

Murdochite**PbCu₆O_{8-x}(Cl, Br)_{2x} (x ≤ 0.5)**

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Crystal Data: Cubic. *Point Group:* $4/m\bar{3}2/m$. As octahedra and cubo-octahedra, to 2 mm. *Twinning:* Common, law not stated.

Physical Properties: *Cleavage:* {111}. *Tenacity:* Brittle. Hardness = 4 VHN = 519–567 (100 g load). D(meas.) = 5.9–6.7 D(calc.) = 6.06

Optical Properties: Opaque. *Color:* Black; gray in reflected light, with yellowish brown tint, may be very finely zoned. *Streak:* Black. *Luster:* Adamantine.

Optical Class: Isotropic.

R: (470) 16.3, (490) 16.4, (510) 16.7, (530) 16.9, (570) 17.2, (610) 17.5, (630) 17.5, (650) 17.6

Cell Data: *Space Group:* $Fm\bar{3}m$. $a = 9.210\text{--}9.224$ $Z = 4$

X-ray Powder Pattern: Tiger, Arizona, USA.

5.30 (10), 2.659 (10), 1.629 (10), 2.303 (9), 2.109 (9), 3.25 (8), 2.776 (8)

Chemistry:	(1)	(2)	(3)
SiO ₂	0.05		
PbO ₂	30.53	31.0	32.4
Fe ₂ O ₃	0.17		
CuO	67.24	64.4	61.6
Cl		3.0	4.6
Br		1.5	1.5
insol.	1.11		
Total	99.10	99.9	100.1

(1) Tiger, Arizona, USA; corresponds to Pb_{0.9}Cu_{6.1}O₈. (2) Hansonburg district, New Mexico, USA; by electron microprobe, average of two analyses. (3) Tchah Khuni mine, Iran; by electron microprobe, average of two analyses.

Occurrence: In oxidized Pb–Cu deposits.

Association: Wulfenite, fluorite, hemimorphite, willemite, descloizite, diopside, chrysocolla, creaseyite, quartz (Tiger, Arizona, USA); plattnerite, malachite, “limonite” (Mapimí, Mexico); embolite, chrysocolla, diopside, plattnerite, hemimorphite, iranite, boleite, diaboelite, “limonite” (Tchah Khuni mine, Iran).

Distribution: In the USA, in Arizona, from the Mammoth-St. Anthony mine, Tiger, Pinal Co., in the Higgins mine, Bisbee, Cochise Co., from the Silver Hill mine, Pima Co., the 79 mine, Gila Co., the Tonopah-Belmont mine, Osborne district, Maricopa Co., and at the Eagle Eye mine, New Water Mountains, La Paz Co.; in the Blanchard and Mex-Tex mines, near Bingham, Hansonburg district, Socorro Co., New Mexico; and at the Blue Bell claims, near Baker, San Bernardino Co., California. From the Ojuela mine, Mapimí, Durango, and at Santa Eulalia, Chihuahua, Mexico. In the Tchah Khuni mine, near Anarak, Iran. From the Whim Creek copper mine, Pilbara district, Western Australia.

Name: In honor of Professor Joseph Murdoch (1890–1973), American mineralogist, University of California, Los Angeles, California, USA.

Type Material: n.d.

References: (1) Fahey, J.J. (1955) Murdochite, a new copper lead oxide mineral. *Amer. Mineral.*, 40, 905–906. (2) Christ, C.L. and J.R. Clark (1955) The crystal structure of murdochite. *Amer. Mineral.*, 40, 907–916. (3) Burke, E.A.J. and P. Maaskant (1970) New data on murdochite. *Neues Jahrb. Mineral., Monatsh.*, 558–565. (4) Dubler, E., A. Vedani, and H.R. Oswald (1983) New structure determination of murdochite, Cu₆PbO₈. *Acta Cryst.*, C39, 1143–1146.

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