American Mineralogist, Volume 84, pages 400–406, 1999

Gillulyite $Tl_2(As,Sb)_8S_{13}$: Reinterpretation of the crystal structure and order-disorder phenomena*

Emil Makovicky† and Tonci Balić-Žunić

Geological Institute, University of Copenhagen, Øster Voldgade 10, DK 1350 Copenhagen K, Denmark

Abstract

The crystal structure of gillulyite $Tl_2(As, Sb)_8 S_{13}$ was reinterpreted based on the average structure determined by Foit et al. (1995). It consists of alternating PbS-like slabs comprised of As-S polyhedra and Tl-bearing slabs with partly zeolitic properties. In the latter, TlS_5 and As_2S_5 groups alternate regularly along the *b* direction and across the width of the slab, thus eliminating the need for S-S and As-As bonds postulated by Foit et al. (1995). These two types of slabs are also unit order-disorder (OD) layers, the ambiguities in stacking of which lead to several potential gillulyite polytypes. The actually observed OD phenomena are caused by ambiguity in the position of [010] TlS_5-As_2S_5 sequences (or of entire such layers), which can with equal probability assume two positions 1*b* apart.