COMMISSION ON **NEW MINERALS NOMENCLATURE AND CLASSIFICATION (CNMNC)**

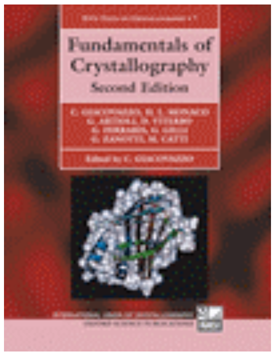
New books

Crystallography of Modular Materials.

Ferraris, G., Makovicky, E., Merlino, S. (2004).

Oxford University Press.

see http://www.oup.co.uk/isbn/0-19-852664-4



Mineral and inorganic crystals

Ferraris G. (2002).

In: **Fundamentals of Crystallography**, Giacovazzo, G. (Ed.)

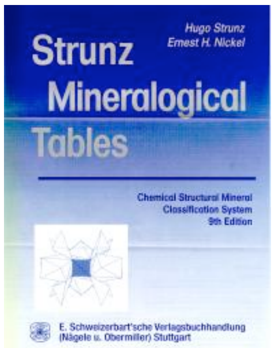
Oxford University Press, pp. 503-584.

Strunz Mineralogical Tables

by Hugo Strunz and Ernest H. Nickel,

E.Schweizerbart'sche Verlagsbuchhandlung (Nagele u. Obermiller)

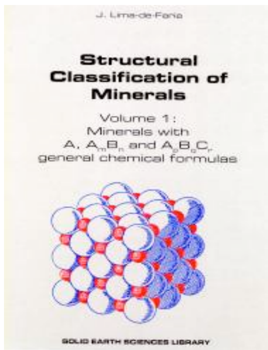
Stuttgart, 2001, p. 870.



***The main principles of chemical-structural classification by H.Strunz:* Minerals are divided into 10 major compositional classes:**
1) elements 2) sulfides 3) halides 4) oxides 5) nitrates, carbonates
6) borates 7) sulfates 8) phosphates 9) silicates 10) organic compounds

The further subdivisions into divisions, families and groups are on the basis of chemical composition and crystal structure

Structural Classification of Minerals



by J.Lima-de-Faria

Kluwer academic Publishers, Solid Earth Science Library, Vol.11,

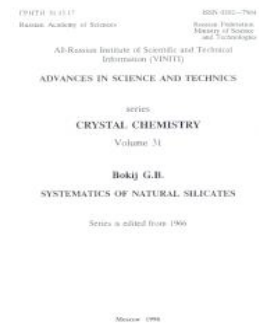
Dordrecht, 2001.

There are atoms that are more tightly bounded, and these assemblages are called **structural units. *They are considered as the main basis for the structural classification of minerals. Thus there are*** five main categories *of structures:* **atomic or close-packed, group, chain, sheet and frame-work *according to their dimensionality. This approach to the analysis of the crystal structures was***

approved by IUCr Commission on Crystallographic Nomenclature in 1990. Later on in 1994 J.Lima-de-Faria applied the structural classification to the most common minerals (about 500 minerals organised in 230 structure types*). Now his task become much more ambitious: to cover the approximately* **3500 mineral species** ***and in his new book he considers*** 960 *of them.*

In the same section of the considered classification there are chemically different minerals such as periclase, halite, galena, osbornite. Several chapters of the new book explain many crystal chemical terms and phenomena, which were not defined clearly enough in earlier publications and which are used by mineralogists in their everyday work. It is referred to the structural notation, chemical and structural formulas, the mode of representation of crystal structures, to the correlation between crystalline structure and properties of minerals and some other problems. Consequently this work is of particular interest to teachers, students and researchers in crystallography, mineralogy and inorganic crystal chemistry in academia.

Systematics of natural silicates



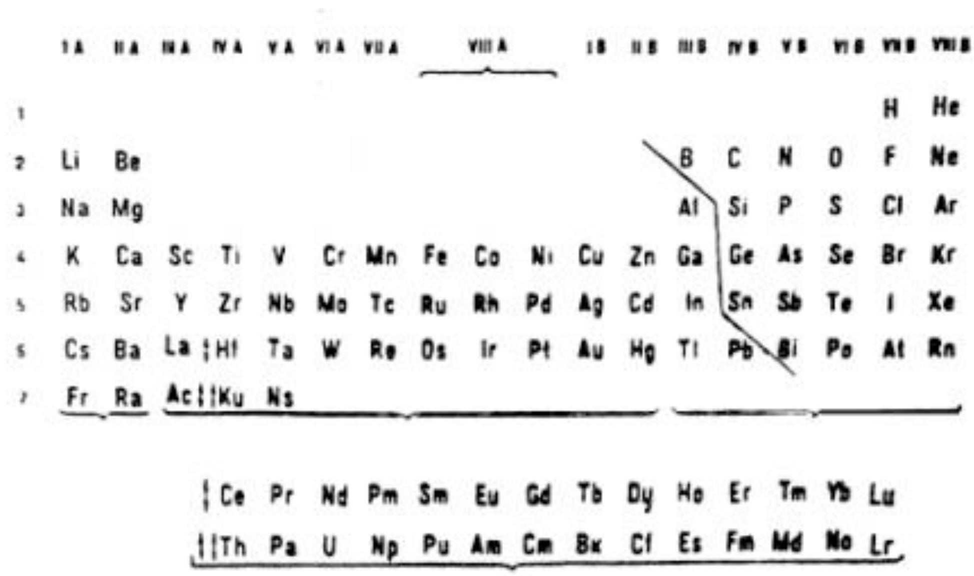
by G.B.Bokii .

Advances in Science and Technics, Crystal chemistry, vol. 32, Moscow, 2000.

Prof. G.Ferraris and prof. D.Pushcharovsky reviewed this edition.

*Since the time of Bercelius most of systematics are based on the types of non-metals. The total number of non-metalic elements is 27. 8 of them donít occur in minerals, namely Po, At and 6 inert gases. Thus 19 non-metallic are present in minerals. They are located in five b-subgroups from III to VII. It looks logic that the 1*st *division devide all minerals on 7 subkingdoms: 1*st *, pure metals and intermetallic compounds; 2*nd *, non-metals; subkingdoms from 3*rd *to 7*th *correspond to the compounds of metallic elements with non-metals of IIIb , VIIb subgroups. If there are two different nonmetals, those which is in higher content will be taken as dominant.*

Z-shape boundary separating metals from non-metals in the Periodic System of Chemical Elements



Crystal chemistry of minerals and inorganic compounds with complexes formed by anion-centred tetrahedra

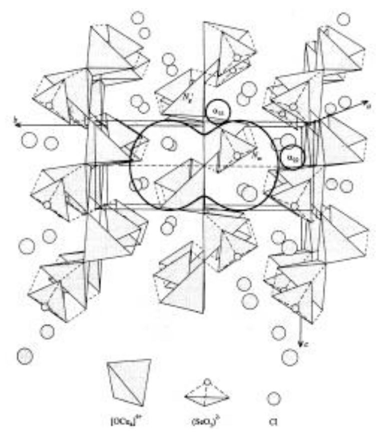
by S.V.Krivovichev, S.K.Filatov ,

S-Pb University Press, 2001, 199 p.

Classification is based on the following principles: - the structures with polyhedra of high valence cations - the structures without those. The scheme is shown on the table. It is based on the dimensionality of cationic and anionic complexes.
Next step assumes the division on types. For example in the 3rd subkingdom there is only one non-metallic element B and consequently there can be only one type. In the 4-th subkingdom types include compounds with metals and non-metallic elements , C, Si, Ge and Sn. Thus the total number of types is 19. It is impossible to divide the first two subkingdoms according this principle and we can consider that there is only one type in each of them. Thus the total number of types is 21 (19+2). Following biological system next subdivision should be called as class. The total number of classes is 52. However 5 were not found as minerals. Consequently there are 47 classes. The site of the classes in mineral system is defined by its symbol: Example: O-containing minerals , 61 (6 stands for 6b , subgroup, 1 , the site of O in the 6b , subgroup). Classes: carbonates , 6141 (C occupies the 1-st place in the 4b-subgroup); silicates , 6142; germanates , 6143; stannates , 6144.

$Cu_4O(AsO_4)_2$ *P*1	1.91	1.97	Staack, Müller-Buschbaum, 1996
$Pb_2O(CrO_4)$	2.30	2.78	Morita, Toda, 1984
$Pb_2O(SO_4)$	2.30	2.66	Sahl, 1970
$Pb_3O_2(SO_4)$ $P2_1/m$	2.32	2.80	Latrach et al., 1985b
$Pb_3O_2(SO_4)$ *Cmcm*	2.36	2.62	Mentzen et al., 1984b
$Pb_3O_2(SO_4)$ *P*1	2.32	2.76	Latrach et al., 1985a
$Pb_{19}(VO_4)_2O_9Cl_4$	2.32	2.77	Cooper, Hawthorne, 1994
$Pb_5O_3(GeO_4)$	2.32	2.54	Kato, 1979
$Pb_3O_2(CO_3)$	2.29	2.95	Krivosheev, Burns, 2000c
$Pb_8Cu(AsO_3)_2O_3Cl_5$	2.40	2.57	Pertlik, 1987
$La_3O_2(ReO_6)$ $P2_1/m$	2.38	2.60	Rae-Smith et al., 1984
$La_4O_2(Re_2O_8)$	2.41	2.57	Waltersson, 1976
$La_3O_2(ReO_6)$ *C*2	2.39	2.60	Band et al., 1979
$La_2[La_2O](Mo_2O_{10})$	2.40	2.56	Gall, Gougeon, 1992

Compound	$A-O_{a'}$	$A-O_{A''}$, Å	Reference
$Cu_5O_2(SeO_3)_2Cl_2$	1.95	2.00	Krivovichev et al., 1999a
$KCu_3OCl(SO_4)_2$	1.92	2.01	Varaksina et al., 1990
$Cu_2O(SO_4)$	1.92	1.99	Effenberger, 1985
$NaKCu_3O(SO_4)_3$	1.93	1.97	Scordery, Stasi, 1990
$K_2Cu_3O(SO_4)_3$	1.93	1.97	Starova et al., 1991
$Na_2Cu_4O(PO_4)_2Cl$	1.88	2.00	Etheredge, Hwu, 1995
$Cu_4O(PO_4)_2$	1.91	1.98	Brunel-Laught et al., 1978
$Cu_2O(SeO_3)$ $P2_1/n$	1.96	1.97	Effenberger, Pertlik, 1986
$Cu_2O(SeO_3)$ $P2_13$	1.94	2.02	Effenberger, Pertlik, 1986
$Cu_5O_2(VO_4)_2$	1.94	1.98	Shannon, Calvo, 1973
$Cu_5O_2(PO_4)_2$	1.93	1.96	Brunel-Laught, Guitel, 1977



In many cases the structural elements formed by anion centered tetrahedra correlate with physical properties. Example , georgbokiite [Cu5O2](SeO3)2Cl2 (thermal expansion, optical properties).