Crystal Structures and Topology of New and Rare Arsenates

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The crystal chemical phenomena (e.g. polyhedral stacking variations, microtwinning etc.) which accompany the formation of real structures are considered on the basis of the results of structural study of a large group of new and rare natural arsenates (pushcharovskite, tillmannsite, zdenekite and mahnertite). The use of synchrotron radiation allowed to perform the crystal structure investigation of these four new and rare minerals and to reveal their structural peculiarities and topology.

The structure of pushcharovskite is characterized by some structural disorder and contains heteropolyhedral sheets formed by Cu-polyhedra and As -tetrahedra and linked by hydrogen bonds.

The main peculiarity of tillmannsite structure is connected with unique tetrahedral clusters $(Ag_3Hg)^{3+}$ revealed in this mineral in which mercury is characterized by the low-valence state.

Mahnertite and zdenekite have close chemical composition but different symmetry. These minerals contain new type of mixed polyhedral sheets, which are characterized by the different mode of stacking.

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