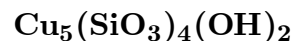


Shattuckite



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Crystal Data: Orthorhombic. *Point Group:* $2/m\ 2/m\ 2/m$. Rarely as well-formed prismatic crystals elongated on {001}, to 2 mm. Typically forms aggregates of spherulitic masses composed of acicular crystals.

Physical Properties: *Cleavage:* {010} and {100}, perfect. *Hardness* = ~ 3.5
D(meas.) = 4.11 D(calc.) = 4.128

Optical Properties: Semitransparent. *Color:* Deep to medium blue. *Luster:* Silky.
Optical Class: Biaxial (+). *Pleochroism:* X = very pale blue; Y = pale blue; Z = deep blue. *Orientation:* X = b; Y = a; Z = c. $\alpha = 1.753(3)$ $\beta = 1.782(3)$ $\gamma = 1.815(3)$
2V(meas.) = n.d. 2V(calc.) = 88°

Cell Data: *Space Group:* *Pcab*. $a = 9.885(1)$ $b = 19.832(2)$ $c = 5.3825(8)$ $Z = 4$

X-ray Powder Pattern: Ajo, Arizona, USA.
4.42 (100), 4.96 (90), 3.50 (80), 3.30 (80), 2.745 (70), 1.627 (70), 2.400 (60)

Chemistry:	(1)	(2)	(3)
SiO ₂	36.68	37.2	36.63
FeO	0.19		
MnO	0.03	1.6	
CuO	60.41	59.0	60.62
MgO	0.02	0.17	
CaO	0.01		
H ₂ O ⁺	2.66	[2.03]	2.75
Total	[100.00]	[100.00]	100.00

(1) Ajo, Arizona, USA; recalculated to 100.00% after deduction of 0.58% quartz; corresponds to $\text{Cu}_{5.02}(\text{SiO}_3)_{4.01}(\text{OH})_{1.94}$. (2) Mili, Evvia Island, Greece; by electron microprobe, H₂O by difference; corresponding to $(\text{Cu}_{4.80}\text{Mn}_{0.15}\text{Mg}_{0.03})_{\Sigma=4.98}(\text{SiO}_3)_{4.01}(\text{OH})_2$. (3) $\text{Cu}_5(\text{SiO}_3)_4(\text{OH})_2$.

Occurrence: A secondary mineral in oxidized copper deposits.

Association: Chrysocolla, ajoite, malachite, quartz, hematite.

Distribution: In the USA, in Arizona, in the Shattuck mine, Bisbee, Cochise Co., the New Cornelia mine, Ajo, Pima Co., the San Manuel and Mammoth-St. Anthony mines, Tiger, Pinal Co., the Clifton-Morenci district, Greenlee Co., and at several localities south of Wickenburg, Maricopa Co.; in the Santa Fe district, Mineral Co., Nevada; from the Buckhorn mine, Red Cloud district, Lincoln Co., New Mexico. From Munihuaza, near Alamos, Sonora, Mexico. At Tsumeb, Namibia. From Tantara and M'Sesa, near Kambove, Katanga Province, Congo (Shaba Province, Zaire). At Mili, Evvia Island, and Apikia, Andros Island, Cyclades Islands, Greece.

Name: For the type locality, the Shattuck mine, Bisbee, Arizona, USA.

Type Material: National Museum of Natural History, Washington, D.C., USA, R4871–R4874, 87447, 93891, 95727.

References: (1) Ford, W.E. (1915) Dana's system of mineralogy, (6th edition), app. III, 72. (2) Newberg, D.W. (1964) X-ray study of shattuckite. *Amer. Mineral.*, 49, 1234–1239. (3) Vlisidis, A.C. and W.T. Schaller (1967) The formula of shattuckite. *Amer. Mineral.*, 52, 782–786. (4) Evans, H.T., Jr. and M.E. Mrose (1977) The crystal chemistry of the hydrous copper silicates, shattuckite and plancheite. *Amer. Mineral.*, 62, 491–502. (5) Reinecke, T., E. Tillmanns, and H.-J. Bernhardt (1991) Abswurbachite, $\text{Cu}^{2+}\text{Mn}_6^{3+}[\text{O}_8/\text{SiO}_4]$, a new mineral of the braunite group: natural occurrence, synthesis, and crystal structure. *Neues Jahrb. Mineral., Abh.*, 163, 117–143.

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