

**Rickardite****Cu<sub>3-x</sub>Te<sub>2</sub>** (x = 0 to 0.36)

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**Crystal Data:** Orthorhombic, pseudotetragonal. *Point Group:* 2/m 2/m 2/m Massive, very fine grained, somewhat porous; may be botryoidal.

**Physical Properties:** *Tenacity:* Brittle. Hardness = 3.5 VHN = 72–85 (50 g load). D(meas.) = 7.54 D(calc.) = 7.467

**Optical Properties:** Opaque. *Color:* Purple-red on fresh surface, tarnishes rapidly. *Luster:* Metallic. *Pleochroism:* Strong; carmine to violet-gray. *Anisotropism:* Strong; exceptional, in fiery orange colors.

R<sub>1</sub>–R<sub>2</sub>: (400) 28.3–37.2, (420) 26.1–35.5, (440) 23.5–33.2, (460) 20.8–30.5, (480) 17.8–27.5, (500) 15.1–24.8, (520) 12.8–22.3, (540) 11.5–20.3, (560) 11.8–18.9, (580) 14.5–18.2, (600) 19.6–18.4, (620) 26.0–19.4, (640) 32.7–21.0, (660) 38.6–23.3, (680) 43.9–26.0, (700) 48.1–28.6

**Cell Data:** *Space Group:* Pmmn (synthetic). a = 3.9727(4) b = 4.0020(5) c = 6.1066(3) Z = 2

**X-ray Powder Pattern:** Good Hope Mine, Colorado, USA. 2.07 (100), 3.36 (60), 2.55 (40), 1.988 (40), 1.158 (30), 2.82 (20), 1.706 (20)

Chemistry:	(1)	(2)
Cu	40.74	40.0
Te	59.21	60.9
Total	99.95	100.9

(1) Good Hope mine, Colorado, USA; corresponds to Cu<sub>2.76</sub>Te<sub>2.00</sub>. (2) Do.; by electron microprobe, corresponds to Cu<sub>2.64</sub>Te<sub>2.00</sub>.

**Occurrence:** A late-stage mineral of low-temperature hydrothermal origin in some Te-bearing mineral deposits.

**Association:** Vulcanite, tellurium, cameronite, petzite, sylvanite, berthierite, pyrite, arsenopyrite, bornite.

**Distribution:** In the USA, in Colorado, at the Good Hope mine, Vulcan, Gunnison Co. [TL]; also at the Empress Josephine mine, Bonanza district, Saguache Co., at Buckeye Gulch, Lake Co., and elsewhere; in Arizona, from the Junction and Campbell mines, Bisbee, and the Little Joe shaft, Tombstone, Cochise Co. In the Horne mine, Noranda, Quebec, Canada. From the San Miguel prospect, 10 km southwest of Moctezuma, Sonora, Mexico. At the Lomo Hierro silver deposit, western Cuba. From the El Indio mine, El Indio-Tambo district, east of La Serena, Coquimbo, Chile. In Japan, from the Teine mine, Hokkaido, and the Kawazu mine, Shizuoka Prefecture. From Kalgoorlie, Western Australia. In South Africa, at Ookiep, Namaqualand. From the Byn'govsk Au–Te deposit, Ural Mountains, and the Koshmansaisk deposits, Chatkal Ridge, in the basin of the Arbulak River, Russia. At Zlata Bana, Slanske vrchy Mountains, Czech Republic. Other occurrences are known.

**Name:** In honor of Thomas Arthur Rickard (1864–1953), mining engineer and Editor of the Engineering and Mining Journal, New York and London.

**Type Material:** National Museum of Natural History, Washington, D.C., USA, 114590.

**References:** (1) Palache, C., H. Berman, and C. Frondel (1944) Dana's system of mineralogy, (7th edition), v. I, 198–199. (2) Mizota, T., K. Koto, and N. Morimoto (1973) Crystallography and composition of synthetic rickardite. *Mineral. J. (Japan)*, 7, 252–261. (3) Schutte, W.J. and J.L. de Boer (1993) Determination of the incommensurately modulated structure of Cu<sub>3-x</sub>Te<sub>2</sub>. *Acta Cryst.*, 49, 398–403. (4) Ramdohr, P. (1969) The ore minerals and their intergrowths, (3rd edition), 416–417. (5) Criddle, A.J. and C.J. Stanley, Eds. (1993) Quantitative data file for ore minerals, 3rd ed. Chapman & Hall, London, 480.

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