

Antlerite**Cu₃(SO₄)(OH)₄**

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Crystal Data: Orthorhombic. *Point Group:* $2/m\ 2/m\ 2/m$. Crystals are thick tabular {010}, equant or short prismatic [001], with dominant {110}, another twenty-odd forms, to 2 cm; commonly fibrous and in cross-fiber veinlets, feltlike, granular or powdery lumps and aggregates.

Physical Properties: *Cleavage:* {010}, perfect; {100}, poor. *Tenacity:* Brittle. Hardness = 3.5 D(meas.) = 3.88 D(calc.) = 3.93

Optical Properties: Translucent. *Color:* Emerald-green, blackish green, pale green. *Streak:* Pale green. *Luster:* Vitreous. *Optical Class:* Biaxial (+). *Pleochroism:* X = yellow-green; Y = blue-green; Z = green. *Orientation:* $X = b$; $Y = a$; $Z = c$. *Dispersion:* $r < v$, very strong. $\alpha = 1.726$ $\beta = 1.738$ $\gamma = 1.789$ $2V(\text{meas.}) = 53^\circ$

Cell Data: *Space Group:* $Pnam$. $a = 8.244(2)$ $b = 11.987(3)$ $c = 6.043(1)$ $Z = 4$

X-ray Powder Pattern: Synthetic. (ICDD 7-407). 4.86 (100), 2.566 (85), 3.60 (75), 2.683 (75), 6.01 (25), 5.40 (25), 2.503 (25)

Chemistry:	(1)	(2)
SO ₃	22.32	22.57
CuO	66.34	67.27
H ₂ O	10.52	10.16
insol.	0.88	
Total	100.06	100.00

(1) Chuquicamata, Chile; average of two analyses. (2) Cu₃(SO₄)(OH)₄.

Occurrence: Uncommon, typically formed in the oxidized zone of copper deposits under highly acid conditions, especially in arid regions.

Association: Brochantite, atacamite, chalcantite, kröhnkite, natrochalcite, linarite, gypsum.

Distribution: In the USA, in Arizona, from the Antler mine, near Yucca Station, Mohave Co., large crystals at several mines in Bisbee, Cochise Co., from the Grandview mine, Grand Canyon, Coconino Co., in Copper Basin, between Skull Valley and Prescott, and at Jerome, Yavapai Co.; from the Blanchard mine, near Bingham, Hansonburg district, Socorro Co., New Mexico; in the Darwin district, Inyo Co., California; from the Northern Light mine, near Black Mountain, Mountain View district, Mineral Co. and other minor occurrences in Nevada; at Kennicott, Alaska. From Puerto de Gomez, Chihuahua, Mexico. An important copper ore at Chuquicamata, Antofagasta, and from Remolinos, Atacama, Chile. At Ober-Planitz, near Zwickau, Saxony, Germany. From Caldbeck Fells, Cumbria, and at several mines in Cornwall, England. From Capdella, Lerida, Spain. A number of additional poorly characterized localities are known.

Name: For the Antler mine, Arizona, USA, where the first specimens were collected.

Type Material: NMNH, 47698.

References: (1) Palache, C., H. Berman, and C. Frondel (1951) Dana's system of mineralogy, (7th edition), v. II, 544–546. (2) Hawthorne, F.C., L.A. Groat, and R.K. Eby (1989) Antlerite, Cu₃SO₄(OH)₄, a heteropolyhedral wallpaper structure. Can. Mineral., 27, 205–209.