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The crystal structures of synthetic $Fe_2(SO_4)_3(H_2O)_5$ and the type specimen of lausenite

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ABSTRACT

An iron sulfate of nominal composition $Fe_2(SO_4)_3(H_2O)_5$ has been synthesized and its structure determined and refined by high resolution powder diffraction using synchrotron radiation. The structure consists of corrugated slabs in which iron octahedra are linked by sulfate tetrahedra in the monoclinic space group $P2_1/m$ with lattice parameters a = 10.711(1), b = 11.085(1), and c = 5.5747(5) Å, β = 98.853(3)°. We compare these results with the type specimen of lausenite from Jerome, Arizona, which has monoclinic lattice parameters a = 10.679(2), b = 11.053(3), and c = 5.567(1) Å, β = 98.89(1)°. Weight loss experiments show that it is currently a pentahydrate, despite earlier reports that lausenite is a hexahydrate. We argue that our synthetic material provides a structure determination for the type specimen of lausenite.