Philrothite $TlAs_3S_5$

Crystal Data: Monoclinic. *Point Group*: 2/*m*. As irregular grains to 200 μm.

Physical Properties: *Cleavage*: None. *Fracture*: Uneven. *Tenacity*: Brittle. Hardness = 3-3.5 VHN = 120-137 (25 g load). D(meas.) = n.d. D(calc.) = 4.635

Optical Properties: Opaque. *Color*: Black. *Streak*: Dark brown. *Luster*: Metallic. *Bireflectance:* Moderate. *Pleochroism:* Weak, dark gray to light gray. *Anisotropism:* Gray to bluish gray.
Optical Class: n.d.
R_1-R_2: (471) 26.5-28.8, (548) 25.4-27.2, (586) 24.6-26.3, (652) 24.0-25.1

Cell Data: *Space Group*: $P2_1/c$. a = 8.013(2) b = 24.829(4) c = 11.762(3) β = 132.84(2)°
Z = 8

X-ray Powder Pattern: Calculated pattern.
3.677 (100), 2.764 (77), 2.769 (76), 12.415 (52), 2.894 (52), 2.324 (52), 3.015 (46)

Chemistry:

	(1)	(2)
Tl	26.28	34.67
Pb	6.69	
Ag	2.50	
Cu	0.04	
Hg	0.07	
As	32.50	38.13
Sb	3.15	
S	26.35	27.20
Total	97.58	100.00

(1) Lengenbach quarry, Valais, Switzerland; average of 5 electron microprobe analyses, corresponding to $(Tl_{0.79}Pb_{0.20})_{\Sigma=0.99}(As_{2.66}Sb_{0.16}Ag_{0.14}Cu_{<0.01}Hg_{<0.01})_{\Sigma=2.97}S_{5.04}$. (2) $TlAs_3S_5$.

Occurrence: A product of late-stage Tl- and As-bearing hydrothermal solutions during alpine metamorphism.

Association: Realgar, smithite, rutile, sartorite.

Distribution: From the Lengenbach quarry, Binn Valley, Valais, Switzerland.

Name: Honors Philippe Roth (b. 1963), President of the FGL (Forschungsgemeinschaft Lengenbach) and an expert on Lengenbach minerals.

Type Material: Museum of Mineralogy, Department of Geosciences, University of Padova, Italy (MMP M12605).

References: (1) Bindi, L., F. Nestola, E. Makovicky, A. Guastoni, and L. De Battisti (2014) Tl-bearing sulfosalt from the Lengenbach quarry, Binn Valley, Switzerland: Philrothite, $TlAs_3S_5$. Mineral. Mag., 78(1), 1-9. (2) (2014) Amer. Mineral., 99, 1810 (abs. ref. 1).