

**Crystal Data:** Hexagonal. *Point Group:*  $6/m\ 2/m\ 2/m$ . As granular aggregates, some with thick and thin tabular grains.

**Physical Properties:** *Cleavage:* Perfect on {0001}. *Hardness* = 2–3 *VHN* = 82–104 (100 g load). *D*(meas.) = 5.99 (synthetic). *D*(calc.) = 6.12

**Optical Properties:** Opaque. *Color:* Slate-gray, tarnishing to blue-black. *Luster:* Metallic when freshly broken, soon becoming dull. *Anisotropism:* Strong; brownish gray to gray-white.  $R_1$ – $R_2$ : (400) 16.2–38.9, (420) 16.6–40.2, (440) 16.9–40.8, (460) 17.0–40.6, (480) 17.0–40.2, (500) 17.0–39.6, (520) 16.8–38.9, (540) 16.4–38.0, (560) 15.8–37.0, (580) 15.0–36.0, (600) 14.3–34.7, (620) 13.9–33.6, (640) 13.9–32.5, (660) 14.5–31.5, (680) 15.8–30.5, (700) 17.7–29.9

**Cell Data:** *Space Group:*  $P6_3/mmc$ .  $a = 3.938$   $c = 17.25$   $Z = 6$

**X-ray Powder Pattern:** Synthetic.  
2.88 (100), 3.18 (90), 1.969 (80), 3.34 (60), 1.821 (60), 1.623 (50), 2.00 (40)

<b>Chemistry:</b>	(1)	(2)
Cu	44.7	44.59
Ag	0.3	
Se	54.1	55.41
Total	99.1	100.00

(1) Locality uncertain; by electron microprobe. (2) CuSe.

**Occurrence:** Of hydrothermal origin, in deposits rich in copper and tellurium.

**Association:** Clausthalite, umangite, eucairite, berzelianite, crookesite, chalcocite.

**Distribution:** In Argentina, from the Sierra de Umango [TL], and in the Santa Brígida mine and at Tuminico, Sierra de Cacho, La Rioja Province; from Cerro de Cacheuta, Mendoza Province. At Lerbach, Tilkerode, and Zorge, Harz Mountains, Germany. From Skrikerum, Kalmar, Sweden. In the Czech Republic, at Bukov, near Tisnova; in the Petrovice uranium deposit, near Ždár; and the Předbořice uranium deposit, near Krásna Hora. In the Pinky Fault uranium deposit, Lake Athabasca, Saskatchewan, and at the Ranwick uranium mine, north of Sault Ste Marie, Ontario, Canada. From Mexico, at the Moctezuma (Bambolla) mine, 12 km south of Moctezuma, Sonora. In Australia, at the Dianne mine, near Mareeba, Queensland.

**Name:** For Professor Friedrich Ferdinand Hermann Klockmann (1858–1937), German mineralogist, Technical High School, Aachen, Germany.

**Type Material:** n.d.

**References:** (1) Palache, C., H. Berman, and C. Frondel (1944) Dana's system of mineralogy, (7th edition), v. I, 251. (2) Earley, J.W. (1949) Studies of natural and artificial selenides: I. Klockmannite, CuSe. *Amer. Mineral.*, 34, 435–440. (3) Berry, L.G. (1954) The crystal structure of covellite, CuS and klockmannite, CuSe. *Amer. Mineral.*, 39, 504–509. (4) Effenberger, H. and F. Pertlik (1981) Ein Beitrag zur Kristallstruktur von  $\alpha$ -CuSe (Klockmannit). *Neues Jahrb. Mineral., Monatsh.*, 197–205 (in German with English abs.). (5) Milman, V. (2002) Klockmannite, CuSe: structure, properties and phase stability from *ab initio* modeling. *Acta Cryst.*, 437–447. (6) Berry, L.G. and R.M. Thompson (1962) X-ray powder data for the ore minerals. *Geol. Soc. Amer. Mem.* 85, 68. (7) Criddle, A.J. and C.J. Stanley, Eds. (1993) Quantitative data file for ore minerals, 3rd ed. Chapman & Hall, London, 290.