Gmelin Handbook of Inorganic Chemistry

A User's Guide

The Gmelin Handbook of Inorganic Chemistry (Handbuch der Anorganischen Chemie), or simply “Gmelin,” is a multi-volume collection of data and information on inorganic and organometallic compounds. Gmelin ceased publication in 1997. The 8th Edition of the **Gmelin Handbook of Inorganic and Organometallic Chemistry** is the most extensive printed compilation of information and data on chemical elements and their compounds and alloys. It was compiled by the Gmelin Institute, part of the Max Planck Institute, and published in over 400 volumes from 1924 to 1998 by Springer-Verlag. All information in the Handbook was derived from the primary journal and patent literature of chemistry, physics, and metallurgy, and then critically appraised and organized by chemical element and species.

Although Gmelin was published over many decades, the volumes are not uniform in their currency. Some elements are represented only by slim summary volumes published in the 1930s, with no further updates. Other elements (such as Fe, B, S, F, U, etc.) have numerous supplements. In most cases, later supplement volumes focus on an element's organometallic compounds (Organische Verbindungen). Each volume indicates a literature coverage date on the back of the title page.

Before 1982, Gmelin text was in German, with English tables of contents, section headings, and sidebar tabs to guide the non-German reader. After 1982 Gmelin was published in English.

Gmelin is typically used to locate factual information on specific compounds via the Formula Indexes. This information includes any or all of the following for a chemical compound:

- History and occurence
- Formation and Preparation (Bildung und Darstellung)
- Physical properties (crystallographic, optical, spectral, electrical, magnetic, mechanical, thermodynamic)
- Chemical properties and reactions, electrochemical behavior, etc.
- Uses, toxicology, miscellany

Text is augmented by tables and graphs in many places. All information is accompanied by the source literature reference.

Introduction

Since 1971, organometallics are heavily covered, except for compounds with Li, Na, K, Rb, Cs, Mg, Ca, Sr, & Ba central atoms. Those exceptions are covered in Beilstein CrossFire. Included in Gmelin are compounds with metal-carbon bonds except carbides, cyanides, cyanates, and thiocyanate.

At this point, UMSL does not subscribe to the electronic version commonly known as CrossFire.

Volumes published after about 1982 are in English. Though volumes prior to 1982 are in German, **English table of contents and section headings in the page margins are provided for all but the very oldest volumes.** Patrons willing to take on the challenges of using German language source are rewarded by the superb and comprehensive content of this resource.

Gmelin contains such information as:

Physical properties	Crystallography
Analytical & Colloid chemistry	Metallography / Metallurgy / Mineralogy
Ore dressing	Electrochemistry
Geochemistry	Corrosion and passivity
Toxicity	Atomic physics

An advantage to using Gmelin is that it covers professional literature prior to 1907 not covered by SciFinder Scholar. In addition, Gmelin often provides the actual physical data and tables rather than just a reference to the original scientific literature and patents. However, researchers should always consult both Gmelin and SciFinder Scholar as unique material will be found in both resources.

How is Gmelin Organized?

Gmelin is divided into 71 sets of volumes, each covering an element or, for minor elements, a group of elements e.g. rare earths. Each set has one or more main volumes and usually a number of supplemental volumes covering new information. Each element (or group of elements) is assigned a unique System Number which has no relationship to its atomic number. The numbering sequence starts with rare gases and progresses to the heavier metals. The system numbers are assigned so that the elements which commonly form cations have a higher system number than those which commonly form anions. Thus, the system arranges compounds under the most electropositive element. To find the system number for an element, consult the periodic table on the inside cover of any of the Formula Indexes.

Obviously, all compounds contain 2 or more elements. Each compound is published in the set for the element with the highest system number. For example, UOCl2 is published in the Uranium volume, since the system number for U is 55, for O is 3, and for Cl is 6.

How is Gmelin shelved on the reference shelves?

The Gmelin volumes are organized on the reference shelves in alphabetical order according to element symbol even though each volume is labeled on the spine by the system number. It is important to first find out from the Formula Index what the element symbol and system number is before approaching the volumes. To find the system number for an element, consult the periodic table on the inside front cover of any formula index. The Gmelin system number for each element is shown in green. Note: the yellow inserts on the shelf tell you where the element group begins. The supplemental works have the abbreviation of the element on the spine of each volume.

Instructions on how to use the Formula Index

The General Formula Indexes are arranged strictly alphabetical by element symbol (Hill Convention) which cover both the main and supplemental volumes.

It is best to start with the latest Formula Index Supplement, since each supplement published updates the previous edition. There are three columns in the Formula Index. The first column shows the empirical formulas arranged by alphabetical order of the element symbols and by increasing atom count (Hill Convention). The second column show the linear structural molecular formula in classic format as it appears in Gmelin text. The third column provides volume and page numbers to a particular entry.

Example: Look up the compound Cl 2 OU
The formula index reads:

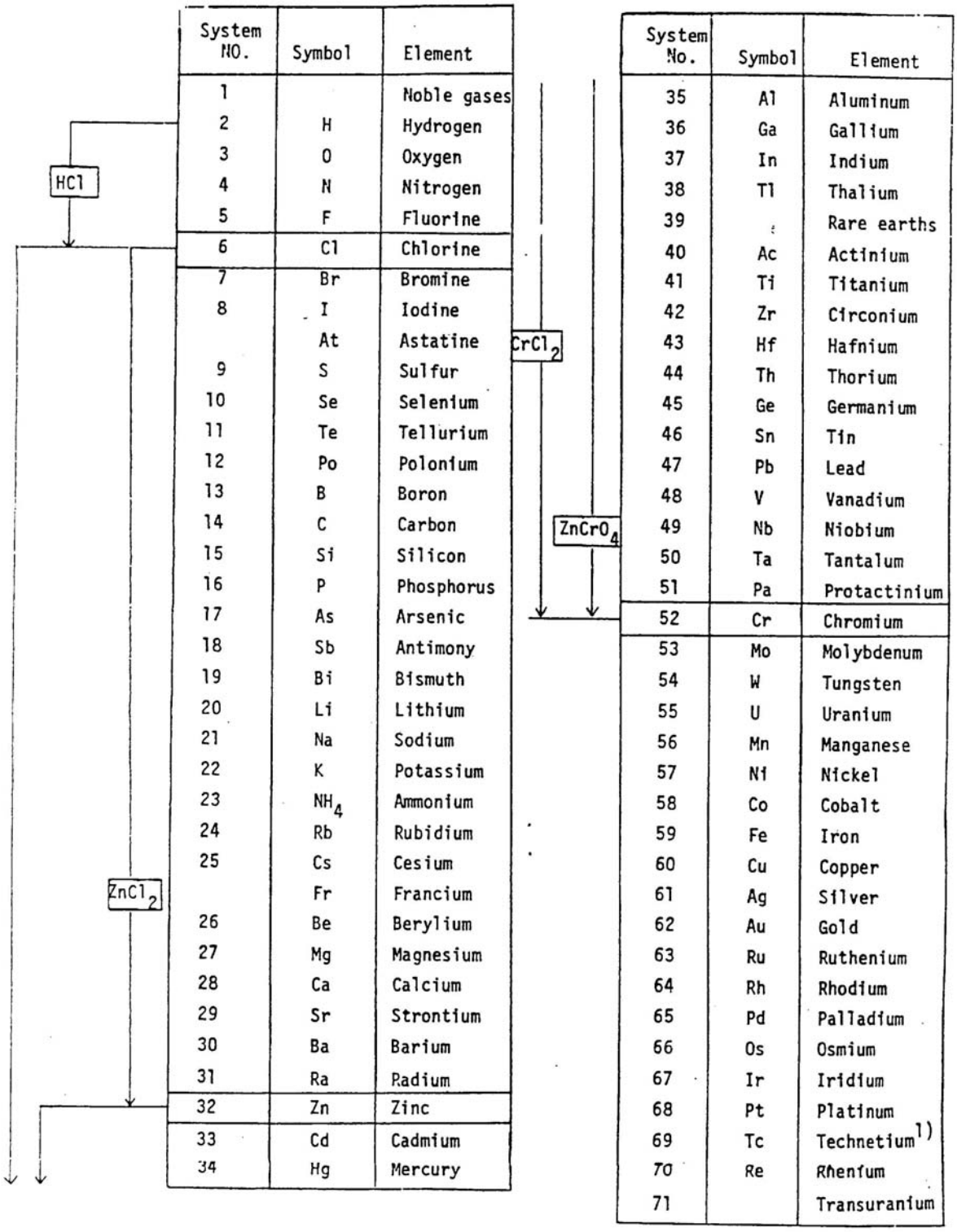
Column 1	**Column 2**	**Column 3**
Cl_2OU	$UOCl_2$	U: SVol.A5-224
^	^	^
|	|	|
Hill Convention mol. formula	*Linear (classic) molecular formula*	*Uranium Supple. Vol. A5, page 224*

In each volume of the Main Work and Supplement Series, there is a table of contents, in which information may also be located.

I can’t read the entry! It’s in German.

Earlier volumes are in German with some English captions. More recent volumes, 1982+, are in English. Use a German-English science dictionary to translate unfamiliar words. All of the foreign language dictionaries are located in the first row of the reference collection.

Patterson's German-English dictionary for chemists
Cassell's German - English, English - German dictionary
Dictionary of chemistry and chemical engineering



System NO.	Symbol	Element
1		Noble gases
2	H	Hydrogen
3	O	Oxygen
4	N	Nitrogen
5	F	Fluorine
6	Cl	Chlorine
7	Br	Bromine
8	I	Iodine
	At	Astatine
9	S	Sulfur
10	Se	Selenium
11	Te	Tellurium
12	Po	Polonium
13	B	Boron
14	C	Carbon
15	Si	Silicon
16	P	Phosphorus
17	As	Arsenic
18	Sb	Antimony
19	Bi	Bismuth
20	Li	Lithium
21	Na	Sodium
22	K	Potassium
23	NH_4	Ammonium
24	Rb	Rubidium
25	Cs	Cesium
	Fr	Francium
26	Be	Berylium
27	Mg	Magnesium
28	Ca	Calcium
29	Sr	Strontium
30	Ba	Barium
31	Ra	Radium
32	Zn	Zinc
33	Cd	Cadmium
34	Hg	Mercury

System No.	Symbol	Element
35	Al	Aluminum
36	Ga	Gallium
37	In	Indium
38	Tl	Thalium
39		Rare earths
40	Ac	Actinium
41	Ti	Titanium
42	Zr	Circonium
43	Hf	Hafnium
44	Th	Thorium
45	Ge	Germanium
46	Sn	Tin
47	Pb	Lead
48	V	Vanadium
49	Nb	Niobium
50	Ta	Tantalum
51	Pa	Protactinium
52	Cr	Chromium
53	Mo	Molybdenum
54	W	Tungsten
55	U	Uranium
56	Mn	Manganese
57	Ni	Nickel
58	Co	Cobalt
59	Fe	Iron
60	Cu	Copper
61	Ag	Silver
62	Au	Gold
63	Ru	Ruthenium
64	Rh	Rhodium
65	Pd	Palladium
66	Os	Osmium
67	Ir	Iridium
68	Pt	Platinum
69	Tc	Technetium[1)]
70	Re	Rhenium
71		Transuranium

BEILSTEIN (1910) / GMELIN (1926) JOURNAL ABBREVIATIONS

A. / Lieb. Ann.---Annalen der Chemie (Justus Liebig's)
A. Ch. / Ann. Chim.---Annales de Chemie et de Physique
Am. Soc. / J. Am. Soc.---Journal of the American Chemical Society
Ann. d. Physik / Wied. Ann.---Annalen der Physik und Chemie
Ar. / Arch. Pharm.---Archiv der Pharmazie
B. / Ber.---Berichte der Deutschen Chem. Gesellschaft
Bl. / Bl. Soc. chim.---Bulletin de la Societe Chemique de France
C. / C.---Chemiches Zentralblatt
C. r. / C. r.---Comptes Rendus de l'Acad. des Sciences
Fr. / Z. anal. ch.---Zeitschrift fur Analytische Chemie (Fresenius)
G. / Gazz.---Gazetta Chimica Italina
J. / Jber.---Jahresbericht uber die Fortschr. der Chemie
J. pr. / J. pr. Ch.---Journal fur Praktische Chemie
M. / Monatsh.---Monatshefte fur Chemie
R. / Rec. Trav. chim.---Recueil des Travaux Chim. des Pays-Bas
R. A. L. / Atti Linc.---Atti della Reale Accad .. Lincei (Rendiconti)
Soc. / J. chem. Soc.---Journal of the Chemical Society (London)
Z. a. Ch. / Z. anorg. Ch.---Zeitschrift fur Anorganische Chemie

Other Reference Sources for Inorganic Chemists

Comprehensive Organometallic Chemistry I & II

Dictionary of Organometallic Compounds, 5 vols., 2nd ed., 1995

Dictionary of Inorganic Compounds, 5 vols, 1st ed, 1992

Encyclopedia of Inorganic Chemistry, 10 vols, 2nd ed, 2005