Über die Struktur von synthetischem Tinsleyit $K[Al_2(PO_4)_2(OH)(H_2O)]\cdot H_2O$

The Structure of Synthetic Tinsleyite $K[Al_2(PO_4)_2(OH)(H_2O)]\cdot H_2O$

Stefan Dick

Süd-Chemie AG, Ostenriederstraße 15, D-85368 Moosburg

Sonderdruckanforderungen an Dr. St. Dick. Fax: +49-8761-82339.
E-mail: s.dick@sued-chemie.de

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Synthetic tinsleyite $K[Al_2(PO_4)_2(OH)(H_2O)]\cdot H_2O$ has been obtained by the reaction of gibbsite with a potassium-phosphate solution of pH = 7 at 423 K within five days. A single crystal X-ray structure analysis has shown that synthetic tinsleyite is isotypic with the mineral leucophosphite $K[Fe_2(PO_4)_2(OH)(H_2O)]\cdot H_2O$. Crystal data: monoclinic space group $P2_1/n$, a = 949.9(2), b = 950.3(2), c = 953, 5(2) pm, β = 103, 26(3)°, Z = 4. The structure of tinsleyite consists of tetranuclear Al_4O_2 units formed by a central pair of edge sharing AlO_6 octahedra, to which two additional AlO_6 octahedra are attached sharing corners. These units are crosslinked by phosphate ions to a three dimensional framework structure with tunnels along [010], occupied by potassium cations. While one type of water molecules is attached to Al, a second type is fixed in the structure by hydrogen bonds only. As a consequence two steps for thermal loss of water at 341 K and 471 K are observed.