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Optical band gaps of selected ternary sulfide minerals

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Abstract

Optical band gaps for a set of 23 ternary and quaternary sulfide minerals have been measured by diffuse reflectance spectroscopy. Comparison of band gaps measured by diffuse reflectance with band gaps determined by single-crystal methods for 12 binary sulfides demonstrates that the diffuse reflectance measurement produces results accurate to within 0.1 eV. Unlike the band gaps of binary sulfides that plot linearly with various measures of bond energy, the ternary and quaternary sulfides cluster within ranges determined by the chemical composition. The band gaps for the ternary and quaternary sulfides tend to lie between the band gaps of the component binary sulfides.