub>4</sub> **Molecular Weight:** 55.255 **CAS RN:** 12069-32-8

Properties: hard, black, shiny cryst, -325 mesh with 99.5% purity; rhomb; hardness 9.3 Mohs; less brittle than most ceramics; does not burn in oxygen flame; used as an abrasive; Knoop hardness ~27 GPa; produced by reducing  $B_2O_3$  with carbon at 1400°C–2300°C; used in crucible form as a container for molten salts except molten caustic and as a 99.5% pure sputtering target for producing semiconductor and wear-resistant films [KIR78] [HAW93] [MER06] [CER91] **Solubility:** not attacked by hot HF, HNO<sub>3</sub>, or chromic acid [MER06] Density, g/cm<sup>3</sup>: 2.508–2.512 [MER06] Melting Point, °C: 2350 [MER06] Boiling Point, °C: >3500 [MER06] **Reactions:** decomposed by molten alkalis at red heat [MER06]

#### 527

Compound: Boron nitride Formula: BN Molecular Formula: BN Molecular Weight: 24.818 CAS RN: 10043-11-5 **Properties:** white powd, 1 µm or less 99.5% pure; hex, most common form: a=0.2504 nm, c=0.6661 nm; fcc: a=0.3615 nm; hardness: hex like graphite, cub approaches that of diamond; band gap ~7.5 eV at 300 K; dielectric 7.1; used in furnace insulation and in crucibles for melting aluminum, boron, iron, and silicon, also as sputtering target for dielectrics, diffusion masks, passivation layers [KIR81] [HAW93] [MER06] [CER91] Density, g/cm<sup>3</sup>: hex: 2.34; fcc: 3.43 [CIC73] Melting Point, °C: hex: 3000 under N<sub>2</sub> [KIR78] Boiling Point, °C: sublimes sl below 3000 [MER06] Reactions: decomposes in vacuum ~2700°C [MER06] Thermal Conductivity, W/(m·K): hex: 15 [KIR81] **Thermal Expansion Coefficient:** 7.51 × 10<sup>-6</sup>/°C [KIR81]

#### 528

Compound: Boron oxide Synonym: boron anhydride Formula: B<sub>2</sub>O<sub>3</sub> Molecular Formula: B<sub>2</sub>O<sub>3</sub> Molecular Weight: 69.620 CAS RN: 1303-86-2 Properties: colorless, brittle, vitreous; 12 mm pieces and smaller (fused) of 99.9995% purity; hygr; heat of solution -75.9 kJ/ mol [MER06] [KIR78] [CER91] **Solubility:** %wt soln, H<sub>2</sub>O: 4.72 (20°C), 8.08 (40°C), 27.53 (100°C); in alcohol: 94.4 g/L (25°C) [KIR78] Density, g/cm<sup>3</sup>: amorphous: 1.8; cryst: 2.46 [MER06] Melting Point, °C: cryst: 450 [MER06] Boiling Point, °C: ~1860 [STR93]

#### 529

Compound: Boron oxide glass
Synonym: vitreous boric oxide
Formula: B<sub>2</sub>O<sub>3</sub>
Molecular Formula: B<sub>2</sub>O<sub>3</sub>
Molecular Weight: 69.620
CAS RN: 1303-86-2
Properties: colorless, glassy solid; enthalpy of formation from elements, 25°C, -1252.2 kJ/mol; heat capacity (25°C) 62.969 J/(mol·K) [KIR78]
Density, g/cm<sup>3</sup>: 0°C, 1.8766; 18°C-25°C, 1.844 [KIR78]
Boiling Point, °C: 2316, extrapolated [KIR78]

#### 530

**Compound:** Boron phosphate **Synonym:** borophosphoric acid

Formula: BPO<sub>4</sub>
Molecular Formula: BO<sub>4</sub>P
Molecular Weight: 105.782
CAS RN: 13308-51-5
Properties: white not hygr cryst; prepared by reacting boric acid and phosphoric acid up to 1200°C: B(OH)<sub>3</sub>+H<sub>3</sub>PO<sub>4</sub>=BPO<sub>4</sub>+3H<sub>2</sub>O; used in special glasses [HAW93]
Solubility: s H<sub>2</sub>O [HAW93]
Density, g/cm<sup>3</sup>: 1.873 [HAW93]
Melting Point, °C: vaporizes slowly without decomposition at >1200 [KIR78]

# 531

**Compound:** Boron phosphide **Formula:** BP **Molecular Formula:** BP

Molecular Weight: 41.785

CAS RN: 20205-91-8

Properties: maroon powd; -100 mesh at 97.5% purity; refractory; hardness 9.5 Mohs; band gap 2.0 eV (300 K); material with formula B<sub>13</sub>P<sub>2</sub> [12008-82-1] is -325 mesh, 10µm or less of 99% purity [HAW93] [CER91] [KIR82]
Solubility: reacts with H<sub>2</sub>O and acids,

releasing toxic fumes [HAW93] **Reactions:** ignites at 200°C [CRC10]

#### 532

Compound: Boron silicide Formula: B<sub>6</sub>Si Molecular Formula: B<sub>6</sub>Si Molecular Weight: 92.952 CAS RN: 12008-29-6 Properties: black cryst; -200 mesh; also material with composition B<sub>4</sub>Si [12007-81-7] and 98% purity [CRC10] [CER91] [ALF93] Density, g/cm<sup>3</sup>: 2.47 [CRC10]

533

**Compound:** Boron tribromide **Formula:** BBr<sub>3</sub> **Molecular Formula:** BBr<sub>3</sub> **Molecular Weight:** 250.523 **CAS RN:** 10294-33-4 Properties: 99.999% and 99.9+% purity doping grade; colorless fuming liq; sensitive to moisture; critical temp 300°C; enthalpy of vaporization 30.5 kJ/mol; used as a catalyst in the manufacture of diborane [HAW93] [MER06] [KIR78] [STR93] [CER91] [CRC10]
Solubility: decomposed by H<sub>2</sub>O, alcohol [MER06]
Density, g/cm<sup>3</sup>: 2.698 [MER06]
Melting Point, °C: -46.0 [MER06]
Boiling Point, °C: 90 [ALD94]
Thermal Conductivity, W/(m·K): 0.112 (20°C) [KIR78]

## 534

Compound: Boron trichloride Formula: BCl<sub>3</sub> Molecular Formula: BCl<sub>3</sub> Molecular Weight: 117.169 CAS RN: 10294-34-5 Properties: colorless, fuming liq or gas; critical temp 178.8°C; critical pressure 3901.0kPa; enthalpy of vaporization 23.77 kJ/mol; enthalpy of fusion 2.10 kJ/mol; vapor pressure: 0.53 (-80°C), 8.9 (-40°C), 63.5 (0°C), 243 (40°C), 689 (80°C); used as catalyst in organic synthesis and as VLSI etchant in electronics industry [HAW93] [MER06] [KIR78] [AIR87] [CRC10] **Solubility:** decomposed by H<sub>2</sub>O, alcohol [MER06] Density, g/cm<sup>3</sup>: 1.35 (12°C), 1.3728 (0°C) [MER06]; 1.434 (0°C) [KIR78] Melting Point, °C: -107 [MER06] Boiling Point, °C: 12.5 [MER06]

# 535

**Compound:** Boron trifluoride **Formula:** BF<sub>3</sub> **Molecular Formula:** BF<sub>3</sub> **Molecular Weight:** 67.806 **CAS RN:** 7637-07-2

Properties: colorless gas, pungent suffocating odor; forms dense white fumes in moist air; triple point -128.4°C at 8.34 kPa; critical temp -12.25°C; critical pressure 4984 kPa; enthalpy of fusion 4.20 kJ/mol; enthalpy of vaporization 19.33 kJ/mol; can be produced by reacting borax, fluorspar, and sulfuric acid; used as a catalyst in organic synthesis and in electronics [HAW93] [KIR78] [MER06] [AIR87] [CRC10]
Solubility: 332 g/100 g H<sub>2</sub>O (0°C) with some hydrolysis [MER06]
Density, g/cm<sup>3</sup>: gas: 3.07666 g/L (STP) [KIR78]
Melting Point, °C: -126.8 [CRC10]

**Boiling Point, °C:** –101 [CRC10] **Reactions:** forms the solid complex HNO<sub>3</sub>·2BF<sub>3</sub> with HNO<sub>3</sub> [MER06]

# 536

Compound: Boron trifluoride etherate Synonym: boron fluoride-ether Formula:  $BF_3(CH_3CH_2)_2O$ Molecular Formula:  $C_4H_{10}BF_3O$ Molecular Weight: 141.929 CAS RN: 109-63-7 Properties: fuming liq; sensitive to moisture; prepared by vapor phase reaction between  $BF_3$  and ethyl ether; used as catalyst in organic reactions [MER06] [ALF95] Solubility: hydrolyzed by H<sub>2</sub>O [MER06] Density, g/cm<sup>3</sup>: 1.125 [MER06] Melting Point, °C: -60.4 [MER06] Boiling Point, °C: 125.7 [MER06]

## 537

Compound: Boron triiodide
Formula: BI<sub>3</sub>
Molecular Formula: BI<sub>3</sub>
Molecular Weight: 391.524
CAS RN: 13517-10-7
Properties: needles or cryst with 99.9% purity; unstable; enthalpy of vaporization 40.5 kJ/mol [CRC10] [CER91]
Density, g/cm<sup>3</sup>: 3.35 [KIR78]
Melting Point, °C: 49.9 [COT88]
Boiling Point, °C: 210 [KIR78]

## 538

Compound: Boron trisulfide Formula: B<sub>2</sub>S<sub>3</sub> Molecular Formula: B<sub>2</sub>S<sub>3</sub> Molecular Weight: 117.820 CAS RN: 12007-33-9 Properties: white; -200 mesh, 99.9% purity [CRC10] [CER91] Density, g/cm<sup>3</sup>: 1.55 [CRC10] Melting Point, °C: 310 [AES93]

## 539

**Compound:** Bromic acid **Formula:** HBrO<sub>3</sub> **Molecular Formula:** BrHO<sub>3</sub> **Molecular Weight:** 128.910 **CAS RN:** 7789-31-3 75

Properties: colorless or sl yellowish liq; stable only in very dil aq solutions; oxidizing agent; used in dyes [HAW93]
Solubility: can exist only in aq media [HAW93]
Density, g/cm<sup>3</sup>: 3.28 [HAW93]
Melting Point, °C: decomposes at 100 [CRC10]

#### 540

**Compound:** Bromine Formula: Br<sub>2</sub> Molecular Formula: Br<sub>2</sub> Molecular Weight: 159.808 (atomic weight, 79.904) CAS RN: 7726-95-6 Properties: dark reddish, volatile liq; suffocating odor; vaporizes rapidly at room temp; oxidant; viscosity (30°C) 0.288 mm<sup>2</sup>/s; surface tension 40.9 mN/m (25°C); electrical resistivity,  $6.5 \times 10^{+10}$  ohm  $\cdot$  cm at 25°C; dielectric constant  $3.33 \times 10^{+5}$  Hz (25°C); enthalpy of vaporization 29.97 kJ/mol; enthalpy of fusion 10.57 kJ/mol; electronegativity 3.0; critical temp 311°C; critical pressure 10.3 atm; used in flameretardant materials [MER06] [KIR78] [CRC10] **Solubility:** 3.35 g/100 g soln, H<sub>2</sub>O (25°C) [KIR78]; forms HOBr with H<sub>2</sub>O [MER06] Density, g/cm<sup>3</sup>: 3.1055 (25°C); vapor density 7.139 g/L (0°C) [KIR78] Melting Point, °C: –7.2 [CRC10] Boiling Point, °C: 59.10 [CRC10] **Reactions:** thermal dissociation at >600°C [KIR78] Thermal Conductivity, W/(m · K): 0.123 (25°C) [KIR78] **Thermal Expansion Coefficient:** 20°C–30°C, 0.0011/°C [KIR78]

## 541

Compound: Bromine azide
Formula: BrN<sub>3</sub>
Molecular Formula: BrN<sub>3</sub>
Molecular Weight: 121.924
CAS RN: 13973-87-0
Properties: cryst or red liq; oxidizing agent; used in detonators and other explosive devices [HAW93]
Melting Point, °C: ~45 [HAW93]
Boiling Point, °C: explodes [HAW93]

#### 542

Compound: Bromine chloride Formula: BrCl Molecular Formula: BrCl Molecular Weight: 115.357 CAS RN: 13863-41-7 Properties: reddish yellow liq; formed by reaction of bromide and chlorine, in the vapor or liq states; easily hydrolyzed by water; used as a disinfectant in industry, for wastewater treatment [HAW93] [KIR78]
Solubility: s H<sub>2</sub>O with ready hydrolysis, s

carbon disulfide, ether [HAW93] Density, g/cm<sup>3</sup>: 5.062 g/L [LID94]

Melting Point, °C: -66 [HAW93]

**Boiling Point, °C:** decomposes evolving Cl<sub>2</sub> at 10 [HAW93]

## 543

Compound: Bromine dioxide
Formula: BrO<sub>2</sub> or Br<sub>2</sub>O<sub>4</sub>
Molecular Formula: BrO<sub>2</sub>
Molecular Weight: 111.903
CAS RN: 21255-83-4
Properties: yellowish orange solid; obtained by ozonation of Br<sub>2</sub> in Freon 11 at -50°C, and subsequent evaporation [KIR78]
Melting Point, °C: decomposes at 0 [KIR78]

544

Compound: Bromine fluoride Formula: BrF Molecular Formula: BrF Molecular Weight: 98.902 CAS RN: 13863-59-7 Properties: unstable red-brown gas [CRC10] Density, g/cm<sup>3</sup>: 4.043 [CRC10] Melting Point, °C: ~-33 [CRC10] Boiling Point, °C: decomposes at ~20 [CRC10]

#### 545

Compound: Bromine monofluoride
Formula: BrF
Molecular Formula: BrF
Molecular Weight: 98.902
CAS RN: 13863-59-7
Properties: red to brownish-red; very unstable, rapidly forming bromine and higher fluorides; prepared by reaction of Br<sub>2</sub> and F<sub>2</sub> [KIR78]
Density, g/cm<sup>3</sup>: 4.34 g/L [CRC10]
Melting Point, °C: ~-33 [KIR78]
Boiling Point, °C: ~20 [KIR78]

### 546

**Compound:** Bromine oxide **Synonym:** bromine monoxide **Formula:** Br<sub>2</sub>O **Molecular Formula:** Br<sub>2</sub>O Molecular Weight: 175.807 CAS RN: 21308-80-5 Properties: dark brown solid; stable below -40°C; formed by reaction of HgO and Br<sub>2</sub> in CCl<sub>4</sub> in the absence of light; used for bromination reactions [KIR78] Melting Point, °C: decomposes at -17.5 [KIR78]

#### 547

Compound: Bromine pentafluoride Formula: BrF<sub>5</sub> Molecular Formula: BrF<sub>5</sub> Molecular Weight: 174.896 CAS RN: 7789-30-2 Properties: colorless, fuming liq; vapor pressure 7 psia (21.1°C); enthalpy of vaporization 30.6 kJ/mol; enthalpy of fusion 5.66 kJ/mol; specific conductivity (25°C)  $9.1 \times 10^{-8}$  ohm · cm; highly reactive, e.g., reacts with all known elements except the inert gases, nitrogen and oxygen; can be prepared by reacting Br<sub>2</sub> and F<sub>2</sub>; used as a fluorinating agent in organic synthesis and as an oxidizing agent in liq rocket fuels [KIR78] [HAW93] Solubility: explodes on contact with H<sub>2</sub>O [MER06] **Density, g/cm<sup>3</sup>:** 2.460 [MER06] Melting Point, °C: –60.5 [MER06] Boiling Point, °C: 40.76 [MER06] **Reactions:** thermally stable up to 460°C [MER06]

#### 548

Compound: Bromine trifluoride Formula: BrF<sub>3</sub> Molecular Formula: BrF<sub>3</sub> Molecular Weight: 136.899 CAS RN: 7787-71-5 Properties: colorless liq, if pure; long prisms when solid; fumes in air; very reactive; v

when solid; fumes in air; very reactive; vapor pressure 0.15 psia (21.1°C); formed by reaction of Br<sub>2</sub> and F<sub>2</sub>; enthalpy of vaporization 47.57 kJ/ mol; enthalpy of fusion 12.01 kJ/mol; used as a fluorinating agent and as a solvent for fluorides [HAW93] [MER06] [AIR87] [KIR78] [CRC10] **Solubility:** violent reaction with H<sub>2</sub>O [HAW93] **Density, g/cm<sup>3</sup>:** 2.803 [MER06] **Melting Point, °C:** 8.77 [MER06] **Boiling Point, °C:** 125.75 [MER06]

#### 549

**Compound:** Bromoauric(III) acid pentahydrate **Formula:**  $HAuBr_4 \cdot 5H_2O$ **Molecular Formula:**  $AuBr_4H_{11}O_5$ **Molecular Weight:** 516.583 **CAS RN:** 17083-68-0 **Properties:** red-brown hygr cryst [CRC10] **Solubility:** s H<sub>2</sub>O, EtOH [CRC10] **Boiling Point, °C:** 27 [CRC10]

# 550

**Compound:** Chloroauric(III) acid tetrahydrate **Formula:**  $HAuCl_4 \cdot 4H_2O$  **Molecular Formula:**  $AuCl_4H_9O_4$  **Molecular Weight:** 411.848 **CAS RN:** 16903-35-8 **Properties:** yellow monocl cryst; hygr [CRC10] **Density, g/cm<sup>3</sup>:** ~3.9 [CRC10] **Solubility:** v sol H<sub>2</sub>O, EtOH; s eth [CRC10]

## 551

Compound: Bromochloromethane Formula: CH<sub>2</sub>BrCl Molecular Formula: CH<sub>2</sub>BrCl Molecular Weight: 129.383 CAS RN: 74-97-5 Properties: liq [ALF95] Density, g/cm<sup>3</sup>: 1.991 [ALF95] Melting Point, °C: -88 [ALF95] Boiling Point, °C: 68 [ALF95]

# 552

Compound: Bromogermane Formula: GeH<sub>3</sub>Br Molecular Formula: BrH<sub>3</sub>Ge Molecular Weight: 155.57 CAS RN: 13569-42-2 Properties: col liq [CRC10] Solubility: reac H<sub>2</sub>O [CRC10] Density, g/cm<sup>3</sup>: 2.34 [CRC10] Melting Point, °C: -32 [CRC10] Boiling Point, °C: 52 [CRC10]

### 553

Compound: Bromosilane Formula: SiH<sub>3</sub>Br Molecular Formula: BrH<sub>3</sub>Si Molecular Weight: 111.014 CAS RN: 13465-73-1 Properties: enthalpy of vaporization 24.4 kJ/mol; entropy of vaporization 88.3 J/(mol⋅K) [CIC73] [CRC10] Melting Point, °C: -94 [CIC73] Boiling Point, °C: 1.9 [CIC73]

# 554

**Compound:** Dibromine trioxide **Formula:** Br<sub>2</sub>O<sub>3</sub> Molecular Formula: Br<sub>2</sub>O<sub>3</sub> Molecular Weight: 207.806 CAS RN: 53809-75-9 Properties: orange needles [CRC10] Melting Point, °C: decomposes at -40

#### 555

Compound: Cacodylic acid
Synonyms: dimethylarsenic acid, hydroxydimethylarsine oxide
Formula: (CH<sub>3</sub>)<sub>2</sub>As(O)OH
Molecular Formula: C<sub>2</sub>H<sub>7</sub>AsO<sub>2</sub>
Molecular Weight: 137.998
CAS RN: 75-60-5
Properties: colorless, odorless cryst; hygr; preparation: distillation of a mixture of As<sub>2</sub>O<sub>3</sub> and CH<sub>3</sub>COOK, followed by oxidation of resulting product with HgO; uses: herbicide, dermatology [MER06] [HAW93]
Solubility: s 0.5 parts H<sub>2</sub>O; v s alcohol [MER06]
Melting Point, °C: 195–196 [ALD94]

# 556

Compound: Cadmium Formula: Cd Molecular Formula: Cd Molecular Weight: 112.411 CAS RN: 7440-43-9 **Properties:** soft, silvery white with blue tinge metal; distorted hex; easily cut with knife; slowly oxidized by moist air to CdO; hardness 2.0 Mohs; fusion enthalpy 6.19 kJ/mol; vaporization enthalpy 99.87 kJ/mol; electrical resistivity (22°C) 7.2 µohm · cm; Brinell hardness 16.23 kg/ mm<sup>2</sup>; Poisson's ratio 0.33; used in easily fusible alloys, solder for aluminum, photoelectric cells, and as 99.999% pure sputtering target for dielectric films [KIR78] [CER91] [CRC10] Solubility: i H<sub>2</sub>O; reacts with dil HNO<sub>3</sub>, slowly with hot HCl [MER06] Density, g/cm<sup>3</sup>: 8.65 [MER06] Melting Point, °C: 321.07 [CRC10] Boiling Point, °C: 767 [CRC10] Thermal Conductivity, W/(m·K): 98 (0°C), 95 (100°C) 89 (300°C) [KIR78] Thermal Expansion Coefficient: 20°C, 31.3 µm/(cm °C) [KIR78]

### 557

**Compound:** Cadmium acetate **Synonyms:** acetic acid, cadmium salt **Formula:** Cd(CH<sub>3</sub>COO)<sub>2</sub> Molecular Formula: C<sub>4</sub>H<sub>6</sub>CdO<sub>4</sub>
Molecular Weight: 230.501
CAS RN: 543-90-8
Properties: colorless cryst; used in ceramics and electroplating baths [HAW93]
Solubility: s H<sub>2</sub>O, alcohol [HAW93]
Density, g/cm<sup>3</sup>: 2.34 [MER06]
Melting Point, °C: 255 [MER06]

#### 558

Compound: Cadmium acetate dihydrate Synonyms: acetic acid, cadmium salt dihydrate Formula:  $Cd(CH_3COO)_2 \cdot 2H_2O$ Molecular Formula:  $C_4H_{10}CdO_6$ Molecular Weight: 266.530 CAS RN: 5743-04-4 Properties: white powd; cryst; slight acetic acid odor [MER06] [STR93] Solubility: v s H<sub>2</sub>O [MER06] Density, g/cm<sup>3</sup>: 2.01 [HAW93] Reactions: minus  $2H_2O \sim 130^{\circ}C$  [MER06]

# 559

**Compound:** Cadmium acetylacetonate **Synonyms:** 2,4-pentanedione, cadmium(II) derivative **Formula:** Cd(CH<sub>3</sub>COCH=C(O)CH<sub>3</sub>)<sub>2</sub> **Molecular Formula:**  $C_{10}H_{14}CdO_4$  **Molecular Weight:** 310.630 **CAS RN:** 14689-45-3 **Properties:** white powd [STR93] **Melting Point, °C:** decomposes [STR93]

## 560

Compound: Cadmium antimonide Formula: CdSb Molecular Formula: CdSb Molecular Weight: 234.171 CAS RN: 12014-29-8

Properties: 6 mm pieces and smaller of 99.999% purity; ortho-rhomb, a=0.6471 nm, b=0.8253 nm; semiconductor; uses: in thermoelectric devices; enthalpy of fusion 32.05 kJ/mol; enthalpy of evaporation 138 kJ/mol; there is also Cd<sub>3</sub>Sb<sub>2</sub>, 12014-29-8 [CER91] [KIR78] [HAW93] Density, g/cm<sup>3</sup>: 6.92 [KIR78]

Melting Point, °C: 456 [KIR78]

#### 561

**Compound:** Cadmium arsenide **Formula:** Cd<sub>3</sub>As<sub>2</sub> **Molecular Formula:** As<sub>2</sub>Cd<sub>3</sub> Molecular Weight: 487.076 CAS RN: 12006-15-4 Properties: gray tetr cryst, a=0.8945 nm, c=1.265 nm [KIR78] Density, g/cm<sup>3</sup>: 6.21 [KIR78] Melting Point, °C: 721 [KIR78]

#### 562

**Compound:** Cadmium azide **Formula:** Cd(N<sub>3</sub>)<sub>2</sub> **Molecular Formula:** CdN<sub>6</sub> **Molecular Weight:** 196.451 **CAS RN:** 14215-29-3 **Properties:** yellow-white ortho [LID94] **Density, g/cm<sup>3</sup>:** 3.24 [LID94]

## 563

Compound: Cadmium borotungstate octadecahydrate
Formula: Cd<sub>5</sub>(BW<sub>12</sub>O<sub>40</sub>) · 18H<sub>2</sub>O
Molecular Formula: BCd<sub>5</sub>H<sub>36</sub>O<sub>58</sub>W<sub>12</sub>
Molecular Weight: 3732.386
CAS RN: 1306-26-9
Properties: yellow, heavy cryst; used to separate minerals [HAW93]
Solubility: 1250 g/100 mL (19°C) H<sub>2</sub>O, yielding a yellow to light brown solution [HAW93] [CRC10]
Melting Point, °C: 75 [CRC10]

### 564

Compound: Cadmium bromide Formula: CdBr<sub>2</sub> Molecular Formula: Br<sub>2</sub>Cd Molecular Weight: 272.219 **CAS RN:** 7789-42-6 Properties: white powd, -80 mesh 99.9% pure; hygr; hex, a = 0.395 nm, c = 1.867 nm; enthalpy of fusion 20.90 kJ/mol; enthalpy of vaporization 115 kJ/ mol; pearly flakes; crystallizes as monohydrate below 36°C, as tetrahydrate above 36°C; finds use in lithography and photography [HAW93] [MER06] [STR93] [KIR78] [CER91] [CRC10] Solubility: g/100 g soln, H<sub>2</sub>O: 36.0 (0°C), 52.9  $(25^{\circ}C)$ , 61.65 (100°C); solid phase, CdBr<sub>2</sub> · 4H<sub>2</sub>O (0°C, 25°C), CdBr<sub>2</sub> (100°C) [KRU93]; s acetone, alcohol, acids [HAW93] Density, g/cm<sup>3</sup>: 5.192 [MER06] Melting Point, °C: 568 [CRC10] Boiling Point, °C: 1136 [COT88]

### 565

**Compound:** Cadmium bromide tetrahydrate **Formula:**  $CdBr_2 \cdot 4H_2O$  Molecular Formula: Br<sub>2</sub>CdH<sub>8</sub>O<sub>4</sub> Molecular Weight: 344.281 CAS RN: 13464-92-1 Properties: white to yellowish efflorescent cryst [HAW93] Solubility: 121 g/100 mL H<sub>2</sub>O (10°C) [CRC10]; s acetone, alcohol, acids [HAW93] Melting Point, °C: transition 36 [CRC10]

## 566

Compound: Cadmium carbonate Synonym: otavite Formula: CdCO<sub>3</sub> Molecular Formula: CCdO<sub>3</sub> Molecular Weight: 172.420 CAS RN: 513-78-0 Properties: -200 mesh with 99.999%, 99.9% and, 99% purity; white, amorphous powd or rhomb leaflets; a=0.61306 nm [HAW93] [MER06] [KIR78] [CER91] Solubility: 2.8 μm/100 g H<sub>2</sub>O; s dil acids [KIR78] [MER06] Density, g/cm<sup>3</sup>: 4.258 [HAW93] Melting Point, °C: decomposes at 500 [HAW93]

## 567

Compound: Cadmium chlorate dihydrate Formula:  $Cd(ClO_3)_2 \cdot 2H_2O$ Molecular Formula:  $CdCl_2H_4O_8$ Molecular Weight: 315.343 CAS RN: 7790-78-5 Properties: colorless cryst; hygr [HAW93] Solubility: mol/100 mol soln, H<sub>2</sub>O: 25.92 (0°C); solid phase,  $Cd(ClO_3)_2 \cdot 2H_2O$  [KRU93]; s alcohol, acetone [HAW93]; g/100 g H<sub>2</sub>O: 299 (0°C), 322 (20°C), 455 (60°C) [LAN05] Density, g/cm<sup>3</sup>: 2.28 (18°C) [HAW93] Melting Point, °C: 80 [HAW93]

## 568

Compound: Cadmium chloride Formula: CdCl<sub>2</sub> Molecular Formula: CdCl<sub>2</sub> Molecular Weight: 183.316 CAS RN: 10108-64-2 Properties: -80 mesh of 99.9% purity; white, odorless hygr; hex, a = 0.3854 nm, c = 1.746 nm; enthalpy of fusion 48.58 kJ/mol; enthalpy of vaporization at bp 124.3 kJ/mol [MER06] [CRC10] Solubility: g/100 g soln, H<sub>2</sub>O: 47.3 (0°C), 54.65 (25°C), 59.55 (100°C); solid phase, CdCl<sub>2</sub> · 2-1/2H<sub>2</sub>O (0°C, 25°C), CdCl<sub>2</sub> · H<sub>2</sub>O(100°C) [KRU93]; s acetone [HAW93] **Density, g/cm<sup>3</sup>:** 4.05 [STR93] **Melting Point, °C:** 564 [CRC10] **Boiling Point, °C:** 960 [CRC10]

#### 569

Compound: Cadmium chloride hemipentahydrate Formula: CdCl<sub>2</sub>·2-l/2H<sub>2</sub>O Molecular Formula: CdCl<sub>2</sub>H<sub>5</sub>O<sub>2.5</sub> Molecular Weight: 228.354 CAS RN: 7790-78-5 Properties: white, efflorescent granules or rhomb leaflets [MER06] [STR93] Solubility: g/100 g H<sub>2</sub>O: 90 (0°C), 113 (20°C), 132 (30°C) [LAN05]; s acetone [HAW93] Density, g/cm<sup>3</sup>: 3.327 [HAW93] Melting Point, °C: 960 [HAW93]

#### 570

Compound: Cadmium chromate Formula: CdCrO<sub>4</sub> Molecular Formula: CdCrO<sub>4</sub> Molecular Weight: 228.405 CAS RN: 14312-00-6 Properties: yellow solid; used in catalysts and in pigments [KIR78] Solubility: i H<sub>2</sub>O [KIR78] Density, g/cm<sup>3</sup>: 4.5 [LID94]

#### 571

Compound: Cadmium cyanide Formula: Cd(CN)<sub>2</sub> Molecular Formula: C<sub>2</sub>CdN<sub>2</sub> Molecular Weight: 164.446 CAS RN: 542-83-6 Properties: cryst or white powd; turns brown if heated in air; used to electroplate cadmium [HAW93] [MER06] Solubility: 1.71 g/100 mL H<sub>2</sub>O (15°C) [MER06] Density, g/cm<sup>3</sup>: 2.23 [MER06] Melting Point, °C: decomposes at >200 [CRC10]

#### 572

Compound: Cadmium dichromate monohydrate
Formula: CdCr<sub>2</sub>O<sub>7</sub>·H<sub>2</sub>O
Molecular Formula: CdCr<sub>2</sub>H<sub>2</sub>O<sub>8</sub>
Molecular Weight: 346.414
CAS RN: 69239-51-6
Properties: orange solid used in metal finishing [KIR78]
Solubility: s H<sub>2</sub>O [KIR78]

573

**Compound:** Cadmium 2-ethylhexanoate **Formula:**  $Cd(C_8H_{15}O_2)_2$  **Molecular Formula:**  $C_{16}H_{30}CdO_4$  **Molecular Weight:** 398.818 **CAS RN:** 2420-98-6 **Properties:** powd [CRC10]

574

**Compound:** Cadmium fluoride **Formula:** CdF<sub>2</sub> **Molecular Formula:** CdF<sub>2</sub> **Molecular Weight:** 150.408 **CAS RN:** 7790-79-6

Properties: 99.9% pure melted pieces, 3–6 mm; cub cryst, a=0.53880 nm; enthalpy of fusion 22.60 kJ/ mol; enthalpy of vaporization 214 kJ/mol; available as 99.89% pure cryst; used in electronic and optical materials, in the preparation of laser cryst, and as a sputtering target to produce multilayers [HAW93] [MER06] [CER91] [CRC10]

 Solubility: mol/kg soln, H<sub>2</sub>O: 0.4652 (0°C), 0.291 (25°C), 0.12 (100°C) [KRU93]; s acids, i alkalies [HAW93]
 Density, g/cm<sup>3</sup>: 6.33 [MER06]; 6.64 [STR93]
 Melting Point, °C: 1110 [CRC10]
 Boiling Point, °C: 1748 [CRC10]

575

Compound: Cadmium hydroxide Formula: Cd(OH)<sub>2</sub> Molecular Formula: CdH<sub>2</sub>O<sub>2</sub> Molecular Weight: 146.426 CAS RN: 21041-95-2 Properties: white, amorphous powd or trig and hex cryst, a = 0.3475 nm, c = 0.467 nm; can absorb atm H<sub>2</sub>O and CO<sub>2</sub> [HAW93] [MER06] [KIR78] Solubility: i H<sub>2</sub>O; s dil acids, NH<sub>4</sub>OH [MER06]; mmol/L soln, H<sub>2</sub>O: 0.038 (18°C) [KRU93] Density, g/cm<sup>3</sup>: 4.79 [MER06] Melting Point, °C: decomposes at 150 [KIR78] Reactions: minus 2H<sub>2</sub>O at 130°C–200°C [MER06]

## 576

Compound: Cadmium iodate Formula:  $Cd(IO_3)_2$ Molecular Formula:  $CdI_2O_6$ Molecular Weight: 462.216 CAS RN: 7790-81-0 Properties: fine white powd; uses: oxidizing agent [HAW93] Solubility: mol/L soln, H<sub>2</sub>O: (1.97 ± 0.13)×10<sup>-3</sup> (25°C) [KRU93]; s HNO<sub>3</sub>, NH<sub>4</sub>OH [HAW93] Density, g/cm<sup>3</sup>: 6.48 [HAW93] Melting Point, °C: decomposes [CRC10]

#### 577

Compound: Cadmium iodide
Formula: CdI <sub>2</sub>
Molecular Formula: CdI <sub>2</sub>
Molecular Weight: 366.220
CAS RN: 7790-80-9
Properties: -40 mesh 99.5% pure; lustrous, flake-like
cryst; odorless; two forms: $\alpha$ and $\beta$ ; $\alpha$ -form is
hex, $a=0.424$ nm, $c=0.684$ nm, enthalpy of fusion
15.30 kJ/mol, enthalpy of vaporization 115 kJ/
mol; becomes yellow on prolonged exposure to
air and light; finds applications in photography
and in lubricants [HAW93] [MER06] [CRC10]
<b>Solubility:</b> s H <sub>2</sub> O, alcohol, ether, acetone [MER06];
g/100 g soln, H <sub>2</sub> O: 44.05 (0°C), 46.30 (25°C),
55.55 (100°C); solid phase, CdI <sub>2</sub> [KRU93]
<b>Density, g/cm<sup>3</sup>:</b> α: 5.67; β: 5.30 [HAW93]
<b>Melting Point, °C:</b> α: 388; β: 404 [HAW93]
Boiling Point, °C: 742 [CRC10]

## 578

Compound: Cadmium metasilicate Formula: CdSiO<sub>3</sub> Molecular Formula: CdO<sub>3</sub>Si Molecular Weight: 188.495 CAS RN: 13477-19-5 Properties: colorless; monocl, a=1.504 nm, b=0.710 nm, c=0.696 nm [KIR78] [CRC10] Solubility: v sl s H<sub>2</sub>O [CRC10] Density, g/cm<sup>3</sup>: 4.928 [KIR78] Melting Point, °C: 1252 [KIR78]

#### 579

Compound: Cadmium molybdate(VI)
Formula: CdMoO<sub>4</sub>
Molecular Formula: CdMoO<sub>4</sub>
Molecular Weight: 272.349
CAS RN: 13972-68-4
Properties: -200 mesh 99.9% pure; yellow cryst; scheelite structure, c/a = 2.174; applications in electronic and optical materials [HAW93] [KIR81]
Solubility: 0.0067 g/100 g H<sub>2</sub>O, s acids [HAW93] [KIR81]
Density, g/cm<sup>3</sup>: 5.347 [HAW93]
Melting Point, °C: decomposes at ~900 [KIR81]

### 580

**Compound:** Cadmium niobate **Formula:** Cd<sub>2</sub>Nb<sub>2</sub>O<sub>7</sub> Molecular Formula: Cd<sub>2</sub>Nb<sub>2</sub>O<sub>7</sub> Molecular Weight: 522.631 CAS RN: 12187-14-3 Properties: cub; -200 mesh 99.9% purity [LID94] [CER91] Density, g/cm<sup>3</sup>: 6.2 [LID94] Melting Point, °C: ~1450 [LID94]

## 581

Compound: Cadmium nitrate Formula: Cd(NO<sub>3</sub>)<sub>2</sub> Molecular Formula: CdN<sub>2</sub>O<sub>6</sub> Molecular Weight: 236.427 CAS RN: 10325-94-7 Properties: white, amorphous pieces or hygr needles; cub, a=0.756 nm; used in coloring glass and in photographic emulsions [HAW93] [KIR78] Solubility: g/100 g soln, H<sub>2</sub>O: 55.1 (0.6°C), 61.3 (25°C), 87.2 (100°C); solid phase, Cd(NO<sub>3</sub>)<sub>2</sub>·4H<sub>2</sub>O (0°C, 25°C), Cd(NO<sub>3</sub>)<sub>2</sub> (100°C) [KRU93]; s alcohol, ammonia [HAW93] Density, g/cm<sup>3</sup>: 3.6 [LID94] Melting Point, °C: 350 [HAW93]

## 582

Compound: Cadmium nitrate tetrahydrate Formula:  $Cd(NO_3)_2 \cdot 4H_2O$ Molecular Formula:  $CdH_8N_2O_{10}$ Molecular Weight: 308.482 CAS RN: 10022-68-1 Properties: colorless; hygr; ortho-rhomb cryst, a = 0.583 nm, b = 2.575 nm, c = 1.099 nm; enthalpy of fusion 32.636 kJ/ mol [MER06] [STR93] [KIR78] Solubility: 132 g/100 g H<sub>2</sub>O (0°C) [KIR78] Density, g/cm<sup>3</sup>: 2.45 [STR93] Melting Point, °C: 59.5 [MER06] Boiling Point, °C: 132 [HAW93]

## 583

Compound: Cadmium oxalate Synonyms: ethanedioic acid, cadmium salt Formula:  $CdC_2O_4$ Molecular Formula:  $C_2CdO_4$ Molecular Weight: 200.431 CAS RN: 814-88-0 Properties: colorless [LAN05] Solubility: mol/kg soln, H<sub>2</sub>O: 0.00030 (25°C); equilibrium solid phase  $CdC_2O_4 \cdot 3H_2O$  [KRU93] Density, g/cm<sup>3</sup>: 3.32 [HAW93] Melting Point, °C: decomposes at 330 [HAW93]

#### 584

**Compound:** Cadmium oxalate trihydrate **Synonyms:** ethanedioic acid, cadmium salt trihydrate **Formula:**  $CdC_2O_4 \cdot 3H_2O$  **Molecular Formula:**  $C_2H_6CdO_7$  **Molecular Weight:** 254.477 **CAS RN:** 20712-42-9 **Properties:** white, amorphous powd [HAW93] **Solubility:** i H<sub>2</sub>O, alcohol; s dil acids, NH<sub>4</sub>OH [HAW93] **Melting Point, °C:** decomposes at 340 [HAW93]

# 585

Compound: Cadmium oxide Formula: CdO Molecular Formula: CdO Molecular Weight: 128.410 CAS RN: 1306-19-0 Properties: -100 mesh 99.999% pure, -200 mesh 99.9% and 99.5% purity; two forms: (1) colorless amorphous powd and (2) brown or red cryst; cub cryst, a=0.46953 nm; enthalpy of fusion 243.5 kJ/mol; used in cadmium plating baths and ceramics [HAW93] [KIR78] [CER91] **Solubility:** 0.00094 g/100 g H<sub>2</sub>O; s dil acids [MER06] [KIR78] Density, g/cm<sup>3</sup>: (1) 6.95; (2) 8.15 [HAW93] Melting Point, °C: sublimes at 1540 [KIR78] Thermal Conductivity, W/(m·K): 0.7 [CRC10]

#### 586

Compound: Cadmium perchlorate Formula:  $Cd(ClO_4)_2$ Molecular Formula:  $CdCl_2O_8$ Molecular Weight: 311.311 CAS RN: 79490-00-9 Solubility: g/100 g soln, H<sub>2</sub>O: 58.7 (25°C), 66.9 (100°C); solid phase,  $Cd(ClO_4)_2 \cdot 6H_2O$  [KRU93]

## 587

Compound: Cadmium perchlorate hexahydrate Formula:  $Cd(ClO_4)_2 \cdot 6H_2O$ Molecular Formula:  $CdCl_2H_{12}O_{14}$ Molecular Weight: 419.403 CAS RN: 10326-28-0 Properties: white cryst [STR93] Solubility: g/100 g H<sub>2</sub>O: 180 (10°C), 188 (20°C), 272 (100°C) [LAN05] Density, g/cm<sup>3</sup>: 2.37 [LID10]

### 588

**Compound:** Cadmium phosphate **Formula:** Cd<sub>3</sub>(PO<sub>4</sub>)<sub>2</sub>

Molecular Formula: CdO<sub>8</sub>P<sub>2</sub> Molecular Weight: 527.176 CAS RN: 13477-17-3 Properties: powd [CRC10] Solubility: i H<sub>2</sub>O Melting Point, °C: ~1500 [CRC10]

#### 589

Compound: Cadmium phosphide Formula: CdP<sub>2</sub> Molecular Formula: CdP<sub>2</sub> Molecular Weight: 174.359 CAS RN: 12133-44-7 Properties: -100 mesh of 99.9% purity; there is a Cd<sub>3</sub>P<sub>2</sub>, 12014-28-7, melting point 700°C, with same properties [CER91] [ALD94] Density, g/cm<sup>3</sup>: Cd<sub>3</sub>P<sub>2</sub>: 5.60 [CRC10] Melting Point, °C: Cd<sub>3</sub>P<sub>2</sub>: 700 [CRC10]

#### 590

Compound: Cadmium selenate dihydrate Formula:  $CdSeO_4 \cdot 2H_2O$ Molecular Formula:  $CdH_4O_6Se$ Molecular Weight: 291.399 CAS RN: 10060-09-0 Properties: ortho-rhomb cryst [MER06] Solubility: g/100 g H<sub>2</sub>O: 72.44 (0°C), 61.23 (26°C), 22.01 (98.5°C); solid phase CdSeO<sub>4</sub> · 2H<sub>2</sub>O [KRU93] Density, g/cm<sup>3</sup>: 3.632 [MER06] Melting Point, °C: decomposes at 100 [MER06]

# 591

Compound: Cadmium selenide Formula: CdSe Molecular Formula: CdSe Molecular Weight: 191.371 CAS RN: 1306-24-7

CAS NIV. 1300-24-7

Properties: 3–12 mm pieces (sintered), and –325 mesh 10 μm or less with 99.999% purity; white to brown; cub or hex cryst; hex: a=0.4309 nm, c=0.7021 nm, enthalpy of fusion 305.307 kJ/mol; becomes red in sunlight; used as a red pigment, in semiconductors, and as an evaporation material and sputtering target to produce photoconductive films and infrared filters; possible use in the electrofabrication of microdiode arrays [HAW93] [MER06] [CER91] [KLE93] [KRE91]

### Solubility: i H<sub>2</sub>O [MER06]

**Density, g/cm<sup>3</sup>:** α: 5.81 [KIR78] **Melting Point, °C:** 1240 [CRC10]

#### 592

Compound: Cadmium selenite Formula: CdSeO<sub>3</sub> Molecular Formula: CdO<sub>3</sub>Se Molecular Weight: 239.369 CAS RN: 13814-59-0 Properties: -80 mesh 99.5% pure [CER91]

#### 593

Compound: Cadmium stearate Formula: Cd(OOC<sub>18</sub>H<sub>35</sub>)<sub>2</sub> Molecular Formula: C<sub>36</sub>H<sub>70</sub>CdO<sub>4</sub> Molecular Weight: 679.361 CAS RN: 2223-93-0 Properties: white powd; uses: lubricant and plastics stabilizer [HAW93] [STR93] Density, g/cm<sup>3</sup>: 1.21 [KIR78] Melting Point, °C: 104 [KIR78]

# 594

Compound: Cadmium succinate Synonyms: succinic acid, cadmium salt Formula: Cd(OOCCH<sub>2</sub>CH<sub>2</sub>COO) Molecular Formula: C<sub>4</sub>H<sub>4</sub>CdO<sub>4</sub> Molecular Weight: 228.484 CAS RN: 141-00-4 Properties: white powd; needles or plates; preparation: reaction of CdCO<sub>3</sub> with succinic acid; uses: plant fungicide [MER06] [HAW93] Solubility: 0.367 g/100 mL (40°C) H<sub>2</sub>O; i alcohol [MER06] [HAW93]

# 595

Compound: Cadmium sulfate Formula:  $CdSO_4$ Molecular Formula:  $CdO_4S$ Molecular Weight: 208.475 CAS RN: 10124-36-4 Properties: colorless, odorless cryst; orthorhomb, a=0.4717 nm, b=0.6559 nm, c=0.4701 nm; enthalpy of fusion 20.084 kJ/ mol; used as a pigment [HAW93] [KIR78] Solubility: g/100 g H<sub>2</sub>O: 75.6 ± 0.1 (0°C), 76.7 (25°C), 58.4 (99°C); solid phase, CdSO<sub>4</sub> · 8/3H<sub>2</sub>O (0°C, 25°C),  $\beta$ -CdSO<sub>4</sub> · H<sub>2</sub>O (99°C) [KRU93] Density, g/cm<sup>3</sup>: 4.691 [KIR78] Melting Point, °C: 1000 [HAW93]

## 596

**Compound:** Cadmium sulfate monohydrate **Formula:**  $CdSO_4 \cdot H_2O$ 

Molecular Formula: CdH<sub>2</sub>O<sub>5</sub>S Molecular Weight: 226.490 CAS RN: 13477-20-8 Properties: monocl, a=7.607 nm, b=7.541 nm, c=8.186 nm [KIR78] Density, g/cm<sup>3</sup>: 3.79 [KIR78] Melting Point, °C: 105 [KIR78]

## 597

Compound: Cadmium sulfate octahydrate Formula:  $3CdSO_4 \cdot 8H_2O$ Molecular Formula:  $Cd_3H_{16}O_{20}S_3$ Molecular Weight: 769.546 CAS RN: 15244-35-6 Properties: colorless, odorless, monocl cryst; preparation: reaction of dil sulfuric acid with Cd or CdO; uses: pigment, electrolyte in Weston standard cell [MER06] [HAW93] Solubility: v s H<sub>2</sub>O [MER06] Density, g/cm<sup>3</sup>: 3.08 [MER06] Reactions: minus H<sub>2</sub>O above 40°C, forms monohydrate by 80°C; does not become anhydrous if heated further [MER06]

# 598

Compound: Cadmium sulfide Synonym: greenockite Formula: CdS Molecular Formula: CdS Molecular Weight: 144.477 CAS RN: 1306-23-6

- Properties: 3–6 mm pieces (highly dense, pressure sintered) and –325 mesh 99.999% pure; light yellow or orange colored cub or hex cryst; hex, a=0.41348 nm, c=0.6749 nm; enthalpy of fusion 201.669 kJ/mol; used in pigments and inks and as evaporation material and pure sputtering target to produce photoconductive films, infrared filters, and solar cells [HAW93] [MER06] [KIR78] [CER91]
- **Solubility:** 0.13 mg/100 g (18°C) [MER06]; mol/L in H<sub>2</sub>O: 1.42×10<sup>-10</sup> (25°C); 8.56×10<sup>-10</sup> (100°C) [KRU93]; s acids, ammonia [HAW93]
- Density, g/cm<sup>3</sup>: cub: 4.50; hex: 4.82 [MER06]

Melting Point, °C: 1750 [STR93];

sublimes at 980 [MER06]

**Reactions:** decomposed by warm dil mineral acids to evolve H<sub>2</sub>S [MER06]

599

**Compound:** Cadmium sulfite **Formula:** CdSO<sub>3</sub> **Molecular Formula:** CdO<sub>3</sub>S Molecular Weight: 192.475 CAS RN: 13477-23-1 Properties: cryst [LAN05] Solubility: mol/kg H<sub>2</sub>O: 0.00221 (0°C), 0.00207 (90°C) [KRU93] Melting Point, °C: decomposes [LAN05]

#### 600

**Compound:** Cadmium tantalate **Formula:** Cd<sub>2</sub>Ta<sub>2</sub>O<sub>7</sub> **Molecular Formula:** Cd<sub>2</sub>O<sub>7</sub>Ta<sub>2</sub> **Molecular Weight:** 698.714 **CAS RN:** 12050-35-0 **Properties:** -200 mesh 99.9% pure [CER91]

## 601

Compound: Cadmium telluride Formula: CdTe Molecular Formula: CdTe Molecular Weight: 240.011 CAS RN: 1306-25-8 Properties: 3–6 mm pieces (fused) of 99.999% purity; brownish black; cub cryst when prepared by sublimation in H<sub>2</sub> atm, also a hex form; hex, a=0.457 nm, c=0.747 nm; oxidizes eventually in moist air; used in phosphors, in semiconductor materials, and as an evaporation material and sputtering target to produce photoconductive films and infrared filters [HAW93] [MER06] [CER91] Solubility: i H<sub>2</sub>O, dil acids; s with decomposition in HNO<sub>3</sub> [MER06] Density, g/cm<sup>3</sup>: 6.2 [MER06] Melting Point, °C: 1041 [MER06]

#### 602

Compound: Cadmium tellurite Formula: CdTeO<sub>3</sub> Molecular Formula: CdO<sub>3</sub>Te Molecular Weight: 288.009 CAS RN: 15851-44-2 Properties: -80 mesh 99% pure [CER91]

#### 603

**Compound:** Cadmium tetrafluoroborate **Formula:** Cd(BF<sub>4</sub>)<sub>2</sub> **Molecular Formula:** B<sub>2</sub>CdF<sub>8</sub> **Molecular Weight:** 286.020 **CAS RN:** 14486-19-2 **Properties:** colorless liq [STR93] 604

**Compound:** Cadmium titanate **Formula:** CdTiO<sub>3</sub> **Molecular Formula:** CdO<sub>3</sub>Ti **Molecular Weight:** 208.276 **CAS RN:** 12014-14-1 **Properties:** ortho-rhomb [KIR83] **Density, g/cm<sup>3</sup>:** 6.5 [KIR83]

#### 605

Compound: Cadmium tungstate(VI)
Formula: CdWO<sub>4</sub>
Molecular Formula: CdO<sub>4</sub>W
Molecular Weight: 360.249
CAS RN: 7790-85-4
Properties: -325 mesh, 10μm or less of 99.9% purity; white or yellowish monocl cryst or powd; finds use in fluorescent paint, x-ray

screens [HAW93] [MER06] [CER91] Solubility: i H<sub>2</sub>O [MER06]; s NH<sub>4</sub>OH,

alkali cyanides [HAW93] Density, g/cm<sup>3</sup>: 8.0 [LID94]

#### 606

**Compound:** Cadmium vanadate **Formula:** CdV<sub>2</sub>O<sub>6</sub> **Molecular Formula:** CdO<sub>6</sub>V<sub>2</sub> **Molecular Weight:** 310.290 **CAS RN:** 12422-12-7 **Properties:** -200 mesh [CER91]

#### 607

**Compound:** Cadmium zirconate **Formula:** CdZrO<sub>3</sub> **Molecular Formula:** CdO<sub>3</sub>Zr **Molecular Weight:** 251.633 **CAS RN:** 12139-23-0 **Properties:** -200 mesh 99.5% purity [CER91]

#### 608

Compound: Calcium Formula: Ca Molecular Formula: Ca Molecular Weight: 40.078 CAS RN: 7440-70-2 Properties: lustrous, silver-white surface (freshly cut); much harder than sodium, softer than aluminum or magnesium; acquires bluish gray tarnish in moist air; enthalpy of fusion 8.54 kJ/ mol; enthalpy of vaporization 161.5 kJ/mol; enthalpy of combustion 634.3 kJ/mol; electrical resistivity (20°C)  $3.5 \mu ohm \cdot cm$ ; Brinell hardness 17 [MER06] [CRC10] [KIR78] Solubility: reacts with H<sub>2</sub>O, alcohols, dil acids to evolve H<sub>2</sub> [MER06] Density, g/cm<sup>3</sup>: 1.54 [MER06] Melting Point, °C: 843 [COT88] Boiling Point, °C: 1440 [MER06] Reactions: burns in air; contact with alkali hydroxides or carbonates may cause explosion [MER06] Thermal Conductivity, W/(m·K): 201 (25°C) [ALD94] Thermal Expansion Coefficient: from 0 to 400°C coefficient is  $22.3 \times 10^{-6}$  m/(m · K) [KIR78]

## 609

Compound: Calcium acetate Formula: Ca(CH<sub>3</sub>COO)<sub>2</sub> Molecular Formula: C<sub>4</sub>H<sub>6</sub>CaO<sub>4</sub> Molecular Weight: 158.168 CAS RN: 62-54-4 Properties: very hygr; rod-shaped cryst [MER06] Solubility: 26 g/100 g soln (25°C); 23 g/100 g soln (100°C) [CIC73] Density, g/cm<sup>3</sup>: 1.50 [MER06] Melting Point, °C: decomposes [ALF93] Reactions: decomposes at >160°C to acetone and CaCO<sub>3</sub> [MER06]

# 610

Compound: Calcium acetate dihydrate Formula: Ca(CH<sub>3</sub>COO)<sub>2</sub> · 2H<sub>2</sub>O Molecular Formula: C<sub>4</sub>H<sub>10</sub>CaO<sub>6</sub> Molecular Weight: 194.197 CAS RN: 14977-17-4 Properties: colorless, long, transparent needles [CRC10] [MER06] Solubility: g/100 g H<sub>2</sub>O: 37.4 (0°C); 34.7 (20°C); 29.7 (100°C) [LAN05] Reactions: minus H<sub>2</sub>O on standing in air to form monohydrate [MER06]

## 611

**Compound:** Calcium acetate monohydrate **Formula:**  $Ca(CH_3COO)_2 \cdot H_2O$  **Molecular Formula:**  $C_4H_8CaO_5$  **Molecular Weight:** 176.183 **CAS RN:** 5743-26-0 Properties: brown, gray, or white powd; hygr; sl bitter taste; an odor of acetic acid; decomposes if heated; used in the manufacture of acetone, acetic acid; as a mordant in dyeing textiles [HAW93] [ALD94] [STR93]
Solubility: 48.6/100 mL (0°C), 34.3/100 mL (100°C) H<sub>2</sub>O; sl s alcohol [CRC10] [HAW93]
Melting Point, °C: decomposes [CRC10]

#### 612

**Compound:** Calcium acetylacetonate **Synonym:** 2,4-pentanedionate, calcium derivative **Formula:**  $Ca(CH_3COCHCOCH_3)_2$  **Molecular Formula:**  $C_{10}H_{14}CaO_4$  **Molecular Weight:** 238.294 **CAS RN:** 19372-44-2 **Properties:** cryst [CRC10] **Melting Point, °C:** decomposes at 175 [CRC10]

## 613

**Compound:** Calcium acetylacetonate hydrate **Synonyms:** 2,4-pentanedione, calcium derivative **Formula:** Ca(CH<sub>3</sub>COCH=C(O)CH<sub>3</sub>)<sub>2</sub> · xH<sub>2</sub>O **Molecular Formula:** C<sub>10</sub>H<sub>14</sub>CaO<sub>4</sub> (anhydrous) **Molecular Weight:** 238.297 (anhydrous) **CAS RN:** 19372-44-2 **Properties:** white powd; x ~ 0.5 [ALD94] [STR93] **Melting Point, °C:** decomposes at 175 [STR93]

614

Compound: Calcium aluminate Formula: CaO  $\cdot$  Al<sub>2</sub>O<sub>3</sub> Molecular Formula: Al<sub>2</sub>CaO<sub>4</sub> Molecular Weight: 158.039 CAS RN: 12042-68-1 Properties: white, monocl, tricl, or rhomb; -200 mesh 99% powd [CER91] [CRC10] Solubility: decomposed by H<sub>2</sub>O [CRC10] Density, g/cm<sup>3</sup>: 2.98 [ALF93] Melting Point, °C: 1600 [ALF93] Thermal Expansion Coefficient: (volume) 100°C (0.12), 200°C (0.28), 400°C (0.63), 800°C (1.49), 1200°C (2.37) [CLA66]

# 615

Compound: Calcium aluminate(β)
Formula: 3CaO · Al<sub>2</sub>O<sub>3</sub>
Molecular Formula: Al<sub>2</sub>Ca<sub>3</sub>O<sub>6</sub>
Molecular Weight: 270.193
CAS RN: 12042-78-3
Properties: white cryst or powd; refractory material, important in cement [HAW93]

Solubility: s acids [HAW93] Density, g/cm<sup>3</sup>: 3.038 [HAW93] Melting Point, °C: decomposes at 1535 [HAW93] Thermal Expansion Coefficient: (volume) 100°C (0.18), 200°C (0.41), 400°C (0.97), 800°C (2.23), 1200°C (3.66) [CLA66]

#### 616

Compound: Calcium aluminum silicate Synonym: gehlenite Formula: Ca<sub>2</sub>Al<sub>2</sub>SiO<sub>7</sub> Molecular Formula: Al<sub>2</sub>Ca<sub>2</sub>O<sub>7</sub>Si Molecular Weight: 274.201 CAS RN: 1327-39-5 Properties: colorless, tetr; mineral; used in cement and refractories [MER06] [CRC10] Density, g/cm<sup>3</sup>: 3.048 [CRC10] Melting Point, °C: 1500 [CRC10] Thermal Expansion Coefficient: (volume) 100°C (0.20), 200°C (0.45), 400°C (0.93), 800°C (1.97), 1200°C (3.07) [CLA66]

# 617

Compound: Calcium arsenate
Formula: Ca<sub>3</sub>(AsO<sub>4</sub>)<sub>2</sub>
Molecular Formula: As<sub>2</sub>Ca<sub>3</sub>O<sub>8</sub>
Molecular Weight: 398.072
CAS RN: 7778-44-1
Properties: -80 mesh 99% purity; white powd; decomposes if heated; preparation: from calcium chloride and sodium arsenate; used as an insecticide and germicide [HAW93] [CER91]
Solubility: 0.013 g/100 mL H<sub>2</sub>O (25°C) [CRC10]; s dil acids [MER06]
Density, g/cm<sup>3</sup>: 3.62 [STR93]
Melting Point, °C: 1455 [CRC10]

#### 618

Compound: Calcium arsenite Formula: CaHAsO<sub>3</sub> Molecular Formula: AsCaHO<sub>3</sub> Molecular Weight: 163.206 CAS RN: 52740-16-6 Properties: white powd; uncertain composition; preparation: passing steam over mixture of CaO and As<sub>2</sub>O<sub>3</sub>; uses: insecticide, germicide [MER06] [HAW93]

### 619

Compound: Calcium

bis(2,2,6,6-tetramethyl-3,5-heptanedionate) Formula:  $Ca[(CH_3)_3CCOCH=C(O)C(CH_3)_3]_2$  Molecular Formula: C<sub>22</sub>H<sub>38</sub>CaO<sub>4</sub>
Molecular Weight: 406.619
CAS RN: 118448-18-3
Properties: uses: preparation of thin film semiconductors [ALD94]
Melting Point, °C: 221–224 [ALD94]

#### 620

Compound: Calcium borate hexahydrate
Formula: CaB<sub>4</sub>O<sub>7</sub>·6H<sub>2</sub>O
Molecular Formula: B<sub>4</sub>CaH<sub>12</sub>O<sub>13</sub>
Molecular Weight: 303.409
CAS RN: 13701-64-9
Properties: white powd; prepared by fusion of CaCO<sub>3</sub> and B<sub>2</sub>O<sub>3</sub>; used as a flux in metallurgy, in fire-retardant paint [MER06] [STR93]
Solubility: g/100 g H<sub>2</sub>O: 2.32 (0°C), 2.72 (20°C), 8.70 (100°C) [LAN05]
Melting Point, °C: 986 (anhydrous) [CRC10]

#### 621

Compound: Calcium boride
Synonym: calcium hexaboride
Formula: CaB<sub>6</sub>
Molecular Formula: B<sub>6</sub>Ca
Molecular Weight: 104.944
CAS RN: 12007-99-7
Properties: black cub; -200 mesh 99.5% pure; refractory material [KIR78] [CER91] [CRC10]
Density, g/cm<sup>3</sup>: 2.3 [ALD94]
Melting Point, °C: 2235 [KIR78]

# 622

**Compound:** Calcium bromate **Formula:** Ca(BrO<sub>3</sub>)<sub>2</sub> **Molecular Formula:** Br<sub>2</sub>CaO<sub>6</sub> **Molecular Weight:** 295.882 **CAS RN:** 10102-75-7 **Properties:** 99% pure powd [ALF93] **Melting Point, °C:** 180 [ALF93]

# 623

**Compound:** Calcium bromate monohydrate **Formula:**  $Ca(BrO_3)_2 \cdot H_2O$  **Molecular Formula:**  $Br_2CaH_2O_7$  **Molecular Weight:** 313.898 **CAS RN:** 10102-75-7 **Properties:** white, monocl, cryst powd; oxidizing

agent; used as a maturing agent, a dough conditioner [HAW93] [CRC10] Solubility: v s H<sub>2</sub>O [HAW93] Density, g/cm<sup>3</sup>: 3.329 [HAW93] Reactions: minus H<sub>2</sub>O at 180°C [HAW93]

## 624

Compound: Calcium bromide Formula: CaBr<sub>2</sub> Molecular Formula: Br<sub>2</sub>Ca Molecular Weight: 199.886 CAS RN: 7789-41-5 Properties: -80 mesh of 99.5% purity; white, odorless, deliq granules or rhomb cryst; becomes yellow on long exposure to air; sharp saline taste; enthalpy of fusion 29.08 kJ/ mol; used in medicine, photography [HAW93] [MER06] [CER91] [STR93] [CRC10] Solubility: v s H<sub>2</sub>O; s alcohol, acetone [HAW93] Density, g/cm<sup>3</sup>: 3.353 [MER06] Melting Point, °C: 742 [CRC10] Boiling Point, °C: 1815 [CRC10] Reactions: when strongly heated in air, forms lime and bromine [MER06]

#### 625

**Compound:** Calcium bromide dihydrate **Formula:**  $CaBr_2 \cdot 2H_2O$  **Molecular Formula:**  $Br_2CaH_4O_2$  **Molecular Weight:** 235.917 **CAS RN:** 22208-73-7 **Properties:** white, cryst powd [ALF93] [STR93]

## 626

Compound: Calcium bromide hexahydrate Formula:  $CaBr_2 \cdot 6H_2O$ Molecular Formula:  $Br_2CaH_{12}O_6$ Molecular Weight: 307.977 CAS RN: 13477-28-6 Properties: white, cryst or powd, odorless, sharp saline taste, very deliq; also  $CaBr_2 \cdot xH_2O$  [HAW93] [STR93] Solubility: g/100 g H<sub>2</sub>O: 125 (0°C), 143 (20°C), 312 (105°C) [LAN05]; s alcohol, acetone [HAW93] Density, g/cm<sup>3</sup>: 2.295 [STR93] Melting Point, °C: 38.2 [STR93] Boiling Point, °C: decomposes at 149 [HAW93]

#### 627

**Compound:** Calcium carbide **Synonym:** acetylenogen **Formula:** CaC<sub>2</sub> **Molecular Formula:** C<sub>2</sub>Ca

# Molecular Weight: 64.100

# CAS RN: 75-20-7

**Properties:** 9–40 mm grayish black, irregular lumps or ortho-rhomb cryst; garlic-like odor; can be prepared by reacting the metal or CaO with carbon in an electric furnace; used to generate acetylene gas, to reduce copper sulfide to metallic Cu [HAW93] [MER06] [ALF93] [COT88]

**Solubility:** decomposed by H<sub>2</sub>O with the evolution of acetylene [MER06]

**Density, g/cm<sup>3</sup>:** 2.22 [MER06] **Melting Point, °C:** 2300 [MER06]

## 628

Compound: Calcium carbonate Synonym: aragonite Formula: CaCO<sub>3</sub> Molecular Formula: CCaO<sub>3</sub> Molecular Weight: 100.087 CAS RN: 471-34-1 Properties: odorless, tasteless powd; orthorhomb; formed >30°C [MER06] **Solubility:** mol/kg H<sub>2</sub>O:  $7.76 \times 10^{-5}$  (0.7°C),  $6.79 \times 10^{-5}$  (25°C),  $3.1 \times 10^{-5}$  (90°C) [KRU93]; solubility data are also found in [PLU82] Density, g/cm<sup>3</sup>: 2.83 [MER06] Melting Point, °C: decomposes at 825 [MER06] **Reactions:** transforms to calcite at ~400°C [KIR78] Thermal Expansion Coefficient: (volume) 100°C (0.36), 200°C (1.00), 400°C (2.48) [CLA66]

# 629

**Compound:** Calcium carbonate **Synonym:** calcite **Formula:** CaCO<sub>3</sub> **Molecular Formula:** CCaO<sub>3</sub> **Molecular Weight:** 100.087 **CAS RN:** 471-34-1

Properties: -325 mesh 99.95% pure, 10µm; white odorless, tasteless hex cryst or powd; formed below 30°C; occurs naturally as mineral calcite; enthalpy of fusion 53.10kJ/mol; used as a source of lime [KIR78] [CER91] [HAW93] [CRC10] [MER06]

 Solubility: mol/kg H<sub>2</sub>O: 6.44×10<sup>-5</sup> (0.2°C), 5.75×10<sup>-5</sup> (25°C), 2.76×10<sup>-5</sup> (89.7°C) [KRU93]; s acids, evolving CO<sub>2</sub> [HAW93]; solubility data are also found in [PLU82]
 Density, g/cm<sup>3</sup>: 2.930 [STR93]
 Reactions: decomposes to CaO at ~800°C [MER06]
 Thermal Expansion Coefficient: (volume) 100°C (0.105), 200°C (0.285), 400°C

(0.765), 600°C (1.395) [CLA66]

#### 630

Compound: Calcium carbonate Synonym: vaterite Formula: CaCO<sub>3</sub> Molecular Formula: CCaO<sub>3</sub> Molecular Weight: 100.087 CAS RN: 471-34-1 Solubility: mol/kg H<sub>2</sub>O:  $1.34 \times 10^{-4}$  (°C),  $1.10 \times 10^{-4}$  (25.1°C),  $4.48 \times 10^{-5}$  (90°C) [KRU93]; solubility data are also found in [PLU82]

#### 631

Compound: Calcium chlorate dihydrate
Formula: Ca(ClO<sub>3</sub>)<sub>2</sub> · 2H<sub>2</sub>O
Molecular Formula: CaCl<sub>2</sub>H<sub>4</sub>O<sub>8</sub>
Molecular Weight: 243.010
CAS RN: 10035-05-9
Properties: white to yellowish cryst; prepared by reaction between chlorine and hot Ca(OH)<sub>2</sub> slurry; used in photography and as a powd to control poison ivy by dusting [HAW93]
Solubility: g/100 g soln, H<sub>2</sub>O: 63.0 (0.5°C), 66.0 (25°C), 78.0 (93°C); solid phase, Ca(ClO<sub>3</sub>)<sub>2</sub> · 2H<sub>2</sub>O (25°C), Ca(ClO<sub>3</sub>)<sub>2</sub> (93.0°C) [KRU93]
Density, g/cm<sup>3</sup>: 2.711 [HAW93]
Melting Point, °C: 340 [HAW93]

## 632

Compound: Calcium chloride Synonym: hydrophilite Formula: CaCl<sub>2</sub> Molecular Formula: CaCl<sub>2</sub> Molecular Weight: 110.983 CAS RN: 10043-52-4 Properties: 99.99% pure -325 mesh white powd; cub cryst, granules of fused masses; very hygr; enthalpy of fusion 28.54 kJ/mol; infinite enthalpy of solution -81.82 kJ/mol; used on roads to control ice and dust [HAW93] [MER06] [KIR78] [STR93] [CRC10] Solubility: g/100 g soln, H<sub>2</sub>O: 37.3 (0°C), 45.3  $(25^{\circ}C)$ , 61.4  $(100^{\circ}C)$ ; solid phase, CaCl<sub>2</sub> · 6H<sub>2</sub>O (0°C, 25°C), CaCl<sub>2</sub>·2H<sub>2</sub>O (100°C) [KRU93] Density, g/cm<sup>3</sup>: 2.152 [MER06] Melting Point, °C: 772 [MER06] Boiling Point, °C: 1935 [KIR78]

# 633

**Compound:** Calcium chloride dihydrate Formula:  $CaCl_2 \cdot 2H_2O$ Molecular Formula:  $CaCl_2H_4O_2$  Molecular Weight: 147.014 CAS RN: 10035-04-8 Properties: hygr granules, flakes or powd; enthalpy of fusion 88 J/g; enthalpy of infinite solution -44.78 kJ/mol [KIR78] [MER06] [ALF93] Solubility: v s H<sub>2</sub>O [MER06] Density, g/cm<sup>3</sup>: 1.85 [KIR78] Melting Point, °C: 176 [KIR78]

#### 634

Compound: Calcium chloride hexahydrate
Synonym: antarcticite
Formula: CaCl<sub>2</sub>·6H<sub>2</sub>O
Molecular Formula: CaCl<sub>2</sub>H<sub>12</sub>O<sub>6</sub>
Molecular Weight: 219.074
CAS RN: 7774-34-7
Properties: white, deliq, trig cryst; enthalpy of fusion 209 J/g; enthalpy of infinite solution 15.77 kJ/mol [KIR78] [MER06]
Solubility: g/100 g H<sub>2</sub>O: 59.5 (0°C), 74.5 (20°C), 159 (100°C) [LAN05]
Density, g/cm<sup>3</sup>: 1.68 [MER06]
Melting Point, °C: 29.9 [KIR78]
Reactions: minus 6H<sub>2</sub>O at 200°C [MER06]

## 635

Compound: Calcium chloride monohydrate
Formula: CaCl<sub>2</sub>·H<sub>2</sub>O
Molecular Formula: CaCl<sub>2</sub>H<sub>2</sub>O
Molecular Weight: 128.998
CAS RN: 13477-29-7
Properties: white, deliq cryst, lumps, granules, flakes; enthalpy of fusion 17.28 kJ/mol; heat of infinite solution -52.24 kJ/mol [KIR78] [HAW93]
Solubility: s H<sub>2</sub>O, alcohol [HAW93]
Density, g/cm<sup>3</sup>: 2.24 [KIR78]
Melting Point, °C: 187 [KIR78]

## 636

Compound: Calcium chloride tetrahydrate
Formula: CaCl<sub>2</sub>·4H<sub>2</sub>O
Molecular Formula: CaCl<sub>2</sub>H<sub>8</sub>O<sub>4</sub>
Molecular Weight: 183.045
CAS RN: 25094-02-4
Properties: enthalpy of fusion 29.86 kJ/mol; heat of infinite dilution -10.87 kJ/mol [KIR78]
Density, g/cm<sup>3</sup>: 1.83 [KIR78]

## 637

**Compound:** Calcium chlorite **Formula:** Ca(ClO<sub>2</sub>)<sub>2</sub> Molecular Formula: CaCl<sub>2</sub>O<sub>4</sub>
Molecular Weight: 174.981
CAS RN: 14674-72-7
Properties: cub white cryst; oxidizing agent [HAW93] [CRC10]
Solubility: decomposed by H<sub>2</sub>O [HAW93]
Density, g/cm<sup>3</sup>: 2.71 [HAW93]

#### 638

Compound: Calcium chromate Synonym: calcium chrome yellow Formula: CaCrO<sub>4</sub> Molecular Formula: CaCrO<sub>4</sub> Molecular Weight: 156.072 CAS RN: 10060-08-9 Properties: yellow cryst, monocl or rhomb; -20 mesh 99.9% pure; used as a pigment and as a corrosion inhibitor [STR93] [CER91] Solubility: sl s H<sub>2</sub>O; s dil acids [MER06]

# 639

Compound: Calcium chromate dihydrate
Formula: CaCrO<sub>4</sub> · 2H<sub>2</sub>O
Molecular Formula: CaCrH<sub>4</sub>O<sub>6</sub>
Molecular Weight: 192.102
CAS RN: 13765-19-0
Properties: bright yellow powd; used as a pigment, corrosion inhibitor, and oxidizing agent [HAW93]
Solubility: g/100 g H<sub>2</sub>O: 17.3 (0°C), 16.6 (30°C), 16.1 (40°C) [LAN05]
Density, g/cm<sup>3</sup>: 2.5 [LID94]
Reactions: minus 2H<sub>2</sub>O at 200°C [HAW93]

# 640

**Compound:** Calcium citrate tetrahydrate Synonym: tricalcium dicitrate tetrahydrate Formula: [OOCCH<sub>2</sub>C(OH)(COO)CH<sub>2</sub>COO]<sub>2</sub>Ca<sub>3</sub>·4H<sub>2</sub>O Molecular Formula: C<sub>12</sub>H<sub>18</sub>Ca<sub>3</sub>O<sub>18</sub> Molecular Weight: 570.498 CAS RN: 5785-44-4 Properties: white, odorless needles or powd; can be obtained from citrus fruits; used as a dietary supplement, sequesterant, and firming agent in foods, used to prepare citric acid [HAW93] [MER06] [KIR78] Solubility:  $0.088 \text{ g}/100 \text{ mL H}_2\text{O}$  at  $18^\circ\text{C}$ , 0.096 g/100 mL at 23°C; 0.0065 g/100 mL alcohol at 18°C; i ether [KIR78] **Reactions:** minus most of its water at 100°C, all H<sub>2</sub>O at 120°C [MER06]

## 641

**Compound:** Calcium cyanamide **Synonym:** calcium carbimide **Formula:**  $N \equiv C - N = Ca$  **Molecular Formula:**  $CCaN_2$  **Molecular Weight:** 80.102 **CAS RN:** 156-62-7

**Properties:** -12 mesh; colorless cryst or powd; pure material glistens, hex cryst; used as a fertilizer and pesticide and in manufacturing iron and Ca(CN)<sub>2</sub> [HAW93] [MER06] [ALF93]

Solubility: i H<sub>2</sub>O, but undergoes hydrolysis releasing acetylene and ammonia [HAW93] [MER06]
Density, g/cm<sup>3</sup>: 2.29 [MER06]; 1.083 [HAW93]
Melting Point, °C: ~1340 [MER06]
Reactions: sublimes at 1150°C–1200°C [MER06]

#### 642

Compound: Calcium cyanide Synonym: cyanogas Formula: Ca(CN)<sub>2</sub> Molecular Formula: C<sub>2</sub>CaN<sub>2</sub> Molecular Weight: 92.113 CAS RN: 592-01-8 Properties: colorless or white rhomb cryst or powd; decomposes in moist air liberating HCN: used

decomposes in moist air liberating HCN; used as a rodenticide, as a fumigant in greenhouses, and in flour mills [HAW93] [MER06]

**Solubility:** s H<sub>2</sub>O, gradually releasing HCN [MER06] **Melting Point, °C:** 640 estimated [KIR78]

# 643

Compound: Calcium dichromate trihydrate Formula:  $CaCr_2O_7 \cdot 3H_2O$ Molecular Formula:  $CaCr_2H_6O_{10}$ Molecular Weight: 310.112 CAS RN: 14307-33-6 Properties: bipyramidal, reddish orange cryst; not hygr, if pure; used as a catalyst in manufacturing CrCl<sub>3</sub> and CrO<sub>3</sub> and as a corrosion inhibitor [MER06] Solubility: v s H<sub>2</sub>O; i ether, CCl<sub>4</sub>; reacts with alcohol [MER06] Density, g/cm<sup>3</sup>: 2.37 [MER06] Melting Point, °C: decomposes above 100 [MER06] Reactions: decomposes when heated forming CaCrO<sub>4</sub> and CrO<sub>3</sub> [MER06]

## 644

**Compound:** Calcium dihydrogen phosphate monohydrate **Formula:**  $Ca(H_2PO_4)_2 \cdot H_2O$ **Molecular Formula:**  $CaH_6O_9P_2$  Molecular Weight: 252.068
CAS RN: 10031-30-8
Properties: white, large, shining, tricl plates, cryst powd or granules; not hygr [MER06] [STR93]
Solubility: moderately s H<sub>2</sub>O; s dil HCl, HNO<sub>3</sub>, acetic acid [MER06]
Density, g/cm<sup>3</sup>: 2.22 [MER06]
Reactions: minus H<sub>2</sub>O at 100°C; decomposes at 200°C [MER06]

# 645

**Compound:** Calcium 2-ethylhexanoate **Formula:**  $Ca(C_8H_{15}O_2)_2$  **Molecular Formula:**  $C_{16}H_{30}CaO_4$  **Molecular Weight:** 326.485 **CAS RN:** 136-57-6 **Properties:** powd [CRC10]

# 646

Compound: Calcium ferrocyanide dodecahydrate
Formula: Ca<sub>2</sub>Fe(CN)<sub>6</sub> · 12H<sub>2</sub>O
Molecular Formula: C<sub>6</sub>H<sub>24</sub>Ca<sub>2</sub>FeN<sub>6</sub>O<sub>12</sub>
Molecular Weight: 508.291
CAS RN: 1327-39-5
Properties: yellow, tricl cryst; decomposes when heated; used to remove metallic impurities from citric, tartaric and, other acids [CRC10] [HAW93]
Solubility: 86.8 g/100 mL (25°C), 115 g/100 mL (65°C) H<sub>2</sub>O; i alcohol [HAW93] [CRC10]
Density, g/cm<sup>3</sup>: 1.68 [HAW93]
Melting Point, °C: decomposes [CRC10]

## 647

**Compound:** Calcium fluoride **Synonyms:** fluorspar, fluorite **Formula:** CaF<sub>2</sub> **Molecular Formula:** CaF<sub>2</sub> **Molecular Weight:** 78.075

CAS RN: 7789-75-5

**Properties:** white powd or cub cryst; enthalpy of fusion 29.71 kJ/mol; enthalpy of vaporization 335 kJ/ mol; hardness 4 Mohs; electrical conductivity  $1.3 \times 10^{-18} \text{ (ohm} \cdot \text{cm})^{-1}$  at  $20^{\circ}\text{C}$ ,  $6 \times 10^{-5}$  at  $650^{\circ}\text{C}$ ; becomes luminous on heating; pure material prepared from CaCO<sub>3</sub> and HF solution; mineral fluorspar is the main source of fluorine; 99.95% pure material used in spectroscopy, lasers, and electronics, for sputtering antireflection coating on glass [HAW93] [MER06] [CER91] [CRC10] **Solubility:** g/L soln, H<sub>2</sub>O: 0.013 (0°C), 0.016 (25°C) [KRU93]

Density, g/cm<sup>3</sup>: 3.18 [MER06]
Melting Point, °C: 1418 [CRC10] Boiling Point, °C: 2500 [MER06] Thermal Conductivity, W/(m⋅K): 10.96 [KIR78] Thermal Expansion Coefficient: (volume) 100°C (0.47), 200°C (1.12) [CLA66]

# 648

Compound: Calcium fluorophosphate Synonym: fluoroapatite Formula:  $Ca_5(PO_4)_3F$ Molecular Formula:  $Ca_5FO_{12}P_3$ Molecular Weight: 504.302 CAS RN: 1306-05-4 Properties: fluoroapatite is a mineral for fluorine; can be prepared from  $CaCl_2$  and sodium monofluorophosphate; used as a laser cryst, may have the lowest energy threshold of any cryst at room temp [KIR78] [HAW93]

#### 649

Compound: Calcium fluorophosphate dihydrate
Formula: CaPO<sub>3</sub>F · 2H<sub>2</sub>O
Molecular Formula: CaFH<sub>4</sub>O<sub>5</sub>P
Molecular Weight: 174.079
CAS RN: 37809-19-1
Properties: monocl cryst powd; tendency to form twins; loses fluorine on heating [MER06] [STR93]
Solubility: 0.417 g/100 mL soln (27°C); i in most common organic solvents [MER06]

# 650

**Compound:** Calcium formate **Synonyms:** formic acid, calcium salt **Formula:** Ca(HCOO)<sub>2</sub> **Molecular Formula:** C<sub>2</sub>H<sub>2</sub>CaO<sub>4</sub> **Molecular Weight:** 130.114

CAS RN: 544-17-2

**Properties:** ortho-rhomb cryst or powd; slight odor similar to acetic acid; obtained from Ca(OH)<sub>2</sub> and CO reaction at high temperatures and pressures; used as food preservative, as binder for fine-ore briquettes, and in drilling fluids [MER06]

Solubility: g/100 g H<sub>2</sub>O: 16.15 (0°C), 16.60 (20°C), 17.95 (80°C), 18.40 (100°C) [LAN05]; i alcohol [MER06]
 Density, g/cm<sup>3</sup>: 2.02 [MER06]
 Melting Point, °C: 300 [HAW93]

#### 651

**Compound:** Calcium hexaborate pentahydrate **Synonym:** colemanite **Formula:**  $Ca_2B_6O_{11} \cdot 5H_2O$  Molecular Formula: B<sub>6</sub>Ca<sub>2</sub>H<sub>10</sub>O<sub>16</sub> Molecular Weight: 411.091 CAS RN: 12291-65-5 Properties: monocl; forms when saturated solutions of inyoite or higher hydrates are heated [KIR78] Solubility: about 1% in H<sub>2</sub>O at 25°C [KIR78] Density, g/cm<sup>3</sup>: 2.42 [KIR78]

#### 652

Compound: Calcium hexafluoroacetylacetonate dihydrate
Synonyms: 1,1,1,5,5,5-hexafluoro-2,4-pentanedione, calcium derivative
Formula: Ca[CF<sub>3</sub>COCH=C(O)CF<sub>3</sub>]<sub>2</sub> · 2H<sub>2</sub>O
Molecular Formula: C<sub>10</sub>H<sub>6</sub>CaF<sub>12</sub>O<sub>6</sub>
Molecular Weight: 490.211
CAS RN: 141572-90-9
Properties: off-white powd; precursor for metal oxide chemical vapor deposition [STR94] [STR93]
Melting Point, °C: 135–140 [STR93]
Boiling Point, °C: decomposes at 230–240 [STR93]
Reactions: sublimes at 180°C, 0.7 mm Hg [STR94]

#### 653

Compound: Calcium hexafluorosilicate dihydrate
Formula: CaSiF<sub>6</sub>·2H<sub>2</sub>O
Molecular Formula: CaF<sub>6</sub>H<sub>4</sub>O<sub>2</sub>Si
Molecular Weight: 218.185
CAS RN: 16925-39-6
Properties: colorless, tetr; powd; obtained by reaction of a Ca salt and H<sub>2</sub>SiF<sub>6</sub>; used as a flotation agent and insecticide [HAW93] [MER06] [CRC10]
Solubility: i cold H<sub>2</sub>O, partially decomposed in hot H<sub>2</sub>O [MER06]
Density, g/cm<sup>3</sup>: 2.25 [MER06]

# 654

Compound: Calcium hydride
Formula: CaH<sub>2</sub>
Molecular Formula: CaH<sub>2</sub>
Molecular Weight: 42.094
CAS RN: 7789-78-8
Properties: -40 mesh, -20 mesh 98% pure; sensitive to moisture; ortho-rhomb cryst or powd; commercial product is gray; decomposes into Ca and H<sub>2</sub> at 990°C without melting; prepared by heating calcium metal to ~300°C under 1 atm of H<sub>2</sub>; used to obtain some metals by reduction of their oxides and to dry gases and unreactive liq [KIR80] [MER06] [STR93]

**Solubility:** decomposed by  $H_2O$ , with

the evolution of H<sub>2</sub> [HAW93] **Density, g/cm<sup>3</sup>:** 1.7 [MER06]; 1.90 [KIR80]

Melting Point, °C: 816 under H<sub>2</sub> [STR93]

**Compound:** Calcium hydrogen phosphate **Synonyms:** calcium phosphate, dibasic **Formula:** CaHPO<sub>4</sub> **Molecular Formula:** CaHO<sub>4</sub>P **Molecular Weight:** 136.057

CAR DN: 7757 02 0

CAS RN: 7757-93-9

**Properties:** white, tasteless, tricl cryst; prepared by reacting phosphoric acid and milk of lime (calcium hydroxide suspended in water); used as food supplement, in medicine, constituent of a dentrifice and fertilizer [HAW93] [MER06]

**Solubility:** i H<sub>2</sub>O, alcohol [MER06] **Reactions:** at red heat, dehydrated to calcium pyrophosphate [MER06]

# 656

Compound: Calcium hydrogen phosphate dihydrate
Synonym: brushite
Formula: CaHPO<sub>4</sub> · 2H<sub>2</sub>O
Molecular Formula: CaH<sub>5</sub>O<sub>6</sub>P
Molecular Weight: 172.088
CAS RN: 7789-77-7
Properties: monocl [MER06]
Solubility: i H<sub>2</sub>O, alcohol; s dil HCl, HNO<sub>3</sub> [MER06]
Density, g/cm<sup>3</sup>: 2.31 [MER06]
Reactions: minus H<sub>2</sub>O <100°C; dehydrates at red heat to calcium pyrophosphate [MER06]</li>

657

Compound: Calcium hydrogen sulfite
Formula: Ca(HSO<sub>3</sub>)<sub>2</sub>
Molecular Formula: CaH<sub>2</sub>O<sub>6</sub>S<sub>2</sub>
Molecular Weight: 202.222
CAS RN: 13780-03-5
Properties: solution of calcium sulfite in an aq solution of sulfur dioxide; yellowish liq; used in bleaching textiles [HAW93]
Density, g/cm<sup>3</sup>: 1.06 [HAW93]

# 658

Compound: Calcium hydrosulfide hexahydrate
Formula: Ca(HS)<sub>2</sub> · 6H<sub>2</sub>O
Molecular Formula: CaH<sub>14</sub>O<sub>6</sub>S<sub>2</sub>
Molecular Weight: 214.317
CAS RN: 12133-28-7
Properties: colorless, transparent cryst; used in the leather industry [HAW93]
Solubility: s H<sub>2</sub>O, alcohol [HAW93]
Melting Point, °C: decomposes in air at 15–18 [HAW93]

#### 659

Compound: Calcium hydroxide Synonyms: portlandite, slaked lime Formula: Ca(OH)<sub>2</sub> Molecular Formula: CaH<sub>2</sub>O<sub>2</sub> Molecular Weight: 74.093 CAS RN: 1305-62-0 Properties: cryst or soft, odorless granules or powd; sl bitter, alkaline taste; readily absorbs CO<sub>2</sub> from air; manufactured from lime and water; used in mortar, plasters, cement [HAW93] [MER06] Solubility: g/100 g H<sub>2</sub>O: 0.189 (0°C), 0.173 (20°C), 0.076 (100°C) [LAN05]; s acids (caution) [MER06]; s glycerol; i alcohol [HAW93] Density, g/cm<sup>3</sup>: 2.08–2.34 [MER06] Reactions: minus H<sub>2</sub>O at 580°C [HAW93]

#### 660

**Compound:** Calcium hydroxide phosphate **Formula:**  $Ca_5(OH)(PO_4)_3$  **Molecular Formula:**  $Ca_5HO_{13}P_3$  **Molecular Weight:** 502.311 **CAS RN:** 12167-74-7 **Properties:** col hex cryst [CRC10] **Solubility:** i H<sub>2</sub>O [CRC10] **Density, g/cm<sup>3</sup>:** 3.155 [CRC10] **Melting Point, °C:** decomposes at >900 [CRC10]

#### 661

Compound: Calcium hypochlorite
Synonym: losantin
Formula: Ca(OCl)<sub>2</sub>
Molecular Formula: CaCl<sub>2</sub>O<sub>2</sub>
Molecular Weight: 142.982
CAS RN: 7778-54-3
Properties: grayish white powd; oxidizing agent; used as an algicide, bactericide, deodorant, disinfectant, as a bleach, and to refine sugar; there is a dihydrate, 22464-76-2 [KIR78] [MER06] [HAW93] [STR93]
Solubility: decomposes in both H<sub>2</sub>O and alcohol [HAW93]
Density, g/cm<sup>3</sup>: 2.35 [HAW93]
Melting Point, °C: decomposes at 100 [HAW93]

# 662

**Compound:** Calcium hypophosphite Formula:  $Ca(H_2PO_2)_2$ Molecular Formula:  $CaH_4O_4P_2$ Molecular Weight: 170.055 CAS RN: 7789-79-9 Properties: white monocl, prismatic cryst or granular powd; used as a corrosion inhibitor and in medicine [MER06] [HAW93]
Solubility: s H<sub>2</sub>O, sl s in glycerol; i alcohol [MER06]
Melting Point, °C: decomposes [ALF93]
Reactions: when heated at >300°C, evolves phosphine, which spontaneously ignites [MER06]

# 663

**Compound:** Calcium iodate **Synonym:** lautarite **Formula:** Ca(IO<sub>3</sub>)<sub>2</sub> **Molecular Formula:** CaI<sub>2</sub>O<sub>6</sub> **Molecular Weight:** 389.883 **CAS RN:** 7789-80-2

- **Properties:** white powd; monocl prismatic cryst; the hexahydrate is ortho-rhomb; not hygr; obtained by passing Cl<sub>2</sub> into a hot solution of lime containing dissolved iodine; used as a deodorant, in mouthwashes, as a food additive, and dough conditioner [MER06] [STR93]
- **Solubility:** s HNO<sub>3</sub>; i alcohol [MER06]; g/100 g soln, H<sub>2</sub>O: 0.0906 (0°C), 0.306 (25°C), 0.668 (90°C); solid phase, Ca(IO<sub>3</sub>)<sub>2</sub> · 6H<sub>2</sub>O (0°C, 25°C), Ca(IO<sub>3</sub>)<sub>2</sub> (90°C) [KRU93]

Density, g/cm<sup>3</sup>: 4.519 [MER06] Melting Point, °C: stable up to 540 [MER06] Reactions: sensitive to reducing agents [MER06]

#### 664

**Compound:** Calcium iodide **Formula:** CaI<sub>2</sub> **Molecular Formula:** CaI<sub>2</sub> **Molecular Weight:** 293.887 **CAS RN:** 10102-68-8

**Properties:** –20 mesh 99.5% pure powd; very hygr; hex; becomes yellow and completely insoluble on exposure to air due to liberation of I<sub>2</sub> and absorption of CO<sub>2</sub>; enthalpy of fusion 41.80 kJ/mol; finds use as an expectorant [MER06] [CRC10]

 Solubility: v s H<sub>2</sub>O, methanol, ethanol, acetone; i ether [MER06], g/100 g soln, H<sub>2</sub>O: 64.6 (0°C), 68.3 (25°C), 81.0 (100°C) [KRU93]
 Density, g/cm<sup>3</sup>: 4.0 [HAW93]
 Melting Point, °C: 779 [CRC10]
 Boiling Point, °C: 1100 [MER06]

#### 665

**Compound:** Calcium iodide hexahydrate Formula:  $CaI_2 \cdot 6H_2O$ Molecular Formula:  $CaH_{12}I_2O_6$  Molecular Weight: 401.978
CAS RN: 71626-98-7
Properties: white powd, hex, thick needles, plates or lumps; very hygr; becomes yellow in air; absorbs atm CO<sub>2</sub>; used in photography and in medicine; formula also given as CaI<sub>2</sub>·xH<sub>2</sub>O [HAW93] [MER06] [STR93]
Solubility: v s H<sub>2</sub>O, alcohol [MER06]
Density, g/cm<sup>3</sup>: 2.55 [HAW93]
Melting Point, °C: 783 [HAW93]
Boiling Point, °C: ~1100 [HAW93]
Reactions: minus 6H<sub>2</sub>O at 42°C [HAW93]

# 666

**Compound:** Calcium metaborate **Formula:**  $Ca(BO_2)_2$  **Molecular Formula:**  $B_2CaO_4$  **Molecular Weight:** 125.698 **CAS RN:** 13701-64-9 **Properties:** powd [CRC10] **Solubility:** g/100 g H<sub>2</sub>O: 0.13<sup>20</sup> [CRC10]

# 667

**Compound:** Calcium metasilicate **Formula:** CaSiO<sub>3</sub> **Molecular Formula:** CaO<sub>3</sub>Si **Molecular Weight:** 116.162 **CAS RN:** 1344-95-2 **Properties:** white, monocl cryst [CRC10] **Solubility:** i H<sub>2</sub>O **Density, g/cm<sup>3</sup>:** 2.92 [CRC10] **Melting Point, °C:** 1540 [CRC10]

#### 668

Compound: Calcium molybdate Synonym: powellite Formula: CaMoO<sub>4</sub> Molecular Formula: CaMoO<sub>4</sub> Molecular Weight: 200.016 CAS RN: 7789-82-4 Properties: -200 mesh 99.9% pure; white, cryst powd; can be produced by reacting CaSO<sub>4</sub> with sodium molybdate; used in optical and electronic applications, as an alloying agent in iron and steel manufacturing [HAW93] [MER06] [CER91] Solubility: 0.0050 g/100 g H<sub>2</sub>O [KIR81]; s conc mineral acids [MER06]; mg/100 g soln, H<sub>2</sub>O: 0.0022 (0°C), 0.0025 (22°C), 0.0085 (100°C) [KRU93] Density, g/cm<sup>3</sup>: 4.38–4.53 [STR93] Melting Point, °C: decomposes at 965

[KIR81]; ~1250 [HAW93]

Compound: Calcium nitrate Formula:  $Ca(NO_3)_2$ Molecular Formula:  $CaN_2O_6$ Molecular Weight: 164.087 CAS RN: 10124-37-5 Properties: white, deliq granules; oxidizing agent; used in pyrotechnics, explosives, and fertilizers [HAW93] [MER06] Solubility: v s H<sub>2</sub>O, evolves heat; s methanol, ethanol, acetone [MER06]; g/100 g soln, H<sub>2</sub>O: 50.50 (0°C), 57.98 (25°C), 78.43 (100°C); solid phase, Ca(NO<sub>3</sub>) · 4H<sub>2</sub>O (0°C, 25°C), Ca(NO<sub>3</sub>)<sub>2</sub> (100°C) [KRU93] Density, g/cm<sup>3</sup>: 2.36 [HAW93] Melting Point, °C: 561 [HAW93]

# 670

Compound: Calcium nitrate tetrahydrate
Formula: Ca(NO<sub>3</sub>)<sub>2</sub> · 4H<sub>2</sub>O
Molecular Formula: CaH<sub>8</sub>N<sub>2</sub>O<sub>10</sub>
Molecular Weight: 236.149
CAS RN: 13477-34-4
Properties: -4 mesh 99.999% pure; white cryst [STR93] [CER91]
Solubility: g/100 g H<sub>2</sub>O: 102 (0°C), 129 (20°C), 363 (100°C) [LAN05]; s alcohol, acetone [HAW93]
Density, g/cm<sup>3</sup>: 1.82 [STR93]
Melting Point, °C: 39.7 [STR93]

# 671

Compound: Calcium nitride Formula: Ca<sub>3</sub>N<sub>2</sub> Molecular Formula: Ca<sub>3</sub>N<sub>2</sub> Molecular Weight: 148.247 CAS RN: 12013-82-0 Properties: 12 mm pieces and smaller, -200 mesh 99% pure; brown cryst; hex: a=0.3533 nm, c=0.411 nm; cub: a=1.138 nm [CIC73] [CER91] Solubility: s H<sub>2</sub>O, releasing ammonia; s dil acids; i absolute alcohol [HAW93] Density, g/cm<sup>3</sup>: hex: 2.62; cub: 2.54 [CIC73] Melting Point, °C: 1195 [HAW93]

#### 672

**Compound:** Calcium nitrite **Formula:** Ca(NO<sub>2</sub>)<sub>2</sub> **Molecular Formula:** CaN<sub>2</sub>O<sub>4</sub> **Molecular Weight:** 132.089 **CAS RN:** 13780-06-8 **Properties:** white or yellowish deliq, hex cryst; prepared from nitric oxide and a mixture consisting of calcium ferrate and calcium nitrate; used to inhibit corrosion in lubricants and concrete [MER06]

Solubility: sl s alcohol [MER06]; g/100 g soln, H<sub>2</sub>O: 38.3 (0°C), 43.0 (18.5°C), 71.2 (91°C); solid phase Ca(NO<sub>2</sub>)<sub>2</sub> · 4H<sub>2</sub>O (0°C, 18.5°C), Ca(NO<sub>2</sub>)<sub>2</sub> · 2H<sub>2</sub>O (91°C) [KRU93] Density, g/cm<sup>3</sup>: 2.23 [MER06]

# 673

Compound: Calcium nitrite monohydrate
Formula: Ca(NO<sub>2</sub>)<sub>2</sub> ⋅ H<sub>2</sub>O
Molecular Formula: CaH<sub>2</sub>N<sub>2</sub>O<sub>5</sub>
Molecular Weight: 150.104
CAS RN: 13780-06-8
Properties: colorless or yellowish cryst; hygr; used in lubricants as a corrosion inhibitor [HAW93]
Solubility: gCa(NO<sub>3</sub>)<sub>2</sub> ⋅ 4H<sub>2</sub>O/100 g H<sub>2</sub>O: 63.9 (0°C), 104 (30°C), 178 (100°C) [LAN05]; sl s alcohol [HAW93]
Density, g/cm<sup>3</sup>: 2.23 (anhydrous, 34°C) [HAW93]
Reactions: minus H<sub>2</sub>O at 100°C [HAW93]

#### 674

Compound: Calcium oleate Synonyms: 9-octadecanoic acid, calcium salt Formula: Ca(C<sub>18</sub>H<sub>33</sub>O<sub>2</sub>)<sub>2</sub> Molecular Formula: C<sub>36</sub>H<sub>66</sub>CaO<sub>4</sub> Molecular Weight: 602.996 CAS RN: 142-17-6 Properties: pale yellow, transparent solid; slowly absorbs moisture from air to form monohydrate; used as a thickening agent for grease [HAW93] [MER06] Solubility: 0.04 g/100 mL (25°C), 0.03 g/100 mL (50°C) H<sub>2</sub>O; i alcohol, ether, acetone; s benzene, chloroform [MER06] [CRC10] Melting Point, °C: decomposes at >140 [MER06]

#### 675

Compound: Calcium oxalate
Synonyms: ethanedioic acid, calcium salt
Formula: CaC<sub>2</sub>O<sub>4</sub>
Molecular Formula: C<sub>2</sub>CaO<sub>4</sub>
Molecular Weight: 128.098
CAS RN: 563-72-4
Properties: white, cryst powd; obtained from calcium formate or calcium cyanamide; used to prepare oxalic acid, glazes, and to separate rare earths [HAW93] [MER06]
Solubility: g/L soln, H<sub>2</sub>O: 0.0069 (25°C), 0.0142 (95°C); solid phase, CaC<sub>2</sub>O<sub>4</sub> · H<sub>2</sub>O [KRU93]; s dil HCl, HNO<sub>3</sub> [HAW93]

Density, g/cm<sup>3</sup>: 2.2 [HAW93] Melting Point, °C: decomposes [CRC10]

#### 676

Compound: Calcium oxalate monohydrate Synonyms: ethanedioic acid, calcium salt monohydrate Formula:  $CaC_2O_4 \cdot H_2O$ Molecular Formula:  $C_2H_2CaO_5$ Molecular Weight: 146.113 CAS RN: 5794-28-5 Properties: colorless, cub cryst; hygr; uses: ceramic glazes [MER06] [CRC10] Solubility: i H<sub>2</sub>O, acetic acid; s dil HCl, HNO<sub>3</sub> [MER06] Density, g/cm<sup>3</sup>: 2.2 [MER06] Reactions: minus 2H<sub>2</sub>O at 200°C; when ignited converts into CaCO<sub>3</sub> or CaO without appreciable charring [MER06]

#### 677

Compound: Calcium oxide Svnonyms: lime, quicklime Formula: CaO Molecular Formula: CaO Molecular Weight: 56.077 CAS RN: 1305-78-8 Properties: -325 mesh, 10µm or less, 99.99% and 99.5% pure; cryst, white or grayish lumps or granular powd; readily absorbs CO<sub>2</sub> and H<sub>2</sub>O from air; odorless; enthalpy of fusion 59.00 kJ/mol; produced from limestone; used in pulp and paper, dehairing of hides, in brick, mortar, and stucco [HAW93] [MER06] [CRC10] Solubility: reacts with H<sub>2</sub>O to form Ca(OH)<sub>2</sub>; s acids [MER06] Density, g/cm<sup>3</sup>: 3.32–3.35 [MER06] Melting Point, °C: 2927 [CRC10] Boiling Point, °C: 2850 [MER06] Thermal Conductivity, W/(m·K): 8.0 (500°C), 7.8 (1000°C) [KIR80] Thermal Expansion Coefficient: (volume) 100°C (0.225), 200°C (0.571), 400°C (1.402), 800°C (3.107), 1200°C (5.078) [CLA66]

# 678

**Compound:** Calcium oxide silicate **Formula:** Ca<sub>3</sub>OSiO<sub>4</sub> **Molecular Formula:** Ca<sub>3</sub>O<sub>5</sub>Si **Molecular Weight:** 228.317 **CAS RN:** 12168-85-3 **Properties:** refrac solid [CRC10] **Melting Point, °C:** 2150 [CRC10]

# 679

Compound: Calcium palmitate
Synonyms: hexadecanoic acid, calcium salt
Formula: Ca(C<sub>16</sub>H<sub>31</sub>O<sub>2</sub>)<sub>2</sub>
Molecular Formula: C<sub>32</sub>H<sub>62</sub>CaO<sub>4</sub>
Molecular Weight: 550.920
CAS RN: 542-42-7
Properties: white or pale yellow powd; used for waterproofing, as a thickener for lubricating oils [HAW93] [MER06]
Solubility: i H<sub>2</sub>O, alcohol, ether, acetone; sl s benzene [MER06]
Melting Point, °C: decomposes above 155 [MER06]

#### 680

Compound: Calcium perborate heptahydrate
Formula: Ca(BO<sub>3</sub>)<sub>2</sub> · 7H<sub>2</sub>O
Molecular Formula: B<sub>2</sub>CaH<sub>14</sub>O<sub>13</sub>
Molecular Weight: 283.803
CAS RN: 12007-56-6
Properties: grayish white lumps or powd; uses: in medicine, as a bleach, and in tooth powd [HAW93]
Solubility: s H<sub>2</sub>O, acids; evolves oxygen [HAW93]

#### 681

Compound: Calcium perchlorate Synonyms: perchloric acid, calcium salt Formula: Ca(ClO<sub>4</sub>)<sub>2</sub> Molecular Formula: CaCl<sub>2</sub>O<sub>8</sub> Molecular Weight: 238.978 CAS RN: 13477-36-6 Properties: white cryst; oxidizing agent [HAW93] Solubility: g/100 g soln, H<sub>2</sub>O: 65.35 (25°C) [KRU93]; s alcohol [HAW93] Density, g/cm<sup>3</sup>: 2.651 [HAW93] Melting Point, °C: decomposes at 270 [HAW93]

#### 682

**Compound:** Calcium perchlorate tetrahydrate **Formula:**  $Ca(ClO_4)_2 \cdot 4H_2O$ **Molecular Formula:**  $CaCl_2H_8O_{12}$ **Molecular Weight:** 311.039 **CAS RN:** 15627-86-8 **Properties:** white cryst [STR93]

#### 683

**Compound:** Calcium permanganate **Formula:** Ca(MnO<sub>4</sub>)<sub>2</sub> **Molecular Formula:** CaMn<sub>2</sub>O<sub>8</sub> **Molecular Weight:** 277.949 **CAS RN:** 10118-76-0 Properties: violet or dark purple, deliq cryst; made by reacting KMnO<sub>4</sub> and CaCl<sub>2</sub>; used in the textile industry, to sterilize water, and as a deodorizer [HAW93] [MER06]
Solubility: v s H<sub>2</sub>O; decomposed by alcohol [MER06]
Density, g/cm<sup>3</sup>: 2.4 [HAW93]

#### 684

Compound: Calcium peroxide
Synonym: calcium dioxide
Formula: CaO<sub>2</sub>
Molecular Formula: CaO<sub>2</sub>
Molecular Weight: 72.077
CAS RN: 1305-79-9
Properties: tetr; white or yellowish, odorless, almost tasteless powd; decomposes in moist air; used to disinfect seeds, in dentrifices [HAW93] [MER06] [CRC10]
Solubility: sl s H<sub>2</sub>O; s in acids forming H<sub>2</sub>O<sub>2</sub> [MER06]
Density, g/cm<sup>3</sup>: 2.92 [CRC10]
Melting Point, °C: decomposes at ~200 [HAW93]

# 685

Compound: Calcium phenoxide Synonyms: calcium phenolate, calcium carbolate Formula:  $Ca(OC_6H_5)_2$ Molecular Formula:  $C_{12}H_{10}CaO_2$ Molecular Weight: 226.288 CAS RN: 5793-84-0 Properties: reddish powd; decomposes in air; used as a detergent for lubricating oil and as an emulsifier [HAW93] [MER06] Solubility: sl s H<sub>2</sub>O, alcohol [MER06]

# 686

Compound: Calcium phosphate
Synonym: whitlockite
Formula: Ca<sub>3</sub>(PO<sub>4</sub>)<sub>2</sub>
Molecular Formula: Ca<sub>3</sub>O<sub>8</sub>P<sub>2</sub>
Molecular Weight: 310.177
CAS RN: 7758-87-4
Properties: amorphous, odorless, tasteless, white powd; produced from phosphate rock; used in ceramics, as a polishing powd [HAW93] [MER06] [STR93]
Solubility: i H<sub>2</sub>O, alcohol, acetic acid; s dil HCl, HNO<sub>3</sub> [MER06]
Density, g/cm<sup>3</sup>: 3.14 [MER06]

Melting Point, °C: 1670 [HAW93]

#### 687

**Compound:** Calcium phosphate hydroxide **Synonyms:** durapatite, hydroxylapatite

Formula:  $3Ca_3(PO_4)_2 \cdot Ca(OH)_2$ Molecular Formula:  $Ca_{10}H_{26}O_{26}P_6$ Molecular Weight: 748.143 CAS RN: 1306-06-5 Properties: occurs naturally as mineral; hex needles with rosettes arrangement; preparation from Ca(NO\_3)\_2 and KH\_2PO\_4; uses: purification of DNA, Ca and P supplement, prosthetic aid [ALD94] [MER06] Solubility: i H<sub>2</sub>O [MER06] Melting Point, °C: decomposes at >1100 [MER06]

#### 688

Compound: Calcium phosphide Synonym: photophor Formula: Ca<sub>3</sub>P<sub>2</sub> **Molecular Formula:** Ca<sub>3</sub>P<sub>2</sub> Molecular Weight: 182.182 CAS RN: 1305-99-3 Properties: 0.5 inch pieces and down; reddish brown cryst powd or gray lumps; decomposed by moist air, evolving flammable phosphine, which can ignite spontaneously; obtained by heating quicklime in phosphorus vapor; used in signal fires, torpedoes, and pyrotechnics [HAW93] [MER06] [STR93] [KIR82] **Solubility:** decomposes in H<sub>2</sub>O to form flammable phosphine [MER06]; i alcohol, ether [HAW93] Density, g/cm<sup>3</sup>: 2.51 (15°C) [HAW93] Melting Point, °C: ~1600 [MER06] Reactions: may be heated up to 1250°C in H<sub>2</sub> without decomposition [KIR82]

# 689

Compound: Calcium phosphite monohydrate
Formula: CaHPO<sub>3</sub>·H<sub>2</sub>O
Molecular Formula: CaH<sub>3</sub>O<sub>4</sub>P
Molecular Weight: 138.073
CAS RN: 21056-98-4
Properties: cryst; used in fertilizers and polymerization catalysts [MER06]
Solubility: sl s H<sub>2</sub>O; i alcohol [MER06]
Reactions: minus H<sub>2</sub>O at 200°C, decomposes at >300°C [MER06]

# 690

**Compound:** Calcium phosphonate monohydrate **Formula:** CaHPO<sub>3</sub>·H<sub>2</sub>O **Molecular Formula:** CaH<sub>3</sub>O<sub>4</sub>P **Molecular Weight:** 138.073 **CAS RN:** 25232-60-4 **Properties:** col monocl cryst [CRC10] **Solubility:** sl H<sub>2</sub>O; i EtOH [CRC10] **Melting Point, °C:** decomposes at 150 [CRC10]

#### 691

Compound: Calcium plumbate
Formula: Ca<sub>2</sub>PbO<sub>4</sub>
Molecular Formula: Ca<sub>2</sub>O<sub>4</sub>Pb
Molecular Weight: 351.354
CAS RN: 12013-69-3
Properties: orange to brown cryst powd; used as an oxidizing agent, in safety matches, and storage batteries [HAW93]
Solubility: i H<sub>2</sub>O, decomposed by hot H<sub>2</sub>O; s acids, with decomposition [HAW93]
Density, g/cm<sup>3</sup>: 5.71 [HAW93]
Melting Point, °C: decomposes [CRC10]

#### 692

Compound: Calcium propionate Synonyms: propionic acid, calcium salt Formula:  $(C_2H_5COO)_2Ca$ Molecular Formula:  $C_6H_{10}CaO_4$ Molecular Weight: 186.221 CAS RN: 4075-81-4 Properties: white powd or monocl cryst; uses: mold-retardant additive for bread, tobacco, pharmaceuticals, antifungal agent [HAW93] Solubility: s H<sub>2</sub>O, sl s methanol, ethanol [MER06]

#### 693

Compound: Calcium pyrophosphate
Synonym: calcium diphosphate
Formula: Ca<sub>2</sub>P<sub>2</sub>O<sub>7</sub>
Molecular Formula: Ca<sub>2</sub>O<sub>7</sub>P<sub>2</sub>
Molecular Weight: 254.099
CAS RN: 7790-76-3
Properties: 99.95% pure 6–8 μm; white, polymorphous cryst or powd; can be made by igniting CaHPO<sub>4</sub>; used as a polishing agent in dentrifices, as a mild abrasive to polish metals [HAW93] [MER06] [STR93]
Solubility: i H<sub>2</sub>O; s dil HCl, HNO<sub>3</sub> [MER06]
Density, g/cm<sup>3</sup>: 3.09 [MER06]
Melting Point, °C: 1230 [STR93]

# 694

**Compound:** Calcium selenate dihydrate Formula:  $CaSeO_4 \cdot 2H_2O$ Molecular Formula:  $CaH_4O_6Se$ Molecular Weight: 219.066 CAS RN: 7790-74-1 Properties: colorless; monocl powd; used as a general pesticide [HAW93] [CRC10]
Solubility: g/100 g H<sub>2</sub>O: 9.73 (0°C), 9.22 (20°C), 7.14 (40°C) [LAN05]
Density, g/cm<sup>3</sup>: 2.7 [HAW93]

#### 695

Compound: Calcium selenide
Formula: CaSe
Molecular Formula: CaSe
Molecular Weight: 119.038
CAS RN: 1305-84-6
Properties: -20 mesh 99.5% pure; white powd; in air may turn red within a few minutes, and light brown in a few hours; obtained by reduction of CaSeO<sub>4</sub> with H<sub>2</sub> at 400°C-500°C; used in electron emitter devices [CER91] [MER06]
Solubility: decomposed by H<sub>2</sub>O; releases H<sub>2</sub>Se gas and forms red Se in HC1 [MER06]
Density, g/cm<sup>3</sup>: 3.82 [MER06]

# 696

Compound: Calcium silicate
Synonym: wollastonite
Formula: β-CaSiO<sub>3</sub>
Molecular Formula: CaO<sub>3</sub>Si
Molecular Weight: 116.162
CAS RN: 1344-95-2
Properties: -200 mesh 99% white powd; used as an absorbent, antacid, as a filler paper, and for paper coatings [HAW93] [ALD93]
Solubility: i H<sub>2</sub>O [HAW93]
Density, g/cm<sup>3</sup>: 2.9 [HAW93]
Reactions: transition to pseudowollastonite at 1200°C [ROB78]

#### 697

Compound: Calcium silicide Formula: CaSi Molecular Formula: CaSi Molecular Weight: 68.164 CAS RN: 12013-55-7 Properties: ortho cryst [CRC10] Density, g/cm<sup>3</sup>: 2.39 [CRC10] Boiling Point, °C: 1324 [CRC10]

### 698

**Compound:** Calcium silicide **Formula:** CaSi<sub>2</sub> **Molecular Formula:** CaSi<sub>2</sub> **Molecular Weight:** 96.249 CAS RN: 12013-56-8
Properties: 3 mm pieces and smaller –140 mesh of 99.5% purity; powd [STR93] [CER91]
Solubility: i cold H<sub>2</sub>O, decomposed by hot H<sub>2</sub>O; s acids, alkalies [HAW93]
Density, g/cm<sup>3</sup>: 2.5 [HAW93]
Melting Point, °C: 1000 [ALF93]

# 699

Compound: Calcium stannate trihydrate
Formula: CaSnO<sub>3</sub> · 3H<sub>2</sub>O
Molecular Formula: CaH<sub>6</sub>O<sub>6</sub>Sn
Molecular Weight: 260.832
CAS RN: 12013-46-6
Properties: white, cryst powd; used as an additive for ceramic capacitors, in the production of ceramic colors; anhydrous is -325 mesh, 5µm or less 99% pure [HAW93] [CER91]
Solubility: i H<sub>2</sub>O [HAW93]
Reactions: minus 3H<sub>2</sub>O ~350°C [HAW93]

700

Compound: Calcium stearate Synonyms: octadecanoic acid, calcium salt Formula: Ca[CH<sub>3</sub>(CH<sub>2</sub>)<sub>16</sub>COO]<sub>2</sub> Molecular Formula: C<sub>36</sub>H<sub>70</sub>CaO<sub>4</sub> Molecular Weight: 607.028 CAS RN: 1592-23-0 Properties: white, granular, fatty powd; used as a water repellent; flattening agent in paints [HAW93] [MER06] Solubility: i H<sub>2</sub>O, ether, chloroform; sl s hot mineral oils [MER06] Density, g/cm<sup>3</sup>: 1.12 [KIR78] Melting Point, °C: 147–149 [MER06]

# 701

Compound: Calcium succinate trihydrate Synonyms: butanedioic acid, calcium salt trihydrate Formula: Ca(OOCCH<sub>2</sub>CH<sub>2</sub>COO)<sub>3</sub>·H<sub>2</sub>O Molecular Formula: C<sub>4</sub>H<sub>10</sub>CaO<sub>7</sub> Molecular Weight: 210.197 CAS RN: 140-99-8 Properties: needles or granules [MER06] Solubility: g/100 g H<sub>2</sub>O: 1.127 (0°C), 1.28 (20°C), 0.66 (100°C) [LAN05]; i alcohol; s dil acids [MER06]

#### 702

**Compound:** Calcium sulfate **Synonym:** anhydrite **Formula:** CaSO<sub>4</sub> Molecular Formula: CaO<sub>4</sub>S
Molecular Weight: 136.142
CAS RN: 7778-18-9
Properties: ortho-rhomb; various colors; odorless; white with blue, gray, or red tinge; hardness 3–3.5 Mohs; enthalpy of fusion 28.03 kJ/mol; used in cement formulations and as a paper filler [MER06] [CRC10]
Solubility: g/100 g soln, H<sub>2</sub>O: 0.63 (25°C), 0.151 (100°C); solid phase, CaSO<sub>4</sub> [KRU93]
Density, g/cm<sup>3</sup>: 2.96 [MER06]
Melting Point, °C: 1450 [CRC10]

#### 703

Compound: Calcium sulfate dihydrate Synonym: gypsum Formula:  $CaSO_4 \cdot 2H_2O$ Molecular Formula: CaH<sub>4</sub>O<sub>6</sub>S Molecular Weight: 172.172 CAS RN: 10101-41-4 Properties: monocl; hardness 1.5–2.0 Mohs; lumps or white powd; used in manufacturing portland cement, plaster of paris and artificial marble [KIR78] [MER06] [STR93] Solubility: g/100 mL soln, H<sub>2</sub>O: 0.1759 (0°C), 0.2080 (25°C), 0.1619 (100°C) [KRU93] Density, g/cm<sup>3</sup>: 2.32 [KIR79] Reactions: minus 1.5 H<sub>2</sub>O at 128°C, minus 2H<sub>2</sub>O at 163°C [KIR78] Thermal Expansion Coefficient: (volume) 100°C (0.58) [CLA66]

#### 704

Compound: Calcium sulfate hemihydrate Synonym: plaster of paris Formula:  $CaSO_4 \cdot 1/2H_2O$ Molecular Formula: CaHO<sub>4.5</sub>S Molecular Weight: 145.145 CAS RN: 10034-76-1 Properties: odorless and tasteless fine powd; hygr; uses: wall plasters, wallboards, and tiles [MER06] [ALD94] Solubility: sets to hard mass when mixed with H<sub>2</sub>O [MER06]; g/100 g soln, H<sub>2</sub>O: 1.23 (0°C), 0.71 (25°C), 0.189 (100°C); solid phase, CaSO<sub>4</sub> · 1/2H<sub>2</sub>O [KRU93] Reactions: minus 1/2H<sub>2</sub>O at 163°C [KIR78]

#### 705

Compound: Calcium sulfide Synonym: oldhamite Formula: CaS Molecular Formula: CaS Molecular Weight: 72.144 CAS RN: 20548-54-3 Properties: -325 mesh, 10μm or less, 99.99% and 99% pure; white powd, if pure; else may be yellowish to a pale gray; odor of H<sub>2</sub>S in moist air; unpleasant alkaline taste; oxidizes in dry air and decomposes in moist air; can be obtained by reacting CaCO<sub>3</sub>, H<sub>2</sub>S, and H<sub>2</sub> at 1000°C [MER06]
Solubility: sl s cold H<sub>2</sub>O, more s hot H<sub>2</sub>O with

partial decomposition [MER06] Density, g/cm<sup>3</sup>: 2.59 [MER06] Melting Point, °C: >2000 [MER06]

# 706

**Compound:** Calcium sulfite dihydrate **Formula:** CaSO<sub>3</sub> · 2H<sub>2</sub>O **Molecular Formula:** CaH<sub>4</sub>O<sub>5</sub>S

Molecular Weight: 156.173

CAS RN: 10257-55-3

**Properties:** hex; white cryst or powd; slowly oxidizes in air to CaSO<sub>4</sub>; used in brewing, as a disinfectant in sugar manufacturing [HAW93] [MER06] [CRC10]

Solubility: 0.0043 g/100 mL (18°C), 0.001 g/100 mL (100°C) H<sub>2</sub>O; sl s alcohol; s in acid solutions with SO<sub>2</sub> evolution [MER06] [CRC10]

Reactions: minus 2H<sub>2</sub>O at 100°C [HAW93]

#### 707

Compound: Calcium tartrate tetrahydrate Synonyms: 2,3-dihydroxybutanedioic acid, calcium salt tetrahydrate Formula:  $CaC_4H_4O_6 \cdot 4H_2O$ Molecular Formula:  $C_4H_{12}CaO_{10}$ Molecular Weight: 260.211 CAS RN: 3164-34-9 Properties: rhomb; white cryst; uses: food preservative, antacid [HAW93] [CRC10] Solubility: g/100 g H<sub>2</sub>O: 0.026 (0°C), 0.034 (20°C), 0.130 (80°C) [LAN05]; s dil HCl, HNO<sub>3</sub> [MER06] Melting Point, °C: decomposes [CRC10]

#### 708

Compound: Calcium telluride Formula: CaTe Molecular Formula: CaTe Molecular Weight: 167.678 CAS RN: 12013-57-9 Properties: cub; -20 mesh 99.5% purity [CER91] [CRC10] Density, g/cm<sup>3</sup>: 4.873 [CRC10]

#### 709

**Compound:** Calcium tetrahydroaluminate **Formula:**  $Ca(AlH_4)_2$ 

Molecular Formula: A1<sub>2</sub>CaH<sub>8</sub> Molecular Weight: 102.105 CAS RN: 16941-10-9 Properties: gray powd; flammable [CRC10] Solubility: reac H<sub>2</sub>O; s THF; i eth, bz [CRC10]

# 710

Compound: Calcium thiocyanate tetrahydrate Formula:  $Ca(SCN)_2 \cdot 4H_2O$ Molecular Formula:  $C_2H_8CaN_2O_4S_2$ Molecular Weight: 228.307 CAS RN: 2092-16-2 Properties: hygr cryst or powd [MER06] Solubility: v s  $H_2O$ ; s methanol, ethanol, acetone [MER06] Reactions: decomposes if heated above 160°C [MER06]

#### 711

Compound: Calcium thioglycollate trihydrate Synonyms: mercaptoacetic acid, calcium salt trihydrate Formula: Ca(HSCH<sub>2</sub>COO)<sub>2</sub>· 3H<sub>2</sub>O Molecular Formula: C<sub>4</sub>H<sub>12</sub>CaO<sub>7</sub>S<sub>2</sub> Molecular Weight: 276.345 CAS RN: 814-71-1 Properties: white powd or prismatic rod cryst; odorless or faint mercaptan odor; used in depilatories and in hair wave preparations [HAW93] [MER06] Solubility: s H<sub>2</sub>O [MER06] Reactions: slowly loses H<sub>2</sub>O above 95°C; darkens at 220°C; partially fuses with decomposition at 280°C–290°C [MER06]

# 712

Compound: Calcium thiosulfate hexahydrate Synonym: calcium hyposulfite hexahydrate Formula:  $CaS_2O_3 \cdot 6H_2O$ Molecular Formula:  $CaH_{12}O_9S_2$ Molecular Weight: 260.300 CAS RN: 10124-41-1 Properties: tricl cryst; when dry, decomposes on standing to form a yellow crust on the surface; spontaneously decomposed at 43°C–49°C; used to treat dermatitis and jaundice caused by arsphenamine [MER06] Solubility: 100 g/100 mL H<sub>2</sub>O (3°C), decomposed by hot water; i alcohol [MER06] [CRC10] Density, g/cm<sup>3</sup>: 1.87 [MER06] Melting Point, °C: decomposes [CRC10]

### 713

**Compound:** Calcium titanate **Synonym:** perovskite

Formula: CaTiO<sub>3</sub> Molecular Formula: CaO<sub>3</sub>Ti Molecular Weight: 135.956 CAS RN: 12049-50-2 Properties: -150, +325 mesh 99% pure; occurs naturally as the mineral perovskite; can be made by heating CaO and TiO<sub>2</sub> to 1350°C; used as an additive to BaTiO<sub>3</sub> [KIR83] [CER91] Density, g/cm<sup>3</sup>: 4.10 [STR93] Melting Point, °C: 1975 [STR93]

# 714

**Compound:** Calcium tungstate Synonym: scheelite Formula: CaWO<sub>4</sub> Molecular Formula: CaO<sub>4</sub>W Molecular Weight: 287.916 CAS RN: 7790-75-2 Properties: -325 mesh, 10µm or less 99.9% pure; occurs in nature as mineral scheelite; white tetr powd, a=0.524 nm, c=1.138 nm; can be prepared by heating tungstic acid and CaO or CaCO<sub>3</sub>; used in tumor treatment and in luminous paint [KIR83] [STR93] [MER06] **Solubility:** i H<sub>2</sub>O; decomposed by hot HCl, HNO<sub>3</sub> [MER06] Density, g/cm<sup>3</sup>: 6.062 [STR93] Melting Point, °C: 1620 [STR93]

# 715

Compound: Calcium vanadate Formula: CaV<sub>2</sub>O<sub>6</sub> Molecular Formula: CaO<sub>6</sub>V<sub>2</sub> Molecular Weight: 237.957 CAS RN: 12135-52-3 **Properties:** -325 mesh, 10µm or less, 99.9% pure [CER91]

#### 716

Compound: Calcium zirconate Formula: CaZrO<sub>3</sub> Molecular Formula: CaO<sub>3</sub>Zr Molecular Weight: 179.300 CAS RN: 12013-47-7 Properties: colorless, monocl; -100, +200 mesh, other sizes, 99% pure; white powd [STR93] [CER91] [CRC10] Solubility: s HNO<sub>3</sub> [HAW93] Density, g/cm<sup>3</sup>: 4.78 [STR93] Melting Point, °C: 2550 [STR93]

717 Compound: Californium Formula: Cf Molecular Formula: Cf Molecular Weight: 251 CAS RN: 7440-71-3 **Properties:**  $\alpha$ -form: hex, a=0.339 nm, c=1.101 nm;  $\beta$ : fcc, a=0.494 nm;  $\gamma$ : fcc, a=0.575 nm; ionic radius of Cf<sup>+++</sup> is 0.0934 nm, of Cf<sup>+++</sup> is 0.0851 nm; discovered in 1950; <sup>252</sup>Cf is an intense neutron source, 1 g emits  $2.4 \times 10^{+12}$  neutrons per sec; has application in neutron activation analysis and field use in mineral prospecting and oil-well logging, potential use in medical applications [KIR78] **Density, g/cm<sup>3</sup>:** all at 25°C: α: 15.1; β: 13.7; γ: 8.70 [KIR78] Melting Point, °C: 900 [KIR91]

#### 718

Compound: Carbon Synonym: fullerene Formula: C<sub>60</sub> **Molecular Formula:** C<sub>60</sub> Molecular Weight: 720.642 CAS RN: 99685-96-8 Properties: yellow needles or plates [CRC10] Solubility: s os [CRC10] Melting Point, °C: >280 [CRC10]

#### 719

Compound: Carbon Synonym: graphite bromide Formula: C<sub>8</sub>Br Molecular Formula: C<sub>8</sub>Br Molecular Weight: 175.992 CAS RN: 12079-58-2 Properties: -100 mesh 99.9% pure [CER91]

# 720

Compound: Carbon Synonym: graphite oxide Formula: C<sub>7</sub>O<sub>2</sub>(H<sub>2</sub>) Molecular Formula: C<sub>7</sub>H<sub>2</sub>O<sub>2</sub> Molecular Weight: 118.092 CAS RN: 1399-57-1 **Properties:** formula also given as  $C_4O(OH)$ ; light yellow flakes or plates; preparation: oxidation of graphite with KNO<sub>3</sub> in nitric and sulfuric acids; uses: rocket propellant mixtures; membranes in the desalination of seawater by reverse osmosis [HAW93] [MER06]

Compound: Carbon Synonym: graphite Formula: C Molecular Formula: C Molecular Weight: 12.011 CAS RN: 7782-42-5

Properties: hex; soft, slippery feel; steel gray to black color with metallic sheen; electrical resistivity (20°C) 1375 μohm · cm; tensile strength 400–2000 psi; compressive strength ~2000–8000 psi; coefficient of friction 0.1 μ; enthalpy of fusion 104.6 kJ/mol; enthalpy of vaporization 711 kJ/ mol; semiconductor: band gap 5.47 eV (300 K); mobility (300 K) cm²/(V · s), 1800 electron, 1200 hole; effective mass: 0.2 electron, 0.25 hole [KIR78] [HAW93] [COT88] [ALD94] [CRC10]

**Density, g/cm<sup>3</sup>:** 2.0–2.25 [HAW93]

Melting Point, °C: sublimes at 3650 [HAW93]

**Thermal Conductivity, W/(m·K):** 119–165 (25°C) [ALD94]; 13.4 (500°C), 9.9 (1000°C) [KIR80]

**Thermal Expansion Coefficient:** (linear) to  $1000^{\circ}$ C is  $4.0 \times 10^{-6}/^{\circ}$ C [KIR80]

# 722

Compound: Carbon Synonym: graphite fluoride Formula:  $(CF_x)_n$ Molecular Formula: x = 0.8–1.5 CAS RN: 11113-63-6 Properties: -200 mesh, 99.9% pure; polymer [ALD94] [CER91]

# 723

Compound: Carbon Synonym: diamond Formula: C Molecular Formula: C Molecular Weight: 12.011 CAS RN: 7782-40-3 Properties: cryst modification of carbon; fcc, a=3.56683-3.56725 nm; specific heat 6.184 J/(mol · K); hardness 10 Mohs; resistivity, 20°C, >10<sup>+16</sup> ohm  $\cdot$  cm (Type I, most Type IIa), 10–10<sup>+3</sup> (Type IIb); dielectric constant (27°C, 0–3 kHz) 5.58; Type I: diamonds containing 0.1%–0.2% nitrogen; Type IIa, free of nitrogen; Type IIb very pure, generally blue in color; obtained by mining; uses: jewelry, polishing, grinding [KIR78] [MER06] Density, g/cm<sup>3</sup>: 3.51524 [KIR78] Melting Point, °C: >3550 [COT88] Boiling Point, °C: 4827 [COT88]

**Reactions:** diamond to graphite transition >1500°C in absence of air [KIR78] **Thermal Conductivity, W/(m·K):** 20°C: Type I, 900; Type IIa, 2600 [KIR78] **Thermal Expansion Coefficient:** 20°C:  $0.8 \times 10^{-6}$ ; -100°C:  $0.4 \times 10^{-6}$ ; 100°C-900°C: (1.5 to 4.8) × 10<sup>-6</sup> [KIR78]

#### 724

Compound: Carbon (amorphous) Synonym: carbon black Formula: C Molecular Formula: C Molecular Weight: 12.011 CAS RN: 7440-44-0 Properties: a quasi graphitic form of carbon of small particle size [MER06]

#### 725

**Compound:** Carbon dioxide

Synonym: carbonic acid anhydride

Formula: CO<sub>2</sub>

- **Molecular Formula:** CO<sub>2</sub>
- Molecular Weight: 44.010

CAS RN: 124-38-9

Properties: colorless, odorless, noncombustible gas; faint acid taste; colorless, odorless volatile liq; white, snow-like flakes or cubes in the solid form; critical temp 31.3°C; critical pressure 7.38 MPa; enthalpy of vaporization 25.21 kJ/mol; enthalpy of fusion 9.02 kJ/mol [HAW93] [MER06] [AIR87] [CRC10]
Solubility: mL CO<sub>2</sub>/100 mL H<sub>2</sub>O at 760 mm: 171 (0°C), 88 (20°C), 36 (60°C) [MER06]
Density, g/cm<sup>3</sup>: gas: 1.527 (air = 1) [MER06]
Melting Point, °C: -56.6 (5.2 atm) [MER06]

Boiling Point, °C: sublimes at -78.5 [MER06]]

#### 726

Compound: Carbon diselenide Formula: CSe<sub>2</sub> Molecular Formula: CSe<sub>2</sub> Molecular Weight: 169.931 CAS RN: 506-80-9 Properties: light sensitive, golden yellow, strongly refractive liq; odor of rotten radishes; turns brown to black on storage [MER06] Solubility: i H<sub>2</sub>O; miscible with CCl<sub>4</sub>, CS<sub>2</sub>, toluene [MER06] Density, g/cm<sup>3</sup>: 2.6824 [MER06] Melting Point, °C: -40 to -45 [KIR82] Density, Brit 4 90, 105, 105 (MER06]

Boiling Point, °C: 125–126 [MER06]

**Compound:** Carbon disulfide **Formula:** CS<sub>2</sub> **Molecular Formula:** CS<sub>2</sub> **Molecular Weight:** 76.143

# CAS RN: 75-15-0

Properties: clear, colorless or faintly yellow liq; refractive, mobile, flammable; decomposes on standing for a long time; burns with blue flame to CO<sub>2</sub> and SO<sub>2</sub>; enthalpy of fusion 4.39 kJ/ mol; enthalpy of vaporization at bp 26.74 kJ/ mol, 27.51 at 25°C; refractive index 1.6232; flash point -30°C; autoignition temp 100°C; used as a solvent, in the manufacture of viscose rayon, cellophane [HAW93] [CRC10] [MER06] [CIC73]
Solubility: g/100 g H<sub>2</sub>O: 0.204 (0°C), 0.179 (20°C), 0.111 (40°C) [LAN05]; s

alcohol, benzene, ether [HAW93] **Density, g/cm<sup>3</sup>:** liq: 1.2632 (20°C); vapor: 2.67 [MER06] **Melting Point, °C:** -111.6 [MER06] **Peiling Point, °C:** 46 [COT99]

Boiling Point, °C: 46 [COT88]

# 728

Compound: Carbon fluoride Formula: C<sub>4</sub>F Molecular Formula: C<sub>4</sub>F Molecular Weight: 67.042 CAS RN: 12774-81-1 Properties: solid, nonconductor formed on carbon anodes when molten KF–HF mixtures are oxidized at carbon electrodes to generate fluorine [HAW93] Melting Point, °C: decomposes at >60 [HAW93]

# 729

Compound: Carbon fullerenes Synonym: (5,6) fullerene Formula: C<sub>70</sub> Molecular Formula: C<sub>70</sub> Molecular Weight: 840.770 CAS RN: 115383-22-7 Properties: black powd; the C<sub>70</sub> fullerene has five cryst structures, depending on the temp; fcc, T>67°C, a=1.501 nm [DRE93] [STR93] [ALD94] Solubility: s benzene, toluene [LID94] Melting Point, °C: >280 [LID94]

#### 730

**Compound:** Carbon monoxide **Formula:** CO **Molecular Formula:** CO **Molecular Weight:** 28.010

# CAS RN: 630-08-0

Properties: highly poisonous, odorless, colorless, tasteless gas; very flammable, burns with bright blue flame; autoignition temp 609°C; enthalpy of fusion 0.83 kJ/mol; enthalpy of vaporization 6.04 kJ/mol; critical temp –140.21°C; critical pressure 34.529 atm; critical density 0.3010 g/cm<sup>3</sup>; triple point 205.0°C at 115.4 mm Hg; produced by partial oxidation of hydrocarbon gases; used as a reducing agent in metallurgy, e.g., for Ni [CIC73] [CRC10] [MER06] [AIR87]
Solubility: mL/100 mL H<sub>2</sub>O: 3.3 (0°C), 2.3 (20°C) [MER06]
Density, g/cm<sup>3</sup>: gas: 0.968 (air = 1.000) [MER06]
Melting Point, °C: -191.5 [MER06]

#### 731

Compound: Carbon oxyselenide Synonym: carbonyl selenide Formula: COSe Molecular Formula: COSe Molecular Weight: 106.970 CAS RN: 1603-84-5 Properties: colorless gas; light sensitive; unstable [KIR82] [CRC10] Solubility: decomposed by H<sub>2</sub>O [CRC10] Density, g/cm<sup>3</sup>: 4.694 g/L [LID94] Melting Point, °C: -124.4 [CRC10] Boiling Point, °C: -21.7 [CRC10]

#### 732

Compound: Carbon oxysulfide Synonym: carbonyl sulfide Formula: COS Molecular Formula: COS Molecular Weight: 60.076 CAS RN: 463-58-1 Properties: colorless gas with sulfide odor unless pure; flammable [HAW93] [COT88] [ALD94] Solubility: mL/100 mL H<sub>2</sub>O: 133.3 (0°C), 56.1 (20°C), 40.3 (30°C) [LAN05]; slowly decomposes in H<sub>2</sub>O [COT88]; s alcohol [HAW93] Density, g/cm<sup>3</sup>: 2.636 g/L [LID94] Melting Point, °C: -138.8 [HAW93] Boiling Point, °C: -50.2 [HAW93]

#### 733

**Compound:** Carbon soot **Formula:** Cx **Molecular Formula:** C **CAS RN:** 1333-86-4

# **Properties:** black powd; contains 2%–20% C<sub>60</sub>/C<sub>70</sub>; preparation: from resistive heating of graphite, 5%–10% yield; uses: precursor to the fullerenes [STR93] [ALD94]

# 734

Compound: Carbon suboxide
Synonym: 1,2-propadiene-1,3-dione
Formula: C<sub>3</sub>O<sub>2</sub>
Molecular Formula: C<sub>3</sub>O<sub>2</sub>
Molecular Weight: 68.032
CAS RN: 504-64-3
Properties: colorless, highly refractive liq or colorless gas, which burns with a blue sooty flame; odor like acrolein or mustard oil; structure: O=C=C=C=O [MER06]
Solubility: forms malonic acid with H<sub>2</sub>O [MER06]
Density, g/cm<sup>3</sup>: 2.985 g/L [LID94]
Melting Point, °C: -111.3 [MER06]
Boiling Point, °C: 6.8 [MER06]

#### 735

**Compound:** Carbon subsulfide **Formula:**  $C_3S_2$  **Molecular Formula:**  $C_3S_2$  **Molecular Weight:** 100.162 **CAS RN:** 627-34-9 **Properties:** red liq [CRC10] **Solubility:** reac H<sub>2</sub>O [CRC10] **Density, g/cm<sup>3</sup>:** 1.27 [CRC10] **Melting Point,** °C: -1 [CRC10] **Boiling Point:** decomposes at 90 [CRC10]

# 736

Compound: Carbon sulfide selenide Formula: CSSe Molecular Formula: CSSe Molecular Weight: 123.037 CAS RN: 5951-19-9 Properties: yellow, oily liq; unstable, sensitive to light [KIR82] [CRC10] Solubility: i H<sub>2</sub>O [CRC10] Density, g/cm<sup>3</sup>: 1.9874 [CRC10] Melting Point, °C: -85 [CRC10] Boiling Point, °C: 84.5 [CRC10]

# 737

**Compound:** Carbon sulfide telluride **Synonym:** carbon sulfotelluride **Formula:** CSTe **Molecular Formula:** CSTe **Molecular Weight:** 171.677 CAS RN: 10340-06-4
Properties: reddish yellow liq; odor of garlic; decomposed by light even at -50°C forming CS<sub>2</sub> and Te [KIR83]
Density, g/cm<sup>3</sup>: 2.9 [CRC10]
Melting Point, °C: -54 [CRC10]
Boiling Point, °C: decomposes [CRC10]

#### 738

Compound: Carbon tetrabromide
Synonym: tetrabromomethane
Formula: CBr<sub>4</sub>
Molecular Formula: CBr<sub>4</sub>
Molecular Weight: 331.627
CAS RN: 558-13-4
Properties: colorless cryst; slight decomposition if boiled [HAW93] [COT88]
Solubility: i H<sub>2</sub>O; s alcohol, ether, chloroform [HAW93]
Density, g/cm<sup>3</sup>: 3.42 [HAW93]
Melting Point, °C: 90.1 [HAW93]
Boiling Point, °C: 189.5 [HAW93]

#### 739

Compound: Carbon tetrachloride Synonym: tetrachloromethane Formula: CCl<sub>4</sub> Molecular Formula: CCl<sub>4</sub> Molecular Weight: 153.822 CAS RN: 56-23-5 Properties: colorless, clear, nonflammable, heavy liq; sweetish odor; refractive index 1.4607; vapor pressure 91.3 mm Hg (20°C); enthalpy of vaporization 29.82 kJ/mol; enthalpy of fusion 3.28 kJ/mol [CRC10] [MER06] Solubility: 1 mL dissolves in 2000 mL H<sub>2</sub>O [MER06]; miscible with alcohol, ether [HAW93] Density, g/cm<sup>3</sup>: 1.589 [MER06] Melting Point, °C: -23 [MER06] Boiling Point, °C: 76.8 [CRC10]

#### 740

Compound: Carbon tetrafluoride Synonyms: tetrafluoromethane, Freon 14 Formula: CF<sub>4</sub> Molecular Formula: CF<sub>4</sub> Molecular Weight: 88.003 CAS RN: 75-73-0 Properties: colorless, odorless gas; thermally stable; chemically very inert; critical temp -45.7°C; critical pressure 3.74 MPa; enthalpy of vaporization 11.98 kJ/mol; obtained by reaction of C or CO and F<sub>2</sub>; used as a gaseous insulator and in electronics production [HAW93] [MER06] [AIR87] Solubility: mL/100 mL in H₂O: 0.595 (10°C), 0.490 (20°C), 0.366 (40°C) [LAN05]
Density, g/cm<sup>3</sup>: solid (−195°C), 1.98; liq (−183°C), 1.89 [MER06]
Melting Point, °C: −183.6 [MER06]
Boiling Point, °C: −127.8 [MER06]

#### 741

Compound: Carbon tetraiodide
Synonym: tetraiodomethane
Formula: CI<sub>4</sub>
Molecular Formula: CI<sub>4</sub>
Molecular Weight: 519.629
CAS RN: 507-25-5
Properties: red cub cryst; odor of iodine; decomposes to iodine and tetraiodoethylene under influence of heat or light [MER06]
Solubility: sl s H<sub>2</sub>O with hydrolysis; s benzene, chloroform [MER06]
Density, g/cm<sup>3</sup>: 4.32 [MER06]
Melting Point, °C: 171 [MER06]
Boiling Point, °C: decomposes [COT88]
Reactions: can be sublimed at low pressure [COT88]

# 742

Compound: Carbonyl bromide
Synonym: bromophosgene
Formula: COBr<sub>2</sub>
Molecular Formula: CBr<sub>2</sub>O
Molecular Weight: 187.818
CAS RN: 593-95-3
Properties: heavy, colorless liq with a strong odor; fumes in air; decomposed by light and heat; used in making cryst-violet type coloring agents and as a poison gas [HAW93]
Solubility: hydrolyzes in H<sub>2</sub>O to form CO<sub>2</sub> and HBr [COT88]
Density, g/cm<sup>3</sup>: 2.5 (~15°C) [HAW93]
Melting Point, °C: 65 [COT88]

#### 743

**Compound:** Carbonyl chloride **Synonyms:** phosgene, carbon oxychloride **Formula:** COCl<sub>2</sub> **Molecular Formula:** CCl<sub>2</sub>O **Molecular Weight:** 98.910 **CAS RN:** 75-44-5 **Properties:** colorless to light yellow gas; hay-like

odor in small concentrations; enthalpy of fusion 5.74 kJ/mol; used in organic synsthesis for isocyanates, polyurethane, and polycarbonate resins [HAW93] [CRC10] Solubility: sl s and hydrolyzed in H<sub>2</sub>O; s benzene, toluene [HAW93]
Density, g/cm<sup>3</sup>: 4.34 g/L [LID94]
Melting Point, °C: -127.9 [CRC10]
Boiling Point, °C: 8.2 [HAW93]

# 744

Compound: Carbonyl fluoride Synonym: fluorophosgene Formula: COF<sub>2</sub> Molecular Formula: CF<sub>2</sub>O Molecular Weight: 66.007 CAS RN: 353-50-4 Properties: pungent, very hygr gas [MER06] Solubility: instantly hydrolyzed by H<sub>2</sub>O [MER06] Density, g/cm<sup>3</sup>: solid: (-190°C), 1.388; liq: (-114°C), 1.139 [MER06] Melting Point, °C: -114.0 [MER06] Boiling Point, °C: -83.1 [MER06]

#### 745

**Compound:** Ceric ammonium nitrate **Formula:**  $(NH_4)_2Ce(NO_3)_6$ **Molecular Formula:**  $CeH_8N_8O_{18}$ **Molecular Weight:** 548.223 **CAS RN:** 16774-21-3 **Properties:** red-orange cryst [CRC10] **Solubility:** v s H<sub>2</sub>O

#### 746

**Compound:** Ceric ammonium sulfate dihydrate **Formula:**  $(NH_4)_4Ce(SO_4)_4 \cdot 2H_2O$  **Molecular Formula:**  $CeH_{20}N_4O_{18}S_4$  **Molecular Weight:** 632.551 **CAS RN:** 10378-47-9 **Properties:** cryst powd [CRC10] **Melting Point,** °C: decomposes at 450 [CRC10]

#### 747

Compound: Ceric basic nitrate trihydrate Formula:  $Ce(OH)(NO_3)_3 \cdot 3H_2O$ Molecular Formula:  $CeH_7N_3O_{13}$ Molecular Weight: 397.183 Properties: long, red needle; prepartion: evaporating a solution of ceric hydroxide in nitric acid solution [KIR78] [CRC10] Solubility: s  $H_2O$  [CRC10]

# 748

**Compound:** Ceric fluoride **Synonym:** cerium(IV) fluoride Formula: CeF<sub>4</sub>
Molecular Formula: CeF<sub>4</sub>
Molecular Weight: 216.109
CAS RN: 10060-10-3
Properties: white powd; hygr; minute cryst; thermally stable below 550°C; monocl, a = 1.2587 nm, c = 0.8041 nm; preparation: reaction of F<sub>2</sub> with CeF<sub>3</sub>; uses: fluorinating agent [STR93] [MER06] [CRC10]
Solubility: i H<sub>2</sub>O, very slowly hydrolyzed by cold H<sub>2</sub>O [MER06]
Density, g/cm<sup>3</sup>: 4.77 [MER06]
Melting Point, °C: decomposes at 650 [STR93]

#### 749

Compound: Ceric hydroxide Synonym: cerium(IV) hydroxide Formula: Ce(OH)<sub>4</sub> Molecular Formula: CeH<sub>4</sub>O<sub>4</sub> Molecular Weight: 208.145 CAS RN: 12014-56-1 Properties: addition of NaOH or NH<sub>4</sub>OH to a solution of Ce<sup>++++</sup> results in a gelatinous precipitate of CeO<sub>2</sub> · xH<sub>2</sub>O (x = 0.5–2); yellowish white powd when dried; granular Ce(OH)<sub>4</sub> obtained by boiling insoluble Ce<sup>++++</sup> salt with NaOH [STR93] [KIR78] Solubility: i H<sub>2</sub>O, s conc acids [HAW93]

#### 750

**Compound:** Ceric oxide **Synonym:** cerianite **Formula:** CeO<sub>2</sub> **Molecular Formula:** CeO<sub>2</sub> **Molecular Weight:** 172.114 **CAS RN:** 1306-38-3

Properties: brownish white powd or cub cryst, but usually pale yellow; refractory material; a=0.54110 nm; used in ceramics, as an abrasive for polishing glass, as evaporated material of 99.9% purity in high index film for dielectric beam splitters, interference filters, and in multilayers as antireflection coating; can be prepared by calcining cerous oxalate or hydroxide [KIR78] [HAW93] [TAY85] [MER06] [CER91]

**Solubility:** i H<sub>2</sub>O; s H<sub>2</sub>SO<sub>4</sub>, HNO<sub>3</sub>; i dil acid [HAW93] **Density, g/cm<sup>3</sup>:** 7.65 [HAW93]

Melting Point, °C: 2400 [KNA91]

**Thermal Expansion Coefficient:** from 25°C to: 100°C (0.24), 200°C (0.54), 400°C (1.20), 600°C (1.92), 800°C (2.70), 1000°C (3.51), 1200°C (4.38) [TAY85]

# 751

Compound: Ceric oxide hydrate
Synonym: cerium dioxide hydrate
Formula: CeO₂ · xH₂O
Molecular Formula: CeO₂ (anhydrous)
Molecular Weight: 172.114 (anhydrous)
CAS RN: 12014-56-1
Properties: white powd; used to produce cerium salts, as an opacifier to impart a yellow color to glasses and enamels [HAW93]
Solubility: i H₂O; s conc mineral acids [HAW93]

#### 752

Compound: Ceric sulfate tetrahydrate Synonyms: sulfuric acid, cerium(IV) salt tetrahydrate Formula:  $Ce(SO_4)_2 \cdot 4H_2O$ Molecular Formula:  $CeH_8O_{12}S_2$ Molecular Weight: 404.304 CAS RN: 10294-42-5 Properties: yellow to orange powd or ortho-rhomb cryst; oxidizer [MER06] Solubility: s small quantity of  $H_2O$ , but decomposes in excess  $H_2O$  [MER06]; s dil  $H_2SO_4$  [HAW93] Density, g/cm<sup>3</sup>: 3.91 [HAW93] Melting Point, °C: decomposes above 350 [MER06] Reactions: minus  $4H_2O$  at  $180^\circ$ C- $200^\circ$ C [MER06]

#### 753

Compound: Ceric titanate Synonym: cerium(IV) titanate Formula: CeTiO<sub>4</sub> Molecular Formula: CeO<sub>4</sub>Ti Molecular Weight: 251.980 CAS RN: 52014-82-1 Properties: -325 mesh 10μm or less at 99.9% purity [CER91]

# 754

**Compound:** Ceric vanadate **Synonym:** cerium(IV) vanadate **Formula:** CeVO<sub>4</sub> **Molecular Formula:** CeO<sub>4</sub>V **Molecular Weight:** 255.055 **CAS RN:** 13597-19-8 **Properties:** -200 mesh with 99.9% purity [CER91]

#### 755

**Compound:** Ceric zirconate **Synonym:** cerium(IV) zirconate **Formula:** CeZrO<sub>4</sub> Molecular Formula: CeO<sub>4</sub>Zr Molecular Weight: 295.337 CAS RN: 53169-24-7 Properties: -325 mesh with 99.5% purity; pyrochlore type structure [TAY88a] [CER91] Thermal Expansion Coefficient: from 25°C to: 100°C (0.24), 200°C (0.57), 400°C (1.23), 600°C (1.92); 800°C (2.58); 1000°C (3.24); 1200°C (3.90) [TAY88a]

#### 756

Compound: Cerium Formula: Ce Molecular Formula: Ce Molecular Weight: 140.115 CAS RN: 7440-45-1

- Properties: gray metal; α-Ce, fcc; β-Ce, hex; γ-Ce, fcc; δ-Ce, bcc; for γ: heat capacity 26.96 J/(mol·K); compressibility 4.18 × 10<sup>-2</sup> GPa; Young's modulus 30 GPa; shear modulus 12 GPa; Poisson's ratio, 0.248; Vicker's hardness 235 MPa; yield strength 91.2 MPa; enthalpy of fusion 5.46 kJ/mol; enthalpy of sublimation 422.6 kJ/mol; electrical reistivity, 20°C, 73 µohm·cm; radius of atom 0.1824 nm; radius of ion 0.1034 nm for Ce<sup>+++</sup> [KIR82] [CRC10] [ALD94]
  Solubility: s dil mineral acids [KIR78]
- Density, g/cm<sup>3</sup>: hex 6.689, cub 6.773 [CRC10], [KIR78]
- Melting Point, °C: 798 [KIR78]
- Boiling Point, °C: 3433 [KIR82]
- Reactions: reacts vigorously with the halogens >200°C [KIR78]

**Thermal Conductivity, W/(m·K):** 11.3, 25°C [ALD94] **Thermal Expansion Coefficient:** 8.5×10<sup>6</sup>/°C [KIR78]

#### 757

Compound: Cerium carbide
Formula: CeC<sub>2</sub>
Molecular Formula: C<sub>2</sub>Ce
Molecular Weight: 164.137
CAS RN: 12012-32-7
Properties: red, hex; 6 mm pieces and smaller of 99.5% purity [CER91] [CRC10]
Solubility: decomposes in H<sub>2</sub>O; s acids [CRC10]
Density, g/cm<sup>3</sup>: 5.23 [CRC10]
Melting Point, °C: 2420 [KNA91]

# 758

**Compound:** Cerium carbide **Formula:** Ce<sub>2</sub>C<sub>3</sub> **Molecular Formula:** C<sub>3</sub>Ce<sub>2</sub> **Molecular Weight:** 316.264 **CAS RN:** 12115-63-8 Properties: yellow-brown cub cryst [CRC10] Density, g/cm<sup>3</sup>: 2.84 [CRC10] Melting Point, °C: 1505 [CRC10]

# 759

Compound: Cerium dihydride
Formula: CeH<sub>2</sub>
Molecular Formula: CeH<sub>2</sub>
Molecular Weight: 142.131
CAS RN: 13569-50-1
Properties: black pyrophoric solid; ignites spontaneously in air; can be prepared by reacting cerium and hydrogen at 345°C; used to store H<sub>2</sub> in the system CeMg<sub>2</sub> [KIR80] [KIR78]
Solubility: reacts with H<sub>2</sub>O at 0°C [KIR80]
Density, g/cm<sup>3</sup>: 5.45 [LID94]
Melting Point, °C: ignites [CRC10]

#### 760

Compound: Cerium hexaboride Formula: CeB<sub>6</sub> Molecular Formula: B<sub>6</sub>Ce Molecular Weight: 204.981 CAS RN: 12008-02-5 Properties: refractory material; blue cub; -325 mesh, 10μm or less at 99.9% purity [CRC10] [KIR78] [CER91] Solubility: i H<sub>2</sub>O, HC1 [CRC10] Density, g/cm<sup>3</sup>: 4.87 [LID94] Melting Point, °C: 2190 [CRC10]

#### 761

Compound: Cerium monosulfide Formula: CeS Molecular Formula: CeS Molecular Weight: 172.181 CAS RN: 12014-82-3 Properties: yellow cub; 3 mm pieces and smaller (fused) 99.9% [CER91] [LID94] Density, g/cm<sup>3</sup>: 5.9 [LID94] Melting Point, °C: 2445 [KNA91]

#### 762

Compound: Cerium nitride Formula: CeN Molecular Formula: CeN Molecular Weight: 154.122 CAS RN: 25764-08-3 Properties: -60 mesh, 99.9% pure; NaCl cryst system; a=0.501 nm [CIC73] [CER91] Density, g/cm<sup>3</sup>: 7.89 [LID94] Melting Point, °C: 2557 [KNA89]

**Compound:** Cerium oxysulfide **Formula:** Ce<sub>2</sub>O<sub>2</sub>S **Molecular Formula:** Ce<sub>2</sub>O<sub>2</sub>S **Molecular Weight:** 344.295 **CAS RN:** 12442-45-4 **Properties:** -200 mesh with 99.9% purity [CER91]

# 764

Compound: Cerium silicide Formula: CeSi<sub>2</sub> Molecular Formula: CeSi<sub>2</sub> Molecular Weight: 196.286 CAS RN: 12014-85-6 Properties: 6.35 mm and down pieces, 99.9% purity [CER91] [ALF93] Solubility: i H<sub>2</sub>O [CRC10] Density, g/cm<sup>3</sup>: 5.67 [CRC10] Melting Point, °C: 1620 [LID94]

# 765

Compound: Cerium stannate Formula:  $CeO_2 \cdot SnO_2$ Molecular Formula:  $CeO_4Sn$ Molecular Weight: 322.822 CAS RN: 53169-23-6 Properties: -325 mesh, 10µm average reacted product of 99.9% purity; pyrochlore type structure [CER91] [TAY88a] Thermal Expansion Coefficient: from 25°C to: 100°C (0.21), 200°C (0.48), 400°C (1.05), 600°C (1.62), 800°C (2.16), 1000°C (2.73), 1200°C (3.30) [TAY88a]

# 766

**Compound:** Cerium trihydride **Formula:** CeH<sub>3</sub> **Molecular Formula:** CeH<sub>3</sub> **Molecular Weight:** 143.139 **CAS RN:** 13864-02-3 **Properties:** dark, black, amorphous powd [CRC10] **Solubility:** decomposes in H<sub>2</sub>O [CRC10]

# 767

**Compound:** Cerous acetate hemitrihydrate **Synonym:** cerium(III) acetate hemitrihydrate **Formula:**  $Ce(CH_3COO)_3 \cdot 1-1/2H_2O$ **Molecular Formula:**  $C_6H_{12}CeO_{7.5}$ **Molecular Weight:** 344.272 CAS RN: 537-00-8 Properties: white powd [STR93] Solubility: g/100 mL H<sub>2</sub>O: 26.5 (15°C), 16.2 (75°C) [CRC10] Boiling Point, °C: decomposes [CRC10] Reactions: minus 1-1/2 H<sub>2</sub>O at 115°C [CRC10]

# 768

**Compound:** Cerous acetylacetonate hydrate **Synonyms:** 2,4-pentanedione, cerium(III) derivative **Formula:** Ce(CH<sub>3</sub>COCH=C(O)CH<sub>3</sub>)<sub>3</sub>  $\cdot$  xH<sub>2</sub>O **Molecular Formula:** C<sub>15</sub>H<sub>21</sub>CeO<sub>6</sub> (anhydrous) **Molecular Weight:** 437.443 (anhydrous) **CAS RN:** 15653-01-7 **Properties:** tan powd; hygr [STR93] [ALD94] **Melting Point, °C:** 131–132 [CRC10]

# 769

**Compound:** Cerous ammonium nitrate tetrahydrate **Formula:**  $(NH_4)_2Ce(NO_3)_5 \cdot 4H_2O$  **Molecular Formula:**  $CeH_8N_7O_{19}$  **Molecular Weight:** 558.279 **CAS RN:** 13083-04-0 **Properties:** col monocl cryst [CRC10] **Solubility:** v s H<sub>2</sub>O [CRC10] **Melting Point, °C:** 74 [CRC10]

# 770

**Compound:** Cerous ammonium sulfate tetrahydrate **Formula:**  $NH_4Ce(SO_4)_2 \cdot 4H_2O$ **Molecular Formula:**  $CeH_8NO_{12}S_2$ **Molecular Weight:** 422.341 **CAS RN:** 21995-38-0 (anhydrous compound) **Properties:** monocl cryst [CRC10] **Solubility:** s  $H_2O$ 

# 771

**Compound:** Cerous bromide **Synonym:** cerium(III) bromide **Formula:** CeBr<sub>3</sub> **Molecular Formula:** Br<sub>3</sub>Ce **Molecular Weight:** 379.827 **CAS RN:** 14457-87-5 **Properties:** orange powd; hygr [STR93] **Melting Point,** °C: 730 [KNA91] **Boiling Point,** °C: 1457 [KNA91]

# 772

**Compound:** Cerous bromide heptahydrate Formula:  $CeBr_3 \cdot 7H_2O$ Molecular Formula:  $Br_3CeH_{14}O_7$  Molecular Weight: 505.924 CAS RN: 14457-87-5 Properties: colorless, deliq needles; anhydrous CeBr<sub>3</sub> -20 mesh at 99.9% purity [MER06] [CER91] Solubility: s H<sub>2</sub>O, alcohol [MER06] Melting Point, °C: 732 [MER06]

# 773

Compound: Cerous carbonate
Synonym: cerium(III) carbonate
Formula: Ce<sub>2</sub>(CO<sub>3</sub>)<sub>3</sub>
Molecular Formula: C<sub>3</sub>Ce<sub>2</sub>O<sub>9</sub>
Molecular Weight: 460.258
CAS RN: 537-01-9
Properties: white powd; if a solution of the carbonate in water is boiling, the product can be Ce(OH)(CO<sub>3</sub>) [KIR78] [MER06]
Solubility: i H<sub>2</sub>O, s mineral acids [HAW93]
Reactions: decomposes at 500°C to CeO<sub>2</sub> with evolution of CO, CO<sub>2</sub> [KIR78]

#### 774

Compound: Cerous carbonate pentahydrate
Synonym: cerium(III) carbonate pentahydrate
Formula: Ce<sub>2</sub>(CO<sub>3</sub>)<sub>3</sub> · 5H<sub>2</sub>O
Molecular Formula: C<sub>3</sub>H<sub>10</sub>Ce<sub>2</sub>O<sub>14</sub>
Molecular Weight: 550.334
CAS RN: 72520-94-6
Properties: white cryst; pentahydrate can be obtained by adding an alkali bicarbonate solution to a solution of Ce<sup>+++</sup> [KIR78] [STR93] [MER06]

**Solubility:** i H<sub>2</sub>O, s dil acid [MER06]

#### 775

Compound: Cerous chloride Synonym: cerium(III) chloride Formula: CeCl<sub>3</sub> Molecular Formula: CeCl<sub>3</sub> Molecular Weight: 246.473 CAS RN: 7790-86-5 Properties: -20 mesh with 99.9% purity; white very fine powd; can be prepared by dissolving cerium carbonate in HCl [CER91] [KIR78] [STR93] [MER06] Solubility: s H<sub>2</sub>O, alcohol (exothermic) [MER06] Density, g/cm<sup>3</sup>: 3.97 [MER06] Melting Point, °C: 807 [KNA91] Boiling Point, °C: 1725 (estimated) [KNA91]

# 776

**Compound:** Cerous chloride heptahydrate **Synonym:** cerium(III) chloride heptahydrate

Formula:  $CeCl_3 \cdot 7H_2O$ Molecular Formula:  $CeCl_3H_{14}O_7$ Molecular Weight: 372.580 CAS RN: 18618-55-8 Properties: colorless to yellow, deliq, ortho-rhomb cryst; can be prepared by evaporating CeCl<sub>3</sub> solution or by saturating conc CeCl<sub>3</sub> solution with HCl [KIR78] [MER06] Solubility: v s H<sub>2</sub>O, alcohol [MER06] Density, g/cm<sup>3</sup>: 3.92 [ALD94] Reactions: minus H<sub>2</sub>O >90°C, becomes anhydrous by 230°C [MER06]

# 777

Compound: Cerous chloride hydrate Synonym: cerium(III) chloride hydrate Formula: CeCl<sub>3</sub>·xH<sub>2</sub>O Molecular Formula: CeCl<sub>3</sub> (anhydrous) Molecular Weight: 246.473 (anhydrous) CAS RN: 19423-76-8 Properties: -4 mesh with 99.9% purity; white or off-white cryst [STR93] [CER91]

#### 778

Compound: Cerous fluoride
Synonym: cerium(III) fluoride
Formula: CeF<sub>3</sub>
Molecular Formula: CeF<sub>3</sub>
Molecular Weight: 197.110
CAS RN: 7758-88-5
Properties: white powd or 99.9% pure melted pieces of 3–6 mm; hygr; hex, a=0.71306 nm, c=0.72805 nm; melted pieces used as evaporation material and sputtering target for multilayers and thin film capacitors [STR93] [GME76] [CER91]
Solubility: i H<sub>2</sub>O, but slowly hydrolyzed [MER06]
Density, g/cm<sup>3</sup>: 6.157 [MER06]
Melting Point, °C: 1437 [KNA91]
Boiling Point, °C: 2280 (estimated) [KNA91]

#### 779

Compound: Cerous hydroxide

Synonym: cerium(III) hydroxide

Formula: Ce(OH)<sub>3</sub>

**Molecular Formula:** CeH<sub>3</sub>O<sub>3</sub> **Molecular Weight:** 191.137

CAS RN: 15785-09-8

Properties: white, gelatinous precipitate; however, impurities impart yellow, brown, or pink coloration; used to produce cerium salts to color glass [HAW93]Solubility: i H<sub>2</sub>O; s acids [HAW93]

Compound: Cerous iodide Synonym: cerium(III) iodide Formula: CeI<sub>3</sub> Molecular Formula: CeI<sub>3</sub> Molecular Weight: 520.828 CAS RN: 7790-87-6 Properties: -20 mesh with 99.9% purity; bright yellow, ortho-rhomb; decomposes in moist air [MER06] [CER91] Solubility: s H<sub>2</sub>O [MER06] Melting Point, °C: 760 [KNA91] Boiling Point, °C: 1500 (estimated) [KNA91]

# 781

Compound: Cerous iodide nonahydrate Synonym: cerium(III) iodide nonahydrate Formula: CeI<sub>3</sub> · 9H<sub>2</sub>O Molecular Formula: CeH<sub>18</sub>I<sub>3</sub>O<sub>9</sub> Molecular Weight: 682.966 CAS RN: 7790-87-6 Properties: white or reddish white cryst [MER06] Solubility: v s H<sub>2</sub>O, solution decomposes with liberation of I<sub>2</sub>; s alcohol [MER06] Melting Point, °C: 752 [CRC10] Boiling Point, °C: 1400 [CRC10]

# 782

Compound: Cerous nitrate hexahydrate
Synonym: cerium(III) nitrate hexahydrate
Formula: Ce(NO<sub>3</sub>)<sub>3</sub> · 6H<sub>2</sub>O
Molecular Formula: CeH<sub>12</sub>N<sub>3</sub>O<sub>15</sub>
Molecular Weight: 434.221
CAS RN: 10294-41-4
Properties: white cryst; deliq; oxidizing agent; used as a catalyst in the hydrolysis of phosphoric acid esters [HAW93]
Solubility: s H<sub>2</sub>O, alcohol, acetone [HAW93]
Boiling Point, °C: decomposes at 200 [HAW93]
Reactions: minus 3H<sub>2</sub>O at 150°C [HAW93]

# 783

**Compound:** Cerous oxalate nonahydrate **Synonym:** cerium(III) oxalate nonahydrate **Formula:**  $Ce_2(C_2O_4)_3 \cdot 9H_2O$ **Molecular Formula:**  $C_6H_{18}Ce_2O_{21}$ **Molecular Weight:** 706.426 **CAS RN:** 13266-83-6 Properties: white or sl pink, tasteless powd; odorless; decomposes upon heating; used in medicine and in the extraction of cerium metals; can be prepared by precipitation with oxalic acid from sl acidic cerium solutions [KIR78] [HAW93] [MER06]
Solubility: i H<sub>2</sub>O; s H<sub>2</sub>SO<sub>4</sub>, HCl; i oxalic acid, alkali, ether, alcohol [KIR78]
Melting Point, °C: decomposes [STR93]

# 784

Compound: Cerous oxide
Synonym: cerium(III) oxide
Formula: Ce<sub>2</sub>O<sub>3</sub>
Molecular Formula: Ce<sub>2</sub>O<sub>3</sub>
Molecular Weight: 328.228
CAS RN: 1345-13-7
Properties: -100 mesh golden green with 99.9% purity; trig; can be prepared by heating powd carbon and CeO<sub>2</sub> at 1250°C in CO atm [KIR78] [CER91]
Solubility: i H<sub>2</sub>O; s H<sub>2</sub>SO<sub>4</sub>; i HCl [CRC10]
Density, g/cm<sup>3</sup>: 6.86 [CRC10]
Melting Point, °C: 2177 [KNA91]

# 785

**Compound:** Cerous perchlorate hexahydrate **Synonym:** cerium(III) perchlorate hexahydrate **Formula:**  $Ce(ClO_4)_3 \cdot 6H_2O$  **Molecular Formula:**  $CeCl_3H_{12}O_{18}$  **Molecular Weight:** 546.557 **CAS RN:** 14017-47-1 **Properties:** white cryst [STR93]

# 786

**Compound:** Cerous phosphate hydrate **Synonym:** monazite **Formula:**  $CePO_4 \cdot xH_2O$ **Molecular Formula:**  $CePO_4$  (anhydrous) **Molecular Weight:** 235.087 (anhydrous) **CAS RN:** 13454-71-2 **Properties:** off-white powd [STR93]

# 787

**Compound:** Cerous selenate **Synonym:** cerium(III) selenate **Formula:**  $Ce_2(SeO_4)_3$  **Molecular Formula:**  $Ce_2O_{12}Se_3$  **Molecular Weight:** 709.103 **CAS RN:** 13454-73-4 **Properties:** rhomb [CRC10] **Solubility:** g/100 g H<sub>2</sub>O: 39.5 (0°C), 35.2 (20°C), 2.1 (90°C) [LAN05] **Density, g/cm<sup>3</sup>:** 4.456 [CRC10]

# 788

Compound: Cerous sulfate Synonym: cerium(III) sulfate Formula: Ce<sub>2</sub>(SO<sub>4</sub>)<sub>3</sub> Molecular Formula: Ce<sub>2</sub>O<sub>12</sub>S<sub>3</sub> Molecular Weight: 568.421 CAS RN: 13454-94-9 Properties: colorless to green, monocl or rhomb; prepared by heating hydrated salt at 350°C-400°C or by reducing a solution of ceric sulfate with H<sub>2</sub>O<sub>2</sub> solution [KIR78] [CRC10] Solubility: 10.1 g/100 mL H<sub>2</sub>O (0°C), 0.25 g/100 mL H<sub>2</sub>O (100°C) [CRC10] Density, g/cm<sup>3</sup>: 3.912 [CRC10] Melting Point, °C: 630 [HAW93]; 920 [CRC10]

#### 789

Compound: Cerous sulfate octahydrate Synonym: cerium(III) sulfate octahydrate Formula:  $Ce_2(SO_4)_3 \cdot 8H_2O$ Molecular Formula:  $Ce_2H_{16}O_{20}S_3$ Molecular Weight: 712.543 CAS RN: 10450-59-6 Properties: white; ortho-rhomb, octahedral cryst [MER06] [STR93] Solubility: g/100 g H\_2O: 9.43 (20°C), 5.70 (40°C), 4.04 (60°C) [LAN05] Density, g/cm<sup>3</sup>: 2.87 [MER06] Melting Point, °C: 630 [ALD94] Reactions: minus 8H<sub>2</sub>O when 250°C is reached [MER06]

# 790

Compound: Cerous sulfide Synonym: cerium(III) sulfide Formula:  $Ce_2S_3$ Molecular Formula:  $Ce_2S_3$ Molecular Weight: 376.428 CAS RN: 12014-93-6 Properties: red cryst; dark brown powd or purple; -325 mesh 10 µm or less 99.9% purity [CER91] [CRC10] Solubility: i H<sub>2</sub>O [CRC10] Density, g/cm<sup>3</sup>: 5.02 [CRC10] Melting Point, °C: 2100 [CRC10]

# 791

**Compound:** Cerous telluride **Synonym:** cerium(III) telluride Formula: Ce<sub>2</sub>Te<sub>3</sub> Molecular Formula: Ce<sub>2</sub>Te<sub>3</sub> Molecular Weight: 663.030 CAS RN: 12014-97-0 Properties: -20 mesh 99.9% purity [CER91]

#### 792

Compound: Cerous tungstate Synonym: cerium(III) tungstate Formula:  $Ce_2(WO_4)_3$ Molecular Formula:  $Ce_2O_{12}W_3$ Molecular Weight: 1023.743 CAS RN: 13454-74-5 Properties: yellow tetr; -200 mesh at 99.9% purity; white, monocl powd, a=1.151 nm, b=1.172 nm, c=0.782 nm [KIR83] [STR93] [CRC10] Density, g/cm<sup>3</sup>: 6.77 [KIR83] Melting Point, °C: 1089 [KIR83]

#### 793

Compound: Cesium Formula: Cs Molecular Formula: Cs Molecular Weight: 132.90543 CAS RN: 7440-46-2 Properties: bcc; atomic radius 0.274 nm; silvery white, ductile metal; oxidizes rapidly in moist air, can ignite spontaneously; hardness 0.2 Mohs; electrical resistivity 19 (0°C), 36.6 (30°C)  $\mu$ ohm  $\cdot$  cm; specific heat (20°C) 0.217 J/( $g \cdot K$ ); enthalpy of fusion 2.087 kJ/mol; enthalpy of vaporization 68.85 kJ/ mol [KIR79] [HAW93] [MER06] [ALD94] Solubility: reacts with H<sub>2</sub>O to evolve H<sub>2</sub>; s liq NH<sub>3</sub> [MER06] **Density, g/cm<sup>3</sup>:** solid: (18°C) 1.892; liq: (40°C) 1.827 [KIR79] Melting Point, °C: 28.44 [LID94] Boiling Point, °C: 671 [LID94] Thermal Conductivity, W/(m·K): 35.9 [ALD94]; liq, at mp: 18.4; vapor at bp 0.0046 [KIR78]

# 794

**Compound:** Cesium acetate **Synonyms:** acetic acid, cesium salt **Formula:** CH<sub>3</sub>COOCs **Molecular Formula:** C<sub>2</sub>H<sub>3</sub>CsO<sub>2</sub> **Molecular Weight:** 191.950 **CAS RN:** 3396-11-0 **Properties:** lump; hygr [STR93] **Solubility:** 945.1 g/100 mL (-2.5°C), 1345.5 g/100 mL (88.5°C) [CRC10] **Melting Point, °C:** 194 [STR93]

# 795

**Compound:** Cesium acetylacetonate **Synonyms:** 2,4-pentanedione, cesium derivative **Formula:**  $C_s[CH_3COCH=C(O)CH_3]$  **Molecular Formula:**  $C_sH_7CsO_2$  **Molecular Weight:** 232.015 **CAS RN:** 25937-78-4 **Properties:** hygr [ALD94]

# 796

Compound: Cesium aluminum sulfate dodecahydrate
Synonym: cesium alum
Formula: CsAl(SO<sub>4</sub>)<sub>2</sub>·12H<sub>2</sub>O
Molecular Formula: AlCsH<sub>24</sub>O<sub>20</sub>S<sub>2</sub>
Molecular Weight: 568.198
CAS RN: 7784-17-0
Properties: colorless, cub cryst; used in mineral waters [HAW93] [CRC10]
Solubility: g anhydrous/100 g H<sub>2</sub>O: 18.8 (0°C), 0.40 (20°C), 22.7 (100°C) [LAN05]; i alcohol [HAW93]
Density, g/cm<sup>3</sup>: 2.0215 [HAW93]
Melting Point, °C: 117 [HAW93]

#### 797

Compound: Cesium amide Formula: CsNH<sub>2</sub> Molecular Formula: CsH<sub>2</sub>N Molecular Weight: 148.928 CAS RN: 22205-57-8 Properties: white needles; tetr [CRC10] [CIC73] Solubility: decomposed by H<sub>2</sub>O; v s liq NH<sub>3</sub> [CIC73] [CRC10] Density, g/cm<sup>3</sup>: 3.44 [CRC10] Melting Point, °C: 262 [CRC10]

#### 798

Compound: Cesium azide Formula: CsN<sub>3</sub> Molecular Formula: CsN<sub>3</sub> Molecular Weight: 174.925 CAS RN: 22750-57-8 Properties: colorless needles; hygr; tetr, a=0.672 nm, c=0.804 nm; Cs–N<sub>3</sub> bond length, 0.334 nm [CIC73] [CRC10] Solubility: 224.2 g/100 mL H<sub>2</sub>O (0°C) [CRC10] Density, g/cm<sup>3</sup>: ~3.5 [LID94] Melting Point, °C: 310 [CRC10]

#### 799

Compound: Cesium bromate Formula:  $CsBrO_3$ Molecular Formula:  $BrCsO_3$ Molecular Weight: 260.807 CAS RN: 13454-75-6 Properties: hex cryst [CRC10] Solubility: g/100 g soln, H<sub>2</sub>O: 3.66 (25°C); solid phase, CsBrO<sub>3</sub> [KRU93]; g/100 g H<sub>2</sub>O: 0.21 (0°C), 5.30 (35°C) [LAN05] Density, g/cm<sup>3</sup>: 4.10 [LAN05] Melting Point, °C: 420 [LAN05]

#### 800

Compound: Cesium bromide Formula: CsBr Molecular Formula: BrCs Molecular Weight: 212.809 CAS RN: 7787-69-1 Properties: white cryst; hygr; used in infrared spectroscopy, scintillation counters [HAW93] [STR93] Solubility: s alcohol; i acetone [MER06]; g/100 g H<sub>2</sub>O: 55.24 (25°C) [KRU93] Density, g/cm<sup>3</sup>: 4.44 [MER06] Melting Point, °C: 636 [MER06] Boiling Point, °C: ~1300 [MER06]

#### 801

**Compound:** Chlorogermane **Formula:**  $GeH_3Cl$ **Molecular Formula:**  $ClGe_5H_{12}$ **Molecular Weight:** 111.12 **CAS RN:** 13637-65-5 **Properties:** col liq [CRC10] **Solubility:** reac  $H_2O$  [CRC10] **Density, g/cm<sup>3</sup>:** 1.75 [CRC10] **Melting Point,** °C: -52 [CRC10] **Boiling Point,** °C: 28 [CRC10]

#### 802

Compound: Cesium bromoiodide Synonym: cesium dibromoiodide Formula: CsIBr<sub>2</sub> Molecular Formula: Br<sub>2</sub>CsI Molecular Weight: 419.617 CAS RN: 18278-82-5 Properties: rhomb; -8 mesh with 99.9% purity [CRC10] [CER91] Solubility: 4.61 g/100 mL (20°C) H<sub>2</sub>O [CRC10] Density, g/cm<sup>3</sup>: 4.25 [CRC10] Melting Point, °C: 248 [CRC10] Boiling Point, °C: decomposes at 330 [CRC10]

# 803

Compound: Cesium carbonate Formula:  $Cs_2CO_3$ Molecular Formula:  $CCs_2O_3$ Molecular Weight: 325.820 CAS RN: 534-17-8 Properties: -20 mesh with 99.996% and 99.9% purity; white powd; very deliq cryst; preparation: addition of  $CO_2$  to a solution of CsOH; uses: catalyst for ethylene oxide polymerization [KIR79] [STR93] [MER06] [CER91] Solubility: 260.5 g/100 mL H<sub>2</sub>O (15°C) [CRC10]; s alcohol, ether [MER06] Density, g/cm<sup>3</sup>: 4.24 [LID94] Melting Point, °C: decomposes at 610 [STR93]

#### 804

Compound: Cesium chlorate Formula:  $CsClO_3$ Molecular Formula:  $ClCsO_3$ Molecular Weight: 216.356 CAS RN: 13763-67-2 Properties: small cryst [CRC10] Solubility: g/100 g H<sub>2</sub>O: 2.46 (0°C), 7.6 (25°C), 79.0 (100°C) [KRU93] Density, g/cm<sup>3</sup>: 3.57 [CRC10]

# 805

Compound: Cesium chloride Formula: CsCl Molecular Formula: ClCs Molecular Weight: 168.358 CAS RN: 7647-17-8

Properties: -4 mesh with 99.999% and 99.9% purity; white, deliq, cub cryst; enthalpy of fusion 15.90kJ/ mol [CRC10] [MER06] [STR93] [CER91]

Solubility: v s H<sub>2</sub>O; s alcohol [MER06]; g/100 g solution H<sub>2</sub>O: 61.7 (0°C), 65.6 (25°C), 73.0 (100°C) [KRU93]; 11.382 ± 0.010 mol/(kg H<sub>2</sub>O) at 25°C [RAR85b]
Density, g/cm<sup>3</sup>: 3.988 [STR93]
Melting Point, °C: 646 [MER06]
Boiling Point, °C: 1303 [MER06]

# 806

**Compound:** Cesium chromate **Formula:** Cs<sub>2</sub>CrO<sub>4</sub> **Molecular Formula:** CrCs<sub>2</sub>O<sub>4</sub> **Molecular Weight:** 381.805 **CAS RN:** 56320-90-2 Properties: -20 mesh with 99.9% purity; yellow hex or ortho-rhomb; used in electronics [KIR78] [CER91]
Solubility: 71.4 g/100 mL H<sub>2</sub>O (15°C), 95.95 g/100 mL (30°C) [CRC10]
Density, g/cm<sup>3</sup>: 4.23 [KIR78]

# 807

Compound: Cesium cyanide Formula: CsCN Molecular Formula: CCsN Molecular Weight: 158.923 CAS RN: 21159-32-0 Properties: white cryst, has odor of HCN; very hygr [KIR78] Solubility: v s H<sub>2</sub>O [KIR78] Density, g/cm<sup>3</sup>: 2.93 [CRC10] Melting Point, °C: 350 [LID94]

#### 808

Compound: Cesium fluoride Formula: CsF Molecular Formula: CsF Molecular Weight: 151.903 CAS RN: 13400-13-0 Properties: -4 mesh of 99.9% purity; enthalpy of fusion 21.70 kJ/mol; hygr white powd; used in optics specialty glasses [HAW93] [STR93] [JAN85] [CER91] Solubility: 366.5 parts CsF dissolves in 100 parts H<sub>2</sub>O (18°C) [KIR79]; s methanol; i dioxane, pyridine [HAW93] Density, g/cm<sup>3</sup>: 4.115 [HAW93] Melting Point, °C: 703 [JAN71] Boiling Point, °C: 1251 [HAW93]

# 809

Compound: Cesium fluoroborate Formula:  $CsBF_4$ Molecular Formula:  $BCsF_4$ Molecular Weight: 219.710 CAS RN: 18909-69-8 Properties: white; ortho-rhomb below 140°C, a=0.7647 nm, b=0.9675 nm, c=0.5885 nm; cub above 140°C [KIR78] Solubility: 1.6 g/100 mL H<sub>2</sub>O (17°C), 30 g/100 mL H<sub>2</sub>O (100°C) [KIR78] Density, g/cm<sup>3</sup>: 3.20 [KIR78] Melting Point, °C: decomposes at 555 [KIR78]

### 810

**Compound:** Cesium formate **Formula:** CsCHO<sub>2</sub>

Molecular Formula: CHCsO<sub>2</sub> Molecular Weight: 177.923 CAS RN: 3495-36-1 Properties: white cryst [CRC10] Solubility: v s H<sub>2</sub>O [CRC10] Density, g/cm<sup>3</sup>: 1.017 [CRC10]

#### 811

**Compound:** Cesium hexafluorogermanate **Formula:**  $Cs_2GeF_6$  **Molecular Formula:**  $Cs_2F_6Ge$  **Molecular Weight:** 452.411 **CAS RN:** 16919-21-4 **Properties:** white, cryst solid [HAW93] **Solubility:** sl s cold H<sub>2</sub>O; v s hot H<sub>2</sub>O; sl s acids [HAW93] **Density, g/cm<sup>3</sup>:** 4.10 [HAW93] **Melting Point, °C:** ~675 [HAW93]

#### 812

**Compound:** Cesium hydride **Formula:** CsH **Molecular Formula:** CsH **Molecular Weight:** 133.913 **CAS RN:** 58724-12-2 **Properties:** white, cib cryst; flam [CRC10] **Solubility:** reac H<sub>2</sub>O **Density, g/cm<sup>3</sup>:** 3.42 [CRC10] **Melting Point, °C:** 528 [CRC10]

# 813

Compound: Cesium hydrogen carbonate Formula: CsHCO<sub>3</sub> Molecular Formula: CHCsO<sub>3</sub> Molecular Weight: 193.92 CAS RN: 29703-01-3 Properties: rhomb white powd [STR93] [CRC10] Solubility: 209.3 g/100 mL (15°C) [CRC10] Reactions: minus 1/2H<sub>2</sub>O at 175°C [CRC10]

#### 814

**Compound:** Cesium hydrogen fluoride **Formula:** CsHF<sub>2</sub> **Molecular Formula:** CsF<sub>2</sub>H **Molecular Weight:** 171.910 **CAS RN:** 12280-52-3 **Properties:** tetr cryst [CRC10] **Density, g/cm<sup>3</sup>:** 3.86 **Melting Point, °C:** 170 [CRC10]

# 815

**Compound:** Cesium hydrogen sulfate **Formula:** CsHSO<sub>4</sub>

Molecular Formula: CsHO<sub>4</sub>S Molecular Weight: 229.976 CAS RN: 7789-16-4 Properties: col rhomb prisms [CRC10] Solubility: s H<sub>2</sub>O Density, g/cm<sup>3</sup>: 3.352 [CRC10] Melting Point, °C: decomposes [CRC10]

#### 816

Compound: Cesium hydroxide
Formula: CsOH
Molecular Formula: CsHO
Molecular Weight: 149.912
CAS RN: 21351-79-1
Properties: white or yellowish; fused; very deliq cryst mass; readily absorbs atm CO<sub>2</sub>; strongest known base; preparation: by the electrolysis of Cs salts; uses: battery electrolyte, catalyst [KIR79] [MER06]
Solubility: s in about 0.25 parts H<sub>2</sub>O, with evolution of heat [MER06]; g/100 g soln, H<sub>2</sub>O: 75.18 (30°C) [KRU93]
Density, g/cm<sup>3</sup>: 3.68 [MER06]
Melting Point, °C: 272 [MER06]

#### 817

Compound: Cesium hydroxide monohydrate Formula: CsOH·H<sub>2</sub>O Molecular Formula: CsH<sub>3</sub>O<sub>2</sub> Molecular Weight: 167.928 CAS RN: 35103-79-8 Properties: -4 mesh with 99.9% purity, contains up to 10% Cs<sub>2</sub>CO<sub>3</sub>; cryst; contains 15%-20% H<sub>2</sub>O [STR93] [CER91] Density, g/cm<sup>3</sup>: 3.675 [STR93] Melting Point, °C: 272 [ALD94]

# 818

Compound: Cesium iodate Formula: CsIO<sub>3</sub> Molecular Formula: CsIO<sub>3</sub> Molecular Weight: 307.807 CAS RN: 13454-81-4 Properties: white, monocl; -4 mesh with 99.9% purity [CER91] [CRC10] Solubility: 2.6 g/100 mL (24°C) [CRC10] Density, g/cm<sup>3</sup>: 4.85 [CRC10]

#### 819

**Compound:** Cesium iodide **Formula:** CsI **Molecular Formula:** CsI

# Molecular Weight: 259.809 CAS RN: 7789-17-5 Properties: -20 mesh with 99.9% purity; white; deliq cryst or cryst powd; used as an optical material in infrared spectrophotometers and in scintillation counters [MER06] [STR93] [CER91] Solubility: s ethanol; sl s methanol; i acetone [MER06]; g/100 g soln, H<sub>2</sub>O: 30.6 (0°C), 46.5 (25°C), 70.2 (102.8°C); solid phase, CsI [KRU93] Density, g/cm<sup>3</sup>: 4.5 [MER06]

Melting Point, °C: 621 [MER06]

Boiling Point, °C: ~1280 [MER06]

#### 820

**Compound:** Cesium metaborate **Formula:** CsBO<sub>2</sub> **Molecular Formula:** BCsO<sub>2</sub> **Molecular Weight:** 175.715 **CAS RN:** 92141-86-1 **Properties:** cub cryst [CRC10] **Density, g/cm<sup>3</sup>:** ~3.7 [CRC10] **Melting Point, °C:** 732 [CRC10]

#### 821

**Compound:** Cesium metavanadate **Formula:** CsVO<sub>3</sub> **Molecular Formula:** CsO<sub>3</sub>V **Molecular Weight:** 231.845 **CAS RN:** 14644-55-4 **Properties:** -100 mesh with 99.9% purity [CER91]

# 822

Compound: Cesium molybdate Formula: Cs<sub>2</sub>MoO<sub>4</sub> Molecular Formula: Cs<sub>2</sub>MoO<sub>4</sub> Molecular Weight: 425.749 CAS RN: 13597-64-3 Properties: -200 mesh with 99.9% purity; white [KIR81] [CER91] Solubility: 67.07 g/100 g H<sub>2</sub>O (18°C) [KIR81] Melting Point, °C: 936 [KIR81]

# 823

Compound: Cesium niobate Formula: CsNbO<sub>3</sub> Molecular Formula: CsNbO<sub>3</sub> Molecular Weight: 273.809 CAS RN: 12053-66-6 Properties: -200 mesh with 99.9% purity [CER91]

#### 824

**Compound:** Cesium nitrate **Formula:** CsNO<sub>3</sub> **Molecular Formula:** CsNO<sub>3</sub> **Molecular Weight:** 194.910

CAS RN: 7789-18-6

Properties: -4 mesh with 99.9% purity; white, lustrous hex or cub prisms; preparation: from pollucite (cesium aluminum silicate); uses: preparation of other cesium salts [MER06] [CER91] [HAW93]

**Solubility:** s acetone [MER06]; g/100 g soln, H<sub>2</sub>O: 8.54 (0°C), 21.53 (25°C), 66.3 (100°C) [KRU93] **Density, g/cm<sup>3</sup>:** 3.64–3.68 [MER06]

Melting Point, °C: 414 [MER06]

Boiling Point, °C: decomposes at >414 [MER06]

#### 825

**Compound:** Cesium nitrite **Formula:** CsNO<sub>2</sub> **Molecular Formula:** CsNO<sub>2</sub> **Molecular Weight:** 178.911 **CAS RN:** 13454-83-6 **Properties:** yellow cryst [CRC10] **Solubility:** s H<sub>2</sub>O **Melting Point, °C:** 406

#### 826

**Compound:** Cesium orthovanadate **Formula:** Cs<sub>3</sub>VO<sub>4</sub> **Molecular Formula:** Cs<sub>3</sub>O<sub>4</sub>V **Molecular Weight:** 513.656 **CAS RN:** 34283-69-7 **Properties:** -100 mesh with 99.9% purity [CER91]

# 827

Compound: Cesium oxide Formula:  $Cs_2O$ Molecular Formula:  $Cs_2O$ Molecular Weight: 281.810 CAS RN: 20281-00-9 Properties: 6 mm pieces and smaller with 99% purity; yellow-brown powd; lemon yellow at  $-80^{\circ}C$ , reddish orange cryst at room temp, cherry red >180°C [KIR79] [HAW93] [STR93] [CER91] Solubility: v s H<sub>2</sub>O; s acids [HAW93] Density, g/cm<sup>3</sup>: 4.25 [STR93] Melting Point, °C: 490 [STR93]

#### 828

**Compound:** Cesium perchlorate **Formula:** CsClO<sub>4</sub> Molecular Formula: ClCsO<sub>4</sub> Molecular Weight: 232.356 CAS RN: 13454-84-7 Properties: -4 mesh with 99.9% purity; white cryst; hygr; oxidizing agent [HAW93] [STR93] [CER91] Solubility: g/100 g H<sub>2</sub>O: 0.8 (0°C), 2.0 (25°C), 30.0 (100°C) [KRU93] Density, g/cm<sup>3</sup>: 3.327 [STR93] Melting Point, °C: 250 [STR93] Reactions: decomposes to CsCl at 575°C [KIR79]

#### 829

**Compound:** Cesium periodate **Formula:**  $CsIO_4$  **Molecular Formula:**  $CsIO_4$  **Molecular Weight:** 323.807 **CAS RN:** 13478-04-1 **Properties:** white, rhomb prisms [CRC10] **Solubility:** g/100 g H<sub>2</sub>O: 2.2<sup>15</sup> **Density, g/cm<sup>3</sup>:** 4.26 [CRC10]

# 830

**Compound:** Cesium pyrovanadate **Formula:**  $Cs_4V_2O_7$  **Molecular Formula:**  $Cs_4O_7V_2$  **Molecular Weight:** 745.501 **CAS RN:** 55343-67-4 **Properties:** -100 mesh with 99.9% purity [CER91]

# 831

Compound: Cesium rubidium fullerene Formula: Cs<sub>2</sub>RbC<sub>60</sub> Molecular Formula: C<sub>60</sub>Cs<sub>2</sub>Rb Molecular Weight: 1071.939 CAS RN: 141326-12-7 Properties: fcc, lattice parameter 1.4493 nm; superconductor, T<sub>c</sub> 33 K [CEN92] [PRE93]

# 832

Compound: Cesium sulfate
Formula: Cs<sub>2</sub>SO<sub>4</sub>
Molecular Formula: Cs<sub>2</sub>O<sub>4</sub>S
Molecular Weight: 361.875
CAS RN: 10294-54-9
Properties: -20 mesh with 99.9% purity; white, hygr cryst; ortho-rhomb or hex prisms; enthalpy of fusion 35.70 kJ/mol [CRC10] [MER06] [STR93] [CER91]
Solubility: v s H<sub>2</sub>O; i alcohol, acetone, pyridine [MER06]; g/100g soln, H<sub>2</sub>O: 62.6 (0°C), 64.5 (25°C), 68.8 (100°C) [KRU93]
Density, g/cm<sup>3</sup>: 4.24 [MER06]
Melting Point, °C: 1005 [CRC10]

#### 833

Compound: Cesium sulfide Formula: Cs<sub>2</sub>S Molecular Formula: Cs<sub>2</sub>S Molecular Weight: 297.877 CAS RN: 12214-16-3 Properties: -100 mesh with 99.9% purity; tetrahydrate: white cryst, hygr [CRC10] [CER91] Solubility: tetrahydrate: v s H<sub>2</sub>O [CRC10]

# 834

Compound: Cesium superoxide
Formula: CsO<sub>2</sub>
Molecular Formula: CsO<sub>2</sub>
Molecular Weight: 164.904
CAS RN: 12018-61-0
Properties: bright yellow cryst; oxidizing agent; preparation: by reaction of Cs metal with O<sub>2</sub> at 330°C [KIR79]
Density, g/cm<sup>3</sup>: 3.77 [LID94]
Melting Point, °C: 432 [LID94]
Reactions: forms Cs<sub>2</sub>O<sub>2</sub> on heating at 280°C-360°C [KIR79]

# 835

Compound: Cesium tantalate Formula: CsTaO<sub>3</sub> Molecular Formula: CsO<sub>3</sub>Ta Molecular Weight: 361.851 CAS RN: 12158-56-4 Properties: -200 mesh with 99.9% purity reacted product [CER91]

#### 836

Compound: Cesium titanate Formula: Cs<sub>2</sub>TiO<sub>3</sub> Molecular Formula: Cs<sub>2</sub>O<sub>3</sub>Ti Molecular Weight: 361.676 CAS RN: 51222-65-2 Properties: reacted product, -200 mesh with 99.9% purity [CER91]

# 837

**Compound:** Cesium trifluoroacetate **Synonyms:** trifluoroacetic acid, cesium salt **Formula:** CF<sub>3</sub>COOCs **Molecular Formula:** C<sub>2</sub>CsF<sub>3</sub>O<sub>2</sub> **Molecular Weight:** 245.921 **CAS RN:** 21907-50-6

# Properties: hygr; uses: biochemical detection of DNA–DNA crosslinks and isolation of proteoglycans [ALD94] Melting Point, °C: 114–116 [ALD94]

# 838

Compound: Cesium trioxide Formula: Cs<sub>2</sub>O<sub>3</sub> Molecular Formula: Cs<sub>2</sub>O<sub>3</sub> Molecular Weight: 313.809 CAS RN: 12134-22-4 Properties: chocolate brown cryst [HAW93] Solubility: decomposed by H<sub>2</sub>O [HAW93] Density, g/cm<sup>3</sup>: 4.25 [HAW93] Melting Point, °C: 400 [HAW93]

#### 839

**Compound:** Cesium tungstate **Formula:** Cs<sub>2</sub>WO<sub>4</sub> **Molecular Formula:** Cs<sub>2</sub>O<sub>4</sub>W **Molecular Weight:** 513.649 **CAS RN:** 52350-17-1 **Properties:** -200 mesh with 99.9% purity [CER91]

#### 840

Compound: Cesium zirconate Formula: Cs<sub>2</sub>ZrO<sub>3</sub> Molecular Formula: Cs<sub>2</sub>O<sub>3</sub>Zr Molecular Weight: 405.033 CAS RN: 51222-66-3 Properties: reacted product, -200 mesh with 99.9% purity [CER91]

# 841

Compound: Chloric acid heptahydrate Formula:  $HClO_3 \cdot 7H_2O$ Molecular Formula:  $ClH_{15}O_{10}$ Molecular Weight: 210.566 CAS RN: 7790-93-4 Properties: can occur only in an aq solution; oxidizing agent; preparation: reaction between  $H_2SO_4$  and barium chlorate; used as a catalyst in the polymerization of acrylonitrile, as an oxidizing agent [MER06] [HAW93] Solubility: v s  $H_2O$  [CRC10] Density, g/cm<sup>3</sup>: 1.282 [CRC10] Melting Point, °C: <-20 [CRC10] Reactions: decomposes at 40°C [CRC10]

#### 842

Compound: Chlorine Formula: Cl<sub>2</sub> Molecular Formula: Cl<sub>2</sub> Molecular Weight: 70.906 (atomic weight 35.4527) CAS RN: 7782-50-5 Properties: greenish yellow diatomic gas; suffocating odor; oxidizing agent; critical temp 144.0°C; critical pressure 78.525 atm; critical density 573 g/L; critical volume 1.763 L/kg; viscosity of gas 14.0  $\mu$ Pa · s at 20°C; specific volume 0.34 m<sup>3</sup>/kg (21.1°C); enthalpy of vaporization 20.41 kJ/mol; enthalpy of fusion 6.40 kJ/ mol; strongly electronegative [HAW93] [AIR87] [MER06] [KIR78] [CRC10] **Solubility:** 0.64 g/100 g H<sub>2</sub>O [HAW93]; 0.062 mol/L H<sub>2</sub>O (25°C) [MER06] Density, g/cm<sup>3</sup>: 3.209 g/L (0°C) [KIR78] Melting Point, °C: -101.5 [CRC10] Boiling Point, °C: –34.05 [MER06] Thermal Conductivity, W/(m·K): 0.0089 at 25°C [ALD94]

#### 843

Compound: Chlorine dioxide Formula: ClO<sub>2</sub> Molecular Formula: ClO<sub>2</sub> Molecular Weight: 67.452 CAS RN: 10049-04-4 Properties: strongly oxidizing, yellow to reddish yellow gas at room temp; unstable in light; reacts violently with organic material; vapor pressure at mp is 1.3 kPa; enthalpy of vaporization at bp 30kJ/mol [MER06] [CRC10] **Solubility:**  $3.01 \text{ g/L H}_2\text{O}$  (25°C) at 34.5 mm Hg [MER06]; g/100 g H<sub>2</sub>O: 2.76 (0°C), 6.00 (10°C), 8.70 (15°C) [LAN05] Density, g/cm<sup>3</sup>: 1.62 (11°C); liq: 1.765 (-59°C) [KIR78] Melting Point, °C: –59 [KIR78] Boiling Point, °C: 11 [MER06]

#### 844

Compound: Chlorine fluoride Formula: ClF Molecular Formula: ClF Molecular Weight: 54.451 CAS RN: 7790-89-8 Properties: col gas [CRC10] Solubility: reacs  $H_2O$  [CRC10] Density, g/L: 2.226 [CRC10] Melting Point, °C: -155.6 [CRC10] Boiling Point, °C: -101.1 [CRC10]

Compound: Chlorine heptoxide Formula: Cl<sub>2</sub>O<sub>7</sub> Molecular Formula: Cl<sub>2</sub>O<sub>7</sub> Molecular Weight: 182.901 CAS RN: 10294-48-1 Properties: colorless, very volatile, oily liq; explodes violently upon concussion or when in contact with iodine or a flame; preparation: dehydration of HClO<sub>4</sub> with phosphorus pentoxide; uses: catalyst [KIR78] [MER06] Solubility: slowly hydrolyzed in H<sub>2</sub>O to form HClO<sub>4</sub> [MER06] Density, g/cm3: 1.86 [MER06] Melting Point, °C: -91.5 [MER06] Boiling Point, °C: 82 [MER06] Reactions: decomposes with evolution of Cl<sub>2</sub> and O2 at 0.2-10.7 kPa pressures and at temperatures from 100°C-120°C [KIR78]

# 846

Compound: Chlorine monofluoride Formula: ClF Molecular Formula: ClF Molecular Weight: 54.451 CAS RN: 7790-89-8 Properties: colorless gas; sl yellow when liq; enthalpy of vaporization 24 kJ/mol; specific conductivity 1.9×10<sup>-7</sup> ohm · cm; destroys glass

instantly, attacks quartz readily in presence of moisture; organic matter bursts into flame instantly on contact [MER06] [CRC10]
Solubility: violent reaction with H<sub>2</sub>O [MER06]
Density, g/cm<sup>3</sup>: gas: 2.389 g/L [LID94]; liq (-108°C), 1.67 [MER06]
Melting Point, °C: -155.6 [MER06]
Boiling Point, °C: -101.1 [CRC10]

# 847

**Compound:** Chlorine monoxide **Formula:** Cl<sub>2</sub>O **Molecular Formula:** Cl<sub>2</sub>O **Molecular Weight:** 80.905 **CAS RN:** 7791-21-1

Properties: yellowish brown gas; disagreeable penetrating odor; explodes on contact with organic matter; decomposes at a moderate rate at room temp; anhydride of hypochlorous acid; Henry's constant at 3.46°C is 14.23 kPa/(molarity); enthalpy of vaporization 25.9 kJ/mol; can be prepared by reacting Cl<sub>2</sub> with HgO; used as an intermediate in manufacture of calcium hypochlorite and in sterilization; reacts with a variety of organic compounds [MER06] [KIR78]

Solubility: 1 volume of water dissolves more than 100 volumes (0°C); saturation solubility is 143.6 g/100 g H<sub>2</sub>O (-9.4°C) [MER06] [KIR78]
Density, g/cm<sup>3</sup>: 3.813 g/L [LID94]
Melting Point, °C: -116 [COT88]
Boiling Point, °C: 2.2 [CRC10]
Reactions: forms HClO in water [MER06]

#### 848

Compound: Chlorine pentafluoride
Formula: ClF₅
Molecular Formula: ClF₅
Molecular Weight: 130.445
CAS RN: 13637-63-3
Properties: colorless gas; critical temp 142.6°C; enthalpy of vaporization 22.21 kJ/mol; specific conductivity 1.25×10<sup>-9</sup> ohm · cm [KIR78]
Density, g/cm<sup>3</sup>: 5.724 g/L [LID94]
Melting Point, °C: −103 [KIR78]
Boiling Point, °C: −13.1 [KIR78]

#### 849

Compound: Chlorine perchlorate Formula: ClOClO<sub>3</sub> Molecular Formula: Cl<sub>2</sub>O<sub>4</sub> Molecular Weight: 134.904 CAS RN: 27218-16-2 Properties: unstable yellow liq [CRC10] Density, g/cm<sup>3</sup>: 1.81 [CRC10] Melting Point, °C: -117 [CRC10] Boiling Point, °C: decomposes at ~45 [CRC10]

#### 850

Compound: Chlorine trifluoride Formula: ClF<sub>3</sub> Molecular Formula: ClF<sub>3</sub> Molecular Weight: 92.450 CAS RN: 7790-91-2 Properties: corrosive, colorless gas or pale yellow liq; somewhat sweet, suffocating odor; extremely reactive; critical temp 154.5°C; enthalpy of vaporization 27.53 kJ/mol; specific conductivity  $4.9 \times 10^{-9}$  ohm  $\cdot$  cm; prepared by reaction of F<sub>2</sub> and Cl<sub>2</sub>; used as a fluorinating agent for nuclear reactor fuels, rocket igniter, and propellant and pyrolysis inhibitor for fluoropolymers [KIR78] [MER06] [CRC10] Solubility: violently hydrolyzed by H<sub>2</sub>O [MER06] Density, g/cm<sup>3</sup>: 1.825 (at bp) [KIR78] Melting Point, °C: –76.34 [MER06] Boiling Point, °C: 11.75 [MER06]

Compound: Chlorohydridotris (triphenylphosphine) ruthenium(II) Formula:  $[(C_6H_5)_3P]_3Ru(Cl)H$ Molecular Formula:  $C_{54}H_{46}ClP_3Ru$ Molecular Weight: 924.403 CAS RN: 55102-19-7 Properties: sensitive to moisture; used as a highly active hydrogenation catalyst [ALD94] Melting Point, °C: decomposes at 130 [ALD94]

# 852

Compound: Chloropentafluoroethane Synonym: halocarbon-115 Formula: C<sub>2</sub>Cl<sub>2</sub>F<sub>5</sub> Molecular Formula: C<sub>2</sub>Cl<sub>2</sub>F<sub>5</sub> Molecular Weight: 189.919 CAS RN: 76-15-3 Properties: colorless, nonflammable gas with ethereal odor; critical temp 80.0°C; critical pressure 66.4 MPa; enthalpy of vaporization 23.59 kJ/mol; used in electronics [AIR87] Melting Point, °C: -106.0 [AIR87]

Boiling Point, °C: -39.1 [AIR87]

# 853

Compound: Chlorosilane Formula: SiH<sub>3</sub>Cl Molecular Formula: ClH<sub>3</sub>Si Molecular Weight: 66.563 CAS RN: 13465-78-6 Properties: colorless gas; enthalpy of vaporization 21 kJ/mol; entropy of vaporization 82.8 kJ/(mol·K) [CIC73] [CRC10] Density, g/cm<sup>3</sup>: 3.033 g/L [CRC10] Melting Point, °C: -118 [CIC73] Boiling Point, °C: -30.4 [CIC73]

# 854

Compound: Chlorosulfonic acid
Formula: ClSO<sub>3</sub>H
Molecular Formula: ClHO<sub>3</sub>S
Molecular Weight: 116.525
CAS RN: 7790-94-5
Properties: colorless to light yellow, fuming liq; pungent odor; used in synthetic detergents, pharmaceuticals, and pesticides [HAW93]
Solubility: decomposed by H<sub>2</sub>O to HCl and H<sub>2</sub>SO<sub>4</sub>, decomposed by alcohol and acids [HAW93]
Density, g/cm<sup>3</sup>: 1.76–1.77 [HAW93]
Melting Point, °C: -80 [HAW93]

#### 855

**Compound:** Chlorosyl trifluoride **Formula:** ClOF<sub>3</sub> **Molecular Formula:** ClF<sub>3</sub>O **Molecular Weight:** 108.447 **CAS RN:** 3708-80-6 **Properties:** col liq [CRC10] **Solubility:** reac H<sub>2</sub>O **Melting Point,** °C: -42 [CRC10] **Boiling Point,** °C: 27 [CRC10]

#### 856

**Compound:** Chloryl fluoride **Formula:** ClO<sub>2</sub>F **Molecular Formula:** ClFO<sub>2</sub> **Molecular Weight:** 86.450 **CAS RN:** 13637-83-7 **Properties:** col gas [CRC10] **Solubility:** reac H<sub>2</sub>O [CRC10] **Density, g/L:** 3.534 [CRC10] **Melting Point, °C:** -115 [CRC10] **Boiling Point, °C:** -6 [CRC10]

#### 857

**Compound:** Chloryl trifluoride **Formula:**  $ClO_2F_3$ **Molecular Formula:**  $ClF_3O_2$ **Molecular Weight:** 124.447 **CAS RN:** 38680-84-1 **Properties:** col gas [CRC10] **Solubility:** reac H<sub>2</sub>O [CRC10] **Density, g/L:** 5.087 [CRC10] **Melting Point,** °C: -81.2 [CRC10] **Boiling Point,** °C: -21.6 [CRC10]

#### 858

Compound: Chromium Formula: Cr Molecular Formula: Cr Molecular Weight: 51.9961 CAS RN: 7440-47-3 Properties: bluish white, refractory metal; bcc, a=0.2844-0.2848 nm; enthalpy of fusion 21.00 kJ/mol; enthalpy of vaporization (2680°C) 320.6 kJ/mol; specific heat 23.9 kJ/(mol·K); electrical resistivity (20°C) 0.129 µohm · m; elastic modulus 250 GPa [KIR78] [CRC10] Solubility: reacts with dil HCl, H<sub>2</sub>SO<sub>4</sub> [MER06] Density, g/cm<sup>3</sup>: 7.19 (20°C) [KIR78] Melting Point, °C: 1857 [COT88] Boiling Point, °C: 2680 [COT88]

# **Thermal Conductivity, W/(m·K):** 93.9 (25°C) [ALD94] **Thermal Expansion Coefficient:** linear

coefficient at 20°C is  $6.2 \times 10^{-6}$  [KIR78]

859

**Compound:** Chromic acid **Formula:**  $H_2CrO_4$  **Molecular Formula:**  $CrH_2O_4$  **Molecular Weight:** 118.010 **CAS RN:** 7738-94-5 **Properties:** aq soln only [CRC10] **Solubility:** s  $H_2O$  [CRC10]

#### 860

**Compound:** Chromium(III) acetate **Formula:**  $Cr(C_2H_3O_2)_3$  **Molecular Formula:**  $C_6H_9CrO_6$  **Molecular Weight:** 229.127 **CAS RN:** 1066-30-4 **Properties:** blue-green powd [CRC10] **Solubility:** sl H<sub>2</sub>O [CRC10]

#### 861

**Compound:** Chromium(III) acetylacetonate **Synonym:** chromium 2,4-pentanedionate **Formula:**  $Cr(CH_3COCHCOCH_3)_3$  **Molecular Formula:**  $C_{12}H_{21}CrO_6$  **Molecular Weight:** 349.320 **CAS RN:** 21679-31-2 **Properties:** red, monocl cryst [CRC10] **Solubility:** i H<sub>2</sub>O; s bz [CRC10] **Density, g/cm<sup>3</sup>:** 1.34 [CRC10] **Melting Point,** °C: 208 [CRC10] **Boiling Point,** °C: 345 [CRC10]

#### 862

Compound: Chromium antimonide Formula: CrSb Molecular Formula: CrSb Molecular Weight: 173.756 CAS RN: 12053-12-2 Properties: hex cryst; -100 mesh with 99% purity [CER91] Density, g/cm<sup>3</sup>: 7.11 [LID94] Melting Point, °C: 1110 [LID94]

### 863

**Compound:** Chromium arsenide **Formula:** Cr<sub>2</sub>As **Molecular Formula:** AsCr<sub>2</sub> Molecular Weight: 178.914 CAS RN: 12254-85-2 Properties: tetr cryst; -60 mesh with 99% purity [LID94] [CER91] Density, g/cm<sup>3</sup>: 7.04 [LID94]

#### 864

Compound: Chromium boride Formula: Cr<sub>2</sub>B Molecular Formula: BCr<sub>2</sub> Molecular Weight: 114.803 CAS RN: 12006-80-3 Properties: -325 mesh 10 μm or less with 99.5% purity; borides are generally used for wear-resistant films

#### 865

Compound: Chromium boride Formula:  $Cr_5B_3$ Molecular Formula:  $B_3Cr_5$ Molecular Weight: 292.414 CAS RN: 12007-38-4 Properties: tetr cryst; -325 mesh 10µm or less with 99.5% purity; borides are generally used to provide wear-resistant films and to produce semiconductor films [LID94] [CER91] Density, g/cm<sup>3</sup>: 6.1 [LID94] Melting Point, °C: 1900 [LID94]

and to produce semiconductor films [CER91]

#### 866

Compound: Chromium carbide Formula:  $Cr_3C_2$ Molecular Formula:  $C_2Cr_3$ Molecular Weight: 180.010 CAS RN: 12012-35-0 Properties: gray powd; ortho-rhomb cryst; microhardness 2700 kg/mm<sup>2</sup> Hg with 50 g load; used as a 99.5% pure sputtering target to produce wear-resistant films and semiconductor films; there are two other carbides:  $Cr_7C_3$ , 12075-40-0 and  $Cr_{23}C_6$ , 12105-81-6 [HAW93] [STR93] [CER91] Density, g/cm<sup>3</sup>: 6.68 [STR93] Melting Point, °C: 1890 [STR93] Boiling Point, °C: 3800 [STR93] Thermal Expansion Coefficient:  $10.3 \times 10^{-6}$ /K [KIR78]

#### 867

**Compound:** Chromium carbonyl **Synonym:** chromium hexacarbonyl **Formula:** Cr(CO)<sub>6</sub> **Molecular Formula:** C<sub>6</sub>CrO<sub>6</sub>

#### Molecular Weight: 220.058 CAS RN: 13007-92-6

Properties: white cryst; ortho-rhomb; stable in air; preparation: reaction of Cr salt and CO gas in presence of Grignard reagent; uses: catalyst, gasoline additive [MER06] [KIR78] [DOU83]Solubility: i H<sub>2</sub>O, ether, ethanol,

benzene; sl s CCl<sub>4</sub> [KIR78]

Density, g/cm<sup>3</sup>: 1.77 [KIR78]

Melting Point, °C: 154–155 [STR93]

Boiling Point, °C: decomposes at 130 [MER06]

**Reactions:** sinters at 90°C, explodes at 210°C [MER06]

# 868

**Compound:** Chromium diboride **Formula:** CrB<sub>2</sub> **Molecular Formula:** B<sub>2</sub>Cr **Molecular Weight:** 73.618

CAS RN: 12007-16-8

Properties: -150, +325 mesh with 99.5% purity; refractory material; high melting point, very hard, very high corrosion resistance; used as metallurgical additive and as a sputtering target to produce films, which can be wear-resistant and semiconducting [KIR78] [HAW93] [CER91]
Density, g/cm<sup>3</sup>: 5.15 [HAW93]

Melting Point, °C: 1850 [HAW93]; 2130 [KIR78]

#### 869

Compound: Chromium disilicide
Formula: CrSi<sub>2</sub>
Molecular Formula: CrSi<sub>2</sub>
Molecular Weight: 108.167
CAS RN: 12018-09-6
Properties: gray powd; used as 99.99% and 99.5% pure sputtering targets to fabricate wear-resistant interconnections and gate electrodes in IC devices [STR93] [CER91]
Density, g/cm<sup>3</sup>: 4.7 [STR93]
Melting Point, °C: 1490 [STR93]

#### 870

Compound: Chromium monoboride Formula: CrB Molecular Formula: BCr Molecular Weight: 62.807 CAS RN: 12006-79-0 Properties: silvery refractory material; powd; used as a sputtering target with 99.9% purity to produce wear-resistant films and semiconductor

films [STR93] [CRC10] [KIR78] [CER91]

Solubility: i H<sub>2</sub>O [CRC10]

**Density, g/cm<sup>3</sup>:** 6.17 [STR93] **Melting Point, °C:** 2060 [KIR78]

# 871

Compound: Chromium nitride Formula:  $Cr_2N$ Molecular Formula:  $Cr_2N$ Molecular Weight: 117.999 CAS RN: 12053-27-9 Properties: -325 mesh 15 µm or less with 99% purity; hex, a = 0.274 nm, c = 0.445 nm [CER91] [CIC73] Density, g/cm<sup>3</sup>: 6.8 [LID94]

#### 872

Compound: Chromium nitride
Formula: CrN
Molecular Formula: CrN
Molecular Weight: 66.003
CAS RN: 24094-93-7
Properties: gray; fcc, a=0.4150 nm; electrical resistivity 640 µohm · cm; microhardness 1090; not superconductive; can be prepared by reacting NH<sub>3</sub> with chromium halide [KIR81]
Density, g/cm<sup>3</sup>: 6.14 [KIR81]
Melting Point, °C: decomposes at 1282 [COT88]
Thermal Conductivity, W/(m·K): 11.7 [KIR81]

### 873

**Compound:** Chromium(II,III) oxide **Synonym:** Trichromium tetroxide **Formula:** Cr<sub>3</sub>O<sub>4</sub> **Molecular Formula:** Cr<sub>3</sub>O<sub>4</sub> **Molecular Weight:** 219.986 **CAS RN:** 12018-34-7 **Properties:** cub cryst [CRC10] **Density, g/cm<sup>3</sup>:** 6.1 [CRC10]

#### 874

Compound: Chromium phosphide Formula: CrP Molecular Formula: CrP Molecular Weight: 82.970 CAS RN: 26342-61-0 Properties: grayish-black cryst; -100 mesh with 99.5% purity [CER91] [CRC10] Solubility: i H<sub>2</sub>O [CRC10] Density, g/cm<sup>3</sup>: 5.7 [CRC10]

#### 875

**Compound:** Chromium selenide **Formula:** CrSe

Molecular Formula: CrSe Molecular Weight: 130.956 CAS RN: 12053-13-3 Properties: -325 mesh 10μm or less with 99.5% purity [CER91] Density, g/cm<sup>3</sup>: 6.1 [LID94]

#### 876

**Compound:** Chromium silicide **Formula:** Cr<sub>3</sub>Si **Molecular Formula:** Cr<sub>3</sub>Si **Molecular Weight:** 184.074 **CAS RN:** 12018-36-9

Properties: cub cryst; -150, +325 mesh; in the form of 99.99% and 99.5% pure material, used as a sputtering target to produce resistant semiconductor films and to fabricate interconnections and gate electrodes in IC devices [CER91] [LID94]

# Density, g/cm<sup>3</sup>: 6.4 [LID94]

**Thermal Expansion Coefficient:** (volume): 100°C (0.191), 200°C (0.468), 400°C (1.077), 800°C (2.516), 1000°C (3.368) [CLA66]

### 877

Compound: Chromium(II) acetate monohydrate
Synonym: chromous acetate monohydrate
Formula: Cr(CH<sub>3</sub>COO)<sub>2</sub>·H<sub>2</sub>O
Molecular Formula: C<sub>4</sub>H<sub>8</sub>CrO<sub>5</sub>
Molecular Weight: 188.101
CAS RN: 628-52-4
Properties: deep red powd or monocl cryst; easily oxidized, especially when moist, to chromic acetate; also listed as the dimer, CAS RN 14976-80-8; uses: preparation of other Cr salts, to

absorb O<sub>2</sub> in gas analyses [MER06] [ALD94]

**Solubility:** sl s cold H<sub>2</sub>O, readily s hot H<sub>2</sub>O [MER06]

Density, g/cm<sup>3</sup>: 1.79 [MER06]

**Reactions:** minus  $H_2O$  when dried over  $P_2O_5$  at 100°C [MER06]

#### 878

Compound: Chromium(II) bromide Synonym: chromous bromide Formula: CrBr<sub>2</sub> Molecular Formula: Br<sub>2</sub>Cr Molecular Weight: 211.804 CAS RN: 10049-25-9 Properties: white; monocl cryst, becomes yellow when heated; stable in dry air, oxidizes in moist air [MER06] **Solubility:** s H<sub>2</sub>O, exothermal, blue soln [MER06] **Density, g/cm<sup>3</sup>:** 4.236 [MER06] **Melting Point, °C:** 842 [MER06]

#### 879

**Compound:** Chromium(II) chloride Synonym: chromous chloride Formula: CrCl<sub>2</sub> Molecular Formula: Cl<sub>2</sub>Cr Molecular Weight: 122.901 CAS RN: 10049-05-5 Properties: -80 mesh with 99.9% purity; white cryst; tetr; has strongly reducing aq solution; enthalpy of vaporization 197 kJ/mol; enthalpy of fusion 32.20 kJ/mol; uses: to manufacture Cr metal and Cr compounds, as a polymerization catalyst [ALF95] [CRC10] [KIR78] [CER91] **Solubility:** s H<sub>2</sub>O, blue soln; absorbs O<sub>2</sub> [KIR78] Density, g/cm<sup>3</sup>: 2.93 [KIR78] Melting Point, °C: 815 [KIR78] Boiling Point, °C: 1300 [CRC10]

# 880

Compound: Chromium(II) chloride tetrahydrate
Synonym: chromous chloride tetrahydrate
Formula: Cr(H<sub>2</sub>O)<sub>4</sub>Cl<sub>2</sub>·4H<sub>2</sub>O
Molecular Formula: Cl<sub>2</sub>CrH<sub>16</sub>O<sub>8</sub>
Molecular Weight: 267.023
CAS RN: 13931-94-7
Properties: bright blue, hygr cryst; transforms to isomeric green modification at >38°C [MER06]
Solubility: s H<sub>2</sub>O, oxidized on standing with H<sub>2</sub>(g) liberated [MER06]
Reactions: minus H<sub>2</sub>O to form trihydrate at 51°C [MER06]

#### 881

Compound: Chromium(II) fluoride Synonym: chromous fluoride Formula: CrF<sub>2</sub> Molecular Formula: CrF<sub>2</sub> Molecular Weight: 89.993 CAS RN: 10049-10-2 Properties: hygr, bluish-green, monocl cryst, with iridescent sheen [MER06] [ALD94] Solubility: sl s H<sub>2</sub>O, s boiling HCl [MER06] Density, g/cm<sup>3</sup>: 3.79 [MER06] Melting Point, °C: 894 [MER06] Boiling Point, °C: >1300 [CRC10] Reactions: transforms to Cr<sub>2</sub>O<sub>3</sub> when heated in air [MER06]

**Compound:** Chromium(II) formate monohydrate **Synonym:** chromous formate monohydrate **Formula:**  $Cr(HOOC)_2 \cdot H_2O$  **Molecular Formula:**  $C_2H_4CrO_5$  **Molecular Weight:** 160.047 **CAS RN:** 4493-37-2 **Properties:** red needles; preparation: reaction between

CrCl<sub>2</sub> and sodium formate; used in chromium electroplating solutions and as a catalyst for organic reactions [MER06] [HAW93]
 Solubility: s H<sub>2</sub>O to give blue soln [MER06]

#### 883

Compound: Chromium(II) oxalate monohydrate Synonym: chromous oxalate monohydrate Formula:  $CrC_2O_4 \cdot H_2O$ Molecular Formula:  $C_2H_2CrO_5$ Molecular Weight: 158.031 CAS RN: 814-90-4 Properties: yellow to yellowish green, cryst powd; not appreciably oxidized by moist air [MER06] Solubility: i cold H<sub>2</sub>O, s hot H<sub>2</sub>O [MER06] Density, g/cm<sup>3</sup>: 2.468 [MER06]

# 884

Compound: Chromium(II) sulfate pentahydrate Synonym: chromous sulfate pentahydrate Formula:  $CrSO_4 \cdot 5H_2O$ Molecular Formula:  $CrH_{10}O_9S$ Molecular Weight: 238.136 CAS RN: 13825-86-0 Properties: blue cryst; stable in air if dry; water solutions rapidly oxidized by air [MER06] Solubility: s  $H_2O_1$ ; s dil  $H_2SO_4$ , decomposed by conc  $H_2SO_4$  [MER06]

# 885

Compound: Chromium(III) acetate hexahydrate Synonym: chromic acetate hexahydrate Formula:  $Cr(CH_3COO)_3 \cdot 6H_2O$ Molecular Formula:  $C_6H_{21}CrO_{12}$ Molecular Weight: 337.222 CAS RN: 1066-30-4 Properties: bluish violet needles; solution in water is blue under incident light, red under transmitted light [MER06] Solubility: readily s  $H_2O$  with partial hydrolysis [MER06]

#### 886

Compound: Chromium(III) acetate hydroxide Synonym: basic chromic acetate Formula: Cr(CH<sub>3</sub>COO)<sub>2</sub>(OH) Molecular Formula: C<sub>4</sub>H<sub>7</sub>CrO<sub>5</sub> Molecular Weight: 187.093 CAS RN: 39430-51-8 Properties: violet powd; commercial material used as a mordant in dyeing, in tanning, and as an oxidation catalyst; formula also written as Cr<sub>3</sub>(CH<sub>3</sub>COO)<sub>7</sub>(OH)<sub>2</sub> [ALD94] [MER06] Solubility: readily s H<sub>2</sub>O [MER06]

#### 887

Compound: Chromium(III) acetate monohydrate Synonym: chromic acetate monohydrate Formula:  $Cr(CH_3COO)_3 \cdot H_2O$ Molecular Formula:  $C_6H_{11}CrO_7$ Molecular Weight: 247.145 CAS RN: 1066-30-4 Properties: greenish gray powd or violet plates; used as a mordant for textiles and to harden emulsions [HAW93] [MER06] Solubility: sl s  $H_2O$ ; i alcohol [MER06]

# 888

Compound: Chromium(III) acetylacetonate Synonyms: 2,4-pentanedione, chromium(III) derivative Formula:  $Cr(CH_3COCH=C(O)CH_3)_3$ Molecular Formula:  $C_{15}H_{21}CrO_6$ Molecular Weight: 349.324 CAS RN: 21679-31-2 Properties: reddish violet cryst; monocl [KIR78] Solubility: i H<sub>2</sub>O; s benzene [KIR78] Density, g/cm<sup>3</sup>: 1.34 [KIR78] Melting Point, °C: 208 [KIR78] Boiling Point, °C: 345 [KIR78]

#### 889

Compound: Chromium(III) basic sulfate Synonym: chromic basic sulfate Formula: Cr(OH)SO<sub>4</sub> Molecular Formula: CrHO<sub>5</sub>S Molecular Weight: 165.067 CAS RN: 12336-95-7 Properties: prepared by reduction of sodium chromate in H<sub>2</sub>SO<sub>4</sub> solution; used in tanning leather [KIR79]

#### 890

**Compound:** Chromium(III) bromide **Synonym:** chromic bromide Formula: CrBr<sub>3</sub>
Molecular Formula: Br<sub>3</sub>Cr
Molecular Weight: 291.708
CAS RN: 10031-25-1
Properties: black cryst; used as a catalyst for polymerization of olefins [HAW93]
Solubility: i cold H<sub>2</sub>O, s hot H<sub>2</sub>O [HAW93]
Density, g/cm<sup>3</sup>: 4.25 [CRC10]
Melting Point, °C: 1130 [LID94]

#### 891

Compound: Chromium(III) bromide hexahydrate Synonym: chromic bromide hexahydrate Formula:  $CrBr_3 \cdot 6H_2O$ Molecular Formula:  $Br_3CrH_{12}O_6$ Molecular Weight: 399.799 CAS RN: 13478-06-3 Properties: two isomeric forms: dibromotetraaquochromium bromide dihydrate: green, deliq cryst; hexaaquochromium tribromide: violet, deliq cryst [MER06] Solubility: s  $H_2O$ ; i alcohol, ether [MER06] Density, g/cm<sup>3</sup>: 5.4 [ALF95]

#### 892

**Compound:** Chromium(III) carbonate hydrate **Synonym:** chromic carbonate hydrate **Formula:**  $Cr_2(CO_3)_3 \cdot xH_2O$  **Molecular Formula:**  $C_3Cr_2O_9$  (anhydrous) **Molecular Weight:** 284.019 (anhydrous) **CAS RN:** 29689-14-3 **Properties:** bluish green, amorphous powd [MER06] **Solubility:** i H<sub>2</sub>O; s mineral acids [MER06]

# 893

Compound: Chromium(III) chloride Synonym: chromic chloride Formula: CrCl<sub>3</sub> Molecular Formula: Cl<sub>3</sub>Cr Molecular Weight: 158.354 CAS RN: 10025-73-7 Properties: bright purple plates; hex [KIR78] Solubility: s H<sub>2</sub>O extremely slowly [MER06] Density, g/cm<sup>3</sup>: 2.87 [KIR78] Melting Point, °C: 1152 [MER06] Boiling Point, °C: dissociates above 1300 [MER06]

# 894

**Compound:** Chromium(III) chloride hexahydrate **Synonym:** chromic chloride hexahydrate

Formula: CrCl<sub>3</sub>·6H<sub>2</sub>O
Molecular Formula: Cl<sub>3</sub>CrH<sub>12</sub>O<sub>6</sub>
Molecular Weight: 266.445
CAS RN: 10060-12-5
Properties: bright green cryst: tricl or monocl; violet cryst: rhomb; several known isomers [KIR78] [MER06]
Solubility: s H<sub>2</sub>O, gives green or violet soln [KIR78]
Density, g/cm<sup>3</sup>: 1.835 [KIR78]
Melting Point, °C: tricl/monocl: 95; rhomb: 90 [KIR78]

#### 895

Compound: Chromium(III) fluoride Synonym: chromic fluoride Formula: CrF<sub>3</sub> Molecular Formula: CrF<sub>3</sub> Molecular Weight: 108.991 CAS RN: 7788-97-8 Properties: dark green needles [MER06] Solubility: i H<sub>2</sub>O; s HCl, violet color [MER06] Density, g/cm<sup>3</sup>: 3.8 [HAW93] Melting Point, °C: 1400 [LID94]

#### 896

**Compound:** Chromium(III) fluoride tetrahydrate **Synonym:** chromic fluoride tetrahydrate **Formula:**  $CrF_3 \cdot 4H_2O$ **Molecular Formula:**  $CrF_3H_8O_4$ **Molecular Weight:** 181.052 **CAS RN:** 123333-98-2 **Properties:** fine, green cryst [HAW93] **Solubility:** i H<sub>2</sub>O, alcohol; s HC1 [HAW93]

# 897

**Compound:** Chromium(III) fluoride trihydrate **Synonym:** chromic fluoride trihydrate **Formula:**  $CrF_3 \cdot 3H_2O$  **Molecular Formula:**  $CrF_3H_6O_3$  **Molecular Weight:** 163.037 **CAS RN:** 16671-27-5 **Properties:** green cryst from solutions of Cr or  $Cr(OH)_3$  in hydrofluoric acid [MER06] **Solubility:** sl s  $H_2O$  [MER06] **Density, g/cm<sup>3</sup>:** 2.2 [LID94]

#### 898

**Compound:** Chromium(III) hydroxide trihydrate **Synonym:** chromic hydroxide trihydrate **Formula:**  $Cr(OH)_3 \cdot 3H_2O$ **Molecular Formula:**  $CrH_9O_6$ **Molecular Weight:** 157.063

# CAS RN: 1308-14-1 Properties: bluish green powd [MER06] Solubility: i H<sub>2</sub>O; s dil mineral acids when freshly prepared [MER06]

#### 899

Compound: Chromium(III) iodide Synonym: chromic iodide Formula: CrI<sub>3</sub> Molecular Formula: CrI<sub>3</sub> Molecular Weight: 432.709 CAS RN: 13569-75-0 Properties: black cryst; -60 mesh with 99.5% purity [CER91] [CRC10] Density, g/cm<sup>3</sup>: 5.32 [LID94] Melting Point, °C: decomposes at 500 [LID94] Reactions: minus I<sub>2</sub> when heated in vacuum at 350°C [CRC10]

#### 900

Compound: Chromium(III) nitrate Synonym: chromic nitrate Formula:  $Cr(NO_3)_3$ Molecular Formula:  $CrN_3O_9$ Molecular Weight: 238.011 CAS RN: 13548-38-4 Properties: pale green, extremely deliq powd [MER06] Solubility: g/100 g soln, H<sub>2</sub>O: 39.21 (5°C), 44.0 ± 0.8 (25°C); solid phase,  $Cr(NO_3)_3 \cdot 9H_2O$  [KRU93] Melting Point, °C: decomposes at >60 [MER06]

#### 901

Compound: Chromium(III) nitrate nonahydrate
Synonym: chromic nitrate nonahydrate
Formula: Cr(NO<sub>3</sub>)<sub>3</sub> · 9H<sub>2</sub>O
Molecular Formula: CrH<sub>18</sub>N<sub>3</sub>O<sub>18</sub>
Molecular Weight: 400.148
CAS RN: 7789-02-8
Properties: greenish black, deep violet; rhomb, monocl cryst; hygr [MER06] [STR93]
Solubility: 74% H<sub>2</sub>O (25°C) [KIR78]
Density, g/cm<sup>3</sup>: 1.80 [KIR78]
Melting Point, °C: 66.3 [KIR78]
Boiling Point, °C: decomposes above 100 [MER06]

# 902

**Compound:** Chromium(III) oxide **Synonyms:** chromic oxide, eskolaite **Formula:** Cr<sub>2</sub>O<sub>3</sub> **Molecular Formula:** Cr<sub>2</sub>O<sub>3</sub> **Molecular Weight:** 151.990

#### **CAS RN:** 1308-38-9

Properties: -325 mesh 10 µm or less, precipitated with 99.999% purity; green powd or hex cryst; cryst  $Cr_2O_3$  is extremely hard and will scratch quartz, zircon, topaz; enthalpy of fusion 130.00 kJ/mol; evaporated material of 99.8% purity used for hard, durable light absorption films with a medium refractive index and as a sputtering target to produce an absorbent brown film with medium index [KIR78] [CRC10] [MER06] [CER91] Solubility: i H<sub>2</sub>O [KIR78] Density, g/cm<sup>3</sup>: 5.22 [KIR78] Melting Point, °C: 2330 [CRC10] Boiling Point, °C: 4000 [HAW93] Thermal Expansion Coefficient: (volume) 100°C (0.15), 200°C (0.36), 400°C (0.78), 800°C (1.68), 1200°C (2.61) [CLA66]

#### 903

Compound: Chromium(III) perchlorate Formula:  $Cr(ClO_4)_3$ Molecular Formula:  $Cl_3CrO_{12}$ Molecular Weight: 350.347 CAS RN: 55147-94-9 Properties: greenish blue cryst; there is also a hexahydrate [STR93] [ALD94] Solubility: g/100 g soln, H<sub>2</sub>O: 50.99 (0°C), 57.73 (25°C); solid phase,  $Cr(ClO_4)_3 \cdot 9H_2O$  [KRU93]

#### 904

Compound: Chromium(III) phosphate
Synonym: chromic phosphate
Formula: CrPO<sub>4</sub>
Molecular Formula: CrO<sub>4</sub>P
Molecular Weight: 146.967
CAS RN: 7789-04-0
Properties: grayish brown to black cryst or amorphous solid; partially oxidizes to CrO<sub>3</sub> on heating in air [MER06]
Solubility: i H<sub>2</sub>O, acetic acid, HCl, aqua regia [MER06]
Density, g/cm<sup>3</sup>: 2.94 [MER06]
Melting Point, °C: >1800 [MER06]

#### 905

Compound: Chromium(III) phosphate hemiheptahydrate
Synonyms: chromic phosphate hemiheptahydrate, Arnaudon's green, Plessy's green
Formula: CrPO<sub>4</sub> · 3-1/2H<sub>2</sub>O
Molecular Formula: CrH<sub>7</sub>O<sub>7.5</sub>P
Molecular Weight: 210.021
CAS RN: 7789-04-0 Properties: bluish green powd [MER06]; formula probably also given as the tetrahydrate, see the reference [HAW93]
Solubility: i H<sub>2</sub>O; s acids [MER06]
Density, g/cm<sup>3</sup>: 2.15 [MER06]

# 906

Compound: Chromium(III) phosphate hexahydrate Synonym: chromic phosphate hexahydrate Formula:  $CrPO_4 \cdot 6H_2O$ Molecular Formula:  $CrH_{12}O_{10}P$ Molecular Weight: 255.059 CAS RN: 84359-31-9 Properties: violet cryst; loses water gradually on heating, becomes anhydrous after 1 h at 800°C or 3–4 h at 500°C [MER06] Solubility: i H<sub>2</sub>O; sl s acetic acid solutions [MER06] Density, g/cm<sup>3</sup>: 2.121 [MER06] Melting Point, °C: decomposes at >500 [LID94]

#### 907

Compound: Chromium(III) potassium oxalate trihydrate Formula:  $K_3Cr(C_2O_4)_3 \cdot 3H_2O$ Molecular Formula:  $C_6H_6CrK_3O_{15}$ Molecular Weight: 487.394 CAS RN: 15275-09-9 Properties: bluish-green monocl cryst [CRC10] Solubility: s  $H_2O$ 

# 908

Compound: Chromium(III) potassium sulfate dodecahydrate
Synonym: chrome alum
Formula: CrK(SO<sub>4</sub>)<sub>2</sub>·12H<sub>2</sub>O
Molecular Formula: CrH<sub>24</sub>KO<sub>20</sub>S<sub>2</sub>
Molecular Weight: 499.405
CAS RN: 7788-99-0
Properties: dark reddish violet cryst; efflorescent; used in tanning, as a textile mordant, in ceramics [HAW93]
Solubility: s H<sub>2</sub>O [HAW93]
Density, g/cm<sup>3</sup>: 1.813 [HAW93]
Melting Point, °C: 89 [HAW93]
Reactions: minus all H<sub>2</sub>O at 400°C [MER06]

#### 909

**Compound:** Chromium(III) sulfate **Synonym:** chromic sulfate **Formula:**  $Cr_2(SO_4)_3$ **Molecular Formula:**  $Cr_2O_{12}S_3$  Molecular Weight: 392.183 CAS RN: 10101-53-8 Properties: peach-colored solid [MER06] Solubility: i H<sub>2</sub>O, acids [MER06] Density, g/cm<sup>3</sup>: 3.012 [MER06]

# 910

Compound: Chromium(III) sulfate hydrate Synonym: chromic sulfate hydrate Formula:  $Cr_2(SO_4)_3 \cdot xH_2O$ Molecular Formula:  $Cr_2O_{12}S_3$  (anhydrous) Molecular Weight: 392.183 (anhydrous) CAS RN: 15244-38-9 Properties: greenish black powd; amorphous [STR93] [KIR78]

#### 911

**Compound:** Chromium(III) sulfate octadecahydrate **Synonym:** chromic sulfate octadecahydrate **Formula:**  $Cr_2(SO_4)_3 \cdot 18H_2O$ **Molecular Formula:**  $Cr_2H_{36}O_{30}S_3$ **Molecular Weight:** 716.458 **CAS RN:** 10101-53-8 **Properties:** violet [KIR78] **Solubility:** 120 g/100 mL H<sub>2</sub>O (20°C) [CRC10] **Density, g/cm<sup>3</sup>:** 1.7 [CRC10] **Reactions:** minus 12H<sub>2</sub>O on heating [CRC10]

#### 912

Compound: Chromium(III) sulfide Synonym: chromic sulfide Formula:  $Cr_2S_3$ Molecular Formula:  $Cr_2S_3$ Molecular Weight: 200.190 CAS RN: 12018-22-3 Properties: -200 mesh with 99% purity; brownish black powd [CER91] [STR93] Solubility: decomposed in H<sub>2</sub>O [CRC10] Density, g/cm<sup>3</sup>: 3.77 [STR93] Reactions: minus sulfur at 1350°C [CRC10]

# 913

Compound: Chromium(III) telluride Synonym: chromic telluride Formula: Cr<sub>2</sub>Te<sub>3</sub> Molecular Formula: Cr<sub>2</sub>Te<sub>3</sub> Molecular Weight: 486.792 CAS RN: 12053-39-3 Properties: hex cryst; -325 mesh 10μm or less; with 99.5% purity [CER91] [LID94] Density, g/cm<sup>3</sup>: 7.0 [LID94]

Compound: Chromium(IV) chloride Formula: CrCl<sub>4</sub> Molecular Formula: Cl<sub>4</sub>Cr Molecular Weight: 193.807 CAS RN: 15597-88-3 Properties: gas; stable only at high temp [LID94] [KIR78] Boiling Point, °C: 830 [KIR78]

# 915

**Compound:** Chromium(IV) fluoride **Formula:**  $CrF_4$  **Molecular Formula:**  $CrF_4$  **Molecular Weight:** 127.990 **CAS RN:** 10049-11-3 **Properties:** green cryst [CRC10] **Solubility:** reac H<sub>2</sub>O **Density, g/cm<sup>3</sup>:** 2.89 [CRC10] **Melting Point, °C:** 277 [CRC10]

# 916

Compound: Chromium(IV) oxide
Synonym: chromium dioxide
Formula: CrO2
Molecular Formula: CrO2
Molecular Weight: 83.995
CAS RN: 12018-01-8
Properties: dark brown or black powd; tetr; used in magnetic tapes [KIR78]; ferromagnetic; rutile structure [MER06]
Solubility: i H2O, s acids giving Cr<sup>+++</sup> and dichromate [KIR78]
Density, g/cm<sup>3</sup>: 4.98 (calc) [KIR78]
Boiling Point, °C: decomposes to Cr2O3 [KIR78]
Reactions: metastable in air; decomposes to Cr2O3 at many reported temperatures [MER06]

# 917

**Compound:** Chromium(V) fluoride **Formula:** CrF<sub>5</sub> **Molecular Formula:** CrF<sub>5</sub> **Molecular Weight:** 146.988 **CAS RN:** 14884-42-5 **Properties:** red ortho cryst [CRC10] **Solubility:** reac H<sub>2</sub>O [CRC10] **Melting Point,** °C: 34 [CRC10] **Boiling Point,** °C: 117 [CRC10]

# 918

**Compound:** Chromium(V) oxide **Formula:** Cr<sub>2</sub>O<sub>5</sub> Molecular Formula: Cr<sub>2</sub>O<sub>5</sub> Molecular Weight: 183.989 CAS RN: 12218-36-9 Properties: black needles [CRC10] Melting Point, °C: decomposes at 200 [CRC10]

# 919

Compound: Chromium(VI) dichloride dioxide Formula: CrO<sub>2</sub>Cl<sub>2</sub> Molecular Formula: Cl<sub>2</sub>CrO<sub>2</sub> Molecular Weight: 154.901 CAS RN: 14977-61-8 Properties: red liq [CRC10] Density, g/cm<sup>3</sup>: 1.91 [CRC10] Solubility: reac H<sub>2</sub>O; s ctc, chl, bz [CRC10] Melting Point, °C: -96.5 [CRC10] Boiling Point, °C: 117 [CRC10]

#### 920

**Compound:** Chromium(VI) difluoride dioxide **Formula:**  $CrO_2F_2$ **Molecular Formula:**  $CrF_2O_2$ **Molecular Weight:** 121.922 **CAS RN:** 7788-96-7 **Properties:** red violet cryst [CRC10] **Solubility:** reac H<sub>2</sub>O

#### 921

**Compound:** Chromium(VI) fluoride **Formula:** CrF<sub>6</sub> **Molecular Formula:** CrF<sub>6</sub> **Molecular Weight:** 165.986 **CAS RN:** 13843-28-2 **Properties:** yellow solid; stable at low temp [CRC10] **Melting Point,** °C: decomposes at -100 [CRC10]

#### 922

**Compound:** Chromium(VI) morpholine **Synonym:** morpholine chromate **Formula:**  $(OC_4H_8NH_2)_2CrO_4$  **Molecular Formula:**  $C_8H_{20}CrN_2O_6$  **Molecular Weight:** 292.252 **CAS RN:** 36969-05-8 **Properties:** yellow, oily; corrosion inhibitor [KIR78]

### 923

**Compound:** Chromium(VI) oxide **Synonyms:** chromium trioxide, chromic acid, chromic anhydride **Formula:** CrO<sub>3</sub>
Molecular Formula:  $CrO_3$ Molecular Weight: 99.994 CAS RN: 1333-82-0 Properties: ruby red cryst; ortho-rhomb; oxidizing agent; deliq [HAW93] [KIR78] Solubility: g/100 g H<sub>2</sub>O: 164.8 (0°), 167.2 (20°C), 206.8 (100°C) [LAN05]; s acetic acid, H<sub>2</sub>SO<sub>4</sub>, ether [KIR78] Density, g/cm<sup>3</sup>: 2.7 [KIR78] Melting Point, °C: 197 [KIR78] Boiling Point, °C: decomposes at 250 to  $Cr_2O_3$  and  $O_2$  [MER06]

# 924

**Compound:** Chromium(VI) tetrafluoride oxide **Formula:**  $CrOF_4$ **Molecular Formula:**  $CrF_4O$ **Molecular Weight:** 143.989 **CAS RN:** 23276-90-6 **Properties:** dark red solid [CRC10] **Solubility:** reac H<sub>2</sub>O, ace, dmso [CRC10] **Melting Point, °C:** 55 [CRC10]

### 925

Compound: Chromyl chloride Synonym: chromium(VI) oxychloride Formula: CrO<sub>2</sub>Cl<sub>2</sub> Molecular Formula: Cl<sub>2</sub>CrO<sub>2</sub> Molecular Weight: 154.900 CAS RN: 14977-61-8 Properties: cherry red liq; enthalpy of vaporization 35.1 kJ/mol [CRC10] [KIR78] [MER06] Solubility: i H<sub>2</sub>O, hydrolyzes; s CS<sub>2</sub>, CCl<sub>4</sub> [KIR78] Density, g/cm<sup>3</sup>: 1.91 [KIR78] Melting Point, °C: -96.5 [KIR78] Boiling Point, °C: 117 [ALD94]

# 926

Compound: Cobalt Formula: Co Molecular Formula: Co Molecular Weight: 58.93320 CAS RN: 7440-48-4

Properties: gray, hard, magnetic, ductile, somewhat malleable metal; two allotropic forms, hex and cub, both can exist at room temp; transformation temp 417°C; enthalpy of transformation 14.79 kJ/mol; enthalpy of fusion 16.20 kJ/ mol; enthalpy of vaporization 369.86 kJ/mol; electrical resistivity (20°C) 6.24 μohm · cm; Young's modulus 211 GPa; Poisson's ratio 0.32; Curie temp 1121°C; stable in air or water at ordinary temp [KIR79] [MER06] [CRC10] Solubility: s dil HNO<sub>3</sub>, very slowly attacked by cold H<sub>2</sub>SO<sub>4</sub> or HCl [MER06]
Density, g/cm<sup>3</sup>: 8.92 [MER06]
Melting Point, °C: 1495 [CRC10]
Boiling Point, °C: 2927 [CRC10]
Thermal Conductivity, W/(m ⋅ K): 100 (25°C) [ALD94]
Thermal Expansion Coefficient: coefficient of thermal expansion 12.5 × 10<sup>-6</sup>/°C at room temp (hex); 14.2 × 10<sup>-6</sup>/°C (cub) at 417°C [KIR78]

#### 927

Compound: Cobalt aluminate Synonym: Thenard's blue Formula: CoAl<sub>2</sub>O<sub>4</sub> Molecular Formula: Al<sub>2</sub>CoO<sub>4</sub> Molecular Weight: 176.894 CAS RN: 13820-62-7 Properties: blue cub solid; used in nickel and cobalt alloys [KIR79] Solubility: i H<sub>2</sub>O [KIR79]

# 928

Compound: Cobalt antimonide Formula: CoSb Molecular Formula: CoSb Molecular Weight: 180.693 CAS RN: 12052-42-5 Properties: hex cryst; 6 mm pieces and smaller with 99.5% purity [CER91] [LID94] Density, g/cm<sup>3</sup>: 8.8 [LID94] Melting Point, °C: 1202 [LID94]

### 929

Compound: Cobalt arsenic sulfide Synonym: cobaltite Formula: CoAsS Molecular Formula: AsCoS Molecular Weight: 165.921 CAS RN: 12254-82-9 Properties: silvery white to gray mineral with metallic luster; 5.5 Mohs hardness; used as an important source of cobalt and in ceramics [HAW93] Density, g/cm<sup>3</sup>: 6–6.3 [HAW93] Melting Point, °C: decomposes [CRC10]

### 930

Compound: Cobalt arsenide Formula: CoAs Molecular Formula: AsCo Molecular Weight: 133.855 CAS RN: 27016-73-5

# Properties: ortho-rhomb cryst; -10 mesh with 99.5% purity [CER91] [LID94] Density, g/cm<sup>3</sup>: 8.22 [LID94] Melting Point, °C: 1180 [LID94]

# 931

Compound: Cobalt arsenide Synonym: skutterudite Formula: CoAs<sub>3</sub> Molecular Formula: As<sub>3</sub>Co Molecular Weight: 283.698 CAS RN: 12196-91-7 Properties: mineral, cub, hardness 6.0 Mohs; 6 mm pieces and smaller [CER91] [KIR79] Density, g/cm<sup>3</sup>: 6.5 [KIR79] Melting Point, °C: 942 [LID94]

# 932

Compound: Cobalt arsenide Formula: CoAs<sub>2</sub> Molecular Formula: As<sub>2</sub>Co Molecular Weight: 208.776 CAS RN: 12044-42-7 Properties: cub mineral, also ortho-rhomb; hardness: cub 6.0 Mohs, ortho-rhomb 5.0 Mohs [KIR79] Density, g/cm<sup>3</sup>: cub: 6.5; ortho-rhomb: 7.2 [KIR79]

# 933

Compound: Cobalt boride Formula: CoB Molecular Formula: BCo Molecular Weight: 69.744 CAS RN: 12006-77-8 Properties: refractory material; cryst; used in ceramics [HAW93] Solubility: decomposed by H<sub>2</sub>O; s HNO<sub>3</sub> [HAW93] Density, g/cm<sup>3</sup>: 7.25 [HAW93] Melting Point, °C: 1460 [KIR78]

### 934

Compound: Cobalt boride Formula: Co<sub>2</sub>B Molecular Formula: BCo<sub>2</sub> Molecular Weight: 128.677 CAS RN: 12045-01-1 Properties: refractory material; there is also a Co<sub>3</sub>B, 12006-78-9 [KIR78] Density, g/cm<sup>3</sup>: 8.1 [LID94] Melting Point, °C: Co<sub>2</sub>B: 1285; Co<sub>3</sub>B: 1125, decomposes [KIR78]

### 935

Compound: Cobalt carbonyl
Synonym: dicobalt octacarbonyl
Formula: Co<sub>2</sub>(CO)<sub>8</sub>
Molecular Formula: C<sub>8</sub>Co<sub>2</sub>O<sub>8</sub>
Molecular Weight: 341.949
CAS RN: 10210-68-1
Properties: dark orange cryst; stabilized with 5%–10% hexane; sensitive to oxidation; freezing point of stabilized compound is –22.8°C; used as catalyst in Oxo process [HAW93] [STR93]
Solubility: i H<sub>2</sub>O; s alcohol, ether, carbon disulfide [HAW93]
Density, g/cm<sup>3</sup>: 1.78 [HAW93]
Melting Point, °C: decomposes at 51–52 [STR93]

#### 936

Compound: Cobalt disilicide Formula: CoSi<sub>2</sub> Molecular Formula: CoSi<sub>2</sub> Molecular Weight: 115.104 CAS RN: 12017-12-8 Properties: gray rhomb powd [ALF93] [KIR79] Solubility: s hot HC1 [KIR79] Density, g/cm<sup>3</sup>: 5.3 [KIR79] Melting Point, °C: 1277 [ALF93]

### 937

Compound: Cobalt disulfide Formula: CoS<sub>2</sub> Molecular Formula: CoS<sub>2</sub> Molecular Weight: 123.065 CAS RN: 12013-10-4 Properties: black cub; -200 mesh with 99.5% purity [CRC10] [CER91] Solubility: i H<sub>2</sub>O; s HNO<sub>3</sub> [CRC10] Density, g/cm<sup>3</sup>: 4.3 [LID94] Melting Point, °C: decomposes at 269 [CRC10]

# 938

Compound: Cobalt dodecacarbonyl Synonym: tetracobalt dodecacarbonyl Formula:  $Co_4(CO)_{12}$ Molecular Formula:  $C_{12}Co_4O_{12}$ Molecular Weight: 571.858 CAS RN: 17786-31-1 Properties: black cryst; air sensitive [DOU83] [STR93] Solubility: sl s H<sub>2</sub>O [CRC10] Density, g/cm<sup>3</sup>: 2.09 [STR93] Melting Point, °C: decomposes at 60 [STR93]

**Compound:** Cobalt metaborate hydrate **Formula:**  $Co(BO_2)_2 \cdot xH_2O \ (x=2,3)$ **Molecular Formula:**  $B_2CoO_4 \ (x=0)$ **Molecular Weight:** 144.553 (x=0) **CAS RN:** 15293-77-3

**Properties:** prepartion: precipitation from an aq Co<sup>++</sup> solution to which borax is added, the product is CoO  $\cdot$  3B<sub>2</sub>O<sub>3</sub>  $\cdot$  10H<sub>2</sub>O; stirring a Co<sup>++</sup> solution with boric acid results in CoB<sub>4</sub>O<sub>7</sub>  $\cdot$  4H<sub>2</sub>O; uses: as acid catalyst [KIR78]

# 940

Compound: Cobalt metatitanate Formula: CoTiO<sub>3</sub> Molecular Formula: CoO<sub>3</sub>Ti Molecular Weight: 154.798 CAS RN: 12017-01-5 Properties: green; rhomb; -325 mesh 10 μm average or less, with 99.9% purity [CER91] [LID94] [KIR83]

Density, g/cm<sup>3</sup>: 5.0 [KIR83]

### 941

Compound: Cobalt molybdate
Formula: CoMoO<sub>4</sub>
Molecular Formula: CoO<sub>4</sub>Mo
Molecular Weight: 218.871
CAS RN: 13762-14-6
Properties: -325 mesh 10 µm or less with 99.9% purity; green powd; three forms: α, β, γ; obtained by reaction of the two oxides; used as a catalyst to desulfurize petroleum [KIR81] [HAW93] [STR93] [CER91]
Density, g/cm<sup>3</sup>: α: 3.6; β: 4.5; γ: 4.1 [KIR81]
Melting Point, °C: 1040 [KIR81]

# 942

**Compound:** Cobalt nitrosocarbonyl **Synonym:** cobalt tricarbonyl nitrosyl **Formula:**  $Co(NO)(CO)_3$  **Molecular Formula:**  $C_3CoNO_4$  **Molecular Weight:** 172.971 **CAS RN:** 14096-82-3 **Properties:** dark red liq; air sensitive [STR93] **Solubility:** i H<sub>2</sub>O [CRC10] **Melting Point,** °C: -1.05 [CRC10] **Boiling Point,** °C: 50 [STR93]

# 943

**Compound:** Cobalt nitrosodicarbonyl **Formula:** Co(NO)(CO)<sub>2</sub> **Molecular Formula:** C<sub>2</sub>CoNO<sub>3</sub> Molecular Weight: 144.960 CAS RN: 12021-68-0 Properties: cherry red liq [KIR79] Solubility: i H<sub>2</sub>O [KIR79]

### 944

**Compound:** Cobaltocene **Formula:**  $Co(C_5H_5)_2$  **Molecular Formula:**  $C_{10}H_{10}Co$  **Molecular Weight:** 189.119 **CAS RN:** 1277-43-6 **Properties:** black purple cryst [CRC10] **Boiling Point,** °C: 173 [CRC10]

# 945

**Compound:** Cobalt orthotitanate **Formula:** Co<sub>2</sub>TiO<sub>4</sub> **Molecular Formula:** Co<sub>2</sub>O<sub>4</sub>Ti **Molecular Weight:** 229.731 **CAS RN:** 12017-38-8 **Properties:** greenish black, cub cryst [KIR79] **Solubility:** s conc HCl [HAW93] **Density, g/cm<sup>3</sup>:** 5.07–5.12 [HAW93]

# 946

Compound: Cobalt phosphide Formula: Co<sub>2</sub>P Molecular Formula: Co<sub>2</sub>P Molecular Weight: 148.840 CAS RN: 12134-02-0 Properties: -100 mesh with 99% purity; gray needles [KIR79] [CER91] Solubility: i H<sub>2</sub>O; s HNO<sub>3</sub> [KIR79] Density, g/cm<sup>3</sup>: 6.4 [KIR79] Melting Point, °C: 1386 [KIR79]

### 947

**Compound:** Cobalt silicide **Formula:** CoSi<sub>2</sub> **Molecular Formula:** CoSi<sub>2</sub> **Molecular Weight:** 115.104 **CAS RN:** 12017-12-8 **Properties:** gray cub cryst [CRC10] **Solubility:** s hot HC1 [CRC10] **Density, g/cm<sup>3</sup>:** 4.9 [CRC10] **Melting Point, °C:** 1326 [CRC10]

### 948

**Compound:** Cobalt stearate **Formula:** Co[CH<sub>3</sub>(CH<sub>2</sub>)<sub>16</sub>COO]<sub>2</sub> Molecular Formula: C<sub>36</sub>H<sub>70</sub>CoO<sub>4</sub>
Molecular Weight: 625.883
CAS RN: 1002-88-6
Properties: purple pellets; used as drying agent [KIR79] [STR93]
Density, g/cm<sup>3</sup>: 1.13 [KIR78]
Melting Point, °C: 140 [KIR78]

#### 949

Compound: Cobalt zirconate Formula: CoZrO<sub>3</sub> Molecular Formula: CoO<sub>3</sub>Zr Molecular Weight: 198.155 CAS RN: 39361-25-6 Properties: reacted product, -325 mesh 10μm or less with 99.5% purity [CER91]

# 950

**Compound:** Cobalt(II) acetate **Formula:**  $C_0(C_2H_3O_2)_2$  **Molecular Formula:**  $C_4H_6CoO_4$  **Molecular Weight:** 177.022 **CAS RN:** 71-48-7 **Properties:** pink cryst [CRC10] **Solubility:** v s H<sub>2</sub>O; s EtOH [CRC10]

# 951

Compound: Cobalt(II) acetate tetrahydrate
Synonym: cobaltous acetate tetrahydrate
Formula: Co(C<sub>2</sub>H<sub>3</sub>O<sub>2</sub>)<sub>2</sub>·4H<sub>2</sub>O
Molecular Formula: C<sub>4</sub>H<sub>14</sub>CoO<sub>8</sub>
Molecular Weight: 249.083
CAS RN: 6147-53-1
Properties: pink; monocl, prismatic cryst; used as a drying agent for lacquers and varnishes and as a catalyst [KIR79] [MER06] [STR93]
Solubility: s H<sub>2</sub>O, alcohol, dil acids [MER06]
Density, g/cm<sup>3</sup>: 1.705 [MER06]
Reactions: minus 4H<sub>2</sub>O by 140°C [MER06]

# 952

**Compound:** Cobalt(II) acetylacetonate **Synonyms:** 2,4-pentanedione, cobalt(II) derivative **Formula:** Co(CH<sub>3</sub>COCH=C(O)CH<sub>3</sub>)<sub>2</sub> **Molecular Formula:** C<sub>10</sub>H<sub>14</sub>CoO<sub>4</sub> **Molecular Weight:** 257.152 **CAS RN:** 14024-48-7 **Properties:** black monocl; tetramer; used for

vapor deposition of chromium; hydrate is a pink powd [KIR79] [STR93] [COT88] Density, g/cm<sup>3</sup>: 1.43 [KIR79] Melting Point, °C: 241 [KIR79]

### 953

**Compound:** Cobalt(II) aluminate Formula:  $CoAl_2O_4$ Molecular Formula:  $Al_2CoO_4$ Molecular Weight: 176.894 CAS RN: 13820-62-7 Properties: blue cryst [CRC10] Solubility: i H<sub>2</sub>O [CRC10] Density, g/cm<sup>3</sup>: 4.37 [CRC10]

# 954

Compound: Cobalt(II) arsenate octahydrate Synonym: cobaltous arsenate octahydrate Formula:  $Co_3(AsO_4)_2 \cdot 8H_2O$ Molecular Formula:  $As_2Co_3H_{16}O_{16}$ Molecular Weight: 598.760 CAS RN: 24719-19-5 Properties: pink to blood red; monocl, fine needles [MER06] Solubility: i H<sub>2</sub>O; s dil mineral acids, NH<sub>4</sub>OH [MER06] Density, g/cm<sup>3</sup>: 2.9–3.1 [MER06] Melting Point, °C: decomposes by 1000 to  $Co_4As_2O_{11}$  [MER06] Reactions: minus 8H<sub>2</sub>O by 400°C [MER06]

### 955

Compound: Cobalt(II) basic carbonate Formula:  $2CoCO_3 \cdot 3Co(OH)_2 \cdot H_2O$ Molecular Formula:  $C_2H_8Co_5O_{13}$ Molecular Weight: 534.744 CAS RN: 7542-09-8 Properties: form of commercial cobalt carbonate; reddish violet cryst; used in pigments [HAW93] [MER06] Solubility: i cold H<sub>2</sub>O, decomposed by hot H<sub>2</sub>O; s acids [HAW93] Melting Point, °C: decomposes [HAW93]

### 956

**Compound:** Cobalt(II) bromate hexahydrate **Formula:**  $Co(BrO_3)_2 \cdot 6H_2O$  **Molecular Formula:**  $Br_2CoH_{12}O_{12}$  **Molecular Weight:** 422.829 **CAS RN:** 13476-01-2 **Properties:** violet cryst [STR93]; red octahedral [KIR79] **Solubility:** 45.5 g/100 mL (17°C)  $H_2O$ ; s NH<sub>4</sub>OH [CRC10] **Density, g/cm<sup>3</sup>:** ~2.462 [STR93]

Compound: Cobalt(II) bromide
Synonym: cobaltous bromide
Formula: CoBr<sub>2</sub>
Molecular Formula: Br<sub>2</sub>Co
Molecular Weight: 218.741
CAS RN: 7789-43-7
Properties: bright green solid or lustrous green cryst leaflets; hygr; forms hexahydrate in air [MER06]
Solubility: g/100 g H<sub>2</sub>O: 91.9 (0°C), 112 (20°C), 257 (100°C) [LAN05]; s methanol, ethanol, acetone [MER06]
Density, g/cm<sup>3</sup>: 4.91 [MER06]
Melting Point, °C: 678 (under HBr and N<sub>2</sub>) [MER06]

# 958

Compound: Cobalt(II) bromide hexahydrate Synonym: cobaltous bromide hexahydrate Formula:  $CoBr_2 \cdot 6H_2O$ Molecular Formula:  $Br_2CoH_{12}O_6$ Molecular Weight: 326.832 CAS RN: 13762-12-4 Properties: red to reddish purple; deliq, prismatic cryst [MER06] [ALD94] Solubility: s H<sub>2</sub>O to give red or blue solution, depending on temp [MER06] Density, g/cm<sup>3</sup>: 2.46 [MER06] Melting Point, °C: 47–48 [MER06] Reactions: minus 4H<sub>2</sub>O at 100°C forming purple dihydrate [MER06]

# 959

Compound: Cobalt(II) carbonate
Synonym: spherocobaltite
Formula: CoCO<sub>3</sub>
Molecular Formula: CCoO<sub>3</sub>
Molecular Weight: 118.942
CAS RN: 513-79-1
Properties: -325 mesh 10 μm or less with 99.5% purity; pink powd or rhomb cryst; there is a monohydrate, CAS RN 137506-60-6 [MER06] [STR93] [CER91] [ALD94]
Solubility: i H<sub>2</sub>O, alcohol, methyl acetate [MER06]
Density, g/cm<sup>3</sup>: 4.13 [MER06]
Melting Point, °C: decomposes [KIR79]
Reactions: oxidized by air to cobalt(III) carbonate [MER06]

# 960

**Compound:** Cobalt(II) chlorate hexahydrate **Synonym:** cobaltous chlorate hexahydrate

Formula:  $Co(ClO_3)_2 \cdot 6H_2O$ Molecular Formula:  $Cl_2CoH_{12}O_{12}$ Molecular Weight: 333.926 CAS RN: 13478-33-6 Properties: red, cub, hygr [CRC10] Solubility: mol/100 mol H<sub>2</sub>O: 10.75 (0°C), 14.51 (21°C); solid phase, Co(ClO\_3)\_2 \cdot 6H\_2O (0°C), Co(ClO\_3)\_2 \cdot 4H\_2O (21°C) [KRU93]; g/100 g H\_2O: 135 (0°C), 180 (20°C), 316 (60°C) [LAN05] Density, g/cm<sup>3</sup>: 1.92 [CRC10] Melting Point, °C: 50 [CRC10] Reactions: decomposes at 100°C [CRC10]

# 961

**Compound:** Copper(II) chloride hydroxide **Formula:** Cu<sub>2</sub>(OH)<sub>3</sub>Cl **Molecular Formula:** ClCu<sub>2</sub>H<sub>3</sub>O<sub>3</sub> **Molecular Weight:** 213.567 **CAS RN:** 1332-65-6 **Properties:** pale green cryst [CRC10] **Solubility:** i H<sub>2</sub>O; s acid [CRC10]

# 962

Compound: Cobalt(II) chloride Synonym: cobaltous chloride Formula: CoCl<sub>2</sub> Molecular Formula: Cl<sub>2</sub>Co Molecular Weight: 129.838 CAS RN: 7646-79-9 Properties: -80 mesh with 99.9% purity; pale blue powd; hygr leaflets; turns pink in moist air; enthalpy of fusion 45.00 kJ/ mol [CRC10] [MER06] [CER91] Solubility: s H<sub>2</sub>O, alcohols, acetone, ether, glycerol, acetone [MER06]; g/100 g soln, H<sub>2</sub>O: 30.3 (0°C), 36.0 (25°C), 51.5 (100°C); solid phase, CoCl<sub>2</sub> · 6H<sub>2</sub>O (0°C, 25°C), CoCl<sub>2</sub>·2H<sub>2</sub>O (100°C) [KRU93] Density, g/cm<sup>3</sup>: 3.367 [MER06] Melting Point, °C: 740 [CRC10] Boiling Point, °C: 1049 [MER06] Reactions: decomposes if subjected to lengthy heating in air at 400°C, sublimes at 500°C in HCl gas [MER06]

### 963

**Compound:** Cobalt(II) chloride dihydrate **Synonym:** cobaltous chloride dihydrate **Formula:** CoCl<sub>2</sub>·2H<sub>2</sub>O **Molecular Formula:** Cl<sub>2</sub>CoH<sub>4</sub>O<sub>2</sub> **Molecular Weight:** 165.869 **CAS RN:** 16544-92-6 **Properties:** violet or blue cryst [MER06] Solubility: s H<sub>2</sub>O [CRC10] Density, g/cm<sup>3</sup>: 2.477 [MER06]

# 964

Compound: Cobalt(II) chloride hexahydrate Synonym: cobaltous chloride hexahydrate Formula: CoCl<sub>2</sub>·6H<sub>2</sub>O Molecular Formula: Cl<sub>2</sub>CoH<sub>12</sub>O<sub>6</sub> Molecular Weight: 237.929 CAS RN: 7791-13-1 Properties: monocl cryst; pink to red, sl deliq [MER06] Solubility: 76.7 g/100 mL cold H<sub>2</sub>O, 190.7 g/100 mL hot H<sub>2</sub>O; s alcohols, acetone, ether, glycerol [MER06] Density, g/cm<sup>3</sup>: 1.924 [MER06] Melting Point, °C: 87 [MER06] Reactions: minus 4H<sub>2</sub>O at 52°C–56°C forming dihydrate; minus H<sub>2</sub>O at 100°C giving monohydrate; loses

remaining H<sub>2</sub>O at 120°C-140°C [MER06]

965

Compound: Cobalt(II) chromate
Synonym: cobaltous chromate
Formula: CoCrO<sub>4</sub>
Molecular Formula: CoCrO<sub>4</sub>
Molecular Weight: 174.927
CAS RN: 24613-38-5
Properties: brown or yellowish brown powd, but pure material is gray-black; used in ceramics [HAW93]
Solubility: i H<sub>2</sub>O; s mineral acids [HAW93]
Density, g/cm<sup>3</sup>: ~4.0 [LID94]
Melting Point, °C: decomposes [CRC10]

# 966

Compound: Cobalt(II) chromite
Synonym: cobalt dichromium tetraoxide
Formula: CoCr<sub>2</sub>O<sub>4</sub>
Molecular Formula: CoCr<sub>2</sub>O<sub>4</sub>
Molecular Weight: 226.923
CAS RN: 12016-69-2
Properties: -200 mesh with 99.5% purity; brilliant greenish blue powd; cub spinel structure; used in pigments and catalysts [KIR79] [MER06] [CER91]
Solubility: almost i conc HCl, HNO<sub>3</sub> [MER06]

# 967

**Compound:** Cobalt(II) citrate dihydrate **Synonyms:** citric acid, cobalt(II) salt dihydrate **Formula:**  $Co_3(C_6H_5O_7)_2 \cdot 2H_2O$  **Molecular Formula:**  $C_{12}H_{14}Co_3O_{16}$ **Molecular Weight:** 591.033 CAS RN: 18727-04-3 Properties: rose red [KIR79] Solubility: 0.8 g/100 mL cold H<sub>2</sub>O [KIR79] Reactions: minus 2H<sub>2</sub>O at 150°C [KIR79]

### 968

Compound: Cobalt(II) cyanide dihydrate Synonym: cobaltous cyanide Formula:  $Co(CN)_2 \cdot 2H_2O$ Molecular Formula:  $C_2H_4CoN_2O_2$ Molecular Weight: 146.999 CAS RN: 20427-11-6 Properties: pink to reddish brown powd or needles [MER06] Solubility: i H<sub>2</sub>O, acids, methyl acetate; s alkali cyanides [MER06] Density, g/cm<sup>3</sup>: anhydrous: 1.872 [KIR79] Melting Point, °C: decomposes at 300 [CRC10] Reactions: minus  $2H_2O$  at 280°C [KIR79]

#### 969

Compound: Cobalt(II) cyanide trihydrate Synonym: cobaltous cyanide trihydrate Formula:  $Co(CN)_2 \cdot 3H_2O$ Molecular Formula:  $C_2H_6CoN_2O_3$ Molecular Weight: 165.014 CAS RN: 20427-11-6 Properties: pink to reddish brown powd or needles [MER06] Solubility: almost i H<sub>2</sub>O, acids; s alkali cyanide solutions [MER06] Reactions: minus 3H<sub>2</sub>O at 250°C [CRC10]

### 970

**Compound:** Cobalt(II) diiron tetroxide **Synonym:** cobaltous ferrite **Formula:** CoFe<sub>2</sub>O<sub>4</sub> **Molecular Formula:** CoFe<sub>2</sub>O<sub>4</sub> **Molecular Weight:** 234.621 **CAS RN:** 12052-28-7 **Properties:** a magnetic ferrite [HAW93]

### 971

**Compound:** Cobalt(II) ferricyanide **Synonym:** cobaltous ferricyanide **Formula:**  $Co_3[Fe(CN)_6]_2$  **Molecular Formula:**  $C_{12}Co_3Fe_2N_{12}$  **Molecular Weight:** 600.703 **CAS RN:** 15415-49-3 **Properties:** red needles [KIR79] **Solubility:** i H<sub>2</sub>O, HCl; s NH<sub>4</sub>OH [KIR79]

**Compound:** Cobalt(II) ferrocyanide hydrate **Synonym:** cobaltous ferrocyanide **Formula:**  $Co_2[Fe(CN)_6] \cdot xH_2O$ **Molecular Formula:**  $C_6Co_2FeN_6$  (anhydrous) **Molecular Weight:** 329.819 (anhydrous) **CAS RN:** 4049-81-1 **Properties:** gray green [KIR79] **Solubility:** i H<sub>2</sub>O, HCl; s KCN [KIR79]

# 973

**Compound:** Cobalt(II) fluoride **Synonym:** cobaltous fluoride **Formula:** CoF<sub>2</sub> **Molecular Formula:** CoF<sub>2</sub> **Molecular Weight:** 96.930 **CAS RN:** 10026-17-2 **Properties:** rosy red tetr cryst; pink powd; forms

di-, tri-, and tetrahydrates, all soluble in H<sub>2</sub>O; enthalpy of fusion 59.00 kJ/mol; can be prepared by reacting CoCO<sub>3</sub> with anhydrous HF; finds use in the manufacture of CoF<sub>3</sub> [MER06] [STR93] [KIR78] [CRC10]
Solubility: sl s H<sub>2</sub>O; readily s warm mineral acids [MER06]; g/100 ml soln, H<sub>2</sub>O: 1.415 (25°C); solid phase, CoF<sub>2</sub>·4H<sub>2</sub>O [KRU93]
Density, g/cm<sup>3</sup>: 4.46 [HAW93]
Melting Point, °C: 1127 [CRC10]
Boiling Point, °C: volatilizes ~1400 [MER06]

# 974

Compound: Cobalt(II) fluoride tetrahydrate
Synonym: cobaltous fluoride tetrahydrate
Formula: CoF<sub>2</sub> · 4H<sub>2</sub>O
Molecular Formula: CoF<sub>2</sub>H<sub>8</sub>O<sub>4</sub>
Molecular Weight: 168.992
CAS RN: 13817-37-3
Properties: red ortho-rhomb; hygr; senstive to moisture [LID94] [ALD94]
Solubility: s H<sub>2</sub>O [MER06]
Density, g/cm<sup>3</sup>: 2.19 [ALD94]
Boiling Point, °C: decomposes [MER06]

# 975

**Compound:** Cobalt(II) hexafluoroacetylacetonate **Synonym:** 2,4-pentanedionate, cobalt(II) derivative **Formula:**  $Co(CF_3COCHCOCF_3)_2$ **Molecular Formula:**  $C_8H_2CoF_{12}O_4$ **Molecular Weight:** 473.035 CAS RN: 19648-83-0 Properties: powd [CRC10]

### 976

**Compound:** Cobalt(II) hexafluorosilicate hexahydrate **Formula:**  $CoSiF_6 \cdot 6H_2O$ **Molecular Formula:**  $CoF_6H_{12}O_6Si$ **Molecular Weight:** 309.100 **CAS RN:** 15415-49-3 **Properties:** pale red cryst; used in ceramics [HAW93] **Solubility:** 118.1 g/100 mL cold H<sub>2</sub>O [KIR79] **Density, g/cm<sup>3</sup>:** 2.087 [HAW93]

# 977

Compound: Cobalt(II) hydroxide Synonym: cobaltous hydroxide Formula: Co(OH)<sub>2</sub> Molecular Formula: CoH<sub>2</sub>O<sub>2</sub> Molecular Weight: 92.948 CAS RN: 21041-93-0 Properties: blue green cryst or rose-red powd or microscopic rhomb; red form most stable of two; easily oxidized by air to Co(OH)<sub>3</sub>; amphoteric [MER06] **Solubility:** v sl s H<sub>2</sub>O; readily s in acids; almost i alkalies [MER06]; mol/L soln, H<sub>2</sub>O: 2×10<sup>-5</sup> (25°C) [KRU93] Density, g/cm<sup>3</sup>: 3.597 [HAW93] Melting Point, °C: decomposes [KIR79] **Reactions:** minus H<sub>2</sub>O on heating in vacuum [MER06]

### 978

Compound: Cobalt(II) iodate Formula:  $Co(IO_3)_2$ Molecular Formula:  $CoI_2O_6$ Molecular Weight: 408.738 CAS RN: 13455-28-2 Properties: black violet needles [KIR79] Solubility: mol/L soln, H<sub>2</sub>O: 0.040 (30°C), 0.031 (100°C); solid phase, Co(IO<sub>3</sub>)<sub>2</sub> [KRU93]; g/100 g H<sub>2</sub>O: 1.02 (20°C), 0.88 (40°C), 0.70 (100°C) [LAN05] Density, g/cm<sup>3</sup>: 5.08 [KIR79] Melting Point, °C: decomposes at 200 [KIR79]

### 979

**Compound:** Cobalt(II) iodide **Synonym:** cobaltous iodide

Formula:  $CoI_2$ Molecular Formula:  $CoI_2$ Molecular Weight: 312.742 CAS RN: 15238-00-3 Properties: -60 mesh with 99.5% purity; two isomorphous forms:  $\alpha$ -CoI<sub>2</sub> is black, graphitelike solid; very hygr; blackish green on exposure to air;  $\beta$ -CoI<sub>2</sub> is ochre yellow powd; blackens at 400°C; very hygr; deliq in moist air forming green droplets [MER06] [CER91] Solubility: g/100 g soln in H<sub>2</sub>O: 58.0 (0°C), 67.0 (25°C), 80.7 (100°C); solid phase: CoI<sub>2</sub>·H<sub>2</sub>O (green) (0°C, 25°C), CoI<sub>2</sub>·H<sub>2</sub>O (yellow) (100°C) [KRU93] Density, g/cm<sup>3</sup>:  $\alpha$ : 5.584;  $\beta$ : 5.45 [MER06]

Melting Point, °C: α: 515–520 (high vacuum); β: blackens at 400 [MER06] Reactions: transition β to α at 400°C [MER06]

# 980

**Compound:** Cobalt(II) iodide dihydrate **Formula:**  $CoI_2 \cdot 2H_2O$  **Molecular Formula:**  $CoH_4I_2O_2$  **Molecular Weight:** 348.773 **CAS RN:** 13455-29-3 **Properties:** green cryst; deliq [CRC10] [STR93] **Solubility:** 376.2 g/100 mL H<sub>2</sub>O (45°C) [CRC10] **Melting Point,** °C: decomposes at 100 [STR93]

# 981

Compound: Cobalt(II) iodide hexahydrate
Synonym: cobaltous iodide hexahydrate
Formula: Col₂ · 6H₂O
Molecular Formula: CoH₁₂I₂O<sub>6</sub>
Molecular Weight: 420.813
CAS RN: 13455-29-3
Properties: dark red; hex prisms; loses iodine when exposed to light and air [MER06]
Solubility: s H₂O to give red solution below 20°C, olive green color 20°C-40°C [MER06]
Density, g/cm<sup>3</sup>: 2.90 [MER06]
Reactions: minus 6H₂O by 130°C [MER06]

# 982

**Compound:** Cobalt(II) linoleate **Formula:**  $Co(C_{18}H_{31}O_2)_2$  **Molecular Formula:**  $C_{36}H_{62}CoO_4$  **Molecular Weight:** 617.819 **CAS RN:** 14666-96-7 Properties: brown amorphous powd; used as a drier for paint and varnish, especially for enamels and white paints [HAW93]Solubility: i H<sub>2</sub>O; s alcohol, ether and acids [HAW93]

#### 983

**Compound:** Cobalt(II) hydroxide monohydrate **Formula:**  $Co(OH)_2 \cdot H_2O$  **Molecular Formula:**  $CoH_4O_3$  **Molecular Weight:** 110.963 **CAS RN:** 35340-84-2 **Properties:** blue solid [CRC10] **Melting Point,** °C: decomposes at 136 [CRC10]

#### 984

**Compound:** Cobalt(II) molybdate **Formula:** CoMoO<sub>4</sub> **Molecular Formula:** CoMoO<sub>4</sub> **Molecular Weight:** 218.87 **CAS RN:** 13762-14-6 **Properties:** black monocl cryst [CRC10] **Density, g/cm<sup>3</sup>:** 4.7 [CRC10] **Melting Point, °C:** 1040 [CRC10]

# 985

**Compound:** Cobalt(II) molybdate monohydrate **Formula:**  $CoMoO_4 \cdot H_2O$  **Molecular Formula:**  $CoH_2MoO_5$  **Molecular Weight:** 236.886 **CAS RN:** 18601-87-1 **Properties:** black powd [STR93]

# 986

Compound: Cobalt(II) nitrate Synonym: cobaltous nitrate Formula:  $Co(NO_3)_2$ Molecular Formula:  $CoN_2O_6$ Molecular Weight: 182.942 CAS RN: 10141-05-6 Properties: pale red powd [MER06] Solubility: g/100 g soln, H<sub>2</sub>O: 45.66 (0°), 50.5 ± 0.2 (25°C), 77.21 (91°C); solid phase,  $Co(NO_3)_2 \cdot 6H_2O$ (0°C, 25°C),  $Co(NO_3)_2 \cdot 3H_2O$  (91°C) [KRU93] Density, g/cm<sup>3</sup>: 2.49 [MER06] Melting Point, °C: decomposes at 100–105 [MER06]

### 987

**Compound:** Cobalt(II) nitrate hexahydrate **Synonym:** cobaltous nitrate hexahydrate **Formula:**  $Co(NO_3)_2 \cdot 6H_2O$  Molecular Formula: CoH<sub>12</sub>N<sub>2</sub>O<sub>12</sub> Molecular Weight: 291.034 CAS RN: 10026-22-9 Properties: red monocl cryst; deliq [MER06] Solubility: 133.8 g/100 mL H<sub>2</sub>O (0°C), 0.217 g/100 mL H<sub>2</sub>O (80°C) [CRC10]; s alcohol, most organic solvents [MER06] Density, g/cm<sup>3</sup>: 1.88 [MER06] Melting Point, °C: 55–56 [STR93] Reactions: decomposes to oxide at >74°C [MER06]

988

Compound: Cobalt(II) nitrite Formula:  $Co(NO_2)_2$ Molecular Formula:  $CoN_2O_4$ Molecular Weight: 150.944 CAS RN: 18488-96-5 Solubility: g/100 g soln, H<sub>2</sub>O: 0.076 (0°C), 0.49 (25°C) [KRU93]

### 989

Compound: Cobalt(II) oleate Formula: Co(C<sub>18</sub>H<sub>33</sub>O<sub>2</sub>)<sub>2</sub> Molecular Formula: C<sub>36</sub>H<sub>66</sub>CoO<sub>4</sub> Molecular Weight: 621.851 CAS RN: 14666-94-5 Properties: brown amorphous powd; used in driers for paints and varnishes [HAW93] Solubility: i H<sub>2</sub>O; s alcohol, ether [HAW93] Melting Point, °C: 235 [HAW93]

# 990

Compound: Cobalt(II) oxalate
Synonym: cobaltous oxalate
Formula: CoC<sub>2</sub>O<sub>4</sub>
Molecular Formula: C<sub>2</sub>CoO<sub>4</sub>
Molecular Weight: 146.953
CAS RN: 814-89-1
Properties: pink powd; readily absorbs moisture from air to form hydrates [MER06] [STR93]
Solubility: i H<sub>2</sub>O; s acids, NH<sub>4</sub>OH [KIR79]
Density, g/cm<sup>3</sup>: 3.021 [MER06]
Melting Point, °C: decomposes at 250 [KIR79]

# 991

**Compound:** Cobalt(II) oxalate dihydrate **Synonym:** cobaltous oxalate dihydrate **Formula:**  $CoC_2O_4 \cdot 2H_2O$ **Molecular Formula:**  $C_2H_4CoO_6$ **Molecular Weight:** 182.984 CAS RN: 5965-38-8

Properties: light pink; microcryst powd or needles; decomposes on heating with KOH or Na<sub>2</sub>CO<sub>3</sub> aq solutions [MER06]
Solubility: i H<sub>2</sub>O; sl s acids; freely s aq ammonia [MER06]; g/L soln, H<sub>2</sub>O: 0.0346 (25°C) [KRU93]
Reactions: minus H<sub>2</sub>O ~190°C [CRC10]

#### 992

Compound: Cobalt(II) oxide Synonym: cobaltous oxide Formula: CoO Molecular Formula: CoO Molecular Weight: 74.932 CAS RN: 1307-96-6 Properties: -325 mesh 10 μm or less with 99.5% purity; powd or cub or hex cryst; color varies from olive green to red depending on particle size; commercial material usually dark gray; readily absorbs O<sub>2</sub>, even at room temp [MER06] [CER91] Solubility: i H<sub>2</sub>O; s acids or alkalis [MER06] Density, g/cm<sup>3</sup>: 5.7-6.7 [MER06] Melting Point, °C: 1805 [JAN85]

# 993

Compound: Cobalt(II) perchlorate Formula: Co(ClO<sub>4</sub>)<sub>2</sub> Molecular Formula: Cl<sub>2</sub>CoO<sub>8</sub> Molecular Weight: 257.833 CAS RN: 13455-31-7 Properties: red needles; used as a chemical reagent, oxidizing agent [HAW93] Solubility: g/100 g H<sub>2</sub>O: 100.0 (0°C), 113.4 (26°C); solid phase, Co(ClO<sub>4</sub>)<sub>2</sub>.5H<sub>2</sub>O [KRU93]; i alcohol, acetone [KIR79] Density, g/cm<sup>3</sup>: 3.327 [HAW93]

# 994

**Compound:** Cobalt(II) perchlorate hexahydrate **Formula:**  $Co(ClO_4)_2 \cdot 6H_2O$ **Molecular Formula:**  $Cl_2CoH_{12}O_{14}$ **Molecular Weight:** 365.925 **CAS RN:** 13478-33-6 **Properties:** red cryst; hygr [STR93] **Solubility:** 225 g/100 mL H<sub>2</sub>O (18°C) [CRC10] **Melting Point, °C:** decomposes at 1534 [CRC10]

### 995

**Compound:** Cobalt(II) phosphate octahydrate **Synonym:** cobaltous phosphate octahydrate **Formula:**  $Co_3(PO_4)_2 \cdot 8H_2O$  Molecular Formula: Co<sub>3</sub>H<sub>16</sub>O<sub>16</sub>P<sub>2</sub> Molecular Weight: 510.865 CAS RN: 10294-50-5 Properties: pink to lavender amorphous powd [MER06] Solubility: i H<sub>2</sub>O; s mineral acids [MER06] Density, g/cm<sup>3</sup>: 2.77 [MER06] Reactions: minus 8H<sub>2</sub>O at 200°C [HAW93]

# 996

**Compound:** Cobalt(II) potassium sulfate hexahydrate **Formula:**  $CoK_2(SO_4)_2 \cdot 6H_2O$  **Molecular Formula:**  $CoH_{12}K_2O_{14}S_2$  **Molecular Weight:** 437.347 **CAS RN:** 10026-20-7 **Properties:** red monocl cryst [CRC10] **Solubility:** v sol  $H_2O$  [CRC10] **Density,** g/cm<sup>3</sup>: 2.22 [CRC10] **Melting Point,** °C: decomposes at 75 [CRC10]

### 997

Compound: Cobalt phosphide Formula: Co<sub>2</sub>P Molecular Formula: Co<sub>2</sub>P Molecular Weight: 148.840 CAS RN: 12134-02-0 Properties: gray needles [CRC10] Density, g/m<sup>3</sup>: 6.4 [CRC10] Melting Point, °C: 1386 [CRC10]

### 998

**Compound:** Cobalt(II) selenate pentahydrate **Formula:**  $CoSeO_4 \cdot 5H_2O$  **Molecular Formula:**  $CoH_{10}O_9Se$  **Molecular Weight:** 291.967 **CAS RN:** 14590-19-3 **Properties:** ruby red tricl [KIR79] **Solubility:** v s H<sub>2</sub>O [KIR79] **Density, g/cm<sup>3</sup>:** 2.512 [KIR79] **Melting Point, °C:** decomposes [KIR79]

#### 999

Compound: Cobalt(II) selenide Formula: CoSe Molecular Formula: CoSe Molecular Weight: 137.893 CAS RN: 1307-99-9 Properties: 6 mm pieces and smaller with 99.5% purity; yellow hex [KIR79] [CER91] Solubility: s HNO<sub>3</sub>, aqua regia; i alkali [KIR79] Density, g/cm<sup>3</sup>: 7.65 [KIR79] Melting Point, °C: 1055 [LID94]

#### 1000

Compound: Cobalt(II) selenite dihydrate Formula:  $CoSeO_3 \cdot 2H_2O$ Molecular Formula:  $CoH_4O_5Se$ Molecular Weight: 221.922 CAS RN: 19034-13-0 Properties: blue red powd [HAW93] [MER06] Solubility: i H<sub>2</sub>O [HAW93]

### 1001

**Compound:** Cobalt(II) silicate **Synonym:** cobalt orthosilicate **Formula:** Co<sub>2</sub>SiO<sub>4</sub> **Molecular Formula:** Co<sub>2</sub>O<sub>4</sub>Si **Molecular Weight:** 209.950 **CAS RN:** 12017-08-2 **Properties:** violet cryst [KIR79] **Solubility:** i H<sub>2</sub>O; s dil HCl [KIR79] **Density, g/cm<sup>3</sup>:** 4.63 [KIR79] **Melting Point, °C:** 1345 [KIR79]

### 1002

Compound: Cobalt(II) stannate Formula: Co<sub>2</sub>SnO<sub>4</sub> Molecular Formula: Co<sub>2</sub>O<sub>4</sub>Sn Molecular Weight: 300.574 CAS RN: 12139-93-4 Properties: greenish blue cub; used as paint and varnish drier [KIR79] Solubility: s alkali [KIR79] Density, g/cm<sup>3</sup>: 6.30 [KIR79]

#### 1003

**Compound:** Cobalt(II) stearate **Formula:**  $Co(C_{18}H_{35}O_2)_2$ **Molecular Formula:**  $C_{36}H_{70}CoO_4$ **Molecular Weight:** 625.872 **CAS RN:** 1002-88-6 **Properties:** purple solid [CRC10] **Density, g/cm<sup>3</sup>:** 1.13 [CRC10] **Melting Point, °C:** 74 [CRC10]

### 1004

**Compound:** Cobalt(II) sulfate **Synonym:** cobaltous sulfate **Formula:** CoSO<sub>4</sub> **Molecular Formula:** CoO<sub>4</sub>S **Molecular Weight:** 154.997 **CAS RN:** 10124-43-3 **Properties:** red to lavender dimorphic, ortho-rhomb cryst; used in ceramics [MER06] [KIR79] **Solubility:** dissolves slowly in boiling H<sub>2</sub>O [MER06]; g/100 g soln, H<sub>2</sub>O: 19.7  $\pm$  0.1 (0°C), 27.2  $\pm$  0.1 (25°C), 27.8 (100°C); solid phase, CoSO<sub>4</sub> · 7H<sub>2</sub>O (0°C, 25°C), CoSO<sub>4</sub> · H<sub>2</sub>O (100°C) [KRU93] **Density, g/cm<sup>3</sup>:** 3.71 [MER06] **Melting Point, °C:** decomposes at 1140 [JAN85]

#### 1005

Compound: Cobalt(II) sulfate heptahydrate Synonym: bieberite Formula:  $CoSO_4 \cdot 7H_2O$ Molecular Formula:  $CoH_{14}O_{11}S$ Molecular Weight: 281.103 CAS RN: 10026-24-1 Properties: pink to red monocl, prismatic cryst [MER06] Solubility: 60.4 g/100 mL cold H<sub>2</sub>O, 67 g/100 mL hot H<sub>2</sub>O; sl s methanol, ethanol [MER06] [KIR78] Density, g/cm<sup>3</sup>: 1.948 [STR93] Melting Point, °C: 96.8 [STR93] Reactions: minus H<sub>2</sub>O at 41.5°C; minus  $6H_2O$  at 71°C [MER06]

# 1006

Compound: Cobalt(II) sulfate monohydrate
Formula: CoSO<sub>4</sub> · H<sub>2</sub>O
Molecular Formula: CoH<sub>2</sub>O<sub>5</sub>S
Molecular Weight: 173.012
CAS RN: 13455-34-0
Properties: red cryst; used as a pigment for porcelain and glazes [KIR78]
Solubility: s H<sub>2</sub>O [KIR79]
Density, g/cm<sup>3</sup>: 3.075 [KIR79]
Melting Point, °C: decomposes [KIR79]

# 1007

Compound: Cobalt(II) sulfide
Synonyms: sycoporite, cobaltous sulfide
Formula: CoS
Molecular Formula: CoS
Molecular Weight: 90.999
CAS RN: 1317-42-6
Properties: -200 mesh with 99.5% purity; exists in two forms; α-CoS: black, amorphous powd; forms Co(OH)S in air; β-CoS: gray powd or reddish-silver octahedral cryst [MER06] [CER91]
Solubility: 0.00038 g/100 mL cold H<sub>2</sub>O; s acids [MER06] [KIR79]
Density, g/cm<sup>3</sup>: 5.45 [MER06]
Melting Point, °C: 1182 [LID94]

#### 1008

Compound: Cobalt(II) telluride Formula: CoTe Molecular Formula: CoTe Molecular Weight: 186.533 CAS RN: 12017-13-9 Properties: hex cryst; 6 mm pieces and smaller [LID94] [CER91] Density, g/cm<sup>3</sup>: ~8.8 [LID94]

### 1009

Compound: Cobalt(II) thiocyanate Synonym: cobaltous thiocyanate Formula: Co(SCN)<sub>2</sub> Molecular Formula: C<sub>2</sub>CoN<sub>2</sub>S<sub>2</sub> Molecular Weight: 175.100 CAS RN: 3017-60-5 Properties: yellowish brown powd [MER06] Solubility: s H<sub>2</sub>O, giving rose-colored soln [MER06]; g/100g soln, H<sub>2</sub>O: 50.7 (25°C) [KRU93]

### 1010

Compound: Cobalt(II) thiocyanate trihydrate
Synonym: cobaltous thiocyanate trihydrate
Formula: Co(SCN)<sub>2</sub>· 3H<sub>2</sub>O
Molecular Formula: C<sub>2</sub>H<sub>6</sub>CoN<sub>2</sub>O<sub>3</sub>S<sub>2</sub>
Molecular Weight: 229.146
CAS RN: 97126-35-7
Properties: violet to brownish, violet rhomb cryst; red in transmitted light; used as an indicator of relative humidity [KIR79] [MER06]
Solubility: s H<sub>2</sub>O, resulting in blue soln [MER06]
Reactions: minus 3H<sub>2</sub>O at 105°C [KIR79]

### 1011

**Compound:** Cobalt(II) titanate **Formula:** CoTiO<sub>3</sub> **Molecular Formula:** CoO<sub>3</sub>Ti **Molecular Weight:** 154.798 **CAS RN:** 12017-01-5 **Properties:** green rhomb cryst [CRC10] **Density, g/cm<sup>3</sup>:** 5.0 [CRC10]

### 1012

**Compound:** Cobalt(II) tungstate **Formula:** CoWO<sub>4</sub> **Molecular Formula:** CoO<sub>4</sub>W **Molecular Weight:** 306.771 **CAS RN:** 12640-47-0 Properties: -325 mesh 10µm or less with 99.9% purity; reddish orange powd; used as a pigment and antiknock agent [HAW93] [CER91]
Solubility: i H<sub>2</sub>O; s hot conc acids [HAW93]
Density, g/cm<sup>3</sup>: 8.42 [HAW93]

### 1013

Compound: Cobalt(II,III) oxide
Synonym: cobaltic-cobaltous oxide
Formula: Co<sub>3</sub>O<sub>4</sub>
Molecular Formula: Co<sub>3</sub>O<sub>4</sub>
Molecular Weight: 240.798
CAS RN: 1308-06-1
Properties: -325 mesh 10 μm or less with 99.5% purity; black or gray octahedral cryst; nonstoichiometric; commercial material is black [MER06] [CER91]
Solubility: i H<sub>2</sub>O; s acids, alkalies [MER06]
Density, g/cm<sup>3</sup>: 6.11 [MER06]
Melting Point, °C: decomposes at 947 [JAN85]
Reactions: minus O<sub>2</sub> >900°C forming CoO [MER06]

1014

Compound: Cobalt(III) acetate
Synonym: cobaltic acetate
Formula: Co(CH<sub>3</sub>COO)<sub>3</sub>
Molecular Formula: C<sub>6</sub>H<sub>9</sub>CoO<sub>6</sub>
Molecular Weight: 236.066
CAS RN: 917-69-1
Properties: dark green, very hygr powd or green octahedral cryst; used as a catalyst for cumene hydroperoxide [KIR79] [MER06]
Solubility: s H<sub>2</sub>O with slow hydrolysis, becoming rapid at 60°C-70°C [MER06]
Melting Point, °C: decomposes at 100 [KIR79]
Reactions: becomes black and decomposes on heating to 100°C [MER06]

# 1015

Compound: Cobalt(III) acetylacetonate Synonyms: 2,4-pentanedione, cobalt(III) derivative Formula: Co(CH<sub>3</sub>COCH=C(O)CH<sub>3</sub>)<sub>3</sub> Molecular Formula: C<sub>15</sub>H<sub>21</sub>CoO<sub>6</sub> Molecular Weight: 356.261 CAS RN: 21679-46-9 Properties: sensitive to moisture; green cryst [STR93] [ALD94] Melting Point, °C: 216 [STR93] Boiling Point, °C: 340 [STR93]

### 1016

**Compound:** Cobalt(III) fluoride **Synonyms:** cobaltic fluoride, cobalt trifluoride Formula: CoF<sub>3</sub>
Molecular Formula: CoF<sub>3</sub>
Molecular Weight: 115.928
CAS RN: 10026-18-3
Properties: light brown; hex cryst; strong oxidizing agent; hygr and discolors rapidly in moist air; can be obtained by reacting F<sub>2</sub> with CoCl<sub>2</sub> or CoF<sub>2</sub> at 150°C–180°C; used as a fluorinating agent to replace hydrogen by fluorine in halocarbons and hydrocarbons [KIR78] [MER06]
Solubility: reacts with H<sub>2</sub>O to evolve O<sub>2</sub> [MER06]
Density, g/cm<sup>3</sup>: 3.88 [MER06]
Melting Point, °C: 927 [LID94]
Reactions: comparatively stable to heat [MER06]

### 1017

Compound: Cobalt(III) fluoride dihydrate Formula:  $Co_2F_6 \cdot 2H_2O$ Molecular Formula:  $Co_2F_6H_4O_2$ Molecular Weight: 267.887 CAS RN: 54496-71-8 Properties: two forms:  $\alpha$  is red, rhomb;  $\beta$  is rose powd [KIR79] Solubility: s H<sub>2</sub>O; i alcohol [KIR79] Density, g/cm<sup>3</sup>: 2.192 [KIR79]

#### 1018

**Compound:** Cobalt(III) hydroxide **Formula:** Co(OH)<sub>3</sub> **Molecular Formula:** CoH<sub>3</sub>O<sub>3</sub> **Molecular Weight:** 109.955 **CAS RN:** 1307-86-4 **Properties:** brown powd [CRC10] **Solubility:** i H<sub>2</sub>O; s acid [CRC10] **Density, g/cm<sup>3</sup>:** ~4 [CRC10] **Melting Point, °C:** decomposes [CRC10]

#### 1019

Compound: Cobalt(III) hydroxide trihydrate Formula:  $Co(OH)_3 \cdot 3H_2O$ Molecular Formula:  $CoH_9O_6$ Molecular Weight: 164.001 CAS RN: 1307-86-4 Properties: dark brown or pink powd; uses: catalyst [STR93] [HAW93] Solubility: i H<sub>2</sub>O, alcohol; s cold conc acids [HAW93] Density, g/cm<sup>3</sup>: 4.46 [HAW93] Melting Point, °C: decomposes [STR93] Reactions: minus water at 100°C [HAW93]

Compound: Cobalt(III) nitrate Formula: Co(NO<sub>3</sub>)<sub>3</sub> Molecular Formula: CoN<sub>3</sub>O<sub>9</sub> Molecular Weight: 244.948 CAS RN: 15520-84-0 Properties: green hygr, reacts vigorously with organic solvents [KIR79] Solubility: s H<sub>2</sub>O [LID94] Density, g/cm<sup>3</sup>: ~3.0 [LID94]

# 1021

Compound: Cobalt(III) oxide
Synonyms: cobaltic oxide; cobalt black
Formula: Co<sub>2</sub>O<sub>3</sub>
Molecular Formula: Co<sub>2</sub>O<sub>3</sub>
Molecular Weight: 165.864
CAS RN: 1308-04-9
Properties: steel gray or black powd; used as a pigment to color enamels and in glazing pottery [HAW93]
Solubility: i H<sub>2</sub>O; s conc acids [HAW93]
Density, g/cm<sup>3</sup>: 4.81–5.60 [HAW93]
Melting Point, °C: decomposes at 895 [HAW93]

# 1022

Compound: Cobalt(III) oxide hydroxide
Synonym: cobaltic oxide monohydrate
Formula: CoO(OH)
Molecular Formula: CoHO<sub>2</sub>
Molecular Weight: 91.940
CAS RN: 12016-80-7
Properties: dark brown to black powd; hex; formula also written as Co<sub>2</sub>O<sub>3</sub> · H<sub>2</sub>O [MER06]
Solubility: i H<sub>2</sub>O; s HCl, evolving Cl<sub>2</sub>; s HNO<sub>3</sub>, H<sub>2</sub>SO<sub>4</sub> [MER06]
Reactions: transforms to Co<sub>3</sub>O<sub>4</sub> if heated to 148°C–150°C [MER06]

# 1023

**Compound:** Cobalt(III) oxide monohydrate **Formula:**  $Co_2O_3 \cdot H_2O$  **Molecular Formula:**  $Co_2H_2O_4$  **Molecular Weight:** 109.955 **CAS RN:** 12016-80-7 **Properties:** brown-black hex cryst [CRC10] **Solubility:** i H<sub>2</sub>O; s acid [CRC10] **Melting Point, °C:** decomposes at 150 [CRC10]

### 1024

**Compound:** Cobalt(III) potassium nitrite sesquihydrate Formula:  $CoK_3(NO_2)_6 \cdot 1.5H_2O$ 

Molecular Formula:  $CoH_3K_3N_6O_{13.5}$ CAS RN: 13782-01-9 [For anhydrous compound] Properties: yellow cub cryst [CRC10] Solubility: sl H<sub>2</sub>O; reac acid; i EtOH [CRC10] Density, g/cm<sup>3</sup>: 2.6 [CRC10]

### 1025

Compound: Cobalt(III) sepulchrate trichloride
Synonym: 1,3,6,8,10,13,16,19-octaazabicyclo(6,6,6) eicosanecobalt trichloride
Molecular Weight: 451.72
Molecular Formula: C<sub>12</sub>H<sub>30</sub>Cl<sub>3</sub>CoN<sub>8</sub>
CAS RN: 71963-57-0
Properties: promising sensitizer for watersplitting systems [ALD94] [HOU82]
Melting Point, °C: decomposes at 262 [ALD94]

# 1026

**Compound:** Cobalt(III) sulfide **Formula:** Co<sub>2</sub>S<sub>3</sub> **Molecular Formula:** Co<sub>2</sub>S<sub>3</sub> **Molecular Weight:** 214.064 **CAS RN:** 1332-71-4 **Properties:** black cryst [KIR79] **Solubility:** decomposes in acid, aqua regia [KIR79] **Density, g/cm<sup>3</sup>:** 4.8 [KIR79]

### 1027

**Compound:** Cobalt(III) titanate **Formula:**  $Co_2TiO_4$  **Molecular Formula:**  $Co_2O_4Ti$  **Molecular Weight:** 229.731 **CAS RN:** 1207-38-8 **Properties:** green-black cub cryst [CRC10] **Solubility:** s conc HCl [CRC10] **Density, gm/cm<sup>3</sup>:** 5.1 [CRC10]

### 1028

Compound: Cobaltocene Synonym: bis(cyclopentadienyl)cobalt(II) Formula:  $(C_5H_5)_2Co$ Molecular Formula:  $C_{10}H_{10}Co$ Molecular Weight: 189.122 CAS RN: 1277-43-6 Properties: purplish-black cryst; sensitive to light, air, and heat; forms intercalation compound  $SnS_2[Co(C_5H_5)_2]$  by reaction with  $SnS_2$  [CEN94] [STR93] [ALD94] Melting Point, °C: decomposes at 176–180 [ALD94]

Compound: Cobaltocenium hexafluorophosphate Synonym: bis(cyclopentadienyl) cobalt(II) hexafluorophosphate Formula:  $(C_5H_5)_2CoPF_6$ Molecular Formula:  $C_{10}H_{10}CoF_6P$ Molecular Weight: 334.086 CAS RN: 12427-42-8 Properties: yellow cryst; moisture sensitive [STR93] [ALD94]

#### 1030

Compound: Copper Formula: Cu Molecular Formula: Cu Molecular Weight: 63.546 CAS RN: 7440-50-8

Properties: reddish, lustrous, ductile metal; fcc; excellent conductor of electricity; becomes dull when exposed to air, coated with green basic carbonate in moist air; hardness 3.0 Mohs; electrical resistivity (20°C) 1.673 μohm · cm; electronegativity 2.43; enthalpy of fusion 13.26 kJ/mol; enthalpy of vaporization 300.4 kJ/mol; ionic radius of Cu<sup>++</sup> 0.096 nm [KIR78] [CRC10] [MER06] [ALD94]
Solubility: very slowly attacked by cold HCl and dil H<sub>2</sub>SO<sub>4</sub>, readily by HNO<sub>3</sub> [MER06]
Density, g/cm<sup>3</sup>: 8.94 [MER06]
Melting Point, °C: 1084.62 [CRC10]
Boiling Point, °C: 2562 [CRC10]
Thermal Conductivity, W/(m · K): 394 (25°C) [ALD94]

**Thermal Expansion Coefficient:** linear coefficient

of expansion at 20°C is  $16.5 \times 10^{-6}$ /°C [KIR78]

# 1031

Compound: Copper arsenide Formula: Cu<sub>3</sub>As Molecular Formula: AsCu<sub>3</sub> Molecular Weight: 265.560 CAS RN: 12005-75-3 Properties: 6 mm pieces and smaller with 99% purity [CER91]

## 1032

**Compound:** Copper citrate hemipentahydrate Formula:  $Cu_2C_6H_4O_7 \cdot 2 \cdot 1/2H_2O$ Molecular Formula:  $C_6H_9Cu_2O_{9.5}$ Molecular Weight: 360.219 CAS RN: 10402-15-0

**Properties:** green or bluish green; odorless; cryst powd; can be prepared by reacting hot citric acid with copper sulfate solutions; used as an antiseptic and astringent [MER06] **Solubility:** sl s H<sub>2</sub>O; s ammonia, dil acids [MER06] **Reactions:** minus 2.5 H<sub>2</sub>O at 100°C [MER06]

#### 1033

Compound: Copper nitride Formula: Cu<sub>3</sub>N Molecular Formula: Cu<sub>3</sub>N Molecular Weight: 204.645 CAS RN: 1308-80-1 Properties: dark green powd; -200 mesh with 99.5% purity; cub, a=0.380 nm [CER91] [CIC73] [CRC10] Solubility: decomposes in H<sub>2</sub>O [CRC10] Density, g/cm<sup>3</sup>: 5.84 [CIC73] Melting Point, °C: 300, decomposes [ALF93]

### 1034

Compound: Copper phosphide Formula: Cu<sub>3</sub>P Molecular Formula: Cu<sub>3</sub>P Molecular Weight: 221.612 CAS RN: 12019-57-7 Properties: grayish-black; -100 mesh of 99.5% purity; other phosphides are Cu<sub>3</sub>P<sub>2</sub>, 12134-35-9, Cu<sub>2</sub>P, 12324-28-6, CuP<sub>2</sub>, 12019-11-3 [KIR82] [CER91] Solubility: i H<sub>2</sub>O [CRC10] Density, g/cm<sup>3</sup>: 6.4–6.8 [CRC10] Melting Point, °C: decomposes [CRC10]

### 1035

**Compound:** Copper silicide **Formula:** Cu<sub>5</sub>Si **Molecular Formula:** Cu<sub>5</sub>Si **Molecular Weight:** 345.816 **CAS RN:** 12159-07-8 **Properties:** 6.35 mm and down pieces [ALF93] **Melting Point, °C:** 825 [ALF93]

#### 1036

**Compound:** Copper vanadate **Formula:**  $CuV_2O_6$  **Molecular Formula:**  $CuO_6V_2$  **Molecular Weight:** 261.425 **CAS RN:** 12789-09-2 **Properties:** -200 mesh with 99.5% purity [CER91]

#### 1037

**Compound:** Copper zirconate **Formula:** CuZrO<sub>3</sub> **Molecular Formula:** CuO<sub>3</sub>Zr **Molecular Weight:** 202.768 CAS RN: 70714-64-6 Properties: reacted product of CuO+ZrO<sub>2</sub>, -200 mesh with 99.5% purity [CER91]

# 1038

Compound: Copper(I) acetate Synonyms: acetic acid, copper(I) salt Formula: Cu(CH<sub>3</sub>COO) Molecular Formula: C<sub>2</sub>H<sub>3</sub>CuO<sub>2</sub> Molecular Weight: 122.591 CAS RN: 598-54-9 Properties: tan powd; stable when dry, decomposes slowly in H<sub>2</sub>O [STR93] [KIR78] Solubility: rapidly hydrolyzed by H<sub>2</sub>O to form yellow Cu<sub>2</sub>O [MER06] Melting Point, °C: volatilizes by heating [MER06] Boiling Point, °C: decomposes if strongly heated [MER06]

#### 1039

Compound: Copper(I) acetylide Synonym: cuprous acetylide Formula: CuC $\equiv$ CCu Molecular Formula: C<sub>2</sub>Cu<sub>2</sub> Molecular Weight: 151.114 CAS RN: 1117-94-8 Properties: amorphous red powd; unstable; oxidizes in air to Cu<sub>2</sub>O, carbon, and water, structure CuC $\equiv$ CCu; can explode when subjected to shock or heated; obtained by reacting acetylene, HC $\equiv$ CH, with soluble cuprous salt in water; used in detonators and other explosives [HAW93] [KIR78] Solubility: v sl s H<sub>2</sub>O [CRC10]

Melting Point, °C: explodes [CRC10]

### 1040

Compound: Copper(I) azide Formula: CuN<sub>3</sub> Molecular Formula: CuN<sub>3</sub> Molecular Weight: 105.566 CAS RN: 14336-80-2 Properties: colorless tetr, a=0.865 nm, c=0.559 nm; M–N<sub>3</sub> bond length, 0.223 nm; highly explosive [CRC10] [CIC73] Solubility: 0.00075 g/100 mL H<sub>2</sub>O (20°C) [CRC10] Density, g/cm<sup>3</sup>: 3.26 [CRC10]

# 1041

**Compound:** Copper(I) bromide **Synonym:** cuprous bromide **Formula:** CuBr Molecular Formula: BrCu Molecular Weight: 143.450 CAS RN: 7787-70-4 **Properties:** -80 mesh with 99.999% and 99% purity; white powd; cub cryst; hygr; turns green to dark blue in sunlight; used as a catalyst for organic reactions [HAW93] [MER06] [STR93] [CER91] Solubility: mol/dm<sup>3</sup> CuBr (mol/dm<sup>3</sup> KBr), 24.8°C: 0.00064 (0.0989), 0.00633 (0.3955), 0.01539 (0.5933), 0.0496 (0.9888), 0.334 (1.978), 1.005 (2.966), 1.860 (3.955) [FRI87] **Density, g/cm<sup>3</sup>:** 4.72 [ALD94] Melting Point, °C: 497 [CRC10] Boiling Point, °C: 1345 [KIR78] Reactions: oxidizes slowly in air becoming green [KIR78] Thermal Conductivity, W/(m·K): 1.25 [CRC10] **Thermal Expansion Coefficient:** 15.4×10<sup>-6</sup>/K [CRC10]

#### 1042

**Compound:** Copper(I) chloride

Synonyms: nantokite, cuprous chloride

- Formula: CuCl
- Molecular Formula: ClCu
- Molecular Weight: 98.999

CAS RN: 7758-89-6

- Properties: -80 mesh with 99.999% and 99% purity; white cub cryst; stable to air and light, if dry; turns green in presence of moisture, sensitive to light, becoming brown; enthalpy of fusion 10.20 kJ/mol; used as a catalyst, preservative, and fungicide [HAW93] [MER06] [CER91] [CRC10]
- **Solubility:** sl s H<sub>2</sub>O; s conc HCl, conc NH<sub>4</sub>OH with complex formation [MER06]
- **Density, g/cm<sup>3</sup>:** 4.14 [MER06]
- Melting Point, °C: 430 [CRC10]
- Boiling Point, °C: 1490 [STR93]; 1366 [KIR78]
- Thermal Conductivity, W/(m·K): 0.84 [CRC10]

**Thermal Expansion Coefficient:** 

 $12.1 \times 10^{-6}$ /K (300 K) [CRC10]

#### 1043

**Compound:** Copper(I) cyanide **Synonym:** cuprous cyanide

Formula: CuCN

Molecular Formula: CCuN

Molecular Weight: 89.564

CAS RN: 544-92-3

**Properties:** white to cream colored powd; colorless or dark green ortho-rhomb cryst; used in plating copper, antifouling paints, and insecticide [HAW93] [MER06] Solubility: i H<sub>2</sub>O, alcohol, cold dil acids; s NH<sub>4</sub>OH, sodium and potassium cyanide solutions [HAW93] [MER06]
Density, g/cm<sup>3</sup>: 1.9 [HAW93]; 2.92 [STR93]
Melting Point, °C: 474 [MER06]
Boiling Point, °C: decomposes [STR93]
Reactions: decomposed by HNO<sub>3</sub> or boiling HCl [MER06]

#### 1044

Compound: Copper(I) fluoride Formula: CuF Molecular Formula: CuF Molecular Weight: 82.544 CAS RN: 13478-41-6 Properties: cub cryst [CRC10] Density, g/cm<sup>3</sup>: 7.1 [CRC10]

### 1045

Compound: Copper(I) hydride Formula: CuH Molecular Formula: CuH Molecular Weight: 64.554 CAS RN: 13517-00-5

Properties: light reddish brown; composition can vary from Cu<sub>0.6</sub> to CuH; can be prepared by precipitation with hypophosphorous acid at 65°C; used as a reducing agent in some organic reactions [KIR78]
Solubility: decomposes in H<sub>2</sub>O at 65°C [CRC10]
Density, g/cm<sup>3</sup>: 6.38 [CRC10]
Melting Point, °C: decomposes at >60 [KIR78]

# 1046

**Compound:** Copper(I) iodide **Synonyms:** marshite, cuprous iodide **Formula:** CuI **Molecular Formula:** CuI **Molecular Weight:** 190.450

CAS RN: 7681-65-4

Properties: -80 mesh with 99.999% purity and -60 mesh with 99% purity; pure white or brownish powd; light sensitive; can be prepared by reacting solution of Cu<sup>++</sup> with I<sup>-</sup> to precipitate CuI; has been used in the manufacture of photographic emulsions, catalyst, and in cloud seeding to assist rainfall [KIR78] [CER91] [ALD94]

**Solubility:** i H<sub>2</sub>O, dil acids; s aq NH<sub>3</sub> solutions [MER06] **Density, g/cm<sup>3</sup>:** 5.63 [MER06]

Melting Point, °C: 605 [CRC10]

Boiling Point, °C: ~1290 [MER06]

**Reactions:** decomposed by conc  $H_2SO_4$ 

and HNO<sub>3</sub> [MER06]

**Thermal Conductivity, W/(m·K):** 1.68 (25°C) [CRC10] **Thermal Expansion Coefficient:** 19.2×10<sup>-6</sup>/K [CRC10]

#### 1047

Compound: Copper(I) mercury iodide Synonym: cuprous mercuric iodide Formula: Cu<sub>2</sub>HgI<sub>4</sub> Molecular Formula: Cu<sub>2</sub>HgI<sub>4</sub> Molecular Weight: 835.300 CAS RN: 13876-85-2 Properties: -60 mesh with 99.5% purity; α-form tetra, deep red; β-form cub, brownish; thermochromic; used for detecting overheating of machine bearings; red color changes to brownish-black at 60°C-70°C, then back to red when cooled; obtained by precipitation from a solution of K<sub>2</sub>HgI<sub>4</sub> and cuprous chloride [KIR81] [MER06] [CER91] [CRC10] Solubility: i H<sub>2</sub>O [KIR81] Density, g/cm<sup>3</sup>: α: 6.116; β: 6.102 [CRC10]

#### 1048

Compound: Copper(I) oxide Synonyms: cuprite, cuprous oxide Formula: Cu<sub>2</sub>O Molecular Formula: Cu<sub>2</sub>O Molecular Weight: 143.091 CAS RN: 1317-39-1 Properties: -200 mesh with 99% purity; cub cryst; color may be yellow, red or brown, depending on method of preparation; brownish red mineral; enthalpy of fusion 64.8 kJ/mol; stable at high temp, can be made by thermal decomposition of CuO above 1030°C; used as a catalyst, fungicide, in purification of helium, and as an antioxidant in lubricants [MER06] [KIR78] [CER91] [JAN85] **Solubility:** i H<sub>2</sub>O; s NH<sub>4</sub>OH, HCl; reacts with dil H<sub>2</sub>SO<sub>4</sub>, HNO<sub>3</sub> [MER06] Density, g/cm<sup>3</sup>: 6.0 [MER06] Melting Point, °C: 1235 [KIR78] **Boiling Point**, °C: decomposes at >1800 [KIR78]

#### 1049

**Compound:** Copper(I) selenide

Synonym: cuprous selenide

Formula: Cu<sub>2</sub>Se

Molecular Formula: Cu<sub>2</sub>Se

Molecular Weight: 206.052

CAS RN: 20405-64-5

Properties: 6 mm pieces and smaller with 99.5% purity; bluish black to black; tetr or cub cryst; metallic luster; semiconductor [MER06] [CER91]
Solubility: i H<sub>2</sub>O; s HCl, evolves H<sub>2</sub>Se [MER06]

### **Density, g/cm<sup>3</sup>:** 6.84 [MER06] **Melting Point, °C:** 1113 [MER06]

## 1050

Compound: Copper(I) sulfide
Synonyms: chalcocite, cuprous sulfide
Formula: Cu<sub>2</sub>S
Molecular Formula: Cu<sub>2</sub>S
Molecular Weight: 159.158
CAS RN: 22205-45-4
Properties: -200 mesh with 99.999% purity; blue to grayish black lustrous powd; orthorhomb cryst; mineral chalcocite has hardness
2.5-3 Mohs [KIR78] [MER06] [CER91]
Solubility: i H<sub>2</sub>O, acetic acid; sl s HC1 [MER06]
Density, g/cm<sup>3</sup>: 5.6 [MER06]
Melting Point, °C: ~1100 [MER06]
Reactions: decomposed by HNO<sub>3</sub> and conc H<sub>2</sub>SO<sub>4</sub> [MER06]

### 1051

Compound: Copper(I) sulfite hemihydrate Synonyms: Etard's salt, cuprous sulfite hemihydrate Formula:  $Cu_2SO_3 \cdot 1/2H_2O$ Molecular Formula:  $Cu_2HO_{3.5}S$ Molecular Weight: 216.164 CAS RN: 13982-53-1 Properties: white to pale yellow; hex cryst; fungicide [MER06] Solubility: sl s  $H_2O$ ; s HCl,  $NH_4OH$ , alkali solutions [MER06]

# 1052

Compound: Copper(I) sulfite monohydrate
Synonyms: Rogojski's salt, cuprous sulfite monohydrate
Formula: Cu<sub>2</sub>SO<sub>3</sub> · H<sub>2</sub>O
Molecular Formula: Cu<sub>2</sub>H<sub>2</sub>O<sub>4</sub>S
Molecular Weight: 225.172
CAS RN: 13982-53-1
Properties: white cryst powd or brick red solid; shown to have an equimolar composition of metallic Cu and Chevreul's salt: Cu<sub>3</sub>O<sub>6</sub>S<sub>2</sub>, cuprocupric sulfate; used as a catalyst, fungicide, and in dyeing textiles [HAW93] [MER06]
Solubility: i H<sub>2</sub>O; s NH<sub>4</sub>OH, decomposes in HCl [HAW93]
Density, g/cm<sup>3</sup>: 3.83 [HAW93]

Melting Point, °C: decomposes [CRC10]

# 1053

**Compound:** Copper(I) telluride **Formula:** Cu<sub>2</sub>Te Molecular Formula: Cu<sub>2</sub>Te
Molecular Weight: 254.692
CAS RN: 12019-52-2
Properties: black hex; 3 mm pieces and smaller with 99.5% purity [CER91] [LID94]
Density, g/cm<sup>3</sup>: 4.6 [STR93]

#### 1054

Compound: Copper(I) thiocyanate
Synonym: cuprous thiocyanate
Formula: CuSCN
Molecular Formula: CCuNS
Molecular Weight: 121.630
CAS RN: 1111-67-7
Properties: white to yellow, amorphous powd; used in manufacturing organic chemicals, antifouling paints, and in printing textiles [HAW93] [MER06]
Solubility: i H<sub>2</sub>O, dil acids, alcohol, acetone; s NH<sub>4</sub>OH, ether [MER06]
Density, g/cm<sup>3</sup>: 2.843 [HAW93]
Melting Point, °C: 1084 [HAW93]
Reactions: decomposed by conc mineral acids [MER06]

### 1055

Compound: Copper(I,II) sulfite dihydrate
Synonym: Chevreul's salt
Formula: Cu<sub>2</sub>SO<sub>3</sub> · CuSO<sub>3</sub> · 2H<sub>2</sub>O
Molecular Formula: Cu<sub>3</sub>H<sub>4</sub>O<sub>8</sub>S<sub>2</sub>
Molecular Weight: 386.797
CAS RN: 13814-81-8
Properties: red; microcryst powd or prismatic cryst [MER06]
Solubility: i H<sub>2</sub>O, alcohol; s NH<sub>4</sub>OH, HCl [MER06]
Density, g/cm<sup>3</sup>: 3.57 [CRC10]
Melting Point, °C: decomposes at 200 [CRC10]

#### 1056

**Compound:** Copper(II) acetate **Synonyms:** acetic acid, Cu(II) salt **Formula:** Cu(CH<sub>3</sub>COO)<sub>2</sub> **Molecular Formula:** C<sub>4</sub>H<sub>6</sub>CuO<sub>4</sub> **Molecular Weight:** 181.636 **CAS RN:** 142-71-2 **Properties:** bluish green powd; hygr [STR93]

#### 1057

**Compound:** Copper(II) acetate metaarsenite **Synonyms:** Paris green, cupric acetoarsenite **Formula:**  $Cu(CH_3COO)_2 \cdot 3Cu(AsO_2)_2$ **Molecular Formula:**  $C_4H_6As_6Cu_4O_{16}$  Molecular Weight: 1013.796

CAS RN: 12002-03-8

Properties: emerald green cryst powd; stable to air and light; used as an insecticide, wood preservative, and paint pigment [KIR78] [MER06]
Solubility: i H<sub>2</sub>O, decomposed by prolonged heating; unstable in acids [MER06]

### 1058

Compound: Copper(II) acetate monohydrate
Synonyms: neutral verdigris, cupric acetate monohydrate
Formula: Cu(CH<sub>3</sub>COO)<sub>2</sub> · H<sub>2</sub>O
Molecular Formula: C<sub>4</sub>H<sub>8</sub>CuO<sub>5</sub>
Molecular Weight: 199.651
CAS RN: 6046-93-1
Properties: dark green; monocl cryst; forms dimeric units; effloresces in dry air [KIR78] [MER06]
Solubility: s H<sub>2</sub>O, alcohol; sl s ether, glycerol [MER06]
Density, g/cm<sup>3</sup>: 1.882 [MER06]
Melting Point, °C: 115 [MER06]
Boiling Point, °C: decomposes at 240 [MER06]

# 1059

Compound: Copper(II) acetylacetonate
Synonyms: 2,4-pentanedione, copper(II) derivative
Formula: Cu(CH<sub>3</sub>COCH=C(O)CH<sub>3</sub>)<sub>2</sub>
Molecular Formula: C<sub>10</sub>H<sub>14</sub>CuO<sub>4</sub>
Molecular Weight: 261.765
CAS RN: 13395-16-9
Properties: cryst blue powd; does not hydrolyze readily [HAW93] [STR93]
Solubility: sl s H<sub>2</sub>O, alcohol; s chloroform [HAW93]
Melting Point, °C: decomposes at 284–285 [STR93]
Boiling Point, °C: sublimes 78 at 0.05 mm Hg pressure [STR93]

# 1060

**Compound:** Copper(II) acetylide **Formula:** CuC<sub>2</sub> **Molecular Formula:** C<sub>2</sub>Cu **CAS RN:** 12540-13-5 **Molecular Weight:** 87.567 **Properties:** brown-black solid; explodes [CRC10] **Melting Point, °C:** explodes at 100 [CRC10]

# 1061

**Compound:** Copper(II) arsenate **Formula:** Cu<sub>3</sub>(AsO<sub>4</sub>)<sub>2</sub> **Molecular Formula:** As<sub>2</sub>Cu<sub>3</sub>O<sub>8</sub> **Molecular Weight:** 468.476 **CAS RN:** 10103-61-4 Properties: light blue, blue, or greenish blue; can have a variable composition; used as an insecticide and fungicide [HAW93]
Solubility: i H<sub>2</sub>O, alcohol; s dil acids, NH<sub>4</sub>OH [HAW93]

### 1062

Compound: Copper(II) arsenite
Synonym: Scheele's green
Formula: CuHAsO<sub>3</sub> (also, Cu(AsO<sub>2</sub>)<sub>2</sub>)
Molecular Formula: AsCuHO<sub>3</sub>
Molecular Weight: 187.474
CAS RN: 10290-12-7
Properties: yellowish green powd; used as an insecticide, fungicide, paint pigment, and as a wood preservative [HAW93] [MER06]
Solubility: i H<sub>2</sub>O, alcohol; s acids, ammonia [MER06]
Melting Point, °C: decomposes [HAW93]

### 1063

Compound: Copper(II) azide Formula:  $Cu(N_3)_2$ Molecular Formula:  $CuN_6$ Molecular Weight: 147.586 CAS RN: 14215-30-6 Properties: brownish-red; ortho-rhomb, a=0.923 nm, b=1.323 nm, c=0.307 nm [CRC10] [CIC73] Solubility: 0.008 g/100 mL H<sub>2</sub>O (20°C) [CRC10] Density, g/cm<sup>3</sup>: 2.604 [CRC10] Reactions: explodes at 215°C [CRC10]

### 1064

Compound: Copper(II) basic acetate Synonym: blue verdigris Formula:  $Cu(CH_3COO)_2 \cdot CuO \cdot 6H_2O$ Molecular Formula:  $C_4H_{18}Cu_2O_{11}$ Molecular Weight: 369.272 CAS RN: 52503-64-7 Properties: formula is approximate; compounds are in the form of blue cryst or blue to green powd [MER06] [CRC10] Solubility: sl s H<sub>2</sub>O, alcohol; s dil acids, ammonia [MER06]

### 1065

**Compound:** Copper(II) basic chromate **Synonym:** basic cupric chromate **Formula:**  $CuCrO_4 \cdot 2Cu(OH)_2$ **Molecular Formula:**  $CrCu_3H_4O_8$ **Molecular Weight:** 340.646 **CAS RN:** 12433-14-6 Properties: light chocolate brown powd; used as a mordant in dyeing, as a wood preservative, and to treat seeds for fungus [HAW93]
Solubility: i H<sub>2</sub>O; s HNO<sub>3</sub> [HAW93]
Reactions: minus water at 260°C [HAW93]

# 1066

Compound: Copper(II) basic nitrite Formula:  $Cu(NO_2)_2 \cdot 3Cu(OH)_2$ Molecular Formula:  $Cu_4H_6N_2O_{10}$ Molecular Weight: 448.239 CAS RN: 14984-71-5 Properties: green powd [HAW93] Solubility: sl s H<sub>2</sub>O; s NH<sub>4</sub>OH; decomposes in dil acids [HAW93] Melting Point, °C: decomposes at 120 [HAW93] Reactions: decomposed by hot H<sub>2</sub>O [CRC10]

#### 1067

**Compound:** Copper(II) benzoate dihydrate **Formula:**  $Cu(C_6H_5COO)_2 \cdot 2H_2O$  **Molecular Formula:**  $C_{14}H_{14}CuO_6$  **Molecular Weight:** 341.807 **CAS RN:** 6046-97-5 **Properties:** blue, cryst, odorless powd [HAW93] **Solubility:** sl s cold H<sub>2</sub>O, alcohol, and acids [HAW93] **Reactions:** minus 2H<sub>2</sub>O at 100°C [HAW93]

# 1068

**Compound:** Copper(II) borate **Synonym:** copper(II) metaborate **Formula:** Cu(BO<sub>2</sub>)<sub>2</sub> **Molecular Formula:** B<sub>2</sub>CuO<sub>4</sub> **Molecular Weight:** 149.166 **CAS RN:** 39290-85-2 **Properties:** amorphous or bluish green cryst

powd; can be prepared by adding borax to an aq Cu<sup>++</sup> sulfate or chloride solution, which precipitates the borate; used as an oil pigment, a dehydrogenation catalyst, wood preservative, and fire retardant additive [HAW93] [KIR78] **Solubility:** i H<sub>2</sub>O; s acids [HAW93]

Density, g/cm<sup>3</sup>: 3.859 [HAW93]

# 1069

Compound: Copper(II) bromide Synonym: cupric bromide Formula: CuBr<sub>2</sub> Molecular Formula: Br<sub>2</sub>Cu Molecular Weight: 223.354 CAS RN: 7789-45-9 Properties: almost black, deliq, monocl cryst or gray powd [MER06] [STR93]  Solubility: s alcohol, acetone, ammonia; i benzene, ether [MER06]; g/100 g soln, H<sub>2</sub>O: 55.7 (0°); solid phase, CuBr<sub>2</sub> [KRU93]; g/100 g H<sub>2</sub>O: 107 (0°C), 126 (20°C), 131 (50°C) [LAN05]
 Density, g/cm<sup>3</sup>: 4.710 [MER06]
 Melting Point, °C: 498 [MER06]
 Boiling Point, °C: 900 [MER06]

#### 1070

**Compound:** Copper(II) butanoate monohydrate **Formula:**  $Cu(C_4H_7O_2)_2 \cdot H_2O$  **Molecular Formula:**  $C_8H_{16}CuO_5$  **Molecular Weight:** 255.756 **CAS RN:** 540-16-9 **Properties:** green monocl plates **Solubility:** s H<sub>2</sub>O, dioxane, benzene; sl EtOH [CRC10]

### 1071

Compound: Copper(II) butyrate monohydrate Synonym: cupric butyrate monohydrate Formula:  $Cu(CH_3CH_2CH_2COO)_2 \cdot H_2O$ Molecular Formula:  $C_8H_{16}CuO_5$ Molecular Weight: 255.758 CAS RN: 540-16-9 Properties: large, dark green; monocl, hex plates; becomes dull and disintegrates after several days of exposure to air [MER06] Solubility: s  $H_2O$ , dioxane, benzene; sl s alcohol, chloroform [MER06]

#### 1072

**Compound:** Copper(II) carbonate Formula:  $CuCO_3$ Molecular Formula:  $CCuO_3$ Molecular Weight: 123.555 CAS RN: 1184-64-1 Properties: cryst [CRC10] Solubility: i H<sub>2</sub>O

#### 1073

Compound: Copper(II) carbonate hydroxide
Synonyms: malachite, Bremen green
Formula: CuCO<sub>3</sub> · Cu(OH)<sub>2</sub>
Molecular Formula: CH<sub>2</sub>Cu<sub>2</sub>O<sub>5</sub>
Molecular Weight: 221.116
CAS RN: 12069-69-1
Properties: green to blue amorphous powd or dark green monocl cryst; malacite hardness 3.5−4 Mohs [KIR78] [MER06]
Solubility: i H<sub>2</sub>O, alcohol; s dil acids, ammonia [MER06]

Density, g/cm<sup>3</sup>: 4.0 [STR93] Melting Point, °C: decomposes at 200 [STR93]

# 1074

Compound: Copper(II) chlorate hexahydrate
Synonym: cupric chlorate hexahydrate
Formula: Cu(ClO<sub>3</sub>)<sub>2</sub>·6H<sub>2</sub>O
Molecular Formula: Cl<sub>2</sub>CuH<sub>12</sub>O<sub>12</sub>
Molecular Weight: 338.539
CAS RN: 14721-21-2
Properties: blue to green; deliq; octahedral cryst [MER06]
Solubility: mol/100 mol H<sub>2</sub>O: 11.02 (0.8°C), equilibrium solid phase Cu(ClO<sub>3</sub>)<sub>2</sub>·4H<sub>2</sub>O [KRU93]; v s alcohol [MER06]
Melting Point, °C: 65 [MER06]
Boiling Point, °C: decomposes at 100 [MER06]

# 1075

Compound: Copper(II) chloride Synonym: cupric chloride Formula: CuCl<sub>2</sub> Molecular Formula: Cl<sub>2</sub>Cu Molecular Weight: 134.451 CAS RN: 7447-39-4 Properties: -80 mesh with 99% purity; yellow to

brown; deliq; microcryst powd; usually exists as blue-green dihydrate; enthalpy of fusion 20.40kJ/ mol [CRC10] [MER06] [KIR78] [CER91]

Solubility: s H<sub>2</sub>O, alcohol, acetone [MER06]; g/100 g soln, H<sub>2</sub>O: 40.7 ± 10.2 (0°C), 43.8 ± 0.6 (25°C), 54.6 (100°C); solid phase, CuCl<sub>2</sub> · 2H<sub>2</sub>O [KRU93]
 Density, g/cm<sup>3</sup>: 3.386 [STR93]
 Melting Point, °C: 620 [ALD94]
 Boiling Point, °C: decomposes to CuCl at 993 [KIR78]

# 1076

Compound: Copper(II) chloride dihydrate Synonyms: eriochalcite, cupric chloride dihydrate Formula: CuCl<sub>2</sub> · 2H<sub>2</sub>O Molecular Formula: Cl<sub>2</sub>CuH<sub>4</sub>O<sub>2</sub> Molecular Weight: 170.482 CAS RN: 10125-13-0 Properties: green to blue powd or ortho-rhomb cryst; deliq in moist air, effloresces in dry air; used as catalyst in organic synthesis, e.g., chlorination; used as pigment [MER06] [KIR78] Solubility: 1 g dihydrate/l mL H<sub>2</sub>O (25°C) [KIR78]; s methanol, ethanol [MER06] Density, g/cm3: 2.51 [MER06] Melting Point, °C: ~100 [MER06] Reactions: minus 2H<sub>2</sub>O if heated at 120°C in a stream of HCl [KIR78]

# 1077

**Compound:** Copper(II) chromate **Formula:** CuCrO<sub>4</sub> **Molecular Formula:** CrCuO<sub>4</sub>

Molecular Weight: 179.540

CAS RN: 13548-42-0

- **Properties:** reddish brown; used as a fungicide, to weatherproof textiles, in epoxy adhesives, and to preserve wood [KIR78]
- **Solubility:** mol/L soln, H<sub>2</sub>O: 0.0020 (25°C); solid phase, CuCrO<sub>4</sub>·H<sub>2</sub>O [KRU93]

Melting Point, °C: decomposes at 400 [KIR78]

Reactions: minus O2 to form blue-black

CuOCr<sub>2</sub>O<sub>3</sub> at 400°C [KIR78]

### 1078

Compound: Copper(II) chromite Synonym: cupric chromite Formula:  $CuCr_2O_4$ Molecular Formula:  $Cr_2CuO_4$ Molecular Weight: 231.536 CAS RN: 12018-10-9 Properties: grayish black to black; tetr cryst; used in automobile exhaust catalysts; there is also  $2CuO \cdot Cr_2O_3$ , CAS RN 12053-18-8 [KIR78] [MER06] [ALD94] Solubility: i H<sub>2</sub>O, dil acids, conc HCl [MER06] Density, g/cm<sup>3</sup>: 5.4 [LID94]

### 1079

**Compound:** Copper(II) citrate hemipentahydrate **Formula:**  $Cu_2C_6H_4O_7 \cdot 2.5H_2O$  **Molecular Formula:**  $C_6H_9O_{9.5}$  **Molecular Weight:** 360.221 **CAS RN:** 10402-15-0 **Properties:** blue-green cryst [CRC10] **Solubility:** sl H<sub>2</sub>O; s dil acid **Melting Point, °C:** decomposes at 100 [CRC10]

#### 1080

Compound: Copper(II) cyanide Synonym: cupric cyanide Formula: Cu(CN)<sub>2</sub> Molecular Formula: C<sub>2</sub>CuN<sub>2</sub> Molecular Weight: 115.581 CAS RN: 14763-77-0 Properties: green powd; used to electroplate copper onto iron [HAW93] Solubility: i H<sub>2</sub>O; s acids and alkalies [HAW93] Melting Point, °C: decomposes [CRC10]

**Compound:** Copper(II) cyclohexanebutanoate **Formula:**  $Cu(C_{10}H_{17}O_2)_2$  **Molecular Formula:**  $C_{20}H_{34}CuO_4$  **Molecular Weight:** 402.028 **CAS RN:** 2218-80-6 **Properties:** powd [CRC10] **Melting Point,** °C: decomposes at 126 [CRC10]

### 1082

Compound: Copper(II) dichromate dihydrate Formula:  $CuCr_2O_7 \cdot 2H_2O$ Molecular Formula:  $Cr_2CuH_4O_9$ Molecular Weight: 315.565 CAS RN: 13675-47-3 Properties: reddish brown; tricl; used in catalysts and as a wood preservative [KIR78] Solubility: v s  $H_2O$  [KIR78] Density, g/cm<sup>3</sup>: 2.286 [KIR78] Reactions: minus  $2H_2O$  at 100°C [CRC10]

#### 1083

**Compound:** Copper(II) ethanolate **Formula:**  $Cu(C_2H_5O)_2$  **Molecular Formula:**  $C_4H_{10}CuO_2$  **Molecular Weight:** 153.667 **CAS RN:** 2850-65-9 **Properties:** blue hygr solid [CRC10] **Solubility:** i organic solvents [CRC10] **Melting Point,** °C: decomposes at 120 [CRC10]

#### 1084

**Compound:** Copper(II) ethylacetoacetate **Formula:**  $Cu(C_2H_5CO_2CHCOCH_3)_2$  **Molecular Formula:**  $C_{12}H_{18}CuO_6$  **Molecular Weight:** 321.813 **CAS RN:** 14284-06-1 **Properties:** green cryst [CRC10] **Solubility:** s EtOH, chloroform [CRC10] **Melting Point, °C:** 192 [CRC10]

# 1085

**Compound:** Copper(II) 2-ethylhexanoate **Formula:**  $Cu(C_8H_{15}O_2)_2$  **Molecular Formula:**  $C_{16}H_{30}CuO_4$  **Molecular Weight:** 349.953 **CAS RN:** 149-11-1 **Properties:** powd [CRC10] **Melting Point,** °C: decomposes at 252 [CRC10]

# 1086

Compound: Copper(II) ferrate Synonym: copper diiron tetroxide Formula:  $CuFe_2O_4$ Molecular Formula:  $CuFe_2O_4$ Molecular Weight: 239.234 CAS RN: 12018-79-0 Properties: black cryst; spinel structure; magnetic properties; formed by reaction of CuO and  $Fe_2O_3$  at ~900°C or by coprecipitation and sintering at 900°C; has been used to manufacture piezomagnets and magnetic tapes; also used as a catalyst, e.g., exhaust control [KIR78] [STR93]

#### 1087

Compound: Copper(II) ferrocyanide Synonyms: Hatchett's brown, cupric ferrocyanide Formula: Cu<sub>2</sub>Fe(CN)<sub>6</sub> Molecular Formula: C<sub>6</sub>Cu<sub>2</sub>FeN<sub>6</sub> Molecular Weight: 339.043 CAS RN: 13601-13-3 Properties: reddish brown powd or cub cryst; precipitates as gel or colloid [MER06] Solubility: i H<sub>2</sub>O, dil acids; s NH<sub>4</sub>OH [MER06]

### 1088

Compound: Copper(II) ferrous sulfide Synonym: chalcopyrite Formula: CuFeS<sub>2</sub> Molecular Formula: CuFeS<sub>2</sub> Molecular Weight: 183.523 CAS RN: 1308-56-1 Properties: yellow brass colored cryst; tetr; hardness 3.5–4.0; chalcopyrite is an ore; can be synthesized by reacting KFeS with ammonia copper solution; used in semiconductor research [MER06] Solubility: s HNO<sub>3</sub>, aqua regia; i HCl [MER06] Density, g/cm<sup>3</sup>: 4.1–4.3 [MER06] Melting Point, °C: 950 [MER06] Thermal Expansion Coefficient: (volume) 100°C (0.42) [CLA66]

# 1089

**Compound:** Copper(II) fluoride **Synonym:** cupric fluoride **Formula:** CuF<sub>2</sub> **Molecular Formula:** CuF<sub>2</sub> **Molecular Weight:** 101.543 **CAS RN:** 7789-19-7

- Properties: -100 mesh with 99.5% purity; white powd; monocl cryst; hygr, turns blue in moist air, forming dihydrate; enthalpy of fusion 55.23 kJ/mol; prepared by reaction of copper oxide or basic carbonate with anhydrous HF, followed by dehydration in stream of anhydrous HF at high temp; finds use as a catalyst in organic reactions, as a fluorinating agent, and in high-density batteries [KIR78] [MER06] [STR93] [CER91] [CRC10] [JAN82]
- Solubility: 4.7 g/100 mL H<sub>2</sub>O (20°C); hydrolyzed to CuFOH in hot H<sub>2</sub>O [MER06]; g/100 ml soln, H<sub>2</sub>O: 0.075 (25°C); solid phase, CuF<sub>2</sub> · 2H<sub>2</sub>O [KRU93]
   Density, g/cm<sup>3</sup>: 4.23 [STR93]
   Melting Point, °C: 836 [CRC10]
   Boiling Point, °C: 1678 [JAN85]

Compound: Copper(II) fluoride dihydrate Synonym: cupric fluoride dihydrate Formula: CuF<sub>2</sub>·2H<sub>2</sub>O Molecular Formula: CuF<sub>2</sub>H<sub>4</sub>O<sub>2</sub> Molecular Weight: 137.574 CAS RN: 13454-88-1 Properties: blue; monocl cryst; a trihydrate is also listed with density 2.93 [MER06] [ALD94] Solubility: sl s cold H<sub>2</sub>O, hydrolyzed to CuFOH in hot H<sub>2</sub>O [MER06] Density, g/cm<sup>3</sup>: 2.934 [MER06] Melting Point, °C: decomposes at >130 [MER06]

### 1091

Compound: Copper(II) formate Synonym: cupric formate Formula: Cu(HCOO)<sub>2</sub> Molecular Formula: C<sub>2</sub>H<sub>2</sub>CuO<sub>4</sub> Molecular Weight: 153.582 CAS RN: 544-19-4 Properties: three forms of anhydrous formate exist: powd blue, turquoise or royal blue cryst [MER06] Solubility: 12.5 g/100 mL H<sub>2</sub>O [CRC10]; i most organic solvents [MER06] Density, g/cm<sup>3</sup>: 1.831 [STR93]

# 1092

**Compound:** Copper(II) formate tetrahydrate **Synonym:** cupric formate tetrahydrate **Formula:**  $Cu(HCOO)_2 \cdot 4H_2O$ **Molecular Formula:**  $C_2H_{10}CuO_8$ **Molecular Weight:** 225.642 **CAS RN:** 5893-61-8 Properties: large, light blue; monocl; powd blue modification formed by dehydration over CaCl<sub>2</sub>, under reduced pressure [MER06]
Solubility: 6.2 g/100 mL H<sub>2</sub>O [CRC10]; v sl s alcohol [MER06]
Density, g/cm<sup>3</sup>: 1.81 [CRC10]
Reactions: minus H<sub>2</sub>O at 130°C [CRC10]

### 1093

Compound: Copper(II) gluconate
Formula: Cu(CH<sub>2</sub>OH(CHOH)<sub>4</sub>COO)<sub>2</sub>
Molecular Formula: C<sub>12</sub>H<sub>22</sub>CuO<sub>14</sub>
Molecular Weight: 453.845
CAS RN: 527-09-3
Properties: forms light blue to bluish green water soluble cryst; used as a feed additive, dietary supplement, mouth deodorant, and to treat arthritis [HAW93] [KIR78] [STR93]
Solubility: s H<sub>2</sub>O; i alcohol, ether, acetone [HAW93]

# 1094

**Compound:** Copper(II) glycinate monohydrate **Synonym:** cupric glycinate hydrate **Formula:**  $Cu(H_2NCH_2COO)_2 \cdot H_2O$  **Molecular Formula:**  $C_4H_{10}CuN_2O_5$  **Molecular Weight:** 229.679 **CAS RN:** 13479-54-4 **Properties:** deep blue; long rhomb needles [MER06] **Solubility:** s H<sub>2</sub>O, sl s alcohol [MER06] **Melting Point,** °C: chars 213 [MER06] **Boiling Point,** °C: decomposes with evolution of gas at 228 [MER06]

#### 1095

Compound: Copper(II) hexafluoroacetylacetonate Synonyms: 1,1,1,5,5,5-hexafluoro-2,4pentanedione, Cu(II) derivative Formula: Cu(CF<sub>3</sub>COCHCOCF<sub>3</sub>)<sub>2</sub> Molecular Formula: C<sub>10</sub>H<sub>2</sub>CuF<sub>12</sub>O<sub>4</sub> Molecular Weight: 477.650 CAS RN: 14781-45-4 Properties: blue-green cryst; hygr [STR94] Melting Point, °C: 85–89 [STR93] Boiling Point, °C: sublimes at 70 (0.05 mm Hg) [STR93] Reactions: decomposes at 220°C [STR93]

#### 1096

**Compound:** Copper(II) hexafluorosilicate tetrahydrate **Synonym:** cupric hexafluorosilicate tetrahydrate **Formula:**  $CuSiF_6 \cdot 4H_2O$  Molecular Formula: CuF<sub>6</sub>H<sub>8</sub>O<sub>4</sub>Si
Molecular Weight: 277.684
CAS RN: 12062-24-7
Properties: blue, monocl, efflorescent cryst; decomposed by heating [HAW93] [MER06]
Solubility: g anhydrous/100 g H<sub>2</sub>O: 73.5 (0°C), 81.6 (20°C), 93.2 (75°C) [LAN05]; sl s alcohol [HAW93] [MER06]
Density, g/cm<sup>3</sup>: 2.56 [MER06]

### 1097

Compound: Copper(II) hexafluoroacetylacetonate hydrate
Synonyms: 1,1,1,5,5,5-hexafluoro-2,4pentanedione, Cu(II) derivative hydrate
Formula: Cu[CF<sub>3</sub>COCH=C(O)CF<sub>3</sub>]<sub>2</sub> · xH<sub>2</sub>O
Molecular Formula: C<sub>10</sub>H<sub>2</sub>CuF<sub>12</sub>O<sub>4</sub> (anhydrous)
Molecular Weight: 477.650 (anhydrous)
CAS RN: 14781-45-4
Properties: bluish-green cryst; precursor for metal oxide chemical vapor deposition [STR94] [STR93] [ALD94]
Melting Point, °C: 130–134 [ALD94]

### 1098

**Compound:** Copper(II) hydroxide **Synonym:** cupric hydroxide **Formula:** Cu(OH)<sub>2</sub> **Molecular Formula:** CuH<sub>2</sub>O<sub>2</sub> **Molecular Weight:** 97.561 **CAS RN:** 20427-59-2 **Properties:** blue to bluish green gel or light blue

- cryst powd, which decomposes to CuO by sl warming; can be prepared by anodic dissolution of a copper anode in sodium sulfate or trisodium phosphate solution; used as a fungicide and as a constituent of antifouling marine paints [MER06]
- **Solubility:** i H<sub>2</sub>O; when freshly precipitated, s conc alkali; s acids, NH<sub>4</sub>OH [MER06]; mol/L soln, H<sub>2</sub>O:  $3 \times 10^{-5}$  (25°C) [KRU93]

**Density, g/cm<sup>3</sup>:** 3.37 [MER06] **Reactions:** minus H<sub>2</sub>O on heating [CRC10]

# 1099

**Compound:** Copper(II) hydroxy chloride **Formula:**  $CuCl_2 \cdot 3Cu(OH)_2$  **Molecular Formula:**  $Cl_2Cu_4H_6O_6$  **Molecular Weight:** 427.133 **CAS RN:** 16004-08-3 Properties: this basic chloride as well as other compositions can be synthesized by precipitation at controlled pH; other compositions include Cu<sub>2</sub>OCl<sub>2</sub>, 12167-76-6, and Cu<sub>4</sub>O<sub>3</sub>Cl<sub>2</sub>, 12356-86-4; compounds have been used in crop protection, electronics, metallurgy, and as catalysts [KIR78]
Solubility: i H<sub>2</sub>O [CRC10]
Density, g/cm<sup>3</sup>: 3.75 [CRC10]
Reactions: minus H<sub>2</sub>O at 250°C [CRC10]

#### 1100

**Compound:** Copper(II) iodate **Formula:**  $Cu(IO_3)_2$  **Molecular Formula:**  $CuI_2O_6$  **Molecular Weight:** 413.351 **CAS RN:** 13454-89-2 **Properties:** green monocl cryst [CRC10] **Density, g/cm<sup>3</sup>:** 5.241 [CRC10] **Solubility:** g/100 g H<sub>2</sub>O: 0.15<sup>20</sup>; s dil acid [CRC10] **Melting Point,** °C: decomposes [CRC10]

### 1101

**Compound:** Copper(II) iodate monohydrate **Formula:**  $Cu(IO_3)_2 \cdot H_2O$  **Molecular Formula:**  $CuH_2I_2O_7$  **Molecular Weight:** 431.367 **CAS RN:** 13454-90-5 **Properties:** blue tricl cryst [CRC10] **Solubility:** g/100 g H<sub>2</sub>O: 0.15<sup>20</sup>; s dil H<sub>2</sub>SO<sub>4</sub> [CRC10] **Melting Point,** °C: decomposes at 248 [CRC10] **Density, g/cm<sup>3</sup>:** 4.872 [CRC10]

### 1102

Compound: Copper(II) lactate dihydrate Formula:  $Cu(C_3H_5O_3)_2 \cdot 2H_2O$ Molecular Formula:  $C_6H_{14}CuO_8$ Molecular Weight: 277.718 CAS RN: 16039-52-4 Properties: greenish blue cryst or granules; fungicide [HAW93] Solubility: 16.7 g/100 mL H<sub>2</sub>O [CRC10]; NH<sub>4</sub>OH [HAW93]

# 1103

**Compound:** Copper(II) molybdate **Formula:** CuMoO<sub>4</sub> **Molecular Formula:** CuMoO<sub>4</sub> **Molecular Weight:** 223.484 **CAS RN:** 13767-34-5 Properties: light green cryst; used as a paint pigment, corrosion inhibitor, and in protective coatings [HAW93] [KIR81] [MOI86]
Solubility: 0.038 g/100 g H<sub>2</sub>O [KIR81]
Density, g/cm<sup>3</sup>: 3.4 [HAW93]
Melting Point, °C: decomposes at 820 [KIR81]

#### 1104

**Compound:** Copper(II) nitrate **Synonym:** cupric nitrate **Formula:** Cu(NO<sub>3</sub>)<sub>2</sub> **Molecular Formula:** CuN<sub>2</sub>O<sub>6</sub> **Molecular Weight:** 187.555 **CAS RN:** 3251-23-8

**Properties:** large, bluish green; deliq; ortho-rhomb cryst; can be obtained by sublimation of Cu(NO<sub>3</sub>)<sub>2</sub> under vacuum from a well mixed mixture of AgNO<sub>3</sub> and CuBr<sub>2</sub> at 200°C; used as ceramic color, mordant in dyeing, and a catalyst [MER06]

**Solubility:** s H<sub>2</sub>O, ethyl acetate, dioxane; reacts with ether [MER06]; g/100 g soln, H<sub>2</sub>O: 45.5 (0°C), 60.1 (25°C), 71.2 (100°C); solid phase, Cu(NO<sub>3</sub>)<sub>2</sub> · 6H<sub>2</sub>O (0°C, 25°C), Cu(NO<sub>3</sub>)<sub>2</sub> · 2-1/2H<sub>2</sub>O (100°C) [KRU93] **Melting Point**, °C: 255–256 [MER06]

# 1105

Compound: Copper(II) nitrate hexahydrate Synonym: cupric nitrate hexahydrate Formula:  $Cu(NO_3)_2 \cdot 6H_2O$ Molecular Formula:  $CuH_{12}N_2O_{12}$ Molecular Weight: 295.647 CAS RN: 13478-38-1 Properties: blue; deliq; prismatic cryst [MER06] Solubility: 243.7 g/100 mL  $H_2O$  (0°C) [CRC10]; s alcohol [MER06] Density, g/cm<sup>3</sup>: 2.07 [MER06] Reactions: minus  $3H_2O$  at 26.4°C [HAW93]

# 1106

Compound: Copper(II) nitrate trihydrate
Synonyms: cupric nitrate trihydrate, gerhardite
Formula: Cu(NO<sub>3</sub>)<sub>2</sub> · 3H<sub>2</sub>O
Molecular Formula: CuH<sub>6</sub>N<sub>2</sub>O<sub>9</sub>
Molecular Weight: 241.602
CAS RN: 10031-43-3
Properties: blue; deliq; rhomb plates; there is a hemipentahydrate with CAS RN 19004-19

with same density and melting point as the trihydrate [MER06] [ALD94]  Solubility: 137.8 g/100 mL H<sub>2</sub>O (0°C), 1270 g/100 mL H<sub>2</sub>O (100°C) [CRC10]; v s alcohol; i ethyl acetate [MER06]
 Density, g/cm<sup>3</sup>: 2.32 [HAW93]
 Melting Point, °C: 114.5 [MER06]
 Boiling Point, °C: decomposes at 170 [HAW93]

# 1107

Compound: Copper(II) oleate Synonyms: 9-octadecanoic acid, Cu(II) salt Formula:  $Cu(C_{17}H_{33}COO)_2$ Molecular Formula:  $C_{36}H_{66}CuO_4$ Molecular Weight: 626.464 CAS RN: 1120-44-1 Properties: blue to green solid; can be prepared by reacting the acid with CuO or basic carbonate of Cu; coalesces mercury drops; improves oil combustion by reducing smoke and fumes of burning oil; used as textile fungicide, used in antifouling marine paints [MER06] Solubility: i H<sub>2</sub>O; sl s alcohol; s ether [MER06]

### 1108

Compound: Copper(II) oxalate Synonyms: ethanedioic acid, Cu(II) salt Formula: CuC<sub>2</sub>O<sub>4</sub> Molecular Formula: C<sub>2</sub>CuO<sub>4</sub> Molecular Weight: 151.566 CAS RN: 814-91-5 Properties: bluish white powd [MER06] Solubility: i H<sub>2</sub>O, alcohol, ether, acetic acid; s NH<sub>4</sub>OH [MER06] Melting Point, °C: decomposes at 310 [MER06]

### 1109

Compound: Copper(II) oxalate hemihydrate Synonym: cupric oxalate hemihydrate Formula:  $CuC_2O_4 \cdot 1/2H_2O$ Molecular Formula:  $C_2HCuO_{4.5}$ Molecular Weight: 160.573 CAS RN: 814-91-5 Properties: bluish white powd; loses any hydrated water by 200°C [MER06] Solubility: i H<sub>2</sub>O, alcohol, ether, acetic acid; s NH<sub>4</sub>OH [MER06] Melting Point, °C: anhydrous decomposes at ~300 to copper oxide [HAW93]

# 1110

**Compound:** Copper(II) oxide

Synonyms: tenorite [1317-92-6], cupric oxide

HANDBOOK OF INORGANIC COMPOUNDS, SECOND EDITION

Formula: CuO Molecular Formula: CuO Molecular Weight: 79.545 CAS RN: 1317-38-0 Properties: 20 mash with 00.000% on

Properties: -20 mesh with 99.999% and -200 mesh with 99.9% purity; black to brownish black amorphous or cryst powd or granules; enthalpy of fusion 11.80 kJ/mol; can be prepared by oxidation of Cu turnings at 800°C; used as a fungicide, herbicide, and in cloud seeding, as a heat collector surface in solar energy; reduces tar in tobacco smoke [MER06] [KIR78] [CER91] [CRC10]

```
Solubility: 0.000320 moles/kg alkaline
phosphate: 0.203 × 10<sup>-6</sup> mol/kg H<sub>2</sub>O
(26.1°C), 0.675 × 10<sup>-6</sup> mol/kg H<sub>2</sub>O (94.4°C),
5.241 × 10<sup>-6</sup> moles/kg H<sub>2</sub>O (190.0°C),
20.43 × 10<sup>-6</sup> m/kg H<sub>2</sub>O (260.0°C) [ZIE92a]
Density, g/cm<sup>3</sup>: 6.315 [MER06]
Melting Point, °C: 1446 [CRC10]
```

# 1111

Compound: Copper(II) oxychloride
Synonym: Brunswick green
Formula: CuCl<sub>2</sub> · 3CuO · 3-l/2H<sub>2</sub>O
Molecular Formula: Cl<sub>2</sub>Cu<sub>4</sub>H<sub>7</sub>O<sub>6.5</sub>
Molecular Weight: 436.141
CAS RN: 1332-40-7
Properties: bluish green powd; used as a pigment, pesticide, and to control fungus growth in grapevines [HAW93]
Solubility: i H<sub>2</sub>O; s acids, ammonia [HAW93]
Reactions: minus 3H<sub>2</sub>O at 140°C [CRC10]

# 1112

Compound: Copper(II) perchlorate
Synonym: cupric perchlorate
Formula: Cu(ClO<sub>4</sub>)<sub>2</sub>
Molecular Formula: Cl<sub>2</sub>CuO<sub>8</sub>
Molecular Weight: 262.446
CAS RN: 13770-18-8
Properties: very pale green; hygr cryst; volatilized by heating; thermally stable up to 130°C [MER06]
Solubility: s H<sub>2</sub>O, ether, dioxane, ethyl acetate; i benzene, CCl<sub>4</sub> [MER06]; g/100g soln, H<sub>2</sub>O: 54.3 (0°C), 59.3 (30°C); solid phase, Cu(ClO<sub>4</sub>)<sub>2</sub>·6H<sub>2</sub>O [KRU93]
Melting Point, °C: ~230–240 [MER06]
Reactions: decomposes to basic perchlorate >130°C [MER06]

### 1113

**Compound:** Copper(II) perchlorate hexahydrate **Synonym:** cupric perchlorate hexahydrate

Formula:  $Cu(ClO_4)_2 \cdot 6H_2O$ Molecular Formula:  $Cl_2CuH_{12}O_{14}$ Molecular Weight: 370.538 CAS RN: 10294-46-9 Properties: deep blue; monocl cryst [MER06] Solubility: v H<sub>2</sub>O, methanol, ethanol, acetic acid [MER06] Density, g/cm<sup>3</sup>: 2.225 [STR93] Melting Point, °C: 82 [STR93] Boiling Point, °C: decomposes at 120 [STR93]

#### 1114

**Compound:** Copper(II) phosphate **Formula:**  $Cu_3(PO_4)_2$  **Molecular Formula:**  $Cu_3O_8P_2$  **Molecular Weight:** 380.581 **CAS RN:** 7798-23-4 **Properties:** blue-green tricl cryst [CRC10] **Solubility:** i H<sub>2</sub>O; s acid, NH<sub>4</sub>OH [CRC10]

### 1115

Compound: Copper(II) phosphate trihydrate Synonym: cupric phosphate trihydrate Formula:  $Cu_3(PO_4)_2 \cdot 3H_2O$ Molecular Formula:  $Cu_3H_6O_{11}P_2$ Molecular Weight: 434.627 CAS RN: 10031-48-8 Properties: blue or olive green; ortho-rhomb cryst; used in chemical analysis, as a fungicide, catalyst, and to inhibit oxidation of metals [HAW93] [MER06] Solubility: i cold H<sub>2</sub>O, sl s hot H<sub>2</sub>O; s acids, NH<sub>4</sub>OH [MER06] Reactions: decomposes if heated [MER06]

# 1116

Compound: Copper(II) phthalocyanine
Synonym: Pigment blue 15C
Molecular Formula: C<sub>32</sub>H<sub>16</sub>CuN<sub>8</sub>
Molecular Weight: 576.079
CAS RN: 147-14-8
Properties: bright blue cryst; both α and β forms, β more stable; used in inks and paints [MER06] [ALD94]
Solubility: s 98% H<sub>2</sub>SO<sub>4</sub>; i H<sub>2</sub>O [MER06]
Melting Point, °C: sublimes at ~580 at low pressure of N<sub>2</sub> [MER06]
Reactions: decomposed by hot HNO<sub>3</sub> [MER06]

# 1117

**Compound:** Copper(II) pyrophosphate hydrate **Synonym:** Unichrome **Formula:**  $Cu_2P_2O_7 \cdot xH_2O$  Molecular Formula: Cu<sub>2</sub>O<sub>7</sub>P<sub>2</sub> (anhydrous) Molecular Weight: 301.035 (anhydrous) CAS RN: 10102-90-6 Properties: used in electroplating copper [HAW93]

# 1118

Compound: Copper(II) selenate pentahydrate Synonym: cupric selenate pentahydrate Formula: CuSeO<sub>4</sub> · 5H<sub>2</sub>O Molecular Formula: CuH<sub>10</sub>O<sub>9</sub>Se Molecular Weight: 296.580 CAS RN: 10031-45-5 Properties: light blue; tricl cryst; used as a black colorant for copper [HAW93] [MER06] **Solubility:**  $g/100 g \operatorname{soln} H_2O$ :  $10.6 \pm 0.2 (0^{\circ}C)$ ,  $16.0 \pm 0.1 (25^{\circ}C)$ , solid phase CuSeO<sub>4</sub> · 5H<sub>2</sub>O [KRU93]; s acids, NH<sub>4</sub>OH; v sl s acetone; i alcohol [HAW93] [MER06] Density, g/cm<sup>3</sup>: 2.56 [MER06] **Reactions:** forms monohydrate at 150°C–200°C, anhydrous by 265°C; decomposes to selenite and basic selenite at ~480°C, then to CuO at ~700°C [MER06]

# 1119

Compound: Copper(II) selenide
Synonym: cupric selenide
Formula: CuSe
Molecular Formula: CuSe
Molecular Weight: 142.506
CAS RN: 1317-41-5
Properties: 6 mm pieces and smaller with 99.5% purity; bluish black to greenish black; prismatic needles or hex plates; decomposes at dull red heat [MER06] [CER91]
Solubility: s HCl, evolves H<sub>2</sub>Se; s H<sub>2</sub>SO<sub>4</sub>, evolves SO<sub>2</sub> [MER06]
Density, g/cm<sup>3</sup>: 5.99 [STR93]
Melting Point, °C: decomposes at 550 [STR93]
Reactions: oxidized to CuSeO<sub>3</sub> by HNO<sub>3</sub> [MER06]

# 1120

**Compound:** Copper(II) selenite dihydrate **Synonym:** cupric selenite dihydrate **Formula:**  $CuSeO_3 \cdot 2H_2O$  **Molecular Formula:**  $CuH_4O_5Se$  **Molecular Weight:** 226.535 **CAS RN:** 15168-20-4 **Properties:** blue; ortho-rhomb or monocl cryst [MER06] **Solubility:** i H<sub>2</sub>O, H<sub>2</sub>SeO<sub>3</sub>; s acids, NH<sub>4</sub>OH [MER06] **Density, g/cm<sup>3</sup>:** 3.31 [MER06] **Reactions:** minus  $2H_2O$  by 265°C; decomposes to CuSeO<sub>3</sub>·CuO at >460°C; decomposes to CuO at >660°C [MER06]

# 1121

Compound: Copper(II) silicate dihydrate Synonym: chrysocolla Formula: CuSiO<sub>3</sub> · 2H<sub>2</sub>O Molecular Formula: CuH<sub>4</sub>O<sub>5</sub>Si Molecular Weight: 175.661 CAS RN: 26318-99-0 Properties: green to blue ortho-rhomb; hardness 2.4 Mohs [KIR78] Density, g/cm<sup>3</sup>: 2–2.24 [CRC10]

### 1122

**Compound:** Copper(II) stannate **Formula:** CuSnO<sub>3</sub> **Molecular Formula:** CuO<sub>3</sub>Sn **Molecular Weight:** 230.254 **CAS RN:** 12019-07-7 **Properties:** blue powd [STR93]

# 1123

Compound: Copper(II) stearate
Synonyms: octadecanoic acid, Cu(II) salt
Formula: Cu[CH<sub>3</sub>(CH<sub>2</sub>)<sub>16</sub>COO]<sub>2</sub>
Molecular Formula: C<sub>36</sub>H<sub>70</sub>CuO<sub>4</sub>
Molecular Weight: 630.496
CAS RN: 660-60-6
Properties: pale blue to bluish green; amorphous powd; used in coatings for xerographic plates and in heat sensitive coatings [MER06] [KIR78]
Solubility: i H<sub>2</sub>O, ethanol, ether; s pyridine, dioxane [MER06]
Density, g/cm<sup>3</sup>: 1.10 [KIR78]
Melting Point, °C: 112 [KIR78]

### 1124

Compound: Copper(II) sulfate Synonym: chalcocyanite Formula:  $CuSO_4$ Molecular Formula:  $CuO_4S$ Molecular Weight: 159.610 CAS RN: 7758-98-7 Properties: grayish white to greenish white; rhomb cryst or amorphous powd [MER06] Solubility: i alcohol [MER06]; g/100 g soln, H<sub>2</sub>O: 12.7 ± 0.3 (0°C), 18.4 ± 0.2 (25°C), 42.9 ± 0.5 (100°C); solid phase,  $CuSO_4 \cdot 5H_2O$ (0°C, 25°C),  $CuSO_4 \cdot 3H_2O$  (100°C) [KRU93] Density, g/cm<sup>3</sup>: 3.603 [STR93] Melting Point, °C: decomposes at 560 [LID94]

# 1125

**Compound:** Copper(II) sulfate, basic **Formula:**  $Cu_3(OH)_4SO_4$  **Molecular Formula:**  $Cu_3H_4O_8S$  **Molecular Weight:** 354.730 **CAS RN:** 1332-14-5 **Properties:** green rhomb cryst [CRC10] **Solubility:** i H<sub>2</sub>O [CRC10] **Density, g/cm<sup>3</sup>:** 3.88 [CRC10]

# 1126

Compound: Copper(II) sulfate pentahydrate Synonym: blue vitriol Formula:  $CuSO_4 \cdot 5H_2O$ Molecular Formula:  $CuH_{10}O_9S$ Molecular Weight: 249.686 CAS RN: 7758-99-8 Properties: blue; tricl cryst; can be made by reaction of copper with hot, conc  $H_2SO_4$ ; used as fungicide, source of Cu in animal nutrition; slowly efflorescent in air [KIR78] [MER06] Solubility: v s  $H_2O$ ; s methanol; sl s ethanol [MER06] Density, g/cm<sup>3</sup>: 2.286 [MER06] Melting Point, °C: 110, decomposes [STR93] Reactions: minus  $2H_2O$  at  $30^\circ$ C; minus  $2H_2O$  at  $110^\circ$ C; becomes anhydrous by  $250^\circ$ C [MER06]

# 1127

Compound: Copper(II) sulfide Synonyms: covellite, cupric sulfide Formula: CuS Molecular Formula: CuS Molecular Weight: 95.612 CAS RN: 1317-40-4 Properties: -100 mesh with 99.999% and -200 mesh with 99.5% purity; black powd; stable in dry air, oxidized to CuSO<sub>4</sub> in moist air; used in antifouling paints, catalysts; covellite mineral is indigo-blue or darker; hex; hardness 1.5-2 Mohs [KIR78] [MER06] [CER91]

Solubility: i H<sub>2</sub>O, alcohol, dil acids and alkalies; s KCN, hot HNO<sub>3</sub> [MER06]
Density, g/cm<sup>3</sup>: 4.6 [STR93]
Melting Point, °C: decomposes at 220 [HAW93]

# 1128

**Compound:** Copper(II) tartrate trihydrate **Synonym:** cupric tartrate trihydrate

Formula:  $CuC_4H_4O_6 \cdot 3H_2O$ Molecular Formula:  $C_4H_{10}CuO_9$ Molecular Weight: 265.664 CAS RN: 815-82-7 Properties: bluish green cryst [STR93] Solubility:  $0.02 \text{ g}/100 \text{ mL } H_2O (15^{\circ}\text{C}), 0.14 \text{ g}/100 \text{ mL } H_2O (85^{\circ}\text{C}) [CRC10]; \text{ s acids, alkali solutions [MER06]}$ Melting Point, °C: decomposes [CRC10]

# 1129

Compound: Copper(II) telluride Formula: CuTe Molecular Formula: CuTe Molecular Weight: 191.146 CAS RN: 12019-23-7 Properties: -60 mesh with 99.5% purity; formula is generally Cu<sub>1.4</sub>Te [CER91] Density, g/cm<sup>3</sup>: 7.1 [LID94]

# 1130

Compound: Copper(II) tellurite Formula: CuTeO<sub>3</sub> Molecular Formula: CuO<sub>3</sub>Te Molecular Weight: 239.144 CAS RN: 13812-58-3 Properties: black glassy; -60 mesh with 99% purity [CER91] [CRC10] Solubility: i H<sub>2</sub>O [CRC10]

# 1131

Compound: Copper(II) tetraammine sulfate monohydrate Synonym: tetraaminecopper(II) sulfate monohydrate Formula:  $Cu(NH_3)_4SO_4 \cdot H_2O$ Molecular Formula:  $CuH_{14}N_4O_5S$ Molecular Weight: 245.747 CAS RN: 10380-29-7 Properties: dark blue cryst; odor of ammonia; decomposes in air; made by dissolving  $CuSO_4$  in water containing ammonia, then by precipitating with ethanol; used in textile printing and as a fungicide [MER06] Solubility: 18.5 g/100 mL H<sub>2</sub>O (21.5°C) [MER06] Density, g/cm<sup>3</sup>: 1.810 [ALD94] Reactions: minus H<sub>2</sub>O and 2NH<sub>3</sub> at 120°C, additional 2NH<sub>3</sub> at 160°C [MER06]

# 1132

**Compound:** Copper(II) tetrafluoroborate **Synonym:** copper(II) fluoroborate **Formula:** Cu(BF<sub>4</sub>)<sub>2</sub> **Molecular Formula:** B<sub>2</sub>CuF<sub>8</sub>

# Molecular Weight: 237.155

# CAS RN: 14735-84-3

**Properties:** prepared by neutralizing HBF with cupric hydroxide or cupric carbonate, then crystallizing; usually a hydrate; used in electroplating bath formulation [KIR78]

# 1133

Compound: Copper(II) titanate Formula: CuTiO<sub>3</sub> Molecular Formula: CuO<sub>3</sub>Ti Molecular Weight: 159.411 CAS RN: 12019-08-8 Properties: reacted product –325 mesh 10μm with 99.5% purity; gray powd [STR93] [CER91]

# 1134

Compound: Copper(II) trifluoroacetylacetonate
Synonyms: 1,1,1-trifluoro-2,4pentanedione, Cu(II) derivative
Formula: Cu(CF<sub>3</sub>COCHCOCH<sub>3</sub>)<sub>2</sub>
Molecular Formula: C<sub>10</sub>H<sub>8</sub>CuF<sub>6</sub>O<sub>4</sub>
Molecular Weight: 369.707
CAS RN: 14324-82-4
Properties: purple powd [STR93]
Melting Point, °C: 194–196 [STR94]
Boiling Point, °C: sublimes at 140 (0.1 mm Hg) [STR93]
Reactions: decomposes at 260°C [STR93]

### 1135

Compound: Copper(II) tungstate Synonym: cupric tungstate Formula: CuWO<sub>4</sub> Molecular Formula: CuO<sub>4</sub>W Molecular Weight: 311.384 CAS RN: 13587-35-4 Properties: -200 mesh with 99.5% purity; brown powd [STR93] [CER91] Density, g/cm<sup>3</sup>: 7.5 [LID94]

# 1136

Compound: Copper(II) tungstate dihydrate Synonym: cupric tungstate dihydrate Formula: CuWO<sub>4</sub>  $\cdot$  2H<sub>2</sub>O Molecular Formula: CuH<sub>4</sub>O<sub>6</sub>W Molecular Weight: 347.414 CAS RN: 13587-35-4 Properties: light green powd; turns brown to grayish yellow by heating, with loss of H<sub>2</sub>O; used in semiconductors, nuclear reactors,

catalyst for polyester formation [MER06]

**Solubility:** i H<sub>2</sub>O; sl s acetic acid; s NH<sub>4</sub>OH, H<sub>3</sub>PO<sub>4</sub> [MER06] **Reactions:** decomposed by mineral acids [MER06]

#### 1137

**Compound:** Copper(II) vanadate **Formula:** Cu(VO<sub>3</sub>)<sub>2</sub> **Molecular Formula:** CuO<sub>6</sub>V<sub>2</sub> **Molecular Weight:** 261.425 **CAS RN:** 12789-09-2 **Properties:** powd

# 1138

**Compound:** Curium( $\alpha$ ) **Formula:** α-Cm Molecular Formula: Cm Molecular Weight: 247 CAS RN: 7440-51-9 Properties: silvery white, hard brittle metal; chemistry of trivalent state similar to that of trivalent lanthanides;  $\alpha$ -emitter; hex, a=0.3496 nm, c=1.1331 nm; enthalpy of vaporization 1340 kJ/mol; ionic radius of Cm+++ is 0.0970 nm; discovered in 1944; used in generating thermoelectric power for remote locations and in space;  $\beta$ -Cm is fcc, which is stable at <1340°C [HAW93] [MER06] [KIR78] Density, g/cm<sup>3</sup>: 13.51 (25°C) [KIR78] Melting Point, °C: 1345 [KIR91] Boiling Point, °C: 3110 [KIR91]

# 1139

Compound: Curium(β) Formula: β-Cm Molecular Formula: Cm Molecular Weight: 247 CAS RN: 7440-51-9 Properties: fcc, a=0.5039 nm; silvery, hard, brittle metal; oxidizes rapidly in the presence of traces of oxygen; chemistry of trivalent state similar to that of trivalent lanthanides; discovered in 1944; stable at <1340°C [KIR78] [MER06]

**Density, g/cm<sup>3</sup>:** 12.66 (25°C) [KIR78] **Melting Point, °C:** 1350 [MER06]

### 1140

**Compound:** Cyanogen **Synonym:** dicyan **Formula:**  $N \equiv C - C \equiv N$ **Molecular Formula:**  $C_2N_2$ **Molecular Weight:** 52.035 **CAS RN:** 460-19-5 Properties: colorless, highly poisonous gas; almond-like odor; burns with pink flame with a bluish border; critical pressure 59.6 atm; critical temp 123.3°C; used in organic synthesis, welding, and as a rocket propellant [HAW93] [MER06]
Solubility: 1.1–1.3 g/100 g H<sub>2</sub>O; 26 g/100 g alcohol; 5 g/100 g ether [CIC73]

**Density, g/cm<sup>3</sup>:** liq at b.p: 0.9537 [MER06]; gas: 2.321 g/L [CIC73]

Melting Point, °C: –28 [COT88]

Boiling Point, °C: –21.17 [MER06]

**Reactions:** slowly hydrolyzed to oxalic acid and ammonia [MER06]

# 1141

**Compound:** Cyanogen azide **Synonym:** carbon pernitride **Formula:**  $N=N=N-C\equiv N$ **Molecular Formula:**  $CN_4$ **Molecular Weight:** 68.038 **CAS RN:** 764-05-6

- **Properties:** clear, colorless, oily liq; can detonate on thermal, electrical, or mechanical shock; decomposes in acetonitrile solvent; made by suspending NaN<sub>3</sub> in dry acetonitrile, followed by distillation of cyanogen chloride into the cooled suspension; used in organic synthesis for example reacts with alkanes to produce primary alkyl cyanamides [MER06]
- **Thermal Expansion Coefficient:** from 25°C to: 100°C (0.18), 200°C (0.48), 400°C (1.11), 600°C (1.77) [TOU77]

# 1142

Compound: Cyanogen bromide
Synonym: bromocyanide
Formula: BrC≡N
Molecular Formula: CBrN
Molecular Weight: 105.922
CAS RN: 506-68-3
Properties: white cryst; sensitive to moisture; corrodes most metals; prepared from Br<sub>2</sub> and KCN; used in organic synthesis, as a fumigant, and in gold extraction [HAW93] [STR93]
Solubility: decomposed slowly by cold H<sub>2</sub>O [HAW93]
Density, g/cm<sup>3</sup>: 2.015 [STR93]
Melting Point, °C: 52 [STR93]
Boiling Point, °C: 61.4 [STR93]

#### 1143

**Compound:** Cyanogen chloride **Synonym:** chlorocyanide

Formula: CIC≡N
Molecular Formula: CCIN
Molecular Weight: 61.470
CAS RN: 506-77-4
Properties: colorless gas or liq with irritating vapor; prepared from Cl<sub>2</sub> and HCN; used in chemical syntheses [HAW93] [MER06]
Solubility: s H<sub>2</sub>O, ether, alcohol [MER06]
Density, g/cm<sup>3</sup>: 2.697 g/L [LID94]
Melting Point, °C: -6 [MER06]
Boiling Point, °C: 13.8 [MER06]

#### 1144

Compound: Cyanogen fluoride
Synonym: fluorocyanide
Formula: FC≡N
Molecular Formula: CFN
Molecular Weight: 45.016
CAS RN: 1495-50-7
Properties: colorless gas; made by reaction of AgF and cyanogen iodide; used in tear gas and in organic synthesis [HAW93]
Solubility: i H<sub>2</sub>O [HAW93]
Density, g/cm<sup>3</sup>: 1.975 g/L [LID94]
Melting Point, °C: -82 [LID94]
Boiling Point, °C: -46 [LID94]

# 1145

Compound: Cyanogen iodide Formula: ICN Molecular Formula: CIN Molecular Weight: 152.922 CAS RN: 506-78-5 Properties: col needles [CRC10] Solubility: s H<sub>2</sub>O, EtOH, eth [CRC10] Density, g/cm<sup>3</sup>: 2.84 [CRC10] Melting Point, °C: 146.7 [CRC10]

### 1146

**Compound:** Cyclohexadiene iron tricarbonyl **Formula:**  $C_6H_8Fe(CO)_3$  **Molecular Formula:**  $C_{11}H_8FeO_3$  **Molecular Weight:** 220.008 **CAS RN:** 12152-72-6 **Properties:** orange-yellow liq; air sensitive [STR93] **Melting Point, °C:** 8 [STR93]

### 1147

**Compound:** Cyclooctatetraene iron tricarbonyl **Formula:**  $C_8H_8Fe(CO)_3$  Molecular Formula: C<sub>11</sub>H<sub>8</sub>FeO<sub>3</sub> Molecular Weight: 244.029 CAS RN: 12093-05-9 Properties: red-brown cryst; sensitive to air [STR93] Melting Point, °C: 93–95 [STR93]

### 1148

Compound: Cyclopentadienylindium(I) Formula:  $C_3H_3In$ Molecular Formula:  $C_5H_5In$ Molecular Weight: 179.915 CAS RN: 34822-89-4 Properties: off-white cryst; sensitive to air, light, and heat [STR93] Melting Point, °C: sublimes at 50 (0.01 mm Hg) [STR93]

# 1149

**Compound:** Cyclopentadienyliron dicarbonyl dimer **Formula:**  $[C_5H_5Fe(CO)_2]_2$  **Molecular Formula:**  $C_{14}H_{10}Fe_2O_4$  **Molecular Weight:** 353.925 **CAS RN:** 12154-95-9 **Properties:** purple-red cryst; air sensitive [STR93] **Melting Point,** °C: decomposes at 194 [STR93]

### 1150

Compound: Cyclopentadienylniobium tetrachloride
Formula: C<sub>5</sub>H<sub>5</sub>NbCl<sub>4</sub>
Molecular Formula: C<sub>5</sub>H<sub>5</sub>Cl<sub>4</sub>Nb
Molecular Weight: 229.812
CAS RN: 33114-15-7
Properties: red-brown powd; sensitive to moisture [STR93]
Melting Point, °C: decomposes at 180 [STR93]

#### 1151

Compound: Decaborane(14) Formula:  $B_{10}H_{14}$ Molecular Formula:  $B_{10}H_{14}$ Molecular Weight: 122.221 CAS RN: 17702-41-9 Properties: white cryst [STR93] Solubility: sl s cold H<sub>2</sub>O [MER06] Density, g/cm<sup>3</sup>: 0.94 [STR93] Melting Point, °C: 100 [STR93] Boiling Point, °C: 213 (extrapolated) [COT88] Reactions: hydrolyzed by hot H<sub>2</sub>O [MER06]

### 1152

Compound: Decaborane(16) Formula:  $B_{10}H_{16}$ Molecular Formula:  $B_{10}H_{16}$ Molecular Weight: 124.237 CAS RN: 71595-75-0 Properties: col cryst [CRC10] Density, g/cm<sup>3</sup>: sublimes [CRC10] Melting Point, °C: ~81 Boiling Point, °C: decomposes at 170

#### 1153

**Compound:** Deuterium Synonym: heavy water Formula: D<sub>2</sub> **Molecular Formula:** D<sub>2</sub> Molecular Weight: 4.032 CAS RN: 7782-39-0 Properties: colorless, odorless gas; flammable; stable, not radioactive; specific volume 6.00 m3/kg at 21.1°C and 101.3 kPa; critical temp -234.75°C; critical pressure 16.432 atm; enthalpy of vaporization 1.23 kJ/mol; enthalpy of fusion 197 J/mol; used extensively at trace levels in measuring rates of chemical reactions [MER06] [AIR87] [KIR78] Density, g/cm3: gas: 0.00018; liq: 0.169 at -252.7°C [MER06] [ALF93] Melting Point, °C: -254.6 [ALF93] Boiling Point, °C: –249.7 [ALF93] Thermal Conductivity,  $W/(m \cdot K)$ : 0.126 (-252.7°C) [KIR78]

#### 1154

Compound: Deuterium bromide Formula: DBr Molecular Formula: BrD Molecular Weight: 81.919 CAS RN: 13536-59-9 Properties: corrosive [ALD94] Density, g/cm<sup>3</sup>: 1.537 [ALD93] Boiling Point, °C: 126 [ALD93]

#### 1155

Compound: Deuterium chloride Formula: DCl Molecular Formula: ClD Molecular Weight: 37.468 CAS RN: 7698-05-7 Properties: gas [CRC10] Solubility: 11.9 cm<sup>3</sup>/100 mL H<sub>2</sub>O (25°C), 8.4 cm<sup>3</sup>/100 mL H<sub>2</sub>O (40°C) [CRC10] Melting Point, °C: –254.6 [CRC10] Boiling Point, °C: –249.7 [CRC10]

### 1156

Compound: Deuterium iodide Formula: DI Molecular Formula: DI Molecular Weight: 128.919 CAS RN: 14104-45-1 Properties: hygr [ALD94]

# 1157

Compound: Deuterium oxide
Synonym: water-d<sub>2</sub>
Formula: D<sub>2</sub>O
Molecular Formula: D<sub>2</sub>O
Molecular Weight: 20.028
CAS RN: 7789-20-0
Properties: ordinary water contains about one part of D<sub>2</sub>O to 6500 parts of H<sub>2</sub>O; triple point 3.82°C; critical temp 371.5°C; enthalpy of fusion 6.280 kJ/mol; enthalpy of vaporization 41.493 kJ/mol; dielectric constant (25°C) 78.06; finds use in the study of rates and mechanisms of chemical reactions [MER06] [HAW93]
Density, g/cm<sup>3</sup>: 1.1056 [HAW93]
Melting Point, °C: 3.81 [MER06]

Boiling Point, °C: 101.42 [MER06]

### 1158

**Compound:** Deuterosulfuric acid **Formula:**  $D_2SO_4$ **Molecular Formula:**  $D_2O_4S$ **Molecular Weight:** 100.094 **CAS RN:** 13813-19-9 **Properties:** liq; 96%–98%, in  $D_2O$  [ALF93] **Density, g/cm<sup>3</sup>:** 1.878 [ALD94]

#### 1159

**Compound:** Diborane(6) **Synonym:** boroethane **Formula:** B<sub>2</sub>H<sub>6</sub> **Molecular Formula:** B<sub>2</sub>H<sub>6</sub> **Molecular Weight:** 27.670 **CAS RN:** 19287-45-7

Properties: gas; spontaneously flammable in air; critical temp 16.7°C; critical pressure 4.00 MPa; enthalpy of vaporization 14.28 kJ/ mol; can be prepared from NaBH<sub>4</sub> and H<sub>3</sub>PO<sub>4</sub>; used as a catalyst and as a reducing agent [AIR87] [COT88] [CRC10] [MER06] Solubility: hydrolyzes quickly [COT88] Density, g/cm<sup>3</sup>: 1.214 g/L [LID94] Melting Point, °C: -164.9 [AIR87] Boiling Point, °C: -87.55 [CRC10] Reactions: decomposes at red heat to B+H<sub>2</sub> [MER06]

# 1160

**Compound:** Dibromogermane **Formula:** GeH<sub>2</sub>Br<sub>2</sub> **Molecular Formula:** Br<sub>2</sub>GeH<sub>2</sub> **Molecular Weight:** 234.46 **CAS RN:** 13769-36-3 **Properties:** col liq [CRC10] **Solubility:** reac H<sub>2</sub>O [CRC10] **Density, g/cm<sup>3</sup>:** 2.80 [CRC10] **Melting Point, °C:** –15 [CRC10] **Boiling Point, °C:** 89 [CRC10]

### 1161

**Compound:** Dibromine pentoxide **Formula:**  $Br_2O_5$  **Molecular Formula:**  $Br_2O_5$  **Molecular Weight:** 239.805 **CAS RN:** 58572-43-3 **Properties:** col cryst (low temp) [CRC10] **Melting Point,** °C: decomposes at -20 [CRC10]

# 1162

Compound: Dibromosilane
Formula: SiH<sub>2</sub>Br<sub>2</sub>
Molecular Formula: Br<sub>2</sub>H<sub>2</sub>Si
Molecular Weight: 189.910
CAS RN: 13768-94-0
Properties: colorless liq; flammable; enthalpy of vaporization 31 kJ/mol; entropy of vaporization 91.21 kJ/(mol · K) [CRC10] [CIC73]
Solubility: decomposed by H<sub>2</sub>O [CRC10]
Density, g/cm<sup>3</sup>: 2.17 (0°C) [CRC10]
Melting Point, °C: -70.1 [CIC73]
Boiling Point, °C: 66 [CIC73]

### 1163

**Compound:** Dicarbonylacetylacetonate iridium(I) **Formula:**  $Ir(CO)_2(CH_3COCHCOCH_3)$  **Molecular Formula:**  $C_7H_7IrO_4$  **Molecular Weight:** 347.350 **CAS RN:** 14023-80-4 **Properties:** copper-brown cryst [STR93]

**Compound:** Dichlorine heptoxide **Formula:** Cl<sub>2</sub>O<sub>7</sub> **Molecular Formula:** Cl<sub>2</sub>O<sub>7</sub> **Molecular Weight:** 182.902 **CAS RN:** 10294-48-1 **Properties:** col oily liq; explosive [CRC10] **Density, g/cm<sup>3</sup>:** 1.9 [CRC10] **Melting Point, °C:** -91.5 [CRC10] **Boiling Point, °C:** 82 [CRC10]

### 1165

**Compound:** Dichlorine hexoxide **Formula:** Cl<sub>2</sub>O<sub>6</sub> **Molecular Formula:** Cl<sub>2</sub>O<sub>6</sub> **Molecular Weight:** 166.902 **CAS RN:** 12442-63-6 **Properties:** red liq [CRC10] **Solubility:** reac H<sub>2</sub>O [CRC10] **Melting Point,** °C: 3.5 [CRC10] **Boiling Point,** °C: ~200 [CRC10]

# 1166

**Compound:** Dichlorine trioxide **Formula:** Cl<sub>2</sub>O<sub>3</sub> **Molecular Formula:** Cl<sub>2</sub>O<sub>3</sub> **Molecular Weight:** 118.904 **CAS RN:** 17496-59-2 **Properties:** dark brown solid [CRC10] **Melting Point, °C:** explodes at <25 [CRC10]

# 1167

**Compound:** Dichlorodiamminepalladium(II) **Formula:** Pd(NH<sub>3</sub>)<sub>2</sub>Cl<sub>2</sub> **Molecular Formula:** Cl<sub>2</sub>H<sub>6</sub>N<sub>2</sub>Pd **Molecular Weight:** 211.386 **CAS RN:** *cis*: 15684-18-1; *trans*: 13782-33-7 **Properties:** yellow powd [STR93] **Density, g/cm<sup>3</sup>:** trans: 2.50 [ALD94]

# 1168

Compound: Dichlorodiammineplatinum(II) (cis) Synonym: cisplatin Formula: Pt(NH<sub>3</sub>)<sub>2</sub>Cl<sub>2</sub> Molecular Formula: Cl<sub>2</sub>H<sub>6</sub>N<sub>2</sub>Pt Molecular Weight: 300.046 CAS RN: 15663-27-1 Properties: deep yellow solid; uses: antineoplastic, has antitumor activity [MER06] [ALD94]  Solubility: 0.253 g/L H<sub>2</sub>O (25°C) [MER06]
 Melting Point, °C: decomposes at 270 [MER06]
 Reactions: cis → trans change slowly in aq media [MER06]

# 1169

**Compound:** Dichlorodiammineplatinum(II)-trans **Formula:** Pt(NH<sub>3</sub>)<sub>2</sub>Cl<sub>2</sub> **Molecular Formula:** Cl<sub>2</sub>H<sub>6</sub>N<sub>2</sub>Pt **Molecular Weight:** 300.046 **CAS RN:** 14913-33-8 **Melting Point, °C:** decomposes at 340 [ALD94]

### 1170

**Compound:** Dichlorodifluorogermane **Formula:** GeF<sub>2</sub>Cl<sub>2</sub> **Molecular Formula:** Cl<sub>2</sub>F<sub>2</sub>Ge **Molecular Weight:** 181.54 **CAS RN:** 24422-21-7 **Properties:** col gas [CRC10] **Density, g/L:** 7.149 [CRC10] **Melting Point,** °C: -51.8 [CRC10] **Boiling Point,** °C: -2.8 [CRC10]

### 1171

**Compound:** Dichlorodimethylgermane **Formula:** Ge(CH<sub>3</sub>)<sub>2</sub>Cl<sub>2</sub> **Molecular Formula:** C<sub>2</sub>H<sub>6</sub>Cl<sub>2</sub>Ge **Molecular Weight:** 173.62 **CAS RN:** 1528-48-2 **Properties:** liq **Density, g/cm<sup>3</sup>:** 1.49 [CRC10] **Melting Point, °C:** -22 [CRC10] **Boiling Point, °C:** 124 [CRC10]

#### 1172

Compound: Dichlorodifluoromethane Synonym: halocarbon-12 Formula: CCl<sub>2</sub>F<sub>2</sub> Molecular Formula: CCl<sub>2</sub>F<sub>2</sub> Molecular Weight: 120.913 CAS RN: 75-71-8 Properties: colorless gas; nonflammable; critical temp 112.04°C; critical pressure 4.14 MPa; enthalpy of vaporization 19.99 kJ/mol; used in electronics industry [AIR87] Melting Point, °C: -157.8 [AIR87] Boiling Point, °C: -29.8 [AIR87]

Compound: Dichlorogermane Formula: GeH<sub>2</sub>Cl<sub>2</sub> Molecular Formula: Cl<sub>2</sub>GeH<sub>2</sub> Molecular Weight: 145.56 CAS RN: 15230-48-5 Properties: col liq [CRC10] Solubility: reac H<sub>2</sub>O [CRC10] Density, g/cm<sup>3</sup>: 1.90 [CRC10] Melting Point, °C: -68 [CRC10] Boiling Point, °C: 69.5 [CRC10]

# 1174

Compound: Dichlorosilane
Formula: SiH<sub>2</sub>Cl<sub>2</sub>
Molecular Formula: Cl<sub>2</sub>H<sub>2</sub>Si
Molecular Weight: 101.007
CAS RN: 4109-96-0
Properties: colorless, flammable gas; sharp pungent odor; autoignition temp 100°C; critical temp 176.0°C; critical pressure 4.68 MPa; enthalpy of vaporization 25 kJ/mol; entropy of vaporization 89.5 kJ/(mol·K); used in electronics industry [AIR87] [CIC73] [CRC10]
Solubility: hydrolyzes in H<sub>2</sub>O [AIR87]
Density, g/cm<sup>3</sup>: 3.47 (air = 1) [AIR87]
Melting Point, °C: -122 [CIC73]
Boiling Point, °C: 8.3 [CIC73]

# 1175

Compound: Diethylaluminum chloride
Synonym: DEAC
Formula: (C<sub>2</sub>H<sub>5</sub>)<sub>2</sub>AlCl
Molecular Formula: C<sub>4</sub>H<sub>10</sub>AlCl
Molecular Weight: 120.558
CAS RN: 96-10-6
Properties: colorless, volatile liq; flammable; sensitive to moisture; prepared from ethyl halide and Al; uses: aldol condensation reagent [ALD94] [MER06]
Density, g/cm<sup>3</sup>: 0.961 [ALD94]
Melting Point, °C: -50 [ALD94]
Boiling Point, °C: 125-126 at 50 mm Hg [ALD94]
Reactions: can be cleaved by H<sub>2</sub>O [MER06]

### 1176

**Compound:** Diethylzinc **Synonym:** zinc diethyl **Formula:**  $(C_2H_5)_2Zn$ **Molecular Formula:**  $C_4H_{10}Zn$ **Molecular Weight:** 123.513 **CAS RN:** 557-20-0 Properties: liq; can ignite in air; preparation: reaction of Zn and diethyl iodide; uses: organic synthesis, preservation of archival papers [MER06]
Solubility: miscible with ether, petroleum ether, benzene [MER06]
Density, g/cm<sup>3</sup>: 1.2065 [MER06]
Melting Point, °C: -28 [ALD94]
Boiling Point, °C: 117 [ALD94]

# 1177

**Compound:** Difluorophosphoric acid **Formula:** HPO<sub>2</sub>F<sub>2</sub> **Molecular Formula:** F<sub>2</sub>HO<sub>2</sub>P **Molecular Weight:** 101.978 **CAS RN:** 13779-41-4 **Properties:** mobile, colorless liq; fumes in air [KIR78] **Density, g/cm<sup>3</sup>:** 1.583 [KIR78] **Melting Point, °C:** -96.5 or -91.3 [KIR78] **Boiling Point, °C:** decomposes at 107–111 [KIR78]

#### 1178

#### 1179

**Compound:** Digermane **Formula:**  $Ge_2H_6$  **Molecular Formula:**  $Ge_2H_6$  **Molecular Weight:** 151.33 **CAS RN:** 13818-89-8 **Properties:** col liq, flammable [CRC10] **Density, g/cm<sup>3</sup>:** 1.98 [at melting point] [CRC10] **Melting Point, °C:** -109 [CRC10] **Boiling Point, °C:** 29 [CRC10]

### 1180

**Compound:** Dihydrazine sulfate **Formula:**  $(N_2H_4)_2 \cdot H_2SO_4$  **Molecular Formula:**  $H_{10}N_4O_4S$  **Molecular Weight:** 162.170 **CAS RN:** 13464-80-7 **Properties:** white cryst; deliq [LAN05] [MER06] Solubility: g/100 g H<sub>2</sub>O: 221 (30°C), 300 (40°C), 554 (60°C) [LAN05] Melting Point, °C: ~104 [MER06] Boiling Point, °C: decomposes [MER06]

# 1181

Compound: Diiodosilane Formula: SiH<sub>2</sub>I<sub>2</sub> Molecular Formula: H<sub>2</sub>I<sub>2</sub>Si Molecular Weight: 283.911 CAS RN: 13760-02-6 Properties: enthalpy of vaporization 36.8 kJ/mol; entropy of vaporization 87.0 kJ/(mol·K) [CIC73] Melting Point, °C: -1 [CIC73] Boiling Point, °C: 150 [CIC73]

# 1182

Compound: Diisobutylaluminum chloride Formula: [(CH<sub>3</sub>)<sub>2</sub>CHCH<sub>2</sub>]<sub>2</sub>AlCl Molecular Formula: C<sub>8</sub>H<sub>18</sub>AlCl Molecular Weight: 176.665 CAS RN: 1779-25-5 Properties: liq; pyrophoric; sensitive to air; uses: transmetallating reagent [ALD94] Density, g/cm<sup>3</sup>: 0.905 [ALD94] Melting Point, °C: -40 [ALD94] Boiling Point, °C: 152 (10 mm Hg) [ALD94]

# 1183

Compound: Dimethylaminotrimethyltin
Synonym: pentamethylstannanamine
Formula: (CH<sub>3</sub>)<sub>3</sub>SnN(CH<sub>3</sub>)<sub>2</sub>
Molecular Formula: C<sub>5</sub>H<sub>15</sub>NSn
Molecular Weight: 207.891
CAS RN: 993-50-0
Properties: liq; uses: a dehydrochlorinating agent [ALD94]
Density, g/cm<sup>3</sup>: 1.274 [ALD94]
Melting Point, °C: 1 [ALD94]
Boiling Point, °C: 126 [ALD94]

# 1184

Compound: Dimethylgermanium dichloride Formula: (CH<sub>3</sub>)<sub>2</sub>GeCl<sub>2</sub> Molecular Formula: C<sub>2</sub>H<sub>6</sub>Cl<sub>2</sub>Ge Molecular Weight: 173.585 CAS RN: 1529-48-2 Properties: liq; flammable [ALD94] Density, g/cm<sup>3</sup>: 1.505 [ALD94] Melting Point, °C: -22 [ALD94] Boiling Point, °C: 123 [ALD94]

#### 1185

Compound: Dimethylmercury Synonym: methylmercury Formula: (CH<sub>3</sub>)<sub>2</sub>Hg Molecular Formula: C<sub>2</sub>H<sub>6</sub>Hg Molecular Weight: 230.659 CAS RN: 593-74-8 Properties: colorless, volatile liq; flammable; uses: inorganic reagent [MER06] Solubility: i H<sub>2</sub>O; s ether, alcohol [MER06] Density, g/cm<sup>3</sup>: 2.961 [ALD94] Melting Point, °C: -43 [ALD94] Boiling Point, °C: 93-94 [ALD94]

# 1186

Compound: Disilane Formula: Si<sub>2</sub>H<sub>6</sub> Molecular Formula: H<sub>6</sub>Si<sub>2</sub> Molecular Weight: 62.219 CAS RN: 1590-87-0 Properties: colorless gas; extremely reactive, ignites in air spontaneously; critical temp 150.9°C; critical pressure 5.15 MPa; enthalpy of vaporization 21.21 kJ/mol; critical temp 109°C; made by photolysis of SiH<sub>4</sub> and H<sub>2</sub> mixture; used in electronics industry [AIR87] [CIC73] [COT88] **Solubility:** s CS<sub>2</sub>, ethanol, benzene [MER06] Density, g/cm<sup>3</sup>: liq, at bp: 0.69 [CIC73] Melting Point, °C: -132.5 [CIC73] Boiling Point, °C: –14.5 [CIC73] Reactions: decomposes at 300°C; KOH causes evolution of H<sub>2</sub> [MER06]

#### 1187

Compound: Disulfur decafluoride Synonym: sulfur pentafluoride Formula: S<sub>2</sub>F<sub>10</sub> Molecular Formula: F<sub>10</sub>S<sub>2</sub> Molecular Weight: 254.116 CAS RN: 5714-22-7 Properties: colorless gas; odor of SO<sub>2</sub>; vapor pressure is 561 torr at 20°C [HAW93] Solubility: i H<sub>2</sub>O [HAW93] Density, g/cm<sup>3</sup>: 2.08 [HAW93] Melting Point, °C: -92 [HAW93] Boiling Point, °C: 29 [HAW93]

### 1188

**Compound:** Dodecaborane(16) Formula:  $B_{10}H_{16}$ Molecular Formula:  $B_{10}H_{16}$  Molecular Weight: 124.237 CAS RN: 71595-75-0 Properties: col cryst [CRC10] Density, g/cm<sup>3</sup>: sublimes [CRC10] Melting Point, °C: ~81 [CRC10] Boiling Point, °C: decomposes at 170 [CRC10]

#### 1189

Compound: Dysprosium Formula: Dy Molecular Formula: Dy Molecular Weight: 162.50 CAS RN: 7429-91-6 Properties: silver metal; tarnishes in moist air; hex close-packed; forms greenish yellow salts; enthalpy of fusion 10.782 kJ/mol; enthalpy of sublimation 290.4 kJ/mol; radius of atom 0.17743 nm; radius of ion 0.0908 nm for Dy+++; light yellow solutions; electrical reisitivity at 20°C: 89µ0hm · cm [KIR82] [MER06] [ALD94] **Solubility:** reacts slowly with H<sub>2</sub>O; s dil acids [HAW93] Density, g/cm<sup>3</sup>: 8.55 [KIR82] Melting Point, °C: 1412 [KIR82] Boiling Point, °C: 2567 [KIR82] Thermal Conductivity, W/(m·K): 10.7 (25°C) [ALD94] **Thermal Expansion Coefficient:** 9.9×10<sup>-6</sup>/K [CRC10]

#### 1190

**Compound:** Dysprosium acetate tetrahydrate **Formula:**  $Dy(CH_3COO)_3 \cdot 4H_2O$  **Molecular Formula:**  $C_6H_{17}DyO_{10}$  **Molecular Weight:** 411.695 **CAS RN:** 15280-55-4 **Properties:** yellow cryst [ALF93] **Solubility:** s  $H_2O$  [CRC10] **Melting Point, °C:** decomposes at 120 [ALF93]

#### 1191

**Compound:** Dysprosium acetylacetonate **Synonyms:** 2,4-pentanedione, dysprosium(III) derivative **Formula:** Dy(CH<sub>3</sub>COCH=C(O)CH<sub>3</sub>)<sub>3</sub> **Molecular Formula:**  $C_{15}H_{21}$ DyO<sub>6</sub> **Molecular Weight:** 459.828 **CAS RN:** 14637-88-8 **Properties:** powd [STR93]

### 1192

**Compound:** Dysprosium boride **Formula:** DyB<sub>4</sub> **Molecular Formula:** B<sub>4</sub>Dy Molecular Weight: 205.744 CAS RN: 12310-43-9 Properties: -60 mesh with 99.9% purity; there is a DyB<sub>6</sub> material, -60 mesh and 99.9% purity, 12008-04-7 [CER91] Density, g/cm<sup>3</sup>: 6.98 [LID94] Melting Point, °C: 2500 [LID94]

#### 1193

Compound: Dysprosium bromide Formula: DyBr<sub>3</sub> Molecular Formula: Br<sub>3</sub>Dy Molecular Weight: 402.212 CAS RN: 14456-48-5 Properties: colorless cryst; -20 mesh with 99.9% purity [CER91] [CRC10] Solubility: s H<sub>2</sub>O [CRC10] Melting Point, °C: 881 [AES93] Boiling Point, °C: 1480 [CRC10]

### 1194

**Compound:** Dysprosium carbonate tetrahydrate **Formula:**  $Dy_2(CO_3)_3 \cdot 4H_2O$ **Molecular Formula:**  $C_3H_8Dy_2O_{13}$ **Molecular Weight:** 577.089 **CAS RN:** 38245-35-1 **Properties:** white powd; cryst [ALF93] **Solubility:** i H<sub>2</sub>O [CRC10] **Reactions:** minus 3H<sub>2</sub>O at 15°C [CRC10]

#### 1195

Compound: Dysprosium chloride Formula: DyCl<sub>3</sub> Molecular Formula: Cl<sub>3</sub>Dy Molecular Weight: 268.858 CAS RN: 10025-74-8 Properties: -20 mesh with 99.9% purity; white powd [STR93]; yellow, shining cryst [MER06] [CER91] Density, g/cm<sup>3</sup>: 3.67 [MER06] Melting Point, °C: 680 [MER06]; 718 [STR93]

# 1196

Compound: Dysprosium chloride hexahydrate Formula: DyCl<sub>3</sub>·6H<sub>2</sub>O Molecular Formula: Cl<sub>3</sub>DyH<sub>12</sub>O<sub>6</sub> Molecular Weight: 376.949 CAS RN: 15059-52-6 Properties: -4 mesh with 99.9% purity; light yellow cryst; hygr [STR93] [CER91] Melting Point, °C: 718 [ALF93]

**Compound:** Dysprosium fluoride **Formula:** DyF<sub>3</sub> **Molecular Formula:** DyF<sub>3</sub> **Molecular Weight:** 219.495 **CAS RN:** 13569-80-7

Properties: white powd or 99.9% pure melted pieces of 3–12 mm; hygr; melted pieces used as an evaporation material for possible application to multilayers [STR93] [CER91]
Melting Point, °C: 1154 [LID94]
Boiling Point, °C: >2200 [STR93]

### 1198

Compound: Dysprosium hydride Formula: DyH<sub>3</sub> Molecular Formula: DyH<sub>3</sub> Molecular Weight: 165.524 CAS RN: 13537-09-2 Properties: hex; -40 mesh with 99.9% purity; lump [ALF93] [CER91] [LID94] Density, g/cm<sup>3</sup>: 7.1 [LID94]

### 1199

Compound: Dysprosium hydroxide Formula: Dy(OH)<sub>3</sub> Molecular Formula: DyH<sub>3</sub>O<sub>3</sub> Molecular Weight: 213.522 CAS RN: 1308-85-6 Properties: gelatinous precipitate; forms a blue colloidal solution [MER06]

# 1200

Compound: Dysprosium iodide Formula: DyI<sub>3</sub> Molecular Formula: DyI<sub>3</sub> Molecular Weight: 544.213 CAS RN: 15474-63-2 Properties: greenish yellow cryst; -20 mesh with 99.9% purity; yellow powd [STR93] [CER91] [CRC10] Solubility: s H<sub>2</sub>O [CRC10] Melting Point, °C: 955 [STR93] Boiling Point, °C: 1320 [STR93]

# 1201

**Compound:** Dysprosium nitrate pentahydrate Formula:  $Dy(NO_3)_3 \cdot 5H_2O$ Molecular Formula:  $DyH_{10}N_3O_{14}$ Molecular Weight: 438.591 CAS RN: 10031-49-9 **Properties:** yellow cryst; hygr [STR93] **Solubility:** s H<sub>2</sub>O [MER06] **Melting Point,** °C: at 88.6, melts in waters of hydration [MER06]

### 1202

Compound: Dysprosium nitride Formula: DyN Molecular Formula: DyN Molecular Weight: 176.507 CAS RN: 12019-88-4 Properties: -60 mesh with 99.9% purity [CER91] Density, g/cm<sup>3</sup>: 9.93 [LID94]

### 1203

**Compound:** Dysprosium oxalate decahydrate **Formula:**  $Dy_2(C_2O_4)_3 \cdot 10H_2O$  **Molecular Formula:**  $C_6H_{20}Dy_2O_{22}$  **Molecular Weight:** 769.210 **CAS RN:** 24670-07-3 **Properties:** white cryst [STR93] **Solubility:** i H<sub>2</sub>O [CRC10] **Melting Point,** °C: 40 [ALF93] **Reactions:** minus H<sub>2</sub>O at 40°C [CRC10]

# 1204

Compound: Dysprosium oxide
Synonym: dysprosia
Formula: Dy<sub>2</sub>O<sub>3</sub>
Molecular Formula: Dy<sub>2</sub>O<sub>3</sub>
Molecular Weight: 372.998
CAS RN: 1308-87-8
Properties: white powd; can be prepared by heating the oxalate or sulfate; more magnetic than ferric oxide; sl hygr; absorbs atm H<sub>2</sub>O and CO<sub>2</sub>; used with nickel in cermets and as an evaporated film of 99.9% purity it is reactive to radio frequencies [HAW93] [MER06] [CER91]
Solubility: s acids [HAW93]
Density, g/cm<sup>3</sup>: 7.81 [MER06]
Melting Point, °C: 2330–2350 [STR93]

### 1205

**Compound:** Dysprosium perchlorate hydrate **Formula:**  $Dy(ClO_4)_3 \cdot xH_2O$  **Molecular Formula:**  $Cl_3DyO_{12}$  (anhydrous) **Molecular Weight:** 460.851 (anhydrous) **CAS RN:** 14692-17-2 **Properties:** white cryst; hygr [STR93]
Compound: Dysprosium silicide Formula: DySi<sub>2</sub> Molecular Formula: DySi<sub>2</sub> Molecular Weight: 218.671 CAS RN: 12133-07-2 Properties: ortho-rhomb; 10 mm and down lump, 6 mm pieces and smaller with 99.9% purity [ALF93] [CER91] [LID94] Density, g/cm<sup>3</sup>: 5.2 [LID94]

# 1207

**Compound:** Dysprosium sulfate octahydrate Formula:  $Dy_2(SO_4)_3 \cdot 8H_2O$ Molecular Formula: Dy<sub>2</sub>H<sub>16</sub>O<sub>20</sub>S<sub>3</sub> Molecular Weight: 757.313 CAS RN: 10031-50-2 Properties: yellow cryst; can be prepared by dissolving the oxide in  $H_2SO_4$ , then precipitating with alcohol; stable in air at 110°C [MER06] Solubility: s H<sub>2</sub>O [HAW93] Reactions: minus 8H<sub>2</sub>O at 360°C [MER06]

## 1208

Compound: Dysprosium sulfide Formula: Dy<sub>2</sub>S<sub>3</sub> Molecular Formula: Dy<sub>2</sub>S<sub>3</sub> Molecular Weight: 421.198 CAS RN: 12133-10-7 Properties: reddish brown monocl; -200 mesh with 99.9% purity [CER91] [LID94] Density, g/cm<sup>3</sup>: 6.08 [LID94]

1209

Compound: Dysprosium telluride Formula: Dy<sub>2</sub>Te<sub>3</sub> Molecular Formula: Dy<sub>2</sub>Te<sub>3</sub> Molecular Weight: 707.800 CAS RN: 12159-43-2 Properties: -20 mesh with 99.9% purity [CER91]

1210

**Compound:** Einsteinium Formula: Es Molecular Formula: Es Molecular Weight: 252 CAS RN: 7429-92-7

Properties: man-made radioisotope; identified by Ghiorso and colleagues at Berkeley in December 1952, as part of debris from first large thermonuclear explosion; chemical properties similar to those of holmium; ionic radius of Es+++ is 0.0925 nm; has lowest enthalpy of vaporization of any of the divalent elements; cub, a=0.575 nm; discovered in 1952;  $t_{1/2}$  of <sup>253</sup>Es is 20.5 days,  $t_{1/2}$  of <sup>254</sup>Es is 276 days, t<sub>1/2</sub> of <sup>255</sup>Es is 40 days [HAW93] [KIR78] Melting Point, °C: 860 [KIR91]

# 1211

Compound: Erbium Formula: Er Molecular Formula: Er Molecular Weight: 167.26 CAS RN: 7440-52-0 Properties: soft, malleable, dark, gray, metallic solid; hex close-pack cryst; similar to other rare earths; used in nuclear controls, room temp laser; enthalpy of fusion 19.90 kJ/mol; enthalpy of sublimation 317.10 kJ/mol; electrical resistivity at  $20^{\circ}$ C 86 uohm  $\cdot$  cm: radius of atom 0.17566 nm: radius of ion 0.0881 nm, Er+++, pink-colored solutions [MER06] [HAW93] [KIR82] [ALD94] Solubility: i H<sub>2</sub>O; s acids [HAW93] Density, g/cm<sup>3</sup>: 9.066 [KIR82] Melting Point, °C: 1529 [KIR82] Boiling Point, °C: 2868 [KIR82] Thermal Conductivity, W/(m·K): 14.5 (25°C) [CRC10] **Thermal Expansion Coefficient:** 12.2×10<sup>-6</sup>/K [CRC10]

# 1212

Compound: Erbium acetate tetrahydrate Formula: Er(CH<sub>3</sub>COO)<sub>3</sub> · 4H<sub>2</sub>O Molecular Formula: C<sub>6</sub>H<sub>17</sub>ErO<sub>10</sub> Molecular Weight: 416.455 CAS RN: 15280-57-6 Properties: pink cryst; tricl [STR93] [CRC10] Density, g/cm<sup>3</sup>: 2.114 [STR93]

## 1213

Compound: Erbium acetylacetonate hydrate Synonyms: 2,4-pentanedione, erbium(III) derivative Formula: Er(CH<sub>3</sub>COCH=C(O)CH<sub>3</sub>)<sub>3</sub> · xH<sub>2</sub>O **Molecular Formula:** C<sub>15</sub>H<sub>21</sub>ErO<sub>6</sub> (anhydrous) Molecular Weight: 464.588 (anhydrous) CAS RN: 14553-08-3 Properties: off-white powd [STR93]

**Compound:** Erbium barium copper oxide **Formula:** ErBa<sub>2</sub>Cu<sub>3</sub>O<sub>x</sub> **Molecular Formula:** Ba<sub>2</sub>Cu<sub>3</sub>ErO<sub>x</sub> **CAS RN:** 109457-23-0 **Properties:** 99.9% and 99.999%, 0.2 μm and 20 μm powd, high T<sub>c</sub> superconductor [ALF93]

# 1215

Compound: Erbium boride Formula: ErB<sub>4</sub> Molecular Formula: B<sub>4</sub>Er Molecular Weight: 210.504 CAS RN: 12310-44-0 Properties: tetr; -100 mesh with 99.9% purity [CER91] [LID94] Density, g/cm<sup>3</sup>: 7.0 [LID94] Melting Point, °C: 2450 [LID94]

# 1216

Compound: Erbium bromide Formula: ErBr<sub>3</sub> Molecular Formula: Br<sub>3</sub>Er Molecular Weight: 406.972 CAS RN: 13536-73-7 Properties: -20 mesh with 99.9% purity; powd [ALF93] [CER91] Melting Point, °C: 923 (under argon) [ALF95]

## 1217

**Compound:** Erbium bromide hexahydrate **Formula:**  $ErBr_3 \cdot 6H_2O$ **Molecular Formula:**  $Br_3ErH_{12}O_6$ **Molecular Weight:** 515.062 **CAS RN:** 14890-44-9 **Properties:** pink cryst [CRC10] **Solubility:** s  $H_2O$ 

#### 1218

**Compound:** Erbium bromide nonahydrate **Formula:**  $ErBr_3 \cdot 9H_2O$  **Molecular Formula:**  $Br_3ErH_{18}O_9$  **Molecular Weight:** 569.110 **CAS RN:** 13536-73-7 **Properties:** rose cryst; deliq [MER06] **Solubility:** s  $H_2O$  [CRC10] **Boiling Point,** °C: 1460 [CRC10]

## 1219

**Compound:** Erbium carbonate hydrate **Formula:**  $Er_2(CO_3)_3 \cdot xH_2O$  **Molecular Formula:** C<sub>3</sub>Er<sub>2</sub>O<sub>9</sub> (anhydrous) **Molecular Weight:** 514.548 (anhydrous) **CAS RN:** 22992-83-2 **Properties:** pink powd [STR93]

#### 1220

Compound: Erbium chloride Formula: ErCl<sub>3</sub> Molecular Formula: Cl<sub>3</sub>Er Molecular Weight: 273.618 CAS RN: 10138-41-7 Properties: -20 mesh with 99.9% purity; pinkish powd [MER06] [CER91] Density, g/cm<sup>3</sup>: 4.1 [MER06] Melting Point, °C: 774 [STR93] Boiling Point, °C: 1500 [STR93]

#### 1221

**Compound:** Erbium chloride hexahydrate **Formula:**  $ErCl_3 \cdot 6H_2O$ **Molecular Formula:**  $Cl_3ErH_{12}O_6$ **Molecular Weight:** 381.709 **CAS RN:** 10025-75-9 **Properties:** pink; hygr cryst [STR93] **Solubility:** s  $H_2O$ ; sl s alcohol [MER06] **Melting Point, °C:** 1500 [ALF93]

## 1222

Compound: Erbium fluoride
Formula: ErF<sub>3</sub>
Molecular Formula: ErF<sub>3</sub>
Molecular Weight: 224.255
CAS RN: 13760-83-3
Properties: rose powd or 99.9% pure melted pieces of 3–6 mm; hygr; melted pieces used as evaporation material for possible application to multilayers [STR93] [CER91]
Density, g/cm<sup>3</sup>: 7.814 [STR93]
Melting Point, °C: 1350 [STR93]
Boiling Point, °C: 2200 [STR93]

#### 1223

Compound: Erbium hydride Formula: ErH<sub>3</sub> Molecular Formula: ErH<sub>3</sub> Molecular Weight: 170.284 CAS RN: 13550-53-3 Properties: hex; -60 mesh with 99.9% purity; lump [ALF93] [CER91] [LID94] Density, g/cm<sup>3</sup>: ~7.6 [LID94]

**Compound:** Erbium hydroxide **Formula:** Er(OH)<sub>3</sub> **Molecular Formula:** ErH<sub>3</sub>O<sub>3</sub> **Molecular Weight:** 218.282 **CAS RN:** 14646-16-3 **Properties:** pale pink, gelatinous precipitate [MER06]

#### 1225

Compound: Erbium iodide Formula: ErI<sub>3</sub> Molecular Formula: ErI<sub>3</sub> Molecular Weight: 547.973 CAS RN: 13813-42-8 Properties: -20 mesh with 99.9% purity; red hygr powd [STR93] CER91] Density, g/cm<sup>3</sup>: ~5.5 [LID94] Melting Point, °C: 1020 [STR93] Boiling Point, °C: 1280 [STR93]

# 1226

Compound: Erbium nitrate pentahydrate Formula:  $Er(NO_3)_3 \cdot 5H_2O$ Molecular Formula:  $ErH_{10}N_3O_{14}$ Molecular Weight: 443.351 CAS RN: 10031-51-3 Properties: reddish cryst; deliq [MER06] Solubility:  $5.5223 \pm 0.0053 \text{ mol}/(\text{kg} \cdot \text{H}_2\text{O})$  at  $25^{\circ}\text{C}$ ; reference is uncertain about the number of hydrated waters, and pentahydrate is assumed for this solubility [RAR85b] Reactions: minus  $4H_2O$  at  $130^{\circ}\text{C}$  [MER06]

#### 1227

Compound: Erbium nitride Formula: ErN Molecular Formula: ErN Molecular Weight: 181.267 CAS RN: 12020-21-2 Properties: cub; -60 mesh with 99.9% purity [CER91] [LID94] Density, g/cm<sup>3</sup>: 10.6 [LID94]

## 1228

**Compound:** Erbium oxalate decahydrate **Formula:**  $Er_2(C_2O_4)_3 \cdot 10H_2O$  **Molecular Formula:**  $C_6H_{20}Er_2O_{22}$  **Molecular Weight:** 778.732 **CAS RN:** 30618-31-6 **Properties:** pink cryst [STR93] Solubility: s H<sub>2</sub>O, dil acids [HAW93] Density, g/cm<sup>3</sup>: 2.64 [HAW93] Melting Point, °C: decomposes at 575 [HAW93]

# 1229

Compound: Erbium oxide Synonym: erbia Formula: Er<sub>2</sub>O<sub>3</sub> Molecular Formula: Er<sub>2</sub>O<sub>3</sub> Molecular Weight: 382.518 CAS RN: 12061-16-4 Properties: pinkish powd; changes into cub cryst at 1300°C; readily absorbs atm H<sub>2</sub>O and  $CO_2$ ; used as a phosphor activator, in infrared absorbing glass, and as an evaporated material of 99.9% purity it is reactive to radio frequencies [HAW93] [MER06] [CER91] Solubility:  $1.28 \times 10^{-5}$  g mol/L H<sub>2</sub>O (29°C); v s a [MER06] Density, g/cm<sup>3</sup>: 8.64 [MER06] Melting Point, °C: 2400 [STR93]

## 1230

**Compound:** Erbium perchlorate hydrate **Formula:**  $Er(ClO_4)_3 \cdot xH_2O$ **Molecular Formula:**  $Cl_3ErO_{12}$  (anhydrous) **Molecular Weight:** 465.611 (anhydrous) **CAS RN:** 61565-07-9 **Properties:** pink cryst; hygr [STR93]

#### 1231

Compound: Erbium silicide Formula: ErSi<sub>2</sub> Molecular Formula: ErSi<sub>2</sub> Molecular Weight: 223.431 CAS RN: 12020-28-9 Properties: ortho-rhomb; 10 mm and down lump [ALF93] [LID94] Density, g/cm<sup>3</sup>: 7.26 [LID94]

#### 1232

Compound: Erbium sulfate Formula:  $Er_2(SO_4)_3$ Molecular Formula:  $Er_2O_{12}S_3$ Molecular Weight: 622.711 CAS RN: 13478-49-4 Properties: powd; hygr; dissociates on heating in H<sub>2</sub>O with evolution of heat [MER06] Density, g/cm<sup>3</sup>: 3.678 [MER06] Melting Point, °C: decomposes [LID94]

Compound: Erbium sulfate octahydrate Formula:  $Er_2(SO_4)_3 \cdot 8H_2O$ Molecular Formula:  $Er_2H_{16}O_{20}S_3$ Molecular Weight: 766.833 CAS RN: 10031-52-4 Properties: pink; monocl cryst [MER06] Solubility: parts/100 parts  $H_2O$ : 16 (20°C), 6.53 (40°C) [MER06] Density, g/cm<sup>3</sup>: 3.217 [STR93] Melting Point, °C: decomposes [STR93] Reactions: minus  $8H_2O$  at 400°C [HAW93]

# 1234

Compound: Erbium sulfide Formula: Er<sub>2</sub>S<sub>3</sub> Molecular Formula: Er<sub>2</sub>S<sub>3</sub> Molecular Weight: 430.718 CAS RN: 12159-66-9 Properties: reddish brown monocl; -200 mesh with 99.9% purity [CER91] [LID94] Density, g/cm<sup>3</sup>: 6.07 [LID94] Melting Point, °C: 1730 [LID94]

#### 1235

Compound: Erbium telluride Formula: Er<sub>2</sub>Te<sub>3</sub> Molecular Formula: Er<sub>2</sub>Te<sub>3</sub> Molecular Weight: 717.320 CAS RN: 12020-39-2 Properties: ortho-rhomb; -20 mesh with 99.9% purity [CER91] [LID94] Density, g/cm<sup>3</sup>: 7.11 [LID94] Melting Point, °C: 1213 [LID94]

# 1236

Compound: Ethylenediaminetetraacetic acid dihydrate disodium salt
Synonym: Edetate disodium
Formula: see under Properties
Molecular Formula: C<sub>10</sub>H<sub>14</sub>N<sub>2</sub>Na<sub>2</sub>O<sub>8</sub>
Molecular Weight: 336.209
CAS RN: 6381-92-6
Properties: Used as a sequestering chelating agent for metals; forms strong chelates with most metals [MER06]
Solubility: g/100 g H<sub>2</sub>O: 10.6 (0°C), 11.1 (20°C), 27.0 (98°C) [LAN05]; pH ~5.3 [MER06]
Melting Point, °C: decomposes at 252 [MER06]

#### 1237

Compound: Ethylenediaminetetraacetic acid Synonym: Edetic acid, EDTA Formula: (HOOCCH<sub>2</sub>)<sub>2</sub>NCHCH<sub>2</sub>CH<sub>2</sub>N(CH<sub>2</sub>COOH)<sub>2</sub> Molecular Formula: C<sub>10</sub>H<sub>16</sub>N<sub>2</sub>O<sub>8</sub> Molecular Weight: 292.246 CAS RN: 60-00-4 Properties: colorless cryst; prepared by addition of NaCN and formaldehyde to basic solution of ethylenediamine, forming the tetrasodium salt; used as food antioxidant and as chelating agent for pharmaceutics, added to detergents, shampoos, liq soaps [HAW93] [MER06] Solubility: 0.5 g/L H<sub>2</sub>O (25°C) [MER06] Melting Point, °C: decomposes at 220 [MER06] Reactions: decarboxylates when heated to 150°C [MER06]

#### 1238

Compound: Europium Formula: Eu Molecular Formula: Eu Molecular Weight: 151.965 CAS RN: 7440-53-1 Properties: soft, silvery metal; enthalpy of fusion 9.1 kJ/mol; radius of atom 0.20418 nm; radius of  $Eu^{+++}$  is 0.0950 nm; bcc, a=0.4582 nm; enthalpy of vaporization 176 kJ/mol; can be made by reduction of Eu<sub>2</sub>O<sub>3</sub> with La under vacuum, followed by distillation; used as a neutron absorber, in color TV phosphors, and in phosphors for postage-stamp glues for electronic identification of first-class mail [ALD94] [HAW93] [MER06] [RAR85a] [KIR82] **Solubility:** reacts with H<sub>2</sub>O to evolve hydrogen gas; s liq ammonia [HAW93] [MER06] Density, g/cm<sup>3</sup>: 5.234 [KIR82] Melting Point, °C: 822 [ALD94] Boiling Point, °C: 1527 [ALD94] Thermal Conductivity, W/(m·K): 13.9 (25°C) [ALD94] Thermal Expansion Coefficient: 35×10<sup>-6</sup>/K [CRC10]

## 1239

Compound: Europium boride Formula: EuB<sub>6</sub> Molecular Formula: B<sub>6</sub>Eu Molecular Weight: 216.831 CAS RN: 12008-05-8 Properties: cub; -60 mesh with 99.9% purity [LID94] [CER91] Density, g/cm<sup>3</sup>: 4.91 [LID94] Melting Point, °C: ~2600 [LID94]

**Compound:** Europium hydride **Formula:** EuH<sub>2-3</sub> **Molecular Formula:** EuH<sub>2</sub>; EuH<sub>3</sub> **Molecular Weight:** EuH<sub>2</sub>: 153.981; EuH<sub>3</sub>: 154.989 **CAS RN:** 70446-10-5 **Properties:** -60 mesh with 99.9% purity [CER91]

#### 1241

Compound: Europium nitride Formula: EuN Molecular Formula: EuN Molecular Weight: 165.972 CAS RN: 12020-58-5 Properties: -60 mesh with 99.9% purity [CER91]

## 1242

Compound: Europium silicide Formula: EuSi<sub>2</sub> Molecular Formula: EuSi<sub>2</sub> Molecular Weight: 208.136 CAS RN: 12434-24-1 Properties: tetr; 6 mm pieces and smaller with 99.9% purity, and 10 mm and down lump [ALF93] [LID94] [CER91] Density, g/cm<sup>3</sup>: 5.46 [LID94] Melting Point, °C: 1500 [LID94]

## 1243

Compound: Europium(II) chloride Synonym: europous chloride Formula: EuCl<sub>2</sub> Molecular Formula: Cl<sub>2</sub>Eu Molecular Weight: 222.870 CAS RN: 13769-20-5 Properties: white, ortho-rhomb cryst; amorphous powd [LID94] [MER06] Solubility: s H<sub>2</sub>O [MER06] Density, g/cm<sup>3</sup>: 4.9 [LID94] Melting Point, °C: 731 [LID94]

# 1244

Compound: Europium(II) fluoride Synonym: europous fluoride Formula: EuF<sub>2</sub> Molecular Formula: EuF<sub>2</sub> Molecular Weight: 189.962 CAS RN: 14077-37-5 Properties: yellow, cub; -200 mesh (precipitated) with 99.9% purity [CER91] [STR93] [LID94] **Solubility:** i H<sub>2</sub>O [CRC10] **Density, g/cm<sup>3</sup>:** 6.495 [CRC10] **Melting Point, °C:** 1380 [CRC10] **Boiling Point, °C:** >2400 [CRC10]

#### 1245

Compound: Europium(II) iodide Synonym: europous iodide Formula: EuI<sub>2</sub> Molecular Formula: EuI<sub>2</sub> Molecular Weight: 405.774 CAS RN: 22015-35-6 Properties: olive green cryst; -20 mesh with 99.9% purity [CER91] [CRC10] Solubility: s H<sub>2</sub>O [CRC10] Density, g/cm<sup>3</sup>: 5.50 [CRC10] Melting Point, °C: 580 [LID94] Boiling Point, °C: 1580 [CRC10]

#### 1246

Compound: Europium(II) selenide Formula: EuSe Molecular Formula: EuSe Molecular Weight: 230.925 CAS RN: 12020-66-5 Properties: brown cub; -100 mesh with 99.9% purity [LID94] [CER91] Density, g/cm<sup>3</sup>: 6.45 [LID94] Melting Point, °C: 2027 [CRC10] Thermal Conductivity, W/(m·K): 0.24 [CRC10]

## 1247

Compound: Europium(II) sulfate Synonym: europous sulfate Formula: EuSO<sub>4</sub> Molecular Formula: EuO<sub>4</sub>S Molecular Weight: 248.029 CAS RN: 10031-54-6 Properties: ortho-rhomb; colorless cryst [MER06] [CRC10] Solubility: i H<sub>2</sub>O, dil acids [MER06] Density, g/cm<sup>3</sup>: 4.989 [CRC10]

# 1248

Compound: Europium(II) sulfide Formula: EuS Molecular Formula: EuS Molecular Weight: 184.031 CAS RN: 12020-65-4 Properties: cub; -200 mesh with 99.9% purity [LID94] [CER91] Density, g/cm<sup>3</sup>: 5.7 [LID94]

Compound: Europium(II) telluride Formula: EuTe Molecular Formula: EuTe Molecular Weight: 279.565 CAS RN: 12020-69-8 Properties: black, cub; -20 mesh with 99.9% purity [LID94] [CER91] Density, g/cm<sup>3</sup>: 6.48 [LID94] Melting Point, °C: 1526 [LID94]

# 1250

**Compound:** Europium(III) acetylacetonate **Synonyms:** 2,4-pentanedione, Eu(III) derivative **Formula:** Eu(CH<sub>3</sub>COCH=C(O)CH<sub>3</sub>)<sub>3</sub>·xH<sub>2</sub>O **Molecular Formula:**  $C_{15}H_{21}EuO_6$  (anhydrous) **Molecular Weight:** 449.293 (anhydrous) **CAS RN:** 14284-86-7 **Properties:** hygr [ALD94] **Melting Point, °C:** decomposes at 140 [ALD94]

#### 1251

Compound: Europium(III) bromide Synonym: europic bromide Formula: EuBr<sub>3</sub> Molecular Formula: Br<sub>3</sub>Eu Molecular Weight: 391.677 CAS RN: 13759-88-1 Properties: gray cryst; -20 mesh with 99.9% purity [LID94] [CER91] Solubility: s H<sub>2</sub>O [CRC10] Melting Point, °C: 702 [CRC10] Boiling Point, °C: decomposes [CRC10]

# 1252

**Compound:** Europium(III) carbonate hydrate **Formula:**  $Eu_2(CO_3)_3 \cdot xH_2O$  **Molecular Formula:**  $C_3Eu_2O_9$  (anhydrous) **Molecular Weight:** 483.958 (anhydrous) **CAS RN:** 86546-99-8 **Properties:** white powd; hygr [STR93] [ALD94]

# 1253

**Compound:** Europium(III) chloride **Synonym:** europic chloride **Formula:** EuCl<sub>3</sub> **Molecular Formula:** Cl<sub>3</sub>Eu **Molecular Weight:** 258.323 **CAS RN:** 10025-76-0 Properties: -20 mesh with 99.9% purity; yellowish-white powd; hygr [STR93] [CER91]
Density, g/cm<sup>3</sup>: 4.89 [STR93]
Melting Point, °C: 623 [LID94]
Reactions: yields EuCl<sub>2</sub> by reduction with H<sub>2</sub> at 600°C [MER06]

#### 1254

Compound: Europium(III) chloride hexahydrate Formula:  $EuCl_3 \cdot 6H_2O$ Molecular Formula:  $Cl_3EuH_{12}O_6$ Molecular Weight: 366.414 CAS RN: 13759-92-7 Properties: yellow needles; white cryst; hygr [HAW93] [STR93] Solubility: s H<sub>2</sub>O [HAW93] Density, g/cm<sup>3</sup>: 4.89 (20°C) [HAW93] Melting Point, °C: 850 [HAW93]

## 1255

Compound: Europium(III) fluoride
Formula: EuF<sub>3</sub>
Molecular Formula: EuF<sub>3</sub>
Molecular Weight: 208.960
CAS RN: 13765-25-8
Properties: white powd or 99.9% pure melted pieces of 3–6 mm; hygr; pieces used as evaporation material for possible applications in multilayers [STR93] [CER91]
Melting Point, °C: 1390 [STR93]
Boiling Point, °C: 2280 [STR93]

# 1256

Compound: Europium(III) nitrate hexahydrate Synonym: europic nitrate hexahydrate Formula: Eu $(NO_3)_3 \cdot 6H_2O$ Molecular Formula: Eu $H_{12}N_3O_{15}$ Molecular Weight: 446.071 CAS RN: 10031-53-5 Properties: white to pale pink cryst; hygr [HAW93] [STR93] Solubility: 4.2732 ± 0.0061 mol/kg in H<sub>2</sub>O (25°C) [RAR84] Melting Point, °C: 85 [HAW93]

# 1257

**Compound:** Europium(III) nitrate pentahydrate **Formula:**  $Eu(NO_3)_3 \cdot 5H_2O$ **Molecular Formula:**  $EuH_{10}N_3O_{14}$ **Molecular Weight:** 428.071 **CAS RN:** 63026-01-7 **Properties:** white cryst [STR93]

**Compound:** Europium(III) oxalate **Formula:**  $Eu_2(C_2O_4)_3$  **Molecular Formula:**  $C_6Eu_2O_{12}$  **Molecular Weight:** 567.989 **CAS RN:** 14175-02-1 **Properties:** white powd; hygr [HAW93] [ALD94] **Solubility:** i H<sub>2</sub>O; sl s acids [HAW93]

# 1259

Compound: Europium(III) oxide Synonym: europia Formula:  $Eu_2O_3$ Molecular Formula:  $Eu_2O_3$ Molecular Weight: 351.928 CAS RN: 1308-96-9 Properties: -325 mesh, 5 µm or less of 99.995% and 99.9% purity; pale rose powd; used in red and infrared sensitive phosphors and in nuclear reactor control rods, as an evaporated material of 99.9% purity it is reactive to

radio frequencies [HAW93] [CER91] Solubility: i H<sub>2</sub>O; s acids [HAW93] Density, g/cm<sup>3</sup>: 7.42 [MER06] Melting Point, °C: 2350 [LID94]

# 1260

**Compound:** Europium(III) perchlorate hexahydrate **Formula:**  $Eu(ClO_4)_3 \cdot 6H_2O$  **Molecular Formula:**  $Cl_3EuH_{12}O_{18}$  **Molecular Weight:** 558.407 **CAS RN:** 36907-40-1 **Properties:** off-white cryst; hygr [STR93]

# 1261

**Compound:** Europium(III) sulfate **Formula:**  $Eu_2(SO_4)_3$  **Molecular Formula:**  $Eu_2O_{12}S_3$  **Molecular Weight:** 592.116 **CAS RN:** 13537-15-0 **Properties:** pale pink cryst [CRC10] **Solubility:** g/100 g H<sub>2</sub>O: 2.1<sup>20</sup> [CRC10] **Density, g/cm<sup>3</sup>:** 4.99 [CRC10]

# 1262

**Compound:** Europium(III) sulfate octahydrate **Formula:**  $Eu_2(SO_4)_3 \cdot 8H_2O$ **Molecular Formula:**  $Eu_2H_{16}O_{20}S_3$ **Molecular Weight:** 736.243 CAS RN: 10031-52-4
Properties: white cryst; prepared by dissolving the oxide in H<sub>2</sub>SO<sub>4</sub> [MER06] [STR93]
Solubility: parts/100 parts H<sub>2</sub>O: 2.56 (20°C), 1.93 parts (40°C) [MER06]
Density, g/cm<sup>3</sup>: 4.95 [CRC10]
Reactions: minus 8H<sub>2</sub>O at 375°C [HAW93]

# 1263

Compound: Fermium
Formula: Fm
Molecular Formula: Fm
Molecular Weight: 257
CAS RN: 7440-72-4
Properties: chemical properties similar to those of erbium; man-made radioactive element; discovered in 1952 in debris from thermonuclear explosion by Ghiorso and colleagues; t<sub>1/2</sub> of <sup>257</sup>Fm is 100 days [KIR78] [HAW93] [MER06]
Melting Point, °C: 1527 [LID94]

# 1264

Compound: Ferric acetylacetonate
Synonyms: 2,4-pentanedione, iron(III) derivative
Formula: Fe(CH<sub>3</sub>COCH=C(O)CH<sub>3</sub>)<sub>3</sub>
Molecular Formula: C<sub>15</sub>H<sub>21</sub>FeO<sub>6</sub>
Molecular Weight: 353.173
CAS RN: 14024-18-1
Properties: reddish orange cryst; resistant to hydrolysis; used as a moderating and combustion catalyst [HAW93] [STR93]
Solubility: sl s H<sub>2</sub>O; s in most organic solvents [HAW93]
Density, g/cm<sup>3</sup>: 5.24 [STR93]
Melting Point, °C: 184 [STR93]

# 1265

Compound: Ferric arsenate dihydrate
Formula: FeAsO<sub>4</sub> · 2H<sub>2</sub>O
Molecular Formula: AsFeH<sub>4</sub>O<sub>6</sub>
Molecular Weight: 230.795
CAS RN: 10102-49-5
Properties: green or brown powd; used as an insecticide [HAW93]
Solubility: i H<sub>2</sub>O; s dil mineral acids [HAW93]
Density, g/cm<sup>3</sup>: 3.18 [HAW93]
Melting Point, °C: decomposes when heated [HAW93]

**1266 Compound:** Ferric basic acetate **Formula:** FeOH(CH<sub>3</sub>COO)<sub>2</sub> Molecular Formula: C<sub>4</sub>H<sub>7</sub>FeO<sub>5</sub>
Molecular Weight: 190.942
CAS RN: 10450-55-2
Properties: brownish red scales or amorphous powd; uses: mordant in textile dyeing, wood preservative, and in medicine [HAW93] [MER06]
Solubility: i H<sub>2</sub>O; s alcohol, acids [MER06]

## 1267

Compound: Ferric basic arsenite Formula:  $2FeAsO_3 \cdot Fe_2O_3 \cdot 5H_2O$ Molecular Formula:  $As_2Fe_4H_{10}O_{14}$ Molecular Weight: 607.294 CAS RN: 63989-69-5 Properties: brownish yellow powd; used in medicine [HAW93] Solubility: s in acids [HAW93] Melting Point, °C: decomposes [CRC10]

#### 1268

Compound: Ferric bromide
Synonym: iron(III) bromide
Formula: FeBr<sub>3</sub>
Molecular Formula: Br<sub>3</sub>Fe
Molecular Weight: 295.557
CAS RN: 10031-26-2
Properties: dark red or black; hex cryst; very hygr; used as a catalyst for brominations [HAW93] [MER06]
Solubility: s H<sub>2</sub>O, alcohol, ether, acetic acid [MER06]
Density, g/cm<sup>3</sup>: 4.5 [LID10]
Melting Point, °C: sublimes, decomposes [STR93]

## 1269

Compound: Ferric chloride Synonym: molysite Formula: FeCl<sub>3</sub> Molecular Formula: Cl<sub>3</sub>Fe Molecular Weight: 162.203 CAS RN: 7705-08-0 Properties: hex; dark leaflets or plates; red by transmitted light, green by reflected light; very hygr; readily absorbs H<sub>2</sub>O from air to form hexahydrate; enthalpy of fusion 43.10 kJ/mol; used in water purification, etching agent [HAW93] [MER06] [CRC10] **Solubility:** s alcohol, ether, acetone [MER06]; mol/100 mol H<sub>2</sub>O: 2.06 (0°C), 7.77 (25°C), 14.88 (100°C); solid phase,  $FeCl_3 \cdot 6H_2O(0^{\circ}C)$ , FeCl<sub>3</sub>·3-l/2H<sub>2</sub>O (25°C), FeCl<sub>3</sub> (100°C) [KRU93] Density, g/cm<sup>3</sup>: 2.804 [STR93] Melting Point, °C: 304 [CRC10] Boiling Point, °C: ~316 [MER06]

## 1270

Compound: Ferric chloride hexahydrate
Synonym: iron(III) chloride hexahydrate
Formula: FeCl<sub>3</sub> · 6H<sub>2</sub>O
Molecular Formula: Cl<sub>3</sub>FeH<sub>12</sub>O<sub>6</sub>
Molecular Weight: 270.294
CAS RN: 10025-77-1
Properties: brownish yellow or orange; monocl cryst [MER06]
Solubility: s H<sub>2</sub>O, alcohol, acetone, ether [MER06]
Density, g/cm<sup>3</sup>: 1.82 [MER06]
Melting Point, °C: ~37 [MER06]
Boiling Point, °C: 280–285 [ALD94]

## 1271

Compound: Ferric chromate Synonym: iron(III) chromate Formula: Fe<sub>2</sub>(CrO<sub>4</sub>)<sub>3</sub> Molecular Formula: Cr<sub>3</sub>Fe<sub>2</sub>O<sub>12</sub> Molecular Weight: 459.671 CAS RN: 10294-52-7 Properties: yellow powd; used in metallurgy, ceramics, and as a paint pigment [HAW93] Solubility: i H<sub>2</sub>O, alcohol; s acids [HAW93]

#### 1272

Compound: Ferric citrate pentahydrate
Synonym: iron(III) citrate pentahydrate
Formula: FeC<sub>6</sub>H<sub>5</sub>O<sub>7</sub> · 5H<sub>2</sub>O
Molecular Formula: C<sub>6</sub>H<sub>15</sub>FeO<sub>12</sub>
Molecular Weight: 335.023
CAS RN: 28633-45-6
Properties: reddish brown scales; light sensitive; used in medicine and in blueprinting paper [HAW93]
Solubility: s H<sub>2</sub>O; i alcohol [HAW93]

## 1273

Compound: Ferric dichromate Synonym: iron(III) dichromate Formula: Fe<sub>2</sub>(Cr<sub>2</sub>O<sub>7</sub>)<sub>3</sub> Molecular Formula: Cr<sub>6</sub>Fe<sub>2</sub>O<sub>21</sub> Molecular Weight: 759.654 CAS RN: 10294-53-8 Properties: reddish brown granules; oxidizing action; used in the preparation of paint pigments [HAW93] Solubility: s H<sub>2</sub>O, acids [HAW93]

# 1274 Compound: Ferric ferrocyanide

Synonym: Prussian blue

Formula: Fe<sub>4</sub>[Fe(CN)<sub>6</sub>]<sub>3</sub>
Molecular Formula: C<sub>18</sub>Fe<sub>7</sub>N<sub>18</sub>
Molecular Weight: 859.234
CAS RN: 14038-43-8
Properties: dark blue powd or lumps [MER06]
Solubility: i H<sub>2</sub>O, dil acids; s aq oxalic acid when freshly prepared [MER06]
Density, g/cm<sup>3</sup>: 1.80 [MER06]

## 1275

Compound: Ferric fluoride
Synonym: iron(III) fluoride
Formula: FeF<sub>3</sub>
Molecular Formula: F<sub>3</sub>Fe
Molecular Weight: 112.840
CAS RN: 7783-50-8
Properties: green hex cryst; preparation is by reaction of FeCl<sub>3</sub> with F<sub>2</sub> or anhydrous HF; uses: ceramics, catalyst [HAW93] [MER06]
Solubility: v sl s H<sub>2</sub>O; s dil HF [MER06]; g/100 g soln, H<sub>2</sub>O: 5.59 (25°C); solid phase, FeF<sub>3</sub> · 3H<sub>2</sub>O [KRU93]
Density, g/cm<sup>3</sup>: 3.87 [MER06]
Melting Point, °C: sublimes at >1000 [MER06]

## 1276

Compound: Ferric fluoride trihydrate
Synonym: iron(III) fluoride trihydrate
Formula: FeF<sub>3</sub> · 3H<sub>2</sub>O
Molecular Formula: F<sub>3</sub>FeH<sub>6</sub>O<sub>3</sub>
Molecular Weight: 166.886
CAS RN: 15469-38-2
Properties: yellowish brown powd; readily prepared from reaction of Fe<sub>2</sub>O<sub>3</sub> and aq HF; dehydration produces a mixture of oxyfluorides [KIR78] [STR93]
Density, g/cm<sup>3</sup>: 2.3 [LID94]

## 1277

**Compound:** Ferric formate **Formula:** Fe(CHO<sub>2</sub>)<sub>3</sub> **Molecular Formula:** C<sub>3</sub>H<sub>3</sub>FeO<sub>6</sub> **Molecular Weight:** 190.897 **CAS RN:** 555-76-0 **Properties:** red-yellow cryst powd [CRC10] **Solubility:** s H<sub>2</sub>O; sl EtOH [CRC10]

## 1278

**Compound:** Ferric hydroxide **Synonym:** iron(III) hyroxide **Formula:** Fe(OH)<sub>3</sub> **Molecular Formula:** FeH<sub>3</sub>O<sub>3</sub> **Molecular Weight:** 106.867 **CAS RN:** 1309-33-7 Properties: brown flocculant precipitate; used in water purification, manufacturing pigments [HAW93]
Solubility: i H<sub>2</sub>O, alcohol, ether; s acids [HAW93]
Density, g/cm<sup>3</sup>: 3.4–3.9 [HAW93]
Reactions: minus water at ~500°C [HAW93]

#### 1279

Compound: Ferric hypophosphite Synonym: iron(III) hypophosphite Formula:  $Fe(H_2PO_2)_3$ Molecular Formula:  $FeH_6O_6P_3$ Molecular Weight: 250.811 CAS RN: 7783-84-8 Properties: white or grayish white powd; odorless and tasteless [HAW93] [MER06] Solubility: s in 2300 parts cold H<sub>2</sub>O, 1200 parts boiling H<sub>2</sub>O [MER06]

#### 1280

Compound: Ferric metavanadate
Synonym: iron(III) vanadate
Formula: Fe(VO<sub>3</sub>)<sub>3</sub>
Molecular Formula: FeO<sub>9</sub>V<sub>3</sub>
Molecular Weight: 352.665
CAS RN: 65842-03-7
Properties: grayish brown powd; used in metallurgy [HAW93]
Solubility: i H<sub>2</sub>O, alcohol; s acids [HAW93]

# 1281

**Compound:** Ferric nitrate **Formula:**  $Fe(NO_3)_3$  **Molecular Formula:**  $FeN_3O_9$  **Molecular Weight:** 241.860 **CAS RN:** 10421-48-4 **Properties:** cryst [CRC10] **Solubility:** g/100 g H<sub>2</sub>O: 82.5<sup>20</sup> [CRC10]

#### 1282

**Compound:** Ferric nitrate hexahydrate **Formula:**  $Fe(NO_3)_3 \cdot 6H_2O$  **Molecular Formula:**  $FeH_{12}N_3O_{15}$  **Molecular Weight:** 349.951 **CAS RN:** 13476-08-9 **Properties:** violet cub cryst [CRC10] **Melting Point,** °C: decomposes at 35 [CRC10] **Solubility:** g/100 g H<sub>2</sub>O: 82.5<sup>20</sup> [CRC10]

#### 1283

**Compound:** Ferric nitrate nonahydrate **Synonym:** iron(III) nitrate nonahydrate

Formula: Fe(NO<sub>3</sub>)<sub>3</sub> · 9H<sub>2</sub>O
Molecular Formula: FeH<sub>18</sub>N<sub>3</sub>O<sub>18</sub>
Molecular Weight: 403.997
CAS RN: 7782-61-8
Properties: pale violet to grayish white cryst; somewhat deliq; used in dyeing, tanning, and analytical chemistry [HAW93] [MER06]
Solubility: g/100 g H<sub>2</sub>O: 112.0 (0°C), 137.7 (20°C), 175.0 (40°C) [LAN05]; v s alcohol, acetone [MER06]
Density, g/cm<sup>3</sup>: 1.684 [HAW93]
Melting Point, °C: 47.2 [HAW93]
Boiling Point, °C: decomposes below 100 [MER06]

# 1284

Compound: Ferric oxalate Synonym: iron(III) oxalate Formula:  $Fe_2(C_2O_4)_3$ Molecular Formula:  $C_6Fe_2O_{12}$ Molecular Weight: 375.749 CAS RN: 19469-07-9 Properties: pale yellow, amorphous, odorless powd; used in photographic printing paper; also a hexahydrate [HAW93] [STR93] Solubility: s H<sub>2</sub>O, acids; i alkalies [HAW93] Melting Point, °C: decomposes at 100 [HAW93]

#### 1285

Compound: Ferric oxide
Synonyms: hematite, maghemite
Formula: hematite: α-Fe<sub>2</sub>O<sub>3</sub>; maghemite: γ-Fe<sub>2</sub>O<sub>3</sub>
Molecular Formula: Fe<sub>2</sub>O<sub>3</sub>
Molecular Weight: 159.688
CAS RN: 1309-37-1
Properties: hematite: reddish brown powd; used in metallurgy, gas purification, as a paint pigment, and as an evaporated material and sputtering target of 99.99% and 99.9% purity for beam splitter and interference layers and magnetic films [HAW93] [STR93] [CER91]
Solubility: i H<sub>2</sub>O; s acids [HAW93]
Density, g/cm<sup>3</sup>: 5.12–5.24 [HAW93]

Melting Point, °C: 1565 [HAW93]

**Thermal Expansion Coefficient:** (volume) 100°C (0.202), 200°C (0.485), 400°C (1.175) [CLA66]

# 1286

**Compound:** Ferric oxide hydroxide **Synonym:** goethite **Formula:** α-FeO(OH) **Molecular Formula:** FeHO<sub>2</sub> **Molecular Weight:** 88.852 **CAS RN:** 20344-49-4 **Properties:** red to brown powd or cryst [MER06] **Solubility:** i H<sub>2</sub>O; s mineral acids [MER06] **Density, g/cm<sup>3</sup>:** 3.4–3.9 [MER06]

#### 1287

**Compound:** Ferric oxide monohydrate **Formula:**  $Fe_2O_3 \cdot H_2O$ **Molecular Formula:**  $Fe_2H_2O_4$ **Molecular Weight:** 177.704 **CAS RN:** 51274-00-1 **Properties:** yellow powd [STR93]

#### 1288

**Compound:** Ferric perchlorate hexahydrate **Synonym:** iron(III) perchlorate hexahydrate **Formula:**  $Fe(ClO_4)_3 \cdot 6H_2O$ **Molecular Formula:**  $Cl_3FeH_{12}O_{18}$ **Molecular Weight:** 462.287 **CAS RN:** 13537-24-1 **Properties:** yellow cryst; hygr [STR93]

## 1289

Compound: Ferric perchlorate hydrate Synonym: iron(III) perchlorate Formula:  $Fe(CIO_4)_3 \cdot xH_2O$ Molecular Formula:  $CI_3FeO_{12}$  (anhydrous) Molecular Weight: 354.196 (anhydrous) CAS RN: 14013-71-9 Properties: purple cryst; hygr [STR93] Solubility: g/100 g soln, H<sub>2</sub>O: 74.32 (0°C), 79.86 (25°C); solid phase, Fe(CIO<sub>4</sub>)<sub>3</sub> · 10H<sub>2</sub>O [KRU93]

#### 1290

Compound: Ferric phosphate dihydrate Synonym: iron(III) phosphate dihydrate Formula:  $FePO_4 \cdot 2H_2O$ Molecular Formula:  $FeH_4O_6P$ Molecular Weight: 186.847 CAS RN: 10045-86-0 Properties: white, grayish white, or light pink; ortho-rhomb or monocl cryst, and amorphous powd; used in fertilizers and as a food and feed additive [HAW93] [MER06] Solubility: i H<sub>2</sub>O; s HC1 [MER06] Density, g/cm<sup>3</sup>: 2.87 [MER06] Reactions: minus H<sub>2</sub>O at >140°C [MER06]

# 1291

**Compound:** Ferric phosphate hydrate **Synonym:** iron(III) phosphate hydrate

**Formula:** FePO<sub>4</sub>·xH<sub>2</sub>O **Molecular Formula:** FeO<sub>4</sub>P (anhydrous) **Molecular Weight:** 150.817 (anhydrous) **CAS RN:** 13463-10-0 **Properties:** white powd [STR93]

## 1292

**Compound:** Ferric pyrophosphate nonahydrate **Synonym:** iron(III) pyrpophosphate nonahydrate **Formula:**  $Fe_4(P_2O_7)_3 \cdot 9H_2O$  **Molecular Formula:**  $Fe_4H_{18}O_{30}P_6$  **Molecular Weight:** 907.348 **CAS RN:** 10058-44-3 **Properties:** yellowish white powd [MER06] **Solubility:** i H<sub>2</sub>O, acetic acid; s mineral acids [MER06]

#### 1293

**Compound:** Ferric sodium pyrophosphate **Formula:** FeNaP<sub>2</sub>O<sub>7</sub> **Molecular Formula:** FeNaO<sub>7</sub>P<sub>2</sub> **Molecular Weight:** 252.778 **CAS RN:** 1045-87-1 **Properties:** white powd [CRC10] **Solubility:** i H<sub>2</sub>O; s Hv1 [CRC10] **Density, g/cm<sup>3</sup>:** 1.5 [CRC10]

#### 1294

Compound: Ferric sulfate Synonym: iron(III) sulfate Formula: Fe<sub>2</sub>(SO<sub>4</sub>)<sub>3</sub> Molecular Formula: Fe<sub>2</sub>O<sub>12</sub>S<sub>3</sub> Molecular Weight: 399.881 CAS RN: 10028-22-5 Properties: grayish white powd or rhomb cryst; very hygr [MER06] Solubility: slowly s H<sub>2</sub>O with hydrolysis [MER06] Density, g/cm<sup>3</sup>: 3.097 [MER06] Melting Point, °C: decomposes at 1178 [JAN85]

# 1295

**Compound:** Ferric sulfate hydrate **Synonym:** iron(III) sulfate hydrate **Formula:**  $Fe_2(SO_4)_3 \cdot xH_2O$  **Molecular Formula:**  $Fe_2O_{12}S_3$  (anhydrous) **Molecular Weight:** 399.881 (anhydrous) **CAS RN:** 15244-10-7 **Properties:** off-white powd [STR93]

#### 1296

**Compound:** Ferric sulfate nonahydrate **Synonym:** coquimbite

Formula: Fe<sub>2</sub>(SO<sub>4</sub>)<sub>3</sub>·9H<sub>2</sub>O
Molecular Formula: Fe<sub>2</sub>H<sub>18</sub>O<sub>21</sub> S<sub>3</sub>
Molecular Weight: 562.018
CAS RN: 13520-56-4
Properties: rhomb yellow cryst or grayish white powd [HAW93] [CRC10]
Solubility: 440 g/100 mL H<sub>2</sub>O [CRC10]
Density, g/cm<sup>3</sup>: 2.0–2.1 [HAW93]
Melting Point, °C: decomposes at 480 [HAW93]
Reactions: minus 7H<sub>2</sub>O at 1750°C [CRC10]

## 1297

Compound: Ferric thiocyanate Synonym: iron(III) thiocyanate Formula: Fe(SCN)<sub>3</sub> Molecular Formula: C<sub>3</sub>FeN<sub>3</sub>S<sub>3</sub> Molecular Weight: 230.096 CAS RN: 4119-52-2 Properties: cub red cryst; deliq; decomposes on heating [MER06] [CRC10] Solubility: s H<sub>2</sub>O, alcohol, ether, acetone, pyridine; i CHCl<sub>3</sub>, toluene [MER06]

## 1298

Compound: Ferric trifluoroacetylacetonate Synonyms: 1,1,1-trifluoro-2,4pentanedione, Fe(III) derivative Formula: Fe(CF<sub>3</sub>COCH=C(O)CH<sub>3</sub>)<sub>3</sub> Molecular Formula: C<sub>15</sub>H<sub>12</sub>F<sub>9</sub>FeO<sub>6</sub> Molecular Weight: 515.089 CAS RN: 14526-22-8 Properties: cryst [ALF95] Melting Point, °C: decomposes at 110–112 [ALF95]

# 1299

**Compound:** 1,1'-Bis(diphenylphosphino)ferrocene **Formula:**  $(C_6H_5)_2PC_5H_4FeC_5H_4P(C_6H_5)_2$  **Molecular Formula:**  $C_{34}H_{28}FeP_2$  **Molecular Weight:** 554.395 **CAS RN:** 12150-46-8 **Properties:** yellow-orange cryst [STR93] **Melting Point, °C:** 180 [STR93]

## 1300

**Compound:** Ferrocene **Synonym:** dicyclopentadienyliron **Formula:**  $Fe(C_5H_5)_2$ **Molecular Formula:**  $C_{10}H_{10}Fe$ **Molecular Weight:** 186.036 **CAS RN:** 102-54-5 Properties: orange needles; camphor odor; volatile in steam; diamagnetic; thermally stable up to >500°C; preparation: reaction of ferric chloride with cyclopentadienyl magnesium bromide in a solvent of diethylether/benzene (T.J. Kealy; P.L. Pauson, Nature 1951, vol. 168, 1039); use: antiknock gasoline additive, catalyst [MER06] [COT88] [ALD94]
Solubility: s alcohol, ether, benzene; dissolves in dil HNO<sub>3</sub> and in conc H<sub>2</sub>SO<sub>4</sub> solutions with deep red solutions [MER06]

Melting Point, °C: 174–176 [ALD94] Boiling Point, °C: 249 [ALD94]

#### 1301

Compound: Ferrocenium hexafluorophosphate
 Molecular Weight: 331.00
 Molecular Formula: [Fe(C<sub>6</sub>H<sub>5</sub>)<sub>2</sub>]PF<sub>6</sub>
 CAS RN: 11077-24-0
 Properties: hygr; uses: preparation of catalysts for asymmetric epoxidation of olefins and other organics [ALD94]

## 1302

**Compound:** Ferrocenium tetrafluoroborate **Molecular Weight:** 272.84 **Molecular Formula:** C<sub>10</sub>H<sub>10</sub>BFeF<sub>4</sub> **CAS RN:** 1282-37-7

**Properties:** hygr; uses: preparation of catalysts for asymmetric epoxidation of olefins and other organics [ALD94]

## 1303

Compound: Ferrous acetate
Synonym: iron(II) acetate
Formula: Fe(CH<sub>3</sub>COO)<sub>2</sub>
Molecular Formula: C<sub>4</sub>H<sub>6</sub>FeO<sub>4</sub>
Molecular Weight: 173.935
CAS RN: 3094-87-9
Properties: off-white to light brown powd; sensitive to atm oxygen and moisture; used to prepare dark shades of inks and dyes and as a mordant [KIR82] [STR93]
Density, g/cm<sup>3</sup>: decomposes at 190–200 [ALD94]

# 1304

**Compound:** Ferrous acetate tetrahydrate **Synonym:** iron(II) acetate tetrahydrate **Formula:**  $Fe(CH_3COO)_2 \cdot 4H_2O$ **Molecular Formula:**  $C_4H_{14}FeO_8$ **Molecular Weight:** 245.995 **CAS RN:** 3094-87-9 Properties: greenish cryst but usually partly brownish due to air oxidation; used in dyeing textiles and leather, in medicine, and as a wood preservative [HAW93]
Solubility: s H<sub>2</sub>O, alcohol [HAW93]
Melting Point, °C: decomposes [CRC10]

#### 1305

**Compound:** Ferrous acetylacetonate **Synonyms:** 2,4-pentanedione, iron(II) derivative **Formula:**  $Fe(CH_3COCH=C(O)CH_3)_2$  **Molecular Formula:**  $C_{10}H_{14}FeO_4$  **Molecular Weight:** 254.064 **CAS RN:** 14024-17-0 **Properties:** powd [STR93]

## 1306

Compound: Ferrous arsenate hexahydrate
Synonym: iron(II) orthoarsenate hexahydrate
Formula: Fe<sub>3</sub>(AsO<sub>4</sub>)<sub>2</sub> · 6H<sub>2</sub>O
Molecular Formula: As<sub>2</sub>Fe<sub>3</sub>H<sub>12</sub>O<sub>14</sub>
Molecular Weight: 553.465
CAS RN: 10102-50-8
Properties: green amorphous powd; used in insecticides [HAW93]
Solubility: i H<sub>2</sub>O; s acids [HAW93]
Melting Point, °C: decomposes [CRC10]

#### 1307

Compound: Ferrous bromide Synonym: iron(II) bromide Formula: FeBr<sub>2</sub> Molecular Formula: Br<sub>2</sub>Fe Molecular Weight: 215.653 CAS RN: 7789-46-0 Properties: light yellow to dark brown; hygr cryst; enthalpy of fusion 50.20 kJ/mol [CRC10] [MER06] Solubility: v s alcohol [MER06]; g/100 g soln, H<sub>2</sub>O: 54.6  $\pm$  0.5 (25°C), 64.8 (100°C); solid phase, FeBr<sub>2</sub>·6H<sub>2</sub>O (25°C), FeBr<sub>2</sub>·2H<sub>2</sub>O (100°C) [KRU93] Density, g/cm<sup>3</sup>: 4.636 [STR93] Melting Point, °C: 684 [ALD94] Boiling Point, °C: 934 [ALD94]

#### 1308

**Compound:** Ferrous bromide hexahydrate **Synonym:** iron(II) bromide hexahydrate **Formula:**  $FeBr_2 \cdot 6H_2O$ **Molecular Formula:**  $Br_2FeH_{12}O_6$ **Molecular Weight:** 323.744 **CAS RN:** 13463-12-2 Properties: pale green to bluish green cryst powd; rhomb prisms; very deliq; rapidly oxidized in moist air; used as a polymerization catalyst [HAW93] [MER06]
Solubility: s H<sub>2</sub>O, alcohol [HAW93]
Density, g/cm<sup>3</sup>: 4.636 [HAW93]
Melting Point, °C: 27 [HAW93]
Reactions: minus 2H<sub>2</sub>O at 49°C; minus 4H<sub>2</sub>O forming dihydrate at 83°C [MER06]

#### 1309

**Compound:** Ferrous bromide hydrate **Formula:**  $FeBr_2 \cdot xH_2O$ **Molecular Formula:**  $Br_2Fe$  (anhydrous) **Molecular Weight:** 295.557 (anhydrous) **CAS RN:** 13463-12-2 **Properties:** orange cryst [STR93] **Melting Point,** °C: 27 [STR93]

# 1310

**Compound:** Ferrous carbonate **Synonym:** siderite **Formula:** FeCO<sub>3</sub> **Molecular Formula:** CFeO<sub>3</sub> **Molecular Weight:** 115.854 **CAS RN:** 563-71-3

Properties: gray, yellow, brown, green, white, or brownish red mineral; hardness is 3.5–4 Mohs; obtained as a white precipitate by adding alkaline carbonate solution to a ferrous solution; used as a flame retardant and diet supplement; forms Fe(HCO<sub>3</sub>)<sub>2</sub>, 6013-77-0, in solutions containing CO<sub>2</sub> [KIR81] [HAW93]
Solubility: 0.0067 g/100 mL H<sub>2</sub>O (25°C) [CRC10]
Density, g/cm<sup>3</sup>: 3.8 [CRC10]
Melting Point, °C: decomposes [CRC10]

# 1311

Compound: Ferrous chloride Synonym: iron(II) chloride Formula: FeCl<sub>2</sub> Molecular Formula: Cl<sub>2</sub>Fe Molecular Weight: 126.750 CAS RN: 7758-94-3 Properties: white, sometimes with green tint; rhomb cryst; very hygr; readily oxidized; enthalpy of fusion 43.01 kJ/mol [CRC10] [HAW93] [MER06] Solubility: v s alcohol, acetone; i ether [MER06]: g/100 g soln, H<sub>2</sub>O: 33.2 (0°C), 39.4  $\pm$  0.2 (25°C), 48.7 (100°C); solid phase, FeCl<sub>2</sub> · 6H<sub>2</sub>O (0°C), FeCl<sub>2</sub> · 4H<sub>2</sub>O (25°C), FeCl<sub>2</sub> · 2H<sub>2</sub>O (100°C) [KRU93] Density, g/cm<sup>3</sup>: 3.16 [MER06] Melting Point, °C: 677 [CRC10] Boiling Point, °C: 1023 [MER06]

**Reactions:** can sublime in HCl atm at 700°C without decomposition; forms FeCl<sub>3</sub> and Fe<sub>2</sub>O<sub>3</sub> when heated in air [MER06]

#### 1312

Compound: Ferrous chloride dihydrate Synonym: iron(II) chloride dihydrate Formula: FeCl<sub>2</sub>·2H<sub>2</sub>O Molecular Formula: Cl<sub>2</sub>FeH<sub>4</sub>O<sub>2</sub> Molecular Weight: 162.781 CAS RN: 16399-77-2 Properties: white with pale green tint; monocl cryst [MER06] Reactions: minus H<sub>2</sub>O at 120°C [MER06]

#### 1313

Compound: Ferrous chloride tetrahydrate Synonym: iron(II) chloride tetrahydrate Formula: FeCl<sub>2</sub>·4H<sub>2</sub>O Molecular Formula: Cl<sub>2</sub>FeH<sub>8</sub>O<sub>4</sub> Molecular Weight: 198.812 CAS RN: 13478-10-9 Properties: pale green to bluish green; monocl cryst or cryst powd [MER06] Solubility: s H<sub>2</sub>O, alcohol [MER06] Density, g/cm<sup>3</sup>: 1.93 [MER06] Reactions: minus 2H<sub>2</sub>O at ~105°C-115°C [MER06]

## 1314

Compound: Ferrous chromite Synonym: chromite Formula:  $FeCr_2O_4$ Molecular Formula:  $Cr_2FeO_4$ Molecular Weight: 223.835 CAS RN: 1308-31-2 Properties: natural oxide of the two metals; iron black to brownish black; hardness 5.5 Mohs; it is the only commercial source of chromium and chromium compounds [HAW93] Solubility: i H<sub>2</sub>O [CRC10] Density, g/cm<sup>3</sup>: 3.6 [HAW93] Thermal Expansion Coefficient: (volume) 100°C (0.09), 200°C (0.21), 400°C (0.48), 800°C (1.26), 1000°C (1.74) [CLA66]

# 1315

**Compound:** Ferrous citrate monohydrate **Synonym:** iron(II) citrate monohydrate **Formula:**  $FeC_6H_6O_7 \cdot H_2O$ 

# Molecular Formula: C<sub>6</sub>H<sub>8</sub>FeO<sub>8</sub> Molecular Weight: 263.970 CAS RN: 23383-11-1 Properties: white, rhomb powd; prepared from iron powd and citric acid; used as supplements to animal diets [KIR81] [MER06] [CRC10] Solubility: i H<sub>2</sub>O, alcohol, acetone [MER06] Melting Point, °C: decomposes under H<sub>2</sub> at 350 [CRC10]

#### 1316

**Compound:** Ferrous fluoride **Synonym:** iron(II) fluoride **Formula:** FeF<sub>2</sub>

**Molecular Formula:** F<sub>2</sub>Fe

Molecular Weight: 93.842

CAS RN: 7789-28-8

**Properties:** off-white powd; tetr cryst or powd; enthalpy of fusion 52.00 kJ/mol; can be prepared by reacting anhydrous HF with metallic Fe; used in ceramics and as a catalyst [HAW93] [MER06] [CRC10]

Solubility: sl s H<sub>2</sub>O; s dil HF; i alcohol, ether [MER06] [HAW93]
Density, g/cm<sup>3</sup>: 4.09 [MER06]
Melting Point, °C: 1100 [CRC10]

#### 1317

Compound: Ferrous fluoride tetrahydrate Synonym: iron(II) fluoride tetrahydrate Formula:  $FeF_2 \cdot 4H_2O$ Molecular Formula:  $F_2FeH_8O_4$ Molecular Weight: 165.904 CAS RN: 13940-89-1 Properties: rhomb, colorless cryst; can be prepared by dissolution of Fe or FeF<sub>2</sub> in HF solution; decomposes to Fe<sub>2</sub>O<sub>3</sub> if heated in air [KIR78] [CRC10] Solubility: v sl s H<sub>2</sub>O [CRC10] Density, g/cm<sup>3</sup>: 2.095 [CRC10] Melting Point, °C: decomposes [CRC10]

# 1318

**Compound:** Ferrous hexafluorosilicate hexahydrate **Synonym:** iron(II) hexafluorosilicate hexahydrate **Formula:** FeSiF<sub>6</sub>·  $6H_2O$  **Molecular Formula:** F<sub>6</sub>FeH<sub>12</sub>O<sub>6</sub>Si **Molecular Weight:** 306.012 **CAS RN:** 12021-70-4 **Properties:** colorless, trig [CRC10] **Solubility:** g/100 g H<sub>2</sub>O: 72.1 (0°C), 77.0 (25°C), 100.1 (106°C) [LAN05] **Density, g/cm<sup>3</sup>:** 1.961 [CRC10]

# 1319

Compound: Ferrous hydroxide Synonym: iron(II) hydroxide Formula: Fe(OH)<sub>2</sub> Molecular Formula: FeH<sub>2</sub>O<sub>2</sub> Molecular Weight: 89.860 CAS RN: 18624-44-7 Properties: white, amorphous powd or white to pale green, hex cryst; oxidizes in air [MER06] Solubility: 0.00015 g/100 mL H<sub>2</sub>O (18°C) [CRC10] Density, g/cm<sup>3</sup>: 3.4 [CRC10] Melting Point, °C: decomposes [CRC10]

## 1320

Compound: Ferrous iodide Synonym: iron(II) iodide Formula: FeI<sub>2</sub> Molecular Formula: FeI<sub>2</sub> Molecular Weight: 309.654 CAS RN: 7783-86-0 Properties: gray powd; large, thin, reddish violet cryst; very hygr; aq solution readily oxidizes in air; enthalpy of fusion 45.00 kJ/mol [STR93] [MER06] [CRC10] Solubility: s H<sub>2</sub>O, alcohol, ether [MER06] Density, g/cm<sup>3</sup>: 5.31 [STR93] Melting Point, °C: 587 [CRC10]

## 1321

Compound: Ferrous iodide tetrahydrate
Formula: FeI<sub>2</sub> · 4H<sub>2</sub>O
Molecular Formula: FeH<sub>8</sub>I<sub>2</sub>O<sub>4</sub>
Molecular Weight: 381.71
CAS RN: 13492-45-0
Properties: dark violet to black; hygr leaflets; sensitive to light; uses: manufacture of alkali metal iodides, pharmaceutical preparations, as a catalyst [HAW93]
Solubility: s H<sub>2</sub>O, alcohol [HAW93]
Density, g/cm<sup>3</sup>: 2.873 [HAW93]
Melting Point, °C: decomposes at 90–98 [ALF95]

## 1322

**Compound:** Ferrous nitrate hexahydrate **Synonym:** iron(II) nitrate hexahydrate **Formula:**  $Fe(NO_3)_2 \cdot 6H_2O$  **Molecular Formula:**  $FeH_{12}N_2O_{12}$  **Molecular Weight:** 287.946 **CAS RN:** 13476-08-9 **Properties:** green rhomb cryst [CRC10] **Solubility:** g/100 g H<sub>2</sub>O: 113 (0°C), 134 (10°C), 266 (60°C) [LAN05] **Melting Point,** °C: decomposes [LAN05]

**Compound:** Ferrous oxalate dihydrate **Synonym:** iron(II) oxalate dihydrate **Formula:**  $FeC_2O_4 \cdot 2H_2O$ **Molecular Formula:**  $C_2H_4FeO_6$ **Molecular Weight:** 179.895 **CAS RN:** 6047-25-2 **Properties:** pale yellow, odorless, cryst powd;

decomposes at 160°C, evolving carbon monoxide; used as a photographic developer, a pigment for glass, in paints [HAW93] [MER06]
Solubility: sl s H<sub>2</sub>O; s mineral acids [MER06]

**Density, g/cm<sup>3</sup>:** 2.28 [MER06]

Melting Point, °C: decomposes at 150 [LID94]

#### 1324

Compound: Ferrous oxide
Synonym: wustite
Formula: FeO
Molecular Formula: FeO
Molecular Weight: 71.844
CAS RN: 1345-25-1
Properties: jet black powd; easily oxidized in air; strong base; readily absorbs CO<sub>2</sub>; enthalpy of fusion 24.00 kJ/mol; used as a catalyst, glass colorant [HAW93] [MER06] [CRC10]
Solubility: i H<sub>2</sub>O, alkalies; s acid [HAW93] [MER06]
Density, g/cm<sup>3</sup>: 5.7 [HAW93]
Melting Point, °C: 1377 [CRC10]
Thermal Expansion Coefficient: (volume) 100°C (0.30), 200°C (0.63), 400°C (1.32), 600°C (2.10) [CLA66]

# 1325

Compound: Ferrous perchlorate hexahydrate Synonym: iron(II) perchlorate hexahydrate Formula:  $Fe(ClO_4)_2 \cdot 6H_2O$ Molecular Formula:  $Cl_2FeH_{12}O_{14}$ Molecular Weight: 362.839 CAS RN: 13520-69-9 Properties: green cryst [AES93] Solubility: g/100 g soln, H<sub>2</sub>O: 63.39 (0°C), 67.76 (25°C); solid phase,  $Fe(ClO_4)_2 \cdot 6H_2O$  [KRU93] Melting Point, °C: decomposes at >100 [CRC10]

# 1326

**Compound:** Ferrous phosphate octahydrate **Synonym:** vivianite **Formula:**  $Fe_3(PO_4)_2 \cdot 8H_2O$ **Molecular Formula:**  $Fe_3H_{16}O_{16}P_2$  Molecular Weight: 501.600
CAS RN: 14940-41-1
Properties: grayish blue powd or monocl cryst; hygr; used in ceramics and as a catalyst [HAW93] [MER06]
Solubility: i H<sub>2</sub>O; s mineral acids [MER06]
Density, g/cm<sup>3</sup>: 2.58 [MER06]

#### 1327

Compound: Ferrous phosphide
Formula: Fe<sub>2</sub>P
Molecular Formula: Fe<sub>2</sub>P
Molecular Weight: 142.664
CAS RN: 1310-43-6
Properties: gray; hex needles or bluish gray powd; ferromagnetic; used in the manufacture of iron and steel; there is also an FeP, 26508-33-8, and Fe<sub>3</sub>P, 12023-53-9; can be formed by heating phosphorus rock, silica, and coke [KIR82] [HAW93] [MER06] [CER91]
Solubility: i H<sub>2</sub>O, dil acid, dil alkali; reacts with hot mineral acids [MER06]
Density, g/cm<sup>3</sup>: 6.85 [MER06]
Melting Point, °C: 1290 [HAW93]

#### 1328

Compound: Ferrous selenide
Synonym: iron(II) selenide
Formula: FeSe
Molecular Formula: FeSe
Molecular Weight: 134.805
CAS RN: 1310-32-3
Properties: black mass with metallic luster; stable in air; decomposes on heating in O<sub>2</sub>; used in semiconductor technology [MER06] [CER91] [HAW93]
Solubility: i H<sub>2</sub>O; s HCl evolving H<sub>2</sub>Se [MER06]

Density, g/cm<sup>3</sup>: 6.78 [MER06]

#### 1329

Compound: Ferrous sulfate Synonym: iron(II) sulfate Formula:  $FeSO_4$ Molecular Formula:  $FeO_4S$ Molecular Weight: 151.909 CAS RN: 7720-78-7 Properties: white, ortho-rhomb, hygr [LID94] Solubility: g/100 g soln, H<sub>2</sub>O: 13.6 (0°C), 22.8 (25°C), 24.0 (100°C); solid phase,  $FeSO_4 \cdot 7H_2O$ (0°C, 25°C),  $FeSO_4 \cdot H_2O$  (100°C) [KRU93] **Density, g/cm<sup>3</sup>:** 3.65 [LID94] Melting Point, °C: decomposes at 671 [JAN85]

# 1330

Compound: Ferrous sulfate heptahydrate Synonym: melanterite Formula: FeSO<sub>4</sub>·7H<sub>2</sub>O Molecular Formula: FeH<sub>14</sub>O<sub>11</sub>S Molecular Weight: 278.015 CAS RN: 7782-63-0 Properties: off-white powd; bluish green; monocl cryst or granules; efflorescent in dry air; oxidizes in moist air; odorless with saline taste; used as a pigment, in water and sewage treatment, process engraving; minus 7H<sub>2</sub>O by 300°C [HAW93] [STR93] [MER06] Solubility: g/100 g H<sub>2</sub>O: 28.8 (0°C), 48.0 (20°C), 57.8 (100°C) [LAN05] Density, g/cm<sup>3</sup>: 1.897 [MER06] Melting Point, °C: decomposes at ~60 [LID94] Reactions: minus 3H<sub>2</sub>O at 56.6°C; minus

6H<sub>2</sub>O at 65°C [MER06]

# 1331

Compound: Ferrous sulfate monohydrate Synonym: szomolnokite Formula: FeSO<sub>4</sub> · H<sub>2</sub>O Molecular Formula: FeH<sub>2</sub>O<sub>5</sub>S Molecular Weight: 169.924 CAS RN: 17375-41-6 **Properties:** white to yellow cryst powd [MER06] Solubility: s H<sub>2</sub>O [MER06] Density, g/cm<sup>3</sup>: 2.970 [CRC10] **Reactions:** minus H<sub>2</sub>O at ~300°C; decomposes at higher temp [MER06]

# 1332

Compound: Ferrous sulfide Synonyms: troilite, iron(II) sulfide Formula: FeS Molecular Formula: FeS Molecular Weight: 87.911 CAS RN: 1317-37-9 Properties: when pure: colorless, hex cryst; usually gray to brownish black lumps; oxidized by moist air to S and Fe<sub>2</sub>O<sub>3</sub>; enthalpy of fusion 31.50 kJ/mol [MER06] [CRC10] Solubility: i H<sub>2</sub>O; s acids, evolving H<sub>2</sub>S [MER06] Density, g/cm<sup>3</sup>: 4.84 [MER06] Melting Point, °C: 1194 [MER06] Boiling Point, °C: decomposes [HAW93]

## 1333

Compound: Ferrous tantalate Formula: Fe(TaO<sub>3</sub>)<sub>2</sub> Molecular Formula: FeO<sub>6</sub>Ta<sub>2</sub> Molecular Weight: 513.737 CAS RN: 12140-41-9 Properties: brown tetr cryst [CRC10] Density, g/cm<sup>3</sup>: 7.33 [CRC10]

# 1334

Compound: Iron(II) tartrate Formula: FeC<sub>4</sub>H<sub>4</sub>O<sub>6</sub> Molecular Formula: C<sub>4</sub>H<sub>4</sub>FeO<sub>6</sub> Molecular Weight: 203.916 CAS RN: 2044-65-2 Properties: white cryst [CRC10] Solubility: g/100 g H<sub>2</sub>O: 0.88; v s acid; s NH<sub>4</sub>OH [CRC10]

#### 1335

**Compound:** Ferrous thiocyanate trihydrate Synonym: iron(II) thiocyanate trihydrate Formula: Fe(SCN)<sub>2</sub> · 3H<sub>2</sub>O Molecular Formula: C<sub>2</sub>H<sub>6</sub>FeN<sub>2</sub>O<sub>3</sub>S<sub>2</sub> Molecular Weight: 226.058 CAS RN: 6010-09-9 **Properties:** pale green, monocl prisms; rapidly oxidized when exposed to air [MER06] **Solubility:** s H<sub>2</sub>O, alcohol, ether [MER06] Reactions: decomposed by heat [MER06]

# 1336

Compound: Ferrous titanate Synonym: ilmenite Formula: FeTiO<sub>3</sub> Molecular Formula: FeO<sub>3</sub>Ti Molecular Weight: 151.710 CAS RN: 12168-52-4 Properties: opaque black with almost metallic luster; rhomb; occurs naturally as the mineral ilmenite; finds extensive use in manufacturing Ti paint pigments; there is also Fe<sub>2</sub>TiO<sub>5</sub>, 12789-64-9, -100 mesh with 99.9% purity [KIR83] [CER91] Density, g/cm<sup>3</sup>: 4.72 [KIR83]

Melting Point, °C: ~1470 [KIR83]

#### 1337

Compound: Fluorine Formula: F<sub>2</sub> **Molecular Formula:** F<sub>2</sub>

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Molecular Weight: 18.9984032 (atomic wt) CAS RN: 7782-41-4

Properties: pale yellow diatomic gas, condenses to yellowish orange liq at –188°C, solidifies to yellow solid at –220°C; critical temp –129°C; critical pressure 55 atm; most reactive nonmetal; enthalpy of fusion 0.51 kJ/mol; enthalpy of vaporization 6.62 kJ/ mol; enthlapy of dissociation 157.7 kJ/mol; reacts vigorously with most oxidizable substances; produced by electrolysis of dil solution of KF in anhydrous HF [KIR78] [MER06] [CRC10] Density, g/cm<sup>3</sup>: gas: 1.695 g/L [KIR78];

liq: 1.5127 at bp [MER06]

Melting Point, °C: -219.66 [CRC10]

Boiling Point, °C: -188.11 [CRC10]

**Thermal Conductivity, W/(m · K):** 24.77 × 10<sup>-7</sup> at 0°C [KIR78]; 0.0277 at 25°C [ALD94]

1338

**Compound:** Fluorine dioxide Synonym: dioxygen difluoride Formula: F<sub>2</sub>O<sub>2</sub> Molecular Formula: F<sub>2</sub>O<sub>2</sub> Molecular Weight: 69.996 CAS RN: 7783-44-0 **Properties:** thermally unstable gas at room temp; pale yellow solid or yellow liq; enthalpy of vaporization 19.1 kJ/mol; produced by reacting O<sub>2</sub> and F<sub>2</sub> at cryogenic temperatures in an electrical discharge [KIR78] [MER06] [CRC10] Density, g/cm<sup>3</sup>: 3.071 g/L [LID94] Melting Point, °C: -154 [MER06] Boiling Point, °C: -57 [CRÇ10] **Reactions:** decomposes to  $F_2$  and O<sub>2</sub> at -100°C [MER06]

# 1339

**Compound:** Fluorine monoxide **Formula:** F<sub>2</sub>O **Molecular Formula:** F<sub>2</sub>O **Molecular Weight:** 53.996 **CAS RN:** 7783-41-7

Properties: colorless gas; yellowish brown when liq; gas may be kept over water unchanged for a month; does not attack glass in the cold; enthalpy of vaporization 11.09 kJ/mol [CRC10] [MER06]
Solubility: 6.8 mL gas/100 mL H<sub>2</sub>O (0°C) [MER06]
Density, g/cm<sup>3</sup>: 2.369 g/L [LID94]; liq: 1.90 (-224°C) [MER06]
Melting Point, °C: -223.8 [MER06]
Boiling Point, °C: -144.75 [CRC10]

#### 1340

Compound: Fluorine nitrate Formula: FNO<sub>3</sub> Molecular Formula: FNO<sub>3</sub> Molecular Weight: 81.003 CAS RN: 7789-26-6 Properties: colorless gas; moldy, acrid odor; liq explodes on slight percussion; hydrolyzed by water to  $OF_2$ ,  $O_2$ , HF, and HNO<sub>3</sub>; burns with alcohol, ether, aniline [MER06] Solubility: s acetone [MER06] Density, g/cm<sup>3</sup>: 3.554 g/L [LID94] Melting Point, °C: -175 [LID94] Boiling Point, °C: -46 [LID94]

# 1341

Compound: Fluorine perchlorate Synonym: chlorine tetroxyfluoride Formula: FOClO<sub>3</sub> Molecular Formula: ClFO<sub>4</sub> Molecular Weight: 118.449 CAS RN: 10049-03-3 Properties: colorless gas; pungent, acrid odor; readily explodes on contact with solids or on heating [MER06] Solubility: reacts with H<sub>2</sub>O [LID94] Density, g/cm<sup>3</sup>: 5.197 g/L [LID94] Melting Point, °C: -167.3 [MER06] Boiling Point, °C: -15.9 (755 mm) [MER06]

## 1342

**Compound:** Fluorine tetroxide **Formula:**  $F_2O_4$  **Molecular Formula:**  $F_2O_4$  **Molecular Weight:** 101.995 **CAS RN:** 107782-11-6 **Properties:** red-brown solid [CRC10] **Melting Point,** °C: -191 [CRC10] **Boiling Point,** °C: decomposes at 185 [CRC10]

#### 1343

Compound: Fluoroantimonic acid Formula:  $HF \cdot SbF_5$ Molecular Formula:  $F_6HSb$ Molecular Weight: 236.758 CAS RN: 16950-06-4 Properties: superacid; moisture sensitive [KIR78] [ALD94]

# 1344

**Compound:** Fluoroboric acid **Formula:** HBF<sub>4</sub>

## Molecular Formula: BF<sub>4</sub>H Molecular Weight: 87.813 CAS RN: 16872-11-0

Properties: does not exist as a free pure material; colorless, strongly acid liq; stable in conc solutions; produced by reacting 70% HF with boric acid, H<sub>3</sub>BO<sub>3</sub>; used to produce fluoroborates, in electrolytic brightening of aluminum [HAW93] [KIR78]
Solubility: miscible with H<sub>2</sub>O, alcohol [HAW93]
Density, g/cm<sup>3</sup>: ~1.84 [HAW93]
Boiling Point, °C: decomposes at 130 [HAW93]

#### 1345

**Compound:** Fluorogermane **Formula:** GeH<sub>3</sub>F **Molecular Formula:** FgeH<sub>3</sub> **Molecular Weight:** 94.66 **CAS RN:** 13537-30-9 **Properties:** col gas [CRC10] **Solubility:** reac H<sub>2</sub>O [CRC10] **Density, g/L:** 3.868 [CRC10]

#### 1346

Compound: Fluorosilane Formula: SiH<sub>3</sub>F Molecular Formula: FH<sub>3</sub>Si Molecular Weight: 50.108 CAS RN: 13537-33-2 Properties: enthalpy of vaporization 18.8 kJ/mol; entropy of vaporization 107.9 kJ/(m · K) [CIC73] Boiling Point, °C: -98.6 [CIC73]

## 1347

Compound: Fluorosulfonic acid Formula: HSO<sub>3</sub>F Molecular Formula: FHO<sub>3</sub>S Molecular Weight: 100.070 CAS RN: 7789-21-1 Properties: colorless liq; fumes in moist air; stable up to 900°C; considerably more acidic than 100% H<sub>2</sub>SO<sub>4</sub>; does not attack glass when anhydrous and pure; viscosity 1.56 MPa · s; dielectric constant ~120; specific conductance  $1.08 \times 10^{-6}$  (ohm  $\cdot$  m)<sup>-1</sup>; used as a catalyst in organic synthesis, in electropolishing, and as a fluorinating agent [HAW93] [MER06] [KIR78] Solubility: hydrolyzes violently in H<sub>2</sub>O; reddishbrown color in acetone [MER06] Density, g/cm<sup>3</sup>: 1.726 [MER06] Melting Point, °C: freezing point -89 [MER06] Boiling Point, °C: 163 [MER06]

#### 1348

Compound: Fluorotrimethylsilane Synonym: trimethylsilyl fluoride Formula: (CH<sub>3</sub>)<sub>3</sub>SiF Molecular Formula: C<sub>3</sub>H<sub>9</sub>FSi Molecular Weight: 92.158 CAS RN: 420-56-4 Properties: gas; flammable; sensitive to moisture [ALD94] Density, g/cm<sup>3</sup>: 0.793 [ALD94] Melting Point, °C: -74 [ALD94] Boiling Point, °C: 16 [ALD94]

## 1349

Compound: Francium
Formula: Fr
Molecular Formula: Fr
Molecular Weight: 223
CAS RN: 7440-73-5
Properties: heaviest of the alkali metal family; may exist only as radioactive isotopes; only natural isotope is <sup>223</sup>Fr with a half-life of 21 min; discovered in 1939 by Mll. M. Perey, Curie Inst., Paris; formed from α-decay of actinium [CRC10] [HAW93]
Melting Point, °C: 27 [CRC10]
Boiling Point, °C: 677 [CRC10]

## 1350

Compound: Fullerene Synonym: carbon fullerenes Formula: C<sub>60</sub> **Molecular Formula:** C<sub>60</sub> Molecular Weight: 720.660 CAS RN: 99685-96-8 Properties: fcc, lattice constant 1.417 nm; mean ball diameter 0.683 nm; compressibility  $6.9 \times 10^{-12}$  cm<sup>2</sup>/ dyne; bulk modulus 14 GPa; binding energy per atom 7.40 eV; structural phase transitions -18°C,  $-108^{\circ}$ C; sound velocity vt  $2.1 \times 10^5$  cm/s, v1  $3.6 \times 10^5$  cm/s; Debye temp -88°C; static dielectric constant 4.0-4.5; synthesized by ac discharge of graphite electrodes under He at 200 torr [DRE93] Solubility: s organic solvents [LID94] Density, g/cm<sup>3</sup>: 1.72 [DRE93] Melting Point, °C: >280 [LID94] **Reactions:** bromination gives C<sub>60</sub>Br<sub>6</sub>, C<sub>60</sub>Br<sub>8</sub> [IUP93] Thermal Conductivity, W/(m·K): 0.4 (7°C) [DRE93] Thermal Expansion Coefficient: volume thermal expansion  $6.2 \times 10^{-5}$ /K [DRE93]

# 1351

**Compound:** Fullerenes **Formula:** C<sub>60</sub>/C<sub>70</sub> Molecular Formula:  $C_{60}/C_{70}$ Molecular Weight:  $C_{60}$ : 720.660;  $C_{70}$ : 840.777 CAS RN: 131159-39-2 Properties: black powd; contains 10%-15%  $C_{70}$  [STR93] Density, g/cm<sup>3</sup>: 1.6 [STR93]

#### 1352

**Compound:** Fullerene fluoride **Formula:**  $C_{60}F_{60}$  **Molecular Formula:**  $C_{60}F_{60}$  **Molecular Weight:** 1860.546 **CAS RN:** 134929-59-2 **Properties:** col plates [CRC10] **Solubility:** v s ace; s THF; i chl [CRC10] **Melting Point,** °C: 287 [CRC10]

#### 1353

Compound: Gadolinium Formula: Gd Molecular Formula: Gd Molecular Weight: 157.25 CAS RN: 7440-54-2

Properties: colorless or faintly yellowish metal; tarnishes in moist air; hex close-packed; magnetic, especially at low temperatures; enthalpy of fusion 9.81 kJ/mol; enthalpy of sublimation 397.5 kJ/ mol; electrical resistivity (20°C) 126 μohm · cm; radius of atom 0.10813 nm; radius of Gd<sup>+++</sup> ion 0.0938 nm; solutions are colorless; used in neutron shielding, garnets for microwave filter [KIR82] [MER06] [HAW93] [CRC10] [ALD94]
Solubility: reacts slowly with H<sub>2</sub>O; s dil acid [HAW93]
Density, g/cm<sup>3</sup>: 7.9004 [KIR82]
Melting Point, °C: 1312 [MER06]
Boiling Point, °C: 3273 [KIR82]
Thermal Conductivity, W/(m·K): 10.5 (25°C) [ALD94]

## 1354

**Compound:** Gadolinium acetate tetrahydrate **Synonyms:** acetic acid, Gd(III) salt **Formula:** Gd(CH<sub>3</sub>COO)<sub>3</sub>·4H<sub>2</sub>O **Molecular Formula:**  $C_6H_{17}GdO_{10}$  **Molecular Weight:** 406.445 **CAS RN:** 15280-53-2 **Properties:** tricl white cryst [STR93] [CRC10] **Solubility:** 11.6 g/100 mL H<sub>2</sub>O (25°C) [CRC10] **Density, g/cm<sup>3</sup>:** 1.611 [STR93] **Boiling Point, °C:** decomposes [ALF95]

## 1355

**Compound:** Gadolinium acetylacetonate dihydrate **Synonyms:** 2,4-pentanedione, gadolinium(III) derivative **Formula:**  $Gd(CH_3COCH=C(O)CH_3)_3 \cdot 2H_2O$  **Molecular Formula:**  $C_{15}H_{25}GdO_8$  **Molecular Weight:** 490.609 **CAS RN:** 14284-87-8 **Properties:** off-white powd [STR93] **Melting Point,** °C: decomposes at 143 [ALD94]

#### 1356

Compound: Gadolinium boride
Formula: GdB<sub>6</sub>
Molecular Formula: B<sub>6</sub>Gd
Molecular Weight: 222.116
CAS RN: 12008-06-9
Properties: brownish-black cub; -325 mesh 10 μm or less with 99.9% purity; refractory material [LID94] [KIR78] [CER91]
Density, g/cm<sup>3</sup>: 5.31 [LID94]
Melting Point, °C: 2100 [KIR78]

#### 1357

Compound: Gadolinium bromide Formula: GdBr<sub>3</sub> Molecular Formula: Br<sub>3</sub>Gd Molecular Weight: 396.962 CAS RN: 13818-75-2 Properties: white, hygr cryst; -20 mesh with 99.9% purity [LID94] [CER91] Melting Point, °C: 770 [LID94]

#### 1358

Compound: Gadolinium chloride Formula: GdCl<sub>3</sub> Molecular Formula: Cl<sub>3</sub>Gd Molecular Weight: 263.608 CAS RN: 10138-52-0 Properties: -20 mesh with 99.9% purity; white; monocl cryst; hygr [STR93] [MER06] [CER91] Solubility: s H<sub>2</sub>O [MER06] Density, g/cm<sup>3</sup>: 4.52 (0°C) [MER06] Melting Point, °C: ~609 [MER06]

#### 1359

**Compound:** Gadolinium chloride hexahydrate **Formula:**  $GdCl_3 \cdot 6H_2O$ **Molecular Formula:**  $Cl_3GdH_{12}O_6$ **Molecular Weight:** 371.654 **CAS RN:** 13450-84-5 Properties: -4 mesh with 99.9% purity; colorless deliq cryst, obtained from aq solutions; used as a source of Gd metal [MER06] [CER91] [HAW93]
Solubility: s H<sub>2</sub>O [HAW93]
Density, g/cm<sup>3</sup>: 2.424 [MER06]

## 1360

Compound: Gadolinium fluoride
Formula: GdF<sub>3</sub>
Molecular Formula: F<sub>3</sub>Gd
Molecular Weight: 214.245
CAS RN: 13765-26-9
Properties: white powd or 99.9% pure melted pieces of 3–6 mm; pieces used as evaporation material for possible application to multilayers [STR93] [CER91]
Melting Point, °C: 1231 [LID94]

#### 1361

**Compound:** Gadolinium gallium garnet **Formula:** Gd<sub>3</sub>Ga<sub>5</sub>O<sub>12</sub> **Molecular Formula:** Ga<sub>5</sub>Gd<sub>3</sub>O<sub>12</sub> **Molecular Weight:** 1012.358 **CAS RN:** 12024-36-1 **Properties:** lump [ALF95] **Density, g/cm<sup>3</sup>:** 7.09 [ALD94]

#### 1362

**Compound:** Gadolinium hydride **Formula:** GdH<sub>2-3</sub> **Molecular Formula:** GdH<sub>2</sub>; GdH<sub>3</sub> **Molecular Weight:** GdH<sub>2</sub>: 159.266; GdH<sub>3</sub>: 160.274 **CAS RN:** 13572-97-9 **Properties:** -60 mesh with 99.9% purity [CER91]

## 1363

Compound: Gadolinium iodide Formula: GdI<sub>3</sub> Molecular Formula: GdI<sub>3</sub> Molecular Weight: 537.963 CAS RN: 13572-98-0 Properties: yellow; -20 mesh with 99.9% purity [CER91] [CRC10] Solubility: s H<sub>2</sub>O [CRC10] Melting Point, °C: 926 [AES93] Boiling Point, °C: 1340 [CRC10]

## 1364

**Compound:** Gadolinium nitrate hexahydrate **Formula:**  $Gd(NO_3)_3 \cdot 6H_2O$ **Molecular Formula:**  $GdH_{12}N_3O_{15}$  Molecular Weight: 451.356 CAS RN: 19598-90-4 Properties: deliq; tricl cryst [MER06] Solubility: s H<sub>2</sub>O, alcohol [MER06] Density, g/cm<sup>3</sup>: 2.332 [MER06] Melting Point, °C: 91 [MER06]

#### 1365

**Compound:** Gadolinium nitrate pentahydrate **Formula:**  $Gd(NO_3)_3 \cdot 5H_2O$ **Molecular Formula:**  $GdH_{10}N_3O_{14}$ **Molecular Weight:** 433.341 **CAS RN:** 52788-53-1 **Properties:** hygr white cryst [STR93] **Solubility:** i H<sub>2</sub>O [MER06] **Density, g/cm<sup>3</sup>:** 2.406 [MER06] **Melting Point,** °C: 92 [MER06]

#### 1366

Compound: Gadolinium nitride Formula: GdN Molecular Formula: GdN Molecular Weight: 171.257 CAS RN: 25764-15-2 Properties: -60 mesh with 99.9% purity; NaCl cryst system, a=0.499 nm [CIC73] [CER91] Density, g/cm<sup>3</sup>: 9.10 [LID94]

#### 1367

**Compound:** Gadolinium oxalate decahydrate **Formula:**  $Gd_2(C_2O_4)_3 \cdot 10H_2O$  **Molecular Formula:**  $C_6H_{20}Gd_2O_{22}$  **Molecular Weight:** 758.712 **CAS RN:** 22992-15-0 **Properties:** monocl white powd [STR93] [CRC10] **Solubility:** i H<sub>2</sub>O; sl s acids [HAW93] **Reactions:** minus 6H<sub>2</sub>O at 110°C [HAW93]

#### 1368

Compound: Gadolinium oxide Synonym: gadolinia Formula:  $Gd_2O_3$ Molecular Formula:  $Gd_2O_3$ Molecular Weight: 362.498 CAS RN: 12064-62-9 Properties: -325 mesh 5 µm or less with 99.999% purity; white to cream-colored powd; hygr; absorbs  $CO_2$  from air; used in neutron shields, in special glasses, and as an evaporated

material of 99.9% purity, it is reactive to radio frequencies [HAW93] [MER06] [CER91]

**Solubility:** i H<sub>2</sub>O; s in acids [HAW93] **Density, g/cm<sup>3</sup>:** 7.407 [MER06] **Melting Point, °C:** 2310 [STR93]

#### 1369

**Compound:** Gadolinium perchlorate hydrate **Formula:**  $Gd(ClO_4)_3 \cdot xH_2O$  **Molecular Formula:**  $Cl_3GdO_{12}$  (anhydrous) **Molecular Weight:** 455.601 (anhydrous) **CAS RN:** 14017-52-8 **Properties:** white cryst; hygr; x = 6 [ALF95] [STR93]

# 1370

Compound: Gadolinium(II) selenide Formula: GdSe Molecular Formula: GdSe Molecular Weight: 236.21 CAS RN: 12024-81-6 Properties: cub cryst Density, g/cm<sup>3</sup>: 8.1 [CRC10] Melting Point, °C: 2170 [CRC10]

## 1371

Compound: Gadolinium silicide
Formula: GdSi<sub>2</sub>
Molecular Formula: GdSi<sub>2</sub>
Molecular Weight: 213.421
CAS RN: 12134-75-7
Properties: 10 mm and down lump; 6 mm pieces and smaller with 99.9% purity [ALF93] [CER91]
Density, g/cm<sup>3</sup>: 5.9 [LID94]

## 1372

Compound: Gadolinium sulfate Formula:  $Gd_2(SO_4)_3$ Molecular Formula:  $Gd_2O_{12}S_3$ Molecular Weight: 602.691 CAS RN: 13450-87-8 Properties: colorless [CRC10] Solubility: g/100 g H<sub>2</sub>O: 3.98 (0°C), 2.60 (20°C), 2.32 (40°C) [LAN05] Density, g/cm<sup>3</sup>: 4.139 [LAN05] Melting Point, °C: decomposes at 500 [CRC10]

## 1373

**Compound:** Gadolinium sulfate octahydrate **Formula:**  $Gd_2(SO_4)_3 \cdot 8H_2O$  **Molecular Formula:**  $[Gd_2H]_6O_{20}S_3$  **Molecular Weight:** 746.813 **CAS RN:** 13450-87-8 Properties: colorless, monocl cryst; used in cryogenic research [MER06] [HAW93]
Solubility: 3.28 g/100 mL H<sub>2</sub>O (20°C), 2.54 g/100 mL H<sub>2</sub>O (40°C) [CRC10]
Density, g/cm<sup>3</sup>: 3.010 [STR93]
Reactions: minus 8H<sub>2</sub>O at 400°C [MER06]

#### 1374

Compound: Gadolinium sulfide Formula: Gd<sub>2</sub>S<sub>3</sub> Molecular Formula: Gd<sub>2</sub>S<sub>3</sub> Molecular Weight: 410.698 CAS RN: 12134-77-9 Properties: yellow, hygr; -200 mesh, 99.9% purity [CER91] Solubility: decomposed by H<sub>2</sub>O [CRC10] Density, g/cm<sup>3</sup>: 6.1 [LID94]

#### 1375

Compound: Gadolinium telluride Formula: Gd<sub>2</sub>Te<sub>3</sub> Molecular Formula: Gd<sub>2</sub>Te<sub>3</sub> Molecular Weight: 697.300 CAS RN: 12160-99-5 Properties: ortho-rhomb; -20 mesh with 99.9% purity [LID94] [CER91] Density, g/cm<sup>3</sup>: 7.7 [LID94] Melting Point, °C: 1255 [LID94]

## 1376

**Compound:** Gadolinium titanate **Formula:** Gd<sub>2</sub>Ti<sub>2</sub>O<sub>7</sub> **Molecular Formula:** Gd<sub>2</sub>O<sub>7</sub>Ti<sub>2</sub> **Molecular Weight:** 522.230 **CAS RN:** 12024-89-4 **Properties:** -100 mesh with 99.9% purity [CER91]

#### 1377

Compound: Gadopentetic acid
Synonyms: diethylenetriaminepentaacetic acid, gadolinium(III) salt
Molecular Formula: C<sub>14</sub>H<sub>20</sub>GdN<sub>3</sub>O<sub>10</sub>
Molecular Weight: 547.577
CAS RN: 80529-93-7
Properties: uses: metal ion complex for MRI, diagnosis of cerebral tumors [ALD94] [MER06]
Melting Point, °C: decomposes at 129 [ALD94]

1378 Compound: Gallium Formula: Ga

## Molecular Formula: Ga Molecular Weight: 69.723 CAS RN: 7440-55-3

Properties: silvery white liq or grayish metal; has tendency to remain in supercooled state; contracts on melting; ortho-rhomb, a=0.45198 nm, b=0.76602 nm, c=0.45258 nm; electron affinity, 0.18 eV; enthalpy of fusion 5.59 kJ/mol; enthalpy of vaporization 254 kJ/mol; electrical resistivity 15.05 µohm · cm (20°C) for polycrystalline form, 25.79 µohm · cm for liq (30°C); radius of atom 0.138 nm, radius of Ga<sup>+++</sup> 0.133 nm [CRC10] [KIR78] [MER87] [CIC73]
Solubility: reacts with alkalies to evolve H<sub>2</sub> [MER06]
Density, g/cm<sup>3</sup>: solid: 5.907; liq: 6.095 [KIR78] [CIC73]
Melting Point, °C: 29.78 [ALD94]
Boiling Point, °C: 2403 [ALD94]

- **Reactions:** attacked by halogens and cold conc HCl [MER06]
- **Thermal Conductivity, W/(m·K):** a-axis: 88.4, b-axis: 16.0, c-axis: 40.8 (20°C); liq 28.7 (77°C) [KIR78]
- **Thermal Expansion Coefficient:** cup coefficient/°C:  $0^{\circ}C-20^{\circ}C$ ,  $5.98 \times 10^{-5}$  (solid); liq  $1.2 \times 10^{-4}$  $(103^{\circ}C)$ ,  $1.03 \times 10^{-4}$  (600°C) [KIR78]

# 1379

**Compound:** Galliumn acetylacetonate **Synonyms:** 2,4-pentanedione, gallium(III) derivative **Formula:** Ga(CH<sub>3</sub>COCH=C(O)CH<sub>3</sub>)<sub>3</sub> **Molecular Formula:**  $C_{15}H_{21}GaO_6$  **Molecular weight:** 367.051 **CAS RN:** 14405-43-7 **Properties:** monocl white powd [STR93] [CRC10] **Density, g/cm<sup>3</sup>:** 1.42 [STR93] **Melting Point, °C:** 192–194 [STR93] **Boiling Point, °C:** 140 (10 mm Hg) sublimes [STR93]

# 1380

Compound: Gallium antimonide Formula: GaSb Molecular Formula: GaSb Molecular Weight: 191.483 CAS RN: 12064-03-8

Properties: cub; 6 mm pieces and smaller with 99.99% purity; band gap, eV, 0.81 (0K), 0.72 (300 K); mobility (300 K), cm²/(V · s), 5000 for electrons, 850 for holes; effective mass 0.042 for electrons, 0.40 for holes; dielectric constant 15.7; enthalpy of fusion 25.10 kJ/mol; used in semiconducting devices; obtained by direct reaction of Ga and Sb at high temp [HAW93] [KIR82] [CER91] [CRC10]
Density, g/cm<sup>3</sup>: 6.096 [KIR78]

Melting Point, °C: 703 [CRC10]

## **Thermal Conductivity, W/(m·K):** 27 [CRC10] **Thermal Expansion Coefficient:** 6.1×10<sup>-6</sup>/K [CRC10]

#### 1381

Compound: Gallium arsenide Formula: GaAs Molecular Formula: AsGa Molecular Weight: 144.645 CAS RN: 1303-00-0 Properties: cub cryst; 3-12 mm pieces of 99.999% purity, 25 mm and down polycrystalline pieces; dark gray with metallic sheen; hardness 4.5; dielectric constant 13.1; band gap, eV, 1.52 (0 K), 1.42 (300 K); mobility  $(300 \text{ K}), \text{ cm}^2/(\text{V} \cdot \text{s}), 8500 \text{ electrons and } 400 \text{ holes};$ electroluminescent in infrared light; obtained by direct reaction of Ga and As at high temp; used as a semiconductor in light-emitting diodes for telephone dials [HAW93] [MER06] [STR93] [KIR82] Density, g/cm<sup>3</sup>: 5.3176 [LID94] Melting Poing, °C: 1238 [MER06] Thermal Conductivity, W/(m·K): 0.52 [MER06] **Thermal Expansion Coefficient:** 5.9×10<sup>-6</sup>/°C [MER06]

## 1382

Compound: Gallium azide Synonym: gallium(III) azide Formula:  $Ga(N_3)_3$ Molecular Formula:  $GaN_9$ Molecular Weight: 195.784 CAS RN: 73157-11-6 Properties: prepared by decomposition of  $GaF_3 \cdot NH_3$ , 73157-06-9, at ~250°C [KIR78]

## 1383

Compound: Gallium nitride Formula: GaN Molecular Formula: GaN Molecular Weight: 83.730 CAS RN: 25617-97-4 Properties: gray powd; -100 mesh with 99.9% purity; hex, a=0.319 nm, c=0.518 nm; has

both semiconductor and electroluminescence properties; band gap, eV, 3.50 (0K) and 3.36 (300 K); electron mobility (300 K) 380 cm<sup>2</sup>/ (V · s); effective mass 0.19 electrons and 0.60 holes; dielectric 12.2; can be prepared by reaction of Ga with ammonia at ~1000°C [KIR81] [CIC73] [KIR82] [CER91] [CRC10] **Density, g/cm<sup>3</sup>:** 6.1 [LID94]

Melting Point, °C: 600 (vacuum) [CIC73] Boiling Point, °C: decomposes at >600 [KIR78] Thermal Conductivity, W/(m·K): 6.56 [CRC10]

**Compound:** Gallium phosphide **Formula:** GaP **Molecular Formula:** GaP **Molecular Weight:** 100.697

CAS RN: 12063-98-8

Properties: amber; cub; 6 mm pieces and smaller with 99.999% purity; translucent, amber-colored cryst; dielectric constant 11.1; band gap, eV, 2.34 (0 K) and 2.26 (300 K); mobility (300 K), cm<sup>2</sup>/(V · s), 75 holes and 110 electrons; effective mass 0.82 electrons and 0.60 holes; obtained by direct reaction of Ga and P at high temperatures; used in semiconductor devices; electroluminescent in visible light [HAW93] [MER06] [KIR82] [CER91] [STR93]

Density, g/cm<sup>3</sup>: 4.138 [LID94] Melting Point, °C: 1457 [LID94] Thermal Conductivity, W/(m⋅K): 75.2 (25°C) [CRC10] Thermal Expansion Coefficient: 5.3×10<sup>-6</sup>/K [CRC10]

# 1385

Compound: Gallium suboxide Formula: Ga<sub>2</sub>O Molecular Formula: Ga<sub>2</sub>O Molecular Weight: 155.445 CAS RN: 12024-20-3 Properties: brown powd; obtained by heating Ga<sub>2</sub>O<sub>3</sub> and Ga at 700°C; stable in dry air [MER06] Solubility: i H<sub>2</sub>O [CRC10] Density, g/cm<sup>3</sup>: 4.77 [KIR78] Melting Point, °C: decomposes above 800 [MER06] Reactions: oxidized to the trivalent state by HNO<sub>3</sub> or Br<sub>2</sub> [MER06]

## 1386

Compound: Gallium(II) chloride Synonym: gallium dichloride Formula: GaCl<sub>2</sub> Molecular Formula: Cl<sub>2</sub>Ga Molecular Weight: 140.628 CAS RN: 24597-12-4 Properties: white; deliq; cryst; can be prepared by heating GaCl<sub>3</sub> with Ga [MER06] [CRC10] Solubility: decomposed by H<sub>2</sub>O [CRC10] Density, g/cm<sup>3</sup>: 2.74 [LID94] Melting Point, °C: 172.4 [MER06]; 164 [STR93] Boiling Point, °C: 535 [STR93]

#### 1387

**Compound:** Gallium(II) selenide **Formula:** GaSe **Molecular Formula:** GaSe Molecular Weight: 148.683
CAS RN: 12024-11-2
Properties: dark red; hex; 6 mm pieces and smaller with 99.999% purity [CER91] [KIR78] [CRC10]
Density, g/cm<sup>3</sup>: 5.01 [KIR78]
Melting Point, °C: 960–965 [KIR78]

#### 1388

Compound: Gallium(II) sulfide Formula: GaS Molecular Formula: GaS Molecular Weight: 101.789 CAS RN: 12024-10-1 Properties: 6 mm pieces and smaller with 99.999% purity; hex, lamellar structure; air sensitive [KIR78] [STR93] [CER91] Density, g/cm<sup>3</sup>: 3.86 [STR93] Melting Point, °C: ~965 [STR93]

#### 1389

Compound: Gallium(II) telluride Formula: GaTe Molecular Formula: GaTe Molecular Weight: 197.323 CAS RN: 12024-14-5 Properties: 6 mm pieces and smaller with 99.999% purity; monocl or hex [KIR78] [CER91] Density, g/cm<sup>3</sup>: 5.44 [KIR78] Melting Point, °C: 825 [KIR78]

# 1390

Compound: Gallium(III) bromide Formula: GaBr<sub>3</sub> Molecular Formula: Br<sub>3</sub>Ga Molecular Weight: 309.435 CAS RN: 13450-88-9 Properties: -8 mesh with 99.999% purity; orthorhomb white cryst; enthalpy of vaporization 38.9 kJ/mol; enthalpy of fusion 11.70 kJ/mol; formed by reacting Br<sub>2</sub> vapor with Ga in N<sub>2</sub> atm; has seven hydrates with 1, 2, 2.5, 3, 4, 6, and 15 H<sub>2</sub>O [CER91] [STR93] [KIR78] [CRC10] Density, g/cm<sup>3</sup>: 3.69 [STR93] Melting Point, °C: 121.5 [CRC10] Boiling Point, °C: 279 [CRC10]

#### 1391

**Compound:** Gallium(III) chloride **Formula:** GaCl<sub>3</sub> **Molecular Formula:** Cl<sub>3</sub>Ga **Molecular Weight:** 176.081 **CAS RN:** 13450-90-3 Properties: solid ingot in glass with 99.999% purity; tricl, colorless needles; enthalpy of vaporization 23.9 kJ/mol; enthalpy of fusion 10.90 kJ/mol; prepared by reacting Ga metal with Cl<sub>2</sub> or HCl in nitrogen atm at 200°C; a trihydrate, 23306-52-7, is known [MER06] [KIR78] [CER91] [CRC10]
Solubility: >800 gGaCl<sub>3</sub>/L H<sub>2</sub>O [KIR78]
Density, g/cm<sup>3</sup>: 2.47 [STR93]
Melting Point, °C: 78 [ALD94]
Boiling Point, °C: 201 [CRC10]

## 1392

Compound: Gallium(III) fluoride Synonym: gallium trifluoride Formula: GaF<sub>3</sub> **Molecular Formula:** F<sub>3</sub>Ga Molecular Weight: 126.718 CAS RN: 7783-51-9 Properties: trig; -60 mesh with 99.95% purity; white powd, colorless needles; formed by thermal decomposition of ammonium hexafluorogallate in Ar atm [MER06] [KIR78] [CER91] Solubility: 0.0024 g/100 mL H<sub>2</sub>O (25°C) [MER06] Density, g/cm<sup>3</sup>: 4.47 (heated in F<sub>2</sub>) atm, 630°C) [MER06] Melting Point, °C: >1000 [MER06] Reactions: can be sublimed in N<sub>2</sub> atm at 800°C without decomposition [MER06]

## 1393

Compound: Gallium(III) fluoride trihydrate Formula: GaF<sub>3</sub> ·  $3H_2O$ Molecular Formula: F<sub>3</sub>GaH<sub>6</sub>O<sub>3</sub> Molecular Weight: 180.764 CAS RN: 22886-66-4 Properties: -60 mesh with 99.5% purity; white cryst; obtained by dissolution of Ga or Ga(OH)<sub>3</sub> in HF [KIR78] [STR93] [CER91] Solubility: more soluble than anhydrous GaF<sub>3</sub> in H<sub>2</sub>O [MER06] Melting Point, °C: >140 [MER06] Reactions: thermally decomposed to 16[Ga(OH,F)<sub>3</sub>] · 6H<sub>2</sub>O at 200°C [KIR78]

# 1394

**Compound:** Gallium(III) hydride **Synonym:** gallane **Formula:** GaH<sub>3</sub> **Molecular Formula:** GaH<sub>3</sub> **Molecular Weight:** 72.747 **CAS RN:** 13572-93-5 **Properties:** viscous liq; can be prepared by reacting (CH<sub>3</sub>)<sub>3</sub>N · GaH<sub>3</sub>, 19528-13-3, with BF<sub>3</sub> at −20°C [LID94] [KIR78] **Melting Point,** °C: decomposes above −15 [KIR78]

## 1395

Compound: Gallium(III) hydroxide Formula: Ga(OH)<sub>3</sub> Molecular Formula: GaH<sub>3</sub>O<sub>3</sub> Molecular Weight: 120.745 CAS RN: 12023-99-3 Properties: white; unstable gelatinous precipitate; obtained by adding ammonia to a solution of Ga(III) salt [MER06] [KIR78] [CRC10] Solubility: i H<sub>2</sub>O [CRC10] Melting Point, °C: decomposes at 440 [CRC10]

#### 1396

Compound: Gallium(III) iodide Formula: GaI<sub>3</sub> Molecular Formula: GaI<sub>3</sub> Molecular Weight: 450.436 CAS RN: 13450-91-4 Properties: -20 mesh with 99.999% purity; monocl; enthalpy of vaporization 56.5 kJ/mol; enthalpy of fusion 16.30 kJ/mol; can be prepared by direct reaction of Ga and I<sub>2</sub> [CRC10] [CER91] [KIR78] Density, g/cm<sup>3</sup>: 4.15 [KIR78] Melting Point, °C: 212 [KIR78] Boiling Point, °C: sublimes at 340 [ALD94]

## 1397

Compound: Gallium(III) nitrate Formula: Ga(NO<sub>3</sub>)<sub>3</sub> Molecular Formula: GaN<sub>3</sub>O<sub>9</sub> Molecular Weight: 255.738 CAS RN: 13494-90-1 Properties: white; cryst powd [MER06] Solubility: s warm and cold H<sub>2</sub>O, absolute alcohol, ether [MER06] Melting Point, °C: decomposes at 110 [AES93]

## 1398

Compound: Gallium(III) nitrate hydrate Formula:  $Ga(NO_3)_3 \cdot xH_2O$ Molecular Formula:  $GaN_3O_9$  (anhydrous) Molecular Weight: 255.738 (anhydrous) CAS RN: 69365-72-6 Properties: obtained by dissolving Ga metal or the oxide in conc HNO<sub>3</sub> [MER06] Solubility: s H<sub>2</sub>O [CRC10] **Melting Point, °C:** decomposes 110 [AES93] **Reactions:** decomposes to Ga<sub>2</sub>O<sub>3</sub> at 200°C [CRC10]

# 1399

**Compound:** Gallium(III) oxide **Formula:** Ga<sub>2</sub>O<sub>3</sub> **Molecular Formula:** Ga<sub>2</sub>O<sub>3</sub> **Molecular Weight:** 187.444 **CAS RN:** 12024-21-4

Properties: α, β, γ, δ, ε forms, β is the most stable; white cryst; α and β obtained by thermal decomposition of salts; γ formed by rapid dehydration of Ge(OH)<sub>3</sub> gels at ~400°C, δ prepared by decomposing Ge(NO<sub>3</sub>)<sub>3</sub> at ~250°C, ε formed by briefly heating δ form at ~550°C; used in spectroscopic analysis and as an evaporated material and sputtering target of 99.999% purity in dielectric films [HAW93] [MER06] [CER91]
Solubility: s hot acid [HAW93]

**Density, g/cm<sup>3</sup>:** α: 6.44; β: 5.88 [HAW93] **Melting Point, °C:** 1725 [LID94] **Reactions:** reacts violently with Mg to give Ga [MER06]

# 1400

Compound: Gallium(III) oxide hydroxide Formula: GaOOH Molecular Formula: GaHO<sub>2</sub> Molecular Weight: 102.730 CAS RN: 20665-52-5 Properties: ortho-rhomb; prepared by oxidation of Ga with H<sub>2</sub>O at ~200°C under pressure [KIR78] Density, g/cm<sup>3</sup>: 5.23 [LID94] Reactions: GaOOH  $\rightarrow \alpha$ -Ga<sub>2</sub>O<sub>3</sub> at 300°C-500°C [KIR78]

# 1401

**Compound:** Gallium(III) perchlorate hexahydrate **Formula:** Ga(ClO<sub>4</sub>)<sub>3</sub>·6H<sub>2</sub>O **Molecular Formula:** Cl<sub>3</sub>GaH<sub>12</sub>O<sub>18</sub> **Molecular Weight:** 476.166 **CAS RN:** 17835-81-3 **Properties:** cryst [ALF95] **Melting Point, °C:** decomposes at 175 [ALF95]

## 1402

Compound: Gallium(III) selenide Formula: Ga<sub>2</sub>Se<sub>3</sub> Molecular Formula: Ga<sub>2</sub>Se<sub>3</sub> Molecular Weight: 376.326 CAS RN: 12024-24-7 Properties: monocl; 6 mm pieces and smaller with 99.999% purity [CER91] [KIR78] Density, g/cm<sup>3</sup>: 4.95 [KIR78] Melting Point, °C: 1005–1010 [KIR78] Thermal Conductivity, W/(m⋅K): 5 [CRC10] Thermal Expansion Coefficient: 8.9×10<sup>-6</sup>/K [CRC10]

## 1403

Compound: Gallium(III) sulfate Formula:  $Ga_2(SO_4)_3$ Molecular Formula:  $Ga_2O_{12}S_3$ Molecular Weight: 427.637 CAS RN: 13494-94-2 Properties: white powd; prepared by evaporation of a solution of GaOOH, 20665-52-5, in 50% sulfuric acid, followed by drying at 360°C; crystallizes from aq solution as the octadecahydrate [KIR78] [CRC10] Solubility: v s H<sub>2</sub>O [CRC10]

## 1404

Compound: Gallium(III) sulfate octadecahydrate Formula:  $Ga_2(SO_4)_3 \cdot 18H_2O$ Molecular Formula:  $Ga_2H_{36}O_{30}S_3$ Molecular Weight: 751.912 CAS RN: 13780-42-2 Properties: octahedral cryst; formed by dissolving  $Ga_2O_3$  or  $Ga(OH)_3$  in sulfuric acid and precipitating with ether or alcohol [MER06] Solubility: s  $H_2O$ , 60% alcohol [MER06] Density, g/cm<sup>3</sup>: 3.86 [STR93]

#### 1405

Compound: Gallium(III) sulfide Formula: Ga<sub>2</sub>S<sub>3</sub> Molecular Formula: Ga<sub>2</sub>S<sub>3</sub> Molecular Weight: 235.644 CAS RN: 12024-22-5 Properties: -100 mesh with 99.95% purity; monocl [CER91] [KIR78] Density, g/cm<sup>3</sup>: 3.77 [KIR78] Melting Point, °C: 1090 [KIR78]

#### 1406

**Compound:** Gallium(III) telluride **Formula:** Ga<sub>2</sub>Te<sub>3</sub> **Molecular Formula:** Ga<sub>2</sub>Te<sub>3</sub> **Molecular Weight:** 522.246 **CAS RN:** 12024-27-0

**Properties:** 6 mm pieces and smaller with 99.999% purity; two forms: cub and tetra; tetra, 73623-48-0, is stable only at 400°C–495°C; the pentavalent telluride  $Ga_2Te_5$ , 73623-48-0, is stable only in the range 400°C–495°C [KIR78] [CER91]

Density, g/cm<sup>3</sup>: cub: 5.57; tetr: 5.85; Ga₂Te₅: 5.85 [KIR78] Melting Point, °C: 792 [KIR78] Thermal Conductivity, W/(m⋅K): 4.7 [CRC10]

# 1407

Compound: Germanium Formula: Ge Molecular Formula: Ge Molecular Weight: 72.61 CAS RN: 7440-56-4

- Properties: grayish white, brittle metalloid; stable to oxidation in air up to 400°C; cub, a=0.56574 nm; enthalpy of fusion 36.94 kJ/mol; enthalpy of vaporization 334 kJ/mol; Poisson's ratio 0.278; hardness 6 Mohs; resistivity 53,000 µohm · cm (25°C); electronegativity 1.8–1.9; band gap, eV, 0.74 (0K), 0.66 (300 K); mobility (300 K), cm<sup>2</sup>/ (V · s), 3900 electron and 1900 holes; used in transistors and semiconductor applications [MER06] [KIR78] [COT88] [CRC10] Solubility: i H<sub>2</sub>O, HCl, dil alkali hydroxides; attacked by aqua regia [MER06] Density, g/cm<sup>3</sup>: 5.323 [MER06]
- Melting Point, °C: 938.25 [LID94]
- $\mathbf{D}_{\mathbf{r}} = \mathbf{D}_{\mathbf{r}} + \mathbf{P}_{\mathbf{r}} +$
- **Boiling Point, °C:** 2830 [KIR78] **Thermal Conductivity, W/(m⋅K):** 60.2 (25°C) [ALD94] **Thermal Expansion Coefficient:** 6.1×10/°C [MER06]

#### 1408

Compound: Germanium nitride Formula: Ge<sub>3</sub>N<sub>4</sub> Molecular Formula: Ge<sub>3</sub>N<sub>4</sub> Molecular Weight: 273.857 CAS RN: 12065-36-0 Properties: brownish-white powd; -200 mesh with 99.999% purity; prepared by reacting Ge powd and ammonia at 700°C-850°C; ortho-rhomb; a=1.384 nm, b=0.406 nm, c=0.818 nm [CIC73] [CER91] [CRC10] Solubility: i H<sub>2</sub>O; does not react with most mineral acids, aqua regia or caustic solutions [KIR78] [CRC10] Density, g/cm<sup>3</sup>: 5.25 [CRC10]

Melting Point, °C: decomposes at 900-1000 [CIC73]

# 1409

**Compound:** Germanium tetrahydride **Synonym:** germane **Formula:** GeH<sub>4</sub> **Molecular Formula:** GeH<sub>4</sub> **Molecular Weight:** 76.642

#### **CAS RN:** 7782-65-2

Properties: colorless gas; spontaneously flammable in air; enthalpy of vaporization 14.06 kJ/mol; can be prepared in small quantity by reaction: GeCl<sub>4</sub>+4NaB<sub>4</sub>+12H<sub>2</sub>O=GeH<sub>4</sub>(gas)+4NaCl+ 4B(OH)<sub>3</sub>+12H<sub>2</sub>(gas); used to produce highly pure electronic grade germanium by thermal decomposition at ~350°C [KIR80] [CRC10]
Solubility: i H<sub>2</sub>O; s liq ammonia, sl s hot HCl [HAW93]
Density, g/cm<sup>3</sup>: liq: 1.523 at -142°C; gas: 3.43 g/L (0°C) [KIR80]
Melting Point, °C: -165 [HAW93]
Boiling Point, °C: -90 [MER06]

# 1410

**Compound:** Germanium(II) bromide **Formula:** GeBr<sub>2</sub> **Molecular Formula:** Br<sub>2</sub>Ge **Molecular Weight:** 232.45 **CAS RN:** 24415-00-7 **Properties:** yellow monocl cryst [CRC10] **Solubility:** reac H<sub>2</sub>O [CRC10] **Melting Point,** °C: 122 [CRC10] **Boiling Point,** °C: decomposes at 150 [CRC10]

#### 1411

Compound: Germanium(II) chloride
Formula: GeCl<sub>2</sub>
Molecular Formula: Cl<sub>2</sub>Ge
Molecular Weight: 143.515
CAS RN: 10060-11-4
Properties: white powd; unstable; decomposes into polymer subchloride at low temp [MER06] [HAW93]
Solubility: decomposes in H<sub>2</sub>O; s ether, benzene; i alcohol and chloroform [HAW93] [MER06]
Melting Point, °C: decomposes [HAW93]

## 1412

Compound: Germanium(II) fluoride

**Formula:** GeF<sub>2</sub>

**Molecular Formula:** F<sub>2</sub>Ge

Molecular Weight: 110.607

**CAS RN:** 13940-63-1

**Properties:** white solid; decomposes above  $130^{\circ}$ C to form GeF<sub>4</sub>(gas), Ge and GeF(gas); deliq in moist air forming Ge(II) hydroxide; can be formed by reduction of GeF<sub>4</sub> with metallic Ge [KIR78]

Solubility: s HF solutions [KIR78]

Melting Point, °C: 110 [LID94]

Boiling Point, °C: decomposes at 130 [LID94]

Compound: Germanium(II) iodide Formula: GeI<sub>2</sub> Molecular Formula: GeI<sub>2</sub> Molecular Weight: 326.419 CAS RN: 13573-08-5 Properties: -10 mesh with 99.999% purity; yellow powd [STR93] [CER91] Solubility: s H<sub>2</sub>O [CRC10] Density, g/cm<sup>3</sup>: 5.73 [STR93] Melting Point, °C: decomposes at 550 [LID94]

# 1414

Compound: Germanium(II) oxide
Synonym: germanium monoxide
Formula: GeO
Molecular Formula: GeO
Molecular Weight: 88.609
CAS RN: 20619-16-3
Properties: black solid; stable at room temp; best prepared in a pure form by heating Ge and GeO<sub>2</sub> in oxygen free atm, GeO sublimes above 710°C and is condensed [KIR78] [HAW93]
Solubility: s in about 250 parts cold H<sub>2</sub>O, 100 parts boiling H<sub>2</sub>O; s acids [MER06]
Melting Point, °C: sublimes at 710 [HAW93]

## 1415

Compound: Germanium(II) selenide Formula: GeSe Molecular Formula: GeSe Molecular Weight: 151.570 CAS RN: 12065-10-0 Properties: gray ortho-rhomb or brown powd; 6 mm pieces and smaller with 99.999% purity [CER91] [LID94] Density, g/cm<sup>3</sup>: 5.6 [LID94] Melting Point, °C: 667 [LID94]

#### 1416

Compound: Germanium(II) sulfide Formula: GeS Molecular Formula: GeS Molecular Weight: 104.676 CAS RN: 12025-32-0 Properties: reddish-yellow, amorphous or rhomb cryst; -20 mesh with 99.95% purity [CER91] [CRC10] Solubility: 0.24 g/100 mL H<sub>2</sub>O [CRC10] Density, g/cm<sup>3</sup>: amorphous: 3.31; rhomb: 4.01 [CRC10] Melting Point, °C: 615 [LID94] Reactions: sublimes at 430°C [CRC10]

#### 1417

Compound: Germanium(II) telluride Formula: GeTe Molecular Formula: GeTe Molecular Weight: 200.210 CAS RN: 12025-39-7 Properties: 6 mm pieces and smaller with 99.999% purity; good semiconductor [HAW93] [CER91] Density, g/cm<sup>3</sup>: 6.14 [CRC10] Melting Point, °C: 725 [HAW93]

## 1418

Compound: Germanium(IV) bromide
Synonym: germanium tetrabromide
Formula: GeBr<sub>4</sub>
Molecular Formula: Br<sub>4</sub>Ge
Molecular Weight: 392.226
CAS RN: 13450-92-5
Properties: solid ingot in glass with 99.999% purity; white cryst; enthalpy of vaporization 41.4 kJ/ mol; can be prepared readily by reacting Ge with Br<sub>2</sub> or with GeO<sub>2</sub> and HBr solutions [KIR78] [STR93] [CER91] [CRC10]
Density, g/cm<sup>3</sup>: 3.132 [STR93]
Melting Point, °C: 26.1 [STR93]
Boiling Point, °C: 186.5 [ALD94]

#### 1419

Compound: Germanium(IV) chloride Synonym: germanium tetrachloride Formula: GeCl<sub>4</sub> **Molecular Formula:** Cl<sub>4</sub>Ge Molecular Weight: 214.421 CAS RN: 10038-98-9 Properties: 99.9999% purity; colorless liq; fumes in air; appreciably volatile at room temp; refractive index 1.464; enthalpy of vaporization 27.9 kJ/mol; vapor pressure, Pa: 100 (-48°C), 1,000 (-20°C), 10,000 (21°C), 10<sup>5</sup> (83°C), 10<sup>6</sup> (190°C); prepared by reacting germanium oxides or germanates with HCl [KIR78] [HAW93] [MER06] [CER91] [CRC10] Solubility: hydrolyzed in H<sub>2</sub>O; s benzene, ether, carbon disulfide, alcohol, chloroform [HAW93] Density, g/cm<sup>3</sup>: 1.874 [HAW93] Melting Point, °C: –49.5 [HAW93] Boiling Point, °C: 86.55 [CRC10]

## 1420

**Compound:** Germanium(IV) ethoxide Formula:  $Ge(OC_2H_5)_4$ Molecular Formula:  $C_8H_{20}GeO_4$ Molecular Weight: 252.84 CAS RN: 14165-55-0 Properties: liq [ALF95] Solubility: s alcohol, benzene [ALF95] Density, g/cm<sup>3</sup>: 1.140 [ALF95] Melting Point, °C: -72 [ALF95] Boiling Point, °C: 185.5 [ALF95] Reactions: hydrolyzed by H<sub>2</sub>O [ALF95]

# 1421

Compound: Germanium(IV) fluoride Synonym: germanium tetrafluoride Formula: GeF<sub>4</sub> **Molecular Formula:** F<sub>4</sub>Ge Molecular Weight: 148.604 CAS RN: 7783-58-6 Properties: 99.99% purity; colorless gas; fumes strongly in air; odor of garlic; thermally stable up to ~1000°C; triple point reported as -50°C and 404.1 kPa; vapor pressure ~100 kPa at -36.5°C; pure GeF<sub>4</sub> usually prepared by decomposing BaGeF<sub>6</sub> at ~700°C [KIR78] [MER06] [CER91] Solubility: hydrolyzes to GeO<sub>2</sub> and H<sub>2</sub>GeF<sub>6</sub> in H<sub>2</sub>O [MER06] Density, g/cm<sup>3</sup>: liq: 2.162; solid (-195°C): 3.148 [MER06] Melting Point, °C: –15 (3032 mm pressure) [MER06] Boiling Point, °C: sublimes at -36.5 [MER06] Reactions: corrodes Hg and grease [MER06]

## 1422

Compound: Germanium(IV) fluoride trihydrate Synonym: germanium tetrafluoride trihydrate Formula:  $GeF_4 \cdot 3H_2O$ Molecular Formula:  $F_4GeH_6O_3$ Molecular Weight: 202.650 CAS RN: 7783-58-6 Properties: white cryst; deliq; obtained by slow evaporation of  $GeO_2$  in 20% HF [MER06] [CRC10] Solubility: s  $H_2O$  [CRC10] Melting Point, °C: decomposes [CRC10]

## 1423

Compound: Germanium(IV) iodide Synonym: germanium tetraiodide Formula: GeI<sub>4</sub> Molecular Formula: GeI<sub>4</sub> Molecular Weight: 580.228 CAS RN: 13450-95-8 Properties: -10 mesh with 99.999% purity; reddish orange cryst; a method of preparation is to react Ge with I<sub>2</sub> or GeO<sub>2</sub> with HI solutions [KIR78] [STR93] [CER91] Density, g/cm<sup>3</sup>: 4.416 [STR93] Melting Point, °C: 146 [STR93] Boiling Point, °C: 350 [STR93]

#### 1424

- **Compound:** Germanium(IV) oxide **Synonym:** germanium dioxide **Formula:** GeO<sub>2</sub> **Molecular Formula:** GeO<sub>2</sub> **Molecular Weight:** 104.609 **CAS RN:** 1310-53-8
- Properties: white powd; two forms: hex, tetr amorphous (vitreous); hex can be produced by the hydrolysis of GeCl<sub>4</sub> in H<sub>2</sub>O or by igniting Ge sulfides; tetr form is insoluble, it can be produced by heating the hex form at 300°C–900°C; amorphous material formed when the hex or tetr forms are melted and cooled; used in phosphors, transistors, and diodes, in infrared transmitting glass; hex form of 99.999% purity is a sputtering target for dielectric film preparation [HAW93] [CER91]
  Solubility: (probably hex form) g/100 g H<sub>2</sub>O: 0.49 (10°C), 0.43 (20°C), 0.61 (40°C) [LAN05]; hex: s HCl, HF, NaOH solutions [KIR78]
  Density, g/cm<sup>3</sup>: hex: 4.228; tetr: 6.239; amorphous: 3.637 [KIR78]

Melting Point, °C: hex: 1116; tetr: 1086 [KIR78]

#### 1425

Compound: Germanium(IV) selenide Synonym: germanium diselenide Formula: GeSe<sub>2</sub> Molecular Formula: GeSe<sub>2</sub> Molecular Weight: 230.530 CAS RN: 12065-11-1 Properties: 6 mm pieces and smaller with 99.999% purity; orange cryst [STR93] [CER91] Solubility: i H<sub>2</sub>O [CRC10] Density, g/cm<sup>3</sup>: 4.56 [STR93] Melting Point, °C: 707 [STR93] Boiling Point, °C: decomposes [CRC10]

#### 1426

Compound: Germanium(IV) sulfide Synonym: germanium disulfide Formula: GeS<sub>2</sub> Molecular Formula: GeS<sub>2</sub> Molecular Weight: 136.742 CAS RN: 12025-34-2 Properties: black cryst; can be prepared by reacting GeO<sub>2</sub> and sulfur [KIR78] [STR93] Solubility: decomposed by H<sub>2</sub>O [CRC10] Density, g/cm<sup>3</sup>: 2.94 [CRC10] Melting Point, °C: 530 [STR93]

Compound: Germanium(IV) telluride Synonym: germanium ditelluride Formula: GeTe<sub>2</sub> Molecular Formula: GeTe<sub>2</sub> Molecular Weight: 327.810 CAS RN: 12260-55-8 Properties: reacted product, 6 mm pieces and smaller with 99.999% purity [CER91]

#### 1428

Compound: Gold Formula: Au Molecular Formula: Au Molecular Weight: 196.96654 CAS RN: 7440-57-5

**Properties:** yellow; soft metal; cub, a=0.407 nm; electronegativity, 2.88; electrical resistivity  $(20^{\circ}C)$  2.35 µohm · cm; temp coefficient of electrical resistivity (0°C-100°C) 0.004; enthalpy of fusion 12.55 kJ/mol; enthalpy of vaporization 324 kJ/mol; specific heat (18°C) 131 J/(kg °C); hardness 2.5–3.0 Mohs; forms AuTe<sub>2</sub> (calaverite), 12006-61-0, by reaction with Te at ~475°C [KIR78] [MER06] [CRC10] Solubility: s aqua regia, alkali cyanide solutions [MER06] Density, g/cm<sup>3</sup>: 19.32 (20°C) [KIR78] Melting Point, °C: 1064.43 [ALD94] Boiling Point, °C: 2808 [ALD94] Reactions: extremely stable: not attacked by acids or air [MER06] Thermal Conductivity, W/(m·K): 318 (25°C) [ALD94] Thermal Expansion Coefficient: 100°C:

14.16×10<sup>-6</sup>/K [KIR78]

# 1429

Compound: Gold(I) bromide Synonym: aurous bromide Formula: AuBr Molecular Formula: AuBr Molecular Weight: 276.871 CAS RN: 10294-27-6 Properties: yellowish gray mass [HAW93] Solubility: i H<sub>2</sub>O [HAW93] Density, g/cm<sup>3</sup>: 7.9 [CRC10] Melting Point, °C: decomposes at 165 [HAW93]

# 1430

**Compound:** Gold(I) carbonyl chloride **Formula:** Au(CO)Cl **Molecular Formula:** CAuClO Molecular Weight: 260.430 CAS RN: 50960-82-2 Properties: off-white powd; sensitive to atm oxygen [STR93]

#### 1431

Compound: Gold(I) chloride Synonym: aurous chloride Formula: AuCl Molecular Formula: AuCl Molecular Weight: 232.420 CAS RN: 10294-29-8 Properties: yellowish powd [MER06] Solubility: i H<sub>2</sub>O with slow decomposition [MER06] Density, g/cm<sup>3</sup>: 7.57 [MER06] Melting Point, °C: decomposes at ~289 [MER06] Reactions: decomposes to Au and Cl<sub>2</sub> at 289°C [MER06]

# 1432

**Compound:** Gold(I) cyanide Synonym: aurous cyanide Formula: AuCN Molecular Formula: CAuN Molecular Weight: 222.985 CAS RN: 506-65-0 **Properties:** yellow powd; hex; odorless; iridescent in sunlight; slowly decomposes in presence of moisture [MER06] Solubility: i H<sub>2</sub>O, alcohol; dil acid; s NH<sub>3</sub>, NaCN soln [MER06] Density, g/cm<sup>3</sup>: 7.14 [MER06] Melting Point, °C: decomposes to Au and CN when ignited [MER06] Reactions: evolves HCN gas if warmed with HCl [MER06]

## 1433

Compound: Gold(I) iodide Synonym: aurous iodide Formula: AuI Molecular Formula: AuI Molecular Weight: 323.871 CAS RN: 10294-31-2 Properties: yellowish to greenish yellow powd; decomposes slowly at ordinary temp, rapidly at elevated temp [MER06] Solubility: i H<sub>2</sub>O; s alkali iodide or cyanide [MER06] Density, g/cm<sup>3</sup>: 8.25 [MER06] Melting Point, °C: decomposes at 120 [STR93] Reactions: decomposed by warm acids [MER06]

Compound: Gold(I) sulfide
Synonym: aurous sulfide
Formula: Au<sub>2</sub>S
Molecular Formula: Au<sub>2</sub>S
Molecular Weight: 425.999
CAS RN: 1303-60-2
Properties: brownish black powd; forms colloid in H<sub>2</sub>O when freshly prepared by treatment of acidified KAu(CN)<sub>2</sub> solutions with H<sub>2</sub>S [MER06] [KIR78]
Solubility: i H<sub>2</sub>O, dil single acids; s aqua regia, alkali cyanide solutions [MER06] [KIR78]
Density, g/cm<sup>3</sup>: ~11 [LID94]
Melting Point, °C: decomposes at 240 [CRC10]

## 1435

Compound: Gold(III) bromide
Synonym: auric bromide
Formula: AuBr<sub>3</sub>
Molecular Formula: AuBr<sub>3</sub>
Molecular Weight: 436.679
CAS RN: 10294-28-7
Properties: brownish orange powd; used to test alkaloids and for testing spermatic fluid, medicinal uses [HAW93] [STR93]
Solubility: s H<sub>2</sub>O, alcohol, glycerol [MER06]
Melting Point, °C: decomposes at ~160 [MER06]
Reactions: slowly decomposed by alcohol and glycerol [MER06]

## 1436

Compound: Gold(III) chloride
Synonym: auric chloride
Formula: AuCl<sub>3</sub>
Molecular Formula: AuCl<sub>3</sub>
Molecular Weight: 303.325
CAS RN: 13453-07-1
Properties: -8 mesh with 99% purity; yellow to red cryst; can be made by heating Au and Cl<sub>2</sub> at 200°C; exists as dimer Au<sub>2</sub>Cl<sub>3</sub> in both solid and gas phases under Cl<sub>2</sub> below 254°C [HAW93] [CER91]
Solubility: s H<sub>2</sub>O, alcohol, ether [HAW93]
Density, g/cm<sup>3</sup>: 4.7 [LID94]
Melting Point, °C: decomposes at >160 [LID94]
Reactions: decomposes to AuCl, then Au, in Cl<sub>2</sub> atm at >254°C [KIR78]

## 1437

**Compound:** Gold(III) cyanide trihydrate **Synonym:** cyanoauric acid **Formula:**  $Au(CN)_3 \cdot 3H_2O$  Molecular Formula: C<sub>3</sub>H<sub>6</sub>AuN<sub>3</sub>O<sub>3</sub>
Molecular Weight: 329.066
CAS RN: 535-37-5
Properties: colorless; deliq cryst; used as an electrolyte for plating gold [HAW93] [MER06]
Solubility: v s H<sub>2</sub>O; sl s alcohol, ether [HAW93]
Melting Point, °C: decomposes at 50 [MER06]

## 1438

Compound: Gold(III) fluoride Formula: AuF<sub>3</sub> Molecular Formula: AuF<sub>3</sub> Molecular Weight: 253.962 CAS RN: 14720-21-9 Properties: orange-yellow hex cryst [CRC10] Density, g/cm<sup>3</sup>: 6.75 [CRC10] Melting Point, °C: 300 [CRC10] Boiling Point, °C: sublimes [CRC10]

## 1439

Compound: Gold(III) hydroxide Synonym: auric hydroxide Formula: Au(OH)<sub>3</sub> Molecular Formula: AuH<sub>3</sub>O<sub>3</sub> Molecular Weight: 247.989 CAS RN: 1303-52-2 Properties: brown powd; decomposed by sunlight to Au metal; also decomposes on standing; decomposes to Au and  $O_2$  at >160°C; precipitates from AuCl<sub>4</sub><sup>-</sup> solutions following addition of alkali hydroxides; used in gilding liq, in decorating porcelain [HAW93] [MER06] [KIR78] Solubility: i H<sub>2</sub>O; s in NaCN soln, HCl, conc HNO<sub>3</sub> [MER06] Melting Point, °C: decomposes at ~100 [LID94] **Reactions:**  $Au(OH)_3 + NH_3 \rightarrow gold$ fulminate (explosive) [MER06]

#### 1440

Compound: Gold(III) iodide
Synonym: auric iodide
Formula: AuI<sub>3</sub>
Molecular Formula: AuI<sub>3</sub>
Molecular Weight: 577.680
CAS RN: 13453-24-2
Properties: green powd, unstable, converts to AuI, 10294-31-2 [KIR78] [STR93]
Solubility: i cold H<sub>2</sub>O, decomposed by hot H<sub>2</sub>O [CRC10]

#### 1441

**Compound:** Gold(III) oxide **Synonyms:** auric oxide, gold trioxide Formula: Au<sub>2</sub>O<sub>3</sub>
Molecular Formula: Au<sub>2</sub>O<sub>3</sub>
Molecular Weight: 441.931
CAS RN: 1303-58-8
Properties: -100 mesh with 99.9% purity; brownish orange powd; slowly decomposed by sunlight; forms when Au(OH)<sub>3</sub> is heated at 140°C; used in gold plating [MER06] [HAW93] [CER91] [KIR78]
Solubility: i H<sub>2</sub>O; s HCl, conc HNO<sub>3</sub>,

NaCN solns [MER06]

Melting Point, °C: decomposes at ~150 [LID94] Reactions: evolves O<sub>2</sub> at 110°C; decomposed to metal at 250°C [MER06]

# 1442

Compound: Gold(III) selenate Synonym: auric selenate Formula: Au<sub>2</sub>(SeO<sub>4</sub>)<sub>3</sub> Molecular Formula: Au<sub>2</sub>O<sub>12</sub>Se<sub>3</sub> Molecular Weight: 822.806 CAS RN: 10294-32-3 Properties: small, yellow cryst; decomposes in light [MER06] Solubility: i H<sub>2</sub>O; s H<sub>2</sub>SO<sub>4</sub>, HNO<sub>3</sub> [MER06]

## 1443

Compound: Gold(III) selenide Synonym: auric selenide Formula: Au<sub>2</sub>Se<sub>3</sub> Molecular Formula: Au<sub>2</sub>Se<sub>3</sub> Molecular Weight: 630.813 CAS RN: 1303-62-4 Properties: black amorphous solid [MER06] Solubility: s aqua regia, alkali cyanides [MER06] Density, g/cm<sup>3</sup>: 4.65 [MER06] Melting Point, °C: decomposed by heat [MER06]

#### 1444

Compound: Gold(III) sulfide Synonyms: auric sulfide, gold trisulfide Formula: Au<sub>2</sub>S<sub>3</sub> Molecular Formula: Au<sub>2</sub>S<sub>3</sub> Molecular Weight: 490.131 CAS RN: 1303-61-3 Properties: black powd [MER06]; not very stable, can be prepared by adding H<sub>2</sub>S to ether solution of AuCl<sub>3</sub> [KIR78] Solubility: i H<sub>2</sub>O [CRC10] Density, g/cm<sup>3</sup>: 8.75 [CRC10] Reactions: decomposes to metal and sulfur at 200°C [MER06]

#### 1445

**Compound:** Hafnium **Formula:** Hf **Molecular Formula:** Hf

violeculai Formula. III

Molecular Weight: 178.49

CAS RN: 7440-58-6

**Properties:** gray, highly lustrous, hard ductile metal; two forms; thermal neutron cross section 115 barns; good corrosion resistance and high strength; electrical resistivity  $3.57 \times 10^{-7}$  ohm  $\cdot$  m (0°C),  $6.24 \times 10^{-7}$  (200°C); enthalpy of vaporization 571 kJ/mol; enthalpy of fusion 27.20 kJ/mol; entropy of fusion  $54.4 \text{ J/(kg} \cdot \text{K})$ ; used in controls for nuclear reactors, in light bulb filaments, electrodes, and special glasses [HAW93] [MER06] [KIR80] [CRC10] [ALD94] Solubility: s HF; slowly reacts with conc  $H_2SO_4$ , aqua regia [KIR80] Density, g/cm3: 13.28 [KIR80] Melting Point, °C: 2227 [ALD94] Boiling Point, °C: 4602 [ALD94] **Reactions:** transition  $\alpha$  to  $\beta$  at 1777°C [KIR80] Thermal Conductivity, W/(m·K): 23.0 (25°C) [ALD94]; 22.3 (50°C), 20.7 (400°C) [KIR80] **Thermal Expansion Coefficient:** 5.9×10<sup>-6</sup>/K [KIR80]

# 1446

**Compound:** Hafnium acetylacetonate **Synonyms:** 2,4-pentanedione, hafnium(IV) derivative **Formula:**  $Hf(CH_3COCH=C(O)CH_3)_4$  **Molecular Formula:**  $C_{20}H_{28}HfO_8$  **Molecular Weight:** 574.927 **CAS RN:** 17475-67-1 **Properties:** powd [STR93]

# 1447

Compound: Hafnium boride Formula: HfB<sub>2</sub> Molecular Formula: B<sub>2</sub>Hf Molecular Weight: 200.112 CAS RN: 12007-23-7 Properties: gray, hex, cryst solid, a=0.3141 nm, c = 0.3470 nm; can be prepared by heating  $HfO_2 + C + B_2O_3$ ; hardness 2900 kgf/mm<sup>2</sup>; resistivity  $8.8 \mu$ ohm  $\cdot$  cm; used as a refractory material and as a sputtering target with 99.5% purity to produce films, which may be wear-resistant and semiconducting [HAW93] [KIR80] [CER91] Density, g/cm<sup>3</sup>: 10.5 (theoretical 11.2) [KIR80] Melting Point, °C: 3250 [KIR78] **Reactions:** attacked by HF, else highly resistant [KIR80] **Thermal Expansion Coefficient:** 5.7 × 10<sup>-6</sup> [KIR80]

**Compound:** Hafnium(II) bromide **Formula:** HfBr<sub>2</sub> **Molecular Formula:** Br<sub>2</sub>Hf **Molecular Weight:** 338.30 **CAS RN:** 13782-95-1 **Properties:** blue black cryst [CRC10] **Melting Point, °C:** decomposes at 400 [CRC10]

## 1449

Compound: Hafnium bromide Synonym: hafnium tetrabromide Formula: HfBr<sub>4</sub> Molecular Formula: Br<sub>4</sub>Hf Molecular Weight: 498.106 CAS RN: 13777-22-5 Properties: -20 mesh with 99.7% purity; hygr; white cub, a = 0.095 nm; or tan powd [KIR80] [STR93] [CER91] Density, g/cm<sup>3</sup>: 4.90 (5.09 theoretical) [KIR80] Melting Point, °C: 424 (3.34 MPa) [KIR80] Boiling Point, °C: sublimation point 322 [KIR80]

## 1450

Compound: Hafnium carbide Formula: HfC Molecular Formula: CHf Molecular Weight: 190.501 CAS RN: 12069-85-1 Properties: dark, gray, brittle solid; fcc, a = 0.4640 nm; high cross section for absorption of thermal neutrons; resistivity  $8.8 \mu$ ohm  $\cdot$  cm; most refractory binary material known; hardness 2300 kgf/mm<sup>2</sup>; used in control rods of nuclear reactors; can be prepared by heating HfO<sub>2</sub> with lampblack under H<sub>2</sub> at 1900°C–2300°C; used in crucible form for melting hafnium oxide, other oxides [KIR80] [HAW93] [CER91] Density, g/cm<sup>3</sup>: 12.2 (theoretical 12.7) [KIR80]

Melting Point, °C: 3950 [KIR80] [CIC73] Thermal Expansion Coefficient:

6.59×10<sup>-6</sup>/K [KIR80]

# 1451

Compound: Hafnium(II) chloride Formula: HfCl<sub>2</sub> Molecular Formula: Cl<sub>2</sub>Hf Molecular Weight: 249.40 CAS RN: 13782-92-8 Properties: black solid [CRC10] Melting Point, °C: decomposes at 400 [CRC10]

# 1452

Compound: Hafnium chloride Synonym: hafnium tetrachloride Formula:  $HfCl_4$ Molecular Formula:  $Cl_4Hf$ Molecular Weight: 320.301 CAS RN: 13499-05-3 Properties: -80 mesh with 99.99% and 99% purity; white, cryst monocl, a=0.631 nm, b=0.7407 nm, c=0.6256 nm; can be obtained by heating the oxide in Cl<sub>2</sub> with carbon at >317°C [MER06] [CER91] [KIR80] Solubility: hydrolyzed by H<sub>2</sub>O to HfOCl<sub>2</sub> [MER06] Melting Point, °C: 432 [KIR80] Boiling Point, °C: sublimation point 317 [KIR80]

#### 1453

Compound: Hafnium fluoride Synonym: hafnium tetrafluoride **Formula:** HfF<sub>4</sub> **Molecular Formula:** F<sub>4</sub>Hf Molecular Weight: 254.484 CAS RN: 13709-52-9 Properties: white or highly dense pressure sintered pieces of 3-6 mm; monocl, a=0.957 nm, b=0.993 nm, c=0.7730 nm; can be formed by careful thermal decomposition of ammonium fluorohafnate, 16925-24-9; sintered pieces used as evaporation material for possible application to lowindex material as a replacement for  $ThF_4$ , 99.95% pure material used as a sputtering target to produce antireflection coatings on glass [KIR80] [CER91] Density, g/cm<sup>3</sup>: 7.1 [LID94] Melting Point, °C: >968 [KIR80] Boiling Point, °C: sublimes at 968 [KIR80]

# 1454

Compound: Hafnium hydride Formula: HfH<sub>2</sub> Molecular Formula: H<sub>2</sub>Hf Molecular Weight: 180.506 CAS RN: 12770-26-2 Properties: -325 mesh 10μm or less with 99.8% purity; brittle solid, fcc; prepared by reacting Hf and H<sub>2</sub> above 250°C [KIR80] [CER91] Density, g/cm<sup>3</sup>: 11.4 [LID94]

#### 1455

**Compound:** Hafnium iodide **Formula:** HfI<sub>3</sub> **Molecular Formula:** HfI<sub>3</sub> **Molecular Weight:** 559.20 CAS RN: 13779-73-2 Properties: black cryst [CRC10] Melting Point, °C: decomposes [CRC10]

# 1456

Compound: Hafnium iodide
Synonym: hafnium tetraiodide
Formula: HfI<sub>4</sub>
Molecular Formula: HfI<sub>4</sub>
Molecular Weight: 686.108
CAS RN: 13777-23-6
Properties: yellowish orange cub, a = 1.176 nm, or red powd; sensitive to moisture [STR93] [KIR80]
Density, g/cm<sup>3</sup>: 5.6 [LID94]
Melting Point, °C: 449 (3.34 MPa) [KIR80]
Boiling Point, °C: sublimation point 393 [KIR80]

#### 1457

Compound: Hafnium nitride Formula: HfN Molecular Formula: HfN Molecular Weight: 192.497 CAS RN: 25817-87-2

Properties: yellowish brown cryst; fcc, a=0.4518 nm; most refractory of all known metal nitrides; hardness 1640 kgf/mm<sup>2</sup>; electrical resistivity 33 μohm · cm; can be prepared by heating Hf in N<sub>2</sub> or NH<sub>3</sub> atm at 1000°C–1500°C; as a 99.5% pure material, used as a sputtering target to increase electrical stability of diodes, transistors, and integrated circuits [KIR80] [KIR81] [HAW93] [CER91]
Density, g/cm<sup>3</sup>: 13.84 (theoretical) [KIR80]
Melting Point, °C: 3305 [HAW93]
Thermal Conductivity, W/(m·K): 11.1 [KIR81]

**Thermal Expansion Coefficient:** 6.9×10<sup>-6</sup> [KIR80]

1458

**Compound:** Hafnium oxide **Synonym:** hafnia **Formula:** HfO<sub>2</sub> **Molecular Formula:** HfO<sub>2</sub> **Molecular Weight:** 210.489 **CAS RN:** 12055-23-1

Properties: white solid; cub, a=0.51156 nm, b=0.51722 nm, c=0.52948 nm; obtained by ignition of the hydroxide, oxalate, or sulfate; hardness 1050 kgf/mm<sup>2</sup>; resistivity >10<sup>+8</sup> μohm · cm; used as a refractory metal oxide, an evaporated material of 99.9% purity for dielectric coatings, to coat wires for emitters, and as a 99.95% pure sputtering target to provide very hard, adherent film; stabilized with 10%–15% CaO [HAW93] [MER06] [KIR80] [CER91] Solubility: i H<sub>2</sub>O [HAW93] Density, g/cm<sup>3</sup>: 9.68 [MER06] Melting Point, °C: 2900 [KIR80] Reactions: transformation tetr to cub above 2700°C [KIR80] Thermal Expansion Coefficient: (volume) 100°C (0.144), 200°C (0.319), 400°C (0.696), 800°C (1.499), 1000°C (2.085) [CLA66]

#### 1459

**Compound:** Hafnium oxychloride octahydrate **Formula:** HfOCl<sub>2</sub> · 8H<sub>2</sub>O **Molecular Formula:** Cl<sub>2</sub>H<sub>16</sub>HfO<sub>9</sub> **Molecular Weight:** 409.517 **CAS RN:** 14456-34-9 **Properties:** -6 mesh with 99.99% purity; white powd or tetr cryst; produced by addition of HfCl<sub>4</sub> to H<sub>2</sub>O or by dissolution of HfO<sub>2</sub> in HCl; when heated, first dissolves in water of crystallization, then decomposes [KIR80] [STR93] [CER91] **Solubility:** s H<sub>2</sub>O [KIR80] **Melting Point, °C:** decomposes [KIR80]

## 1460

Compound: Hafnium phosphide Formula: HfP Molecular Formula: HfP Molecular Weight: 209.464 CAS RN: 12325-59-6 Properties: -100 mesh with 99% purity; hex, a=0.365 nm, c=1.237 nm [KIR80] [CER91] Density, g/cm<sup>3</sup>: 9.78 (theoretical) [KIR80]

#### 1461

Compound: Hafnium selenide Synonym: hafnium diselenide Formula: HfSe<sub>2</sub> Molecular Formula: HfSe<sub>2</sub> Molecular Weight: 336.410 CAS RN: 12162-21-9 Properties: -325 mesh 10µm or less with 99.5% purity; dark brown; hex, a=0.375 nm, b=0.616 nm; resistivity 20µohm ⋅ cm [CER91] [KIR80] Density, g/cm<sup>3</sup>: 7.46 [KIR80]

#### 1462

**Compound:** Hafnium silicate **Formula:** HfSiO<sub>4</sub> **Molecular Formula:** HfO<sub>4</sub>Si **Molecular Weight:** 270.574 **CAS RN:** 37248-04-7

Properties: zircon cryst structure; a=0.65725 nm, c=0.59632 nm [SUB90]

**Thermal Expansion Coefficient:** 1020°C

is 3.1×10<sup>-6</sup>/°C [SUB90]

#### 1463

Compound: Hafnium silicide Formula: HfSi<sub>2</sub> Molecular Formula: HfSi<sub>2</sub> Molecular Weight: 234.661 CAS RN: 12401-56-8 Properties: gray powd; rhomb, a=0.3677 nm, b=1.455 nm, c=0.3649 nm; hardness 930 kgf/ mm<sup>2</sup>; as 99.5% pure material, used as sputtering target to produce wear-resistant films and semiconducting films for use in integrated circuits [KIR80] [STR93] [CER91] Density, g/cm<sup>3</sup>: 7.2 (8.03 theoretical) [KIR80] Melting Point, °C: 1680 [STR93]; 1750 [KIR80]

#### 1464

Compound: Hafnium sulfate
Formula: Hf(SO<sub>4</sub>)<sub>2</sub>
Molecular Formula: HfO<sub>8</sub>S<sub>2</sub>
Molecular Weight: 370.617
CAS RN: 15823-43-5
Properties: can be prepared by reacting fuming sulfuric acid with HfCl<sub>4</sub> [MER06]
Melting Point, °C: decomposes at >500 [MER06]

#### 1465

Compound: Hafnium sulfide
Formula: HfS<sub>2</sub>
Molecular Formula: HfS<sub>2</sub>
Molecular Weight: 242.622
CAS RN: 18855-94-2
Properties: -200 mesh with 99.9% purity; purple brown; hex, a = 0.364 nm, b = 0.584 nm; resistivity at room temp 1 µohm · cm; can be prepared by reacting the elements at 500°C; used as a solid lubricant [HAW93] [CER91]
Density, g/cm<sup>3</sup>: 6.03 [KIR80]

# 1466

Compound: Hafnium telluride Formula: HfTe<sub>2</sub> Molecular Formula: HfTe<sub>2</sub> Molecular Weight: 433.690 CAS RN: 39082-23-0 Properties: -325 mesh 10μm or less with 99.5% purity [CER91]

#### 1467

Compound: Hafnium titanate Formula: HfTiO<sub>4</sub> Molecular Formula: HfO<sub>4</sub>Ti Molecular Weight: 290.355 CAS RN: 12055-24-2 Properties: -325 mesh 10 μm or less with 99.5% purity; off-white powd [STR93] [CER91]

# 1468

Compound: Hafnocene dichloride
Synonym: bis(cyclopentadienyl)hafnium dichloride
Molecular Weight: 379.59
Molecular Formula: C<sub>10</sub>H<sub>10</sub>Cl<sub>2</sub>Hf
CAS RN: 12116-66-4
Properties: moisture sensitive; uses: synthesis of many organometallic compounds and early-transition-metal complexes [ALD94]
Melting Point, °C: 230–233 [ALD94]

#### 1469

**Compound:** Helium **Formula:** He

Molecular Formula: He

Molecular Weight: 4.002602

CAS RN: 7440-59-7

- Properties: inert gas; nonflammable, colorless, odorless, tasteless; critical temp -267.9°C; critical pressure 227.5 kPa; enthalpy of vaporization 81.70 J/mol; enthalpy of fusion 0.0138 kJ/mol; heat capacity (101.32 kPa, 25°C) 20.78 J/(mol⋅K); sonic velocity (101.32 kPa, 0°C) 973 m/s; viscosity (101.32 kPa, 0°C) 19.86 Pa⋅s, specific volume (21.1°C, 101.3 kPa) 6.04 m³/kg [MER06] [KIR78] [AIR87] [ALD94]
  Solubility: 8.61 mL/1000 g H<sub>2</sub>O (101.32 kPa, 0°C) [KIR78]; Henry's law constants, k × 10<sup>-4</sup>:
- [KIR /8]; Henry's law constants, k × 10<sup>-4</sup>: 9.856 (104°C), 6.739 (149.4°C), 2.524 (250.6°C), 1.796 (275.1°C) [POT78]
- **Density, g/cm<sup>3</sup>:** gas (101.3 kPa, 0°C) 0.00017850 [KIR78]
- **Melting Point, °C:** –272.2 (25 atm) [HAW93]
- Boiling Point, °C: -268.93 [KIR78]
- **Thermal Conductivity, W/(m·K):** 0.14184 (gas) (101.32 kPa, 0°C) [KIR78]

## 1470

**Compound:** Helium-3 **Formula:** <sup>3</sup>He **Molecular Formula:** He **Molecular Weight:** 3.0160 **CAS RN:** 14762-55-7 Properties: gas; enthalpy of vaporization 0.0829 kJ/mol; heat capacity (101.32 kPa, 25°C) 20.78 J/(mol⋅K); viscosity (101.32 kPa, 25°C) ~17.2 Pa⋅s [KIR78] [CRC10]
Density, g/cm<sup>3</sup>: 0.0001347 (gas, 101.3 kPa, 0°C) [KIR78]
Boiling Point, °C: -268.93 [CRC10]
Thermal Conductivity, W/(m⋅K): gas (101.32 kPa, 0°C) ~0.1636 [KIR78]

#### 1471

Compound: Hexaamminecobalt(III) chloride Formula: Co(NH<sub>3</sub>)<sub>6</sub>Cl<sub>3</sub> Molecular Formula: Cl<sub>3</sub>CoH<sub>18</sub>N<sub>6</sub> Molecular Weight: 267.474 CAS RN: 10534-89-1 Properties: wine red monocl [KIR79] Solubility: 5.99 g/100 mL cold H<sub>2</sub>O; s conc HCl; i alcohol, NH<sub>4</sub>OH [KIR79] Density, g/cm<sup>3</sup>: 1.71 [KIR79] Reactions: evolves NH<sub>3</sub> at 215°C [KIR79]

# 1472

Compound: Hexaammineruthenium(III) chloride Formula: Ru(NH<sub>3</sub>)<sub>6</sub>Cl<sub>3</sub> Molecular Formula: Cl<sub>3</sub>H<sub>18</sub>N<sub>6</sub>Ru Molecular Weight: 309.612 CAS RN: 14282-91-8 Properties: off-white powd; there is also a hexaamineruthenium(II) chloride, CAS RN 15305-72-3 [STR93] [ALD94]

## 1473

Compound: Hexaborane(10) Formula: B<sub>6</sub>H<sub>10</sub> Molecular Formula: B<sub>6</sub>H<sub>10</sub> Molecular Weight: 74.945 CAS RN: 23777-80-2 Properties: colorless liq; slowly decomposes at 25°C [COT88] Solubility: hydrolyzed in H<sub>2</sub>O if heated [COT88] Density, g/cm<sup>3</sup>: 0.67 [LID94] Melting Point, °C: -62.3 [KIR78] Boiling Point, °C: 108 [KIR78]

# 1474

**Compound:** Hexaborane(12) **Formula:** B<sub>6</sub>H<sub>12</sub> **Molecular Formula:** B<sub>6</sub>H<sub>12</sub> **Molecular Weight:** 76.961 **CAS RN:** 12008-19-4 **Properties:** col liq [CRC10] **Solubility:** reac H<sub>2</sub>O [CRC10] **Melting Point, °C:** -82.3 [CRC10] **Boiling Point, °C:** ~85 [CRC10]

## 1475

Compound: Hexachlorodisilane
Formula: Cl<sub>3</sub>SiSiCl<sub>3</sub>
Molecular Formula: Cl<sub>6</sub>Si<sub>2</sub>
Molecular Weight: 268.89
CAS RN: 13465-77-5
Properties: colorless liq; precursor to substituted disilanes [ALD94] [CRC10]
Density, g/cm<sup>3</sup>: 1.562 [ALD94]
Melting Point, °C: -1 [CRC10]
Boiling Point, °C: 144–145.5 [ALD94]

#### 1476

Compound: Hexadecaborane(20) Formula:  $B_{16}H_{20}$ Molecular Formula:  $B_{16}H_{20}$ Molecular Weight: 193.135 CAS RN: 28265-11-4 Properties: col cryst [CRC10] Solubility: s cyhex, thf [CRC10] Melting Point, °C: ~110 [CRC10]

#### 1477

Compound: Hexafluorophosphoric acid Formula: HPF<sub>6</sub> Molecular Formula: F<sub>6</sub>HP Molecular Weight: 145.972 CAS RN: 16940-81-1 Properties: clear liq; fumes due to evolving HF; forms a hexahydrate [KIR78] [STR93] Density, g/cm<sup>3</sup>: 1.651 [ALD94]

#### 1478

Compound: Holmium Formula: Ho Molecular Formula: Ho Molecular Weight: 164.93032 CAS RN: 7440-60-0 Properties: cryst solid, has metallic luster; hex; forms yellow-green salts; sensitive to air and moisture;

yellow-green salts; sensitive to air and moisture; electrical resistivity (20°C) 94µohm · cm; enthalpy of fusion 11.76 kJ/mol; enthalpy of sublimation 300.8 kJ/mol; atom radius 0.17661 nm; radius of Ho<sup>+++</sup> ion 0.0894 nm, has yellow colored solutions; used as a getter in vacuum tubes, applications to electrochemical and spectrochemical research [HAW93] [MER06] [KIR82] [CRC10] [ALD94] Solubility: reacts slowly with H₂O, s dil acids [HAW93] Density, g/cm<sup>3</sup>: 8.7947 [KIR82] Melting Point, °C: 1470 [ALD94] Boiling Point, °C: 2700 [ALD94] Thermal Conductivity, W/(m⋅K): 16.2 (25°C) [CRC10] Thermal Expansion Coefficient: 11.2×10<sup>-6</sup>/K [CRC10]

#### 1479

**Compound:** Holmium acetate monohydrate **Formula:**  $Ho(CH_3COO)_3 \cdot H_2O$  **Molecular Formula:**  $C_6H_{11}HoO_7$  **Molecular Weight:** 360.079 **CAS RN:** 25519-09-9 **Properties:** peach powd [STR93]

#### 1480

Compound: Holmium bromide Formula: HoBr<sub>3</sub> Molecular Formula: Br<sub>3</sub>Ho Molecular Weight: 404.642 CAS RN: 13825-76-8 Properties: -20 mesh with 99.9% purity; off-white powd; hygr [CER91] [STR93] Melting Point, °C: 914 [MER06] Boiling Point, °C: 1470 [STR93]

# 1481

**Compound:** Holmium carbonate hydrate **Formula:** Ho<sub>2</sub>(CO<sub>3</sub>)<sub>3</sub> · xH<sub>2</sub>O **Molecular Formula:** C<sub>3</sub>Ho<sub>2</sub>O<sub>9</sub> (anhydrous) **Molecular Weight:** 509.888 (anhydrous) **CAS RN:** 38245-34-0 **Properties:** white powd; hygr [STR93] [ALD94]

## 1482

Compound: Holmium chloride Formula: HoCl<sub>3</sub> Molecular Formula: Cl<sub>3</sub>Ho Molecular Weight: 271.288 CAS RN: 10138-62-2 Properties: -20 mesh with 99.9% purity; off-white powd; bright yellow solid; hygr [HAW93] [CER91] [MER06] [STR93] Solubility: s H<sub>2</sub>O [HAW93] Melting Point, °C: 718 [MER06] Boiling Point, °C: 1500 [HAW93]

#### 1483

**Compound:** Holmium chloride hexahydrate **Formula:**  $HoCl_3 \cdot 6H_2O$  Molecular Formula: Cl<sub>3</sub>H<sub>12</sub>HoO<sub>6</sub> Molecular Weight: 379.380 CAS RN: 14914-84-2 Properties: -4 mesh with 99.9% purity; off-white cryst [CER91] [STR93] Melting Point, °C: 718 [AES93]

#### 1484

Compound: Holmium fluoride
Formula: HoF<sub>3</sub>
Molecular Formula: F<sub>3</sub>Ho
Molecular Weight: 221.925
CAS RN: 13760-78-6
Properties: bright yellow solid or 99.9% pure melted pieces of 3–6 mm; hygr; melted pieces used as evaporation material for possible application in multilayers [STR93] [HAW93] [CER91]
Solubility: s H<sub>2</sub>O [HAW93]
Density, g/cm<sup>3</sup>: 7.644 [STR93]
Melting Point, °C: 1143 [STR93]
Boiling Point, °C: >2200 [STR93]

#### 1485

**Compound:** Holmium hydride **Formula:** HoH<sub>2-3</sub> **Molecular Formula:** H<sub>2</sub>Ho; H<sub>3</sub>Ho **Molecular Weight:** H<sub>2</sub>Ho: 166.946; H<sub>3</sub>Ho: 167.954 **CAS RN:** 13598-41-9 **Properties:** -60 mesh with 99.9% purity [CER91]

#### 1486

Compound: Holmium iodide Formula: HoI<sub>3</sub> Molecular Formula: HoI<sub>3</sub> Molecular Weight: 545.643 CAS RN: 13813-41-7 Properties: -20 mesh with 99.9% purity; light yellow solid [CER91] [MER06] Melting Point, °C: 1010 [MER06] Boiling Point, °C: 1300 [CRC10]

#### 1487

**Compound:** Holmium nitrate pentahydrate **Formula:**  $Ho(NO_3)_3 \cdot 5H_2O$ **Molecular Formula:**  $H_{10}HoN_3O_{14}$ **Molecular Weight:** 441.022 **CAS RN:** 14483-18-2 **Properties:** orange cryst; hygr [STR93]

#### 1488

**Compound:** Holmium nitride **Formula:** HoN
Molecular Formula: HoN Molecular Weight: 178.937 CAS RN: 12029-81-1 Properties: cub; -60 mesh with 99.9% purity [LID94] [CER91] Density, g/cm<sup>3</sup>: 10.6 [LID94]

#### 1489

**Compound:** Holmium oxalate decahydrate **Formula:**  $Ho_2(C_2O_4)_3 \cdot 10H_2O$  **Molecular Formula:**  $C_6H_{20}Ho_2O_{22}$  **Molecular Weight:** 774.072 **CAS RN:** 28965-57-3 **Properties:** off-white powd [STR93] **Reactions:** minus H<sub>2</sub>O, 40°C [AES93]

#### 1490

Compound: Holmium oxide
Synonym: holmia
Formula: Ho<sub>2</sub>O<sub>3</sub>
Molecular Formula: Ho<sub>2</sub>O<sub>3</sub>
Molecular Weight: 377.859
CAS RN: 12055-62-8
Properties: light yellow solid; sl hygr; used in refractories and as a special catalyst, and as an evaporated film of 99.9% purity, it is reactive to radio frequencies [HAW93] [CER91]
Solubility: s inorganic acids [HAW93]
Density, g/cm<sup>3</sup>: 8.36 [STR93]
Melting Point, °C: 2415 [LID94]

#### 1491

**Compound:** Holmium perchlorate hexahydrate **Formula:**  $Ho(ClO_4)_3 \cdot 6H_2O$ **Molecular Formula:**  $Cl_3H_{12}HoO_{18}$ **Molecular Weight:** 571.373 **CAS RN:** 14017-54-0 **Properties:** cryst; hygr [STR93]

#### 1492

Compound: Holmium silicide Formula: HoSi<sub>2</sub> Molecular Formula: HoSi<sub>2</sub> Molecular Weight: 221.101 CAS RN: 12136-24-2 Properties: hex; 10 mm and down lump, 6 mm pieces and smaller with 99.9% purity [ALF93] [LID94] [CER91] Density, g/cm<sup>3</sup>: 7.1 [LID94]

#### 1493

Compound: Holmium sulfate octahydrate Formula:  $Ho_2(SO_4)_3 \cdot 8H_2O$ Molecular Formula:  $H_{16}Ho_2O_{20}S_3$ Molecular Weight: 762.174 CAS RN: 13473-57-9 Properties: hygr cryst [AES93] [ALD94] Solubility: g/100 g H<sub>2</sub>O: 8.18 (20°C), 6.71 (25°C), 4.52 (40°C) [LAN05]

# 1494

Compound: Holmium sulfide Formula: Ho<sub>2</sub>S<sub>3</sub> Molecular Formula: Ho<sub>2</sub>S<sub>3</sub> Molecular Weight: 426.059 CAS RN: 12162-59-3 Properties: monocl; –200 mesh with 99.9% purity [LID94] [CER91] Density, g/cm<sup>3</sup>: 5.92 [LID94]

# 1495

**Compound:** Holmium telluride **Formula:** Ho<sub>2</sub>Te<sub>3</sub> **Molecular Formula:** Ho<sub>2</sub>Te<sub>3</sub> **Molecular Weight:** 712.661 **CAS RN:** 12162-61-7 **Properties:** -20 mesh with 99.9% purity [CER91]

#### 1496

**Compound:** Holmium boride **Synonym:** holmium tetraboride **Formula:** HoB<sub>4</sub> **Molecular Formula:** B<sub>4</sub>Ho **Molecular Weight:** 208.174 **CAS RN:** 12045-77-1 **Properties:** -100 mesh of 99.9% purity [CER91]

#### 1497

Compound: Hydrazine Formula: H<sub>2</sub>NNH<sub>2</sub> Molecular Formula: H<sub>4</sub>N<sub>2</sub> Molecular Weight: 32.045 CAS RN: 302-01-2 Properties: colorless, oily liq, fuming in air; burns with violet flame; N–N distance 0.146 nm; vapo

with violet flame; N–N distance 0.146 nm; vapor pressure 14.38 mm (25°C); viscosity 0.009 dyne s/cm<sup>2</sup> (25°C); surface tension 66.67 dyne/cm (25°C); dielectric constant 58.5 (0°C); enthalpy of vaporization 41.8 kJ/mol; enthalpy of fusion 12.60 kJ/mol [CRC10] [MER06] [CIC73]

Solubility: miscible with H<sub>2</sub>O and the following alcohols: methyl, ethyl, propyl, isobutyl [MER06]
Density, g/cm<sup>3</sup>: liq: 1.00; solid: 1.146 (-5°C) [CIC73]
Melting Point, °C: 1.4 [CRC10]
Boiling Point, °C: 113.55 [CRC10]
Reactions: good reducing agent [MER06]

## 1498

Compound: Hydrazine acetate Formula:  $H_2NNH_2 \cdot (CH_3COOH)$ Molecular Formula:  $C_2H_8N_2O_2$ Molecular Weight: 92.098 CAS RN: 13255-48-6 Melting Point, °C: 100–102 [ALD94]

#### 1499

**Compound:** Hydrazine azide **Formula:**  $N_2H_4 \cdot HN_3$  **Molecular Formula:**  $H_5N_5$  **Molecular Weight:** 75.074 **CAS RN:** 14662-04-5 **Properties:** white; deliq prism [CRC10] **Solubility:** v s  $H_2O$  [CRC10] **Melting Point,** °C: explodes at 75.4 [CIC73]

#### 1500

Compound: Hydrazine dihydrochloride Formula:  $N_2H_4 \cdot 2HCl$ Molecular Formula:  $Cl_2H_6N_2$ Molecular Weight: 104.966 CAS RN: 5341-61-7 Properties: white, cryst powd; ortho-rhomb, a = 1.249 nm, b = 2.185 nm, c = 0.441 nm [CIC73] [MER06] Solubility: 27.2 g/100 g H<sub>2</sub>O (32°C) [CIC73]; sl s alcohol [HAW93] Density, g/cm<sup>3</sup>: 1.42 [CIC73] Melting Point, °C: 198 (minus HCl) [CIC73] Boiling Point, °C: decomposes at 200 [CIC73]

#### 1501

Compound: Hydrazine dinitrate Formula:  $N_2H_4 \cdot 2HNO_3$ Molecular Formula:  $H_6N_4O_6$ Molecular Weight: 158.071 CAS RN: 13464-98-7 Properties: needles [LAN05] Solubility: 20.2 g/100 g H<sub>2</sub>O (35°C) [CIC73] Melting Point, °C: 104 [LAN05] Boiling Point, °C: decomposes [LAN05] Reactions: decomposes quickly at 104°C, slowly at 80°C [CIC73]

#### 1502

**Compound:** Hydrazine hydrate **Formula:**  $H_2NNH_2 \cdot xH_2O$ **Molecular Formula:**  $H_4N_2$  (anhydrous) **Molecular Weight:** 32.048 (anhydrous) **CAS RN:** 10217-52-4 **Properties:**  $x\sim$ 1.5 [ALD94] **Density, g/cm<sup>3</sup>:** 1.029 [ALD94] **Melting Point, °C:** 95 [ALD94]

#### 1503

Compound: Hydrazine monohydrate Formula:  $N_2H_4 \cdot H_2O$ Molecular Formula:  $H_6N_2O$ Molecular Weight: 50.060 CAS RN: 7803-57-8 Properties: fuming refractive liq; trig, a=0.4873 nm, c=1.094 nm [CIC73] [MER06] Solubility: miscible with  $H_2O$ , alcohol; i chloroform, ether [MER06] Density, g/cm<sup>3</sup>: 1.0305 [CIC73] Melting Point, °C: -51.7 [CIC73] Boiling Point, °C: 118.5 [CIC73] Reactions: reducing agent [MER06]

#### 1504

Compound: Hydrazine monohydrobromide Formula:  $N_2H_4 \cdot HBr$ Molecular Formula:  $BrH_5N_2$ Molecular Weight: 112.957 CAS RN: 13775-80-9 Properties: white, cryst flakes; used in soldering flux; monocl, a = 1.285 nm, b = 0.454 nm, c = 1.194 nm [CIC73] [HAW93] Solubility: s H<sub>2</sub>O, lower alcohols; i most organic solvents [HAW93] Density, g/cm<sup>3</sup>: 2.3 [LID94] Melting Point, °C: 81–87 [HAW93] Boiling Point, °C: decomposes at ~190 [HAW93]

#### 1505

Compound: Hydrazine monohydrochloride Formula:  $N_2H_4 \cdot HCl$ Molecular Formula:  $ClH_5N_2$ Molecular Weight: 68.506 CAS RN: 2644-70-4 Properties: white, cryst flakes; ortho-rhomb, a=1.249 nm, b=2.185 nm, c=0.441 nm [CIC73] Solubility: 37 g/100 g H<sub>2</sub>O (20°C); i most organic solvents [HAW93] Density, g/cm<sup>3</sup>: 1.5 [LID94] Melting Point, °C: 89 [CIC73] Boiling Point, °C: decomposes at 240 [CIC73]

## 1506

**Compound:** Hydrazine monohydroiodide **Formula:**  $N_2H_4 \cdot HI$ **Molecular Formula:**  $H_5IN_2$ **Molecular Weight:** 159.957 **CAS RN:** 10039-55-1 **Properties:** colorless prism [CRC10] **Solubility:** s  $H_2O$  [CIC73] **Melting Point, °C:** 125 [CIC73]

#### 1507

Compound: Hydrazine mononitrate Formula:  $N_2H_4 \cdot HNO_3$ Molecular Formula:  $H_5N_3O_3$ Molecular Weight: 95.058 CAS RN: 37836-27-4 Properties: colorless needles; explosive;  $\alpha$ ,  $\beta$ forms; monocl, a = 1.123 nm, b = 1.173 nm, c = 0.517 nm [HAW93] [CIC73] [CRC10] Solubility: 327 g/100 g H<sub>2</sub>O (25°C) [CIC73]; g/100 g H<sub>2</sub>O: 175 (10°C), 266 (20°C), 2127 (60°C) [LAN05] Melting Point, °C:  $\alpha$ : 70.71;  $\beta$ : 62.09 [CIC73] Boiling Point, °C: sublimes at 140 [CRC10]

#### 1508

Compound: Hydrazine monooxalate Formula:  $2N_2H_4 \cdot H_2C_2O_4$ Molecular Formula:  $C_2H_{10}N_4O_4$ Molecular Weight: 154.13 CAS RN: 108249-27-0 Properties: monocl, a=0.3580 nm, b=0.3321 nm, c=0.5097 nm [CIC73] Solubility: 200 g/100 mL H<sub>2</sub>O (15°C) [CRC10] Melting Point, °C: 148 [CRC10]

#### 1509

Compound: Hydrazine perchlorate hemihydrate
Formula: N<sub>2</sub>H<sub>4</sub> · HClO<sub>4</sub> · 1/2H<sub>2</sub>O
Molecular Formula: ClH<sub>6</sub>N<sub>2</sub>O<sub>4.5</sub>
Molecular Weight: 141.511
CAS RN: 13762-65-7
Properties: solid; used as a rocket propellant [HAW93]
Solubility: decomposes in H<sub>2</sub>O; s alcohol; i ether, benzene, chloroform, carbon disulfide [HAW93]
Density, g/cm<sup>3</sup>: 1.939 [CIC73]
Melting Point, °C: 137 [HAW93]
Boiling Point, °C: 145 [HAW93]
Reactions: can explode [CRC10]

## 1510

Compound: Hydrazine sulfate Formula:  $N_2H_4 \cdot H_2SO_4$ Molecular Formula:  $H_6N_2O_4S$ Molecular Weight: 130.125 CAS RN: 10034-93-2 Properties: glass-like plates or prisms; orthorhomb cryst, a=0.8251 nm, b=0.9159 nm, c=0.5532 nm [MER06] [CIC73] Solubility: 3.415 g/100 g H\_2O (25°C) [CIC73]; g/100 g H\_2O: 2.87 (20°C), 4.15 (40°C), 14.39 (80°C) [LAN05] Density, g/cm<sup>3</sup>: 1.378 [MER06] Melting Point, °C: 254 [CIC73]

## 1511

Compound: Hydrazoic acid Synonym: hydrogen azide Formula: HN<sub>3</sub> Molecular Formula: HN<sub>3</sub> Molecular Weight: 43.028 CAS RN: 7782-79-8 Properties: colorless, volatile liq; intolerable pungent odor; highly explosive; enthalpy of vaporization 30.5 kJ/mol [CRC10] [MER06] [HAW93] Solubility: v s H<sub>2</sub>O [HAW93] Density, g/cm<sup>3</sup>: 1.092 [CRC10] Melting Point, °C: -80 [MER06] Boiling Point, °C: 35.7 [CRC10]

# 1512

Compound: Hydrofluoric acid, 70%
Formula: HF
Molecular Formula: HF
Molecular Weight: 20.006
CAS RN: 7664-39-3
Properties: colorless, fuming, mobile liq; solid phase is HF ⋅ H<sub>2</sub>O at freezing point; specific conductivity 0.79 (ohm ⋅ cm)<sup>-1</sup> at 0°C; attacks glass, silica; manufactured by reacting fluorspar with sulfuric acid to form calcium sulfate and HF(gas); used in aluminum production, acidizing oil wells, gasoline production [HAW93] [KIR78]
Density, g/cm<sup>3</sup>: 1.22 [KIR78]
Melting Point, °C: -69 [KIR78]
Boiling Point, °C: 66.4 [KIR78]

## 1513

**Compound:** Hydrogen Formula: H<sub>2</sub> Molecular Formula: H<sub>2</sub>

## **Molecular Weight:** 2.016 (at wt 1.00794) **CAS RN:** 1333-74-0

Properties: colorless, odorless, tasteless, diatomic gas; flammable or explosive when mixed with air, oxygen, chlorine; critical temp –239.96°C; critical pressure 1315 kPa; critical volume 66.949 cm<sup>3</sup>/mol; enthalpy of vaporization 0.898 kJ/mol; enthalpy of fusion 0.12 kJ/mol; velocity of sound (0°C) 1246 m/s; viscosity (0°C) 0.00843 mPa · s; dielectric constant at bp 1.231, 1.000271 at 0°C [MER06] [CRC10]

**Solubility:** s in about 50 vols H<sub>2</sub>O (0°C) [MER06] **Density, g/cm<sup>3</sup>:** 0.088 g/L [LID94] **Melting Point, °C:** -259.34 [CRC10]

- Boiling Point, °C: –252.87 [CRC10]
- Thermal Conductivity, W/(m·K): liq: at bp: 0.10; at triple point: 0.074; gas: 0.1739 [KIR80]

# 1514

Compound: Hydrogen-d<sub>2</sub> Formula: D<sub>2</sub> Molecular Formula: D<sub>2</sub> Molecular Weight: 4.028 CAS RN: 7782-39-0 Properties: col gas [CRC10] Density, g/L: 0.164 [CRC10] Melting Point, °C: -254.42 [CRC10] Boiling Point, °C: -249.48 [CRC10]

#### 1515

Compound: Hydrogen-t<sub>2</sub> Formula: T<sub>2</sub> Molecular Formula: T<sub>3</sub> Molecular Weight: 6.032 CAS RN: 10028-17-8 Properties: col gas [CRC10] Density, g/L: 0.246 [CRC10] Melting Point, °C: -252.53 [CRC10] Boiling Point, °C: -248.11 [CRC10]

#### 1516

Compound: Hydrogen-d<sub>1</sub> Formula: HD Molecular Formula: DH Molecular Weight: 3.022 CAS RN: 13983-20-5 Properties: col gas [CRC10] Density, g/L: 0.123 [CRC10] Melting Point, °C: -256.55 [CRC10] Boiling Point, °C: -251.02

#### 1517

Compound: Hydrogen-t<sub>1</sub> Formula: HT Molecular Formula: HT Molecular Weight: 4.024 CAS RN: 14885-60-0 Properties: col gas [CRC10] Melting Point, °C: -254.7 [CRC10] Boiling Point, °C: -249.6 [CRC10]

# 1518

Compound: Hydrogen- $d_1$ , $t_1$ Formula: DT Molecular Formula: DT Molecular Weight: 5.030 CAS RN: 14885-61-1 Properties: col gas [CRC10] Melting Point, °C: -252.5 [CRC10] Boiling Point, °C: -238.9 [CRC10]

## 1519

Compound: Hydrogen bromide-d Formula: DBr Molecular Formula: BrD Molecular Weight: 81.918 CAS RN: 13536-59-9 Properties: col gas [CRC10] Solubility: s H<sub>2</sub>O [CRC10] Melting Point, °C: -87.54 [CRC10] Boiling Point, °C: -66.9 [CRC10]

#### 1520

Compound: Hydrogen bromide Formula: HBr Molecular Formula: BrH Molecular Weight: 80.912 CAS RN: 10035-10-6 Properties: colorless, corrosive, nonflammable gas; fumes in moist air; specific conductance  $1.4 \times 10^{-10}$  (ohm  $\cdot$  cm)<sup>-1</sup> at  $-84^{\circ}$ C; dielectric constant 7.33 at -84°C; enthalpy of vaporization (25°C) 12.69 kJ/mol; enthalpy of fusion 2.41 kJ/mol [CRC10] [MER06] [COT88] Solubility: g/100 g H<sub>2</sub>O: 221.2 (0°C), 204.0 (15°C), 171.5 (50°C), 130.0 (100°C) [LAN05]; s alcohol [HAW93] Density, g/cm3: 3.55 g/L [LID94] Melting Point, °C: -86.81 [CRC10] Boiling Point, °C: -66.38 [CRC10]

Compound: Hydrogen chloride Formula: HCl Molecular Formula: ClH

Molecular Weight: 36.461

# CAS RN: 7647-01-0

- Properties: colorless gas; fumes in air; suffocating odor; enthalpy of fusion 2.00 kJ/mol; enthalpy of vaporization 16.15 kJ/mol; triple point  $-114.25^{\circ}$ C; critical temp 54.4°C; critical pressure 8.316 MPa; critical volume 0.069 L/mol; critical density 424 g/L; dielectric constant liq: 14.2 (10°C), gas: 1.0046 (25°C); specific conductance 3.5 × 10<sup>-9</sup> (-85°C) [KIR80] [MER06] [COT88] [CRC10] Solubility: g/100 g H<sub>2</sub>O: 82.3 (0°C); 67.3 (30°C); 56.1 (60°C) [MER06] Density, g/cm<sup>3</sup>: 1.268 (air = 1.000) [MER06] Melting Point, °C: -114.18 [CRC10] Boiling Point, °C: -85 [CRC10]
- **Thermal Conductivity, W/(m⋅K):** liq: (−154.99°C) 3.35; vapor: (0°C) 1.34 [KIR80]

#### 1522

**Compound:** Hydrogen chloride-d **Formula:** DCl **Molecular Formula:** ClD **Molecular Weight:** 37.467 **CAS RN:** 7698-05-7 **Properties:** col gas [CRC10] **Solubility:** s H<sub>2</sub>O [CRC10] **Melting Point,** °C: -114.72 [CRC10] **Boiling Point,** °C: -84.4 [CRC10]

# 1523

**Compound:** Hydrogen chloride dihydrate **Formula:** HCl·2H<sub>2</sub>O **Molecular Formula:** ClH<sub>5</sub>O<sub>2</sub> **Molecular Weight:** 72.492 **CAS RN:** 13465-05-9 **Properties:** col liq [CRC10] **Density, gm/cm<sup>3</sup>:** 1.46 [CRC10] **Melting Point, °C:** -17.7 [CRC10]

## 1524

Compound: Hydrogen cyanide Synonyms: hydrocyanic acid, prussic acid Formula: HCN Molecular Formula: CHN Molecular Weight: 27.026 CAS RN: 74-90-8 Properties: colorless gas or liq; burns in air with blue flame; weakly acidic solutions; critical pressure 55 atm; critical temp 183.5°C; viscosity at 20°C 0.00201 dyne s/cm<sup>2</sup>; dielectric constant at 15.6°C is 123; enthalpy of fusion 8.41 kJ/mol [CIC73] [MER06] [CRC10]
Solubility: miscible with H<sub>2</sub>O, alcohol; sl s ether [MER06]
Density, g/cm<sup>3</sup>: gas: 0.941 (air = 1); liq: 0.687 [MER06]
Melting Point, °C: -13.4 [MER06]
Boiling Point, °C: 25.6 [MER06]

#### 1525

**Compound:** Hydrogen disulfide **Formula:** H<sub>2</sub>S<sub>2</sub> **Molecular Formula:** H<sub>2</sub>S<sub>2</sub> **Molecular Weight:** 66.146 **CAS RN:** 13465-07-1 **Properties:** col liq [CRC10] **Density, g/cm<sup>3</sup>:** 1.334 [CRC10] **Boiling Point, °C:** 70.7 [CRC10]

# 1526

Compound: Hydrogen fluoride Formula: HF Molecular Formula: FH Molecular Weight: 20.006 CAS RN: 7664-39-3 Properties: colorless liq or gas; fumes in air; irritating, corrosive, and poisonous; vapor pressure 122.9 MPa at 25°C; enthalpy of vaporization 7493 J/mol; enthalpy of fusion 4.58 kJ/mol; critical temp 188°C; critical pressure 6.480 MPa; critical density 0.29 g/cm<sup>3</sup>; viscosity 0.25 mPa · s at 0°C; dielectric constant 83.6 at 0°C; specific conductance  $1.6 \times 10^{-6} (\text{ohm} \cdot \text{cm})^{-1}$ at 0°C [KIR78] [MER06] [COT88] [CRC10] Solubility: v s H<sub>2</sub>O, alcohol; sl s ether, other organic solvents [MER06] Density, g/cm<sup>3</sup>: liq: 0.9576 (25°C) [KIR78] Melting Point, °C: -83.36 [CRC10] Boiling Point, °C: 19.51 [MER06]

#### 1527

**Compound:** Hydrogen hexachloroiridate(IV) hydrate **Synonym:** chloroiridic acid **Formula:**  $H_2IrCl_6 \cdot xH_2O$ **Molecular Formula:**  $Cl_6H_2Ir$  (anhydrous) **Molecular Weight:** 406.952 (anhydrous) **CAS RN:** 110802-84-1 **Properties:** black cryst; hygr [STR93]

**Compound:** Hydrogen hexachloroplatinate(IV) **Synonym:** platinic acid **Formula:** H<sub>2</sub>PtCl<sub>6</sub> **Molecular Formula:** Cl<sub>6</sub>H<sub>2</sub>Pt **Molecular Weight:** 409.812 **CAS RN:** 16941-12-1 **Properties:** color red to brown; liq [KIR82] [ALF95] **Solubility:** v s H<sub>2</sub>O, alcohol [KIR82]

## 1529

Compound: Hydrogen hexachloroplatinate(IV) hexahydrate
Synonym: platinic acid hexahydrate
Formula: H₂PtCl<sub>6</sub>·6H₂O
Molecular Formula: Cl<sub>6</sub>H<sub>14</sub>O<sub>6</sub>Pt
Molecular Weight: 517.903
CAS RN: 16941-12-1
Properties: brownish yellow; very deliq cryst; sensitive to light [MER06]
Solubility: v s H₂O, alcohol [MER06]
Density, g/cm<sup>3</sup>: 2.431 [MER06]
Melting Point, °C: 60 [MER06]

# 1530

Compound: Hydrogen hexafluorosilicic acid Formula: H<sub>2</sub>SiF<sub>6</sub> Molecular Formula: F<sub>6</sub>H<sub>2</sub>Si Molecular Weight: 144.092 CAS RN: 16961-83-4 Properties: aq solution: colorless fuming liq; attacks glass and stoneware; produced as a byproduct

of the reaction between  $H_2SO_4$  and phosphate rocks, which contain fluorides and silica; used to fluoridate water, to increase the hardness of ceramics, and in electroplating [HAW93]

Density, g/cm<sup>3</sup>: 1.22 [ALD94]

# 1531

Compound: Hydrogen hexahydroxyplatinate(IV) Formula: H<sub>2</sub>Pt(OH)<sub>6</sub> Molecular Formula: H<sub>8</sub>O<sub>6</sub>Pt Molecular Weight: 299.15 CAS RN: 51850-20-5 Properties: yellow needles; hygr [ALD94] Reactions: minus 2H<sub>2</sub>O at 100; minus 3H<sub>2</sub>O at 120°C [CRC10]

#### 1532

**Compound:** Hydrogen iodide **Formula:** HI

Molecular Formula: HI Molecular Weight: 127.912 CAS RN: 10034-85-2 **Properties:** pale yellow or colorless, nonflammable gas; fumes in moist air; decomposed by light; critical temp 150°C; critical pressure 8.3 MPa; dielectric constant 3.57 at -45°C; specific conductance  $8.5 \times 10^{-10}$  (ohm  $\cdot$  cm)<sup>-1</sup> at  $-45^{\circ}$ C; enthalpy of vaporization 19.76 kJ/mol; enthalpy of fusion 2.87 kJ/mol; produced by reaction of  $I_2$  and hydrazine in the presence of  $H_2O$ [KIR81] [MER06] [CRC10] [COT88] Solubility: g/100 g H<sub>2</sub>O: 234 (10°C), 900 (0°C); s organic solvents [MER06] Density, g/cm<sup>3</sup>: gas: 5.23 g/L (25°C); liq:  $2.85 \text{ g/cm}^3$  (-4.7°C) [KIR81] Melting Point, °C: -50.77 [CRC10] Boiling Point, °C: -35.55 [CRC10]

#### 1533

Compound: Hydrogen iodide-d Formula: DI Molecular Formula: DI Molecular Weight: 128.918 CAS RN: 14104-45-1 Properties: col gas [CRC10] Solubility: s H<sub>2</sub>O [CRC10] Melting Point, °C: -51.93 [CRC10] Boiling Point, °C: -36.2 [CRC10]

# 1534

Compound: Hydrogen peroxide Formula: H<sub>2</sub>O<sub>2</sub> Molecular Formula: H<sub>2</sub>O<sub>2</sub> Molecular Weight: 34.015 CAS RN: 7722-84-1 Properties: clear, colorless liq; weakly acidic, dissociation constant  $1.78 \times 10^{-12}$ ; viscosity  $1.245 \text{ mPa} \cdot \text{s} (20^{\circ}\text{C})$ ; surface tension, 80.4 mN/m(20°C); enthalpy of dissociation 34.3 kJ/mol; enthalpy of vaporization 51.6 kJ/g at 25°C; enthalpy of fusion 12.50 kJ/mol; specific conductance  $(25^{\circ}C) 4 \times 10^{-7} \text{ ohm} \cdot \text{cm} [CRC10] [KIR81]$ Solubility: miscible with H<sub>2</sub>O [KIR81] Density, g/cm<sup>3</sup>: 1.443 [KIR81] Melting Point, °C: -0.43 [CRC10] Boiling Point, °C: 150.2 [KIR81]

#### 1535

**Compound:** Hydrogen selenide **Formula:** H<sub>2</sub>Se **Molecular Formula:** H<sub>2</sub>Se

#### Molecular Weight: 80.976

CAS RN: 7783-07-5

Properties: colorless gas with disagreeable odor; flammable; toxic; liquefies at 0°C under
6.6 atm pressure; thermodynamically unstable at room temp, but rate of decomposition is slow; reducing agent; enthalpy of vaporization 19.7 kJ/mol; can be prepared by adding HCl to ferrous selenide [KIR82] [MER06] [CRC10]
Solubility: mL/100 mL H<sub>2</sub>O: 377 (4°C), 270 (22.5°C)

[MER06]; mL/l00 g H<sub>2</sub>O at standard temp, pressure: 386 (0°C), 351 (10°C), 289 (20°C) [LAN05]

**Density, g/cm<sup>3</sup>:** 3.553 g/L [LID94];

(-42°C) 2.12 [MER06]

Melting Point, °C: -65.73 [MER06]

**Boiling Point, °C:** -41.3 [KIR82]

**Reactions:** reacts directly with most metals to form highly insoluble selenides [MER06]

1536

Compound: Hydrogen sulfide Formula: H<sub>2</sub>S Molecular Formula: H<sub>2</sub>S Molecular Weight: 34.082 CAS RN: 7783-06-4 Properties: colorless, flammable gas with characteristic rotten egg odor; burns in air

with blue flame; critical temp 100.5°C; critical pressure 9.02 MPa; enthalpy of vaporization 18.67 kJ/mol; enthalpy of fusion 23.80 kJ/ mol [CRC10] [AIR87] [HAW93] [MER06] **Solubility:** 1 g dissolves in H<sub>2</sub>O: 187 mL (10°C), 242 mL (20°C), 314 (30°C) [MER06] **Density, g/cm<sup>3</sup>:** 1.19 (air = 1) [MER06]

**Melting Point, °C:** –85.49 [MER06] **Boiling Point, °C:** –59.55 [CRC10]

#### 1537

**Compound:** Hydrogen telluride **Formula:** H<sub>2</sub>Te **Molecular Formula:** H<sub>2</sub>Te **Molecular Weight:** 129.616 **CAS RN:** 7783-09-7

Properties: colorless gas with offensive odor, like garlic; 1 L weighs 6.234 g; liq H<sub>2</sub>Te readily decomposed by light; dry gas stable to light, but decomposes in presence of dust; enthalpy of vaporization 19.2 kJ/mol; can be prepared by adding AlTe<sub>3</sub> to water in the absence of air; easily oxidized [KIR83] [MER06] [CRC10]

**Solubility:** s H<sub>2</sub>O, unstable solution; s alcohol and alkalies [HAW93]

Density, g/cm<sup>3</sup>: 5.687 g/L [LID94]; (-12°C) 2.68 [MER06] Melting Point, °C: -49 [MER06] Boiling Point, °C: -2 [MER06]

# 1538

Compound: Hydrogen tetrabromoaurate(III) pentahydrate Formula:  $HAuBr_4 \cdot 5H_2O$ Molecular Formula:  $AuBr_4H_{11}O_5$ Molecular Weight: 607.667 CAS RN: 17083-68-0 Properties: dark reddish brown, needle-shaped cryst or granular masses; odorless; acidic taste [HAW93] Solubility: s H<sub>2</sub>O, alcohol [HAW93] Melting Point, °C: 27 [HAW93]

#### 1539

**Compound:** Hydrogen tetracarbonylferrate(II) **Formula:** H<sub>2</sub>Fe(CO)<sub>4</sub> **Molecular Formula:** C<sub>4</sub>H<sub>2</sub>FeO<sub>4</sub> **Molecular Weight:** 169.903 **CAS RN:** 12002-28-7 **Properties:** colorless cryst [MER06] **Solubility:** s alkalies [MER06] **Melting Point, °C:** -70 [MER06]

#### 1540

Compound: Hydrogen tetrachloroaurate(III) hydrate Formula: HAuCl<sub>4</sub> · xH<sub>2</sub>O Molecular Formula: AuCl<sub>4</sub>H (anhydrous) Molecular Weight: 339.785 (anhydrous) CAS RN: 27988-77-8 Properties: yellowish orange cryst; hygr; sensitive to light [STR93] Melting Point, °C: decomposes [STR93]

#### 1541

Compound: Hydrogen tetrachloroaurate(III) tetrahydrate Formula: HAuCl<sub>4</sub>·4H<sub>2</sub>O Molecular Formula: AuCl<sub>4</sub>H<sub>9</sub>O<sub>4</sub> Molecular Weight: 411.847 CAS RN: 16903-35-8 Properties: golden yellow to reddish yellow; very hygr; deliq; monocl cryst; readily affected by sunlight; there is a trihydrate CAS RN 16961-25-4 [MER06] [ALD94]

Solubility: v s H<sub>2</sub>O, alcohol; s ether [MER06]

**Density, g/cm<sup>3</sup>:** ~3.9 [MER06] **Reactions:** decomposes if strongly heated forming Cl<sub>2</sub>, HCl, Au [MER06]

# 1542

Compound: Hydroxylamine Formula: H<sub>2</sub>NOH **Molecular Formula:** H<sub>3</sub>NO Molecular Weight: 33.030 CAS RN: 7803-49-8 Properties: unstable, large, white flakes or needles; ortho-rhomb, a=0.729 nm, b=0.439 nm, c = 0.488 nm; very hygr; vapor pressure 5.3 mm (32°C), 400 mm (99.2°C); dielectric constant 77.63-77.85; used as a reducing agent in photography [CIC73] [MER06] **Solubility:** v s H<sub>2</sub>O, methanol; decomposed by hot H<sub>2</sub>O [MER06] Density, g/cm<sup>3</sup>: liq: 1.204 (33°C) [CIC73] Melting Point, °C: 32.05 [CIC73] **Boiling Point, °C:** 56–57 (22 mm) [CIC73]

# 1543

Compound: Hydroxylamine hydrobromide Formula:  $H_2NOH \cdot HBr$ Molecular Formula:  $BrH_4NO$ Molecular Weight: 113.942 CAS RN: 41591-55-3 Properties: monocl, a=0.729 nm, b=0.613 nm, c=0.804 nm [CIC73] Density, g/cm<sup>3</sup>: 2.3514 [CIC73]

## 1544

Compound: Hydroxylamine hydrochloride Formula:  $H_2NOH \cdot HCl$ Molecular Formula:  $ClH_4NO$ Molecular Weight: 69.491 CAS RN: 5470-11-1 Properties: colorless; monocl, a=0.695 nm, b=0.595 nm, c=0.770 nm [CIC73] [CRC10] Solubility: 94.4 g/100 g  $H_2O$  (25°C) [CIC73] Density, g/cm<sup>3</sup>: 1.680 [CIC73] Melting Point, °C: decomposes at 152 [CIC73]

# 1545

**Compound:** Hydroxylamine perchlorate **Formula:**  $H_2NOH \cdot HClO_4$  **Molecular Formula:**  $ClH_4NO_5$  **Molecular Weight:** 133.489 **CAS RN:** 15598-62-2 **Properties:** ortho-rhomb, a=0.752 nm, b=0.714 nm, c= 1.599 nm [CIC73] Melting Point, °C: 88–89 [CIC73] Boiling Point, °C: decomposes at 120 [CIC73]

# 1546

Compound: Hydroxylamine sulfate Formula:  $(H_2NOH)_2 \cdot H_2SO_4$ Molecular Formula:  $H_8N_2O_6S$ Molecular Weight: 164.139 CAS RN: 10039-54-0 Properties: colorless, monocl cryst [CRC10] Solubility: 32.9 g/100 mL H<sub>2</sub>O (0°C), 68.5 g/100 mL (20°C) [CRC10] Melting Point, °C: decomposes at 170 [CIC73]

# 1547

Compound: Hypobromous acid Formula: HOBr Molecular Formula: BrHO Molecular Weight: 96.911 CAS RN: 13517-11-8 Properties: stable only in solution, produced by the hydrolysis of bromine chloride; used as a bactericide and a disinfectant [HAW93] Solubility: s H<sub>2</sub>O, decomposed by hot H<sub>2</sub>O [CRC10]

#### 1548

Compound: Hypochlorous acid Formula: HOCl Molecular Formula: ClHO Molecular Weight: 52.460 CAS RN: 7790-92-3 Properties: greenish yellow; can exist only in aq solution;

very unstable weak acid, which decomposes to HCl and oxygen; used in bleaching textiles and fibers, in water purification, and as an antiseptic [HAW93]

#### 1549

Compound: Hypophosphoric acid Formula:  $H_4O_6P_2$ Molecular Formula:  $H_4O_6P_2$ Molecular Weight: 161.976 CAS RN: 7803-60-3 Properties: plate-like cryst; available commercially as a water solution; readily forms hydrates; conc solution decomposes; used in baking powd in the form of the sodium salt [HAW93] Melting Point, °C: decomposes at 73 [LID94]

# 1550

**Compound:** Hypophosphorous acid **Synonym:** phosphinic acid

# **Formula:** H<sub>3</sub>PO<sub>2</sub> **Molecular Formula:** H<sub>3</sub>O<sub>2</sub>P **Molecular Weight:** 65.997

CAS RN: 6303-21-5

Properties: colorless, oily liq or deliq cryst; sour odor; reducing agent; enthalpy of fusion 9.70 kJ/ mol; strong monobasic acid; sold in the form of a solution; can be prepared by heating baryta water with white phosphorus, followed by treatment with H<sub>2</sub>SO<sub>4</sub> and filtering; used in electroplating baths [HAW93] [CRC10] Density, g/cm<sup>3</sup>: 1.439 [HAW93]

Melting Point, °C: 26.5 [HAW93] Boiling Point, °C: decomposes at 130 [CRC10]

#### 1551

Compound: Indium Formula: In Molecular Formula: In Molecular Weight: 114.818 CAS RN: 7440-74-6

Properties: soft, white metal with bluish tinge; ductile; quite stable in air; hardness 1.2 Mohs; tetr, a=0.5979 nm, c=0.49467 nm; enthalpy of fusion 3.28 kJ/mol; enthalpy of vaporization 55.57 kJ/mol; electrical resistivity (22°C) 8.8 μohm · cm; tensile strength 2.645 MPa; elongation 22%; modulus of elasticity 10.8 GPa; superconductor at 3.38 K; uses: production of bearings and in solder [MER06] [KIR81] [CRC10]
Solubility: i H<sub>2</sub>O; attacked by mineral acids; not attacked by alkalies [MER06]
Density, g/cm<sup>3</sup>: 7.31 [CIC73]
Melting Point, °C: 156.6 [KIR81]
Boiling Point, °C: 2080 [KIR81]

Thermal Conductivity, W/( $\mathbf{m} \cdot \mathbf{K}$ ): 81.8 (25°C) [ALD94] Thermal Expansion Coefficient: linear expansion is  $25 \times 10^{-6}$ /°C from 0°C–100°C [KIR81]

#### 1552

**Compound:** Indium acetate **Formula:** In(CH<sub>3</sub>COO)<sub>3</sub> **Molecular Formula:** C<sub>6</sub>H<sub>9</sub>InO<sub>6</sub> **Molecular Weight:** 291.951 **CAS RN:** 25114-58-3 **Properties:** white, hygr cryst [STR93]

#### 1553

**Compound:** Indium acetylacetonate **Synonyms:** 2,4-pentanedione, indium(III) derivative **Formula:** In(CH<sub>3</sub>COCH=C(O)CH<sub>3</sub>)<sub>3</sub> **Molecular Formula:**  $C_{15}H_{21}InO_6$  Molecular Weight: 412.146 CAS RN: 14405-45-9 Properties: off-white powd [STR93] Melting Point, °C: 180–185 [STR93]

## 1554

Compound: Indium antimonide Formula: InSb Molecular Formula: InSb Molecular Weight: 236.578 CAS RN: 1312-41-0 Properties: 6 mm pieces and smaller (fused) with

99.999% purity; black cryst; semiconductor; band gap, eV, 0.23 (0 K) and 0.17 (300 K); electron mobility 80,000 cm²/(V ⋅ s) and hole mobility 1250 cm²/(V ⋅ s); dielectric constant 17.7; effective mass 0.0145 for electrons and 0.40 for holes; enthalpy of fusion 25.50 kJ/mol [KIR82] [MER06] [STR93] [CER91] [CRC10]
Density, g/cm<sup>3</sup>: 5.7747 [LID94]; liq: 6.48 [MER06]
Melting Point, °C: 525 [CRC10]
Thermal Conductivity, W/(m ⋅ K): 16 [CRC10]
Thermal Expansion Coefficient: 4.7 × 10<sup>-6</sup>/K [CRC10]

#### 1555

Compound: Indium arsenide
Formula: InAs
Molecular Formula: AsIn
Molecular Weight: 189.740
CAS RN: 1303-11-3
Properties: 6 mm pieces and smaller (fused) with 99.999% purity; semiconductor; metallic appearance; band gap, 0.42 (0 K) and 0.36 (300 K); mobility (300 K), cm<sup>2</sup>/(V · s), 33,000 electrons and 460 holes; dielectric constant 14.6; effective mass 0.023 for electrons and 0.40 for holes [KIR82] [MER06] [CER91]
Solubility: i acids [HAW93]
Density, g/cm<sup>3</sup>: 5.67 [LID94]
Melting Point, °C: 943 [MER06]

#### 1556

**Compound:** Indium nitride

Formula: InN

Molecular Formula: InN

Molecular Weight: 128.825

CAS RN: 25617-98-5

**Properties:** -100 mesh with 99.999% purity; wurtzite system, a=0.353 nm, c=0.570 nm; can be prepared by reacting In<sub>2</sub>O<sub>3</sub> with ammonia at high temp; has semiconductor and electroluminescence properties [KIR81] [CIC73] [CER91] Density, g/cm<sup>3</sup>: 6.89 [CIC73] Melting Point, °C: decomposes above 600 [KIR81] Thermal Conductivity, W/(m·K): 55.6 [CRC10]

#### 1557

Compound: Indium phosphide Formula: InP Molecular Formula: InP Molecular Weight: 145.792 CAS RN: 22398-80-7 Properties: black cryst; 6 mm pieces and smaller with

99.999% purity; semiconductor; band gap, eV, 1.42 (0K) and 1.35 (300 K); mobility (300 K), cm<sup>2</sup>/ (V · s), 4600 electrons and 150 holes; dielectric constant 12.4; effective mass 0.077 electrons and 0.64 holes [KIR82] [CER91] [STR93]
Density, g/cm<sup>3</sup>: 4.81 [LID94]

Melting Point, °C: 1070 [AES93]

#### 1558

Compound: Indium(I) bromide
Formula: InBr
Molecular Formula: BrIn
Molecular Weight: 194.722
CAS RN: 14280-53-6
Properties: can be prepared by reacting In with InBr<sub>3</sub> vapor; enthalpy of vaporization 92 kJ/mol [KIR81] [CRC10]
Solubility: reacts in H<sub>2</sub>O to form In and InBr<sub>3</sub> [KIR81]
Density, g/cm<sup>3</sup>: 4.96 [CRC10]
Melting Point, °C: 220 [AES93]
Boiling Point, °C: 656 [CRC10]

## 1559

Compound: Indium(I) chloride
Formula: InCl
Molecular Formula: ClIn
Molecular Weight: 150.271
CAS RN: 13465-10-6
Properties: golden yellow powd; sensitive to atm oxygen and moisture; enthalpy of fusion 17.20 kJ/ mol; can be prepared by passing InCl<sub>3</sub> vapor over In metal [KIR81] [STR93] [CRC10]
Solubility: decomposes in H<sub>2</sub>O to In and InCl<sub>3</sub> [KIR81]
Density, g/cm<sup>3</sup>: 4.19 [STR93]
Melting Point, °C: 225 [CRC10]
Boiling Point, °C: 608 [STR93]

## 1560

**Compound:** Indium(I) iodide **Formula:** InI **Molecular Formula:** IIn Molecular Weight: 241.722 CAS RN: 13966-94-4 Properties: reddish solid; -8 mesh with 99.999% purity; enthalpy of vaporization 90.8 kJ/mol [CRC10] [CER91] Density, g/cm<sup>3</sup>: 5.31 [CRC10] Melting Point, °C: 351 [AES93] Boiling Point, °C: 712 [CRC10]

#### 1561

Compound: Indium(II) bromide Formula: InBr<sub>2</sub> Molecular Formula: Br<sub>2</sub>In Molecular Weight: 274.626 CAS RN: 21264-43-7 Properties: pale yellow solid; preparation: by reduction of InBr<sub>3</sub> with H<sub>2</sub>/HBr mixture [KIR81] [CRC10] Solubility: reacts in H<sub>2</sub>O to form In and InBr<sub>3</sub> [KIR81] Density, g/cm<sup>3</sup>: 4.22 [CRC10] Melting Point, °C: 235 [CRC10] Boiling Point, °C: sublimes at 632 [CRC10]

# 1562

Compound: Indium(II) chloride Formula: InCl<sub>2</sub> Molecular Formula: Cl<sub>2</sub>In Molecular Weight: 185.723 CAS RN: 13465-11-7 Properties: colorless, rhomb cryst; can be prepared by heating indium to 200°C in HCl or by reducing InCl<sub>3</sub> in H<sub>2</sub>/HCl mixture below 600°C [KIR81] [CRC10] Solubility: decomposes in H<sub>2</sub>O to In and InCl<sub>3</sub> [KIR81] Density, g/cm<sup>3</sup>: 3.655 [CRC10] Melting Point, °C: 235 [CRC10] Boiling Point, °C: 550–570 [CRC10]

#### 1563

Compound: Indium(II) sulfide Formula: InS Molecular Formula: InS Molecular Weight: 146.884 CAS RN: 12030-14-7 Properties: red-brown solid, -100 mesh with 99.999% purity [CER91] [KIR81] Density, g/cm<sup>3</sup>: 5.18 [CRC10] Melting Point, °C: 692 [CRC10] Boiling Point, °C: sublimes at 850 in vacuum [CRC10]

# 1564

**Compound:** Indium(III) bromide **Formula:** InBr<sub>3</sub> Molecular Formula: Br<sub>3</sub>In Molecular Weight: 354.530 CAS RN: 13465-09-3 Properties: -60 mesh with 99.999% purity; white to light yellow powd; hygr [STR93] [CER91] Density, g/cm<sup>3</sup>: 4.74 [STR93] Melting Point, °C: ~436 [STR93]

#### 1565

Compound: Indium(III) chloride Synonym: indium trichloride Formula: InCl<sub>3</sub> Molecular Formula: Cl<sub>3</sub>In Molecular Weight: 221.176 CAS RN: 10025-82-8 Properties: sublimed flakes with 99.999% purity; tan to yellowish, deliq cryst; can be made by

heating indium in presence of excess Cl<sub>2</sub>; used in electroplating baths; has high vapor pressure [KIR81] [HAW93] [MER06] [CER91]
Solubility: v s H<sub>2</sub>O [MER06]; s alcohol [HAW93]
Density, g/cm<sup>3</sup>: 4.0 [MER06]; 3.46 [HAW93]
Melting Point, °C: 586 [MER06]
Boiling Point, °C: sublimes at 600 [CRC10]

#### 1566

**Compound:** Indium(III) chloride tetrahydrate **Formula:** InCl<sub>3</sub>·4H<sub>2</sub>O **Molecular Formula:** Cl<sub>3</sub>H<sub>8</sub>InO<sub>4</sub> **Molecular Weight:** 293.238 **CAS RN:** 22519-64-8 **Properties:** white cryst [STR93]

#### 1567

Compound: Indium(III) fluoride Synonym: indium trifluoride Formula:  $InF_3$ Molecular Formula:  $F_3In$ Molecular Weight: 171.813 CAS RN: 7783-52-0 Properties: -40 mesh with 99.999% purity; white powd; hygr; stable in hot and cold  $H_2O$  [STR93] [MER06] [CER91] Solubility: 0.04 g/200 mL  $H_2O$  (25°C); v s dil acids [MER06] Density, g/cm<sup>3</sup>: 4.39 [MER06] Melting Point, °C: 1170 [MER06] Boiling Point, °C: >1200 [MER06]

#### 1568

**Compound:** Indium(III) fluoride trihydrate **Synonym:** indium trifluoride trihydrate

Formula:  $InF_3 \cdot 3H_2O$ Molecular Formula:  $F_3H_6InO_3$ Molecular Weight: 225.859 CAS RN: 14166-78-0 Properties: white cryst [STR93] Solubility: 8.49 g/100 mL H<sub>2</sub>O (22°C) [MER06] Melting Point, °C: decomposes at 100 [STR93]

#### 1569

Compound: Indium(III) hydroxide Formula: In(OH)<sub>3</sub> Molecular Formula: H<sub>3</sub>InO<sub>3</sub> Molecular Weight: 165.840 CAS RN: 20661-21-6 Properties: yellow-white powd; -100 mesh with 99.999% purity [AES93] [CER91] Density, g/cm<sup>3</sup>: 4.4 [LID94] Reactions: minus H<sub>2</sub>O at 150°C [AES93]

#### 1570

Compound: Indium(III) iodide Formula: InI<sub>3</sub> Molecular Formula: I<sub>3</sub>In Molecular Weight: 495.531 CAS RN: 13510-35-5 Properties: -40 mesh with 99.999% purity; yellow-red solid; hygr [STR93] [CER91] Density, g/cm<sup>3</sup>: 4.69 [STR93] Melting Point, °C: 210 [STR93]

# 1571

Compound: Indium(III) nitrate trihydrate
Formula: In(NO<sub>3</sub>)<sub>3</sub> · 3H<sub>2</sub>O
Molecular Formula: H<sub>6</sub>InN<sub>3</sub>O<sub>12</sub>
Molecular Weight: 354.879
CAS RN: 13770-61-1
Properties: -80 mesh with 99.999% purity; can be prepared by dissolving In or the oxide in nitric acid [CER91] [KIR81]
Solubility: v s [KIR81]
Melting Point, °C: decomposes [AES93]
Reactions: minus 2H<sub>2</sub>O at 100°C [KIR81]

#### 1572

**Compound:** Indium(III) oxide **Formula:** In<sub>2</sub>O<sub>3</sub> **Molecular Formula:** In<sub>2</sub>O<sub>3</sub> **Molecular Weight:** 277.634 **CAS RN:** 1312-43-2 **Properties:** white to pale yellow powd in both amorphous and cryst forms; turns red brown if heated; volatilizes at 850°C; can be prepared by heating indium in air or by calcining indium carbonate; forms In<sub>2</sub>O, 12030-22-7 and InO, 12136-26-4, if carefully reduced; used to impart yellow color to glass, as an evaporated film of 99.999% purity provides protective coating for metal minors, and as a sputtering target for transparent conductive films in electro-optical displays [KIR82] [MER06]

**Solubility:** i H<sub>2</sub>O; s hot mineral acids [MER06] **Density, g/cm<sup>3</sup>:** 7.179 [HAW93] **Melting Point, °C:** ~2000 [LID94]

# 1573

**Compound:** Indium(III) perchlorate octahydrate **Formula:**  $In(ClO_4)_3 \cdot 8H_2O$  **Molecular Formula:**  $Cl_3H_{16}InO_{20}$  **Molecular Weight:** 557.291 **CAS RN:** 13465-15-1 **Properties:** white cryst [STR93] **Melting Point, °C:** ~80 [STR93] **Boiling Point, °C:** decomposes at 200 [STR93]

# 1574

Compound: Indium(III) phosphate
Formula: InPO<sub>4</sub>
Molecular Formula: InO<sub>4</sub>P
Molecular Weight: 209.789
CAS RN: 14693-82-4
Properties: prepared by adding phosphate solution to an indium solution [KIR81]
Solubility: i H<sub>2</sub>O [KIR81]
Density, g/cm<sup>3</sup>: 4.9 [LID94]

#### 1575

Compound: Indium(III) selenide
Formula: In<sub>2</sub>Se<sub>3</sub>
Molecular Formula: In<sub>2</sub>Se<sub>3</sub>
Molecular Weight: 466.516
CAS RN: 12056-07-4
Properties: black cryst; ortho-rhomb; used in the form of 99.999% pure material as a sputtering target for production of semiconductors [MER06] [CER91]
Density, g/cm<sup>3</sup>: 5.67 [ALD94]
Melting Point, °C: 660 [MER06]

## 1576

**Compound:** Indium(III) sulfate **Formula:** In<sub>2</sub>(SO<sub>4</sub>)<sub>3</sub> Molecular Formula: In<sub>2</sub>O<sub>12</sub>S<sub>3</sub>
Molecular Weight: 517.827
CAS RN: 13464-82-9
Properties: -80 mesh with 99.999% purity; grayish deliq powd; decomposed by heat; formed by dissolution of In or In oxides in warm sulfuric acid [KIR81] [HAW93] [CER91]
Solubility: s H<sub>2</sub>O [MER06]
Density, g/cm<sup>3</sup>: 3.438 [HAW93]
Melting Point, °C: decomposes at 600 [AES93]

# 1577

Compound: Indium(III) sulfide Formula: In<sub>2</sub>S<sub>3</sub> Molecular Formula: In<sub>2</sub>S<sub>3</sub> Molecular Weight: 325.834 CAS RN: 12030-24-9 Properties: -200 mesh with 99.999% purity; orange powd; preparation is by heating In and S or by precipitating with H<sub>2</sub>S from weakly acidic solutions [KIR81] [STR93] [CER91] Density, g/cm<sup>3</sup>: 4.45 [STR93] Melting Point, °C: 1050 [STR93]

## 1578

Compound: Indium(III) telluride Formula: In<sub>2</sub>Te<sub>3</sub> Molecular Formula: In<sub>2</sub>Te<sub>3</sub> Molecular Weight: 612.436 CAS RN: 1312-45-4 Properties: 6 mm pieces and smaller with 99.999% purity; black or gray cryst; used in semiconductor technology [HAW93] [STR93] [CER91] Density, g/cm<sup>3</sup>: (x-ray) 5.798 [MER06] Melting Point, °C: 667 [MER06]

## 1579

Compound: Iodic acid Formula: HIO<sub>3</sub> Molecular Formula: HIO<sub>3</sub> Molecular Weight: 175.910 CAS RN: 7782-68-5 Properties: colorless, rhomb cryst or white, cryst powd; darkens on exposure to light; it is a moderately strong acid; used in analytical chemistry and in medicine [HAW93] [MER06] Solubility: g/mL H<sub>2</sub>O: 269 (20°C), 295 (40°C); i alcohol, ether [MER06]; 310 g/100 g H<sub>2</sub>O [KIR81] Density, g/cm<sup>3</sup>: 4.629 [MER06] Melting Point, °C: 110, with decomposition [MER06]

**Reactions:** decomposes to I<sub>2</sub>O<sub>5</sub> at 220°C [MER06]

**Compound:** Iodine Formula: I<sub>2</sub> Molecular Formula: I<sub>2</sub>

**Molecular Weight:** 253.809 (atomic wt 126.90447) **CAS RN:** 7553-56-2

Properties: heavy, bluish black scales or plates; rhomb; metallic luster; a=0.47761 nm, b=0.72501 nm, c = 0.97711 nm; readily sublimes to a violet, corrosive vapor; dielectric constant (23°C) 10.3; enthalpy of fusion 15.52 kJ/mol; enthalpy of sublimation (113.6°C) 238.24 J/g; enthalpy of vaporization 41.57 kJ/mol; electrical resistivity (25°C)  $5.85 \times 10^{+6}$ ohm · cm; used in aniline dyes, antiseptics, feed and food additives [HAW93] [MER06] [KIR81] [CRC10] **Solubility:** g/100 g H<sub>2</sub>O: 0.014 (0°C), 0.029 (20°C), 0.445 (100°C) [LAN05]; s benzene, CCl<sub>4</sub>, alcohol, glycerol, ether, CS<sub>2</sub> and alkaline iodide solutions [HAW93] Density, g/cm3: solid 4.940; liq (120°C) 3.960 [KIR81] Melting Point, °C: 113.60 [MER06] Boiling Point, °C: 185.25 [CRC10] Thermal Conductivity, W/(m·K): 0.421 (24.4°C) [KIR81] Thermal Expansion Coefficient: cub coefficient

is 2.81×10<sup>-4</sup>/°C (0°C–113.6°C) [KIR81]

# 1581

Compound: Iodine bromide Formula: IBr Molecular Formula: BrI Molecular Weight: 206.808 CAS RN: 7789-33-5 Properties: black ortho cryst [CRC10] Solubility: s H<sub>2</sub>O, EtOH, eth [CRC10] Density, g/cm<sup>3</sup>: 4.3 [CRC10] Melting Point, °C: 40 [CRC10] Boiling Point, °C: decomposes at 116 [CRC10]

#### 1582

Compound: Iodine chloride Formula: ICl Molecular Formula: ClI Molecular Weight: 162.357 CAS RN: 7790-99-0 Properties: red cryst or oily liq [CRC10] Density, g/cm<sup>3</sup>: 3.24 [CRC10] Melting Point, °C: 27.38 [CRC10] Boiling Point, °C: decomposes at 94.4 [CRC10]

# 1583

**Compound:** Iodine cyanide **Synonym:** cyanogen iodide

Formula: ICN
Molecular Formula: CIN
Molecular Weight: 152.922
CAS RN: 506-78-5
Properties: colorless needles; very pungent odor and acrid taste; used in taxidermists' preservatives [HAW93]
Solubility: s H<sub>2</sub>O, alcohol, ether [HAW93]
Density, g/cm<sup>3</sup>: 1.84 [HAW93]
Melting Point, °C: 146.5 [HAW93]

# 1584

Compound: Iodine dioxide Formula: IO<sub>2</sub> Molecular Formula: IO<sub>2</sub> Molecular Weight: 158.903 CAS RN: 13494-92-3 Properties: lemon yellow cryst [KIR82] Density, g/cm<sup>3</sup>: 4.2 [KIR81] Reactions: decomposes at 85°C [KIR81]

#### 1585

Compound: Iodine fluoride Formula: IF Molecular Formula: FI Molecular Weight: 145.902 CAS RN: 13873-84-2 Properties: white powd (-78°C) [CRC10] Melting Point, °C: -14 [CRC10]

#### 1586

Compound: Iodine heptafluoride
Formula: IF<sub>7</sub>
Molecular Formula: F<sub>7</sub>I
Molecular Weight: 259.893
CAS RN: 16921-96-3
Properties: colorless liq; enthalpy of vaporization 24.7 kJ/mol; specific conductivity 10<sup>-9</sup> ohm ⋅ cm [KIR78] [MER06]
Solubility: s H<sub>2</sub>O with some decomposition [MER06]
Density, g/cm<sup>3</sup>: 2.669 [KIR78]
Melting Point, °C: 6.45 [MER06]
Boiling Point, °C: sublimes at 4.77 [MER06]

#### 1587

**Compound:** Iodine hexoxide **Formula:** I<sub>2</sub>O<sub>6</sub> **Molecular Formula:** I<sub>2</sub>O<sub>6</sub> **Molecular Weight:** 349.805 **CAS RN:** 65355-99-9 **Properties:** yellow solid [CRC10] **Solubility:** reac H<sub>2</sub>O [CRC10] **Melting Point, °C:** decomposes at 150 [CRC10]

# 1588

Compound: Iodine monobromide
Formula: IBr
Molecular Formula: BrI
Molecular Weight: 206.808
CAS RN: 7789-33-5
Properties: brownish black cryst or very hard solid; uses: organic synthesis [HAW93] [MER06]
Solubility: s H<sub>2</sub>O, alcohol, ether, CS<sub>2</sub>, glacial acetic acid [MER06]
Density, g/cm<sup>3</sup>: 4.416 [MER06]
Melting Point, °C: 40 [MER06]
Boiling Point, °C: 116, decomposes [MER06]

#### 1589

Compound: Iodine monochloride Formula: ICl Molecular Formula: ClI Molecular Weight: 162.357 CAS RN: 7790-99-0

Properties: reddish brown oily liq; viscosity at 35°C is 1.21 cSt; electrical conductivity 4.60×10<sup>-3</sup> at 35°C; enthalpy of vaporization 256.4 kJ/kg; enthalpy of fusion 11.60 kJ/mol; readily supercooled; polar solvent; best prepared by direct reaction between I<sub>2</sub> and liq Cl<sub>2</sub>; used in analytical chemistry and in organic synthesis [KIR81] [CRC10] [HAW93]
Solubility: s in H<sub>2</sub>O (decomposes), alcohol, dil HC1 [HAW93]
Density, g/cm<sup>3</sup>: 3.24 (liq at 34°C) [HAW93]
Melting Point, °C: 27.38 [CRC10]
Boiling Point, °C: decomposes at 101 [HAW93]

#### 1590

**Compound:** Iodine nonoxide **Formula:** I<sub>4</sub>O<sub>9</sub> **Molecular Formula:** I<sub>4</sub>O<sub>9</sub> **Molecular Weight:** 651.613 **CAS RN:** 73560-00-6 **Properties:** yellow hygr powd [KIR81] **Reactions:** decomposes at 75°C [KIR81]

# 1591

**Compound:** Iodine pentafluoride **Formula:** IF<sub>5</sub> **Molecular Formula:** F<sub>5</sub>I **Molecular Weight:** 221.896 **CAS RN:** 7783-66-6 Properties: fuming straw-colored liq; critical temp 300.7°C; critical pressure 5.16 MPa; enthalpy of vaporization 41.3 kJ/mol; enthalpy of fusion 11.21 kJ/mol; specific conductivity 5.4×10<sup>-6</sup> ohm·cm; attacks glass; used as a fluorinating and incendiary agent [KIR78] [HAW93] [AIR87] [CRC10]
Solubility: reacts violently with H<sub>2</sub>O [HAW93]
Density, g/cm<sup>3</sup>: 3.19 [MER06]
Melting Point, °C: 9.43 [MER06]
Boiling Point, °C: 100.5 [MER06]

## 1592

Compound: Iodine pentoxide Synonym: iodine(V) oxide Formula: I<sub>2</sub>O<sub>5</sub> Molecular Formula: I<sub>2</sub>O<sub>5</sub> Molecular Weight: 333.806 CAS RN: 12029-98-0 Properties: -80 mesh with 99.9% purity; white, cryst powd; oxidizing agent, used in organic synthesis; oxidizes CO to CO<sub>2</sub> at ordinary temperatures; can be prepared by dehydration of iodic acid [KIR81] [HAW93] [CER91] Solubility: s H<sub>2</sub>O, HNO<sub>3</sub>; i absolute alcohol, ether, CS<sub>2</sub> [HAW93] Density, g/cm<sup>3</sup>: 4.980 [KIR81] Melting Point, °C: decomposes at 300–350 [STR93]

# 1593

**Compound:** Iodine tetroxide **Formula:**  $I_2O_4$  **Molecular Formula:**  $I_2O_4$  **Molecular Weight:** 317.807 **CAS RN:** 12399-08-5 **Properties:** yellow cryst [CRC10] **Solubility:** sl H<sub>2</sub>O **Density,** g/cm<sup>3</sup>: 4.2 [CRC10] **Melting Point,** °C: 130 [CRC10] **Boiling Point,** °C: decomposes at >85 [CRC10]

#### 1594

**Compound:** Iodine trichloride **Formula:** ICl<sub>3</sub> **Molecular Formula:** Cl<sub>3</sub>I **Molecular Weight:** 233.262 **CAS RN:** 865-44-1

**Properties:** yellowish orange; deliq cryst powd; pungent irritating odor; electrical conductivity  $8.60 \times 10^{-3}$  at 102°C; can be formed by adding iodine to liq chlorine; used to introduce iodine and chlorine in organic synthesis, used as a topical antiseptic [HAW93] [KIR81] Solubility: decomposes in H<sub>2</sub>O; s alcohol, benzene [HAW93]
Density, g/cm<sup>3</sup>: 3.111 [KIR81]
Melting Point, °C: 33 [HAW93]
Reactions: decomposes at 65°C [KIR81]

#### 1595

Compound: Iodine trifluoride Formula: IF<sub>3</sub> Molecular Formula: F<sub>3</sub>I Molecular Weight: 183.899 CAS RN: 22520-96-3 Properties: yellow solid; stable at low temp [CRC10] Melting Point, °C: -28 [CRC10]

#### 1596

**Compound:** Iodosyl pentafluoride **Formula:**  $IOF_5$ **Molecular Formula:**  $F_5IO$ **Molecular Weight:** 237.895 **CAS RN:** 16056-61-4 **Properties:** col liq [CRC10] **Melting Point, °C:** 4.5 [CRC10]

## 1597

Compound: Iodosyl trifluoride Formula: IOF<sub>3</sub> Molecular Formula: F<sub>3</sub>IO Molecular Weight: 199.898 CAS RN: 19058-78-7 Properties: hygr col needles [CRC10] Solubility: reac H<sub>2</sub>O [CRC10] Melting Point, °C: decomposes at >110 [CRC10]

#### 1598

**Compound:** Iodogermane **Formula:** GeH<sub>3</sub>I **Molecular Formula:** GeH<sub>3</sub>I **Molecular Weight:** 202.57 **CAS RN:** 13573-02-9 **Properties:** liq [CRC10] **Solubility:** reac H<sub>2</sub>O [CRC10] **Melting Point,** °C: ~90 [CRC10]

#### 1599

**Compound:** Iodyl trifluoride **Formula:**  $IO_2F_3$ **Molecular Formula:**  $F_3IO_2$ **Molecular Weight:** 215.898 **CAS RN:** 25402-50-0 Properties: yellow solid [CRC10] Melting Point, °C: 41 [CRC10] Boiling Point, °C: sublimes [CRC10]

# 1600

Compound: Iridium Formula: Ir Molecular Formula: Ir Molecular Weight: 192.217 CAS RN: 7439-88-5 Properties: silver white metal; most corrosion resistant of the elements; cub, a=0.384 nm; hardness 6.5 Mohs; Poisson's ratio 0.26; not attacked by acids, including aqua regia; attacked by fluorine, chlorine at red heat; modulus of elasticity is 75,000,000 psi, one of the highest; enthalpy of fusion 41.12 kJ/ mol; enthalpy of vaporization, 231.84 kJ/mol; electrical resistivity at 20°C, 4.71 µohm · cm [HAW93] [MER06] [KIR82] [CRC10] [ALD94] Solubility: s slowly in aqua regia and in fused alkalies [HAW93] **Density, g/cm<sup>3</sup>:** 22.65, highest of any element [MER06] Melting Point, °C: 2410 [ALD94] Boiling Point, °C: 4130 [ALD94] Thermal Conductivity, W/(m·K): 147 (25°C) [ALD94] **Thermal Expansion Coefficient:** 6.4×10<sup>-6</sup>/K [CRC10]

# 1601

**Compound:** Iridium carbonyl **Synonym:** tetrairidium dodecacarbonyl **Formula:**  $Ir_4(CO)_{12}$  **Molecular Formula:**  $C_{12}Ir_4O_{12}$  **Molecular Weight:** 1104.993 **CAS RN:** 11065-24-0 **Properties:** yellow powd; stable in air [DOU83] [STR93] **Melting Point, °C:** decomposes at 230 [STR93]

#### 1602

Compound: Iridium hexafluoride Formula:  $IrF_6$ Molecular Formula:  $F_6Ir$ Molecular Weight: 306.207 CAS RN: 7783-75-7 Properties: golden yellow; cub; very hygr; enthalpy of vaporization 36 kJ/mol; enthalpy of fusion 8.40 kJ/mol [MER06] [CRC10] Solubility: decomposes in H<sub>2</sub>O [MER06] Density, g/cm<sup>3</sup>: 4.8 [LID94] Melting Point, °C: 44 [CRC10] Boiling Point, °C: 53 [MER06] Reactions: volatilized by slow heating; reduced to IrF<sub>4</sub> by halogens [MER06]

**Compound:** Iridium pentafluoride **Formula:** (IrF<sub>5</sub>)<sub>4</sub> **Molecular Formula:** F<sub>20</sub>Ir<sub>4</sub> **Molecular Weight:** 1148.836 **CAS RN:** 14568-19-5 **Properties:** tetramer [KIR82]

## 1604

**Compound:** Iridium(I) chlorotricarbonyl **Synonym:** chlorotricarbonyliridium(I) **Formula:** [IrCl(CO)<sub>3</sub>]n **Molecular Formula:** C<sub>3</sub>ClIrO<sub>3</sub> (n = 1) **Molecular Weight:** 311.701 (n = 1) **CAS RN:** 32594-40-4 **Properties:** brown powd [STR93] **Melting Point, °C:** decomposes at 235 [STR93]

# 1605

**Compound:** Iridium(III) acetylacetonate **Synonyms:** 2,4-pentanedione, Ir(III) derivative **Formula:** Ir[CH<sub>3</sub>COCH=C(O)CH<sub>3</sub>]<sub>3</sub> **Molecular Formula:** C<sub>15</sub>H<sub>21</sub>IrO<sub>6</sub> **Molecular Weight:** 489.550 **CAS RN:** 15635-87-7 **Properties:** orange-yellow cryst [CRC10] **Melting Point, °C:** 269–271 [ALD94]

#### 1606

Compound: Ir(III) bromide Formula: IrBr<sub>3</sub> Molecular Formula: Br<sub>3</sub>Ir Molecular Weight: 431.929 CAS RN: 10049-24-8 Properties: red-brown monocl [CRC10] Solubility: i H<sub>2</sub>O, acid, alk [CRC10] Density, g/cm<sup>3</sup>: 6.82 [CRC10]

# 1607

Compound: Iridium(III) bromide tetrahydrate
Synonym: iridium tribromide tetrahydrate
Formula: IrBr<sub>3</sub> · 4H<sub>2</sub>O
Molecular Formula: Br<sub>3</sub>H<sub>8</sub>IrO<sub>4</sub>
Molecular Weight: 503.991
CAS RN: 10049-24-8
Properties: olive green, brown or black cryst [HAW93]
Solubility: s H<sub>2</sub>O; i alcohol [HAW93]
Reactions: minus 3H<sub>2</sub>O at 100°C [AES93]

#### 1608

Compound: Iridium(III) chloride
Synonym: iridium trichloride
Formula: IrCl<sub>3</sub>
Molecular Formula: Cl<sub>3</sub>Ir
Molecular Weight: 298.575
CAS RN: 10025-83-9
Properties: -8 mesh with 99.5% purity; α-IrCl<sub>3</sub>: brown, monocl cryst; β-IrCl<sub>3</sub>: red, orthorhomb cryst [MER06] [CER91]
Solubility: i H<sub>2</sub>O, acids, alkalies [MER06]
Density, g/cm<sup>3</sup>: 5.30 [STR93]
Melting Point, °C: decomposes at 763 [MER06]

# 1609

**Compound:** Iridium(III) chloride hydrate **Formula:** IrCl<sub>3</sub> · xH<sub>2</sub>O **Molecular Formula:** Cl<sub>3</sub>Ir (anhydrous) **Molecular Weight:** 298.575 (anhydrous) **CAS RN:** 14996-61-3 **Properties:** black cryst [STR93]

#### 1610

**Compound:** Iridium(III) fluoride **Formula:**  $IrF_3$  **Molecular Formula:**  $F_3Ir$  **Molecular Weight:** 249.212 **CAS RN:** 23370-59-4 **Properties:** black hex cryst [CRC10] **Solubility:** i H<sub>2</sub>O, dil acid [CRC10] **Density, g/cm<sup>3</sup>:** ~8.0 [CRC10] **Melting Point, °C:** decomposes at 250 [CRC10]

## 1611

**Compound:** Iridium(III) iodide **Formula:** IrI<sub>3</sub> **Molecular Formula:** I<sub>3</sub>Ir **Molecular Weight:** 572.930 **CAS RN:** 7790-41-2 **Properties:** dark brown monocl cryst [CRC10] **Solubility:** i H<sub>2</sub>O, acid, bz, chl; s alk [CRC10] **Density, g/cm<sup>3</sup>:** ~7.4 [CRC10]

## 1612

**Compound:** Iridium(III) oxide **Synonym:** iridium trioxide **Formula:** Ir<sub>2</sub>O<sub>3</sub> **Molecular Formula:** Ir<sub>2</sub>O<sub>3</sub> **Molecular Weight:** 432.432 **CAS RN:** 1312-46-5 Properties: bluish black powd [MER06]
Solubility: i H<sub>2</sub>O; slowly dissolves in boiling HCl [MER06]
Reactions: minus O at 400°C; oxidized to IrO<sub>2</sub> by HNO<sub>3</sub> [MER06] [CRC10]

## 1613

**Compound:** Iridium(III) sulfide **Formula:** Ir<sub>2</sub>S<sub>3</sub> **Molecular Formula:** Ir<sub>2</sub>S<sub>3</sub> **Molecular Weight:** 480.629 **CAS RN:** 12136-42-4 **Properties:** ortho cryst [CRC10] **Density, g/cm<sup>3</sup>:** 10.2 [CRC10]

#### 1614

Compound: Iridium(IV) oxide Formula: IrO<sub>2</sub> Molecular Formula: IrO<sub>2</sub> Molecular Weight: 224.216 CAS RN: 12030-49-8 Properties: -325 mesh 10μm or less with 99.9% purity; brown powd [STR93] [CER91] Density, g/cm<sup>3</sup>: 11.66 [STR93] Melting Point, °C: decomposes at 1100 [STR93]

#### 1615

Compound: Iron Formula: Fe Molecular Formula: Fe Molecular Weight: 55.845 CAS RN: 7439-89-6

Properties: cub; silver-white or gray; soft, ductile; somewhat magnetic; tensile strength 30,000 psi; Brinell hardness 82-100; electrical resistivity  $(20^{\circ}C)$  9.71 µohm · cm; magnetic permeability 88,400 gauss (25°C); tensile strength 245–280 MPa; yield strength 70-140 MPa; enthalpy of fusion 13.81 kJ/mol; enthalpy of vaporization 340 kJ/ mol; reducing agent; oxidizes readily in moist air; elongation in 5 cm at 20°C is 40%–60% [MER06] [KIR81] [CRC10] [ALD94] Solubility: s HCl, H<sub>2</sub>SO<sub>4</sub>, dil HNO<sub>3</sub> [HAW93] Density, g/cm<sup>3</sup>: 7.86 [MER06] Melting Point, °C: 1535 [MER06] Boiling Point, °C: 2861 [LID94] **Reactions:** reacts with steam to produce hydrogen gas [HAW93] Thermal Conductivity, W/(m·K): 80.4 (25°C) [ALD94] Thermal Expansion Coefficient: (volume) 100°C (0.326), 200°C (0.747), 400°C (1.645), 800°C (3.523), 1200°C (2.986) [CLA66]

#### 1616

Compound: Iron antimonide Formula: Fe<sub>3</sub>Sb<sub>2</sub> Molecular Formula: Fe<sub>3</sub>Sb<sub>2</sub> Molecular Weight: 411.055 CAS RN: 39356-80-4 Properties: 6 mm pieces and smaller with 99.5% purity [CER91]

# 1617

Compound: Iron arsenide Formula: FeAs Molecular Formula: AsFe Molecular Weight: 130.767 CAS RN: 12044-16-5 Properties: white; 6 mm pieces and smaller with 99.5% purity; there are two other arsenides: Fe<sub>2</sub>As, 12005-88-8, and FeAs<sub>2</sub>, 12006-21-2 [CER91] [CRC10] Solubility: v sl s H<sub>2</sub>O [CRC10] Density, g/cm<sup>3</sup>: 7.83 [CRC10] Melting Point, °C: 1020 [CRC10]

# 1618

Compound: Iron boride Formula: FeB Molecular Formula: BFe Molecular Weight: 66.656 CAS RN: 12006-84-7 Properties: gray cryst; –35 mesh with 99% purity; refractory material [KIR78] [CER91] [CRC10] Density, g/cm<sup>3</sup>: 7.15 [ALF93] Melting Point, °C: ~1550 [KIR78]

## 1619

Compound: Iron boride Formula: Fe<sub>2</sub>B Molecular Formula: BFe<sub>2</sub> Molecular Weight: 122.501 CAS RN: 12006-85-8 Properties: -35 mesh with 99% purity; refractory material [KIR78] [CER91]

# 1620

**Compound:** Iron carbide **Formula:** Fe<sub>3</sub>C **Molecular Formula:** CFe<sub>3</sub> **Molecular Weight:** 179.546 **CAS RN:** 12011-67-5 **Properties:** gray cub cryst [CRC10] **Density, g/cm<sup>3</sup>:** 7.694 [CRC10] **Melting Point, °C:** 1227 [CRC10]

Compound: Iron disilicide Formula: FeSi<sub>2</sub> Molecular Formula: FeSi<sub>2</sub> Molecular Weight: 112.016 CAS RN: 12022-99-0 Properties: tetr, gray powd [LID94] [STR93] Density, g/cm<sup>3</sup>: 4.75 [STR93] Melting Point, °C: 1220 [STR93]

#### 1622

Compound: Iron disulfide Synonym: pyrite Formula: FeS<sub>2</sub> Molecular Formula: FeS<sub>2</sub> Molecular Weight: 119.967 CAS RN: 1317-66-4 Properties: black cub powd [LID94] [STR93] Density, g/cm<sup>3</sup>: 5.02 [LID94] Melting Point, °C: 1171 [AES93] Thermal Expansion Coefficient: (volume) 100°C (0.219), 200°C (0.529), 400°C (1.291) [CLA66]

# 1623

Compound: Iron dodecacarbonyl Formula: Fe<sub>3</sub>(CO)<sub>12</sub> Molecular Formula: C<sub>12</sub>Fe<sub>3</sub>O<sub>12</sub> Molecular Weight: 503.660 CAS RN: 12088-65-2 Properties: stabilized with 5%–10% methanol; black cryst; sensitive to air [STR93] Density, g/cm<sup>3</sup>: 2.00 [STR93] Melting Point, °C: 140 [STR93]

# 1624

**Compound:** Iron molybdate **Formula:** FeMoO<sub>4</sub> **Molecular Formula:** FeMoO<sub>4</sub> **Molecular Weight:** 215.783 **CAS RN:** 13718-70-2 **Properties:** dark brown, yellow; monocl [KIR81] **Solubility:** 0.0076 g/100 g H<sub>2</sub>O [KIR78] **Density, g/cm<sup>3</sup>:** 5.6 [LID94] **Melting Point, °C:** 1115 [LID94]

#### 1625

**Compound:** Iron nonacarbonyl **Formula:** Fe<sub>2</sub>(CO)<sub>9</sub> **Molecular Formula:** C<sub>9</sub>Fe<sub>2</sub>O<sub>9</sub> **Molecular Weight:** 363.784 CAS RN: 15321-51-4 Properties: orange yellow cryst; sensitive to air [STR93] Density, g/cm<sup>3</sup>: 2.85 [STR93] Melting Point, °C: decomposes at 100 [STR93]

#### 1626

Compound: iron pentacarbonyl
Formula: Fe(CO)<sub>5</sub>
Molecular Formula: C<sub>3</sub>FeO<sub>5</sub>
Molecular Weight: 195.897
CAS RN: 13463-40-6
Properties: colorless to yellow, oily liq; decomposed by light to Fe<sub>2</sub>(CO)<sub>9</sub> and CO; burns in air; used as a catalyst in organic reactions [HAW93] [MER06]
Solubility: i H<sub>2</sub>O; s ether, benzene, acetone, CCl<sub>4</sub> [MER06]
Density, g/cm<sup>3</sup>: 1.490 [STR93]
Melting Point, °C: -20 [MER06]
Boiling Point, °C: 103 [MER06]

## 1627

**Compound:** Iron phosphide **Formula:** Fe<sub>2</sub>P **Molecular Formula:** Fe<sub>2</sub>P **Molecular Weight:** 142.664 **CAS RN:** 1310-43-6 **Properties:** gray hex needles [CRC10] **Solubility:** i H<sub>2</sub>O, dil acid, alk [CRC10] **Density, g/cm<sup>3</sup>:** 6.8 [CRC10] **Melting Point, °C:** 1370 [CRC10]

# 1628

**Compound:** Iron phosphide **Formula:** Fe<sub>3</sub>P **Molecular Formula:** Fe<sub>3</sub>P **Molecular Weight:** 198.509 **CAS RN:** 12023-53-9 **Properties:** gray solid [CRC10] **Solubility:** i H<sub>2</sub>O [CRC10] **Density, g/cm<sup>3</sup>:** 6.74 [CRC10] **Melting Point, °C:** 1100 [CRC10]

#### 1629

Compound: Iron phosphide Formula: FeP Molecular Formula: FeP Molecular Weight: 86.819 CAS RN: 26508-33-8 Properties: rhom cryst [CRC10] Density, g/cm<sup>3</sup>: 6.07 [CRC10]

Compound: Iron silicide Formula: FeSi Molecular Formula: FeSi Molecular Weight: 83.931 CAS RN: 12022-95-6 Properties: -20 mesh gray powd [ALF93] Density, g/cm<sup>3</sup>: 6.1 [CRC10] Melting Point, °C: 1410 [ALF93]

## 1631

Compound: Iron telluride Formula: FeTe Molecular Formula: FeTe Molecular Weight: 183.445 CAS RN: 12125-63-2 Properties: tetr; 6 mm pieces and smaller with 99.5% purity; there is also a FeTe<sub>2</sub>, 12023-03-9 [LID94] [CER91] Density, g/cm<sup>3</sup>: 6.8 [LID94] Melting Point, °C: 914 [LID94]

# 1632

Compound: Iron tungstate Synonym: ferberite Formula: FeWO<sub>4</sub> Molecular Formula: FeO<sub>4</sub>W Molecular Weight: 303.683 CAS RN: 13870-24-1 Properties: tetr; -200 mesh will 99.5% purity [CRC10] [CER91] Density, g/cm<sup>3</sup>: 6.64 [CRC10]

# 1633

Compound: Iron zirconate Formula: Fe<sub>2</sub>O<sub>3</sub>·ZrO<sub>2</sub> Molecular Formula: Fe<sub>2</sub>O<sub>5</sub>Zr Molecular Weight: 282.911 CAS RN: 52933-62-7 Properties: reacted product, -200 mesh with 99.7% purity [CER91]

# 1634

**Compound:** Iron(II) aluminate **Formula:** Fe(AlO<sub>2</sub>)<sub>2</sub> **Molecular Formula:** Al<sub>2</sub>FeO<sub>4</sub> **Molecular Weight:** 173.806 **CAS RN:** 12068-49-4 **Properties:** black cub cryst [CRC10] **Density, g/cm<sup>3</sup>:** 4.3 [CRC10]

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#### 1635

Compound: Iron(II) arsenate Formula:  $Fe_3(AsO_4)_2$ Molecular Formula:  $As_2Fe_3O_8$ Molecular Weight: 445.373 CAS RN: 10102-50-8 Properties: green powd [CRC10] Solubility: i H<sub>2</sub>O

# 1636

**Compound:** Iron(II) nitrate **Formula:**  $Fe(NO_3)_2$  **Molecular Formula:**  $FeN_2O_6$  **Molecular Weight:** 179.854 **CAS RN:** 14013-86-6 **Properties:** green solid [CRC10] **Solubility:** g/100 g H<sub>2</sub>O: 87.5<sup>25</sup> [CRC10]

## 1637

**Compound:** Iron(II) orthosilicate **Formula:** Fe<sub>2</sub>SiO<sub>4</sub> **Molecular Formula:** Fe<sub>2</sub>O<sub>4</sub>Si **Molecular Weight:** 203.774 **CAS RN:** 10179-73-4 **Properties:** brown ortho cryst [CRC10] **Density, g/cm<sup>3</sup>:** 4.30 [CRC10]

#### 1638

**Compound:** Iron(II,III) oxide Synonym: magnetite Formula: Fe<sub>3</sub>O<sub>4</sub> Molecular Formula: Fe<sub>3</sub>O<sub>4</sub> Molecular Weight: 231.533 CAS RN: 1317-61-9 Properties: black cubes or amorphous powd; dull to metallic luster; magnetic properties; hardness 5.5-6.5; enthalpy of fusion 138.00 kJ/mol; used as 99.5% pure material as a sputtering target for magnetic films [HAW93] [CRC10] [MER06] [CER91] Solubility: i H<sub>2</sub>O; s acids [MER06] Density, g/cm<sup>3</sup>: 5.2 [MER06] Melting Point, °C: 1597 [CRC10] Thermal Expansion Coefficient: (volume) 100°C (0.212), 200°C (0.513), 400°C (1.328), 800°C (3.24), 1000°C (4.26) [CLA66]

#### 1639

**Compound:** Iron(II) perchlorate **Formula:** Fe(ClO<sub>4</sub>)<sub>2</sub> **Molecular Formula:** Cl<sub>2</sub>FeO<sub>8</sub> Molecular Weight: 254.746 CAS RN: 13933-23-8 Properties: green-white hygr needles [CRC10] Solubility: g/100 g H<sub>2</sub>O:  $210^{25}$  [CRC10] Melting Point, °C: decomposes at >100 [CRC10]

#### 1640

**Compound:** Iron(III) acetate basic **Formula:** FeOH( $C_2H_3O_2$ )<sub>2</sub> **Molecular Formula:**  $C_4H_7FeO_5$  **Molecular Weight:** 190.941 **CAS RN:** 10450-55-2 **Properties:** brown red amorphous powd [CRC10] **Solubility:** i H<sub>2</sub>O; s EtOH, acid [CRC10]

# 1641

 $\label{eq:compound: Iron(III) ammonium citrate} Formula: Fe(NH_4)_3(C_6H_5O_7)_2 \\ \mbox{Molecular Formula: } C_{12}H_{22}N_3O_{14}Fe \\ \mbox{Molecular Weight: } 488.160 \\ \mbox{CAS RN: } 1185-57-5 \\ \mbox{Properties: } red or brown powd; hygr [CRC10] \\ \mbox{Solubility: } s H_2O; i EtOH [CRC10] \\ \end{tabular}$ 

#### 1642

Compound: Krypton Formula: Kr Molecular Formula: Kr Molecular Weight: 83.80 CAS RN: 7439-90-9

Properties: colorless, odorless gas; condenses to colorless liq; critical temp -63.8°C; critical pressure 5.50 MPa; enthalpy of vaporization at bp 9.08 kJ/ mol; enthalpy of fusion 1.37 kJ/mol; heat capacity (101.32 kPa, 25°C) 20.95 J/(mol · K); sonic velocity of gas (101.32 kPa, 0°C) 213 m/s; viscosity of gas (101.32 kPa, 25°C) 25.3 [CRC10] [MER06] [KIR78] Solubility: 59.4 mL/1000 g H<sub>2</sub>O (20°C) [KIR78]; Henry's law constants, k×10<sup>-4</sup>: 3.685 (70.2°C), 4.017 (175.0°C), 3.761 (175.0°C), 2.392 (252.5°C) [POT78] Density, g/cm<sup>3</sup>: gas: 101.3 kPa, 0°C, 0.0037493 [KIR78] Melting Point, °C: -157.36 [CRC10] Boiling Point, °C: –153.23 [CRC10] **Reactions:** forms hydrate with water [MER06] Thermal Conductivity, W/(m·K): gas at 101.32 kPa and 0°C is 0.874 [KIR78]

#### 1643

**Compound:** Krypton difluoride **Formula:** KrF<sub>2</sub> **Molecular Formula:** F<sub>2</sub>Kr Molecular Weight: 121.797
CAS RN: 13773-81-4
Properties: colorless solid; decomposes rapidly at room temp; tetr, a=0.6533 nm, c=0.5831 nm; vapor pressure at 0°C is 29 mm Hg; thermodynamically unstable, can be stored at -78°C; prepared by electrical discharge of Kr and F<sub>2</sub> at -183°C; used in certain types of electric light bulbs [MER06] [KIR78] [COT88]
Density, g/cm<sup>3</sup>: 3.24 [KIR78]
Melting Point, °C: decomposes at ~25 [KIR78]

#### 1644

**Compound:** Krypton fluoride hexafluoroantimonate **Formula:** KrFSbF<sub>6</sub> **Molecular Formula:** F<sub>7</sub>KrSb **Molecular Weight:** 338.549 **CAS RN:** 52708-44-8 **Properties:** white [KIR78] **Melting Point, °C:** decomposes at 45 [KIR78]

#### 1645

Compound: Krypton fluoride monodecafluoroantimonate
Formula: KrFSb<sub>2</sub>F<sub>11</sub>
Molecular Formula: F<sub>12</sub>KrSb<sub>2</sub>
Molecular Weight: 555.301
CAS RN: 39578-36-4
Properties: white [KIR78]
Melting Point, °C: decomposes at 50 [KIR78]

## 1646

**Compound:** Krypton fluoride monodecafluorotantalate **Formula:** KrFTaF<sub>11</sub> **Molecular Formula:** F<sub>12</sub>KrTa **Molecular Weight:** 492.729 **CAS RN:** 58815-72-8 **Properties:** white [KIR78] **Melting Point, °C:** decomposes at ~-20 [KIR78]

## 1647

**Compound:** Krypton trifluoride hexafluoroantimonate **Formula:** Kr<sub>2</sub>F<sub>3</sub>SbF<sub>6</sub> **Molecular Formula:** F<sub>9</sub>Kr<sub>2</sub>Sb **Molecular Weight:** 460.346 **CAS RN:** 52721-22-9 **Properties:** white [KIR78] **Melting Point, °C:** decomposes at ~25 [KIR78]

Compound: Lanthanum Formula: La Molecular Formula: La Molecular Weight: 138.9055

#### CAS RN: 7439-91-0

- **Properties:** white, malleable metal; tarnishes in air; three cryst forms: α-La, hex, stable at ordinary temp; β-La, stable at 350°C, fcc; γ-La, stable above 868°C; enthalpy of fusion is 6.20 kJ/mol; enthalpy of sublimation is 431.0 kJ/mol; electrical resistivity (20°C) 54 µohm · cm; radius of atom is 0.1879 nm; radius of La<sup>+++</sup> ion is 0.1061 nm; solution is colorless [MER06] [KIR82] [ALD94]
- **Solubility:** slowly decomposes in H<sub>2</sub>O; readily attacked by mineral acids [MER06]
- **Density, g/cm<sup>3</sup>:** α: 6.17; β: 6.19; γ: 5.98 [MER06]; α: 6.1453 [KIR82]
- Melting Point, °C: 920 [MER06]
- Boiling Point, °C: 3464 [KIR82]

**Thermal Conductivity, W/(m·K):** 13.4 (25°C) [CRC10] **Thermal Expansion Coefficient:**  $12.1 \times 10^{-6}$ /K [CRC10]

# 1649

**Compound:** Lanthanum acetate hydrate **Formula:**  $La(CH_3COO)_3 \cdot xH_2O$  **Molecular Formula:**  $C_6H_9LaO_6$  (anhydrous) **Molecular Weight:** 316.039 (anhydrous) **CAS RN:** 100587-90-4 **Properties:** white cryst; x = 1.5 [ALF95] [STR93] **Solubility:** 16.88 g/100 mL H<sub>2</sub>O (25°C) [CRC10]

# 1650

**Compound:** Lanthanum acetylacetonate hydrate **Synonyms:** 2,4-pentanedione, lanthanum(III) derivative **Formula:** La[CH<sub>3</sub>COCH=C(O)CH<sub>3</sub>]<sub>3</sub>  $\cdot$  xH<sub>2</sub>O **Molecular Formula:** C<sub>15</sub>H<sub>21</sub>LaO<sub>6</sub> (anhydrous) **Molecular Weight:** 436.234 (anhydrous) **CAS RN:** 64424-12-0 **Properties:** hygr white powd [STR93] [ALD94]

# 1651

**Compound:** Lanthanum aluminum oxide **Formula:** LaAlO<sub>3</sub> **Molecular Formula:** AlLaO<sub>3</sub> **Molecular Weight:** 213.885 **CAS RN:** 12003-65-5 **Properties:** white powd [STR93]

# 1652

**Compound:** Lanthanum boride **Synonym:** lanthanum hexaboride

Formula: LaB<sub>6</sub>
Molecular Formula: B<sub>6</sub>La
Molecular Weight: 203.772
CAS RN: 12008-21-8
Properties: refractory material; black powd; used as a sputtering target with 99.9% and 99.5% purity to produce wear-resistant and semiconducting films and for preparation of thermionic conductor films [STR93] [CER91]
Density, g/cm<sup>3</sup>: 4.76 [LID94]
Melting Point, °C: 2715 [LID94]

#### 1653

Compound: Lanthanum bromate nonahydrate Formula: La(BrO<sub>3</sub>)<sub>3</sub>·9H<sub>2</sub>O Molecular Formula: Br<sub>3</sub>H<sub>18</sub>LaO<sub>18</sub> Molecular Weight: 644.751 CAS RN: 28958-23-8 Properties: hex [CRC10] Solubility: g/100 g H<sub>2</sub>O: 98 (0°C), 149 (20°C), 200 (30°C) [LAN05] Melting Point, °C: 37.5 [CRC10] Reactions: minus 7H<sub>2</sub>O at 100°C [CRC10]

# 1654

Compound: Lanthanum bromide Formula: LaBr<sub>3</sub> Molecular Formula: Br<sub>3</sub>La Molecular Weight: 378.618 CAS RN: 13536-79-3 Properties: -20 mesh with 99.9% purity; heptahydrate, 13465-19-5, is white cryst [CER91] [STR93] Density, g/cm<sup>3</sup>: 5.057 [CRC10] Melting Point, °C: 783 [CRC10] Boiling Point, °C: 1577 [CRC10]

# 1655

Compound: Lanthanum carbide Formula: LaC<sub>2</sub> Molecular Formula: C<sub>2</sub>La Molecular Weight: 162.928 CAS RN: 12071-15-7 Properties: yellow cryst; 12mm pieces and smaller of 99.9% purity [CER91] [CRC10] Solubility: decomposed by H<sub>2</sub>O [CRC10] Density, g/cm<sup>3</sup>: 5.29 [LID94] Melting Point, °C: 2360 [LID94]

# 1656

**Compound:** Lanthanum carbonate octahydrate **Formula:**  $La_2(CO_3)_3 \cdot 8H_2O$ **Molecular Formula:**  $C_3H_{16}La_2O_{17}$  Molecular Weight: 601.961 CAS RN: 6487-39-4 Properties: white; cryst powd [MER06] Solubility: i H<sub>2</sub>O; s dil mineral acids [MER06] Density, g/cm<sup>3</sup>: 2.6 [HAW93]

#### 1657

**Compound:** Lanthanum carbonate pentahydrate **Formula:**  $La_2(CO_3)_3 \cdot 5H_2O$  **Molecular Formula:**  $C_3H_{10}La_2O_{14}$  **Molecular Weight:** 547.915 **CAS RN:** 54451-24-0 **Properties:** white powd [STR93] **Density, g/cm<sup>3</sup>:** 2.6–2.7 [STR93]

#### 1658

Compound: Lanthanum chloride Formula: LaCl<sub>3</sub> Molecular Formula: Cl<sub>3</sub>La Molecular Weight: 245.264 CAS RN: 10099-58-8 Properties: white powd; hygr [STR93] Density, g/cm<sup>3</sup>: 3.84 [STR93] Melting Point, °C: 860 [STR93] Boiling Point, °C: 1000 [STR93]

## 1659

Compound: Lanthanum chloride heptahydrate
Formula: LaCl<sub>3</sub> · 7H<sub>2</sub>O
Molecular Formula: Cl<sub>3</sub>H<sub>14</sub>LaO<sub>7</sub>
Molecular Weight: 371.371
CAS RN: 10025-84-0
Properties: white, transparent, hygr, tricl cryst [HAW93] [MER06] [ALD94]
Solubility: s H<sub>2</sub>O, alcohol [MER06]
Melting Point, °C: decomposes at 91 [HAW93]
Reactions: forms LaCl<sub>3</sub> by heating in HCl at 850°C [MER06]

#### 1660

**Compound:** Lanthanum chloride hexahydrate **Formula:**  $LaCl_3 \cdot 6H_2O$  **Molecular Formula:**  $Cl_3H_{12}LaO_6$  **Molecular Weight:** 353.355 **CAS RN:** 17272-45-6 **Properties:** white cryst [STR93] **Solubility:** 4.6147 ± 0.0056 mol/kg (25°C) [RAR87a] **Melting Point, °C:** decomposes at 91 [STR93]

#### 1661

**Compound:** Lanthanum chromite **Formula:** LaCrO<sub>3</sub> **Molecular Formula:** CrLaO<sub>3</sub> **Molecular Weight:** 238.900 **CAS RN:** 12017-94-6 **Properties:** -200 mesh with 99.9% purity [CER91]

#### 1662

Compound: Lanthanum fluoride
Formula: LaF<sub>3</sub>
Molecular Formula: F<sub>3</sub>La
Molecular Weight: 195.901
CAS RN: 13709-38-1
Properties: white powd or 99.9% pure melted pieces of 3–6 mm; hygr; used in phosphor lamp coatings, lasers, and melted pieces are used as evaporation material and sputtering material for multilayers [HAW93] [STR93] [CER91]
Solubility: i H<sub>2</sub>O, acids [HAW93]
Density, g/cm<sup>3</sup>: 5.936 [STR93]
Melting Point, °C: 1493 [STR93]

#### 1663

Compound: Lanthanum hydride
Formula: LaH<sub>3</sub>
Molecular Formula: H<sub>3</sub>La
Molecular Weight: 141.930
CAS RN: 13864-01-2
Properties: black pyrophoric solid; prepared by heating La metal in H<sub>2</sub> to 300°C; spontaneously ignites in air; there is also the LaH<sub>2</sub> hydride; possible use as hydrogenation catalysts; used to store H<sub>2</sub> in the system LaNi<sub>15</sub>, 12196-72-4 [KIR80]
Solubility: reacts with H<sub>2</sub>O at 0°C [KIR80]
Density, g/cm<sup>3</sup>: 5.36 [LID94]

#### 1664

Compound: Lanthanum hydroxide Formula: La(OH)<sub>3</sub> Molecular Formula: H<sub>3</sub>LaO<sub>3</sub> Molecular Weight: 189.928 CAS RN: 14507-19-8 Properties: white, amorphous precipitate; absorbs CO<sub>2</sub> [MER06] Melting Point, °C: decomposes [STR93]

# 1665

**Compound:** Lanthanum iodate **Formula:** La(IO<sub>3</sub>)<sub>3</sub>

Molecular Formula:  $I_3LaO_9$ Molecular Weight: 663.614 CAS RN: 13870-19-4 Properties: col cryst [CRC10] Solubility: g/100 g H<sub>2</sub>O: 1.7 [CRC10] Melting Point, °C: decomposes at 190 [CRC10]

#### 1666

**Compound:** Lanthanum iodide **Formula:** LaI<sub>3</sub> **Molecular Formula:** I<sub>3</sub>La **Molecular Weight:** 519.619 **CAS RN:** 13813-22-4 **Properties:** grayish white powd; hygr [STR93] **Density, g/cm<sup>3</sup>:** 5.63 [STR93] **Melting Point, °C:** 772 [STR93]

## 1667

Compound: Lanthanum monosulfide Formula: LaS Molecular Formula: LaS Molecular Weight: 170.970 CAS RN: 12031-30-0 Properties: yellow cub cryst [CRC10] Density, g/cm<sup>3</sup>: 5.61 [CRC10] Melting Point, °C: 2300 [CRC10]

#### 1668

Compound: Lanthanum nitrate hexahydrate Formula: La(NO<sub>3</sub>)<sub>3</sub>·6H<sub>2</sub>O Molecular Formula: H<sub>12</sub>LaN<sub>3</sub>O<sub>15</sub> Molecular Weight: 433.012 CAS RN: 10277-43-7 Properties: white; deliq cryst; used as an antiseptic, in gas mantles [HAW93] [MER06] Solubility: g/100 g H<sub>2</sub>O: 100 (0°C), 136 (20°C), 247 (60°C) [LAN05] Melting Point, °C: ~40 [MER06]

## 1669

Compound: Lanthanum nitride Formula: LaN Molecular Formula: LaN Molecular Weight: 152.913 CAS RN: 25764-10-7 Properties: cub; -60 mesh with 99.9% purity [LID94] [CER91] Density, g/cm<sup>3</sup>: 6.73 [LID94]

#### 1670

Compound: Lanthanum oxalate hydrate Formula:  $La_2(C_2O_4)_3 \cdot xH_2O$ Molecular Formula:  $C_6La_2O_{12}$  (anhydrous) Molecular Weight: 541.869 (anhydrous) CAS RN: 537-03-1 Properties: white powd; x = 10 [ALF95] [HAW93] [STR93] Solubility: i H<sub>2</sub>O; s acids [HAW93]

# 1671

Compound: Lanthanum oxide Formula: La<sub>2</sub>O<sub>3</sub> Molecular Formula: La<sub>2</sub>O<sub>3</sub> Molecular Weight: 325.809 CAS RN: 1312-81-8 **Properties:** -325 mesh 5 µm or less with 99.9999% purity; almost white, amorphous powd; absorbs  $CO_2$ ; can be prepared by decomposition of the hydroxide or oxalate at high temp; used in calcium lights, optical glass, in refractories, and as an evaporated material or sputtering target of 99.9% and 99.99% purity in thermistor elements and for thin film capacitors [HAW93] [MER06] [CER91] **Solubility:** i H<sub>2</sub>O; s dil mineral acids [MER06] Density, g/cm<sup>3</sup>: 6.51 [MER06] Melting Point, °C: 2315 [HAW93]

Boiling Point, °C: 4200 [HAW93]

## 1672

**Compound:** Lanthanum oxysulfide **Formula:** La<sub>2</sub>O<sub>2</sub>S **Molecular Formula:** La<sub>2</sub>O<sub>2</sub>S **Molecular Weight:** 341.876 **CAS RN:** 12031-43-5 **Properties:** -200 mesh with 99.9% purity [CER91]

#### 1673

**Compound:** Lanthanum perchlorate hexahydrate **Formula:**  $La(ClO_4)_3 \cdot 6H_2O$ **Molecular Formula:**  $Cl_3H_{12}LaO_{18}$ **Molecular Weight:** 545.348 **CAS RN:** 36907-37-6 **Properties:** white cryst; hygr [STR93]

# 1674

**Compound:** Lanthanum phosphate hydrate Formula:  $LaPO_4 \cdot xH_2O$ Molecular Formula:  $LaO_4P$  (anhydrous) Molecular Weight: 233.827 (anhydrous) CAS RN: 14913-14-5 Properties: white powd [STR93]

## 1675

Compound: Lanthanum silicide Formula: LaSi<sub>2</sub> Molecular Formula: LaSi<sub>2</sub> Molecular Weight: 195.077 CAS RN: 12056-90-5 Properties: gray tetr; 10 mm and down lump [LID94] [ALF93] Density, g/cm<sup>3</sup>: 5.0 [LID94]

#### 1676

**Compound:** Lanthanum strontium copper oxide **Formula:** La<sub>1.85</sub>Sr<sub>0.15</sub>CuO<sub>4</sub> **Molecular Formula:** CuLa<sub>1.85</sub>O<sub>4</sub>Sr<sub>0.15</sub> **Molecular Weight:** 397.662 **CAS RN:** 111419-39-7 **Properties:** superconductor, general formula is

**Properties:** superconductor, general formula is  $La_2 \cdot xM_xCuO_4$ ; for x = 0.15, T<sub>c</sub> is 36 K; oriented thin films can be prepared from bulk cuprates or the metal oxides by sputtering or by laser ablation; potential uses of superconductors include low-loss microwave devices such as cavities and wave guides, frictionless bearings and electronic devices [CEN92]

#### 1677

**Compound:** Lanthanum sulfate **Formula:**  $La_2(SO_4)_3$  **Molecular Formula:**  $La_2O_{12}S_3$  **Molecular Weight:** 565.999 **CAS RN:** 10099-60-2 **Properties:** hygr white powd [CRC10] **Solubility:** sl H<sub>2</sub>O [CRC10] **Melting Point,** °C: 1150

#### 1678

Compound: Lanthanum sulfate nonahydrate
Formula: La<sub>2</sub>(SO<sub>4</sub>)<sub>3</sub>·9H<sub>2</sub>O
Molecular Formula: H<sub>18</sub>La<sub>2</sub>O<sub>21</sub>S<sub>3</sub>
Molecular Weight: 728.139
CAS RN: 10294-62-9
Properties: hex prisms; decomposes at white heat; refractive index 1.564 (20°C) [HAW93] [MER06]
Solubility: s H<sub>2</sub>O, solubility decreases with increasing temp [MER06]; i alcohol [HAW93]
Density, g/cm<sup>3</sup>: 2.821 [HAW93]

#### 1679

Compound: Lanthanum sulfate octahydrate Formula:  $La_2(SO_4)_3 \cdot 8H_2O$ Molecular Formula:  $H_{16}La_2O_{20}S_3$ Molecular Weight: 710.124 CAS RN: 57804-25-8 Properties: white cryst [STR93] Solubility: g/100 g H<sub>2</sub>O: 3.00 (0°C), 2.33 (20°C), 0.66 (100°C) [LAN05] Density, g/cm<sup>3</sup>: 2.821 [STR93] Melting Point, °C: decomposes [STR93]

# 1680

# 1681

**Compound:** Lanthanum telluride **Formula:** La<sub>2</sub>Te<sub>3</sub> **Molecular Formula:** La<sub>2</sub>Te<sub>3</sub> **Molecular Weight:** 660.62 **CAS RN:** 12031-53-7 **Properties:** -20 mesh [ALF95]

#### 1682

Compound: Lanthanum tris(cyclopentadienyl)
Synonym: tris(cyclopentadienyl)lanthanum
Formula: (C<sub>5</sub>H<sub>5</sub>)<sub>3</sub>La
Molecular Formula: C<sub>15</sub>H<sub>15</sub>La
Molecular Weight: 334.189
CAS RN: 1272-23-7
Properties: white cryst; air and moisture sensitive [STR93]
Melting Point, °C: decomposes at 295 [STR93]

#### 1683

Compound: Lawrencium Formula: Lr Molecular Formula: Lr Molecular Weight: 262 CAS RN: 22537-19-5 Properties: has two isotopes, 257 and 256; <sup>257</sup>Lr has a half-life of 8 s; discovered in 1961 by Ghioros and colleagues at Lawrence Berkeley Laboratory; can be synthesized by bombardment of californium with boron ions [KIR78] [HAW93] [CRC10] Melting Point, °C: 1627 [LID94]

#### 1684

Compound: Lead Formula: Pb Molecular Formula: Pb Molecular Weight: 207.2 CAS RN: 7439-92-1

Properties: bluish white, silvery gray metal; fcc; tarnishes in air; very soft and malleable; cub; electrical resistivity 20.65 μohm · cm (20°C), 27.02 μohm · cm (100°C); velocity of sound 122,700 cm/s; hardness 1.5 Mohs; Young's modulus 16.5 MPa; surface tension (360°C) 442 mN/m; electronegativity 1.8; enthalpy of fusion 4.77 kJ/mol; enthalpy of vaporization 179.5 kJ/mol [CRC10] [KIR78] [MER06] [COT88]
Solubility: reacts with hot conc HNO<sub>3</sub>, boiling conc HCl, H<sub>2</sub>SO<sub>4</sub> [MER06]

```
Density, g/cm<sup>3</sup>: 11.35 (20°C); 327°C: 11.00 (solid); 10.67 (liq) [KIR78]
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- Melting Point, °C: 327.4 [MER06]
- Boiling Point, °C: 1749 [LID94]
- **Reactions:** attacked by pure water in presence of O<sub>2</sub>; resistant to tap water, HF, brine, solvents [MER06]

**Thermal Conductivity, W/(m·K):** 35.3 (25°C) [ALD94]

**Thermal Expansion Coefficient:** linear expansion

```
from 0^{\circ}C-100°C is 29×10<sup>-6</sup>/K [MER06]
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# 1685

**Compound:** Lead acetate **Synonym:** lead diacetate **Formula:** Pb(CH<sub>3</sub>COO)<sub>2</sub>

**Molecular Formula:** C<sub>4</sub>H<sub>6</sub>O<sub>4</sub>Pb

Molecular Weight: 325.289

- **CAS RN:** 301-04-2
- **Properties:** white cryst; -8 mesh with 99.999% purity; can be prepared by dissolution of PbO (litharge) or PbCO<sub>3</sub> in acetic acid; used in the preparation of other Pb salts [KIR78] [CER91]

**Solubility:** g/100 g H<sub>2</sub>O: 19.7 (0°C), 55.2 (25°C); equilibrium solid phase, Pb(CH<sub>3</sub>COO)<sub>2</sub> · 3H<sub>2</sub>O [KRU93]; g/100 mL H<sub>2</sub>O: 44.3 (20°C), 221 (50°C) [KIR78]

Density, g/cm<sup>3</sup>: 3.25 [KIR78]

Melting Point, °C: 280 [KIR78] Boiling Point, °C: decomposes at >280 [KIR78]

# 1686

**Compound:** Lead acetate trihydrate Formula: Pb(CH<sub>3</sub>COO)<sub>2</sub> · 3H<sub>2</sub>O Molecular Formula: C<sub>4</sub>H<sub>12</sub>O<sub>7</sub>Pb Molecular Weight: 379.319 CAS RN: 6080-56-4 Properties: colorless cryst or white granules or powd; slowly effloresces; absorbs CO<sub>2</sub> from air; obtained by dissolution of PbO in hot dil acetic acid, then cooling to precipitate crysts; used to prepare basic lead carbonate and lead chromate, used as a mordant in cotton dyes and a water repellent [KIR78] [MER06] **Solubility:** g/100 mL H<sub>2</sub>O: 45.61 (15°C), 200 (100°C) [KIR78]; sl s in alcohol, s in glycerol [HAW93] Density, g/cm<sup>3</sup>: 2.55 [MER06] Melting Point, °C: 75 (decomposes 200) [KIR78] Reactions: minus 3H<sub>2</sub>O at 75°C [HAW93]

#### 1687

**Compound:** Lead acetylacetonate **Synonyms:** 2,4-pentanedione, lead(II) derivative **Formula:**  $Pb(CH_3C(O)CH=COCH_3)_2$  **Molecular Formula:**  $C_{10}H_{14}O_4Pb$  **Molecular Weight:** 405.419 **CAS RN:** 15282-88-9 **Properties:** white powd; hygr [STR93]

#### 1688

Compound: Lead antimonate
Synonym: naples yellow
Formula: Pb<sub>3</sub>(SbO<sub>4</sub>)<sub>2</sub>
Molecular Formula: O<sub>8</sub>Pb<sub>3</sub>Sb<sub>2</sub>
Molecular Weight: 993.115
CAS RN: 13510-89-9
Properties: orange yellow powd; formed by a reaction between lead nitrate and potassium antimonate solutions, with subsequent crystallization; used in staining glass, crockery, and porcelain [HAW93] [MER06]
Solubility: i H<sub>2</sub>O, dil acids [MER06]
Density, g/cm<sup>3</sup>: 6.58 (20°C) [HAW93]

#### 1689

**Compound:** Lead antimonide **Formula:** PbSb **Molecular Formula:** PbSb Molecular Weight: 328.960 CAS RN: 12266-38-5 Properties: gray powd [STR93]

## 1690

Compound: Lead arsenate Synonym: schultenite Formula: Pb<sub>3</sub>(AsO<sub>4</sub>)<sub>2</sub> Molecular Formula: As<sub>2</sub>O<sub>8</sub>Pb<sub>3</sub> Molecular Weight: 899.438 CAS RN: 7784-40-9 Properties: white cryst; used in insecticides and herbicides [HAW93] Solubility: i H<sub>2</sub>O; s HNO<sub>3</sub> [HAW93] Density, g/cm<sup>3</sup>: 5.8 [HAW93] Melting Point, °C: decomposes at 1042 [HAW93]

## 1691

Compound: Lead arsenite Formula: Pb(AsO<sub>2</sub>)<sub>2</sub> Molecular Formula: As<sub>2</sub>O<sub>4</sub>Pb Molecular Weight: 421.041 CAS RN: 10031-13-7 Properties: white powd; used as an insecticide [HAW93] Solubility: i H<sub>2</sub>O; s dil HNO<sub>3</sub> [MER06] Density, g/cm<sup>3</sup>: 5.85 [MER06]

#### 1692

**Compound:** Lead azide **Formula:** Pb(N<sub>3</sub>)<sub>2</sub> **Molecular Formula:** N<sub>6</sub>Pb **Molecular Weight:** 291.240 **CAS RN:** 13424-46-9

Properties: needles or white powd; prepared by<br/>reaction of dil solutions of lead nitrate and<br/>sodium azide; used as a primary detonating<br/>compound for high explosives;  $\alpha$ -Pb(N<sub>3</sub>)<sub>2</sub>:<br/>ortho, a=0.663 nm, b=0.546 nm, c=1.625 nm;<br/> $\beta$ -Pb(N<sub>3</sub>)<sub>3</sub>: monocl, a=0.509 nm, b=0.884 nm,<br/>c=1.751 nm;  $\gamma$ -Pb(N<sub>3</sub>)<sub>2</sub>: a=0.622 nm, b=1.051 nm,<br/>c=1.217 nm [MER06] [CIC73] [KIR78]Solubility: 0.023% H<sub>2</sub>O (18°C), 0.09% (70°C)<br/>[MER06]; i NH<sub>4</sub>OH; v s acetic acid [KIR78]Density, g/cm<sup>3</sup>: 4.7 [LID94]Reactions: explodes at 350°C [MER06]

#### 1693

**Compound:** Lead basic acetate **Synonym:** lead subacetate

Formula:  $2Pb(OH)_2 \cdot Pb(CH_3COO)_2$ Molecular Formula:  $C_4H_{10}O_8Pb_3$ Molecular Weight: 807.718 CAS RN: 1335-32-6 Properties: white; heavy powd; absorbs atm CO<sub>2</sub> [MER06] Solubility: s 16 parts cold, 4 parts boiling H<sub>2</sub>O [MER06] Melting Point, °C: decomposes [LID94]

## 1694

Compound: Lead basic carbonate
Synonyms: hydrocerussite, white lead
Formula: 2PbCO<sub>3</sub> · Pb(OH)<sub>2</sub>
Molecular Formula: C<sub>2</sub>H<sub>2</sub>O<sub>8</sub>Pb<sub>3</sub>
Molecular Weight: 775.633
CAS RN: 1319-46-6
Properties: white hex cryst; -100 mesh with 99.9% purity; produced by addition of CO<sub>2</sub> to a solution of lead acetate; used in ceramic glazes and as an exterior paint pigment [HAW93] [CER91] [KIR78]
Solubility: i H<sub>2</sub>O; s acids [HAW93]
Density, g/cm<sup>3</sup>: 6.68 [HAW93]
Melting Point, °C: decomposes at 400 [HAW93]

#### 1695

Compound: Lead borate monohydrate Formula:  $Pb(BO_2)_2 \cdot H_2O$ Molecular Formula:  $B_2H_2O_5Pb$ Molecular Weight: 310.835 CAS RN: 10124-39-8 Properties: white, cryst powd; produced by fusing boric acid with either lead carbonate or litharge; used as a varnish and paint drier, to waterproof paints, in electrically conductive ceramic coatings [HAW93] [KIR78] Solubility: i  $H_2O$ ; s dil HNO<sub>3</sub> [MER06]; g/100 mL soln,  $H_2O$ : 2 (room temp) [KRU93] Density, g/cm<sup>3</sup>: 5.6 [HAW93] Melting Point, °C: 500 [KIR78] Reactions: minus  $H_2O$  at 160°C [HAW93]

## 1696

**Compound:** Lead bromate monohydrate **Formula:**  $Pb(BrO_3)_2 \cdot H_2O$  **Molecular Formula:**  $Br_2H_2O_7Pb$  **Molecular Weight:** 481.020 **CAS RN:** 10031-21-7 **Properties:** monocl colorless cryst [CRC10] [MER06] **Solubility:** 1.38 g/100 mL H<sub>2</sub>O (20°C) [CRC10] Density, g/cm<sup>3</sup>: 5.53 [HAW93] Melting Point, °C: ~180, decomposes [HAW93]

#### 1697

Compound: Lead bromide Formula: PbBr<sub>2</sub> Molecular Formula: Br<sub>2</sub>Pb Molecular Weight: 367.008 CAS RN: 10031-22-8 Properties: white, ortho-rhomb cryst; -80 mesh with 99.999% purity; enthalpy of vaporization 133 kJ/mol; enthalpy of fusion 16.44 kJ/mol; obtained from PbO or PbCO<sub>3</sub> and HBr; finds use as a photopolymerization catalyst and in photoduplication processes in the 365 nm region [KIR78] [CER91] [CRC10] [MER06] Solubility: s in ~200 parts H<sub>2</sub>O, 20 parts boiling H<sub>2</sub>O; sl s in ammonia; i alcohol [MER06] [KIR78]; g/100 g soln, H<sub>2</sub>O: 0.4554 (0°C), 0.9744 (25°C), 4.751 (100°C) [KRU93]

**Density, g/cm<sup>3</sup>:** 6.66 [HAW93] **Melting Point, °C:** 371 [CRC10] **Boiling Point, °C:** 892 [CRC10]

# 1698

Compound: Lead carbonate
Synonym: cerussite
Formula: PbCO<sub>3</sub>
Molecular Formula: CO<sub>3</sub>Pb
Molecular Weight: 267.209
CAS RN: 598-63-0
Properties: colorless ortho-rhomb cryst; made by adding CO<sub>2</sub> to a cold dil solution of lead acetate; many uses such as a catalyst for organic reactions, in high temp greases, as a photoconductor in electrophotography [KIR78]
Solubility: g/L solution, H<sub>2</sub>O: 0.0011–0.0017 (20°C) [KRU93]

Density, g/cm<sup>3</sup>: 6.6 [KIR78]

Melting Point, °C: decomposes at ~315 [KIR78]

#### 1699

Compound: Lead chlorate Formula:  $Pb(ClO_3)_2$ Molecular Formula:  $Cl_2O_6Pb$ Molecular Weight: 374.101 CAS RN: 10294-47-0 Properties: colorless; deliq cryst [MER06] Solubility: s 0.7 parts H<sub>2</sub>O; v s alcohol [MER06]; g/100 g soln, H<sub>2</sub>O: 151.3-440 (18°C) [KRU93] Density, g/cm<sup>3</sup>: 3.9 [MER06] Melting Point, °C: decomposes at 230 [MER06]

## 1700

Compound: Lead chloride Formula: PbCl<sub>2</sub> Molecular Formula: Cl<sub>2</sub>Pb Molecular Weight: 278.105 CAS RN: 7758-95-4 **Properties:** white, ortho-rhomb needles; -80 mesh precipitated agglomerates with 99.999% purity or 0.8–3.4 mm pieces (fused) with 99.999% purity; readily forms basic chlorides, for example  $PbCl_2 \cdot Pb(OH)_2$ , 15887-88-4, which is Pattinson's lead white pigment; enthalpy of vaporization 127 kJ/mol; enthalpy of fusion 21.90 kJ/mol; can be prepared by reacting PbO or PbCO<sub>3</sub> and HCl; uses: preparation of lead salts [CER91] [HAW93] [KIR78] [CRC10] **Solubility:** g/100 g soln,  $H_2O: 0.67 (0^{\circ}C)$ ,  $1.06 \pm$  $0.02 (25^{\circ}C), 3.17 \pm 0.07 (100^{\circ}C)$  [KRU93]; sl s dil HCl and NH<sub>3</sub>; i alcohol [KIR78] Density, g/cm<sup>3</sup>: 5.85 [KIR78] Melting Point, °C: 501 [MER06] Boiling Point, °C: 951 [CRC10]

## 1701

Compound: Lead chlorite Formula:  $Pb(ClO_2)_2$ Molecular Formula:  $Cl_2O_4Pb$ Molecular Weight: 342.103 CAS RN: 13453-57-2 Properties: yellow monocl [CRC10] Solubility: g/100 g soln, H<sub>2</sub>O: 0.035 (0°C), 0.12 (25°C), 0.41 (100°C); solid phase, Pb(ClO<sub>2</sub>)<sub>2</sub> [KRU93] Melting Point, °C: decomposes at 126 [LAN05]

#### 1702

Compound: Lead chromate Synonyms: crocoite, chrome yellow Formula: PbCrO<sub>4</sub> Molecular Formula: CrO<sub>4</sub>Pb Molecular Weight: 323.194 CAS RN: 7758-97-6 Properties: yellow: ortho-rhomb cryst; orange: monocl; red: tetr [KIR78] Solubility: s dil HNO<sub>3</sub>; i acetic acid [MER06] [KIR78]; g/L soln, H<sub>2</sub>O: 0.00017 (25°C) [KRU93] Density, g/cm<sup>3</sup>: 6.12 (monocl) [KIR78] Melting Point, °C: 844 (monocl) [KIR78]

**Compound:** Lead citrate trihydrate **Synonyms:** citric acid, lead salt trihydrate **Formula:**  $Pb_3(C_6H_5O_7)_2 \cdot 3H_2O$ **Molecular Formula:**  $C_{12}H_{16}O_{17}Pb_3$ **Molecular Weight:** 1053.849 **CAS RN:** 512-26-5 **Properties:** white, cryst powd [CRC10] [STR93] **Solubility:** s  $H_2O$ ; v sl s alcohol [CRC10]

# 1704

Compound: Lead cyanide Formula: Pb(CN)<sub>2</sub> Molecular Formula: C<sub>2</sub>N<sub>2</sub>Pb Molecular Weight: 259.235 CAS RN: 592-05-2 Properties: white to yellowish powd; used in metallurgy [HAW93] Solubility: sl s H<sub>2</sub>O; decomposed by acid [HAW93]

1705

Compound: Lead dioxide Synonym: plattnerite Formula: PbO<sub>2</sub> Molecular Formula: O<sub>2</sub>Pb Molecular Weight: 239.199 CAS RN: 1309-60-0 Properties: dark brown powd; oxidizing agent; evolves O<sub>2</sub> if heated; produced by oxidation of  $Pb_3O_4$  with  $Cl_2$  in an alkaline media; used as electrodes, to manufacture dyes, and in lead-storage batteries [MER06] [HAW93] **Solubility:** i H<sub>2</sub>O; s HCl evolving Cl<sub>2</sub>; s hot caustic solutions [MER06] Density, g/cm<sup>3</sup>: 9.375 [HAW93] Melting Point, °C: decomposes at 290 [HAW93] **Reactions:** if heated evolves  $O_2$  to form  $Pb_3O_4$ , then PbO at higher temperatures [MER06]

1706

**Compound:** Lead fluoride **Formula:** PbF<sub>2</sub> **Molecular Formula:** F<sub>2</sub>Pb **Molecular Weight:** 245.197 **CAS RN:** 7783-46-2 Properties: white to colorless cryst or 99.9% pure melted pieces of 3-6 mm or 1-3 mm; orthorhomb or cub; enthalpy of vaporization 160.4 kJ/ mol; enthalpy of fusion 14.70 kJ/mol; obtained by reaction of HF and PbCO<sub>3</sub> or lead hydroxide; used in electronic and optical applications, pieces used as evaporation material and sputtering material for dielectric interference filter in the ultraviolet, and as a high index film in the ultraviolet [HAW93] [CRC10] [MER06] [KIR78] [CER91] **Solubility:** 0.057 g/100 mL H<sub>2</sub>O (0°C), 0.065 (20°C) [MER06]; g/L soln, H<sub>2</sub>O: 0.66 (25°C) [KRU93]; s HNO<sub>3</sub>; i acetone, ammonia [KIR78] Density, g/cm<sup>3</sup>: ortho-rhomb: 8.445; cub: 7.750 [MER06] Melting Point, °C: 830 [CRC10] Boiling Point, °C: 1293 [MER06] Reactions: transition from ortho-rhomb to cub at >316°C [MER06]

#### 1707

Compound: Lead fluoroborate Synonym: lead borofluoride Formula: Pb(BF<sub>4</sub>)<sub>2</sub> Molecular Formula: B<sub>2</sub>F<sub>8</sub>Pb Molecular Weight: 380.809 CAS RN: 13814-96-5 Properties: liq; used in lead electroplating, in tin-lead plating [HAW93]

## 1708

Compound: Lead fluorosilicate dihydrate Synonym: lead hexafluorosilicate dihydrate Formula:  $PbSiF_6 \cdot 2H_2O$ Molecular Formula:  $F_6H_4O_2PbSi$ Molecular Weight: 385.307 CAS RN: 1310-03-8 Properties: colorless cryst; used in aq solutions for the electrodeposition of lead [HAW93] Solubility: g/100 g H<sub>2</sub>O: 190 (0°C), 222 (20°C), 463 (100°C) [LAN05] Melting Point, °C: decomposes [HAW93]

#### 1709

Compound: Lead hexafluoroacetylacetonate Synonyms: 1,1,1,5,5,5-hexafluoro-2,4pentanedione, lead derivative Formula: Pb(CF<sub>3</sub>COCHCOCF<sub>3</sub>)<sub>2</sub> Molecular Formula: C<sub>10</sub>F<sub>12</sub>O<sub>4</sub>Pb Molecular Weight: 621.289 CAS RN: 19648-88-5 Properties: white powd [STR93]
Melting Point, °C: 153–158 [STR93]
Boiling Point, °C: decomposes at 210 [STR93]
Reactions: sublimes at 180°C (0.05 mm Hg) [STR93]

# 1710

Compound: Lead hydrogen phosphate
Formula: PbHPO<sub>4</sub>
Molecular Formula: HO<sub>4</sub>PPb
Molecular Weight: 303.179
CAS RN: 7446-27-7
Properties: soft, white powd or fine plate-like cryst; used to impart heat resistance and pearlescence to polystyrene and casein plastics [HAW93]
Density, g/cm<sup>3</sup>: 5.66 [HAW93]
Melting Point, °C: decomposes [HAW93]

#### 1711

**Compound:** Lead hydroxide **Formula:** Pb(OH)<sub>2</sub> **Molecular Formula:** H<sub>2</sub>O<sub>2</sub>Pb **Molecular Weight:** 241.215 **CAS RN:** 19783-14-3

Properties: white, bulky powd; absorbs atm CO<sub>2</sub>; can be prepared by addition of alkali to a solution of lead nitrate; used in Ni–Cd battery electrolytes, as an oxidation catalyst, in electrical insulating paper and in petroleum well plugs [KIR78] [HAW93]
Solubility: 0.0155 g/100 mL H<sub>2</sub>O (20°C) [KIR78];

s HNO<sub>3</sub> and acetic acid [HAW93] Density, g/cm<sup>3</sup>: 7.592 [HAW93] Melting Point, °C: decomposes at 145 [HAW93]

## 1712

**Compound:** Lead(II) hypophosphite **Formula:**  $Pb(H_2PO_2)_2$ **Molecular Formula:**  $H_4O_4P_2Pb$ **Molecular Weight:** 337.2 **CAS RN:** 10294-58-3 **Properties:** hygr cryst powd [CRC10] **Solubility:** sl H<sub>2</sub>O; i EtOH [CRC10] **Melting Point,** °C: decomposes [CRC10]

## 1713

**Compound:** Lead iodate **Formula:** Pb(IO<sub>3</sub>)<sub>2</sub> **Molecular Formula:** I<sub>2</sub>O<sub>6</sub>Pb **Molecular Weight:** 557.005 CAS RN: 25659-31-8 Properties: white; -60 mesh with 99.9% purity [CRC10] [CER91] Solubility: g/L soln, H<sub>2</sub>O: 0.0254 (25°C) [KRU93] Density, g/cm<sup>3</sup>: 6.5 [LID94] Melting Point, °C: decomposes at 300 [CRC10]

#### 1714

Compound: Lead iodide Formula: PbI<sub>2</sub> Molecular Formula: I<sub>2</sub>Pb Molecular Weight: 461.009 CAS RN: 10101-63-0 Properties: yellow hex powd cryst; -100 mesh with 99.999% purity; heavy, odorless powd; sensitive to light; enthalpy of vaporization 104 kJ/mol; enthalpy of fusion 23.40 kJ/mol; can be made by mixing a soluble Pb compound with HI, followed by recrystallization from water; used in bronzing, printing, photography, and in cloud seeding [HAW93] [CRC10] [MER06] [CER91] [KIR78] Solubility: 1 gram dissolves in 1350 mL cold H<sub>2</sub>O, in 230 mL boiling H<sub>2</sub>O [MER06]; g/100 g soln, H<sub>2</sub>O: 0.0442 (0°C), 0.0764 (25°C), 0.436 (100°C) [KRU93] Density, g/cm<sup>3</sup>: 6.16 [MER06] Melting Point, °C: 402 [CRC10] Boiling Point, °C: 954 [CRC10]

# 1715

Compound: Lead metasilicate Formula: PbSiO<sub>3</sub> Molecular Formula: O<sub>3</sub>PbSi Molecular Weight: 283.3 CAS RN: 10099-76-0 Properties: white, monocl, cryst powd [CRC10] Solubility: i H<sub>2</sub>O, os [CRC10] Density, g/cm<sup>3</sup>: 6.49 [CRC10]

#### 1716

Compound: Lead molybdate Synonym: wulfenite Formula: PbMoO<sub>4</sub> Molecular Formula: MoO<sub>4</sub>Pb Molecular Weight: 367.138 CAS RN: 10190-55-3 Properties: white; scheelite structure, c/a=2.23; used in pigments and as an analytical reagent [HAW93] [KIR81] Solubility: 0.000012 g/100 g H<sub>2</sub>O; s HNO<sub>3</sub>, NaOH when freshly precipitated [HAW93] [MER06] [KIR81]
 Density, g/cm<sup>3</sup>: 6.92 [STR93]
 Melting Point, °C: 1060–1070 [STR93]

# 1717

Compound: Lead niobate Formula: PbNb<sub>2</sub>O<sub>6</sub> Molecular Formula: Nb<sub>2</sub>O<sub>6</sub>Pb Molecular Weight: 489.009 CAS RN: 12034-88-7 Properties: -200 mesh with 99.9% purity [CER91] Melting Point, °C: >1200 [LID94]

#### 1718

Compound: Lead nitrate Formula: Pb(NO<sub>3</sub>)<sub>2</sub> Molecular Formula: N<sub>2</sub>O<sub>6</sub>Pb Molecular Weight: 331.209 CAS RN: 10099-74-8 Properties: colorless cub or monocl cryst; prepared by dissolution of Pb, PbO, or PbCO<sub>3</sub> in dil HNO<sub>3</sub>; -50 mesh with 99.999% purity; hygr; many uses including textile mordant, pyrotechnics, and photothermography [KIR78] [MER06] [STR93] [CER91] Solubility: s alkalies, ammonia; 8.77 g/100 mL alcohol (22°C) [KIR78]; g/100 g soln, H<sub>2</sub>O: 39.5±0.7 (0°C),  $60.0 \pm 0.8 (25^{\circ}C), 130 \pm 6 (100^{\circ}C) [KRU93]$ Density, g/cm<sup>3</sup>: 4.53 [MER06] Melting Point, °C: 470 [STR93]

Reactions: decomposes with evolution of O<sub>2</sub> and N<sub>2</sub> at >205°C [KIR78]

#### 1719

Compound: Lead oxalate Formula: PbC<sub>2</sub>O<sub>4</sub> Molecular Formula: C<sub>2</sub>O<sub>4</sub>Pb Molecular Weight: 295.220 CAS RN: 814-93-7 Properties: white, heavy powd [MER06] Solubility: i H<sub>2</sub>O; s dil HNO<sub>3</sub>; sl s acetic acid [MER06]; g/L soln, H<sub>2</sub>O: 0.0015 (18°C) [KRU93] Density, g/cm<sup>3</sup>: 5.28 [MER06] Melting Point, °C: decomposes at 300 [AES93]

# 1720

**Compound:** Lead oxide **Synonyms:** massicot, litharge

Formula: PbO
Molecular Formula: OPb
Molecular Weight: 223.199
CAS RN: 1317-36-8
Properties: two forms: red to reddish yellow, tetr cryst, stable at ordinary temp; yellow, orthorhomb cryst, stable above 489°C [MER06]
Solubility: i H<sub>2</sub>O, alcohol; s acetic acid, dil HNO<sub>3</sub> [MER06]
Density, g/cm<sup>3</sup>: 9.53 [MER06]
Melting Point, °C: 888 [MER06]
Reactions: transforms slowly to Pb<sub>3</sub>O<sub>4</sub> at 300°C-450°C; reverts to PbO at higher temperatures [MER06]

# 1721

Compound: Lead oxide
Synonym: lead sesquioxide
Formula: Pb<sub>2</sub>O<sub>3</sub>
Molecular Formula: O<sub>3</sub>Pb<sub>2</sub>
Molecular Weight: 462.398
CAS RN: 1314-27-8
Properties: reddish yellow amorphous powd; obtained from PbO<sub>2</sub> by hydrothermal reaction; used in ceramics, ceramic cements, metallurgy, and in varnishes [HAW93] [MER06] [KIR78]
Solubility: i H<sub>2</sub>O; decomposed by conc HCl, H<sub>2</sub>SO<sub>4</sub>, evolving Cl<sub>2</sub> or O<sub>2</sub> [MER06]; s alkalies [HAW93]
Melting Point, °C: decomposes at 370 [KIR78]
Reactions: forms Pb<sub>3</sub>O<sub>4</sub> in air at 370°C [MER06]

# 1722

**Compound:** Lead(II) perchlorate Formula:  $Pb(ClO_4)_2$ Molecular Formula: $Cl_2O_8Pb$ Molecular Weight: 406.1 CAS RN: 13453-62-8 Properties: white cryst [CRC10] Solubility: g/100 g H<sub>2</sub>O: 4.41<sup>25</sup>

#### 1723

**Compound:** Lead perchlorate trihydrate **Formula:**  $Pb(ClO_4)_2 \cdot 3H_2O$  **Molecular Formula:**  $Cl_2H_6O_{11}Pb$  **Molecular Weight:** 460.146 **CAS RN:** 13637-76-8 **Properties:** white cryst [HAW93] **Solubility:** 81.5 g/100 g soln in H<sub>2</sub>O (25°C), solid phase is Pb(ClO<sub>4</sub>)<sub>2</sub> · 3H<sub>2</sub>O [KRU93] **Density, g/cm<sup>3</sup>:** 2.6 [HAW93] **Melting Point, °C:** decomposes at 100 [HAW93]

Compound: Lead phosphate
Formula: Pb<sub>3</sub>(PO<sub>4</sub>)<sub>2</sub>
Molecular Formula: O<sub>8</sub>P<sub>2</sub>Pb<sub>3</sub>
Molecular Weight: 811.543
CAS RN: 7446-27-7
Properties: white powd; used as a stabilizing agent for plastics [HAW93]
Solubility: g/L H<sub>2</sub>O: 1.35 × 10<sup>-4</sup> (20°C) [KRU93]
Density, g/cm<sup>3</sup>: 6.9 [MER06]
Melting Point, °C: 1014 [MER06]

# 1725

**Compound:** Lead selenate **Formula:** PbSeO<sub>4</sub> **Molecular Formula:** O<sub>4</sub>PbSe **Molecular Weight:** 350.158 **CAS RN:** 7446-15-3 **Properties:** ortho-rhomb cryst [MER06] **Solubility:** i H<sub>2</sub>O; s conc acids [MER06] **Density, g/cm<sup>3</sup>:** 6.37 [MER06] **Melting Point, °C:** decomposes [CRC10]

# 1726

Compound: Lead selenide Synonym: clausthalite Formula: PbSe Molecular Formula: PbSe Molecular Weight: 286.160 CAS RN: 12069-00-0 **Properties:** gray black powd; semiconducting material used in infrared detectors and in thermoelectric devices, and as a 99.999% pure material, to produce photoconductive films [HAW93] [STR93] [CER91] Solubility: i H<sub>2</sub>O; s HNO<sub>3</sub> [HAW93] Density, g/cm<sup>3</sup>: 8.10 (15°C) [HAW93] Melting Point, °C: 1065 [HAW93] Thermal Conductivity, W/(m·K): 1.7 [CRC10] Thermal Expansion Coefficient: (volume) 100°C (0.474), 200°C (1.110), 400°C (2.420), 600°C (3.716) [CLA66]

# 1727

Compound: Lead selenite Formula: PbSeO<sub>3</sub> Molecular Formula: O<sub>3</sub>PbSe Molecular Weight: 334.158 CAS RN: 7488-51-9 Properties: white, monocl; -100 mesh with 99.9% purity; powd [CER91] [MER06] [LID94] Solubility: v sl s H<sub>2</sub>O [MER06] Density, g/cm<sup>3</sup>: 7.0 [LID94]
Melting Point, °C: melts to yellow liq at ~500 [MER06]
Reactions: decomposes at bright-red heat with formation of selenium oxide [MER06]

## 1728

Compound: Lead silicate Synonym: alamoisite Formula: PbSiO<sub>3</sub> Molecular Formula: O<sub>3</sub>PbSi Molecular Weight: 283.284 CAS RN: 10099-76-0 Properties: white, cryst powd; obtained by reacting lead acetate with sodium silicate; used in ceramics and for fireproofing fabrics; formula given also as 1-1/2PbO · SiO<sub>2</sub> for a commercial product [KIR78] [HAW93] Solubility: i most solvents [HAW93] Density, g/cm<sup>3</sup>: 6.50–6.65 [KIR78] Melting Point, °C: 700–784 [KIR78]

#### 1729

Compound: Lead stearate Formula: Pb[CH<sub>3</sub>(CH<sub>2</sub>)<sub>16</sub>COO]<sub>2</sub> Molecular Formula: C<sub>36</sub>H<sub>70</sub>O<sub>4</sub>Pb Molecular Weight: 774.152 CAS RN: 1072-35-1 Properties: white powd; used as drier in varnishes and lacquer, in high pressure lubricants [HAW93] [MER06] Solubility: i H<sub>2</sub>O; s hot alcohol [MER06] Density, g/cm<sup>3</sup>: 1.4 [HAW93] Melting Point, °C: 100–115 [HAW93]

# 1730

Compound: Lead sulfate Synonym: anglesite Formula: PbSO<sub>4</sub> Molecular Formula: O<sub>4</sub>PbS Molecular Weight: 303.264 CAS RN: 7446-14-2 Properties: white ortho-rhomb, monocl; heavy, cryst powd; made by warming PbO, PbCO<sub>3</sub>, or  $Pb(OH)_2$  in  $H_2SO_4$ ; used in paint pigments and in storage batteries, used to stabilize clay soils [HAW93] [MER06] [KIR78] Solubility: s in ~2225 parts H<sub>2</sub>O; more s dil HCl, HNO<sub>3</sub>; s NaOH [MER06]; g/L soln, H<sub>2</sub>O: 0.0330 (0°C), 0.0452 (25°C), 0.0574 (50°C) [KRU93] Density, g/cm<sup>3</sup>: 6.12–6.39 [HAW93] Melting Point, °C: 1170 [MER06]

Compound: Lead sulfide Synonym: galena Formula: PbS Molecular Formula: PbS Molecular Weight: 239.266 CAS RN: 1314-87-0

- **Properties:** black powd or silvery cub cryst; enthalpy of fusion 19.00 kJ/mol; photoconductive; can be made by heating Pb in sulfur vapor; used in ceramics, infrared radiation detection, and semiconductors, and in the form of 99.9% or 99.999% pure material as a sputtering target for metallic high reflecting films; galena is natural lead sulfide ore, it has a lead gray color with a metallic luster, a 2.5 Mohs hardness [KIR78] [HAW93] [CER91] [CRC10]
- **Solubility:** 0.01244 g/100 mL H<sub>2</sub>O (20°C); s HNO<sub>3</sub>, hot dil HCl [KIR78] [MER06]

Density, g/cm<sup>3</sup>: 7.61 [CRC10]

Melting Point, °C: 1113 [CRC10]

Thermal Conductivity, W/(m·K): 2.3 [CRC10]

**Thermal Expansion Coefficient:** (volume) 100°C (0.490), 200°C (1.099), 400°C (2.402), 600°C (3.878) [CLA66]

# 1732

**Compound:** Lead sulfite **Formula:** PbSO<sub>3</sub> **Molecular Formula:** O<sub>3</sub>PbS **Molecular Weight:** 287.264 **CAS RN:** 7446-10-8 **Properties:** white powd [HAW93] **Solubility:** i H<sub>2</sub>O; s HNO<sub>3</sub> [HAW93] **Melting Point, °C:** decomposes [HAW93]

# 1733

Compound: Lead tantalate Formula: PbTa<sub>2</sub>O<sub>6</sub> Molecular Formula: O<sub>6</sub>PbTa<sub>2</sub> Molecular Weight: 665.092 CAS RN: 12065-68-8 Properties: ortho; -200 mesh with 99.9% purity [LID94] [CER91] Density, g/cm<sup>3</sup>: 7.9 [LID94]

# 1734

Compound: Lead telluride Synonym: altaite Formula: PbTe Molecular Formula: PbTe Molecular Weight: 334.800 CAS RN: 1314-91-6 Properties: silver gray cub cryst, 99.999% pure melted pieces of 3–12 mm and 1–3 mm; semiconductor, photoconductor; hardness 3 Mohs; made by melting mixture of Pb and Te; used as an evaporation material and sputtering target for high-index film in infrared filters and infrared detectors [KIR78] [MER06] [CER91]
Solubility: not attacked by HCl, HF, HClO [MER06]
Density, g/cm<sup>3</sup>: 8.164 [STR93]
Melting Point, °C: 905 [MER06]
Thermal Conductivity, W/(m·K): 2.3 [CRC10]

# 1735

Compound: Lead tellurite Formula: PbTeO<sub>3</sub> Molecular Formula: O<sub>3</sub>PbTe Molecular Weight: 382.798 CAS RN: 15851-47-5 Properties: -100 mesh with 99.9% purity [CER91]

#### 1736

Compound: Lead tetraacetate Synonym: lead(IV) acetate Formula: Pb(CH<sub>3</sub>COO)<sub>4</sub> Molecular Formula: C<sub>8</sub>H<sub>12</sub>O<sub>8</sub>Pb Molecular Weight: 443.378 CAS RN: 546-67-8 Properties: white to light brown; monocl prisms from glacial acetic acid; readily turns pink; unstable in air, moisture sensitive; hydrolyzes in H<sub>2</sub>O to form brown PbO<sub>2</sub> and acetic acid; oxidizing agent; obtained by adding warm glacial water free acetic acid to Pb<sub>3</sub>O<sub>4</sub>, then cooling; used as a laboratory reagent, as an oxidant in organic synthesis [KIR78] [HAW93] [MER06] [STR93] Solubility: decomposes in cold H<sub>2</sub>O and alcohol; s hot glacial acetic acid, benzene, chloroform [MER06] [KIR78] Density, g/cm3: 2.228 [MER06] Melting Point, °C: 175–180 [MER06] Reactions: reacts with conc halogen acids, HX, to form haloplumbic acids, H<sub>2</sub>PbX [MER06]

# 1737

Compound: Lead tetrachloride Formula: PbCl<sub>4</sub> Molecular Formula: Cl<sub>4</sub>Pb Molecular Weight: 349.0 CAS RN: 13463-30-4 Properties: yellow oily liq [CRC10] Melting Point: -15 [CRC10] Boiling Point, °C: decomposes at ~50 [CRC10] **Compound:** Lead tetrafluoride **Formula:** PbF<sub>4</sub> **Molecular Formula:** F<sub>4</sub>Pb **Molecular Weight:** 283.194 **CAS RN:** 7783-59-7

Properties: white tetr cryst; readily hydrolyzes and forms PbO<sub>2</sub> in the presence of moisture; can be produced from a reaction of F<sub>2</sub> with PbF<sub>2</sub>; used as a very effective fluorinating agent for olefins [KIR78] [MER06]
Density, g/cm<sup>3</sup>: 6.7 [MER06]
Melting Point, °C: ~600 decomposes [MER06]

# 1739

Compound: Lead thiocyanate
Formula: Pb(SCN)<sub>2</sub>
Molecular Formula: C<sub>2</sub>N<sub>2</sub>PbS<sub>2</sub>
Molecular Weight: 323.367
CAS RN: 592-87-0
Properties: white or light yellow odorless powd; used as an ingredient of priming mixture for small arms cartridges, safety matches, and used in dyeing [HAW93] [MER06]
Solubility: s ~200 parts cold, 50 parts boiling H<sub>2</sub>O [MER06]; g/L H<sub>2</sub>O: 0.0137 (18°) [KRU93]
Density, g/cm<sup>3</sup>: 3.82 [MER06]

Melting Point, °C: decomposes at 190 [ALD94]

# 1740

Compound: Lead thiosulfate Formula: PbS<sub>2</sub>O<sub>3</sub> Molecular Formula: O<sub>3</sub>PbS<sub>2</sub> Molecular Weight: 319.330 CAS RN: 13478-50-7 Properties: white cryst [HAW93] Solubility: i H<sub>2</sub>O; s acids and sodium thiosulfate solutions [HAW93] Density, g/cm<sup>3</sup>: 5.18 [HAW93] Melting Point, °C: decomposes [HAW93]

# 1741

**Compound:** Lead titanate **Synonym:** lead metatitanate **Formula:** PbTiO<sub>3</sub> **Molecular Formula:** O<sub>3</sub>PbTi **Molecular Weight:** 303.065 **CAS RN:** 12060-00-3 Properties: yellow tetr cryst <490°C, cub >490°C; can be made by calcination of stoichiometric amounts of PbO and TiO<sub>2</sub> at 400°C; also prepared by precipitation from aq solution of lead nitrate, titanium tetrachloride, and ammonium hydroxide, followed by calcining at 900°C; has been used as a paint pigment; and in 99.9% purity as a sputtering target for thin film capacitors [KIR78] [KIR83] [STR93] [CER91] [SAF87]
Solubility: i H<sub>2</sub>O; decomposed in HCl solution to PbCl<sub>2</sub> and TiO<sub>2</sub> [KIR78] [HAW93]
Density, g/cm<sup>3</sup>: 7.52 [HAW93]

# 1742

Compound: Lead tungstate Synonym: raspite Formula: PbWO<sub>4</sub> Molecular Formula: O<sub>4</sub>PbW Molecular Weight: 455.038 CAS RN: 7759-01-5 Properties: -200 mesh with 99.9% purity; colorless monocl [CER91] [KIR83] Solubility: 0.03 g/100 mL H<sub>2</sub>O [CRC10] Density, g/cm<sup>3</sup>: 8.46 [KIR83] Melting Point, °C: 1123 [KIR83] Reactions: transforms to stolzite ~400°C [LID94]

#### 1743

Compound: Lead tungstate Synonym: stolzite Formula: PbWO<sub>4</sub> Molecular Formula: O<sub>4</sub>PbW Molecular Weight: 455.038 CAS RN: 7759-01-5 Properties: white powd; used as a pigment [HAW93] Solubility: i H<sub>2</sub>O, cold HNO<sub>3</sub>; s in fixed alkali hydroxides [MER06] Density, g/cm<sup>3</sup>: 8.24 [HAW93] Melting Point, °C: 1130 [HAW93]

#### 1744

Compound: Lead vanadate
Synonym: lead metavanadate
Formula: Pb(VO<sub>3</sub>)<sub>2</sub>
Molecular Formula: O<sub>6</sub>PbV<sub>2</sub>
Molecular Weight: 405.079
CAS RN: 10099-79-3
Properties: yellow powd; used to prepare other vanadium compounds and as a pigment [HAW93]
Solubility: i H<sub>2</sub>O; decomposed by HNO<sub>3</sub> [MER06]

**Compound:** Lead zirconate **Formula:** PbZrO<sub>3</sub> **Molecular Formula:** O<sub>3</sub>PbZr **Molecular Weight:** 346.422 **CAS RN:** 12060-01-4

Properties: colorless cub perovskite >230°, pseudotetr or ortho-rhomb <230°C; can be obtained by heating stoichiometric amounts of lead and zirconium oxides; has high piezoelectric properties; used in high power acoustic transducer, hydrophones, and as a 99.7% pure sputtering target for thin film capacitors [STR93] [CER91] [KIR78]
Solubility: i H<sub>2</sub>O, alkalies; s mineral acids [KIR78]

Density, g/cm<sup>3</sup>: 7.0 [STR93]

# 1746

**Compound:** Lead(II) butanoate **Formula:**  $Pb(C_4H_7O_2)_2$  **Molecular Formula:**  $C_8H_{14}PbO_4$  **Molecular Weight:** 381.4 **CAS RN:** 819-73-8 **Properties:** col solid [CRC10] **Solubility:** i H<sub>2</sub>O; s dil HNO<sub>3</sub> [CRC10] **Melting Point, °C:** ~90 [CRC10]

#### 1747

**Compound:** Lead(II) carbonate, basic **Formula:**  $Pb(OH)_2 \cdot 2PbCO_3$  **Molecular Formula:**  $C_2H_2O_8Pb_3$  **Molecular Weight:** 775.6 **CAS RN:** 1319-46-6 **Properties:** white, hex cryst [CRC10] **Solubility:** i H<sub>2</sub>O, EtOH; s acid [CRC10] **Density, g/cm<sup>3</sup>:** ~6.5 [CRC10] **Melting Point,** °C: decomposes at 400 [CRC10]

#### 1748

**Compound:** Lead(II) chloride fluoride **Formula:** PbClF **Molecular Formula:** ClFPb **Molecular Weight:** 261.7 **CAS RN:** 13847-57-9 **Properties:** tetr cryst [CRC10] **Solubility:** g/100 g H<sub>2</sub>O: 0.035<sup>20</sup> [CRC10] **Density, g/cm<sup>3</sup>:** 7.05 [CRC10]

#### 1749

**Compound:** Lead(II) chromate(VI) oxide **Formula:**  $PbCrO_4 \cdot PbO$  Molecular Formula: CrO<sub>5</sub>Pb<sub>2</sub> Molecular Weight: 546.4 CAS RN: 18454-12-1 Properties: red powd [CRC10] Solubility: i H<sub>2</sub>O [CRC10]

#### 1750

**Compound:** Lead(II) 2-ethylhexanoate **Formula:**  $Pb(C_7H_{15}CO_2)_2$  **Molecular Formula:**  $C_{16}H_{30}O_4Pb$  **Molecular Weight:** 493.6 **CAS RN:** 301-08-6 **Properties:** visc liq [CRC10] **Density, g/cm<sup>3</sup>:** 1.56 [CRC10]

#### 1751

**Compound:** Lead(II) formate **Formula:**  $Pb(CHO_2)_2$  **Molecular Formula:**  $C_2H_2O_4Pb$  **Molecular Weight:** 297.2 **CAS RN:** 811-54-1 **Properties:** white prisms or needles [CRC10] **Solubility:** g/100 g H<sub>2</sub>O: 1.6<sup>16</sup>; i EtOH [CRC10] **Melting Point,** °C: decomposes at 190 [CRC10] **Density, g/cm<sup>3</sup>:** 4.63 [CRC10]

#### 1752

Compound: Lead(II) hydrogen arsenate Formula: PbHAsO<sub>4</sub> Molecular Formula: AsHO<sub>4</sub>Pb Molecular Weight: 347.1 CAS RN: 7784-40-9 Properties: white, monocl cryst [CRC10] Solubility: i H<sub>2</sub>O; s HNO<sub>3</sub>, alk [CRC10] Melting Point, °C: decomposes at 280 [CRC10] Density, g/cm<sup>3</sup>: 5.943 [CRC10]

#### 1753

**Compound:** Lead(II) lactate **Formula:**  $Pb(C_3H_5O_3)_2$  **Molecular Formula:**  $C_6H_{10}O_6Pb$  **Molecular Weight:** 385.3 **CAS RN:** 18917-82-3 **Properties:** white, cryst powd [CRC10] **Solubility:** s H<sub>2</sub>O, hot EtOH [CRC10]

## 1754

**Compound:** Lead(II) oleate **Formula:**  $Pb(C_{18}H_{33}O_2)_2$ 

**Compound:** Lead(II) oxide hydrate **Formula:**  $3PbO \cdot H_2O$  **Molecular Formula:**  $H_2O_4Pb_3$  **Molecular Weight:** 687.6 **CAS RN:** 1311-11-1 **Properties:** white powd [CRC10] **Solubility:** i  $H_2O$ ; s dil acid [CRC10] **Density, g/cm<sup>3</sup>:** 7.41 [CRC10]

## 1756

**Compound:** Lead(IV) bromide **Formula:** PbBr<sub>4</sub> **Molecular Formula:** Br<sub>4</sub>Pb **Molecular Weight:** 526.8 **CAS RN:** 13702-91-2 **Properties:** unstable liq [CRC10]

# 1757

**Compound:** Lead(IV) chloride **Formula:** PbCl<sub>4</sub> **Molecular Formula:** Cl<sub>4</sub>Pb **Molecular Weight:** 349.0 **CAS RN:** 13463-30-4 **Properties:** yellow oily liq [CRC10]

## 1758

**Compound:** Lead(IV) fluoride **Formula:** PbF<sub>4</sub> **Molecular Formula:** F<sub>4</sub>Pb **Molecular Weight:** 283.2 **CAS RN:** 7783-59-7 **Properties:** white, tetr cryst; hygr [CRC10] **Density:** 6.7 [CRC10] **Melting Point,** °C: ~600 [CRC10]

#### 1759

**Compound:** Lead(II,III) oxide **Synonyms:** minium, red lead **Formula:** Pb<sub>3</sub>O<sub>4</sub> **Molecular Formula:** O<sub>4</sub>Pb<sub>3</sub> **Molecular Weight:** 685.598 **CAS RN:** 1314-41-6 Properties: bright red, heavy powd; spinel structure; evolves Cl in contact with hot HCl; oxidizing agent; manufactured by heating PbO in air at 450°C–500°C; used in storage batteries, in the purification of alcohol, as a pigment in corrosion-protective paints [HAW93] [MER06] [KIR78]
Solubility: i H<sub>2</sub>O, alcohol; s in excess glacial acetic acid, hot HCl [MER06]
Density, g/cm<sup>3</sup>: 9.1 [MER06]
Melting Point, °C: 830 (under O<sub>2</sub>) [KIR78]
Boiling Point, °C: decomposes at 500 [KIR78]

#### 1760

**Compound:** Lithium Formula: Li Molecular Formula: Li Molecular Weight: 6.941 CAS RN: 7439-93-2 Properties: very soft silver-white metal; bcc from ~-195°C-180°C, a=0.350 nm; hardness 0.6 Mohs; specific heat 3.55 J/g; enthalpy of fusion 3.00 kJ/mol; enthalpy of vaporization ~147.8 kJ/ mol; electrical resistivity  $9.446 \mu ohm \cdot cm$ ; ionic radius 0.060 nm; vapor pressure, kPa: 0.065 (702°C), 0.376 (802°C), 1.61 (902°C), 5.47 (1002°C), 9.4 (1052°C), 12.13 (1077°C); manufactured by electrolysis; used to prepare the amide, nitride, and hydride [KIR81] [CRC10] Solubility: reacts vigorously with H<sub>2</sub>O, dil HCl, H<sub>2</sub>SO<sub>4</sub>, HNO<sub>3</sub> evolving H<sub>2</sub> [MER06] Density, g/cm<sup>3</sup>: 0.531 (20°C) [KIR81] Melting Point, °C: 180.5 [KIR81] Boiling Point, °C: 1336 [KIR81] **Reactions:** transformation to fcc at -133°C; bcc to hex at -199°C [KIR78] Thermal Conductivity, W/(m·K): 84.7 [CRC10] **Thermal Expansion Coefficient:** 46×10<sup>-6</sup>/K [CRC10]

## 1761

Compound: Lithium acetate
Formula: CH<sub>3</sub>COOLi
Molecular Formula: C<sub>2</sub>H<sub>3</sub>LiO<sub>2</sub>
Molecular Weight: 65.986
CAS RN: 546-89-4
Properties: used as an alcoholysis catalyst in the manufacture of alkyl resins [KIR81]
Solubility: g/100 g soln, H<sub>2</sub>O: 23.76 (0°C), 31.28 (25.8°C), 66.73 (102.8°C); solid phase, CH<sub>3</sub>COOLi · 2H<sub>2</sub>O (0°C, 25°C), CH<sub>3</sub>COOLi (100°C) [KRU93]
Melting Point, °C: 291 [KIR81]

Compound: Lithium acetate dihydrate Synonyms: acetic acid, lithium salt Formula: LiCH<sub>3</sub>COO  $\cdot$  2H<sub>2</sub>O Molecular Formula: C<sub>2</sub>H<sub>7</sub>LiO<sub>4</sub> Molecular Weight: 102.017 CAS RN: 6108-17-4 Properties: white powd; rhomb cryst; obtained readily from reaction of acetic acid and Li<sub>2</sub>CO<sub>3</sub> or LiOH; used as catalyst in production of polyester, as an anticorrosion agent [KIR81] [STR93] [MER06] [FMC93] Solubility: gLiC<sub>2</sub>H<sub>3</sub>O<sub>2</sub>/100 g H<sub>2</sub>O: 31 (25°C), 66 g/100 g H<sub>2</sub>O (100°C) [KIR81] Density, g/cm<sup>3</sup>: 1.3 [STR93] Melting Point, °C: 57.8; anhydrous, 291 [KIR81]

# 1763

**Compound:** Lithium acetylacetonate **Synonyms:** 2,4-pentanedione, lithium derivative **Formula:** Li[CH<sub>3</sub>COCH=C(O)CH<sub>3</sub>] **Molecular Formula:**  $C_5H_7LiO_2$  **Molecular Weight:** 106.051 **CAS RN:** 18115-70-3 **Properties:** white powd; hygr [STR93] **Melting Point, °C:** decomposes at 250 [ALD94]

1764

Compound: Lithium aluminum deuteride
Formula: LiAlD<sub>4</sub>
Molecular Formula: AlD<sub>4</sub>Li
Molecular Weight: 41.983
CAS RN: 14128-54-2
Properties: white to gray cryst; sensitive to moisture; decomposes at >140°C liberating deuterium; used to introduce deuterium atoms into molecules [HAW93]
Solubility: s ether, tetrahydrofuran [HAW93]
Density, g/cm<sup>3</sup>: 1.02 [HAW93]
Melting Point, °C: decomposes at 175 [ALD94]

## 1765

**Compound:** Lithium aluminum hydride **Synonym:** lithium tetrahydridoaluminate **Formula:** LiAlH<sub>4</sub> **Molecular Formula:** AlH<sub>4</sub>Li **Molecular Weight:** 37.955 **CAS RN:** 16853-85-3 Properties: cryst or gray powd; monocl; stable in dry air, decomposes in moist air; prepared by reaction of LiH with AlCl<sub>3</sub>; used as a reducing agent for organics to convert esters, aldehydes, and ketones to alcohols, used in perfumes, and in pharmaceuticals [HAW93] [MER06]
Solubility: reacts rapidly with H<sub>2</sub>O; 30 parts/100 parts ether [MER06]
Density, g/cm<sup>3</sup>: 0.917 [STR93]
Melting Point, °C: decomposes at >125 [MER06]
Reactions: slowly evolves H<sub>2</sub> at 120°C [MER06]

# 1766

Compound: Lithium aluminum silicate Synonym:  $\alpha$ -spodumene Formula:  $\alpha$ -LiAlSi<sub>2</sub>O<sub>6</sub> Molecular Formula: AlLiO<sub>6</sub>Si<sub>2</sub> Molecular Weight: 186.089 CAS RN: 12068-40-5 Properties: white powd; used in ceramic flux formulations, as a solid electrolyte, and in heat sinks for solar and nuclear applications [FMC93] [STR93]

#### 1767

Compound: Lithium amide Formula: LiNH<sub>2</sub> Molecular Formula: H<sub>2</sub>LiN Molecular Weight: 22.964 CAS RN: 7782-89-0 Properties: gray-to-white powd; tetr; manufactured by reacting LiH and NH<sub>3</sub> gas; used in the pharmaceutical industry to make antihistamines and analgesics [KIR81] [MER06] [FMC93] Solubility: decomposed by H<sub>2</sub>O [MER06] Density, g/cm<sup>3</sup>: 1.178 [ALD94] Melting Point, °C: 375 [KIR81] Reactions: transforms to imide at >400°C [KIR81]

#### 1768

**Compound:** Lithium arsenate **Formula:** Li<sub>3</sub>AsO<sub>4</sub> **Molecular Formula:** AsLi<sub>3</sub>O<sub>4</sub> **Molecular Weight:** 159.743 **CAS RN:** 13478-14-3 **Properties:** white powd [HAW93] **Solubility:** sl s H<sub>2</sub>O; s dil acetic acid [HAW93] **Density, g/cm<sup>3</sup>:** 3.07 (15°C) [HAW93]
Compound: Lithium azide
Formula: LiN<sub>3</sub>
Molecular Formula: LiN<sub>3</sub>
Molecular Weight: 48.961
CAS RN: 19597-69-4
Properties: colorless; hygr; body-center rhomb [CRC10] [CIC73]
Solubility: g/100 g H<sub>2</sub>O: 61.3 (0°C), 67.2 (20°C), 86.6 (60°C) [LAN05]
Density, g/cm<sup>3</sup>: 1.83 [LID94]
Melting Point, °C: decomposes at 115–298 [CRC10]

# 1770

Compound: Lithium borate Synonym: lithium metaborate Formula: LiBO<sub>2</sub> Molecular Formula: BLiO<sub>2</sub> Molecular Weight: 49.751 CAS RN: 13453-69-5 Properties: -80 mesh with 99.9% purity; used in special glass and enamel formulations as a flux, as an electrolyte component for lithium batteries; there is a dihydrate, LiBO<sub>2</sub>·2H<sub>2</sub>O [KIR81] [CER91] [FMC93] Solubility: g/100 g H<sub>2</sub>O: 0.9 (0°C), 2.7 (20°C), 5.78 (30°C) [LAN05] Density, g/cm<sup>3</sup>: 2.18 [LID94] Melting Point, °C: 849 [KIR81]

# 1771

Compound: Lithium borohydride Formula: LiBH<sub>4</sub> Molecular Formula: BH<sub>4</sub>Li Molecular Weight: 21.784 CAS RN: 16949-15-8 **Properties:** white to gray cryst powd; ortho-rhomb; decomposes in moist air; used as a source of hydrogen; reducing agent for aldehydes, ketones, and esters [MER06] [HAW93] **Solubility:** s H<sub>2</sub>O above pH 7, ether, tetrahydrofuran, aliphatic amines [MER06] Density, g/cm<sup>3</sup>: 0.66 [MER06] Melting Point, °C: 268 [MER06] Boiling Point, °C: decomposes at 380 [MER06] Reactions: reacts with HCl to form hydrogen, diborane, and LiCl [MER06]

# 1772

**Compound:** Lithium bromate **Formula:** LiBrO<sub>3</sub> Molecular Formula: BrLiO<sub>3</sub> Molecular Weight: 134.843 CAS RN: 13550-28-2 Solubility: g/100 g soln, H<sub>2</sub>O: 61.2 (0°C), 65.4 (25°C), 78.0 (100°C); solid phase, LiBrO<sub>3</sub> ⋅ H<sub>2</sub>O (0°C, 25°C), LiBrO<sub>3</sub> (100°C) [KRU93]

#### 1773

Compound: Lithium bromide Formula: LiBr Molecular Formula: BrLi Molecular Weight: 86.845 CAS RN: 7550-35-8 **Properties:** white cub; very deliq; bitter taste; enthalpy of fusion 17.60 kJ/mol manufactured by neutralizing HBr with LiOH or Li<sub>2</sub>CO<sub>3</sub>; used in pharmaceuticals, air conditioning, in batteries, LiBr solution is used as a component of refrigrant in absorption air conditioning and as a swelling agent for proteins [CRC10] [HAW93] [FMC93] Solubility: s alcohol, glycol, ether, amyl alcohol [KIR81] [MER06]; g/100 g soln, H<sub>2</sub>O: 58.4 ± 0.4 (0°C), 63.3 ± 1.8 (25°C), 72.7 (100°C); solid phase, LiBr  $\cdot$  3H<sub>2</sub>O (0°C), LiBr  $\cdot$  2H<sub>2</sub>O  $(25^{\circ}C)$ , LiBr · H<sub>2</sub>O (100°C) [KRU93] **Density, g/cm<sup>3</sup>:** 3.464 [LID94] Melting Point, °C: 552 [CRC10] Boiling Point, °C: 1310 [KIR81]; 1265 [STR93]

# 1774

Compound: Lithium bromide monohydrate Formula: LiBr $\cdot$ H<sub>2</sub>O Molecular Formula: BrH<sub>2</sub>LiO Molecular Weight: 104.860 CAS RN: 13453-70-8 Properties: white powd; obtained by crystallization from a hot solution of HBr and either LiOH or Li<sub>2</sub>CO<sub>3</sub>; can be dried to the anhydrous salt [KIR81] [STR93]

# 1775

Compound: Lithium carbide Formula: Li<sub>2</sub>C<sub>2</sub> Molecular Formula: C<sub>2</sub>Li<sub>2</sub> Molecular Weight: 37.904 CAS RN: 1070-75-3 Properties: cryst white powd; decomposes in water, evolves acetylene when dissolved in acid [HAW93] Density, g/cm<sup>3</sup>: 1.65 (18°C) [HAW93]

**Compound:** Lithium carbonate **Formula:** Li<sub>2</sub>CO<sub>3</sub> **Molecular Formula:** CLi<sub>2</sub>O<sub>3</sub>

Molecular Weight: 73.891

- CAS RN: 554-13-2
- Properties: white, light alkaline powd; enthalpy of fusion 41.00 kJ/mol; produced by reacting hot conc soda ash with LiCl, Li<sub>2</sub>SO<sub>4</sub>; used in ceramics and porcelain glazes; Li<sub>2</sub>CO<sub>3</sub> slurry can be dissolved by passing CO<sub>2</sub> through the slurry, carbonate reprecipitates if heated [HAW93] [MER06] [CRC10]
  Solubility: g/100 g H<sub>2</sub>O: 1.52 (0°C), 1.31 (20°C), 0.71 (100°C); i alcohol [KIR81]; g/100 g H<sub>2</sub>O: 1.54
- (0°C), 1.29 (25°C), 0.72 (100°C) [KRU93] Density, g/cm<sup>3</sup>: 2.11 [MER06] Melting Point, °C: 726 [KIR81] Boiling Point, °C: decomposes at 1310 [STR93]

## 1777

Compound: Lithium chlorate Formula: LiClO<sub>3</sub> Molecular Formula: ClLiO<sub>3</sub> Molecular Weight: 90.392 CAS RN: 13453-71-9 Properties: needle-like cryst; deliq; oxidizing agent; decomposes at 270°C; used in air conditioning, in propellants [HAW93] Solubility: g/100 g soln, H<sub>2</sub>O: 71.1 (1.5°C), 81.7 (22.1°C), 94.9 (99°C); solid phase, LiClO<sub>3</sub> · 3H<sub>2</sub>O + LiClO<sub>3</sub> · H<sub>2</sub>O (1.5°C), 4LiClO<sub>3</sub> · H<sub>2</sub>O (22.1°C),  $\alpha$ -LiClO<sub>3</sub> +  $\beta$ -LiClO<sub>3</sub> (100°C) [KRU93] Density, g/cm<sup>3</sup>: 1.119 [HAW93] Melting Point, °C: 128 [HAW93] Boiling Point, °C: decomposes [HAW93]

#### 1778

Compound: Lithium chloride Formula: LiCl Molecular Formula: ClLi Molecular Weight: 42.394 CAS RN: 7447-41-8

Properties: white powd; cub; very hygr; sharp saline taste; enthalpy of fusion 19.90 kJ/mol; obtained from reaction of HCl and LiOH or Li<sub>2</sub>CO<sub>3</sub> at >95°C; used in air conditioning, welding, and in soldering flux; component of dry batteries, catalyst for some oxidation reactions, chlorinating agent for steroid substrates [KIR81] [MER06] [STR93] [FMC93] Solubility: s water, alcohol, acetone, amyl alcohol, pyridine [KIR81] [MER06]; g/100 g soln, H<sub>2</sub>O: 40.9 (0°C), 45.8 (25°C), 56.2 (100°C); solid phase, LiCl · 2H<sub>2</sub>O (0°C), LiCl · H<sub>2</sub>O (25°C), LiCl (100°C) [KRU93]
 Density, g/cm<sup>3</sup>: 2.068 [HAW93]
 Melting Point, °C: 610 [CRC10]
 Boiling Point, °C: 1360 [HAW93]

# 1779

Compound: Lithium chloride monohydrate
Formula: LiCl·H<sub>2</sub>O
Molecular Formula: ClH<sub>2</sub>LiO
Molecular Weight: 60.409
CAS RN: 16712-20-2
Properties: white cryst; prepared by reacting HCl with LiOH or Li<sub>2</sub>CO<sub>3</sub> and crystallizing below 95°C; solution is used for deicing, in fire extinguishers, catalysts and for dehumidifying [FMC93] [KIR81] [STR93]
Solubility: 45.9 g/100 g saturated solution in water (25°C) [KIR81]
Density, g/cm<sup>3</sup>: 1.78 [CRC10]
Reactions: minus H<sub>2</sub>O at >98°C [CRC10]

#### 1780

Compound: Lithium chromate
Formula: Li<sub>2</sub>CrO<sub>4</sub>
Molecular Formula: CrLi<sub>2</sub>O<sub>4</sub>
Molecular Weight: 129.876
CAS RN: 14307-35-8
Properties: yellow cryst; clear yellow solution is used as a corrosion inhibitor and as an additive to industrial batteries [STR93] [FMC93]
Solubility: g/100 g soln, H<sub>2</sub>O: 47.27 (0.7°C), 48.60 (20°C), 56.82 (100°C); solid phase, Li<sub>2</sub>CrO<sub>4</sub> · 2H<sub>2</sub>O (0.7°C, 20°C), Li<sub>2</sub>CrO<sub>4</sub> (100°C) [KRU93]
Melting Point, °C: 495 [AES93]

#### 1781

Compound: Lithium chromate dihydrate
Formula: Li<sub>2</sub>CrO<sub>4</sub> · 2H<sub>2</sub>O
Molecular Formula: CrH<sub>4</sub>Li<sub>2</sub>O<sub>6</sub>
Molecular Weight: 165.906
CAS RN: 7789-01-7
Properties: yellow cryst; ortho-rhomb; deliq powd; oxidizing agent; eutectic in aq solutions is at −60°C; used as a corrosion inhibitor [HAW93] [MER06]
Solubility: 49.6% H<sub>2</sub>O (30°C); s methanol,

ethanol [KIR78] [MER06]

**Density, g/cm<sup>3</sup>:** 2.15 [KIR78] **Reactions:** minus 2H<sub>2</sub>O (74.6°C) to become anhydrous [KIR78]

# 1782

**Compound:** Lithium citrate tetrahydrate Synonyms: citric acid, trilithium salt Formula: LiOOCCH<sub>2</sub>C(OH)(COOLi)CH<sub>2</sub>COOLi · 4H<sub>2</sub>O Molecular Formula: C<sub>6</sub>H<sub>13</sub>Li<sub>3</sub>O<sub>11</sub> Molecular Weight: 281.985 CAS RN: 6680-58-6 **Properties:** white granules or cryst powd; deliq in moist air; barely perceptive alkaline taste; used in beverages and pharmaceuticals, as a clay dispersant, in electroplating solutions, and as a buffer for ion chromatography [FMC93] [HAW93] [MER06] Solubility: 74.5 g/100 mL H<sub>2</sub>O (25°C), 66.7 g/100 mL (100°C) H<sub>2</sub>O [CRC10]; sl s alcohol [MER06] Melting Point, °C: 209.92 [ALD94] Reactions: minus 4H<sub>2</sub>O at 105°C

becoming anhydrous [MER06]

#### 1783

**Compound:** Lithium cobaltite **Formula:** LiCoO<sub>2</sub> **Molecular Formula:** CoLiO<sub>2</sub>

Molecular Weight: 97.873

CAS RN: 12190-79-3

Properties: dark gray powd, a=0.2817 nm, c=1.4059 nm; can be prepared by reacting  $\text{Li}_2\text{CO}_3$  or  $\text{LiOH} \cdot \text{H}_2\text{O}$ with  $\text{CoCO}_3$  at  $850^{\circ}\text{C}-900^{\circ}\text{C}$  for 24 h in air; used in ceramics and as an insertion electrode in Li battery systems; has fluxing properties of lithium oxide, and enhances adhesion similar to cobalt oxide [HAW93] [STR93] [DAH90] [GUM92] Solubility: i H<sub>2</sub>O [HAW93]

1784

Compound: Lithium cyanide
Formula: LiCN
Molecular Formula: CLiN
Molecular Weight: 32.959
CAS RN: 2408-36-8
Properties: colorless to light yellow liq; sensitive to moisture; freezing point 58°C [STR93]
Density, g/cm<sup>3</sup>: 1.075 (fused) [KIR78]
Melting Point, °C: 160 [KIR78]
Reactions: decomposes to cyanamide and carbon below ~600°C [KIR78]

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## 1785

Compound: Lithium cyclopentadienide Formula: LiC<sub>5</sub>H<sub>5</sub> Molecular Formula: C<sub>5</sub>H<sub>5</sub>Li Molecular Weight: 72.036 CAS RN: 16733-97-4 Properties: off-white powd; air and moisture sensitive [STR93] [ALF95]

# 1786

Compound: Lithium deuteride Formula: LiD Molecular Formula: DLi Molecular Weight: 8.956 CAS RN: 13587-16-1 Properties: off-white powd; sensitive to air and moisture; thermally stable up to its melting point; used in thermonuclear fusion [HAW93] [STR93] Density, g/cm<sup>3</sup>: 0.820 [STR93] Melting Point, °C: ~680 [STR93]

# 1787

Compound: Lithium dichromate dihydrate Formula:  $Li_2Cr_2O_7 \cdot 2H_2O$ Molecular Formula:  $Cr_2H_4Li_2O_9$ Molecular Weight: 265.901 CAS RN: 10022-48-7 Properties: reddish orange cryst powd; deliq; eutectic in aq solutions is at  $-70^{\circ}C$ ; used to dehumidify and in refrigeration [HAW93] [KIR78] Solubility: g/100 g soln,  $H_2O$ : 62.36 (0.8°C), 65.25 (30°C), 73.55 (100°C); solid phase  $Li_2Cr_2O_7 \cdot 2H_2O$  [KRU93] Density, g/cm<sup>3</sup>: 2.34 (30°C) [KIR78] Melting Point, °C: 130 [HAW93] Reactions: minus  $2H_2O$  at 110°C [CRC10]

#### 1788

Compound: Lithium dihydrogen phosphate Formula: LiH<sub>2</sub>PO<sub>4</sub> Molecular Formula: H<sub>2</sub>LiO<sub>4</sub>P Molecular Weight: 103.928 CAS RN: 13453-80-0 Properties: white powd; used as a constituent in low-expansion porcelain enamel glazes and in some laser glasses [STR93] [FMC93] Solubility: g/100 g soln, H<sub>2</sub>O: 55.8 (0°C); solid phase, LiH<sub>2</sub>PO<sub>4</sub> [KRU93] Density, g/cm<sup>3</sup>: 2.461 [STR93] Melting Point, °C: >100 [AES93]

Compound: Lithium diisopropylamide Synonym: LDA Formula: [(CH<sub>3</sub>)<sub>2</sub>CH]<sub>2</sub>NLi Molecular Formula: C<sub>6</sub>H<sub>14</sub>LiN Molecular Weight: 107.125 CAS RN: 4111-54-0 Properties: pyrophoric powd; hindered, non-nucleophilic strong base; sensitive to air and moisture; uses: generation of carbanions [ALD94] [MER06] Melting Point, °C: decomposes [MER06]

1790

**Compound:** Lithium iron silicide **Formula:** LiFeSi **Molecular Formula:** FeLiSi **Molecular Weight:** 90.872 **CAS RN:** 64082-35-5 **Properties:** dark brittle cryst **Solubility:** reac  $H_2O$ 

# 1791

Compound: Lithium fluoride Formula: LiF Molecular Formula: FLi Molecular Weight: 25.939 CAS RN: 7789-24-4

Properties: cub cryst or white fluffy powd; does not form a hydrate; enthalpy of fusion 27.09 kJ/ mol; enthalpy of vaporization 147 kJ/mol; index of refraction 1.3915; manufactured by reacting lithium carbonate or lithium hydroxide with dil HF; used as a welding and soldering flux, used in ceramics to reduce firing temperatures and to improve thermal shock resistance; as a 99.9% pure sputtering target for low-index, antireflection film [HAW93] [MER06] [KIR78] [CER91] [CRC10] **Solubility:** 0.133 g/100 soln in H<sub>2</sub>O (25°C) [KIR81];  $g/100 \text{ g soln}, \text{H}_2\text{O}: 0.120 (0^{\circ}\text{C}), 0.134 \pm 0.008$ (25°C) [KRU93]; s acids; i alcohol [HAW93] Density, g/cm<sup>3</sup>: 2.640 [MER06] Melting Point, °C: 848 [KIR81] Boiling Point, °C: 1673 [CRC10] Reactions: volatilizes at 1100°C–1200°C [MER06] Thermal Expansion Coefficient: (volume) 100°C (0.912), 200°C (2.086), 400°C (4.759) [CLA66]

# 1792

**Compound:** Lithium formate monohydrate **Formula:**  $Li(CHO_2) \cdot H_2O$ 

Molecular Formula: CHLiO<sub>3</sub> Molecular Weight: 69.974 CAS RN: 6108-23-2 Properties: col-white cryst [CRC10] Solubility: sol H<sub>2</sub>O [CRC10] Density, g/cm<sup>3</sup>: 1.46 [CRC10]

#### 1793

**Compound:** Lithium hexafluoroantimonate **Formula:** LiSbF<sub>6</sub> **Molecular Formula:** F<sub>6</sub>LiSb **Molecular Weight:** 242.691 **CAS RN:** 18424-17-4 **Properties:** powd; hygr [STR93] **Melting Point,** °C: decomposes [ALF95]

#### 1794

Compound: Lithium hexafluoroarsenate Synonym: lithium hexafluorarsenate(V) Formula: LiAsF<sub>6</sub> Molecular Formula: AsF<sub>6</sub>Li Molecular Weight: 195.853 CAS RN: 29935-35-1 Properties: white, hygr powd; has been used as an electrolyte for organic solvent lithium batteries [KIR78]

## 1795

**Compound:** Lithium hexafluorophosphate **Formula:** LiPF<sub>6</sub> **Molecular Formula:** F<sub>6</sub>LiP **Molecular Weight:** 151.905 **CAS RN:** 21324-40-3 **Properties:** white to off-white powd; hygr [STR93]

#### 1796

**Compound:** Lithium hexafluorosilicate Formula:  $Li_2SiF_6$ Molecular Formula:  $F_6Li_2Si$ Molecular Weight: 155.958 CAS RN: 17347-95-4 Properties: white powd [STR93]

# 1797

**Compound:** Lithium hexafluorostannate(IV) Formula:  $Li_2SnF_6$ Molecular Formula:  $F_6Li_2Sn$  Molecular Weight: 246.582 CAS RN: 17029-16-2 Properties: white powd [STR93]

#### 1798

Compound: Lithium hydride Formula: LiH Molecular Formula: HLi Molecular Weight: 7.949 CAS RN: 7580-67-8

Properties: gray powd; sensitive to moisture; cub; darkens rapidly on exposure to light; very stable thermally, melts without decomposition; enthalpy of fusion 22.59 kJ/mol; can be prepared by adding H<sub>2</sub>O to molten lithium at 680°C–900°C under ~1 atm H<sub>2</sub> pressure; used as a source of hydrogen in military applications and buoyancy devices and in organic synthesis [KIR80] [CRC10] [KIR81] [MER06]

**Solubility:** reacts vigorously with H<sub>2</sub>O [KIR81]; s ether, i benzene, toluene [HAW93]

Density, g/cm<sup>3</sup>: 0.78 [KIR81]

Melting Point, °C: 688.7 [CRC10]

**Reactions:** forms LiOH and  $H_2$  in  $H_2O$ ; reacts with lower alcohols, carboxylic acids, chlorine, and ammonia with evolution of  $H_2$  [MER06]

#### 1799

Compound: Lithium hydrogen carbonate
Synonym: lithia water
Formula: LiHCO<sub>3</sub>
Molecular Formula: CHLiO<sub>3</sub>
Molecular Weight: 67.958
CAS RN: 10377-37-4
Properties: white; prepared by dissolving lithium carbonate in water that contains excess dissolved carbon dioxide; used in medicine and in the preparation of mineral water [CRC10] [HAW93]

Solubility: 5.5 g/100 mL H<sub>2</sub>O (13°C) [CRC10]

#### 1800

Compound: Lithium hydroxide
Formula: LiOH
Molecular Formula: HLiO
Molecular Weight: 23.948
CAS RN: 1310-65-2
Properties: colorless; granular, free-flowing powd; tetr; acrid; readily absorbs CO<sub>2</sub> and H<sub>2</sub>O from atm; enthlapy of vaporization 188 kJ/ mol; enthalpy of fusion 20.88 kJ/mol; can be prepared from Li<sub>2</sub>CO<sub>3</sub> and Ca(OH)<sub>2</sub>; used to manufacture lithium stearate, in storage battery electrolytes, and to absorb CO<sub>2</sub> in space vehicles [HAW93] [CRC10] [MER06] [KIR81]

Solubility: g/100 g H<sub>2</sub>O: 10.7 (0°C), 11.3 (40°C), 14.8 (100°C); sl s alcohol [KIR81] [MER06]; g/100 g soln, H<sub>2</sub>O: 12.7 (0°C), 12.9 (25°C), 17.5 (100°C); solid phase, LiOH · H<sub>2</sub>O [KRU93]
Density, g/cm<sup>3</sup>: 1.45 [LID94]
Melting Point, °C: 471.2 [CRC10]
Boiling Point, °C: 1626 [CRC10]

# 1801

Compound: Lithium hydroxide monohydrate Formula: LiOH · H<sub>2</sub>O Molecular Formula: H<sub>3</sub>LiO<sub>2</sub> Molecular Weight: 41.964 CAS RN: 1310-66-3 Properties: white powd; hygr; monocl; solid phase in equilibrium with dissolved LiOH from 0°C-100°C; used in manufacturing lithium-based greases, as an additive in alkaline battery electrolyte, dye solubilizer for textiles, and as a heat sink in nuclear reactors [KIR81] [STR93] [KIR81] [FMC93] Solubility: w/w solubility, H<sub>2</sub>O: 10.7% (0°C), 10.9% (20°C), 14.8% (100°C); sl s in alcohol [MER06] Density, g/cm<sup>3</sup>: 1.51 [MER06] Melting Point, °C: 680 [AES93] **Reactions:** minus H<sub>2</sub>O at >100°C [KIR81]

# 1802

Compound: Lithium hypochlorite Formula: LiOCl Molecular Formula: ClLiO Molecular Weight: 58.393 CAS RN: 13840-33-0 Properties: white granules; oxidant; can ignite organic materials; can be prepared by action of chlorine on a solution of LiOH; used as a bleach and an oxidizing agent, sanitizer for swimming pools, cooling water treatment [HAW93] [KIR81] [FMC93]

#### 1803

Compound: Lithium iodate Formula: LiIO<sub>3</sub> Molecular Formula: ILiO<sub>3</sub> Molecular Weight: 181.843 CAS RN: 13765-03-2 Properties: -80 mesh with 99.9% purity; has two forms,  $\alpha$  and  $\beta$ ; white powd; oxidizing agent [HAW93] [CER91] Solubility: s H<sub>2</sub>O; i alcohol [HAW93] Density, g/cm<sup>3</sup>: 4.487 [HAW93] Melting Point, °C: 50-60 [HAW93] Reactions: transition from  $\alpha$  to  $\beta$  at 50°-60° [HAW93]

Compound: Lithium iodide Formula: LiI Molecular Formula: ILi Molecular Weight: 133.845

**CAS RN:** 10377-51-2

**Properties:** white powd; hygr; enthalpy of fusion 14.60 kJ/mol; formed by neutralizing HI

solutions with LiOH or Li<sub>2</sub>CO<sub>3</sub> to obtain the trihydrate followed by careful dehydration in vacuum [KIR81] [STR93] [CRC10]

Solubility: g/100 g soln, H<sub>2</sub>O: 62.6 (25°C), 71.1 (75°C) [KIR81]; g/100 g H<sub>2</sub>O: 149 (0°C), 163±3 (25°C), 476 (99°C); solid phase, LiI⋅3H<sub>2</sub>O (0°C, 25°C), LiI⋅H<sub>2</sub>O (99°C) [KRU93]
Density, g/cm<sup>3</sup>: 3.494 [STR93]
Melting Point, °C: 469 [CRC10]
Deiling Point, °C: 4142 [KID91], 1190 [STD03]

**Boiling Point, °C:** 1142 [KIR81]; 1180 [STR93] **Reactions:** minus iodine when heated in air [KIR81]

#### 1805

**Compound:** Lithium iodide trihydrate **Formula:** LiI·3H<sub>2</sub>O **Molecular Formula:** H<sub>6</sub>ILiO<sub>3</sub> **Molecular Weight:** 187.891 **CAS RN:** 7790-22-9

Properties: white cryst; extremely hygr; granules of fused masses; becomes yellow due to liberation of I<sub>2</sub> when exposed to atm; used in air conditioning, as a catalyst in acetal formation; there are two other hydrates: LiI · 2H<sub>2</sub>O, 17023-25-5, and LiI · H<sub>2</sub>O, 17023-24-4 [KIR81] [HAW93] [MER06]
Solubility: s in about 0.5 parts H<sub>2</sub>O or alcohol; v s in

amyl alcohol or acetone [MER06] Density, g/cm<sup>3</sup>: 3.48 [HAW93]

Melting Point, °C: 73 [MER06]

Boiling Point, °C: 1171 [HAW93]

**Reactions:** minus 3H<sub>2</sub>O at 450°C [HAW93]

#### 1806

Compound: Lithium manganate Formula: Li $Mn_2O_3$ Molecular Formula: Li $Mn_2O_3$ Molecular Weight: 164.815 CAS RN: 12057-17-9 Properties: monocl, a=0.4921 nm, b=0.8526 nm, c=0.9606 nm; prepared by reacting LiOH and  $\gamma$ -MnO<sub>2</sub> in air at 400°C for several days or at 700°C

for 24 h; used in battery research [ROS91] [RIO92] **Density, g/cm<sup>3</sup>:** 3.90 [ROS91] [RIO92]

#### 1807

Compound: Lithium manganite Formula: Li<sub>2</sub>MnO<sub>3</sub> Molecular Formula: Li<sub>2</sub>MnO<sub>3</sub> Molecular Weight: 116.818 CAS RN: 12163-00-7 Properties: reddish brown powd; very highly stable; used as a smelter addition in the manufacture of frit and as a cathode material for lithium batteries [HAW93] [FMC93] Solubility: i H<sub>2</sub>O [HAW93]

#### 1808

Compound: Lithium metaaluminate Formula: LiAlO<sub>2</sub> Molecular Formula: AlLiO<sub>2</sub> Molecular Weight: 65.922 CAS RN: 12003-67-7 Properties: white powd [STR93] Density, g/cm<sup>3</sup>: 2.55 [STR93] Melting Point, °C: >1625 [STR93]

#### 1809

**Compound:** Lithium metaborate **Formula:** LiBO<sub>2</sub> **Molecular Formula:** BLiO<sub>2</sub> **Molecular Weight:** 49.751 **CAS RN:** 13453-69-5 **Properties:** white, monocl cryst; hygr [CRC10] **Solubility:** g/100 g H<sub>2</sub>O: 2.6<sup>20</sup>; sl H<sub>2</sub>O; sol EtOH [CRC10] **Density, g/cm<sup>3</sup>:** 2.18 [CRC10] **Melting Point, °C:** 844 [CRC10]

## 1810

Compound: Lithium metaborate dihydrate Formula: LiBO<sub>2</sub>·2H<sub>2</sub>O Molecular Formula: BH<sub>4</sub>LiO<sub>4</sub> Molecular Weight: 85.782 CAS RN: 15293-74-0 Properties: white, cryst powd; used in ceramics as a flux, in welding and brazing [HAW93] Solubility: s H<sub>2</sub>O [HAW93] Density, g/cm<sup>3</sup>: 1.8 [STR93]

# 1811

**Compound:** Lithium metaphosphate **Formula:** LiPO<sub>3</sub>

Molecular Formula: LiO<sub>3</sub>P
Molecular Weight: 85.913
CAS RN: 13762-75-9
Properties: white cryst or glassy transparent particles; used as a consituent in low-expansion procelain enamel and in selected laser glasses [FMC93] [AES93]
Solubility: g/100 g H<sub>2</sub>O: 0.101 (0°C), 0.058 (25°C), 0.048 (40°C) [LAN05]
Melting Point, °C: 656 [AES93]

# 1812

Compound: Lithium metasilicate
Formula: Li<sub>2</sub>SiO<sub>3</sub>
Molecular Formula: Li<sub>2</sub>O<sub>3</sub>Si
Molecular Weight: 89.966
CAS RN: 10102-24-6
Properties: white powd; ortho-rhomb needles; enthalpy of fusion 28.00 kJ/mol; obtained by fusing lithium carbonate and SiO<sub>2</sub>; used as a flux in glazes and ceramic enamels [HAW93] [MER06] [FMC93]
Solubility: i cold H<sub>2</sub>O, decomposes in boiling H<sub>2</sub>O [MER06]
Density, g/cm<sup>3</sup>: 2.52 [MER06]
Melting Point, °C: 1201 [MER06]

#### 1813

Compound: Lithium molybdate
Synonym: lithium molybdate(VI)
Formula: Li<sub>2</sub>MoO<sub>4</sub>
Molecular Formula: Li<sub>2</sub>MoO<sub>4</sub>
Molecular Weight: 173.820
CAS RN: 13568-40-6
Properties: white cryst; phenacite structure, c/a = 1.153; used in steel coating and in petroleum cracking catalysts [HAW93] [KIR81]
Solubility: g/100 g soln, H<sub>2</sub>O: 45.24 (0°C), 44.81 (25°C), 42.50 (98°C); solid phase, 4Li<sub>2</sub>MoO<sub>4</sub> · 3H<sub>2</sub>O [KRU93]
Density, g/cm<sup>3</sup>: 2.66 [STR93]
Melting Point, °C: 705 [STR93]

# 1814

**Compound:** Lithium niobate **Synonym:** lithium niobate(V) **Formula:** LiNbO<sub>3</sub> **Molecular Formula:** LiNbO<sub>3</sub> **Molecular Weight:** 147.845 **CAS RN:** 12031-63-9 Properties: white powd, also single cryst; can be prepared by hydrolysis of equimolar amounts of lithium ethoxide and niobium ethoxide in absolute alcohol by refluxing at 78.5°C for 24 h, then crystallizing the resulting precipitate by heating 2 h in a stream of oxygen gas at 250°C–350°C; ferroelectric; used in infrared detectors, in transducers for lasers, and as a sputtering target of 99.9% purity for piezoelectric applications [HAW93] [STR93] [HIR87] [CER91]
Melting Point, °C: 1240 [LID94]

#### 1815

Compound: Lithium nitrate Formula: LiNO<sub>3</sub> Molecular Formula: LiNO<sub>3</sub> Molecular Weight: 68.946 CAS RN: 7790-69-4 Properties: white, cryst powd; very hygr; enthalpy of fusion 24.90 kJ/mol; can be prepared by reaction of HNO<sub>3</sub> with LiOH or Li<sub>2</sub>CO<sub>3</sub>, followed by evaporation to dryness and then heating at ~200°C in vacuum; used in ceramics, pyrotechnics, molten salt baths, rocket propellants, refrigerators [HAW93] [CRC10] [MER06] [KIR81] [FMC93] Solubility: 43 g/100 g soln, H<sub>2</sub>O (20°C); s alcohol [KIR81] [MER06]; g/100 g soln, H<sub>2</sub>O: 34.6 (0°C), 45.8 (25°C), 68.0 (90°C); solid phase, LiNO<sub>3</sub>·3H<sub>2</sub>O (0°C, 25°C), LiNO<sub>3</sub> (90°C) [KRU93] Density, g/cm<sup>3</sup>: 2.38 [MER06] Melting Point, °C: 253 [CRC10]

#### 1816

Compound: Lithium nitride

- Formula: Li<sub>3</sub>N
- Molecular Formula: Li<sub>3</sub>N
- Molecular Weight: 34.830
- CAS RN: 26134-62-3
- Properties: reddish brown cryst or freely flowing powd; slowly decomposed by atm moisture; ruby red; hex, a=0.3658 nm, c=0.3882 nm; conductivity, 227°C, 0.04 (ohm ⋅ cm)<sup>-1</sup>; one of most effective solid ionic conductors; can be prepared by direct reaction of Li and nitrogen; used as a nitriding agent in metallurgy [HAW93] [STR93] [CIC73] [KIR81]
  Solubility: reacts with H<sub>2</sub>O, yielding LiOH and ammonia; i polyethers [HAW93]
- **Density, g/cm<sup>3</sup>:** 1.27 [LID94]
- Melting Point, °C: 813 [KIR81]; 845 [HAW93]

#### 1817

**Compound:** Lithium nitrite **Formula:** LiNO<sub>2</sub>

Molecular Formula: LiNO<sub>2</sub> Molecular Weight: 52.947 CAS RN: 13568-33-7 Properties: white, hygr cryst [CRC10] Solubility: v s H<sub>2</sub>O [CRC10] Melting Point, °C: 222 [CRC10]

#### 1818

Compound: Lithium nitrite monohydrate Formula:  $LiNO_2 \cdot H_2O$ Molecular Formula:  $H_2LiNO_3$ Molecular Weight: 70.962 CAS RN: 13568-33-7 Properties: colorless needles [CRC10] Solubility: g/100 g soln,  $H_2O$ : 41.5 (0°C), 50.9 (25°C), 76.4 (99°C); solid phase,  $LiNO_2 \cdot H_2O$ (0°C, 25°C),  $LiNO_2$  (99°C) [KRU93] Density, g/cm<sup>3</sup>: 1.615 [CRC10] Melting Point, °C: >100 [CRC10] Boiling Point, °C: decomposes [CRC10]

# 1819

Compound: Lithium orthosilicate
Formula: Li<sub>4</sub>SiO<sub>4</sub>
Molecular Formula: Li<sub>4</sub>O<sub>4</sub>Si
Molecular Weight: 119.848
CAS RN: 13453-84-4
Properties: rhomb; white powd; -100 mesh with 99.9% purity; used as a flux in ceramic formulations [FMC93] [CER91] [CRC10]
Density, g/cm<sup>3</sup>: 2.39 [CRC10]
Melting Point, °C: 1256 [CRC10]

#### 1820

Compound: Lithium oxalate
Formula: Li<sub>2</sub>C<sub>2</sub>O<sub>4</sub>
Molecular Formula: C<sub>2</sub>Li<sub>2</sub>O<sub>4</sub>
Molecular Weight: 101.902
CAS RN: 30903-87-8
Properties: white, cryst powd; used as an anticoagulant in blood analysis [FMC93] [STR93]
Solubility: s in 15 part H<sub>2</sub>O [MER06]; g/100 g soln, H<sub>2</sub>O: 5.87 (25°C) [KRU93]
Density, g/cm<sup>3</sup>: 2.12 [MER06]
Melting Point, °C: decomposes [STR93]

#### 1821

**Compound:** Lithium oxide **Synonym:** lithia **Formula:** Li<sub>2</sub>O **Molecular Formula:** Li<sub>2</sub>O

# Molecular Weight: 29.881 CAS RN: 12057-24-8 Properties: finely divided white powd or crusty material; readily absorbs CO<sub>2</sub> and H<sub>2</sub>O from the atm; made by heating LiOH to ~800°C in a vacuum or by thermal decomposition of lithium peroxide; used in ceramics and special glass formulations and in lithium thermal batteries [HAW93] [MER06] [KIR81] [FMC93] Density, g/cm<sup>3</sup>: 2.013 [MER06] Melting Point, °C: 1570 [MER06] Reactions: attacks glass, silica, many metals at elevated temperatures [MER06]

#### 1822

- **Compound:** Lithium perchlorate **Formula:** LiClO<sub>4</sub> **Molecular Formula:** ClLiO<sub>4</sub> **Molecular Weight:** 106.392 **CAS RN:** 7791-03-9
- Properties: white powd or ortho-rhomb cryst; hygr; oxidizing agent; enthalpy of fusion 29.00 kJ/ mol; prepared from a saturated solution, which forms the trihydrate, followed by drying at 300°C; used in solid rocket propellants, as an electrolyte constituent for lithium batteries, and as a catalyst and oxidizing agent [HAW93] [STR93] [KIR79] [FMC93]
- Solubility: v s alcohol, acetone, ether, ethyl acetate [MER06]; g/100 g soln, H<sub>2</sub>O: 29.90 (0°C), 37.48 (25°C), 71.4 (100°C); solid phase,  $LiClO_4 \cdot 3H_2O$ (0°C, 25°C),  $LiClO_4 \cdot H_2O$  (100°C) [KRU93]

**Density, g/cm<sup>3</sup>:** 2.428 [STR93]

Melting Point, °C: 236 [CRC10]

- Boiling Point, °C: 430 [STR93]
- **Reactions:** decomposes rapidly at 450°C to LiCl and O<sub>2</sub> [KIR81]

#### 1823

Compound: Lithium perchlorate trihydrate
Formula: LiClO<sub>4</sub> · 3H<sub>2</sub>O
Molecular Formula: ClH<sub>6</sub>LiO<sub>7</sub>
Molecular Weight: 160.438
CAS RN: 13453-78-6
Properties: white powd; hygr; can be prepared by crystallization from a saturated solution of lithium perchlorate [KIR81] [STR93]
Solubility: 37.5 g/100 g saturated solution in water (25°C) [KIR81]
Density, g/cm<sup>3</sup>: 1.841 [STR93]
Melting Point, °C: 95 [KER79]
Boiling Point, °C: decomposes at 470 [KIR79]
Reactions: minus 3H<sub>2</sub>O at 300°C [KIR81]

**Compound:** Lithium peroxide **Formula:** Li<sub>2</sub>O<sub>2</sub> **Molecular Formula:** Li<sub>2</sub>O<sub>2</sub> **Molecular Weight:** 45.881

CAS RN: 12031-80-0

**Properties:** light yellow to tan powd; can be made from  $H_2O_2$  and LiOH solution in

boiling ethanol; used in fuel cells and as

an oxidizing agent [HAW93] [FMC93] Solubility: solubility in H<sub>2</sub>O is 8% (20°C);

- solubility in acetic acid is 5.6% (20°C); i absolute alcohol (20°C) [HAW93]
- Density, g/cm<sup>3</sup>: 2.14 (20°C) [HAW93]

# 1825

Compound: Lithium phosphate Synonyms: lithium phosphate, tribasic Formula:  $Li_3PO_4$ Molecular Formula:  $Li_3O_4P$ Molecular Weight: 115.794 CAS RN: 10377-52-3 Properties: white powd [STR93] Solubility: g/100 g soln, H<sub>2</sub>O: 0.022 (0°C); 0.0297 g/100 mL soln, H<sub>2</sub>O (25°C); solid phase,  $Li_3PO_4$  [KRU93] Density, g/cm<sup>3</sup>: 2.46 [LID94] Melting Point, °C: 1205 [STR93]

# 1826

**Compound:** Lithium selenate monohydrate **Formula:**  $Li_2SeO_4 \cdot H_2O$  **Molecular Formula:**  $H_2Li_2O_5Se$  **Molecular Weight:** 174.855 **CAS RN:** 15593-52-9 **Properties:** monocl [MER06] **Solubility:** v s  $H_2O$  [MER06] **Density, g/cm<sup>3</sup>:** 2.565 [MER06]

# 1827

Compound: Lithium selenite monohydrate Formula:  $Li_2SeO_3 \cdot H_2O$ Molecular Formula:  $H_2Li_2O_4Se$ Molecular Weight: 158.856 CAS RN: 15593-51-8 Properties: cryst; hygr [MER06] Solubility: g/100 g  $H_2O$ : 25.0 (0°C), 21.5 (20°C), 9.9 (100°C) [LAN05]

#### HANDBOOK OF INORGANIC COMPOUNDS, SECOND EDITION

#### 1828

Compound: Lithium stearate
Synonyms: stearic acid, lithium salt
Formula: CH<sub>3</sub>(CH<sub>2</sub>)<sub>16</sub>COOLi
Molecular Formula: C<sub>18</sub>H<sub>35</sub>LiO<sub>2</sub>
Molecular Weight: 290.416
CAS RN: 4485-12-5
Properties: white cryst; forms gels in mineral oils; used in cosmetics, plastics, waxes, greases [HAW93]
Solubility: i H<sub>2</sub>O, alcohol, ethyl acetate [HAW93]
Density, g/cm<sup>3</sup>: 1.025 [HAW93]
Melting Point, °C: 220 [HAW93]

# 1829

**Compound:** Lithium sulfate **Formula:** Li<sub>2</sub>SO<sub>4</sub> **Molecular Formula:** Li<sub>2</sub>O<sub>4</sub>S **Molecular Weight:** 109.946 **CAS RN:** 10377-48-7 **Properties:** white, hygr cryst; enthalpy of fusion

7.50 kJ/mol; can be obtained from sulfuric acid and LiOH or  $Li_2CO_3$  solutions to form the monohydrate, followed by heating to obtain the anhydrous salt; used in ceramic compositions, as a solubilizer in photographic developers, and as an additive to specialty Portland cements [KIR81] [FMC93]

**Solubility:** g/100 g soln, H<sub>2</sub>O: 25.7 (25°C), 23.6 (100°C) [KIR81]; g/100 g soln, H<sub>2</sub>O: 25.9  $\pm$  0.5 (0°C), 25.7  $\pm$  0.1 (25°C), 23.5 (100.1°C); solid phase, Li<sub>2</sub>SO<sub>4</sub>·H<sub>2</sub>O [KRU93] **Melting Point, °C:** 860 [KIR81]

# 1830

Compound: Lithium sulfate monohydrate Formula:  $Li_2SO_4 \cdot H_2O$ Molecular Formula:  $H_2Li_2O_5S$ Molecular Weight: 127.961 CAS RN: 10102-25-7 Properties: colorless cryst; does not form alums; obtained by reacting solution of  $H_2SO_4$  with LiOH or  $Li_2CO_3$ ; used in ceramics and in pharmaceutical products [HAW93] [KIR81] [STR93] Solubility: soluble in 2.6 parts  $H_2O$ ; sl s alcohol [MER06] Density, g/cm<sup>3</sup>: 2.06 [MER06] Melting Point, °C: 130 [HAW93] Reactions: minus  $H_2O$  at >100°C [KIR81]

# 1831

**Compound:** Lithium sulfide **Formula:** Li<sub>2</sub>S

Molecular Formula: Li<sub>2</sub>S Molecular Weight: 45.948 CAS RN: 12136-58-2 Properties: off-white powd; sensitive to moisture [STR93] Density, g/cm<sup>3</sup>: 1.64 [LID94] Melting Point, °C: 1372 [LID94]

#### 1832

**Compound:** Lithium tantalate **Formula:** LiTaO<sub>3</sub> **Molecular Formula:** LiO<sub>3</sub>Ta **Molecular Weight:** 235.887 **CAS RN:** 12031-66-2 **Properties:** white powd [STR93]

#### 1833

**Compound:** Lithium tellurite **Formula:** Li<sub>2</sub>TeO<sub>3</sub> **Molecular Formula:** Li<sub>2</sub>O<sub>3</sub>Te **Molecular Weight:** 189.480 **CAS RN:** 14929-69-2 **Properties:** -100 mesh with 99.5% purity [CER91]

## 1834

Compound: Lithium tetraborate Formula: Li<sub>2</sub>B<sub>4</sub>O<sub>7</sub> Molecular Formula: B<sub>4</sub>Li<sub>2</sub>O<sub>7</sub> Molecular Weight: 169.122 CAS RN: 12007-60-2 Properties: white powd; -100 mesh with 99.9% purity; used as a flux in x-ray fluorescence analysis, in grease formulations, and as an electrolyte component in lithium batteries [FMC93] [CER91] [STR93] Solubility: 2.89 g/100 mL H<sub>2</sub>O (20°C), 5.45 g/100 mL H<sub>2</sub>O (100°C) [CRC10]

Melting Point, °C: 917 [STR93]

## 1835

Compound: Lithium tetraborate pentahydrate Formula:  $Li_2B_4O_7 \cdot 5H_2O$ Molecular Formula:  $B_4H_{10}Li_2O_{12}$ Molecular Weight: 211.200 CAS RN: 1303-94-2 Properties: white, cryst powd; used in ceramics, in vacuum spectroscopy, in metal refining and degassing [HAW93] Solubility: v s  $H_2O$ ; i alcohol [HAW93] Reactions: minus  $5H_2O$  at 200°C [HAW93]

#### 1836

**Compound:** Lithium thiocyanate **Formula:** LiSCN **Molecular Formula:** CLiNS **Molecular Weight:** 65.024 **CAS RN:** 556-65-0 **Properties:** white, hygr cryst [CRC10] **Solubility:** g/100 g H<sub>2</sub>O: 120<sup>25</sup> [CRC10]

# 1837

Compound: Lithium tetrachlorocuprate Formula: Li<sub>2</sub>CuCl<sub>4</sub> Molecular Formula: Cl<sub>4</sub>CuLi<sub>2</sub> Molecular Weight: 219.239 CAS RN: 15489-27-7 Properties: 0.1 M in THF; freezing point -17°C; orange liq; sensitive to moisture [STR93]

#### 1838

**Compound:** Lithium tetracyanoplatinate(II) pentahydrate **Formula:**  $Li_2Pt(CN)_4 \cdot 5H_2O$  **Molecular Formula:**  $C_4H_{10}Li_2N_4O_5Pt$  **Molecular Weight:** 403.109 **CAS RN:** 14402-73-4 **Properties:** greenish yellow cryst [MER06] **Solubility:** sl s H<sub>2</sub>O [MER06]

#### 1839

Compound: Lithium tetrafluoroborate Formula: LiBF<sub>4</sub> Molecular Formula: BF<sub>4</sub>Li Molecular Weight: 93.746 CAS RN: 14283-07-9 Properties: white, hygr powd; hygr; can be prepared by reacting LiOH with fluoroboric acid [KIR78] [STR93] Solubility: v s H<sub>2</sub>O [KIR78] Melting Point, °C: decomposes [STR93]

#### 1840

Compound: Lithium thiocyanate hydrate Formula: LiSCN · xH<sub>2</sub>O Molecular Formula: CLiNS (anhydrous) Molecular Weight: 65.025 (anhydrous) CAS RN: 123333-85-7 Properties: white, deliq cryst [CRC10] Solubility: g/100 g soln, H<sub>2</sub>O: 54.5 (25°C); solid phase, LiSCN · 2H<sub>2</sub>O [KRU93]

Compound: Lithium titanate
Formula: Li<sub>2</sub>TiO<sub>3</sub>
Molecular Formula: Li<sub>2</sub>O<sub>3</sub>Ti
Molecular Weight: 109.747
CAS RN: 12031-82-2
Properties: white powd; has strong fluxing properties at low concentrations for use in titanium-bearing enamels [HAW93]
Solubility: i H<sub>2</sub>O [HAW93]
Melting Point, °C: 1520–1564 [STR93]

# 1842

**Compound:** Lithium tungstate **Formula:**  $Li_2WO_4$  **Molecular Formula:**  $Li_2O_4W$  **Molecular Weight:** 261.720 **CAS RN:** 13568-45-1 **Properties:** trig; white powd [CRC10] [STR93] **Solubility:** s H<sub>2</sub>O [HAW93] **Density, g/cm<sup>3</sup>:** 3.71 [STR93] **Melting Point, °C:** 742 [STR93]

# 1843

Compound: Lithium vanadate Formula: LiVO<sub>3</sub> Molecular Formula: LiO<sub>3</sub>V Molecular Weight: 105.881 CAS RN: 15060-59-0 Properties: -100 mesh with 99.9% purity; hydrate is yellowish powd [HAW93] [CER91]

# 1844

Compound: Lithium zirconate
Formula: Li<sub>2</sub>ZrO<sub>3</sub>
Molecular Formula: Li<sub>2</sub>O<sub>3</sub>Zr
Molecular Weight: 153.104
CAS RN: 12031-83-3
Properties: white powd; used as a flux in glasses, which contain zirconium dioxide [HAW93] [FMC93]

# 1845

Compound: Lutetium Synonym: cassiopeium Formula: Lu Molecular Formula: Lu Molecular Weight: 174.967 CAS RN: 7439-94-3 Properties: silvery white metal; hex; soft and ductile; electrical resistivity (20°C) 54 µohm ⋅ cm; enthalpy of fusion 78.03 kJ/mol; enthalpy of sublimation 427.6 kJ/mol; atom radius is 0.17349 nm; ion radius is 0.0850 nm for Lu<sup>+++</sup>, colorless solutions [HAW93] [KIR82] [ALD94]
Solubility: reacts slowly with H<sub>2</sub>O; s in dil acids [HAW93]
Density, g/cm<sup>3</sup>: 9.840 [KIR82]
Melting Point, °C: 1663 [KIR82]
Boiling Point, °C: 3402 [KIR82]
Thermal Conductivity, W/(m ⋅ K): 16.4 at 25°C [CRC10]
Thermal Expansion Coefficient: 9.9×10<sup>-6</sup>/K [CRC10]

# 1846

**Compound:** Lutetium acetate hydrate **Formula:**  $Lu(CH_3COO)_3 \cdot xH_2O$  **Molecular Formula:**  $C_6H_9LuO_6$  (anhydrous) **Molecular Weight:** 352.101 (anhydrous) **CAS RN:** 18779-08-3 **Properties:** hygr white cryst [STR93] [ALD94]

#### 1847

Compound: Lutetium boride Formula: LuB<sub>4</sub> Molecular Formula: B<sub>4</sub>Lu Molecular Weight: 218.211 CAS RN: 12688-52-7 Properties: tetr; -100 mesh of 99.9% purity [LID94] [CER91] Density, g/cm<sup>3</sup>: ~7.0 [LID94] Melting Point, °C: 2600 [LID94]

## 1848

Compound: Lutetium bromide Formula: LuBr<sub>3</sub> Molecular Formula: Br<sub>3</sub>Lu Molecular Weight: 414.679 CAS RN: 14456-53-2 Properties: white, hygr cryst; -20 mesh with 99.9% purity [CER91] [LID94] Solubility: s H<sub>2</sub>O [CRC10] Density, g/cm<sup>3</sup>: 1.025 [ALF95] Melting Point, °C: 1400 [CRC10]

#### 1849

**Compound:** Lutetium chloride **Formula:** LuCl<sub>3</sub> **Molecular Formula:** Cl<sub>3</sub>Lu **Molecular Weight:** 281.325 **CAS RN:** 10099-66-8 Properties: colorless cryst [MER06] Solubility: s H<sub>2</sub>O [MER06] Density, g/cm<sup>3</sup>: 3.98 [STR93] Melting Point, °C: 905 [HAW93] Reactions: sublimes at >750°C [MER06]

#### 1850

Compound: Lutetium chloride hexahydrate Formula: LuCl<sub>3</sub>·6H<sub>2</sub>O Molecular Formula: Cl<sub>3</sub>H<sub>12</sub>LuO<sub>6</sub> Molecular Weight: 389.416 CAS RN: 15230-79-2 Properties: -4 mesh with 99.9% purity; white cryst [CER91] [STR93] Melting Point, °C: 892 [ALF95]

## 1851

Compound: Lutetium fluoride
Formula: LuF<sub>3</sub>
Molecular Formula: F<sub>3</sub>Lu
Molecular Weight: 231.962
CAS RN: 13760-81-1
Properties: ortho; 99.9% pure melted pieces of 3–6 mm; used as an evaporation material for possible application to multilayers [LID94] [CER91]
Solubility: i H<sub>2</sub>O [HAW93]
Density, g/cm<sup>3</sup>: 8.3 [LID94]
Melting Point, °C: 1182 [HAW93]
Boiling Point, °C: 2200 [HAW93]

# 1852

Compound: Lutetium hydride Formula: LuH<sub>2-3</sub> Molecular Formula: H<sub>2</sub>Lu; H<sub>3</sub>Lu Molecular Weight: H<sub>2</sub>Lu: 176.983; H<sub>3</sub>Lu: 177.991 CAS RN: 13598-44-2 Properties: -60 mesh with 99.9% purity; lumps, under argon [ALF95] [CER91]

#### 1853

Compound: Lutetium iodide Formula: LuI<sub>3</sub> Molecular Formula: I<sub>3</sub>Lu Molecular Weight: 555.680 CAS RN: 13813-45-1 Properties: powd, under argon; -20 mesh with 99.9% purity [CER91] [ALF95] Density, g/cm<sup>3</sup>: ~5.6 [LID94] Melting Point, °C: 1050 [AES93]

#### 1854

Compound: Lutetium iron oxide Synonym: lutetium garnet Formula: Lu<sub>3</sub>Fe<sub>5</sub>O<sub>12</sub> Molecular Formula: Fe<sub>3</sub>Lu<sub>3</sub>O<sub>12</sub> Molecular Weight: 996.119 CAS RN: 12023-71-1 Properties: used in 99.9% purity as a sputtering target in the preparation of bubble memory devices [CER91]

#### 1855

**Compound:** Lutetium nitrate **Formula:**  $Lu(NO_3)_3$ **Molecular Formula:**  $LuN_3O_9$ **Molecular Weight:** 360.982 **CAS RN:** 10099-67-9 **Properties:** hygr col solid [CRC10] **Solubility:** s H<sub>2</sub>O, EtOH [CRC10]

#### 1856

**Compound:** Lutetium nitrate hydrate **Formula:** Lu(NO<sub>3</sub>)<sub>3</sub>·xH<sub>2</sub>O **Molecular Formula:** LuN<sub>3</sub>O<sub>9</sub> (anhydrous) **Molecular Weight:** 360.982 (anhydrous) **CAS RN:** 10099-67-9 **Properties:** white cryst [STR93]

#### 1857

Compound: Lutetium nitride Formula: LuN Molecular Formula: LuN Molecular Weight: 188.974 CAS RN: 12125-25-6 Properties: -60 mesh with 99.9% purity [CER91] Density, g/cm<sup>3</sup>: 11.6 [LID94]

# 1858

**Compound:** Lutetium oxalate hexahydrate Formula:  $Lu_2(C_2O_4)_3 \cdot 6H_2O$ Molecular Formula:  $C_6H_{12}Lu_2O_{18}$ Molecular Weight: 722.084 CAS RN: 26677-69-0 Properties: white cryst [ALF95]

#### 1859

**Compound:** Lutetium oxide **Formula:** Lu<sub>2</sub>O<sub>3</sub> **Molecular Formula:** Lu<sub>2</sub>O<sub>3</sub> **Molecular Weight:** 397.932 CAS RN: 12032-20-1
Properties: white powd; cub cryst; absorbs H<sub>2</sub>O and CO<sub>2</sub>; as an evaporated material of 99.9% purity is reactive to radio frequencies [HAW93] [CER91] [STR93] [MER06]
Density, g/cm<sup>3</sup>: 9.41 [STR93]
Melting Point, °C: 2487 [STR93]

#### 1860

**Compound:** Lutetium perchlorate hexahydrate **Formula:**  $Lu(ClO_4)_3 \cdot 6H_2O$  **Molecular Formula:**  $CI_3H_{12}LuO_{18}$  **Molecular Weight:** 581.409 **CAS RN:** 14646-29-8 **Properties:** white cryst; hygr [STR93]

# 1861

Compound: Lutetium silicide Formula: LuSi<sub>2</sub> Molecular Formula: LuSi<sub>2</sub> Molecular Weight: 231.138 CAS RN: 12032-13-2 Properties: 6 mm pieces and smaller with 99.9% purity [CER91]

## 1862

Compound: Lutetium sulfate Formula:  $Lu_2(SO_4)_3$ Molecular Formula:  $Lu_2O_{12}S_3$ Molecular Weight: 638.125 CAS RN: 14986-89-1 Properties: white powd [STR93] Solubility: 0.6260  $\pm$  0.0017 mol/kg in H<sub>2</sub>O (25°C) [RAR88]

# 1863

Compound: Lutetium sulfate octahydrate Formula:  $Lu_2(SO_4)_3 \cdot 8H_2O$ Molecular Formula:  $H_{16}Lu_2O_{20}S_3$ Molecular Weight: 782.247 CAS RN: 13473-77-3 Properties: white cryst [STR93] Solubility: g/100 g H<sub>2</sub>O: 42.27 (20°C), 16.93 (40°C) [MER06]

## 1864

**Compound:** Lutetium sulfide **Formula:** Lu<sub>2</sub>S<sub>3</sub> **Molecular Formula:** Lu<sub>2</sub>S<sub>3</sub> **Molecular Weight:** 446.132 **CAS RN:** 12163-20-1 Properties: gray rhomb cryst; -200 mesh with 99.9% purity [CER91] [LID94]
Density, g/cm<sup>3</sup>: 6.26 [LID94]
Melting Point, °C: decomposes at 1750 [LID94]

#### 1865

Compound: Lutetium telluride Formula: Lu<sub>2</sub>Te<sub>3</sub> Molecular Formula: Lu<sub>2</sub>Te<sub>3</sub> Molecular Weight: 732.734 CAS RN: 12163-22-3 Properties: ortho cryst; -20 mesh with 99.9% purity [LID94] [CER91] Density, g/cm<sup>3</sup>: 7.8 [LID94]

#### 1866

Compound: Magnesium Formula: Mg Molecular Formula: Mg Molecular Weight: 24.3050 CAS RN: 7439-95-4 **Properties:** silver-white metal; hex, a=0.3203 nm, c = 0.5199 nm; slowly oxidizes in moist air; electrical resistivity (20°C) 4.46 µohm cm; enthalpy of fusion 8.48 kJ/mol; enthalpy of sublimation 150 kJ/mol; enthalpy of combustion 606 kJ/mol; thermal diffusivity (20°C) 0.87 cm<sup>2</sup>/s; Poisson's ratio 0.35; electronegativity 1.56; many uses including ferromagnetic films; preparation by diffusion with bismuth [DOU83] [MER06] [KIR81] [CER91] Solubility: reacts slowly with H<sub>2</sub>O; evolves H<sub>2</sub> with dil acids [MER06] Density, g/cm<sup>3</sup>: 1.738 (20°C) [CIC73] Melting Point, °C: 649 [CIC73] Boiling Point, °C: 1105 [CIC73] Thermal Conductivity, W/(m·K): 155 at 20°C [KIR81] **Thermal Expansion Coefficient:** 24.8×10<sup>-6</sup>/K [CRC10]

#### 1867

Compound: Magnesium acetate Synonym: cromosan Formula: Mg(CH<sub>3</sub>COO)<sub>2</sub> Molecular Formula: C<sub>4</sub>H<sub>6</sub>MgO<sub>4</sub> Molecular Weight: 142.395 CAS RN: 142-72-3 Properties: white; two forms:  $\alpha$  ortho-rhomb, a=1.127 nm, b=1.501 nm, c=1.100 nm, obtained by reacting MgO with 13%–33% acetic acid in boiling ethyl acetate, and  $\beta$  tricl, a=1.034 nm, b=1.29 nm, c=7.726 nm, obtained from 5%–6% acetic acid; odor of acetic acid; used as a dye fixative in textile printing, as a deodorant, and disinfectant [KIR81] [HAW93] **Solubility:** g/100 g soln, H<sub>2</sub>O: 36.2 (0.1°C), 39.6 (24.9°C); solid phase, Mg(CH<sub>3</sub>COO)<sub>2</sub>·4H<sub>2</sub>O [KRU93]; s dil alcohol [HAW93] **Density, g/cm<sup>3</sup>:** α: 1.507, β: 1.502 [KIR81] **Melting Point, °C:** decomposes at 323 [KIR81]

# 1868

Compound: Magnesium acetate monohydrate Formula:  $Mg(CH_3COO)_2 \cdot H_2O$ Molecular Formula:  $C_4H_8MgO_5$ Molecular Weight: 160.410 CAS RN: 60582-92-5 Properties: ortho-rhomb, a = 1.175 nm, b = 1.753 nm, c = 0.6662 nm; can be obtained by reacting MgO and acetic acid in isobutyl alcohol, which contains some  $H_2O$  [KIR81] Density, g/cm<sup>3</sup>: 1.553 [KIR81]

#### 1869

Compound: Magnesium acetate tetrahydrate Synonyms: acetic acid, magnesium salt Formula:  $Mg(CH_3COO)_2 \cdot 4H_2O$ Molecular Formula:  $C_4H_{14}MgO_8$ Molecular Weight: 214.455 CAS RN: 16674-78-5 Properties: colorless or white; monocl, a=0.8550 nm, b=1.1995 nm, c=0.4807 nm; deliq cryst; crystallizes from aq solution as only stable phase below  $68^{\circ}C$ ; there is a  $\beta$  phase [KIR81] [MER06] Solubility: v s H<sub>2</sub>O, alcohol [MER06] Density, g/cm<sup>3</sup>: 1.45 [LID94] Melting Point, °C: decomposes at 80 [LID94]

#### 1870

Compound: Magnesium acetylacetonate dihydrate
Synonyms: 2,4-pentanedione, magnesium derivative dihydrate
Formula: Mg(CH<sub>3</sub>COCH=C(O)CH<sub>3</sub>)<sub>2</sub> · 2H<sub>2</sub>O
Molecular Formula: C<sub>10</sub>H<sub>18</sub>MgO<sub>6</sub>
Molecular Weight: 258.554
CAS RN: 68488-07-3
Properties: white powd [STR93]
Melting Point, °C: decomposes at 265 [ALD94]

## 1871

**Compound:** Magnesium aluminum oxide **Synonym:** spinel **Formula:** Mg(AlO<sub>2</sub>)<sub>2</sub> **Molecular Formula:** Al<sub>2</sub>MgO<sub>4</sub> **Molecular Weight:** 142.266 **CAS RN:** 12068-51-8 Properties: 3–12 mm pieces (fused); used as an evaporated ceramic of 99.9% purity to form a high temp dielectric [CER91] [MIT72] [YAM87]
Density, g/cm<sup>3</sup>: 3.58 [KIR80]
Melting Point, °C: 2135 [KIR80]
Thermal Conductivity, W/(m · K): 9.1 (500°C), 5.8 (1000°C) [KIR80]
Thermal Expansion Coefficient: (volume) 100°C (0.18), 200°C (0.39), 400°C (0.90), 800°C (2.01), 1200°C (3.24) [CLA66]

#### 1872

Compound: Magnesium aluminum silicate Synonym: cordierite Formula:  $Mg_2Al_3(AlSi_5O_{18})$ Molecular Formula:  $Al_4Mg_2O_{18}Si_5$ Molecular Weight: 584.953 CAS RN: 61027-88-1 Properties: dielectric constant (26°C–300°C) 4.00–4.42, hydrothermally prepared material [MOY86]; sol-gel synthesis in [MAE90] and [KAZ90] Density, g/cm<sup>3</sup>: when sintered at 1200°C–1400°C: 2.63–2.35 [KAZ90] Thermal Expansion Coefficient: 50°C–650°C: 0.3–2.5×10<sup>-6</sup>/°C [MOY86]

# 1873

Compound: Magnesium aluminum zirconate Synonym: zirconium spinel Formula: MgO·Al<sub>2</sub>O<sub>3</sub>·ZrO<sub>2</sub> Molecular Formula: Al<sub>2</sub>MgO<sub>6</sub>Zr Molecular Weight: 265.488 CAS RN: 53169-11-2 Properties: 3–12 sintered pieces powd; used for vacuum deposition [ALF95] [CER91]

#### 1874

Compound: Magnesium amide
Formula: Mg(NH<sub>2</sub>)<sub>2</sub>
Molecular Formula: H<sub>4</sub>MgN<sub>2</sub>
Molecular Weight: 56.350
CAS RN: 7803-54-5
Properties: white powd or cryst; flammable in air; used as a catalyst for polymerization [HAW93] [MER06]
Solubility: reacts violently with H<sub>2</sub>O releasing NH<sub>3</sub> [MER06]
Density, g/cm<sup>3</sup>: 1.39 [MER06]
Melting Point, °C: decomposes when heated [HAW93]

#### 1875

Compound: Magnesium ammonium phosphate hexahydrate Synonym: guanite Formula: MgNH<sub>4</sub>PO<sub>4</sub>·6H<sub>2</sub>O
Molecular Formula: H<sub>16</sub>MgNO<sub>10</sub>P
Molecular Weight: 245.407
CAS RN: 13478-16-5
Properties: white powd; used as a fire retardant for fabrics and in fertilizer [HAW93]
Solubility: i H<sub>2</sub>O, alcohol; s in acids [HAW93]
Density, g/cm<sup>3</sup>: 1.71 [HAW93]
Melting Point, °C: decomposes to Mg<sub>2</sub>P<sub>2</sub>O<sub>7</sub> [HAW93]

#### 1876

Compound: Magnesium antimonide Formula: Mg<sub>3</sub>Sb<sub>2</sub> Molecular Formula: Mg<sub>3</sub>Sb<sub>2</sub> Molecular Weight: 316.435 CAS RN: 12057-75-9 Properties: hex; 6 mm pieces and smaller with 99.5% purity [CER91] [CRC10] Density, g/cm<sup>3</sup>: 4.088 [CRC10] Melting Point, °C: 1245 [LID94]

# 1877

**Compound:** Magnesium arsenate hydrate **Formula:**  $Mg_3(AsO_4)_2 \cdot xH_2O$  **Molecular Formula:**  $As_2Mg_3O_8$  (anhydrous) **Molecular Weight:** 350.753 (anhydrous) **CAS RN:** 10103-50-1 **Properties:** white powd; used as an insecticide [HAW93] **Solubility:** i H<sub>2</sub>O [HAW93]

## 1878

Compound: Magnesium arsenide Formula: Mg<sub>3</sub>As<sub>2</sub> Molecular Formula: As<sub>2</sub>Mg<sub>3</sub> Molecular Weight: 222.758 CAS RN: 12044-49-4 Properties: 6 mm pieces and smaller of 99.5% purity [CER91] Density, g/cm<sup>3</sup>: 3.148 [ALF95] Melting Point, °C: 800 [ALF95]

## 1879

Compound: Magnesium basic carbonate pentahydrate Formula:  $4MgCO_3 \cdot Mg(OH)_2 \cdot 5H_2O$ Molecular Formula:  $C_4H_{12}Mg_5O_{19}$ Molecular Weight: 485.653 CAS RN: 56378-72-4 Properties: white, colorless, bulky powd [MER06] Solubility: s in ~3300 parts  $H_2O$ ; more soluble if  $H_2O$  contains dissolved  $CO_2$ ; s dil acids; i alcohol [MER06] Reactions: converts to MgO at ~700°C [MER06]

#### 1880

Compound: Magnesium bis(pentamethylcyclopentadienyl) Synonym: bis(pentamethylcyclopentadienyl)magnesium Formula: [(CH<sub>3</sub>)<sub>5</sub>C<sub>5</sub>]<sub>2</sub>Mg Molecular Formula: C<sub>20</sub>H<sub>30</sub>Mg Molecular Weight: 294.763 CAS RN: 74507-64-5 Properties: cryst [ALF95]

## 1881

**Compound:** Magnesium borate octahydrate Formula:  $Mg(BO_2)_2 \cdot 8H_2O$ Molecular Formula:  $B_2H_{16}MgO_{12}$ Molecular Weight: 254.047 CAS RN: 13703-82-7 Properties: white powd [MER06] Solubility: sl s  $H_2O$  [MER06] Density, g/cm<sup>3</sup>: 2.30 [CRC10]

# 1882

Compound: Magnesium boride Formula: MgB<sub>2</sub> Molecular Formula: B<sub>2</sub>Mg Molecular Weight: 45.927 CAS RN: 12007-25-9 Properties: hex cryst; -100 mesh with 99% purity; refractory material [CER91] [KIR78] [LID94] Density, g/cm<sup>3</sup>: 2.57 [LID94] Melting Point, °C: decomposes at 800 [KIR78]

#### 1883

**Compound:** Magnesium boride **Formula:** MgB<sub>6</sub> **Molecular Formula:** B<sub>6</sub>Mg **Molecular Weight:** 89.171 **CAS RN:** 12008-22-9 **Properties:** refractory material [KIR78] **Melting Point,** °C: decomposes at 1100 [KIR78]

#### 1884

Compound: Magnesium bromate hexahydrate Formula:  $Mg(BrO_3)_2 \cdot 6H_2O$ Molecular Formula:  $Br_2H_{12}MgO_{12}$ Molecular Weight: 388.201 CAS RN: 7789-36-8 Properties: colorless or white cryst; used as an oxidizing agent [HAW93] [MER06] Solubility: 42 g/100 mL H<sub>2</sub>O (18°C) [CRC10] **Density, g/cm<sup>3</sup>:** 2.29 [HAW93] **Reactions:** minus 6H<sub>2</sub>O at ~200°C; decomposes at higher temp [MER06]

# 1885

**Compound:** Magnesium bromide **Formula:** MgBr<sub>2</sub> **Molecular Formula:** Br<sub>2</sub>Mg

Molecular Weight: 184.113

**CAS RN:** 7789-48-2

Properties: hex, a=0.3822 nm, c=0.6269 nm; off-white powd; hygr; enthalpy of fusion 39.30 kJ/mol; occurs in seawater, brines, the Dead Sea; used in medicine as a sedative and in some dry cell electrolytes for batteries [STR93] [KIR81] [CRC10]
Solubility: g/100 g H<sub>2</sub>O: 100.6 (25°C), 125.4

(100°C); solid phase,  $MgBr_2 \cdot 6H_2O$  [KRU93] **Density, g/cm<sup>3</sup>:** 3.72 [STR93]

Melting Point, °C: 711 [CRC10]

## 1886

Compound: Magnesium bromide hexahydrate Formula:  $MgBr_2 \cdot 6H_2O$ Molecular Formula:  $Br_2H_{12}MgO_6$ Molecular Weight: 292.204 CAS RN: 13446-53-2 Properties: colorless monocl, a = 1.0286 nm, b = 0.7331 nm, c = 0.6211 nm; very deliq cryst or white granules; bitter taste; used as a sedative and in organic synthesis [HAW93] [KIR81] [MER06] Solubility: s 0.3 parts H<sub>2</sub>O; s alcohol [MER06] Density, g/cm<sup>3</sup>: 2.00 [STR93] Melting Point, °C: ~165 with decomposition [MER06]

# 1887

Compound: Magnesium carbonate Synonym: magnesite Formula: MgCO<sub>3</sub> Molecular Formula: CMgO<sub>3</sub> Molecular Weight: 84.314 CAS RN: 546-93-0 Properties: light, bulky white powd; trig, a=0.46332 nm, c=1.5015 nm; magnesite mineral, 13717-00-5, hardness is 3.5–4.5 Mohs; can be prepared in aq systems under high CO<sub>2</sub> pressure; used in

heat insulation and inks [HAW93] [KIR81]

**Solubility:** g MgCO<sub>3</sub>/100 g soln at CO<sub>2</sub> pressure, kPa, 18°C: 3.5 (203), 4.28 (405), 5.90 (1010), 7.49 (1820), 7.49 (5670); at 0°C 8.58 (3445), at 60°C 5.56 (3445); s acids; i alcohol [HAW93] [KIR81]

Density, g/cm<sup>3</sup>: 3.009 (calculated) [KIR81]

**Melting Point, °C:** decomposes at 350 [HAW93] **Reactions:** minus CO<sub>2</sub> at 900°C [CRC10]

#### 1888

Compound: Magnesium carbonate dihydrate Synonym: barringtonite Formula: MgCO<sub>3</sub> · 2H<sub>2</sub>O Molecular Formula: CH<sub>4</sub>MgO<sub>5</sub> Molecular Weight: 120.345 CAS RN: 5145-48-2 Properties: colorless; tricl, a=0.9115 nm, b=0.6202 nm, c=0.6092 nm [KIR81] Density, g/cm<sup>3</sup>: 2.825 (calculated) [KIR81]

# 1889

Compound: Magnesium carbonate hydroxide tetrahydrate Synonym: hydromagnesite Formula:  $4MgCO_3 \cdot Mg(OH)_2 \cdot 4H_2O$ Molecular Formula:  $C_4H_{10}Mg_5O_{18}$ Molecular Weight: 467.637 CAS RN: 39409-82-0 Properties: white; monocl, a = 1.011 nm, b=0.315 nm, c=0.622 nm; there is a pentahydrate (dypingite) 56378-72-6, and an octahydrate, 75300-49-1 [KIR81] Density, g/cm<sup>3</sup>: 2.254 [KIR81]

# 1890

**Compound:** Magnesium carbonate hydroxide trihydrate **Synonym:** artinite **Formula:**  $MgCO_3 \cdot Mg(OH)_2 \cdot 3H_2O$  **Molecular Formula:**  $CH_8Mg_2O_8$  **Molecular Weight:** 198.680 **CAS RN:** 12143-96-3 **Properties:** white; monocl, a = 1.656 nm, b=0.315 nm, c=0.622 nm [KIR81] **Density, g/cm<sup>3</sup>:** 2.039 [KIR81]

#### 1891

Compound: Magnesium carbonate pentahydrate Synonym: lansfordite Formula:  $MgCO_3 \cdot 5H_2O$ Molecular Formula:  $CH_{10}MgO_8$ Molecular Weight: 174.390 CAS RN: 61042-72-6 Properties: white monocl [KIR81] Solubility: 0.176 g/100 mL H<sub>2</sub>O (7°C), 0.375 g/100 mL H<sub>2</sub>O (20°C) [CRC10] Density, g/cm<sup>3</sup>: 1.73 (calculated) [KIR81] Melting Point, °C: decomposes [CRC10]

Compound: Magnesium carbonate trihydrate Synonym: nesquehonite Formula:  $MgCO_3 \cdot 3H_2O$ Molecular Formula:  $CH_6MgO_6$ Molecular Weight: 138.360 CAS RN: 14457-83-1 Properties: colorless to white; monocl, a = 1.2112 nm, b = 0.5365 nm, c = 0.7697 nm [KIR81] Solubility: 0.179 g/100 mL H<sub>2</sub>O (16°C) [CRC10] Density, g/cm<sup>3</sup>: 1.837 (calculated) [KIR81] Reactions: minus  $3H_2O$  at  $100^{\circ}C$  [CRC10]

# 1893

Compound: Magnesium chlorate hexahydrate
Formula: Mg(ClO<sub>3</sub>)<sub>2</sub> · 6H<sub>2</sub>O
Molecular Formula: Cl<sub>2</sub>H<sub>12</sub>MgO<sub>12</sub>
Molecular Weight: 299.298
CAS RN: 10326-21-3
Properties: white; very deliq cryst or cryst powd; bitter taste; used as a defoliant and dessicant; oxidizing agent [HAW93] [MER06]
Solubility: mol/100 mol H<sub>2</sub>O: 10.73 (0°C), 13.52 (25°C), 26.38 (93°C); solid phase Mg(ClO<sub>3</sub>)<sub>2</sub> · 6H<sub>2</sub>O (0°C, 25°C), Mg(ClO<sub>3</sub>)<sub>2</sub> · 2H<sub>2</sub>O (93°C) [KRU93]
Density, g/cm<sup>3</sup>: 1.80 [MER06]
Melting Point, °C: ~35 [MER06]

#### 1894

**Compound:** Magnesium chloride **Synonym:** magnogene **Formula:** MgCl<sub>2</sub> **Molecular Formula:** Cl<sub>2</sub>Mg **Molecular Weight:** 95.210 **CAS RN:** 7786-30-3

- **Properties:** white lustrous, soft highly deliq leaflets; hex, a=0.3632 nm, c=1.7795 nm; can be distilled in H<sub>2</sub>; attacks fused silica when melted; evolves heat when dissolved in H<sub>2</sub>O; can be obtained by dissolution of MgO, MgCO<sub>3</sub> or Mg(OH)<sub>2</sub> in HCl, followed by cooling and dehydration; enthalpy of fusion 43.10 kJ/mol; used in disinfectants, in fire extinguishers, for fireproofing wood, and in ceramics [HAW93] [CRC10] [MER06] [KIR81]
- **Solubility:** g/100 g soln, H<sub>2</sub>O: 34.6 (0°C), 35.5 (25°C), 42.3 (100°C); solid phase, MgCl<sub>2</sub>·6H<sub>2</sub>O [KRU93]; g/100 g alcohol: 3.61 (0°C), 15.89 (60°C) [KIR81] **Density, g/cm<sup>3</sup>:** 2.325 [KIR81]
- Melting Point, °C: 714 [CRC10]
- Boiling Point, °C: 1412 [CIC73]
- Reactions: slow heating releases Cl<sub>2</sub> at 300°C [MER06]

# 1895

Compound: Magnesium chloride hexahydrate Synonym: bischofite Formula: MgCl<sub>2</sub> · 6H<sub>2</sub>O Molecular Formula: Cl<sub>2</sub>H<sub>12</sub>MgO<sub>6</sub> Molecular Weight: 203.301 CAS RN: 7791-18-6 Properties: colorless or white, highly deliq, monocl cryst, a = 0.9871 nm, b = 0.7113 nm, c = 0.6097 nm; only stable hydrate from 0°C-100°C; obtained from a solution of MgO, MgCO<sub>3</sub>, or Mg(OH), in HCl [KIR81] [HAW93] **Solubility:**  $5.8101 \pm 0.0017 \text{ mol/(kg} \cdot \text{H}_2\text{O})$  at  $25^{\circ}\text{C}$ [RAR85b]; 1 g/2 mL alcohol [MER06] Density, g/cm<sup>3</sup>: 1.56 [MER06] Melting Point, °C: decomposes at ~118 [MER06] Reactions: minus 2H<sub>2</sub>O at 95°C-115°C, minus 4H<sub>2</sub>O at 135°C-180°C, minus 5H<sub>2</sub>O at >230°C and decomposes [KIR81]

#### 1896

Compound: Magnesium chromate pentahydrate
Formula: MgCrO<sub>4</sub> · 5H<sub>2</sub>O
Molecular Formula: CrH<sub>10</sub>MgO<sub>9</sub>
Molecular Weight: 230.375
CAS RN: 16569-85-0
Properties: small yellow cryst; tricl; used as a corrosion inhibitor in the water coolant of gas turbine engines [KIR78] [HAW93]
Solubility: 35.39% H<sub>2</sub>O (25°C) [KIR78]
Density, g/cm<sup>3</sup>: 1.954 [KIR78]
Reactions: transforms to 7H<sub>2</sub>O (17.2°C) [KIR78]

## 1897

Compound: Magnesium chromite Formula: MgCr<sub>2</sub>O<sub>4</sub> Molecular Formula: Cr<sub>2</sub>MgO<sub>4</sub> Molecular Weight: 192.295 CAS RN: 12053-26-8 Properties: brown cub spinel; used as a refractory [KIR78] Density, g/cm<sup>3</sup>: 4.415 [KIR78]

# 1898

**Compound:** Magnesium citrate Formula:  $Mg_3(C_6H_5O_7)_2$ Molecular Formula:  $C_{12}H_{10}Mg_3O_{14}$ Molecular Weight: 451.114 CAS RN: 3344-18-1 Properties: white cryst [CRC10] Solubility: sl H<sub>2</sub>O [CRC10]

**Compound:** Magnesium citrate pentahydrate **Synonym:** magnesium dibasic citrate **Formula:**  $MgC_6H_6O_7 \cdot 5H_2O$  **Molecular Formula:**  $C_6H_{16}MgO_{12}$  **Molecular Weight:** 304.491 **CAS RN:** 7779-25-1 **Properties:** white or sl yellow granules or powd; odorless [MER06] **Solubility:**  $20g/100 \text{ mL } H_2O$  ( $20^\circ$ C) [CRC10]

# 1900

Compound: Magnesium citrate tetradecahydrate Synonyms: citric acid, magnesium salt tetradecahydrate Formula:  $Mg_3(C_6H_5O_7)_2 \cdot 14H_2O$ Molecular Formula:  $C_{12}H_{38}Mg_3O_{28}$ Molecular Weight: 703.332 CAS RN: 144-23-0 Properties: white, odorless, cryst powd or granules; used as a cathartic [MER06] Solubility: sl s  $H_2O$ ; s dil acids [MER06]

# 1901

Compound: Magnesium diboride Formula: MgB<sub>2</sub> Molecular Formula: B<sub>2</sub>Mg Molecular Weight: 45.927 CAS RN: 12007-25-9 Properties: hex cryst [CRC10] Density, g/cm<sup>3</sup>: 2.57 [CRC10] Melting Point, °C: decomposes at 800 [CRC10]

#### 1902

**Compound:** Magnesium dichromate hexahydrate **Formula:**  $MgCr_2O_7 \cdot 6H_2O$  **Molecular Formula:**  $Cr_2H_{12}MgO_{13}$  **Molecular Weight:** 348.384 **CAS RN:** 16569-85-0 **Properties:** reddish orange ortho-rhomb; deliq [HAW93] **Solubility:** 58.52% H<sub>2</sub>O (30°C) [KIR78] **Density, g/cm<sup>3</sup>:** 2.002 [KIR78] **Reactions:** minus H<sub>2</sub>O at 48.5°C [KIR78]

# 1903

**Compound:** Magnesium dititanate **Synonym:** magnesium pyrotitanate **Formula:** MgTi<sub>2</sub>O<sub>5</sub> **Molecular Formula:** MgO<sub>5</sub>Ti<sub>2</sub> **Molecular Weight:** 176.461 **CAS RN:** 12032-35-8 Properties: ortho-rhomb; -325 mesh with 99.9% purity [CER91] [KIR83]
Melting Point, °C: 1645 [KIR83]

## 1904

**Compound:** Magnesium dodecaboride **Formula:** MgB<sub>12</sub> **Molecular Formula:** B<sub>12</sub>Mg **Molecular Weight:** 154.037 **CAS RN:** 12230-32-9 **Properties:** refrac solid **Density, g/cm<sup>3</sup>:** [CRC10] **Melting Point, 1300°C:** [CRC10] **Boiling Point, °C:** [CRC10]

#### 1905

Compound: Magnesium fluoride Synonym: sellaite Formula: MgF<sub>2</sub> Molecular Formula: F<sub>2</sub>Mg Molecular Weight: 62.302 CAS RN: 7783-40-6 Properties: white powd or cryst or 99.9% pure melted pieces of 3–6 mm or 0.8–3 mm; enthalpy of fusion

pieces of 3–6 mm or 0.8–3 mm; enthalpy of fusion 58.2 kJ/mol; enthalpy of vaporization 264 kJ/mol; manufactured by reacting hydrofluoric acid with MgO or MgCO<sub>3</sub>; hardness 6 Mohs; used in ceramics, melted pieces used as evaporation material and sputtering material for widely used antireflection films, low-index film used in multilayers [HAW93] [MER06] [KIR78] [CER91]
Solubility: g/L soln, H<sub>2</sub>O: 0.130 (25°C) [KRU93]
Density, g/cm<sup>3</sup>: 3.148 [MER06]
Melting Point, °C: 1263 [CIC73]
Boiling Point, °C: 2227 [CIC73]

#### 1906

**Compound:** Magnesium formate dihydrate **Formula:**  $Mg(CHO_2)_2 \cdot 2H_2O$  **Molecular Formula:**  $C_2H_6MgO_6$  **Molecular Weight:** 150.370 **CAS RN:** 6150-82-9 **Properties:** white cryst [CRC10] **Solubility:** s  $H_2O$ ; i EtOH [CRC10] **Melting Point,** °C: decomposes [CRC10]

#### 1907

**Compound:** Magnesium germanate **Formula:** Mg<sub>2</sub>GeO<sub>4</sub> **Molecular Formula:** GeMg<sub>2</sub>O<sub>4</sub> **Molecular Weight:** 185.218 CAS RN: 12025-13-7
 Properties: white precipitate; -325 mesh 10 μm or less with 99.9% purity [CER91] [CRC10]
 Solubility: 0.0016 g/100 mL H<sub>2</sub>O (25°C) [CRC10]

#### 1908

Compound: Magnesium germanide Formula: Mg<sub>2</sub>Ge Molecular Formula: GeMg<sub>2</sub> Molecular Weight: 121.220 CAS RN: 1310-52-7 Properties: cub cryst; used in semiconductor research [LID94] [MER06] Density, g/cm<sup>3</sup>: 3.09 [LID94] Melting Point, °C: 1115 [MER06]

# 1909

Compound: Magnesium hexafluoroacetylacetonate dihydrate Synonyms: 1,1,1,5,5,5-hexafluoro-2,4pentanedione, magnesium derivative Formula: Mg(CF<sub>3</sub>COCH=C(O)CF<sub>3</sub>)<sub>2</sub>·H<sub>2</sub>O Molecular Formula: C<sub>10</sub>H<sub>6</sub>F<sub>12</sub>MgO<sub>6</sub> Molecular Weight: 474.440 CAS RN: 19648-85-2 Properties: white powd [STR93] [ALF95]

## 1910

Compound: Magnesium hexafluorosilicate hexahydrate Formula: MgSiF<sub>6</sub>·6H<sub>2</sub>O Molecular Formula: F<sub>6</sub>H<sub>12</sub>MgO<sub>6</sub>Si Molecular Weight: 274.472 CAS RN: 60950-56-3 Properties: white, efflorescent, odorless cryst; used to mothproof textile fabrics [MER06] [STR93] Solubility: anhydrous, g/100 g H<sub>2</sub>O: 26.3 (0°C), 30.8 (20°C), 44.4 (80°C) [LAN05] Density, g/cm<sup>3</sup>: 1.788 [MER06] Reactions: minus SiF<sub>4</sub> at ~120°C [MER06]

#### 1911

**Compound:** Magnesium hydride Formula: MgH<sub>2</sub> Molecular Formula: H<sub>2</sub>Mg Molecular Weight: 26.321 CAS RN: 60616-74-2

**Properties:** white; nonvolatile mass or tetr cryst; strong reducing agent; readily oxidized; reactivity depends on method of preparation, e.g., if prepared from diethylmagnesium it is very reactive; spontaneously ignites in air forming MgO and H<sub>2</sub>O [MER06] [KIR80] Solubility: reacts violently with H<sub>2</sub>O, evolving H<sub>2</sub> [MER06]
Density, g/cm<sup>3</sup>: 1.45 [MER06]
Melting Point, °C: decomposes 280 in high vacuum [MER06]

## 1912

Compound: Magnesium hydrogen phosphate trihydrate Synonym: newberyite Formula: MgHPO<sub>4</sub> · 3H<sub>2</sub>O Molecular Formula: H<sub>7</sub>MgO<sub>7</sub>P Molecular Weight: 174.331 CAS RN: 7757-86-0 Properties: white, cryst powd; decomposes to Mg<sub>2</sub>P<sub>2</sub>O<sub>7</sub> when heated; used to fireproof wood and as a stabilizer for plastics [HAW93] Solubility: sl s H<sub>2</sub>O; s dil acids [MER06] Density, g/cm<sup>3</sup>: 2.13 [MER06] Melting Point, °C: decomposes at 550–650 [HAW93]

#### 1913

Compound: Magnesium hydroxide Synonym: brucite Formula: Mg(OH)<sub>2</sub> Molecular Formula: H<sub>2</sub>MgO<sub>2</sub> Molecular Weight: 58.320 CAS RN: 1309-42-8 Properties: white powd; absorbs CO<sub>2</sub> when H<sub>2</sub>O is present; hex, a = 0.3147 nm, c = 0.4769 nm; hardness 2.5 Mohs; produced from seawater and brines by precipitation of soluble magnesium with Ca(OH)<sub>2</sub>; used in sugar refining, as an antacid [HAW93] [KIR81] [MER06] Solubility: mg/L, H<sub>2</sub>O: 11.7 (25°C), 4.08 (100°C); s dil acid [KIR81]; mol/L soln,  $H_2O: 0.5 \times 10^{-4} (0^{\circ}C)$ ,  $(2.6 \pm 1.5) \times 10^{-4} (25^{\circ}C), 7.2 \times 10^{-5} (100^{\circ}C) [KRU93]$ **Density, g/cm<sup>3</sup>:** 2.37 [KIR81] Melting Point, °C: 350 [KIR81]

#### 1914

Compound: Magnesium iodate tetrahydrate Formula:  $Mg(IO_3)_2 \cdot 4H_2O$ Molecular Formula:  $H_8I_2MgO_{10}$ Molecular Weight: 446.171 CAS RN: 7790-32-1 Properties: white, monocl [CRC10] Solubility: g/100 g soln,  $H_2O$ : 8.55 (25°C), 13.5 (90°C); solid phase,  $Mg(IO_3)_2 \cdot 4H_2O$ (25°C),  $Mg(IO_3)_2$  (90°C) [KRU93] Density, g/cm<sup>3</sup>: 3.3 [CRC10] Melting Point, °C: decomposes at 210 [CRC10] Reactions: minus  $4H_2O$  at 210°C [CRC10]

**Compound:** Magnesium iodide **Formula:** MgI<sub>2</sub> **Molecular Formula:** I<sub>2</sub>Mg **Molecular Weight:** 278.114

**CAS RN:** 10377-58-9 **Properties:** white; hex, a=0.4148 nm, c=0.6894 nm;

very hygr; decomposes in air evolving I<sub>2</sub>; enthalpy of fusion 29.00 kJ/mol; can be obtained by heating the hexahydrate in stream of dry H<sub>2</sub> [KIR81] [CRC10] **Solubility:** g/100 g soln, H<sub>2</sub>O: 54.7 (0°C), 59.6 (25°C), 65.2 (100°C); solid phase, MgI<sub>2</sub>·8H<sub>2</sub>O (0°C, 25°C), MgI<sub>2</sub>·6H<sub>2</sub>O (100°C) [KRU93]

Density, g/cm<sup>3</sup>: 4.43 [KIR81]

Melting Point, °C: decomposes at 637 [KIR81]

# 1916

Compound: Magnesium iodide hexahydrate Formula:  $MgI_2 \cdot 6H_2O$ Molecular Formula:  $H_{12}I_2MgO_6$ Molecular Weight: 386.2005 CAS RN: 75535-11-4 Properties: white; monocl, a=1.1159 nm, b=0.7740 nm, c=0.6323 nm [KIR81] Density, g/cm<sup>3</sup>: 2.353 [KIR81]

#### 1917

Compound: Magnesium iodide octahydrate Formula:  $MgI_2 \cdot 8H_2O$ Molecular Formula:  $H_{16}I_2MgO_8$ Molecular Weight: 422.236 CAS RN: 7790-31-0 Properties: white; ortho-rhomb, a=0.9948 nm, b=1.5652 nm, c=0.8585 nm; deliq powd; discolors readily in air and light [MER06] [KIR81] Solubility: 81 g/100 mL H<sub>2</sub>O (20°C), 90.3 g/100 mL H<sub>2</sub>O (80°C) [CRC10] Density, g/cm<sup>3</sup>: 2.098 [KIR81] Melting Point, °C: decomposes at 41 [KIR81]

## 1918

Compound: Magnesium metaborate octahydrate Formula:  $Mg(BO_2)_2 \cdot 8H_2O$ Molecular Formula:  $B_2H_{16}MgO_{12}$ Molecular Weight: 254.047 CAS RN: 13703-82-7 [For anhydrous compound] Properties: white powd [CRC10] Solubility: sl H<sub>2</sub>O [CRC10] Melting Point, °C: 988 (anhydrous parent compound) [CRC10]

# 1919

**Compound:** Magnesium metasilicate **Formula:** FeSi<sub>2</sub> **Molecular Formula:** FeSi<sub>2</sub> **Molecular Weight:** 112.016 **CAS RN:** 12022-99-0 **Properties:** gray tetr cryst [CRC10] **Density, g/cm<sup>3</sup>:** 4.74 **Melting Point, °C:** 1220

# 1920

Compound: Magnesium metatitanate
Formula: MgTiO<sub>3</sub>
Molecular Formula: MgO<sub>3</sub>Ti
Molecular Weight: 120.183
CAS RN: 12032-30-3
Properties: rhombohedral white powd; used mainly as an additive for ceramic dielectric materials, also as a gemstone and a pigment in ultraviolet cured systems [KIR83] [STR93]
Density, g/cm<sup>3</sup>: 3.36 [STR93]
Melting Point, °C: 1610 [STR93]

# 1921

Compound: Magnesium molybdate
Synonym: magnesium molybdate(VI)
Formula: MgMoO<sub>4</sub>
Molecular Formula: MgMoO<sub>4</sub>
Molecular Weight: 184.243
CAS RN: 12013-21-7
Properties: -200 mesh with 99.9% purity; white powd; used in electronic and optical applications [CER91] [STR93] [HAW93]
Solubility: g/100 g soln, H<sub>2</sub>O: 15.90 (25°C), 9.38 (95°C); solid phase, MgMoO<sub>4</sub> · 5H<sub>2</sub>O (25°C), MgMoO<sub>4</sub> · 2H<sub>2</sub>O (95°C) [KRU93]
Density, g/cm<sup>3</sup>: 2.208 [STR93]
Melting Point, °C: ~1060 [HAW93]

## 1922

**Compound:** Magnesium niobate **Formula:** MgNb<sub>2</sub>O<sub>6</sub> **Molecular Formula:** MgNb<sub>2</sub>O<sub>6</sub> **Molecular Weight:** 306.114 **CAS RN:** 12163-26-7 **Properties:** -200 mesh with 99.9% purity [CER91]

# **1923 Compound:** Magnesium nitrate **Formula:** Mg(NO<sub>3</sub>)<sub>2</sub> **Molecular Formula:** MgN<sub>2</sub>O<sub>6</sub>

# Molecular Weight: 148.314

## CAS RN: 10377-60-3

**Properties:** white, cub cryst; difficult to isolate in anhydrous form; can be prepared at room temp by dissolution of MgO, Mg(OH)<sub>2</sub>, or MgCO<sub>3</sub> in HNO<sub>3</sub>, followed by solvent evaporation and crystallization; finds use as a fertilizer and in the manufacture of ammonium nitrate [KIR81] [LID94]

**Solubility:** g/100 g soln, H<sub>2</sub>O: 38.5 (1.0°C), 42.1 (25°C), 71.7 (100°C); solid phase, Mg(NO<sub>3</sub>)<sub>2</sub>·6H<sub>2</sub>O (1.0°C, 25°C), Mg(NO<sub>3</sub>)<sub>2</sub>·2H<sub>2</sub>O (100°C) [KRU93] **Density, g/cm<sup>3</sup>:** ~2.3 [LID94]

#### 1924

Compound: Magnesium nitrate dihydrate
Formula: Mg(NO<sub>3</sub>)<sub>2</sub>·2H<sub>2</sub>O
Molecular Formula: H<sub>4</sub>MgN<sub>2</sub>O<sub>8</sub>
Molecular Weight: 184.345
CAS RN: 15750-45-5
Properties: white cryst; deliq; used in pyrotechnics [HAW93]
Solubility: s H<sub>2</sub>O, alcohol [HAW93]
Density, g/cm<sup>3</sup>: 1.45 [HAW93]
Melting Point, °C: 95–100 [HAW93]
Boiling Point, °C: decomposes at 330 [HAW93]

## 1925

Compound: Magnesium nitrate hexahydrate
Formula: Mg(NO<sub>3</sub>)<sub>2</sub> · 6H<sub>2</sub>O
Molecular Formula: H<sub>12</sub>MgN<sub>2</sub>O<sub>12</sub>
Molecular Weight: 256.406
CAS RN: 13446-18-9
Properties: colorless, clear deliq cryst; monocl [KIR81] [MER06]
Solubility: s in 0.8 parts H<sub>2</sub>O; v sl alcohol [MER06]
Density, g/cm<sup>3</sup>: 1.464 [MER06]
Melting Point, °C: ~95 [MER06]

# 1926

Compound: Magnesium nitride Formula: Mg<sub>3</sub>N<sub>2</sub> Molecular Formula: Mg<sub>3</sub>N<sub>2</sub> Molecular Weight: 100.928 CAS RN: 12057-71-5 Properties: -325 mesh 10μm or less of 99.6% purity; bcc, a=0.993 nm [CER91] [CIC73] Density, g/cm<sup>3</sup>: 2.71 [ALD94] Melting Point, °C: decomposes at 271 [CIC73]

#### 1927

**Compound:** Magnesium nitrite trihydrate **Formula:**  $Mg(NO_2)_2 \cdot 3H_2O$ **Molecular Formula:**  $H_6MgN_2O_7$  Molecular Weight: 170.362 CAS RN: 15070-34-5 Properties: white prism; hygr [CRC10] Solubility: g/100 g soln, H<sub>2</sub>O: 47.0 (25.65°C); solid phase, Mg(NO<sub>2</sub>)<sub>2</sub>  $\cdot$  6H<sub>2</sub>O [KRU93] Melting Point, °C: decomposes at 100 [CRC10]

#### 1928

**Compound:** Magnesium orthosilicate **Formula:** Mg<sub>2</sub>SiO<sub>4</sub> **Molecular Formula:** Mg<sub>2</sub>O<sub>4</sub>Si **Molecular Weight:** 140.694 **CAS RN:** 26686-77-1 **Properties:** white, ortho cryst [CRC10] **Density, g/cm<sup>3</sup>:** 3.21 [CRC10] **Melting Point, °C:** 1897

#### 1929

**Compound:** Magnesium orthotitanate **Formula:** Mg<sub>2</sub>TiO<sub>4</sub> **Molecular Formula:** Mg<sub>2</sub>O<sub>4</sub>Ti **Molecular Weight:** 160.475 **CAS RN:** 12032-52-9 **Properties:** cub [KIR83] **Density, g/cm<sup>3</sup>:** 3.53 [KIR83] **Melting Point, °C:** 1840 [KIR83]

#### 1930

**Compound:** Magnesium oxalate **Formula:**  $MgC_2O_4$  **Molecular Formula:**  $C_2MgO_4$  **Molecular Weight:** 112.324 **CAS RN:** 547-66-0 **Properties:** white powd [CRC10] **Solubility:** g/100 g H<sub>2</sub>O: 0.038<sup>25</sup> [CRC10]

#### 1931

**Compound:** Magnesium oxalate dihydrate **Formula:**  $MgC_2O_4 \cdot 2H_2O$  **Molecular Formula:**  $C_2H_4MgO_6$  **Molecular Weight:** 148.335 **CAS RN:** 6150-88-5 **Properties:** white powd [MER06] **Solubility:** g/L solution in  $H_2O$ : 0.38 ± 0.04 (25°C), 0.4 (92°C); solid phase  $MgC_2O_4 \cdot 2H_2O$  [KRU93] **Density,** g/cm<sup>3</sup>: 2.45 [CRC10] **Melting Point, °C:** decomposes at 150 [AES93]

## 1932

**Compound:** Magnesium oxide **Synonyms:** periclase, magnesia

Formula: MgO Molecular Formula: MgO Molecular Weight: 40.304 CAS RN: 1309-48-4

**Properties:** white powd; highly reflective in visible and near ultraviolet regions; cub, a = 0.4213 nm; hardness 5.5 Mohs; resistivity  $1.3 \times 10^{+15}$ ohm · cm (27°C); enthalpy of fusion 78 kJ/mol; used as a refractory material, particularly for steel furnace linings, as a sputtering target of 99.95% and 99.9% purity to prepare high temp dielectrics, and in crucible form to contain melting corrosive salts such as fluorides [MER06] [HAW93] [KIR81] [CER91] [CRC10]

**Solubility:** v sl s pure H<sub>2</sub>O; s dil acids; i alcohol [MER06] **Density, g/cm<sup>3</sup>:** 3.581 [KIR81]

Melting Point, °C: 2852 [KIR81]

**Boiling Point**, °C: 3600 [STR93]

**Reactions:** absorbs CO<sub>2</sub> and H<sub>2</sub>O from atm [MER06]

Thermal Conductivity, W/(m·K): 60.0

(27°C), 43.1 (127°C); 13.9 (550°C), 7.0 (1000°C) [KIR80] [KIR81]

**Thermal Expansion Coefficient:** (volume) 100°C (0.219), 200°C (0.588), 400°C (1.386), 800°C (3.150), 1000°C (4.050) [CLA66]

# 1933

Compound: Magnesium perborate heptahydrate
Formula: Mg(BO<sub>3</sub>)<sub>2</sub>·7H<sub>2</sub>O
Molecular Formula: B<sub>2</sub>H<sub>14</sub>MgO<sub>13</sub>
Molecular Weight: 268.030
CAS RN: 14635-87-1
Properties: white powd; decomposes, evolving oxygen; used in driers, in bleaching, and as an antiseptic for tooth powd [HAW93]
Solubility: sl s H<sub>2</sub>O [HAW93]

# 1934

Compound: Magnesium perchlorate
Synonym: dehydrite
Formula: Mg(ClO<sub>4</sub>)<sub>2</sub>
Molecular Formula: Cl<sub>2</sub>MgO<sub>8</sub>
Molecular Weight: 223.205
CAS RN: 10034-81-8
Properties: white, very hygr powd; oxidant; evolves heat when dissolving in H<sub>2</sub>O; crystallizes from H<sub>2</sub>O as the hexahydrate; used as a regenerable drying agent for gases [HAW93] [MER06]
Solubility: mol/100 mol H<sub>2</sub>O: 0.410 (0°C), 0.448 ± 0.001 (25°C); solid phase, Mg(ClO<sub>4</sub>)<sub>2</sub> · 6H<sub>2</sub>O [KRU93]
Density, g/cm<sup>3</sup>: 2.21 [STR93]

Melting Point, °C: decomposes at 251 [STR93]

#### 1935

**Compound:** Magnesium perchlorate hexahydrate **Formula:**  $Mg(ClO_4)_2 \cdot 6H_2O$ **Molecular Formula:**  $Cl_2H_{12}MgO_{14}$ **Molecular Weight:** 331.297 **CAS RN:** 13446-19-0 **Properties:** white cryst; hygr [HAW93] **Solubility:** v s H<sub>2</sub>O, alcohol [HAW93] **Density, g/cm<sup>3</sup>:** 1.98 [HAW93] **Melting Point, °C:** 185–190 [HAW93]

# 1936

Compound: Magnesium permanganate hexahydrate
Formula: Mg(MnO<sub>4</sub>)<sub>2</sub> · 6H<sub>2</sub>O
Molecular Formula: H<sub>12</sub>MgMn<sub>2</sub>O<sub>14</sub>
Molecular Weight: 370.268
CAS RN: 10377-62-5
Properties: bluish black cryst; deliq; used as an antiseptic and as a polymerization catalyst [HAW93]
Solubility: s H<sub>2</sub>O [HAW93]
Density, g/cm<sup>3</sup>: 2.18 [HAW93]
Melting Point, °C: decomposes [HAW93]

#### 1937

Compound: Magnesium peroxide
Synonym: magnesium dioxide
Formula: MgO<sub>2</sub>
Molecular Formula: MgO<sub>2</sub>
Molecular Weight: 56.304
CAS RN: 1335-26-8
Properties: white, tasteless, odorless powd; used as a bleaching and oxidizing agent, as an antacid [HAW93] [MER06]
Solubility: i H<sub>2</sub>O; s dil acids forming H<sub>2</sub>O<sub>2</sub> [MER06]
Melting Point, °C: decomposes at >100 [HAW93]
Reactions: gradually decomposed by H<sub>2</sub>O evolving O<sub>2</sub> [MER06]

## 1938

Compound: Magnesium phosphate octahydrate Synonym: bobierrite Formula:  $Mg_3(PO_4)_2 \cdot 8H_2O$ Molecular Formula:  $H_{16}Mg_3O_{16}P_2$ Molecular Weight: 406.980 CAS RN: 13446-23-6 Properties: soft, bulky, white powd; odorless and tasteless; used as a dentifrice polishing agent, as an antacid [HAW93] [ALF95] Solubility: i H<sub>2</sub>O; s acids [HAW93] Density, g/cm<sup>3</sup>: 2.195 [CRC10] Reactions: minus 5H<sub>2</sub>O at 150°C [CRC10],

minus 8H<sub>2</sub>O at 400°C [HAW93]

**Compound:** Magnesium phosphate pentahydrate **Formula:**  $Mg_3(PO_4)_2 \cdot 5H_2O$  **Molecular Formula:**  $H_{10}Mg_3O_{13}P_2$  **Molecular Weight:** 352.934 **CAS RN:** 7757-87-1 **Properties:** white, cryst powd [MER06] **Solubility:** i H<sub>2</sub>O; s dil mineral acids [MER06] **Reactions:** minus last H<sub>2</sub>O at ~400°C [MER06]

# 1940

**Compound:** Magnesium phosphide Formula: Mg<sub>3</sub>P<sub>2</sub> Molecular Formula: Mg<sub>3</sub>P<sub>2</sub> Molecular Weight: 134.863

CAS RN: 12057-74-8

**Properties:** shiny grayish yellow; stable in dry air; decomposed by moisture; can be prepared directly from magnesium and phosphorus; used with igniting agent such as 1% HNO<sub>3</sub> in sea flares [KIR82]

**Solubility:** decomposed by H<sub>2</sub>O [KIR82] **Density, g/cm<sup>3</sup>:** 2.055 [CRC10]

# 1941

**Compound:** Magnesium pyrophosphate **Formula:** Mg<sub>2</sub>P<sub>2</sub>O<sub>7</sub> **Molecular Formula:** Mg<sub>2</sub>O<sub>7</sub>P<sub>2</sub> **Molecular Weight:** 222.553 **CAS RN:** 13446-24-7 **Properties:** colorless; monocl [CRC10] **Density, g/cm<sup>3</sup>:** 2.559 [CRC10] **Melting Point, °C:** 1383 [HAW93]

# 1942

**Compound:** Magnesium pyrophosphate trihydrate **Formula:**  $Mg_2P_2O_7 \cdot 3H_2O$  **Molecular Formula:**  $H_6Mg_2O_{10}P_2$  **Molecular Weight:** 276.600 **CAS RN:** 10102-34-8 **Properties:** white powd [MER06] **Solubility:** i H<sub>2</sub>O; s mineral acids [MER06] **Density, g/cm<sup>3</sup>:** 2.56 [MER06] **Reactions:** minus  $3H_2O$  at  $100^{\circ}C$  [MER06]

# 1943

**Compound:** Magnesium salicylate tetrahydrate **Formula:**  $Mg(C_7H_5O_3)_2 \cdot 4H_2O$ **Molecular Formula:**  $C_{14}H_{18}MgO_{10}$ **Molecular Weight:** 370.596 **CAS RN:** 18917-95-8 Properties: white, odorless, efflorescent, cryst powd; used as an anti-infective in medicine [HAW93] [MER06]Solubility: s 13 parts H<sub>2</sub>O; s alcohol [MER06]

# 1944

Compound: Magnesium selenate hexahydrate Formula:  $MgSeO_4 \cdot 6H_2O$ Molecular Formula:  $H_{12}MgO_{10}Se$ Molecular Weight: 275.354 CAS RN: 14986-91-5 Properties: monocl cryst [MER06] Solubility: g/100 g soln in H<sub>2</sub>O: 31.41 (0°C), 35.70 (25°C), 46.50 (99.5°C); solid phase, MgSeO<sub>4</sub> · 7H<sub>2</sub>O (0°C), MgSeO<sub>4</sub> · 6H<sub>2</sub>O (25°C), MgSeO<sub>4</sub> · 4-1/2H<sub>2</sub>O (99.5°C) [KRU93] Density, g/cm<sup>3</sup>: 1.928 [MER06]

# 1945

Compound: Magnesium selenide Formula: MgSe Molecular Formula: MgSe Molecular Weight: 103.265 CAS RN: 1313-04-8 Properties: light brown powd; unstable in air [MER06] Solubility: decomposes in H<sub>2</sub>O [MER06] Density, g/cm<sup>3</sup>: 4.21 [MER06]

#### 1946

Compound: Magnesium selenite hexahydrate Formula: MgSeO<sub>3</sub> · 6H<sub>2</sub>O Molecular Formula: H<sub>12</sub>MgO<sub>9</sub>Se Molecular Weight: 259.355 CAS RN: 15593-61-0 Properties: colorless ortho-rhomb cryst [LID94] [MER06] Solubility: i H<sub>2</sub>O; s dil acids [MER06] Density, g/cm<sup>3</sup>: 2.09 [LID94] Reactions: loses 5H<sub>2</sub>O to form monohydrate at 100°C [MER06]

# 1947

Compound: Magnesium silicate Synonym: clinoenstatite Formula: MgSiO<sub>3</sub> Molecular Formula: MgO<sub>3</sub>Si Molecular Weight: 100.389 CAS RN: 1343-88-0 Properties: white, monocl cryst [MER06] Solubility: i H<sub>2</sub>O [MER06] Density, g/cm<sup>3</sup>: 3.192 [MER06]

# Melting Point, °C: decomposes at 1557 [MER06] Thermal Expansion Coefficient: (volume) 100°C (0.19), 200°C (0.42), 400°C (0.96), 800°C (2.28), 1200°C (3.68) [CLA66]

# 1948

Compound: Magnesium silicate Synonym: forsterite Formula:  $Mg_2SiO_4$ Molecular Formula:  $Mg_2O_4Si$ Molecular Weight: 140.694 CAS RN: 26686-77-1 Properties: white; ortho-rhomb; enthalpy of fusion 71.00 kJ/mol [CRC10] Density, g/cm<sup>3</sup>: 3.22 [KIR80] Melting Point, °C: 1898 [KIR80] Thermal Conductivity, W/(m·K): 3.1 (500°C), 2.4 (1000°C) [KIR80] Thermal Expansion Coefficient: linear expansion to 1000°C,  $9.5 \times 10^{-6}$ °C [KIR80]

# 1949

Compound: Magnesium silicide
Formula: Mg<sub>2</sub>Si
Molecular Formula: Mg<sub>2</sub>Si
Molecular Weight: 76.696
CAS RN: 22831-39-6
Properties: -20 mesh with 99.5% purity; gray powd; slate blue, cub cryst; used in semiconductor technology [CER91] [HAW93] [STR93] [MER06]
Solubility: decomposed by H<sub>2</sub>O, HCl [MER06]
Density, g/cm<sup>3</sup>: 1.94 [STR93]
Melting Point, °C: 1085 [MER06]; 1102 [ALF93]

# 1950

Compound: Magnesium stannate trihydrate
Formula: MgSnO<sub>3</sub>·3H<sub>2</sub>O
Molecular Formula: H<sub>6</sub>MgO<sub>6</sub>Sn
Molecular Weight: 245.059
CAS RN: 12032-29-0
Properties: white, cryst powd; decomposes at ~340°C; used as an additive in ceramic capacitors; anhydrous form -325 mesh 10µm or less with 99% and 99.9% purity [CER91] [HAW93]
Solubility: s H<sub>2</sub>O [HAW93]

#### 1951

**Compound:** Magnesium stannide **Formula:** Mg<sub>2</sub>Sn **Molecular Formula:** Mg<sub>2</sub>Sn **Molecular Weight:** 167.320

#### CAS RN: 1313-08-2

Properties: bluish white, metallic compound; resistivity (25°C) 42,000 μohm · cm; used in semiconductors, thermoelectric research [HAW93] [MER06]
Solubility: s H<sub>2</sub>O, dil HCl [MER06]
Density, g/cm<sup>3</sup>: 3.60 [LID94]
Melting Point, °C: 775 [HAW93]

#### 1952

Compound: Magnesium stearate
Formula: Mg[CH<sub>3</sub>(CH<sub>2</sub>)<sub>16</sub>COO]<sub>2</sub>
Molecular Formula: C<sub>36</sub>H<sub>70</sub>MgO<sub>4</sub>
Molecular Weight: 591.255
CAS RN: 557-04-0
Properties: soft, light white powd; odorless, tasteless; nonflammable used in baby dusting powd and as tablet lubricant [HAW93] [MER06]
Solubility: i H<sub>2</sub>O; decomposed by dil acids [MER06]
Density, g/cm<sup>3</sup>: 1.028 [HAW93]
Melting Point, °C: 88.5 [HAW93]

# 1953

Compound: Magnesium sulfate Formula: MgSO<sub>4</sub> Molecular Formula: MgO<sub>4</sub>S Molecular Weight: 120.369 CAS RN: 7487-88-9 Properties: colorless; ortho-rhomb, a=0.5182 nm, b=0.7893 nm, c=0.6506 nm; occurs widely in minerals; enthalpy of fusion 14.60 kJ/mol; saline bitter taste; prepared by dehydration of its hydrates; used in fireproofing, for warp sizing, and loading textile goods [HAW93] [KIR81] [CRC10] Solubility: g/100 g soln, H<sub>2</sub>O: 20.5 (0°C), 27.6 (25°C), 42.9 (100°C); solid phase, MgSO<sub>4</sub> · 6H<sub>2</sub>O [KRU93] Density, g/cm<sup>3</sup>: 2.66 [STR93] Melting Point, °C: decomposes at 1124 [HAW93]

# 1954

Compound: Magnesium sulfate heptahydrate Synonym: epsomite Formula: MgSO<sub>4</sub> · 7H<sub>2</sub>O Molecular Formula: H<sub>14</sub>MgO<sub>11</sub>S Molecular Weight: 246.475 CAS RN: 10034-99-8 Properties: ortho-rhomb, a = 1.186 nm, b = 1.199 nm, c = 0.6858 nm; colorless efflorescent cryst or powd; bitter, saline cooling taste; stable from ~-5°C-48.2°C; there is a hexahydrate, 17830-18-1, stable from 48.2°C to 67.5°C [MER06] [KIR81] Solubility: g/100 mL H<sub>3</sub>O: 71 (20°C), 91 (40°C);

sl s alcohol [MER06]

Density, g/cm<sup>3</sup>: 1.67 [MER06]
Melting Point, °C: decomposes at ~150 [KIR81]
Reactions: loses 6H<sub>2</sub>O at 150°C, minus H<sub>2</sub>O at 200°C [HAW93]

# 1955

Compound: Magnesium sulfate monohydrate Synonym: kieserite Formula:  $MgSO_4 \cdot H_2O$ Molecular Formula:  $H_2MgO_5S$ Molecular Weight: 138.384 CAS RN: 14168-73-1 Properties: colorless cryst; monocl, a=0.690 nm, b=0.771 nm, c=0.754 nm [KIR81] Solubility:  $H_2O$ : 37.1% (67.5°C), 8% (170°C), 0.5% (240°C) [KIR81] Density, g/cm<sup>3</sup>: 2.571 [KIR81] Melting Point, °C: decomposes at ~150 [KIR81]

## 1956

Compound: Magnesium sulfide
Formula: MgS
Molecular Formula: MgS
Molecular Weight: 56.371
CAS RN: 12032-36-9
Properties: powd; sensitive to moisture; reddish brown cryst; used as a source of hydrogen sulfide [STR93] [HAW93]
Solubility: decomposes in H<sub>2</sub>O [HAW93]
Density, g/cm<sup>3</sup>: 2.68 [LID94]
Melting Point, °C: decomposes at >2000 [STR93]

#### 1957

Compound: Magnesium sulfite
Formula: MgSO<sub>3</sub>
Molecular Formula: MgO<sub>3</sub>S
Molecular Weight: 104.369
CAS RN: 7757-88-2
Properties: used in systems for flue gas desulfurization in which Mg(OH)<sub>2</sub> is the alkaline scrubber [KIR81]
Solubility: g/100 g soln, H<sub>2</sub>O: 0.338 (0°C), 0.646 (25°C), 0.615 (98°C); solid phase, MgSO<sub>3</sub> · 6H<sub>2</sub>O (0°C, 25°C), MgSO<sub>3</sub> · 3H<sub>2</sub>O (98°C) [KRU93]

## 1958

**Compound:** Magnesium sulfite hexahydrate **Formula:** MgSO<sub>3</sub>·6H<sub>2</sub>O **Molecular Formula:** H<sub>12</sub>MgO<sub>9</sub>S **Molecular Weight:** 212.461 **CAS RN:** 13446-29-2

Properties: white; hex, a=0.88385 nm, c=0.9080 nm; gradually oxidizes to sulfate in air; used in the manufacture of paper pulp [HAW93] [MER06] [KIR81]
Solubility: s in ~150 parts H<sub>2</sub>O; sl more soluble in hot H<sub>2</sub>O [MER06]; i alcohol [HAW93]
Density, g/cm<sup>3</sup>: 1.725 [HAW93]
Melting Point, °C: decomposes at 200 [KIR81]
Reactions: minus all H<sub>2</sub>O at 200°C [MER06]

## 1959

Compound: Magnesium sulfite trihydrate Formula:  $MgSO_3 \cdot 3H_2O$ Molecular Formula:  $H_6MgO_6S$ Molecular Weight: 158.415 CAS RN: 19086-20-5 Properties: colorless; ortho-rhomb, a=0.939 nm, b=0.9584 nm, c=0.5523 nm; used in flue gas desulfurization [KIR81] Density, g/cm<sup>3</sup>: 2.117 [KIR81]

## 1960

**Compound:** Magnesium tantalate **Formula:** MgTa<sub>2</sub>O<sub>6</sub> **Molecular Formula:** MgO<sub>6</sub>Ta<sub>2</sub> **Molecular Weight:** 482.197 **CAS RN:** 12293-61-7 **Properties:** -200 mesh with 99.9% purity [CER91]

## 1961

Compound: Magnesium tetrahydrogen phosphate dihydrate Formula:  $MgH_4(PO_4)_2 \cdot 2H_2O$ Molecular Formula:  $H_8MgO_{10}P_2$ Molecular Weight: 254.311 CAS RN: 13092-66-5 Properties: white, cryst powd; hygr; decomposes when heated to metaphosphate; preparation: reaction between phosphoric acid and magnesium hydroxide; used to fireproof wood and as a stabilizer for plastics [HAW93] Solubility: s H<sub>2</sub>O, acids; i alcohol [HAW93]

## 1962

**Compound:** Magnesium thiocyanate tetrahydrate **Formula:**  $Mg(SCN)_2 \cdot 4H_2O$ **Molecular Formula:**  $C_2H_8MgN_2O_4S_2$ **Molecular Weight:** 212.534 **CAS RN:** 306-61-6 **Properties:** colorless or white deliq cryst [MER06] **Solubility:** v s H<sub>2</sub>O, alcohol [MER06]

Compound: Magnesium thiosulfate hexahydrate Synonym: magnesium hyposulfite hexahydrate Formula:  $MgS_2O_3 \cdot 6H_2O$ Molecular Formula:  $H_{12}MgO_9S_2$ Molecular Weight: 244.527 CAS RN: 10124-53-5 Properties: colorless or white cryst [MER06] Solubility: g/100 g soln,  $H_2O$ : 30.69 (0°C), 34.51 (28°C); solid phase,  $MgS_2O_3 \cdot 6H_2O$ [KRU93]; i alcohol [MER06] Density, g/cm<sup>3</sup>: 1.82 [MER06] Melting Point, °C: decomposes at 1700 [AES93] Reactions: minus  $3H_2O$  at 170°C [MER06]

# 1964

Compound: Magnesium trifluoroacetylacetonate dihydrate
Synonyms: 1,1,1-trifluoro-2,4-pentandione, magnesium derivative
Formula: Mg(CF<sub>3</sub>COCH=C(0)CH<sub>3</sub>)<sub>2</sub> · 2H<sub>2</sub>O
Molecular Formula: C<sub>10</sub>H<sub>12</sub>F<sub>6</sub>MgO<sub>6</sub>
Molecular Weight: 366.497
CAS RN: 53633-79-7
Properties: white powd [STR93]

#### 1965

**Compound:** Magnesium trisilicate **Formula:** Mg<sub>2</sub>Si<sub>3</sub>O<sub>8</sub> **Molecular Formula:** Mg<sub>2</sub>O<sub>8</sub>Si<sub>3</sub> **Molecular Weight:** 260.862 **CAS RN:** 14987-04-3 **Properties:** white powd [CRC10] **Solubility:** i H<sub>2</sub>O, EtOH [CRC10]

## 1966

Compound: Magnesium tungstate
Synonym: magnesium tungstate(VI)
Formula: MgWO<sub>4</sub>
Molecular Formula: MgO<sub>4</sub>W
Molecular Weight: 272.143
CAS RN: 13573-11-0
Properties: -325 mesh with 99.9% purity, 10µm or less; white, cryst powd; used in fluorescent x-ray screens and in luminescent paint [CER91] [HAW93] [MER06]
Solubility: i H<sub>2</sub>O and alcohol; s in acids [HAW93]
Density, g/cm<sup>3</sup>: 5.66 [HAW93]

#### 1967

**Compound:** Magnesium vanadate **Formula:**  $2MgO \cdot V_2O_5$  Molecular Formula:  $Mg_2O_7V_2$ Molecular Weight: 262.489 CAS RN: 13568-63-3 Properties: tricl, a = 1.3767 nm, b=0.5414 nm, c=0.4912 nm; other vanadates are  $MgV_2O_6$ , 13573-13-2,  $MgV_3O_8$ , 12181-49-6,  $Mg_{1.9}V_3O_8$  and  $Mg_3V_2O_8$ , 13568-68-8; formed by addition of MgO dispersed in oil into the flame zone of utility boilers in order to remove vanadium compounds and thereby to reduce corrosion caused by the presence of vanadium [KIR81] [CER91] Density, g/cm<sup>3</sup>: 3.1 [KIR81]

## 1968

Compound: Magnesium zirconate Formula: MgZrO<sub>3</sub> Molecular Formula: MgO<sub>3</sub>Zr Molecular Weight: 163.527 CAS RN: 12032-31-4 Properties: reacted product, -100 and +200 mesh of 99% purity; powd; used in electronics [CER91] [HAW93] Density, g/cm<sup>3</sup>: 4.23 [HAW93] Melting Point, °C: 2060 [HAW93]

## 1969

Compound: Magnesium zirconium silicate
Formula: MgO · ZrO<sub>2</sub> · SiO<sub>2</sub>
Molecular Formula: MgO<sub>5</sub>SiZr
Molecular Weight: 223.612
CAS RN: 52110-05-1
Properties: white solid; used in electrical resistor, ceramics, as an opacifier for glazes [HAW93]
Solubility: i H<sub>2</sub>O, alkalies; sl s in acids [HAW93]

# 1970

Compound: Manganese Formula: Mn Molecular Formula: Mn Molecular Weight: 54.93805 CAS RN: 7439-96-5 Properties: steel gray, lustrous, hard, brittle metal; has four allotropes:  $\alpha$ -Mn, cub, a=0.89 nm, stable <710°C;  $\beta$ -Mn, cub, a=0.63 nm, stable 710°C–1079°C;  $\gamma$ -Mn, fcc, a=0.387 nm, stable 1079°C–1143°C;  $\delta$ -Mn, bcc, a=0.309 nm, stable 1143°C to melting; hardness 5.0 Mohs; enthalpy of fusion 12.91 kJ/mol; enthalpy of vaporization 220.9 kJ/mol; electrical resistivity at 20°C for  $\alpha$ is 160 µohm · cm [MER06] [KIR81] [CRC10] Solubility: decomposes slowly in cold H<sub>2</sub>O, rapidly

in hot H<sub>2</sub>O; evolves hydrogen with dil mineral acids, dissolving as Mn++ [MER06]

Density, g/cm<sup>3</sup>: α: 7.47; β: 7.26; γ: 6.37; δ: 6.28 [MER06] Melting Point, °C: 1244 [MER06] Boiling Point, °C: 2095 [MER06] Thermal Conductivity, W/(m·K): 7.82 (25°C) [CRC10] Thermal Expansion Coefficient: 100°C: 25.2×10<sup>-6</sup>/°C (α), 43.0×10<sup>-6</sup>/°C (β), 45.2×10<sup>-6</sup>/°C (γ), 41.6×10<sup>-6</sup>/°C (δ) [KIR81]

#### 1971

Compound: Manganese aluminide Formula: MnAl<sub>3</sub> Molecular Formula: Al<sub>3</sub>Mn Molecular Weight: 135.883 CAS RN: 12253-13-3 Properties: 6 mm pieces and smaller with 99.5% purity [CER91]

# 1972

**Compound:** Manganese ammonium sulfate hexahydrate **Formula:**  $MnSO_4 \cdot (NH_4)_2SO_4 \cdot 6H_2O$  **Molecular Formula:**  $H_{20}MnN_2O_{14}S_2$  **Molecular Weight:** 391.235 **CAS RN:** 7785-19-5 **Properties:** light red cryst [HAW93] **Solubility:** s  $H_2O$  [HAW93] **Density, g/cm<sup>3</sup>:** 1.83 [HAW93]

# 1973

Compound: Manganese antimonide
Formula: MnSb
Molecular Formula: MnSb
Molecular Weight: 176.698
CAS RN: 12032-82-5
Properties: hex cryst; 6 mm pieces and smaller with 99.5% purity; there is also an antimonide with the formula Mn<sub>2</sub>Sb, 12032-97-2 [CER91] [LID94]
Density, g/cm<sup>3</sup>: 6.9 [LID94]
Melting Point, °C: 840 [LID94]

#### 1974

**Compound:** Manganese antimonide **Formula:** Mn<sub>2</sub>Sb **Molecular Formula:** Mn<sub>2</sub>Sb **Molecular Weight:** 231.636 **CAS RN:** 12032-97-2 **Properties:** tetr cryst [CRC10] **Density, g/cm<sup>3</sup>:** 7.0 [CRC10] **Melting Point, °C:** 948 [CRC10]

#### 1975

**Compound:** Manganese bis(cyclopentadienyl) **Synonym:** bis(cyclopentadienyl)manganese Formula:  $(C_5H_5)_2$ Mn Molecular Formula:  $C_{10}H_{10}$ Mn Molecular Weight: 185.127 CAS RN: 1271-27-8 Properties: sublimed powd, in ampoules [ALF95] Melting Point, °C: 292 [ALF95]

#### 1976

Compound: Manganese boride
Formula: MnB
Molecular Formula: BMn
Molecular Weight: 65.749
CAS RN: 12045-15-7
Properties: powd; -80 mesh with 99% purity, there is also MnB<sub>2</sub>, 12228-50-1, -200 mesh; refractory material [CER91] [KIR81] [CRC91]
Density, g/cm<sup>3</sup>: 6.2 [CRC10]
Melting Point, °C: 1890 [KIR81]

#### 1977

Compound: Manganese boride Formula: Mn<sub>2</sub>B Molecular Formula: BMn<sub>2</sub> Molecular Weight: 120.687 CAS RN: 12045-16-8 Properties: red-brown tetr cryst [CRC10] Density, g/cm<sup>3</sup>: 7.20 [CRC10] Melting Point, °C: 1580 [CRC10]

#### 1978

Compound: Manganese carbide
Formula: Mn<sub>3</sub>C
Molecular Formula: CMn<sub>3</sub>
Molecular Weight: 176.825
CAS RN: 12266-65-8
Properties: tetr; mixture of Mn<sub>5</sub>C<sub>2</sub> and possibly other Mn-C phases, 6 mm pieces and smaller with 99.5% purity; there is also a material with formula Mn<sub>23</sub>C<sub>6</sub>, 72266-65-8, -80 mesh with 99.5% purity [CER91] [CRC10]
Density, g/cm<sup>3</sup>: 6.89 [CRC10]
Melting Point, °C: 1520 [LID94]

## 1979

**Compound:** Manganese carbonyl **Synonym:** dimanganese decacarbonyl **Formula:** Mn<sub>2</sub>(CO)<sub>10</sub> **Molecular Formula:** C<sub>10</sub>Mn<sub>2</sub>O<sub>10</sub> **Molecular Weight:** 389.980 **CAS RN:** 10170-69-1 Properties: golden yellow, monocl cryst; stable under CO gas, less stable to air, heat and light in solution; used as an antiknock agent in gasoline [HAW93] [MER06]
Solubility: i H<sub>2</sub>O; s organic solvents [MER06]
Density, g/cm<sup>3</sup>: 1.75 [HAW93]
Melting Point, °C: 154 [HAW93]
Boiling Point, °C: 80 [ALF95]

#### 1980

Compound: Manganese diboride Formula: MnB<sub>2</sub> Molecular Formula: B<sub>2</sub>Mn Molecular Weight: 76.560 CAS RN: 12228-50-1 Properties: gray-violet cryst; refractory material [KIR81] [CRC10] Solubility: decomposed by H<sub>2</sub>O [CRC10] Density, g/cm<sup>3</sup>: 5.3 [LID94] Melting Point, °C: 1827 [LID94]

# 1981

**Compound:** Manganese niobate **Formula:** MnNb<sub>2</sub>O<sub>6</sub> **Molecular Formula:** MnNb<sub>2</sub>O<sub>6</sub> **Molecular Weight:** 336.747 **CAS RN:** 12032-69-8 **Properties:** -200 mesh with 99.9% purity [CER91]

#### 1982

Compound: Manganese nitride Formula: MnN Molecular Formula: MnN Molecular Weight: 68.945 CAS RN: 36678-21-4 Properties: formed by reaction of Mn and N<sub>2</sub> above 740°C; other nitrides are Mn<sub>6</sub>N<sub>5</sub> (64886-63-1), Mn<sub>3</sub>N<sub>2</sub> (12033-03-3), Mn<sub>2</sub>N (12163-53-0), and Mn<sub>4</sub>N (12033-07-7); used in steelmaking as nitrogen containing intermediate alloys [KIR81]

# 1983

**Compound:** Manganese pentacarbonyl bromide **Formula:** Mn(CO)<sub>5</sub>Br **Molecular Formula:** C<sub>5</sub>BrMnO<sub>5</sub> **Molecular Weight:** 274.894 **CAS RN:** 14516-54-2 **Properties:** yellowish orange cryst [STR93]

#### 1984

Compound: Manganese phosphide Formula: MnP Molecular Formula: MnP Molecular Weight: 85.912 CAS RN: 12032-78-9 Properties: ortho cryst [CRC10] Density, g/cm<sup>3</sup>: 5.49 [CRC10] Melting Point, °C: 1147 [CRC10]

# 1985

Compound: Manganese phosphide Formula: Mn<sub>2</sub>P Molecular Formula: Mn<sub>2</sub>P Molecular Weight: 140.850 CAS RN: 12333-54-9 Density, g/cm<sup>3</sup>: 6.0 [CRC10] Melting Point, °C: 1327 [CRC10]

## 1986

Compound: Manganese phosphide Formula: Mn<sub>3</sub>P<sub>2</sub> Molecular Formula: Mn<sub>3</sub>P<sub>2</sub> Molecular Weight: 226.762 CAS RN: 12397-32-9 Properties: dark gray; mixture of MnP and Mn<sub>2</sub>P; -100 mesh with 99% purity [CER91] [CRC10] Density, g/cm<sup>3</sup>: 5.12 [CRC10] Melting Point, °C: 1095 [AES93]

# 1987

**Compound:** Manganese selenide **Formula:** MnSe **Molecular Formula:** MnSe **Molecular Weight:** 133.90 **CAS RN:** 1313-22-0 **Properties:** gray cub cryst [CRC10] **Solubility:** i H<sub>2</sub>O [CRC10] **Density, g/cm<sup>3</sup>:** 5.45 [CRC10] **Melting Point, °C:** 1460 [CRC10]

## 1988

**Compound:** Manganese silicate **Synonyms:** rhodonite, manganjustite, tephroite **Formula:** MnSiO<sub>3</sub> **Molecular Formula:** MnO<sub>3</sub>Si **Molecular Weight:** 131.022 **CAS RN:** 7759-00-4 Properties: red cryst or yellowish red powd; prepared from manganous salts and sodium silicate; used to color glass and pottery [MER06] [HAW93]
Solubility: i H<sub>2</sub>O [MER06]
Density, g/cm<sup>3</sup>: 3.48 [MER06]
Melting Point, °C: 1323 [HAW93]

# 1989

Compound: Manganese silicide Synonym: manganese disilicide Formula: MnSi<sub>2</sub> Molecular Formula: MnSi<sub>2</sub> Molecular Weight: 111.109 CAS RN: 12032-86-9 Properties: gray; possibly Mn<sub>15</sub>Si<sub>26</sub>; -325 mesh 10μm or less with 99.5% purity [CER91] [CRC10] Density, g/cm<sup>3</sup>: 5.24 [CRC10]

## 1990

**Compound:** Manganese vanadate **Formula:** MnV<sub>2</sub>O<sub>6</sub> **Molecular Formula:** MnO<sub>6</sub>V<sub>2</sub> **Molecular Weight:** 252.817 **CAS RN:** 14986-94-8 **Properties:** -200 mesh with 99.9% purity [CER91]

#### 1991

**Compound:** Manganocene **Formula:**  $Mn(C_{s}H_{s})_{2}$  **Molecular Formula:**  $C_{10}H_{10}Mn$  **Molecular Weight:** 185.124 **CAS RN:** 1271-27-8 **Properties:** yellow-brown cryst [CRC10] **Solubility:** s py, thf; sl bz [CRC10] **Melting Point,** °C: 173 [CRC10]

#### 1992

Compound: Manganese(II) acetate tetrahydrate
Formula: Mn(CH<sub>3</sub>COO)<sub>2</sub>·4H<sub>2</sub>O
Molecular Formula: C<sub>4</sub>H<sub>14</sub>MnO<sub>8</sub>
Molecular Weight: 245.088
CAS RN: 6156-78-1
Properties: pale red cryst; monocl; used in textile dyeing, as an oxidation catalyst; anhydrous manganese(II) acetate has CAS RN 638-38-0 [ALF93] [HAW93]
Solubility: s H<sub>2</sub>O, alcohol [HAW93]
Density, g/cm<sup>3</sup>: 1.589 [KIR81]
Melting Point, °C: 80 [HAW93]; 180 [AES93]

# 1993

Compound: Manganese(II) acetylacetonate
Synonyms: 2,4-pentanedione, manganese(II) derivative
Formula: Mn(CH<sub>3</sub>COCH=C(O)CH<sub>3</sub>)<sub>2</sub>
Molecular Formula: C<sub>10</sub>H<sub>14</sub>MnO<sub>4</sub>
Molecular Weight: 253.157
CAS RN: 14024-58-9
Properties: tan powd; trimer; hygr [STR93] [COT88]
Melting Point, °C: decomposes at 216 [ALD94]

#### 1994

Compound: Manganese(II) borate octahydrate
Formula: MnB<sub>4</sub>O<sub>7</sub>·8H<sub>2</sub>O
Molecular Formula: B<sub>4</sub>H<sub>16</sub>MnO<sub>15</sub>
Molecular Weight: 354.300
CAS RN: 12228-91-0
Properties: brownish-white powd; preparation: by addition of borax to an aq manganese(II) sulfate solution; used in drying varnishes and oils and in the leather industry [MER06] [KIR81]
Solubility: i H<sub>2</sub>O, alcohol; s dil acids [MER06]
Reactions: decomposes on standing in H<sub>2</sub>O [MER06]

#### 1995

Compound: Manganese(II) bromide Formula:  $MnBr_2$ Molecular Formula:  $Br_2Mn$ Molecular Weight: 214.746 CAS RN: 13446-03-2 Properties: -80 mesh with 99.5% purity; pink powd; hygr [STR93] [CER91] Solubility: g/100 g soln, H<sub>2</sub>O: 56.0 (0°C), 60.2 (25°C), 69.5 (100°C); solid phase,  $MnBr_2 \cdot 4H_2O$  (0°C, 25°C),  $MnBr_2 \cdot 2H_2O$  (100°C) [KRU93] Density, g/cm<sup>3</sup>: 4.385 [STR93] Melting Point, °C: 698 [LID94]

#### 1996

Compound: Manganese(II) bromide tetrahydrate Formula:  $MnBr_2 \cdot 4H_2O$ Molecular Formula:  $Br_2H_8MnO_4$ Molecular Weight: 286.808 CAS RN: 10031-20-6 Properties: rose red, sl deliq cryst [MER06] Solubility: s in 0.5 parts  $H_2O$ ; s alcohol [MER06] Melting Point, °C: 64, with some decomposition [MER06]

Compound: Manganese(II) carbonate Synonym: rhodochrosite Formula: MnCO<sub>3</sub> Molecular Formula: CMnO<sub>3</sub> Molecular Weight: 114.947 CAS RN: 598-62-9 Properties: pink solid; trig; gradually turns light brown in air; photoluminescent; hardness 3–4 Mohs; can be made by precipitation of a water soluble Mn(II) salt with an alkali carbonate [HAW93] [KIR81] [MER06] Solubility: sl s H<sub>2</sub>O; s dil acids [KIR81] Density, g/cm<sup>3</sup>: 3.125 [KIR81] Melting Point, °C: decomposes at >200 [KIR81]

#### 1998

**Compound:** Manganese(II) chloride **Synonym:** sacchite **Formula:** MnCl<sub>2</sub> **Molecular Formula:** Cl<sub>2</sub>Mn **Molecular Weight:** 125.843 **CAS RN:** 7773-01-5 **Properties:** pink cryst or flakes; trig, hygr; enthalpy

of fusion 30.70kJ/mol; obtained by reaction of Mn, MnO, Mn(OH)<sub>2</sub>, or MnCO<sub>3</sub> and HCl, followed by crystallization and dehydration; used as a chlorination catalyst for organic materials, as a paint dryer, as a dietary supplement [CRC10] [HAW93] [KIR81]

**Solubility:** s pyridine, ethanol; i ether [KIR78]; g/100 g soln, H<sub>2</sub>O: 38.8 (0°C), 43.6 (25°C), 53.5 (100°C); equilibrium solid phases: MnCl<sub>2</sub> · 4H<sub>2</sub>O (0°C, 25°C), MnCl<sub>2</sub> (100°C) [KRU93]

Density, g/cm<sup>3</sup>: 2.977 [KIR81] Melting Point, °C: 652 [KIR81]

Boiling Point, °C: 1190 [KIR81]

# 1999

Compound: Manganese(II) chloride tetrahydrate
Formula: MnCl<sub>2</sub> · 4H<sub>2</sub>O
Molecular Formula: Cl<sub>2</sub>H<sub>8</sub>MnO<sub>4</sub>
Molecular Weight: 197.905
CAS RN: 13446-34-9
Properties: reddish, sl deliq, monocl cryst; there is a dihydrate, 20603-88-7 [KIR81] [MER06]
Solubility: s 0.7 parts H<sub>2</sub>O; s alcohol; i ether [MER06]
Density, g/cm<sup>3</sup>: 1.913 [HAW93]
Melting Point, °C: 87.5 [HAW93]

#### 2000

Compound: Manganese(II) citrate
Synonym: manganous citrate
Formula: Mn<sub>3</sub>(C<sub>6</sub>H<sub>5</sub>O<sub>7</sub>)<sub>2</sub>
Molecular Formula: C<sub>12</sub>H<sub>10</sub>Mn<sub>3</sub>O<sub>14</sub>
Molecular Weight: 543.017
CAS RN: 71799-92-3
Properties: white powd; used as a food and feed additive and as a dietary supplement [HAW93]
Solubility: s H<sub>2</sub>O containing dissolved sodium citrate [HAW93]

# 2001

Compound: Manganese(II) dihydrogen phosphate dihydrate
Formula: Mn(H<sub>2</sub>PO<sub>4</sub>)<sub>2</sub> · 2H<sub>2</sub>O
Molecular Formula: H<sub>8</sub>MnO<sub>10</sub>P<sub>2</sub>
Molecular Weight: 284.944
CAS RN: 18718-07-5
Properties: almost colorless cryst; deliq [KIR81]
Solubility: s H<sub>2</sub>O; i ethanol [KIR81]
Reactions: minus H<sub>2</sub>O at 100°C [KIR81]

#### 2002

**Compound:** Manganese(II) dithionate **Formula:** Mn(SO<sub>3</sub>)<sub>2</sub> **Molecular Formula:** MnO<sub>6</sub>S<sub>2</sub> **Molecular Weight:** 215.066 **CAS RN:** 13568-72-4 **Properties:** tricl cryst [CRC10] **Solubility:** s H<sub>2</sub>O [HAW93] **Density, g/cm<sup>3</sup>:** 1.76 [HAW93]

#### 2003

Compound: Manganese(II) fluoride Synonym: manganous fluoride Formula:  $MnF_2$ Molecular Formula:  $F_2Mn$ Molecular Weight: 92.935 CAS RN: 7782-64-1 Properties: hygr; -80 mesh with 99.5% purity; reddish powd [HAW93] [CER91] [STR93] Solubility: g/100 g soln, H<sub>2</sub>O: 0.800 (0°C), 1.00 (23.5°C), 0.48 (100°C); equilibrium solid phase,  $MnF_2 \cdot 4H_2O$  (0°C),  $MnF_2$  (25°C, 100°C) [KRU93]; s dil HF, conc HCl or HNO<sub>3</sub> [MER06] Density, g/cm<sup>3</sup>: 3.98 [MER06] Melting Point, °C: 856 [MER06]

Compound: Manganese(II) hydrogen phosphate trihydrate Formula:  $MnHPO_4 \cdot 3H_2O$ Molecular Formula:  $H_7MnO_7P$ Molecular Weight: 204.959 CAS RN: 10236-39-2 Properties: has two forms: gray, prepared by decomposition of  $MnCO_3$ , and pink, prepared by reaction between phosphoric acid and  $Mn_3(PO_4)_2$  [MER06] Solubility: pink form: v sl s  $H_2O$ ; s dil acids; gray form: s only in hot conc HC1 [MER06] Reactions: minus  $H_2O > 100^{\circ}C$  [CRC10]

## 2005

Compound: Manganese(II) hydroxide Synonym: pyrochroite Formula: Mn(OH)<sub>2</sub> Molecular Formula: H<sub>2</sub>MnO<sub>2</sub> Molecular Weight: 88.953 CAS RN: 18933-05-6 Properties: white to pink cryst; hardness is 2.5 Mohs [HAW93] Solubility: mol/L soln, H<sub>2</sub>O: 3.6 × 10<sup>-5</sup> (25°C) [KRU93] Density, g/cm<sup>3</sup>: 3.258 [HAW93] Melting Point, °C: decomposes [HAW93]

# 2006

Compound: Manganese(II) hypophosphite monohydrate
Formula: Mn(H<sub>2</sub>PO<sub>2</sub>)<sub>2</sub>·H<sub>2</sub>O
Molecular Formula: H<sub>6</sub>MnO<sub>5</sub>P<sub>2</sub>
Molecular Weight: 202.931
CAS RN: 10043-84-2
Properties: pink, odorless, almost tasteless cryst or powd; used as a food additive and dietary supplement [HAW93] [MER06]
Solubility: 1 g/6.5 mL H<sub>2</sub>O, 1 g/6 mL boiling H<sub>2</sub>O; i alcohol [MER06]
Reactions: evolves phosphine when heated [MER06]

# 2007

Compound: Manganese(II) iodide Formula: MnI<sub>2</sub> Molecular Formula: I<sub>2</sub>Mn Molecular Weight: 308.747 CAS RN: 7790-33-2 Properties: red-brown powd; hygr [STR93] Solubility: s H<sub>2</sub>O, with gradual decomposition; s alcohol [HAW93] **Density, g/cm<sup>3</sup>:** 5.01 [HAW93] **Melting Point, °C:** 638 [HAW93]

#### 2008

Compound: Manganese(II) iodide tetrahydrate Formula:  $MnI_2 \cdot 4H_2O$ Molecular Formula:  $H_8I_2MnO_4$ Molecular Weight: 380.809 CAS RN: 7790-33-2 Properties: rose red cryst; rapidly turns brown when exposed to air and light due to liberation of iodine [MER06] Solubility: v s  $H_2O$ , with gradual decomposition; s alcohol [MER06] Melting Point, °C: decomposes [CRC10]

# 2009

**Compound:** Manganese(II) metasilicate **Formula:** MnSiO<sub>3</sub> **Molecular Formula:** MnO<sub>3</sub>Si **Molecular Weight:** 131.022 **CAS RN:** 7759-00-4 **Properties:** red ortho cryst [CRC10] **Solubility:** i H<sub>2</sub>O [CRC10] **Density, g/cm<sup>3</sup>:** 3.48 [CRC10] **Melting Point, °C:** 1291

# 2010

Compound: Manganese(II) molybdate Formula: MnMoO<sub>4</sub> Molecular Formula: MnMoO<sub>4</sub> Molecular Weight: 214.876 CAS RN: 14013-15-1 Properties: yellow or off-white powd; monocl [KIR81] [STR93] Density, g/cm<sup>3</sup>: 4.05 [LID94]

#### 2011

Compound: Manganese(II) nitrate Formula: Mn(NO<sub>3</sub>)<sub>2</sub> Molecular Formula: MnN<sub>2</sub>O<sub>6</sub> Molecular Weight: 178.948 CAS RN: 10377-66-9 Properties: liq; available in dissolved form; forms pink solutions [ALF95] [STR93] Solubility: g/100 g soln, H<sub>2</sub>O: 50.49 (0°C), 61.74 (25°C); solid phase, Mn(NO<sub>3</sub>)<sub>2</sub>·6H<sub>2</sub>O [KRU93]

# 2012

**Compound:** Manganese(II) nitrate hexahydrate **Formula:**  $Mn(NO_3)_2 \cdot 6H_2O$  Molecular Formula: H<sub>12</sub>MnN<sub>2</sub>O<sub>12</sub>
Molecular Weight: 287.040
CAS RN: 17141-63-8
Properties: rose colored, deliq, monocl needles; used in ceramics, as a catalyst [HAW93] [MER06]
Solubility: v s H<sub>2</sub>O, alcohol [MER06]
Density, g/cm<sup>3</sup>: 1.8 [MER06]

#### 2013

Compound: Manganese(II) nitrate tetrahydrate
Formula: Mn(NO<sub>3</sub>)<sub>2</sub>·4H<sub>2</sub>O
Molecular Formula: H<sub>8</sub>MnN<sub>2</sub>O<sub>10</sub>
Molecular Weight: 251.010
CAS RN: 20694-39-7
Properties: pink, deliq cryst masses below 20°C [MER06]
Solubility: v s H<sub>2</sub>O, s alcohol [MER06]
Density, g/cm<sup>3</sup>: 2.129 [MER06]
Melting Point, °C: 37.1 [MER06]

# 2014

Compound: Manganese(II) oxalate dihydrate Formula:  $MnC_2O_4 \cdot 2H_2O$ Molecular Formula:  $C_2H_4MnO_6$ Molecular Weight: 178.988 CAS RN: 6556-16-7 Properties: white, cryst powd; used as a paint and varnish drier [HAW93] [MER06] Solubility: g/100 g soln in H<sub>2</sub>O: 0.0198 (0°C), 0.0309 ± 0.0002 (25°C); solid phase  $MnC_2O_4 \cdot 2H_2O$  [KRU93] Density, g/cm<sup>3</sup>: 2.453 [HAW93] Melting Point, °C: decomposes at 150 [MER06] Reactions: minus 2H<sub>2</sub>O at 100°C [HAW93]

#### 2015

Compound: Manganese(II) oxide Synonym: manganosite Formula: MnO Molecular Formula: MnO Molecular Weight: 70.937 CAS RN: 1344-43-0

Properties: grass green powd; cub; enthalpy of fusion 54.40 kJ/mol; produced from MnO<sub>2</sub> ores by roasting in a reducing atm, e.g., methane; used in textile printing, in ceramics, in paints [HAW93] [CRC10]
Solubility: i H<sub>2</sub>O; s acids [HAW93]
Density, g/cm<sup>3</sup>: 5.37 [KIR81]

Melting Point, °C: 1840 [LID94]

#### 2016

**Compound:** Manganese(II) perchlorate hexahydrate **Formula:**  $Mn(ClO_4)_2 \cdot 6H_2O$ **Molecular Formula:**  $Cl_2H_{12}MnO_{14}$ **Molecular Weight:** 361.930 **CAS RN:** 15364-94-0 **Properties:** pink cryst; hygr [STR93] **Density, g/cm<sup>3</sup>:** 2.10 [LID94] **Melting Point, °C:** decomposes at 165 [AES93]

#### 2017

Compound: Manganese(II) phosphate heptahydrate Formula:  $Mn_3(PO_4)_2 \cdot 7H_2O$ Molecular Formula:  $H_{14}Mn_3O_{15}P_2$ Molecular Weight: 480.864 CAS RN: 10236-39-2 Properties: reddish white powd; used in conversion coating of steel, aluminum, and other metals [HAW93] Solubility: i H<sub>2</sub>O; s mineral acids [HAW93]

# 2018

Compound: Manganese(II) pyrophosphate Formula: Mn<sub>2</sub>P<sub>2</sub>O<sub>7</sub> Molecular Formula: Mn<sub>2</sub>O<sub>7</sub>P<sub>2</sub> Molecular Weight: 283.819 CAS RN: 53731-35-4 Properties: white powd [HAW93] Solubility: i H<sub>2</sub>O; s solutions of potassium or sodium pyrophosphate [HAW93] Density, g/cm<sup>3</sup>: 3.71 [HAW93] Melting Point, °C: 1196 [HAW93]

# 2019

Compound: Manganese(II) pyrophosphate trihydrate Formula:  $Mn_2P_2O_7 \cdot 3H_2O$ Molecular Formula:  $H_6Mn_2O_{10}P_2$ Molecular Weight: 337.866 CAS RN: 53731-35-4 Properties: white or nearly white powd [MER06] Solubility: i  $H_2O$ , s in excess of alkali pyrophosphate, acids [MER06]

# 2020

Compound: Manganese(II) selenide Formula: MnSe Molecular Formula: MnSe Molecular Weight: 133.898 CAS RN: 1313-22-0 Properties: black cryst; -20 mesh with 99.9% purity [CER91] [STR93]

# **Density, g/cm<sup>3</sup>:** 5.45 [LID94] **Melting Point, °C:** 1460 [LID94]

#### 2021

Compound: Manganese(II) sulfate Formula:  $MnSO_4$ Molecular Formula:  $MnO_4S$ Molecular Weight: 151.002 CAS RN: 7785-87-7 Properties: almost white; ortho-rhomb [KIR81] Solubility: g/100 g soln, H<sub>2</sub>O: 34.6 (0°C), 39.2 (25°C), 26.1 (100.7°C); solid phase,  $MnSO_4 \cdot 7H_2O$  (0°C),  $MnSO_4 \cdot H_2O$  (25°C, 100.7°C) [KRU93] Density, g/cm<sup>3</sup>: 3.25 [KIR81] Melting Point, °C: 700 [HAW93] Boiling Point, °C: decomposes at 850 [HAW93]

#### 2022

Compound: Manganese(II) sulfate monohydrate Formula: MnSO<sub>4</sub>·H<sub>2</sub>O Molecular Formula: H<sub>2</sub>MnO<sub>5</sub>S Molecular Weight: 169.017 CAS RN: 10034-96-5 Properties: pale red, sl efflorescent cryst; used in dyeing [MER06] Solubility: s in about 1 part cold H<sub>2</sub>O, 0.6 parts boiling; i alcohol [MER06] Density, g/cm<sup>3</sup>: 2.95 [LID94] Reactions: minus H<sub>2</sub>O at 400°C-450°C [MER06]

# 2023

Compound: Manganese(II) sulfate tetrahydrate Formula: MnSO<sub>4</sub> · 4H<sub>2</sub>O Molecular Formula: H<sub>8</sub>MnO<sub>8</sub>S Molecular Weight: 223.063 CAS RN: 10101-68-5 Properties: translucent, pale rose red; efflorescent prisms; used in fertilizers, as a feed additive, in ceramics [HAW93] Solubility: s H<sub>2</sub>O; i alcohol [HAW93] Density, g/cm<sup>3</sup>: 2.107 [HAW93] Melting Point, °C: 30 [HAW93]

## 2024

Compound: Manganese(II) sulfide Synonyms: alabandite, manganblende Formula: MnS Molecular Formula: MnS Molecular Weight: 87.004 CAS RN: 18820-29-6 Properties: pink, green, or brownish green powd; three cryst forms: α: green cub; β: red cub; γ: red hex; used as an additive in steel production [HAW93] [MER06]
Solubility: i H<sub>2</sub>O; s dil acids [MER06]
Density, g/cm<sup>3</sup>: 3.99 [STR93]
Melting Point, °C: decomposes at 1610 [AES93]
Reactions: readily oxidized in moist air to sulfate [MER06]

#### 2025

Compound: Manganese(II) telluride
Formula: MnTe
Molecular Formula: MnTe
Molecular Weight: 182.538
CAS RN: 12032-88-1
Properties: hex cryst; possibly contains some MnTe<sub>2</sub>, 12032-89-2; 6 mm pieces and smaller with 99.9% purity [LID94] [CER91]
Density, g/cm<sup>3</sup>: 6.0 [LID94]

# 2026

**Compound:** Manganese(II) tetraborate octahydrate **Formula:**  $MnB_4O_7 \cdot 8H_2O$  **Molecular Formula:**  $B_4H_{16}MnO_{15}$  **Molecular Weight:** 354.300 **CAS RN:** 12228-91-0 **Properties:** red solid [CRC10] **Solubility:** i H<sub>2</sub>O, EtOH; s dil acids [CRC10]

#### 2027

Compound: Manganese(II) titanate Synonym: pyrophanite Formula: MnTiO<sub>3</sub> Molecular Formula: MnO<sub>3</sub>Ti Molecular Weight: 150.803 CAS RN: 12032-74-5 Properties: -100 mesh with 99.9% purity; red hex cryst [LID94] [CER91] [KIR83] Density, g/cm<sup>3</sup>: 4.54 [KIR83] Melting Point, °C: 1360 [KIR83]

## 2028

Compound: Manganese(II) tungstate Formula: MnWO<sub>4</sub> Molecular Formula: MnO<sub>4</sub>W Molecular Weight: 302.776 CAS RN: 13918-22-4 Properties: -200 mesh with 99.9% purity; off-white powd [STR93] [CER91] Density, g/cm<sup>3</sup>: 7.2 [LID94]

Compound: Manganese(II) zirconate Formula: MnZrO<sub>3</sub> Molecular Formula: MnO<sub>3</sub>Zr Molecular Weight: 194.160 CAS RN: 70692-94-3 Properties: reacted product; -200 mesh with 99.5% purity [CER91]

# 2030

Compound: Manganese(II,III) oxide Synonym: hausmannite Formula: Mn<sub>3</sub>O<sub>4</sub> Molecular Formula: Mn<sub>3</sub>O<sub>4</sub> Molecular Weight: 228.812 CAS RN: 1317-35-7 Properties: brownish powd; tetr, a=0.5762 nm, c=0.9470 nm [THA92] [HAW93] Solubility: i H<sub>2</sub>O [KIR81]; s HCl, releasing Cl<sub>2</sub> [MER06] Density, g/cm<sup>3</sup>: 4.876 [HAW93] Melting Point, °C: 1564 [HAW93]

# 2031

Compound: Manganese(III) acetate dihydrate
Formula: Mn(CH<sub>3</sub>COO)<sub>3</sub> · 2H<sub>2</sub>O
Molecular Formula: C<sub>6</sub>H<sub>13</sub>MnO<sub>8</sub>
Molecular Weight: 268.102
CAS RN: 19513-05-4
Properties: brown cryst; mild selective oxidizing agent [ALD94] [STR93]

# 2032

Compound: Manganese(III) acetylacetonate Synonyms: 2,4-pentanedione, manganese(III) derivative Formula: Mn(CH<sub>3</sub>COCH=C(O)CH<sub>3</sub>)<sub>3</sub> Molecular Formula: C<sub>15</sub>H<sub>21</sub>MnO<sub>6</sub> Molecular Weight: 352.266 CAS RN: 14284-89-0 Properties: black cryst; hygr [STR93] Melting Point, °C: decomposes at 160 [ALD94]

# 2033

Compound: Manganese(III) fluoride Formula: MnF<sub>3</sub> Molecular Formula: F<sub>3</sub>Mn Molecular Weight: 111.933 CAS RN: 7783-53-1 Properties: red cryst; monocl; hygr; used as a fluorinating agent [HAW93] [KIR81] Solubility: decomposed by H<sub>2</sub>O [KIR81] Density, g/cm<sup>3</sup>: 3.54 [KIR81] Melting Point, °C: decomposes at >600 [KIR81]

#### 2034

Compound: Manganese(III) hydroxide Synonym: manganite Formula: γ-MnO(OH) Molecular Formula: HMnO<sub>2</sub> Molecular Weight: 87.945 CAS RN: 1332-63-4 Properties: black solid; monocl [KIR81] Solubility: i H<sub>2</sub>O; disproportionates in dil acid [KIR81] Density, g/cm<sup>3</sup>: 4.2–4.4 [KIR81] Melting Point, °C: decomposes at 250 [KIR81] Reactions: transformed to Mn<sub>2</sub>O<sub>3</sub> at 250°C [KIR81]

#### 2035

Compound: Manganese(III) oxide
Synonym: braunite
Formula: α-Mn<sub>2</sub>O<sub>3</sub>
Molecular Formula: Mn<sub>2</sub>O<sub>3</sub>
Molecular Weight: 157.874
CAS RN: 1317-34-6
Properties: black to brown solid; rhomb, cub; very hard [HAW93] [KIR81]
Solubility: i H<sub>2</sub>O [KIR81]; s HCl, evolving Cl<sub>2</sub> [MER06]
Density, g/cm<sup>3</sup>: 4.50 [HAW93]
Melting Point, °C: decomposes at 1080 [HAW93]

#### 2036

Compound: Manganese(IV) oxide Synonyms: manganese dioxide, pyrolusite Formula: MnO<sub>2</sub> Molecular Formula: MnO<sub>2</sub> Molecular Weight: 86.937 CAS RN: 1313-13-9 **Properties:** black cryst or powd; α-MnO<sub>2</sub>:  $a = 0.97876 \text{ nm}, c = 0.28650 \text{ nm}; \lambda \text{-MnO}_2$ : cub, a=0.8029 nm; used as an oxidizing agent, in dry cell batteries [HAW93] [THA92] [ROS92] Solubility: i H<sub>2</sub>O, HNO<sub>3</sub>, cold H<sub>2</sub>SO<sub>4</sub>; slowly dissolves in HCl, evolving Cl<sub>2</sub>; s dil H<sub>2</sub>SO<sub>4</sub>, dil HNO<sub>3</sub> in the presence of H<sub>2</sub>O<sub>2</sub> or oxalic acid [MER06] Density, g/cm<sup>3</sup>: 5.026 [STR93]; α: 4.21 [ROS92] Melting Point, °C: decomposes at 535 [STR93] Reactions: minus O at 535°C [CRC10]

#### 2037

**Compound:** Manganese(IV) telluride **Synonym:** manganese ditelluride **Formula:** MnTe<sub>2</sub>

Molecular Formula: MnTe<sub>2</sub> Molecular Weight: 310.14 CAS RN: 12032-89-2 Properties: 6 mm pieces and down [STR93]

#### 2038

**Compound:** Manganese(VII) oxide **Synonym:** manganese heptoxide **Formula:** Mn<sub>2</sub>O<sub>7</sub> **Molecular Formula:** Mn<sub>2</sub>O<sub>7</sub> **Molecular Weight:** 221.872 **CAS RN:** 12057-92-0 **Properties:** dark red oil; hygr [KIR81] **Solubility:** v s H<sub>2</sub>O [KIR81] **Density, g/cm<sup>3</sup>:** 2.396 [KIR81] **Melting Point,** °C: 5.9 [KIR81] **Boiling Point,** °C: decomposes at 55 [KIR81]

# 2039

Compound: Mendelevium Formula: Md Molecular Formula: Md Molecular Weight: 258 CAS RN: 7440-11-1

Properties: discovered in 1955 by Ghiorso and colleagues at Lawrence Berkeley Laboratory; preparation: bombardment of <sup>253</sup>Es with He ions [KIR78]
 Melting Point, °C: 827 [LID94]

#### 2040

**Compound:** Mercury **Synonym:** quicksilver **Formula:** Hg **Molecular Formula:** Hg

Molecular Weight: 200.59

CAS RN: 7439-97-6

Properties: silvery white, heavy liq metal; surface tension is 480 dynes/cm; enthalpy of vaporization 59.11 kJ/mol; enthalpy of fusion 2.29 kJ/mol; resistivity (20°C) 95.8 μohm · cm; critical density 3.56 g/cm<sup>3</sup>; critical pressure 74.2 MPa; critical temp 1677°C; expansion coefficient of liq at 20°C is 182×10<sup>-6</sup>/°C; viscosity at 20°C is 1.55 mPa · s [KIR81] [HAW93] [COT88] [CRC10]

- **Solubility:** 20–30 μg/L in H<sub>2</sub>O; s in boiling H<sub>2</sub>SO<sub>4</sub>, HNO<sub>3</sub> [KIR81] [HAW93] **Density, g/cm<sup>3</sup>:** 13.534 [MER06]
- Melting Point, °C: –38.87 [MER06]
- Boiling Point, °C: 356.73 [CRC10]
- Thermal Conductivity,  $W/(m \cdot K)$ : 9.2 (25°C) [KIR81]

**Thermal Expansion Coefficient:** liq: 100°C

(1.458), 200°C (3.307) [CLA66]

## 2041

Compound: Mercury(I) acetate Synonym: mercurous acetate Formula: Hg<sub>2</sub>(CH<sub>3</sub>COO)<sub>2</sub> Molecular Formula: C<sub>4</sub>H<sub>6</sub>Hg<sub>2</sub>O<sub>4</sub> Molecular Weight: 519.370 CAS RN: 631-60-7 Properties: colorless scales; lustrous leaflets or cryst powd; light sensitive, becomes dark; aq solutions decomposed quickly by light and heat; used in medicine as an antibacterial agent [HAW93] [MER06] Solubility: 0.75 g/100 mL H<sub>2</sub>O (12°C) [CRC10] Melting Point, °C: decomposes [CRC10]

#### 2042

**Compound:** Mercury(I) bromate **Formula:**  $Hg_2(BrO_3)_2$  **Molecular Formula:**  $Br_2Hg_2O_6$  **Molecular Weight:** 656.98 **CAS RN:** 13465-33-3 **Properties:** col cryst [CRC10] **Solubility:** i H<sub>2</sub>O; sl acid [CRC10] **Melting Point, °C:** decomposes [CRC10]

# 2043

**Compound:** Mercury(I) bromide Synonym: mercurous bromide Formula: Hg<sub>2</sub>Br<sub>2</sub> Molecular Formula: Br<sub>2</sub>Hg<sub>2</sub> Molecular Weight: 560.988 CAS RN: 15385-58-7 Properties: white, odorless, tasteless powd; tetr; sensitive to light (darkens); decomposed by hot HCl or alkali bromides; becomes yellow when heated, returns to white color when cooled; prepared by oxidation of Hg with Br<sub>2</sub> or as a precipitate by addition of NaBr to HgNO<sub>3</sub> solution [KIR81] [HAW93] [MER06] **Solubility:** g/L soln, H<sub>2</sub>O:  $3.9 \times 10^{-5}$  (25°C) [KRU93]; i alcohol, ether [MER06]; s in fuming HNO<sub>3</sub>, hot conc H<sub>2</sub>SO<sub>4</sub> [HAW93] Density, g/cm<sup>3</sup>: 7.307 [HAW93] Melting Point, °C: 405 [HAW93] Boiling Point, °C: sublimes at 340–350 [HAW93]

## 2044

**Compound:** Mercury(I) carbonate **Formula:** Hg<sub>2</sub>CO<sub>3</sub> **Molecular Formula:** CHg<sub>2</sub>O<sub>3</sub> **Molecular Weight:** 461.189 **CAS RN:** 50968-00-8 **Properties:** yellow powd [LAN05] **Solubility:** g/L soln, H<sub>2</sub>O:  $8.8 \times 10^{-9}$  (25°C) [KRU93] **Melting Point,** °C: decomposes at 130 [LAN05]

# 2045

Compound: Mercury(I) chlorate Synonym: mercurous chlorate Formula: Hg<sub>2</sub>(ClO<sub>3</sub>)<sub>2</sub> Molecular Formula: Cl<sub>2</sub>Hg<sub>2</sub>O<sub>6</sub> Molecular Weight: 568.081 CAS RN: 10294-44-7 Properties: white cryst; decomposes at ~250°C to O<sub>2</sub>, HgO, HgCl<sub>2</sub> [MER06] Solubility: sl s H<sub>2</sub>O, hydrolyzed in hot H<sub>2</sub>O forming basic salt [MER06]; s alcohol, acetic acid [HAW93] Density, g/cm<sup>3</sup>: 6.409 [HAW93] Melting Point, °C: decomposes at 250 [HAW93]

#### 2046

**Compound:** Mercury(I) chloride **Synonyms:** mercurous chloride, calomel **Formula:** Hg<sub>2</sub>Cl<sub>2</sub> **Molecular Formula:** Cl<sub>2</sub>Hg<sub>2</sub> **Molecular Weight:** 472.085

CAS RN: 10112-91-1

- **Properties:** white, odorless, tasteless powd; rhomb cryst; slowly decomposed by sunlight to liq Hg and HgCl<sub>2</sub>; can be obtained by oxidation of Hg with Cl<sub>2</sub>; used as a fungicide, as a reference electrode, in ceramic painting; decomposed by alkalies [HAW93] [MER06] **Solubility:** g/100 g soln, H<sub>2</sub>O: 0.000140 ( $0.5^{\circ}$ C); mol/L soln, H<sub>2</sub>O: 7.5 × 10<sup>-6</sup> (25°C)
- [KRU93]; i alcohol, ether [MER06] Density, g/cm<sup>3</sup>: 7.15 [MER06] Melting Point, °C: 302 [HAW93] Boiling Point, °C: 384 [HAW93]

#### 2047

Compound: Mercury(I) chromate
Synonym: mercurous chromate
Formula: Hg<sub>2</sub>CrO<sub>4</sub>
Molecular Formula: CrHg<sub>2</sub>O<sub>4</sub>
Molecular Weight: 517.174
CAS RN: 13444-75-2
Properties: brick red powd; ortho-rhomb cryst; can have a variable composition; used for coloring ceramics green [HAW93] [KIR78]
Solubility: i H<sub>2</sub>O, alcohol; s conc HNO<sub>3</sub> [HAW93]

Melting Point, °C: decomposes [CRC10]

#### 2048

Compound: Mercury(I) fluoride Synonym: mercurous fluoride Formula: Hg<sub>2</sub>F<sub>2</sub> Molecular Formula: F<sub>2</sub>Hg<sub>2</sub> Molecular Weight: 439.177 CAS RN: 13967-25-4 Properties: small, yellow cub cryst; blackens in light; preparation by reaction of Hg<sub>2</sub>CO<sub>3</sub> and HF [MER06] Solubility: hydrolyzed in H<sub>2</sub>O to Hg(I), HgO, HF [MER06] Density, g/cm<sup>3</sup>: 8.73 [MER06] Melting Point, °C: sublimes at ~240 [MER06] Boiling Point, °C: decomposes at 570 [MER06]

# 2049

**Compound:** Mercury(I) iodate **Formula:**  $Hg_2(IO_3)_2$  **Molecular Formula:**  $Hg_2I_2O_6$  **Molecular Weight:** 750.985 **CAS RN:** 13465-35-9 **Properties:** yellowish [LAN05] **Solubility:** g/L soln,  $H_2O: 6.0 \times 10^{-7}$  (25°C) [KRU93] **Melting Point,** °C: volatilizes at 250 [LAN05]

# 2050

Compound: Mercury(I) iodide Synonym: mercurous iodide Formula: Hg<sub>2</sub>I<sub>2</sub> Molecular Formula: Hg<sub>2</sub>I<sub>2</sub> Molecular Weight: 654.989 CAS RN: 15385-57-6 Properties: bright yellow, amorphous, odorless, tasteless powd; darkens or becomes greenish in light forming HgI and liq Hg; color changes to dark yellow, orange, and orange-red when heated, reverse order when cooled; enthalpy of fusion 27.00 kJ/mol; can be made by precipitation in HgNO<sub>3</sub> solution with KI; used as a topical antibacterial agent in medicine [HAW93] [MER06] [KIR81] [CRC10] **Solubility:** g/L soln, H<sub>2</sub>O:  $2.0 \times 10^{-7}$  (25°C) [KRU93]; i alcohol, ether [MER06]; s castor oil, ammonia [HAW93] Density, g/cm<sup>3</sup>: 7.65–7.75 [HAW93]

Melting Point, °C: 290, when rapidly heated, decomposes to HgI, Hg(I) [MER06]Boiling Point, °C: sublimes at 140 [HAW93]

# 2051

**Compound:** Mercury(I) nitrate dihydrate **Synonym:** mercurous nitrate
Formula: HgNO<sub>3</sub>·2H<sub>2</sub>O
Molecular Formula: H<sub>4</sub>HgNO<sub>5</sub>
Molecular Weight: 298.626
CAS RN: 10415-75-5
Properties: short prismatic cryst; effloresces, becoming anhydrous in dry air; light sensitive; used as an analytical reagent [HAW93]
Solubility: sensitive to H<sub>2</sub>O: s in small quantities of warm H<sub>2</sub>O, but hydrolyzes in larger amounts [HAW93]
Density, g/cm<sup>3</sup>: 4.785 (3.9°C) [HAW93]

Melting Point, °C: decomposes at 70 [HAW93]

## 2052

**Compound:** Mercury(I) nitrate monohydrate **Formula:**  $HgNO_3 \cdot H_2O$  **Molecular Formula:**  $H_2HgNO_4$  **Molecular Weight:** 280.611 **CAS RN:** 7782-86-7

Properties: white cryst; anhydrous is white monocl, which can be prepared by dissolution of Hg in hot dil HNO<sub>3</sub> followed by crystallization, some Hg(NO<sub>3</sub>)<sub>2</sub> is also formed [KIR81] [STR93]
Density, g/cm<sup>3</sup>: 4.79 [STR93]
Melting Point, °C: 70 [STR93]

2053

**Compound:** Mercury(I) nitrite **Formula:**  $Hg_2(NO_2)_2$  **Molecular Formula:**  $Hg_2N_2O_4$  **Molecular Weight:** 493.19 **CAS RN:** 13492-25-6 **Properties:** yellow cryst [CRC10] **Solubility:** reac  $H_2O$  [CRC10] **Density, g/cm<sup>3</sup>:** 7.3 [CRC10] **Melting Point, °C:** decomposes at 100 [CRC10]

#### 2054

**Compound:** Mercury(I) oxalate **Formula:**  $Hg_2C_2O_4$  **Molecular Formula:**  $C_2Hg_2O_4$  **Molecular Weight:** 489.20 **CAS RN:** 2949-11-3 **Properties:** cryst [CRC10] **Solubility:** i H<sub>2</sub>O; sl HNO<sub>3</sub> [CRC10]

# 2055

**Compound:** Mercury(I) oxide **Synonym:** mercurous oxide **Formula:** Hg<sub>2</sub>O **Molecular Formula:** Hg<sub>2</sub>O **Molecular Weight:** 417.179

#### CAS RN: 15829-53-5

Properties: black or brownish black powd; light sensitive; no evidence that Hg<sub>2</sub>O has been isolated; on adding NaOH solution to HgNO<sub>3</sub>, what x-ray data indicate could be intimate mixture of HgO and Hg [MER06]
Solubility: i H<sub>2</sub>O; s HNO<sub>3</sub>; reacts with HCl to form calomel, Hg<sub>2</sub>Cl<sub>2</sub> [MER06]
Density, g/cm<sup>3</sup>: 9.8 [HAW93]
Melting Point, °C: decomposes at 100 [HAW93]

#### 2056

Compound: Mercury(I) perchlorate tetrahydrate Formula:  $HgClO_4 \cdot 4H_2O$ Molecular Formula:  $ClH_8HgO_8$ Molecular Weight: 372.102 CAS RN: 65202-12-2 Properties: white cryst [STR93] Solubility: g/100 g soln in H<sub>2</sub>O: 282 (0°C), 394 (25°C), 580 (99°C); solid phase:  $Hg_2(ClO_4)_2 \cdot 4H_2O$  (0°C, 25°C),  $Hg_2(ClO_4)_2 \cdot 2H_2O$  (99°C) [KRU93]

# 2057

Compound: Mercury(I) sulfate Synonym: mercurous sulfate Formula:  $Hg_2SO_4$ Molecular Formula:  $Hg_2O_4S$ Molecular Weight: 497.224 CAS RN: 7783-36-0 Properties: white to sl yellow cryst powd; becomes gray and forms Hg and  $HgSO_4$  in light; decomposes on heating; forms as a precipitate by addition of dil  $H_2SO_4$  to a solution of  $HgNO_3$ ; used in Clark and Weston standard cells [KIR81] [HAW93] [MER06] Solubility: 0.05 g/100 g H<sub>2</sub>O [KIR81]; s dil HNO<sub>3</sub> [MER06] Density, g/cm<sup>3</sup>: 7.56 [MER06] Melting Point, °C: decomposes [AES93]

## 2058

Compound: Mercury(I) sulfide Formula:  $Hg_2S$ Molecular Formula:  $Hg_2S$ Molecular Weight: 433.246 CAS RN: 51595-71-2 Properties: black [LAN05] Solubility: g/L soln,  $H_2O$ :  $2.8 \times 10^{-23}$  (25°C) [KRU93] Melting Point, °C: decomposes [LAN05]

# 2059

**Compound:** Mercury(I) thiocyanate **Formula:** Hg<sub>2</sub>(SCN)<sub>2</sub> Molecular Formula:  $C_2Hg_2N_2S_2$ Molecular Weight: 517.34 CAS RN: 13465-37-7 Properties: col powd [CRC10] Solubility: g/100 g H<sub>2</sub>O: 0.03<sup>25</sup> [CRC10]

## 2060

**Compound:** Mercury(I) tungstate **Formula:** Hg<sub>2</sub>WO<sub>4</sub> **Molecular Formula:** Hg<sub>2</sub>O<sub>4</sub>W **Molecular Weight:** 649.02 **CAS RN:** 38705-19-0 **Properties:** yellow amorphous solid [CRC10] **Solubility:** i H<sub>2</sub>O, EtOH [CRC10] **Melting Point,** °C: decomposes [CRC10]

#### 2061

**Compound:** Mercury(II) acetate **Synonym:** mercuric acetate **Formula:** Hg(CH<sub>3</sub>COO)<sub>2</sub> **Molecular Formula:** C<sub>4</sub>H<sub>6</sub>HgO<sub>4</sub> **Molecular Weight:** 318.680 **CAS RN:** 1600-27-7

Properties: white cryst or light yellow powd; -60 mesh with 99.9% purity; sensitive to light; prepared by dissolving HgO in warm 20% acetic acid; used in pharmaceuticals and as a catalyst in organic synthesis [HAW93] [STR93] [KIR81] [CER91]
Solubility: s H<sub>2</sub>O, alcohol [HAW93]
Density, g/cm<sup>3</sup>: 3.25 [HAW93]

Melting Point, °C: 179–182 [ALD94]

# 2062

Compound: Mercury(II) amide chloride Formula: Hg(NH<sub>2</sub>)Cl Molecular Formula: ClH<sub>2</sub>HgN Molecular Weight: 252.07 CAS RN: 10124-48-8 Properties: white solid [CRC10] Solubility: i H<sub>2</sub>O, EtOH; sol warm acid [CRC10] Density, g/cm<sup>3</sup>: 5.38 [CRC10] Boiling Point, °C: sublimes [CRC10]

# 2063

**Compound:** Mercury(II) arsenate **Synonym:** mercuric arsenate **Formula:** HgHAsO<sub>4</sub> **Molecular Formula:** AsHHgO<sub>4</sub> **Molecular Weight:** 340.518 **CAS RN:** 7784-37-4 Properties: yellow powd; used to waterproof paints and in antifouling paints [HAW93] [MER06]Solubility: i H<sub>2</sub>O; s HCl, HNO<sub>3</sub> [MER06]

# 2064

Compound: Mercury(II) basic carbonate Formula:  $HgCO_3 \cdot 3HgO$ Molecular Formula:  $CHg_4O_6$ Molecular Weight: 910.367 CAS RN: 13004-83-6 Properties: brown precipitate formed by adding sodium carbonate solution to  $HgCl_2$  solution, forming a slurry; refluxing the slurry decomposes carbonate to red HgO [KIR81]

#### 2065

Compound: Mercury(II) benzoate monohydrate Formula:  $Hg(C_7H_5O_2)_2 \cdot H_2O$ Molecular Formula:  $C_{14}H_{12}HgO_5$ Molecular Weight: 460.836 CAS RN: 583-15-3 Properties: white cryst; odorless cryst powd; sensitive to light [MER06] [HAW93] Solubility: 1.2 g/100 mL H<sub>2</sub>O (15°C), 2.5 g/100 mL H<sub>2</sub>O (100°C) [CRC10] Melting Point, °C: 165 [HAW93] Reactions: hydrolyzed in boiling H<sub>2</sub>O to a basic salt and benzoic acid [MER06]

#### 2066

**Compound:** Mercury(II) bromate **Formula:** Hg(BrO<sub>3</sub>)<sub>2</sub> **Molecular Formula:** Hg(BrO<sub>3</sub>)<sub>2</sub> **Molecular Weight:** 456.39 **CAS RN:** 26522-91-8 **Properties:** cryst [CRC10] **Solubility:** g/100 g H<sub>2</sub>O: 0.15; s acid [CRC10] **Melting Point,** °C: decomposes at 130 [CRC10]

#### 2067

**Compound:** Mercury(II) bromide **Formula:** HgBr<sub>2</sub> **Molecular Formula:** Br<sub>2</sub>Hg **Molecular Weight:** 360.398 **CAS RN:** 7789-47-1 **Properties:** white rhomb cryst or powd; sensitive

to light; enthalpy of vaporization 58.89 kJ/mol; enthalpy of fusion 17.90 kJ/mol; can be prepared by precipitation below 75°C from Hg(NO<sub>3</sub>)<sub>2</sub> solution with NaBr, followed by drying; used in medicine [HAW93] [MER06] [KIR81] [CRC10] Solubility: g/100 g soln, H<sub>2</sub>O: 0.3 (0°C), 0.611 ± 0.002 (25°C), 4.7 (100°C) [KRU93]; v s hot alcohol, methanol, HCl, HBr; sl s chloroform [MER06]
 Density, g/cm<sup>3</sup>: 6.109 [STR93]
 Melting Point, °C: 236 [CRC10]
 Boiling Point, °C: 322 [CRC10]

#### 2068

**Compound:** Mercury(II) chlorate **Formula:** Hg(ClO<sub>3</sub>)<sub>2</sub> **Molecular Formula:** Cl<sub>2</sub>HgO<sub>6</sub> **Molecular Weight:** 367.49 **CAS RN:** 13465-30-0 **Properties:** white needles [CRC10] **Solubility:** g/100 g H<sub>2</sub>O: 25 [CRC10] **Density, g/cm<sup>3</sup>:** 4.998 [CRC10] **Melting Point, °C:** decomposes [CRC10]

#### 2069

**Compound:** Mercury(II) chloride Synonym: corrosive sublimate Formula: HgCl<sub>2</sub> Molecular Formula: Cl<sub>2</sub>Hg Molecular Weight: 271.495 CAS RN: 7487-94-7 Properties: cryst or white granules or powd; odorless; volatilizes unchanged at ~300°C; vapor pressure 13 Pa (100°C), 400 Pa (150°C); enthalpy of vaporization 58.9 kJ/mol; enthalpy of fusion 19.41 kJ/mol; obtained by reaction of Hg with Cl<sub>2</sub>; used to coagulate albumin, to manufacture mercury compounds, as a disinfectant [HAW93] [MER06] [KIR81] [JAN71] Solubility: g/100 g soln, H<sub>2</sub>O: 3.5 (0°C), 6.8 (25°C), 36.5 (100°C) [KRU93]; 1 g dissolves in 3.8 mL alcohol, 200 mL benzene, 22 mL ether, 12 mL glycerol, 40 mL acetic acid; s other organics [MER06] Density, g/cm<sup>3</sup>: 5.44 [HAW93]; vapor: 9.8 [KIR81]

Melting Point, °C: 276 [JAN71] Boiling Point, °C: 304 [JAN71]

## 2070

**Compound:** Mercury(II) chloride ammoniated **Synonym:** ammoniated mercuric chloride **Formula:** Hg(NH<sub>2</sub>)Cl **Molecular Formula:** ClH<sub>2</sub>HgN **Molecular Weight:** 252.066 **CAS RN:** 10124-48-8

**Properties:** white lumps, odorless powd; stable in air, darkens when exposed to light; used in medicine as a topical anti-infective [HAW93] [MER06]

Solubility: i H<sub>2</sub>O, alcohol; s warm HCl, HNO<sub>3</sub>, acetic acid [MER06] Density, g/cm<sup>3</sup>: 5.38 [MER06]

#### 2071

Compound: Mercury(II) chromate Synonym: mercuric chromate Formula: HgCrO<sub>4</sub> Molecular Formula: CrHgO<sub>4</sub> Molecular Weight: 316.584 CAS RN: 13444-75-2 Properties: red ortho-rhomb; used in antifouling formulations [KIR78] Solubility: sl s H<sub>2</sub>O [KIR78] Density, g/cm<sup>3</sup>: 6.06 [LID94] Melting Point, °C: decomposes [CRC10]

# 2072

Compound: Mercury(II) cyanide Synonym: mercuric cyanide Formula: Hg(CN)<sub>2</sub> Molecular Formula: C<sub>2</sub>HgN<sub>2</sub> Molecular Weight: 252.625 CAS RN: 592-04-1 Properties: colorless, odorless; tetr cryst; darkens if exposed to light; can be made by reaction of aq slurry of yellow HgO with excess HCN, followed by heating to 95°C and filtration; used as an antiseptic in medicine, in germicidal soaps, and in photography [HAW93] [MER06] **Solubility:** g/100 g soln, H<sub>2</sub>O: 6.31 (0°C), 10.06±0.06 (25°C), 35.05 (101.1°C) [KRU93]; 1g dissolves in 13 mL alcohol, 4 mL methanol; sl s ether; slowly s glycerol [MER06] Density, g/cm<sup>3</sup>: 3.996 [MER06] Melting Point, °C: decomposes at 320 [MER06]

# 2073

**Compound:** Mercury(II) dichromate **Synonym:** mercuric dichromate **Formula:** HgCr<sub>2</sub>O<sub>7</sub> **Molecular Formula:** Cr<sub>2</sub>HgO<sub>7</sub> **Molecular Weight:** 416.578 **CAS RN:** 7789-10-8 **Properties:** red, heavy, cryst powd [MER06] **Solubility:** i H<sub>2</sub>O; s HCl, HNO<sub>3</sub> [MER06]

# 2074

**Compound:** Mercury(II) fluoride **Synonym:** mercuric fluoride

Formula: HgF<sub>2</sub>
Molecular Formula: F<sub>2</sub>Hg
Molecular Weight: 238.587
CAS RN: 7783-39-3
Properties: transparent cryst; white powd or cub cryst; very sensitive to moisture; can be obtained from a reaction of F<sub>2</sub> with HgCl<sub>2</sub> or HgO; used in the synthesis of organic fluoride compounds [HAW93] [MER06] [KIR78]
Solubility: turns yellow and hydrolyzes in H<sub>2</sub>O after prolonged time [MER06]; moderately s in alcohol [HAW93]
Density, g/cm<sup>3</sup>: 8.95 [MER06]
Melting Point, °C: decomposes at 645 [HAW93]

## 2075

Compound: Mercury(II) fulminate
Formula: Hg(CNO)<sub>2</sub>
Molecular Formula: C<sub>2</sub>HgN<sub>2</sub>O<sub>2</sub>
Molecular Weight: 284.624
CAS RN: 628-86-4
Properties: gray, cryst powd; explodes readily if dry; used to manufacture caps and detonators for explosives [HAW93]
Solubility: sl s cold H<sub>2</sub>O, s hot H<sub>2</sub>O; s alcohol, NH<sub>4</sub>OH [HAW93]
Density, g/cm<sup>3</sup>: 4.42 [HAW93]
Melting Point, °C: explodes [HAW93]

# 2076

**Compound:** Mercury(II) hydrogen arsenate **Formula:** HgHAsO<sub>4</sub> **Molecular Formula:** AsHHgO<sub>4</sub> **Molecular Weight:** 340.52 **CAS RN:** 7784-37-4 **Properties:** yellow powd [CRC10] **Solubility:** i H<sub>2</sub>O; s acid [CRC10]

## 2077

**Compound:** Mercury(II) iodate **Synonym:** mercuric iodate **Formula:**  $Hg(IO_3)_2$  **Molecular Formula:**  $HgI_2O_6$  **Molecular Weight:** 550.395 **CAS RN:** 7783-32-6 **Properties:** white powd [MER06] **Solubility:** g/100 g H<sub>2</sub>O: 0.002 (20°C) [MER06] **Melting Point,** °C: decomposes at 175 [LID94]

## 2078

**Compound:** Mercury(II) iodide(α) Synonym: mercuric iodide Formula:  $\alpha$ -HgI<sub>2</sub> Molecular Formula: HgI<sub>2</sub> Molecular Weight: 454.399 CAS RN: 7774-29-0 Properties: scarlet red, heavy odorless, almost tasteless powd; tetr; sensitive to light; enthalpy of vaporization 59.2 kJ/mol; enthalpy of fusion 18.90 kJ/mol; obtained as a precipitate from a solution of HgCl<sub>2</sub> and KI; used to treat skin diseases and as an analytical reagent [KIR81] [CRC10] [MER06] Solubility: 0.006 g/100 g H<sub>2</sub>O (25°C); Hg dissolves in: 115 mL alcohol, 20 mL boiling alcohol, about 120 mL ether, about 60 mL acetone, 910 mL chloroform, 75 mL ethyl acetate [MER06] Density, g/cm<sup>3</sup>: 6.28 [MER06] Melting Point, °C: 259 [MER06] Boiling Point, °C: 354 [CRC10] **Reactions:** transition red  $\rightarrow$  yellow at 130°C [MER06]

## 2079

**Compound:** Mercury(II) iodide( $\beta$ ) Synonym: coccinite **Formula:** β-HgI<sub>2</sub> **Molecular Formula:** HgI<sub>2</sub> Molecular Weight: 454.399 CAS RN: 7774-29-0 **Properties:** rhomb; turns yellow from red  $\alpha$ -form when  $\alpha$ -form is heated to 130°C, then reverses color change when cooled; used as an antiseptic in medicine and as Nessler's reagent [HAW93] [STR93] [CRC10] **Solubility:** g/L soln,  $H_2O$ : 0.050 ± 0.06 (25°C) [KRU93]; s boiling alcohol [HAW93] Density, g/cm<sup>3</sup>: 6.094 [CRC10] Melting Point, °C: 259 (under argon) [STR93] Boiling Point, °C: 349 [HAW93]

# 2080

**Compound:** Mercury(II) nitrate dihydrate **Formula:**  $Hg(NO_3)_2 \cdot 2H_2O$ **Molecular Formula:**  $H_4HgN_2O_8$ **Molecular Weight:** 360.63 **CAS RN:** 22852-67-1 **Properties:** monocl cryst [CRC10] **Solubility:** s  $H_2O$  [CRC10] **Density, g/cm<sup>3</sup>:** 4.78 [CRC10]

**Compound:** Mercury(II) nitrate **Formula:** Hg(NO<sub>3</sub>)<sub>2</sub> **Molecular Formula:** HgN<sub>2</sub>O<sub>6</sub> **Molecular Weight:** 324.60 **CAS RN:** 10045-94-0 **Properties:** col hygr cryst [CRC10] **Solubility:** s H<sub>2</sub>O; i EtOH [CRC10] **Density, g/cm<sup>3</sup>:** 4.3 [CRC10] **Melting Point, °C:** 79 [CRC10]

# 2082

Compound: Mercury(II) nitrate hemihydrate
Synonym: mercuric nitrate
Formula: Hg(NO<sub>3</sub>)<sub>2</sub>·1/2H<sub>2</sub>O
Molecular Formula: HHgN<sub>2</sub>O<sub>6.5</sub>
Molecular Weight: 333.607
CAS RN: 10045-94-0
Properties: colorless cryst or white deliq powd; decomposes by heating; made by dissolution of Hg in hot conc HNO<sub>3</sub>, then cooling to crystallize product; used in the nitration of aromatic organic compounds and in felt manufacture [HAW93]
Solubility: s H<sub>2</sub>O, HNO<sub>3</sub>; i alcohol [HAW93]
Density, g/cm<sup>3</sup>: 4.39 [CRC10]
Melting Point, °C: 79 [HAW93]
Boiling Point, °C: decomposes [CRC10]

## 2083

**Compound:** Mercury(II) nitrate monohydrate **Synonym:** mercuric nitrate monohydrate **Formula:**  $Hg(NO_3)_2 \cdot H_2O$  **Molecular Formula:**  $H_2HgN_2O_7$  **Molecular Weight:** 342.615 **CAS RN:** 7783-34-8 **Properties:** white or sl yellow, deliq cryst powd [MER06] **Solubility:** s  $H_2O$ , decomposes; s dil acids [MER06] **Density, g/cm<sup>3</sup>:** 4.3 [STR93]

# 2084

Compound: Mercury(II) oleate Synonym: mercuric oleate Formula: Hg(C<sub>17</sub>H<sub>33</sub>COO)<sub>2</sub> Molecular Formula: C<sub>36</sub>H<sub>66</sub>HgO<sub>4</sub> Molecular Weight: 763.508 CAS RN: 1191-80-6 Properties: yellowish brown; odor of oleic acid; sensitive to light; used as an antiseptic and in antifouling paints [HAW93] [MER06] Solubility: i H<sub>2</sub>O; sl s alcohol, ether;

v s in fixed oils [MER06]

## 2085

Compound: Mercury(II) oxalate Formula:  $HgC_2O_4$ Molecular Formula:  $C_2HgO_4$ Molecular Weight: 288.610 CAS RN: 3444-13-1 Properties: powd [LAN05] Solubility: g/100 g H<sub>2</sub>O: 0.0107 (20°C) [KRU93] Melting Point, °C: decomposes at 165 [LAN05]

# 2086

Compound: Mercury(II) oxide red Synonym: red mercuric oxide Formula: HgO Molecular Formula: HgO Molecular Weight: 216.589 CAS RN: 21908-53-2 Properties: bright red or orange red, odorless cryst; ortho-rhomb; sensitive to light, decomposes to Hg and O<sub>2</sub>; obtained either by thermal decomposition of Hg(NO<sub>3</sub>)<sub>2</sub> or by precipitation from a hot solution of HgCl by Na<sub>2</sub>CO<sub>3</sub>; used in paint pigments, perfumery and cosmetics, and as an antiseptic [HAW93] [MER06] [KIR81] Solubility: i H<sub>2</sub>O; s dil HCl, HNO<sub>3</sub>; i alcohol [MER06] Density, g/cm<sup>3</sup>: 11.14 [MER06] Melting Point, °C: decomposes at 500 [STR93] **Reactions:** decomposes to Hg(I) and O<sub>2</sub> at 500°C [MER06]

# 2087

**Compound:** Mercury(II) oxide yellow **Synonym:** yellow mercuric oxide

**Formula:** HgO

Molecular Formula: HgO

Molecular Weight: 216.589

CAS RN: 21908-53-2

**Properties:** yellow or light orange yellow, odorless powd; ortho-rhomb; stable in air; darkens on exposure to light; can be prepared by precipitation from a water soluble mercuric salt by an alkali; used as an antiseptic [KIR81] [HAW93] [MER06]

Solubility: i H<sub>2</sub>O; s dil HCl, HNO<sub>3</sub> [MER06]

Density, g/cm<sup>3</sup>: 11.14 [MER06]

# 2088

**Compound:** Mercury(II) oxide sulfate **Formula:** (Hg<sub>3</sub>O<sub>2</sub>)SO<sub>4</sub> **Molecular Formula:** Hg<sub>3</sub>O<sub>6</sub>S **Molecular Weight:** 729.83

Melting Point, °C: decomposes at 500 [STR93]

CAS RN: 1312-03-4 Properties: yellow powd [CRC10] Solubility: i H<sub>2</sub>O; s acid [CRC10]

## 2089

Compound: Mercury(II) oxycyanide Synonym: mercuric oxycyanide Formula:  $Hg(CN)_2 \cdot HgO$ Molecular Formula:  $C_2Hg_2N_2O$ Molecular Weight: 469.214 CAS RN: 1335-31-5 Properties: white, ortho-rhomb cryst or cryst powd; exploded by percussion or if in contact with flame; prepared from excess yellow HgO in a slurry with HCN [MER06] [KIR81] Solubility: 1 g/80 mL cold H<sub>2</sub>O, more soluble in hot H<sub>2</sub>O [MER06] Density, g/cm<sup>3</sup>: 4.44 [MER06] Melting Point, °C: can explode [CRC10]

# 2090

**Compound:** Mercury(II) perchlorate trihydrate **Formula:**  $Hg(ClO_4)_2 \cdot 3H_2O$ **Molecular Formula:**  $Cl_2H_6HgO_{11}$ **Molecular Weight:** 453.536 **CAS RN:** 73491-34-6 **Properties:** white cryst [STR93] **Density, g/cm<sup>3</sup>:** ~4 [STR93]

# 2091

**Compound:** Mercury(II) phosphate **Formula:**  $Hg_3(PO_4)_2$  **Molecular Formula:**  $Hg_3O_8P_2$  **Molecular Weight:** 791.713 **CAS RN:** 7782-66-3 **Properties:** heavy, white or yellowish powd [HAW93] **Solubility:** i H<sub>2</sub>O, alcohol; s in acids [HAW93]

# 2092

Compound: Mercury(II) selenide Synonym: tiemannite Formula: HgSe Molecular Formula: HgSe Molecular Weight: 279.550 CAS RN: 20601-83-6 Properties: gray powd; sublimes in vacuum [HAW93] [STR93] Solubility: i H<sub>2</sub>O [HAW93] Density, g/cm<sup>3</sup>: 8.266 [HAW93] Melting Point, °C: sublimes in vacuum [CRC10]

## 2093

Compound: Mercury(II) sulfate Synonym: mercuric sulfate Formula: HgSO<sub>4</sub> **Molecular Formula:** HgO<sub>4</sub>S Molecular Weight: 296.654 CAS RN: 7783-35-9 Properties: white, odorless granules or cryst powd; sensitive to light; decomposes at red heat; can be obtained by reacting yellow HgO with H<sub>2</sub>SO<sub>4</sub> solution; used as a catalyst for converting acetylene to acetaldehyde and as a battery electrolyte [HAW93] [MER06] [KIR81] Solubility: decomposed in H<sub>2</sub>O to yellow insoluble basic sulfate and H<sub>2</sub>SO<sub>4</sub>; s HCl, hot dil H<sub>2</sub>SO<sub>4</sub>, conc NaCl solution [MER06] Density, g/cm<sup>3</sup>: 6.47 [MER06] Melting Point, °C: decomposes [AES93]

# 2094

Compound: Mercury(II) sulfide( $\alpha$ ) Synonym: cinnabar Formula:  $\alpha$ -HgS Molecular Formula: HgS Molecular Weight: 232.656 CAS RN: 1344-48-5 Properties: bright scarlet red powd, lumps, hex cryst; sensitive to light (blackens); not attacked by HNO<sub>3</sub> or cold HCl; decomposed by hot conc H<sub>2</sub>SO<sub>4</sub>; can be prepared by heating black HgS in a conc solution of alkali polysulfide [KIR81] [MER06] Solubility: i H<sub>2</sub>O; s aqua regia, warm HI [MER06] Density, g/cm<sup>3</sup>: 8.10 [STR93] Melting Point, °C: sublimes at 583 [STR93]

#### 2095

Compound: Mercury(II) sulfide( $\beta$ ) Synonym: metacinnabar Formula:  $\beta$ -HgS Molecular Formula: HgS Molecular Weight: 232.656 CAS RN: 1344-48-5 Properties: black or grayish black, odorless, tasteless, cub; can exist indefinitely in metastable state at room temp; prepared by mixing soluble mercuric salts and sulfides [KIR81] [MER06] Solubility: i H<sub>2</sub>O, alcohol, dil mineral acids [MER06] Density, g/cm<sup>3</sup>: 7.70 [LID94] Melting Point, °C: sublimes at 583 [STR93]

Compound: Mercury(II) telluride
Formula: HgTe
Molecular Formula: HgTe
Molecular Weight: 328.190
CAS RN: 12068-90-5
Properties: gray powd; used as a semiconductor in solar cells, in thin-film transistors and in infrared detectors [HAW93] [STR93]
Density, g/cm<sup>3</sup>: 8.17 [CRC10]
Melting Point, °C: 673 [CRC10]
Thermal Conductivity, W/(m⋅K): 2 (25°C) [CRC10]

# 2097

Compound: Mercury(II) tetrathiocyanatocobaltate(II)
 Synonym: cobalt(II) tetrathiocyanatomercurate(II)
 Formula: HgCo(SCN)<sub>4</sub>
 Molecular Formula: C<sub>4</sub>CoHgN<sub>4</sub>S<sub>4</sub>
 Molecular Weight: 491.845
 CAS RN: 27685-51-4
 Properties: blue cryst; high-purity magnetic susceptibility standard [ALD94] [ALF95]

# 2098

Compound: Mercury(II) thiocyanate
Synonym: mercuric thiocyante
Formula: Hg(SCN)<sub>2</sub>
Molecular Formula: C<sub>2</sub>HgN<sub>2</sub>S<sub>2</sub>
Molecular Weight: 316.757
CAS RN: 592-85-8
Properties: odorless powd; radially arranged cryst needles; if heated, swells to considerable volume; sensitive to light [MER06]
Solubility: 0.069 g/100 mL H<sub>2</sub>O (25°C); more soluble in boiling water, but decomposes; s dil HCl [MER06]
Density, g/cm<sup>3</sup>: 3.71 [LID94]
Melting Point, °C: decomposes at 165 [ALD94]
Reactions: decomposes into Hg, N<sub>2</sub>, other products at ~165°C [MER06]

## 2099

**Compound:** Mercury(II) tungstate **Formula:**  $HgWO_4$  **Molecular Formula:**  $HgO_4W$  **Molecular Weight:** 448.43 **CAS RN:** 37913-38-5 **Properties:** yellow cryst [CRC10] **Solubility:** i H<sub>2</sub>O, EtOH [CRC10] **Melting Point, °C:** decomposes [CRC10]

# 2100

Compound: Metaphosphoric acid Synonyms: phosphoric acid, meta Formula: (HPO<sub>3</sub>)<sub>n</sub> Molecular Formula: HO<sub>3</sub>P, n=1 Molecular Weight: 79.980, n=1 CAS RN: 10343-62-1 Properties: transparent, glass-like solid or soft silky masses; hygr; volatilizes at red heat (HPO<sub>3</sub>)<sub>n</sub> [MER06] Solubility: dissolves very slowly in cold H<sub>2</sub>O to form H<sub>3</sub>PO<sub>4</sub>, formation of H<sub>3</sub>PO<sub>4</sub> accelerated by boiling; s alcohol [MER06]

## 2101

**Compound:** Metavanadic acid **Formula:** HVO<sub>3</sub> **Molecular Formula:** HO<sub>3</sub>V **Molecular Weight:** 99.948 **CAS RN:** 13470-24-1 **Properties:** yellow scales [KIR83] **Solubility:** s acids and alkalies [KIR83]

#### 2102

Compound: Methylcyclopentadienylmanganese tricarbonyl Formula: C<sub>5</sub>H<sub>4</sub>CH<sub>3</sub>Mn(CO)<sub>3</sub> Molecular Formula: C<sub>9</sub>H<sub>7</sub>MnO<sub>3</sub> Molecular Weight: 218.091 CAS RN: 12108-13-3 Properties: yellow liq; metallocene derivative [STR93] [ALD94] Density, g/cm<sup>3</sup>: 1.38 [ALD94] Melting Point, °C: -1 [ALD94] Boiling Point, °C: 232–233 [ALD94]

## 2103

**Compound:** Methylgermane **Formula:** GeH<sub>3</sub>CH<sub>3</sub> **Molecular Formula:** CH<sub>6</sub>Ge **Molecular Weight:** 90.70 **CAS RN:** 1449-65-6 **Properties:** col gas [CRC10] **Density, g/L:** 3.706 **Melting Point, °C:** –158 [CRC10] **Boiling Point, °C:** –23 [CRC10]

# 2104

Compound: Molybdenum Formula: Mo Molecular Formula: Mo Molecular Weight: 95.94 CAS RN: 7439-98-7 **Properties:** dark gray or black powd, metallic luster or silver-white color; bcc; enthalpy of fusion 37.48 kJ/ mol; enthalpy of vaporization 491 kJ/mol; electrical resistivity (0°C) 50μohm·m, (1000°C) 320; optical reflectivity 46% at 500 nm, 93% at 10,000 nm; has excellent corrosion resistance; used in crucible form to melt reactive metals such as barium, strontium, and indium, and to evaporate fluorides, chlorides, and reactive sulfides [KIR81] [MER06] [CER91] [CRC10]

**Solubility:** i H<sub>2</sub>O, dil acids, conc HCl, alkali hydroxides, fused alkalis; reacts with HNO<sub>3</sub>, hot conc H<sub>2</sub>SO<sub>4</sub> [MER06]

**Density, g/cm<sup>3</sup>:** 10.28 [MER06]

Melting Point, °C: 2622 [MER06]

Boiling Point, °C: 4639 [CRC10]

**Reactions:** oxidizes rapidly to MoO<sub>3</sub> at >600°C [KIR81]

**Thermal Conductivity, W/(m · K):** 138 (25°C), 122 (500°C), 101 (1000°C), 82 (1500°C) [ALD94] [KIR81]

**Thermal Expansion Coefficient:** 0°C–400°C: 0.23%; 0°C–800°C: 0.46%; 0°C–1200°C: 0.72% [KIR81]

# 2105

**Compound:** Molybdenum acetate dimer **Formula:** [Mo(CH<sub>3</sub>COO)<sub>2</sub>]<sub>2</sub> **Molecular Formula:** C<sub>8</sub>H<sub>12</sub>Mo<sub>2</sub>O<sub>8</sub> **Molecular Weight:** 428.058 **CAS RN:** 14221-06-8 **Properties:** yellow cryst; sensitive to air [STR93]

## 2106

Compound: Molybdenum aluminide Formula: Mo<sub>3</sub>Al Molecular Formula: AlMo<sub>3</sub> Molecular Weight: 314.802 CAS RN: 12003-72-4 Properties: -150, +325, -325 mesh with 99.5% purity; compound is a cermet, which can be flame sprayed [CER91] [HAW93]

# 2107

**Compound:** Molybdenum boride **Formula:** Mo<sub>2</sub>B **Molecular Formula:** BMo<sub>2</sub> **Molecular Weight:** 202.691 **CAS RN:** 12006-99-4

Properties: tetr; refractory material; one of several borides, other formulas: MoB, MoB<sub>2</sub>, Mo<sub>2</sub>B<sub>2</sub>, Mo<sub>2</sub>B<sub>5</sub>; used in brazes to join molybdenum and tungsten and tantalum for electronic and corrosion protection applications, and as sputtering material with 99.5% purity to produce wear-resistant and semiconductive films [KIR78] [HAW93] [CER91] **Density, g/cm<sup>3</sup>:** 9.26 [CRC10] **Melting Point, °C:** 2280 [KIR78]

# 2108

Compound: Molybdenum carbide Formula: MoC Molecular Formula: CMo Molecular Weight: 107.951 CAS RN: 12011-97-1 Properties: -325 mesh, 10μm or less, 95% purity; fcc, a=0.42810 nm [CIC73] [CER91] Density, g/cm<sup>3</sup>: 9.15 [KIR78] Melting Point, °C: 2577 [CIC73]

## 2109

Compound: Molybdenum carbide Synonym:  $\beta$ -Mo<sub>2</sub>C Formula: Mo<sub>2</sub>C Molecular Formula: CMo<sub>2</sub> Molecular Weight: 203.891 CAS RN: 12069-89-5 Properties: gray powd; ortho-rhomb, a=0.4733 nm, b=0.60344 nm, c=0.52056 nm; in 99.5% purity, used as a sputtering target to produce wear-resistant films and semiconducting films; there is also material with formula MoC, 12011-97-1 [CIC73] [STR93] [CER91] Density, g/cm<sup>3</sup>: 9.18 [STR93] Melting Point, °C: 2687 [STR93] Thermal Expansion Coefficient: 7.8 × 10<sup>-6</sup>/K [KIR78]

## 2110

**Compound:** Molybdenum carbonyl Synonym: molybdenum hexacarbonyl Formula: Mo(CO)<sub>6</sub> Molecular Formula: C<sub>6</sub>MoO<sub>6</sub> Molecular Weight: 264.002 CAS RN: 13939-06-5 Properties: white, shiny cryst; ortho-rhomb, a = 1.20 nm, b = 0.64 nm, c = 1.12 nm; vaporpressure ~0.1 mm Hg at 20°C, ~43 mm Hg at 101°C; can be prepared by reacting MoCl<sub>5</sub> with zinc dust and CO in ether at high pressure; used in depositing molybdenum, for example to form molybdenum mirror [HAW93] [KIR81] **Solubility:** i H<sub>2</sub>O; s ceresin, paraffin oil, benzene; sl s ether and other organic solvents [HAW93] Density, g/cm<sup>3</sup>: 1.96 [HAW93] Melting Point, °C: decomposes at 150-151 (sublimes) [HAW93]

**Compound:** Molybdenum disulfide **Synonym:** molybdenite **Formula:** MoS<sub>2</sub> **Molecular Formula:** MoS<sub>2</sub> **Molecular Weight:** 160.072

CAS RN: 1317-33-5

Properties: lead gray; hex; can be prepared by direct reaction of the elements to form a black and lustrous powd; greasy to the touch with low coefficient of friction; hardness 1–1.5 Mohs; similar to graphite in appearance; principal ore for molybdenum; as a 99% pure material, used as a sputtering target to form lubricant film on bearings and other moving parts [HAW93] [KIR81] [MER06] [CER91] [JAN85]
Solubility: i H<sub>2</sub>O, dil acids; s H<sub>2</sub>SO<sub>4</sub>, conc HNO<sub>3</sub> [HAW93] [MER06]

Density, g/cm<sup>3</sup>: 5.06 [MER06]; black powd: 4.80 [STR93] Melting Point, °C: 1750 [JAN85]

**Reactions:** begins to sublime at 450°C [MER06]

# 2112

Compound: Molybdenum metaphosphate Formula: Mo(PO<sub>3</sub>)<sub>6</sub> Molecular Formula: MoO<sub>18</sub>P<sub>6</sub> Molecular Weight: 569.772 CAS RN: 133863-98-6 Properties: yellow powd [HAW93] Solubility: i H<sub>2</sub>O, most acids; sl s hot aqua regia [HAW93] Density, g/cm<sup>3</sup>: 3.28 (0°C) [HAW93]

# 2113

Compound: Molybdenum mononitride Formula: MoN Molecular Formula: MoN Molecular Weight: 109.947 CAS RN: 12033-19-1 Properties: hex, a=0.5725 nm, c=0.5608 nm [CIC73] Density, g/cm<sup>3</sup>: 9.20 [LID94]

## 2114

Compound: Molybdenum nitride Formula: Mo<sub>2</sub>N Molecular Formula: Mo<sub>2</sub>N Molecular Weight: 205.887 CAS RN: 12033-31-7 Properties: gray; fcc, a=0.416 nm; microhardness 1700; transition temp 5.0 K [KIR81] **Density, g/cm<sup>3</sup>:** 9.46 [KIR81] **Melting Point, °C:** decomposes at 790 [KIR81] **Thermal Expansion Coefficient:** 6.7×10<sup>-6</sup> [KIR81]

## 2115

Compound: Molybdenum oxytetrafluoride
Formula: MoOF<sub>4</sub>
Molecular Formula: F<sub>4</sub>MoO
Molecular Weight: 187.933
CAS RN: 14459-59-7
Properties: volatile at moderate temp; there is a tetrahydrate (77727-63-0) and the compound MoO<sub>2</sub>F<sub>2</sub> (13824-57-2) [KIR81]
Density, g/cm<sup>3</sup>: 3.00 [CRC10]
Melting Point, °C: MoOF<sub>4</sub>: 98; MoO<sub>2</sub>F<sub>2</sub> sublimes at 270 [KIR81]
Boiling Point, °C: 180 [CRC10]

#### 2116

Compound: Molybdenum pentaboride
Formula: Mo<sub>2</sub>B<sub>5</sub>
Molecular Formula: B<sub>5</sub>Mo<sub>2</sub>
Molecular Weight: 245.935
CAS RN: 12007-97-5
Properties: refractory material; borides used as a braze to join molybdenum, tungsten, and tantalum, and niobium parts for electronic, corrosion, and abrasion protection, used as a sputtering target with 99.5% purity to produce films which may be wear-resistant and semiconducting [CER91] [HAW93] [KIR78]
Melting Point, °C: 1600 [HAW93]
Reactions: transformed to MoB<sub>2</sub> at 1600°C [HAW93]

## 2117

Compound: Molybdenum phosphide Formula: MoP Molecular Formula: MoP Molecular Weight: 126.914 CAS RN: 12163-69-8 Properties: gray-green powd; -200 mesh with 99.5% purity [CER91] [CRC10] Density, g/cm<sup>3</sup>: 7.34 [LID94]

#### 2118

**Compound:** Molybdenum silicide **Synonym:** molybdenum disilicide **Formula:** MoSi<sub>2</sub> **Molecular Formula:** MoSi<sub>2</sub> **Molecular Weight:** 152.111

# CAS RN: 12136-78-6

Properties: a cermet; dark gray cryst powd; has high stress rupture strength; used in electrical resistors, as a high temp protective coating, and in crucible form for melting bismuth, gallium, lead, silicon, silver, tin, zinc and to contain mercury, also as sputtering targets of 99.5%–99.95% purity to fabricate electrodes for integrated circuits [HAW93] [CER91]

Solubility: s HF and HNO<sub>3</sub>; i aqua regia, other acids [HAW93] Density, g/cm<sup>3</sup>: 6.31 [HAW93]

Melting Point, °C: 1870–2030 [HAW93]

**Thermal Expansion Coefficient:** (volume) 100°C (0.166), 200°C (0.400), 400°C (0.899), 800°C (1.960), 1200°C (3.048) [CLA66]

## 2119

**Compound:** Molybdenum(II) bromide **Formula:** MoBr<sub>2</sub> **Molecular Formula:** Br<sub>2</sub>Mo **Molecular Weight:** 255.75 **CAS RN:** 13446-56-5 **Properties:** yellow-red cryst [CRC10] **Solubility:** i H<sub>2</sub>O, EtOH [CRC10] **Density, g/cm<sup>3</sup>:** 4.88 [CRC10] **Melting Point, °C:** decomposes at 700 [CRC10]

#### 2120

Compound: Molybdenum(II) chloride Formula: MoCl<sub>2</sub> Molecular Formula: Cl<sub>2</sub>Mo Molecular Weight: 166.845 CAS RN: 13478-17-6 Properties: yellow amorphous solid; -100 mesh with 99.5% purity [CER91] [CRC10] Density, g/cm<sup>3</sup>: 3.714 [CRC10] Melting Point, °C: decomposes at 530 [LID94]

#### 2121

Compound: Molybdenum(II) iodide Formula:  $MoI_2$ Molecular Formula:  $I_2Mo$ Molecular Weight: 349.749 CAS RN: 14055-74-4 Properties: black cryst; sensitive to air and moisture; can be prepared by reduction of  $MoI_3$  (14055-75-5) with Mo,  $H_2$ , or a hydrocarbon [KIR81] [STR93]

Density, g/cm3: 5.278 [STR93]

#### 2122

Compound: Molybdenum(III) bromide
Formula: MoBr<sub>3</sub>
Molecular Formula: Br<sub>3</sub>Mo
Molecular Weight: 335.652
CAS RN: 13446-57-6
Properties: can be prepared from MoBr<sub>4</sub> by reduction with Mo, H<sub>2</sub>, or a hydrocarbon; another bromide is MoBr<sub>2</sub>, which can be prepared by reduction of MoBr<sub>4</sub> (13446-56-5); oxybromides are: MoOBr<sub>3</sub>

(13596-04-8) and MoO<sub>2</sub>Br<sub>2</sub> (13595-98-7) [KIR81]

Melting Point, °C: decomposes [KIR81]

## 2123

Compound: Molybdenum(III) chloride Formula: MoCl<sub>3</sub> Molecular Formula: Cl<sub>3</sub>Mo Molecular Weight: 202.298 CAS RN: 13478-18-7 Properties: -100 mesh with 99.5% purity; purple cryst [STR93] [CER91] Density, g/cm<sup>3</sup>: 3.59 [STR93] Melting Point, °C: disproportionates at >410 [KIR81]

#### 2124

Compound: Molybdenum(III) fluoride Formula: MoF<sub>3</sub> Molecular Formula: F<sub>3</sub>Mo Molecular Weight: 152.94 CAS RN: 20193-58-2 Properties: yellow brown hex cryst [CRC10] Solubility: i H<sub>2</sub>O [CRC10] Density, g/cm<sup>3</sup>: 4.64 [CRC10] Melting Point, °C: >600 [CRC10]

## 2125

**Compound:** Molybdenum(III) iodide **Formula:** MoI<sub>3</sub> **Molecular Formula:** I<sub>3</sub>Mo **Molecular Weight:** 476.65 **CAS RN:** 14055-75-5 **Properties:** black solid [CRC10] **Solubility:** i H<sub>2</sub>O [CRC10] **Melting Point, °C:** 927 [CRC10]

#### 2126

**Compound:** Molybdenum(III) oxide **Synonym:** molybdenum sesquioxide **Formula:** Mo<sub>2</sub>O<sub>3</sub> **Molecular Formula:** Mo<sub>2</sub>O<sub>3</sub> Molecular Weight: 239.878
CAS RN: 1313-29-7
Properties: known only in the hydrated form Mo(OH)<sub>3</sub>, but generally given the formula Mo<sub>2</sub>O<sub>3</sub>; grayish-black powd; used as a catalyst for organic synthesis; feed additive [HAW93]
Solubility: i H<sub>2</sub>O; in alkalies; sl s acids [HAW93]

#### 2127

Compound: Molybdenum(III) sulfide
Formula: Mo<sub>2</sub>S<sub>3</sub>
Molecular Formula: Mo<sub>2</sub>S<sub>3</sub>
Molecular Weight: 288.078
CAS RN: 12033-33-9
Properties: enthalpy of fusion 129.7 kJ/mol; can be prepared by reacting Mo and S in a sealed tube, under vacuum at high temperatures; there is also MoS<sub>2</sub>, 1317-33-5 [CER91] [KIR81] [JAN85]
Density, g/cm<sup>3</sup>: 5.91 [CRC10]
Melting Point, °C: 1807 [JAN85]
Boiling Point, °C: decomposes at 1870 [JAN85]

#### 2128

Compound: Molybdenum(IV) bromide Formula: MoBr<sub>4</sub> Molecular Formula: Br<sub>4</sub>Mo Molecular Weight: 415.556 CAS RN: 13520-59-7 Properties: black needles; deliq; obtained by bromination of Mo [KIR81] [CRC10] Solubility: reacts with H<sub>2</sub>O [LID94] Melting Point, °C: decomposes [KIR81]

# 2129

Compound: Molybdenum(IV) chloride Synonym: molybdenum tetrachloride Formula: MoCl<sub>4</sub> Molecular Formula: Cl<sub>4</sub>Mo Molecular Weight: 237.751 CAS RN: 13320-71-3 Properties: black cryst; sensitive to both air and moisture [STR93] Solubility: reacts with H<sub>2</sub>O [LID94] Melting Point, °C: decomposes [STR93]

#### 2130

**Compound:** Molybdenum(IV) fluoride **Formula:** MoF<sub>4</sub> **Molecular Formula:** F<sub>4</sub>Mo **Molecular Weight:** 171.93 CAS RN: 23412-45-5 Properties: green cryst [CRC10] Solubility: reac H<sub>2</sub>O [CRC10] Melting Point, °C: decomposes [CRC10]

# 2131

**Compound:** Molybdenum(IV) iodide **Formula:** MoI<sub>4</sub> **Molecular Formula:** I<sub>4</sub>Mo **Molecular Weight:** 603.56 **CAS RN:** 14055-76-6 **Properties:** black cryst [CRC10] **Melting Point, °C:** decomposes at 100 [CRC10]

## 2132

Compound: Molybdenum(IV) oxide Synonym: molybdenum dioxide Formula: MoO<sub>2</sub> Molecular Formula: MoO<sub>2</sub> Molecular Weight: 127.939 CAS RN: 18868-43-4 Properties: tetr; brownish violet or lead gray, nonvolatile powd; can be made by reduction of MoO<sub>3</sub> with H<sub>2</sub> at 300°C–400°C, at higher temp Mo obtained ~500°C [CER91] [HAW93] [KIR81] Solubility: sl s H<sub>2</sub>SO<sub>4</sub>; i HCl, HF, and alkalies [HAW93] Density, g/cm<sup>3</sup>: 6.47 [STR93] Melting Point, °C: decomposes [JAN85]

#### 2133

Compound: Molybdenum(IV) selenide Formula: MoSe<sub>2</sub> Molecular Formula: MoSe<sub>2</sub> Molecular Weight: 253.860 CAS RN: 12058-18-3 Properties: gray powd; used as a solid lubricant and lubricant film prepared by sputtering 99.9% pure material [HAW93] [STR93] [CER91] Density, g/cm<sup>3</sup>: 6.0 [STR93] Melting Point, °C: >1200 [STR93]

#### 2134

Compound: Molybdenum(IV) sulfide Formula: MoS<sub>2</sub> Molecular Formula: MoS<sub>2</sub> Molecular Weight: 160.07 CAS RN: 1317-33-5 Properties: black powd or hex cryst [CRC10] Density, g/cm<sup>3</sup>: 5.06 [CRC10] Solubility: i H<sub>2</sub>O; s conc acid [CRC10] Melting Point, °C: 1750 [CRC10]

**Compound:** Molybdenum(IV) telluride **Formula:** MoTe<sub>2</sub> **Molecular Formula:** MoTe<sub>2</sub> **Molecular Weight:** 351.140 **CAS RN:** 12058-20-7

Properties: gray hex and 40µm powd; used as a solid lubricant and with 99.9% purity as a sputtering target to produce lubricant films [HAW93] [CER91] [LID94]
Density, g/cm<sup>3</sup>: 7.7 [LID94]

## 2136

Compound: Molybdenum(V) chloride Synonym: molybdenum pentachloride Formula: MoCl<sub>5</sub> Molecular Formula: Cl<sub>5</sub>Mo Molecular Weight: 273.204 CAS RN: 10241-05-1 Properties: greenish black solid, is dark red liq or vapor; hygr; reacts with atm oxygen; enthalpy of vaporization 62.8 kJ/mol; enthalpy of fusion 19.00 kJ/mol; used as a chlorination catalyst for vapor deposition of molybdenum [HAW93] [CRC10] Solubility: s in dry ether and dry alcohol, in other organic solvents [HAW93] Density, g/cm<sup>3</sup>: 2.928 [ALD94] Melting Point, °C: 194 [CRC10] Boiling Point, °C: 268 [HAW93]

## 2137

**Compound:** Molybdenum(V) fluoride **Formula:** MoF<sub>5</sub> **Molecular Formula:** F<sub>5</sub>Mo **Molecular Weight:** 190.93 **CAS RN:** 13819-84-6 **Properties:** yellow monocl cryst [CRC10] **Solubility:** reac H<sub>2</sub>O [CRC10] **Melting Point,** °**C:** 67 [CRC10] **Density, g/cm<sup>3</sup>:** 3.5 [CRC10]

## 2138

**Compound:** Molybdenum(V) oxytrichloride **Formula:** MoOCl<sub>3</sub> **Molecular Formula:** Cl<sub>3</sub>MoO **Molecular Weight:** 218.297 **CAS RN:** 13814-74-9

Properties: green cryst; can be prepared by refluxing MoOCl<sub>4</sub> in benzene; other oxychlorides are: MoOCl (41004-72-2), MoO<sub>2</sub>Cl (20770-33-6), MoOCl<sub>2</sub> (24989-40-0) sublimes, MoO<sub>2</sub>Cl<sub>2</sub> (13637-68-8) mp 184°C in a sealed tube, Mo<sub>2</sub>OCl<sub>8</sub> (77727-64-1) [KIR81] [CRC10] **Solubility:** reacts with H<sub>2</sub>O [LID94] **Melting Point, °C:** 302 [KIR81] **Boiling Point, °C:** sublimes [LID94]

#### 2139

Compound: Molybdenum(VI) acid monohydrate Synonym: molybdic acid monohydrate Formula:  $H_2MoO_4 \cdot H_2O$ Molecular Formula:  $H_4MoO_5$ Molecular Weight: 179.969 CAS RN: 7782-91-4 Properties: white powd [MER06] Solubility: 0.133 g/100 mL  $H_2O$  (18°C), 2.568 (70°C) [CRC10] Density, g/cm<sup>3</sup>: 3.1 [MER06] Melting Point, °C: decomposes [CRC10] Reactions: minus  $H_2O$  at 70°C [CRC10]

#### 2140

Compound: Molybdenum(VI) dioxydichloride Synonym: molybdenum dichloride dioxide Formula: MoO<sub>2</sub>Cl<sub>2</sub> Molecular Formula: Cl<sub>2</sub>MoO<sub>2</sub> Molecular Weight: 198.844 CAS RN: 13637-68-8 Properties: yellowish-orange solid [LID94] Density, g/cm<sup>3</sup>: 3.31 [ALD94] Melting Point, °C: 184 [KIR81]

## 2141

**Compound:** Molybdenum(VI) dioxydifluoride **Synonym:** molybdenum dioxide difluoride **Formula:**  $MoO_2F_2$ **Molecular Formula:**  $F_2MoO_2$ **Molecular Weight:** 165.936 **CAS RN:** 13824-57-2 **Properties:** white cryst; hygr [CRC10] **Density, g/cm<sup>3</sup>:** 3.494 [CRC10] **Melting Point, °C:** sublimes at 270 [KIR81]

# 2142

**Compound:** Molybdenum(VI) fluoride **Synonym:** molybdenum hexafluoride **Formula:** MoF<sub>6</sub> **Molecular Formula:** F<sub>6</sub>Mo **Molecular Weight:** 209.930 **CAS RN:** 7783-77-9 Properties: volatile, white, cub cryst; very hygr; enthalpy of fusion 4.33 kJ/mol; enthalpy of vaporization 27.7 kJ/mol; evolves bluewhite clouds in moist air; can be prepared by reacting molybdenum metal with F<sub>2</sub> at elevated temperatures; other fluorides are: MoF<sub>5</sub>, 13819-84-6, mp 64°C, MoF<sub>4</sub>, 23412-45-5, MoF<sub>3</sub>, 20193-58-2, mp decomposes, MoF<sub>2</sub>, 20205-60-1 [KIR81] [MER06] [CRC10]
Solubility: hydrolyzed in H<sub>2</sub>O; s anhydrous HF: 1.5 moles/1000 g HF [MER06]
Density, g/cm<sup>3</sup>: 2.30 [ALD94]
Melting Point, °C: 17.5 [MER06]

Boiling Point, °C: 35.0 [MER06]

## 2143

**Compound:** Molybdenum(VI) oxide **Synonyms:** molybdenum trioxide, molybdic anhydride **Formula:** MoO<sub>3</sub> **Molecular Formula:** MoO<sub>3</sub> **Molecular Weight:** 143.938 **CAS RN:** 1313-27-5

- Properties: white or sl yellow to sl bluish powd or granules; ortho-rhomb, a=0.39628 nm, b=1.3855 nm; c=0.36964 nm; enthalpy of vaporization 138 kJ/ mol; enthalpy of fusion 48.00 kJ/mol; produced by roasting MoS<sub>2</sub>; used in 99.99% pure form as a sputtering target for luminescent coatings [KIR81] [MER06] [CER91] [CRC10]
- Solubility: g/100 g H<sub>2</sub>O: 0.134 (20°C), 0.285 (30°C), 1.74 (80°C) [LAN05]; s conc mineral acids, alkali hydroxides; after strongly ignited is v sl s acids [MER06]
  Density, g/cm<sup>3</sup>: 4.696 [MER06]
  Melting Point, °C: 801 [CRC10]

Boiling Point, °C: 1155 [MER06] Reactions: can sublime at >795°C [MER06]

# 2144

Compound: Molybdenum(VI) oxytetrachloride Formula: MoOCl<sub>4</sub> Molecular Formula: Cl<sub>4</sub>MoO Molecular Weight: 253.750 CAS RN: 13814-75-0 Properties: green powd; sensitive to moisture; volatile at ordinary temp [KIR81] [STR93] Melting Point, °C: 100–101 [STR93]

## 2145

**Compound:** Molybdenum(VI) oxytetrafluoride **Formula:** MoOF<sub>4</sub>

Molecular Formula:  $F_4MoO$ Molecular Weight: 187.93 CAS RN: 14459-59-7 Properties: volatile solid [CRC10] Density, g/cm<sup>3</sup>: 3.00 Melting Point, °C: 97.2 [CRC10] Boiling Point, °C: 186.0 [CRC10]

# 2146

Compound: Molybdenum(VI) sulfide
Synonym: molybdenum trisulfide
Formula: MoS<sub>3</sub>
Molecular Formula: MoS<sub>3</sub>
Molecular Weight: 192.138
CAS RN: 12033-29-3
Properties: brownish black amorphous powd; formed by acidifying a solution of ammonium tetrathiomolybdate [KIR81]
Melting Point, °C: decomposes [CRC10]

# 2147

Compound: Molybdic silicic acid hydrate
Formula: H<sub>4</sub>SiMo<sub>12</sub>O<sub>40</sub>·xH<sub>2</sub>O
Molecular Formula: H<sub>4</sub>Mo<sub>12</sub>O<sub>40</sub>Si (anhydrous)
Molecular Weight: 1823.373 (anhydrous)
CAS RN: 11089-20-6
Properties: x is commonly 6–8; yellow cryst powd; thermally stable; used in photography, as a catalyst [HAW93]
Solubility: s H<sub>2</sub>O, alcohol, acetone; i benzene; decomposes in strongly basic solutions [HAW93]
Density, g/cm<sup>3</sup>: 2.82 [HAW93]

## 2148

**Compound:** Molybdophosphoric acid **Formula:**  $H_3P(Mo_3O_{10})_4$ **Molecular Formula:**  $H_3Mo_{12}O_{40}P$ **Molecular Weight:** 1825.25 **CAS RN:** 51429-74-4 **Properties:** bright yellow cryst [CRC10]

#### 2149

**Compound:** Monofluorophosphoric acid **Formula:** (HO)<sub>2</sub>P(O)F **Molecular Formula:** FH<sub>2</sub>O<sub>3</sub>P **Molecular Weight:** 99.986 **CAS RN:** 13537-32-1 Properties: colorless or yellow viscous liq; used in metal cleaners, electrolytic or chemical polishing agents [HAW93] [STR93]
Solubility: miscible with H<sub>2</sub>O [HAW93]
Density, g/cm<sup>3</sup>: 1.818 [HAW93]

#### 2150

Compound: Monoiodosilane
Formula: SiH<sub>3</sub>I
Molecular Formula: H<sub>3</sub>ISi
Molecular Weight: 158.014
CAS RN: 13598-42-0
Properties: enthalpy of vaporization 28.9 kJ/mol; entropy of vaporization 90.4 kJ/(mol · K) [CIC73]
Melting Point, °C: -57 [CIC73]
Boiling Point, °C: 45.6 [CIC73]

#### 2151

Compound: Neodymium Formula: Nd Molecular Formula: Nd Molecular Weight: 144.24 CAS RN: 7440-00-8 Properties: soft, silver white metal; yellowish in air; hex, at room temp; bcc >868°C; enthalpy of fusion 7.14 kJ/mol; enthalpy of sublimation 327.6 kJ/mol; electrical resistivity (20°C)  $64.0\mu$ ohm · cm; radius of atom is 0.1821 nm; radius of ion 0.0995 nm for Nd+++, rose-colored solution [MER06] [KIR82] [CRC10] [ALD94] Solubility: slowly reacts with cold H<sub>2</sub>O; rapidly with hot H<sub>2</sub>O [MER06] Density, g/cm<sup>3</sup>: 7.003 [MER06] Melting Point, °C: 1021 [ALD94] Boiling Point, °C: 3074 [KIR82] Thermal Conductivity, W/(m·K): 16.5 (25°C) [CRC10] **Thermal Expansion Coefficient:** 9.6×10<sup>-6</sup>/K [CRC10]

## 2152

**Compound:** Neodymium acetate **Formula:**  $Nd(C_2H_3O_2)_3$  **Molecular Formula:**  $C_6H_9NdO_6$  **Molecular Weight:** 321.373 **CAS RN:** 6192-13-6 **Properties:** red-purple cryst [CRC10] **Solubility:** s H<sub>2</sub>O [CRC10]

## 2153

**Compound:** Neodymium acetate monohydrate **Synonyms:** acetic acid, neodymium salt monohydrate

Formula:  $Nd(CH_3COO)_3 \cdot H_2O$ Molecular Formula:  $C_6H_{11}NdO_7$ Molecular Weight: 339.389 CAS RN: 6192-13-8 Properties: light purple cryst [STR93] Solubility: 26.2 g/100 mL H<sub>2</sub>O [CRC10]

#### 2154

Compound: Neodymium boride Formula: NdB<sub>6</sub> Molecular Formula: B<sub>6</sub>Nd Molecular Weight: 209.106 CAS RN: 12008-23-0 Properties: -325 mesh 10μm or less with 99.9% purity; refractory material [KIR78] [CER91] Density, g/cm<sup>3</sup>: 4.93 [LID94] Melting Point, °C: 2540 [KIR78]

#### 2155

**Compound:** Neodymium bromate nonahydrate **Formula:**  $Nd(BrO_3)_3 \cdot 9H_2O$  **Molecular Formula:**  $Br_3H_{18}NdO_{18}$  **Molecular Weight:** 690.084 **CAS RN:** 15162-92-2 **Properties:** red; hex [CRC10] **Solubility:** g/100 g H\_2O: 43.9 (0°C), 75.6 (20°C), 116 (40°C) [LAN05] **Melting Point,** °C: 66.7 [CRC10] **Reactions:** minus  $9H_2O$  at 150°C [CRC10]

#### 2156

Compound: Neodymium bromide Formula: NdBr<sub>3</sub> Molecular Formula: Br<sub>3</sub>Nd Molecular Weight: 383.952 CAS RN: 13536-80-6 Properties: -20 mesh with 99.9% purity; green powd; hygr [STR93] [CER91] Density, g/cm<sup>3</sup>: 5.3 [LID94] Melting Point, °C: 684 [STR93] Boiling Point, °C: 1540 [STR93]

#### 2157

**Compound:** Neodymium carbonate hydrate **Formula:** Nd<sub>2</sub>(CO<sub>3</sub>)<sub>3</sub>·xH<sub>2</sub>O **Molecular Formula:** C<sub>3</sub>Nd<sub>2</sub>O<sub>9</sub> (anhydrous) **Molecular Weight:** 468.508 (anhydrous) **CAS RN:** 38245-38-4 **Properties:** light purple powd [STR93] **Solubility:** i H<sub>2</sub>O; s acids [HAW93]

2158

**Compound:** Neodymium cerium copper oxide **Formula:** Nd<sub>1.85</sub>Ce<sub>0.15</sub>CuO<sub>4</sub> **Molecular Formula:** Ce<sub>0.15</sub>CuNd<sub>1.85</sub>O<sub>4</sub> **Molecular Weight:** 415.405 **CAS RN:** 119800-94-1 **Properties:** superconductor; general formula is

Nd<sub>2-x</sub>Ce<sub>x</sub>CuO<sub>4</sub>; material with formula where x = 0.15has T<sub>c</sub> 20 K; cuprate semiconductors are metastable at low temperatures; oriented thin films can be prepared from bulk cuprates or from metal oxides by sputtering or by laser ablation; potential uses of superconductors include frictionless bearings, microwave, and electronic devices [CEN92]

2159

**Compound:** Neodymium chloride **Formula:** NdCl<sub>2</sub> **Molecular Formula:** Cl<sub>2</sub>Nd **Molecular Weight:** 215.148 **CAS RN:** 25469-93-6 **Properties:** green hygr solid [CRC10] **Melting Point,** °C: 841 [CRC10]

## 2160

Compound: Neodymium chloride Formula: NdCl<sub>3</sub> Molecular Formula: Cl<sub>3</sub>Nd Molecular Weight: 250.598 CAS RN: 10024-93-8 Properties: -20 mesh with 99.9% purity; violet powd [ALD94] [STR93] [CER91] Solubility: g/100 g H<sub>2</sub>O: 96.7 (10°C), 98.0 (20°C), 105 (60°C) [LAN05]; v s alcohol; i ether, chloroform [HAW93] [MER06] Density, g/cm<sup>3</sup>: 4.134 [STR93] Melting Point, °C: 784 [STR93] Boiling Point, °C: 1600 [HAW93]

# 2161

**Compound:** Neodymium chloride hexahydrate **Formula:**  $NdCl_3 \cdot 6H_2O$ **Molecular Formula:**  $Cl_3H_{12}NdO_6$ **Molecular Weight:** 358.689 **CAS RN:** 13477-89-9 Properties: -4 mesh with 99.9% purity; purple cryst [STR93] [CER91]
Solubility: 2.46 parts per 1 part H<sub>2</sub>O [MER06]; s alcohol [HAW93]
Density, g/cm<sup>3</sup>: 2.282 [STR93]
Melting Point, °C: 124 [MER06]
Reactions: minus 6H<sub>2</sub>O at 160°C [HAW93]

#### 2162

Compound: Neodymium fluoride Formula: NdF<sub>3</sub> Molecular Formula: F<sub>3</sub>Nd Molecular Weight: 201.235 CAS RN: 13709-42-7 Properties: purple powd or 99.9% pure sintered tablets; hygr; tablets used as evaporation and sputtering material for multilayers, used with ZnS [STR93] [CER91] Solubility: i H<sub>2</sub>O [HAW93] Density, g/cm<sup>3</sup>: 6.506 [STR93] Melting Point, °C: 1410 [HAW93] Boiling Point, °C: 2300 [HAW93]

#### 2163

Compound: Neodymium hexafluoroacetylacetonate dihydrate Synonyms: 1,1,1,5,5,5-hexafluoro-2,4-pentanedione, Nd Formula: Nd(CF<sub>3</sub>COCHCOCF<sub>3</sub>)<sub>3</sub> · 2H<sub>2</sub>O Molecular Formula: C<sub>15</sub>H<sub>7</sub>F<sub>18</sub>NdO<sub>8</sub> Molecular Weight: 801.427 CAS RN: 47814-18-6 Properties: cryst [STR93]

# 2164

Compound: Neodymium hydride Formula: NdH<sub>2-3</sub> Molecular Formula: H<sub>2</sub>Nd; H<sub>3</sub>Nd Molecular Weight: NdH<sub>2</sub>: 146.256; NdH<sub>3</sub>: 147.264 CAS RN: 13864-04-5 Properties: lumps under argon atm; -60 mesh with 99.9% purity [CER91] [ALF95]

#### 2165

**Compound:** Neodymium hydroxide **Formula:** Nd(OH)<sub>3</sub> **Molecular Formula:** H<sub>3</sub>NdO<sub>3</sub> **Molecular Weight:** 195.262 **CAS RN:** 16469-17-3

Compound: Neodymium iodide Formula: NdI<sub>3</sub> Molecular Formula: I<sub>3</sub>Nd Molecular Weight: 524.953 CAS RN: 13813-24-6 Properties: -20 mesh with 99.9% purity; green powd; hygr [STR93] [CER91] Melting Point, °C: 775 [STR93]

#### 2167

**Compound:** Neodymium nitrate **Formula:** Nd(NO<sub>3</sub>)<sub>3</sub> **Molecular Formula:** N<sub>3</sub>NdO<sub>9</sub> **Molecular Weight:** 330.257 **CAS RN:** 10045-95-1 **Properties:** violet hygr cryst [CRC10] **Solubility:** g/100 g H<sub>2</sub>O: 152<sup>25</sup>; s EtOH [CRC10]

## 2168

Compound: Neodymium nitrate hexahydrate Formula:  $Nd(NO_3)_3 \cdot 6H_2O$ Molecular Formula:  $H_{12}N_3NdO_{15}$ Molecular Weight: 438.346 CAS RN: 14517-29-4 Properties: purple cryst; hygr [STR93] Solubility: g/100 g H<sub>2</sub>O: 127 (0°C), 142 (20°C), 211 (60°C) [LAN05]

# 2169

Compound: Neodymium nitride Formula: NdN Molecular Formula: NNd Molecular Weight: 158.247 CAS RN: 25764-11-8 Properties: black powd; -60 mesh with 99.9% purity; NaCl cryst system, a=0.514 nm [CIC73] [CER91] [CRC10] Solubility: decomposed by H<sub>2</sub>O [CRC10] Density, g/cm<sup>3</sup>: 7.69 [LID94]

# 2170

**Compound:** Neodymium oxalate decahydrate **Formula:**  $Nd_2(C_2O_4)_3 \cdot 10H_2O$ **Molecular Formula:**  $C_6H_{20}Nd_2O_{22}$  **Molecular Weight:** 732.692 **CAS RN:** 14551-74-7 **Properties:** rose cryst [STR93] **Solubility:** 0.000074 g/100 mL H<sub>2</sub>O (25°C) [CRC10] **Reactions:** minus H<sub>2</sub>O 40°C–50°C [AES93]

#### 2171

Compound: Neodymium oxide Synonym: neodymia Formula: Nd<sub>2</sub>O<sub>3</sub> Molecular Formula: Nd<sub>2</sub>O<sub>3</sub> Molecular Weight: 336.478 CAS RN: 1313-97-9 Properties: pure material is a blue powd; technical material has a brown color; hygr; absorbs atm  $CO_2$ ; hex; has sl red fluorescence; used in ceramic capacitors, in coloring glass, and in television tubes, and as an evaporated material of 99.9% purity, it is possibly reactive to radio frequencies [HAW93] [MER06] [CER91] **Solubility:**  $5.7 \times 10^{-6}$  g mol/L H<sub>2</sub>O (29°C); s dil acids [MER06] Density, g/cm<sup>3</sup>: 7.24 [STR93] Melting Point, °C: 2272 [STR93]

#### 2172

**Compound:** Neodymium perchlorate hexahydrate **Formula:**  $Nd(ClO_4)_3 \cdot 6H_2O$ **Molecular Formula:**  $Cl_3H_{12}NdO_{18}$ **Molecular Weight:** 550.683 **CAS RN:** 17522-69-9 **Properties:** cryst [ALF95]

# 2173

**Compound:** Neodymium phosphate hydrate **Formula:** NdPO<sub>4</sub> · xH<sub>2</sub>O **Molecular Formula:** NdO<sub>4</sub>P (anhydrous) **Molecular Weight:** 239.211 (anhydrous) **CAS RN:** 14298-32-9 **Properties:** powd [ALF95]

#### 2174

Compound: Neodymium silicide Formula: NdSi<sub>2</sub> Molecular Formula: NdSi<sub>2</sub> Molecular Weight: 200.411 CAS RN: 12137-04-1 Properties: 10 mm and down lump [ALF93]

Compound: Neodymium sulfate Formula:  $Nd_2(SO_4)_3$ Molecular Formula:  $Nd_2O_{12}S_3$ Molecular Weight: 576.671 CAS RN: 101509-27-7 Properties: pinkish needles [MER06] Solubility: g/100 g H<sub>2</sub>O: 13.0 (0°C), 7.1 (20°C), 1.2 (90°C) [LAN05] Melting Point, °C: decomposes at 700–800 [MER06]

# 2176

**Compound:** Neodymium sulfate octahydrate **Formula:**  $Nd_2(SO_4)_3 \cdot 8H_2O$  **Molecular Formula:**  $H_{16}Nd_2O_{20}S_3$  **Molecular Weight:** 720.793 **CAS RN:** 13477-91-3 **Properties:** purple cryst [STR93] **Solubility:** s cold H<sub>2</sub>O, less soluble in hot H<sub>2</sub>O [HAW93] **Density, g/cm<sup>3</sup>:** 2.85 [HAW93] **Melting Point,** °C: decomposes at 800 [HAW93]

# 2177

Compound: Neodymium sulfide Formula: Nd<sub>2</sub>S<sub>3</sub> Molecular Formula: Nd<sub>2</sub>S<sub>3</sub> Molecular Weight: 384.678 CAS RN: 12035-32-4 Properties: -200 mesh with 99.9% purity [CER91] Density, g/cm<sup>3</sup>: 5.46 [LID94] Melting Point, °C: 2207 [LID94]

# 2178

Compound: Neodymium telluride Formula: Nd<sub>2</sub>Te<sub>3</sub> Molecular Formula: Nd<sub>2</sub>Te<sub>3</sub> Molecular Weight: 671.280 CAS RN: 12035-35-7 Properties: -20 mesh with 99.9% purity gray powd [STR93] [CER91] Density, g/cm<sup>3</sup>: 7.0 [LID94] Melting Point, °C: 1377 [LID94]

## 2179

**Compound:** Neodymium trifluoroacetylacetonate **Synonyms:** 1,1,1-trifluoro-2,4pentanedione, Nd derivative **Formula:** Nd(CF<sub>3</sub>COCH=C(O)CH<sub>3</sub>)<sub>3</sub> Molecular Formula: C<sub>15</sub>H<sub>12</sub>F<sub>9</sub>NdO<sub>6</sub> Molecular Weight: 603.482 CAS RN: 37473-67-9 Properties: blue-pink cryst [STR93] Melting Point, °C: 140–142 [STR93]

## 2180

Compound: Neodymium tris(cyclopentadienyl) Synonym: tris(cyclopentadienyl)neodymium Formula:  $Nd(C_5H_5)_3$ Molecular Formula:  $C_{15}H_{15}Nd$ Molecular Weight: 339.53 CAS RN: 1273-98-9 Properties: powd; sensitive to air and moisture [STR93] Melting Point, °C: 417 [STR93] Boiling Point, °C: sublimes at 220 (0.01 mm Hg) [STR93]

# 2181

Compound: Neon Formula: Ne Molecular Formula: Ne Molecular Weight: 20.1797 CAS RN: 7440-01-9 Properties: inert, odorless gas; critical temp -228.7°C; critical pressure 2.65 MPa; enthalpy of vaporization 1.71 kJ/mol; enthalpy of fusion 0.34 kJ/mol; heat capacity (25°C) 20.79; sonic velocity at 0°C is 433 m/s; viscosity (25°C) 31.73 Pa · s [KIR78] [CRC10] [AIR87] **Solubility:** 10.5 mL/100 g H<sub>2</sub>O (20°C, 101.32 kPa) [KIR78]; Henry's law constants,  $k \times 10^{-4}$ : 13.023 (70.0°C), 12.022 (124.5°C), 9.805 (174.5°C), 7.166 (226.4°C), 4.160 (283.7°C) [POT78] Density, g/cm<sup>3</sup>: gas (101.3 kPa, 0°C) 0.0009000 [KIR78] Melting Point, °C: -248.59 [CRC10] Boiling Point, °C: -246.08 [CRC10] Thermal Conductivity, W/(m·K): gas: (101.32 kPa, 0°C) 0.04607 [KIR78]

# 2182

Compound: Neptunium Formula: Np Molecular Formula: Np Molecular Weight: 237 CAS RN: 7439-99-8 Properties: silvery metal; α: ortho-rhomb, a=0.4721 nm, b=0.4888 nm, c=0.6661 nm, stable from room temp to 280°C; β: tetra, a=0.4895 nm, c=0.3386 nm, stable from 280–577°C; γ: a=0.3518 nm; bcc, stable from 577–637°C; enthalpy of vaporization 418 kJ/mol; enthalpy of fusion 3.20 kJ/mol; <sup>237</sup>Np, t<sub>1/2</sub>=2.14×10<sup>+6</sup> years, t<sub>1/2</sub> of <sup>236</sup>Np 1.29×10<sup>+6</sup> years; discovered in 1940; produced in kg amounts as a by-product of plutonium production [MER06] [KIR78] [CRC10] Solubility: s HCl [HAW93] Density, g/cm<sup>3</sup>: 20.45 [KIR78] Melting Point, °C: 637 [KIR91] Boiling Point, °C: 3900 [KIR91] Thermal Conductivity, W/(m · K): 6.3 [CRC10]

## 2183

Compound: Neptunium(IV) oxide Synonym: neptunium dioxide Formula: NpO<sub>2</sub> Molecular Formula: NpO<sub>2</sub> Molecular Weight: 269 CAS RN: 12035-79-9 Properties: cub; dark olive powd [HAW93] [CRC10] Density, g/cm<sup>3</sup>: 11.11 [CRC10] Melting Point, °C: 2547 [LID94]

## 2184

**Compound:** Nickel Formula: Ni Molecular Formula: Ni Molecular Weight: 58.6934 CAS RN: 7440-02-0 Properties: white, ferromagnetic metal; fcc, a=0.35238 nm; decomposes steam at red heat; electrical resistivity (20°C)  $6.844 \mu \text{ohm} \cdot \text{cm}$ ; Curie temp 353°C; Poisson's ratio 0.30; saturation magnetization 0.617 T; residual magnetization 0.300 T; coercive force 239 A/m; initial permeability 0.251 mH/m, maximum permeability 2.51-3.77 mH/m; enthalpy of vaporization 377.5 kJ/mol; enthalpy of fusion 17.48 kJ/ mol [KIR81] [MER06] [CRC10] [ALD94] **Solubility:** i H<sub>2</sub>O; slowly attacked by dil HCl, H<sub>2</sub>SO<sub>4</sub>, readily by HNO<sub>3</sub> [MER06] Density, g/cm<sup>3</sup>: 8.908 [HAW93] Melting Point, °C: 1453 [ALD94] Boiling Point, °C: 2732 (extrapolated) [KIR81] Thermal Conductivity, W/(m·K): 90.0 (25°C), 82.8 (100°C), 63.6 (300°C), 61.9 (500°C) [KIR81] [ALD94]

**Thermal Expansion Coefficient:** 500°**C:** 15.2×10<sup>-6</sup>/°C [KIR81]

## 2185

Compound: Nickel acetate tetrahydrate
Synonyms: acetic acid, nickel(II) salt
Formula: Ni(CH<sub>3</sub>COO)<sub>2</sub>·4H<sub>2</sub>O
Molecular Formula: C<sub>4</sub>H<sub>14</sub>NiO<sub>8</sub>
Molecular Weight: 248.843
CAS RN: 6018-89-9
Properties: green monocl cryst; hygr; used in textiles as a mordant [HAW93]
Solubility: s in 6 parts H<sub>2</sub>O; s alcohol [MER06]
Density, g/cm<sup>3</sup>: 1.744 [MER06]
Melting Point, °C: decomposes at 250 [HAW93]

#### 2186

Compound: Nickel acetylacetonate Synonyms: 2,4-pentanedione, Ni(II) derivative Formula: Ni(CH<sub>3</sub>COCH=C(O)CH<sub>3</sub>)<sub>2</sub> Molecular Formula: C<sub>10</sub>H<sub>14</sub>NiO<sub>4</sub> Molecular Weight: 256.912 CAS RN: 3264-82-2 Properties: light green powd; hygr; trimer; there is a hydrate, CAS RN 120156-44-7 [STR93] [ALD94] [COT88] Melting Point, °C: decomposes at 238 [STR93]

#### 2187

Compound: Nickel aluminide Formula: NiAl<sub>3</sub> Molecular Formula: Al<sub>3</sub>Ni Molecular Weight: 139.638 CAS RN: 12004-71-6 Properties: -20 mesh with 99.9% purity; there is also NiAl, 12003-78-0; a cermet that can be flame sprayed [CER91] [HAW93]

# 2188

**Compound:** Nickel ammonium chloride hexahydrate **Formula:**  $NH_4NiCl_3 \cdot 6H_2O$  **Molecular Formula:**  $Cl_3H_{16}NNiO_6$  **Molecular Weight:** 291.182 **CAS RN:** 16122-03-5 (anhydrous) **Properties:** green hygr cryst [CRC10] **Solubility:** s  $H_2O$  [CRC10] **Density, g/cm<sup>3</sup>:** 1.65 [CRC10]

**Compound:** Nickel ammonium sulfate **Formula:**  $Fe_2(SO_4)_3 \cdot 9H_2O$  **Molecular Formula:**  $Fe_2H_{18}O_{21}S_3$  **Molecular Weight:** 562.015 **CAS RN:** 13520-56-4 **Properties:** yellow hex cryst [CRC10] **Solubility:** g/100 g H<sub>2</sub>O: 440<sup>20</sup> [CRC10] **Density, g/cm<sup>3</sup>:** 2.1 [CRC10] **Melting Point,** °C: decomposes at 400 [CRC10]

# 2190

**Compound:** Nickel ammonium sulfate hexahydrate **Formula:** Ni(NH<sub>4</sub>)<sub>2</sub>(SO<sub>4</sub>)<sub>2</sub>  $\cdot$  6H<sub>2</sub>O **Molecular Formula:** N<sub>4</sub>NiH<sub>20</sub>O<sub>14</sub>S<sub>2</sub> **Molecular Weight:** 394.987 **CAS RN:** 7785-20-8 **Properties:** blue-green cryst [CRC10] **Solubility:** g/100 g H<sub>2</sub>O: 6.5<sup>20</sup>; s H<sub>2</sub>O; i EtOH [CRC10] **Density, g/cm<sup>3</sup>:** 1.92 [CRC10] **Melting Point, °C:** decomposes at 130 [CRC10]

#### 2191

Compound: Nickel antimonide Synonym: breithauptite Formula: NiSb Molecular Formula: NiSb Molecular Weight: 180.453 CAS RN: 12035-52-8 Properties: reddish hex; 6 mm pieces and smaller with 99.5% purity; there is also Ni<sub>3</sub>Sb, 12503-49-0 [CER91] [CRC10] Density, g/cm<sup>3</sup>: 8.74 [LID94] Melting Point, °C: 1158 [CRC10] Boiling Point, °C: decomposes at 1400 [CRC10]

## 2192

Compound: Nickel arsenate octahydrate
Formula: Ni<sub>3</sub>(AsO<sub>4</sub>)<sub>2</sub> ⋅ 8H<sub>2</sub>O
Molecular Formula: As<sub>2</sub>H<sub>16</sub>Ni<sub>13</sub>O<sub>16</sub>
Molecular Weight: 598.040
CAS RN: 7784-48-7
Properties: yellowish green powd; formed when an aq solution of arsenic anhydride is reacted with nickel carbonate; used as a catalyst for hardening fats, which are used in soap [HAW93] [KIR81]
Solubility: i H<sub>2</sub>O; s acids [HAW93]

Density, g/cm3: 4.98 [HAW93]

**Melting Point,** °C: decomposes to NiO and As<sub>2</sub>O<sub>5</sub> [KIR81]

# 2193

Compound: Nickel arsenide Synonym: niccolite Formula: NiAs Molecular Formula: AsNi Molecular Weight: 133.615 CAS RN: 27016-75-7 Properties: hex; 6 mm pieces and smaller of 99.5% purity; there is also NiAs<sub>2</sub>, 12068-61-0, of the same purity [CER91] [CRC10] Density, g/cm<sup>3</sup>: 7.57 [CRC10] Melting Point, °C: 968 [CRC10]

# 2194

Compound: Nickel basic carbonate tetrahydrate
Synonym: zaratite
Formula: NiCO<sub>3</sub> · 2Ni(OH)<sub>2</sub> · 4H<sub>2</sub>O
Molecular Formula: CH<sub>12</sub>Ni<sub>3</sub>O<sub>11</sub>
Molecular Weight: 376.179
CAS RN: 3333-67-3
Properties: light green rhomb cryst or brown powd; can be obtained by adding sodium carbonate to a nickel salt solution; used in the manufacture of catalyst, electroplating, ceramic colors, and glazes [HAW93] [KIR81]
Solubility: i H<sub>2</sub>O; s in dil acids and in ammonia [HAW93]
Density, g/cm<sup>3</sup>: 2.6 [HAW93]

# 2195

Compound: Nickel bis(cyclopentadienyl) Synonym: bis(cyclopentadienyl)nickel Formula: Ni(C<sub>5</sub>H<sub>5</sub>)<sub>2</sub> Molecular Formula: C<sub>10</sub>H<sub>10</sub>Ni Molecular Weight: 188.883 CAS RN: 1271-28-9 Properties: bright green cryst; fairly stable in air [COT88] [ALF95] Melting Point, °C: 171–173 [ALF95] Reactions: forms CpNiNO with NO [COT88]

#### 2196

Compound: Nickel boride Formula: Ni<sub>2</sub>B Molecular Formula: BNi<sub>2</sub> Molecular Weight: 128.198 CAS RN: 12007-01-1 Properties: -35 mesh with 99% purity; refractory material [CER91] [KIR78] Density, g/cm<sup>3</sup>: 7.90 [LID94] Melting Point, °C: 1230 [KIR78]

Compound: Nickel boride Formula: NiB Molecular Formula: BNi Molecular Weight: 69.504 CAS RN: 12007-00-0 Properties: -35 mesh with 99% purity; refractory material; silver green [CER91] [STR93] [KIR78] Density, g/cm<sup>3</sup>: 7.39 [STR93] Melting Point, °C: 1080 [KIR78]

# 2198

Compound: Nickel boride Formula: Ni<sub>3</sub>B Molecular Formula: BNi<sub>3</sub> Molecular Weight: 186.891 CAS RN: 12007-02-2 Properties: -35 mesh with 99% purity; refractory material [KIR78] Density, g/cm<sup>3</sup>: 8.17 [LID94] Melting Point, °C: 1155 [KIR78]

# 2199

Compound: Nickel bromide Formula: NiBr<sub>2</sub> Molecular Formula: Br<sub>2</sub>Ni Molecular Weight: 218.501 CAS RN: 13462-88-9 Properties: brownish yellow or yellow, lustrous scales [HAW93] Solubility: g/100 g soln, H<sub>2</sub>O: 53.0 (0°C), 57.3 (25°C), 60.8 (100°C); solid phase, NiBr<sub>2</sub> · 6H<sub>2</sub>O [KRU93] Density, g/cm<sup>3</sup>: 5.098 [STR93] Melting Point, °C: 963 [STR93]

## 2200

Compound: Nickel bromide trihydrate Formula: NiBr<sub>2</sub>  $\cdot$  3H<sub>2</sub>O Molecular Formula: Br<sub>2</sub>H<sub>6</sub>NiO<sub>3</sub> Molecular Weight: 272.547 CAS RN: 13462-88-9 Properties: yellowish green, very deliq cryst; hexahydrate obtained from a reaction of black NiO and HBr [KIR81] [MER06] Solubility: 199 g/100 mL H<sub>2</sub>O (0°C), 316 g/100 mL H<sub>2</sub>O (100°C) [CRC10] Melting Point, °C: 300, decomposes [STR93] Reactions: minus 3H<sub>2</sub>O ~200°C [MER06]

#### 2201

**Compound:** Nickel carbonate **Formula:** NiCO<sub>3</sub> **Molecular Formula:** CNiO<sub>3</sub> **Molecular Weight:** 118.702 **CAS RN:** 3333-67-3 **Properties:** light green thomb:

Properties: light green rhomb; -325 mesh 10μm and smaller; can be prepared by adding Na<sub>2</sub>CO<sub>3</sub> solution to a nickel salt solution or by heating Ni powd in NH<sub>3</sub> and CO<sub>2</sub>, followed by boiling of NH<sub>3</sub> to obtain purer material; used in manufacture of catalysts, colored glass, and certain nickel pigments [KIR81] [CER91]
Solubility: 0.0093 g/100 mL H<sub>2</sub>O (25°C) [CRC10]
Density, g/cm<sup>3</sup>: 4.39 [LID94]
Melting Point, °C: decomposes [CRC10]

## 2202

**Compound:** Nickel carbonate hydroxide tetrahydrate **Formula:**  $2NiCO_3 \cdot 3Ni(OH)_2 \cdot 4H_2O$  **Molecular Formula:**  $C_2H_{14}Ni_{15}O_{16}$  **Molecular Weight:** 587.591 **CAS RN:** 12244-51-8 **Properties:** green powd [AES93] [STR93] [ALD94] **Melting Point,** °C: decomposes [CRC10]

#### 2203

Compound: Nickel carbonyl Formula: Ni(CO)<sub>4</sub> Molecular Formula: C<sub>4</sub>NiO<sub>4</sub> Molecular Weight: 170.735 CAS RN: 13463-39-3 Properties: colorless, volatile liq; oxidizes in air; explodes at ~60°C; vapor pressure, kPa: 19.2 (0°C), 28.7 (10°C), 44.0 (20°C); critical temp 200°C; vapor density is four times greater than air; manufactured by reacting CO with Ni; used to prepare highly pure nickel and in alkaline nickel batteries [KIR81] [HAW93] [MER06] Solubility: s in ~5000 parts air free H<sub>2</sub>O; s alcohol, benzene, chloroform, acetone, CCl<sub>4</sub> [MER06] Density, g/cm<sup>3</sup>: 1.3185 [HAW93] Melting Point, °C: –19.3 [MER06] Boiling Point, °C: 42.6 [KIR81] Reactions: decomposed by heat to Ni and 4CO [DOU83]

#### 2204

**Compound:** Nickel chlorate hexahydrate Formula:  $Ni(ClO_3)_2 \cdot 6H_2O$ Molecular Formula:  $Cl_2H_{12}NiO_{12}$ Molecular Weight: 333.687 CAS RN: 67952-43-6 Properties: dark red [CRC10]
Solubility: mol/100 mol H<sub>2</sub>O: 8.88 (0°C), 12.02 (25°C); solid phase, Ni(ClO<sub>3</sub>)<sub>2</sub> ⋅ 6H<sub>2</sub>O (0°C), Ni(ClO<sub>3</sub>)<sub>2</sub> ⋅ 4H<sub>2</sub>O (25°C) [KRU93]; g/100 g H<sub>2</sub>O: 111 (0°C), 133 (20°C), 308 (80°C) [LAN05]
Density, g/cm<sup>3</sup>: 2.07 [CRC10]
Melting Point, °C: decomposes at 80 [CRC10]

# 2205

Compound: Nickel chloride
Formula: NiCl<sub>2</sub>
Molecular Formula: Cl<sub>2</sub>Ni
Molecular Weight: 129.598
CAS RN: 7718-54-9
Properties: golden yellow powd; hygr; readily absorbs NH<sub>3</sub>; enthalpy of fusion 71.20 kJ/ mol [CRC10] [STR93] [MER06]
Solubility: g/100 g soln, H<sub>2</sub>O: 35.04 (0°C), 39.6 (25°C), 46.7 (100.2°C); solid phase, NiCl<sub>2</sub>·6H<sub>2</sub>O (0°C, 25°C), NiCl<sub>2</sub>·2H<sub>2</sub>O (100.2°C) [KRU93]
Density, g/cm<sup>3</sup>: 3.55 [HAW93]
Melting Point, °C: 1031 [CRC10]
Boiling Point, °C: sublimes [LID94]
Reactions: sublimable in absence of air [MER06]

# 2206

Compound: Nickel chloride hexahydrate
Formula: NiCl₂ · 6H₂O
Molecular Formula: Cl₂H₁₂NiO<sub>6</sub>
Molecular Weight: 237.689
CAS RN: 7791-20-0
Properties: green cryst; monocl; formed when Ni or NiO is reacted with hot aq HCl solution; used in nickel electroplating [KIR81] [MER06]
Solubility: 4.9208 ± 0.0028 mol/kg, and 4.9172 ± 0.0049 mol/kg, in H₂O (25°C) [RAR87b], [RAR92]; s alcohol [MER06]
Reactions: sublimes at 973°C [STR93]

## 2207

Compound: Nickel chromate
Formula: NiCrO<sub>4</sub>
Molecular Formula: CrNiO<sub>4</sub>
Molecular Weight: 174.687
CAS RN: 14721-18-7
Properties: maroon; used in catalysts; gives dark red aq solutions; there is also nickel chromium oxide, NiCr<sub>2</sub>O<sub>4</sub>, 12018-18-7, -100 mesh with 99% purity [KIR78] [CER91]

Solubility: v sl s H<sub>2</sub>O [KIR78]

#### 2208

Compound: Nickel cyanide tetrahydrate Formula: Ni(CN)<sub>2</sub> ·  $4H_2O$ Molecular Formula: C<sub>2</sub>H<sub>8</sub>N<sub>2</sub>NiO<sub>4</sub> Molecular Weight: 182.790 CAS RN: 13477-95-7 Properties: apple green plates or powd; prepared by reacting KCN and NiSO<sub>4</sub>; used in metallurgy and in electroplating; anhydrous Ni(CN)<sub>2</sub>, 557-19-7 [STR93] [MER06] [KIR81] Solubility: i H<sub>2</sub>O; sl s dil acids; v s alkali cyanides, ammonia, ammonium carbonate [MER06] Melting Point, °C: decomposes above 200 [KIR81]

# Reactions: minus 4H<sub>2</sub>O at 200°C [HAW93]

#### 2209

Compound: Nickel disilicide Formula: NiSi<sub>2</sub> Molecular Formula: NiSi<sub>2</sub> Molecular Weight: 114.864 CAS RN: 12201-89-7 Properties: -80 mesh powd [ALF93] Density, g/cm<sup>3</sup>: 4.83 [LID94] Melting Point, °C: 1200 [ALF93]

#### 2210

Compound: Nickel fluoride Formula: NiF<sub>2</sub> Molecular Formula:  $F_2Ni$ Molecular Weight: 96.690 CAS RN: 10028-18-9 Properties: yellowish to green tetr cryst; hygr [MER06] [STR93] Solubility: g/100 g soln, H<sub>2</sub>O: 2.50 (25°C), 2.52 (90°C); solid phase, NiF<sub>2</sub>·4H<sub>2</sub>O [KRU93]; i alcohol, ether [MER06] Density, g/cm<sup>3</sup>: 4.72 [MER06] Melting Point, °C: ~1100 [KIR78] Reactions: sublimes under HF at >1000°C [MER06]

# 2211

**Compound:** Nickel fluoride tetrahydrate **Formula:**  $NiF_2 \cdot 4H_2O$  **Molecular Formula:**  $F_2H_8NiO_4$  **Molecular Weight:** 168.752 **CAS RN:** 13940-83-5 **Properties:** green powd; can be prepared by reacting  $NiCO_3$  with aq HF [KIR78] [STR93]

Compound: Nickel hexafluoroacetylacetonate hydrate
Synonyms: 1,1,1,5,5,5-hexafluoro-2,4pentanedione, Ni derivative
Formula: Ni(CF<sub>3</sub>COCH=C(O)CF<sub>3</sub>)<sub>2</sub> · xH<sub>2</sub>O
Molecular Formula: C<sub>10</sub>H<sub>2</sub>F<sub>12</sub>NiO<sub>4</sub> (anhydrous)
Molecular Weight: 472.798
CAS RN: 14949-69-0
Properties: green cryst [STR94] [ALD94]
Melting Point, °C: 211–213 [STR93]

# 2213

**Compound:** Nickel hydroxide **Formula:** Ni(OH)<sub>2</sub> **Molecular Formula:** H<sub>2</sub>NiO<sub>2</sub> **Molecular Weight:** 92.708 **CAS RN:** 12054-48-7

**Properties:** fine green powd; formed when a nickel sulfate solution is treated with sodium hydroxide, then neutralized and filtered; used in the manufacture of Ni-Cd batteries [KIR81] [HAW93]

Solubility: mol/L soln, H<sub>2</sub>O: 1×10<sup>-4</sup> (20°C) [KRU93]; s in acids and in NH<sub>4</sub>OH [HAW93]
Density, g/cm<sup>3</sup>: 4.15 [HAW93]
Melting Point, °C: decomposes at 230 [STR93]
Reactions: forms NiO and H<sub>2</sub>O on

decomposing [MER06]

#### 2214

Compound: Nickel iodate Formula: Ni(IO<sub>3</sub>)<sub>2</sub> Molecular Formula:  $I_2NiO_6$ Molecular Weight: 408.498 CAS RN: 13477-98-0 Properties: yellow needles [LAN05] Solubility: mol/100 mol H<sub>2</sub>O: 0.023 (0°C), 0.035 (25°C), 0.044 (90°C); solid phase, Ni(IO<sub>3</sub>)<sub>2</sub> · 2H<sub>2</sub>O (0°C, 25°C), Ni(IO<sub>3</sub>)<sub>2</sub> (90°C) [KRU93] Density, g/cm<sup>3</sup>: 5.07 [LAN05]

# 2215

Compound: Nickel iodate tetrahydrate Formula: Ni $(IO_{3})_2 \cdot 4H_2O$ Molecular Formula:  $H_8I_2NiO_{10}$ Molecular Weight: 480.560 CAS RN: 13477-99-1 Properties: hex cryst; deliq [CRC10] [LAN05] Solubility: g/100 g H<sub>2</sub>O: 0.74 (0°C), 1.09 (20°C), 1.43 (30°C) [LAN05] Melting Point, °C: decomposes at 100 [LAN05]

#### 2216

Compound: Nickel iodide Formula: NiI<sub>2</sub> Molecular Formula: I<sub>2</sub>Ni Molecular Weight: 312.502 CAS RN: 13462-90-3 Properties: iron black color; hygr; sublimes in absence of air [MER06] [STR93] Solubility: g/100 g soln, H<sub>2</sub>O: 55.4 (0°C), 60.7 (25°C), 65.3 (90°C) [KRU93] Density, g/cm<sup>3</sup>: 5.83 [KIR81] Melting Point, °C: 797 [KIR81] Boiling Point, °C: sublimes [LID94]

# 2217

Compound: Nickel iodide hexahydrate Formula: NiI<sub>2</sub>· $6H_2O$ Molecular Formula:  $H_{12}I_2NiO_6$ Molecular Weight: 420.593 CAS RN: 7790-34-3 Properties: bluish green, very deliq cryst; obtained when nickel carbonate is reacted with hydriodic acid [KIR81] Solubility: v s  $H_2O$ , alcohol [MER06] Density, g/cm<sup>3</sup>: 5.83 [KIR81] Melting Point, °C: 797 [KIR81]

#### 2218

**Compound:** Nickel molybdate **Formula:** NiMoO<sub>4</sub> **Molecular Formula:** MoNiO<sub>4</sub> **Molecular Weight:** 218.631 **CAS RN:** 14177-55-0 **Properties:** green; three forms;  $\alpha$  monocl,  $\beta$  and  $\gamma$ ; obtained by reacting the metal oxides [KIR81] **Density, g/cm<sup>3</sup>:**  $\alpha$ : 3.5;  $\beta$ : 4.9 [KIR81] **Melting Point,** °C: 970 [KIR78]

## 2219

**Compound:** Nickel nitrate **Formula:** Ni(NO<sub>3</sub>)<sub>2</sub>

Molecular Formula: N<sub>2</sub>NiO<sub>6</sub>

Molecular Weight: 182.702

CAS RN: 13138-45-9

**Properties:** prepared by reacting red fuming nitric acid with nickel nitrate hexahydrate [KIR81]

**Solubility:** g/100 g soln, H<sub>2</sub>O: 44.2 (0°C), 50.0 (25°C), 69.2 (99.5°C); solid phase, Ni(NO<sub>3</sub>)<sub>2</sub> · 6H<sub>2</sub>O (0°C, 25°C), Ni(NO<sub>3</sub>)<sub>2</sub> · 2H<sub>2</sub>O (99.5°C) [KRU93]

**Compound:** Nickel nitrate hexahydrate **Formula:**  $Ni(NO_3)_2 \cdot 6H_2O$ **Molecular Formula:**  $H_{12}N_2NiO_{12}$ **Molecular Weight:** 290.794 **CAS RN:** 13478-00-7

**Properties:** green monocl deliq cryst; manufactured by several methods for example slowly adding nickel powd to a stirred mixture of nitric acid and water; used as an intermediate in the manufacture of nickel catalysts [KIR81] [MER06]

Solubility: s in 0.4 parts H<sub>2</sub>O; s alcohol [MER06] Density, g/cm<sup>3</sup>: 2.065 [HAW93] Melting Point, °C: 56.7 [MER06] Boiling Point, °C: 137 [MER06] Reactions: minus H<sub>2</sub>O on heating [KIR81]

## 2221

Compound: Nickel oxalate dihydrate Formula:  $NiC_2O_4 \cdot 2H_2O$ Molecular Formula:  $C_2H_4NiO_6$ Molecular Weight: 182.743 CAS RN: 6018-94-6 Properties: light green powd [MER06] Solubility: g/L soln, H<sub>2</sub>O: 0.0118 (25°C); solid phase is  $NiC_2O_4 \cdot 2H_2O$  [KRU93]

# 2222

Compound: Nickel oxide Synonym: bunsenite Formula: NiO Molecular Formula: NiO Molecular Weight: 74.692 CAS RN: 1313-99-1

**Properties:** green powd, yellow when hot; cub; prepared by reaction of pure nickel powd and water in air at 1000°C; inert and refractory material; there is a black form with 76%–77% Ni, whereas green form has 78.5% Ni; black form is microcrystalline and prepared by calcination of the NiCO<sub>3</sub> or Ni(NO<sub>3</sub>)<sub>2</sub> at 600°C, green form prepared by heating a mixture of H<sub>2</sub>O and Ni powd in air at 1000°C; used in the manufacture of steels [KIR81] [MER06] **Solubility:** in 0.00054 m alkaline phosphate

solution: 0.0157 × 10<sup>-6</sup> m (26.8°C), 0.0169 × 10<sup>-6</sup> m (93.3°C), 0.0102 × 10<sup>-6</sup> m (262.2°C) [ZIE89]; s acids [MER06]

Density, g/cm<sup>3</sup>: 7.45 [KIR81]

Melting Point, °C: 2090 [KIR81]

**Reactions:**  $\beta$ -Ni(OH)<sub>2</sub> = NiO + H<sub>2</sub>O at 195°C [ZIE89]

#### 2223

Compound: Nickel oxide Formula: Ni<sub>2</sub>O<sub>3</sub> Molecular Formula: Ni<sub>2</sub>O<sub>3</sub> Molecular Weight: 165.385 CAS RN: 1314-06-3 Properties: gray-black cub cryst [CRC10] Solubility: i H<sub>2</sub>O; s hot acid [CRC10] Melting Point, °C: decomposes at ~600 [CRC10]

# 2224

Compound: Nickel perchlorate hexahydrate Formula: Ni $(ClO_4)_2 \cdot 6H_2O$ Molecular Formula:  $Cl_2Hl_2NiO_{14}$ Molecular Weight: 365.686 CAS RN: 13520-61-1 Properties: green cryst; hygr [STR93] Solubility: g/100 g soln, H<sub>2</sub>O: 104.6 (0°C), 112.2 (26°C); solid phase Ni $(ClO_4)_2 \cdot 5H_2O$  (0°C) [KRU93] Melting Point, °C: 140 [STR93]

## 2225

#### 2226

**Compound:** Nickel phosphate octahydrate **Formula:**  $Ni_3(PO_4)_2 \cdot 8H_2O$  **Molecular Formula:**  $H_{16}Ni_3O_{16}P_2$  **Molecular Weight:** 510.145 **CAS RN:** 10381-36-9 **Properties:** light green powd [MER06] **Solubility:** i H<sub>2</sub>O; s acids, ammonia [MER06] **Melting Point,** °C: decomposes [ALF95]

# 2227

Compound: Nickel phosphide Formula: Ni<sub>2</sub>P Molecular Formula: Ni<sub>2</sub>P Molecular Weight: 148.361 CAS RN: 12035-64-2 Properties: gray cryst; -100 mesh with 99.5% purity [CER91] [CRC10] Density, g/cm<sup>3</sup>: 7.33 [LID94] Melting Point, °C: 1112 [AES93]

#### 2228

Compound: Nickel selenate hexahydrate Formula: NiSeO<sub>4</sub> ·  $6H_2O$ Molecular Formula:  $H_{12}NiO_{10}Se$ Molecular Weight: 309.743 CAS RN: 75060-62-5 Properties: green; tetr [CRC10] Solubility: g/100 g H<sub>2</sub>O: 27.36 (0°C), 36.20 (21.6°C), 83.99 (100°C); solid phase, NiSeO<sub>4</sub> ·  $6H_2O$  (0°C, 25°C), NiSeO<sub>4</sub> ·  $4H_2O$  (100°C) [KRU93] Density, g/cm<sup>3</sup>: 2.314 [CRC10]

# 2229

Compound: Nickel selenide Formula: NiSe Molecular Formula: NiSe Molecular Weight: 137.653 CAS RN: 1314-05-2 Properties: cub gray powd [CRC10] Density, g/cm<sup>3</sup>: 7.2 [LID94]

## 2230

Compound: Nickel silicide Formula: Ni<sub>2</sub>Si Molecular Formula: Ni<sub>2</sub>Si Molecular Weight: 145.473 CAS RN: 12059-14-2 Properties: -20 mesh powd [ALF93] Density, g/cm<sup>3</sup>: 7.4 [LID94] Melting Point, °C: 1255 [LID94]

# 2231

Compound: Nickel stannate dihydrate
Formula: NiSnO<sub>3</sub> · 2H<sub>2</sub>O
Molecular Formula: H<sub>4</sub>NiO<sub>5</sub>Sn
Molecular Weight: 261.432
CAS RN: 12035-38-0
Properties: green powd; light colored cryst powd; used as an additive in ceramic capacitors [HAW93]
Reactions: minus 2H<sub>2</sub>O at ~120°C [HAW93]

#### 2232

**Compound:** Nickel stearate **Formula:** Ni $[CH_3(CH_2)_{16}COO]_2$  **Molecular Formula:** C<sub>36</sub>H<sub>70</sub>NiO<sub>4</sub> **Molecular Weight:** 625.643 CAS RN: 2223-95-2 Properties: waxy green solid [STR93] Density, g/cm<sup>3</sup>: 1.13 [STR93] Melting Point, °C: 180 [KIR78]

#### 2233

Compound: Nickel subsulfide Synonym: heazlewoodite Formula: Ni<sub>3</sub>S<sub>2</sub> Molecular Formula: Ni<sub>3</sub>S<sub>2</sub> Molecular Weight: 240.212 CAS RN: 12035-72-2 Properties: yellowish; naturally occurring nickel mineral [KIR81] [CRC10] Density, g/cm<sup>3</sup>: 5.82 [CRC10] Melting Point, °C: 790 [CRC10]

# 2234

Compound: Nickel sulfate Formula: NiSO<sub>4</sub> Molecular Formula: NiO<sub>4</sub>S Molecular Weight: 154.757 CAS RN: 7786-81-4 Properties: greenish yellow cryst; used in manufacture of nickel catalysts; nickel plating [HAW93] Solubility: g/100 g H<sub>2</sub>O: 27.6 (0°C), 40.8 (25°C), 78.0 (100°C); solid phase, NiSO<sub>4</sub> · 7H<sub>2</sub>O (0°C, 25°C),  $\beta$ -NiSO<sub>4</sub> · 6H<sub>2</sub>O (100°C) [KRU93]; i alcohol and ether [HAW93] Density, g/cm<sup>3</sup>: 3.68 [HAW93] Melting Point, °C: 840, minus SO<sub>3</sub> [HAW93]

## 2235

Compound: Nickel sulfate heptahydrate Formula: NiSO<sub>4</sub> · 7H<sub>2</sub>O Molecular Formula:  $H_{14}$ NiO<sub>11</sub>S Molecular Weight: 280.863 CAS RN: 10101-98-1 Properties: green cryst [HAW93] Solubility: g/100 g H<sub>2</sub>O: 26.2 (0°C), 37.7 (20°C), 50.4 (40°C) [LAN05]; s alcohol [HAW93] Density, g/cm<sup>3</sup>: 1.98 [HAW93] Reactions: minus H<sub>2</sub>O at 99°C, minus 6H<sub>2</sub>O at 103°C [CRC10] [HAW93]

#### 2236

Compound: Nickel sulfate hexahydrate Formula:  $NiSO_4 \cdot 6H_2O$ Molecular Formula:  $H_{12}NiO_{10}S$ Molecular Weight: 262.848 CAS RN: 10101-97-0

- **Properties:** two phases:  $\alpha$ : blue to bluish green tetr cryst;  $\beta$ : green transparent cryst, stable at 40°C; sweet, astringent taste; somewhat efflorescent; produced by adding Ni powd to hot dil H<sub>2</sub>SO<sub>4</sub>; used as an electrolyte in metal finishing and in electroless plating [KIR81] [MER06]
- **Solubility:** g/100 g H<sub>2</sub>O: (blue green) 40.1 (20°C), 43.6 (30°C), 47.6 (40°C); (green) 44.4 (20°C), 46.6 (30°C), 76.7 (100°C) [LAN05]; sl s alcohol, more s methanol [MER06]

**Density, g/cm<sup>3</sup>:** 2.07 [STR93]

- **Melting Point**, °**C**: decomposes at ~100 [LID94] **Reactions:** transition α to β at 53.3°C; minus 5H<sub>2</sub>O at ~100°C; decomposes to NiO and
  - SO<sub>3</sub> at >800°C [KIR81] [MER06]

#### 2237

Compound: Nickel sulfide Synonym: millerite Formula: NiS Molecular Formula: NiS Molecular Weight: 90.759 CAS RN: 16812-54-7 Properties: black powd; trig, yellow metallic luster; enthalpy of fusion 30.10 kJ/mol; can be formed by fusing Ni powd and molten sulfur; other sulfides include Ni<sub>2</sub>S, 12137-08-5, Ni<sub>3</sub>S<sub>2</sub>, 12035-72-2 (heazlewoodite), NiS<sub>2</sub>, 12035-51-7, and Ni<sub>3</sub>S, 12137-12-1 (polydymite) [KIR81] [STR93] [CRC10] [JAN85] Solubility: 0.00036 g/100 mL H<sub>2</sub>O (18°C) [CRC10] Density, g/cm<sup>3</sup>: 5.3–5.65 [STR93] Melting Point, °C: 976 [LID94]

## 2238

Compound: Nickel telluride Formula: NiTe Molecular Formula: NiTe Molecular Weight: 186.293 CAS RN: 12142-88-0 Properties: 6 mm pieces and smaller with 99.9% purity [CER91]

## 2239

**Compound:** Nickel tetrafluoroborate hexahydrate **Formula:** Ni $(BF_4)_2 \cdot 6H_2O$  **Molecular Formula:**  $B_2F_8H_{12}NiO_6$  **Molecular Weight:** 340.394 **CAS RN:** 15684-36-3 **Properties:** green cryst [STR93] **Density, g/cm<sup>3</sup>:** 1.47 [STR93]

## 2240

**Compound:** Nickel thiocyanate **Formula:**  $Ni(SCN)_2$  **Molecular Formula:**  $C_2N_2NiS_2$  **Molecular Weight:** 174.860 **CAS RN:** 13689-92-4 **Properties:** green powd [STR93] **Solubility:** g/100 g soln, H<sub>2</sub>O: 35.48 (25°C) [KRU93]

#### 2241

Compound: Nickel titanate
Formula: NiTiO<sub>3</sub>
Molecular Formula: NiO<sub>3</sub>Ti
Molecular Weight: 154.558
CAS RN: 12035-39-1
Properties: brown powd or canary yellow with rhomb structure; -325 mesh 10μm or less with 99.9% purity [CER91] [KIR83] [STR93]
Density, g/cm<sup>3</sup>: 4.56 [STR93]

# 2242

Compound: Nickel trifluoroacetylacetonate dihydrate Synonym: 1,1,1-trifluoro-2,4pentandione nickel derivative Formula: Ni(CF<sub>3</sub>COCH=C(O)CH<sub>3</sub>)<sub>2</sub> · 2H<sub>2</sub>O Molecular Formula: C<sub>10</sub>H<sub>12</sub>F<sub>6</sub>NiO<sub>6</sub> Molecular Weight: 400.885 CAS RN: 14324-83-5 Properties: powd [ALF95]

# 2243

**Compound:** Nickel tungstate **Formula:** NiWO<sub>4</sub> **Molecular Formula:** NiO<sub>4</sub>W **Molecular Weight:** 306.531 **CAS RN:** 14177-51-6 **Properties:** -325 mesh 10μm or less with 99.9% purity [CER91]

## 2244

Compound: Nickel vanadate Formula: NiV<sub>2</sub>O<sub>6</sub> Molecular Formula: NiO<sub>6</sub>V<sub>2</sub> Molecular Weight: 256.572 CAS RN: 52502-12-2 Properties: -200 mesh with 99.9% purity [CER91] [ALF95]

Compound: Nickel(II,III) sulfide Synonym: polydymite Formula: Ni<sub>3</sub>S<sub>4</sub> Molecular Formula: Ni<sub>3</sub>S<sub>4</sub> Molecular Weight: 304.344 CAS RN: 12137-12-1 Properties: gray-black; naturally occurring nickel mineral [KIR81] [CRC10] Density, g/cm<sup>3</sup>: 4.77 [LID94]

# 2246

Compound: Nickel(III) oxide Synonym: nickel sesquioxide Formula: Ni<sub>2</sub>O<sub>3</sub> Molecular Formula: Ni<sub>2</sub>O<sub>3</sub> Molecular Weight: 165.385 CAS RN: 1314-06-3 Properties: gray black powd [MER06] Solubility: i H<sub>2</sub>O; v sl s cold acid; dissolves in hot HCl releasing Cl<sub>2</sub>; dissolves in hot H<sub>2</sub>SO<sub>4</sub> or HNO<sub>3</sub> evolving O<sub>2</sub> [MER06] Reactions: decomposes at ~600°C to give NiO and O<sub>2</sub> [MER06]

## 2247

Compound: Niobium Formula: Nb Molecular Formula: Nb Molecular Weight: 92.90638 CAS RN: 7440-03-1

Properties: steel gray, lustrous metal; pure metal is ductile and malleable; bcc, lattice constant 0.33004 nm; enthalpy of fusion 30.0 kJ/mol; enthalpy of vaporization 697 kJ/mol; enthalpy of combustion 949 kJ/mol; vapor pressure (2300°C) 22 MPa; evaporation rate (2300°C) 1.9 µg/(cm<sup>2</sup> s); electrical resistivity 13–16µohm · cm; produced from Nb<sub>2</sub>O<sub>5</sub> and carbon at 1800°C–2000°C; used as an anodic film for rectification [KIR81] [MER06] [CER91] [CRC10]

**Solubility:** inert to HCl, HNO<sub>3</sub>, aqua regia; attacked by fusion with alkali hydroxides [MER06]

Density, g/cm<sup>3</sup>: 8.57 [MER06]

Melting Point, °C: 2477 [CRC10]

Boiling Point, °C: 4944 [CRC10]

Thermal Conductivity, W/(m·K): 52.3 (25°C) [KIR81]

**Thermal Expansion Coefficient:** coefficient of linear expansion 7.1 × 10<sup>-6</sup>/°C from 18°C–100°C [KIR81]

#### 2248

Compound: Niobium boride Formula: NbB Molecular Formula: BNb Molecular Weight: 103.717 CAS RN: 12045-19-1 Properties: gray ortho cryst [CRC10] Density, g/cm<sup>3</sup>: 7.5 [CRC10]

# 2249

**Compound:** Niobium boride **Formula:** NbB<sub>2</sub> **Molecular Formula:** B<sub>2</sub>Nb **Molecular Weight:** 114.528 **CAS RN:** 12007-29-3 **Properties:** gray hex cryst [CRC10] **Density, g/cm<sup>3</sup>:** 6.97 [CRC10] **Melting Point, °C:** 3050 [CRC10]

# 2250

Compound: Niobium carbide Formula: Nb<sub>2</sub>C Molecular Formula: CNb<sub>2</sub> Molecular Weight: 197.824 CAS RN: 12011-99-3 Properties: -325 mesh, 10μm or less, 99.5% purity; hex, a=0.3127 nm, c=0.4972 nm [CER91] [KIR81] Density, g/cm<sup>3</sup>: 7.80 [KIR81] Melting Point, °C: 3090 [KIR81]

#### 2251

Compound: Niobium diboride
Formula: NbB<sub>2</sub>
Molecular Formula: B<sub>2</sub>Nb
Molecular Weight: 114.528
CAS RN: 12007-29-3
Properties: gray powd; hex, a=0.3089 nm, c=0.3303 nm; hardness 8+ Mohs; resistivity 65 μohm · cm at 25°C; refractory material; used as a sputtering target with 99.5% purity to produce thermionic conductor film [KIR81] [CER91] [ALF93]
Density, g/cm<sup>3</sup>: 6.97 [ALD94]
Melting Point, °C: 2900 [KIR78]
Thermal Conductivity, W/(m·K): 17 at 296 K [KIR81]

# 2252

**Compound:** Niobium disilicide **Formula:** NbSi<sub>2</sub> **Molecular Formula:** NbSi<sub>2</sub> **Molecular Weight:** 149.077

# CAS RN: 12034-80-9

Properties: -325 mesh powd; cryst solid; used as a refractory and as 99.5%-99.95% pure material as a sputtering target in the fabrication of integrated circuits [HAW93] [ALF93] [CER91]
Density, g/cm<sup>3</sup>: 5.7 [LID94]
Melting Point, °C: 1950 [HAW93]

## 2253

Compound: Niobium hydride Formula: NbH Molecular Formula: HNb Molecular Weight: 93.914 CAS RN: 13981-86-7 Properties: gray powd; bcc; sensitive to moisture; reaction of H<sub>2</sub> with Nb at 300°C–1500°C can result in the formation of NbH<sub>0.85</sub> [STR93] [KIR81] Density, g/cm<sup>3</sup>: 6.6 [STR93]

#### 2254

Compound: Niobium monoboride Formula: NbB Molecular Formula: BNb Molecular Weight: 103.717 CAS RN: 12045-19-1

Properties: gray powd; ortho-rhomb, a=0.3298 nm, b=0.872 nm, c=0.3166 nm; resistivity 64.5 μohm · cm at 25°C; refractory material; commonly prepared by hot-pressing boron with niobium or niobium hydride; used as sputtering target with 99.5% purity to produce wear-resistant and semiconductor films, and can provide neutron absorbing layers on nuclear fuel pellets [KIR78] [KIR81] [CER91] [ALF93]
Density, g/cm<sup>3</sup>: 7.5 [KIR81]

Melting Point, °C: 2270 [KIR78]

#### 2255

Compound: Niobium nitride Formula: NbN Molecular Formula: NNb Molecular Weight: 106.913 CAS RN: 24621-21-4

**Properties:** dark gray; fcc, a = 0.4388 nm; hardness, 8+ Mohs; electrical resistivity 78 µohm · cm; transition temp 15.2 K; can be prepared by heating Nb metal in excess N<sub>2</sub> or NH<sub>3</sub> to 700°C–1100°C; used in the form of 99.5% pure sputtering target for increasing electrical stability of diodes, transistors, and integrated circuits [KIR81] [CIC73] [CER91]

Solubility: i HCl, HNO<sub>3</sub>, H<sub>2</sub>SO<sub>4</sub>; attacked by hot caustic, lime or strong alkali, evolving NH<sub>3</sub> [KIR81]
 Density, g/cm<sup>3</sup>: 8.47 [KIR81]

Melting Point, °C: 2575 [STR93] Thermal Conductivity, W/(m·K): 3.8 [KIR81] Thermal Expansion Coefficient: 10.1×10<sup>-6</sup> [KIR81]

## 2256

Compound: Niobium phosphide Formula: NbP Molecular Formula: NbP Molecular Weight: 123.880 CAS RN: 12034-66-1 Properties: tetr cryst; -200 mesh with 99.5% purity [LID94] [CER91] Density, g/cm<sup>3</sup>: 6.5 [LID94]

#### 2257

Compound: Niobium(II) oxide Formula: NbO Molecular Formula: NbO Molecular Weight: 108.905 CAS RN: 12034-57-0 Properties: gray metallic appearance; can be obtained by reduction of Nb<sub>2</sub>O<sub>5</sub> in H<sub>2</sub> at  $1300^{\circ}$ C-1700 $^{\circ}$ C; -100 mesh with 99.9% purity; cub, a=0.42108 nm; enthalpy of fusion 85.00 kJ/mol [CRC10] [CER91] [KIR81] Density, g/cm<sup>3</sup>: 7.30 [KIR81] Melting Point, °C: 1937 [CRC10]

#### 2258

**Compound:** Niobium(IV) bromide **Formula:** NbBr<sub>4</sub> **Molecular Formula:** Br<sub>4</sub>Nb **Molecular Weight:** 412.522 **CAS RN:** 13842-75-6 **Properties:** dark brown cryst [CRC10] **Density, g/cm<sup>3</sup>:** 4.72 [CRC10] **Solubility:** reac H<sub>2</sub>O [CRC10] **Melting Point, °C:** sublimes at 300 [CRC10]

#### 2259

Compound: Niobium(IV) carbide Formula: NbC Molecular Formula: CNb Molecular Weight: 104.917

CAS RN: 12069-94-2

Properties: lavender gray powd; -325 mesh, 10µm or less, 99.9% purity; fcc, a=0.4471 nm; hardness 9+ Mohs; resistivity 180µohm ⋅ cm maximum; used in special steels, coating graphite for nuclear reactors; as a 99.5% pure material, used as a sputtering target to produce wear-resistant and semiconducting films [HAW93] [KIR81] [CER91] Solubility: i H₂O, acids; s in a mixture of HNO₃ and HF [HAW93]
Density, g/cm³: 7.82 [STR93]
Melting Point, °C: 3500 [STR93]
Boiling Point, °C: 4300 [KIR81]
Thermal Conductivity, W/(m⋅K): 14 at 23°C [KIR81]
Thermal Expansion Coefficient: (volume) 100°C (0.141), 200°C (0.329), 400°C (0.740), 800°C (1.626), 1200°C (2.565) [CLA66]

#### 2260

Compound: Niobium(IV) chloride Formula: NbCl<sub>4</sub> Molecular Formula: Cl<sub>4</sub>Nb Molecular Weight: 234.718 CAS RN: 13569-70-5 Properties: violet-black monocl cryst [CRC10] Solubility: reac H<sub>2</sub>O [CRC10] Density, g/cm<sup>3</sup>: 3.2 [CRC10] Melting Point, °C: decomposes at 800 [CRC10] Boiling Point, °C: sublimes at 275 [CRC10]

#### 2261

Compound: Niobium(IV) oxide Synonym: niobium dioxide Formula: NbO<sub>2</sub> Molecular Formula: NbO<sub>2</sub> Molecular Weight: 124.905 CAS RN: 12034-59-2 Properties: white powd; -200 mesh with 99.9% purity; tetr, a=0.371 nm, c=0.5985 nm; enthalpy of fusion 92.00 kJ/mol; can be prepared by reduction of Nb<sub>2</sub>O<sub>5</sub> with H<sub>2</sub> at 800°C-1300°C [KIR81] [STR93] [CER91] [CRC10] Density, g/cm<sup>3</sup>: 5.9 [STR93] Melting Point, °C: 1902 [CRC10]

## 2262

Compound: Niobium(IV) selenide Formula: NbSe<sub>2</sub> Molecular Formula: NbSe<sub>2</sub> Molecular Weight: 250.826 CAS RN: 12034-77-4 Properties: gray black solid; has a higher electrical

conductivity than graphite; used as a lubricant and conductor at high temperatures and in high vacuum, and as a 99.8% pure material, used as a sputtering target to produce electrically conductive lubricant film [HAW93] [CER91]

**Density, g/cm<sup>3</sup>:** 6.3 [LID94] **Melting Point, °C:** >1316 [HAW93]

#### 2263

Compound: Niobium(IV) sulfide Formula: NbS<sub>2</sub> Molecular Formula: NbS<sub>2</sub> Molecular Weight: 157.038 CAS RN: 12136-97-9 Properties: black powd; formula also given as NbS<sub>1.75</sub>; as a 99.8% pure material, used as sputtering target to produce lubricant film on bearings and other moving parts [STR93] [CER91]

Density, g/cm<sup>3</sup>: 4.4 [LID94]

#### 2264

Compound: Niobium(IV) telluride
Formula: NbTe<sub>2</sub>
Molecular Formula: NbTe<sub>2</sub>
Molecular Weight: 348.106
CAS RN: 12034-83-2
Properties: hex cryst; -325 mesh with 10µm average or less; 99.8% pure material used as a sputtering target for lubricant film [CER91] [LID94]
Density, g/cm<sup>3</sup>: 7.6 [LID94]

#### 2265

Compound: Niobium(V) bromide
Synonym: niobium pentabromide
Formula: NbBr<sub>5</sub>
Molecular Formula: Br<sub>5</sub>Nb
Molecular Weight: 492.426
CAS RN: 13478-45-0
Properties: yellow powd; ortho-rhomb, a=0.6127 nm, b=1.2198 nm, c=1.855 nm; sensitive to moisture; can be formed by reacting Br<sub>2</sub> and niobium at ~500°C [STR93] [KIR81]
Solubility: s H<sub>2</sub>O, alcohol, ethyl bromide [KIR81]
Density, g/cm<sup>3</sup>: 4.36 [KIR81]
Melting Point, °C: 150 [STR93]; 254 [KIR81]
Boiling Point, °C: 361.6 [STR93]

#### 2266

**Compound:** Niobium(V) chloride

Synonym: niobium pentachloride

- Formula: NbCl<sub>5</sub>
- Molecular Formula: Cl<sub>5</sub>Nb
- Molecular Weight: 270.170
- CAS RN: 10026-12-7
- Properties: yellow, very deliq; monocl, a=0.1830 nm, b=1.798 nm, c=0.5888 nm; melts to a reddish orange liq; decomposes in moist air evolving HCl; enthalpy of vaporization 52.7 kJ/mol; enthalpy of fusion 33.90 kJ/mol; can be obtained by chlorination of Nb metal at 300°C–350°C [MER06] [KIR81] [CRC10]

Solubility: hydrolyzes in H<sub>2</sub>O; s HCl, CCl<sub>4</sub> [MER06] [KIR81]
Density, g/cm<sup>3</sup>: 2.75 [MER06]
Melting Point, °C: 204.7 [CRC10]
Boiling Point, °C: 254.05 [CRC10]
Reactions: starts to sublime at 125°C [MER06]

#### 2267

**Compound:** Niobium(V) ethoxide **Formula:** Nb(OC<sub>2</sub>H<sub>5</sub>)<sub>5</sub> **Molecular Formula:**  $C_{10}H_{25}NbO_5$  **Molecular Weight:** 318.212 **CAS RN:** 3236-82-6 **Properties:** liq; flammable; moisture sensitive [ALD94] **Solubility:** decomposed by H<sub>2</sub>O [ALF95] **Density, g/cm<sup>3</sup>:** 1.258 [ALD94] **Melting Point, °C:** 6 [ALD94] **Boiling Point, °C:** 140–142 (0.1 mm Hg) [ALD94]

## 2268

Compound: Niobium(V) fluoride Synonym: niobium pentafluoride Formula: NbF5 **Molecular Formula:** F<sub>5</sub>Nb Molecular Weight: 187.898 CAS RN: 7783-68-8 Properties: strongly refractive, deliq, colorless monocl cryst; very hygr; lattice parameters a = 0.963 nm, b = 1.443 nm, c = 0.512 nm; enthalpy of vaporization 52.3 kJ/mol; enthalpy of fusion 36.00 kJ/mol; obtained from Nb and F2 or anhydrous HF at 250°C-300°C [KIR81] [MER06] [CRC10] **Solubility:** hydrolyzes in H<sub>2</sub>O; sl s CS<sub>2</sub>, CHCl<sub>3</sub> [MER06] Density, g/cm<sup>3</sup>: 2.6955 [MER06]; 3.92 [STR93] Melting Point, °C: 80 [MER06] Boiling Point, °C: 229 [CRC10]

#### 2269

Compound: Niobium(V) fluorodioxide Synonym: niobium dioxide fluoride Formula: NbO<sub>2</sub>F Molecular Formula: FNbO<sub>2</sub> Molecular Weight: 143.903 CAS RN: 15195-33-2 Properties: cub, a = 0.3902 nm; can be prepared by dissolution of Nb<sub>2</sub>O<sub>5</sub> in 48% HF, followed by evaporation to dryness and heating to 250°C [KIR81] Density, g/cm<sup>3</sup>: 4.0 [LID94]

2270 Compound: Niobium(V) iodide Synonym: niobium pentiodide Formula: NbI₅
Molecular Formula: I₅Nb
Molecular Weight: 727.428
CAS RN: 13779-92-5
Properties: black powd; monocl, a = 1.058 nm, b = 0.658 nm, c = 1.388 nm; sensitive to moisture; obtained by reaction of excess I₂ with Nb metal in a sealed tube [STR93] [KIR81]
Density, g/cm<sup>3</sup>: 5.32 [LID94]
Melting Point, °C: decomposes at ~200 [KIR81]
Reactions: decomposes to NbI₄, 13870-21-8, at 206°C-270°C in vacuum [KIR81]

# 2271

**Compound:** Niobium(V) oxide Synonym: niobium pentoxide Formula: Nb<sub>2</sub>O<sub>5</sub> Molecular Formula: Nb<sub>2</sub>O<sub>5</sub> Molecular Weight: 265.810 CAS RN: 1313-96-8 Properties: white, ortho-rhomb cryst; becomes yellow when heated;  $\alpha$  form is monocl, a=2.116 nm, b=0.3822 nm, c=1.935 nm; enthalpy of fusion 104.3 kJ/mol; used as an evaporated material and sputtering target with 99.95% and 99.5% purity to prepare dielectric coatings and multilayers [KIR81] [MER06] [CER91] [CRC10] Solubility: i H<sub>2</sub>O; s HF, hot H<sub>2</sub>SO<sub>4</sub> [MER06] Density, g/cm<sup>3</sup>: 4.47 [ALD94] Melting Point, °C: 1520 [MER06]

#### 2272

Compound: Niobium(V) oxybromide
Formula: NbOBr<sub>3</sub>
Molecular Formula: Br<sub>3</sub>NbO
Molecular Weight: 348.617
CAS RN: 14459-75-7
Properties: yellowish brown solid; hydrolyzes readily in moist air, prepared by reacting Br<sub>2</sub> with a mixture of Nb<sub>2</sub>O<sub>5</sub> and carbon at 550°C [KIR81]
Melting Point, °C: sublimes in vacuum at 180 [KIR81]
Boiling Point, °C: decomposes at ~320 [KIR81]
Reactions: decomposes in vacuum to NbBr<sub>5</sub> and Nb<sub>2</sub>O<sub>5</sub> [KIR81]

#### 2273

Compound: Niobium(V) oxychloride Formula: NbOCl<sub>3</sub> Molecular Formula: Cl<sub>3</sub>NbO Molecular Weight: 215.263 CAS RN: 13597-20-1 Properties: white solid; tetr, a = 1.087 nm, c=0.396 nm; can be prepared by air oxidation of NbCl<sub>5</sub> [KIR81]
Density, g/cm<sup>3</sup>: 3.72 [KIR81]
Melting Point, °C: sublimes in vacuum at ~200 [KIR81]

# 2274

Compound: Niobocene dichloride Synonym: bis(cyclopentadienyl)niobium Formula:  $(C_5H_5)_2NbCl_2$ Molecular Formula:  $C_{10}H_{10}Cl_2Nb$ Molecular Weight: 294.00 CAS RN: 12793-14-5 Properties: sensitive to moisture; uses: synthesis of transition metal complexes and organometallic compounds [ALD93]

#### 2275

**Compound:** Nitric acid **Synonym:** aqua fortis **Formula:** HNO<sub>3</sub> **Molecular Formula:** HNO<sub>3</sub> **Molecular Weight:** 63.013 **CAS RN:** 7697-37-2

Properties: transparent, colorless or yellowish liq; fuming; hygr; corrosive; attacks almost all metals; yellowish color is due to formation of nitrogen dioxide when exposed to light; strong oxidizing agent; viscosity (25°C) is 0.761 cp; vapor pressure (25°C) is 62 mm Hg; specific conductance 3.77 × 10<sup>-2</sup> (ohm · cm)<sup>-1</sup> at 25°C; enthalpy of vaporization 39.1 kJ/ mol at 25°C; enthalpy of fusion 10.50 kJ/ mol; [CRC10] [HAW93] [COT88]
Solubility: miscible with H₂O; decomposed by alcohol [HAW93]
Density, g/cm<sup>3</sup>: 1.504 [HAW93]
Melting Point, °C: −41.6 [CRC10]
Boiling Point, °C: decomposes at 78 [HAW93]

#### 2276

Compound: Nitric oxide Synonym: nitrogen monoxide Formula: NO Molecular Formula: NO Molecular Weight: 30.006 CAS RN: 10102-43-9

**Properties:** colorless gas; reacts readily with oxygen at room temp to form NO<sub>2</sub>; enthalpy of vaporization 13.83 kJ/mol; enthalpy of fusion 2.30 kJ/mol [CRC10] [HAW93] **Solubility:** sl s H<sub>2</sub>O [HAW93] **Density, g/cm<sup>3</sup>:** 1.317 g/L [LID94] **Melting Point, °C:** –163.6 [COT88] **Boiling Point, °C:** –151.8 [COT88]

#### 2277

Compound: Nitrogen Formula: N<sub>2</sub> **Molecular Formula:** N<sub>2</sub> Molecular Weight: 28.013 (atomic weight 14.00674) CAS RN: 7727-37-9 Properties: colorless, tasteless, odorless gas; chemically unreactive; specific volume (21.1°C, 1 atm) 0.86 m<sup>3</sup>/ kg; critical temp -147.1°C; critical pressure 33.5 atm; critical density 0.311 g/cm<sup>3</sup>; enthalpy of vaporization 5.57 kJ/mol; enthalpy of fusion 0.71 kJ/ mol [CRC10] [AIR87] [HAW93] [MER06] Solubility: sl s H<sub>2</sub>O; i alcohol [HAW93] Density, g/cm<sup>3</sup>: gas: 1.25046 g/L [MER06] Melting Point, °C: –210.01 [MER06] Boiling Point, °C: –195.79 [MER06] Thermal Conductivity,  $W/(m \cdot K)$ : 0.02583 (25°C) [ALD94]

# 2278

Compound: Nitrogen dioxide Formula: NO<sub>2</sub> Molecular Formula: NO<sub>2</sub> Molecular Weight: 46.006 CAS RN: 10102-44-0 Properties: reddish brown gas; brown liq below 21.15°C; colorless solid at about -11°C; used in the production of nitric acid, as an oxidizing agent [HAW93] [MER06] Solubility: decomposes in H<sub>2</sub>O to HNO<sub>3</sub> and releases NO; s conc H<sub>2</sub>SO<sub>4</sub>, HNO<sub>3</sub> [MER06] Density, g/cm<sup>3</sup>: gas: 2.0198 g/L [LID94); liq: 1.448 [MER06] Melting Point, °C: -9.3 [MER06] Boiling Point, °C: 21.15 [MER06]

## 2279

**Compound:** Nitrogen pentoxide **Formula:** N<sub>2</sub>O<sub>5</sub> **Molecular Formula:** N<sub>2</sub>O<sub>5</sub> **Molecular Weight:** 108.010 **CAS RN:** 10102-03-1 **Properties:** col hex cryst [CRC10] **Solubility:** s chl **Density, g/cm<sup>3</sup>:** 2.0 [CRC10] **Boiling Point, °C:** 33 [CRC10]

Compound: Nitrogen selenide
Synonym: selenium nitride
Formula: N<sub>4</sub>Se<sub>4</sub>
Molecular Formula: N<sub>4</sub>Se<sub>4</sub>
Molecular Weight: 371.867
CAS RN: 12033-88-4
Properties: orange red, amorphous powd or monocl cryst; preparation: by reaction of dry NH<sub>3</sub> and SeCl<sub>4</sub>; explosive [MER06]
Solubility: i H<sub>2</sub>O, ether, absolute alcohol; sl s CS<sub>2</sub>, benzene, acetic acid [MER06]
Density, g/cm<sup>3</sup>: 4.2 [MER06]
Melting Point, °C: explodes [LID94]

#### 2281

**Compound:** Nitrogen tetroxide **Formula:**  $N_2O_4$ **Molecular Formula:**  $N_2O_4$ **Molecular Weight:** 92.011 **CAS RN:** 10544-72-6 **Properties:** col liq [CRC10] **Solubility:** reac H<sub>2</sub>O [CRC10] **Density, g/cm<sup>3</sup>:** 1.45<sup>20</sup> [CRC10] **Melting Point, °C:** -9.3 [CRC10] **Boiling Point, °C:** 21.15 [CRC10]

#### 2282

Compound: Nitrogen trichloride
Formula: NCl<sub>3</sub>
Molecular Formula: Cl<sub>3</sub>N
Molecular Weight: 120.365
CAS RN: 10025-85-1
Properties: yellowish, thick, oily, liq; pungent odor; evaporates rapidly in air; very unstable; decomposes in light; explodes when heated to 93°C or when subjected to a flash of direct sunlight [MER06]
Solubility: i H<sub>2</sub>O, decomposes in H<sub>2</sub>O after 24 h; s CS<sub>2</sub>, phosphorus trichloride, benzene, CCl<sub>4</sub>, CHCl<sub>3</sub> [MER06]
Density, g/cm<sup>3</sup>: 1.653 [MER06]
Melting Point, °C: <40 [HAW93]</li>
Boiling Point, °C: <71 [HAW93]</li>

# 2283

**Compound:** Nitrogen trifluoride **Formula:** NF<sub>3</sub> **Molecular Formula:** F<sub>3</sub>N **Molecular Weight:** 71.002 **CAS RN:** 7783-54-2 Properties: colorless gas; oxidizing agent; moldy odor; critical temp -39.25°C; critical pressure 4.53 MPa; critical volume 123.8 cm<sup>3</sup>/mol; enthalpy of vaporization 11.59 kJ/mol; enthalpy of fusion 398 J/mol; chemically inert, does not attack glass, mercury; decomposed by electric sparks; used in electronics industry [MER06] [AIR87]
Solubility: 1.4×10<sup>-5</sup> mol/mol H<sub>2</sub>O at 25°C [KIR78]
Density, g/cm<sup>3</sup>: gas: 3.116 g/L [LID94]; liq, at bp: 1.885 [MER06]
Melting Point, °C: -208.5 [MER06]
Boiling Point, °C: -129 [MER06]

#### 2284

Compound: Nitrogen triiodide Formula: NI<sub>3</sub> Molecular Formula: I<sub>3</sub>N Molecular Weight: 394.720 CAS RN: 13444-85-4 Properties: black cryst; unstable; can explode if touched; more stable if kept wet [HAW93] Reactions: can explode [CRC10]

#### 2285

Compound: Nitrogen trioxide Synonym: dinitrogen trioxide Formula: N<sub>2</sub>O<sub>3</sub> Molecular Formula: N<sub>2</sub>O<sub>3</sub> Molecular Weight: 76.011 CAS RN: 10544-73-7 Properties: blue liq; used as an oxidant in special fuel systems [HAW93] Density, g/cm<sup>3</sup>: 1.447 (2°C) [HAW93] Melting Point, °C: -102 [COT88] Boiling Point, °C: decomposes at 3.5 [COT88]

#### 2286

Compound: Nitrogen(V) oxide Synonym: dinitrogen pentoxide Formula: N<sub>2</sub>O<sub>5</sub> Molecular Formula: N<sub>2</sub>O<sub>5</sub> Molecular Weight: 108.010 CAS RN: 10102-03-1 Properties: colorless, hex cryst [MER06] Solubility: v s chloroform without appreciable decomposition; less s CCl<sub>4</sub> [MER06] Density, g/cm<sup>3</sup>: 2.0 [LID94] Melting Point, °C: 30 [COT88] Boiling Point, °C: decomposes at 47 [COT88] Reactions: sublimes at 32.4°C [MER06]

**Compound:** Nitronium hexafluoroantimonate **Formula:** NO<sub>2</sub>SbF<sub>6</sub> **Molecular Formula:** F<sub>6</sub>NO<sub>2</sub>Sb **Molecular Weight:** 281.756 **CAS RN:** 17856-92-7 **Properties:** white cryst; sensitive to moisture [STR93]

#### 2288

**Compound:** Nitronium hexafluorophosphate **Formula:** NO<sub>2</sub>PF<sub>6</sub> **Molecular Formula:** F<sub>6</sub>NO<sub>2</sub>P **Molecular Weight:** 190.970 **CAS RN:** 19200-21-6 **Properties:** white cryst; sensitive to moisture [STR93]

#### 2289

**Compound:** Nitronium tetrafluoroborate **Formula:** NO<sub>2</sub>BF<sub>4</sub> **Molecular Formula:** BF<sub>4</sub>NO<sub>2</sub> **Molecular Weight:** 132.811 **CAS RN:** 13826-86-3 **Properties:** white cryst; sensitive to moisture [ALD94]

## 2290

Compound: Nitrosyl chloride
Formula: NOCl
Molecular Formula: CINO
Molecular Weight: 65.459
CAS RN: 2696-92-6
Properties: yellowish red liq or yellow gas; forms nitric oxide and chlorine when heated; enthalpy of vaporization 25.78 kJ/mol; used as a catalyst [HAW93] [CRC10]
Solubility: decomposes in H<sub>2</sub>O; s fuming H<sub>2</sub>SO<sub>4</sub> [HAW93]
Density, g/cm<sup>3</sup>: gas: 2.872 g/L [LID94]; liq: 1.273 [HAW93]
Melting Point, °C: -61.5 [HAW93]
Boiling Point, °C: -5.55 [CRC10]

# 2291

Compound: Nitrosyl fluoride Formula: FNO Molecular Formula: FNO Molecular Weight: 49.005 CAS RN: 7789-25-5 Properties: colorless gas, has bluish color if impure; reacts rapidly with glass; used as

an oxidizer in rocket propellants and as a reagent for fluorination [MER06] **Solubility:** reacts with H<sub>2</sub>O to form NO, HNO<sub>3</sub>, and HF [MER06] **Density, g/cm<sup>3</sup>:** gas: 2.150 g/L [LID94]; liq: 1.326; solid: 1.719 [MER06] **Melting Point, °C:** −132.5 [MER06] **Boiling Point, °C:** −59.9 [MER06]

#### 2292

**Compound:** Nitrosylsulfuric acid Synonym: nitrosyl sulfate Formula: HOSO<sub>2</sub>ONO **Molecular Formula:** HNO<sub>5</sub>S Molecular Weight: 127.078 CAS RN: 7782-78-7 Properties: prisms; oxidizing agent; forms an intermediate in the Chamber process for fuming sulfuric acid; obtained by reaction of SO<sub>3</sub>, nitrogen oxides, and H<sub>2</sub>O; uses: preparation of cryst diazonium sulfates, bleaching cereal milling products [MER06] [ALD94] **Solubility:** decomposes in H<sub>2</sub>O; s H<sub>2</sub>SO<sub>4</sub> [MER06] Melting Point, °C: decomposes at 73.5 [MER06] Reactions: decomposes in moist air to form H<sub>2</sub>SO<sub>4</sub> and HNO<sub>3</sub> [MER06]

## 2293

Compound: Nitrous acid Formula: HNO<sub>2</sub> Molecular Formula: HNO<sub>2</sub> Molecular Weight: 47.014 CAS RN: 7782-77-6 Properties: weak acid; stable only in solution; light blue [HAW93]

## 2294

Compound: Nitrous oxide Formula: N<sub>2</sub>O Molecular Formula: N<sub>2</sub>O Molecular Weight: 44.012 CAS RN: 10024-97-2 Properties: colorless gas; sweet taste; critical temp 36.5°C; critical pressure 7.26 MPa; enthalpy of vaporization 16.53 kJ/mol; enthalpy of fusion 6.54 kJ/mol; used in dentistry and medicine as an anesthetic and in electronics industry [CRC10] [AIR87] [HAW93] Solubility: sl s H<sub>2</sub>O; s alcohol, ether, conc H<sub>2</sub>SO<sub>4</sub> [HAW93] Density, g/cm<sup>3</sup>: gas: 1.931 g/L [LID94]; liq: 1.22 (-89°C) [HAW93] Melting Point, °C: -90.8 [HAW93] Boiling Point, °C: -88.5 [COT88]

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## 2295

Compound: Nitryl chloride
Formula: NO<sub>2</sub>Cl
Molecular Formula: ClNO<sub>2</sub>
Molecular Weight: 81.459
CAS RN: 13444-90-1
Properties: colorless gas; odor of chlorine; yellow tinge to its solutions; enthalpy of vaporization 25.7 kJ/mol [CRC10] [HAW93]
Density, g/cm<sup>3</sup>: gas: 3.574 g/L [LID94]; liq: 1.33 [HAW93]
Melting Point, °C: -145 [HAW93]
Boiling Point, °C: -14.3 [MER06]

# 2296

Compound: Nitryl fluoride Formula: NO<sub>2</sub>F Molecular Formula: FNO<sub>2</sub> Molecular Weight: 65.004 CAS RN: 10022-50-1 Properties: colorless gas; strong oxidizing agent; enthalpy of vaporization 18.05 kJ/ mol; used in rocket propellants and as a fluorinating agent [HAW93] [CRC10] Solubility: hydrolyzes with HNO<sub>3</sub> and HF as products [HAW93] Density, g/cm<sup>3</sup>: gas: 2.852 g/L [LID94]; liq: 1.80 [HAW93] Melting Point, °C: -165 [HAW93] Boiling Point, °C: -72.4 [MER06]

# 2297

Compound: Nobelium Formula: No Molecular Formula: No Molecular Weight: 259 CAS RN: 10028-14-5 Properties: synthetic radioactive element; one of the actinides; has nine very shortlived isotopes; discovered in 1958 by Ghiorso and colleagues [HAW93] Melting Point, °C: 827 [LID94]

# 2298

**Compound:** Octadecaborane(22) **Formula:**  $B_{18}H_{22}$  **Molecular Formula:**  $B_{18}H_{22}$  **Molecular Weight:** 216.733 **CAS RN:** 11071-61-7 **Properties:** yellow cryst [CRC10] **Solubility:** org solvents [CRC10] **Melting Point, °C:** 180 [CRC10]

# 2299

## 2300

Compound: Osmium Formula: Os Molecular Formula: Os Molecular Weight: 190.230 CAS RN: 7440-04-2 Properties: bluish white, lustrous metal; has ten oxidation states, -2 to +8, with higher oxidation states being the most stable; closed-packed hex, a=0.27341 nm; stable in cold air; hardness

is 7.0 Mohs; electrical resistivity, μohm · cm: 8.12 (0°C), 9.66 (20°C); vapor pressure at mp 1.8 Pa; Young's modulus 558.6 GPa; enthalpy of fusion 57.85 kJ/mol; enthalpy of vaporization 738 kJ/mol [KIR82] [MER06] [ALD94]
Solubility: attacked by aqua regia; barely affected by HCl, H<sub>2</sub>SO<sub>4</sub> [MER06]
Density, g/cm<sup>3</sup>: 22.61 [MER06]

Melting Point, °C: 3045 [ALD94]

Boiling Point, °C: 5027 [ALD94]

Thermal Conductivity, W/(m·K): 87.6 (25°C) [CRC10]

Thermal Expansion Coefficient: at

20°C is 6.1×10<sup>-6</sup>/°C [KIR82]

## 2301

**Compound:** Osmium bis(cyclopentadienyl) **Synonym:** bis(cyclopentadienyl)osmium **Formula:** (C<sub>5</sub>H<sub>5</sub>)<sub>2</sub>Os **Molecular Formula:** C<sub>10</sub>H<sub>10</sub>Os **Molecular Weight:** 320.419 **CAS RN:** 1273-81-0 **Properties:** cryst [ALF95] **Melting Point,** °C: 226–228 [ALF95]

#### 2302

**Compound:** Osmium carbonyl **Synonym:** triosmium dodecacarbonyl **Formula:**  $Os_3(CO)_{12}$  **Molecular Formula:**  $C_{12}O_{12}OS_3$  **Molecular Weight:** 906.815 **CAS RN:** 15696-40-9 **Properties:** yellow cryst; stable in air [DOU83] [STR93] Density, g/cm<sup>3</sup>: 3.48 [STR93] Melting Point, °C: 224 [ALD94]

#### 2303

Compound: Osmium(II) chloride Synonym: osmium dichloride Formula: OsCl<sub>2</sub> Molecular Formula: Cl<sub>2</sub>Os Molecular Weight: 261.135 CAS RN: 13444-92-3 Properties: dark green needles; hygr; unstable with respect to atm oxygen [HAW93] Solubility: i H<sub>2</sub>O; s alcohol, ether [HAW93]

# 2304

Compound: Osmium(III) chloride Synonym: osmium trichloride Formula: OsCl<sub>3</sub> Molecular Formula: Cl<sub>3</sub>Os Molecular Weight: 296.588 CAS RN: 13444-93-4 Properties: dark gray cub solid [KIR82] Solubility: i H<sub>2</sub>O; s HNO<sub>3</sub> [KIR82] Melting Point, °C: decomposes at >450 [KIR82]

#### 2305

Compound: Osmium(III) chloride hydrate Formula: OsCl<sub>3</sub>·xH<sub>2</sub>O Molecular Formula: Cl<sub>3</sub>Os (anhydrous) Molecular Weight: 296.588 (anhydrous) CAS RN: 14996-60-2 Properties: black cryst [STR93] Melting Point, °C: decomposes at >500 [STR93]

# 2306

Compound: Osmium(IV) chloride Synonym: osmium tetrachloride Formula: OsCl<sub>4</sub> Molecular Formula: Cl<sub>4</sub>Os Molecular Weight: 332.041 CAS RN: 10026-01-4 Properties: red cryst [MER06] Solubility: s H<sub>2</sub>O resulting in a yellow solution, hydrolysis occurs after standing [MER06] Density, g/cm<sup>3</sup>: 4.38 [MER06] Reactions: sublimes at 450°C [MER06]

# 2307

**Compound:** Osmium(IV) oxide **Synonym:** osmium dioxide

Formula: OsO2
Molecular Formula: O2Os
Molecular Weight: 222.229
CAS RN: 12036-02-1
Properties: dark bluish black powd, with rutile cryst form [KIR82] [ALD94]
Solubility: i H2O, acids [KIR82]
Density, g/cm<sup>3</sup>: 11.4 [KIR82]

# 2308

Compound: Osmium(VI) fluoride
Synonym: osmium hexafluoride
Formula: OsF<sub>6</sub>
Molecular Formula: F<sub>6</sub>Os
Molecular Weight: 304.220
CAS RN: 13768-38-2
Properties: pale yellow, volatile solid; hydrolyzed when exposed to moisture [MER06]
Density, g/cm<sup>3</sup>: 4.1 [LID94]
Melting Point, °C: 32.1 [MER06]
Boiling Point, °C: 45.9 [MER06]

## 2309

Compound: Osmium(VIII) oxide Synonym: osmium tetroxide Formula: OsO4 Molecular Formula: O<sub>4</sub>Os Molecular Weight: 254.228 CAS RN: 20816-12-0 Properties: pale yellow solid; monocl cryst; acrid, chlorine-like odor; volatile; vapor pressure 11 mm Hg (27°C); critical temp 405°C; enthalpy of fusion 9.80 kJ/mol; obtained by heating finely divided Os in air or  $O_2$ ; used as an oxidation agent and catalyst [MER06] [CRC10] **Solubility:** g/100 g H<sub>2</sub>O: 5.26 (0°C), 5.75 (10°C), 6.43 (20°C) [LAN05]; 375 g/100 CCl<sub>4</sub>; s benzene [MER06] Density, g/cm<sup>3</sup>: 5.10 [MER06] Melting Point, °C: 40.6 [MER06] Boiling Point, °C: 130.0 [MER06] Reactions: begins to sublime and distill below the boiling point [MER06]

# 2310

**Compound:** Oxalic acid **Synonym:** ethanedioic acid **Formula:** (COOH)<sub>2</sub> **Molecular Formula:** C<sub>2</sub>H<sub>2</sub>O<sub>4</sub> **Molecular Weight:** 90.035 **CAS RN:** 144-62-7

Properties: colorless, odorless, hygr solid; has two forms: rhomb  $\alpha$  and monocl  $\beta$ ;  $\alpha$  prepared from sublimation of the dihydrate,  $\beta$  prepared by crystallization from acetic acid; rhomb is thermodynamically stable form at room temp; enthalpy of sublimation 90.58 kJ/mol; enthalpy of solution in water -9.58 kJ/mol; enthalpy of combustion -245.61 kJ/ mol; enthalpy of decomposition 826.78 kJ/ mol; vapor pressure (P), kPa, (57°C–107°C)  $\log P = -(4726.95/T) + 11.3478$  [KIR81] **Solubility:** g/100 g H<sub>2</sub>O: 3.54 (0°C), 9.52 (20°C), 120 (90°C) [LAN05]; g/100 g: 23.7 in ethanol (15.6°C), 1.5 in ethyl ether (25°C) [KIR81] **Density, g/cm<sup>3</sup>:** α: 1.900; β: 1.896 [KIR81] **Melting Point**, °**C**: α: 189.5; β: 182 [KIR81] **Reactions:** sublimes starting at 100°C, rapidly by 125°C [KIR81] Thermal Conductivity, W/(m·K): 0.9 at 0°C [KIR81]

2311

Compound: Oxalic acid dihydrate Formula: HOOCCOOH · 2H<sub>2</sub>O Molecular Formula: C<sub>2</sub>H<sub>6</sub>O<sub>6</sub> Molecular Weight: 126.066 CAS RN: 6153-56-6 Properties: transparent, colorless cryst; enthalpy of solution in water –35.5 kJ/ mol; crystallizes from water; used to clean automobile radiators [HAW93] [KIR81] Solubility: s H<sub>2</sub>O, ether [KIR81] Density, g/cm<sup>3</sup>: 1.653 [KIR81] Melting Point, °C: 101.5 [HAW93] Reactions: minus 2H<sub>2</sub>O at 98°C–100°C [KIR81]

# 2312

**Compound:** Oxalyl chloride **Formula:** ClCOCOCl **Molecular Formula:** C<sub>2</sub>Cl<sub>2</sub>O<sub>2</sub> **Molecular Weight:** 126.926 **CAS RN:** 79-37-8 **Properties:** liq [ALF95] **Density, g/cm<sup>3</sup>:** 1.455 [ALF95] **Boiling Point, °C:** 63–64 [ALF95]

## 2313

**Compound:** Oxygen **Formula:** O<sub>2</sub> **Molecular Formula:** O<sub>2</sub> **Molecular Weight:** 31.999 (atomic weight: 15.9994) **CAS RN:** 7782-44-7 Properties: colorless, odorless, tasteless gas; diatomic; can be liquefied at -183°C to sl bluish liq; solidifies at -218°C; critical temp -118.95°C; critical pressure 50.14 atm; enthalpy of vaporization 6.820 kJ/mol; enthalpy of fusion 0.44 kJ/mol; specific volume (21.1°C, 101.3 kPa) 0.75 m<sup>3</sup>/kg [HAW93] [MER06] [AIR87] [CRC10] [ALD94] Solubility: one vol gas dissolves in 32 volumes H<sub>2</sub>O (20°C), in 7 volumes alcohol (20°C); s other organic liq, usually higher solubility than in H<sub>2</sub>O [MER06] **Density, g/cm<sup>3</sup>:** gas: 1.404 g/L [LID94]; liq: 1.14 g/mL [MER06] Melting Point, °C: -218.79 [CRC10] Boiling Point, °C: -182.96 [CRC10] Thermal Conductivity, W/(m·K): 0.02658 (25°C) [ALD94]

#### 2314

Compound: Ozone Synonym: triatomic oxygen Formula: O<sub>3</sub> **Molecular Formula:** O<sub>3</sub> Molecular Weight: 47.998 CAS RN: 10028-15-6 Properties: blue gas; unstable; pungent odor; oxidizing agent; can be liquefied at  $-12.1^{\circ}$ C; solid is black violet; prepared by silent electric discharge in oxygen; used in drinking water purification, in industrial waste treatment [MER06] [COT88] [DOU83] Density, g/cm<sup>3</sup>: gas: 2.144; liq: 1.614 [MER06] Melting Point, °C: –193 [MER06] Boiling Point, °C: –111.9 [MER06] Reactions: reacts with most compounds at 25°C [COT88]

## 2315

Compound: Palladium Formula: Pd Molecular Formula: Pd Molecular Weight: 106.42 CAS RN: 7440-05-3 **Properties:** silvery white metal; fcc, a=0.389 nm; also occurs as black powd, spongy compressible mass; hardness, 4.8 Mohs; electrical resistivity  $10.0\mu$ ohm · cm; Poisson's ratio 0.39; appreciably volatile at high temperatures; absorbs up to 800 times its own volume of  $H_2(g)$ ; enthalpy of fusion 16.74 kJ/mol; enthalpy of vaporization 362 kJ/mol [HAW93] [MER06] [KIR82] [CRC10] [ALD94] Solubility: s aqua regia, fused alkalies [HAW93] Density, g/cm<sup>3</sup>: 12.02 [MER06] Melting Point, °C: 1555 [MER06] Boiling Point, °C: 3167 [MER06]

Reactions: forms dihalides at red heat with fluorine, chlorine [MER06]
Thermal Conductivity, W/(m⋅K): 75.3 (25°C) [KIR82]
Thermal Expansion Coefficient: 11.1×10<sup>-6</sup>/°C [KIR82]

# 2316

Compound: Palladium(II) acetate Synonym: palladous acetate Formula: Pd(CH<sub>3</sub>COO)<sub>2</sub> Molecular Formula: C<sub>4</sub>H<sub>6</sub>O<sub>4</sub>Pd Molecular Weight: 224.510 CAS RN: 3375-31-3 Properties: orange brown cryst; there is a trimer [Pd(CH<sub>3</sub>COO)<sub>2</sub>]<sub>3</sub> [MER06] [AES93] Solubility: i H<sub>2</sub>O; s with decomposition, HCl; s CHCl<sub>3</sub>, methylene dichloride, acetone, acetonitrile, diethyl ether [MER06] Melting Point, °C: decomposes at 205 [KIR82]

## 2317

**Compound:** Palladium(II) acetylacetonate **Synonyms:** 2,4-pentanedione, palladium(II) derivative **Formula:** Pd(CH<sub>3</sub>C(O)CH=COCH<sub>3</sub>)<sub>2</sub> **Molecular Formula:**  $C_{10}H_{14}O_4Pd$  **Molecular Weight:** 304.639 **CAS RN:** 14024-61-4 **Properties:** yellow cryst [STR93] **Melting Point, °C:** decomposes at 205 [STR93]

# 2318

Compound: Palladium(II) bromide Formula: PdBr<sub>2</sub> Molecular Formula: Br<sub>2</sub>Pd Molecular Weight: 266.228 CAS RN: 13444-94-5 Properties: black cryst; hygr [STR93] Density, g/cm<sup>3</sup>: 5.173 [STR93] Melting Point, °C: decomposes [AES93]

## 2319

Compound: Palladium(II) chloride Synonym: palladous chloride Formula: PdCl<sub>2</sub> Molecular Formula: Cl<sub>2</sub>Pd Molecular Weight: 177.325 CAS RN: 7647-10-1 Properties: dark brown powd or cryst; red rhomb; hygr; used in the electroless deposition process [KIR82] [HAW93] [STR93] [MER06] Solubility: s H<sub>2</sub>O, HCl, alcohol, and acetone [HAW93] Density, g/cm<sup>3</sup>: 4.0 [STR93] Melting Point, °C: decomposes at 675 [HAW93]

#### 2320

Compound: Palladium(II) chloride dihydrate
Formula: PdCl<sub>2</sub>·2H<sub>2</sub>O
Molecular Formula: Cl<sub>2</sub>H<sub>4</sub>O<sub>2</sub>Pd
Molecular Weight: 213.356
CAS RN: 7647-10-1
Properties: dark brown cryst; reduced by H<sub>2</sub> or CO in solution to the metal [MER06]
Solubility: s H<sub>2</sub>O, alcohol, acetone [MER06]

## 2321

**Compound:** Palladium(II) cyanide **Formula:** Pd(CN)<sub>2</sub> **Molecular Formula:** C<sub>2</sub>N<sub>2</sub>Pd **Molecular Weight:** 158.455 **CAS RN:** 2035-66-7 **Properties:** yellow powd [STR93] **Melting Point, °C:** decomposes [AES93]

## 2322

Compound: Palladium(II) fluoride Formula: PdF<sub>2</sub> Molecular Formula: F<sub>2</sub>Pd Molecular Weight: 144.417 CAS RN: 13444-96-7 Properties: violet hygr cryst; paramagnetic [LID94] [KIR82] Solubility: reacts with H<sub>2</sub>O [LID94] Density, g/cm<sup>3</sup>: 5.76 [LID94] Melting Point, °C: 952 [LID94]

#### 2323

Compound: Palladium(II) hexafluoroacetylacetonate Synonyms: 1,1,1,5,5,5-hexafluoro-2,4pentanedione Pd(II) derivative Formula: Pd(CF<sub>3</sub>COCHCOCF<sub>3</sub>)<sub>2</sub> Molecular Formula: C<sub>10</sub>H<sub>2</sub>F<sub>12</sub>O<sub>4</sub>Pd Molecular Weight: 520.524 CAS RN: 64916-48-9 Properties: cryst [ALF95] [ALD94]

2324 Compound: Palladium(II) iodide Formula: PdI<sub>2</sub> Molecular Formula: I<sub>2</sub>Pd
Molecular Weight: 360.229 CAS RN: 7790-38-7 Properties: black powd [HAW93] Solubility: s KI soln; i H<sub>2</sub>O, alcohol, ether [HAW93] Density, g/cm<sup>3</sup>: 6.003 [HAW93] Melting Point, °C: decomposes at 350 [HAW93]

## 2325

Compound: Palladium(II) nitrate
Synonym: palladous nitrate
Formula: Pd(NO<sub>3</sub>)<sub>2</sub>
Molecular Formula: N<sub>2</sub>O<sub>6</sub>Pd
Molecular Weight: 230.429
CAS RN: 10102-05-3
Properties: brown deliq cryst; heating causes decomposition; used as a catalyst [MER06] [HAW93]
Solubility: s H<sub>2</sub>O giving a turbid solution, may form precipitate; s dil HNO<sub>3</sub> [MER06]
Density, g/cm<sup>3</sup>: 1.118 [ALD94]

2326

**Compound:** Palladium(II) oxalate **Formula:**  $Pd(C_2O_4)_2$  **Molecular Formula:**  $C_4O_8Pd$  **Molecular Weight:** 194.42 **CAS RN:** 57592-57-1 **Properties:** powd [ALF95]

### 2327

Compound: Palladium(II) oxide Synonym: palladium monoxide Formula: PdO Molecular Formula: OPd Molecular Weight: 122.419 CAS RN: 1314-08-5 Properties: -20 mesh with 99.95% purity; black green or amber solid [HAW93] [CER91] Solubility: i H<sub>2</sub>O, acids; sl s aqua regia, 48% HBr [MER06] Density, g/cm<sup>3</sup>: 8.70 [STR93] Melting Point, °C: 870 [ALD94]

# 2328

**Compound:** Palladium(II) sulfate dihydrate **Formula:**  $PdSO_4 \cdot 2H_2O$  **Molecular Formula:**  $H_4O_6PdS$  **Molecular Weight:** 238.514 **CAS RN:** 13566-03-5 **Properties:** brown cryst [STR93]

#### 2329

Compound: Palladium(II) sulfide Formula: PdS Molecular Formula: PdS Molecular Weight: 138.486 CAS RN: 12125-22-3 Properties: gray, tetr cryst [LID94] Density, g/cm<sup>3</sup>: 6.60 [ALD94] Melting Point, °C: 950 [LAN05]

### 2330

Compound: Palladium(II) tetraammine chloride monohydrate Formula: Pd(NH<sub>3</sub>)<sub>4</sub>Cl<sub>2</sub>·H<sub>2</sub>O Molecular Formula: Cl<sub>2</sub>H<sub>14</sub>N<sub>4</sub>OPd Molecular Weight: 263.463 CAS RN: 13933-31-8 Properties: hygr [ALD94]

### 2331

Compound: Palladium(III) fluoride Formula: PdF<sub>3</sub> Molecular Formula: F<sub>3</sub>Pd Molecular Weight: 163.415 CAS RN: 12021-58-8 Properties: consists of Pd(II) and Pd(IV) with the formula Pd(II)[PdIV)]F<sub>6</sub> [KIR82]

#### 2332

Compound: Pentaborane(11) Synonym: dihydropentaborane(9) Formula:  $B_5H_{11}$ Molecular Formula:  $B_5H_{11}$ Molecular Weight: 65.142 CAS RN: 18433-84-6 Properties: unstable liq; prepared from diborane; decomposes when heated or when allowed to stand for long periods of time, producing various products including diborane, tetraborane, hydrogen; spontaneously flammable in air; enthalpy of vaporization 31.8 kJ/mol [MER06] [CRC10] Solubility: hydrolyzes in H<sub>2</sub>O [MER06] Melting Point, °C: -122 [COT88] Boiling Point, °C: 63 [MER06]

#### 2333

**Compound:** Pentaborane(9) **Synonym:** pentaboron nonahydride **Formula:** B<sub>5</sub>H<sub>9</sub> **Molecular Formula:** B<sub>5</sub>H<sub>9</sub> Molecular Weight: 63.126
CAS RN: 19624-22-7
Properties: liq; vapor pressure (0°C) 66 mm Hg; spontaneously flammable in air; can be prepared from diborane; forms diammine by reaction with NH<sub>3</sub> [MER06]
Solubility: hydrolyzed if heated [COT88]
Density, g/cm<sup>3</sup>: 0.61 [MER06]
Melting Point, °C: -46.6 [KIR78]
Boiling Point, °C: 60 [COT88]
Reactions: decomposes slowly at 150°C [MER06]

### 2334

**Compound:** Pentagermane **Formula:**  $Ge_5H_{12}$  **Molecular Formula:**  $Ge_5H_{12}$  **Molecular Weight:** 375.30 **CAS RN:** 15587-39-0 **Properties:** col liq [CRC10] **Solubility:** i H<sub>2</sub>O [CRC10] **Boiling Point, °C:** 234 [CRC10]

### 2335

Compound: Pentamethylcyclopentadienyltantalum tetrachloride
Formula: [C<sub>5</sub>(CH<sub>3</sub>)<sub>5</sub>]TaCl<sub>4</sub>
Molecular Formula: C<sub>10</sub>H<sub>15</sub>Cl<sub>4</sub>Ta
Molecular Weight: 457.988
CAS RN: 71414-47-6
Properties: orange powd; sensitive to atm moisture and oxygen [STR93]
Melting Point, °C: 220 [STR93]

#### 2336

Compound: Pentamminechlorocobalt(III) chloride Formula:  $[Co(NH_3)_5Cl]Cl_2$ Molecular Formula:  $Cl_3CoH_{15}N_5$ Molecular Weight: 250.444 CAS RN: 13859-51-3 Properties: brick red cryst [KIR79] [ALD94] Solubility: 24.87 g/100 mL cold H<sub>2</sub>O; sl s HCl; i alcohol [KIR79]

## 2337

**Compound:** Perbromyl fluoride **Formula:** BrO<sub>3</sub>F **Molecular Formula:** BrFO<sub>3</sub> **Molecular Weight:** 146.900 **CAS RN:** 37265-91-1 Properties: col gas [CRC10] Solubility: reac H<sub>2</sub>O [CRC10] Melting Point, °C: -110 [CRC10] Boiling Point, °C: decomposes at 20 [CRC10]

# 2338

**Compound:** Perchloric acid Formula: HClO<sub>4</sub> Molecular Formula: ClHO<sub>4</sub> Molecular Weight: 100.459 CAS RN: 7601-90-3 Properties: colorless, fuming liq; hygr; conc acid is unstable, e.g., sensitive to shock; commercial aq acid contains 65%–70% HClO<sub>4</sub>; some hydrates are:  $HClO_4 \cdot H_2O$ , 60477-26-1, a colorless oily liq, mp 50°C, bp decomposes;  $HClO_4 \cdot 2H_2O_5$ , 13445-00-6, colorless, mp -17.5°C, bp 203°C; HClO<sub>4</sub>  $\cdot$  3H<sub>2</sub>O, 35468-32-7, two forms:  $\alpha$ , mp -37°C, β, mp -43.2°C [HAW93] [KIR79] Solubility: s H<sub>2</sub>O with evolution of heat [HAW93] Density, g/cm<sup>3</sup>: 1.77 [KIR79] Melting Point, °C: –112 [HAW93] Boiling Point, °C: 110 (extrapolated) [KIR79]

### 2339

Compound: Perchloryl fluoride Formula: ClO<sub>3</sub>F Molecular Formula: ClFO<sub>3</sub> Molecular Weight: 102.45 CAS RN: 7616-94-6 Properties: col gas [CRC10] Density, g/L: 4.187 [CRC10] Melting Point, °C: -147 [CRC10] Boiling Point, °C: decomposes at -46.75 [CRC10]

### 2340

Compound: Performic acid Formula: HCOOOH Molecular Formula: CH<sub>2</sub>O<sub>3</sub> Molecular Weight: 62.024 CAS RN: 107-32-4 Properties: colorless liq; solutions are unstable; used in epoxidation and hydroxylation reactions [HAW93] Solubility: miscible with H<sub>2</sub>O, alcohol, ether; s benzene, chloroform [HAW93]

**2341 Compound:** Periodic acid **Formula:**  $HIO_4 \cdot 2H_2O$ 

# Molecular Formula: $H_5IO_6$ Molecular Weight: 227.940 CAS RN: 10450-60-9 Properties: white cryst; oxidizing agent; preparation:

oxidation of an iodate by Cl<sub>2</sub> in basic solution; uses: quantitative measurement of α,β-dihydroxyorganic compounds, to increase the wet strength of paper [HAW93] [DOU83]
Solubility: s H<sub>2</sub>O, alcohol; sl s ether [HAW93]
Melting Point, °C: 122 [HAW93]
Boiling Point, °C: decomposes at 130 [HAW93]
Reactions: minus 2H<sub>2</sub>O at 100°C [HAW93]

# 2342

Compound: Periodyl fluoride Formula: IO<sub>3</sub>F Molecular Formula: FIO<sub>3</sub> Molecular Weight: 193.900 CAS RN: 30708-86-2 Properties: col cryst [CRC10] Boiling Point, °C: decomposes at >100 [CRC10]

## 2343

**Compound:** Periodic acid dihydrate **Formula:**  $HIO_4 \cdot 2H_2O$  **Molecular Formula:**  $H_5IO_6$  **Molecular Weight:** 227.940 **CAS RN:** 10450-60-9 **Properties:** monocl hygr cryst [CRC10] **Solubility:** s H<sub>2</sub>O, EtOH; sl eth [CRC10] **Melting Point,** °C: decomposes at 122 [CRC10]

# 2344

Compound: Peroxysulfuric acid Synonym: Caro's acid Formula: H<sub>2</sub>SO<sub>5</sub> Molecular Formula: H<sub>2</sub>O<sub>5</sub>S Molecular Weight: 114.079 CAS RN: 7722-86-3 Properties: white cryst; oxidant; used for testing aniline; in dye manufacturing [HAW93] Melting Point, °C: 45, decomposing [HAW93]

# 2345

**Compound:** Perrhenic acid **Formula:** HReO<sub>4</sub> **Molecular Formula:** HO<sub>4</sub>Re **Molecular Weight:** 251.213 **CAS RN:** 13768-11-1 Properties: colorless liq; only exists in solution; strong, very stable acid [HAW93] [STR93]Solubility: v s H<sub>2</sub>O and in organic solvents [HAW93]

## 2346

Compound: Phenylmercuric acetate
Synonym: PMA
Formula: CH<sub>3</sub>COOHgC<sub>6</sub>H<sub>5</sub>
Molecular Formula: C<sub>8</sub>H<sub>8</sub>HgO<sub>2</sub>
Molecular Weight: 336.740
CAS RN: 62-38-4
Properties: cryst prisms; preparation: heating mercuric acetate with benzene; uses: herbicide, fungicide [KIR81] [MER06]
Solubility: s ~600 parts H<sub>2</sub>O, s CH<sub>3</sub>COONH<sub>4</sub> aq solutions, s alcohol, benzene, acetone [MER06]
Melting Point, °C: 150–152 [ALD94]

### 2347

Compound: Phenylmercuric chloride Synonym: chlorophenylmercury Formula: C<sub>6</sub>H<sub>5</sub>HgCl Molecular Formula: C<sub>6</sub>H<sub>5</sub>ClHg Molecular Weight: 313.15 CAS RN: 100-56-1 Properties: white leaflets; uses: fungicide [MER06] Solubility: ~20,000 parts H<sub>2</sub>O; s benzene, ether [MER06] Melting Point, °C: decomposes at 248–250 [ALD94]

# 2348

Compound: Phenylmercuric nitrate, basic
Formula: C<sub>6</sub>H<sub>5</sub>HgNO<sub>3</sub> · C<sub>6</sub>H<sub>5</sub>HgOH
Molecular Formula: C<sub>12</sub>H<sub>11</sub>Hg<sub>2</sub>NO<sub>4</sub>
Molecular Weight: 634.404
CAS RN: 8003-05-2
Properties: pearly scales; preparation: boiling benzene and mercuric acetate, followed by treatment with an alkali nitrate; uses: antimicrobial, fungicide for tree treatment [MER06]
Solubility: s ~1250 parts H<sub>2</sub>O; sl s alcohol [MER06]
Melting Point, °C: decomposes at 176–186 [ALD94]

# 2349

**Compound:** Phosphine **Formula:** PH<sub>3</sub> **Molecular Formula:** H<sub>3</sub>P **Molecular Weight:** 33.998 **CAS RN:** 7803-51-2

- Properties: colorless gas; spontaneously flammable in air; decaying fish odor; reacts violently with halogens, O<sub>2</sub>; forms phosphonium salts with halogen acids; critical temp 51.6°C; critical pressure 6.53 MPa; enthalpy of vaporization 14.6 kJ/ mol; formed from white phosphorus and an aq alkali hydroxide [AIR87] [MER06] [CRC10]
  Solubility: 0.26 volumes in H<sub>2</sub>O (20°C); i hot H<sub>2</sub>O; sl s alcohol, ether, cuprous chloride
- solutions [HAW93] [MER06] Density, g/cm<sup>3</sup>: 1.492 g/L [LID94] Melting Point, °C: –133 [MER06]
- Boiling Point, °C: -87.75 [CRC10]
- **Reactions:** decomposed to  $H_2$  and metal phosphide by hot metal [MER06]

Compound: Phosphomolybdic acid hydrate Formula:  $H_3[P(Mo_3O_{10})_4] \cdot xH_2O$ Molecular Formula:  $H_3Mo_{12}O_{40}P$  (anhydrous) Molecular Weight: 1825.254 (anhydrous) CAS RN: 11104-88-4 Properties: yellow cryst; oxidizing agent; used as a reagent for alkaloids, as a pigment; imparts water resistance to plastics [HAW93] Solubility: s in less than 0.4 parts  $H_2O$ , alcohol, ether [MER06] Density, g/cm<sup>3</sup>: 3.15 [HAW93]

**Melting Point**, °C: 78–90 [HAW93]

### 2351

**Compound:** Phosphonitrilic chloride trimer **Formula:**  $(PNCl_2)_3$  **Molecular Formula:**  $Cl_6N_3P_3$  **Molecular Weight:** 347.657 **CAS RN:** 940-71-6 **Properties:** white cryst; sensitive to moisture [STR93] **Density, g/cm<sup>3</sup>:** 1.98 [STR93] **Melting Point, °C:** 128.8 [STR93] **Boiling Point, °C:** 127 (12 mm Hg) [STR93]

### 2352

Compound: Phosphonium iodide Formula:  $PH_4I$ Molecular Formula:  $H_4IP$ Molecular Weight: 161.910 CAS RN: 12125-09-6

**Properties:** large, transparent, colorless cryst; tetr; sublimes at room temp; decomposes to PH<sub>3</sub> and HI when heated or in presence of alcohol or water; rapid heating causes detonation [MER06] Solubility: decomposed by H<sub>2</sub>O, alcohol, evolving phosphine gas [HAW93]
Density, g/cm<sup>3</sup>: 2.86 [HAW93]
Melting Point, °C: 18.5 [HAW93]
Boiling Point, °C: 80 [HAW93]
Reactions: sublimes at 61.8°C [HAW93]

# 2353

Compound: Phosphoric acid Synonym: orthophosphoric acid Formula: H<sub>3</sub>PO<sub>4</sub> Molecular Formula: H<sub>3</sub>O<sub>4</sub>P Molecular Weight: 97.995 CAS RN: 7664-38-2 Properties: colorless, odorless, sparkling, syrupy liq or unstable ortho-rhomb cryst; acid dissociation constants:  $K_1 = 7.107 \times 10^{-3}$ ,  $K_2 = 7.99 \times 10^{-8}$ ,  $K_3 = 4.8 \times 10^{-13}$ ; enthalpy of fusion 13.40 kJ/mol [MER06] [CRC10] Solubility: s H<sub>2</sub>O, alcohol [MER06] Density, g/cm<sup>3</sup>: cryst: 1.834 [HAW93] Melting Point, °C: cryst: 42.35 [MER06] Boiling Point, °C: 407 [LID94] Reactions: minus 1/2H<sub>2</sub>O at 213°C, forming pyrophosphoric acid [HAW93]

## 2354

Compound: Phosphorous acid
Synonym: orthophosphorus acid
Formula: H<sub>3</sub>PO<sub>3</sub>
Molecular Formula: H<sub>3</sub>O<sub>3</sub>P
Molecular Weight: 81.996
CAS RN: 13598-36-2
Properties: white, very hygr and deliq, cryst mass; slowly oxidized in air to H<sub>3</sub>PO<sub>4</sub>; enthalpy of fusion 12.80 kJ/mol [MER06] [DOU83]
Solubility: v s H<sub>2</sub>O, alcohol [MER06]
Density, g/cm<sup>3</sup>: 1.65; liq: 1.597 [MER06]
Melting Point, °C: 74.4 [CRC10]
Boiling Point, °C: decomposes to PH<sub>3</sub>, H<sub>3</sub>PO<sub>4</sub> above 180 [MER06]

### 2355

**Compound:** Phosphorus (black) **Synonym:** black phosphorus **Formula:** P **Molecular Formula:** P **Molecular Weight:** 30.973762 **CAS RN:** 7723-14-0 Properties: black solid, resembling graphite; obtained by heating white phosphorus under pressure; ortho-rhomb cryst; stable in air; not spontaneously flammable in air; under high pressure, transformed reversibly to a second rhomb cryst, density 3.56, and cub cryst, density 3.83; conducts electricity [HAW93] [MER06]
Solubility: i organic solvents [MER06]
Density, g/cm<sup>3</sup>: 2.691 [MER06]

#### 2356

Compound: Phosphorus (red) Synonym: red phosphorus Formula: P Molecular Formula: P Molecular Weight: 30.973762 CAS RN: 7723-14-0 Properties: red to violet amorphous powd; 6 mm pieces

and smaller with 99.995% purity; obtained from white phosphorus using catalysts by heating at 240°; less active than white phosphorus; has high electrical resistivity [HAW93] [MER06] [CER91] Solubility: i organic solvents; s PBr<sub>3</sub> [MER06] Density, g/cm<sup>3</sup>: 2.34 [MER06] Melting Point, °C: sublimes at 416 [MER06]

```
Reactions: burns in air to form P<sub>2</sub>O<sub>5</sub> at 260°C [MER06]
```

### 2357

Compound: Phosphorus (white) Synonyms: white, yellow phosphorus Formula: P<sub>4</sub> **Molecular Formula:** P<sub>4</sub> Molecular Weight: 123.895 (atomic weight: 30.974) CAS RN: 12185-10-3 Properties: wax-like transparent cryst; darkens when exposed to light; impurities cause yellow color;  $\alpha$ -form: exists at room temp;  $\beta$ -form: hex cryst; prepared from  $\alpha$ -form at -79.6°C; volatile; sublimes in vacuum at ordinary temperatures; vapor density corresponds to formula P<sub>4</sub>; hardness is 0.5 Mohs; electronegativity 2.06; enthalpy of vaporization 12.4 kJ/mol; enthalpy of fusion 0.66 kJ/ mol; electrical resistivity (20°C) 10µohm · cm [CRC10] [ALD94] [HAW93] [MER06] [COT88] Solubility: 1 part/300,000 parts H<sub>2</sub>O; 1 g/400 mL absolute alcohol; 1 g/200 mL CHCl<sub>2</sub>; 1 g/40 mL benzene [MER06] **Density, g/cm<sup>3</sup>:** α: 1.83; β. 1.88 [MER06] Melting Point, °C: 44.1 (0.181 mm) [MER06]

Boiling Point, °C: 277 [CRC10]

Reactions: ignites in moist at ~30°C [MER06]

Thermal Conductivity, W/(m·K): 0.236 (25°C) [ALD94]

#### 2358

**Compound:** Phosphorus heptasulfide **Formula:** P<sub>4</sub>S<sub>7</sub> **Molecular Formula:** P<sub>4</sub>S<sub>7</sub> **Molecular Weight:** 348.357 **CAS RN:** 12037-82-0 **Properties:** light yellow cryst [HAW93] **Solubility:** sl s carbon disulfide [HAW93] **Density, g/cm<sup>3</sup>:** 2.19 [HAW93] **Melting Point, °C:** 310 [HAW93] **Boiling Point, °C:** 523 [HAW93]

## 2359

Compound: Phosphorus nitride Formula:  $P_3N_5$ Molecular Formula:  $N_5P_3$ Molecular Weight: 162.955 CAS RN: 17739-47-8 Properties: white, amorphous solid; stable in air [HAW93] Solubility: i cold H<sub>2</sub>O, decomposed by hot H<sub>2</sub>O (HAW93]; s in common organic solvents [HAW93] Melting Point, °C: decomposes at 800 [HAW93]

### 2360

Compound: Phosphorus oxybromide Synonym: phosphoryl bromide Formula: POBr<sub>3</sub> Molecular Formula: Br<sub>3</sub>OP Molecular Weight: 286.685 CAS RN: 7789-59-5 Properties: colorless cryst; thin plates with faint orange tint; enthalpy of vaporization 38 kJ/ mol; used as an intermediate in chemical processes [HAW93] [MER06] [CRC10] **Solubility:** hydrolyzes slowly in  $H_2O$  to  $H_3PO_4$ and HBr; s ether, benzene, chloroform, CS<sub>2</sub>, conc H<sub>2</sub>SO<sub>4</sub> [MER06] Density, g/cm<sup>3</sup>: 2.822 [MER06] Melting Point, °C: 56 [MER06] Boiling Point, °C: 191.7 [CRC10]

### 2361

**Compound:** Phosphorus oxychloride **Synonym:** phosphoryl chloride **Formula:** POCl<sub>3</sub> **Molecular Formula:** Cl<sub>3</sub>OP **Molecular Weight:** 153.331 **CAS RN:** 10025-87-3 Properties: colorless, clear liq; 99.9% purity; fumes strongly; liberates heat by reaction with H<sub>2</sub>O, alcohol; pungent odor; enthalpy of vaporization 34.35 at bp, 38.6 at 25°C; enthalpy of fusion 13.10 kJ/mol; used to manufacture esters for plasticizers and gasoline additives [HAW93] [MER06] [CER91] [CRC10]
Solubility: reacts with H<sub>2</sub>O, alcohol [HAW93]
Density, g/cm<sup>3</sup>: 1.645 [MER06]
Melting Point, °C: 1.25 [ALD94]
Boiling Point, °C: 105.8 [MER06]

### 2362

Compound: Phosphorus oxyfluoride
Formula: POF<sub>3</sub>
Molecular Formula: F<sub>3</sub>OP
Molecular Weight: 103.968
CAS RN: 13478-20-1
Properties: colorless gas; critical temp 73.3°C; critical pressure 4.23 MPa; enthalpy of fusion 14.9 kJ/mol; enthalpy of vaporization 23.2 kJ/mol [KIR78]
Solubility: hydrolyzes [KIR78]
Density, g/cm<sup>3</sup>: 4.562 g/L [LID94]
Melting Point, °C: -39.1 [KIR78]

Boiling Point, °C: –39.7 [KIR78]

2363

Compound: Phosphorus triselenide
Formula: P<sub>2</sub>Se<sub>3</sub>
Molecular Formula: P<sub>2</sub>Se<sub>3</sub>
Molecular Weight: 298.828
CAS RN: 1314-86-9
Properties: dark red mass; heating causes decomposition; decomposed by moist air and in H<sub>2</sub>O [MER06]
Solubility: s KOH; i CS<sub>2</sub> [MER06]
Density, g/cm<sup>3</sup>: 1.31 [LID94]
Melting Point, °C: 245 [LID94]
Boiling Point, °C: ~380 [LID94]

2364

Compound: Phosphorus(III) bromide
Synonym: phosphorus tribromide
Formula: PBr<sub>3</sub>
Molecular Formula: Br<sub>3</sub>P
Molecular Weight: 270.686
CAS RN: 7789-60-8
Properties: colorless, fuming liq; 99.9% purity; penetrating odor; enthalpy of vaporization 38.8 kJ/ mol [CRC10] [CER91] [HAW93] [MER06]
Solubility: s with decomposition, H<sub>2</sub>O and alcohol; s acetone, CS<sub>2</sub> [MER06] **Density, g/cm<sup>3</sup>:** 2.852 (15°C) [STR93] **Melting Point, °C:** -41.5 [MER06] **Boiling Point, °C:** 172.95 [CRC10]

#### 2365

Compound: Phosphorus(III) chloride
Synonym: phosphorus trichloride
Formula: PCl<sub>3</sub>
Molecular Formula: Cl<sub>3</sub>P
Molecular Weight: 137.332
CAS RN: 7719-12-2
Properties: 99.9% purity; colorless, clear, fuming liq; enthalpy of vaporization 30.5 kJ/mol at bp, 32.1 kJ/mol at 25°C; enthalpy of fusion 7.10 kJ/mol [MER06] [CRC10] [CER91]
Solubility: decomposed by H<sub>2</sub>O, alcohol; s benzene, chloroform, ether, CS<sub>2</sub> [MER06]
Density, g/cm<sup>3</sup>: 1.574 [MER06]
Melting Point, °C: -112 [CRC10]
Boiling Point, °C: 75.95 [CRC10]

# 2366

Compound: Phosphorus(III) fluoride
Synonym: phosphorus trifluoride
Formula: PF<sub>3</sub>
Molecular Formula: F<sub>3</sub>P
Molecular Weight: 87.969
CAS RN: 7783-55-3
Properties: colorless gas; sensitive to air and moisture; critical temp -2.05°C; critical pressure 4.33 MPa; enthalpy of vaporization 16.5 kJ/mol [KIR78] [STR93]
Solubility: slowly hydrolyzed by H<sub>2</sub>O [MER06]
Density, g/cm<sup>3</sup>: gas: 3.907 g/L [MER06]
Boiling Point, °C: -151.30 [MER06]

#### 2367

Compound: Phosphorus(III) iodide
Synonym: phosphorus triiodide
Formula: PI<sub>3</sub>
Molecular Formula: I<sub>3</sub>P
Molecular Weight: 411.687
CAS RN: 13455-01-1
Properties: red or orange cryst; hygr; enthalpy of vaporization 43.9 kJ/mol [HAW93] [CRC10]
Solubility: decomposed by H<sub>2</sub>O; s alcohol, CS<sub>2</sub> [HAW93]
Density, g/cm<sup>3</sup>: 4.18 [STR93]
Melting Point, °C: 61.5 [LID94]
Boiling Point, °C: decomposes at 227 [CRC10]

Compound: Phosphorus(III) oxide Synonym: phosphorus trioxide Formula: P<sub>2</sub>O<sub>3</sub> Molecular Formula: O<sub>3</sub>P<sub>2</sub> Molecular Weight: 109.946 CAS RN: 1314-24-5 Properties: transparent cryst; monocl or colorless liq; disproportionates to red P and P<sub>2</sub>O<sub>4</sub> if heated above 210°C [MER06] Solubility: slowly forms H<sub>3</sub>PO<sub>3</sub> in cold H<sub>2</sub>O; reacts violently in hot H<sub>2</sub>O forming red P, PH<sub>3</sub>, and H<sub>3</sub>PO<sub>4</sub> [MER06] Density, g/cm<sup>3</sup>: 2.135 [MER06] Melting Point, °C: 23.8 [MER06] Boiling Point, °C: 173.1 (under N<sub>2</sub>) [MER06]

# 2369

Compound: Phosphorus(III) sulfide Synonym: phosphorus trisulfide Formula: P<sub>2</sub>S<sub>3</sub> Molecular Formula: P<sub>2</sub>S<sub>3</sub> Molecular Weight: 158.146 CAS RN: 81129-00-2 Properties: grayish yellow mass; tasteless and odorless; decomposed by atm moisture [HAW93] Solubility: s alcohol, CS<sub>2</sub>, ether [HAW93] Melting Point, °C: 290 [HAW93] Boiling Point, °C: 490 [HAW93]

# 2370

Compound: Phosphorus(V) bromide
Synonym: phosphorus pentabromide
Formula: PBr<sub>5</sub>
Molecular Formula: Br<sub>5</sub>P
Molecular Weight: 430.494
CAS RN: 7789-69-7
Properties: yellow cryst; -60 mesh with 99.9% purity; decomposed by H<sub>2</sub>O or alcohol; used as a brominating agent [HAW93] [MER06] [CER91]
Solubility: s CS<sub>2</sub>, CCl<sub>4</sub> [MER06]

Melting Point, °C: decomposes at 106 [HAW93]

# 2371

**Compound:** Phosphorus(V) chloride **Synonym:** phosphorus pentachloride **Formula:** PCl<sub>5</sub> **Molecular Formula:** Cl<sub>5</sub>P **Molecular Weight:** 208.238 **CAS RN:** 10026-13-8 Properties: white to pale yellow; -60 mesh with 99.9% purity; deliq; fumes; sublimes without melting from 160°C-165°C; irritating odor; used as a chlorinating agent, catalyst, and dehydrating agent [HAW93] [MER06] [CER91]
Solubility: hydrolyzed in H<sub>2</sub>O to H<sub>3</sub>PO<sub>4</sub>, HCl; s CS<sub>2</sub>, CCl<sub>4</sub> [MER06]
Density, g/cm<sup>3</sup>: 3.60 [LID94]
Melting Point, °C: 148 (under pressure) [MER06]
Boiling Point, °C: 160 [MER06]

# 2372

**Compound:** Phosphorus(V) fluoride Synonym: phosphorus pentafluoride Formula: PF<sub>5</sub> **Molecular Formula:** F<sub>5</sub>P Molecular Weight: 125.966 CAS RN: 7647-19-0 Properties: colorless gas; nonflammable; fumes strongly in air; high thermal stability; critical temp 144.5°C; critical pressure 3.39 MPa; enthalpy of fusion 12.1 kJ/ mol; enthalpy of vaporization 17.2 kJ/mol; can be prepared by reaction of  $PF_3$  with  $F_2$ ; used as a polymerization catalyst and in electronics industry [AIR87] [HAW93] [MER06] [CRC10] [KIR78] Solubility: hydrolyzed in H<sub>2</sub>O, eventually to H<sub>3</sub>PO<sub>4</sub> [MER06] Density, g/cm<sup>3</sup>: gas: 5.527 g/L [LID94] Melting Point, °C: -93.8 [MER06] Boiling Point, °C: -84.6 [MER06]

# 2373

Compound: Phosphorus(V) oxide Synonym: phosphorus pentoxide Formula:  $P_2O_5$ Molecular Formula:  $O_5P_2$ Molecular Weight: 141.945 CAS RN: 1314-56-3 Properties: soft, white powd; -100 mesh with 99.9% purity; several cryst and amorphous forms; very deliq; corrosive; not flammable; readily absorbs H<sub>2</sub>O from air; forms H<sub>3</sub>PO<sub>4</sub> in water, releasing heat; enthalpy of fusion 27.20 kJ/ mol [CRC10] [CER91] [HAW93] [MER06] Density, g/cm<sup>3</sup>: 2.39 [STR93] Melting Point, °C: 420 [CRC10] Boiling Point, °C: sublimes at 360 [MER06]

# 2374

**Compound:** Phosphorus(V) selenide **Synonym:** phosphorus pentaselenide **Formula:** P<sub>2</sub>Se<sub>5</sub> **Molecular Formula:** P<sub>2</sub>Se<sub>5</sub> Molecular Weight: 456.748 CAS RN: 1314-82-5 Properties: amorphous glass; blackish purple solid; decomposes in steam and boiling water [MER06] Solubility: reacts with CCl<sub>4</sub>; i CS<sub>2</sub> [MER06]

#### 2375

Density, g/cm<sup>3</sup>: 2.03 [HAW93] Melting Point, °C: 286–290 [HAW93] Boiling Point, °C: 515 [HAW93]

### 2376

Compound: Phosphotungstic acid 24-hydrate Synonym: tungstophosphoric acid Formula:  $H_3PW_{12}O_{40} \cdot 24H_2O$ Molecular Formula:  $H_{51}O_{64}PW_{12}$ Molecular Weight: 3312.420 CAS RN: 12067-99-1 Properties:  $H_2O$  content can vary appreciably; white or sl yellowish green cryst or powd; efflorescent; used in analytical chemistry to detect many organic compounds such as phenols, alkaloids, and albumin [MER06] Solubility: s ~0.5 parts  $H_2O$ ; s alcohol, ether [MER06]

Melting Point, °C: 89 [HAW93]

### 2377

Compound: Platinum Formula: Pt Molecular Formula: Pt Molecular Weight: 195.08 CAS RN: 7440-06-4

Properties: silvery gray, lustrous, ductile metal; fcc, a=0.39231 nm; also has black powd and spongy mass forms; vapor pressure at mp 0.0187 Pa; electrical resistivity, μohm · cm: 10.6 (20°C), 9.85 (0°C); Brinell hardness 97; does not corrode or tarnish; attacked by Cl<sub>2</sub> at high temperatures; Poisson's ratio 0.39; enthalpy of fusion 22.17 kJ/mol; used as a catalyst for chemical, automotive, and petroleum industries [KIR82] [HAW93] [MER06] [CRC10] Solubility: i H<sub>2</sub>O, mineral acids; s aqua regia [HAW93] [MER06]
Density, g/cm<sup>3</sup>: 21.447 (calc) [MER06]
Melting Point, °C: 1768.4 [CRC10]
Boiling Point, °C: 3825 [CRC10]
Thermal Conductivity, W/(m⋅K): 71.1 (25°C) [KIR82]
Thermal Expansion Coefficient: (volume) 100°C (0.216), 200°C (0.494), 400°C (1.074), 800°C (2.339), 1200°C (3.750) [CLA66]

#### 2378

**Compound:** Platinum acetylacetonate **Synonyms:** 2,4-pentanedione, platinum(II) derivative **Formula:**  $Pt(CH_3C(O)CH=COCH_3)_2$  **Molecular Formula:**  $C_{10}H_{14}O_4Pt$  **Molecular Weight:** 393.299 **CAS RN:** 15170-57-7 **Properties:** pale yellow cryst [STR93] **Melting Point,** °C: 250–252 [ALD94]

## 2379

Compound: Platinum hexafluoride
Formula: PtF<sub>6</sub>
Molecular Formula: F<sub>6</sub>Pt
Molecular Weight: 309.070
CAS RN: 13693-05-5
Properties: dark brick red, rhomb solid; strong oxidizing agent; there are also PtF<sub>4</sub>, 13455-15-7, and PtF<sub>5</sub>, 13782-84-8 [KIR82]
Density, g/cm<sup>3</sup>: 3.83 [KIR82]
Melting Point, °C: 61.3 [KIR82]
Boiling Point, °C: 69.14 [KIR82]

### 2380

Compound: Platinum silicide Formula: PtSi Molecular Formula: PtSi Molecular Weight: 223.166 CAS RN: 12137-83-6 Properties: ortho-rhomb cryst; –100 mesh powd [LID94] [ALF93] Density, g/cm<sup>3</sup>: 12.4 [LID94] Melting Point, °C: 1229 [ALF93]

#### 2381

**Compound:** Platinum(II) bromide **Synonym:** platinum dibromide **Formula:** PtBr<sub>2</sub> **Molecular Formula:** Br<sub>2</sub>Pt **Molecular Weight:** 354.888 CAS RN: 13455-12-4
 Properties: brown powd; PtBr<sub>4</sub>, 13455-11-3, exists [KIR82] [STR93]
 Density, g/cm<sup>3</sup>: 6.65 [STR93]
 Melting Point, °C: decomposes at 250 [STR93]

# 2382

Compound: Platinum(II) chloride Synonym: platinum dichloride Formula: PtCl<sub>2</sub> Molecular Formula: Cl<sub>2</sub>Pt Molecular Weight: 265.985 CAS RN: 10025-65-7 Properties: grayish green to brown powd; hex [KIR82] [MER06] Solubility: i H<sub>2</sub>O, alcohol, ether; s HCl [MER06] Density, g/cm<sup>3</sup>: 5.87 [MER06]; 6.05 [STR93] Melting Point, °C: decomposes at 581 [STR93] Reactions: decomposes at red heat yielding platinum [HAW93]

# 2383

**Compound:** Platinum(II) cyanide **Formula:** Pt(CN)<sub>2</sub> **Molecular Formula:** C<sub>2</sub>N<sub>2</sub>Pt **Molecular Weight:** 247.115 **CAS RN:** 592-06-3 **Properties:** yellowish green cryst [STR93]

#### 2384

Compound: Platinum(II) hexafluoroacetylacetonate Synonyms: 1,1,1,5,5,5-hexafluoro-2,4pentanedione Pt(II) derivative Formula:  $Pt(CF_3COCHCOCF_3)_2$ Molecular Formula:  $C_{10}H_2F_{12}O_4Pt$ Molecular Weight: 609.185 CAS RN: 65353-51-7 Properties: orange cryst [STR93] Melting Point, °C: sublimes at 65 [STR93]

### 2385

Compound: Platinum(II) iodide Synonym: platinum diiodide Formula: PtI<sub>2</sub> Molecular Formula: I<sub>2</sub>Pt Molecular Weight: 448.889 CAS RN: 7790-39-8 Properties: heavy, black powd [MER06] Solubility: i H<sub>2</sub>O, alkali iodides [MER06] Density, g/cm<sup>3</sup>: 6.40 [ALD94] Melting Point, °C: decomposes at 325 [MER06]

### 2386

Compound: Platinum(II) oxide Synonym: platinum monoxide Formula: PtO Molecular Formula: OPt Molecular Weight: 211.079 CAS RN: 12035-82-4 Properties: tetr black cryst [LID94] [KIR82] Solubility: i H<sub>2</sub>O, alcohol; s aqua regia [KIR82] Density, g/cm<sup>3</sup>: 14.9 [KIR82] Melting Point, °C: decomposes at 500 [KIR82]

### 2387

Compound: Platinum(IV) chloride
Synonym: platinum tetrachloride
Formula: PtCl<sub>4</sub>
Molecular Formula: Cl<sub>4</sub>Pt
Molecular Weight: 336.891
CAS RN: 37773-49-2
Properties: reddish brown cryst; sensitive to moisture [STR93]
Density, g/cm<sup>3</sup>: 4.303 [STR93]
Melting Point, °C: 370, decomposes [STR93]

# 2388

**Compound:** Platinum(IV) chloride pentahydrate **Formula:**  $PtCl_4 \cdot 5H_2O$  **Molecular Formula:**  $Cl_4H_{10}O_5Pt$  **Molecular Weight:** 426.967 **CAS RN:** 13454-96-1 **Properties:** red cryst [HAW93] **Solubility:** s H<sub>2</sub>O and alcohol [HAW93] **Density,** g/cm<sup>3</sup>: 2.43 [HAW93] **Reactions:** minus 4H<sub>2</sub>O at 100°C [HAW93]

#### 2389

Compound: Platinum(IV) iodide Synonym: platinic iodide Formula: PtI<sub>4</sub> Molecular Formula: I<sub>4</sub>Pt Molecular Weight: 702.698 CAS RN: 7790-46-7 Properties: brownish black powd; PtI<sub>3</sub>, 58782-50-6, exists [KIR82] [MER06] Solubility: s H<sub>2</sub>O [MER06] Melting Point, °C: decomposes at 130 [LID94]

## 2390

**Compound:** Platinum(IV) oxide **Synonym:** Adams' catalyst

Formula: PtO<sub>2</sub>
Molecular Formula: O<sub>2</sub>Pt
Molecular Weight: 227.079
CAS RN: 1314-15-4
Properties: -100 mesh with 99.9% purity; black powd [HAW93] [CER91]
Solubility: s conc acids, s dil KOH solutions [HAW93]
Density, g/cm<sup>3</sup>: 11.8 [LID94]
Melting Point, °C: 450 [AES93]

#### 2391

Compound: Plutonium Formula: α-Pu Molecular Formula: Pu Molecular Weight: 244 CAS RN: 7440-07-5

Properties: silvery white metal; highly reactive; α form: monocl, a=0.6183 nm, b=0.4822 nm, c=1.0963 nm; ionic radius of Pu<sup>++++</sup> is 0.0887 nm; stable form from room temp to 115°C; enthalpy of vaporization 333.5 kJ/mol; enthalpy of fusion 2.82 kJ/mol; discovered in 1940–1941; prepared in ton quantities in nuclear reactors; <sup>238</sup>Pu produced in kg amounts from <sup>237</sup>Np; important fuel for producing power for terrestrial and extraterrestrial applications [MER06] [KIR78] [CRC10] Density, g/cm<sup>3</sup>: 19.86 [KIR78] Melting Point, °C: 6466 [KIR91] Boiling Point, °C: 3235 [KIR91] Reactions: transitions: α → β, 115°C; β → γ, 185°C; γ → δ, 310°C; δ → δ', 452°C; δ' → ε, 480°C [KIR78]

2392

Compound: Plutonium nitride Formula: PuN Molecular Formula: NPu Molecular Weight: 258 CAS RN: 12033-54-4 Properties: dark gray; fcc, a=0.4907 nm [KIR81] Density, g/cm<sup>3</sup>: 14.4 [KIR81] Melting Point, °C: 2550 [KIR81]

# 2393

Compound: Plutonium(III) chloride Formula: PuCl<sub>3</sub> Molecular Formula: Cl<sub>3</sub>Pu Molecular Weight: 350 CAS RN: 13569-62-5 Properties: emerald green; hex, a=0.7394 nm, c=0.4243 nm [KIR78] Density, g/cm<sup>3</sup>: 5.71 [KIR78] Melting Point, °C: 760 [KIR91]

#### 2394

Compound: Plutonium(III) fluoride Formula: PuF<sub>3</sub> Molecular Formula: F<sub>3</sub>Pu Molecular Weight: 301 CAS RN: 13842-83-6 Properties: purple; hex, a=0.7092 nm, c=0.7254 nm [KIR78] Density, g/cm<sup>3</sup>: 9.33 [KIR78] Melting Point, °C: 1425 [KIR91]

### 2395

Compound: Plutonium(III) iodide Formula: PuI<sub>3</sub> Molecular Formula: I<sub>3</sub>Pu Molecular Weight: 625 CAS RN: 13813-46-2 Properties: green; ortho-rhomb, a=0.4326 nm, b=1.3962 nm, c=0.9974 nm [KIR78] Density, g/cm<sup>3</sup>: 6.92 [KIR78]

### 2396

Compound: Plutonium(IV) chloride Formula: PuCl<sub>4</sub> Molecular Formula: Cl<sub>4</sub>Pu Molecular Weight: 386 CAS RN: 13536-92-0 Properties: greenish yellow; tetr, a=0.8377 nm, c=0.7481 nm [KIR78] Density, g/cm<sup>3</sup>: 4.72 [KIR78]

# 2397

**Compound:** Plutonium(IV) fluoride **Formula:** PuF<sub>4</sub> **Molecular Formula:** F<sub>4</sub>Pu **Molecular Weight:** 320 **CAS RN:** 13709-56-3 **Density, g/cm<sup>3</sup>:** 7.1 [CRC10] **Melting Point:** 1037

#### 2398

Compound: Plutonium(IV) oxide Synonym: plutonium dioxide Formula: PuO<sub>2</sub> Molecular Formula: O<sub>2</sub>Pu Molecular Weight: 276 CAS RN: 11116-03-3 Properties: yellowish green to brown; cub, a=0.53960 nm [KIR78]

## **Density, g/cm<sup>3</sup>:** 11.46 [KIR78] **Melting Point, °C:** 2400 [KIR91]

### 2399

Compound: Plutonium(VI) hexafluoride Formula:  $PuF_6$ Molecular Formula:  $F_6Pu$ Molecular Weight: 358 CAS RN: 13693-06-6 Properties: reddish brown; ortho-rhomb, a=0.9912 nm, b=0.8942 nm, c=0.5206 nm [KIR78] Density, g/cm<sup>3</sup>: 5.081 [KIR78] Melting Point, °C: 52 [KIR91]

#### 2400

Compound: Polonium
Formula: α-Po
Molecular Formula: Po
Molecular Weight: 209
CAS RN: 7440-08-6
Properties: radioactive solid, α-emitter; resistivity at 0°C is 42 µohm · cm; resembles Te and Bi in chemical properties; coexists with β-form over temp range 18 to 54°C [MER06]
Density, g/cm<sup>3</sup>: 9.196 [MER06]
Melting Point, °C: 254 [MER06]
Boiling Point, °C: 962 [MER06]
Thermal Conductivity, W/(m·K): 20 [CRC10]

### 2401

Compound: Polonium Formula: β-Po Molecular Formula: Po Molecular Weight: 209 CAS RN: 7440-08-6 Properties: radioactive solid; α-emitter; resistivity (0°C)

44 μohm · cm; chemical behavior resembles Te, Bi; coexists with α-form over temp range 18°C–54°C; electronegativity 1.76 [MER06] [COT88]
Density, g/cm<sup>3</sup>: 9.398 [MER06]
Melting Point, °C: 254 [MER06]
Boiling Point, °C: 962 [MER06]

# 2402

**Compound:** Polonium(IV) chloride **Synonym:** polonium tetrachloride **Formula:** PoCl<sub>4</sub> **Molecular Formula:** Cl<sub>4</sub>Po **Molecular Weight:** 351 **CAS RN:** 10026-02-5 Properties: hygr; bright yellow cryst; monocl or tricl; hydrolyzed in moist air to form a white solid; vapors are purplish brown, becoming bluish green at >500°C [MER06]
Solubility: s H<sub>2</sub>O, slowly hydrolyzing; v s HCl, thionyl chloride; s ethanol, acetone; decomposed by dil HNO<sub>3</sub> [MER06]
Melting Point, °C: ~300 (in chlorine) [MER06]
Boiling Point, °C: 390 [LID94]
Reactions: turns scarlet red at 350°C [MER06]

# 2403

Compound: Polonium(IV) oxide Synonym: polonium dioxide Formula: PoO<sub>2</sub> Molecular Formula: O<sub>2</sub>Po Molecular Weight: 241 CAS RN: 7446-06-2 Properties: two cryst forms: low temp, yellow fcc; high temp, red tetr [MER06] Solubility: s phosphoric acid, ammonium carbonate solution [MER06] Density, g/cm<sup>3</sup>: 8.9 [LID94] Melting Point, °C: sublimes at 885, color darkens to chocolate brown [MER06] Reactions: decomposes into elements at 500°C under vacuum [MER06]

### 2404

Compound: Potassium

Synonym: kalium

Formula: K Molecular Formula: K

Molecular Weight: 39.0983

**CAS RN:** 7440-09-7

Properties: soft, silvery white metal; tarnishes in air; bcc; brittle at low temperatures; reacts vigorously with O<sub>2</sub>, H<sub>2</sub>O, acids, hydroxides, halogens; enthalpy of fusion 2.32 kJ/mol; enthalpy of vaporization 81.13 kJ/mol; electrical resistivity (20°C) 6.1 μohm · cm; surface tension (100°C) 86 mN/m; viscosity (25°C) 0.258 mPa · s; ionic radius 0.133 nm; Pauling electronegativity 0.8 [KIR82] [MER06] [ALD94]
Solubility: s liq ammonia, ethylenediamine, aniline; some metals [MER06]

Density, g/cm<sup>3</sup>: 0.856 [MER06]

Melting Point, °C: 63.7 [CAB85]

Boiling Point, °C: 760 [CAB85]

**Thermal Conductivity, W/(m·K):** 102.5 (25°C) [ALD94]

Compound: Potassium acetate Synonyms: acetic acid, potassium salt Formula: CH<sub>3</sub>COOK Molecular Formula: C<sub>2</sub>H<sub>3</sub>KO<sub>2</sub> Molecular Weight: 98.143

CAS RN: 127-08-2

Properties: white, lustrous cryst; very deliq; saline taste; usually prepared by reacting potassium carbonate with acetic acid; used as a dehydrating agent and as a textile conditioner [HAW93] [MER06] [KIR82]

Solubility: g/100 g, H<sub>2</sub>O: 216 (0°C), 256 (20°C), 398 (90°C); solid phase, CH<sub>3</sub>COOK [LAN05]; s alcohol, i ether [HAW93] Density, g/cm3: 1.57 [MER06]

Melting Point, °C: 292 [MER06]

# 2406

**Compound:** Potassium acetylacetonate hemihydrate Synonyms: 2,4-pentanedione, potassium derivative hemihdvrate Formula: K(CH<sub>3</sub>COCH=C(O)CH<sub>3</sub>) · 1/2H<sub>2</sub>O Molecular Formula: C<sub>5</sub>H<sub>8</sub>KO<sub>25</sub> Molecular Weight: 147.215 CAS RN: 57402-46-7 **Properties:** off-white powd; hygr [ALD94] [STR93] Melting Point, °C: decomposes at 215 [STR93]

# 2407

Compound: Potassium aluminate trihydrate Formula:  $K_2Al_2O_4 \cdot 3H_2O$ Molecular Formula: Al<sub>2</sub>H<sub>6</sub>K<sub>2</sub>O<sub>7</sub> Molecular Weight: 250.202 CAS RN: 12003-63-1 Properties: hard, lustrous cryst; using in dyeing, printing, paper sizing [HAW93] [MER06] Solubility: v s H<sub>2</sub>O, hydrolyzes giving alkaline solution; i alcohol [HAW93] [MER06]

# 2408

Compound: Potassium aluminum sulfate Synonym: burnt alum Formula:  $KAl(SO_4)_2$ Molecular Formula: AlKO<sub>8</sub>S<sub>2</sub> Molecular Weight: 258.207 CAS RN: 10043-67-1 Properties: white powd; absorbs atm moisture [MER06] Solubility: g/100 g H<sub>2</sub>O: 3.00 (0°C), 5.90 (20°C), 109 (90°C) [LAN05]

# 2409

Compound: Potassium aluminum sulfate dodecahydrate Synonym: kalinite Formula: KAl(SO<sub>4</sub>)<sub>2</sub> · 12H<sub>2</sub>O Molecular Formula: AlH<sub>24</sub>KO<sub>20</sub>S<sub>2</sub> Molecular Weight: 474.391 CAS RN: 7784-24-9 Properties: colorless, trans cryst [MER06] Solubility: 1 g/7.2 mL H<sub>2</sub>O, 1 g/0.3 mL boiling H<sub>2</sub>O; s glyercol [MER06] Density, g/cm3: 1.725 [MER06] Melting Point, °C: 92.5 [MER06] Reactions: minus 12H<sub>2</sub>O at ~200°C [MER06]

# 2410

Compound: Potassium antimony oxalate trihydrate Synonym: antimony potassium oxalate Formula: K<sub>3</sub>[Sb(OOCCOO)<sub>3</sub>] · 3H<sub>2</sub>O Molecular Formula: C<sub>6</sub>H<sub>6</sub>K<sub>3</sub>O<sub>15</sub>Sb Molecular Weight: 557.160 CAS RN: 5965-33-3 Properties: cryst powd [MER06] Solubility: s H<sub>2</sub>O [MER06]

# 2411

Compound: Potassium antimony tartrate hemihydrate Synonym: tartar emetic Formula:  $K(SbO)C_4O_6 \cdot 1/2H_2O$ Molecular Formula: C<sub>4</sub>HKO<sub>75</sub>Sb Molecular Weight: 329.903 CAS RN: 28300-74-5 Properties: transparent cryst; effloresces in air; sweetish metallic taste; used in medicine, textiles and, leather, as an insecticide [HAW93] [MER06] Solubility:  $1 g/12 mL H_2O$ , 1 g/3 mLboiling H<sub>2</sub>O [MER06] Density, g/cm<sup>3</sup>: 2.6 [HAW93] Reactions: dehydrates at 100°C [HAW93]

### 2412

Compound: Potassium azide Formula: KN<sub>3</sub> Molecular Formula: KN<sub>3</sub> Molecular Weight: 81.118 CAS RN: 20762-60-1 Properties: colorless; body-center; tetr, a=0.6091 nm, c=0.7056nm [CIC73] [CRC10] Solubility: g/100 g H<sub>2</sub>O: 41.4 (0°C), 50.8 (20°C), 61.0 (40°C), 106 (100°C) [LAN05] Density, g/cm<sup>3</sup>: 2.04 [CRC10] Melting Point, °C: 350 (vacuum) [CRC10]

**Compound:** Potassium bis(oxalato) platinate(II) dihydrate **Formula:**  $K_2Pt(C_2O_4)_2 \cdot 2H_2O$ **Molecular Formula:**  $C_4H_4K_2O_{10}Pt$ **Molecular Weight:** 485.346 **CAS RN:** 14224-64-5 **Properties:** cryst [ALF95]

# 2414

**Compound:** Potassium borohydride **Synonym:** potassium tetrahydroborate **Formula:** KBH<sub>4</sub> **Molecular Formula:** BH<sub>4</sub>K **Molecular Weight:** 53.941

CAS RN: 13762-51-1

**Properties:** white, cryst powd; nonhygr cryst; supports combustion; decomposes without melting at ~500°C; thermally more stable and less reactive than sodium borohydride; used as a reducing agent for aldehydes, ketones, and acid chlorides [MER06]

Solubility: w/w H<sub>2</sub>O, 19% (25°C); alkaline solutions stable [MER06]
Density, g/cm<sup>3</sup>: 1.11 [LID94]
Melting Point, °C: decomposes at 500 [KIR80]

# 2415

Compound: Potassium bromate
Formula: KBrO<sub>3</sub>
Molecular Formula: BrKO<sub>3</sub>
Molecular Weight: 167.000
CAS RN: 7758-01-2
Properties: white cryst or granules; oxidizing agent; used as a laboratory reagent, in permanent wave formulations, as a food additive [HAW93] [MER06]
Solubility: g/100 g soln, H<sub>2</sub>O: 2.96 (0°C), 7.53 (25°C), 33.3 (100°C) [KRU93]; i alcohol [MER06]
Density, g/cm<sup>3</sup>: 3.27 [MER06]
Melting Point, °C: ~350 [MER06]
Reactions: ~370°C, decomposes with evolution of O<sub>2</sub> [MER06]

# 2416

Compound: Potassium bromide Formula: KBr Molecular Formula: BrK Molecular Weight: 119.002 CAS RN: 7758-02-3 Properties: colorless cub cryst or white granules or powd; hygr; strong, bitter, saline taste; enthalpy of fusion 25.50 kJ/mol; can be prepared by reacting bromine with potassium carbonate; used in photography, engraving and lithography, spectroscopy [HAW93] [CRC10] [STR93] [MER06] [KIR82]
Solubility: g/100 g soln, H<sub>2</sub>O: 40.61 (25°C); solid phase, KBr [KRU93]; 1 g/250 mL alcohol; 1 g/4.6 mL glycerol [MER06]
Density, g/cm<sup>3</sup>: 2.75 [MER06]
Melting Point, °C: 734 [CRC10]
Boiling Point, °C: 1435 [STR93]
Thermal Expansion Coefficient: (volume) 100°C (0.951), 200°C (2.265), 400°C (5.116) [CLA66]

# 2417

**Compound:** Potassium carbonate **Synonyms:** salt of tartar, pearl ash **Formula:** K<sub>2</sub>CO<sub>3</sub> **Molecular Formula:** CK<sub>2</sub>O<sub>3</sub>

Molecular Weight: 138.206

CAS RN: 584-08-7

**Properties:** white monocl; hygr, odorless granules or translucent powd; enthalpy of fusion 27.60 kJ/ mol; commonly produced by the carbonation of KOH; used in special glasses, e.g., optical and color TV tubes, pigments; general-purpose food additive [HAW93] [MER06] [KIR82] [CRC10]

 Solubility: g/100 g soln, H<sub>2</sub>O: 51.25 (0°C), 52.85 (25°C), 60.90 (100°C); solid phase, K<sub>2</sub>CO<sub>3</sub> · 1-1/2H<sub>2</sub>O [KRU93]
 Density, g/cm<sup>3</sup>: 2.428 [HAW93]
 Melting Point, °C: 891 [MER06]
 Boiling Point, °C: decomposes [STR93]

## 2418

Compound: Potassium carbonate hemitrihydrate Synonym: potassium carbonate sesquihydrate Formula:  $K_2CO_3 \cdot 1-1/2H_2O$ Molecular Formula:  $CH_3K_2O_{4.5}$ Molecular Weight: 165.229 CAS RN: 6381-79-9 Properties: small, granular cryst; not hygr, if fully hydrated with 1.5  $H_2O$ ; formula also given as  $2K_2CO_3 \cdot 3H_2O$  [MER06] Solubility: 129.4 g/100 mL  $H_2O$  (0°C), 268 g/100 mL  $H_2O$  (100°C) [LAN05] Density, g/cm<sup>3</sup>: 2.043 [CRC10] Melting Point, °C: 891 [ALD94]

**Compound:** Potassium chlorate **Synonym:** potcrate **Formula:** KClO<sub>3</sub> **Molecular Formula:** ClKO<sub>3</sub> **Molecular Weight:** 122.549

CAS RN: 3811-04-9

- **Properties:** monocl lustrous cryst or white granules or powd; cooling, saline taste; used as an oxidizing agent, in explosives, in matches, is a source of oxygen; can react violently with organic matter; explodes with  $H_2SO_4$  [MER06] [HAW93]
- **Solubility:** g/100 g soln, H<sub>2</sub>O: 3.2 (0°C), 7.9 (25°C), 36.0 (100°C) [KRU93]; ~1 g/50 mL glycerol; i alcohol [MER06]

Density, g/cm<sup>3</sup>: 2.32 [MER06]

Melting Point, °C: 368 [MER06]

**Boiling Point**, °C: decomposes to perchlorate

and  $O_2$  at >368 [MER06]

### 2420

Compound: Potassium chloride Synonym: sylvite Formula: KCl Molecular Formula: ClK Molecular Weight: 74.551 CAS RN: 7447-40-7 **Properties:** white, cub cryst or powd; -40 mesh with 99.999% purity; strong saline taste; enthalpy of fusion 26.53 kJ/mol; used in fertilizers, pharmaceutical preparations [MER06] [HAW93] [CER91] [CRC10] Solubility: g/100 g soln, H<sub>2</sub>O: 21.92 (0°C), 26.4 (25°C), 36.0 (100°C); equilibrium solid phase KCl at 25°C [KRU93]; 1 g/14 mL glycerol, 1 g/~250 mL alcohol [MER06]; 4.8088 ± 0.0024 mol/(kg H<sub>2</sub>O) at 25°C [RAR85b] Density, g/cm<sup>3</sup>: 1.984 [STR93] Melting Point, °C: 776 [DOU83] Boiling Point, °C: sublimes at 1500 [STR93] Thermal Expansion Coefficient: (volume) 100°C (0.887), 200°C (1.994), 400°C (4.850), 600°C (8.805) [CLA66]

# 2421

**Compound:** Potassium chlorochromate **Synonym:** Peligot's salt **Formula:** KCrO<sub>3</sub>Cl **Molecular Formula:** ClCrKO<sub>3</sub> **Molecular Weight:** 174.545 CAS RN: 16037-50-6
Properties: red or orange cryst; monocl; evolves chlorine when heated; used as an oxidizing agent [HAW93] [KIR78]
Solubility: s H<sub>2</sub>O, hydrolyzes [KIR78]
Density, g/cm<sup>3</sup>: 2.497 [KIR78]
Melting Point, °C: decomposes [KIR78]

### 2422

Compound: Potassium chromate Synonym: tarapacaite Formula: K<sub>2</sub>CrO<sub>4</sub> Molecular Formula: CrK<sub>2</sub>O<sub>4</sub> Molecular Weight: 194.191 CAS RN: 7789-00-6 Properties: yellow cryst; ortho-rhomb; used in analytical chemistry as a reagent and in inks [HAW93] [KIR78] Solubility: g/100 g H<sub>2</sub>O: 58.8 (0°C), 65.1 (25°C), 80.1 (100°C) [KRU93] Density, g/cm<sup>3</sup>: 2.732 [KIR78] Melting Point, °C: 971 [KIR78]

# 2423

Compound: Potassium chromium(III) oxalate trihydrate Synonym: potassium tris(oxalato) chromate Formula:  $K_3Cr(C_2O_4)_3 \cdot 3H_2O$ Molecular Formula:  $C_6H_6CrK_3O_{15}$ Molecular Weight: 487.396 CAS RN: 15275-09-9 Properties: black-green, monocl; hygr; prepared from reaction of oxalic acid, potassium oxalate, and potassium dichromate; used in tanning and dyeing wool [MER06] Solubility: s H\_2O [MER06]

### 2424

Compound: Potassium chromium(III) sulfate dodecahydrate
Synonym: chrome alum
Formula: CrK(SO<sub>4</sub>)<sub>2</sub> · 12H<sub>2</sub>O
Molecular Formula: CrH<sub>24</sub>KO<sub>20</sub>S<sub>2</sub>
Molecular Weight: 499.405
CAS RN: 7789-99-0
Properties: large, reddish violet to black; efflorescent; octahedral cub cryst; ruby red under transmitted light; aq solution is violet when cold, green when hot, color returns to violet on cooling; used in tanning, textile dyeing, ceramics [HAW93] [MER06]
Solubility: 4 parts cold, 2 parts boiling H<sub>2</sub>O [MER06]
Density, g/cm<sup>3</sup>: 1.813 [HAW93]

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Melting Point, °C: 89 [HAW93] Reactions: minus 10H<sub>2</sub>O at 100°C [HAW93]

# 2425

Compound: Potassium citrate Formula: K<sub>3</sub>C<sub>6</sub>H<sub>5</sub>O<sub>7</sub> Molecular Formula: C<sub>6</sub>H<sub>5</sub>K<sub>3</sub>O<sub>7</sub> Molecular Weight: 306.397 CAS RN: 866-84-2 Properties: used to modify the burning rate of papers [KIR78] Solubility: 60.91 g/100 g saturated solution in water (25°C) [MER06] Melting Point, °C: decomposes at 230 [KIR78]

## 2426

Compound: Potassium citrate monohydrate **Synonyms:** citric acid, tripotassium salt monohydrate Formula: KOOCCH<sub>2</sub>C(OH)(COOK)CH<sub>2</sub>COOK · H<sub>2</sub>O Molecular Formula: C<sub>6</sub>H<sub>7</sub>K<sub>3</sub>O<sub>8</sub> Molecular Weight: 324.412 CAS RN: 6100-05-6 Properties: colorless or white cryst or powd; deliq; cooling, saline taste, odorless; used as an antacid, as a sequestrant for metals and as a buffer in food [HAW93] **Solubility:** g anhydrous/100 g H<sub>2</sub>O: 153 (10°C), 172 (20°C), 194 (30°C) [LAN05]; 1 g/2.5 mL glycerol (dissolves slowly); sl s alcohol [MER06] [HAW93] Density, g/cm<sup>3</sup>: 1.98 [HAW93] Melting Point, °C: decomposes at 230 [HAW93] **Reactions:** minus H<sub>2</sub>O at 180°C [HAW93]

### 2427

Compound: Potassium cobalt(II) selenate hexahydrate Formula:  $K_2Co(SeO_4)_2 \cdot 6H_2O$ Molecular Formula:  $CoH_{12}K_2O_{14}Se_2$ Molecular Weight: 531.137 CAS RN: 28041-86-3 Properties: garnet red; monocl cryst; stable in air [MER06] Density, g/cm<sup>3</sup>: 2.514 [MER06]

# 2428

Compound: Potassium copper(I) cyanide Formula: KCu(CN)<sub>2</sub> Molecular Formula: C<sub>2</sub>CuKN<sub>2</sub> Molecular Weight: 150.679 CAS RN: 13682-73-0 Properties: white, cryst salt; used in copper plating baths [HAW93]

### 2429

Compound: Potassium cyanate Formula: KCNO Molecular Formula: CKNO Molecular Weight: 81.115 CAS RN: 590-28-3 Properties: white; cryst powd; used in herbicides, treatment of sickle cell anemia [MER06] [HAW93] Solubility: s H<sub>2</sub>O; v sl s alcohol [MER06] Density, g/cm<sup>3</sup>: 2.05 [MER06] Melting Point, °C: decomposes at 700–900 [HAW93]

# 2430

Compound: Potassium cyanide
Formula: KCN
Molecular Formula: CKN
Molecular Weight: 65.116
CAS RN: 151-50-8
Properties: white, deliq, granular powd or fused pieces; odor of hydrogen cyanide; gradually decomposed in moist air; enthalpy of fusion 1470 J/mol; enthalpy of solution 11700 J/mol [MER06] [KIR78]
Solubility: s in: 2 parts cold H<sub>2</sub>O, 1 part boiling H<sub>2</sub>O, 2 parts glycerol, 100 parts alcohol, 25 parts methanol [MER06]
Density, g/cm<sup>3</sup>: cub: 1.553 (20°C); orthorhomb 1.62 (-60°C) [KIR78]
Melting Point, °C: 634 [MER06]

# 2431

Compound: Potassium cyanoaurite Synonym: potassium dicyanoaurate(I) Formula: KAu(CN)<sub>2</sub> Molecular Formula: C<sub>2</sub>AuKN<sub>2</sub> Molecular Weight: 288.104 CAS RN: 13967-50-5 Properties: white, cryst powd; used in electrogilding [HAW93] Solubility: 1 g/7 mL H<sub>2</sub>O, 1 g/0.5 mL boiling H<sub>2</sub>O; sl s alcohol; i ether [MER06] Density, g/cm<sup>3</sup>: 3.45 [ALD94]

# 2432

**Compound:** Potassium dichromate **Synonym:** potassium bichromate **Formula:** K<sub>2</sub>Cr<sub>2</sub>O<sub>7</sub> **Molecular Formula:** Cr<sub>2</sub>K<sub>2</sub>O<sub>7</sub> **Molecular Weight:** 294.185 **CAS RN:** 7778-50-9 Properties: bright reddish orange cryst; tricl; not hygr or deliq; decomposes at ~500°C; oxidizing agent [KIR78] [MER06]
Solubility: g/100 g H<sub>2</sub>O: 4.6 (0°C), 15.0 (25°C), 97 (100°C); solid phase, K<sub>2</sub>Cr<sub>2</sub>O<sub>7</sub> [KRU93]
Density, g/cm<sup>3</sup>: 2.676 [KIR78]
Melting Point, °C: 398 [KIR78]
Boiling Point, °C: decomposes at -500 [LID94]

### 2433

Compound: Potassium dihydrogen arsenate
Synonym: Macquer's salt
Formula: KH<sub>2</sub>AsO<sub>4</sub>
Molecular Formula: AsH<sub>2</sub>KO<sub>4</sub>
Molecular Weight: 180.034
CAS RN: 7784-41-0
Properties: colorless cryst or white cryst mass or powd; used in preserving hides, to print textiles, in insecticides [HAW93] [MER06]
Solubility: g/100 g soln, H<sub>2</sub>O: 15.7 (0°C), 23.6 (25°C), 48.0 (100°C); solid phase, KH<sub>2</sub>AsO<sub>4</sub>·H<sub>2</sub>O (0°C, 25°C), KH<sub>2</sub>AsO<sub>4</sub> (100°C) [KRU93]; slowly s in 1.6 parts glycerol; i alcohol [MER06]
Density, g/cm<sup>3</sup>: 2.867 [HAW93]
Melting Point, °C: 288 [HAW93]

#### 2434

Compound: Potassium dihydrogen hypophosphite
Formula: KH<sub>2</sub>PO<sub>2</sub>
Molecular Formula: H<sub>2</sub>KO<sub>2</sub>P
Molecular Weight: 104.087
CAS RN: 7782-87-8
Properties: white cryst or granules; deliq; decomposes when strongly heated in air, evolving PH<sub>3</sub>; can explode when mixed with oxidizing agents, e.g., chlorates [MER06]
Solubility: 200 g/100 mL H<sub>2</sub>O (25°C) [CRC10]
Melting Point, °C: decomposes [CRC10]

### 2435

Compound: Potassium dihydrogen phosphate Synonym: potassium phosphate monobasic Formula: KH<sub>2</sub>PO<sub>4</sub> Molecular Formula: H<sub>2</sub>KO<sub>4</sub>P Molecular Weight: 136.085 CAS RN: 7778-77-0 Properties: tetr cryst or white granular powd; used in baking powd, in yeast foods, as a buffer, and accurate for

powd; used in baking powd, in yeast foods, as a buffer, and sequestrant for metals [HAW93] [MER06] [KIR82] Solubility: g/100g soln, H<sub>2</sub>O: 12.4 (0°C), 20.0 (25°C), 45.5 (90°C) [KRU93]; i alcohol [MER06] Density, g/cm<sup>3</sup>: 2.338 [HAW93] Melting Point, °C: 253 [HAW93] Reactions: minus H<sub>2</sub>O forming metaphosphate at 400°C [MER06]

### 2436

Compound: Potassium dihydrogen phosphite Synonym: potassium monobasic phosphite Formula: KH<sub>2</sub>PO<sub>3</sub> Molecular Formula: H<sub>2</sub>KO<sub>3</sub>P Molecular Weight: 120.086 CAS RN: 13598-36-2 Properties: white powd; hygr; slowly oxidized in air to the phosphate [HAW93] Solubility: 220 g/100 mL H<sub>2</sub>O (20°C) [CRC10] Melting Point, °C: decomposes [CRC10]

### 2437

Compound: Potassium dithionate Synonym: potassium hyposulfate Formula: K<sub>2</sub>(SO<sub>3</sub>)<sub>2</sub> Molecular Formula: K<sub>2</sub>O<sub>6</sub>S<sub>2</sub> Molecular Weight: 238.325 CAS RN: 13455-20-4 Properties: colorless cryst; used as an analytical reagent [HAW93] Solubility: g/100 g H<sub>2</sub>O: 2.6 (0°C), 6.6 (20°C), 9.3 (30°C) [LAN05]; i alcohol [HAW93] Density, g/cm<sup>3</sup>: 2.27 [HAW93] Melting Point, °C: decomposes [CRC10]

# 2438

Compound: Potassium ferricyanide Synonym: potassium hexacyanoferrate(III) Formula: K<sub>3</sub>Fe(CN)<sub>6</sub> Molecular Formula: C<sub>6</sub>FeK<sub>3</sub>N<sub>6</sub> Molecular Weight: 329.248 CAS RN: 13746-66-2 Properties: ruby red cryst or powd; lustrous; used to temper steel, as an etching liq, in electroplating [HAW93] [MER06] Solubility: g/100 g H<sub>2</sub>O: 30.2 (0°C), 46 (20°C), 70 (60°C) [LAN05]; s alcohol; decomposed by acids [MER06] Density, g/cm<sup>3</sup>: 1.89 [MER06] Melting Point, °C: decomposes [STR93]

### 2439

**Compound:** Potassium ferrocyanide trihydrate **Synonym:** potassium hexacyanoferrate(II) trihydrate **Formula:**  $K_4$ Fe(CN)<sub>6</sub> $\cdot$  3H<sub>2</sub>O Molecular Formula: C<sub>6</sub>H<sub>6</sub>FeK<sub>4</sub>N<sub>6</sub>O<sub>3</sub>
Molecular Weight: 422.390
CAS RN: 14459-95-1
Properties: lemon yellow; soft, sl efflorescent cryst; used in dyeing, in tempering steel [HAW93] [MER06]
Solubility: g anhydrous/100 g H<sub>2</sub>O: 14.3 (0°C), 28.2 (20°C), 74.2 (100°C) [LAN05]; i alcohol [HAW93]
Density, g/cm<sup>3</sup>: 1.85 [MER06]
Melting Point, °C: decomposes at 70 [STR93]
Reactions: begins to give up H<sub>2</sub>O at 60°C;

anhydrous by 100°C [MER06]

### 2440

**Compound:** Potassium fluoride **Formula:** KF **Molecular Formula:** FK **Molecular Weight:** 58.096

CAS RN: 7789-23-3

Properties: cub cryst; usually white, deliq powd; sharp saline taste; enthalpy of fusion 27.2 kJ/ mol; enthalpy of vaporization 173 kJ/mol; commercial preparation is from KOH and HF, followed by drying; used to etch glass, as a preservative [HAW93] [MER06] [CRC10]
Solubility: g/100 g soln, H<sub>2</sub>O: 30.90 (0°C), 50.41 (25°C), 60.01 (80°C); solid phase, KF · 4H<sub>2</sub>O (0°C), KF · 2H<sub>2</sub>O (25°C), KF (80°C) [KRU93]; s acids, HF, liq NH<sub>3</sub> [MER06]

Density, g/cm<sup>3</sup>: 2.481 [MER06] Melting Point, °C: 858 [CRC10] Boiling Point, °C: 1505 [MER06]

# 2441

Compound: Potassium fluoride dihydrate
Formula: KF · 2H<sub>2</sub>O
Molecular Formula: FH₄KO<sub>2</sub>
Molecular Weight: 94.127
CAS RN: 13455-21-5
Properties: white monocl cryst; has been used as stationary phase in gas chromatography [ALD94] [MER06]
Solubility: 349.3 g/100 mL H<sub>2</sub>O (18°C) [MER06]
Density, g/cm<sup>3</sup>: 2.454 [STR93]
Melting Point, °C: decomposes at 41 [LID94]

## 2442

**Compound:** Potassium fullerene **Formula:** K<sub>3</sub>C<sub>60</sub> **Molecular Formula:** C<sub>60</sub>K<sub>3</sub> **Molecular Weight:** 837.955 **CAS RN:** 137232-17-8 **Properties:** fcc, lattice constant 1.4253 nm; superconductor,  $T_c$  19.3 K; bulk modulus 28 GPa; cohesive energy 24.2 eV; enthalpy of formation 4.9 eV; density of states 25/ (eV/C<sub>60</sub>); electron effective mass 1.3; hole effective mass 1.5, 3.4; potential uses include optical limiter to protect materials from damage due to high light intensities and for the fabrication of industrial diamonds [DRE93]

#### 2443

Compound: Potassium gold(III) oxide trihydrate
Synonym: potassium aurate
Formula: KAuO<sub>2</sub> · 3H<sub>2</sub>O
Molecular Formula: AuH<sub>6</sub>KO<sub>5</sub>
Molecular Weight: 322.110
CAS RN: 12446-76-3
Properties: yellow cryst; used to prepare other gold compounds [HAW93]
Solubility: s H<sub>2</sub>O, alcohol [HAW93]
Melting Point, °C: decomposes [CRC10]

#### 2444

**Compound:** Potassium heptafluoroniobate **Formula:** K<sub>2</sub>NbF<sub>7</sub> **Molecular Formula:** F<sub>7</sub>K<sub>2</sub>Nb **Molecular Weight:** 304.092 **CAS RN:** 16924-03-1 **Properties:** lump [ALF95]

# 2445

Compound: Potassium heptafluorotantalate
Formula: K<sub>2</sub>TaF<sub>7</sub>
Molecular Formula: F<sub>7</sub>K<sub>2</sub>Ta
Molecular Weight: 392.134
CAS RN: 16924-00-8
Properties: colorless, rhomb needles when crystallized from solution containing HF, KF, and tantalum fluoride [KIR83]
Solubility: hydrolyzes in H<sub>2</sub>O [KIR83]
Density, g/cm<sup>3</sup>: 5.24 [KIR83]
Melting Point, °C: 740 [KIR83]

### 2446

**Compound:** Potassium heptaiodobismuthate **Synonym:** bismuth potassium iodide **Formula:** K<sub>4</sub>BiI<sub>7</sub> **Molecular Formula:** BiI<sub>7</sub>K<sub>4</sub> **Molecular Weight:** 1253.704

# CAS RN: 41944-01-8

Properties: red cryst; used to precipitate vitamins and antibiotics from aq solutions [HAW93] [MER06]
Solubility: decomposes in H<sub>2</sub>O; s alkali iodide soln [MER06]

### 2447

Compound: Potassium hexabromoplatinate(IV) Formula: K<sub>2</sub>PtBr<sub>6</sub> Molecular Formula: Br<sub>6</sub>K<sub>2</sub>Pt Molecular Weight: 752.701 CAS RN: 16920-93-7 Properties: reddish brown powd; hygr [STR93] Density, g/cm<sup>3</sup>: 4.66 [STR93] Melting Point, °C: decomposes at 400 [STR93]

# 2448

Compound: Potassium hexachloroiridate(IV) Formula: K<sub>2</sub>IrCl<sub>6</sub> Molecular Formula: Cl<sub>6</sub>IrK<sub>2</sub> Molecular Weight: 483.130 CAS RN: 16920-56-2 Properties: black powd; hygr; there is also K<sub>3</sub>IrCl<sub>6</sub>, CAS RN 14024-41-0 [STR93] [ALD94] Density, g/cm<sup>3</sup>: 3.546 [STR93] Melting Point, °C: decomposes [STR93]

# 2449

Compound: Potassium hexachloroosmiate(IV) Formula: K<sub>2</sub>O<sub>5</sub>Cl<sub>6</sub> Molecular Formula: Cl<sub>6</sub>K<sub>2</sub>O<sub>5</sub> Molecular Weight: 481.143 CAS RN: 16871-60-6 Properties: dark red to almost black; cub cryst; hygr [STR93] [MER06] Solubility: v s H<sub>2</sub>O; sl s alcohol [MER06] Density, g/cm<sup>3</sup>: 3.42 [ALD94] Melting Point, °C: decomposes at 600 [ALD94]

# 2450

**Compound:** Potassium hexachloropalladate(IV) **Formula:** K<sub>2</sub>PdCl<sub>6</sub> **Molecular Formula:** Cl<sub>6</sub>K<sub>2</sub>Pd **Molecular Weight:** 397.333 **CAS RN:** 16919-73-6 **Properties:** red powd; hygr [STR93] **Density, g/cm<sup>3</sup>:** 2.738 [STR93]

### 2451

Compound: Potassium hexachloroplatinate(IV)
Formula: K<sub>2</sub>PtCl<sub>6</sub>
Molecular Formula: Cl<sub>6</sub>K<sub>2</sub>Pt
Molecular Weight: 485.993
CAS RN: 16921-30-5
Properties: small, yellowish orange cryst or powd; used in photography and as a reagent [HAW93]
Solubility: g/100 g H<sub>2</sub>O: 0.48 (0°C), 0.78 (20°C), 5.03 (100°C) [LAN05]; i alcohol [HAW93]
Density, g/cm<sup>3</sup>: 3.50 [HAW93]
Melting Point, °C: decomposes at 250 [HAW93]

## 2452

**Compound:** Potassium hexachlororhenate(IV) **Formula:** K<sub>2</sub>ReCl<sub>6</sub> **Molecular Formula:** Cl<sub>6</sub>K<sub>2</sub>Re **Molecular Weight:** 477.120 **CAS RN:** 16940-97-9 **Properties:** green powd; hygr [STR93] **Density, g/cm<sup>3</sup>:** 3.34 [STR93]

### 2453

Compound: Potassium tetracyanocadmium Synonym: cadmium potassium cyanide Formula: K<sub>2</sub>Cd(CN)<sub>4</sub> Molecular Formula: C<sub>4</sub>CdK<sub>2</sub>N<sub>4</sub> Molecular Weight: 294.679 CAS RN: 14402-75-6 Properties: highly refractive, cub cryst; when heated, melts to colorless liq, solidifying to a gray, cryst mass on cooling [MER06] Solubility: s 3 parts cold H<sub>2</sub>O, 1 part hot H<sub>2</sub>O [MER06] Density, g/cm<sup>3</sup>: 1.846 [MER06] Melting Point, °C: ~450 [MER06]

### 2454

Compound: Potassium hexacyanocobalt(III)
Synonym: potassium cobalticyanide
Formula: K<sub>3</sub>Co(CN)<sub>6</sub>
Molecular Formula: C<sub>6</sub>CoK<sub>3</sub>N<sub>6</sub>
Molecular Weight: 332.334
CAS RN: 13963-58-1
Properties: faintly yellow, monocl cryst when obtained from H<sub>2</sub>O; sensitive to light; unstable if stored, generating HCN [MER06]
Solubility: v s H<sub>2</sub>O, acetic acid solutions; i alcohol [MER06]
Density, g/cm<sup>3</sup>: 1.906 [MER06]
Melting Point, °C: decomposes, forming

olive green mass [MER06]

**Compound:** Potassium hexacyanoplatinate(IV) **Formula:** K<sub>2</sub>Pt(CN)<sub>6</sub> **Molecular Formula:** C<sub>6</sub>K<sub>2</sub>N<sub>6</sub>Pt **Molecular Weight:** 429.383 **CAS RN:** 16920-94-8 **Properties:** white powd [STR93]

# 2456

**Compound:** Potassium hexafluoroantimonate **Formula:** KSbF<sub>6</sub> **Molecular Formula:** F<sub>6</sub>KSb **Molecular Weight:** 274.846 **CAS RN:** 16893-92-8 **Properties:** -6 mesh of 99.9% purity [CER91]

# 2457

**Compound:** Potassium hexafluoroarsenate(V) **Formula:** KAsF<sub>6</sub> **Molecular Formula:** AsF<sub>6</sub>K **Molecular Weight:** 228.010 **CAS RN:** 17029-22-0 **Properties:** grayish white cryst [STR93] **Melting Point, °C:** 400 [STR93]

# 2458

Compound: Potassium hexafluorogermanate Formula:  $K_2GeF_6$ Molecular Formula:  $F_6GeK_2$ Molecular Weight: 264.797 CAS RN: 7783-73-5 Properties: white cryst; stable up to 500°C [HAW93] Solubility: g/100 g H<sub>2</sub>O: 0.25 (0°C), 0.50 (20°C), 0.96 (40°C) [LAN05]; s alcohol [HAW93] Melting Point, °C: 730 [CRC10] Boiling Point, °C: ~835 [CRC10]

# 2459

Compound: Potassium hexafluoromanganate(IV) Formula:  $K_2MnF_6$ Molecular Formula:  $F_6K_2Mn$ Molecular Weight: 247.125 CAS RN: 16962-31-5 Properties: golden yellow; hex platelets; turns brown when heated, but returns to original color when cooled [MER06] Solubility: hydrolyzed in H<sub>2</sub>O, precipitates MnO<sub>4</sub> [MER06] Melting Point, °C: decomposes [CRC10]

### 2460

Compound: Potassium hexafluoronickelate(IV) Synonym: potassium nickel(IV) fluoride Formula: K<sub>2</sub>NiF<sub>6</sub> Molecular Formula: F<sub>6</sub>K<sub>2</sub>Ni Molecular Weight: 250.880 CAS RN: 17218-47-2 Properties: powd; can be a source of F<sub>2</sub> because F<sub>2</sub> is evolved when the compound is heated [STR93] Melting Point, °C: decomposes at 400 [STR93]

## 2461

Compound: Potassium hexafluorophosphate Formula:  $KPF_6$ Molecular Formula:  $F_6KP$ Molecular Weight: 184.062 CAS RN: 17084-13-8 Properties: white cryst; hygr [ALD94] [STR93] Solubility: 9.3 g/100 mL H<sub>2</sub>O (25°C), 20.6 g/100 mL H<sub>2</sub>O (50°C) [CRC10] Density, g/cm<sup>3</sup>: 2.55 [STR93] Melting Point, °C: ~575 [STR93] Boiling Point, °C: decomposes [STR93]

## 2462

Compound: Potassium hexafluorosilicate
Synonym: hieratite
Formula: K<sub>2</sub>SiF<sub>6</sub>
Molecular Formula: F<sub>6</sub>K<sub>2</sub>Si
Molecular Weight: 220.273
CAS RN: 16871-90-2
Properties: white fine powd or cryst; used to manufacture opalescent glass, used in porcelain enamel and as an insecticide [MER06]
Solubility: g/100 g H<sub>2</sub>O: 0.077 (0°C), 0.151 (20°C), 0.253 (40°C) [LAN05]; hydrolyzes in hot water to KF, HF, and silicic acid; i alcohol [MER06]
Density, g/cm<sup>3</sup>: 2.27 [MER06]
Melting Point, °C: decomposes [STR93]

# 2463

Compound: Potassium hexafluorotitanate monohydrate Formula:  $K_2 TiF_6 \cdot H_2 O$ Molecular Formula:  $F_6 H_2 K_2 OTi$ Molecular Weight: 258.082 CAS RN: 16919-27-0 Properties: colorless; monocl [CRC10] Solubility: g/100 g H<sub>2</sub>O: 0.55 (0°C), 0.91 (10°C), 1.28 (20°C) [LAN05] Melting Point, °C: 780 [CRC10] Reactions: minus H<sub>2</sub>O at 32°C [CRC10]

Compound: Potassium hexafluorozirconate Formula:  $K_2ZrF_6$ Molecular Formula:  $F_6K_2Zr$ Molecular Weight: 283.411 CAS RN: 16923-95-8 Properties: colorless, monocl cryst [MER06] [CRC10] Solubility: 0.781 g/100 mL H<sub>2</sub>O (2°C), 25 g/100 mL H<sub>2</sub>O (100°C) [CRC10] Density, g/cm<sup>3</sup>: 3.48 [CRC10]

# 2465

Compound: Potassium hexametaphosphite Formula: (KPO<sub>3</sub>)<sub>6</sub> Molecular Formula: K<sub>6</sub>O<sub>18</sub>P<sub>6</sub> Molecular Weight: 708.420 CAS RN: 7790-53-6 Properties: white powd; hygr [CRC10] [STR93] Solubility: g/100 mL soln, H<sub>2</sub>O: 0.0041 (25°C) [KRU93] Density, g/cm<sup>3</sup>: 1.207 [CRC10] Melting Point, °C: 807 [STR93] Boiling Point, °C: 1320 [CRC10]

# 2466

Compound: Potassium hexanitritocobalt(III) Synonym: Fischer's salt Formula:  $K_3Co(NO_2)_6$ Molecular Formula:  $CoK_3N_6O_{12}$ Molecular Weight: 452.261 CAS RN: 66942-97-0 Properties: yellow cryst powd [HAW93] Solubility: 0.9 g/100 mL H<sub>2</sub>O (17°C), decomposed by hot H<sub>2</sub>O [CRC10] Melting Point, °C: decomposes at 200 [HAW93]

# 2467

**Compound:** Potassium hexanitritorhodate(III) **Formula:** K<sub>3</sub>Rh(NO<sub>2</sub>)<sub>6</sub> **Molecular Formula:** K<sub>3</sub>N<sub>6</sub>O<sub>12</sub>Rh **Molecular Weight:** 496.234 **CAS RN:** 17712-66-2 **Properties:** white powd [STR93]

# 2468

**Compound:** Potassium hexathiocyanoplatinate(IV) **Formula:** K<sub>2</sub>Pt(SCN)<sub>6</sub> **Molecular Formula:** C<sub>6</sub>K<sub>2</sub>N<sub>6</sub>PtS<sub>6</sub> **Molecular Weight:** 621.779 **CAS RN:** 17069-38-4 **Properties:** carmine red cryst [MER06] **Solubility:** s H<sub>2</sub>O [MER06]

#### 2469

Compound: Potassium hydride Formula: KH Molecular Formula: HK Molecular Weight: 40.106 CAS RN: 7693-26-7 Properties: white needles; slurry of gray powd in oil; sensitive to atm oxygen and moisture [STR93] [CRC10] Solubility: decomposed by H<sub>2</sub>O [CRC10] Density, g/cm<sup>3</sup>: 1.47 [CRC10] Melting Point, °C: decomposes [CRC10]

### 2470

Compound: Potassium hydrogen arsenite
Formula: KAsO<sub>2</sub> · HAsO<sub>2</sub>
Molecular Formula: As<sub>2</sub>HKO<sub>4</sub>
Molecular Weight: 253.947
CAS RN: 10124-50-2
Properties: white hygr powd; gradually decomposed by atm CO<sub>2</sub>; used in the manufacture of silver mirrors to reduce silver salts to metallic silver [MER06]
Solubility: s H<sub>2</sub>O [MER06]

### 2471

Compound: Potassium hydrogen carbonate
Synonym: potassium bicarbonate
Formula: KHCO<sub>3</sub>
Molecular Formula: CHKO<sub>3</sub>
Molecular Weight: 100.115
CAS RN: 298-14-6
Properties: monocl transparent cryst, white granules or powd; sl alkaline or salty taste; obtained by addition of CO<sub>2</sub> to a solution of potassium carbonate; used in baking powd, soft drinks, as an antacid [HAW93] [MER06] [KIR82]
Solubility: g/100 g soln, H<sub>2</sub>O: 18.6 (0°C), 26.6 (25°C); solid phase, KHCO<sub>3</sub> [KRU93]; i alcohol [MER06]
Density, g/cm<sup>3</sup>: 2.17 [HAW93]
Melting Point, °C: decomposes at 100–120 [HAW93]

# 2472

Compound: Potassium hydrogen fluoride Formula: KHF<sub>2</sub> Molecular Formula: F<sub>2</sub>HK Molecular Weight: 78.103 CAS RN: 7789-29-9 Properties: colorless tetr cryst; decomposed by heat; enthalpy of fusion 6.62 kJ/mol; produced by reaction of KOH or K<sub>2</sub>CO<sub>3</sub> with HF; used to etch glass, as a

flux for silver solders [HAW93] [MER06] [CRC10]

Solubility: g/100 mL H<sub>2</sub>O: 30.1 (10°C), 39.2 (20°C), 114.0 (80°C); s dil alcohol; i absolute alcohol [MER06] Density, g/cm<sup>3</sup>: 2.37 [MER06] Melting Point, °C: 238.7 [MER06]

### 2473

Compound: Potassium hydrogen iodate Synonym: potassium acid iodate Formula: KH(IO<sub>3</sub>)<sub>2</sub> Molecular Formula: HI<sub>2</sub>KO<sub>6</sub> Molecular Weight: 389.911 CAS RN: 13455-24-8 Properties: colorless monocl or rhomb cryst; used as an alkalimetric standard [KIR81] Solubility: 9.15 parts/100 parts H<sub>2</sub>O at 50°C [KIR81]

# 2474

**Compound:** Potassium hydrogen oxalate hemihydrate **Synonyms:** potassium binoxalate, sorrel salt **Formula:**  $KHC_2O_4 \cdot 1/2H_2O$  **Molecular Formula:**  $C_2H_2KO_{4.5}$  **Molecular Weight:** 137.133 **CAS RN:** 127-95-7 **Properties:** white, odorless cryst; bitter sharp

taste; somewhat hygr; used to remove ink stains, in scouring metals, cleaning wood; decomposes when heated [HAW93] [MER06] **Solubility:** s 40 parts cold H<sub>2</sub>O, 6 parts

boiling H<sub>2</sub>O [MER06] **Density, g/cm<sup>3</sup>:** 2.088 [HAW93]

# 2475

Compound: Potassium hydrogen phosphite
Formula: K<sub>2</sub>HPO<sub>3</sub>
Molecular Formula: HK<sub>2</sub>O<sub>3</sub>P
Molecular Weight: 158.177
CAS RN: 13492-26-7
Properties: white; deliq powd; slowly oxidized in air to the phosphate; decomposed by heating [MER06]
Solubility: v s H<sub>2</sub>O; i alcohol [MER06]

### 2476

**Compound:** Potassium hydrogen selenite **Synonym:** potassium biselenite **Formula:** KHSeO<sub>3</sub> **Molecular Formula:** HKO<sub>3</sub>Se **Molecular Weight:** 167.064 **CAS RN:** 7782-70-9 Properties: ortho-rhomb prisms; very deliq; selenium oxide liberated by heating at >100°C [MER06]
Solubility: s H<sub>2</sub>O; sl s alcohol [MER06]
Reactions: slowly loses H<sub>2</sub>O at 100°C [MER06]

#### 2477

**Compound:** Potassium hydrogen sulfate Synonyms: mercallite, misenite Formula: KHSO<sub>4</sub> **Molecular Formula:** HKO<sub>4</sub>S Molecular Weight: 136.170 CAS RN: 7646-93-7 **Properties:** white delig monocl or rhomb cryst; used as a flux and in the manufacture of mixed fertilizers [HAW93] [MER06] [KIR82] **Solubility:** g/100 g soln, H<sub>2</sub>O: 26.6 (0°C), 34.0 (25°C), 54.9 (100°C) [KRU93] Density, g/cm<sup>3</sup>: 2.322 [STR93] Melting Point, °C: 210 [KIR82] Boiling Point, °C: decomposes [STR93] **Reactions:** gives up H<sub>2</sub>O at high temp to form pyrosulfate [MER06]

# 2478

Compound: Potassium hydrogen sulfide hemihydrate
Formula: KHS · 1/2H<sub>2</sub>O
Molecular Formula: H<sub>2</sub>KO<sub>0.5</sub>S
Molecular Weight: 81.180
CAS RN: 1310-61-8
Properties: tetr; turns yellow rapidly in air, forming polysulfides and H<sub>2</sub>S; forms dark red liq when melted [MER06]
Solubility: v s H<sub>2</sub>O, alcohol [MER06]
Density, g/cm<sup>3</sup>: 1.70 [MER06]
Melting Point, °C: 450–510 [MER06]
Reactions: loses H<sub>2</sub>O at 175°C–200°C [MER06]

### 2479

Compound: Potassium hydrogen sulfite
Synonym: potassium bisulfite
Formula: KHSO<sub>3</sub>
Molecular Formula: HKO<sub>3</sub>S
Molecular Weight: 120.170
CAS RN: 7773-03-7
Properties: white, cryst powd; odor of sulfur dioxide; preparation: passing SO<sub>2</sub> through aq solution of K<sub>2</sub>CO<sub>3</sub>; uses: antiseptic, bleaching straw and textiles, reduce various organic compounds [HAW93]
Solubility: s H<sub>2</sub>O; i alcohol [HAW93]

Melting Point, °C: decomposes at 190 [HAW93]

**Compound:** Potassium hydrogen tartrate **Synonyms:** tartaric acid, monopotassium salt **Formula:** KOOCCH(OH)CH(OH)COOH **Molecular Formula:** C<sub>4</sub>H<sub>5</sub>KO<sub>6</sub> **Molecular Weight:** 188.178 **CAS RN:** 868-14-4

Properties: colorless cryst or white, cryst powd; pleasant acidic taste; used in baking powd, medicine, as a food additive [HAW93] [MER06]
Solubility: g/100 g H<sub>2</sub>O: 0.231 (0°C), 0.523 (20°C),

0.762 (30°C) [LAN05]; v s dil mineral acids, solutions of alkalies [MER06] **Density, g/cm<sup>3</sup>:** 1.984 [HAW93]

### 2481

Compound: Potassium hydroxide Formula: KOH Molecular Formula: HKO Molecular Weight: 56.105 CAS RN: 1310-58-3 Properties: white or sl yellow lumps, rods, pellets; rhomb; deliq; absorbs H<sub>2</sub>O and CO<sub>2</sub> from air; enthalpy of fusion 8.60 kJ/ mol; manufactured by electrolysis of KCl solutions; used in soap manufacture, for bleaching [HAW93] [MER06] [KIR82] Solubility: g/100 g soln, H<sub>2</sub>O: 49.00 (0°C), 54.27 (25°C), 64.59 (100°C); solid phase, KOH · 2H<sub>2</sub>O (0°C, 25°C), KOH·H<sub>2</sub>O (100°C) [KRU93]; s 3 parts alcohol, 2.5 parts glycerol [MER06] Density, g/cm<sup>3</sup>: 2.044 [STR93]

Melting Point, °C: 406 [LID94] Boiling Point, °C: 1324 [STR93]

### 2482

Compound: Potassium iodate Formula: KIO<sub>3</sub> Molecular Formula: IKO<sub>3</sub> Molecular Weight: 214.001 CAS RN: 7758-05-6 Properties: white, odorless, monocl cryst or powd; -80 mesh with 99.9% purity; can be prepared by electrochemical oxidation of KI; forms KIO<sub>2</sub>F<sub>2</sub> when reacted with HF [KIR81] [MER06] [CER91] Solubility: g/100 g soln, H<sub>2</sub>O: 4.4 (0°C), 8.4 (25°C), 24.4 (100°C) [KRU93]; i alcohol [MER06] Density, g/cm<sup>3</sup>: 3.979 [KIR81] Melting Point, °C: partially decomposes at 560 [MER06]

#### 2483

Compound: Potassium iodide Formula: KI Molecular Formula: IK Molecular Weight: 166.003

CAS RN: 7681-11-0

- Properties: colorless or white; cub cryst, white granules, or powd; -20 mesh with 99.999% purity; sl deliq in moist air; liberates iodine if exposed to air for a lengthy time; sensitive to light; strong, bitter, saline taste; enthalpy of fusion 24.00kJ/mol; produced by dissolution of I<sub>2</sub> in KOH solutions; used in infrared transmission instrumentation, as a dietary supplement [HAW93] [MER06] [KIR82] [CER91] [CRC10]
  Solubility: g/100 g H<sub>2</sub>O: 127.5 (0°C), 148 (25°C),
- $207.2 \pm 0.8$  (100°C); solid phase, KI [KRU93]; 1 g/22 mL alcohol, 1 g/8 mL boiling alcohol, 1 g/51 mL absolute alcohol [MER06]
- Density, g/cm<sup>3</sup>: 3.123 [HAW93]
- Melting Point, °C: 681 [CRC10]
- Boiling Point, °C: 1330 [HAW93]
- **Thermal Expansion Coefficient:** (volume) 100°C (0.90), 200°C (2.04), 400°C (4.92) [CLA66]

# 2484

Compound: Potassium magnesium chloride sulfate Synonym: kainite Formula: MgSO<sub>4</sub> · KCl · 3H<sub>2</sub>O Molecular Formula: ClH<sub>6</sub>KMgO<sub>7</sub>S Molecular Weight: 248.966 CAS RN: 1318-72-5 Properties: natural hydrated double salt; white, gray, reddish, or colorless; vitreous luster; hardness is 2.5–3; used as a fertilizer [HAW93] Solubility: 79.56 g/100 mL H<sub>2</sub>O (18°C) [CRC10] Density, g/cm<sup>3</sup>: 2.131 [CRC10]

#### 2485

Compound: Potassium magnesium sulfate Synonym: langbeinite Formula:  $K_2SO_4 \cdot 2MgSO_4$ Molecular Formula:  $K_2Mg_2O_{12}S_3$ Molecular Weight: 414.998 CAS RN: 13826-56-7 Properties: white, tetr cryst; used in fertilizers [HAW93] Solubility: g/100 g H<sub>2</sub>O: 14.0 (0°C), 25.0 (20°C), 63.4 (80°C) [LAN05] Density, g/cm<sup>3</sup>: 2.829 [HAW93] Melting Point, °C: 927 [HAW93]

Compound: Potassium manganate
Formula: K<sub>2</sub>MnO<sub>4</sub>
Molecular Formula: K<sub>2</sub>MnO<sub>4</sub>
Molecular Weight: 197.133
CAS RN: 10294-64-1
Properties: dark green cryst; oxidizing agent, liberates Cl<sub>2</sub> from HCl; used in bleaching skins, fibers, oils, as a disinfectant [HAW93] [MER06]
Solubility: s H<sub>2</sub>O; s and stable in KOH solutions [MER06]
Melting Point, °C: decomposes at 190 [MER06]

## 2487

**Compound:** Potassium metaarsenite monohydrate **Formula:**  $KH(AsO_2)_2 \cdot H_2O$  **Molecular Formula:**  $As_2H_3KO_5$  **Molecular Weight:** 271.962 **CAS RN:** 10124-50-2 **Properties:** white powd; hygr; decomposes slowly in air; used as a reducing agent in silvering mirrors [HAW93] **Solubility:** s  $H_2O$ , sl s in alcohol [HAW93]

# 2488

Compound: Potassium molybdate Formula:  $K_2MoO_4$ Molecular Formula:  $K_2MoO_4$ Molecular Weight: 238.135 CAS RN: 13446-49-6 Properties: white, deliq, microcryst powd; -200 mesh with 99.9% purity; isomorphous with  $K_2SO_4$ ,  $K_2CrO_4$  [KIR81] [HAW93] [CER91] Solubility: g/100g soln,  $H_2O$ : 64.57 ± 0.1 (25°C), 66.54 (89.96°C); solid phase,  $K_2MoO_4$  [KRU93] Density, g/cm<sup>3</sup>: 2.342 [KIR81] Melting Point, °C: 919 [HAW93]

### 2489

Compound: Potassium monohydrogen phosphate Synonym: potassium dibasic phosphate Formula:  $K_2HPO_4$ Molecular Formula:  $HK_2O_4P$ Molecular Weight: 174.176 CAS RN: 7758-11-4 Properties: white somewhat hygr powd; ignited to pyrophosphate [MER06] Solubility: g/100 g soln,  $H_2O$ : 45.8 ± 0.3 (0°C),  $62.4 \pm 0.4$  (25°C), 73.8 (99.4°C); solid phase,  $K_2HPO_4 \cdot 6H_2O$  (0°C),  $K_2HPO_4 \cdot 3H_2O$  (25°C),  $K_2HPO_4$  (99.4°C) [KRU93]; sl s alcohol [MER06] Melting Point, °C: decomposes [CRC10]

### 2490

Compound: Potassium monoxide Synonym: potassium oxide Formula: K<sub>2</sub>O Molecular Formula: K<sub>2</sub>O Molecular Weight: 94.196 CAS RN: 12136-45-7 Properties: gray cryst mass; hygr [CRC10] [HAW93] Solubility: s H<sub>2</sub>O, forming KOH; s alcohol and ether [HAW93] Density, g/cm<sup>3</sup>: 2.32 (0°C) [HAW93] Melting Point, °C: decomposes at 350 [HAW93]

# 2491

Compound: Potassium nickel sulfate hexahydrate Synonym: nickel potassium sulfate Formula:  $K_2SO_4 \cdot NiSO_4 \cdot 6H_2O$ Molecular Formula:  $H_{12}K_2NiO_{14}S_2$ Molecular Weight: 437.109 CAS RN: 10294-65-2 Properties: blueish green cryst; prepared by crystallization from an aq solution; has limited use as a dye mordant and in metal finishing [KIR81] [HAW93] Solubility: g/100 g H\_2O: 3.37 (0°C), 5.94 (20°C), 33.4 (100°C) [LAN05] Density, g/cm<sup>3</sup>: 2.124 [HAW93] Melting Point, °C: decomposes at <100 [CRC10]

### 2492

Compound: Potassium niobate Formula: KNbO<sub>3</sub> Molecular Formula: KNbO<sub>3</sub> Molecular Weight: 180.002 CAS RN: 12030-85-2 Properties: -100 mesh with 99.9% purity; white powd [STR93] [CER91]

# 2493

Compound: Potassium niobate hexadecahydrate Formula:  $K_8Nb_6O_{19} \cdot 16H_2O$ Molecular Formula:  $H_{32}K_8Nb_6O_{35}$ Molecular Weight: 1462.457 CAS RN: 12502-31-7 Properties: large monocl cryst; forms supersaturated solutions in water [KIR81] Solubility: saturated soln is 425 g/100 g H<sub>2</sub>O at room temp, more soluble in hot H<sub>2</sub>O [KIR81]

**Compound:** Potassium nitrate **Synonym:** saltpeter **Formula:** KNO<sub>3</sub> **Molecular Formula:** KNO<sub>3</sub> **Molecular Weight:** 101.103

CAS RN: 7757-79-1

- Properties: colorless, transparent prisms, white granular, or rhomb and trig cryst powd; cools when dissolved in H<sub>2</sub>O; enthalpy of fusion 10.10kJ/mol; manufactured by reaction of KCl and HNO<sub>3</sub>, with Cl<sub>2</sub> as a by-product [MER06] [KIR82] [CRC10]
- **Solubility:** g/100 g soln, H<sub>2</sub>O: 11.7 (0°C), 27.5 (25°C), 71.0 (100°C) [KRU93]; 1 g/620 mL alcohol; s glycerol; i absolute alcohol [MER06]

**Density, g/cm<sup>3</sup>:** 2.109 [STR93]

Melting Point, °C: 333 [MER06]

**Boiling Point, °C:** decomposes at 400,

evolving oxygen [MER06]

# 2495

Compound: Potassium nitrite
Formula: KNO<sub>2</sub>
Molecular Formula: KNO<sub>2</sub>
Molecular Weight: 85.104
CAS RN: 7758-09-0
Properties: white or sl yellow; deliq granules or rods; decomposed by acids, evolving brown fumes of nitrous anhydride [MER06]
Solubility: g/100 g soln, H<sub>2</sub>O: 73.7 (0°C), 75.75 (25°C), 80.2 (100°C); solid phase, KNO<sub>2</sub> [KRU93]; sl s alcohol [MER06]
Density, g/cm<sup>3</sup>: 1.915 [MER06]
Melting Point, °C: decomposes at 350 [ALD94]
Boiling Point, °C: explodes at 537 [HAW93]

### 2496

**Compound:** Potassium nitroprusside dihydrate **Formula:**  $K_2[Fe(CN)_5(NO)] \cdot 2H_2O$  **Molecular Formula:**  $C_5H_4FeK_2N_6O_3$  **Molecular Weight:** 330.167 **CAS RN:** 14709-57-0 **Properties:** garnet red; hygr cryst [MER06] **Solubility:** 100 g/100 mL H<sub>2</sub>O (16°C) [CRC10]

# 2497

**Compound:** Potassium osmate dihydrate **Formula:**  $K_2OsO_4 \cdot 2H_2O$ **Molecular Formula:**  $H_4K_2O_6Os$ **Molecular Weight:** 368.455 **CAS RN:** 19718-36-6 Properties: purple powd; hygr rhomb cryst; slowly decomposes in aq solution, forming tetroxide [STR93] [MER06] [KIR82]
Solubility: s H<sub>2</sub>O; i alcohol, ether [MER06]
Reactions: minus H<sub>2</sub>O at 200°C [KIR82]

# 2498

Compound: Potassium oxalate monohydrate Formula:  $K_2C_2O_4 \cdot H_2O$ Molecular Formula:  $C_2H_2K_2O_5$ Molecular Weight: 184.232 CAS RN: 6487-48-5 Properties: colorless, odorless cryst; efflorescent in warm, dry air; converted to carbonate by ignition [MER06] Solubility: g/100 g soln,  $H_2O$ : 29.32 ± 0.04 (0°C), 27.4 (25°C), 44.5 (100°C); solid phase  $K_2C_2O_4 \cdot H_2O$  [KRU93] Density, g/cm<sup>3</sup>: 2.13 [MER06] Melting Point, °C: decomposes when heated [HAW93] Reactions: minus  $H_2O$  at ~160°C [MER06]

# 2499

Compound: Potassium pentaborate octahydrate Formula:  $K_2B_{10}O_{16} \cdot 8H_2O$ Molecular Formula:  $B_{10}H_{16}K_2O_{24}$ Molecular Weight: 586.420 CAS RN: 12229-13-9 Properties: ortho-rhomb, white powd; enthalpy of dehydration 110.8 kJ/mol from 106.5°C-134°C [STR93] [KIR78] Solubility: % anhydrous by weight, H<sub>2</sub>O: 1.56 (0°C), 3.28 (25°C), 6.88 (50°C), 22.3 (100°C) [KIR78] Density, g/cm<sup>3</sup>: 1.74 [KIR78] Melting Point, °C: 780 [STR93]

### 2500

 Compound: Potassium pentachloronitrosyl iridium(III) hydrate
 Formula: KIr(NO)Cl<sub>5</sub> ⋅ xH<sub>2</sub>O
 Molecular Formula: Cl<sub>5</sub>IrKNO (anhydrous)
 Molecular Weight: 438.588 (anhydrous)
 CAS RN: 22594-86-1
 Properties: brown cryst [STR93]

### 2501

**Compound:** Potassium pentachlororuthenate(III) hydrate **Formula:**  $K_2RuCl_5 \cdot xH_2O$ **Molecular Formula:**  $Cl_5K_2Ru$  (anhydrous) **Molecular Weight:** 356.530 (anhydrous) **CAS RN:** 14404-33-2 **Properties:** brown powd [STR93]

Compound: Potassium perborate monohydrate Synonym: potassium peroxyborate Formula:  $2KBO_3 \cdot H_2O$ Molecular Formula:  $B_2H_2K_2O_7$ Molecular Weight: 213.831 CAS RN: 28876-88-2 Properties: white cryst; formula also given as a hemihydrate [CRC10] Solubility: g/100 g H<sub>2</sub>O: 1.25 (0°C) [KRU93] Melting Point, °C: decomposes at 150 [CRC10] Reactions: minus O<sub>2</sub> at 100°C [CRC10]

# 2503

Compound: Potassium percarbonate monohydrate Synonym: potassium peroxycarbonate Formula:  $K_2C_2O_6 \cdot H_2O$ Molecular Formula:  $C_2H_2K_2O_7$ Molecular Weight: 216.231 CAS RN: 589-97-9 Properties: white, granular mass; sensitive to light [MER06] Solubility: 1 part/15 parts cold  $H_2O$ ; evolves  $O_2$  in hot  $H_2O$  [MER06] Melting Point, °C: 200–300 [HAW93]

# 2504

Compound: Potassium perchlorate
Formula: KClO<sub>4</sub>
Molecular Formula: ClKO<sub>4</sub>
Molecular Weight: 138.549
CAS RN: 7778-74-7
Properties: hygr; colorless cryst or white powd; oxidizing agent, reacts with organic matter, other oridizable materials analyze O if

other oxidizable material; evolves  $O_2$  if heated; can decompose by concussion; used in explosives, photography, pyrotechnics, and flares [HAW93] [MER06] [STR93]

**Solubility:** g/100 g soln, H<sub>2</sub>O: 0.75 (0°C), 2.03 (25°C), 18.2 (100°C); solid phase, KClO<sub>4</sub> [KRU93] **Density, g/cm<sup>3</sup>:** 2.52 [MER06]

Melting Point, °C: decomposes at 400 [MER06]; 610 [STR93]

# 2505

**Compound:** Potassium periodate **Formula:** KIO<sub>4</sub> **Molecular Formula:** IKO<sub>4</sub> **Molecular Weight:** 230.001 **CAS RN:** 7790-21-8 Properties: white powd or colorless, transparent, tetr cryst; strong oxidizing agent in aq solutions, e.g., can oxidize manganese compounds to permanganate [MER06]
Solubility: g/100 g soln, H<sub>2</sub>O: 0.169 (0.2°C), 0.51 (25°C), 6.83 (97°C) [KRU93]
Density, g/cm<sup>3</sup>: 3.618 [MER06]
Melting Point, °C: 582 [MER06]
Boiling Point, °C: explodes [HAW93]

### 2506

Compound: Potassium permanganate
Formula: KMnO<sub>4</sub>
Molecular Formula: KMnO<sub>4</sub>
Molecular Weight: 158.034
CAS RN: 7722-64-7
Properties: dark purple cryst; stable in air; decomposes evolving O<sub>2</sub> at ~240°C; good oxidizing agent in aq solutions, e.g., oxidizes HCl to Cl<sub>2</sub>; astringent taste; odorless; used as an oxidizer, as a disinfectant, bleach, in tanning [HAW93] [MER06]
Solubility: g/100 g soln, H<sub>2</sub>O: 2.75 (0°C), 7.09 (25°C); solid phase, KMnO<sub>4</sub> [KRU93]
Density, g/cm<sup>3</sup>: 2.70 [HAW93]
Melting Point, °C: decomposes [HAW93]

### 2507

Compound: Potassium peroxide Formula: K<sub>2</sub>O<sub>2</sub> Molecular Formula: K<sub>2</sub>O<sub>2</sub> Molecular Weight: 110.196 CAS RN: 17014-71-0 Properties: yellow amorphous mass; decomposes in water, evolving oxygen; oxidizing agent; used for bleaching, in oxygen generating gas masks [HAW93] Solubility: decomposed by H<sub>2</sub>O [HAW93] Melting Point, °C: 490 [HAW93]

# 2508

Compound: Potassium perrhenate Formula: KReO<sub>4</sub> Molecular Formula: KO<sub>4</sub>Re Molecular Weight: 289.303 CAS RN: 10466-65-6 Properties: white, tetr cryst; -40 mesh with 99.9% purity [STR93] [KIR82] [CER91] Solubility: g/100 g H<sub>2</sub>O: 0.34 (0°C), 0.99 (20°C), 8.7 (80°C) [LAN05] Density, g/cm<sup>3</sup>: 4.887 [STR93] Melting Point, °C: 555 [STR93] Boiling Point, °C: ~1365 [STR93]

**Compound:** Potassium perruthenate **Formula:**  $KRuO_4$  **Molecular Formula:**  $KO_4Ru$  **Molecular Weight:** 204.166 **CAS RN:** 10378-50-4 **Properties:** black tetr [KIR82] **Solubility:** 1.1 g/100 mL H<sub>2</sub>O (60°C) [CRC10] **Melting Point,** °C: decomposes at 400 [KIR82]

# 2510

Compound: Potassium persulfate
Synonym: potassium peroxydisulfate
Formula: K<sub>2</sub>S<sub>2</sub>O<sub>8</sub>
Molecular Formula: K<sub>2</sub>O<sub>8</sub>S<sub>2</sub>
Molecular Weight: 270.324
CAS RN: 7727-21-1
Properties: colorless or white cryst; -100 mesh with 99.9% purity; unstable, gradually evolving O<sub>2</sub> with rate of evolution increasing with temp; strong oxidizing agent in aq solutions [MER06] [CER91]
Solubility: g/100 mL soln, H<sub>2</sub>O: 1.620 (0°C), 5.840 (25°C) [KRU93]; i alcohol [MER06]
Density, g/cm<sup>3</sup>: 2.477 [HAW93]
Melting Point, °C: completely decomposed at ~100 [MER06]

# 2511

Compound: Potassium phosphate
Formula: K<sub>3</sub>PO<sub>4</sub>
Molecular Formula: K<sub>3</sub>O<sub>4</sub>P
Molecular Weight: 212.266
CAS RN: 7778-53-2
Properties: granular, white powd; deliq; orthorhomb cryst; used in gasoline purification, to soften water, in liq soaps, and as an emulsifier in foods [HAW93] [MER06]
Solubility: g/100 g soln, H<sub>2</sub>O: 44.26 (0°C), 51.42 (25°C); solid phase, K<sub>3</sub>PO<sub>4</sub> · 7H<sub>2</sub>O [KRU93]; i alcohol [MER06]
Density, g/cm<sup>3</sup>: 2.564 [MER06]
Melting Point, °C: 1340 [MER06]

# 2512

**Compound:** Potassium pyrophosphate trihydrate Formula:  $K_4P_2O_7 \cdot 3H_2O$ Molecular Formula:  $H_6K_4O_{10}P_2$ Molecular Weight: 384.374 CAS RN: 7320-34-5

**Properties:** colorless; deliq granules or cryst; somewhat hygr; used as a builder in soaps and detergents and as a sequestering agent; also anhydrous form [HAW93] [MER06] [STR93] [ALD94] Solubility: v s H<sub>2</sub>O; i alcohol [MER06] Density, g/cm<sup>3</sup>: 2.33 [HAW93] Melting Point, °C: 1090 [HAW93] Reactions: minus 2H<sub>2</sub>O at 180°C, minus 3H<sub>2</sub>O at ~300°C [CRC10] [HAW93]

# 2513

Compound: Potassium pyrosulfate Formula: K<sub>2</sub>S<sub>2</sub>O<sub>7</sub> Molecular Formula: K<sub>2</sub>O<sub>7</sub>S<sub>2</sub> Molecular Weight: 254.325 CAS RN: 7790-62-7 Properties: colorless needles; fused pieces or white cryst powd; used as a laboratory reagent [HAW93] [MER06] Solubility: s H<sub>2</sub>O [MER06] Density, g/cm<sup>3</sup>: 2.28 [MER06] Melting Point, °C: ~325 [MER06]

### 2514

Compound: Potassium pyrosulfite
Formula: K<sub>2</sub>S<sub>2</sub>O<sub>5</sub>
Molecular Formula: K<sub>2</sub>O<sub>5</sub>S<sub>2</sub>
Molecular Weight: 222.326
CAS RN: 16731-55-8
Properties: white cryst or cryst powd; odor of sulfur dioxide; SO<sub>2</sub> evolved from acidic solutions; oxidizes to sulfate in air [MER06]
Solubility: g/100 g soln, H<sub>2</sub>O: 22.1 (0°C), 32.8 (25°C), 55.5 (94.0°C), solid phase K<sub>2</sub>S<sub>2</sub>O<sub>5</sub> [KRU93]
Density, g/cm<sup>3</sup>: 2.3 [HAW93]
Melting Point, °C: decomposes at 150–190 [HAW93]

## 2515

Compound: Potassium ruthenate(VI) Formula:  $K_2RuO_4$ Molecular Formula:  $K_2O_4Ru$ Molecular Weight: 243.265 CAS RN: 31111-21-4 Properties: black with green luster; rhomb [KIR82] Solubility: v s H<sub>2</sub>O [KIR82]

### 2516

Compound: Potassium selenate Formula:  $K_2SeO_4$ Molecular Formula:  $K_2O_4Se$ Molecular Weight: 221.155 CAS RN: 7790-59-2 Properties: -100 mesh with 99.5% purity; colorless cryst or white powd [MER06] [CER91] Solubility: g/100 g soln, H<sub>2</sub>O: 52.7 ± 0.9 (0°C), 53.3 ± 0.3 (25°C), 55.6 ± 0.6 (100°C) [KRU93] Density, g/cm<sup>3</sup>: 3.07 [MER06]

Compound: Potassium selenide Formula: K<sub>2</sub>Se Molecular Formula: K<sub>2</sub>Se Molecular Weight: 157.157 CAS RN: 1312-74-9 Properties: cryst; reddens in air; color changes to brownish black when heated; deliq [MER06] Solubility: s H<sub>2</sub>O; i ammonia [MER06] Density, g/cm<sup>3</sup>: 2.29 [LID94] Melting Point, °C: 800 [LID94]

# 2518

Compound: Potassium selenite Formula:  $K_2SeO_3$ Molecular Formula:  $K_2O_3Se$ Molecular Weight: 205.155 CAS RN: 10431-47-7 Properties: -100 mesh with 99.5% purity; white powd; hygr [STR93] [CER91] Solubility: g/100 g soln, H<sub>2</sub>O: 68.45 (0°C), 68.5 (24.3°C), 68.53 (100.6°C); solid phase,  $K_2SeO_3$  (0°C, 100.6°C),  $K_2SeO_3 \cdot 4H_2O + K_2SeO_3$  (24.3°C) [KRU93] Melting Point, °C: 875 [STR93] Boiling Point, °C: decomposes [STR93]

# 2519

Compound: Potassium silver cyanide
Synonym: silver potassium cyanide
Formula: KAg(CN)<sub>2</sub>
Molecular Formula: C<sub>2</sub>AgKN<sub>2</sub>
Molecular Weight: 199.001
CAS RN: 506-61-6
Properties: white cryst; sensitive to light [MER06]
Solubility: s H<sub>2</sub>O; silver cyanide precipitated from acid solutions [MER06]

# 2520

Compound: Potassium sodium carbonate hexahydrate
Synonym: sodium potassium carbonate hexahydrate
Formula: KNaCO<sub>3</sub> · 6H<sub>2</sub>O
Molecular Formula: CH<sub>12</sub>KNaO<sub>9</sub>
Molecular Weight: 230.189
CAS RN: 64399-16-2
Properties: colorless cryst; this double salt fuses more readily than the single salts; used as a flux in analysis [HAW93]
Solubility: 185.2 g/100 mL H<sub>2</sub>O (15°C) [CRC10]
Density, g/cm<sup>3</sup>: 1.6344 [HAW93]
Melting Point, °C: decomposes at 135 [HAW93]
Reactions: minus 6H<sub>2</sub>O at 100°C [CRC10]

### 2521

Compound: Potassium stannate trihydrate
Synonym: potassium hydroxystannate(IV)
Formula: K<sub>2</sub>SnO<sub>3</sub> · 3H<sub>2</sub>O
Molecular Formula: H<sub>6</sub>K<sub>2</sub>O<sub>6</sub>Sn
Molecular Weight: 298.951
CAS RN: 12142-33-5
Properties: white to light tan cryst; used to dye and print textiles, in alkaline tin plating baths; anhydrous available as -100 mesh with 99.9% purity [HAW93] [CER91]
Solubility: 110.5 g/100 mL H<sub>2</sub>O at 15°C; i alcohol [MER06] [KIR83]
Density, g/cm<sup>3</sup>: 3.197 [MER06]
Melting Point, °C: decomposes at 140 [AES93]

#### 2522

Compound: Potassium stannosulfate Formula:  $K_2Sn(SO_4)_2$ Molecular Formula:  $K_2O_8S_2Sn$ Molecular Weight: 389.034 CAS RN: 27790-37-0 Properties: white cryst; partially decomposed by H<sub>2</sub>O [MER06] Solubility: s dil alkaline hydroxide solutions [MER06]

# 2523

Compound: Potassium stearate Synonyms: stearic acid, potassium salt Formula:  $CH_3(CH_2)_{16}COOK$ Molecular Formula:  $C_{18}H_{35}KO_2$ Molecular Weight: 322.573 CAS RN: 593-29-3 Properties: white, cryst powd; slight odor of fat; used in softening textiles [HAW93] Solubility: slowly s cold H<sub>2</sub>O, more readily s hot H<sub>2</sub>O, alcohol [MER06]

### 2524

**Compound:** Potassium sulfate **Synonym:** arcanite **Formula:** K<sub>2</sub>SO<sub>4</sub> **Molecular Formula:** K<sub>2</sub>O<sub>4</sub>S

Molecular Weight: 174.261

CAS RN: 7778-80-5

**Properties:** colorless or white, hard, rhomb or hex cryst, granules or powd; bitter saline taste; enthalpy of fusion 36.40 kJ/mol; also used in glass manufacture [MER06] [KIR82] [CRC10] Solubility: g/100 g soln, H<sub>2</sub>O: 6.9 (0°C), 10.75 (25°C), 19.4 (100°C); solid phase, K<sub>2</sub>SO<sub>4</sub> [KRU93]; 1 g/75 mL glycerol; i alcohol [MER06]
Density, g/cm<sup>3</sup>: 2.66 [MER06]
Melting Point, °C: 1069 [CRC10]
Thermal Expansion Coefficient: (volume) 100°C (0.544), 200°C (2.118), 400°C (4.935) [CLA66]

### 2525

**Compound:** Potassium sulfide **Formula:** K<sub>2</sub>S **Molecular Formula:** K<sub>2</sub>S **Molecular Weight:** 110.263 **CAS RN:** 1312-73-8

Properties: may contain polysulfides; red or yellowish red; cub cryst or fused plates; discolored in air; very hygr; unstable; may explode when struck or if rapidly heated; enthalpy of fusion 16.15 kJ/mol [STR93] [MER06] [HAW93] [CRC10]
Solubility: s H<sub>2</sub>O, alcohol, glycerol; i ether [HAW93]
Density, g/cm<sup>3</sup>: 1.74 [MER06]
Melting Point, °C: 948 [CRC10]

# 2526

Compound: Potassium sulfide pentahydrate
Formula: K<sub>2</sub>S · 5H<sub>2</sub>O
Molecular Formula: H<sub>10</sub>K<sub>2</sub>O<sub>5</sub>S
Molecular Weight: 200.339
CAS RN: 1312-73-8
Properties: colorless; rhomb; odor of H<sub>2</sub>S; turns yellow to yellowish red when exposed to air and light; aq solutions are alkaline and unstable [MER06]
Solubility: v s H<sub>2</sub>O, alcohol, glycerol; i ether [MER06]
Melting Point, °C: 60 [MER06]
Reactions: minus 3H<sub>2</sub>O at 150°C [CRC10]

### 2527

Compound: Potassium sulfite dihydrate Formula:  $K_2SO_3 \cdot 2H_2O$ Molecular Formula:  $H_4K_2O_5S$ Molecular Weight: 194.292 CAS RN: 7790-56-9 Properties: white, monocl cryst or cryst powd; oxidizes gradually to sulfate in air; used as a photographic developer, as a food and wine preservative [HAW93] [MER06] [KIR82]

**Solubility:** g/100 g soln, H<sub>2</sub>O: 47.52 (0°C), 49.01 (25°C), 55.53 (100°C); solid phase, K<sub>2</sub>SO<sub>3</sub> [KRU93]

Melting Point, °C: decomposes [KIR82]

### 2528

Compound: Potassium superoxide Synonym: potassium dioxide Formula: KO<sub>2</sub> Molecular Formula: KO<sub>2</sub> Molecular Weight: 71.097 CAS RN: 12030-88-5 Properties: yellow powd; sensitive to moisture [STR93] Solubility: decomposes in H<sub>2</sub>O [CRC10] Density, g/cm<sup>3</sup>: 2.14 [STR93] Melting Point, °C: 380 [LID94]

## 2529

**Compound:** Potassium tantalate **Formula:** KTaO<sub>3</sub> **Molecular Formula:** KO<sub>3</sub>Ta **Molecular Weight:** 268.044 **CAS RN:** 12030-91-0 **Properties:** -100 mesh with 99.9% purity [CER91]

# 2530

**Compound:** Potassium tellurate(VI) trihydrate **Formula:**  $K_2 TeO_4 \cdot 3H_2O$ **Molecular Formula:**  $H_6K_2O_7Te$ **Molecular Weight:** 323.841 **CAS RN:** 15571-91-2 **Properties:** white, cryst powd [MER06] **Solubility:** s in 4 parts  $H_2O$  [MER06]

### 2531

Compound: Potassium tellurite
Formula: K<sub>2</sub>TeO<sub>3</sub>
Molecular Formula: K<sub>2</sub>O<sub>3</sub>Te
Molecular Weight: 253.795
CAS RN: 7790-58-1
Properties: white powd; granular; hygr; used in chemical analysis to test for bacteria [HAW93]
Solubility: g/100 g H<sub>2</sub>O: 8.8 (0°C), 27.5 (20°C), 50.4 (30°C) [LAN05]
Melting Point, °C: decomposes at 460–470 [HAW93]

# 2532

**Compound:** Potassium tellurite(IV) hydrate **Formula:** K<sub>2</sub>TeO<sub>3</sub>·xH<sub>2</sub>O **Molecular Formula:** K<sub>2</sub>O<sub>3</sub>Te (anhydrous) **Molecular Weight:** 253.795 (anhydrous) **CAS RN:** 123333-66-4 **Properties:** white, hygr powd [ALD94] [STR93] **Melting Point,** °C: decomposes at 465 [STR93]

**Compound:** Potassium tetraborate pentahydrate **Formula:**  $K_2B_4O_7 \cdot 5H_2O$  **Molecular Formula:**  $B_4H_{10}K_2O_{12}$  **Molecular Weight:** 323.513 **CAS RN:** 1332-77-0 **Properties:** white, cryst powd [MER06] **Solubility:** s 4 parts  $H_2O$ ; sl s alcohol [MER06]

# 2534

Compound: Potassium tetraborate tetrahydrate
Formula: K<sub>2</sub>B<sub>4</sub>O<sub>7</sub>·4H<sub>2</sub>O
Molecular Formula: B<sub>4</sub>H<sub>8</sub>K<sub>2</sub>O<sub>11</sub>
Molecular Weight: 305.498
CAS RN: 12045-78-2
Properties: -6 mesh with 99.9% purity; ortho-rhomb, white powd; dehydration temp depends on partial pressure of H<sub>2</sub>O [CER91] [STR93] [KIR78]
Solubility: % anhydrous by weight, H<sub>2</sub>O: 9.02 (10°C), 13.6 (25°C), 24.0 (50°C), 48.4 (100°C) [KIR78]
Density, g/cm<sup>3</sup>: 1.92 [KIR78]
Melting Point, °C: decomposes [STR93]

**Reactions:** reversible dehydration from 85°C–111°C [KIR78]

#### 2535

Compound: Potassium tetrabromoaurate(III) dihydrate Formula: KAuBr<sub>4</sub>·2H<sub>2</sub>O Molecular Formula: AuBr<sub>4</sub>H<sub>4</sub>KO<sub>2</sub> Molecular Weight: 591.712 CAS RN: 14323-32-1 Properties: violet cryst; sensitive to light [MER06] Solubility: s H<sub>2</sub>O, alcohol [MER06] Melting Point, °C: decomposes at 120 [CRC10]

### 2536

**Compound:** Potassium tetrabromopalladate(II) **Formula:** K<sub>2</sub>PdBr<sub>4</sub> **Molecular Formula:** Br<sub>4</sub>K<sub>2</sub>Pd **Molecular Weight:** 504.233 **CAS RN:** 13826-93-2 **Properties:** reddish brown powd; hygr [STR93]

### 2537

**Compound:** Potassium tetrabromoplatinate(II) **Formula:** K<sub>2</sub>PtBr<sub>4</sub> **Molecular Formula:** Br<sub>4</sub>K<sub>2</sub>Pt **Molecular Weight:** 592.893 CAS RN: 13826-94-3 Properties: red powd [STR93]

# 2538

Compound: Potassium tetrachloroaurate(III) Formula: KAuCl<sub>4</sub> Molecular Formula: AuCl<sub>4</sub>K Molecular Weight: 377.876 CAS RN: 13682-61-6 Properties: yellowish orange cryst [STR93] Solubility: g/100 g H<sub>2</sub>O: 38.3 (10°C), 61.8 (20°C), 405 (60°C) [LAN05] Melting Point, °C: decomposes at 357 [AES93]

# 2539

 $\label{eq:compound: Potassium tetrachloroaurate(III) dihydrate Formula: KAuCl_4 \cdot 2H_2O \\ \mbox{Molecular Formula: AuCl_4H_4KO_2} \\ \mbox{Molecular Weight: 413.907} \\ \mbox{CAS RN: 13005-39-5} \\ \mbox{Properties: yellow, monocl cryst; light sensitive [MER06] [HAW93]} \\ \mbox{Solubility: s } H_2O, alcohol, ether [HAW93] \\ \end{tabular}$ 

### 2540

Compound: Potassium tetrachloropalladate(II) Formula: K<sub>2</sub>PdCl<sub>4</sub> Molecular Formula: Cl<sub>4</sub>K<sub>2</sub>Pd Molecular Weight: 326.428 CAS RN: 10025-98-6 Properties: brown powd; hygr [STR93] Density, g/cm<sup>3</sup>: 2.67 [STR93] Melting Point, °C: decomposes at 105 [ALD94]

### 2541

Compound: Potassium tetrachloroplatinate(II) Synonym: potassium chloroplatinate Formula: K<sub>2</sub>PtCl<sub>4</sub> Molecular Formula: Cl<sub>4</sub>K<sub>2</sub>Pt Molecular Weight: 415.088 CAS RN: 10025-99-7 Properties: pink or ruby red; tetr; hygr [MER06] [STR93] [KIR82] Solubility: s H<sub>2</sub>O; i alcohol [MER06] [KIR82] Density, g/cm<sup>3</sup>: 3.38 [STR93] Melting Point, °C: decomposes at >500 [KIR82]

# 2542

**Compound:** Potassium tetracyanomercurate(II) **Formula:** K<sub>2</sub>Hg(CN)<sub>4</sub> Molecular Formula: C<sub>4</sub>HgK<sub>2</sub>N<sub>4</sub> Molecular Weight: 382.858 CAS RN: 591-89-9 Properties: colorless or white cryst [MER06] Solubility: s H<sub>2</sub>O [MER06]

### 2543

Compound: Potassium tetracyanonickelate(II) monohydrate
Formula: K₂Ni(CN)₄ · H₂O
Molecular Formula: C₄H₂K₂N₄NiO
Molecular Weight: 258.976
CAS RN: 14220-17-8
Properties: yellowish orange; cryst powd [MER06]
Solubility: s H₂O [MER06]
Density, g/cm<sup>3</sup>: 1.875 [CRC10]
Reactions: minus H₂O at ~100°C [MER06]

## 2544

Compound: Potassium tetracyanoplatinate(II) Formula: K<sub>2</sub>Pt(CN)<sub>4</sub> Molecular Formula: C<sub>4</sub>K<sub>2</sub>N<sub>4</sub>Pt Molecular Weight: 377.348 CAS RN: 562-76-5 Properties: yellow powd; hygr [STR93] Solubility: g/100 g H<sub>2</sub>O: 11.6 (0°C), 33.9 (20°C), 194 (90°C) [LAN05]

### 2545

Compound: Potassium tetracyanoplatinate(II) trihydrate
Formula: K<sub>2</sub>Pt(CN)<sub>4</sub> · 3H<sub>2</sub>O
Molecular Formula: C<sub>4</sub>H<sub>6</sub>K<sub>2</sub>N<sub>4</sub>O<sub>3</sub>Pt
Molecular Weight: 431.394
CAS RN: 14323-36-5
Properties: almost colorless; rhomb prisms; blue color in direction of principal axis [MER06]
Solubility: s H<sub>2</sub>O [MER06]
Density, g/cm<sup>3</sup>: 2.455 [CRC10]
Melting Point, °C: decomposes at 400–600 [CRC10]
Reactions: minus 3H<sub>2</sub>O at 100°C [CRC10]

### 2546

**Compound:** Potassium tetracyanozincate **Formula:**  $K_2Zn(CN)_4$  **Molecular Formula:**  $C_4K_2N_4Zn$  **Molecular Weight:** 247.658 **CAS RN:** 14244-62-3 **Properties:** cryst powd [MER06] **Solubility:** v s H<sub>2</sub>O [MER06]

#### 2547

**Compound:** Potassium tetrafluoroberyllate dihydrate **Synonym:** beryllium potassium fluoride **Formula:**  $K_2BeF_4 \cdot 2H_2O$  **Molecular Formula:**  $BeF_4H_4K_2O_2$  **Molecular Weight:** 199.234 **CAS RN:** 7787-50-0 **Properties:** brilliant cryst [MER06] **Solubility:** s H<sub>2</sub>O, conc K<sub>2</sub>SO<sub>4</sub> [MER06]

### 2548

Compound: Potassium tetrafluoroborate Synonym: avogadrite Formula: KBF<sub>4</sub> **Molecular Formula:** BF<sub>4</sub>K Molecular Weight: 125.903 CAS RN: 14075-53-7 Properties: colorless; ortho-rhomb below 283°C, a = 0.7032 nm, b = 0.8674 nm, c = 0.5496 nm;bipyrimidal or cub cryst; enthalpy of fusion 17.7 kJ/mol; can be prepared as a gelatinous precipitate from fluoroboric acid and KOH or K<sub>2</sub>CO<sub>3</sub>; used in plating, in flux for soldering [HAW93] [MER06] [KIR78] [JAN71] Solubility: g/100 g H<sub>2</sub>O: 0.3 (3°C), 0.448 (20°C), 0.55 (25°C), 1.4 (40°C), 6.27 (100°C); sl s boiling alcohol [MER06] Density, g/cm3: 2.505 [MER06] Melting Point, °C: 530 [MER06]

# 2549

Compound: Potassium tetraiodoaurate(III)
Synonym: gold potassium iodide
Formula: KAuI<sub>4</sub>
Molecular Formula: AuI<sub>4</sub>K
Molecular Weight: 743.683
CAS RN: 7791-29-9
Properties: black, lustrous cryst; sensitive to light [MER06]
Solubility: s H<sub>2</sub>O, decomposes and liberates iodine [MER06]
Melting Point, °C: decomposes at 150 [CRC10]

### 2550

**Compound:** Potassium tetraiodocadmium dihydrate **Synonym:** cadmium potassium iodide dihydrate **Formula:**  $K_2CdI_4 \cdot 2H_2O$ **Molecular Formula:**  $CdH_4I_4K_2O_2$ **Molecular Weight:** 734.256 **CAS RN:** 584-10-1 Properties: large, water clear, somewhat distorted octahedra; deliq; turns yellow when aging due to release of I<sub>2</sub> [MER06]
Solubility: 1 part w/w dissolves at 15°C, in: 0.73 parts H<sub>2</sub>O, 1.4 parts alcohol; 24.5 parts ether; 4.5 parts of a 1:1 mixture of ether and alcohol; s ethyl acetate [MER06]
Density, g/cm<sup>3</sup>: 3.359 [MER06]

#### 2551

**Compound:** Potassium tetraiodomercurate(II) **Formula:** K<sub>2</sub>HgI<sub>4</sub> **Molecular Formula:** HgI<sub>4</sub>K<sub>2</sub> **Molecular Weight:** 786.404 **CAS RN:** 7783-33-7

Properties: sulfur yellow color; cryst; deliq; dihydrate known as Mayers reagent; dihydrate prepared by dissolving stoichiometric amounts of HgI<sub>2</sub> and KI in distilled water, which is used as an antiseptic and as a precipitant for alkaloids; in strongly alkaline solutions, known as Nessler's reagent, which is used for ammonia detection [KIR81] [MER06]
Solubility: v s H<sub>2</sub>O; s alcohol, ether, acetone [MER06]

Density, g/cm<sup>3</sup>: 4.29 [LID94] Melting Point, °C: 105 [CRC10]

#### 2552

**Compound:** Potassium tetranitritoplatinate(II) **Formula:** K<sub>2</sub>Pt(NO<sub>2</sub>)<sub>4</sub> **Molecular Formula:** K<sub>2</sub>N<sub>4</sub>O<sub>8</sub>Pt **Molecular Weight:** 457.299 **CAS RN:** 13815-39-9 **Properties:** white powd [STR93]

### 2553

**Compound:** Potassium tetraoxalate dihydrate **Formula:**  $KHC_2O_4 \cdot H_2C_2O_4 \cdot 2H_2O$  **Molecular Formula:**  $C_4H_7KO_{10}$  **Molecular Weight:** 254.192 **CAS RN:** 127-96-8 **Properties:** colorless or white cryst [MER06] **Solubility:** s 60 parts cold H<sub>2</sub>O, 12 parts boiling H<sub>2</sub>O; sl s alcohol [MER06] **Melting Point, °C:** decomposes [CRC10]

## 2554

**Compound:** Potassium thioantimonate heminonahydrate **Formula:** K<sub>3</sub>SbS<sub>4</sub> · 4-1/2H<sub>2</sub>O **Molecular Formula:** H<sub>9</sub>K<sub>3</sub>O<sub>4 5</sub>S<sub>4</sub>Sb Molecular Weight: 448.385
CAS RN: 14693-02-8
Properties: colorless to yellowish cryst; formula also given as 2K<sub>3</sub>SbS<sub>4</sub>·4-1/2H<sub>2</sub>O [MER06] [CRC10]
Solubility: g anhydrous/100 g H<sub>2</sub>O: 306 (0°C), 302 (30°C), 381 (80°C) [LAN05]; i alcohol [MER06]

## 2555

Compound: Potassium thiocarbonate
Formula: K<sub>2</sub>CS<sub>3</sub>
Molecular Formula: CK<sub>2</sub>S<sub>3</sub>
Molecular Weight: 186.406
CAS RN: 26750-66-3
Properties: yellowish red; deliq granules or cryst; very hygr; used in medicine, as a soil fumigant [HAW93] [MER06]
Solubility: v s H<sub>2</sub>O, giving strongly akaline solution [MER06]
Melting Point, °C: decomposes [CRC10]

#### 2556

Compound: Potassium thiocyanate Formula: KSCN Molecular Formula: CKNS Molecular Weight: 97.182 CAS RN: 333-20-0 Properties: colorless; deliq cryst; temp drops to ~30°C when dissolved in its own weight of H<sub>2</sub>O [MER06] **Solubility:** g/100 g H<sub>2</sub>O: 177 (0°C), 239 (25°C), 673.6 (99°C); solid phase, KSCN [KRU93]; 1 g dissolves in: 0.5 mL acetone, 12 mL alcohol, 8 mL boiling alcohol [MER06] Density, g/cm<sup>3</sup>: 1.88 [HAW93] Melting Point, °C: 173 [HAW93] Boiling Point, °C: decomposes at 500 [HAW93] Reactions: turns brown, green, blue when fused, white when cooled [HAW93]

### 2557

Compound: Potassium thiosulfate Synonym: potassium hyposulfite Formula:  $K_2S_2O_3$ Molecular Formula:  $K_2O_3S_2$ Molecular Weight: 190.327 CAS RN: 10294-66-3 Properties: colorless cryst; hygr [MER06] Solubility: g/100 g H<sub>2</sub>O: 96.1 (0°C), 165.0 (25°C), 312.0 (90°C); solid phase,  $K_2S_2O_3 \cdot 2H_2O$ (0°C),  $3K_2S_2O_3 \cdot 5H_2O$  (25°C),  $K_2S_2O_3$ (90°C) [KRU93]; i alcohol [MER06] Density, g/cm<sup>3</sup>: 2.23 [CRC10]

**Compound:** Potassium titanate **Formula:** K<sub>2</sub>TiO<sub>3</sub> **Molecular Formula:** K<sub>2</sub>O<sub>3</sub>Ti **Molecular Weight:** 174.062 **CAS RN:** 12030-97-6

Properties: white; grayish brown powd; as a fiber, has a high index of refraction, can diffuse and reflect infrared radiation; used in fiber form in rockets, missiles, and in nuclear power as an insulator [HAW93] [STR93]
Solubility: hydrolyzes in H<sub>2</sub>O to give a

strongly alkaline solution [HAW93] Density, g/cm<sup>3</sup>: 3.1 [LID94] Melting Point, °C: 1515 [LID94]

# 2559

Compound: Potassium titanium oxalate dihydrate Formula:  $K_2TiO(C_2O_4)_2 \cdot 2H_2O$ Molecular Formula:  $C_4H_4K_2O_{11}Ti$ Molecular Weight: 354.133 CAS RN: 14402-67-6 Properties: colorless, lustrous cryst; used as a mordant in cotton and leather dyeing [HAW93] Solubility: v s H<sub>2</sub>O [MER06]

# 2560

Compound: Potassium triiodide monohydrate
Formula: KI<sub>3</sub> · H<sub>2</sub>O
Molecular Formula: H<sub>2</sub>I<sub>3</sub>KO
Molecular Weight: 437.827
CAS RN: 7790-42-3
Properties: dark brown, hygr; monocl prisms; reasonably stable only in the monohydrate form; formula also given as hemihydrate [CRC10] [MER06]
Solubility: s H<sub>2</sub>O; s with partial decomposition in alcohol and ether [MER06]
Density, g/cm<sup>3</sup>: 3.50 [MER06]
Melting Point, °C: 38 (closed tube) [MER06]
Reactions: decomposes, evolving I<sub>2</sub> with

KI residue at 225°C [MER06]

# 2561

**Compound:** Potassium triiodozincate **Synonym:** potassium zinc iodide **Formula:** KZnI<sub>3</sub> **Molecular Formula:** I<sub>3</sub>KZn **Molecular Weight:** 485.202 **CAS RN:** 7790-43-4 **Properties:** cryst; very hygr [MER06] **Solubility:** v s H<sub>2</sub>O [MER06]

### 2562

Compound: Potassium triphosphate
Synonym: potassium tripolyphosphate
Formula: K<sub>5</sub>P<sub>3</sub>O<sub>10</sub>
Molecular Formula: K<sub>5</sub>O<sub>10</sub>P<sub>3</sub>
Molecular Weight: 448.407
CAS RN: 13845-36-8
Properties: white powd; prepared by dehydration of an equimolar mixture of mono- and dipotassium phosphates; used in detergents [KIR82] [STR93]
Density, g/cm<sup>3</sup>: 2.54 [STR93]
Melting Point, °C: 620 [STR93]

### 2563

Compound: Potassium tungstate Formula: K<sub>2</sub>WO<sub>4</sub> Molecular Formula: K<sub>2</sub>O<sub>4</sub>W Molecular Weight: 326.035 CAS RN: 7790-60-5 Properties: -100 mesh with 99.5% purity; heavy; deliq; cryst powd [MER06] [CER91] Solubility: s ~2 parts cold H<sub>2</sub>O, ~0.7 parts boiling H<sub>2</sub>O; i alcohol [MER06] Density, g/cm<sup>3</sup>: 3.12 [MER06] Melting Point, °C: 921 [MER06]

# 2564

**Compound:** Potassium tungstate dihydrate **Formula:**  $K_2WO_4 \cdot 2H_2O$  **Molecular Formula:**  $H_4K_2O_6W$  **Molecular Weight:** 362.065 **CAS RN:** 7790-60-5 **Properties:** heavy, cryst powd; hygr [ALD94] [HAW93] **Solubility:** 51.5 g/100 mL H<sub>2</sub>O [CRC10] **Density, g/cm<sup>3</sup>:** 3.1 [HAW93] **Melting Point,** °C: 921 [HAW93]

### 2565

**Compound:** Potassium uranate **Formula:**  $K_2U_2O_7$  **Molecular Formula:**  $K_2O_7U_2$  **Molecular Weight:** 666.251 **CAS RN:** 7790-63-8 **Properties:** cub orange powd [LID94] [MER06] **Solubility:** i H<sub>2</sub>O; s acids [MER06] **Density, g/cm<sup>3</sup>:** 6.12 [LID94]

**Compound:** Potassium uranyl nitrate **Formula:** K(UO<sub>2</sub>)(NO<sub>3</sub>)<sub>3</sub> **Molecular Formula:** KN<sub>3</sub>O<sub>11</sub>U **Molecular Weight:** 495.140 **CAS RN:** 18078-40-5 **Properties:** greenish yellow; cryst powd [MER06] **Solubility:** s ~1 part H<sub>2</sub>O [MER06]

## 2567

**Compound:** Potassium uranyl sulfate dihydrate **Formula:**  $K_2(UO_2)(SO_4)_2 \cdot 2H_2O$  **Molecular Formula:**  $H_4K_2O_{12}S_2U$  **Molecular Weight:** 576.383 **CAS RN:** 27709-53-1 **Properties:** greenish yellow; cryst powd [MER06] **Solubility:** v s  $H_2O$  [MER06] **Density, g/cm<sup>3</sup>:** 3.363 [CRC10] **Reactions:** minus  $2H_2O$  at  $120^{\circ}C$  [CRC10]

# 2568

Compound: Potassium vanadate Synonym: potassium metavanadate Formula: KVO<sub>3</sub> Molecular Formula: KO<sub>3</sub>V Molecular Weight: 138.038 CAS RN: 13769-43-2 Properties: colorless cryst; -200 mesh with 99.9% purity; there are also K<sub>3</sub>VO<sub>4</sub>, 14293-78-8, and K<sub>4</sub>V<sub>2</sub>O<sub>7</sub>, 14638-93-8 [CRC10] [CER91]

# 2569

Compound: Potassium zinc sulfate hexahydrate Formula:  $K_2Zn(SO_4)_2 \cdot 6H_2O$ Molecular Formula:  $H_{12}K_2O_{14}S_2Zn$ Molecular Weight: 443.806 CAS RN: 13932-17-7 Properties: cryst [MER06] Solubility: g/100 g H<sub>2</sub>O: 13.0 (0°C), 25.9 (20°C), 72.1 (60°C) [LAN05]

# 2570

**Compound:** Potassium zirconate **Formula:** K<sub>2</sub>ZrO<sub>3</sub> **Molecular Formula:** K<sub>2</sub>O<sub>3</sub>Zr **Molecular Weight:** 217.419 **CAS RN:** 12030-98-7 **Properties:** -200 mesh with 99.9% purity [CER91]

### 2571

**Compound:** Potassium zirconium sulfate trihydrate **Formula:**  $K_4Zr(SO_4)_4 \cdot 3H_2O$  **Molecular Formula:**  $H_6K_4O_{19}S_4Zr$  **Molecular Weight:** 685.918 **CAS RN:** 53608-79-0 **Properties:** white, cryst powd [HAW93] **Solubility:** sl s H<sub>2</sub>O [MER06]

### 2572

**Compound:** Praseodymium acetate hydrate **Formula:**  $Pr(CH_3COO)_3 \cdot xH_2O$ **Molecular Formula:**  $C_6H_9O_6Pr$  (anhydrous) **Molecular Weight:** 318.041 (anhydrous) **CAS RN:** 6192-12-7 **Properties:** green cryst; hygr [AES93] [STR93]

### 2573

Compound: Praseodymium acetylacetonate Synonyms: 2,4-pentanedione, praseodymiun(III) derivative Formula: Pr(CH<sub>3</sub>COCH=C(O)CH<sub>3</sub>)<sub>3</sub> Molecular Formula: C<sub>15</sub>H<sub>21</sub>O<sub>6</sub>Pr Molecular Weight: 438.236 CAS RN: 14553-09-4 Properties: powd [STR93] Melting Point, °C: 146 [CRC10]

## 2574

**Compound:** Praseodymium barium copper oxide **Formula:**  $PrBa_2Cu_3O_7$  **Molecular Formula:**  $Ba_2Cu_3O_7Pr$  **Molecular Weight:** 718.196 **CAS RN:** 126284-91-1 **Properties:** a = 0.3878 nm, b = 0.3940 nm, c = 1.1761 nm; can be prepared by heating  $Pr_6O_{11}$ , which is free of both carbonate and hydroxide with stoichiometric amounts of  $BaCO_3$  and CuO, then grinding the reactants and heating the resulting powd at 950°C for 12 h in air; CAS RN 126284-91-1 is for the compound with  $PrBa_2CuO_{6.97}$ ; CAS RN 120309-22-8 refers to compound with  $PrBa_2Cu_3O_{7.05}$  [CON87]

### 2575

**Compound:** Praseodymium boride **Formula:** PrB<sub>6</sub> **Molecular Formula:** B<sub>6</sub>Pr **Molecular Weight:** 205.774 **CAS RN:** 12008-27-4 Properties: -325 mesh with 10μm average or less [CER91]
Density, g/cm<sup>3</sup>: 4.84 [LID94]
Melting Point, °C: 2610 [LID94]

### 2576

**Compound:** Praseodymium bromate nonahydrate **Formula:**  $Pr(BrO_3)_3 \cdot 9H_2O$  **Molecular Formula:**  $Br_3H_{18}O_{18}Pr$  **Molecular Weight:** 686.752 **CAS RN:** 15162-93-3 **Properties:** green; hex [CRC10] **Solubility:** g/100 g H<sub>2</sub>O: 55.9 (0°C), 91.8 (20°C), 144 (80°C) [LAN05] **Melting Point,** °C: 56.5 [CRC10] **Reactions:** minus 7H<sub>2</sub>O at 170°C [CRC10]

## 2577

Compound: Praseodymium bromide Formula: PrBr<sub>3</sub> Molecular Formula: Br<sub>3</sub>Pr Molecular Weight: 380.620 CAS RN: 13536-53-3 Properties: green cryst; -20 mesh with 99.9% purity [CER91] [CRC10] Solubility: decomposed by H<sub>2</sub>O [CRC10] Density, g/cm<sup>3</sup>: 5.28 [LID94] Melting Point, °C: 691 [AES93] Boiling Point, °C: 1547 [CRC10]

# 2578

**Compound:** Praseodymium carbonate octahydrate **Formula:**  $Pr_2(CO_3)_3 \cdot 8H_2O$  **Molecular Formula:**  $C_3H_{16}O_{17}Pr_2$  **Molecular Weight:** 605.965 **CAS RN:** 14948-62-0 **Properties:** light green powd [AES93] [STR93] **Reactions:** minus  $6H_2O$  at  $100^{\circ}C$  [CRC10]

## 2579

Compound: Praseodymium chloride Formula: PrCl<sub>3</sub> Molecular Formula: Cl<sub>3</sub>Pr Molecular Weight: 247.266 CAS RN: 10361-79-2 Properties: -20 mesh of 99.9% purity; bluish green powd; hygr [STR93] [CER91] Solubility: s H<sub>2</sub>O, alcohol [MER06] Density, g/cm<sup>3</sup>: 4.02 [STR93] Melting Point, °C: 786 (under argon) [STR93] Boiling Point, °C: 1700 [STR93]

#### 2580

Compound: Praseodymium chloride heptahydrate Formula: PrCl<sub>3</sub>·7H<sub>2</sub>O Molecular Formula: Cl<sub>3</sub>H<sub>14</sub>O<sub>7</sub>Pr Molecular Weight: 373.373 CAS RN: 10025-90-8 Properties: -4 mesh with 99.9% purity; hygr; green cryst [MER06] [STR93] [CER91] Solubility: 334 g/100 mL H<sub>2</sub>O (13°C) [CRC10] Density, g/cm<sup>3</sup>: 2.250 [STR93] Melting Point, °C: 115 [STR93] Reactions: minus 7H<sub>2</sub>O at 180°C-200°C if heated in HCl stream [MER06]

# 2581

Compound: Praseodymium fluoride
Formula: PrF<sub>3</sub>
Molecular Formula: F<sub>3</sub>Pr
Molecular Weight: 197.903
CAS RN: 13709-46-1
Properties: hygr, light blue powd and 99.9% pure melted pieces of 3–6 mm; hygr; melted pieces used as evaporation material for infrared multilayers, low and high ends only [STR93] [CER91]
Density, g/cm<sup>3</sup>: 6.3 [LID94]
Melting Point, °C: 1395 [LID94]

## 2582

Compound: Praseodymium hexafluoroacetylacetonate Synonyms: 1,1,1,5,5,5-hexafluoro-2,4pentanedione, Pr derivative Formula:  $Pr(CF_3COCHCOCF_3)_3$ Molecular Formula:  $C_{15}H_3F_{18}O_6Pr$ Molecular Weight: 762.067 CAS RN: 47814-20-0 Properties: light green powd [STR93]

### 2583

**Compound:** Praseodymium hydride **Formula:** PrH<sub>3</sub> **Molecular Formula:** H<sub>3</sub>Pr **Molecular Weight:** 143.931 **CAS RN:** 13864-03-4 **Properties:** lump under argon atm [ALF95]

#### 2584

**Compound:** Praseodymium hydroxide **Formula:** Pr(OH)<sub>3</sub> **Molecular Formula:** H<sub>3</sub>O<sub>3</sub>Pr

# Molecular Weight: 191.929 CAS RN: 16469-16-2 Properties: gelatinous; pale green; obtained by reacting

hydroxide with Pr salt; purple powd obtained by reacting Pr carbide with H<sub>2</sub>O [MER06]

# 2585

Compound: Praseodymium iodide Formula: PrI<sub>3</sub> Molecular Formula: I<sub>3</sub>Pr Molecular Weight: 521.621 CAS RN: 13813-23-5 Properties: green hygr cryst; –20 mesh with 99.9% purity [CER91] [CRC10] Density, g/cm<sup>3</sup>: ~5.8 [LID94] Melting Point, °C: 737 [CRC10]

### 2586

Compound: Praseodymium nitrate hexahydrate Formula:  $Pr(NO_3)_3 \cdot 6H_2O$ Molecular Formula:  $H_{12}N_3O_{15}Pr$ Molecular Weight: 435.014 CAS RN: 15878-77-0 Properties: light green cryst; there is a pentahydrate, 14483-17-1 [AES93] [STR93] Solubility: 5.0257 ± 0.0087 mol/kg (25°C), hexahydrate is the stable phase [RAR85b]; g anhydrous/100 g  $H_2O$ : 112 (20°C), 162 (30°C), 178 (40°C) [LAN05]

# 2587

Compound: Praseodymium nitride Formula: PrN Molecular Formula: NPr Molecular Weight: 154.915 CAS RN: 25764-09-4 Properties: -60 mesh with 99.9% purity; NaCl crystal system, a=0.515 nm [CER91] [CIC73] Density, g/cm<sup>3</sup>: 7.46 [LID94]

# 2588

**Compound:** Praseodymium oxalate decahydrate **Formula:**  $Pr_2(C_2O_4)_3 \cdot 10H_2O$  **Molecular Formula:**  $C_6H_{20}O_{22}Pr_2$  **Molecular Weight:** 726.027 **CAS RN:** 24992-60-7 **Properties:** light green powd [ALF95] [STR93]

### 2589

**Compound:** Praseodymium perchlorate hexahydrate **Formula:**  $Pr(ClO_4)_3 \cdot 6H_2O$  Molecular Formula: Cl<sub>3</sub>H<sub>12</sub>O<sub>18</sub>Pr Molecular Weight: 547.351 CAS RN: 13498-07-2 Properties: green cryst; hygr [ALF95] [STR93]

## 2590

**Compound:** Praseodymium phosphate **Formula:** PrPO<sub>4</sub> **Molecular Formula:** O<sub>4</sub>PPr **Molecular Weight:** 235.879 **CAS RN:** 14298-31-8 **Properties:** green powd [STR93]

# 2591

Compound: Praseodymium silicide Formula: PrSi<sub>2</sub> Molecular Formula: PrSi<sub>2</sub> Molecular Weight: 197.079 CAS RN: 12066-83-0 Properties: tetr cryst; 10 mm and down lump [LID94] [ALF93] Density, g/cm<sup>3</sup>: 5.46 [LID94] Melting Point, °C: 1712 [LID94]

## 2592

Compound: Praseodymium sulfate Formula:  $Pr_2(SO_4)_3$ Molecular Formula:  $O_{12}Pr_2S_3$ Molecular Weight: 570.006 CAS RN: 10277-44-8 Properties: light green cryst [MER06] Solubility: 0.1545 ± 0.0019 mol/kg (25°C), octahydrate is the equilibrium phase [RAR88]; g/100 g H<sub>2</sub>O: 19.8 (0°C), 12.6 (20°C), 0.91 (100°C) [LAN05] Density, g/cm<sup>3</sup>: 3.72 [CRC10]

### 2593

Compound: Praseodymium sulfate octahydrate Formula:  $Pr_2(SO_4)_3 \cdot 8H_2O$ Molecular Formula:  $H_{16}O_{20}Pr_2S_3$ Molecular Weight: 714.128 CAS RN: 13510-41-3 Properties: light green cryst; monocl [CRC10] [AES93] [STR93] Solubility: 17.4 g/100 mL H<sub>2</sub>O (20°C) [CRC10] Density, g/cm<sup>3</sup>: 2.827 [CRC10]

# 2594

**Compound:** Praseodymium sulfide Formula:  $Pr_2S_3$ 

Molecular Formula: Pr<sub>2</sub>S<sub>3</sub> Molecular Weight: 378.013 CAS RN: 12038-13-0 Properties: cub cryst; -200 mesh with 99.9% purity [LID94] [CER91] Density, g/cm<sup>3</sup>: 5.1 [LID94] Melting Point, °C: 1765 [LID94]

### 2595

Compound: Praseodymium telluride Formula: Pr<sub>2</sub>Te<sub>3</sub> Molecular Formula: Pr<sub>2</sub>Te<sub>3</sub> Molecular Weight: 664.615 CAS RN: 12038-12-9 Properties: cub cryst; -20 mesh with 99.9% purity; probably also contains PrTe<sub>3</sub>, as well as other Pr-Te phases [LID94] [CER91] Density, g/cm<sup>3</sup>: ~7.0 [LID94] Melting Point, °C: 1500 [LID94]

# 2596

**Compound:** Praseodymium(α) **Formula:** α-Pr **Molecular Formula:** Pr **Molecular Weight:** 140.90765

CAS RN: 7440-10-0

Properties: yellowish metal; hex; tarnishes in moist air, forming oxide film; enthalpy of fusion is 6.912 kJ/ mol; enthalpy of sublimation is 355.6 kJ/mol; electrical resistivity 68 μohm · cm; radius of atom is 0.1828 nm; radius of ion is 0.1013 nm, Pr<sup>+++</sup>; forms green solutions [MER06] [KIR82] [ALD94] Density, g/cm<sup>3</sup>: 6.773 [KIR82]

Melting Point, °C: 935 [DOU83]

**Reactions:**  $\alpha$  to  $\beta$  transition at 800°C [MER06]

### 2597

Compound: Praseodymium(β) Formula: β-Pr Molecular Formula: Pr Molecular Weight: 140.90765 CAS RN: 7440-10-0 Properties: 12 mm pieces and smaller (under oil) of 99.9% purity; yellowish metal; forms oxide film in moist air; bcc; electrical resistivity (20°C) 68 μohm · cm; enthalpy of fusion 6.89 kJ/mol; enthalpy of vaporization 331 kJ/ mol [MER06] [CER91] [CRC10] [ALD94]

Density, g/cm<sup>3</sup>: 6.64 [MER06]

Melting Point, °C: 935 [MER06]

Boiling Point, °C: 3510 [LID94]

**Reactions:** α to β transition at 800°C [MER06] **Thermal Conductivity, W/(m·K):** 12.5 (25°C) [CRC10] **Thermal Expansion Coefficient:** 6.7×10<sup>-6</sup>/K [CRC10]

### 2598

Compound: Praseodymium(III) oxide
Formula: Pr<sub>2</sub>O<sub>3</sub>
Molecular Formula: O<sub>3</sub>Pr<sub>2</sub>
Molecular Weight: 329.813
CAS RN: 12036-32-7
Properties: yellow-green amorphous; 3–12 mm pieces with 10µm average or less with 99.9% purity [CER91] [CRC10]
Solubility: 0.000020 g/100 mL H<sub>2</sub>O (29°C) [CRC10]
Density, g/cm<sup>3</sup>: 7.07 [CRC10]
Melting Point, °C: 2300 [LID94]

### 2599

Compound: Praseodymium(III,IV) oxide
Formula: Pr<sub>6</sub>O<sub>11</sub>
Molecular Formula: O<sub>11</sub>Pr<sub>6</sub>
Molecular Weight: 1021.439
CAS RN: 12037-29-5
Properties: black powd or brown sintered pieces; used as an evaporation material, with interest in its reactivity to radio frequencies [STR93] [CER91]

# 2600

Compound: Promethium Formula: Pm Molecular Formula: Pm Molecular Weight: 145 CAS RN: 7440-12-2 Properties: silvery metal; enthalpy of sublimation is 348 kJ/mol (estimated); radius of atom is 0.1811 nm; radius of ion is 0.0979 nm; Pr<sup>+++</sup>

0.1811 nm; radius of ion is 0.0979 nm; Pr<sup>+++</sup> has yellow-colored solutions [KIR82] Density, g/cm<sup>3</sup>: 7.22 [MER06] Melting Point, °C: 1042 [KIR82] Boiling Point, °C: ~3000 [KIR82]

Thermal Conductivity, W/(m·K): 15 (25°C) [CRC10]

#### 2601

**Compound:** 2,2-Bis(ethylferrocenyl)propane **Formula:**  $(C_2H_5C_5H_3FeC_5H_5C)_2C(CH_3)_2$  **Molecular Formula:**  $C_{27}H_{32}Fe_2$  **Molecular Weight:** 468.245 **CAS RN:** 81579-74-0 **Properties:** red-brown viscous liq [STR93] **Density, g/cm<sup>3</sup>:** 1.275 [STR93]
Compound: Protactinium Formula: Pa Molecular Formula: Pa Molecular Weight: 231.03588

CAS DN: 7440 12 2

**CAS RN:** 7440-13-3 **Properties:** shiny, malleable metal; readily tarnishes in air;  $\alpha$ : tetr, a=0.3929 nm, c=0.3241 nm, stable from room temp up to 1170°C;  $\beta$ : bcc, a=0.381 nm, stable from 1170°C-1575°C; first discovered in 1917; enthalpy of fusion 12.34 kJ/ mol; can be produced by nuclear reaction <sup>230</sup>Th+n  $\rightarrow$  <sup>231</sup>Th+ $\gamma$  <sup>231</sup>Th  $\rightarrow$  <sup>231</sup>Pa, however, Pa is also found in natural sources; t<sub>1/2</sub> <sup>231</sup>Pa is 3.25 × 10<sup>+4</sup> years [KIR78] [MER06] [CRC10]

Density, g/cm<sup>3</sup>: 15.37 [KIR78]

Melting Point, °C: 1575 [KIR91]

**Reactions:** reacts with H<sub>2</sub> at 250°C–300°C forming PaH<sub>3</sub> [MER06]

## 2603

Compound: Pyrophosphoric acid
Synonym: diphosphoric acid
Formula: [P(O)(OH)<sub>2</sub>]<sub>2</sub>O
Molecular Formula: H<sub>4</sub>O<sub>7</sub>P<sub>2</sub>
Molecular Weight: 177.98
CAS RN: 2466-09-3
Properties: hygr; syrupy liq, glassy cryst; preparation: reaction of H<sub>3</sub>PO<sub>4</sub> and POCl<sub>3</sub>; uses: catalyst, metal treatment, stabilizer for organic peroxides [HAW93] [MER06]
Solubility: 709 g/100 mL H<sub>2</sub>O (23°C); s alcohol, ether [MER06]
Melting Point, °C: 61–63 [ALD94]
Reactions: forms phosphoric acid on dissolution in hot H<sub>2</sub>O [MER06]

## 2604

**Compound:** Radium Formula: Ra Molecular Formula: Ra Molecular Weight: 226 CAS RN: 7440-14-4

Properties: brilliant white metal; bcc; blackens when exposed to air; spontaneously disintegrates, forming radon; compounds closely resemble those of barium; t<sub>1/2</sub>=1600 years; enthalpy of sublimation 130 kJ/mol [DOU83] [MER06] [GME77]
Solubility: evolves H<sub>2</sub> in H<sub>2</sub>O [CRC10]
Density, g/cm<sup>3</sup>: 5.5 [MER06]
Melting Point, °C: 700 [MER06]

Boiling Point, °C: 1737 [MER06]

### 2605

Compound: Radium bromide Formula: RaBr<sub>2</sub> Molecular Formula: Br<sub>2</sub>Ra Molecular Weight: 386 CAS RN: 10031-23-9 Properties: white or sl brownish cryst [MER06] Solubility: s H<sub>2</sub>O [MER06], s alcohol [HAW93] Density, g/cm<sup>3</sup>: 5.79 [MER06] Melting Point, °C: 728 [MER06] Boiling Point, °C: sublimes at 900 [MER06]

#### 2606

Compound: Radium carbonate Formula: RaCO<sub>3</sub> Molecular Formula: CO<sub>3</sub>Ra Molecular Weight: 286 CAS RN: 7116-98-5 Properties: amorphous, radioactive powd; pure material is white, but impurities impart yellow, orange, or pink color [HAW93] Solubility: i H<sub>2</sub>O [HAW93]

#### 2607

Compound: Radium chloride Formula: RaCl<sub>2</sub> Molecular Formula: Cl<sub>2</sub>Ra Molecular Weight: 297 CAS RN: 10025-66-8 Properties: radioactive; white or sl brownish cryst [MER06] Solubility: s H<sub>2</sub>O [MER06]; s alcohol [HAW93] Density, g/cm<sup>3</sup>: 4.91 [MER06] Melting Point, °C: 1000 [MER06]

## 2608

Compound: Radium sulfate
Formula: RaSO<sub>4</sub>
Molecular Formula: O<sub>4</sub>RaS
Molecular Weight: 322
CAS RN: 7446-16-4
Properties: white, rhomb cryst when pure, else colored yellow, orange, pink; radioactive [HAW93] [CRC10]
Solubility: i H<sub>2</sub>O, acids [HAW93]

# 2609

Compound: Radon Formula: Rn Molecular Formula: Rn Molecular Weight: 222 CAS RN: 10043-92-2 Properties: colorless, inert gas; strongly radioactive; enthalpy of vaporization 18.10 kJ/mol; heat capacity (101.32 kPa, 25°C) ~21 J/(mol·K); viscosity (25°C, 101.32 kPa) 23.3 Pa·s; <sup>222</sup>Rn t<sub>1/2</sub>=3.82 days; can be condensed to a colorless, transparent liq [MER06] [HAW93] [KIR78]
Solubility: at 101.32 kPa, 230 mL/L H<sub>2</sub>O (20°C) [KIR78]; s organic solvents [MER06]
Density, g/cm<sup>3</sup>: gas: (101.32 kPa, 0°C) 9.741 g/L [LID94]; liq: 4.4 [MER06]
Melting Point, °C: -71 [CRC10]
Boiling Point, °C: -61.7 [LID94]

## 2610

Compound: Rhenium Formula: Re Molecular Formula: Re Molecular Weight: 186.207 CAS RN: 7440-15-5

Properties: 3–6 mm pieces of 99.99% purity; black to silvery gray metal; hex closepacked cryst, a = 0.2760 nm, c = 0.4458 nm; enthalpy of sublimation 791 kJ/mol; enthalpy of fusion 60.43 kJ/mol; electrical resistivity 19.3 µohm · cm at 20°C; tensile strength is 80,000 psi; modulus of elasticity is 0.46 Pa [KIR82] [HAW93] [MER06] [CER91] [CRC10]
Solubility: i HCl; attacked by HNO<sub>3</sub>, H<sub>2</sub>SO<sub>4</sub> [HAW93]
Density, g/cm<sup>3</sup>: 21.02 [MER06]
Melting Point, °C: 3180 [MER06]
Boiling Point, °C: 5596 [CRC10]
Thermal Conductivity, W/(m·K): 47.9 (25°C) [CRC10]

### 2611

Compound: Rhenium boride Formula: Re<sub>7</sub>B<sub>3</sub> Molecular Formula: B<sub>3</sub>Re<sub>7</sub> Molecular Weight: 1335.882 CAS RN: 12355-99-6 Properties: formula is generally Re<sub>7</sub>B<sub>3</sub> with possible traces of ReB<sub>2</sub>; -100 mesh with 99.5% purity [CER91]

# 2612

**Compound:** Rhenium carbonyl **Synonym:** dirhenium pentacarbonyl **Formula:** Re<sub>2</sub>(CO)<sub>10</sub> **Molecular Formula:** C<sub>10</sub>O<sub>10</sub>Re<sub>2</sub> **Molecular Weight:** 652.518 **CAS RN:** 14285-68-8 Properties: yellowish white, volatile cryst; can be prepared by reacting Re<sub>2</sub>O<sub>7</sub>, H<sub>2</sub>, and CO under high pressure; used to produce highly pure Re metal [KIR82] [STR93]
Solubility: s in most organic solvents [KIR82]
Density, g/cm<sup>3</sup>: 2.87 [STR93]
Melting Point, °C: 170, decomposes [STR93]

### 2613

Compound: Rhenium pentacarbonyl bromide Formula:  $Re(CO)_5Br$ Molecular Formula:  $C_5BrO_5Re$ Molecular Weight: 406.163 CAS RN: 14220-21-4 Properties: off-white cryst; used to study  $\pi$ -electron complexes [ALD94] [STR93] Melting Point, °C: sublimes at 90 [STR93]

### 2614

Compound: Rhenium pentacarbonyl chloride Formula:  $Re(CO)_5Cl$ Molecular Formula:  $C_5ClO_5Re$ Molecular Weight: 361.712 CAS RN: 14099-01-5 Properties: octahedral cryst; off-white; used to study  $\pi$ -electron-deficient compounds [STR93] [ALD94]

#### 2615

Compound: Rhenium(III) bromide Synonym: rhenium tribromide Formula: ReBr<sub>3</sub> Molecular Formula: Br<sub>3</sub>Re Molecular Weight: 425.919 CAS RN: 13569-49-8 Properties: green-black cryst; -100 mesh with 99.9% purity structure consists of Fe<sub>3</sub>Br<sub>9</sub> units, linked by bridging [CER91] [COT88] [CRC10] Density, g/cm<sup>3</sup>: 6.10 [LID94] Melting Point, °C: sublimes at 500 (vacuum) [CRC10]

#### 2616

Compound: Rhenium(III) chloride
Formula: ReCl<sub>3</sub>
Molecular Formula: Cl<sub>3</sub>Re
Molecular Weight: 292.565
CAS RN: 13569-63-6
Properties: reddish black powd; hygr; sensitive to light; emits green vapor when heated from which the metal can be deposited [HAW93] [STR93]
Solubility: s H<sub>2</sub>O and glacial acetic acid [HAW93]
Density, g/cm<sup>3</sup>: 4.81 [LID94]
Melting Point, °C: decomposes at 500 [LID94]

**Compound:** Rhenium(III) iodide **Synonym:** rhenium triiodide **Formula:** ReI<sub>3</sub> **Molecular Formula:** I<sub>3</sub>Re

Molecular Weight: 566.920

CAS RN: 15622-42-1

Properties: black; -80 mesh of 99.9% purity; structure consists of Re<sub>3</sub>I<sub>9</sub> molecules linked by bridging; preparation: careful evaporation of HReO<sub>4</sub> solution containing excess HI [COT88] [CER91]
 Melting Point, °C: decomposes [LID94]

# 2618

Compound: Rhenium(IV) chloride Formula: ReCl<sub>4</sub> Molecular Formula: Cl<sub>4</sub>Re Molecular Weight: 328.018 CAS RN: 13569-71-6 Properties: greenish black cryst; structure consists of zigzag chains of Fe<sub>2</sub>Co<sub>9</sub>; -80 mesh; sensitive to moisture; forms when a solution of HReO<sub>4</sub> and HCl is carefully evaporated [KIR82] [STR93] [CER91] [COT88] Density, g/cm<sup>3</sup>: 4.9 [STR93] Melting Point, °C: decomposes at 300 [LID94]

### 2619

Compound: Rhenium(IV) fluoride Formula: ReF<sub>4</sub> Molecular Formula: F<sub>4</sub>Re Molecular Weight: 262.201 CAS RN: 15192-42-4 Properties: dark green; blue [COT88] [CRC10] Density, g/cm<sup>3</sup>: 7.49 [LID94] Melting Point, °C: sublimes at >300 [COT88]

#### 2620

Compound: Rhenium(IV) oxide Formula: ReO<sub>2</sub> Molecular Formula: O<sub>2</sub>Re Molecular Weight: 218.206 CAS RN: 12036-09-8 Properties: black powd; distorted rutile structure; anhydrous available as -100 mesh with 99.95% purity [CER91] [STR93] [COT88] Density, g/cm<sup>3</sup>: 11.4 [CRC10] Melting Point, °C: decomposes at 1000 [STR93]

#### 2621

Compound: Rhenium(IV) selenide Formula: ReSe<sub>2</sub> Molecular Formula: ReSe<sub>2</sub> Molecular Weight: 344.127 CAS RN: 12038-64-1 Properties: -100 mesh with 99.9% purity; layer structures with considerable Re-Re bonding [COT88] [CER91]

# 2622

Compound: Rhenium(IV) silicide Formula: ReSi<sub>2</sub> Molecular Formula: ReSi<sub>2</sub> Molecular Weight: 242.378 CAS RN: 12038-66-3 Properties: -80 mesh powd of 99.9% purity [CER91] [ALF93]

### 2623

Compound: Rhenium(IV) sulfide
Formula: ReS<sub>2</sub>
Molecular Formula: ReS<sub>2</sub>
Molecular Weight: 250.339
CAS RN: 12038-63-0
Properties: tricl cryst; commonly nonstoichiometric;

-80 mesh with 99.9% purity; preparation: by heating
Re<sub>2</sub>S<sub>7</sub> with sulfur in vacuum; uses: effective catalyst for hydrogenation of organic compounds, not poisoned by sulfur compounds, catalyzes reduction of NO to N<sub>2</sub>O at 100°C [CER91] [COT88] [LID94]
Density, g/cm<sup>3</sup>: 7.6 [LID94]

#### 2624

Compound: Rhenium(IV) telluride Formula: ReTe<sub>2</sub> Molecular Formula: ReTe<sub>2</sub> Molecular Weight: 441.407 CAS RN: 12067-00-4 Properties: well-characterized compound, which does not have a layer structure; -60 mesh with 99.9% purity [COT88] [CER91]

# 2625

**Compound:** Rhenium(V) bromide **Synonym:** rhenium pentabromide **Formula:** ReBr<sub>5</sub> **Molecular Formula:** Br<sub>5</sub>Re **Molecular Weight:** 585.727 CAS RN: 30937-53-2 Properties: dark brown; -100 mesh with 99.9% purity [COT88] [CER91] Melting Point, °C: decomposes at 110 [LID94]

#### 2626

Compound: Rhenium(V) chloride Formula: ReCl<sub>5</sub> Molecular Formula: Cl<sub>5</sub>Re Molecular Weight: 363.471 CAS RN: 39368-69-9 Properties: sensitive to moisture; formula is also given as the dimer Re<sub>2</sub>Cl<sub>10</sub>; dark green to black solid; decomposed by heating; formed by reacting Re

as the differ Re<sub>2</sub>Cl<sub>10</sub>; dark green to black solid; decomposed by heating; formed by reacting Re with Cl<sub>2</sub> at ~600°C, yielding a dark red-brown liq; starting material for rhenium porphyrin complexes [ALD94] [HAW93] [KIR82] [COT88] **Solubility:** decomposes in H<sub>2</sub>O; s HCl and alkalies [HAW93]

Density, g/cm<sup>3</sup>: 4.9 [HAW93]

- Melting Point, °C: decomposes [AES93]
- **Reactions:** rapidly hydrolyzed to  $\text{ReO}_4^$ 
  - by aq basic solution [COT88]

## 2627

Compound: Rhenium(VI) fluoride Formula: ReF<sub>6</sub> **Molecular Formula:** F<sub>6</sub>Re Molecular Weight: 300.197 CAS RN: 10049-17-9 Properties: yellow cub cryst; extremely hygr; bluish vapors given off in air; transition point -1.9 or -3.45°C; enthalpy of sublimation 32.657 kJ/ mol (above transition), 41.407 kJ/mol (below transition); enthalpy of fusion 4.635 kJ/mol; enthalpy of vaporization 28.75 kJ/mol; entropy of fusion  $60.46 \text{ J/(mol} \cdot \text{K})$ ; entropy of vaporization  $93.4 \text{ J/(mol} \cdot \text{K})$ ; can be produced by reacting Re powd with  $F_2$  at ~100°C; used in the chemical vapor deposition of Re [KIR78] [MER06] Solubility: s HNO<sub>3</sub>; s 1.75 mol/1000 g anhydrous HF [MER06] **Density, g/cm<sup>3</sup>: 3.58** [KIR78] Melting Point, °C: 18.5 [MER06]

## 2628

**Compound:** Rhenium(VI) oxide **Synonym:** rhenium trioxide **Formula:** ReO<sub>3</sub> **Molecular Formula:** O<sub>3</sub>Re

Boiling Point, °C: 48 [CER91]

Molecular Weight: 234.205
CAS RN: 1314-28-9
Properties: -100 mesh with 99.95% purity; red cub cryst; green luster imparted by transmitted light; disproportionates in vacuum to Re<sub>2</sub>O<sub>7</sub> and ReO<sub>2</sub> [MER06] [CER91]
Solubility: i H<sub>2</sub>O, alkalies, nonoxidizing acids [MER06]
Density, g/cm<sup>3</sup>: 6.9–7.4 [MER06]
Melting Point, °C: decomposes at 400 [STR93]
Reactions: oxidized to HReO<sub>4</sub> by HNO<sub>3</sub> [MER06]

# 2629

Compound: Rhenium(VI) oxytetrachloride Formula: ReOCl<sub>4</sub> Molecular Formula: Cl<sub>4</sub>ORe Molecular Weight: 344.017 CAS RN: 13814-76-1 Properties: orange square pyramid; preparation: by reaction between Re and SO<sub>2</sub>Cl<sub>2</sub> at 350°C [COT88] [CRC10] [KIR82] Melting Point, °C: 29.3 [CRC10] Boiling Point, °C: 223 [CRC10]

#### 2630

Compound: Rhenium(VI) trioxychloride
Formula: ReO<sub>3</sub>Cl
Molecular Formula: ClO<sub>3</sub>Re
Molecular Weight: 269.658
CAS RN: 7791-09-5
Properties: clear, colorless liq; can be prepared by chlorination of Re<sub>2</sub>O<sub>7</sub> [MER06]
Solubility: hydrolyzed to HReO<sub>4</sub> in H<sub>2</sub>O; s CCl<sub>4</sub> [MER06]
Density, g/cm<sup>3</sup>: 3.867 [HAW93]
Melting Point, °C: 4.5 [MER06]
Boiling Point, °C: 128 [MER06]

### 2631

Compound: Rhenium(VII) oxide
Synonym: rhenium heptaoxide
Formula: Re<sub>2</sub>O<sub>7</sub>
Molecular Formula: O<sub>7</sub>Re<sub>2</sub>
Molecular Weight: 484.410
CAS RN: 1314-68-7
Properties: -6 mesh with 99.99% purity; canary yellow; very deliq cryst; absorbs water readily, forming perrhenic acid, HReO<sub>4</sub>; enthalpy of fusion 64.20 kJ/mol; structure has infinite array of alternating ReO<sub>4</sub> tetrahedra and ReO<sub>6</sub> octahedra; preparation: reaction with O<sub>2</sub> and heated Re metal [COT88] [CRC10] [MER06] [CER91]

Solubility: v s H<sub>2</sub>O, alcohol, ether, ethyl acetate, dioxane, pyridine [MER06]
Density, g/cm<sup>3</sup>: 6.103 [STR93]
Melting Point, °C: 220 [COT88]
Boiling Point, °C: 360 [ALD94]
Reactions: sublimes at 250°C [MER06]

## 2632

```
Compound: Rhenium(VII) sulfide
Formula: Re<sub>2</sub>S<sub>7</sub>
Molecular Formula: Re<sub>2</sub>S<sub>7</sub>
Molecular Weight: 596.876
CAS RN: 12038-67-4
Properties: brownish black solid; preparation:
precipitation from a saturated solution of
2–6 M HCl solution of ReO<sub>4</sub><sup>-</sup> with H<sub>2</sub>S;
used as a catalyst [HAW93] [COT88]
Solubility: i H<sub>2</sub>O; s alkali sulfide solutions [HAW93]
Density, g/cm<sup>3</sup>: 4.87 [HAW93]
Melting Point, °C: decomposes to ReS at 600 [HAW93]
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2633

**Compound:** Rhodium Formula: Rh Molecular Formula: Rh Molecular Weight: 102.90550 CAS RN: 7440-16-6 **Properties:** silvery white, ductile metal; fcc, a=0.3803 nm; electrical resistivity at 0°C 4.51 µohm · cm; Vicker's hardness 120; Poisson's ratio 0.26; resistant to acids; reacts with aqua regia if finely divided; enthalpy of fusion 26.59 kJ/mol; enthalpy of vaporization 494 kJ/ mol [ALD94] [MER06] [KIR82] [CRC10] Solubility: i acids, aqua regia; s fused KHSO<sub>4</sub> [HAW93] Density, g/cm<sup>3</sup>: 12.41 [MER06] Melting Point, °C: 1966 [MER06] Boiling Point. °C: 3695 [LID94] Thermal Conductivity, W/(m·K): 150.6 (25°C) [KIR82] Thermal Expansion Coefficient: 8.3×10<sup>-6</sup>/°C [KIR82]

# 2634

Compound: Rhodium carbonyl Synonym: hexarhodium hexadecacarbonyl Formula: Rh<sub>6</sub>(CO)<sub>16</sub> Molecular Formula: C<sub>16</sub>O<sub>16</sub>Rh<sub>6</sub> Molecular Weight: 1065.61 CAS RN: 28407-51-4 Properties: black cryst; cluster structure; used as a catalyst [COT88] [ALD94] [ALF95]

#### 2635

Compound: Rhodium carbonyl chloride
Formula: [Rh(CO)<sub>2</sub>Cl]<sub>2</sub>
Molecular Formula: C<sub>4</sub>Cl<sub>2</sub>O<sub>4</sub>Rh<sub>2</sub>
Molecular Weight: 388.758
CAS RN: 14523-22-9
Properties: reddish orange cryst, planar structure; stable in dry air; solutions in organic solvents decompose in air; preparation: by passing ethanol saturated CO over RhCl<sub>3</sub>· 3H<sub>2</sub>O at ~100°C, followed by sublimation of needles of the carbonyl; uses: homogeneous catalyst [ALD94] [MER06] [COT88]
Solubility: s in most organic solvents; i aliphatic hydrocarbons [MER06]
Melting Point, °C: 124–125 [MER06]

## 2636

Compound: Rhodium dodecacarbonyl Formula: Rh<sub>4</sub>(CO)<sub>12</sub> Molecular Formula: C<sub>12</sub>O<sub>12</sub>Rh<sub>4</sub> Molecular Weight: 747.747 CAS RN: 19584-30-6 Properties: dark red cryst; sensitive to light, atm oxygen, and moisture [STR93] [ALD94] Density, g/cm<sup>3</sup>: 2.52 [STR93] Melting Point, °C: 150 [DOU83]

#### 2637

 $\label{eq:compound: Rhodium(II) acetate dimer} Formula: Rh_2(CH_3COO)_4 \\ \mbox{Molecular Formula: } C_8H_{12}O_8Rh_2 \\ \mbox{Molecular Weight: 441.989} \\ \mbox{CAS RN: 15956-28-2} \\ \mbox{Properties: greenish black cryst; preparation: by heating sodium acetate and RhCl_3 \cdot 3H_2O in methanol; uses: homogeneous catalyst [ALD94] [STR93] [COT88] \\ \end{tabular}$ 

### 2638

**Compound:** Rhodium(III) acetylacetonate **Synonyms:** 2,4-pentanedione, rhodium(III) derivative **Formula:** Rh(CH<sub>3</sub>COCH=C(O)CH<sub>3</sub>)<sub>3</sub> **Molecular Formula:** C<sub>15</sub>H<sub>21</sub>O<sub>6</sub>Rh **Molecular Weight:** 400.234 **CAS RN:** 14284-92-5 **Properties:** yellow cryst [STR93] **Melting Point,** °C: 263–264 [ALD94] **Boiling Point,** °C: decomposes at 280 [STR93]

## 2639

**Compound:** Rhodium(III) bromide dihydrate **Synonym:** rhodium tribromide dihydrate

Formula: RhBr<sub>3</sub> · 2H<sub>2</sub>O Molecular Formula: Br<sub>3</sub>H<sub>4</sub>O<sub>2</sub>Rh Molecular Weight: 378.649 CAS RN: 15608-29-4 Properties: hygr, brownish black cryst [STR93] [ALD94]

## 2640

Compound: Rhodium(III) chloride Synonym: rhodium trichloride Formula: RhCl<sub>3</sub> Molecular Formula: Cl<sub>3</sub>Rh Molecular Weight: 209.264 CAS RN: 10049-07-7 Properties: reddish brown, monocl powd [KIR82] [HAW93] Solubility: i H<sub>2</sub>O; s alkali hydroxide or cyanide solutions [MER06] Density, g/cm<sup>3</sup>: 5.38 [KIR82] Melting Point, °C: decomposes at 450 [STR93] Boiling Point, °C: sublimes at 800 [HAW93]

## 2641

**Compound:** Rhodium(III) chloride hydrate **Synonym:** rhodium trichloride hydrate **Formula:** RhCl<sub>3</sub>·xH<sub>2</sub>O **Molecular Formula:** Cl<sub>3</sub>Rh (anhydrous) **Molecular Weight:** 209.264 (anhydrous) **CAS RN:** 20765-98-4 **Properties:** dark red powd; hygr [STR93] **Melting Point, °C:** decomposes at 100 [ALD94]

## 2642

Compound: Rhodium(III) iodide Synonym: rhodium triiodide Formula: RhI<sub>3</sub> Molecular Formula: I<sub>3</sub>Rh Molecular Weight: 483.619 CAS RN: 15492-38-3 Properties: monocl cryst; black powd; hygr [LID94] [STR93] Density, g/cm<sup>3</sup>: 6.4 [LID94]

# 2643

**Compound:** Rhodium(III) nitrate **Formula:** Rh(NO<sub>3</sub>)<sub>3</sub> **Molecular Formula:** N<sub>3</sub>O<sub>9</sub>Rh **Molecular Weight:** 288.921 **CAS RN:** 10139-58-9 **Properties:** available as amber-colored 10% soln [STR93] **Density, g/cm<sup>3</sup>:** soln: 1.410 [ALD94]

#### 2644

**Compound:** Rhodium(III) nitrate dihydrate **Formula:**  $Rh(NO_3)_3 \cdot 2H_2O$ **Molecular Formula:**  $H_4N_3O_{11}Rh$ **Molecular Weight:** 324.951 **CAS RN:** 13465-43-5 **Properties:** deliq red cryst [AES93] [CRC10]

# 2645

Compound: Rhodium(III) oxide Synonym: rhodium trioxide Formula: Rh<sub>2</sub>O<sub>3</sub> Molecular Formula: O<sub>3</sub>Rh<sub>2</sub> Molecular Weight: 253.809 CAS RN: 12036-35-0 Properties: hex cryst; gray powd [LID94] [STR93] Density, g/cm<sup>3</sup>: 8.2 [STR93] Melting Point, °C: decomposes at 1100 [STR93]

# 2646

**Compound:** Rhodium(III) oxide pentahydrate **Formula:**  $Rh_2O_3 \cdot 5H_2O$ **Molecular Formula:**  $H_{10}O_8Rh_2$ **Molecular Weight:** 343.885 **CAS RN:** 39373-27-8 **Properties:** yellow powd [STR93] **Melting Point, °C:** decomposes [STR93]

#### 2647

Compound: Rhodium(III) sulfate Formula: Rh<sub>2</sub>(SO<sub>4</sub>)<sub>3</sub> Molecular Formula: O<sub>12</sub>Rh<sub>2</sub>S<sub>3</sub> Molecular Weight: 494.002 CAS RN: 10489-46-0 Properties: reddish yellow solid; ~8% aq soln [ALD94] [KIR82] Density, g/cm<sup>3</sup>: soln: 1.217 [ALD94] Melting Point, °C: decomposes at >500 [KIR82]

## 2648

Compound: Rhodium(IV) oxide dihydrate Formula: RhO<sub>2</sub>·2H<sub>2</sub>O Molecular Formula: H<sub>4</sub>O<sub>4</sub>Rh Molecular Weight: 170.935 CAS RN: 12137-27-8 Properties: olive-green powd [CRC10] [AES93] Density, g/cm<sup>3</sup>: 8.20 [CRC10] Melting Point, °C: decomposes at 1100–1150 [CRC10]

Compound: Rubidium Formula: Rb Molecular Formula: Rb Molecular Weight: 85.4678

CAS RN: 7440-17-7
Properties: lustrous, silvery white, soft metal; bcc; tarnishes readily in air; evolves H<sub>2</sub> in water; ignites spontaneously in oxygen; reacts with halogens, mercury; ionic radius 0.148 nm; viscosity (39°C) 0.6713 mPa · s; surface tension (39°C)

(c) C) for the line a by barrier tension (c) C)
75 mN/m; electrical resistivity 11.0 μohm · cm; enthalpy of fusion 2.19 kJ/mol; enthalpy of vaporization 75.77 kJ/mol; used in photocells, as a catalyst or catalyst promoter [HAW93]
[KIR82] [MER06] [CRC10] [ALD94]
Solubility: s in acids and alcohol [HAW93]
Density, g/cm<sup>3</sup>: solid: 1.532 [MER06]; liq: 1.472 at 39°C [KIR82]
Melting Point, °C: 38.5 [CAB85]
Boiling Point, °C: 688 [MER06]
Thermal Conductivity, W/(m · K): 58.2 (25°C) [CRC10]; 29.3 for liq [KIR82]

2650

Compound: Rubidium acetate Synonyms: acetic acid, Rb salt Formula: CH<sub>3</sub>COORb Molecular Formula: C<sub>2</sub>H<sub>3</sub>O<sub>2</sub>Rb Molecular Weight: 144.513 CAS RN: 563-67-7 Properties: -4 mesh with 99.9% purity; white, hygr cryst [CER91] [STR93] Solubility: 86 g/100 mL H<sub>2</sub>O (45°C), 89.3 g/100 mL (99.4°C) [CRC10] Melting Point, °C: 246 [STR93]

2651

**Compound:** Rubidium acetylacetonate **Synonyms:** 2,4-pentanedione, rubidium derivative **Formula:** [CH<sub>3</sub>COCH=C(O)CH<sub>3</sub>)Rb **Molecular Formula:** C<sub>3</sub>H<sub>7</sub>O<sub>2</sub>Rb **Molecular Weight:** 184.578 **CAS RN:** 66169-93-5 **Properties:** white cryst [CRC10] **Melting Point,** °C: decomposes at 200 [ALD94]

## 2652

**Compound:** Rubidium aluminum sulfate dodecahydrate Formula:  $RbAl(SO_4)_2 \cdot 12H_2O$ Molecular Formula:  $AlH_{24}O_{20}RbS_2$  Molecular Weight: 520.760 CAS RN: 7488-54-2 Properties: colorless cryst [MER06] [HAW93] Solubility: g/100 g H<sub>2</sub>O: 0.72 (0°C), 1.50 (20°C), 21.6 (80°C) [LAN05]; i alcohol [MER06] Density, g/cm<sup>3</sup>: 1.867 [HAW93] Melting Point, °C: dodecahydrate, 99–109 [MER06]

### 2653

Compound: Rubidium azide Formula: RbN<sub>3</sub> Molecular Formula: N<sub>3</sub>Rb Molecular Weight: 127.488 CAS RN: 22756-36-1 Properties: colorless needles; tetr, a=0.636 nm, c=0.741 nm [CRC10] [CIC73] Solubility: 107 g/100 mL H<sub>2</sub>O (16°C) [CRC10] Density, g/cm<sup>3</sup>: 2.79 [CRC10] Melting Point, °C: decomposes at ~310 [CRC10]

### 2654

**Compound:** Rubidium bromate **Formula:** RbBrO<sub>3</sub> **Molecular Formula:** BrO<sub>3</sub>Rb **Molecular Weight:** 213.370 **CAS RN:** 13446-70-3 **Properties:** cub [CRC10] **Solubility:** g/100 g H<sub>2</sub>O: 2.93 (25°C) [KRU93] **Density, g/cm<sup>3</sup>:** 3.68 [LAN05] **Melting Point, °C:** 430 [LAN05]

## 2655

Compound: Rubidium bromide
Formula: RbBr
Molecular Formula: BrRb
Molecular Weight: 165.372
CAS RN: 7789-39-1
Properties: -4 mesh with 99.9% purity; white, cryst powd; enthalpy of fusion 15.50 kJ/ mol [MER06] [CRC10] [CER91]
Solubility: g/100 g soln, H<sub>2</sub>O: 47.26 (0.5°C), 53.69 (25°C), 67.24 (113.5°C) [KRU93]
Density, g/cm<sup>3</sup>: 3.35 [MER06]
Melting Point, °C: 682 [CRC10]
Boiling Point, °C: 1340 [MER06]
Thermal Expansion Coefficient: (volume) 100°C (0.925), 200°C (2.171) [CLA66]

2656

**Compound:** Rubidium carbonate **Formula:** Rb<sub>2</sub>CO<sub>3</sub>

Molecular Formula: CO<sub>3</sub>Rb<sub>2</sub>
Molecular Weight: 230.945
CAS RN: 584-09-8
Properties: -20 mesh with 99.9% purity; white, monocl cryst; extremely hygr; dissociates above 900°C; used in special glass formulations [LID94] [HAW93] [CER91]
Solubility: 450 g/100 mL H<sub>2</sub>O at 20°C [KIR82]
Melting Point, °C: 837 [STR93]
Boiling Point, °C: decomposes at 740 [KIR82]

#### 2657

Compound: Rubidium chlorate Formula: RbClO<sub>3</sub> Molecular Formula: ClO<sub>3</sub>Rb Molecular Weight: 168.919 CAS RN: 13446-71-4 Properties: trimetric [CRC10] Solubility: g/100 g H<sub>2</sub>O: 2.138 (0°C), 5.36 (19.8°C), 62.80 (99°C) [KRU93] Density, g/cm<sup>3</sup>: 3.19 [LAN05]

### 2658

Compound: Rubidium chloride Formula: RbCl Molecular Formula: CIRb Molecular Weight: 120.921 CAS RN: 7791-11-9 Properties: -4 mesh with 99.9% purity; white, cryst powd; hygr; enthalpy of fusion 18.40 kJ/mol; used in testing for perchloric acid and as a source of Rb metal [HAW93] [CRC10] [CER91] **Solubility:**  $g/100 g \text{ soln } H_2O: 43.5 (0^\circ),$  $48.4 \pm 0.21$  (25°), 58.9 (100°); equilibrium solid phase RbCl at 25° [KRU93];  $7.7832 \pm 0.0083 \text{ mol/(kg} \cdot H_2\text{O})$  at 25°C [RAR85b] Density, g/cm<sup>3</sup>: 2.76 [MER06] Melting Point, °C: 715 [CRC10] Boiling Point, °C: 1390 [MER06] Thermal Expansion Coefficient: (volume) 100°C (0.891), 200°C (2.079) [CLA66]

# 2659

Compound: Rubidium chromate Formula: Rb<sub>2</sub>CrO<sub>4</sub> Molecular Formula: CrO<sub>4</sub>Rb<sub>2</sub> Molecular Weight: 286.930 CAS RN: 13446-72-5 Properties: -20 mesh with 99.9% purity; yellow cryst [STR93] [CER91] **Solubility:** g/100 g soln, H<sub>2</sub>O: 38.27 (0°), 43.265 (25°C) [KRU93]; g/100 g H<sub>2</sub>O: 62.0 (0°C), 73.6 (20°C), 95.7 (60°C) [LAN05] **Density, g/cm<sup>3</sup>:** 3.518 [STR93]

#### 2660

Compound: Rubidium cobalt(II) sulfate hexahydrate Formula:  $Rb_2Co(SO_4)_2 \cdot 6H_2O$ Molecular Formula:  $CoH_{12}O_{14}Rb_2S_2$ Molecular Weight: 530.088 CAS RN: 28038-39-3 Properties: ruby-red, monocl [CRC10] Solubility: g/100 g H<sub>2</sub>O: 5.10 (0°C), 10.8 (20°C), 70.1 (100°C) [LAN05] Density, g/cm<sup>3</sup>: 2.56 [CRC10]

## 2661

Compound: Rubidium cyanide Formula: RbCN Molecular Formula: CNRb Molecular Weight: 111.486 CAS RN: 19073-56-4 Properties: cub; white or colorless [LID94] [KIR78] Density, g/cm<sup>3</sup>: 2.32 [CRC10]

#### 2662

Compound: Rubidium dichromate Formula:  $Rb_2Cr_2O_7$ Molecular Formula:  $Cr_2O_7Rb_2$ Molecular Weight: 386.924 CAS RN: 13446-73-6 Properties: red tricl or yellow monocl [LAN05] Solubility: monocl: g/100 g H<sub>2</sub>O: 5.9 (20°C), 10.0 (30°C), 15.2 (40°C), 32.3 (60°C); tricl: 5.8 (20°C), 9.5 (30°C), 14.8 (40°C), 32.4 (60°C) [LAN05] Density, g/cm<sup>3</sup>: monocl: 3.021; tricl: 3.125 [CRC10] [LAN05]

#### 2663

Compound: Rubidium fluoride
Formula: RbF
Molecular Formula: FRb
Molecular Weight: 104.466
CAS RN: 13446-74-7
Properties: -4 mesh with 99.9% purity; white cub; hygr; enthalpy of fusion 17.30 kJ/mol [STR93] [CRC10] [CER91] [LID94]
Solubility: g/100 g soln, H<sub>2</sub>O: 75.06 (18°C); solid phase, RbF · 1-1/2H<sub>2</sub>O [KRU93]; i alcohol [HAW93]
Density, g/cm<sup>3</sup>: 3.557 [HAW93]
Melting Point, °C: 833 [CRC10]
Boiling Point, °C: 1410 [STR93]

Compound: Rubidium fluoroborate Synonym: rubidium borofluoride Formula: RbBF<sub>4</sub> Molecular Formula: BF<sub>4</sub>Rb Molecular Weight: 172.273 CAS RN: 18909-68-7 Properties: ortho-rhomb below 245°C, a=0.7296 nm, b=0.9108 nm, c=0.5636 nm; cub above 245°C [KIR78] Solubility: 0.6 g/100 mL H<sub>2</sub>O (17°C) [KIR78] Density, g/cm<sup>3</sup>: 2.820 [KIR78] Melting Point, °C: decomposes at 612 [KIR78]

## 2665

Compound: Rubidium fullerene Formula: Rb<sub>3</sub>C<sub>60</sub> Molecular Formula: C<sub>60</sub>Rb<sub>3</sub> Molecular Weight: 977.063 CAS RN: 137926-73-9 Properties: fcc, lattice constant 1.4436 nm; bulk modulus 22 GPa; density of states 35 states/(eV/C<sub>60</sub>); superconducting temp 29.4 K [DRE93]

#### 2666

**Compound:** Rubidium hexafluorogermanate **Formula:** Rb<sub>2</sub>GeF<sub>6</sub> **Molecular Formula:** F<sub>6</sub>GeRb<sub>2</sub> **Molecular Weight:** 357.536 **CAS RN:** 16962-48-4 **Properties:** white, cryst solid [HAW93] **Solubility:** sl s cold H<sub>2</sub>O, v s hot H<sub>2</sub>O [HAW93] **Melting Point, °C:** 696 [HAW93]

## 2667

Compound: Rubidium hydroxide
Formula: RbOH
Molecular Formula: HORb
Molecular Weight: 102.475
CAS RN: 1310-82-3
Properties: grayish white; deliq; stronger base than KOH; absorbs atm CO<sub>2</sub>; possible use in low temp storage batteries; there is a hydrate form [HAW93] [MER06] [STR93] [CER91]
Solubility: g/100 g soln, H<sub>2</sub>O: 63.39 (30°C) [KRU93]; s alcohol [MER06]
Density, g/cm<sup>3</sup>: 3.203 [MER06]
Melting Point, °C: 300 [HAW93]

#### 2668

Compound: Rubidium iodide
Formula: RbI
Molecular Formula: IRb
Molecular Weight: 212.372
CAS RN: 7790-29-6
Properties: -4 mesh with 99.9% purity; white cryst or cryst powd; discolors if exposed to light, air; enthalpy of fusion 12.50 kJ/mol [CRC10] [MER06] [CER91]
Solubility: g/100 g soln, H<sub>2</sub>O: 55.50 (0°C), 61.99 (25°C), 73.01 (93°C); solid phase, RbI [KRU93]; s alcohol [MER06]
Density, g/cm<sup>3</sup>: 3.55 [MER06]
Melting Point, °C: 642 [MER06]
Boiling Point, °C: 1300 [MER06]

## 2669

Compound: Rubidium iron(III) sulfate dodecahydrate Formula: RbFe(SO<sub>4</sub>)<sub>2</sub> · 12H<sub>2</sub>O Molecular Formula: FeH<sub>24</sub>O<sub>20</sub>RbS<sub>2</sub> Molecular Weight: 549.624 CAS RN: 30622-97-0 Properties: cub [CRC10] Solubility: g/100 g H<sub>2</sub>O: 8.0 (10°C), 20 (20°C), 52 (40°C) [LAN05] Density, g/cm<sup>3</sup>: 1.91–1.95 [CRC10] Melting Point, °C: 45–53 [CRC10]

#### 2670

Compound: Rubidium metavanadate Formula: RbVO<sub>3</sub> Molecular Formula: O<sub>3</sub>RbV Molecular Weight: 184.408 CAS RN: 13597-45-0 Properties: -100 mesh with 99.9% purity [CER91]

### 2671

Compound: Rubidium molybdate Formula: Rb<sub>2</sub>MoO<sub>4</sub> Molecular Formula: MoO<sub>4</sub>Rb<sub>2</sub> Molecular Weight: 330.874 CAS RN: 13718-22-4 Properties: -200 mesh with 99.9% purity; white [KIR81] [CER91] Solubility: g/100 g soln, H<sub>2</sub>O: 67.88 (18°C) [KRU93] Melting Point, °C: 958, 919 [KIR81]

Compound: Rubidium niobate Formula: RbNbO<sub>3</sub> Molecular Formula: NbO<sub>3</sub>Rb Molecular Weight: 226.372 CAS RN: 12059-51-7 Properties: -200 mesh with 99.9% purity [CER91]

### 2673

Compound: Rubidium nitrate Formula: RbNO<sub>3</sub> Molecular Formula: NO<sub>3</sub>Rb Molecular Weight: 147.473 CAS RN: 13126-12-0 Properties: -80 mesh with 99.9% purity; white cryst; hygr; enthalpy of fusion 5.60 kJ/mol [STR93] [CRC10] [CER91] Solubility: g/100 g H<sub>2</sub>O: 19.5 (0°C), 67.3 (25°C), 452 (100°C) [KRU93] Density, g/cm<sup>3</sup>: 3.11 [STR93] Melting Point, °C: 305 [CRC10]

# 2674

**Compound:** Rubidium orthovanadate **Formula:** Rb<sub>3</sub>VO<sub>4</sub> **Molecular Formula:** O<sub>4</sub>Rb<sub>3</sub>V **Molecular Weight:** 371.343 **CAS RN:** 13566-05-7 **Properties:** -100 mesh with 99.9% purity [CER91]

#### 2675

Compound: Rubidium oxide
Formula: Rb<sub>2</sub>O
Molecular Formula: ORb<sub>2</sub>
Molecular Weight: 186.935
CAS RN: 18088-11-4
Properties: cub; yellowish brown; sensitive to atm oxygen and moisture [STR93] [CRC10]
Density, g/cm<sup>3</sup>: 4.0 [LID94]
Melting Point, °C: decomposes at 400 [STR93]

# 2676

Compound: Rubidium perchlorate Formula: RbClO<sub>4</sub> Molecular Formula: ClO<sub>4</sub>Rb Molecular Weight: 184.919 CAS RN: 13510-42-4 Properties: -4 mesh with 99.9% purity; white, rhomb cryst; hygr [STR93] [CRC10] [CER91] Solubility: g/100 g H<sub>2</sub>O: 1.1 (0°C), 1.8 (25°C), 22 (100°C) [KRU93]
Density, g/cm<sup>3</sup>: 2.80 [STR93]
Melting Point, °C: 281 [KIR79]
Boiling Point, °C: decomposes at 606 [KIR79]
Reactions: transition from ortho-rhomb to cub at 551–534 K [KIR79]

## 2677

Compound: Rubidium permanganate Formula: RbMnO<sub>4</sub> Molecular Formula: MnO<sub>4</sub>Rb Molecular Weight: 204.404 CAS RN: 13465-49-1 Properties: cryst [LAN05] Solubility: g/100 mL soln, H<sub>2</sub>O: 1.06 (19°C) [KRU93] Density, g/cm<sup>3</sup>: 3.325 [LAN05] Melting Point, °C: decomposes at 295 [LAN05]

#### 2678

**Compound:** Rubidium pyrovanadate **Formula:**  $Rb_4V_2O_7$  **Molecular Formula:**  $O_7Rb_4V_2$  **Molecular Weight:** 555.750 **CAS RN:** 13597-61-0 **Properties:** -100 mesh with 99.9% purity [CER91]

#### 2679

Compound: Rubidium selenide Formula: Rb<sub>2</sub>Se Molecular Formula: Rb<sub>2</sub>Se Molecular Weight: 249.896 CAS RN: 31052-43-4 Properties: white cub cryst; -60 mesh with 99.5% purity [LID94] [CER91] Density, g/cm<sup>3</sup>: 3.22 [LID94] Melting Point, °C: 733 [LID94]

## 2680

Compound: Rubidium sulfate Formula: Rb<sub>2</sub>SO<sub>4</sub> Molecular Formula: O<sub>4</sub>Rb<sub>2</sub>S Molecular Weight: 267.000 CAS RN: 7488-54-2 Properties: -20 mesh with 99.9% purity; white cryst [STR93] [CER91] Solubility: g/100 g H<sub>2</sub>O: 36.4 (0°C), 50.8 (25°C), 81.8 (100°C) [KRU93] Density, g/cm<sup>3</sup>: 3.613 [STR93] Melting Point, °C: 1050 [STR93] Boiling Point, °C: ~1700 [STR93] Compound: Rubidium sulfide Formula: Rb<sub>2</sub>S Molecular Formula: Rb<sub>2</sub>S Molecular Weight: 203.002 CAS RN: 31083-74-6 Properties: yellow-white; available as -60 mesh, dry, under argon with 99.9% purity [CER91] [CRC10] Density, g/cm<sup>3</sup>: 2.913 [CRC10] Melting Point, °C: decomposes at 530 [CRC10]

### 2682

**Compound:** Rubidium tantalate **Formula:** RbTaO<sub>3</sub> **Molecular Formula:** O<sub>3</sub>RbTa **Molecular Weight:** 314.414 **CAS RN:** 12333-74-3 **Properties:** -200 mesh with 99.9% purity [CER91]

## 2683

**Compound:** Rubidium tetrahydridoborate **Formula:** RbBH<sub>4</sub> **Molecular Formula:** BH<sub>4</sub>Rb **Molecular Weight:** 100.310 **CAS RN:** 20346-99-0 **Properties:** powd [ALF95] **Density, g/cm<sup>3</sup>:** 1.92 [ALF95]

## 2684

Compound: Rubidium titanate Formula: Rb<sub>2</sub>TiO<sub>3</sub> Molecular Formula: O<sub>3</sub>Rb<sub>2</sub>Ti Molecular Weight: 266.801 CAS RN: 12137-34-7 Properties: reacted product, -200 mesh with 99.9% purity [CER91]

## 2685

**Compound:** Rubidium tungstate **Formula:** Rb<sub>2</sub>WO<sub>4</sub> **Molecular Formula:** O<sub>4</sub>Rb<sub>2</sub>W **Molecular Weight:** 418.774 **CAS RN:** 13597-52-9 **Properties:** -200 mesh with 99.9% purity [CER91]

## 2686

**Compound:** Rubidium zirconate **Formula:** Rb<sub>2</sub>ZrO<sub>3</sub> **Molecular Formula:** O<sub>3</sub>Rb<sub>2</sub>Zr **Molecular Weight:** 310.158 **CAS RN:** 12534-23-5 **Properties:** -200 mesh with 99.9% purity [CER91]

## 2687

Compound: Ruthenium Formula: Ru Molecular Formula: Ru Molecular Weight: 101.07 CAS RN: 7440-18-8 Properties: silvery white; lustrous, hard metal; hex close-packed, a=0.2704 nm, c=0.4281 nm; enthalpy of sublimation 649.6 kJ/mol; entropy of sublimation  $157.8 \text{ J/(mol} \cdot \text{K})$ ; enthalpy of fusion 38.8 kJ/mol; entropy of fusion  $15.2 \text{ J/(mol} \cdot \text{K})$ ; vapor pressure at mp is 1.31 Pa; electrical resistivity  $(20^{\circ}\text{C})$  7.4 µohm · cm; Young's modulus 413.8 GPa; Brinell hardness 220; superconducting transition 0.48 K; used as a hardener for platinum and palladium [HAW93] [MER06] [KIR82] [RAR85] Solubility: i acids and aqua regia; attacked by conc NaOH, by fused alkalies [HAW93] Density, g/cm<sup>3</sup>: 12.45 [MER06] Melting Point, °C: 2546 [RAR85] Boiling Point, °C: ~4400 [RAR85] Thermal Conductivity, W/(m·K): 117 (25°C) [ALD94] Thermal Expansion Coefficient: 20°C is 9.1×10<sup>-6</sup>/°C [KIR82]

### 2688

Compound: Ruthenium ammoniated oxychloride Synonym: ruthenium red Formula:  $[(NH_3)_5Ru-O-Ru(NH_3)_4-ORu(NH_3)_5]Cl_6$ Molecular Formula:  $Cl_6H_{42}N_{14}O_2Ru_3$ Molecular Weight: 786.352 CAS RN: 11103-72-3 Properties: brownish red powd; exists as tetrahydrate; preparation: treatment of RuCl\_3(aq) with NH\_4OH for several days, in air, followed by crystallization [COT88] [MER06] Solubility: s H\_2O, ammonia [MER06]

### 2689

**Compound:** Ruthenium dodecacarbonyl **Synonym:** triruthenium dodecacarbonyl **Formula:**  $Ru_3(CO)_{12}$ **Molecular Formula:**  $C_{12}O_{12}Ru_3$ **Molecular Weight:** 639.335 **CAS RN:** 15243-33-1 **Properties:** orange cryst; stable in air [DOU83] [STR93] **Melting Point, °C:** decomposes at 150 [STR93]

**Compound:** Ruthenium nitrosyl chloride monohydrate **Formula:**  $Ru(NO)Cl_3 \cdot H_2O$  **Molecular Formula:**  $Cl_3H_2NO_2Ru$  **Molecular Weight:** 255.450 **CAS RN:** 18902-42-6 **Properties:** red cryst; hygr [STR93]

## 2691

**Compound:** Ruthenium(III) acetylacetonate **Synonyms:** 2,4-pentanedione, ruthenium(III) derivative **Formula:** Ru(CH<sub>3</sub>COCH=C(O)CH<sub>3</sub>)<sub>3</sub> **Molecular Formula:**  $C_{15}H_{21}O_6Ru$  **Molecular Weight:** 398.398 **CAS RN:** 14284-93-6 **Properties:** redish brown cryst [STR93] **Melting Point,** °C: 230–235 [STR93]

### 2692

Compound: Ruthenium(III) bromide Synonym: ruthenium tribromide Formula: RuBr<sub>3</sub> Molecular Formula: Br<sub>3</sub>Ru Molecular Weight: 340.782 CAS RN: 14014-88-1 Properties: hex brown cryst [LID94] Density, g/cm<sup>3</sup>: 5.3 [LID94] Melting Point, °C: decomposes at >400 [LID94]

### 2693

Compound: Ruthenium(III) chloride Synonym: ruthenium trichloride Formula: RuCl<sub>3</sub> Molecular Formula: Cl<sub>3</sub>Ru Molecular Weight: 207.428 CAS RN: 10049-08-8 Properties: α-RuCl<sub>3</sub>: black, lustrous cryst; β-RuCl<sub>3</sub>: dark brown, fluffy, hex cryst; hygr [MER06] [STR93] Solubility: i H<sub>2</sub>O, decomposed by hot H<sub>2</sub>O; sl s alcohol [HAW93] Density, g/cm<sup>3</sup>: 3.11 [HAW93] Melting Point, °C: decomposes at >500 [STR93]

## 2694

**Compound:** Ruthenium(III) chloride hydrate **Synonym:** ruthenium trichloride hydrate **Formula:** RuCl<sub>3</sub>·xH<sub>2</sub>O **Molecular Formula:** Cl<sub>3</sub>Ru (anhydrous) **Molecular Weight:** 207.428 (anhydrous) **CAS RN:** 14898-67-0 **Properties:** black powd; hygr [STR93]

#### 2695

Compound: Ruthenium(III) iodide Formula: RuI<sub>3</sub> Molecular Formula: I<sub>3</sub>Ru Molecular Weight: 481.783 CAS RN: 13896-65-6 Properties: hex black cryst [LID94] [STR93] Density, g/cm<sup>3</sup>: 6.0 [LID94] Melting Point, °C: decomposes at 590 [AES93]

### 2696

Compound: Ruthenium(IV) oxide Synonym: ruthenium dioxide Formula: RuO<sub>2</sub> Molecular Formula: O<sub>2</sub>Ru Molecular Weight: 133.069 CAS RN: 12036-10-1 Properties: -100 mesh with 99.9% purity; dark, grayish black, tetr solid [KIR82] [CER91] Solubility: i H<sub>2</sub>O, acids; s fused alkali [KIR82] Density, g/cm<sup>3</sup>: 7.0 [KIR82] Melting Point, °C: decomposes [KIR82]

## 2697

Compound: Ruthenium(VIII) oxide
Synonym: ruthenium tetroxide
Formula: RuO<sub>4</sub>
Molecular Formula: O<sub>4</sub>Ru
Molecular Weight: 165.068
CAS RN: 20427-56-9
Properties: golden yellow; monocl prisms; very volatile; sublimes at room temp; strong oxidizing agent, e.g., explosive reaction with filter paper, alcohol [MER06]
Solubility: 2.03 g/100 mL H<sub>2</sub>O (20°C); v s CCl<sub>4</sub>, other chlorinated hydrocarbons [MER06] [KIR82]
Density, g/cm<sup>3</sup>: 3.29 [KIR82]
Melting Point, °C: 25.4 [MER06]
Boiling Point, °C: 40 [MER06]

### 2698

Compound: Samarium

# Formula: Sm

Molecular Formula: Sm

- Molecular Weight: 150.36
- CAS RN: 7440-19-9
- **Properties:** yellow metal; tarnishes in air; rhomb, room temp; bcc, >917°C; electrical resistivity (20°C) 91.4μohm · cm; enthalpy of fusion 8.62 kJ/mol; enthalpy of sublimation 206.7 kJ/mol; radius of atom is 0.1804 nm; radius of Sm<sup>+++</sup> ion 0.0964 nm; Sm<sup>+++</sup> forms colorless solutions [MER06] [KIR82]

Density, g/cm<sup>3</sup>: 7.520 [KIR82] Melting Point, °C: 1072 [MER06] Boiling Point, °C: 1794 [KIR82] Thermal Conductivity, W/(m⋅K): 13.3 (25°C) [CRC10] Thermal Expansion Coefficient: 12.7 × 10<sup>-6</sup>/K [CRC10]

### 2699

**Compound:** Samarium acetate trihydrate **Formula:**  $Sm(CH_3COO)_3 \cdot 3H_2O$ **Molecular Formula:**  $C_6H_{15}O_9Sm$ **Molecular Weight:** 381.540 **CAS RN:** 17829-86-6 **Properties:** off-white powd [STR93] **Solubility:** 15 g/100 mL H<sub>2</sub>O (25°C) [CRC10] **Density, g/cm<sup>3</sup>:** 1.94 [STR93]

## 2700

**Compound:** Samarium acetylacetonate **Synonyms:** 2,4-pentanedione, samarium(III) derivative **Formula:** Sm(CH<sub>3</sub>COCH=C(O)CH<sub>3</sub>)<sub>3</sub> **Molecular Formula:**  $C_{15}H_{21}O_6Sm$  **Molecular Weight:** 447.688 **CAS RN:** 14589-42-5 **Properties:** white powd [STR93] **Melting Point,** °C: 146 [AES93]

## 2701

Compound: Samarium boride Formula: SmB<sub>6</sub> Molecular Formula: B<sub>6</sub>Sm Molecular Weight: 215.226 CAS RN: 12008-29-6 Properties: -325 mesh 10μm or less with 99.9% purity; refractory material [KIR78] [CER91] Density, g/cm<sup>3</sup>: 5.07 [LID94] Melting Point, °C: 2540 [KIR78]

## 2702

**Compound:** Samarium bromate nonahydrate **Formula:**  $Sm(BrO_3)_3 \cdot 9H_2O$  **Molecular Formula:**  $Br_3H_{18}O_{18}Sm$  **Molecular Weight:** 696.204 **CAS RN:** 28958-26-1 **Properties:** yellow; hex [CRC10] **Solubility:** g/100 g H\_2O: 34.2 (0°C), 62.5 (20°C), 98.5 (40°C) [LAN05] **Melting Point,** °C: 75 [CRC10] **Reactions:** minus 9H\_2O, 150°C [CRC10]

#### 2703

Compound: Samarium bromide hexahydrate Formula:  $SmBr_3 \cdot 6H_2O$ Molecular Formula:  $Br_3H_{12}O_6Sm$ Molecular Weight: 498.164 CAS RN: 13517-12-9 Properties: -20 mesh with 99.9% purity; yellow cryst [ALD94] [CRC10] Density, g/cm<sup>3</sup>: 2.971 [ALF95] Melting Point, °C: >640 [ALF95]

#### 2704

**Compound:** Samarium carbonate **Formula:** Sm<sub>2</sub>(CO<sub>3</sub>)<sub>3</sub> **Molecular Formula:** C<sub>3</sub>O<sub>9</sub>Sm<sub>2</sub> **Molecular Weight:** 480.748 **CAS RN:** 5895-47-6 **Properties:** white to light yellow powd [STR93] **Melting Point,** °C: >500, decomposes [STR93]

# 2705

Compound: Samarium chloride Formula: SmCl<sub>3</sub> Molecular Formula: Cl<sub>3</sub>Sm Molecular Weight: 256.718 CAS RN: 10361-82-7 Properties: -20 mesh with 99.9% purity; yellowish white powd; hygr [STR93] [CER91] Solubility: g/100 g H<sub>2</sub>O: 92.4 (10°C), 93.4 (20°C), 96.9 (40°C) [LAN05] Density, g/cm<sup>3</sup>: 4.465 [STR93] Melting Point, °C: 686 [STR93]

# 2706

Compound: Samarium chloride hexahydrate Formula: SmCl<sub>3</sub> · 6H<sub>2</sub>O Molecular Formula: Cl<sub>3</sub>H<sub>12</sub>O<sub>6</sub>Sm Molecular Weight: 364.809 CAS RN: 13465-55-9 Properties: −4 mesh with 99.9% purity; light yellow cryst [STR93] [CER91] Density, g/cm<sup>3</sup>: 2.382 [MER06] Reactions: minus 5H<sub>2</sub>O at 110°C [AES93]

## 2707

**Compound:** Samarium diiodide **Synonym:** samarium(II) iodide **Formula:** SmI<sub>2</sub> **Molecular Formula:** I<sub>2</sub>Sm **Molecular Weight:** 404.169

## CAS RN: 32248-43-4

Properties: dark brown solid; ampoules under argon or in liq form; stabilized with Sm powd; sensitive to atm oxygen and moisture; freezing point of liq –17°C in THF solvent [STR93] [ALD94]
Melting Point, °C: solid: 527 [CRC10]
Boiling Point, °C: solid: 1580 [CRC10]

#### 2708

Compound: Samarium fluoride
Formula: SmF<sub>3</sub>
Molecular Formula: F<sub>3</sub>Sm
Molecular Weight: 207.355
CAS RN: 13765-24-7
Properties: off-white powd, and 99.9% pure melted pieces of 3–6 mm; hygr; pieces used as evaporation material for possible application to multilayers [STR93] [CER91]
Density, g/cm<sup>3</sup>: 6.928 [STR93]
Melting Point, °C: 1306 [STR93]
Boiling Point, °C: 2323 [STR93]

2709

**Compound:** Samarium hydride **Formula:** SmH<sub>3</sub> **Molecular Formula:** H<sub>3</sub>Sm **Molecular Weight:** 153.384 **CAS RN:** 13598-53-3 **Properties:** lumps, under argon [AES93]

## 2710

Compound: Samarium iodide Formula: SmI<sub>3</sub> Molecular Formula: I<sub>3</sub>Sm Molecular Weight: 531.073 CAS RN: 13813-25-7 Properties: -20 mesh [ALF95]

#### 2711

**Compound:** Samarium nitrate hexahydrate **Formula:** Sm(NO<sub>3</sub>)<sub>3</sub>·6H<sub>2</sub>O **Molecular Formula:** H<sub>12</sub>N<sub>3</sub>O<sub>15</sub>Sm **Molecular Weight:** 444.466 **CAS RN:** 13759-83-6 **Properties:** yellow cryst; hygr [STR93] **Melting Point,** °C: 78 [AES93]

# 2712

**Compound:** Samarium oxalate decahydrate **Formula:**  $Sm_2(C_2O_4)_3 \cdot 10H_2O$ **Molecular Formula:**  $C_6H_{20}O_{22}Sm_2$  **Molecular Weight:** 744.932 **CAS RN:** 14175-03-2 **Properties:** white powd [AES93] [STR93] **Solubility:** 0.000054 g/100 mL H<sub>2</sub>O [CRC10]

#### 2713

Compound: Samarium oxide
Synonyms: samaria, samarium oxide
Formula: Sm<sub>2</sub>O<sub>3</sub>
Molecular Formula: O<sub>3</sub>Sm<sub>2</sub>
Molecular Weight: 348.718
CAS RN: 12060-58-1
Properties: yellowish white powd or sintered pieces; used as an evaporation material because of its reactivity to radio frequencies [MER06] [CER91]
Density, g/cm<sup>3</sup>: 8.347 [MER06]

## 2714

**Compound:** Samarium perchlorate hydrate **Formula:**  $Sm(ClO_4)_3 \cdot xH_2O$  **Molecular Formula:**  $Cl_3O_{12}Sm$  (anhydrous) **Molecular Weight:** 448.711 (anhydrous) **CAS RN:** 13569-60-3 **Properties:** white powd; hygr; x = 6 [AES93] [STR93]

# 2715

Compound: Samarium silicide Formula: SmSi<sub>2</sub> Molecular Formula: Si<sub>2</sub>Sm Molecular Weight: 206.531 CAS RN: 12300-22-0 Properties: 10 mm & down lump [ALF93]

#### 2716

Compound: Samarium sulfate octahydrate Formula:  $Sm_2(SO_4)_3 \cdot 8H_2O$ Molecular Formula:  $H_{16}O_{20}S_3Sm_2$ Molecular Weight: 733.033 CAS RN: 13465-58-2 Properties: white monocl cryst; hygr [ALD94] [STR93] Solubility: 4.4 g/100 mL H<sub>2</sub>O (25°C), 1.99 g/100 mL H<sub>2</sub>O (40°C) [CRC10] Density, g/cm<sup>3</sup>: 2.93 [STR93] Reactions: minus 8H<sub>2</sub>O at 450 [AES93]

### 2717

**Compound:** Samarium sulfide **Formula:** Sm<sub>2</sub>S<sub>3</sub> **Molecular Formula:** S<sub>3</sub>Sm<sub>2</sub> **Molecular Weight:** 396.918 **CAS RN:** 12067-22-0 Properties: red powd [STR93] Density, g/cm<sup>3</sup>: 5.87 [LID94] Melting Point, °C: 1720 [LID94]

2718

**Compound:** Samarium telluride **Formula:** Sm<sub>2</sub>Te<sub>3</sub> **Molecular Formula:** Sm<sub>2</sub>Te<sub>3</sub> **Molecular Weight:** 683.520 **CAS RN:** 12040-00-5 **Properties:** -20 mesh with 99.9% purity [CER91] **Density, g/cm<sup>3</sup>:** 7.31 [LID94]

## 2719

Compound: Samarium tris(cyclopentadienyl)
Synonym: tris(cyclopentadienyl)samarium
Formula: Sm(C<sub>5</sub>H<sub>5</sub>)<sub>3</sub>
Molecular Formula: C<sub>15</sub>H<sub>15</sub>Sm
Molecular Weight: 345.644
CAS RN: 1298-55-1
Properties: orange powd; air and moisture sensitive [STR93]
Melting Point, °C: 356 [STR93]

# 2720

Compound: Samarium(II) chloride Formula: SmCl<sub>2</sub> Molecular Formula: Cl<sub>2</sub>Sm Molecular Weight: 221.265 CAS RN: 13874-75-4 Properties: dark brown cryst [MER06] Solubility: decomposes in H<sub>2</sub>O; i alcohol [MER06] Density, g/cm<sup>3</sup>: 3.687 [MER06] Melting Point, °C: 740 [CRC10]

#### 2721

Compound: Scandium Formula: Sc Molecular Formula: Sc Molecular Weight: 44.955910 CAS RN: 7440-20-2

**Properties:** white, silvery metal; electrical resistivity<br/>(20°C) 50.5 μohm · cm; enthalpy of fusion<br/>14.10 kJ/mol; enthalpy of sublimation 377.8 kJ/<br/>mol; radius of atom 0.1640 nm; radius of<br/>ion is 0.0732 nm; aq solutions are colorless;<br/>α-form: hex close-packed; existence of β-form<br/>inconclusive; used in catalyst studies of para-<br/>to-ortho hydrogen conversion, in high intensity<br/>lamps, for neutron filters and in ion microprobe<br/>analyzers [KIR82] [CER91] [MER06] [ALD94]

Density, g/cm<sup>3</sup>: 2.989 [KIR82] Melting Point, °C: 1538 [MER06] Boiling Point, °C: 2836 [KIR82] Thermal Conductivity, W/(m·K): 15.8 (25°C) [CRC10] Thermal Expansion Coefficient: 10.2×10<sup>-6</sup>/K [CRC10]

### 2722

**Compound:** Scandium acetate hydrate **Formula:**  $Sc(CH_3COO)_3 \cdot xH_2O$ **Molecular Formula:**  $C_6H_9O_6Sc$  (anhydrous) **Molecular Weight:** 222.089 (anhydrous) **CAS RN:** 3804-23-7 **Properties:** white cryst [AES93] **Melting Point, °C:** decomposes [AES93]

#### 2723

Compound: Scandium boride Formula: ScB<sub>2</sub> Molecular Formula: B<sub>2</sub>Sc Molecular Weight: 66.578 CAS RN: 12007-34-0 Properties: -200 mesh with 99.5% purity; refractory material [KIR78] [CER91] Density, g/cm<sup>3</sup>: 3.17 [LID94] Melting Point, °C: 2250 [KIR78]

### 2724

**Compound:** Scandium bromide **Formula:** ScBr<sub>3</sub> **Molecular Formula:** Br<sub>3</sub>Sc **Molecular Weight:** 284.668 **CAS RN:** 13465-59-3 **Properties:** -20 mesh with 99.9% purity [CER91] **Density, g/cm<sup>3</sup>:** 1.914 [CRC10] **Melting Point, °C:** sublimes >1000 [CRC10]

### 2725

**Compound:** Scandium carbonate hydrate **Formula:**  $Sc_2(CO_3)_3 \cdot xH_2O$  **Molecular Formula:**  $C_3O_9Sc_2$  (anhydrous) **Molecular Weight:** 269.939 (anhydrous) **CAS RN:** 17926-77-1 **Properties:** white powd [STR93] **Melting Point, °C:** decomposes >500 [AES93]

#### 2726

**Compound:** Scandium chloride **Formula:** ScCl<sub>3</sub> **Molecular Formula:** Cl<sub>3</sub>Sc **Molecular Weight:** 151.314 CAS RN: 10361-84-9 Properties: -20 mesh with 99.9% purity; white; deliq [MER06] [CER91] Solubility: s H<sub>2</sub>O, i alcohol [MER06] Density, g/cm<sup>3</sup>: 2.39 [STR93] Melting Point, °C: 960 [MER06]

#### 2727

**Compound:** Scandium chloride hexahydrate **Formula:** ScCl<sub>3</sub>·6H<sub>2</sub>O **Molecular Formula:** Cl<sub>3</sub>H<sub>12</sub>O<sub>6</sub>Sc **Molecular Weight:** 259.405 **CAS RN:** 20662-14-0 **Properties:** white cryst [STR93]

## 2728

Compound: Scandium fluoride Formula: ScF<sub>3</sub> Molecular Formula: F<sub>3</sub>Sc Molecular Weight: 101.951 CAS RN: 13709-47-2 Properties: hygr white powd, and 99.9% pure sintered pieces of 3–12 mm; pieces used as evaporation material for possible application in lasers [STR93] [CER91] Melting Point, °C: 1515 [STR93]

#### 2729

**Compound:** Scandium nitrate pentahydrate **Formula:**  $Sc(NO_3)_3 \cdot 5H_2O$  **Molecular Formula:**  $H_{10}N_3O_{14}Sc$  **Molecular Weight:** 321.047 **CAS RN:** 13465-60-6 **Properties:** white cryst [STR93] **Solubility:** anhydrous v s H<sub>2</sub>O, alcohol [MER06]

### 2730

**Compound:** Scandium oxalate pentahydrate **Formula:**  $Sc_2(C_2O_4)_3 \cdot 5H_2O$ **Molecular Formula:**  $C_6H_{10}O_{17}Sc_2$ **Molecular Weight:** 444.047 **CAS RN:** 17926-77-1 **Properties:** white cryst [STR93]

#### 2731

**Compound:** Scandium oxide **Synonym:** scandia **Formula:** Sc<sub>2</sub>O<sub>3</sub> **Molecular Formula:** O<sub>3</sub>Sc<sub>2</sub> Molecular Weight: 137.910
CAS RN: 12060-08-1
Properties: fine white powd or sintered pieces of 3–12 mm; used as an evaporation material of 99.99% purity to produce fairly hard coating which is very stable, and is useful for antireflection coating on semiconductors with high index [MER06] [CER91]
Solubility: v s hot conc acids [MER06]
Density, g/cm<sup>3</sup>: 3.864 [MER06]

### 2732

Compound: Scandium sulfate octahydrate Formula:  $Sc_2(SO_4)_3 \cdot 8H_2O$ Molecular Formula:  $H_{16}O_{20}S_3Sc_2$ Molecular Weight: 522.225 CAS RN: 52788-54-2 Properties: white cryst; pentahydrate also exists [STR93] [MER06] Solubility: pentahydrate: 54.6 g/100 mL  $H_2O$  (25°C) [MER06] Density, g/cm<sup>3</sup>: pentahydrate: 2.519 [MER06] Reactions: pentahydrate: minus 3H<sub>2</sub>O to form dihydrate >100°C [MER06]

# 2733

Compound: Scandium sulfide Formula: Sc<sub>2</sub>S<sub>3</sub> Molecular Formula: S<sub>3</sub>Sc<sub>2</sub> Molecular Weight: 186.110 CAS RN: 12166-29-9 Properties: -200 mesh with 99.9% purity [CER91] Density, g/cm<sup>3</sup>: 2.91 [LID94] Melting Point, °C: 1775 [LID94]

#### 2734

Compound: Scandium telluride Formula: Sc<sub>2</sub>Te<sub>3</sub> Molecular Formula: Sc<sub>2</sub>Te<sub>3</sub> Molecular Weight: 472.712 CAS RN: 12166-44-8 Properties: black hex cryst; -20 mesh with 99.9% purity (Ta ~1%-3%) [CER91] [LID94] Density, g/cm<sup>3</sup>: 5.29 [LID94]

# 2735

**Compound:** Scandium tris(cyclopentadienyl) **Synonym:** tris(cyclopentadienyl)scandium **Formula:**  $Sc(C_5H_5)_3$  **Molecular Formula:**  $C_{15}H_{15}Sc$  **Molecular Weight:** 240.240 **CAS RN:** 1298-54-0 Properties: powd; sensitive to air and moisture [STR93]
Melting Point, °C: 240 [STR93]
Reactions: sublimes at 200°C (0.05 mm Hg) [STR93]

#### 2736

Compound: Selenic acid Formula: H<sub>2</sub>SeO<sub>4</sub> Molecular Formula: H<sub>2</sub>O<sub>4</sub>Se Molecular Weight: 144.974 CAS RN: 7783-08-6 Properties: white hygr solid; easily undercools; oxidizing agent [KIR82] [HAW93] Solubility: g/100 g H<sub>2</sub>O: 426 (0°C), 567 (20°C), 1328 (30°C) [LAN05]; decomposed by alcohol [HAW93] Density, g/cm<sup>3</sup>: 3.004 [HAW93] Melting Point, °C: 58 [HAW93] Boiling Point, °C: 260, decomposes [HAW93]

#### 2737

Compound: Selenium Formula: Se Molecular Formula: Se Molecular Weight: 78.96 CAS RN: 7782-49-2

Properties: gray hex stable at room temp, semiconductor; other forms: monocl red ( $\alpha$  and  $\beta$ ), amorphous black and red; hex: a = 0.4366 nm, c = 0.4954 nm; trig liq enthalpy of fusion 6.224 J/mol; enthalpy of vaporization 95.48 J/mol; hardness 2.0 Mohs; viscosity 221 mPa · s (220°C) is 70 mPa · s (360°C); rectifies AC voltage to DC; electrical resistivity  $(0^{\circ}C)$  1.2 µohm · cm; red cryst obtained by evaporation of amorphous red form from CS<sub>2</sub> [MER06] [KIR82] [CRC10] [COT88] [ALD94] Solubility: i H<sub>2</sub>O, alcohol; 2 mg/100 mL CS<sub>2</sub>; s ether [MER06] **Density, g/cm<sup>3</sup>:** trig: 4.819 (25°C); monocl: 4.4; liq: 3.975 (200°C) [KIR82] Melting Point, °C: 217 [ALD94] Boiling Point, °C: 684.9 [ALD94]

**Thermal Conductivity, W/(m·K):** 248.1 [KIR82], 4.52 (25°C) [CRC10]; 0.519 for amorphous at 25°C [ALD94] [CRC10]

- Thermal Expansion Coefficient:  $3.24 \times 10^{-5}$ /°C to
- $7.5 \times 10^{-5}$  /°C, depending on the form of Se [KIR80]

#### 2738

**Compound:** Selenium(β) **Formula:** β-Se **Molecular Formula:** Se **Molecular Weight:** 78.96 CAS RN: 7782-49-2

Properties: dark red; monocl, a = 1.285 nm, b=0.807 nm, c=0.931 nm; transparent cryst; metastable; prepared by rapid evaporation of solution consisting of Se dissolved in CS<sub>2</sub> [MER06] [KIR82]
Density, g/cm<sup>3</sup>: 4.39 [LID94]
Melting Point, °C: 221 [COT88]
Boiling Point, °C: 684.8 [COT88]
Reactions: transforms into gray Se if heated [MER06]

### 2739

Compound: Selenium bromide Formula: Se<sub>2</sub>Br<sub>2</sub> Molecular Formula: Br<sub>2</sub>Se<sub>2</sub> Molecular Weight: 317.728 CAS RN: 7789-52-8 Properties: dark red liq; decomposes if heated in moist air [MER06] Solubility: decomposes in H<sub>2</sub>O; s chloroform, ethyl bromide, carbon disulfide [MER06] Density, g/cm<sup>3</sup>: 3.604 [MER06] Boiling Point, °C: 227, decomposes [KIR82]

# 2740

Compound: Selenium chloride
Formula: Se<sub>2</sub>Cl<sub>2</sub>
Molecular Formula: Cl<sub>2</sub>Se<sub>2</sub>
Molecular Weight: 228.825
CAS RN: 10025-68-0
Properties: deep red, oily liq; sensitive to moisture [MER06] [STR93]
Solubility: decomposes in H<sub>2</sub>O; s chloroform, benzene, CCl<sub>4</sub>, CS<sub>2</sub>, fuming sulfuric acid [MER06]
Density, g/cm<sup>3</sup>: 2.7741 [MER06]
Melting Point, °C: -85 [KIR82]
Boiling Point, °C: 127, decomposes [KIR82]

### 2741

Compound: Selenium dioxide Synonym: selenium(IV) oxide Formula: SeO<sub>2</sub> Molecular Formula: O<sub>2</sub>Se Molecular Weight: 110.959 CAS RN: 7446-08-4 Properties: off-white powd; has yellowish green vapor; absorbs dry HF, HCl, HBr, HI to form the respective selenium oxyhalide; oxidizing agent, reduced to Se by SO<sub>2</sub>, hydrogen, hydrogen sulfide, ammonia [KIR82] [STR93] [MER06] Selebilitum of (100 - 14 O: 222 (108C)) 257 (208C)

**Solubility:** g/100 g H<sub>2</sub>O: 222 (10°C), 257 (20°C), 440 (60°C) [LAN05]; parts/100 parts: 10.16 methanol (11.8°C); 6.67 93% ethanol (14°C); 4.35 acetone (15.3°C); 1.11 (13.9°C) acetic acid; s H<sub>2</sub>SO<sub>4</sub> [MER06]

Density, g/cm<sup>3</sup>: 3.954 [MER06] Melting Point, °C: 340 [KIR82] Boiling Point, °C: sublimes 315 [KIR82]

### 2742

Compound: Selenium disulfide
Formula: SeS<sub>2</sub>
Molecular Formula: S<sub>2</sub>Se
Molecular Weight: 143.092
CAS RN: 7488-56-4
Properties: red powd; used in medicine and medicated shampoos [HAW93] [STR93]
Solubility: i H<sub>2</sub>O, organic solvents [HAW93]
Melting Point, °C: <100 [STR93]</li>
Boiling Point, °C: decomposes [STR93]

## 2743

**Compound:** Selenium hexafluoride **Synonym:** selenium(VI) fluoride Formula: SeF<sub>6</sub> Molecular Formula: F<sub>6</sub>Se Molecular Weight: 192.950 CAS RN: 7783-79-1 Properties: moisture sensitive; gas; vapor pressure, mm Hg: 651.2 (-48.7°C), 213.1 (-64.8°C), 30.4 (-87.5°C); reacts with NH<sub>3</sub> at 200°C forming Se, N<sub>2</sub> and HF; prepared by reaction of finely divided Se metal in F<sub>2</sub> atm in Cu container; used as an electrical insulator [MER06] [STR93] Solubility: i H<sub>2</sub>O [MER06] Density, g/cm<sup>3</sup>: 8.467 g/L [LID94] Melting Point, °C: –34.6 [KIR82] Boiling Point, °C: sublimes at –46.6 [KIR82]

# 2744

Compound: Selenium hexasulfide Formula: Se<sub>2</sub>S<sub>6</sub> Molecular Formula: S<sub>6</sub>Se<sub>2</sub> Molecular Weight: 350.316 CAS RN: 75926-22-6 Properties: light orange needles when prepared from benzene [MER06] Solubility: s CS<sub>2</sub>; 12 g/L benzene (20°C) [MER06] Density, g/cm<sup>3</sup>: 2.44 [MER06] Melting Point, °C: 121.5 [MER06]

#### 2745

Compound: Selenium monosulfide Formula: SeS Molecular Formula: SSe Molecular Weight: 111.026 CAS RN: 7446-34-6 Properties: brick red [KIR82] Density, g/cm<sup>3</sup>: 3.056 [CRC10] Melting Point, °C: decomposes at 118–119 [CRC10]

#### 2746

Compound: Selenium oxybromide
Formula: SeOBr<sub>2</sub>
Molecular Formula: Br<sub>2</sub>OSe
Molecular Weight: 254.767
CAS RN: 7789-51-7
Properties: reddish yellow solid; decomposed by sulfur and hydrogen sulfide; preparation by reaction of Br<sub>2</sub> with dry mixture of Se and SeO<sub>2</sub>; uses: brominating agent [KIR82] [MER06]
Solubility: decomposed by H<sub>2</sub>O; s H<sub>2</sub>SO<sub>4</sub>, CS<sub>2</sub>, CHCl<sub>3</sub>, benzene, toluene, xylene, CCl<sub>4</sub> [MER06]
Density, g/cm<sup>3</sup>: 3.38 [MER06]
Melting Point, °C: 41 [MER06]
Boiling Point, °C: 217 (740 mm) [MER06]
Reactions: decomposes in air at 50°C [KIR82]

#### 2747

**Compound:** Selenium oxychloride Formula: SeOCl<sub>2</sub> Molecular Formula: Cl<sub>2</sub>OSe Molecular Weight: 165.864 CAS RN: 7791-23-3 Properties: nearly colorless or yellowish; corrosive liq; fumes in air; excellent solvent for many substances; has high dielectric constant; preparation: Cl<sub>2</sub> reacted with dry mixture of Se and SeO<sub>2</sub>; strong chlorinating agent [KIR82] [MER06] Solubility: decomposed in H<sub>2</sub>O to HCl, selenious acid; miscible with CCl<sub>4</sub>, CHCl<sub>3</sub>, CS<sub>2</sub>, benzene, toluene [MER06] Density, g/cm<sup>3</sup>: 2.44 [MER06] Melting Point, °C: 10.8 [KIR82] Boiling Point, °C: 176.4 [STR93]

#### 2748

Compound: Selenium oxydifluoride
Formula: SeO<sub>2</sub>F<sub>2</sub>
Molecular Formula: F<sub>2</sub>O<sub>2</sub>Se
Molecular Weight: 148.956
CAS RN: 14984-81-7
Properties: colorless liq; prepared by reaction between selenium oxychloride and silver fluoride [KIR82]
Solubility: reacts with H<sub>2</sub>O [KIR82]
Density, g/cm<sup>3</sup>: 6.536 g/L [LID94]
Melting Point, °C: -99.5 [KIR82]
Boiling Point, °C: -8.4 [KIR82]

**Compound:** Selenium oxyfluoride **Formula:** SeOF<sub>2</sub> **Molecular Formula:** F<sub>2</sub>OSe **Molecular Weight:** 132.956

CAS RN: 7783-43-9

**Properties:** colorless liq with pungent odor; reacts with water, glass, silicon and violently with red phosphorus; can be prepared by reacting selenium oxychloride with silver fluoride [KIR82]

Density, g/cm<sup>3</sup>: 2.8 [MER06]

Melting Point, °C: 15 [KIR82] Boiling Point, °C: 125 to 126 [KIR82]

# 2750

Compound: Selenium sulfide
Formula: Se<sub>4</sub>S<sub>4</sub>
Molecular Formula: S<sub>4</sub>Se<sub>4</sub>
Molecular Weight: 444.104
CAS RN: 75426-28-2
Properties: red cryst when prepared from benzene [MER06]
Solubility: s benzene, CS<sub>2</sub> [MER06]
Density, g/cm<sup>3</sup>: 3.20 [MER06]
Melting Point, °C: 113, decomposes [MER06]

# 2751

Compound: Selenium tetrabromide
Synonym: selenium(IV) bromide
Formula: SeBr<sub>4</sub>
Molecular Formula: Br<sub>4</sub>Se
Molecular Weight: 398.576
CAS RN: 7789-65-3
Properties: reddish brown; cryst powd; decomposed in moist air [MER06]
Solubility: decomposed by H<sub>2</sub>O; s CS<sub>2</sub>, CHCl<sub>3</sub>, ethyl bromide [MER06]
Melting Point, °C: 75, decomposes [KIR82]
Reactions: decomposes at 70°C–80°C [MER06]

### 2752

Compound: Selenium tetrachloride
Formula: SeCl<sub>4</sub>
Molecular Formula: Cl<sub>4</sub>Se
Molecular Weight: 220.771
CAS RN: 10026-03-6
Properties: white to pale yellow cryst; sublimes when heated; decomposed by moist air [MER06]
Solubility: decomposed in H<sub>2</sub>O; i liq bromine [MER06]
Density, g/cm<sup>3</sup>: 2.6 [LID94]
Melting Point, °C: 305 [KIR82]
Boiling Point, °C: sublimes [KIR82]

#### 2753

Compound: Selenium tetrafluoride
Formula: SeF<sub>4</sub>
Molecular Formula: F<sub>4</sub>Se
Molecular Weight: 154.954
CAS RN: 13465-66-2
Properties: colorless liq; fumes in air; strong oxidizing agent; attacks glass, silicon, phosphorus, arsenic, antimony and bismuth; enthalpy of vaporization 47.2 kJ/mol [CRC10] [KIR82] [MER06]
Solubility: reacts violently with H<sub>2</sub>O; miscible with ether, ethanol, sulfuric acid; s CHC1<sub>3</sub>, CC1<sub>4</sub> [MER06]
Density, g/cm<sup>3</sup>: 2.75 [MER06]
Melting Point, °C: -13.2 [KIR82]
Boiling Point, °C: 106 [MER06]

### 2754

Compound: Selenium trioxide Formula: SeO<sub>3</sub> Molecular Formula: O<sub>3</sub>Se Molecular Weight: 126.958 CAS RN: 13768-86-0 Properties: white cryst; hygr; can be prepared by reacting SO<sub>3</sub> with potassium selenate or phosphorus pentoxide with selenic acid; strong oxidizing agent; stable in dry air at room temperatures; decomposes, if heated, first to selenium pentoxide, then to the dioxide [KIR82] **Solubility:** dissolves in H<sub>2</sub>O forming selenic acid [KIR82] Density, g/cm<sup>3</sup>: 3.6 [CRC10] Melting Point, °C: 118 [KIR82] Boiling Point, °C: decomposes at 180 [CRC10]

## 2755

Compound: Selenium(α)
Formula: α-Se
Molecular Formula: Se
Molecular Weight: 78.96
CAS RN: 7782-49-2
Properties: dark red; monocl, a=0.9054 nm, b=0.9083 nm, c=1.106 nm; can be prepared by slow evaporation of Se dissolved in CS<sub>2</sub> [MER06] [KIR82]
Density, g/cm<sup>3</sup>: 4.46 [MER06]
Melting Point, °C: <200 [MER06]</li>
Reactions: transforms to gray Se by heating [MER06]

**2756 Compound:** Selenous acid **Formula:** H<sub>2</sub>SeO<sub>3</sub> Molecular Formula: H<sub>2</sub>O<sub>3</sub>Se
Molecular Weight: 128.974
CAS RN: 7783-00-8
Properties: white cryst; hygr; can be prepared by wet oxidation of selenium or from an aq solution of SeO<sub>2</sub>; oxidizing agent [KIR82] [STR93]
Solubility: g/100 g H<sub>2</sub>O: 90.1 (0°C), 166.7 (20°C), 385.4 (90°C) [LAN05]; s alcohol; i ammonia [HAW93]
Density, g/cm<sup>3</sup>: 3.004 [STR93]
Melting Point, °C: 70, decomposes [STR93]

## 2757

**Compound:** Silane **Synonym:** silicon tetrahydride **Formula:** SiH<sub>4</sub> **Molecular Formula:** H<sub>4</sub>Si **Molecular Weight:** 32.118 **CAS RN:** 7803-62-5

Properties: colorless gas; spontaneously flammable in air; repulsive odor; enthalpy of fusion 667.3 kJ/ mol; enthalpy of vaporization 12.48 kJ/mol; triple point -209°C; critical temp -3.5°C; critical pressure 4.84 MPa; prepared by the reaction 4LiH+SiCl<sub>4</sub>=SiH<sub>4</sub>(gas)+4LiCl; used to prepare semiconducting silicon by thermal decomposition above 600°C [MER06] [HAW93] [CIC73] [AIR87]
Solubility: decomposed by H<sub>2</sub>O; i alcohol, benzene [HAW93]
Density, g/cm<sup>3</sup>: liq: 0.68 at -185°C; gas: 1.44 g/L (20°C) [KIR80]

Melting Point, °C: –200 [HAW93] Boiling Point, °C: –112 [HAW93]

## 2758

Compound: Silicon Formula: Si Molecular Formula: Si Molecular Weight: 28.0855 CAS RN: 7440-21-3

**Properties:** black-gray; cub, needle-like cryst or octahedral; burns in  $F_2$ ,  $Cl_2$  atm; amorphous silicon is dark brown powd; electrical resistivity 100,000 µohm · cm; hardness 7 Mohs; dielectric constant 12; enthalpy of vaporization 359 kJ/mol: band gap, eV, 1.17 (0 K) 1.12 (300 K); mobility (300 K), cm<sup>2</sup>/(V · s), 1500 electrons, 450 holes; enthalpy of fusion 50.21 kJ/mol; uses include index films for infrared filters [COT88] [HAW93] [MER06] [CER91] [CRC10] [ALD94]

**Solubility:** i H<sub>2</sub>O, HNO<sub>3</sub> and HCl; s alkalies and in mixture of HNO<sub>3</sub> and HF acids [HAW93]

**Density, g/cm<sup>3</sup>:** 2.33 [MER06]

Melting Point, °C: 1410 [MER06]

**Boiling Point, °C:** 2355 [HAW93] **Thermal Conductivity, W/(m⋅K):** 149 (25°C) [ALD94] **Thermal Expansion Coefficient:** (volume) 100°C (0.066), 200°C (0.171), 400°C (0.398),

800°C (0.875), 1000°C (1.109) [CLA66]

#### 2759

Compound: Silicon acetate
Formula: Si(CH<sub>3</sub>COO)<sub>4</sub>
Molecular Formula: C<sub>8</sub>H<sub>12</sub>O<sub>8</sub>Si
Molecular Weight: 264.264
CAS RN: 562-90-3
Properties: very hygr white cryst; rapidly hydrolyzed in moist air; reacts violently with H<sub>2</sub>O [MER06]
Solubility: s acetone, benzene [MER06]
Melting Point, °C: 110 [MER06]
Boiling Point, °C: 148 (6.0 mm Hg) [MER06]
Reactions: decomposes evolving acetic anhydride at 160°C–170°C [MER06]

# 2760

Compound: Silicon boride
Synonym: silicon tetraboride
Formula: SiB<sub>4</sub>
Molecular Formula: B<sub>4</sub>Si
Molecular Weight: 71.330
CAS RN: 12007-81-7
Properties: refractory material; grayish black powd; there is also a SiB<sub>6</sub>+Si, 12008-29-6, density 2.47 [ALF93] [STR93]
Density, g/cm<sup>3</sup>: 2.40 [ALD94]
Melting Point, °C: 1870, decomposes [STR93]

# 2761

Compound: Silicon carbide Formula: SiC Molecular Formula: CSi Molecular Weight: 40.097 CAS RN: 409-21-2 **Properties:** two forms:  $\beta$  is cub, a = 0.43502 nm; extremely hard; green to bluish black; iridescent; dielectric constant 7.0; hardness 9 Mohs;  $\alpha$ is semiconductor: mobility (300 K), cm<sup>2</sup>/V s, 400 electrons and 50 holes; band gap, eV, 3.03 (0 K) and 2.996 (300 K); effective mass 0.60 for electrons and 1.00 for holes; electrically conductive; resistant to high temp oxidation; used as an abrasive, and sputtering target [HAW93] [MER06] [CIC73] [CER91] [KIR82] **Solubility:** i H<sub>2</sub>O, alcohol; s fused alkalies [HAW93] Density, g/cm<sup>3</sup>: 3.16 [LID94]

Melting Point, °C: 2830 [LID94] Thermal Conductivity, W/(m⋅K): 22.5 (500°C), 23.7 (1000°C) [KIR80] Thermal Expansion Coefficient: linear to 1000°C: 5.2×10<sup>-6</sup>/°C [KIR80]

#### 2762

Compound: Silicon decahydride Synonym: tetrasilane Formula: Si<sub>4</sub>H<sub>10</sub> Molecular Formula: H<sub>10</sub>Si<sub>4</sub> Molecular Weight: 122.421 CAS RN: 7783-29-1 Properties: colorless liq; enthalpy of vaporization 35.56 kJ/mol; vapor pressure at 0°C 9.1 mm Hg; critical temp 249°C [CIC73] [CRC10] Density, g/cm<sup>3</sup>: liq at mp: 0.79 [CIC73] Melting Point, °C: -84.3 [CIC73] Boiling Point, °C: 107.4 [CIC73]

## 2763

Compound: Silicon dioxide Synonym: coesite Formula: SiO<sub>2</sub> Molecular Formula: O<sub>2</sub>Si Molecular Weight: 60.085 CAS RN: 7631-86-9 Properties: cryst from 298.15 K to 1800 K [ROB78] Thermal Expansion Coefficient: (volume)  $100^{\circ}$ C (0.059), 200^{\circ}C (0.145), 400°C (0.345),  $800^{\circ}$ C (0.849), 1000°C (1.150) [CLA66]

#### 2764

Compound: Silicon dioxide Synonym: tridymite Formula: SiO<sub>2</sub> Molecular Formula: O<sub>2</sub>Si Molecular Weight: 60.085 CAS RN: 7631-86-9 **Properties:**  $\beta$  form: hex, lattice constant a=0.503 nm, c=0.822 nm;  $\alpha$  form: rhomb; enthalpy of transition 2903 J/g [CIC73] Density, g/cm<sup>3</sup>: 2.262 (0°C) [CIC73] Melting Point, °C: 1703 [CIC73] Boiling Point, °C: 2950 [CIC73] **Reactions:** transition  $\alpha$  to  $\beta$  at 1470°C [CIC73] Thermal Expansion Coefficient: (volume) 100°C (0.63), 200°C (2.40), 400°C (3.33), 800°C (3.66), 1200°C (3.60) [CLA66]

#### 2765

Compound: Silicon dioxide Synonym: quartz Formula: SiO<sub>2</sub> Molecular Formula: O2Si Molecular Weight: 60.085 CAS RN: 7631-86-9 **Properties:** two forms:  $\alpha$ , trig, a = 0.49127 nm, c = 0.54046 nm, and  $\beta$ , hex, a = 0.501 nm, c = 0.547 nm; transparent cryst or amorphous powd; melts to a glass; enthalpy of fusion of  $\alpha$  8.5 kJ/mol; heat of transition for  $\alpha$  to  $\beta$ 10 J/g; hardness of  $\alpha$  form 7 Mohs; velocity of sound of  $\alpha$  form 5870 m/sec; used in crucible form for melting aluminum, antimony and other metals, as a sputtering target of 99.995% purity for preparing hard durable films with low index [CIC73] [MER06] [CER91] Solubility: i H<sub>2</sub>O, most acids; s HF [MER06] **Density, g/cm<sup>3</sup>:** α: 2.6507 (0°C); β: 2.533 (600°C) [CIC73] **Melting Point**, °**C**: α: 1423 [JAN85] Boiling Point, °C: 2950 [CIC73] **Reactions:** transition from  $\alpha$  to  $\beta$  at 573°C [CIC73] Thermal Conductivity, W/(m·K): 1.6 (500°C), 2.1 (1000°C) [KIR80] Thermal Expansion Coefficient: (volume) 100°C (0.36), 200°C (0.78), 400°C (1.89), 800°C (4.42), 1000°C (4.29) [CLA66]

## 2766

Compound: Silicon dioxide Synonym: cristobalite Formula: SiO<sub>2</sub> Molecular Formula: O2Si Molecular Weight: 60.085 CAS RN: 14464-46-1 **Properties:**  $\beta$  form: regular holohedra,  $\alpha$  form: tetr; lattice constant 0.711 nm; enthalpy of fusion 9.58 kJ/mol; enthalpy of transition for  $\alpha$  to  $\beta$  50.3 KJ/mol [CIC73] [JAN85] Density, g/cm<sup>3</sup>: 2.21 (0°C) [CIC73] Melting Point, °C: 1713 [CIC73] Boiling Point, °C: 2950 [CIC73] Thermal Expansion Coefficient: (volume) 100°C (0.791), 200°C (1.795), 400°C (6.271), 800°C (6.499), 1200°C (6.651) [CLA66]

#### 2767

**Compound:** Silicon disulfide **Formula:** SiS<sub>2</sub>

Molecular Formula: S<sub>2</sub>Si
Molecular Weight: 92.218
CAS RN: 13759-10-9
Properties: sublimed cotton-like fibrous clumps with 99.9% purity; white, fibrous mass or needles; rhomb, a=0.560 nm, b=0.553 nm, c=0.975 nm; decomposes in moist air to evolve H<sub>2</sub>S; burns if ignited by a flame [MER06] [CIC73] [CER91]
Solubility: decomposes in H<sub>2</sub>O, alcohol, alkaline solutions; i benzene [MER06]
Density, g/cm<sup>3</sup>: 2.02 [MER06]
Melting Point, °C: 1092 [CIC73]
Boiling Point, °C: sublimes 1250 [CIC73]

### 2768

Compound: Silicon monosulfide Formula: SiS Molecular Formula: SSi Molecular Weight: 60.152 CAS RN: 50927-81-6 Properties: yellow or reddish powd; burns in air to SiO<sub>2</sub> and SO<sub>2</sub>; very hygr [CIC73] Solubility: hydrolyzes in H<sub>2</sub>O [CIC73] Density, g/cm<sup>3</sup>: 1.853 [CIC73] Melting Point, °C: ~900 [CIC73]

2769

Compound: Silicon monoxide Synonym: silicon(II) oxide Formula: SiO Molecular Formula: OSi Molecular Weight: 44.085 CAS RN: 10097-28-6

Properties: brownish black scales when prepared by sublimation; cub, a = 0.64 nm; does not conduct electricity; enthalpy of vaporization 320.6 kJ/mol; dielectric constant 4.9; used as an evaporation material and sputtering target of 99.99% and 99.9% purity to provide protective film for front surface of aluminum mirrors, and for low index layers in infrared filters [CIC73] [MER06] [CER91] Density, g/cm<sup>3</sup>: 2.18 [MER06] Melting Point, °C: >1702 [STR93]

Boiling Point, °C: 1880 [STR93]

**Thermal Expansion Coefficient:** 4.5 × 10<sup>-6</sup> [CIC73]

# 2770

**Compound:** Silicon nitride **Formula:**  $Si_3N_4$ 

Molecular Formula: N<sub>4</sub>Si<sub>3</sub> Molecular Weight: 140.284 CAS RN: 12033-89-5 **Properties:** gray, amorphous powd or cryst; hex  $\alpha$ ,  $a = 0.77488 \text{ nm}, c = 0.5618 \text{ nm}; \text{ hex } \beta, a = 0.7608 \text{ nm},$ c=0.2911 nm; hardness is 9+ Mohs; resistant to oxidation; used in refractory coatings, and in crucible form for melting aluminum, lead, magnesium, tin and as a container for dil acids and caustics, also used as a 99.9% pure (with added small amounts of MgO for strength) sputtering target to provide insulating properties [KIR81] [HAW93] [STR93] [CER91] **Density, g/cm<sup>3</sup>:** hex α: 3.2 [KIR81] Melting Point, °C: sublimes at 1900 [HAW93] Thermal Conductivity, W/(m·K): 17 [KIR81] **Thermal Expansion Coefficient:** 2.5×10<sup>-6</sup>/K [MER06]

#### 2771

Compound: Silicon octahydride Synonym: trisilane Formula: Si<sub>3</sub>H<sub>8</sub> Molecular Formula: H<sub>8</sub>Si<sub>3</sub> Molecular Weight: 92.321 CAS RN: 7783-26-8 Properties: colorless liq; enthalpy of vaporization 28.38 kJ/mol; vapor pressure at (0°C) 95 mm Hg; critical temp 189°C; reacts vigorously with CCl<sub>4</sub> and CHCl<sub>3</sub> [CIC73] [CRC10] [MER06] Solubility: decomposed by H<sub>2</sub>O [MER06] Density, g/cm<sup>3</sup>: liq at mp: 0.725 [CIC73] Melting Point, °C: -117.4 [CIC73] Boiling Point, °C: 52.9 [CIC73]

## 2772

Compound: Silicon tetrabromide
Formula: SiBr<sub>4</sub>
Molecular Formula: Br<sub>4</sub>Si
Molecular Weight: 347.702
CAS RN: 7789-66-4
Properties: colorless fuming liq; becomes yellow in air; enthalpy of vaporization 37.87 kJ/mol; entropy of vaporization 88.7 J/(mol · K); vapor pressure (0°C) 1.8 mm Hg; critical temp 383°C; surface tension (20°C) 16.9 dyne/cm [CIC73] [MER06]
Solubility: decomposed in water to HBr, silicic acid, with evolution of heat [MER06]
Density, g/cm<sup>3</sup>: 2.772 [STR93]
Melting Point, °C: 5.4 [STR93]

## Boiling Point, °C: 153 [ALD94] Thermal Expansion Coefficient: (20°C) 0.000983 [CIC73]

# 2773

**Compound:** Silicon tetrachloride **Formula:** SiCl<sub>4</sub> **Molecular Formula:** Cl<sub>4</sub>Si **Molecular Weight:** 169.897 **CAS RN:** 10026-04-7

Properties: colorless, clear fuming liq; decomposed in H<sub>2</sub>O, evolving heat; enthalpy of vaporization 28.7 kJ/mol; entropy of vaporization 87.9 J/(mol·K); enthalpy of fusion 7.60 kJ/mol; enthalpy of sublimation 38.07 kJ/mol; vapor pressure (0°C) 77 mm Hg; critical temp 233.6°C; critical pressure 36.8 atm; surface tension (20°C) 19.71 dyne/cm; used in electronics industry [CIC73] [CRC10] [MER06] [AIR87]
Solubility: miscible with benzene, ether,

CHCl<sub>3</sub>, petroleum ether [MER06] **Density, g/cm<sup>3</sup>:** 1.5 [LID94] **Melting Point, °C:** -68.85 [LID94] **Boiling Point, °C:** 57.65 [LID94]

### 2774

Compound: Silicon tetrafluoride Synonym: silicon(IV) fluoride Formula: SiF<sub>4</sub> Molecular Formula: F<sub>4</sub>Si Molecular Weight: 104.080 CAS RN: 7783-61-1 Properties: colorless gas; odor similar to that of HCl; forms cloud in moist air; critical temp -14.1°C; critical pressure 3.72 MPa; enthalpy of fusion

7.07 kJ/mol; enthalpy of vaporization 18.7 kJ/mol; entropy of vaporization 102.1 J/(mol·K); enthalpy of sublimation 25.9 kJ/mol; vapor pressure at -99.8°C 515 mm Hg; decomposed by H<sub>2</sub>O to silicic acid and HF; used in electronics industry [MER06] [CIC73] [AIR87]
Solubility: hydrolyzed by H<sub>2</sub>O [AIR87]

 Density, g/cm<sup>3</sup>: gas: 3.57 (15°C) [HAW93]; liq (-80°C): 1.590 [MER06]
 Melting Point, °C: -90.2 [MER06]
 Boiling Point, °C: -86 [HAW93]

### 2775

**Compound:** Silicon tetraiodide **Synonym:** silicon(IV) iodide

Formula: SiI<sub>4</sub>
Molecular Formula: I<sub>4</sub>Si
Molecular Weight: 535.704
CAS RN: 13465-84-4
Properties: off-white powd; sensitive to moisture; enthalpy of vaporization 50.2 kJ/mol; enthalpy of fusion 19.70 kJ/mol [CRC10] [STR93] [CRC10]
Density, g/cm<sup>3</sup>: 4.198 [STR93]
Melting Point, °C: 120.5 [CRC10]
Boiling Point, °C: 287.35 [CRC10]

## 2776

**Compound:** Silicotungstic acid **Synonym:** tungstosilicic acid **Formula:**  $H_4SiW_{12}O_{40} \cdot 5H_2O$  **Molecular Formula:**  $H_{14}O_{45}SiW_{12}$  **Molecular Weight:** 2968.250 **CAS RN:** 12520-88-6 **Properties:** white to SI yellow; deliq cryst [MER06] **Solubility:** v s  $H_2O$ , alcohol [MER06]

## 2777

**Compound:** Silver **Formula:** Ag

Molecular Formula: Ag

Molecular Weight: 107.8682

CAS RN: 7440-22-4

Properties: white metal; most silver salts are sensitive to light; fcc; electronegativity 2.43; electrical resistivity  $1.59 \mu ohm \cdot cm (0^{\circ}C)$ ; temp coefficient of electrical resistivity (0°C-100°C) 0.0041; Poisson's ratio 0.39 (hard drawn); enthalpy of fusion 11.30 kJ/mol; enthalpy of vaporization 284.34 kJ/mol; used in highly reflective films and in semiconductors [KIR78] [CER91] [MER06] [KIR83] Solubility: reacts readily with dil HNO<sub>3</sub>, hot conc H<sub>2</sub>SO<sub>4</sub>; s fused alkali hydroxides in air [MER06] Density, g/cm<sup>3</sup>: 10.43 [KER83] Melting Point, °C: 961.93 [ALD94] Boiling Point, °C: 2212 [ALD93] Thermal Conductivity, W/(m·K): 428 (20°C), 356 (450°C) [KIR83] Thermal Expansion Coefficient: from 0°C to 500°C: 20.61 µm/mK [KIR83]

### 2778

**Compound:** Silver acetate **Formula:** CH<sub>3</sub>COOAg **Molecular Formula:** C<sub>2</sub>H<sub>3</sub>AgO<sub>2</sub> **Molecular Weight:** 166.913

# CAS RN: 563-63-3

Properties: white to sl grayish, lustrous needles or cryst powd; light sensitive; uses: removes and replaces chloride from precious metal complexes [ALD94] [MER06] **Solubility:** g CH<sub>3</sub>COOAg/100 g H<sub>2</sub>O: 0.73 (0°C), 1.05 (20°C), 2.59 (80°C) [LAN05]; v s dil HNO<sub>3</sub> [MER06] **Density, g/cm<sup>3</sup>: 3.26** [MER06] Melting Point, °C: decomposes [STR93]

#### 2779

Compound: Silver acetylacetonate Synonyms: 2,3-pentanedione, silver(I) derivative **Formula:** Ag(CH<sub>3</sub>COCH=C(O)CH<sub>3</sub>) Molecular Formula: C<sub>5</sub>H<sub>7</sub>AgO<sub>2</sub> Molecular Weight: 206.977 CAS RN: 15525-64-1 **Properties:** light and moisture sensitive [ALD94] Melting Point, °C: 100, decomposes [ALD94]

## 2780

**Compound:** Silver acetylide Synonym: silver carbide Formula: AgC=CAg Molecular Formula: C<sub>2</sub>Ag<sub>2</sub> Molecular Weight: 239.758 CAS RN: 7659-31-6 Properties: white powd; unstable; prepared by reacting acetylene with silver salts ammoniacal solution; used as a detonator [HAW93] [KIR83] Reactions: can explode [CRC10]

## 2781

Compound: Silver azide Formula: AgN<sub>3</sub> Molecular Formula: AgN<sub>3</sub> Molecular Weight: 149.888 CAS RN: 13863-88-2 **Properties:** ortho-rhomb, a=0.559 nm, b=0.591 nm, c = 0.610 nm; can be prepared by reacting silver nitrate solution with hydrazine or hydrazoic acid; sensitive to shock [KIR83] [CIC73] **Solubility:** 0.01 g/100 mL H<sub>2</sub>O (100°C) [CRC10] **Density, g/cm<sup>3</sup>:** 4.9 [LID94] Melting Point, °C: ~250 [LID94] Reactions: violently decomposes when heated [KIR83]

### 2782

Compound: Silver benzoate Formula: C<sub>6</sub>H<sub>5</sub>COOAg

**Molecular Formula:** C<sub>7</sub>H<sub>5</sub>AgO<sub>2</sub> Molecular Weight: 228.984 CAS RN: 532-31-0 **Properties:** powd; sensitive to light [ALD94] **Solubility:** s 3 parts cold H<sub>2</sub>O [MER06]

#### 2783

Compound: Silver bromate Formula: AgBrO<sub>3</sub> Molecular Formula: AgBrO<sub>3</sub> Molecular Weight: 235.770 CAS RN: 7783-89-3 Properties: white powd; sensitive to light; decomposes if heated [HAW93] **Solubility:** g/100 g soln, H<sub>2</sub>O: 0.193 (25°C), 1.325 (90°C) [KRU93] Density, g/cm<sup>3</sup>: 5.2 [HAW93]

## 2784

Compound: Silver bromide Formula: AgBr Molecular Formula: AgBr

- Molecular Weight: 187.772
- CAS RN: 7785-23-1
- Properties: -20 mesh with 99.999% purity; yellowish powd; darkens when exposed to light; enthalpy of fusion 9.12 kJ/mol; enthalpy of vaporization 198 kJ/ mol; used in photographic film, in photochromic glass [HAW93] [MER06] [CER91] [CRC10]

Solubility: 0.135 mg/L H<sub>2</sub>O (25°C); i alcohol, most acids; sl s dil ammonia, more soluble in conc ammonia [MER06] Density, g/cm<sup>3</sup>: 6.47 [LID94] Melting Point, °C: 432 [CRC10] Boiling Point, °C: 1502 [CRC10]

#### 2785

**Compound:** Silver carbonate Formula: Ag<sub>2</sub>CO<sub>3</sub> Molecular Formula: CAg<sub>2</sub>O<sub>3</sub> Molecular Weight: 275.745 CAS RN: 534-16-7 Properties: light yellow powd, when freshly prepared, darkens if permitted to stand; light sensitive; made by adding an alkaline carbonate solution to a conc solution of silver nitrate [KIR83] [MER06] **Solubility:** g/1000 g soln, H<sub>2</sub>O: 1.15 (25°C) [KRU93] Density, g/cm<sup>3</sup>: 6.077 [LID94]

- **Reactions:** ~220 decomposes to Ag<sub>2</sub>O and CO<sub>2</sub>; at higher temperatures forms Ag [MER06]

Compound: Silver chlorate
Formula: AgClO<sub>3</sub>
Molecular Formula: AgClO<sub>3</sub>
Molecular Weight: 191.319
CAS RN: 7783-92-8
Properties: white, tetr cryst; slowly decomposes in presence of light, and darkens; oxidizing agent; used in organic synthesis [MER06]
Solubility: g/100 g soln, H<sub>2</sub>O: 14.46 (25°C) [KRU93]; g/100 g H<sub>2</sub>O: 10.4 (10°C), 15.3 (20°C), 26.8 (40°C) [LAN05]; sl s alcohol [MER06]
Density, g/cm<sup>3</sup>: 4.430 [MER06]
Melting Point, °C: 230 [MER06]
Reactions: decomposes at 270°C to AgCl

and evolves O<sub>2</sub> [MER06]

### 2787

Compound: Silver chloride Synonym: ceragyrite Formula: AgCl Molecular Formula: AgCl Molecular Weight: 143.321 CAS RN: 7783-90-6 Properties: white powd; enthalpy of vaporization 199 kJ/mol; enthalpy of fusion 13.20 kJ/mol;

199 kJ/mol; enthalpy of fusion 13.20 kJ/mol; sensitive to light, darkens; has several modifications which differ in solubility and in light sensitivity; used in photography, batteries, silver plating [HAW93] [MER06] [CRC10]

 Solubility: g/L soln, H<sub>2</sub>O: 0.00070 (0°C), 0.00193 (25°C), 0.021 (100°C) [KRU93]; s 250 parts HCl; s in alkali cyanide solutions; i alcohol, dil acids [MER06]
 Density, g/cm<sup>3</sup>: 5.56 [MER06]
 Melting Point, °C: 455 [DOU83]
 Boiling Point, °C: 1547 [CRC10]

## 2788

Compound: Silver chlorite Formula: AgClO<sub>2</sub> Molecular Formula: AgClO<sub>2</sub> Molecular Weight: 175.320 CAS RN: 7783-91-7 Properties: yellow cryst [CRC10] Solubility: g/100 g soln, H<sub>2</sub>O: 0.17 (0°C), 0.44 (18°C), 2.11 (100°C) [KRU93] Reactions: explodes, 105°C [CRC10]

## 2789

**Compound:** Silver chromate **Formula:** Ag<sub>2</sub>CrO<sub>4</sub>

Molecular Formula: Ag<sub>2</sub>CrO<sub>4</sub>
Molecular Weight: 331.730
CAS RN: 7784-01-2
Properties: dark brownish red to maroon cryst; monocl; formed by reaction of a chromate salt and silver nitrate solution; used as a catalyst to form aldol from alcohol [MER06] [KIR83] [KIR78]
Solubility: g/L soln, H<sub>2</sub>O: 0.0142 (0.26°C), 0.028 ± 0.006 (25°C), 0.64 (100°C) [KRU93]; s HNO<sub>3</sub>, ammonia [MER06]
Density, g/cm<sup>3</sup>: 5.625 [KIR78]

# 2790

Compound: Silver citrate Synonyms: citric acid, trisilver salt Formula: AgOOCCH<sub>2</sub>C(OH)(COOAg)CH<sub>2</sub>COOAg Molecular Formula: C<sub>6</sub>H<sub>5</sub>Ag<sub>3</sub>O<sub>7</sub> Molecular Weight: 512.707 CAS RN: 126-45-4 Properties: white, heavy, cryst powd; light sensitive, causing compound to darken [MER06] Solubility: s 3500 parts H<sub>2</sub>O, more s in boiling H<sub>2</sub>O; v s dil HNO<sub>3</sub>, ammonia [MER06]

# 2791

Compound: Silver cyanide
Formula: AgCN
Molecular Formula: CAgN
Molecular Weight: 133.886
CAS RN: 506-64-9
Properties: white or grayish powd; odorless; stable in dry air; darkens in light; can be prepared by mixing stoichiometric amounts of silver nitrate and soluble cyanide; used in silver plating [HAW93] [KIR83] [MER06]
Solubility: 0.000023 g/100 mL H<sub>2</sub>O (20°C) [CRC10]; s, alcohol, dil acids; s alkali cyanides [MER06]
Density, g/cm<sup>3</sup>: 3.95 [MER06]
Melting Point, °C: 320 [STR93]
Reactions: evolves HCN from HCl solutions [MER06]

### 2792

Compound: Silver dichromate Formula:  $Ag_2Cr_2O_7$ Molecular Formula:  $Ag_2Cr_2O_7$ Molecular Weight: 431.724 CAS RN: 7784-02-3 Properties: dark red cryst powd [HAW93] Solubility: 0.0083 g/100 mL H<sub>2</sub>O (15°C) [CRC10], s NH<sub>4</sub>OH, HNO<sub>3</sub> [HAW93] Density, g/cm<sup>3</sup>: 4.770 [HAW93]

Compound: Silver diethyldithiocarbamate
Synonyms: diethyldithiocarbamic acid, silver(I) salt
Formula: (C<sub>2</sub>H<sub>5</sub>)<sub>2</sub>NCS<sub>2</sub>Ag
Molecular Formula: C<sub>5</sub>H<sub>10</sub>AgNS<sub>2</sub>
Molecular Weight: 256.141
CAS RN: 1470-61-7
Properties: light-sensitive; used as a reagent to detect arsenic [ALD94]
Melting Point, °C: 172–175 [ALD94]

## 2794

Compound: Silver difluoride
Synonym: Ag(II) fluoride
Formula: AgF<sub>2</sub>
Molecular Formula: AgF<sub>2</sub>
Molecular Weight: 145.865
CAS RN: 7783-95-1
Properties: white, when pure; usually grayish black or brownish solid; light sensitive; very hygr; reacts violently with H<sub>2</sub>O; very strong oxidizing agent, e.g. can evolve ozone from dil acids and oxidizes iodides to iodine;

obtained by reaction of F<sub>2</sub> on AgCl at 200°C; fluorinating agent [KIR83] [MER06] Solubility: decomposed by H<sub>2</sub>O [CRC10] Density, g/cm<sup>3</sup>: 4.58 [STR93]

Melting Point, °C: 700, decomposes [STR93]

### 2795

Compound: Silver fluoride Formula: AgF Molecular Formula: AgF Molecular Weight: 126.866 CAS RN: 7775-41-9

**Properties:** yellow or brownish cryst; cub; very hygr; darkens if exposed to light; forms basic fluoride in moist air; can form several hydrates; used as an antiseptic [HAW93] [MER06]

Solubility: mol/kg H<sub>2</sub>O: 6.76 (0°C), 13.97 (25°C), 16.15 (108°C); solid phase, AgF ⋅ 4H<sub>2</sub>O (0°C), AgF ⋅ 2H<sub>2</sub>O (25°C), AgF (108°C) [KRU93]; s HF, NH<sub>3</sub>, CH<sub>3</sub>CN [MER06] Density, g/cm<sup>3</sup>: 5.852 [MER06] Melting Point, °C: 435 [MER06] Boiling Point, °C: 1159 [HAW93]

#### 2796

**Compound:** Silver hexafluoroantimonate(V) **Formula:** AgSbF<sub>6</sub>

# **Molecular Formula:** AgF<sub>6</sub>Sb **Molecular Weight:** 343.616 **CAS RN:** 26042-64-8 **Properties:** -6 mesh with 99.9% purity; white

powd; hygr; used as acidic catalyst in epoxide reactions [STR93] [ALD94] [CER91]

#### 2797

**Compound:** Silver hexafluoroarsenate **Formula:** AgAsF<sub>6</sub> **Molecular Formula:** AgAsF<sub>6</sub> **Molecular Weight:** 296.780 **CAS RN:** 12005-82-2 **Properties:** hygr powd [STR93] **Melting Point, °C:** decomposes [STR93]

## 2798

Compound: Silver hexafluorophosphate Formula: AgPF<sub>6</sub> Molecular Formula: AgF<sub>6</sub>P Molecular Weight: 252.832 CAS RN: 26042-63-7 Properties: -6 mesh with 99.9% purity; white cryst; hygr; sensitive to light; uses: acidic catalyst to synthesize some sulfides and vinyl fluorides [ALD94] [STR93] [CER91]

# 2799

**Compound:** Silver hydrogen fluoride **Formula:** AgHF<sub>2</sub> **Molecular Formula:** AgF<sub>2</sub>H **Molecular Weight:** 146.873 **CAS RN:** 12249-52-4 **Properties:** light sensitive; hygr [STR93] **Melting Point, °C:** decomposes [STR93]

### 2800

Compound: Silver iodate Formula: AgIO<sub>3</sub> Molecular Formula: AgIO<sub>3</sub> Molecular Weight: 282.770 CAS RN: 7783-97-3 Properties: white, cryst powd; light sensitive [MER06] Solubility: g/L soln, H<sub>2</sub>O: 0.0505 (25°C) [KRU93]; s ~1000 parts 35% HNO<sub>3</sub> (25°C), 2.5 parts 10% ammonia [MER06] Density, g/cm<sup>3</sup>: 5.53 [MER06] Melting Point, °C: >200 [MER06]

Compound: Silver iodide Synonym: iodyrite Formula: AgI Molecular Formula: AgI Molecular Weight: 234.772 CAS RN: 7783-96-2 Properties: -20 mesh with 99.999% purity; light yellow powd; darkens when exposed to light; hex or cub cryst; enthalpy of vaporization 143.9 kJ/mol; enthalpy of fusion 9.41 kJ/mol [MER06] [CER91] [CRC10] Solubility: 0.03 mg/L H<sub>2</sub>O; i acids, except HI [MER06]; s KI, KCN, NH₄OH, NaCl solutions [HAW93] Density, g/cm<sup>3</sup>: 5.68 [LID94] Melting Point, °C: 558 [CRC10] Boiling Point, °C: 1506 [CRC10] Thermal Expansion Coefficient: -2.5×10<sup>-6</sup>/K [CRC10]

## 2802

Compound: Silver lactate monohydrate Formula:  $AgC_3H_5O_3 \cdot H_2O$ Molecular Formula:  $C_3H_7AgO_4$ Molecular Weight: 214.955 CAS RN: 128-00-7 Properties: white or sl gray cryst powd; sensitive to light [MER06] Solubility: s in ~15 parts  $H_2O$ ; sl s alcohol [MER06] Melting Point, °C: 212 [CRC10]

# 2803

Compound: Silver molybdate Formula:  $Ag_2MoO_4$ Molecular Formula:  $Ag_2MoO_4$ Molecular Weight: 375.674 CAS RN: 13765-74-7 Properties: white, pale yellow (if fused) [KIR81] Solubility: 3.86 mg/100 g soln in H<sub>2</sub>O (25°C) [KRU93] Density, g/cm<sup>3</sup>: 6.18 [LID94] Melting Point, °C: 483 [KIR81]

# 2804

Compound: Silver nitrate Formula: AgNO<sub>3</sub> Molecular Formula: AgNO<sub>3</sub> Molecular Weight: 169.873 CAS RN: 7761-88-8 Properties: -10 mesh with 99.999% purity; colorless, transparent rhomb cryst; pure material not light sensitive; enthalpy of fusion 11.50 kJ/mol [CRC10] [MER06] [CER91] Solubility: g/100 g soln, H<sub>2</sub>O: 54.8 (0°C), 70.7 (25°C), 88.0 (100°C) [KRU93]; 1 g dissolves in: 30 mL alcohol, 6.5 mL boiling alcohol; 253 mL acetone; v s ammonia solution; sl s ether [MER06]
Density, g/cm<sup>3</sup>: 4.352 [STR93]
Melting Point, °C: 212, forming yellowish liq [MER06]
Boiling Point, °C: decomposes, 440, into Ag, nitrogen, oxygen [MER06]

# 2805

Compound: Silver nitrite
Formula: AgNO<sub>2</sub>
Molecular Formula: AgNO<sub>2</sub>
Molecular Weight: 153.874
CAS RN: 7783-99-5
Properties: pale yellow needles; light sensitive, turning gray; used as a reagent for alcohols, as a standard solution for water analysis [HAW93] [MER06]
Solubility: g/100 g soln, H<sub>2</sub>O: 0.155 (0°C), 0.4135 (25°C) [KRU93]; i alcohol; decomposed by dil acids [MER06]
Density, g/cm<sup>3</sup>: 4.453 [STR93]
Melting Point, °C: decomposes, 140 [MER06]

## 2806

Compound: Silver oxalate Formula: Ag<sub>2</sub>C<sub>2</sub>O<sub>4</sub> Molecular Formula: C<sub>2</sub>Ag<sub>2</sub>O<sub>4</sub> Molecular Weight: 303.756 CAS RN: 533-51-7 Properties: white, cryst powd [MER06] Solubility: g/L soln, H<sub>2</sub>O: 0.041 (25°C) [KRU93]; s moderately conc HNO<sub>3</sub>, ammonia [MER06] Density, g/cm<sup>3</sup>: 5.03 [MER06] Melting Point, °C: decomposes [STR93] Reactions: can explode [CRC10]

### 2807

Compound: Silver oxide Formula: Ag<sub>2</sub>O Molecular Formula: Ag<sub>2</sub>O Molecular Weight: 231.735 CAS RN: 20667-12-3 Properties: brownish black powd; reduced by hydrogen, carbon monoxide, and most metals; light sensitive; used to polish glass, to purify drinking water, as a catalyst [HAW93] [MER06] Solubility: 0.0013 g/100 mL H<sub>2</sub>O (20°C), 0.0053 g/100 mL H<sub>2</sub>O (80°C) [CRC10]; v s dil HNO<sub>3</sub>, ammonia; i alcohol [MER06] Density, g/cm<sup>3</sup>: 7.2 [LID94]

## Melting Point, °C: 300, decomposes [STR93] Reactions: begins to decompose at ~200°C, rapidly at 250°C–300°C [MER06]

# 2808

Compound: Silver perchlorate Formula:  $AgClO_4$ Molecular Formula:  $AgClO_4$ Molecular Weight: 207.319 CAS RN: 7783-93-9 Properties: colorless deliq cryst; used in the manufacture of explosives [MER06] [HAW93] Solubility: g/100 g soln, H<sub>2</sub>O: 81.7 ± 0.4 (0°C), 84.6 ± 0.1 (25°C), 88.8 (99°C); solid phase, AgClO<sub>4</sub>·H<sub>2</sub>O (0°C, 25°C), AgClO<sub>4</sub> (99°C) [KRU93]; s in many organic solvents [MER06] Density, g/cm<sup>3</sup>: 2.806 [MER06] Melting Point, °C: 486, decomposes [MER06]

#### 2809

Compound: Silver perchlorate monohydrate Formula:  $AgClO_4 \cdot H_2O$ Molecular Formula:  $AgClH_2O_5$ Molecular Weight: 225.334 CAS RN: 14242-05-8 Properties: white cryst; hygr; stable up to 43°C [MER06] [STR93] Solubility: 84.5 g/100 g saturated soln of  $H_2O$  (25°C) [MER06]

# 2810

Compound: Silver permanganate Formula: AgMnO<sub>4</sub> Molecular Formula: AgMnO<sub>4</sub> Molecular Weight: 226.804 CAS RN: 7783-98-4 Properties: violet; light sensitive; cryst powd; used in gas masks and as an antiseptic [HAW93] [MER06] Solubility: ~9 g/L H<sub>2</sub>O, room temp, more s in hot H<sub>2</sub>O [MER06] Density, g/cm<sup>3</sup>: 4.49 [MER06] Melting Point, °C: decomposes [HAW93]

# 2811

**Compound:** Silver peroxide **Synonym:** silver(II) oxide **Formula:** Ag<sub>2</sub>O<sub>2</sub> **Molecular Formula:** Ag<sub>2</sub>O<sub>2</sub> **Molecular Weight:** 247.735 **CAS RN:** 1301-96-8 Properties: charcoal gray powd; oxidant; malleable; ortho-rhomb or cub cryst; can be obtained by persulfate oxidation of Ag<sub>2</sub>O in alkaline medium at 90°C; strongly oxidizing; used in the manufacture of silver-zinc batteries [HAW93] [MER06] [KIR83]
Solubility: 27 mg/L H<sub>2</sub>O, decomposes (25°C); s alkalies, NH<sub>4</sub>OH (evolving N<sub>2</sub>); s dil acids, evolving O<sub>2</sub> [MER06]
Density, g/cm<sup>3</sup>: 7.483 [MER06]
Melting Point, °C: decomposes >100 to Ag and O<sub>2</sub> [MER06]

#### 2812

Compound: Silver perrhenate Formula: AgO<sub>4</sub>Re Molecular Formula: AgO<sub>4</sub>Re Molecular Weight: 358.07 CAS RN: 20654-56-2 Properties: white solid [STR08] Density, g/cm<sup>3</sup>: 7.05 (25°C) [STR08] Melting Point, °C: 430 [STR08]

### 2813

Compound: Silver phosphate
Synonyms: silver phosphate, tribasic
Formula: Ag<sub>3</sub>PO<sub>4</sub>
Molecular Formula: Ag<sub>3</sub>O<sub>4</sub>P
Molecular Weight: 418.574
CAS RN: 7784-09-0
Properties: yellow powd; darkened by light; reduced by hydrogen; used in photographic emulsions, in pharmaceuticals [HAW93] [MER06]
Solubility: s 15,550 parts H<sub>2</sub>O; sl s dil acids; v s dil HNO<sub>3</sub>, ammonia [MER06]
Density, g/cm<sup>3</sup>: 6.37 [MER06]
Melting Point, °C: 849 [MER06]

#### 2814

Compound: Silver picrate monohydrate
Formula: AgOC<sub>6</sub>H<sub>2</sub>(NO<sub>2</sub>)<sub>3</sub>·H<sub>2</sub>O
Molecular Formula: C<sub>6</sub>H<sub>4</sub>AgN<sub>3</sub>O<sub>8</sub>
Molecular Weight: 353.981
CAS RN: 146-84-9
Properties: yellow cryst; used as an antimicrobial agent [HAW93] [MER06]
Solubility: s ~50 parts H<sub>2</sub>O; sl s alcohol; i CHCl<sub>3</sub>, ether [MER06]
Reactions: can explode [HAW93]

## 2815

**Compound:** Silver selenate **Formula:** Ag<sub>2</sub>SeO<sub>4</sub> Molecular Formula: Ag<sub>2</sub>O<sub>4</sub>Se Molecular Weight: 358.692 CAS RN: 7784-07-8 Properties: ortho-rhomb cryst; prepared from silver carbonate and sodium selenate [KIR83] [MER06] Solubility: g/1000 g H<sub>2</sub>O: 0.870 (25°C), 0.053 (100°C) [KRU93] Density, g/cm<sup>3</sup>: 5.72 [MER06]

### 2816

Compound: Silver selenide
Formula: Ag<sub>2</sub>Se
Molecular Formula: Ag<sub>2</sub>Se
Molecular Weight: 294.696
CAS RN: 1302-09-6
Properties: gray hex microscopic needles; exists in two forms, transition temp 133°C; oxidized to Ag and selenium oxide when heated in O<sub>2</sub> [MER06]
Solubility: i H<sub>2</sub>O [MER06]
Density, g/cm<sup>3</sup>: 8.216 [MER06]
Melting Point, °C: 880 [MER06]

# 2817

Compound: Silver selenite Formula: Ag<sub>2</sub>SeO<sub>3</sub> Molecular Formula: Ag<sub>2</sub>O<sub>3</sub>Se Molecular Weight: 342.694 CAS RN: 7784-05-6 Properties: needles; decomposes >530°C to Ag, selenium oxide, oxygen [MER06] Solubility: sl s cold H<sub>2</sub>O, v s hot H<sub>2</sub>O; s HNO<sub>3</sub> [MER06] Density, g/cm<sup>3</sup>: 5.9297 [MER06] Melting Point, °C: 530, decomposes [MER06]

## 2818

Compound: Silver subfluoride
Formula: Ag<sub>2</sub>F
Molecular Formula: Ag<sub>2</sub>F
Molecular Weight: 234.734
CAS RN: 1302-01-8
Properties: hex; bronze colored cryst with green luster; becomes grayish black as a result of prolonged exposure to air; good electrical conductor;

quickly hydrolyzes in H<sub>2</sub>O precipitating Ag powd; can be prepared by heating a conc solution

of AgF with Ag powd [KIR78] [MER06]

Solubility: decomposes in H<sub>2</sub>O [KIR78]

Density, g/cm<sup>3</sup>: 8.57 [MER06]

Melting Point, °C: decomposes to Ag, AgF 100–200 [MER06]

#### 2819

Compound: Silver sulfate Formula:  $Ag_2SO_4$ Molecular Formula:  $Ag_2O_4S$ Molecular Weight: 311.798 CAS RN: 10294-26-5 Properties: small colorless cryst or cryst powd; light sensitive, slowly darkening; can be made by reaction of metallic Ag and hot  $H_2SO_4$  [KIR84] [MER06] Solubility: g/100 g soln,  $H_2O$ : 0.56 ± 0.01 (0°C), 0.834 (25°C), 1.39 (100°C) [KRU93]; s HNO<sub>3</sub>, ammonia, conc  $H_2SO_4$  [MER06] Density, g/cm<sup>3</sup>: 5.45 [MER06] Melting Point, °C: 657 [MER06] Boiling Point, °C: decomposes, 1085 [MER06]

#### 2820

Compound: Silver sulfide Synonyms: acanthite, argentite Formula: Ag<sub>2</sub>S Molecular Formula: Ag<sub>2</sub>S Molecular Weight: 247.802 CAS RN: 21548-73-2 Properties: -100 mesh with 99.9% purity; grayish black powd; orthro-rhomb, changes to cub >179°C; enthalpy of fusion 14.10 kJ/mol; used in ceramics [HAW93] [MER06] [CER91] Solubility: i H<sub>2</sub>O; s conc H<sub>2</sub>SO<sub>4</sub>, HNO<sub>3</sub> [HAW93] Density, g/cm<sup>3</sup>: 7.32 [HAW93] Melting Point, °C: 825 [HAW93] Boiling Point, °C: decomposes [HAW93]

### 2821

**Compound:** Silver telluride **Synonym:** hessite **Formula:** Ag<sub>2</sub>Te **Molecular Formula:** Ag<sub>2</sub>Te **Molecular Weight:** 343.336 **CAS RN:** 12002-99-2 **Properties:** black cryst [STR93] **Density, g/cm<sup>3</sup>:** 8.5 [STR93] **Melting Point, °C:** 955 [STR93]

# 2822

**Compound:** Silver tetraiodomercurate(II) ( $\alpha$ -form) **Synonym:** mercury(II) silver iodide **Formula:** Ag<sub>2</sub>HgI<sub>4</sub> **Molecular Formula:** Ag<sub>2</sub>HgI<sub>4</sub> **Molecular Weight:** 923.942

## CAS RN: 7784-03-4

Properties: deep yellow; thermochromic powd; becomes blood red at 40°C–50°C, β-form; can be prepared by precipitation from a solution of AgNO<sub>3</sub> and K<sub>2</sub>HgI<sub>4</sub> [KIR81] [CRC10] [MER06]
Solubility: i H<sub>2</sub>O, dil acids; s in solutions of alkali iodides or cyanides [MER06]
Density, g/cm<sup>3</sup>: 6.02 [CRC10]
Melting Point, °C: β: decomposes 158 [CRC10]
Reactions: α to β transition, 50.7°C [CRC10]

#### 2823

Compound: Silver thiocyanate Formula: AgSCN Molecular Formula: CAgNS Molecular Weight: 165.952 CAS RN: 1701-93-5 Properties: white powd [STR93] Solubility: g/L soln, H<sub>2</sub>O: 0.00018±0.00002 (25°C), 0.0064 (100°C) [KRU93] Melting Point, °C: decomposes [STR93]

### 2824

**Compound:** Silver trifluoroacetate **Formula:** AgO<sub>2</sub>CCF<sub>3</sub> **Molecular Formula:** C<sub>2</sub>AgF<sub>3</sub>O<sub>2</sub> **Molecular Weight:** 220.88 **CAS RN:** 2966-50-9 **Properties:** white to off-white solid [STR08]

## 2825

Compound: Silver tungstate Formula:  $Ag_2WO_4$ Molecular Formula:  $Ag_2O_4W$ Molecular Weight: 463.574 CAS RN: 13465-93-5 Properties: white powd; formula also written as  $Ag_8W_4O_{16}$  [ALD94] [STR93] Solubility: g/L soln, H<sub>2</sub>O: 0.235 (25°C) [KRU93]

# 2826

Compound: Sodium Synonym: natrium Formula: Na Molecular Formula: Na Molecular Weight: 22.989768 CAS RN: 7440-23-5 Properties: soft silvery white metal; bcc, a=0.4282 nm; lustrous, but tarnishes in air; enthalpy of fusion 2.60 kJ/mol; enthalpy of vaporization 97.4 kJ/mol; electrical resistivity (20°C) 4.69 μohm · cm; viscosity at 100°C is 0.680 mPa · s; surface tension at 400°C 161 mN/m; decomposes alcohol; burns with a yellow flame; reduces most oxides to elements [MER06] [KIR82] [ALD94]
Solubility: reacts violently with H<sub>2</sub>O evolving H<sub>2</sub> and forming NaOH soln; s mercury, liq NH<sub>3</sub> [KIR82] [MER06]
Density, g/cm<sup>3</sup>: 0.968 at 20°C [MER06]
Melting Point, °C: 97.82 [MER06]

Boiling Point, °C: 881 [MER06]

Thermal Conductivity, W/( $\mathbf{m} \cdot \mathbf{K}$ ): 142 at 25°C [ALD94] Thermal Expansion Coefficient: 71 × 10<sup>-6</sup>/K [CRC10]

#### 2827

Compound: Sodium  $\beta$ -aluminum oxide Formula:  $\beta$ -Na<sub>2</sub>O · 11Al<sub>2</sub>O<sub>3</sub> Molecular Formula: Al<sub>22</sub>Na<sub>2</sub>O<sub>34</sub> Molecular Weight: 1183.554 CAS RN: 11138-49-1 Properties: hex, a=0.558 nm, c=2.245 nm [KIR78] Density, g/cm<sup>3</sup>: 3.24 [KIR78]

#### 2828

Compound: Sodium acetate Synonyms: acetic acid, sodium salt Formula: CH<sub>3</sub>COONa Molecular Formula: C<sub>2</sub>H<sub>3</sub>NaO<sub>2</sub> Molecular Weight: 82.035 CAS RN: 127-09-3 Properties: white powd; odorless; efflorescent [HAW93] Solubility: g/100 g H<sub>2</sub>O: 36.3 (0°C), 50.5 (25°C), 170 (100°C); solid phase, CH<sub>3</sub>COONa · 3H<sub>2</sub>O (0°C, 25°C) [KRU93]; s alcohol [MER06] Density, g/cm<sup>3</sup>: 1.528 [STR93] Melting Point, °C: 324 [STR93]

## 2829

Compound: Sodium acetate trihydrate Synonyms: acetic acid, sodium salt trihydrate Formula: NaCH<sub>3</sub>COO · 3H<sub>2</sub>O Molecular Formula: C<sub>2</sub>H<sub>9</sub>NaO<sub>5</sub> Molecular Weight: 136.080 CAS RN: 6131-90-4 Properties: transparent cryst or granules; efflorescent in warm air [MER06] Solubility: 1 g/0.8 mL H<sub>2</sub>O, 1 g/0.6 mL boiling H<sub>2</sub>O, 1 g/19 mL alcohol [MER06]
Density, g/cm<sup>3</sup>: 1.45 [MER06]
Melting Point, °C: 58 [MER06]
Reactions: minus 3H<sub>2</sub>O 120°C; decomposes at higher temp [MER06]

## 2830

**Compound:** Sodium acetylacetonate **Synonyms:** 2,4-pentanedione, sodium derivative **Formula:** NaCH<sub>3</sub>COCH=C(O)CH<sub>3</sub> **Molecular Formula:** C<sub>5</sub>H<sub>7</sub>NaO<sub>2</sub> **Molecular Weight:** 122.100 **CAS RN:** 15435-71-9 **Properties:** off-white powd [STR93] **Melting Point, °C:** 210 decomposes [STR93]

## 2831

Compound: Sodium acetylide Synonym: sodium carbide Formula: NaC≡CH Molecular Formula: C<sub>2</sub>HNa Molecular Weight: 48.020 CAS RN: 1066-26-8 Properties: 18% suspension in xylene with gray color; sensitive to atm oxygen and moisture; freezing point of suspension is 29°C [STR93]

#### 2832

**Compound:** Sodium aluminate **Formula:** NaAlO<sub>2</sub> **Molecular Formula:** AlNaO<sub>2</sub> **Molecular Weight:** 81.971 **CAS RN:** 1302-42-7

Properties: white powd; hygr; can be prepared by fusing sodium carbonate and aluminum acetate in stoichiometric amounts at 800°C; used as a mordant, in water purification, in sizing paper, in cleaning compounds [HAW93] [KIR78]
Solubility: v s H<sub>2</sub>O; i alcohol [MER06]

**Density, g/cm<sup>3</sup>:** 4.63 [LID94] **Melting Point, °C:** 1650 [MER06]

## 2833

**Compound:** Sodium aluminum sulfate dodecahydrate **Synonym:** sodium alum **Formula:** AlNa(SO<sub>4</sub>)<sub>2</sub> · 12H<sub>2</sub>O **Molecular Formula:** AlH<sub>24</sub>NaO<sub>20</sub>S<sub>2</sub> **Molecular Weight:** 458.282 **CAS RN:** 10102-71-3 **Properties:** colorless cryst [MER06] **Solubility:** g anhydrous/100 g H<sub>2</sub>O: 37.4 (0°C), 39.7 (20°C), 43.8 (40°C) [LAN05]; i alcohol [MER06] **Density, g/cm<sup>3</sup>:** 1.61 [MER06] **Melting Point, °C:** ~60 [MER06]

## 2834

Compound: Sodium amide Synonym: sodamide Formula: NaNH<sub>2</sub> **Molecular Formula:** H<sub>2</sub>NNa Molecular Weight: 39.013 CAS RN: 7782-92-5 Properties: -40 mesh protected from atm under hexane, with 96% purity; commercial product white to olive green; orthorhomb cryst; enthalpy of formation is -118.8 kJ/mol [CIC73] [CER91] [MER06] Solubility: reacts violently with H<sub>2</sub>O, forming NaOH and NH<sub>3</sub> [MER06]; 0.17 g/100 g liq NH<sub>3</sub> [CIC73] **Density, g/cm<sup>3</sup>:** 1.39 [CIC73] Melting Point, °C: 208 [CIC73] Boiling Point, °C: 400 [HAW93]

#### 2835

Compound: Sodium ammonium hydrogen phosphate tetrahydrate
Synonym: microcosmic salt
Formula: NaNH₄HPO₄ · 4H₂O
Molecular Formula: H₁₃NNaO<sub>8</sub>P
Molecular Weight: 209.069
CAS RN: 51750-73-3
Properties: odorless; monocl; efflorescent in air, evolving NH₃ [MER06]
Solubility: s about 5 parts cold, 1 part boiling H₂O [MER06]; i alcohol [HAW93]
Density, g/cm³: 1.544 [MER06] [ALD94]
Melting Point, °C: ~80, when rapidly heated [MER06]
Reactions: prolonged heating produces NaPO₃ [MER06]

### 2836

Compound: Sodium antimonate monohydrate Synonym: sodium pyroantimonate monohydrate Formula:  $Na_2O \cdot Sb_2O_5 \cdot H_2O$ Molecular Formula:  $H_2Na_2O_7Sb_2$ Molecular Weight: 403.512 CAS RN: 33908-66-6 Properties: white, granular powd; formula also given as  $NaSb(OH)_6$ , -200 mesh with 99.9% purity [MER06] [CER91] Solubility: sl s  $H_2O$  [MER06]

Compound: Sodium arsenate dodecahydrate Formula:  $Na_3AsO_4 \cdot 12H_2O$ Molecular Formula:  $AsH_{24}Na_3O_{16}$ Molecular Weight: 424.072 CAS RN: 7778-43-0 Properties: colorless cryst [HAW93] Solubility: 38.9 g/100 mL H<sub>2</sub>O (15.5°C) [CRC10]; sl s in alcohol and glycerol; i ether [HAW93] Density, g/cm<sup>3</sup>: 1.7539 [HAW93] Melting Point, °C: 86 [HAW93]

# 2838

Compound: Sodium arsenite
Synonym: sodium metaarsenite
Formula: NaAsO<sub>2</sub>
Molecular Formula: AsO<sub>2</sub>Na
Molecular Weight: 129.911
CAS RN: 7784-46-5
Properties: white or grayish white powd; somewhat hygr; absorbs atm CO<sub>2</sub>; used in soaps for taxidermists, in insecticides, as a hide preservative [HAW93] [MER06]
Solubility: v s H<sub>2</sub>O; sl s alcohol [MER06]
Density, g/cm<sup>3</sup>: 1.87 [HAW93]

#### 2839

Compound: Sodium azide
Synonym: smite
Formula: NaN<sub>3</sub>
Molecular Formula: N<sub>3</sub>Na
Molecular Weight: 65.010
CAS RN: 26628-22-8
Properties: white powd; hex cryst; β-NaN<sub>3</sub>: body-center rhomb, with a=0.5488 nm; decomposes when heated into Na, N<sub>2</sub> [CIC73] [MER06] [STR93]
Solubility: g/100 g H<sub>2</sub>O: 38.9 (0°C), 40.8 (20°C), 55.3 (100°C) [LAN05]
Density, g/cm<sup>3</sup>: 1.846 [MER06]
Melting Point, °C: 300, decomposes [STR93]

# 2840

Compound: Sodium borodeuteride Formula: NaBD<sub>4</sub> Molecular Formula: BD<sub>4</sub>Na Molecular Weight: 41.861 CAS RN: 15681-89-7 Properties: white powd; sensitive to moisture [STR93] Density, g/cm<sup>3</sup>: 1.074 [STR93] Melting Point, °C: ~400 [STR93]

## 2841

Compound: Sodium borohydride
Formula: NaBH<sub>4</sub>
Molecular Formula: BH<sub>4</sub>Na
Molecular Weight: 37.833
CAS RN: 16940-66-2
Properties: white cub; hygr; stable in dry air up to 300°C, decomposes 400°C–500°C; strong reducing agent [MER06]
Solubility: w/w H<sub>2</sub>O: 55% (25°C), 88.5% (60°C); s liq ammonia, ethylenediamine, other organic solvents [MER06]
Density, g/cm<sup>3</sup>: 1.074 [MER06]
Melting Point, °C: ~400, decomposes [MER06]

# 2842

Compound: Sodium bromate Formula: NaBrO<sub>3</sub> Molecular Formula: BrNaO<sub>3</sub> Molecular Weight: 150.892 CAS RN: 7789-38-0 Properties: colorless; cub cryst, granules or powd; enthalpy of fusion 28.11 kJ/mol [CRC10] [MER06] Solubility: g/100 g soln, H<sub>2</sub>O: 28.29 (25°C), 47.6 (100°C); solid phase, NaBrO<sub>3</sub> [KRU93] Density, g/cm<sup>3</sup>: 3.34 [MER06] Melting Point, °C: 381, decomposes and evolves oxygen [MER06]

## 2843

Compound: Sodium bromide Formula: NaBr Molecular Formula: BrNa Molecular Weight: 102.894 CAS RN: 7647-15-6 **Properties:** white cub cryst, a=0.5977 nm; granules, powd; absorbs moisture from air; enthalpy of fusion 26.11 kJ/mol; preparation: by the addition of stoichometric amount of HBr to NaOH or Na<sub>2</sub>CO<sub>3</sub> [CRC10] [KIR82] [MER06] **Solubility:** g/100 g soln, H<sub>2</sub>O: 44.47 (0°C), 48.61 (25°C), 53.8-54.8 (100°C); solid phase, NaBr-2H<sub>2</sub>O (0°C, 25°C), NaBr (100°C) [KRU93]; s alcohol [HAW93] Density, g/cm3: 3.203 [STR93] Melting Point, °C: 747 [CRC10] Boiling Point, °C: 1390 [STR93]

# 2844

**Compound:** Sodium bromide dihydrate **Formula:** NaBr·2H<sub>2</sub>O **Molecular Formula:** BrH<sub>4</sub>NaO<sub>2</sub> **Molecular Weight:** 138.925 CAS RN: 13466-08-5 Properties: white cryst powd [HAW93] Solubility: 79.5 g/100 mL H<sub>2</sub>O (0°C), 118.6 g/100 mL H<sub>2</sub>O (80.5°C) [CRC10]; moderately s in alcohol [HAW93] Density, g/cm<sup>3</sup>: 2.176 [HAW93] Reactions: minus 2H<sub>2</sub>O at 51°C [CRC10]

### 2845

Compound: Sodium *t*-butoxide Formula: C<sub>4</sub>H<sub>9</sub>NaO Molecular Formula: C<sub>4</sub>H<sub>9</sub>NaO Molecular Weight: 96.11 CAS RN: 865-48-5 Properties: white to off-white solid; moisture-sensitive [STR08]

## 2846

**Compound:** Sodium cacodylate hydrate Formula:  $(CH_3)_2As(O)ONa \cdot xH_2O$ Molecular Formula:  $C_2H_8AsNaO_3$ Molecular Weight: 159.91 CAS RN: 124-65-2

# 2847

Compound: Sodium carbonate Synonym: soda ash Formula: Na<sub>2</sub>CO<sub>3</sub> Molecular Formula: CNa<sub>2</sub>O<sub>3</sub> Molecular Weight: 105.989 CAS RN: 497-19-8 **Properties:** -100 mesh with 99.999% purity; hygr powd; gradually absorbs one mole H<sub>2</sub>O from air; enthalpy of fusion 29.70 kJ/mol [MER06] [CER91] [CRC10] Solubility: mol/kg H<sub>2</sub>O: 0.66 (0°C), 2.77 (25°C), 4.22 (100°C); solid phase,  $Na_2CO_3 \cdot 10H_2O$  $(0^{\circ}C, 25^{\circ}C), Na_2CO_3 \cdot H_2O (100^{\circ}C)$ [KRU93]; s glycerol; i alcohol [MER06] Density, g/cm<sup>3</sup>: 2.54 [LID94] Melting Point, °C: 858.1 [LID94] **Reactions:** minus CO<sub>2</sub> starting at 400°C [MER06]

## 2848

**Compound:** Sodium carbonate bicarbonate dihydrate **Synonyms:** trona, sodium sesquicarbonate **Formula:**  $Na_2CO_3 \cdot NaHCO_3 \cdot 2H_2O$  **Molecular Formula:**  $C_2H_5Na_3O_8$  **Molecular Weight:** 226.026 **CAS RN:** 497-19-8 **Properties:** monocl needles; stable in air [MER06] **Solubility:** g/100 mL H<sub>2</sub>O: 13 (0°C), 42 (100°C) [MER06] Density, g/cm<sup>3</sup>: 2.112 [MER06] Melting Point, °C: decomposes [CRC10]

### 2849

Compound: Sodium carbonate decahydrate Synonyms: soda, washing soda Formula:  $Na_2CO_3 \cdot 10H_2O$ Molecular Formula:  $CH_{20}Na_2O_{13}$ Molecular Weight: 286.142 CAS RN: 6132-02-1 Properties: transparent cryst; effloresces in air [MER06] Solubility: s 2 parts cold  $H_2O$ , 0.25 parts boiling  $H_2O$ ; glycerol; i alcohol [MER06] Density, g/cm<sup>3</sup>: 1.46 [MER06] Melting Point, °C: 34 [MER06] Reactions: minus  $H_2O$  at 33.5°C [CRC10]

#### 2850

Compound: Sodium carbonate monohydrate
Synonym: thermonatrite
Formula: Na<sub>2</sub>CO<sub>3</sub>·H<sub>2</sub>O
Molecular Formula: CH<sub>2</sub>Na<sub>2</sub>O<sub>4</sub>
Molecular Weight: 124.005
CAS RN: 5968-11-6
Properties: colorless; small cryst or powd; stable under ordinary atm conditions of temp and moisture [MER06]
Solubility: s 3 parts H<sub>2</sub>O, 1.8 parts boiling H<sub>2</sub>O, 7 parts glycerol; i alcohol [MER06]
Density, g/cm<sup>3</sup>: 2.25 [MER06]
Melting Point, °C: 109 [HAW93]
Reactions: forms anhydride at 100°C [MER06]

# 2851

Compound: Sodium carbonate peroxohydrate
Synonym: sodium percarbonate
Formula: Na<sub>2</sub>CO<sub>3</sub> · 1-1/2H<sub>2</sub>O<sub>2</sub>
Molecular Formula: CH<sub>3</sub>Na<sub>2</sub>O<sub>6</sub>
Molecular Weight: 157.011
CAS RN: 15630-39-4
Properties: stable, microcryst powd; forms Na<sub>2</sub>O<sub>2</sub> and Na<sub>2</sub>CO<sub>3</sub> in water; used as a bleaching agent, mild antiseptic and a cleaner for dentures [HAW93]
Solubility: 120 g/kg H<sub>2</sub>O (20°C) [HAW93]

**2852 Compound:** Sodium chlorate **Formula:** NaClO<sub>3</sub> Molecular Formula: ClNaO<sub>3</sub>
Molecular Weight: 106.441
CAS RN: 7775-09-9
Properties: cub cryst or white granules; sl hygr; strong oxidizing agent; enthalpy of fusion 22.10kJ/mol [CRC10] [MER06] [KIR78]
Solubility: g/100 g soln, H<sub>2</sub>O: 44.3 (0°C), 50.0 (25°C), 66.8 (100°C); solid phase, NaClO<sub>3</sub> [KRU93]; s alcohol [MER06]
Density, g/cm<sup>3</sup>: 2.490 [HAW93]
Melting Point, °C: 248–261, decomposes [STR93]
Boiling Point, °C: decomposes 300 [MER06]
Reactions: decomposes at 300°C, with evolution of O<sub>2</sub> [MER06]

## 2853

Compound: Sodium chloride Synonym: halite Formula: NaCl Molecular Formula: ClNa Molecular Weight: 58.443 CAS RN: 7647-14-5

- Properties: colorless cub white cryst, granules or powd; hygr; hardness 2.5; enthalpy of fusion 28.16 kJ/mol; enthalpy of solution 3.757 kJ/mol; saturated brine has vapor pressure, kPa: 1.76 (20°C), 2.39 (25°C), 9.26 (50°C), 23.27 (70°C), 52.20 (90°C); bp of saturated brine is 108.7°C; specific gravity of saturated brine is 1.1978 [KIR82] [MER06] [STR93] [CRC10]
- Solubility: g/100 g soln, H<sub>2</sub>O: 35.63 (0°C), 35.92 (25°C), 39.4 (100°C); solid phase, NaCl [KRU93]; 1 g/10 mL glycerol; v sl s alcohol [MER06]; 6.1581 ±0.0058 mol/(kg ⋅ H<sub>2</sub>O) at 25°C [RAR85b]
- **Density, g/cm<sup>3</sup>:** 2.165 [STR93]
- Melting Point, °C: 800.7 [LID94]
- Boiling Point, °C: 1465 [LID94]
- **Thermal Conductivity, W/(m·K):** data for aq solutions of NaCl from 20°C to 330°C are found in [OZB80] **Thermal Expansion Coefficient:** (volume)
- 100°C (0.963), 200°C (2.288), 400°C (5.256), 600°C (8.932) [CLA66]

## 2854

**Compound:** Sodium chlorite **Formula:** NaClO<sub>2</sub> **Molecular Formula:** ClNaO<sub>2</sub> **Molecular Weight:** 90.442 **CAS RN:** 7758-19-2

**Properties:** white cryst or powd; sl hygr; strong oxidizing agent; used to improve the taste and odor of potable water, and as a bleaching agent for textiles and wood pulp [HAW93] [MER06] **Solubility:** mol/mol soln, H<sub>2</sub>O: 6.51 (25°C), 4.1 (60°C); solid phase, NaClO<sub>2</sub> · 3H<sub>2</sub>O (25°C), NaClO<sub>2</sub> (60°C) [KRU93] **Reactions:** decomposes at 180°C−200°C [MER06]

## 2855

Compound: Sodium chromate Formula: Na<sub>2</sub>CrO<sub>4</sub> Molecular Formula: CrNa<sub>2</sub>O<sub>4</sub> Molecular Weight: 161.974 CAS RN: 7775-11-3 Properties: yellow cryst; ortho-rhomb [KIR78] Solubility: g/100 g soln, H<sub>2</sub>O: 24.2 (0°C), 45.8 (25°C), 56.1 (100°C); solid phase, Na<sub>2</sub>CrO<sub>4</sub> · 10H<sub>2</sub>O (0°C), Na<sub>2</sub>CrO<sub>4</sub> · 6H<sub>2</sub>O (25°C), Na<sub>2</sub>CrO<sub>4</sub> · 10H<sub>2</sub>O (0°C), Na<sub>2</sub>CrO<sub>4</sub> · 6H<sub>2</sub>O (25°C), Na<sub>2</sub>CrO<sub>4</sub> (100°C) [KRU93] Density, g/cm<sup>3</sup>: 2.723 [KIR78] Melting Point, °C: 792 [KIR78]

#### 2856

Compound: Sodium chromate decahydrate
Formula: Na<sub>2</sub>CrO<sub>4</sub> · 10H<sub>2</sub>O
Molecular Formula: CrH<sub>20</sub>Na<sub>2</sub>O<sub>14</sub>
Molecular Weight: 342.127
CAS RN: 7775-11-3
Properties: yellow, translucent, efflorescent cryst, water content can vary; used in inks, for dyeing, as a paint pigment, wood preservative and corrosion protectant [HAW93] [MER06]
Solubility: s H<sub>2</sub>O; sl s in alcohol [HAW93]
Density, g/cm<sup>3</sup>: 1.483 [HAW93]
Melting Point, °C: 19.9 [HAW93]

#### 2857

Compound: Sodium chromate tetrahydrate
Formula: Na<sub>2</sub>CrO<sub>4</sub> · 4H<sub>2</sub>O
Molecular Formula: CrH<sub>8</sub>Na<sub>2</sub>O<sub>8</sub>
Molecular Weight: 234.035
CAS RN: 10034-82-9
Properties: yellow; somewhat deliq cryst; used in pigment manufacture, leather tanning and as a corrosion inhibitor [MER06] [HAW93]
Solubility: s ~1 part H<sub>2</sub>O; sl s alcohol [MER06]

### 2858

**Compound:** Sodium citrate dihydrate **Synonyms:** citric acid, trisodium salt dihydrate **Formula:** NaOOCCH<sub>2</sub>C(OH)(COONa)CH<sub>2</sub>COONa · 2H<sub>2</sub>O **Molecular Formula:** C<sub>6</sub>H<sub>9</sub>Na<sub>3</sub>O<sub>9</sub> **Molecular Weight:** 294.101 **CAS RN:** 6132-04-3 Properties: white cryst, granules or powd; odorless with cool saline taste; used in photography, as a sequestering agent for metals, as an anticoagulant for blood samples, and for emulsifying, acidifying and sequestering food [MER06]
Solubility: g/100 mL H<sub>2</sub>O: 71 (25°C), 167

(100°C); i alcohol, ether [KIR78] **Reactions:** minus 2H<sub>2</sub>O at 150°C [MER06]

## 2859

Compound: Sodium citrate pentahydrate Formula:  $Na_3C_6H_5O_7 \cdot 5H_2O$ Molecular Formula:  $C_6H_{15}Na_3O_{12}$ Molecular Weight: 348.147 CAS RN: 6858-44-2 Properties: large, colorless cryst or white granules; effloresces in air [MER06] [KIR78] Solubility: g/100 mL H<sub>2</sub>O: 92.6 (25°C), 250 (100°C); sl s alcohol, i ether [KIR78] Density, g/cm<sup>3</sup>: 1.857 [CRC10] Reactions: minus 5H<sub>2</sub>O at 150°C [CRC10]

# 2860

Compound: Sodium copper chromate trihydrate
Formula: Na<sub>2</sub>O · 4CuO · 4CrO<sub>3</sub> · 3H<sub>2</sub>O
Molecular Formula: Cr<sub>4</sub>Cu<sub>4</sub>H<sub>6</sub>Na<sub>2</sub>O<sub>20</sub>
Molecular Weight: 834.184
CAS RN: 68399-60-0
Properties: maroon triclinic; used as an antifouling pigment [KIR78]
Solubility: v sl s H<sub>2</sub>O [KIR78]
Density, g/cm<sup>3</sup>: 3.57 [KIR78]

## 2861

Compound: Sodium cyanate
Formula: NaOCN
Molecular Formula: CNNaO
Molecular Weight: 65.007
CAS RN: 917-61-3
Properties: colorless needles when prepared from alcohol medium; decomposes in H<sub>2</sub>O to urea and Na<sub>2</sub>CO<sub>3</sub> [MER06]
Solubility: 0.22 g/100 g alcohol (0°C); i ether [MER06]
Density, g/cm<sup>3</sup>: 1.893 [MER06]
Melting Point, °C: 550 [MER06]

### 2862

Compound: Sodium cyanide Synonym: cyanogran Formula: NaCN Molecular Formula: CNNa Molecular Weight: 49.008

## CAS RN: 143-33-9

Properties: white granules or fused pieces; somewhat deliq; enthalpy of fusion 15.4 kJ/mol; enthalpy of vaporization 156.3 kJ/mol; enthalpy of solution 1510 J/mol; vapor pressure, kPa: 0.1013 (800°C), 1.652 (1000°C), 11.9 (1200°C), 41.8 (1360°C); used in electroplating of zinc, copper, brass gold and other metals; forms a dihydrate [KIR78] [MER06]
Solubility: g/100 g H<sub>2</sub>O: 40.8 (0°C), 58.7 (20°C), 71.2 (30°C) [LAN05]; sl s alcohol [MER06]
Density, g/cm<sup>3</sup>: cub: 1.60, ortho-rhomb: 1.62–1.624 [KIR78]

Melting Point, °C: 563.7 [STR93] Boiling Point, °C: 1496 [STR93]

#### 2863

Compound: Sodium cyanoborohydride
Synonym: sodium cyanotrihydridoborate
Formula: NaBH<sub>3</sub>(CN)
Molecular Formula: CH<sub>3</sub>BNNa
Molecular Weight: 62.843
CAS RN: 25895-60-7
Properties: white powd; hygr; mild reducing agent, e.g. reduces aldehydes, ketones, oximes [MER06] [ALD94]
Solubility: 212 g/100 g H<sub>2</sub>O (29°C); v s methanol; sl s ethanol [MER06]
Density, g/cm<sup>3</sup>: 1.199 [MER06]
Melting Point, °C: 240–242 [MER06]

#### 2864

Compound: Sodium deuteride Formula: NaD Molecular Formula: DNa Molecular Weight: 25.005 CAS RN: 15780-28-6 Properties: slurry of gray powd; sensitive to moisture; 20% in oil, 98% isotopic purity [STR93]

#### 2865

Compound: Sodium diacetate
Synonym: sodium acid acetate
Formula: CH<sub>3</sub>COOH · CH<sub>3</sub>COONa
Molecular Formula: C<sub>4</sub>H<sub>7</sub>NaO<sub>4</sub>
Molecular Weight: 142.089
CAS RN: 126-96-5
Properties: white powd; can be used as a source of acetic acid; releases 42.25% of available CH<sub>3</sub>COOH; used as a buffer, as a mold inhibitor, food preservative [HAW93] [MER06]
Solubility: s H<sub>2</sub>O [MER06]; sl s alcohol; i ether [HAW93]
Melting Point, °C: decomposes >150 [MER06]

Compound: Sodium dichromate dihydrate
Formula: Na<sub>2</sub>Cr<sub>2</sub>O<sub>7</sub> · 2H<sub>2</sub>O
Molecular Formula: Cr<sub>2</sub>H<sub>4</sub>Na<sub>2</sub>O<sub>9</sub>
Molecular Weight: 297.999
CAS RN: 7782-12-0
Properties: reddish orange cryst; monocl; somewhat deliq [KIR78] [MER06] [STR93]
Solubility: g/100 g soln in H<sub>2</sub>O: 62.17 (0°C), 65.01 (25°C), 80.6 (100°C); solid phase, Na<sub>2</sub>Cr<sub>2</sub>O<sub>7</sub> · 2H<sub>2</sub>O (0°C, 25°C), Na<sub>2</sub>Cr<sub>2</sub>O<sub>7</sub> · 6H<sub>2</sub>O (100°C) [KRU93]
Density, g/cm<sup>3</sup>: 2.348 [KIR78]
Melting Point, °C: 84.6 (incongruent) [KIR78]
Reactions: minus 2H<sub>2</sub>O ~100°C [MER06]

## 2867

Compound: Sodium dihydrogen phosphate dihydrate Formula: NaH<sub>2</sub>PO<sub>4</sub>·2H<sub>2</sub>O Molecular Formula: H<sub>6</sub>NaO<sub>6</sub>P Molecular Weight: 156.008 CAS RN: 7558-80-7 Properties: ortho-rhomb, colorless cryst [MER06] Solubility: g/100 g soln in H<sub>2</sub>O: 36.5 (0°C), 48.5 (25°C), 71.0 (100°C); solid phase, NaH<sub>2</sub>PO<sub>4</sub>·2H<sub>2</sub>O (0°C, 25°C), NaH<sub>2</sub>PO<sub>4</sub> (100°C) [KRU93] Density, g/cm<sup>3</sup>: 1.915 [MER06] Melting Point, °C: 60 [MER06]

### 2868

Compound: Sodium dihydrogen phosphate monohydrate
Synonym: sodium monobasic phosphate
Formula: NaH<sub>2</sub>PO<sub>4</sub> · H<sub>2</sub>O
Molecular Formula: H<sub>4</sub>NaO<sub>5</sub>P
Molecular Weight: 137.993
CAS RN: 10049-21-5
Properties: white; sl deliq cryst or granules [MER06] [STR93]
Solubility: 59.9 g/100 mL H<sub>2</sub>O (0°C), 427 g/100 mL H<sub>2</sub>O (100°C) [CRC10]; i alcohol [MER06]
Density, g/cm<sup>3</sup>: 2.04 [CRC10]
Melting Point, °C: decomposes, 204 [CRC10]
Reactions: minus H<sub>2</sub>O at 100°C; forms metaphosphate when ignited [MER06]

# 2869

**Compound:** Sodium dihydrogen pyrophosphate **Synonym:** sodium acid pyrophosphate **Formula:** Na<sub>2</sub>H<sub>2</sub>P<sub>2</sub>O<sub>7</sub> **Molecular Formula:** H<sub>2</sub>Na<sub>2</sub>O<sub>7</sub>P<sub>2</sub> **Molecular Weight:** 221.939 **CAS RN:** 7758-16-9 Properties: white; fused masses or powd; used in baking powd [MER06]
Solubility: g/100 g H<sub>2</sub>O: 4.47 (0°C), 12.0 (20°C), 18.4 (40°C) [LAN05]
Density, g/cm<sup>3</sup>: ~1.9 [LID94]
Melting Point, °C: decomposes 220 [MER06]

#### 2870

Compound: Sodium dithionate
Synonym: sodium hyposulfate
Formula: Na<sub>2</sub>(SO<sub>3</sub>)<sub>2</sub>
Molecular Formula: Na<sub>2</sub>O<sub>6</sub>S<sub>2</sub>
Molecular Weight: 206.108
CAS RN: 7631-94-9
Properties: prepared by reacting MnO<sub>2</sub> with SO<sub>2</sub> to form the product MnS<sub>2</sub>O<sub>6</sub>, then reacting this product with Na<sub>2</sub>CO<sub>3</sub> [MER06]
Solubility: g/100 g H<sub>2</sub>O: 7.83 (0°C), 17.38 (25°C), 64.74 (100°C); solid phase, Na<sub>2</sub>S<sub>2</sub>O<sub>6</sub> · 2H<sub>2</sub>O [KRU93]

### 2871

Compound: Sodium dithionate dihydrate Formula:  $Na_2S_2O_6 \cdot 2H_2O$ Molecular Formula:  $H_4Na_2O_8S_2$ Molecular Weight: 242.139 CAS RN: 7631-94-9 Properties: colorless; ortho-rhomb cryst; stable in air [MER06] Solubility:  $H_2O$ , w/w: 6.05% (0°C), 13.39% (20°C), 17.32 (30°C); i alcohol [MER06] Density, g/cm<sup>3</sup>: 2.189 [MER06] Reactions: minus 2H<sub>2</sub>O at 110°C; decomposes to  $Na_2SO_4 + SO_2$  at 267°C [MER06]

## 2872

**Compound:** Sodium ethoxide **Formula:** NaOC<sub>2</sub>H<sub>5</sub> **Molecular Formula:** C<sub>2</sub>H<sub>5</sub>NaO **Molecular Weight:** 68.05 **CAS RN:** 141-52-6 **Properties:** white-to-yellow [STR08]

# 2873

Compound: Sodium ferricyanide monohydrate Formula:  $Na_3Fe(CN)_6 \cdot H_2O$ Molecular Formula:  $C_6H_2FeN_6Na_3O$ Molecular Weight: 298.935 CAS RN: 14217-21-1 Properties: ruby red deliq cryst; used in the production of pigments, in dyeing and printing [HAW93] [MER06] Solubility: s 5.5 parts  $H_2O$ , 1.5 parts boiling  $H_2O$  [MER06]; i alcohol [HAW93]
Compound: Sodium ferrocyanide decahydrate Synonym: yellow prussiate of soda Formula:  $Na_4Fe(CN)_6 \cdot 10H_2O$ Molecular Formula:  $C_6H_{20}FeN_6Na_4O_{10}$ Molecular Weight: 484.063 CAS RN: 13601-19-9 Properties: pale yellow monocl cryst; somewhat efflorescent; steadily dehydrated >50°C [MER06] Solubility: H<sub>2</sub>O: 10.2% (1°C), 14.7% (17°C), 17.6% (25°C), 28.1% (53°C), 39% (85°C), 39.7% (96.6°C); i most organic solvents [MER06] Density, g/cm<sup>3</sup>: 1.458 [HAW93] Melting Point, °C: decomposes to NaCN, Fe, C, N<sub>2</sub> at 435 [MER06] Reactions: minus 10H<sub>2</sub>O at 81.5°C [MER06]

#### 2875

Compound: Sodium fluoride Synonym: villaumite Formula: NaF Molecular Formula: FNa Molecular Weight: 41.988 CAS RN: 7681-49-4

**Properties:** clear lustrous white powd, or 99.9% pure melted pieces of 3–6 mm; cub or tetr cryst; enthalpy of fusion 33.35 kJ/mol; can be prepared by reacting hydrofluoric acid with soda ash or NaOH; used to fluoridate municipal drinking water, in toothpastes, for cryolite manufacture, as windows in ultraviolet and infrared detectors, in the form of melted pieces used as evaporation material for low index films, and reflection diminishing coatings [MER06] [CER91] [CRC10]

Solubility: g/100 g soln, H<sub>2</sub>O: 3.53 (0°C), 3.98 (25°C), 4.83 (100°C); solid phase, NaF (0°C, 25°C) [KRU93]; i alcohol [MER06]
 Density, g/cm<sup>3</sup>: 2.78 [LID94]
 Melting Point, °C: 996 [CRC10]

Boiling Point, °C: 1704 [MER06]

# 2876

**Compound:** Sodium fluoroborate **Synonym:** sodium tetrafluoroborate **Formula:** NaBF<sub>4</sub> **Molecular Formula:** BF<sub>4</sub>Na **Molecular Weight:** 109.795 **CAS RN:** 13755-29-8

**Properties:** white powd; ortho-rhomb below 240°C, a=0.68358 nm, b=0.62619 nm, c=0.67916 nm; slowly decomposed by heat; can be prepared by reacting NaOH or Na<sub>2</sub>CO<sub>3</sub> with fluoroboric acid; used in sand casting of aluminum and magnesium [HAW93] [MER06] [KIR78] Solubility: g/100 mL H<sub>2</sub>O: 108 (26°C), 210 (100°C) [MER06]; s alcohol [KIR78] Density, g/cm<sup>3</sup>: 2.47 [MER06] Melting Point, °C: 384 [MER06]

#### 2877

Compound: Sodium fluorophosphate
Formula: Na<sub>2</sub>PO<sub>3</sub>F
Molecular Formula: FNa<sub>2</sub>O<sub>3</sub>P
Molecular Weight: 143.939
CAS RN: 10163-15-2
Properties: white powd; used in the preparation of bactericides and fungicides [HAW93] [STR93]
Solubility: s H<sub>2</sub>O [HAW93]
Melting Point, °C: ~625 [STR93]

# 2878

Compound: Sodium fluorosulfonate Formula: NaSO<sub>3</sub>F Molecular Formula: FNaO<sub>3</sub>S Molecular Weight: 122.052 CAS RN: 14483-63-7 Properties: shiny leaflets; hygr [KIR78] Solubility: s H<sub>2</sub>O, alcohol, acetone; i ether [KIR78] Melting Point, °C: decomposes [CRC10]

## 2879

Compound: Sodium formaldehyde sulfoxylate
Formula: NaHSO<sub>2</sub> · CH<sub>2</sub>O · 2H<sub>2</sub>O
Molecular Formula: CH<sub>7</sub>NaO<sub>5</sub>S
Molecular Weight: 154.120
CAS RN: 149-44-0
Properties: white solid; used as stripping and discharge agent for textiles [HAW93]
Solubility: s H<sub>2</sub>O, alcohol [HAW93]
Melting Point, °C: 64 [HAW93]

#### 2880

Compound: Sodium gold cyanide Synonym: gold sodium cyanide Formula: NaAu(CN)<sub>2</sub> Molecular Formula: C<sub>2</sub>AuN<sub>2</sub>Na Molecular Weight: 271.992 CAS RN: 15280-09-8 Properties: white cryst yellow powd; used for gold plating electronic components [HAW93] [MER06] Solubility: s H<sub>2</sub>O [MER06]

### 2881

**Compound:** Sodium gold thiosulfate dihydrate **Synonym:** gold sodium thiosulfate

Formula: Na<sub>3</sub>Au(S<sub>2</sub>O<sub>3</sub>)<sub>2</sub>·2H<sub>2</sub>O
Molecular Formula: AuH<sub>4</sub>Na<sub>3</sub>O<sub>8</sub>S<sub>4</sub>
Molecular Weight: 526.227
CAS RN: 10233-88-2
Properties: white; glistening cryst; needle like or prismatic; darkens slowly when exposed to light; aq solution decomposes on standing, and turns yellow [MER06]
Solubility: 1 gm/2 mL H<sub>2</sub>O; i alcohol [MER06]
Density, g/cm<sup>3</sup>: 3.09 [MER06]
Reactions: minus 2H<sub>2</sub>O at 150°C–160°C [MER06]

2882

Compound: Sodium hexachloroiridate(III) hydrate Formula: Na<sub>3</sub>IrCl<sub>6</sub>·xH<sub>2</sub>O Molecular Formula: Cl<sub>6</sub>IrNa<sub>3</sub> (anhydrous) Molecular Weight: 473.905 (anhydrous) CAS RN: 123334-23-6 Properties: greenish brown cryst; hygr [STR93] [ALD94]

#### 2883

Compound: Sodium hexachloroiridate(IV) hexahydrate Formula:  $Na_2IrCl_6 \cdot 6H_2O$ Molecular Formula:  $Cl_6H_{12}IrNa_2O_6$ Molecular Weight: 559.004 CAS RN: 19567-78-3 Properties: reddish black powd; hygr [STR93] Solubility: g/100 g H<sub>2</sub>O: 34.46 (15°C), 56.17 (30°C), 279.3 (80°C) [LAN05] Melting Point, °C: 600, decomposes [STR93]

#### 2884

Compound: Sodium hexachloroosmiate(IV) hydrate Formula: Na<sub>2</sub>OsCl<sub>6</sub>·xH<sub>2</sub>O Molecular Formula: Cl<sub>6</sub>Na<sub>2</sub>Os (anhydrous) Molecular Weight: 448.926 (anhydrous) CAS RN: 1307-81-9 Properties: reddish orange powd; hygr; x<2 [STR93] [ALD94]

## 2885

**Compound:** Sodium hexachloropalladate(IV) **Formula:** Na<sub>2</sub>PdCl<sub>6</sub> **Molecular Formula:** Cl<sub>6</sub>Na<sub>2</sub>Pd **Molecular Weight:** 365.116 **CAS RN:** 53823-60-2 **Properties:** reddish orange cryst; hygr [STR93]

### 2886

**Compound:** Sodium hexachloroplatinate(IV) **Formula:** Na<sub>2</sub>PtCl<sub>6</sub> Molecular Formula: Cl<sub>6</sub>Na<sub>2</sub>Pt Molecular Weight: 453.776 CAS RN: 1307-82-0 Properties: yellow cryst; hygr; readily forms hexahydrate in moist air at 25°C when relative humidity >50% [MER06] Solubility: s H<sub>2</sub>O, alcohol [MER06]

#### 2887

Compound: Sodium hexachloroplatinate(IV) hexahydrate Formula: Na<sub>2</sub>PtCl<sub>6</sub>·6H<sub>2</sub>O Molecular Formula: Cl<sub>6</sub>H<sub>12</sub>Na<sub>2</sub>O<sub>6</sub>Pt Molecular Weight: 561.867 CAS RN: 19583-77-8 Properties: orange powd; hygr [STR93]

#### 2888

**Compound:** Sodium hexachlororhodate(III) hydrate **Formula:** Na<sub>3</sub>RhCl<sub>6</sub>·xH<sub>2</sub>O **Molecular Formula:** Cl<sub>6</sub>Na<sub>3</sub>Rh (anhydrous) **Molecular Weight:** 384.591 (anhydrous) **CAS RN:** 14972-70-4 **Properties:** red cryst; hygr [AES93] [STR93] **Melting Point,** °C: 900 decomposes [AES93]

#### 2889

Compound: Sodium hexafluoroaluminate Synonym: cryolite Formula: Na<sub>3</sub>AlF<sub>6</sub> Molecular Formula: AlF<sub>6</sub>Na<sub>3</sub> Molecular Weight: 209.941 CAS RN: 13775-53-6 Properties: white powd or melted pieces; liq vapor pressure 253 Pa (1012°C); monocl, a = 0.546 nm, b = 0.561 nm, c = 0.780 nm;enthalpy of vaporization 225 kJ/mol; hardness 2.5 Mohs; electrical conductivity of liq (1012°C) 2.82 (ohm  $\cdot$  cm)<sup>-1</sup>; viscosity of liq  $6.7 \text{ mPa} \cdot \text{s}$  (1012°C); enthalpy of transition 8.21 kJ/mol (565°C); used in the molten form to dissolve Al<sub>2</sub>O<sub>3</sub> in the manufacture of aluminum [KIR78] [CIC73] [STR93] [CER91] Solubility: g/100 g H<sub>2</sub>O: 0.042 (25°C), 0.135 (100°C) [CIC73] Density, g/cm<sup>3</sup>: monocl: 2.97; cub (560°C): 2.77; liq: 2.087 [KIR78] Melting Point, °C: 1012 [KIR78] Reactions: transition from monocl to cub at 565°C [KIR78]

**Compound:** Sodium hexafluoroantimonate(V) **Formula:** NaSbF<sub>6</sub> **Molecular Formula:** F<sub>6</sub>NaSb **Molecular Weight:** 258.740 **CAS RN:** 16925-25-0 **Properties:** white powd [STR93] **Density, g/cm<sup>3</sup>:** 3.375 [STR93]

## 2891

**Compound:** Sodium hexafluoroarsenate **Formula:** NaAsF<sub>6</sub> **Molecular Formula:** AsF<sub>6</sub>Na **Molecular Weight:** 211.902 **CAS RN:** 12005-86-6 **Properties:** white powd [STR93]

## 2892

**Compound:** Sodium hexafluoroferrate(III) **Formula:** Na<sub>3</sub>FeF<sub>6</sub> **Molecular Formula:** F<sub>6</sub>FeNa<sub>3</sub> **Molecular Weight:** 238.806 **CAS RN:** 20955-11-7 **Properties:** off-white to green [STR93]

#### 2893

Compound: Sodium hexafluorogermanate Formula: Na<sub>2</sub>GeF<sub>6</sub> Molecular Formula: F<sub>6</sub>GeNa<sub>2</sub> Molecular Weight: 232.580 CAS RN: 36470-39-0 Properties: white powd [STR93] Solubility: g/100 g H<sub>2</sub>O: 1.52 (0°C), 2.25 (30°C), 3.36 (80°C) [LAN05]

# 2894

**Compound:** Sodium hexafluorophosphate **Formula:** NaPF<sub>6</sub> **Molecular Formula:** F<sub>6</sub>NaP **Molecular Weight:** 167.954 **CAS RN:** 21324-39-0 **Properties:** white cryst; hygr [STR93] **Density, g/cm<sup>3</sup>:** 2.369 [ALD94]

#### 2895

**Compound:** Sodium hexafluorosilicate **Formula:** Na<sub>2</sub>SiF<sub>6</sub> **Molecular Formula:** F<sub>6</sub>Na<sub>2</sub>Si **Molecular Weight:** 188.056

## CAS RN: 16893-85-9

Properties: white granular powd; odorless, tasteless, free flowing; prepared from H<sub>2</sub>SiF<sub>6</sub> and Na<sub>2</sub>CO<sub>3</sub> or NaCl; used in fluoridation, in laundry soaps and for mothproofing woolens [HAW93] [MER06]
Solubility: g/100 g H<sub>2</sub>O: 4.35 (0°C), 7.2 (20°C), 24.5 (100°C) [LAN05]; i alcohol [MER06]
Density, g/cm<sup>3</sup>: 2.679 [STR93]
Melting Point, °C: melts at red heat, decomposing [MER06]

# 2896

**Compound:** Sodium hexafluorostannate(IV) **Formula:** Na<sub>2</sub>SnF<sub>6</sub> **Molecular Formula:** F<sub>6</sub>Na<sub>2</sub>Sn **Molecular Weight:** 278.680 **CAS RN:** 16924-51-9 **Properties:** white powd [STR93]

#### 2897

**Compound:** Sodium hexafluorotitanate **Formula:**  $Na_2TiF_6$ **Molecular Formula:**  $F_6Na_2Ti$ **Molecular Weight:** 207.837 **CAS RN:** 17116-13-1 **Properties:** white powd [STR93]

## 2898

**Compound:** Sodium hexafluorozirconate Formula:  $Na_2ZrF_6$ Molecular Formula:  $F_6Na_2Zr$ Molecular Weight: 251.194 CAS RN: 16925-26-1 Properties: white powd [STR93]

#### 2899

**Compound:** Sodium hexametaphosphate **Synonym:** Graham's salt **Formula:** (NaPO<sub>3</sub>)<sub>6</sub> **Molecular Formula:** Na<sub>6</sub>O<sub>18</sub>P<sub>6</sub> **Molecular Weight:** 611.771 **CAS RN:** 10124-56-8 **Properties:** white powd [STR93]

## 2900

**Compound:** Sodium hexanitritocobalt(III) **Synonym:** sodium cobaltinitrite **Formula:** Na<sub>3</sub>Co(NO<sub>2</sub>)<sub>6</sub> **Molecular Formula:** CoN<sub>6</sub>Na<sub>3</sub>O<sub>12</sub> **Molecular Weight:** 403.935 CAS RN: 14649-73-1

Properties: yellow to brownish yellow; cryst powd; decomposed by mineral acids [MER06]Solubility: v s H<sub>2</sub>O; sl s alcohol [MER06]

#### 2901

Compound: Sodium hydride Formula: NaH Molecular Formula: HNa Molecular Weight: 23.998 CAS RN: 7646-69-7 Properties: silvery needles; commercial material is grayish white powd; reacts explosively with H<sub>2</sub>O, vigorously with lower alcohols; ignites when

standing in moist air; manufactured by reaction of H<sub>2</sub> with molten sodium metal which has been dispersed in mineral oil [KIR80] [MER06]
Solubility: s molten NaOH; i liq NH<sub>3</sub> [MER06]
Density, g/cm<sup>3</sup>: 1.396 [MER06]

Melting Point, °C: 425 with decomposition [MER06]

## 2902

Compound: Sodium hydrogen arsenate Formula:  $Na_2HAsO_4$ Molecular Formula:  $AsHNa_2O_4$ Molecular Weight: 185.908 CAS RN: 7778-43-0 Properties: powd [MER06] Solubility: g/100 g soln, H<sub>2</sub>O: 5.59 (0.1°C), 29.33 (25°C), 66.5 (98.5°C); solid phase,  $Na_2HAsO_4 \cdot 12H_2O$ (0.1°C),  $Na_2HAsO_4 \cdot 7H_2O$  (25°C),  $Na_2HAsO_4$ (98.5°C) [KRU93]; sl s alcohol [MER06]

## 2903

Compound: Sodium hydrogen arsenate heptahydrate
Formula: Na<sub>2</sub>HAsO<sub>4</sub>·7H<sub>2</sub>O
Molecular Formula: AsH<sub>15</sub>Na<sub>2</sub>O<sub>11</sub>
Molecular Weight: 312.014
CAS RN: 10048-95-0
Properties: odorless cryst; effloresces in warm air; has been used as antimalarial dermatologic [MER06]
Solubility: s in 1.3 parts H<sub>2</sub>O; s glycerol; sl s alcohol [MER06]
Density, g/cm<sup>3</sup>: 1.87 [MER06]
Melting Point, °C: 57 [MER06]
Reactions: minus 5H<sub>2</sub>O ~50°C, becomes anhydrous at 100°C [MER06]

### 2904

**Compound:** Sodium hydrogen carbonate **Synonym:** sodium bicarbonate

Formula: NaHCO<sub>3</sub>
Molecular Formula: CHNaO<sub>3</sub>
Molecular Weight: 84.007
CAS RN: 144-55-8
Properties: white cryst powd or granules; readily decomposed by weak acids [MER06]
Solubility: g/100 g soln, H<sub>2</sub>O: 6.48 (0°C), 9.32 (25°C), 19.1 (100°C); solid phase, NaHCO<sub>3</sub> [KRU93]; i alcohol [MER06]
Density, g/cm<sup>3</sup>: 2.159 [ALD94]
Reactions: minus CO<sub>2</sub> ~50°C, forms Na<sub>2</sub>CO<sub>3</sub> at 100°C [MER06]

## 2905

Compound: Sodium hydrogen fluoride Synonym: sodium bifluoride Formula: NaHF<sub>2</sub> Molecular Formula: F<sub>2</sub>HNa Molecular Weight: 61.995 CAS RN: 1333-83-1 Properties: white cryst powd [MER06] Solubility: g/100 g soln in H<sub>2</sub>O: 3.7 (20°C), 16.4 (80°C) [KIR78] Density, g/cm<sup>3</sup>: 2.08 [LID94] Melting Point, °C: decomposes above 160 [KIR78]

#### 2906

**Compound:** Sodium hydrogen oxalate monohydrate **Formula:**  $NaHC_2O_4 \cdot H_2O$ **Molecular Formula:**  $C_2H_3NaO_5$ **Molecular Weight:** 130.033 **CAS RN:** 1186-49-8 **Properties:** white powd [STR93]

## 2907

Compound: Sodium hydrogen phosphate
Formula: Na<sub>2</sub>HPO<sub>4</sub>
Molecular Formula: HNa<sub>2</sub>O<sub>4</sub>P
Molecular Weight: 141.959
CAS RN: 7558-79-4
Properties: hygr powd; absorbs from 2 to 7 moles H<sub>2</sub>O from atm, depending on humidity and temp [MER06]
Solubility: g/100 g H<sub>2</sub>O: 1.6 (0°C), 11.8 (25°C), 103.3 (100°C); solid phase, α-Na<sub>2</sub>HPO<sub>4</sub> · 12H<sub>2</sub>O (0°C, 25°C), Na<sub>2</sub>HPO<sub>4</sub> (100°) [KRU93]
Density, g/cm<sup>3</sup>: 1.679 [STR93]

### 2908

**Compound:** Sodium hydrogen phosphate dodecahydrate **Formula:**  $Na_2HPO_4 \cdot 12H_2O$  Molecular Formula: H<sub>25</sub>Na<sub>2</sub>O<sub>16</sub>P Molecular Weight: 358.143 CAS RN: 10039-32-4 **Properties:** translucent cryst or granules; minus 5H<sub>2</sub>O at ambient atm conditions [MER06] **Solubility:** s 3 parts H<sub>2</sub>O; i alcohol [MER06] **Density, g/cm<sup>3</sup>:** ~1.5 [MER06] Melting Point, °C: 34–35 [MER06]

#### 2909

Compound: Sodium hydrogen phosphate heptahydrate **Formula:**  $Na_2HPO_4 \cdot 7H_2O$ Molecular Formula: H<sub>15</sub>Na<sub>2</sub>O<sub>11</sub>P Molecular Weight: 268.066 CAS RN: 7782-85-6 Properties: cryst or granular powd; stable in air [MER06] Solubility: s 4 parts H<sub>2</sub>O, more s in boiling H<sub>2</sub>O; i alcohol [MER06] Density, g/cm<sup>3</sup>: ~1.7 [MER06]

#### 2910

Compound: Sodium hydrogen phosphite pentahydrate Formula: Na<sub>2</sub>HPO<sub>3</sub>·5H<sub>2</sub>O Molecular Formula: H<sub>11</sub>Na<sub>2</sub>O<sub>8</sub>P Molecular Weight: 216.036 CAS RN: 13708-85-5 Properties: white; hygr; cryst powd; used as an antidote to mercuric chloride poisoning [HAW93] [MER06] **Solubility:** g anhydrous/100 g  $H_2O$ : 418 (0°C), 429 (20°C), 566 (30°C) [LAN05]; i alcohol [HAW93] Melting Point, °C: 53 [HAW93] Boiling Point, °C: 200–250, decomposes [HAW93]

#### 2911

Compound: Sodium hydrogen sulfate Synonym: niter cake Formula: NaHSO<sub>4</sub> **Molecular Formula:** HNaO<sub>4</sub>S Molecular Weight: 120.062 CAS RN: 7681-38-1 Properties: fused hygr; tricl [KIR82] [MER06] **Solubility:** s in 2 parts H<sub>2</sub>O, 1 part boiling H<sub>2</sub>O; decomposes in alcohol to sodium sulfate and H<sub>2</sub>SO<sub>4</sub> [MER06] Density, g/cm<sup>3</sup>: 2.435 [MER06] Melting Point, °C: ~315 [MER06]

## 2912

**Compound:** Sodium hydrogen sulfate monohydrate Synonym: sodium bisulfate monohydrate Formula: NaHSO<sub>4</sub>·H<sub>2</sub>O

Molecular Formula: H<sub>3</sub>NaO<sub>5</sub>S Molecular Weight: 138.077 CAS RN: 10034-88-5 Properties: cryst; forms pyrosulfate if heated strongly [MER06] Solubility: s ~0.8 parts H<sub>2</sub>O; decomposed by alcohol [MER06] Density, g/cm<sup>3</sup>: 2.10 [LID94]

## 2913

**Compound:** Sodium hydrogen sulfide Synonym: sodium hydrosulfide Formula: NaHS Molecular Formula: HNaS Molecular Weight: 56.064 CAS RN: 16721-80-5 Properties: white to colorless; hydrogen sulfide odor; enthalpy of solution is 15.9 kJ/mol; cub cryst; very hygr; hydrolyzed in moist air to Na<sub>2</sub>S and NaOH; color changed by heating in dry air: yellow, then orange as the temp increases [MER06] [KIR83] Solubility: s H<sub>2</sub>O, alcohol, ether [MER06] Density, g/cm<sup>3</sup>: 1.79 [MER06] Melting Point, °C: 350, becomes black liq [MER06]

#### 2914

Compound: Sodium hydrogen sulfide dihydrate Synonym: sodium bisulfide Formula: NaHS · 2H<sub>2</sub>O Molecular Formula: H<sub>5</sub>NaO<sub>2</sub>S Molecular Weight: 92.095 CAS RN: 16721-80-5 Properties: lemon colored needle or flake forms; used in paper pulping and dyestuff processing [MER06] [HAW93] **Solubility:** v s H<sub>2</sub>O, alcohol, ether [MER06] Melting Point, °C: 55 [MER06]

#### 2915

Compound: Sodium hydrogen sulfide trihydrate Formula: NaHS · 3H<sub>2</sub>O Molecular Formula: H<sub>7</sub>NaO<sub>3</sub>S Molecular Weight: 110.110 CAS RN: 16721-80-5 Properties: shiny; rhomb [MER06] Melting Point, °C: 22 [MER06]

#### 2916

**Compound:** Sodium hydrogen sulfite Synonym: sodium bisulfite

Formula: NaHSO<sub>3</sub>
Molecular Formula: HNaO<sub>3</sub>S
Molecular Weight: 104.062
CAS RN: 7631-90-5
Properties: white; cryst powd; gradually oxidized to sulfate in air; has SO<sub>2</sub> odor [MER06]
Solubility: s 3.5 parts cold H<sub>2</sub>O, 2 parts boiling water, in ~70 parts alcohol [MER06]
Density, g/cm<sup>3</sup>: 1.48 [MER06]

## 2917

Compound: Sodium hydrogen tartrate monohydrate
Formula: NaHC<sub>4</sub>H<sub>4</sub>O<sub>6</sub> · H<sub>2</sub>O
Molecular Formula: C<sub>4</sub>H<sub>7</sub>NaO<sub>7</sub>
Molecular Weight: 190.086
CAS RN: 868-18-8
Properties: white cryst [MER06]
Solubility: s in ~9 parts H<sub>2</sub>O, 2 parts boiling H<sub>2</sub>O; i alcohol [MER06]

# 2918

Compound: Sodium hydrosulfite
Synonym: sodium dithionite
Formula: Na<sub>2</sub>S<sub>2</sub>O<sub>4</sub>
Molecular Formula: Na<sub>2</sub>O<sub>4</sub>S<sub>2</sub>
Molecular Weight: 174.110
CAS RN: 7775-14-6
Properties: white or grayish white; cryst powd; oxidizes in air to bisulfite and bisulfate, more quickly oxidized in moist atm [MER06]
Solubility: v s H<sub>2</sub>O; sl s alcohol [MER06]
Melting Point, °C: 55, decomposes [HAW93]

# 2919

Compound: Sodium hydroxide Synonyms: caustic soda, soda lye Formula: NaOH Molecular Formula: HNaO Molecular Weight: 39.997 CAS RN: 1310-73-2 Properties: white, deliq solid; fused solid; absorbs both CO<sub>2</sub> and H<sub>2</sub>O from the atm; enthalpy of vaporization 175 kJ/mol; enthalpy of fusion 6.60 kJ/mol [CRC10] [HAW93] [MER06] **Solubility:** g/100 g soln, H<sub>2</sub>O: 29.6 (0°C), 53.3 (25°C), 77.6 (100°C) [KRU93]; 1 g dissolves in: 7.2 mL absolute alcohol, 4.2 mL methanol; s glycerol [MER06] Density, g/cm<sup>3</sup>: 2.13 [MER06] Melting Point, °C: 323 [CRC10] Boiling Point, °C: 1390 [STR93]

## 2920

**Compound:** Sodium hydroxide monohydrate **Formula:** NaOH·H<sub>2</sub>O **Molecular Formula:** H<sub>3</sub>NaO<sub>2</sub> **Molecular Weight:** 58.013 **CAS RN:** 12179-02-1 **Properties:** white powd; hygr [STR93]

#### 2921

Compound: Sodium hypochlorite
Formula: NaClO
Molecular Formula: ClNaO
Molecular Weight: 74.442
CAS RN: 7681-52-9
Properties: very explosive; used to bleach wood
pulp and textiles, is a disinfectant for municipal
water and sewage, prevents the formation of
fungi in oil production [KIR78] [MER06]
<b>Solubility:</b> g/100 g soln, H <sub>2</sub> O: 22.7 (0°C), 44.0
(24.5°C); solid phase, NaClO · 5H <sub>2</sub> O [KRU93]
Density, g/cm <sup>3</sup> : 1.097 [ALD94]

## 2922

Compound: Sodium hypochlorite pentahydrate
Formula: NaOCl·5H<sub>2</sub>O
Molecular Formula: ClH<sub>10</sub>NaO<sub>6</sub>
Molecular Weight: 164.518
CAS RN: 7681-52-9
Properties: pale greenish color; cryst; very unstable; decomposed by atm CO<sub>2</sub>; used to bleach paper pulp, textiles [HAW93] [MER06]
Solubility: 29.3 g/100 mL H<sub>2</sub>O (0°C) [MER06], 94.2 g/100 mL H<sub>2</sub>O (23°C) [CRC10]
Density, g/cm<sup>3</sup>: 1.6 [LID94]
Melting Point, °C: 18 [MER06]

#### 2923

Compound: Sodium hypophosphate decahydrate Formula:  $Na_4P_2O_6 \cdot 10H_2O$ Molecular Formula:  $H_{20}Na_4O_{16}P_2$ Molecular Weight: 430.056 CAS RN: 13721-43-2 Properties: colorless or white cryst [MER06] Solubility: 1.49 g/100 mL H<sub>2</sub>O (25°C), 5.46 g/100 mL H<sub>2</sub>O (60°C) [CRC10] Density, g/cm<sup>3</sup>: 1.823 [CRC10] Melting Point, °C: decomposes [CRC10]

#### 2924

**Compound:** Sodium hypophosphite monohydrate **Formula:**  $NaH_2PO_2 \cdot H_2O$ 

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# Molecular Formula: H<sub>4</sub>NaO<sub>3</sub>P Molecular Weight: 105.994 CAS RN: 123333-67-5 Properties: white, odorless; deliq; evolves flammable phosphine when heated strongly; strong reducing agent, e.g., explodes when triturated with chlorates or other oxidizing

agents; used as reducing agent in the electroless plating of nickel onto plastics [MER06] **Solubility:** 100 g/100 g H<sub>2</sub>O [KRU93];

s 1 part H<sub>2</sub>O, 0.15 parts boiling H<sub>2</sub>O; s cold alcohol; i ether [MER06] Melting Point, °C: decomposes [STR93]

2925

**Compound:** Sodium iodate **Formula:** NaIO<sub>3</sub> **Molecular Formula:** INaO<sub>3</sub> **Molecular Weight:** 197.892

CAS RN: 7681-55-2

- **Properties:** white, cryst powd; oxidizing agent; can be prepared by electrochemical oxidation of NaI; used as an antiseptic, disinfectant, feed additive [HAW93] [MER06] [KIR81]
- Solubility: g/100 g soln, H<sub>2</sub>O: 2.42 (0°C), 8.62 (25°C), 24.8 (100°C); solid phase, NaIO<sub>3</sub> · 5H<sub>2</sub>O (0°C), NaIO<sub>3</sub> · H<sub>2</sub>O (25°C), NaIO<sub>3</sub> (100°C) [KRU93]; i alcohol [MER06] Density, g/cm<sup>3</sup>: 4.277 [STR93]

Melting Point, °C: decomposes [STR93]

## 2926

Compound: Sodium iodide Formula: NaI Molecular Formula: INa Molecular Weight: 149.894

CAS RN: 7681-82-5

Properties: white deliq cub cryst or granules; gradually absorbs up to ~5% H<sub>2</sub>O from moist atm; iodine slowly evolved, imparting brown coloration; enthalpy of fusion 23.60 kJ/mol; preparation: from a reaction between acidic iodide solution and NaOH or Na<sub>2</sub>CO<sub>3</sub>; uses: in photography, as a solvent for iodine, in cloud seeding [HAW93] [MER06] [CRC10]

Solubility: g/100 g soln, H<sub>2</sub>O: 61.54 (0°C), 64.76 (25°C), 75.14 (100°C); solid phase, NaI · 2H<sub>2</sub>O (0°C, 25°C), NaI (100°C) [KRU93]; 1 g dissolves in ~2 mL alcohol, 1 mL glycerol; s acetone [MER06]
Density, g/cm<sup>3</sup>: 3.667 [KIR82]
Melting Point, °C: 660 [CRC10]

Boiling Point, °C: 1304 [KIR82]

## 2927

Compound: Sodium iodide dihydrate Formula: NaI  $\cdot$  2H<sub>2</sub>O Molecular Formula: H<sub>4</sub>INaO<sub>2</sub> Molecular Weight: 185.925 CAS RN: 13517-06-1 Properties: white, cub cryst or powd [HAW93] Solubility: 318 g/100 mL H<sub>2</sub>O (0°C), 1550 g/100 mL H<sub>2</sub>O (100°C) [CRC10] Density, g/cm<sup>3</sup>: 2.448 [HAW93] Melting Point, °C: 752 [CRC10]

#### 2928

Compound: Sodium metabismuthate
Synonym: sodium bismuthate
Formula: NaBiO<sub>3</sub>
Molecular Formula: BiNaO<sub>3</sub>
Molecular Weight: 279.968
CAS RN: 12232-99-4
Properties: yellow to yellowish brown powd; somewhat hygr; slowly decomposes when stored, decomposition accelerated by moisture and high temp [MER06]
Solubility: i cold H<sub>2</sub>O, decomposed in hot H<sub>2</sub>O evolving oxygen; evolves chlorine with HC1 [MER06]

## 2929

Compound: Sodium metabisulfite Synonym: sodium pyrosulfite Formula: Na<sub>2</sub>S<sub>2</sub>O<sub>5</sub> Molecular Formula: Na<sub>2</sub>O<sub>5</sub>S<sub>2</sub> Molecular Weight: 190.109 CAS RN: 7681-57-4 Properties: white; cryst or powd; has odor of SO<sub>2</sub>; used as a food preservative [HAW93] [MER06] Solubility: 54 g/100 mL H<sub>2</sub>O (20°C), 82 g/100 mL H<sub>2</sub>O (100°C) [CRC10] Density, g/cm<sup>3</sup>: 1.48 [ALD94] Melting Point, °C: decomposes >150 [CRC10]

#### 2930

Compound: Sodium metaborate
Formula: NaBO<sub>2</sub>
Molecular Formula: BNaO<sub>2</sub>
Molecular Weight: 65.800
CAS RN: 7775-19-1
Properties: white pieces or powd; enthalpy of fusion 36.20 kJ/mol; used as an herbicide [HAW93] [CRC10] [MER06]
Solubility: g/100 g soln, H<sub>2</sub>O: 14.10 (0°C), 22.00 (25°C), 55.60 (100°C); solid phase, NaBO<sub>2</sub> · 4H<sub>2</sub>O

 $(0^{\circ}C, 25^{\circ}C)$ , NaBO<sub>2</sub>·2H<sub>2</sub>O (100°C) [KRU93]

Density, g/cm<sup>3</sup>: 2.464 [HAW93] Melting Point, °C: 966 [CRC10] Boiling Point, °C: 1434 [HAW93]

## 2931

**Compound:** Sodium metaborate dihydrate Formula:  $NaBO_2 \cdot 2H_2O$ Molecular Formula:  $BH_4NaO_4$ Molecular Weight: 101.831 CAS RN: 35585-58-1

- **Properties:** tricl; can be prepared by heating slurry of tetrahydrate above 54°C; stable phase for saturated solutions from 54 to 105°C; a hemihydrate forms at higher temperatures; absorbs atm CO<sub>2</sub> forming borax and sodium carbonate [KIR78]
- **Solubility:** % anhydrous in H<sub>2</sub>O: 14.82 (60°C), 19.88 (80°C), 28.22 (100°C); 0.3% in boiling alcohol [KIR78] **Density, g/cm<sup>3</sup>:** 1.91 [KIR78]

Melting Point, °C: 90–95 [KIR78]

## 2932

**Compound:** Sodium metaborate tetrahydrate **Formula:** NaBO<sub>2</sub>·4H<sub>2</sub>O **Molecular Formula:** BH<sub>8</sub>NaO<sub>6</sub> **Molecular Weight:** 137.861

CAS RN: 10555-76-7

- **Properties:** tricl; readily obtained by cooling solution of borax and a calculated amount of NaOH; absorbs atm CO<sub>2</sub>, forming borax and sodium carbonate; stable phase in saturated solution from 11.5°C to 53.6°C, stable phase above 53.6°C is the dihydrate [KIR78]
- **Solubility:** % anhydrous in H<sub>2</sub>O soln: 14.5 (0°C), 21.7 (25°C), 34.1 (50°C); solubility in methanol is 26.4% (40°C) [KIR78]

Density, g/cm<sup>3</sup>: 1.74 [KIR78]

Melting Point, °C: ~54 melts in waters of hydration [KIR78]

Reactions: minus H<sub>2</sub>O 120°C [CRC10]

## 2933

Compound: Sodium metagermanate Formula: Na<sub>2</sub>GeO<sub>3</sub> Molecular Formula: GeNa<sub>2</sub>O<sub>3</sub> Molecular Weight: 166.588 CAS RN: 12025-19-3 Properties: white, monocl, deliq [CRC10] Solubility: g/100 g H<sub>2</sub>O: 14.4 (0°C), 23.8 (20°C), 116 (80°C) [LAN05] Density, g/cm<sup>3</sup>: 3.31 [CRC10] Melting Point, °C: 1083 [CRC10]

## 2934

Compound: Sodium metaniobate heptahydrate
Formula: Na<sub>2</sub>Nb<sub>2</sub>O<sub>6</sub> · 7H<sub>2</sub>O
Molecular Formula: H<sub>14</sub>Na<sub>2</sub>Nb<sub>2</sub>O<sub>13</sub>
Molecular Weight: 453.895
CAS RN: 67211-31-8
Properties: colorless tricl; obtained from niobium pentoxide and sodium hydroxide or sodium carbonate [KIR81]
Solubility: sl s H<sub>2</sub>O [HAW93]
Density, g/cm<sup>3</sup>: 4.512–4.559 [CRC10]
Reactions: minus H<sub>2</sub>O 100°C [CRC10]

#### 2935

Compound: Sodium metasilicate Formula: Na<sub>2</sub>SiO<sub>3</sub> Molecular Formula: Na2O3Si Molecular Weight: 122.064 CAS RN: 6834-92-0 Properties: white powd; bead shaped with uniform particle size; hygr; normally in the form of a glass or ortho-rhomb cryst; enthalpy of fusion 52.2 kJ/mol; the nonahydrate  $Na_2SiO_3 \cdot 9H_2O$ is ortho-rhomb, efflorescent, melts at 48°C in its waters of cryst, has enthalpy of hydration of -101.04 kJ/mol; normally prepared by fusion of sand (SiO<sub>2</sub>) and soda ash (Na<sub>2</sub>CO<sub>3</sub>); used for cleaning laundry, dairy and metals, for floor cleaning [HAW93] [MER06] [STR93] [OXY93] Solubility: parts/100 parts soln, H<sub>2</sub>O: 15.8 (20°C), 15.6 (35°C), 36.1 (45°C), 46.5 (55°C), 48.3 (60°C), 52.4 (70°C); i alcohol, acids, salt solutions [OXY93] [MER06] Density, g/cm<sup>3</sup>: 2.614 [MER06] Melting Point, °C: 1089 [MER06]

#### 2936

Compound: Sodium metasilicate pentahydrate
Formula: Na<sub>2</sub>SiO<sub>3</sub> · 5H<sub>2</sub>O
Molecular Formula: H<sub>10</sub>Na<sub>2</sub>O<sub>8</sub>Si
Molecular Weight: 212.140
CAS RN: 13517-24-3
Properties: white powd; uniform particle size; enthalpy of fusion 30.5 kJ/mol; manufactured in brick furnace at 1300°C by fusing sand and soda ash, followed by removal of glass; used in the form of liq solutions for

numerous applications such as in coatings, adhesives and cements, gels and catalysts [STR93] [OXY93] **Solubility:** parts/100 parts soln in H<sub>2</sub>O: 27.5 (20°C), 44.5 (35°C), 62.8 (45°C), 80.9 (55°C),

84.0 (60°C), 91.2 (70°C) [OXY93]

Melting Point, °C: 72.2 [OXY93]

Compound: Sodium metatantalate Formula: NaTaO<sub>3</sub> Molecular Formula: NaO<sub>3</sub>Ta Molecular Weight: 251.936 CAS RN: 12034-15-0 Properties: white powd, -100 mesh of 99.9% purity [CRC10] [STR93]

# 2938

Compound: Sodium metavanadate
Formula: NaVO<sub>3</sub>
Molecular Formula: NaO<sub>3</sub>V
Molecular Weight: 121.930
CAS RN: 13718-26-8
Properties: -200 mesh with 99.9% purity; colorless, monocl, or pale green cryst powd; used in inks, and in fur dyeing [CER91] [HAW93]
Solubility: 21.1 g/100 mL H<sub>2</sub>O (25°C), 38.8 g/100 mL H<sub>2</sub>O (75°C) [CRC10]
Melting Point, °C: 630 [STR93]

# 2939

**Compound:** Sodium molybdate **Formula:** Na<sub>2</sub>MoO<sub>4</sub> **Molecular Formula:** MoNa<sub>2</sub>O<sub>4</sub> **Molecular Weight:** 205.918 **CAS RN:** 7631-95-0

Properties: white to off-white powd; small, lustrous, cryst plates; prepared by evaporation of aq solution of molybdic oxide and sodium hydroxide to form the dihydrate, followed by heating at 100°C; used in pigments and metal finishing, and to inhibit corrosion in aq media [KIR81] [HAW93] [STR93]
Solubility: g/100 g soln, H<sub>2</sub>O: 30.62 (0°C), 39.40 (25°C), 45.52 (100°C); solid phase, Na<sub>2</sub>MoO<sub>4</sub> · 10H<sub>2</sub>O (0°C), Na<sub>2</sub>MoO<sub>4</sub> · 2H<sub>2</sub>O (25°C, 100°C) [KRU93]
Density, g/cm<sup>3</sup>: 3.28 [STR93]
Melting Point, °C: 687 [STR93]

#### 2940

Compound: Sodium molybdate dihydrate Formula: Na<sub>2</sub>MoO<sub>4</sub> · 2H<sub>2</sub>O Molecular Formula: H<sub>4</sub>MoNa<sub>2</sub>O<sub>6</sub> Molecular Weight: 241.948 CAS RN: 10102-40-6 Properties: cryst powd [MER06] Solubility: s 1.7 parts cold H<sub>2</sub>O, ~0.7 parts boiling H<sub>2</sub>O [MER06] Density, g/cm<sup>3</sup>: 3.28 [STR93] Reactions: minus 2H<sub>2</sub>O 100°C [CRC10]

### 2941

Compound: Sodium molybdosilicate hydrate Formula: Na<sub>4</sub>SiMo<sub>12</sub>O<sub>40</sub>·xH<sub>2</sub>O Molecular Formula: Mo<sub>12</sub>Na<sub>4</sub>O<sub>40</sub>Si (anhydrous) Molecular Weight: 1911.301 (anhydrous) CAS RN: 103443-51-2 Properties: yellow cryst; used as a catalyst [HAW93] Solubility: s H<sub>2</sub>O, acetone, alcohol, ethyl acetate; i ether, benzene, cyclohexane [HAW93] Density, g/cm<sup>3</sup>: 3.44 [HAW93]

#### 2942

Compound: Sodium niobate Formula: NaNbO<sub>3</sub> Molecular Formula: NaNbO<sub>3</sub> Molecular Weight: 163.894 CAS RN: 12034-09-2 Properties: -100 mesh with 99.9% purity; white powd [CER91] [STR93] Density, g/cm<sup>3</sup>: 4.55 [LID94] Melting Point, °C: 1422 [AES93]

#### 2943

Compound: Sodium nitrate Synonym: niter Formula: NaNO<sub>2</sub> Molecular Formula: NNaO<sub>3</sub> Molecular Weight: 84.995 CAS RN: 7631-99-4 Properties: colorless transparent trigonal cryst, white granules or powd; delig; enthalpy of fusion 15.00 kJ/mol; preparation: extraction from ore by brine at 70°C, followed by crystallization [KIR82] [MER06] [CRC10] Solubility: g/100 g H<sub>2</sub>O: 73.0 (0°C), 87.6 (20°C), 180 (100°C) [LAN05]; 1 g dissolves in: 125 mL alcohol, 52 mL boiling alcohol; 3470 mL absolute alcohol; 300 mL absolute methanol [MER06] Density, g/cm<sup>3</sup>: 2.261 [STR93] Melting Point, °C: 307 [CRC10] Boiling Point, °C: explodes at 537 [HAW93] Thermal Expansion Coefficient: (volume) 100°C (1.076), 200°C (2.74) [CLA66]

# 2944

**Compound:** Sodium nitrite **Formula:** NaNO<sub>2</sub> **Molecular Formula:** NNaO<sub>2</sub> **Molecular Weight:** 68.996 **CAS RN:** 7632-00-0

- **Properties:** white or sl yellow hygr granules, rods or powd; body-centered ortho-rhomb, a=0.355 nm, b=0.556 nm, c=0.557 nm; enthalpy of transition at 158°C–165°C is 1192 kJ/mol; oxidizing agent; slowly oxidized to the nitrate by atm O<sub>2</sub>; preparation: by the dissolution of nitrogen oxides in aq alkaline solutions [KIR82] [MER06]
- Solubility: g/100 g soln, H<sub>2</sub>O: 41.65 (0°C), 45.92 (25°C), 61.50 (99.9°C); solid phase, NaNO<sub>2</sub> [KRU93]; sl s alcohol; decomposed by weak acids, evolving brown fumes of N<sub>2</sub>O<sub>3</sub> [MER06]

**Density, g/cm<sup>3</sup>:** 2.168 [STR93]

- Melting Point, °C: 271 [MER06]
- **Boiling Point, °C:** 320, decomposes [KIR82] **Reactions:** forms Na<sub>2</sub>O and N<sub>2</sub> or nitrogen
- oxide at  $320^{\circ}$ C [KIR82]

## 2945

Compound: Sodium nitroferricyanide(III) dihydrate
Synonym: sodium nitroprusside dihydrate
Formula: Na<sub>2</sub>[Fe(CN)<sub>5</sub>NO] · 2H<sub>2</sub>O
Molecular Formula: C<sub>5</sub>H<sub>4</sub>FeN<sub>6</sub>Na<sub>2</sub>O<sub>3</sub>
Molecular Weight: 297.950
CAS RN: 13755-38-9
Properties: ruby red; transparent cryst; aq solutions decompose [MER06]
Solubility: s in ~2.3 parts H<sub>2</sub>O; sl s alcohol [MER06]
Density, g/cm<sup>3</sup>: 1.72 [STR93]

# 2946

Compound: Sodium oleate
Formula: C<sub>17</sub>H<sub>33</sub>COONa
Molecular Formula: C<sub>18</sub>H<sub>33</sub>NaO<sub>2</sub>
Molecular Weight: 304.449
CAS RN: 143-19-1
Properties: white powd; used in ore flotation, to waterproof textiles [HAW93]
Solubility: s H<sub>2</sub>O, partially decomposes; s alcohol [HAW93]
Melting Point, °C: 232–235 [CRC10]

# 2947

Compound: Sodium orthosilicate
Formula: Na<sub>4</sub>SiO<sub>4</sub>
Molecular Formula: Na<sub>4</sub>O<sub>4</sub>Si
Molecular Weight: 184.043
CAS RN: 13472-30-5
Properties: white powd; used in laundries, for metal cleaning, in heavy duty cleaning [HAW93] [STR93]
Solubility: s H<sub>2</sub>O [HAW93]
Melting Point, °C: 1018 [STR93]

## 2948

Compound: Sodium orthovanadate Formula: Na<sub>3</sub>VO<sub>4</sub> Molecular Formula: Na<sub>3</sub>O<sub>4</sub>V Molecular Weight: 183.909 CAS RN: 13721-39-6 Properties: -200 mesh with 99.9% purity; colorless hex prisms [CER91] [KIR83] Solubility: s H<sub>2</sub>O [KIR83] Melting Point, °C: 850–856 [KIR83]

## 2949

**Compound:** Sodium orthovanadate decahydrate **Formula:**  $Na_3VO_4 \cdot 10H_2O$  **Molecular Formula:**  $H_{20}Na_3O_{14}V$  **Molecular Weight:** 364.062 **CAS RN:** 16519-60-1 **Properties:** white cryst [STR93] **Melting Point,** °C: 850–866 [STR93]

# 2950

Compound: Sodium oxalate
Formula: Na<sub>2</sub>C<sub>2</sub>O<sub>4</sub>
Molecular Formula: C<sub>2</sub>Na<sub>2</sub>O<sub>4</sub>
Molecular Weight: 134.000
CAS RN: 62-76-0
Properties: white, odorless powd; used in textile and leather finishing, blueprinting [MER06] [HAW93]
Solubility: g/100 g soln, H<sub>2</sub>O: 2.62 (0°C), 3.48 (25°C), 6.10 (100°C) [KRU93]; i alcohol [MER06]
Density, g/cm<sup>3</sup>: 2.34 [HAW93]
Melting Point, °C: 250–270, decomposes [HAW93]

# 2951

Compound: Sodium oxide Synonym: sodium monoxide Formula: Na<sub>2</sub>O Molecular Formula: Na<sub>2</sub>O Molecular Weight: 61.979 CAS RN: 1313-59-3 Properties: white; amorphous pieces or powd; reacts violently with H<sub>2</sub>O, forming NaOH; enthalpy of fusion 48.00kJ/mol [MER06] [CRC10] Solubility: reacts with H<sub>2</sub>O, forming NaOH [HAW93] Density, g/cm<sup>3</sup>: 2.27 [MER06] Melting Point, °C: 1132 [CRC10] Boiling Point, °C: sublimes at 1274 [HAW93] Reactions: decomposition begins >400°C to form Na<sub>2</sub>O<sub>2</sub> and Na [MER06]

Compound: Sodium paraperiodate
Formula: Na<sub>3</sub>H<sub>2</sub>IO<sub>6</sub>
Molecular Formula: H<sub>2</sub>INa<sub>3</sub>O<sub>6</sub>
Molecular Weight: 293.885
CAS RN: 13940-38-0
Properties: white cryst solid; used as a selective oxidizing agent for specific carbohydrates and amino acids [HAW93]
Solubility: v sl s H<sub>2</sub>O; s in conc NaOH solutions [HAW93]

# 2953

**Compound:** Sodium pentaiodobismuthate tetrahydrate **Synonym:** bismuth sodium iodide **Formula:**  $Na_2BiI_5 \cdot 4H_2O$ **Molecular Formula:**  $BiH_8I_5Na_2O_4$ **Molecular Weight:** 961.544 **CAS RN:** 53778-50-0 **Properties:** odorless, red cryst, astringent taste [MER06] **Solubility:** s  $H_2O$ , hydrolyzes [MER06] **Melting Point, °C:** decomposes 93 [MER06]

# 2954

Compound: Sodium perborate monohydrate Formula:  $NaBO_3 \cdot H_2O$ Molecular Formula:  $BH_2NaO_4$ Molecular Weight: 99.815 CAS RN: 10332-33-9 Properties: white, amorphous powd; used as a denture cleaner, as a bleaching agent in special detergents [HAW93] Solubility: v s  $H_2O$ , reacting to give  $H_2O_2$ and sodium borate [HAW93]

## 2955

**Compound:** Sodium perborate tetrahydrate **Formula:** NaBO<sub>3</sub>·4H<sub>2</sub>O **Molecular Formula:** BH<sub>8</sub>NaO<sub>7</sub> **Molecular Weight:** 153.861 **CAS RN:** 10486-00-7 **Properties:** white, odorless, cryst powd; stable when cool and dry, else decomposes evolving O<sub>2</sub> [MER06] **Solubility:** s ~40 parts H<sub>2</sub>O, soln eventually decomposes in the sequence:  $\rightarrow$  H<sub>2</sub>O<sub>2</sub>  $\rightarrow$  O<sub>2</sub> [MER06] **Melting Point,** °C: 60, decomposes [ALD94]

## 2956

**Compound:** Sodium perchlorate **Formula:** NaClO<sub>4</sub>

Molecular Formula: ClNaO<sub>4</sub> Molecular Weight: 122.441 CAS RN: 7601-89-0 Properties: white powd; hygr; used in explosives, jet fuel [HAW93] [STR93] Solubility: g/100 g soln, H<sub>2</sub>O: 62.8  $\pm$  0.1 (0°C), 67.7  $\pm$  0.1 (25°C), 76.75 (100°C); solid phase, NaClO<sub>4</sub> · H<sub>2</sub>O (0°C, 25°C), NaClO<sub>4</sub> (100°C) [KRU93] Density, g/cm<sup>3</sup>: 2.499 [KIR79] Melting Point, °C: 482 [STR93] Boiling Point, °C: decomposes [HAW93] Reactions: transition from ortho-rhomb to cub at 577–586 K [KIR79]

# 2957

**Compound:** Sodium perchlorate monohydrate **Formula:**  $NaClO_4 \cdot H_2O$  **Molecular Formula:**  $ClH_2NaO_5$  **Molecular Weight:** 140.456 **CAS RN:** 7791-07-3 **Properties:** white cryst; deliq [MER06] **Solubility:** 66 parts in 100 parts  $H_2O$  (0°C) [KIR79] **Density, g/cm<sup>3</sup>:** 2.02 [MER06] **Melting Point, °C:** decomposes ~130 [MER06]

## 2958

Compound: Sodium periodate Synonym: sodium metaperiodate Formula: NaIO<sub>4</sub> Molecular Formula: INaO<sub>4</sub> Molecular Weight: 213.892 CAS RN: 7790-28-5 Properties: white, tetr cryst; oxidant [ALD94] [MER06] Solubility: g/100 g soln, H<sub>2</sub>O: 12.62 (25°C); solid phase, NaIO<sub>4</sub> · 3H<sub>2</sub>O [KRU93]; s H<sub>2</sub>SO<sub>4</sub>, HNO<sub>3</sub>, acetic acids [MER06] Density, g/cm<sup>3</sup>: 3.865 [MER06] Melting Point, °C: decomposes ~300 [MER06]

## 2959

Compound: Sodium periodate trihydrate Synonym: sodium metaperiodate Formula:  $NaIO_4 \cdot 3H_2O$ Molecular Formula:  $H_6INaO_7$ Molecular Weight: 267.938 CAS RN: 13472-31-6 Properties: stable phase below 34.5°C; white, efflorescent; trig cryst [MER06] [KIR81] Solubility: 1 g/8 mL H<sub>2</sub>O (20°C) [MER06] Density, g/cm<sup>3</sup>: 3.219 (18°C) [HAW93] Melting Point, °C: decomposes 175 [MER06]

**Compound:** Sodium permanganate trihydrate **Formula:**  $NaMnO_4 \cdot 3H_2O$  **Molecular Formula:**  $H_6MnNaO_7$  **Molecular Weight:** 195.972 **CAS RN:** 10101-50-5 **Properties:** purple to reddish black; very hygr; granules;

**Solubility:** v s H<sub>2</sub>O; decomposed by alcohol [MER06] **Density, g/cm<sup>3</sup>:** 2.47 [HAW93] **Melting Point, °C:** 170, decomposes [HAW93]

#### 2961

Compound: Sodium peroxide
Synonym: sodium dioxide
Formula: Na<sub>2</sub>O<sub>2</sub>
Molecular Formula: Na<sub>2</sub>O<sub>2</sub>
Molecular Weight: 77.979
CAS RN: 1313-60-6
Properties: yellowish white; granular powd; absorbs atm water and CO<sub>2</sub>; reacts with dil acids to produce H<sub>2</sub>O<sub>2</sub>; strong oxidant, e.g. readily reacts with organic matter or other oxidizable materials [MER06]
Solubility: v s H<sub>2</sub>O, producing NaOH, H<sub>2</sub>O<sub>2</sub>; H<sub>2</sub>O<sub>2</sub> quickly decomposes evolving O<sub>2</sub> [MER06]
Density, g/cm<sup>3</sup>: 2.805 [STR93]
Melting Point, °C: 460, decomposes [STR93]

## 2962

**Compound:** Sodium perrhenate **Formula:** NaReO<sub>4</sub> **Molecular Formula:** NaO<sub>4</sub>Re **Molecular Weight:** 273.195 **CAS RN:** 13472-33-8 **Properties:** white powd; hygr [STR93] **Solubility:** 100 g/100 mL H<sub>2</sub>O (20°C) [CRC10] **Density, g/cm<sup>3</sup>:** 5.39 [STR93] **Melting Point, °C:** 300 (in oxygen) [STR93]

# 2963

**Compound:** Sodium persulfate **Synonym:** sodium peroxydisulfate **Formula:** Na<sub>2</sub>S<sub>2</sub>O<sub>8</sub> **Molecular Formula:** Na<sub>2</sub>O<sub>8</sub>S<sub>2</sub> **Molecular Weight:** 238.107 **CAS RN:** 7775-27-1

**Properties:** white; cryst powd; gradually decomposes if standing, with rate of decomposition accelerated by moisture and high temp; strong oxidizing agent; used as bleaching agent for fats, oils, fabrics [MER06] Solubility: 549 g/L H<sub>2</sub>O (20°C); decomposed by alcohol [MER06] Density, g/cm<sup>3</sup>: 2.400 [ALD94]

#### 2964

Compound: Sodium phosphate
Synonyms: trisodium phosphate, sodium orthophosphate
Formula: Na<sub>3</sub>PO<sub>4</sub>
Molecular Formula: Na<sub>3</sub>O<sub>4</sub>P
Molecular Weight: 163.940
CAS RN: 7601-54-9
Properties: hygr; -100 mesh powd; uses: photographic developers, clarify sugar, clean boiler scale, soften water, paper manufacturing, laundering, detergents [ALD94] [MER06] [AES93]
Solubility: g/100 g H<sub>2</sub>O: 5.38 (0°C), 14.53 (25°C), 94.6 (100°C); solid phase, Na<sub>3</sub>PO<sub>4</sub> · 1/4NaOH · 12H<sub>2</sub>O (0°C, 25°C), Na<sub>3</sub>PO<sub>4</sub> · 6H<sub>2</sub>O (100°C) [KRU93]

# 2965

Compound: Sodium phosphate dodecahydrate
Formula: Na<sub>3</sub>PO<sub>4</sub> · 12H<sub>2</sub>O
Molecular Formula: H<sub>24</sub>Na<sub>3</sub>O<sub>16</sub>P
Molecular Weight: 380.124
CAS RN: 10101-89-0
Properties: colorless or white cryst; used to soften water, as a detergent and metal cleaner [MER06] [HAW93] [STR93]
Solubility: s 3.5 parts H<sub>2</sub>O, 1 part boiling H<sub>2</sub>O; i alcohol [MER06]
Density, g/cm<sup>3</sup>: 1.62 [HAW93]
Melting Point, °C: ~75, when heated rapidly [MER06]
Reactions: minus 12H<sub>2</sub>O at 100°C [HAW93]

# 2966

Compound: Sodium phosphide
Formula: Na<sub>3</sub>P
Molecular Formula: Na<sub>3</sub>P
Molecular Weight: 99.943
CAS RN: 12058-85-4
Properties: red solid; decomposes when heated or if immersed in water, evolving phosphine; thermally stable up to 650°C; there are also Na<sub>2</sub>P, 12439-14-4, and Na<sub>3</sub>P<sub>11</sub>, 39343-85-6; produced by reacting Na and P, then stored under oil [KIR82] [HAW93]
Solubility: decomposes in H<sub>2</sub>O, evolving PH<sub>3</sub> [CRC10] [HAW93]

Melting Point, °C: stable up to 650 [KIR82]

Compound: Sodium phosphomolybdate Synonym: sodium 12-molybdophosphate Formula: Na<sub>3</sub>PO<sub>4</sub> · 12MoO<sub>3</sub> Molecular Formula: MO<sub>12</sub>Na<sub>3</sub>O<sub>40</sub>P Molecular Weight: 1891.199 CAS RN: 1313-30-0 Properties: yellow cryst; used in chemical analysis,

roperties: yenow eryst, used in chemical analysis, neuromicroscopy, imparts water resistance to plastics, adhesives, cements [HAW93] [MER06]
 Solubility: v s H<sub>2</sub>O [MER06]
 Density, g/cm<sup>3</sup>: 2.83 [HAW93]

## 2968

Compound: Sodium phosphotungstate Synonym: sodium 12-tungstophosphate Formula:  $2Na_2O \cdot P_2O_5 \cdot 12WO_3 \cdot 18H_2O$ Molecular Formula:  $H_{36}Na_4O_{61}P_2W_{12}$ Molecular Weight: 3372.236 CAS RN: 51312-42-6 Properties: yellowish white; granular powd; used as a reagent, and in the manufacture of pigments [HAW93] [MER06] Solubility: v s H<sub>2</sub>O, alcohol [HAW93]

#### 2969

**Compound:** Sodium polyphosphate **Synonym:** sodium polymetaphosphate **Formula:**  $Na_{(n+2)}P_nO_{(3n+1)}$ **Molecular Formula:**  $Na_5P_3O_{10}$ **CAS RN:** 50813-16-6

Properties: clear hygr glass; two most important of the polyphosphates are with n=2 and with n=3; preparation: rapid chilling of molten sodium metaphosphate; used in water treatment for sequestering metals [HAW93] [MER06] [ALD94]Solubility: s H<sub>2</sub>O [MER06]

Melting Point, °C: 628 [MER06]

## 2970

**Compound:** Sodium potassium tartrate tetrahydrate **Synonyms:** Rochelle salt, potassium sodium tartrate **Formula:** NaKC<sub>4</sub>H<sub>4</sub>O<sub>6</sub>·4H<sub>2</sub>O **Molecular Formula:** C<sub>4</sub>H<sub>12</sub>KNaO<sub>10</sub> **Molecular Weight:** 282.221

CAS RN: 304-59-6

**Properties:** translucent cryst or white cryst powd; sl efflorescent in warm air; has cool, saline taste; used in baking powd, as a cathartic in medicine, for silvering mirrors [HAW93] [MER06]

**Solubility:** g anhydrous/100 g H<sub>2</sub>O: 31.9 (0°C), 67.8 (20°C), 102 (30°C) [LAN05]; sl s alcohol [MER06]

Density, g/cm<sup>3</sup>: 1.79 [MER06]
Melting Point, °C: 70–80 [MER06]
Boiling Point, °C: decomposition begins at 220 [MER06]
Reactions: minus 3H<sub>2</sub>O at 100°C; anhydrous 130°C–140°C [MER06]

## 2971

Compound: Sodium pyrophosphate Formula:  $Na_4P_2O_7$ Molecular Formula:  $Na_4O_7P_2$ Molecular Weight: 265.902 CAS RN: 7722-88-5 Properties: colorless, transparent cryst or white powd; used in water softening, as a metal cleaner [HAW93] Solubility: g/100 g soln, H<sub>2</sub>O: 2.236 (0°C), 6.618 (25°C), 31.15 (96°C); solid phase,  $Na_4P_2O_7 \cdot 10H_2O_10°C$ , 25°C),  $Na_4P_2O_7$  (100°C) [KRU93] Density, g/cm<sup>3</sup>: 2.45 [HAW93] Melting Point, °C: 880 [HAW93]

#### 2972

**Compound:** Sodium pyrophosphate decahydrate **Formula:**  $Na_4P_2O_7 \cdot 10H_2O$  **Molecular Formula:**  $H_{20}Na_4O_{17}P_2$  **Molecular Weight:** 446.055 **CAS RN:** 13472-36-1 **Properties:** white powd [STR93] **Solubility:** s H<sub>2</sub>O; decomposed by alcohol [HAW93] **Density, g/cm<sup>3</sup>:** 1.815–1.836 [STR93] **Reactions:** minus H<sub>2</sub>O 94°C [HAW93]

## 2973

Compound: Sodium pyrovanadate Formula: Na<sub>4</sub>V<sub>2</sub>O<sub>7</sub> Molecular Formula: Na<sub>4</sub>O<sub>7</sub>V<sub>2</sub> Molecular Weight: 305.838 CAS RN: 13517-26-5 Properties: -200 mesh with 99.9% purity; colorless hex prisms [KIR83] [CER91] Solubility: s H<sub>2</sub>O [KIR83] Melting Point, °C: 632-654 [KIR83]

# 2974

**Compound:** Sodium selenate **Formula:** Na<sub>2</sub>SeO<sub>4</sub> **Molecular Formula:** Na<sub>2</sub>O<sub>4</sub>Se **Molecular Weight:** 188.938 **CAS RN:** 13410-01-0 Properties: −100 mesh with 99.5% purity; white powd; uses: insecticide [MER06] [STR93] [CER91]
Solubility: g/100 g soln, H<sub>2</sub>O: 11.74 (0°C), 36.91 (25.2°C), 42.14 (100°C); solid phase, Na<sub>2</sub>SeO<sub>4</sub> · 10H<sub>2</sub>O (0°C, 25°C), Na<sub>2</sub>SeO<sub>4</sub> (100°C) [KRU93]
Density, g/cm<sup>3</sup>: 3.213 [STR93]

## 2975

**Compound:** Sodium selenate decahydrate **Formula:**  $Na_2SeO_4 \cdot 10H_2O$  **Molecular Formula:**  $H_{20}Na_2O_{14}Se$  **Molecular Weight:** 369.091 **CAS RN:** 10102-23-5 **Properties:** white cryst [MER06] **Solubility:** v s H<sub>2</sub>O [MER06] **Density, g/cm<sup>3</sup>:** 1.603–1.620 [HAW93]

## 2976

Compound: Sodium selenide
Formula: Na<sub>2</sub>Se
Molecular Formula: Na<sub>2</sub>Se
Molecular Weight: 124.940
CAS RN: 1313-85-5
Properties: -60 mesh, dry under argon with 99.9% purity; amorphous cryst: deliq; becomes red if exposed to the atm; decahydrate: needles, becomes red, then brown in air; hexadecahydrate: prisms; decomposes in air to Na<sub>2</sub>CO<sub>3</sub>, Se and some Na<sub>2</sub>Se [MER06] [CER91]
Solubility: decomposes in H<sub>2</sub>O [MER06]
Density, g/cm<sup>3</sup>: 2.625 [MER06]
Melting Point, °C: Na<sub>2</sub>Se: >875; hexadecahydrate: 40 [MER06]

# 2977

Compound: Sodium selenite
Formula: Na<sub>2</sub>SeO<sub>3</sub>
Molecular Formula: Na<sub>2</sub>O<sub>3</sub>Se
Molecular Weight: 172.938
CAS RN: 10102-18-8
Properties: -100 mesh with 99.5% purity; white powd; tetr prisms; stable in air [MER06] [STR93] [CER91]
Solubility: g/100 g soln, H<sub>2</sub>O: 47.28 (24.4°C), 45.3 (103.3°C); solid phase, Na<sub>2</sub>SeO<sub>3</sub> · 5H<sub>2</sub>O (24.4°C), Na<sub>2</sub>SeO<sub>3</sub> (103.3°C) [KRU93]; i alcohol [MER06]
Melting Point, °C: decomposes [AES93]

### 2978

**Compound:** Sodium selenite pentahydrate **Formula:**  $Na_2SeO_3 \cdot 5H_2O$  Molecular Formula: H<sub>10</sub>Na<sub>2</sub>O<sub>8</sub>
Molecular Weight: 263.014
CAS RN: 26970-82-1
Properties: white acicular cryst; evolves 5H<sub>2</sub>O in dry air; used in glass manufacturing to control color, in decorating porcelain, and for testing seed germination [HAW93] [MER06] [ALD94]
Solubility: s H<sub>2</sub>O; i alcohol [HAW93]

# 2979

Compound: Sodium silicate
Synonym: waterglass
Formula: Na<sub>2</sub>O · xSiO<sub>2</sub>
Molecular Formula: Na<sub>2</sub>SiO<sub>3</sub>
CAS RN: 1344-09-8
Properties: colorless to white; usual compositions: Na<sub>2</sub>SiO<sub>3</sub>, Na<sub>6</sub>Si<sub>2</sub>O<sub>7</sub>, Na<sub>2</sub>Si<sub>3</sub>O<sub>7</sub>; contains variable amounts of H<sub>2</sub>O, e.g. Na<sub>2</sub>SiO<sub>3</sub> · 5H<sub>2</sub>O; produced by fusion of sand and soda ash; used as a catalyst and in silica gels, soaps [HAW93] [MER06]
Solubility: v sl s cold H<sub>2</sub>O [MER06]

#### 2980

Compound: Sodium stannate trihydrate
Formula: Na<sub>2</sub>SnO<sub>3</sub> · 3H<sub>2</sub>O
Molecular Formula: H<sub>6</sub>Na<sub>2</sub>O<sub>6</sub>Sn
Molecular Weight: 266.734
CAS RN: 12209-98-2
Properties: −100 mesh with 99.9% purity; white or colorless; cryst; decomposed in air and by weak acids; used as a mordant in dyeing, and in ceramics [HAW93] [MER06] [CER91]
Solubility: g/100 g H<sub>2</sub>O: 46.0 (0°C), 43.7 (20°C), 38.9 (40°C) [LAN05]; i alcohol [MER06]
Reactions: minus 3H<sub>2</sub>O at 140°C [HAW93]

## 2981

Compound: Sodium stearate Synonyms: stearic acid, sodium salt Formula:  $CH_3(CH_2)_{16}COONa$ Molecular Formula:  $C_{18}H_{35}NaO_2$ Molecular Weight: 306.465 CAS RN: 822-16-2 Properties: usually contains sodium palmitate; white powd; soapy feel; hydrolyzes in water to given an alkaline solution; used as a waterproofing and gelling agent; in toothpaste and cosmetics [HAW93] [MER06] Solubility: slowly s cold H<sub>2</sub>O, alcohol;

v s hot H<sub>2</sub>O, alcohol [MER06]

**Compound:** Sodium sulfate **Synonyms:** mirabilite, thenardite **Formula:** Na<sub>2</sub>SO<sub>4</sub>

Molecular Formula: Na<sub>2</sub>O<sub>4</sub>S

Molecular Weight: 142.044

CAS RN: 7757-82-6

- **Properties:** white odorless powd or ortho-rhomb cryst; enthalpy of fusion is 23.60 kJ/mol; used in the manufacture of kraft paper, paperboard and glass; also used as a filler in synthetic detergents [HAW93] [MER06] [KIR83] [CRC10]
- Solubility: g/100 g H<sub>2</sub>O: 4.5 (0°C), 28.0 (25°C), 42.2 (100°C); solid phase, Na<sub>2</sub>SO<sub>4</sub> · 10H<sub>2</sub>O (0°C, 25°C), Na<sub>2</sub>SO<sub>4</sub> (100°C) [KRU93]; i alcohol [MER06] Density, g/cm<sup>3</sup>: 2.68 [STR93]

Melting Point, °C: 884 [CRC10]

#### 2983

**Compound:** Sodium sulfate decahydrate **Synonyms:** Glauber's salt, mirabilite **Formula:**  $Na_2SO_4 \cdot 10H_2O$ **Molecular Formula:**  $H_{20}Na_2O_{14}S$ **Molecular Weight:** 322.197 **CAS RN:** 7727-73-3

**Properties:** large, transparent monocl cryst or granules; effloresces; enthalpy of crystallization 74.98 J/mol at 25°C; energy storage capacity is more than seven times greater than that of water; used in solar energy to store heat, and in air conditioning [MER06] [HAW93]

**Solubility:** s in 3.3 parts H<sub>2</sub>O (15°C), 1.5 parts (25°C); s glycerol; i alcohol [MER06]

Density, g/cm<sup>3</sup>: 1.464 (cryst) [HAW93]

Melting Point, °C: 32.4 [MER06] Reactions: gives up waters of hydration at 100°C [HAW93]

# 2984

Compound: Sodium sulfate heptahydrate Formula:  $Na_2SO_4 \cdot 7H_2O$ Molecular Formula:  $H_{14}Na_2O_{11}S$ Molecular Weight: 268.150 CAS RN: 7727-73-3 Properties: white rhomb; tetr [CRC10] [LAN05] Solubility: g/100 g H<sub>2</sub>O: 19.5 (°C), 30.0 (10°C), 44.1 (20°C) [LAN05] Reactions: minus 7H<sub>2</sub>O 24.4°C [CRC10]

## 2985

**Compound:** Sodium sulfide **Formula:** Na<sub>2</sub>S

Molecular Formula: Na<sub>2</sub>S Molecular Weight: 78.046 CAS RN: 1313-82-2 Properties: white cub cryst or granules; very hygr; discolors when exposed to the atm, slowly forming sodium carbonate and sodium thiosulfate; enthalpy of solution is -63.5 kJ/mol; enthalpy of fusion 19.00 kJ/mol; crystallzes from aq solution as the nonahydrate, 1313-84-4 [KIR82] [MER06] [CRC10] **Solubility:** g/100 g soln, H<sub>2</sub>O: 8.8 (0°C), 15.3 (25°C), 60.1 (95°C); solid phase, Na<sub>2</sub>S · 9H<sub>2</sub>O (0°C, 25°C), Na<sub>2</sub>S · H<sub>2</sub>O (95°C) [KRU93]; sl s alcohol; i ether [MER06] Density, g/cm<sup>3</sup>: 1.856 [MER06] Melting Point, °C: 1180 (vacuum) [MER06]

#### 2986

Compound: Sodium sulfide nonahydrate
Formula: Na<sub>2</sub>S · 9H<sub>2</sub>O
Molecular Formula: H<sub>18</sub>Na<sub>2</sub>O<sub>9</sub>S
Molecular Weight: 240.184
CAS RN: 1313-84-4
Properties: tetr; deliq; cryst; H<sub>2</sub>S odor; becomes yellow, then brownish black if subjected to atm exposure; decomposed by acids [MER06]
Solubility: 1 g/0.5 mL H<sub>2</sub>O (25°C); sl s alcohol; i ether [MER06]
Density, g/cm<sup>3</sup>: 1.427 [MER06]
Melting Point, °C: 920, decomposes [HAW93]

# 2987

Compound: Sodium sulfide pentahydrate Formula:  $Na_2S \cdot 5H_2O$ Molecular Formula:  $H_{10}Na_2O_5S$ Molecular Weight: 168.122 CAS RN: 1313-83-3 Properties: flat, shiny cryst; flammable; evolves  $H_2S$  in acid solutions [MER06] [ALD94] Solubility: v s  $H_2O$ , alcohol; i ether [MER06] Density, g/cm<sup>3</sup>: 1.58 [LID94] Melting Point, °C: 120 [MER06] Reactions: minus  $3H_2O$  100°C [CRC10], dehydrates at 120°C [MER06]

## 2988

**Compound:** Sodium sulfite **Formula:** Na<sub>2</sub>SO<sub>3</sub> **Molecular Formula:** Na<sub>2</sub>O<sub>3</sub>S **Molecular Weight:** 126.044 **CAS RN:** 7757-83-7 Properties: white, small cryst or powd; fairly stable to oxidation; used in paper and dyes industries [HAW93] [MER06]
Solubility: g/100 g H₂O: 13.85 (0°C), 30.5 ± 0.4 (25°C), 26.3 (100°C); solid phase, Na₂SO₃ · 7H₂O (0°C, 25°C), Na₂SO₃ (100°C) [KRU93]
Density, g/cm<sup>3</sup>: 2.633 [STR93]
Melting Point, °C: decomposes [STR93]

#### 2989

Compound: Sodium sulfite heptahydrate Formula:  $Na_2SO_3 \cdot 7H_2O$ Molecular Formula:  $H_{14}Na_2O_{10}S$ Molecular Weight: 252.151 CAS RN: 10102-15-5 Properties: efflorescent cryst; oxidizing in air to sulfate [MER06] Solubility: s 1.6 parts  $H_2O$ , ~30 parts glycerol; sl s alcohol [MER06] Density, g/cm<sup>3</sup>: 1.539 [CRC10] Reactions: minus  $7H_2O$  150°C [CRC10]

## 2990

Compound: Sodium tartrate dihydrate Formula:  $Na_2C_4H_4O_6 \cdot 2H_2O$ Molecular Formula:  $C_4H_8Na_2O_8$ Molecular Weight: 230.083 CAS RN: 868-18-8 Properties: white cryst or granules; used as food additive, as a sequestrant and stabilizer [HAW93] [MER06] Solubility: s in ~3 parts H<sub>2</sub>O, 1.5 parts boiling H<sub>2</sub>O; i alcohol [MER06] Density, g/cm<sup>3</sup>: 1.794 [HAW93] Reactions: minus  $2H_2O$  at  $150^{\circ}C$  [HAW93]

## 2991

Compound: Sodium tellurate(VI) Formula: Na<sub>2</sub>TeO<sub>4</sub> Molecular Formula: Na<sub>2</sub>O<sub>4</sub>Te Molecular Weight: 237.578 CAS RN: 10102-83-4 Properties: white powd [MER06] Solubility: s in 130 parts cold H<sub>2</sub>O, 50 parts boiling H<sub>2</sub>O [MER06]

## 2992

**Compound:** Sodium tellurate(VI) dihydrate **Formula:**  $Na_2TeO_4 \cdot 2H_2O$ **Molecular Formula:**  $H_4Na_2O_6Te$ **Molecular Weight:** 273.608 **CAS RN:** 26006-71-3 Properties: -100 mesh with 99.5% purity; white powd [STR93] [CER91]
Melting Point, °C: decomposes [STR93]

# 2993

Compound: Sodium tellurite(IV) Formula: Na<sub>2</sub>TeO<sub>3</sub> Molecular Formula: Na<sub>2</sub>O<sub>3</sub>Te Molecular Weight: 221.578 CAS RN: 10102-20-2 Properties: -100 mesh with 99.5% purity; white powd; used in bacteriology, and in medicine [HAW93] [CER91] Solubility: s H<sub>2</sub>O [MER06]

#### 2994

**Compound:** Sodium tetraborate Synonym: sodium borate Formula: Na<sub>2</sub>B<sub>4</sub>O<sub>7</sub> Molecular Formula: B<sub>4</sub>Na<sub>2</sub>O<sub>7</sub> Molecular Weight: 201.220 CAS RN: 1330-43-4 **Properties:** fused sodium borate; white powd or glassy plates; hygr; becomes opaque in air; partially hydrates in damp air; enthalpy of formation of glass form -3256.6 kJ/mol; has several cryst forms; enthalpy of fusion of cryst form 81.2 kJ/mol; used in the manufacture of glass, enamels and other ceramics [KIR78] [HAW93] [MER06] Solubility: g/100 g soln, H<sub>2</sub>O: 1.18 (0°C), 3.13 (25°C), 28.22 (100°C); solid phase,  $Na_2B_4O_7 \cdot 10H_2O$ (0°C, 25°C), Na<sub>2</sub>B<sub>4</sub>O<sub>7</sub>·4H<sub>2</sub>O (100°C) [KRU93] Density, g/cm<sup>3</sup>: 2.367 [STR93] Melting Point, °C: 741 [STR93] Boiling Point, °C: 1575 [STR93]

## 2995

Compound: Sodium tetraborate decahydrate Synonym: borax Formula:  $Na_2B_4O_7 \cdot 10H_2O$ Molecular Formula:  $B_4H_{20}Na_2O_{17}$ Molecular Weight: 381.373 CAS RN: 1303-96-4 Properties: hard, odorless cryst, granules or powd; effloresces in dry air; monocl; specific heat, 1.611 kJ/(kg · K); cryst habit may be changed by adding various substances, and by altering conditions [MER06] [KIR78] Solubility: %w anhydrous salt: 1.18 (0°C); 3.13 (25°C); 15.90 (60°C) [KIR78];

1 g/1 mL glycerol; i alcohol [MER06]

Density, g/cm<sup>3</sup>: 1.73 [MER06]
Melting Point, °C: 75, when heated rapidly [MER06]
Reactions: loses 5H<sub>2</sub>O at 100°C; loses 9H<sub>2</sub>O at 150°C, dehydrates at 320°C [MER06]

#### 2996

Compound: Sodium tetraborate pentahydrate Synonym: tincalconite Formula:  $Na_2B_4O_7 \cdot 5H_2O$ Molecular Formula: B<sub>4</sub>H<sub>10</sub>Na<sub>2</sub>O<sub>12</sub> Molecular Weight: 291.296 CAS RN: 12045-88-4 Properties: free flowing powd; trig; specific heat  $1.32 \text{ kJ/(kg \cdot K)}$ ; enthalpy of formation -4784.4 MJ/ mol; used as a weed killer, and to control fungus growth on citrus fruit [KIR78] Solubility: %w of anhydrous in H<sub>2</sub>O: 16.40 (60°C), 23.38 (80°C), 34.63 (100°C); %w of pentahydrate at 25°C: 16.9% in methanol, 31.1% in ethylene glycol, 10.0% in diethylene glycol [KIR78] Density, g/cm<sup>3</sup>: 1.815 [HAW93] Reactions: minus H<sub>2</sub>O at 122°C [HAW93]

# 2997

Compound: Sodium tetraborate tetrahydrate
Synonym: ernite
Formula: Na<sub>2</sub>B<sub>4</sub>O<sub>7</sub> · 4H<sub>2</sub>O
Molecular Formula: B<sub>4</sub>H<sub>8</sub>Na<sub>2</sub>O<sub>11</sub>
Molecular Weight: 273.281
CAS RN: 12045-87-3
Properties: monocl; specific heat ~1.2 kJ/(kg · K); enthalpy of formation -4489.0 kJ/mol; absorbs water to form borax at relative humidities above 70% [KIR78]
Solubility: % anhydrous in H<sub>2</sub>O: 14.82

(60°C), 17.12 (70°C), 19.88 (80°C), 23.31
(90°C), 28.22 (100°C) [KIR78]

Density, g/cm<sup>3</sup>: 1.95 [LID94]

## 2998

**Compound:** Sodium tetrabromoaurate(III) **Formula:** NaAuBr<sub>4</sub> **Molecular Formula:** AuBr<sub>4</sub>Na **Molecular Weight:** 539.573 **CAS RN:** 52495-41-7 **Properties:** reddish black cryst [STR93]

#### 2999

**Compound:** Sodium tetrachloroaluminate **Formula:** NaAlCl<sub>4</sub> **Molecular Formula:** AlCl<sub>4</sub>Na **Molecular Weight:** 191.783 CAS RN: 7784-16-9
Properties: yellow hygr powd; used as a catalyst for organic reactions [CRC10] [HAW93]
Solubility: s H<sub>2</sub>O [MER06]
Density, g/cm<sup>3</sup>: 2.01 [LID94]
Melting Point, °C: 185 [CRC10]

## 3000

Compound: Sodium tetrachloroaurate(III) dihydrate Formula: NaAuCl<sub>4</sub> · 2H<sub>2</sub>O Molecular Formula: AuCl<sub>4</sub>H<sub>4</sub>NaO<sub>2</sub> Molecular Weight: 397.799 CAS RN: 13874-02-7 Properties: yellowish orange cryst; rhomb; stable up to 100°C; used in photography, in staining fine glass, for decorating porcelain and in medicine [HAW93] [MER06] Solubility: g anhydrous/100 g H<sub>2</sub>O: 139 (10°C), 151 (20°C), 900 (60°C) [LAN05]; s alcohol, ether [MER06] Melting Point, °C: 100 decomposes [AES93]

## 3001

**Compound:** Sodium tetrachloropalladate(II) trihydrate **Formula:**  $Na_2PdCl_4 \cdot 3H_2O$ **Molecular Formula:**  $Cl_4H_6Na_2O_3Pd$ **Molecular Weight:** 384.256 **CAS RN:** 13820-53-6 **Properties:** reddish brown powd [STR93]

# 3002

Compound: Sodium tetrafluoroberyllate Synonym: beryllium sodium fluoride Formula: Na<sub>2</sub>BeF<sub>4</sub> Molecular Formula: BeF<sub>4</sub>Na<sub>2</sub> Molecular Weight: 130.986 CAS RN: 13871-27-7 Properties: ortho-rhomb or monocl cryst [MER06] Solubility: g/100 g H<sub>2</sub>O: 1.33 (0°C), 1.44 (20°C), 2.73 (90°C) [LAN05] Density, g/cm<sup>3</sup>: 2.47 [LID94] Melting Point, °C: 575 [LID94]

#### 3003

**Compound:** Sodium tetrasulfide **Formula:** Na<sub>2</sub>S<sub>4</sub> **Molecular Formula:** Na<sub>2</sub>S<sub>4</sub> **Molecular Weight:** 174.244 **CAS RN:** 12034-39-8 Properties: yellow, hygr cryst; can be clear, dark red liq; prepared by reacting Na<sub>2</sub>S with S; used to reduce organic nitro compounds, for the manufacture of sulfur dyes, and in the preparation of metal sulfide finishes [HAW93]
Density, g/cm<sup>3</sup>: 1.335 at 15.5°C [KIR83]
Melting Point, °C: cryst: 275 [HAW93]; solidifies at -33 to 10 [KIR83]
Boiling Point, °C: 115 [KIR83]

## 3004

Compound: Sodium thioantimonate nonahydrate
Synonym: Schlippe's salt
Formula: Na<sub>3</sub>SbS<sub>4</sub>·9H<sub>2</sub>O
Molecular Formula: H<sub>18</sub>Na<sub>3</sub>O<sub>9</sub>S<sub>4</sub>Sb
Molecular Weight: 481.131
CAS RN: 13776-84-6
Properties: colorless or light yellow large cryst; becomes covered with reddish brown coating of antimony sulfide if exposed to air [MER06]
Solubility: g anhydrous/100 g H<sub>2</sub>O: 13.4 (0°C), 27.9 (20°C), 88.3 (80°C) [LAN05]; i alcohol; decomposed by weak acids [MER06]
Density, g/cm<sup>3</sup>: 1.806 [CRC10]
Melting Point, °C: 87 [CRC10]
Boiling Point, °C: decomposes 234 [CRC10]

#### 3005

Compound: Sodium thiocyanate
Formula: NaSCN
Molecular Formula: CNNaS
Molecular Weight: 81.074
CAS RN: 540-72-7
Properties: colorless cryst or white powd; hygr; sensitive to light; used as an analytical reagent, in dyeing and printing textiles [HAW93]
Solubility: g/100 g H<sub>2</sub>O: 142.6 (25°C), 225.6 (101.4°C); solid phase, NaSCN · H<sub>2</sub>O (25°C), NaSCN (100°C) [KRU93]; s alcohol [HAW93]
Melting Point, °C: 287 [HAW93]

#### 3006

Compound: Sodium thiophosphate dodecahydrate
Formula: Na<sub>3</sub>PO<sub>3</sub>S · 12H<sub>2</sub>O
Molecular Formula: H<sub>24</sub>Na<sub>3</sub>O<sub>15</sub>PS
Molecular Weight: 396.191
CAS RN: 51674-17-0
Properties: thin, six sided leaflets when prepared from water solvent; effloresces in dry air [MER06] [ALD94]
Solubility: v s warm H<sub>2</sub>O [MER06]
Melting Point, °C: 60 [MER06]

#### 3007

Compound: Sodium thiosulfate Formula: Na<sub>2</sub>S<sub>2</sub>O<sub>3</sub> Molecular Formula: Na<sub>2</sub>O<sub>3</sub>S<sub>2</sub> Molecular Weight: 158.110 CAS RN: 7772-98-7 Properties: colorless monocl powd; hygr [CRC10] [ALD94] [MER06] Solubility: s H<sub>2</sub>O; i alcohol [MER06] Density, g/cm<sup>3</sup>: 1.667 [ALD94]

# 3008

Compound: Sodium thiosulfate pentahydrate Synonym: hypo Formula:  $Na_2S_2O_3 \cdot 5H_2O$ Molecular Formula:  $H_{10}Na_2O_8S_2$ Molecular Weight: 248.186 CAS RN: 10102-17-7 Properties: colorless cryst or granules; effloresces in warm dry air; somewhat deliq in moist air [MER06] Solubility: g/100 g H<sub>2</sub>O: 50.2 (0°C), 70.1 (20°C), 104 (60°C) [LAN05]; i alcohol [MER06] Density, g/cm<sup>3</sup>: 1.729 [STR93] Melting Point, °C: 48, decomposes [STR93] Reactions: minus 5H<sub>2</sub>O at 100°C; decomposes at higher temperatures [MER06]

## 3009

Compound: Sodium titanate Formula: Na<sub>2</sub>Ti<sub>3</sub>O<sub>7</sub> Molecular Formula: Na<sub>2</sub>O<sub>7</sub>Ti<sub>3</sub> Molecular Weight: 301.577 CAS RN: 12034-36-5 Properties: -200 mesh with 99.9% purity; white cryst; used in welding [HAW93] [CER91] Solubility: i H<sub>2</sub>O [HAW93] Density, g/cm<sup>3</sup>: 3.35-3.50 [STR93] Melting Point, °C: 1128 [STR93]

#### 3010

Compound: Sodium trimetaphosphate hexahydrate Synonym: Knorre's salt Formula:  $(NaPO_3)_3 \cdot 6H_2O$ Molecular Formula:  $H_{12}Na_3O_{15}P_3$ Molecular Weight: 413.976 CAS RN: 7785-84-4 Properties: efflorescent; tricl-rhomb prisms [MER06] Solubility: 1 g/4.5 mL H<sub>2</sub>O; i alcohol [MER06] Density, g/cm<sup>3</sup>: 1.786; anhydrous: 2.49 [MER06] Melting Point, °C: 53 [MER06] Reactions: minus H<sub>2</sub>O when stored; anhydrous at 100°C [MER06]

Compound: Sodium triphosphate Synonym: sodium tripolyphosphate Formula:  $Na_5P_3O_{10}$ Molecular Formula:  $Na_5O_{10}P_3$ Molecular Weight: 367.864 CAS RN: 7758-29-4 Properties: white cryst powd; has two cryst forms; sl hygr; granules; used to soften water, as a food additive, and as a sequestering agent [HAW93] [MER06] Solubility: g/100 g soln, H<sub>2</sub>O: 13.98 (0°C), 12.96 (25°C), 16.50 (70°C); solid phase,  $Na_5P_3O_{10} \cdot 6H_2O$  [KRU93] Melting Point, °C: 622 [HAW93] Reactions: cryst form transition at 417°C [HAW93]

# 3012

Compound: Sodium tungstate Formula: Na<sub>2</sub>WO<sub>4</sub> Molecular Formula: Na<sub>2</sub>O<sub>4</sub>W Molecular Weight: 293.818 CAS RN: 13472-45-2 Properties: -200 mesh with 99.9% purity; white rhomb powd [STR93] [KIR83] [CER91] Solubility: g/100 g H<sub>2</sub>O: 71.5 (0°C), 73.0 (20°C), 97.2 (100°C) [LAN05] Density, g/cm<sup>3</sup>: 4.179 [KIR83] Melting Point, °C: 698 [KIR83]

# 3013

Compound: Sodium tungstate dihydrate
Formula: Na<sub>2</sub>WO<sub>4</sub> · 2H<sub>2</sub>O
Molecular Formula: H<sub>4</sub>Na<sub>2</sub>O<sub>6</sub>W
Molecular Weight: 329.848
CAS RN: 10213-10-2
Properties: colorless cryst or white rhomb cryst powd; effloresces in dry air [KIR83] [MER06]
Solubility: s in ~1.1 parts H<sub>2</sub>O; i alcohol [MER06]
Density, g/cm<sup>3</sup>: 3.245 [HAW93]
Melting Point, °C: 692 [STR93]
Reactions: minus 2H<sub>2</sub>O at 100°C [MER06]

# 3014

**Compound:** Sodium uranate monohydrate **Synonym:** sodium metauranate **Formula:**  $Na_2U_2O_7 \cdot H_2O$  **Molecular Formula:**  $H_2Na_2O_8U_2$  **Molecular Weight:** 652.049 **CAS RN:** 13721-34-1 **Properties:** yellow powd [MER06] **Solubility:** i  $H_2O$ ; s acids [MER06]

## 3015

Compound: Sodium uranyl carbonate Formula:  $2Na_2CO_3 \cdot UO_2CO_3$ Molecular Formula:  $C_3Na_4O_{11}U$ Molecular Weight: 542.014 CAS RN: 60897-40-7 Properties: yellow; obtained when uranium ores are leached with soda ash at high temperatures and high pressures [KIR83] [CRC10] Melting Point, °C: decomposes at 400 [KIR83]

## 3016

**Compound:** Sodium zirconate **Formula:** Na<sub>2</sub>ZrO<sub>3</sub> **Molecular Formula:** Na<sub>2</sub>O<sub>3</sub>Zr **Molecular Weight:** 185.202 **CAS RN:** 12201-48-8 **Properties:** -200 mesh with 99.5% purity [CER91]

#### 3017

Compound: Stannic bromide
Synonym: tin(IV) bromide
Formula: SnBr<sub>4</sub>
Molecular Formula: Br<sub>4</sub>Sn
Molecular Weight: 438.326
CAS RN: 7789-67-5
Properties: white cryst mass; fumes strongly in air; enthalpy of vaporization 43.5 kJ/mol; enthalpy of fusion 12.00 kJ/mol; used in mineral separations [HAW93] [MER06] [CRC10]
Solubility: v s water, evolving heat; s alcohol [MER06]
Density, g/cm<sup>3</sup>: 3.34 [MER06]
Melting Point, °C: 31 [MER06]
Boiling Point, °C: 202 [MER06]

## 3018

Compound: Stannic chloride
Synonym: tin(IV) chloride
Formula: SnCl<sub>4</sub>
Molecular Formula: Cl<sub>4</sub>Sn
Molecular Weight: 260.521
CAS RN: 7646-78-8
Properties: colorless liq; fumes in air; enthalpy of vaporization 34.9 kJ/mol; enthalpy of fusion 9.20 kJ/mol [MER06] [STR93] [CRC10]
Solubility: s H<sub>2</sub>O, evolving heat; s alcohol, CCl<sub>4</sub>, benzene, toluene, acetone, kerosene, gasoline [MER06]
Density, g/cm<sup>3</sup>: 2.2788 [HAW93]
Melting Point, °C: -33 [MER06]
Boiling Point, °C: 114 [DOU83]

Compound: Stannic chloride pentahydrate Synonym: tin(IV) chloride pentahydrate Formula:  $SnCl_4 \cdot 5H_2O$ Molecular Formula:  $Cl_4H_{10}O_5Sn$ Molecular Weight: 350.697 CAS RN: 10026-06-9 Properties: white or slighlty yellow cryst or fused small lumps; slight odor of HC1 [MER06] Solubility: v s H<sub>2</sub>O, alcohol [MER06] Density, g/cm<sup>3</sup>: 2.04 [KIR83] Melting Point, °C: ~56 decomposes [KIR83]

## 3020

Compound: Stannic chromate Formula: Sn(CrO<sub>4</sub>)<sub>2</sub> Molecular Formula: Cr<sub>2</sub>O<sub>8</sub>Sn Molecular Weight: 350.697 CAS RN: 38455-77-5 Properties: brownish yellow, cryst powd; used in coloring porcelain [HAW93] [MER06] Solubility: s H<sub>2</sub>O [MER06] Melting Point, °C: decomposed by heating [MER06]

# 3021

Compound: Stannic fluoride
Synonym: tin(IV) fluoride
Formula: SnF<sub>4</sub>
Molecular Formula: F<sub>4</sub>Sn
Molecular Weight: 194.704
CAS RN: 7783-62-2
Properties: snow white, tetr cryst; very hygr; can be prepared by reacting F<sub>2</sub> with many stannous or stannic compounds [KIR78] [MER06]
Solubility: hydrolyzes in H<sub>2</sub>O [MER06]
Density, g/cm<sup>3</sup>: 4.78 [MER06]
Melting Point, °C: sublimes 705 [STR93]

## 3022

Compound: Stannic iodide Synonym: tin(IV) iodide Formula: SnI<sub>4</sub> Molecular Formula: I<sub>4</sub>Sn Molecular Weight: 626.328 CAS RN: 7790-47-8 Properties: -6 mesh with 99.999% purity; yellow to reddish cryst; hydrolyzes in H<sub>2</sub>O; enthalpy of vaporization 56.9kJ/mol [CRC10] [MER06] [CER91] Solubility: s alcohol, benzene, chloroform, ether, carbon disulfide [MER06] Density, g/cm<sup>3</sup>: 4.473 [STR93] Melting Point, °C: 144.5 [STR93] Boiling Point, °C: 364.5 [CRC10]

#### 3023

Compound: Stannic oxide Synonym: cassiterite Formula: SnO<sub>2</sub> Molecular Formula: O<sub>2</sub>Sn Molecular Weight: 150.709 CAS RN: 18282-10-5 Properties: white or sl gray powd or 3-12 mm sintered pieces of 99.9% purity; manufactured by blowing hot air over molten tin or by calcining the hydrated oxide; sintered pieces used as an evaporation material for anti static film and transparent heating elements, 99.9% pure material used as a sputtering target for transparent conductive films and in varistors [KIR83] [MER06] [CER91] **Solubility:** i H<sub>2</sub>O, alcohol, cold acids; slowly dissolves in hot, conc KOH or NaOH solutions [MER06] Density, g/cm<sup>3</sup>: 6.95 [MER06] Melting Point, °C: 1630 [STR93] Reactions: sublimes at 1800°C–1900°C [HAW93]

## 3024

Compound: Stannic selenide Synonym: tin diselenide Formula: SnSe<sub>2</sub> Molecular Formula: Se<sub>2</sub>Sn Molecular Weight: 276.630 CAS RN: 20770-09-6 Properties: reddish brown cryst [MER06] Solubility: s in alkali, conc acids; decomposed by HNO<sub>3</sub> [MER06] Density, g/cm<sup>3</sup>: 4.85 [MER06] Melting Point, °C: 650 [MER06]

#### 3025

**Compound:** Stannic selenite **Synonym:** tin selenite **Formula:** Sn(SeO<sub>3</sub>)<sub>2</sub> **Molecular Formula:** O<sub>6</sub>Se<sub>2</sub>Sn **Molecular Weight:** 372.626 **CAS RN:** 7446-25-5 **Properties:** cryst powd [MER06] **Solubility:** i H<sub>2</sub>O; s in excess warm HCl [MER06]

### 3026

**Compound:** Stannic sulfide **Synonyms:** mosaic gold, tin disulfide **Formula:** SnS<sub>2</sub> Molecular Formula: S<sub>2</sub>Sn
Molecular Weight: 182.842
CAS RN: 1315-01-1
Properties: yellow to brown powd; golden leaflets, metallic luster, has been used as a pigment [MER06] [HAW93]
Solubility: i H<sub>2</sub>O, dil mineral acids; s aqua regia, alkali hydroxide solutions [MER06]

Density, g/cm<sup>3</sup>: 4.3 [MER06]

Melting Point, °C: decomposes at 600 [HAW93]

## 3027

Compound: Stannous acetate Synonym: tin(II) acetate Formula: Sn(CH<sub>3</sub>COO)<sub>2</sub> Molecular Formula: C<sub>4</sub>H<sub>6</sub>O<sub>4</sub>Sn Molecular Weight: 236.800 CAS RN: 638-39-1 Properties: white, ortho-rhomb cryst; decomposed by water; used as a reducing agent [HAW93] [MER06] Solubility: s dil HCl [MER06] Density, g/cm<sup>3</sup>: 2.31 [MER06] Melting Point, °C: 182.5–183 [MER06] Boiling Point, °C: sublimes, 155 (0.1 mm Hg) [STR93]

#### 3028

Compound: Stannous bromide
Synonym: tin(II) bromide
Formula: SnBr<sub>2</sub>
Molecular Formula: Br<sub>2</sub>Sn
Molecular Weight: 278.518
CAS RN: 10031-24-0
Properties: yellowish powd; oxidizes in air, turning brown; sensitive to moisture; enthalpy of vaporization 102 kJ/mol [CRC10] [MER06] [STR93] [HAW93]
Solubility: s in a small amount of H<sub>2</sub>O, decomposed by a larger volume; s alcohol, ether, acetone [MER06]
Density, g/cm<sup>3</sup>: 5.12 [MER06]
Melting Point, °C: 215 [MER06]
Boiling Point, °C: 639 [CRC10]

#### 3029

**Compound:** Stannous chloride **Synonym:** tin(II) chloride **Formula:** SnCl<sub>2</sub> **Molecular Formula:** Cl<sub>2</sub>Sn **Molecular Weight:** 189.615 **CAS RN:** 7772-99-8

**Properties:** white; ortho-rhomb cryst; mass of flakes; can absorb atm oxygen; enthalpy of vaporization 86.8 kJ/mol; enthalpy of fusion 12.80 kJ/mol; used as a reducing agent [HAW93] [MER06] [CRC10] Solubility: s H<sub>2</sub>O, ethanol, acetone, ether, methyl acetate [MER06]
Density, g/cm<sup>3</sup>: 3.95 [MER06]
Melting Point, °C: 246 [DOU83]
Boiling Point, °C: 606 [DOU83]

#### 3030

Compound: Stannous chloride dihydrate Synonym: tin(II) chloride dihydrate Formula: SnCl<sub>2</sub> · 2H<sub>2</sub>O Molecular Formula: Cl<sub>2</sub>H<sub>4</sub>O<sub>2</sub>Sn Molecular Weight: 225.646 CAS RN: 10025-69-1 **Properties:** white cryst; absorbs atm O<sub>2</sub>, forming insoluble oxychloride; reducing agent [MER06] [STR93] Solubility: s in less than its own weight of H<sub>2</sub>O; forms insoluble material with more water; v s dil, conc HCl; s alcohol, NaOH soln, glacial acetic acid [MER06] Density, g/cm<sup>3</sup>: 2.71 [MER06] Melting Point, °C: 37–38 [MER06] Boiling Point, °C: 652 [ALD94] Reactions: decomposes when strongly heated [MER06]

## 3031

Compound: Stannous fluoride
Synonym: tin(II) fluoride
Formula: SnF<sub>2</sub>
Molecular Formula: F<sub>2</sub>Sn
Molecular Weight: 156.707
CAS RN: 7783-47-3
Properties: white powd; hygr; monocl; forms

an oxyfluoride in air; can be prepared by
 reacting SnO with aq HF; used in dental
 preparations [KIR78] [MER06] [STR93]

Solubility: g/100 g in H<sub>2</sub>O: 31 (0°), 78.5 (106°C);

i alcohol, ether, chloroform [HAW93] [KIR83]

Density, g/cm<sup>3</sup>: 4.57 [MER06]
Melting Point, °C: 219 [STR93]
Boiling Point, °C: 850 [STR93]

## 3032

Compound: Stannous fluoroborate

Formula: Sn(BF)<sub>2</sub>

Molecular Formula: B<sub>2</sub>F<sub>2</sub>Sn

Molecular Weight: 178.329

CAS RN: 13814-97-6

**Properties:** only available as a solution, e.g. 47% w; prepared by dissolution of SnO in fluoroboric acid; used in tin and tin-lead plating baths [KIR83]

**Compound:** Stannous fluorophosphate **Synonym:** tin(II) fluorophosphate **Formula:** SnPO<sub>3</sub>F **Molecular Formula:** FO<sub>3</sub>PSn **Molecular Weight:** 216.680 **CAS RN:** 52262-58-5 **Properties:** white powd [STR93]

# 3034

Compound: Stannous iodide Synonym: tin(II) iodide Formula: SnI<sub>2</sub> Molecular Formula: I<sub>2</sub>Sn Molecular Weight: 372.519 CAS RN: 10294-70-9 Properties: reddish orange powd; moisture sensitive; enthalpy of vaporization 105 kJ/mol [CRC10] [STR93] **Solubility:** g/100 g H<sub>2</sub>O: 0.99 (20°C), 1.42 (40°C), 4.20 (100°C) [LAN05]; decomposes in H<sub>2</sub>O; s alkali chloride or iodide solutions, benzene, CHCl<sub>3</sub> [MER06] Density, g/cm<sup>3</sup>: 5.28 [MER06] Melting Point, °C: 320 [MER06] Boiling Point, °C: 714 [CRC10]

## 3035

Compound: Stannous oxalate
Synonym: tin(II) oxalate
Formula: SnC<sub>2</sub>O<sub>4</sub>
Molecular Formula: C<sub>2</sub>O<sub>4</sub>Sn
Molecular Weight: 206.730
CAS RN: 814-94-8
Properties: heavy, white, cryst powd; used in dyeing and printing textiles [HAW93] [MER06]
Solubility: i H<sub>2</sub>O; s dil HCl [MER06]
Density, g/cm<sup>3</sup>: 3.56 [MER06]
Melting Point, °C: 280, decomposes [STR93]

#### 3036

Compound: Stannous oxide Synonym: tin(II) oxide Formula: SnO Molecular Formula: OSn Molecular Weight: 134.709 CAS RN: 21651-19-4 Properties: brownish black powd; unstable in air [HAW93] Solubility: i H<sub>2</sub>O, alcohol; s acids, conc NaOH, KOH solutions [MER06] **Density, g/cm<sup>3</sup>:** 6.45 [MER06] **Melting Point, °C:** 1080 (600 mm Hg), decomposes [HAW93]

#### 3037

Compound: Stannous pyrophosphate
Synonym: tin(II) pyrophosphate
Formula: Sn<sub>2</sub>P<sub>2</sub>O<sub>7</sub>
Molecular Formula: O<sub>7</sub>P<sub>2</sub>Sn<sub>2</sub>
Molecular Weight: 411.363
CAS RN: 15578-26-4
Properties: white free flowing cryst; prepared from stannous chloride and sodium pyrophosphate; used in toothpastes [HAW93]
Solubility: i H<sub>2</sub>O; s conc acid [MER06]
Density, g/cm<sup>3</sup>: 4.009 [MER06]
Melting Point, °C: decomposes above 400 [KIR83]

## 3038

Compound: Stannous selenide Synonym: tin(II) selenide Formula: SnSe Molecular Formula: SeSn Molecular Weight: 197.670 CAS RN: 1315-06-6 Properties: 3–12 mm pieces with 99.999% purity; steel gray prisms [MER06] [CER91] Solubility: i H<sub>2</sub>O; s aqua regia, alkali sulfide and selenide solutions [MER06] Density, g/cm<sup>3</sup>: 6.18 [MER06] Melting Point, °C: 861 [MER06]

#### 3039

**Compound:** Stannous stearate **Synonym:** tin(II) stearate **Formula:**  $Sn[CH_3(CH_2)_{16}COO]_2$  **Molecular Formula:**  $C_{36}H_{70}O_4Sn$  **Molecular Weight:** 685.660 **CAS RN:** 7637-13-0 **Properties:** off-white powd [STR93]

## 3040

**Compound:** Stannous sulfate **Synonym:** tin(II) sulfate **Formula:** SnSO<sub>4</sub> **Molecular Formula:** O<sub>4</sub>SSn **Molecular Weight:** 214.774 **CAS RN:** 7488-55-3

- **Properties:** snow white ortho-rhomb cryst; can be prepared by reacting tin with excess sulfuric acid at 100°C for several days; principal use is in tin plating baths [KIR83] [MER06]
- **Solubility:** 330 g/L H<sub>2</sub>O at H<sub>2</sub>O, hydrolyzes with precipitation of basic salt; s dil

 $H_2SO_4$  [MER06] [KIR83]

Melting Point, °C: decomposes at 378 to SnO<sub>2</sub> and SO<sub>2</sub> [MER06]

## 3041

Compound: Stannous sulfide
Synonym: tin(II) sulfide
Formula: SnS
Molecular Formula: SSn
Molecular Weight: 150.776
CAS RN: 1314-95-0
Properties: dark gray cryst, or black amorphous powd; has been used as a pigment [KIR83] [MER06]
Solubility: i H<sub>2</sub>O, alkali hydroxides; s conc HCl, hot conc H<sub>2</sub>SO<sub>4</sub> [MER06]
Density, g/cm<sup>3</sup>: 5.08 [MER06]
Melting Point, °C: 880 [HAW93]
Boiling Point, °C: 1230 [HAW93]

#### 3042

Compound: Stannous tartrate
Synonym: tin(II) tartrate
Formula: SnC<sub>4</sub>H<sub>4</sub>O<sub>6</sub>
Molecular Formula: C<sub>4</sub>H<sub>4</sub>O<sub>6</sub>Sn
Molecular Weight: 266.782
CAS RN: 815-85-0
Properties: heavy, white, cryst powd; used in dyeing and printing fabrics [HAW93]
Solubility: s H<sub>2</sub>O, dil HC1 [MER06]

## 3043

Compound: Stannous telluride Synonym: tin(II) telluride Formula: SnTe Molecular Formula: SnTe Molecular Weight: 246.310 CAS RN: 12040-02-7 Properties: gray cryst; 3–12 mm pieces with 99.999% and 99.8% purity [CER91] Density, g/cm<sup>3</sup>: 6.45 [CRC10] Melting Point, °C: 807 (max) [CRC10] Thermal Conductivity, W/(m·K): 9.1 [CRC10]

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Compound: Strontium Formula: Sr Molecular Formula: Sr Molecular Weight: 87.62 CAS RN: 7440-24-6 Properties: silvery white metal; fcc; active metal, e.g. forms oxide film in air, electrical resistivity (20°C)  $23 \mu$ ohm·cm; enthalpy of fusion 7.43 kJ/mol; enthalpy of vaporization 136.9 kJ/mol; electronegativity 1.10 [CIC73] [MER06] [CRC10] [ALD94] Solubility: reacts quickly with H<sub>2</sub>O; s alcohol [HAW93] Density, g/cm<sup>3</sup>: 2.63 [CIC73] Melting Point, °C: 769 [CRC10] Boiling Point, °C: 1384 [CRC10] Thermal Conductivity, W/(m·K): 35.3 (25°C) [ALD94] **Thermal Expansion Coefficient:** 22.5×10<sup>-6</sup>/K [CRC10]

#### 3045

Compound: Strontium acetate Formula:  $Sr(CH_3COO)_2$ Molecular Formula:  $C_4H_6O_4Sr$ Molecular Weight: 205.710 CAS RN: 543-94-2 Properties: white powd [STR93] Solubility: g/100 g H<sub>2</sub>O: 36.93 (0.05°C), 40.19 (25°C), 36.36 (97°C); solid phase,  $Sr(CH_3COO)_2 \cdot 4H_2O$ (0°C),  $Sr(CH_3COO)_2 \cdot 1/2H_2O$  (25°C, 97°C) [KRU93] Density, g/cm<sup>3</sup>: 2.099 [STR93] Melting Point, °C: decomposes [CRC10]

## 3046

Compound: Strontium acetate hemihydrate Formula:  $Sr(CH_3COO)_2 \cdot 1/2H_2O$ Molecular Formula:  $C_4H_7O_{4.5}Sr$ Molecular Weight: 214.717 CAS RN: 543-94-2 Properties: white, cryst powd; ignites to  $SrCO_3$  [ALF95] [MER06] Solubility: s in 2.5 parts  $H_2O$ ; sl s alcohol [MER06] Reactions: minus  $1/2H_2O$  at  $150^{\circ}C$  [MER06]

# 3047

**Compound:** Strontium acetylacetonate **Synonyms:** 2,4-pentanedione, strontium derivative **Formula:**  $Sr(CH_3COCH=C(O)CH_3)_2$  **Molecular Formula:**  $C_{10}H_{14}O_4Sr$  **Molecular Weight:** 285.839 **CAS RN:** 12193-47-4 Properties: white powd [STR93] Melting Point, °C: 220 decomposes [STR93]

## 3048

**Compound:** Strontium aluminate **Formula:** SrAl<sub>2</sub>O<sub>4</sub> **Molecular Formula:** Al<sub>2</sub>O<sub>4</sub>Sr **Molecular Weight:** 205.581 **CAS RN:** 12004-37-4 **Properties:** -100 mesh with 99.5% purity [CER91]

## 3049

Compound: Strontium bromate monohydrate Formula:  $Sr(BrO_3)_2 \cdot H_2O$ Molecular Formula:  $Br_2H_2O_7Sr$ Molecular Weight: 361.440 CAS RN: 14519-18-7 Properties: lustrous powd; white to sl yellow cryst; hygr [HAW93] Solubility: g/100 g soln  $H_2O$ : 18.32 (0°C), 27.25 (25°C), 41.00 (104°C); solid phases:  $Sr(BrO_3)_2 \cdot H_2O$ (0°C, 25°C),  $Sr(BrO_3)_2$  (104°C) [KRU93] Density, g/cm<sup>3</sup>: 3.773 [HAW93] Melting Point, °C: decomposes at 240 [HAW93] Reactions: minus  $H_2O$  at 120°C [HAW93]

#### 3050

Compound: Strontium bromide Formula:  $SrBr_2$ Molecular Formula:  $Br_2Sr$ Molecular Weight: 247.428 CAS RN: 10476-81-0 Properties: white powd; -20 mesh with 99.5% purity; enthalpy of fusion 10.12 kJ/mol [CRC10] [CER91] Solubility: g/100 g H<sub>2</sub>O: 85.2 (0°C), 107.0 (25°C), 222.5 (100°C) [KRU93] Density, g/cm<sup>3</sup>: 4.216 [STR93] Melting Point, °C: 657 [CRC10]

## 3051

Compound: Strontium bromide hexahydrate Formula:  $SrBr_2 \cdot 6H_2O$ Molecular Formula:  $Br_2H_{12}O_6Sr$ Molecular Weight: 355.519 CAS RN: 10476-81-0 Properties: colorless; deliq; cryst or white granules; used as a sedative in medicine [HAW93] [MER06] Solubility: s in 0.35 parts  $H_2O$ ; s alcohol; i ether [MER06] Density, g/cm<sup>3</sup>: 2.386 [CRC10] Reactions: minus  $4H_2O$  at 89°C, minus

6H<sub>2</sub>O by 180°C [HAW93]

#### 3052

Compound: Strontium carbide Formula: SrC<sub>2</sub> Molecular Formula: C<sub>2</sub>Sr Molecular Weight: 111.642 CAS RN: 12071-29-3 Properties: black tetr; -8 mesh with 99% purity [CER91] [CRC10] Solubility: decomposed by H<sub>2</sub>O [CRC10] Density, g/cm<sup>3</sup>: 3.2 [CRC10] Melting Point, °C: >1700 [CRC10]

## 3053

**Compound:** Strontium carbonate Synonym: strontianite Formula: SrCO<sub>3</sub> Molecular Formula: CO<sub>3</sub>Sr Molecular Weight: 147.629 CAS RN: 1633-05-2 Properties: -20 mesh with 99.999% purity, <30 ppm Ba; white powd; hygr [STR93] [CER91] Solubility: g/L H<sub>2</sub>O: 0.00082 (8.8°C), 0.0109 (24°C) [KRU93]; s dil acids [MER06] Density, g/cm<sup>3</sup>: 3.70 [STR93] Melting Point, °C: 1497 [STR93] **Reactions:** minus CO<sub>2</sub> at 1340 [HAW93] Thermal Expansion Coefficient: (volume) 100°C (0.541), 200°C (1.168), 400°C (2.473), 800°C (5.726) [CLA66]

## 3054

Compound: Strontium chlorate Formula:  $Sr(ClO_3)_2$ Molecular Formula:  $Cl_2O_6Sr$ Molecular Weight: 254.521 CAS RN: 7791-10-8 Properties: colorless or white cryst powd [HAW93] [MER06] Solubility: g/100 g soln, H<sub>2</sub>O: 61.40 (0°C), 63.78 (25°C), 67.08 (95°C); solid phase, Sr(ClO<sub>3</sub>)<sub>2</sub>· 3H<sub>2</sub>O (0°C), Sr(ClO<sub>3</sub>)<sub>2</sub> (25°C, 95°C) [KRU93]; sl s alcohol [MER06] Density, g/cm<sup>3</sup>: 3.15 [MER06] Melting Point, °C: 120, decomposes [HAW93]

#### 3055

**Compound:** Strontium chloride **Formula:** SrCl<sub>2</sub> **Molecular Formula:** Cl<sub>2</sub>Sr **Molecular Weight:** 158.525 **CAS RN:** 10476-85-4 Properties: −40 mesh with 99.5% purity; white powd; hygr; enthalpy of fusion 16.20 kJ/mol [STR93] [CRC10] [CER91]
Solubility: g/100 g H<sub>2</sub>O: 43.5 (0°C), 55.8 (25°C), 100.8 (100°C); solid phase, SrCl<sub>2</sub> · 6H<sub>2</sub>O (0°C, 25°C), SrCl<sub>2</sub> · 2H<sub>2</sub>O (100°C) [KRU93]
Density, g/cm<sup>3</sup>: 3.052 [STR93]
Melting Point, °C: 874 [CRC10]
Boiling Point, °C: 1250 [STR93]

#### 3056

Compound: Strontium chloride hexahydrate Formula:  $SrCl_2 \cdot 6H_2O$ Molecular Formula:  $Cl_2H_{12}O_6Sr$ Molecular Weight: 266.617 CAS RN: 10025-70-4 Properties: colorless cryst; white granules; effloresces in air; deliq in presence of moisture [MER06] Solubility:  $3.5195 \pm 0.0026 \text{ mol}/(\text{kg} \cdot \text{H}_2O)$  at  $25^{\circ}C$  [RAR85b]; s alcohol [MER06] Density, g/cm<sup>3</sup>: 1.96 [MER06] Melting Point, °C: 115 [STR93] Reactions: minus 5H<sub>2</sub>O at 100°C; minus  $6H_2O$  at 150°C [MER06]

# 3057

Compound: Strontium chromate
Formula: SrCrO<sub>4</sub>
Molecular Formula: CrO<sub>4</sub>Sr
Molecular Weight: 203.614
CAS RN: 7789-06-2
Properties: -80 mesh with 99% purity; light yellow; monocl; has been used in metal coatings to protect the metal from corrosion [HAW93] [KIR78] [CER91]
Solubility: s dil acids [KIR78]; g/L soln, H<sub>2</sub>O: 0.91 (25°C), 0.43 (100°C) [KRU93]
Density, g/cm<sup>3</sup>: 3.895 [KIR78]
Melting Point, °C: decomposes [KIR78]

## 3058

Compound: Strontium dithionate tetrahydrate Formula:  $Sr(SO_3)_2 \cdot 4H_2O$ Molecular Formula:  $H_8O_{10}S_2Sr$ Molecular Weight: 319.809 CAS RN: 13845-16-4 Properties: trig [CRC10] Solubility: g/100 g soln,  $H_2O$ : 4.51 (0°C), 10.8 (20°C) [KRU93] Density, g/cm<sup>3</sup>: 2.373 [CRC10] Reactions: minus  $4H_2O$ , 78°C [CRC10]

#### 3059

Compound: Strontium ferrite Synonym: strontium dodecairon nonadecaoxide Formula: SrFe<sub>12</sub>O<sub>19</sub> Molecular Formula: Fe<sub>12</sub>O<sub>19</sub>Sr Molecular Weight: 1061.773 CAS RN: 12023-91-5 Properties: powd; -325 mesh with 99.5% purity [CER91] [ALF93]

## 3060

Compound: Strontium fluoride Formula: SrF<sub>2</sub> Molecular Formula: F<sub>2</sub>Sr Molecular Weight: 125.617 CAS RN: 7783-48-4 Properties: white powd, and 99.9% pure melted pieces of 3-6 mm; hygr; enthalpy of fusion 29.70 kJ/mol; pieces used as evaporation and sputtering material for infrared transparent films [STR93] [CER91] [CRC10] Solubility: g/L soln, H<sub>2</sub>O: 0.1135 (0.26°C), 0.21 ± 0.13 (25°C) [KRU93]; s dil acids; decomposed by strong acids [MER06] Density, g/cm<sup>3</sup>: 4.24 [MER06] Melting Point, °C: 1477 [CRC10] Boiling Point, °C: 2489 [STR93] Reactions: oxidized to SrO >1000°C [MER06]

#### 3061

Compound: Strontium hexaboride Synonym: strontium boride Formula: SrB<sub>6</sub> Molecular Formula: B<sub>6</sub>Sr Molecular Weight: 152.486 CAS RN: 12046-54-7 Properties: -325 mesh 10μm or less with 99.5% purity; refractory material [KIR78] [CER91] Density, g/cm<sup>3</sup>: 3.39 [ALD94] Melting Point, °C: 2235 [KIR78]

## 3062

Compound: Strontium hydride Formula: SrH<sub>2</sub> Molecular Formula: H<sub>2</sub>Sr Molecular Weight: 89.636 CAS RN: 13598-33-9 Properties: -60 mesh with 99.5% purity; resembles CaH<sub>2</sub> in both properties and reactivity [KIR80] [CER91] Density, g/cm<sup>3</sup>: 3.72 [KIR80]

Compound: Strontium hydroxide Formula:  $Sr(OH)_2$ Molecular Formula:  $H_2O_2Sr$ Molecular Weight: 121.635 CAS RN: 18480-07-4 Properties: colorless deliq cryst; absorbs  $H_2O$  from air; enthalpy of fusion 21.00kJ/mol [HAW93] [CRC10] Solubility: g/100 g soln in  $H_2O$ : 0.90 (0°C), 2.16 ± 0.41 (25°C), 47.71 (100°C); solid phase,  $Sr(OH)_2 \cdot 8H_2O$  [KRU93] Density, g/cm<sup>3</sup>: 3.625 [HAW93] Melting Point, °C: 512 [JAN71] Reactions: minus  $H_2O$  at 710°C [CRC10]

## 3064

Compound: Strontium hydroxide octahydrate Formula:  $Sr(OH)_2 \cdot 8H_2O$ Molecular Formula:  $H_{18}O_{10}Sr$ Molecular Weight: 265.757 CAS RN: 1311-10-0 Properties: colorless; deliq cryst or white powd; forms  $SrCO_3$  by reaction with atm  $CO_2$  [MER06] Solubility: s in 50 parts  $H_2O$ ; 2.1 parts boiling  $H_2O$  [MER06] Density, g/cm<sup>3</sup>: 1.90 [STR93] Reactions: minus some  $H_2O \sim 100^{\circ}C$  [MER06]

## 3065

Compound: Strontium iodate Formula:  $Sr(IO_3)_2$ Molecular Formula:  $I_2O_6Sr$ Molecular Weight: 437.425 CAS RN: 13470-01-4 Properties: tricl; -80 mesh with 99.5% purity [CER91] [CRC10] Solubility: g/100 g soln, H<sub>2</sub>O: 0.098 (0°C), 0.165 (25°C), 0.350 (100°C); solid phase,  $Sr(IO_3)_2$  [KRU93] Density, g/cm<sup>3</sup>: 5.045 [CRC10]

## 3066

Compound: Strontium iodide Formula: SrI<sub>2</sub> Molecular Formula: I<sub>2</sub>Sr Molecular Weight: 341.429 CAS RN: 10476-86-5 Properties: -80 mesh with 99.5% purity; white cryst; enthalpy of fusion 19.70 kJ/mol [CER91] [HAW93] [CRC10] Solubility: g/100 g H<sub>2</sub>O: 165.3 (0°C), 181.2 (25°C), 383.1 (100°C); solid phase, SrI<sub>2</sub> · 6H<sub>2</sub>O (0°C, 25°C), SrI<sub>2</sub> · 2H<sub>2</sub>O (100°C) [KRU93]
Density, g/cm<sup>3</sup>: 4.549 [HAW93]
Melting Point, °C: 515 [CRC10]
Boiling Point, °C: decomposes [HAW93]

## 3067

Compound: Strontium iodide hexahydrate Formula:  $SrI_2 \cdot 6H_2O$ Molecular Formula:  $H_{12}I_2O_6Sr$ Molecular Weight: 449.520 CAS RN: 10476-86-5 Properties: colorless to yellowish; deliq; sensitive to light and atm  $O_2$  with partial oxidation freeing  $I_2$  [MER06] Solubility: s in 0.2 parts  $H_2O$ ; s alcohol [MER06] Density, g/cm<sup>3</sup>: 2.67 [HAW93] Melting Point, °C: ~120, when rapidly heated [MER06]

# 3068

**Compound:** Strontium lactate trihydrate **Formula:**  $Sr(C_3H_5O_3)_2 \cdot 3H_2O$  **Molecular Formula:**  $C_6H_{16}O_9Sr$  **Molecular Weight:** 319.808 **CAS RN:** 29870-99-3 **Properties:** white, odorless, granular powd [MER06] **Solubility:** s in 3 parts H<sub>2</sub>O, 0.5 parts boiling H<sub>2</sub>O; sl s alcohol [MER06] **Reactions:** minus 3H<sub>2</sub>O at 120°C [MER06]

#### 3069

Compound: Strontium molybdate(VI) Formula: SrMoO<sub>4</sub> Molecular Formula: MoO<sub>4</sub>Sr Molecular Weight: 247.558 CAS RN: 13470-04-7 Properties: -200 mesh with 99.9% purity; white cryst powd; scheelite structure, c/a=2.23; used as an anticorrosion pigment, used in electronic and optical applications, in solid state lasers [HAW93] [KIR81] [CER91] Solubility: ~0.003 g/100 g H<sub>2</sub>O [KIR81] Density, g/cm<sup>3</sup>: 4.662 [KIR81] Melting Point, °C: ~1040 [KIR81]

#### 3070

**Compound:** Strontium niobate **Formula:** SrNb<sub>2</sub>O<sub>6</sub>

Molecular Formula: Nb<sub>2</sub>O<sub>6</sub>Sr Molecular Weight: 369.429 CAS RN: 12034-89-8 Properties: monocl cryst; -200 mesh with 99.9% purity [LID94] [CER91] Density, g/cm<sup>3</sup>: 5.11 [LID94] Melting Point, °C: 1225 [LID94]

#### 3071

**Compound:** Strontium nitrate Formula: Sr(NO<sub>3</sub>)<sub>2</sub> Molecular Formula: N<sub>2</sub>O<sub>6</sub>Sr Molecular Weight: 211.629 CAS RN: 10042-76-9 Properties: 8 mach with 00.005

Properties: -8 mesh with 99.995% purity; white cryst; used in pyrotechnics, in marine signals, matches, and railroad flares [HAW93] [STR93] [CER91]

Solubility: g/100 g soln, H<sub>2</sub>O: 28.2 (0.1°C), 40.7 (20°C), 51.2 (105°C); solid phase, Sr(NO<sub>3</sub>)<sub>2</sub> · 4H<sub>2</sub>O (0.1°C, 20°C), Sr(NO<sub>3</sub>)<sub>2</sub> (105°C) [KRU93]; sl s alcohol, acetone [MER06]
Density, g/cm<sup>3</sup>: 2.99 [MER06]
Melting Point, °C: 570 [MER06]

**3072 Compound:** Strontium nitride **Formula:** Sr<sub>3</sub>N<sub>2</sub> **Molecular Formula:** N<sub>2</sub>Sr<sub>3</sub> **Molecular Weight:** 290.873 **CAS RN:** 12033-82-8 **Properties:** -60 mesh with 99.5% purity [CER91] **Melting Point, °C:** 1030 [CIC73]

## 3073

Compound: Strontium nitrite
Formula: Sr(NO<sub>2</sub>)<sub>2</sub>
Molecular Formula: N<sub>2</sub>O<sub>4</sub>Sr
Molecular Weight: 179.631
CAS RN: 13470-06-9
Properties: white or yellowish powd; hygr needles [HAW93]
Solubility: g/100 g soln, H<sub>2</sub>O: 43.1 (35°C), 58.1 (98°C); solid phase, Sr(NO<sub>2</sub>)<sub>2</sub> · H<sub>2</sub>O [KRU93]; i alcohol [HAW93]
Density, g/cm<sup>3</sup>: 2.8 [HAW93]
Melting Point, °C: decomposes at 240 [HAW93]

#### 3074

**Compound:** Strontium oxalate **Formula:** SrC<sub>2</sub>O<sub>4</sub> **Molecular Formula:** C<sub>2</sub>O<sub>4</sub>Sr **Molecular Weight:** 175.640 **CAS RN:** 814-95-9 **Properties:** white powd [STR93] **Solubility:** g/L soln, H<sub>2</sub>O: 0.057 (0°C), 0.077 (20°C) [KRU93]

#### 3075

Compound: Strontium oxalate monohydrate
Formula: SrC<sub>2</sub>O<sub>4</sub>·H<sub>2</sub>O
Molecular Formula: C<sub>2</sub>H<sub>2</sub>O<sub>5</sub>Sr
Molecular Weight: 193.655
CAS RN: 814-95-9
Properties: white, odorless; cryst powd; used in pyrotechnics, tanning, catalyst manufacturing [HAW93] [MER06]
Solubility: s in 20,000 parts H<sub>2</sub>O; 1900 parts 3.5% acetic acid; s dil HCl, HNO<sub>3</sub> [MER06]
Reactions: minus H<sub>2</sub>O at 150°C [HAW93]

#### 3076

Compound: Strontium oxide Synonym: strontia Formula: SrO Molecular Formula: OSr Molecular Weight: 103.619 CAS RN: 1314-11-0 Properties: white to grayish white; reacts with water, forming Sr(OH)<sub>2</sub>, with evolution of heat; enthalpy of fusion 75.00 kJ/mol [MER06] [CRC10] Solubility: g/100 g H<sub>2</sub>O: 1.03 (30°C), 1.05 (40°C), 12.15 (100°C) [LAN05]; reacts with H<sub>2</sub>O to form the hydroxide [HAW93] Density, g/cm<sup>3</sup>: 4.7 [MER06] Melting Point, °C: 2430 [AES93] Boiling Point, °C: ~3000 [HAW93]

## 3077

Compound: Strontium perchlorate Formula:  $Sr(ClO_4)_2$ Molecular Formula:  $Cl_2O_8Sr$ Molecular Weight: 286.520 CAS RN: 13450-97-0 Properties: colorless cryst [HAW93] Solubility: mol/kg H<sub>2</sub>O: 8.16 (0°C), 10.67 (25°C), 12.70 (40°C); solid phase,  $Sr(ClO_4)_2 \cdot 4H_2O$ (0°C),  $Sr(ClO_4)_2 \cdot 2H_2O$  (25°C),  $3Sr(ClO_4)_2 \cdot 2H_2O$ (above 40°C) [KRU93]; s alcohol [HAW93]

# 3078

**Compound:** Strontium perchlorate hexahydrate Formula:  $Sr(ClO_4)_2 \cdot 6H_2O$ Molecular Formula:  $Cl_2H_{12}O_{14}Sr$  Molecular Weight: 394.612 CAS RN: 13450-97-0 Properties: white cryst; hygr [STR93] Melting Point, °C: <100 [STR93]

## 3079

**Compound:** Strontium permanganate trihydrate **Formula:**  $Sr(MnO_4)_2 \cdot 3H_2O$  **Molecular Formula:**  $H_6Mn_2O_{11}Sr$  **Molecular Weight:** 379.537 **CAS RN:** 14446-13-0 **Properties:** purple cub [CRC10] **Solubility:** g/100 g soln,  $H_2O$ : 2.5 (0°C) [KRU93] **Density, g/cm<sup>3</sup>:** 2.75 [CRC10] **Melting Point, °C:** decomposes 175 [CRC10]

## 3080

Compound: Strontium peroxide
Formula: SrO<sub>2</sub>
Molecular Formula: O<sub>2</sub>Sr
Molecular Weight: 119.619
CAS RN: 1314-18-7
Properties: white powd; unstable if standing, decomposes in air under ambient conditions; decomposed in water, evolving O<sub>2</sub> [MER06]
Solubility: decomposed to H<sub>2</sub>O<sub>2</sub> by dil acids [MER06]
Density, g/cm<sup>3</sup>: 4.56 [HAW93]
Melting Point, °C: 215, decomposes [HAW93]

#### 3081

**Compound:** Strontium peroxide octahydrate **Formula:**  $SrO_2 \cdot 8H_2O$  **Molecular Formula:**  $H_{16}O_{10}Sr$  **Molecular Weight:** 263.741 **CAS RN:** 1314-18-7 **Properties:** white powd [HAW93] **Solubility:** sl s cold H<sub>2</sub>O, decomposed by hot H<sub>2</sub>O; s NH<sub>4</sub>Cl solutions and alcohol [HAW93] **Density, g/cm<sup>3</sup>:** 1.951 [HAW93] **Melting Point,** °C: decomposes [CRC10] **Reactions:** minus 8H<sub>2</sub>O at 100°C [HAW93]

# 3082

**Compound:** Strontium salicylate dihydrate **Formula:**  $Sr(C_7H_5O_3)_2 \cdot 2H_2O$ **Molecular Formula:**  $C_{14}H_{14}O_8Sr$ **Molecular Weight:** 397.880 **CAS RN:** 6160-38-9

**Properties:** white cryst or powd; odorless; light sensitive; heat causes decomposition; used in manufacturing of pharmaceuticals and fine chemicals [HAW93] **Solubility:** s H<sub>2</sub>O and alcohol [HAW93] **Melting Point, °C:** decomposes [HAW93]

#### 3083

Compound: Strontium selenate Formula: SrSeO<sub>4</sub> Molecular Formula: O<sub>4</sub>SeSr Molecular Weight: 230.578 CAS RN: 7446-21-1 Properties: ortho-rhomb cryst; prepared by heating strontium carbonate with selenium or selenium oxide [MER06] Solubility: i H<sub>2</sub>O; s HC1 [MER06] Density, g/cm<sup>3</sup>: 4.25 [MER06]

#### 3084

Compound: Strontium selenide Formula: SrSe Molecular Formula: SeSr Molecular Weight: 166.580 CAS RN: 1315-07-7 Properties: white cub; -20 mesh with 99.5% purity [CER91] [CRC10] Density, g/cm<sup>3</sup>: 4.38 [CRC10] Melting Point, °C: 1600 [AES93]

#### 3085

Compound: Strontium silicide Formula: SrSi<sub>2</sub> Molecular Formula: Si<sub>2</sub>Sr Molecular Weight: 143.791 CAS RN: 12138-28-2 Properties: silver-gray cub cryst; 10 mm & down lump [LID94] [ALF93] Density, g/cm<sup>3</sup>: 3.35 [LID94] Melting Point, °C: 1100 [LID94]

#### 3086

**Compound:** Strontium stannate **Formula:** SrSnO<sub>3</sub> **Molecular Formula:** O<sub>3</sub>SnSr **Molecular Weight:** 254.328 **CAS RN:** 12143-34-9 **Properties:** -200 mesh with 99.5% purity [CER91]

### 3087

**Compound:** Strontium sulfate **Synonym:** celestite **Formula:** SrSO<sub>4</sub> **Molecular Formula:** O<sub>4</sub>SSr Molecular Weight: 183.684
CAS RN: 7759-02-6
Properties: hygr white cryst or precipitate; used in pyrotechnics, in ceramics and glass [HAW93] [STR93]
Solubility: g/100 mL soln, H<sub>2</sub>O: 0.0121 (5°C), 0.0135 (25°C), 0.0113 (95°C); solid phase, SrSO<sub>4</sub> [KRU93]; s HCl, HNO<sub>3</sub> [MER06]
Density, g/cm<sup>3</sup>: 3.96 [MER06]
Melting Point, °C: 1600 [STR93]

#### 3088

Compound: Strontium sulfide Formula: SrS Molecular Formula: SSr Molecular Weight: 119.686 CAS RN: 1314-96-1 Properties: -200 mesh with 99.9% purity; gray powd; has odor of H<sub>2</sub>S in moist atm [MER06] [CER91] Solubility: sl s H<sub>2</sub>O; s acids, decomposes [MER06] Density, g/cm<sup>3</sup>: 3.70 [MER06] Melting Point, °C: >2000 [STR93]

#### 3089

Compound: Strontium tantalate Formula: SrTa<sub>2</sub>O<sub>6</sub> Molecular Formula: O<sub>6</sub>SrTa<sub>2</sub> Molecular Weight: 545.512 CAS RN: 12065-74-6 Properties: reacted product; -200 mesh with 99.9% purity [CER91]

#### 3090

Compound: Strontium tartrate tetrahydrate Formula:  $SrC_4H_4O_6 \cdot 4H_2O$ Molecular Formula:  $C_4H_{12}O_{10}Sr$ Molecular Weight: 307.753 CAS RN: 6100-96-5 Properties: monocl white cryst; used in pyrotechnics [HAW93] [CRC10] Solubility: sl s H<sub>2</sub>O [HAW93] Density, g/cm<sup>3</sup>: 1.966 [HAW93]

#### 3091

**Compound:** Strontium thiosulfate pentahydrate **Synonym:** strontium hyposulfite **Formula:**  $SrS_2O_3 \cdot 5H_2O$  **Molecular Formula:**  $H_{10}O_8S_2Sr$  **Molecular Weight:** 289.826 **CAS RN:** 15123-90-7 **Properties:** monocl fine needles [CRC10] [HAW93] **Solubility:** g/100 g solution H<sub>2</sub>O: 8.78 (0°C), 21.10 (27.5°C), 26.80 (40°C); solid phase:  $SrS_2O_3 \cdot 3H_2O$  [KRU93]; i alcohol [HAW93] **Density, g/cm<sup>3</sup>:** 2.17 [HAW93] **Reactions:** minus 4H<sub>2</sub>O at 100°C [HAW93]

## 3092

Compound: Strontium titanate
Formula: SrTiO <sub>3</sub>
Molecular Formula: O <sub>3</sub> SrTi
Molecular Weight: 183.485
CAS RN: 12060-59-2
Properties: -200 mesh of 99.9% purity; white powd;
cub; hardness 6–6.5 Mohs; has properties
of refractive index, dispersion and optical
transmission which are comparable to diamond;
highly pure material can be obtained by
calcining the double strontium titanate; used in
electronics and in electrical insulation; as 99.9%
pure material, used as sputtering target for thin
film capacitors [HAW93] [KIR83] [CER91]
<b>Solubility:</b> i H <sub>2</sub> O and in most solvents [HAW93]
Density, g/cm <sup>3</sup> : 4.81 (HAW93]
Melting Point, °C: 2060 [HAW93]

## 3093

Compound: Strontium tungstate Formula: SrWO<sub>4</sub> Molecular Formula: O<sub>4</sub>SrW Molecular Weight: 335.458 CAS RN: 13451-05-3 Properties: -200 mesh with 99.9% purity; white tetr, a=0.540 nm, c=1.109 nm [KIR83] [CER91] Solubility: 0.14 g/100 mL H<sub>2</sub>O (15°C) [CRC10] Density, g/cm<sup>3</sup>: 6.187 [KIR83] Melting Point, °C: decomposes [CRC10]

## 3094

**Compound:** Strontium vanadate **Formula:** SrV<sub>2</sub>O<sub>6</sub> **Molecular Formula:** O<sub>6</sub>SrV<sub>2</sub> **Molecular Weight:** 285.499 **CAS RN:** 12435-86-8 **Properties:** -200 mesh with 99.9% purity [CER91]

## 3095

Compound: Strontium zirconate
Formula: SrZrO<sub>3</sub>
Molecular Formula: O<sub>3</sub>SrZr
Molecular Weight: 226.842
CAS RN: 12036-39-4
Properties: white powd; used in electronics, and as the 99% pure material, is used as a sputtering target for thin film capacitors [HAW93] [STR93] [CER91]
Melting Point, °C: 2600 [HAW93]

Compound: Sulfur chloride Synonym: sulfur monochloride Formula: S<sub>2</sub>Cl<sub>2</sub> Molecular Formula: Cl<sub>2</sub>S<sub>2</sub> Molecular Weight: 135.037 CAS RN: 10025-67-9 Properties: light amber to yellowish red; fuming, oily liq; penetrating odor; dielectric constant, 4.9 (22°C); dipole moment, 1.60 [MER06] Solubility: s alcohol, benzene, ether, CS<sub>2</sub>, CCl<sub>4</sub>, oils; decomposed in water, forming sulfur, HCl, SO<sub>2</sub>, H<sub>2</sub>S, sulfite, thiosulfate [MER06] Density, g/cm<sup>3</sup>: 1.6885 [MER06] Melting Point, °C: -77 [MER06] Boiling Point, °C: 138 [MER06]

#### 3097

**Compound:** Sulfur dioxide **Formula:** SO<sub>2</sub> **Molecular Formula:** O<sub>2</sub>S **Molecular Weight:** 64.065 **CAS RN:** 7446-09-5

Properties: colorless gas; not flammable; mild reducing agent, e.g. bleaches vegetable colors; vapor pressure is 3.2 atms at 20°C; critical temp 157.5°C; critical pressure 7.87 MPa; enthalpy of vaporization 24.94 kJ/mol [CRC10] [AIR87] [HAW93] [MER06]
Solubility: % H<sub>2</sub>O: 17.7 (0°C), 11.9 (15°C), 8.5 (25°C), 6.4 (35°C); % other solvents: 25, alcohol; 32, methanol [MER06]
Density, g/cm<sup>3</sup>: liq: 1.5 [MER06]
Melting Point, °C: -72 [MER06]
Boiling Point, °C: -10.0 [CRC10]

# 3098

**Compound:** Sulfur hexafluoride **Formula:** SF<sub>6</sub> **Molecular Formula:** F<sub>6</sub>S **Molecular Weight:** 146.056 **CAS RN:** 2551-62-4

Properties: colorless, odorless gas; very stable, e.g. to electrical discharge (in transformer oil); does not attack glass; enthalpy of sublimation 23.59 kJ/mol; triple point -50.52°C; enthalpy of vaporization 9.642 kJ/mol; enthalpy of fusion 5.02 kJ/mol; dielectric constant of gas 1.00204; viscosity of gas 0.01576 mPa · s; critical temp 45.55°C; critical pressure 3.759 MPa; critical density 0.737 g/cm<sup>3</sup> [KIR78] [MER06] [CRC10] Solubility: sl s H<sub>2</sub>O; s alcohol [MER06] Density, g/cm<sup>3</sup>: gas: 6.5 g/L; liq: 1.67 [HAW93]

Melting Point, °C: -50.8 [MER06]

Boiling Point, °C: sublimes –63.8 [MER06] Thermal Conductivity, W/(m·K): liq is 0.0583; gas is 0.01415 [KIR78]

## 3099

Compound: Sulfur tetrafluoride Formula: SF<sub>4</sub> **Molecular Formula:** F<sub>4</sub>S Molecular Weight: 108.060 CAS RN: 7783-60-0 Properties: colorless gas; stable up to 600°C; reacts violently with H<sub>2</sub>O; decomposed by conc H<sub>2</sub>SO<sub>4</sub>; critical temp 90.9°C; enthalpy of vaporization 26.44 kJ/mol; used in electronics industry [AIR87] [MER06] [CRC10] Solubility: decomposes in H<sub>2</sub>O [HAW93] Density, g/cm<sup>3</sup>: liq: 1.95 (-78°C); solid: 2.349 (-18.3°C) [MER06] Melting Point, °C: –121.0 [MER06] Boiling Point, °C: -40.5 [CRC10] Reactions: attacks glass, but not quartz [MER06]

## 3100

Compound: Sulfur trioxide N,N-dimethylformamide complex Formula:  $HCON(CH_3)_2 \cdot SO_3$ Molecular Formula:  $C_3H_7NO_4S$ Molecular Weight: 153.159 CAS RN: 29584-42-7 Properties: corrosive; uses: mild sulfating agent [ALD94] Melting Point, °C: 115–158 [ALD94]

# 3101

Compound: Sulfur trioxide( $\alpha$ ) Formula:  $\alpha$ -SO<sub>3</sub> Molecular Formula: O<sub>3</sub>S Molecular Weight: 80.064 CAS RN: 7446-11-9 Properties: solid; needles; vapor pressure (25°C) 73 mm; stable form is  $\alpha$ ; enthalpy of vaporization 43.14 kJ/mol at 25°C; enthalpy of fusion 8.60 kJ/mol [CRC10] [MER06] [HAW93] Solubility: reacts vigorously with H<sub>2</sub>O to form H<sub>2</sub>SO<sub>4</sub> [MER06] Density, g/cm<sup>3</sup>: 1.97 [CRC10] Melting Point, °C: 16.8 [CRC10] Boiling Point, °C: 45 [CRC10]

#### 3102

**Compound:** Sulfur trioxide( $\beta$ ) **Formula:**  $\beta$ -SO<sub>3</sub> Molecular Formula: O<sub>3</sub>S Molecular Weight: 80.064 CAS RN: 7446-11-9 Properties: dimer; needles; metastable; vapor pressure, 25°C, 344 mm [MER06] [CRC10] Solubility: decomposed by H<sub>2</sub>O [CRC10] Melting Point, °C: 32.5 [MER06]

#### 3103

Compound: Sulfur trioxide(γ)
Formula: γ-SO<sub>3</sub>
Molecular Formula: O<sub>3</sub>S
Molecular Weight: 80.064
CAS RN: 7446-11-9
Properties: form can be icy mass or liq; metastable [MER06] [DOU83]
Solubility: reacts violently with H<sub>2</sub>O, forming H<sub>2</sub>SO<sub>4</sub> [MER06]
Density, g/cm<sup>3</sup>: liq: 1.9224 [MER06]
Melting Point, °C: 16.8 [MER06]
Boiling Point, °C: 44.8 [MER06]

## 3104

**Compound:** Sulfur(α) Synonym: brimstone Formula: α-S Molecular Formula: S Molecular Weight: 32.066 CAS RN: 7704-34-9 Properties: yellow cryst; ortho-rhomb; stable form at usual temperatures; electrical resistivity (20°C)  $2 \times 10^{+23}$  µohm · cm; electronegativity 2.44; enthalpy of vaporization 45 kJ/mol; enthalpy of fusion 1.72 kJ/mol [CRC10] [MER06] [COT88] **Solubility:** i H<sub>2</sub>O; sl s alcohol and ether; s CS<sub>2</sub>, CCl<sub>4</sub>, benzene [HAW93] Density, g/cm<sup>3</sup>: 2.06 [MER06] Melting Point, °C: 112.8 [ALD94] Boiling Point, °C: 444.674 [ALD94] Reactions: forms monocl S at 94.5°C [MER06] Thermal Conductivity, W/(m·K): 0.205 (25°C) [ALD94]

## 3105

**Compound:** Sulfur(β) **Formula:** β-S **Molecular Formula:** S **Molecular Weight:** 32.066

CAS RN: 7704-34-9

**Properties:** monocl; light yellow; opaque; brittle; stable form from 94.5°C to 120°C; transforms if left standing to ortho-rhomb at a slow rate [MER06]

**Solubility:** i H<sub>2</sub>O; sl s alcohol, ether; s 1 g/2 mL CS<sub>2</sub>; s benzene, toluene, acetone [MER06] Density, g/cm<sup>3</sup>: 1.957 [ALD94] Melting Point, °C: 119.0 [ALD94] Boiling Point, °C: 444.674 [ALD94]

## 3106

Compound: Sulfur( $\gamma$ ) Synonym: mother-of-pearl sulfur Formula:  $\gamma$ -S Molecular Formula: S Molecular Weight: 32.066 CAS RN: 7704-34-9 Properties: yellow, amorphous [CRC10] Solubility: i H<sub>2</sub>O [CRC10] Density, g/cm<sup>3</sup>: 1.92 [CRC10] Melting Point, °C: 106.8 [MER06] Boiling Point, °C: 444.6 [CRC10]

## 3107

**Compound:** Sulfuric acid Synonym: oil of vitriol Formula: H<sub>2</sub>SO<sub>4</sub> Molecular Formula: H<sub>2</sub>O<sub>4</sub>S Molecular Weight: 98.080 CAS RN: 7664-93-9 Properties: clear, colorless, oily liq; absorbs moisture from atm; can char organic materials, e.g. sugar; miscible with water, evolving heat; enthalpy of fusion 10.71 kJ/mol; specific conductance  $1.044 \times 10^{-2}$  at 25°C; dielectric constant 110 at 20°C [MER06] [COT88] [CRC10] Solubility: miscible with H<sub>2</sub>O [HAW93] Density, g/cm<sup>3</sup>: ~1.84 [MER06] Melting Point, °C: 10.31 [CRC10] Boiling Point, °C: ~290 [MER06] **Reactions:** decomposes to SO<sub>3</sub> and H<sub>2</sub>O at 340°C [MER06]

#### 3108

Compound: Sulfuric acid fuming Synonym: oleum Formula:  $H_2SO_4 + SO_3$ Molecular Formula:  $H_2S_2O_7$ Molecular Weight: 178.144 CAS RN: 8014-95-7 Properties: commercial acid contains up to 30% SO<sub>3</sub>; colorless, or sl colored, viscous liq; choking fumes of SO<sub>3</sub> [MER06]

# 3109

**Compound:** Sulfurous acid **Formula:** H<sub>2</sub>SO<sub>3</sub> Molecular Formula: H<sub>2</sub>O<sub>3</sub>S Molecular Weight: 82.080 CAS RN: 7782-99-2 Properties: solution of sulfur dioxide in water; colorless; clear liq; odor of SO<sub>2</sub>; gradually oxidized to sulfate by atm O<sub>2</sub>; mild reducing

agent; e.g. dental bleach [MER06]

Solubility: s H<sub>2</sub>O [HAW93] Density, g/cm<sup>3</sup>: ~1.03 [MER06]

#### 3110

**Compound:** Sulfuryl chloride **Formula:**  $SO_2Cl_2$ 

**Molecular Formula:** Cl<sub>2</sub>O<sub>2</sub>S **Molecular Weight:** 134.970

CAS RN: 7791-25-5

**Properties:** colorless liq; pungent odor; turns yellow slowly when standing due to slight dissociation into Cl<sub>2</sub> and SO<sub>2</sub>; violent reaction with alkalies; enthalpy of vaporization 31.4 kJ/mol [CRC10] [MER06]

**Solubility:** slowly decomposed in H<sub>2</sub>O, forming H<sub>2</sub>SO<sub>4</sub> and HCl [MER06]; miscible with benzene, toluene, ether, acetic acid, other organic materials [MER06]

Density, g/cm<sup>3</sup>: 1.664 [MER06]

Melting Point, °C: -54.1, -46 [MER06]

Boiling Point, °C: 69.3 [MER06]

**Reactions:** forms  $SO_2Cl_2 \cdot 15H_2O$  with icy cold  $H_2O$  [MER06]

#### 3111

**Compound:** Sulfuryl fluoride **Formula:** SO<sub>2</sub>F<sub>2</sub> **Molecular Formula:** F<sub>2</sub>O<sub>2</sub>S **Molecular Weight:** 102.062 **CAS RN:** 2699-79-8

**Properties:** colorless odorless gas; not very reactive; stable up to 400°C; not hydrolyzed in H<sub>2</sub>O, but hydrolyzes in NaOH solutions; used in insecticides, fumigants [MER06] [HAW93]

Solubility: mL SO<sub>2</sub>F<sub>2</sub>/100 mL solvent: 4–5, H<sub>2</sub>O; 24–27, alcohol; 210–220, toluene; 136–138, CCl<sub>4</sub>, [MER06]
Density, g/cm<sup>3</sup>: gas: 4.55 g/L; liq; 1.7 [CRC10]
Melting Point, °C: -135.8 [MER06]
Boiling Point, °C: -55.4 [MER06]

## 3112

Compound: Tantalum Formula: Ta Molecular Formula: Ta Molecular Weight: 180.9479 CAS RN: 7440-25-7 **Properties:** gray, very hard, malleable metal; bcc, a=0.33026 nm; electrical resistivity (18°C)  $12.4 \mu$ ohm · cm; Poisson's ratio 0.35; Young's modulus at room temp 186; slowly reacts with fused alkalies; reacts with F<sub>2</sub>, Cl<sub>2</sub>, O<sub>2</sub> when heated; absorbs H<sub>2</sub> at high temp; enthalpy of vaporization 732.8 kJ/mol; enthalpy of fusion 36.57 kJ/mol; used to contain molten metals such as sodium [KIR83] [ALD94] [MER06] [CER91] [CRC] [CAB93] **Solubility:** very resistant to attack by acids except HF, resistant to alkali solutions [KIR83] **Density, g/cm<sup>3</sup>:** 16.69 [MER06]

Melting Point, °C: 2996 [ALD94]

- Boiling Point, °C: 5429 [MER06]
- **Thermal Conductivity, W/(m · K):** 54.4 at 20°C [KIR83]
- **Thermal Expansion Coefficient:** 8×10<sup>-6</sup>/°C over the temp range 20°C–1500°C [HAW93]

#### 3113

Compound: Tantalum aluminide Formula: TaAl<sub>3</sub> Molecular Formula: Al<sub>3</sub>Ta Molecular Weight: 261.859 CAS RN: 12004-76-1 Properties: -80 mesh with 99.5% purity; gray refractory powd; oxidizes slowly in air above 500°C; formed by adding Al metal to potassium fluorotantalate at ~1000°C [KIR83] [CER91] Solubility: i acids and alkalies [KIR83] Density, g/cm<sup>3</sup>: 7.02 [KIR83]

Melting Point, °C: ~1400 [KIR83]

# 3114

Compound: Tantalum boride Formula: TaB Molecular Formula: BTa Molecular Weight: 191.759 CAS RN: 12007-07-7 Properties: -325 mesh with 99.5% purity; refractory material; used as a sputtering target of 99.5% purity to produce wear-resistant and semiconductive

films, and other uses [KIR78] [CER91]

**Density, g/cm<sup>3</sup>:** 14.2 [LID94]

Melting Point, °C: 2040 [KIR78]

#### 3115

**Compound:** Tantalum carbide **Formula:** Ta<sub>2</sub>C **Molecular Formula:** CTa<sub>2</sub> **Molecular Weight:** 373.907 **CAS RN:** 12070-07-4

# Properties: hex, refractory; -325 mesh, 10μm or less, 99.5% purity; hex, a=0.3106nm [CER91] [CIC73] Density, g/cm<sup>3</sup>: 15.1 [LID94] Melting Point, °C: 3327 [LID94]

#### 3116

**Compound:** Tantalum diboride **Synonym:** tantalum boride **Formula:** TaB<sub>2</sub> **Molecular Formula:** B<sub>2</sub>Ta **Molecular Weight:** 202.570 **CAS RN:** 12077-35-1

Properties: gray metallic powd; hardness >8 mohs; can be formed by heating tantalum and boron in vacuum at ~1800°C; 99.5% pure material used as a sputtering target to produce wearresistant films and semiconductor films, and other applications [KIR83] [CER91]
Solubility: i acids and alkalies [KIR83]
Density, g/cm<sup>3</sup>: 11.15 [KIR83]

Melting Point, °C: ~3000 [KIR83]

## 3117

**Compound:** Tantalum disulfide **Formula:** TaS<sub>2</sub> **Molecular Formula:** S<sub>2</sub>Ta **Molecular Weight:** 245.080 **CAS RN:** 12143-72-5

CAS KN: 12145-72-5

Properties: black powd or cryst; used as a solid lubricant, also as a 99% pure material used as a sputtering target to form lubricant film on bearings and other moving parts; there is TaS compound [HAW93] [CER91] [STR93]
Solubility: i H<sub>2</sub>O [HAW93]

**Density, g/cm<sup>3</sup>:** 6.86 [LID94] **Melting Point, °C:** for TaS: >1300 [STR93]

## 3118

Compound: Tantalum ethoxide Formula: Ta(OC<sub>2</sub>H<sub>5</sub>)<sub>5</sub> Molecular Formula: C<sub>10</sub>H<sub>25</sub>O<sub>5</sub>Ta Molecular Weight: 406.254 CAS RN: 6074-84-6 Properties: yellow liq; moisture sensitive; 99.999% purity, <100 ppm Nb [CER91] [STR93] Density, g/cm<sup>3</sup>: 1.566 [ALD94] Melting Point, °C: 21 [CER91] Boiling Point, °C: 145 at 0.1 mm Hg [CER91]

#### 3119

**Compound:** Tantalum hydride **Formula:** TaH Molecular Formula: HTa
Molecular Weight: 181.956
CAS RN: 13981-95-8
Properties: gray, brittle with metallic luster; can form when H<sub>2</sub> is absorbed by Ta at 450°C; hydrogen is released when TaH is heated above 800°C; material is a superconductor [KIR83]
Solubility: resistant to attack by acids [KIR83]
Density, g/cm<sup>3</sup>: 15.1 [KIR83]

#### 3120

Compound: Tantalum monocarbide Formula: TaC Molecular Formula: CTa Molecular Weight: 192.959 CAS RN: 12070-06-3 Properties: cryst, very fine golden brown powd; fcc, a=0.44555 nm; refractory material; resistivity is  $30\mu$ ohm · cm at room temp; hardness 9–10 Mohs prepared by reaction of tantalum powd and carbon black at ~1900°C in an inert atm; used in crucible form for melting zirconium oxide and similar oxides with high melting points, and as a sputtering target [CER91] [KIR83] [CIC73] Solubility: i acids except mixture of HF and HNO<sub>3</sub> [KIR83] **Density, g/cm<sup>3</sup>:** 13.9 [KIR83] Melting Point, °C: 3880 [KIR83] Boiling Point, °C: 5500 [HAW93] Thermal Conductivity, W/(m·K): 22 [KIR78] **Thermal Expansion Coefficient:** 6.29×10<sup>-6</sup>/K [KIR78]

## 3121

Compound: Tantalum nitride(δ)
Formula: δ-TaN
Molecular Formula: NTa
Molecular Weight: 194.955
CAS RN: 12033-62-4
Properties: yellowish gray; fcc, a=0.4336 nm; microhardness 3200; transition temp 17.8 K; used as a 99.5% pure sputtering target to increase electrical stability of diodes, transistors and integrated circuits [KIR81] [CER91]
Solubility: i acids; decomposed by KOH with evolution of NH<sub>3</sub> [KIR83]
Density, g/cm<sup>3</sup>: 15.6 [KIR81]
Melting Point, °C: 2950 [KIR81]

### 3122

**Compound:** Tantalum nitride(ε) **Formula:** ε-TaN **Molecular Formula:** NTa

#### Molecular Weight: 194.955 CAS RN: 12033-62-4

Properties: brown, bronze or black cryst; hex, a=0.5191 nm, c=0.2906 nm; electrical resistivity 128 μohm · m; hardness 1100 microhardness; transition temp 1.8 K; forms when tantalum is heated in pure nitrogen ~1100°C [KIR81] [KIR83] [HAW93] [CIC73]
Solubility: i H<sub>2</sub>O; sl s in aqua regia, HNO<sub>3</sub> and HF [HAW93]
Density, g/cm<sup>3</sup>: 13.8 [KIR83]
Melting Point, °C: 2800 [KIR83]
Reactions: evolves N<sub>2</sub> if heated to 2000°C [KIR83]
Thermal Conductivity, W/(m · K): 9.54 [KIR81]

# 3123

Compound: Tantalum pentabromide
Synonym: tantalum(V) bromide
Formula: TaBr<sub>5</sub>
Molecular Formula: Br<sub>5</sub>Ta
Molecular Weight: 580.468
CAS RN: 13451-11-1
Properties: yellow cryst powd; sensitive to moisture; enthalpy of vaporization 62.3 kJ/mol; enthalpy of fusion 45.60 kJ/mol; can be prepared by heating tantalum metal in pure bromine gas above 300°C [STR93] [CRC10]
Density, g/cm<sup>3</sup>: 4.67 [STR93]

Melting Point, °C: 240 [ALD94] Boiling Point, °C: 349 [CRC10]

## 3124

**Compound:** Tantalum pentachloride Synonym: tantalum(V) chloride Formula: TaCl<sub>5</sub> Molecular Formula: Cl<sub>5</sub>Ta Molecular Weight: 358.212 CAS RN: 7721-01-9 Properties: resublimed yellow cryst powd; monocl; decomposed in moist atm; enthalpy of fusion 35.10 kJ/mol; enthalpy of vaporization 54.8 kJ/mol; formed by reaction of Cl<sub>2</sub> with tantalum at 200°C; used in the chlorination of organic materials [HAW93] [MER06] [CRC10] Solubility: decomposed in H<sub>2</sub>O; s absolute alcohol [MER06] Density, g/cm<sup>3</sup>: 3.68 [MER06] Melting Point, °C: 216 [CRC10] Boiling Point, °C: 242 [CRC10]

## 3125

**Compound:** Tantalum pentafluoride **Synonym:** tantalum(V) fluoride

Formula: TaF<sub>5</sub>
Molecular Formula: F<sub>5</sub>Ta
Molecular Weight: 275.940
CAS RN: 7783-71-3
Properties: off-white deliq powd; enthalpy of vaporization is 56.9 kJ/mol; slowly etches glass; can be produced by fluorination of Ta metal; used as a catalyst in organic reactions [MER06] [STR93] [HAW93] [CRC10] [KIR78]
Solubility: s H<sub>2</sub>O, ether, conc HNO<sub>3</sub>; sl s hot CS<sub>2</sub>, CCl<sub>4</sub> [MER06]
Density, g/cm<sup>3</sup>: 4.74 [MER06]
Melting Point, °C: 96.8 [KIR83]
Boiling Point, °C: 229.5 [MER06]

#### 3126

Compound: Tantalum pentaiodide
Synonym: tantalum(V) iodide
Formula: TaI₅
Molecular Formula: I₅Ta
Molecular Weight: 815.470
CAS RN: 14693-81-3
Properties: hex black powd; sensitive to moisture [LID94] [STR93]
Density, g/cm<sup>3</sup>: 5.80 [LID94]
Melting Point, °C: 496 [KIR83]
Boiling Point, °C: 543 [KIR83]
Reactions: minus iodine above 1000°C [KIR83]

## 3127

Compound: Tantalum pentoxide Synonym: tantalum(V) oxide Formula: Ta<sub>2</sub>O<sub>5</sub> Molecular Formula: O<sub>5</sub>Ta<sub>2</sub> Molecular Weight: 441.893 CAS RN: 1314-61-0 Properties: white microcryst rhomb powd; decomposed by fusing with KHSO<sub>4</sub> or KOH; forms potassium tantalate when fused with KOH; enthalpy of fusion 120.00 kJ/mol; can be prepared by igniting Ta in air; used in optical glass, lasers and as a dielectric material, also as an evaporation material and sputtering target of 99.95% purity for dielectric films and multilayers [HAW93] [MER06] [KIR83] [CER91] [CRC10] Solubility: i H<sub>2</sub>O, alcohol, mineral acids; s HF [MER06] Density, g/cm<sup>3</sup>: 8.2 [KIR83] Melting Point, °C: 1800 [KIR83] Reactions: reacts with carbon at 1900°C to form the carbide [KIR83]

**Compound:** Tantalum pentoxide hydrate **Synonym:** tantalic acid **Formula:**  $Ta_2O_5 \cdot xH_2O$ **Molecular Formula:**  $O_5Ta_2$  (anhydrous) **Molecular Weight:** 441.893 (anhydrous) **CAS RN:** 75397-94-3

**Properties:** white insoluble precipitate formed by leaching a potassium pyrosulfate fusion of tantalum in H<sub>2</sub>O; tantalic acid forms organic complexes with tannic, oxalic, tartaric, citric and pyrogallic acids; used in analytical chemistry [KIR83]

# 3129

Compound: Tantalum phosphide Formula: TaP Molecular Formula: PTa Molecular Weight: 211.922 CAS RN: 12037-63-7 Properties: -100 mesh with 99.5% purity [CER91]

3130

Compound: Tantalum selenide Formula: TaSe<sub>2</sub> Molecular Formula: Se<sub>2</sub>Ta Molecular Weight: 338.868 CAS RN: 12039-55-3 Properties: -325 mesh, 10μm or less, 99.8% pure material used as a sputtering target

to produce lubricant films [CER91]

# 3131

**Compound:** Tantalum silicide Formula: TaSi<sub>2</sub> Molecular Formula: Si<sub>2</sub>Ta Molecular Weight: 237.119 CAS RN: 12039-79-1 Properties: gray powd: used in t

Properties: gray powd; used in the form of a 99.5%–99.95% pure material as a sputtering target in the fabrication of integrated circuits; there is also the compound Ta<sub>5</sub>Si<sub>3</sub>, 12067-56-0 [STR93] [CER91]
Density, g/cm<sup>3</sup>: 9.14 [STR93]
Melting Point, °C: 2200 [STR93]

#### 3132

**Compound:** Tantalum telluride **Formula:** TaTe<sub>2</sub> **Molecular Formula:** TaTe<sub>2</sub> **Molecular Weight:** 436.148 **CAS RN:** 12067-66-2 **Properties:** –325 mesh 10μm or less with 99.8% purity [CER91]

## 3133

Compound: Tantalum tetroxide Formula: Ta<sub>2</sub>O<sub>4</sub> Molecular Formula: O<sub>4</sub>Ta<sub>2</sub> Molecular Weight: 425.894 CAS RN: 12035-90-4 Properties: dark gray powd; probably forms when the pentoxide is partially reduced by carbon at 1900°C [KIR83] [CRC10] Reactions: oxidizes on heating [CRC10]

### 3134

Compound: Tantalum trisilicide Formula: Ta<sub>5</sub>Si<sub>3</sub> Molecular Formula: Si<sub>3</sub>Ta<sub>5</sub> Molecular Weight: 988.996 CAS RN: 12067-56-0 Properties: -325 mesh powd; used as a 99.5 or 99.95% material as a sputtering target in the fabrication of integrated circuits [ALF93] [CER91]

#### 3135

Compound: Technetium Formula: Tc Molecular Formula: Tc Molecular Weight: 98 CAS RN: 7440-26-8 Properties: closed-packed hex, a=0.2741 nm, c = 0.4399 nm; enthalpy of sublimation 650 kJ/mol; enthalpy of vaporization ~577 kJ/mol; enthalpy of fusion 33.29 kJ/mol; slowly tarnishes in moist air; when obtained from H<sub>2</sub> reduction of ammonium pertechnate, has silvery gray color, and a spongy mass; resembles rhenium in chemical behavior; Debye constant 455 K; used as a metallurgical tracer, in nuclear medicine, and to protect against corrosion [HAW93] [MER06] [RAR83] [CRC10] **Density, g/cm<sup>3</sup>:** 11.5 [HAW93] Melting Point, °C: 2167 [RAR83] Boiling Point, °C: ~4600 [RAR83] Thermal Conductivity, W/(m·K): 50.6 [CRC10] Thermal Expansion Coefficient: a-axis:  $7.04 \times 10^{-6}$ /K; c-axis:  $7.06 \times 10^{-6}$ /K [RAR83]

**3136 Compound:** Technetium dioxide **Formula:** TcO<sub>2</sub> Molecular Formula:  $O_2Tc$ Molecular Weight: 130 CAS RN: 12036-16-7 Properties: there is a monohydrate, CAS RN 42861-23-4, and a dihydrate, CAS RN 60003-95-4 [ERI92] Solubility:  $H_2O$ :  $TcO_2 \cdot nH_2O = TcO(OH)_2(aq) + (n-1)H_2O$ , log K = -8.16;  $TcO_2 \cdot n2H_2O + H_2O = Tc(OH)_3 - + (n-1)$   $H_2O + H^+$ , log K = -19.20; reference also contains predominance diagram [ERI92]

## 3137

Compound: Telluric acid Synonym: orthotelluric acid Formula:  $H_6TeO_6$ Molecular Formula:  $H_6O_6Te$ Molecular Weight: 229.644 CAS RN: 7803-68-1 Properties: -40 mesh with 99.5% purity; white solid; monocl, cub; very weak acid,  $K_1 = 2 \times 10^{-8}$ ,  $K_2 = 1 \times 10^{-11}$  [MER06] [CER91] Solubility: g  $H_2TeO_6/100$  g  $H_2O$ : 16.2 (0°C), 41.6 (20°C), 155 (100°C) [LAN05]; tends to polymerize; s dil HNO<sub>3</sub> [MER06] Density, g/cm<sup>3</sup>: monocl: 3.068; cub: 3.163 [MER06] Melting Point, °C: 136 [HAW93] Boiling Point, °C: 160, decomposes [STR93]

## 3138

Compound: Tellurium Formula: Te Molecular Formula: Te Molecular Weight: 127.60 CAS RN: 13494-80-9 Properties: grayish white, lustrous, brittle; rhomb cryst; hardness, 2.3 Mohs; Poisson's ratio 0.33 at 30°C; enthalpy of fusion 17.87 kJ/mol;

enthalpy of vaporization 114.1 kJ/mol; electrical resistivity (20°C) (5.8–33) × 10<sup>+3</sup> µohm · cm; modulus of elasticity 4140 MPa; viscosity at mp 1.8–1.95 mPa · s; electronegativity 2.01; burns with greenish blue flame; p-type semiconductor; used in thin film devices as blocking contact [HAW93] [MER06] [CRC10] [KIR83] [COT88] [CER91] [ALD94]
Solubility: i H<sub>2</sub>O, benzene, CS<sub>2</sub> [MER06]
Density, g/cm<sup>3</sup>: 6.24 (cryst) [KIR83]
Melting Point, °C: 449.8 [MER06]
Boiling Point, °C: 989.8 [ALD94]
Reactions: reacts with HNO<sub>3</sub>, conc H<sub>2</sub>SO<sub>4</sub>, KOH, forming red solution [MER06]
Thermal Conductivity, W/(m·K): 1.97

to 3.38 (25°C) [ALD94]

## 3139

**Compound:** Tellurium decafluoride **Formula:** Te<sub>2</sub>F<sub>10</sub> **Molecular Formula:** F<sub>10</sub>Te<sub>2</sub> **Molecular Weight:** 445.184 **CAS RN:** 53214-07-6 **Properties:** volatile, colorless liq; stable [KIR83] **Melting Point,** °C: -33.7 [KIR83] **Boiling Point,** °C: 59 [KIR83]

## 3140

Compound: Tellurium dibromide
Synonym: tellurous bromide
Formula: TeBr<sub>2</sub>
Molecular Formula: Br<sub>2</sub>Te<sub>2</sub>
Molecular Weight: 287.408
CAS RN: 7789-54-0
Properties: greenish black cryst mass, or gray to black needles; very hygr; has a violet vapor [HAW93]
Solubility: decomposed by H<sub>2</sub>O; s ether; sl s chloroform [MER06]
Melting Point, °C: 210 [HAW93]
Boiling Point, °C: 339 [HAW93]

## 3141

Compound: Tellurium dichloride Synonym: tellurous chloride Formula: TeCl<sub>2</sub> Molecular Formula: Cl<sub>2</sub>Te Molecular Weight: 198.505 CAS RN: 10025-71-5 Properties: black amorphous solid; hygr; melts to a black liq; purple vapor, disproportionates in ether, dioxane [MER06] [KIR83] Solubility: decomposed by H<sub>2</sub>O; i CCl<sub>4</sub> [MER06] [HAW93] Density, g/cm<sup>3</sup>: 6.9 [HAW93] Melting Point, °C: 208 [MER06] Boiling Point, °C: 328 [MER06]

#### 3142

**Compound:** Tellurium dioxide **Synonym:** tellurite

**Formula:** TeO<sub>2</sub>

**Molecular Formula:** O<sub>2</sub>Te

Molecular Weight: 159.599

CAS RN: 7446-07-3

**Properties:** white cryst; tetr and ortho-rhomb; yellow when heated; made by dissolving Te in strong  $HNO_3$  to form  $2TeO_2 \cdot HNO_3$  at  $400^{\circ}C-430^{\circ}C$ , then decomposing this product [KIR83] [MER06]
Solubility: s H<sub>2</sub>O ~1:150,000; s NaOH, HCl solutions [MER06]
Density, g/cm<sup>3</sup>: tetr: 5.75; ortho-rhomb: 6.04 [MER06]
Melting Point, °C: 733, forming yellow liq [MER06]
Boiling Point, °C: 1245 [HAW93]

## 3143

Compound: Tellurium disulfide
Formula: TeS<sub>2</sub>
Molecular Formula: S<sub>2</sub>Te
Molecular Weight: 191.732
CAS RN: 7446-35-7
Properties: red powd; eventually turns to brown amorphous powd; fuses to a gray, lustrous mass [HAW93]
Solubility: i H<sub>2</sub>O, acids; s in alkali sulfides [HAW93]

## 3144

Compound: Tellurium hexafluoride
Formula: TeF<sub>6</sub>
Molecular Formula: F<sub>6</sub>Te
Molecular Weight: 241.590
CAS RN: 7783-80-4
Properties: colorless gas; does not attack glass when pure [MER06]
Solubility: slowly mixes with H<sub>2</sub>O, hydrolyzing to telluric acid [MER06]
Density, g/cm<sup>3</sup>: solid (-191°C): 4.006; liq (-10°C): 2.499 [MER06]
Melting Point, °C: -37.6 [MER06]
Boiling Point, °C: 35.5 [CRC10]
Reactions: reduced by Te to TeF<sub>4</sub> [KIR83]

## 3145

Compound: Tellurium nitrate Synonym: basic tellurium nitrate Formula:  $TeO_2 \cdot NO_3$ Molecular Formula:  $NO_5Te$ Molecular Weight: 221.604 CAS RN: 64535-94-0 Properties: prepared by dissolution of Te in HNO<sub>3</sub> [KIR83] Melting Point, °C: decomposes from 190 to 300 [KIR83]

## 3146

**Compound:** Tellurium nitride **Formula:** Te<sub>3</sub>N<sub>4</sub> **Molecular Formula:** N<sub>4</sub>Te<sub>3</sub> **Molecular Weight:** 438.827 **CAS RN:** 12164-01-1 Properties: citron-yellow colored solid; unstable, and can detonate readily if struck or heated [KIR83]Solubility: could explode on contact with H<sub>2</sub>O [KIR83]

## 3147

Compound: Tellurium sulfate Synonym: basic tellurium sulfate Formula:  $2\text{TeO}_2 \cdot \text{SO}_3$ Molecular Formula:  $O_7\text{STe}_2$ Molecular Weight: 399.262 CAS RN: 12068-84-8 Properties: prepared by dissolution of TeO<sub>2</sub> solution in  $H_2\text{SO}_4$ , followed by slow evaporation to form the compound; stable up to 440°C–500°C [KIR83] Solubility: slowly hydrolyzed by cold  $H_2O$ , rapidly by hot  $H_2O$  [KIR83]

## 3148

Compound: Tellurium tetrabromide
Formula: TeBr<sub>4</sub>
Molecular Formula: Br<sub>4</sub>Te
Molecular Weight: 447.216
CAS RN: 10031-27-3
Properties: -4 mesh with 99.9% purity; orange cryst, turning red when hot [MER06] [CER91]
Solubility: s in small volume of H<sub>2</sub>O, hydrolyzes in larger volume [MER06]
Density, g/cm<sup>3</sup>: 4.3 [MER06]
Melting Point, °C: ~380 [MER06]
Boiling Point, °C: 420, decomposes to TeBr<sub>2</sub> and Br<sub>2</sub> [HAW93]

## 3149

Compound: Tellurium tetrachloride
Formula: TeCl<sub>4</sub>
Molecular Formula: Cl<sub>4</sub>Te
Molecular Weight: 269.411
CAS RN: 10026-07-0
Properties: white, cryst sold; very hygr; decomposed by water to TeO<sub>2</sub> and HCl; melts to a yellow liq, dark red at higher temperatures; enthalpy of vaporization 77 kJ/mol [MER06] [CRC10]
Solubility: s in absolute alcohol, toluene [MER06]
Density, g/cm<sup>3</sup>: 3.01 [MER06]
Melting Point, °C: 225 [MER06]
Boiling Point, °C: ~390 [KIR83]

## 3150

**Compound:** Tellurium tetrafluoride **Formula:**  $TeF_4$ **Molecular Formula:**  $F_4Te$  Molecular Weight: 203.594
CAS RN: 15192-26-4
Properties: white hygr needles; attacks glass, silica, and copper at 200°C, does not attack platinum below 300°C [KIR83]
Solubility: readily hydrolyzed [KIR83]
Melting Point, °C: decomposes to TaF<sub>6</sub> at 194 [KIR83]

## 3151

Compound: Tellurium tetraiodide
Formula: TeI<sub>4</sub>
Molecular Formula: I<sub>4</sub>Te
Molecular Weight: 635.218
CAS RN: 7790-48-9
Properties: -4 mesh with 99.9% purity; grayish black volatile cryst; stable in moist air [MER06] [KIR83] [CER91]
Solubility: hydrolyzed by H<sub>2</sub>O forming TeO<sub>2</sub>, HI; s HI; sl s acetone [MER06]
Density, g/cm<sup>3</sup>: 5.05 [MER06]
Melting Point, °C: 280 [MER06]
Reactions: I<sub>2</sub> evolved by heating [MER06]

## 3152

Compound: Tellurium trioxide
Formula: TeO<sub>3</sub>
Molecular Formula: O<sub>3</sub>Te
Molecular Weight: 175.598
CAS RN: 13451-18-8
Properties: -60 mesh with 99.9% purity; two forms: yellowish orange α, and grayish β; α is a strong oxidant, e.g. reacting vigorously with Al, Sn, C, P and S [KIR83] [CER91]
Density, g/cm<sup>3</sup>: α: 5.07; β: 6.21 [KIR83]
Melting Point, °C: decomposes [CRC10]

## 3153

Compound: Tellurous acid Formula: H<sub>2</sub>TeO<sub>3</sub> Molecular Formula: H<sub>2</sub>O<sub>3</sub>Te Molecular Weight: 177.614 CAS RN: 10049-23-7 Properties: unstable white cryst, or cryst powd; dehydrates readily to TeO<sub>2</sub> [KIR83] [MER06] Solubility: sl s H<sub>2</sub>O; s in dil acids, alkalies [MER06] Density, g/cm<sup>3</sup>: 3.05 [HAW93] Melting Point, °C: 40, decomposes [HAW93]

# 3154

**Compound:** Terbium **Formula:** Tb

Molecular Formula: Tb Molecular Weight: 158.92534 CAS RN: 7440-27-9 Properties: silvery gray metal; easily oxidized by atm  $O_2$ ; hex close-packed; electrical resistivity (20°C)  $116 \mu ohm \cdot cm$ ; enthalpy of fusion is 10.80 kJ/mol; enthalpy of sublimation 288.7 kJ/mol; radius of atom is 0.17833 nm; radius of Tb+++ ion is 0.0923 nm; forms colorless solutions; used as a phosphor activator [HAW93] [MER06] [KIR82] [ALD94] **Solubility:** slowly reacts with H<sub>2</sub>O; s dil acids [HAW93] Density, g/cm<sup>3</sup>: 8.27 [MER06] Melting Point, °C: 1356 [MER06] Boiling Point, °C: 3230 [ALD94] Thermal Conductivity, W/(m·K): 11.1 (25°C) [CRC10] Thermal Expansion Coefficient: 10.3×10<sup>-6</sup>/K [CRC10]

## 3155

**Compound:** Terbium acetate hydrate **Formula:** Tb(CH<sub>3</sub>COO)<sub>3</sub> · xH<sub>2</sub>O **Molecular Formula:** C<sub>6</sub>H<sub>9</sub>O<sub>6</sub>Tb (anhydrous) **Molecular Weight:** 336.059 (anhydrous) **CAS RN:** 100587-92-6 **Properties:** hygr [ALD94]

## 3156

**Compound:** Terbium acetylacetonate trihydrate **Synonyms:** 2,4-pentanedione, terbium(III) derivative **Formula:** Tb(CH<sub>3</sub>COCH=C(O)(CH<sub>3</sub>)<sub>3</sub> $\cdot$ 3H<sub>2</sub>O **Molecular Formula:** C<sub>15</sub>H<sub>27</sub>O<sub>9</sub>Tb **Molecular Weight:** 510.299 **CAS RN:** 14284-95-8 **Properties:** white powd; hygr [STR93] **Melting Point,** °C: 168–170 [STR93]

## 3157

Compound: Terbium bromide Formula: TbBr<sub>3</sub> Molecular Formula: Br<sub>3</sub>Tb Molecular Weight: 398.637 CAS RN: 14456-47-4 Properties: hex, silvery gray; -20 mesh with 99.9% purity [CER91] [CRC10] Melting Point, °C: 827 [AES93] Boiling Point, °C: 1490 [CRC10]

#### 3158

**Compound:** Terbium carbonate hydrate **Formula:**  $Tb_2(CO_3)_3 \cdot xH_2O$ **Molecular Formula:**  $C_3O_9Tb_2$  (anhydrous) **Molecular Weight:** 497.878 (anhydrous)

## CAS RN: 100587-96-0 Properties: white powd [STR93]

## 3159

Compound: Terbium chloride Formula: TbCl<sub>3</sub> Molecular Formula: Cl<sub>3</sub>Tb Molecular Weight: 265.283 CAS RN: 10042-88-3 Properties: -20 mesh with 99.9% purity; off-white powd; hygr [STR93] [CER91] Solubility: s H<sub>2</sub>O [MER06] Density, g/cm<sup>3</sup>: 4.35 [MER06] Melting Point, °C: 588 [MER06]

## 3160

Compound: Terbium chloride hexahydrate Formula:  $TbCl_3 \cdot 6H_2O$ Molecular Formula:  $Cl_3H_{12}O_6Tb$ Molecular Weight: 373.374 CAS RN: 13798-24-8 Properties: -4 mesh with 99.9% purity; transparent, colorless prismatic cryst; very hygr [HAW93] [CER91] Solubility: v s H<sub>2</sub>O; forms supersaturated solutions [MER06] Density, g/cm<sup>3</sup>: 4.35 [HAW93] Melting Point, °C: 588 (anhydrous) [HAW93] Reactions: minus  $6H_2O$  180°C–200°C (in HCl gas stream) [MER06]

## 3161

Compound: Terbium fluoride
Formula: TbF<sub>3</sub>
Molecular Formula: F<sub>3</sub>Tb
Molecular Weight: 215.920
CAS RN: 13708-63-9
Properties: white powd, and 99.9% pure melted pieces of 3–12 mm; hygr; pieces used as evaporation material for possible application to multilayers [STR93] [CER91]
Melting Point, °C: 1172 [STR93]

## 3162

**Compound:** Terbium hydride **Formula:** TbH<sub>2-3</sub> **Molecular Formula:** H<sub>2</sub>Tb; H<sub>3</sub>Tb **Molecular Weight:** TbH<sub>2</sub>: 160.941; TbH<sub>3</sub>: 161.949 **CAS RN:** 13598-54-4 **Properties:** -60 mesh with 99.9% purity [CER91]

## 3163

Compound: Terbium iodide Formula: TbI<sub>3</sub> Molecular Formula: I<sub>3</sub>Tb Molecular Weight: 539.638 CAS RN: 13813-40-6 Properties: -20 mesh with 99.9% purity [CER91] Density, g/cm<sup>3</sup>: ~5.2 [LID94] Melting Point, °C: 946 [AES93] Boiling Point, °C: >1300 [CRC10]

## 3164

Compound: Terbium nitrate hexahydrate Formula:  $Tb(NO_3)_3 \cdot 6H_2O$ Molecular Formula:  $H_{12}N_3O_{15}Tb$ Molecular Weight: 453.031 CAS RN: 13451-19-9 Properties: colorless; monocl cryst or white powd [HAW93] [MER06] Solubility: s  $H_2O$  [HAW93] Melting Point, °C: 893 [AES93]

#### 3165

Compound: Terbium nitride Formula: TbN Molecular Formula: NTb Molecular Weight: 172.932 CAS RN: 12033-64-6 Properties: cub cryst; -40 mesh with 99.9% purity [LID94] [CER91] Density, g/cm<sup>3</sup>: 9.55 [LID94]

## 3166

**Compound:** Terbium oxalate hydrate **Formula:**  $Tb_2(C_2O_4)_3 \cdot xH_2O$  **Molecular Formula:**  $C_6O_{12}Tb_2$  (anhydrous) **Molecular Weight:** 581.909 (anhydrous) **CAS RN:** 24670-06-2 **Properties:** white powd, x = 10 [CRC10] [STR93] **Density, g/cm<sup>3</sup>:** x = 10: 2.60 [STR93] **Reactions:** minus  $H_2O$  at 40°C [CRC10]

## 3167

**Compound:** Terbium perchlorate hexahydrate **Formula:**  $Tb(ClO_4)_3 \cdot 6H_2O$ **Molecular Formula:**  $Cl_3H_{12}O_{18}Tb$ **Molecular Weight:** 565.367 **CAS RN:** 14014-09-6 **Properties:** white cryst; hygr [STR93]

Compound: Terbium silicide Formula: TbSi<sub>2</sub> Molecular Formula: Si<sub>2</sub>Tb Molecular Weight: 215.096 CAS RN: 12039-80-4 Properties: ortho-rhomb cryst; 10 mm & down lump [LID94] [ALF93] Density, g/cm<sup>3</sup>: 6.66 [LID94]

## 3169

**Compound:** Terbium sulfate octahydrate **Formula:**  $Tb_2(SO_4)_3 \cdot 8H_2O$  **Molecular Formula:**  $H_{16}O_{20}S_3Tb_2$  **Molecular Weight:** 750.164 **CAS RN:** 13842-67-6 **Properties:** white cryst [STR93] **Solubility:** s  $H_2O$  [HAW93] **Reactions:** minus  $8H_2O$  at 360°C [HAW93]

#### 3170

Compound: Terbium sulfide Formula: Tb<sub>2</sub>S<sub>3</sub> Molecular Formula: S<sub>3</sub>Tb<sub>2</sub> Molecular Weight: 414.049 CAS RN: 12138-11-3 Properties: cub cryst; -200 mesh with 99.9% purity [LID94] [CER91] Density, g/cm<sup>3</sup>: 6.35 [LID94]

## 3171

Compound: Terbium(III,IV) oxide
Formula: Tb<sub>4</sub>O<sub>7</sub>
Molecular Formula: O<sub>7</sub>Tb<sub>4</sub>
Molecular Weight: 747.697
CAS RN: 12037-01-3
Properties: dark brown powd, or sintered pieces 3–12 mm; sl hygr; absorbs atm CO<sub>2</sub>; used as an evaporation material of 99.9% purity; possibly reactive to radio frequencies [HAW93] [CER91]
Solubility: s dil acids [HAW93]
Reactions: minus O<sub>2</sub> on heating [CRC10]

## 3172

**Compound:** Tetraborane(10) **Formula:**  $B_4H_{10}$ **Molecular Formula:**  $B_4H_{10}$ **Molecular Weight:** 53.323 **CAS RN:** 18283-93-7 Properties: gas with disagreeable odor; vapor pressure, mm Hg: (0°C) 388, (6°C) 580; enthalpy of vaporization 27.1 kJ/mol; decomposes in a few hours at room temp, more rapidly at 100°C; spontaneously flammable in air, unless pure [MER06] [COT88] [CRC10]
Solubility: hydrolyzes in H<sub>2</sub>O to boric acid with evolution of hydrogen [MER06]
Density, g/cm<sup>3</sup>: 2.34 g/L [LID94]
Melting Point, °C: -120 [KIR78]
Boiling Point, °C: 18 [KIR78]

## 3173

**Compound:** Tetrabromodiborane **Formula:** B<sub>2</sub>Br<sub>4</sub> **Molecular Formula:** B<sub>2</sub>Br<sub>4</sub> **Molecular Weight:** 341.238 **CAS RN:** 14355-29-4 **Properties:** col liq [CRC10] **Melting Point,** °C: ~1 [CRC10] **Boiling Point,** °C: decomposes at 20 [CRC10]

#### 3174

**Compound:** Tetrachlorodiborane **Formula:** B<sub>2</sub>Cl<sub>4</sub> **Molecular Formula:** B<sub>2</sub>Cl<sub>4</sub> **Molecular Weight:** 163.434 **CAS RN:** 13701-67-2 **Properties:** colorless liq; flam [CRC10] **Melting Point,** °C: -92.6 [CRC10] **Boiling Point,** °C: 66.5 [CRC10]

## 3175

**Compound:** Tetradecaborane(18) **Formula:**  $B_{14}H_{18}$  **Molecular Formula:**  $B_{14}H_{18}$  **Molecular Weight:** 169.497 **CAS RN:** 55606-55-8 **Properties:** visc yellow oil [CRC10] **Solubility:** s cychex, CS<sub>2</sub> [CRC10] **Boiling Point,** °C: decomposes at 100 [CRC10]

## 3176

**Compound:** Tetraethyl lead **Synonym:** TEL **Formula:**  $(C_2H_5)_4$ Pb **Molecular Formula:**  $C_8H_{20}$ Pb **Molecular Weight:** 323.447 **CAS RN:** 78-00-2 Properties: colorless liq; burns with orange-colored flame; obtained by reacting PbCl<sub>2</sub> and zinc-ethyl; uses: formerly used as gasoline additive [ALD94] [MER06]
Solubility: i H<sub>2</sub>O; s benzene, petroleum ether, gasoline [MER06]
Density, g/cm<sup>3</sup>: 1.653 [ALD94]
Melting Point, °C: -136 [ALD94]
Boiling Point, °C: 84-85 at 15 mm Hg [ALD94]

#### 3177

**Compound:** Tetraethyl silane **Formula:**  $Si(C_2H_5)_4$  **Molecular Formula:**  $C_8H_{20}Si$  **Molecular Weight:** 144.332 **CAS RN:** 631-36-7 **Properties:** hygr [ALD94] **Density, g/cm<sup>3</sup>:** 0.766 [ALD94] **Melting Point, °C:** -82.5 [ALD94] **Boiling Point, °C:** 153-154 [ALD94]

## 3178

Compound: Tetraethylammonium bromide
Synonym: TEAB
Formula: (C<sub>2</sub>H<sub>5</sub>)<sub>4</sub>NBr
Molecular Formula: C<sub>8</sub>H<sub>20</sub>BrN
Molecular Weight: 210.158
CAS RN: 71-91-0
Properties: hygr cryst; prepared from triethylamine and ethyl bromide; used as ganglion blocking agent [MER06] [ALD94]
Solubility: v s H<sub>2</sub>O, alcohol, chloroform [MER06]
Melting Point, °C: 285, decomposes [ALD94]
Thermal Expansion Coefficient: from 25°C to 100°C (0.18), 200°C (0.42), 400°C (0.90), 600°C (1.38), 800°C (1.86), 1000°C (2.34), 1200°C (2.82) [TAY91b]

## 3179

Compound: Tetraethylammonium chloride Synonym: T.E.A. chloride Formula: (C<sub>2</sub>H<sub>5</sub>)<sub>4</sub>NCl Molecular Formula: C<sub>8</sub>H<sub>20</sub>ClN Molecular Weight: 165.706 CAS RN: 56-34-8 Properties: deliq cryst, tetrahydrate is monocl; ganglion blocking agent [MER06] Solubility: s H<sub>2</sub>O [MER06] Density, g/cm<sup>3</sup>: 1.0801 [MER06] Melting Point, °C: 37.5 (tetrahydrate) [MER06]

#### 3180

Compound: Tetraethylorthosilicate Synonym: ethyl silicate Formula:  $Si(OC_2H_5)_4$ Molecular Formula: C<sub>8</sub>H<sub>20</sub>O<sub>4</sub>Si Molecular Weight: 208.329 CAS RN: 78-10-4 Properties: colorless, flammable liq; flash point 52°C; prepared by reaction of absolute ethanol with SiCl<sub>4</sub>; sensitive to moisture; used in the solgel preparation of zircon, in weatherproofing and hardening stone [MER06] [ALD94] Solubility: miscible with ethanol; reacts with H<sub>2</sub>O [MER06] Density, g/cm<sup>3</sup>: 0.934 [ALD94] Melting Point, °C: -77 [MER06] Boiling Point, °C: 165–166 [MER06]

#### 3181

**Compound:** Tetragermane **Formula:**  $Ge_4H_{10}$  **Molecular Formula:**  $Ge_4H_{10}$  **Molecular Weight:** 300.64 **CAS RN:** 14691-47-5 **Properties:** col liq [CRC10] **Solubility:** i H<sub>2</sub>O [CRC10] **Boiling Point, °C:** 176.9 [CRC10]

#### 3182

**Compound:** Tetrafluoroboric acid **Formula:** HBF<sub>4</sub> **Molecular Formula:** HBF<sub>4</sub> **Molecular Weight:** 87.813 **CAS RN:** 16872-11-0 **Properties:** col liq [CRC10] **Solubility:** v s H<sub>2</sub>O, EtOH [CRC10] **Density, g/cm<sup>3</sup>:** ~1.8 [CRC10] **Boiling Point:** decomposes at 130 [CRC10]

#### 3183

**Compound:** Tetrafluorodiborane **Formula:**  $B_2F_4$ **Molecular Formula:**  $B_2F_4$ **Molecular Weight:** 97.616 **CAS RN:** 13965-73-6 **Properties:** col gas; flam [CRC10] **Solubility:** reac H<sub>2</sub>O [CRC10] **Density, g/L:** 3.990 [CRC10] **Melting Point,** °C: -56 [CRC10] **Boiling Point,** °C: -34 [CRC10]

**Compound:** Tetracarbonyldihydroiron **Formula:**  $Fe(CO)_4H_2$  **Molecular Formula:**  $C_4H_2FeO_4$  **Molecular Weight:** 169.902 **CAS RN:** 12002-28-7 **Properties:** col liq; stab low temp [CRC10] **Solubility:** s alk [CRC10] **Melting Point,** °C: -70 [CRC10] **Boiling Point,** °C: decomposes at -20 [CRC10]

## 3185

**Compound:** Tetramethylgermane **Formula:**  $(CH_3)_4$ Ge **Molecular Formula:**  $C_4H_{12}$ Ge **Molecular Weight:** 132.749 **CAS RN:** 865-52-1 **Properties:** liq; flammable [ALD94] **Density, g/cm<sup>3</sup>:** 0.978 [ALD94] **Melting Point, °C:** -88 [ALD94] **Boiling Point, °C:** 43-44 [ALD94]

## 3186

Compound: Tetramethyltin Formula: (CH<sub>3</sub>)<sub>4</sub>Sn Molecular Formula: C<sub>4</sub>H<sub>12</sub>Sn Molecular Weight: 178.849 CAS RN: 594-27-4 Properties: liq; flammable [ALD94] Density, g/cm<sup>3</sup>: 1.291 [ALD94] Melting Point, °C: -54 [ALD94] Boiling Point, °C: 74-75 [ALD94]

#### 3187

**Compound:** Tetrapropylammonium perruthenate(VII) **Synonym:** TPAP **Formula:**  $(CH_3CH_2CH_2)_4NRuO_4$  **Molecular Formula:**  $C_{12}H_{28}NO_4Ru$  **Molecular Weight:** 351.428 **CAS RN:** 114615-82-6 **Properties:** sold; mild catalytic oxidant [ALD94] **Melting Point,** °C: 165, decomposes [ALD94] **Reactions:** explodes when heated [ALD94]

## 3188

Compound: Thallium Formula: Tl Molecular Formula: Tl Molecular Weight: 204.3833 CAS RN: 7440-28-0 **Properties:**  $\alpha$ -Tl: hex;  $\beta$ -Tl: cub; bluish white, very soft; enthalpy of fusion 4.14 kJ/mol; vaporization enthalpy 165 kJ/mol; Brinell hardness is 2; resistivity 16.6 µohm · cm; oxidizes in air, forming oxide film on surface; used in low melting alloys as electrode to measure the dissolved oxygen content of waters; photoelectric [CIC73] [HAW93] [ALD94] [MER06] [KIR83] [CRC10] Solubility: i H<sub>2</sub>O; reacts with HNO<sub>3</sub>, H<sub>2</sub>SO<sub>4</sub> [MER06] **Density, g/cm<sup>3</sup>:** α: 11.85; β: 11.86–11.87 [CIC73] Melting Point, °C: 303.5 [MER06] Boiling Point, °C: 1553 [COT88] Reactions: volatilization begins at 174°C [MER06] Thermal Conductivity, W/(m·K): 46.1 (25°C) [CRC10] **Thermal Expansion Coefficient:** (volume)  $\times 10^{-6/\circ}$ C: 90 (20°C) α, 124 β, 140 lig [CIC73]

## 3189

Compound: Thallium barium calcium copper oxide Formula:  $Tl_4Ba_3Ca_3Cu_4O_{13}$ Molecular Formula:  $Ba_3Ca_3Cu_4O_{13}Tl_4$ Molecular Weight: 1808.924 CAS RN: 119000-19-0 Properties: superconductor; 99.99% and 99.9% purity 20 µm powd [ALF93]

## 3190

 $\label{eq:compound: Thallium barium calcium copper oxide Formula: $Tl_2Ba_2Ca_2Cu_3O_{10}$ Molecular Formula: $Ba_2Ca_2Cu_3O_{10}Tl_2$ Molecular Weight: 1114.209 CAS RN: 127241-75-2$ Properties: superconductor (2223 phase); 99.999% and 99.9% purity, 20 \mbox{$\mu$m powd}; $T_c$ 115-127 $K; for material with formula $Tl_2Ba_2Ca_3Cu_4O_{12}$, $T_c$ is $113-119 $K$ [CEN92] [ALF93] [ASM93] $ \end{tabular}$ 

## 3191

 $\label{eq:compound: thallium barium calcium copper oxide Formula: $Tl_2Ba_2CaCu_2O_8$ Molecular Formula: $Ba_2CaCu_2O_8Tl_2$ Molecular Weight: 1018.664 CAS RN: 125720-69-1 Properties: superconductor; 20 $\mu$m powd, 99.999% purity and 99.9%; $T_c$ 95-110 K [ALF93] [ASM93] \\$ 

## 3192

**Compound:** Thallium(I) acetate **Synonym:** thallous acetate **Formula:** CH<sub>3</sub>COOTI **Molecular Formula:** C<sub>2</sub>H<sub>3</sub>O<sub>2</sub>TI Molecular Weight: 263.428
CAS RN: 563-68-8
Properties: -4 mesh with 99.9% purity; white cryst; deliq; used in ore flotation separation; there is a hemitrihydrate, 2570-63-0 [HAW93] [MER06] [CER91]
Solubility: s H<sub>2</sub>O, alcohol [MER06]
Density, g/cm<sup>3</sup>: 3.68 [HAW93]
Melting Point, °C: 131 [STR93]

## 3193

**Compound:** Thallium(I) acetylacetonate **Synonyms:** 2,4-pentanedione, thallium(I) derivative **Formula:** TICH<sub>3</sub>COCH=C(O)CH<sub>3</sub> **Molecular Formula:** C<sub>5</sub>H<sub>7</sub>O<sub>2</sub>Tl **Molecular Weight:** 303.493 **CAS RN:** 25955-51-5 **Properties:** white powd [STR93]

## 3194

Compound: Thallium(I) azide Formula: TlN<sub>3</sub> Molecular Formula: N<sub>3</sub>Tl Molecular Weight: 246.403 CAS RN: 13847-66-0 Properties: yellow; body-center tetr, a=0.623 nm, c=0.675 nm [CIC73] [CRC10] Solubility: g/100 g H<sub>2</sub>O: 0.171 (0°C), 0.236 (10°C), 0.364 (20°°C) [LAN05] Melting Point, °C: 330 (vacuum) [CRC10]

#### 3195

**Compound:** Thallium(I) bromide Synonym: thallous bromide Formula: TlBr Molecular Formula: BrT1 Molecular Weight: 284.287 CAS RN: 7789-40-4 **Properties:** –20 mesh with 99.999% purity; pale vellow; cryst powd; enthalpy of vaporization 99.56 kJ/mol; enthalpy of fusion 25.10 kJ/mol; used in a mixture with TII in infrared transmitters [HAW93] [MER06] [CER91] [CRC10] **Solubility:** g/100 g H<sub>2</sub>O: 0.022 (0°C), 0.048 (20°C), 0.177 (60°C) [LAN05] **Density, g/cm<sup>3</sup>:** 7.557 [HAW93] Melting Point, °C: 460 [CRC10] Boiling Point, °C: 819 [CRC10]

## 3196

**Compound:** Thallium(I) carbonate **Synonym:** thallous carbonate

Formula: Tl<sub>2</sub>CO<sub>3</sub>
Molecular Formula: CO<sub>3</sub>Tl<sub>2</sub>
Molecular Weight: 468.776
CAS RN: 6533-73-9
Properties: shiny white monocl cryst; highly refractive; melts to a dark gray mass; enthalpy of fusion 18.40 kJ/mol; used in testing for carbon disulfide and in artificial diamonds [HAW93] [KIR83] [CRC10]
Solubility: g/100 g H<sub>2</sub>O: 5.3 (20°C), 12.2 (60°C), 27.2 (100°C) [LAN05]; i alcohol [MER06]
Density, g/cm<sup>3</sup>: 7.11 [STR93]
Melting Point, °C: 272 [MER06]

## 3197

Compound: Thallium(I) chlorate Formula: TlClO<sub>3</sub> Molecular Formula: ClO<sub>3</sub>Tl Molecular Weight: 287.834 CAS RN: 13453-30-0 Properties: needles [LAN05] Solubility: g/100 g H<sub>2</sub>O: 2.00 (0°C), 3.92 (20°C), 57.3 (100°C) [LAN05] Density, g/cm<sup>3</sup>: 5.047 [LAN05]

## 3198

**Compound:** Thallium(I) chloride Synonym: thallous chloride Formula: TICI Molecular Formula: CIT1 Molecular Weight: 239.836 CAS RN: 7791-12-0 Properties: white cryst powd, and 99.9% pure melted pieces of 3-12 mm; turns violet when exposed to light; enthalpy of vaporization 102.2 kJ/mol; enthalpy of fusion 17.80 kJ/mol; used as a chlorination catalyst and in suntan lamp monitors, and as an evaporation material to deposit long wavelength coatings up to  $>50 \,\mu\text{m}$ , has index of ~1.90 at 20µm [HAW93] [CER91] [CRC10] Solubility: g/100 g H<sub>2</sub>O: 0.21 (0°C), 0.33 (20°C), 1.80 (100°C) [LAN05]; i alcohol [MER06] **Density, g/cm<sup>3</sup>:** 7.004 [HAW93] Melting Point, °C: 430 [MER06]

## 3199

Compound: Thallium(I) cyanide Synonym: thallous cyanide Formula: TICN Molecular Formula: CNTI Molecular Weight: 230.401 CAS RN: 13453-34-4

Boiling Point, °C: 807 [CRC10]

**Properties:** white; hex platelets [MER06] **Solubility:** 16.8 g/100 mL H<sub>2</sub>O, s a, alcohol [MER06] **Density, g/cm<sup>3</sup>:** 6.523 [MER06] **Melting Point, °C:** decomposes [CRC10]

#### 3200

Compound: Thallium(I) ethoxide Formula: TlOC<sub>2</sub>H<sub>5</sub> Molecular Formula: C<sub>2</sub>H<sub>5</sub>OTl Molecular Weight: 249.444 CAS RN: 20398-06-5 Properties: cloudy, dense liq; sensitive to moisture [STR93] Density, g/cm<sup>3</sup>: 3.493 (20°C) [STR93] Melting Point, °C: -3 [STR93] Boiling Point, °C: decomposes at 130 [STR93]

#### 3201

Compound: Thallium(I) fluoride Synonym: thallous fluoride Formula: T1F Molecular Formula: FT1 Molecular Weight: 223.381 CAS RN: 7789-27-7 Properties: white powd; ortho-rhomb; hard, shiny cryst; can deliq, e.g., if breathed upon, however reverts to anhydrous form in dry air; not typically hygr; enthalpy of fusion 14.00 kJ/mol [MER06] [STR93] [CRC10] Solubility:  $78.6 \text{ g}/100 \text{ g H}_2\text{O}$  at  $15^{\circ}\text{C}$ ; s alcohols, HF [KIR83] **Density, g/cm<sup>3</sup>:** 8.36 [MER06] Melting Point, °C: 322 [MER06] Boiling Point, °C: 655 [STR93]

## 3202

Compound: Thallium(I) formate
Formula: HCOOT1
Molecular Formula: CHO<sub>2</sub>T1
Molecular Weight: 249.401
CAS RN: 992-98-3
Properties: colorless needles or white powd; hygr [STR93][KIR83]
Solubility: 500 g/100 g H<sub>2</sub>O at 10°C; s methanol [KIR83]
Density, g/cm<sup>3</sup>: 4.967 [STR93]
Melting Point, °C: 101 [STR93]

## 3203

**Compound:** Thallium(I) hexafluoroacetylacetonate **Synonyms:** 1,1,1,5,5,5-hexafluoro-2,4pentanedione, T1(I) derivative Formula:  $TlCF_3COCHCOCF_3$ Molecular Formula:  $C_5HF_6O_2T1$ Molecular Weight: 411.435 CAS RN: 15444-43-6 Properties: yellow cryst [STR93] Melting Point, °C: 126–128 [STR93] Boiling Point, °C: decomposes [STR93] Reactions: sublimes at 140°C (0.1 mm Hg) [STR94]

#### 3204

**Compound:** Thallium(I) hexafluorophosphate **Formula:** T1PF<sub>6</sub> **Molecular Formula:** FePT1 **Molecular Weight:** 349.347 **CAS RN:** 60969-19-9 **Properties:** white cryst [STR93]

#### 3205

Compound: Thallium(I) hydroxide Synonym: thallous hydroxide Formula: TIOH Molecular Formula: HOTI Molecular Weight: 221.390 CAS RN: 1310-83-4 Properties: yellow needles; gives strongly alkaline solution when dissolved in H<sub>2</sub>O, which turns tumeric paper brown color [MER06] Solubility: g/100 g H<sub>2</sub>O: 25.4 (0°C), 35.0 (20°C), 150 (100°C) [LAN05] Density, g/cm<sup>3</sup>: 7.44 [KIR83] Melting Point, °C: decomposes at 139 [KIR83]

#### 3206

Compound: Thallium(I) iodide Synonym: thallous iodide Formula: α-TII Molecular Formula: IT1 Molecular Weight: 331.287 CAS RN: 7790-30-9 Properties: yellow; rhomb cryst; turns red at 170°C; enthalpy of vaporization 104.7 kJ/mol; enthalpy of fusion 13.10 kJ/mol; used mixed with TlBr in infrared transmitters [HAW93] [MER06] [CRC10] [KIR83] Solubility: g/100 g H<sub>2</sub>O: 0.002 (0°C), 0.006 (20°C), 0.120 (100°C) [LAN05] **Density, g/cm<sup>3</sup>:** 7.29 [KIR83] Melting Point, °C: 440 [MER06] Boiling Point, °C: 824 [MER06]

Compound: Thallium(I) molybdate Formula: Tl<sub>2</sub>MoO<sub>4</sub> Molecular Formula: MoO<sub>4</sub>Tl<sub>2</sub> Molecular Weight: 568.705 CAS RN: 34128-09-1 Properties: white when precipitated, yellow during fusion; cub, a=0.926 nm [KIR81] Solubility: i H<sub>2</sub>O [KIR81] Melting Point, °C: red heat [KIR81]

## 3208

Compound: Thallium(I) nitrate
Synonym: thallous nitrate
Formula: TINO<sub>3</sub>
Molecular Formula: NO<sub>3</sub>TI
Molecular Weight: 266.388
CAS RN: 10102-45-1
Properties: white cryst; enthalpy of fusion 9.60 kJ/mol; used in analysis and as a pyrotechnic (green fire) [HAW93] [MER06] [CRC10]
Solubility: g/100 g H<sub>2</sub>O: 3.90 (0°C), 9.55 (20°C), 414 (100°C) [LAN05]; i alcohol [MER06]
Density, g/cm<sup>3</sup>: 5.55 [MER06]
Melting Point, °C: 206 [MER06]
Boiling Point, °C: decomposes at 450 [MER06]

## 3209

Compound: Thallium(I) nitrite Formula: TlNO<sub>2</sub> Molecular Formula: NO<sub>2</sub>Tl Molecular Weight: 250.389 CAS RN: 13824-63-6 Properties: yellow cryst [CRC10] Solubility: g/100 g H<sub>2</sub>O: 17.9 (0°C), 40.3 (20°C), 750 (90°C) [LAN05] Melting Point, °C: 182 [CRC10]

## 3210

Compound: Thallium(I) oxalate Formula:  $Tl_2C_2O_4$ Molecular Formula:  $C_2O_4Tl_2$ Molecular Weight: 496.786 CAS RN: 30737-24-7 Properties: white powd [STR93] Solubility: 1.48 g/100 mL H<sub>2</sub>O (15°C), 9.02 g/100 mL H<sub>2</sub>O (100°C) [CRC10] Density, g/cm<sup>3</sup>: 6.31 [STR93]

#### 3211

Compound: Thallium(I) oxide
Synonym: thallous oxide
Formula: Tl<sub>2</sub>O
Molecular Formula: OTl<sub>2</sub>
Molecular Weight: 424.766
CAS RN: 1314-12-1
Properties: black powd; gradually oxides to Tl<sub>2</sub>O<sub>3</sub> in air; used in artificial gems, to test for ozone, in optical glass [MER06]
Solubility: s H<sub>2</sub>O, hydrolyzes to hydroxide; s alcohol [MER06]
Density, g/cm<sup>3</sup>: 9.52 (16°C) [HAW93]
Melting Point, °C: 300 [HAW93]
Boiling Point, °C: 1080 [HAW93]

## 3212

Compound: Thallium(I) perchlorate Formula: TlClO<sub>4</sub> Molecular Formula: ClO<sub>4</sub>Tl Molecular Weight: 303.834 CAS RN: 13453-40-2 Properties: colorless rhomb [CRC10] [LAN05] Solubility: g/100 g H<sub>2</sub>O: 6.00 (0°C), 13.1 (20°C), 81.5 (80°C) [LAN05] Density, g/cm<sup>3</sup>: 4.89 [LAN05] Melting Point, °C: 501 [LAN05] Boiling Point, °C: decomposes [LAN05]

## 3213

Compound: Thallium(I) picrate Formula:  $TIOC_6H_2(NO_2)_3$ Molecular Formula:  $C_6H_2N_3O_7Tl$ Molecular Weight: 432.481 CAS RN: 23293-27-8 Properties: red monocl or yellow tricl [CRC10] Solubility: g/100 g H<sub>2</sub>O: 0.135 (0°C), 0.40 (20°C), 1.73 (60°C) [LAN05] Density, g/cm<sup>3</sup>: red: 3.164; yellow: 2.993 [CRC10] Reactions: explodes, 723°C–725°C [CRC10]

## 3214

**Compound:** Thallium(I) selenate **Synonym:** thallous selenate **Formula:** Tl<sub>2</sub>SeO<sub>4</sub> **Molecular Formula:** O<sub>4</sub>SeTl<sub>2</sub> **Molecular Weight:** 551.725 **CAS RN:** 7446-22-2 **Properties:** ortho-rhomb cryst [MER06]

Solubility: g/100 g H<sub>2</sub>O: 2.13 (9.3°C), 2.4 (12°C), 10.86 (100°C); i alcohol, ether [MER06] Density, g/cm<sup>3</sup>: 6.875 [MER06] Melting Point, °C: >400 [MER06]

#### 3215

Compound: Thallium(I) selenide Synonym: thallous selenide Formula: Tl<sub>2</sub>Se Molecular Formula: SeTl<sub>2</sub> Molecular Weight: 487.727 CAS RN: 15572-25-5 Properties: dark gray plates with metallic luster [MER06] Solubility: i H<sub>2</sub>O, acids [MER06] Density, g/cm<sup>3</sup>: 9.05 [CRC10] Melting Point, °C: 340 [MER06]

#### 3216

Compound: Thallium(I) sulfate
Synonym: thallous sulfate
Formula: Tl<sub>2</sub>SO<sub>4</sub>
Molecular Formula: O<sub>4</sub>STl<sub>2</sub>
Molecular Weight: 504.831
CAS RN: 7446-18-6
Properties: white, rhomb prisms; enthalpy of fusion 23.00 kJ/mol; used to analyze for iodine in the presence of chlorine, in ozonometry and as a pesticide [HAW93] [MER06] [CRC10]
Solubility: g/100 mL H<sub>2</sub>O: 2.70 (0°C), 4.87 (20°C), 18.45 (100°C) [MER06]
Density, g/cm<sup>3</sup>: 6.77 [MER06]
Melting Point, °C: 632 [MER06]
Boiling Point, °C: decomposes [STR93]

## 3217

**Compound:** Thallium(I) sulfide **Synonym:** thallous sulfide **Formula:** Tl<sub>2</sub>S **Molecular Formula:** STl<sub>2</sub> **Molecular Weight:** 440.833 **CAS RN:** 1314-97-2 **Preparenties:** 20 much with 00 00%

Properties: -20 mesh with 99.9% purity; bluish black cryst powd; enthalpy of vaporization 154 kJ/mol; enthalpy of fusion 12.00 kJ/mol; used in infrared photocells [HAW93] [MER06] [CER91] [CRC10]

**Solubility:** sl s H<sub>2</sub>O, alkali hydroxides, sulfides, cyanides; s mineral acids [MER06]

Density, g/cm<sup>3</sup>: 8.39 [MER06]

Melting Point, °C: 448.5 [MER06]

Boiling Point, °C: 1367 [CRC10]

#### 3218

Compound: Thallium(I) trifluoroacetylacetonate
Synonyms: 1,1,1-trifluoro-2,4-pentanedione, thallium(I) derivative
Formula: TlCF<sub>3</sub>COCH=C(O)CH<sub>3</sub>
Molecular Formula: C<sub>5</sub>H<sub>4</sub>F<sub>3</sub>O<sub>2</sub>Tl
Molecular Weight: 357.464
CAS RN: 54412-40-7
Properties: white powd [ALD94]
Melting Point, °C: 110 decomposes [ALD94]

## 3219

Compound: Thallium(III) acetate
Synonyms: acetic acid, thallium(III) salt
Formula: Tl(CH<sub>3</sub>COO)<sub>3</sub>
Molecular Formula: C<sub>6</sub>H<sub>9</sub>O<sub>6</sub>Tl
Molecular Weight: 381.517
CAS RN: 2570-63-0
Properties: light sensitive; uses: together with bromine, selective electrophilic aromatic brominator [ALD94]
Melting Point, °C: decomposes at 182 [ALD94]

#### 3220

Compound: Thallium(III) bromide Synonym: thallic bromide Formula: TlBr<sub>3</sub> Molecular Formula: Br<sub>3</sub>Tl Molecular Weight: 444.095 CAS RN: 13701-90-1 Properties: yellow [KIR83] Solubility: s H<sub>2</sub>O, alcohols [KIR83]

## 3221

Compound: Thallium(III) chloride Synonym: thallic chloride Formula: TlCl<sub>3</sub> Molecular Formula: Cl<sub>3</sub>Tl Molecular Weight: 310.741 CAS RN: 13453-32-2 Properties: hexagonal plate [KIR83] Solubility: v s H<sub>2</sub>O, alcohols, ether [KIR83] Density, g/cm<sup>3</sup>: 4.7 [LID94] Melting Point, °C: 155 [KIR83]

## 3222

**Compound:** Thallium(III) chloride hydrate **Synonym:** thallic chloride hydrate **Formula:**  $TlCl_3 \cdot xH_2O$  Molecular Formula: C1<sub>3</sub>Tl (anhydrous) Molecular Weight: 310.741 (anhydrous) CAS RN: 13453-33-3 Properties: white cryst [STR93] Melting Point, °C: 37 [STR93]

#### 3223

Compound: Thallium(III) fluoride Synonym: thallic fluoride Formula: TIF<sub>3</sub> Molecular Formula: F<sub>3</sub>Tl Molecular Weight: 261.378 CAS RN: 7783-57-5 Properties: olive green ortho-rhomb cryst; very sensitive to moisture; quickly decomposed by water; decomposed if heated in air [MER06] [KIR83] Solubility: i H<sub>2</sub>O [KIR83] Density, g/cm<sup>3</sup>: 8.65 [MER06] Melting Point, °C: decomposes at 550 in air [MER06]

3224

Compound: Thallium(III) nitrate Synonym: thallic nitrate Formula: Tl(NO<sub>3</sub>)<sub>3</sub> Molecular Formula: N<sub>3</sub>O<sub>9</sub>Tl Molecular Weight: 390.398 CAS RN: 13746-98-0 Properties: colorless; there is a trihydrate, CAS RN 13453-38-8 [KIR83] [ALD94] Solubility: decomposes in H<sub>2</sub>O [KIR83] Melting Point, °C: 102–105 (trihydrate) [ALD94]

#### 3225

Compound: Thallium(III) oxide Synonym: thallic oxide Formula: Tl<sub>2</sub>O<sub>3</sub> Molecular Formula: O<sub>3</sub>Tl<sub>2</sub> Molecular Weight: 456.765 CAS RN: 1314-32-5 Properties: brown powd; oxidant, e.g., reacts with HCl evolving Cl<sub>2</sub>, and with H<sub>2</sub>SO<sub>4</sub> evolving O<sub>2</sub> [MER06] Solubility: i H<sub>2</sub>O [MER06] Density, g/cm<sup>3</sup>: 10.11 [KIR83] Melting Point, °C: ~717 [STR93]

#### 3226

**Compound:** Thallium(III) perchlorate hexahydrate Formula:  $Tl(ClO_4)_3 \cdot 6H_2O$ Molecular Formula:  $Cl_3H_{12}O_{18}Tl$ Molecular Weight: 610.825 CAS RN: 15596-83-5 Properties: white cryst; hygr [STR93]

#### 3227

Compound: Thallium(III) trifluoroacetate Synonyms: trifluoroacetic acid, thallium(III) salt Formula: (CF<sub>3</sub>COO)<sub>3</sub>Tl Molecular Weight: 543.42 Molecular Formula: C<sub>6</sub>F<sub>9</sub>O<sub>6</sub>Tl CAS RN: 23586-53-0 Properties: hygr; oxidizing agent; uses: organic sulfide bond formation [ALD94] Melting Point, °C: 213, decomposes [ALD94]

## 3228

Compound: Thionyl bromide Formula: SOBr<sub>2</sub> Molecular Formula: Br<sub>2</sub>OS Molecular Weight: 207.873 CAS RN: 507-16-4 Properties: orange-yellow liq; slowly decomposes on standing; prepared by reaction of SOCl<sub>2</sub> and HBr [MER06] Solubility: hydrolyzed by H<sub>2</sub>O; miscible with benzene, chloroform, CCl<sub>4</sub> [MER06] Density, g/cm<sup>3</sup>: 2.688 [MER06] Melting Point, °C: -52 [MER06] Boiling Point, °C: 138 [MER06]

#### 3229

Compound: Thionyl chloride Synonym: sulfurous oxychloride Formula: SOCl<sub>2</sub> Molecular Formula: Cl<sub>2</sub>OS Molecular Weight: 118.970 CAS RN: 7719-09-7 Properties: pale yellow to red liq; suffocating odor; sensitive to moisture; enthalpy of vaporization 31.7 kJ/mol at bp, 31 kJ/mol at 25°C; produced by oxidation of SCl<sub>2</sub> by SO<sub>3</sub>; used in pesticides, engineering plastics [HAW93] [STR93] [MER06] **Solubility:** decomposes in H<sub>2</sub>O; s benzene, CCl<sub>4</sub> [HAW93] Density, g/cm3: 1.638 [HAW93] Melting Point, °C: -105 [HAW93] Boiling Point, °C: 79 [ALD94] Reactions: decomposes at 140°C [HAW93]

## 3230

**Compound:** Thionyl fluoride **Formula:** SOF<sub>2</sub>

Molecular Formula: F<sub>2</sub>OS
Molecular Weight: 86.062
CAS RN: 7783-42-8
Properties: colorless gas with suffocating odor; does not attack glass; obtained from reaction between SbF<sub>3</sub> and SOCl<sub>2</sub> in presence of SbF<sub>5</sub> [MER06]
Solubility: hydrolyzed by H<sub>2</sub>O; s ether, benzene [MER06]
Density, g/cm<sup>3</sup>: gas: 3.84 g/L [CRC10]; liq: 1.780 (-100°C) [MER06]
Melting Point, °C: -129.5 [MER06]
Boiling Point, °C: -43.8 [MER06]

## 3231

Compound: Thiophosphoryl chloride Synonym: phosphorus sulfochloride Formula:  $PSCl_3$ Molecular Formula:  $Cl_3PS$ Molecular Weight: 169.398 CAS RN: 3982-91-0 Properties: fuming liq; crystallizes to  $\alpha$ -form at  $-40.8^{\circ}C$ , to  $\beta$ -form at  $-36.2^{\circ}C$  [MER06] [ALD94] Solubility: hydrolyzes in H<sub>2</sub>O, forming H<sub>3</sub>PO<sub>4</sub>, HCl, H<sub>2</sub>S; hydrolyzes rapidly in alkaline solutions; s benzene,  $CCl_4$ ,  $CS_2$ , chloroform [MER06] Density, g/cm<sup>3</sup>: 1.635 [STR93] Melting Point, °C: -35 [STR93] Boiling Point, °C: 125 [STR93]

#### 3232

Compound: Thorium Formula: Th Molecular Formula: Th Molecular Weight: 232.0381 CAS RN: 7440-29-1

- Properties: soft; grayish white, lustrous metal; somewhat ductile; α: fcc up to 1400°C, a=0.5086 nm; β: bcc, a=0.411 nm, stable 1400°C–1750°C; enthalpy of vaporization 564 kJ/mol; enthalpy of fusion 13.81 kJ/mol; electrical resistivity 14 µohm · cm; Poisson's ratio 0.27; thermal diffusivity 0.28 cm²/s at 200°C; t<sub>1/2</sub> <sup>232</sup>Th is 1.41 × 10<sup>+10</sup> years; ionic radius of Th<sup>++++</sup> is 0.0972 nm [KIR78] [KIR83] [MER06] [CRC10]
  Solubility: s acids; i H<sub>2</sub>O, alkalies [HAW93]
  Density, g/cm<sup>3</sup>: α: 11.724 [KIR91]
  Melting Point, °C: 1750 [KIR91]
  Boiling Point, °C: 3800 [ALD94]
  Reactions: phase change from fcc to bcc ~1345°C [KIR83]
- Thermal Conductivity, W/(m·K): 54.0 (25°C) [CRC10]

**Thermal Expansion Coefficient:** 

 $11.0 \times 10^{-6}$ /K [CRC10]

## 3233

**Compound:** Thorium acetylacetonate **Synonyms:** 2,4-pentanedione, thorium(IV) derivative **Formula:** Th(CH<sub>3</sub>COCH=C(O)CH<sub>3</sub>)<sub>4</sub> **Molecular Formula:**  $C_{20}H_{28}O_8$ Th **Molecular Weight:** 628.475 **CAS RN:** 102192-40-5 **Properties:** cryst powd [HAW93] **Solubility:** sl s H<sub>2</sub>O, not readily hydrolyzed [HAW93]

## 3234

Compound: Thorium bromide Formula: ThBr<sub>4</sub> Molecular Formula: Br<sub>4</sub>Th Molecular Weight: 551.654 CAS RN: 13453-49-1 Properties: colorless hygr; -8 mesh with 99.5% purity; can be prepared by reacting Th with Br<sub>2</sub>; light sensitive and easily hydrolyzed [KIR83] [CER91] [CRC10] Density, g/cm<sup>3</sup>: 5.67 [CRC10] Melting Point, °C: sublimes at 610 [CRC10]

#### 3235

Compound: Thorium carbide
Formula: ThC
Molecular Formula: CTh
Molecular Weight: 244.049
CAS RN: 12012-16-7
Properties: -40 mesh with 99.5% purity; fcc, a=0.5346 nm; prepared by reacting stoichiometric amounts of Th and C; reactive, e.g., burns in air to form ThO<sub>2</sub>; there is a ThC<sub>2</sub>, 12071-31-7 [KIR83] [CIC73] [CER91]
Solubility: readily hydrolyzes in H<sub>2</sub>O evolving methane [KIR83]
Melting Point, °C: 2655 [KIR83]

#### 3236

Compound: Thorium chloride

- Formula: ThCl<sub>4</sub>
- Molecular Formula:  $Cl_4Th$
- Molecular Weight: 373.849

CAS RN: 10026-08-1

**Properties:** tetr; grayish white powd; hygr lustrous needles; enthalpy of vaporization 146.4 kJ/mol; enthalpy of fusion 40.20 kJ/mol; can be prepared by reacting Th with Cl<sub>2</sub>; used in incandescent lamps [HAW93] [CRC10] [STR93] [KIR83] [COT88]

**Solubility:** s H<sub>2</sub>O, alcohol [MER06]

## Density, g/cm<sup>3</sup>: 4.59 [MER06] Melting Point, °C: 770 [MER06] Boiling Point, °C: 921 [MER06]

#### 3237

**Compound:** Thorium dicarbide **Formula:** ThC<sub>2</sub> **Molecular Formula:** C<sub>2</sub>Th

Molecular Weight: 256.060

CAS RN: 12071-31-7

**Properties:** yellow solid; α form: monocl, a = 1.0555 nm, b = 0.8233 nm, c = 0.4201 nm; β form: tetr; γ form: cub, a = 0.5808 nm; decomposed by water; formed by heating ThO<sub>2</sub> and excess carbon; used as a nuclear fuel [HAW93] [CIC73] [KIR83] **Solubility:** decomposed in H<sub>2</sub>O, with evolution of ethane [KIR83] **Density, g/cm<sup>3</sup>:** 8.96 (18°C) [HAW93] Making Print SC 2020 (100 HAW93]

Melting Point, °C: 2630–2680 [HAW93]

Boiling Point, °C: –5000 [HAW93]

**Reactions:**  $\alpha$  to  $\beta$  transition at 1427°C,  $\beta$  to  $\gamma$  at 1497°C [CIC73]

## 3238

**Compound:** Thorium fluoride **Formula:**  $ThF_4$ **Molecular Formula:**  $F_4Th$ **Molecular Weight:** 308.032 **CAS RN:** 13709-59-6

**Properties:** white powd; hygr; reacts with atm moisture to form ThOF<sub>2</sub> at temperatures >500°C; enthalpy of vaporization 258 kJ/mol; can be prepared by reaction of Th and F<sub>2</sub>; used to produce thorium metal and in high temp ceramics; as 99.99% pure material, used as a sputtering target to produce low-index film with no absorption in visible and ultraviolet [HAW93] [STR93] [KIR83] [CER91] [CRC10] **Density, g/cm<sup>3</sup>:** 6.32 [STR93]

Melting Point, °C: 1068 [KIR91]

## 3239

Compound: Thorium hexaboride Formula: ThB<sub>6</sub> Molecular Formula: B<sub>6</sub>Th Molecular Weight: 296.904 CAS RN: 12229-63-9 Properties: -100 mesh with 99.8% purity, there is a ThB<sub>4</sub>, 12007-83-9; refractory material [KIR78] Density, g/cm<sup>3</sup>: 6.4 [CRC10] Melting Point, °C: 2195; tetraboride 2500 [KIR78] HANDBOOK OF INORGANIC COMPOUNDS, SECOND EDITION

## 3240

Compound: Thorium hexafluoroacetylacetonate Synonyms: 1,1,1,5,5,5-hexafluoro-2,4pentanedione, thorium derivative Formula: Th(CF<sub>3</sub>COCHCOCF<sub>3</sub>)<sub>4</sub> Molecular Formula: C<sub>20</sub>H<sub>4</sub>F<sub>24</sub>O<sub>8</sub>Th Molecular Weight: 1060.247 CAS RN: 18865-75-3 Properties: white powd [STR93] Melting Point, °C: 100–101 [STR93]

## 3241

Compound: Thorium hydride Formula: ThH<sub>2</sub> Molecular Formula: H<sub>2</sub>Th Molecular Weight: 234.054 CAS RN: 16689-88-6 Properties: tetr cryst; here are also ThH<sub>3</sub>, 40004-84-0, -60 mesh with 99.5% purity, and ThH<sub>3.75</sub> (Th<sub>4</sub>H<sub>15</sub>), 12055-07-1; the third hydride exhibits superconductivity [LID94] [KIR83] [CER91] Density, g/cm<sup>3</sup>: 9.5 [LID94]

## 3242

Compound: Thorium hydroxide
Formula: Th(OH)<sub>4</sub>
Molecular Formula: H<sub>4</sub>O<sub>4</sub>Th
Molecular Weight: 300.068
CAS RN: 13825-36-0
Properties: prepared by addition of alkali to a solution of Th<sup>++++</sup> salt, yielding a gelatinous precipitate which is subsequently dehydrated; absorbs CO<sub>2</sub> to form ThOCO<sub>3</sub> [KIR83]
Melting Point, °C: decomposes [CRC10]
Reactions: minus water >470°C to form ThO<sub>2</sub> [KIR83]

## 3243

Compound: Thorium iodide
Formula: ThI<sub>4</sub>
Molecular Formula: I<sub>4</sub>Th
Molecular Weight: 739.656
CAS RN: 7790-49-0
Properties: pale yellow cryst; obtained from a reaction between Th and I<sub>2</sub>; decomposed by light or heat [MER06] [KIR83]
Melting Point, °C: 556 [KIR91]
Boiling Point, °C: 837 [MER06]

## 3244

**Compound:** Thorium nitrate **Formula:**  $Th(NO_3)_4$ 

Molecular Formula: N<sub>4</sub>O<sub>12</sub>Th
Molecular Weight: 480.058
CAS RN: 13823-29-5
Properties: plates, deliq; obtained when thorium hydroxide is dissolved in a nitric acid solution [KIR83] [CRC10]
Solubility: g/100 g H<sub>2</sub>O: 186 (0°C), 187 (10°C), 191 (20°C) [LAN05]; additional solubility data are in [SIE94]
Melting Point, °C: decomposes at 500 [CRC10]

#### 3245

Compound: Thorium nitrate tetrahydrate
Formula: Th(NO<sub>3</sub>)<sub>4</sub>·4H<sub>2</sub>O
Molecular Formula: H<sub>8</sub>N<sub>4</sub>O<sub>16</sub>Th
Molecular Weight: 552.119
CAS RN: 33088-16-3
Properties: white cryst; sl deliq; used in thoriated tungsten filaments and as a reagent for fluoride determination [HAW93] [MER06]
Solubility: v s H<sub>2</sub>O, alcohol [MER06]
Melting Point, °C: decomposes at 500 [HAW93]

#### 3246

Compound: Thorium nitride
Formula: ThN
Molecular Formula: NTh
Molecular Weight: 246.045
CAS RN: 12033-65-7
Properties: gray refractory solid; fcc, a=0.5159 nm; electrical resistivity 20µohm · cm; microhardness 600; there is also the compound Th<sub>3</sub>N<sub>4</sub>, CAS RN 12033-90-8, -100 mesh with 99.5% purity [CER91] [KIR81]
Solubility: slowly hydrolyzed by H<sub>2</sub>O [COT88]
Density, g/cm<sup>3</sup>: 11.9 [KIR81]
Melting Point, °C: 2820 [KIR81]

#### 3247

**Compound:** Thorium orthosilicate **Synonym:** thorite **Formula:** ThSiO<sub>4</sub> **Molecular Formula:** O<sub>4</sub>SiTh **Molecular Weight:** 324.122 **CAS RN:** 51184-23-7 **Properties:** black to orange; zircon structure, a=0.71328 nm, c=0.63188 nm; hardness is 4.5–5 [HAW93] [SUB90] **Density, g/cm<sup>3</sup>:** 4.4–5.2 [HAW93] **Thermal Expansion Coefficient:**  $(25^{\circ}C-500^{\circ}C) 2.5 \times 10^{-6}/^{\circ}C$  [SUB90]

## 3248

Compound: Thorium oxalate dihydrate Formula:  $Th(C_2O_4)_2 \cdot 2H_2O$ Molecular Formula:  $C_4H_4O_{10}Th$ Molecular Weight: 444.108 CAS RN: 24012-17-7 Properties: white powd; there is a hexahydrate, white cryst, which is precipitated from up to 2M HNO<sub>3</sub>; used in ceramics [HAW93] [COT88] Solubility: i H<sub>2</sub>O and most acids [HAW93] Density, g/cm<sup>3</sup>: anhydrous: 4.637 (16°C) [HAW93] Melting Point, °C: decomposes at >300-400 to ThO<sub>2</sub> [HAW93]

## 3249

Compound: Thorium oxide Synonyms: thoria, thorianite Formula: ThO<sub>2</sub> Molecular Formula: O<sub>2</sub>Th Molecular Weight: 264.037 CAS RN: 1314-20-1 Properties: white, heavy, cryst, cub powd, or 3-12 mm sintered pieces; hardness 6.5 Mohs; used in ceramics, gas mantles, crucibles, thoriated tungsten filaments, and in crucible form for melting hafnium, iridium, iron, manganese, silicon, thorium, titanium, uranium, and zirconium; used as an evaporation material and sputtering target of 99.99% and 99.9% purity for highly durable beam splitter [HAW93] [MER06] [KIR83] [CER91] Solubility: i H<sub>2</sub>O, alkalies [MER06] Density, g/cm<sup>3</sup>: 9.86 [STR93]; 10.01 [KIR80] Melting Point, °C: ~3050 [KIR91] Boiling Point, °C: 4400 [HAW93] Thermal Conductivity, W/(m·K): 5.1 (500°C), 3.0 (1000°C) [KIR80] Thermal Expansion Coefficient: (volume) 100°C (0.234), 200°C (0.517), 400°C (1.100), 800°C (2.249), 1000°C (2.833) [CLA66]

#### 3250

Compound: Thorium oxyfluoride Formula: ThOF<sub>2</sub> Molecular Formula: F<sub>2</sub>OTh Molecular Weight: 286.034 CAS RN: 13597-30-3 Properties: 3–6 mm pieces (sintered) with 99.9% purity [CER91]

## 3251

**Compound:** Thorium perchlorate **Formula:** Th(ClO<sub>4</sub>)<sub>4</sub>

# Molecular Formula: Cl<sub>4</sub>O<sub>16</sub>Th Molecular Weight: 629.839 CAS RN: 16045-17-3 Properties: obtained by dissolution of thorium hydroxide in perchloric acid solution; the tetrahydrate can be crystallized from an acidic solution which is then dehydrated to Th(ClO<sub>4</sub>)<sub>4</sub> at ~280°C [KIR83]

**Solubility:** v s H<sub>2</sub>O [KIR83]

Melting Point, °C: ~355 decomposes to ThO<sub>2</sub> [KIR83]

#### 3252

Compound: Thorium selenide Formula: ThSe<sub>2</sub> Molecular Formula: Se<sub>2</sub>Th Molecular Weight: 389.958 CAS RN: 60763-24-8 Properties: ortho-rhomb cryst; -80 mesh with 99.5 purity [LID94] [CER91] Density, g/cm<sup>3</sup>: 805 [LID94]

#### 3253

Compound: Thorium silicide Formula: ThSi<sub>2</sub> Molecular Formula: Si<sub>2</sub>Th Molecular Weight: 288.209 CAS RN: 12067-54-8 Properties: black tetr; -80 mesh with 99.5% purity [CER91] [CRC10] Density, g/cm<sup>3</sup>: 7.96 [CRC10]

#### 3254

Compound: Thorium sulfate nonahydrate Formula: Th $(SO_4)_2 \cdot 9H_2O$ Molecular Formula:  $H_{18}O_{17}S_2$ Th Molecular Weight: 586.303 CAS RN: 10381-37-0 Properties: colorless or white; monocl cryst; decomposes when heated strongly [MER06] Solubility: g/100 g H<sub>2</sub>O: 0.74 (0°C), 1.38 (20°C), 3.00 (40°C) [LAN05] Density, g/cm<sup>3</sup>: 2.8 [MER06] Reactions: minus 9H<sub>2</sub>O at 400°C [CRC10]

## 3255

Compound: Thorium sulfate octahydrate Formula:  $Th(SO_4)_2 \cdot 8H_2O$ Molecular Formula:  $H_{16}O_{16}S_2Th$ Molecular Weight: 568.287 CAS RN: 10381-37-0 Properties: monocl white cryst powd [HAW93] [CRC10] Solubility: sl s water; s ice water [HAW93] Density, g/cm<sup>3</sup>: 2.8 [HAW93] Reactions: minus 4H<sub>2</sub>O at 42°C, minus 8H<sub>2</sub>O at 400°C [HAW93]

#### 3256

Compound: Thorium sulfate tetrahydrate Formula:  $Th(SO_4)_2 \cdot 4H_2O$ Molecular Formula:  $H_8O_{12}S_2Th$ Molecular Weight: 496.227 CAS RN: 10381-37-0 Properties: white needles [CRC10] Solubility: g/100 g H<sub>2</sub>O: 4.04 (40°C), 1.63 (60°C) [LAN05] Reactions: minus 4H<sub>2</sub>O, 400°C [CRC10]

#### 3257

Compound: Thorium sulfide
Formula: ThS<sub>2</sub>
Molecular Formula: S<sub>2</sub>Th
Molecular Weight: 296.170
CAS RN: 12138-07-7
Properties: dark brown cryst; begins to decompose above 1500°C; used as a solid lubricant [HAW93] [KIR83]
Solubility: i H<sub>2</sub>O; s acids [HAW93] [COT88]
Density, g/cm<sup>3</sup>: 7.30 [HAW93]
Melting Point, °C: 1875–1975 (in vacuum) [HAW93]

#### 3258

 $\label{eq:compound:} \begin{array}{l} \mbox{Compound: Thorium tetracyanoplatinate(II)} \\ \mbox{hexadecahydrate} \\ \mbox{Formula: Th}[Pt(CN)_4]_2 \cdot 16H_2O \\ \mbox{Molecular Formula: } C_8H_{32}N_8O_{16}Pt_2Th \\ \mbox{Molecular Weight: 1118.594} \\ \mbox{CAS RN: 14481-33-5} \\ \mbox{Properties: yellow cryst [MER06]} \\ \mbox{Solubility: sl s } H_2O \mbox{[MER06]} \\ \end{array}$ 

#### 3259

Compound: Thulium Formula: Tm Molecular Formula: Tm Molecular Weight: 168.9342 CAS RN: 7440-30-4 Properties: silvery white metal; easily worked; hex close-packed; electrical resistivity (20°C) 90μohm · cm; enthalpy of fusion 16.84 kJ/mol; enthalpy of sublimation 232.2 kJ/mol; radius of atom 0.17462 nm; radius of Tm<sup>+++</sup> ion 0.0870 nm; forms light green colored solutions [MER06] [KIR82] [ALD94] Solubility: slowly reacts with H₂O; s in dil acids [HAW93]
Density, g/cm<sup>3</sup>: 9.32 [KIR82]
Melting Point, °C: 1545 [KIR82]
Boiling Point, °C: 1950 [KIR82]
Thermal Conductivity, W/(m ⋅ K): 16.9 (25°C) [CRC10]
Thermal Expansion Coefficient: 13.3 × 10<sup>-6</sup>/K [CRC10]

## 3260

**Compound:** Thulium acetate monohydrate **Formula:**  $Tm(CH_3COO)_3 \cdot H_2O$  **Molecular Formula:**  $C_6H_{11}O_7Tm$  **Molecular Weight:** 364.083 **CAS RN:** 39156-80-4 **Properties:** white powd [STR93]

#### 3261

**Compound:** Thulium acetylacetonate trihydrate **Synonyms:** 2,4-pentanedione, thulium(III) derivative **Formula:** Tm(CH<sub>3</sub>COCH=C(O)CH<sub>3</sub>)<sub>3</sub> $\cdot$ 3H<sub>2</sub>O **Molecular Formula:** C<sub>15</sub>H<sub>27</sub>O<sub>9</sub>Tm **Molecular Weight:** 520.308 **CAS RN:** 14589-44-7 **Properties:** white powd [STR93]

#### 3262

Compound: Thulium bromide Formula: TmBr<sub>3</sub> Molecular Formula: Br<sub>3</sub>Tm Molecular Weight: 408.646 CAS RN: 14456-51-0 Properties: -20 mesh of 99.9% purity [CER91] Melting Point, °C: 952 [AES93] Boiling Point, °C: 1440 [CRC10]

## 3263

Compound: Thulium chloride Formula: TmCl<sub>3</sub> Molecular Formula: Cl<sub>3</sub>Tm Molecular Weight: 275.292 CAS RN: 13537-18-3 Properties: -20 mesh with 99.9% purity; off-white powd; hygr [STR93] [CER91] Melting Point, °C: 821 [STR93]

#### 3264

**Compound:** Thulium chloride heptahydrate **Formula:**  $TmCl_3 \cdot 7H_2O$ **Molecular Formula:**  $Cl_3H_{14}O_7Tm$ **Molecular Weight:** 401.399 CAS RN: 13778-39-7 Properties: -4 mesh with 99.9% purity; light green cryst; deliq; there is a hexahydrate, CAS RN 1331-74-4 [HAW93] [STR93] [CER91] [ALD94] Solubility: s H<sub>2</sub>O, alcohol [MER06] Melting Point, °C: 824 [HAW93] Boiling Point, °C: 1440 [HAW93]

#### 3265

Compound: Thulium fluoride Formula: TmF<sub>3</sub> Molecular Formula: F<sub>3</sub>Tm Molecular Weight: 225.929 CAS RN: 13760-79-7 Properties: off-white powd; hygr [STR93] Melting Point, °C: 1158 [STR93] Boiling Point, °C: >2200 [CRC10]

#### 3266

**Compound:** Thulium hydroxide **Formula:** Tm(OH)<sub>3</sub> **Molecular Formula:** H<sub>3</sub>O<sub>3</sub>Tm **Molecular Weight:** 219.956 **CAS RN:** 1311-33-7 **Properties:** white precipitate [MER06]

## 3267

Compound: Thulium iodide Formula: TmI<sub>3</sub> Molecular Formula: I<sub>3</sub>Tm Molecular Weight: 549.553 CAS RN: 13813-43-9 Properties: yellow cryst; -20 mesh with 99.9% purity [CRC10] [CER91] Melting Point, °C: 1015 [CRC10] Boiling Point, °C: 1260 [CRC10]

## 3268

**Compound:** Thulium nitrate hexahydrate **Formula:**  $Tm(NO_3)_3 \cdot 6H_2O$ **Molecular Formula:**  $H_{12}N_3O_{15}Tm$ **Molecular Weight:** 463.040 **CAS RN:** 36548-87-5 **Properties:** off-white cryst [STR93]

#### 3269

**Compound:** Thulium oxalate hexahydrate **Formula:**  $Tm_2(C_2O_4)_3 \cdot 6H_2O$  Molecular Formula: C<sub>6</sub>H<sub>12</sub>O<sub>18</sub>Tm<sub>2</sub>
Molecular Weight: 710.018
CAS RN: 26677-68-9
Properties: cryst; greenish white precipitate [STR93] [MER06]
Solubility: s aq solutions of alkali oxalates forming double oxalates [MER06]
Reactions: minus H<sub>2</sub>O at 50°C [HAW93]

## 3270

**Compound:** Thulium oxide **Synonym:** thulia **Formula:** Tm<sub>2</sub>O<sub>3</sub> **Molecular Formula:** O<sub>3</sub>Tm<sub>2</sub> **Molecular Weight:** 385.866 **CAS RN:** 12036-44-1

Properties: dense white powd, with greenish tinge, or 3–12 mm sintered pieces; sl hygr; absorbs atm H<sub>2</sub>O and CO<sub>2</sub>; has reddish incandescence when heated, which changes to yellow and then white if heating is prolonged; used as an evaporation material of 99.9% purity to deposit films possibly reactive to radio frequencies [HAW93] [CER91]
Solubility: slowly dissolves in strong acids [HAW93]

Density, g/cm<sup>3</sup>: 8.6 [HAW93]

#### 3271

Compound: Thulium silicide Formula: TmSi<sub>2</sub> Molecular Formula: Si<sub>2</sub>Tm Molecular Weight: 225.105 CAS RN: 12039-84-8 Properties: 10 mm & down lump [ALF93]

## 3272

**Compound:** Thulium sulfate octahydrate **Formula:**  $Tm_2(SO_4)_3 \cdot 8H_2O$  **Molecular Formula:**  $H_{16}O_{20}S_3Tm_2$  **Molecular Weight:** 770.181 **CAS RN:** 13778-40-0 **Properties:** white cryst; obtained from an aq solution of TlCl<sub>3</sub> and  $H_2SO_4$  by precipitating with alcohol [MER06] [STR93]

## 3273

**Compound:** Thulium sulfide **Formula:** Tm<sub>2</sub>S<sub>3</sub> **Molecular Formula:** S<sub>3</sub>Tm<sub>2</sub> **Molecular Weight:** 434.001 CAS RN: 12166-30-2 Properties: -200 mesh with 99.9% purity [CER91]

#### 3274

Compound: Tin (gray) Synonym: gray tin Formula: Sn Molecular Formula: Sn Molecular Weight: 118.710 CAS RN: 7440-31-5 Properties: amorphous; unstable, brittle; formed by white tin at -40°C, but slowly reverts back to white form >20°C [MER06] Density, g/cm<sup>3</sup>: 5.77 [KIR83] Reactions: gray to white transformation at 13.2°C [KIR83]

#### 3275

**Compound:** Tin (white) Synonym: white tin Formula: Sn Molecular Formula: Sn Molecular Weight: 118.710 CAS RN: 7440-31-5 Properties: almost silvery-white, lustrous, very malleable; easily powdered; brittle at 200°C; has thin oxide film; enthalpy of fusion 7.03 kJ/mol; enthalpy of vaporization 296.4 kJ/mol; electrical resistivity (0°C) 11.0  $\mu$ ohm · cm, (100°C) 15.5  $\mu$ ohm · cm; Brinell hardness at 20°C is 3.9; tensile strength at 15°C is 14.5 MPa; electronegativity 1.8–1.9; uses include cryogenic switching devices; band gap 0.082 eV (0 K) [MER06] [KIR83] [KIR82] [COT88] [CER91] [CRC10] Solubility: reacts slowly with cold dil HCl, dil HNO<sub>3</sub>, hot dil H<sub>2</sub>SO<sub>4</sub>; readily with conc HCl, aqua regia [MER06] Density, g/cm<sup>3</sup>: 7.31 [MER06] Melting Point, °C: 231.9 [KIR83] Boiling Point, °C: 2270 [ALD94] Reactions: crumbles to gray amorphous powd at -40°C ("gray tin") [MER06] Thermal Conductivity, W/(m·K): 66.6 (25°C) [CRC10] Thermal Expansion Coefficient: (volume) 100°C (0.54), 200°C (1.27) [CLA66]

**3276 Compound:** Tin hydride **Synonym:** stannane Formula: SnH<sub>4</sub>
Molecular Formula: H<sub>4</sub>Sn
Molecular Weight: 122.742
CAS RN: 2406-52-2
Properties: colorless poisonous gas; decomposes rapidly at room temp; enthalpy of vaporization 19.05 kJ/mol [KIR80] [CRC10]
Melting Point, °C: -150 [KIR80]
Boiling Point, °C: -51.8 [CRC10]

#### 3277

Compound: Tin monophosphide Formula: SnP Molecular Formula: PSn Molecular Weight: 149.684 CAS RN: 25324-56-5 Properties: white powd; -100 mesh of 99.5% purity [CER91] [AES93] Density, g/cm<sup>3</sup>: 6.56 [CRC10] Melting Point, °C: decomposes [AES93]

## 3278

Compound: Tin triphosphide Formula:  $Sn_4P_3$ Molecular Formula:  $P_3Sn_4$ Molecular Weight: 567.761 CAS RN: 12286-33-8 Properties: white cryst; other phosphides are  $Sn_2P_3$  [53095-87-7] and  $SnP_3$ [37367-13-8] [KIR82] [CRC10] Density, g/cm<sup>3</sup>: 5.181 [CRC10] Melting Point, °C: decomposes at <480 [CRC10]

## 3279

Compound: Titanic acid Synonym: orthotitanic acid Formula: Ti(OH)<sub>4</sub> Molecular Formula: H<sub>4</sub>O<sub>4</sub>Ti Molecular Weight: 115.897 CAS RN: 20338-08-3 Properties: white powd; variable water content; can be obtained as a precipitate by adding NaOH solution to a solution of a Ti(IV) salt; used as a mordant [HAW93] [KIR83] Solubility: i H<sub>2</sub>O; s dil HC1 [KIR83]

## 3280 Compound: Titanium Formula: Ti

Molecular Formula: Ti Molecular Weight: 47.867 CAS RN: 7440-32-6 **Properties:** dark gray lustrous metal; two phases:  $\alpha$ -form, hex, stable below 882.5°C;  $\beta$ -form, bcc, stable above 882.5°C; brittle when cold, else ductile; Vickers hardness is 80-100; Poisson's ratio ~0.41; enthalpy of fusion 14.15 kJ/mol; enthalpy of vaporization 425 kJ/mol; electrical resistivity 42.0 µohm · cm at 20°C [HAW93] [MER06] [KIR83] [CRC10] [ALD94] Solubility: i H<sub>2</sub>O [HAW93] Density, g/cm<sup>3</sup>: α: 4.506; β: 4.400 (885°C) [KIR83] [MER06] Melting Point, °C: 1660 [ALD94] Boiling Point, °C: 3277 [MER06] **Reactions:** reacts with:  $F_2$  (150°C);  $Cl_2$ (300°C); Br<sub>2</sub> (360°C) [MER06] Thermal Conductivity, W/(m·K): 21.9 at 25°C [KIR83] Thermal Expansion Coefficient: (volume) 100°C (0.240), 200°C (0.567), 400°C (1.316), 600°C (2.095) [CLA66]

## 3281

**Compound:** Titanium boride Formula: TiB<sub>2</sub> Molecular Formula: B<sub>2</sub>Ti Molecular Weight: 69.489 CAS RN: 12045-63-5 **Properties:** gray cryst refractory material; hex, a = 0.3028 nm, c = 0.3228 nm; hardness 9+ Mohs; electrical resistivity  $28.4 \mu ohm \cdot cm (20^{\circ}C)$ ; superconducting at 1.26 K; can be prepared by direct reaction of Ti with  $\beta$  at 2000°C; used as a high temp electrical conductor, as a cermet component, in crucibles to melt metals such as aluminum and tin, and as a 99.5% pure sputtering target to form films which increase cutting tool life [HAW93] [KIR78] [KIR83] [CER91] Density, g/cm<sup>3</sup>: 4.50 [STR93] Melting Point, °C: 2900 [STR93]

## 3282

Compound: Titanium carbide Formula: TiC Molecular Formula: CTi Molecular Weight: 59.878 CAS RN: 12070-08-5 Properties: gray cub, a=0.4328 nm; extremely hard; resistivity at room temp 60μohm · cm; enthalpy of fusion 71 kJ/mol; hardness 9–10 Mohs; superconducting at 1.1 K; made by reaction of titanium with carbon at high temperatures; used as an additive in cutting tools, in crucible form for melting metals such as bismuth, zinc, and cadmium, and as 99.5% pure sputtering target to prepare wear-resistant semiconducting films [HAW93] [STR93] [CER91] [JAN71]
Solubility: i H<sub>2</sub>O; s nitric acid, aqua regia [HAW93]
Density, g/cm<sup>3</sup>: 4.93 [STR93]
Melting Point, °C: ~3140 [STR93]

Boiling Point, °C: 4820 [STR93]

Thermal Conductivity, W/(m·K): 21 [KIR78]

Thermal Expansion Coefficient: (volume)

100°C (0.125), 200°C (0.326), 400°C (0.771), 800°C (1.736), 1200°C (2.869) [CLA66]

## 3283

Compound: Titanium dibromide
Formula: TiBr<sub>2</sub>
Molecular Formula: Br<sub>2</sub>Ti
Molecular Weight: 207.675
CAS RN: 13783-04-5
Properties: black powd; strong reducing agent; ignites spontaneously in air; can be made by disporportionation of TiBr<sub>4</sub> at 400°C [KIR83]
Solubility: reacts with H<sub>2</sub>O evolving hydrogen and forming Ti<sup>+++</sup> [KIR83]
Density, g/cm<sup>3</sup>: 4.31 [KIR83]
Melting Point, °C: decomposes at >500 [CRC10]

## 3284

Compound: Titanium dichloride
Formula: TiCl<sub>2</sub>
Molecular Formula: Cl<sub>2</sub>Ti
Molecular Weight: 118.772
CAS RN: 10049-06-6
Properties: black hex cryst; burns in air if heated; enthalpy of vaporization 232 kJ/mol; can be made by heating TiCl<sub>3</sub> in vacuum at 475°C [MER06] [KIR83] [CRC10]
Solubility: decomposed by H<sub>2</sub>O evolving H<sub>2</sub> and forming TiCl<sub>3</sub> [KIR83]; s alcohol; i chloroform, ether, CS<sub>2</sub> [MER06]
Density, g/cm<sup>3</sup>: 3.13 [MER06]
Melting Point, °C: 1035 [MER06]
Boiling Point, °C: 1500 [KIR83]

## 3285

**Compound:** Titanium diiodide **Synonym:** titanium(II) iodide

Formula: TiI<sub>2</sub>
Molecular Formula: I<sub>2</sub>Ti
Molecular Weight: 301.676
CAS RN: 13783-07-8
Properties: hygr black powd, hex; can be prepared by reacting Ti and I<sub>2</sub> at 440°C [KIR82] [CRC10]
Solubility: reacts quickly with H<sub>2</sub>O, evolving hydrogen and forming TiI<sub>3</sub> solution [KIR83]
Density, g/cm<sup>3</sup>: 4.99 [CRC10]
Melting Point, °C: 600 [CRC10]
Boiling Point, °C: 1000 [CRC10]

## 3286

Compound: Titanium dioxide Synonym: anatase Formula: TiO<sub>2</sub> Molecular Formula: O<sub>2</sub>Ti Molecular Weight: 79.866 CAS RN: 1317-70-0 Properties: white; tetr, a=0.3758 nm, c=0.9514 nm; hardness 5.5–6 Mohs; enthalpy of transition to rutile 12.6 kJ/mol; can be prepared by hydrolysis of titanium tetraethoxide solutions in ethanol solution to yield amorphous hydrous powd, followed by hydrothermal treatment at 200°C–282°C for 5 h and refluxing [KIR83] [OGU88] Density, g/cm<sup>3</sup>: 3.9 [KIR83] Reactions: transforms to rutile ~700°C [KIR83]

## 3287

Compound: Titanium dioxide Synonym: brookite Formula: TiO<sub>2</sub> Molecular Formula: O<sub>2</sub>Ti Molecular Weight: 79.866 CAS RN: 13463-67-7 Properties: ortho-rhomb, a=0.9166 nm, b=0.5436 nm, c=0.5135 nm; hardness 5.5–6 Mohs; produced by heating amorphous TiO<sub>2</sub> with NaOH or KOH for several days at 200°C–600°C [KIR83] Density, g/cm<sup>3</sup>: 4.0 [KIR83]

#### 3288

**Compound:** Titanium dioxide **Synonym:** rutile **Formula:**  $TiO_2$ **Molecular Formula:**  $O_2Ti$ **Molecular Weight:** 79.866 **CAS RN:** 1317-80-2

- **Properties:** white powd or 99.9% pure gold sintered tablets; tetr, a = 0.533 nm, c = 0.6645 nm; thermally stable form of TiO<sub>2</sub>; hardness 7–7.5 Mohs; dielectric constant 114; used as a white pigment in paints, paper, rubber, etc., as an opacifying agent, and with 99.99% and 99.9% purity as a sputtering target to prepare high index films, and multilayer interference filters [HAW93] [MER06] [CER91] [KIR83]
- **Solubility:** in 0.00058 mol/kg alkaline phosphate solutions: in units of 10<sup>-6</sup> mol/kg ⋅ H<sub>2</sub>O: 0.00125 (20°C), 0.00109 (120.5°C), 0.00244 (218.3°C), 0.0232 (287.2°C) [ZIE93]; s hot cone H<sub>2</sub>SO<sub>4</sub>, HF [MER06]
- **Density, g/cm<sup>3</sup>:** 4.23 [MER06]
- Melting Point, °C: 1855 [MER06]
- Boiling Point, °C: 2500–3000 [STR93]
- **Thermal Conductivity, W/(m·K):** 3.8 (500°C), 3.3 (1000°C) [KIR80]
- **Thermal Expansion Coefficient:** (volume) 100°C (0.182), 200°C (0.434), 400°C (0.968), 800°C (2.063), 1000°C (2.861) [CLA66]

Compound: Titanium diselenide Synonym: Ti(IV) selenide Formula: TiSe<sub>2</sub> Molecular Formula: Se<sub>2</sub>Ti Molecular Weight: 205.800 CAS RN: 12067-45-7 Properties: -325 mesh white powd [AES93]

## 3290

Compound: Titanium disulfide
Synonym: titanium(IV) sulfide
Formula: TiS<sub>2</sub>
Molecular Formula: S<sub>2</sub>Ti
Molecular Weight: 111.999
CAS RN: 12039-13-3
Properties: yellowish brown powd; hex; sensitive to moisture, forming H<sub>2</sub>S and TiO<sub>2</sub>; decomposed by steam; is obtained as a product of the reaction of H<sub>2</sub>S and TiCl<sub>4</sub> at 600°C; used as a

solid lubricant [HAW93] [STR93] [KIR83] Solubility: stable to HCl, s cold or hot H<sub>2</sub>SO<sub>4</sub>; decomposed by hot NaOH [KIR83]

**Density, g/cm<sup>3</sup>:** 3.22 [STR93]

## 3291

**Compound:** Titanium ditelluride **Synonym:** Ti(IV) telluride

Formula: TiTe<sub>2</sub> Molecular Formula: Te<sub>2</sub>Ti Molecular Weight: 303.080 CAS RN: 12067-15-3 Properties: -325 mesh black powd [AES93]

#### 3292

**Compound:** Titanium hydride **Formula:** TiH<sub>2</sub> **Molecular Formula:** H<sub>2</sub>Ti **Molecular Weight:** 49.883

CAS RN: 7704-98-5

Properties: grayish black metallic powd; stable in air; dissociates at 450°C; can produce 448 mL H<sub>2</sub>/g; stable at room temp; burns quietly when ignited but violent reaction if oxidizing agents are present; industrial preparation by reaction of titanium sponge with H<sub>2</sub> at 200°C-600°C, then cooling in H<sub>2</sub>; used as a source for Ti powd, as a getter in electronic tubes, and to seal metals [KIR80] [MER06]
Solubility: i H<sub>2</sub>O [KIR80]
Density, g/cm<sup>3</sup>: 3.9 [STR93]

Melting Point, °C: decomposes at 400 [STR93] Reactions: dissociates from 300°C to 600°C [KIR80]

#### 3293

**Compound:** Titanium isopropoxide Synonym: titanium isopropylate Formula: Ti[OCH(CH<sub>3</sub>)<sub>2</sub>]<sub>4</sub> Molecular Formula: C12H28O4Ti Molecular Weight: 284.232 CAS RN: 546-68-9 Properties: colorless liq; fumes in air; used as a polymerization catalyst; used to prepare barium titanate, aluminum titanate, and TiO<sub>2</sub>–CeO<sub>2</sub> coatings by the sol-gel process [MER06] [MAK90] [RIT86] [YAM89] [STR93] **Solubility:** decomposes rapidly in H<sub>2</sub>O; s absolute ethanol, ether, benzene, chloroform [MER06] Density, g/cm<sup>3</sup>: 0.955 [STR93] Melting Point, °C: ~20 [MER06] Boiling Point, °C: 220 [MER06]

#### 3294

Compound: Titanium monosulfide Formula: TiS Molecular Formula: STi Molecular Weight: 79.933 CAS RN: 12039-07-5 Properties: hex, dark brown solid; can be obtained by direct reaction of Ti and S [KIR83] **Solubility:** attacked by conc HCl and HNO<sub>3</sub> but not by alkalies [KIR83] **Density, g/cm<sup>3</sup>:** 4.05 [KIR83]

3295

Compound: Titanium monoxide Synonym: titanium(II) oxide Formula: TiO Molecular Formula: OTi Molecular Weight: 63.866 CAS RN: 12137-20-1 Properties: bronze pellets; fcc; weakly basic oxide with no important industrial uses [HAW93] [STR93] [KIR83] Solubility: s hot 40% HF and 30% H<sub>2</sub>O<sub>2</sub> [KIR83] Density, g/cm<sup>3</sup>: 4.95 [STR93] Melting Point, °C: 1700 [STR93] Boiling Point, °C: >3000 [STR93]

## 3296

Compound: Titanium nitride Formula: TiN Molecular Formula: NTi Molecular Weight: 61.874 CAS RN: 25583-20-4

Properties: bronze powd; fcc, a=0.4246 nm; hardness, 8–9 Mohs; electrical resistivity 21.7 μohm · cm (20°C); transition temp 4.8 K; can be prepared by reaction between finely divided Ti and nitrogen at 1000°C–1400°C; used in cermets, rectifiers and in crucible form for melting metals such as aluminum, bismuth, cadmium, lead, steel, tin; used as 99.5% pure sputtering target to increase life of cutting tools [HAW93] [CIC73] [KIR81] [KIR83] [CER91]
Solubility: attacked by boiling aqua regia,

decomposed by boiling alkalies evolving ammonia; otherwise highly stable [KIR83]

Density, g/cm<sup>3</sup>: 5.22 [STR93]

Melting Point, °C: 2930 [STR93]

Thermal Conductivity, W/(m·K): 29.1 [KIR81]

**Thermal Expansion Coefficient:** 

 $9.35 \times 10^{-6}$  (KIR81)

## 3297

Compound: Titanium oxalate decahydrate Formula:  $Ti_2(C_2O_4)_3 \cdot 10H_2O$ Molecular Formula:  $C_6H_{20}O_{22}Ti_2$ Molecular Weight: 539.946 CAS RN: 28212-09-1 Properties: yellow prisms; prepared from oxalic acid and TiCl<sub>3</sub> [HAW93] Solubility: s H<sub>2</sub>O; i alcohol, ether [HAW93]

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#### 3298

Compound: Titanium oxysulfate Formula: TiOSO<sub>4</sub> Molecular Formula: O<sub>5</sub>STi Molecular Weight: 159.930 CAS RN: 13825-75-6 Properties: white or sl yellow powd; decomposed by water [MER06]

## 3299

Compound: Titanium phosphide
Formula: TiP
Molecular Formula: PTi
Molecular Weight: 78.841
CAS RN: 12037-65-9
Properties: hard, gray metallic powd with hex structure; prepared by heating phosphine with TiCl<sub>4</sub>; stable up to 1400°C; finds use as a catalyst in organic reactions [KIR83]
Solubility: not attacked by common acids [KIR83]
Density, g/cm<sup>3</sup>: 4.08 [KIR83]

## 3300

Compound: Titanium silicide Synonym: titanium disilicide Formula: TiSi<sub>2</sub> Molecular Formula: Si<sub>2</sub>Ti Molecular Weight: 104.051 CAS RN: 12039-83-7 **Properties:** ortho-rhomb black powd, a=0.8236 nm, b = 0.4773 nm, c = 0.8523 nm; hardness 4.5 Mohs; resistivity  $123 \mu ohm \cdot cm can be prepared$ by reaction of the elements; used in special alloy applications, as a flame-resistant coating material, also as 99.5 or 99.9% pure material, as a sputtering target in the fabrication of integrated circuits [HAW93] [STR93] [CER91] Solubility: s HF, resistant to mineral acids and alkali solutions [KIR83] Density, g/cm<sup>3</sup>: 4.39 [STR93] Melting Point, °C: 1540 [STR93]

#### 3301

**Compound:** Titanium sulfate **Synonym:** titanous sulfate **Formula:**  $Ti_2(SO_4)_3$ **Molecular Formula:**  $O_{12}S_3Ti_2$ **Molecular Weight:** 383.925 **CAS RN:** 10343-61-0 Properties: green, cryst powd; produced by reduction of Ti(IV) in sulfuric acid solution; used as a reducing agent in the textile industry [HAW93] [MER06] [KIR83]
Solubility: i H<sub>2</sub>O, alcohol, conc H<sub>2</sub>SO<sub>4</sub>; s dil HCl, dil H<sub>2</sub>SO<sub>4</sub> both giving violet solutions [MER06]

## 3302

Compound: Titanium tetrabromide Synonym: titanium(IV) bromide Formula: TiBr<sub>4</sub> Molecular Formula: Br<sub>4</sub>Ti Molecular Weight: 367.483 CAS RN: 7789-68-6 Properties: amber yellow or orange cub; very hygr; enthalpy of vaporization 44.37 kJ/mol; enthalpy of fusion 12.90 kJ/ mol; can be made by reaction between TiCl<sub>4</sub> and HBr [MER06] [KIR83] [CRC10] Solubility: dissolves with hydrolysis in H<sub>2</sub>O [KIR83] Density, g/cm<sup>3</sup>: 3.25 [MER06] Melting Point, °C: 39 [CRC10] Boiling Point, °C: 230 [CRC10]

3303

**Compound:** Titanium tetrachloride **Formula:** TiCl<sub>4</sub> **Molecular Formula:** Cl<sub>4</sub>Ti **Molecular Weight:** 189.678 **CAS RN:** 7550-45-0

Properties: pale yellow or colorless liq; absorbs atm moisture and emits dense white cloud; vapor pressure (20°C) 1.33 kPa; enthalpy of vaporization 36.2 kJ/mol; enthalpy of fusion 9.97 kJ/mol; critical temp 358°C; viscosity 0.079 mPa s; dielectric constant (20°C) 2.79; manufactured by the chlorination of titanium compounds, for example rutile [MER06] [STR93] [KIR83] [CRC10]
Solubility: s cold H<sub>2</sub>O, alcohol; decomposed in

hot H<sub>2</sub>O [MER06]; s dil HCl [HAW93] **Density, g/cm<sup>3</sup>:** 1.726 [MER06] **Melting Point, °C:** -45 [ALD94] **Boiling Point, °C:** 136.4 [ALD94]

#### 3304

**Compound:** Titanium tetrafluoride **Formula:** TiF<sub>4</sub> **Molecular Formula:** F<sub>4</sub>Ti **Molecular Weight:** 123.861 **CAS RN:** 7783-63-3 Properties: powd or white mass; very hygr; can be produced by the reaction between F<sub>2</sub> and TiCl<sub>4</sub> at 250°C [MER06]
Solubility: hydrolyzes in H<sub>2</sub>O; s alcohol, pyridine [MER06]
Density, g/cm<sup>3</sup>: 2.798 [MER06]
Boiling Point, °C: sublimes at 284 [MER06]

## 3305

Compound: Titanium tetraiodide
Formula: TiI<sub>4</sub>
Molecular Formula: I<sub>4</sub>Ti
Molecular Weight: 555.485
CAS RN: 7720-83-4
Properties: red powd; sensitive to moisture; enthalpy of vaporization 58.4 kJ/mol; enthalpy of fusion 19.80 kJ/mol; prepared by reacting Ti and I<sub>2</sub> under controlled conditions; used extensively as a catalyst in organic reactions [KIR83] [STR93] [CRC10]
Solubility: dissolves and hydrolyzes in H<sub>2</sub>O [KIR82]
Density, g/cm<sup>3</sup>: 4.3 [STR93]
Melting Point, °C: 150 [CRC10]
Boiling Point, °C: 377 [CRC10]

#### 3306

Compound: Titanium tribromide Formula: TiBr<sub>3</sub> Molecular Formula: Br<sub>3</sub>Ti Molecular Weight: 287.579 CAS RN: 13135-31-4 Properties: bluish black cryst powd; hex plates or needles; disproportinates at 400°C to di- and tetrabromides [KIR83] Solubility: s H<sub>2</sub>O resulting in dark violet solution [KIR83] Melting Point, °C: 115, hexahydrate [CRC10]

## 3307

**Compound:** Titanium trichloride **Formula:** TiCl<sub>3</sub> **Molecular Formula:** Cl<sub>3</sub>Ti **Molecular Weight:** 154.225 **CAS RN:** 7705-07-9 **Properties:** dark reddish violet cryst; deliq; unstable, dagamagag shows 500°C; stange reducing agent

decomposes above 500°C; strong reducing agent; reaction between hydrogen and TiCl<sub>4</sub> produces  $\alpha$ -TiCl<sub>3</sub> (violet);  $\beta$  (brown), and  $\gamma$  (violet) forms are produced by reacting TiCl<sub>4</sub> with aluminum alkyls; a  $\tau$  (violet) form is made by grinding the  $\alpha$  or  $\gamma$ forms; enthalpy of vaporization 124 kJ/mol; used extensively as a catalyst for the polymerization of hydrocarbons [KIR83] [MER06] [CRC10] **Solubility:** s H<sub>2</sub>O (exothermic), alcohol [MER06] **Density, g/cm<sup>3</sup>:** 2.640 [STR93] **Melting Point, °C:** decomposes at 440 [STR93] **Boiling Point, °C:** 960 [CRC10]

## 3308

Compound: Titanium trifluoride
Formula: TiF<sub>3</sub>
Molecular Formula: F<sub>3</sub>Ti
Molecular Weight: 104.862
CAS RN: 13470-08-1
Properties: violet powd; sensitive to moisture; can be obtained by dissolving Ti metal in aq HF [STR93]
Solubility: i H<sub>2</sub>O, dil acids and alkalies [KIR82]
Density, g/cm<sup>3</sup>: 3.40 [STR93]
Reactions: disproportionates >950°C [CER91]

#### 3309

Compound: Titanium trioxide Formula: Ti<sub>2</sub>O<sub>3</sub> Molecular Formula: O<sub>3</sub>Ti<sub>2</sub> Molecular Weight: 143.732 CAS RN: 1344-54-3 Properties: violet sintered tablets; hexagonal; oxidizes to TiO<sub>2</sub>; sintered material of 99.9% purity used as

an evaporation material for interference films, thin film resistors and capacitors [KIR83] [CER91] Solubility: 40% hot HF [KIR83] Density, g/cm<sup>3</sup>: 4.486 [KIR83] Melting Point, °C: 1900 [KIR83]

## 3310

**Compound:** Titanium trisilicide **Formula:** Ti<sub>5</sub>Si<sub>3</sub> **Molecular Formula:** Si<sub>3</sub>Ti<sub>5</sub> **Molecular Weight:** 323.657 **CAS RN:** 12067-57-1 **Properties:** -325 mesh gray powd [AES93] **Melting Point, °C:** 2130 [AES93]

## 3311

Compound: Titanium trisulfide Synonym: titanium sesquisulfide Formula: Ti<sub>2</sub>S<sub>3</sub> Molecular Formula: S<sub>3</sub>Ti<sub>2</sub> Molecular Weight: 191.932 CAS RN: 12039-16-6 Properties: black cryst hex solid; can be prepared by direct reaction of Ti and S at 800°C [KIR83] Density, g/cm<sup>3</sup>: 3.52 [KIR83]

## 3312

Compound: Titanium(IV) oxide acetylacetonate Synonyms: 2,4-pentanedione, Ti(IV) derivative Formula:  $[CH_3COCH=C(O)CH_3]_2$ TiO Molecular Formula:  $C_{10}H_{14}O_5$ Ti Molecular Weight: 262.098 CAS RN: 14024-64-7 Properties: cryst powd; hydrolysis resistant; preparation: reaction of titanium oxychloride with acetylacetone and sodium carbonate; uses: crosslinking agent for cellulosic fibers [HAW93] Solubility: sl s H<sub>2</sub>O [HAW93] Melting Point, °C: 200, decomposes [ALD94]

## 3313

Compound: Titanocene dichloride Synonym: bis(cyclopentadienyl)titanium dichloride Formula:  $(C_5H_5)_2TiCl_2$ Molecular Formula:  $C_{10}H_{10}Cl_2Ti$ Molecular Weight: 248.975 CAS RN: 1271-19-8 Properties: bright red acidular cryst from toluene; sensitive to moisture; uses: synthesis of many transition metal complexes and organometallic compounds, catalyst [MER06] [ALF95] Solubility: sl s H<sub>2</sub>O [MER06] Density, g/cm<sup>3</sup>: 1.6 [ALD94] Melting Point, °C: 289–290 [ALF95] Reactions: with H<sub>2</sub>O forms Cp<sub>2</sub>TiOH+ [COT88]

#### 3314

**Compound:** Tribromogermane **Formula:** GeHBr<sub>3</sub> **Molecular Formula:** Br<sub>3</sub>GeH **Molecular Weight:** 313.36 **CAS RN:** 14779-70-5 **Properties:** col liq [CRC10] **Solubility:** reac H<sub>2</sub>O [CRC10] **Melting Point,** °C: -25 [CRC10] **Boiling Point,** °C: decomposes [CRC10]

## 3315

**Compound:** Trichlorogermane **Formula:** GeHCl<sub>3</sub> **Molecular Formula:** Cl<sub>3</sub>GeH **Molecular Weight:** 180.01 **CAS RN:** 1184-65-2 **Properties:** liq [CRC10] **Solubility:** reac H<sub>2</sub>O [CRC10] **Density, g/cm<sup>3</sup>:** 1.93 [CRC10]

## Melting Point, °C: -71 [CRC10] Boiling Point, °C: 75.3 [CRC10]

## 3316

Compound: Tribromosilane Formula: SiHBr<sub>3</sub> Molecular Formula: Br<sub>3</sub>HSi Molecular Weight: 268.806 CAS RN: 7789-57-3 Properties: enthalpy of vaporization 34.8 kJ/mol; entropy of vaporization 87.9 kJ/(mol · K) [CRC10] [CIC73] Melting Point, °C: -73 [CIC73] Boiling Point, °C: 109 [CRC10]

## 3317

**Compound:** Trichlorofluorogermane **Formula:** GeCl<sub>3</sub>F **Molecular Formula:** Cl<sub>3</sub>FGe **Molecular Weight:** 198.00 **CAS RN:** 24422-20-6 **Properties:** liq [CRC10] **Melting Point, °C:** -49.8 [CRC10] **Boiling Point, °C:** 37.5 [CRC10]

#### 3318

Compound: Trichlorosilane
Synonym: silicochloroform
Formula: SiHCl<sub>3</sub>
Molecular Formula: Cl<sub>3</sub>HSi
Molecular Weight: 135.452
CAS RN: 10025-78-2
Properties: colorless volatile mobile liq; supports combustion; enthalpy of vaporization 25.7 kJ/mol at 25°C; entropy of vaporization 82.8 kJ/(mol ⋅ K); used in organic synthesis [CIC73] [CRC10] [MER06] [STR93]
Solubility: decomposed by H<sub>2</sub>O [MER06]
Density, g/cm<sup>3</sup>: (25°C) 1.3313 [MER06]
Melting Point, °C: -118 [CIC73]
Boiling Point, °C: 33 [CRC10]

## 3319

**Compound:** Tridecaborane(19) **Formula:** B<sub>13</sub>H<sub>19</sub> **Molecular Formula:** B<sub>13</sub>H<sub>19</sub> **Molecular Weight:** 159.694 **CAS RN:** 43093-20-5 **Properties:** yellow cryst [CRC10] **Melting Point, °C:** 44 [CRC10]

#### 3320

Compound: Triethylphosphine
Formula: (C<sub>2</sub>H<sub>5</sub>)<sub>3</sub>P
Molecular Formula: C<sub>6</sub>H<sub>15</sub>P
Molecular Weight: 118.16
CAS RN: 554-70-1
Properties: colorless liq; preparation from white phosphorus, ethylene, and hydrogen under pressure; used in organic synthesis [MER06] [ALD94]
Solubility: i H<sub>2</sub>O; miscible with alcohol, ether [MER06]
Density, g/cm<sup>3</sup>: 0.80 [MER06]
Melting Point, °C: -17 [ALD94]
Boiling Point, °C: 127–128 [MER06]

## 3321

Compound: Trifluoromethane Synonym: halocarbon-23 Formula: CHF<sub>3</sub> Molecular Formula: CHF<sub>3</sub> Molecular Weight: 70.013 CAS RN: 75-46-7 Properties: colorless gas with ethereal odor; critical temp 25.9°C; critical pressure 4.84 MPa; enthalpy of vaporization 170.5 kJ/mol; used in electronics industry [AIR87] Melting Point, °C: -155.2 [AIR87] Boiling Point, °C: -82.2 [AIR87]

## 3322

Compound: Trifluorosilane Synonym: silicofluoroform Formula: SiHF<sub>3</sub> Molecular Formula: F<sub>3</sub>HSi Molecular Weight: 86.089 CAS RN: 13465-71-9 Properties: colorless gas; enthalpy of vaporization 16.1 kJ/mol; entropy of vaporization 87.9 kJ/(mol·K) [CIC73] [CRC10] Density, g/cm<sup>3</sup>: 1.86 (0°C) [CRC10] Melting Point, °C: -131 [CIC73] Boiling Point, °C: -94.4 [CIC73]

## 3323

**Compound:** Trigermane **Formula:**  $Ge_3H_8$  **Molecular Formula:**  $Ge_3H_8$  **Molecular Weight:** 225.98 **CAS RN:** 14691-44-2 **Properties:** col liq [CRC10] **Solubility:** i H<sub>2</sub>O **Density, g/cm<sup>3</sup>:** 2.20<sup>-105</sup> [CRC10]

## **Melting Point, °C:** –105.6 [CRC10] **Boiling Point, °C:** 110.5 [CRC10]

## 3324

Compound: Triiodosilane Synonym: silicoiodoform Formula: SiHI<sub>3</sub> Molecular Formula: HI<sub>3</sub>Si Molecular Weight: 409.807 CAS RN: 13465-72-0 Properties: colorless liq; enthalpy of vaporization 62.8 kJ/mol; entropy of vaporization 159 kJ/(mol·K) [CIC73] [CRC10] Density, g/cm<sup>3</sup>: 3.314 (20°C) [CRC10] Melting Point, °C: 8 [CIC73] Boiling Point, °C: decomposes at 220 [CIC73]

## 3325

Compound: Tris(ethylenediammine) cobalt(III) chloride trihydrate
Formula: Co[H<sub>2</sub>NCH<sub>2</sub>CH<sub>2</sub>NH<sub>2</sub>]<sub>3</sub>Cl<sub>3</sub>· 3H<sub>2</sub>O
Molecular Formula: C<sub>6</sub>H<sub>28</sub>Cl<sub>3</sub>CoN<sub>6</sub>O<sub>2</sub>
Molecular Weight: 399.629
CAS RN: 14883-80-8
Properties: brown prisms [KIR79]
Solubility: v s H<sub>2</sub>O [KIR79]
Density, g/cm<sup>3</sup>: 1.542 [KIR79]
Melting Point, °C: decomposes at 275 [ALD94]
Reactions: minus 3H<sub>2</sub>O at 100°C [KIR79]

## 3326

Compound: Tris(triphenylphosphine)rhodium(I) chloride Synonym: Wilkinson's catalyst Formula: Rh[P(C<sub>6</sub>H<sub>5</sub>)<sub>3</sub>]<sub>3</sub> Molecular Formula: C<sub>54</sub>H<sub>45</sub>ClP<sub>3</sub>Rh Molecular Weight: 925.231 CAS RN: 14694-95-2 Properties: burgundy-red cryst when prepared in ethanol by reaction between excess triphenylphosphine and RhCl<sub>3</sub> $\cdot$  3H<sub>2</sub>O; used as a homogeneous catalyst [MER06] [ALD94] Solubility: ~20 g/L (25°C) chloroform [MER06] Melting Point, °C: 157–158 [MER06]

## 3327

**Compound:** Tritium Formula: T<sub>2</sub> Molecular Formula: T<sub>2</sub> Molecular Weight: 6.032

## CAS RN: 10028-17-8

Properties: gas with t<sub>1/2</sub> of 12.26 years; low β-emitter; critical temp -232.56°C; critical pressure 18.317 atm; enthalpy of sublimation 1640 J/mol; enthalpy of vaporization 1390 J/mol; used in hydrogen bomb and in radioactive tracers [MER06] [KIR78]
Density, g/cm<sup>3</sup>: liq: 45.35 mol/L [KIR78]
Melting Point, °C: -254.54 [MER06]
Boiling Point, °C: -248.12 [MER06]

## 3328

Compound: Tritium dioxide Formula: T<sub>2</sub>O Molecular Formula: OT<sub>2</sub> Molecular Weight: 22.032 CAS RN: 14940-65-9 Properties: liq; triple point 4.49°C; liq vapor pressure at 25°C 2.64 kPa; enthalpy of vaporization ~45.81 kJ/mol; ionization constant ~6×10<sup>16</sup>; temp of maximum density 13.4°C [KIR78] Density, g/cm<sup>3</sup>: 1.2138 [KIR78] Boiling Point, °C: 101.51 [KIR78]

## 3329

Compound: Tungsten Synonym: wolfram Formula: W Molecular Formula: W Molecular Weight: 183.84 CAS RN: 7440-33-7 Properties: steel gray to tin white metal; bcc, a=0.316524 nm; enthalpy of fusion 52.31 kJ/mol; enthalpy of sublimation (25°C) 859.8 kJ/mol; electrical resistivity (20°C) 5.5  $\mu$ ohm  $\cdot$  cm; stable in dry air, unless heated to red heat, then forms WO<sub>3</sub>; used in crucible form for growing single cryst from reactive melts, and to evaporate metals and compounds for thin films [MER06] [KIR83] [CER91] [CRC10] Solubility: s slowly in fused KOH or Na<sub>2</sub>CO<sub>3</sub> in the presence of air [MER06] Density, g/cm<sup>3</sup>: 19.254 [KIR83] Melting Point, °C: 3410 [ALD94] Boiling Point, °C: 5660 [ALD94] Thermal Conductivity, W/(m·K): 146 (227°C), 118 (727°C), 100 (1727°C), 90 (3127°C) [KIR83]; 173 (25°C) [ALD94] Thermal Expansion Coefficient: (volume) 100°C (0.095), 200°C (0.228), 400°C (0.513), 800°C (1.104), 1200 (1.774) [CLA66]

Compound: Tungsten boride Formula: WB Molecular Formula: BW Molecular Weight: 194.651 CAS RN: 12007-09-9

Properties: refractory material; black powd; in -325 mesh 99.5% pure form, used as a sputtering target for producing wear-resistant and semiconducting films, and other applications [KIR78] [STR93] [CER91]

**Density, g/cm<sup>3</sup>:** 15.2 [LID94]

Melting Point, °C: 2660 [KIR78]

## 3331

**Compound:** Tungsten boride **Synonym:** ditungsten boride **Formula:** W<sub>2</sub>B **Molecular Formula:** BW<sub>2</sub> **Molecular Weight:** 378.491 **CAS RN:** 12007-10-2

Properties: refractory material; black powd; forms when tungsten and boron are hot pressed; extremely hard and has almost metallic electrical conductivity; -325 mesh in 99.5% pure form used as a sputtering target for fabricating wear-resistant and semiconductor films [KIR83] [STR93] [CER91] Density, g/cm<sup>3</sup>: 16.0 [LID94]

Melting Point, °C: 2670 [KIR78]

## 3332

**Compound:** Tungsten carbide **Formula:** W<sub>2</sub>C **Molecular Formula:** CW<sub>2</sub> **Molecular Weight:** 379.691

**CAS RN:** 12070-13-2

Properties: black hex, a=0.29982 nm, c=0.4722 nm; can be prepared by heating tungsten and carbon in the presence of hydrogen at high temperatures; hardness approaches that of diamond; brittle; used in hard metals, and as a 99.5% pure sputtering target to produce wear-resistant films and semiconductor films [KIR83] [CIC73] [CER91] [CRC10] Density, g/cm<sup>3</sup>: 17.15 [KIR83] Melting Point, °C: ~2800 [KIR83]

3333

Compound: Tungsten carbide Formula: WC Molecular Formula: CW Molecular Weight: 195.851 CAS RN: 12070-12-1 **Properties:** gray powd; hex, a=0.29063 nm, c = 0.28386 nm; hardness 9+ Mohs; can be prepared by heating tungsten and carbon at high temperatures, sometimes in the presence of hydrogen; used in dies and cutting tools, wear-resistant parts, electrical resistors, as an abrasive, in crucible form used to melt copper, tin, bismuth and cobalt, and as a 99.5% pure sputtering target to prepare wearresistant semiconductor films [HAW93] [CIC73] [STR93] [KIR83] [CER91] [GEI92] Solubility: i H<sub>2</sub>O; attacked by a mixture of HNO<sub>3</sub>, HF acids [HAW93] Density, g/cm3: 15.63 [STR93] Melting Point, °C: ~2870 [STR93] Boiling Point, °C: 6000 [STR93] Thermal Conductivity, W/(m·K): 121 [KIR78] Thermal Expansion Coefficient: (volume) 100°C (0.104), 200°C (0.236), 400°C (0.507), 800°C (1.103), 1200°C (1.768) [CLA66]

#### 3334

Compound: Tungsten carbonyl Synonym: tungsten hexacarbonyl Formula: W(CO)<sub>6</sub> Molecular Formula: C<sub>6</sub>O<sub>6</sub>W Molecular Weight: 351.902 CAS RN: 14040-11-0 Properties: white, volatile, highly refractive cryst; very stable; vapor pressure is 13.3 Pa (20°C) and 160 Pa (67°C); may be prepared by reducing WCl<sub>6</sub> with A1 in anhydrous ether under 10 MPa of CO at 70°C [KIR83] [HAW93]

Solubility: i H<sub>2</sub>O; s in organic solvents [HAW93]

Density, g/cm<sup>3</sup>: 2.65 [HAW93]

Melting Point, °C: decomposes at 169–170 [STR93]

## 3335

Compound: Tungsten dibromide Formula: WBr<sub>2</sub> Molecular Formula: Br<sub>2</sub>W Molecular Weight: 343.648 CAS RN: 13470-10-5 Properties: black powd; prepared by the reduction of WBr<sub>5</sub> with H<sub>2</sub> [KIR83] Melting Point, °C: decomposes at 400 [KIR83]

#### 3336

**Compound:** Tungsten dichloride **Formula:** WCl<sub>2</sub> **Molecular Formula:** Cl<sub>2</sub>W **Molecular Weight:** 254.745 CAS RN: 13470-12-7
Properties: gray amorphous powd; prepared by reduction of WCl<sub>6</sub> by Al in molten NaAlCl<sub>6</sub> [KIR83] [CRC10]
Density, g/cm<sup>3</sup>: 5.436 [CRC10]

## 3337

Compound: Tungsten diiodide Formula: WI<sub>2</sub> Molecular Formula: I<sub>2</sub>W Molecular Weight: 437.649 CAS RN: 13470-17-2 Properties: brown powd [KIR83] Density, g/cm<sup>3</sup>: 6.79 [KIR83] Melting Point, °C: decomposes [CRC10]

#### 3338

Compound: Tungsten dinitride Formula: WN<sub>2</sub> Molecular Formula: N<sub>2</sub>W Molecular Weight: 211.853 CAS RN: 60922-26-1 Properties: brown; hex, a=0.2893 nm, c=0.2826 nm [CIC73] [CRC10] Density, g/cm<sup>3</sup>: 7.7 [LID94] Melting Point, °C: decomposes 600 [CIC73]

#### 3339

Compound: Tungsten dioxide
Synonym: tungsten(IV) oxide
Formula: WO<sub>2</sub>
Molecular Formula: O<sub>2</sub>W
Molecular Weight: 215.839
CAS RN: 12036-22-5
Properties: brown powd, may become purple on standing; formed when WO<sub>3</sub> is reduced by H<sub>2</sub> at 575°C-600°C [KIR83] [STR93]
Density, g/cm<sup>3</sup>: 12.11 [STR93]
Melting Point, °C: 1500-1600 [STR93]

## 3340

Compound: Tungsten dioxydibromide
Formula: WO<sub>2</sub>Br<sub>2</sub>
Molecular Formula: Br<sub>2</sub>O<sub>2</sub>W
Molecular Weight: 375.647
CAS RN: 13520-75-7
Properties: light red cryst that forms when a mixture of bromine and oxygen is passed over tungsten at 300°C [KIR83]
Melting Point, °C: decomposes [CRC10]

#### 3341

**Compound:** Tungsten diselenide **Formula:** WSe<sub>2</sub> **Molecular Formula:** Se<sub>2</sub>W **Molecular Weight:** 341.760 **CAS RN:** 12067-46-8 **Properties:** 325 meth black peop

**Properties:** -325 mesh black powd; dry, solid lubricant with exceptional stability at high temperatures, and in high vacuum; used in the form of 99.8% pure material as a sputtering target to produce lubricant films [HAW93] [CER91] [AES93]

#### 3342

**Compound:** Tungsten disilicide **Formula:** WSi<sub>2</sub> **Molecular Formula:** Si<sub>2</sub>W Molecular Weight: 240.011 CAS RN: 12039-88-2 **Properties:** bluish gray tetr powd, a = 0.3212 nm, c = 0.7880 nm; attacked by fluorine, chlorine, and fused alkalies; can be used in high temp thermocouples in combination with MoSi<sub>2</sub>, in an oxidizing atm; as a 99.95% and 99.5% pure material, used as a sputtering target in the fabrication of integrated circuits [KIR83] [STR93] [CER91] Solubility: i H<sub>2</sub>O [KIR83] Density, g/cm<sup>3</sup>: 9.4 [STR93] Melting Point, °C: 2165 [STR93] Thermal Expansion Coefficient: (volume) 100°C (0.164), 200°C (0.364), 400°C (0.868), 800°C (1.886), 1200°C (3.047) [CLA66]

## 3343

**Compound:** Tungsten disulfide **Synonym:** tungstenite **Formula:** WS<sub>2</sub> **Molecular Formula:** S<sub>2</sub>W **Molecular Weight:** 247.972 **CAS RN:** 12138-09-9

Properties: soft, grayish black powd which is relatively inert and unreactive; exists in mineral form, or can be prepared by heating tungsten powd with sulfur at 900°C; used as a solid lubricant, and as a 99.8% pure material as a sputtering target for lubricant films on bearings and other moving parts [HAW93] [STR93] [KIR83] [CER91]
Solubility: i H<sub>2</sub>O, HCl, alkali [KIR83]

Density, g/cm<sup>3</sup>: 7.5 [STR93]

Melting Point, °C: decomposes at 1250 [STR93]

Compound: Tungsten hexabromide Formula: WBr<sub>6</sub> Molecular Formula: Br<sub>6</sub>W Molecular Weight: 663.264 CAS RN: 13701-86-5 Properties: bluish black cryst; made by reaction of BBr<sub>3</sub> with WCl<sub>6</sub> [KIR83] Density, g/cm<sup>3</sup>: 6.9 [CRC10] Melting Point, °C: 232 [KIR83]

#### 3345

**Compound:** Tungsten hexachloride **Synonym:** tungsten(VI) chloride **Formula:** WCl<sub>6</sub> **Molecular Formula:** Cl<sub>6</sub>W **Molecular Weight:** 396.556

CAS RN: 13283-01-7

Properties: purple hex cryst; sensitive to moisture; vapor pressure is 43 mm Hg (215°C); enthalpy of vaporization 52.7 kJ/mol; enthalpy of fusion 6.60 kJ/mol; decomposed by moist air, and water; can be obtained by direct reaction of Cl<sub>2</sub> and W at 600°C [HAW93] [STR93] [KIR83] [CRC10]
Solubility: s organic solvents such as ethanol [HAW93]

Density, g/cm<sup>3</sup>: 3.52 [HAW93] Melting Point, °C: 275 [CRC10] Boiling Point, °C: 346.75 [CRC10]

#### 3346

**Compound:** Tungsten hexafluoride **Synonym:** tungsten(VI) fluoride **Formula:** WF<sub>6</sub> **Molecular Formula:** F<sub>6</sub>W **Molecular Weight:** 297.830 **CAS RN:** 7783-82-6

Properties: colorless gas or pale yellow liq when condensed; critical temp 169.8°C; critical pressure 4.27 MPa; triple point 2.0°C at 55.1 kPa; transition point -8.4°C; enthalpy of vaporization 27 kJ/mol; enthalpy of fusion 4.10 kJ/mol; vapor pressure (17°C) 100.49 kPa; produced by reacting tungsten powd with gaseous fluorine above 350°C; used in electronics industry [KIR78] [MER06] [AIR87] [CRC10]

**Solubility:** decomposes in H<sub>2</sub>O; s anhydrous HF: 3.14 moles/100 g [HAW93] [MER06]

**Density, g/cm<sup>3</sup>:** gas: 12.9 g/L [STR93]; liq: 3.441 (15°C) [KIR78]

Melting Point, °C: 2.3 [MER06]

Boiling Point, °C: 17.5 [ALD94]

## 3347

Compound: Tungsten nitride
Formula: W<sub>2</sub>N
Molecular Formula: NW<sub>2</sub>
Molecular Weight: 381.687
CAS RN: 12033-72-6
Properties: gray; fcc, a=0.412 nm; can be prepared by heating tungsten in ammonia; there is also a WN phase, 12058-38-7 [KIR83] [KIR81]
Density, g/cm<sup>3</sup>: 17.7 [KIR81]
Melting Point, °C: decomposes [KIR81]

## 3348

Compound: Tungsten oxychloride Synonym: tungsten(VI) tetrachloride monoxide Formula: WOCl<sub>4</sub> **Molecular Formula:** Cl<sub>4</sub>OW Molecular Weight: 341.650 CAS RN: 13520-78-0 Properties: dark red, acicular cryst; enthalpy of vaporization 67.8 kJ/mol; enthalpy of fusion 45.00 kJ/mol; obtained by refluxing SOCl<sub>2</sub> with tungsten trioxide; used in incandescent lamps [HAW93] [CRC10] **Solubility:** decomposed by H<sub>2</sub>O; s CS<sub>2</sub>, benzene [KIR83] [HAW93] Density, g/cm<sup>3</sup>: 11.92 [HAW93] Melting Point, °C: 211 [KIR83] Boiling Point, °C: 227.5 [CRC10]

## 3349

Compound: Tungsten oxydichloride Synonym: tungsten(VI) dichloride dioxide Formula: WO<sub>2</sub>Cl<sub>2</sub> Molecular Formula: Cl<sub>2</sub>O<sub>2</sub>W Molecular Weight: 286.744 CAS RN: 13520-76-8 Properties: pale yellow cryst solid; obtained by reacting CCl<sub>4</sub> and WO<sub>2</sub> at 250°C [KIR83] Solubility: i cold H<sub>2</sub>O, partially decomposed by hot H<sub>2</sub>O; i alkaline solutions [KIR83] Melting Point, °C: 266 [KIR83]

## 3350

**Compound:** Tungsten oxydiiodide **Formula:** WOI<sub>2</sub> **Molecular Formula:** I<sub>2</sub>OW **Molecular Weight:** 453.648

wolecular weight. 455.04

CAS RN: 14447-89-3

**Properties:** obtained by heating tungsten, tungsten trioxide, and iodine in a 500°C–700°C temp gradient for 36h [KIR83]

Compound: Tungsten oxytetrabromide
Formula: WOBr<sub>4</sub>
Molecular Formula: Br<sub>4</sub>OW
Molecular Weight: 519.455
CAS RN: 13520-77-9
Properties: black deliq needles; made by reacting CBr<sub>4</sub> and WO<sub>2</sub> at 250°C [KIR83]
Melting Point, °C: 277 [KIR83]
Boiling Point, °C: 327 [KIR83]

## 3352

Compound: Tungsten oxytetrafluoride
Formula: WOF<sub>4</sub>
Molecular Formula: F<sub>4</sub>OW
Molecular Weight: 275.833
CAS RN: 13520-79-1
Properties: colorless plates; can be prepared by reacting W metal with an O<sub>2</sub>-F<sub>2</sub> mixture at high temperatures; hygr [KIR83]
Solubility: decomposes to tungstic acid in H<sub>2</sub>O [KIR83]
Melting Point, °C: 110 [CRC10]
Boiling Point, °C: 187 [CRC10]

3353

Compound: Tungsten oxytrichloride Formula: WOCl<sub>3</sub> Molecular Formula: Cl<sub>3</sub>OW Molecular Weight: 306.197 CAS RN: 14249-98-0 Properties: green solid; can be obtained by reduction of WOCl<sub>4</sub> with Al in a sealed system at 100°C–140°C [KIR83]

## 3354

Compound: Tungsten pentaboride Formula: W<sub>2</sub>B<sub>5</sub> Molecular Formula: B<sub>5</sub>W<sub>2</sub> Molecular Weight: 421.735 CAS RN: 12007-98-6 Properties: black powd, -325 mesh; refractory material [KIR78] [STR93] Melting Point, °C: 2365 [KIR78]

## 3355

**Compound:** Tungsten pentabromide **Synonym:** tungsten(V) bromide **Formula:** WBr<sub>5</sub> **Molecular Formula:** Br<sub>5</sub>W Molecular Weight: 583.360
CAS RN: 13470-11-6
Properties: brownish violet cryst; high moisture sensitivity; prepared by reaction of bromine vapor on metallic tungsten at 450°C–500°C [KIR83]
Melting Point, °C: 276 [KIR83]
Boiling Point, °C: 333 [KIR83]

## 3356

Compound: Tungsten pentachloride Formula: WCl<sub>5</sub> Molecular Formula: Cl<sub>5</sub>W Molecular Weight: 361.104 CAS RN: 13470-14-9 Properties: black cryst deliq solid; can be prepared by reducing WCl<sub>6</sub> with red phosphorus [KIR83] Solubility: decomposes in H<sub>2</sub>O to a blue oxide; v sl s CS<sub>2</sub> [KIR83] Density, g/cm<sup>3</sup>: 3.875 [CRC10] Melting Point, °C: 243 [KIR83] Boiling Point, °C: 275.6 [KIR83]

#### 3357

Compound: Tungsten telluride Synonym: tungsten(IV) telluride Formula: WTe<sub>2</sub> Molecular Formula: Te<sub>2</sub>W Molecular Weight: 439.040 CAS RN: 12067-26-4 Properties: gray powd; used in the form of a -325 mesh, 99.8% pure material as a sputtering target to form lubricant film [STR93] [CER91]

## 3358

Compound: Tungsten tetrabromide
Synonym: tungsten(IV) bromide
Formula: WBr<sub>4</sub>
Molecular Formula: Br<sub>4</sub>W
Molecular Weight: 503.456
CAS RN: 12045-94-2
Properties: black ortho-rhomb cryst; prepared by reduction of WBr<sub>5</sub> with Al [KIR83]

#### 3359

**Compound:** Tungsten tetrachloride **Synonym:** tungsten(IV) chloride **Formula:** WCl<sub>4</sub> Molecular Formula: Cl<sub>4</sub>W
Molecular Weight: 325.651
CAS RN: 13470-13-8
Properties: gray powd; sensitive to moisture; decomposes if heated; diamagnetic; obtained by reduction of WCl<sub>6</sub> with A1 [KIR83] [STR93]
Density, g/cm<sup>3</sup>: 4.624 [STR93]
Melting Point, °C: decomposes [CRC10]

## 3360

Compound: Tungsten tetraiodide Formula: WI<sub>4</sub> Molecular Formula: I<sub>4</sub>W Molecular Weight: 691.458 CAS RN: 14055-84-6 Properties: black powd; decomposed by air; prepared by reacting conc hydriodic acid and WCl<sub>6</sub> at 100°C [KIR83] Density, g/cm<sup>3</sup>: 5.2 [CRC10] Melting Point, °C: decomposes [CRC10]

## 3361

Compound: Tungsten tribromide Formula: WBr<sub>3</sub> Molecular Formula: Br<sub>3</sub>W Molecular Weight: 423.552 CAS RN: 15163-24-3 Properties: black powd; thermally unstable; prepared by reaction of bromine and WBr<sub>2</sub> at 50°C in a sealed system [KIR83] Solubility: i H<sub>2</sub>O [KIR83]

#### 3362

Compound: Tungsten triiodide Formula: WI<sub>3</sub> Molecular Formula: I<sub>3</sub>W Molecular Weight: 564.553 CAS RN: 15513-69-6 Properties: can be prepared by reacting iodine and W(CO)<sub>6</sub> in a sealed system at 120°C [KIR83]

## 3363

**Compound:** Tungsten trioxide **Synonym:** tungsten(VI) oxide **Formula:** WO<sub>3</sub> **Molecular Formula:** O<sub>3</sub>W **Molecular Weight:** 231.838 **CAS RN:** 1314-35-8 Properties: canary yellow, heavy powd which becomes dark orange when heated and reverts to original color when cooled, also greenish yellow 3–12 mm sintered pieces; enthalpy of fusion 73.00 kJ/ mol; can be prepared from tungstic acid; used as starting material to produce tungsten powd, sintered pieces used as evaporation material and sputtering target for shadow casting in electron microscopy [KIR83] [MER06] [CER91] [CRC10]
Solubility: i H<sub>2</sub>O; s caustic alkalies; v sl s in acids [MER06]
Density, g/cm<sup>3</sup>: 7.16 [STR93]
Melting Point, °C: 1472 [CRC10]
Reactions: phase change from pseudorhomb to tetr above 700°C [KIR83]

## 3364

Compound: Tungsten trisilicide Formula: W<sub>5</sub>Si<sub>3</sub> Molecular Formula: Si<sub>3</sub>W<sub>5</sub> Molecular Weight: 1003.457 CAS RN: 12039-95-1 Properties: bluish gray; very hard solid; attacked by fused alkalies and mixtures of nitric and hydrofluoric acids [HAW93] Solubility: i H<sub>2</sub>O [HAW93] Density, g/cm<sup>3</sup>: 9.4 [HAW93] Melting Point, °C: >900 [HAW93]

#### 3365

Compound: Tungsten trisulfide
Formula: WS<sub>3</sub>
Molecular Formula: S<sub>3</sub>W
Molecular Weight: 280.038
CAS RN: 12125-19-8
Properties: chocolate brown powd; can be obtained from an alkali metal thiotungstate by treating with HCl [KIR83]
Solubility: sl s cold H<sub>2</sub>O, forms colloid in hot H<sub>2</sub>O; s alkali carbonate and hydroxide solutions [KIR83]

## 3366

**Compound:** Tungstic acid **Formula:** H<sub>2</sub>WO<sub>4</sub> **Molecular Formula:** H<sub>2</sub>O<sub>4</sub>W **Molecular Weight:** 249.854 **CAS RN:** 7783-03-1

**Properties:** amorphous yellow powd; prepared by precipitation from hot tungstate solutions with strong acids, followed by boiling in an acidic medium; used in textile and plastics industries [KIR83] [STR93]

**Solubility:** i H<sub>2</sub>O, acids; s alkalies [KIR83] **Density, g/cm<sup>3</sup>:** 5.5 [STR93] **Reactions:** minus H<sub>2</sub>O at 100°C [CRC10]

3367

Compound: Tungstophosphoric acid hydrate Synonym: 12-tungstophosphate Formula:  $H_3PO_4 \cdot 12WO_3 \cdot xH_2O$ Molecular Formula:  $H_3O_{40}PW_{12}$  (anhydrous) Molecular Weight: 2880.053 (anhydrous) CAS RN: 12501-23-4 Properties: yellowish white solid; hygr [HAW93] [STR93] Solubility: s  $H_2O$ , acetone, ether [HAW93] Melting Point, °C: 89, for x = 24 [HAW93]

3368

Compound: Uranium Formula: U Molecular Formula: U Molecular Weight: 238.0289 CAS RN: 7440-61-1

**Properties:** silvery white, lustrous; black powd, when obtained by reduction of UF<sub>4</sub>; three forms,  $\alpha$ -form: ortho-rhomb, a = 0.2854 nm, b = 0.5869 nm,  $c = 0.4956 \text{ nm}; \beta$ : tetr,  $a = 1.0763 \text{ nm}, c = 0.5652 \text{ nm}; \gamma$ : bcc, a=0.3524 nm; resistivity 29 µohm  $\cdot$  cm; enthalpy of fusion 9.14 kJ/mol; enthalpy of sublimation 1062.73 kJ/mol; flammable in air forming  $U_3O_8$ ;  $t_{1/2}^{238}$ U is  $4.47 \times 10^{+9}$  years; ionic radius of U<sup>++++</sup> 0.0918 nm [MER06] [KIR78] [KIR83] [CRC10] **Density, g/cm<sup>3</sup>:** α: 19.07; β: 18.11; γ: 18.06 [KIR83] Melting Point, °C: 1132 [KIR91] Boiling Point, °C: 3818 [ALD94] **Reactions:** transition  $\alpha$  to  $\beta$  at 667.7°C, β to γ at 774.8°C [MER06] Thermal Conductivity, W/(m·K): 25.1 (36°C), 26.3 (100°C), 29.7 (200°C), 31.4 (300°C), 32.6 (400°C) [KIR83]

Thermal Expansion Coefficient: 13.9×10<sup>-6</sup>/K [CRC10]

## 3369

Compound: Uranium diboride Formula: UB<sub>2</sub> Molecular Formula: B<sub>2</sub>U Molecular Weight: 259.651 CAS RN: 12007-36-2 Properties: hex; -8 mesh with 99.5% purity; refractory material [KIR78] [CER91] [CRC10] Density, g/cm<sup>3</sup>: 12.7 [CRC10] Melting Point, °C: 2385 [KIR78]

#### 3370

Compound: Uranium dicarbide
Formula: UC<sub>2</sub>
Molecular Formula: C<sub>2</sub>U
Molecular Weight: 262.051
CAS RN: 12071-33-9
Properties: gray tetr cryst, a=0.35241 nm, c=0.59962 nm; used in the form of pellets or microspheres to fuel nuclear reactors [HAW93] [CIC73]
Solubility: decomposes in H<sub>2</sub>O; sl s alcohol [HAW93]
Density, g/cm<sup>3</sup>: 11.28 [HAW93]
Melting Point, °C: 2350 [HAW93]
Boiling Point, °C: 4370 [HAW93]
Reactions: transition tetr to cub at 1765°C [CIC73]

## 3371

Compound: Uranium dioxide Synonym: uraninite Formula: UO<sub>2</sub> Molecular Formula: O<sub>2</sub>U Molecular Weight: 270.028 CAS RN: 1344-57-6 **Properties:** -100 mesh; brown to black powd; cub cryst; widely used to manufacture fuel pellets for power reactors [KIR83] [MER06] [STR94] **Solubility:** i H<sub>2</sub>O, dil acids; s conc acids [MER06] Density, g/cm<sup>3</sup>: 10.97 [MER06] Melting Point, °C: 2865 [MER06] Thermal Conductivity, W/(m·K): 5.1 (500°C), 3.4 (1000°C) [KIR80] Thermal Expansion Coefficient: (volume) 100°C (0.199), 200°C (0.468), 400°C (1.045), 800°C (2.638), 1000°C (3.115) [CLA66]

#### 3372

**Compound:** Uranium hexafluoride **Formula:** UF<sub>6</sub>

Molecular Formula: F<sub>6</sub>U

Molecular Weight: 352.019

CAS RN: 7783-81-5

- **Properties:** white; volatile; monocl solid; reacts vigorously with  $H_2O$ , forming mainly  $UO_2F_2$ and HF; enthalpy of vaporization at 64.01°C 28.899 kJ/mol; enthalpy of fusion 19.19 kJ/ mol; enthalpy of sublimation 48.095 kJ/ mol; triple point 64.052°C at 151 kPa; can be prepared by direct reaction of uranium metal and fluorine [KIR83] [MER06] [CRC10]
- **Solubility:** s liq Cl<sub>2</sub>, Br<sub>2</sub>; gives dark red fuming solution with nitrobenzene; s CCl<sub>4</sub>, CH<sub>3</sub>Cl [MER06]

**Density, g/cm<sup>3</sup>:** solid: 5.09; liq: 3.595 [MER06] **Melting Point, °C:** 64 [KIR91]

## 3373

Compound: Uranium monocarbide
Formula: UC
Molecular Formula: CU
Molecular Weight: 250.040
CAS RN: 12070-09-6
Properties: gray with metallic appearance; fcc, a=0.49605 nm; can be prepared by arc melting stoichiometric amounts of the elements in an inert atm; reacts with oxygen [CIC73]
Density, g/cm<sup>3</sup>: 13.63 [KIR78]
Melting Point, °C: 2790 [CIC73]
Thermal Conductivity, W/(m·K): 25 [KIR78]
Thermal Expansion Coefficient: 9.1 × 10<sup>-6</sup>/K [KIR78]

#### 3374

Compound: Uranium mononitride Formula: UN Molecular Formula: NU Molecular Weight: 252.036 CAS RN: 25658-43-9

Properties: dark gray; fcc, a = 0.4890 nm; electrical resistivity 176 μohm · cm; Knoop hardness 580; only stable uranium nitride above 1300°C; formed by reacting uranium and nitrogen; there are two other nitrides, UN<sub>1.5</sub>, 12033-85-1, and UN<sub>1.75</sub>, 12266-20-5 [KIR83] [KIR81]
Density, g/cm<sup>3</sup>: 14.4 [KIR81]

Melting Point, °C: 2800 [CIC73] Thermal Conductivity, W/(m⋅K): 15.5 [KIR81] Thermal Expansion Coefficient: 8.0×10<sup>-6</sup> [KIR81]

## 3375

Compound: Uranium pentabromide
Formula: UBr<sub>5</sub>
Molecular Formula: Br<sub>5</sub>U
Molecular Weight: 637.549
CAS RN: 13775-16-1
Properties: dark brown hygr unstable solid; formed when UBr<sub>4</sub> is extracted with liq Br<sub>2</sub> at 55°C,

when  $OBr_4$  is extracted with hig  $Br_2$  at 55°C, followed by recrystallization from hig  $Br_2$  [KIR83]

## 3376

**Compound:** Uranium pentachloride **Formula:** UCl<sub>5</sub> **Molecular Formula:** Cl<sub>5</sub>U **Molecular Weight:** 415.293 **CAS RN:** 13470-21-8 Properties: reddish brown cryst, with metallic luster; can be formed by reaction of UO<sub>3</sub> with CCl<sub>4</sub> or Cl<sub>2</sub> [KIR83]
Solubility: s liq Cl<sub>2</sub> [KIR83]
Density, g/cm<sup>3</sup>: 3.81 [CRC10]
Melting Point, °C: decomposes 300 [CRC10]

#### 3377

Compound: Uranium pentafluoride Formula: UF<sub>5</sub> Molecular Formula: F<sub>5</sub>U Molecular Weight: 333.021 CAS RN: 13775-07-0 Properties: two forms:  $\alpha$ -UF<sub>5</sub> is grayish white and can be obtained by reduction of UF<sub>6</sub> with HBr,  $\beta$ -UF<sub>5</sub> is yellowish white and is obtained by reacting UF<sub>6</sub> with UF<sub>4</sub> at 150°C-200°C; both forms are hygr; have blue solutions in anhydrous HF [KIR83] Density, g/cm<sup>3</sup>: 5.81 [LID94] Melting Point, °C: 348 [LID94]

## 3378

Compound: Uranium tetraboride
Formula: UB<sub>4</sub>
Molecular Formula: B<sub>4</sub>U
Molecular Weight: 281.273
CAS RN: 12007-84-0
Properties: brown; -8 mesh with 99.9% purity and -60 mesh with 99.7% purity; refractory material [KIR78] [CRC10] [CER91]
Density, g/cm<sup>3</sup>: 5.35 [CRC10]
Melting Point, °C: 2495 [KIR78]

#### 3379

Compound: Uranium tetrabromide
Formula: UBr<sub>4</sub>
Molecular Formula: Br<sub>4</sub>U
Molecular Weight: 557.645
CAS RN: 13470-20-7
Properties: dark brown, very hygr cryst; prepared by heating uranium turnings in a nitrogen gas stream saturated with bromine vapor; can be purified by vacuum distillation in a similar nitrogen stream [KIR83]
Density, g/cm<sup>3</sup>: 5.35 [CRC10]
Melting Point, °C: 765 [KIR83]

#### 3380

**Compound:** Uranium tetrachloride **Formula:** UCl<sub>4</sub>

## Molecular Formula: $Cl_4U$ Molecular Weight: 379.840 CAS RN: 10026-10-5 Properties: dark green octahedral cryst; oxidizes in air; decomposes in water; enthalpy of fusion 45.00 kJ/ mol; prepared by the reaction $UO_3 + 3CCl_3CCl=CCl_2$ $\rightarrow UCl_4 + Cl_2 + 3CCl_2=CCIOCl$ [KIR83] [CRC10] [MER06] Solubility: v s H<sub>2</sub>O, with decomposition [MER06] Density, g/cm<sup>3</sup>: 4.725 [MER06] Melting Point, °C: 590 [KIR91] Boiling Point, °C: 791 [MER06]

## 3381

Compound: Uranium tetrafluoride

**Formula:** UF<sub>4</sub> **Molecular Formula:** F<sub>4</sub>U

Molecular Weight: 314.023

CAS RN: 10049-14-6

**Properties:** monocl green cryst; reacts when heated with atm  $O_2$ , forming  $U_3O_8$ ; prepared by reacting  $UO_2$  with excess gaseous HF at ~550°C; used to produce both uranium metal and UF<sub>6</sub> [MER06] [KIR83]

Solubility: i H<sub>2</sub>O; s conc acids, alkalies, but decomposes [MER06]
Density, g/cm<sup>3</sup>: 6.70 [HAW93]
Melting Point, °C: 960 [KIR91]

#### 3382

Compound: Uranium tetraiodide
Formula: UI<sub>4</sub>
Molecular Formula: I<sub>4</sub>U
Molecular Weight: 745.647
CAS RN: 13470-22-9
Properties: black lustrous cryst; can be made by reaction of iodine and uranium metal; similar properties for UI<sub>3</sub> and for preparation of UI<sub>3</sub>, 13775-18-8 [KIR83]
Density, g/cm<sup>3</sup>: 5.6 [CRC10]
Melting Point, °C: 506 [CRC10]
Boiling Point, °C: 729 [CRC10]

## 3383

Compound: Uranium tribromide Formula: UBr<sub>3</sub> Molecular Formula: Br<sub>3</sub>U Molecular Weight: 477.741 CAS RN: 13470-19-4 Properties: reddish brown cryst; prepared by reacting UH- and HBr. or directly from t

reacting UH<sub>3</sub> and HBr, or directly from the two elements; black cryst obtained when purified by gas phase transport [KIR83]

**Density, g/cm<sup>3</sup>:** 6.53 [CRC10] **Melting Point, °C:** 730 [KIR91]

#### 3384

Compound: Uranium tricarbide Formula: U<sub>2</sub>C<sub>3</sub> Molecular Formula: C<sub>3</sub>U<sub>2</sub> Molecular Weight: 512.091 CAS RN: 12612-73-6 Properties: -60 mesh; gray with metallic appearance; bcc, a = 0.80889 nm; can be prepared by arc welding stoichiometric amounts of the two elements [CIC73] [CER91] Density, g/cm<sup>3</sup>: 12.7 [LID94] Melting Point, °C: decomposes at 1727 [CIC73]

#### 3385

Compound: Uranium trichloride
Formula: UCl<sub>3</sub>
Molecular Formula: Cl<sub>3</sub>U
Molecular Weight: 344.387
CAS RN: 10025-93-1
Properties: dark purple cryst; somewhat hygr; obtained by reacting UH<sub>3</sub> with HCl at 250°C-300°C; used in molten salt electrolytes to refine uranium metal [KIR83] [MER06]
Solubility: v s H<sub>2</sub>O, evolves H<sub>2</sub>, solution changes color from purple to green due to oxidation of U<sup>+++</sup> [MER06]
Density, g/cm<sup>3</sup>: 5.51 [MER06]
Melting Point, °C: 835 [KIR91]

## 3386

Compound: Uranium trifluoride
Formula: UF<sub>3</sub>
Molecular Formula: F<sub>3</sub>U
Molecular Weight: 295.024
CAS RN: 13775-06-9
Properties: black mass containing small deep purple cryst; has been used as a component in molten salt systems [KIR83]
Solubility: i H<sub>2</sub>O; s HNO<sub>3</sub>, hot H<sub>2</sub>SO<sub>4</sub>, hot HClO<sub>4</sub> [KIR83]
Density, g/cm<sup>3</sup>: 8.9 [LID94]
Melting Point, °C: decomposes at >1140 [KIR91]

#### 3387

**Compound:** Uranium trihydride **Formula:** UH<sub>3</sub> **Molecular Formula:** H<sub>3</sub>U **Molecular Weight:** 241.053

## CAS RN: 13598-56-6

Properties: -100 mesh; brownish gray to black powd; conducts electricity; prepared by heating uranium metal in a hydrogen atm at 150°C-200°C; used to prepare finely divided uranium by decomposition reaction [HAW93] [CER91]
Density, g/cm<sup>3</sup>: 10.92 [HAW93]

## 3388

**Compound:** Uranium trinitride **Formula:**  $U_2N_3$  **Molecular Formula:**  $N_3U_2$  **Molecular Weight:** 518.078 **CAS RN:** 12033-83-9 **Properties:** bcc, a = 1.0678 nm [CIC73] **Density, g/cm<sup>3</sup>:** 11.24 [CIC73] **Melting Point, °C:** decomposes [CIC73]

## 3389

**Compound:** Uranium trioxide **Synonym:** uranium(VI) oxide **Formula:** UO<sub>3</sub> **Molecular Formula:** O<sub>3</sub>U **Molecular Weight:** 286.027 **CAS RN:** 1344-58-7 **Properties:** -100 mesh; has six forms: α is hex

brown, β is orange monocl, γ is bright yellow rhomb, δ is red cub, ε is brick red tricl, η is rhomb; UO<sub>3</sub> can be obtained by thermal decomposition of uranyl compounds, e.g, carbonates, oxalates nitrates [KIR83] [CER91]

**Solubility:** i H<sub>2</sub>O; s acids [MER06] **Density, g/cm<sup>3</sup>:** 7.29 [MER06]

Melting Point, °C: decomposes at 650 [KIR91]

#### 3390

Compound: Uranium(IV) sulfate octahydrate Formula:  $U(SO_4)_2 \cdot 8H_2O$ Molecular Formula:  $H_{16}O_{16}S_2U$ Molecular Weight: 574.278 CAS RN: 19086-22-7 Solubility: g/100 g H<sub>2</sub>O: 11.9 (20°C), 17.9 (30°C), 29.2 (40°C), 55.8 (60°C) [LAN05] Melting Point, °C: decomposes at 90 [CRC10]

## 3391

**Compound:** Uranium(IV) sulfate tetrahydrate Formula:  $U(SO_4)_2 \cdot 4H_2O$ Molecular Formula:  $H_8O_{12}S_2U$ Molecular Weight: 502.218 CAS RN: 13470-23-0 Properties: green, rhomb [LAN05]
 Solubility: g/100 g H<sub>2</sub>O: 10.1 (30°C), 9.0 (40°C), 7.7 (60°C) [LAN05]
 Melting Point, °C: decomposes at 90 [CRC10]
 Reactions: minus 4H<sub>2</sub>O at 300°C [LAN05]

## 3392

Compound: Uranium(V,VI) oxide Formula: U<sub>3</sub>O<sub>8</sub> Molecular Formula: O<sub>8</sub>U<sub>3</sub> Molecular Weight: 842.082 CAS RN: 1344-59-8 Properties: greenish black powd [STR93] Density, g/cm<sup>3</sup>: 8.30 [STR93] Melting Point, °C: 1150, decomposes to UO<sub>2</sub> [CRC10] [KIR91]

#### 3393

Compound: Uranyl acetate dihydrate
Formula: UO<sub>2</sub>(CH<sub>3</sub>COO)<sub>2</sub> · 2H<sub>2</sub>O
Molecular Formula: C<sub>4</sub>H<sub>10</sub>O<sub>8</sub>U
Molecular Weight: 424.147
CAS RN: 6159-44-0
Properties: yellow; cryst powd; slight odor of acetic acid; used as bacterial oxidation activator and in copying inks [MER06] [HAW93]
Solubility: s in 10 parts H<sub>2</sub>O; sl s alcohol [MER06]
Density, g/cm<sup>3</sup>: 2.89 [MER06]
Reactions: minus 2H<sub>2</sub>O at 110°C [CRC10]

## 3394

**Compound:** Uranyl acetylacetonate **Synonyms:** 2,4-pentanedione, uranyl derivative **Formula:**  $UO_2(CH_3COCH=C(O)CH_3)_2$  **Molecular Formula:**  $C_{10}H_{14}O_6U$  **Molecular Weight:** 468.248 **CAS RN:** 18039-69-5 **Properties:** cryst [AES93]

#### 3395

**Compound:** Uranyl carbonate **Synonym:** rutherfordine **Formula:** UO<sub>2</sub>CO<sub>3</sub> **Molecular Formula:** CO<sub>5</sub>U **Molecular Weight:** 330.037 **CAS RN:** 12202-79-8 **Properties:** naturally occurring mineral [KIR83]

# **3396 Compound:** Uranyl chloride

Formula: UO<sub>2</sub>Cl<sub>2</sub>

Molecular Formula: Cl<sub>2</sub>O<sub>2</sub>U Molecular Weight: 340.933 CAS RN: 7791-26-6 Properties: bright yellow cryst; ortho-rhomb; very hygr; very volatile >775°C [MER06] Solubility: v s H<sub>2</sub>O; s acetone, alcohol; i benzene [MER06] Melting Point, °C: 578 [CRC10] Boiling Point, °C: decomposes [CRC10]

#### 3397

**Compound:** Uranyl chloride trihydrate **Formula:**  $UO_2Cl_2 \cdot 3H_2O$  **Molecular Formula:**  $Cl_2HeO_5U$  **Molecular Weight:** 394.979 **CAS RN:** 13867-67-9 **Properties:** yellow powd; hygr [STR93]

## 3398

**Compound:** Uranyl fluoride **Formula:**  $F_2O_2U$  **Molecular Formula:**  $UO_2F_2$  **Molecular Weight:** 308.025 **CAS RN:** 13536-84-0 **Properties:** yellow hygr solid [CRC10] **Solubility, g/100 g H\_2O:** 64.4<sup>20</sup>; i bz [CRC10]

#### 3399

**Compound:** Uranyl hydrogen phosphate tetrahydrate **Formula:**  $UO_2HPO_4 \cdot 4H_2O$ **Molecular Formula:**  $H_9O_{10}PU$ **Molecular Weight:** 438.068 **CAS RN:** 18433-48-2 **Properties:** yellow; microcryst powd [MER06] **Solubility:** i H<sub>2</sub>O; s acids [MER06]

## 3400

**Compound:** Uranyl nitrate **Formula:** UO<sub>2</sub>(NO<sub>3</sub>)<sub>2</sub> **Molecular Formula:** N<sub>2</sub>O<sub>8</sub>U **Molecular Weight:** 283.698 **CAS RN:** 10102-06-4 **Properties:** yellow cryst [CRC10] **Solubility, g/100 g H<sub>2</sub>O:** 127<sup>25</sup> [CRC10]

#### 3401

**Compound:** Uranyl nitrate hexahydrate Formula:  $UO_2(NO_3)_2 \cdot 6H_2O$ Molecular Formula:  $H_{12}N_2O_{14}U$ Molecular Weight: 502.129

## CAS RN: 13520-83-7

Properties: yellow ortho-rhomb cryst; hygr; greenish luster by reflected light; can be prepared by heating a solution of uranyl nitrate to 188°C, then cooling to room temp [MER06] [STR93] [KIR83]
Solubility: g/100 g H<sub>2</sub>O: 98 (0°C), 122 (20°C), 474 (100°C) [LAN05]; v s alcohol, ether [MER06], data are in [SIE94]
Density, g/cm<sup>3</sup>: 2.807 [MER06]
Melting Point, °C: 60.2 [STR93]
Boiling Point, °C: 118 [HAW93]

## 3402

Compound: Uranyl oxalate trihydrate Formula:  $UO_2C_2O_4 \cdot 3H_2O$ Molecular Formula:  $C_2H_6O_9U$ Molecular Weight: 412.094 CAS RN: 22429-50-1 Properties: yellow cryst [CRC10] Solubility: g anhydrous/100 g H<sub>2</sub>O: 0.45 (10°C), 0.50 (20°C), 3.16 (100°C) [LAN05] Reactions: minus H<sub>2</sub>O, 110°C [CRC10]

#### 3403

**Compound:** Uranyl sulfate **Formula:** UO<sub>2</sub>SO<sub>4</sub> **Molecular Formula:** O<sub>6</sub>SU **Molecular Weight:** 366.090 **CAS RN:** 1314-64-3 **Properties:** yellow cryst [CRC10]

#### 3404

Compound: Uranyl sulfate monohydrate Formula:  $UO_2SO_4 \cdot H_2O$ Molecular Formula:  $H_2O_7SU$ Molecular Weight: 384.107 CAS RN: 19415-82-8 Properties: stable up to 600°C; used to leach uranyl sulfate at this temp from sulfates of iron and aluminum [KIR83]

## 3405

**Compound:** Uranyl sulfate trihydrate **Formula:**  $UO_2SO_4 \cdot 3H_2O$ 

Molecular Formula: H<sub>6</sub>O<sub>9</sub>SU

Molecular Weight: 420.138

CAS RN: 12384-63-3

**Properties:** lemon yellow; cryst mass; property of stability at 600°C can be used in order to leach uranium from iron and aluminum at 600°C [KIR83] [MER06] **Solubility:** s in ~5 parts H<sub>2</sub>O, 25 parts alcohol [MER06] **Density, g/cm<sup>3</sup>:** 3.28 [MER06] **Melting Point, °C:** decomposes at 100 [CRC10]

## 3406

Compound: Vanadium Formula: V Molecular Formula: V Molecular Weight: 50.9415 CAS RN: 7440-62-2

Properties: light gray or white, lustrous powd, or fused hard lumps; bcc, a=0.3026 nm; enthalpy of fusion 21.50 kJ/mol; enthalpy of evaporation 458.6 kJ/mol; stable to moist air under typical conditions; electrical resistivity 24.2 μohm · cm at 20°C; Poisson's ratio 0.36; superconductivity transition 5.13 K; inert towards hot or cold HCl, cold H<sub>2</sub>SO<sub>4</sub>; uses include film resistors [MER06] [KIR83] [CER91] [CRC10]
Solubility: i H<sub>2</sub>O; reacts with hot H<sub>2</sub>SO<sub>4</sub>, HF, HNO<sub>3</sub>, aqua regia [MER06]
Density, g/cm<sup>3</sup>: 6.11 [MER06]
Melting Point, °C: 1890 [ALD94]
Boiling Point, °C: 3380 [ALD94]

Thermal Conductivity, W/(m⋅K): 30.7 at 25°C [ALD94]; 31 at 100°C [KIR83]
Thermal Expansion Coefficient: 8.3×10<sup>-6</sup>/°C (23°C-100°C) [KIR83]

## 3407

**Compound:** Vanadium bis(cyclopentadienyl) dichloride **Synonym:** bis(cyclopentadienyl)vanadium dichloride **Formula:**  $V(C_5H_5)_2Cl_2$  **Molecular Formula:**  $C_{10}H_{10}Cl_2V$  **Molecular Weight:** 252.036 **CAS RN:** 12086-48-6 **Properties:** cryst [ALF95] **Density, g/cm<sup>3</sup>:** 1.6 [ALF95] **Melting Point,** °C: decomposes at 250 [ALF95]

3408

Compound: Vanadium carbide Formula: VC Molecular Formula: CV Molecular Weight: 62.953 CAS RN: 12070-10-9

Properties: black cub cryst, a=0.41355 nm; hardness 2800 kg/mm<sup>2</sup>; resistivity at room temp is 150 μohm · cm; used in alloys for cutting tools, and in 99.5% pure form as a sputtering target for producing wear-resistant films and semiconductor films [HAW93] [KIR83] [CIC73] [CER91]

Solubility: i H<sub>2</sub>O; s HNO<sub>3</sub> with decomposition [KIR83]

Density, g/cm<sup>3</sup>: 5.77 [KIR83] Melting Point, °C: 2810 [KIR83] Boiling Point, °C: 3900 [KIR83] Thermal Expansion Coefficient: 7.2×10<sup>-6</sup>/K [KIR78]

## 3409

Compound: Vanadium carbonyl Synonym: vanadium hexacarbonyl Formula: V(CO)<sub>6</sub> Molecular Formula: C<sub>6</sub>O<sub>6</sub>V Molecular Weight: 219.004 CAS RN: 20644-87-5 Properties: bluish green cryst; sensitive to atm O<sub>2</sub>, pyromorphic; paramagnetic [MER06] [HAW93] Melting Point, °C: 60–70, decomposes without melting [HAW93] Boiling Point, °C: sublimes at 50 (15 mm Hg) [HAW93]

## 3410

Compound: Vanadium diboride
Formula: VB<sub>2</sub>
Molecular Formula: B<sub>2</sub>V
Molecular Weight: 72.564
CAS RN: 12007-37-3
Properties: refractory material; used as a 99.5% pure sputtering target to produce wear-resistant and semiconductive films [KIR78] [CER91]
Density, g/cm<sup>3</sup>: 5.100 [ALD94]
Melting Point, °C: 2450 [KIR78]

#### 3411

Compound: Vanadium dibromide Formula: VBr<sub>2</sub> Molecular Formula: Br<sub>2</sub>V Molecular Weight: 210.750 CAS RN: 14890-41-6 Properties: hex brownish orange cryst [LID94] [KIR83] Density, g/cm<sup>3</sup>: 4.58 [LID94]

#### 3412

Compound: Vanadium dichloride

Formula: VCl<sub>2</sub>

Molecular Formula: Cl<sub>2</sub>V

Molecular Weight: 121.847

CAS RN: 10580-52-6

**Properties:** apple green; hex plates; strong reducing agent; preparation: heating VCl<sub>3</sub> in N<sub>2</sub> atm, followed by sublimation in N<sub>2</sub> atm; used to purify HCl by removing arsenic [HAW93]
Solubility: decomposed in hot H<sub>2</sub>O; s alcohol, ether [HAW93] Density, g/cm<sup>3</sup>: 3.23 (18°C) [HAW93]

3413

Compound: Vanadium diiodide Synonym: vanadium(II) iodide Formula: VI<sub>2</sub> Molecular Formula: I<sub>2</sub>V Molecular Weight: 304.751 CAS RN: 15513-84-5 Properties: red hex [CRC10] [KIR83] Density, g/cm<sup>3</sup>: 5.44 [CRC10] Melting Point, °C: sublimes at 750–800 [CRC10]

3414

Compound: Vanadium dioxide
Synonym: vanadium(IV) oxide
Formula: V<sub>2</sub>O<sub>4</sub>
Molecular Formula: O<sub>4</sub>V<sub>2</sub>
Molecular Weight: 165.881
CAS RN: 12036-21-4
Properties: formula also VO<sub>2</sub>; bluish black powd; slowly oxidizes in air; can be prepared by reacting V<sub>2</sub>O<sub>5</sub> at its melting point with reductants such as sugar or oxalic acid; used as a high temp catalyst [HAW93] [KIR83]
Solubility: i H<sub>2</sub>O; s acids, alkalies [HAW93]
Density, g/cm<sup>3</sup>: 4.339 [STR93]
Melting Point, °C: 1967 [STR93]

# 3415

**Compound:** Vanadium disilicide **Formula:** VSi<sub>2</sub> **Molecular Formula:** Si<sub>2</sub>V **Molecular Weight:** 336.817

CAS RN: 12039-87-1

Properties: metallic prisms; -325 mesh; as a 99.5% pure material, used as a sputtering target in the fabrication of integrated circuits and as an electrochemical cathode [ALD94] [KIR83] [ALF93] [CER91]
Solubility: s HF [KIR83]

Density, g/cm<sup>3</sup>: 4.42 [KIR83]

# 3416

Compound: Vanadium gallide Formula: V<sub>3</sub>Ga Molecular Formula: GaV<sub>3</sub> Molecular Weight: 222.548 CAS RN: 12024-15-6 Properties: -100 mesh of 99.5% purity; superconducting material [KIR83] [CER91]

#### 3417

Compound: Vanadium monoboride
Formula: VB
Molecular Formula: BV
Molecular Weight: 61.753
CAS RN: 12045-27-1
Properties: refractory material; in the form of
a 99.5% pure material used as a sputtering
target to produce semiconductor and wearresistant films [KIR78] [CER91]
Melting Point, °C: 2250 [KIR78]

# 3418

Compound: Vanadium monocarbide Synonym: divanadium carbide Formula:  $V_2C$ Molecular Formula:  $CV_2$ Molecular Weight: 113.894 CAS RN: 12012-17-8 Properties: hex, a = 0.41655 nm, b = 0.29020 nm, c = 0.4577 nm [CIC73] Melting Point, °C: 2167 [CIC73]

# 3419

Compound: Vanadium monosilicide
Formula: V<sub>3</sub>Si
Molecular Formula: SiV<sub>3</sub>
Molecular Weight: 180.911
CAS RN: 12039-76-8
Properties: cub cryst; superconducting; -100
 mesh; as a 99.5% pure sputtering target, used
 to produce resistant and semiconducting
 films in the fabrication of integrated
 circuits [LID94] [ALF93] [CER91]
Density, g/cm<sup>3</sup>: 5.70 [LID94]
Melting Point, °C: 1935 [ALF93]

#### 3420

Compound: Vanadium monoxide Synonym: vanadium(II) oxide Formula: VO Molecular Formula: OV Molecular Weight: 66.941 CAS RN: 12035-98-2 Properties: -80 mesh powd; light green cryst; enthalpy of fusion 63.00 kJ/ mol [CRC10] [KIR83] [STR93] Solubility: s acids [KIR83] Density, g/cm<sup>3</sup>: 5.758 [KIR83] Melting Point, °C: 1790 [CRC10]

# 3421

**Compound:** Vanadium nitride **Formula:** VN **Molecular Formula:** NV **Molecular Weight:** 64.949

**CAS RN:** 24646-85-3

Properties: black powd; fcc, a=0.4140 nm; hardness 9–10 Mohs; electrical resistivity 85 μohm · cm; transition temp 7.5 K; used as a 99.5% pure sputtering target to produce films [KIR81] [CIC73] [STR93] [CER91]
Solubility: i H<sub>2</sub>O; s aqua regia [HAW93]
Density, g/cm<sup>3</sup>: 6.13 [STR93]
Melting Point, °C: 2320 [STR93]

Thermal Conductivity, W/( $\mathbf{m} \cdot \mathbf{K}$ ): 11.3 [KIR81] Thermal Expansion Coefficient:  $8.1 \times 10^{-6}$  [KIR81]

#### 3422

Compound: Vanadium oxytrichloride
Synonym: vanadium(V) oxytrichloride
Formula: VOCl<sub>3</sub>
Molecular Formula: Cl<sub>3</sub>OV
Molecular Weight: 173.299
CAS RN: 7727-18-6
Properties: yellow liq; evolves red fumes in moist atm; can be used as a nonionizing solvent dissolving most nonmetals; hydrolyzes in moisture; enthalpy of vaporization 36.78 kJ/ mol [CRC10] [HAW93] [MER06]
Solubility: decomposes in H<sub>2</sub>O to vanadic acid and HCl; s methanol, ether, acetone, acids [KIR83] [MER06]
Density, g/cm<sup>3</sup>: 1.829 [STR93]

3423

Compound: Vanadium oxytrifluoride Synonym: vanadium(V) oxytrifluoride Formula: VOF<sub>3</sub> Molecular Formula: F<sub>3</sub>OV Molecular Weight: 123.936 CAS RN: 13709-31-4 Properties: yellowish orange powd; sensitive to moisture [STR93] Density, g/cm<sup>3</sup>: 2.459 [STR93] Melting Point, °C: 300 [STR93] Boiling Point, °C: 480 [STR93]

Melting Point, °C: -77 [MER06]

Boiling Point, °C: 126–127 [ALD94]

# 3424

**Compound:** Vanadium pentafluoride **Synonym:** vanadium(V) fluoride

Formula: VF<sub>5</sub>
Molecular Formula: F<sub>5</sub>V
Molecular Weight: 145.934
CAS RN: 7783-72-4
Properties: liq; etches glass slowly at room temp; appreciable vapor pressure at room temp; enthalpy of vaporization 44.52 kJ/mol; enthalpy of fusion 49.96 kJ/mol [CRC10] [MER06]
Solubility: hydrolyzed in H<sub>2</sub>O, dil alkali; s anhydrous HF [MER06]
Density, g/cm<sup>3</sup>: 2.502 [MER06]
Melting Point, °C: 19.5 [MER06]

# 3425

Compound: Vanadium pentasulfide Synonym: vanadium(V) sulfide Formula: V<sub>2</sub>S<sub>5</sub> Molecular Formula: S<sub>5</sub>V<sub>2</sub> Molecular Weight: 262.213 CAS RN: 12138-17-9 Properties: greenish black powd; decomposes when heated [HAW93] Density, g/cm<sup>3</sup>: 3.0 [CRC10] Melting Point, °C: decomposes [CRC10]

# 3426

Compound: Vanadium pentoxide Synonym: vanadium(V) oxide Formula: V<sub>2</sub>O<sub>5</sub> Molecular Formula: O<sub>5</sub>V<sub>2</sub> Molecular Weight: 181.880 CAS RN: 1314-62-1 Properties: yellow to rust brown ortho-rhomb cryst; reversibly evolves O<sub>2</sub>, 700°C–1125°C; enthalpy of fusion 64.50 kJ/mol [CRC10] [MER06] Solubility: ~1 g/125 mL H<sub>2</sub>O; s conc acids, forming red to yellow solutions [MER06] Density, g/cm<sup>3</sup>: 3.357 [STR93] Melting Point, °C: 690 [ALD94] Boiling Point, °C: 1750, decomposes [HAW93]

#### 3427

Compound: Vanadium sulfide Formula: V<sub>2</sub>S<sub>2</sub> Molecular Formula: S<sub>2</sub>V<sub>2</sub> Molecular Weight: 166.015 CAS RN: 12138-08-8 Properties: black; formula also VS; used as a solid lubricant and as an electrode in lithium based batteries [HAW93] [CRC10] Density, g/cm<sup>3</sup>: 4.2 [CRC10] Melting Point, °C: decomposes [CRC10]

# 3428

Compound: Vanadium tetrachloride Synonym: vanadium(IV) chloride Formula: VCl<sub>4</sub> Molecular Formula: Cl<sub>4</sub>V Molecular Weight: 192.753 CAS RN: 7632-51-1 Properties: red liq; decomposes slowly to VCl<sub>3</sub> and Cl<sub>2</sub> below 63°C; enthalpy of vaporization 41.4 kJ/mol (bp), 42.5 kJ/mol (25°C); enthalpy of fusion 2.30 kJ/mol [CRC10] [HAW93] Solubility: s alcohol, ether [HAW93] Density, g/cm<sup>3</sup>: 1.816 [HAW93] Melting Point, °C: -28 [ALD94] Boiling Point, °C: 154 [ALD94]

# 3429

Compound: Vanadium tetrafluoride Synonym: vanadium(IV) fluoride Formula:  $VF_4$ Molecular Formula:  $F_4V$ Molecular Weight: 126.936 CAS RN: 10049-16-8 Properties: bright lime green powd; very hygr; disproportionates in vacuum to  $VF_3$ and  $VF_5$  at 100°C–120°C [MER06] Solubility: v s H<sub>2</sub>O imparting blue color [MER06] Density, g/cm<sup>3</sup>: 3.15 [MER06] Melting Point, °C: 325, decomposes [STR93]

# 3430

Compound: Vanadium tribromide Synonym: vanadium(III) bromide Formula: VBr<sub>3</sub> Molecular Formula: Br<sub>3</sub>V Molecular Weight: 290.654 CAS RN: 13470-26-3 Properties: -20 mesh; black powd; sensitive to moisture [STR93] Density, g/cm<sup>3</sup>: 4.0 [STR93]

# 3431

Compound: Vanadium trichloride
Synonym: vanadium(III) chloride
Formula: VCl<sub>3</sub>
Molecular Formula: Cl<sub>3</sub>V
Molecular Weight: 157.300
CAS RN: 7718-98-1
Properties: purple powd; sensitive to moisture; decomposes if heated; used to prepare organovanadium compounds [HAW93] [STR93] Solubility: decomposes in H<sub>2</sub>O; s alcohol, ether [HAW93] Density, g/cm<sup>3</sup>: 3.00 [STR93] Melting Point, °C: decomposes [KIR83]

#### 3432

Compound: Vanadium trifluoride
Synonym: vanadium(III) fluoride
Formula: VF<sub>3</sub>
Molecular Formula: F<sub>3</sub>V
Molecular Weight: 107.937
CAS RN: 10049-12-4
Properties: greenish yellow powd; sublimes at bright red heat [MER06]
Solubility: i H<sub>2</sub>O, alcohol [MER06]
Density, g/cm<sup>3</sup>: 3.363 [MER06]
Melting Point, °C: decomposes at 1406 [STR93]
Boiling Point, °C: sublimes at 800 [STR93]

# 3433

**Compound:** Vanadium trifluoride trihydrate **Formula:**  $VF_3 \cdot 3H_2O$ **Molecular Formula:**  $F_3H_6O_3V$ **Molecular Weight:** 161.983 **CAS RN:** 10049-12-4 **Properties:** dark green; rhomb cryst [MER06] **Solubility:** sl s  $H_2O$  [MER06] **Reactions:** minus  $H_2O$  at 100°C [MER06]

# 3434

Compound: Vanadium trioxide
Synonym: vanadium(III) oxide
Formula: V<sub>2</sub>O<sub>3</sub>
Molecular Formula: O<sub>3</sub>V<sub>2</sub>
Molecular Weight: 149.881
CAS RN: 1314-34-7
Properties: black powd; gradually forms indigo blue cryst, V<sub>2</sub>O<sub>4</sub>, in air; used as a catalyst to convert ethylene to ethanol [HAW93] [MER06]
Solubility: i H<sub>2</sub>O; s with difficulty in acids [MER06]
Density, g/cm<sup>3</sup>: 4.87 [MER06]
Melting Point, °C: 1940 [MER06]

# 3435

**Compound:** Vanadium trisulfate **Synonym:** vanadium(III) sulfate **Formula:**  $V_2(SO_4)_3$ **Molecular Formula:**  $O_{12}S_3V_2$ **Molecular Weight:** 390.074 **CAS RN:** 13701-70-7 Properties: lemon yellow powd; decomposes to VOSO<sub>4</sub> and SO<sub>2</sub>, when heated ~410°C in vacuum; stable in dry air; strong reducing agent [MER06]
Solubility: very slowly dissolves in H<sub>2</sub>O at room temp; s HNO<sub>3</sub> [MER06]
Melting Point, °C: decomposes ~400 [MER06]

#### 3436

Compound: Vanadium trisulfide
Synonym: vanadium(III) sulfide
Formula: V<sub>2</sub>S<sub>3</sub>
Molecular Formula: S<sub>3</sub>V<sub>2</sub>
Molecular Weight: 198.081
CAS RN: 1315-03-3
Properties: -325 mesh; greenish black powd; heating causes decomposition [MER06] [STR93]
Solubility: i H<sub>2</sub>O, cold HCl, dil H<sub>2</sub>SO<sub>4</sub>; s hot HCl, hot dil H<sub>2</sub>SO<sub>4</sub>, HNO<sub>3</sub> [MER06]
Density, g/cm<sup>3</sup>: 4.7 [MER06]
Melting Point, °C: decomposes at >600 [CRC10]

# 3437

**Compound:** Vanadium(II) sulfate heptahydrate **Formula:**  $VSO_4 \cdot 7H_2O$  **Molecular Formula:**  $H_{14}O_{11}SV$  **Molecular Weight:** 273.112 **CAS RN:** 36907-42-3 **Properties:** violet monocl [CRC10] [KIR83] **Reactions:** decomposes on heating in air [CRC10]

# 3438

Compound: Vanadium(III) acetylacetonate
Synonyms: 2,4-pentanedione, vanadium(III) derivative
Formula: V(CH<sub>3</sub>COCH=C(O)CH<sub>3</sub>)<sub>3</sub>
Molecular Formula: C<sub>15</sub>H<sub>21</sub>O<sub>6</sub>V
Molecular Weight: 348.270
CAS RN: 13476-99-8
Properties: brown cryst; sensitive to air [KIR83] [STR93]
Solubility: s methanol, acetone, benzene, chloroform [KIR83]
Density, g/cm<sup>3</sup>: 0.9–1.2 [KIR83]
Melting Point, °C: 178–190 [KIR83]
Boiling Point, °C: sublimes at 170 (0.05 mm Hg) [STR93]

# 3439

**Compound:** Vanadocene **Synonym:** bis(cyclopentadienyl)vanadium **Formula:**  $V(C_5H_5)_2$ **Molecular Formula:**  $C_{10}H_{10}V$ **Molecular Weight:** 181.131 **CAS RN:** 1277-47-0 Properties: purple cryst; air and moisture sensitive [STR93]Reactions: sublimes at 200°C (0.1 mm Hg) [STR93]

# 3440

**Compound:** Vanadocene dichloride **Formula:**  $V(C_5H_5)_2Cl_2$  **Molecular Formula:**  $C_{10}H_{10}Cl_2V$  **Molecular Weight:** 252.034 **CAS RN:** 12083-48-6 **Properties:** dark green cryst [CRC10] **Solubility:** s H<sub>2</sub>O, chl, EtOH [CRC10] **Melting Point,** °C: decomposes at 205 [CRC10]

#### 3441

Compound: Vanadyl bromide Formula: VOBr Molecular Formula: BrOV Molecular Weight: 146.845 CAS RN: 13520-88-2 Properties: violet [KIR83] Density, g/cm<sup>3</sup>: 4.0 [CRC10] Melting Point, °C: decomposes at 482 [CRC10]

#### 3442

Compound: Vanadyl chloride Formula: VOCl Molecular Formula: ClOV Molecular Weight: 102.394 CAS RN: 13520-87-1 Properties: yellow-brown powd [CRC10] [KIR83] Density, g/cm<sup>3</sup>: 2.824 [CRC10]

# 3443

Compound: Vanadyl dibromide
Formula: VOBr<sub>2</sub>
Molecular Formula: Br<sub>2</sub>OV
Molecular Weight: 226.749
CAS RN: 13520-89-3
Properties: yellowish brown powd; deliq [CRC10] [KIR83]
Melting Point, °C: decomposes at 180 [CRC10]

# 3444

**Compound:** Vanadyl dichloride **Formula:** VOCl<sub>2</sub> **Molecular Formula:** Cl<sub>2</sub>OV **Molecular Weight:** 137.846 **CAS RN:** 10213-09-9 Properties: green cryst; very deliq; disproportionates at 384°C to VOCl and VOCl<sub>3</sub> [MER06]
Solubility: slowly decomposed in water; s absolute alcohol, glacial acetic acid [MER06]
Density, g/cm<sup>3</sup>: 2.88 [MER06]

# 3445

Compound: Vanadyl difluoride Formula: VOF<sub>2</sub> Molecular Formula: F<sub>2</sub>OV Molecular Weight: 104.938 CAS RN: 13814-83-0 Properties: yellow [KIR83] Density, g/cm<sup>3</sup>: 3.396 [CRC10] Melting Point, °C: decomposes [CRC10]

# 3446

Compound: Vanadyl selenite monohydrate Formula:  $VOSeO_3 \cdot H_2O$ Molecular Formula:  $H_2O_5SeV$ Molecular Weight: 211.915 CAS RN: 133578-89-9 Properties: green plates; tric, a=0.5969 nm, b=0.6155 nm, c=0.6349 nm; has magnetic properties; can be prepared by heating  $H_2SeO_3$ and  $V_2O_5$  in an autoclave at 200°C for ~48 h; material selectively intercalates alcohols [HUA91] Density, g/cm<sup>3</sup>: 3.506 [HUA91] Reactions: minus  $H_2O$  at 240°C–280°C [HUA91]

# 3447

Compound: Vanadyl sulfate dihydrate
Formula: VOSO<sub>4</sub> · 2H<sub>2</sub>O
Molecular Formula: H<sub>4</sub>O<sub>7</sub>SV
Molecular Weight: 199.036
CAS RN: 27774-13-6
Properties: blue cryst powd; used as a mordant, catalyst reducing agent, colorant in glasses and ceramics; there is a trihydrate, CAS RN 12210-47-8 [HAW93] [MER06] [ALD94]
Solubility: s H<sub>2</sub>O [MER06]

# 3448

Compound: Vanadyl tribromide Formula: VOBr<sub>3</sub> Molecular Formula: Br<sub>3</sub>OV Molecular Weight: 306.653 CAS RN: 13520-90-6 Properties: deep red liq [KIR83] Density, g/cm<sup>3</sup>: 2.933 [CRC10] Boiling Point, °C: 130 [CRC10] Reactions: decomposes at 180°C [CRC10]

# 3449

Compound: Vitreous silica Formula: SiO<sub>2</sub> Molecular Formula: O<sub>2</sub>Si Molecular Weight: 60.085 CAS RN: 60676-86-0 Properties: hardness 5.5 Mohs; velocity of sound 5730 m/s [CIC73] Density, g/cm<sup>3</sup>: 2.1957 at 0°C [CIC73] Melting Point, °C: ~1500 [CIC73] Boiling Point, °C: 2950 [CIC73] Thermal Conductivity, W/(m · K): 1.423 (100°C) [CIC73]

# 3450

Compound: Water Synonym: hydrogen oxide Formula: H<sub>2</sub>O Molecular Formula: H<sub>2</sub>O Molecular Weight: 18.015 CAS RN: 7732-18-5 Properties: colorless, odorless, tasteless liq; dielectric constant 78.54; viscosity 1.005 cp (20°C); vapor pressure 760 mm Hg (100°C); triple point 273.16 K at 4.6 mm Hg; surface tension 73 dyne/ cm (20°C); enthalpy of fusion (ice) 6.008 kJ/mol; enthalpy of vaporization 40.65 kJ/mol; critical temp 374.2°C [DOU83] [HAW93] [MER06] Density, g/cm3: 0.9970 [LID94] Melting Point, °C: 0 [MER06] Boiling Point, °C: 100 [MER06] Thermal Conductivity, W/(m·K): values from

# 3451

Compound: Xenon Formula: Xe Molecular Formula: Xe Molecular Weight: 131.29 CAS RN: 7440-63-3 Properties: colorless, odorless gas; enthalpy of vaporization 12.62 kJ/mol; enthalpy of fusion 1.81 kJ/ mol; critical temp 16.6°C; critical pressure 5.84 MPa; sonic velocity (101.32 kPa, 0°C) 168 m/s; viscosity (101.32 kPa, 25°C) 23.1 Pa·s; dielectric constant 1.0012 at 25°C and 1 atm; used in flash lamps, lasers, anesthesia [HAW93] [KIR78] [AIR87] [CRC10] Solubility: 101.32 kPa: 108.1 mL/1000 g H<sub>2</sub>O (20°C) [KIR78]; Henry's law constants,  $k \times 10^{-4}$ : 2.558 (70.3°C), 2.586 (125.5°C), 2.485 (175.7), 2.048 (225.1°C), 1.308 (284.2°C) [POT78] Density, g/cm<sup>3</sup>: gas: 101.3 kPa, 0°C, 0.0058971 [KIR78]

<sup>20°</sup>C to 330°C are found in [OZB80]

# Melting Point, °C: −111.75 [CRC10] Boiling Point, °C: −108.05 [CRC10] Thermal Conductivity, W/(m·K): gas (101.32 kPa, 0°C) 0.00565 [ALD94]

# 3452

Compound: Xenon difluoride Synonym: xenon fluoride Formula: XeF<sub>2</sub> **Molecular Formula:** F<sub>2</sub>Xe Molecular Weight: 169.287 CAS RN: 13709-36-9 **Properties:** white stable cryst; powerful oxidizing agent; enthalpy of sublimation 55.73 kJ/mol; tetr, a=0.4315 nm, c=0.6990 nm; obtained from F<sub>2</sub> and Xe under high pressure [DOU83] [KIR78] Solubility: 25 g/L H<sub>2</sub>O (0°C) [MER06]; hydrolyzes to Xe+O<sub>2</sub>; v s liq HF [COT88] Density, g/cm<sup>3</sup>: 4.32 [KIR78] Melting Point, °C: 129.03 [KIR78] Boiling Point, °C: sublimes without decomposition [MER06]

# 3453

Compound: Xenon dioxydifluoride Formula:  $XeO_2F_2$ Molecular Formula:  $F_2O_2Xe$ Molecular Weight: 201.286 CAS RN: 13875-06-4 Properties: colorless; ortho-rhomb, a=0.6443 nm, b=0.6288 nm, c=0.8312 nm [KIR78] Density, g/cm<sup>3</sup>: 4.10 [KIR78] Melting Point, °C: 30.8 explodes [KIR78]

# 3454

Compound: Xenon fluoride hexafluoroantimonate Formula: XeF<sub>3</sub>SbF<sub>6</sub> Molecular Formula: F<sub>9</sub>SbXe Molecular Weight: 424.036 CAS RN: 39797-63-2 Properties: yellowish green; monocl, a=0.5394 nm, b=1.5559 nm, c=0.5394 nm [KIR78] Density, g/cm<sup>3</sup>: 3.92 [KIR78] Melting Point, °C: 109–113 [KIR78]

# 3455

**Compound:** Xenon fluoride hexafluoroarsenate **Formula:** Xe<sub>2</sub>F<sub>3</sub>AsF<sub>6</sub> **Molecular Formula:** AsF<sub>9</sub>Xe<sub>2</sub> **Molecular Weight:** 377.198 **CAS RN:** 50432-32-1 Properties: yellowish green; monocl, a = 1.5443 nm, b = 0.8678 nm, c = 2.0888 nm [KIR78] Density, g/cm<sup>3</sup>: 3.62 [KIR78] Melting Point, °C: 99 [KIR78]

#### 3456

Compound: Xenon fluoride hexafluororuthenate Formula: XeFRuF<sub>6</sub> Molecular Formula: F<sub>7</sub>RuXe Molecular Weight: 365.349 CAS RN: 22527-13-5 Properties: yellowish green; monocl, a=0.7991 nm, b=1.1086 nm, c=0.7250 nm [KIR78] Density, g/cm<sup>3</sup>: 3.78 [KIR78] Melting Point, °C: 110–111 [KIR78]

# 3457

Compound: Xenon fluoride monodecafluoroantimonate Formula:  $XeFSb_2F_{11}$ Molecular Formula:  $F_{12}Sb_2Xe$ Molecular Weight: 602.785 CAS RN: 15364-10-0 Properties: yellow; monocl, a=0.807 nm, b=0.955 nm, c=0.733 nm [KIR78] Density, g/cm<sup>3</sup>: 3.69 [KIR78] Melting Point, °C: 63 [KIR78]

# 3458

Compound: Xenon hexafluoride Formula: XeF<sub>6</sub> **Molecular Formula:** F<sub>6</sub>Xe Molecular Weight: 245.280 CAS RN: 13693-09-9 Properties: colorless solid; has greenish yellow vapor; monocl, a = 0.933 nm, b = 1.096 nm, c = 0.895 nm; enthalpy of sublimation 59.12 kJ/mol; very strong oxidizing agent; preparation: reaction between Xe and excess F<sub>2</sub> at 250°C [DOU83] [MER06] [KIR78] **Solubility:** hydrolyzed in H<sub>2</sub>O, forming XeOF<sub>4</sub> and XeO<sub>3</sub> [MER06] Density, g/cm<sup>3</sup>: 3.56 [KIR78] Melting Point, °C: 49.48 [KIR78] Boiling Point, °C: 75.57 [MER06]

# 3459

**Compound:** Xenon oxydifluoride **Formula:** XeOF<sub>2</sub> **Molecular Formula:** F<sub>2</sub>OXe **Molecular Weight:** 185.286

# CAS RN: 13780-64-8 Properties: yellow; formed as an unstable product of the partial hydrolysis of XeF<sub>4</sub> [KIR78] Melting Point, °C: explodes ~0 [KIR78]

# 3460

Compound: Xenon oxytetrafluoride Formula: XeOF<sub>4</sub> Molecular Formula: F<sub>4</sub>OXe Molecular Weight: 223.283 CAS RN: 13774-85-1 Properties: colorless volatile stable liq at 25°C [KIR78] Melting Point, °C: -46.2 [KIR78]

#### 3461

Compound: Xenon pentafluoride hexafluoroarsenate Formula:  $XeF_5AsF_6$ Molecular Formula:  $AsF_{11}Xe$ Molecular Weight: 415.194 CAS RN: 20328-94-3 Properties: white; monocl, a=0.5886 nm, b=1.6564 nm, c=0.8051 nm [KIR78] Density, g/cm<sup>3</sup>: 3.51 [KIR78] Melting Point, °C: 130.5 [KIR78]

#### 3462

Compound: Xenon pentafluoride hexafluororuthenate Formula:  $XeF_5RuF_6$ Molecular Formula:  $F_{11}RuXe$ Molecular Weight: 441.342 CAS RN: 39796-98-0 Properties: green; ortho-rhomb, a=1.6771 nm, b=0.8206 nm, c=0.5617 nm [KIR78] Density, g/cm<sup>3</sup>: 3.79 [KIR78] Melting Point, °C: 152 [KIR78]

# 3463

Compound: Xenon tetrafluoride
Formula: XeF<sub>4</sub>
Molecular Formula: F<sub>4</sub>Xe
Molecular Weight: 207.284
CAS RN: 13709-61-0
Properties: colorless cryst; readily prepared by mixing fluorine and xenon; enthalpy of sublimation 60.92 kJ/mol; monocl, a=0.5050 nm, b=0.5922 nm, c=0.5771 nm [KIR78]
Solubility: reacts violently with H<sub>2</sub>O, forming Xe, O<sub>2</sub>, HF, and XeO<sub>3</sub> [DOU83]
Density, g/cm<sup>3</sup>: 4.04 [KIR78]
Melting Point, °C: 117.10 [KIR78]

#### 3464

**Compound:** Xenon tetroxide **Formula:** XeO<sub>4</sub> **Molecular Formula:** O<sub>4</sub>Xe **Molecular Weight:** 195.288 **CAS RN:** 12340-14-6 **Properties:** yellow solid; unstable, can explode [KIR78] **Melting Point,** °C: decomposes at <0 [KIR78]

#### 3465

Compound: Xenon trifluoride monodecafluoroantimonate Formula:  $XeF_3Sb_2F_{11}$ Molecular Formula:  $F_{14}Sb_2Xe$ Molecular Weight: 640.776 CAS RN: 35718-37-7 Properties: yellowish green; tric, a=0.8237 nm, b=0.9984 nm, c=0.8004 nm [KIR78] Density, g/cm<sup>3</sup>: 3.98 [KIR78] Melting Point, °C: 81–83 [KIR78]

# 3466

Compound: Xenon trioxide Formula: XeO<sub>3</sub> Molecular Formula: O<sub>3</sub>Xe Molecular Weight: 179.288 CAS RN: 13776-58-4 Properties: colorless solid; hygr; strongly explosive; ortho-rhomb, a=0.6163 nm, b=0.8115 nm, c=0.5234 nm [MER06] [KIR78]Solubility: s H<sub>2</sub>O [KIR78] Density, g/cm<sup>3</sup>: 4.55 [KIR78] Melting Point, °C: explodes ~25 [KIR78] Reactions: forms HXeO<sub>4</sub> in basic solutions [DOU83]

# 3467

Compound: Ytterbium Formula: Yb Molecular Formula: Yb Molecular Weight: 173.04 CAS RN: 7440-64-4 **Properties:** silvery, ductile metal; fcc, room temp; bcc >798°C; enthalpy of fusion 7.657 kJ/ mol; enthalpy of sublimation 152.1 kJ/mol; atom radius 0.19392 nm; ion radius 0.0858 nm, Yb<sup>+++</sup>, colorless; electrical resistivity (20°C) 28 µohm · cm [MER06] [KIR82] [ALD94] Solubility: slowly reacts with H<sub>2</sub>O; s dil acids, ammonia [HAW93] Density, g/cm<sup>3</sup>: fcc: 6.9654 [KIR82]; bcc: 6.54 [MER06] Melting Point, °C: 819 [KIR82] Boiling Point, °C: 1196 [KIR82]

**Thermal Conductivity, W/(m·K):** 34.9 (25°C) [CRC10] **Thermal Expansion Coefficient:** 26.3×10<sup>-6</sup>/K [CRC10]

# 3468

Compound: Ytterbium acetate tetrahydrate Formula: Yb(CH<sub>3</sub>COO)<sub>3</sub> · 4H<sub>2</sub>O Molecular Formula:  $C_6H_{17}O_{10}$ Yb Molecular Weight: 422.235 CAS RN: 15280-58-7 Properties: white hygr powd; cryst aggregates [AES93] [STR93] [ALD94] Density, g/cm<sup>3</sup>: 2.09 [STR93] Reactions: minus 4H<sub>2</sub>O at 100°C [CRC10]

# 3469

**Compound:** Ytterbium acetylacetonate **Synonyms:** 2,4-pentanedione, ytterbium(III) derivative **Formula:** Yb(CH<sub>3</sub>COCH=C(O)CH<sub>3</sub>)<sub>3</sub> **Molecular Formula:** C<sub>15</sub>H<sub>21</sub>O<sub>6</sub>Yb **Molecular Weight:** 470.368 **CAS RN:** 14284-98-1 **Properties:** powd [STR93]

# 3470

Compound: Ytterbium bromide hydrate Formula: YbBr<sub>3</sub>·xH<sub>2</sub>O Molecular Formula: Br<sub>3</sub>Yb (anhydrous) Molecular Weight: 412.752 (anhydrous) CAS RN: 15163-03-8 Properties: white cryst; anhydrous YBr<sub>3</sub>, 13759-89-2, −20 mesh with 99.9% purity [STR93] [CER91] Melting Point, °C: 956 [AES93] (anhydrous)

# 3471

**Compound:** Ytterbium carbonate hydrate **Formula:** Yb<sub>2</sub>(CO<sub>3</sub>)<sub>3</sub> · xH<sub>2</sub>O **Molecular Formula:** C<sub>3</sub>O<sub>9</sub>Yb<sub>2</sub> (anhydrous) **Molecular Weight:** 526.112 (anhydrous) **CAS RN:** 64360-98-1 **Properties:** cryst [AES93] **Melting Point, °C:** decomposes [AES93]

# 3472

Compound: Ytterbium chloride Formula: YbCl<sub>3</sub> Molecular Formula: Cl<sub>3</sub>Yb Molecular Weight: 279.398 CAS RN: 10361-91-8 Properties: -20 mesh with 99.9% purity; white powd; hygr [STR93] [CER91] Melting Point, °C: 875 [LID94]

# 3473

Compound: Ytterbium chloride hexahydrate Formula:  $YbCl_3 \cdot 6H_2O$ Molecular Formula:  $Cl_3H_{12}O_6Yb$ Molecular Weight: 387.489 CAS RN: 10035-01-5 Properties: -4 mesh with 99.9% purity; green cryst; hygr [HAW93] [CER91] Solubility: v s  $H_2O$  [HAW93] Density, g/cm<sup>3</sup>: 2.575 [MER06] Melting Point, °C: 865 [HAW93] Reactions: minus  $6H_2O$  at 180°C [HAW93]

# 3474

Compound: Ytterbium fluoride Formula: YbF<sub>3</sub> Molecular Formula: F<sub>3</sub>Yb Molecular Weight: 230.035 CAS RN: 13760-80-0 Properties: 3–12 mm fused pieces with 99.9% purity; white powd; hygr [STR93] [CER91] Solubility: i H<sub>2</sub>O [HAW93] Density, g/cm<sup>3</sup>: 8.168 [STR93] Melting Point, °C: 1157 [STR93] Boiling Point, °C: 2200 [STR93]

# 3475

Compound: Ytterbium hydride Formula: YbH<sub>3</sub> Molecular Formula: H<sub>3</sub>Yb Molecular Weight: 176.064 CAS RN: 32997-62-9 Properties: in the form of lumps, in ampoule under Ar [AES93]

#### 3476

**Compound:** Ytterbium nitrate pentahydrate **Formula:**  $Yb(NO_3)_3 \cdot 5H_2O$ **Molecular Formula:**  $H_{10}N_3O_{14}Yb$ **Molecular Weight:** 449.131 **CAS RN:** 35725-34-9 **Properties:** white cryst [STR93] [ALD94]

# 3477

**Compound:** Ytterbium oxalate decahydrate **Formula:**  $Yb_2(C_2O_4)_3 \cdot 10H_2O$  **Molecular Formula:**  $C_6H_{20}O_{22}Yb_2$  **Molecular Weight:** 790.292 **CAS RN:** 51373-68-3 **Properties:** white cryst [STR93]

# **Solubility:** 0.0001 g/100 mL H<sub>2</sub>O [CRC10] **Density, g/cm<sup>3</sup>:** 2.644 [CRC10]

#### 3478

**Compound:** Ytterbium oxide **Synonym:** ytterbia **Formula:** Yb<sub>2</sub>O<sub>3</sub> **Molecular Formula:** O<sub>3</sub>Yb<sub>2</sub> **Molecular Weight:** 394.078 **CAS RN:** 1314-37-0 **Properties:** if pure, colorless mass; brownish or yellowish

if thulia is present, also 3–12 mm sintered pieces of 99.9% purity; sl hygr; absorbs atm H<sub>2</sub>O and NH<sub>3</sub>; used in special alloys, dielectric ceramics, and special glasses, also sintered pieces used as evaporation material to form film with reactivity to radio frequencies [HAW93] [MER06] [CER91]
 Solubility: s dil acids [MER06]

Density, g/cm<sup>3</sup>: 9.2 [HAW93] Melting Point, °C: 2346 [HAW93]

# 3479

**Compound:** Ytterbium perchlorate **Formula:** Yb(ClO<sub>4</sub>)<sub>3</sub> **Molecular Formula:** Cl<sub>3</sub>O<sub>12</sub>Yb **Molecular Weight:** 471.390 **CAS RN:** 13498-08-3 **Properties:** off-white cryst [STR93]

# 3480

Compound: Ytterbium silicide Formula: YbSi<sub>2</sub> Molecular Formula: Si<sub>2</sub>Yb Molecular Weight: 229.211 CAS RN: 12039-89-3 Properties: hex cryst; 10 mm & down lump [LID94] [ALF93] Density, g/cm<sup>3</sup>: 7.54 [LID94]

# 3481

Compound: Ytterbium sulfate Formula:  $Yb_2(SO_4)_3$ Molecular Formula:  $O_{12}S_3Yb_2$ Molecular Weight: 634.271 CAS RN: 10034-98-7 Properties: colorless cryst [CRC10] Solubility: g/100 g H<sub>2</sub>O: 44.2 (0°C), 22.2 (30°C), 4.7 (100°C) [LAN05] Density, g/cm<sup>3</sup>: 3.793 [LAN05] Melting Point, °C: decomposes at 900 [LAN05]

#### 3482

Compound: Ytterbium sulfate octahydrate Formula:  $Yb_2(SO_4)_3 \cdot 8H_2O$ Molecular Formula:  $H_{16}O_{20}S_3Yb_2$ Molecular Weight: 778.393 CAS RN: 10034-98-7 Properties: lustrous, colorless cryst [MER06] Solubility: s  $H_2O$ , solubility decreases with temp increase [MER06] Density, g/cm<sup>3</sup>: 3.286 [STR93]

3483 Compound: Yttrium Formula: Y Molecular Formula: Y Molecular Weight: 88.90585 CAS RN: 7440-65-5 Properties: white; silvery metal; hex close-packed cryst; enthalpy of fusion 11.43 kJ/mol; enthalpy of sublimation 424.7 kJ/mol; radius of atom 0.1801 nm; ion radius of Y<sup>+++</sup> 0.0893 nm aq solutions are colorless; electrical resistivity (20°C) 57 µohm · cm [KIR82] [ALD94] Solubility: decomposes in cold H<sub>2</sub>O, more rapidly in hot H<sub>2</sub>O [MER06]; s dil acids, KOH solutions [HAW93] Density, g/cm<sup>3</sup>: 4.4689 [KIR82] Melting Point, °C: 1522 [KIR82] Boiling Point, °C: 3338 [KIR82]

Thermal Conductivity, W/( $\mathbf{m} \cdot \mathbf{K}$ ): 17.2 (25°C) [CRC10] Thermal Expansion Coefficient: 10.6×10<sup>-6</sup>/K [CRC10]

#### 3484

Compound: Yttrium acetate hydrate Formula:  $Y(CH_3COO)_3 \cdot xH_2O$ Molecular Formula:  $C_6H_9O_6Y$  (anhydrous) Molecular Weight: 266.039 (anhydrous) CAS RN: 23363-14-6 Properties: white cryst; x = 4, Molecular Weight 338.10 [AES93] [STR93] Melting Point, °C: decomposes [AES93]

# 3485

**Compound:** Yttrium acetylacetonate trihydrate **Synonyms:** 2,4-pentanedione, yttrium(III) derivative **Formula:** Y(CH<sub>3</sub>COCH=C(O)CH<sub>3</sub>)<sub>3</sub>  $\cdot$  3H<sub>2</sub>O **Molecular Formula:** C<sub>15</sub>H<sub>27</sub>O<sub>9</sub>Y **Molecular Weight:** 440.280 **CAS RN:** 15554-47-9 **Properties:** yellowish white cryst [STR93] **Melting Point,** °C: 138–140 [STR93]

#### 3486

Compound: Yttrium aluminum oxide Synonym: YAG Formula: Y<sub>3</sub>Al<sub>5</sub>O<sub>12</sub> Molecular Formula: Al<sub>5</sub>O<sub>12</sub>Y<sub>3</sub> Molecular Weight: 593.619 CAS RN: 12005-21-9 Properties: green cub cryst; 3–12 mm fused pieces; used in the form of a 99.99% pure

material as a sputtering target to prepare bubble memory devices [CER91] [LID94] **Density, g/cm<sup>3</sup>:** ~4.5 [LID94]

# 3487

Compound: Yttrium antimonide Formula: YSb Molecular Formula: SbY Molecular Weight: 210.666 CAS RN: 12186-97-9 Properties: cub cryst; high purity semiconductor [HAW93] [LID94] Density, g/cm<sup>3</sup>: 5.97 [LID94] Melting Point, °C: 2310 [LID94]

# 3488

Compound: Yttrium arsenide Formula: YAs Molecular Formula: AsY Molecular Weight: 163.828 CAS RN: 12255-48-0 Properties: cub cryst; high purity semiconductor [LID94] [HAW93] Density, g/cm<sup>3</sup>: 5.59 [LID94]

# 3489

Compound: Yttrium barium copper oxide Synonyms: supercon N-124, O-124 Formula:  $YBa_2Cu_4O_8$ Molecular Formula:  $Ba_2Cu_4O_8Y$ Molecular Weight: 745.739 CAS RN: 107539-20-8 Properties: N-124: 0.2 µm powd; wet processed from ACS grade nitrates; O-124: 20µm powd; dry processed from ACS grade oxides; T<sub>c</sub> is 81 K [STR93] [ASM93]

# 3490

**Compound:** Yttrium barium copper oxide **Synonym:** supercon N-123 **Formula:** YBa<sub>2</sub>Cu<sub>3</sub>O<sub>7</sub> **Molecular Formula:** Ba<sub>2</sub>Cu<sub>3</sub>O<sub>7</sub>Y **Molecular Weight:** 666.194 **CAS RN:** 107539-20-8 **Properties:** ortho-rhomb; superconductor; 0.2 μm powd: wet processed from 99 999% nitrates: :

powd; wet processed from 99.999% nitrates; a hard grayish black sintered material prepared by reacting carbonate and hydroxide free  $Y_2O_3$  with stoichoimetric amounts of BaCO<sub>3</sub> and CuO in air at 950°C for 12h; sensitive to atm CO<sub>2</sub> and H<sub>2</sub>O; a=0.3835 nm, b=0.3884 nm, c=1.1681 nm; transition temp, T<sub>c</sub>, is 92 K; for YBa<sub>2</sub>Cu<sub>3.5</sub>O<sub>7.5</sub>, T<sub>c</sub> is 94 K [STR93] [CON87] [CEN92] [ASM93] [ALF93]

# 3491

Compound: Yttrium barium copper oxide Synonym: supercon O-123 Formula: YBa<sub>2</sub>Cu<sub>3</sub>O<sub>7</sub> Molecular Formula: Ba<sub>2</sub>Cu<sub>3</sub>O<sub>7</sub>Y Molecular Weight: 666.194 CAS RN: 107539-20-8 Properties: 20 µm powd; dry processed from ACS grade oxides; T<sub>c</sub> is 93 K for YBa<sub>2</sub>Cu<sub>3</sub>O<sub>7</sub>; interplanar spacing 0.58 nm; effective mass to free electron mass ratio 2-2.5; coherence length parallel and perpendicular to conduction plane 1.5 nm and 0.15–3 nm; mean free path of charge carrier above T<sub>c</sub> is 10.0 nm; penetration depth 145.0 nm; carrier density  $3.1 \times 10^{+21}$ /cm<sup>3</sup>; for  $x = 7 - \delta$ , T<sub>c</sub> is 92 K [CEN92] [STR93] [ASM93] Reactions: metastable at low temperatures [CEN92]

#### 3492

Compound: Yttrium boride Synonym: yttrium hexaboride Formula: YB<sub>6</sub> Molecular Formula: B<sub>6</sub>Y Molecular Weight: 153.772 CAS RN: 12008-32-1 Properties: -325 mesh 10μm or less with 99.9% purity; refractory material [CER91] [KIR78] Density, g/cm<sup>3</sup>: 3.2 [LID94] Melting Point, °C: decomposes at 2600 [KIR78]

# 3493

Compound: Yttrium bromide Formula: YBr<sub>3</sub> Molecular Formula: Br<sub>3</sub>Y Molecular Weight: 328.618 CAS RN: 13469-98-2 Properties: deliq; -20 mesh with 99.9% purity [CRC10] [CER91] Solubility: g/100 g H<sub>2</sub>O: 63.9 (0°C), 75.1 (20°C), 123 (90°C) [LAN05] Melting Point, °C: 904 [HAW93]

# 3494

**Compound:** Yttrium bromide nonahydrate Formula:  $YBr_3 \cdot 9H_2O$ Molecular Formula:  $Br_3H_{18}O_9Y$ Molecular Weight: 490.756 CAS RN: 13469-98-2 Properties: colorless cryst [HAW93] Solubility: s H<sub>2</sub>O, alcohol; i ether [HAW93]

# 3495

Compound: Yttrium carbide Formula: YC<sub>2</sub> Molecular Formula: C<sub>2</sub>Y Molecular Weight: 112.928 CAS RN: 12071-35-1 Properties: yellow; 12 mm pieces and smaller of 99.5% purity [CER91] [CRC10] Density, g/cm<sup>3</sup>: 4.13 [CRC10] Melting Point, °C: ~2400 [LID94]

# 3496

Compound: Yttrium carbonate trihydrate Formula: Y<sub>2</sub>(CO<sub>3</sub>)<sub>3</sub> · 3H<sub>2</sub>O Molecular Formula: C<sub>3</sub>H<sub>6</sub>O<sub>12</sub>Y<sub>2</sub> Molecular Weight: 411.886 CAS RN: 5970-44-5 Properties: white to reddish white powd [MER06] [STR93] Solubility: i H<sub>2</sub>O; s dil mineral acids [MER06]

# 3497

Compound: Yttrium chloride Formula: YCl<sub>3</sub> Molecular Formula: Cl<sub>3</sub>Y Molecular Weight: 195.264 CAS RN: 10361-92-9 Properties: -20 mesh with 99.9% purity; white powd; hygr [STR93] [CER91] Solubility: g/100 g H<sub>2</sub>O: 77.3 (0°C), 78.8 (20°C), 80.8 (40°C) [LAN05] Density, g/cm<sup>3</sup>: 2.67 [STR93] Melting Point, °C: 721 [STR93] Boiling Point, °C: 1507 [CRC10]

#### 3498

**Compound:** Yttrium chloride hexahydrate **Formula:**  $YCl_3 \cdot 6H_2O$  Molecular Formula: Cl<sub>3</sub>H<sub>12</sub>O<sub>6</sub>Y Molecular Weight: 303.355 CAS RN: 10025-94-2 Properties: -4 mesh with 99.9% purity; colorless cryst; deliq [MER06] [CER91] Solubility: 217 g/100 mL H<sub>2</sub>O (20°C), 235 g/100 mL H<sub>2</sub>O (50°C) [CRC10] Density, g/cm<sup>3</sup>: 2.18 [STR93] Reactions: minus 6H<sub>2</sub>O by heating in HCl stream [MER06]

# 3499

Compound: Yttrium fluoride
Formula: YF<sub>3</sub>
Molecular Formula: F<sub>3</sub>Y
Molecular Weight: 145.901
CAS RN: 13709-49-4
Properties: white powd; hygr; in the form of a 99.9% pure material, is used as a sputtering target for multilayers [STR93] [CER91]
Density, g/cm<sup>3</sup>: 4.01 [STR93]
Melting Point, °C: 1152 [STR93]

#### 3500

Compound: Yttrium hexafluoroacetylacetonate Synonyms: 1,1,1,5,5,5-hexafluoro-2,4pentanedione, yttrium derivative Formula: Y(CF<sub>3</sub>COCHCOCF<sub>3</sub>)<sub>3</sub> Molecular Formula: C<sub>15</sub>H<sub>3</sub>F<sub>18</sub>O<sub>6</sub>Y Molecular Weight: 710.062 CAS RN: 18911-76-7 Properties: white cryst [STR93] Melting Point, °C: 166–170 [STR93] Boiling Point, °C: decomposes at 240 [STR93] Reactions: sublimes at 100°C (0.2 mm Hg) [STR93]

# 3501

Compound: Yttrium hydride Formula: YH<sub>3</sub> Molecular Formula: H<sub>3</sub>Y Molecular Weight: 91.929 CAS RN: 13598-57-7 Properties: -60 mesh of 99.9% purity and lumps [CER91] [AES93]

# 3502

**Compound:** Yttrium hydroxide **Formula:** Y(OH)<sub>3</sub> **Molecular Formula:** H<sub>3</sub>O<sub>3</sub>Y **Molecular Weight:** 139.928 **CAS RN:** 16469-22-0 Properties: white; gelatinous precipitate; dries to a white powd, which absorbs atm CO<sub>2</sub> [MER06]Reactions: decomposes on heating [CRC10]

# 3503

**Compound:** Yttrium iodide **Formula:** YI<sub>3</sub> **Molecular Formula:** I<sub>3</sub>Y **Molecular Weight:** 469.619 **CAS RN:** 13470-38-7 **Properties:** white deliq flakes [CRC10] [AES93] **Melting Point,** °C: 1004 [AES93]

# 3504

Compound: Yttrium iron oxide Synonym: yttrium garnet Formula:  $Y_3Fe_5O_{12}$ Molecular Formula:  $Fe_5O_{12}Y_3$ Molecular Weight: 737.936 CAS RN: 12063-56-8 Properties: used as 99.99% and 99.9% pure sputtering target to prepare ferromagnetic films and in bubble memory devices [CER91]

# 3505

Compound: Yttrium nitrate hexahydrate Formula:  $Y(NO_3)_3 \cdot 6H_2O$ Molecular Formula:  $H_{12}N_3O_{15}Y$ Molecular Weight: 383.012 CAS RN: 13494-98-9 Properties: white deliq cryst [MER06] [STR93] Solubility: g anhydrous/100 g H<sub>2</sub>O: 93.1 (0°C), 123 (20°C), 200 (60°C) [LAN05]; partially decomposed in water to basic nitrates [MER06]; 5.2759±0.0009 mol/(kg·H<sub>2</sub>O) at 25°C [RAR85b] Density, g/cm<sup>3</sup>: 2.68 [CRC10] Reactions: minus 3H<sub>2</sub>O at 100°C [CRC10]

# 3506

**Compound:** Yttrium oxalate nonahydrate **Formula:**  $Y_2(C_2O_4)_3 \cdot 9H_2O$  **Molecular Formula:**  $C_6H_{18}O_{21}Y_2$  **Molecular Weight:** 604.008 **CAS RN:** 13266-82-5 **Properties:** white cryst [STR93] **Solubility:** 0.0001 g/100 mL H<sub>2</sub>O [CRC10] **Melting Point,** °C: decomposes [AES93]

# 3507

**Compound:** Yttrium oxide **Synonym:** yttria

Formula: Y<sub>2</sub>O<sub>3</sub> **Molecular Formula:** O<sub>3</sub>Y<sub>2</sub> Molecular Weight: 225.810 CAS RN: 1314-36-9 **Properties:** white powd or sintered tablets and pieces of 99.9% purity; bcc; readily absorbs atm CO<sub>2</sub>; enthalpy of fusion 105.00 kJ/mol; used in crucible form for experimental, proprietary melting, also sintered pieces used as evaporation material for hard film dielectric coating and thin film capacitors, and as 99.999%, 99.99%, 99.9% pure sputtering target for preparing hard films, dielectric coatings, and thin film capacitor [CER91] [MER06] [CRC10] Solubility: s dil acids [MER06] Density, g/cm<sup>3</sup>: 5.03 [MER06] Melting Point, °C: 2439 [CRC10]

# 3508

**Compound:** Yttrium perchlorate hexahydrate **Formula:**  $Y(ClO_4)_3 \cdot 6H_2O$ **Molecular Formula:**  $Cl_3H_{12}O_{18}Y$ **Molecular Weight:** 495.348 **CAS RN:** 14017-56-2 **Properties:** white cryst [STR93]

#### 3509

Compound: Yttrium phosphide Formula: YP Molecular Formula: PY Molecular Weight: 119.880 CAS RN: 12294-01-8 Properties: cub cryst; high purity semiconductor [LID94] [HAW93] Density, g/cm<sup>3</sup>: ~4.4 [LID94]

# 3510

Compound: Yttrium sulfate octahydrate Formula:  $Y_2(SO_4)_3 \cdot 8H_2O$ Molecular Formula:  $H_{16}O_{20}S_3Y_2$ Molecular Weight: 610.125 CAS RN: 7446-33-5 Properties: small, reddish white; monocl cryst [MER06] [HAW93] Solubility: g/100 g H<sub>2</sub>O: 8.05 (0°C), 7.30 (20°C), 2.2 (90°C) [LAN05]; s conc H<sub>2</sub>SO<sub>4</sub> reacting to produce Y(HSO<sub>4</sub>)<sub>3</sub> [MER06] Density, g/cm<sup>3</sup>: 2.558 [STR93] Reactions: minus 8H<sub>2</sub>O at 120°C [HAW93]

# 3511

**Compound:** Yttrium sulfide **Formula:**  $Y_2S_3$ 

Molecular Formula: S<sub>3</sub>Y<sub>2</sub>
Molecular Weight: 274.010
CAS RN: 12039-19-9
Properties: -200 mesh with 99.9% purity; yellow powd [STR93] [CER91]
Density, g/cm<sup>3</sup>: 3.87 [LID94]
Melting Point, °C: 1925 [LID94]

# 3512

Compound: Yttrium vanadate Formula: YVO<sub>3</sub> Molecular Formula: O<sub>3</sub>VY Molecular Weight: 187.845 CAS RN: 12143-39-4 Properties: white cryst; 99.9% pure, doped with Eu<sub>2</sub>O<sub>3</sub>; used in phosphorescent coating on

special currency papers, and as red phosphor in television tubes [HAW93] [CER91]

# 3513

Compound: Zinc Formula: Zn Molecular Formula: Zn Molecular Weight: 65.39

CAS RN: 7440-66-6

Properties: lustrous bluish white; hex closed-packed metal; reacts with atm moisture producing surface of basic zinc carbonate; hardness 2.5 Mohs; electrical resistivity, 20°C, 5.8µohm · cm; malleable when heated to 100°C–150°C; brittle at 210°C; enthalpy of fusion 7.387 kJ/mol; enthalpy of vaporization 114.8 kJ/mol; uses include evaporating metal for metallized paper and capacitor dielectric films [KIR84] [MER06] [CER91] [ALD94]Solubility: i H<sub>2</sub>O; s HC1, HNO<sub>3</sub>, alkaline

hydroxides [MER06]

**Density, g/cm<sup>3</sup>:** 7.14 [MER06]

Melting Point, °C: 419.5 [MER06]

Boiling Point, °C: 908 [MER06]

**Thermal Conductivity, W/(m·K):** 113.0 (18°C), 96.0 (419.5°C); liq: 60.7

(419.5°C), 56.5 (750°C) [KIR84]

**Thermal Expansion Coefficient:** (volume) 100°C (0.717), 200°C (1.656), 400°C (3.699) [CLA66]

# 3514

**Compound:** Zinc acetate **Formula:**  $Zn(CH_3COO)_2$  **Molecular Formula:**  $C_4H_6O_4Zn$  **Molecular Weight:** 183.479 **CAS RN:** 557-34-6 Properties: prepared from zinc nitrate and acetic anhydride; used to preserve wood, as a mordant in dyeing, and a blood test reagent [MER06]Density, g/cm<sup>3</sup>: 1.84 [ALD94]

# 3515

Compound: Zinc acetate dihydrate Formula:  $Zn(CH_3COO)_2 \cdot 2H_2O$ Molecular Formula: C<sub>4</sub>H<sub>10</sub>O<sub>6</sub>Zn Molecular Weight: 219.509 CAS RN: 5970-45-6 Properties: white powd; pearly luster; somewhat efflorescent; monocl cryst; used as wood preservative, mordant, antiseptic, and a catalyst; anhydrous form: 99.99% pure powd; CAS RN 557-34-6 [AES93] [KIR84] [MER06] [STR93] [HAW93] **Solubility:** g/100 g H<sub>2</sub>O: 40 (25°C), 67 (100°C); 3 g/100 g alcohol at 25°C [KIR84] Density, g/cm<sup>3</sup>: 1.735 [MER06] Melting Point, °C: 237 [MER06] Reactions: minus 2H<sub>2</sub>O at 100°C [HAW93]

# 3516

Compound: Zinc acetylacetonate hydrate Synonyms: 2,4-pentanedione, zinc(II) derivative Formula: Zn(CH<sub>3</sub>COCH=C(O)CH<sub>3</sub>)<sub>2</sub> · xH<sub>2</sub>O Molecular Formula:  $C_{10}H_{14}O_4Zn$  (anhydrous) Molecular Weight: 263.609 (anhydrous) CAS RN: 108503-47-5 Properties: cryst solid; trimer; hydrate is a white powd; used as a catalyst in the synthesis of long chain alcohols and aldehydes, and as a textile weighting agent [HAW93] [STR93] [COT88]

**Solubility:** decomposed by H<sub>2</sub>O; s benzene, acetone [HAW93]

Melting Point, °C: 138 [HAW93]

**Boiling Point, °C:** sublimes [HAW93]

#### 3517

Compound: Zinc ammonium chloride
Formula: ZnCl<sub>2</sub> · 2NH<sub>4</sub>Cl
Molecular Formula: Cl<sub>4</sub>H<sub>8</sub>N<sub>2</sub>Zn
Molecular Weight: 243.278
CAS RN: 52628-25-8
Properties: white powd or cryst; used in galvanizing, as a flux for solder, and in adhesives [KIR84] [HAW93]
Solubility: g/100 g H<sub>2</sub>O: 66 (0°C), 69 (30°C) [KIR84]
Density, g/cm<sup>3</sup>: 1.88 [KIR84]
Melting Point, °C: 150 (decomposes) [KIR84]

# 3518

Compound: Zinc antimonide
Formula: ZnSb
Molecular Formula: SbZn
Molecular Weight: 187.150
CAS RN: 12039-35-9
Properties: silvery white cryst, 99.5% pure melted pieces of 6 mm and smaller; used in thermoelectric devices and thermionic studies [HAW93] [CER91]
Solubility: decomposed by H<sub>2</sub>O [HAW93]
Density, g/cm<sup>3</sup>: 6.33 [HAW93]
Melting Point, °C: 570 [HAW93]

# 3519

Compound: Zinc arsenate octahydrate Synonym: koettigite Formula:  $Zn_3(AsO_4)_2 \cdot 8H_2O$ Molecular Formula:  $As_2H_{16}O_{16}Zn_3$ Molecular Weight: 618.130 CAS RN: 13464-44-4 Properties: white powd; used as an insecticide and wood preservative [HAW93] Solubility: i H<sub>2</sub>O; s in acids, alkalies [HAW93] Density, g/cm<sup>3</sup>: 3.31 (15°C) [HAW93] Reactions: minus H<sub>2</sub>O at 100°C [HAW93]

# 3520

Compound: Zinc arsenide Formula: Zn<sub>3</sub>As<sub>2</sub> Molecular Formula: As<sub>2</sub>Zn<sub>3</sub> Molecular Weight: 346.013 CAS RN: 12006-40-5 Properties: gray tetr; -20 mesh with 99% purity, for arsine generation; 99.9999% purity electronic doping grade [CER91] [CRC10] Density, g/cm<sup>3</sup>: 5.528 [ALD94] Melting Point, °C: 1015 [AES93]

# 3521

Compound: Zinc arsenite Synonym: zinc metaarsenite Formula: Zn(AsO<sub>2</sub>)<sub>2</sub> Molecular Formula: As<sub>2</sub>O<sub>4</sub>Zn Molecular Weight: 279.231 CAS RN: 10326-24-6 Properties: colorless powd; used as insecticide and wood preservative [HAW93] Solubility: i H<sub>2</sub>O; s acids [HAW93]

# 3522

**Compound:** Zinc borate **Synonym:** zinc diborate **Formula:** 3ZnO · 2B<sub>2</sub>O<sub>3</sub> **Molecular Formula:** B<sub>4</sub>O<sub>9</sub>Zn<sub>3</sub> **Molecular Weight:** 383.409 **CAS RN:** 27043-84-1 **Properties:** white, amorphous powd

Properties: white, amorphous powd; used in medicine, for fireproofing textiles, as an inhibitor of fungus and mildew, and as a ceramic flux; most common borate is 2ZnO·3B<sub>2</sub>O<sub>3</sub>·7H<sub>2</sub>O, x-ray structure is given as Zn[B<sub>2</sub>O<sub>3</sub>(OH)<sub>5</sub>]·H<sub>2</sub>O; this hydrate can be prepared by adding borax to a solution of a soluble zinc salt; there are other hydrated borates, for example Zn<sub>3</sub>B<sub>4</sub>O<sub>9</sub>·5H<sub>2</sub>O, CAS RN 12536-65-1, -325 mesh white powd [AES93] [HAW93] [KIR78]
Solubility: g/100 g H<sub>2</sub>O: 0.007 (25°C); s dil acids [KIR84]
Density, g/cm<sup>3</sup>: 3.64 [HAW93]
Melting Point, °C: 980 [HAW93]

# 3523

Compound: Zinc borate hemiheptahydrate Formula:  $2ZnO \cdot 3B_2O_3 \cdot 3 \cdot 1/2H_2O$ Molecular Formula:  $B_6H_7O_{14.5}Zn_2$ Molecular Weight: 434.690 CAS RN: 12513-27-8 Properties: white tricl or powd; has about 20% hydrate water; used as a fire retardant material [KIR84] [HAW93] [CRC10] Solubility: i H<sub>2</sub>O [KIR84] Density, g/cm<sup>3</sup>: 4.22 [KIR84] Melting Point, °C: 980 [KIR84]

# 3524

Compound: Zinc borate pentahydrate
Formula: 3ZnO · 2B<sub>2</sub>O<sub>3</sub> · 5H<sub>2</sub>O
Molecular Formula: B<sub>4</sub>H<sub>10</sub>O<sub>14</sub>Zn<sub>3</sub>
Molecular Weight: 473.487
CAS RN: 12536-65-1
Properties: -325 mesh white powd; formula also given as a dihydrate; used for fireproofing, in ceramics and fungicides [KIR84] [AES93]
Solubility: 0.007 g/100 g H<sub>2</sub>O at 25°C; sl s HC1 [KIR84]
Density, g/cm<sup>3</sup>: 3.64 [KIR84]

#### 3525

**Compound:** Zinc bromate hexahydrate **Formula:**  $Zn(BrO_3)_2 \cdot 6H_2O$ **Molecular Formula:**  $Br_2H_{12}O_{12}Zn$ **Molecular Weight:** 429.286 **CAS RN:** 13517-27-6 Properties: white solid; deliq; oxidizing agent [HAW93]
Solubility: v s H<sub>2</sub>O [HAW93]
Density, g/cm<sup>3</sup>: 2.566 [HAW93]
Melting Point, °C: 100 [HAW93]
Reactions: minus 6H<sub>2</sub>O at 200°C [CRC10]

# 3526

**Compound:** Zinc bromide **Formula:** ZnBr<sub>2</sub> **Molecular Formula:** Br<sub>2</sub>Zn **Molecular Weight:** 225.198 **CAS RN:** 7699-45-8

- **Properties:** white granular powd; very hygr; enthalpy of vaporization 118 kJ/mol; enthalpy of fusion 16.70 kJ/mol; used in photographic emulsions, to manufacture rayon [MER06] [HAW93] [CRC10]
- Solubility: mol/100 mol soln, H<sub>2</sub>O: 31.1 (0°C), 37.6 (25°C), 53.8 (100°C); solid phase, ZnBr<sub>2</sub> · 2H<sub>2</sub>O (0°C, 25°C), ZnBr<sub>2</sub> (100°C) [KRU93]; 1 g/0.5 mL 90% alcohol; s ether, alkali hydroxide solutions [MER06]
  Density, g/cm<sup>3</sup>: 4.5 [LID94]
  Melting Point, °C: 394 [CRC10]
  Boiling Point, °C: 650 [CRC10]

# 3527

Compound: Zinc caprylate Formula:  $Zn(C_8H_{15}O_2)_2$ Molecular Formula:  $C_{16}H_{30}O_4Zn$ Molecular Weight: 351.802 CAS RN: 557-09-5 Properties: lustrous scales; decomposes in moist atm forming caprylic acid; used as a fungicide [HAW93] Solubility: sl s boiling H<sub>2</sub>O; s boiling alcohol [HAW93] Melting Point, °C: 136 [HAW93]

3528

Compound: Zinc carbonate Synonym: smithsonite Formula: ZnCO<sub>3</sub> Molecular Formula: CO<sub>3</sub>Zn Molecular Weight: 125.399 CAS RN: 3486-35-9 Properties: white, cryst powd; rhombohedr cryst; used in ceramics, as fireproofing filler, in cosmetics and lotions [HAW93] [MER06] Solubility: mol/L soln, H<sub>2</sub>O: 1.64×10<sup>-4</sup> (solubility is given at Pco<sub>2</sub>=0.00032 bar) [KRU93]; s dil

acids, alkalies, NH<sub>3</sub> solutions [MER06]

Density, g/cm<sup>3</sup>: 4.42–4.45 [HAW93]

Melting Point, °C: decomposes [KIR84]

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Reactions: evolves CO<sub>2</sub> at 300°C [HAW93]
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#### 3529

**Compound:** Zinc carbonate hydroxide **Formula:**  $3Zn(OH)_2 \cdot 2ZnCO_3$ **Molecular Formula:**  $C_2H_6O_{12}Zn_5$ **Molecular Weight:** 549.013 **CAS RN:** 3486-35-9 **Properties:** white powd [STR93] **Density, g/cm<sup>3</sup>:** 4.398 [STR93]

# 3530

Compound: Zinc chlorate Formula:  $Zn(ClO_3)_2$ Molecular Formula:  $Cl_2O_6Zn$ Molecular Weight: 232.291 CAS RN: 10361-95-2 Properties: colorless to yellowish cryst; deliq; oxidizing agent [HAW93] Solubility: mol/100 mol H<sub>2</sub>O: 59.19 (0°C), 66.52 (18°C), 75.44 (55°C); solid phase,  $Zn(ClO_3)_2 \cdot 6H_2O$ (0°C),  $Zn(ClO_3)_2 \cdot 4H_2O$  (18°C, 55°C) [KRU93]; s alcohol, glycerol, ether [HAW93] Density, g/cm<sup>3</sup>: 2.15 [HAW93] Melting Point, °C: decomposes at 60 [HAW93]

# 3531

Compound: Zinc chloride Formula: ZnCl<sub>2</sub> Molecular Formula: Cl<sub>2</sub>Zn Molecular Weight: 136.295 CAS RN: 7646-85-7 **Properties:** white granules; very deliq; enthalpy of vaporization 126 kJ/mol; used as a catalyst, dehydrating agent in organic synthesis, as an antiseptic, and for fireproofing [HAW93] [MER06] [CRC10] Solubility: g/100 g H<sub>2</sub>O: 342 (0°C), 432 (25°), 615 (100°C); solid phase,  $ZnCl_2 \cdot H_2O$  (0°C),  $ZnCl_2$  (25°C, 100°C) [KRU93]; 1 g soluble in: 0.25 mL 2% HCl, 1.3 mL alcohol, 2 mL glycerol; v s acetone [MER06] Density, g/cm<sup>3</sup>: 2.91 [STR93] Melting Point, °C: 283 [STR93] Boiling Point, °C: 732 [STR93]

#### 3532

**Compound:** Zinc chromate heptahydrate **Formula:**  $ZnCrO_4 \cdot 7H_2O$  **Molecular Formula:**  $CrH_{14}O_{11}Zn$  **Molecular Weight:** 307.490 **CAS RN:** 13530-65-9 **Properties:** yellow solid; used as a pigment [HAW93] **Density, g/cm<sup>3</sup>:** 3.4 [CRC10] (anhydrous)

# 3533

Compound: Zinc chromite Formula: ZnCr<sub>2</sub>O<sub>4</sub> Molecular Formula: Cr<sub>2</sub>O<sub>4</sub>Zn Molecular Weight: 233.380 CAS RN: 12018-19-8 Properties: green cub spinel; pellets; used in catalysts [KIR78] [STR93] Density, g/cm<sup>3</sup>: 5.3 [CRC10]

# 3534

Compound: Zinc citrate dihydrate Synonyms: citric acid, zinc salt dihydrate Formula:  $Zn_3(C_6H_5O_7)_2 \cdot 2H_2O$ Molecular Formula:  $C_{12}H_{14}O_{16}Zn_3$ Molecular Weight: 610.403 CAS RN: 546-46-3 Properties: colorless powd; can be made from zinc carbonate and citric acid; used in toothpaste and as a mouthwash [MER06] Solubility: sl s  $H_2O$ ; s dil mineral acids and alkali hydroxides [MER06]

# 3535

Compound: Zinc cyanide
Formula: Zn(CN)<sub>2</sub>
Molecular Formula: C<sub>2</sub>N<sub>2</sub>Zn
Molecular Weight: 117.425
CAS RN: 557-21-1
Properties: white powd; readily decomposed by dil mineral acids, evolving HCN; has been used in plating, and as an insecticide [MER06]
Solubility: mol/L soln, H<sub>2</sub>O: 4.2 × 10<sup>-5</sup> (room temp) [KRU93]; s dil mineral acids, evolving HCN; i alcohol [HAW93]
Density, g/cm<sup>3</sup>: 1.852 [HAW93]
Melting Point, °C: 800, decomposes [HAW93]

# 3536

Compound: Zinc dichromate trihydrate Formula:  $ZnCr_2O_7 \cdot 3H_2O$ Molecular Formula:  $Cr_2H_6O_{10}Zn$ Molecular Weight: 335.424 CAS RN: 7789-12-0 Properties: yellowish orange powd; preparation: reaction between chromic acid and  $Zn(OH)_2$ ; used as a pigment [HAW93] Solubility: s hot  $H_2O$ , acids; i alcohol and ether [HAW93]

#### 3537

Compound: Zinc dimethyldithiocarbamate Synonyms: dimethyldithiocarbamic acid, zinc salt Formula: Zn[(CH<sub>3</sub>)<sub>2</sub>NCS<sub>2</sub>]<sub>2</sub> Molecular Formula: C<sub>6</sub>H<sub>12</sub>N<sub>2</sub>S<sub>4</sub>Zn Molecular Weight: 305.828 CAS RN: 137-30-4 Properties: cryst when obtained by reaction from hot chloroform + alcohol; used as accelerator for rubber vulcanization [MER06] Solubility: i H<sub>2</sub>O [MER06] Density, g/cm<sup>3</sup>: 1.66 Melting Point, °C: 250–252 [ALD94]

# 3538

Compound: Zinc fluoride Formula:  $ZnF_2$ Molecular Formula:  $F_2Zn$ Molecular Weight: 103.387 CAS RN: 7783-49-5 Properties: hygr; tetr needles or white cryst; enthalpy of vaporization 190.1 kJ/mol; finds use as ceramic glaze and as a wood preservative [HAW93] [MER06] [CRC10] [STR93] Solubility: g/100 mL soln, H<sub>2</sub>O: 1.516 (25°C); solid phase,  $ZnF_2 \cdot 4H_2O$  [KRU93]; sl s HF solutions; s HCl, HNO<sub>3</sub>, NH<sub>4</sub>OH [MER06]; i alcohol [HAW93] Density, g/cm<sup>3</sup>: 4.95 [STR93] Melting Point, °C: 872 [MER06] Boiling Point, °C: 1500 [MER06]

# 3539

**Compound:** Zinc fluoride tetrahydrate **Formula:**  $ZnF_2 \cdot 4H_2O$  **Molecular Formula:**  $F_2H_8O_4Zn$  **Molecular Weight:** 175.449 **CAS RN:** 13986-18-0 **Properties:** white cryst; rhombohedr [MER06] [STR93] **Solubility:** mol/L soln,  $H_2O$ : 0.151 ± 0.004 (25°C) [KRU93] **Density, g/cm<sup>3</sup>:** 2.255 [STR93] **Reactions:** releases 4H<sub>2</sub>O at 100°C [MER06]

# 3540

**Compound:** Zinc fluoroborate hexahydrate **Formula:**  $Zn(BF_4)_2 \cdot 6H_2O$  **Molecular Formula:**  $B_2F_8H_{12}O_6Zn$  **Molecular Weight:** 347.090 **CAS RN:** 27860-83-9 **Properties:** hex cryst; used in zinc plating, for bonding and in the textile industry as a resin cure [LID94] [KIR84] Solubility: >100 g/100 g H<sub>2</sub>O at 25°C; s alcohol [KIR84] Density, g/cm<sup>3</sup>: 2.12 [LID94] Reactions: minus H<sub>2</sub>O at 60°C [KIR84]

# 3541

Compound: Zinc formaldehyde sulfoxylate
Formula: Zn(HSO<sub>2</sub>·CH<sub>2</sub>O)<sub>2</sub>
Molecular Formula: C<sub>2</sub>H<sub>6</sub>O<sub>6</sub>S<sub>2</sub>Zn
Molecular Weight: 255.588
CAS RN: 24887-06-7
Properties: rhomb prisms; used as a stripping and discharging agent in the textile industry [HAW93]
Solubility: v s H<sub>2</sub>O; i alcohol; decomposed by acids [HAW93]
Melting Point, °C: 90 decomposes [KIR84]

# 3542

Compound: Zinc formate
Synonyms: formic acid, zinc salt
Formula: Zn(CHOO)<sub>2</sub>
Molecular Formula: C<sub>2</sub>H<sub>2</sub>O<sub>4</sub>Zn
Molecular Weight: 155.426
CAS RN: 557-41-5
Properties: colorless; readily forms dihydrate; can be obtained from reaction between zinc carbonate and formic acid [MER06] [CRC10]
Solubility: g/100 g H<sub>2</sub>O: 3.70 (0°C), 5.20 (20°C), 38.0 (100°C) [LAN05]
Density, g/cm<sup>3</sup>: 2.368 [CRC10]
Reactions: decomposes on heating [CRC10]

# 3543

Compound: Zinc formate dihydrate
Formula: Zn(CHO<sub>2</sub>)<sub>2</sub>·2H<sub>2</sub>O
Molecular Formula: C<sub>2</sub>H<sub>6</sub>O<sub>6</sub>Zn
Molecular Weight: 191.456
CAS RN: 5970-62-7
Properties: white cryst; has been used as a catalyst for the production of methanol, and as a waterproofing agent in the textile industry [HAW93]
Solubility: 5.2 g anhydrous/100 g H<sub>2</sub>O (20°C); i alcohol [MER06]
Density, g/cm<sup>3</sup>: 2.207 [MER06]
Reactions: minus 2H<sub>2</sub>O at 140°C [HAW93]

# 3544

**Compound:** Zinc hexafluoroacetylacetonate dihydrate **Synonyms:** 1,1,1,5,5,5-hexafluoro-2,4pentanedione, zinc derivative **Formula:** Zn(CF<sub>3</sub>COCHCOCF<sub>3</sub>)<sub>2</sub>·2H<sub>2</sub>O **Molecular Formula:**  $C_{10}H_6F_{12}O_6Zn$  Molecular Weight: 515.525 CAS RN: 16743-33-2 Properties: white powd [STR93] Melting Point, °C: 157–158 [STR93]

#### 3545

Compound: Zinc hexafluorosilicate hexahydrate Formula:  $ZnSiF_6 \cdot 6H_2O$ Molecular Formula:  $F_6H_{12}O_6SiZn$ Molecular Weight: 315.557 CAS RN: 16871-71-9 Properties: white cryst; uses: harden concrete, preservative [HAW93] [MER06] Solubility: s H<sub>2</sub>O [MER06] Density, g/cm<sup>3</sup>: 2.104 [CRC10] Reactions: decomposes at 100°C [CRC10]

#### 3546

Compound: Zinc hydroxide Formula: Zn(OH)<sub>2</sub> Molecular Formula: H<sub>2</sub>O<sub>2</sub>Zn Molecular Weight: 99.405 CAS RN: 20427-58-1 Properties: colorless cryst; used as an absorbent in surgical dressings and in rubber compounding [HAW93] Solubility: sl s H<sub>2</sub>O [HAW93] Density, g/cm<sup>3</sup>: 3.053 [HAW93] Melting Point, °C: 125, decomposes [HAW93]

#### 3547

**Compound:** Zinc hypophosphite monohydrate **Formula:**  $Zn(H_2PO_2)_2 \cdot H_2O$ **Molecular Formula:**  $H_6O_5P_2Zn$ **Molecular Weight:** 213.383 **CAS RN:** 7783-14-4 **Properties:** white cryst; hygr [HAW93] **Solubility:** s  $H_2O$  and alkalies [HAW93]

#### 3548

Compound: Zinc iodate Formula:  $Zn(IO_3)_2$ Molecular Formula:  $I_2O_6Zn$ Molecular Weight: 415.195 CAS RN: 7790-37-6 Properties: white, cryst powd [MER06] Solubility: g/100 g soln, H<sub>2</sub>O: 0.622 (25°C) [KRU93]; s in 77 parts hot H<sub>2</sub>O [MER06] Density, g/cm<sup>3</sup>: 5.063 [CRC10] Reactions: decomposes on heating [CRC10]

#### 3549

Compound: Zinc iodide
Formula: ZnI<sub>2</sub>
Molecular Formula: I<sub>2</sub>Zn
Molecular Weight: 319.199
CAS RN: 10139-47-6
Properties: white or almost white; hygr cryst, granular powd; sensitive to air and light, turning brown due to iodine; used as topical antiseptic [HAW93] [MER06]
Solubility: g/100 g soln, H<sub>2</sub>O: 81.11 (0°C), 81.20 (18°C), 83.62 (100°C); solid phase, ZnI<sub>2</sub> [KRU93]; 1 g/2 mL glycerol; v s alcohol, ether [MER06]
Density, g/cm<sup>3</sup>: 4.74 [MER06]
Melting Point, °C: ~446 [MER06]
Boiling Point, °C: ~625, decomposing [MER06]

# 3550

Compound: Zinc laurate Synonyms: lauric acid, zinc salt Formula: Zn(C<sub>12</sub>H<sub>23</sub>O<sub>2</sub>)<sub>2</sub> Molecular Formula: C<sub>24</sub>H<sub>46</sub>O<sub>4</sub>Zn Molecular Weight: 464.017 CAS RN: 2452-01-9 Properties: white powd; used in paints and varnishes, in rubber compounding [HAW93] Solubility: 0.01 g/100 mL H<sub>2</sub>O (15°C), 0.019 g/100 mL H<sub>2</sub>O (100°C) [CRC10] Melting Point, °C: 128 [HAW93]

# 3551

Compound: Zinc molybdate
Formula: ZnMoO<sub>4</sub>
Molecular Formula: MoO<sub>4</sub>Zn
Molecular Weight: 225.328
CAS RN: 13767-32-3
Properties: white tetr; can be prepared from the two metal oxides [KIR81]
Solubility: 0.5 g/100 g H<sub>2</sub>O [KIR81]
Density, g/cm<sup>3</sup>: 4.3 [LID94]
Melting Point, °C: >700 [KIR81]

# 3552

Compound: Zinc nitrate hexahydrate Formula:  $Zn(NO_3)_2 \cdot 6H_2O$ Molecular Formula:  $H_{12}N_2O_{12}Zn$ Molecular Weight: 297.491 CAS RN: 10196-18-6 Properties: colorless cryst or lumps; used as catalyst and in latex coagulation [HAW93] Solubility: g/100 g soln in H<sub>2</sub>O: 48.3 (0.4°C), 56.1 (25.1°C), 90.0 (70.7°C); solid phase:  $Zn(NO_3)_2 \cdot 6H_2O$ (0°C, 25.1°C),  $Zn(NO_3)_2 \cdot H_2O$  (70.7°C) [KRU93] Density, g/cm<sup>3</sup>: 2.065 [MER06] Melting Point, °C: 36.4 [STR93] Reactions: minus 6H<sub>2</sub>O between 105°C and 131°C [HAW93]

# 3553

Compound: Zinc nitride Formula:  $Zn_3N_2$ Molecular Formula:  $N_2Zn_3$ Molecular Weight: 224.183 CAS RN: 1313-49-1 Properties: -200 mesh with 99.9% purity; bluish gray, cryst material; a=0.972 nm [CER91] [MER06] [CIC73] Density, g/cm<sup>3</sup>: 6.22 [CRC10]

# 3554

Compound: Zinc nitrite Formula: Zn(NO<sub>2</sub>)<sub>2</sub> Molecular Formula: N<sub>2</sub>O<sub>4</sub>Zn Molecular Weight: 157.401 CAS RN: 10102-02-0 Properties: rapidly hydrolyzes in water; prepared by reaction of sodium nitrite and zinc sulfate in alcohol [MER06]

#### 3555

Compound: Zinc oleate Formula: Zn(C<sub>18</sub>H<sub>33</sub>O<sub>2</sub>)<sub>2</sub> Molecular Formula: C<sub>36</sub>H<sub>66</sub>O<sub>4</sub>Zn Molecular Weight: 628.308 CAS RN: 557-07-3 Properties: white to tan, greasy powd; used in paints, resins, and varnishes [HAW93] Solubility: i H<sub>2</sub>O; s alcohol, ether, CS<sub>2</sub>, benzene, petroleum ether [MER06] Melting Point, °C: 70 [HAW93]

# 3556

Compound: Zinc oxalate dihydrate
Formula: ZnC<sub>2</sub>O<sub>4</sub> · 2H<sub>2</sub>O
Molecular Formula: C<sub>2</sub>H<sub>4</sub>O<sub>6</sub>Zn
Molecular Weight: 189.440
CAS RN: 547-68-2
Properties: white powd; used in organic synthesis [HAW93]
Solubility: g/L soln, H<sub>2</sub>O: 0.018 (0°C), 0.0256 (25°C) [KRU93]; s dil mineral acids, ammonia solutions [MER06]
Density, g/cm<sup>3</sup>: 2.562 [HAW93]
Melting Point, °C: decomposes at 100 [HAW93]

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# 3557

Compound: Zinc oxide Synonym: zincite Formula: ZnO Molecular Formula: OZn Molecular Weight: 81.389 CAS RN: 1314-13-2

- Properties: white or yellowish white powd, hex cryst or 99.9% sintered tablets; sublimes at normal pressure; absorbs atm CO<sub>2</sub>; has greatest ultraviolet absorption of all commercial pigments; enthalpy of fusion 52.3 kJ/mol; used in ointments, pigments, as ultraviolet absorber in plastics, in ceramics, and sintered tablets; used as an evaporation material for sensors, also as 99.999% and 99.9% pure sputtering target for dielectric, varistors, and gas sensors [HAW93] [MER06] [CRC10]Solubility: 0.00042 g/100 g H<sub>2</sub>O at 18°C; s dil acetic
- acid, dil mineral acids, ammonia solutions, alkali hydroxides [MER06] [KIR84]; see also [ZIE92b] **Density, g/cm<sup>3</sup>:** 5.607 [MER06]

Melting Point, °C: ~1975 sublimes [KIR84]

Thermal Conductivity, W/(m·K): 25.2 [KIR84]

Thermal Expansion Coefficient: 4.0×10<sup>-6</sup>/°C [KIR84]

# 3558

Compound: Zinc perchlorate hexahydrate Formula:  $Zn(ClO_4)_2 \cdot 6H_2O$ Molecular Formula:  $Cl_2H_{12}O_{14}Zn$ Molecular Weight: 372.382 CAS RN: 10025-64-6 Properties: white rhomb deliq cryst [CRC10] [STR93] Solubility: mol/kg H<sub>2</sub>O: 3.97 (0°C), 4.30 (25°C), 4.74 (50°C); solid phase:  $Zn(ClO_4)_2 \cdot 7H_2O$  (0°C),  $Zn(ClO_4)_2 \cdot 6H_2O$  (25°C, 50°C) [KRU93] Density, g/cm<sup>3</sup>: 2.252 [STR93] Melting Point, °C: 106 [MER06] Boiling Point, °C: 200, decomposes [STR93]

# 3559

Compound: Zinc permanganate hexahydrate Formula:  $Zn(MnO_4)_2 \cdot 6H_2O$ Molecular Formula:  $H_{12}Mn_2O_{14}Zn$ Molecular Weight: 411.353 CAS RN: 23414-72-4 Properties: brownish violet or almost black; deliq cryst; light sensitive, decomposes; used as a curative for rubber and elastomers [MER06] [HAW93] Solubility: s 3 parts  $H_2O$ ; decomposed by alcohol [MER06] Density, g/cm<sup>3</sup>: 2.47 [CRC10] Reactions: minus 5H<sub>2</sub>O at 100°C [CRC10]

# 3560

Compound: Zinc peroxide
Formula: ZnO<sub>2</sub>
Molecular Formula: O<sub>2</sub>Zn
Molecular Weight: 97.389
CAS RN: 1314-22-3
Properties: white powd; decomposes rapidly at temperatures >150°C; used as curative for rubber and elastomers, and in high temp oxidation [HAW93]
Solubility: i H<sub>2</sub>O, and decomposed; decomposed by acids, alcohol and acetone [HAW93]
Density, g/cm<sup>3</sup>: 1.57 [KIR84]
Melting Point, °C: explodes at 212 [KIR84]

# 3561

**Compound:** Zinc phosphate **Synonym:** zinc orthophosphate **Formula:**  $Zn_3(PO_4)_2$  **Molecular Formula:**  $O_8P_2Zn_3$  **Molecular Weight:** 385.513 **CAS RN:** 7779-90-0 **Properties:** colorless rhomb powd [CRC10] [AES93] **Density, g/cm<sup>3</sup>:** 3.99 [CRC10] **Melting Point, °C:** 900 [CRC10]

# 3562

Compound: Zinc phosphate tetrahydrate
Formula: Zn<sub>3</sub>(PO<sub>4</sub>)<sub>2</sub>·4H<sub>2</sub>O
Molecular Formula: H<sub>8</sub>O<sub>12</sub>P<sub>2</sub>Zn<sub>3</sub>
Molecular Weight: 458.174
CAS RN: 7543-51-3
Properties: white powd; used in metal coatings and dental cement; also a dihydrate and an anhydrous form [AES93] [MER06]
Solubility: i H<sub>2</sub>O, alcohol; s dil mineral acids, acetic acid, ammonia solutions, alkali hydroxide solutions [MER06]
Density, g/cm<sup>3</sup>: 3.04 [CRC10]

# 3563

# Density, g/cm<sup>3</sup>: 4.55 [MER06] Melting Point, °C: 420 [MER06] Boiling Point, °C: 1100 [MER06] Reactions: reacts with HCl and H<sub>2</sub>SO<sub>4</sub> evolving PH<sub>3</sub> [MER06]

# 3564

Compound: Zinc propionate Synonyms: propionic acid, zinc salt Formula:  $Zn(CH_3CH_2COO)_2$ Molecular Formula:  $C_6H_{10}O_4Zn$ Molecular Weight: 211.533 CAS RN: 557-28-8 Properties: plate or tablet form; senstitive to moisture; prepared by dissolution of ZnO in dil propionic acid; used as a fungicide [MER06] Solubility: solubility in H<sub>2</sub>O, w/w%: 32 (15°C) [MER06] Reactions: evolves propionic acid in moist air [MER06]

# 3565

Compound: Zinc pyrophosphate Formula: Zn<sub>2</sub>P<sub>2</sub>O<sub>7</sub> Molecular Formula: O<sub>7</sub>P<sub>2</sub>Zn<sub>2</sub> Molecular Weight: 304.723 CAS RN: 7446-26-6 Properties: white, cryst powd; used as a pigment [HAW93] [MER06] Solubility: i H<sub>2</sub>O; s dil mineral acids [MER06] Density, g/cm<sup>3</sup>: 3.75 [MER06]

#### 3566

Compound: Zinc salicylate trihydrate Formula:  $Zn(C_7H_5O_3)_2 \cdot 3H_2O$ Molecular Formula:  $C_{14}H_{16}O_9Zn$ Molecular Weight: 393.666 CAS RN: 16283-36-6 Properties: white needles or cryst powd; used as an antiseptic [HAW93] [MER06] Solubility: 5 g/100 mL H<sub>2</sub>O (20°C) [CRC10], s alcohol [MER06]

# 3567

Compound: Zinc selenate pentahydrate Formula:  $ZnSeO_4 \cdot 5H_2O$ Molecular Formula:  $H_{10}O_9SeZn$ Molecular Weight: 298.424 CAS RN: 13597-54-1 Properties: white tricl cryst [CRC10] [MER06] Solubility: g/100 g H<sub>2</sub>O: 49.37 (0°C), 60.87 (22°C), 46.22 (98.5°C); solid phase:  $ZnSeO_4 \cdot 6H_2O$ (0°C, 22°C),  $ZnSeO_4$  (98.5°C) [KRU93] Density, g/cm<sup>3</sup>: 2.591 [MER06] Melting Point, °C: decomposes at >50 [MER06]

#### 3568

Compound: Zinc selenide Synonym: stilleite Formula: ZnSe Molecular Formula: SeZn Molecular Weight: 144.350 CAS RN: 1315-09-9 Properties: yellowish to reddish powd, and 99.999% pure melted pieces of 3-6 mm and 1-3 mm; cub cryst; decomposes in air; used in infrared instruments, and as an evaporation material for deposition of multilayers, laser mirrors, photoconductive and infrared films and filters, also used as a sputtering target [HAW93] [MER06] [CER91] Solubility: i H<sub>2</sub>O; s dil HNO<sub>3</sub> [MER06] Density, g/cm<sup>3</sup>: 5.42 [CRC10] Melting Point, °C: 1517 [CRC10] Thermal Conductivity, W/(m·K): 14 (25°C) [CRC10] Thermal Expansion Coefficient: (volume) 100°C (0.151), 200°C (0.380), 400°C (0.902), 800°C (2.059) [CLA66]

# 3569

Compound: Zinc selenite Formula: ZnSeO<sub>3</sub> Molecular Formula: O<sub>3</sub>SeZn Molecular Weight: 192.348 CAS RN: 13597-46-1 Properties: white powd [AES93]

#### 3570

Compound: Zinc silicate Synonym: zinc orthosilicate Formula: Zn<sub>2</sub>SiO<sub>4</sub> Molecular Formula: O<sub>4</sub>SiZn<sub>2</sub> Molecular Weight: 222.864 CAS RN: 13597-65-4 Properties: white powd; occurs as mineral willemite; can be prepared by heating ZnO and SiO<sub>2</sub> ~1200°C; used in television screens [MER06] Solubility: i H<sub>2</sub>O, dil acids [MER06] Density, g/cm<sup>3</sup>: 4.103 [HAW93] Melting Point, °C: 1509 [HAW93]

#### 3571

**Compound:** Zinc stearate **Formula:**  $Zn[CH_3(CH_2)_{16}COO]_2$ **Molecular Formula:**  $C_{36}H_{70}O_4Zn$  Molecular Weight: 632.340
CAS RN: 557-05-1
Properties: white; hydrophobic; fine, soft, bulky powd; slight odor; used in cosmetics, lacquers, and ointments [MER06] [HAW93]
Solubility: i H<sub>2</sub>O, alcohol, ether; s benzene; decomposed by dil acids [MER06]
Density, g/cm<sup>3</sup>: 1.095 [HAW93]
Melting Point, °C: 130 [HAW93]

#### 3572

Compound: Zinc sulfate
Synonym: zinkosite
Formula: ZnSO<sub>4</sub>
Molecular Formula: O<sub>4</sub>SZn
Molecular Weight: 161.454
CAS RN: 7733-02-0
Properties: used in zinc plating and as a mordant [KIR84]
Solubility: g/100 g H<sub>2</sub>O: 28.58 (0°C), 36.67 (25°C), 37.7 (100°C); solid phase, ZnSO<sub>4</sub> · 7H<sub>2</sub>O (0°C, 25°C), ZnSO<sub>4</sub> · H<sub>2</sub>O (100°C) [KRU93]
Density, g/cm<sup>3</sup>: 3.54 [KIR84]
Melting Point, °C: decomposes at 680 [KIR84]

# 3573

Compound: Zinc sulfate heptahydrate
Synonym: goslarite
Formula: ZnSO<sub>4</sub> · 7H<sub>2</sub>O
Molecular Formula: H<sub>14</sub>O<sub>11</sub>SZn
Molecular Weight: 287.560
CAS RN: 7446-20-0
Properties: colorless; cryst, granules or powd; effloresces in dry atm; used in rayon manufacture, in animal feeds, and as a wood preservative [MER06] [HAW93]
Solubility: 1 g soluble in: 0.6 mL H<sub>2</sub>O, 2.5 mL glycerol; i alcohol [MER06]
Density, g/cm<sup>3</sup>: 1.97 [MER06]
Melting Point, °C: 100 [MER06]
Reactions: minus 7H<sub>2</sub>O at 280°C [MER06]

# 3574

Compound: Zinc sulfate hexahydrate Formula:  $ZnSO_4 \cdot 6H_2O$ Molecular Formula:  $H_{12}O_{10}SZn$ Molecular Weight: 269.545 CAS RN: 13986-24-8 Properties: colorless monocl; formed from heptahydrate >39°C by loss of  $H_2O$  [KIR84] [CRC10] Solubility: 47.7% in  $H_2O$  at 70°C [KIR84] Density, g/cm<sup>3</sup>: 2.072 [CRC10] Reactions: minus 5H<sub>2</sub>O at 70°C, minus 6H<sub>2</sub>O at 238°C [KIR84] [CRC10]

#### 3575

Compound: Zinc sulfate monohydrate Formula:  $ZnSO_4 \cdot H_2O$ Molecular Formula:  $H_2O_5SZn$ Molecular Weight: 179.469 CAS RN: 7446-19-7 Properties: white powd or granules; used in rayon manufacture, agricultural sprays, and dyestuffs [MER06] [STR93] Solubility: 101 g/100 g H<sub>2</sub>O at 70°C, 87 g/100 g H<sub>2</sub>O at 105°C; i alcohol [MER06] [KIR84] Density, g/cm<sup>3</sup>: 3.28 [KIR84] Melting Point, °C: decomposes at 238 [KIR84] Reactions: minus H<sub>2</sub>O >238°C [MER06]

#### 3576

**Compound:** Zinc sulfide( $\alpha$ ) Synonym: wurtzite Formula: α-ZnS Molecular Formula: SZn Molecular Weight: 97.456 CAS RN: 1314-98-3 Properties: hex; white to grayish white or yellowish powd, and 99.99% pure highly dense pressure sintered cubes and pieces of 9 mm and 3–12 mm; can slowly oxidize in air; used in phosphors, as a white pigment and in dental materials, and as an evaporation and sputtering material for multilayers, high index film used in nonabsorbing beam splitters [KIR84] [MER06] [CER91] Solubility: 0.0007 g/100 g H<sub>2</sub>O at 18°C; i alcohol; s dil mineral acids [MER06] [KIR84] Density, g/cm3: 4.087 [MER06] Melting Point, °C: 1700 [STR93] Thermal Conductivity, W/(m·K): 25.1 [CRC10] Thermal Expansion Coefficient: (volume) 100°C (0.163), 200°C (0.395), 400°C (0.919), 800°C (2.146), 1000°C (2.839) [CLA66]

# 3577

**Compound:** Zinc sulfide(β) **Synonym:** sphalerite **Formula:** β-ZnS **Molecular Formula:** SZn **Molecular Weight:** 97.456

CAS RN: 1314-98-3

**Properties:** cub; white to grayish white or yellow powd; can slowly oxidize in air to sulfate [MER06]

Solubility: i H<sub>2</sub>O, alcohol, s dil mineral acids [MER06] Density, g/cm<sup>3</sup>: 4.102 [MER06] Melting Point, °C: 1700 [STR93] Thermal Expansion Coefficient: (volume) 100°C (0.156), 200°C (0.386), 400°C (0.898), 800°C (1.996), 1000°C (2.559) [CLA66]

# 3578

**Compound:** Zinc sulfite dihydrate **Formula:**  $ZnSO_3 \cdot 2H_2O$ **Molecular Formula:**  $H_4O_5SZn$ **Molecular Weight:** 181.485 **CAS RN:** 7488-52-0

**Properties:** white, cryst powd; absorbs atm oxygen, and is oxidized to sulfate; used as a preservative for anatomical specimens [HAW93]

Solubility: 0.01733 mol/kg H<sub>2</sub>O (25°C) [KRU93]; decomposed by hot H<sub>2</sub>O; s H<sub>2</sub>SO<sub>3</sub> [HAW93] Melting Point, °C: decomposes at 200 [HAW93] Reactions: minus 2H<sub>2</sub>O at 100°C [HAW93]

3579

Compound: Zinc tartrate dihydrate Formula:  $Zn(C_4H_4O_6)_2 \cdot 2H_2O$ Molecular Formula:  $C_8H_{12}O_{14}Zn$ Molecular Weight: 397.565 CAS RN: 551-64-4 Properties: white cryst powd [CRC10] [MER06] Solubility: g anhydrous/100 g H<sub>2</sub>O: 0.022 (20°C), 0.041 (30°C), 0.060 (40°C), 0.059 (80°C) [LAN05]

#### 3580

Compound: Zinc telluride Formula: ZnTe Molecular Formula: TeZn Molecular Weight: 192.990 CAS RN: 1315-11-3 Properties: gray or brownish red powd, or 99.999% pure melted pieces 3-12 mm; cub ruby red cryst; stable in dry air; used in semiconductor work and as an evaporation material and sputtering target to prepare thermionic power generators [HAW93] [MER06] [CER91] Solubility: i H<sub>2</sub>O, prolonged contact with H<sub>2</sub>O or dil HCl evolves H<sub>2</sub>, H<sub>2</sub>Te gases [MER06] Density, g/cm<sup>3</sup>: 5.9 [LID94] Melting Point, °C: 1239 [MER06] Thermal Conductivity, W/(m·K): 10.8 [CRC10] Thermal Expansion Coefficient: 6.6×10<sup>-6</sup>/K [CRC10]

# 3581

Compound: Zinc thiocyanate Formula: Zn(SCN)<sub>2</sub> Molecular Formula: C<sub>2</sub>N<sub>2</sub>S<sub>2</sub>Zn Molecular Weight: 181.557 CAS RN: 557-42-6 Properties: white cryst; deliq; used as a swelling agent for cellulose esters, and to assist dyeing [HAW93] [MER06] Solubility: mol/L soln, H<sub>2</sub>O: 0.144 (18°C) [KRU93]; s alcohol [MER06]

# 3582

Compound: Zinc titanate Formula: ZnTiO<sub>3</sub> Molecular Formula: O<sub>3</sub>TiZn Molecular Weight: 161.255 CAS RN: 12036-43-0 Properties: -200 mesh with 99.9% purity; off-white powd with spinel structure [KIR83] [STR93] [CER91] Density, g/cm<sup>3</sup>: 5.12 [KIR83]

# 3583

**Compound:** Zinc valerate dihydrate **Synonyms:** valeric acid, zinc salt dihydrate **Formula:**  $Zn(CH_3(CH_2)_3COO)_2 \cdot 2H_2O$  **Molecular Formula:**  $C_{10}H_{22}O_6Zn$  **Molecular Weight:** 303.671 **CAS RN:** 556-38-7 **Properties:** lustrous scales or powd; odorous; gradually decomposes in air [MER06] **Solubility:** 1 g soluble in: 70 mL H<sub>2</sub>O, 22 mL alcohol; decomposed by acid [MER06]

# 3584

Compound: Zirconium Formula:  $\alpha$ -Zr;  $\beta$ -Zr Molecular Formula: Zr Molecular Weight: 91.224 CAS RN: 7440-67-7 **Properties:** bluish black amorphous powd, or hard, shiny, ductile metal;  $\alpha$ : hex, a=0.3231 nm, c=0.5146 nm;  $\beta$ -Zr: bcc; enthalpy of fusion 21.0 kJ/mol; enthalpy of vaporization 573.2 kJ/mol; Brinell hardness 90–130; electrical resistivity (5°C) 43.74  $\mu$ ohm · cm; Poisson's ratio 0.33; resistant to corrosion by water and steam; uses include foundry sand and evaporated film for depositing interference layers [KIR84] [MER06] [CER91] [CRC10] Solubility: i H<sub>2</sub>O, cold acids; s hot, very conc acids [HAW93]

Density, g/cm3: 6.5107 [KIR84]

Melting Point, °C: 1852 [KIR84]
Boiling Point, °C: 4409 [LID94]
Reactions: transition α → β at 863°C; heat of transition 3.89 kJ/mol [KIR84]
Thermal Conductivity, W/(m · K): 22.6 (25°C) [ALD94]
Thermal Expansion Coefficient: single cryst, perpendicular to *c*-axis, 1+5.145×10<sup>-T</sup>, T=(273.15+°C) [KIR84]

# 3585

**Compound:** Zirconium acetylacetonate **Synonyms:** 2,4-pentanedione, zirconium(IV) derivative **Formula:** Zr(CH<sub>3</sub>COCH=C(O)CH<sub>3</sub>)<sub>4</sub> **Molecular Formula:** C<sub>20</sub>H<sub>28</sub>O<sub>8</sub>Zr **Molecular Weight:** 487.661 **CAS RN:** 17501-44-9 **Properties:** white powd; hygr [ALD94] [STR93] **Melting Point, °C:** 171–173 [STR93]

3586

Compound: Zirconium aluminide Formula: ZrAl<sub>3</sub> Molecular Formula: Al<sub>3</sub>Zr Molecular Weight: 172.169 CAS RN: 12004-83-0 Properties: 6 mm pieces and smaller of 99.5% purity [CER91]

3587

**Compound:** Zirconium boride **Synonym:** zirconium diboride **Formula:** ZrB<sub>2</sub> **Molecular Formula:** B<sub>2</sub>Zr **Molecular Weight:** 112.846 **CAS RN:** 12045-64-6

Properties: gray metallic cryst or powd; Mohs hardness 8; electrical resistivity 9.2µohm ⋅ cm; excellent thermal shock resistance; hex; considered to have best oxidation resistance of all refractory "hard metals"; used as a hot pressed crucible for melting metals such as aluminum, bismuth, brass, manganese, and tin, and as a container for acidic and basic slags and for cryolite, and as a 99.5% pure sputtering target, make films to increase cutting tool life [HAW93] [KIR84] [CER91]
Density, g/cm<sup>3</sup>: 6.085 [HAW93]

Melting Point, °C: 3245 [KIR84]

#### 3588

**Compound:** Zirconium bromide **Formula:** ZrBr<sub>4</sub> Molecular Formula: Br₄Zr Molecular Weight: 410.840 CAS RN: 13777-25-8 Properties: −40 mesh with 99.8% purity; off-white powd; cub, a=1.095 nm [KIR84] [STR93] [CER91] Density, g/cm<sup>3</sup>: 3.98 [LID94] Melting Point, °C: 450 [KIR84] Reactions: sublimes 357°C [KIR84]

#### 3589

Compound: Zirconium carbide Formula: ZrC Molecular Formula: CZr Molecular Weight: 103.235 CAS RN: 12020-14-3 Properties: dark gray brittle solid; cub, a=0.46983 nm; it is not a fixed stoichiometric compound; hard, high melting carbide used in UC-fueled reactors; enthalpy of fusion 79.4 kJ/mol; hardness 8+ Mohs; used as a hot pressed crucible to melt metals such as bismuth, cadmium, lead, tin and high melting point oxides such as ZrO<sub>2</sub>, and as a 99.5% pure sputtering target to produce wear-resistant and other films [KIR84] [HAW93] [CER91] [JAN71] Solubility: s HF solutions which contain NO<sub>3</sub><sup>-</sup> or peroxide [KIR84] Density, g/cm<sup>3</sup>: 6.73 [STR93] Melting Point, °C: 3540 [STR93] Boiling Point, °C: 5100 [STR93] Reactions: forms tetrahalides with halogens above 250°C [KIR84] Thermal Expansion Coefficient: (volume) 100°C (0.141), 200°C (0.326), 400°C (0.711), 800°C (1.509), 1200°C (2.344) [CLA66]

#### 3590

**Compound:** Zirconium carbonate basic hydrate **Formula:**  $3ZrO_2 \cdot CO_2 \cdot xH_2O$  **Molecular Formula:**  $CO_8Zr_3$  (anhydrous) **Molecular Weight:** 413.678 (anhydrous) **CAS RN:** 12671-00-0 **Properties:** white powd [STR93] **Solubility:** i H<sub>2</sub>O; s acids [HAW93]

#### 3591

**Compound:** Zirconium chloride **Formula:** ZrCl<sub>4</sub> **Molecular Formula:** Cl<sub>4</sub>Zr **Molecular Weight:** 233.035 **CAS RN:** 10026-11-6 Properties: lustrous white; monocl cryst, a=0.6361 nm, b=0.7404 nm, c=0.6256 nm; quickly hygr, fuming in moist air, reacting to emit HCl vapor; enthalpy of fusion 50.00 kJ/mol [CRC10] [KIR84]
Solubility: instantly hydrolyzed in H<sub>2</sub>O to ZrOCl<sub>2</sub> · 8H<sub>2</sub>O, and HCl; s alcohol, ether [KIR84], [MER06]
Density, g/cm<sup>3</sup>: 2.803 [STR93]
Melting Point, °C: 437 [AES93]
Reactions: sublimes 331°C [KIR84]

# 3592

Compound: Zirconium cyclopentadienyl trichloride
Synonym: cyclopentadienylzirconium trichloride
Formula: Zr(C<sub>5</sub>H<sub>5</sub>)Cl<sub>3</sub>
Molecular Formula: C<sub>5</sub>H<sub>5</sub>Cl<sub>3</sub>Zr
Molecular Weight: 262.677
CAS RN: 34767-44-7
Properties: off-white powd; sensitive to moisture [STR93]
Melting Point, °C: 237, decomposes [STR93]

3593

Compound: Zirconium fluoride
Formula: ZrF<sub>4</sub>
Molecular Formula: F<sub>4</sub>Zr
Molecular Weight: 167.218
CAS RN: 7783-64-4
Properties: white; monocl, a=0.957 nm, b=0.993 nm, c=0.773 nm; enthalpy of fusion 64.20 kJ/mol; component of molten salts for use in nuclear reactors [KIR84] [HAW93] [CRC10]
Solubility: 1.32 g/100 mL H<sub>2</sub>O (20°C); v s HF acid [MER06]
Density, g/cm<sup>3</sup>: 4.43 [KIR84]
Melting Point, °C: 932 [KIR84]
Reactions: sublimes 903°C [KIR84]

3594

Compound: Zirconium hexafluoroacetylacetonate
Synonym: 1,1,1,5,5,5-hexafluoro-2,4pentanedione Zr derivative
Formula: Zr(CF<sub>3</sub>COCHCOCF<sub>3</sub>)<sub>4</sub>
Molecular Formula: C<sub>20</sub>H<sub>4</sub>F<sub>24</sub>O<sub>8</sub>Zr
Molecular Weight: 919.433
CAS RN: 19530-02-0
Properties: white to off-white cryst; hygr [STR93]
Melting Point, °C: 41–43 [STR93]
Boiling Point, °C: 225 [STR93]

3595

**Compound:** Zirconium hydride **Formula:** ZrH<sub>2</sub> Molecular Formula:  $H_2Zr$ Molecular Weight: 93.240 CAS RN: 7704-99-6 Properties: grayish black metallic powd; strong reducing agent; absorbs and desorbs hydrogen reversibly; enthalpy of formation 167.4 kJ/mol; does not have fixed stoichiometry; most commercial hydride powd contains  $\delta$  and  $\varepsilon$  phases with compositions  $ZrH_{1.5}$  to  $ZrH_{1.7}$ and  $ZrH_{1.8}$  to  $ZrH_2$ , respectively; stable in air [MER06] [KIR84] [HAW93] [KIR80] Solubility: no reaction with  $H_2O$  [MER06] Density, g/cm<sup>3</sup>: 5.6 [HAW93] Reactions: dissociates between 300°C and 700°C [KIR80]

# 3596

Compound: Zirconium hydroxide Formula: Zr(OH)<sub>4</sub> Molecular Formula: H<sub>4</sub>O<sub>4</sub>Zr Molecular Weight: 159.254 CAS RN: 14475-63-9 Properties: white, bulky, amorphous powd [MER06] Solubility: i H<sub>2</sub>O and alkalies; s mineral acids [MER06] [HAW93] Density, g/cm<sup>3</sup>: 3.25 [MER06] Reactions: minus 2H<sub>2</sub>O at 500°C [CRC10]

#### 3597

Compound: Zirconium iodide Synonym: zirconium tetraiodide Formula: ZrI<sub>4</sub> Molecular Formula: I<sub>4</sub>Zr Molecular Weight: 598.842 CAS RN: 13986-26-0 Properties: orange cryst; fumes heavily in air; cub, a = 1.179 nm [KIR84] [MER06] Solubility: dissolves in H<sub>2</sub>O, evolving steam [MER06] Density, g/cm<sup>3</sup>: 4.85 [KIR78] Melting Point, °C: 499 (high pressure) [MER06] Boiling Point, °C: sublimes 431 [MER06]

# 3598

**Compound:** Zirconium nitrate pentahydrate **Formula:**  $Zr(NO_3)_4 \cdot 5H_2O$  **Molecular Formula:**  $H_{10}N_4O_{17}Zr$  **Molecular Weight:** 429.320 **CAS RN:** 13746-89-9 **Properties:** white, very hygr cryst [MER06] **Solubility:** v s  $H_2O$ ; s alcohol [MER06] **Melting Point, °C:** decomposes at 100 [HAW93]

# 3599

Compound: Zirconium nitride Formula: ZrN Molecular Formula: NZr Molecular Weight: 105.231

# CAS RN: 25658-42-8

Properties: brittle, yellow solid; fcc, a=0.4577 nm; electrical resistivity 21 μohm · cm; hardness 8+ Mohs; transition temp -264°C; can be obtained by reacting NH<sub>3</sub> with a zirconium halide; used as a hot pressed crucible for melting metals such as aluminum, bismuth, cadmium, lead, steel, tin, and as a container for acid and basic slags and cryolite, also used as a 99.5% pure sputtering target to produce films [KIR81] [CIC73] [KIR84] [CER91]
Solubility: s conc HF, slowly in hot conc H<sub>2</sub>SO<sub>4</sub> [KIR84]; sl s dil HCl and H<sub>2</sub>SO<sub>4</sub> [HAW93]
Density, g/cm<sup>3</sup>: 7.09 [STR93]
Melting Point, °C: 2980 [CIC73]
Reactions: oxidizes to ZrO<sub>2</sub> above

700°C in air [KIR84] Thermal Conductivity, W/(m·K): 10.9 [KIR81]

Thermal Expansion Coefficient: 7.24×10<sup>-6</sup> [KIR81]

# 3600

Compound: Zirconium oxide Synonym: baddeleyite Formula: ZrO<sub>2</sub> **Molecular Formula:** O<sub>2</sub>Zr Molecular Weight: 123.223 CAS RN: 12036-23-6 Properties: baddeleyite mineral: white, heavy, amorphous powd, or monocl cryst: stable up to ~1100°C, transition to tetr form as temp increases to 1200°C; hardness 6.5 Mohs; enthalpy of fusion 87.00 kJ/mol [CRC10] [MER06] [KIR84] Solubility: i H<sub>2</sub>O; sl s HCl, HNO<sub>3</sub>; s in heated mixture of 2 part H<sub>2</sub>SO<sub>4</sub>, 1 part H<sub>2</sub>O [MER06] Density, g/cm3: 5.85 [MER06] Melting Point, °C: 2710 [KIR84] Boiling Point, °C: 4300 [MER06] Thermal Expansion Coefficient: (volume) 100°C (0.209), 200°C (0.423), 400°C (0.854), 800°C (1.688), 1000°C (2.267) [CLA66]

# 3601

**Compound:** Zirconium oxide **Synonym:** zirconia **Formula:** ZrO<sub>2</sub> **Molecular Formula:** O<sub>2</sub>Zr **Molecular Weight:** 123.223 **CAS RN:** 1314-23-4 Properties: heavy, white, amorphous powd or 99.7% pure 3–12 mm white sintered pieces; most heat resistant of commercial refractories; four phases: monocl, tetr, ortho-rhomb, cub; monocl stable up to ~1100°C; generally stable to most reagents; used as a crucible for melting metals such as hafnium, iridium, platinum, iron, plutonium, zirconium and vanadium; as 99.7% pure sputtering target produces adherent high index coating and dielectric coating [HAW93] [KIR84] [CER91]
Solubility: i H<sub>2</sub>O and most acids and alkalies at room temp [HAW93]; slowly dissolves in

- hot conc HF, hot conc  $H_2SO_4$  [KIR84]
- **Density, g/cm<sup>3</sup>:** 5.68 [LID94]
- Melting Point, °C: 2710 [KIR84]
- **Reactions:** transforms from monocl to tetr at 1200°C; tetr to monocl between 1000 and 850°C; tetr to cub transition at 2370°C [KIR84]
- **Thermal Conductivity, W/(m·K):** 2.1 (500°C), 2.3 (1000°C) [KIR80]

#### 3602

Compound: Zirconium oxide yttria stabilized Formula:  $ZrO_2$  (10%–15%  $Y_2O_3$ ) Molecular Formula:  $O_2Zr$ Molecular Weight: 123.223 ( $ZrO_2$ ) CAS RN: 64417-98-7 Properties: -150, +325 mesh with 99% purity; powd [STR93] [CER91]

#### 3603

Compound: Zirconium phosphate trihydrate Formula:  $ZrO(H_2PO_4)_2 \cdot 3H_2O$ Molecular Formula:  $H_{10}O_{12}P_2Zr$ Molecular Weight: 355.243 CAS RN: 59129-80-5 Properties: white, dense, amorphous powd; decomposes when heated; extensively hydrolyzed in basic solutions [HAW93] Solubility: i H<sub>2</sub>O; s acids [HAW93]

# 3604

**Compound:** Zirconium phosphide **Formula:** ZrP<sub>2</sub> **Molecular Formula:** P<sub>2</sub>Zr **Molecular Weight:** 153.172 **CAS RN:** 12037-80-8 Properties: gray, brittle; solubility of phosphorus in zirconium metal is low, ~50 ppm; at higher concentrations phosphorus collects as separate globules at the metal grain boundaries, possibly in the form of Zr<sub>3</sub>P; other phosphides include ZrP<sub>3</sub>, ZrP<sub>0.6</sub> [KIR84] [CRC10] Density, g/cm<sup>3</sup>: 4.77 [CRC10]

#### 3605

Compound: Zirconium pyrophosphate Formula:  $ZrP_2O_7$ Molecular Formula:  $O_7P_2Zr$ Molecular Weight: 265.165 CAS RN: 13565-97-4 Properties: white solid; used as a refractory, phosphor, and olefin polymerization catalyst [HAW93] Solubility: i H<sub>2</sub>O and dil acids; s HF [HAW93] Melting Point, °C: decomposes at 1550 [HAW93] Thermal Expansion Coefficient:  $5 \times 10^{-6}$  at 1000°C [HAW93]

# 3606

Compound: Zirconium selenide Formula: ZrSe<sub>2</sub> Molecular Formula: Se<sub>2</sub>Zr Molecular Weight: 249.144 CAS RN: 12166-47-1 Properties: -325 mesh powd [ALF95]

# 3607

**Compound:** Zirconium silicate **Synonym:** zircon **Formula:** ZrSiO<sub>4</sub> **Molecular Formula:** O<sub>4</sub>SiZr **Molecular Weight:** 183.308 **CAS RN:** 10101-52-7

Properties: white powd; also mineral; colorless, unless contains impurities, can then be brown, gray, red; hardness 7.5; tetr cryst, a=0.6607 nm, c=0.5982 nm; dissociates >1540°C into ZrO<sub>2</sub> and SiO<sub>2</sub>; highly stable; can be prepared by reacting ZrO<sub>2</sub> with SiO<sub>2</sub> in an arc furnace; sol-gel synthesis by reacting ZrO(NO<sub>3</sub>)<sub>2</sub> ⋅ xH<sub>2</sub>O with tetraethylorthosilicate; used in refractories, ceramics, glazes, and as a gem stone [KIR84] [HAW93] [SUB90] [SCH88]
Solubility: very inert to most solvents [MER06]; i acids [HAW93]
Density, g/cm<sup>3</sup>: 4.56 [STR93]

**Reactions:** transforms to scheelite type structure at 900°C and 12 GPa [KIR84]

Thermal Conductivity, W/(m⋅K): 4.3 (500°C), 4.1 (1000°C) [KIR80] Thermal Expansion Coefficient: (1000°C) 4.1×10<sup>-6</sup>/°C [SUB90]

#### 3608

Compound: Zirconium silicide
Formula: ZrSi<sub>2</sub>
Molecular Formula: Si<sub>2</sub>Zr
Molecular Weight: 147.396
CAS RN: 12039-90-6
Properties: gray solid powd; in the form of a 99.5% pure material; used as a sputtering target to produce resistant semiconducting films in the fabrication of integrated circuits [ALF93] [HAW93] [CER91]
Solubility: i H<sub>2</sub>O, aqua regia; s HF [HAW93]
Density, g/cm<sup>3</sup>: 4.88 (22°C) [HAW93]
Melting Point, °C: 1620 [LID94]

#### 3609

Compound: Zirconium sulfate tetrahydrate Formula:  $Zr(SO_4)_2 \cdot 4H_2O$ Molecular Formula:  $H_8O_{12}S_2Zr$ Molecular Weight: 355.413 CAS RN: 14644-61-2 Properties: white cryst [STR93] Solubility: 52.5 g/100 g soln,  $H_2O$  (18°C); deposits solid with elementary composition  $4ZrO_2 \cdot 3SO_3 \cdot 15H_2O$ , on standing at ambient temp [MER06] Density, g/cm<sup>3</sup>: 3.22 [CRC10] Reactions: minus  $3H_2O$  at 100°C; minus  $4H_2O$  at 380°C [MER06]

# 3610

Compound: Zirconium sulfide Formula: ZrS<sub>2</sub> Molecular Formula: S<sub>2</sub>Zr Molecular Weight: 155.356 CAS RN: 12039-15-5 Properties: reddish brown powd; hex; semiconductor; has layered structure of stacked sandwiches each containing single sheets of metal cations between two sheets of anions [KIR84] [STR93] Solubility: i H<sub>2</sub>O [HAW93] Density, g/cm<sup>3</sup>: 3.82 [LID94] Melting Point, °C: 1480 [LID94]

#### 3611

**Compound:** Zirconium telluride **Formula:** ZrTe<sub>2</sub> **Molecular Formula:** Te<sub>2</sub>Zr Molecular Weight: 346.424 CAS RN: 32321-65-6 Properties: –325 mesh powd [ALF95]

# 3612

Compound: Zirconium tungstate Formula: Zr(WO<sub>4</sub>)<sub>2</sub> Molecular Formula: O<sub>8</sub>W<sub>2</sub>Zr Molecular Weight: 586.899 CAS RN: 16853-74-0 Properties: -200 mesh with 99.7% purity; light green powd [STR93] [CER91]

# 3613

Compound: Zirconocene dichloride
Synonym: bis(cyclopentadienyl)zirconium chloride
Formula: Zr(C<sub>5</sub>H<sub>5</sub>)<sub>2</sub>Cl<sub>2</sub>
Molecular Formula: C<sub>10</sub>H<sub>10</sub>Cl<sub>2</sub>Zr
Molecular Weight: 292.339
CAS RN: 1291-32-3
Properties: sensitive to moisture; uses: synthesis of metal complexes and organometallic compounds [ALD94]
Melting Point, °C: 242–245 [ALD93]

# 3614

Compound: Zirconyl acetate hydroxide
Formula: Zr(CH<sub>3</sub>COO)<sub>2</sub>(OH)<sub>2</sub>
Molecular Formula: C<sub>4</sub>H<sub>8</sub>O<sub>6</sub>Zr
Molecular Weight: 243.328
CAS RN: 14311-93-4
Properties: 22% soln; solidifies when heated under reduced pressure; stable at room temp; resinous in appearance; amorphous; highly polymerized material; formula is an approximation [HAW93] [MER06]
Solubility: s H<sub>2</sub>O, hydrolyzes when heated [MER06]
Density, g/cm<sup>3</sup>: 1.46 [MER06]
Melting Point, °C: -7 [HAW93]

# 3615

**Compound:** Zirconyl basic nitrate **Formula:** ZrO(OH)NO<sub>3</sub> **Molecular Formula:** HNO<sub>5</sub>Zr **Molecular Weight:** 186.236 **CAS RN:** 71965-17-8 **Properties:** aq solution [HAW93] **Density, g/cm<sup>3</sup>:** aq solution, 1.35 (25°C) [HAW93]

# 3616

**Compound:** Zirconyl chloride hydrate **Formula:**  $ZrOCl_2 \cdot xH_2O$  Molecular Formula: Cl<sub>2</sub>OZr (anhydrous) Molecular Weight: 178.129 (anhydrous) CAS RN: 15461-27-5 Properties: white hygr powd [ALD94] [STR93] Density, g/cm<sup>3</sup>: 1.910 [STR93]

#### 3617

Compound: Zirconyl chloride octahydrate Formula:  $ZrOCl_2 \cdot 8H_2O$ Molecular Formula:  $Cl_2H_{16}O_9Zr$ Molecular Weight: 322.251 CAS RN: 13520-92-8 Properties: tetr cryst when prepared from water [MER06] Solubility: v s  $H_2O$ , alcohol [MER06] Density, g/cm<sup>3</sup>: 1.91 [MER06] Melting Point, °C: 400, decomposes [STR93] Reactions: minus  $6H_2O$  at 150°C, minus  $8H_2O$  at 210°C [CRC10]

# 3618

**Compound:** Zirconyl hydroxychloride hydrate **Formula:** ZrO(OH)Cl·xH<sub>2</sub>O **Molecular Formula:** ClHO<sub>2</sub>Zr (anhydrous) **Molecular Weight:** 159.683 (anhydrous) **CAS RN:** 10119-31-0 **Properties:** colorless or sl amber liq (aq solutions);

soluble glass formed when evaporated; reacts with alkalies to form hydrous zirconia; used in pharmaceuticals, deodorants, and as a water repellent for textiles [HAW93]

# 3619

**Compound:** Zirconyl nitrate hydrate **Formula:**  $ZrO(NO_3)_2 \cdot xH_2O$  **Molecular Formula:**  $N_2O_7Zr$  (anhydrous) **Molecular Weight:** 231.233 (anhydrous) **CAS RN:** 14985-18-3 **Properties:** -8 mesh soft cryst sl wet with HNO<sub>3</sub>; white powd [STR93] [CER91]

# 3620

**Compound:** Zirconyl perchlorate octahydrate **Synonym:** zirconium diperchlorate oxide **Formula:**  $ZrO(CIO_4)_2 \cdot 8H_2O$  **Molecular Formula:**  $Cl_2H_{16}O_{17}Zr$  **Molecular Weight:** 450.246 **CAS RN:** 12205-73-1 **Properties:** white cryst [STR93]

# **CAS Registry Number Index**

56-23-5	739: Carbon tetrachloride	144-62-7	2310: Oxalic acid	537-00-8	767: Cerous acetate
56-34-8	3179: Tetraethylammonium	146-84-9	2814: Silver picrate		hemitrihydrate
	chloride		monohydrate	537-01-9	773: Cerous carbonate
60-00-4	1237:	147-14-8	1116: Copper(II) phthalocyanine	537-03-1	1670: Lanthanum oxalate
	Ethylenediaminetetraacetic	149-11-1	1085: Copper(II)		hydrate
	acid		2-ethylhexanoate	538-17-0	92: Aluminum thiocyanate
62-38-4	2346: Phenylmercuric acetate	149-44-0	2879: Sodium formaldehyde	540-16-9	1070: Copper(II) butanoate
62-54-4	609: Calcium acetate		sulfoxylate		monohydrate
62-76-0	2950: Sodium oxalate	151-50-8	2430: Potassium cyanide	540-16-9	1071: Copper(II) butyrate
71-48-7	950: Cobalt(II) acetate	156-62-7	641: Calcium cyanamide		monohydrate
71-91-0	3178: Tetraethylammonium	298-14-6	2471: Potassium hydrogen	540-69-2	156: Ammonium formate
	bromide		carbonate	540-72-7	3005: Sodium thiocyanate
74-90-8	1524: Hydrogen cyanide	301-04-2	1685: Lead acetate	541-43-5	358: Barium formate
74-97-5	551: Bromochloromethane	301-08-6	1750: Lead(II) 2-ethylhexanoate	542-42-7	679: Calcium palmitate
75-15-0	727: Carbon disulfide	302-01-2	1497: Hydrazine	542-62-1	350: Barium cyanide
75-20-7	627: Calcium carbide	304-59-6	2970: Sodium potassium tartrate	542-83-6	571: Cadmium cyanide
75-44-5	743: Carbonyl chloride		tetrahydrate	543-80-6	320: Barium acetate
75-46-7	3321: Trifluoromethane	306-61-6	1962: Magnesium thiocyanate	543-81-7	435: Beryllium acetate
75-60-5	555: Cacodylic acid		tetrahydrate	543-90-8	557: Cadmium acetate
75-71-8	1172: Dichlorodifluoromethane	333-20-0	2556: Potassium thiocyanate	543-94-2	3045: Strontium acetate
75-73-0	740: Carbon tetrafluoride	353-50-4	744: Carbonyl fluoride	543-94-2	3046: Strontium acetate
76-15-3	852: Chloropentafluoroethane	409-21-2	2761: Silicon carbide		hemihydrate
78-00-2	3176: Tetraethyl lead	420-56-4	1348: Fluorotrimethylsilane	544-17-2	650: Calcium formate
78-10-4	3180: Tetraethylorthosilicate	460-19-5	1140: Cyanogen	544-19-4	1091: Copper(II) formate
79-37-8	2312: Oxalyl chloride	463-58-1	732: Carbon oxysulfide	544-60-5	206: Ammonium oleate
96-10-6	98: Chlorodiethylaluminum	471-34-1	628: Calcium carbonate	544-92-3	1043: Copper(I) cyanide
96-10-6	1175: Diethylaluminum chloride	471-34-1	629: Calcium carbonate	546-46-3	3534: Zinc citrate dihydrate
100-56-1	2347: Phenylmercuric chloride	471-34-1	630: Calcium carbonate	546-67-8	1736: Lead tetraacetate
102-54-5	1300: Ferrocene	497-19-8	2847: Sodium carbonate	546-68-9	3293: Titanium isopropoxide
107-32-4	2340: Performic acid	497-19-8	2848: Sodium carbonate	546-89-4	1761: Lithium acetate
109-63-7	536: Boron trifluoride etherate		bicarbonate dihydrate	546-93-0	1887: Magnesium carbonate
124-38-9	725: Carbon dioxide	504-64-3	734: Carbon suboxide	547-66-0	1930: Magnesium oxalate
124-65-2	2846: Sodium cacodylate	506-61-6	2519: Potassium silver cyanide	547-68-2	3556: Zinc oxalate dihydrate
	hydrate	506-64-9	2791: Silver cyanide	551-64-4	3579: Zinc tartrate dihydrate
126-45-4	2790: Silver citrate	506-65-0	1432: Gold(I) cyanide	554-13-2	1776: Lithium carbonate
126-96-5	2865: Sodium diacetate	506-66-1	447: Beryllium carbide	554-70-1	3320: Triethylphosphine
127-08-2	2405: Potassium acetate	506-68-3	1142: Cyanogen bromide	555-31-7	54: Aluminum isopropoxide
127-09-3	2828: Sodium acetate	506-77-4	1143: Cyanogen chloride	555-35-1	58: Aluminum monopalmitate
127-95-7	2474: Potassium hydrogen	506-78-5	1145: Cyanogen iodide	555-35-1	71: Aluminum palmitate
	oxalate hemihydrate	506-78-5	1583: Iodine cyanide	555-75-9	39: Aluminum ethoxide
127-96-8	2553: Potassium tetraoxalate	506-80-9	726: Carbon diselenide	555-76-0	1277: Ferric formate
	dihydrate	506-87-6	128: Ammonium carbonate	556-38-7	3583: Zinc valerate dihydrate
128-00-7	2802: Silver lactate monohydrate	507-16-4	3228: Thionyl bromide	556-65-0	1836: Lithium thiocyanate
131-74-8	221: Ammonium picrate	507-25-5	741: Carbon tetraiodide	557-04-0	1952: Magnesium stearate
136-57-6	645: Calcium 2-ethylhexanoate	512-25-4	345: Barium citrate monohydrate	557-05-1	3571: Zinc stearate
137-30-4	3537: Zinc	(anhydrous	l -	557-07-3	3555: Zinc oleate
	dimethyldithiocarbamate	parent com	pound)	557-09-5	3527: Zinc caprylate
139-12-8	17: Aluminum acetate	512-26-5	1703: Lead citrate trihydrate	557-20-0	1176: Diethylzinc
140-99-8	701: Calcium succinate	513-74-6	146: Ammonium	557-21-1	3535: Zinc cyanide
	trihydrate		dithiocarbamate	557-28-8	3564: Zinc propionate
141-00-4	594: Cadmium succinate	513-77-9	337: Barium carbonate	557-34-6	3514: Zinc acetate
141-52-6	2872: Sodium ethoxide	513-78-0	566: Cadmium carbonate	557-41-5	3542: Zinc formate
142-03-0	35: Aluminum diacetate	513-79-1	959: Cobalt(II) carbonate	557-42-6	3581: Zinc thiocyanate
142-17-6	674: Calcium oleate	516-02-9	386: Barium oxalate	558-13-4	738: Carbon tetrabromide
142-71-2	1056: Copper(II) acetate	527-09-3	1093: Copper(II) gluconate	562-76-5	2544: Potassium
142-72-3	1867: Magnesium acetate	528-94-9	223: Ammonium salicylate		tetracyanoplatinate(II)
143-19-1	2946: Sodium oleate	532-31-0	2782: Silver benzoate	562-90-3	2759: Silicon acetate
143-33-9	2862: Sodium cyanide	533-51-7	2806: Silver oxalate	563-63-3	2778: Silver acetate
144-23-0	1900: Magnesium citrate	534-16-7	2785: Silver carbonate	563-67-7	2650: Rubidium acetate
	tetradecahydrate	534-17-8	803: Cesium carbonate	563-68-8	3192: Thallium(I) acetate
144-55-8	2904: Sodium hydrogen	535-37-5	1437: Gold(III) cyanide	563-71-3	1310: Ferrous carbonate
	carbonate		trihydrate	563-72-4	675: Calcium oxalate

583-15-3	2065: Mercury(II) benzoate
	monohydrate
584-08-7	2417: Potassium carbonate
584-09-8	2656: Rubidium carbonate
584-10-1	2550: Potassium
	tetraiodocadmium dihydrate
589-97-9	2503: Potassium percarbonate
	monohydrate
590-28-3	2429: Potassium cyanate
591-89-9	2542: Potassium
	tetracyanomercurate(II)
592-01-8	642: Calcium cyanide
592-04-1	2072: Mercury(II) cyanide
592-05-2	1704: Lead cvanide
592-06-3	2383: Platinum(II) cvanide
592-85-8	2098: Mercury(II) thiocyanate
592-87-0	1739: Lead thiocyanate
593-26-0	209: Ammonium palmitate
593-29-3	2523: Potassium stearate
593-74-8	1185: Dimethylmercury
593-95-3	742: Carbonyl bromide
594-27-4	3186: Tetramethyltin
508-54-0	1038: Copper(I) acetate
508-62-0	1000: Copper(I) acctate
508 62 0	1997. Manganese(II) carbonate
598-05-0 627-24-0	725. Carbon subsulfide
627-54-9	755: Carbon subsuinde
028-32-4	8//: Chroinium(II) acetate
(20. 06. 4	2075. Managemer (II) failure in a ta
028-80-4	2075: Mercury(II) Iulminate
630-08-0	
631-36-7	31//: letraetnyl silane
631-60-7	2041: Mercury(1) acetate
631-61-8	118: Ammonium acetate
631-61-8	1/6: Ammonium hydrogen
(07.10.7	acetate
637-12-7	37: Aluminum distearate
637-12-7	50: Aluminum hydroxystearate
637-12-7	85: Aluminum stearate
637-12-7	94: Aluminum tristearate
638-39-1	3027: Stannous acetate
660-60-6	1123: Copper(II) stearate
685-83-6	468: Bis(diethylamino)
	chlorophosphine
688-37-9	62: Aluminum oleate
764-05-6	1141: Cyanogen azide
811-54-1	1751: Lead(II) formate
813-93-4	478: Bismuth citrate
814-71-1	711: Calcium thioglycollate
	trihydrate
814-87-9	63: Aluminum oxalate
	monohydrate
814-88-0	583: Cadmium oxalate
814-89-1	990: Cobalt(II) oxalate
814-90-4	883: Chromium(II) oxalate
	monohydrate
814-91-5	1108: Copper(II) oxalate
814-91-5	1109: Copper(II) oxalate
	hemihydrate
814-93-7	1719: Lead oxalate
814-94-8	3035: Stannous oxalate
814-95-9	3074: Strontium oxalate
814-95-9	3075: Strontium oxalate
	monohydrate
815-78-1	89: Aluminum tartrate
815-82-7	1128: Copper(II) tartrate
· ·	trihydrate

815-85-0	3042: Stannous tartrate
819-73-8	1746: Lead(II) butanoate
822-16-2	2981: Sodium stearate
865-44-1	1594: Iodine trichloride
865-48-5	2845: Sodium t-butoxide
865-52-1	3185: Tetramethylgermane
866-84-2	2425: Potassium citrate
868-14-4	2480: Potassium hydrogen
	tartrate
868-18-8	2917: Sodium hydrogen tartrate
	monohvdrate
868-18-8	2990: Sodium tartrate dihydrate
917-61-3	2861: Sodium cvanate
917-65-7	100. Dichloromethylaluminum
917-69-1	1014: Cobalt(III) acetate
940-71-6	2351: Phosphonitrilic chloride
, 10 / 1 0	trimer
992-98-3	3202: Thallium(I) formate
993-50-0	1183·
775-50-0	Dimethylaminotrimethyltin
1002-88-6	948: Cobalt stearate
1002-88-6	1003: Cobalt(II) stearate
1002-88-0	227: A mmonium stoarato
1002-89-7	1202: Earnia andium
1045-87-1	1293: Ferric sodium
10// 0/ 0	pyrophosphate
1066-26-8	2831: Sodium acetylide
1066-30-4	860: Chromium(III) acetate
1066-30-4	885: Chromium(III) acetate
	hexahydrate
1066-30-4	887: Chromium(III) acetate
	monohydrate
1066-33-7	179: Ammonium hydrogen
	carbonate
1068-22-0	205: Ammonium
	O,O-diethyldithiophosphate
1070-75-3	1775: Lithium carbide
1072-35-1	1729: Lead stearate
1111-67-7	1054: Copper(I) thiocyanate
1111-71-3	451: Beryllium formate
1111-78-0	127: Ammonium carbamate
1113-38-8	207: Ammonium oxalate
1117-94-8	1039: Copper(I) acetylide
1120-44-1	1107: Copper(II) oleate
1120-46-3	1754: Lead(II) oleate
1184-64-1	1072: Copper(II) carbonate
1184-65-2	3315: Trichlorogermane
1185-57-5	148: Ammonium ferric citrate
1185-57-5	1641: Iron(III) ammonium
1105 57 5	citrate
1186-49-8	2906: Sodium hydrogen oxalate
1100 47 0	monohydrate
1101-80-6	2084: Mercury(II) oleate
1207 28 8	1027: Coholt(III) titanata
1207-36-6	2212: Titanagana diahlarida
12/1-19-0	1075: Manzanasa
12/1-2/-0	his(avalamenta dianvil)
1071 07 9	
12/1-2/-8	1991: Manganocene
12/1-28-9	
1071 55 0	bis(cyclopentadienyl)
12/1-55-2	1: Acetylferrocene
1272-23-7	1682: Lanthanum
	tris(cyclopentadienyl)
1273-81-0	2301: Osmium
	bis(cyclopentadienyl)
1273-98-9	2180: Neodymium
	tris(cyclopentadienyl)

1277-43-6	944: Cobaltocene
1277-43-6	1028: Cobaltocene
1277-47-0	3439: Vanadocene
1282-37-7	1302: Ferrocenium
	tetrafluoroborate
1287-13-4	467: Bis(cyclopentadienyl)
	ruthenium
1291-32-3	3613: Zirconocene dichloride
1298-54-0	2735: Scandium
	tris(cyclopentadienyl)
1298-55-1	2719: Samarium
	tris(cyclopentadienyl)
1299-86-1	28: Aluminum carbide
1301-96-8	2811: Silver peroxide
1302-01-8	2818: Silver subfluoride
1302-09-6	2816: Silver selenide
1302-42-7	2852: Sodium aluminate
1302-32-9	458: Berymum auminum sincate
1302-74-5	70: Aluminum silicate
1302-70-7	88: Aluminum sulfide
1302-82-5	78: Aluminum selenide
1302-93-8	82: Aluminum silicate
1303-00-0	1381: Gallium arsenide
1303-11-3	1555: Indium arsenide
1303-28-2	312: Arsenic(V) oxide
1303-32-8	300: Arsenic(II) sulfide
1303-33-9	308: Arsenic(III) sulfide
1303-34-0	314: Arsenic(V) sulfide
1303-35-1	298: Arsenic hemiselenide
1303-36-2	307: Arsenic(III) selenide
1303-37-3	313: Arsenic(V) selenide
1303-52-2	1439: Gold(III) hydroxide
1303-58-8	1441: Gold(III) oxide
1303-60-2	1434: Gold(I) sulfide
1303-61-3	1444: Gold(III) sulfide
1303-62-4	1443: Gold(III) selenide
1303-86-2	528: Boron oxide
1303-86-2	529: Boron oxide glass
1303-94-2	1835: Lithium tetraborate
1202 06 4	2005. Sodium tetrohoroto
1303-90-4	2995: Soutum tetraborate
1304-28-5	388: Barium oxide
1304-29-6	392: Barium peroxide
1304-39-8	396: Barium selenide
1304-40-1	401: Barium silicide
1304-54-7	458: Beryllium nitride
1304-56-9	460: Beryllium oxide
1304-75-2	474: Bismuth basic dichromate
1304-76-3	492: Bismuth oxide
1304-82-1	511: Bismuth telluride
1304-85-4	484: Bismuth hydroxide nitrate
	oxide
1304-85-4	508: Bismuth subnitrate
1305-62-0	659: Calcium hydroxide
1305-78-8	677: Calcium oxide
1305-79-9	684: Calcium peroxide
1305-84-6	695: Calcium selenide
1305-99-3	688: Calcium phosphide
1306-05-4	648: Calcium fluorophosphate
1306-06-5	68/: Calcium phosphate hydroxide
1306-19-0	585: Cadmium oxide
1306-24-7	501: Cadmium salanida
1300-24-7	601: Cadmium tellurida
1500-25-0	oor. Caumum tenuride

1306-26-9	563: Cadmium borotungstate	1313-13-9	2036: Manganese(IV) oxide
	octadecahydrate	1313-22-0	1987: Manganese selenide
1306-38-3	750: Ceric oxide	1313-22-0	2020: Manganese(II) selenide
1307 81 0	2884: Sodium	1313 27 5	21/3: Molyhdenum(VI) oxide
1507-01-2		1212 20 7	2126: Malada dammer (III) and da
	nexactioroosiniate(1v)	1313-29-7	
	hydrate	1313-30-0	2967: Sodium
1307-82-0	2886: Sodium		phosphomolybdate
	hexachloroplatinate(IV)	1313-49-1	3553: Zinc nitride
1307-86-4	1018: Cobalt(III) hydroxide	1313-59-3	2951: Sodium oxide
1307-86-4	1019: Cobalt(III) hydroxide	1313-60-6	2061: Sodium perovide
1507-00-4	tuiberdante	1212 82 2	2005. Se diam peroxide
	trinydrate	1313-82-2	2985: Sodium sullide
1307-96-6	992: Cobalt(II) oxide	1313-83-3	2987: Sodium sulfide
1307-99-9	999: Cobalt(II) selenide		pentahydrate
1308-04-9	1021: Cobalt(III) oxide	1313-84-4	2986: Sodium sulfide nonahydrate
1308-06-1	1013: Cobalt(II.III) oxide	1313-85-5	2976: Sodium selenide
1308-14-1	898: Chromium(III) hydroxide	1313-96-8	2271: Niobium(V) oxide
1500-14-1	tuihandaata	1212 07 0	2171: Noodumi (V) oxide
	trinydrate	1313-97-9	21/1: Neodymium oxide
1308-31-2	1314: Ferrous chromite	1313-99-1	2222: Nickel oxide
1308-38-9	902: Chromium(III) oxide	1314-05-2	2229: Nickel selenide
1308-56-1	1088: Copper(II) ferrous sulfide	1314-06-3	2223: Nickel oxide
1308-80-1	1033: Copper nitride	1314-06-3	2246: Nickel(III) oxide
1308-85-6	1199: Dysprosium hydroxide	1314-08-5	2327: Palladium(II) oxide
1200-05-0	1204. Deserve sizes and	1214-00-5	2076. Streeting or de
1308-87-8	1204: Dysprosium oxide	1314-11-0	3076: Strontium oxide
1308-96-9	1259: Europium(III) oxide	1314-12-1	3211: Thallium(1) oxide
1309-33-7	1278: Ferric hydroxide	1314-13-2	3557: Zinc oxide
1309-37-1	1285: Ferric oxide	1314-15-4	2390: Platinum(IV) oxide
1309-42-8	1913: Magnesium hydroxide	1314-18-7	3080: Strontium peroxide
1300-48-4	1932: Magnesium ovide	1314-18-7	3081: Strontium perovide
1200 (0.0	1705: Lood disside	1514-10-7	
1309-60-0	1705: Lead dioxide	1211 20 1	octanydrate
1309-64-4	270: Antimony(III) oxide	1314-20-1	3249: Thorium oxide
1310-03-8	1708: Lead fluorosilicate	1314-22-3	3560: Zinc peroxide
	dihydrate	1314-23-4	3601: Zirconium oxide
1310-32-3	1328: Ferrous selenide	1314-24-5	2368: Phosphorus(III) oxide
1310-43-6	1327: Ferrous phosphide	1314-27-8	1721: Lead oxide
1210 42 6	1627: Iron phosphide	1214 28 0	2629: Bhanium(VI) avida
1310-43-0		1314-20-9	
1310-52-7	1908: Magnesium germanide	1314-32-5	3225: Thallium(III) oxide
1310-53-8	1424: Germanium(IV) oxide	1314-34-7	3434: Vanadium trioxide
1310-58-3	2481: Potassium hydroxide	1314-35-8	3363: Tungsten trioxide
1310-61-8	2478: Potassium hydrogen	1314-36-9	3507: Yttrium oxide
	sulfide hemihydrate	1314-37-0	3478. Ytterbium oxide
1310-65-2	1800: Lithium hydroxide	1314-41-6	1759: Lead(ILIII) oxide
1210 (6.2	1801. Lithing hadronide	1214 56 2	2272: Dhe such a max $(M)$ and de
1310-66-3	1801: Lithium hydroxide	1314-56-5	2373: Phosphorus(V) oxide
	monohydrate	1314-60-9	286: Antimony(V) oxide
1310-73-2	2919: Sodium hydroxide	1314-61-0	3127: Tantalum pentoxide
1310-82-3	2667: Rubidium hydroxide	1314-62-1	3426: Vanadium pentoxide
1310-83-4	3205: Thallium(I) hydroxide	1314-64-3	3403: Uranyl sulfate
1311-10-0	3064: Strontium hydroxide	1314-68-7	2631: Rhenium(VII) oxide
1011 10 0	octabudrata	1214 80 2	2275: Phoenhorus(V) sulfide
1011 11 1		1314-80-5	2375. Phosphorus(V) suffice
1311-11-1	1/55: Lead(II) oxide hydrate	1314-82-5	23/4: Phosphorus(V) selenide
1311-33-7	3266: Thulium hydroxide	1314-84-7	3563: Zinc phosphide
1311-90-6	220: Ammonium	1314-86-9	2363: Phosphorus triselenide
	phosphotungstate dihydrate	1314-87-0	1731: Lead sulfide
1311-93-9	252: Ammonium tungstate	1314-91-6	1734: Lead telluride
/ - /	nentahydrate	1314-95-0	30/1: Stannous sulfide
1212 02 4	2008: Margury (II) gyida gylfata	1214 06 1	2089: Strentium sulfide
1512-05-4	2088: Wercury(II) oxide suitate	1314-90-1	
1312-41-0	1554: Indium antimonide	1314-97-2	3217: Thallium(1) sulfide
1312-43-2	1572: Indium(III) oxide	1314-98-3	3576: Zinc sulfide( $\alpha$ )
1312-45-4	1578: Indium(III) telluride	1314-98-3	3577: Zinc sulfide(β)
1312-46-5	1612: Iridium(III) oxide	1315-01-1	3026: Stannic sulfide
1312-73-8	2525. Potassium sulfide	1315-03-3	3436: Vanadium trisulfide
1312 73-0	2526: Potassium sulfida	1315 04 4	280: Antimony(V) sulfide
1312-13-0		1015-04-4	207. Antimoly (v) suffice
	pentanydrate	1315-05-5	2/0: Antimony(III) selenide
1312-74-9	2517: Potassium selenide	1315-06-6	3038: Stannous selenide
1312-81-8	1671: Lanthanum oxide	1315-07-7	3084: Strontium selenide
1313-04-8	1945: Magnesium selenide	1315-09-9	3568: Zinc selenide
1313-08-2	1951: Magnesium stannide	1315-11-3	3580: Zinc telluride

1317-33-5	
	2111. Molybdenum disulfide
1017 00 0	
1317-33-5	2134: Molybdenum(IV) sulfide
1317-34-6	2035: Manganese(III) oxide
1017 07 0	
131/-35-/	2030: Manganese(II,III) oxide
1317-36-8	1720: Lead oxide
1217 27 0	1222. Economic culfide
1517-57-9	1552: Ferrous suilide
1317-38-0	1110: Copper(II) oxide
1317 30 1	1048: Copper(I) oxide
1517-59-1	1048. Copper(1) oxide
1317-40-4	1127: Copper(II) sulfide
1317-41-5	1119: Copper(II) selenide
1017 11 0	
131/-42-6	1007: Cobalt(II) suinde
1317-61-9	1638: Iron(II.III) oxide
1217 66 1	1600. Iron digulf de
1517-00-4	1022. Iron disultude
1317-70-0	3286: Titanium dioxide
1317-80-2	3288: Titanium dioxide
1317-00-2	5266. Thainum dioxide
1317-98-2	269: Antimony(III) oxide
1318-23-6	69. Aluminum oxyhydroxide( $\alpha$ )
1210 22 5	
1318-72-5	2484: Potassium magnesium
	chloride sulfate
1310 16 6	1604: Lead basis carbonata
1019-40-0	1074. Leau Dasie Carbonate
1319-46-6	1747: Lead(II) carbonate, basic
1327-39-5	616: Calcium aluminum silicate
1327 39 5	
1327-39-5	646: Calcium ferrocyanide
	dodecahydrate
1227 41 0	40. Aluminum huda1-1'1
1327-41-9	49: Aluminum nydroxychloride
1327-50-0	279: Antimony(III) telluride
1327-53-3	305: Arsenic(III) oxide
1527-55-5	505. Arsenie (III) oxide
1327-53-3	306: Arsenic(III) oxide
1330-43-4	2994: Sodium tetraborate
1222 14 5	1125. Compar(II) sulfate hasia
1332-14-5	1125: Copper(11) suitate, basic
1332-40-7	1111: Copper(II) oxychloride
1332 52 1	130: Beryllium basic acetate
1332-32-1	45). Der ymann basic acetate
1332-58-7	84: Aluminum silicate dihydrate
1332-63-4	2034: Manganese(III) hydroxide
1002 60 1	
1332-03-0	961: Copper(11) chioride hydroxide
1332-71-4	1026: Cobalt(III) sulfide
1332 77 0	2533: Potassium tetrahorate
1552-77-0	2555. I otassium tetraborate
	pentahydrate
1332-81-6	280: Antimony(IV) oxide
1222 81 6	281: Antimony(IV) oxida
1 1 1/01-0	281. Antimony(1v) oxide
1002 01 0	
1333-74-0	1513: Hydrogen
1333-74-0 1333-82-0	1513: Hydrogen 923: Chromium(VI) oxide
1333-74-0 1333-82-0	1513: Hydrogen 923: Chromium(VI) oxide
1333-74-0 1333-82-0 1333-83-1	1513: Hydrogen 923: Chromium(VI) oxide 2905: Sodium hydrogen fluoride
1333-74-0 1333-82-0 1333-83-1 1333-86-4	1513: Hydrogen 923: Chromium(VI) oxide 2905: Sodium hydrogen fluoride 733: Carbon soot
1333-74-0 1333-82-0 1333-83-1 1333-86-4	1513: Hydrogen 923: Chromium(VI) oxide 2905: Sodium hydrogen fluoride 733: Carbon soot
1333-74-0 1333-82-0 1333-83-1 1333-86-4 1335-26-8	1513: Hydrogen 923: Chromium(VI) oxide 2905: Sodium hydrogen fluoride 733: Carbon soot 1937: Magnesium peroxide
1333-74-0 1333-82-0 1333-83-1 1333-86-4 1335-26-8 1335-31-5	1513: Hydrogen 923: Chromium(VI) oxide 2905: Sodium hydrogen fluoride 733: Carbon soot 1937: Magnesium peroxide 2089: Mercury(II) oxycyanide
1333-74-0 1333-82-0 1333-83-1 1333-86-4 1335-26-8 1335-31-5 1335-32-6	1513: Hydrogen 923: Chromium(VI) oxide 2905: Sodium hydrogen fluoride 733: Carbon soot 1937: Magnesium peroxide 2089: Mercury(II) oxycyanide 1693: Lead basic acetate
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1333-74-0 1333-82-0 1333-83-1 1333-86-4 1335-26-8 1335-31-5 1335-32-6 1336-21-6 1341-49-7	<ul> <li>1513: Hydrogen</li> <li>923: Chromium(VI) oxide</li> <li>2905: Sodium hydrogen fluoride</li> <li>733: Carbon soot</li> <li>1937: Magnesium peroxide</li> <li>2089: Mercury(II) oxycyanide</li> <li>1693: Lead basic acetate</li> <li>191: Ammonium hydroxide</li> <li>181: Ammonium hydrogen</li> </ul>
1333-74-0 1333-82-0 1333-83-1 1333-86-4 1335-26-8 1335-31-5 1335-32-6 1336-21-6 1341-49-7	<ul> <li>1513: Hydrogen</li> <li>923: Chromium(VI) oxide</li> <li>2905: Sodium hydrogen fluoride</li> <li>733: Carbon soot</li> <li>1937: Magnesium peroxide</li> <li>2089: Mercury(II) oxycyanide</li> <li>1693: Lead basic acetate</li> <li>191: Ammonium hydroxide</li> <li>181: Ammonium hydrogen</li> <li>fluoride</li> </ul>
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1333-74-0 1333-82-0 1333-82-0 1333-83-1 1333-86-4 1335-26-8 1335-31-5 1335-31-5 1335-32-6 1336-21-6 1341-49-7 1343-88-0 1344-09-8	<ul> <li>1513: Hydrogen</li> <li>923: Chromium(VI) oxide</li> <li>2905: Sodium hydrogen fluoride</li> <li>733: Carbon soot</li> <li>1937: Magnesium peroxide</li> <li>2089: Mercury(II) oxycyanide</li> <li>1693: Lead basic acetate</li> <li>191: Ammonium hydroxide</li> <li>181: Ammonium hydrogen</li> <li>fluoride</li> <li>1947: Magnesium silicate</li> <li>2979: Sodium silicate</li> </ul>
1333-74-0 1333-82-0 1333-82-0 1333-83-1 1333-86-4 1335-26-8 1335-31-5 1335-32-6 1336-21-6 1341-49-7 1343-88-0 1344-09-8	<ul> <li>1513: Hydrogen</li> <li>923: Chromium(VI) oxide</li> <li>2905: Sodium hydrogen fluoride</li> <li>733: Carbon soot</li> <li>1937: Magnesium peroxide</li> <li>2089: Mercury(II) oxycyanide</li> <li>1693: Lead basic acetate</li> <li>191: Ammonium hydroxide</li> <li>181: Ammonium hydrogen</li> <li>fluoride</li> <li>1947: Magnesium silicate</li> <li>2979: Sodium silicate</li> <li>2979: Sodium silicate</li> </ul>
1333-74-0 1333-82-0 1333-83-1 1333-86-4 1335-26-8 1335-31-5 1335-32-6 1336-21-6 1341-49-7 1343-88-0 1344-09-8 1344-28-1	<ul> <li>1513: Hydrogen</li> <li>923: Chromium(VI) oxide</li> <li>2905: Sodium hydrogen fluoride</li> <li>733: Carbon soot</li> <li>1937: Magnesium peroxide</li> <li>2089: Mercury(II) oxycyanide</li> <li>1693: Lead basic acetate</li> <li>191: Ammonium hydroxide</li> <li>181: Ammonium hydrogen fluoride</li> <li>1947: Magnesium silicate</li> <li>2979: Sodium silicate</li> <li>64: Aluminum oxide</li> </ul>
1333-74-0 1333-82-0 1333-82-0 1333-83-1 1333-86-4 1335-26-8 1335-31-5 1335-32-6 1336-21-6 1341-49-7 1343-88-0 1344-09-8 1344-28-1 1344-28-1	<ul> <li>1513: Hydrogen</li> <li>923: Chromium(VI) oxide</li> <li>2905: Sodium hydrogen fluoride</li> <li>733: Carbon soot</li> <li>1937: Magnesium peroxide</li> <li>2089: Mercury(II) oxycyanide</li> <li>1693: Lead basic acetate</li> <li>191: Ammonium hydroxide</li> <li>181: Ammonium hydroxide</li> <li>181: Ammonium silicate</li> <li>2979: Sodium silicate</li> <li>64: Aluminum oxide</li> <li>66: Aluminum oxide(γ)</li> </ul>
1333-74-0 1333-74-0 1333-82-0 1333-82-0 1333-83-1 1333-86-4 1335-26-8 1335-31-5 1335-32-6 1336-21-6 1341-49-7 1343-88-0 1344-09-8 1344-28-1 1344-28-1 1344-28-1	<ul> <li>1513: Hydrogen</li> <li>923: Chromium(VI) oxide</li> <li>2905: Sodium hydrogen fluoride</li> <li>733: Carbon soot</li> <li>1937: Magnesium peroxide</li> <li>2089: Mercury(II) oxycyanide</li> <li>1693: Lead basic acetate</li> <li>191: Ammonium hydroxide</li> <li>181: Ammonium hydrogen</li> <li>fluoride</li> <li>1947: Magnesium silicate</li> <li>2979: Sodium silicate</li> <li>64: Aluminum oxide</li> <li>66: Aluminum oxide(γ)</li> <li>67: Aluminum oxide(δ)</li> </ul>
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1333-74-0 1333-74-0 1333-82-0 1333-82-0 1333-83-1 1333-86-4 1335-26-8 1335-31-5 1335-32-6 1336-21-6 1341-49-7 1343-88-0 1344-09-8 1344-28-1 1344-28-1 1344-28-1 1344-28-1 1344-28-1 1344-28-1 1344-28-1	<ul> <li>1513: Hydrogen</li> <li>923: Chromium(VI) oxide</li> <li>2905: Sodium hydrogen fluoride</li> <li>733: Carbon soot</li> <li>1937: Magnesium peroxide</li> <li>2089: Mercury(II) oxycyanide</li> <li>1693: Lead basic acetate</li> <li>191: Ammonium hydroxide</li> <li>181: Ammonium hydrogen</li> <li>fluoride</li> <li>1947: Magnesium silicate</li> <li>2979: Sodium silicate</li> <li>64: Aluminum oxide</li> <li>66: Aluminum oxide(δ)</li> <li>68: Aluminum oxide(κ)</li> <li>2015: Manganese(II) oxide</li> </ul>
1333-74-0 1333-82-0 1333-82-0 1333-83-1 1333-86-4 1335-26-8 1335-31-5 1335-32-6 1336-21-6 1341-49-7 1343-88-0 1344-09-8 1344-28-1 1344-28-1 1344-28-1 1344-28-1 1344-28-1	<ul> <li>1513: Hydrogen</li> <li>923: Chromium(VI) oxide</li> <li>2905: Sodium hydrogen fluoride</li> <li>733: Carbon soot</li> <li>1937: Magnesium peroxide</li> <li>2089: Mercury(II) oxycyanide</li> <li>1693: Lead basic acetate</li> <li>191: Ammonium hydroxide</li> <li>181: Ammonium hydrogen fluoride</li> <li>1947: Magnesium silicate</li> <li>2979: Sodium silicate</li> <li>2979: Sodium silicate</li> <li>64: Aluminum oxide</li> <li>66: Aluminum oxide(\$\omega)</li> <li>68: Aluminum oxide(\$\omega)</li> <li>2015: Magnese(II) oxide</li> </ul>
1333-74-0 1333-82-0 1333-82-0 1333-83-1 1333-86-4 1335-26-8 1335-31-5 1335-32-6 1336-21-6 1341-49-7 1343-88-0 1344-09-8 1344-28-1 1344-28-1 1344-28-1 1344-28-1 1344-28-1 1344-48-5	<ul> <li>1513: Hydrogen</li> <li>923: Chromium(VI) oxide</li> <li>2905: Sodium hydrogen fluoride</li> <li>733: Carbon soot</li> <li>1937: Magnesium peroxide</li> <li>2089: Mercury(II) oxycyanide</li> <li>1693: Lead basic acetate</li> <li>191: Ammonium hydroxide</li> <li>181: Ammonium hydrogen fluoride</li> <li>1947: Magnesium silicate</li> <li>2979: Sodium silicate</li> <li>64: Aluminum oxide</li> <li>66: Aluminum oxide(δ)</li> <li>68: Aluminum oxide(κ)</li> <li>2015: Manganese(II) oxide</li> <li>2094: Mercury(II) sulfide(α)</li> </ul>
1333-74-0 1333-74-0 1333-82-0 1333-82-0 1333-86-4 1335-26-8 1335-31-5 1335-32-6 1335-32-6 1341-49-7 1343-88-0 1344-09-8 1344-28-1 1344-28-1 1344-28-1 1344-28-1 1344-28-1 1344-28-1 1344-48-5 1344-48-5	<ul> <li>1513: Hydrogen</li> <li>923: Chromium(VI) oxide</li> <li>2905: Sodium hydrogen fluoride</li> <li>733: Carbon soot</li> <li>1937: Magnesium peroxide</li> <li>2089: Mercury(II) oxycyanide</li> <li>1693: Lead basic acetate</li> <li>191: Ammonium hydroxide</li> <li>181: Ammonium hydroxide</li> <li>181: Ammonium silicate</li> <li>2979: Sodium silicate</li> <li>64: Aluminum oxide</li> <li>65: Aluminum oxide(\$)</li> <li>68: Aluminum oxide(\$)</li> <li>68: Aluminum oxide(\$)</li> <li>2015: Manganese(II) oxide</li> <li>2094: Mercury(II) sulfide(\$)</li> <li>2095: Mercury(II) sulfide(\$)</li> </ul>
1333-74-0 1333-74-0 1333-82-0 1333-82-0 1333-82-0 1333-86-4 1335-26-8 1335-31-5 1335-32-6 1336-21-6 1341-49-7 1343-88-0 1344-09-8 1344-28-1 1344-28-1 1344-28-1 1344-28-1 1344-28-1 1344-28-1 1344-48-5 1344-48-5 1344-48-5 1344-48-5	<ul> <li>1513: Hydrogen</li> <li>923: Chromium(VI) oxide</li> <li>2905: Sodium hydrogen fluoride</li> <li>733: Carbon soot</li> <li>1937: Magnesium peroxide</li> <li>2089: Mercury(II) oxycyanide</li> <li>1693: Lead basic acetate</li> <li>191: Ammonium hydroxide</li> <li>181: Ammonium hydrogen</li> <li>fluoride</li> <li>1947: Magnesium silicate</li> <li>2979: Sodium silicate</li> <li>64: Aluminum oxide</li> <li>66: Aluminum oxide(δ)</li> <li>68: Aluminum oxide(δ)</li> <li>68: Aluminum oxide(δ)</li> <li>68: Aluminum oxide(δ)</li> <li>68: Aluminum oxide(δ)</li> <li>69: Mercury(II) sulfide(α)</li> <li>2095: Mercury(II) sulfide(β)</li> <li>3309: Titanium trioxide</li> </ul>
1333-74-0 1333-82-0 1333-82-0 1333-83-1 1333-86-4 1335-26-8 1335-31-5 1335-32-6 1336-21-6 1341-49-7 1343-88-0 1344-09-8 1344-28-1 1344-28-1 1344-28-1 1344-28-1 1344-28-1 1344-48-5 1344-48-5 1344-54-3 1244-57 (	<ul> <li>1513: Hydrogen</li> <li>923: Chromium(VI) oxide</li> <li>2905: Sodium hydrogen fluoride</li> <li>733: Carbon soot</li> <li>1937: Magnesium peroxide</li> <li>2089: Mercury(II) oxycyanide</li> <li>1693: Lead basic acetate</li> <li>191: Ammonium hydroxide</li> <li>181: Ammonium hydroxide</li> <li>181: Ammonium hydrogen fluoride</li> <li>1947: Magnesium silicate</li> <li>2979: Sodium silicate</li> <li>2079: Sodium silicate</li> <li>66: Aluminum oxide(%)</li> <li>66: Aluminum oxide(%)</li> <li>2015: Manganese(II) oxide</li> <li>2094: Mercury(II) sulfide(α)</li> <li>2095: Mercury(II) sulfide(β)</li> <li>3309: Titanium trioxide</li> </ul>
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1333-74-0 1333-74-0 1333-82-0 1333-82-0 1333-82-1 1333-86-4 1335-26-8 1335-31-5 1335-31-5 1335-32-6 1346-21-6 1341-49-7 1343-88-0 1344-09-8 1344-09-8 1344-28-1 1344-28-1 1344-28-1 1344-28-1 1344-28-1 1344-28-1 1344-28-1 1344-48-5 1344-48-5 1344-48-5 1344-54-3 1344-57-6 1344-58-7	<ul> <li>1513: Hydrogen</li> <li>923: Chromium(VI) oxide</li> <li>2905: Sodium hydrogen fluoride</li> <li>733: Carbon soot</li> <li>1937: Magnesium peroxide</li> <li>2089: Mercury(II) oxycyanide</li> <li>1693: Lead basic acetate</li> <li>191: Ammonium hydroxide</li> <li>181: Ammonium hydroxide</li> <li>181: Ammonium hydrogen</li> <li>fluoride</li> <li>1947: Magnesium silicate</li> <li>2979: Sodium silicate</li> <li>64: Aluminum oxide</li> <li>66: Aluminum oxide(δ)</li> <li>68: Aluminum oxide(δ)</li> <li>68: Aluminum oxide(δ)</li> <li>68: Aluminum oxide(δ)</li> <li>68: Aluminum oxide(β)</li> <li>2015: Manganese(II) oxide</li> <li>2095: Mercury(II) sulfide(α)</li> <li>2095: Mercury(II) sulfide(β)</li> <li>3309: Titanium trioxide</li> <li>3389: Uranium trioxide</li> </ul>
1333-74-0 1333-82-0 1333-82-0 1333-83-1 1333-86-4 1335-26-8 1335-31-5 1335-32-6 1336-21-6 1341-49-7 1343-88-0 1344-09-8 1344-28-1 1344-28-1 1344-28-1 1344-28-1 1344-28-1 1344-28-1 1344-48-5 1344-48-5 1344-54-3 1344-58-7 1344-50 8	<ul> <li>1513: Hydrogen</li> <li>923: Chromium(VI) oxide</li> <li>2905: Sodium hydrogen fluoride</li> <li>733: Carbon soot</li> <li>1937: Magnesium peroxide</li> <li>2089: Mercury(II) oxycyanide</li> <li>1693: Lead basic acetate</li> <li>191: Ammonium hydroxide</li> <li>181: Ammonium hydrogen fluoride</li> <li>1947: Magnesium silicate</li> <li>2979: Sodium silicate</li> <li>2979: Sodium silicate</li> <li>64: Aluminum oxide</li> <li>66: Aluminum oxide(\$)</li> <li>68: Aluminum oxide(\$)</li> <li>68: Aluminum oxide(\$)</li> <li>68: Aluminum oxide(\$)</li> <li>2015: Manganese(II) oxide</li> <li>2095: Mercury(II) sulfide(\$)</li> <li>3309: Titanium trioxide</li> <li>3389: Uranium trioxide</li> <li>3302: Uranium trioxide</li> </ul>
1333-74-0 1333-82-0 1333-82-0 1333-82-0 1333-83-1 1333-86-4 1335-26-8 1335-31-5 1335-32-6 1336-21-6 1341-49-7 1343-88-0 1344-09-8 1344-28-1 1344-28-1 1344-28-1 1344-28-1 1344-28-1 1344-28-1 1344-28-1 1344-48-5 1344-48-5 1344-48-5 1344-58-7 1344-59-8 1344-59-8	1513: Hydrogen 923: Chromium(VI) oxide 2905: Sodium hydrogen fluoride 733: Carbon soot 1937: Magnesium peroxide 2089: Mercury(II) oxycyanide 1693: Lead basic acetate 1911: Ammonium hydroxide 1811: Ammonium hydroxide 1811: Ammonium hydroxide 1947: Magnesium silicate 2979: Sodium silicate 2979: Sodium silicate 64: Aluminum oxide 66: Aluminum oxide 66: Aluminum oxide( $\alpha$ ) 2015: Manganese(II) oxide 2094: Mercury(II) sulfide( $\alpha$ ) 2095: Mercury(II) sulfide( $\beta$ ) 3309: Titanium trioxide 3371: Uranium dioxide 3389: Uranium trioxide 3389: Uranium (VVI) oxide
1333-74-0 1333-74-0 1333-82-0 1333-82-0 1333-83-1 1333-86-4 1335-26-8 1335-31-5 1335-32-6 1345-21-6 1341-49-7 1343-88-0 1344-09-8 1344-28-1 1344-28-2	<ul> <li>1513: Hydrogen</li> <li>923: Chromium(VI) oxide</li> <li>2905: Sodium hydrogen fluoride</li> <li>733: Carbon soot</li> <li>1937: Magnesium peroxide</li> <li>2089: Mercury(II) oxycyanide</li> <li>1693: Lead basic acetate</li> <li>191: Ammonium hydroxide</li> <li>181: Ammonium hydrogen</li> <li>fluoride</li> <li>1947: Magnesium silicate</li> <li>2979: Sodium silicate</li> <li>64: Aluminum oxide</li> <li>66: Aluminum oxide(δ)</li> <li>68: Aluminum oxide(κ)</li> <li>2015: Manganese(II) oxide</li> <li>2094: Mercury(II) sulfide(α)</li> <li>2095: Mercury(II) sulfide(β)</li> <li>3309: Titanium trioxide</li> <li>3389: Uranium (V,VI) oxide</li> <li>667: Calcium metasilicate</li> </ul>
1333-74-0 1333-82-0 1333-82-0 1333-83-1 1333-86-4 1335-26-8 1335-31-5 1335-32-6 1336-21-6 1341-49-7 1343-88-0 1344-09-8 1344-28-1 1344-28-1 1344-28-1 1344-28-1 1344-28-1 1344-28-1 1344-28-1 1344-48-5 1344-54-3 1344-57-6 1344-59-8 1344-95-2 1344-95-2	<ul> <li>1513: Hydrogen</li> <li>923: Chromium(VI) oxide</li> <li>2905: Sodium hydrogen fluoride</li> <li>733: Carbon soot</li> <li>1937: Magnesium peroxide</li> <li>2089: Mercury(II) oxycyanide</li> <li>1693: Lead basic acetate</li> <li>191: Ammonium hydroxide</li> <li>181: Ammonium hydrogen</li> <li>fluoride</li> <li>1947: Magnesium silicate</li> <li>2979: Sodium silicate</li> <li>2979: Sodium silicate</li> <li>64: Aluminum oxide(%)</li> <li>66: Aluminum oxide(%)</li> <li>2015: Manganese(II) oxide</li> <li>2094: Mercury(II) sulfide(β)</li> <li>3309: Titanium trioxide</li> <li>3389: Uranium trioxide</li> <li>3392: Uranium (V,VI) oxide</li> <li>667: Calcium metasilicate</li> </ul>
1333-74-0 1333-82-0 1333-82-0 1333-82-0 1333-82-1 1335-26-8 1335-26-8 1335-31-5 1335-32-6 1336-21-6 1341-49-7 1343-88-0 1344-09-8 1344-09-8 1344-28-1 1344-28-1 1344-28-1 1344-28-1 1344-28-1 1344-28-1 1344-28-1 1344-48-5 1344-48-5 1344-48-5 1344-59-8 1344-59-8 1344-59-2 1344-95-2 1344-95-2	1513: Hydrogen 923: Chromium(VI) oxide 2905: Sodium hydrogen fluoride 733: Carbon soot 1937: Magnesium peroxide 2089: Mercury(II) oxycyanide 1693: Lead basic acetate 191: Ammonium hydroxide 181: Ammonium hydroxide 181: Ammonium hydrogen fluoride 1947: Magnesium silicate 2979: Sodium silicate 64: Aluminum oxide 66: Aluminum oxide( $\gamma$ ) 67: Aluminum oxide( $\gamma$ ) 67: Aluminum oxide( $\gamma$ ) 67: Aluminum oxide( $\gamma$ ) 68: Aluminum oxide( $\gamma$ ) 68: Aluminum oxide( $\gamma$ ) 67: Aluminum oxide( $\gamma$ ) 2015: Manganese(II) oxide 2094: Mercury(II) sulfide( $\beta$ ) 3309: Titanium trioxide 3371: Uranium dioxide 3389: Uranium trioxide 3392: Uranium (V,VI) oxide 667: Calcium metasilicate 696: Calcium silicate

1345-07-9	510: Bismuth sulfide
1345-13-7	784: Cerous oxide
1345-25-1	1324: Ferrous oxide
1399-57-1	720: Carbon
1449-65-6	2103: Methylgermane
1470-61-7	2793: Silver
	diethyldithiocarbamate
1495-50-7	1144: Cyanogen fluoride
1528-48-2	1171: Dichlorodimethylgermane
1529-48-2	1184: Dimethylgermanium
	dichloride
1590-87-0	1186: Disilane
1592-23-0	700: Calcium stearate
1600-27-7	2061: Mercury(II) acetate
1603-84-5	731: Carbon oxyselenide
1633-05-2	3053: Strontium carbonate
1701-93-5	2823: Silver thiocyanate
1762-95-4	248: Ammonium thiocyanate
1779-25-5	99: Chlorodiisobutylaluminum
1779-25-5	1182: Diisobutylaluminum
	chloride
1863-63-4	123: Ammonium benzoate
2035-66-7	2321: Palladium(II) cvanide
2044-65-2	1334: Iron(II) tartrate
2092-16-2	710: Calcium thiocyanate
	tetrahydrate
2092-17-3	417: Barium thiocyanate
2218-80-6	1081: Copper(II)
	cvclohexanebutanoate
2223-93-0	593: Cadmium stearate
2223-95-2	2232: Nickel stearate
2406-52-2	3276: Tin hydride
2408-36-8	1784: Lithium cvanide
2420-98-6	573: Cadmium 2-ethylhexanoate
2452-01-9	3550: Zinc laurate
2457-01-4	319: Barium 2-ethylhexanoate
2466-09-3	2603: Pyrophosphoric acid
2551-62-4	3098: Sulfur hexafluoride
2570-63-0	3219: Thallium(III) acetate
2644-70-4	1505: Hydrazine
	monohydrochloride
2696-92-6	2290: Nitrosyl chloride
2699-79-8	3111: Sulfuryl fluoride
2850-65-9	1083: Copper(II) ethanolate
2949-11-3	2054: Mercury(I) oxalate
2966-50-9	2824: Silver trifluoroacetate
3012-65-5	180: Ammonium hydrogen citrate
3017-60-5	1009: Cobalt(II) thiocyanate
3094-87-9	1303: Ferrous acetate
3094-87-9	1304: Ferrous acetate
	tetrahydrate
3095-65-6	189: Ammonium hydrogen
	tartrate
3141-12-6	297: Arsenic(III) ethoxide
3164-29-2	233: Ammonium tartrate
3164-34-9	707: Calcium tartrate
	tetrahydrate
3236-82-6	2267: Niobium(V) ethoxide
3251-23-8	1104: Copper(II) nitrate
3264-82-2	2186: Nickel acetvlacetonate
3333-67-3	2194: Nickel basic carbonate
	tetrahydrate
3333-67-3	2201: Nickel carbonate
3344-18-1	1898: Magnesium citrate
3375-31-3	2316: Palladium(II) acetate
3396-11-0	794: Cesium acetate

3444-13-1	2085: Mercury(II) oxalate
3458-72-8	137: Ammonium citrate tribasic
3486-35-9	3528: Zinc carbonate
3486-35-9	3529: Zinc carbonate hydroxide
3495-36-1	810: Cesium formate
3643-76-3	261: Antimony(III) acetate
3708-80-6	855: Chlorosyl trifluoride
3804-23-7	2722: Scandium acetate hydrate
3811-04-9	2419: Potassium chlorate
3982-91-0	3231: Thiophosphoryl chloride
4049-81-1	972: Cobalt(II) ferrocyanide hydrate
4075-81-4	692: Calcium propionate
4109-96-0	1174: Dichlorosilane
4111-54-0	1789: Lithium diisopropylamide
4119-52-2	1297: Ferric thiocyanate
4485-12-5	1828: Lithium stearate
4493-37-2	882: Chromium(II) formate monohydrate
5142-76-7	507: Bismuth subacetate
5145-48-2	1888: Magnesium carbonate
	dihydrate
5341-61-7	1500: Hydrazine dihydrochloride
5470-11-1	1544: Hydroxylamine
	hydrochloride
5714-22-7	1187: Disulfur decafluoride
5743-04-4	558: Cadmium acetate dihydrate
5743-26-0	611: Calcium acetate
5785 11 1	640: Calaium aitrata tatrahudrata
5702 84 0	640: Calcium phonoxido
5704 28 5	676: Calcium avalata
5794-28-5	monohydrate
5892-10-4	473: Bismuth basic carbonate
007210	hemihvdrate
5893-61-8	1092: Copper(II) formate
	tetrahydrate
5895-47-6	2704: Samarium carbonate
5895-47-6 5908-64-5	2704: Samarium carbonate 321: Barium acetate
5895-47-6 5908-64-5	<ul><li>2704: Samarium carbonate</li><li>321: Barium acetate</li><li>monohydrate</li></ul>
5895-47-6 5908-64-5 5908-81-6	<ul><li>2704: Samarium carbonate</li><li>321: Barium acetate monohydrate</li><li>413: Barium tartrate</li></ul>
5895-47-6 5908-64-5 5908-81-6 5951-19-9	<ul><li>2704: Samarium carbonate</li><li>321: Barium acetate monohydrate</li><li>413: Barium tartrate</li><li>736: Carbon sulfide selenide</li></ul>
5895-47-6 5908-64-5 5908-81-6 5951-19-9 5965-33-3	<ul> <li>2704: Samarium carbonate</li> <li>321: Barium acetate monohydrate</li> <li>413: Barium tartrate</li> <li>736: Carbon sulfide selenide</li> <li>275: Antimony(III) potassium</li> </ul>
5895-47-6 5908-64-5 5908-81-6 5951-19-9 5965-33-3 (anhydrous	<ul> <li>2704: Samarium carbonate</li> <li>321: Barium acetate monohydrate</li> <li>413: Barium tartrate</li> <li>736: Carbon sulfide selenide</li> <li>275: Antimony(III) potassium oxalate trihydrate</li> </ul>
5895-47-6 5908-64-5 5908-81-6 5951-19-9 5965-33-3 (anhydrous compound)	<ul> <li>2704: Samarium carbonate</li> <li>321: Barium acetate monohydrate</li> <li>413: Barium tartrate</li> <li>736: Carbon sulfide selenide</li> <li>275: Antimony(III) potassium oxalate trihydrate</li> </ul>
5895-47-6 5908-64-5 5908-81-6 5951-19-9 5965-33-3 (anhydrous compound) 5965-33-3	<ul> <li>2704: Samarium carbonate</li> <li>321: Barium acetate monohydrate</li> <li>413: Barium tartrate</li> <li>736: Carbon sulfide selenide</li> <li>275: Antimony(III) potassium oxalate trihydrate</li> <li>2410: Potassium antimony</li> </ul>
5895-47-6 5908-64-5 5908-81-6 5951-19-9 5965-33-3 (anhydrous compound) 5965-33-3	<ul> <li>2704: Samarium carbonate</li> <li>321: Barium acetate monohydrate</li> <li>413: Barium tartrate</li> <li>736: Carbon sulfide selenide</li> <li>275: Antimony(III) potassium oxalate trihydrate</li> <li>2410: Potassium antimony oxalate trihydrate</li> </ul>
5895-47-6 5908-64-5 5908-81-6 5951-19-9 5965-33-3 (anhydrous compound) 5965-33-3 5965-38-8	<ul> <li>2704: Samarium carbonate</li> <li>321: Barium acetate monohydrate</li> <li>413: Barium tartrate</li> <li>736: Carbon sulfide selenide</li> <li>275: Antimony(III) potassium oxalate trihydrate</li> <li>2410: Potassium antimony oxalate trihydrate</li> <li>991: Cobalt(II) oxalate dihydrate</li> </ul>
5895-47-6 5908-64-5 5908-81-6 5951-19-9 5965-33-3 (anhydrous compound) 5965-33-3 5965-38-8 5968-11-6	<ul> <li>2704: Samarium carbonate</li> <li>321: Barium acetate monohydrate</li> <li>413: Barium tartrate</li> <li>736: Carbon sulfide selenide</li> <li>275: Antimony(III) potassium oxalate trihydrate</li> <li>2410: Potassium antimony oxalate trihydrate</li> <li>991: Cobalt(II) oxalate dihydrate</li> <li>2850: Sodium carbonate</li> </ul>
5895-47-6 5908-64-5 5908-81-6 5951-19-9 5965-33-3 (anhydrous compound) 5965-33-3 5965-38-8 5968-11-6	<ul> <li>2704: Samarium carbonate</li> <li>321: Barium acetate monohydrate</li> <li>413: Barium tartrate</li> <li>736: Carbon sulfide selenide</li> <li>275: Antimony(III) potassium oxalate trihydrate</li> <li>2410: Potassium antimony oxalate trihydrate</li> <li>991: Cobalt(II) oxalate dihydrate</li> <li>2850: Sodium carbonate monohydrate</li> </ul>
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5895-47-6 5908-64-5 5908-81-6 5951-19-9 5965-33-3 (anhydrous compound) 5965-33-3 5965-38-8 5968-11-6 5970-44-5 5970-44-5 5970-45-6 5970-62-7 5972-71-4 5972-72-5	<ul> <li>2704: Samarium carbonate</li> <li>321: Barium acetate monohydrate</li> <li>413: Barium tartrate</li> <li>736: Carbon sulfide selenide</li> <li>275: Antimony(III) potassium oxalate trihydrate</li> <li>2410: Potassium antimony oxalate trihydrate</li> <li>991: Cobalt(II) oxalate dihydrate</li> <li>991: Cobalt(II) oxalate dihydrate</li> <li>2850: Sodium carbonate monohydrate</li> <li>3496: Yttrium carbonate trihydrate</li> <li>3515: Zinc acetate dihydrate</li> <li>3543: Zinc formate dihydrate</li> <li>124: Ammonium bimalate</li> <li>183: Ammonium hydrogen oxalate monohydrate</li> </ul>
5895-47-6 5908-64-5 5908-64-5 5951-19-9 5965-33-3 (anhydrous compound) 5965-33-3 5965-38-8 5968-11-6 5970-44-5 5970-44-5 5970-45-6 5970-62-7 5972-71-4 5972-72-5 5972-76-9 6009-70-7	<ul> <li>2704: Samarium carbonate</li> <li>321: Barium acetate monohydrate</li> <li>413: Barium tartrate</li> <li>736: Carbon sulfide selenide</li> <li>275: Antimony(III) potassium oxalate trihydrate</li> <li>2410: Potassium antimony oxalate trihydrate</li> <li>991: Cobalt(II) oxalate dihydrate</li> <li>991: Cobalt(II) oxalate dihydrate</li> <li>2850: Sodium carbonate monohydrate</li> <li>3496: Yttrium carbonate trihydrate</li> <li>3515: Zinc acetate dihydrate</li> <li>3543: Zinc formate dihydrate</li> <li>124: Ammonium bimalate</li> <li>183: Ammonium hydrogen oxalate monohydrate</li> <li>126: Ammonium carptlate</li> <li>208: Ammonium oxalate</li> </ul>
5895-47-6 5908-64-5 5908-81-6 5951-19-9 5965-33-3 (anhydrous compound) 5965-33-3 5965-38-8 5968-11-6 5970-44-5 5970-45-6 5970-45-6 5970-62-7 5972-71-4 5972-72-5 5972-76-9 6009-70-7	<ul> <li>2704: Samarium carbonate</li> <li>321: Barium acetate monohydrate</li> <li>413: Barium tartrate</li> <li>736: Carbon sulfide selenide</li> <li>275: Antimony(III) potassium oxalate trihydrate</li> <li>2410: Potassium antimony oxalate trihydrate</li> <li>991: Cobalt(II) oxalate dihydrate</li> <li>991: Cobalt(II) oxalate dihydrate</li> <li>2850: Sodium carbonate monohydrate</li> <li>3496: Yttrium carbonate trihydrate</li> <li>3515: Zinc acetate dihydrate</li> <li>3543: Zinc formate dihydrate</li> <li>124: Ammonium bimalate</li> <li>183: Ammonium hydrogen oxalate monohydrate</li> <li>126: Ammonium caprylate</li> <li>208: Ammonium oxalate monohydrate</li> </ul>
5895-47-6 5908-64-5 5908-81-6 5951-19-9 5965-33-3 (anhydrous compound) 5965-33-3 5965-38-8 5968-11-6 5970-44-5 5970-44-5 5970-62-7 5972-76-9 6009-70-7 6010-09-9	<ul> <li>2704: Samarium carbonate</li> <li>321: Barium acetate monohydrate</li> <li>413: Barium tartrate</li> <li>736: Carbon sulfide selenide</li> <li>275: Antimony(III) potassium oxalate trihydrate</li> <li>2410: Potassium antimony oxalate trihydrate</li> <li>991: Cobalt(II) oxalate dihydrate</li> <li>991: Cobalt(II) oxalate dihydrate</li> <li>2850: Sodium carbonate monohydrate</li> <li>3496: Yttrium carbonate trihydrate</li> <li>3515: Zinc acetate dihydrate</li> <li>3543: Zinc formate dihydrate</li> <li>124: Ammonium bimalate</li> <li>183: Ammonium hydrogen oxalate monohydrate</li> <li>126: Ammonium caprylate</li> <li>208: Ammonium oxalate monohydrate</li> <li>1335: Ferrous thiocvanate</li> </ul>
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5895-47-6 5908-64-5 5908-81-6 5951-19-9 5965-33-3 (anhydrous compound) 5965-33-3 5965-38-8 5968-11-6 5970-44-5 5970-44-5 5970-62-7 5972-71-4 5972-76-9 6009-70-7 6010-09-9 6018-89-9	<ul> <li>2704: Samarium carbonate</li> <li>321: Barium acetate monohydrate</li> <li>413: Barium tartrate</li> <li>736: Carbon sulfide selenide</li> <li>275: Antimony(III) potassium oxalate trihydrate</li> <li>2410: Potassium antimony oxalate trihydrate</li> <li>991: Cobalt(II) oxalate dihydrate</li> <li>991: Cobalt(II) oxalate dihydrate</li> <li>2850: Sodium carbonate monohydrate</li> <li>3496: Yttrium carbonate trihydrate</li> <li>3515: Zinc acetate dihydrate</li> <li>3543: Zinc formate dihydrate</li> <li>124: Ammonium bimalate</li> <li>183: Ammonium hydrogen oxalate monohydrate</li> <li>208: Ammonium oxalate monohydrate</li> <li>1335: Ferrous thiocyanate trihydrate</li> <li>2185: Nickel acetate tetrahydrate</li> </ul>
5895-47-6 5908-64-5 5908-64-5 5908-81-6 5951-19-9 5965-33-3 (anhydrous compound) 5965-33-3 5965-38-8 5968-11-6 5970-44-5 5970-44-5 5970-62-7 5972-71-4 5972-76-9 6009-70-7 6010-09-9 6018-89-9 6018-89-9 6018-94-6	<ul> <li>2704: Samarium carbonate</li> <li>321: Barium acetate monohydrate</li> <li>413: Barium tartrate</li> <li>736: Carbon sulfide selenide</li> <li>275: Antimony(III) potassium oxalate trihydrate</li> <li>2410: Potassium antimony oxalate trihydrate</li> <li>991: Cobalt(II) oxalate dihydrate</li> <li>991: Cobalt(II) oxalate dihydrate</li> <li>2850: Sodium carbonate monohydrate</li> <li>3496: Yttrium carbonate trihydrate</li> <li>3515: Zinc acetate dihydrate</li> <li>3543: Zinc formate dihydrate</li> <li>124: Ammonium bimalate</li> <li>183: Ammonium hydrogen oxalate monohydrate</li> <li>208: Ammonium caprylate</li> <li>208: Ammonium oxalate monohydrate</li> <li>1335: Ferrous thiocyanate trihydrate</li> <li>2185: Nickel acetate tetrahydrate</li> <li>2221: Nickel oxalate dihydrate</li> </ul>
5895-47-6 5908-64-5 5908-64-5 5908-81-6 5951-19-9 5965-33-3 (anhydrous compound) 5965-33-3 5965-38-8 5968-11-6 5970-44-5 5970-44-5 5970-45-6 5970-62-7 5972-71-4 5972-76-9 6009-70-7 6010-09-9 6018-89-9 6018-89-9 6018-94-6 6046-93-1	<ul> <li>2704: Samarium carbonate</li> <li>321: Barium acetate monohydrate</li> <li>413: Barium tartrate</li> <li>736: Carbon sulfide selenide</li> <li>275: Antimony(III) potassium oxalate trihydrate</li> <li>2410: Potassium antimony oxalate trihydrate</li> <li>991: Cobalt(II) oxalate dihydrate</li> <li>991: Cobalt(II) oxalate dihydrate</li> <li>2850: Sodium carbonate monohydrate</li> <li>3496: Yttrium carbonate trihydrate</li> <li>3515: Zinc acetate dihydrate</li> <li>124: Ammonium bimalate</li> <li>183: Ammonium hydrogen oxalate monohydrate</li> <li>126: Antmonium caprylate</li> <li>208: Ammonium oxalate monohydrate</li> <li>1335: Ferrous thiocyanate trihydrate</li> <li>2185: Nickel acetate tetrahydrate</li> <li>221: Nickel oxalate dihydrate</li> <li>1058: Copper(II) acetate</li> </ul>

6046-97-5	1067: Copper(II) benzoate
6047 25 2	1222: Earnous avalata dibudrata
6074 84 6	1323: Ferrous oxalate dillydrate
6080-56-4	1686: Lead acetate tribydrate
6100-05-6	2426: Potassium citrate
0100-05-0	monohydrate
6100-96-5	3090: Strontium tartrate
0100 90 9	tetrahydrate
6108-17-4	1762: Lithium acetate dihydrate
6108-23-2	1792: Lithium formate
	monohvdrate
6131-90-4	2829: Sodium acetate trihydrate
6132-02-1	2849: Sodium carbonate
	decahydrate
6132-04-3	2858: Sodium citrate dihydrate
6147-53-1	951: Cobalt(II) acetate
	tetrahydrate
6150-82-9	1906: Magnesium formate
	dihydrate
6150-88-5	1931: Magnesium oxalate
	dihydrate
6153-56-6	2311: Oxalic acid dihydrate
6156-78-1	1992: Manganese(II) acetate
	tetrahydrate
6159-44-0	3393: Uranyl acetate dihydrate
6160-38-9	3082: Strontium salicylate
(100.10.7	dihydrate
6192-12-7	25/2: Praseodymium acetate
(102 12 (	nyurate
6192-13-0	2152: Neodymium acetate
0192-13-8	2155: Neodymium acetate
	mononyurate
6211-24-1	352 Barium
6211-24-1	352: Barium diphenylamine-4-sulfonate
6211-24-1 6303-21-5	352: Barium diphenylamine-4-sulfonate 1550: Hypophosphorous acid
6211-24-1 6303-21-5 6381-79-9	352: Barium diphenylamine-4-sulfonate 1550: Hypophosphorous acid 2418: Potassium carbonate
6211-24-1 6303-21-5 6381-79-9	352: Barium diphenylamine-4-sulfonate 1550: Hypophosphorous acid 2418: Potassium carbonate hemitrihydrate
6211-24-1 6303-21-5 6381-79-9 6381-92-6	<ul> <li>352: Barium diphenylamine-4-sulfonate</li> <li>1550: Hypophosphorous acid</li> <li>2418: Potassium carbonate hemitrihydrate</li> <li>1236:</li> </ul>
6211-24-1 6303-21-5 6381-79-9 6381-92-6	<ul> <li>352: Barium diphenylamine-4-sulfonate</li> <li>1550: Hypophosphorous acid</li> <li>2418: Potassium carbonate hemitrihydrate</li> <li>1236: Ethylenediaminetetraacetic</li> </ul>
6211-24-1 6303-21-5 6381-79-9 6381-92-6	<ul> <li>352: Barium diphenylamine-4-sulfonate</li> <li>1550: Hypophosphorous acid</li> <li>2418: Potassium carbonate hemitrihydrate</li> <li>1236: Ethylenediaminetetraacetic acid dihydrate disodium salt</li> </ul>
6211-24-1 6303-21-5 6381-79-9 6381-92-6 6484-52-2	<ul> <li>352: Barium diphenylamine-4-sulfonate</li> <li>1550: Hypophosphorous acid</li> <li>2418: Potassium carbonate hemitrihydrate</li> <li>1236: Ethylenediaminetetraacetic acid dihydrate disodium salt</li> <li>202: Ammonium nitrate</li> </ul>
6211-24-1 6303-21-5 6381-79-9 6381-92-6 6484-52-2 6487-39-4	<ul> <li>352: Barium diphenylamine-4-sulfonate</li> <li>1550: Hypophosphorous acid</li> <li>2418: Potassium carbonate hemitrihydrate</li> <li>1236: Ethylenediaminetetraacetic acid dihydrate disodium salt</li> <li>202: Ammonium nitrate</li> <li>1656: Lanthanum carbonate</li> </ul>
6211-24-1 6303-21-5 6381-79-9 6381-92-6 6484-52-2 6487-39-4	<ul> <li>352: Barium diphenylamine-4-sulfonate</li> <li>1550: Hypophosphorous acid</li> <li>2418: Potassium carbonate hemitrihydrate</li> <li>1236: Ethylenediaminetetraacetic acid dihydrate disodium salt</li> <li>202: Ammonium nitrate</li> <li>1656: Lanthanum carbonate octahydrate</li> </ul>
6211-24-1 6303-21-5 6381-79-9 6381-92-6 6484-52-2 6487-39-4 6487-48-5	<ul> <li>352: Barium diphenylamine-4-sulfonate</li> <li>1550: Hypophosphorous acid</li> <li>2418: Potassium carbonate hemitrihydrate</li> <li>1236: Ethylenediaminetetraacetic acid dihydrate disodium salt</li> <li>202: Ammonium nitrate</li> <li>1656: Lanthanum carbonate octahydrate</li> <li>2498: Potassium oxalate</li> </ul>
6211-24-1 6303-21-5 6381-79-9 6381-92-6 6484-52-2 6487-39-4 6487-48-5	<ul> <li>352: Barium diphenylamine-4-sulfonate</li> <li>1550: Hypophosphorous acid</li> <li>2418: Potassium carbonate hemitrihydrate</li> <li>1236: Ethylenediaminetetraacetic acid dihydrate disodium salt</li> <li>202: Ammonium nitrate</li> <li>1656: Lanthanum carbonate octahydrate</li> <li>2498: Potassium oxalate monohydrate</li> </ul>
6211-24-1 6303-21-5 6381-79-9 6381-92-6 6484-52-2 6487-39-4 6487-48-5 6533-73-9	<ul> <li>352: Barium diphenylamine-4-sulfonate</li> <li>1550: Hypophosphorous acid</li> <li>2418: Potassium carbonate hemitrihydrate</li> <li>1236: Ethylenediaminetetraacetic acid dihydrate disodium salt</li> <li>202: Ammonium nitrate</li> <li>1656: Lanthanum carbonate octahydrate</li> <li>2498: Potassium oxalate monohydrate</li> <li>3196: Thallium(I) carbonate</li> </ul>
6211-24-1 6303-21-5 6381-79-9 6381-92-6 6484-52-2 6487-39-4 6487-48-5 6533-73-9 6556-16-7	<ul> <li>352: Barium diphenylamine-4-sulfonate</li> <li>1550: Hypophosphorous acid</li> <li>2418: Potassium carbonate hemitrihydrate</li> <li>1236: Ethylenediaminetetraacetic acid dihydrate disodium salt</li> <li>202: Ammonium nitrate</li> <li>1656: Lanthanum carbonate octahydrate</li> <li>2498: Potassium oxalate monohydrate</li> <li>3196: Thallium(I) carbonate</li> <li>2014: Manganese(II) oxalate</li> </ul>
6211-24-1 6303-21-5 6381-79-9 6381-92-6 6484-52-2 6487-39-4 6487-48-5 6533-73-9 6556-16-7 6550-51-2	<ul> <li>352: Barium diphenylamine-4-sulfonate</li> <li>1550: Hypophosphorous acid</li> <li>2418: Potassium carbonate hemitrihydrate</li> <li>1236: Ethylenediaminetetraacetic acid dihydrate disodium salt</li> <li>202: Ammonium nitrate</li> <li>1656: Lanthanum carbonate octahydrate</li> <li>2498: Potassium oxalate monohydrate</li> <li>3196: Thallium(I) carbonate</li> <li>2014: Manganese(II) oxalate dihydrate</li> </ul>
6211-24-1 6303-21-5 6381-79-9 6381-92-6 6484-52-2 6487-39-4 6487-48-5 6533-73-9 6556-16-7 6569-51-3 6569-51-3	<ul> <li>352: Barium diphenylamine-4-sulfonate</li> <li>1550: Hypophosphorous acid</li> <li>2418: Potassium carbonate hemitrihydrate</li> <li>1236: Ethylenediaminetetraacetic acid dihydrate disodium salt</li> <li>202: Ammonium nitrate</li> <li>1656: Lanthanum carbonate octahydrate</li> <li>2498: Potassium oxalate monohydrate</li> <li>3196: Thallium(I) carbonate</li> <li>2014: Manganese(II) oxalate dihydrate</li> <li>519: Borazole</li> <li>401: Biemuth oxelata</li> </ul>
6211-24-1 6303-21-5 6381-79-9 6381-92-6 6484-52-2 6487-39-4 6487-48-5 6533-73-9 6556-16-7 6569-51-3 6591-55-5 6680,58,6	<ul> <li>352: Barium diphenylamine-4-sulfonate</li> <li>1550: Hypophosphorous acid</li> <li>2418: Potassium carbonate hemitrihydrate</li> <li>1236: Ethylenediaminetetraacetic acid dihydrate disodium salt</li> <li>202: Ammonium nitrate</li> <li>1656: Lanthanum carbonate octahydrate</li> <li>2498: Potassium oxalate monohydrate</li> <li>3196: Thallium(I) carbonate</li> <li>2014: Manganese(II) oxalate dihydrate</li> <li>519: Borazole</li> <li>491: Bismuth oxalate</li> </ul>
6211-24-1 6303-21-5 6381-79-9 6381-92-6 6484-52-2 6487-39-4 6487-48-5 6533-73-9 6556-16-7 6569-51-3 6591-55-5 6680-58-6	<ul> <li>352: Barium diphenylamine-4-sulfonate</li> <li>1550: Hypophosphorous acid</li> <li>2418: Potassium carbonate hemitrihydrate</li> <li>1236: Ethylenediaminetetraacetic acid dihydrate disodium salt</li> <li>202: Ammonium nitrate</li> <li>1656: Lanthanum carbonate octahydrate</li> <li>2498: Potassium oxalate monohydrate</li> <li>3196: Thallium(I) carbonate</li> <li>2014: Manganese(II) oxalate dihydrate</li> <li>519: Borazole</li> <li>491: Bismuth oxalate</li> <li>1782: Lithium citrate tetrahydrate</li> </ul>
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6211-24-1 6303-21-5 6381-79-9 6381-92-6 6484-52-2 6487-39-4 6487-48-5 6533-73-9 6556-16-7 6569-51-3 6591-55-5 6680-58-6 6834-92-0 6858-44-2	<ul> <li>352: Barium diphenylamine-4-sulfonate</li> <li>1550: Hypophosphorous acid</li> <li>2418: Potassium carbonate hemitrihydrate</li> <li>1236: Ethylenediaminetetraacetic acid dihydrate disodium salt</li> <li>202: Ammonium nitrate</li> <li>1656: Lanthanum carbonate octahydrate</li> <li>2498: Potassium oxalate monohydrate</li> <li>3196: Thallium(I) carbonate</li> <li>2014: Manganese(II) oxalate dihydrate</li> <li>519: Borazole</li> <li>491: Bismuth oxalate</li> <li>1782: Lithium citrate tetrahydrate</li> <li>2935: Sodium metasilicate</li> <li>2859: Sodium citrate</li> </ul>
6211-24-1 6303-21-5 6381-79-9 6381-92-6 6484-52-2 6487-39-4 6487-48-5 6533-73-9 6556-16-7 6569-51-3 6591-55-5 6680-58-6 6834-92-0 6858-44-2	<ul> <li>352: Barium diphenylamine-4-sulfonate</li> <li>1550: Hypophosphorous acid</li> <li>2418: Potassium carbonate hemitrihydrate</li> <li>1236: Ethylenediaminetetraacetic acid dihydrate disodium salt</li> <li>202: Ammonium nitrate</li> <li>1656: Lanthanum carbonate octahydrate</li> <li>2498: Potassium oxalate monohydrate</li> <li>3196: Thallium(I) carbonate</li> <li>2014: Manganese(II) oxalate dihydrate</li> <li>519: Borazole</li> <li>491: Bismuth oxalate</li> <li>1782: Lithium citrate tetrahydrate</li> <li>2935: Sodium metasilicate</li> <li>2859: Sodium citrate pentahydrate</li> </ul>
6211-24-1 6303-21-5 6381-79-9 6381-92-6 6484-52-2 6487-39-4 6487-48-5 6533-73-9 6556-16-7 6569-51-3 6591-55-5 6680-58-6 6834-92-0 6858-44-2 6865-35-6	<ul> <li>352: Barium diphenylamine-4-sulfonate</li> <li>1550: Hypophosphorous acid</li> <li>2418: Potassium carbonate hemitrihydrate</li> <li>1236: Ethylenediaminetetraacetic acid dihydrate disodium salt</li> <li>202: Ammonium nitrate</li> <li>1656: Lanthanum carbonate octahydrate</li> <li>2498: Potassium oxalate monohydrate</li> <li>3196: Thallium(I) carbonate</li> <li>2014: Manganese(II) oxalate dihydrate</li> <li>519: Borazole</li> <li>491: Bismuth oxalate</li> <li>1782: Lithium citrate tetrahydrate</li> <li>2935: Sodium metasilicate</li> <li>2859: Sodium citrate pentahydrate</li> <li>405: Barium stearate</li> </ul>
6211-24-1 6303-21-5 6381-79-9 6381-92-6 6484-52-2 6487-39-4 6487-48-5 6533-73-9 6556-16-7 6569-51-3 6591-55-5 6680-58-6 6834-92-0 6858-44-2 6865-35-6 7047-84-9	<ul> <li>352: Barium diphenylamine-4-sulfonate</li> <li>1550: Hypophosphorous acid</li> <li>2418: Potassium carbonate hemitrihydrate</li> <li>1236: Ethylenediaminetetraacetic acid dihydrate disodium salt</li> <li>202: Ammonium nitrate</li> <li>1656: Lanthanum carbonate octahydrate</li> <li>2498: Potassium oxalate monohydrate</li> <li>3196: Thallium(I) carbonate</li> <li>2014: Manganese(II) oxalate dihydrate</li> <li>519: Borazole</li> <li>491: Bismuth oxalate</li> <li>1782: Lithium citrate tetrahydrate</li> <li>2935: Sodium metasilicate</li> <li>2859: Sodium citrate pentahydrate</li> <li>405: Barium stearate</li> <li>59: Aluminum monostearate</li> </ul>
6211-24-1 6303-21-5 6381-79-9 6381-92-6 6484-52-2 6487-39-4 6487-48-5 6533-73-9 6556-16-7 6569-51-3 6591-55-5 6680-58-6 6834-92-0 6858-44-2 6865-35-6 7047-84-9 7116-98-5	<ul> <li>352: Barium diphenylamine-4-sulfonate</li> <li>1550: Hypophosphorous acid</li> <li>2418: Potassium carbonate hemitrihydrate</li> <li>1236: Ethylenediaminetetraacetic acid dihydrate disodium salt</li> <li>202: Ammonium nitrate</li> <li>1656: Lanthanum carbonate octahydrate</li> <li>2498: Potassium oxalate monohydrate</li> <li>3196: Thallium(I) carbonate</li> <li>2014: Manganese(II) oxalate dihydrate</li> <li>519: Borazole</li> <li>491: Bismuth oxalate</li> <li>1782: Lithium citrate tetrahydrate</li> <li>2935: Sodium metasilicate</li> <li>2859: Sodium citrate pentahydrate</li> <li>405: Barium stearate</li> <li>59: Aluminum monostearate</li> <li>2606: Radium carbonate</li> </ul>
6211-24-1 6303-21-5 6381-79-9 6381-92-6 6484-52-2 6487-39-4 6487-48-5 6533-73-9 6556-16-7 6569-51-3 6591-55-5 6680-58-6 6834-92-0 6858-44-2 6865-35-6 7047-84-9 7116-98-5 7320-34-5	<ul> <li>352: Barium diphenylamine-4-sulfonate</li> <li>1550: Hypophosphorous acid</li> <li>2418: Potassium carbonate hemitrihydrate</li> <li>1236: Ethylenediaminetetraacetic acid dihydrate disodium salt</li> <li>202: Ammonium nitrate</li> <li>1656: Lanthanum carbonate octahydrate</li> <li>2498: Potassium oxalate monohydrate</li> <li>3196: Thallium(I) carbonate</li> <li>2014: Manganese(II) oxalate dihydrate</li> <li>519: Borazole</li> <li>491: Bismuth oxalate</li> <li>1782: Lithium citrate tetrahydrate</li> <li>2935: Sodium metasilicate</li> <li>2859: Sodium citrate</li> <li>pentahydrate</li> <li>405: Barium stearate</li> <li>59: Aluminum monostearate</li> <li>2606: Radium carbonate</li> <li>2512: Potassium pyrophosphate</li> </ul>
6211-24-1 6303-21-5 6381-79-9 6381-92-6 6484-52-2 6487-39-4 6487-48-5 6533-73-9 6556-16-7 6569-51-3 6591-55-5 6680-58-6 6834-92-0 6858-44-2 6865-35-6 7047-84-9 7116-98-5 7320-34-5	<ul> <li>352: Barium diphenylamine-4-sulfonate</li> <li>1550: Hypophosphorous acid</li> <li>2418: Potassium carbonate hemitrihydrate</li> <li>1236: Ethylenediaminetetraacetic acid dihydrate disodium salt</li> <li>202: Ammonium nitrate</li> <li>1656: Lanthanum carbonate octahydrate</li> <li>2498: Potassium oxalate monohydrate</li> <li>3196: Thallium(I) carbonate</li> <li>2014: Manganese(II) oxalate dihydrate</li> <li>519: Borazole</li> <li>491: Bismuth oxalate</li> <li>1782: Lithium citrate tetrahydrate</li> <li>2935: Sodium metasilicate</li> <li>2859: Sodium citrate</li> <li>pentahydrate</li> <li>405: Barium stearate</li> <li>59: Aluminum monostearate</li> <li>2606: Radium carbonate</li> <li>2512: Potassium pyrophosphate trihydrate</li> </ul>
6211-24-1 6303-21-5 6381-79-9 6381-92-6 6484-52-2 6487-39-4 6487-48-5 6533-73-9 6556-16-7 6569-51-3 6591-55-5 6680-58-6 6834-92-0 6858-44-2 6865-35-6 7047-84-9 7116-98-5 7320-34-5	<ul> <li>352: Barium diphenylamine-4-sulfonate</li> <li>1550: Hypophosphorous acid</li> <li>2418: Potassium carbonate hemitrihydrate</li> <li>1236: Ethylenediaminetetraacetic acid dihydrate disodium salt</li> <li>202: Ammonium nitrate</li> <li>1656: Lanthanum carbonate octahydrate</li> <li>2498: Potassium oxalate monohydrate</li> <li>3196: Thallium(I) carbonate</li> <li>2014: Manganese(II) oxalate dihydrate</li> <li>519: Borazole</li> <li>491: Bismuth oxalate</li> <li>1782: Lithium citrate tetrahydrate</li> <li>2935: Sodium metasilicate</li> <li>2859: Sodium citrate</li> <li>pentahydrate</li> <li>405: Barium stearate</li> <li>59: Aluminum monostearate</li> <li>2606: Radium carbonate</li> <li>2512: Potassium pyrophosphate trihydrate</li> <li>16: Aluminum</li> </ul>
6211-24-1 6303-21-5 6381-79-9 6381-92-6 6484-52-2 6487-39-4 6487-48-5 6533-73-9 6556-16-7 6569-51-3 6591-55-5 6680-58-6 6834-92-0 6858-44-2 6865-35-6 7047-84-9 7116-98-5 7320-34-5 7429-90-5 7429-91-6	<ul> <li>352: Barium diphenylamine-4-sulfonate</li> <li>1550: Hypophosphorous acid</li> <li>2418: Potassium carbonate hemitrihydrate</li> <li>1236: Ethylenediaminetetraacetic acid dihydrate disodium salt</li> <li>202: Ammonium nitrate</li> <li>1656: Lanthanum carbonate octahydrate</li> <li>2498: Potassium oxalate</li> <li>monohydrate</li> <li>3196: Thallium(I) carbonate</li> <li>2014: Manganese(II) oxalate dihydrate</li> <li>519: Borazole</li> <li>491: Bismuth oxalate</li> <li>1782: Lithium citrate tetrahydrate</li> <li>2935: Sodium metasilicate</li> <li>2859: Sodium citrate</li> <li>pentahydrate</li> <li>405: Barium stearate</li> <li>59: Aluminum monostearate</li> <li>2606: Radium carbonate</li> <li>2512: Potassium pyrophosphate trihydrate</li> <li>16: Aluminum</li> <li>1189: Dysprosium</li> </ul>
6211-24-1 6303-21-5 6381-79-9 6381-92-6 6484-52-2 6487-39-4 6487-48-5 6533-73-9 6556-16-7 6569-51-3 6591-55-5 6680-58-6 6834-92-0 6858-44-2 6865-35-6 7047-84-9 7116-98-5 7320-34-5 7429-90-5 7429-91-6 7429-92-7	<ul> <li>352: Barium diphenylamine-4-sulfonate</li> <li>1550: Hypophosphorous acid</li> <li>2418: Potassium carbonate hemitrihydrate</li> <li>1236: Ethylenediaminetetraacetic acid dihydrate disodium salt</li> <li>202: Ammonium nitrate</li> <li>1656: Lanthanum carbonate octahydrate</li> <li>2498: Potassium oxalate monohydrate</li> <li>3196: Thallium(I) carbonate</li> <li>2014: Manganese(II) oxalate dihydrate</li> <li>519: Borazole</li> <li>491: Bismuth oxalate</li> <li>1782: Lithium citrate tetrahydrate</li> <li>2935: Sodium metasilicate</li> <li>2859: Sodium citrate</li> <li>pentahydrate</li> <li>405: Barium stearate</li> <li>59: Aluminum monostearate</li> <li>2606: Radium carbonate</li> <li>2512: Potassium pyrophosphate trihydrate</li> <li>16: Aluminum</li> <li>1189: Dysprosium</li> <li>1210: Einsteinium</li> </ul>
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7439-90-9	1642: Krypton
7439-91-0	1648: Lanthanum
7439-92-1	1684: Lead
7439-93-2	1760: Lithium
7439-94-3	1845: Lutetium
7439-95-4	1866: Magnesium
7439-96-5	1970: Manganese
7439-97-6	2040: Mercury
7439-98-7	2104: Molybdenum
7439-99-8	2182: Neptunium
7440-00-8	2151: Neodymium
7440-01-9	2181: Neon
7440-02-0	2184: Nickel
7440-03-1	2247: Niobium
7440-04-2	2300: Osmium
7440-05-3	2315: Palladium
7440-06-4	2377: Platinum
7440-07-5	2391: Plutonium
7440-08-6	2400: Polonium
7440-08-6	2401: Polonium
7440-09-7	2404: Potassium
7440-10-0	2596: Praseodymium( $\alpha$ )
7440-10-0	2597: Praseodymium(B)
7440-11-1	2039: Mendelevium
7440-12-2	2600: Promethium
7440-12-2	2602: Protactinium
7440-14-4	2604: Radium
7440-15-5	2610: Rhenium
7440-16-6	2633: Rhodium
7440-17-7	2649: Rubidium
7440-18-8	2687: Ruthenium
7440-10-0	2608: Samarium
7440-20-2	2721: Scandium
7440-21-3	2758: Silicon
7440-21-3	2758. Silver
7440-22-4	2826: Sodium
7440-23-5	2020. Sourium
7440-25-7	3112. Tantalum
7440-26-8	3135: Technetium
7440-27-9	315/: Terbium
7440-28-0	3188. Thallium
7440-20-0	3732: Thorium
7440-29-1	3250: Thulium
7440-31-5	3239. Thuhum 3274: Tin (grav)
7440-31-5	3275: Tin (white)
7440-31-5	3275. Thi (white)
7440-32-0	3320: Tungsten
7440-33-7	2: Actinium
7440-34-8	2. Actimum 101: Americium
7440-35-9	257: Antimony
7440-37-1	200: Argon
7440-37-1	290. Argoni $(\alpha)$
7440-38-2	292: Arsenic( $\beta$ )
7440-38-2	295. Aiseine(p)
7440-39-3	122: Parkalium(a)
7440-40-0	432. Derkelium(a)
7440-40-0	433. Derkellung)
7440-41-7	434: Derymuni 524: Doron
7440-42-8	554. Codmium
7440-43-9	724: Carbon (amorph)
7440-44-0	724: Carbon (amorphous)
7440-43-1	702: Cosium
7440-40-2	195: Cesiulli 259: Chromium
7440-47-3	026: Cobalt
7440-40-4	1030: Copper
7440-30-8	1138: Curium(a)
1440-31-9	$1130.$ Culturn( $\alpha$ )

7440-51-9	1139: Curium(β)
7440-52-0	1211. Frhium
7110 52 0	1229. Erzenium
/440-55-1	1238: Europium
7440-54-2	1353: Gadolinium
7440-55-3	1378: Gallium
7440-56-4	1407: Germanium
7440 57 5	1428: Gold
7440-37-3	1428. Gold
/440-58-6	1445: Hafnium
7440-59-7	1469: Helium
7440-60-0	1478: Holmium
7440-61-1	3368: Uranium
7440 61 1	
7440-62-2	3406: Vanadium
7440-63-3	3451: Xenon
7440-64-4	3467: Ytterbium
7440-65-5	3483: Yttrium
7440-66-6	3513: Zinc
7440-00-0	2504 Z
/440-6/-/	3584: Zirconium
7440-68-8	317: Astatine
7440-69-9	469: Bismuth
7440-70-2	608: Calcium
7110 70 2	717: Californium
7440-71-3	
7440-72-4	1263: Fermium
7440-73-5	1349: Francium
7440-74-6	1551: Indium
7446.06.2	2403: Polonium(IV) ovide
7440-00-2	
/446-0/-3	3142: Tellurium dioxide
7446-08-4	2741: Selenium dioxide
7446-09-5	3097: Sulfur dioxide
7446-10-8	1732. Lead sulfite
7446 11 0	2101: Sulfur trioxida(a)
7440-11-9	
7446-11-9	3102: Sulfur trioxide( $\beta$ )
7446-11-9	3103: Sulfur trioxide( $\gamma$ )
7446-14-2	1730: Lead sulfate
7446-15-3	1725: Lead selenate
7446 15 5	2608 Dedison milfete
/440-10-4	2008: Radium suitate
7446-18-6	3216: Thallium(1) sulfate
7446-19-7	3575: Zinc sulfate monohydrate
7446-20-0	3573: Zinc sulfate heptahydrate
7446-21-1	3083: Strontium selenate
7440-21-1	
/446-22-2	3214: Thallium(1) selenate
7446-25-5	3025: Stannic selenite
7446-26-6	3565: Zinc pyrophosphate
7446-27-7	1710. Lead hydrogen phosphate
7116 27 7	1724: Load phosphate
7440-27-7	1724. Lead phosphate
7446-32-4	277: Antimony(III) sulfate
7446-33-5	3510: Yttrium sulfate octahydrate
7446-34-6	2745: Selenium monosulfide
7446-35-7	3143. Tellurium disulfide
7446 70 0	21: Aluminum ablarida
7440-70-0	
/44/-39-4	10/5: Copper(II) chloride
7447-40-7	2420: Potassium chloride
7447-41-8	1778: Lithium chloride
7487-88-9	1953 Magnesium sulfate
7497 04 7	2060: Margury(II) ablarida
7467-94-7	2009: Mercury(II) chloride
/488-51-9	1/2/: Lead selenite
7488-52-0	3578: Zinc sulfite dihydrate
7488-54-2	2652: Rubidium aluminum
	sulfate dodecahydrate
7100 51 0	2690: Dubidium sulfata
/400-34-2	
/488-55-3	3040: Stannous sulfate
7488-56-4	2742: Selenium disulfide
7542-09-8	955: Cobalt(II) basic carbonate
7543_51_3	3562: Zinc phosphate
15-51-5	totrohydroto
	tetranyarate
7550-35-8	1773: Lithium bromide
7550-45-0	3303: Titanium tetrachloride

1773-76-2	1580: Iodine
7558-79-4	2907: Sodium hydrogen
	phosphate
7558-80-7	2867: Sodium dihydrogen
1550 00 1	phosphate dihydrate
7580-67-8	1798: Lithium hydride
7601-54-9	2064: Sodium phosphate
7601-89-0	2056: Sodium parchlorate
7601-09-0	2229. Darahlaria agid
7601-90-3	
7010-94-0	
/631-86-9	
/631-86-9	2/64: Silicon dioxide
7631-86-9	2765: Silicon dioxide
7631-90-5	2916: Sodium hydrogen sulfite
7631-94-9	2870: Sodium dithionate
7631-94-9	2871: Sodium dithionate
	dihydrate
7631-95-0	2939: Sodium molybdate
7631-99-4	2943: Sodium nitrate
7632-00-0	2944: Sodium nitrite
7632-51-1	3428: Vanadium tetrachloride
7637-07-2	535: Boron trifluoride
7637-13-0	3039: Stannous stearate
7646-69-7	2901: Sodium hydride
7646-78-8	3018: Stannic chloride
7646-79-9	962: Cobalt(II) chloride
7646-85-7	3531: Zinc chloride
7646 03 7	2477: Potassium hydrogen
/040-95-7	sulfate
7647 01 0	1521: Hydrogen chloride
7647-01-0	2210: Dalla dium(II) ablarida
7047-10-1	2219: Palladium(II) chloride
/64/-10-1	2320: Palladium(II) chloride
/64/-14-5	2855: Sodium chioride
7647-14-5 7647-15-6	2853: Sodium chioride 2843: Sodium bromide
7647-14-5 7647-15-6 7647-17-8	2833: Sodium chloride 2843: Sodium bromide 805: Cesium chloride
7647-14-5 7647-15-6 7647-17-8 7647-18-9	2855: Sodium chloride 2843: Sodium bromide 805: Cesium chloride 282: Antimony(V) chloride
7647-14-5 7647-15-6 7647-17-8 7647-18-9 7647-19-0	2853: Sodium chioride 2843: Sodium bromide 805: Cesium chloride 282: Antimony(V) chloride 2372: Phosphorus(V) fluoride
7647-14-5 7647-15-6 7647-17-8 7647-18-9 7647-19-0 7659-31-6	2855: Sodium chioride 2843: Sodium bromide 805: Cesium chioride 282: Antimony(V) chioride 2372: Phosphorus(V) fluoride 2780: Silver acetylide
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7647-14-5 7647-15-6 7647-15-6 7647-17-8 7647-19-0 7659-31-6 7664-39-3 7664-39-3 7664-39-3 7664-41-7 7664-93-9 7681-11-0 7681-38-1 7681-38-1 7681-52-9 7681-52-9	<ul> <li>2853: Sodium chloride</li> <li>2843: Sodium bromide</li> <li>805: Cesium chloride</li> <li>282: Antimony(V) chloride</li> <li>2372: Phosphorus(V) fluoride</li> <li>2373: Phosphoric acid</li> <li>2510: Hydrofluoric acid, 70%</li> <li>1526: Hydrogen fluoride</li> <li>116: Ammonia</li> <li>3107: Sulfuric acid</li> <li>2483: Potassium iodide</li> <li>2911: Sodium hydrogen sulfate</li> <li>2875: Sodium fluoride</li> <li>2921: Sodium hypochlorite</li> <li>2922: Sodium hypochlorite</li> <li>pentahydrate</li> </ul>
7647-14-5 7647-15-6 7647-15-6 7647-17-8 7647-19-0 7659-31-6 7664-39-3 7664-39-3 7664-39-3 7664-39-3 7664-41-7 7664-93-9 7681-11-0 7681-38-1 7681-52-9 7681-52-9 7681-52-2	<ul> <li>2853: Sodium chloride</li> <li>2843: Sodium bromide</li> <li>805: Cesium chloride</li> <li>282: Antimony(V) chloride</li> <li>2372: Phosphorus(V) fluoride</li> <li>2780: Silver acetylide</li> <li>2353: Phosphoric acid</li> <li>1512: Hydrofluoric acid, 70%</li> <li>1526: Hydrogen fluoride</li> <li>116: Ammonia</li> <li>3107: Sulfuric acid</li> <li>2483: Potassium iodide</li> <li>2911: Sodium hydrogen sulfate</li> <li>2875: Sodium fluoride</li> <li>2921: Sodium hypochlorite</li> <li>2922: Sodium hypochlorite</li> <li>2925: Sodium iodate</li> </ul>
7647-14-5 7647-15-6 7647-15-6 7647-17-8 7647-19-0 7659-31-6 7664-39-3 7664-39-3 7664-39-3 7664-39-3 7664-41-7 7664-93-9 7681-11-0 7681-38-1 7681-38-1 7681-52-9 7681-52-9 7681-55-2 7681-55-2 7681-55-2	<ul> <li>2853: Sodium chloride</li> <li>2843: Sodium bromide</li> <li>805: Cesium chloride</li> <li>282: Antimony(V) chloride</li> <li>2372: Phosphorus(V) fluoride</li> <li>2780: Silver acetylide</li> <li>2353: Phosphoric acid</li> <li>1512: Hydrofluoric acid, 70%</li> <li>1526: Hydrogen fluoride</li> <li>116: Ammonia</li> <li>3107: Sulfuric acid</li> <li>2483: Potassium iodide</li> <li>2911: Sodium hydrogen sulfate</li> <li>2875: Sodium hypochlorite</li> <li>2921: Sodium hypochlorite</li> <li>2922: Sodium iodate</li> <li>2929: Sodium metabisulfite</li> </ul>
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7647-14-5 7647-15-6 7647-15-6 7647-17-8 7647-19-0 7659-31-6 7664-38-2 7664-39-3 7664-39-3 7664-39-3 7664-41-7 7664-93-9 7681-11-0 7681-38-1 7681-49-4 7681-52-9 7681-52-9 7681-55-2 7681-55-2 7681-55-2	<ul> <li>2853: Sodium chloride</li> <li>2843: Sodium bromide</li> <li>2843: Sodium bromide</li> <li>280: Cesium chloride</li> <li>282: Antimony(V) chloride</li> <li>2372: Phosphorus(V) fluoride</li> <li>2780: Silver acetylide</li> <li>2353: Phosphoric acid</li> <li>1512: Hydrofluoric acid, 70%</li> <li>1526: Hydrogen fluoride</li> <li>116: Ammonia</li> <li>3107: Sulfuric acid</li> <li>2483: Potassium iodide</li> <li>2911: Sodium hydrogen sulfate</li> <li>2875: Sodium fluoride</li> <li>2921: Sodium hypochlorite</li> <li>2922: Sodium hypochlorite</li> <li>2925: Sodium iodate</li> <li>2929: Sodium metabisulfite</li> <li>1046: Copper(I) iodide</li> </ul>
7647-14-5 7647-15-6 7647-15-6 7647-17-8 7647-19-0 7659-31-6 7664-38-2 7664-39-3 7664-39-3 7664-39-3 7664-41-7 7664-93-9 7681-11-0 7681-38-1 7681-49-4 7681-52-9 7681-55-2 7681-55-2 7681-55-2 7681-55-4 7681-65-4 7681-82-5 7692 7	<ul> <li>2853: Sodium chioride</li> <li>2843: Sodium bromide</li> <li>805: Cesium chloride</li> <li>282: Antimony(V) chloride</li> <li>2372: Phosphorus(V) fluoride</li> <li>2353: Phosphoric acid</li> <li>21512: Hydrofluoric acid, 70%</li> <li>1526: Hydrogen fluoride</li> <li>116: Ammonia</li> <li>3107: Sulfuric acid</li> <li>2483: Potassium iodide</li> <li>2911: Sodium hydrogen sulfate</li> <li>2875: Sodium fluoride</li> <li>2921: Sodium hypochlorite</li> <li>2922: Sodium hypochlorite</li> <li>2925: Sodium iodate</li> <li>2929: Sodium metabisulfite</li> <li>1046: Copper(I) iodide</li> <li>2940: Detacrime, Ideaid</li> </ul>
7647-14-5 7647-15-6 7647-15-6 7647-17-8 7647-19-0 7659-31-6 7664-39-3 7664-39-3 7664-39-3 7664-39-3 7664-39-3 7664-93-9 7681-41-7 7664-93-9 7681-41-7 7681-38-1 7681-49-4 7681-52-9 7681-55-2 7681-55-2 7681-55-2 7681-55-2 7681-55-2 7681-55-2 7681-55-2 7681-55-2 7681-55-2 7681-55-2 7681-55-2 7681-55-2 7681-55-2 7681-55-2	<ul> <li>2853: Sodium chioride</li> <li>2843: Sodium bromide</li> <li>805: Cesium chloride</li> <li>282: Antimony(V) chloride</li> <li>2372: Phosphorus(V) fluoride</li> <li>2373: Phosphoric acid</li> <li>1512: Hydrofluoric acid, 70%</li> <li>1526: Hydrogen fluoride</li> <li>116: Ammonia</li> <li>3107: Sulfuric acid</li> <li>2483: Potassium iodide</li> <li>2911: Sodium hydrogen sulfate</li> <li>2875: Sodium fluoride</li> <li>2921: Sodium hypochlorite</li> <li>2922: Sodium hypochlorite</li> <li>2925: Sodium metabisulfite</li> <li>1046: Copper(I) iodide</li> <li>2926: Sodium iodide</li> <li>2469: Potassium hydride</li> </ul>
7647-14-5 7647-15-6 7647-15-6 7647-17-8 7647-19-0 7659-31-6 7664-39-3 7664-39-3 7664-39-3 7664-39-3 7664-39-3 7664-93-9 7681-11-0 7681-38-1 7681-49-4 7681-52-9 7681-52-9 7681-55-2 7681-55-2 7681-55-2 7681-55-4 7681-82-5 7693-26-7 7697-37-2 7690-27	<ul> <li>2853: Sodium chioride</li> <li>2843: Sodium bromide</li> <li>805: Cesium chloride</li> <li>282: Antimony(V) chloride</li> <li>2372: Phosphorus(V) fluoride</li> <li>2373: Phosphoric acid</li> <li>1512: Hydrofluoric acid, 70%</li> <li>1526: Hydrogen fluoride</li> <li>116: Ammonia</li> <li>3107: Sulfuric acid</li> <li>2483: Potassium iodide</li> <li>2911: Sodium hydrogen sulfate</li> <li>2875: Sodium fluoride</li> <li>2921: Sodium hypochlorite</li> <li>2922: Sodium hypochlorite</li> <li>2925: Sodium metabisulfite</li> <li>1046: Copper(I) iodide</li> <li>2926: Sodium iodide</li> <li>2469: Potassium hydride</li> <li>2275: Nitric acid</li> </ul>
7647-14-5 7647-15-6 7647-15-6 7647-17-8 7647-19-0 7659-31-6 7664-39-3 7664-39-3 7664-39-3 7664-39-3 7664-41-7 7664-93-9 7681-38-1 7681-49-4 7681-52-9 7681-52-9 7681-52-9 7681-55-2 7681-55-2 7681-55-2 7681-55-4 7681-65-4 7693-26-7 7697-37-2 7698-05-7	<ul> <li>2853: Sodium chloride</li> <li>2843: Sodium bromide</li> <li>805: Cesium chloride</li> <li>282: Antimony(V) chloride</li> <li>2372: Phosphorus(V) fluoride</li> <li>2373: Phosphoric acid</li> <li>1512: Hydrofluoric acid, 70%</li> <li>1526: Hydrogen fluoride</li> <li>116: Ammonia</li> <li>3107: Sulfuric acid</li> <li>2483: Potassium iodide</li> <li>2911: Sodium hydrogen sulfate</li> <li>2875: Sodium fluoride</li> <li>2921: Sodium hypochlorite</li> <li>2922: Sodium hypochlorite</li> <li>2925: Sodium metabisulfite</li> <li>1046: Copper(I) iodide</li> <li>2926: Sodium iodide</li> <li>2469: Potassium hydride</li> <li>2275: Nitric acid</li> <li>1155: Deuterium chloride</li> <li>1222 Hydrofluoride</li> </ul>
7647-14-5 7647-15-6 7647-15-6 7647-17-8 7647-18-9 7647-19-0 7659-31-6 7664-39-3 7664-39-3 7664-39-3 7664-39-3 7664-41-7 7664-93-9 7681-51-9 7681-52-9 7681-52-9 7681-52-9 7681-52-9 7681-55-2 7681-55-2 7681-55-2 7681-55-2 7681-55-2 7681-55-2 7693-26-7 7698-05-7 7698-05-7	<ul> <li>2853: Sodium chloride</li> <li>2843: Sodium bromide</li> <li>805: Cesium chloride</li> <li>282: Antimony(V) chloride</li> <li>2372: Phosphorus(V) fluoride</li> <li>2373: Phosphoric acid</li> <li>1512: Hydrofluoric acid, 70%</li> <li>1526: Hydrogen fluoride</li> <li>116: Ammonia</li> <li>3107: Sulfuric acid</li> <li>2483: Potassium iodide</li> <li>2911: Sodium hydrogen sulfate</li> <li>2875: Sodium fluoride</li> <li>2921: Sodium hydrogen sulfate</li> <li>2922: Sodium hypochlorite</li> <li>2923: Sodium hypochlorite</li> <li>2925: Sodium iodate</li> <li>2929: Sodium metabisulfite</li> <li>1046: Copper(I) iodide</li> <li>2926: Sodium iodide</li> <li>2469: Potassium hydride</li> <li>2275: Nitric acid</li> <li>1155: Deuterium chloride</li> <li>1522: Hydrogen chloride-d</li> </ul>
7647-14-5 7647-15-6 7647-15-6 7647-17-8 7647-19-0 7659-31-6 7664-39-3 7664-39-3 7664-39-3 7664-41-7 7664-93-9 7681-11-0 7681-38-1 7681-49-4 7681-52-9 7681-52-9 7681-52-9 7681-55-2 7681-55-2 7681-55-2 7681-55-4 7681-65-4 7681-82-5 7693-26-7 7698-05-7 7698-05-7 7699-45-8	<ul> <li>2853: Sodium chloride</li> <li>2843: Sodium bromide</li> <li>805: Cesium chloride</li> <li>282: Antimony(V) chloride</li> <li>2372: Phosphorus(V) fluoride</li> <li>2373: Phosphoric acid</li> <li>1512: Hydrofluoric acid, 70%</li> <li>1526: Hydrogen fluoride</li> <li>116: Ammonia</li> <li>3107: Sulfuric acid</li> <li>2483: Potassium iodide</li> <li>2911: Sodium hydrogen sulfate</li> <li>2875: Sodium fluoride</li> <li>2921: Sodium hydrogen sulfate</li> <li>2922: Sodium hypochlorite</li> <li>2923: Sodium nydrogen sulfate</li> <li>2925: Sodium iodate</li> <li>2929: Sodium metabisulfite</li> <li>1046: Copper(I) iodide</li> <li>2926: Sodium iodide</li> <li>2469: Potassium hydride</li> <li>2275: Nitric acid</li> <li>1155: Deuterium chloride</li> <li>1522: Hydrogen chloride-d</li> <li>3526: Zinc bromide</li> </ul>
7647-14-5 7647-15-6 7647-15-6 7647-17-8 7647-18-9 7647-19-0 7659-31-6 7664-39-3 7664-39-3 7664-39-3 7664-39-3 7664-41-7 7664-93-9 7681-11-0 7681-38-1 7681-49-4 7681-52-9 7681-52-9 7681-52-9 7681-52-9 7681-55-2 7681-55-2 7681-55-2 7681-55-2 7681-55-2 7681-55-2 7681-55-2 7693-26-7 7693-26-7 7698-05-7 7699-45-8 7704-34-9	2853: Sodium chloride 2843: Sodium bromide 805: Cesium chloride 282: Antimony(V) chloride 2372: Phosphorus(V) fluoride 2780: Silver acetylide 2353: Phosphoric acid 1512: Hydrofluoric acid, 70% 1526: Hydrogen fluoride 116: Ammonia 3107: Sulfuric acid 2483: Potassium iodide 2911: Sodium hydrogen sulfate 2875: Sodium fluoride 2921: Sodium hypochlorite 2922: Sodium hypochlorite 2922: Sodium netabisulfite 1046: Copper(I) iodide 2926: Sodium iodate 2926: Sodium iodate 2926: Sodium iodate 2926: Sodium iodate 2927: Nitric acid 1155: Deuterium chloride 1522: Hydrogen chloride-d 3526: Zinc bromide 3104: Sulfur( $\alpha$ )
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7647-14-5 7647-15-6 7647-15-6 7647-17-8 7647-19-0 7659-31-6 7664-39-3 7664-39-3 7664-39-3 7664-41-7 7664-93-9 7681-11-0 7681-38-1 7681-49-4 7681-52-9 7681-52-9 7681-52-9 7681-52-9 7681-52-9 7681-52-2 7681-52-2 7681-52-2 7681-52-2 7681-52-2 7681-52-2 7681-52-2 7681-52-2 7681-52-2 7681-52-2 7681-52-2 7681-52-2 7681-52-2 7681-52-2 7693-26-7 7693-26-7 7698-05-7 7699-45-8 7704-34-9 7704-34-9 7704-34-9	2853: Sodium chloride 2843: Sodium bromide 805: Cesium chloride 282: Antimony(V) chloride 2372: Phosphorus(V) fluoride 2370: Silver acetylide 2353: Phosphoric acid 1512: Hydrofluoric acid, 70% 1526: Hydrogen fluoride 116: Ammonia 3107: Sulfuric acid 2483: Potassium iodide 2911: Sodium hydrogen sulfate 2875: Sodium fluoride 2921: Sodium hypochlorite 2921: Sodium hypochlorite 2922: Sodium hypochlorite 2922: Sodium iodate 2929: Sodium iodate 2929: Sodium iodate 2929: Sodium iodate 2920: Sodium iodide 2469: Potassium hydride 2275: Nitric acid 1155: Deuterium chloride 1522: Hydrogen chloride-d 3526: Zinc bromide 3104: Sulfur( $\alpha$ ) 3105: Sulfur( $\beta$ ) 3106: Sulfur( $\gamma$ )
7647-14-5 7647-15-6 7647-15-6 7647-17-8 7647-19-0 7659-31-6 7664-39-3 7664-39-3 7664-39-3 7664-39-3 7664-39-3 7664-39-3 7664-41-7 7664-39-9 7681-51-9 7681-52-9 7681-52-9 7681-52-9 7681-52-9 7681-52-9 7681-52-9 7681-52-9 7681-52-9 7681-52-9 7681-52-9 7681-52-9 7681-52-9 7681-52-7 7693-26-7 7693-26-7 7698-05-7 7698-05-7 7699-45-8 7704-34-9 7704-34-9 7704-34-9 7704-34-9	2853: Sodium chloride 2843: Sodium bromide 805: Cesium chloride 282: Antimony(V) chloride 2372: Phosphorus(V) fluoride 2370: Silver acetylide 2353: Phosphoric acid 1512: Hydrofluoric acid, 70% 1526: Hydrogen fluoride 116: Ammonia 3107: Sulfuric acid 2483: Potassium iodide 2911: Sodium hydrogen sulfate 2875: Sodium fluoride 2921: Sodium hypochlorite 2921: Sodium hypochlorite 2922: Sodium iodate 2929: Sodium metabisulfite 1046: Copper(I) iodide 2926: Sodium iodide 2469: Potassium hydride 2275: Nitric acid 1155: Deuterium chloride 1522: Hydrogen chloride-d 3526: Zinc bromide 3104: Sulfur( $\alpha$ ) 3105: Sulfur( $\beta$ ) 3106: Sulfur( $\gamma$ ) 3292: Titanium hydride
7647-14-5 7647-15-6 7647-15-6 7647-17-8 7647-19-0 7659-31-6 7664-39-3 7664-39-3 7664-39-3 7664-39-3 7664-39-3 7664-39-3 7664-41-7 7664-93-9 7681-51-9 7681-52-9 7681-52-9 7681-52-9 7681-52-9 7681-52-9 7681-52-9 7681-52-9 7681-52-9 7681-52-9 7681-52-9 7681-52-9 7681-52-9 7681-52-9 7681-52-7 7693-26-7 7693-26-7 7698-05-7 7698-05-7 7699-45-8 7704-34-9 7704-34-9 7704-34-9 7704-38-5 7704-99-6	2853: Sodium chloride 2843: Sodium bromide 805: Cesium chloride 282: Antimony(V) chloride 2372: Phosphorus(V) fluoride 2373: Phosphoric acid 1512: Hydrofluoric acid, 70% 1526: Hydrogen fluoride 116: Ammonia 3107: Sulfuric acid 2483: Potassium iodide 2911: Sodium hydrogen sulfate 2921: Sodium hydrogen sulfate 2922: Sodium hypochlorite 2922: Sodium hypochlorite 2929: Sodium metabisulfite 1046: Copper(I) iodide 2926: Sodium iodide 2926: Sodium iodide 2469: Potassium hydride 2527: Nitric acid 1155: Deuterium chloride 1552: Hydrogen chloride-d 3526: Zinc bromide 3104: Sulfur( $\alpha$ ) 3106: Sulfur( $\beta$ ) 3106: Sulfur( $\gamma$ ) 3292: Titanium hydride 3595: Zirconium hydride
7647-14-5 7647-15-6 7647-15-6 7647-17-8 7647-19-0 7659-31-6 7664-39-3 7664-39-3 7664-39-3 7664-39-3 7664-39-3 7664-41-7 7664-93-9 7681-11-0 7681-38-1 7681-49-4 7681-52-9 7681-52-9 7681-52-9 7681-52-9 7681-55-2 7681-55-2 7681-55-2 7681-55-2 7681-55-2 7681-55-2 7681-55-2 7693-35-7 7698-05-7 7698-05-7 7698-05-7 7698-05-7 7699-45-8 7704-34-9 7704-34-9 7704-34-9 7704-98-5 7704-99-6 7705-07-9	2853: Sodium chioride 2843: Sodium bromide 805: Cesium chloride 282: Antimony(V) chloride 2372: Phosphorus(V) fluoride 2373: Phosphoric acid 1512: Hydrofluoric acid, 70% 1526: Hydrogen fluoride 116: Ammonia 3107: Sulfuric acid 2483: Potassium iodide 2911: Sodium hydrogen sulfate 2921: Sodium hydrogen sulfate 2921: Sodium hydrolorite 2922: Sodium hypochlorite 2929: Sodium iodate 2929: Sodium metabisulfite 1046: Copper(I) iodide 2926: Sodium iodide 2469: Potassium hydride 2525: Nitric acid 1155: Deuterium chloride 1522: Hydrogen chloride-d 3526: Zinc bromide 3104: Sulfur(β) 3106: Sulfur(β) 3106: Sulfur(β) 3107: Titanium hydride 3307: Titanium trichloride

7718-54-9	2205: Nickel chloride	7772-99-8	3029: Stannous chloride	7782-91-4	2139: Molybdenum(VI) acid
7718-98-1	3431: Vanadium trichloride	7773-01-5	1998: Manganese(II) chloride	//02 //1 1	monohydrate
7719-09-7	3229: Thionyl chloride	7773-03-7	2479: Potassium hydrogen sulfite	7782-92-5	2834: Sodium amide
7719-12-2	2365: Phosphorus(III) chloride	7773-06-0	228: Ammonium sulfamate	7782-99-2	3109: Sulfurous acid
7720-78-7	1329: Ferrous sulfate	7774-29-0	2078: Mercury(II) iodide( $\alpha$ )	7783-00-8	2756: Selenous acid
7720-83-4	3305: Titanium tetraiodide	7774-29-0	2079: Mercury(II) iodide( $\beta$ )	7783-03-1	3366: Tungstic acid
7721-01-9	3124: Tantalum pentachloride	7774-34-7	634: Calcium chloride	7783-06-4	1536: Hydrogen sulfide
7722-64-7	2506: Potassium permanganate	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	hexahydrate	7783-07-5	1535: Hydrogen selenide
7722-76-1	144. Ammonium dihydrogen	7775-09-9	2852: Sodium chlorate	7783-08-6	2736: Selenic acid
	phosphate	7775-11-3	2855: Sodium chromate	7783-09-7	1537: Hydrogen telluride
7722-84-1	1534: Hydrogen peroxide	7775-11-3	2856: Sodium chromate	7783-11-1	232: Ammonium sulfite
7722-86-3	2344: Peroxysulfuric acid	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	decahydrate	//00/111	monohydrate
7722-88-5	2971: Sodium pyrophosphate	7775-14-6	2918: Sodium hydrosulfite	7783-14-4	3547: Zinc hypophosphite
7723-14-0	2355: Phosphorus (black)	7775-19-1	2930: Sodium metaborate	//00 11 1	monohydrate
7723-14-0	2356: Phosphorus (red)	7775-27-1	2963: Sodium persulfate	7783-18-8	249: Ammonium thiosulfate
7726-95-6	540: Bromine	7775-41-9	2795: Silver fluoride	7783-19-9	225: Ammonium selenite
7727-15-3	26: Aluminum bromide	7778-18-9	702: Calcium sulfate	7783-20-2	229: Ammonium sulfate
7727-18-6	3422: Vanadium oxytrichloride	7778-39-4	294: Arsenic acid	7783-21-3	224. Ammonium selenate
7727-21-1	2510: Potassium persulfate	7778-39-4	295: Arsenic acid hemihydrate	7783-22-4	253: Ammonium uranate(VI)
7727-37-9	2277: Nitrogen	7778-39-4	310: Arsenic(V) acid hemihydrate	7783-26-8	2771: Silicon octahydride
7727-43-7	408: Barium sulfate	7778-39-4	14: Actinium phosphate	7783-28-0	184: Ammonium hydrogen
7727-54-0	216: Ammonium peroxydisulfate		hemihvdrate		phosphate
7727-73-3	2983: Sodium sulfate	7778-43-0	2837: Sodium arsenate	7783-29-1	2762: Silicon decahydride
	decahydrate		dodecahydrate	7783-32-6	2077: Mercury(II) jodate
7727-73-3	2984: Sodium sulfate	7778-43-0	2902: Sodium hydrogen arsenate	7783-33-7	2551: Potassium
	heptahydrate	7778-44-1	617: Calcium arsenate		tetrajodomercurate(II)
7732-18-5	3450: Water	7778-50-9	2432: Potassium dichromate	7783-34-8	2083: Mercury(II) nitrate
7733-02-0	3572: Zinc sulfate	7778-53-2	2511: Potassium phosphate		monohydrate
7738-94-5	859: Chromic acid	7778-54-3	661: Calcium hypochlorite	7783-35-9	2093: Mercury(II) sulfate
7757-79-1	2494: Potassium nitrate	7778-74-7	2504: Potassium perchlorate	7783-36-0	2057: Mercury(I) sulfate
7757-82-6	2982: Sodium sulfate	7778-77-0	2435: Potassium dihydrogen	7783-39-3	2074: Mercury(II) fluoride
7757-83-7	2988: Sodium sulfite		phosphate	7783-40-6	1905: Magnesium fluoride
7757-86-0	1912: Magnesium hydrogen	7778-80-5	2524: Potassium sulfate	7783-41-7	1339: Fluorine monoxide
	phosphate trihydrate	7779-25-1	1899: Magnesium citrate	7783-42-8	3230: Thionyl fluoride
7757-87-1	1939: Magnesium phosphate		pentahvdrate	7783-43-9	2749: Selenium oxyfluoride
	pentahydrate	7779-90-0	3561: Zinc phosphate	7783-44-0	1338: Fluorine dioxide
7757-88-2	1957: Magnesium sulfite	7782-12-0	2866: Sodium dichromate	7783-46-2	1706: Lead fluoride
7757-93-9	655: Calcium hydrogen		dihydrate	7783-47-3	3031: Stannous fluoride
	phosphate	7782-39-0	1153: Deuterium	7783-48-4	3060: Strontium fluoride
7758-01-2	2415: Potassium bromate	7782-39-0	1514: Hydrogen-d2	7783-49-5	3538: Zinc fluoride
7758-02-3	2416: Potassium bromide	7782-40-3	723: Carbon	7783-50-8	1275: Ferric fluoride
7758-05-6	2482: Potassium iodate	7782-41-4	1337: Fluorine	7783-51-9	1392: Gallium(III) fluoride
7758-09-0	2495: Potassium nitrite	7782-42-5	721: Carbon	7783-52-0	1567: Indium(III) fluoride
7758-11-4	2489: Potassium monohydrogen	7782-44-7	2313: Oxygen	7783-53-1	2033: Manganese(III) fluoride
	phosphate	7782-49-2	2737: Selenium	7783-54-2	2283: Nitrogen trifluoride
7758-16-9	2869: Sodium dihvdrogen	7782-49-2	2738: Selenium(β)	7783-55-3	2366: Phosphorus(III) fluoride
	pyrophosphate	7782-49-2	2755: Selenium(α)	7783-56-4	264: Antimony(III) fluoride
7758-19-2	2854: Sodium chlorite	7782-50-5	842: Chlorine	7783-57-5	3223: Thallium(III) fluoride
7758-29-4	3011: Sodium triphosphate	7782-61-8	1283: Ferric nitrate nonahydrate	7783-58-6	1421: Germanium(IV) fluoride
7758-87-4	686: Calcium phosphate	7782-63-0	1330: Ferrous sulfate	7783-58-6	1422: Germanium(IV) fluoride
7758-88-5	778: Cerous fluoride		heptahydrate		trihydrate
7758-89-6	1042: Copper(I) chloride	7782-64-1	2003: Manganese(II) fluoride	7783-59-7	1738: Lead tetrafluoride
7758-94-3	1311: Ferrous chloride	7782-65-2	1409: Germanium tetrahydride	7783-59-7	1758: Lead(IV) fluoride
7758-95-4	1700: Lead chloride	7782-66-3	2091: Mercury(II) phosphate	7783-60-0	3099: Sulfur tetrafluoride
7758-97-6	1702: Lead chromate	7782-68-5	1579: Iodic acid	7783-61-1	2774: Silicon tetrafluoride
7758-98-7	1124: Copper(II) sulfate	7782-70-9	2476: Potassium hydrogen selenite	7783-62-2	3021: Stannic fluoride
7758-99-8	1126: Copper(II) sulfate	7782-77-6	2293: Nitrous acid	7783-63-3	3304: Titanium tetrafluoride
	pentahydrate	7782-78-7	2292: Nitrosylsulfuric acid	7783-64-4	3593: Zirconium fluoride
7759-00-4	1988: Manganese silicate	7782-79-8	1511: Hydrazoic acid	7783-66-6	1591: Iodine pentafluoride
7759-00-4	2009: Manganese(II)	7782-85-6	2909: Sodium hydrogen	7783-68-8	2268: Niobium(V) fluoride
	metasilicate		phosphate heptahydrate	7783-70-2	285: Antimony(V) fluoride
7759-01-5	1742: Lead tungstate	7782-86-7	2052: Mercury(I) nitrate	7783-71-3	3125: Tantalum pentafluoride
7759-01-5	1743: Lead tungstate		monohydrate	7783-72-4	3424: Vanadium pentafluoride
7759-02-6	3087: Strontium sulfate	7782-87-8	2434: Potassium dihydrogen	7783-73-5	2458: Potassium
7761-88-8	2804: Silver nitrate		hypophosphite		hexafluorogermanate
7772-98-7	3007: Sodium thiosulfate	7782-89-0	1767: Lithium amide	7783-75-7	1602: Iridium hexafluoride

7783-77-9	2142: Molybdenum(VI) fluoride	7784-40-9	1752: Lead(II) hydrogen arsenate	7789-02-8	901: Chromium(III) nitrate
7783-79-1	2743: Selenium hexafluoride	7784-41-0	2433: Potassium dihydrogen		nonahydrate
7783-80-4	3144: Tellurium hexafluoride		arsenate	7789-04-0	904: Chromium(III) phosphate
7783-81-5	3372: Uranium hexafluoride	7784-42-1	316: Arsine	7789-04-0	905: Chromium(III) phosphate
7783-82-6	3346: Tungsten hexafluoride	7784-44-3	177: Ammonium hydrogen		hemiheptahydrate
7783-84-8	1279: Ferric hypophosphite		arsenate	7789-06-2	3057: Strontium chromate
7783-86-0	1320: Ferrous iodide	7784-45-4	304: Arsenic(III) iodide	7789-08-4	147: Ammonium ferric chromate
7783-89-3	2783: Silver bromate	7784-46-5	2838: Sodium arsenite	7789-09-5	142: Ammonium dichromate(VI)
7783-90-6	2787: Silver chloride	7784-48-7	2192: Nickel arsenate	7789-10-8	2073: Mercury(II) dichromate
7783-91-7	2788: Silver chlorite		octahydrate	7789-12-0	3536: Zinc dichromate trihydrate
7783-92-8	2786: Silver chlorate	7785-19-5	1972: Manganese ammonium	7789-16-4	815: Cesium hydrogen sulfate
7783-93-9	2808: Silver perchlorate	1100 17 0	sulfate bexahydrate	7789-17-5	819: Cesium iodide
7783-95-1	2794: Silver difluoride	7785-20-8	201: Ammonium nickel sulfate	7789-18-6	824: Cesium nitrate
7783-96-2	2801: Silver iodide	1105 20 0	hevahydrate	7780-10-7	1089: Copper(II) fluoride
7783 07 3	2800: Silver iodate	7785 20 8	2100: Nickel ammonium sulfate	7780 20 0	1157: Deuterium oxide
7783-98-4	2810: Silver permanganate	1105-20-0	hevabydrate	7789-21-1	1347: Eluorosulfonic acid
7782 00 5	2010: Silver permanganate	7785 22 1	2784: Silver bromide	7780 22 2	2440: Potossium fluorido
7784 01 2	2780: Silver shremete	7705 01 1	2010. Sodium trimotonhoonhoto	7780.24.4	1701. Lithium fluoride
7784-01-2	2789: Silver chromate	//85-84-4	3010: Sodium trimetaphosphate	7789-24-4	2201. Nitra and fina mide
7784-02-3	2/92: Silver dichromate	7705 07 7	nexanydrate	7789-25-5	2291: Nitrosyl nuoride
//84-03-4	2822: Silver	//85-8/-/	2021: Manganese(11) sulfate	7/89-26-6	1340: Fluorine nitrate
	tetraiodomercurate(11)	7/86-30-3	1894: Magnesium chloride	7789-27-7	3201: Thallium(1) fluoride
	( $\alpha$ -form)	7786-81-4	2234: Nickel sulfate	7789-28-8	1316: Ferrous fluoride
7784-05-6	2817: Silver selenite	7787-32-8	357: Barium fluoride	7789-29-9	2472: Potassium hydrogen
7784-07-8	2815: Silver selenate	7787-33-9	373: Barium iodide dihydrate		fluoride
7784-09-0	2813: Silver phosphate	7787-34-0	371: Barium iodate monohydrate	7789-30-2	547: Bromine pentafluoride
7784-11-4	27: Aluminum bromide	7787-35-1	375: Barium manganate(VI)	7789-31-3	539: Bromic acid
	hexahydrate	7787-36-2	391: Barium permanganate	7789-33-5	1581: Iodine bromide
7784-13-6	32: Aluminum chloride	7787-37-3	380: Barium molybdate	7789-33-5	1588: Iodine monobromide
	hexahydrate	7787-38-4	385: Barium nitrite monohydrate	7789-36-8	1884: Magnesium bromate
7784-14-7	236: Ammonium	7787-39-5	411: Barium sulfite		hexahydrate
	tetrachloroaluminate	7787-40-8	420: Barium thiosulfate	7789-38-0	2842: Sodium bromate
7784-16-9	2999: Sodium		monohydrate	7789-39-1	2655: Rubidium bromide
	tetrachloroaluminate	7787-41-9	395: Barium selenate	7789-40-4	3195: Thallium(I) bromide
7784-17-0	796: Cesium aluminum sulfate	7787-42-0	425: Barium tungstate	7789-41-5	624: Calcium bromide
,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	dodecabydrate	7787-46-4	446: Beryllium bromide	7789-42-6	564: Cadmium bromide
7784-18-1	40. Aluminum fluoride	7787-47-5	449: Beryllium chloride	7789-43-7	957: Cobalt(II) bromide
7784-19-2	170: Ammonium	7787-48-6	461: Beryllium perchlorate	7789-45-9	1069: Copper(II) bromide
//011/2	hexafluoroaluminate	1101 10 0	tetrahydrate	7789-46-0	1307: Ferrous bromide
7784-21-6	44: Aluminum hydride	7787-49-7	450: Beryllium fluoride	7789-47-1	2067: Mercury(II) bromide
7784 22 7	51: Aluminum hypophosphite	7787 50 0	2547: Potassium	7780 48 2	1885: Magnesium bromide
7784-22-7	52: Aluminum indida	7787-30-0	2547. I Otassium	7780 51 7	2746: Salanium avubramida
7784-23-8	2400. Betaggium aluminum	7797 52 2	452. Dorvilium hydride	7780.52.8	2740. Selenium bromide
//64-24-9		7707-52-2		7789-52-8	
7794 25 0		//8/-55-5	456: Beryllium iodide	7789-54-0	
//84-25-0	20: Aluminum ammonium	//8/-50-0	465: Beryllium sulfate	//89-5/-3	3316: Iribromosilane
	sulfate		tetrahydrate	7789-59-5	2360: Phosphorus oxybromide
7784-25-0	119: Ammonium aluminum	7787-57-7	493: Bismuth oxybromide	7789-60-8	2364: Phosphorus(III) bromide
	sulfate	7787-58-8	475: Bismuth bromide	7789-61-9	262: Antimony(III) bromide
7784-26-1	19: Aluminum ammonium	7787-59-9	494: Bismuth oxychloride	7789-65-3	2751: Selenium tetrabromide
	sulfate dodecahydrate	7787-60-2	476: Bismuth chloride	7789-66-4	2772: Silicon tetrabromide
7784-26-1	120: Ammonium aluminum	7787-61-3	479: Bismuth fluoride	7789-67-5	3017: Stannic bromide
	sulfate dodecahydrate	7787-62-4	498: Bismuth pentafluoride	7789-68-6	3302: Titanium tetrabromide
7784-27-2	60: Aluminum nitrate	7787-63-5	495: Bismuth oxyiodide	7789-69-7	2370: Phosphorus(V) bromide
	nonahydrate	7787-64-6	485: Bismuth iodide	7789-75-5	647: Calcium fluoride
7784-30-7	74: Aluminum phosphate	7787-68-0	509: Bismuth sulfate	7789-77-7	656: Calcium hydrogen
7784-30-7	75: Aluminum phosphate	7787-69-1	800: Cesium bromide		phosphate dihydrate
	dihydrate	7787-70-4	1041: Copper(I) bromide	7789-78-8	654: Calcium hydride
7784-31-8	87: Aluminum sulfate	7787-71-5	548: Bromine trifluoride	7789-79-9	662: Calcium hypophosphite
	octadecahydrate	7788-96-7	920: Chromium(VI) difluoride	7789-80-2	663: Calcium iodate
7784-33-0	301: Arsenic(III) bromide		dioxide	7789-82-4	668: Calcium molybdate
7784-34-1	302: Arsenic(III) chloride	7788-97-8	895: Chromium(III) fluoride	7789-99-0	2424: Potassium chromium(III)
7784-35-2	303: Arsenic(III) fluoride	7788-98-9	135: Ammonium chromate(VI)		sulfate dodecahvdrate
7784-36-3	311: Arsenic(V) fluoride	7788-99-0	908: Chromium(III) potassium	7790-21-8	2505: Potassium periodate
7784-37-4	2063: Mercury(II) arsenate		sulfate dodecabydrate	7790-22-9	1805: Lithium jodide trihydrate
7784-37-4	2076: Mercury(II) hydrogen	7789-00-6	2422: Potassium chromate	7790-28-5	2958: Sodium periodate
,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	arsenate	7789-01-7	1781: Lithium chromate	7790-29-6	2668: Rubidium jodide
7784-40 0	1690: Lead arcenate	1107-01-1	dihydrate	7790-30 0	3206: Thallium(I) iodide
, , 0-1-10-2	1070. Loud al soliate		unyulute	1170-50-2	5200. mamun(1) loulue

7790-31-0	1917: Magnesium iodide	7791-16-4
	octahydrate	
7790-32-1	1914: Magnesium iodate	7791-18-6
7700 22 2	tetrahydrate	7701 20 0
7790-33-2	2007: Manganese(II) iodide	//91-20-0
//90-33-2	2008: Manganese(11) iodide	7701 21 1
7700 24 2	tetranydrate	7701-22-2
7790-34-3	2217: Nickel lodide nexanydrate	7701 25 5
7700.28.7	3548: Zinc iodate	7701.20
7790-38-7	2324: Pariadium(II) iodide	7791-20-0
7790-39-8		7791-28-8
7790-41-2	1611: Iridium(III) iodide	//91-29-9
//90-42-3	2500: Potassium tritodide	7708 22 4
7700 42 4	2561. Detessium triis degineete	7902 40 9
7790-43-4	2501. Fotassium timodozincate	7803 51 2
7790-44-5	2380: Distinum(IV) jodida	7803-51-2
7790-40-7	2002: Stannia iodida	7802 54 5
7700 48 0	2151: Tallurium tatraiadida	7802 55 6
7790-48-9	32/3: Thorium iodide	7803-55-0
7790-49-0	2465: Potassium	7803-60-3
1190-55-0	hexametanhosphite	7803-62-5
7700 56 0	2527: Potessium sulfite dihudrate	7802-62-6
7790-50-9	2521: Potassium tallurita	/803-03-0
7790-56-1	2551. Potassium colonata	7802 65 8
7790-59-2	2562: Potassium tungstate	7802 68 1
7790-60-5	2564: Potassium tungstate	7803-08-1
//90-00-3	dihydrate	/003-20-0
7700 62 7	2512: Potessium purosulfate	8002 05 2
7790-63-8	2565: Potassium uranate	8003-03-2
7790-69-4	1815: Lithium nitrate	8014 05 7
7790-09-4	604: Calcium selenate dihydrate	0080 17 5
7790-74-1	714: Calcium tungstate	10022-31-8
7790 76 3	603: Calcium pyrophosphate	10022-31-0
7790-70-3	567: Cadmium ablarata	10022-47-0
1190-18-5	dihydrate	10022-48-7
7790-78-5	560: Cadmium chloride	10022-40-
1190-10-5	heminentahydrate	10022-50-1
7790-79-6	574: Cadmium fluoride	10022-50
7790-80-9	577: Cadmium iodide	10022 00
7790-81-0	576: Cadmium iodate	10024-93-
7790-85-4	605: Cadmium tungstate(VI)	10024-95
7790-86-5	775: Cerous chloride	10025-64-
7790-87-6	780: Cerous iodide	10025 04
7790-87-6	781: Cerous iodide nonahydrate	10025-65-
7790-89-8	844: Chlorine fluoride	10025-66-
7790-89-8	846: Chlorine monofluoride	10025-67-9
7790-91-2	850: Chlorine trifluoride	10025-68-
7790-92-3	1548: Hypochlorous acid	10025-69-
7790-93-4	841: Chloric acid heptahydrate	10025 07
7790-94-5	854: Chlorosulfonic acid	10025-70-4
7790-98-9	214: Ammonium perchlorate	10020 /0
7790-99-0	1582: Iodine chloride	10025-71-5
7790-99-0	1589: Iodine monochloride	10025-73-7
7791-03-9	1822: Lithium perchlorate	10025-74-8
7791-07-3	2957: Sodium perchlorate	10025-75-9
	monohydrate	
7791-08-4	272: Antimony(III) oxychloride	10025-76-0
7791-08-4	288: Antimony(V) oxychloride	10025-77-1
7791-09-5	2630: Rhenium(VI)	
	trioxychloride	10025-78-2
7791-10-8	3054: Strontium chlorate	10025-82-
7791-11-9	2658: Rubidium chloride	10025-83-9
7791-12-0	3198: Thallium(I) chloride	10025-84-
7791-13-1	964: Cobalt(II) chloride	
	hexahydrate	10025-85-

791-16-4	284: Antimony(V)
	dichlorotrifluoride
791-18-6	1895: Magnesium chloride hexabydrate
791-20-0	2206: Nickel chloride
701 21 1	hexahydrate
791-21-1	84/: Chlorine monoxide
791-23-3	2747: Selenium oxychloride
791-25-5	3110: Sulfuryl chloride
791-26-6	3396: Uranyl chloride
791-28-8	334: Barium bromide dihydrate
791-29-9	2549: Potassium
	tetraiodoaurate(III)
798-23-4	1114: Copper(II) phosphate
803-49-8	1542. Hydroxylamine
803-51-2	23/Q: Phosphine
803-51-2	254). I nospinic
803-32-3	
803-54-5	18/4: Magnesium amide
803-55-6	198: Ammonium metavanadate
803-57-8	1503: Hydrazine monohydrate
803-60-3	1549: Hypophosphoric acid
803-62-5	2757: Silane
803-63-6	186: Ammonium hydrogen
005 05 0	sulfate
803-65-8	192: Ammonium hypophosphite
803-68-1	3137: Telluric acid
883-28-0	218: Ammonium phosphate
005-20-0	dibasic
003-05-2	23/18: Phenylmercuric nitrate
005-05-2	basia
014 05 7	
014-95-7	3108: Sulturic acid luming
080-17-5	222: Ammonium polysulfide
0022-31-8	382: Barium nitrate
0022-47-6	136: Ammonium chromic sulfate
	dodecahydrate
0022-48-7	1787: Lithium dichromate
	dihydrate
0022-50-1	2296: Nitryl fluoride
0022-68-1	582: Cadmium nitrate
	tetrahydrate
0024-93-8	2160: Neodymium chloride
0024-97-2	2294. Nitrous oxide
0025-64-6	3558: Zinc perchlorate
0023-04-0	hexahydrate
0025-65-7	2382: Platinum(II) chloride
0025-05-7	2607: Radium ablarida
0025-00-8	
0025-67-9	3096: Sulfur chloride
0025-68-0	2740: Selenium chloride
0025-69-1	3030: Stannous chloride
	dihydrate
0025-70-4	3056: Strontium chloride
	hexahydrate
0025-71-5	3141: Tellurium dichloride
0025-73-7	893: Chromium(III) chloride
0025-74-8	1195: Dysprosium chloride
0025-75-9	1221: Erbium chloride
0020 10 2	hexahydrate
0025-76-0	1253: Europium(III) chloride
0025-77-1	1270: Ferric chloride
0020-11-1	hexahydrate
0025-78-2	3318: Trichlorosilane
0025 92 9	1565. Indium(III) -h1
0025-82-8	1505: Indium(III) chloride
0025-83-9	1608: Iridium(III) chloride
0025-84-0	1659: Lanthanum chloride
	heptahydrate
0025-85-1	2282: Nitrogen trichloride

10025-87-3	2361: Phosphorus oxychloride
10025-90-8	2580: Praseodymium chloride
	heptahydrate
10025-01-0	263: Antimony(III) chloride
10025 02 1	2205: Uranium triablarida
10025-95-1	
10025-94-2	3498: Yttrium chloride
10025 08 6	2540: Potossium
10023-98-0	2340. Fotassium
10025 00 7	2541: Potossium
10023-99-7	2341. Folassium
10026 01 4	220(c Orminate(II)) shlarida
10026-01-4	2306: Osmium(TV) chloride
10026-02-5	2402: Polonium(IV) chloride
10026-03-6	2752: Selenium tetrachloride
10026-04-7	2773: Silicon tetrachloride
10026-06-9	3019: Stannic chloride
	pentahydrate
10026-07-0	3149: Tellurium tetrachloride
10026-08-1	3236: Thorium chloride
10026-10-5	3380: Uranium tetrachloride
10026-11-6	3591: Zirconium chloride
10026 12 7	2266: Nichium(V) chlorida
10020-12-7	
10026-13-8	23/1: Phosphorus(V) chloride
10026-17-2	973: Cobalt(II) fluoride
10026-18-3	1016: Cobalt(III) fluoride
10026-20-7	996: Cobalt(II) potassium sulfate
	hexahydrate
10026-22-9	987: Cobalt(II) nitrate
	hexahydrate
10026-24-1	1005: Cobalt(II) sulfate
	heptahydrate
10028-14-5	2297: Nobelium
10028-15-6	2314: Ozone
10028-13-0	1515: Under son 42
10028-17-8	1515: Hydrogen-t2
10028-17-8	3327: Tritium
10028-18-9	2210: Nickel fluoride
10028-22-5	1294: Ferric sulfate
10031-13-7	1691: Lead arsenite
10031-16-0	351: Barium dichromate
	dihydrate
10031-20-6	1996: Manganese(II) bromide
	tetrahydrate
10031-21-7	1696: Lead bromate
	monohydrate
10031-22-8	1697: Lead bromide
10031-23-9	2605: Radium bromide
10031-24-0	3028: Stannous bromide
10031-25-1	890: Chromium(III) bromide
10031-26-2	1268: Ferric bromide
10031-20-2	1200. I CITIC DIOIIIIde
10031-27-3	3148: Tellurium tetrabromide
10021-20-0	3148: Tellurium tetrabromide
10001 00 0	3148: Tellurium tetrabromide 644: Calcium dihydrogen
10021 42 2	3148: Tellurium tetrabromide 644: Calcium dihydrogen phosphate monohydrate
10031-43-3	<ul><li>3148: Tellurium tetrabromide</li><li>644: Calcium dihydrogen phosphate monohydrate</li><li>1106: Copper(II) nitrate</li></ul>
10031-43-3	<ul> <li>3148: Tellurium tetrabromide</li> <li>644: Calcium dihydrogen phosphate monohydrate</li> <li>1106: Copper(II) nitrate trihydrate</li> </ul>
10031-43-3 10031-45-5	<ul> <li>3148: Tellurium tetrabromide</li> <li>644: Calcium dihydrogen phosphate monohydrate</li> <li>1106: Copper(II) nitrate trihydrate</li> <li>1118: Copper(II) selenate</li> </ul>
10031-43-3 10031-45-5	<ul> <li>3148: Tellurium tetrabromide</li> <li>644: Calcium dihydrogen phosphate monohydrate</li> <li>1106: Copper(II) nitrate trihydrate</li> <li>1118: Copper(II) selenate pentahydrate</li> </ul>
10031-43-3 10031-45-5 10031-48-8	<ul> <li>3148: Tellurium tetrabromide</li> <li>644: Calcium dihydrogen phosphate monohydrate</li> <li>1106: Copper(II) nitrate trihydrate</li> <li>1118: Copper(II) selenate pentahydrate</li> <li>1115: Copper(II) phosphate</li> </ul>
10031-43-3 10031-45-5 10031-48-8	<ul> <li>3148: Tellurium tetrabromide</li> <li>644: Calcium dihydrogen phosphate monohydrate</li> <li>1106: Copper(II) nitrate trihydrate</li> <li>1118: Copper(II) selenate pentahydrate</li> <li>1115: Copper(II) phosphate trihydrate</li> </ul>
10031-43-3 10031-45-5 10031-48-8 10031-49-9	<ul> <li>3148: Tellurium tetrabromide</li> <li>644: Calcium dihydrogen phosphate monohydrate</li> <li>1106: Copper(II) nitrate trihydrate</li> <li>1118: Copper(II) selenate pentahydrate</li> <li>1115: Copper(II) phosphate trihydrate</li> <li>1201: Dysprosium nitrate</li> </ul>
10031-43-3 10031-45-5 10031-48-8 10031-49-9	<ul> <li>3148: Tellurium tetrabromide</li> <li>644: Calcium dihydrogen phosphate monohydrate</li> <li>1106: Copper(II) nitrate trihydrate</li> <li>1118: Copper(II) selenate pentahydrate</li> <li>1115: Copper(II) phosphate trihydrate</li> <li>1201: Dysprosium nitrate pentahydrate</li> </ul>
10031-43-3 10031-45-5 10031-48-8 10031-49-9 10031-50-2	<ul> <li>3148: Tellurium tetrabromide</li> <li>644: Calcium dihydrogen phosphate monohydrate</li> <li>1106: Copper(II) nitrate trihydrate</li> <li>1118: Copper(II) selenate pentahydrate</li> <li>1115: Copper(II) phosphate trihydrate</li> <li>1201: Dysprosium nitrate pentahydrate</li> <li>1207: Dysprosium sulfate</li> </ul>
10031-43-3 10031-45-5 10031-48-8 10031-49-9 10031-50-2	<ul> <li>3148: Tellurium tetrabromide</li> <li>644: Calcium dihydrogen phosphate monohydrate</li> <li>1106: Copper(II) nitrate trihydrate</li> <li>1118: Copper(II) selenate pentahydrate</li> <li>1115: Copper(II) phosphate trihydrate</li> <li>1201: Dysprosium nitrate pentahydrate</li> <li>1207: Dysprosium sulfate octahydrate</li> </ul>
10031-43-3 10031-45-5 10031-48-8 10031-49-9 10031-50-2	<ul> <li>3148: Tellurium tetrabromide</li> <li>644: Calcium dihydrogen phosphate monohydrate</li> <li>1106: Copper(II) nitrate trihydrate</li> <li>1118: Copper(II) selenate pentahydrate</li> <li>1115: Copper(II) phosphate trihydrate</li> <li>1201: Dysprosium nitrate pentahydrate</li> <li>1207: Dysprosium sulfate octahydrate</li> <li>1226: Erbium nitrate</li> </ul>
10031-43-3 10031-45-5 10031-48-8 10031-49-9 10031-50-2 10031-51-3	<ul> <li>3148: Tellurium tetrabromide</li> <li>644: Calcium dihydrogen phosphate monohydrate</li> <li>1106: Copper(II) nitrate trihydrate</li> <li>1118: Copper(II) selenate pentahydrate</li> <li>1115: Copper(II) phosphate trihydrate</li> <li>1201: Dysprosium nitrate pentahydrate</li> <li>1207: Dysprosium sulfate octahydrate</li> <li>1226: Erbium nitrate pentahydrate</li> </ul>
10031-43-3 10031-45-5 10031-48-8 10031-49-9 10031-50-2 10031-51-3	<ul> <li>3148: Tellurium tetrabromide</li> <li>644: Calcium dihydrogen phosphate monohydrate</li> <li>1106: Copper(II) nitrate trihydrate</li> <li>1118: Copper(II) selenate pentahydrate</li> <li>1115: Copper(II) phosphate trihydrate</li> <li>1201: Dysprosium nitrate pentahydrate</li> <li>1207: Dysprosium sulfate octahydrate</li> <li>1226: Erbium nitrate pentahydrate</li> <li>1226: Erbium nitrate</li> <li>pentahydrate</li> <li>1233: Erbium sulfate</li> </ul>
10031-43-3 10031-45-5 10031-48-8 10031-49-9 10031-50-2 10031-51-3 10031-52-4	<ul> <li>3148: Tellurium tetrabromide</li> <li>644: Calcium dihydrogen phosphate monohydrate</li> <li>1106: Copper(II) nitrate trihydrate</li> <li>1118: Copper(II) selenate pentahydrate</li> <li>1115: Copper(II) phosphate trihydrate</li> <li>1201: Dysprosium nitrate pentahydrate</li> <li>1207: Dysprosium sulfate octahydrate</li> <li>1226: Erbium nitrate pentahydrate</li> <li>1233: Erbium sulfate octahydrate</li> </ul>

10031-52-4	1262: Europium(III) sulfate
10031-53-5	octahydrate 1256: Europium(III) nitrate
10021 54 6	1247: Europium (II) sulfate
10031-34-0	704: Coloium sulfate
10034-70-1	homihudroto
10024 01 0	1024 Magnasium nanahlanata
10034-81-8	2957: Se diamente al menerate
10034-82-9	2857: Sodium chromate
10034-85-2	1532: Hydrogen jodide
10034-88-5	2912: Sodium hydrogen sulfate
10054 00 5	monohydrate
10034-93-2	1510: Hydrazine sulfate
10034-96-5	2022: Manganese(II) sulfate
	monohydrate
10034-98-7	3481: Ytterbium sulfate
10034-98-7	3482: Ytterbium sulfate
	octahydrate
10034-99-8	1954: Magnesium sulfate
10025 01 5	heptahydrate
10035-01-5	34/3: Ytterbium chloride
10025 04 9	nexanydrate
10035-04-8	635. Calcium chlorata dihydrata
10035-05-9	480: Piemuth nitrate
10033-00-0	nentahydrate
10035-10-6	1520: Hydrogen bromide
10038-98-9	1419: Germanium(IV) chloride
10039-31-3	462: Bervllium selenate
10009 010	tetrahydrate
10039-32-4	2908: Sodium hydrogen
	phosphate dodecahydrate
10039-54-0	1546: Hydroxylamine sulfate
10039-55-1	1506: Hydrazine
	monohydroiodide
10042-76-9	3071: Strontium nitrate
10042-88-3	3159: Terbium chloride
10043-01-3	86: Aluminum sulfate
10043-11-5	527: Boron nitride
10043-35-3	520: Orthoboric acid
10043-52-4	632: Calcium chloride
10043-67-1	2408: Potassium aluminum
10043-84-2	2006: Manganese(II)
100.0012	hypophosphite monohydrate
10043-92-2	2609: Radon
10045-86-0	1290: Ferric phosphate dihydrate
10045-89-3	152: Ammonium ferrous sulfate
	hexahydrate
10045-94-0	2081: Mercury(II) nitrate
10045-94-0	2082: Mercury(II) nitrate
	hemihydrate
10045-95-1	2167: Neodymium nitrate
10048-95-0	2903: Sodium hydrogen arsenate
	heptahydrate
10048-98-3	363: Barium hydrogen phosphate
10048-99-4	410: Barium
10040 01 1	tetraiodomercurate(11)
10049-01-1	499: BISMUIN phosphate
10049-03-3	843: Chloring dioxida
10049-04-4	870: Chromium(II) shlarida
10049-03-3	3284: Titanium dichloride
10049-00-0	2640: Rhodium(III) chloride
10040 08 8	2693: Ruthenium(III) chloride
10049-00-0	man a second sec

10049-10-2	881: Chromium(II) fluoride
10049-11-3	915: Chromium(IV) fluoride
10049-12-4	3432: Vanadium trifluoride
10049-12-4	3433: Vanadium trifluoride
	trihydrate
10049-14-6	3381: Uranium tetrafluoride
100/19-16-8	3/29: Vanadium tetrafluoride
10049-10-8	2627: Phanium (VI) fluorida
10049-17-9	
10049-21-5	2868: Sodium dihydrogen
	phosphate monohydrate
10049-23-7	3153: Tellurous acid
10049-24-8	1606: Ir(III) bromide
10049-24-8	1607: Iridium(III) bromide
	tetrahydrate
10049-25-9	878: Chromium(II) bromide
10058-44-3	1292: Ferric pyrophosphate
	nonahydrate
10060-08-9	638: Calcium chromate
10060-09-0	590: Cadmium selenate
10000 07 0	dihydrate
10060 10 2	748: Caria fluorida
10000-10-3	
10060-11-4	1411: Germanium(11) chloride
10060-12-5	894: Chromium(III) chloride
	hexahydrate
10060-13-6	140: Ammonium copper(II)
	chloride dihydrate
10090-53-6	53: Aluminum iodide
	hexahydrate
10097-28-6	2769: Silicon monoxide
10099-58-8	1658: Lanthanum chloride
10099-60-2	1677: Lanthanum sulfate
10000 66 8	1840: Lutetium chloride
10099-00-8	1855: Lutetium nitrate
10099-07-9	1855. Lutetium mitate
10099-67-9	1856: Lutetium nitrate hydrate
10099-74-8	1718: Lead nitrate
10099-76-0	1715: Lead metasilicate
10099-76-0	1728: Lead silicate
10099-79-3	1744: Lead vanadate
10101-41-4	703: Calcium sulfate dihydrate
10101-50-5	2960: Sodium permanganate
	trihydrate
10101-52-7	3607: Zirconium silicate
10101-53-8	909: Chromium(III) sulfate
10101-53-8	911: Chromium(III) sulfate
10101-55-8	onto do colorado
10101 (2.0	
10101-63-0	1/14: Lead lodide
10101-68-5	2023: Manganese(II) sulfate
	tetrahydrate
10101-89-0	2965: Sodium phosphate
	dodecahydrate
10101-97-0	2236: Nickel sulfate hexahydrate
10101-98-1	2235: Nickel sulfate
	heptahydrate
10102-02-0	3554: Zinc nitrite
10102-03-1	2279: Nitrogen pentoxide
10102-03-1	2286: Nitrogen(V) oxide
10102 05 1	22200: Hurogen (V) oxide
10102-05-5	2400: Leonyl nitroto
10102-00-4	
10102-15-5	2989: Sodium sulfite
10105	heptahydrate
10102-17-7	3008: Sodium thiosulfate
	pentahydrate
10102-18-8	2977: Sodium selenite
10102-20-2	2993: Sodium tellurite(IV)
10102-23-5	2975: Sodium selenate
	decahydrate
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10102-24-6	1812: Lithium metasilicate
10102-25-7	1830: Lithium sulfate
	monohydrate
10102-34-8	1942: Magnesium pyrophosphate
	trihydrate
10102-40-6	2940: Sodium molybdate
	dihydrate
10102-43-9	2276: Nitric oxide
10102-44-0	2278: Nitrogen dioxide
10102-45-1	3208: Thallium(1) nitrate
10102-49-5	1265: Ferric arsenate dinydrate
10102-50-8	1300: Ferrous arsenate
10102 50 8	1635: Irop(II) arsenate
10102-50-8	664: Calcium iodide
10102-71-3	2833: Sodium aluminum sulfate
	dodecahydrate
10102-75-7	622: Calcium bromate
10102-75-7	623: Calcium bromate
	monohydrate
10102-83-4	2991: Sodium tellurate(VI)
10102-90-6	1117: Copper(II) pyrophosphate
	hydrate
10103-50-1	1877: Magnesium arsenate
	hydrate
10103-61-4	1061: Copper(II) arsenate
10108-64-2	568: Cadmium chloride
10112-91-1	2046: Mercury(I) chloride
10118-76-0	683: Calcium permanganate
10119-31-0	3018: Zirconyi nyaroxychioride
10124 26 4	505: Cadmium sulfata
10124-30-4	669: Calcium nitrate
10124-39-8	1695: Lead borate monohydrate
10124-41-1	712: Calcium thiosulfate
	hexahydrate
10124-43-3	1004: Cobalt(II) sulfate
10124-48-8	2062: Mercury(II) amide
	chloride
10124-48-8	2070: Mercury(II) chloride
	ammoniated
10124-50-2	2470: Potassium hydrogen
	arsenite
10124-50-2	2487: Potassium metaarsenite
10101 50 5	monohydrate
10124-53-5	1963: Magnesium thiosulfate
10124 56 9	2800. Sodium
10124-30-8	2899: Sodium
10125 13 0	1076: Copper(II) chloride
10125-15-0	dihydrate
10135-84-9	178: Ammonium hydrogen
10155 04 7	borate tribydrate
10138-04-2	150: Ammonium ferric sulfate
10120 01 2	dodecahydrate
10138-41-7	1220: Erbium chloride
10138-52-0	1358: Gadolinium chloride
10138-62-2	1482: Holmium chloride
10139-47-6	3549: Zinc iodide
10139-58-9	2643: Rhodium(III) nitrate
10141-05-6	986: Cobalt(II) nitrate
10163-15-2	2877: Sodium fluorophosphates
10170-69-1	1979: Manganese carbonyl
10179-73-4	1637: Iron(II) orthosilicate
10190-55-3	1716: Lead molybdate
10192-29-7	133: Ammonium chlorate
10192-30-0	188: Ammonium hydrogen
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	sulfite
10196-18-6	3552: Zinc nitrate hexahydrate
10210-64-7	436: Bervllium acetylacetonate
10210-68-1	935: Cobalt carbonyl
10213-09-9	3444. Vanadyl dichloride
10213-10-2	3013: Sodium tungstate
10213 10 2	dihydrate
10217 52 4	1502: Hydrozina hydrota
10217-32-4	2891. Sodium cold this sulfate
10233-88-2	dihudrata
10226 20.2	2004 Manager (II) hadre and
10230-39-2	2004: Manganese(II) nydrogen
10226 20 2	phosphate trinydrate
10236-39-2	2017: Manganese(11) phosphate
	heptahydrate
10241-05-1	2136: Molybdenum(V) chloride
10257-55-3	706: Calcium sulfite dihydrate
10277-43-7	1668: Lanthanum nitrate
	hexahydrate
10277-44-8	2592: Praseodymium sulfate
10290-12-7	1062: Copper(II) arsenite
10294-26-5	2819: Silver sulfate
10294-27-6	1429: Gold(I) bromide
10294-28-7	1435: Gold(III) bromide
10294-29-8	1431: Gold(I) chloride
10294-31-2	1433: Gold(I) iodide
10294-32-3	1442: Gold(III) selenate
10294-33-4	533: Boron tribromide
10294-34-5	534: Boron trichloride
10294-38-9	339: Barium chlorate
	monohydrate
10294-39-0	390: Barium perchlorate
10271070	trihydrate
	unijarate
10294-40-3	343. Barium chromate
10294-40-3 10294-41-4	343: Barium chromate 782: Cerous nitrate hexabydrate
10294-40-3 10294-41-4 10294-42-5	343: Barium chromate 782: Cerous nitrate hexahydrate 752: Ceric sulfate tetrahydrate
10294-40-3 10294-41-4 10294-42-5 10294-44-7	343: Barium chromate 782: Cerous nitrate hexahydrate 752: Ceric sulfate tetrahydrate 2045: Mercury(1) chlorate
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10294-40-3 10294-41-4 10294-42-5 10294-44-7 10294-46-9 10294-46-9 10294-48-1 10294-48-1 10294-50-5 10294-52-7 10294-53-8 10294-53-8 10294-54-9 10294-54-9 10294-62-9 10294-64-1 10294-65-2 10294-66-3 10294-66-3 10294-66-3 10294-70-9 10325-94-7 10326-21-3 10326-21-3	<ul> <li>343: Barium chromate</li> <li>782: Cerous nitrate hexahydrate</li> <li>752: Ceric sulfate tetrahydrate</li> <li>2045: Mercury(I) chlorate</li> <li>1113: Copper(II) perchlorate</li> <li>hexahydrate</li> <li>1699: Lead chlorate</li> <li>845: Chlorine heptoxide</li> <li>1164: Dichlorine heptoxide</li> <li>995: Cobalt(II) phosphate</li> <li>octahydrate</li> <li>1271: Ferric chromate</li> <li>1273: Ferric dichromate</li> <li>832: Cesium sulfate</li> <li>1712: Lead(II) hypophosphite</li> <li>1678: Lanthanum sulfate</li> <li>nonahydrate</li> <li>2486: Potassium manganate</li> <li>2491: Potassium nickel sulfate</li> <li>a034: Stannous iodide</li> <li>581: Cadmium nitrate</li> <li>1893: Magnesium chlorate</li> <li>hexahydrate</li> <li>3521: Zinc arsenite</li> <li>332: Barium bromate</li> <li>monohydrate</li> <li>341: Barium chloride dihydrate</li> </ul>
10294-40-3 10294-41-4 10294-42-5 10294-44-7 10294-46-9 10294-46-9 10294-48-1 10294-48-1 10294-50-5 10294-52-7 10294-53-8 10294-53-8 10294-54-9 10294-54-9 10294-64-1 10294-65-2 10294-66-3 10294-66-3 10294-66-3 10294-66-3 10294-66-3 10294-66-3 10294-66-3 10294-70-9 10325-94-7 10326-21-3	<ul> <li>343: Barium chromate</li> <li>782: Cerous nitrate hexahydrate</li> <li>752: Ceric sulfate tetrahydrate</li> <li>2045: Mercury(I) chlorate</li> <li>1113: Copper(II) perchlorate</li> <li>hexahydrate</li> <li>1699: Lead chlorate</li> <li>845: Chlorine heptoxide</li> <li>1164: Dichlorine heptoxide</li> <li>995: Cobalt(II) phosphate</li> <li>octahydrate</li> <li>1271: Ferric chromate</li> <li>1273: Ferric dichromate</li> <li>832: Cesium sulfate</li> <li>1712: Lead(II) hypophosphite</li> <li>1678: Lanthanum sulfate</li> <li>nonahydrate</li> <li>2486: Potassium manganate</li> <li>2491: Potassium nickel sulfate</li> <li>a034: Stannous iodide</li> <li>581: Cadmium nitrate</li> <li>1893: Magnesium chlorate</li> <li>hexahydrate</li> <li>3521: Zinc arsenite</li> <li>332: Barium bromate</li> <li>monohydrate</li> <li>341: Barium chloride dihydrate</li> <li>587: Cadmium perchlorate</li> </ul>
10294-40-3 10294-41-4 10294-42-5 10294-44-7 10294-46-9 10294-46-9 10294-48-1 10294-48-1 10294-50-5 10294-52-7 10294-53-8 10294-53-8 10294-54-9 10294-62-9 10294-64-1 10294-65-2 10294-66-3 10294-66-3 10294-66-3 10294-66-3 10294-66-3 10294-66-3 10294-66-3 10294-65-2 10326-21-3 10326-21-3	<ul> <li>343: Barium chromate</li> <li>782: Cerous nitrate hexahydrate</li> <li>752: Ceric sulfate tetrahydrate</li> <li>2045: Mercury(I) chlorate</li> <li>1113: Copper(II) perchlorate</li> <li>hexahydrate</li> <li>1699: Lead chlorate</li> <li>845: Chlorine heptoxide</li> <li>1164: Dichlorine heptoxide</li> <li>995: Cobalt(II) phosphate</li> <li>octahydrate</li> <li>1271: Ferric chromate</li> <li>1273: Ferric dichromate</li> <li>832: Cesium sulfate</li> <li>1712: Lead(II) hypophosphite</li> <li>1678: Lanthanum sulfate</li> <li>nonahydrate</li> <li>2486: Potassium manganate</li> <li>2491: Potassium thiosulfate</li> <li>3034: Stannous iodide</li> <li>581: Cadmium nitrate</li> <li>1893: Magnesium chlorate</li> <li>hexahydrate</li> <li>3521: Zinc arsenite</li> <li>332: Barium bromate</li> <li>monohydrate</li> <li>341: Barium chloride dihydrate</li> <li>587: Cadmium perchlorate</li> <li>hexahydrate</li> </ul>
10294-40-3 10294-41-4 10294-42-5 10294-44-7 10294-46-9 10294-46-9 10294-48-1 10294-48-1 10294-50-5 10294-52-7 10294-53-8 10294-53-8 10294-53-8 10294-62-9 10294-64-1 10294-65-2 10294-66-3 10294-65-2 10294-66-3 10294-66-3 10294-65-2 10326-21-3 10326-21-3 10326-24-6 10326-27-9 10326-28-0 10332-33-9	<ul> <li>343: Barium chromate</li> <li>782: Cerous nitrate hexahydrate</li> <li>752: Ceric sulfate tetrahydrate</li> <li>2045: Mercury(I) chlorate</li> <li>1113: Copper(II) perchlorate</li> <li>hexahydrate</li> <li>1699: Lead chlorate</li> <li>845: Chlorine heptoxide</li> <li>1164: Dichlorine heptoxide</li> <li>995: Cobalt(II) phosphate</li> <li>octahydrate</li> <li>1271: Ferric chromate</li> <li>1273: Ferric dichromate</li> <li>832: Cesium sulfate</li> <li>1712: Lead(II) hypophosphite</li> <li>1678: Lanthanum sulfate</li> <li>nonahydrate</li> <li>2486: Potassium maganate</li> <li>2491: Potassium nickel sulfate</li> <li>3034: Stannous iodide</li> <li>581: Cadmium nitrate</li> <li>1893: Magnesium chlorate</li> <li>hexahydrate</li> <li>3521: Zinc arsenite</li> <li>332: Barium bromate</li> <li>monohydrate</li> <li>341: Barium chloride dihydrate</li> <li>587: Cadmium perchlorate</li> <li>hexahydrate</li> <li>2954: Sodium perborate</li> </ul>

10340-06-4	737: Carbon sulfide telluride
10343-61-0	3301: Titanium sulfate
10343-62-1	2100: Metaphosphoric acid
10361-29-2	226: Ammonium
	sesquicarbonate
10361-37-2	340: Barium chloride
10361-43-0	483: Bismuth hydroxide
10361-46-3	196: Bismuth oxynitrate
10361 70 2	2570: Pressodymium chlorida
10301-79-2	2579. Flaseodymium chloride
10301-82-7	2705: Samarium chloride
10301-84-9	2726: Scandium chloride
10361-91-8	34/2: Ytterbium chloride
10361-92-9	3497: Yttrium chloride
10361-95-2	3530: Zinc chlorate
10377-37-4	1799: Lithium hydrogen
	carbonate
10377-48-7	1829: Lithium sulfate
10377-51-2	1804: Lithium iodide
10377-52-3	1825: Lithium phosphate
10377-58-9	1915: Magnesium jodide
10377-60-3	1973: Magnesium nitrate
10377 62 5	1926: Magnesium permanganate
10377-02-3	hovebydroto
10277 (( 0	2011: Manager and (II) without
10377-00-9	2011: Manganese(11) nitrate
10378-47-9	132: Ammonium cerium(IV)
	sulfate dihydrate
10378-47-9	746: Ceric ammonium sulfate
	dihydrate
10378-50-4	2509: Potassium perruthenate
10380-29-7	1131: Copper(II) tetraammine
	sulfate monohydrate
10380-31-1	426: Barium uranium oxide
10381-36-9	2225. Nickel phosphate
10001 00 9	hentahydrate
10381 36 0	2226: Nickel phosphate
10381-30-9	octabudrate
10201 27 0	octanyurate
	2254. The allower and feet
10381-37-0	3254: Thorium sulfate
10381-57-0	3254: Thorium sulfate nonahydrate
10381-37-0	<ul><li>3254: Thorium sulfate nonahydrate</li><li>3255: Thorium sulfate</li></ul>
10381-37-0	<ul><li>3254: Thorium sulfate nonahydrate</li><li>3255: Thorium sulfate octahydrate</li></ul>
10381-37-0 10381-37-0 10381-37-0	<ul><li>3254: Thorium sulfate nonahydrate</li><li>3255: Thorium sulfate octahydrate</li><li>3256: Thorium sulfate</li></ul>
10381-37-0 10381-37-0	<ul><li>3254: Thorium sulfate nonahydrate</li><li>3255: Thorium sulfate octahydrate</li><li>3256: Thorium sulfate tetrahydrate</li></ul>
10381-37-0 10381-37-0 10381-37-0 10402-15-0	<ul> <li>3254: Thorium sulfate nonahydrate</li> <li>3255: Thorium sulfate octahydrate</li> <li>3256: Thorium sulfate tetrahydrate</li> <li>1032: Copper citrate</li> </ul>
10381-37-0 10381-37-0 10402-15-0	<ul> <li>3254: Thorium sulfate nonahydrate</li> <li>3255: Thorium sulfate octahydrate</li> <li>3256: Thorium sulfate tetrahydrate</li> <li>1032: Copper citrate hemipentahydrate</li> </ul>
10381-37-0 10381-37-0 10402-15-0 10402-15-0	<ul> <li>3254: Thorium sulfate nonahydrate</li> <li>3255: Thorium sulfate octahydrate</li> <li>3256: Thorium sulfate tetrahydrate</li> <li>1032: Copper citrate hemipentahydrate</li> <li>1079: Copper(II) citrate</li> </ul>
10381-37-0 10381-37-0 10402-15-0 10402-15-0	<ul> <li>3254: Thorium sulfate nonahydrate</li> <li>3255: Thorium sulfate octahydrate</li> <li>3256: Thorium sulfate tetrahydrate</li> <li>1032: Copper citrate hemipentahydrate</li> <li>1079: Copper(II) citrate hemipentahydrate</li> </ul>
10381-37-0 10381-37-0 10381-37-0 10402-15-0 10402-15-0 10415-75-5	<ul> <li>3254: Thorium sulfate nonahydrate</li> <li>3255: Thorium sulfate octahydrate</li> <li>3256: Thorium sulfate tetrahydrate</li> <li>1032: Copper citrate hemipentahydrate</li> <li>1079: Copper(II) citrate hemipentahydrate</li> <li>2051: Mercury(I) nitrate</li> </ul>
10381-37-0 10381-37-0 10402-15-0 10402-15-0 10415-75-5	<ul> <li>3254: Thorium sulfate nonahydrate</li> <li>3255: Thorium sulfate octahydrate</li> <li>3256: Thorium sulfate tetrahydrate</li> <li>1032: Copper citrate hemipentahydrate</li> <li>1079: Copper(II) citrate hemipentahydrate</li> <li>2051: Mercury(I) nitrate dibydrate</li> </ul>
10381-37-0 10381-37-0 10402-15-0 10402-15-0 10415-75-5	<ul> <li>3254: Thorium sulfate nonahydrate</li> <li>3255: Thorium sulfate octahydrate</li> <li>3256: Thorium sulfate tetrahydrate</li> <li>1032: Copper citrate hemipentahydrate</li> <li>1079: Copper(II) citrate hemipentahydrate</li> <li>2051: Mercury(I) nitrate dihydrate</li> <li>1281: Ferrie nitrate</li> </ul>
10381-37-0 10381-37-0 10381-37-0 10402-15-0 10402-15-0 10415-75-5 10421-48-4	<ul> <li>3254: Thorium sulfate nonahydrate</li> <li>3255: Thorium sulfate octahydrate</li> <li>3256: Thorium sulfate tetrahydrate</li> <li>1032: Copper citrate hemipentahydrate</li> <li>1079: Copper(II) citrate hemipentahydrate</li> <li>2051: Mercury(I) nitrate dihydrate</li> <li>1281: Ferric nitrate</li> <li>2518: Potessium selanita</li> </ul>
10381-37-0 10381-37-0 10402-15-0 10402-15-0 10415-75-5 10421-48-4 10431-47-7	<ul> <li>3254: Thorium sulfate nonahydrate</li> <li>3255: Thorium sulfate octahydrate</li> <li>3256: Thorium sulfate tetrahydrate</li> <li>1032: Copper citrate hemipentahydrate</li> <li>1079: Copper(II) citrate hemipentahydrate</li> <li>2051: Mercury(I) nitrate dihydrate</li> <li>1281: Ferric nitrate</li> <li>2518: Potassium selenite</li> </ul>
10381-37-0 10381-37-0 10402-15-0 10402-15-0 10415-75-5 10421-48-4 10431-47-7 10450-55-2	<ul> <li>3254: Thorium sulfate nonahydrate</li> <li>3255: Thorium sulfate octahydrate</li> <li>3256: Thorium sulfate tetrahydrate</li> <li>1032: Copper citrate hemipentahydrate</li> <li>1079: Copper(II) citrate hemipentahydrate</li> <li>2051: Mercury(I) nitrate dihydrate</li> <li>1281: Ferric nitrate</li> <li>2518: Potassium selenite</li> <li>1266: Ferric basic acetate</li> </ul>
10381-37-0 10381-37-0 10402-15-0 10402-15-0 10415-75-5 10421-48-4 10431-47-7 10450-55-2 10450-55-2	<ul> <li>3254: Thorium sulfate nonahydrate</li> <li>3255: Thorium sulfate octahydrate</li> <li>3256: Thorium sulfate tetrahydrate</li> <li>1032: Copper citrate hemipentahydrate</li> <li>1079: Copper(II) citrate hemipentahydrate</li> <li>2051: Mercury(I) nitrate dihydrate</li> <li>1281: Ferric nitrate</li> <li>2518: Potassium selenite</li> <li>1266: Ferric basic acetate</li> <li>1640: Iron(III) acetate basic</li> </ul>
10381-37-0 10381-37-0 10402-15-0 10402-15-0 10402-15-0 10415-75-5 10421-48-4 10431-47-7 10450-55-2 10450-55-2 10450-59-6	<ul> <li>3254: Thorium sulfate nonahydrate</li> <li>3255: Thorium sulfate octahydrate</li> <li>3256: Thorium sulfate tetrahydrate</li> <li>1032: Copper citrate hemipentahydrate</li> <li>1079: Copper(II) citrate hemipentahydrate</li> <li>2051: Mercury(I) nitrate dihydrate</li> <li>1281: Ferric nitrate</li> <li>2518: Potassium selenite</li> <li>1266: Ferric basic acetate</li> <li>1640: Iron(III) acetate basic</li> <li>789: Cerous sulfate octahydrate</li> </ul>
10381-37-0 10381-37-0 10402-15-0 10402-15-0 10402-15-0 10415-75-5 10421-48-4 10431-47-7 10450-55-2 10450-55-2 10450-55-2 10450-59-6 10450-60-9	<ul> <li>3254: Thorium sulfate nonahydrate</li> <li>3255: Thorium sulfate octahydrate</li> <li>3256: Thorium sulfate tetrahydrate</li> <li>1032: Copper citrate hemipentahydrate</li> <li>1079: Copper(II) citrate hemipentahydrate</li> <li>2051: Mercury(I) nitrate dihydrate</li> <li>1281: Ferric nitrate</li> <li>2518: Potassium selenite</li> <li>1266: Ferric basic acetate</li> <li>1640: Iron(III) acetate basic</li> <li>789: Cerous sulfate octahydrate</li> <li>2341: Periodic acid</li> </ul>
10381-37-0         10381-37-0         10381-37-0         10402-15-0         10402-15-0         10415-75-5         10421-48-4         10431-47-7         10450-55-2         10450-55-2         10450-59-6         10450-60-9         10450-60-9	<ul> <li>3254: Thorium sulfate nonahydrate</li> <li>3255: Thorium sulfate octahydrate</li> <li>3256: Thorium sulfate tetrahydrate</li> <li>1032: Copper citrate hemipentahydrate</li> <li>1079: Copper(II) citrate hemipentahydrate</li> <li>2051: Mercury(I) nitrate dihydrate</li> <li>1281: Ferric nitrate</li> <li>2518: Potassium selenite</li> <li>1266: Ferric basic acetate</li> <li>1640: Iron(III) acetate basic</li> <li>789: Cerous sulfate octahydrate</li> <li>2341: Periodic acid</li> <li>2343: Periodic acid dihydrate</li> </ul>
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10381-37-0 10381-37-0 10402-15-0 10402-15-0 10415-75-5 10421-48-4 10431-47-7 10450-55-2 10450-55-2 10450-55-2 10450-60-9 10450-60-9 10466-65-6 10476-81-0	<ul> <li>3254: Thorium sulfate nonahydrate</li> <li>3255: Thorium sulfate octahydrate</li> <li>3256: Thorium sulfate tetrahydrate</li> <li>1032: Copper citrate hemipentahydrate</li> <li>1079: Copper(II) citrate hemipentahydrate</li> <li>2051: Mercury(I) nitrate dihydrate</li> <li>1281: Ferric nitrate</li> <li>2518: Potassium selenite</li> <li>1266: Ferric basic acetate</li> <li>1640: Iron(III) acetate basic</li> <li>789: Cerous sulfate octahydrate</li> <li>2341: Periodic acid</li> <li>2343: Periodic acid dihydrate</li> <li>2508: Potassium perrhenate</li> <li>3050: Strontium bromide</li> </ul>
10381-37-0 10381-37-0 10402-15-0 10402-15-0 10415-75-5 10421-48-4 10431-47-7 10450-55-2 10450-55-2 10450-55-2 10450-59-6 10450-60-9 10466-65-6 10476-81-0 10476-81-0	<ul> <li>3254: Thorium sulfate nonahydrate</li> <li>3255: Thorium sulfate octahydrate</li> <li>3256: Thorium sulfate tetrahydrate</li> <li>1032: Copper citrate hemipentahydrate</li> <li>1079: Copper(II) citrate hemipentahydrate</li> <li>2051: Mercury(I) nitrate dihydrate</li> <li>1281: Ferric nitrate</li> <li>2518: Potassium selenite</li> <li>1266: Ferric basic acetate</li> <li>1640: Iron(III) acetate basic</li> <li>789: Cerous sulfate octahydrate</li> <li>2341: Periodic acid</li> <li>2343: Periodic acid dihydrate</li> <li>2508: Potassium perrhenate</li> <li>3050: Strontium bromide</li> <li>3051: Strontium bromide</li> </ul>
10381-37-0 10381-37-0 10402-15-0 10402-15-0 10415-75-5 10421-48-4 10431-47-7 10450-55-2 10450-55-2 10450-59-6 10450-60-9 10450-60-9 10466-65-6 10476-81-0	<ul> <li>3254: Thorium sulfate nonahydrate</li> <li>3255: Thorium sulfate octahydrate</li> <li>3256: Thorium sulfate tetrahydrate</li> <li>1032: Copper citrate hemipentahydrate</li> <li>1079: Copper(II) citrate hemipentahydrate</li> <li>2051: Mercury(I) nitrate dihydrate</li> <li>1281: Ferric nitrate</li> <li>2518: Potassium selenite</li> <li>1266: Ferric basic acetate</li> <li>1640: Iron(III) acetate basic</li> <li>789: Cerous sulfate octahydrate</li> <li>2343: Periodic acid</li> <li>2343: Periodic acid dihydrate</li> <li>2508: Potassium perrhenate</li> <li>3050: Strontium bromide</li> <li>3051: Strontium bromide</li> <li>hexahydrate</li> </ul>
10381-37-0 10381-37-0 10381-37-0 10402-15-0 10402-15-0 10415-75-5 10421-48-4 10431-47-7 10450-55-2 10450-55-2 10450-59-6 10450-60-9 10450-60-9 10466-65-6 10476-81-0 10476-85-4	<ul> <li>3254: Thorium sulfate nonahydrate</li> <li>3255: Thorium sulfate octahydrate</li> <li>3256: Thorium sulfate tetrahydrate</li> <li>1032: Copper citrate hemipentahydrate</li> <li>1079: Copper(II) citrate hemipentahydrate</li> <li>2051: Mercury(I) nitrate dihydrate</li> <li>1281: Ferric nitrate</li> <li>2518: Potassium selenite</li> <li>1266: Ferric basic acetate</li> <li>1640: Iron(III) acetate basic</li> <li>789: Cerous sulfate octahydrate</li> <li>2343: Periodic acid</li> <li>2343: Periodic acid dihydrate</li> <li>2508: Potassium perhenate</li> <li>3050: Strontium bromide</li> <li>a055: Strontium chloride</li> </ul>
10381-37-0 10381-37-0 10381-37-0 10402-15-0 10402-15-0 10415-75-5 10421-48-4 10431-47-7 10450-55-2 10450-55-2 10450-59-6 10450-60-9 10450-60-9 1046-65-6 10476-81-0 10476-85-4 10476-85-4 10476-86-5	<ul> <li>3254: Thorium sulfate nonahydrate</li> <li>3255: Thorium sulfate octahydrate</li> <li>3256: Thorium sulfate tetrahydrate</li> <li>1032: Copper citrate hemipentahydrate</li> <li>1079: Copper(II) citrate hemipentahydrate</li> <li>2051: Mercury(I) nitrate dihydrate</li> <li>1281: Ferric nitrate</li> <li>2518: Potassium selenite</li> <li>1266: Ferric basic acetate</li> <li>1640: Iron(III) acetate basic</li> <li>789: Cerous sulfate octahydrate</li> <li>2343: Periodic acid</li> <li>2343: Periodic acid dihydrate</li> <li>2508: Potassium perrhenate</li> <li>3050: Strontium bromide hexahydrate</li> <li>3055: Strontium chloride</li> <li>3066: Strontium iodide</li> </ul>
10381-37-0 10381-37-0 10381-37-0 10402-15-0 10402-15-0 10402-15-0 10415-75-5 10421-48-4 10431-47-7 10450-55-2 10450-55-2 10450-55-2 10450-60-9 10450-60-9 10450-60-9 10466-65-6 10476-81-0 10476-85-4 10476-85-4	<ul> <li>3254: Thorium sulfate nonahydrate</li> <li>3255: Thorium sulfate octahydrate</li> <li>3256: Thorium sulfate tetrahydrate</li> <li>1032: Copper citrate hemipentahydrate</li> <li>1079: Copper(II) citrate hemipentahydrate</li> <li>2051: Mercury(I) nitrate dihydrate</li> <li>1281: Ferric nitrate</li> <li>2518: Potassium selenite</li> <li>1266: Ferric basic acetate</li> <li>1640: Iron(III) acetate basic</li> <li>789: Cerous sulfate octahydrate</li> <li>2341: Periodic acid</li> <li>2343: Periodic acid dihydrate</li> <li>3050: Strontium bromide hexahydrate</li> <li>3055: Strontium chloride</li> <li>3066: Strontium iodide</li> </ul>
10381-37-0 10381-37-0 10381-37-0 10402-15-0 10402-15-0 10415-75-5 10421-48-4 10431-47-7 10450-55-2 10450-55-2 10450-60-9 10450-60-9 10450-60-9 10466-65-6 10476-81-0 10476-85-4 10476-85-4 10476-86-5	<ul> <li>3254: Thorium sulfate nonahydrate</li> <li>3255: Thorium sulfate octahydrate</li> <li>3256: Thorium sulfate tetrahydrate</li> <li>1032: Copper citrate hemipentahydrate</li> <li>1079: Copper(II) citrate hemipentahydrate</li> <li>2051: Mercury(I) nitrate dihydrate</li> <li>1281: Ferric nitrate</li> <li>2518: Potassium selenite</li> <li>1266: Ferric basic acetate</li> <li>1640: Iron(III) acetate basic</li> <li>789: Cerous sulfate octahydrate</li> <li>2341: Periodic acid</li> <li>2343: Periodic acid dihydrate</li> <li>2508: Potassium perrhenate</li> <li>3050: Strontium bromide</li> <li>absolit: Strontium chloride</li> <li>3066: Strontium iodide</li> <li>absolite acid</li> </ul>
10381-37-0 10381-37-0 10381-37-0 10402-15-0 10402-15-0 10415-75-5 10421-48-4 10431-47-7 10450-55-2 10450-55-2 10450-60-9 10450-60-9 10450-60-9 10476-85-4 10476-85-4 10476-86-5 10476-80-7	<ul> <li>3254: Thorium sulfate nonahydrate</li> <li>3255: Thorium sulfate octahydrate</li> <li>3256: Thorium sulfate tetrahydrate</li> <li>1032: Copper citrate hemipentahydrate</li> <li>1079: Copper(II) citrate hemipentahydrate</li> <li>2051: Mercury(I) nitrate dihydrate</li> <li>1281: Ferric nitrate</li> <li>2518: Potassium selenite</li> <li>1266: Ferric basic acetate</li> <li>1640: Iron(III) acetate basic</li> <li>789: Cerous sulfate octahydrate</li> <li>2341: Periodic acid</li> <li>2343: Periodic acid dihydrate</li> <li>2508: Potassium perrhenate</li> <li>3050: Strontium bromide</li> <li>hexahydrate</li> <li>3055: Strontium chloride</li> <li>3066: Strontium iodide</li> <li>hexahydrate</li> <li>2055: Scdium perherate</li> </ul>
10381-37-0 10381-37-0 10381-37-0 10402-15-0 10402-15-0 10415-75-5 10421-48-4 10431-47-7 10450-55-2 10450-55-2 10450-55-2 10450-60-9 10450-60-9 10466-65-6 10476-81-0 10476-85-4 10476-85-5 10486-00-7	<ul> <li>3254: Thorium sulfate nonahydrate</li> <li>3255: Thorium sulfate octahydrate</li> <li>3256: Thorium sulfate tetrahydrate</li> <li>1032: Copper citrate hemipentahydrate</li> <li>1079: Copper(II) citrate hemipentahydrate</li> <li>2051: Mercury(I) nitrate dihydrate</li> <li>1281: Ferric nitrate</li> <li>2518: Potassium selenite</li> <li>1266: Ferric basic acetate</li> <li>1640: Iron(III) acetate basic</li> <li>789: Cerous sulfate octahydrate</li> <li>2341: Periodic acid</li> <li>2343: Periodic acid dihydrate</li> <li>3050: Strontium bromide</li> <li>3051: Strontium bromide</li> <li>3055: Strontium chloride</li> <li>3066: Strontium iodide</li> <li>3067: Strontium perborate</li> <li>ttoshydrate</li> </ul>
10381-37-0         10381-37-0         10381-37-0         10402-15-0         10402-15-0         10415-75-5         10415-75-5         10421-48-4         10431-47-7         10450-55-2         10450-55-2         10450-60-9         10450-60-9         10476-81-0         10476-85-4         10476-85-5         10486-00-7	<ul> <li>3254: Thorium sulfate nonahydrate</li> <li>3255: Thorium sulfate octahydrate</li> <li>3256: Thorium sulfate tetrahydrate</li> <li>1032: Copper citrate hemipentahydrate</li> <li>1079: Copper(II) citrate hemipentahydrate</li> <li>2051: Mercury(I) nitrate dihydrate</li> <li>1281: Ferric nitrate</li> <li>2518: Potassium selenite</li> <li>1266: Ferric basic acetate</li> <li>1640: Iron(III) acetate basic</li> <li>789: Cerous sulfate octahydrate</li> <li>2343: Periodic acid</li> <li>2343: Periodic acid dihydrate</li> <li>3050: Strontium bromide</li> <li>3051: Strontium bromide</li> <li>3055: Strontium chloride</li> <li>3066: Strontium iodide</li> <li>3067: Strontium iodide</li> <li>hexahydrate</li> <li>2955: Sodium perborate tetrahydrate</li> </ul>

10534-89-1	1471: Hexaamminecobalt(III)
10544 72 (	
10544-72-6	2281: Nitrogen tetroxide
10544-73-7	2285: Nitrogen trioxide
10553-31-8	333: Barium bromide
10555-76-7	2932: Sodium metaborate
105/5 /0 0	tetrahydrate
10567-69-8	370: Barium iodate
10580-03-7	250: Ammonium titanium
10580-52-6	3412: Vanadium dichloride
11065 24 0	1601. Iridium corbonul
11003-24-0	
110/1-61-/	2298: Octadecaborane(22)
11077-24-0	1301: Ferrocenium
11000 20 (	
11089-20-6	2147: Molybdic silicic acid
11103-72-3	2688: Ruthenium ammoniated
11105 72 5	oxychloride
11104-88-4	2350: Phosphomolybdic acid
11101 00 1	hydrate
11113-63-6	722: Carbon
11116 03 3	2308: Plutonium(IV) oxide
11110-05-5	2598. Flutomani(TV) oxide
11120-23-3	231: Annionium tungstate(VI)
11121-16-/	23: Aluminum borate
11126-81-1	25: Aluminum bromate
11120 00 1	
11129-08-1	324: Barium aluminate
11138-11-7	355: Barium ferrite
11138-49-1	2827: Sodium $\beta$ -aluminum oxide
12002-03-8	1057: Copper(II) acetate
	metaarsenite
12002-28-7	1539: Hydrogen
	tetracarbonylferrate(II)
12002-28-7	3184: Tetracarbonyldihydroiron
12002-61-8	10: Actinium oxide
12002-61-8	9: Actinium oxalate decahydrate
12002-99-2	2821: Silver telluride
12003-63-1	2407: Potassium aluminate
	trihydrate
12003-65-5	1651: Lanthanum aluminum
	oxide
12003-67-7	1808: Lithium metaaluminate
12003-72-4	2106: Molybdenum aluminide
12004-04-5	323: Barium aluminate
12004-06-7	137: Beryllium aluminate
12004-20-4	76: Aluminum phosphate
12004-27-4	trihvdroxide
12004-37-4	3048: Strontium aluminate
12004-39-6	93. Aluminum titanate
12004 59 0	95: Aluminum zirconium
12004-30-1	2187: Niekel aluminide
12004-71-0	
12004-76-1	3113: Tantalum aluminide
12004-83-0	3586: Zirconium aluminide
12005-21-9	3486: Yttrium aluminum oxide
12005-67-3	115: Americium(IV) oxide
12005-69-5	525: Boron arsenide
12005-75-3	1031: Copper arsenide
12005-82-2	2797: Silver hexafluoroarsenate
12005-86-6	2891: Sodium hexafluoroarsenate
12006-15-4	561: Cadmium arsenide
12006 40 5	3520: Zine arsenide
12000-40-3	022. Cabalt hard-
12006-77-8	955: Coball Doride
12006-79-0	8/0: Unromium monoboride
12006-80-3	864: Chromium boride
12006-84-7	1618: Iron boride

12006-85-8	1619: Iron boride
12006-99-4	2107: Molybdenum boride
12007-00-0	2197: Nickel boride
12007-01-1	2196: Nickel boride
12007-02-2	2198: Nickel boride
12007-07-7	3114: Tantalum boride
12007-09-9	3330: Tungsten boride
12007-10-2	3331: Tungsten boride
12007-16-8	868: Chromium diboride
12007-23-7	144/: Hafnium boride
12007-25-9	1882: Magnesium diharida
12007-23-9	2240: Niobium boride
12007-29-3	2251: Niobium diboride
12007-33-9	538: Boron trisulfide
12007-34-0	2723: Scandium boride
12007-36-2	3369: Uranium diboride
12007-37-3	3410: Vanadium diboride
12007-38-4	865: Chromium boride
12007-56-6	680: Calcium perborate
	heptahydrate
12007-60-2	1834: Lithium tetraborate
12007-81-7	2760: Silicon boride
12007-84-0	3378: Uranium tetraboride
12007-97-5	2116: Molybdenum pentaboride
12007-98-6	3354: Tungsten pentaboride
12007-99-7	621: Calcium boride
12008-02-5	760: Cerium hexaboride
12008-05-8	1239: Europium boride
12008-06-9	1356: Gadolinium boride
12008-19-4	14/4: Hexaborane(12)
12008-21-8	1052: Lanthanum boride
12008-22-9	2154: Neodymium boride
12008-23-0	2575: Praseodymium boride
12008-27-4	532: Boron silicide
12008-29-6	2701: Samarium boride
12008-32-1	3492: Yttrium boride
12009-14-2	381: Barium niobate
12009-18-6	403: Barium stannate
12009-18-6	404: Barium stannate trihydrate
12009-21-1	429: Barium zirconate
12009-27-5	421: Barium titanate
12009-31-3	422: Barium titanate
12009-36-8	414: Barium telluride
12011-67-5	1620: Iron carbide
12011-97-1	2108: Molybdenum carbide
12011-99-3	2250: Niobium carbide
12012-16-7	3235: Thorium carbide
12012-17-8	3418: Vanadium monocarbide
12012-32-7	757: Cerium carbide
12012-33-0	037: Cobalt disulfide
12013-10-4	1021: Magnesium molybdate
12013-21-7	699: Calcium stannate
12013 40 0	trihydrate
12013-47-7	716: Calcium zirconate
12013-55-7	697: Calcium silicide
12013-56-8	698: Calcium silicide
12013-57-9	<b>5</b> 00 <b>G</b> 1 <b>i i</b> 11 <b>i</b> 1
12013-60-3	708: Calcium telluride
12013-07-5	691: Calcium plumbate
12013-82-0	691: Calcium telluride 671: Calcium nitride
12013-82-0 12014-14-1	<ul><li>708: Calcium telluride</li><li>691: Calcium plumbate</li><li>671: Calcium nitride</li><li>604: Cadmium titanate</li></ul>
12013-82-0 12014-14-1 12014-29-8	<ul><li>708: Calcium telluride</li><li>691: Calcium plumbate</li><li>671: Calcium nitride</li><li>604: Cadmium titanate</li><li>560: Cadmium antimonide</li></ul>
12013-89-5 12013-82-0 12014-14-1 12014-29-8 12014-56-1	<ul> <li>708: Calcium telluride</li> <li>691: Calcium plumbate</li> <li>671: Calcium nitride</li> <li>604: Cadmium titanate</li> <li>560: Cadmium antimonide</li> <li>749: Ceric hydroxide</li> </ul>

12014-82-3	761: Cerium monosulfide
12014-85-6	764: Cerium silicide
12014-93-6	790: Cerous sulfide
12014-97-0	791: Cerous telluride
12016-69-2	966: Cobalt(II) chromite
12016-80-7	1022: Cobalt(III) oxide
	hydroxide
12016-80-7	1023: Cobalt(III) oxide
	monohydrate
12017-01-5	940: Cobalt metatitanate
12017-01-5	1011: Cobalt(II) titanate
12017-08-2	1001: Cobalt(II) silicate
12017-12-8	936: Cobalt disilicide
12017-12-8	947: Cobalt silicide
12017-13-9	1008: Cobalt(II) telluride
12017-38-8	945: Cobalt orthotitanate
12017-94-6	1661: Lanthanum chromite
12018-01-8	916: Chromium(IV) oxide
12018-09-6	869: Chromium disilicide
12018-10-9	10/8: Copper(II) chromite
12018-19-8	3533: Zinc chromite
12018-22-3	912: Chromium(III) suinde
12018-34-7	873: Chromium(II,III) oxide
12018-30-9	876: Chromium silicide
12018-01-0	1086: Compor(II) formata
12018-79-0	1122: Copper(II) stannate
12019-07-7	1133: Copper(II) titanate
12019-08-8	1129: Copper(II) telluride
12019-23-7	1053: Copper(I) telluride
12019-57-7	1034: Copper phosphide
12019-88-4	1202: Dysprosium nitride
12020-14-3	3589: Zirconium carbide
12020-21-2	1227: Erbium nitride
12020-28-9	1231: Erbium silicide
12020-39-2	1235: Erbium telluride
12020-58-5	1241: Europium nitride
12020-65-4	1248: Europium(II) sulfide
12020-66-5	1246: Europium(II) selenide
12020-69-8	1249: Europium(II) telluride
12021-58-8	2331: Palladium(III) fluoride
12021-68-0	943: Cobalt nitrosodicarbonyl
12021-70-4	1318: Ferrous hexafluorosilicate
	hexahydrate
12022-02-5	158: Ammonium
	heptafluorotantalate
12022-95-6	1630: Iron silicide
12022-99-0	1621: Iron disilicide
12022-99-0	1919: Magnesium metasilicate
12023-53-9	1628: Iron phosphide
12023-71-1	1854: Lutetium iron oxide
12023-91-5	3059: Strontium territe
12023-99-3	1395: Gallium(III) hydroxide
12024-10-1	1388: Gallium(II) sullide
12024-11-2	1387. Gallium(II) selellurida
12024-14-5	3416: Vanadium gallide
12024-13-0	1385: Gallium subovide
12024-21-4	1399: Gallium(III) oxide
12024-22-5	1405: Gallium(III) sulfide
12024-24-7	1402: Gallium(III) selenide
12024-27-0	1406: Gallium(III) telluride
12024-36-1	1361: Gadolinium gallium garnet
12024-81-6	1370: Gadolinium(II) selenide
12024-89-4	1376: Gadolinium titanate
12025-13-7	1907: Magnesium germanate

12025-19-3 12025-32-0 12025-34-2 12025-39-7 12026-66-3	2933: Sodium metagermanate 1416: Germanium(II) sulfide 1426: Germanium(IV) sulfide 1417: Germanium(II) telluride 117: Ammonium 12-molybdophosphate hydrate
12027-06-4 12028-48-7	<ul><li>194: Ammonium iodide</li><li>197: Ammonium metatungstate hexahydrate</li></ul>
12029-81-1	1488: Holmium nitride
12029-98-0	1592: Iodine pentoxide
12030-14-7	1563: Indium(II) sulfide
12030-24-9	1614: Iridium(IV) oxide
12030-85-2	2492: Potassium niobate
12030-88-5	2528: Potassium superoxide
12030-91-0	2529: Potassium tantalate
12030-97-6	2558: Potassium titanate
12030-98-7	1667: Lanthanum monosulfide
12031-43-5	1672: Lanthanum oxysulfide
12031-49-1	1680: Lanthanum sulfide
12031-53-7	1681: Lanthanum telluride
12031-63-9	1814: Lithium niobate
12031-00-2	1832: Lithium tantalate
12031-82-2	1841: Lithium titanate
12031-83-3	1844: Lithium zirconate
12032-13-2	1861: Lutetium silicide
12032-20-1	1859: Lutetium oxide
12032-27-0	trihydrate
12032-30-3	1920: Magnesium metatitanate
12032-31-4	1968: Magnesium zirconate
12032-35-8	1903: Magnesium dititanate
12032-30-9	1930. Magnesium sunde 1929: Magnesium orthotitanate
12032-69-8	1981: Manganese niobate
12032-74-5	2027: Manganese(II) titanate
12032-78-9	1984: Manganese phosphide
12032-82-5	1973: Manganese antimonide
12032-80-9	2025: Manganese(II) telluride
12032-89-2	2037: Manganese(IV) telluride
12032-97-2	1974: Manganese antimonide
12033-19-1	2113: Molybdenum mononitride
12033-29-3	2146: Molybdenum (VI) sulfide
12033-31-7	2127: Molybdenum IIII ac
12033-54-4	2392: Plutonium nitride
12033-62-4	3121: Tantalum nitride( $\delta$ )
12033-62-4	3122: Tantalum nitride(E)
12033-64-0	3246: Thorium nitride
12033-72-6	3347: Tungsten nitride
12033-82-8	3072: Strontium nitride
12033-83-9	3388: Uranium trinitride
12033-88-4	2280: Nitrogen selenide
12033-09-3	2942: Sodium niobate
12034-15-0	2937: Sodium metatantalate
12034-36-5	3009: Sodium titanate
12034-39-8	3003: Sodium tetrasulfide
12034-57-0 12034-50-2	2257: Niobium(II) oxide
12034-39-2	

12034-66-1 2256: Niobium phosphide 2262: Niobium(IV) selenide 12034-77-4 12034-80-9 2252: Niobium disilicide 12034-83-2 2264: Niobium(IV) telluride 1717: Lead niobate 12034-88-7 12034-89-8 3070: Strontium niobate 12035-32-4 2177: Neodymium sulfide 12035-35-7 2178: Neodymium telluride 2231: Nickel stannate dihydrate 12035-38-0 12035-39-1 2241: Nickel titanate 12035-52-8 2191: Nickel antimonide 2227: Nickel phosphide 12035-64-2 12035-72-2 2233: Nickel subsulfide 2183: Neptunium(IV) oxide 12035-79-9 2386: Platinum(II) oxide 12035-82-4 12035-90-4 3133: Tantalum tetroxide 12035-98-2 3420: Vanadium monoxide 12036-02-1 2307: Osmium(IV) oxide 12036-09-8 2620: Rhenium(IV) oxide 12036-10-1 2696: Ruthenium(IV) oxide 3136: Technetium dioxide 12036-16-7 12036-21-4 3414: Vanadium dioxide 12036-22-5 3339: Tungsten dioxide 12036-23-6 3600: Zirconium oxide 12036-32-7 2598: Praseodymium(III) oxide 12036-35-0 2645: Rhodium(III) oxide 12036-39-4 3095: Strontium zirconate 12036-43-0 3582: Zinc titanate 12036-44-1 3270: Thulium oxide 12036-46-3 274: Antimony(III) phosphate 12037-01-3 3171: Terbium(III,IV) oxide 12037-29-5 2599: Praseodymium(III,IV) oxide 12037-63-7 3129: Tantalum phosphide 3299: Titanium phosphide 12037-65-9 12037-80-8 3604: Zirconium phosphide 12037-82-0 2358: Phosphorus heptasulfide 2595: Praseodymium telluride 12038-12-9 12038-13-0 2594: Praseodymium sulfide 2623: Rhenium(IV) sulfide 12038-63-0 12038-64-1 2621: Rhenium(IV) selenide 2622: Rhenium(IV) silicide 12038-66-3 12038-67-4 2632: Rhenium(VII) sulfide 12039-07-5 3294: Titanium monosulfide 12039-13-3 3290: Titanium disulfide 12039-15-5 3610: Zirconium sulfide 3311: Titanium trisulfide 12039-16-6 12039-19-9 3511: Yttrium sulfide 12039-35-9 3518: Zinc antimonide 12039-55-3 3130: Tantalum selenide 3419: Vanadium monosilicide 12039-76-8 12039-79-1 3131: Tantalum silicide 12039-80-4 3168: Terbium silicide 12039-83-7 3300: Titanium silicide 12039-84-8 3271: Thulium silicide 12039-87-1 3415: Vanadium disilicide 12039-88-2 3342: Tungsten disilicide 12039-89-3 3480: Ytterbium silicide 12039-90-6 3608: Zirconium silicide 12039-95-1 3364: Tungsten trisilicide 12040-00-5 2718: Samarium telluride 12040-02-7 3043: Stannous telluride 12041-50-8 36: Aluminum diboride 12041-54-2 38: Aluminum dodecaboride 12042-68-1 614: Calcium aluminate 12042-78-3 615: Calcium aluminate( $\beta$ )

12043-29-7	90: Aluminum telluride
12044-16-5	1617: Iron arsenide
12044-42-7	932: Cobalt arsenide
12044-49-4	1878: Magnesium arsenide
12044 54 1	200: A magnesic(III) tallumida
12044-34-1	309: Arsenic(III) tenuride
12045-01-1	934: Cobalt boride
12045-15-7	1976: Manganese boride
12045-16-8	1977. Manganese boride
12045 10 0	2249: Nichians herida
12045-19-1	2248: Niobium boride
12045-19-1	2254: Niobium monoboride
12045-27-1	3417: Vanadium monoboride
12045-63-5	3281: Titanium boride
12045 64 6	3587: Zirconium boride
12045-04-0	
12045-77-1	1496: Holmium boride
12045-78-2	2534: Potassium tetraborate
	tetrahvdrate
120/15-87-3	2007: Sodium tetrahorate
120-5-07-5	
	tetranydrate
12045-88-4	2996: Sodium tetraborate
	pentahydrate
12045-94-2	3358: Tungsten tetrabromide
12045-94-2	
12046-08-1	359: Barium hexaboride
12046-54-7	3061: Strontium hexaboride
12047-25-5	374: Barium lead oxide
12047-27-7	123: Barium titanate
12047-27-7	423. Darium titaliate
12047-34-6	412: Barium tantalate
12047-79-9	383: Barium nitride
12048-50-9	512: Bismuth tetroxide
12048-51-0	514: Bismuth titanate
12040 50 2	712. C-1-i titt-
12049-50-2	/15: Calcium titanate
12050-35-0	600: Cadmium tantalate
12052-28-7	970: Cobalt(II) diiron tetroxide
12052-42-5	928. Cobalt antimonide
12052 42 5	962: Charmine antimoride
12055-12-2	862: Chromium antimonide
12053-13-3	875: Chromium selenide
12053-26-8	1897: Magnesium chromite
12053-27-9	871: Chromium nitride
12053 27 9	012: Chromium (III) tallurida
12033-39-3	915. Chronnuni(111) tenuride
12053-66-6	823: Cesium niobate
12054-48-7	2213: Nickel hydroxide
12054-85-2	199: Ammonium molvbdate
	tetrahydrate
10055 00 1	
12055-23-1	1458: Hafnium oxide
12055-24-2	1467: Hafnium titanate
12055-62-8	1490: Holmium oxide
12056-07-4	1575: Indium(III) selenide
12056 00 5	1675. Length annual science
12030-90-5	1075: Lanunanum silicide
12057-17-9	1806: Lithium manganate
12057-24-8	1821: Lithium oxide
12057-71-5	1926: Magnesium nitride
12057 74 9	1040: Magnasium phagphida
12037-74-8	1940. Wagnesium phosphide
12057-75-9	1876: Magnesium antimonide
12057-92-0	2038: Manganese(VII) oxide
12058-18-3	2133: Molybdenum(IV)
12050 10 5	colonido
	selenide
12058-20-7	2135: Molybdenum(IV)
	telluride
12058-85-4	2966: Sodium phosphide
12050 14 2	2230: Nickel silieide
12039-14-2	
12059-51-7	2672: Rubidium niobate
12060-00-3	1741: Lead titanate
12060-01-4	1745: Lead zirconate
12060 00 1	2731: Scandium ovida
12000-08-1	
12060-58-1	2/13: Samarium oxide
12060-59-2	3092: Strontium titanate
12061-16-4	1229: Erbium oxide
.2001 10 4	

12062-24-7	1096: Copper(II)
	hexafluorosilicate
	tetrahydrate
12063-56-8	3504: Yttrium iron oxide
12063-98-8	1384: Gallium phosphide
12064-03-8	1380: Gallium antimonide
12064-62-9	1368: Gadolinium oxide
12065-10-0	1415: Germanium(II) selenide
12065-11-1	1425: Germanium(IV) selenide
12065-36-0	1408: Germanium nitride
12065-68-8	1733: Lead tantalate
12065-74-6	3089: Strontium tantalate
12066-83-0	2591: Praseodymium silicide
12067-00-4	2624: Rhenium(IV) telluride
12067-15-3	3291: Titanium ditelluride
12067-22-0	2/1/: Samarium sulfide
12067-26-4	3357: Tungsten telluride
12067-45-7	3289: Titanium diselenide
12067-46-8	3341: Tungsten diselenide
12067-54-8	3253: Thorium silicide
12067-56-0	3134: Tantalum trisilicide
12067-57-1	
12067-66-2	3132: Tantalum telluride
12067-99-1	2376: Phosphotungstic acid
120(9,40,5	24-nyurate
12068-40-5	1/00: Litinium aluminum silicate
12008-49-4	1034: Iron(11) aluminate
12008-31-8	18/1: Magnesium aluminum
12068 60 8	501: Piemuth colonido
12008-09-8	3147: Tellurium culfate
12068 00 5	2006: Mercury(II) telluride
12069-00-0	1726: Lead selenide
12069-32-8	526: Boron carbide
12069-69-1	1073: Copper(II) carbonate
12007 07 1	hydroxide
12069-85-1	1450: Hafnium carbide
12069-89-5	2109: Molybdenum carbide
12069-94-2	2259: Niobium(IV) carbide
12070-06-3	3120: Tantalum monocarbide
12070-07-4	3115: Tantalum carbide
12070-08-5	3282: Titanium carbide
12070-09-6	3373: Uranium monocarbide
12070-10-9	3408: Vanadium carbide
12070-12-1	3333: Tungsten carbide
12070-13-2	3332: Tungsten carbide
12071-15-7	1655: Lanthanum carbide
12071-29-3	3052: Strontium carbide
12071-31-7	3237: Thorium dicarbide
12071-33-9	3370: Uranium dicarbide
12071-35-1	3495: Yttrium carbide
12077-35-1	3116: Tantalum diboride
12079-58-2	719: Carbon
12083-48-6	3440: Vanadocene dichloride
12084-29-6	322: Barium acetylacetonate
	octahydrate
12086-48-6	3407: Vanadium
	bis(cyclopentadienyl)
	dichloride
12088-65-2	1623: Iron dodecacarbonyl
12093-05-9	1147: Cyclooctatetraene iron
	tricarbonyl
12108-13-3	2102: Methylcyclopentadienyl-
	manganese tricarbonyl
12115-63-8	758: Cerium carbide
12116-66-4	1468: Hafnocene dichloride

12124-97-9	125: Ammonium bromide
12124_00_1	187: A mmonium hydrogen sulfide
12124-77-1	157. Ammonium fluorido
12125-01-8	155: Ammonium Iluoride
12125-02-9	134: Ammonium chloride
12125-08-5	164: Ammonium
	hexachloroosmiate(IV)
12125-09-6	2352: Phosphonium iodide
12125-19-8	3365: Tungsten trisulfide
12125 22 3	2320: Palladium(II) sulfide
12125-22-5	1957: Lastations mitride
12125-25-0	
12125-63-2	1631: Iron telluride
12133-07-2	1206: Dysprosium silicide
12133-10-7	1208: Dysprosium sulfide
12133-28-7	658: Calcium hydrosulfide
	hexahydrate
12133-44-7	589: Cadmium phosphide
12134-02-0	946: Cobalt phosphide
12134-02-0	007. Cabalt phosphile
12134-02-0	997: Cobait phosphide
12134-22-4	838: Cesium trioxide
12134-75-7	1371: Gadolinium silicide
12134-77-9	1374: Gadolinium sulfide
12135-52-3	715: Calcium vanadate
12135-76-1	230: Ammonium sulfide
12136-24-2	1492: Holmium silicide
12136-42-4	1613: Iridium(III) sulfide
12130-42-4	2400: Determinent men en inte
12130-43-7	2490: Potassium monoxide
12136-58-2	1831: Lithium sulfide
12136-78-6	2118: Molybdenum silicide
12136-97-9	2263: Niobium(IV) sulfide
12137-04-1	2174: Neodymium silicide
12137-12-1	2245: Nickel(II,III) sulfide
12137-20-1	3295: Titanium monoxide
12137 20 1	2648: Phodium(IV) oxide
12137-27-0	dihadaata
	dinydrate
12137-34-7	2684: Rubidium titanate
12137-83-6	2380: Platinum silicide
12138-07-7	3257: Thorium sulfide
12138-08-8	3427: Vanadium sulfide
12138-09-9	3343: Tungsten disulfide
12138-11-3	3170 <sup>.</sup> Terbium sulfide
12138-17-9	3425: Vanadium pentasulfide
12130 17 2	2085: Strontium silisida
12136-26-2	
12139-23-0	607: Cadmium zirconate
12139-93-4	1002: Cobalt(II) stannate
12140-41-9	1333: Ferrous tantalate
12141-45-6	80: Aluminum silicate
12141-46-7	83: Aluminum silicate
12142-33-5	2521: Potassium stannate
	trihydrate
12142-88-0	2238. Nickel telluride
12172-00-0	2006: Strontium stannata
12143-34-9	2512. Vttainer
12143-39-4	5512: Yttrium vanadate
12143-72-5	3117: Tantalum disulfide
12143-96-3	1890: Magnesium carbonate
	hydroxide trihydrate
12150-46-8	1299:
	1.1'-Bis(diphenvlphosphino)
	ferrocene
12152.72.6	1146: Cyclohevadiana iron
12132-12-0	tuisanharri
10154 05 0	uricarbonyi
12154-95-9	1149: Cyclopentadienyliron
	dicarbonyl dimer
12158-56-4	835: Cesium tantalate
12159-07-8	1035: Copper silicide
12159-43-2	1209: Dysprosium telluride
12159-66-9	1234: Erbium sulfide

12162-21-9	1461: Hafnium selenide
12162-59-3	1494: Holmium sulfide
12162-61-7	1495: Holmium telluride
12163-00-7	1807: Lithium manganite
12163-20-1	1864: Lutetium sulfide
12163-22-3	1865: Lutetium telluride
12163-26-7	1922: Magnesium niobate
12163-69-8	2117: Molybdenum phosphide
12164-01-1	3146: Tellurium nitride
12164-94-2	122: Ammonium azide
12166-29-9	2733: Scandium sulfide
12166-30-2	3273: Thulium sulfide
12166-44-8	2734: Scandium telluride
12166-47-1	3606: Zirconium selenide
12167-74-7	660: Calcium hydroxide phosphate
12168-52-4	1336: Ferrous titanate
12168-85-3	678: Calcium oxide silicate
12179-02-1	2920: Sodium hydroxide
	monohydrate
12183-80-1	81: Aluminum silicate
12185-10-3	2357: Phosphorus (white)
12186-97-9	3487: Yttrium antimonide
12187-14-3	580: Cadmium niobate
12190-79-3	1783: Lithium cobaltite
12193-47-4	3047: Strontium acetylacetonate
12196-91-7	931: Cobalt arsenide
12201-48-8	3016: Sodium zirconate
12201-89-7	2209: Nickel disilicide
12202-79-8	3395: Uranyl carbonate
12205-73-1	3620: Zirconyl perchlorate
12200 08 2	octahydrate
12209-98-2	2980: Sodium stannate trinydrate
12211-52-8	141: Ammonium cyanide
12214-10-3	855: Cesium suilide
12218-30-9	442: Dorullium horida III
12228-40-9	1980: Manganese diboride
12228-30-1	1980. Mangaliese ulboride
12228-80-5	tetrahorate dibydrate
12228-87-4	235: Ammonium tetraborate
12220 07 4	tetrahydrate
12228-91-0	1994: Manganese(II) borate
12220 91 0	octahydrate
12228-91-0	2026: Manganese(II) tetraborate
12220 /1 0	octahydrate
12229-12-8	210: Ammonium pentaborate
	tetrahvdrate
12229-13-9	2499: Potassium pentaborate
	octahydrate
12229-63-9	3239: Thorium hexaboride
12230-32-9	1904: Magnesium dodecaboride
12230-71-6	368: Barium hydroxide
	octahydrate
12230-74-9	365: Barium hydrosulfide
	tetrahydrate
12232-99-4	2928: Sodium metabismuthate
12233-34-0	513: Bismuth titanate
12233-56-6	480: Bismuth germanium oxide
12244-51-8	2202: Nickel carbonate
	hydroxide tetrahydrate
12249-30-8	7: Actinium hydroxide
12249-52-4	2799: Silver hydrogen fluoride
12253-13-3	1971: Manganese aluminide
12254-64-7	109: Americium oxide( $\alpha$ )
12254-64-7	110: Americium oxide( $\beta$ )

12160-99-5 1375: Gadolinium telluride

12254-82-9	929: Cobalt arsenic sulfide
12254-85-2	863: Chromium arsenide
12255-36-6	258: Antimony arsenide
12255-48-0	3488. Yttrium arsenide
12255-50-4	327: Barium arsenide
12260-55-8	1427: Germanium(IV) telluride
12266-38-5	1689: Lead antimonide
12200-38-3	1079: Manganasa garbida
12200-05-8	206. A mania digulfida
12279-90-2	290: Arsenic disunde
12280-52-5	2279 Ti vi la li l
12286-33-8	32/8: Tin tripnosphide
12291-65-5	651: Calcium hexaborate
	pentahydrate
12293-61-7	1960: Magnesium tantalate
12294-01-8	3509: Yttrium phosphide
12300-22-0	2715: Samarium silicide
12310-43-9	1192: Dysprosium boride
12310-44-0	1215: Erbium boride
12323-03-4	402: Barium sodium niobium
	oxide
12323-19-2	471: Bismuth antimonide
12325-59-6	1460: Hafnium phosphide
12333-54-9	1985: Manganese phosphide
12333-74-3	2682: Rubidium tantalate
12336-95-7	889: Chromium(III) basic
12000 /0 /	sulfate
12338-09-9	502: Bismuth stannate
12340 14 6	3464: Yenon tetrovide
12345 14 1	244: Parium abromata(V)
12345-14-1	2611: Dhanium harida
12333-99-0	2405. Unamed sulfate tribudante
12384-03-3	3405: Uranyi sullate trinydrate
12397-32-9	1986: Manganese phosphide
12399-08-5	1593: Iodine tetroxide
12401-56-8	1463: Hafnium silicide
12412-52-1	271: Antimony(III) oxide
12422-12-7	606: Cadmium vanadate
12427-42-8	1029: Cobaltocenium
	hexafluorophosphate
12429-94-6	444: Beryllium boride-IV
12433-14-6	1065: Copper(II) basic chromate
12434-24-1	1242: Europium silicide
12435-86-8	3094: Strontium vanadate
12442-45-4	763: Cerium oxysulfide
12442-63-6	1165: Dichlorine hexoxide
12446-46-7	113: Americium sulfide
12446-76-3	2443: Potassium gold(III) oxide
	trihydrate
12501-23-4	3367: Tungstophosphoric acid
	hydrate
12502-31-7	2493: Potassium niobate
	hexadecahydrate
12513-27-8	3523: Zinc borate
12515 27 0	hemihentahydrate
12520 88 6	2776: Silicotungstic acid
12524 22 5	2686: Pubidium ziroonata
12534-23-5	442. Dorvilium horida II
12530-51-5	441: Dorylliver basids I
12330-32-0	441. Derymum ooride-1
12330-03-1	1060: Compar(II) and 111
12540-13-5	1000: Copper(11) acetylide
12612-73-6	3384: Uranium tricarbide
12616-24-9	256: Ammonium zirconyl
	carbonate dihydrate
12640-47-0	1012: Cobalt(II) tungstate
12650-28-1	252 Dominum digilizate
10 ( 70 00 1	555: Darium districate
12650-28-1	399: Barium silicate
12650-28-1 12650-28-1	399: Barium silicate 398: Barium silicate

3590: Zirconium carbonate basic	13446-
hydrate	13446-
325: Barium aluminide	13446-
1847: Lutetium boride	
287: Antimony(V) oxide hydrate	13446-
46: Aluminum hydroxide( $\beta'$ )	13446-
1454: Hafnium hydride	13446-
728: Carbon fluoride	13446-
503: Bismuth stannate	13446-
pentahydrate	13446-
330: Barium bismuth oxide	13446-
1036: Copper vanadate	13450-
1137: Copper(II) vanadate	
2274: Niobocene dichloride	13450-
2064: Mercury(II) basic carbonate	13450-
2539: Potassium	
tetrachloroaurate(III)	13450-
dihydrate	13450-
867: Chromium carbonyl	13450-
769: Cerous ammonium nitrate	13450-
tetrahydrate	13450-
1961: Magnesium tetrahydrogen	13450-
phosphate dihydrate	13450-
2673: Rubidium nitrate	
3306: Titanium tribromide	13451-0
2219: Nickel nitrate	13451-1
518: Borane carbonyl	13451-1
379: Barium metasilicate	13451-1
1498: Hydrazine acetate	10 101 1
3506: Yttrium oxalate	13453-0
nonahydrate	13453-
783: Cerous ovalate nonahydrate	13/153_
149: A mmonium ferric ovalate	13/153_2
tribydrate	13/153_3
3345: Tungstan havachlorida	13453
530: Boron phosphate	15455-
2120: Molybdenum(IV) chloride	13/53
$454$ : Bervllium hydroxide( $\alpha$ )	13453-
455: Beryllium hydroxide(β)	13453
1050: Copper(II) acetylacetonate	13/153-
808: Cesium fluoride	13455-
ooo. Cestuin nuoriue	13/153-1
2074: Sodium selenate	13453-
2974: Sodium selenate	13453- 13453- 13453
2974: Sodium selenate 1692: Lead azide 2047: Margury (L) chromate	13453-0 13453-0 13453-0 13453-0
2974: Sodium selenate 1692: Lead azide 2047: Mercury(I) chromate 2071: Marcury(II) chromate	13453-0 13453-0 13453-0 13453-0
2974: Sodium selenate 1692: Lead azide 2047: Mercury(I) chromate 2071: Mercury(II) chromate 2084: Nitragen trijodide	13453-0 13453-0 13453-0 13453-7
2974: Sodium selenate 1692: Lead azide 2047: Mercury(I) chromate 2071: Mercury(II) chromate 2284: Nitrogen triiodide 2205: Nitrul ablorida	13453-0 13453-0 13453-0 13453-0 13453-0
2974: Sodium selenate 1692: Lead azide 2047: Mercury(I) chromate 2071: Mercury(II) chromate 2284: Nitrogen triiodide 2295: Nitryl chloride	13453-0 13453-0 13453-7 13453-7 13453-7
2974: Sodium selenate 1692: Lead azide 2047: Mercury(I) chromate 2071: Mercury(II) chromate 2284: Nitrogen triiodide 2295: Nitryl chloride 2303: Osmium(II) chloride 2004: Osmium(II) chloride	13453-1 13453-1 13453-1 13453-7 13453-7
2974: Sodium selenate 1692: Lead azide 2047: Mercury(I) chromate 2071: Mercury(II) chromate 2284: Nitrogen triiodide 2295: Nitryl chloride 2303: Osmium(II) chloride 2304: Osmium(II) chloride	13453-4 13453-4 13453-7 13453-7 13453-7 13453-7
2974: Sodium selenate 1692: Lead azide 2047: Mercury(I) chromate 2071: Mercury(II) chromate 2284: Nitrogen triiodide 2295: Nitryl chloride 2303: Osmium(II) chloride 2304: Osmium(III) chloride 2318: Palladium(II) bromide	13453-4 13453-4 13453-7 13453-7 13453-7 13453-7
2974: Sodium selenate 1692: Lead azide 2047: Mercury(I) chromate 2071: Mercury(II) chromate 2284: Nitrogen triiodide 2295: Nitryl chloride 2303: Osmium(II) chloride 2304: Osmium(II) chloride 2318: Palladium(II) bromide 2322: Palladium(II) fuoride	13453-1 13453-1 13453-1 13453-1 13453-1 13453-1 13453-1
2974: Sodium selenate 1692: Lead azide 2047: Mercury(I) chromate 2071: Mercury(II) chromate 2284: Nitrogen triiodide 2295: Nitryl chloride 2303: Osmium(II) chloride 2304: Osmium(II) chloride 2318: Palladium(II) bromide 2322: Palladium(II) fluoride 1995: Manganese(II) bromide	13453-1 13453-1 13453-1 13453-1 13453-1 13453-1 13453-1 13453-1 13453-1
2974: Sodium selenate 1692: Lead azide 2047: Mercury(I) chromate 2071: Mercury(II) chromate 2284: Nitrogen triiodide 2295: Nitryl chloride 2303: Osmium(II) chloride 2304: Osmium(II) chloride 2318: Palladium(II) bromide 2322: Palladium(II) fluoride 1995: Manganese(II) bromide 155: Ammonium fluorosulfonate	13453-1 13453-1 13453-1 13453-1 13453-1 13453-1 13453-1 13453-1 13454-1 13454-1
2974: Sodium selenate 1692: Lead azide 2047: Mercury(I) chromate 2071: Mercury(II) chromate 2284: Nitrogen triiodide 2295: Nitryl chloride 2303: Osmium(II) chloride 2304: Osmium(II) chloride 2318: Palladium(II) bromide 2322: Palladium(II) fluoride 1995: Manganese(II) bromide 155: Ammonium fluorosulfonate 193: Ammonium iodate	13453-1 13453-1 13453-1 13453-1 13453-1 13453-1 13453-1 13453-1 13454-1 13454-1 13454-1
2974: Sodium selenate 1692: Lead azide 2047: Mercury(I) chromate 2071: Mercury(II) chromate 2284: Nitrogen triiodide 2295: Nitryl chloride 2303: Osmium(II) chloride 2304: Osmium(II) chloride 2318: Palladium(II) bromide 2322: Palladium(II) fluoride 1995: Manganese(II) bromide 155: Ammonium fluorosulfonate 193: Ammonium iodate 215: Ammonium permanganate	13453-1 13453-1 13453-1 13453-1 13453-1 13453-1 13453-1 13453-1 13454-1 13454-1 13454-1 13454-1
2974: Sodium selenate 1692: Lead azide 2047: Mercury(I) chromate 2071: Mercury(II) chromate 2284: Nitrogen triiodide 2295: Nitryl chloride 2303: Osmium(II) chloride 2304: Osmium(II) chloride 2318: Palladium(II) bromide 2322: Palladium(II) fluoride 1995: Manganese(II) bromide 155: Ammonium fluorosulfonate 193: Ammonium iodate 215: Ammonium permanganate 1925: Magnesium nitrate	13453- 13453- 13453- 13453- 13453- 13453- 13453- 13453- 13453- 13454- 13454- 13454- 13454- 13454- 13454-
2974: Sodium selenate 1692: Lead azide 2047: Mercury(I) chromate 2071: Mercury(II) chromate 2284: Nitrogen triiodide 2295: Nitryl chloride 2303: Osmium(II) chloride 2304: Osmium(II) chloride 2318: Palladium(II) bromide 2322: Palladium(II) fluoride 1995: Manganese(II) bromide 155: Ammonium fluorosulfonate 193: Ammonium jermanganate 1925: Magnesium nitrate hexahydrate	13453- 13453- 13453- 13453- 13453- 13453- 13453- 13453- 13453- 13454- 13454- 13454- 13454- 13454- 13454- 13454- 13454-
2974: Sodium selenate 1692: Lead azide 2047: Mercury(I) chromate 2071: Mercury(II) chromate 2284: Nitrogen triiodide 2295: Nitryl chloride 2303: Osmium(II) chloride 2304: Osmium(II) chloride 2318: Palladium(II) bromide 2322: Palladium(II) fluoride 1995: Manganese(II) bromide 155: Ammonium fluorosulfonate 193: Ammonium iodate 215: Ammonium permanganate 1925: Magnesium nitrate hexahydrate 1935: Magnesium perchlorate	13453- 13453- 13453- 13453- 13453- 13453- 13453- 13453- 13453- 13454- 13454- 13454- 13454- 13454- 13454- 13454- 13454- 13454-
2974: Sodium selenate 1692: Lead azide 2047: Mercury(I) chromate 2071: Mercury(II) chromate 2284: Nitrogen triiodide 2295: Nitryl chloride 2303: Osmium(II) chloride 2304: Osmium(II) chloride 2318: Palladium(II) bromide 2322: Palladium(II) fluoride 1995: Manganese(II) bromide 155: Ammonium fluorosulfonate 193: Ammonium jermanganate 1925: Magnesium nitrate hexahydrate 1935: Magnesium perchlorate hexahydrate	13453- 13453- 13453- 13453- 13453- 13453- 13453- 13453- 13453- 13454- 13454- 13454- 13454- 13454- 13454- 13454- 13454- 13454-
2974: Sodium selenate 1692: Lead azide 2047: Mercury(I) chromate 2071: Mercury(II) chromate 2284: Nitrogen triiodide 2295: Nitryl chloride 2303: Osmium(II) chloride 2304: Osmium(II) chloride 2304: Osmium(II) chloride 2318: Palladium(II) bromide 2322: Palladium(II) fluoride 1995: Manganese(II) bromide 155: Ammonium fluorosulfonate 193: Ammonium iodate 215: Ammonium permanganate 1925: Magnesium nitrate hexahydrate 1935: Magnesium perchlorate hexahydrate 1938: Magnesium phosphate	13453-1 13453-1 13453-1 13453-1 13453-1 13453-1 13453-1 13453-1 13453-1 13453-1 13454-1 13453-1 13454-1 13455-1 13455-1 13455-1 13455-1 13455-
2974: Sodium selenate 1692: Lead azide 2047: Mercury(I) chromate 2071: Mercury(II) chromate 2284: Nitrogen triiodide 2295: Nitryl chloride 2303: Osmium(II) chloride 2304: Osmium(II) chloride 2318: Palladium(II) bromide 2322: Palladium(II) fluoride 1995: Manganese(II) bromide 155: Ammonium fluorosulfonate 193: Ammonium iodate 215: Ammonium permanganate 1925: Magnesium nitrate hexahydrate 1935: Magnesium perchlorate hexahydrate 1938: Magnesium phosphate octahydrate	13453-1 13453-1 13453-1 13453-1 13453-1 13453-1 13453-1 13453-1 13453-1 13453-1 13454-1 13454-1 13454-1 13454-1 13454-1
<ul> <li>2974: Sodium selenate</li> <li>1692: Lead azide</li> <li>2047: Mercury(I) chromate</li> <li>2071: Mercury(II) chromate</li> <li>2284: Nitrogen triiodide</li> <li>2295: Nitryl chloride</li> <li>2303: Osmium(II) chloride</li> <li>2304: Osmium(II) chloride</li> <li>2304: Osmium(II) chloride</li> <li>2304: Osmium(II) bromide</li> <li>2322: Palladium(II) fluoride</li> <li>1995: Manganese(II) bromide</li> <li>155: Ammonium fluorosulfonate</li> <li>193: Ammonium iodate</li> <li>215: Ammonium permanganate</li> <li>1925: Magnesium nitrate hexahydrate</li> <li>1935: Magnesium perchlorate hexahydrate</li> <li>1938: Magnesium phosphate octahydrate</li> <li>1941: Magnesium pyrophosphate</li> </ul>	13453- 13453- 13453- 13453- 13453- 13453- 13453- 13453- 13453- 13453- 13453- 13454- 13454- 13454- 13454- 13454- 13454- 13454- 13454-
2974: Sodium selenate 1692: Lead azide 2047: Mercury(I) chromate 2071: Mercury(II) chromate 2284: Nitrogen triiodide 2295: Nitryl chloride 2303: Osmium(II) chloride 2304: Osmium(II) chloride 2318: Palladium(II) bromide 2322: Palladium(II) fluoride 1995: Manganese(II) bromide 155: Ammonium fluorosulfonate 1935: Magnesium nitrate hexahydrate 1935: Magnesium perchlorate hexahydrate 1938: Magnesium phosphate octahydrate 1941: Magnesium sulfite	13453-1 13453-1 13453-1 13453-1 13453-1 13453-1 13453-1 13453-1 13453-1 13453-1 13454-1 13454-1 13454-1 13454-1 13454-1
<ul> <li>2974: Sodium selenate</li> <li>1692: Lead azide</li> <li>2047: Mercury(I) chromate</li> <li>2071: Mercury(II) chromate</li> <li>2284: Nitrogen triiodide</li> <li>2295: Nitryl chloride</li> <li>2303: Osmium(II) chloride</li> <li>2304: Osmium(II) chloride</li> <li>2304: Osmium(II) chloride</li> <li>2304: Osmium(II) bromide</li> <li>2322: Palladium(II) fluoride</li> <li>1995: Manganese(II) bromide</li> <li>155: Ammonium fluorosulfonate</li> <li>193: Ammonium permanganate</li> <li>1925: Magnesium nitrate</li> <li>hexahydrate</li> <li>1938: Magnesium perchlorate</li> <li>hexahydrate</li> <li>1938: Magnesium phosphate</li> <li>octahydrate</li> <li>1958: Magnesium sulfite</li> <li>hexahydrate</li> </ul>	13453-1 13453-1 13453-1 13453-1 13453-1 13453-1 13453-1 13453-1 13453-1 13453-1 13454-1 13454-1 13454-1 13454-1 13454-1 13454-1
2974: Sodium selenate 1692: Lead azide 2047: Mercury(I) chromate 2071: Mercury(II) chromate 2284: Nitrogen triiodide 2295: Nitryl chloride 2303: Osmium(II) chloride 2304: Osmium(II) chloride 2318: Palladium(II) bromide 2322: Palladium(II) fluoride 1995: Manganese(II) bromide 155: Ammonium fluorosulfonate 1935: Magnesium nitrate hexahydrate 1935: Magnesium perchlorate hexahydrate 1938: Magnesium phosphate octahydrate 1941: Magnesium sulfite hexahydrate 1995: Magnesium sulfite hexahydrate 1999: Manganese(II) chloride	13453-1 13453-1 13453-1 13453-1 13453-1 13453-1 13453-1 13453-1 13453-1 13453-1 13454-1 13454-1 13454-1 13454-1 13454-1 13454-1 13454-1
	3590: Zhroontum carbonate basic hydrate325: Barium aluminide1847: Lutetium boride287: Antimony(V) oxide hydrate46: Aluminum hydroxide( $\beta'$ )1454: Hafnium hydride728: Carbon fluoride503: Bismuth stannate pentahydrate330: Barium bismuth oxide1036: Copper vanadate1137: Copper(II) vanadate2274: Niobocene dichloride2064: Mercury(II) basic carbonate2539: Potassium tetrachloroaurate(III) dihydrate867: Chromium carbonyl769: Cerous ammonium nitrate tetrahydrate1961: Magnesium tetrahydrogen phosphate dihydrate2306: Titanium tribromide2219: Nickel nitrate518: Borane carbonyl379: Barium metasilicate1498: Hydrazine acetate3506: Yttrium oxalate nonahydrate783: Cerous oxalate nonahydrate149: Ammonium ferric oxalate trihydrate3345: Tungsten hexachloride300: Boron phosphate2129: Molybdenum(IV) chloride454: Beryllium hydroxide( $\alpha$ )455: Beryllium hydroxide( $\beta$ )1059: Copper(II) acetylacetonate

te basic	13446-48-5	203: Ammonium nitrite
	13446-49-6	2488: Potassium molybdate
	13446-53-2	1886: Magnesium bromide
		hexahydrate
hydrate	13446-56-5	2119: Molyhdenum(II) bromide
(B')	13446 57 6	2122: Molybdenum(III) bromide
( <b>þ</b> )	12446 70 2	2654: Dubidium bromoto
	13440-70-3	
	13446-/1-4	2657: Rubidium chlorate
	13446-72-5	2659: Rubidium chromate
	13446-73-6	2662: Rubidium dichromate
de	13446-74-7	2663: Rubidium fluoride
	13450-84-5	1359: Gadolinium chloride
e		hexahydrate
de	13450-87-8	1372: Gadolinium sulfate
arbonate	13450-87-8	1373: Gadolinium sulfate
		octahydrate
	13450-88-9	1390: Gallium(III) bromide
	13450-90-3	1391: Gallium(III) chloride
	13450-91-4	1396: Gallium(III) iodide
nitroto	13450 02 5	1418: Germanium(IV) bromide
mate	13450.05.9	1418. Germanium( $\mathbf{IV}$ ) browning
1	13430-93-8	1425. Germanum(TV) lodide
drogen	13450-97-0	30//: Strontium perchlorate
	13450-97-0	3078: Strontium perchlorate
		hexahydrate
le	13451-05-3	3093: Strontium tungstate
	13451-11-1	3123: Tantalum pentabromide
	13451-18-8	3152: Tellurium trioxide
	13451-19-9	3164: Terbium nitrate
		hexahydrate
	13453-06-0	234: Ammonium tellurate
	13453-07-1	1436: Gold(III) chloride
hydrata	13453 24 2	1440: Gold(III) iodide
nyurate	13453-24-2	2107: Thallium(I) ablarata
Xalate	13453-30-0	2221. Thallium(I) chlorida
.,	13453-32-2	3221: Thallium(III) chloride
ide	13453-33-3	3222: Thallium(III) chloride
		hydrate
chloride	13453-34-4	3199: Thallium(I) cyanide
$e(\alpha)$	13453-40-2	3212: Thallium(I) perchlorate
e(β)	13453-49-1	3234: Thorium bromide
cetonate	13453-57-2	1701: Lead chlorite
	13453-62-8	1722: Lead(II) perchlorate
	13453-69-5	1770: Lithium borate
	13453-69-5	1809: Lithium metaborate
ite	13453-70-8	1774: Lithium bromide
ate	15455 70 0	monohydrate
ate	12452 71 0	1777. Lithium chlorate
	13433-71-9	1922. Lithium parahlarata
	13433-78-0	1823: Lithium perchlorate
de		trihydrate
ide	13453-80-0	1788: Lithium dihydrogen
ide		phosphate
ide	13453-84-4	1819: Lithium orthosilicate
mide	13454-71-2	786: Cerous phosphate hydrate
lfonate	13454-73-4	787: Cerous selenate
	13454-74-5	792: Cerous tungstate
ganate	13454-75-6	799: Cesium bromate
8	13454-81-4	818: Cesium iodate
	13/15/1-83-6	825: Cesium nitrite
orata	13454 84 7	828: Cesium perchlorate
Jac	12454 00 1	1000: Compar(II) fluorida
	15454-66-1	1090. Copper(11) Informe
late	10151 00 0	dihydrate
	13454-89-2	1100: Copper(II) iodate
osphate	13454-90-5	1101: Copper(II) iodate
		monohydrate
	13454-94-9	788: Cerous sulfate
oride	13454-96-1	2388: Platinum(IV) chloride
		pentahydrate

13455-01-1	2367: Phosphorus(III) iodide
13455-12-4	2381: Platinum(II) bromide
13455-20-4	2437: Potassium dithionate
13455-21-5	2441: Potassium fluoride
	dihydrate
13455-24-8	2473: Potassium hydrogen iodate
13455-28-2	978: Cobalt(II) iodate
13/155-20-2	980: Cobalt(II) iodide dihydrate
12455 20 2	081: Cobalt(II) iodide
13433-29-3	bey abydrate
13455-31-7	903: Cobalt(II) perchlorate
12455 24 0	1006: Cobalt(II) sulfate
13433-34-0	monohydrata
12460 50 0	521. Matabania agid or Earm
13400-30-9	$521$ : Metabolic acid- $\alpha$ -Form
13460-50-9	522: Metaboric acid-p-Form
13460-50-9	523: Metaboric acid- $\gamma$ -Form
13462-88-9	2199: Nickel bromide
13462-88-9	2200: Nickel bromide trihydrate
13462-90-3	2216: Nickel iodide
13462-93-6	121: Ammonium arsenate
	hydrate
13462-93-6	143: Ammonium dihydrogen
	arsenate
13463-10-0	1291: Ferric phosphate hydrate
13463-12-2	1308: Ferrous bromide
	hexahydrate
13463-12-2	1309: Ferrous bromide hydrate
13463-22-4	387: Barium oxalate
	monohydrate
13463-30-4	1737: Lead tetrachloride
13463-30-4	1757: Lead(IV) chloride
13463-39-3	2203: Nickel carbonyl
13463-40-6	1626: Iron pentacarbonyl
12462 677	2287: Titanium dioxido
13403-07-7	2510. Zing angenete a stalander
13464-44-4	3519: Zinc arsenate octanydrate
13464-46-5	104: Americium chloride
13464-58-9	315: Arsenious acid
13464-80-7	1180: Dihydrazine sulfate
13464-82-9	1576: Indium(III) sulfate
13464-92-1	565: Cadmium bromide
	tetrahydrate
13464-98-7	1501: Hydrazine dinitrate
13465-05-9	1523: Hydrogen chloride
	dihydrate
13465-07-1	1525: Hydrogen disulfide
13465-09-3	1564: Indium(III) bromide
13465-10-6	1559: Indium(I) chloride
13465-11-7	1562: Indium(II) chloride
13465-15-1	1573: Indium(III) perchlorate
	octahydrate
13465-30-0	2068: Mercury(II) chlorate
13465-33-3	2042: Mercury(I) bromate
13465-35-9	2049: Mercury(I) iodate
13465-37-7	2059: Mercury(I) thiocyanate
13465-43-5	2644: Rhodium(III) nitrate
	dihvdrate
13465-49-1	2677: Rubidium permanganate
13465-55-9	2706: Samarium chloride
10100 00 2	hexahydrate
13465-58-2	2716: Samarium sulfate
10 100 00-2	octahydrate
13465-59-3	2724: Scandium bromide
13465 60 6	2729: Scandium pitrate
13403-00-0	pentahydrate
13165 66 0	2753: Salanium totrofuscido
13403-00-2	
13403-/1-9	5522: Iriiiuorosilane

3324: Triiodosilane 13465-72-0 13465-73-1 553: Bromosilane 13465-77-5 1475: Hexachlorodisilane 13465-78-6 853: Chlorosilane 13465-84-4 2775: Silicon tetraiodide 2825: Silver tungstate 13465-93-5 13465-94-6 384: Barium nitrite 13465-95-7 389: Barium perchlorate 13466-08-5 2844: Sodium bromide dihydrate 13466-20-1 378: Barium metaphosphate 13466-21-2 394: Barium pyrophosphate 13469-98-2 3493: Yttrium bromide 13469-98-2 3494: Yttrium bromide nonahydrate 13470-01-4 3065: Strontium iodate 13470-04-7 3069: Strontium molybdate(VI) 3073: Strontium nitrite 13470-06-9 13470-08-1 3308: Titanium trifluoride 13470-10-5 3335: Tungsten dibromide 13470-11-6 3355: Tungsten pentabromide 13470-12-7 3336: Tungsten dichloride 13470-13-8 3359: Tungsten tetrachloride 13470-14-9 3356: Tungsten pentachloride 13470-17-2 3337: Tungsten diiodide 13470-19-4 3383: Uranium tribromide 13470-20-7 3379: Uranium tetrabromide 13470-21-8 3376: Uranium pentachloride 13470-22-9 3382: Uranium tetraiodide 13470-23-0 3391: Uranium(IV) sulfate tetrahydrate 13470-24-1 2101: Metavanadic acid 13470-26-3 3430: Vanadium tribromide 13470-38-7 3503: Yttrium iodide 13472-30-5 2947: Sodium orthosilicate 13472-31-6 2959: Sodium periodate trihydrate 13472-33-8 2962: Sodium perrhenate 13472-36-1 2972: Sodium pyrophosphate decahydrate 13472-45-2 3012: Sodium tungstate 13473-57-9 1493: Holmium sulfate octahydrate 13473-77-3 1863: Lutetium sulfate octahydrate 13476-01-2 956: Cobalt(II) bromate hexahydrate 13476-08-9 1282: Ferric nitrate hexahydrate 13476-08-9 1322: Ferrous nitrate hexahydrate 13476-99-8 3438: Vanadium(III) acetylacetonate 13477-00-4 338: Barium chlorate 13477-09-3 362: Barium hydride 13477-17-3 588: Cadmium phosphate 13477-19-5 578: Cadmium metasilicate 13477-20-8 596: Cadmium sulfate monohydrate 13477-23-1 599: Cadmium sulfite 13477-28-6 626: Calcium bromide hexahydrate 13477-29-7 635: Calcium chloride monohvdrate 13477-34-4 670: Calcium nitrate tetrahydrate 13477-36-6 681: Calcium perchlorate 13477-89-9 2161: Neodymium chloride hexahydrate

13477-91-3	2176: Neodymium sulfate
	octahydrate
13477-95-7	2208. Nickel cyanide tetrahydrate
12477 08 0	2200. Nickel eyande tetranyulate
134/7-98-0	
134/7-99-1	2215: Nickel iodate tetrahydrate
13478-00-7	2220: Nickel nitrate hexahydrate
13478-04-1	829: Cesium periodate
13478-06-3	891: Chromium(III) bromide
	bexabydrate
12478 10 0	1212: Earrous ablarida
134/6-10-9	1515. Perious cinoride
	tetrahydrate
13478-14-3	1768: Lithium arsenate
13478-16-5	1875: Magnesium ammonium
	phosphate hexahydrate
13478-17-6	2120: Molybdenum(II) chloride
13/78 18 7	2123: Molybdenum(III) chloride
134/0-10-/	
134/8-20-1	2362: Phosphorus oxyfluoride
13478-33-6	994: Cobalt(II) perchlorate
	hexahydrate
13478-33-6	960: Cobalt(II) chlorate
	hexahydrate
12/70 20 1	1105: Connor(II) nitrata
134/0-30-1	
	hexahydrate
13478-41-6	1044: Copper(I) fluoride
13478-45-0	2265: Niobium(V) bromide
13478-49-4	1232: Erbium sulfate
13478-50-7	1740. Lead thiosulfate
13470 54 4	1004: Coppor(II) glygingto
13479-34-4	1094. Copper(II) giyeniate
	monohydrate
13492-25-6	2053: Mercury(I) nitrite
13492-26-7	2475: Potassium hydrogen
	phosphite
13492-45-0	1321: Ferrous jodide tetrahydrate
13/0/ 80 0	3138: Tellurium
13494-00-9	
13494-90-1	1397: Gallium(III) nitrate
13494-92-3	1584: Iodine dioxide
13494-94-2	1403: Gallium(III) sulfate
13494-98-9	3505: Yttrium nitrate
	hexahydrate
13/08-07-2	2580: Praseodymium perchlorate
13498-07-2	2569. I fascouyinnum peremorate
	nexanydrate
13498-08-3	3479: Ytterbium perchlorate
13499-05-3	1452: Hafnium chloride
13510-35-5	1570: Indium(III) iodide
13510-41-3	2593 <sup>.</sup> Praseodymium sulfate
	octahydrate
12510 42 4	2676. Deskidiene neueblenete
13310-42-4	2070: Kubiaium perchlorate
13510-49-1	463: Beryllium sulfate
13510-89-9	1688: Lead antimonate
13517-00-5	1045: Copper(I) hydride
13517-06-1	2927: Sodium iodide dihvdrate
13517-10-7	537: Boron trijodide
12517 11 9	1547: Llur abrom ava asid
13317-11-8	1347. Hypobronious acid
13517-12-9	2703: Samarium bromide
	hexahydrate
13517-24-3	2936: Sodium metasilicate
	pentahydrate
13517-26-5	2973: Sodium pyrovanadate
12517 27 6	2575: Sourdin pyrovanadate
1331/-2/-0	1206 End of the state
13520-56-4	1296: Ferric sulfate nonahydrate
13520-56-4	2189: Nickel ammonium sulfate
13520-59-7	2128: Molybdenum(IV) bromide
13520-61-1	2224: Nickel perchlorate
	hexahydrate
12520 60 0	1225: Earroug parahlarata
13320-09-9	1525: Ferrous perchiorate
	hexahydrate

13520-75-7	3340: Tungsten dioxydibromide
13520-76-8	3349: Tungsten oxydichloride
13520-77-9	3351: Tungsten oxytetrabromide
13520-78-0	3348: Tungsten oxychloride
13520-79-1	3352: Tungsten oxytetrafluoride
13520-83-7	3401: Uranyl nitrate hexahydrate
13520-87-1	3442: Vanadyl chloride
13520-88-2	3441: Vanadyl bromide
13520-89-3	3443: Vanadyl dibromide
13520-90-6	3448: Vanadyl tribromide
13520-92-8	3617: Zirconyl chloride
	octahydrate
13530-65-9	3532: Zinc chromate
	heptahydrate
13536-53-3	2577: Praseodymium bromide
13536-59-9	1154: Deuterium bromide
13536-59-9	1519: Hydrogen bromide-d
13536-73-7	1216: Erbium bromide
13536-73-7	1218: Erbium bromide
	nonahydrate
13536-79-3	1654: Lanthanum bromide
13536-80-6	2156: Neodymium bromide
13536-84-0	3398: Uranyl fluoride
13536-92-0	2396: Plutonium(IV) chloride
13537-09-2	1198: Dysprosium hydride
13537-15-0	1261: Europium(III) sulfate
13537-18-3	3263: Thulium chloride
13537-24-1	1288: Ferric perchlorate
	hexahydrate
13537-30-9	1345: Fluorogermane
13537-32-1	2149: Monofluorophosphoric
	acid
13537-33-2	1346: Fluorosilane
13548-38-4	900: Chromium(III) nitrate
13548-42-0	1077: Copper(II) chromate
13550-28-2	1772: Lithium bromate
13550-53-3	1223: Erbium hydride
13565-96-3	488: Bismuth molybdenum oxide
13565-97-4	3605: Zirconium pyrophosphate
13566-03-5	2328: Palladium(II) sulfate
	dihydrate
13566-05-7	2674: Rubidium orthovanadate
13568-33-7	1817: Lithium nitrite
13568-33-7	1818: Lithium nitrite
	monohydrate
13568-40-6	1813: Lithium molybdate
13568-45-1	1842: Lithium tungstate
13568-63-3	1967: Magnesium vanadate
13568-72-4	2002: Manganese(II) dithionate
13569-42-2	552: Bromogermane
13569-49-8	2615: Rhenium(III) bromide
13569-50-1	759: Cerium dihydride
13569-60-3	2714: Samarium perchlorate
	hydrate
13569-62-5	2393: Plutonium(III) chloride
13569-63-6	2616: Rhenium(III) chloride
13569-70-5	2260: Niobium(IV) chloride
13569-71-6	2618: Rhenium(IV) chloride
13569-75-0	899: Chromium(III) iodide
13569-80-7	1197: Dysprosium fluoride
135/2-93-5	1394: Gallium(III) hydride
135/2-97-9	1362: Gadolinium hydride
13572-98-0	1363: Gadolinium iodide
135/3-02-9	1598: lodogermane
135/3-08-5	1413: Germanium(II) iodide
135/3-11-0	1966: Magnesium tungstate

13573-16-5	244: Ammonium tetrathiocyano- diammonochromate(III) monohydrate	13702-91-2 13703-82-7	1756: Lead(IV) bromide 1881: Magnesium borate octahydrate
13586-38-4	139: Ammonium cobalt(II) sulfate hexahydrate	13703-82-7 [For anhydrou	1918: Magnesium metaborate is octahydrate
13587-16-1	1786: Lithium deuteride	compound]	
13587-35-4	1135: Copper(II) tungstate	13708-63-9	3161: Terbium fluoride
13587-35-4	1136: Copper(II) tungstate	13708-68-4	431: Barium zirconium silicate
	dihydrate	13708-80-0	105: Americium fluoride
13595-87-4	515: Bismuth tungstate	13708-85-5	2910: Sodium hydrogen
13597-19-8	754: Ceric vanadate		phosphite pentahydrate
13597-20-1	2273: Niobium(V) oxychloride	13709-31-4	3423: Vanadium oxytrifluoride
13597-30-3	3250: Thorium oxyfluoride	13709-36-9	3452: Xenon difluoride
13597-45-0	2670: Rubidium metavanadate	13709-38-1	1662: Lanthanum fluoride
13597-46-1	3569: Zinc selenite	13709-42-7	2162: Neodymium fluoride
13597-52-9	2685: Rubidium tungstate	13709-46-1	2581: Praseodymium fluoride
13597-54-1	3567: Zinc selenate pentahydrate	13709-47-2	2728: Scandium fluoride
13597-61-0	2678: Rubidium pyrovanadate	13709-49-4	3499: Yttrium fluoride
13597-64-3	822: Cesium molybdate	13709-52-9	1453: Hafnium fluoride
13597-65-4	3570: Zinc silicate	13709-56-3	2397: Plutonium(IV) fluoride
13597-99-4	457: Beryllium nitrate trihydrate	13709-59-6	3238: Thorium fluoride
13598-15-7	453: Beryllium hydrogen	13709-61-0	3463: Xenon tetrafluoride
10070 10 /	phosphate	13718-22-4	2671: Rubidium molybdate
13598-22-6	466: Beryllium sulfide	13718-26-8	2938: Sodium metavanadate
13598-33-9	3062: Strontium hydride	13718-50-8	372: Barium iodide
13508-36-2	2354: Phosphorous acid	13718-55-3	3/2: Barium chloride fluoride
13508-36-2	2/36: Potassium dihydrogen	13718-59-7	307: Barium selenite
15576-50-2	phosphite	13718 70 2	1624: Iron molyhdata
13508 /1 0	1485: Holmium hydride	13721 34 1	3014: Sodium uranate
13508 42 0	2150: Monojodosilane	13/21-34-1	monohydrate
13598-42-0	1952: Lutatium hydrida	12721 20 6	2048: Sadium arthouanadata
13598-44-2	2700: Samanium hadaida	13721-39-0	2948: Sodium orthovanadate
13396-33-3	2109: Samarium nyuride	15/21-45-2	2925: Sodium hypophosphate
13598-54-4	2287: Unonium tribudrido	12716 66 2	2428: Detensium formiovonide
13598-50-0	2501. Vetering headside	13740-00-2	2438: Potassium terricyanide
13396-37-7	217. Ammonium northonoto	15/40-69-9	5598: Zircomum mirate
13598-05-7	242: A mmonium tetronitro di	12746 08 0	2224. Thallium(III) nitrata
13000-89-0	245: Ammonium tetramtrou-	13740-98-0	3224: I hamum(III) intrate
12601 12 2	1087: Compor(II) formo quanida	13755 22 2	415: Dominum
13001-13-3	2874. Se disere fame and ide	15/55-52-5	415: Dariulli
15001-19-9	2874: Soulum lerrocyanide		tetracyanopiannate(11)
12(27 (2.2	249. Chlaring nantafing ride	12755 29 0	2045. S. diam
13037-03-3	848: Chlorine pentalluoride	13/33-38-9	2945: Sodium
13037-03-3	2140: Malak daman (VII)		dihardrate
13037-08-8		12750 10 0	
12(27.7(.0)		13759-10-9	
1363/-/6-8	1/23: Lead perchlorate	13/59-83-6	2/11: Samarium nitrate
12627 92 7	crinydrate	12750 00 1	1251: Error incom (III) has mide
13637-83-7	856: Chloryl fluoride	13/59-88-1	1251: Europium(III) bromide
136/5-4/-3	1082: Copper(11) dichromate	13/59-92-7	1254: Europium(III) chloride
12(02 (1 (		127(0.02.(	nexanydrate
13682-61-6	2538: Potassium	13/60-02-6	
12(02 72 0	tetrachioroaurate(III)	13/60-/8-6	
13682-73-0	2428: Potassium copper(1)	13/60-/9-/	3265: Thulium fluoride
12/00 02 1	cyanide	13760-80-0	34/4: Ytterbium fluoride
13689-92-4	2240: Nickel thiocyanate	13760-81-1	1851: Lutetium fluoride
13693-05-5	2379: Platinum hexafluoride	13760-83-3	1222: Erbium fluoride
13693-06-6	2399: Plutonium(VI)	13762-12-4	958: Cobalt(II) bromide
	hexafluoride		hexahydrate
13693-09-9	3458: Xenon hexafluoride	13/62-14-6	941: Cobalt molybdate
13701-64-9	620: Calcium borate hexahydrate	13762-14-6	984: Cobalt(II) molybdate
13701-64-9	666: Calcium metaborate	13762-51-1	2414: Potassium borohydride
13701-67-2	3174: Tetrachlorodiborane	13762-65-7	1509: Hydrazine perchlorate
13701-70-7	3435: Vanadium trisulfate		hemihydrate
13701-86-5	3344: Tungsten hexabromide	13762-75-9	1811: Lithium metaphosphate
13701-90-1	3220: Thallium(III) bromide	13763-67-2	804: Cesium chlorate
13702-38-0	472: Bismuth arsenate	13765-03-2	1803: Lithium iodate

13765-19-0	639: Calcium chromate dihydrate
13765-24-7	2708: Samarium fluoride
13765-25-8	1255: Europium(III) fluoride
13765-26-9	1360: Gadolinium fluoride
13765-74-7	2803: Silver molybdate
13767-32-3	3551: Zinc molybdate
13767-34-5	1103: Copper(II) molybdate
13768-11-1	2345: Perrhenic acid
13768-38-2	2308: Osmium(VI) fluoride
13768-86-0	2754: Selenium trioxide
13768-94-0	1162: Dibromosilane
13769-20-5	1243: Europium(II) chloride
13769-36-3	1160: Dibromogermane
13769-43-2	2568: Potassium vanadate
13770-18-8	1112: Copper(II) perchlorate
13/70-56-4	299: Arsenic(II) iodide
13770-61-1	15/1: Indium(III) nitrate
10770 01 4	trihydrate
13//3-81-4	1643: Krypton diffuoride
13/74-24-8	106: Americium nydride
13775 06 0	2286. Unonium trifluorida
13775-00-9	2277: Uranium pantafluarida
13775-07-0	2275: Uranium pantabromida
13775 52 6	2880: Sodium
13775-55-0	2009. Souluili
13775 80 0	1504: Hydrozine
13775-80-9	monohydrohromide
13776 58 4	3466: Yenon triovide
13776-84-6	3004: Sodium thioantimonate
15770 04 0	nonahydrate
13777-22-5	1449: Hafnium bromide
13777-23-6	1456: Hafnium iodide
13777-25-8	3588: Zirconium bromide
13778-39-7	3264: Thulium chloride
10110 05 1	heptahydrate
13778-40-0	3272: Thulium sulfate
	octahydrate
13779-41-4	1177: Difluorophosphoric acid
13779-73-2	1455: Hafnium iodide
13779-92-5	2270: Niobium(V) iodide
13780-03-5	657: Calcium hydrogen sulfite
13780-06-8	672: Calcium nitrite
13780-06-8	673: Calcium nitrite
	monohydrate
13780-42-2	1404: Gallium(III) sulfate
	octadecahydrate
13780-64-8	3459: Xenon oxydifluoride
13782-01-9	1024: Cobalt(III) potassium
[For	nitrite sesquihydrate
anhydrous	
compound]	
13782-92-8	1451: Hafnium(II) chloride
13782-95-1	1448: Hafnium(II) bromide
13783-04-5	3283: Titanium dibromide
13/83-07-8	3285: Titanium diiodide
13/98-24-8	510U: Ierbium chloride
12010 50 0	nexanyurate
13812-38-3	1150: Copper(11) tellurite
13813-19-9	1138: Deuterosulturic acid
13813-22-4	2585: Drogo dumium 10010e
13013-23-3	2365: Praseodymium iodide
13013-24-0	2710: Neodyinium iodide
13813-40-6	2110. Samanum jodide
13813-40-0	1486: Holmium iodide
15015 41-7	1 100. Hommuni Ioulue

15015 42 0	1225: Erbium iodide
13813-43-9	3267: Thulium iodide
13813-45-1	1853: Lutetium iodide
13813-46-2	2395: Plutonium(III) iodide
13813-47-3	108: A mericium iodide
13814 50 0	502: Codmium selenite
13014-39-0	2129: Malach da marca (M)
13814-74-9	2138: Molybdenum(v)
	oxytrichloride
13814-75-0	2144: Molybdenum(VI)
	oxytetrachloride
13814-76-1	2629: Rhenium(VI)
	oxytetrachloride
13814-81-8	1055: Copper(I,II) sulfite
	dihvdrate
13814-83-0	3445 <sup>.</sup> Vanadyl difluoride
13814-96-5	1707: Lead fluoroborate
13814 07 6	3032: Stannous fluoroborate
12815 20.0	2552. Determinus nuoroborate
13813-39-9	2552: Potassium
	tetranitritoplatinate(11)
13816-38-1	259: Antimony iodide sulfide
13816-38-1	267: Antimony(III) iodide sulfide
13817-37-3	974: Cobalt(II) fluoride
	tetrahydrate
13818-75-2	1357: Gadolinium bromide
13818-89-8	1179: Digermane
13819-84-6	2137: Molybdenum(V) fluoride
13820-40-1	238: Ammonium
15020 10 1	tetrachloropalladate(II)
12020 41 2	
13820-41-2	
10000 50 5	
13820-53-6	3001: Sodium
	tetrachloropalladate(II)
	trihydrate
13820-62-7	927: Cobalt aluminate
13820-62-7	953: Cobalt(II) aluminate
13821-06-2	356: Barium ferrocyanide
	hexahydrate
13823-29-5	3244: Thorium nitrate
13824-36-7	1178: Difluorosilane
	1170. Dimuorositune
13824 57 2	2141: Molyhdanum(VI)
13824-57-2	2141: Molybdenum(VI)
13824-57-2	2141: Molybdenum(VI) dioxydifluoride
13824-57-2 13824-63-6	2141: Molybdenum(VI) dioxydifluoride 3209: Thallium(I) nitrite
13824-63-6 13825-36-0	2141: Molybdenum(VI) dioxydifluoride 3209: Thallium(I) nitrite 3242: Thorium hydroxide
13824-63-6 13825-36-0 13825-75-6	<ul><li>2141: Molybdenum(VI) dioxydifluoride</li><li>3209: Thallium(I) nitrite</li><li>3242: Thorium hydroxide</li><li>3298: Titanium oxysulfate</li></ul>
13824-63-6 13825-36-0 13825-75-6 13825-76-8	<ul> <li>2141: Molybdenum(VI) dioxydifluoride</li> <li>3209: Thallium(I) nitrite</li> <li>3242: Thorium hydroxide</li> <li>3298: Titanium oxysulfate</li> <li>1480: Holmium bromide</li> </ul>
13824-63-6 13824-63-6 13825-36-0 13825-75-6 13825-76-8 13825-86-0	<ul> <li>2141: Molybdenum(VI) dioxydifluoride</li> <li>3209: Thallium(I) nitrite</li> <li>3242: Thorium hydroxide</li> <li>3298: Titanium oxysulfate</li> <li>1480: Holmium bromide</li> <li>884: Chromium(II) sulfate</li> </ul>
13824-57-2 13824-63-6 13825-36-0 13825-75-6 13825-76-8 13825-86-0	2141: Molybdenum(VI) dioxydifluoride 3209: Thallium(I) nitrite 3242: Thorium hydroxide 3298: Titanium oxysulfate 1480: Holmium bromide 884: Chromium(II) sulfate pentahydrate
13824-57-2 13824-63-6 13825-36-0 13825-75-6 13825-76-8 13825-86-0 13826-56-7	2141: Molybdenum(VI) dioxydifluoride 3209: Thallium(I) nitrite 3242: Thorium hydroxide 3298: Titanium oxysulfate 1480: Holmium bromide 884: Chromium(II) sulfate pentahydrate 2485: Potassium magnesium
13824-57-2 13824-53-6 13825-36-0 13825-75-6 13825-76-8 13825-86-0 13826-56-7	2141: Molybdenum(VI) dioxydifluoride 3209: Thallium(I) nitrite 3242: Thorium hydroxide 3298: Titanium oxysulfate 1480: Holmium bromide 884: Chromium(II) sulfate pentahydrate 2485: Potassium magnesium sulfate
13824-63-6 13824-63-6 13825-36-0 13825-75-6 13825-76-8 13825-86-0 13826-56-7 13826-83-0	2141: Molybdenum(VI) dioxydifluoride 3209: Thallium(I) nitrite 3242: Thorium hydroxide 3298: Titanium oxysulfate 1480: Holmium bromide 884: Chromium(II) sulfate pentahydrate 2485: Potassium magnesium sulfate 154: Ammonium fluoroborate
13824-63-6 13825-36-0 13825-75-6 13825-75-6 13825-76-8 13825-86-0 13826-56-7 13826-83-0 13826-83-0	2141: Molybdenum(VI) dioxydifluoride 3209: Thallium(I) nitrite 3242: Thorium hydroxide 3298: Titanium oxysulfate 1480: Holmium bromide 884: Chromium(II) sulfate pentahydrate 2485: Potassium magnesium sulfate 154: Ammonium fluoroborate 242: Ammonium
13824-63-6 13825-36-0 13825-75-6 13825-76-8 13825-76-8 13825-86-0 13826-56-7 13826-83-0 13826-83-0	2141: Molybdenum(VI) dioxydifluoride 3209: Thallium(I) nitrite 3242: Thorium hydroxide 3298: Titanium oxysulfate 1480: Holmium bromide 884: Chromium(II) sulfate pentahydrate 2485: Potassium magnesium sulfate 154: Ammonium fluoroborate 242: Ammonium
13824-63-6 13825-36-0 13825-75-6 13825-75-6 13825-76-8 13825-86-0 13826-56-7 13826-83-0 13826-83-0	<ul> <li>2141: Molybdenum(VI) dioxydifluoride</li> <li>3209: Thallium(I) nitrite</li> <li>3242: Thorium hydroxide</li> <li>3298: Titanium oxysulfate</li> <li>1480: Holmium bromide</li> <li>884: Chromium(II) sulfate pentahydrate</li> <li>2485: Potassium magnesium sulfate</li> <li>154: Ammonium fluoroborate</li> <li>242: Ammonium tetrafluoroborate</li> </ul>
13824-57-2 13824-63-6 13825-36-0 13825-75-6 13825-76-8 13825-86-0 13826-56-7 13826-83-0 13826-83-0 13826-83-0	<ul> <li>2141: Molybdenum(VI) dioxydifluoride</li> <li>3209: Thallium(I) nitrite</li> <li>3242: Thorium hydroxide</li> <li>3298: Titanium oxysulfate</li> <li>1480: Holmium bromide</li> <li>884: Chromium(II) sulfate pentahydrate</li> <li>2485: Potassium magnesium sulfate</li> <li>154: Ammonium fluoroborate</li> <li>242: Ammonium tetrafluoroborate</li> <li>2289: Nitronium</li> </ul>
13824-57-2 13824-63-6 13825-36-0 13825-75-6 13825-76-8 13825-86-0 13826-56-7 13826-83-0 13826-83-0 13826-83-0	<ul> <li>2141: Molybdenum(VI) dioxydifluoride</li> <li>3209: Thallium(I) nitrite</li> <li>3242: Thorium hydroxide</li> <li>3298: Titanium oxysulfate</li> <li>1480: Holmium bromide</li> <li>884: Chromium(II) sulfate pentahydrate</li> <li>2485: Potassium magnesium sulfate</li> <li>154: Ammonium fluoroborate</li> <li>242: Ammonium tetrafluoroborate</li> <li>2289: Nitronium tetrafluoroborate</li> </ul>
13824-63-6 13824-63-6 13825-36-0 13825-75-6 13825-76-8 13825-86-0 13826-56-7 13826-83-0 13826-83-0 13826-83-0 13826-83-3 13826-83-3	<ul> <li>2141: Molybdenum(VI) dioxydifluoride</li> <li>3209: Thallium(I) nitrite</li> <li>3242: Thorium hydroxide</li> <li>3298: Titanium oxysulfate</li> <li>1480: Holmium bromide</li> <li>884: Chromium(II) sulfate pentahydrate</li> <li>2485: Potassium magnesium sulfate</li> <li>154: Ammonium fluoroborate</li> <li>242: Ammonium tetrafluoroborate</li> <li>2289: Nitronium tetrafluoroborate</li> <li>2536: Potassium</li> </ul>
13824-63-6 13825-36-0 13825-75-6 13825-76-8 13825-76-8 13825-86-0 13826-56-7 13826-83-0 13826-83-0 13826-83-0 13826-86-3 13826-93-2	2141: Molybdenum(VI) dioxydifluoride 3209: Thallium(I) nitrite 3242: Thorium hydroxide 3298: Titanium oxysulfate 1480: Holmium bromide 884: Chromium(II) sulfate pentahydrate 2485: Potassium magnesium sulfate 154: Ammonium fluoroborate 242: Ammonium tetrafluoroborate 2289: Nitronium tetrafluoroborate 2536: Potassium tetrabromopalladate(II)
13824-63-6 13825-36-0 13825-75-6 13825-75-6 13825-76-8 13825-86-0 13826-56-7 13826-83-0 13826-83-0 13826-83-0 13826-86-3 13826-93-2 13826-94-3	2141: Molybdenum(VI) dioxydifluoride 3209: Thallium(I) nitrite 3242: Thorium hydroxide 3298: Titanium oxysulfate 1480: Holmium bromide 884: Chromium(II) sulfate pentahydrate 2485: Potassium magnesium sulfate 154: Ammonium fluoroborate 242: Ammonium tetrafluoroborate 2289: Nitronium tetrafluoroborate 2536: Potassium tetrabromopalladate(II) 2537: Potassium
13824-63-6 13825-36-0 13825-75-6 13825-75-6 13825-76-8 13825-86-0 13826-56-7 13826-83-0 13826-83-0 13826-83-0 13826-83-3 13826-93-2 13826-94-3	2141: Molybdenum(VI) dioxydifluoride 3209: Thallium(I) nitrite 3242: Thorium hydroxide 3298: Titanium oxysulfate 1480: Holmium bromide 884: Chromium(II) sulfate pentahydrate 2485: Potassium magnesium sulfate 154: Ammonium fluoroborate 242: Ammonium tetrafluoroborate 2289: Nitronium tetrafluoroborate 2536: Potassium tetrabromopalladate(II) 2537: Potassium tetrabromopaltinate(II)
13824-57-2 13824-57-2 13824-63-6 13825-36-0 13825-75-6 13825-76-8 13825-76-8 13825-86-0 13826-56-7 13826-83-0 13826-83-0 13826-83-0 13826-83-2 13826-93-2 13826-94-3 13840-33-0	2141: Molybdenum(VI) dioxydifluoride 3209: Thallium(I) nitrite 3242: Thorium hydroxide 3298: Titanium oxysulfate 1480: Holmium bromide 884: Chromium(II) sulfate pentahydrate 2485: Potassium magnesium sulfate 154: Ammonium fluoroborate 242: Ammonium tetrafluoroborate 2289: Nitronium tetrafluoroborate 2536: Potassium tetrabromopalladate(II) 2537: Potassium tetrabromoplatinate(II)
13824-57-2 13824-63-6 13825-36-0 13825-75-6 13825-76-8 13825-76-8 13825-86-0 13826-56-7 13826-83-0 13826-83-0 13826-83-0 13826-83-3 13826-93-2 13826-94-3 13840-33-0 13842-67-6	<ul> <li>2141: Molybdenum(VI) dioxydifluoride</li> <li>3209: Thallium(I) nitrite</li> <li>3242: Thorium hydroxide</li> <li>3298: Titanium oxysulfate</li> <li>1480: Holmium bromide</li> <li>884: Chromium(II) sulfate pentahydrate</li> <li>2485: Potassium magnesium sulfate</li> <li>154: Ammonium fluoroborate</li> <li>242: Ammonium tetrafluoroborate</li> <li>2289: Nitronium tetrafluoroborate</li> <li>2536: Potassium tetrabromopalladate(II)</li> <li>2537: Potassium tetrabromoplatinate(II)</li> <li>1802: Lithium hypochlorite</li> <li>3169: Terbium sulfate</li> </ul>
13824-57-2 13824-63-6 13825-36-0 13825-75-6 13825-76-8 13825-86-0 13826-83-0 13826-83-0 13826-83-0 13826-83-0 13826-93-2 13826-94-3 13840-33-0 13842-67-6	<ul> <li>2141: Molybdenum(VI) dioxydifluoride</li> <li>3209: Thallium(I) nitrite</li> <li>3242: Thorium hydroxide</li> <li>3298: Titanium oxysulfate</li> <li>1480: Holmium bromide</li> <li>884: Chromium(II) sulfate pentahydrate</li> <li>2485: Potassium magnesium sulfate</li> <li>154: Ammonium fluoroborate</li> <li>242: Ammonium tetrafluoroborate</li> <li>2289: Nitronium tetrafluoroborate</li> <li>2536: Potassium tetrabromopalladate(II)</li> <li>2537: Potassium tetrabromoplatinate(II)</li> <li>1802: Lithium hypochlorite</li> <li>3169: Terbium sulfate octabydrate</li> </ul>
13824-57-2 13824-57-2 13824-63-6 13825-36-0 13825-75-6 13825-76-8 13825-86-0 13826-56-7 13826-83-0 13826-83-0 13826-83-0 13826-86-3 13826-93-2 13826-94-3 13840-33-0 13842-75-6	<ul> <li>2141: Molybdenum(VI) dioxydifluoride</li> <li>3209: Thallium(I) nitrite</li> <li>3242: Thorium hydroxide</li> <li>3298: Titanium oxysulfate</li> <li>1480: Holmium bromide</li> <li>884: Chromium(II) sulfate pentahydrate</li> <li>2485: Potassium magnesium sulfate</li> <li>154: Ammonium fluoroborate</li> <li>242: Ammonium tetrafluoroborate</li> <li>2289: Nitronium tetrafluoroborate</li> <li>2536: Potassium tetrabromopalladate(II)</li> <li>2537: Potassium tetrabromoplatinate(II)</li> <li>1802: Lithium hypochlorite</li> <li>3169: Terbium sulfate octahydrate</li> <li>258: Niohium(UV) bromide</li> </ul>
13824-57-2 13824-63-6 13825-36-0 13825-75-6 13825-76-8 13825-76-8 13825-86-0 13826-56-7 13826-83-0 13826-83-0 13826-83-0 13826-83-3 13826-93-2 13826-94-3 13840-33-0 13842-67-6 13842-75-6	<ul> <li>2141: Molybdenum(VI) dioxydifluoride</li> <li>3209: Thallium(I) nitrite</li> <li>3242: Thorium hydroxide</li> <li>3298: Titanium oxysulfate</li> <li>1480: Holmium bromide</li> <li>884: Chromium(II) sulfate pentahydrate</li> <li>2485: Potassium magnesium sulfate</li> <li>154: Ammonium fluoroborate</li> <li>242: Ammonium tetrafluoroborate</li> <li>2289: Nitronium tetrafluoroborate</li> <li>2536: Potassium tetrabromopalladate(II)</li> <li>2537: Potassium tetrabromoplatinate(II)</li> <li>1802: Lithium hypochlorite</li> <li>3169: Terbium sulfate octahydrate</li> <li>2258: Niobium(IV) bromide</li> <li>2204: Blutonium(II) floored</li> </ul>
13824-57-2 13824-57-2 13824-53-6 13825-36-0 13825-75-6 13825-76-8 13825-86-0 13826-56-7 13826-83-0 13826-83-0 13826-83-0 13826-83-0 13826-83-0 13826-83-0 13826-83-0 13826-83-0 13826-83-0 13826-83-0 13826-93-2 13840-33-0 13842-75-6 13842-75-6 13842-75-6	<ul> <li>2141: Molybdenum(VI) dioxydifluoride</li> <li>3209: Thallium(I) nitrite</li> <li>3242: Thorium hydroxide</li> <li>3298: Titanium oxysulfate</li> <li>1480: Holmium bromide</li> <li>884: Chromium(II) sulfate pentahydrate</li> <li>2485: Potassium magnesium sulfate</li> <li>154: Ammonium fluoroborate</li> <li>242: Ammonium tetrafluoroborate</li> <li>2289: Nitronium tetrafluoroborate</li> <li>2536: Potassium tetrabromopalladate(II)</li> <li>2537: Potassium tetrabromoplatinate(II)</li> <li>1802: Lithium hypochlorite</li> <li>3169: Terbium sulfate octahydrate</li> <li>2239: Niobium(IV) bromide</li> <li>2394: Plutonium(III) fluoride</li> </ul>
13824-63-6 13825-36-0 13825-75-6 13825-75-6 13825-76-8 13825-76-8 13825-86-0 13826-56-7 13826-83-0 13826-83-0 13826-83-0 13826-83-0 13826-83-3 13826-93-2 13826-93-2 13840-33-0 13842-75-6 13842-75-6 13842-75-6 13842-75-6	<ul> <li>2141: Molybdenum(VI) dioxydifluoride</li> <li>3209: Thallium(I) nitrite</li> <li>3242: Thorium hydroxide</li> <li>3298: Titanium oxysulfate</li> <li>1480: Holmium bromide</li> <li>884: Chromium(II) sulfate pentahydrate</li> <li>2485: Potassium magnesium sulfate</li> <li>154: Ammonium fluoroborate</li> <li>242: Ammonium tetrafluoroborate</li> <li>2289: Nitronium tetrafluoroborate</li> <li>2336: Potassium tetrabromopalladate(II)</li> <li>2537: Potassium tetrabromoplatinate(II)</li> <li>1802: Lithium hypochlorite</li> <li>3169: Terbium sulfate octahydrate</li> <li>2258: Niobium(IV) bromide</li> <li>2394: Plutonium(III) fluoride</li> <li>921: Chromium(VI) fluoride</li> </ul>
13824-63-6         13824-63-6         13825-36-0         13825-75-6         13825-76-8         13825-86-0         13826-56-7         13826-83-0         13826-83-0         13826-83-0         13826-83-0         13826-83-0         13826-83-0         13826-83-0         13826-83-0         13826-83-0         13826-86-3         13826-93-2         13840-33-0         13842-67-6         13842-75-6         13842-82-         13843-28-2         13845-16-4	<ul> <li>2141: Molybdenum(VI) dioxydifluoride</li> <li>3209: Thallium(I) nitrite</li> <li>3242: Thorium hydroxide</li> <li>3298: Titanium oxysulfate</li> <li>1480: Holmium bromide</li> <li>884: Chromium(II) sulfate pentahydrate</li> <li>2485: Potassium magnesium sulfate</li> <li>154: Ammonium fluoroborate</li> <li>242: Ammonium tetrafluoroborate</li> <li>2289: Nitronium tetrafluoroborate</li> <li>2536: Potassium tetrabromopalladate(II)</li> <li>2537: Potassium tetrabromoplatinate(II)</li> <li>1802: Lithium hypochlorite</li> <li>3169: Terbium sulfate octahydrate</li> <li>2258: Niobium(IV) bromide</li> <li>2394: Plutonium(III) fluoride</li> <li>23058: Strontium dithionate</li> </ul>

13845-17-5	
	354: Barium dithionate dihydrate
13845-36-8	2562: Potassium triphosphate
12047 57 0	1749. Lood(II) ablarida fluarida
13647-37-9	1/48: Lead(II) chioride huoride
13847-66-0	3194: Thallium(I) azide
13859-51-3	2336 Pentammine-
15057 51 5	
	chlorocobalt(III) chloride
13862-78-7	246: Ammonium
	tetrathiotungstate
100/0 11 5	
13863-41-7	542: Bromine chloride
13863-59-7	544: Bromine fluoride
13863 50 7	545: Bromine monofluoride
13003-37-7	
13863-88-2	2/81: Silver azide
13864-01-2	1663: Lanthanum hydride
13864-02-3	766: Cerium trihydride
13064 02 3	
13864-03-4	2583: Praseodymium hydride
13864-04-5	2164: Neodymium hydride
13867-67-9	3397: Uranyl chloride trihydrate
12000/ 0/ 2	16(5: Lentheman is date
138/0-19-4	1665: Lanthanum iodate
13870-24-1	1632: Iron tungstate
13871-27-7	3002: Sodium
	tetrafluorobervllate
10070 0 : -	
13873-84-2	1585: Iodine fluoride
13874-02-7	3000: Sodium
	tetrachloroaurate(III)
	tetraemoroaurate(III)
	dihydrate
13874-04-9	237: Ammonium
	tetrachloroaurate(III) hydrate
12074 75 4	
138/4-/5-4	2/20: Samarium(II) chloride
13875-06-4	3453: Xenon dioxydifluoride
13876-85-2	1047: Copper(I) mercury jodide
12006 65 6	2605: Duthanium (III) is dida
13890-03-0	2095: Ruthellium(III) Iouide
13918-22-4	2028: Manganese(II) tungstate
13931-94-7	880: Chromium(II) chloride
	tetrahydrate
13932-17-7	2560: Potossium zine sulfate
10/02 11 1	2509. I Otassium Zine sunate
15952 17 7	hexahydrate
13033_23_8	hexahydrate
13933-23-8	hexahydrate 1639: Iron(II) perchlorate
13933-23-8 13933-31-8	hexahydrate 1639: Iron(II) perchlorate 2330: Palladium(II) tetraammine
13933-23-8 13933-31-8	hexahydrate 1639: Iron(II) perchlorate 2330: Palladium(II) tetraammine chloride monohydrate
13933-23-8 13933-31-8	<ul> <li>hexahydrate</li> <li>hexahydrate</li> <li>1639: Iron(II) perchlorate</li> <li>2330: Palladium(II) tetraammine chloride monohydrate</li> <li>2110: Molyhdenum carbonyl</li> </ul>
13933-23-8 13933-31-8 13939-06-5	<ul> <li>hexahydrate</li> <li>hexahydrate</li> <li>1639: Iron(II) perchlorate</li> <li>2330: Palladium(II) tetraammine chloride monohydrate</li> <li>2110: Molybdenum carbonyl</li> <li>2052: Soldium eargenerie data</li> </ul>
13933-23-8 13933-31-8 13939-06-5 13940-38-0	<ul> <li>hexahydrate</li> <li>1639: Iron(II) perchlorate</li> <li>2330: Palladium(II) tetraammine chloride monohydrate</li> <li>2110: Molybdenum carbonyl</li> <li>2952: Sodium paraperiodate</li> </ul>
13933-23-8 13933-31-8 13939-06-5 13940-38-0 13940-63-1	<ul> <li>hexahydrate</li> <li>1639: Iron(II) perchlorate</li> <li>2330: Palladium(II) tetraammine chloride monohydrate</li> <li>2110: Molybdenum carbonyl</li> <li>2952: Sodium paraperiodate</li> <li>1412: Germanium(II) fluoride</li> </ul>
13933-23-8 13933-31-8 13939-06-5 13940-38-0 13940-63-1 13940-63-1 13940-83-5	<ul> <li>2309. Fotassimi Zine surface hexahydrate</li> <li>1639: Iron(II) perchlorate</li> <li>2330: Palladium(II) tetraammine chloride monohydrate</li> <li>2110: Molybdenum carbonyl</li> <li>2952: Sodium paraperiodate</li> <li>1412: Germanium(II) fluoride</li> <li>2211: Nickel fluoride</li> </ul>
13933-23-8 13933-31-8 13939-06-5 13940-38-0 13940-63-1 13940-83-5	<ul> <li>hexahydrate</li> <li>hexahydrate</li> <li>1639: Iron(II) perchlorate</li> <li>2330: Palladium(II) tetraammine chloride monohydrate</li> <li>2110: Molybdenum carbonyl</li> <li>2952: Sodium paraperiodate</li> <li>1412: Germanium(II) fluoride</li> <li>2211: Nickel fluoride</li> <li>torshudrata</li> </ul>
13933-23-8 13933-31-8 13939-06-5 13940-38-0 13940-63-1 13940-83-5	<ul> <li>hexahydrate</li> <li>hexahydrate</li> <li>1639: Iron(II) perchlorate</li> <li>2330: Palladium(II) tetraammine chloride monohydrate</li> <li>2110: Molybdenum carbonyl</li> <li>2952: Sodium paraperiodate</li> <li>1412: Germanium(II) fluoride</li> <li>2211: Nickel fluoride tetrahydrate</li> </ul>
13933-23-8 13933-31-8 13939-06-5 13940-38-0 13940-63-1 13940-83-5 13940-83-5	<ul> <li>2305 Fotassimi Zine surface hexahydrate</li> <li>1639: Iron(II) perchlorate</li> <li>2330: Palladium(II) tetraammine chloride monohydrate</li> <li>2110: Molybdenum carbonyl</li> <li>2952: Sodium paraperiodate</li> <li>1412: Germanium(II) fluoride</li> <li>2211: Nickel fluoride tetrahydrate</li> <li>1317: Ferrous fluoride</li> </ul>
13933-23-8 13933-31-8 13939-06-5 13940-38-0 13940-63-1 13940-83-5 13940-89-1	<ul> <li>2305. Fotassimi Zine surface hexahydrate</li> <li>1639: Iron(II) perchlorate</li> <li>2330: Palladium(II) tetraammine chloride monohydrate</li> <li>2110: Molybdenum carbonyl</li> <li>2952: Sodium paraperiodate</li> <li>1412: Germanium(II) fluoride</li> <li>2211: Nickel fluoride tetrahydrate</li> <li>1317: Ferrous fluoride</li> <li>tetrahydrate</li> </ul>
13933-23-8 13933-31-8 13939-06-5 13940-38-0 13940-63-1 13940-83-5 13940-89-1 13963-57-0	<ul> <li>2009. Fotassimi zinc surface hexahydrate</li> <li>1639: Iron(II) perchlorate</li> <li>2330: Palladium(II) tetraammine chloride monohydrate</li> <li>2110: Molybdenum carbonyl</li> <li>2952: Sodium paraperiodate</li> <li>1412: Germanium(II) fluoride</li> <li>2211: Nickel fluoride tetrahydrate</li> <li>1317: Ferrous fluoride tetrahydrate</li> <li>18: Aluminum acetylacetonate</li> </ul>
13933-23-8 13933-31-8 13933-31-8 13940-38-0 13940-63-1 13940-83-5 13940-89-1 13963-57-0	<ul> <li>hexahydrate</li> <li>hexahydrate</li> <li>1639: Iron(II) perchlorate</li> <li>2330: Palladium(II) tetraammine chloride monohydrate</li> <li>2110: Molybdenum carbonyl</li> <li>2952: Sodium paraperiodate</li> <li>1412: Germanium(II) fluoride</li> <li>2211: Nickel fluoride tetrahydrate</li> <li>1317: Ferrous fluoride tetrahydrate</li> <li>18: Aluminum acetylacetonate</li> </ul>
13933-23-8 13933-31-8 13939-06-5 13940-38-0 13940-63-1 13940-83-5 13940-83-5 13940-89-1 13963-57-0 13963-58-1	<ul> <li>2305 Fotassimi Zine surface hexahydrate</li> <li>1639: Iron(II) perchlorate</li> <li>2330: Palladium(II) tetraammine chloride monohydrate</li> <li>2110: Molybdenum carbonyl</li> <li>2952: Sodium paraperiodate</li> <li>1412: Germanium(II) fluoride</li> <li>2211: Nickel fluoride tetrahydrate</li> <li>1317: Ferrous fluoride tetrahydrate</li> <li>1317: Ferrous fluoride</li> <li>tetrahydrate</li> <li>18: Aluminum acetylacetonate</li> <li>2454: Potassium</li> </ul>
13933-23-8 13933-23-8 13933-31-8 13939-06-5 13940-38-0 13940-63-1 13940-83-5 13940-83-5 13940-89-1 13963-57-0 13963-58-1	<ul> <li>2305 Fotassimi Zine surface hexahydrate</li> <li>1639: Iron(II) perchlorate</li> <li>2330: Palladium(II) tetraammine chloride monohydrate</li> <li>2110: Molybdenum carbonyl</li> <li>2952: Sodium paraperiodate</li> <li>1412: Germanium(II) fluoride</li> <li>2211: Nickel fluoride tetrahydrate</li> <li>1317: Ferrous fluoride tetrahydrate</li> <li>18: Aluminum acetylacetonate</li> <li>2454: Potassium hexacyanocobalt(III)</li> </ul>
13933-23-8 13933-23-8 13933-31-8 13939-06-5 13940-38-0 13940-63-1 13940-83-5 13940-83-5 13940-89-1 13963-57-0 13963-58-1 13965-73-6	<ul> <li>2009. Fotassimi Zine surface hexahydrate</li> <li>1639: Iron(II) perchlorate</li> <li>2330: Palladium(II) tetraammine chloride monohydrate</li> <li>2110: Molybdenum carbonyl</li> <li>2952: Sodium paraperiodate</li> <li>1412: Germanium(II) fluoride</li> <li>2211: Nickel fluoride tetrahydrate</li> <li>1317: Ferrous fluoride tetrahydrate</li> <li>18: Aluminum acetylacetonate</li> <li>2454: Potassium hexacyanocobalt(III)</li> <li>3183: Tetrafluorodiborane</li> </ul>
13933-23-8 13933-31-8 13933-31-8 13939-06-5 13940-38-0 13940-63-1 13940-83-5 13940-83-5 13940-89-1 13963-57-0 13963-58-1 13965-73-6	<ul> <li>2509. Fotassimi Zine surface hexahydrate</li> <li>1639: Iron(II) perchlorate</li> <li>2330: Palladium(II) tetraammine chloride monohydrate</li> <li>2110: Molybdenum carbonyl</li> <li>2952: Sodium paraperiodate</li> <li>1412: Germanium(II) fluoride</li> <li>2211: Nickel fluoride</li> <li>tetrahydrate</li> <li>1317: Ferrous fluoride</li> <li>tetrahydrate</li> <li>1317: Ferrous fluoride</li> <li>tetrahydrate</li> <li>18: Aluminum acetylacetonate</li> <li>2454: Potassium</li> <li>hexacyanocobalt(III)</li> <li>3183: Tetrafluorodiborane</li> <li>1560: Lachurg(D) ia dida</li> </ul>
13933-23-8         13933-23-8         13933-31-8         13939-06-5         13940-38-0         13940-63-1         13940-83-5         13940-83-5         13940-89-1         13963-57-0         13965-73-6         13965-73-6         13965-94-4	<ul> <li>2305 Fotassimi Zine surface hexahydrate</li> <li>1639: Iron(II) perchlorate</li> <li>2330: Palladium(II) tetraammine chloride monohydrate</li> <li>2110: Molybdenum carbonyl</li> <li>2952: Sodium paraperiodate</li> <li>1412: Germanium(II) fluoride</li> <li>2211: Nickel fluoride tetrahydrate</li> <li>1317: Ferrous fluoride tetrahydrate</li> <li>1317: Ferrous fluoride</li> <li>tetrahydrate</li> <li>18: Aluminum acetylacetonate</li> <li>2454: Potassium hexacyanocobalt(III)</li> <li>3183: Tetrafluorodiborane</li> <li>1560: Indium(I) iodide</li> </ul>
13933-23-8         13933-23-8         13933-31-8         13939-06-5         13940-38-0         13940-63-1         13940-83-5         13940-83-5         13940-89-1         13963-57-0         13963-58-1         13965-73-6         13966-94-4         13967-25-4	<ul> <li>hexahydrate</li> <li></li></ul>
13933-23-8         13933-23-8         13933-31-8         13939-06-5         13940-38-0         13940-63-1         13940-63-1         13940-83-5         13940-89-1         13963-57-0         13963-58-1         13965-73-6         13966-94-4         13967-25-4         13967-50-5	<ul> <li>2305. Fotassium Zine surface hexahydrate</li> <li>1639: Iron(II) perchlorate</li> <li>2330: Palladium(II) tetraammine chloride monohydrate</li> <li>2110: Molybdenum carbonyl</li> <li>2952: Sodium paraperiodate</li> <li>1412: Germanium(II) fluoride</li> <li>2211: Nickel fluoride tetrahydrate</li> <li>1317: Ferrous fluoride tetrahydrate</li> <li>1317: Ferrous fluoride tetrahydrate</li> <li>18: Aluminum acetylacetonate</li> <li>2454: Potassium hexacyanocobalt(III)</li> <li>3183: Tetrafluorodiborane</li> <li>1560: Indium(I) iodide</li> <li>2048: Mercury(I) fluoride</li> <li>2431: Potassium cyanoaurite</li> </ul>
13933-23-8 13933-31-8 13933-31-8 13940-38-0 13940-63-1 13940-83-5 13940-83-5 13940-89-1 13963-57-0 13963-58-1 13965-73-6 13966-94-4 13967-25-4 13967-50-5 13967-90-3	<ul> <li>2509. Fotassium Zine surface hexahydrate</li> <li>1639: Iron(II) perchlorate</li> <li>2330: Palladium(II) tetraammine chloride monohydrate</li> <li>2110: Molybdenum carbonyl</li> <li>2952: Sodium paraperiodate</li> <li>1412: Germanium(II) fluoride</li> <li>2211: Nickel fluoride tetrahydrate</li> <li>1317: Ferrous fluoride tetrahydrate</li> <li>18: Aluminum acetylacetonate</li> <li>2454: Potassium hexacyanocobalt(III)</li> <li>3183: Tetrafluorodiborane</li> <li>1560: Indium(I) iodide</li> <li>2048: Mercury(I) fluoride</li> <li>2431: Potassium cyanoaurite</li> <li>331: Barium bromate</li> </ul>
13933-23-8         13933-23-8         13933-31-8         13933-31-8         13940-63-1         13940-63-1         13940-83-5         13940-83-5         13963-57-0         13963-58-1         13965-73-6         13965-73-6         13967-25-4         13967-90-3         13967-90-3	<ul> <li>2309. Fotassium Zine surface hexahydrate</li> <li>1639: Iron(II) perchlorate</li> <li>2330: Palladium(II) tetraammine chloride monohydrate</li> <li>2110: Molybdenum carbonyl</li> <li>2952: Sodium paraperiodate</li> <li>1412: Germanium(II) fluoride</li> <li>2211: Nickel fluoride tetrahydrate</li> <li>1317: Ferrous fluoride tetrahydrate</li> <li>1317: Ferrous fluoride tetrahydrate</li> <li>18: Aluminum acetylacetonate</li> <li>2454: Potassium hexacyanocobalt(III)</li> <li>3183: Tetrafluorodiborane</li> <li>1560: Indium(I) iodide</li> <li>2048: Mercury(I) fluoride</li> <li>2431: Potassium cyanoaurite</li> <li>331: Barium bromate</li> </ul>
13933-23-8         13933-23-8         13933-31-8         13933-31-8         13940-63-1         13940-63-1         13940-83-5         13940-83-5         13940-89-1         13963-57-0         13965-73-6         13965-73-6         13967-25-4         13967-90-3         13972-68-4	<ul> <li>2309. Fotassimi Zine surface hexahydrate</li> <li>1639: Iron(II) perchlorate</li> <li>2330: Palladium(II) tetraammine chloride monohydrate</li> <li>2110: Molybdenum carbonyl</li> <li>2952: Sodium paraperiodate</li> <li>1412: Germanium(II) fluoride</li> <li>2211: Nickel fluoride tetrahydrate</li> <li>1317: Ferrous fluoride tetrahydrate</li> <li>1317: Ferrous fluoride tetrahydrate</li> <li>18: Aluminum acetylacetonate</li> <li>2454: Potassium hexacyanocobalt(III)</li> <li>3183: Tetrafluorodiborane</li> <li>1560: Indium(I) iodide</li> <li>2048: Mercury(I) fluoride</li> <li>2431: Potassium cyanoaurite</li> <li>331: Barium bromate</li> <li>579: Cadmium molybdate(VI)</li> </ul>
13933-23-8         13933-23-8         13933-31-8         13933-31-8         13940-63-1         13940-63-1         13940-83-5         13940-83-5         13940-89-1         13963-57-0         13963-58-1         13965-73-6         13966-94-4         13967-25-4         13967-90-3         13972-68-4         13973-87-0	<ul> <li>2305 Fotassimi Zinc surface hexahydrate</li> <li>1639: Iron(II) perchlorate</li> <li>2330: Palladium(II) tetraammine chloride monohydrate</li> <li>2110: Molybdenum carbonyl</li> <li>2952: Sodium paraperiodate</li> <li>1412: Germanium(II) fluoride</li> <li>2211: Nickel fluoride tetrahydrate</li> <li>1317: Ferrous fluoride tetrahydrate</li> <li>1317: Ferrous fluoride tetrahydrate</li> <li>18: Aluminum acetylacetonate</li> <li>2454: Potassium hexacyanocobalt(III)</li> <li>3183: Tetrafluorodiborane</li> <li>1560: Indium(I) iodide</li> <li>2048: Mercury(I) fluoride</li> <li>2431: Potassium cyanoaurite</li> <li>331: Barium bromate</li> <li>579: Cadmium molybdate(VI)</li> <li>541: Bromine azide</li> </ul>
13933-23-8         13933-23-8         13933-31-8         13933-31-8         13933-31-8         13940-38-0         13940-38-0         13940-63-1         13940-63-1         13940-83-5         13940-83-5         13940-89-1         13963-57-0         13963-58-1         13965-73-6         13967-25-4         13967-25-4         13972-68-4         13973-87-0         13981-86-7	<ul> <li>2509. Fotassimi Zine surface hexahydrate</li> <li>1639: Iron(II) perchlorate</li> <li>2330: Palladium(II) tetraammine chloride monohydrate</li> <li>2110: Molybdenum carbonyl</li> <li>2952: Sodium paraperiodate</li> <li>1412: Germanium(II) fluoride</li> <li>2211: Nickel fluoride tetrahydrate</li> <li>1317: Ferrous fluoride tetrahydrate</li> <li>18: Aluminum acetylacetonate</li> <li>2454: Potassium hexacyanocobalt(III)</li> <li>3183: Tetrafluorodiborane</li> <li>1560: Indium(I) iodide</li> <li>2048: Mercury(I) fluoride</li> <li>2431: Potassium cyanoaurite</li> <li>331: Barium bromate</li> <li>579: Cadmium molybdate(VI)</li> <li>541: Bromine azide</li> <li>2253: Niobium hydride</li> </ul>
13933-23-8         13933-23-8         13933-31-8         13933-31-8         13940-65         13940-63-1         13940-83-5         13940-83-5         13963-57-0         13963-57-0         13965-73-6         13965-73-6         13965-73-6         13965-73-6         13965-73-6         13965-73-6         13967-25-4         13967-80-3         13972-68-4         13973-87-0         13981-86-7         13981-86-7         13981-86-7	<ul> <li>2305 Fotassium Zine surface hexahydrate</li> <li>1639: Iron(II) perchlorate</li> <li>2330: Palladium(II) tetraammine chloride monohydrate</li> <li>2110: Molybdenum carbonyl</li> <li>2952: Sodium paraperiodate</li> <li>1412: Germanium(II) fluoride</li> <li>2211: Nickel fluoride tetrahydrate</li> <li>1317: Ferrous fluoride tetrahydrate</li> <li>1317: Ferrous fluoride</li> <li>tetrahydrate</li> <li>18: Aluminum acetylacetonate</li> <li>2454: Potassium hexacyanocobalt(III)</li> <li>3183: Tetrafluorodiborane</li> <li>1560: Indium(I) iodide</li> <li>2048: Mercury(I) fluoride</li> <li>2431: Potassium cyanoaurite</li> <li>331: Barium bromate</li> <li>579: Cadmium molybdate(VI)</li> <li>541: Bromine azide</li> <li>2253: Niobium hydride</li> <li>3110: Tantalum hydride</li> </ul>
13933-23-8         13933-23-8         13933-31-8         13933-31-8         13940-63-5         13940-63-1         13940-63-1         13940-83-5         13940-83-5         13940-83-5         13965-73-6         13967-90-3         13972-68-4         13973-87-0         13981-95-8         13981-95-8	<ul> <li>2509, Fotassimi Zine surface hexahydrate</li> <li>1639: Iron(II) perchlorate</li> <li>2330: Palladium(II) tetraammine chloride monohydrate</li> <li>2110: Molybdenum carbonyl</li> <li>2952: Sodium paraperiodate</li> <li>1412: Germanium(II) fluoride</li> <li>2211: Nickel fluoride tetrahydrate</li> <li>1317: Ferrous fluoride tetrahydrate</li> <li>1317: Ferrous fluoride tetrahydrate</li> <li>18: Aluminum acetylacetonate</li> <li>2454: Potassium hexacyanocobalt(III)</li> <li>3183: Tetrafluorodiborane</li> <li>1560: Indium(I) iodide</li> <li>2048: Mercury(I) fluoride</li> <li>2431: Potassium cyanoaurite</li> <li>331: Barium bromate</li> <li>579: Cadmium molybdate(VI)</li> <li>541: Bromine azide</li> <li>2253: Niobium hydride</li> </ul>
13933-23-8         13933-23-8         13933-31-8         13933-31-8         13933-31-8         13940-63-1         13940-63-1         13940-83-5         13940-83-5         13940-83-5         13940-89-1         13963-57-0         13963-58-1         13965-73-6         13965-73-6         13967-25-4         13967-90-3         13972-68-4         13973-87-0         13981-86-7         13981-95-8         13982-53-1	<ul> <li>2509, Fotassimi Zine surface hexahydrate</li> <li>1639: Iron(II) perchlorate</li> <li>2330: Palladium(II) tetraammine chloride monohydrate</li> <li>2110: Molybdenum carbonyl</li> <li>2952: Sodium paraperiodate</li> <li>1412: Germanium(II) fluoride</li> <li>2211: Nickel fluoride tetrahydrate</li> <li>1317: Ferrous fluoride tetrahydrate</li> <li>1317: Ferrous fluoride tetrahydrate</li> <li>18: Aluminum acetylacetonate</li> <li>2454: Potassium hexacyanocobalt(III)</li> <li>3183: Tetrafluorodiborane</li> <li>1560: Indium(I) iodide</li> <li>2048: Mercury(I) fluoride</li> <li>2431: Potassium cyanoaurite</li> <li>331: Barium bromate</li> <li>579: Cadmium molybdate(VI)</li> <li>541: Bromine azide</li> <li>2253: Niobium hydride</li> <li>3119: Tantalum hydride</li> <li>1051: Copper(I) sulfite</li> </ul>
13933-23-8         13933-31-8         13933-31-8         13933-31-8         13940-63-1         13940-83-5         13940-83-5         13963-57-0         13963-58-1         13965-73-6         13972-68-4         13972-88         13981-95-8         13982-53-1	<ul> <li>2509, Fotassinii Zine surfate hexahydrate</li> <li>1639: Iron(II) perchlorate</li> <li>2330: Palladium(II) tetraammine chloride monohydrate</li> <li>2110: Molybdenum carbonyl</li> <li>2952: Sodium paraperiodate</li> <li>1412: Germanium(II) fluoride</li> <li>2211: Nickel fluoride tetrahydrate</li> <li>1317: Ferrous fluoride tetrahydrate</li> <li>18: Aluminum acetylacetonate</li> <li>2454: Potassium hexacyanocobalt(III)</li> <li>3183: Tetrafluorodiborane</li> <li>1560: Indium(I) iodide</li> <li>2048: Mercury(I) fluoride</li> <li>2431: Potassium cyanoaurite</li> <li>331: Barium bromate</li> <li>579: Cadmium molybdate(VI)</li> <li>541: Bromine azide</li> <li>2253: Niobium hydride</li> <li>3119: Tantalum hydride</li> <li>1051: Copper(I) sulfite hemihydrate</li> </ul>
13932-23-8         13933-23-8         13933-31-8         13933-31-8         13933-31-8         13940-63-1         13940-63-1         13940-83-5         13940-83-5         13940-83-5         13963-57-0         13963-57-0         13965-73-6         13965-73-6         13965-73-6         13965-73-6         13965-73-6         13965-73-6         13965-73-6         13965-73-6         13965-73-6         13965-73-6         13965-73-6         13965-73-6         13965-73-6         13965-73-6         13965-73-6         13965-73-6         13965-73-6         13965-73-6         13965-73-6         13967-80-3         13972-68-4         13973-87-0         13981-86-7         13981-95-8         13982-53-1	<ul> <li>2305 Fotassini Zilić suriaće hexahydrate</li> <li>1639: Iron(II) perchlorate</li> <li>2330: Palladium(II) tetraammine chloride monohydrate</li> <li>2110: Molybdenum carbonyl</li> <li>2952: Sodium paraperiodate</li> <li>1412: Germanium(II) fluoride</li> <li>2211: Nickel fluoride tetrahydrate</li> <li>1317: Ferrous fluoride tetrahydrate</li> <li>1317: Ferrous fluoride</li> <li>tetrahydrate</li> <li>18: Aluminum acetylacetonate</li> <li>2454: Potassium hexacyanocobalt(III)</li> <li>3183: Tetrafluorodiborane</li> <li>1560: Indium(I) iodide</li> <li>2048: Mercury(I) fluoride</li> <li>2431: Potassium cyanoaurite</li> <li>331: Barium bromate</li> <li>579: Cadmium molybdate(VI)</li> <li>541: Bromine azide</li> <li>2253: Niobium hydride</li> <li>31051: Copper(I) sulfite hemihydrate</li> </ul>
13933-23-8         13933-23-8         13933-31-8         13933-31-8         13940-63-1         13940-63-1         13940-63-1         13940-83-5         13940-83-5         13940-83-5         13965-73-6         13965-73-6         13965-73-6         13965-73-6         13965-73-6         13965-73-6         13965-73-6         13965-73-6         13965-73-6         13965-73-6         13965-73-6         13965-73-6         13965-73-6         13965-73-6         13965-73-6         13965-73-6         13965-73-70         13967-80-3         13972-68-4         13973-87-0         13981-86-7         13982-53-1         13982-53-1	<ul> <li>2505, Fotassini Zile surface hexahydrate</li> <li>1639: Iron(II) perchlorate</li> <li>2330: Palladium(II) tetraammine chloride monohydrate</li> <li>2110: Molybdenum carbonyl</li> <li>2952: Sodium paraperiodate</li> <li>1412: Germanium(II) fluoride</li> <li>2211: Nickel fluoride tetrahydrate</li> <li>1317: Ferrous fluoride tetrahydrate</li> <li>1317: Ferrous fluoride</li> <li>tetrahydrate</li> <li>18: Aluminum acetylacetonate</li> <li>2454: Potassium hexacyanocobalt(III)</li> <li>3183: Tetrafluorodiborane</li> <li>1560: Indium(I) iodide</li> <li>2048: Mercury(I) fluoride</li> <li>2431: Potassium cyanoaurite</li> <li>331: Barium bromate</li> <li>579: Cadmium molybdate(VI)</li> <li>541: Bromine azide</li> <li>2253: Niobium hydride</li> <li>3119: Tantalum hydride</li> <li>1051: Copper(I) sulfite hemihydrate</li> </ul>
13933-23-8         13933-23-8         13933-31-8         13933-31-8         13933-31-8         13940-63-1         13940-63-1         13940-83-5         13940-83-5         13940-83-5         13940-89-1         13963-57-0         13965-73-6         13965-73-6         13965-73-6         13967-25-4         13967-50-5         13967-90-3         13972-68-4         13973-87-0         13981-86-7         13982-53-1         13982-53-1	<ul> <li>2509, Fotassimi Zine surface hexahydrate</li> <li>1639: Iron(II) perchlorate</li> <li>2330: Palladium(II) tetraammine chloride monohydrate</li> <li>2110: Molybdenum carbonyl</li> <li>2952: Sodium paraperiodate</li> <li>1412: Germanium(II) fluoride</li> <li>2211: Nickel fluoride tetrahydrate</li> <li>1317: Ferrous fluoride tetrahydrate</li> <li>1317: Ferrous fluoride</li> <li>tetrahydrate</li> <li>18: Aluminum acetylacetonate</li> <li>2454: Potassium hexacyanocobalt(III)</li> <li>3183: Tetrafluorodiborane</li> <li>1560: Indium(I) iodide</li> <li>2048: Mercury(I) fluoride</li> <li>2431: Potassium cyanoaurite</li> <li>331: Barium bromate</li> <li>579: Cadmium molybdate(VI)</li> <li>541: Bromine azide</li> <li>2253: Niobium hydride</li> <li>3119: Tantalum hydride</li> <li>1051: Copper(I) sulfite hemihydrate</li> <li>1052: Copper(I) sulfite monohydrate</li> </ul>
13932-23-8         13933-23-8         13933-31-8         13933-31-8         13933-31-8         13940-63-1         13940-63-1         13940-83-5         13940-83-5         13940-83-5         13963-57-0         13963-57-0         13965-73-6         13965-73-6         13965-73-6         13965-73-6         13965-73-6         13965-73-6         13965-73-6         13965-73-6         13965-73-6         13965-73-6         13965-73-6         13965-73-6         13965-73-6         13965-73-6         13965-73-6         13965-73-6         13965-73-6         13965-73-6         13972-68-4         13972-68-4         13981-95-8         13982-53-1         13982-53-1         13983-20-5	<ul> <li>2509, Fotassimi Zine surface hexahydrate</li> <li>1639: Iron(II) perchlorate</li> <li>2330: Palladium(II) tetraammine chloride monohydrate</li> <li>2110: Molybdenum carbonyl</li> <li>2952: Sodium paraperiodate</li> <li>1412: Germanium(II) fluoride</li> <li>2211: Nickel fluoride tetrahydrate</li> <li>1317: Ferrous fluoride tetrahydrate</li> <li>18: Aluminum acetylacetonate</li> <li>2454: Potassium hexacyanocobalt(III)</li> <li>3183: Tetrafluorodiborane</li> <li>1560: Indium(I) iodide</li> <li>2048: Mercury(I) fluoride</li> <li>2431: Potassium cyanoaurite</li> <li>331: Barium bromate</li> <li>579: Cadmium molybdate(VI)</li> <li>541: Bromine azide</li> <li>2253: Niobium hydride</li> <li>3119: Tantalum hydride</li> <li>1051: Copper(I) sulfite hemihydrate</li> <li>1052: Copper(I) sulfite monohydrate</li> <li>1516: Hydrogen-d1</li> </ul>
13933-23-8         13933-23-8         13933-31-8         13933-31-8         13933-31-8         13940-63-1         13940-63-1         13940-83-5         13940-83-5         13940-83-5         13963-57-0         13963-57-0         13965-73-6         13965-73-6         13965-73-6         13965-73-6         13965-73-6         13965-73-6         13965-73-6         13965-73-6         13965-73-6         13965-73-6         13965-73-6         13965-73-6         13965-73-6         13965-73-6         13965-73-6         13965-73-7         13965-73-6         13972-68-4         13973-87-0         13981-86-7         13981-95-8         13982-53-1         13983-20-5         13986-18-0	<ul> <li>230: Fotassini Zilic surface hexahydrate</li> <li>1639: Iron(II) perchlorate</li> <li>2330: Palladium(II) tetraammine chloride monohydrate</li> <li>2110: Molybdenum carbonyl</li> <li>2952: Sodium paraperiodate</li> <li>1412: Germanium(II) fluoride</li> <li>2211: Nickel fluoride tetrahydrate</li> <li>1317: Ferrous fluoride tetrahydrate</li> <li>1317: Ferrous fluoride tetrahydrate</li> <li>18: Aluminum acetylacetonate</li> <li>2454: Potassium hexacyanocobalt(III)</li> <li>3183: Tetrafluorodiborane</li> <li>1560: Indium(I) iodide</li> <li>2048: Mercury(I) fluoride</li> <li>2431: Potassium cyanoaurite</li> <li>331: Barium bromate</li> <li>579: Cadmium molybdate(VI)</li> <li>541: Bromine azide</li> <li>2253: Niobium hydride</li> <li>31051: Copper(I) sulfite hemihydrate</li> <li>1516: Hydrogen-d1</li> <li>3539: Zinc fluoride tetrahydrate</li> </ul>
13933-23-8         13933-23-8         13933-31-8         13933-31-8         13933-31-8         13940-63-1         13940-63-1         13940-83-5         13940-83-5         13940-83-5         13965-73-6         13965-73-6         13965-73-6         13965-73-6         13965-73-6         13965-73-6         13965-73-6         13965-73-6         13965-73-6         13965-73-6         13965-73-6         13965-73-6         13965-73-6         13965-73-6         13965-73-6         13965-73-6         13965-73-6         13967-80-3         13972-68-4         13973-87-0         13981-86-7         13982-53-1         13982-53-1         13983-20-5         13986-18-0         13986-18-0	<ul> <li>2509. Fotassimi Zilic surface hexahydrate</li> <li>1639: Iron(II) perchlorate</li> <li>2330: Palladium(II) tetraammine chloride monohydrate</li> <li>2110: Molybdenum carbonyl</li> <li>2952: Sodium paraperiodate</li> <li>1412: Germanium(II) fluoride</li> <li>2211: Nickel fluoride tetrahydrate</li> <li>1317: Ferrous fluoride tetrahydrate</li> <li>1317: Ferrous fluoride tetrahydrate</li> <li>18: Aluminum acetylacetonate</li> <li>2454: Potassium hexacyanocobalt(III)</li> <li>3183: Tetrafluorodiborane</li> <li>1560: Indium(I) iodide</li> <li>2048: Mercury(I) fluoride</li> <li>2431: Potassium cyanoaurite</li> <li>331: Barium bromate</li> <li>579: Cadmium molybdate(VI)</li> <li>541: Bromine azide</li> <li>2253: Niobium hydride</li> <li>3119: Tantalum hydride</li> <li>1051: Copper(I) sulfite hemihydrate</li> <li>1052: Copper(I) sulfite monohydrate</li> <li>1516: Hydrogen-d1</li> <li>3539: Zinc fluoride tetrahydrate</li> </ul>
13933-23-8         13933-23-8         13933-31-8         13933-31-8         13933-31-8         13940-63-1         13940-63-1         13940-83-5         13940-83-5         13940-83-5         13940-83-5         13940-83-5         13940-83-5         13965-73-6         13965-73-6         13965-73-6         13967-25-4         13967-25-4         13967-25-4         13972-68-4         13973-87-0         13981-95-8         13982-53-1         13983-20-5         13983-20-5         13986-24-8	<ul> <li>2509, Fotassimi Zine surface hexahydrate</li> <li>1639: Iron(II) perchlorate</li> <li>2330: Palladium(II) tetraammine chloride monohydrate</li> <li>2110: Molybdenum carbonyl</li> <li>2952: Sodium paraperiodate</li> <li>1412: Germanium(II) fluoride</li> <li>2211: Nickel fluoride tetrahydrate</li> <li>1317: Ferrous fluoride tetrahydrate</li> <li>1317: Ferrous fluoride tetrahydrate</li> <li>18: Aluminum acetylacetonate</li> <li>2454: Potassium hexacyanocobalt(III)</li> <li>3183: Tetrafluorodiborane</li> <li>1560: Indium(I) iodide</li> <li>2048: Mercury(I) fluoride</li> <li>2431: Potassium cyanoaurite</li> <li>331: Barium bromate</li> <li>579: Cadmium molybdate(VI)</li> <li>541: Bromine azide</li> <li>2253: Niobium hydride</li> <li>3119: Tantalum hydride</li> <li>1051: Copper(I) sulfite hemihydrate</li> <li>1052: Copper(I) sulfite monohydrate</li> <li>1516: Hydrogen-d1</li> <li>3539: Zinc fluoride tetrahydrate</li> </ul>
13933-23-8         13933-23-8         13933-31-8         13933-31-8         13933-31-8         13940-63-1         13940-63-1         13940-83-5         13940-83-5         13940-83-5         13963-57-0         13963-57-0         13965-73-6         13965-73-6         13965-73-6         13965-73-6         13965-73-6         13965-73-6         13965-73-6         13965-73-6         13965-73-6         13965-73-6         13965-73-6         13965-73-6         13965-73-6         13965-73-6         13965-73-6         13965-73-6         13965-73-6         13972-68-4         13972-68-4         13982-53-1         13982-53-1         13983-20-5         13986-18-0         13986-24-8         13986-26-0	<ul> <li>2509, Fotassimi Zine surface hexahydrate</li> <li>1639: Iron(II) perchlorate</li> <li>2330: Palladium(II) tetraammine chloride monohydrate</li> <li>2110: Molybdenum carbonyl</li> <li>2952: Sodium paraperiodate</li> <li>1412: Germanium(II) fluoride</li> <li>2211: Nickel fluoride tetrahydrate</li> <li>1317: Ferrous fluoride tetrahydrate</li> <li>1317: Ferrous fluoride tetrahydrate</li> <li>18: Aluminum acetylacetonate</li> <li>2454: Potassium hexacyanocobalt(III)</li> <li>3183: Tetrafluorodiborane</li> <li>1560: Indium(I) iodide</li> <li>2048: Mercury(I) fluoride</li> <li>2431: Potassium cyanoaurite</li> <li>331: Barium bromate</li> <li>579: Cadmium molybdate(VI)</li> <li>541: Bromine azide</li> <li>2253: Niobium hydride</li> <li>3119: Tantalum hydride</li> <li>1051: Copper(I) sulfite hemihydrate</li> <li>1052: Copper(I) sulfite monohydrate</li> <li>1516: Hydrogen-d1</li> <li>3539: Zinc fluoride tetrahydrate</li> <li>3574: Zinc sulfate hexahydrate</li> <li>3597: Zirconium iodide</li> </ul>

14013-15-1	2010: Manganese(II) molybdate
14013-71-9	1289: Ferric perchlorate hydrate
14013-86-6	1636: Iron(II) nitrate
14014-09-6	3167: Terbium perchlorate
14014 88 1	2602: Puthenium(III) bromide
14017-47-1	785: Cerous perchlorate
14017-52-8	1369: Gadolinium perchlorate
14017-54-0	1491: Holmium perchlorate
14017-56-2	3508: Yttrium perchlorate
14023-80-4	1163: Dicarbonylacetylacetonate iridium(I)
14024-17-0	1305: Ferrous acetylacetonate
14024-18-1	1264: Ferric acetylacetonate
14024-18-1	052: Cabalt(II) agetulagetanete
14024-46-7	
14024-58-9	1993: Manganese(11)
14024-61-4	2317: Palladium(II)
11021 01 1	acetylacetonate
14024-64-7	3312: Titanium(IV) oxide
	acetylacetonate
14038-43-8	1274: Ferric ferrocyanide
14040-11-0	3334: Tungsten carbonyl
14055-74-4	2121: Molybdenum(II) jodide
14055 75 5	2125: Molybdenum(III) jodide
14055 76 6	2121: Molybdonum(III) iodide
14055-70-0	
14055-84-6	3360: Tungsten tetraiodide
14059-33-7	516: Bismuth vanadate
14075-53-7	2548: Potassium
	tetrafluoroborate
14077-37-5	1244: Europium(II) fluoride
14096-82-3	942: Cobalt nitrosocarbonyl
14099-01-5	2614: Rhenium pentacarbonyl
14104 45 1	1156: Doutorium iodido
14104-45-1	
14104-45-1	1533: Hydrogen iodide-d
14128-54-2	1764: Lithium aluminum deuteride
14165-55-0	1420: Germanium(IV) ethoxide
14166-78-0	1568: Indium(III) fluoride
14100 70 0	trihydrate
14168-73-1	1955: Magnesium sulfate
14175 02 1	mononydrate
141/5-02-1	1258: Europium(III) oxalate
14175-03-2	2712: Samarium oxalate decahydrate
14177-51-6	2243: Nickel tungstate
14177-55-0	2218: Nickel molybdate
14215 00 0	464: Beryllium sulfate dihydrate
14215-00-0	562: Codmium coide
14215-29-5	
14213-30-0	1005: Copper(11) azide
14217-21-1	2873: Sodium ferricyanide
14220-17-8	2543: Potassium tetracyanonickelate(II)
14220-21-4	monohydrate 2613: Rhenium pentacarbonyl bromide
14221-06-8	2105: Molybdenum acetate
14221-48-8	151: Ammonium ferricyanide trihydrate

14224-64-5	2413: Potassium bis(oxalato) platinate(II) dihydrate
14242-05-8	2809: Silver perchlorate
14244-62-3	2546: Potassium
	tetracyanozincate
14249-98-0	3353: Tungsten oxytrichloride
14280-53-6	1558: Indium(I) bromide
14282-91-8	1472:
	Hexaammineruthenium(III) chloride
14283-07-9	1839: Lithium tetrafluoroborate
14284-06-1	1084: Copper(II)
	ethylacetoacetate
14284-86-7	1250: Europium(III)
	acetylacetonate
14284-87-8	1355: Gadolinium
	acetylacetonate dihydrate
14284-89-0	2032: Manganese(III)
14294 02 5	acetylacetonate
14284-92-5	2038: Rhodium(III)
14284 03 6	2601: Puthenium(III)
14284-95-0	acetylacetonate
14284-95-8	3156: Terbium acetylacetonate
11201 90 0	trihydrate
14284-98-1	3469: Ytterbium acetylacetonate
14285-68-8	2612: Rhenium carbonyl
14298-31-8	2590: Praseodymium phosphate
14298-32-9	2173: Neodymium phosphate
	hydrate
14307-33-6	643: Calcium dichromate
	trihydrate
14307-35-8	1780: Lithium chromate
14311-93-4	3614: Zirconyl acetate hydroxide
14312-00-6	5/0: Cadmium chromate
14323-32-1	tetrabromoaurate(III)
	dihydrate
14323-36-5	2545: Potassium
	tetracyanoplatinate(II)
	trihydrate
14324-82-4	1134: Copper(II)
	trifluoroacetylacetonate
14324-83-5	2242: Nickel trifluoro-
11226 00 0	acetylacetonate dihydrate
14336-80-2	1040: Copper(1) azide
14355-29-4	31/3: Tetrabromodiborane
14402-07-0	dibydrate
14402-70-1	204: Ammonium
14402 70 1	nitroferricvanide
14402-73-4	1838: Lithium
	tetracyanoplatinate(II)
	pentahydrate
14402-75-6	2453: Potassium
	tetracyanocadmium
14404-33-2	2501: Potassium
	pentachlororuthenate(III)
14405 42 7	hydrate
14405-45-7	1579: Gallium acetylacetonate
1440J-4J-9 14446-12 0	3079. Strontium permanganate
13-0-13-0	trihvdrate
14447-89-3	3350: Tungsten oxydijodide
14452-39-2	72: Aluminum perchlorate
	-

14456-34-9	1459: Hafnium oxychloride
	octahydrate
14456-47-4	3157: Terbium bromide
14456-48-5	1193: Dysprosium bromide
14456-51-0	3262: Thulium bromide
14456-53-2	1848: Lutetium bromide
14457-83-1	1892: Magnesium carbonate trihydrate
14457-84-2	70: Aluminum oxyhydroxide( $\beta$ )
14457-87-5	771: Cerous bromide
14457-87-5	772: Cerous bromide
	heptahydrate
14459-59-7	2115: Molybdenum
	oxytetrafluoride
14459-59-7	2145: Molybdenum(VI)
	oxytetrafluoride
14459-75-7	2272: Niobium(V) oxybromide
14459-95-1	2439: Potassium ferrocyanide
	trihydrate
14464-46-1	2766: Silicon dioxide
144/5-63-9	3596: Zirconium hydroxide
14481-29-9	169: Ammonium
	hexacyanoferrate(11)
14491 22 5	225% Thorium
14461-55-5	52.56: Thornum
	hevadecabydrate
14483-18-2	1487: Holmium nitrate
14405 10 2	pentahydrate
14483-63-7	2878: Sodium fluorosulfonate
14486-19-2	603: Cadmium tetrafluoroborate
14507-19-8	1664: Lanthanum hydroxide
14516-54-2	1983: Manganese pentacarbonyl
	bromide
14517-29-4	2168: Neodymium nitrate
14517-29-4	2168: Neodymium nitrate hexahydrate
14517-29-4 14519-18-7	<ul><li>2168: Neodymium nitrate hexahydrate</li><li>3049: Strontium bromate</li></ul>
14517-29-4 14519-18-7	<ul><li>2168: Neodymium nitrate hexahydrate</li><li>3049: Strontium bromate monohydrate</li></ul>
14517-29-4 14519-18-7 14523-22-9	<ul><li>2168: Neodymium nitrate hexahydrate</li><li>3049: Strontium bromate monohydrate</li><li>2635: Rhodium carbonyl chloride</li></ul>
14517-29-4 14519-18-7 14523-22-9 14526-22-8	<ul> <li>2168: Neodymium nitrate hexahydrate</li> <li>3049: Strontium bromate monohydrate</li> <li>2635: Rhodium carbonyl chloride</li> <li>1298: Ferric</li> </ul>
14517-29-4 14519-18-7 14523-22-9 14526-22-8	<ul> <li>2168: Neodymium nitrate hexahydrate</li> <li>3049: Strontium bromate monohydrate</li> <li>2635: Rhodium carbonyl chloride</li> <li>1298: Ferric trifluoroacetylacetonate</li> </ul>
14517-29-4 14519-18-7 14523-22-9 14526-22-8 14551-74-7	<ul> <li>2168: Neodymium nitrate hexahydrate</li> <li>3049: Strontium bromate monohydrate</li> <li>2635: Rhodium carbonyl chloride</li> <li>1298: Ferric trifluoroacetylacetonate</li> <li>2170: Neodymium oxalate</li> </ul>
14517-29-4 14519-18-7 14523-22-9 14526-22-8 14551-74-7	<ul> <li>2168: Neodymium nitrate hexahydrate</li> <li>3049: Strontium bromate monohydrate</li> <li>2635: Rhodium carbonyl chloride</li> <li>1298: Ferric trifluoroacetylacetonate</li> <li>2170: Neodymium oxalate decahydrate</li> </ul>
14517-29-4 14519-18-7 14523-22-9 14526-22-8 14551-74-7 14553-08-3	<ul> <li>2168: Neodymium nitrate hexahydrate</li> <li>3049: Strontium bromate monohydrate</li> <li>2635: Rhodium carbonyl chloride</li> <li>1298: Ferric trifluoroacetylacetonate</li> <li>2170: Neodymium oxalate decahydrate</li> <li>1213: Erbium acetylacetonate</li> </ul>
14517-29-4 14519-18-7 14523-22-9 14526-22-8 14551-74-7 14553-08-3	<ul> <li>2168: Neodymium nitrate hexahydrate</li> <li>3049: Strontium bromate monohydrate</li> <li>2635: Rhodium carbonyl chloride</li> <li>1298: Ferric trifluoroacetylacetonate</li> <li>2170: Neodymium oxalate decahydrate</li> <li>1213: Erbium acetylacetonate hydrate</li> </ul>
14517-29-4 14519-18-7 14523-22-9 14526-22-8 14551-74-7 14553-08-3 14553-09-4	<ul> <li>2168: Neodymium nitrate hexahydrate</li> <li>3049: Strontium bromate monohydrate</li> <li>2635: Rhodium carbonyl chloride</li> <li>1298: Ferric trifluoroacetylacetonate</li> <li>2170: Neodymium oxalate decahydrate</li> <li>1213: Erbium acetylacetonate hydrate</li> <li>2573: Praseodymium acetylacetonate</li> </ul>
14517-29-4 14519-18-7 14523-22-9 14526-22-8 14551-74-7 14553-08-3 14553-09-4	<ul> <li>2168: Neodymium nitrate hexahydrate</li> <li>3049: Strontium bromate monohydrate</li> <li>2635: Rhodium carbonyl chloride</li> <li>1298: Ferric trifluoroacetylacetonate</li> <li>2170: Neodymium oxalate decahydrate</li> <li>1213: Erbium acetylacetonate hydrate</li> <li>2573: Praseodymium acetylacetonate</li> <li>1603: Iridium pentafluoride</li> </ul>
14517-29-4 14519-18-7 14523-22-9 14526-22-8 14551-74-7 14553-08-3 14553-09-4 14568-19-5 14589-42-5	<ul> <li>2168: Neodymium nitrate hexahydrate</li> <li>3049: Strontium bromate monohydrate</li> <li>2635: Rhodium carbonyl chloride</li> <li>1298: Ferric trifluoroacetylacetonate</li> <li>2170: Neodymium oxalate decahydrate</li> <li>1213: Erbium acetylacetonate hydrate</li> <li>2573: Praseodymium acetylacetonate</li> <li>1603: Iridium pentafluoride</li> <li>2700: Samarium acetylacetonate</li> </ul>
14517-29-4 14519-18-7 14523-22-9 14526-22-8 14551-74-7 14553-08-3 14553-09-4 14568-19-5 14589-42-5 14589-44-7	<ul> <li>2168: Neodymium nitrate hexahydrate</li> <li>3049: Strontium bromate monohydrate</li> <li>2635: Rhodium carbonyl chloride</li> <li>1298: Ferric trifluoroacetylacetonate</li> <li>2170: Neodymium oxalate decahydrate</li> <li>1213: Erbium acetylacetonate hydrate</li> <li>2573: Praseodymium acetylacetonate</li> <li>1603: Iridium pentafluoride</li> <li>2700: Samarium acetylacetonate</li> <li>3261: Thulium acetylacetonate</li> </ul>
14517-29-4 14519-18-7 14523-22-9 14526-22-8 14551-74-7 14553-08-3 14553-09-4 14568-19-5 14589-42-5 14589-44-7	<ul> <li>2168: Neodymium nitrate hexahydrate</li> <li>3049: Strontium bromate monohydrate</li> <li>2635: Rhodium carbonyl chloride</li> <li>1298: Ferric trifluoroacetylacetonate</li> <li>2170: Neodymium oxalate decahydrate</li> <li>1213: Erbium acetylacetonate hydrate</li> <li>2573: Praseodymium acetylacetonate</li> <li>1603: Iridium pentafluoride</li> <li>2700: Samarium acetylacetonate</li> <li>3261: Thulium acetylacetonate trihydrate</li> </ul>
14517-29-4 14519-18-7 14523-22-9 14526-22-8 14551-74-7 14553-08-3 14553-09-4 14568-19-5 14589-42-5 14589-44-7 14590-13-7	<ul> <li>2168: Neodymium nitrate hexahydrate</li> <li>3049: Strontium bromate monohydrate</li> <li>2635: Rhodium carbonyl chloride</li> <li>1298: Ferric trifluoroacetylacetonate</li> <li>2170: Neodymium oxalate decahydrate</li> <li>1213: Erbium acetylacetonate hydrate</li> <li>2573: Praseodymium acetylacetonate</li> <li>1603: Iridium pentafluoride</li> <li>2700: Samarium acetylacetonate</li> <li>3261: Thulium acetylacetonate trihydrate</li> <li>138: Ammonium cobalt(II)</li> </ul>
14517-29-4 14519-18-7 14523-22-9 14526-22-8 14551-74-7 14553-08-3 14553-09-4 14568-19-5 14589-42-5 14589-44-7 14590-13-7	<ul> <li>2168: Neodymium nitrate hexahydrate</li> <li>3049: Strontium bromate monohydrate</li> <li>2635: Rhodium carbonyl chloride</li> <li>1298: Ferric trifluoroacetylacetonate</li> <li>2170: Neodymium oxalate decahydrate</li> <li>1213: Erbium acetylacetonate hydrate</li> <li>2573: Praseodymium acetylacetonate</li> <li>1603: Iridium pentafluoride</li> <li>2700: Samarium acetylacetonate</li> <li>3261: Thulium acetylacetonate trihydrate</li> <li>138: Ammonium cobalt(II) phosphate monohydrate</li> </ul>
14517-29-4 14519-18-7 14523-22-9 14526-22-8 14551-74-7 14553-08-3 14553-09-4 14568-19-5 14589-42-5 14589-44-7 14590-13-7 14590-19-3	<ul> <li>2168: Neodymium nitrate hexahydrate</li> <li>3049: Strontium bromate monohydrate</li> <li>2635: Rhodium carbonyl chloride</li> <li>1298: Ferric trifluoroacetylacetonate</li> <li>2170: Neodymium oxalate decahydrate</li> <li>1213: Erbium acetylacetonate hydrate</li> <li>2573: Praseodymium acetylacetonate</li> <li>1603: Iridium pentafluoride</li> <li>2700: Samarium acetylacetonate</li> <li>3261: Thulium acetylacetonate trihydrate</li> <li>138: Ammonium cobalt(II) phosphate monohydrate</li> <li>998: Cobalt(II) selenate</li> </ul>
14517-29-4 14519-18-7 14523-22-9 14526-22-8 14551-74-7 14553-08-3 14553-09-4 14568-19-5 14589-42-5 14589-44-7 14590-13-7 14590-19-3	<ul> <li>2168: Neodymium nitrate hexahydrate</li> <li>3049: Strontium bromate monohydrate</li> <li>2635: Rhodium carbonyl chloride</li> <li>1298: Ferric trifluoroacetylacetonate</li> <li>2170: Neodymium oxalate decahydrate</li> <li>1213: Erbium acetylacetonate hydrate</li> <li>2573: Praseodymium acetylacetonate</li> <li>1603: Iridium pentafluoride</li> <li>2700: Samarium acetylacetonate</li> <li>3261: Thulium acetylacetonate trihydrate</li> <li>138: Ammonium cobalt(II) phosphate monohydrate</li> <li>998: Cobalt(II) selenate pentahydrate</li> </ul>
14517-29-4         14519-18-7         14523-22-9         14526-22-8         14551-74-7         14553-08-3         14553-09-4         14568-19-5         14589-42-5         14590-13-7         14590-19-3         14635-87-1	<ul> <li>2168: Neodymium nitrate hexahydrate</li> <li>3049: Strontium bromate monohydrate</li> <li>2635: Rhodium carbonyl chloride</li> <li>1298: Ferric trifluoroacetylacetonate</li> <li>2170: Neodymium oxalate decahydrate</li> <li>1213: Erbium acetylacetonate hydrate</li> <li>2573: Praseodymium acetylacetonate</li> <li>1603: Iridium pentafluoride</li> <li>2700: Samarium acetylacetonate</li> <li>3261: Thulium acetylacetonate trihydrate</li> <li>138: Ammonium cobalt(II) phosphate monohydrate</li> <li>998: Cobalt(II) selenate pentahydrate</li> <li>1933: Magnesium perborate</li> </ul>
14517-29-4 14519-18-7 14523-22-9 14526-22-8 14551-74-7 14553-08-3 14553-09-4 14568-19-5 14589-42-5 14589-44-7 14590-13-7 14590-19-3 14635-87-1	<ul> <li>2168: Neodymium nitrate hexahydrate</li> <li>3049: Strontium bromate monohydrate</li> <li>2635: Rhodium carbonyl chloride</li> <li>1298: Ferric trifluoroacetylacetonate</li> <li>2170: Neodymium oxalate decahydrate</li> <li>1213: Erbium acetylacetonate hydrate</li> <li>2573: Praseodymium acetylacetonate</li> <li>1603: Iridium pentafluoride</li> <li>2700: Samarium acetylacetonate</li> <li>3261: Thulium acetylacetonate trihydrate</li> <li>138: Ammonium cobalt(II) phosphate monohydrate</li> <li>998: Cobalt(II) selenate pentahydrate</li> <li>1933: Magnesium perborate heptahydrate</li> </ul>
14517-29-4         14519-18-7         14523-22-9         14526-22-8         14551-74-7         14553-08-3         14553-09-4         14568-19-5         14589-42-5         14590-13-7         14590-19-3         14635-87-1         14637-88-8	<ul> <li>2168: Neodymium nitrate hexahydrate</li> <li>3049: Strontium bromate monohydrate</li> <li>2635: Rhodium carbonyl chloride</li> <li>1298: Ferric trifluoroacetylacetonate</li> <li>2170: Neodymium oxalate decahydrate</li> <li>1213: Erbium acetylacetonate hydrate</li> <li>2573: Praseodymium acetylacetonate</li> <li>1603: Iridium pentafluoride</li> <li>2700: Samarium acetylacetonate trihydrate</li> <li>138: Ammonium cobalt(II) phosphate monohydrate</li> <li>998: Cobalt(II) selenate pentahydrate</li> <li>1933: Magnesium perborate heptahydrate</li> <li>1911: Dysprosium</li> </ul>
14517-29-4 14519-18-7 14523-22-9 14526-22-8 14551-74-7 14553-08-3 14553-09-4 14568-19-5 14589-42-5 14589-44-7 14590-13-7 14590-19-3 14635-87-1 14637-88-8	<ul> <li>2168: Neodymium nitrate hexahydrate</li> <li>3049: Strontium bromate monohydrate</li> <li>2635: Rhodium carbonyl chloride</li> <li>1298: Ferric trifluoroacetylacetonate</li> <li>2170: Neodymium oxalate decahydrate</li> <li>1213: Erbium acetylacetonate hydrate</li> <li>2573: Praseodymium acetylacetonate</li> <li>1603: Iridium pentafluoride</li> <li>2700: Samarium acetylacetonate</li> <li>3261: Thulium acetylacetonate trihydrate</li> <li>138: Ammonium cobalt(II) phosphate monohydrate</li> <li>998: Cobalt(II) selenate pentahydrate</li> <li>1933: Magnesium perborate heptahydrate</li> <li>191: Dysprosium acetylacetonate</li> </ul>
14517-29-4         14519-18-7         14523-22-9         14526-22-8         14551-74-7         14553-08-3         14553-09-4         14568-19-5         14589-42-5         14590-13-7         14590-19-3         14635-87-1         14637-88-8         14639-94-2	<ul> <li>2168: Neodymium nitrate hexahydrate</li> <li>3049: Strontium bromate monohydrate</li> <li>2635: Rhodium carbonyl chloride</li> <li>1298: Ferric trifluoroacetylacetonate</li> <li>2170: Neodymium oxalate decahydrate</li> <li>1213: Erbium acetylacetonate hydrate</li> <li>2573: Praseodymium acetylacetonate</li> <li>1603: Iridium pentafluoride</li> <li>2700: Samarium acetylacetonate</li> <li>1361: Thulium acetylacetonate</li> <li>138: Ammonium cobalt(II) phosphate monohydrate</li> <li>998: Cobalt(II) selenate pentahydrate</li> <li>1933: Magnesium perborate heptahydrate</li> <li>1931: Dysprosium acetylacetonate</li> <li>171: Ammonium</li> </ul>
14517-29-4 14519-18-7 14523-22-9 14526-22-8 14551-74-7 14553-08-3 14553-09-4 14568-19-5 14589-42-5 14589-44-7 14590-13-7 14590-19-3 14635-87-1 14637-88-8 14639-94-2	<ul> <li>2168: Neodymium nitrate hexahydrate</li> <li>3049: Strontium bromate monohydrate</li> <li>2635: Rhodium carbonyl chloride</li> <li>1298: Ferric trifluoroacetylacetonate</li> <li>2170: Neodymium oxalate decahydrate</li> <li>1213: Erbium acetylacetonate hydrate</li> <li>2573: Praseodymium acetylacetonate</li> <li>1603: Iridium pentafluoride</li> <li>2700: Samarium acetylacetonate</li> <li>1361: Thulium acetylacetonate</li> <li>138: Ammonium cobalt(II) phosphate monohydrate</li> <li>998: Cobalt(II) selenate pentahydrate</li> <li>1933: Magnesium perborate heptahydrate</li> <li>1933: Magnesium perborate heptahydrate</li> <li>191: Dysprosium acetylacetonate</li> <li>171: Ammonium hexafluorogallate</li> </ul>
14517-29-4         14519-18-7         14523-22-9         14526-22-8         14551-74-7         14553-08-3         14553-08-3         14553-09-4         14568-19-5         14589-42-5         14590-13-7         14590-19-3         14635-87-1         14637-88-8         14639-94-2         14639-97-5	<ul> <li>2168: Neodymium nitrate hexahydrate</li> <li>3049: Strontium bromate monohydrate</li> <li>2635: Rhodium carbonyl chloride</li> <li>1298: Ferric trifluoroacetylacetonate</li> <li>2170: Neodymium oxalate decahydrate</li> <li>1213: Erbium acetylacetonate hydrate</li> <li>2573: Praseodymium acetylacetonate</li> <li>1603: Iridium pentafluoride</li> <li>2700: Samarium acetylacetonate</li> <li>1361: Thulium acetylacetonate trihydrate</li> <li>138: Ammonium cobalt(II) phosphate monohydrate</li> <li>998: Cobalt(II) selenate pentahydrate</li> <li>1933: Magnesium perborate heptahydrate</li> <li>1933: Magnesium perborate</li> <li>heptahydrate</li> <li>191: Dysprosium acetylacetonate</li> <li>171: Ammonium hexafluorogallate</li> <li>240: Ammonium</li> </ul>
14517-29-4         14519-18-7         14523-22-9         14526-22-8         14551-74-7         14553-08-3         14553-08-3         14553-09-4         14568-19-5         14589-42-5         14590-13-7         14590-19-3         14635-87-1         14637-88-8         14639-94-2         14639-97-5	<ul> <li>2168: Neodymium nitrate hexahydrate</li> <li>3049: Strontium bromate monohydrate</li> <li>2635: Rhodium carbonyl chloride</li> <li>1298: Ferric trifluoroacetylacetonate</li> <li>2170: Neodymium oxalate decahydrate</li> <li>1213: Erbium acetylacetonate hydrate</li> <li>2573: Praseodymium acetylacetonate</li> <li>1603: Iridium pentafluoride</li> <li>2700: Samarium acetylacetonate</li> <li>1361: Thulium acetylacetonate trihydrate</li> <li>138: Ammonium cobalt(II) phosphate monohydrate</li> <li>998: Cobalt(II) selenate pentahydrate</li> <li>1933: Magnesium perborate heptahydrate</li> <li>1931: Dysprosium acetylacetonate</li> <li>171: Ammonium hexafluorogallate</li> <li>240: Ammonium tetrachlorozincate</li> </ul>
14517-29-4         14519-18-7         14523-22-9         14526-22-8         14551-74-7         14553-08-3         14553-09-4         14568-19-5         14589-42-5         14590-13-7         14590-19-3         14635-87-1         14637-88-8         14639-94-2         14639-94-2         14639-98-6	<ul> <li>2168: Neodymium nitrate hexahydrate</li> <li>3049: Strontium bromate monohydrate</li> <li>2635: Rhodium carbonyl chloride</li> <li>1298: Ferric trifluoroacetylacetonate</li> <li>2170: Neodymium oxalate decahydrate</li> <li>1213: Erbium acetylacetonate hydrate</li> <li>2573: Praseodymium acetylacetonate</li> <li>1603: Iridium pentafluoride</li> <li>2700: Samarium acetylacetonate</li> <li>1361: Thulium acetylacetonate trihydrate</li> <li>138: Ammonium cobalt(II) phosphate monohydrate</li> <li>998: Cobalt(II) selenate pentahydrate</li> <li>1933: Magnesium perborate heptahydrate</li> <li>1931: Dysprosium acetylacetonate</li> <li>171: Ammonium hexafluorogallate</li> <li>240: Ammonium tetrachlorozincate</li> <li>213: Ammonium</li> </ul>
14517-29-4         14519-18-7         14523-22-9         14526-22-8         14551-74-7         14553-08-3         14553-09-4         14568-19-5         14589-42-5         14590-13-7         14635-87-1         14637-88-8         14639-94-2         14639-98-6	<ul> <li>2168: Neodymium nitrate hexahydrate</li> <li>3049: Strontium bromate monohydrate</li> <li>2635: Rhodium carbonyl chloride</li> <li>1298: Ferric trifluoroacetylacetonate</li> <li>2170: Neodymium oxalate decahydrate</li> <li>1213: Erbium acetylacetonate hydrate</li> <li>2573: Praseodymium acetylacetonate</li> <li>1603: Iridium pentafluoride</li> <li>2700: Samarium acetylacetonate</li> <li>1361: Thulium acetylacetonate trihydrate</li> <li>138: Ammonium cobalt(II) phosphate monohydrate</li> <li>998: Cobalt(II) selenate pentahydrate</li> <li>1933: Magnesium perborate heptahydrate</li> <li>1931: Dysprosium acetylacetonate</li> <li>171: Ammonium hexafluorogallate</li> <li>240: Ammonium tetrachlorozincate</li> <li>213: Ammonium pentachlorozincate</li> <li>213: Ammonium</li> </ul>
14517-29-4         14519-18-7         14523-22-9         14526-22-8         14551-74-7         14553-08-3         14553-09-4         14558-19-5         14589-42-5         14590-13-7         14635-87-1         14637-88-8         14639-94-2         14639-98-6         14644-55-4	<ul> <li>2168: Neodymium nitrate hexahydrate</li> <li>3049: Strontium bromate monohydrate</li> <li>2635: Rhodium carbonyl chloride</li> <li>1298: Ferric trifluoroacetylacetonate</li> <li>2170: Neodymium oxalate decahydrate</li> <li>1213: Erbium acetylacetonate hydrate</li> <li>2573: Praseodymium acetylacetonate</li> <li>1603: Iridium pentafluoride</li> <li>2700: Samarium acetylacetonate</li> <li>1603: Iridium pentafluoride</li> <li>2700: Samarium acetylacetonate</li> <li>138: Ammonium cobalt(II) phosphate monohydrate</li> <li>998: Cobalt(II) selenate pentahydrate</li> <li>1933: Magnesium perborate heptahydrate</li> <li>1191: Dysprosium acetylacetonate</li> <li>171: Ammonium hexafluorogallate</li> <li>240: Ammonium tetrachlorozincate</li> <li>213: Ammonium pentachlorozincate</li> <li>821: Cesium metavanadate</li> </ul>

14644-61-2	3609: Zirconium sulfate
	tetrahydrate
14646-16-3	1224: Erbium hydroxide
14646-29-8	1860: Lutetium perchlorate hexahydrate
14649-73-1	2900: Sodium
14662 04 5	1400: Hydrozina azida
14002-04-3	1499. Hydrazine azide
14000-94-5	989: Coball(II) oleate
14666-96-7	982: Cobalt(II) linoleate
146/4-72-7	637: Calcium chlorite
14689-45-3	559: Cadmium acetylacetonate
14691-44-2	3323: Trigermane
14691-47-5	3181: Tetragermane
14692-17-2	1205: Dysprosium perchlorate hydrate
14693-02-8	2554: Potassium thioantimonate
14603 56 2	247: Ammonium
14093-30-2	tetrathiovandate(IV)
14602 81 2	2126 Tantalum nantaiadida
14095-81-5	
14693-82-4	15/4: Indium(III) phosphate
14694-95-2	3326: Tris(triphenylphosphine) rhodium(I) chloride
14709-57-0	2496: Potassium nitroprusside
	dihydrate
14720-21-9	1438: Gold(III) fluoride
14721-18-7	2207: Nickel chromate
14721-21-2	1074: Copper(II) chlorate
14735-84-3	1132: Copper(II)
	tetrafluoroborate
14762-49-3	47: Aluminum hydroxide( $\alpha$ )
14762-55-7	1470: Helium-3
14763-77-0	1080: Copper(II) cyanide
14779-70-5	3314: Tribromogermane
14781-45-4	1095: Copper(II) hexafluoroacetylacetonate
14781-45-4	1097: Copper(II)
14701 45 4	hexafluoroacetylacetonate
	hydrate
14871-56-8	407: Barium strontium tungsten
14871-79-5	369: Barium hypophosphite
110/1 // 0	monohydrate
14871-82-0	400: Barium silicate
14883-80-8	3325: Tris(ethylenediammine)
	cobalt(III) chloride
	trihydrate
14884-42-5	917: Chromium(V) fluoride
14885-60-0	1517: Hydrogen-t1
14885-61-1	1518: Hydrogen-d1,t1
14890-41-6	3411: Vanadium dibromide
1/800-//-0	1217: Erbium bromide
14090-44-9	hexahydrate
14898-67-0	2694: Ruthenium(III) chloride hydrate
14913-14-5	1674: Lanthanum phosphate hvdrate
14913-33-8	1169: Dichlorodiammine- platinum(II)-trans
14914-84-2	1483: Holmium chloride
14020 60 2	1922: Lithium tollurito
14929-09-2	
14933-38-1	102: Americium bromide
14933-41-6	112: Americium phosphate

14940-41-1	1326: Ferrous phosphate
	octahydrate
14940-65-9	3328: Tritium dioxide
14948-62-0	2578: Praseodymium carbonate
	octahydrate
14949-69-0	2212: Nickel
	hexafluoroacetylacetonate
	hydrate
14972-70-4	2888: Sodium
	hexachlororhodate(111)
11050 00 0	hydrate
14972-90-8	241: Ammonium
14077 17 4	tetrafluoroantimonate(III)
149//-1/-4	610: Calcium acetate dihydrate
14977-61-8	919: Chromium(VI) dichloride
14077 (1.9	dioxide
14977-01-8	925: Chromyl chloride
14984-71-5	2748: Solonium oxydifluorida
14904-01-7	2/48. Selemum oxyumuonde 2610: Ziraanyi nitrata hydrata
14965-16-5	1862: Lutetium sulfate
14980-89-1	10/4: Magnesium selenate
14980-91-5	hexabydrate
14986-94-8	1990: Manganese vanadate
14987-04-3	1965: Magnesium trisilicate
14996-60-2	2305: Osmium(III) chloride
11990 00 2	hydrate
14996-61-3	1609: Iridium(III) chloride
11,770 01 0	hydrate
15059-52-6	1196: Dysprosium chloride
	hexahvdrate
15060-55-6	245: Ammonium
	tetrathiomolybdate
15060-59-0	1843: Lithium vanadate
15070-34-5	1927: Magnesium nitrite
	trihydrate
15098-87-0	42: Aluminum fluoride
	trihydrate
15123-80-5	57: Aluminum molybdate
15123-82-7	95: Aluminum tungstate
15123-90-7	3091: Strontium thiosulfate
	pentahydrate
15162-92-2	2155: Neodymium bromate
	nonahydrate
15162-93-3	2576: Praseodymium bromate
	nonahydrate
15163-03-8	3470: Ytterbium bromide
	hydrate
15163-24-3	3361: Tungsten tribromide
15168-20-4	1120: Copper(11) selenite
15170 57 7	dinydrate
151/0-57-7	2578: Platinum acetylacetonate
15192-20-4	2610: Phonium (IV) fluorido
15192-42-4	2019. Kilelium(IV) fluorodiovide
15230-48-5	1173: Dichlorogermane
15230-79-2	1850: Lutetium chloride
15250 17-2	hexahydrate
15238-00-3	979: Cobalt(II) jodide
15243-33-1	2689: Ruthenium
	dodecacarbonvl
15244-10-7	1295: Ferric sulfate hydrate
15244-35-6	597: Cadmium sulfate
	octahydrate
15244-38-9	910: Chromium(III) sulfate
	hydrate

15275-09-9	907: Chromium(III) potassium
	oxalate trihydrate
15275-09-9	2423: Potassium chromium(III)
15000 00 0	oxalate trihydrate
15280-09-8	2880: Sodium gold cyanide
15280-53-2	1354: Gadolinium acetate
	tetrahydrate
15280-55-4	1190: Dysprosium acetate
	tetrahydrate
15280-57-6	1212: Erbium acetate
	tetrahydrate
15280-58-7	3468: Ytterbium acetate
	tetrahydrate
15282-88-9	1687: Lead acetylacetonate
15293-74-0	1810: Lithium metaborate
	dihydrate
15293-77-3	939: Cobalt metaborate hydrate
15318-60-2	129: Ammonium cerium(III)
	nitrate tetrahvdrate
15321-51-4	1625: Iron nonacarbonyl
15336-18-2	167: Ammonium
10000 10 2	hexachlororhodate(III)
	monohydrate
15364-10-0	3457: Xenon fluoride
15504-10-0	monodecafluoroantimonate
15264 04 0	2016: Manganasa(II) parahlarata
15504-94-0	2010. Manganese(11) peremotate
15205 57 6	2050: Monounty(I) indida
15365-57-0	2030: Mercury(I) Iodide
15365-56-7	2045: Mercury(1) bronnide
15415-49-5	971: Coball(II) Terricyanide
15415-49-3	976: Cobalt(11)
	hexafluorosilicate
	hexahydrate
15435-71-9	2830: Sodium acetylacetonate
15435-71-9 15444-43-6	2830: Sodium acetylacetonate 3203: Thallium(I)
15435-71-9 15444-43-6	2830: Sodium acetylacetonate 3203: Thallium(I) hexafluoroacetylacetonate
15435-71-9 15444-43-6 15461-27-5	2830: Sodium acetylacetonate 3203: Thallium(I) hexafluoroacetylacetonate 3616: Zirconyl chloride hydrate
15435-71-9 15444-43-6 15461-27-5 15469-38-2	2830: Sodium acetylacetonate 3203: Thallium(I) hexafluoroacetylacetonate 3616: Zirconyl chloride hydrate 1276: Ferric fluoride trihydrate
15435-71-9 15444-43-6 15461-27-5 15469-38-2 15474-63-2	2830: Sodium acetylacetonate 3203: Thallium(I) hexafluoroacetylacetonate 3616: Zirconyl chloride hydrate 1276: Ferric fluoride trihydrate 1200: Dysprosium iodide
15435-71-9 15444-43-6 15461-27-5 15469-38-2 15474-63-2 15477-33-5	2830: Sodium acetylacetonate 3203: Thallium(I) hexafluoroacetylacetonate 3616: Zirconyl chloride hydrate 1276: Ferric fluoride trihydrate 1200: Dysprosium iodide 29: Aluminum chlorate
15435-71-9 15444-43-6 15461-27-5 15469-38-2 15474-63-2 15477-33-5 15477-33-5	2830: Sodium acetylacetonate 3203: Thallium(I) hexafluoroacetylacetonate 3616: Zirconyl chloride hydrate 1276: Ferric fluoride trihydrate 1200: Dysprosium iodide 29: Aluminum chlorate 30: Aluminum chlorate
15435-71-9 15444-43-6 15461-27-5 15469-38-2 15474-63-2 15477-33-5 15477-33-5	2830: Sodium acetylacetonate 3203: Thallium(I) hexafluoroacetylacetonate 3616: Zirconyl chloride hydrate 1276: Ferric fluoride trihydrate 1200: Dysprosium iodide 29: Aluminum chlorate 30: Aluminum chlorate nonahydrate
15435-71-9 15444-43-6 15461-27-5 15469-38-2 15474-63-2 15477-33-5 15477-33-5	<ul> <li>2830: Sodium acetylacetonate</li> <li>3203: Thallium(I) hexafluoroacetylacetonate</li> <li>3616: Zirconyl chloride hydrate</li> <li>1276: Ferric fluoride trihydrate</li> <li>1200: Dysprosium iodide</li> <li>29: Aluminum chlorate</li> <li>30: Aluminum chlorate</li> <li>nonahydrate</li> <li>1837: Lithium tetrachlorocuprate</li> </ul>
15435-71-9 15444-43-6 15461-27-5 15469-38-2 15474-63-2 15477-33-5 15477-33-5 15489-27-7 15491-35-7	<ul> <li>2830: Sodium acetylacetonate</li> <li>3203: Thallium(I) hexafluoroacetylacetonate</li> <li>3616: Zirconyl chloride hydrate</li> <li>1276: Ferric fluoride trihydrate</li> <li>1200: Dysprosium iodide</li> <li>29: Aluminum chlorate</li> <li>30: Aluminum chlorate</li> <li>30: Aluminum chlorate</li> <li>1837: Lithium tetrachlorocuprate</li> <li>424: Barium titanium silicate</li> </ul>
15435-71-9 15444-43-6 15461-27-5 15469-38-2 15474-63-2 15477-33-5 15477-33-5 15489-27-7 15491-35-7 15492-38-3	<ul> <li>2830: Sodium acetylacetonate</li> <li>3203: Thallium(I) hexafluoroacetylacetonate</li> <li>3616: Zirconyl chloride hydrate</li> <li>1276: Ferric fluoride trihydrate</li> <li>1200: Dysprosium iodide</li> <li>29: Aluminum chlorate</li> <li>30: Aluminum chlorate</li> <li>30: Aluminum chlorate</li> <li>1837: Lithium tetrachlorocuprate</li> <li>424: Barium titanium silicate</li> <li>2642: Rhodium(III) iodide</li> </ul>
15435-71-9 15444-43-6 15461-27-5 15469-38-2 15474-63-2 15477-33-5 15477-33-5 15489-27-7 15491-35-7 15492-38-3 15513-69-6	<ul> <li>2830: Sodium acetylacetonate</li> <li>3203: Thallium(I) hexafluoroacetylacetonate</li> <li>3616: Zirconyl chloride hydrate</li> <li>1276: Ferric fluoride trihydrate</li> <li>1200: Dysprosium iodide</li> <li>29: Aluminum chlorate</li> <li>30: Aluminum chlorate</li> <li>30: Aluminum chlorate</li> <li>1837: Lithium tetrachlorocuprate</li> <li>424: Barium titanium silicate</li> <li>2642: Rhodium(III) iodide</li> <li>3362: Tungsten triiodide</li> </ul>
15435-71-9 15444-43-6 15461-27-5 15469-38-2 15474-63-2 15477-33-5 15477-33-5 15489-27-7 15491-35-7 15492-38-3 15513-69-6 15513-84-5	<ul> <li>2830: Sodium acetylacetonate</li> <li>3203: Thallium(I) hexafluoroacetylacetonate</li> <li>3616: Zirconyl chloride hydrate</li> <li>1276: Ferric fluoride trihydrate</li> <li>1200: Dysprosium iodide</li> <li>29: Aluminum chlorate</li> <li>30: Aluminum chlorate</li> <li>30: Aluminum chlorate</li> <li>1837: Lithium tetrachlorocuprate</li> <li>424: Barium titanium silicate</li> <li>2642: Rhodium(III) iodide</li> <li>3362: Tungsten triiodide</li> <li>3413: Vanadium diiodide</li> </ul>
15435-71-9 15444-43-6 15461-27-5 15469-38-2 15474-63-2 15477-33-5 15477-33-5 15489-27-7 15491-35-7 15492-38-3 15513-69-6 15513-84-5 15520-84-0	<ul> <li>2830: Sodium acetylacetonate</li> <li>3203: Thallium(I) hexafluoroacetylacetonate</li> <li>3616: Zirconyl chloride hydrate</li> <li>1276: Ferric fluoride trihydrate</li> <li>1200: Dysprosium iodide</li> <li>29: Aluminum chlorate</li> <li>30: Aluminum chlorate</li> <li>30: Aluminum chlorate</li> <li>1837: Lithium tetrachlorocuprate</li> <li>424: Barium titanium silicate</li> <li>2642: Rhodium(III) iodide</li> <li>3362: Tungsten triiodide</li> <li>3413: Vanadium diiodide</li> <li>1020: Cobalt(III) nitrate</li> </ul>
15435-71-9 15444-43-6 15461-27-5 15469-38-2 15474-63-2 15477-33-5 15477-33-5 15477-33-5 15489-27-7 15491-35-7 15492-38-3 15513-69-6 15513-84-5 15520-84-0 15525-64-1	<ul> <li>2830: Sodium acetylacetonate</li> <li>3203: Thallium(I) hexafluoroacetylacetonate</li> <li>3616: Zirconyl chloride hydrate</li> <li>1276: Ferric fluoride trihydrate</li> <li>1200: Dysprosium iodide</li> <li>29: Aluminum chlorate</li> <li>30: Aluminum chlorate</li> <li>30: Aluminum chlorate</li> <li>1837: Lithium tetrachlorocuprate</li> <li>424: Barium titanium silicate</li> <li>2642: Rhodium(III) iodide</li> <li>3362: Tungsten triiodide</li> <li>3413: Vanadium diiodide</li> <li>1020: Cobalt(III) nitrate</li> <li>2779: Silver acetylacetonate</li> </ul>
15435-71-9 15444-43-6 15461-27-5 15469-38-2 15474-63-2 15477-33-5 15477-33-5 15477-33-5 15489-27-7 15491-35-7 15492-38-3 15513-69-6 15513-84-5 15520-84-0 15525-64-1 15552-14-4	<ul> <li>2830: Sodium acetylacetonate</li> <li>3203: Thallium(I) hexafluoroacetylacetonate</li> <li>3616: Zirconyl chloride hydrate</li> <li>1276: Ferric fluoride trihydrate</li> <li>1200: Dysprosium iodide</li> <li>29: Aluminum chlorate</li> <li>30: Aluminum chlorate</li> <li>30: Aluminum chlorate</li> <li>1837: Lithium tetrachlorocuprate</li> <li>424: Barium titanium silicate</li> <li>2642: Rhodium(III) iodide</li> <li>3362: Tungsten triiodide</li> <li>3413: Vanadium diiodide</li> <li>1020: Cobalt(III) nitrate</li> <li>2779: Silver acetylacetonate</li> <li>335: Barium calcium tungstate</li> </ul>
15435-71-9 15444-43-6 15461-27-5 15469-38-2 15474-63-2 15477-33-5 15477-33-5 15489-27-7 15491-35-7 15492-38-3 15513-69-6 15513-84-5 15520-84-0 15525-64-1 15552-14-4 15552-14-4	<ul> <li>2830: Sodium acetylacetonate</li> <li>3203: Thallium(I) hexafluoroacetylacetonate</li> <li>3616: Zirconyl chloride hydrate</li> <li>1276: Ferric fluoride trihydrate</li> <li>1200: Dysprosium iodide</li> <li>29: Aluminum chlorate</li> <li>30: Aluminum chlorate</li> <li>30: Aluminum chlorate</li> <li>1837: Lithium tetrachlorocuprate</li> <li>424: Barium titanium silicate</li> <li>2642: Rhodium(III) iodide</li> <li>3362: Tungsten triiodide</li> <li>3413: Vanadium diiodide</li> <li>1020: Cobalt(III) nitrate</li> <li>2779: Silver acetylacetonate</li> <li>335: Barium calcium tungstate</li> <li>3485: Yttrium acetylacetonate</li> </ul>
15435-71-9 15444-43-6 15461-27-5 15469-38-2 15474-63-2 15477-33-5 15477-33-5 15489-27-7 15491-35-7 15492-38-3 15513-69-6 15513-84-5 15520-84-0 15525-64-1 15552-14-4 15554-47-9	<ul> <li>2830: Sodium acetylacetonate</li> <li>3203: Thallium(I) hexafluoroacetylacetonate</li> <li>3616: Zirconyl chloride hydrate</li> <li>1276: Ferric fluoride trihydrate</li> <li>1200: Dysprosium iodide</li> <li>29: Aluminum chlorate</li> <li>30: Aluminum chlorate</li> <li>30: Aluminum chlorate</li> <li>1837: Lithium tetrachlorocuprate</li> <li>424: Barium titanium silicate</li> <li>2642: Rhodium(III) iodide</li> <li>3362: Tungsten triiodide</li> <li>3413: Vanadium diiodide</li> <li>1020: Cobalt(III) nitrate</li> <li>2779: Silver acetylacetonate</li> <li>335: Barium calcium tungstate</li> <li>3485: Yttrium acetylacetonate</li> <li>trihydrate</li> </ul>
15435-71-9 15444-43-6 15469-38-2 15474-63-2 15477-33-5 15477-33-5 15489-27-7 15491-35-7 15492-38-3 15513-69-6 15513-84-5 15520-84-0 15552-14-4 15552-14-4 15554-47-9	<ul> <li>2830: Sodium acetylacetonate</li> <li>3203: Thallium(I) hexafluoroacetylacetonate</li> <li>3616: Zirconyl chloride hydrate</li> <li>1276: Ferric fluoride trihydrate</li> <li>1200: Dysprosium iodide</li> <li>29: Aluminum chlorate</li> <li>30: Aluminum chlorate</li> <li>30: Aluminum chlorate</li> <li>1837: Lithium tetrachlorocuprate</li> <li>424: Barium titanium silicate</li> <li>2642: Rhodium(III) iodide</li> <li>3362: Tungsten triiodide</li> <li>3413: Vanadium diiodide</li> <li>1020: Cobalt(III) nitrate</li> <li>2779: Silver acetylacetonate</li> <li>335: Barium calcium tungstate</li> <li>3485: Yttrium acetylacetonate</li> <li>trihydrate</li> <li>2530: Potassium tellurate(VI)</li> </ul>
15435-71-9 15444-43-6 15469-38-2 15474-63-2 15477-33-5 15477-33-5 15489-27-7 15491-35-7 15492-38-3 15513-69-6 15513-84-5 15520-84-0 15525-64-1 15552-14-4 15554-47-9 15571-91-2	<ul> <li>2830: Sodium acetylacetonate</li> <li>3203: Thallium(I) hexafluoroacetylacetonate</li> <li>3616: Zirconyl chloride hydrate</li> <li>1276: Ferric fluoride trihydrate</li> <li>1200: Dysprosium iodide</li> <li>29: Aluminum chlorate</li> <li>30: Aluminum chlorate</li> <li>30: Aluminum chlorate</li> <li>1837: Lithium tetrachlorocuprate</li> <li>424: Barium titanium silicate</li> <li>2642: Rhodium(III) iodide</li> <li>3362: Tungsten triiodide</li> <li>3413: Vanadium diiodide</li> <li>1020: Cobalt(III) nitrate</li> <li>2779: Silver acetylacetonate</li> <li>335: Barium calcium tungstate</li> <li>3485: Yttrium acetylacetonate</li> <li>trihydrate</li> </ul>
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15598-62-2 15608-29-4	1545: Hydroxylamine perchlorate 2639: Rhodium(III) bromide dibydrate
15622-42-1 15627-86-8	2617: Rhenium(III) iodide 682: Calcium perchlorate
15630-39-4	tetrahydrate 2851: Sodium carbonate peroxohydrate
15635-87-7	1605: Iridium(III)
15653-01-7	768: Cerous acetylacetonate
15663-27-1	1168: Dichlorodiammine- platinum(II) (cis)
15681-89-7	2840: Sodium borodeuteride
cis: 15684-	1167: Dichloro
18-1; trans:	diamminepalladium(II)
13782-33-7	
15684-36-3	2239: Nickel tetrafluoroborate
	hexahydrate
15696-40-9	2302: Osmium carbonyl
15750-45-5	1924: Magnesium nitrate
	dihvdrate
15752-05-3	161: Ammonium
	hexachloroiridate(III)
15771-43-4	450: Beryllium ovalate
13771-43-4	tribydrate
15780-28-6	2864: Sodium deuteride
15785 00 8	770: Corous hydroxido
15822 42 5	1464: Hefnium sulfete
15820 52 5	2055: Manager (I) and de
15829-55-5	2055: Mercury(1) oxide
15851-44-2	1725 L 1 L 1
15851-47-5	1735: Lead tellurite
158/8-77-0	2586: Praseodymium nitrate
150 15 11 0	hexahydrate
15947-41-8	114: Americium(IV) fluoride
15956-28-2	2637: Rhodium(II) acetate dimer
16004-08-3	chloride
16037-50-6	2421: Potassium chlorochromate
16039-52-4	1102: Copper(II) lactate dihydrate
16045-17-3	3251: Thorium perchlorate
16056-61-4	1596: Iodosyl pentafluoride
16122-03-5	200: Ammonium nickel chloride
	hexahydrate
16122-03-5	2188: Nickel ammonium
(anhydrous)	chloride hexahydrate
16283-36-6	3566: Zinc salicylate trihydrate
16399-77-2	1312: Ferrous chloride dihydrate
16469-16-2	2584: Praseodymium hydroxide
16469-17-3	2165: Neodymium hydroxide
16469-22-0	3502: Yttrium hydroxide
16519-60-1	2949: Sodium orthovanadate decahydrate
16544-92-6	963: Cobalt(II) chloride dihydrate
16569-85-0	1896: Magnesium chromate pentahydrate
16569-85-0	1902: Magnesium dichromate hexahydrate
16671-27-5	897: Chromium(III) fluoride trihydrate
16674-78-5	1869: Magnesium acetate tetrahydrate
16689-88-6	3241: Thorium hydride

16712-20-2	1779: Lithium chloride
	monohydrate
16721-80-5	2913: Sodium hydrogen sulfide
16721-80-5	2914: Sodium hydrogen sulfide dihydrate
16721-80-5	2915: Sodium hydrogen sulfide
16721 55 9	2514: Potassium purosulfita
10731-33-8	2514: Potassium pyrosume
16/33-9/-4	1785: Litnium cyclopentadienide
10/43-33-2	hexafluoroacetylacetonate
16774-21-3	131: Ammonium cerium(IV)
1(774 01 0	TALE
16/74-21-3	745: Ceric ammonium nitrate
16812-54-7	2237: Nickel sulfide
16853-74-0	3612: Zirconium tungstate
16853-85-3	1765: Lithium aluminum hydride
16871-60-6	2449: Potassium hexachloroosmiate(IV)
16871-71-9	3545: Zinc hexafluorosilicate
100/1/1/	hexahydrate
16871-90-2	2462. Potassium
10071 90 2	hexafluorosilicate
16872 11 0	1344: Eluoroboric acid
16872-11-0	2182: Tatrafluorobaria agid
10872-11-0	
10895-85-9	2895: Soutuin nexanuorosinicate
16893-92-8	hexafluoroantimonate
16903-35-8	550: Chloroauric(III) acid tetrahydrate
16903-35-8	1541: Hydrogen
	tatrahydrata
16010 10 0	174. A mmonium
10919-19-0	hevafluorosilicate
16010 21 4	811: Casium
10717-21-4	hexafluorogermanate
16010 27 0	2463: Potassium
10919-27-0	hexafluorotitanate
	monohydrate
16010 58 7	166: A mmonium
10919-38-7	hevachloroplatinate(IV)
16919-73-6	2450: Potassium
10/17 75 0	hexachloropalladate(IV)
16920-56-2	2448: Potassium
	hexachloroiridate(IV)
16920-93-7	2447: Potassium
16020 04 0	nexabromoplatinate(1v)
16920-94-8	hexacyanoplatinate(IV)
16921-30-5	2451: Potassium
	hexachloroplatinate(IV)
16921-96-3	1586: Iodine heptafluoride
16923-95-8	2464: Potassium hexafluorozirconate
16924-00-8	2445: Potassium
	heptafluorotantalate
16924-03-1	2444: Potassium
	heptafluoroniobate
16924-51-9	2896: Sodium
	hexafluorostannate(IV)
16925-25-0	2890: Sodium
	hexafluoroantimonate(V)

16925-26-1	2898: Sodium hexafluorozirconate
16925-39-6	653: Calcium hexafluorosilicate
	dinydrate
16940-66-2	2841: Sodium borohydride
16940-81-1	1477: Hexafluorophosphoric acid
16940-92-4	163: Ammonium hexachloroiridate(IV)
16940-97-9	2452: Potassium
16941-10-9	709: Calcium
16941-11-0	tetrahydroaluminate 173: Ammonium
	hexafluorophosphate
16941-12-1	1528: Hydrogen hexachloroplatinate(IV)
16941-12-1	1529: Hydrogen
	hexachloroplatinate(IV)
	hexahydrate
16949-15-8	1771: Lithium borohydride
16950-06-4	1343: Fluoroantimonic acid
16961-83-4	1530: Hydrogen hexafluorosilicic
	acid
16962-07-5	24: Aluminum borohydride
16962-31-5	2459: Potassium
10702 51 5	hexafluoromanganate(IV)
16062 40 6	175. A mmonium
10902-40-0	hexafluorotitanate dihydrate
16962-47-3	172: Ammonium
10702-47-5	hevafluorogermanate
16062 48 4	2666. Dubidium
10902-46-4	2000. Kubidiulii
17014 71 0	2507. Determine neuronide
17014-71-0	
1/026-44-7	231: Ammonium sulfite
17029-16-2	1797: Lithium hexafluorostannate(IV)
17029-22-0	2457: Potassium
	hexafluoroarsenate(V)
17069-38-4	2468: Potassium
	hexathiocyanoplatinate(IV)
17083-68-0	549: Bromoauric(III) acid
	pentahydrate
17083-68-0	1538: Hydrogen
	tetrabromoaurate(III)
17004 12 0	pentahydrate
1/084-13-8	2461: Potassium
15000 50 6	hexafluorophosphate
17099-70-6	43: Aluminum hexafluorosilicate
17116 12 1	nonanyurate 2807: Sodium hovofluorotitonst
1710-13-1	2677. Sourini nexanuorontanale
1/125-80-3	361: Barium nexafluorosilicate
1/141-63-8	2012: Manganese(II) nitrate
17104 00 2	266: Darium hudrowide
17194-00-2	
1/218-4/-2	2400: Potassium
	hexafluoronickelate(IV)
17272-45-6	1660: Lanthanum chloride
172 47 05 1	nexanyurate
1/34/-95-4	1/96: Lithium hexafluorosilicate
17363-02-9	160: Ammonium
	hexabromoplatinate(IV)
17375-41-6	1331: Ferrous sulfate
	monohydrate
17440-85-6	445: Beryllium borohydride
17475-67-1	1446: Hafnium acetylacetonate
17496-59-2	1166: Dichlorine trioxide

17501-44-9	3585: Zirconium acetylacetonate
17522-69-9	2172: Neodymium perchlorate
	hexahydrate
17594-47-7	320: Barium bis(2.2.6.6-
11574 477	tetromethyl 3 5
	hantanadianata) hydrota
17702 41 0	1151. Descharge (14)
17702-41-9	1151: Decaborane(14)
17/12-66-2	2467: Potassium
	hexanitritorhodate(III)
17739-47-8	2359: Phosphorus nitride
17786-31-1	938: Cobalt dodecacarbonyl
17829-86-6	2699: Samarium acetate
	trihydrate
17835-81-3	1401: Gallium(III) perchlorate
11000 01 0	hexabydrate
17856 02 7	2287: Nitronium
17850-92-7	2287. Nutoinum
17026 77 1	
1/926-//-1	2725: Scandium carbonate
	hydrate
17926-77-1	2730: Scandium oxalate
	pentahydrate
18039-69-5	3394: Uranyl acetylacetonate
18078-40-5	2566: Potassium uranyl nitrate
18088-11-4	2675: Rubidium oxide
18115 70 2	1762: Lithium agetulagetonate
10113-70-3	
182/8-82-5	802: Cesium bromoiodide
18282-10-5	3023: Stannic oxide
18283-93-7	3172: Tetraborane(10)
18288-22-7	482: Bismuth hydride
18421-71-1	103: Americium carbonate
	dihydrate
18424-17-4	1703: Lithium
10424-17-4	havefluoroontimonato
10.422 40 4	
18433-40-4	254: Ammonium uranium fluoride
18433-48-2	3399: Uranyl hydrogen
	phosphate tetrahydrate
18433-84-6	2332: Pentaborane(11)
18454-12-1	1749: Lead(II) chromate(VI)
	oxide
18480-07-4	3063: Strontium hydroxide
18/188-96-5	988: Cobalt(II) nitrite
10400 90 5	085: Cabalt(II) malubdata
18001-87-1	
10/10 55 0	mononydrate
18618-55-8	7/6: Cerous chloride
	heptahydrate
18624-44-7	1319: Ferrous hydroxide
18718-07-5	2001: Manganese(II) dihydrogen
	phosphate dihydrate
18727-04-3	967: Cobalt(II) citrate dihydrate
18746-63-9	168: Ammonium
10740 05 7	havaahlararuthanata(IV)
10770 00 2	184(: L statisme a state hadrate
18//9-08-3	1846: Lutetium acetate hydrate
18810-58-7	328: Barium azide
18820-29-6	2024: Manganese(II) sulfide
18855-94-2	1465: Hafnium sulfide
18865-75-3	3240: Thorium
	hexafluoroacetylacetonate
18868-43-4	2132: Molybdenum(IV) oxide
18902-42-6	2690: Ruthenium nitrosyl
10702-42-0	ahlorida monahydrata
19000 69 7	26(4, Dashidiana C
18909-68-/	2004: Kubidium fluoroborate
18909-69-8	809: Cesium fluoroborate
18911-76-7	3500: Yttrium
	hexafluoroacetylacetonate
18917-82-3	1753: Lead(II) lactate
18917-91-4	55: Aluminum lactate

18917-95-8	1943: Magnesium salicylate	2
19022 05 (	tetrahydrate	2
18933-05-6	2005: Manganese(II) hydroxide	4
19034-13-0	dihydrate	2
19058-78-7	1597: Jodosyl trifluoride	2
19073-56-4	2661: Rubidium cvanide	2
19086-20-5	1959: Magnesium sulfite	2
	trihydrate	2
19086-22-7	3390: Uranium(IV) sulfate	2
	octahydrate	
19168-23-1	165: Ammonium	2
	hexachloropalladate(IV)	
19200-21-6	2288: Nitronium	2
	hexafluorophosphate	2
19287-45-7	1159: Diborane(6)	
19372-44-2	612: Calcium acetylacetonate	2
19372-44-2	613: Calcium acetylacetonate	~
10.415 00 0	hydrate	2
19415-82-8	3404: Uranyl sulfate	4
10/23 76 8	777: Cerous chloride hydrate	2
19425-70-8	2209: Nonaborane(15)	2
19469-07-9	1284: Ferric oxalate	2
19513-05-4	2031: Manganese(III) acetate	2
	dihvdrate	-
19530-02-0	3594: Zirconium	2
	hexafluoroacetylacetonate	2
19567-78-3	2883: Sodium	2
	hexachloroiridate(IV)	
	hexahydrate	2
19583-77-8	2887: Sodium	2
	hexachloroplatinate(IV)	2
10501 00 6	hexahydrate	2
19584-30-6	2636: Rhodium dodecacarbonyl	2
19597-69-4	1769: Lithium azide	4
19398-90-4	hevabydrate	4
19624-22-7	2333: Pentaborane(9)	2
19648-83-0	975: Cobalt(II)	-
	hexafluoroacetylacetonate	2
19648-85-2	1909: Magnesium	2
	hexafluoroacetylacetonate	2
	dihydrate	2
19648-88-5	1709: Lead	2
	hexafluoroacetylacetonate	
19718-36-6	2497: Potassium osmate	2
10702 14 2	dihydrate	-
19/83-14-3	1/11: Lead hydroxide	2
20195-38-2	521: Poron phosphide	2
20203-91-8	48: Aluminum hydroxide(B)	2
20237-20-9	827: Cesium oxide	2
20201 00 9	3461: Xenon pentafluoride	-
	hexafluoroarsenate	2
20328-96-5	268: Antimony(III) nitrate	(
20338-08-3	3279: Titanic acid	c
20344-49-4	1286: Ferric oxide hydroxide	2
20346-99-0	2683: Rubidium	2
	tetrahydridoborate	2
20398-06-5	3200: Thallium(I) ethoxide	2
20405-64-5	1049: Copper(I) selenide	2
20427-11-6	968: Cobalt(II) cyanide	2
20/27 11 6	dihydrate	~
20427-11-6	909: Coball(11) cyanide	2
	trinyarate	2

20427-56-9	2697: Ruthenium(VIII) oxide
20427-58-1	3546: Zinc hydroxide
20427-59-2	1098: Copper(II) hydroxide
20548-54-3	705: Calcium sulfide
20540-54-5	2002: Marcury(II) salanida
20610 16 2	1414: Cormanium(II) ovida
20019-10-3	2400: Vanadium aarhanul
20044-87-3	
20654-56-2	2812: Silver permenate
20661-21-6	1569: Indium(III) hydroxide
20662-14-0	2727: Scandium chloride
	hexahydrate
20665-52-5	1400: Gallium(III) oxide
	hydroxide
20667-12-3	2807: Silver oxide
20694-39-7	2013: Manganese(II) nitrate
	tetrahydrate
20712-42-9	584: Cadmium oxalate
	trihydrate
20762-60-1	2412: Potassium azide
20765-98-4	2641: Rhodium(III) chloride
	hvdrate
20770-09-6	3024: Stannic selenide
20816-12-0	2309: Osmium(VIII) oxide
20859-73-8	77: Aluminum phosphide
20055 11 7	2802: Sodium
20955-11-7	bayafluarafarrata(III)
21041 02 0	077. Coholt(II) hydroxido
21041-95-0	575. Coducium hadronida
21041-95-2	
21056-98-4	689: Calcium phosphite
	monohydrate
21109-95-5	409: Barium sulfide
21109-95-5	410: Barium sulfide
21159-32-0	807: Cesium cyanide
21255-83-4	543: Bromine dioxide
21264-43-7	1561: Indium(II) bromide
21308-80-5	546: Bromine oxide
21324-39-0	2894: Sodium
	hexafluorophosphate
21324-40-3	1795: Lithium
	hexafluorophosphate
21351-79-1	816: Cesium hydroxide
21548-73-2	2820: Silver sulfide
21645-51-2	45: Aluminum hydroxide
21651-19-4	3036: Stannous oxide
21679-31-2	861: Chromium(III)
21079 51 2	acetylacetonate
21670 31 2	888: Chromium(III)
21077-31-2	acetylacetonate
21670 46 0	1015: Cobalt(III) acatulacatonata
210/9-40-9	1015: Coball(III) acetylacetollate
21907-30-0	
21908-53-2	2086: Mercury(II) oxide red
21908-53-2	2087: Mercury(II) oxide yellow
21995-38-0	130: Ammonium cerium(III)
	sulfate tetrahydrate
21995-38-0	770: Cerous ammonium
(anhydrous	sulfate tetrahydrate
compound)	
22015-35-6	1245: Europium(II) iodide
22205-45-4	1050: Copper(I) sulfide
22205-57-8	797: Cesium amide
22208-73-7	625: Calcium bromide dihydrate
22306-37-2	470: Bismuth acetate
22326-55-2	367: Barium hydroxide
	monohydrate
22398-80-7	1557: Indium phosphido
	1337. Indium phospinae
22429-50-1	3402: Uranyl oxalate trihydrate

22519-64-8	1566: Indium(III) chloride
	tetrahydrate
22520-96-3	1595: Iodine trifluoride
22527 13 5	3456: Yanon fluorida
22327-13-3	have for an weth an etc
	nexalluororutnenate
22537-19-5	1683: Lawrencium
22594-86-1	2500: Potassium
	pentachloronitrosvl
	iridium(III) hydrate
22750 57 9	709. Continue antida
22750-57-8	/98: Cesium azide
22756-36-1	2653: Rubidium azide
22831-39-6	1949: Magnesium silicide
22831-42-1	22: Aluminum arsenide
22852-67-1	2080: Mercury(II) nitrate
22032 07 1	2000: Mercury(II) Intrate
22886-66-4	1393: Gallium(III) fluoride
	trihydrate
22986-54-5	4: Actinium chloride
22992-15-0	1367: Gadolinium oxalate
22))2 15 0	de e cherdrete
	decanydrate
22992-83-2	1219: Erbium carbonate hydrate
23276-90-6	924: Chromium(VI) tetrafluoride
	oxide
23293-27-8	3213: Thallium(I) picrate
22222 20 7	107. A maniaium hudravida
23525-19-1	107. Americium nydroxide
23363-14-6	3484: Yttrium acetate hydrate
23370-59-4	1610: Iridium(III) fluoride
23383-11-1	1315: Ferrous citrate
	monohydrate
23/12 /5 5	2130: Molyhdenum(IV) fluoride
23412-45-5	
23414-72-4	3559: Zinc permanganate
	hexahydrate
23436-05-7	376: Barium metaborate
	dihvdrate
23586-53-0	3227: Thallium(III)
25500-55-0	5227. Thanhum(III)
	trinuoroacetate
23777-80-2	1473: Hexaborane(10)
24012-17-7	3248: Thorium oxalate dihydrate
24094-93-7	872: Chromium nitride
24304-00-5	61. Aluminum nitride
24415 00 7	1410: Cormonium(II) bromido
24413-00-7	
24422-20-6	331/: Trichlorofluorogermane
24422-21-7	1170: Dichlorodifluorogermane
24597-12-4	1386: Gallium(II) chloride
24598-62-7	159. Ammonium
2.070 02 /	havebromoosmisto(IV)
24(12 29 5	$0(5, C_{ab}, ab(H))$
24015-58-5	905: Cobalt(11) chroniate
24621-21-4	2255: Niobium nitride
24646-85-3	3421: Vanadium nitride
24670-06-2	A466 TE 11 1 1 1 1
24670 07 2	3166: Terbium oxalate hydrate
/40/0-0/-1	3166: Terbium oxalate hydrate
24670-07-3	1203: Dysprosium oxalate
24070-07-3	<ul> <li>3166: Terbium oxalate hydrate</li> <li>1203: Dysprosium oxalate</li> <li>decahydrate</li> </ul>
24670-07-3 24719-19-5	<ul> <li>3166: Terbium oxalate hydrate</li> <li>1203: Dysprosium oxalate decahydrate</li> <li>954: Cobalt(II) arsenate</li> </ul>
24070-07-3 24719-19-5	<ul> <li>3166: Terbium oxalate hydrate</li> <li>1203: Dysprosium oxalate decahydrate</li> <li>954: Cobalt(II) arsenate octahydrate</li> </ul>
24870-07-3 24719-19-5 24887-06-7	<ul> <li>3166: Terbium oxalate hydrate</li> <li>1203: Dysprosium oxalate decahydrate</li> <li>954: Cobalt(II) arsenate octahydrate</li> <li>3541: Zinc formaldehyde</li> </ul>
24670-07-3 24719-19-5 24887-06-7	<ul> <li>3166: Terbium oxalate hydrate</li> <li>1203: Dysprosium oxalate decahydrate</li> <li>954: Cobalt(II) arsenate octahydrate</li> <li>3541: Zinc formaldehyde sulfoxylate</li> </ul>
24670-07-3 24719-19-5 24887-06-7 24992-60-7	<ul> <li>3166: Terbium oxalate hydrate</li> <li>1203: Dysprosium oxalate decahydrate</li> <li>954: Cobalt(II) arsenate octahydrate</li> <li>3541: Zinc formaldehyde sulfoxylate</li> <li>2588: Praseodymium oxalate</li> </ul>
24670-07-3 24719-19-5 24887-06-7 24992-60-7	<ul> <li>3166: Terbium oxalate hydrate</li> <li>1203: Dysprosium oxalate decahydrate</li> <li>954: Cobalt(II) arsenate octahydrate</li> <li>3541: Zinc formaldehyde sulfoxylate</li> <li>2588: Praseodymium oxalate daeabydrate</li> </ul>
24070-07-3 24719-19-5 24887-06-7 24992-60-7	<ul> <li>3166: Terbium oxalate hydrate</li> <li>1203: Dysprosium oxalate decahydrate</li> <li>954: Cobalt(II) arsenate octahydrate</li> <li>3541: Zinc formaldehyde sulfoxylate</li> <li>2588: Praseodymium oxalate decahydrate</li> </ul>
24070-07-3 24719-19-5 24887-06-7 24992-60-7 25094-02-4	<ul> <li>3166: Terbium oxalate hydrate</li> <li>1203: Dysprosium oxalate decahydrate</li> <li>954: Cobalt(II) arsenate octahydrate</li> <li>3541: Zinc formaldehyde sulfoxylate</li> <li>2588: Praseodymium oxalate decahydrate</li> <li>636: Calcium chloride</li> </ul>
24070-07-3 24719-19-5 24887-06-7 24992-60-7 25094-02-4	<ul> <li>3166: Terbium oxalate hydrate</li> <li>1203: Dysprosium oxalate decahydrate</li> <li>954: Cobalt(II) arsenate octahydrate</li> <li>3541: Zinc formaldehyde sulfoxylate</li> <li>2588: Praseodymium oxalate decahydrate</li> <li>636: Calcium chloride tetrahydrate</li> </ul>
24070-07-3 24719-19-5 24887-06-7 24992-60-7 25094-02-4 25114-58-3	<ul> <li>3166: Terbium oxalate hydrate</li> <li>1203: Dysprosium oxalate decahydrate</li> <li>954: Cobalt(II) arsenate octahydrate</li> <li>3541: Zinc formaldehyde sulfoxylate</li> <li>2588: Praseodymium oxalate decahydrate</li> <li>636: Calcium chloride tetrahydrate</li> <li>1552: Indium acetate</li> </ul>
24070-07-3 24719-19-5 24887-06-7 24992-60-7 25094-02-4 25114-58-3 25152-52-7	<ul> <li>3166: Terbium oxalate hydrate</li> <li>1203: Dysprosium oxalate decahydrate</li> <li>954: Cobalt(II) arsenate octahydrate</li> <li>3541: Zinc formaldehyde sulfoxylate</li> <li>2588: Praseodymium oxalate decahydrate</li> <li>636: Calcium chloride tetrahydrate</li> <li>1552: Indium acetate</li> <li>21: Aluminum antimonida</li> </ul>
24070-07-3 24719-19-5 24887-06-7 24992-60-7 25094-02-4 25114-58-3 25152-52-7 25222 (0.4	<ul> <li>3166: Terbium oxalate hydrate</li> <li>1203: Dysprosium oxalate decahydrate</li> <li>954: Cobalt(II) arsenate octahydrate</li> <li>3541: Zinc formaldehyde sulfoxylate</li> <li>2588: Praseodymium oxalate decahydrate</li> <li>636: Calcium chloride tetrahydrate</li> <li>1552: Indium acetate</li> <li>21: Aluminum antimonide</li> <li>600: Calcium ek turk susta</li> </ul>
24070-07-3 24719-19-5 24887-06-7 24992-60-7 25094-02-4 25114-58-3 25152-52-7 25232-60-4	<ul> <li>3166: Terbium oxalate hydrate</li> <li>1203: Dysprosium oxalate decahydrate</li> <li>954: Cobalt(II) arsenate octahydrate</li> <li>3541: Zinc formaldehyde sulfoxylate</li> <li>2588: Praseodymium oxalate decahydrate</li> <li>636: Calcium chloride tetrahydrate</li> <li>1552: Indium acetate</li> <li>21: Aluminum antimonide</li> <li>690: Calcium phosphonate</li> </ul>
24070-07-3 24719-19-5 24887-06-7 24992-60-7 25094-02-4 25114-58-3 25152-52-7 25232-60-4	<ul> <li>3166: Terbium oxalate hydrate</li> <li>1203: Dysprosium oxalate decahydrate</li> <li>954: Cobalt(II) arsenate octahydrate</li> <li>3541: Zinc formaldehyde sulfoxylate</li> <li>2588: Praseodymium oxalate decahydrate</li> <li>636: Calcium chloride tetrahydrate</li> <li>1552: Indium acetate</li> <li>21: Aluminum antimonide</li> <li>690: Calcium phosphonate monohydrate</li> </ul>
24070-07-3 24719-19-5 24887-06-7 24992-60-7 25094-02-4 25114-58-3 25152-52-7 25232-60-4 25324-56-5	<ul> <li>3166: Terbium oxalate hydrate</li> <li>1203: Dysprosium oxalate decahydrate</li> <li>954: Cobalt(II) arsenate octahydrate</li> <li>3541: Zinc formaldehyde sulfoxylate</li> <li>2588: Praseodymium oxalate decahydrate</li> <li>636: Calcium chloride tetrahydrate</li> <li>1552: Indium acetate</li> <li>21: Aluminum antimonide</li> <li>690: Calcium phosphonate monohydrate</li> <li>3277: Tin monophosphide</li> </ul>
24070-07-3 24719-19-5 24887-06-7 24992-60-7 25094-02-4 25114-58-3 25152-52-7 25232-60-4 25324-56-5 25402-50-0	<ul> <li>3166: Terbium oxalate hydrate</li> <li>1203: Dysprosium oxalate decahydrate</li> <li>954: Cobalt(II) arsenate octahydrate</li> <li>3541: Zinc formaldehyde sulfoxylate</li> <li>2588: Praseodymium oxalate decahydrate</li> <li>636: Calcium chloride tetrahydrate</li> <li>1552: Indium acetate</li> <li>21: Aluminum antimonide</li> <li>690: Calcium phosphonate monohydrate</li> <li>3277: Tin monophosphide</li> <li>1599: Iodyl trifluoride</li> </ul>

23417-81-0	364: Barium hydrosulfide
25469-93-6	2159: Neodymium chloride
25519-09-9	1479: Holmium acetate
	monohydrate
25583-20-4	3296: Titanium nitride
25617-97-4	1383: Gallium nitride
25617-98-5	1556: Indium nitride
25658-42-8	3599: Zirconium nitride
25658-43-9	3374: Uranium mononitride
25659-31-8	1713: Lead iodate
25764-08-3	762: Cerium nitride
25764-09-4	2587: Praseodymium nitride
25764-10-7	1669: Lanthanum nitride
25764-11-8	2169: Neodymium nitride
25764-15-2	1366: Gadolinium nitride
25817-87-2	1457: Hafnium nitride
25895-60-7	2863: Sodium cyanoborohydride
25937-78-4	795: Cesium acetylacetonate
25955-51-5	3193: Thallium(I)
	acetylacetonate
26006-71-3	2992: Sodium tellurate(VI)
	dihydrate
26042-63-7	2798: Silver hexafluorophosphate
26042-64-8	2796: Silver
	hexafluoroantimonate(V)
26124-86-7	377: Barium metaborate
	monohydrate
26134-62-3	1816: Lithium nitride
26318-99-0	1121: Copper(II) silicate
	dihydrate
26342-61-0	874: Chromium phosphide
26508-33-8	1629: Iron phosphide
26522-91-8	2066: Mercury(II) bromate
26628-22-8	2839: Sodium azide
26677-68-9	3269: Thulium oxalate
	hexahydrate
26677-69-0	1858: Lutetium oxalate
	hexahydrate
26686-77-1	1928: Magnesium orthosilicate
26686-77-1	1948: Magnesium silicate
26750-66-3	
	2555: Potassium thiocarbonate
26970-82-1	2555: Potassium thiocarbonate 2978: Sodium selenite
26970-82-1	2555: Potassium thiocarbonate 2978: Sodium selenite pentahydrate
26970-82-1 27016-73-5	<ul><li>2555: Potassium thiocarbonate</li><li>2978: Sodium selenite</li><li>pentahydrate</li><li>930: Cobalt arsenide</li></ul>
26970-82-1 27016-73-5 27016-75-7	2555: Potassium thiocarbonate 2978: Sodium selenite pentahydrate 930: Cobalt arsenide 2193: Nickel arsenide
26970-82-1 27016-73-5 27016-75-7 27043-84-1	2555: Potassium thiocarbonate 2978: Sodium selenite pentahydrate 930: Cobalt arsenide 2193: Nickel arsenide 3522: Zinc borate
26970-82-1 27016-73-5 27016-75-7 27043-84-1 27133-66-0	<ul> <li>2555: Potassium thiocarbonate</li> <li>2978: Sodium selenite pentahydrate</li> <li>930: Cobalt arsenide</li> <li>2193: Nickel arsenide</li> <li>3522: Zinc borate</li> <li>393: Barium potassium chromate</li> </ul>
26970-82-1 27016-73-5 27016-75-7 27043-84-1 27133-66-0 27218-16-2	<ul> <li>2555: Potassium thiocarbonate</li> <li>2978: Sodium selenite pentahydrate</li> <li>930: Cobalt arsenide</li> <li>2193: Nickel arsenide</li> <li>3522: Zinc borate</li> <li>393: Barium potassium chromate</li> <li>849: Chlorine perchlorate</li> </ul>
26970-82-1 27016-73-5 27016-75-7 27043-84-1 27133-66-0 27218-16-2 27546-07-2	<ul> <li>2555: Potassium thiocarbonate</li> <li>2978: Sodium selenite pentahydrate</li> <li>930: Cobalt arsenide</li> <li>2193: Nickel arsenide</li> <li>3522: Zinc borate</li> <li>393: Barium potassium chromate</li> <li>849: Chlorine perchlorate</li> <li>145: Ammonium dimolybdate</li> </ul>
26970-82-1 27016-73-5 27016-75-7 27043-84-1 27133-66-0 27218-16-2 27546-07-2 27685-51-4	<ul> <li>2555: Potassium thiocarbonate</li> <li>2978: Sodium selenite pentahydrate</li> <li>930: Cobalt arsenide</li> <li>2193: Nickel arsenide</li> <li>3522: Zinc borate</li> <li>393: Barium potassium chromate</li> <li>849: Chlorine perchlorate</li> <li>145: Ammonium dimolybdate</li> <li>2097: Mercury(II)</li> </ul>
26970-82-1 27016-73-5 27016-75-7 27043-84-1 27133-66-0 27218-16-2 27546-07-2 27685-51-4	2555: Potassium thiocarbonate 2978: Sodium selenite pentahydrate 930: Cobalt arsenide 2193: Nickel arsenide 3522: Zinc borate 393: Barium potassium chromate 849: Chlorine perchlorate 145: Ammonium dimolybdate 2097: Mercury(II) tetrathiocyanatocobaltate(II)
26970-82-1 27016-73-5 27016-75-7 27043-84-1 27133-66-0 27218-16-2 27546-07-2 27685-51-4 27709-53-1	2555: Potassium thiocarbonate 2978: Sodium selenite pentahydrate 930: Cobalt arsenide 2193: Nickel arsenide 3522: Zinc borate 393: Barium potassium chromate 849: Chlorine perchlorate 145: Ammonium dimolybdate 2097: Mercury(II) tetrathiocyanatocobaltate(II) 2567: Potassium uranyl sulfate
26970-82-1 27016-73-5 27016-75-7 27043-84-1 27133-66-0 27218-16-2 27546-07-2 27685-51-4 27709-53-1	2555: Potassium thiocarbonate 2978: Sodium selenite pentahydrate 930: Cobalt arsenide 2193: Nickel arsenide 3522: Zinc borate 393: Barium potassium chromate 849: Chlorine perchlorate 145: Ammonium dimolybdate 2097: Mercury(II) tetrathiocyanatocobaltate(II) 2567: Potassium uranyl sulfate dihydrate
26970-82-1 27016-73-5 27016-75-7 27043-84-1 27133-66-0 27218-16-2 27546-07-2 27685-51-4 27709-53-1 27774-13-6	2555: Potassium thiocarbonate 2978: Sodium selenite pentahydrate 930: Cobalt arsenide 2193: Nickel arsenide 3522: Zinc borate 393: Barium potassium chromate 849: Chlorine perchlorate 145: Ammonium dimolybdate 2097: Mercury(II) tetrathiocyanatocobaltate(II) 2567: Potassium uranyl sulfate dihydrate 3447: Vanadyl sulfate dihydrate
26970-82-1 27016-73-5 27016-75-7 27043-84-1 27133-66-0 27218-16-2 27546-07-2 27685-51-4 27709-53-1 27779-53-1 27774-13-6 27790-37-0	2555: Potassium thiocarbonate 2978: Sodium selenite pentahydrate 930: Cobalt arsenide 2193: Nickel arsenide 3522: Zinc borate 393: Barium potassium chromate 849: Chlorine perchlorate 145: Ammonium dimolybdate 2097: Mercury(II) tetrathiocyanatocobaltate(II) 2567: Potassium uranyl sulfate dihydrate 3447: Vanadyl sulfate dihydrate 2522: Potassium stannosulfate
26970-82-1 27016-73-5 27016-75-7 27043-84-1 27133-66-0 27218-16-2 27546-07-2 27685-51-4 27709-53-1 277709-53-1 27774-13-6 27790-37-0 27860-83-9	<ul> <li>2555: Potassium thiocarbonate</li> <li>2978: Sodium selenite pentahydrate</li> <li>930: Cobalt arsenide</li> <li>2193: Nickel arsenide</li> <li>3522: Zinc borate</li> <li>393: Barium potassium chromate</li> <li>849: Chlorine perchlorate</li> <li>145: Ammonium dimolybdate</li> <li>2097: Mercury(II) tetrathiocyanatocobaltate(II)</li> <li>2567: Potassium uranyl sulfate dihydrate</li> <li>3447: Vanadyl sulfate dihydrate</li> <li>2522: Potassium stannosulfate</li> <li>3540: Zinc fluoroborate</li> </ul>
26970-82-1 27016-73-5 27016-75-7 27043-84-1 27133-66-0 27218-16-2 27546-07-2 27685-51-4 27709-53-1 277709-53-1 27774-13-6 27790-37-0 27860-83-9	2555: Potassium thiocarbonate 2978: Sodium selenite pentahydrate 930: Cobalt arsenide 2193: Nickel arsenide 3522: Zinc borate 393: Barium potassium chromate 849: Chlorine perchlorate 145: Ammonium dimolybdate 2097: Mercury(II) tetrathiocyanatocobaltate(II) 2567: Potassium uranyl sulfate dihydrate 3447: Vanadyl sulfate dihydrate 2522: Potassium stannosulfate 3540: Zinc fluoroborate hexahydrate
26970-82-1 27016-73-5 27016-75-7 27043-84-1 27133-66-0 27218-16-2 27546-07-2 27685-51-4 27709-53-1 277709-53-1 27774-13-6 27790-37-0 27860-83-9 27988-77-8	<ul> <li>2555: Potassium thiocarbonate</li> <li>2978: Sodium selenite pentahydrate</li> <li>930: Cobalt arsenide</li> <li>2193: Nickel arsenide</li> <li>3522: Zinc borate</li> <li>393: Barium potassium chromate</li> <li>849: Chlorine perchlorate</li> <li>145: Ammonium dimolybdate</li> <li>2097: Mercury(II) tetrathiocyanatocobaltate(II)</li> <li>2567: Potassium uranyl sulfate dihydrate</li> <li>3447: Vanadyl sulfate dihydrate</li> <li>2522: Potassium stannosulfate</li> <li>3540: Zinc fluoroborate hexahydrate</li> <li>1540: Hydrogen</li> </ul>
26970-82-1 27016-73-5 27016-75-7 27043-84-1 27133-66-0 27218-16-2 27546-07-2 27685-51-4 27709-53-1 277709-53-1 27774-13-6 27790-37-0 27860-83-9 27988-77-8	2555: Potassium thiocarbonate 2978: Sodium selenite pentahydrate 930: Cobalt arsenide 2193: Nickel arsenide 3522: Zinc borate 393: Barium potassium chromate 849: Chlorine perchlorate 145: Ammonium dimolybdate 2097: Mercury(II) tetrathiocyanatocobaltate(II) 2567: Potassium uranyl sulfate dihydrate 3447: Vanadyl sulfate dihydrate 2522: Potassium stannosulfate 3540: Zinc fluoroborate hexahydrate 1540: Hydrogen tetrachloroaurate(III) hydrate
26970-82-1 27016-73-5 27043-84-1 27133-66-0 27218-16-2 27546-07-2 27685-51-4 27709-53-1 27774-13-6 27790-37-0 27860-83-9 27988-77-8 28038-39-3	<ul> <li>2555: Potassium thiocarbonate</li> <li>2978: Sodium selenite pentahydrate</li> <li>930: Cobalt arsenide</li> <li>2193: Nickel arsenide</li> <li>2193: Nickel arsenide</li> <li>3522: Zinc borate</li> <li>393: Barium potassium chromate</li> <li>849: Chlorine perchlorate</li> <li>145: Ammonium dimolybdate</li> <li>2097: Mercury(II) tetrathiocyanatocobaltate(II)</li> <li>2567: Potassium uranyl sulfate dihydrate</li> <li>3447: Vanadyl sulfate dihydrate</li> <li>2522: Potassium stannosulfate</li> <li>3540: Zinc fluoroborate hexahydrate</li> <li>1540: Hydrogen tetrachloroaurate(III) hydrate</li> <li>2660: Rubidium cobalt(II)</li> </ul>
26970-82-1 27016-73-5 27016-75-7 27043-84-1 27133-66-0 27218-16-2 27546-07-2 27685-51-4 27709-53-1 277709-53-1 27774-13-6 27790-37-0 27860-83-9 27988-77-8 28038-39-3	<ul> <li>2555: Potassium thiocarbonate</li> <li>2978: Sodium selenite pentahydrate</li> <li>930: Cobalt arsenide</li> <li>2193: Nickel arsenide</li> <li>3522: Zinc borate</li> <li>393: Barium potassium chromate</li> <li>849: Chlorine perchlorate</li> <li>145: Ammonium dimolybdate</li> <li>2097: Mercury(II) tetrathiocyanatocobaltate(II)</li> <li>2567: Potassium uranyl sulfate dihydrate</li> <li>3447: Vanadyl sulfate dihydrate</li> <li>2522: Potassium stannosulfate</li> <li>3540: Zinc fluoroborate hexahydrate</li> <li>1540: Hydrogen tetrachloroaurate(III) hydrate</li> <li>2660: Rubidium cobalt(II) sulfate hexahydrate</li> </ul>
26970-82-1 27016-73-5 27016-75-7 27043-84-1 27133-66-0 27218-16-2 27546-07-2 27685-51-4 27709-53-1 277709-53-1 27774-13-6 27790-37-0 27860-83-9 27988-77-8 28038-39-3 28041-86-3	<ul> <li>2555: Potassium thiocarbonate</li> <li>2978: Sodium selenite pentahydrate</li> <li>930: Cobalt arsenide</li> <li>2193: Nickel arsenide</li> <li>2193: Nickel arsenide</li> <li>3522: Zinc borate</li> <li>393: Barium potassium chromate</li> <li>849: Chlorine perchlorate</li> <li>145: Ammonium dimolybdate</li> <li>2097: Mercury(II) tetrathiocyanatocobaltate(II)</li> <li>2567: Potassium uranyl sulfate dihydrate</li> <li>3447: Vanadyl sulfate dihydrate</li> <li>2522: Potassium stannosulfate</li> <li>3540: Zinc fluoroborate hexahydrate</li> <li>1540: Hydrogen tetrachloroaurate(III) hydrate</li> <li>2660: Rubidium cobalt(II) sulfate hexahydrate</li> <li>2427: Potassium cobalt(II)</li> </ul>
26970-82-1 27016-73-5 27016-75-7 27043-84-1 27133-66-0 27218-16-2 27546-07-2 27545-51-4 27709-53-1 27774-13-6 27790-37-0 27860-83-9 27988-77-8 28038-39-3 28041-86-3	2555: Potassium thiocarbonate 2978: Sodium selenite pentahydrate 930: Cobalt arsenide 2193: Nickel arsenide 3522: Zinc borate 393: Barium potassium chromate 849: Chlorine perchlorate 145: Ammonium dimolybdate 2097: Mercury(II) tetrathiocyanatocobaltate(II) 2567: Potassium uranyl sulfate dihydrate 3447: Vanadyl sulfate dihydrate 2522: Potassium stannosulfate 3540: Zinc fluoroborate hexahydrate 1540: Hydrogen tetrachloroaurate(III) hydrate 2660: Rubidium cobalt(II) sulfate hexahydrate
26970-82-1 27016-73-5 27016-75-7 27043-84-1 27133-66-0 27218-16-2 27546-07-2 27545-51-4 27709-53-1 27774-13-6 27790-37-0 27860-83-9 27988-77-8 28038-39-3 28041-86-3 28212-09-1	2555: Potassium thiocarbonate 2978: Sodium selenite pentahydrate 930: Cobalt arsenide 2193: Nickel arsenide 3522: Zinc borate 393: Barium potassium chromate 849: Chlorine perchlorate 145: Ammonium dimolybdate 2097: Mercury(II) tetrathiocyanatocobaltate(II) 2567: Potassium uranyl sulfate dihydrate 3447: Vanadyl sulfate dihydrate 2522: Potassium stannosulfate 3540: Zinc fluoroborate hexahydrate 1540: Hydrogen tetrachloroaurate(III) hydrate 2660: Rubidium cobalt(II) sulfate hexahydrate 2427: Potassium cobalt(II) selenate hexahydrate 3297: Titanium oxalate
26970-82-1 27016-73-5 27016-75-7 27043-84-1 27133-66-0 27218-16-2 27546-07-2 27545-51-4 27709-53-1 27774-13-6 27790-37-0 27860-83-9 27988-77-8 28038-39-3 28041-86-3 28212-09-1	2555: Potassium thiocarbonate 2978: Sodium selenite pentahydrate 930: Cobalt arsenide 2193: Nickel arsenide 3522: Zinc borate 393: Barium potassium chromate 849: Chlorine perchlorate 145: Ammonium dimolybdate 2097: Mercury(II) tetrathiocyanatocobaltate(II) 2567: Potassium uranyl sulfate dihydrate 3447: Vanadyl sulfate dihydrate 2522: Potassium stannosulfate 3540: Zinc fluoroborate hexahydrate 1540: Hydrogen tetrachloroaurate(III) hydrate 2660: Rubidium cobalt(II) sulfate hexahydrate 2427: Potassium cobalt(II) selenate hexahydrate 3297: Titanium oxalate decahydrate

28300-74-5	2411: Potassium antimony
28407-51-4	2634: Rhodium carbonyl
28633-45-6	1272: Ferric citrate pentahydrate
28876-88-2	2502: Potassium perhorate
20070 00 2	monohydrate
28958-23-8	1653: Lanthanum bromate
20930 23 0	nonahydrate
28958-26-1	2702: Samarium bromate
20750-20-1	nonahydrate
28065 57 3	1480: Holmium ovalate
20705-57-5	decabydrate
20584-42-7	3100: Sulfur triovide N N-
27504-42-7	dimethylformamide complex
20680 14 3	802: Chromium(III) carbonate
27007-14-5	hydrate
20703-01-3	813: Cesium hydrogen
27705-01-5	carbonate
29796-57-4	162: Ammonium
27770-57-4	hevachloroiridate(III)
	monohydrate
20870-00-3	3068: Strontium lactate
29010-99-5	tribudrate
20035-35-1	1794: Lithium
27755-55-1	hevafluoroarsenate
30618-31-6	1228: Erbium ovalate
50018-51-0	decabydrate
30622 07 0	2660: Pubidium iron(III) sulfate
50022-57-0	dodecabydrate
30708-86-2	23/2: Periodyl fluoride
30737 24 7	3210: Thallium(I) ovalate
20002 97 9	1220: Lithium analata
30903-87-8	
30937-53-2	2625: Rhenium(V) bromide
31052-43-4	2679: Rubidium selenide
31083-74-6	2681: Rubidium sulfide
31111-21-4	2515: Potassium ruthenate(VI)
31142-56-0	34: Aluminum citrate
32248-43-4	2707: Samarium diiodide
32287-65-3	41: Aluminum fluoride
	monohydrate
32321-65-6	3611: Zirconium telluride
32594-40-4	1604: Iridium(I)
	chlorotricarbonyl
32823-06-6	56: Aluminum metaphosphate
32997-62-9	3475: Ytterbium hydride
33088-16-3	3245: Thorium nitrate
	tetrahydrate
33114-15-7	1150: Cyclopentadienylniobium
	tetrachloride
33445-15-7	196: Ammonium mercuric
	chloride dihydrate
33689-80-4	5: Actinium fluoride
33689-81-5	3: Actinium bromide
33689-82-6	8: Actinium iodide
33908-66-6	2836: Sodium antimonate
	monohydrate
34128-09-1	3207: Thallium(I) molybdate
34283-69-7	826: Cesium orthovanadate
34767-44-7	3592: Zirconium
	cyclopentadienyl trichloride
34822-89-4	1148: Cyclopentadienvlindium(I)
35103-79-8	817: Cesium hydroxide
	monohydrate
35112-53-9	419: Barium thiosulfate
35340-84-2	983: Cobalt(II) hydroxide
	monohydrate

dihydrate 35718-37-7 3465: Xenon trifluoride monodecafluoroantimonate 35725-34-9 3476: Ytterbium nitrate pentahydrate 36470-39-0 2893: Sodium hexafluorogermanate 36548-87-5 3268: Thulium nitrate hexahydrate 36678-21-4 1982: Manganese nitride 36697-37-6 1673: Lanthanum perchlorate hexahydrate 36907-40-1 1260: Europium(III) perchlorate hexahydrate 36907-42-3 3437: Vanadium(II) sulfate heptahydrate 36969-05-8 922: Chromium(VI) morpholinu 37185-09-4 406: Barium strontium niobium oxide 37248-04-7 1462: Hafnium silicate 37265-86-4 428: Barium yttrium tungsten oxide 37265-91-1 2337: Perbromyl fluoride 37306-42-6 517: Bismuth zirconate		2931: Sodium metaborate
<ul> <li>35/18-3/-/ 3465: Xenon trifluoride monodecafluoroantimonate</li> <li>35725-34-9 3476: Ytterbium nitrate pentahydrate</li> <li>36470-39-0 2893: Sodium hexafluorogermanate</li> <li>36548-87-5 3268: Thulium nitrate hexahydrate</li> <li>36678-21-4 1982: Manganese nitride</li> <li>36678-21-4 1982: Manganese nitride</li> <li>36907-37-6 1673: Lanthanum perchlorate hexahydrate</li> <li>36907-40-1 1260: Europium(III) perchlorate hexahydrate</li> <li>36907-42-3 3437: Vanadium(II) sulfate heptahydrate</li> <li>36969-05-8 922: Chromium(VI) morpholinu oxide</li> <li>37248-04-7 1462: Hafnium silicate</li> <li>37265-86-4 428: Barium yttrium tungsten oxide</li> <li>37265-91-1 2337: Perbromyl fluoride</li> <li>37306-42-6 517: Bismuth zirconate</li> </ul>	25710 27 7	dihydrate
<ul> <li>35725-34-9</li> <li>3476: Ytterbium nitrate pentahydrate</li> <li>36470-39-0</li> <li>2893: Sodium hexafluorogermanate</li> <li>36548-87-5</li> <li>3268: Thulium nitrate hexahydrate</li> <li>36678-21-4</li> <li>1982: Manganese nitride</li> <li>36907-40-1</li> <li>1260: Europium(III) perchlorate hexahydrate</li> <li>36907-40-1</li> <li>1260: Europium(III) perchlorate hexahydrate</li> <li>36907-42-3</li> <li>3437: Vanadium(II) sulfate heptahydrate</li> <li>36969-05-8</li> <li>922: Chromium(VI) morpholinu oxide</li> <li>37248-04-7</li> <li>1462: Hafnium silicate</li> <li>37265-86-4</li> <li>428: Barium yttrium tungsten oxide</li> <li>37265-91-1</li> <li>2337: Perbromyl fluoride</li> <li>37306-42-6</li> <li>517: Bismuth zirconate</li> </ul>	35/18-3/-/	3465: Xenon trifluoride
<ul> <li>36470-39-0 2893: Sodium pentahydrate</li> <li>36470-39-0 2893: Sodium hexafluorogermanate</li> <li>36548-87-5 3268: Thulium nitrate hexahydrate</li> <li>36678-21-4 1982: Manganese nitride</li> <li>36907-37-6 1673: Lanthanum perchlorate hexahydrate</li> <li>36907-40-1 1260: Europium(III) perchlorate hexahydrate</li> <li>36907-42-3 3437: Vanadium(II) sulfate heptahydrate</li> <li>36969-05-8 922: Chromium(VI) morpholing</li> <li>37185-09-4 406: Barium strontium niobium oxide</li> <li>37248-04-7 1462: Hafnium silicate</li> <li>37265-86-4 428: Barium yttrium tungsten oxide</li> <li>37265-91-1 2337: Perbromyl fluoride</li> <li>37306-42-6 517: Bismuth zirconate</li> </ul>	35725-34-9	3476: Ytterbium nitrate
<ul> <li>36470-39-0 2893: Sodium hexafluorogermanate</li> <li>36548-87-5 3268: Thulium nitrate hexahydrate</li> <li>36678-21-4 1982: Manganese nitride</li> <li>36907-37-6 1673: Lanthanum perchlorate hexahydrate</li> <li>36907-40-1 1260: Europium(III) perchlorate hexahydrate</li> <li>36907-42-3 3437: Vanadium(II) sulfate heptahydrate</li> <li>36969-05-8 922: Chromium(VI) morpholine</li> <li>37185-09-4 406: Barium strontium niobium oxide</li> <li>37248-04-7 1462: Hafnium silicate</li> <li>37265-86-4 428: Barium yttrium tungsten oxide</li> <li>37265-91-1 2337: Perbromyl fluoride</li> <li>37306-42-6 517: Bismuth zirconate</li> </ul>	55725 51 9	pentahydrate
hexafluorogermanate 36548-87-5 3268: Thulium nitrate hexahydrate 36678-21-4 1982: Manganese nitride 36907-37-6 1673: Lanthanum perchlorate hexahydrate 36907-40-1 1260: Europium(III) perchlorate hexahydrate 36907-42-3 3437: Vanadium(II) sulfate heptahydrate 36969-05-8 922: Chromium(VI) morpholine 37185-09-4 406: Barium strontium niobium oxide 37248-04-7 1462: Hafnium silicate 37265-86-4 428: Barium yttrium tungsten oxide 37265-91-1 2337: Perbromyl fluoride 37306-42-6 517: Bismuth zirconate	36470-39-0	2893: Sodium
<ul> <li>36548-87-5 3268: Thulium nitrate hexahydrate</li> <li>36678-21-4 1982: Manganese nitride</li> <li>36907-37-6 1673: Lanthanum perchlorate hexahydrate</li> <li>36907-40-1 1260: Europium(III) perchlorate hexahydrate</li> <li>36907-42-3 3437: Vanadium(II) sulfate heptahydrate</li> <li>36969-05-8 922: Chromium(VI) morpholine</li> <li>37185-09-4 406: Barium strontium niobium oxide</li> <li>37248-04-7 1462: Hafnium silicate</li> <li>37265-86-4 428: Barium yttrium tungsten oxide</li> <li>37265-91-1 2337: Perbromyl fluoride</li> <li>37306-42-6 517: Bismuth zirconate</li> </ul>		hexafluorogermanate
hexahydrate 36678-21-4 1982: Manganese nitride 36907-37-6 1673: Lanthanum perchlorate hexahydrate 36907-40-1 1260: Europium(III) perchlorate hexahydrate 36907-42-3 3437: Vanadium(II) sulfate heptahydrate 36969-05-8 922: Chromium(VI) morpholine 37185-09-4 406: Barium strontium niobium oxide 37248-04-7 1462: Hafnium silicate 37265-86-4 428: Barium yttrium tungsten oxide 37265-91-1 2337: Perbromyl fluoride 37306-42-6 517: Bismuth zirconate	36548-87-5	3268: Thulium nitrate
<ul> <li>36907-37-6</li> <li>36907-37-6</li> <li>1673: Lanthanum perchlorate hexahydrate</li> <li>36907-40-1</li> <li>1260: Europium(III) perchlorate hexahydrate</li> <li>36907-42-3</li> <li>3437: Vanadium(II) sulfate heptahydrate</li> <li>36969-05-8</li> <li>922: Chromium(VI) morpholine</li> <li>37185-09-4</li> <li>406: Barium strontium niobium oxide</li> <li>37248-04-7</li> <li>1462: Hafnium silicate</li> <li>37265-86-4</li> <li>428: Barium yttrium tungsten oxide</li> <li>37265-91-1</li> <li>2337: Perbromyl fluoride</li> <li>37306-42-6</li> <li>517: Bismuth zirconate</li> </ul>	26679 21 4	hexahydrate
<ul> <li>36907-37-6 1073. Eannandin percindrate hexahydrate</li> <li>36907-40-1 1260: Europium(III) perchlorate hexahydrate</li> <li>36907-42-3 3437: Vanadium(II) sulfate heptahydrate</li> <li>36969-05-8 922: Chromium(VI) morpholine</li> <li>37185-09-4 406: Barium strontium niobium oxide</li> <li>37248-04-7 1462: Hafnium silicate</li> <li>37265-86-4 428: Barium yttrium tungsten oxide</li> <li>37265-91-1 2337: Perbromyl fluoride</li> <li>37306-42-6 517: Bismuth zirconate</li> </ul>	360/8-21-4	1982: Manganese filtride
<ul> <li>36907-40-1 1260: Europium(III) perchlorate hexahydrate</li> <li>36907-42-3 3437: Vanadium(II) sulfate heptahydrate</li> <li>36969-05-8 922: Chromium(VI) morpholine 37185-09-4 406: Barium strontium niobium oxide</li> <li>37248-04-7 1462: Hafnium silicate</li> <li>37265-86-4 428: Barium yttrium tungsten oxide</li> <li>37265-91-1 2337: Perbromyl fluoride</li> <li>37306-42-6 517: Bismuth zirconate</li> </ul>	30907-37-0	hexabydrate
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<ul> <li>36907-42-3</li> <li>3437: Vanadium(II) sulfate heptahydrate</li> <li>36969-05-8</li> <li>922: Chromium(VI) morpholine</li> <li>37185-09-4</li> <li>406: Barium strontium niobium oxide</li> <li>37248-04-7</li> <li>1462: Hafnium silicate</li> <li>37265-86-4</li> <li>428: Barium yttrium tungsten oxide</li> <li>37265-91-1</li> <li>2337: Perbromyl fluoride</li> <li>37306-42-6</li> <li>517: Bismuth zirconate</li> </ul>		hexahydrate
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<ul> <li>37265-86-4</li> <li>37265-86-4</li> <li>428: Barium yttrium tungsten oxide</li> <li>37265-91-1</li> <li>2337: Perbromyl fluoride</li> <li>37306-42-6</li> <li>517: Bismuth zirconate</li> </ul>	37248 04 7	0X10e
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37306-42-6 517: Bismuth zirconate	37265-91-1	2337: Perbromyl fluoride
	37306-42-6	517: Bismuth zirconate
37473-67-9 2179: Neodymium	37473-67-9	2179: Neodymium
trifluoroacetylacetonate		trifluoroacetylacetonate
37541-72-3182: Ammonium hydrogen	37541-72-3	182: Ammonium hydrogen
oxalate hemihydrate	27772 40 2	oxalate hemihydrate
27800 10 1 640: Calaium fluorenhaanhata	37773-49-2	2387: Platinum(IV) chloride
dibydrate	57809-19-1	dibydrate
uniyulate	37836-27-4	1507 <sup>·</sup> Hydrazine mononitrate
37836-27-4 1507: Hydrazine mononitrate	37913-38-5	2099: Mercury(II) tungstate
37836-27-4 1507: Hydrazine mononitrate 37913-38-5 2099: Mercury(II) tungstate	37961-19-6	111: Americium oxychloride
37836-27-4         1507: Hydrazine mononitrate           37913-38-5         2099: Mercury(II) tungstate           37961-19-6         111: Americium oxychloride	38245-34-0	1481: Holmium carbonate
37836-27-4       1507: Hydrazine mononitrate         37913-38-5       2099: Mercury(II) tungstate         37961-19-6       111: Americium oxychloride         38245-34-0       1481: Holmium carbonate		hydrate
37836-27-4       1507: Hydrazine mononitrate         37913-38-5       2099: Mercury(II) tungstate         37961-19-6       111: Americium oxychloride         38245-34-0       1481: Holmium carbonate         hydrate       1491	38245-35-1	1194: Dysprosium carbonate
37836-27-41507: Hydrazine mononitrate37913-38-52099: Mercury(II) tungstate37961-19-6111: Americium oxychloride38245-34-01481: Holmium carbonatehydrate38245-35-11194: Dysprosium carbonate		tetrahydrate
37836-27-41507: Hydrazine mononitrate37913-38-52099: Mercury(II) tungstate37961-19-6111: Americium oxychloride38245-34-01481: Holmium carbonatehydrate1194: Dysprosium carbonatetetrahydrate	38245-38-4	2157: Neodymium carbonate
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<ul> <li>37836-27-4 1507: Hydrazine mononitrate</li> <li>37913-38-5 2099: Mercury(II) tungstate</li> <li>37961-19-6 111: Americium oxychloride</li> <li>38245-34-0 1481: Holmium carbonate hydrate</li> <li>38245-35-1 1194: Dysprosium carbonate tetrahydrate</li> <li>38245-38-4 2157: Neodymium carbonate hydrate</li> </ul>	29690 94 1	857: Chloryl triffuorida
<ul> <li>37836-27-4 1507: Hydrazine mononitrate</li> <li>37913-38-5 2099: Mercury(II) tungstate</li> <li>37961-19-6 111: Americium oxychloride</li> <li>38245-34-0 1481: Holmium carbonate hydrate</li> <li>38245-35-1 1194: Dysprosium carbonate tetrahydrate</li> <li>38245-38-4 2157: Neodymium carbonate hydrate</li> <li>38455-77-5 3020: Stannic chromate</li> <li>2860.84 1 857: Chlorul trifluoride</li> </ul>	38705-10-0	2060: Mercury(I) tungstate
37836-27-41507: Hydrazine mononitrate37913-38-52099: Mercury(II) tungstate37961-19-6111: Americium oxychloride38245-34-01481: Holmium carbonatehydrate1194: Dysprosium carbonate38245-35-11194: Dysprosium carbonate38245-38-42157: Neodymium carbonatehydrate3020: Stannic chromate38680-84-1857: Chloryl trifluoride38705-19-02060: Mercury(1) tungstate	39082-23-0	1466: Hafnium telluride
<ul> <li>37836-27-4 1507: Hydrazine mononitrate</li> <li>37913-38-5 2099: Mercury(II) tungstate</li> <li>37961-19-6 111: Americium oxychloride</li> <li>38245-34-0 1481: Holmium carbonate hydrate</li> <li>38245-35-1 1194: Dysprosium carbonate tetrahydrate</li> <li>38245-38-4 2157: Neodymium carbonate hydrate</li> <li>38455-77-5 3020: Stannic chromate</li> <li>38680-84-1 857: Chloryl trifluoride</li> <li>38705-19-0 2060: Mercury(I) tungstate</li> <li>3082-23-0 1466: Hafnium telluride</li> </ul>	39156-80-4	3260: Thulium acetate
<ul> <li>37836-27-4 1507: Hydrazine mononitrate</li> <li>37913-38-5 2099: Mercury(II) tungstate</li> <li>37961-19-6 111: Americium oxychloride</li> <li>38245-34-0 1481: Holmium carbonate hydrate</li> <li>38245-35-1 1194: Dysprosium carbonate tetrahydrate</li> <li>38245-38-4 2157: Neodymium carbonate hydrate</li> <li>38455-77-5 3020: Stannic chromate</li> <li>38680-84-1 857: Chloryl trifluoride</li> <li>38705-19-0 2060: Mercury(I) tungstate</li> <li>39082-23-0 1466: Hafnium telluride</li> <li>39156-80-4 3260: Thulium acetate</li> </ul>		monohydrate
<ul> <li>37836-27-4 1507: Hydrazine mononitrate</li> <li>37913-38-5 2099: Mercury(II) tungstate</li> <li>37961-19-6 111: Americium oxychloride</li> <li>38245-34-0 1481: Holmium carbonate hydrate</li> <li>38245-35-1 1194: Dysprosium carbonate tetrahydrate</li> <li>38245-38-4 2157: Neodymium carbonate hydrate</li> <li>38455-77-5 3020: Stannic chromate</li> <li>38680-84-1 857: Chloryl trifluoride</li> <li>38705-19-0 2060: Mercury(I) tungstate</li> <li>39082-23-0 1466: Hafnium telluride</li> <li>39156-80-4 3260: Thulium acetate monohydrate</li> </ul>	39290-85-2	1068: Copper(II) borate
<ul> <li>37836-27-4 1507: Hydrazine mononitrate</li> <li>37913-38-5 2099: Mercury(II) tungstate</li> <li>37961-19-6 111: Americium oxychloride</li> <li>38245-34-0 1481: Holmium carbonate hydrate</li> <li>38245-35-1 1194: Dysprosium carbonate tetrahydrate</li> <li>38245-38-4 2157: Neodymium carbonate hydrate</li> <li>38455-77-5 3020: Stannic chromate</li> <li>38680-84-1 857: Chloryl trifluoride</li> <li>38705-19-0 2060: Mercury(I) tungstate</li> <li>39082-23-0 1466: Hafnium telluride</li> <li>39156-80-4 3260: Thulium acetate monohydrate</li> <li>39290-85-2 1068: Copper(II) borate</li> </ul>	39356-80-4	1616: Iron antimonide
37836-27-4       1507: Hydrazine mononitrate         37913-38-5       2099: Mercury(II) tungstate         37961-19-6       111: Americium oxychloride         38245-34-0       1481: Holmium carbonate         hydrate       1194: Dysprosium carbonate         s8245-35-1       1194: Dysprosium carbonate         tetrahydrate       38245-38-4         38245-38-4       2157: Neodymium carbonate         hydrate       3020: Stannic chromate         38680-84-1       857: Chloryl trifluoride         38705-19-0       2060: Mercury(I) tungstate         39082-23-0       1466: Hafnium telluride         39156-80-4       3260: Thulium acetate         monohydrate       39290-85-2         39356-80-4       1616: Iron antimonide	39361-25-6	949: Cobalt zirconate
37836-27-4       1507: Hydrazine mononitrate         37913-38-5       2099: Mercury(II) tungstate         37961-19-6       111: Americium oxychloride         38245-34-0       1481: Holmium carbonate         hydrate       1194: Dysprosium carbonate         s8245-35-1       1194: Dysprosium carbonate         hydrate       111: Americium oxychloride         38245-38-4       2157: Neodymium carbonate         hydrate       3020: Stannic chromate         38680-84-1       857: Chloryl trifluoride         38705-19-0       2060: Mercury(I) tungstate         39082-23-0       1466: Hafnium telluride         39156-80-4       3260: Thulium acetate         monohydrate       39290-85-2         39356-80-4       1616: Iron antimonide         39361-25-6       949: Cobalt zirconate	39368-69-9	2626: Rhenium(V) chloride
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<ul> <li>37836-27-4 1507: Hydrazine mononitrate</li> <li>37913-38-5 2099: Mercury(II) tungstate</li> <li>37961-19-6 111: Americium oxychloride</li> <li>38245-34-0 1481: Holmium carbonate hydrate</li> <li>38245-35-1 1194: Dysprosium carbonate tetrahydrate</li> <li>38245-38-4 2157: Neodymium carbonate hydrate</li> <li>38455-77-5 3020: Stannic chromate</li> <li>38680-84-1 857: Chloryl trifluoride</li> <li>38705-19-0 2060: Mercury(I) tungstate</li> <li>39082-23-0 1466: Hafnium telluride</li> <li>39156-80-4 3260: Thulium acetate monohydrate</li> <li>39290-85-2 1068: Copper(II) borate</li> <li>39356-80-4 1616: Iron antimonide</li> <li>39361-25-6 949: Cobalt zirconate</li> <li>39368-69-9 2626: Rhenium(V) chloride</li> <li>39409-82-0</li> </ul>	39409-82-0	pentahydrate 1889: Magnesium carbonate hydroxide tatrahydrate
<ul> <li>37836-27-4 1507: Hydrazine mononitrate</li> <li>37913-38-5 2099: Mercury(II) tungstate</li> <li>37961-19-6 111: Americium oxychloride</li> <li>38245-34-0 1481: Holmium carbonate hydrate</li> <li>38245-35-1 1194: Dysprosium carbonate tetrahydrate</li> <li>38245-38-4 2157: Neodymium carbonate hydrate</li> <li>38455-77-5 3020: Stannic chromate</li> <li>38680-84-1 857: Chloryl trifluoride</li> <li>38705-19-0 2060: Mercury(I) tungstate</li> <li>39082-23-0 1466: Hafnium telluride</li> <li>39156-80-4 3260: Thulium acetate monohydrate</li> <li>39290-85-2 1068: Copper(II) borate</li> <li>39356-80-4 1616: Iron antimonide</li> <li>39356-80-4 1616: Rhodium(V) chloride</li> <li>39373-27-8 2646: Rhodium(III) oxide pentahydrate</li> <li>39409-82-0 1889: Magnesium carbonate hydroxide tetrahydrate</li> <li>39416-30-3 427: Barium vanadate</li> </ul>	39409-82-0 39416-30-3	<ul> <li>2040: Knothin(11) oxide</li> <li>pentahydrate</li> <li>1889: Magnesium carbonate</li> <li>hydroxide tetrahydrate</li> <li>427: Barium vanadate</li> </ul>
<ul> <li>37836-27-4 1507: Hydrazine mononitrate</li> <li>37913-38-5 2099: Mercury(II) tungstate</li> <li>37961-19-6 111: Americium oxychloride</li> <li>38245-34-0 1481: Holmium carbonate hydrate</li> <li>38245-35-1 1194: Dysprosium carbonate tetrahydrate</li> <li>38245-38-4 2157: Neodymium carbonate hydrate</li> <li>38455-77-5 3020: Stannic chromate</li> <li>38680-84-1 857: Chloryl trifluoride</li> <li>38705-19-0 2060: Mercury(I) tungstate</li> <li>39082-23-0 1466: Hafnium telluride</li> <li>39156-80-4 3260: Thulium acetate monohydrate</li> <li>39290-85-2 1068: Copper(II) borate</li> <li>39368-69-9 2626: Rhenium(V) chloride</li> <li>39368-69-9 2646: Rhodium(III) oxide pentahydrate</li> <li>39409-82-0 1889: Magnesium carbonate hydroxide tetrahydrate</li> <li>39416-30-3 427: Barium vanadate</li> </ul>	39409-82-0 39416-30-3 39430-51-8	<ul> <li>2040: Knothum(III) oxide</li> <li>pentahydrate</li> <li>1889: Magnesium carbonate</li> <li>hydroxide tetrahydrate</li> <li>427: Barium vanadate</li> <li>886: Chromium(III) acetate</li> </ul>
<ul> <li>37836-27-4 1507: Hydrazine mononitrate</li> <li>37913-38-5 2099: Mercury(II) tungstate</li> <li>37961-19-6 111: Americium oxychloride</li> <li>38245-34-0 1481: Holmium carbonate hydrate</li> <li>38245-35-1 1194: Dysprosium carbonate tetrahydrate</li> <li>38245-38-4 2157: Neodymium carbonate hydrate</li> <li>38455-77-5 3020: Stannic chromate</li> <li>38680-84-1 857: Chloryl trifluoride</li> <li>38705-19-0 2060: Mercury(I) tungstate</li> <li>39082-23-0 1466: Hafnium telluride</li> <li>39156-80-4 3260: Thulium acetate monohydrate</li> <li>39290-85-2 1068: Copper(II) borate</li> <li>39368-69-9 2626: Rhenium(V) chloride</li> <li>39368-69-9 2626: Rhenium(V) chloride</li> <li>39373-27-8 2646: Rhodium(III) oxide pentahydrate</li> <li>39409-82-0 1889: Magnesium carbonate hydroxide tetrahydrate</li> <li>39416-30-3 427: Barium vanadate</li> <li>39430-51-8 886: Chromium(III) acetate hydroxide</li> </ul>	39409-82-0 39416-30-3 39430-51-8	<ul> <li>2040: Knothum(III) oxide</li> <li>pentahydrate</li> <li>1889: Magnesium carbonate</li> <li>hydroxide tetrahydrate</li> <li>427: Barium vanadate</li> <li>886: Chromium(III) acetate</li> <li>hydroxide</li> </ul>
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37836-27-4 $1507$ : Hydrazine mononitrate $37913-38-5$ $2099$ : Mercury(II) tungstate $37913-38-5$ $2099$ : Mercury(II) tungstate $37961-19-6$ $111$ : Americium oxychloride $38245-34-0$ $1481$ : Holmium carbonate $hydrate$ $38245-35-1$ $38245-35-1$ $1194$ : Dysprosium carbonate $hydrate$ $38245-38-4$ $38245-38-4$ $2157$ : Neodymium carbonate $hydrate$ $3020$ : Stannic chromate $38455-77-5$ $3020$ : Stannic chromate $38680-84-1$ $857$ : Chloryl trifluoride $39705-19-0$ $2060$ : Mercury(I) tungstate $39082-23-0$ $1466$ : Hafnium telluride $39156-80-4$ $3260$ : Thulium acetate monohydrate $39290-85-2$ $1068$ : Copper(II) borate $39368-69-9$ $2626$ : Rhenium(V) chloride $39373-27-8$ $2646$ : Rhodium(III) oxide pentahydrate $39409-82-0$ $1889$ : Magnesium carbonate hydroxide tetrahydrate $39416-30-3$ $427$ : Barium vanadate $39430-51-8$ $886$ : Chromium(III) acetate hydroxide $39433-74-4$ $477$ : Bismuth chloride monohydrate $39578-36-4$ $1645$ : Krypton fluoride	39409-82-0 39416-30-3 39430-51-8 39483-74-4 39578-36-4	<ul> <li>2040: Knothuln(III) oxide</li> <li>pentahydrate</li> <li>1889: Magnesium carbonate</li> <li>hydroxide tetrahydrate</li> <li>427: Barium vanadate</li> <li>886: Chromium(III) acetate</li> <li>hydroxide</li> <li>477: Bismuth chloride</li> <li>monohydrate</li> <li>1645: Krypton fluoride</li> </ul>
37836-27-41507: Hydrazine mononitrate $37913-38-5$ 2099: Mercury(II) tungstate $37961-19-6$ 111: Americium oxychloride $38245-34-0$ 1481: Holmium carbonate hydrate $38245-35-1$ 1194: Dysprosium carbonate tetrahydrate $38245-38-4$ 2157: Neodymium carbonate hydrate $38455-77-5$ 3020: Stannic chromate $38680-84-1$ 857: Chloryl trifluoride $38705-19-0$ 2060: Mercury(I) tungstate $39082-23-0$ 1466: Hafnium telluride $39156-80-4$ 3260: Thulium acetate monohydrate $39290-85-2$ 1068: Copper(II) borate $39368-69-9$ 2626: Rhenium(V) chloride $39368-69-9$ 2626: Rhenium(V) chloride $39409-82-0$ 1889: Magnesium carbonate hydroxide tetrahydrate $39440-30-3$ 427: Barium vanadate $39430-51-8$ 886: Chromium(III) acetate hydroxide $39433-74-4$ 477: Bismuth chloride monohydrate $39578-36-4$ 1645: Krypton fluoride monohydrate	39409-82-0 39416-30-3 39430-51-8 39483-74-4 39578-36-4	<ul> <li>2040: Knothin(III) oxide</li> <li>pentahydrate</li> <li>1889: Magnesium carbonate</li> <li>hydroxide tetrahydrate</li> <li>427: Barium vanadate</li> <li>886: Chromium(III) acetate</li> <li>hydroxide</li> <li>477: Bismuth chloride</li> <li>monohydrate</li> <li>1645: Krypton fluoride</li> <li>monodecafluoroantimonate</li> </ul>
37836-27-41507: Hydrazine mononitrate $37913-38-5$ 2099: Mercury(II) tungstate $37961-19-6$ 111: Americium oxychloride $38245-34-0$ 1481: Holmium carbonate hydrate $38245-35-1$ 1194: Dysprosium carbonate tetrahydrate $38245-38-4$ 2157: Neodymium carbonate hydrate $38455-77-5$ 3020: Stannic chromate $38680-84-1$ 857: Chloryl trifluoride $39082-23-0$ 1466: Hafnium telluride $39156-80-4$ 3260: Thulium acetate monohydrate $39290-85-2$ 1068: Copper(II) borate $39361-25-6$ 949: Cobalt zirconate $39363-69-9$ 2626: Rhenium(V) chloride $39373-27-8$ 2646: Rhodium(III) oxide pentahydrate $39416-30-3$ 427: Barium vanadate $39430-51-8$ 886: Chromium(III) acetate hydroxide $39433-51-8$ 886: Chromium(III) acetate hydroxide $39433-51-8$ 865: Chromium(III) acetate hydroxide $39433-51-8$ 886: Chromium(III) acetate hydroxide $39578-36-4$ 1645: Krypton fluoride monodecafluoroantimonate $39733-35-2$ 195: Ammonium magnesium chloride havabudrate	39409-82-0 39416-30-3 39430-51-8 39483-74-4 39578-36-4 39733-35-2	<ul> <li>2040: Knothin(III) oxide</li> <li>pentahydrate</li> <li>1889: Magnesium carbonate</li> <li>hydroxide tetrahydrate</li> <li>427: Barium vanadate</li> <li>886: Chromium(III) acetate</li> <li>hydroxide</li> <li>477: Bismuth chloride</li> <li>monohydrate</li> <li>1645: Krypton fluoride</li> <li>monodecafluoroantimonate</li> <li>195: Ammonium magnesium</li> <li>chloride heyabydrate</li> </ul>
<ul> <li>37836-27-4 1507: Hydrazine mononitrate</li> <li>37913-38-5 2099: Mercury(II) tungstate</li> <li>37961-19-6 111: Americium oxychloride</li> <li>38245-34-0 1481: Holmium carbonate hydrate</li> <li>38245-35-1 1194: Dysprosium carbonate tetrahydrate</li> <li>38245-38-4 2157: Neodymium carbonate hydrate</li> <li>38455-77-5 3020: Stannic chromate</li> <li>38680-84-1 857: Chloryl trifluoride</li> <li>39082-23-0 1466: Hafnium telluride</li> <li>39156-80-4 3260: Thulium acetate monohydrate</li> <li>39290-85-2 1068: Copper(II) borate</li> <li>39361-25-6 949: Cobalt zirconate</li> <li>39368-69-9 2626: Rhenium(V) chloride</li> <li>39368-69-9 2626: Rhenium(V) chloride</li> <li>39409-82-0 1889: Magnesium carbonate hydroxide tetrahydrate</li> <li>39409-82-0 1889: Magnesium carbonate hydroxide</li> <li>39430-51-8 886: Chromium(III) acetate hydroxide</li> <li>39483-74-4 477: Bismuth chloride monohydrate</li> <li>39578-36-4 1645: Krypton fluoride</li> <li>39733-35-2 195: Ammonium magnesium chloride hexahydrate</li> <li>39796-98-0 3462: Xenon pentafluoride</li> </ul>	39409-82-0 39416-30-3 39430-51-8 39483-74-4 39578-36-4 39733-35-2 39796-98-0	<ul> <li>2040. Knothin(III) oxide pentahydrate</li> <li>1889: Magnesium carbonate hydroxide tetrahydrate</li> <li>427: Barium vanadate</li> <li>886: Chromium(III) acetate hydroxide</li> <li>477: Bismuth chloride</li> <li>477: Bismuth chloride</li> <li>1645: Krypton fluoride</li> <li>monodecafluoroantimonate</li> <li>195: Ammonium magnesium chloride hexahydrate</li> <li>3462: Xenon pentafluoride</li> </ul>
37809-19-1 649: Calcium fluorophosphate dihydrate	37809-19-1 37836-27-4 37913-38-5 37961-19-6 38245-34-0 38245-35-1 38245-38-4 38455-77-5 38680-84-1 38705-19-0	<ul> <li>649: Calcium fluorophosphate dihydrate</li> <li>1507: Hydrazine mononitrate</li> <li>2099: Mercury(II) tungstate</li> <li>111: Americium oxychloride</li> <li>1481: Holmium carbonate hydrate</li> <li>1194: Dysprosium carbonate tetrahydrate</li> <li>2157: Neodymium carbonate hydrate</li> <li>3020: Stannic chromate</li> <li>857: Chloryl trifluoride</li> <li>2060: Mercury(I) tungstate</li> </ul>
37473-67-9 2179: Neodymium	37473-67-9	2179: Neodymium
37473-67-9 2179 <sup>.</sup> Neodymium	37473-67-9	2179: Neodymium
37473-67-9 2179 <sup>.</sup> Neodymium	37473-67-9	2179: Neodymium
27472 (7.0 0170 N 1 '	3/306-42-6	517: Bismuth zirconate
	37306-42-6	517: Bismuth zirconate
37306-42-6 517: Bismuth zirconate	3/265-91-1	2337: Perbromyl fluoride
37306-42-6 517: Bismuth zirconate	37265-91-1	2337: Perbromyl fluoride
37265-91-12337: Perbromyl fluoride37306-42-6517: Bismuth zirconate	27265 01 1	oxide
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37265-91-1         2337: Perbromyl fluoride           37306-42-6         517: Bismuth zirconate	57205-80-4	ovide
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37265-86-4428: Barium yttrium tungsten oxide37265-91-12337: Perbromyl fluoride37306-42-6517: Bismuth zirconate	37248-04-7	1462: Hafnium silicate
<ul> <li>37265-86-4</li> <li>37265-91-1</li> <li>2337: Perbromyl fluoride</li> <li>37306-42-6</li> <li>517: Bismuth zirconate</li> </ul>	37248-04-7	1462: Hafnium silicate
37248-04-7       1462: Hafnium silicate         37265-86-4       428: Barium yttrium tungsten oxide         37265-91-1       2337: Perbromyl fluoride         37306-42-6       517: Bismuth zirconate		oxide
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<ul> <li>36969-05-8 922: Chromium(V1) morpholine</li> <li>37185-09-4 406: Barium strontium niobium oxide</li> <li>37248-04-7 1462: Hafnium silicate</li> <li>37265-86-4 428: Barium yttrium tungsten oxide</li> <li>37265-91-1 2337: Perbromyl fluoride</li> <li>37306-42-6 517: Bismuth zirconate</li> </ul>		neptanydrate
<ul> <li>36969-05-8 922: Chromium(VI) morpholine</li> <li>37185-09-4 406: Barium strontium niobium oxide</li> <li>37248-04-7 1462: Hafnium silicate</li> <li>37265-86-4 428: Barium yttrium tungsten oxide</li> <li>37265-91-1 2337: Perbromyl fluoride</li> <li>37306-42-6 517: Bismuth zirconate</li> </ul>	36907-42-3	5457: Vanadium(11) suitate
<ul> <li>heptahydrate</li> <li>heptahydrate</li> <li>heptahydrate</li> <li>36969-05-8</li> <li>922: Chromium(VI) morpholing</li> <li>37185-09-4</li> <li>406: Barium strontium niobium oxide</li> <li>37248-04-7</li> <li>1462: Hafnium silicate</li> <li>37265-86-4</li> <li>428: Barium yttrium tungsten oxide</li> <li>37265-91-1</li> <li>2337: Perbromyl fluoride</li> <li>37306-42-6</li> <li>517: Bismuth zirconate</li> </ul>	36007 12 3	hexahydrate
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<ul> <li>36907-40-1 1260: Europium(III) perchlorate hexahydrate</li> <li>36907-42-3 3437: Vanadium(II) sulfate heptahydrate</li> <li>36969-05-8 922: Chromium(VI) morpholine 37185-09-4 406: Barium strontium niobium oxide</li> <li>37248-04-7 1462: Hafnium silicate</li> <li>37265-86-4 428: Barium yttrium tungsten oxide</li> <li>37265-91-1 2337: Perbromyl fluoride</li> <li>37306-42-6 517: Bismuth zirconate</li> </ul>		hexahydrate
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<ul> <li>36907-37-6 1075: Lamanum perchlorate hexahydrate</li> <li>36907-40-1 1260: Europium(III) perchlorate hexahydrate</li> <li>36907-42-3 3437: Vanadium(II) sulfate heptahydrate</li> <li>36969-05-8 922: Chromium(VI) morpholine</li> <li>37185-09-4 406: Barium strontium niobium oxide</li> <li>37248-04-7 1462: Hafnium silicate</li> <li>37265-86-4 428: Barium yttrium tungsten oxide</li> <li>37265-91-1 2337: Perbromyl fluoride</li> <li>37306-42-6 517: Bismuth zirconate</li> </ul>	26007 27 6	1672: Lonthonym norohloroto
<ul> <li>36907-37-6 1673: Lanthanum perchlorate hexahydrate</li> <li>36907-40-1 1260: Europium(III) perchlorate hexahydrate</li> <li>36907-42-3 3437: Vanadium(II) sulfate heptahydrate</li> <li>36969-05-8 922: Chromium(VI) morpholine</li> <li>37185-09-4 406: Barium strontium niobium oxide</li> <li>37248-04-7 1462: Hafnium silicate</li> <li>37265-86-4 428: Barium yttrium tungsten oxide</li> <li>37265-91-1 2337: Perbromyl fluoride</li> <li>37306-42-6 517: Bismuth zirconate</li> </ul>	36678-21-4	1982: Manganese nitride
<ul> <li>36678-21-4 1982: Manganese nitride</li> <li>36907-37-6 1673: Lanthanum perchlorate hexahydrate</li> <li>36907-40-1 1260: Europium(III) perchlorate hexahydrate</li> <li>36907-42-3 3437: Vanadium(II) sulfate heptahydrate</li> <li>36969-05-8 922: Chromium(VI) morpholine</li> <li>37185-09-4 406: Barium strontium niobium oxide</li> <li>37248-04-7 1462: Hafnium silicate</li> <li>37265-86-4 428: Barium yttrium tungsten oxide</li> <li>37265-91-1 2337: Perbromyl fluoride</li> <li>37306-42-6 517: Bismuth zirconate</li> </ul>		hexahydrate
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<ul> <li>3268: Influtum intrate hexahydrate</li> <li>36678-21-4</li> <li>1982: Manganese nitride</li> <li>36907-37-6</li> <li>1673: Lanthanum perchlorate hexahydrate</li> <li>36907-40-1</li> <li>1260: Europium(III) perchlorate hexahydrate</li> <li>36907-42-3</li> <li>3437: Vanadium(II) sulfate heptahydrate</li> <li>36969-05-8</li> <li>922: Chromium(VI) morpholine</li> <li>37185-09-4</li> <li>406: Barium strontium niobium oxide</li> <li>37248-04-7</li> <li>1462: Hafnium silicate</li> <li>37265-86-4</li> <li>428: Barium yttrium tungsten oxide</li> <li>37265-91-1</li> <li>2337: Perbromyl fluoride</li> <li>37306-42-6</li> <li>517: Bismuth zirconate</li> </ul>	26540 07 5	hexafluorogermanate
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<ul> <li>36470-39-0 2893: Sodium hexafluorogermanate</li> <li>36548-87-5 3268: Thulium nitrate hexahydrate</li> <li>36678-21-4 1982: Manganese nitride</li> <li>36607-37-6 1673: Lanthanum perchlorate hexahydrate</li> <li>36907-40-1 1260: Europium(III) perchlorate hexahydrate</li> <li>36907-40-1 1260: Europium(III) perchlorate hexahydrate</li> <li>36907-42-3 3437: Vanadium(II) sulfate heptahydrate</li> <li>36969-05-8 922: Chromium(VI) morpholine oxide</li> <li>37185-09-4 406: Barium strontium niobium oxide</li> <li>37248-04-7 1462: Hafnium silicate</li> <li>37265-86-4 428: Barium yttrium tungsten oxide</li> <li>37265-91-1 2337: Perbromyl fluoride</li> <li>37306-42-6 517: Bismuth zirconate</li> </ul>		pentahydrate
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<ul> <li>3476: Ytterbium nitrate pentahydrate</li> <li>36470-39-0</li> <li>2893: Sodium hexafluorogermanate</li> <li>36548-87-5</li> <li>3268: Thulium nitrate hexahydrate</li> <li>36678-21-4</li> <li>1982: Manganese nitride</li> <li>36907-37-6</li> <li>1673: Lanthanum perchlorate hexahydrate</li> <li>36907-40-1</li> <li>1260: Europium(III) perchlorate hexahydrate</li> <li>36907-42-3</li> <li>3437: Vanadium(II) sulfate heptahydrate</li> <li>36969-05-8</li> <li>922: Chromium(VI) morpholine oxide</li> <li>37248-04-7</li> <li>1462: Hafnium silicate</li> <li>37265-86-4</li> <li>428: Barium yttrium tungsten oxide</li> <li>37265-91-1</li> <li>2337: Perbromyl fluoride</li> <li>37306-42-6</li> <li>517: Bismuth zirconate</li> </ul>		monodecafluoroantimonate
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<ul> <li>3465: Xenon (Thiloride monodecafluoroantimonate monodecafluoroantimonate 35725-34-9</li> <li>3476: Ytterbium nitrate pentahydrate 36470-39-0</li> <li>2893: Sodium hexafluorogermanate 36548-87-5</li> <li>3268: Thulium nitrate hexahydrate 36678-21-4</li> <li>1982: Manganese nitride 36907-37-6</li> <li>1673: Lanthanum perchlorate hexahydrate 36907-40-1</li> <li>1260: Europium(III) perchlorate hexahydrate 36907-42-3</li> <li>3437: Vanadium(II) sulfate heptahydrate 36969-05-8</li> <li>922: Chromium(VI) morpholinu oxide 37248-04-7</li> <li>1462: Hafnium silicate 37265-86-4</li> <li>428: Barium yttrium tungsten oxide 37265-91-1</li> <li>2337: Perbromyl fluoride 37306-42-6</li> </ul>	25710 277	ainyarate
<ul> <li>3465: Xenon trifluoride monodecafluoroantimonate</li> <li>3476: Ytterbium nitrate pentahydrate</li> <li>3476: Ytterbium nitrate</li> <li>36470-39-0</li> <li>2893: Sodium</li> <li>hexafluorogermanate</li> <li>36548-87-5</li> <li>3268: Thulium nitrate</li> <li>hexahydrate</li> <li>36678-21-4</li> <li>3268: Thulium nitrate</li> <li>1982: Manganese nitride</li> <li>36907-37-6</li> <li>1673: Lanthanum perchlorate</li> <li>hexahydrate</li> <li>36907-40-1</li> <li>1260: Europium(III) perchlorate</li> <li>hexahydrate</li> <li>36907-42-3</li> <li>3437: Vanadium(II) sulfate</li> <li>heptahydrate</li> <li>36969-05-8</li> <li>922: Chromium(VI) morpholing</li> <li>37185-09-4</li> <li>406: Barium strontium niobium</li> <li>oxide</li> <li>37248-04-7</li> <li>1462: Hafnium silicate</li> <li>37265-86-4</li> <li>2337: Perbromyl fluoride</li> <li>37306-42-6</li> <li>517: Bismuth zirconate</li> </ul>		dihydrate
<ul> <li>dihydrate</li> <li>35718-37-7</li> <li>3465: Xenon trifluoride monodecafluoroantimonate</li> <li>35725-34-9</li> <li>3476: Ytterbium nitrate pentahydrate</li> <li>36470-39-0</li> <li>2893: Sodium hexafluorogermanate</li> <li>36548-87-5</li> <li>3268: Thulium nitrate hexahydrate</li> <li>36678-21-4</li> <li>1982: Manganese nitride</li> <li>36907-37-6</li> <li>1673: Lanthanum perchlorate hexahydrate</li> <li>36907-40-1</li> <li>1260: Europium(III) perchlorate hexahydrate</li> <li>36907-42-3</li> <li>3437: Vanadium(II) sulfate heptahydrate</li> <li>36969-05-8</li> <li>922: Chromium(VI) morpholinu oxide</li> <li>37248-04-7</li> <li>1462: Hafnium silicate</li> <li>37265-86-4</li> <li>428: Barium yttrium tungsten oxide</li> <li>37265-91-1</li> <li>2337: Perbromyl fluoride</li> <li>37306-42-6</li> <li>517: Bismuth zirconate</li> </ul>		2931: Sodium metaborate
<ul> <li>35353-367</li> <li>36353-367</li> <li>3465: Xenon trifluoride monodecafluoroantimonate</li> <li>35725-34-9</li> <li>3476: Ytterbium nitrate pentahydrate</li> <li>36470-39-0</li> <li>2893: Sodium hexafluorogermanate</li> <li>36548-87-5</li> <li>3268: Thulium nitrate hexahydrate</li> <li>36678-21-4</li> <li>1982: Manganese nitride</li> <li>36907-37-6</li> <li>1673: Lanthanum perchlorate hexahydrate</li> <li>36907-40-1</li> <li>1260: Europium(III) perchlorate hexahydrate</li> <li>36907-42-3</li> <li>3437: Vanadium(II) sulfate heptahydrate</li> <li>36969-05-8</li> <li>922: Chromium(VI) morpholing</li> <li>37185-09-4</li> <li>406: Barium strontium niobium oxide</li> <li>37248-04-7</li> <li>1462: Hafnium silicate</li> <li>37265-86-4</li> <li>2337: Perbromyl fluoride</li> <li>37306-42-6</li> <li>517: Bismuth zirconate</li> </ul>	55565-56-1	AUXIE Sodium materiorata

39797-63-2	3454: Xenon fluoride
	hexafluoroantimonate
41591-55-3	1543: Hydroxylamine hydrobromide
41944-01-8	500: Bismuth potassium iodide
41044 01 8	2446: Potossium
41944-01-0	heptaiodobismuthate
42739-38-8	255: Ammonium valerate
43093-20-5	3319: Tridecaborane(19)
1/158/1-78-3	407: Bismuth oxynerchlorate
++50+ 70 5	monohydrate
47814-18-6	2163: Neodymium
47014-10-0	bayafluoroaaatulaaatonata
	dibudroto
47914 20 0	
4/814-20-0	2582: Praseodymium
10010 01 0	nexanuoroacetylacetonate
49848-24-0	13: Actinium oxyfluoride
49848-29-5	12: Actinium oxychloride
49848-33-1	11: Actinium oxybromide
50432-32-1	3455: Xenon fluoride
	hexafluoroarsenate
50647-18-2	15: Actinium sulfide
50813-16-6	2969: Sodium polyphosphate
50813-65-5	336: Barium carbide
50927-81-6	2768: Silicon monosulfide
50960-82-2	1430: Gold(I) carbonyl chloride
50968-00-8	2044: Mercury(I) carbonate
51184-23-7	3247: Thorium orthosilicate
51222 65 2	836: Casium titanata
51222-05-2	840: Cosium ziroonata
51222-00-3	1287. Espiris series menushadante
51274-00-1	1287: Ferric oxide mononydrate
51312-42-6	2968: Sodium phosphotungstate
513/3-68-3	3/1 / /· Ytterhium ovalate
51575 00 5	
51575 00 5	decahydrate
51429-74-4	decahydrate 2148: Molybdophosphoric acid
51429-74-4 51503-61-8	decahydrate 2148: Molybdophosphoric acid 185: Ammonium hydrogen
51429-74-4 51503-61-8	decahydrate 2148: Molybdophosphoric acid 185: Ammonium hydrogen phosphite monohydrate
51429-74-4 51503-61-8 51595-71-2	decahydrate 2148: Molybdophosphoric acid 185: Ammonium hydrogen phosphite monohydrate 2058: Mercury(I) sulfide
51429-74-4 51503-61-8 51595-71-2 51674-17-0	decahydrate 2148: Molybdophosphoric acid 185: Ammonium hydrogen phosphite monohydrate 2058: Mercury(I) sulfide 3006: Sodium thiophosphate
51429-74-4 51503-61-8 51595-71-2 51674-17-0	<ul> <li>decahydrate</li> <li>2148: Molybdophosphoric acid</li> <li>185: Ammonium hydrogen phosphite monohydrate</li> <li>2058: Mercury(I) sulfide</li> <li>3006: Sodium thiophosphate dodecahydrate</li> </ul>
51429-74-4 51503-61-8 51595-71-2 51674-17-0 51750-73-3	<ul> <li>decahydrate</li> <li>2148: Molybdophosphoric acid</li> <li>185: Ammonium hydrogen phosphite monohydrate</li> <li>2058: Mercury(I) sulfide</li> <li>3006: Sodium thiophosphate dodecahydrate</li> <li>2835: Sodium ammonium</li> </ul>
51429-74-4 51503-61-8 51595-71-2 51674-17-0 51750-73-3	<ul> <li>decahydrate</li> <li>2148: Molybdophosphoric acid</li> <li>185: Ammonium hydrogen phosphite monohydrate</li> <li>2058: Mercury(I) sulfide</li> <li>3006: Sodium thiophosphate dodecahydrate</li> <li>2835: Sodium ammonium hydrogen phosphate</li> </ul>
51429-74-4 51503-61-8 51595-71-2 51674-17-0 51750-73-3	decahydrate 2148: Molybdophosphoric acid 185: Ammonium hydrogen phosphite monohydrate 2058: Mercury(I) sulfide 3006: Sodium thiophosphate dodecahydrate 2835: Sodium ammonium hydrogen phosphate tetrahydrate
51429-74-4 51503-61-8 51595-71-2 51674-17-0 51750-73-3 51850-20-5	decahydrate 2148: Molybdophosphoric acid 185: Ammonium hydrogen phosphite monohydrate 2058: Mercury(I) sulfide 3006: Sodium thiophosphate dodecahydrate 2835: Sodium ammonium hydrogen phosphate tetrahydrate 1531: Hydrogen
51429-74-4 51503-61-8 51595-71-2 51674-17-0 51750-73-3 51850-20-5	decahydrate 2148: Molybdophosphoric acid 185: Ammonium hydrogen phosphite monohydrate 2058: Mercury(I) sulfide 3006: Sodium thiophosphate dodecahydrate 2835: Sodium ammonium hydrogen phosphate tetrahydrate 1531: Hydrogen hexahydroxyplatinate(IV)
51429-74-4 51503-61-8 51595-71-2 51674-17-0 51750-73-3 51850-20-5 51898-99-8	decahydrate 2148: Molybdophosphoric acid 185: Ammonium hydrogen phosphite monohydrate 2058: Mercury(I) sulfide 3006: Sodium thiophosphate dodecahydrate 2835: Sodium ammonium hydrogen phosphate tetrahydrate 1531: Hydrogen hexahydroxyplatinate(IV) 487: Bismuth molybdate
51429-74-4 51503-61-8 51595-71-2 51674-17-0 51750-73-3 51850-20-5 51898-99-8 52014-82-1	decahydrate 2148: Molybdophosphoric acid 185: Ammonium hydrogen phosphite monohydrate 2058: Mercury(I) sulfide 3006: Sodium thiophosphate dodecahydrate 2835: Sodium ammonium hydrogen phosphate tetrahydrate 1531: Hydrogen hexahydroxyplatinate(IV) 487: Bismuth molybdate 753: Ceric titanate
51429-74-4 51503-61-8 51595-71-2 51674-17-0 51750-73-3 51850-20-5 51898-99-8 52014-82-1 52110-05-1	decahydrate 2148: Molybdophosphoric acid 185: Ammonium hydrogen phosphite monohydrate 2058: Mercury(I) sulfide 3006: Sodium thiophosphate dodecahydrate 2835: Sodium ammonium hydrogen phosphate tetrahydrate 1531: Hydrogen hexahydroxyplatinate(IV) 487: Bismuth molybdate 753: Ceric titanate 1969: Magnesium zirconium
51429-74-4 51503-61-8 51595-71-2 51674-17-0 51750-73-3 51850-20-5 51898-99-8 52014-82-1 52110-05-1	decahydrate 2148: Molybdophosphoric acid 185: Ammonium hydrogen phosphite monohydrate 2058: Mercury(I) sulfide 3006: Sodium thiophosphate dodecahydrate 2835: Sodium ammonium hydrogen phosphate tetrahydrate 1531: Hydrogen hexahydroxyplatinate(IV) 487: Bismuth molybdate 753: Ceric titanate 1969: Magnesium zirconium silicate
51429-74-4 51503-61-8 51595-71-2 51674-17-0 51750-73-3 51850-20-5 51898-99-8 52014-82-1 52110-05-1 52262-58-5	<ul> <li>decahydrate</li> <li>2148: Molybdophosphoric acid</li> <li>185: Ammonium hydrogen</li> <li>phosphite monohydrate</li> <li>2058: Mercury(I) sulfide</li> <li>3006: Sodium thiophosphate</li> <li>dodecahydrate</li> <li>2835: Sodium ammonium</li> <li>hydrogen phosphate</li> <li>tetrahydrate</li> <li>1531: Hydrogen</li> <li>hexahydroxyplatinate(IV)</li> <li>487: Bismuth molybdate</li> <li>753: Ceric titanate</li> <li>1969: Magnesium zirconium</li> <li>silicate</li> <li>3033: Stannous fluorophosphate</li> </ul>
51429-74-4 51503-61-8 51595-71-2 51674-17-0 51750-73-3 51850-20-5 51898-99-8 52014-82-1 52110-05-1 52262-58-5 52350-17-1	<ul> <li>decahydrate</li> <li>2148: Molybdophosphoric acid</li> <li>185: Ammonium hydrogen</li> <li>phosphite monohydrate</li> <li>2058: Mercury(I) sulfide</li> <li>3006: Sodium thiophosphate</li> <li>dodecahydrate</li> <li>2835: Sodium ammonium</li> <li>hydrogen phosphate</li> <li>tetrahydrate</li> <li>1531: Hydrogen</li> <li>hexahydroxyplatinate(IV)</li> <li>487: Bismuth molybdate</li> <li>753: Ceric titanate</li> <li>1969: Magnesium zirconium</li> <li>silicate</li> <li>3033: Stannous fluorophosphate</li> </ul>
51429-74-4 51503-61-8 51595-71-2 51674-17-0 51750-73-3 51850-20-5 51898-99-8 52014-82-1 52110-05-1 52262-58-5 52350-17-1 52495-41-7	<ul> <li>decahydrate</li> <li>2148: Molybdophosphoric acid</li> <li>185: Ammonium hydrogen</li> <li>phosphite monohydrate</li> <li>2058: Mercury(I) sulfide</li> <li>3006: Sodium thiophosphate</li> <li>dodecahydrate</li> <li>2835: Sodium ammonium</li> <li>hydrogen phosphate</li> <li>tetrahydrate</li> <li>1531: Hydrogen</li> <li>hexahydroxyplatinate(IV)</li> <li>487: Bismuth molybdate</li> <li>753: Ceric titanate</li> <li>1969: Magnesium zirconium</li> <li>silicate</li> <li>3033: Stannous fluorophosphate</li> <li>839: Cesium tungstate</li> <li>2998: Sodium</li> </ul>
51429-74-4 51503-61-8 51595-71-2 51674-17-0 51750-73-3 51850-20-5 51898-99-8 52014-82-1 52110-05-1 52262-58-5 52350-17-1 52495-41-7	<ul> <li>decahydrate</li> <li>2148: Molybdophosphoric acid</li> <li>185: Ammonium hydrogen</li> <li>phosphite monohydrate</li> <li>2058: Mercury(I) sulfide</li> <li>3006: Sodium thiophosphate</li> <li>dodecahydrate</li> <li>2835: Sodium ammonium</li> <li>hydrogen phosphate</li> <li>tetrahydrate</li> <li>1531: Hydrogen</li> <li>hexahydroxyplatinate(IV)</li> <li>487: Bismuth molybdate</li> <li>753: Ceric titanate</li> <li>1969: Magnesium zirconium</li> <li>silicate</li> <li>3033: Stannous fluorophosphate</li> <li>839: Cesium tungstate</li> <li>2998: Sodium</li> <li>tetrahycomoaurate(III)</li> </ul>
51429-74-4 51503-61-8 51595-71-2 51674-17-0 51750-73-3 51850-20-5 51898-99-8 52014-82-1 52110-05-1 52262-58-5 52350-17-1 52495-41-7 52502 12 2	<ul> <li>3477. Heroinn oxaate</li> <li>decahydrate</li> <li>2148: Molybdophosphoric acid</li> <li>185: Ammonium hydrogen phosphite monohydrate</li> <li>2058: Mercury(I) sulfide</li> <li>3006: Sodium thiophosphate dodecahydrate</li> <li>2835: Sodium ammonium hydrogen phosphate tetrahydrate</li> <li>1531: Hydrogen hexahydroxyplatinate(IV)</li> <li>487: Bismuth molybdate</li> <li>753: Ceric titanate</li> <li>1969: Magnesium zirconium silicate</li> <li>3033: Stannous fluorophosphate</li> <li>839: Cesium tungstate</li> <li>2998: Sodium</li> <li>tetrabromoaurate(III)</li> <li>2244: Nickel vanodata</li> </ul>
51429-74-4 51503-61-8 51595-71-2 51674-17-0 51750-73-3 51850-20-5 51898-99-8 52014-82-1 52110-05-1 52262-58-5 52350-17-1 52495-41-7 52502-12-2	<ul> <li>3477. Itterformit oxatate decahydrate</li> <li>2148: Molybdophosphoric acid</li> <li>185: Ammonium hydrogen phosphite monohydrate</li> <li>2058: Mercury(I) sulfide</li> <li>3006: Sodium thiophosphate dodecahydrate</li> <li>2835: Sodium ammonium hydrogen phosphate tetrahydrate</li> <li>1531: Hydrogen hexahydroxyplatinate(IV)</li> <li>487: Bismuth molybdate</li> <li>753: Ceric titanate</li> <li>1969: Magnesium zirconium silicate</li> <li>3033: Stannous fluorophosphate</li> <li>839: Cesium tungstate</li> <li>2998: Sodium tetrabromoaurate(III)</li> <li>2244: Nickel vanadate</li> <li>1064: Conpor(II) basia societa.</li> </ul>
51429-74-4 51503-61-8 51595-71-2 51674-17-0 51750-73-3 51850-20-5 51898-99-8 52014-82-1 52110-05-1 52262-58-5 52350-17-1 52495-41-7 52502-12-2 52503-64-7 52628-25 %	<ul> <li>3477. Itterformit oxtate decahydrate</li> <li>2148: Molybdophosphoric acid</li> <li>185: Ammonium hydrogen phosphite monohydrate</li> <li>2058: Mercury(I) sulfide</li> <li>3006: Sodium thiophosphate dodecahydrate</li> <li>2835: Sodium ammonium hydrogen phosphate tetrahydrate</li> <li>1531: Hydrogen hexahydroxyplatinate(IV)</li> <li>487: Bismuth molybdate</li> <li>753: Ceric titanate</li> <li>1969: Magnesium zirconium silicate</li> <li>3033: Stannous fluorophosphate</li> <li>839: Cesium tungstate</li> <li>2998: Sodium tetrabromoaurate(III)</li> <li>2244: Nickel vanadate</li> <li>1064: Copper(II) basic acetate</li> <li>2517: Zina ammonium ablanida</li> </ul>
51429-74-4 51503-61-8 51595-71-2 51674-17-0 51750-73-3 51850-20-5 51898-99-8 52014-82-1 52110-05-1 52262-58-5 52350-17-1 52495-41-7 52502-12-2 52503-64-7 52628-25-8	<ul> <li>3477. Itterformit oxtatte decahydrate</li> <li>2148: Molybdophosphoric acid</li> <li>185: Ammonium hydrogen phosphite monohydrate</li> <li>2058: Mercury(I) sulfide</li> <li>3006: Sodium thiophosphate dodecahydrate</li> <li>2835: Sodium ammonium hydrogen phosphate tetrahydrate</li> <li>1531: Hydrogen hexahydroxyplatinate(IV)</li> <li>487: Bismuth molybdate</li> <li>753: Ceric titanate</li> <li>1969: Magnesium zirconium silicate</li> <li>3033: Stannous fluorophosphate</li> <li>839: Cesium tungstate</li> <li>2998: Sodium tetrabromoaurate(III)</li> <li>2244: Nickel vanadate</li> <li>1064: Copper(II) basic acetate</li> <li>3517: Zinc ammonium chloride</li> </ul>
51429-74-4 51503-61-8 51595-71-2 51674-17-0 51750-73-3 51850-20-5 51898-99-8 52014-82-1 5210-05-1 52262-58-5 52350-17-1 52495-41-7 52502-12-2 52503-64-7 52628-25-8 52708-44-8	<ul> <li>3477. Itterformit oxtatte decahydrate</li> <li>2148: Molybdophosphoric acid</li> <li>185: Ammonium hydrogen phosphite monohydrate</li> <li>2058: Mercury(I) sulfide</li> <li>3006: Sodium thiophosphate dodecahydrate</li> <li>2835: Sodium ammonium hydrogen phosphate tetrahydrate</li> <li>1531: Hydrogen hexahydroxyplatinate(IV)</li> <li>487: Bismuth molybdate</li> <li>753: Ceric titanate</li> <li>1969: Magnesium zirconium silicate</li> <li>3033: Stannous fluorophosphate</li> <li>839: Cesium tungstate</li> <li>2998: Sodium tetrabromoaurate(III)</li> <li>2244: Nickel vanadate</li> <li>1064: Copper(II) basic acetate</li> <li>3517: Zinc ammonium chloride</li> <li>1644: Krypton fluoride</li> </ul>
51429-74-4 51503-61-8 51595-71-2 51674-17-0 51750-73-3 51850-20-5 51898-99-8 52014-82-1 5210-05-1 52262-58-5 52350-17-1 52495-41-7 52502-12-2 52503-64-7 52628-25-8 52708-44-8	<ul> <li>decahydrate</li> <li>2148: Molybdophosphoric acid</li> <li>185: Ammonium hydrogen phosphite monohydrate</li> <li>2058: Mercury(I) sulfide</li> <li>3006: Sodium thiophosphate dodecahydrate</li> <li>2835: Sodium ammonium hydrogen phosphate tetrahydrate</li> <li>1531: Hydrogen hexahydroxyplatinate(IV)</li> <li>487: Bismuth molybdate</li> <li>753: Ceric titanate</li> <li>1969: Magnesium zirconium silicate</li> <li>3033: Stannous fluorophosphate</li> <li>839: Cesium tungstate</li> <li>2998: Sodium tetrabromoaurate(III)</li> <li>2244: Nickel vanadate</li> <li>1064: Copper(II) basic acetate</li> <li>3517: Zinc ammonium chloride</li> <li>1644: Krypton fluoride hexafluoroantimonate</li> </ul>
51429-74-4 51503-61-8 51595-71-2 51674-17-0 51750-73-3 51850-20-5 51898-99-8 52014-82-1 52110-05-1 52262-58-5 52350-17-1 52495-41-7 52502-12-2 52503-64-7 52628-25-8 52708-44-8 52721-22-9	<ul> <li>decahydrate</li> <li>2148: Molybdophosphoric acid</li> <li>185: Ammonium hydrogen phosphite monohydrate</li> <li>2058: Mercury(I) sulfide</li> <li>3006: Sodium thiophosphate dodecahydrate</li> <li>2835: Sodium ammonium hydrogen phosphate tetrahydrate</li> <li>1531: Hydrogen hexahydroxyplatinate(IV)</li> <li>487: Bismuth molybdate</li> <li>753: Ceric titanate</li> <li>1969: Magnesium zirconium silicate</li> <li>3033: Stannous fluorophosphate</li> <li>839: Cesium tungstate</li> <li>2998: Sodium tetrabromoaurate(III)</li> <li>2244: Nickel vanadate</li> <li>1064: Copper(II) basic acetate</li> <li>3517: Zinc ammonium chloride</li> <li>1644: Krypton fluoride hexafluoroantimonate</li> <li>1647: Krypton trifluoride</li> </ul>
51429-74-4 51503-61-8 51595-71-2 51674-17-0 51750-73-3 51850-20-5 51898-99-8 52014-82-1 52110-05-1 52262-58-5 52350-17-1 52495-41-7 52502-12-2 52503-64-7 52628-25-8 52708-44-8 52721-22-9	<ul> <li>decahydrate</li> <li>2148: Molybdophosphoric acid</li> <li>185: Ammonium hydrogen phosphite monohydrate</li> <li>2058: Mercury(I) sulfide</li> <li>3006: Sodium thiophosphate dodecahydrate</li> <li>2835: Sodium ammonium hydrogen phosphate tetrahydrate</li> <li>1531: Hydrogen hexahydroxyplatinate(IV)</li> <li>487: Bismuth molybdate</li> <li>753: Ceric titanate</li> <li>1969: Magnesium zirconium silicate</li> <li>3033: Stannous fluorophosphate</li> <li>839: Cesium tungstate</li> <li>2998: Sodium tetrabromoaurate(III)</li> <li>2244: Nickel vanadate</li> <li>1064: Copper(II) basic acetate</li> <li>3517: Zinc ammonium chloride</li> <li>1644: Krypton fluoride hexafluoroantimonate</li> <li>1647: Krypton trifluoride hexafluoroantimonate</li> </ul>
51429-74-4 51503-61-8 51595-71-2 51674-17-0 51750-73-3 51850-20-5 51898-99-8 52014-82-1 52110-05-1 52262-58-5 52350-17-1 52495-41-7 52502-12-2 52503-64-7 52628-25-8 52708-44-8 52721-22-9 52740-16-6	<ul> <li>decahydrate</li> <li>decahydrate</li> <li>2148: Molybdophosphoric acid</li> <li>185: Ammonium hydrogen phosphite monohydrate</li> <li>2058: Mercury(I) sulfide</li> <li>3006: Sodium thiophosphate dodecahydrate</li> <li>2835: Sodium ammonium hydrogen phosphate tetrahydrate</li> <li>1531: Hydrogen hexahydroxyplatinate(IV)</li> <li>487: Bismuth molybdate</li> <li>753: Ceric titanate</li> <li>1969: Magnesium zirconium silicate</li> <li>3033: Stannous fluorophosphate</li> <li>839: Cesium tungstate</li> <li>2998: Sodium tetrabromoaurate(III)</li> <li>2244: Nickel vanadate</li> <li>1064: Copper(II) basic acetate</li> <li>3517: Zinc ammonium chloride</li> <li>1644: Krypton fluoride hexafluoroantimonate</li> <li>1647: Krypton trifluoride hexafluoroantimonate</li> <li>618: Calcium arsenite</li> </ul>
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51429-74-4 51503-61-8 51595-71-2 51674-17-0 51750-73-3 51850-20-5 51898-99-8 52014-82-1 52110-05-1 52262-58-5 52350-17-1 52495-41-7 52628-25-8 52708-44-8 52721-22-9 52740-16-6 52788-54-2	<ul> <li>3.47). Itterformit oxatate decahydrate</li> <li>2148: Molybdophosphoric acid</li> <li>185: Ammonium hydrogen phosphite monohydrate</li> <li>2058: Mercury(I) sulfide</li> <li>3006: Sodium thiophosphate dodecahydrate</li> <li>2835: Sodium ammonium hydrogen phosphate tetrahydrate</li> <li>1531: Hydrogen hexahydroxyplatinate(IV)</li> <li>487: Bismuth molybdate</li> <li>753: Ceric titanate</li> <li>1969: Magnesium zirconium silicate</li> <li>3033: Stannous fluorophosphate</li> <li>839: Cesium tungstate</li> <li>2998: Sodium tetrabromoaurate(III)</li> <li>2244: Nickel vanadate</li> <li>1064: Copper(II) basic acetate</li> <li>3517: Zinc ammonium chloride</li> <li>1644: Krypton fluoride hexafluoroantimonate</li> <li>1647: Krypton trifluoride hexafluoroantimonate</li> <li>618: Calcium arsenite</li> <li>1365: Gadolinium nitrate pentahydrate</li> <li>2732: Scandium sulfate</li> </ul>
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52951-38-9	
52120 22 2	490: Bismuth oleate
11/10-2.1-1	260. Antimony phosphide
521(0 11 0	
55109-11-2	18/3: Magnesium aluminum
	zirconate
53169-23-6	765: Cerium stannate
55107 25 0	
53169-24-7	755: Ceric zirconate
53214-07-6	3139: Tellurium decafluoride
52608 70 0	2571. D-4
55008-79-0	25/1: Potassium zirconium
	sulfate trihydrate
53633-70-7	1964: Magnesium
55055-17-1	1904. Wagnesium
	trifluoroacetylacetonate
	dihydrate
52721 25 4	2018: Manager (II)
53/31-35-4	2018: Manganese(11)
	pyrophosphate
53731 35 /	2010: Manganese(II)
55751-55-4	2017. Waliganese(II)
	pyrophosphate trihydrate
53778-50-0	2953 Sodium
22110200	
	pentalodobismuthate
	tetrahydrate
52800 75 0	554: Dibromino triovido
55809-75-9	
53823-60-2	2885: Sodium
	hexachloropalladate(IV)
54410 40 7	2019. The Illians (I)
54412-40-7	3218: 1 nallium(1)
	trifluoroacetylacetonate
54451 24 0	1657: Lanthanum aarbanata
54451-24-0	1057. L'antifatiuni carbonate
	pentahydrate
54496-71-8	1017: Cobalt(III) fluoride
01100710	
	dinydrate
54723-94-3	219: Ammonium
	nhosnhomolybdate
	phospholilolybdate
55102-19-7	851: Chlorohydridotris
	(triphenylphosphine)
	muth an ium (II)
	ruthemum(11)
55147-94-9	903: Chromium(III) perchlorate
55343-67-4	830: Cesium pyroyanadate
55576 04 0	
555/6-04-0	326: Barium antimonide
55606-55-8	3175: Tetradecaborane(18)
	206. Casimus shares at
56320-90-2	AUD' Cestilim chromate
56320-90-2	806: Cesium chromate
56320-90-2 56378-72-4	1879: Magnesium basic
56320-90-2 56378-72-4	1879: Magnesium basic carbonate pentahydrate
56320-90-2 56378-72-4	1879: Magnesium basic carbonate pentahydrate
56320-90-2 56378-72-4 56617-31-3	<ul> <li>1879: Magnesium basic carbonate pentahydrate</li> <li>291: Argon fluoride</li> </ul>
56320-90-2 56378-72-4 56617-31-3 57402-46-7	<ul> <li>1879: Magnesium basic carbonate pentahydrate</li> <li>291: Argon fluoride</li> <li>2406: Potassium acetylacetonate</li> </ul>
56320-90-2 56378-72-4 56617-31-3 57402-46-7	<ul> <li>1879: Magnesium basic carbonate pentahydrate</li> <li>291: Argon fluoride</li> <li>2406: Potassium acetylacetonate hemihydrate</li> </ul>
56320-90-2 56378-72-4 56617-31-3 57402-46-7	<ul> <li>806: Cestum chromate</li> <li>1879: Magnesium basic</li> <li>carbonate pentahydrate</li> <li>291: Argon fluoride</li> <li>2406: Potassium acetylacetonate</li> <li>hemihydrate</li> <li>226: Billodium(II) anglata</li> </ul>
56320-90-2 56378-72-4 56617-31-3 57402-46-7 57592-57-1	<ul> <li>2006: Cestum chromate</li> <li>1879: Magnesium basic carbonate pentahydrate</li> <li>291: Argon fluoride</li> <li>2406: Potassium acetylacetonate hemihydrate</li> <li>2326: Palladium(II) oxalate</li> </ul>
56320-90-2 56378-72-4 56617-31-3 57402-46-7 57592-57-1 57804-25-8	<ul> <li>800: Cestum chromate</li> <li>1879: Magnesium basic carbonate pentahydrate</li> <li>291: Argon fluoride</li> <li>2406: Potassium acetylacetonate hemihydrate</li> <li>2326: Palladium(II) oxalate</li> <li>1679: Lanthanum sulfate</li> </ul>
56320-90-2 56378-72-4 56617-31-3 57402-46-7 57592-57-1 57804-25-8	<ul> <li>806: Cestum chromate</li> <li>1879: Magnesium basic carbonate pentahydrate</li> <li>291: Argon fluoride</li> <li>2406: Potassium acetylacetonate hemihydrate</li> <li>2326: Palladium(II) oxalate</li> <li>1679: Lanthanum sulfate octahydrate</li> </ul>
56320-90-2 56378-72-4 56617-31-3 57402-46-7 57592-57-1 57804-25-8	<ul> <li>806: Cestum chromate</li> <li>1879: Magnesium basic carbonate pentahydrate</li> <li>291: Argon fluoride</li> <li>2406: Potassium acetylacetonate hemihydrate</li> <li>2326: Palladium(II) oxalate</li> <li>1679: Lanthanum sulfate octahydrate</li> </ul>
56320-90-2 56378-72-4 56617-31-3 57402-46-7 57592-57-1 57804-25-8 57921-51-4	<ul> <li>806: Cestum chromate</li> <li>1879: Magnesium basic carbonate pentahydrate</li> <li>291: Argon fluoride</li> <li>2406: Potassium acetylacetonate hemihydrate</li> <li>2326: Palladium(II) oxalate</li> <li>1679: Lanthanum sulfate octahydrate</li> <li>33: Aluminum chromate</li> </ul>
56320-90-2 56378-72-4 56617-31-3 57402-46-7 57592-57-1 57804-25-8 57921-51-4 58500-12-2	<ul> <li>806: Cestum chromate</li> <li>1879: Magnesium basic carbonate pentahydrate</li> <li>291: Argon fluoride</li> <li>2406: Potassium acetylacetonate hemihydrate</li> <li>2326: Palladium(II) oxalate</li> <li>1679: Lanthanum sulfate octahydrate</li> <li>33: Aluminum chromate</li> <li>91: Aluminum tellurite</li> </ul>
56320-90-2 56378-72-4 56617-31-3 57402-46-7 57592-57-1 57804-25-8 57921-51-4 58500-12-2 58572 42 2	<ul> <li>806: Cestum chromate</li> <li>1879: Magnesium basic carbonate pentahydrate</li> <li>291: Argon fluoride</li> <li>2406: Potassium acetylacetonate hemihydrate</li> <li>2326: Palladium(II) oxalate</li> <li>1679: Lanthanum sulfate octahydrate</li> <li>33: Aluminum chromate</li> <li>91: Aluminum tellurite</li> <li>1161: Dibroming partoxide</li> </ul>
56320-90-2 56378-72-4 56617-31-3 57402-46-7 57592-57-1 57804-25-8 57921-51-4 58500-12-2 58572-43-3	<ul> <li>806: Cestum chromate</li> <li>1879: Magnesium basic carbonate pentahydrate</li> <li>291: Argon fluoride</li> <li>2406: Potassium acetylacetonate hemihydrate</li> <li>2326: Palladium(II) oxalate</li> <li>1679: Lanthanum sulfate octahydrate</li> <li>33: Aluminum chromate</li> <li>91: Aluminum tellurite</li> <li>1161: Dibromine pentoxide</li> </ul>
56320-90-2 56378-72-4 56617-31-3 57402-46-7 57592-57-1 57804-25-8 57921-51-4 58500-12-2 58572-43-3 58724-12-2	<ul> <li>806: Cestum chromate</li> <li>1879: Magnesium basic carbonate pentahydrate</li> <li>291: Argon fluoride</li> <li>2406: Potassium acetylacetonate hemihydrate</li> <li>2326: Palladium(II) oxalate</li> <li>1679: Lanthanum sulfate octahydrate</li> <li>33: Aluminum chromate</li> <li>91: Aluminum tellurite</li> <li>1161: Dibromine pentoxide</li> <li>812: Cesium hydride</li> </ul>
56320-90-2 56378-72-4 56617-31-3 57402-46-7 57592-57-1 57804-25-8 57921-51-4 58500-12-2 58572-43-3 58724-12-2 58815-72-8	<ul> <li>806: Cestum chromate</li> <li>1879: Magnesium basic carbonate pentahydrate</li> <li>291: Argon fluoride</li> <li>2406: Potassium acetylacetonate hemihydrate</li> <li>2326: Palladium(II) oxalate</li> <li>1679: Lanthanum sulfate octahydrate</li> <li>33: Aluminum chromate</li> <li>91: Aluminum tellurite</li> <li>1161: Dibromine pentoxide</li> <li>812: Cesium hydride</li> <li>1646: Krynton fluoride</li> </ul>
56320-90-2 56378-72-4 56617-31-3 57402-46-7 57592-57-1 57804-25-8 57921-51-4 58500-12-2 58572-43-3 58724-12-2 58815-72-8	<ul> <li>806: Cestum chromate</li> <li>1879: Magnesium basic carbonate pentahydrate</li> <li>291: Argon fluoride</li> <li>2406: Potassium acetylacetonate hemihydrate</li> <li>2326: Palladium(II) oxalate</li> <li>1679: Lanthanum sulfate octahydrate</li> <li>33: Aluminum chromate</li> <li>91: Aluminum tellurite</li> <li>1161: Dibromine pentoxide</li> <li>812: Cesium hydride</li> <li>1646: Krypton fluoride</li> <li>mendage@urstentelate</li> </ul>
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56320-90-2 56378-72-4 56617-31-3 57402-46-7 57592-57-1 57804-25-8 57921-51-4 58500-12-2 58572-43-3 58724-12-2 58815-72-8 59129-80-5	<ul> <li>806: Cestum chromate</li> <li>1879: Magnesium basic carbonate pentahydrate</li> <li>291: Argon fluoride</li> <li>2406: Potassium acetylacetonate hemihydrate</li> <li>2326: Palladium(II) oxalate</li> <li>1679: Lanthanum sulfate octahydrate</li> <li>33: Aluminum chromate</li> <li>91: Aluminum tellurite</li> <li>1161: Dibromine pentoxide</li> <li>812: Cesium hydride</li> <li>1646: Krypton fluoride monodecafluorotantalate</li> <li>3603: Zirconium phosphate</li> </ul>
56320-90-2 56378-72-4 56617-31-3 57402-46-7 57592-57-1 57804-25-8 57921-51-4 58500-12-2 58572-43-3 58724-12-2 58815-72-8 59129-80-5	<ul> <li>806: Cestum chromate</li> <li>1879: Magnesium basic carbonate pentahydrate</li> <li>291: Argon fluoride</li> <li>2406: Potassium acetylacetonate hemihydrate</li> <li>2326: Palladium(II) oxalate</li> <li>1679: Lanthanum sulfate octahydrate</li> <li>33: Aluminum chromate</li> <li>91: Aluminum tellurite</li> <li>1161: Dibromine pentoxide</li> <li>812: Cesium hydride</li> <li>1646: Krypton fluoride monodecafluorotantalate</li> <li>3603: Zirconium phosphate tribydrate</li> </ul>
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56320-90-2 56378-72-4 56617-31-3 57402-46-7 57592-57-1 57804-25-8 57921-51-4 58500-12-2 58572-43-3 58724-12-2 58815-72-8 59129-80-5 59393-06-5	<ul> <li>800: Cestum chromate</li> <li>1879: Magnesium basic carbonate pentahydrate</li> <li>291: Argon fluoride</li> <li>2406: Potassium acetylacetonate hemihydrate</li> <li>2326: Palladium(II) oxalate</li> <li>1679: Lanthanum sulfate octahydrate</li> <li>33: Aluminum chromate</li> <li>91: Aluminum tellurite</li> <li>1161: Dibromine pentoxide</li> <li>812: Cesium hydride</li> <li>1646: Krypton fluoride monodecafluorotantalate</li> <li>3603: Zirconium phosphate trihydrate</li> <li>486: Bismuth iron molybdenum oxide</li> </ul>
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56320-90-2 56378-72-4 56617-31-3 57402-46-7 57592-57-1 57804-25-8 57921-51-4 58570-12-2 58572-43-3 58724-12-2 58815-72-8 59129-80-5 59393-06-5 60582-92-5 60616-74-2 60676-86-0 60763-24-8 60883-64-9 60897-40-7 60897-63-4	<ul> <li>806: Cestum chromate</li> <li>1879: Magnesium basic carbonate pentahydrate</li> <li>291: Argon fluoride</li> <li>2406: Potassium acetylacetonate hemihydrate</li> <li>2326: Palladium(II) oxalate</li> <li>1679: Lanthanum sulfate octahydrate</li> <li>33: Aluminum chromate</li> <li>91: Aluminum tellurite</li> <li>1161: Dibromine pentoxide</li> <li>812: Cesium hydride</li> <li>1646: Krypton fluoride monodecafluorotantalate</li> <li>3603: Zirconium phosphate trihydrate</li> <li>486: Bismuth iron molybdenum oxide</li> <li>1868: Magnesium acetate monohydrate</li> <li>1911: Magnesium hydride</li> <li>3449: Vitreous silica</li> <li>3252: Thorium selenide</li> <li>448: Beryllium carbonate tetrahydrate</li> <li>3015: Sodium uranyl carbonate</li> <li>360: Barium hexafluorogermanate</li> </ul>

60922-26-1	3338. Tungsten dinitride
60026 01 4	
60936-81-4	6: Actinium hydride
60950-56-3	1910: Magnesium
	hexafluorosilicate
	havebudrete
(00/0 10 0	
60969-19-9	3204: Thallium(1)
	hexafluorophosphate
61027-88-1	1872: Magnesium aluminum
01027 00 1	-:1:
	silicate
61042-72-6	1891: Magnesium carbonate
	pentahydrate
61565 07 0	1220: Erbium parablarata
01505-07-9	1250. Erbium peremorate
	hydrate
63026-01-7	1257: Europium(III) nitrate
	pentahydrate
62771 22 5	211: Ammonium
03771-33-3	211. Allillolliulli
	pentachlororhodate(III)
	monohvdrate
63989-69-5	1267: Ferric basic arsenite
(4002.05.5	
64082-35-5	1/90: Lithium iron silicide
64360-98-1	3471: Ytterbium carbonate
	hydrate
64300 16 2	2520: Potassium sodium
04399-10-2	2520: Potassium soulum
	carbonate hexahydrate
64417-98-7	3602: Zirconium oxide yttria
	stabilized
(1424 12.0	
04424-12-0	1650: Lantnanum
	acetylacetonate hydrate
64535-94-0	3145: Tellurium nitrate
64016-48-0	2323: Palladium(II)
04910-40-9	
	hexafluoroacetylacetonate
65202-12-2	2056: Mercury(I) perchlorate
	tetrahydrate
65277 18 7	272: Antimony(III) parablarata
65277-48-7	273: Antimony(III) perchlorate
65277-48-7	273: Antimony(III) perchlorate trihydrate
65277-48-7 65353-51-7	<ul><li>273: Antimony(III) perchlorate trihydrate</li><li>2384: Platinum(II)</li></ul>
65277-48-7 65353-51-7	273: Antimony(III) perchlorate trihydrate 2384: Platinum(II) hexafluoroacetvlacetonate
65277-48-7 65353-51-7 65355-99-9	273: Antimony(III) perchlorate trihydrate 2384: Platinum(II) hexafluoroacetylacetonate 1587: Iodina bayoxida
65277-48-7 65353-51-7 65355-99-9	<ul> <li>273: Antimony(III) perchlorate trihydrate</li> <li>2384: Platinum(II) hexafluoroacetylacetonate</li> <li>1587: Iodine hexoxide</li> </ul>
65277-48-7 65353-51-7 65355-99-9 65842-03-7	273: Antimony(III) perchlorate trihydrate 2384: Platinum(II) hexafluoroacetylacetonate 1587: Iodine hexoxide 1280: Ferric metavanadate
65277-48-7 65353-51-7 65355-99-9 65842-03-7 66104-24-3	273: Antimony(III) perchlorate trihydrate 2384: Platinum(II) hexafluoroacetylacetonate 1587: Iodine hexoxide 1280: Ferric metavanadate 440: Beryllium basic carbonate
65277-48-7 65353-51-7 65355-99-9 65842-03-7 66104-24-3 66169-93-5	273: Antimony(III) perchlorate trihydrate 2384: Platinum(II) hexafluoroacetylacetonate 1587: Iodine hexoxide 1280: Ferric metavanadate 440: Beryllium basic carbonate 2651: Buhidium acetylacetonate
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71414-47-6	2335: Pentamethyl- cyclopentadienyltantalum	97126-35-7	1010: Cobalt(II) thiocyanate trihydrate
	tetrachloride	99685-96-8	718: Carbon
71595-75-0	1152: Decaborane(16)	99685-96-8	1350: Fullerene
71595-75-0	1188: Dodecaborane(16)	100587-90-4	1649: Lanthanum acetate
71626-98-7	665: Calcium iodide hexahydrate		hydrate
71799-92-3	2000: Manganese(II) citrate	100587-92-6	3155: Terbium acetate hydrate
71963-57-0	1025: Cobalt(III) sepulchrate trichloride	100587-96-0	3158: Terbium carbonate hydrate
71965-17-8	3615: Zirconyl basic nitrate	101509-27-7	2175: Neodymium sulfate
72520-94-6	774: Cerous carbonate	102192-40-5	3233: Thorium acetylacetonate
	pentahydrate	103443-51-2	2941: Sodium molybdosilicate
73157-11-6	1382: Gallium azide		hydrate
73491-34-6	2090: Mercury(II) perchlorate trihvdrate	107539-20-8	3489: Yttrium barium copper oxide
73560-00-6	1590: Iodine nonoxide	107539-20-8	3490: Yttrium barium copper
74507-64-5	1880: Magnesium bis(pentameth		oxide
	ylcyclopentadienyl)	107539-20-8	3491: Yttrium barium copper
75060-62-5	2228: Nickel selenate		oxide
75397-94-3	hexahydrate 3128: Tantalum pentoxide	107539-20-8	348: Barium copper yttrium oxide-III
	hydrate	107782-11-6	1342: Fluorine tetroxide
75426-28-2	2750: Selenium sulfide	108249-27-0	1508: Hydrazine monooxalate
75535-11-4	1916: Magnesium iodide	108503-47-5	3516: Zinc acetylacetonate
	hexahydrate		hydrate
75926-22-6	2744: Selenium hexasulfide	109064-29-1	347: Barium copper yttrium
79490-00-9	586: Cadmium perchlorate		oxide-II
80529-93-7	1377: Gadopentetic acid	109457-23-0	1214: Erbium barium copper
81029-06-3	73: Aluminum perchlorate		oxide
	nonahydrate	110802-84-1	1527: Hydrogen
81129-00-2	2369: Phosphorus(III) sulfide		hexachloroiridate(IV) hydrate
81579-74-0	2601: 2,2-Bis(ethylferrocenyl) propane	111419-39-7	1676: Lanthanum strontium copper oxide
82045-86-1	430: Barium zirconium	114615-82-6	3187: Tetrapropylammonium
	phosphate		perruthenate(VII)
82642-06-6	346: Barium copper yttrium oxide-I	114901-61-0	504: Bismuth strontium calcium copper oxide (1112)
84359-31-9	906: Chromium(III) phosphate hexahydrate	114901-61-0	505: Bismuth strontium calcium copper oxide (2212)
86546-99-8	1252: Europium(III) carbonate hydrate	114901-61-0	506: Bismuth strontium calcium copper oxide (2223)
92141-86-1	820: Cesium metaborate	115383-22-7	729: Carbon fullerenes

118448-18-3	619: Calcium bis(2,2,6,6-
	tetramethyl-3,5-
	heptanedionate)
119000-19-0	3189: Thallium barium calcium
	copper oxide
119800-94-1	2158: Neodymium cerium
	copper oxide
123333-66-4	2532: Potassium tellurite(IV)
	hydrate
123333-67-5	2924: Sodium hypophosphite
	monohydrate
123333-85-7	1840: Lithium thiocyanate
	hydrate
123333-98-2	896: Chromium(III) fluoride
	tetrahydrate
123334-23-6	2882: Sodium
	hexachloroiridate(III)
	hydrate
124365-83-9	349: Barium copper yttrium
	oxide-IV
125720-69-1	3191: Thallium barium calcium
	copper oxide
126284-91-1	2574: Praseodymium barium
	copper oxide
127241-75-2	3190: Thallium barium calcium
	copper oxide
127386-54-3	283: Antimony(V) fluoride
131159-39-2	1351: Fullerenes
133578-89-9	3446: Vanadyl selenite
	monohydrate
133863-98-6	2112: Molybdenum
	metaphosphate
134929-59-2	1352: Fullerene fluoride
137232-17-8	2442: Potassium fullerene
137926-73-9	2665: Rubidium fullerene
141326-12-7	831: Cesium rubidium fullerene
141572-90-9	652: Calcium
	hexafluoroacetylacetonate
	dihydrate
142617-56-9	481: Bismuth
	hexafluoroacetylacetonate

# **Molecular Formula Index**

110	2: Actinium	AlBr <sub>3</sub>	26: Aluminum bromide
AcBrO	11: Actinium oxybromide	AlBr <sub>3</sub> H <sub>12</sub> O <sub>6</sub>	27: Aluminum bromide
AcBr <sub>3</sub>	3: Actinium bromide		hexahydrate
AcClO	12: Actinium oxychloride	AlBr <sub>3</sub> H <sub>18</sub> O <sub>18</sub>	25: Aluminum bromate
AcCl <sub>3</sub>	4: Actinium chloride		nonahydrate
AcFO	13: Actinium oxyfluoride	AlCl <sub>3</sub>	31: Aluminum chloride
AcF <sub>3</sub>	5: Actinium fluoride	AlCl <sub>3</sub> H <sub>12</sub> O <sub>6</sub>	32: Aluminum chloride
AcHO <sub>4.5</sub> P	14: Actinium phosphate		hexahydrate
	hemihydrate	AlCl <sub>3</sub> H <sub>18</sub> O <sub>18</sub>	30: Aluminum chlorate
AcH <sub>2</sub>	6: Actinium hydride	5 10 10	nonahydrate
AcH <sub>3</sub> O <sub>3</sub>	7: Actinium hydroxide	AlCl <sub>3</sub> H <sub>18</sub> O <sub>21</sub>	73: Aluminum perchlorate
AcI <sub>3</sub>	8: Actinium iodide	5 10 21	nonahydrate
$Ac_2O_3$	10: Actinium oxide	AlCl <sub>3</sub> O <sub>9</sub>	29: Aluminum chlorate
$Ac_2S_3$	15: Actinium sulfide	AlCl <sub>3</sub> O <sub>12</sub>	72: Aluminum perchlorate
Ag	2777: Silver	AlCl <sub>4</sub> H <sub>4</sub> N	236: Ammonium
AgAsF <sub>6</sub>	2797: Silver		tetrachloroaluminate
• •	hexafluoroarsenate	AlCl <sub>4</sub> Na	2999: Sodium
AgBr	2784: Silver bromide		tetrachloroaluminate
AgBrO <sub>3</sub>	2783: Silver bromate	AlCsH <sub>24</sub> O <sub>20</sub> S <sub>2</sub>	796: Cesium aluminum
AgCl	2787: Silver chloride	21 20 2	sulfate dodecahydrate
AgClH <sub>2</sub> O <sub>5</sub>	2809: Silver perchlorate	AlD₄Li	1764: Lithium aluminum
0 2 5	monohydrate	-	deuteride
AgClO <sub>2</sub>	2788: Silver chlorite	AlF <sub>3</sub>	40: Aluminum fluoride
AgClO <sub>3</sub>	2786: Silver chlorate	AlF <sub>2</sub> H <sub>2</sub> O	41: Aluminum fluoride
AgClO <sub>4</sub>	2808: Silver perchlorate	5 2	monohydrate
AgF	2795: Silver fluoride	AlF <sub>2</sub> H <sub>6</sub> O <sub>2</sub>	42: Aluminum fluoride
AgF <sub>2</sub>	2794: Silver difluoride	5 0 5	trihydrate
AgF <sub>2</sub> H	2799: Silver hydrogen	AlF <sub>6</sub> H <sub>12</sub> N <sub>2</sub>	170: Ammonium
0 2	fluoride	0 12 5	hexafluoroaluminate
AgF_P	2798: Silver	AlF <sub>c</sub> Na <sub>2</sub>	2889: Sodium
0 0	hexafluorophosphate	0	hexafluoroaluminate
AgF,Sb	2796: Silver	AlHO <sub>2</sub>	69: Aluminum
8 0	hexafluoroantimonate(V)	- 2	$oxyhydroxide(\alpha)$
AgI	2801: Silver jodide		70: Aluminum
AgI AgIO <sub>2</sub>	2801: Silver iodide 2800: Silver iodate		70: Aluminum oxyhydroxide(β)
AgI AgIO <sub>3</sub> AgMnO <sub>4</sub>	2801: Silver iodide 2800: Silver iodate 2810: Silver permanganate	AlHa	<ul> <li>70: Aluminum oxyhydroxide(β)</li> <li>44: Aluminum hydride</li> </ul>
AgI AgIO <sub>3</sub> AgMnO <sub>4</sub> AgNO <sub>2</sub>	2801: Silver iodide 2800: Silver iodate 2810: Silver permanganate 2805: Silver nitrite	AlH <sub>3</sub> AlH <sub>2</sub> O <sub>2</sub>	<ul> <li>70: Aluminum oxyhydroxide(β)</li> <li>44: Aluminum hydride</li> <li>45: Aluminum hydroxide</li> </ul>
AgI AgIO <sub>3</sub> AgMnO <sub>4</sub> AgNO <sub>2</sub> AgNO <sub>2</sub>	2801: Silver iodide 2800: Silver iodate 2810: Silver permanganate 2805: Silver nitrite 2804: Silver nitrate	AlH <sub>3</sub> AlH <sub>3</sub> O <sub>3</sub>	<ul> <li>70: Aluminum oxyhydroxide(β)</li> <li>44: Aluminum hydride</li> <li>45: Aluminum hydroxide</li> <li>46: Aluminum hydroxide(β')</li> </ul>
AgI AgIO <sub>3</sub> AgMnO <sub>4</sub> AgNO <sub>2</sub> AgNO <sub>3</sub> AgN <sub>2</sub>	2801: Silver iodide 2800: Silver iodate 2810: Silver permanganate 2805: Silver nitrite 2804: Silver nitrate 2781: Silver azide	AlH <sub>3</sub> AlH <sub>3</sub> O <sub>3</sub>	<ul> <li>70: Aluminum oxyhydroxide(β)</li> <li>44: Aluminum hydride</li> <li>45: Aluminum hydroxide</li> <li>46: Aluminum hydroxide(β')</li> <li>47: Aluminum hydroxide(α)</li> </ul>
AgI AgIO <sub>3</sub> AgMnO <sub>4</sub> AgNO <sub>2</sub> AgNO <sub>3</sub> AgN <sub>3</sub> AgO.Re	2801: Silver iodide 2800: Silver iodate 2810: Silver permanganate 2805: Silver nitrite 2804: Silver nitrate 2781: Silver azide 2812: Silver perrhenate	AlH <sub>3</sub> AlH <sub>3</sub> O <sub>3</sub>	<ul> <li>70: Aluminum oxyhydroxide(β)</li> <li>44: Aluminum hydride</li> <li>45: Aluminum hydroxide</li> <li>46: Aluminum hydroxide(β')</li> <li>47: Aluminum hydroxide(α)</li> <li>48: Aluminum hydroxide(β)</li> </ul>
AgI AgIO <sub>3</sub> AgMnO <sub>4</sub> AgNO <sub>2</sub> AgNO <sub>3</sub> AgN <sub>3</sub> AgO <sub>4</sub> Re Ag <sub>2</sub> CrO <sub>4</sub>	2801: Silver iodide 2800: Silver iodate 2810: Silver permanganate 2805: Silver nitrite 2804: Silver nitrate 2781: Silver azide 2812: Silver perrhenate 2789: Silver chromate	AlH <sub>3</sub> AlH <sub>3</sub> O <sub>3</sub> AlH.Li	<ul> <li>70: Aluminum oxyhydroxide(β)</li> <li>44: Aluminum hydride</li> <li>45: Aluminum hydroxide</li> <li>46: Aluminum hydroxide(β')</li> <li>47: Aluminum hydroxide(β)</li> <li>48: Aluminum hydroxide(β)</li> <li>1765: Lithium aluminum</li> </ul>
AgI AgIO <sub>3</sub> AgMnO <sub>4</sub> AgNO <sub>2</sub> AgNO <sub>3</sub> AgN <sub>3</sub> AgO <sub>4</sub> Re Ag <sub>2</sub> CrO <sub>4</sub> Ag <sub>2</sub> CrO <sub>4</sub>	2801: Silver iodide 2800: Silver iodate 2810: Silver permanganate 2805: Silver nitrite 2804: Silver nitrate 2781: Silver azide 2812: Silver perrhenate 2789: Silver chromate 2792: Silver dichromate	AlH <sub>3</sub> AlH <sub>3</sub> O <sub>3</sub> AlH <sub>4</sub> Li	<ul> <li>70: Aluminum oxyhydroxide(β)</li> <li>44: Aluminum hydride</li> <li>45: Aluminum hydroxide</li> <li>46: Aluminum hydroxide(β')</li> <li>47: Aluminum hydroxide(β)</li> <li>48: Aluminum hydroxide(β)</li> <li>1765: Lithium aluminum hydride</li> </ul>
AgI AgIO <sub>3</sub> AgMnO <sub>4</sub> AgNO <sub>2</sub> AgNO <sub>3</sub> AgN <sub>3</sub> AgO <sub>4</sub> Re Ag <sub>2</sub> CrO <sub>4</sub> Ag <sub>2</sub> CrO <sub>7</sub> Ag.F	2801: Silver iodide 2800: Silver iodate 2810: Silver permanganate 2805: Silver nitrite 2804: Silver nitrate 2781: Silver azide 2812: Silver perrhenate 2789: Silver chromate 2792: Silver dichromate 2818: Silver subfluoride	AlH <sub>3</sub> AlH <sub>3</sub> O <sub>3</sub> AlH <sub>4</sub> Li AlH.NO <sub>8</sub> S <sub>2</sub>	<ul> <li>70: Aluminum oxyhydroxide(β)</li> <li>44: Aluminum hydride</li> <li>45: Aluminum hydroxide</li> <li>46: Aluminum hydroxide(β')</li> <li>47: Aluminum hydroxide(β)</li> <li>1765: Lithium aluminum hydride</li> <li>20: Aluminum ammonium</li> </ul>
AgI AgIO <sub>3</sub> AgMnO <sub>4</sub> AgNO <sub>2</sub> AgNO <sub>3</sub> AgN <sub>3</sub> AgO <sub>4</sub> Re Ag <sub>2</sub> CrO <sub>4</sub> Ag <sub>2</sub> CrO <sub>4</sub> Ag <sub>2</sub> F Ag,HgI <sub>4</sub>	2801: Silver iodide 2800: Silver iodate 2810: Silver permanganate 2805: Silver nitrite 2804: Silver nitrate 2781: Silver azide 2812: Silver perrhenate 2789: Silver chromate 2792: Silver dichromate 2818: Silver subfluoride 2822: Silver	AlH <sub>3</sub> AlH <sub>3</sub> O <sub>3</sub> AlH <sub>4</sub> Li AlH <sub>4</sub> NO <sub>8</sub> S <sub>2</sub>	<ul> <li>70: Aluminum oxyhydroxide(β)</li> <li>44: Aluminum hydride</li> <li>45: Aluminum hydroxide</li> <li>46: Aluminum hydroxide(β')</li> <li>47: Aluminum hydroxide(β)</li> <li>1765: Lithium aluminum hydride</li> <li>20: Aluminum ammonium sulfate</li> </ul>
$\begin{array}{l} AgI\\ AgIO_3\\ AgMnO_4\\ AgNO_2\\ AgNO_3\\ AgN_3\\ AgO_4Re\\ Ag_2CrO_4\\ Ag_2CrO_4\\ Ag_2Cr_2O_7\\ Ag_2F\\ Ag_2HgI_4 \end{array}$	2801: Silver iodide 2800: Silver iodate 2810: Silver permanganate 2805: Silver nitrite 2804: Silver nitrate 2781: Silver azide 2812: Silver perrhenate 2789: Silver chromate 2792: Silver dichromate 2818: Silver subfluoride 2822: Silver tetraiodomercurate(II)	AlH <sub>3</sub> AlH <sub>3</sub> O <sub>3</sub> AlH <sub>4</sub> Li AlH <sub>4</sub> NO <sub>8</sub> S <sub>2</sub>	<ul> <li>70: Aluminum oxyhydroxide(β)</li> <li>44: Aluminum hydride</li> <li>45: Aluminum hydroxide</li> <li>46: Aluminum hydroxide(β')</li> <li>47: Aluminum hydroxide(β)</li> <li>1765: Lithium aluminum hydride</li> <li>20: Aluminum ammonium sulfate</li> <li>119: Ammonium aluminum</li> </ul>
$\begin{array}{l} AgI\\ AgIO_3\\ AgMnO_4\\ AgNO_2\\ AgNO_3\\ AgN_3\\ AgO_4Re\\ Ag_2CrO_4\\ Ag_2CrO_4\\ Ag_2Cr_2O_7\\ Ag_2F\\ Ag_2HgI_4 \end{array}$	2801: Silver iodide 2800: Silver iodate 2810: Silver permanganate 2805: Silver nitrite 2804: Silver nitrate 2781: Silver azide 2812: Silver perrhenate 2789: Silver chromate 2792: Silver dichromate 2818: Silver subfluoride 2822: Silver tetraiodomercurate(II) (α-form)	AlH <sub>3</sub> AlH <sub>3</sub> O <sub>3</sub> AlH <sub>4</sub> Li AlH <sub>4</sub> NO <sub>8</sub> S <sub>2</sub>	<ul> <li>70: Aluminum oxyhydroxide(β)</li> <li>44: Aluminum hydride</li> <li>45: Aluminum hydroxide</li> <li>46: Aluminum hydroxide(β')</li> <li>47: Aluminum hydroxide(β)</li> <li>1765: Lithium aluminum hydride</li> <li>20: Aluminum ammonium sulfate</li> <li>119: Ammonium aluminum sulfate</li> </ul>
AgI AgIO <sub>3</sub> AgMO <sub>4</sub> AgNO <sub>2</sub> AgNO <sub>3</sub> AgN <sub>3</sub> AgO <sub>4</sub> Re Ag <sub>2</sub> CrO <sub>4</sub> Ag <sub>2</sub> CrO <sub>4</sub> Ag <sub>2</sub> F Ag <sub>2</sub> HgI <sub>4</sub> Ag <sub>3</sub> MoO <sub>4</sub>	2801: Silver iodide 2800: Silver iodate 2810: Silver permanganate 2805: Silver nitrite 2804: Silver nitrate 2781: Silver azide 2812: Silver perrhenate 2789: Silver chromate 2792: Silver dichromate 2818: Silver subfluoride 2822: Silver tetraiodomercurate(II) ( $\alpha$ -form) 2803: Silver molybdate	AlH <sub>3</sub> AlH <sub>3</sub> O <sub>3</sub> AlH <sub>4</sub> Li AlH <sub>4</sub> NO <sub>8</sub> S <sub>2</sub> AlH <sub>4</sub> O <sub>6</sub> P	<ul> <li>70: Aluminum oxyhydroxide(β)</li> <li>44: Aluminum hydride</li> <li>45: Aluminum hydroxide</li> <li>46: Aluminum hydroxide(β')</li> <li>47: Aluminum hydroxide(β)</li> <li>48: Aluminum hydroxide(β)</li> <li>1765: Lithium aluminum hydride</li> <li>20: Aluminum ammonium sulfate</li> <li>119: Ammonium aluminum sulfate</li> <li>75: Aluminum phosphate</li> </ul>
AgI AgIO <sub>3</sub> AgMO <sub>4</sub> AgNO <sub>2</sub> AgNO <sub>3</sub> AgN <sub>3</sub> AgO <sub>4</sub> Re Ag <sub>2</sub> CrO <sub>4</sub> Ag <sub>2</sub> CrO <sub>4</sub> Ag <sub>2</sub> F Ag <sub>2</sub> HgI <sub>4</sub> Ag <sub>2</sub> MoO <sub>4</sub> Ag <sub>2</sub> O	2801: Silver iodide 2800: Silver iodate 2810: Silver permanganate 2805: Silver nitrite 2804: Silver nitrate 2781: Silver azide 2812: Silver perrhenate 2789: Silver chromate 2792: Silver dichromate 2818: Silver subfluoride 2822: Silver tetraiodomercurate(II) ( $\alpha$ -form) 2803: Silver molybdate 2807: Silver oxide	AlH <sub>3</sub> AlH <sub>3</sub> O <sub>3</sub> AlH <sub>4</sub> Li AlH <sub>4</sub> NO <sub>8</sub> S <sub>2</sub> AlH <sub>4</sub> O <sub>6</sub> P	<ul> <li>70: Aluminum oxyhydroxide(β)</li> <li>44: Aluminum hydride</li> <li>45: Aluminum hydroxide</li> <li>46: Aluminum hydroxide(β')</li> <li>47: Aluminum hydroxide(β)</li> <li>48: Aluminum hydroxide(β)</li> <li>1765: Lithium aluminum hydride</li> <li>20: Aluminum ammonium sulfate</li> <li>119: Ammonium aluminum sulfate</li> <li>75: Aluminum phosphate dihydrate</li> </ul>
AgI AgIO <sub>3</sub> AgMnO <sub>4</sub> AgNO <sub>2</sub> AgNO <sub>3</sub> AgN <sub>3</sub> AgO <sub>4</sub> Re Ag <sub>2</sub> CrO <sub>4</sub> Ag <sub>2</sub> CrO <sub>7</sub> Ag <sub>2</sub> F Ag <sub>2</sub> HgI <sub>4</sub> Ag <sub>2</sub> MoO <sub>4</sub> Ag <sub>2</sub> O Ag <sub>2</sub> O Ag <sub>2</sub> O	2801: Silver iodide 2800: Silver iodate 2810: Silver permanganate 2805: Silver nitrite 2804: Silver nitrate 2781: Silver azide 2812: Silver perrhenate 2789: Silver chromate 2792: Silver dichromate 2818: Silver subfluoride 2822: Silver tetraiodomercurate(II) ( $\alpha$ -form) 2803: Silver molybdate 2807: Silver oxide 2811: Silver peroxide	AlH <sub>3</sub> AlH <sub>3</sub> O <sub>3</sub> AlH <sub>4</sub> Li AlH <sub>4</sub> NO <sub>8</sub> S <sub>2</sub> AlH <sub>4</sub> O <sub>6</sub> P AlH <sub>4</sub> O <sub>6</sub> P	<ul> <li>70: Aluminum oxyhydroxide(β)</li> <li>44: Aluminum hydride</li> <li>45: Aluminum hydroxide</li> <li>46: Aluminum hydroxide(β')</li> <li>47: Aluminum hydroxide(β)</li> <li>48: Aluminum hydroxide(β)</li> <li>1765: Lithium aluminum hydride</li> <li>20: Aluminum ammonium sulfate</li> <li>119: Ammonium aluminum sulfate</li> <li>75: Aluminum phosphate dihydrate</li> <li>51: Aluminum</li> </ul>
AgI AgIO <sub>3</sub> AgMnO <sub>4</sub> AgNO <sub>2</sub> AgNO <sub>3</sub> AgN <sub>3</sub> AgO <sub>4</sub> Re Ag <sub>2</sub> CrO <sub>4</sub> Ag <sub>2</sub> Cr $_0$ Ag <sub>2</sub> F Ag <sub>2</sub> HgI <sub>4</sub> Ag <sub>2</sub> MoO <sub>4</sub> Ag <sub>2</sub> O Ag <sub>2</sub> O Ag <sub>2</sub> O <sub>2</sub> Ag <sub>2</sub> O <sub>2</sub>	2801: Silver iodide 2800: Silver iodate 2810: Silver permanganate 2805: Silver nitrite 2804: Silver nitrate 2781: Silver azide 2812: Silver perrhenate 2789: Silver chromate 2792: Silver dichromate 2818: Silver subfluoride 2822: Silver tetraiodomercurate(II) ( $\alpha$ -form) 2803: Silver molybdate 2807: Silver peroxide 2811: Silver peroxide 2817: Silver selenite	AlH <sub>3</sub> AlH <sub>3</sub> O <sub>3</sub> AlH <sub>4</sub> Li AlH <sub>4</sub> NO <sub>8</sub> S <sub>2</sub> AlH <sub>4</sub> O <sub>6</sub> P AlH <sub>6</sub> O <sub>6</sub> P <sub>3</sub>	<ul> <li>70: Aluminum oxyhydroxide(β)</li> <li>44: Aluminum hydride</li> <li>45: Aluminum hydroxide</li> <li>46: Aluminum hydroxide(β')</li> <li>47: Aluminum hydroxide(β)</li> <li>48: Aluminum hydroxide(β)</li> <li>1765: Lithium aluminum hydride</li> <li>20: Aluminum ammonium sulfate</li> <li>119: Ammonium aluminum sulfate</li> <li>75: Aluminum phosphate dihydrate</li> <li>51: Aluminum hyoophosphite</li> </ul>
AgI AgIO <sub>3</sub> AgMO <sub>4</sub> AgNO <sub>2</sub> AgNO <sub>3</sub> AgN <sub>3</sub> AgO <sub>4</sub> Re Ag <sub>2</sub> CrO <sub>4</sub> Ag <sub>2</sub> CrO <sub>4</sub> Ag <sub>2</sub> F Ag <sub>2</sub> HgI <sub>4</sub> Ag <sub>2</sub> MoO <sub>4</sub> Ag <sub>2</sub> O Ag <sub>2</sub> O <sub>2</sub> Ag <sub>2</sub> O <sub>3</sub> Se Ag <sub>2</sub> O <sub>3</sub> Se	2801: Silver iodide 2800: Silver iodate 2810: Silver permanganate 2805: Silver nitrite 2804: Silver nitrate 2781: Silver azide 2812: Silver perrhenate 2789: Silver chromate 2792: Silver dichromate 2818: Silver subfluoride 2822: Silver tetraiodomercurate(II) (α-form) 2803: Silver molybdate 2807: Silver peroxide 2811: Silver peroxide 2817: Silver selenite 2819: Silver sulfate	AIH <sub>3</sub> AIH <sub>3</sub> O <sub>3</sub> AIH <sub>4</sub> Li AIH <sub>4</sub> NO <sub>8</sub> S <sub>2</sub> AIH <sub>4</sub> O <sub>6</sub> P AIH <sub>6</sub> O <sub>6</sub> P <sub>3</sub> AIH <sub>2</sub> I <sub>2</sub> O <sub>6</sub>	<ul> <li>70: Aluminum oxyhydroxide(β)</li> <li>44: Aluminum hydride</li> <li>45: Aluminum hydroxide</li> <li>46: Aluminum hydroxide(β')</li> <li>47: Aluminum hydroxide(β)</li> <li>1765: Lithium aluminum hydride</li> <li>20: Aluminum aluminum sulfate</li> <li>119: Ammonium aluminum sulfate</li> <li>75: Aluminum phosphate dihydrate</li> <li>51: Aluminum hypophosphite</li> <li>53: Aluminum iodide</li> </ul>
$\begin{array}{c} AgI \\ AgIO_3 \\ AgMO_4 \\ AgNO_2 \\ AgNO_3 \\ AgN_3 \\ AgO_4Re \\ Ag_2CrO_4 \\ Ag_2CrO_4 \\ Ag_2CrO_7 \\ Ag_2F \\ Ag_2F \\ Ag_2HgI_4 \\ \end{array}$	2801: Silver iodide 2800: Silver iodate 2810: Silver permanganate 2805: Silver nitrite 2804: Silver nitrate 2781: Silver azide 2812: Silver perrhenate 2789: Silver chromate 2792: Silver dichromate 2818: Silver subfluoride 2822: Silver tetraiodomercurate(II) (α-form) 2803: Silver molybdate 2807: Silver oxide 2811: Silver peroxide 2817: Silver selenite 2819: Silver sulfate 2819: Silver sulfate 2815: Silver selenate	AIH <sub>3</sub> O <sub>3</sub> AIH <sub>4</sub> Li AIH <sub>4</sub> NO <sub>8</sub> S <sub>2</sub> AIH <sub>4</sub> O <sub>6</sub> P AIH <sub>6</sub> O <sub>6</sub> P <sub>3</sub> AIH <sub>12</sub> I <sub>3</sub> O <sub>6</sub>	<ul> <li>70: Aluminum oxyhydroxide(β)</li> <li>44: Aluminum hydride</li> <li>45: Aluminum hydroxide</li> <li>46: Aluminum hydroxide(β')</li> <li>47: Aluminum hydroxide(β)</li> <li>1765: Lithium aluminum hydride</li> <li>20: Aluminum aluminum sulfate</li> <li>119: Ammonium aluminum sulfate</li> <li>75: Aluminum phosphate dihydrate</li> <li>51: Aluminum hypophosphite</li> <li>53: Aluminum iodide hexahydrate</li> </ul>
$\begin{array}{l} AgI \\ AgIO_3 \\ AgMO_4 \\ AgNO_2 \\ AgNO_3 \\ AgN_3 \\ AgO_4Re \\ Ag_2CrO_4 \\ Ag_2CrO_7 \\ Ag_2F \\ Ag_2F \\ Ag_2HgI_4 \\ \end{array}$	2801: Silver iodide 2800: Silver iodate 2810: Silver permanganate 2805: Silver nitrite 2804: Silver nitrate 2781: Silver azide 2812: Silver perrhenate 2789: Silver chromate 2792: Silver dichromate 2818: Silver subfluoride 2822: Silver tetraiodomercurate(II) ( $\alpha$ -form) 2803: Silver molybdate 2807: Silver oxide 2811: Silver peroxide 2811: Silver peroxide 2817: Silver sulfate 2819: Silver sulfate 2815: Silver selenate 2815: Silver selenate 2825: Silver tungstate	AlH <sub>3</sub> AlH <sub>3</sub> O <sub>3</sub> AlH <sub>4</sub> Li AlH <sub>4</sub> NO <sub>8</sub> S <sub>2</sub> AlH <sub>4</sub> O <sub>6</sub> P AlH <sub>6</sub> O <sub>6</sub> P <sub>3</sub> AlH <sub>12</sub> I <sub>3</sub> O <sub>6</sub> AlH <sub>19</sub> N <sub>2</sub> O <sub>19</sub>	<ul> <li>70: Aluminum oxyhydroxide(β)</li> <li>44: Aluminum hydride</li> <li>45: Aluminum hydroxide</li> <li>46: Aluminum hydroxide(β')</li> <li>47: Aluminum hydroxide(β)</li> <li>1765: Lithium aluminum hydride</li> <li>20: Aluminum aluminum sulfate</li> <li>119: Ammonium aluminum sulfate</li> <li>75: Aluminum phosphate dihydrate</li> <li>51: Aluminum hypophosphite</li> <li>53: Aluminum iodide hexahydrate</li> <li>60: Aluminum nitrate</li> </ul>
$\begin{array}{l} AgI \\ AgIO_3 \\ AgMO_4 \\ AgNO_2 \\ AgNO_3 \\ AgN_3 \\ AgO_4Re \\ Ag_2CrO_4 \\ Ag_2CrO_7 \\ Ag_2F \\ Ag_2F \\ Ag_2HgI_4 \\ \end{array}$	2801: Silver iodide 2800: Silver iodate 2810: Silver permanganate 2805: Silver nitrite 2804: Silver nitrate 2781: Silver azide 2812: Silver perrhenate 2789: Silver chromate 2792: Silver dichromate 2818: Silver subfluoride 2822: Silver tetraiodomercurate(II) $(\alpha$ -form) 2803: Silver molybdate 2807: Silver oxide 2811: Silver peroxide 2811: Silver selenite 2819: Silver sulfate 2815: Silver selenate 2825: Silver tungstate 2820: Silver sulfide	$AIH_3O_3$ $AIH_4Li$ $AIH_4NO_8S_2$ $AIH_4O_6P$ $AIH_6O_6P_3$ $AIH_{12}I_3O_6$ $AIH_{18}N_3O_{18}$	<ul> <li>70: Aluminum oxyhydroxide(β)</li> <li>44: Aluminum hydride</li> <li>45: Aluminum hydroxide(β')</li> <li>47: Aluminum hydroxide(β')</li> <li>47: Aluminum hydroxide(β)</li> <li>1765: Lithium aluminum hydride</li> <li>20: Aluminum aluminum sulfate</li> <li>119: Ammonium aluminum sulfate</li> <li>75: Aluminum phosphate dihydrate</li> <li>51: Aluminum hypophosphite</li> <li>53: Aluminum iodide hexahydrate</li> <li>60: Aluminum nitrate nonahydrate</li> </ul>
$\begin{array}{l} AgI \\ AgIO_3 \\ AgMO_4 \\ AgNO_2 \\ AgNO_3 \\ AgN_3 \\ AgO_4Re \\ Ag_2CrO_4 \\ Ag_2CrO_7 \\ Ag_2F \\ Ag_2F \\ Ag_2HgI_4 \\ \end{array}$	2801: Silver iodide 2800: Silver iodate 2810: Silver permanganate 2805: Silver nitrite 2804: Silver nitrate 2781: Silver azide 2812: Silver perrhenate 2789: Silver chromate 2792: Silver dichromate 2818: Silver subfluoride 2822: Silver tetraiodomercurate(II) $(\alpha$ -form) 2803: Silver molybdate 2811: Silver peroxide 2811: Silver peroxide 2815: Silver sulfate 2815: Silver sulfate 2815: Silver sulfate 2815: Silver sulfate 2825: Silver tungstate 2820: Silver sulfide 2820: Silver sulfide 2816: Silver selenide	$AIH_{3}O_{3}$ $AIH_{4}Li$ $AIH_{4}NO_{8}S_{2}$ $AIH_{4}O_{6}P$ $AIH_{6}O_{6}P_{3}$ $AIH_{12}I_{3}O_{6}$ $AIH_{18}N_{3}O_{18}$ $AIH_{24}KO_{20}S_{2}$	<ul> <li>70: Aluminum oxyhydroxide(β)</li> <li>44: Aluminum hydride</li> <li>45: Aluminum hydroxide</li> <li>46: Aluminum hydroxide(β')</li> <li>47: Aluminum hydroxide(β)</li> <li>1765: Lithium aluminum hydride</li> <li>20: Aluminum aluminum sulfate</li> <li>119: Ammonium aluminum sulfate</li> <li>75: Aluminum phosphate dihydrate</li> <li>51: Aluminum hypophosphite</li> <li>53: Aluminum iodide hexahydrate</li> <li>60: Aluminum nitrate nonahydrate</li> <li>2409: Potassium aluminum</li> </ul>
AgI AgIO <sub>3</sub> AgMnO <sub>4</sub> AgNO <sub>2</sub> AgNO <sub>3</sub> AgN <sub>3</sub> AgO <sub>4</sub> Re Ag <sub>2</sub> CrO <sub>4</sub> Ag <sub>2</sub> CrO <sub>4</sub> Ag <sub>2</sub> CrO <sub>7</sub> Ag <sub>2</sub> F Ag <sub>2</sub> HgI <sub>4</sub> Ag <sub>2</sub> O Ag <sub>2</sub> O <sub>2</sub> Ag <sub>2</sub> O <sub>3</sub> Se Ag <sub>2</sub> O <sub>4</sub> Se Ag <sub>2</sub> O <sub>4</sub> Se Ag <sub>2</sub> O <sub>4</sub> W Ag <sub>2</sub> S Ag <sub>2</sub> Se Ag <sub>2</sub> Se Ag <sub>2</sub> Ne	2801: Silver iodide 2800: Silver iodate 2810: Silver permanganate 2805: Silver nitrite 2804: Silver nitrate 2781: Silver azide 2812: Silver perrhenate 2789: Silver chromate 2792: Silver dichromate 2818: Silver subfluoride 2822: Silver tetraiodomercurate(II) (α-form) 2803: Silver molybdate 2807: Silver oxide 2811: Silver peroxide 2811: Silver peroxide 2815: Silver sulfate 2815: Silver sulfate 2815: Silver sulfate 2825: Silver tungstate 2820: Silver selenide 2821: Silver selenide 2821: Silver selenide	$AIH_3O_3$ $AIH_4Li$ $AIH_4NO_8S_2$ $AIH_4O_6P$ $AIH_6O_6P_3$ $AIH_{12}I_3O_6$ $AIH_{18}N_3O_{18}$ $AIH_{24}KO_{20}S_2$	<ul> <li>70: Aluminum oxyhydroxide(β)</li> <li>44: Aluminum hydride</li> <li>45: Aluminum hydroxide</li> <li>46: Aluminum hydroxide(β')</li> <li>47: Aluminum hydroxide(β)</li> <li>1765: Lithium aluminum hydride</li> <li>20: Aluminum aluminum sulfate</li> <li>119: Ammonium aluminum sulfate</li> <li>75: Aluminum phosphate dihydrate</li> <li>51: Aluminum hypophosphite</li> <li>53: Aluminum iodide hexahydrate</li> <li>60: Aluminum nitrate nonahydrate</li> <li>2409: Potassium aluminum sulfate dodecahydrate</li> </ul>
$\begin{array}{l} AgI \\ AgIO_3 \\ AgMO_4 \\ AgNO_2 \\ AgNO_3 \\ AgN_3 \\ AgO_4Re \\ Ag_2CrO_4 \\ Ag_2CrO_7 \\ Ag_2F \\ Ag_2F \\ Ag_2HgI_4 \\ \end{array}$	2801: Silver iodide 2800: Silver iodate 2810: Silver permanganate 2805: Silver nitrite 2804: Silver nitrate 2781: Silver azide 2812: Silver perrhenate 2789: Silver chromate 2792: Silver dichromate 2818: Silver subfluoride 2822: Silver tetraiodomercurate(II) (α-form) 2803: Silver molybdate 2807: Silver oxide 2811: Silver peroxide 2811: Silver selenite 2819: Silver sulfate 2815: Silver sulfate 2815: Silver sulfate 2825: Silver sulfate 2820: Silver sulfate 2820: Silver selenite 2820: Silver selenite 2821: Silver selenite 2825: Silver sulfate 2825: Silver sulfate 2826: Silver selenite 2827: Silver sulfate 2828: Silver sulfate 2829: Silver sulfate 2821: Silver selenite 2821: Silver selenite 2823: Silver selenite 2824: Silver selenite 2825: Silver selenite 2825: Silver selenite 2826: Silver selenite 2827: Silver selenite 2828: Silver selenite 2829: Silver selenite 2829: Silver selenite 2820: Silver selenite 2821: Silver selenite 2821: Silver selenite 2821: Silver selenite 2821: Silver selenite 2823: Silver selenite 2824: Silver selenite 2825: Silver selenite 2825: Silver selenite 2826: Silver selenite 2827: Silver selenite 2828: Silver selenite 2829: Silver selenite 2821: Silver selenite 2821: Silver selenite 2821: Silver selenite 2821: Silver selenite	$AIH_{3}O_{3}$ $AIH_{4}Li$ $AIH_{4}NO_{8}S_{2}$ $AIH_{4}O_{6}P$ $AIH_{6}O_{6}P_{3}$ $AIH_{12}I_{3}O_{6}$ $AIH_{18}N_{3}O_{18}$ $AIH_{24}KO_{20}S_{2}$ $AIH_{24}NaO_{30}S_{3}$	<ul> <li>70: Aluminum oxyhydroxide(β)</li> <li>44: Aluminum hydride</li> <li>45: Aluminum hydroxide</li> <li>46: Aluminum hydroxide(β')</li> <li>47: Aluminum hydroxide(β)</li> <li>1765: Lithium aluminum hydride</li> <li>20: Aluminum aluminum sulfate</li> <li>119: Ammonium aluminum sulfate</li> <li>75: Aluminum phosphate dihydrate</li> <li>51: Aluminum hypophosphite</li> <li>53: Aluminum iodide hexahydrate</li> <li>60: Aluminum nitrate nonahydrate</li> <li>2409: Potassium aluminum sulfate dodecahydrate</li> <li>2833: Sodium aluminum</li> </ul>
$\begin{array}{l} AgI \\ AgIO_3 \\ AgMO_4 \\ AgNO_2 \\ AgNO_3 \\ AgN_3 \\ AgO_4Re \\ Ag_2CrO_4 \\ Ag_2CrO_4 \\ Ag_2CrO_7 \\ Ag_2F \\ Ag_2HgI_4 \\ \end{array}$	2801: Silver iodide 2800: Silver iodate 2810: Silver permanganate 2805: Silver nitrite 2804: Silver nitrate 2781: Silver azide 2812: Silver perrhenate 2789: Silver chromate 2792: Silver dichromate 2818: Silver subfluoride 2822: Silver tetraiodomercurate(II) (α-form) 2803: Silver molybdate 2807: Silver oxide 2811: Silver peroxide 2811: Silver sulfate 2815: Silver sulfate 2815: Silver sulfate 2815: Silver sulfate 2825: Silver sulfate 2820: Silver sulfate 2820: Silver sulfate 2820: Silver sulfate 2821: Silver selenite 2822: Silver sulfate 2823: Silver sulfate 2824: Silver sulfate 2825: Silver sulfate 2825: Silver sulfate 2826: Silver selenite 2827: Silver sulfate 2828: Silver sulfate 2829: Silver sulfate 2821: Silver selenite 2821: Silver selenite 2823: Silver selenite 2823: Silver selenite 2824: Silver selenite 2825: Silver selenite 2825: Silver selenite 2826: Silver selenite 2827: Silver selenite 2828: Silver selenite 2829: Silver selenite 2821: Silver selenite 2821: Silver selenite 2823: Silver selenite 2823: Silver selenite 2824: Silver selenite 2825: Silver selenite 2825: Silver selenite 2826: Silver selenite 2827: Silver selenite 2828: Silver selenite 2829: Silver selenite 2829: Silver selenite 2821: Silver selenite 2821: Silver selenite 2825: Silver selenite 2825: Silver selenite 2826: Silver selenite 2827: Silver selenite 2827: Silver selenite 2828: Silver selenite 2829: Silve	AIH <sub>3</sub> O <sub>3</sub> AIH <sub>4</sub> Di AIH <sub>4</sub> NO <sub>8</sub> S <sub>2</sub> AIH <sub>4</sub> O <sub>6</sub> P AIH <sub>6</sub> O <sub>6</sub> P <sub>3</sub> AIH <sub>12</sub> I <sub>3</sub> O <sub>6</sub> AIH <sub>18</sub> N <sub>3</sub> O <sub>18</sub> AIH <sub>24</sub> KO <sub>20</sub> S <sub>2</sub> AIH <sub>24</sub> NaO <sub>20</sub> S <sub>2</sub>	<ul> <li>70: Aluminum oxyhydroxide(β)</li> <li>44: Aluminum hydride</li> <li>45: Aluminum hydroxide(β')</li> <li>47: Aluminum hydroxide(β')</li> <li>47: Aluminum hydroxide(β)</li> <li>1765: Lithium aluminum hydride</li> <li>20: Aluminum aluminum sulfate</li> <li>119: Ammonium aluminum sulfate</li> <li>75: Aluminum phosphate dihydrate</li> <li>51: Aluminum hydroxide</li> <li>48: Aluminum hypophosphite</li> <li>53: Aluminum iodide hexahydrate</li> <li>60: Aluminum nitrate nonahydrate</li> <li>2409: Potassium aluminum sulfate dodecahydrate</li> <li>2833: Sodium aluminum sulfate dodecahydrate</li> </ul>
$\begin{array}{l} AgI \\ AgIO_3 \\ AgMO_4 \\ AgNO_2 \\ AgNO_3 \\ AgNO_3 \\ AgN_3 \\ AgO_4Re \\ Ag_2CrO_4 \\ Ag_2CrO_7 \\ Ag_2F \\ Ag_2HgI_4 \\ \\ \\ Ag_2O_4 \\ Ag_2O_2 \\ Ag_2O_2 \\ Ag_2O_3Se \\ Ag_2O_4S \\ Ag_2S \\ Ag_2S \\ Ag_2S \\ Ag_2S \\ Ag_2Te \\ Ag_3O_4P \\ Al \\ AlAs \\ \end{array}$	2801: Silver iodide 2800: Silver iodate 2810: Silver permanganate 2805: Silver nitrite 2804: Silver nitrate 2781: Silver azide 2812: Silver perrhenate 2789: Silver chromate 2792: Silver dichromate 2818: Silver subfluoride 2822: Silver tetraiodomercurate(II) (α-form) 2803: Silver molybdate 2807: Silver peroxide 2811: Silver peroxide 2817: Silver sulfate 2819: Silver sulfate 2815: Silver sulfate 2825: Silver tungstate 2820: Silver sulfate 2820: Silver sulfate 2821: Silver sulfate 2822: Silver sulfate 2825: Silver sulfate 2826: Silver sulfate 2827: Silver sulfate 2828: Silver sulfate 2829: Silver sulfate 2820: Silver sulfate 2821: Silver telluride 2821: Silver telluride 2813: Silver phosphate 16: Aluminum 22: Aluminum arsenide	$AIH_{3}O_{3}$ $AIH_{4}Li$ $AIH_{4}NO_{8}S_{2}$ $AIH_{4}O_{6}P$ $AIH_{6}O_{6}P_{3}$ $AIH_{12}I_{3}O_{6}$ $AIH_{18}N_{3}O_{18}$ $AIH_{24}KO_{20}S_{2}$ $AIH_{24}NaO_{20}S_{2}$ $AIH_{24}NaO_{20}S_{2}$	<ul> <li>70: Aluminum oxyhydroxide(β)</li> <li>44: Aluminum hydride</li> <li>45: Aluminum hydroxide</li> <li>46: Aluminum hydroxide(β')</li> <li>47: Aluminum hydroxide(β)</li> <li>47: Aluminum hydroxide(β)</li> <li>1765: Lithium aluminum hydride</li> <li>20: Aluminum aluminum sulfate</li> <li>119: Ammonium aluminum sulfate</li> <li>75: Aluminum phosphate dihydrate</li> <li>51: Aluminum hydroxide</li> <li>53: Aluminum iodide hexahydrate</li> <li>60: Aluminum nitrate nonahydrate</li> <li>2409: Potassium aluminum sulfate dodecahydrate</li> <li>2833: Sodium aluminum sulfate dodecahydrate</li> <li>2652: Rubidium aluminum</li> </ul>
$\begin{array}{l} AgI \\ AgIO_3 \\ AgMO_4 \\ AgNO_2 \\ AgNO_3 \\ AgNO_3 \\ AgN_3 \\ AgO_4Re \\ Ag_2CrO_4 \\ Ag_2CrO_4 \\ Ag_2CrO_7 \\ Ag_2F \\ Ag_2HgI_4 \\ \\ \\ Ag_2O_4 \\ Ag_2O_4 \\ Ag_2O_2 \\ Ag_2O_2 \\ Ag_2O_4Se $	2801: Silver iodide 2800: Silver iodate 2810: Silver permanganate 2805: Silver nitrite 2804: Silver nitrate 2781: Silver azide 2812: Silver perrhenate 2789: Silver chromate 2792: Silver dichromate 2818: Silver subfluoride 2822: Silver tetraiodomercurate(II) (α-form) 2803: Silver molybdate 2807: Silver oxide 2811: Silver peroxide 2817: Silver sulfate 2819: Silver sulfate 2815: Silver sulfate 2825: Silver tungstate 2820: Silver sulfate 2820: Silver sulfate 2821: Silver sulfate 2822: Silver tungstate 2820: Silver sulfate 2821: Silver sulfate 2821: Silver sulfate 2822: Silver tungstate 2823: Silver tungstate 2821: Silver sulfate 2821: Silver sulfate 2823: Silver sulfate 2824: Silver sulfate 2825: Silver tungstate 2825: Silver tungstate 2826: Silver sulfate 2827: Silver sulfate 2828: Silver sulfate 2829: Silver sulfate 2829: Silver sulfate 2820: Silver sulfate 2821: Silver sulfate 2821: Silver sulfate 2822: Silver tungstate 2823: Silver sulfate 2824: Silver sulfate 2825: Silver sulfate 2825: Silver sulfate 2826: Silver sulfate 2827: Silver sulfate 2828: Silver sulfate 2829: Silver sulfate 2829: Silver sulfate 2820: Silver sulfate 2821: Silver sulfate 2821: Silver sulfate 2825: Silver sulfate 2826: Silver sulfate 2827: Silver sulfate 2827: Silver sulfate 2828: Silver sulfate 2829: Silver sulfate 2820: Silve	AIH <sub>3</sub> O <sub>3</sub> AIH <sub>4</sub> O <sub>3</sub> AIH <sub>4</sub> Li AIH <sub>4</sub> NO <sub>8</sub> S <sub>2</sub> AIH <sub>4</sub> O <sub>6</sub> P AIH <sub>6</sub> O <sub>6</sub> P <sub>3</sub> AIH <sub>12</sub> I <sub>3</sub> O <sub>6</sub> AIH <sub>18</sub> N <sub>3</sub> O <sub>18</sub> AIH <sub>24</sub> KO <sub>20</sub> S <sub>2</sub> AIH <sub>24</sub> NaO <sub>20</sub> S <sub>2</sub>	<ul> <li>70: Aluminum oxyhydroxide(β)</li> <li>44: Aluminum hydride</li> <li>45: Aluminum hydroxide</li> <li>46: Aluminum hydroxide(β')</li> <li>47: Aluminum hydroxide(β)</li> <li>47: Aluminum hydroxide(β)</li> <li>1765: Lithium aluminum hydride</li> <li>20: Aluminum aluminum sulfate</li> <li>119: Ammonium aluminum sulfate</li> <li>75: Aluminum phosphate dihydrate</li> <li>51: Aluminum phosphate</li> <li>dihydrate</li> <li>53: Aluminum iodide hexahydrate</li> <li>60: Aluminum nitrate nonahydrate</li> <li>2409: Potassium aluminum sulfate dodecahydrate</li> <li>2833: Sodium aluminum sulfate dodecahydrate</li> <li>2652: Rubidium aluminum sulfate dodecahydrate</li> </ul>
$\begin{array}{l} AgI \\ AgIO_3 \\ AgMO_4 \\ AgNO_2 \\ AgNO_3 \\ AgNO_3 \\ AgN_3 \\ AgO_4Re \\ Ag_2CrO_4 \\ Ag_2CrO_7 \\ Ag_2F \\ Ag_2HgI_4 \\ \\ \\ Ag_2O_4 \\ Ag_2O_2 \\ Ag_2O_2 \\ Ag_2O_4Se \\ Ag_2Se \\ Ag_2Se \\ Ag_2Se \\ Ag_2Se \\ Ag_2Te \\ Ag_3O_4P \\ AI \\ AIAs \\ AIB_2 \\ AIB_3H_{12} \\ \end{array}$	2801: Silver iodide 2800: Silver iodate 2810: Silver permanganate 2805: Silver nitrite 2804: Silver nitrate 2781: Silver azide 2812: Silver perrhenate 2789: Silver chromate 2792: Silver dichromate 2818: Silver subfluoride 2822: Silver tetraiodomercurate(II) (α-form) 2803: Silver molybdate 2807: Silver peroxide 2811: Silver peroxide 2817: Silver sulfate 2819: Silver sulfate 2815: Silver sulfate 2825: Silver tungstate 2820: Silver sulfate 2820: Silver sulfate 2820: Silver sulfate 2821: Silver sulfate 2821: Silver sulfate 2825: Silver tungstate 2820: Silver sulfate 2821: Silver sulfate 2821: Silver sulfate 2821: Silver sulfate 2821: Silver sulfate 2821: Silver sulfate 2821: Silver sulfate 2823: Silver sulfate 2824: Silver sulfate 2825: Silver sulfate 2825: Silver sulfate 2826: Silver sulfate 2827: Silver sulfate 2828: Silver sulfate 2829: Silver sulfate 2820: Silver sulfate 2821: Silver sulfate 2821: Silver sulfate 2822: Silver sulfate 2823: Silver sulfate 2824: Silver sulfate 2825: Silver sulfate 2825: Silver sulfate 2826: Silver sulfate 2827: Silver sulfate 2827: Silver sulfate 2828: Silver sulfate 2829: Silver sulfate 2829: Silver sulfate 2820: Silver sulfate 2820: Silver sulfate 2821: Silver sulfate 2821: Silver sulfate 2825: Silver sulfate 2826: Silver sulfate 2827: Silver sulfate 2827: Silver sulfate 2828: Silver sulfate 2829: Silver sulfate 2829: Silver sulfate 2829: Silver sulfate 2820: Silver sulfa	AIH <sub>3</sub> O <sub>3</sub> AIH <sub>4</sub> D <sub>3</sub> O <sub>3</sub> AIH <sub>4</sub> Li AIH <sub>4</sub> NO <sub>8</sub> S <sub>2</sub> AIH <sub>4</sub> O <sub>6</sub> P AIH <sub>6</sub> O <sub>6</sub> P <sub>3</sub> AIH <sub>12</sub> I <sub>3</sub> O <sub>6</sub> AIH <sub>12</sub> I <sub>3</sub> O <sub>6</sub> AIH <sub>18</sub> N <sub>3</sub> O <sub>18</sub> AIH <sub>24</sub> KO <sub>20</sub> S <sub>2</sub> AIH <sub>24</sub> NaO <sub>20</sub> S <sub>2</sub> AIH <sub>24</sub> O <sub>20</sub> RbS <sub>2</sub>	<ul> <li>70: Aluminum oxyhydroxide(β)</li> <li>44: Aluminum hydride</li> <li>45: Aluminum hydroxide(β')</li> <li>47: Aluminum hydroxide(β')</li> <li>47: Aluminum hydroxide(β)</li> <li>1765: Lithium aluminum hydride</li> <li>20: Aluminum aluminum sulfate</li> <li>119: Ammonium aluminum sulfate</li> <li>119: Ammonium aluminum sulfate</li> <li>75: Aluminum phosphate dihydrate</li> <li>51: Aluminum hypophosphite</li> <li>53: Aluminum iodide hexahydrate</li> <li>60: Aluminum nitrate nonahydrate</li> <li>2409: Potassium aluminum sulfate dodecahydrate</li> <li>2833: Sodium aluminum sulfate dodecahydrate</li> <li>2652: Rubidium aluminum sulfate dodecahydrate</li> <li>19: Aluminum ammonium</li> </ul>
$\begin{array}{l} AgI \\ AgIO_3 \\ AgMO_4 \\ AgNO_2 \\ AgNO_3 \\ AgNO_3 \\ AgN_3 \\ AgO_4Re \\ Ag_2CrO_4 \\ Ag_2CrO_7 \\ Ag_2F \\ Ag_2HgI_4 \\ \\ \\ Ag_2O \\ Ag_2O_2 \\ Ag_2O_2 \\ Ag_2O_2 \\ Ag_2O_4Se \\ Ag_2Se \\ Ag_2Se \\ Ag_2Se \\ Ag_2Se \\ Ag_2Se \\ Ag_2Ge \\ Ag_3O_4P \\ AI \\ AIB_3 \\ AIB_2 \\ AIB_3H_{12} \\ AIB_{12} \\ AIB_{1$	2801: Silver iodide 2800: Silver iodate 2810: Silver permanganate 2805: Silver nitrite 2804: Silver nitrate 2781: Silver azide 2812: Silver perrhenate 2789: Silver chromate 2792: Silver dichromate 2818: Silver subfluoride 2822: Silver tetraiodomercurate(II) ( $\alpha$ -form) 2803: Silver molybdate 2807: Silver oxide 2811: Silver peroxide 2817: Silver sulfate 2815: Silver sulfate 2815: Silver sulfate 2825: Silver ungstate 2820: Silver sulfide 2820: Silver sulfide 2816: Silver selenite 2820: Silver sulfate 2821: Silver tungstate 2821: Silver tungstate 2821: Silver sulfide 2813: Silver phosphate 16: Aluminum diboride 24: Aluminum diboride 24: Aluminum dodecaboride	AIH <sub>3</sub> O <sub>3</sub> AIH <sub>4</sub> O <sub>3</sub> AIH <sub>4</sub> Li AIH <sub>4</sub> NO <sub>8</sub> S <sub>2</sub> AIH <sub>4</sub> O <sub>6</sub> P AIH <sub>6</sub> O <sub>6</sub> P <sub>3</sub> AIH <sub>12</sub> I <sub>3</sub> O <sub>6</sub> AIH <sub>18</sub> N <sub>3</sub> O <sub>18</sub> AIH <sub>24</sub> KO <sub>20</sub> S <sub>2</sub> AIH <sub>24</sub> NaO <sub>20</sub> S <sub>2</sub> AIH <sub>24</sub> NO <sub>20</sub> S <sub>2</sub>	<ul> <li>70: Aluminum oxyhydroxide(β)</li> <li>44: Aluminum hydride</li> <li>45: Aluminum hydroxide(β')</li> <li>47: Aluminum hydroxide(β')</li> <li>47: Aluminum hydroxide(β)</li> <li>1765: Lithium aluminum hydride</li> <li>20: Aluminum aluminum sulfate</li> <li>119: Ammonium aluminum sulfate</li> <li>75: Aluminum phosphate dihydrate</li> <li>51: Aluminum phosphate</li> <li>dihydrate</li> <li>53: Aluminum iodide hexahydrate</li> <li>60: Aluminum nitrate nonahydrate</li> <li>2409: Potassium aluminum sulfate dodecahydrate</li> <li>2833: Sodium aluminum sulfate dodecahydrate</li> <li>2652: Rubidium aluminum sulfate dodecahydrate</li> <li>19: Aluminum ammonium sulfate dodecahydrate</li> </ul>

$\mathrm{AlH}_{28}\mathrm{NO}_{20}\mathrm{S}_2$	120: Ammonium aluminum sulfate dodecahydrate
All	52: Aluminum iodide
	2408: Potossium aluminum
$AIKO_8S_2$	
AlLaO <sub>3</sub>	1651: Lanthanum aluminum
A11.:O	1909: Lithium mataaluminata
$AILIO_2$	1808: Lithium metaaluminate
AIL $10_6$ S $1_2$	silicate
AlMo <sub>3</sub>	2106: Molybdenum aluminide
AlN	61: Aluminum nitride
AlNaO <sub>2</sub>	2832: Sodium aluminate
AlO <sub>4</sub> P	74: Aluminum phosphate
AlO P.	56 <sup>.</sup> Aluminum
111091 3	metanhosnhata
A 1D	77: Aluminum phosphido
AIP	77. Aluminum phosphide
AISb	21: Aluminum antimonide
$AI_2BaO_4$	323: Barium aluminate
$Al_2Ba_3O_6$	324: Barium aluminate
$Al_2BeO_4$	437: Beryllium aluminate
Al <sub>2</sub> Be <sub>3</sub> O <sub>18</sub> Si <sub>6</sub>	438: Beryllium aluminum
	silicate
Al <sub>2</sub> CaH <sub>2</sub>	709: Calcium
2	tetrahydroaluminate
A1 CaO	614: Calcium aluminate
$A1_2CaO_4$	616: Calaium aluminum
$A_1 Ca_2 O_7 SI$	
$AI_2Ca_3O_6$	615: Calcium aluminate(β)
Al <sub>2</sub> ClH <sub>9</sub> O <sub>7</sub>	49: Aluminum
	hydroxychloride
Al <sub>2</sub> CoO <sub>4</sub>	927: Cobalt aluminate
	953: Cobalt(II) aluminate
$Al_2Cr_2O_6$	33: Aluminum chromate
$Al_2F_{18}H_{18}O_9Si_3$	43: Aluminum
	hexafluorosilicate
	nonahydrate
Al <sub>2</sub> FeO <sub>4</sub>	1634: Iron(II) aluminate
Al <sub>2</sub> H <sub>2</sub> O <sub>7</sub> P	76: Aluminum phosphate
2 3-1	trihydroxide
ALH O.Si.	84: Aluminum silicate
111211409012	dihydrate
ALHKO	2407: Potassium aluminate
$\mathbf{A}_{2}\mathbf{H}_{6}\mathbf{K}_{2}\mathbf{O}_{7}$	tribudrata
	87: Aluminum sulfata
$AI_2 I_{36} O_{30} S_3$	87. Aluminum sunate
$AI_2MgO_4$	18/1: Magnesium aluminum
	oxide
Al <sub>2</sub> MgO <sub>6</sub> Zr	1873: Magnesium aluminum
	zirconate
$Al_2Mo_3O_{12}$	57: Aluminum molybdate
$Al_2O_3$	64: Aluminum oxide
	65: Aluminum oxide( $\alpha$ )
	66: Aluminum oxide(γ)
	67: Aluminum oxide( $\delta$ )
	68: Aluminum $oxide(\kappa)$
Al.O.Sr	3048: Strontium aluminate
A1.O.Si	80: Aluminum silicate
A120551	81: Aluminum silicate
	or. Aluminum sincate
	85: Aluminum silicate
$AI_2O_5I_1$	93: Aluminum titanate

$Al_2O_7Si_2$	79: Aluminum silicate	
$Al_2O_9Te_3$	91: Aluminum tellurite	
$Al_2O_9Zr_3$	96: Aluminum zirconate	AsHNa <sub>2</sub> O <sub>4</sub>
$Al_2O_{12}S_3$	86: Aluminum sulfate	
$Al_2O_{12}W_3$	95: Aluminum tungstate	AsHO <sub>4</sub> Pb
$Al_2S_3$	88: Aluminum sulfide	
Al <sub>2</sub> Se <sub>3</sub>	78: Aluminum selenide	AsH <sub>2</sub> KO <sub>4</sub>
Al <sub>2</sub> Te <sub>3</sub>	90: Aluminum telluride	
Al <sub>2</sub> Zr	97: Aluminum zirconium	AsH <sub>3</sub>
Al <sub>3</sub> Mn	1971: Manganese aluminide	AsH <sub>3</sub> O <sub>3</sub>
Al <sub>3</sub> Ni	2187: Nickel aluminide	AsH <sub>3</sub> O <sub>4</sub>
Al <sub>3</sub> Ta	3113: Tantalum aluminide	AsH <sub>4</sub> O <sub>45</sub>
Al <sub>3</sub> Zr	3586: Zirconium aluminide	
$Al_4B_2O_0$	23: Aluminum borate	
Al <sub>4</sub> Ba	325: Barium aluminide	
$Al_4Mg_2O_{18}Si_5$	1872: Magnesium aluminum silicate	$\mathrm{AsH}_6\mathrm{NO}_4$
$Al_5O_{12}Y_3\\$	3486: Yttrium aluminum	$AsH_9N_2O_4$
A1.0 Si	82: Aluminum silicate	AcH NO
$A1_6O_{13}O_{12}$	2827: Sodium B-aluminum	(anhydrou
$A1_{22}11a_2O_{34}$	ovide	
A.m.	101: A mariaium	$Asn_{15}Na_2O_1$
Alli AmPr	101: Americium bromida	AcH No O
	102. Americium bronnde	$Asn_{24}Na_{3}O_{1}$
AmClO	104. Americium oxychloride	A -T
AmCl <sub>3</sub>	104: Americium chloride	AsI <sub>2</sub>
AmF <sub>3</sub>	105: Americium fluoride	AsI <sub>3</sub>
AmF <sub>4</sub>	114: Americium(IV) fluoride	Asin
AmH <sub>3</sub>	106: Americium hydride	$AsL_{13}O_4$
AmH <sub>3</sub> O <sub>3</sub>	107: Americium hydroxide	AsN1
Aml <sub>3</sub>	108: Americium iodide	AsO <sub>2</sub> Na
AmO <sub>2</sub>	115: Americium(IV) oxide	AsSb <sub>3</sub>
AmO <sub>4</sub> P	112: Americium phosphate	AsY
$Am_2O_3$	109: Americium oxide( $\alpha$ )	$As_2Ba_3$
	110: Americium oxide( $\beta$ )	$As_2Ca_3O_8$
$Am_2S_3$	113: Americium sulfide	$As_2Cd_3$
Ar	290: Argon	$As_2Co$
ArF	291: Argon fluoride	$As_2Co_3H_{16}O$
As	292: Arsenic( $\alpha$ )	
	293: Arsenic(β)	$As_2Cu_3O_8$
AsBiO <sub>4</sub>	472: Bismuth arsenate	As <sub>2</sub> Fe <sub>3</sub> H <sub>12</sub> O
AsBr <sub>3</sub>	301: Arsenic(III) bromide	
AsCaHO <sub>3</sub>	618: Calcium arsenite	$As_2Fe_3O_8$
AsCl <sub>3</sub>	302: Arsenic(III) chloride	$As_2Fe_4H_{10}O$
AsCo	930: Cobalt arsenide	$As_2HKO_4$
AsCoS	929: Cobalt arsenic sulfide	
AsCr <sub>2</sub>	863: Chromium arsenide	As <sub>2</sub> H <sub>3</sub> KO <sub>5</sub>
AsCuHO <sub>3</sub>	1062: Copper(II) arsenite	
AsCu <sub>3</sub>	1031: Copper arsenide	$As_2H_{16}Ni_{13}C$
AsF <sub>3</sub>	303: Arsenic(III) fluoride	
AsF <sub>5</sub>	311: Arsenic(V) fluoride	$As_2H_{16}O_{16}Zt$
AsF <sub>6</sub> K	2457: Potassium	
	hexafluoroarsenate(V)	$As_2Mg_3$
AsF <sub>6</sub> Li	1794: Lithium	As2Mg3O8
	hexafluoroarsenate	(anhydrou
AsF <sub>6</sub> Na	2891: Sodium	$As_2O_3$
-	hexafluoroarsenate	
AsF <sub>9</sub> Xe <sub>2</sub>	3455: Xenon fluoride	$As_2O_4Pb$
, 2	hexafluoroarsenate	$As_2O_4Zn$
AsF <sub>11</sub> Xe	3461: Xenon pentafluoride	As <sub>2</sub> O <sub>5</sub>
	hexafluoroarsenate	As <sub>2</sub> O <sub>2</sub> Pb <sub>2</sub>
AsFe	1617: Iron arsenide	As <sub>2</sub> S <sub>2</sub>
AsFeH.O.	1265: Ferric arsenate	As <sub>2</sub> S <sub>2</sub>
	dihvdrate	As <sub>2</sub> S <sub>2</sub>
AsGa	1381: Gallium arsenide	As <sub>5</sub> Se
AsHHgO	2063: Mercury(II) arsenate	As <sub>2</sub> Se <sub>2</sub>
0 - 4		2 . 3

	2076: Mercury(II) hydrogen
	arsenate
	2902: Sodium hydrogen
	1752: Lead(II) bydrogen
	arsenate
	2433: Potassium dihydrogen
	arsenate
	316: Arsine
	315: Arsenious acid
	294: Arsenic acid
	295: Arsenic acid
	hemihydrate
	310: Arsenic(V) acid
	hemihydrate
	143: Ammonium dihydrogen
	arsenate
	1//: Ammonium hydrogen
	121: Ammonium arconato
16)	hydrate
	2903: Sodium hydrogen
11	arsenate heptahydrate
16	2837: Sodium arsenate
10	dodecahydrate
	299: Arsenic(II) iodide
	304: Arsenic(III) iodide
	1555: Indium arsenide
	1768: Lithium arsenate
	2193: Nickel arsenide
	2838: Sodium arsenite
	258: Antimony arsenide
	3488: Hurium arsenide
	527: Barluin arsenate
	561: Cadmium arsenide
	932: Cobalt arsenide
) <sub>16</sub>	954: Cobalt(II) arsenate
10	octahydrate
	1061: Copper(II) arsenate
14	1306: Ferrous arsenate
	hexahydrate
	1635: Iron(II) arsenate
) <sub>14</sub>	1267: Ferric basic arsenite
	24/0: Potassium hydrogen
	arsenite
	monohydrate
)	2192: Nickel arsenate
16	octahydrate
n <sub>3</sub>	3519: Zinc arsenate
5	octahydrate
	1878: Magnesium arsenide
	1877: Magnesium arsenate
1S)	hydrate
	305: Arsenic(III) oxide
	306: Arsenic(III) oxide
	1691: Lead arsenite
	3321: Zilic arsenne
	1690. Lead arsenate
	300: Arsenic(II) sulfide
	308: Arsenic(III) sulfide
	314: Arsenic(V) sulfide
	298: Arsenic hemiselenide
	307: Arsenic(III) selenide

2 5	313: Arsenic(V) selenide
As <sub>2</sub> Te <sub>3</sub>	309: Arsenic(III) telluride
As <sub>2</sub> Zn <sub>3</sub>	3520: Zinc arsenide
As <sub>3</sub> Co	931: Cobalt arsenide
$As_4S_4$	296: Arsenic disulfide
At	317: Astatine
Au	1428: Gold
AuBr	1429: Gold(I) bromide
AuBr <sub>3</sub>	1435: Gold(III) bromide
AuBr <sub>4</sub> H <sub>4</sub> KO <sub>2</sub>	2535: Potassium
	tetrabromoaurate(III)
	dihydrate
AuBr <sub>4</sub> H <sub>11</sub> O <sub>5</sub>	1538: Hydrogen
	tetrabromoaurate(III)
	pentahydrate
AuBr <sub>4</sub> Na	2998: Sodium
	tetrabromoaurate(III)
AuCl	1431: Gold(I) chloride
AuCl <sub>3</sub>	1436: Gold(III) chloride
AuCl <sub>4</sub> H	1540: Hydrogen
(anhydrous)	tetrachloroaurate(III)
	hydrate
AuCl <sub>4</sub> H <sub>4</sub> KO <sub>2</sub>	2539: Potassium
	tetrachloroaurate(III)
	dihydrate
AuCl <sub>4</sub> H <sub>4</sub> N	237: Ammonium
(anhydrous)	tetrachloroaurate(III)
	hydrate
AuCl <sub>4</sub> H <sub>4</sub> NaO <sub>2</sub>	3000: Sodium
	tetrachloroaurate(III)
	dihydrate
AuCl <sub>4</sub> H <sub>9</sub> O <sub>4</sub>	550: Chloroauric(III) acid
	tetrahydrate
	1541: Hydrogen
	tetrachloroaurate(III)
	tetrahydrate
AuCl <sub>4</sub> K	2538: Potassium
	tetrachloroaurate(III)
AuF <sub>3</sub>	1438: Gold(III) fluoride
AuH <sub>3</sub> O <sub>3</sub>	1439: Gold(III) hydroxide
AuH <sub>4</sub> Na <sub>3</sub> O <sub>8</sub> S <sub>4</sub>	2881: Sodium gold
	thiosulfate dihydrate
AuH <sub>6</sub> KO <sub>5</sub>	thiosulfate dihydrate 2443: Potassium gold(III)
AuH <sub>6</sub> KO <sub>5</sub>	thiosulfate dihydrate 2443: Potassium gold(III) oxide trihydrate
AuH <sub>6</sub> KO <sub>5</sub> AuI	thiosulfate dihydrate 2443: Potassium gold(III) oxide trihydrate 1433: Gold(I) iodide
AuH <sub>6</sub> KO <sub>5</sub> AuI AuI <sub>3</sub>	thiosulfate dihydrate 2443: Potassium gold(III) oxide trihydrate 1433: Gold(I) iodide 1440: Gold(III) iodide
AuH <sub>6</sub> KO <sub>5</sub> AuI AuI <sub>3</sub> AuI <sub>4</sub> K	thiosulfate dihydrate 2443: Potassium gold(III) oxide trihydrate 1433: Gold(I) iodide 1440: Gold(III) iodide 2549: Potassium
AuH <sub>6</sub> KO <sub>5</sub> AuI AuI <sub>3</sub> AuI <sub>4</sub> K	thiosulfate dihydrate 2443: Potassium gold(III) oxide trihydrate 1433: Gold(I) iodide 1440: Gold(III) iodide 2549: Potassium tetraiodoaurate(III)
$AuH_6KO_5$ AuI $AuI_3$ $AuI_4K$ $Au_2O_3$	thiosulfate dihydrate 2443: Potassium gold(III) oxide trihydrate 1433: Gold(I) iodide 1440: Gold(III) iodide 2549: Potassium tetraiodoaurate(III) 1441: Gold(III) oxide
AuH <sub>6</sub> KO <sub>5</sub> AuI AuI <sub>3</sub> AuI <sub>4</sub> K Au <sub>2</sub> O <sub>3</sub> Au <sub>2</sub> O <sub>12</sub> Se <sub>3</sub>	thiosulfate dihydrate 2443: Potassium gold(III) oxide trihydrate 1433: Gold(I) iodide 1440: Gold(III) iodide 2549: Potassium tetraiodoaurate(III) 1441: Gold(III) oxide 1442: Gold(III) selenate
$AuH_{6}KO_{5}$ $AuI$ $AuI_{3}$ $AuI_{4}K$ $Au_{2}O_{3}$ $Au_{2}O_{12}Se_{3}$ $Au_{2}S$	thiosulfate dihydrate 2443: Potassium gold(III) oxide trihydrate 1433: Gold(I) iodide 1440: Gold(III) iodide 2549: Potassium tetraiodoaurate(III) 1441: Gold(III) oxide 1442: Gold(III) selenate 1434: Gold(I) sulfide
$AuH_{6}KO_{5}$ $AuI$ $AuI_{3}$ $AuI_{4}K$ $Au_{2}O_{3}$ $Au_{2}O_{12}Se_{3}$ $Au_{2}S$ $Au_{2}S$ $Au_{2}S_{3}$	thiosulfate dihydrate 2443: Potassium gold(III) oxide trihydrate 1433: Gold(I) iodide 1440: Gold(III) iodide 2549: Potassium tetraiodoaurate(III) 1441: Gold(III) oxide 1442: Gold(III) selenate 1434: Gold(I) sulfide 1444: Gold(III) sulfide
$AuH_{6}KO_{5}$ AuI $AuI_{3}$ $AuI_{4}K$ $Au_{2}O_{3}$ $Au_{2}O_{12}Se_{3}$ $Au_{2}S$ $Au_{2}S$ $Au_{2}S_{3}$ $Au_{2}Se_{3}$	thiosulfate dihydrate 2443: Potassium gold(III) oxide trihydrate 1433: Gold(I) iodide 1440: Gold(III) iodide 2549: Potassium tetraiodoaurate(III) 1441: Gold(III) oxide 1442: Gold(III) selenate 1434: Gold(II) sulfide 1444: Gold(III) sulfide 1443: Gold(III) selenide
$AuH_{6}KO_{5}$ AuI $AuI_{3}$ $AuI_{4}K$ $Au_{2}O_{3}$ $Au_{2}O_{12}Se_{3}$ $Au_{2}S$ $Au_{2}S$ $Au_{2}S_{3}$ $Au_{2}Se_{3}$ B	thiosulfate dihydrate 2443: Potassium gold(III) oxide trihydrate 1433: Gold(I) iodide 1440: Gold(III) iodide 2549: Potassium tetraiodoaurate(III) 1441: Gold(III) oxide 1442: Gold(III) selenate 1434: Gold(II) sulfide 1444: Gold(III) sulfide 1443: Gold(III) selenide 524: Boron
$AuH_{6}KO_{5}$ $AuI$ $AuI_{3}$ $AuI_{4}K$ $Au_{2}O_{3}$ $Au_{2}O_{12}Se_{3}$ $Au_{2}S$ $Au_{2}S_{3}$ $Au_{2}Se_{3}$ $B$ $BAs$	thiosulfate dihydrate 2443: Potassium gold(III) oxide trihydrate 1433: Gold(I) iodide 1440: Gold(III) iodide 2549: Potassium tetraiodoaurate(III) 1441: Gold(III) oxide 1442: Gold(III) selenate 1434: Gold(II) selenate 1444: Gold(III) sulfide 1444: Gold(III) sulfide 1443: Gold(III) selenide 524: Boron 525: Boron arsenide
$AuH_{6}KO_{5}$ $AuI$ $AuI_{3}$ $AuI_{4}K$ $Au_{2}O_{3}$ $Au_{2}O_{12}Se_{3}$ $Au_{2}S$ $Au_{2}S_{3}$ $Au_{2}Se_{3}$ $B$ $BAs$ $BBe_{2}$	thiosulfate dihydrate 2443: Potassium gold(III) oxide trihydrate 1433: Gold(I) iodide 1440: Gold(III) iodide 2549: Potassium tetraiodoaurate(III) 1441: Gold(III) oxide 1442: Gold(III) selenate 1434: Gold(II) selenate 1434: Gold(II) sulfide 1444: Gold(III) sulfide 1443: Gold(III) selenide 524: Boron 525: Boron arsenide 442: Beryllium boride-II
$AuH_6KO_5$ $AuI$ $AuI_3$ $AuI_4K$ $Au_2O_3$ $Au_2O_{12}Se_3$ $Au_2S$ $Au_2S_3$ $Au_2S_3$ $Bu_2S_3$ $BBe_2$ $BBe_4$	thiosulfate dihydrate 2443: Potassium gold(III) oxide trihydrate 1433: Gold(I) iodide 1440: Gold(III) iodide 2549: Potassium tetraiodoaurate(III) 1441: Gold(III) oxide 1442: Gold(III) selenate 1434: Gold(I) sulfide 1444: Gold(III) sulfide 1444: Gold(III) selenide 524: Boron 525: Boron arsenide 442: Beryllium boride-II 441: Beryllium boride-I
$AuH_6KO_5$ $AuI$ $AuI_3$ $AuI_4K$ $Au_2O_3$ $Au_2O_{12}Se_3$ $Au_2S$ $Au_2S_3$ $Au_2S_3$ $Bu_2S_3$ $BBe_2$ $BBe_4$ $BBr_3$	thiosulfate dihydrate 2443: Potassium gold(III) oxide trihydrate 1433: Gold(I) iodide 1440: Gold(II) iodide 2549: Potassium tetraiodoaurate(III) 1441: Gold(III) oxide 1442: Gold(III) selenate 1434: Gold(III) sulfide 1444: Gold(III) sulfide 1443: Gold(III) selenide 524: Boron 525: Boron arsenide 442: Beryllium boride-II 441: Beryllium boride-I 533: Boron tribromide
$\begin{array}{l} AuH_{6}KO_{5}\\ \\ AuI\\ AuI_{3}\\ AuI_{4}K\\ \\ Au_{2}O_{3}\\ Au_{2}O_{12}Se_{3}\\ \\ Au_{2}S\\ Au_{2}S\\ \\ Au_{2}S_{3}\\ \\ Au_{2}Se_{3}\\ \\ B\\ \\ BAs\\ \\ BBe_{2}\\ \\ BBe_{4}\\ \\ BBr_{3}\\ \\ BCd_{5}H_{36}O_{58}W_{12}\\ \end{array}$	thiosulfate dihydrate 2443: Potassium gold(III) oxide trihydrate 1433: Gold(I) iodide 1440: Gold(II) iodide 2549: Potassium tetraiodoaurate(III) 1441: Gold(III) oxide 1442: Gold(III) selenate 1434: Gold(II) sulfide 1444: Gold(III) sulfide 1444: Gold(III) sulfide 1443: Gold(III) selenide 524: Boron 525: Boron arsenide 442: Beryllium boride-II 441: Beryllium boride-I 533: Boron tribromide 563: Cadmium
$\begin{array}{l} AuH_6KO_5\\ AuI\\ AuI_3\\ AuI_4K\\ Au_2O_3\\ Au_2O_{12}Se_3\\ Au_2S\\ Au_2S\\ Au_2S_3\\ Au_2Se_3\\ B\\ BAs\\ BBe_2\\ BBe_4\\ BBr_3\\ BCd_5H_{36}O_{58}W_{12} \end{array}$	thiosulfate dihydrate 2443: Potassium gold(III) oxide trihydrate 1433: Gold(I) iodide 1440: Gold(II) iodide 2549: Potassium tetraiodoaurate(III) 1441: Gold(III) oxide 1442: Gold(III) selenate 1434: Gold(II) sulfide 1444: Gold(III) sulfide 1444: Gold(III) sulfide 1443: Gold(III) selenide 524: Boron 525: Boron arsenide 442: Beryllium boride-II 441: Beryllium boride-II 533: Boron tribromide 563: Cadmium borotungstate
$\begin{array}{l} AuH_6KO_5\\ AuI\\ AuI_3\\ AuI_4K\\ Au_2O_3\\ Au_2O_{12}Se_3\\ Au_2S\\ Au_2S\\ Au_2S_3\\ Au_2Se_3\\ B\\ BAs\\ BBe_2\\ BBe_4\\ BBr_3\\ BCd_5H_{36}O_{58}W_{12} \end{array}$	thiosulfate dihydrate 2443: Potassium gold(III) oxide trihydrate 1433: Gold(I) iodide 1440: Gold(II) iodide 2549: Potassium tetraiodoaurate(III) 1441: Gold(III) oxide 1442: Gold(III) selenate 1434: Gold(II) sulfide 1444: Gold(III) sulfide 1444: Gold(III) selenide 524: Boron 525: Boron arsenide 442: Beryllium boride-II 441: Beryllium boride-II 533: Boron tribromide 563: Cadmium borotungstate octadecahydrate
$AuH_6KO_5$ $AuI$ $AuI_3$ $AuI_4K$ $Au_2O_3$ $Au_2O_{12}Se_3$ $Au_2S$ $Au_2S_3$ $Au_2S_3$ $BBe_2$ $BBe_2$ $BBe_4$ $BBr_3$ $BCd_5H_{36}O_{58}W_{12}$ $BCl_3$	thiosulfate dihydrate 2443: Potassium gold(III) oxide trihydrate 1433: Gold(I) iodide 1440: Gold(II) iodide 2549: Potassium tetraiodoaurate(III) 1441: Gold(III) oxide 1442: Gold(III) oxide 1442: Gold(III) sulfide 1444: Gold(III) sulfide 1444: Gold(III) sulfide 1443: Gold(III) selenide 524: Boron 525: Boron arsenide 442: Beryllium boride-II 441: Beryllium boride-II 533: Boron tribromide 563: Cadmium borotungstate octadecahydrate 534: Boron trichloride
$\begin{array}{c} AuH_6KO_5 \\ \\ AuI \\ AuI_3 \\ AuI_4K \\ \\ Au_2O_3 \\ Au_2O_12Se_3 \\ Au_2S \\ Au_2S \\ Au_2S \\ Au_2Se_3 \\ B \\ BAs \\ BBe_2 \\ BBe_4 \\ BBe_2 \\ BBe_4 \\ BBr_3 \\ BCd_5H_{36}O_{58}W_{12} \\ \end{array}$	thiosulfate dihydrate 2443: Potassium gold(III) oxide trihydrate 1433: Gold(I) iodide 1440: Gold(III) iodide 2549: Potassium tetraiodoaurate(III) 1441: Gold(III) oxide 1442: Gold(III) oxide 1442: Gold(III) sulfide 1444: Gold(III) sulfide 1444: Gold(III) sulfide 1443: Gold(III) selenide 524: Boron 525: Boron arsenide 442: Beryllium boride-II 441: Beryllium boride-II 533: Boron tribromide 563: Cadmium borotungstate octadecahydrate 534: Boron trichloride 933: Cobalt boride
$\begin{array}{c} AuH_6KO_5 \\ \\ AuI \\ AuI_3 \\ AuI_4K \\ \\ Au_2O_3 \\ Au_2O_12Se_3 \\ Au_2S \\ Au_2S \\ Au_2S \\ Au_2Se_3 \\ B \\ BAs \\ BBe_2 \\ BBe_4 \\ BBe_3 \\ BCd_5H_{36}O_{58}W_{12} \\ \\ \end{array}$	thiosulfate dihydrate 2443: Potassium gold(III) oxide trihydrate 1433: Gold(I) iodide 1440: Gold(III) iodide 2549: Potassium tetraiodoaurate(III) 1441: Gold(III) oxide 1442: Gold(III) oxide 1442: Gold(III) sulfide 1444: Gold(III) sulfide 1444: Gold(III) sulfide 1443: Gold(III) selenide 524: Boron 525: Boron arsenide 442: Beryllium boride-II 441: Beryllium boride-II 533: Boron tribromide 563: Cadmium borotungstate octadecahydrate 534: Boron trichloride 933: Cobalt boride
$\begin{array}{c} AuH_{6}KO_{5} \\ \\ AuI_{4}AuI_{3} \\ AuI_{4}K \\ \\ Au_{2}O_{3} \\ Au_{2}O_{12}Se_{3} \\ Au_{2}S_{3} \\ Au_{2}S_{3} \\ Au_{2}Se_{3} \\ \\ BBe_{4} \\ BBe_{2} \\ BBe_{4} \\ BBr_{3} \\ BCd_{5}H_{36}O_{58}W_{12} \\ \\ \end{array}$	thiosulfate dihydrate 2443: Potassium gold(III) oxide trihydrate 1433: Gold(I) iodide 1440: Gold(III) iodide 2549: Potassium tetraiodoaurate(III) 1441: Gold(III) oxide 1442: Gold(III) oxide 1442: Gold(III) sulfide 1444: Gold(III) sulfide 1444: Gold(III) sulfide 1443: Gold(III) selenide 524: Boron 525: Boron arsenide 442: Beryllium boride-II 441: Beryllium boride-I 533: Boron tribromide 563: Cadmium borotungstate octadecahydrate 534: Boron trichloride 933: Cobalt boride 870: Chromium monoboride

BCsF <sub>4</sub>	809: Cesium fluoroborate	$B_2CaH_{14}O_{13}$	680: Calcium perborate	$B_4H_{10}O_{14}Zn_3$	3524: Zinc borate
BCsO <sub>2</sub>	820: Cesium metaborate		heptahydrate		pentahydrate
BD <sub>4</sub> Na	2840: Sodium	$B_2CaO_4$	666: Calcium metaborate	$B_4H_{11}NO_{10}$	178: Ammonium hydrogen
	borodeuteride	$B_2CdF_8$	603: Cadmium		borate trihydrate
BF <sub>3</sub>	535: Boron trifluoride		tetrafluoroborate	$B_4H_{16}MnO_{15}$	1994: Manganese(II) borate
BF <sub>4</sub> H	1344: Fluoroboric acid	$B_2Cl_4$	31/4: Tetrachlorodiborane		octahydrate
$BF_4H_4N$	154: Ammonium	$B_2COO_4 (x = 0)$	939: Cobalt metaborate		2026: Manganese(II)
DEV	nuoroborate	D Ca	nydrate		225: A mmonium totrohomoto
dΓ <sub>4</sub> κ	2346: Polassiulli tetrafluoroborate	B CuF	1132: Copper(II)	$\mathbf{D}_{4}\mathbf{\Pi}_{16}\mathbf{N}_{2}\mathbf{O}_{11}$	255. Allinollium tetraborate
BEI	1830: Lithium	$\mathbf{D}_2\mathbf{Cur}_8$	tetrafluoroborate	BH Na O	2005: Sodium tetraborate
DI <sub>4</sub> LI	tetrafluoroborate	B-CuO.	1068: Copper(II) borate	$\mathbf{D}_{4}\mathbf{D}_{20}\mathbf{D}_{17}$	decabydrate
BE.NO.	2289: Nitronium	$B_2 CuO_4$ B_F_Sn	3032: Stannous fluoroborate	B.Ho	1496: Holmium boride
DI 41102	tetrafluoroborate	$\mathbf{B}_{2}\mathbf{F}_{2}\mathbf{S}\mathbf{n}$	3183: Tetrafluorodiborane	B.Li <sub>2</sub> O <sub>2</sub>	1834: Lithium tetraborate
BF₄Na	2876: Sodium fluoroborate	B <sub>2</sub> F <sub>4</sub> B <sub>2</sub> F <sub>8</sub> H <sub>12</sub> NiO <sub>6</sub>	2239: Nickel	B <sub>4</sub> Lu	1847: Lutetium boride
BF₄Rb	2664: Rubidium	-2-8-120	tetrafluoroborate	$B_4Na_2O_7$	2994: Sodium tetraborate
+	fluoroborate		hexahydrate	$\dot{B}_{4}O_{0}Zn_{3}$	3522: Zinc borate
BF <sub>8</sub> N	242: Ammonium	$B_2F_8H_{12}O_6Zn$	3540: Zinc fluoroborate	B <sub>4</sub> Si	2760: Silicon boride
-	tetrafluoroborate		hexahydrate	$B_4U$	3378: Uranium tetraboride
BFe	1618: Iron boride	$B_2F_8Pb$	1707: Lead fluoroborate	$B_5H_9$	2333: Pentaborane(9)
BFe <sub>2</sub>	1619: Iron boride	$B_2H_2K_2O_7$	2502: Potassium perborate	$B_5H_{11}$	2332: Pentaborane(11)
$BH_2NaO_4$	2954: Sodium perborate		monohydrate	$B_5H_{12}NO_{12}$	210: Ammonium pentaborate
	monohydrate	$B_2H_2O_5Pb$	1695: Lead borate		tetrahydrate
BH <sub>3</sub> O <sub>3</sub>	520: Orthoboric acid		monohydrate	$B_5Mo_2$	2116: Molybdenum
$BH_4K$	2414: Potassium borohydride	$B_2H_6$	1159: Diborane(6)		pentaboride
BH <sub>4</sub> Li	1771: Lithium borohydride	$B_2H_{14}MgO_{13}$	1933: Magnesium perborate	$B_5W_2$	3354: Tungsten pentaboride
BH <sub>4</sub> LiO <sub>4</sub>	1810: Lithium metaborate		heptahydrate	B <sub>6</sub> Ba	359: Barium hexaboride
	dihydrate	$B_2H_{16}MgO_{12}$	1881: Magnesium borate	B <sub>6</sub> Be	444: Beryllium boride-IV
BH <sub>4</sub> Na	2841: Sodium borohydride		octahydrate	B <sub>6</sub> Ca	621: Calcium boride
$BH_4NaO_4$	2931: Sodium metaborate		1918: Magnesium metaborate	$B_6Ca_2H_{10}O_{16}$	651: Calcium hexaborate
DUDI	dihydrate	D HC	octahydrate	D.C.	pentahydrate
BH <sub>4</sub> Kb	2683: Rubidium	B <sub>2</sub> Hf	1447: Hatnium boride	B <sub>6</sub> Ce	760: Cerium hexaboride
DU NoO	2022: Sadium matcharata	B <sub>2</sub> Mg	1882: Magnesium diboride	B <sub>6</sub> Eu B C d	1259: Europium boride
DH <sub>8</sub> NaO <sub>6</sub>	2952: Souluin metaborate	D Mn	1901: Magnesium diboride		2522: Zing bornto
BH NaO	2055: Sodium perhorate	D <sub>2</sub> IVIII B Nb	2240: Nichium boride	$\mathbf{D}_{6}\mathbf{\Pi}_{7}\mathbf{O}_{14.5}\mathbf{Z}\mathbf{\Pi}_{2}$	bemihentahydrate
<b>D</b> 11 <sub>8</sub> 1 <b>v</b> a <b>O</b> <sub>7</sub>	tetrahydrate	<b>D</b> <sub>2</sub> <b>N0</b>	2251: Niobium diboride	B.H.,	1473: Hexaborane(10)
BHO.	521: Metaboric acid-α-Form	B.O.	528: Boron oxide	B <sub>6</sub> H <sub>10</sub>	1475: Hexaborane(10)
<b>D</b> 110 <sub>2</sub>	522: Metaboric acid-8-Form	$D_2 O_3$	529: Boron oxide glass	B.L.a	1652: Lanthanum boride
BL	537: Boron trijodide	B <sub>2</sub> S <sub>2</sub>	538: Boron trisulfide	B <sub>6</sub> Mg	1883: Magnesium boride
BLiO	1770: Lithium borate	B <sub>2</sub> S <sub>5</sub> B <sub>2</sub> Sc	2723: Scandium boride	B <sub>4</sub> Nd	2154: Neodymium boride
- 2	1809: Lithium metaborate	B <sub>2</sub> Ta	3116: Tantalum diboride	B <sub>6</sub> Pr	2575: Praseodymium boride
BMn	1976: Manganese boride	B <sub>2</sub> Ti	3281: Titanium boride	B <sub>6</sub> Si	532: Boron silicide
BMn <sub>2</sub>	1977: Manganese boride	$\dot{B_2U}$	3369: Uranium diboride	B <sub>6</sub> Sm	2701: Samarium boride
BMo <sub>2</sub>	2107: Molybdenum boride	$\tilde{\mathbf{B}_{2}\mathbf{V}}$	3410: Vanadium diboride	B <sub>6</sub> Sr	3061: Strontium hexaboride
BN	527: Boron nitride	$\mathbf{B}_{2}\mathbf{Z}\mathbf{r}$	3587: Zirconium boride	B <sub>6</sub> Th	3239: Thorium hexaboride
BNaO <sub>2</sub>	2930: Sodium metaborate	B <sub>3</sub> Cr <sub>5</sub>	865: Chromium boride	B <sub>6</sub> Y	3492: Yttrium boride
BNb	2248: Niobium boride	$B_3H_6N_3$	519: Borazole	$B_9H_{15}$	2299: Nonaborane(15)
	2254: Niobium monoboride	$B_3Re_7$	2611: Rhenium boride	$B_{10}H_{14}$	1151: Decaborane(14)
BNi	2197: Nickel boride	B <sub>4</sub> CaH <sub>12</sub> O <sub>13</sub>	620: Calcium borate	$B_{10}H_{16}$	1152: Decaborane(16)
BNi <sub>2</sub>	2196: Nickel boride		hexahydrate		1188: Dodecaborane(16)
BNi <sub>3</sub>	2198: Nickel boride	B <sub>4</sub> Dy	1192: Dysprosium boride	$B_{10}H_{16}K_2O_{24}$	2499: Potassium pentaborate
BO <sub>4</sub> P	530: Boron phosphate	$B_4Er$	1215: Erbium boride		octahydrate
BP	531: Boron phosphide	$B_4H_8K_2O_{11}$	2534: Potassium tetraborate	B <sub>12</sub> Mg	1904: Magnesium
ВТа	3114: Tantalum boride		tetrahydrate		dodecaboride
BV	3417: Vanadium	$B_4H_8Na_2O_{11}$	2997: Sodium tetraborate	$B_{13}H_{19}$	3319: Tridecaborane(19)
	monoboride	B. 11. 110	tetrahydrate	$B_{14}H_{18}$	3175: Tetradecaborane(18)
BW	3330: Tungsten boride	$B_4H_9NO_9$	190: Ammonium hydrogen	$B_{16}H_{20}$	14/6: Hexadecaborane(20)
ыw <sub>2</sub>	3331: Tungsten boride	DII	tetraborate dihydrate	B <sub>18</sub> H <sub>22</sub>	2298: Octadecaborane(22)
$B_2BaH_2O_5$	5//: Barium metaborate		51/2: letraborane(10)		318: Barium
	mononyurate	$\mathbf{D}_4\mathbf{\Pi}_{10}\mathbf{K}_2\mathbf{O}_{12}$	2000: Folassium letraborate	$Da_{0.5}SO_{12}P_3Zr_2$	+30: Darium Zirconium
$\mathbf{D}_2\mathbf{D}\mathbf{a}\mathbf{\Pi}_4\mathbf{U}_6$	dihydroto	RHIO	1835: Lithium tatraharata	B <sup>0</sup> B:O	230: Barium biomuth avid
B Be	443. Beryllium horide III	$\mathbf{D}_{4}\mathbf{\Pi}_{10}\mathbf{L}\mathbf{I}_{2}\mathbf{U}_{12}$	nentabydrate	BaBr	333. Barium bromide
B <sub>2</sub> BeH	445: Beryllium borohydride	B.H. Na O	2996: Sodium tetrahorate	BaBr.H O	332. Barium bromate
$B_2BCH_8$	3173. Tetrabromodiborane	$D_4 I_{10} a_2 O_{12}$	nentabydrate	<b>D</b> a <b>D1</b> <sub>2</sub> <b>1</b> <sub>2</sub> <b>0</b> <sub>7</sub>	monohydrate
- 24	circle reactoring and on the		Permany arano		

$BaBr_2H_4O_2$	334: Barium bromide	$BaO_3S$	411: Barium sulfite	$BeCl_2$	449: Beryllium chloride
	dihydrate	$BaO_3S_2$	419: Barium thiosulfate	BeCl <sub>2</sub> H <sub>8</sub> O <sub>12</sub>	461: Beryllium perchlorate
BaBr <sub>2</sub> O	331: Barium bromate	BaO <sub>2</sub> Se	397: Barium selenite	2 0 12	tetrahydrate
BaClE	3/2: Barium chloride fluoride	BaO Si	370: Barium metasilicate	BeE	450: Beryllium fluoride
D <sub>a</sub> Cl	240: Danierre ablanida	DaO <sub>3</sub> SI	402. Derivers sternets		450. Der ymum nuor de
BaCl <sub>2</sub>	340: Barium chloride	BaO <sub>3</sub> Sh	403: Barium stannate	$BeF_4H_4K_2O_2$	2547: Polassium
$BaCl_2H_2O_7$	339: Barium chlorate	BaO <sub>3</sub> Ti	423: Barium titanate		tetrafluoroberyllate
	monohydrate	BaO <sub>3</sub> Zr	429: Barium zirconate		dihydrate
BaCl <sub>2</sub> H <sub>4</sub> O <sub>2</sub>	341: Barium chloride	BaO <sub>4</sub> S	408: Barium sulfate	BeF <sub>4</sub> Na <sub>2</sub>	3002: Sodium
	dihydrate	BaO	395: Barium selenate		tetrafluorobervllate
BaCl H O	390: Barium perchlorate	BaO W	425: Barium tungstate	BeHO P	453: Beryllium hydrogen
Baci <sub>2</sub> 11 <sub>6</sub> O <sub>11</sub>	syo. Darium peremorate	D <sub>4</sub> O <sub>4</sub>	421. De siene - in - siene	Dello <sub>4</sub> i	
	trinydrate	BaO <sub>5</sub> SiZr	431: Barium zirconium		phosphate
$BaCl_2O_6$	338: Barium chlorate		silicate	$BeH_2$	452: Beryllium hydride
BaCl <sub>2</sub> O <sub>8</sub>	389: Barium perchlorate	BaO <sub>5</sub> Si <sub>2</sub>	353: Barium disilicate	$BeH_2O_2$	454: Beryllium
BaCrO <sub>4</sub>	343: Barium chromate		399: Barium silicate		hydroxide( $\alpha$ )
BaCr <sub>2</sub> H <sub>0</sub>	351: Barium dichromate	BaO <sub>c</sub> Ti <sub>2</sub>	421: Barium titanate		455: Beryllium hydroxide( $\beta$ )
	dihydrate	BaO P	378: Barium	BeH O S	464: Beryllium sulfate
D.C. KO	202: Baring a standing	$DaO_6 I_2$	576. Darium	Der1 <sub>4</sub> 0 <sub>6</sub> 5	dihardasta
$BaCr_2K_2O_8$	393: Barium potassium		metaphosphate		dinydrate
	chromate	$BaO_6Ta_2$	412: Barium tantalate	$BeH_6N_2O_9$	457: Beryllium nitrate
BaCuO <sub>6</sub> Y <sub>2</sub>	346: Barium copper yttrium	$BaO_7U_2$	426: Barium uranium oxide		trihydrate
	oxide-I	BaO <sub>9</sub> Si <sub>3</sub> Ti	424: Barium titanium	BeH <sub>8</sub> O <sub>8</sub> S	465: Beryllium sulfate
BaF <sub>2</sub>	357: Barium fluoride	, ,	silicate	0 0	tetrahydrate
BaE Ge	360: Barium	BaO Ti	122: Barium titanate	Ball SaO	462: Beryllium selenate
Dal' <sub>6</sub> Oc	Job. Barluin	$D_a O_9 \Pi_4$		Dell <sub>8</sub> SeO <sub>8</sub>	402. Berymuni scienate
	hexafluorogermanate	BaS	409: Barium sulfide		tetrahydrate
BaF <sub>6</sub> Si	361: Barium		410: Barium sulfide	BeI <sub>2</sub>	456: Beryllium iodide
	hexafluorosilicate	BaSe	396: Barium selenide	BeO	460: Beryllium oxide
BaFe <sub>12</sub> O <sub>10</sub>	355: Barium ferrite	BaSi <sub>2</sub>	401: Barium silicide	BeO <sub>4</sub> S	463: Bervllium sulfate
BaHO P	363: Barium hydrogen	BaTe	414. Barium telluride	BeS	466: Beryllium sulfide
Bull0 <sub>4</sub> i	nhoanhata	Pa CaCu O Tl	2101: Thallium harium	Do N	459: Doryllium nitrido
- ··	phosphate	$\operatorname{Ba}_2\operatorname{CaCu}_2\operatorname{O}_8\operatorname{II}_2$	S191: Thannum barlum	De <sub>3</sub> IN <sub>2</sub>	458: Berymun muride
$BaH_2$	362: Barium hydride		calcium copper oxide	Bı	469: Bismuth
BaH <sub>2</sub> I <sub>2</sub> O <sub>7</sub>	371: Barium iodate	$Ba_2CaO_6W$	335: Barium calcium	BiBrO	493: Bismuth oxybromide
	monohydrate		tungstate	BiBr <sub>3</sub>	475: Bismuth bromide
BaH2N2O5	385: Barium nitrite	Ba <sub>2</sub> Ca <sub>2</sub> Cu <sub>2</sub> O <sub>10</sub> Tl	3190: Thallium barium	BiCaCuSr <sub>2</sub> O.	504: Bismuth strontium
	monohydrate		calcium copper oxide	y	calcium copper oxide
Dall O	266. Dominum hydrowido	Do Cu ErOr	1214: Erhium harium aannan		(1112)
$DaH_2O_2$	Soo: Barlum hydroxide	Da <sub>2</sub> Cu <sub>3</sub> EIOX	1214: Erbium barium copper	DIGITI O	(1112)
$BaH_2O_4S_2$	420: Barium thiosulfate		oxide	BiClH <sub>2</sub> O <sub>6</sub>	497: Bismuth oxyperchlorate
	monohydrate	Ba <sub>2</sub> Cu <sub>3</sub> O <sub>7</sub> Pr	2574: Praseodymium barium		monohydrate
BaH <sub>2</sub> S <sub>2</sub>	364: Barium hydrosulfide		copper oxide	BiClO	494: Bismuth oxychloride
BaH LO.	373: Barium iodide dihydrate	Ba <sub>2</sub> Cu <sub>2</sub> O <sub>2</sub> Y	347: Barium copper vttrium	BiCl	476: Bismuth chloride
BaH O	367: Barium hydroxide		ovide-II	BICLH O	477: Bismuth chloride
Dall <sub>4</sub> O <sub>3</sub>				$\text{DICI}_3 \Pi_2 O$	
	mononydrate		3490: Attrium barium copper		mononydrate
$BaH_4O_8S_2$	354: Barium dithionate		oxide	BiF <sub>3</sub>	479: Bismuth fluoride
	dihydrate		3491: Yttrium barium copper	BiF <sub>5</sub>	498: Bismuth pentafluoride
BaH <sub>6</sub> O <sub>5</sub> P <sub>2</sub>	369: Barium hypophosphite		oxide	BiH <sub>3</sub>	482: Bismuth hydride
0 0 2	monohydrate	Ba <sub>2</sub> Cu <sub>2</sub> O <sub>2</sub> Y	348: Barium copper yttrium	BiH	483: Bismuth hydroxide
Doll O Sn	404: Parium stannata	Bu20u4081	ovide III	BH I No O	2052: Sodium
Dan <sub>6</sub> O <sub>6</sub> Sii	404. Barlum stannate			$BIR_8I_5INa_2O_4$	2955. Soululli
	trihydrate		3489: Yttrium barium copper		pentaiodobismuthate
$BaH_{10}O_4S_2$	365: Barium hydrosulfide		oxide		tetrahydrate
	tetrahydrate	Ba <sub>2</sub> NaNb <sub>5</sub> O <sub>15</sub>	402: Barium sodium niobium	BiH <sub>10</sub> N <sub>3</sub> O <sub>14</sub>	489: Bismuth nitrate
BaH <sub>18</sub> O <sub>10</sub>	368: Barium hydroxide		oxide		pentahydrate
10 10	octahydrate	Ba <sub>2</sub> O <sub>2</sub> SrW	407: Barium strontium	BiIO	495: Bismuth oxyiodide
BaHal	416: Barium	20,011	tungsten ovide	BII	185: Bismuth iodide
Dangi <sub>4</sub>					485. Bislinuti louide
	tetraiodomercurate(11)	$Ba_2O_7P_2$	394: Barium pyrophosphate	$B11_7K_4$	500: Bismuth potassium
BaI <sub>2</sub>	372: Barium iodide	$Ba_2O_8Si_3$	400: Barium silicate		iodide
$BaI_2O_6$	370: Barium iodate	Ba <sub>3</sub> Ca <sub>3</sub> Cu <sub>4</sub> O <sub>13</sub> Tl <sub>4</sub>	3189: Thallium barium		2446: Potassium
BaMnO	375: Barium manganate(VI)		calcium copper oxide		heptaiodobismuthate
BaMn O	391. Barium nermanganate	Ba-Cr O	344. Barium chromate(V)	BiNO	496: Bismuth oxynitrate
$D_1 M_2 O_8$	200: Darium permanganate	$D_{13}C_{12}O_{8}$	202. De siene situide	DING4	2028: S. diama
$D_{1}$	204 D	$Da_{3}N_{2}$		DIINaU <sub>3</sub>	2720. SOUIUIII
$BaN_2O_4$	384: Barium nitrite	$Ba_3O_8V_2$	427: Barium vanadate		metabismuthate
BaN <sub>2</sub> O <sub>6</sub>	382: Barium nitrate	$Ba_3O_9WY_3$	428: Barium yttrium tungsten	BiO <sub>4</sub> P	499: Bismuth phosphate
BaN <sub>6</sub>	328: Barium azide		oxide	BiSb	471: Bismuth antimonide
BaNb <sub>2</sub> O	381: Barium niobate	Ba <sub>2</sub> Sb <sub>2</sub>	326: Barium antimonide	BiaCaCuaOaSr-	505: Bismuth strontium
BaNh O Sr	106: Barium strontium	$B_{2}C_{1}O_{2}V$	3/0: Barium copper vttrium		calcium conner ovide
Dario <sub>4</sub> 0 <sub>12</sub> 51		$\mathbf{D}a_4\mathbf{C}u_7\mathbf{O}_{15}\mathbf{I}_2$			
	niobium oxide		oxide-IV		(2212)
BaO	388: Barium oxide	Ba <sub>5</sub> O <sub>21</sub> Si <sub>8</sub>	398: Barium silicate	$Bi_2Ca_2Cu_3O_{10}Sr_2$	506: Bismuth strontium
$BaO_2$	392: Barium peroxide	Be	434: Beryllium		calcium copper oxide
BaO <sub>3</sub> Pb	374: Barium lead oxide	BeBr <sub>2</sub>	446: Beryllium bromide		(2223)
-		-	•		· · · ·

$Bi_2Cr_2O_9$	474: Bismuth basic	BrRb	2655: Rubidium bromide	Br <sub>2</sub> Pb	1697: Lead bromide
	dichromate	BrTl	3195: Thallium(I) bromide	Br <sub>2</sub> Pd	2318: Palladium(II) bromide
Bi <sub>2</sub> H <sub>10</sub> O <sub>14</sub> Sn <sub>3</sub>	503: Bismuth stannate	$Br_2$	540: Bromine	Br <sub>2</sub> Pt	2381: Platinum(II) bromide
	pentahydrate	Br <sub>2</sub> Ca	624: Calcium bromide	Br <sub>2</sub> Ra	2605: Radium bromide
Bi <sub>2</sub> MoO <sub>6</sub>	488: Bismuth molybdenum	Br <sub>2</sub> CaH <sub>2</sub> O <sub>7</sub>	623: Calcium bromate	$Br_2Se_2$	2739: Selenium bromide
	oxide		monohydrate	Br <sub>2</sub> Sn	3028: Stannous bromide
Bi <sub>2</sub> Mo <sub>3</sub> O <sub>12</sub>	487: Bismuth molybdate	Br <sub>2</sub> CaH <sub>4</sub> O <sub>2</sub>	625: Calcium bromide	Br <sub>2</sub> Sr	3050: Strontium bromide
Bi <sub>2</sub> O <sub>2</sub>	492: Bismuth oxide	2 7 2	dihydrate	Br <sub>2</sub> Te <sub>2</sub>	3140: Tellurium dibromide
Bi <sub>2</sub> O <sub>4</sub>	512: Bismuth tetroxide	Br <sub>2</sub> CaH <sub>12</sub> O <sub>6</sub>	626: Calcium bromide	Br <sub>2</sub> Ti	3283: Titanium dibromide
Bi <sub>2</sub> O <sub>7</sub> Sn <sub>2</sub>	502: Bismuth stannate	2 12 - 0	hexahvdrate	Br <sub>2</sub> V	3411: Vanadium dibromide
Bi <sub>2</sub> O <sub>7</sub> Ti <sub>2</sub>	514: Bismuth titanate	Br <sub>2</sub> CaO	622: Calcium bromate	Br	3335: Tungsten dibromide
$Bi_2O_2V_2$	516: Bismuth vanadate	Br <sub>2</sub> Cd	564 <sup>.</sup> Cadmium bromide	Br <sub>2</sub> Zn	3526. Zinc bromide
Bi <sub>2</sub> O <sub>2</sub> Ti	513: Bismuth titanate	Br <sub>2</sub> CdH <sub>2</sub> O	565: Cadmium bromide	BraCe	771: Cerous bromide
$B_{12}O_{11}T_{4}$	509: Bismuth sulfate	D12Cd11804	tetrahydrate	Br CeH O	772: Cerous bromide
$B_{12}O_{12}O_{3}$ Bi O W	515: Bismuth tungstate	Br Co	957: Cobalt(II) bromide	D13CC111407	hentahydrate
Bi S	510: Bismuth sulfide	$Br_2C0$	958: Cobalt(II) bromide	Br Cr	890: Chromium(III) bromide
$B_1 S_2$	501: Bismuth selenide	$D1_2C011_{12}O_6$	hevelydrate	Br CrH O	801: Chromium(III) bromide
$D_2 S C_3$ D: T <sub>2</sub>	511. Dismuth tallurida	D <sub>a</sub> C <sub>a</sub> IL O	056. Coholt(II) bromoto	$BI_3CIT_{12}O_6$	bayahydrata
$B_1 B_3 B_1 B_3 B_2 B_2 B_3 B_2 B_3 B_1 B_2 B_3 B_2 B_2 B_3 B_2 B_2 B_3 B_2 B_2 B_2 B_2 B_2 B_2 B_2 B_2 B_2 B_2$	486 Dismuth incr	$Br_2COH_{12}O_{12}$	956: Coball(11) bromate	D., D.,	1102. Devenue sieure has anide
$B1_3FeMO_2O_{12}$	480: Bismuth iron	D C		Br <sub>3</sub> Dy	195: Dysprosium bromide
D' C O	molybdenum oxide	Br <sub>2</sub> Cr	8/8: Chromium(II) bromide	Br <sub>3</sub> Er	1216: Erbium bromide
$B_{1_4}Ge_3O_{12}$	480: Bismuth germanium	Br <sub>2</sub> CsI	802: Cesium bromoiodide	$Br_3ErH_{12}O_6$	1217: Erbium bromide
	oxide	Br <sub>2</sub> Cu	1069: Copper(II) bromide		hexahydrate
$Bi_4O_{12}Zr_3$	517: Bismuth zirconate	Br <sub>2</sub> Fe	1307: Ferrous bromide	$Br_3ErH_{18}O_9$	1218: Erbium bromide
$\operatorname{Bi}_{5}\operatorname{H}_{9}\operatorname{N}_{4}\operatorname{O}_{22}$	484: Bismuth hydroxide	Br <sub>2</sub> Fe	1309: Ferrous bromide		nonahydrate
	nitrate oxide	(anhydrous)	hydrate	Br <sub>3</sub> Eu	1251: Europium(III) bromide
	508: Bismuth subnitrate	Br <sub>2</sub> FeH <sub>12</sub> O <sub>6</sub>	1308: Ferrous bromide	Br <sub>3</sub> Fe	1268: Ferric bromide
Bk	432: Berkelium(α)		hexahydrate	Br <sub>3</sub> Ga	1390: Gallium(III) bromide
	433: Berkelium(β)	Br <sub>2</sub> Ge	1410: Germanium(II)	Br <sub>3</sub> Gd	1357: Gadolinium bromide
BrCl	542: Bromine chloride	-	bromide	Br <sub>3</sub> GeH	3314: Tribromogermane
BrCs	800: Cesium bromide	Br <sub>2</sub> GeH <sub>2</sub>	1160: Dibromogermane	Br <sub>3</sub> HSi	3316: Tribromosilane
BrCsO <sub>2</sub>	799: Cesium bromate	Br <sub>2</sub> H <sub>2</sub> O <sub>7</sub> Pb	1696: Lead bromate	Br <sub>3</sub> H <sub>4</sub> O <sub>2</sub> Rh	2639: Rhodium(III) bromide
BrCu	1041: Copper(I) bromide	2 2 7 7	monohydrate	3 4 - 2	dihvdrate
BrD	1154: Deuterium bromide	Br <sub>2</sub> H <sub>2</sub> O <sub>7</sub> Sr	3049: Strontium bromate	Br <sub>2</sub> H <sub>2</sub> IrO <sub>4</sub>	1607: Iridium(III) bromide
	1519. Hydrogen bromide-d		monohydrate		tetrahydrate
BrF	5/4: Bromine fluoride	Br H Si	1162: Dibromosilane	Br H O Sm	2703: Samarium bromide
DII	545: Bromine monofluoride	$Br_2H_2SI$ Br H NiO	2200: Nickel bromide	D13111206011	hevahydrate
BrEO	2337: Perbromyl fluoride	D1211614103	tribydrate	Br H L D	1653: Lanthanum bromate
BrF	548: Bromine trifluoride	Br H MnO	1006: Manganese(II)	D131118LaO18	nonabydrate
DIT <sub>3</sub> DrE	547: Promine pontafluorida	$D1_2 11_8 WIIIO_4$	hromida tatrahydrata	Pr H NAO	2155: Naadymium bromata
DIF <sub>5</sub> Dell	1520. Lludrogen bromide	De IL Ma	1996. Magnasium heamida	$BI_{3}\Pi_{18}\Pi_{10}U_{18}$	2155. Neodymium bromate
	1520: Hydrogen bronnde	$\mathbf{D}_{12}\mathbf{n}_{12}\mathbf{M}_{2}\mathbf{O}_{6}$	have hydrote	Dall O V	2404. Vttrium harmida
DIHU DIHU		DUMO		$DI_3\Pi_{18}O_9I$	5494: Ittrium bronnide
BrHO <sub>3</sub>	539: Bromic acid	$Br_2H_{12}MgO_{12}$	1884: Magnesium bromate		nonanydrate
BrH <sub>2</sub> LiO	1//4: Lithium bromide		hexahydrate	$\mathrm{Br}_{3}\mathrm{H}_{18}\mathrm{O}_{18}\mathrm{Pr}$	2576: Praseodymium
<b>D</b> 11 G	monohydrate	$\mathrm{Br}_{2}\mathrm{H}_{12}\mathrm{O}_{6}\mathrm{Sr}$	3051: Strontium bromide	<b>D U</b> O O	bromate nonahydrate
BrH <sub>3</sub> Ge	552: Bromogermane		hexahydrate	$\mathrm{Br}_{3}\mathrm{H}_{18}\mathrm{O}_{18}\mathrm{Sm}$	2702: Samarium bromate
BrH <sub>3</sub> Si	553: Bromosilane	$Br_2H_{12}O_{12}Zn$	3525: Zinc bromate		nonahydrate
BrH <sub>4</sub> N	125: Ammonium bromide		hexahydrate	Br <sub>3</sub> Ho	1480: Holmium bromide
BrH <sub>4</sub> NO	1543: Hydroxylamine	$Br_2Hf$	1448: Hafnium(II) bromide	Br <sub>3</sub> In	1564: Indium(III) bromide
	hydrobromide	Br <sub>2</sub> Hg	2067: Mercury(II) bromide	Br <sub>3</sub> Ir	1606: Ir(III) bromide
BrH <sub>4</sub> NaO <sub>2</sub>	2844: Sodium bromide	$Br_2Hg_2$	2043: Mercury(I) bromide	Br <sub>3</sub> La	1654: Lanthanum bromide
	dihydrate	$Br_2Hg_2O_6$	2042: Mercury(I) bromate	Br <sub>3</sub> Lu	1848: Lutetium bromide
BrH <sub>5</sub> N <sub>2</sub>	1504: Hydrazine	Br <sub>2</sub> In	1561: Indium(II) bromide	Br <sub>3</sub> Mo	2122: Molybdenum(III)
	monohydrobromide	Br <sub>2</sub> Mg	1885: Magnesium bromide		bromide
BrI	1581: Iodine bromide	Br <sub>2</sub> Mn	1995: Manganese(II)	Br <sub>3</sub> NbO	2272: Niobium(V)
	1588: Iodine monobromide		bromide		oxybromide
BrIn	1558: Indium(I) bromide	Br <sub>2</sub> Mo	2119: Molybdenum(II)	Br <sub>3</sub> Nd	2156: Neodymium bromide
BrK	2416: Potassium bromide	2	bromide	Br <sub>3</sub> OP	2360: Phosphorus
BrKO <sub>2</sub>	2415: Potassium bromate	Br <sub>2</sub> Ni	2199: Nickel bromide	;	oxybromide
BrL i	1773: Lithium bromide	Br <sub>2</sub> n	546: Bromine oxide	Br.OV	3448: Vanadyl tribromide
BrL iO.	1772: Lithium bromate	Br <sub>2</sub> OS	3228. Thionyl bromide	Br <sub>3</sub> O,	2364: Phosphorus(III)
BrN	541: Bromine azide	Br OSe	2746: Selenium ovybromide	131	bromide
BrNa	28/3: Sodium bromida	Br OV	3//3. Vanadul dibramida	Br Pr	2577: Preseadumium
BrNaO	2043. Sodium bromata	$\mathbf{Br} \mathbf{O} \mathbf{W}$	3340: Tungston	D1311	bromida
BrOV	2042. Sourin Dromate 3441: Vanadul bromida	$\mathbf{D}_2\mathbf{O}_2\mathbf{W}$	diovydihromida	Br Po	2615: Dhonium(III) haramid-
DIOV PrO	542: Droming dior: 1-	Dr O	554 Dibroming triania	DI <sub>3</sub> NC Dr. D.:	2013. Kilcinull(111) biolifide
	343: Bromine dioxide	$Br_2O_3$	354: Dibromine trioxide	Br <sub>3</sub> Ku	2092: Kuinenium(III)
BrO <sub>3</sub> Kb	2654: Rubidium bromate	$Br_2O_5$	1161: Dibromine pentoxide		bromide

Br <sub>3</sub> Sb	262: Antimony(III) bromide	CCaO <sub>3</sub>	628: Calcium carbonate	CHCsO <sub>3</sub>	813: Cesium hydrogen
Br <sub>3</sub> Sc	2724: Scandium bromide		629: Calcium carbonate		carbonate
Br <sub>3</sub> Tb	3157: Terbium bromide		630: Calcium carbonate	CHf	1450: Hafnium carbide
Br <sub>3</sub> Ti	3306: Titanium tribromide	CCdO <sub>3</sub>	566: Cadmium carbonate	CHF <sub>3</sub>	3321: Trifluoromethane
Br <sub>3</sub> Tl	3220: Thallium(III) bromide	CCIN	1143: Cyanogen chloride	CHg <sub>2</sub> O <sub>2</sub>	2044: Mercury(I) carbonate
Br <sub>2</sub> Tm	3262: Thulium bromide	CClaFa	1172:	CHg <sub>4</sub> O <sub>4</sub>	2064: Mercury(II) basic
Br <sub>a</sub> U	3383: Uranium tribromide	2- 2	Dichlorodifluoromethane	84-0	carbonate
Br V	3/30: Vanadium tribromide	CC1 0	7/3: Carbonyl chloride	СНКО	2471: Potassium hydrogen
$D_{13}$ V	2261. Tungstan tribromide		745. Carbonyi emonde	CIIKO <sub>3</sub>	
	2402 Nuclear Land		759: Carbon tetrachioride	CITI , O	
Br <sub>3</sub> Y	3493: Yttrium bromide		959: Cobalt(II) carbonate	CHLIO <sub>3</sub>	1/92: Lithium formate
Br <sub>3</sub> Yb	3470: Ytterbium bromide	CCsN	807: Cesium cyanide		monohydrate
(anhydrous)	hydrate	$CCs_2O_3$	803: Cesium carbonate		1799: Lithium hydrogen
Br <sub>4</sub> Ge	1418: Germanium(IV)	CCuN	1043: Copper(I) cyanide		carbonate
	bromide	CCuNS	1054: Copper(I) thiocyanate	CHN	1524: Hydrogen cyanide
Br <sub>4</sub> Hf	1449: Hafnium bromide	CCuO <sub>3</sub>	1072: Copper(II) carbonate	CHNaO3	2904: Sodium hydrogen
$Br_4K_2Pd$	2536: Potassium	CF <sub>2</sub> O	744: Carbonyl fluoride		carbonate
4 2	tetrabromopalladate(II)	CE	740: Carbon tetrafluoride	CHO <sub>2</sub> T.	3202: Thallium(I) formate
Br.K.Pt	2537: Potassium	CFeO.	1310: Ferrous carbonate	CLHuLuO	1860: Lutetium perchlorate
bi <sub>4</sub> iv <sub>2</sub> i t	tetrabromonlatinate(II)	CFe	1620: Iron carbide	013111220018	hexabydrate
Pr Mo	2128: Malybdanum(IV)	CEN	1144: Cyanagan fluorida	CI	741: Carbon tatraiodida
DI <sub>4</sub> MO	2128. Worybuchum(1V)	CLUD-CI	551. Draws shi sa wethan s	CI <sub>4</sub>	1145. Cross and india
	bromide	CH <sub>2</sub> BrCl	551: Bromocniorometnane	CIN	1145: Cyanogen lodide
Br <sub>4</sub> Nb	2258: Niobium(IV) bromide	$CH_2Cu_2O_5$	1073: Copper(II) carbonate		1583: Iodine cyanide
Br <sub>4</sub> OW	3351: Tungsten		hydroxide	$CK_2O_3$	2417: Potassium carbonate
	oxytetrabromide	CH <sub>2</sub> Na <sub>2</sub> O <sub>4</sub>	2850: Sodium carbonate	$CK_2S_3$	2555: Potassium
Br <sub>4</sub> Pb	1756: Lead(IV) bromide		monohydrate		thiocarbonate
Br₄Se	2751: Selenium tetrabromide	CH <sub>2</sub> O <sub>3</sub>	2340: Performic acid	CKN	2430: Potassium cyanide
Br₄Si	2772: Silicon tetrabromide	CH <sub>3</sub> AlCl <sub>2</sub>	100: Dichloromethyl-	CKNO	2429: Potassium cyanate
Br.Sn	3017: Stannic bromide	5 2	aluminum	CKNS	2556: Potassium thiocyanate
Br.Te	3148: Tellurium tetrabromide	CH.BNNa	2863: Sodium	CLIN	1784: Lithium cyanide
Br Th	3234: Thorium bromide	CHI3DIATA	cyanoborobydride	CLINS	1836: Lithium thiogyanate
$D_4 T_4$	2202: Titorium totrohoomida		2418: Detessium carbonate	CLING	1830. Lithium
		$CH_{3}K_{2}O_{4.5}$	2418: Potassium carbonate		1840. Liunum
Br <sub>4</sub> U	33/9: Uranium tetrabromide	<i></i>	hemitrihydrate	(anhydrous)	thiocyanate hydrate
$Br_4W$	3358: Tungsten tetrabromide	$CH_3Na_2O_6$	2851: Sodium carbonate	$CL_{1_2}O_3$	1776: Lithium carbonate
Br <sub>4</sub> Zr	3588: Zirconium bromide		peroxohydrate	CMgO <sub>3</sub>	1887: Magnesium carbonate
Br <sub>5</sub> Nb	2265: Niobium(V) bromide	CH <sub>4</sub> MgO <sub>5</sub>	1888: Magnesium carbonate	$CMnO_3$	1997: Manganese(II)
Br <sub>5</sub> P	2370: Phosphorus(V)		dihydrate		carbonate
	bromide	$CH_4N_2$	141: Ammonium cyanide	CMn <sub>3</sub>	1978: Manganese carbide
Br <sub>5</sub> Re	2625: Rhenium(V) bromide	CH <sub>4</sub> N <sub>2</sub> S	248: Ammonium	СМо	2108: Molybdenum carbide
Br-Ta	3123: Tantalum pentabromide	7 2	thiocvanate	CMo	2109: Molybdenum carbide
Br-U	3375: Uranium pentabromide	CH-NO <sub>2</sub>	156 <sup>.</sup> Ammonium formate	CN.	1141: Cyanogen azide
Br W	3355: Tungsten pentabromide	CH NO	179: A mmonium hydrogen	CNa O	2847: Sodium carbonate
	150: A mmonium	01131103	aarbanata	CNb	2250: Nichium(IV) carbida
$B_{6}n_{8}n_{2}08$		CIL C		CINU	2259. Niobium(1v) carbide
D HIND	nexabromoosmiate(1v)	CH <sub>6</sub> Ge	2103: Methylgermane		2250: Niobium carbide
$Br_6H_8N_2Pt$	160: Ammonium	$CH_6MgO_6$	1892: Magnesium carbonate	$CN_1O_3$	2201: Nickel carbonate
	hexabromoplatinate(IV)		trihydrate	CNNa	2862: Sodium cyanide
$Br_6K_2Pt$	2447: Potassium	$CH_6N_2O_2$	127: Ammonium carbamate	CNNaO	2861: Sodium cyanate
	hexabromoplatinate(IV)	$CH_6N_2S_2$	146: Ammonium	CNNaS	3005: Sodium thiocyanate
Br <sub>6</sub> W	3344: Tungsten hexabromide		dithiocarbamate	CNRb	2661: Rubidium cyanide
С	721: Carbon	CH <sub>7</sub> NaO <sub>5</sub> S	2879: Sodium formaldehyde	CNT1	3199: Thallium(I) cyanide
	723: Carbon		sulfoxylate	СО	730: Carbon monoxide
	724: Carbon (amorphous)	CH <sub>o</sub> BeO <sub>7</sub>	448: Bervllium carbonate	CO <sub>2</sub>	725: Carbon dioxide
	733: Carbon soot	8 - 7	tetrahydrate	CO <sub>2</sub> Pb	1698: Lead carbonate
CAgN	2791: Silver cyanide	CH Mg O	1890: Magnesium carbonate	CORa	2606: Radium carbonate
CAGNS	2022: Silver thiosympto	C1181015208	hydroxido tribydroto	$CO_{3}Ra$	2656: Pubidium carbonate
CAGNS	2725. Silver and enets	CUNO		$CO_3 KU_2$	2050. Rubidium carbonate
$CAg_2O_3$		$CH_8N_2O_3$			
CAuCIO	1430: Gold(1) carbonyl	$CH_{10}MgO_8$	1891: Magnesium carbonate	$CO_3\Pi_2$	3196: Thallium(1) carbonate
	chloride		pentahydrate	$CO_3Zn$	3528: Zinc carbonate
CAuN	1432: Gold(I) cyanide	CH <sub>12</sub> KNaO <sub>9</sub>	2520: Potassium sodium	CO <sub>5</sub> U	3395: Uranyl carbonate
$CB_4$	526: Boron carbide		carbonate hexahydrate	$CO_8Zr_3$	3590: Zirconium carbonate
CBaO <sub>3</sub>	337: Barium carbonate	CH <sub>12</sub> Ni <sub>3</sub> O <sub>11</sub>	2194: Nickel basic carbonate	(anhydrous)	basic hydrate
CBe <sub>2</sub>	447: Beryllium carbide		tetrahydrate	COS	732: Carbon oxysulfide
CBH <sub>3</sub> O	518: Borane carbonvl	CH <sub>20</sub> Na <sub>2</sub> O <sub>12</sub>	2849: Sodium carbonate	COSe	731: Carbon oxyselenide
CBrN	1142: Cyanogen bromide	20 . 2 - 15	decahvdrate	$CS_2$	727: Carbon disulfide
CBr <sub>2</sub> O	742: Carbonyl bromide	CHBi <sub>2</sub> O <sub>4</sub>	473: Bismuth basic carbonate	CSe.	726: Carbon diselenide
CBr CBr	738: Carbon tetrabromide	JIID1205.5	hemihydrate	CSSe	736: Carbon sulfide selenide
$CC_{0}N$	641: Caloium avances	CHC=O	810: Cooium format-	CST	727: Carbon sulfide telline
CCan <sub>2</sub>	0+1. Calcium cyanamide	$CHCSO_2$	oro. Cestulli formate	Cole	131. Carbon sunde tenuride

CTa CTa	3120: Tantalum monocarbide	$C_2H_2O_8Pb_3$	1694: Lead basic carbonate	$C_2H_8AsNaO_3$	2846: Sodium cacodylate
CTa <sub>2</sub> CTh	3235: Thorium carbide		basic	C <sub>2</sub> H <sub>8</sub> CaN <sub>2</sub> O <sub>4</sub> S <sub>2</sub>	710: Calcium thiocyanate
CTi	3282: Titanium carbide	C <sub>2</sub> H <sub>3</sub> AgO <sub>2</sub>	2778: Silver acetate		tetrahydrate
CU	3373: Uranium monocarbide	C <sub>2</sub> H <sub>3</sub> BiO <sub>3</sub>	507: Bismuth subacetate	$C_2H_8Co_5O_{13}$	955: Cobalt(II) basic
CV	3408: Vanadium carbide	$C_2H_3CsO_2$	794: Cesium acetate		carbonate
CV <sub>2</sub>	3418: Vanadium monocarbide	$C_2H_3CuO_2$	1038: Copper(I) acetate	$C_2H_8MgN_2O_4S_2$	1962: Magnesium
CW	3333: Tungsten carbide	$C_2H_3KO_2$	2405: Potassium acetate		thiocyanate
$CW_2$	3332: Tungsten carbide	$C_2H_3LiO_2$	1761: Lithium acetate		tetrahydrate
CZr	3589: Zirconium carbide	C <sub>2</sub> H <sub>3</sub> NaO <sub>2</sub>	2828: Sodium acetate	C <sub>2</sub> H <sub>8</sub> N <sub>2</sub> NiO <sub>4</sub>	2208: Nickel cyanide
$C_2AgF_3O_2$	2824: Silver trifluoroacetate	$C_2H_3O_2Rb$	2650: Rubidium acetate		tetrahydrate
$C_2AgKN_2$	2519: Potassium silver cyanide	$C_2H_3O_2Tl$	3192: Thallium(I) acetate	$C_2H_8N_2O_2$	1498: Hydrazine acetate
$C_2Ag_2$	2780: Silver acetylide	$C_2H_4CoN_2O_2$	968: Cobalt(II) cyanide	$C_2H_8N_2O_4$	207: Ammonium oxalate
$C_2Ag_2O_4$	2806: Silver oxalate		dihydrate	C2H9NaO5	2829: Sodium acetate
C <sub>2</sub> AuKN <sub>2</sub>	2431: Potassium cyanoaurite	$C_2H_4CoO_6$	991: Cobalt(II) oxalate		trihydrate
C <sub>2</sub> AuN <sub>2</sub> Na	2880: Sodium gold cyanide		dihydrate	$C_2H_{10}CuO_8$	1092: Copper(II) formate
C <sub>2</sub> Ba	336: Barium carbide	$C_2H_4CrO_5$	882: Chromium(II) formate		tetrahydrate
$C_2BaN_2$	350: Barium cyanide		monohydrate	$C_2H_{10}N_2O_5$	208: Ammonium oxalate
$C_2BaN_2S_2$	417: Barium thiocyanate	$C_2H_4FeO_6$	1323: Ferrous oxalate		monohydrate
$C_2BaO_4$	386: Barium oxalate		dihydrate	$\mathrm{C_2H_{10}N_4O_4}$	1508: Hydrazine
C <sub>2</sub> Ca	627: Calcium carbide	$C_2H_4MgO_6$	1931: Magnesium oxalate		monooxalate
C <sub>2</sub> CaN <sub>2</sub>	642: Calcium cyanide		dihydrate	$C_2H_{11}N_3O_5$	226: Ammonium
$C_2CaO_4$	675: Calcium oxalate	$C_2H_4MnO_6$	2014: Manganese(II) oxalate		sesquicarbonate
$C_2CdN_2$	571: Cadmium cyanide		dihydrate	C2H14Ni15O16	2202: Nickel carbonate
$C_2CdO_4$	583: Cadmium oxalate	C <sub>2</sub> H <sub>4</sub> NiO <sub>6</sub>	2221: Nickel oxalate		hydroxide tetrahydrate
C <sub>2</sub> Ce	757: Cerium carbide		dihydrate	C <sub>2</sub> H <sub>3</sub> NaO <sub>5</sub>	2906: Sodium hydrogen
$C_2Cl_2F_5$	852: Chloropentafluoroethane	$C_2H_4O_6Zn$	3556: Zinc oxalate dihydrate		oxalate monohydrate
$C_2Cl_2O_2$	2312: Oxalyl chloride	C <sub>2</sub> H <sub>5</sub> NaO	2872: Sodium ethoxide	C <sub>2</sub> HgN <sub>2</sub>	2072: Mercury(II) cyanide
C <sub>2</sub> CoNO <sub>3</sub>	943: Cobalt nitrosodicarbonyl	C <sub>2</sub> H <sub>5</sub> Na <sub>3</sub> O <sub>8</sub>	2848: Sodium carbonate	$C_2HgN_2O_2$	2075: Mercury(II) fulminate
$C_2CoN_2S_2$	1009: Cobalt(II) thiocyanate		bicarbonate dihydrate	$C_2HgN_2S_2$	2098: Mercury(II)
$C_2CoO_4$	990: Cobalt(II) oxalate	C <sub>2</sub> H <sub>5</sub> OT1	3200: Thallium(I) ethoxide		thiocyanate
$C_2Cr_3$	866: Chromium carbide	$C_2H_6BaN_2O_3S_2$	418: Barium thiocyanate	$C_2HgO_4$	2085: Mercury(II) oxalate
$C_2CsF_3O_2$	837: Cesium trifluoroacetate		trihydrate	$C_2Hg_2N_2O$	2089: Mercury(II)
C <sub>2</sub> Cu	1060: Copper(II) acetylide	$C_2H_6BeO_7$	459: Beryllium oxalate		oxycyanide
$C_2CuKN_2$	2428: Potassium copper(I)		trihydrate	$C_2Hg_2N_2S_2$	2059: Mercury(I) thiocyanate
	cyanide	$C_2H_6CdO_7$	584: Cadmium oxalate	$C_2Hg_2O_4$	2054: Mercury(I) oxalate
$C_2CuN_2$	1080: Copper(II) cyanide		trihydrate	$C_2La$	1655: Lanthanum carbide
$C_2CuO_4$	1108: Copper(II) oxalate	C <sub>2</sub> H <sub>6</sub> Cl <sub>2</sub> Ge	1171: Dichlorodimethyl-	$C_2Li_2$	1775: Lithium carbide
$C_2Cu_2$	1039: Copper(I) acetylide		germane	C <sub>2</sub> Li <sub>2</sub> O <sub>4</sub>	1820: Lithium oxalate
C <sub>2</sub> HCuO <sub>4.5</sub>	1109: Copper(II) oxalate		1184: Dimethylgermanium	$C_2MgO_4$	1930: Magnesium oxalate
	hemihydrate		dichloride	$C_2N_2$	1140: Cyanogen
$C_2$ HNa	2831: Sodium acetylide	$C_2H_6CoN_2O_3$	969: Cobalt(II) cyanide	$C_2N_2NiS_2$	2240: Nickel thiocyanate
$C_2H_2BaO_4$	358: Barium formate		trihydrate	$C_2N_2Pb$	1704: Lead cyanide
$C_2H_2BaO_5$	387: Barium oxalate	$C_2H_6CoN_2O_3S_2$	1010: Cobalt(II) thiocyanate	$C_2N_2PbS_2$	1739: Lead thiocyanate
	monohydrate		trihydrate	$C_2N_2Pd$	2321: Palladium(II) cyanide
$C_2H_2BeO_4$	451: Beryllium formate	$C_2H_6FeN_2O_3S_2$	1335: Ferrous thiocyanate	$C_2N_2Pt$	2383: Platinum(II) cyanide
$C_2H_2Be_3O_8$	440: Beryllium basic	<u></u>	trihydrate	$C_2N_2S_2Zn$	3581: Zinc thiocyanate
	carbonate	$C_2H_6Hg$	1185: Dimethylmercury	$C_2N_2Zn$	3535: Zinc cyanide
$C_2H_2CaO_4$	650: Calcium formate	$C_2H_6MgO_6$	1906: Magnesium formate	$C_2Na_2O_4$	2950: Sodium oxalate
$C_2H_2CaO_5$	6/6: Calcium oxalate		dinydrate	$C_2O_4Pb$	1/19: Lead oxalate
	mononydrate	$C_2H_6NO_{45}$	182: Ammonium nydrogen	$C_2 O_4 Sn$	3035: Stannous oxalate
$C_2H_2CrO_5$	885: Chromium(II) oxalate	C II O		$C_2O_4Sr$	2014: Strontium oxalate
C II C-O	1001. Compared U) formate	$C_2H_6O_6$	2511: Oxalic acid dinydrate	$C_2 O_4 \Pi_2$	3210: Thainum(1) oxalate
$C_2H_2CuO_4$	2474: Detessium hydrogen	$C_2H_6O_6S_2Zn$	3541: Zinc formaldenyde	$C_2$ Sr	2022: Strontium carbide
$C_2 \Pi_2 K O_{4.5}$	24/4: Polassium nydrogen	$C \parallel O 7$	25.42. Zing formate dihudrate	$C_2 III$	2270: Uranium dicarbide
СЧКО	2408: Potossium ovalata	$C_2 \Pi_6 O_6 Z \Pi$	3402: Urapyl evalute	$C_2 U$	3405: Vttrium carbide
$C_2 \Pi_2 K_2 O_5$	2498. Fotassiulli Oxalate	$C_2 \Pi_6 O_9 O_9 O_9 O_9 O_9 O_9 O_9 O_9 O_9 O_9$	5402. Ofaliyi Oxalate	$C_2 I$	02: Aluminum thiographic
СНКО	2503: Potassium	С Н О. 7 л	3520. Zinc carbonate	$C_3 A \Pi v_3 S_3$	28: Aluminum carbide
$C_2 \Pi_2 K_2 O_7$	2000. FUIdSSIUIII	$C_2 \Pi_6 O_{12} \Sigma \Pi_5$	bydroxide	$C_3 AI_4$	20. Alumnum carbide
	monohydrate	СНАю	555: Cacodylic acid	$C_3 C C_2$	773: Cerous carbonate
СНО	2310: Oxalic acid	C H LiO	1762: Lithium scetate	$C_{3}CC_{2}O_{9}$	1604. Iridium(I)
C H O P b	1751: Lead(II) formate	C2117LIO4	dihydrate	$C_3 C I I O_3 (II = I)$	chlorotricarbonyl
$C_{2}H_{2}O_{4}H_{0}$	3542. Zinc formate	C.H.NO	118. Ammonium acetate	C.CoNO	942. Cobalt nitrosocarbonyl
C <sub>2</sub> H <sub>2</sub> O <sub>4</sub> Zm	3075: Strontium oxalate	$C_2H_7HO_2$	183. Ammonium hydrogen	$C_3C_{1}C_4$	892: Chromium(III)
21120501	monohydrate	22171.05	oxalate monohydrate	(anhvdrous)	carbonate hydrate
			, arace	(	

$C_3 Er_2 O_9$	1219: Erbium carbonate	$C_4H_4K_2O_{10}Pt$	2413: Potassium bis(oxalato)	$C_4H_{10}BF$
(annyurous)		CUKOT	2550: Data asiana titan inna	
$C_3 Eu_2 O_9$	1252: Europium(111)	$C_4 H_4 K_2 O_{11} \Pi$	2559: Potassium titanium	$C_4H_{10}Ca$
(anhydrous)	carbonate hydrate	~ ~ ~ ~ ~	oxalate dihydrate	~ ~ ~ ~
$C_3FeN_3S_3$	1297: Ferric thiocyanate	$C_4H_4O_6Sn$	3042: Stannous tartrate	$C_4H_{10}Ca$
C <sub>3</sub> H <sub>3</sub> FeO <sub>6</sub>	1277: Ferric formate	$C_4H_4O_{10}Th$	3248: Thorium oxalate	
$C_3H_4Am_2O_{11}$	103: Americium carbonate		dihydrate	$C_4H_{10}Cd$
	dihydrate	$C_4H_5KO_6$	2480: Potassium hydrogen	
C <sub>3</sub> H <sub>6</sub> AuN <sub>3</sub> O <sub>3</sub>	1437: Gold(III) cyanide		tartrate	$C_4H_{10}Cu$
	trihydrate	C4H6As6Cu4O16	1057: Copper(II) acetate	
$C_{3}H_{6}O_{12}Y_{2}$	3496: Yttrium carbonate		metaarsenite	$C_4H_{10}Cu$
5 6 12 2	trihydrate	C <sub>4</sub> H <sub>6</sub> BaO <sub>4</sub>	320: Barium acetate	C <sub>4</sub> H <sub>10</sub> Cu
C <sub>2</sub> H <sub>7</sub> AgO <sub>4</sub>	2802: Silver lactate	C <sub>4</sub> H <sub>2</sub> BeO <sub>4</sub>	435: Bervllium acetate	4 10
-3 / 8-4	monohydrate	C.H.CaO.	609: Calcium acetate	C.H.J.i.
C.H.NO.S	3100: Sulfur trioxide N N-	C.H.CdO.	557: Cadmium acetate	~ 4102
0311/11040	dimethylformamide	$C_{4}H_{0}C_{0}O_{4}$	950: Cobalt(II) acetate	
	complex	C H C U O	1056: Copper(II) acetate	СНМ
	1104: Dyenrosium corbonate	$C H E_{2}O$	1202: Earrous agotata	C <sub>4</sub> 11 <sub>10</sub> 1418
$C_{3}H_{8}Dy_{2}O_{13}$	totrobudroto	$C_4 \Pi_6 \Gamma C U_4$	2061: Margury (II) agatata	CUN
C II FO.		$C_4 \Pi_6 \Pi g O_4$	2001: Mercury(II) acetate	$C_4 \Pi_{10} N_2$
$C_3H_9FS1$	1348: Fluorotrimethylsilane	$C_4H_6Hg_2O_4$	2041: Mercury(1) acetate	
$C_{3}H_{10}Ce_{2}O_{14}$	7/4: Cerous carbonate	$C_4H_6K_2N_4O_3Pt$	2545: Potassium	$C_4 H_{10} O_6$
	pentahydrate		tetracyanoplatinate(II)	$C_4 H_{10} O_8$
$C_{3}H_{10}La_{2}O_{14}$	1657: Lanthanum carbonate		trihydrate	$C_4 H_{10} O_8$
	pentahydrate	$C_4H_6MgO_4$	1867: Magnesium acetate	
$C_{3}H_{16}La_{2}O_{17}$	1656: Lanthanum carbonate	$C_4H_6O_4Pb$	1685: Lead acetate	$C_4H_{10}Zn$
	octahydrate	$C_4H_6O_4Pd$	2316: Palladium(II) acetate	$C_4H_{11}NC$
$C_{3}H_{16}O_{17}Pr_{2}$	2578: Praseodymium	C <sub>4</sub> H <sub>6</sub> O <sub>4</sub> Sn	3027: Stannous acetate	
	carbonate octahydrate	C4H6O4Sr	3045: Strontium acetate	$C_4H_{12}Ca$
$C_2H_{17}N_2O_{12}Zr$	256: Ammonium zirconvl	$C_4H_6O_4Zn$	3514: Zinc acetate	4 12
5 17 5 12	carbonate dihvdrate	C <sub>4</sub> H <sub>7</sub> AlO <sub>5</sub>	35: Aluminum diacetate	C <sub>4</sub> H <sub>12</sub> Ca
C.Ho.O.	1481: Holmium carbonate	C.H.CrO.	886: Chromium(III) acetate	- 4 12
(anhydrous)	hydrate	041170105	hydroxide	C.H.,Crl
C Na O U	3015: Sodium uranyl	C H FeO	1266: Ferric basic acetate	C41112C11
$C_{31} V a_4 O_{11} O$	carbonate	C <sub>4</sub> 11 <sub>7</sub> 1 CO <sub>5</sub>	1640: Iron(III) acetate	
CNLO	2157: No o dour inte		hasis	
$C_3Nd_2O_9$	2157: Neodymium	C II KO	Dasic	
(annydrous)	carbonate hydrate	$C_4H_7KO_{10}$	2553: Potassium tetraoxalate	$C_4H_{12}Ge$
$C_3O_2$	734: Carbon suboxide	<b>A 11 11 A</b>	dihydrate	$C_4H_{12}KN$
$C_3O_9Sc_2$	2725: Scandium	$C_4H_7NaO_4$	2865: Sodium diacetate	
(anhydrous)	carbonate hydrate	$C_4H_7NaO_7$	2917: Sodium hydrogen	$C_4H_{12}Mg$
$C_3O_9Sm_2$	2704: Samarium carbonate		tartrate monohydrate	
$C_3O_9Tb_2$	3158: Terbium carbonate	$C_4H_7O_{4.5}Sr$	3046: Strontium acetate	$C_4H_{12}N_2$
(anhydrous)	hydrate		hemihydrate	$C_4H_{12}O_7$
$C_3O_9Yb_2$	3471: Ytterbium	C <sub>4</sub> H <sub>8</sub> BaN <sub>4</sub> O <sub>4</sub> Pt	415: Barium	$C_4H_{12}O_{10}$
(anhydrous)	carbonate hydrate		tetracyanoplatinate(II)	
$C_3S_2$	735: Carbon subsulfide		tetrahydrate	$C_4H_{12}Sn$
$C_{4}U_{2}$	3384: Uranium tricarbide	C <sub>4</sub> H <sub>2</sub> BaO <sub>5</sub>	321: Barium acetate	C <sub>4</sub> H <sub>14</sub> Co
C.CdK <sub>2</sub> N	2453: Potassium	- 4 8	monohydrate	- 4 14
- 4 2 4	tetracyanocadmium	C.H.CaO.	611: Calcium acetate	C.H. Fe
C.Cl.O.Rh.	2635: Rhodium carbonyl	041180405	monohydrate	0411141 0
C4Cl2O4Rl2	chloride	CHCrO	877: Chromium(II) acetate	СНМ
C Collens	2007: Moroury(II)	$C_4 \Pi_8 C I O_5$	monohydrata	C <sub>4</sub> 11 <sub>14</sub> 141g
$C_4 Congin_4 S_4$	2097: Mercury(II)	C II C-O	1058: Compare (II) contate	C II M
	tetratniocyanato-	$C_4H_8CuO_5$	1058: Copper(II) acetate	$C_4 H_{14} MI$
<b>a F</b>	cobaltate(II)		mononydrate	a
C <sub>4</sub> F	728: Carbon fluoride	$C_4H_8MgO_5$	1868: Magnesium acetate	$C_4H_{14}NC$
$C_4$ HKO <sub>7.5</sub> Sb	2411: Potassium antimony		monohydrate	
	tartrate hemihydrate	$C_4H_8Na_2O_8$	2990: Sodium tartrate	$C_4H_{14}NiC$
$C_4H_2FeO_4$	1539: Hydrogen		dihydrate	
	tetracarbonylferrate(II)	$C_4H_8O_6Zr$	3614: Zirconyl acetate	$C_4H_{18}Cu$
C <sub>4</sub> H <sub>2</sub> FeO <sub>4</sub>	3184:		hydroxide	
	Tetracarbonyldihydroiron	C <sub>4</sub> H <sub>9</sub> NO <sub>5</sub>	124: Ammonium bimalate	C <sub>4</sub> HgK <sub>2</sub> I
C <sub>4</sub> H <sub>2</sub> K <sub>2</sub> N <sub>4</sub> NiO	2543: Potassium	C <sub>4</sub> H <sub>9</sub> NO <sub>6</sub>	189: Ammonium hydrogen	
	tetracyanonickelate(II)		tartrate	C4K2N4P
	monohydrate	C4H0NaO	2845: Sodium <i>t</i> -butoxide	+ 2 4
C <sub>4</sub> H <sub>4</sub> BaO <sub>2</sub>	413: Barium tartrate	C <sub>4</sub> H <sub>10</sub> AlCl	98: Chlorodiethylaluminum	C <sub>4</sub> K <sub>2</sub> N <sub>2</sub> 7
C.H.CdO.	594: Cadmium succinate	4 10	1175: Diethylaluminum	- 42* 14
C <sub>4</sub> H <sub>4</sub> EeO <sub>4</sub>	1334. Iron(II) tartrate		chloride	C.NiO
-44-000			·	~4· ·····4

$C_4H_{10}BF_3O$	536: Boron trifluoride
	etherate
$_4\Pi_{10}$ Ca $O_6$	dihvdrate
$C_4H_{10}CaO_7$	701: Calcium succinate
	trihydrate
$L_4 H_{10} C dO_6$	558: Cadmium acetate
$C_4H_{10}CuN_2O_5$	1094: Copper(II) glycinate
	monohydrate
$C_4H_{10}CuO_2$	1083: Copper(II) ethanolate
$L_4$ H <sub>10</sub> CuO <sub>9</sub>	trihvdrate
$C_4H_{10}Li_2N_4O_5Pt$	1838: Lithium
	tetracyanoplatinate(II)
	pentahydrate
$_{4}n_{10}mg_{5}O_{18}$	hydroxide tetrahydrate
$C_4H_{10}N_2O_{10}Ti$	250: Ammonium titanium
	oxalate monohydrate
$C_4 H_{10} O_6 Zn$	3515: Zinc acetate dihydrate
$C_4 H_{10} O_8 P b_3$	1693: Lead basic acetate
<sub>4</sub> 11 <sub>10</sub> 0 <sub>8</sub> 0	dihvdrate
$C_4H_{10}Zn$	1176: Diethylzinc
$C_4H_{11}NO_4$	176: Ammonium hydrogen
	acetate
$L_4 \Pi_{12} CaO_7 S_2$	trihydrate
$C_4H_{12}CaO_{10}$	707: Calcium tartrate
	tetrahydrate
$C_4H_{12}CrN_7OS_4$	244: Ammonium
	diammonochromate(III)
	monohydrate
$C_4H_{12}Ge$	3185: Tetramethylgermane
C <sub>4</sub> H <sub>12</sub> KNaO <sub>10</sub>	2970: Sodium potassium
	tartrate tetrahydrate
$2_4 \Pi_{12} \Pi_{12} \Pi_{15} O_{19}$	carbonate pentahvdrate
$C_4 H_{12} N_2 O_6$	233: Ammonium tartrate
$C_4H_{12}O_7Pb$	1686: Lead acetate trihydrate
$C_4H_{12}O_{10}Sr$	3090: Strontium tartrate
TH Sn	3186: Tetramethyltin
$C_4 H_{12} SH$ $C_4 H_{14} CoO_8$	951: Cobalt(II) acetate
	tetrahydrate
$C_4H_{14}FeO_8$	1304: Ferrous acetate
	tetrahydrate
2411 <sub>14</sub> 1v1gO <sub>8</sub>	tetrahvdrate
$C_4H_{14}MnO_8$	
	1992: Manganese(II) acetate
	1992: Manganese(II) acetate tetrahydrate
$C_4H_{14}NO_2PS_2$	1992: Manganese(II) acetate tetrahydrate 205: Ammonium O,O- diathyldithionhoenhata
$C_4H_{14}NO_2PS_2$ $C_4H_{14}NiO_8$	<ul><li>1992: Manganese(II) acetate tetrahydrate</li><li>205: Ammonium O,O- diethyldithiophosphate</li><li>2185: Nickel acetate</li></ul>
$C_4H_{14}NO_2PS_2$ $C_4H_{14}NiO_8$	<ul><li>1992: Manganese(II) acetate tetrahydrate</li><li>205: Ammonium O,O- diethyldithiophosphate</li><li>2185: Nickel acetate tetrahydrate</li></ul>
$C_4 H_{14} NO_2 PS_2$ $C_4 H_{14} NiO_8$ $C_4 H_{18} Cu_2 O_{11}$	<ul> <li>1992: Manganese(II) acetate tetrahydrate</li> <li>205: Ammonium O,O- diethyldithiophosphate</li> <li>2185: Nickel acetate tetrahydrate</li> <li>1064: Copper(II) basic</li> </ul>
C <sub>4</sub> H <sub>14</sub> NO <sub>2</sub> PS <sub>2</sub> C <sub>4</sub> H <sub>14</sub> NiO <sub>8</sub> C <sub>4</sub> H <sub>18</sub> Cu <sub>2</sub> O <sub>11</sub>	<ul> <li>1992: Manganese(II) acetate tetrahydrate</li> <li>205: Ammonium O,O- diethyldithiophosphate</li> <li>2185: Nickel acetate tetrahydrate</li> <li>1064: Copper(II) basic acetate</li> <li>2542: Detacsium</li> </ul>
C <sub>4</sub> H <sub>14</sub> NO <sub>2</sub> PS <sub>2</sub> C <sub>4</sub> H <sub>14</sub> NiO <sub>8</sub> C <sub>4</sub> H <sub>18</sub> Cu <sub>2</sub> O <sub>11</sub> C <sub>4</sub> HgK <sub>2</sub> N <sub>4</sub>	<ul> <li>1992: Manganese(II) acetate tetrahydrate</li> <li>205: Ammonium O,O- diethyldithiophosphate</li> <li>2185: Nickel acetate tetrahydrate</li> <li>1064: Copper(II) basic acetate</li> <li>2542: Potassium tetracyanomercurate(II)</li> </ul>
$C_4H_{14}NO_2PS_2$ $C_4H_{14}NiO_8$ $C_4H_{18}Cu_2O_{11}$ $C_4HgK_2N_4$ $C_4HgK_2N_4Pt$	<ul> <li>1992: Manganese(II) acetate tetrahydrate</li> <li>205: Ammonium O,O- diethyldithiophosphate</li> <li>2185: Nickel acetate tetrahydrate</li> <li>1064: Copper(II) basic acetate</li> <li>2542: Potassium tetracyanomercurate(II)</li> <li>2544: Potassium</li> </ul>
$C_4H_{14}NO_2PS_2$ $C_4H_{14}NiO_8$ $C_4H_{18}Cu_2O_{11}$ $C_4HgK_2N_4$ $C_4K_2N_4Pt$	<ul> <li>1992: Manganese(II) acetate tetrahydrate</li> <li>205: Ammonium O,O- diethyldithiophosphate</li> <li>2185: Nickel acetate tetrahydrate</li> <li>1064: Copper(II) basic acetate</li> <li>2542: Potassium tetracyanomercurate(II)</li> <li>2544: Potassium tetracyanoplatinate(II)</li> </ul>
$C_4H_{14}NO_2PS_2$ $C_4H_{14}NiO_8$ $C_4H_{18}Cu_2O_{11}$ $C_4HgK_2N_4$ $C_4K_2N_4Pt$ $C_4K_2N_4Zn$	<ul> <li>1992: Manganese(II) acetate tetrahydrate</li> <li>205: Ammonium O,O- diethyldithiophosphate</li> <li>2185: Nickel acetate tetrahydrate</li> <li>1064: Copper(II) basic acetate</li> <li>2542: Potassium tetracyanomercurate(II)</li> <li>2544: Potassium tetracyanoplatinate(II)</li> <li>2546: Potassium tatracyanoplatinate(II)</li> </ul>
$C_4H_{14}NO_2PS_2$ $C_4H_{14}NiO_8$ $C_4H_{18}Cu_2O_{11}$ $C_4HgK_2N_4$ $C_4K_2N_4Pt$ $C_4K_2N_4Zn$ $C_4K_2N_4Zn$ $C_4NiO_4$	<ul> <li>1992: Manganese(II) acetate tetrahydrate</li> <li>205: Ammonium O,O- diethyldithiophosphate</li> <li>2185: Nickel acetate tetrahydrate</li> <li>1064: Copper(II) basic acetate</li> <li>2542: Potassium tetracyanomercurate(II)</li> <li>2544: Potassium tetracyanoplatinate(II)</li> <li>2546: Potassium tetracyanozincate</li> <li>2203: Nickel carbonvl</li> </ul>

$C_4O_8Pd$ $C_5BrMnO_5$	2326: Palladium(II) oxalate 1983: Manganese	$C_6H_4AgN_3O_8$	2814: Silver picrate monohydrate	$C_6H_{11}O_7Tm$	3260: Thulium acetate monohydrate
C5BrO5Re	pentacarbonyl bromide 2613: Rhenium	C <sub>6</sub> H <sub>5</sub> Ag <sub>3</sub> O <sub>7</sub> C <sub>6</sub> H <sub>5</sub> AlO <sub>7</sub>	<ul><li>2790: Silver citrate</li><li>34: Aluminum citrate</li></ul>	$C_6H_{12}Ba_2FeN_6O_6$	356: Barium ferrocyanide hexahydrate
C-ClO-Re	pentacarbonyl bromide 2614: Rhenium pentacarbonyl	C <sub>6</sub> H <sub>5</sub> BiO <sub>7</sub> C <sub>4</sub> H <sub>5</sub> ClHg	478: Bismuth citrate	C <sub>6</sub> H <sub>12</sub> CeO <sub>7.5</sub>	767: Cerous acetate
	chloride		chloride	$C_6H_{12}Lu_2O_{18}$	1858: Lutetium oxalate
$C_5 FeO_5$ $C_5 HF_6 O_2 Tl$	1626: iron pentacarbonyl 3203: Thallium(I)	$C_6H_5K_3O_7$ $C_6H_{5+4y}Fe_xN_yO_7$	2425: Potassium citrate 148: Ammonium ferric citrate	$C_6H_{12}N_2S_4Zn$	hexahydrate 3537: Zinc
	hexafluoro- acetylacetonate	C <sub>6</sub> H <sub>6</sub> CrK <sub>3</sub> O <sub>15</sub>	907: Chromium(III)	СНОТт	dimethyldithiocarbamate
$C_5H_4F_3O_2Tl$	3218: Thallium(I)		trihydrate	C <sub>6</sub> 11 <sub>12</sub> O <sub>18</sub> 1111 <sub>2</sub>	hexahydrate
C-H-FeK-N-O	trifluoroacetylacetonate 2496: Potassium		2423: Potassium chromium(III) oxalate	C <sub>6</sub> H <sub>13</sub> Li <sub>3</sub> O <sub>11</sub>	1782: Lithium citrate
0,511,41 011,21,603	nitroprusside dihydrate		trihydrate	$C_6H_{13}MnO_8$	2031: Manganese(III) acetate
C <sub>5</sub> H <sub>4</sub> FeN <sub>6</sub> Na <sub>2</sub> O <sub>3</sub>	2945: Sodium nitroferricyanide(III)	$C_6H_6FeK_4N_6O_3$	2439: Potassium ferrocyanide trihydrate	C <sub>6</sub> H <sub>14</sub> CuO <sub>8</sub>	dihydrate 1102: Copper(II) lactate
	dihydrate	$C_6H_6K_3O_{15}Sb$	275: Antimony(III)		dihydrate
C <sub>5</sub> H <sub>5</sub> Cl <sub>3</sub> Zr	3592: Zirconium		potassium oxalate	C <sub>6</sub> H <sub>14</sub> LiN	1789: Lithium
	trichloride		2410: Potassium antimony	$C_{6}H_{14}N_{2}O_{7}$	180: Ammonium hydrogen
C <sub>5</sub> H <sub>5</sub> Cl <sub>4</sub> Nb	1150: Cyclopenta-		oxalate trihydrate		citrate
	dienylniobium	$C_6H_6N_4O_7$	221: Ammonium picrate	$C_6H_{15}AlO_3$	39: Aluminum ethoxide
C <sub>s</sub> H <sub>s</sub> In	1148: Cyclopenta-	$C_6 \Pi_7 K_3 O_8$	monohydrate	$C_6H_{15}AsO_6$ $C_6H_{15}FeO_{12}$	1272: Ferric citrate
5 5	dienylindium(I)	$C_6H_8FeO_8$	1315: Ferrous citrate	0 15 12	pentahydrate
C <sub>5</sub> H <sub>5</sub> Li	1785: Lithium	CHCNO	monohydrate	C <sub>6</sub> H <sub>15</sub> Na <sub>3</sub> O <sub>12</sub>	2859: Sodium citrate
C-H-A9O	2779: Silver acetylacetonate	$C_6 \Pi_8 \text{GeIN}_2 O_{12}$	oxalate hydrate	C <sub>c</sub> H <sub>u</sub> O <sub>o</sub> Sm	2699: Samarium acetate
$C_5H_7CsO_2$	795: Cesium acetylacetonate	$C_6H_0AlO_6$	17: Aluminum acetate	0611309511	trihydrate
C <sub>5</sub> H <sub>7</sub> LiO <sub>2</sub>	1763: Lithium	C <sub>6</sub> H <sub>9</sub> BiO <sub>6</sub>	470: Bismuth acetate	C <sub>6</sub> H <sub>15</sub> P	3320: Triethylphosphine
	acetylacetonate	C <sub>6</sub> H <sub>9</sub> CoO <sub>6</sub>	1014: Cobalt(III) acetate	C <sub>6</sub> H <sub>16</sub> MgO <sub>12</sub>	1899: Magnesium citrate
C <sub>5</sub> H <sub>7</sub> NaO <sub>2</sub>	2830: Sodium	C <sub>6</sub> H <sub>9</sub> CrO <sub>6</sub>	860: Chromium(III) acetate		pentahydrate
	acetylacetonate	$C_{6}H_{9}Cu_{2}O_{9.5}$	1032: Copper citrate	$C_6H_{16}O_9Sr$	3068: Strontium lactate
$C_5H_7O_2Rb$	2651: Rubidium	CHInO	hemipentahydrate	C H DyO	trihydrate
CeH2O2T1	3193: Thallium(I)	C <sub>6</sub> H <sub>9</sub> InO <sub>6</sub>	1649: Lanthanum acetate	$C_6 H_{17} D y O_{10}$	tetrahydrate
- 3 7 - 2	acetylacetonate	(anhydrous)	hydrate	$C_6H_{17}ErO_{10}$	1212: Erbium acetate
C <sub>5</sub> H <sub>8</sub> FeN <sub>8</sub> O	204: Ammonium	C <sub>6</sub> H <sub>9</sub> LuO <sub>6</sub>	1846: Lutetium acetate	0 17 10	tetrahydrate
	nitroferricyanide	(anhydrous)	hydrate	$C_6H_{17}GdO_{10}$	1354: Gadolinium acetate
$C_5H_8KO_{2.5}$	2406: Potassium	C <sub>6</sub> H <sub>9</sub> Na <sub>3</sub> O <sub>9</sub>	2858: Sodium citrate		tetrahydrate
	acetylacetonate	C U NIO	dihydrate	$C_6H_{17}N_3O_7$	137: Ammonium citrate
C H AgNS	2703: Silver	$C_6H_9NdO_6$	2152: Neodymium acetate	CHO Vh	ITIDASIC 3468: Vtterbium acetate
$C_5\Pi_{10}Ag\Pi S_2$	diethyldithiocarbamate	(anhydrous)	hydrate	$C_6 \Pi_{17} O_{10} \Pi U$	tetrahydrate
C <sub>5</sub> H <sub>12</sub> NO <sub>2</sub>	255: Ammonium valerate	C <sub>6</sub> H <sub>0</sub> O <sub>6</sub> Sb	261: Antimony(III) acetate	C <sub>6</sub> H <sub>10</sub> AlCl	99: Chlorodiisobutyl-
C <sub>5</sub> H <sub>15</sub> NSn	1183: Dimethylaminotri-	C <sub>6</sub> H <sub>9</sub> O <sub>6</sub> Sc	2722: Scandium acetate	0 10	aluminum
	methyltin	(anhydrous)	hydrate	$C_6H_{18}Ce_2O_{21}$	783: Cerous oxalate
$C_6Bi_2O_{12}$	491: Bismuth oxalate	C <sub>6</sub> H <sub>9</sub> O <sub>6</sub> Tb	3155: Terbium acetate		nonahydrate
$C_6 CoK_3 N_6$	2454: Potassium	(anhydrous)	hydrate	$C_6H_{18}FeN_3O_{15}$	149: Ammonium ferric
C Co EoN	hexacyanocobalt(III)	$C_6H_9O_6T1$	3219: Thallium(III) acetate	C II EaN O	oxalate trihydrate
$C_6 C O_2 F e N_6$	bydrate	$C_6 \Pi_9 O_6 I$	bydrate	$C_6 \Pi_{18} \Gamma e N_9 O_3$	ferricyanide tribydrate
C <sub>c</sub> CrO <sub>c</sub>	867: Chromium carbonyl	C(H <sub>2</sub> O <sub>2</sub> c	1079: Copper(II) citrate	C <sub>c</sub> H <sub>10</sub> FeN <sub>10</sub> O	169 <sup>.</sup> Ammonium
$C_6Cu_5FeN_6$	1087: Copper(II)	0,611909.5	hemipentahydrate	0,011,81 01 (100	hexacvanoferrate(II)
0 2 0	ferrocyanide	C <sub>6</sub> H <sub>10</sub> CaO <sub>4</sub>	692: Calcium propionate		monohydrate
$C_6Eu_2O_{12}$	1258: Europium(III) oxalate	$C_6H_{10}O_4Zn$	3564: Zinc propionate	$C_6H_{18}O_{21}Y_2$	3506: Yttrium oxalate
$C_6F_9O_6Tl$	3227: Thallium(III)	$\mathrm{C_6H_{10}O_6Pb}$	1753: Lead(II) lactate		nonahydrate
~ ~ ~ ~ ~ ~	trifluoroacetate	$C_6H_{10}O_{17}Sc_2$	2730: Scandium oxalate	$C_6H_{20}Ac_2O_{22}$	9: Actinium oxalate
$C_6 FeK_3 N_6$	2438: Potassium ferricyanide	CH CO	pentahydrate	CUDO	decahydrate
$C_6 Fe_2 O_{12}$	1284: Ferric Oxalate	$C_6 H_{11} Cr O_7$	oo/: Unromium(III) acetate	$C_6 H_{20} D y_2 O_{22}$	1203: Dysprosium oxalate
$C_6 m_2 m_2 O_{13}$	monohvdrate	C.H. HoO-	1479: Holmium acetate	C.H.,Er.O.	1228: Erbjum oxalate
C <sub>6</sub> H <sub>2</sub> FeN <sub>6</sub> Na <sub>2</sub> O	2873: Sodium ferricvanide	0001110007	monohydrate	~ <sub>6</sub> <sub>2</sub> 0 <sub>2</sub>	decahydrate
0 2 0	monohydrate	C <sub>6</sub> H <sub>11</sub> NdO <sub>7</sub>	2153: Neodymium acetate	C <sub>6</sub> H <sub>20</sub> FeN <sub>6</sub> Na <sub>4</sub> O <sub>10</sub>	2874: Sodium ferrocyanide
C <sub>6</sub> H <sub>2</sub> N <sub>3</sub> O <sub>7</sub> Tl	3213: Thallium(I) picrate	'	monohydrate		decahydrate

$C_{6}H_{20}Gd_{2}O_{22} \\$	1367: Gadolinium oxalate	$C_8H_{20}ClN_2P$	468: Bis(diethylamino)	$C_{10}H_{10}V$	3439: Vanadocene
	1480: Holmium ovalata	CH C-NO	Chromium(VI)	$C_{10}H_{12}F_6MgO_6$	1964: Magnesium
$C_6 \Pi_{20} \Pi O_2 O_{22}$	1489: Hollinulli Oxalate	$C_8 \Pi_{20} CIN_2 O_6$	922: Chromium(VI)		dibudrata
CH NAO	2170: Nacdymium ovalata		1420: Cormonium(IV)	CHENIO	2242: Niekel
$C_6 H_{20} M_2 O_{22}$	dagabydrata	$C_8 H_{20} O C O_4$	athevide	$C_{10} \Pi_{12} \Gamma_6 \Pi_{10} G_6$	2242. INICKEI
CHOPr	2588: Praseodymium ovalate	CHOS	3180: Tetraethylorthosilicate		dibydrate
$C_6 \Pi_{20} O_{22} \Pi_2$	2388. Flaseodymium oxalate	$C_{8}H_{20}O_{4}SI$	3176: Tatraathyl laad	СИРО	426: Porullium
CILO Sm	2712: Samarium avalata	$C_8 \Pi_{20} P D$	2177: Tetraethyl silone	$C_{10} \Pi_{14} BeO_4$	
$C_6 \Pi_{20} O_{22} S \Pi_2$	2/12: Samarium oxalate	$C_8 \Pi_{20} SI$	225% Thorium		612: Calaium aastulaastanata
CILOT	2207. Titorium evalate	$C_8 \Pi_{32} \Pi_8 O_{16} \Gamma_2 \Pi_1$	tatroayon on latinata(II)	$C_{10}\Pi_{14}CaO_4$	612: Calcium acetylacetonate
$C_6 \Pi_{20} O_{22} \Pi_2$	3297: Intamum Oxanate		here de celestration	$C_{10}\Pi_{14}CaO_4$	badante
	accanydrate		1625. Lucra a card a real	(annydrous)	nydrate
$C_6 \Pi_{20} O_{22} \Pi_{02}$	34/7. Itterbium oxalate	$C_9 F e_2 O_9$	102.5: Ifon honacarbonyi	$C_{10} \Pi_{14} C d O_4$	
	decanydrate	$C_9H_7MnO_3$	2102:		acetylacetonate
$C_6 \Pi_{21} C I O_{12}$	bayahydrata		manganasa tricarbanyl	$C_{10}\Pi_{14}C0O_4$	952: Cobalt(II)
C II. Co EoN O	646. Calaium fama ayanida		55. A huminum la stata	C II CvO	1050: Comport(II)
$C_6 \Pi_{24} Ca_2 ren_6 O_1$	2 040: Calcium lerrocyanide	$C_9 \Pi_{15} AlO_9$	54. Aluminum isomenovide	$C_{10}\Pi_{14}CuO_4$	1039: Copper(II)
C II CI CaN O		$C_9 \Pi_{21} A I O_3$	1700: L and hereflyand	C II E O	1205: Formous apatula atomata
$C_6 H_{28} C I_3 C O N_6 O_2$	Tris(sthylens diammins)	$C_{10}\Gamma_{12}O_4\Gamma D$	1709. Lead nexandoro-	$C_{10}\Pi_{14}\Gamma e O_4$	1226: Ethylanadiamina
	ashalt(III) shlarida		1005: Coppor(II) have	$C_{10} \Pi_{14} \Pi_2 \Pi_2 \Omega_8$	1250: Ethylenedialille-
	tribudrate	$C_{10}H_2Cur_{12}O_4$	fuoroacetulacetonate		disadium salt
CUND	2455. Detective	C II C <sub>2</sub> E O	1007: Coppor(U) have	C II MaO	1002: Manganasa(II)
$C_6 K_2 N_6 Pt$	2455: Potassium	$C_{10}\Pi_2 Cu\Gamma_{12}O_4$	fuoroactulacatorato	$C_{10}\Pi_{14}WIIO_4$	1995: Manganese(11)
CKNDS	246% Detagaium		hudrote	C II NO	2196: Niekel egetylegetenete
$C_6 K_2 N_6 P l S_6$	2408. Polassiulli	CHENO	2212: Niekel hevefluore	$C_{10}\Pi_{14}NIO_4$	2180: Nickel acetylacetollate
	nexatinocyano-	$C_{10}\Pi_2\Gamma_{12}\Pi_1O_4$	2212: Nickel liexalluoro	$C_{10}\Pi_{14}O_4Pb$	2217: Dolladium(II)
C Lo O	platiliate(1V)		2222 Palla dium (II) have	$C_{10}\Pi_{14}O_4Pd$	2317: Panadium(II)
$C_6La_2O_{12}$	hydrote	$C_{10}\Pi_2\Gamma_{12}O_4Pd$	2323: Palladiull(II) llexa-	CILOD	2278: Distinum
(annyurous)	2110: Malubdanum aarbanul	CHEOD	2284: Platinum(II) have	$C_{10}\Pi_{14}O_4Pt$	
$C_6 MOO_6$	2400: Vanadium aarbanul	$C_{10} \mathbf{n}_2 \mathbf{r}_{12} \mathbf{O}_4 \mathbf{r} \mathbf{t}$	2364. Flathluni(II) liexa-	C II O S=	2047: Strontium
$C_6 O_6 V$	2224 Tungston conhonvil		652: Coloium hous	$C_{10} \Pi_{14} O_4 SI$	
$C_6 O_6 W$	2166: Tarbium avalata	$C_{10} \Pi_6 Ca \Gamma_{12} O_6$	fuoroacetulacetonate	С Ц О 7 л	2516: Zine sectula storate
$C_6 O_{12} I O_2$	budrata		dibudrata	$C_{10}\Pi_{14}O_4Z\Pi$	bydrata
	720: Carbon	C HE Mao	1000: Magnasium hava		2212: Titonium(IV) ovido
$C_7 \Pi_2 O_2$	720: Carboli 2782: Silver henzoete	$C_{10}\Pi_6\Gamma_{12}MgO_6$	fuoroacetulacetonate	$C_{10}\Pi_{14}O_5O_5O_5O_5O_5O_5O_5O_5O_5O_5O_5O_5O_5O$	solutionationate
$C_7 \Pi_5 AgO_2$	1162: Diagrhonylagetyl		dibudrata	СНОЦ	2204: Uranyl acatylacatonata
$C_7 \Pi_7 \Pi O_4$	acetonate iridium(I)	C HE O 7n	3544: Zinc heve	$C_{10}H_{14}O_6U$	2335: Pentamethyloyolo
C H NO	123: A mmonium benzoate	$C_{10}\Pi_{6}\Pi_{12}O_{6}\Sigma\Pi$	fluoroacetylacetonate	$C_{10}\Pi_{15}C\Pi_{4}\Pi_{4}$	2555. I citamethyleyelo-
$C_7 \Pi_9 NO_2$	222: A mmonium selicylete		dibudrata		tatrachlorida
$C_7 H_9 NO_3$	710: Carbon	CHCUEO	1134: Copper(II)	СНИО	1237: Ethylene
$C_8 D$	935: Cobalt carbonyl	$C_{10}\Pi_8 C U G_4$	trifluoroacetylacetonate	$C_{10} \Pi_{16} \Pi_2 O_8$	diaminatetrancetic acid
$C_8 C O_2 O_8$	975: Cobalt(II)	C H BEAE	1302: Ferrocenium	СНМаО	1870: Magnesium
$C_8 H_2 C O F_{12} O_4$	hevafluoroacetyl	$C_{10}\Pi_{10}\Pi_{10}\Pi_{10}\Pi_{10}$	tetrafluoroborate	$C_{10} \Pi_{18} W I g O_6$	acetylacetonate dibydrate
		C H Cl Hf	1468: Hafnocene dichloride	С Н О 7 л	3583: Zinc valerate dihydrate
	2346: Phenylmercuric	$C_{10}H_{10}C_{12}H_{10}$	2274: Nichocene dichloride	$C_{10}H_{22}O_{6}ZH$	2267: Niobium(V) ethoxide
$C_8\Pi_8\Pi_9O_2$	acetate	$C H C T_1$	3313: Titanocene dichloride	$C H O T_{2}$	3118: Tantalum ethoxide
CH Mo O	2105: Molybdenum acetate	C H C V	3407: Vanadium	$C H B_{20}$	322: Barium acetylacetonate
$C_8 \Pi_{12} W O_2 O_8$	dimer	$C_{10} I_{10} C_{12} V$	bis(cyclopentadienyl)	$C_{10} \Pi_{30} Da O_{12}$	octahydrate
CHOP	1736: Lead tetraacetate		dichloride	C Mn O	1979: Manganese carbonyl
C H O Rh	2637: Rhodium(II) acetate		3440: Vanadocene dichloride	$C_{10} R_{10}$	2612: Rhenium carbonyl
C81112O81012	dimer	CHC17r	3613: Zirconocene dichloride	$C_{10}O_{10}RO_{2}$	1146: Cyclobexadiene iron
CHOS	2759: Silicon acetate	$C H C_0$	944: Cobaltocene	0111181003	tricarbonyl
$C_8 H_{12} O_8 S I$	3579: Zinc tartrate dihydrate	01011000	1028: Cobaltocene	C., H.FeO.	1147: Cyclooctatetraene iron
$C_8H_{12}O_{14}\Sigma H$	1746: Lead(II) butanoate	CH.,CoF.P	1029: Cobaltocenium	011181003	tricarbonyl
C H C U O	1070: Copper(II) butanoate	01011000161	hexafluorophosphate	C. Co Fe N	971: Cobalt(II) ferricyanide
C81116CuO5	monohydrate	C. H. Fe	1300: Ferrocene	$C_{12}C_{03}C_{21}C_{12}$	938: Cobalt dodecacarbonyl
	1071: Copper(II) butyrate	CioHioMn	1975: Manganese	$C_{12}C_{4}O_{12}$	1623. Iron dodecacarbonyl
	monohydrate	~1010	his(cyclopentadienyl)	$C_{12}$ , $C_{3}$ , $C_{12}$	685: Calcium phenoxide
C.H.AICI	1182. Dijsobutylaluminum		1991: Manganocene	$C_{12}H_{10}CaO_2$	1898: Magnesium citrate
C <sup>811</sup> 18, 11C1	chloride	CueHueNi	2195: Nickel	$C_{12}H_{10}M_{53}O_{14}$	2000: Manganese(II) citrate
C <sub>2</sub> H <sub>10</sub> NO <sub>2</sub>	126: Ammonium caprvlate	- 1010- 1-	bis(cyclopentadienyl)	$C_{12} = 10^{-10} \cdot 10^{-3} \cdot 0^{-14}$	2348: Phenylmercuric nitrate
C <sub>e</sub> H <sub>20</sub> BrN	3178: Tetraethylammonium	CioHioOs	2301: Osmium	-121162-004	basic
- 6 20	bromide	-10-10-00	bis(cyclopentadienyl)	C12H12Al2O12	89: Aluminum tartrate
C <sub>s</sub> H <sub>20</sub> ClN	3179: Tetraethylammonium	$C_{10}H_{10}Ru$	467: Bis(cyclopentadienvl)	$C_{12}H_{12}Ba_{2}O_{12}$	345: Barium citrate
0 20	chloride	10 10	ruthenium	12 12	monohydrate

C <sub>12</sub> H <sub>12</sub> FeO C <sub>12</sub> H <sub>12</sub> Co <sub>2</sub> O <sub>16</sub>	1: Acetylferrocene 967: Cobalt(II) citrate	$C_{15}H_{21}AlO_6$	18: Alur ace
C H O 7r	dihydrate	$C_{15}H_{21}CeO_6$	768: Cer
$C_{12}\Pi_{14}O_{16}Z\Pi_{3}$	1703: Lead citrate tribydrate	C H CoO	1015: C
$C_{12}\Pi_{16}O_{17}\Pi_{03}$	430: Beryllium basic acetate	$C_{15}\Pi_{21}COO_6$	1015. CC
$C_{12}H_{18}BC_4O_{13}$ $C_{12}H_{18}Ca_3O_{18}$	640: Calcium citrate	$C_{15}H_{21}CrO_6$	888: Ch
$C_{12}H_{21}CrO_6$	861: Chromium(III) acetylacetonate	$C_{15}H_{21}EuO_6$ (anhydrous)	1250: Ei acei
C <sub>12</sub> H <sub>22</sub> CuO <sub>14</sub>	1093: Copper(II) gluconate	C.H.,FeO	1264: Fe
$C_{12}H_{22}N_3O_{14}Fe$	1641: Iron(III) ammonium citrate	$C_{15}H_{21}GaO_6$	1379: G ace
$\mathrm{C}_{12}\mathrm{H}_{28}\mathrm{NO}_4\mathrm{Ru}$	3187: Tetrapropylammonium perruthenate(VII)	$C_{15}H_{21}InO_6$ $C_{15}H_{21}IrO_6$	1553: In 1605: Ir
C <sub>12</sub> H <sub>28</sub> O <sub>4</sub> Ti	3293: Titanium isopropoxide		ace
C <sub>12</sub> H <sub>30</sub> Cl <sub>3</sub> CoN <sub>8</sub>	1025: Cobalt(III) sepulchrate	C <sub>15</sub> H <sub>21</sub> LaO <sub>6</sub>	1650: La
	trichloride	(anhydrous)	ace
$C_{12}H_{38}Mg_{3}O_{28}$	1900: Magnesium citrate tetradecahydrate	$C_{15}H_{21}MnO_6$	2032: M ace
$C_{12}Ir_4O_{12}$	1601: Iridium carbonyl	$C_{15}H_{21}O_6Pr$	2573: Pi
$C_{12}O_{12}OS_{3}$	2302: Osmium carbonyl		ace
$C_{12}O_{12}Rh_4$	2636: Rhodium	C <sub>15</sub> H <sub>21</sub> O <sub>6</sub> Rh	2638: R
	dodecacarbonyl		ace
$C_{12}O_{12}Ru_3$	2689: Ruthenium dodecacarbonyl	$\mathrm{C}_{15}\mathrm{H}_{21}\mathrm{O}_{6}\mathrm{Ru}$	2691: Ru ace
Cl <sub>3</sub> Tl	3222: Thallium(III) chloride	$C_{15}H_{21}O_6Sm$	2700: Sa
(anhydrous)	hydrate		ace
$C_{14}H_{10}Fe_2O_4$	1149: Cyclopentadienyliron dicarbonyl dimer	$C_{15}H_{21}O_6V$	3438: Va ace
$\mathrm{C}_{14}\mathrm{H}_{12}\mathrm{Hg}\mathrm{O}_5$	2065: Mercury(II) benzoate monohydrate	$C_{15}H_{21}O_6Yb$	3469: Y ace
$\mathrm{C}_{14}\mathrm{H}_{14}\mathrm{CuO}_{6}$	1067: Copper(II) benzoate dihydrate	$\mathrm{C_{15}H_{25}GdO_8}$	1355: Ga ace
$C_{14}H_{14}O_8Sr$	3082: Strontium salicylate dihydrate	$C_{15}H_{27}O_9Tb$	3156: Te ace
$C_{14}H_{16}O_9Zn$	3566: Zinc salicylate trihydrate	C <sub>15</sub> H <sub>27</sub> O <sub>9</sub> Tm	trih 3261: Tł
$C_{14}H_{18}MgO_{10}$	1943: Magnesium salicylate tetrahydrate		ace trih
$\begin{array}{c} C_{14}H_{20}GdN_{3}O_{10}\\ C_{15}H_{3}BiF_{18}O_{6} \end{array}$	1377: Gadopentetic acid 481: Bismuth hexa-	$C_{15}H_{27}O_9Y$	3485: Yi ace
	fluoroacetylacetonate		trih
$C_{15}H_3F_{18}O_6Pr$	2582: Praseodymium hexa- fluoroacetylacetonate	$C_{16}H_{30}BaO_4$	319: Bai 2-e
$C_{15}H_3F_{18}O_6Y$	3500: Yttrium hexa- fluoroacetylacetonate	$C_{16}H_{30}CaO_4$	645: Cal 2-e
$C_{15}H_7F_{18}NdO_8$	2163: Neodymium hexa- fluoroacetylacetonate	$C_{16}H_{30}CdO_4$	573: Cao 2-ei
$\mathrm{C_{15}H_{12}F_{9}FeO_{6}}$	1298: Ferric	$C_{16}H_{30}CuO_4$	1085: Co 2-ei
$C_{15}H_{12}F_9NdO_6$	2179: Neodymium	$C_{16}H_{30}O_4PD$	2-ei
C <sub>15</sub> H <sub>15</sub> La	1682: Lanthanum	$C_{16}H_{30}O_4ZII$ $C_{16}H_{33}AlO_4$	58: Alur
$C_{15}H_{15}Nd$	2180: Neodymium tris(cyclopentadienyl)	$C_{16}H_{35}NO_2$	209: An
C.H.Sc	2735: Scandium	$C_{16} \overline{C_{16}} C_{16$	1274. Fe
C1511155C	tris(cyclonentadienyl)	$C_{18} C_{18} C_{18}$	2016. 6
C. H. Sm	2719: Samarium	$C_{18} H_{33} VaO_2$	2573. Dr
C <sub>15</sub> 11 <sub>15</sub> 5111	tris(cyclonentadienyl)	C H I i O	1828.1
$C_{15}H_{21}DyO_6$	1191: Dysprosium	$C_{18}H_{35}NaO_2$ $C_{18}H_{35}NaO_2$	2981: Sc
CHErO	1213: Erbium acetylacetorate	C H NO	206. An
(anhydrous)	hydrate	$C_{18}H_{39}NO_2$	200. An 227: An

: Aluminum	$C_{20}H_4F_{24}O_8$
acetylacetonate	
8: Cerous acetylacetonate	$C_{20}H_4F_{24}O_8$
hydrate 15: Cobalt(III)	C <sub>20</sub> H <sub>28</sub> HfO
acetylacetonate 8: Chromium(III)	C <sub>20</sub> H <sub>28</sub> O <sub>8</sub> T
acetylacetonate	
50: Europium(III)	$C_{20}H_{28}O_8Z_1$
64: Ferric acetylacetonate	CaoHaoMg
79: Galliumn	- 20 30 8
acetylacetonate 53: Indium acetylacetonate	$C_{20}H_{34}CuC$
05: Iridium(III)	C <sub>22</sub> H <sub>38</sub> BaO
acetylacetonate	(anhydro
50: Lanthanum	
acetylacetonate hydrate	
32: Manganese(III)	$C_{22}H_{38}CaO$
73: Praseodymium	
acetylacetonate	C24H20BaO
38: Rhodium(III)	24 20
acetylacetonate	$C_{24}H_{46}O_4Z_{10}$
91: Ruthenium(III)	$\mathrm{C}_{27}\mathrm{H}_{32}\mathrm{Fe}_2$
acetylacetonate	
00: Samarium	
acetylacetonate	$C_{32}H_{16}CuN$
acetylacetonate	CHCaO
69: Ytterbium	C <sub>32</sub> H <sub>62</sub> EuO
acetylacetonate	- 34 26 2
55: Gadolinium	C <sub>36</sub> H <sub>62</sub> CoO
acetylacetonate dihydrate	C <sub>36</sub> H <sub>66</sub> CaO
56: Terbium	C <sub>36</sub> H <sub>66</sub> CoO
acetylacetonate	$C_{36}H_{66}CuO$
trinydrate	CHOP
acetylacetonate	$C_{36}\Pi_{66}O_{4}\Pi_{10}$
trihydrate	$C_{36}H_{66}O_4D$
85: Yttrium	C <sub>36</sub> H <sub>70</sub> CaO
acetylacetonate	C <sub>36</sub> H <sub>70</sub> CdO
trihydrate	C36H70CoO
9: Barium	
2-ethylhexanoate	$C_{36}H_{70}CuO$
2 ethylbevanoste	$C_{36}H_{70}MgC$
3: Cadmium	$C_{36}H_{70}$ (10)
2-ethylhexanoate	$C_{36}H_{70}O_4S_1$
85: Copper(II)	C <sub>36</sub> H <sub>70</sub> O <sub>4</sub> Z
2-ethylhexanoate	C <sub>36</sub> H <sub>71</sub> AlO
50: Lead(II)	C <sub>36</sub> H <sub>71</sub> AlO
2-ethylhexanoate	
27: Zinc caprylate	$C_{48}H_{93}AIO$
mononalmitate	$C_{54}\Pi_{105}AIC$
9: Ammonium palmitate	C54H45ClP2
34: Rhodium carbonyl	- 54 45 - 5
74: Ferric ferrocyanide	
46: Sodium oleate	$C_{54}H_{46}ClP_3$
23: Potassium stearate	
28: Lithium stearate	C II AIC
31: Sodium stearate	CHRO
6: Ammonium oleate	С <sub>54</sub> п <sub>99</sub> ыО <sub>0</sub>
7: Ammonium stearate	~60

<sub>3</sub> Th	3240: Thorium hexa-
Zr	fluoroacetylacetonate 3594: Zirconium hexa-
,	fluoroacetylacetonate
8	acetylacetonate
h	3233: Thorium
r	3585: Zirconium
	acetylacetonate
	1880: Magnesium bis(penta-
<b>)</b> <sub>4</sub>	1081: Copper(II)
	cyclohexanebutanoate
4 118)	329: Barium bis
(10)	3,5-heptanedionate)
	hydrate
4	619: Calcium bis(2,2,6,6- tetramethyl-3 5-
	heptanedionate)
${}_{6}S_{2}$	352: Barium diphenylamine-
n	4-sulfonate
	2601:
	2,2-Bis(ethylferrocenyl)
	propane
8	phthalocyanine
4	679: Calcium palmitate
!	1299: 1,1'-Bis(diphenyl-
4	982: Cobalt(II) linoleate
4	674: Calcium oleate
4	989: Cobalt(II) oleate
4 ),	2084: Mercury(II) oleate
5	1754: Lead(II) oleate
n	3555: Zinc oleate
4	405: Barium stearate
4	593: Cadmium stearate
4	948: Cobalt stearate
	1003: Cobalt(II) stearate
′₄ )₄	1952: Magnesium stearate
4	2232: Nickel stearate
2	1729: Lead stearate
n	3571: Zinc stearate
5	37: Aluminum distearate
7	50: Aluminum
6	71: Aluminum palmitate
) <sub>6</sub>	85: Aluminum stearate
D1.	94: Aluminum tristearate
ĸn	3526: Tris(triphenvlphosphine)
	rhodium(I) chloride
Ru	851: Chlorohydridotris
	(tripnenylphosphine) ruthenium(II)
6	62: Aluminum oleate
5	490: Bismuth oleate
	/18: Carbon 1350: Fullerene
	1550.1 0101010

$C_{60}Cs_2Rb$	831: Cesium rubidium	$CaH_{12}O_9S_2$	712: Calcium thiosulfate	CdO	585: Cadmium oxide
	fullerene		hexahydrate	CdO <sub>3</sub> S	599: Cadmium sulfite
$C_{60}F_{60}$	1352: Fullerene fluoride	$CaH_{14}O_6S_2$	658: Calcium hydrosulfide	$CdO_3Se$	592: Cadmium selenite
$C_{60}K_{3}$	2442: Potassium fullerene		hexahydrate	CdO <sub>3</sub> Si	578: Cadmium metasilicate
$C_{60}Rb_3$	2665: Rubidium fullerene	CaI <sub>2</sub>	664: Calcium iodide	CdO <sub>3</sub> Te	602: Cadmium tellurite
$C_{60}/C_{70}$	1351: Fullerenes	CaI <sub>2</sub> O <sub>6</sub>	663: Calcium iodate	CdO <sub>3</sub> Ti	604: Cadmium titanate
C <sub>70</sub>	729: Carbon fullerenes	CaMn <sub>2</sub> O <sub>8</sub>	683: Calcium permanganate	CdO <sub>3</sub> Zr	607: Cadmium zirconate
Ca	608: Calcium	CaMoO <sub>4</sub>	668: Calcium molybdate	CdO <sub>4</sub> S	595: Cadmium sulfate
CaCl <sub>2</sub>	632: Calcium chloride	CaN <sub>2</sub> O <sub>4</sub>	672: Calcium nitrite	CdO <sub>4</sub> W	605: Cadmium tungstate(VI)
CaCl <sub>2</sub> H <sub>2</sub> O	635: Calcium chloride	CaN <sub>2</sub> O <sub>4</sub>	669: Calcium nitrate	CdO <sub>4</sub> V <sub>2</sub>	606: Cadmium vanadate
2 2-	monohydrate	CaO	677: Calcium oxide	CdO <sub>2</sub> P <sub>2</sub>	588. Cadmium phosphate
CaCl.H.O.	633: Calcium chloride	CaO.	684: Calcium perovide	CdP.	589: Cadmium phosphile
	dihydrate	$C_{2}O_{2}$	667: Calcium metasilicate		508: Cadmium sulfide
	621: Calaium ablarata	CaO <sub>3</sub> 51	606: Calcium silicata	CdSh	560: Cadmium antimonida
$CaCl_2ll_4O_8$	dibudroto	C <sub>2</sub> O Ti	712: Coloium titonoto	CdSo	501. Cadmium altimolide
	6261 Calaium ablarida	$C_{a}O_{3}\Pi$	715. Calcium zincenete	CdTa	601. Cadmium tallurida
$CaCl_2\Pi_8O_4$					
a a	tetranydrate	$CaO_4S$	702: Calcium sulfate	$Cd_2Nb_2O_7$	580: Cadmium niobate
$CaCl_2H_8O_{12}$	682: Calcium perchlorate	CaO <sub>4</sub> W	714: Calcium tungstate	$Cd_2O_7Ta_2$	600: Cadmium tantalate
	tetrahydrate	$CaO_6V_2$	715: Calcium vanadate	$Cd_{3}H_{16}O_{20}S_{3}$	597: Cadmium sulfate
$CaCl_2H_{12}O_6$	634: Calcium chloride	CaS	705: Calcium sulfide		octahydrate
	hexahydrate	CaSe	695: Calcium selenide	Ce	756: Cerium
CaCl <sub>2</sub> O <sub>2</sub>	661: Calcium hypochlorite	CaSi	697: Calcium silicide	Ce <sub>0.15</sub> CuNd <sub>1.85</sub> O <sub>4</sub>	2158: Neodymium cerium
$CaCl_2O_4$	637: Calcium chlorite	CaSi <sub>2</sub>	698: Calcium silicide		copper oxide
CaCl <sub>2</sub> O <sub>8</sub>	681: Calcium perchlorate	CaTe	708: Calcium telluride	CeCl <sub>3</sub>	775: Cerous chloride
CaCrH <sub>4</sub> O <sub>6</sub>	639: Calcium chromate	Ca <sub>2</sub> O <sub>4</sub> Pb	691: Calcium plumbate	CeCl <sub>3</sub> H <sub>12</sub> O <sub>18</sub>	785: Cerous perchlorate
4 0	dihvdrate	$Ca_2O_7P_2$	693: Calcium	5 12 10	hexahvdrate
CaCrO.	638: Calcium chromate	2 - 7 2	pyrophosphate	CeCl <sub>2</sub> H <sub>2</sub> O <sub>2</sub>	776: Cerous chloride
CaCr.H.O.	643: Calcium dichromate	Ca.N.	671: Calcium nitride		hentahydrate
Cuci <sub>2</sub> 11 <sub>6</sub> O <sub>10</sub>	trihydrate	$C_{2} O Si$	678: Calcium oxide silicate	CeCl	777: Cerous chloride hydrate
CaEH O P	649: Calcium		686: Calcium phosphate	(anhydrous)	TTT. Cerous emoride nyurate
Car 11 <sub>4</sub> O <sub>5</sub> 1	fluorophosphoto	$Ca_3O_8I_2$	689: Calcium phosphate	CoE	778: Carous fluorida
	dihardante	$C_{3}\Gamma_{2}$	(49) Calairan	Cer <sub>3</sub>	7/8. Cerio Aragida
C F		$Ca_5FO_{12}P_3$	648: Calcium		
CaF <sub>2</sub>	64/: Calcium nuoride	a wa b	nuoropnosphate	CeH <sub>2</sub>	759: Cerium dinydride
$CaF_6H_4O_2S_1$	653: Calcium	$Ca_5HO_{13}P_3$	660: Calcium hydroxide	CeH <sub>3</sub>	766: Cerium trihydride
	hexafluorosilicate		phosphate	CeH <sub>3</sub> O <sub>3</sub>	779: Cerous hydroxide
	dihydrate	$Ca_{10}H_{26}O_{26}P_{6}$	687: Calcium phosphate	$CeH_4O_4$	749: Ceric hydroxide
CaHO₄P	655: Calcium hydrogen		hydroxide	CeH <sub>7</sub> N <sub>3</sub> O <sub>13</sub>	747: Ceric basic nitrate
	phosphate	Cd	556: Cadmium		trihydrate
CaHO <sub>4.5</sub> S	704: Calcium sulfate	CdCl <sub>2</sub>	568: Cadmium chloride	CeH <sub>8</sub> NO <sub>12</sub> S <sub>2</sub>	770: Cerous ammonium
	hemihydrate	CdCl <sub>2</sub> H <sub>4</sub> O <sub>8</sub>	567: Cadmium chlorate		sulfate tetrahydrate
$CaH_2$	654: Calcium hydride		dihydrate	CeH <sub>8</sub> N <sub>7</sub> O <sub>19</sub>	769: Cerous ammonium
CaH <sub>2</sub> N <sub>2</sub> O <sub>5</sub>	673: Calcium nitrite	CdCl <sub>2</sub> H <sub>5</sub> O <sub>25</sub>	569: Cadmium chloride		nitrate tetrahydrate
2 2 3	monohydrate	2 5 2.5	hemipentahydrate	CeH <sub>8</sub> N <sub>8</sub> O <sub>18</sub>	131: Ammonium cerium(IV)
CaH <sub>2</sub> O <sub>2</sub>	659: Calcium hydroxide	CdCl <sub>2</sub> H <sub>12</sub> O <sub>14</sub>	587: Cadmium perchlorate	0 0 10	nitrate
CaH <sub>2</sub> O <sub>2</sub> S <sub>2</sub>	657: Calcium hydrogen	2 12 14	hexahydrate		745: Ceric ammonium nitrate
2 0 0 2 0 0 2	sulfite	CdCl_O	586: Cadmium perchlorate	CeH-O-S	752: Ceric sulfate
CaH O P	689: Calcium phosphite	CdCrO	570: Cadmium chromate	0011801202	tetrahydrate
Ca11 <sub>3</sub> O <sub>4</sub> 1	monohydrate	CdCr H O	572: Cadmium dichromate	Call NO S	130: Ammonium carium(III)
	600: Calaium phosphopata	CuCl <sub>2</sub> Il <sub>2</sub> O <sub>8</sub>	manahydrata	$CCH_{12} + CO_{12} + CO_$	sulfata tatrahydrata
	monohydrata	CAE	574. Codmium fluorido	Call NO	792: Conous pitroto
CILOD				$Cen_{12}N_3O_{15}$	782: Cerous intrate
$CaH_4O_4P_2$	562: Calcium nypopnosphite		5/5: Cadmium hydroxide	C U N O	nexanydrate
$CaH_4O_5S$	706: Calcium sulfite	$CdH_2O_5S$	596: Cadmium sulfate	$CeH_{16}N_7O_{19}$	129: Ammonium cerium(III)
	dihydrate		monohydrate		nitrate tetrahydrate
$CaH_4O_6S$	703: Calcium sulfate dihydrate	CdH <sub>4</sub> I <sub>4</sub> K <sub>2</sub> O <sub>2</sub>	2550: Potassium	$CeH_{18}I_3O_9$	781: Cerous iodide
CaH <sub>4</sub> O <sub>6</sub> Se	694: Calcium selenate		tetraiodocadmium		nonahydrate
	dihydrate		dihydrate	CeH <sub>20</sub> N <sub>4</sub> O <sub>18</sub> S <sub>4</sub>	132: Ammonium cerium(IV)
CaH₅O <sub>6</sub> P	656: Calcium hydrogen	CdH <sub>4</sub> O <sub>6</sub> Se	590: Cadmium selenate		sulfate dihydrate
	phosphate dihydrate		dihydrate		746: Ceric ammonium sulfate
CaH <sub>6</sub> O <sub>6</sub> Sn	699: Calcium stannate	CdH <sub>8</sub> N <sub>2</sub> O <sub>10</sub>	582: Cadmium nitrate		dihydrate
	trihydrate	0 2 10	tetrahydrate	CeI <sub>3</sub>	780: Cerous iodide
CaH <sub>6</sub> O <sub>0</sub> P <sub>2</sub>	644: Calcium dihydrogen	CdI <sub>2</sub>	577: Cadmium iodide	CeN	762: Cerium nitride
0 7 2	phosphate monohydrate	CdI <sub>2</sub> O	576: Cadmium iodate	CeO <sub>2</sub>	750: Ceric oxide
CaH <sub>0</sub> N <sub>2</sub> O <sub>10</sub>	670: Calcium nitrate	CdMoQ.	579: Cadmium	CeQ <sub>4</sub> Sn	765: Cerium stannate
201181 2010	tetrahvdrate	2011004	molybdate(VI)	CeO Ti	753: Ceric titanate
Санто	665: Calcium iodide	CdN O	581: Cadmium nitrate	CeO V	754: Ceric vanadate
Carr <sub>12</sub> r <sub>2</sub> O <sub>6</sub>	hevelydrate	CdN	562: Cadmium azida	$C_{2}O_{4}$	755: Cario ziroonata
	nexanyurate	Curv <sub>6</sub>	502. Caulillulli azide	CCO <sub>4</sub> ZI	755. Certe zirconate

CeO <sub>2</sub> (anhydrous)	751: Ceric oxide hydrate	ClH <sub>6</sub> LiO <sub>7</sub>	1823: Lithium perchlorate trihydrate	$Cl_2CuO_8$	1112: Copper(II) perchlorate
CePO <sub>4</sub>	786: Cerous phosphate	$\mathrm{ClH}_6\mathrm{N}_2\mathrm{O}_{4.5}$	1509: Hydrazine perchlorate	$Cl_2Cu_4H_6O_6$	1099: Copper(II) hydroxy
(annyurous)	761: Corium monosulfido		2056: Margury(I) parahlarata		1111: Coppor(II) ovvehlorida
CeSi	764: Cerium silicide	$\operatorname{CIII}_8\operatorname{IIgO}_8$	2000. Weredi y(1) peremorate	$C1_2Cu_411_7O_{6.5}$	1243: Europium(II) chloride
$Ce_2H_{16}O_{20}S_3$	789: Cerous sulfate	ClH <sub>10</sub> NaO <sub>6</sub>	2922: Sodium hypochlorite	$Cl_2Eu$ $Cl_2F_2Ge$	1170:
~ ~ ~	octahydrate		pentahydrate	~ ~ ~	Dichlorodifluorogermane
$Ce_2O_2S$	763: Cerium oxysulfide	$ClH_{15}O_{10}$	841: Chloric acid	$Cl_2F_3Sb$	284: Antimony(V)
$Ce_2O_3$	784: Cerous oxide	au	heptahydrate		dichlorotrifluoride
$Ce_2O_{12}S_3$	788: Cerous sulfate	CII	1582: Iodine chloride	$Cl_2Fe$	1311: Ferrous chloride
$Ce_2O_{12}Se_3$	787: Cerous selenate	CIT	1589: Iodine monochloride	$Cl_2FeH_4O_2$	1312: Ferrous chloride
$Ce_2O_{12}W_3$	792: Cerous tungstate	Clin	1559: Indium(1) chloride		dihydrate
$Ce_2S_3$	790: Cerous sulfide	CIK	2420: Potassium chloride	$Cl_2FeH_8O_4$	1313: Ferrous chloride
$Ce_2 Ie_3$	791: Cerous telluride	CIKO <sub>3</sub>	2419: Potassium chlorate		tetranydrate
	717: Californium		2504: Potassium perchlorate	$Cl_2FeH_{12}O_{14}$	1325: Ferrous perchiorate
CICIKO <sub>3</sub>	2421: Polassium		1778: Lithium chloride	CI E-0	nexanydrate
CICa	chlorochromate		1802: Lithium hypochiorite	$Cl_2FeO_8$	1059: Iron(II) perchlorate
CICs	803: Cestum chlorate		1///: Lithium conorate	$Cl_2Ga$	1380: Gamuni(II) chloride
$ClCsO_3$	804. Cesium parchlorate	CINO	2200: Nitrosyl chloride		chloride
	1042: Copper(I) chloride	CINO	2290. Nitryl chloride	Cl CaH	1173: Dichlorogermane
CICu H O	961: Copper(II) chloride	$CINO_2$	2253: Null yl chiolide	$C_1 H S_1$	1174: Dichlorosilane
CICu <sub>2</sub> II <sub>3</sub> O <sub>3</sub>	bydrovide	CINa CINaO	2000 2000 Sodium chiorite	$C1_2 I1_2 S1$	2320: Palladium(II) chloride
CID	1155: Deuterium chloride	CINaO	2854: Sodium chlorite	C1 <sub>2</sub> 11 <sub>4</sub> O <sub>2</sub> 1 u	dihydrate
CID	1522: Hydrogen chloride-d	$CINaO_2$	2852: Sodium chlorate	Cl.H.O.Sn	3030: Stannous chloride
CIF	844: Chlorine fluoride	CINaO.	2052: Sodium entorate	01211402511	dihydrate
en	846: Chlorine monofluoride	ClOSb	272: Antimony(III)	Cl.H.H.O.	2090: Mercury(II)
C1FO <sub>2</sub>	856: Chloryl fluoride	0.000	oxychloride	012116119011	perchlorate trihydrate
CIFO	1341: Fluorine perchlorate		288: Antimony(V)	Cl <sub>2</sub> H <sub>2</sub> N <sub>2</sub>	1500: Hydrazine
CIFPb	1748: Lead(II) chloride		oxychloride		dihydrochloride
	fluoride	ClOV	3442: Vanadyl chloride	Cl <sub>2</sub> H <sub>6</sub> N <sub>2</sub> Pd	1167: Dichlorodiammine-
ClF <sub>3</sub>	850: Chlorine trifluoride	ClO <sub>2</sub>	843: Chlorine dioxide	2 0 2	palladium(II)
ClF <sub>3</sub> O	855: Chlorosyl trifluoride	ClO <sub>3</sub> F	2339: Perchloryl fluoride	Cl <sub>2</sub> H <sub>6</sub> N <sub>2</sub> Pt	1168: Dichlorodiammine-
ClF <sub>3</sub> O <sub>2</sub>	857: Chloryl trifluoride	ClO <sub>3</sub> Rb	2657: Rubidium chlorate	2 0 2	platinum(II) (cis)
ClF <sub>5</sub>	848: Chlorine pentafluoride	ClO <sub>3</sub> Re	2630: Rhenium(VI)		1169: Dichlorodiammine-
ClGe <sub>5</sub> H <sub>12</sub>	801: Chlorogermane	5	trioxychloride		platinum(II)-trans
ClH	1521: Hydrogen chloride	ClO <sub>3</sub> Tl	3197: Thallium(I) chlorate	Cl <sub>2</sub> H <sub>6</sub> O <sub>11</sub> Pb	1723: Lead perchlorate
ClHO	1548: Hypochlorous acid	ClO <sub>4</sub> Rb	2676: Rubidium perchlorate		trihydrate
ClHO <sub>2</sub> Zr	3618: Zirconyl	ClO <sub>4</sub> Tl	3212: Thallium(I) perchlorate	$Cl_2H_8MnO_4$	1999: Manganese(II)
(anhydrous)	hydroxychloride hydrate	ClRb	2658: Rubidium chloride		chloride tetrahydrate
ClHO <sub>3</sub> S	854: Chlorosulfonic acid	CITI	3198: Thallium(I) chloride	$Cl_2H_{12}MgO_6$	1895: Magnesium chloride
ClHO <sub>4</sub>	2338: Perchloric acid	$Cl_2$	842: Chlorine		hexahydrate
ClH <sub>2</sub> HgN	2062: Mercury(II) amide	Cl <sub>2</sub> Co	962: Cobalt(II) chloride	$Cl_2H_{12}MgO_{12}$	1893: Magnesium chlorate
	chloride	Cl <sub>2</sub> CoH <sub>4</sub> O <sub>2</sub>	963: Cobalt(II) chloride		hexahydrate
	2070: Mercury(II) chloride	~ ~ ~ ~	dihydrate	$Cl_2H_{12}MgO_{14}$	1935: Magnesium perchlorate
<b>aut</b> 1 10	ammoniated	$Cl_2CoH_{12}O_6$	964: Cobalt(II) chloride	<i>a</i>	hexahydrate
CIH <sub>2</sub> L1O	1779: Lithium chloride		hexahydrate	$Cl_2H_{12}MnO_{14}$	2016: Manganese(11)
CILL N-O	monohydrate	$Cl_2CoH_{12}O_{12}$	960: Cobalt(II) chlorate	CLU NO	perchlorate hexahydrate
$CIH_2NaO_5$	2957: Sodium perchlorate		nexanydrate	$CI_2H_{12}NIO_6$	2206: Nickel chloride
CILLS	mononydrate	$CI_2COH_{12}O_{14}$	994: Coball(11) perchiorate	CLU NO	nexanydrate
	134: A mmonium ablorida	$C_{1}$ $C_{2}$ $O_{2}$	002: Cobalt(II) porchlorate	$CI_2 \Pi_{12} INIO_{12}$	2204: Nickel chlorate
CIH NO	1544: Hudroxylamino	$Cl_2COO_8$	995. Coban(II) percinorate		2056: Strontium ablorida
	hydrochloride	$Cl_2Cl$	880: Chromium(II) chloride	$C_{12}T_{12}O_{6}S_{1}$	bevabydrate
CIH NO	133: Ammonium chlorate	$C_{1_2}C_{1_1_6}C_{8}$	tetrahydrate	CIH O Sr	3078: Strontium perchlorate
CIH.NO.	214: Ammonium	Cl.CrO.	919: Chromium(VI)	012111201451	hexabydrate
	perchlorate		dichloride dioxide	Cl.H.,O.,Zn	3558: Zinc perchlorate
CIH.NO-	1545: Hydroxylamine		925: Chromyl chloride	0121112014211	hexahydrate
01141105	perchlorate	Cl <sub>2</sub> Cu	1075: Copper(II) chloride	Cl <sub>2</sub> H <sub>4</sub> N <sub>2</sub> OPd	2330: Palladium(II)
ClH <sub>5</sub> N <sub>2</sub>	1505: Hydrazine	Cl <sub>2</sub> CuH <sub>2</sub> O <sub>2</sub>	1076: Copper(II) chloride		tetraammine chloride
5 2	monohydrochloride	2 4 2	dihydrate		monohydrate
ClH <sub>5</sub> O <sub>2</sub>	1523: Hydrogen chloride	Cl <sub>2</sub> CuH <sub>12</sub> O <sub>12</sub>	1074: Copper(II) chlorate	Cl <sub>2</sub> H <sub>16</sub> HfO <sub>0</sub>	1459: Hafnium oxychloride
	dihydrate	2 12 - 12	hexahydrate	2 10 7	octahydrate
ClH <sub>6</sub> KMgO <sub>7</sub> S	2484: Potassium magnesium	Cl <sub>2</sub> CuH <sub>12</sub> O <sub>14</sub>	1113: Copper(II) perchlorate	Cl <sub>2</sub> H <sub>16</sub> O <sub>9</sub> Zr	3617: Zirconyl chloride
	chloride sulfate	/	hexahydrate	/	octahydrate

(	$Cl_2H_{16}O_{17}Zr$	3620: Zirconyl perchlorate octahydrate	Cl <sub>3</sub> Dy Cl <sub>3</sub> DyH <sub>12</sub> O <sub>6</sub>	1195: D 1196: D
C	Cl <sub>2</sub> HeO <sub>5</sub> U	3397: Uranyl chloride		he:
	71 IIF	1451: Usfrium(II) shlarida	CI <sub>3</sub> DyO <sub>12</sub>	1205: L
	л <sub>2</sub> пі Лис	2060: Managery (II) chloride	(annyurous)	1220, E
	$J_1 Hg$	2069: Mercury(II) chloride	Cl <sub>3</sub> Er	1220: E
	$I_2$ HgO <sub>6</sub>	2068: Mercury(II) chlorate	$CI_3ErH_{12}O_6$	1221: E
	$J_2Hg_2$	2046: Mercury(I) chloride		1020 E
(	$Cl_2Hg_2O_6$	2045: Mercury(I) chlorate	Cl <sub>3</sub> ErO <sub>12</sub>	1230: E
C	$I_2 H I_2 N I O_{14}$	2224: Nickel perchlorate	(anhydrous)	hyc
		hexahydrate	Cl <sub>3</sub> Eu	1253: E
(	Cl <sub>2</sub> In	1562: Indium(II) chloride	$Cl_3EuH_{12}O_6$	1254: E
(	Cl <sub>2</sub> Mg	1894: Magnesium chloride		he
C	$Cl_2MgO_8$	1934: Magnesium perchlorate	$Cl_3EuH_{12}O_{18}$	1260: E
(	$Cl_2Mn$	1998: Manganese(II) chloride		per
C	Cl <sub>2</sub> Mo	2120: Molybdenum(II)	Cl <sub>3</sub> FGe	3317: T
		chloride	Cl <sub>3</sub> Fe	1269: F
C	$Cl_2MoO_2$	2140: Molybdenum(VI)	Cl <sub>3</sub> FeH <sub>12</sub> O <sub>6</sub>	1270: F
		dioxydichloride		he
(	Cl <sub>2</sub> Nd	2159: Neodymium chloride	Cl <sub>3</sub> FeH <sub>12</sub> O <sub>18</sub>	1288: F
(	Cl <sub>2</sub> Ni	2205: Nickel chloride		he
C	Cl <sub>2</sub> O	847: Chlorine monoxide	Cl <sub>3</sub> FeO <sub>12</sub>	1289: F
0	Cl <sub>2</sub> OS	3229: Thionyl chloride	(anhydrous)	hyo
(	Cl <sub>2</sub> OSe	2747: Selenium oxychloride	Cl <sub>3</sub> Ga	1391: G
(	Cl <sub>2</sub> OV	3444: Vanadyl dichloride	Cl <sub>3</sub> GaH <sub>12</sub> O <sub>18</sub>	1401: G
0	Cl <sub>2</sub> OZr	3616: Zirconyl chloride		per
	(anhydrous)	hydrate	Cl <sub>3</sub> Gd	1358: G
(	$Cl_2O_2S$	3110: Sulfuryl chloride	Cl <sub>3</sub> GdH <sub>12</sub> O <sub>6</sub>	1359: C
(	$Cl_2O_2U$	3396: Uranyl chloride		he
0	$Cl_2O_2W$	3349: Tungsten oxydichloride	Cl <sub>3</sub> GdO <sub>12</sub>	1369: 0
0	$Cl_2O_3$	1166: Dichlorine trioxide	(anhydrous)	pei
(	$Cl_2O_4$	849: Chlorine perchlorate	Cl <sub>3</sub> GeH	3315: T
(	Cl <sub>2</sub> O <sub>4</sub> Pb	1701: Lead chlorite	Cl <sub>3</sub> HSi	3318: T
(	$Cl_2O_6$	1165: Dichlorine hexoxide	Cl <sub>3</sub> H <sub>2</sub> NO <sub>2</sub> Ru	2690: F
(	Cl <sub>2</sub> O <sub>6</sub> Pb	1699: Lead chlorate	, <u>,</u> ,	chl
(	$Cl_2O_6Sr$	3054: Strontium chlorate	Cl <sub>3</sub> H <sub>6</sub> O <sub>15</sub> Sb	273: Ar
0	$Cl_2O_6Zn$	3530: Zinc chlorate		per
0	$Cl_2O_7$	845: Chlorine heptoxide	Cl <sub>3</sub> H <sub>8</sub> InO <sub>4</sub>	1566: In
		1164: Dichlorine heptoxide		tet
0	Cl <sub>2</sub> O <sub>8</sub> Pb	1722: Lead(II) perchlorate	Cl <sub>3</sub> H <sub>12</sub> HoO <sub>6</sub>	1483: H
0	$Cl_2O_8Sr$	3077: Strontium perchlorate		he
0	Cl <sub>2</sub> Os	2303: Osmium(II) chloride	Cl <sub>3</sub> H <sub>12</sub> HoO <sub>18</sub>	1491: H
(	Cl <sub>2</sub> Pb	1700: Lead chloride		he
0	Cl <sub>2</sub> Pd	2319: Palladium(II) chloride	Cl <sub>3</sub> H <sub>12</sub> LaO <sub>6</sub>	1660: L
0	Cl <sub>2</sub> Pt	2382: Platinum(II) chloride		he
0	$Cl_2Ra$	2607: Radium chloride	Cl <sub>3</sub> H <sub>12</sub> LaO <sub>18</sub>	1673: L
0	$Cl_2S_2$	3096: Sulfur chloride		he
(	Cl <sub>2</sub> Se <sub>2</sub>	2740: Selenium chloride	Cl <sub>3</sub> H <sub>12</sub> LuO <sub>6</sub>	1850: L
(	Cl <sub>2</sub> Sm	2720: Samarium(II) chloride	5 12 0	he
(	Cl <sub>2</sub> Sn	3029: Stannous chloride	Cl <sub>3</sub> H <sub>12</sub> NdO <sub>6</sub>	2161: N
(	Cl <sub>2</sub> Sr	3055: Strontium chloride	5 12 0	he
(	Cl <sub>2</sub> Te	3141: Tellurium dichloride	Cl <sub>3</sub> H <sub>12</sub> NdO <sub>18</sub>	2172: N
0	Cl <sub>2</sub> Ti	3284: Titanium dichloride	5 12 16	per
0	$\tilde{\mathbf{U}}_{2}\mathbf{V}$	3412: Vanadium dichloride		he
0	Cl <sub>2</sub> W	3336: Tungsten dichloride	Cl <sub>2</sub> H <sub>12</sub> O <sub>4</sub> Sc	2727: S
0	Cl <sub>2</sub> Zn	3531: Zinc chloride	5 12 0	he
C	Cl <sub>2</sub> CoH <sub>16</sub> N <sub>6</sub>	2336: Pentammine-	Cl <sub>2</sub> H <sub>12</sub> O <sub>4</sub> Sm	2706: S
		chlorocobalt(III)		he
		chloride	Cl <sub>a</sub> H <sub>a</sub> O <sub>2</sub> Th	3160 <sup>.</sup> T
C	Cl <sub>2</sub> CoH <sub>10</sub> N <sub>2</sub>	1471: Hexaamminecobalt(III)		he
		chloride	ClaH.,O.Y	3498· V
C	ClaCr	893: Chromium(III) chloride		he
0	Cl <sub>o</sub> CrH <sub>10</sub> O	894: Chromium(III) chloride	ClaHao Yh	3473· V
	.,0111206	hexahydrate	5131120610	
C	CloCrO	903: Chromium(III)	ClaH.,O.,Pr	2589· P
	-30.012	perchlorate	2-312-181 1	nei
		reconnection		PCI

5: Dysprosium chloride	Cl <sub>2</sub> H <sub>12</sub> O <sub>10</sub> Tb
6: Dysprosium chloride	- 5 12 - 16
hexahydrate	$Cl_3H_{12}O_{18}Tl$
5: Dysprosium	
perchlorate hydrate	$Cl_3H_{12}O_{18}Y$
0: Erbium chloride	
1: Erbium chloride	Cl <sub>3</sub> H <sub>14</sub> LaO <sub>7</sub>
hexahydrate	
0: Erbium perchlorate	$Cl_3H_{14}O_7Pr$
hydrate	01 FF 0 T
3: Europium(III) chloride	$Cl_3H_{14}O_7Tm$
4: Europium(III) chloride	
nexanydrate	$CI_3H_{16}InO_{20}$
0: Europium(III)	CLU MaNO
7: Trichlorofluorogermane	$C1_3 I1_{16} Wig WO_6$
0: Ferric chloride	CI H NNIO
0: Ferric chloride	CI <sub>3</sub> II <sub>16</sub> IIIIO <sub>6</sub>
hexahydrate	
8: Ferric perchlorate	
hexahydrate	Cl <sub>2</sub> H <sub>10</sub> N <sub>2</sub> Ru
9: Ferric perchlorate	5 18 0
hydrate	
1: Gallium(III) chloride	Cl <sub>3</sub> Ho
1: Gallium(III)	Cl <sub>3</sub> I
perchlorate hexahydrate	Cl <sub>3</sub> In
8: Gadolinium chloride	Cl <sub>3</sub> Ir
9: Gadolinium chloride	Cl <sub>3</sub> Ir
hexahydrate	(anhydrous)
9: Gadolinium	Cl <sub>3</sub> La
perchlorate hydrate	Cl <sub>3</sub> Lu
5: Trichlorogermane	Cl <sub>3</sub> Mo
8: Trichlorosilane	
0: Ruthenium nitrosyl	Cl <sub>3</sub> MoO
chloride monohydrate	
: Antimony(III)	Cl <sub>3</sub> N
perchlorate trihydrate	Cl <sub>3</sub> NbO
6: Indium(III) chloride	
tetrahydrate	Cl <sub>3</sub> Nd
3: Holmium chloride	Cl <sub>3</sub> OP
hexahydrate	CL OV
1: Holmium perchlorate	Cl <sub>3</sub> OV
nexanydrate	CL OW
0: Lantnanum chloride	$Cl_3OW$
nexanydrate	$CI_3O_{12}Sm$
5: Lanthanum perchiorate	(annydrous)
0: Lutatium chlorida	$C_{1_3}O_{12} = 0$
bayabydrate	$Cl_3Os$
1: Neodymium chloride	(anhydrous)
hevahydrate	Cl P
2: Neodymium	C1 <sub>3</sub> 1
perchlorate	CLPS
hexabydrate	0131 0
7: Scandium chloride	Cl.Pr
hexahydrate	3
6: Samarium chloride	Cl <sub>2</sub> Pu
hexahvdrate	Cl <sub>2</sub> Re
0: Terbium chloride	Cl <sub>2</sub> Rh
hexahvdrate	Cl <sub>2</sub> Rh
8: Yttrium chloride	(anhydrous)
hexahydrate	Cl <sub>3</sub> Ru
3: Ytterbium chloride	~
hexahydrate	Cl <sub>3</sub> Ru
9: Praseodymium	(anhydrous)
perchlorate hexahydrate	Cl <sub>3</sub> Sb

3167: Terbium perchlorate
hexahydrate
3226: Thallium(III)
2508: Vttrium parablarata
hexahydrate
1659: Lanthanum chloride
heptahydrate
2580: Praseodymium
chloride heptahydrate
3264: Thulium chloride
heptahydrate
octahydrate
195: Ammonium magnesium
chloride hexahydrate
200: Ammonium nickel
chloride hexahydrate
2188: Nickel ammonium
1472: Hexa-
ammineruthenium(III)
chloride
1482: Holmium chloride
1594: Iodine trichloride
1565: Indium(III) chloride
1608: Iridium(III) chloride
1609: Iridium(III) chloride
1658: Lanthanum chloride
1849: Lutetium chloride
2123: Molybdenum(III)
chloride
2138: Molybdenum(V)
oxytrichloride
2282: Nitrogen trichloride
oxychloride
2160: Neodymium chloride
2361: Phosphorus
oxychloride
3422: Vanadium
3353: Tungsten ovytrichloride
2714: Samarium perchlorate
hydrate
3479: Ytterbium perchlorate
2304: Osmium(III) chloride
2305: Osmium(III) chloride
nydrate 2365: Phosphorus(III)
chloride
3231: Thiophosphoryl
chloride
2579: Praseodymium
chloride
2393: Plutonium(III) chloride
2640: Rhodium(III) chloride
2641: Rhodium(III) chloride
hydrate
2693: Ruthenium(III)
chloride
2694: Ruthenium(III)
2694: Ruthenium(III) chloride hydrate

Cl₃Sc Cl₃Sm	2726: Scandium chloride 2705: Samarium chloride	$Cl_5H_{10}N_2ORh$	211: Ammonium pentachlororhodate(III)	$Cl_6K_2Pt$	2451: Potassium hexachloroplatinate(IV)
Cl <sub>3</sub> Tb	3159: Terbium chloride		monohydrate	Cl <sub>6</sub> K <sub>2</sub> Re	2452: Potassium
Cl <sub>3</sub> Ti	3307: Titanium trichloride	Cl <sub>5</sub> H <sub>10</sub> N <sub>2</sub> ORu	212: Ammonium penta-		hexachlororhenate(IV)
Cl <sub>3</sub> Tl	3221: Thallium(III) chloride		chlororuthenate(III)	Cl <sub>6</sub> K <sub>2</sub> O <sub>5</sub>	2449: Potassium
Cl <sub>3</sub> Tm	3263: Thulium chloride		monohydrate		hexachloroosmiate(IV)
Cl <sub>3</sub> U	3385: Uranium trichloride	Cl <sub>5</sub> H <sub>12</sub> N <sub>3</sub> Zn	213: Ammonium	$Cl_6N_3P_3$	2351: Phosphonitrilic
Cl <sub>3</sub> V	3431: Vanadium trichloride		pentachlorozincate		chloride trimer
Cl <sub>3</sub> Y	3497: Yttrium chloride	Cl <sub>5</sub> IrKNO	2500: Potassium	Cl <sub>6</sub> Na <sub>2</sub> O <sub>5</sub>	2884: Sodium
Cl <sub>3</sub> Yb	3472: Ytterbium chloride	(anhydrous)	pentachloronitrosyl	(anhydrous)	hexachloroosmiate(IV)
Cl <sub>4</sub> Cr	914: Chromium(IV)		iridium(III) hydrate		hydrate
	chloride	$Cl_5K_2Ru$	2501: Potassium penta	$Cl_6Na_2Pd$	2885: Sodium
$Cl_4CuH_{12}N_2O_2$	140: Ammonium copper(II)	(anhydrous)	chlororuthenate(III)		hexachloropalladate(IV)
	chloride dihydrate		hydrate	$Cl_6Na_2Pt$	2886: Sodium
Cl <sub>4</sub> CuLi <sub>2</sub>	1837: Lithium	Cl <sub>5</sub> Mo	2136: Molybdenum(V)		hexachloroplatinate(IV)
~ ~	tetrachlorocuprate		chloride	$Cl_6Na_3Rh$	2888: Sodium
Cl <sub>4</sub> Ge	1419: Germanium(IV)	Cl <sub>5</sub> Nb	2266: Niobium(V) chloride	(anhydrous)	hexachlororhodate(III)
0	chloride	Cl <sub>5</sub> P	2371: Phosphorus(V)	<b>C1</b> C1	hydrate
$Cl_4H_6Na_2O_3Pd$	3001: Sodium		chloride	$Cl_6Sl_2$	14/5: Hexachlorodisilane
	tetrachloropalladate(11)	Cl <sub>5</sub> Re	2626: Rhenium(V) chloride	Cl <sub>6</sub> W	3345: Tungsten hexachloride
CLUNDI			282: Antimony(V) chloride	Cm	1138: Curium( $\alpha$ )
$Cl_4H_8N_2Pd$	238: Ammonium	CI <sub>5</sub> 1a	3124: Tantalum	C	1139: Curium(p)
CI II N D	tetrachloropalladate(II)	CLU	pentachloride		926: Cobalt
$Cl_4H_8N_2Pt$	239: Ammonium	$Cl_5 U$	2256. Transition in anti-shlarida	$C_0 C_{\rm T} O_4$	965: Cobalt(II) chromate
CLUN 7.	tetrachloroplatinate(11)	Cl II I	3356: Tungsten pentachloride	$C_0Cr_2O_4$	966: Cobalt(II) chromite
$Cl_4H_8N_2Zn$	240: Ammonium	$Cl_6H_2Ir$	1527: Hydrogen	$CoF_2$	9/3: Cobalt(II) fluoride
		(annydrous)	hexachioroiridate(1v)	$COF_2H_8O_4$	9/4: Coball(II) Iluoride
			nyurate	C-E	101(c Cabalt(III) from the
	2289: Platinum (IV) shlarida	$Cl_6H_2Pl$	1528: Hydrogen	$C_{0}F_{3}$	1016: Cobalt(III) Informe
$Cl_4\Pi_{10}O_5Pl$	2588: Platinum(1v) chloride	CI II I-N	162: Ammonium	$C0F_6H_{12}O_6SI$	970: Coball(II)
CLU O Sa	2010: Stammia ablamida	$Cl_6 \Pi_8 III N_2$	havaahlanairidata(IV)		hevelyudrote
$C1_4\Pi_{10}O_5S\Pi$	pentabydrate	CI H N Oc	164: Ammonium	CoFe O	970: Cobalt(II) diiron
CIH HaNO	196: Ammonium mercuric	C1 <sub>6</sub> 11 <sub>8</sub> 1 <b>v</b> <sub>2</sub> O3	hevachloroosmiate(IV)	$corc_2o_4$	tetrovide
$Cl_4 l_{12} l_{12} l_{12} l_{2} O_2$	chloride dihydrate	CI H N Pd	165: Ammonium	CoHO	1022: Cobalt(III) oxide
Cl Hf	1452: Hafnium chloride	C161181 V21 U	hexachloropalladate(IV)		hydroxide
CLK <sub>a</sub> Pd	2540: Potassium	Cl.H.N.Pt	166: Ammonium	CoH <sub>2</sub> MoO <sub>2</sub>	985: Cobalt(II) molybdate
0141121 0	tetrachloropalladate(II)	0161181 (21 (	hexachloroplatinate(IV)	00112111005	monohydrate
CLK <sub>2</sub> Pt	2541: Potassium	Cl.H.N.Ru	168: Ammonium	CoH <sub>2</sub> O <sub>2</sub>	977: Cobalt(II) hydroxide
0141121	tetrachloroplatinate(II)	0161181 12114	hexachlororuthenate(IV)	CoH <sub>2</sub> O <sub>5</sub> S	1006: Cobalt(II) sulfate
Cl₄Mo	2129: Molybdenum(IV)	Cl <sub>6</sub> H <sub>12</sub> IrN <sub>2</sub>	161: Ammonium	2-3-	monohydrate
- 4	chloride	0 12 5	hexachloroiridate(III)	CoH <sub>2</sub> O <sub>2</sub>	1018: Cobalt(III) hydroxide
Cl <sub>4</sub> MoO	2144: Molvbdenum(VI)	Cl <sub>6</sub> H <sub>12</sub> IrNa <sub>2</sub> O <sub>6</sub>	2883: Sodium	CoH <sub>4</sub> I <sub>2</sub> O <sub>2</sub>	980: Cobalt(II) iodide
-	oxytetrachloride	0 12 2 0	hexachloroiridate(IV)	722	dihydrate
Cl <sub>4</sub> Nb	2260: Niobium(IV) chloride		hexahydrate	CoH <sub>4</sub> O <sub>3</sub>	983: Cobalt(II) hydroxide
Cl <sub>4</sub> ORe	2629: Rhenium(VI)	Cl <sub>6</sub> H <sub>12</sub> Na <sub>2</sub> O <sub>6</sub> Pt	2887: Sodium		monohydrate
	oxytetrachloride		hexachloroplatinate(IV)	CoH <sub>4</sub> O <sub>5</sub> Se	1000: Cobalt(II) selenite
Cl <sub>4</sub> OW	3348: Tungsten oxychloride		hexahydrate		dihydrate
Cl <sub>4</sub> O <sub>16</sub> Th	3251: Thorium perchlorate	Cl <sub>6</sub> H <sub>14</sub> IrN <sub>3</sub> O	162: Ammonium	CoH <sub>6</sub> NO <sub>5</sub> P	138: Ammonium cobalt(II)
Cl <sub>4</sub> Os	2306: Osmium(IV) chloride		hexachloroiridate(III)		phosphate monohydrate
Cl <sub>4</sub> Pb	1737: Lead tetrachloride		monohydrate	CoH <sub>9</sub> O <sub>6</sub>	1019: Cobalt(III) hydroxide
	1757: Lead(IV) chloride	Cl <sub>6</sub> H <sub>14</sub> N <sub>3</sub> ORh	167: Ammonium		trihydrate
Cl <sub>4</sub> Po	2402: Polonium(IV) chloride		hexachlororhodate(III)	$CoH_{10}N_7O_8$	243: Ammonium tetranitro-
Cl <sub>4</sub> Pt	2387: Platinum(IV) chloride		monohydrate		diamminecobaltate(III)
Cl <sub>4</sub> Pu	2396: Plutonium(IV) chloride	$Cl_6H_{14}O_6Pt$	1529: Hydrogen	CoH <sub>10</sub> O <sub>9</sub> Se	998: Cobalt(II) selenate
Cl <sub>4</sub> Re	2618: Rhenium(IV) chloride		hexachloroplatinate(IV)		pentahydrate
Cl <sub>4</sub> Se	2752: Selenium tetrachloride		hexahydrate	$CoH_{12}I_2O_6$	981: Cobalt(II) iodide
Cl <sub>4</sub> Si	2773: Silicon tetrachloride	$Cl_{6}H_{42}N_{14}O_{2}Ru_{3}$	2688: Ruthenium		hexahydrate
Cl <sub>4</sub> Sn	3018: Stannic chloride	<b>a 1 1</b>	ammoniated oxychloride	$CoH_{12}K_2O_{14}S_2$	996: Cobalt(II) potassium
Cl <sub>4</sub> Te	3149: Tellurium tetrachloride	$Cl_6IrK_2$	2448: Potassium		sulfate hexahydrate
Cl <sub>4</sub> Th	3236: Thorium chloride		hexachloroiridate(IV)	$\operatorname{CoH}_{12}\operatorname{K}_2\operatorname{O}_{14}\operatorname{Se}_2$	2427: Potassium cobalt(II)
Cl <sub>4</sub> Ti	3303: Titanium tetrachloride	Cl <sub>6</sub> IrNa <sub>3</sub>	2882: Sodium	a u via	selenate hexahydrate
CI <sub>4</sub> U	3380: Uranium tetrachloride	(anhydrous)	hexachloroiridate(III)	$CoH_{12}N_2O_{12}$	98 /: Cobalt(II) nitrate
CI <sub>4</sub> V	3428: Vanadium tetrachloride	CLK DI	hydrate	C-IL O DI C	hexahydrate
Cl <sub>4</sub> w	2501, Zingenium - hlanida	$CI_6K_2Pd$	2430: Polassium	$COH_{12}O_{14}Rb_2S_2$	2000: Kubidium cobalt(11)
CI <sub>4</sub> ZI	5591: Zirconium cnioride		nexacinoropanadate(1V)		sunate nexanydrate

$CoH_{14}O_{11}S$	1005: Cobalt(II) sulfate	CrH <sub>2</sub> O <sub>4</sub> CrH <sub>4</sub> Li <sub>2</sub> O <sub>4</sub>	859: Chromic acid 1781: Lithium chromate	$Cr_2H_6O_{10}Zn$	3536: Zinc dichromate trihydrate
COH NO S	130: Ammonium cobalt(II)		dihydrate	Cr H N O	1/2: Ammonium
$C011_{20}13_{2}O_{14}O_{2}$	aulfata havahydrata	C-ILO D	005: Chromium(III)	$C1_{2}11_{8}14_{2}O_{7}$	diahamata(VI)
C-I	Suffate flexally drate	$CIH_7O_{7.5}P$	905: Chromium(III)	C. IL M-O	1002. Magnesium disharmata
	979: Cobalt(II) lodide		phosphate	$Cr_2H_{12}MgO_{13}$	1902: Magnesium dichromate
$Col_2O_6$	9/8: Cobalt(II) iodate	~	hemiheptahydrate	~ ~ ~ ~ ~	hexahydrate
$CoK_3N_6O_{12}$	2466: Potassium	$CrH_8N_2O_4$	135: Ammonium chromate(VI)	$Cr_2H_{36}O_{30}S_3$	911: Chromium(III) sulfate
CoK	1024: Cobalt(III) potassium	CrH Na O	2857: Sodium chromate	Cr HaO	2073: Mercury(II)
(NO) 154 O	nitrita sasquibudrata	$CIII_8IVa_2O_8$	2007. Sourian emoliate	$C1_2 IIgO_7$	diabromata
$(100_2)_6 \cdot 1.511_20$	1792. Lishiran a haltita	C-ILO	2009. Characteria (III)	C. K.O	2422: Determinante
		$CIH_9O_6$		$CI_2K_2O_7$	2432: Potassium dicironiate
CoMoO <sub>4</sub>	984: Cobalt(II) molybdate	~	hydroxide trihydrate	$Cr_2MgO_4$	189/: Magnesium chromite
$CoN_2O_4$	988: Cobalt(II) nitrite	CrH <sub>10</sub> MgO <sub>9</sub>	1896: Magnesium chromate	$Cr_2N$	871: Chromium nitride
$CoN_2O_6$	986: Cobalt(II) nitrate		pentahydrate	$Cr_2O_3$	902: Chromium(III) oxide
CoN <sub>3</sub> O <sub>9</sub>	1020: Cobalt(III) nitrate	CrH <sub>10</sub> O <sub>9</sub> S	884: Chromium(II) sulfate	$Cr_2O_4Zn$	3533: Zinc chromite
CoN <sub>6</sub> Na <sub>3</sub> O <sub>12</sub>	2900: Sodium		pentahydrate	$Cr_2O_5$	918: Chromium(V) oxide
	hexanitritocobalt(III)	$CrH_{12}O_{10}P$	906: Chromium(III)	$Cr_2O_7Rb_2$	2662: Rubidium dichromate
CoO	992: Cobalt(II) oxide	12 10	phosphate hexahydrate	Cr <sub>2</sub> O <sub>2</sub> Sn	3020: Stannic chromate
CoO <sub>2</sub> Ti	940: Cobalt metatitanate	CrH.,O.,Zn	3532: Zinc chromate	Cr <sub>2</sub> O <sub>12</sub> S <sub>2</sub>	909: Chromium(III) sulfate
	1011: Cobalt(II) titanate	011114 0 11	hentahydrate	CrOS	910: Chromium(III) sulfate
$C_{0}O_{7}r$	040: Cobalt zirconate	CrH NO	001: Chromium(III) nitrate	(anhydrous)	hydrate
$C_{3}$	949. Cobalt Zircollate	$CIII_{18} v_3 O_{18}$	901. Chromium(III) intrate	(annyurous)	012: Characteria (III) and file
	941: Cobalt molybdate			$Cr_2S_3$	912: Chromium(III) suinde
$CoO_4S$	1004: Cobalt(II) sulfate	$CrH_{20}Na_2O_{14}$	2856: Sodium chromate	$Cr_2 Te_3$	913: Chromium(III) telluride
$CoO_4W$	1012: Cobalt(II) tungstate		decahydrate	$Cr_3Fe_2O_{12}$	1271: Ferric chromate
CoS	1007: Cobalt(II) sulfide	$CrH_{24}KO_{20}S_2$	908: Chromium(III)	$Cr_3O_4$	873: Chromium(II,III) oxide
CoS <sub>2</sub>	937: Cobalt disulfide		potassium sulfate	Cr <sub>3</sub> Si	876: Chromium silicide
CoSb	928: Cobalt antimonide		dodecahydrate	Cr <sub>4</sub> Cu <sub>4</sub> H <sub>6</sub> Na <sub>2</sub> O <sub>20</sub>	2860: Sodium copper
CoSe	999: Cobalt(II) selenide		2424: Potassium	4 4 0 2 20	chromate trihydrate
CoSia	936: Cobalt disilicide		chromium(III) sulfate	Cr. FeaOa	1273: Ferric dichromate
00012	947: Cobalt silicide		dodecabydrate	$C_{16} c_{2} c_{21}$	703: Cesium
CoTo	100% Cabalt/II) tallyrida	C-IL NO S	126. Ammonium	C <sub>3</sub> E	208: Cosium fuorida
		$CIH_{28}NO_{20}S_2$			
$CO_2F_6H_4O_2$	1017: Cobalt(III) fluoride		chromic sulfate	CSF <sub>2</sub> H	814: Cesium nydrogen fluoride
	dihydrate		dodecahydrate	CsH	812: Cesium hydride
$Co_2H_2O_4$	1023: Cobalt(III) oxide	CrHgO <sub>4</sub>	2071: Mercury(II) chromate	CsHO	816: Cesium hydroxide
	monohydrate	$CrHg_2O_4$	2047: Mercury(I) chromate	$CsHO_4S$	815: Cesium hydrogen sulfate
$Co_2O_3$	1021: Cobalt(III) oxide	CrI <sub>3</sub>	899: Chromium(III) iodide	CsH <sub>2</sub> N	797: Cesium amide
Co <sub>2</sub> O <sub>4</sub> Si	1001: Cobalt(II) silicate	$CrK_2O_4$	2422: Potassium chromate	CsH <sub>3</sub> O <sub>2</sub>	817: Cesium hydroxide
Co <sub>2</sub> O <sub>4</sub> Sn	1002: Cobalt(II) stannate	CrLaO <sub>3</sub>	1661: Lanthanum chromite		monohydrate
Co <sub>2</sub> O <sub>4</sub> Ti	945: Cobalt orthotitanate	CrLi <sub>2</sub> O <sub>4</sub>	1780: Lithium chromate	CsI	819: Cesium iodide
2 4	1027: Cobalt(III) titanate	CrN	872: Chromium nitride	CsIO <sub>2</sub>	818: Cesium iodate
CoP	946: Cobalt phosphide	CrN O	900: Chromium(III) nitrate	CalO	829: Cesium periodate
0021	907: Cobalt phosphide	CrNa O	2855: Sodium chromate	CoNO	825: Cesium pitrite
C- C	102(, C-h-t/(III)16 d-	$C_1 Na_2 O_4$	2007: Nichol al remente	C-NO	824. Casican nitrate
$C_0 S_3$				$CSNO_3$	
$Co_3H_{16}O_{16}P_2$	995: Cobalt(II) phosphate	CrO <sub>2</sub>	916: Chromium(IV) oxide	CSN <sub>3</sub>	/98: Cesium azide
	octahydrate	CrO <sub>3</sub>	923: Chromium(VI) oxide	CsNbO <sub>3</sub>	823: Cesium niobate
$Co_3O_4$	1013: Cobalt(II,III) oxide	CrO <sub>4</sub> P	904: Chromium(III)	CsO <sub>2</sub>	834: Cesium superoxide
Cr	858: Chromium		phosphate	CsO <sub>3</sub> Ta	835: Cesium tantalate
CrCs <sub>2</sub> O <sub>4</sub>	806: Cesium chromate	CrO <sub>4</sub> Pb	1702: Lead chromate	CsO <sub>3</sub> V	821: Cesium metavanadate
CrCuO <sub>4</sub>	1077: Copper(II) chromate	CrO <sub>4</sub> Rb <sub>2</sub>	2659: Rubidium chromate	Cs <sub>2</sub> F <sub>6</sub> Ge	811: Cesium
CrCu <sub>2</sub> H <sub>4</sub> O <sub>2</sub>	1065: Copper(II) basic	CrO	3057: Strontium chromate	2 0	hexafluorogermanate
	chromate	CrO.Ph.	1749: Lead(II) chromate(VI)	Cs-MoO.	822. Cesium molybdate
CrE	881: Chromium(II) fluoride	$c_{1}o_{5}i_{2}$	ovide	$C_{2}$	827: Cesium ovide
CrE O	020: Chromium(VI)	CrD	874: Chromium phoophida	$C_{2}O$	829: Cosium trioxido
$CIP_2O_2$	920. Chronnum(VI)	CIF	8/4. Chromium phosphile	$Cs_2O_3$	836. Cestum titoxide
C F		CrSb	862: Chromium antimonide	$Cs_2O_3I1$	830: Cesium titanate
CrF <sub>3</sub>	895: Chromium(III) fluoride	CrSe	8/5: Chromium selenide	$Cs_2O_3Zr$	840: Cesium zirconate
CrF <sub>3</sub> H <sub>6</sub> O <sub>3</sub>	897: Chromium(III) fluoride	CrSi <sub>2</sub>	869: Chromium disilicide	$Cs_2O_4S$	832: Cesium sulfate
	trihydrate	$Cr_2CuH_4O_9$	1082: Copper(II) dichromate	$Cs_2O_4W$	839: Cesium tungstate
CrF <sub>3</sub> H <sub>8</sub> O <sub>4</sub>	896: Chromium(III) fluoride		dihydrate	Cs <sub>2</sub> S	833: Cesium sulfide
	tetrahydrate	$Cr_2CuO_4$	1078: Copper(II) chromite	$Cs_3O_4V$	826: Cesium orthovanadate
$CrF_4$	915: Chromium(IV) fluoride	Cr <sub>2</sub> FeH <sub>4</sub> NO <sub>8</sub>	147: Ammonium ferric	$Cs_4O_7V_2$	830: Cesium pyrovanadate
CrF <sub>4</sub> O	924: Chromium(VI)	2 7 0	chromate	CSi	2761: Silicon carbide
+	tetrafluoride oxide	Cr <sub>2</sub> FeO.	1314: Ferrous chromite	Cu	1030: Copper
CrF.	917: Chromium(V) fluoride	$Cr_{1}H \downarrow O$	1787: Lithium dichromate	CuF	1044: Copper(I) fluoride
CrE	921: Chromium(VI) fluorida	C12114L12O9	dibydrote	CuF	1089: Copper(II) fluorida
CrHO S	880: Chromium(III) basis	Cr H No O	2866: Sodium dishramata	$C_{\rm uF} = 0$	1000: Copper(II) fluoride
00053	007. Chromium(III) Dasic	$C_2 \Pi_4 I N a_2 O_9$		$\operatorname{Cur}_2 \Pi_4 O_2$	
	suirate		ainyarate		ainyarate

CuF <sub>6</sub> H <sub>8</sub> O <sub>4</sub> Si	1096: Copper(II) hexafluorosilicate	$\begin{array}{c} Cu_3O_8P_2\\ Cu_3P \end{array}$	1114: Copper(II) phosphate 1034: Copper phosphide	FH <sub>2</sub> O <sub>3</sub> P	2149: Monofluorophosphoric acid
	tetrahydrate	$Cu_4H_6N_2O_{10}$	1066: Copper(II) basic nitrite	FH <sub>3</sub> Si	1346: Fluorosilane
CuFeS <sub>2</sub>	1088: Copper(II) ferrous sulfide	Cu <sub>5</sub> Si Cu(C <sub>2</sub> H <sub>5</sub> CO <sub>2</sub>	1035: Copper silicide 1084: Copper(II)	$FH_4KO_2$	2441: Potassium fluoride dihydrate
CuFe <sub>2</sub> O <sub>4</sub>	1086: Copper(II) ferrate	$CHCOCH_3)_2$	ethylacetoacetate	$FH_4N$	153: Ammonium fluoride
CuH	1045: Copper(I) hydride	DH	1516: Hydrogen-d <sub>1</sub>	FH <sub>4</sub> NO <sub>3</sub> S	155: Ammonium
CuH <sub>2</sub> I <sub>2</sub> O <sub>7</sub>	1101: Copper(II) iodate	DI	1156: Deuterium iodide		fluorosulfonate
	monohydrate		1533: Hydrogen iodide-d	FHO <sub>3</sub> S	1347: Fluorosulfonic acid
CuH <sub>2</sub> O <sub>2</sub>	1098: Copper(II) hydroxide	DLi	1786: Lithium deuteride	FI	1585: Iodine fluoride
CuH <sub>4</sub> O <sub>5</sub> Se	1120: Copper(II) selenite	DNa	2864: Sodium deuteride	FIO <sub>3</sub>	2342: Periodyl fluoride
	dihydrate	DT	1518: Hydrogen-d <sub>1</sub> ,t <sub>1</sub>	FK	2440: Potassium fluoride
CuH <sub>4</sub> O <sub>5</sub> Si	1121: Copper(II) silicate	$D_2$	1153: Deuterium	FLi	1791: Lithium fluoride
	dihydrate		1514: Hydrogen-d <sub>2</sub>	FNa	2875: Sodium fluoride
CuH <sub>4</sub> O <sub>6</sub> W	1136: Copper(II) tungstate	$D_2O$	1157: Deuterium oxide	FNaO <sub>3</sub> S	2878: Sodium fluorosulfonate
	dihydrate	$D_2O_4S$	1158: Deuterosulfuric acid	FNa <sub>2</sub> O <sub>3</sub> P	2877: Sodium
CuH <sub>6</sub> N <sub>2</sub> O <sub>9</sub>	1106: Copper(II) nitrate	Dy	1189: Dysprosium		fluorophosphates
	trihydrate	DyF <sub>3</sub>	1197: Dysprosium fluoride	FNbO <sub>2</sub>	2269: Niobium(V)
CuH <sub>10</sub> O <sub>9</sub> S	1126: Copper(II) sulfate	DyH <sub>3</sub>	1198: Dysprosium hydride		fluorodioxide
	pentahydrate	DyH <sub>3</sub> O <sub>3</sub>	1199: Dysprosium hydroxide	FNO	2291: Nitrosyl fluoride
CuH <sub>10</sub> O <sub>9</sub> Se	1118: Copper(II) selenate	DyH10N3O14	1201: Dysprosium nitrate	$FNO_2$	2296: Nitryl fluoride
	pentahydrate		pentahydrate	FNO <sub>3</sub>	1340: Fluorine nitrate
CuH12N2O12	1105: Copper(II) nitrate	DyI <sub>3</sub>	1200: Dysprosium iodide	FO <sub>3</sub> PSn	3033: Stannous
	hexahydrate	DyN	1202: Dysprosium nitride		fluorophosphate
CuH14N4O5S	1131: Copper(II)	DySi <sub>2</sub>	1206: Dysprosium silicide	FRb	2663: Rubidium fluoride
	tetraammine sulfate	$Dy_2H_{16}O_{20}S_3$	1207: Dysprosium sulfate	FT1	3201: Thallium(I) fluoride
	monohydrate		octahydrate	$F_2$	1337: Fluorine
CuI	1046: Copper(I) iodide	$Dy_2O_3$	1204: Dysprosium oxide	F <sub>2</sub> Fe	1316: Ferrous fluoride
CuI <sub>2</sub> O <sub>6</sub>	1100: Copper(II) iodate	$Dy_2S_3$	1208: Dysprosium sulfide	F <sub>2</sub> FeH <sub>8</sub> O <sub>4</sub>	1317: Ferrous fluoride
CuLa <sub>1.85</sub> O <sub>4</sub> Sr <sub>0.15</sub>	1676: Lanthanum strontium	$Dy_2Te_3$	1209: Dysprosium telluride		tetrahydrate
	copper oxide	Er	1211: Erbium	F <sub>2</sub> Ge	1412: Germanium(II) fluoride
CuMoO <sub>4</sub>	1103: Copper(II) molybdate	ErF <sub>3</sub>	1222: Erbium fluoride	F <sub>2</sub> HK	2472: Potassium hydrogen
CuN <sub>2</sub> O <sub>6</sub>	1104: Copper(II) nitrate	ErH <sub>3</sub>	1223: Erbium hydride		fluoride
CuN <sub>3</sub>	1040: Copper(I) azide	ErH <sub>3</sub> O <sub>3</sub>	1224: Erbium hydroxide	F <sub>2</sub> HNa	2905: Sodium hydrogen
CuN <sub>6</sub>	1063: Copper(II) azide	ErH <sub>10</sub> N <sub>3</sub> O <sub>14</sub>	1226: Erbium nitrate	-	fluoride
CuO	1110: Copper(II) oxide		pentahydrate	F <sub>2</sub> HO <sub>2</sub> P	1177: Difluorophosphoric
CuO <sub>3</sub> Sn	1122: Copper(II) stannate	ErI <sub>3</sub>	1225: Erbium iodide		acid
CuO <sub>3</sub> Te	1130: Copper(II) tellurite	ErN	1227: Erbium nitride	F <sub>2</sub> H <sub>2</sub> Si	1178: Difluorosilane
CuO <sub>3</sub> Ti	1133: Copper(II) titanate	ErSi <sub>2</sub>	1231: Erbium silicide	$F_2H_5N$	181: Ammonium hydrogen
CuO <sub>3</sub> Zr	1037: Copper zirconate	$Er_2H_{16}O_{20}S_3$	1233: Erbium sulfate	2 0	fluoride
CuO <sub>4</sub> S	1124: Copper(II) sulfate		octahydrate	F <sub>2</sub> H <sub>8</sub> NiO <sub>4</sub>	2211: Nickel fluoride
CuO <sub>4</sub> W	1135: Copper(II) tungstate	$Er_2O_3$	1229: Erbium oxide		tetrahydrate
$CuO_6V_2$	1036: Copper vanadate	$Er_2O_{12}S_3$	1232: Erbium sulfate	$F_2H_8O_4Zn$	3539: Zinc fluoride
	1137: Copper(II) vanadate	$Er_2S_3$	1234: Erbium sulfide		tetrahydrate
CuS	1127: Copper(II) sulfide	$Er_2Te_3$	1235: Erbium telluride	F <sub>2</sub> Hg	2074: Mercury(II) fluoride
CuSe	1119: Copper(II) selenide	Es	1210: Einsteinium	F <sub>2</sub> Hg <sub>2</sub>	2048: Mercury(I) fluoride
CuTe	1129: Copper(II) telluride	Eu	1238: Europium	$F_2Kr$	1643: Krypton difluoride
Cu <sub>2</sub> HO <sub>35</sub> S	1051: Copper(I) sulfite	EuF <sub>2</sub>	1244: Europium(II) fluoride	F <sub>2</sub> Mg	1905: Magnesium fluoride
2 3.5	hemihydrate	EuF <sub>3</sub>	1255: Europium(III) fluoride	$F_2Mn$	2003: Manganese(II) fluoride
$Cu_2H_2O_4S$	1052: Copper(I) sulfite monohydrate	EuH <sub>10</sub> N <sub>3</sub> O <sub>14</sub>	1257: Europium(III) nitrate pentahydrate	F <sub>2</sub> MoO <sub>2</sub>	2141: Molybdenum(VI) dioxydifluoride
CuaHgL	1047: Copper(I) mercury	EuH.,N.O.	1256: Europium(III) nitrate	F <sub>2</sub> Ni	2210: Nickel fluoride
2 0 4	iodide	12 5 - 15	hexahydrate	F <sub>2</sub> O	1339: Fluorine monoxide
Cu <sub>2</sub> O	1048: Copper(I) oxide	EuH <sub>a</sub> : EuH <sub>a</sub>	1240: Europium hydride	F <sub>2</sub> OS	3230: Thionyl fluoride
$Cu_2O$	1117: Copper(II)	EuL	1245: Europium(II) iodide	F <sub>2</sub> OSe	2749: Selenium oxyfluoride
(anhydrous)	pyrophosphate hydrate	EuN	1241: Europium nitride	F <sub>2</sub> OTh	3250: Thorium oxyfluoride
CusS	1050: Copper(I) sulfide	EuO.S	1247: Europium(II) sulfate	F <sub>2</sub> OV	3445: Vanadyl difluoride
Cu <sub>2</sub> Se	1049: Copper(I) selenide	EuS	1248: Europium(II) sulfide	F <sub>2</sub> OXe	3459: Xenon oxydifluoride
Cu.Te	1053: Copper(I) telluride	EuSe	1246: Europium(II) selenide	F.O.	1338: Eluorine dioxide
Cu <sub>2</sub> HO <sub>2</sub> S	1125: Copper(II) sulfate	EuSi	1242: Europium silicide	F <sub>2</sub> O <sub>2</sub> S	3111: Sulfuryl fluoride
	basic	EuTe	1249: Europium(II) telluride	$F_2O_2S$	2748: Selenium oxydifluoride
Cu <sub>2</sub> H <sub>2</sub> O <sub>2</sub> S <sub>2</sub>	1055: Copper(LII) sulfite	EuaHucOasSa	1262: Europium(III) sulfate	F <sub>2</sub> O <sub>2</sub> Xe	3453: Xenon dioxydifluoride
	dihvdrate	216 - 20-3	octahydrate	$F_2O_4$	1342: Fluorine tetroxide
Cu <sub>2</sub> H <sub>2</sub> O <sub>11</sub> P <sub>2</sub>	1115: Copper(II) phosphate	Eu <sub>2</sub> O <sub>2</sub>	1259: Europium(III) oxide	F <sub>2</sub> Pb	1706: Lead fluoride
	trihvdrate	$Eu_2O_1S_2$	1261: Europium(III) sulfate	F <sub>2</sub> Pd	2322: Palladium(II) fluoride
Cu <sub>3</sub> N	1033: Copper nitride	FH	1526: Hydrogen fluoride	$F_2Sn$	3031: Stannous fluoride
-	**			-	

$F_2Sr$	3060: Strontium fluoride	$F_4Pu$	2397: Plutonium (IV) fluoride	F <sub>6</sub> KP	24
$F_2Xe$	3452: Xenon difluoride	F <sub>4</sub> Re	2619: Rhenium(IV) fluoride		
$F_2Zn$	3538: Zinc fluoride	$F_4S$	3099: Sulfur tetrafluoride	F <sub>6</sub> KSb	24
F <sub>3</sub> Fe	1275: Ferric fluoride	F <sub>4</sub> Se	2753: Selenium tetrafluoride		
F <sub>3</sub> FeH <sub>6</sub> O <sub>3</sub>	1276: Ferric fluoride	F <sub>4</sub> Si	2774: Silicon tetrafluoride	$F_6K_2Mn$	24
	trihydrate	F <sub>4</sub> Sn	3021: Stannic fluoride		
F <sub>3</sub> Ga	1392: Gallium(III) fluoride	F <sub>4</sub> Te	3150: Tellurium	F <sub>6</sub> K <sub>2</sub> Ni	24
F <sub>3</sub> GaH <sub>6</sub> O <sub>3</sub>	1393: Gallium(III) fluoride		tetrafluoride		
	trihydrate	$F_4Th$	3238: Thorium fluoride	$F_6K_2Si$	24
F <sub>3</sub> Gd	1360: Gadolinium fluoride	F <sub>4</sub> Ti	3304: Titanium tetrafluoride		
F <sub>3</sub> HSi	3322: Trifluorosilane	$F_4U$	3381: Uranium tetrafluoride	$F_6K_2Zr$	24
F <sub>3</sub> H <sub>6</sub> InO <sub>3</sub>	1568: Indium(III) fluoride	$F_4V$	3429: Vanadium tetrafluoride		
	trihydrate	F <sub>4</sub> Xe	3463: Xenon tetrafluoride	F <sub>6</sub> LiP	17
$F_3H_6O_3V$	3433: Vanadium trifluoride	$F_4Zr$	3593: Zirconium fluoride		
	trihydrate	$F_5H_{12}N_3O_2U$	254: Ammonium uranium	F <sub>6</sub> LiSb	17
F <sub>3</sub> Ho	1484: Holmium fluoride		fluoride		
F <sub>3</sub> I	1595: Iodine trifluoride	$F_5I$	1591: Iodine pentafluoride	F <sub>6</sub> Li <sub>2</sub> Si	17
F <sub>3</sub> IO	1597: Iodosyl trifluoride	F5IO	1596: Iodosyl pentafluoride		
F <sub>3</sub> IO <sub>2</sub>	1599: Iodyl trifluoride	F <sub>5</sub> Mo	2137: Molybdenum(V)	F <sub>6</sub> Li <sub>2</sub> Sn	17
F <sub>3</sub> In	1567: Indium(III) fluoride		fluoride		
F <sub>3</sub> Ir	1610: Iridium(III) fluoride	F5Nb	2268: Niobium(V) fluoride	F <sub>6</sub> Mo	21
F <sub>3</sub> La	1662: Lanthanum fluoride	F <sub>5</sub> P	2372: Phosphorus(V) fluoride		
F <sub>3</sub> Lu	1851: Lutetium fluoride	F <sub>5</sub> Sb	283: Antimony(V) fluoride	F <sub>6</sub> NO <sub>2</sub> P	22
F₄Mn	2033: Manganese(III)	5	285: Antimony(V) fluoride	0 2	
5	fluoride	F₅Ta	3125: Tantalum pentafluoride	F <sub>6</sub> NO <sub>2</sub> Sb	22
F₂Mo	2124: Molvbdenum(III)	F₅U	3377: Uranium pentafluoride	0 2	
- 3	fluoride	F <sub>e</sub> V	3424: Vanadium	F∠NaP	28
F₂N	2283: Nitrogen trifluoride	3	pentafluoride	0	
F <sub>3</sub> Nd	2162: Neodymium fluoride	F_FeH_O_Si	1318: Ferrous	F <sub>c</sub> NaSb	28
F.OP	2362: Phosphorus oxyfluoride	1 01 01112 0 001	hexafluorosilicate	1 01 (000	-
FOV	3423: Vanadium		hexahydrate	F.Na.Si	28
1301	oxytrifluoride	F.FeNa.	2892: Sodium	1 61 4201	20
F.P	2366: Phosphorus(III)	1 61 CI (u)	hexafluoroferrate(III)	F.Na.Sn	28
1 31	fluoride	F.GaHN.	171: Ammonium	16142011	20
F.Pd	2331: Palladium(III) fluoride	1 <sub>6</sub> 0a11 <sub>12</sub> 14 <sub>3</sub>	hexafluorogallate	F.Na.Ti	25
F Pr	2581: Praseodymium fluoride	F GeH N	172: Ammonium	1614211	20
F Pu	2304: Plutonium(III) fluoride	1 <sub>6</sub> 00118142	hevafluorogermanate	E Na Zr	29
F Sh	264: Antimony(III) fluoride	F GeK	2458: Potassium	1 61 4u221	20
F Sc	2728: Scandium fluoride	1 <sub>6</sub> Gen <sub>2</sub>	hexafluorogermanate	F Os	2
F Sm	2708: Samarium fluoride	E GeNa	2803: Sodium	F Pt	2.
F Th	3161: Terbium fluoride	1 <sub>6</sub> Octva <sub>2</sub>	hevafluorogermanate	F Pu	2
FTi	3308: Titanium trifluoride	E GePh	2666: Pubidium	1 <sub>6</sub> 1 u	4.
F T1	3223: Thallium(III) fluoride	1 <sub>6</sub> OcK0 <sub>2</sub>	hexafluorogermanate	E Do	26
F Tm	3265: Thulium fluoride	ЕПр	1477: Hevafluorophosphoric	F S	20
	2286: Uranium trifluorida	1.6111	1477. Hexandorophosphorie	F So	2
F <sub>3</sub> U	2422: Vanadium triffuarida	ELICH	12.42. Elucroantimonia acid	Г <sub>6</sub> 3с Б.То	21
	3452: Valiadiulii triiuonde		2463: Potossium		22
	2474. Vttarkium fluorida	$\Gamma_6 \Pi_2 K_2 O \Pi$	2403. Fotassium	Γ <sub>6</sub> U EW	22
	1421: Componing (IV)		nexanuorontanate	Γ <sub>6</sub> W	2
F <sub>4</sub> Ge	1421: Germanium(1v)	E LL C:	1520. Usedas sea	F <sub>6</sub> Ae	34 14
		$F_6 H_2 S1$	1550: Hydrogen	$\mathbf{F}_{7}\mathbf{H}_{8}\mathbf{N}_{2}\mathbf{I}\mathbf{a}$	13
$F_4GeH_6O_3$	1422: Germanium(IV)	E U ND		E I	1.6
	nuoride trinydrate	F <sub>6</sub> H <sub>4</sub> NP	1/3: Ammonium		13
F <sub>4</sub> H <sub>4</sub> NSb	241: Ammonium tetra-		hexafluorophosphate	$\mathbf{F}_{7}\mathbf{K}_{2}\mathbf{N}\mathbf{b}$	22
	fluoroantimonate(III)	$F_6H_4O_2PbS_1$	1708: Lead fluorosilicate	5 K <b>5</b>	
F <sub>4</sub> Hf	1453: Hafnium fluoride		dihydrate	$\mathbf{F}_{7}\mathbf{K}_{2}\mathbf{T}\mathbf{a}$	24
F <sub>4</sub> Mo	2130: Molybdenum(IV)	$F_6H_8N_2Si$	174: Ammonium		
	fluoride		hexafluorosilicate	F <sub>7</sub> KrSb	16
F <sub>4</sub> MoO	2115: Molybdenum	F <sub>6</sub> H <sub>12</sub> MgO <sub>6</sub> Si	1910: Magnesium		
	oxytetrafluoride		hexafluorosilicate	F <sub>7</sub> RuXe	34
	2145: Molybdenum(VI)		hexahydrate		
	oxytetrafluoride	$F_6H_{12}N_2O_2Ti$	175: Ammonium	F <sub>9</sub> Kr <sub>2</sub> Sb	16
F <sub>4</sub> OW	3352: Tungsten		hexafluorotitanate		
	oxytetrafluoride		dihydrate	F <sub>9</sub> SbXe	34
F <sub>4</sub> OXe	3460: Xenon oxytetrafluoride	F <sub>6</sub> H <sub>12</sub> O <sub>6</sub> SiZn	3545: Zinc hexafluorosilicate		
F <sub>4</sub> Pb	1738: Lead tetrafluoride		hexahydrate	$F_{10}S_{2}$	11
	1758: Lead(IV) fluoride	F <sub>6</sub> Ir	1602: Iridium hexafluoride	$F_{10}Te_2$	31

2461: Potassium hexafluorophosphate 456: Potassium hexafluoroantimonate 459: Potassium hexafluoromanganate(IV) 460: Potassium hexafluoronickelate(IV) 462: Potassium hexafluorosilicate 464: Potassium hexafluorozirconate 795: Lithium hexafluorophosphate 793: Lithium hexafluoroantimonate 796: Lithium hexafluorosilicate 797: Lithium hexafluorostannate(IV) 42: Molybdenum(VI) fluoride 288: Nitronium hexafluorophosphate 287: Nitronium hexafluoroantimonate 894: Sodium hexa fluorophosphate890: Sodium hexafluoroantimonate(V) 895: Sodium hexafluorosilicate 896: Sodium hexafluorostannate(IV) 897: Sodium hexafluorotitanate 898: Sodium hexafluorozirconate 308: Osmium(VI) fluoride 379: Platinum hexafluoride 399: Plutonium(VI) hexafluoride 627: Rhenium(VI) fluoride 98: Sulfur hexafluoride 743: Selenium hexafluoride 44: Tellurium hexafluoride 372: Uranium hexafluoride 346: Tungsten hexafluoride 458: Xenon hexafluoride 58: Ammonium heptafluorotantalate 586: Iodine heptafluoride 444: Potassium heptafluoroniobate 445: Potassium heptafluorotantalate 644: Krypton fluoride hexafluoroantimonate 456: Xenon fluoride hexa fluor or uthen ate647: Krypton trifluoride hexafluoroantimonate 454: Xenon fluoride hexafluoroantimonate 87: Disulfur decafluoride 39: Tellurium decafluoride

F <sub>11</sub> RuXe	3462: Xenon pentafluoride	FeTe	1631: Iron telluride	$[Gd_2H]_6O_{20}S_3$	1373: Gadolinium sulfate
	hexafluororuthenate	$Fe_2H_2O_4$	1287: Ferric oxide		octahydrate
F <sub>12</sub> KrSb <sub>2</sub>	1645: Krypton fluoride		monohydrate	$Gd_2O_3$	1368: Gadolinium oxide
	monodecafluoro-	Fe <sub>2</sub> H <sub>18</sub> O <sub>21</sub> S <sub>3</sub>	1296: Ferric sulfate	Gd <sub>2</sub> O <sub>7</sub> Ti <sub>2</sub>	1376: Gadolinium titanate
	antimonate		nonahydrate	$Gd_2O_{12}S_3$	1372: Gadolinium sulfate
F <sub>12</sub> KrTa	1646: Krypton fluoride	Fe <sub>2</sub> H <sub>18</sub> O <sub>21</sub> S <sub>3</sub>	2189: Nickel ammonium	$Gd_2S_3$	1374: Gadolinium sulfide
	monodecafluorotantalate		sulfate	$Gd_2Te_3$	1375: Gadolinium telluride
F <sub>12</sub> Sb <sub>2</sub> Xe	3457: Xenon fluoride	Fe <sub>2</sub> O <sub>3</sub>	1285: Ferric oxide	Ge	1407: Germanium
	monodeca-	Fe <sub>2</sub> O <sub>4</sub> Si	1637: Iron(II) orthosilicate	GeH <sub>3</sub> I	1598: Iodogermane
	fluoroantimonate	Fe <sub>2</sub> O <sub>5</sub> Zr	1633: Iron zirconate	GeH <sub>4</sub>	1409: Germanium tetrahydride
F <sub>14</sub> Sb <sub>2</sub> Xe	3465: Xenon trifluoride	$Fe_2O_{12}S_3$	1294: Ferric sulfate	GeI <sub>2</sub>	1413: Germanium(II) iodide
	monodeca-	$Fe_2O_{12}S_3$	1295: Ferric sulfate hydrate	$GeI_4$	1423: Germanium(IV) iodide
	fluoroantimonate	(anhydrous)		GeMg <sub>2</sub>	1908: Magnesium germanide
$F_{20}Ir_4$	1603: Iridium pentafluoride	Fe <sub>2</sub> P	1327: Ferrous phosphide	$GeMg_2O_4$	1907: Magnesium germanate
Fe	1615: Iron	Fe <sub>2</sub> P	1627: Iron phosphide	GeNa <sub>2</sub> O <sub>3</sub>	2933: Sodium metagermanate
$[Fe(C_6H_5)_2]PF_6$	1301: Ferrocenium	$Fe_{3}H_{16}O_{16}P_{2}$	1326: Ferrous phosphate	GeO	1414: Germanium(II) oxide
	hexafluorophosphate		octahydrate	$GeO_2$	1424: Germanium(IV) oxide
FeHO <sub>2</sub>	1286: Ferric oxide hydroxide	$Fe_3O_4$	1638: Iron(II,III) oxide	GeS	1416: Germanium(II) sulfide
FeH <sub>2</sub> O <sub>2</sub>	1319: Ferrous hydroxide	Fe <sub>3</sub> P	1628: Iron phosphide	GeS <sub>2</sub>	1426: Germanium(IV) sulfide
FeH <sub>2</sub> O <sub>5</sub> S	1331: Ferrous sulfate	$Fe_3Sb_2$	1616: Iron antimonide	GeSe	1415: Germanium(II)
	monohydrate	$Fe_4H_{18}O_{30}P_6$	1292: Ferric pyrophosphate		selenide
FeH <sub>3</sub> O <sub>3</sub>	1278: Ferric hydroxide		nonahydrate	GeSe <sub>2</sub>	1425: Germanium(IV)
FeH <sub>4</sub> O <sub>6</sub> P	1290: Ferric phosphate	Fe <sub>5</sub> Lu <sub>3</sub> O <sub>12</sub>	1854: Lutetium iron oxide		selenide
	dihydrate	$Fe_5O_{12}Y_3$	3504: Yttrium iron oxide	GeTe	1417: Germanium(II)
FeH <sub>6</sub> O <sub>6</sub> P <sub>3</sub>	1279: Ferric hypophosphite	Fe <sub>12</sub> O <sub>19</sub> Sr	3059: Strontium ferrite		telluride
FeH <sub>8</sub> I <sub>2</sub> O <sub>4</sub>	1321: Ferrous iodide	FgeH <sub>3</sub>	1345: Fluorogermane	GeTe <sub>2</sub>	1427: Germanium(IV)
	tetrahydrate	Fm	1263: Fermium		telluride
FeH <sub>12</sub> N <sub>2</sub> O <sub>12</sub>	1322: Ferrous nitrate	Fr	1349: Francium	$Ge_2H_6$	1179: Digermane
	hexahydrate	Ga	1378: Gallium	Ge <sub>3</sub> H <sub>8</sub>	3323: Trigermane
FeH <sub>12</sub> N <sub>3</sub> O <sub>15</sub>	1282: Ferric nitrate	GaHO <sub>2</sub>	1400: Gallium(III) oxide	Ge <sub>3</sub> N <sub>4</sub>	1408: Germanium nitride
	hexahydrate		hydroxide	$Ge_4H_{10}$	3181: Tetragermane
FeH <sub>14</sub> O <sub>11</sub> S	1330: Ferrous sulfate	GaH <sub>3</sub>	1394: Gallium(III) hydride	Ge <sub>5</sub> H <sub>12</sub>	2334: Pentagermane
	heptahydrate	GaH <sub>3</sub> O <sub>3</sub>	1395: Gallium(III) hydroxide	$HAuBr_4 \cdot 5H_2O$	549: Bromoauric(III) acid
FeH <sub>18</sub> N <sub>3</sub> O <sub>18</sub>	1283: Ferric nitrate	GaI <sub>3</sub>	1396: Gallium(III) iodide		pentahydrate
	nonahydrate	GaN	1383: Gallium nitride	$HBF_4$	3182: Tetrafluoroboric acid
$FeH_{20}N_2O_{14}S_2$	152: Ammonium ferrous	GaN <sub>3</sub> O <sub>9</sub>	1397: Gallium(III) nitrate	$HBO_2$	523: Metaboric acid-γ-Form
	sulfate hexahydrate	GaN <sub>3</sub> O <sub>9</sub>	1398: Gallium(III) nitrate	HF	1512: Hydrofluoric acid, 70%
FeH <sub>24</sub> O <sub>20</sub> RbS <sub>2</sub>	2669: Rubidium iron(III)	(anhydrous)	hydrate	HHgN <sub>2</sub> O <sub>6.5</sub>	2082: Mercury(II) nitrate
	sulfate dodecahydrate	GaN <sub>9</sub>	1382: Gallium azide		hemihydrate
FeH <sub>28</sub> NO <sub>20</sub> S <sub>2</sub>	150: Ammonium ferric	GaP	1384: Gallium phosphide	HI	1532: Hydrogen iodide
	sulfate dodecahydrate	GaS	1388: Gallium(II) sulfide	$HI_2KO_6$	2473: Potassium hydrogen
FeI <sub>2</sub>	1320: Ferrous iodide	GaSb	1380: Gallium antimonide		iodate
FeLiSi	1790: Lithium iron silicide	GaSe	1387: Gallium(II) selenide	HI <sub>3</sub> Si	3324: Triiodosilane
FeMoO <sub>4</sub>	1624: Iron molybdate	GaTe	1389: Gallium(II) telluride	HIO <sub>3</sub>	1579: Iodic acid
FeN <sub>2</sub> O <sub>6</sub>	1636: Iron(II) nitrate	GaV <sub>3</sub>	3416: Vanadium gallide	HK	2469: Potassium hydride
FeN <sub>3</sub> O <sub>9</sub>	1281: Ferric nitrate	$Ga_{2}H_{36}O_{30}S_{3}$	1404: Gallium(III) sulfate	$HK_2O_3P$	2475: Potassium hydrogen
FeNaO <sub>7</sub> P <sub>2</sub>	1293: Ferric sodium		octadecahydrate		phosphite
	pyrophosphate	Ga <sub>2</sub> O	1385: Gallium suboxide	$HK_2O_4P$	2489: Potassium
FeO	1324: Ferrous oxide	$Ga_2O_3$	1399: Gallium(III) oxide		monohydrogen
FeO <sub>3</sub> Ti	1336: Ferrous titanate	$Ga_2O_{12}S_3$	1403: Gallium(III) sulfate		phosphate
FeO <sub>4</sub> P	1291: Ferric phosphate	$Ga_2S_3$	1405: Gallium(III) sulfide	НКО	2481: Potassium hydroxide
(anhydrous)	hydrate	$Ga_2Se_3$	1402: Gallium(III) selenide	HKO <sub>3</sub> S	2479: Potassium hydrogen
FeO <sub>4</sub> S	1329: Ferrous sulfate	Ga <sub>2</sub> Te <sub>3</sub>	1406: Gallium(III) telluride		sulfite
FeO <sub>4</sub> W	1632: Iron tungstate	$Ga_5Gd_3O_{12}$	1361: Gadolinium gallium	HKO <sub>3</sub> Se	2476: Potassium hydrogen
FeO <sub>6</sub> Ta <sub>2</sub>	1333: Ferrous tantalate		garnet		selenite
$FeO_9V_3$	1280: Ferric metavanadate	Gd	1353: Gadolinium	HKO <sub>4</sub> S	2477: Potassium hydrogen
FeP	1629: Iron phosphide	$GdH_{10}N_{3}O_{14}$	1365: Gadolinium nitrate		sulfate
FePTl	3204: Thallium(I)		pentahydrate	HLi	1798: Lithium hydride
	hexafluorophosphate	$GdH_{12}N_3O_{15}$	1364: Gadolinium nitrate	HLiO	1800: Lithium hydroxide
FeS	1332: Ferrous sulfide	a 111	hexahydrate	$HMnO_2$	2034: Manganese(III)
FeS <sub>2</sub>	1622: Iron disulfide	$GdH_2$ ; $GdH_3$	1362: Gadolinium hydride		hydroxide
FeSe	1328: Ferrous selenide	GdI <sub>3</sub>	1363: Gadolinium iodide	HN <sub>3</sub>	1511: Hydrazoic acid
FeSi	1630: Iron silicide	GdN	1366: Gadolinium nitride	HNa	2901: Sodium hydride
FeSi <sub>2</sub>	1621: Iron disilicide	GdSe	13/0: Gadolinium(II)	HNaO	2919: Sodium hydroxide
FeSi <sub>2</sub>	1919: Magnesium	~	selenide	HNaO <sub>3</sub> S	2916: Sodium hydrogen
	metasilicate	GdSi <sub>2</sub>	1371: Gadolinium silicide		sulfite

HNaO <sub>4</sub> S	2911: Sodium hydrogen sulfate	H <sub>2</sub> Nd; H <sub>3</sub> Nd H <sub>2</sub> NiO <sub>2</sub>	2164: Neodymium hydride 2213: Nickel hydroxide	$H_4HgN_2O_8$	2080: Mercury(II) nitrate dihydrate
HNaS	2913: Sodium hydrogen	H <sub>2</sub> O	3450: Water	$H_4IN$	194: Ammonium iodide
HN <sub>2</sub> O P	sulfide 2907: Sodium hydrogen	$H_2O_2$ H O Pb	1534: Hydrogen peroxide	H <sub>4</sub> INaO <sub>2</sub>	2927: Sodium iodide
111112_041	phosphate	$H_2O_2Sr$	3063: Strontium hydroxide	H <sub>4</sub> INO <sub>3</sub>	193: Ammonium iodate
HNb	2253: Niobium hydride	$H_2O_2Zn$	3546: Zinc hydroxide	$H_4IP$	2352: Phosphonium iodide
HNO <sub>2</sub>	2293: Nitrous acid	$H_2O_3S$	3109: Sulfurous acid	$H_4K_2O_5S$	2527: Potassium sulfite
HNO <sub>3</sub>	2275: Nitric acid	H <sub>2</sub> O <sub>3</sub> Se	2756: Selenous acid		dihydrate
HNO <sub>5</sub> S	2292: Nitrosylsulfuric acid	$H_2O_3Te$	3153: Tellurous acid	$H_4K_2O_6Os$	2497: Potassium osmate
$HNO_5Zr$	3615: Zirconyl basic nitrate	$H_2O_4Pb_3$	1/55: Lead(II) oxide hydrate	UKOW	dihydrate
$HO_3P$ , $n = 1$ $HO_3V$	2100: Metaphosphoric acid	$H_2O_4S$	2736: Selenic acid	$H_4K_2O_6W$	2564: Potassium tungstate
HO PPh	1710: Lead hydrogen	$H_2O_4SC$	3366: Tungstic acid	нкози	2567: Potassium uranyl
1104110	nhosphate	$H_2O_4W$	2344. Peroxysulfuric acid	$H_4 R_2 O_{12} O_2 O$	sulfate dihydrate
HO₄Re	2345: Perrhenic acid	H <sub>2</sub> O <sub>5</sub> SZn	3575: Zinc sulfate	H <sub>4</sub> MgN <sub>2</sub>	1874: Magnesium amide
HORb	2667: Rubidium hydroxide	2 - 3 -	monohydrate	$H_4 MgN_2O_8$	1924: Magnesium nitrate
HOTI	3205: Thallium(I) hydroxide	H <sub>2</sub> O <sub>5</sub> SeV	3446: Vanadyl selenite	4020	dihydrate
HT	1517: Hydrogen-t <sub>1</sub>		monohydrate	$H_4MnNO_4$	215: Ammonium
НТа	3119: Tantalum hydride	$H_2O_7SU$	3404: Uranyl sulfate		permanganate
$H_2$	1513: Hydrogen		monohydrate	H <sub>4</sub> MoNa <sub>2</sub> O <sub>6</sub>	2940: Sodium molybdate
$H_2Hf$	1454: Hafnium hydride	$H_2S$	1536: Hydrogen sulfide		dihydrate
$H_2HgNO_4$	2052: Mercury(I) nitrate	$H_2S_2$	1525: Hydrogen disulfide	H <sub>4</sub> MoO <sub>5</sub>	2139: Molybdenum(VI) acid
U U-N O	monohydrate	$H_2S_2O_7$	3108: Sulfuric acid fuming		monohydrate
$H_2HgN_2O_7$	2083: Mercury(II) mirate	H <sub>2</sub> Se	1555: Hydrogen selenide	$H_4MO_{12}O_{40}SI$	2147: Molybuic silicic acid
н но н но	1/85: Holmium hydride	$\Pi_2$ SI H Th: H Th	3162: Terbium hydride	(annyurous) H NO V	198: A mmonium
$H_{2}H_{0}, H_{3}H_{0}$	2952: Sodium paraperiodate	H Te	1537: Hydrogen telluride	11 <sub>4</sub> 1 <b>0</b> <sub>3</sub> <b>v</b>	metavanadate
H <sub>2</sub> II (u <sub>3</sub> O <sub>6</sub>	1181: Dijodosilane	H <sub>2</sub> Th	3241: Thorium hydride	H <sub>4</sub> NO <sub>4</sub> Re	217: Ammonium perrhenate
H <sub>2</sub> I <sub>2</sub> KO	2560: Potassium triiodide	H <sub>2</sub> Ti	3292: Titanium hydride	$H_4N_2$	1497: Hydrazine
2.5	monohydrate	H <sub>2</sub> Zr	3595: Zirconium hydride	$H_4 N_2 O_2$	203: Ammonium nitrite
$H_2KO_{0.5}S$	2478: Potassium hydrogen	H <sub>3</sub> ISi	2150: Monoiodosilane	$H_4N_2O_3$	202: Ammonium nitrate
	sulfide hemihydrate	H <sub>3</sub> InO <sub>3</sub>	1569: Indium(III) hydroxide	$H_4N_3O_{11}Rh$	2644: Rhodium(III) nitrate
$H_2KO_2P$	2434: Potassium dihydrogen	H <sub>3</sub> La	1663: Lanthanum hydride		dihydrate
	hypophosphite	$H_3LaO_3$	1664: Lanthanum hydroxide	$H_4N_4$	122: Ammonium azide
$H_2KO_3P$	2436: Potassium dihydrogen	H <sub>3</sub> LiO <sub>2</sub>	1801: Lithium hydroxide	$H_4N_2$	1502: Hydrazine hydrate
	phosphite		monohydrate	(anhydrous)	
$H_2 KO_4 P$	2435: Potassium dinydrogen	$H_3MO_{12}O_{40}P$	2148: Molybdophosphoric	$H_4NaO_3P$	2924: Sodium hypophosphite
HIN	1767: Lithium amide	H Mo O P	2350: Phosphomolybdic acid	H NaO P	2868: Sodium dibydrogen
H.LiNO.	1818: Lithium nitrite	(anhydrous)	hvdrate	11 <sub>4</sub> 1 <b>v</b> aO <sub>5</sub> 1	phosphate monohydrate
112211103	monohydrate	H <sub>2</sub> N	116: Ammonia	H <sub>4</sub> Na <sub>2</sub> O <sub>2</sub> Te	2992: Sodium tellurate(VI)
H <sub>2</sub> LiO <sub>4</sub> P	1788: Lithium dihydrogen	H <sub>3</sub> NO	1542: Hydroxylamine	426	dihydrate
2 .	phosphate	H <sub>3</sub> NaO <sub>2</sub>	2920: Sodium hydroxide	H <sub>4</sub> Na <sub>2</sub> O <sub>6</sub> W	3013: Sodium tungstate
H <sub>2</sub> Li <sub>2</sub> O <sub>4</sub> Se	1827: Lithium selenite		monohydrate		dihydrate
	monohydrate	H <sub>3</sub> NaO <sub>5</sub> S	2912: Sodium hydrogen	$H_4Na_2O_8S_2$	2871: Sodium dithionate
$H_2Li_2O_5S$	1830: Lithium sulfate		sulfate monohydrate		dihydrate
	monohydrate	H <sub>3</sub> NdO <sub>3</sub>	2165: Neodymium hydroxide	H <sub>4</sub> NiO <sub>5</sub> Sn	2231: Nickel stannate
$H_2Li_2O_5Se$	1826: Lithium selenate	H <sub>3</sub> O <sub>2</sub> P	1550: Hypophosphorous acid		dihydrate
II I va II I v	mononydrate	$H_3O_3P$	2354: Phosphorous acid	$H_4O_4P_2Pb$	1/12: Lead(11) hypophosphite
$H_2LU; H_3LU$	1852: Lutetium hydride	H <sub>3</sub> O <sub>3</sub> Pr	2384: Praseodymium	H <sub>4</sub> O <sub>4</sub> Kn	2048: Knodium(IV) 0xide
$H_2Mg$	1913: Magnesium hydroxide	H.O.Tm	3266: Thulium hydroxide	H.O.Th	3242: Thorium hydroxide
H <sub>2</sub> MgO <sub>2</sub>	1955: Magnesium sulfate	H <sub>2</sub> O <sub>2</sub> Y	3502: Yttrium hydroxide	H <sub>4</sub> O <sub>4</sub> Ti	3279: Titanic acid
28 3	monohydrate	H <sub>3</sub> O <sub>4</sub> P	2353: Phosphoric acid	$H_4O_4Zr$	3596: Zirconium hydroxide
$H_2MnO_2$	2005: Manganese(II)	$H_{3}O_{40}PW_{12}$	3367: Tungstophosphoric	H <sub>4</sub> O <sub>5</sub> SZn	3578: Zinc sulfite dihydrate
	hydroxide	(anhydrous)	acid hydrate	$H_4O_6P_2$	1549: Hypophosphoric acid
$H_2MnO_5S$	2022: Manganese(II) sulfate	H <sub>3</sub> P	2349: Phosphine	$H_4O_6PdS$	2328: Palladium(II) sulfate
	monohydrate	H <sub>3</sub> Pr	2583: Praseodymium hydride		dihydrate
H <sub>2</sub> NNa	2834: Sodium amide	H <sub>3</sub> Sb	265: Antimony(III) hydride	$H_4O_7P_2$	2603: Pyrophosphoric acid
$H_2Na_2O_7P_2$	2869: Sodium dihydrogen	H <sub>3</sub> Sm	2/09: Samarium hydride	$H_4O_7SV$	3447: Vanadyl sulfate
$\mathbf{U}$ N <sub>2</sub> $\mathbf{O}$ $\mathbf{S}^{1}$	pyrophosphate	H <sub>3</sub> U	358/: Uranium trihydride	11 6:	dihydrate
$\pi_2 \ln a_2 O_7 S D_2$	2030: Sourium antimonate	п <sub>3</sub> т н vb	3475: Vtterbium hydride	п <sub>4</sub> 51 Н Sn	2131: Silane
H <sub>a</sub> Na <sub>2</sub> O <sub>2</sub> U	3014: Sodium uranate	H <sub>3</sub> H <sub>9</sub> NO <sub>-</sub>	2051: Mercurv(I) nitrate	H <sub>4</sub> Sn H <sub>2</sub> IN-	1506 Hydrazine
220802	monohydrate		dihydrate		monohydroiodide
	<b>J</b>		· ····		

H <sub>5</sub> IO <sub>6</sub>	2341: Periodic acid 2343: Periodic acid dihydrate	H <sub>7</sub> NaO <sub>3</sub> S	2915: Sodium hydrogen sulfide trihydrate	$H_{10}N_2O_4S$	232: Ammonium sulfite monohydrate
H <sub>5</sub> NO	191: Ammonium hydroxide	$H_8I_2MgO_{10}$	1914: Magnesium iodate	$H_{10}N_3O_{14}Sc$	2729: Scandium nitrate
$\Pi_5 NO_3 S$	sulfite	$H_8I_2MnO_4$	2008: Manganese(II) iodide	$H_{10}N_{3}O_{14}Yb$	3476: Ytterbium nitrate
$H_5NO_4S$	186: Ammonium hydrogen		tetrahydrate	H N O S	pentahydrate
H-NS	sulfate 187: Ammonium hydrogen	$H_8I_2NiO_{10}$	2215: Nickel iodate tetrahydrate	$H_{10}N_4O_4S$ $H_{10}N_4O_{17}Zr$	3598: Zirconium nitrate
32	sulfide	$H_8MgO_{10}P_2$	1961: Magnesium	104 - 17	pentahydrate
H <sub>5</sub> N <sub>3</sub> O <sub>3</sub>	1507: Hydrazine mononitrate		tetrahydrogen phosphate	$H_{10}Na_2O_5S$	2987: Sodium sulfide
$H_5NaO_2S$	2914: Sodium hydrogen	$H_8MnN_2O_{10}$	2013: Manganese(II) nitrate	$H_{10}Na_2O_8$	2978: Sodium selenite
5 2	sulfide dihydrate	0 2 10	tetrahydrate	10 2 0	pentahydrate
H <sub>6</sub> ILiO <sub>3</sub>	1805: Lithium iodide	H <sub>8</sub> MnO <sub>8</sub> S	2023: Manganese(II) sulfate	$H_{10}Na_2O_8S_2$	3008: Sodium thiosulfate
H <sub>6</sub> INaO <sub>7</sub>	2959: Sodium periodate	$H_8MnO_{10}P_2$	2001: Manganese(II)	H <sub>10</sub> Na <sub>2</sub> O <sub>8</sub> Si	2936: Sodium metasilicate
	trihydrate		dihydrogen phosphate		pentahydrate
$H_6 In N_3 O_{12}$	1571: Indium(III) nitrate	H-MoN-S	dihydrate 245: Ammonium	$H_{10}O_8Rh_2$	2646: Rhodium(III) oxide
H <sub>6</sub> K <sub>2</sub> O <sub>6</sub> Sn	2521: Potassium stannate	11811101 1204	tetrathiomolybdate	$H_{10}O_8S_2Sr$	3091: Strontium thiosulfate
H K O T	trihydrate	$\mathrm{H_{8}Mo_{2}N_{2}O_{7}}$	145: Ammonium		pentahydrate
$H_6K_2O_7$ le	2530: Potassium tellurate(VI) trihydrate	H <sub>a</sub> N <sub>a</sub> O <sub>a</sub> S	231: Ammonium sulfite	$H_{10}O_9$ SeZn	356/: Zinc selenate
$H_6K_4O_{10}P_2$	2512: Potassium	$H_8N_2O_3S_2$	249: Ammonium thiosulfate	$H_{10}O_{12}P_2Zr$	3603: Zirconium phosphate
	pyrophosphate trihydrate	$H_8N_2O_3Se$	225: Ammonium selenite	H 0'	trihydrate
$H_6K_4O_{19}S_4Zr$	25/1: Potassium zirconium sulfate tribydrate	$H_8N_2O_4S$ $H_2N_2O_4Se$	229: Ammonium sulfate 224: Ammonium selenate	$H_{10}S1_4$ $H_{10}N_2O_4P$	2762: Silicon decahydride 185: Ammonium hydrogen
$H_6MgN_2O_7$	1927: Magnesium nitrite	$H_8N_2O_4Te$	234: Ammonium tellurate		phosphite monohydrate
UM-OS	trihydrate	$H_8N_2O_6S$	1546: Hydroxylamine	$H_{11}Na_2O_8P$	2910: Sodium hydrogen
$H_6MgO_6S$	trihvdrate	H <sub>e</sub> N <sub>2</sub> O <sub>7</sub> U <sub>2</sub>	253: Ammonium uranate(VI)	H12I2MgO	1916: Magnesium iodide
$H_6MgO_6Sn$	1950: Magnesium stannate	$H_8N_2O_8S_2$	216: Ammonium	12 2 0 0	hexahydrate
H Mg O P	trihydrate	HNS	peroxydisulfate	$H_{12}I_2NiO_6$	2217: Nickel iodide
$\mathbf{H}_{6}\mathbf{W}\mathbf{g}_{2}\mathbf{O}_{10}\mathbf{F}_{2}$	pyrophosphate trihydrate	$H_8N_2S_4W$	246: Ammonium	$H_{12}I_2O_6Sr$	3067: Strontium iodide
$H_6MnNaO_7$	2960: Sodium permanganate		tetrathiotungstate		hexahydrate
H MnO P	trihydrate 2006: Manganese(II)	$H_8N_4O_{16}Th$	3245: Thorium nitrate	$H_{12}K_2NiO_{14}S_2$	2491: Potassium nickel
11611110312	hypophosphite	H <sub>8</sub> O <sub>6</sub> Pt	1531: Hydrogen hexa-	$H_{12}K_2O_{14}S_2Zn$	2569: Potassium zinc sulfate
	monohydrate		hydroxyplatinate(IV)		hexahydrate
$H_6Mn_2O_{10}P_2$	2019: Manganese(11) pyrophosphate trihydrate	$H_8O_{10}S_2Sr$	tetrahydrate	$H_{12}LaN_3O_{15}$	hexahvdrate
$H_6Mn_2O_{11}Sr$	3079: Strontium	$H_8O_{12}P_2Zn_3$	3562: Zinc phosphate	$H_{12}MgMn_2O_{14}\\$	1936: Magnesium
U NO P	permanganate trihydrate		tetrahydrate		permanganate
$\Pi_6 NO_2 P$	hypophosphite	$\Pi_8 O_{12} S_2 \Pi$	tetrahydrate	H <sub>12</sub> MgN <sub>2</sub> O <sub>12</sub>	1925: Magnesium nitrate
$H_6 NO_4 P$	144: Ammonium dihydrogen	$H_8O_{12}S_2U$	3391: Uranium(IV) sulfate		hexahydrate
H.N.O	phosphate 1503: Hydrazine monohydrate	H-08-7r	tetrahydrate 3609: Zirconium sulfate	H <sub>12</sub> MgO <sub>9</sub> S	1958: Magnesium sulfite
$H_6N_2O_3S$	228: Ammonium sulfamate	1180120221	tetrahydrate	$H_{12}MgO_9S_2$	1963: Magnesium thiosulfate
H <sub>6</sub> N <sub>2</sub> O <sub>4</sub> S	1510: Hydrazine sulfate	H <sub>8</sub> Si <sub>3</sub>	2771: Silicon octahydride	H M O G	hexahydrate
H <sub>6</sub> N <sub>4</sub> O <sub>6</sub> H <sub>2</sub> NaO <sub>2</sub> P	2867: Sodium dihydrogen	$H_9K_3O_{4.5}S_4SD$	2554: Potassium thioantimonate	$H_{12}MgO_9Se$	hexahvdrate
00-	phosphate dihydrate		heminonahydrate	H <sub>12</sub> MgO <sub>10</sub> Se	1944: Magnesium selenate
H <sub>6</sub> Na <sub>2</sub> O <sub>6</sub> Sn	2980: Sodium stannate	$H_9N_2O_4P$	184: Ammonium hydrogen	II. MaN O	hexahydrate
$H_6O_5P_2Zn$	3547: Zinc hypophosphite		218: Ammonium phosphate	$\Pi_{12}$ $\Pi_{12}$ $\Omega_{12}$	hexahydrate
0 5 2	monohydrate		dibasic	$H_{12}Mn_2O_{14}Zn$	3559: Zinc permanganate
$H_6O_6Te$	3137: Telluric acid 3405: Urapyl sulfate tribydrate	$H_9O_{10}PU$	3399: Uranyl hydrogen	H Mo NO P	hexahydrate
$H_6O_9SO$ $H_6Si_2$	1186: Disilane	H <sub>10</sub> HoN <sub>3</sub> O <sub>14</sub>	1487: Holmium nitrate	$11_{12}110_{12}130_{40}1$	phosphomolybdate
H <sub>7</sub> MgO <sub>7</sub> P	1912: Magnesium hydrogen		pentahydrate	$H_{12}Mo_{12}N_3O_{40}P$	117: Ammonium
H_MnO_P	phosphate trihydrate	$H_{10}K_2O_5S$	2526: Potassium sulfide	(anhydrous)	12-molybdophosphate hydrate
	hydrogen phosphate	$H_{10}Mg_{3}O_{13}P_{2}$	1939: Magnesium phosphate	H <sub>12</sub> N <sub>2</sub> NiO <sub>12</sub>	2220: Nickel nitrate
	trihydrate	-	pentahydrate		hexahydrate
$H_{12}N_2O_{12}Zn \\$	3552: Zinc nitrate hexahydrate	$H_{16}Nd_2O_{20}S_3$	2176: Neodymium sulfate octahydrate	$H_{50}N_{10}O_{46}W_{12} \\$	252: Ammonium tungstate pentahydrate
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$H_{12}N_2O_{14}U$	3401: Uranyl nitrate	$H_{16}Ni_{3}O_{16}P_{2} \\$	2226: Nickel phosphate	$H_{51}O_{64}PW_{12}$	2376: Phosphotungstic acid
$\rm H_{12}N_3NdO_{15}$	2168: Neodymium nitrate	$H_{16}O_{10}Sr$	3081: Strontium peroxide	Не	1469: Helium 1470: Helium-3
$\mathrm{H_{12}N_{3}O_{15}Pr}$	2586: Praseodymium nitrate	$H_{16}O_{16}S_2Th$	3255: Thorium sulfate	Hf HfI	1445: Hafnium 1455: Hafnium iodide
$H_{12}N_3O_{15}Sm$	2711: Samarium nitrate	$H_{16}O_{16}S_2U$	3390: Uranium(IV) sulfate	HfI <sub>4</sub> HfN	1455: Hafnium iodide 1456: Hafnium nitride
$H_{12}N_3O_{15}Tb$	3164: Terbium nitrate	$H_{16}O_{20}Pr_2S_3$	2593: Praseodymium sulfate	$HfO_2$	1458: Hafnium oxide
$\mathrm{H_{12}N_{3}O_{15}Tm}$	3268: Thulium nitrate	$H_{16}O_{20}S_{3}Sc_{2}$	2732: Scandium sulfate	HfO <sub>4</sub> Ti HfO S	1467: Hafnium silfate
$H_{12}N_{3}O_{15}Y$	3505: Yttrium nitrate	$H_{16}O_{20}S_{3}Sm_{2} \\$	2716: Samarium sulfate	HfP HfS	1460: Hafnium sulfide
$H_{12}N_3S_4V$	247: Ammonium	$H_{16}O_{20}S_{3}Tb_{2} \\$	3169: Terbium sulfate	HfSe <sub>2</sub> HfSi	1461: Hafnium selenide
$H_{12}Na_3O_{15}P_3$	3010: Sodium	$H_{16}O_{20}S_{3}Y_{2} \\$	3510: Yttrium sulfate	HfTe <sub>2</sub>	1466: Hafnium telluride
H NGO S	hexahydrate	$H_{16}O_{20}S_{3}Yb_{2} \\$	3482: Ytterbium sulfate	$Hg(BrO_3)_2$	2066: Mercury(II) bromate 2078: Mercury(II) iodide(a)
H NiO Se	hexahydrate	$H_{16}O_{20}S_{3}Tm_{2}$	3272: Thulium sulfate		2070: Mercury(II) iodide( $\beta$ ) 2077: Mercury(II) iodite
H O \$7	hexahydrate	$H_{18}La_2O_{21}S_3$	1678: Lanthanum sulfate	$HgI_{4}K_{2}$	2551: Potassium
$\Pi_{12} O_{10} SZ \Pi$	hexahydrate	$H_{18}Na_2O_9S$	2986: Sodium sulfide	HgN <sub>2</sub> O <sub>6</sub>	2081: Mercury(II) nitrate
H <sub>13</sub> NNaO <sub>8</sub> P	2835: Sodium ammonium hydrogen phosphate	$H_{18}Na_3O_9S_4Sb$	3004: Sodium thioantimonate	HgO	2086: Mercury(II) oxide red 2087: Mercury(II) oxide
$H_{14}MgO_{11}S$	1954: Magnesium sulfate	$H_{18}O_{10}Sr$	3064: Strontium hydroxide	HgO <sub>4</sub> S	2093: Mercury(II) sulfate
$H_{14}Mn_3O_{15}P_2$	2017: Manganese(II)	$H_{18}O_{17}S_2Th$	3254: Thorium sulfate	HgO <sub>4</sub> w HgS	2099: Mercury(II) tungstate 2094: Mercury(II) sulfide( $\alpha$ ) 2005: Mercury(II) sulfide( $\beta$ )
$H_{14}Na_2Nb_2O_{13}\\$	2934: Sodium metaniobate	$H_{20}MnN_2O_{14}S_2$	1972: Manganese ammonium	HgSe HgTe	2095: Mercury(II) selenide 2096: Mercury(II) telluride
$H_{14}Na_2O_{10}S$	2989: Sodium sulfite	$H_{20}N_2NiO_{14}S_2$	201: Ammonium nickel	$Hg_2I_2$	2050: Mercury(I) iodide
$\mathrm{H_{14}Na_{2}O_{11}S}$	2984: Sodium sulfate	H <sub>20</sub> Na <sub>2</sub> O <sub>14</sub> S	2983: Sodium sulfate	$Hg_2I_2O_6$ $Hg_2N_2O_4$	2055: Mercury(I) Iodate
H <sub>14</sub> NiO <sub>11</sub> S	2235: Nickel sulfate	H <sub>20</sub> Na <sub>2</sub> O <sub>14</sub> Se	2975: Sodium selenate	$Hg_2O$ $Hg_2O_4S$	2055: Mercury(I) oxide 2057: Mercury(I) sulfate
$H_{14}Ni_3O_{15}P_2$	heptahydrate 2225: Nickel phosphate	$\mathrm{H}_{20}\mathrm{Na_{3}O_{14}V}$	decahydrate 2949: Sodium orthovanadate	$Hg_2O_4W$ $Hg_2S$	2060: Mercury(I) tungstate 2058: Mercury(I) sulfide
$H_{14}O_{11}SV$	heptahydrate 3437: Vanadium(II) sulfate	$H_{20}Na_4O_{16}P_2$	decahydrate 2923: Sodium hypophosphate	Hg <sub>3</sub> O <sub>6</sub> S	2088: Mercury(II) oxide sulfate
H <sub>14</sub> O <sub>11</sub> SZn	heptahydrate 3573: Zinc sulfate	$H_{20}Na_4O_{17}P_2$	decahydrate 2972: Sodium pyrophosphate	Hg <sub>3</sub> O <sub>8</sub> P <sub>2</sub> Ho	2091: Mercury(II) phosphate 1478: Holmium
H <sub>14</sub> O <sub>45</sub> SiW <sub>12</sub>	heptahydrate 2776: Silicotungstic acid	H <sub>24</sub> Na <sub>3</sub> O <sub>15</sub> PS	decahydrate 3006: Sodium thiophosphate	HoI <sub>3</sub> HoN	1486: Holmium iodide 1488: Holmium nitride
$\mathbf{H}_{15}\mathbf{Na}_{2}\mathbf{O}_{11}\mathbf{P}$	2909: Sodium hydrogen	H. Na.O. P	dodecahydrate 2965: Sodium phosphate	HoSi <sub>2</sub> Ho-O-	1492: Holmium silicide
$H_{16}Ho_2O_{20}S_3$	1493: Holmium sulfate	HNa.O.P	dodecahydrate	$Ho_2S_3$ Ho.Te.	1494: Holmium sulfide
$H_{16}I_2MgO_8\\$	1917: Magnesium iodide	11 <sub>25</sub> 1 va <sub>2</sub> O <sub>16</sub> 1	phosphate dodecabydrate	IIn IK	1560: Indium(I) iodide
$H_{16}La_2O_{20}S_3$	1679: Lanthanum sulfate	$H_{32}K_8Nb_6O_{35}$	2493: Potassium niobate	IKO <sub>3</sub>	2482: Potassium iodate 2505: Potassium periodate
$H_{16}Lu_2O_{20}S_3$	1863: Lutetium sulfate	${\rm H}_{32}{\rm Mo}_7{\rm N}_6{\rm O}_{28}$	199: Ammonium molybdate	ILi ILi	1804: Lithium iodate
$H_{16}MgNO_{10}P$	1875: Magnesium ammonium	$H_{36}N_{6}O_{30}W_{7} \\$	197: Ammonium metatungstate	INa INa INaO-	2926: Sodium iodate
$H_{16}Mg_{3}O_{16}P_{2}$	1938: Magnesium phosphate	H No O D W	hexahydrate	INaO <sub>4</sub>	2958: Sodium fordate
$H_{16}N_{3}O_{42}PW_{12}$	220: Ammonium	$11_{36}$ $11_{36}$ $11_{36}$ $11_{4}$ $0_{61}$ $11_{2}$ $11_{2}$ $11_{12}$ $11_{13}$	phosphotungstate	IRb	2668: Rubidium iodide
	dihydrate	$\Pi_{40} N_{10} U_{41} W_{12}$	231: Ammonium tungstate(VI)	1330	sulfide

	267: Antimony(III) iodide	InP	1557: Indium phosphide	LaS	1667: Lanthanum monosulfide
	sulfide	InS	1563: Indium(II) sulfide	LaSi <sub>2</sub>	1675: Lanthanum silicide
IT1	3206: Thallium(I) iodide	InSb	1554: Indium antimonide	$La_2O_2S$	1672: Lanthanum oxysulfide
I <sub>2</sub>	1580: Iodine	$In_2O_3$	1572: Indium(III) oxide	$La_2O_3$	1671: Lanthanum oxide
I <sub>2</sub> Mg	1915: Magnesium iodide	$In_2O_{12}S_3$	1576: Indium(III) sulfate	$La_2O_{12}S_3$	1677: Lanthanum sulfate
I <sub>2</sub> Mn	2007: Manganese(II) iodide	$In_2S_3$	1577: Indium(III) sulfide	$La_2S_3$	1680: Lanthanum sulfide
I <sub>2</sub> Mo	2121: Molybdenum(II) iodide	$In_2Se_3$	1575: Indium(III) selenide	$La_2Te_3$	1681: Lanthanum telluride
I <sub>2</sub> Ni	2216: Nickel iodide	In <sub>2</sub> Te <sub>3</sub>	1578: Indium(III) telluride	Li	1760: Lithium
I <sub>2</sub> NiO <sub>6</sub>	2214: Nickel iodate	Ir	1600: Iridium	LiMn <sub>2</sub> O <sub>3</sub>	1806: Lithium manganate
LOW	3350: Tungsten oxydiiodide	IrO <sub>2</sub>	1614: Iridium(IV) oxide	LiNO	1817: Lithium nitrite
I <sub>2</sub> O <sub>4</sub>	1593: Iodine tetroxide	Ir <sub>2</sub> O <sub>2</sub>	1612: Iridium(III) oxide	LiNO	1815: Lithium nitrate
I <sub>2</sub> O <sub>5</sub>	1592: Iodine pentoxide	$Ir_2S_2$	1613: Iridium(III) sulfide	LiN	1769: Lithium azide
LO.	1587: Iodine hexoxide	K	2404: Potassium	LiNbO	1814: Lithium niobate
LO.Ph	1713: Lead iodate	KMnO.	2506: Potassium	LiO.P	1811: Lithium metaphosphate
LO.Sr	3065: Strontium iodate	11111104	permanganate	LiO <sub>2</sub> Ta	1832: Lithium tantalate
LO.Zn	3548: Zinc iodate	KN.	2412: Potassium azide	LiO.V	1843: Lithium vanadate
I Ph	1714: Lead iodide	KNO U	2566: Potassium uranyl	Li MnO	1807: Lithium manganite
I Dd	2324: Palladium(II) iodide	KIN30110	nitrote	$Li_2 MinO_3$	1813: Lithium molybdate
I <sub>2</sub> I U I Dt	2324. I alladium(II) iodide	KNHO	2402: Botaggium nichota		1815. Lithium avida
1 <sub>2</sub> Fl I S	2385. Flathull(II) louide	KNOO3	2492. Fotassium modate		
1 <sub>2</sub> Sm		KNO <sub>2</sub>	2495: Polassium nitrite	$Li_2O_2$	1824: Lithium peroxide
1 <sub>2</sub> Sn	3034: Stannous iodide	KNO <sub>3</sub>	2494: Potassium nitrate	$Li_2O_3Si$	1812: Lithium metasilicate
$I_2Sr$	3066: Strontium iodide	KO <sub>2</sub>	2528: Potassium superoxide	$L_{1_2}O_3$ Te	1833: Lithium tellurite
I <sub>2</sub> T1	3285: Titanium diiodide	KO <sub>3</sub> Ta	2529: Potassium tantalate	$L_{12}O_3T_1$	1841: Lithium titanate
$I_2V$	3413: Vanadium diiodide	$KO_3V$	2568: Potassium vanadate	$Li_2O_3Zr$	1844: Lithium zirconate
$I_2W$	3337: Tungsten diiodide	KO <sub>4</sub> Re	2508: Potassium perrhenate	Li <sub>2</sub> O <sub>4</sub> S	1829: Lithium sulfate
$I_2Zn$	3549: Zinc iodide	KO <sub>4</sub> Ru	2509: Potassium perruthenate	$Li_2O_4W$	1842: Lithium tungstate
I <sub>3</sub> In	1570: Indium(III) iodide	$K_2Mg_2O_{12}S_3$	2485: Potassium magnesium	$Li_2S$	1831: Lithium sulfide
I <sub>3</sub> Ir	1611: Iridium(III) iodide		sulfate	Li <sub>3</sub> N	1816: Lithium nitride
I <sub>3</sub> KZn	2561: Potassium	$K_2MnO_4$	2486: Potassium manganate	Li <sub>3</sub> O <sub>4</sub> P	1825: Lithium phosphate
	triiodozincate	$K_2MoO_4$	2488: Potassium molybdate	Li <sub>4</sub> O <sub>4</sub> Si	1819: Lithium orthosilicate
I <sub>3</sub> La	1666: Lanthanum iodide	$K_2N_4O_8Pt$	2552: Potassium	Lr	1683: Lawrencium
I <sub>3</sub> LaO <sub>9</sub>	1665: Lanthanum iodate		tetranitritoplatinate(II)	Lu	1845: Lutetium
I <sub>3</sub> Lu	1853: Lutetium iodide	K <sub>2</sub> O	2490: Potassium monoxide	LuN	1857: Lutetium nitride
I <sub>3</sub> Mo	2125: Molybdenum(III)	$\tilde{K_2O_2}$	2507: Potassium peroxide	LuN <sub>3</sub> O <sub>9</sub>	1855: Lutetium nitrate
5	iodide	$K_2 O_2 S_2$	2557: Potassium thiosulfate	LuN <sub>2</sub> O <sub>0</sub>	1856: Lutetium nitrate
I2N	2284: Nitrogen trijodide	K <sub>2</sub> O <sub>2</sub> Se	2518: Potassium selenite	(anhydrous)	hvdrate
LNd	2166: Neodymium jodide	K <sub>2</sub> O <sub>2</sub> Te	2531: Potassium tellurite	LuSi	1861: Lutetium silicide
LP	2367: Phosphorus(III) jodide	K <sub>2</sub> O <sub>2</sub> Te	2532: Potassium tellurite(IV)	Lu <sub>2</sub> O <sub>2</sub>	1859: Lutetium oxide
I.Pr	2585: Praseodymium iodide	(anhydrous)	hydrate	Lu.O.S.	1862: Lutetium sulfate
I.Pu	2395: Plutonium(III) jodide	K.O.Ti	2558: Potassium titanate	Lu <sub>2</sub> O <sub>12</sub> O <sub>3</sub>	1864: Lutetium sulfide
IRe	2617: Rhenium(III) iodide	$K_2O_3T$	2570: Potassium zirconate	Lu <sub>2</sub> 03	1865: Lutetium telluride
I Ph	2642: Phodium(III) iodide	$K_2 O_3 Z_1$	2515: Potassium	$MO N_2 O P$	2067: Sodium
I Du	2605: Buthanium(III) iodida	$\mathbf{K}_{2}\mathbf{O}_{4}\mathbf{K}\mathbf{u}$	zuthonata(VI)	100 <sub>12</sub> 10a <sub>3</sub> 0 <sub>40</sub> 1	phosphomolybdata
I <sub>3</sub> Ku I Sh	266: Antimony(III) iodide	KOS	2524: Potossium sulfato	Md	2020: Mandalavium
1 <sub>3</sub> 50	200. Altimoliy(III) louide	$K_2 O_4 S$	2524. Potassium selenate	Ma	1866: Magnasium
1 <sub>3</sub> 5111 1 Th	2/10: Samarium Iodide	$K_2 O_4 Se$		Mg M-M-O	1021. Magnesium
1 <sub>3</sub> 10 I Tm	2267: Thulium iodide	$K_2O_4W$	2505: Polassium nungstate	$M_{2}NOO_{4}$	1921: Magnesium nitroto
1 <sub>3</sub> 1111 1 NV		$K_2 O_5 S_2$	2427 D to 111	$MgN_2O_6$	1925: Magnesium intrate
I <sub>3</sub> W	3362: Tungsten trilodide	$\mathbf{K}_{2}\mathbf{O}_{6}\mathbf{S}_{2}$	2437: Potassium dithionate	$MgNb_2O_6$	1922: Magnesium niobate
I <sub>3</sub> Y	3503: Yttrium iodide	$\mathbf{K}_{2}\mathbf{O}_{7}\mathbf{S}_{2}$	2513: Potassium pyrosulfate	MgO	1932: Magnesium oxide
I <sub>4</sub> Mo	2131: Molybdenum(IV)	$\mathbf{K}_2\mathbf{O}_7\mathbf{U}_2$	2565: Potassium uranate	MgO <sub>2</sub>	1937: Magnesium peroxide
	iodide	$K_2O_8S_2$	2510: Potassium persulfate	MgO <sub>3</sub> S	1957: Magnesium sulfite
$I_4O_9$	1590: Iodine nonoxide	$K_2O_8S_2Sn$	2522: Potassium	MgO <sub>3</sub> Si	1947: Magnesium silicate
I <sub>4</sub> Pt	2389: Platinum(IV) iodide		stannosulfate	MgO <sub>3</sub> Ti	1920: Magnesium
I <sub>4</sub> Si	2775: Silicon tetraiodide	$K_2S$	2525: Potassium sulfide		metatitanate
I <sub>4</sub> Sn	3022: Stannic iodide	$K_2Se$	2517: Potassium selenide	MgO <sub>3</sub> Zr	1968: Magnesium zirconate
I <sub>4</sub> Te	3151: Tellurium tetraiodide	$K_3N_6O_{12}Rh$	2467: Potassium	$MgO_4S$	1953: Magnesium sulfate
I₄Th	3243: Thorium iodide		hexanitritorhodate(III)	$MgO_4W$	1966: Magnesium tungstate
I <sub>4</sub> Ti	3305: Titanium tetraiodide	$K_3O_4P$	2511: Potassium phosphate	MgO <sub>5</sub> SiZr	1969: Magnesium zirconium
$I_4U$	3382: Uranium tetraiodide	$K_5O_{10}P_3$	2562: Potassium triphosphate		silicate
$I_4W$	3360: Tungsten tetraiodide	$K_6O_{18}P_6$	2465: Potassium	MgO <sub>5</sub> Ti <sub>2</sub>	1903: Magnesium dititanate
I <sub>4</sub> Zr	3597: Zirconium iodide		hexametaphosphite	MgO <sub>6</sub> Ta <sub>2</sub>	1960: Magnesium tantalate
I5Nb	2270: Niobium(V) iodide	Kr	1642: Krypton	MgS	1956: Magnesium sulfide
I₅Ta	3126: Tantalum pentaiodide	La	1648: Lanthanum	MgSe	1945: Magnesium selenide
In	1551: Indium	LaN	1669: Lanthanum nitride	Mg <sub>2</sub> O <sub>4</sub> Si	1928: Magnesium
InN	1556: Indium nitride	LaO₄P	1674: Lanthanum phosphate		orthosilicate
InO₄P	1574: Indium(III) phosphate	(anhydrous)	hydrate		1948: Magnesium silicate
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Mg <sub>2</sub> O <sub>4</sub> Ti	1929: Magnesium	$MoO_{18}P_6$	2112: Molybdenum	N <sub>3</sub> U <sub>2</sub>	3388: Uranium trinitride
Ma O P	orthotitanate	MaD	metaphosphate	$N_4N1H_{20}O_{14}S_2$	2190: Nickel ammonium
$Mg_2O_7P_2$	1941: Magnesium	MOP	2111: Molybdenum phosphide	NO TH	2244. Thorium nitrate
ΜαΟΥ	1967: Magnesium vanadate	W1032	2111. Molybdenum disumde	$N_4O_{12}III$	2280: Nitrogen selenide
$Mg_2O_7V_2$ Mg_O_Si_	1965: Magnesium trisilicate		sulfide	N <sub>4</sub> Se <sub>4</sub>	2770: Silicon nitride
Mg <sub>2</sub> O <sub>8</sub> Si	1949: Magnesium silicide	MoS	2146: Molybdenum(VI)	N <sub>4</sub> 51 <sub>3</sub> N <sub>2</sub> Te <sub>2</sub>	3146: Tellurium nitride
Mg <sub>2</sub> Sn	1951: Magnesium stannide	11003	sulfide	N <sub>4</sub> P <sub>2</sub>	2359: Phosphorus nitride
Mg <sub>2</sub> N <sub>2</sub>	1926: Magnesium nitride	MoSe	2133: Molybdenum(IV)	N <sub>4</sub> Pb	1692: Lead azide
Mg <sub>3</sub> P <sub>2</sub>	1940: Magnesium phosphide		selenide	Na	2826: Sodium
Mg <sub>2</sub> Sb <sub>2</sub>	1876: Magnesium antimonide	MoSi <sub>2</sub>	2118: Molybdenum silicide	NaNbO <sub>3</sub>	2942: Sodium niobate
Mn	1970: Manganese	MoTe <sub>2</sub>	2135: Molybdenum(IV)	NaO <sub>3</sub> Ta	2937: Sodium metatantalate
MnMoO <sub>4</sub>	2010: Manganese(II)	2	telluride	NaO <sub>3</sub> V	2938: Sodium metavanadate
4	molybdate	Mo <sub>2</sub> N	2114: Molybdenum nitride	NaO <sub>4</sub> Re	2962: Sodium perrhenate
MnN	1982: Manganese nitride	Mo <sub>2</sub> O <sub>3</sub>	2126: Molybdenum(III) oxide	Na <sub>2</sub> O	2951: Sodium oxide
MnN <sub>2</sub> O <sub>6</sub>	2011: Manganese(II) nitrate	$Mo_2S_3$	2127: Molybdenum(III)	$Na_2O_2$	2961: Sodium peroxide
MnNb <sub>2</sub> O <sub>6</sub>	1981: Manganese niobate	2 0	sulfide	Na <sub>2</sub> O <sub>3</sub> S	2988: Sodium sulfite
MnO	2015: Manganese(II) oxide	Mo12Na4O40Si	2941: Sodium	$Na_2O_3S_2$	3007: Sodium thiosulfate
MnO <sub>2</sub>	2036: Manganese(IV) oxide	(anhydrous)	molybdosilicate hydrate	Na <sub>2</sub> O <sub>3</sub> Se	2977: Sodium selenite
MnO <sub>3</sub> Si	1988: Manganese silicate	$(NH_4)_2S_x$	222: Ammonium polysulfide	Na <sub>2</sub> O <sub>3</sub> Si	2935: Sodium metasilicate
	2009: Manganese(II)	NNaO <sub>2</sub>	2944: Sodium nitrite	Na <sub>2</sub> O <sub>3</sub> Te	2993: Sodium tellurite(IV)
	metasilicate	NNaO <sub>3</sub>	2943: Sodium nitrate	Na <sub>2</sub> O <sub>3</sub> Zr	3016: Sodium zirconate
MnO <sub>3</sub> Ti	2027: Manganese(II) titanate	NNb	2255: Niobium nitride	$Na_2O_4S$	2982: Sodium sulfate
MnO <sub>3</sub> Zr	2029: Manganese(II)	NNd	2169: Neodymium nitride	$Na_2O_4S_2$	2918: Sodium hydrosulfite
	zirconate	NO	2276: Nitric oxide	Na <sub>2</sub> O <sub>4</sub> Se	2974: Sodium selenate
MnO <sub>4</sub> Rb	2677: Rubidium	$NO_2$	2278: Nitrogen dioxide	Na <sub>2</sub> O <sub>4</sub> Te	2991: Sodium tellurate(VI)
	permanganate	NO <sub>2</sub> Tl	3209: Thallium(I) nitrite	$Na_2O_4W$	3012: Sodium tungstate
$MnO_4S$	2021: Manganese(II) sulfate	NO <sub>3</sub> Rb	2673: Rubidium nitrate	$Na_2O_5S_2$	2929: Sodium metabisulfite
$MnO_4W$	2028: Manganese(II)	NO <sub>3</sub> Tl	3208: Thallium(I) nitrate	$Na_2O_6S_2$	2870: Sodium dithionate
	tungstate	NO <sub>5</sub> Te	3145: Tellurium nitrate	Na <sub>2</sub> O <sub>7</sub> Ti <sub>3</sub>	3009: Sodium titanate
$MnO_6S_2$	2002: Manganese(II)	NPr	2587: Praseodymium nitride	$Na_2O_8S_2$	2963: Sodium persulfate
	dithionate	NPu	2392: Plutonium nitride	$Na_2S$	2985: Sodium sulfide
$MnO_6V_2$	1990: Manganese vanadate	NTa	3121: Tantalum nitride( $\delta$ )	$Na_2S_4$	3003: Sodium tetrasulfide
MnP	1984: Manganese phosphide		3122: Tantalum nitride(ε)	Na <sub>2</sub> Se	2976: Sodium selenide
MnS	2024: Manganese(II) sulfide	NTb	3165: Terbium nitride	Na <sub>2</sub> SiO <sub>3</sub>	2979: Sodium silicate
MnSb	1973: Manganese antimonide	NTh	3246: Thorium nitride	Na <sub>3</sub> O <sub>4</sub> P	2964: Sodium phosphate
MnSe	1987: Manganese selenide	NTi	3296: Titanium nitride	$Na_3O_4V$	2948: Sodium orthovanadate
	2020: Manganese(II)	NU	3374: Uranium mononitride	Na <sub>3</sub> P	2966: Sodium phosphide
	selenide	NV	3421: Vanadium nitride	Na <sub>4</sub> O <sub>4</sub> Si	2947: Sodium orthosilicate
MnSi <sub>2</sub>	1989: Manganese silicide	NW <sub>2</sub>	3347: Tungsten nitride	$Na_4O_7P_2$	2971: Sodium pyrophosphate
MnTe	2025: Manganese(II)	NZr	3599: Zirconium nitride	$Na_4O_7V_2$	2973: Sodium pyrovanadate
	telluride	N <sub>2</sub>	2277: Nitrogen	$Na_5O_{10}P_3$	3011: Sodium triphosphate
MnTe <sub>2</sub>	2037: Manganese(IV)	$N_2N_1O_6$	2219: Nickel nitrate	$Na_5P_3O_{10}$	2969: Sodium polyphosphate
	telluride	N <sub>2</sub> O	2294: Nitrous oxide	$Na_6O_{18}P_6$	2899: Sodium
$Mn_2O_3$	2035: Manganese(III) oxide	$N_2O_3$	2285: Nitrogen trioxide	NI	hexametaphosphate
$Mn_2O_7$	2038: Manganese(VII) oxide	$N_2O_4$	2281: Nitrogen tetroxide	Nb	2247: Niobium
$Mn_2O_7P_2$	2018: Manganese(11)	$N_2O_4Sr$	3073: Strontium nitrite	NDO	2257: Niobium(II) oxide
Mn D	1085. Managanaga nhagnhida	$N_2O_4ZII$	2270: Nitrogen nentovide	NbO Ph	2201: Niobium(1V) Oxide
Mn Sh	1985: Manganese phosphilde	$N_2O_5$	2279: Nitrogen pentoxide	NDO3KU NDD	2072: Rubidium modale
Mn <sub>2</sub> S0	2020: Manganasa (ILIII)	N O Ph	1718: Load pitrate	NDF	2250. Niobium phosphilde
WIII <sub>3</sub> O <sub>4</sub>	2050. Manganese(11,111)	$N_2O_6FD$	2325: Palladium(II) nitrate	NbSe	2263: Niobium(IV) selenide
Mn P	1086: Manganese phosphide	$N_2O_6 I u$	3071: Strontium nitrate	NbSi	2252: Niobium disilicide
Mo	2104: Molybdenum	$N_2O_60r$ $N_2O_7r$	3619: Zirconyl nitrate	NbTe.	2264: Niobium(IV) telluride
MoN	2113: Molybdenum	(anhydrous)	hydrate	Nb.O.	2204. Niobium(IV) tenuride
	mononitride	N-O-U	3400: Uranyl nitrate	Nb <sub>2</sub> O <sub>5</sub>	1717: Lead niobate
MoNa <sub>2</sub> O.	2939: Sodium molybdate	$N_2 S_8 C$	3072: Strontium nitride	Nb <sub>2</sub> O <sub>6</sub> Sr	3070: Strontium niobate
MoNiO	2218: Nickel molybdate	N <sub>2</sub> W	3338: Tungsten dinitride	Nd	2151: Neodymium
MoO <sub>2</sub>	2132: Molybdenum(IV) oxide	$N_2Zn_2$	3553: Zinc nitride	NdO <sub>4</sub> P	2173: Neodymium phosphate
MoO <sub>3</sub>	2143: Molybdenum(VI) oxide	N <sub>2</sub> Na	2839: Sodium azide	(anhvdrous)	hydrate
MoO₄Pb	1716: Lead molvbdate	N <sub>2</sub> NdO <sub>0</sub>	2167: Neodymium nitrate	NdSi	2174: Neodymium silicide
MoO <sub>4</sub> Rb <sub>2</sub>	2671: Rubidium molvbdate	N <sub>2</sub> O <sub>0</sub> Rh	2643: Rhodium(III) nitrate	$Nd_2O_2$	2171: Neodymium oxide
MoO <sub>4</sub> Sr	3069: Strontium	N <sub>3</sub> O <sub>9</sub> Sb	268: Antimony(III) nitrate	$Nd_2O_{12}S_3$	2175: Neodymium sulfate
Ŧ	molybdate(VI)	N <sub>3</sub> O <sub>9</sub> Tl	3224: Thallium(III) nitrate	Nd <sub>2</sub> S <sub>3</sub>	2177: Neodymium sulfide
MoO <sub>4</sub> Tl <sub>2</sub>	3207: Thallium(I) molybdate	N <sub>3</sub> Rb	2653: Rubidium azide	Nd <sub>2</sub> Te <sub>3</sub>	2178: Neodymium telluride
MoO <sub>4</sub> Zn	3551: Zinc molybdate	$N_3Tl$	3194: Thallium(I) azide	Ne	2181: Neon

Ni	2184: Nickel	O <sub>3</sub> PbSe	1727: Lead selenite	$O_4SiZn_2$	3570: Zinc silicate
NiO	2222: Nickel oxide	O <sub>3</sub> PbSi	1715: Lead metasilicate	O <sub>4</sub> SiZr	3607: Zirconium silicate
NiO <sub>3</sub> Ti	2241: Nickel titanate	5	1728: Lead silicate	O₄SrW	3093: Strontium tungstate
NiO₄S	2234: Nickel sulfate	O <sub>3</sub> PbTe	1735: Lead tellurite	$O_4 Ta_2$	3133: Tantalum tetroxide
NiO <sub>4</sub> W	2243: Nickel tungstate	O₄PbTi	1741: Lead titanate	$O_4 V_2$	3414: Vanadium dioxide
NiO <sub>6</sub> V <sub>2</sub>	2244: Nickel vanadate	O₄PbZr	1745: Lead zirconate	O <sub>4</sub> Xe	3464: Xenon tetroxide
NiS	2237: Nickel sulfide	O <sub>2</sub> Pb <sub>2</sub>	1721: Lead oxide	O <sub>c</sub> P <sub>o</sub>	2373: Phosphorus(V) oxide
NiSh	2191: Nickel antimonide	$O_2 Pr_2$	2598: Praseodymium(III)	0.STi	3298: Titanium oxysulfate
NiSe	2229: Nickel selenide	03112	oxide	O.Sh.	286: Antimony(V) oxide
NiSi	2209: Nickel disilicide	O RhTa	2682: Rubidium tantalate	$O_{5}SO_{2}$	287: Antimony(V) oxide
NiTo	2209. Nickel tallurida	$O_3 RU1a$	2670: Pubidium	(aphydrous)	207. Antimony(V) Oxide
NIC	2238. Nickel tenunde	O <sub>3</sub> KUV		(annyurous)	2127: Tentelene nentenide
$N1_2O_3$	2223: Nickel Öxide			$O_5 Ia_2$	3127: Tantalum pentoxide
	2246: Nickel(III) oxide	$O_3 R D_2 I I$	2684: Rubidium titanate	$O_5 Ia_2$	3128: Tantalum pentoxide
N <sub>12</sub> P	2227: Nickel phosphide	$O_3Rb_2Zr$	2686: Rubidium zirconate	(anhydrous)	hydrate
Ni <sub>2</sub> Si	2230: Nickel silicide	O <sub>3</sub> Re	2628: Rhenium(VI) oxide	$O_5V_2$	3426: Vanadium pentoxide
$Ni_3S_2$	2233: Nickel subsulfide	$O_3Rh_2$	2645: Rhodium(III) oxide	O <sub>6</sub> PbTa <sub>2</sub>	1733: Lead tantalate
Ni <sub>3</sub> S <sub>4</sub>	2245: Nickel(II,III) sulfide	$O_3S$	3101: Sulfur trioxide( $\alpha$ )	$O_6PbV_2$	1744: Lead vanadate
No	2297: Nobelium		3102: Sulfur trioxide( $\beta$ )	$O_6SU$	3403: Uranyl sulfate
Np	2182: Neptunium		3103: Sulfur trioxide( $\gamma$ )	$O_6Se_2Sn$	3025: Stannic selenite
NpO <sub>2</sub>	2183: Neptunium(IV) oxide	$O_3Sb_2$	269: Antimony(III) oxide	O <sub>6</sub> SrTa <sub>2</sub>	3089: Strontium tantalate
OPb	1720: Lead oxide	~ -	270: Antimony(III) oxide	$O_6SrV_2$	3094: Strontium vanadate
OPd	2327: Palladium(II) oxide		271: Antimony(III) oxide	$O_7P_3Sn_3$	3037: Stannous
OPt	2386 <sup>.</sup> Platinum(II) oxide	O <sub>2</sub> Sc <sub>2</sub>	2731: Scandium oxide	- / 2 - 2	pyrophosphate
ORb.	2675: Rubidium oxide	0.Se	2754: Selenium trioxide	O-P.Zn.	3565: Zinc pyrophosphate
	2075: Rubiarum oxide	$O_{3}Se^{7}n$	3560: Zinc selenite	O P Zr	3605: Zirconium
051	2026. Storpaus avida	$O_3$ SeZII	2712: Somerium evide	$\mathbf{O}_{7}\mathbf{I}_{2}\mathbf{Z}\mathbf{I}$	5005. Zircomuni
051	2076. Strantism suide	$O_3SIII_2$	2006. Streations steamate	O DL V	2678: Dichi dinan
OSr	3076: Strontium oxide	O <sub>3</sub> ShSr	3080: Strontium stannate	$\mathbf{O}_7 \mathbf{K} \mathbf{O}_4 \mathbf{V}_2$	2678: Rubidium
	3328: Tritium dioxide	O <sub>3</sub> SrI1	3092: Strontium titanate		pyrovanadate
OTi	3295: Titanium monoxide	$O_3SrZr$	3095: Strontium zirconate	$O_7 Re_2$	2631: Rhenium(VII) oxide
OTl <sub>2</sub>	3211: Thallium(I) oxide	O <sub>3</sub> Te	3152: Tellurium trioxide	$O_7STe_2$	3147: Tellurium sulfate
OV	3420: Vanadium monoxide	O <sub>3</sub> TiZn	3582: Zinc titanate	$O_7Tb_4$	3171: Terbium(III,IV) oxide
OZn	3557: Zinc oxide	O <sub>3</sub> Ti <sub>2</sub>	3309: Titanium trioxide	$O_8P_2Pb_3$	1724: Lead phosphate
O <sub>2</sub>	2313: Oxygen	$O_3Tl_2$	3225: Thallium(III) oxide	$O_8P_2Zn_3$	3561: Zinc phosphate
O <sub>2</sub> Os	2307: Osmium(IV) oxide	$O_3Tm_2$	3270: Thulium oxide	$O_8Pb_3Sb_2$	1688: Lead antimonate
O <sub>2</sub> Pb	1705: Lead dioxide	O <sub>3</sub> U	3389: Uranium trioxide	$O_8U_3$	3392: Uranium(V,VI) oxide
O <sub>2</sub> Po	2403: Polonium(IV) oxide	O <sub>3</sub> VY	3512: Yttrium vanadate	$O_{a}W_{2}Zr$	3612: Zirconium tungstate
0 <sub>2</sub> Pt	2390: Platinum(IV) oxide	$O_3 V_2$	3434: Vanadium trioxide	$O_{11}Pr_6$	2599: Praseodymium(III.IV)
O <sub>2</sub> Pu	2398: Plutonium(IV) oxide	O <sub>2</sub> W	3363: Tungsten trioxide	- 11 0	oxide
O.Re	2620: Rhenium(IV) oxide	O.Xe	3466: Xenon trioxide	O.,Pr.S.	2592: Praseodymium sulfate
	2696: Ruthenium(IV) oxide	0 Y	3507: Yttrium oxide	$O_{12}P_{2}S_{3}$	2647: Rhodium(III) sulfate
$O_2 Ru$	2007: Sulfur dioxide	$O_3 I_2$	3478: Vtterbium oxide	$O_{12}RI_{2}O_{3}$	2047. Knoulum(III) sulfate
023	2741: Salarium diavida	$0_{3}10_{2}$	2200: Osmium(VIII) svids	$O_{12}S_3SU_2$	277. Antimony(III) suitate
$O_2Se$				$O_{12}S_3 \Pi_2$	
0281	2763: Silicon dioxide	O <sub>4</sub> PPr	2590: Praseodymium	$O_{12}S_3V_2$	3435: Vanadium trisultate
	2/64: Silicon dioxide		phosphate	$O_{12}S_3Yb_2$	3481: Ytterbium sulfate
	2765: Silicon dioxide	O <sub>4</sub> PSb	274: Antimony(III)	Os	2300: Osmium
	2766: Silicon dioxide		phosphate	Р	2355: Phosphorus (black)
	3449: Vitreous silica	O <sub>4</sub> PbS	1730: Lead sulfate		2356: Phosphorus (red)
O <sub>2</sub> Sn	3023: Stannic oxide	O <sub>4</sub> PbSe	1725: Lead selenate	PSb	260: Antimony phosphide
O <sub>2</sub> Sr	3080: Strontium peroxide	O <sub>4</sub> PbW	1742: Lead tungstate	PSn	3277: Tin monophosphide
O <sub>2</sub> Tc	3136: Technetium dioxide		1743: Lead tungstate	РТа	3129: Tantalum phosphide
O <sub>2</sub> Te	3142: Tellurium dioxide	O <sub>4</sub> Pb <sub>3</sub>	1759: Lead(II,III) oxide	PTi	3299: Titanium phosphide
0,Th	3249: Thorium oxide	O₄RaS	2608: Radium sulfate	PY	3509: Yttrium phosphide
0,Ti	3286: Titanium dioxide	O <sub>4</sub> Rb <sub>2</sub> S	2680: Rubidium sulfate	$P_2S_2$	2369: Phosphorus(III) sulfide
- 2	3287: Titanium dioxide	O.Rb <sub>2</sub> W	2685: Rubidium tungstate	P <sub>2</sub> S <sub>5</sub>	2375: Phosphorus(V) sulfide
	3288: Titanium dioxide	$O_4 Rb_2 H$	2674: Rubidium	P.Se.	2363: Phosphorus triselenide
O U	3371: Uranium dioxide	041003	orthovanadate	P Se	2374: Phosphorus (V)
0 <sub>2</sub> 0	2220: Tungston dioxido	O Pu	2607: Puthanium(VIII) avida	1 <sub>2</sub> 505	solonido
$O_2$	3557. Tungsten utoxide	O sen	2077. Kullellull( VIII) 0x1de	D 7n	3563. Tine phosphide
$O_2 Z_1$	2600. Zinc peroxide	04551	2007. Standinus sullate	$\Gamma_2 \Sigma II_3$	2604. Zine priospride
$O_2 Zr$	3600: Zirconium oxide	O <sub>4</sub> SSr	308/: Strontium sulfate	$P_2 Zr$	3604: Zirconium phosphide
	3601: Zirconium oxide	$O_4STI_2$	3216: Thallium(1) sulfate	$P_3Sn_4$	32/8: Tin triphosphide
	3602: Zirconium oxide yttria	$O_4SZn$	35/2: Zinc sulfate	$\mathbf{P}_4$	2357: Phosphorus (white)
	stabilized	$O_4Sb_2$	280: Antimony(IV) oxide	$P_4S_7$	2358: Phosphorus
O <sub>3</sub>	2314: Ozone		281: Antimony(IV) oxide		heptasulfide
$O_3P_2$	2368: Phosphorus(III) oxide	$O_4$ SeSr	3083: Strontium selenate	Ра	2602: Protactinium
O <sub>3</sub> PbS	1732: Lead sulfite	$O_4SeTl_2$	3214: Thallium(I) selenate	Pb	1684: Lead
O <sub>3</sub> PbS <sub>2</sub>	1740: Lead thiosulfate	O <sub>4</sub> SiTh	3247: Thorium orthosilicate	PbS	1731: Lead sulfide

PbSb	1689: Lead antimonide	S <sub>2</sub> Ta	3117: Tantalum disulfide	Si <sub>2</sub> Sr	3085: Strontium silicide
PbSe	1726: Lead selenide	S <sub>2</sub> Te	3143: Tellurium disulfide	Si <sub>2</sub> Ta	3131: Tantalum silicide
PbTe	1734: Lead telluride	$S_2Th$	3257: Thorium sulfide	Si <sub>2</sub> Tb	3168: Terbium silicide
Pd	2315: Palladium	S <sub>2</sub> Ti	3290: Titanium disulfide	Si <sub>2</sub> Th	3253: Thorium silicide
PdS	2329: Palladium(II) sulfide	$S_2V_2$	3427: Vanadium sulfide	Si <sub>2</sub> Ti	3300: Titanium silicide
Pm	2600: Promethium	$S_2W$	3343: Tungsten disulfide	Si <sub>2</sub> V	3415: Vanadium disilicide
Ро	2400: Polonium	$S_2Zr$	3610: Zirconium sulfide	Si <sub>2</sub> W	3342: Tungsten disilicide
	2401: Polonium	$S_3Sb_2$	278: Antimony(III) sulfide	Si <sub>2</sub> Yb	3480: Ytterbium silicide
Pr	2596: Praseodymium(α)	$S_3Sc_2$	2733: Scandium sulfide	Si <sub>2</sub> Zr	3608: Zirconium silicide
	2597: Praseodymium(β)	$S_3Sm_2$	2717: Samarium sulfide	Si <sub>3</sub> Ta <sub>5</sub>	3134: Tantalum trisilicide
PrSi <sub>2</sub>	2591: Praseodymium silicide	$S_3Tb_2$	3170: Terbium sulfide	Si <sub>3</sub> Ti <sub>5</sub>	3310: Titanium trisilicide
$Pr_2S_3$	2594: Praseodymium sulfide	S <sub>3</sub> Ti <sub>2</sub>	3311: Titanium trisulfide	Si <sub>3</sub> W <sub>5</sub>	3364: Tungsten trisilicide
$Pr_2Te_3$	2595: Praseodymium	S <sub>3</sub> Tm <sub>2</sub>	3273: Thulium sulfide	Si <sub>2</sub> Tm	3271: Thulium silicide
	telluride	$S_3V_2$	3436: Vanadium trisulfide	Sm	2698: Samarium
Pt	2377: Platinum	S <sub>3</sub> W	3365: Tungsten trisulfide	$Sm_2Te_3$	2718: Samarium telluride
PtSi	2380: Platinum silicide	$S_3Y_2$	3511: Yttrium sulfide	Sn	3274: Tin (gray)
Pu	2391: Plutonium	S <sub>4</sub> Se <sub>4</sub>	2750: Selenium sulfide		3275: Tin (white)
Ra	2604: Radium	$S_5Sb_2$	289: Antimony(V) sulfide	SnTe	3043: Stannous telluride
Rb	2649: Rubidium	$S_5V_2$	3425: Vanadium	Sr	3044: Strontium
Rb <sub>2</sub> S	2681: Rubidium sulfide	5 2	pentasulfide	T <sub>2</sub>	3327: Tritium
Rb <sub>2</sub> Se	2679: Rubidium selenide	$S_6Se_2$	2744: Selenium hexasulfide	T <sub>3</sub>	1515: Hydrogen-t <sub>2</sub>
Re	2610: Rhenium	Sb	257: Antimony	Ta	3112: Tantalum
ReS <sub>2</sub>	2623: Rhenium(IV) sulfide	SbY	3487: Yttrium antimonide	TaTe <sub>2</sub>	3132: Tantalum telluride
ReSe <sub>2</sub>	2621: Rhenium(IV) selenide	SbZn	3518: Zinc antimonide	Tb	3154: Terbium
ReSi <sub>2</sub>	2622: Rhenium(IV) silicide	$Sb_2Se_3$	276: Antimony(III) selenide	Tc	3135: Technetium
ReTe <sub>2</sub>	2624: Rhenium(IV) telluride	Sb <sub>2</sub> Te <sub>3</sub>	279: Antimony(III) telluride	Te	3138: Tellurium
$Re_2S_7$	2632: Rhenium(VII) sulfide	Sc	2721: Scandium	TeZn	3580: Zinc telluride
Rh	2633: Rhodium	$Sc_2Te_3$	2734: Scandium telluride	Te <sub>2</sub> Ti	3291: Titanium ditelluride
Rn	2609: Radon	Se	2737: Selenium	Te2W	3357: Tungsten telluride
Ru	2687: Ruthenium		2738: Selenium(β)	Te <sub>2</sub> Zr	3611: Zirconium telluride
S	3104: Sulfur(α)		2755: Selenium(α)	Th	3232: Thorium
	3105: Sulfur(β)	SeSn	3038: Stannous selenide	Ti	3280: Titanium
	3106: Sulfur( $\gamma$ )	SeSr	3084: Strontium selenide	Tl	3188: Thallium
SSe	2745: Selenium monosulfide	SeTl <sub>2</sub>	3215: Thallium(I) selenide	Tm	3259: Thulium
SSi	2768: Silicon monosulfide	SeZn	3568: Zinc selenide	U	3368: Uranium
SSn	3041: Stannous sulfide	Se <sub>2</sub> Sn	3024: Stannic selenide	$UO_2F_2$	3398: Uranyl fluoride
SSr	3088: Strontium sulfide	Se <sub>2</sub> Ta	3130: Tantalum selenide	V	3406: Vanadium
STi	3294: Titanium monosulfide	Se <sub>2</sub> Th	3252: Thorium selenide	W	3329: Tungsten
STl <sub>2</sub>	3217: Thallium(I) sulfide	Se <sub>2</sub> Ti	3289: Titanium diselenide	x = 0.8 - 1.5	722: Carbon
SZn	3576: Zinc sulfide( $\alpha$ )	Se <sub>2</sub> W	3341: Tungsten diselenide	Xe	3451: Xenon
	3577: Zinc sulfide(β)	Se <sub>2</sub> Zr	3606: Zirconium selenide	Y	3483: Yttrium
S <sub>2</sub> Se	2742: Selenium disulfide	Si	2758: Silicon	Yb	3467: Ytterbium
$S_2Si$	2767: Silicon disulfide	SiV <sub>3</sub>	3419: Vanadium monosilicide	Zn	3513: Zinc
$S_2Sn$	3026: Stannic sulfide	Si <sub>2</sub> Sm	2715: Samarium silicide	Zr	3584: Zirconium

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468 1299 2601 1880 1895 469 470	Bismuth sulfate Bismuth sulfate Bismuth telluride Bismuth tetroxide Bismuth titanate Bismuth trianate Bismuth tribromide Bismuth trichloride Bismuth trichloride Bismuth trifluoride Bismuth trifluoride	509 510 511 512 513 514 475 476 477 479 485
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468 1299 2601 1880 1895 469 470 507 471	Bismuth sulfate Bismuth sulfate Bismuth telluride Bismuth tetroxide Bismuth titanate Bismuth titanate Bismuth tribromide Bismuth trichloride Bismuth trichloride monohydrate Bismuth trifluoride Bismuth trifluoride Bismuth trigluoride Bismuth tungstate Bismuth vanadate	509 510 511 512 513 514 475 476 477 479 485 515 516
468 1299 2601 1880 1895 469 470 507 471 472	Bismuth sulfate Bismuth sulfate Bismuth telluride Bismuth tetroxide Bismuth titanate Bismuth titanate Bismuth tribromide Bismuth trichloride Bismuth trichloride monohydrate Bismuth trifluoride Bismuth trifluoride Bismuth trijdide Bismuth tungstate Bismuth vanadate Bismuth zirconate	509 510 511 512 513 514 475 476 477 479 485 515 516 517
468 1299 2601 1880 1895 469 470 507 471 472 473	Bismuth sulfate Bismuth sulfate Bismuth telluride Bismuth tetroxide Bismuth titanate Bismuth titanate Bismuth tribromide Bismuth trichloride Bismuth trichloride monohydrate Bismuth trifluoride Bismuth trifluoride Bismuth trigatate Bismuth tungstate Bismuth vanadate Bismuth zirconate Bismuth(V) fluoride	<ul> <li>509</li> <li>510</li> <li>511</li> <li>512</li> <li>513</li> <li>514</li> <li>475</li> <li>476</li> <li>477</li> <li>479</li> <li>485</li> <li>515</li> <li>516</li> <li>517</li> <li>498</li> </ul>
468 1299 2601 1880 1895 469 470 507 471 472 473 474	Bismuth sulfate Bismuth sulfate Bismuth telluride Bismuth tetroxide Bismuth titanate Bismuth titanate Bismuth tribromide Bismuth trichloride Bismuth trichloride monohydrate Bismuth trifluoride Bismuth trifluoride Bismuth trifluoride Bismuth tungstate Bismuth vanadate Bismuth zirconate Bismuth(V) fluoride Bismuthine	509 510 511 512 513 514 475 476 477 479 485 515 516 517 498 482
468 1299 2601 1880 1895 469 470 507 471 472 473 474 475	Bismuth sulfate Bismuth sulfate Bismuth telluride Bismuth tetroxide Bismuth titanate Bismuth titanate Bismuth tribromide Bismuth trichloride Bismuth trichloride monohydrate Bismuth trifluoride Bismuth trifluoride Bismuth trifluoride Bismuth tungstate Bismuth vanadate Bismuth zirconate Bismuth/V) fluoride Bismuthine Black ash	509 510 511 512 513 514 475 476 477 479 485 515 516 517 498 482 410
468 1299 2601 1880 1895 469 470 507 471 472 473 474 475 493	Bismuth sulfate Bismuth sulfate Bismuth telluride Bismuth tetroxide Bismuth titanate Bismuth titanate Bismuth tribromide Bismuth trichloride Bismuth trichloride monohydrate Bismuth trichloride Bismuth trifluoride Bismuth trifluoride Bismuth tungstate Bismuth tungstate Bismuth vanadate Bismuth zirconate Bismuth/V) fluoride Bismuthine Black ash Black phosphorus	509 510 511 512 513 514 475 476 477 479 485 515 516 517 498 482 410 2355
468 1299 2601 1880 1895 469 470 507 471 472 473 474 475 493 476	Bismuth sulfate Bismuth sulfate Bismuth telluride Bismuth tetroxide Bismuth titanate Bismuth tribromide Bismuth trichloride Bismuth trichloride monohydrate Bismuth trichloride monohydrate Bismuth trifluoride Bismuth trifluoride Bismuth trifluoride Bismuth tungstate Bismuth ungstate Bismuth vanadate Bismuth zirconate Bismuth(V) fluoride Bismuthine Black ash Black phosphorus Blue verdigris	509 510 511 512 513 514 475 476 477 479 485 515 516 517 498 482 410 2355 1064
468 1299 2601 1880 1895 469 470 507 471 472 473 474 475 493 476 477	Bismuth sulfate Bismuth sulfate Bismuth telluride Bismuth tetroxide Bismuth titanate Bismuth tribromide Bismuth trichloride Bismuth trichloride monohydrate Bismuth trichloride monohydrate Bismuth trifluoride Bismuth trifluoride Bismuth trifluoride Bismuth tungstate Bismuth vanadate Bismuth vanadate Bismuth zirconate Bismuth(V) fluoride Bismuthine Black ash Black phosphorus Blue verdigris Blue vitriol	509 510 511 512 513 514 475 476 477 479 485 515 516 517 498 482 410 2355 1064 1126

Boehmite	69	Cadmium chlorate dihydrate	567	Calcium carbimide	641
Borane carbonyl	518	Cadmium chloride	568	Calcium carbolate	685
Borax	2995	Cadmium chloride hemipentahydrate	569	Calcium carbonate	628
Borazine	519	Cadmium chromate	570	Calcium carbonate	629
Borazole	519	Cadmium cyanide	571	Calcium carbonate	630
Boroethane	1159	Cadmium dichromate monohydrate	572	Calcium chlorate dihydrate	631
Boron	524	Cadmium fluoride	574	Calcium chloride	632
Boron anhydride	528	Cadmium hydroxide	575	Calcium chloride dihydrate	633
Boron arsenide	525	Cadmium iodate	576	Calcium chloride hexahydrate	634
Boron carbide	526	Cadmium iodide	577	Calcium chloride monohydrate	635
Boron fluoride-ether	536	Cadmium metasilicate	578	Calcium chloride tetrahydrate	636
Boron nitride	527	Cadmium molybdate(VI)	5/9	Calcium chlorite	637
Boron oxide	528	Cadmium niobate	580	Calcium chromate	638
Boron oxide glass	529	Cadmium nitrate	581	Calcium chromate dinydrate	639
Boron phosphide	530 521	Cadmium nitrate tetranydrate	382 583	Calcium chrome yellow	640
Boron giligida	522	Cadmium oxalate tribudrate	581	Calcium curate tetranyurate	641
Boron tribromida	522	Cadmium oxida	595	Calcium evanida	642
Boron trichloride	535 534	Cadmium perchlorate	586	Calcium dichromate tribydrate	642
Boron trifluoride	535	Cadmium perchlorate hevahydrate	587	Calcium dibydrogen phosphate	045
Boron trifluoride etherate	536	Cadmium phosphate	588	monohydrate	644
Boron trijodide	537	Cadmium phosphate	589	Calcium dioxide	684
Boron trisulfide	538	Cadmium potassium cyanide	2453	Calcium diphosphate	693
Borophosphoric acid	530	Cadmium potassium iodide dihydrate	2550	Calcium ferrocyanide dodecahydrate	646
Braunite	2035	Cadmium selenate dihydrate	590	Calcium fluoride	647
Breithauntite	2191	Cadmium selenide	591	Calcium fluorophosphate	648
Bremen green	1073	Cadmium selenite	592	Calcium fluorophosphate dihydrate	649
Brimstone	3104	Cadmium stearate	593	Calcium formate	650
Bromic acid	539	Cadmium succinate	594	Calcium hexaborate pentahydrate	651
Bromine	540	Cadmium sulfate	595	Calcium hexaboride	621
Bromine azide	541	Cadmium sulfate monohydrate	596	Calcium hexafluoroacetylacetonate	
Bromine chloride	542	Cadmium sulfate octahydrate	597	dihydrate	652
Bromine dioxide	543	Cadmium sulfide	598	Calcium hexafluorosilicate dihydrate	653
Bromine fluoride	544	Cadmium sulfite	599	Calcium hydride	654
Bromine monofluoride	545	Cadmium tantalate	600	Calcium hydrogen phosphate	655
Bromine monoxide	546	Cadmium telluride	601	Calcium hydrogen phosphate dihydrate	656
Bromine oxide	546	Cadmium tellurite	602	Calcium hydrogen sulfite	657
Bromine pentafluoride	547	Cadmium tetrafluoroborate	603	Calcium hydrosulfide hexahydrate	658
Bromine trifluoride	548	Cadmium titanate	604	Calcium hydroxide	659
Bromoauric(III) acid pentahydrate	549	Cadmium tungstate(VI)	605	Calcium hydroxide phosphate	660
Bromochloromethane	551	Cadmium vanadate	606	Calcium hypochlorite	661
Bromocyanide	1142	Cadmium zirconate	607	Calcium hypophosphite	662
Bromogermane	552	Cake alum	87	Calcium hyposulfite hexahydrate	712
Bromophosgene	742	Calcite	629	Calcium iodate	663
Bromosilane	2227		608		664
Brookite	3287	Calcium 2-ethylnexanoate	645	Calcium iodide nexanydrate	665
Brucile	1915	Calcium acetate dibudrate	609	Calcium metaoiliaata	667
Brunswick green	1111 656	Calcium acetate dinydrate	010 611	Calcium melubilicate	660
Brusinite	2222	Calcium acetale mononydrate	612	Calcium nitrata	660
Burnt alum	2408	Calcium acetylacetonate hydrate	613	Calcium nitrate tetrahydrate	670
Burnt ammonium alum	110	Calcium aluminate	614	Calcium nitride	671
Butanedioic acid	701	Calcium aluminate(B)	615	Calcium nitrite	672
Cacodylic acid	555	Calcium aluminum silicate	616	Calcium nitrite monohydrate	673
Cadmium	556	Calcium arsenate	617	Calcium oleate	674
Cadmium 2-ethylhexanoate	573	Calcium arsenite	618	Calcium oxalate	675
Cadmium acetate	557	Calcium bis(2.2.6.6-tetramethyl-3.5-		Calcium oxalate monohydrate	676
Cadmium acetate dihydrate	558	heptanedionate)	619	Calcium oxide	677
Cadmium acetylacetonate	559	Calcium borate hexahydrate	620	Calcium oxide silicate	678
Cadmium antimonide	560	Calcium boride	621	Calcium palmitate	679
Cadmium arsenide	561	Calcium bromate	622	Calcium perborate heptahydrate	680
Cadmium azide	562	Calcium bromate monohydrate	623	Calcium perchlorate	681
Cadmium borotungstate octadecahydrate	563	Calcium bromide	624	Calcium perchlorate tetrahydrate	682
Cadmium bromide	564	Calcium bromide dihydrate	625	Calcium permanganate	683
Cadmium bromide tetrahydrate	565	Calcium bromide hexahydrate	626	Calcium peroxide	684
Cadmium carbonate	566	Calcium carbide	627	Calcium phenolate	685

Calcium phenoxide
Calcium phosphate
Calairer ab carbate badrenide
Calcium phosphate, dibasic
Calcium phosphide
Calcium phosphite monohydrate
Calcium phosphonate monohydrate
Calcium nlumbate
Calaium promionata
Calcium pyrophosphate
Calcium salt trihydrate
Calcium selenate dihydrate
Calcium selenide
Calcium silicate
Calcium silicide
Calcium stannate trihydrate
Calcium stearate
Calcium succinate trihydrate
Calcium sulfate
Calcium sulfate dinydrate
Calcium sulfate hemihydrate
Calcium sulfide
Calcium sulfite dihvdrate
Calcium tartrate tetrahydrate
Calairen tallenida
Calcium tetrahydroaluminate
Calcium thiocyanate tetrahydrate
Calcium thioglycollate trihydrate
Calcium thiosulfate hexahydrate
Calcium titanate
Calcium tranac
Calcium tungstate
Calcium vanadate
Calcium zirconate
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685	Carbonyl bromide
686	Carbonyl chloride
687	Carbonyl fluoride
655	Carbonyl selenide
688	Carbonyl sulfide
689	Carnallite
690	Caro's acid
691	Cassiopeium
692	Cassiterite
693	Caustic baryta
701	Caustic soda
694	Celestite
695	Celphos
696	Ceragyrite
697	Cerianite
698	Ceric ammonium nitrate
699	Ceric ammonium nitrate
700	Ceric ammonium sulfate dihydrate
701	Ceric ammonium sulfate dihydrate
702	Ceric basic nitrate trihydrate
703	Ceric fluoride
704	Ceric hydroxide
705	Ceric oxide
706	Ceric oxide hydrate
707	Ceric sulfate tetrahydrate
708	Ceric titanate
709	Ceric vanadate
710	Ceric zirconate
711	Cerium
712	Cerium carbide
713	Cerium carbide
714	Cerium dihydride
715	Cerium dioxide hydrate
716	Cerium hexaboride
717	Cerium monosulfide
2046	Cerium nitride
718	Cerium oxysulfide
719	Cerium silicide
720	Cerium stannate
721	Cerium trihydride
722	Cerium(III) acetate hemitrihydrate
723	Cerium(III) bromide
724	Cerium(III) carbonate
724	Cerium(III) carbonate pentahydrate
725	Cerium(III) chloride
726	Cerium(III) chloride heptahydrate
727	Cerium(III) chloride hydrate
728	Cerium(III) fluoride
729	Cerium(III) hydroxide
1350	Cerium(III) iodide
730	Cerium(III) iodide nonahydrate
743	Cerium(III) nitrate hexahydrate
731	Cerium(III) oxalate nonahydrate
732	Cerium(III) oxide
1141	Cerium(III) perchlorate hexahydrate
733	Cerium(III) selenate
734	Cerium(III) sulfate
735	Cerium(III) sulfate octahydrate
736	Cerium(III) sulfide
737	Cerium(III) telluride
737	Cerium(III) tungstate
738	Cerium(IV) fluoride
720	
739	Cerium(IV) hydroxide
739 740	Cerium(IV) hydroxide Cerium(IV) titanate
739 740 741	Cerium(IV) hydroxide Cerium(IV) titanate Cerium(IV) vanadate

742	Cerous acetate hemitrihydrate	767
743	Cerous acetylacetonate hydrate	768
744	Cerous ammonium nitrate	129
731	Cerous ammonium nitrate tetrahydrate	769
732	Cerous ammonium sulfate	130
195	Cerous ammonium sulfate tetrahydrate	770
2344	Cerous bromide	771
1845	Cerous bromide heptahydrate	772
3023	Cerous carbonate	773
366	Cerous carbonate pentahydrate	774
2919	Cerous chloride	775
3087	Cerous chloride heptahydrate	776
11	Cerous chioride hydrate	111
2101	Cerous hudrovide	770
730	Cerous iodide	780
131	Cerous iodide nonahydrate	781
746	Cerous nitrate heyabydrate	782
132	Cerous oxalate nonabydrate	783
747	Cerous oxide	784
748	Cerous perchlorate hexahydrate	785
749	Cerous phosphate hydrate	786
750	Cerous selenate	787
751	Cerous sulfate	788
752	Cerous sulfate octahydrate	789
753	Cerous sulfide	790
754	Cerous telluride	791
755	Cerous tungstate	792
756	Cerussite	1698
757	Cervantite	281
758	Cesium	793
759	Cesium acetate	794
751	Cesium acetylacetonate	795
760	Cesium alum	796
761	Cesium aluminum sulfate	
762	dodecahydrate	796
763	Cesium amide	797
764	Cesium azide	798
765	Cesium bromate	/99
/00 767	Cesium bromide	800
707	Casium aerbanata	802 802
772	Cosium chlorata	803
774	Cesium chloride	805
775	Cesium chromate	806
776	Cesium evanide	807
777	Cesium dibromoiodide	802
778	Cesium fluoride	808
779	Cesium fluoroborate	809
780	Cesium formate	810
781	Cesium hexafluorogermanate	811
782	Cesium hydride	812
783	Cesium hydrogen carbonate	813
784	Cesium hydrogen fluoride	814
785	Cesium hydrogen sulfate	815
787	Cesium hydroxide	816
788	Cesium hydroxide monohydrate	817
789	Cesium iodate	818
790	Cesium iodide	819
791	Cesium metaborate	820
792	Cesium metavanadate	821
748	Cesium molybdate	822
749	Cesium niobate	823
753	Cesium nitrate	824
754	Cesium nitrite	825
/55	Cesium orthovanadate	826

~	~
Cesium oxide	827
Cesium perchlorate	828
Cesium periodate	829
Cesium pyrovanadate	830
Cesium rubidium fullerene	831
Cesium sulfate	832
Cesium sulfide	833
Cesium superoxide	834
Cesium tantalate	835
Cesium titanate	836
Cesium trifluoroacetate	837
Cesium trioxide	838
Cesium tungstate	839
Cesium zirconate	840
Chalcocite	105
Chalcocyanite	1124
Chalcopyrite	108
Chevreul's salt	105
China clay	84
Chloric acid heptahydrate	841
Chlorine	842
Chlorine dioxide	843
Chlorine fluoride	844
Chlorine heptoxide	845
Chlorine monofluoride	846
Chlorine monoxide	847
Chlorine pentafluoride	848
Chlorine perchlorate	849
Chlorine tetroxyfluoride	134
Chlorine trifluoride	850
Chloroauric(III) acid tetrahydrate	550
Chlorocyanide	1143
Chlorodiethylaluminum	98
Chlorodiisobutylaluminum	99
Chlorogermane	801
Chlorohydridotris (triphenylphosphine)	
ruthenium(II)	851
Chloroiridic acid	152
Chloropentafluoroethane	852
Chlorophenylmercury	234
Chlorosilane	853
Chlorosulfonic acid	854
Chrome yellow	1702
Chlorosyl trifluoride	855
Chlorotricarbonyliridium(I)	160-
Chloryl fluoride	856
Chloryl trifluoride	857
Chrome alum	908
Chrome alum	242
Chrome vellow	1702
Chromic acetate hexahydrate	885
Chromic acetate monohydrate	887
Chromic acid	859
Chromic acid	923
Chromic anhydride	923
Chromic basic sulfate	889
Chromic bromide	890
Chromic bromide hexahydrate	891
	0/1
Chromic carbonate hydrate	892
Chromic carbonate hydrate	892 803
Chromic carbonate hydrate Chromic chloride	892 893 804
Chromic carbonate hydrate Chromic chloride Chromic chloride hexahydrate Chromic fluoride	892 893 894 805
Chromic carbonate hydrate Chromic chloride Chromic chloride hexahydrate Chromic fluoride	892 893 894 895 896
Chromic carbonate hydrate Chromic chloride Chromic chloride hexahydrate Chromic fluoride tetrahydrate Chromic fluoride trihydrate	892 893 894 895 896 896
Chromic carbonate hydrate Chromic chloride Chromic chloride hexahydrate Chromic fluoride tetrahydrate Chromic fluoride trihydrate Chromic hydroxide trihydrate	892 893 894 895 896 896 897
Chromic carbonate hydrate Chromic chloride Chromic chloride hexahydrate Chromic fluoride tetrahydrate Chromic fluoride trihydrate Chromic hydroxide trihydrate Chromic igidide	892 893 894 895 896 896 897 898

327	Chromic nitrate	900
328	Chromic nitrate nonahydrate	901
329	Chromic oxide	902
330	Chromic phosphate	904
331	Chromic phosphate hemiheptahydrate	905
332	Chromic phosphate hexahydrate	906
333	Chromic sulfate	909
534 25	Chromic sulfate a stada a hadrate	910
26	Chromic sulfate octadecanydrate	911
27	Chromic telluride	013
38	Chromite	1314
39	Chromium	858
340	Chromium 2.4-pentanedionate	861
.050	Chromium antimonide	862
124	Chromium arsenide	863
088	Chromium boride	864
055	Chromium boride	865
34	Chromium carbide	866
841	Chromium carbonyl	867
342	Chromium diboride	868
343	Chromium dioxide	916
344	Chromium disilicide	869
845	Chromium hexacarbonyl	867
346	Chromium monoboride	870
347 1	Chromium nitride	871
548 240	Chromium nitride	872
241	Chromium phosphide	874
250	Chromium silicide	876
50	Chromium trioxide	923
143	Chromium(II) acetate monohydrate	877
8	Chromium(II) bromide	878
9	Chromium(II) chloride	879
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Cobalt(II) acetate tetrahydrate
Cobalt(II) acetylacetonate
Cobalt(II) aluminate
Cobalt(II) basic carbonate
Cobalt(II) bromate hevabydrate
Cobalt(II) bromide
Cobalt(II) bromide hexabydrate
Cobalt(II) carbonate
Cobalt(II) chlorate hexahydrate
Cobalt(II) chloride
Cobalt(II) chloride dihydrate
Cobalt(II) chloride hexahydrate
Cobalt(II) chromate
Cobalt(II) chromite
Cobalt(II) citrate dihydrate
Cobalt(II) cyanide dihydrate
Cobalt(II) cyanide trihydrate
Cobalt(II) diiron tetroxide
Cobalt(II) ferricyanide
Cobalt(II) ferrocyanide hydrate
Cobalt(II) fluoride
Cobalt(II) fluoride tetrahydrate
Cobalt(II) hexafluoroacetylacetonate
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Cobalt(II) molybdate
Cobalt(II) molybdate monohydrate
Cobalt(II) nitrate
Cobalt(II) nitrate hexahydrate
Cobalt(II) nitrite
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Cobalt(II) oxalate
Cobalt(II) oxalate dihydrate
Cobalt(II) oxide
Cobalt(II) perchlorate
Cobalt(II) perchlorate hexahydrate
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Cobalt(II) potassium sulfate hexahydrate
Cobalt(II) selenate pentahydrate
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946	Cobalt(II) thiocyanate	10
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947	Cobalt(II) titanate	10
0/8	Cobalt(II) tungstate	10
042	Cabalt(II III) avida	10
942 1016		10
1010	Coball(III) acetate	10
949	Cobalt(III) acetylacetonate	10
950	Cobalt(III) fluoride	10
951	Cobalt(III) fluoride dihydrate	10
952	Cobalt(III) hydroxide	10
953	Cobalt(III) hydroxide trihydrate	10
954	Cobalt(III) nitrate	10
955	Cobalt(III) oxide	10
956	Cobalt(III) oxide hydroxide	10
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965	Cobaltic fluoride	10
966	Cobaltic oxide monohydrate	10
967	Cobaltic oxide; cobalt black	10
968	Cobaltic-cobaltous oxide	10
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970	Cobaltocene	94
971	Cobaltocene	10
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Dysprosium chloride
Dysprosium chloride hexahydrate
Dysprosium fluoride
Dysprosium hydride
Dysprosium hydroxide
Dysprosium iodide
Dysprosium nitrate pentahydrate
Dysprosium nitride
Dysprosium avalate deservidente
Dysprosium oxalate decanydrate
Dysprosium oxide
Dysprosium perchlorate hydrate
Dysprosium silicide
Dysprosium sulfata a stabudrata
Dysprosium sunate octanyurate
Dysprosium sulfide
Dysprosium telluride
Edetate disodium
Edetic acid
EDTA
Einsteinium
Encomita
Epsonne
Erbia
Erbium
Frhium acetate tetrahydrate
Exclusion according to the second sec
Erbium acetylacetonate hydrate
Erbium barium copper oxide
Erbium boride
Erbium bromide
Erbium bromide hexahydrate
Erbium bromide nonahydrate
Erbium carbonate hydrate
Erbium chlorido
Erbium chloride hexahydrate
Erbium fluoride
Erbium hydride
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Erbium nitrate pentahydrate
Frbium nitride
Erbium oxalate decanydrate
Erbium oxide
Erbium perchlorate hydrate
Erbium silisida
Erbium sulfate
Erbium sulfate octahydrate
Erbium sulfide
Endines telleside
Erdmann's salt
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Ethanedioic acid
Ethanedioic acid, barium salt
Ethanedioic acid, barium salt
monohydrate
Ethanadioia aoid acdminum colt
Emaneurore acid, cadinium salt
Ethanedioic acid, cadmium salt
trihydrate
Ethanedioic acid calcium salt
Ethanadioia anid anlaine14
Emaneuloic aciu, calcium sait
monohydrate
Ethanedioic acid, Cu(II) salt
Ethanedioic acid diammonium salt
Etnanedioic acid, diammonium salt
monohydrate

1196	Ethylenediaminetetraacetic acid
1197	Ethylenediaminetetraacetic acid
1198	dihydrate disodium salt
1199	Europia
1200	Europic bromide
1201	Europic chloride
1202	Europic nitrate hexahydrate
1203	Europium
1204	Europium boride
1205	Europium hydride
1206	Europium nitride
1207	Europium silicide
1208	Europium(II) chloride
1209	Europium(II) fluoride
1236	Europium(II) iodide
1237	Europium(II) selenide
1237	Europium(II) sulfate
1210	Europium(II) sulfide
1954	Europium(II) telluride
1229	Europium(III) acetylacetonate
1211	Europium(III) bromide
1212	Europium(III) carbonate hydrate
1213	Europium(III) chloride
1214	Europium(III) chloride hexahydrate
1215	Europium(III) fluoride
1210	Europium(III) nitrate nexanydrate
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1218	Europium(III) oxalate
1219	Europium(III) parablarata havabudrata
1220	Europium(III) pereniorate nexaliyurate
1221	Europium(III) sulfate octabydrate
1222	Europous chloride
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1224	Furopous fluoride
1224 1225	Europous fluoride
1224 1225 1226	Europous fluoride Europous iodide Europous sulfate
1224 1225 1226 1227	Europous fluoride Europous iodide Europous sulfate Ferberite
1224 1225 1226 1227 1228	Europous fluoride Europous iodide Europous sulfate Ferberite Fermium
1224 1225 1226 1227 1228 1229	Europous fluoride Europous iodide Europous sulfate Ferberite Fermium Ferric acetylacetonate
1224 1225 1226 1227 1228 1229 1230	Europous fluoride Europous iodide Europous sulfate Ferberite Fermium Ferric acetylacetonate Ferric alum
1224 1225 1226 1227 1228 1229 1230 1231	Europous fluoride Europous iodide Europous sulfate Ferberite Fermium Ferric acetylacetonate Ferric alum Ferric ammonium chromate
1224 1225 1226 1227 1228 1229 1230 1231 1232	Europous fluoride Europous iodide Europous sulfate Ferberite Fermium Ferric acetylacetonate Ferric alum Ferric ammonium chromate Ferric ammonium citrate
1224 1225 1226 1227 1228 1229 1230 1231 1232 1233	Europous fluoride Europous iodide Europous sulfate Ferberite Fermium Ferric acetylacetonate Ferric alum Ferric ammonium chromate Ferric ammonium citrate Ferric ammonium oxalate trihydrate
1224 1225 1226 1227 1228 1229 1230 1231 1232 1233 1234	Europous fluoride Europous iodide Europous sulfate Ferberite Fermium Ferric acetylacetonate Ferric alum Ferric ammonium chromate Ferric ammonium citrate Ferric ammonium oxalate trihydrate Ferric arsenate dihydrate
1224 1225 1226 1227 1228 1229 1230 1231 1232 1233 1234 1235	Europous fluoride Europous iodide Europous sulfate Ferberite Fermium Ferric acetylacetonate Ferric alum Ferric ammonium chromate Ferric ammonium citrate Ferric arsenate dihydrate Ferric arsenate dihydrate Ferric basic acetate
1224 1225 1226 1227 1228 1229 1230 1231 1232 1233 1234 1235 243	Europous fluoride Europous iodide Europous sulfate Ferberite Fermium Ferric acetylacetonate Ferric alum Ferric ammonium chromate Ferric ammonium citrate Ferric ammonium oxalate trihydrate Ferric arsenate dihydrate Ferric basic acetate Ferric basic arsenite
1224 1225 1226 1227 1228 1229 1230 1231 1232 1233 1234 1235 243 23	Europous fluoride Europous iodide Europous sulfate Ferberite Fermium Ferric acetylacetonate Ferric alum Ferric ammonium chromate Ferric ammonium citrate Ferric ammonium oxalate trihydrate Ferric arsenate dihydrate Ferric basic acetate Ferric basic arsenite Ferric bromide
1224 1225 1226 1227 1228 1229 1230 1231 1232 1233 1234 1235 243 23 1076	Europous fluoride Europous iodide Europous sulfate Ferberite Fermium Ferric acetylacetonate Ferric alum Ferric ammonium chromate Ferric ammonium citrate Ferric ammonium oxalate trihydrate Ferric arsenate dihydrate Ferric basic acetate Ferric basic arsenite Ferric bromide Ferric chloride
1224 1225 1226 1227 1228 1229 1230 1231 1232 1233 1234 1235 243 23 1076 2997	Europous fluoride Europous iodide Europous sulfate Ferberite Ferberite Fermium Ferric acetylacetonate Ferric alum Ferric ammonium chromate Ferric ammonium citrate Ferric ammonium oxalate trihydrate Ferric arsenate dihydrate Ferric basic acetate Ferric basic acetate Ferric basic arsenite Ferric bromide Ferric chloride Ferric chloride hexahydrate
1224 1225 1226 1227 1228 1229 1230 1231 1232 1233 1234 1235 243 23 1076 2997 902	Europous fluoride Europous iodide Europous sulfate Ferberite Ferberite Fernium Ferric acetylacetonate Ferric alum Ferric ammonium chromate Ferric ammonium citrate Ferric ammonium oxalate trihydrate Ferric arsenate dihydrate Ferric basic acetate Ferric basic acetate Ferric basic arsenite Ferric boromide Ferric chloride Ferric chloride hexahydrate Ferric chromate
1224 1225 1226 1227 1228 1229 1230 1231 1232 1233 1234 1235 243 23 1076 2997 902 1051	Europous fluoride Europous sidide Europous sulfate Ferberite Fermium Ferric acetylacetonate Ferric alum Ferric ammonium chromate Ferric ammonium citrate Ferric ammonium oxalate trihydrate Ferric arsenate dihydrate Ferric basic acetate Ferric basic acetate Ferric basic arsenite Ferric bomide Ferric chloride Ferric chloride hexahydrate Ferric chromate Ferric citrate pentahydrate
1224 1225 1226 1227 1228 1229 1230 1231 1232 1233 1234 1235 243 23 1076 2997 902 1051 2310	Europous fluoride Europous iodide Europous sulfate Ferberite Ferberite Fernium Ferric acetylacetonate Ferric alum Ferric ammonium chromate Ferric ammonium citrate Ferric ammonium oxalate trihydrate Ferric arsenate dihydrate Ferric basic acetate Ferric basic acetate Ferric basic arsenite Ferric bomide Ferric chloride Ferric chloride hexahydrate Ferric citrate pentahydrate Ferric citrate pentahydrate
1224 1225 1226 1227 1228 1229 1230 1231 1232 1233 1234 1235 243 23 1076 2997 902 1051 2310 386	Europous fluoride Europous sidide Europous sulfate Ferberite Fermium Ferric acetylacetonate Ferric alum Ferric ammonium chromate Ferric ammonium citrate Ferric ammonium oxalate trihydrate Ferric arsenate dihydrate Ferric basic acetate Ferric basic acetate Ferric basic arsenite Ferric bornide Ferric chloride Ferric chloride hexahydrate Ferric citrate pentahydrate Ferric citrate pentahydrate Ferric dichromate Ferric ferrocyanide
1224 1225 1226 1227 1228 1229 1230 1231 1232 1233 1234 1235 243 23 1076 2997 902 1051 2310 386	Europous fluoride Europous iodide Europous sulfate Ferberite Ferberite Fermium Ferric acetylacetonate Ferric alum Ferric ammonium chromate Ferric ammonium citrate Ferric ammonium oxalate trihydrate Ferric arsenate dihydrate Ferric basic acetate Ferric basic acetate Ferric basic arsenite Ferric bornide Ferric chloride Ferric chloride Ferric chloride hexahydrate Ferric citrate pentahydrate Ferric dichromate Ferric ferrocyanide Ferric fluoride
1224 1225 1226 1227 1228 1229 1230 1231 1232 1233 1234 1235 243 23 1076 2997 902 1051 2310 386 387	Europous fluoride Europous solfate Europous sulfate Ferberite Ferberite Fernium Ferric acetylacetonate Ferric alum Ferric ammonium chromate Ferric ammonium citrate Ferric ammonium oxalate trihydrate Ferric arsenate dihydrate Ferric basic acetate Ferric basic acetate Ferric basic arsenite Ferric boromide Ferric chloride Ferric chloride hexahydrate Ferric citrate pentahydrate Ferric dichromate Ferric ferrocyanide Ferric fluoride trihydrate
1224 1225 1226 1227 1228 1229 1230 1231 1232 1233 1234 1235 243 23 1076 2997 902 1051 2310 386 387 583	Europous fluoride Europous solfate Europous sulfate Ferberite Ferberite Fermium Ferric acetylacetonate Ferric alum Ferric ammonium chromate Ferric ammonium citrate Ferric ammonium oxalate trihydrate Ferric arsenate dihydrate Ferric basic acetate Ferric basic acetate Ferric basic arsenite Ferric bromide Ferric chloride Ferric chloride hexahydrate Ferric chloride hexahydrate Ferric citrate pentahydrate Ferric dichromate Ferric ferrocyanide Ferric fluoride trihydrate Ferric formate
1224 1225 1226 1227 1228 1229 1230 1231 1232 1233 1234 1235 243 23 1076 2997 902 1051 2310 386 387 583	Europous fluoride Europous solfate Europous sulfate Ferberite Fermium Ferric acetylacetonate Ferric alum Ferric ammonium chromate Ferric ammonium citrate Ferric ammonium oxalate trihydrate Ferric arsenate dihydrate Ferric basic acetate Ferric basic acetate Ferric basic arsenite Ferric bromide Ferric chloride Ferric chloride hexahydrate Ferric chloride hexahydrate Ferric citrate pentahydrate Ferric ferrocyanide Ferric fruoride Ferric fluoride trihydrate Ferric formate Ferric formate Ferric formate Ferric formate Ferric formate Ferric formate Ferric formate Ferric formate
1224 1225 1226 1227 1228 1229 1230 1231 1232 1233 1234 1235 243 23 1076 2997 902 1051 2310 386 387 583	Europous fluoride Europous solfate Europous sulfate Ferberite Ferberite Fermium Ferric acetylacetonate Ferric alum Ferric ammonium chromate Ferric ammonium citrate Ferric ammonium oxalate trihydrate Ferric arsenate dihydrate Ferric basic acetate Ferric basic acetate Ferric basic arsenite Ferric bromide Ferric chloride Ferric chloride hexahydrate Ferric chloride hexahydrate Ferric citrate pentahydrate Ferric ferrocyanide Ferric ferrocyanide Ferric fluoride trihydrate Ferric formate Ferric formate Ferric formate Ferric formate Ferric formate Ferric formate Ferric hydroxide Ferric hypophosphite
1224 1225 1226 1227 1228 1229 1230 1231 1232 1233 1234 1235 243 23 1076 2997 902 1051 2310 386 387 583 584 675	Europous fluoride Europous solfate Europous sulfate Ferberite Fermium Ferric acetylacetonate Ferric alum Ferric ammonium chromate Ferric ammonium citrate Ferric ammonium oxalate trihydrate Ferric arsenate dihydrate Ferric basic acetate Ferric basic acetate Ferric bosic arsenite Ferric chloride Ferric chloride Ferric chloride hexahydrate Ferric chloride hexahydrate Ferric citrate pentahydrate Ferric ferrocyanide Ferric fruoride Ferric fruoride Ferric fluoride trihydrate Ferric formate Ferric formate Ferric formate Ferric hydroxide Ferric hypophosphite Ferric metavanadate
1224 1225 1226 1227 1228 1229 1230 1231 1232 1233 1234 1235 243 23 1076 2997 902 1051 2310 386 387 583 584 675	Europous fluoride Europous solfate Europous sulfate Ferberite Fermium Ferric acetylacetonate Ferric alum Ferric ammonium chromate Ferric ammonium citrate Ferric ammonium oxalate trihydrate Ferric arsenate dihydrate Ferric basic acetate Ferric basic acetate Ferric bornide Ferric chloride Ferric chloride Ferric chloride hexahydrate Ferric chloride hexahydrate Ferric citrate pentahydrate Ferric ferrocyanide Ferric fruoride Ferric fruoride Ferric formate Ferric formate Ferric formate Ferric formate Ferric formate Ferric formate Ferric formate Ferric nydroxide Ferric hypophosphite Ferric metavanadate Ferric nitrate
1224 1225 1226 1227 1228 1229 1230 1231 1232 1233 1234 1235 243 23 1076 2997 902 1051 2310 386 387 583 584 675 676	Europous fluoride Europous solfate Europous sulfate Ferberite Fermium Ferric acetylacetonate Ferric alum Ferric ammonium chromate Ferric ammonium citrate Ferric ammonium oxalate trihydrate Ferric ammonium oxalate trihydrate Ferric assenate dihydrate Ferric basic acetate Ferric basic acetate Ferric bornide Ferric chloride Ferric chloride Ferric chloride hexahydrate Ferric citrate pentahydrate Ferric ferrocyanide Ferric ferrocyanide Ferric fruoride trihydrate Ferric formate Ferric formate Ferric formate Ferric hydroxide Ferric hydpohosphite Ferric metavanadate Ferric nitrate hexahydrate
1224 1225 1226 1227 1228 1229 1230 1231 1232 1233 1234 1235 243 23 1076 2997 902 1051 2310 386 387 583 584 675 676 1108 207	Europous fluoride Europous solfate Europous sulfate Ferberite Fermium Ferric acetylacetonate Ferric alum Ferric ammonium chromate Ferric ammonium citrate Ferric ammonium oxalate trihydrate Ferric ammonium oxalate trihydrate Ferric assenate dihydrate Ferric basic acetate Ferric basic acetate Ferric bornide Ferric chloride Ferric chloride Ferric chloride hexahydrate Ferric citrate pentahydrate Ferric ferrocyanide Ferric ferrocyanide Ferric fruoride Ferric formate Ferric formate Ferric formate Ferric formate Ferric formate Ferric formate Ferric nitrate hexahydrate Ferric nitrate Ferric nitrate Ferric nitrate Ferric nitrate nonahydrate
1224 1225 1226 1227 1228 1229 1230 1231 1232 1233 1234 1235 243 23 1076 2997 902 1051 2310 386 387 583 584 675 676 1108 207	Europous fluoride Europous solfate Europous sulfate Ferberite Fermium Ferric acetylacetonate Ferric alum Ferric ammonium chromate Ferric ammonium citrate Ferric ammonium oxalate trihydrate Ferric arsenate dihydrate Ferric basic acetate Ferric basic acetate Ferric bornide Ferric chloride Ferric chloride Ferric chloride hexahydrate Ferric chloride hexahydrate Ferric ferrocyanide Ferric ferrocyanide Ferric fruoride trihydrate Ferric formate Ferric formate Ferric formate Ferric hydroxide Ferric nitrate hexahydrate Ferric mitrate hexahydrate Ferric nitrate Ferric nitrate Ferric nitrate Ferric oxalate Ferric oxalate
1224 1225 1226 1227 1228 1229 1230 1231 1232 1233 1234 1235 243 23 1076 2997 902 1051 2310 386 387 583 584 675 676 1108 207 208	Europous fluoride Europous solfate Europous sulfate Ferberite Fermium Ferric acetylacetonate Ferric alum Ferric annonium chromate Ferric annonium citrate Ferric annonium oxalate trihydrate Ferric arsenate dihydrate Ferric basic acetate Ferric basic acetate Ferric bornide Ferric chloride Ferric chloride Ferric chloride hexahydrate Ferric chloride hexahydrate Ferric citrate pentahydrate Ferric ferrocyanide Ferric fruoride Ferric fruoride Ferric formate Ferric formate Ferric formate Ferric formate Ferric formate Ferric nitrate Ferric nitrate Ferric nitrate Ferric nitrate Ferric nitrate Ferric nitrate Ferric oxalate Ferric oxide Ferric oxide Ferric oxide

Ethyl silicate

3180	Ferric oxide monohydrate	1287
1237	Ferric perchlorate hexahydrate	1288
	Ferric perchlorate hydrate	1289
1236	Ferric phosphate dihydrate	1290
1259	Ferric phosphate hydrate	1291
1251	Ferric pyrophosphate nonahydrate	1292
1253	Ferric sodium pyrophosphate	1293
1256	Ferric sulfate	1294
1238	Ferric sulfate hydrate	1295
1239	Ferric sulfate nonahydrate	1296
1240	Ferric thiocyanate	1297
1241	Ferric trifluoroacetylacetonate	1298
1242	Ferrocene	1300
1243	Ferrocenium hexafluorophosphate	1301
1243	Ferrocenium tetrafluoroborate	1302
1244	Ferrous acetate	1302
1245	Ferrous acetate tetrahydrate	1303
1240	Ferrous acetulacetonate	1304
1247	Ferrous arcenate hexabydrate	1305
1240	Forrous ammonium sulfate	1500
1249	Ferrous bromida	132
1250	Formous bromide herebydrote	1209
1251	Ferrous bronnide nexaligarate	1200
1252	Ferrous bromide nydrate	1309
1253	Ferrous carbonate	1310
1254	Ferrous chloride	1311
1255	Ferrous chloride dihydrate	1312
1256	Ferrous chloride tetrahydrate	1313
1257	Ferrous chromite	1314
1258	Ferrous citrate monohydrate	1315
1259	Ferrous fluoride	1316
1260	Ferrous fluoride tetrahydrate	1317
1261	Ferrous hexafluorosilicate	
1262	hexahydrate	1318
1243	Ferrous hydroxide	1319
1244	Ferrous iodide	1320
1245	Ferrous iodide tetrahydrate	1321
1247	Ferrous nitrate hexahydrate	1322
1632	Ferrous oxalate dihydrate	1323
1263	Ferrous oxide	1324
1264	Ferrous perchlorate hexahydrate	1325
150	Ferrous phosphate octahydrate	1326
147	Ferrous phosphide	1327
148	Ferrous selenide	1328
149	Ferrous sulfate	1329
1265	Ferrous sulfate heptahydrate	1330
1266	Ferrous sulfate monohydrate	1331
1267	Ferrous sulfide	1332
1268	Ferrous tantalate	1333
1269	Ferrous thiocyanate trihydrate	1335
1270	Ferrous titanate	1336
1271	Fischer's salt	2466
1272	Fluellite	41
1273	Fluorine	1337
1274	Fluorine dioxide	1338
1275	Fluorine monoxide	1330
1275	Fluorine nitrate	1340
1270	Fluorine perchlorate	1340
1277	Fluorine tetrovide	1341
1270	Fluorite	647
12/9	Fluoreentimonia coid	1242
1260	Fluoroantinomic acid	1343
1201	Fluoroapatile	048
1282	Fluorodoric acid	1344
1283	Fluorocyanide	1144
1284	Fluorogermane	1345
1285	Fluorophosgene	/44
1286	Fluorosilane	1346

Fluorosulfonic acid	1347
Fluorotrimethylsilane	1348
Fluorspar	647
Formic acid, ammonium salt	156
Formic acid, beryllium salt	451
Formic acid, calcium salt	650
Formic acid, zinc salt	3542
Forsterite	1948
Francium	1349
Freon 14	740
Fullerene	1350
Fullerene	729
Fullenene Arrenide	/18
Fullementes	1352
Gadalinia	1269
Gadolinium	1300
Gadolinium acetate tetrahydrate	1353
Gadolinium acetylacetonate dibydrate	1355
Gadolinium boride	1356
Gadolinium bromide	1357
Gadolinium chloride	1358
Gadolinium chloride hexahvdrate	1359
Gadolinium fluoride	1360
Gadolinium gallium garnet	1361
Gadolinium hydride	1362
Gadolinium iodide	1363
Gadolinium nitrate hexahydrate	1364
Gadolinium nitrate pentahydrate	1365
Gadolinium nitride	1366
Gadolinium oxalate decahydrate	1367
Gadolinium oxide	1368
Gadolinium perchlorate hydrate	1369
Gadolinium silicide	1371
Gadolinium sulfate	13/2
Gadolinium sulfate	13/3
Gadolinium tallurida	13/4
Gadolinium titanate	1375
Gadolinium(II) selenide	1370
Gadopentetic acid	1377
Galena	1731
Gallane	1394
Gallium	1378
Gallium antimonide	1380
Gallium arsenide	1381
Gallium azide	1382
Gallium dichloride	1386
Gallium nitride	1383
Gallium phosphide	1384
Gallium suboxide	1385
Gallium trifluoride	1392
Gallium(II) chloride	1386
Gallium(II) selenide	1387
Gallium(II) sulfide	1388
Gallium(II) telluride	1389
Gallium(III) azīde	1382
Gallium(III) bioinide	1390
Gallium(III) fluoride	1391
Gallium(III) fluoride tribydrate	1392
Gallium(III) hvdride	1394
Gallium(III) hydroxide	1395
Gallium(III) iodide	1396
Gallium(III) nitrate	1397
Gallium(III) nitrate hydrate	1398
•	

1347	Gallium(III) oxide
1348	Gallium(III) oxide hydroxide
647	Gallium(III) perchlorate hexahydrate
156	Gallium(III) selenide
451	Gallium(III) sulfate
650	Gallium(III) sulfate octadecahydrate
3542	Gallium(III) sulfide
1948	Gallium(III) telluride
1349	Galliumn acetylacetonate
740	Gehlenite
1350	Germane
729	Germanium
718	Germanium dioxide
1352	Germanium diselenide
1351	Germanium disulfide
1368	Germanium ditelluride
1353	Germanium monoxide
1354	Germanium nitride
1355	Germanium tetrabromide
1356	Germanium tetrachloride
1357	Germanium tetrafluoride
1259	Germanium tetrafluorida tribudrata
1250	Germanium tetrahudrida
1339	Germanium tetraiodide
12(1	Common internationale
1301	Germanium(II) bromide
1362	Germanium(II) chloride
1363	Germanium(II) fluoride
1364	Germanium(II) iodide
1365	Germanium(II) oxide
1366	Germanium(II) selenide
1367	Germanium(II) sulfide
1368	Germanium(II) telluride
1369	Germanium(IV) bromide
1371	Germanium(IV) chloride
1372	Germanium(IV) ethoxide
1373	Germanium(IV) fluoride
1374	Germanium(IV) fluoride trihydrate
1375	Germanium(IV) iodide
1376	Germanium(IV) oxide
1370	Germanium(IV) selenide
1377	Germanium(IV) sulfide
1731	Germanium(IV) telluride
1394	Gibbsite
1378	Glauber's salt
1380	Glucinium
1381	Goethite
1382	Gold
1386	Gold potassium iodide
1383	Gold sodium cvanide
1384	Gold sodium thiosulfate
1385	Gold trioxide
1392	Gold trisulfide
1386	Gold(I) bromide
1387	Gold(I) carbonyl chloride
1388	Gold(I) chloride
1389	Gold(I) cvanide
1382	Gold(I) iodide
1300	Gold(I) sulfide
1301	Gold(III) bromide
1391	Gold(III) chlorida
1392	Gold(III) cuntida tribudrata
1393	Cold(III) cyanide trinyurate
1394	Cold(III) hudrer: 1-
1395	Gold(III) hydroxide
1396	
1397	Gold(III) oxide
1398	Goid(III) selenate

1399	Gold(III) selenide	1443
1400	Gold(III) sulfide	1444
1401	Golden sulfide of antimony	289
1402	Goslarite	3573
1403	Graham's salt	2899
1404	Graphite	721
1405	Graphite bromide	719
1406	Graphite fluoride	722
1379	Graphite oxide	720
616	Grav tin	3274
1409	Greenockite	598
1407	Guanaiuatite	501
1424	Guanite	1875
1425	Gynsum	703
1426	Hafnia	1458
1420	Hafnium	1445
1414	Hafnium acetylacetonate	1446
1414	Hafnium horida	1440
1400	Hafnium bromida	1447
1410		1449
1419	Harnium carbide	1450
1421	Hafnium chloride	1452
1422	Hafnium diselenide	1461
1409	Hafnium fluoride	1453
1423	Hafnium hydride	1454
1410	Hafnium iodide	1455
1411	Hafnium iodide	1456
1412	Hafnium nitride	1457
1413	Hafnium oxide	1458
1414	Hafnium oxychloride octahydrate	1459
1415	Hafnium phosphide	1460
1416	Hafnium selenide	1461
1417	Hafnium silicate	1462
1418	Hafnium silicide	1463
1419	Hafnium sulfate	1464
1420	Hafnium sulfide	1465
1420	Hafnium telluride	1466
1/22	Hafnium tetrabromide	1//0
1422	Hafnium tetrachloride	1/152
1423	Hafnium tetrafluoride	1452
1425	Hafnium tetraiodide	1456
1425	Hafnium titanata	1450
1420		1407
1427	Harmun(II) bronnde	1440
4/	Hafnium(II) chloride	1451
2983	Hafnocene dichloride	1468
434	Halite	2853
1286	Halocarbon-115	852
1428	Halocarbon-12	1172
2549	Halocarbon-23	3321
2880	Hartshorn	226
2881	Hatchett's brown	1087
1441	Hausmannite	2030
1444	Heavy water	1153
1429	Heazlewoodite	2233
1430	Helium	1469
1431	Helium-3	1470
1432	Hematite	1285
1433	Hessite	2821
1434	Hexaamminecobalt(III) chloride	1471
1435	Hexaammineruthenium(III) chloride	1472
1436	Hexaborane(10)	1473
1437	Hexaborane(12)	1474
1438	Hexachlorodisilane	1475
1430	Hexadecaborane(20)	1476
1440	Hexadecanoic acid aluminum(III) salt	71
1//1	Hexadecanoic acid ammonium salt	200
1//2	Hexadecanoic acid, calcium salt	670
1442	riezauccanole aciu, calciulii salt	019

Hexafluoro-2,4-pentanedione Pd(II)	
derivative Hexafluoro-2,4-pentanedione Pt(II)	2323
derivative	2384
derivative	3594
Hexafluoro-2,4-pentanedione, calcium	(52)
Hexafluoro-2,4-pentanedione, Cu(II)	032
derivative	1095
derivative hydrate	1097
Hexafluoro-2,4-pentanedione, lead	1700
Hexafluoro-2,4-pentanedione,	1709
magnesium derivative	1909
Hexafluoro-2,4-pentanedione, Nd	2163
Hexafluoro-2,4-pentanedione, Ni	2212
Hexafluoro-2.4-pentanedione. Pr	2212
derivative	2582
Hexafluoro-2,4-pentanedione, T1(I)	
derivative	3203
derivative	3240
Hexafluoro-2,4-pentanedione, yttrium	5210
derivative	3500
Hexafluoro-2,4-pentanedione, zinc deriva	ative
3544 Hexafluorophosphoric acid	1477
Hexarbodium bexadecacarbonyl	263/
Hieratite	2054
Holmia	1490
Holmium	1478
Holmium acetate monohydrate	1479
Holmium boride	1496
Holmium bromide	1480
Holmium carbonate hydrate	1481
Holmium chloride	1482
Holmium chloride hexahydrate	1483
Holmium fluoride	1484
Holmium hydride	1485
Holmium iodide	1486
Holmium nitrate pentahydrate	1487
Holmium nitride	1488
Holmium oxalate decahydrate	1489
Holmium oxide	1490
Holmium perchlorate hexahydrate	1491
Holmium silicide	1492
Holmium sulfate octanydrate	1493
Holmium sulfide	1494
Holmium tetrahorida	1495
Hydrazine	1490
Hydrazine acetate	1498
Hydrazine azide	1499
Hydrazine dihydrochloride	1500
Hydrazine dinitrate	1501
Hydrazine hydrate	1502
Hydrazine monohydrate	1503
Hydrazine monohydrobromide	1504
Hydrazine monohydrochloride	1505
Hydrazine monohydroiodide	1506
Hydrazine mononitrate	1507
Hydrazine monooxalate	1508
Hydrazine perchlorate hemihydrate	1509

Hydrazine sulfate	1510
Hydrazoic acid	1511
Hydrocerussite	1694
Hydrocyanic acid	1524
Hydrofluoric acid, 70%	1512
Hydrogen	1513
Hydrogen azide	1511
Hydrogen bromide	1520
Hydrogen bromide-d	1519
Hydrogen chloride	1521
Hydrogen chloride dihydrate	1523
Hydrogen chloride-d	1522
Hydrogen cyanide	1524
Hydrogen disulfide	1525
Hydrogen fluoride	1520
Hydrogen hexachloroiridate(IV) hydrate	1527
Hydrogen hexachloroplatinate(IV)	1528
Hydrogen hexachloroplatinate(IV)	
hexahydrate	1529
Hydrogen hexafluorosilicic acid	1530
Hydrogen hexahydroxyplatinate(IV)	1531
Hydrogen iodide	1532
Hydrogen iodide-d	1533
Hydrogen oxide	3450
Hydrogen perovide	152
Hydrogen gelenide	1524
Hydrogen sulfda	152
Hydrogen sunde	155
Hydrogen telluride	153
Hydrogen tetrabromoaurate(III)	1.50
pentahydrate	1538
Hydrogen tetracarbonylferrate(II)	1539
Hydrogen tetrachloroaurate(III) hydrate	154
Hydrogen tetrachloroaurate(III)	
tetrahydrate	154
Hydrogen-d <sub>1</sub>	1516
Hydrogen-d <sub>1</sub> ,t <sub>1</sub>	1518
Hydrogen-d <sub>2</sub>	1514
Hydrogen-t <sub>1</sub>	1517
Hydrogen-t <sub>2</sub>	1515
Hydromagnesite	1889
Hydrophilite	632
Hydroxybutanedioic acid,	
monoammonium salt	124
Hydroxydimethylarsine oxide	555
Hydroxylamine	1542
Hydroxylamine hydrobromide	154
Hydroxylamine hydrochloride	154
Hydroxylamine perchlorate	154
Hydroxylamine pereniorate	154
Hydroxylapatite	687
Hypo	200
Hypo	154
Hypotromous acid	154
Hypochlorous acid	1540
Hypophosphoric acid	1549
Hypophosphorous acid	1550
Ilmenite	1330
Indium	1551
Indium acetate	1552
Indium acetylacetonate	1553
Indium antimonide	1554
Indium arsenide	1555
Indium nitride	1550
Indium phosphide	1557
Indium trichloride	156
Indium trifluoride	156
Indium trifluoride trihydrate	156
-	

1510	Indium(I) bromide	1558
1511	Indium(I) chloride	1559
1694	Indium(I) iodide	1560
1524	Indium(II) beamide	1560
1524		1501
1512	Indium(II) chloride	1562
1513	Indium(II) sulfide	1563
1511	Indium(III) bromide	1564
1520	Indium(III) chloride	1565
1519	Indium(III) chloride tetrahydrate	1566
1521	Indium(III) fluorida	1567
1521		1507
1523	Indium(III) fluoride trihydrate	1568
1522	Indium(III) hydroxide	1569
1524	Indium(III) iodide	1570
1525	Indium(III) nitrate trihvdrate	1571
1526	Indium(III) oxide	1572
1520	Indium(III) parablarata aatabudrata	1572
1527	Indium(III) peremorate octanyurate	1575
1528	Indium(III) phosphate	1574
	Indium(III) selenide	1575
1529	Indium(III) sulfate	1576
1530	Indium(III) sulfide	1577
1531	Indium(III) telluride	1578
1522	India agid	1570
1552		1579
1533	lodine	1580
3450	Iodine bromide	1581
1534	Iodine chloride	1582
1535	Iodine cvanide	1583
1536	Iodine dioxide	1584
1537	Iodine fluoride	1585
1557		1505
	lodine neptanuoride	1586
1538	lodine hexoxide	1587
1539	Iodine monobromide	1588
1540	Iodine monochloride	1589
	Iodine nonoxide	1590
1541	Iodine pentafluoride	1591
1516	Iodine pentandonde	1502
1510	Iodine penioxide	1592
1518	lodine tetroxide	1593
1514	Iodine trichloride	1594
1517	Iodine trifluoride	1595
1515	Iodine(V) oxide	1592
1889	Iodogermane	1598
632	Iodosyl pentafluoride	1596
052		1590
	lodosyl trilluoride	1597
124	lodyl trifluoride	1599
555	Iodyrite	2801
1542	Ir(III) bromide	1606
1543	Iridium	1600
1544	Iridium carbonyl	1601
1545	Inidium bayafuarida	1602
1343		1602
1546	Iridium pentafluoride	1603
687	Iridium tribromide tetrahydrate	1607
3008	Iridium trichloride	1608
1547	Iridium trioxide	1612
1548	Iridium(I) chlorotricarbonyl	1604
1540	Iridium(III) agetulagetonata	1605
1549		1005
1550	Iridium(III) bromide tetranydrate	1607
1336	Iridium(III) chloride	1608
1551	Iridium(III) chloride hydrate	1609
1552	Iridium(III) fluoride	1610
1553	Iridium(III) iodide	1611
1554	Iridium(III) oxide	1612
1555	Iridium(III) sulfida	1612
1555		1013
1556	Iridium(IV) oxide	1614
1557	Iron	1615
1565	Iron antimonide	1616
1567	Iron arsenide	1617
1568	Iron boride	1618
1200		1010

Iron boride
Iron carbide
Iron disilicide
Iron disulfide
Iron dodecacarbonyl
Iron molybdate
Iron nonacarbonyl
Iron pentacarbonyl
Iron phosphide
Iron phosphide
Iron silicide
Iron telluride
Iron tungstate
Iron zirconate
Iron(II) acetate
Iron(II) acetate tetrahydrate
Iron(II) aluminate
Iron(II) arsenate
Iron(II) bromide
Iron(II) bromide hexahydrate
Iron(II) chloride
Iron(II) chloride dihydrate
Iron(II) chloride tetrahydrate
Iron(II) citrate monohydrate
Iron(II) fluoride
Iron(II) fluoride tetrahydrate
Iron(II) hexafluorosilicate hexahydrate
Iron(II) hydroxide
Iron(II) iodide
Iron(II) nitrate
Iron(II) nitrate hexahydrate
Iron(II) orthoarsenate hexahydrate
Iron(II) orthosilicate
Iron(II) oxalate dihydrate
Iron(II) perchlorate
Iron(II) perchlorate hexahydrate
Iron(II) selenide
Iron(II) suifate
Iron(II) sumue
Iron(II) this cyanate tribydrate
Iron(II III) ovide
Iron(III) acetate basic
Iron(III) ammonium citrate
Iron(III) bromide
Iron(III) chloride hexahvdrate
Iron(III) chromate
Iron(III) citrate pentahydrate
Iron(III) dichromate
Iron(III) fluoride
Iron(III) fluoride trihydrate
Iron(III) hypophosphite
Iron(III) hyroxide
Iron(III) nitrate nonahydrate
Iron(III) oxalate
Iron(III) perchlorate
Iron(III) perchlorate hexahydrate
Iron(III) phosphate dihydrate
Iron(III) phosphate hydrate
Iron(III) pyrpophosphate nonahydrate
Iron(III) sulfate
Iron(III) sulfate hydrate
· · · · · · ·
Iron(III) thiocyanate
Iron(III) thiocyanate Iron(III) vanadate

1619	Kainite	2484
1620	Kalinite	2409
1621	Kalium	2404
1622	Kaolin	84
1623	Kieserite	1955
1624	Knorre's salt	3010
1625	Koettigite	3519
1626	Krypton	1642
1627	Krypton difluoride	1643
1628	Krypton fluoride hexafluoroantimonate	1644
1629	Krypton fluoride	
1630	monodecafluoroantimonate	1645
1631	Krypton fluoride	
1632	monodecafluorotantalate	1646
1633	Krypton trifluoride	
1303	hexafluoroantimonate	1647
1304	Kyanite	83
1634	Langbeinite	2485
1635	Lansfordite	1891
1307	Lanthanum	1648
1308	Lanthanum acetate hydrate	1649
1311	Lanthanum acetylacetonate hydrate	1650
1312	Lanthanum aluminum oxide	1651
1313	Lanthanum boride	1652
1315	Lanthanum bromate nonahydrate	1653
1316	Lanthanum bromide	1654
1317	Lanthanum carbide	1655
1318	Lanthanum carbonate octahydrate	1656
1319	Lanthanum carbonate pentahydrate	1657
1320	Lanthanum chloride	1658
1636	Lanthanum chloride heptahydrate	1659
1322	Lanthanum chloride hexahydrate	1660
1306	Lanthanum chromite	1661
1637	Lanthanum fluoride	1662
1323	Lanthanum hexaboride	1652
1639	Lanthanum hydride	1663
1325	Lanthanum hydroxide	1664
1328	Lanthanum iodate	1665
1329	Lanthanum iodide	1666
1332	Lanthanum monosulfide	1667
1334	Lanthanum nitrate hexahydrate	1668
1335	Lanthanum nitride	1669
1638	Lanthanum oxalate hydrate	1670
1640	Lanthanum oxide	1671
1641	Lanthanum oxysulfide	1672
1268	Lanthanum perchlorate hexahydrate	1673
1270	Lanthanum phosphate hydrate	1674
1271	Lanthanum silicide	16/5
1272	Lanthanum strontium copper oxide	16/6
1273	Lanthanum sulfate	1677
1275	Lanthanum sulfate nonanydrate	1678
1270	Lanthanum sulfate octanydrate	10/9
1279	Lanthanum suinde	1080
1270	Lanthanum tris(auslananta dianul)	1601
1205	Lantianum tris(cyclopentadienyl)	2550
1204	Lauric acid, zinc san	2220
1209	Lautaine Lawrencium	1693
1200		1003
1290	Land	1/09
1291	Lead acetate	1004
1292	Lead acetate tribydrate	1694
1204	Lead acetylacetonate	1687
1295	Lead antimonate	1689
1280	Lead antimonide	1680
23	Lead arsenate	1600
	Lead arbenate	1070

2484	Lead arsenite	1691
2409	Lead azide	1692
2404	Lead basic acetate	1693
34	Lead basic carbonate	1694
955	Lead borate monohydrate	1695
8010	Lead borofluoride	1707
519	Lead bromate monohydrate	1696
642	Lead bromide	1697
643	Lead carbonate	1698
.644	Lead chlorate	1699
<i>(</i> 1 <i>7</i>	Lead chloride	1700
.645	Lead chlorite	1701
CAC	Lead chromate	1702
040		1703
617	Lead cyanide	1/04
.047	Lead diacetate	1065
00 0 1 0 5	Lead dioxide	1705
2465	Lead fluoraborate	1700
648	Lead fluorosilicate dibydrate	1707
6/10	Lead hevefluoroacetylacetonate	1708
650	Lead hexafluorosilicate dihydrate	1709
651	Lead hydrogen phosphate	1700
652	Lead hydroxide	1710
653	Lead indate	1713
654	Lead iodide	1713
655	Lead metasilicate	1715
656	Lead metatitanate	1713
657	Lead metavanadate	1741
658	Lead molybdate	1716
659	Lead niobate	1717
660	Lead nitrate	1718
661	Lead oxalate	1719
662	Lead oxide	1720
652	Lead oxide	1721
663	Lead perchlorate trihydrate	1723
664	Lead phosphate	1724
665	Lead selenate	1725
666	Lead selenide	1726
667	Lead selenite	1727
668	Lead sesquioxide	1721
669	Lead silicate	1728
670	Lead stearate	1729
671	Lead subacetate	1693
672	Lead sulfate	1730
.673	Lead sulfide	1731
674	Lead sulfite	1732
675	Lead tantalate	1733
.676	Lead telluride	1734
677	Lead tellurite	1735
678	Lead tetraacetate	1736
.6/9	Lead tetrachioride	1/3/
680	Lead tetrafluoride	1738
081	Lead thiocyanate	1739
062	Lead thiosulfate	1740
550 62	Lead tungstate	1741
683	Lead tungstate	1742
780	Lead vanadate	1743
681	Lead zirconate	1744
685	Lead(II) 2-ethylhexanoate	1743
686	Lead(II) butanoate	1746
687	Lead(II) carbonate basic	1740
.688	Lead(II) chloride fluoride	1748
689	Lead(II) chromate(VI) oxide	1749
690	Lead(II) formate	1751

Lead(II) hydrogen arsenate Lead(II) hypophosphite Lead(II) lactate Lead(II) oleate Lead(II) oxide hydrate Lead(II) perchlorate Lead(II,III) oxide Lead(IV) acetate Lead(IV) bromide Lead(IV) chloride Lead(IV) fluoride Lemon chrome Lime Litharge Lithia Lithia water Lithium Lithium acetate Lithium acetate dihydrate Lithium acetylacetonate Lithium aluminum deuteride Lithium aluminum hydride Lithium aluminum silicate Lithium amide Lithium arsenate Lithium azide Lithium borate Lithium borohydride Lithium bromate Lithium bromide Lithium bromide monohydrate Lithium carbide Lithium carbonate Lithium chlorate Lithium chloride Lithium chloride monohydrate Lithium chromate Lithium chromate dihydrate Lithium citrate tetrahydrate Lithium cobaltite Lithium cyanide Lithium cyclopentadienide Lithium deuteride Lithium dichromate dihydrate Lithium dihydrogen phosphate Lithium diisopropylamide Lithium fluoride Lithium formate monohydrate Lithium hexafluorarsenate(V) Lithium hexafluoroantimonate Lithium hexafluoroarsenate Lithium hexafluorophosphate Lithium hexafluorosilicate Lithium hexafluorostannate(IV) Lithium hydride Lithium hydrogen carbonate Lithium hydroxide Lithium hydroxide monohydrate Lithium hypochlorite Lithium iodate Lithium iodide Lithium iodide trihvdrate Lithium iron silicide Lithium manganate Lithium manganite

Lithium metaaluminate

1752	Lithium metaborate
1712	Lithium metaborate
1753	Lithium metaborate dihydrate
1754	Lithium metaphosphate
1755	Lithium metasilicate
1722	Lithium molybdate
1759	Lithium molybdate(VI)
1736	Lithium niobate
1750	Lithium niobate(V)
1/5/	Lithium nitrate
3/3	Lithium nitrite
5 <del>4</del> 5 677	Lithium nitrite monohydrate
1720	Lithium orthosilicate
1821	Lithium oxalate
1799	Lithium oxide
1760	Lithium perchlorate
1761	Lithium perchlorate trihydrate
1762	Lithium peroxide
1763	Lithium phosphate
1764	Lithium phosphate, tribasic
1765	Lithium selenate monohydrate
1766	Lithium selenite monohydrate
1767	Lithium stearate
1768	Lithium sulfate
1769	Lithium sulfate monohydrate
1770	Lithium sulfide
1771	Lithium tantalate
1772	Lithium tellurite
1//3	Lithium tetrahorate nontehudrate
1775	Lithium tetrachlorocuprate
1776	Lithium tetracyanonlatinate(II)
1777	nentahvdrate
1778	Lithium tetrafluoroborate
1779	Lithium tetrahydridoaluminate
1780	Lithium thiocyanate
1781	Lithium thiocyanate hydrate
1782	Lithium titanate
1783	Lithium tungstate
1784	Lithium vanadate
1785	Lithium zirconate
1786	Losantin
1787	Lutetium
1788	Lutetium acetate hydrate
1789	Lutetium boride
1791	Lutetium bromide
1792	Lutetium chloride
1794	Lutetium chloride nexanydrate
1793	Lutetium nuoride
1794	Lutetium bydride
1796	Lutetium iodide
1797	Lutetium iron oxide
1798	Lutetium nitrate
1799	Lutetium nitrate hydrate
1800	Lutetium nitride
1801	Lutetium oxalate hexahydrate
1802	Lutetium oxide
1803	Lutetium perchlorate hexahydrate
1804	Lutetium silicide
1805	Lutetium sulfate
1790	Lutetium sulfate octahydrate
1806	Lutetium sulfide
1807	Lutetium telluride
1808	Macquer's salt

1809	Maghemite	1285
1770	Magnesia	1932
1810	Magnesite	1887
1811	Magnesium	1866
1812	Magnesium acetate	1867
1813	Magnesium acetate monohydrate	1868
1813	Magnesium acetate tetrahydrate	1869
1814	Magnesium acetylacetonate dihydrate	1870
1814	Magnesium aluminum oxide	1871
1815	Magnesium aluminum silicate	1872
1810	Magnesium aluminum zirconate	18/3
181/	Magnesium ammenium phosphoto	18/4
1010	havebudrate	1975
1820	Magnesium antimonide	1075
1820	Magnesium arsenate hydrate	1877
1822	Magnesium arsenide	1878
1823	Magnesium basic carbonate pentabydrate	1879
1824	Magnesium	1077
1825	bis(pentamethylcyclopentadienyl)	1880
1825	Magnesium borate octahydrate	1881
1826	Magnesium boride	1882
1827	Magnesium boride	1883
1828	Magnesium bromate hexahydrate	1884
1829	Magnesium bromide	1885
1830	Magnesium bromide hexahydrate	1886
1831	Magnesium carbonate	1887
1832	Magnesium carbonate dihydrate	1888
1833	Magnesium carbonate hydroxide	
1834	tetrahydrate	1889
1835	Magnesium carbonate hydroxide	
1837	trihydrate	1890
	Magnesium carbonate pentahydrate	1891
1838	Magnesium carbonate trihydrate	1892
1839	Magnesium chlorate hexahydrate	1893
1765	Magnesium chloride	1894
1836	Magnesium chloride hexahydrate	1895
1840	Magnesium chromate pentanydrate	1890
1841	Magnesium chromite	1897
1042	Magnesium citrate pentabydrate	1090
1843	Magnesium citrate tetradecabydrate	1000
661	Magnesium dibasic citrate	1899
1845	Magnesium diboride	1901
1846	Magnesium dichromate hexabydrate	1902
1847	Magnesium dioxide	1937
1848	Magnesium dititanate	1903
1849	Magnesium dodecaboride	1904
1850	Magnesium fluoride	1905
1851	Magnesium formate dihydrate	1906
1854	Magnesium germanate	1907
1852	Magnesium germanide	1908
1853	Magnesium hexafluoroacetylacetonate	
1854	dihydrate	1909
1855	Magnesium hexafluorosilicate	
1856	hexahydrate	1910
1857	Magnesium hydride	1911
1858	Magnesium hydrogen phosphate	
1859	trihydrate	1912
1860	Magnesium hydroxide	1913
1861	Magnesium hyposulfite hexahydrate	1963
1862	Magnesium iodate tetrahydrate	1914
1863	Magnesium iodide	1915
1864	Magnesium iodide hexahydrate	1916
1805	wagnesium iodide octahydrate	1917
2433	magnesium metaborate octahydrate	1918

Magnesium metasilicate Magnesium metatitanate Magnesium molybdate Magnesium molybdate(VI) Magnesium niobate Magnesium nitrate Magnesium nitrate dihydrate Magnesium nitrate hexahydrate Magnesium nitride Magnesium nitrite trihydrate Magnesium orthosilicate Magnesium orthotitanate Magnesium oxalate Magnesium oxalate dihydrate Magnesium oxide Magnesium perborate heptahydrate Magnesium perchlorate Magnesium perchlorate hexahydrate Magnesium permanganate hexahydrate Magnesium peroxide Magnesium phosphate octahydrate Magnesium phosphate pentahydrate Magnesium phosphide Magnesium pyrophosphate Magnesium pyrophosphate trihydrate Magnesium pyrotitanate Magnesium salicylate tetrahydrate Magnesium selenate hexahydrate Magnesium selenide Magnesium selenite hexahydrate Magnesium silicate Magnesium silicate Magnesium silicide Magnesium stannate trihydrate Magnesium stannide Magnesium stearate Magnesium sulfate Magnesium sulfate heptahydrate Magnesium sulfate monohydrate Magnesium sulfide Magnesium sulfite Magnesium sulfite hexahydrate Magnesium sulfite trihydrate Magnesium tantalate Magnesium tetrahydrogen phosphate dihydrate Magnesium thiocyanate tetrahydrate Magnesium thiosulfate hexahydrate Magnesium trifluoroacetylacetonate dihydrate Magnesium trisilicate Magnesium tungstate Magnesium tungstate(VI) Magnesium vanadate Magnesium zirconate Magnesium zirconium silicate Magnetite Magnogene Malachite Mallebrin Manganblende Manganese Manganese aluminide Manganese ammonium sulfate hexahydrate Manganese antimonide

1919	Manganese antimonide	1974
1920	Manganese bis(cyclopentadienyl)	1975
1921	Manganese boride	1976
1921	Manganese boride	1977
1922	Manganese carbide	1978
1923	Manganese carbonyl	1979
1924	Manganese diboride	1980
1925	Manganese dioxide	2036
1926	Manganese disilicide	1989
1927	Manganese ditelluride	2037
1928	Manganese green	375
1929	Manganese heptoxide	2038
1930	Manganese niobate	1981
1931	Manganese nitride	1982
1932	Manganese pentacarbonyl bromide	1983
1933	Manganese phosphide	1984
1934	Manganese phosphide	1985
1935	Manganese phosphide	1986
1936	Manganese selenide	1987
1937	Manganese silicate	1988
1938	Manganese silicide	1989
1939	Manganese vanadate	1990
1940	Manganese(II) acetate tetrahydrate	1992
1941	Manganese(II) acetylacetonate	1993
1942	Manganese(II) horate octahydrate	1994
1903	Manganese(II) bromide	1995
1943	Manganese(II) bromide tetrahydrate	1996
10//	Manganese(II) carbonate	1007
10/15	Manganese(II) chloride	1008
1946	Manganese(II) chloride tetrahydrate	1990
10/17	Manganese(II) citrate	2000
10/18	Manganese(II) dihydrogen	2000
1940	nhosphate dihydrate	2001
1950	Manganese(II) dithionate	2001
1950	Manganese(II) fluoride	2002
1952	Manganese(II) hydrogen phosphate	2005
1953	trihydrate	2004
1954	Manganese(II) hydroxide	2004
1955	Manganese(II) hypophosphite	2005
1956	monohydrate	2006
1957	Manganese(II) iodide	2000
1058	Manganese(II) iodide tetrahydrate	2007
1050	Manganese(II) notice tetranyurate	2000
1960	Manganese(II) molybdate	2007
1700	Manganese(II) nitrate	2010
1061	Manganasa(II) nitrate havehydrate	2011
1962	Manganese(II) nitrate tetrahydrate	2012
1962	Manganese(II) initiate tetranyurate	2013
1905	Manganese(II) oxide	2014
1064	Manganese(II) perchlorate hevahydrate	2015
1904	Manganese(II) phosphate hentabydrate	2010
1905	Manganese(II) phosphate heptanyurate	2017
1066	Manganese(II) pyrophosphate tribydrate	2010
1900	Manganasa(II) pyrophosphate trinydrate Manganasa(II) salanida	2019
1967	Manganese(II) sulfate	2020
1908	Manganese(II) sulfate monohydrate	2021
1638	Manganese(II) suitate intribudrate	2022
1030	Manganese(II) sulfide	2023
1073	Manganese(II) telluride	2024
30	Manganese(II) tetrahorata ootahudrata	2023
2024	Manganese(II) tetraborate octanyurate	2020
1070	Manganese(II) tungatata	2027
1970	Manganese(II) ziraanata	2028
19/1	Manganese(III) ZIICOBale	2029
1072	Manganese(III) agatata dibuduata	2030
1972	Manganese(III) actuale ulliyulate	2031
17/3	manganese(111) acetylacetonate	2032

1051		
1974	Manganese(III) fluoride	2033
1975	Manganese(III) hydroxide	2034
1976	Manganese(III) oxide	2035
1977	Manganese(IV) oxide	2036
1978	Manganese(IV) telluride	2037
1979	Manganese(VII) oxide	2038
1980	Manganjustite	1988
2036	Manganite	2034
1989	Manganocene	1991
2037	Manganosite	2015
375	Manganous citrate	2015
2028	Manganous fluorida	2000
2036	Marshita	2003
1981	Marshite	1040
1982	Mascagnite	229
1983	Massicot	1/20
1984	Melanterite	1330
1985	Mendelevium	2039
1986	Mercallite	2477
1987	Mercaptoacetic acid	711
1988	Mercuric acetate	2061
1989	Mercuric ammonium chloride	196
1990	Mercuric arsenate	2063
1992	Mercuric barium iodide	416
1993	Mercuric chromate	2071
1994	Mercuric cyanide	2072
1995	Mercuric dichromate	2073
1006	Mercuric fluoride	2073
1007	Marauria indata	2074
1997	Marayria iadida	2077
1998	Mercuric iodide	2078
1999	Mercuric mirate	2082
2000	Mercuric nitrate monohydrate	2083
	Mercuric oleate	2084
2001	Mercuric oxycyanide	2089
2002	Mercuric sulfate	2093
2003	Mercuric thiocyante	2098
	Mercurous acetate	2041
2004	Mercurous bromide	2043
2005	Mercurous chlorate	2045
	Mercurous chloride	2046
2006	Mercurous chromate	2047
2007	Mercurous fluoride	2048
2008	Mercurous iodide	2050
2009	Mercurous nitrate	2051
2010	Mercurous oxide	2051
2010	Maraurous sulfate	2055
2011	Mercurous surface	2037
2012	Mercury	2040
2013	Mercury(I) acetate	2041
2014	Mercury(1) bromate	2042
2015	Mercury(1) bromide	2043
2016	Mercury(I) carbonate	2044
2017	Mercury(I) chlorate	2045
2018	Mercury(I) chloride	2046
2019	Mercury(I) chromate	2047
2020	Mercury(I) fluoride	2048
2021	Mercury(I) iodate	2049
2022	Mercury(I) iodide	2050
2023	Mercury(I) nitrate dihydrate	2051
2024	Mercury(I) nitrate monohydrate	2052
2025	Mercury(I) nitrite	2053
2026	Mercury(I) oxalate	2054
2027	Mercury(I) oxide	2054
2022	Mercury(I) perchlorate tetrahydrota	2055
2020	Moroury(I) peremotate tettanyulate	2030
2029	Moreovery(1) suifade	2057
2030	wiercury(1) suinde	2058
2031	Mercury(1) thiocyanate	2059
2032	Mercury(1) tungstate	2060

Maraury (II) agatata	2061
Mercury(II) acetate Mercury(II) amida chlorida	2001
Management (II) annue chioride	2002
Mercury(II) arsenate	2003
Mercury(II) basic carbonate	2004
Mercury(II) benzoate mononydrate	2005
Mercury(II) bromate	2066
Mercury(II) bromide	2067
Mercury(II) chlorate	2068
Mercury(II) chloride	2069
Mercury(II) chloride ammoniated	2070
Mercury(II) chromate	2071
Mercury(II) cyanide	2072
Mercury(II) dichromate	2073
Mercury(II) fluoride	2074
Mercury(II) fulminate	2075
Mercury(II) hydrogen arsenate	2076
Mercury(II) iodate	2077
Mercury(II) iodide(α)	2078
Mercury(II) iodide(β)	2079
Mercury(II) nitrate	2081
Mercury(II) nitrate dihydrate	2080
Mercury(II) nitrate hemihydrate	2082
Mercury(II) nitrate monohydrate	2083
Mercury(II) oleate	2084
Mercury(II) oxalate	2085
Mercury(II) oxide red	2086
Mercury(II) oxide sulfate	2088
Mercury(II) oxide vellow	2087
Mercury(II) oxycyanide	2089
Mercury(II) perchlorate trihydrate	2090
Mercury(II) phosphate	2091
Mercury(II) selenide	2092
Mercury(II) silver iodide	2822
Mercury(II) sulfate	2093
Mercury(II) sulfide( $\alpha$ )	2000
Mercury(II) sulfide( $\beta$ )	2004
Marcury(II) tallurida	2005
Marcury(II) tetrathiocyapatocobaltate(II)	2090
Marcury(II) this avanata	2097
Maroury(II) tunocyaliate	2096
Matabaria asid or Form	2099
Metaboric acid-Q-Form	521
Metaboric acid-p-Form	522
Metaboric acid- $\gamma$ -Form	523
Metacinnabar	2095
Metakaolinite	79
Metaphosphoric acid	2100
Metavanadic acid	2101
Methylcyclopentadienyl-manganese	
tricarbonyl	2102
Methylgermane	2103
Methylmercury	1185
Microcosmic salt	2835
Millerite	2237
Minium	1759
Mirabilite	2982
Misenite	2477
Mohr's salt	152
Molybdenite	2111
Molybdenum	2104
Molybdenum acetate dimer	2105
Molybdenum aluminide	2106
Molybdenum boride	2107
Molvbdenum carbide	2108
Molybdenum carbide	2109
Molybdenum carbonyl	2110
,	
Molybdenum dichloride dioxide	2140

Molybdenum dioxide diffuoride
Molybdenum disilicide
Molybdenum disulfide
Molybdenum hexafluoride
Molybdenum metaphosphate
Molybdenum mononitride
Molybdenum nitride
Molybdenum oxytetrafluoride
Molybdenum pentaboride
Molybdenum pentachloride
Molybdenum prospride
Molybdenum silicide
Molybdenum tetrachloride
Molybdenum trioxide
Molybdenum trisulfide
Molybdenum(II) bromide
Molybdenum(II) chloride
Molybdenum(II) iodide
Molybdenum(III) bromide
Molybdenum(III) fluoride
Molybdenum(III) iodide
Molybdenum(III) oxide
Molybdenum(III) sulfide
Molybdenum(IV) chloride
Molybdenum(IV) fluoride
Molybdenum(IV) iodide
Molybdenum $(IV)$ oxide
Molybdenum(IV) sulfide
Molybdenum(IV) telluride
Molybdenum(IV) bromide
Molybdenum(V) chloride
Molybdenum(V) fluoride
Molybdenum(V) oxytrichloride
Molybdenum(V) oxytrichloride Molybdenum(VI) acid monohydrate
Molybdenum(V) oxytrichloride Molybdenum(VI) acid monohydrate Molybdenum(VI) dioxydichloride Molybdenum(VI) dioxydifluorida
Molybdenum(V) oxytrichloride Molybdenum(VI) acid monohydrate Molybdenum(VI) dioxydichloride Molybdenum(VI) dioxydifluoride Molybdenum(VI) fluoride
Molybdenum(V) oxytrichloride Molybdenum(VI) acid monohydrate Molybdenum(VI) dioxydichloride Molybdenum(VI) dioxydifluoride Molybdenum(VI) fluoride Molybdenum(VI) oxide
Molybdenum(V) oxytrichloride Molybdenum(VI) acid monohydrate Molybdenum(VI) dioxydichloride Molybdenum(VI) dioxydifluoride Molybdenum(VI) fluoride Molybdenum(VI) oxide Molybdenum(VI) oxytetrachloride
Molybdenum(V) oxytrichloride Molybdenum(VI) acid monohydrate Molybdenum(VI) dioxydichloride Molybdenum(VI) dioxydifluoride Molybdenum(VI) fluoride Molybdenum(VI) oxytetrachloride Molybdenum(VI) oxytetrafluoride
Molybdenum(V) oxytrichloride Molybdenum(VI) acid monohydrate Molybdenum(VI) dioxydichloride Molybdenum(VI) dioxydifluoride Molybdenum(VI) fluoride Molybdenum(VI) oxytetrachloride Molybdenum(VI) oxytetrafluoride Molybdenum(VI) sulfide
Molybdenum(V) oxytrichloride Molybdenum(VI) acid monohydrate Molybdenum(VI) dioxydichloride Molybdenum(VI) dioxydifluoride Molybdenum(VI) fluoride Molybdenum(VI) oxytetrachloride Molybdenum(VI) oxytetrachloride Molybdenum(VI) sulfide Molybdic acid monohydrate
Molybdenum(V) oxytrichloride Molybdenum(VI) acid monohydrate Molybdenum(VI) dioxydichloride Molybdenum(VI) dioxydifluoride Molybdenum(VI) fluoride Molybdenum(VI) oxytetrachloride Molybdenum(VI) oxytetrachloride Molybdenum(VI) sulfide Molybdenum(VI) sulfide Molybdic acid monohydrate Molybdic anhydride
Molybdenum(V) oxytrichloride Molybdenum(VI) acid monohydrate Molybdenum(VI) dioxydichloride Molybdenum(VI) dioxydifluoride Molybdenum(VI) fluoride Molybdenum(VI) oxytetrachloride Molybdenum(VI) oxytetrachloride Molybdenum(VI) sulfide Molybdenum(VI) sulfide Molybdic acid monohydrate Molybdic anhydride Molybdic silicic acid hydrate
Molybdenum(V) oxytrichloride Molybdenum(VI) acid monohydrate Molybdenum(VI) dioxydichloride Molybdenum(VI) dioxydifluoride Molybdenum(VI) fluoride Molybdenum(VI) oxytetrachloride Molybdenum(VI) oxytetrachloride Molybdenum(VI) sulfide Molybdic acid monohydrate Molybdic anhydride Molybdic silicic acid hydrate Molybdophosphoric acid Molysite
Molybdenum(V) oxytrichloride Molybdenum(VI) acid monohydrate Molybdenum(VI) dioxydichloride Molybdenum(VI) dioxydifluoride Molybdenum(VI) fluoride Molybdenum(VI) oxytetrachloride Molybdenum(VI) oxytetrafluoride Molybdenum(VI) sulfide Molybdic acid monohydrate Molybdic anhydride Molybdic ahydride Molybdic silicic acid hydrate Molybdophosphoric acid Molysite Monazite
Molybdenum(V) oxytrichloride Molybdenum(VI) acid monohydrate Molybdenum(VI) dioxydichloride Molybdenum(VI) dioxydifluoride Molybdenum(VI) fluoride Molybdenum(VI) oxytetrachloride Molybdenum(VI) oxytetrafluoride Molybdenum(VI) sulfide Molybdic acid monohydrate Molybdic acid monohydrate Molybdic silicic acid hydrate Molybdic silicic acid hydrate Molybdophosphoric acid Molysite Monazite Monobarium silicate
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Molybdenum(V) oxytrichloride Molybdenum(VI) acid monohydrate Molybdenum(VI) dioxydichloride Molybdenum(VI) dioxydifluoride Molybdenum(VI) fluoride Molybdenum(VI) oxytetrachloride Molybdenum(VI) oxytetrafluoride Molybdenum(VI) oxytetrafluoride Molybdenum(VI) sulfide Molybdic acid monohydrate Molybdic anhydride Molybdic silicic acid hydrate Molybdophosphoric acid Molysite Monazite Monobarium silicate Monofluorophosphoric acid Monoiodosilane
Molybdenum(V) oxytrichloride Molybdenum(VI) acid monohydrate Molybdenum(VI) dioxydichloride Molybdenum(VI) dioxydifluoride Molybdenum(VI) fluoride Molybdenum(VI) oxide Molybdenum(VI) oxytetrachloride Molybdenum(VI) oxytetrafluoride Molybdenum(VI) sulfide Molybdenum(VI) sulfide Molybdic acid monohydrate Molybdic acid monohydrate Molybdic silicic acid hydrate Molybdic silicic acid hydrate Molybdophosphoric acid Molysite Monoazite Monobarium silicate Monofluorophosphoric acid Monoiodosilane Morpholine chromate
Molybdenum(V) oxytrichloride Molybdenum(VI) acid monohydrate Molybdenum(VI) dioxydichloride Molybdenum(VI) dioxydifluoride Molybdenum(VI) fluoride Molybdenum(VI) oxide Molybdenum(VI) oxytetrachloride Molybdenum(VI) oxytetrafluoride Molybdenum(VI) sulfide Molybdic acid monohydrate Molybdic acid monohydrate Molybdic ailcic acid hydrate Molybdic silicic acid hydrate Molybdophosphoric acid Molysite Monoazite Monobarium silicate Monofluorophosphoric acid Monoiodosilane Morpholine chromate Mosaic gold
Molybdenum(V) oxytrichloride Molybdenum(VI) acid monohydrate Molybdenum(VI) dioxydichloride Molybdenum(VI) dioxydifluoride Molybdenum(VI) fluoride Molybdenum(VI) oxide Molybdenum(VI) oxytetrachloride Molybdenum(VI) oxytetrafluoride Molybdenum(VI) sulfide Molybdenum(VI) sulfide Molybdic acid monohydrate Molybdic acid monohydrate Molybdic silicic acid hydrate Molybdic silicic acid hydrate Molybdophosphoric acid Molysite Monoazite Monobarium silicate Monofluorophosphoric acid Monoiodosilane Morpholine chromate Mosaic gold Mother-of-pearl sulfur Mullire
Molybdenum(V) oxytrichloride Molybdenum(VI) acid monohydrate Molybdenum(VI) dioxydichloride Molybdenum(VI) dioxydifluoride Molybdenum(VI) fluoride Molybdenum(VI) oxytetrachloride Molybdenum(VI) oxytetrachloride Molybdenum(VI) oxytetrafluoride Molybdenum(VI) sulfide Molybdic acid monohydrate Molybdic acid monohydrate Molybdic anhydride Molybdic anhydride Molybdic anhydride Molybdic silicic acid hydrate Molybdophosphoric acid Molysite Monobarium silicate Monofluorophosphoric acid Monoidosilane Morpholine chromate Mosaic gold Mother-of-pearl sulfur Mullite Nantokite
Molybdenum(V) oxytrichloride Molybdenum(VI) acid monohydrate Molybdenum(VI) dioxydichloride Molybdenum(VI) dioxydifluoride Molybdenum(VI) fluoride Molybdenum(VI) oxytetrachloride Molybdenum(VI) oxytetrachloride Molybdenum(VI) sulfide Molybdenum(VI) sulfide Molybdic acid monohydrate Molybdic acid monohydrate Molybdic silicic acid hydrate Molybdic silicic acid hydrate Molybdophosphoric acid Molysite Monobarium silicate Monofuorophosphoric acid Monoiodosilane Morpholine chromate Mosaic gold Mother-of-pearl sulfur Mullite Nantokite Naples yellow
Molybdenum(V) oxytrichloride Molybdenum(VI) acid monohydrate Molybdenum(VI) dioxydichloride Molybdenum(VI) dioxydifluoride Molybdenum(VI) fluoride Molybdenum(VI) oxide Molybdenum(VI) oxytetrachloride Molybdenum(VI) oxytetrafluoride Molybdenum(VI) sulfide Molybdic acid monohydrate Molybdic anhydride Molybdic silicic acid hydrate Molybdic silicic acid hydrate Molybdophosphoric acid Molysite Monoazite Monofluorophosphoric acid Monoiodosilane Morpholine chromate Mosaic gold Mother-of-pearl sulfur Mullite Nantokite Naples yellow Native aluminum oxide
Molybdenum(V) oxytrichloride Molybdenum(VI) acid monohydrate Molybdenum(VI) dioxydichloride Molybdenum(VI) dioxydifluoride Molybdenum(VI) fluoride Molybdenum(VI) oxide Molybdenum(VI) oxytetrachloride Molybdenum(VI) oxytetrafluoride Molybdenum(VI) sulfide Molybdic acid monohydrate Molybdic anhydride Molybdic silicic acid hydrate Molybdic silicic acid hydrate Molybdic silicic acid hydrate Molybdic silicit acid hydrate Molybdic silicate Monobarium silicate Monofluorophosphoric acid Monoidosilane Morpholine chromate Mosaic gold Mother-of-pearl sulfur Mullite Nantokite Naples yellow Native aluminum oxide Natrium
Molybdenum(V) oxytrichloride Molybdenum(VI) acid monohydrate Molybdenum(VI) dioxydichloride Molybdenum(VI) dioxydifluoride Molybdenum(VI) fluoride Molybdenum(VI) oxytetrachloride Molybdenum(VI) oxytetrachloride Molybdenum(VI) suffide Molybdic acid monohydrate Molybdic acid monohydrate Molybdic anhydride Molybdic silicic acid hydrate Molybdic silicic acid hydrate Molybdic silicit acid hydrate Monobarium silicate Monobarium silicate Monofluorophosphoric acid Monoidosilane Morpholine chromate Mosaic gold Mother-of-pearl sulfur Mullite Nantokite Naples yellow Native aluminum oxide Natrium Neodymia
Molybdenum(V) oxytrichloride Molybdenum(VI) acid monohydrate Molybdenum(VI) dioxydichloride Molybdenum(VI) dioxydifluoride Molybdenum(VI) oxide Molybdenum(VI) oxytetrachloride Molybdenum(VI) oxytetrachloride Molybdenum(VI) oxytetrafluoride Molybdenum(VI) suffide Molybdic acid monohydrate Molybdic anhydride Molybdic anhydride Molybdic silicic acid hydrate Molybdophosphoric acid Molybite Monazite Monobarium silicate Monofluorophosphoric acid Monoiodosilane Morpholine chromate Mosaic gold Mother-of-pearl sulfur Mullite Nantokite Naples yellow Native aluminum oxide Natrium Neodymia Neodymia

2132	Neodymium acetate monohydrate	2153
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2141	Neodymium boride	2154
2118	Neodymium bromate nonahydrate	2155
2111	Neodymium bromide	2156
2110	Neodymium carbonate hydrate	2157
2110	Noodymium carium connor oxida	2159
2142	Neodymum certain copper oxide	2138
2112	Neodymium chloride	2159
2113	Neodymium chloride	2160
2114	Neodymium chloride hexahydrate	2161
2115	Neodymium fluoride	2162
2116	Noodymium havefluoroagetylagetonete	2102
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2136	dihydrate	2163
2117	Neodymium hydride	2164
2126	Neodymium hydroxide	2165
2118	Neodymium iodide	2166
2120	Neodymium nitrate	2167
2127		2107
2143	Neodymium nitrate nexanydrate	2168
2146	Neodymium nitride	2169
2119	Neodymium oxalate decahydrate	2170
2120	Neodymium oxide	2171
2121	Neodymium perchlorate hexabydrate	2172
2121	Needymium phoenhote hydrote	2172
2122	Neodymum phosphate hydrate	2175
2123	Neodymium silicide	2174
2124	Neodymium sulfate	2175
2125	Neodymium sulfate octahydrate	2176
2126	Neodymium sulfide	2177
2127	Neodymium telluride	2178
2127	Needyminim tenuride	2170
2129	Neodymium trilluoroacetylacetonate	2179
2130	Neodymium tris(cyclopentadienyl)	2180
2131	Neon	2181
2132	Neptunium	2182
2133	Neptunium dioxide	2183
2134	Neptunium(IV) oxide	2183
2125	Nasquehonita	1802
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2146	Nickel ammonium sulfate hexabydrate	2190
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2143	Nickel arsenate octahydrate	2192
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786	Nickel bis(cyclopentadienyl)	2195
/00	Nickel bis(cyclopentadienyl) Nickel boride	2195 2196
270	Nickel bis(cyclopentadienyl) Nickel boride	2195 2196 2107
379	Nickel bis(cyclopentadienyl) Nickel boride Nickel boride	2195 2196 2197
379 2149	Nickel bis(cyclopentadienyl) Nickel boride Nickel boride Nickel boride	2195 2196 2197 2198
379 2149 2150	Nickel bis(cyclopentadienyl) Nickel boride Nickel boride Nickel boride Nickel bromide	2195 2196 2197 2198 2199
379 2149 2150 922	Nickel bis(cyclopentadienyl) Nickel boride Nickel boride Nickel boride Nickel bromide Nickel bromide trihydrate	2195 2196 2197 2198 2199 2200
<ul><li>379</li><li>2149</li><li>2150</li><li>922</li><li>3026</li></ul>	Nickel bis(cyclopentadienyl) Nickel boride Nickel boride Nickel boride Nickel bromide Nickel bromide trihydrate Nickel carbonate	2195 2196 2197 2198 2199 2200 2201
<ul> <li>379</li> <li>2149</li> <li>2150</li> <li>922</li> <li>3026</li> <li>3106</li> </ul>	Nickel bis(cyclopentadienyl) Nickel boride Nickel boride Nickel boride Nickel bromide Nickel bromide trihydrate Nickel carbonate Nickel carbonate hydroxide tetrahydrate	2195 2196 2197 2198 2199 2200 2201 2201
<ul> <li>379</li> <li>2149</li> <li>2150</li> <li>922</li> <li>3026</li> <li>3106</li> <li>82</li> </ul>	Nickel bis(cyclopentadienyl) Nickel boride Nickel boride Nickel boride Nickel bromide Nickel bromide trihydrate Nickel carbonate Nickel carbonate hydroxide tetrahydrate Nickel carbonyl	2195 2196 2197 2198 2199 2200 2201 2202 2202
379 2149 2150 922 3026 3106 82	Nickel bis(cyclopentadienyl) Nickel boride Nickel boride Nickel boride Nickel bromide Nickel bromide trihydrate Nickel carbonate Nickel carbonate hydroxide tetrahydrate Nickel carbonyl	2195 2196 2197 2198 2199 2200 2201 2202 2203
<ul> <li>379</li> <li>2149</li> <li>2150</li> <li>922</li> <li>3026</li> <li>3106</li> <li>82</li> <li>1042</li> <li>1622</li> </ul>	Nickel bis(cyclopentadienyl) Nickel boride Nickel boride Nickel boride Nickel bromide Nickel bromide trihydrate Nickel carbonate Nickel carbonate hydroxide tetrahydrate Nickel carbonyl Nickel chlorate hexahydrate	2195 2196 2197 2198 2199 2200 2201 2202 2203 2204
<ul> <li>379</li> <li>2149</li> <li>2150</li> <li>922</li> <li>3026</li> <li>3106</li> <li>82</li> <li>1042</li> <li>1688</li> </ul>	Nickel bis(cyclopentadienyl) Nickel boride Nickel boride Nickel boride Nickel bromide Nickel bromide trihydrate Nickel carbonate Nickel carbonate hydroxide tetrahydrate Nickel carbonyl Nickel chlorate hexahydrate Nickel chloride	2195 2196 2197 2198 2199 2200 2201 2202 2203 2204 2205
<ul> <li>379</li> <li>2149</li> <li>2150</li> <li>922</li> <li>3026</li> <li>3106</li> <li>82</li> <li>1042</li> <li>1688</li> <li>64</li> </ul>	Nickel bis(cyclopentadienyl) Nickel boride Nickel boride Nickel boride Nickel bromide Nickel bromide trihydrate Nickel carbonate Nickel carbonate hydroxide tetrahydrate Nickel carbonyl Nickel chlorate hexahydrate Nickel chloride Nickel chloride	2195 2196 2197 2198 2199 2200 2201 2202 2203 2204 2205 2206
<ul> <li>379</li> <li>2149</li> <li>2150</li> <li>922</li> <li>3026</li> <li>3106</li> <li>82</li> <li>1042</li> <li>1688</li> <li>64</li> <li>2826</li> </ul>	Nickel bis(cyclopentadienyl) Nickel boride Nickel boride Nickel boride Nickel bromide trihydrate Nickel bromide trihydrate Nickel carbonate hydroxide tetrahydrate Nickel carbonyl Nickel chlorate hexahydrate Nickel chloride Nickel chloride hexahydrate Nickel chloride hexahydrate	2195 2196 2197 2198 2199 2200 2201 2202 2203 2204 2205 2206 2207
<ul> <li>379</li> <li>2149</li> <li>2150</li> <li>922</li> <li>3026</li> <li>3106</li> <li>82</li> <li>1042</li> <li>1688</li> <li>64</li> <li>2826</li> <li>2171</li> </ul>	Nickel bis(cyclopentadienyl) Nickel boride Nickel boride Nickel boride Nickel bromide Nickel bromide trihydrate Nickel carbonate Nickel carbonate hydroxide tetrahydrate Nickel carbonyl Nickel chlorate hexahydrate Nickel chloride Nickel chloride hexahydrate Nickel chromate Nickel cyanide tetrahydrate	2195 2196 2197 2198 2199 2200 2201 2202 2203 2204 2205 2206 2207 2208
<ul> <li>379</li> <li>2149</li> <li>2150</li> <li>922</li> <li>3026</li> <li>3106</li> <li>82</li> <li>1042</li> <li>1688</li> <li>64</li> <li>2826</li> <li>2171</li> <li>2151</li> </ul>	Nickel bis(cyclopentadienyl) Nickel boride Nickel boride Nickel boride Nickel bromide Nickel bromide trihydrate Nickel carbonate hydroxide tetrahydrate Nickel carbonyl Nickel chlorate hexahydrate Nickel chloride hexahydrate Nickel chloride hexahydrate Nickel chromate Nickel cyanide tetrahydrate	2195 2196 2197 2198 2199 2200 2201 2202 2203 2204 2205 2206 2207 2208 2207
<ul> <li>379</li> <li>2149</li> <li>2150</li> <li>922</li> <li>3026</li> <li>3106</li> <li>82</li> <li>1042</li> <li>1688</li> <li>64</li> <li>2826</li> <li>2171</li> <li>2151</li> <li>2152</li> </ul>	Nickel bis(cyclopentadienyl) Nickel boride Nickel boride Nickel boride Nickel bromide Nickel bromide trihydrate Nickel carbonate Nickel carbonate hydroxide tetrahydrate Nickel carbonyl Nickel chlorate hexahydrate Nickel chloride Nickel chloride hexahydrate Nickel chloride hexahydrate Nickel chromate Nickel disilicide Nickel disilicide	2195 2196 2197 2198 2199 2200 2201 2202 2203 2204 2205 2206 2207 2208 2209 2210
<ul> <li>379</li> <li>2149</li> <li>2150</li> <li>922</li> <li>3026</li> <li>3106</li> <li>82</li> <li>1042</li> <li>1688</li> <li>64</li> <li>2826</li> <li>2171</li> <li>2151</li> <li>2152</li> </ul>	Nickel bis(cyclopentadienyl) Nickel boride Nickel boride Nickel boride Nickel bromide Nickel bromide trihydrate Nickel carbonate Nickel carbonate hydroxide tetrahydrate Nickel carbonyl Nickel chlorate hexahydrate Nickel chloride Nickel chloride Nickel chloride hexahydrate Nickel chromate Nickel cyanide tetrahydrate Nickel disilicide Nickel fluoride	2195 2196 2197 2198 2199 2200 2201 2202 2203 2204 2205 2206 2207 2208 2209 2210

Nickel fluoride tetrahydrate	2211
Nickel hexafluoroacetylacetonate hydrate	2212
Nickel hydroxide	2213
Nickel iodate	2214
Nickel iodate tetrahydrate	2215
Nickel iodide	2216
Nickel iodide hexahydrate	2217
Nickel molybdate	2218
Nickel nitrate	2219
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Nickel oxalate dihydrate	2221
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Nickel silicide	2230
Nickel stannate dihvdrate	2231
Nickel stearate	2232
Nickel subsulfide	2233
Nickel sulfate	2234
Nickel sulfate heptahydrate	2235
Nickel sulfate hexahydrate	2236
Nickel sulfide	2237
Nickel telluride	2238
Nickel tetrafluoroborate hexahydrate	2239
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Nickel trifluoroacetylacetonate dihydrate	2242
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Nickel(III) oxide	2243 2246 2247
Nickel(III) oxide Nickium Nickium boride	2243 2246 2247 2248
Nickel(III) oxide Niobium Niobium boride	2243 2246 2247 2248 2249
Nickel(III) oxide Niobium Niobium boride Niobium boride	2243 2246 2247 2248 2249 2250
Nickel(III) osiide Niobium Niobium boride Niobium carbide Niobium diboride	2243 2246 2247 2248 2249 2250 2251
Nickel(III) osiide Niobium Niobium boride Niobium carbide Niobium diboride Niobium dioxide	2243 2246 2247 2248 2249 2250 2251 2261
Nickel(III) osiide Niobium Niobium boride Niobium carbide Niobium diboride Niobium dioxide Niobium dioxide	2243 2246 2247 2248 2249 2250 2251 2261 2269
Nickel(III) osiide Nickel(III) osiide Niobium boride Niobium carbide Niobium diboride Niobium dioxide Niobium dioxide fluoride Niobium disilicide	2243 2246 2247 2248 2249 2250 2251 2261 2269 2252
Nickel(III) osiide Nickel(III) osiide Niobium boride Niobium carbide Niobium diboride Niobium dioxide Niobium dioxide fluoride Niobium disilicide Niobium hydride	2243 2246 2247 2248 2249 2250 2251 2261 2269 2252 2253
Nickel(III) osiide Nickel(III) osiide Niobium boride Niobium carbide Niobium diboride Niobium dioxide Niobium dioxide fluoride Niobium disilicide Niobium hydride Niobium monoboride	2243 2246 2247 2248 2249 2250 2251 2261 2269 2252 2253 2253
Nickel(III) osiide Nickel(III) osiide Niobium boride Niobium carbide Niobium diboride Niobium dioxide Niobium dioxide fluoride Niobium disilicide Niobium hydride Niobium monoboride Niobium nitride	2243 2246 2247 2248 2249 2250 2251 2261 2269 2252 2253 2254 2255
Nickel(III) osiide Nickel(III) osiide Niobium boride Niobium boride Niobium diboride Niobium dioxide Niobium dioxide fluoride Niobium disilicide Niobium hydride Niobium monoboride Niobium nitride Niobium pentabromide	2243 2246 2247 2248 2249 2250 2251 2261 2269 2252 2253 2254 2255 2265
Nickel(III) oxide Nickel(III) oxide Niobium boride Niobium boride Niobium diboride Niobium dioxide Niobium dioxide fluoride Niobium disilicide Niobium hydride Niobium nonoboride Niobium nitride Niobium pentabromide Niobium pentachloride	2243 2246 2247 2248 2249 2250 2251 2261 2269 2252 2253 2254 2255 2265 2265
Nickel(III) oxide Nickel(III) oxide Niobium boride Niobium boride Niobium diboride Niobium dioxide Niobium dioxide fluoride Niobium disilicide Niobium disilicide Niobium hydride Niobium monoboride Niobium nitride Niobium pentabromide Niobium pentafluoride	2243 2246 2247 2248 2249 2250 2251 2261 2269 2252 2253 2254 2255 2265 2265 2266 2268
Nickel(III) oxide Nickel(III) oxide Niobium boride Niobium boride Niobium carbide Niobium diboride Niobium dioxide Niobium dioxide fluoride Niobium disilicide Niobium disilicide Niobium hydride Niobium nonoboride Niobium nitride Niobium pentabromide Niobium pentachloride Niobium pentafluoride Niobium pentodide	2243 2246 2247 2248 2249 2250 2251 2261 2269 2252 2253 2254 2255 2265 2265 2266 2268 2270
Nickel(III) oxide Nickel(III) oxide Niobium boride Niobium boride Niobium carbide Niobium diboride Niobium dioxide Niobium dioxide fluoride Niobium disilicide Niobium disilicide Niobium monoboride Niobium nitride Niobium pentabromide Niobium pentachloride Niobium pentafluoride Niobium pentodide Niobium pentoxide	2243 2246 2247 2248 2249 2250 2251 2261 2269 2252 2253 2254 2255 2265 2266 2268 2270 2271
Nickel(III) oxide Nickel(III) oxide Niobium boride Niobium boride Niobium carbide Niobium diboride Niobium dioxide Niobium dioxide fluoride Niobium dioxide fluoride Niobium disilicide Niobium disilicide Niobium hydride Niobium nonoboride Niobium nentoboride Niobium pentabromide Niobium pentachloride Niobium pentafluoride Niobium pentoxide Niobium pentoxide Niobium phosphide	2243 2246 2247 2248 2249 2250 2251 2261 2269 2252 2253 2254 2255 2265 2266 2268 2270 2271 2256
Nickel(III) oxide Nickel(III) oxide Niobium boride Niobium boride Niobium carbide Niobium diboride Niobium dioxide Niobium dioxide fluoride Niobium disilicide Niobium disilicide Niobium hydride Niobium monoboride Niobium nitride Niobium pentabromide Niobium pentachloride Niobium pentafluoride Niobium pentoxide Niobium pentoxide Niobium phosphide Niobium (II) oxide	2243 2246 2247 2248 2249 2250 2251 2261 2269 2252 2253 2254 2255 2265 2266 2268 2270 2271 2256 2257
Nickel(III) oxide Nickel(III) oxide Niobium boride Niobium boride Niobium carbide Niobium diboride Niobium dioxide Niobium dioxide fluoride Niobium dioxide fluoride Niobium disilicide Niobium disilicide Niobium hydride Niobium monoboride Niobium nentabromide Niobium pentabromide Niobium pentafluoride Niobium pentoride Niobium pentoxide Niobium pentoxide Niobium phosphide Niobium (IV) bromide	2243 2246 2247 2248 2249 2250 2251 2261 2269 2252 2253 2254 2255 2265 2266 2268 2270 2271 2256 2257 2258
Nickel(III) oxide Nickel(III) oxide Niobium boride Niobium boride Niobium carbide Niobium diboride Niobium dioxide Niobium dioxide fluoride Niobium dioxide fluoride Niobium disilicide Niobium disilicide Niobium monoboride Niobium nonoboride Niobium pentabromide Niobium pentachloride Niobium pentafluoride Niobium pentoxide Niobium pentoxide Niobium phosphide Niobium (II) oxide Niobium(IV) bromide	2243 2246 2247 2248 2249 2250 2251 2261 2269 2252 2253 2254 2255 2265 2266 2268 2270 2271 2256 2257 2258 2259
Nickel(III) oxide Nickel(III) oxide Niobium boride Niobium boride Niobium carbide Niobium diboride Niobium dioxide Niobium dioxide fluoride Niobium dioxide fluoride Niobium disilicide Niobium disilicide Niobium monoboride Niobium nonoboride Niobium pentabromide Niobium pentachloride Niobium pentafluoride Niobium pentoxide Niobium pentoxide Niobium phosphide Niobium (II) oxide Niobium(IV) bromide Niobium(IV) carbide	2243 2246 2247 2248 2249 2250 2251 2261 2269 2252 2253 2254 2255 2265 2266 2268 2270 2271 2256 2257 2258 2259 2260
Nickel(III) oxide Nickel(III) oxide Niobium boride Niobium boride Niobium carbide Niobium diboride Niobium dioxide Niobium dioxide fluoride Niobium dioxide fluoride Niobium disilicide Niobium disilicide Niobium monoboride Niobium nonoboride Niobium pentabromide Niobium pentabromide Niobium pentafluoride Niobium pentoride Niobium pentoxide Niobium pentoxide Niobium phosphide Niobium (IV) bromide Niobium(IV) carbide Niobium(IV) oxide	2243 2246 2247 2248 2249 2250 2251 2261 2269 2252 2253 2254 2255 2265 2266 2268 2270 2271 2256 2257 2258 2259 2260 2260 2261
Nickel(III) oxide Nickel(III) oxide Niobium boride Niobium boride Niobium carbide Niobium diboride Niobium dioxide Niobium dioxide fluoride Niobium dioxide fluoride Niobium disilicide Niobium disilicide Niobium monoboride Niobium nonoboride Niobium pentabromide Niobium pentabromide Niobium pentafluoride Niobium pentafluoride Niobium pentoxide Niobium pentoxide Niobium phosphide Niobium plosphide Niobium (IV) bromide Niobium(IV) carbide Niobium(IV) sclenide	2243 2246 2247 2248 2249 2250 2251 2261 2269 2252 2253 2254 2255 2265 2266 2268 2270 2271 2256 2257 2258 2259 2260 2259 2260 2261 2262
Nickel(III) oxide Nickel(III) oxide Niobium Niobium boride Niobium boride Niobium carbide Niobium diboride Niobium dioxide Niobium dioxide fluoride Niobium dioxide fluoride Niobium disilicide Niobium disilicide Niobium monoboride Niobium monoboride Niobium pentabromide Niobium pentabromide Niobium pentafluoride Niobium pentafluoride Niobium pentoxide Niobium pentoxide Niobium pentoxide Niobium plosphide Niobium (IV) bromide Niobium(IV) carbide Niobium(IV) carbide Niobium(IV) selenide Niobium(IV) sulfide	2243 2246 2247 2248 2249 2250 2251 2261 2269 2252 2253 2254 2255 2265 2266 2268 2270 2271 2256 2267 2258 2259 2260 2261 2262 2262 2263
Nickel(III) oxide Nickel(III) oxide Niobium boride Niobium boride Niobium carbide Niobium diboride Niobium dioxide Niobium dioxide fluoride Niobium dioxide fluoride Niobium disilicide Niobium disilicide Niobium hydride Niobium monoboride Niobium nentabromide Niobium pentabromide Niobium pentachloride Niobium pentafluoride Niobium pentoxide Niobium pentoxide Niobium pentoxide Niobium plosphide Niobium (IV) bromide Niobium(IV) carbide Niobium(IV) carbide Niobium(IV) selenide Niobium(IV) selenide Niobium(IV) sulfide Niobium(IV) telluride	2243 2246 2247 2248 2249 2250 2251 2261 2269 2252 2253 2254 2255 2265 2266 2268 2270 2271 2256 2266 2267 2258 2259 2260 2261 2262 2261 2262 2263
Nickel(III) oxide Nickel(III) oxide Niobium boride Niobium boride Niobium carbide Niobium diboride Niobium dioxide Niobium dioxide fluoride Niobium dioxide fluoride Niobium disilicide Niobium disilicide Niobium monoboride Niobium monoboride Niobium pentabromide Niobium pentabromide Niobium pentafluoride Niobium pentafluoride Niobium pentoxide Niobium pentoxide Niobium pentoxide Niobium plosphide Niobium (IV) bromide Niobium(IV) carbide Niobium(IV) carbide Niobium(IV) selenide Niobium(IV) selenide Niobium(IV) sulfide Niobium(IV) telluride Niobium(V) bromide	2243 2246 2247 2248 2249 2250 2251 2261 2269 2252 2253 2254 2255 2265 2266 2268 2270 2271 2256 2260 2271 2258 2259 2260 2261 2262 2263 2264
Nickel(III) oxide Nickel(III) oxide Niobium boride Niobium boride Niobium carbide Niobium diboride Niobium dioxide Niobium dioxide fluoride Niobium dioxide fluoride Niobium disilicide Niobium disilicide Niobium monoboride Niobium monoboride Niobium pentabromide Niobium pentachloride Niobium pentafluoride Niobium pentafluoride Niobium pentoxide Niobium pentoxide Niobium pentoxide Niobium plosphide Niobium (IV) bromide Niobium(IV) carbide Niobium(IV) carbide Niobium(IV) selenide Niobium(IV) selenide Niobium(IV) sulfide Niobium(IV) telluride Niobium(V) chloride Niobium(V) chloride	2243 2246 2247 2248 2249 2250 2251 2261 2269 2252 2253 2254 2255 2265 2266 2268 2270 2271 2256 2266 2267 2258 2259 2260 2261 2262 2263 2264 2263 2264 2265

Niobium(V) fluoride
Niobium(V) fluorodioxide
Niobium(V) iodide
Niobium(V) oxide
Niobium(V) oxybromide
Niobium(V) oxychloride
Niobocene dichloride
Niter
Niter cake
Nitric acid
Nitric Oxide
Nitrogan
Nitrogen dievide
Nitrogen monovide
Nitrogen pentoxide
Nitrogen selenide
Nitrogen tetroxide
Nitrogen trichloride
Nitrogen trifluoride
Nitrogen triiodide
Nitrogen trioxide
Nitrogen(V) oxide
Nitronium hexafluoroantimonate
Nitronium hexafluorophosphate
Nitronium tetrafluoroborate
Nitrosyl chloride
Nitrosyl fluoride
Nitrosyl sulfate
Nitrosylsulfuric acid
Nitrous acid
Nitrous oxide
Nitryl chloride
Nitryl fluoride
Nobelium
Norbide
Nordstrandite
Normal ammonium carbonate
Octaazabicyclo(6.6.6)eicosanecobalt
trichloride
Octadecaborane(22)
Octadecanoic acid, aluminum(III) salt
Octadecanoic acid, ammonium salt
Octadecanoic acid, calcium salt
Octadecanoic acid, calcium salt
Octadecanoic acid, Cu(II) salt
Octadecanoic acid, Cu(II) salt
Octanoic acid ammonium salt
Oil of vitriol
Oldhamite
Oleum
Orthoboria agid
Orthophosphoric acid
Orthophosphorus acid
Orthotelluric acid
Orthotelluric acid Orthotitanic acid
Orthotelluric acid Orthotitanic acid Osmium
Orthotelluric acid Orthotitanic acid Osmium Osmium bis(cyclopentadienyl)
Orthotelluric acid Orthotitanic acid Osmium Osmium bis(cyclopentadienyl) Osmium carbonyl
Orthotelluric acid Orthotitanic acid Osmium Osmium bis(cyclopentadienyl) Osmium carbonyl Osmium dichloride
Orthotelluric acid Orthotitanic acid Osmium Osmium bis(cyclopentadienyl) Osmium carbonyl Osmium dichloride Osmium dioxide
Orthotelluric acid Orthotelluric acid Osmium Osmium bis(cyclopentadienyl) Osmium carbonyl Osmium dichloride Osmium dioxide Osmium hexafluoride
Orthotelluric acid Orthotelluric acid Osmium Osmium bis(cyclopentadienyl) Osmium carbonyl Osmium dichloride Osmium dioxide Osmium hexafluoride Osmium tetrachloride

2268	Osmium tetroxide	2309
2269	Osmium trichloride	2304
2270	Osmium(II) chloride	2303
2271	Osmium(III) chloride	2304
2272	Osmium(III) chloride hydrate	2305
2273	Osmium(IV) chloride	2306
2275	Osmium(IV) oxide	2300
22/4	Osminum(IV) for saids	2307
2945		2308
2911	Osmium(VIII) oxide	2309
2275	Otavite	566
2276	Oxalic acid	2310
382	Oxalic acid dihydrate	2311
2277	Oxalyl chloride	2312
2278	Oxygen	2313
2276	Ozone	2314
2279	Palladium	2315
2280	Palladium monoxide	2327
2281	Palladium(II) acetate	2316
2282	Palladium(II) acetylacetonate	2317
2202	Palladium(II) bromide	2317
2203	Palladium(II) bioinide	2210
2204		2519
2285	Palladium(II) chloride dinydrate	2320
2286	Palladium(II) cyanide	2321
2287	Palladium(II) fluoride	2322
2288	Palladium(II) hexafluoroacetylacetonate	2323
2289	Palladium(II) iodide	2324
2290	Palladium(II) nitrate	2325
2291	Palladium(II) oxalate	2326
2292	Palladium(II) oxide	2327
2292	Palladium(II) sulfate dihydrate	2328
2293	Palladium(II) sulfide	2329
2294	Palladium(II) tetraammine chloride	
2204	monohydrate	2330
2295	Palladium(III) fluoride	2330
2290		2331
2297		2310
2299	Palladous chloride	2319
526	Palladous nitrate	2325
46	Paris green	1057
128	Pearl alum	86
	Pearl ash	2417
1025	Peligot's salt	2421
2298	Pentabarium octasilicate	398
62	Pentaborane(11)	2332
227	Pentaborane(9)	2333
674	Pentaboron nonahydride	2333
700	Pentagermane	2334
1107	Pentamethylcyclopentadienyltantalum	
1123	tetrachloride	2335
126	Pentamethylstannanamine	1183
3107	Pentamminechlorocobalt(III) chloride	2226
705	Pentamininectionocobal(III) chloride	2330
105	Pentanedionale, calcium derivative	012
490	Pentanedionate, cobali(II) derivative	9/5
3108	Pentanedione, aluminum(III) derivative	18
308	Pentanedione, barium derivative	
520	octahydrate	322
2353	Pentanedione, beryllium derivative	436
2354	Pentanedione, cadmium(II) derivative	559
3137	Pentanedione, calcium derivative	613
3279	Pentanedione, cerium(III) derivative	768
2300	Pentanedione, cesium derivative	795
2301	Pentanedione, chromium(III) derivative	888
2302	Pentanedione, cobalt(II) derivative	952
2303	Pentanedione, cobalt(III) derivative	1015
2307	Pentanedione, copper(II) derivative	1050
2308	Pentanedione, dvsprosium(III) derivativa	1101
2300	remaneurone, uysprosium(111) derivative	1010
2206	Dantanadiona arbijim(III) daministrija	

Pentanedione, Eu(III) derivative 1250 Pentanedione, gadolinium(III) derivative 1355 Pentanedione, gallium(III) derivative 1379 Pentanedione, hafnium(IV) derivative 1446 Pentanedione, indium(III) derivative 1553 Pentanedione, Ir(III) derivative 1605 1305 Pentanedione, iron(II) derivative Pentanedione, iron(III) derivative 1264 Pentanedione, lanthanum(III) derivative 1650 Pentanedione, lead(II) derivative 1687 Pentanedione, lithium derivative 1763 Pentanedione, magnesium derivative 1870 dihydrate 1993 Pentanedione, manganese(II) derivative 2032 Pentanedione, manganese(III) derivative Pentanedione, Ni(II) derivative 2186 Pentanedione, palladium(II) derivative 2317 Pentanedione, platinum(II) derivative 2378 Pentanedione, potassium derivative hemihdyrate 2406 Pentanedione, praseodymiun(III) derivative 2573 Pentanedione, rhodium(III) derivative 2638 Pentanedione, rubidium derivative 2651 Pentanedione, ruthenium(III) derivative 2691 Pentanedione, samarium(III) derivative 2700 Pentanedione, silver(I) derivative 2779 Pentanedione, sodium derivative 2830 Pentanedione, strontium derivative 3047 Pentanedione, terbium(III) derivative 3156 Pentanedione, thallium(I) derivative 3193 3233 Pentanedione, thorium(IV) derivative Pentanedione, thulium(III) derivative 3261 Pentanedione, Ti(IV) derivative 3312 3394 Pentanedione, uranyl derivative Pentanedione, vanadium(III) derivative 3438 Pentanedione, ytterbium(III) derivative 3469 Pentanedione, yttrium(III) derivative 3485 Pentanedione, zinc(II) derivative 3516 Pentanedione, zirconium(IV) derivative 3585 255 Pentanoic acid, ammonium salt 2337 Perbromyl fluoride Perchloric acid 2338 Perchloric acid, calcium salt 681 Perchloryl fluoride 2339 2340 Performic acid 1932 Periclase Periodic acid 2341 Periodic acid dihydrate 2343 Periodyl fluoride 2342 713 Perovskite Peroxysulfuric acid 2344 Perrhenic acid 2345 2346 Phenylmercuric acetate Phenylmercuric chloride 2347 2348 Phenylmercuric nitrate, basic 743 Phosgene Phosphine 2349 Phosphinic acid 1550 2350 Phosphomolybdic acid hydrate Phosphonitrilic chloride trimer 2351 Phosphonium iodide 2352 2353 Phosphoric acid Phosphoric acid, meta 2100 2354 Phosphorous acid Phosphorus (black) 2355

Phosphorus (red) Phosphorus (white) Phosphorus heptasulfide Phosphorus nitride Phosphorus oxybromide Phosphorus oxychloride Phosphorus oxyfluoride Phosphorus pentabromide Phosphorus pentachloride Phosphorus pentafluoride Phosphorus pentaselenide Phosphorus pentasulfide Phosphorus pentoxide Phosphorus sulfochloride Phosphorus tribromide Phosphorus trichloride Phosphorus trifluoride Phosphorus triiodide Phosphorus trioxide Phosphorus triselenide Phosphorus trisulfide Phosphorus(III) bromide Phosphorus(III) chloride Phosphorus(III) iodide Phosphorus(III) oxide Phosphorus(III) sulfide Phosphorus(III) fluoride Phosphorus(V) bromide Phosphorus(V) chloride Phosphorus(V) fluoride Phosphorus(V) oxide Phosphorus(V) selenide Phosphorus(V) sulfide Phosphoryl bromide Phosphoryl chloride Phosphotungstic acid 24-hydrate Photophor Pigment blue 15C Pigment E Plaster of paris Platinic acid Platinic acid hexahydrate Platinic iodide Platinum Platinum acetylacetonate Platinum dibromide Platinum dichloride Platinum diiodide Platinum hexafluoride Platinum monoxide Platinum silicide Platinum tetrachloride Platinum(II) bromide Platinum(II) chloride Platinum(II) cyanide Platinum(II) hexafluoroacetylacetonate Platinum(II) iodide Platinum(II) oxide Platinum(IV) chloride Platinum(IV) chloride pentahydrate Platinum(IV) iodide Platinum(IV) oxide Plattnerite Plessy's green Plutonium Plutonium (IV) fluoride

2356	Plutonium dioxide	2398
2357	Plutonium nitride	2392
2358	Plutonium(III) chloride	2393
2359	Plutonium(III) fluoride	2394
2360	Plutonium(IV) chloride	2396
2361	Plutonium(IV) oxide	2398
2362	Plutonium(III) iodide	2395
2370	Plutonium(VI) hexafluoride	2399
2371	PMA	2346
2372	Polonium	2400
2374	Polonium	2401
2375	Polonium dioxide	2403
2373	Polonium tetrachloride	2402
3231	Polonium(IV) chloride	2402
2364	Polonium(IV) oxide	2403
2365	Polydymite	2245
2366	Portlandite	659
2367	Potassium	2404
2368	Potassium acetate	2405
2363	Potassium acetylacetonate hemihydrate	2406
2369	Potassium acid iodate	2473
2364	Potassium aluminate trihydrate	2407
2365	Potassium aluminum sulfate	2408
2367	Potassium aluminum sulfate	
2368	dodecahvdrate	2409
2369	Potassium antimony oxalate trihydrate	2410
2366	Potassium antimony tartrate hemihydrate	2411
2370	Potassium aurate	2443
2371	Potassium azide	2412
2372	Potassium bicarbonate	2471
2373	Potassium bichromate	2432
2374	Potassium binoxalate	2474
2375	Potassium bis(oxalato)platinate(II)	
2360	dihvdrate	2413
2361	Potassium biselenite	2476
2376	Potassium bisulfite	2479
688	Potassium borohydride	2414
1116	Potassium bromate	2415
393	Potassium bromide	2416
704	Potassium carbonate	2417
1528	Potassium carbonate hemitrihydrate	2418
1529	Potassium carbonate sesquihydrate	2418
2389	Potassium chlorate	2419
2377	Potassium chloride	2420
2378	Potassium chlorochromate	2421
2381	Potassium chloroplatinate	2541
2382	Potassium chromate	2422
2385	Potassium chromium(III) oxalate	
2379	tribydrate	2423
2386	Potassium chromium(III) sulfate	2120
2380	dodecabydrate	2424
2387	Potassium citrate	2425
2381	Potassium citrate monohydrate	2426
2382	Potassium cobalt(II) selenate hexabydrate	2427
2383	Potassium cobalticyanide	2454
2384	Potassium copper(I) cyanide	2428
2385	Potassium copper(1) cyanide	2429
2386	Potassium cyanide	2430
2387	Potassium cyanoaurite	2431
2388	Potassium dibasic phosphate	2480
2389	Potassium dichromate	2432
2390	Potassium dicyanoaurate(I)	2431
1705	Potassium dibydrogen arsenate	2431
905	Potassium dihydrogen hypophosphite	2455
2391	Potassium dihydrogen nhosphate	2434
	I VIANDIALLI ALLIVALUZULI DIUNDIALE	J
2397	Potassium dihydrogen phosphite	2026

Potassium dioxide Potassium dithionate Potassium ferricyanide Potassium ferrocyanide trihydrate Potassium fluoride Potassium fluoride dihydrate Potassium fullerene Potassium gold(III) oxide trihydrate Potassium heptafluoroniobate Potassium heptafluorotantalate Potassium heptaiodobismuthate Potassium hexabromoplatinate(IV) Potassium hexachloroiridate(IV) Potassium hexachloroosmiate(IV) Potassium hexachloropalladate(IV) Potassium hexachloroplatinate(IV) Potassium hexachlororhenate(IV) Potassium hexacyanocobalt(III) Potassium hexacyanoferrate(II) trihydrate Potassium hexacyanoferrate(III) Potassium hexacyanoplatinate(IV) Potassium hexafluoroantimonate Potassium hexafluoroarsenate(V) Potassium hexafluorogermanate Potassium hexafluoromanganate(IV) Potassium hexafluoronickelate(IV) Potassium hexafluorophosphate Potassium hexafluorosilicate Potassium hexafluorotitanate monohydrate Potassium hexafluorozirconate Potassium hexametaphosphite Potassium hexanitritocobalt(III) Potassium hexanitritorhodate(III) Potassium hexathiocyanoplatinate(IV) Potassium hydride Potassium hydrogen arsenite Potassium hydrogen carbonate Potassium hydrogen fluoride Potassium hydrogen iodate Potassium hydrogen oxalate hemihydrate Potassium hydrogen phosphite Potassium hydrogen selenite Potassium hydrogen sulfate Potassium hydrogen sulfide hemihydrate Potassium hydrogen sulfite Potassium hydrogen tartrate Potassium hydroxide Potassium hydroxystannate(IV) Potassium hyposulfate Potassium hyposulfite Potassium iodate Potassium iodide Potassium magnesium chloride sulfate Potassium magnesium sulfate Potassium manganate Potassium metaarsenite monohydrate Potassium metavanadate Potassium molvbdate Potassium monobasic phosphite Potassium monohydrogen phosphate Potassium monoxide Potassium nickel sulfate hexahydrate

Potassium nickel(IV) fluoride	2460
Potassium niobate	2492
Potassium niobate hexadecahydrate	2493
Potassium nitrate	2494
Potassium nitrite	2494
Potassium nitroprusside dihydrate	2496
Potossium osmoto dibudrato	240
Potassium osmate umyurate	2491
Potassium oxalate mononydrate	2498
Potassium oxide	2490
Potassium pentaborate octahydrate	2499
Potassium pentachloronitrosyl	
iridium(III) hydrate	2500
Potassium pentachlororuthenate(III)	
hydrate	2501
Potassium perhorate monohydrate	2501
Potossium percorbonate monohydrate	2502
Potassium percarbonate mononyurate	2503
Potassium perchlorate	2504
Potassium periodate	2505
Potassium permanganate	2506
Potassium peroxide	2507
Potassium peroxyborate	2502
Potassium peroxycarbonate	2503
Potassium peroxydisulfate	2510
Petersium peroxydisunate	2510
Potassium permenate	2500
Potassium perruthenate	2509
Potassium persulfate	2510
Potassium phosphate	2511
Potassium phosphate monobasic	2435
Potassium pyrophosphate trihydrate	2512
Potassium pyrosulfate	2513
Potassium pyrosulfite	2514
Potassium ruthonata(VI)	2515
Potassium ruthenate(v1)	2515
Potassium selenate	2516
Potassium selenide	2517
Potassium selenite	2518
Potassium silver cyanide	2519
Potassium sodium carbonate hexahydrate	2520
Potassium sodium tartrate	2970
Potassium stannate trihydrate	2521
Potassium stannosulfate	2522
Potossium stannosunate	2522
	2523
Potassium sulfate	2524
Potassium sulfide	2525
Potassium sulfide pentahydrate	2526
Potassium sulfite dihydrate	2527
Potassium superoxide	2528
Potassium tantalate	2529
Potassium tellurate(VI) trihydrate	2530
Potassium tellurite	2531
Potossium tellurite(IV) hydroto	2551
Potassium tenurite(IV) hydrate	2352
Potassium tetraborate pentahydrate	2533
Potassium tetraborate tetrahydrate	2534
Potassium tetrabromoaurate(III)	
dihydrate	2535
Potassium tetrabromopalladate(II)	2536
Potassium tetrabromoplatinate(II)	2537
Potassium tetrachloroaurate(III)	2538
Potassium tetrachloroaurate(III)	
dihydrote	2520
Determinent tetre shile n 11 1 ( (II)	2005
Potassium tetrachioropalladate(11)	2540
Potassium tetrachloroplatinate(II)	2541
Potassium tetracyanocadmium	2453
Potassium tetracyanomercurate(II)	2542
Potassium tetracyanonickelate(II)	
monohydrate	2543
Potassium tetracyanoplatinate(II)	2544
······································	

2460	Potassium tetracyanoplatinate(II)	
2492	trihydrate	2545
2493	Potassium tetracvanozincate	2546
2494	Potassium tetrafluorobervllate dihydrate	2547
2/05	Potassium tetrafluoroborate	25/18
2495	Petersium tetrahudrahanta	2340
2496	Potassium tetranydroborate	2414
2497	Potassium tetraiodoaurate(III)	2549
2498	Potassium tetraiodocadmium dihydrate	2550
2490	Potassium tetraiodomercurate(II)	2551
2499	Potassium tetranitritoplatinate(II)	2552
	Potassium tetraovalate dihydrate	2553
2500	Potassium thioantimonata	2000
2300	Potassium tinoantinonate	0554
	heminonahydrate	2554
2501	Potassium thiocarbonate	2555
2502	Potassium thiocyanate	2556
2503	Potassium thiosulfate	2557
2504	Potassium titanate	2558
2505	Potassium titanium ovalate dihydrate	2550
2505	Potossium triiodide monohydrate	2555
2300		2300
2507	Potassium triiodozincate	2561
2502	Potassium triphosphate	2562
2503	Potassium tripolyphosphate	2562
2510	Potassium tris(oxalato) chromate	2423
2508	Potassium tungstate	2563
2500	Potossium tungstate dibudrate	2564
2509		2504
2510	Potassium uranate	2565
2511	Potassium uranyl nitrate	2566
2435	Potassium uranyl sulfate dihydrate	2567
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Sulfulle acto fulling	
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tetrahydrate	
Sulfurous acid	
Sulfurous acid, diammonium sait	
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Tantalum(V) orloride Tantalum(V) fluoride Tantalum(V) iodide Tantalum(V) oxide Tarapacaite Tartar emetic Tartaric acid, diammonium salt Tartaric acid, monopotassium salt TEAB	
Tantalum(V) orloride Tantalum(V) fluoride Tantalum(V) iodide Tantalum(V) oxide Tarapacaite Tartar emetic Tartaric acid, diammonium salt Tartaric acid, monopotassium salt TEAB Technetium	
Tantalum(V) orloride Tantalum(V) fluoride Tantalum(V) iodide Tantalum(V) oxide Tarapacaite Tartar emetic Tartaric acid, diammonium salt Tartaric acid, monopotassium salt TEAB Technetium Technetium dioxide	
Tantalum(V) orloride Tantalum(V) fluoride Tantalum(V) fluoride Tantalum(V) iodide Tantalum(V) oxide Tarapacaite Tartar emetic Tartaric acid, diammonium salt Tartaric acid, monopotassium salt TEAB Technetium Technetium dioxide TEL	
Tantalum(V) orloride Tantalum(V) fluoride Tantalum(V) fluoride Tantalum(V) iodide Tantalum(V) oxide Tarapacaite Tartar emetic Tartaric acid, diammonium salt Tartaric acid, monopotassium salt TEAB Technetium Technetium dioxide TEL Telluric acid	
Tantalum(V) orloride Tantalum(V) fluoride Tantalum(V) fluoride Tantalum(V) iodide Tantalum(V) oxide Tarapacaite Tartar emetic Tartaric acid, diammonium salt Tartaric acid, monopotassium salt TEAB Technetium Technetium dioxide TEL Telluric acid Tellurite	
Tantalum(V) orloride Tantalum(V) fuoride Tantalum(V) fluoride Tantalum(V) iodide Tantalum(V) oxide Tarapacaite Tartar emetic Tartaric acid, diammonium salt Tartaric acid, monopotassium salt TEAB Technetium Technetium Technetium dioxide TEL Telluric acid Tellurite Tellurite	
Tantalum(V) orloride Tantalum(V) fuoride Tantalum(V) fluoride Tantalum(V) iodide Tantalum(V) oxide Tarapacaite Tartar emetic Tartaric acid, diammonium salt Tartaric acid, monopotassium salt TEAB Technetium Technetium dioxide TEL Telluric acid Tellurite Tellurite Tellurium Tellurium	
Tantalum(V) orloride Tantalum(V) filoride Tantalum(V) filoride Tantalum(V) iodide Tantalum(V) oxide Tarapacaite Tartaric acid, diammonium salt Tartaric acid, monopotassium salt TEAB Technetium Technetium dioxide TEL Telluric acid Tellurite Tellurite Tellurium Tellurium dioromide Tellurium dioromide	
Tantalum(V) orloride Tantalum(V) filoride Tantalum(V) filoride Tantalum(V) iodide Tantalum(V) oxide Tarapacaite Tartar emetic Tartaric acid, diammonium salt Tartaric acid, monopotassium salt TEAB Technetium Technetium dioxide TEL Telluric acid Telluric acid Tellurite Tellurium Tellurium dioxide Tellurium dioxide Tellurium dioxide Tellurium dioxide	
Tantalum(V) orloride Tantalum(V) fluoride Tantalum(V) fluoride Tantalum(V) iodide Tantalum(V) oxide Tarapacaite Tartar emetic Tartaric acid, diammonium salt Tartaric acid, monopotassium salt TEAB Technetium Technetium dioxide TEL Telluric acid Telluric acid Tellurite Tellurium Tellurium decafluoride Tellurium dibromide Tellurium dioxide Tellurium dioxide	
Tantalum(V) orloride Tantalum(V) fluoride Tantalum(V) fluoride Tantalum(V) iodide Tantalum(V) oxide Tarapacaite Tartaric acid, diammonium salt Tartaric acid, diammonium salt Tartaric acid, monopotassium salt TEAB Technetium Technetium dioxide TEL Telluric acid Tellurite Tellurium Tellurium decafluoride Tellurium diormide Tellurium dioxide Tellurium dioxide Tellurium dioxide Tellurium dioxide Tellurium dioxide Tellurium dioxide Tellurium dioxide	

3107	Tellurium nitrate	3145
3108	Tellurium nitride	3146
	Tellurium sulfate	3147
752	Tellurium tetrabromide	31/18
3100	Tellurium tetrachloride	31/0
222	Tellening total for a side	2150
232		3150
3229	Tellurium tetraiodide	3151
3110	Tellurium trioxide	3152
3111	Tellurous acid	3153
504	Tellurous bromide	3140
505	Tellurous chloride	3141
506	Tenorite [1317-92-6]	1110
3490	Tephroite	1988
2490	Torbium	215/
2401	Terbium	2155
3491	Terbium acetate nydrate	3155
1007	Terbium acetylacetonate trihydrate	3156
2420	Terbium bromide	3157
1331	Terbium carbonate hydrate	3158
3179	Terbium chloride	3159
3128	Terbium chloride hexahydrate	3160
3112	Terbium fluoride	3161
3113	Terbium hydride	3162
3114	Terbium iodide	3163
2114	Terbium nitrate have bedrate	2164
3110	Terbium nitrate nexanydrate	3104
3115	Terbium nitride	3165
3116	Terbium oxalate hydrate	3166
3117	Terbium perchlorate hexahydrate	3167
3118	Terbium silicide	3168
3119	Terbium sulfate octahydrate	3169
3120	Terbium sulfide	3170
3121	Terbium(III IV) oxide	3171
3122	Tetraaminecopper(II) sulfate	5171
2122	monohydrato	1121
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3124	Tetraborane(10)	3172
3125	Tetrabromodiborane	3173
3126	Tetrabromomethane	738
3127	Tetracarbonyldihydroiron	3184
3128	Tetrachlorodiborane	3174
3129	Tetrachloromethane	739
3130	Tetracobalt dodecacarbonyl	938
3131	Tetradecaborane(18)	3175
3132	Tetradymite	511
3132	Tetraethyl lead	3176
2124	Tetracthyl silana	2177
2102		2170
3123	Tetraethylammonium bromide	31/8
3124	Tetraethylammonium chloride	3179
3125	Tetraethylorthosilicate	3180
3126	Tetrafluoroboric acid	3182
3127	Tetrafluorodiborane	3183
2422	Tetrafluoromethane	740
2411	Tetragermane	3181
233	Tetraiodomethane	741
2480	Tetrairidium dodecacarbonyl	1601
2179	Tetramethylaarmana	2105
2125	Tetramethylgermane	2100
3135	Tetrametnyllin	3180
3136	Tetrapropylammonium	
3176	perruthenate(VII)	3187
3137	Tetrasilane	2762
3142	Thallic bromide	3220
3138	Thallic chloride	3221
3139	Thallic chloride hydrate	3222
3140	Thallic fluoride	3223
3141	Thallic nitrate	322/
3142	Thallic oxide	3774
31/2	Thallium	2100
2143	Thellium heating and the	2100
3144	i nanium barium calcium copper oxide	3189

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Thallium(I) acetate	3192
Thallium(I) acetylacetonate	3193
Thallium(I) azide	3194
Thallium(I) bromide	3195
Thallium(I) carbonate	3190
Thallium(I) chloride	3198
Thallium(I) cyanide	3199
Thallium(I) ethoxide	3200
Thallium(I) fluoride	3201
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Thallium(I) hexafluoroacetylacetonate	3203
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Thallium(I) holide	3200
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Thallium(I) nitrite	3209
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Thallium(III) nitrate	3224
Thallium(III) oxide	3225
Thallium(III) perchlorate nexanydrate	3220
Thallous acetate	3192
Thallous bromide	3195
Thallous carbonate	3196
Thallous chloride	3198
Thallous cyanide	3199
Thallous fluoride	3201
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Thorium bromide	3234
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Thorium cl	ıloride
Thorium di	carbide
Thorium flu	ıoride
Thorium he	exaboride
Thorium he	xafluoroacetylacetonate
Thorium hy	dride
Thorium hy	/drox1de
Thorium io	dide
Thorium n	trate
Thorium ni	trate tetrahydrate
Thorium ni	tride
Thorium of	thosilicate
Thorium of	vide
Thorium or	uue wfwarida
Thorium of	cylluoride
Thorium as	lanida
Thorium si	lieide
Thorium si	liciue
Thorium su	ulfate octabydrate
Thorium su	ilfate tetrahydrate
Thorium su	lfide
Thorium te	tracvanonlatinate(II)
hevade	ahydrate
Thulia	lanyurate
Thulium	
Thulium ac	etate monohydrate
Thulium ac	etvlacetonate trihvdrate
Thulium br	omide
Thulium ch	loride
Thulium ch	loride heptahydrate
Thulium flu	ioride
Thulium hy	droxide
Thulium io	dide
Thulium ni	trate hexahydrate
Thulium o	alate hexahydrate
Thulium ox	tide
Thulium si	licide
Thulium su	lfate octahydrate
Thulium su	lfide
Ti(IV) sele	nide
Ti(IV) tellu	ride
Tielite	
Tiemannite	
Tin (gray)	
Tin (white)	
Tin diselen	ide
Tin hydride	
Tin monop	hosphide
Tin selenite	<u>)</u>
Tin disulfic	le
Tin triphos	phide
Tin(II) ace	tate
Tin(II) bro	mide
Tin(II) chlo	oride
Tin(II) chlo	oride dihydrate
Tin(II) fluc	ride
Tin(II) fluc	ropnospnate
I III(II) IOOI	ue lata
Tin(II) oxa	iaie
Tin(II) 0X10	ic anhosnhata
Tin(II) pyr	nide
Tin(II) stee	rate
Tin(II) stea	ate
Tin(II) sulf	ìde
rin(11) suit	iuc

3236	Tin(II) tartrate	3042
3237	Tin(II) telluride	3043
3238	Tin(IV) bromide	3017
3239	Tin(IV) chloride	3018
3240	Tin(IV) chloride pentahydrate	3019
3241	Tin(IV) fluoride	3021
3242	Tin(IV) iodide	3022
3243	Tincalconite	2996
3244	s-triazoborzane	519
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3245	Titanium	3280
3240	Titanium boride	3281
3247	Titanium carbide	3282
3240	Titanium dibromide	3282
2250	Titanium diablorida	2203
2251	Titanium diedide	2204
2251	Titanium dirodide	3263
3232		3280
3253	Titanium dioxide	3287
3254	Titanium dioxide	3288
3255	Titanium diselenide	3289
3256	Titanium disilicide	3300
3257	Titanium disulfide	3290
	Titanium ditelluride	3291
3258	Titanium hydride	3292
3270	Titanium isopropoxide	3293
3259	Titanium isopropylate	3293
3260	Titanium monosulfide	3294
3261	Titanium monoxide	3295
3262	Titanium nitride	3296
3263	Titanium oxalate decahydrate	3297
3264	Titanium oxysulfate	3298
3265	Titanium phosphide	3299
3266	Titanium sesquisulfide	3311
3267	Titanium silicide	3300
3268	Titanium sulfate	3301
3269	Titanium tetrabromide	3302
3270	Titanium tetrachloride	3303
3271	Titanium tetrafluoride	3304
3272	Titanium tetraiodide	3305
3273	Titanium tribromide	3306
3289	Titanium trichloride	3307
3201	Titanium trifluoride	3308
03	Titanium triovide	3300
2002	Titanium trisilicide	3310
2092	Titanium trisulfida	2211
2275	Titanium (II) ia dida	2205
3275	Titanium(II) iodide	3283
3024		3295
3276	Titanium(TV) bromide	3302
3277	Titanium(IV) oxide acetylacetonate	3312
3025	Titanium(IV) sulfide	3290
3026	Titanocene dichloride	3313
3278	Titanous sulfate	3301
3027	TPAP	3187
3028	Triatomic oxygen	2314
3029	Tribromogermane	3314
3030	Tribromosilane	3316
3031	Tricalcium dicitrate tetrahydrate	640
3033	Trichlorofluorogermane	3317
3034	Trichlorogermane	3315
3035	Trichlorosilane	3318
3036	Trichromium tetroxide	873
3037	Tridecaborane(19)	3319
3038	Tridymite	2764
3039	Triethylphosphine	3320
3040	Trifluoro-2,4-pentandione nickel	
3041	derivative	2242

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derivative	1964
Trifluoro-2,4-pentanedione, Cu(II)	
derivative	1134
Trifluoro-2,4-pentanedione, Fe(III)	
derivative	1298
Trifluoro-2,4-pentanedione, Nd	
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Tungsten boride	3331
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Tungsten carbonyl	3334
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Tungsten dichloride	3336
Tungsten diiodide	3337
Tungsten dinitride	3338
Tungsten dioxide	3339
Tungsten dioxydibromide	3340
Tungsten diselenide	3341
Tungsten disilicide	3342
Tungsten disulfide	3343
Tungsten hexabromide	3344
Tungsten hexacarbonyl	3334
Tungsten hexachloride	3345
Tungsten hexafluoride	3346
Tungsten nitride	3347
Tungsten oxychloride	3348
Tungsten oxydichloride	3349
Tungsten oxydiiodide	3350
Tungsten oxytetrabromide	3351
Tungsten oxytetrafluoride	3352
Tungsten oxytrichloride	3353
Tungsten pentaboride	3354
Tungsten pentabromide	3355
Tungsten pentachloride	3356
Tungsten telluride	3357
Tungsten tetrabromide	3358
Tungsten tetrachloride	3359
Tungsten tetraiodide	3360
G	2200

	Tungsten tribromide
1964	Tungsten trijodide
1701	Tungston triovido
1124	
1134	Tungsten trisilicide
	Tungsten trisulfide
1298	Tungsten(IV) bromide
	Tungsten(IV) chloride
2170	Tungsten(IV) oxide
2177	
	lungsten(IV) telluride
3218	Tungsten(V) bromide
837	Tungsten(VI) chloride
3227	Tungsten(VI) dichloride dioxide
3321	Tungsten(VI) fluoride
3377	Tungsten(VI) oxide
2222	
3323	Tungsten(VI) tetrachioride monoxide
3324	Tungstenite
1348	Tungstic acid
2302	Tungstophosphate
2689	Tungstophosphoric acid
1682	Tungstophosphoric acid hydrate
1002	Tungstophosphorie acid
2160	
2719	Unichrome
2735	Uraninite
	Uranium
3325	Uranium diboride
	Uranium dicarbide
2226	Una nine diamida
5526	Uranium dioxide
2771	Uranium hexafluoride
2964	Uranium monocarbide
3327	Uranium mononitride
3328	Uranium pentabromide
1332	Uranium pentachloride
1332	
2848	Uranium pentaluoride
3329	Uranium tetraboride
3330	Uranium tetrabromide
3331	Uranium tetrachloride
3332	Uranium tetrafluoride
2222	Uranium tetraiodide
2224	
3334	Uranium tribromide
3335	Uranium tricarbide
3336	Uranium trichloride
3337	Uranium trifluoride
3338	Uranium trihydride
3330	Uranium trinitride
22.40	
3340	Uranium trioxide
3341	Uranium(IV) sulfate octahydrate
3342	Uranium(IV) sulfate tetrahydrate
3343	Uranium(V,VI) oxide
3344	Uranium(VI) oxide
2221	Uranyl acetate dihydrate
22.45	
3345	Uranyl acetylacetonate
3346	Uranyl carbonate
3347	Uranyl chloride
3348	Uranyl chloride trihydrate
3349	Uranyl fluoride
2250	Uranyi hudrogon phosphete
5550	Uranyi nyurogen phosphate
3351	tetrahydrate
3352	Uranyl nitrate
3353	Uranyl nitrate hexahydrate
3354	Uranyl oxalate trihydrate
3355	Uranyl sulfate
	Langer auffate and the second second
5556	oranyi suitate mononydrate
3357	Uranyl sulfate trihydrate
3358	Valentinite
3359	Valeric acid
3360	Vanadium
	· «

3361	Vanadium bis(cyclopentadienyl)	
3362	dichloride	3407
3363	Vanadium carbide	3408
3364	Vanadium carbonyl	3409
3365	Vanadium diboride	3410
3358	Vanadium dibromide	3411
3359	Vanadium dichloride	3412
3339	Vanadium diiodide	3413
3357	Vanadium dioxide	3414
3355	Vanadium disilicide	3415
3345	Vanadium gallide	3416
3349	Vanadium hexacarbonyl	3409
3340 2262	Vanadium monoboride	2417
2249	Vanadium monosiliaida	2410
3340	Vanadium monovide	3419
3366	Vanadium nitride	3420
3367	Vanadium oxytrichloride	3422
2376	Vanadium oxytrifluoride	3423
3367	Vanadium pentafluoride	3424
2776	Vanadium pentasulfide	3425
1117	Vanadium pentoxide	3426
3371	Vanadium sulfide	3427
3368	Vanadium tetrachloride	3428
3369	Vanadium tetrafluoride	3429
3370	Vanadium tribromide	3430
3371	Vanadium trichloride	3431
3372	Vanadium trifluoride	3432
3373	Vanadium trifluoride trihydrate	3433
3374	Vanadium trioxide	3434
3375	Vanadium trisulfate	3435
3376	Vanadium trisulfide	3436
3377	Vanadium(II) iodide	3413
3378	Vanadium(II) oxide	3420
3379	Vanadium(II) sulfate heptahydrate	3437
3380	Vanadium(III) acetylacetonate	3438
3381	Vanadium(III) bromide	3430 2421
3382	Vanadium(III) fluoride	3431
3384	Vanadium(III) nuoride	3/3/
3385	Vanadium(III) sulfate	3435
3386	Vanadium(III) sulfide	3436
3387	Vanadium(IV) sunde	3428
3388	Vanadium(IV) fluoride	3429
3389	Vanadium(IV) oxide	3414
3390	Vanadium(V) fluoride	3424
3391	Vanadium(V) oxide	3426
3392	Vanadium(V) oxytrichloride	3422
3389	Vanadium(V) oxytrifluoride	3423
3393	Vanadium(V) sulfide	3425
3394	Vanadocene	3439
3395	Vanadocene dichloride	3440
3396	Vanadyl bromide	3441
3397	Vanadyl chloride	3442
3398	Vanadyl dibromide	3443
	Vanadyl dichloride	3444
3399	Vanadyl difluoride	3445
3400	Vanadyl selenite monohydrate	3446
3401	Vanadyl sulfate dihydrate	3447
3402	Vanadyl tribromide	3448
3403	Variscite	75
5404 2405	valerile Villoumite	630
3403 260	vinaunne Vitreous boric ovide	28/5
209	Vitreous silica	329
3406	Vivianite	1276
J+00	v i v i allitte	1520

Water
Water-d <sub>2</sub>
Waterglass
Washing soda
White
White lead
White tin
White lead
Whitlockite
Wilkinson's catalyst
Witherite
Wolfram
Wollastonite
Wulfenite
Wurtzite
Wustite
Xenon
Xenon difluoride
Xenon dioxydifluoride
Xenon fluoride
Xenon fluoride hexafluoroantimonate
Xenon fluoride hexafluoroarsenate
Xenon fluoride hexafluororuthenate
Xenon fluoride
monodecafluoroantimonate
Xenon hexafluoride
Xenon oxydifluoride
Xenon oxytetrafluoride
Xenon pentafluoride hexafluoroarsena
Xenon pentafluoride hexafluororuthen
Xenon tetrafluoride
Xenon tetroxide
Xenon trifluoride
monodecafluoroantimonate
Xenon trioxide
YAG
Yellow mercuric oxide
<b>X</b> 7 11 1 1

Xenon fluoride
monodecafluoroantimonate
Xenon hexafluoride
Xenon oxydifluoride
Xenon oxytetrafluoride
Xenon pentafluoride hexafluoroarsenate
Xenon pentafluoride hexafluororuthenate
Xenon tetrafluoride
Xenon tetroxide
Xenon trifluoride
monodecafluoroantimonate
Xenon trioxide
YAG
Yellow mercuric oxide
Yellow phosphorus
Yellow prussiate of soda
Ytterbia
Ytterbium
Ytterbium acetate tetrahydrate
Ytterbium acetylacetonate
Ytterbium bromide hydrate
Ytterbium carbonate hydrate
Ytterbium chloride
Ytterbium chloride hexahydrate
Ytterbium fluoride
Ytterbium hydride
Ytterbium nitrate pentahydrate
Ytterbium oxalate decahydrate
Ytterbium oxide
Ytterbium perchlorate
Ytterbium silicide
Ytterbium sulfate
Ytterbium sulfate octahydrate
Yttria
Yttrium
Yttrium acetate hydrate
Yttrium acetylacetonate trihydrate
Yttrium aluminum oxide
Yttrium antimonide
Yttrium arsenide
Yttrium barium copper oxide
Yttrium barium copper oxide

Yttrium barium copper oxide

3450	Yttrium boride	34
1157	Yttrium bromide	34
2979	Yttrium bromide nonabydrate	34
28/0	Vttrium carbide	34
2077	Vttrium carbonata tribudrata	24
1604	Vttrium carbonate trinydrate	24
1094		34
3275	Yttrium chloride nexanydrate	34
1694	Yttrium fluoride	34
686	Yttrium garnet	35
3326	Yttrium hexaboride	34
337	Yttrium hexafluoroacetylacetonate	35
3329	Yttrium hydride	35
696	Yttrium hydroxide	35
1716	Yttrium iodide	35
3576	Yttrium iron oxide	35
1324	Yttrium nitrate hexahvdrate	35
3451	Yttrium oxalate nonahydrate	35
3452	Yttrium oxide	35
3453	Vttrium perchlorate hevabydrate	35
2452	Vttrium phoephido	25
2454	Yttrium gulfata aatabudrata	25
2454		33
3455	Yttrium suinde	35
3456	Yttrium vanadate	35
	Zaratite	21
3457	Zinc	35
3458	Zinc acetate	35
3459	Zinc acetate dihydrate	35
3460	Zinc acetylacetonate hydrate	35
3461	Zinc ammonium chloride	35
3462	Zinc ammonium chloride	21
3463	Zinc antimonide	35
3464	Zinc arsenate octahydrate	35
	Zinc arsenide	35
3465	Zinc arsenite	35
2466	Zine horate	25
2400	Zine borate hamihantahudrata	25
2097		25
2087		35
2357	Zinc bromate nexanydrate	35.
2874	Zinc bromide	35
3478	Zinc caprylate	35
3467	Zinc carbonate	35
3468	Zinc carbonate hydroxide	35
3469	Zinc chlorate	35
3470	Zinc chloride	35
3471	Zinc chromate heptahydrate	35
3472	Zinc chromite	35
3473	Zinc citrate dihvdrate	35
3474	Zinc cyanide	35
3475	Zinc diborate	35
3476	Zinc dichromate trihydrate	35
2477	Zine dietholiate trinydrate	11'
2479	Zine dimethyldithiogerhamete	25
2470		22
3479		35.
3480	Zinc fluoride tetrahydrate	35
3481	Zinc fluoroborate hexahydrate	35
3482	Zinc formaldehyde sulfoxylate	35
3507	Zinc formate	35
3483	Zinc formate dihydrate	35
3484	$\label{eq:constraint} Zinc \ hexafluoroacetylacetonate \ dihydrate$	35
3485	Zinc hexafluorosilicate hexahydrate	35
3486	Zinc hydroxide	35
3487	Zinc hypophosphite monohydrate	35
3488	Zinc iodate	35
3489	Zinc iodide	35
3490	Zinc laurate	35
3491	Zinc metaarsenite	35
~ . / 1		55

3492	Zinc molybdate	3551
3493	Zinc nitrate hexahydrate	3552
3494	Zinc nitride	3553
3495	Zinc nitrite	3554
3496	Zinc oleate	3555
3497	Zinc orthophosphate	3561
3498	Zinc orthosilicate	3570
3499	Zinc oxalate dihvdrate	3556
3504	Zinc oxide	3557
3492	Zinc perchlorate hexahydrate	3558
3500	Zinc permanganate hexahydrate	3559
3501	Zinc peroxide	3560
3502	Zinc phosphate	3561
3503	Zinc phosphate tetrahydrate	3562
3504	Zinc phosphide	3563
3505	Zinc propionate	3564
3506	Zinc pyrophosphate	3565
3507	Zinc salicylate tribydrate	3566
3508	Zinc salt dihydrate	3583
3509	Zinc selenate pentahydrate	3567
3510	Zinc selenide	3568
3511	Zinc selenite	3569
3512	Zinc silicate	3570
2104	Zinc stearate	3571
2513	Zine sulfate	3572
3513	Zine sulfate hentabydrate	3572
2515	Zine sulfate heyehydrate	2574
2516	Zine sulfate monohydrate	2575
2517	Zine sulfide(c)	2576
212	Zine sulfide( $\alpha$ )	2570
213	Zine suffice dihydrate	2579
2510	Zine summe universite Zine tertrete dibudrete	2570
2520	Zine tallurida	2580
2521	Zine thiographic	2591
2522	Zine titonete	2502
2522	Zine velerete dibudrete	2502
2524		2557
3524 2525	Zincile	2577
3323 2526	Zincon	2607
2527	Zircon	2601
2520	Zirconia	2504
2520		2505
2520		2500
2521	Zirconium aluminide	3380
2522	Zirconium annionium carbonate	2507
3332 2522	Zirconium boride	338/
2522	Zirconium bromide	3388
2525	Zinconium carbide	2500
3333		3590
3522	Zirconium chloride	3591
3330		3592
11/6	Zirconium diboride	3587
2529/		3620
2528		3593
3539	Zirconium nexafluoroacetylacetonate	3594
3540		3393
3541		3590
3542 2542	Zirconium iodide	3597
3545		3598
5544 2545	Zirconium nitride	3399
5545 2546	Zirconium oxide	3000
3340 25.47	Zinconium oxide	3001
354/	Zirconium oxide yttria stabilized	3602
3548	Zirconium phosphate trihydrate	3603
3549	Zirconium phosphide	3604
3550	Zirconium pyrophosphate	3605
3521	Zirconium selenide	3606

Zirconium silicate	3607	Zirconium tetraiodide	3597	Zirconyl chloride octahydrate	3617
Zirconium silicide	3608	Zirconium tungstate	3612	Zirconyl hydroxychloride hydrate	3618
Zirconium spinel	1873	Zirconocene dichloride	3613	Zirconyl nitrate hydrate	3619
Zirconium sulfate tetrahydrate	3609	Zirconyl acetate hydroxide	3614	Zirconyl perchlorate octahydrate	3620
Zirconium sulfide	3610	Zirconyl basic nitrate	3615	α-spodumene	1766
Zirconium telluride	3611	Zirconyl chloride hydrate	3616	β-Mo <sub>2</sub> C	2109