

**Crystal Data:** Orthorhombic. *Point Group:* n.d. As crystal laths, to 100  $\mu\text{m}$ ; also massive.

**Physical Properties:** Hardness = n.d. VHN = 78 (15 g load). D(meas.) = n.d.  
D(calc.) = 6.59

**Optical Properties:** Opaque. *Color:* Pale gray to white. *Luster:* Metallic.  
*Pleochroism:* Distinct, pale gray to blue-gray. *Anisotropism:* Strong, creamy white to dark blue.  
 $R_1$ – $R_2$ : (400) 21.2–25.1, (420) 19.9–25.2, (440) 19.6–25.3, (460) 19.3–25.4, (480) 19.0–25.5, (500) 18.6–25.6, (520) 18.3–25.6, (540) 17.8–25.5, (560) 17.4–25.4, (580) 16.9–25.1, (600) 16.3–25.0, (620) 15.5–24.5, (640) 15.0–24.2, (660) 14.2–23.7, (680) 13.4–23.1, (700) 12.5–22.4

**Cell Data:** *Space Group:* n.d.  $a = 8.227$   $b = 11.982$   $c = 6.441$   $Z = 4$

**X-ray Powder Pattern:** Martin Lake mine, Canada.  
3.235 (100), 1.997 (80), 3.015 (60), 1.893 (50), 1.664 (40), 3.44 (30), 1.817 (30)

Chemistry:	(1)	(2)	(3)
Ag		0.43	
Cu	51.1	50.96	50.15
Se	49.7	46.64	49.85
S		2.12	
Total	100.8	100.15	100.00

(1) Martin Lake mine, Canada; by electron microprobe; corresponds to  $\text{Cu}_{5.11}\text{Se}_{4.00}$ .

(2) Chaméane mine, France; by electron microprobe; corresponds to  $(\text{Cu}_{4.88}\text{Ag}_{0.02})_{\Sigma=4.90}(\text{Se}_{3.60}\text{S}_{0.40})_{\Sigma=4.00}$ .

(3)  $\text{Cu}_5\text{Se}_4$ .

**Occurrence:** As inclusions in and replacements of umangite, as stringers and veinlets in carbonate veins cutting basalt (Martin Lake mine, Canada).

**Association:** Umangite, clausthalite, eucairite, berzelianite, sulfatian berzelianite, klockmannite, eskebornite, tyrrellite, copper, silver, uraninite, hematite, pyrite, calcite, barite, quartz, feldspar (Martin Lake mine, Canada); berzelianite, eucairite, crookesite, tyrrellite, ferroselite, bukovite, krutaite, calcite, dolomite (Petrovice, Czech Republic); umangite, berzelianite (Sierra de Umango, Argentina).

**Distribution:** At the Martin Lake mine, northeast of Martin Lake, Saskatchewan, Canada [TL]. In the Petrovice uranium deposit, near Žďár; the Předbořice uranium deposit, near Krásna Hora; and on Koksín Hill, near Mitov, Czech Republic. At the Chaméane uranium mine, near Vernet-la-Varenne, Puy-de-Dôme, France. From Skrikerum, near Tryserum, Kalmar, Sweden. At Sierra de Umango, La Rioja Province, Argentina.

**Name:** For Lake Athabasca, northern Saskatchewan, Canada.

**Type Material:** National Museum of Canada, Ottawa; Royal Ontario Museum, Toronto, Canada, M29432.

**References:** (1) Harris, D.C., L.J. Cabri, and S. Kaiman (1970) Athabascaite: a new copper selenide mineral from Martin Lake, Saskatchewan. *Can. Mineral.*, 10, 207–215. (2) (1971) *Amer. Mineral.*, 56, 632 (abs. ref. 1). (3) Johan, Z., P. Picot, and F. Ruhlmann (1982) Evolution paragenétique de la minéralisation uranifère de Chaméane (Puy-de-Dôme) France: chaméanite, geffroyite et giraudite, trois séléniures nouveaux de Cu, Fe, Ag, and As. *Tschermaks Mineral. Petrog. Mitt.*, 29, 151–167 (in French with English abs.).