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Raman spectroscopic investigations of some Tl-sulfosalt minerals containing pyramidal $(As,Sb)S_3$ groups

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Abstract

Oriented single crystals of stibioellisite (Tl_3SbS_3), parapierrotite ($TlSb_5S_8$), weissbergite ($TlSbS_2$), and lorandite ($TlAsS_2$) were investigated by polarized Raman spectroscopy. Whereas stibioellsite shows isolated SbS_3 groups, the rest of the minerals show interconnected pyramidal $(As,Sb)S_3$ groups. Raman bands of the investigated minerals occur between 400 and 10 cm^{-1}. The internal vibrations for stibioellsite occur between 350–100 cm^{-1}. Those of the interconnected pyramidal groups occur between 350 and 10 cm^{-1} in parapierrotite, 350 and 90 cm^{-1} in weissbergite, and 420 and 130 cm^{-1} in lorandite. Approximate similarities in the spectral features are evident when comparing the spectra of minerals containing XS_3 pyramids with the spectra of the minerals in the present study. A clear distinction between Raman spectra of separated and interconnected SbS_3 groups is not observed.

Keywords: Stibioellisite, parapierrotite, weissbergite, lorandite, Raman spectroscopy, pyramidal $(As,Sb)S_3$ groups