

Paramelaconite



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Crystal Data: Tetragonal. *Point Group:* $4/m\ 2/m\ 2/m$. Crystals, to 7.5 cm, prismatic || [001], showing {010} heavily striated || [001], {011}, and {001}; massive.

Physical Properties: *Fracture:* Flat conchoidal. *Tenacity:* Brittle. Hardness = 4.5
D(meas.) = 6.04–6.11 D(calc.) = 5.93

Optical Properties: Opaque. *Color:* Black to purplish black, pitch-black on fractures; white with pinkish brown tint in reflected light. *Streak:* Brownish black. *Luster:* Brilliant metallic to adamantine.

Optical Class: Uniaxial. *Pleochroism:* Weak. *Anisotropism:* Strong.

R_1 – R_2 : n.d.

Cell Data: *Space Group:* $I4_1/amd$. $a = 5.837$ $c = 9.932$ $Z = 4$

X-ray Powder Pattern: Bisbee, Arizona, USA.
2.490 (vs), 1.575 (s), 1.251 (s), 2.050 (m), 1.449 (m), 1.430 (m), 2.888 (w)

Chemistry:	(1)	(2)
Cu	81.80	84.12
O		15.88
Total		100.00

(1) Bisbee, Arizona, USA; by electrolytic determination of total Cu. (2) $\text{Cu}_2^{1+}\text{Cu}_2^{2+}\text{O}_3$.

Occurrence: A very rare secondary mineral in hydrothermal copper deposits.

Association: Cuprite, tenorite, connellite, malachite, goethite (Bisbee, Arizona, USA); cuprite, tenorite, chrysocolla, malachite, plancheite, diopside, atacamite (Algomah mine, Michigan, USA).

Distribution: From the Copper Queen mine, Bisbee, Cochise Co., Arizona, and at the Algomah mine, Ontonagon Co., Michigan, USA.

Name: From the Greek for *near* and *melaconite*, which in turn was named for *black* and *dust*, now a synonym for tenorite.

Type Material: Seaman Mineral Museum, Michigan Technical University, Houghton, Michigan, 13396; American Museum of Natural History, New York City, New York, 4630; Harvard University, Cambridge, Massachusetts, 97919; National Museum of Natural History, Washington, D.C., USA, 112878; The Natural History Museum, London, England, 1967,37.

References: (1) Palache, C., H. Berman, and C. Frondel (1944) Dana's system of mineralogy, (7th edition), v. I, 510–511. (2) Frondel, C. (1941) Paramelaconite: a tetragonal oxide of copper. *Amer. Mineral.*, 26, 657–672. (3) Williams, S.A. (1962) Paramelaconite and associated minerals from the Algomah mine, Ontonagon County, Michigan. *Amer. Mineral.*, 47, 778–779. (4) O'Keeffe, M. and J.-O. Bovin (1978) The crystal structure of paramelaconite, Cu_4O_3 . *Amer. Mineral.*, 63, 180–185. (5) Morgan, P.E.D., D.E. Partin, B.L. Chamberland, and M. O'Keeffe (1996) Synthesis of paramelaconite: Cu_4O_3 . *J. Solid State Chem*, 121, 33–37.