

# Tintinaite

# $\text{Cu}_2\text{Pb}_{10}(\text{Sb}, \text{Bi})_{16}\text{S}_{35}$

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**Crystal Data:** Orthorhombic. *Point Group:*  $2/m\ 2/m\ 2/m$ . As blades forming parallel aggregates, to 2 mm; in small masses and veinlets.

**Physical Properties:** *Cleavage:* Distinct on {010}. *Hardness* = n.d. *VHN* = n.d. *D*(meas.) = 5.48 *D*(calc.) = 5.51

**Optical Properties:** Opaque. *Color:* Lead-gray. *Streak:* Black. *Luster:* Metallic.

$R_1$ – $R_2$ : (400) 39.3–44.5, (420) 39.0–44.3, (440) 38.8–44.0, (460) 38.5–43.7, (480) 38.2–43.6, (500) 38.1–43.8, (520) 38.0–43.8, (540) 37.9–43.6, (560) 37.9–43.3, (580) 37.3–42.6, (600) 36.7–41.8, (620) 36.0–41.0, (640) 35.6–40.8, (660) 35.5–40.3, (680) 34.9–39.7, (700) 34.2–38.5

**Cell Data:** *Space Group:*  $Pn\bar{m}$ .  $a = 22.30$   $b = 34.00$   $c = 4.04$   $Z = 2$

**X-ray Powder Pattern:** Tintina mine, Canada.

3.40 (100), 3.51 (80), 2.71 (70), 2.022 (60), 2.87 (50), 3.96 (40), 3.27 (40)

## Chemistry:

	(1)	(2)	(3)
Pb	40.97	42.3	41.05
Cu	2.21		
Ag	0.12		
Sb	34.96	17.6	30.68
Bi		23.0	5.3
As			0.84
S	21.33	20.0	21.7
Total	99.59	102.9	99.57

(1) Tintina mine, Canada; by electron microprobe, corresponding to  $\text{Cu}_{1.85}\text{Ag}_{0.06}\text{Pb}_{10.50}\text{Sb}_{15.11}\text{S}_{35.00}$ . (2) Rossland, Canada; by electron microprobe, corresponding to  $\text{Pb}_{11.46}(\text{Sb}_{8.41}\text{Bi}_{6.41})_{\Sigma=14.82}\text{S}_{35.00}$ . (3) Shexingping mine, China; by electron microprobe, corresponding to  $\text{Pb}_{10.25}(\text{Sb}_{13.03}\text{Bi}_{1.31}\text{As}_{0.58})_{\Sigma=14.92}\text{S}_{35.00}$ .

**Polymorphism & Series:** Forms a series with kobellite.

**Occurrence:** As small masses and veinlets in malachite-stained quartz (Tintina mines, Canada).

**Association:** Jamesonite, argentian tetrahedrite, galena, sphalerite, pyrite, arsenopyrite, marcasite, bournonite, owyheeite, pyrrotite, chalcopyrite (Tintina mines, Canada); joséite, kobellite (Boliden, Sweden).

**Distribution:** In Canada, from the Tintina silver mines, Watson Lake, Yukon Territory [TL]; at the Deer Park mine, Rossland, British Columbia. In the Cofer deposit, near Mineral, Louisa Co., Virginia, USA. From Boliden, Västerbotten, Sweden. In Slovakia, at the Mária mine, Rožňava, and in the Däbrava deposit, Low Tatra Mountains. From the Shexingping mine, Cheng Co., Hunan Province, China. In the Srednegolgotaiskoe gold deposit, eastern Transbaikalia, Siberia, Russia.

**Name:** For the Tintina mines, Canada.

**Type Material:** Geological Survey of Canada, Ottawa, 12133 (Tintina material); Royal Ontario Museum, Toronto, Canada, M27173 (Rossland material).

**References:** (1) Harris, D.C., J.L. Jambor, G.R. Lachance, and R.I. Thorpe (1968) Tintinaite, the antimony analogue of kobellite. *Can. Mineral.*, 9, 371–382. (2) (1969) *Amer. Mineral.*, 54, 573 (abs. ref. 1). (3) Moëlo, Y., J.L. Jambor, and D.C. Harris (1984) Tintinaïte et sulfosels associés de Tintina (Yukon): la cristallographie de la série de la kobellite. *Can. Mineral.*, 22, 219–226 (in French with English abs.). (4) Criddle, A.J. and C.J. Stanley, Eds. (1993) Quantitative data file for ore minerals, 3rd ed. Chapman & Hall, London, 577.

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