

Hatchite

(Pb, Tl)₂(Ag, Cu)As₂S₅

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Crystal Data: Triclinic. *Point Group:* $\bar{1}$ or 1. As euhedral crystals, to 0.7 mm.

Physical Properties: Hardness = n.d. VHN = n.d. D(meas.) = n.d. D(calc.) = 5.8

Optical Properties: Opaque to subtranslucent. *Color:* Lead-gray; dark red in transmitted light. *Streak:* Chocolate-brown.

R₁–R₂: n.d.

Cell Data: *Space Group:* P1 or $P\bar{1}$. $a = 9.22(1)$ $b = 7.84(1)$ $c = 8.06(1)$
 $\alpha = 66^\circ 25(15)'$ $\beta = 65^\circ 17(15)'$ $\gamma = 74^\circ 5(15)'$ $Z = 2$

X-ray Powder Pattern: Binntal, Switzerland.

3.314 (100), 2.863 (90), 3.401 (80), 3.569 (40), 4.54 (30), 4.28 (30), 3.750 (20)

Chemistry:

	(1)	(2)	(3)
Pb	25.5	24.6	24.97
Tl	25.5	24.5	24.64
Ag	8.8	10.9	13.00
Cu	3.0	0.95	
As	17.0	20.7	18.06
Sb	1.5		
S	18.6	19.0	19.33
Total	99.9	100.65	100.00

(1) Binntal, Switzerland; by electron microprobe, corresponds to $(\text{Pb}_{0.99}\text{Tl}_{1.01})_{\Sigma=2.00}$
 $(\text{Ag}_{0.66}\text{Cu}_{0.38})_{\Sigma=1.04}(\text{As}_{1.82}\text{Sb}_{0.10})_{\Sigma=1.93}\text{S}_{4.68}$. (2) Do.; corresponds to $(\text{Pb}_{1.00}\text{Tl}_{1.00})_{\Sigma=2.00}$
 $(\text{Ag}_{0.85}\text{Cu}_{0.12})_{\Sigma=0.97}\text{As}_{2.32}\text{S}_{4.97}$. (3) $(\text{Pb, Tl})_2\text{AgAs}_2\text{S}_5$ with Pb:Tl = 1:1.

Occurrence: Of hydrothermal origin, in crystalline dolostone.

Association: Wallisite, hutchinsonite, jentschite, sicherite, edenharterite, bernardite, stalderite, lorandite, realgar, orpiment.

Distribution: From the Lengenbach quarry, Binntal, Valais, Switzerland [TL].

Name: To honor Dr. Frederick Henry Hatch (1864–1932), American geologist and mining engineer.

Type Material: The Natural History Museum, London, England, 1913,399.

References: (1) Palache, C., H. Berman, and C. Frondel (1944) Dana's system of mineralogy, (7th edition), v. I, 487. (2) Nowacki, W., G. Burri, P. Engel, and F. Marumo (1967) Über einige Mineralstufen aus dem Lengenbach (Binntal) II. Neues Jahrb. Mineral., Monatsh., 43–48 (in German with English abs.). (3) Marumo, F., W. Nowacki, C. Bahezre, and G. Burri (1967) The crystal structure of hatchite. Zeits. Krist., 125, 249–265. (4) Berry, L.G. (1969) The crystallography of hatchite. Indian Mineralogist, 10, 165–173.