

THE STRUCTURE OF SYNTHETIC ZIPPEITES

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Zippeites are secondary uranium-bearing minerals belonging to the group of basic uranyl sulfates. The compounds K, Na, Co, Ni, Mn, and Zn-zippeite were synthesized at elevated temperature and pressure resulting in well formed monoclinic crystals which were suitable for single crystal diffraction studies.

The crystal structures were solved by Patterson methods. All the studied compounds possess a layer structure. The U and S coordination polyhedra are located in parallel layers and are interconnected through cations, OH groups and water molecules. The coordination polyhedron around uranium is a pentagonal bipyramid similar to that found in other sulfate compounds.

Each uranium atom is surrounded by two apical O atoms and three equatorial hydroxyl groups and two equatorial oxygen atoms of sulfate. The $UO_4(OH)_3$ polyhedra form zigzag chains by sharing equatorial OH-pairs. In this way, a polymeric chain is built up from dimers of uranium atoms bounded by double OH-bridges.

These linked double polyhedra are connected to other $UO_4(OH)_3$ chains on both sides by chains of S polyhedra to form parallel layers.

The infrared spectra were recorded, and the most important absorption bands were assigned.

The optical parameters were determined.