

## Guildite

## $\text{Cu}(\text{Fe}^{3+}, \text{Al})(\text{SO}_4)_2(\text{OH}) \cdot 4\text{H}_2\text{O}$

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**Crystal Data:** Monoclinic. *Point Group:*  $2/m$ . As short prismatic pseudocubic to platy crystals, to 5 mm, showing {001}, {100}, {110}, {540}, {011}, {101},  $\{\bar{1}01\}$ .

**Physical Properties:** *Cleavage:* Perfect on {001} and {100}. *Fracture:* Conchoidal. *Tenacity:* Brittle. Hardness = 2.5 D(meas.) = 2.695–2.72 D(calc.) = 2.717

**Optical Properties:** Translucent to transparent in thin fragments. *Color:* Honey-yellow, deep chestnut-brown. *Streak:* Pale canary-yellow. *Luster:* Vitreous.

*Optical Class:* Biaxial (+). *Pleochroism:*  $X = Y$  = pale yellow;  $Z$  = greenish yellow.

*Orientation:*  $X = a$ ;  $Y = b$ ;  $Z = c$ .  $\alpha = 1.622$ – $1.623$   $\beta = 1.628$ – $1.630$   $\gamma = 1.681$ – $1.684$   
 $2V(\text{meas.}) = 62(2)^\circ$

**Cell Data:** *Space Group:*  $P2_1/m$ .  $a = 9.786(2)$   $b = 7.134(1)$   $c = 7.263(1)$   
 $\beta = 105.28(1)^\circ$   $Z = 2$

**X-ray Powder Pattern:** United Verde mine, Arizona, USA.

3.144 (100), 9.46 (35), 4.998 (27), 3.606 (20), 2.076 (12), 2.909 (11), 2.355 (10)

### Chemistry:

	(1)	(2)	(3)
$\text{SO}_3$	39.68	38.6	39.97
$\text{Al}_2\text{O}_3$	2.11	2.0	
$\text{Fe}_2\text{O}_3$	19.12	21.8	19.93
FeO	1.49		
CuO	15.78	16.4	19.86
$\text{Na}_2\text{O}$	1.23	0.0	
$\text{H}_2\text{O}$	22.15	21.7	20.24
Total	101.56	100.5	100.00

(1) United Verde mine, Arizona, USA. (2) Do.; Cu, Fe, and Na by AA, Al by electron microprobe,  $\text{H}_2\text{O}$  by moisture analyzer; total Fe as  $\text{Fe}_2\text{O}_3$ . (3)  $\text{CuFe}(\text{SO}_4)_2(\text{OH}) \cdot 4\text{H}_2\text{O}$ .

**Occurrence:** A rare secondary mineral formed in mine workings by burning pyritic ores.

**Association:** Coquimbite, ransomite.

**Distribution:** From the United Verde mine, Jerome, Yavapai Co., Arizona, USA.

**Name:** Honors Professor Frank Nelson Guild (1870–1939), American mineralogist and economic geologist, University of Arizona, Tucson, Arizona, USA.

**Type Material:** National School of Mines, Paris, France; University of Arizona, Tucson, Arizona, M47; Harvard University, Cambridge, Massachusetts, 90540; National Museum of Natural History, Washington, D.C., USA, 95950.

**References:** (1) Palache, C., H. Berman, and C. Frondel (1951) Dana's system of mineralogy, (7th edition), v. II, 619. (2) Laughon, R.B. (1970) New data on guildite. *Amer. Mineral.*, 55, 502–505. (3) C. Wan, S. Ghose, and G.R. Rossman (1978) Guildite, a layer structure with a ferric hydroxy-sulphate chain and its optical absorption spectra. *Amer. Mineral.*, 63, 478–483.