American Mineralogist, Volume 83, pages 365–372, 1998

Stacking disorder and polytypism in enargite and luzonite

MIHÁLY PÓSFAI[1,*] **AND MARGARETA SUNDBERG**[2]

[1]Department of Earth and Environmental Sciences, University of Veszprém, P.O. Box 158, H-8201 Veszprém, Hungary
[2]Department of Inorganic Chemistry, Arrhenius Laboratory, Stockholm University, S-106 91 Stockholm, Sweden

ABSTRACT

Microstructures of enargite and luzonite (Cu_3AsS_4) were studied using high-resolution transmission electron microscopy (HRTEM) and selected-area electron diffraction (SAED). Enargite and luzonite are intergrown at the atomic level in samples from Recsk, Hungary. Both minerals typically contain faults along the planes of their close-packed layers. Comparisons of electron micrographs and images simulated for several types of fault models indicate that the planar defects can be interpreted as stacking faults in the regular cubic (luzonite) or hexagonal (enargite) sequence of close-packed layers. In addition to disordered layer sequences, two long-period, rhombohedral polytypes—9R, $(21)_3$ and 24R, $(311111)_3$—occur in enargite. The presence of defect-free luzonite and enargite indicates that both minerals grew directly from the hydrothermal solution. The disordered structures represent transitional structural states between luzonite and enargite and probably reflect the effects of fluctuating conditions during hydrothermal deposition.