

# Hoganite

# $\text{Cu}(\text{C}_2\text{H}_3\text{O}_2)_2 \cdot \text{H}_2\text{O}$

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**Crystal Data:** Monoclinic. *Point Group:*  $2/m$ . Isolated crystals are short prismatic, thick tabular, showing  $\{110\}$ ,  $\{10\bar{1}\}$ ,  $\{01\bar{1}\}$ ,  $\{2\bar{1}\bar{1}\}$ ,  $\{1\bar{1}\bar{2}\}$ , to 0.6 mm.

**Physical Properties:** *Cleavage:* On  $\{001\}$ , perfect; on  $\{110\}$ , distinct (synthetic).  
*Fracture:* Conchoidal. *Tenacity:* Brittle. Hardness = 1.5 D(meas.) = n.d. D(calc.) = 1.910

**Optical Properties:** Transparent. *Color:* Dark bluish green. *Streak:* Pale blue.  
*Luster:* Vitreous.

*Optical Class:* Biaxial (+) (synthetic). *Pleochroism:* Strong; X = blue; Y = pale blue; Z = pale bluish green. *Dispersion:*  $r < v$ , medium. *Absorption:*  $X > Y > Z$ .  $\alpha = 1.533(2)$   $\beta = 1.541(3)$   
 $\gamma = 1.554(2)$   $2V(\text{meas.}) = 85(5)^\circ$   $2V(\text{calc.}) = 76.8^\circ$

**Cell Data:** *Space Group:*  $C2/c$ .  $a = 13.162(3)$   $b = 8.555(2)$   $c = 13.850(3)$   
 $\beta = 117.08(3)^\circ$  Z = 8

**X-ray Powder Pattern:** Potosi pit, Australia.  
6.921 (100), 3.532 (28), 6.176 (14), 3.592 (11), 5.382 (10), 2.278 (10), 5.872 (9)

Chemistry:	(1)	(2)
Cu	31.6	31.83
Fe	0.4	
C	23.85	24.06
H	3.95	4.04
O	[40.2]	40.07
Total	[100.0]	100.00

(1) Potosi pit, Australia; by AA, C and H by CHN analyzer, average of two analyses, O by difference; corresponds to  $\text{Cu}_{1.00}\text{Fe}_{0.01}\text{C}_{4.00}\text{H}_{7.89}\text{O}_{5.07}$ ; equivalence to the synthetic compound was established by crystal-structure analysis. (2)  $\text{Cu}(\text{C}_2\text{H}_3\text{O}_2)_2 \cdot \text{H}_2\text{O}$ .

**Occurrence:** Formed in ferruginous gossan by reaction of oxidized zone metallic minerals with decaying vegetable matter provided by leaf litter and possibly mine timbers.

**Association:** Pateite, linarite, malachite, azurite, cuprian smithsonite, cerussite, goethite, hematite, quartz.

**Distribution:** From the Potosi Ag–Pb–Zn pit, two km northeast of Broken Hill, New South Wales, Australia.

**Name:** To honor Graham P. Hogan (1957–), Broken Hill, Australia, miner and collector of Broken Hill minerals, who found the first specimens.

**Type Material:** Broken Hill Geocentre, Broken Hill; Australian Museum, Sydney; Museum of Victoria, Melbourne, Australia, M47465.

**References:** (1) Hibbs, D.E., U. Kolitsch, P. Leverett, J.L. Sharpe, and P.A. Williams (2002) Hoganite and pateite, two new acetate minerals from the Potosi mine, Broken Hill, Australia. *Mineral. Mag.*, 66, 459–464. (2) de Meester, P., S.R. Fletcher, and A.C. Skapski (1973) Refined crystal structure of tetra- $\mu$ -acetato-bis-aquodicopper(II). *J. Chem. Soc., Dalton Transactions*, 2575–2578.