Sicherite $TlAg_2(As, Sb)_3S_6$

Crystal Data: Orthorhombic. *Point Group*: 2/*m* 2/*m* 2/*m*. Crystals to ~0.4 mm, are elongated along [100], dominated by {141}, with {001}, {010}, {031}, and {301}; in aggregates to 2 mm.

Physical Properties: *Cleavage*: None. *Fracture*: Uneven to conchoidal. *Tenacity*: Brittle. Hardness = ~3 VHN = 57-59, 58.3 average (10 g load). D(meas.) = n.d. D(calc.) = 5.26

Optical Properties: Opaque. *Color*: Dark metallic gray, pure white in reflected light. *Streak*: Dark brown-red. *Luster*: Metallic.
Optical Class: *Anisotropism*: Extremely weak in air.
R_1-R_2: (470) 31.43-33.43 $(15.98\text{-}18.41)_{oil}$, (546) 28.31-30.52 $(13.48\text{-}15.80)_{oil}$, (589) 27.10-29.11 $(12.54\text{-}14.56)_{oil}$, (650) 25.57-27.44 $(11.36\text{-}13.17)_{oil}$

Cell Data: *Space Group*: *Pmnb*. a = 12.479(3) b = 15.522(4) c = 5.719(4) Z = 4

X-ray Powder Pattern: Lengenbach quarry, Binntal, Switzerland.
2.822 (100), 3.363 (50), 3.118 (27), 3.210 (26), 3.29 (23) 2.540 (17), 3.655 (16)

Chemistry:

	(1)	(2)
Tl	23.63	23.36
Ag	23.98	24.66
Cu	0.22	
As	19.08	18.85
Sb	10.96	11.14
S	21.65	21.99
Total	99.53	100.00

(1) Lengenbach quarry, Binntal, Switzerland; average electron microprobe analysis; corresponding to $Tl_{1.02}Ag_{1.96}Cu_{0.03}(As_{2.24}Sb_{0.80})_{\Sigma=3.04}S_{5.95}$. (2) $TlAg_2(As_{2.2}Sb_{0.8})_{\Sigma=3}S_6$.

Occurrence: In cavities in dolomitic rock; the product of late-stage Tl-As-bearing hydrothermal solutions during metamorphism.

Association: Realgar, hutchinsonite, hatchite, jentschite.

Distribution: From Lengenbach quarry, Binntal, Valais Canton, Switzerland.

Name: Honors Valentin *Sicher* (b. 1925), active member in the Lengenbach syndicates since 1963 who contributed greatly to specimen recovery efforts at Lengenbach for research and collectors.

Type Material: Department of Mineralogy, Natural History Museum, Basel, Switzerland.

References: (1) Graeser, S., P. Berlepsch, E. Makovicky, and T. Balić-Zŭnić (2001) Sicherite, $TlAg_2(As,Sb)_3S_6$, a new sulfosalt mineral from Lengenbach (Binntal, Switzerland): Description and structure determination. Amer. Mineral., 86(9), 1087-1093.