

**Crystal Data:** Tetragonal. *Point Group:*  $\bar{4}2m$ . Grains, to 1 mm, in massive sulfides, and as intergrowths with haycockite.

**Physical Properties:** Hardness = n.d. VHN = 240–246 (100 g load). D(meas.) = 4.36  
D(calc.) = 4.37

**Optical Properties:** Opaque. *Color:* Pale yellow in reflected light, tarnishes to pinkish brown and purple. *Luster:* Metallic.

R: (400) 14.3, (420) 16.7, (440) 20.0, (460) 23.9, (480) 27.5, (500) 30.6, (520) 33.2, (540) 35.2, (560) 36.7, (580) 37.8, (600) 38.8, (620) 39.4, (640) 40.0, (660) 40.2, (680) 40.3, (700) 40.4

**Cell Data:** *Space Group:*  $P\bar{4}2m$ .  $a = 10.585(5)$   $c = 5.383(5)$   $Z = 1$

**X-ray Powder Pattern:** Mooihoek mine, South Africa.

3.06 (10), 1.881 (8), 1.593 (6), 1.081 (6), 1.219 (5), 1.870 (5), 1.321 (4)

**Chemistry:**

	(1)	(2)	(3)
Cu	35.91	34.08	36.02
Fe	31.88	32.47	31.66
Ni	0.26	0.24	
S	32.44	32.84	32.32
Total	100.49	99.65	100.00

(1) Bushveld complex, South Africa; by electron microprobe, average of 13 analyses; corresponding to  $(\text{Cu}_{8.94}\text{Ni}_{0.07})_{\Sigma=9.01}\text{Fe}_{9.03}\text{S}_{16.00}$ . (2) Minnesota, USA; by electron microprobe, average of four analyses; corresponding to  $(\text{Cu}_{9.04}\text{Ni}_{0.06})_{\Sigma=9.10}\text{Fe}_{9.08}\text{S}_{16.00}$ . (3)  $\text{Cu}_9\text{Fe}_9\text{S}_{16}$ .

**Occurrence:** In massive sulfide from a pipe-shaped dunite pegmatite in the Norite Zone of the Bushveld complex (Mooihoek mine, South Africa); in troctolite from the basal Duluth Gabbro complex (Minnesota, USA).

**Association:** Haycockite, magnetite, troilite, cuprian pentlandite, mackinawite, sphalerite, moncheite (Mooihoek Farm, South Africa); haycockite, copper, troilite, pentlandite, cubanite, magnetite (Minnesota, USA).

**Distribution:** In South Africa, from Transvaal, in the Mooihoek mine, Lydenburg district [TL], and from the Townlands pipe, Rustenburg. At the Duluth Gabbro complex, near Hibbing, St. Louis Co., Minnesota, USA. From the Talnakh area, Noril'sk region, western Siberia, Russia. At Krzemianka, Poland. In the Malanjkhanda Cu–Mo deposit, Madhya-Pradesh, India.

**Name:** For the locality on Mooihoek Farm, South Africa.

**Type Material:** Princeton University, Princeton, New Jersey; National Museum of Natural History, Washington, D.C., USA, 124965; Canadian Museum of Nature, Ottawa, 10309; Royal Ontario Museum, Toronto, Canada, M30992; Heidelberg University, Heidelberg, Germany, 2313a.

**References:** (1) Cabri, L.J. and S.R. Hall (1972) Mooihoekite and haycockite, two new copper–iron sulfides, and their relationship to chalcopyrite and talnakhite. *Amer. Mineral.*, 57, 689–708. (2) Hall, S.R. and J.F. Rowland (1973) The crystal structure of synthetic mooihoekite,  $\text{Cu}_9\text{Fe}_9\text{S}_{16}$ . *Acta Cryst.*, 29, 2365–2372. (3) Putnis, A. (1978) Talnakhite and mooihoekite: the accessibility of ordered structures in the metal-rich region around chalcopyrite. *Can. Mineral.*, 16, 23–30. (4) Criddle, A.J. and C.J. Stanley, Eds. (1993) Quantitative data file for ore minerals, 3rd ed. Chapman & Hall, London, 384.