NEW MINERALS AND ADVANCES IN INORGANIC CRYSTAL CHEMISTRY

FERRARIS GIOVANNI

New minerals and advances in inorganic crystal chemistryFERRARIS GIOVANNI - Dpt. Sci. Mineral. Petrol., Univ. Torino, Italy Several fundamentals of inorganic crystal chemistry have been established by analysing the crystal structures of minerals: from ionic radii to (i) Pauling rules, (ii) bond valence theory, and (iii) structural classification of the inorganic structures. In recent years, the increasing power of microanalytical methods has led to discovering an average of more than 50 new species per year. At the same time, (i) diffraction methods, (ii) electron microscopy and (iii) capability of directly solving or theoretically modeling the crystalline structures allow to disclose the atomic arrangements of practically any mineral species. In the field of inorganic compounds, by far the minerals show the most complex structures and an increasing number of complex anions is described; that, e.g., brought to a very sophisticated classification of silicates. Very fruitful results are nowadays coming from the recognition that some structural modules are recurrent and different crystalline structures are based on coherent intergrowths of the same module(s). The field of modular crystallography (which includes polytypes and even twins) is rapidly widening with the description of new (kinds of) polysomatic and homologous series. The modular approach is now a key for: (i) modeling unknown structures, if chemical and metrical relationships with known structures can be established; (ii) classification purposes, since minerals can be grouped into series; (iii) genetic purposes, since modules can survive through chemical reactions. Key examples from the author's research and literature shall be illustrated.