

Single-crystal Raman spectroscopy of natural schafarzikite FeSb_2O_4 from Pernek, Slovak Republic

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ABSTRACT

We present the first single-crystal Raman spectra of the mineral schafarzikite FeSb_2O_4 from the Pernek locality of the Slovak Republic. In addition, Raman spectra of the natural mineral apuanite $\text{Fe}^{2+}\text{Fe}_4^{3+}\text{Sb}_4\text{O}_{12}\text{S}$, originating from the Apuan Alps in Italy, as well as spectra of synthetic ZnSb_2O_4 and the arsenite mineral trippkeite (CuAs_2O_4) are presented for the first time. The spectra of the antimonite minerals are characterized by a strong band in the region $660\text{--}680\text{ cm}^{-1}$ with shoulders on either side, and a band of medium intensity near 300 cm^{-1} . The spectrum of the arsenite mineral is characterized by a medium band near 780 cm^{-1} with a shoulder on the high wavenumber side and a strong band at 370 cm^{-1} . Mode assignments are proposed based on the spectral comparison between the compounds, symmetry modes of the bands and prior literature. The single-crystal spectra of schafarzikite showed good mode separation, allowing bands to be assigned to the symmetry species of A_{1g} , B_{1g} , B_{2g} , or E_g .

Keywords: Schafarzikite, trippkeite, apuanite, single-crystal Raman spectroscopy, antimonite