08.3-4 AN X-RAY AND NEUTRON POWDER DIFFRACTION STUDY OF TERNARY GAMMA BRASS PHASES. By E. Kisi, Department of Chemical and Materials Engineering, The University of Newcastle, Australia.

Rietveld analysis of X-ray and high resolution neutron powder diffraction data has been used to investigate the atomic ordering of ternary Cu-Al-Zn gamma brass alloys. These alloys have been taken from the continuous single phase region which connects the prototype binary gamma brasses Cu_5Zn_8 and Cu_9Al_4. Cu_5Zn_8 has space group $I\bar{4}3m$ and contains 52 atoms arranged in two identical clusters. Cu_9Al_4 with space group $P\bar{4}3m$ has 52 atoms but non identical clusters. (Pearson W.B.. Handbook of Lattice Spacings and Structures of Metals and Alloys, Pergamon 1964.)
The experimentally determined ordering scheme is detailed, related to the prototype ordering and discussed in terms of recent attempts to explain the occurrence of gamma brass structures (Brandon J.K., Brizard R.Y., Pearson W.B. and Tozer D.J.N., 1977, Acta Cryst. B33 527-537).

08.4-1 THE STRUCTURAL CLASSIFICATION OF SILICATES

G.B.Bokij. Inst.IGEM of the USSR Academy of Science

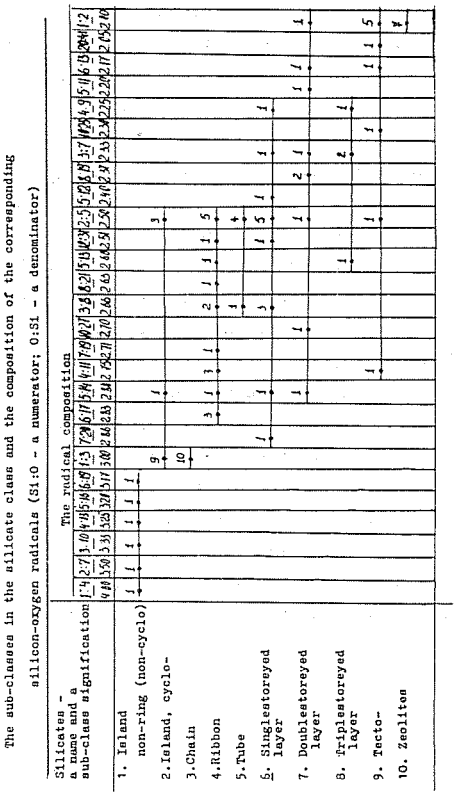
We suggest to divide the class of silicate minerals into ten subclasses or motives (see the Table), analogously to the classifications by F.Machatschki or by W.L.Bragg. In the Table, dots on the lines indicate the presence of minerals with corresponding ratio of Si:O in the motives and numbers near the dots show the number of the corresponding orders. We followed all names of taxa from the biological classification.

The order is the taxon immediately below the subclass. A subclass is divided into the orders according to the composition and the mode of linkage of silicon-oxygen tetrahedra which repeats in the structure. The number of orders in the whole class of silicates is about one hundred.

Each motive has a limit of existence according to the composition. Motives are arranged in the order of their dimensions of the tetrahedral linkages: i.e. 1 and 2 have zero, 3, 4 and 5 have one, 6, 7 and 8 have two, 9 and 10 have three dimensional structures. Among the motives with the same dimension, one having the order of the smaller Si:O ratio is placed before the other having orders of the lager ratios. The number of orders is subjected to a regularity of taking simple ratios (analogous to Dalton's law). Thus nearly 2/3 of the orders falls into the first five simplest Si:O ratios (1:2, 1:3, 2:3, 3:7 and 3:8) and more than a half of them falls in the first three.

We will discuss the advantage and necessity of this classification and will also present a detailed explanation about two representative orders: the first contains two reiterative silicon-oxygen tetrahedra and belongs to the chain motive, and the second has six-membered rings and belongs to the single storeyed layer motive.

The sub-classes in the silicate class and the composition of the corresponding silicon-oxygen radicals (Si:O - a numerator; O:Si - a denominator)



08.4-2 CALCIUM SHEET SILICATES: STRUCTURAL RELATIONSHIPS AND CRYSTAL CHEMISTRY. By Stefano Merlino, Dipartimento di Scienze della Terra, Universita' di Pisa, Italy.

A number of mineral phases (okenite, nekoite, reyerite, truscottite, fedorite, gyrolite, zeophillite), which are collected under the name of calcium sheet silicates because of their chemical composition and distinct basal cleavage, have attracted interest from mineralogists and crystal chemists due to the peculiarities of their structures and the presence of some of them as stable phases in the system $CaO\text{-}SiO_2\text{-}H_2O$, the most important in the chemistry of cements.
The structural study of the whole group of phases was completed with the recent determination of the crystal structure of gyrolite. The crystal chemistry of the various minerals may now be assessed on a sound structural basis. Moreover a comprehensive description of their structures in terms of common modules, sheets of calcium octahedra and silicon tetrahedra, clarifies the close relationships as well as the differences among the different phases.
The possibility of faults in the stacking of the sheets and the formation of polytypic variants are described and discussed.