Chalcothallite $Tl_2(Cu,Fe)_6SbS_4$

Crystal Data: Tetragonal. *Point Group:* $4/m\ 2/m\ 2/m$. As lamellar aggregates, to 2 cm. *Twinning:* A fine grid of lamellae are visible parallel to {110} and $\{1\bar{1}0\}$.

Physical Properties: *Cleavage:* Perfect on {001}, indistinct on {100} and {010}. *Tenacity:* Plastic, tectonically deformed. Hardness = 2–2.5 VHN = 68–76, average 71, on {001} (50 g load). D(meas.) = 6.6 D(calc.) = [6.74]

Optical Properties: Opaque. *Color:* Lead-gray to iron-black, tarnishes iridescent; creamy white to pale gray, with a brownish creamy tint in reflected light. *Streak:* Black. *Luster:* Metallic. *Pleochroism:* Notable in air. *Anisotropism:* Distinct in orange to red-browns. R_1–R_2: (400) 27.6–31.0, (420) 27.1–30.5, (440) 26.5–30.1, (460) 26.0–29.6, (480) 25.5–29.2, (500) 25.1–28.8, (520) 24.9–28.4, (540) 24.7–28.1, (560) 24.6–27.7, (580) 24.7–27.3, (600) 24.7–26.9, (620) 24.8–26.6, (640) 24.8–26.2, (660) 24.8–26.0, (680) 24.9–25.7, (700) 24.9–25.5

Cell Data: *Space Group:* $I4/mmm$. $a = 3.827(1)$ $c = 34.280(1)$ $Z = 2$

X-ray Powder Pattern: Ilímaussaq intrusion, Greenland.
2.447 (10), 1.913 (10), 3.803 (7), 3.015 (7), 3.630(5), 2.704 (5), 2.580 (5)

Chemistry:

	(1)	(2)
Tl	33.72	36.2
K	0.79	
Cu	34.33	32.7
Ag	1.78	
Pb	0.08	
Fe	3.78	3.9
Sb	11.96	11.2
Se	0.02	
S	12.52	13.05
Total	98.98	97.05

(1) Ilímaussaq intrusion, Greenland; by electron microprobe, corresponding to $(Tl_{1.69}K_{0.21})_{\Sigma=1.90}(Cu_{5.53}Fe_{0.69}Ag_{0.17})_{\Sigma=6.39}Sb_{1.01}S_{4.00}$. (2) Do.; by electron microprobe, corresponding to $Tl_{1.74}(Cu_{5.06}Fe_{0.69})_{\Sigma=5.75}Sb_{0.90}S_{4.00}$.

Occurrence: In ussingite veins cutting poikilitic sodalite syenite.

Association: Galena, vrbaite, cuprostibite, thalcusite, silver, gudmundite, chalcocite, sphalerite, molybdenite, avicennite, chkalovite, epistolite, niobophyllite, analcime, natrolite, microcline, lithium-mica, tugtupite.

Distribution: From Mt. Nákâlâq, northwest of Taseq Lake, in the Ilímaussaq intrusion, southern Greenland.

Name: For the composition.

Type Material: National School of Mines, Paris, France.

References: (1) Semenov, E.I., H. Sørensen, M.S. Bezsmertnaya, and L.E. Novorossova (1967) Chalcothallite, a new sulphide of copper and thallium from the Ilímaussaq alkaline intrusion, South Greenland. Medd. Grønland, 181, 13–25. (2) (1968) Amer. Mineral., 53, 1775 (abs. ref. 1). (3) Kovalenker, V.A., I.P. Laputina, Y.I. Semenov, and T.L. Evstigneeva (1978) Potassium-bearing thalcusite from the Ilimaussak pluton and new data on chalcothallite. Doklady Acad. Nauk SSSR, 239, 1203–1206 (in Russian). (4) Makovicky, E., Z. Johan, and S. Karup-Møeller (1980) New data on bukovite, thalcusite, chalcothallite and rohaite. Neues Jahrb. Mineral., Abh., 138, 122–146.