

Near end-member shenzhuangite, NiFeS₂, found in Muong Nong-type tektites from Laos

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ABSTRACT

Australasian Muong Nong-type tektites from the locality centered at 16.46150° N, 106.48917° E in Laos contain sporadic spherical heterogeneous sulfide inclusions less than 10 μm in diameter, which have been identified by electron probe microanalyzer and electron backscatter diffraction to represent a mixture of rare mineral shenzhuangite with a pyrrhotite polytype (possibly troilite). Contrary to type shenzhuangite found in the shocked L6 chondrite Suizhou, the mineral embedded in the tektite glass is nearly free of copper, making the composition close to its expected end-member that has not yet been found in nature; the empirical formula closest to ideal end-member composition based on four atoms per formula unit is Ni_{1.007}Fe_{0.998}Cu_{0.016}Co_{0.058}S_{1.922}. The described occurrence also represents the first find of shenzhuangite in terrestrial material. Presented is the Raman spectrum for shenzhuangite with the tentative assignment of spectral bands based on the analogy with synthetic chalcopyrite-structured phases. The chemical composition of shenzhuangite close to NiFeS₂ is not consistent with any stable phase in the Fe–Ni–S system up to melting temperature. Available data so far on phase relations in this system do not allow unambiguous interpretation of conditions under which the sulfide association within inclusions had formed.

Keywords: Shenzhuangite, tektites, Australasian strewn field, electron backscatter diffraction, electron probe microanalysis, Raman spectroscopy, meteoritic component