

Sorosite, Cu(Sn,Sb), a new mineral from the Baimka placer deposit, western Chukotka, Russian Far East

ANDREI Y. BARKOV,^{1,*} KAUKO V.O. LAAJOKI,¹ STANISLAV S. GORNOSTAYEV,²
YAKOV A. PAKHOMOVSKII,³ AND YURI P. MEN'SHIKOV³

¹Institute of Geosciences, University of Oulu, FIN-90570 Oulu, Finland

²National Mining University of Ukraine, 19 Karl Marx Avenue, 320027 Dnepropetrovsk, Ukraine

³Geological Institute, Kola Science Center, Russian Academy of Sciences, 14 Fersman Street, 184200 Apatity, Russia

ABSTRACT

Sorosite, ideally Cu(Sn,Sb), is a new mineral species from the Baimka gold-platinum-group mineral placer deposit, Chukotka, Russian Far East. It occurs as large subhedral to euhedral crystals (0.1–0.4 mm in length), hexagonal in cross section, minute crystals ($\leq 15 \mu\text{m}$, also hexagonal), and anhedral grains. Sorosite forms inclusions in Sb-bearing native tin, is often intergrown with stistaite ($\text{Sn}_{1.12-1.13}\text{Sb}_{0.87-0.88}$) and occurs with herzenbergite (SnS), native lead, and trace cassiterite. Sorosite is brittle with a microhardness $\text{VHN}_{40:50} = 443.7 \text{ kg/mm}^2$ ($n = 3$). No cleavage is observed. In reflected light, the large crystals are nearly white with a pinkish tint, whereas the microcrystals show a pronounced pinkish tint. Bireflectance is variable. The average of nine electron microprobe analyses gave Cu 35.33, Fe 1.18, Sn 58.18, and Sb 4.77, sum 99.46 wt%, corresponding to $(\text{Cu}_{1.00}\text{Fe}_{0.04})_{\Sigma 1.04}(\text{Sn}_{0.89}\text{Sb}_{0.07})_{\Sigma 0.96}$. The powder pattern is close to those of natural Cu(Sn,Sb) and synthetic $\eta\text{-Cu}_6\text{Sn}_6$; it was indexed for a hexagonal cell, with $a = 4.217(4) \text{ \AA}$, $c = 5.120(6) \text{ \AA}$, and $V = 78.85 \text{ \AA}^3$. For $Z = 2$, the calculated density is 7.6 g/cm^3 . The strongest lines in the pattern are at 2.970 (011), 2.112 (110), and 2.094 \AA (012). The sorosite-bearing mineral assemblage apparently formed under low f_{O_2} and f_{S_2} conditions.