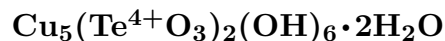


# Cesbronite



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**Crystal Data:** Orthorhombic. *Point Group:*  $2/m\ 2/m\ 2/m$ . As chisel-shaped dipyramidal crystals, to 0.5 mm, showing dominant and striated {103}, with {180}, {001}, and {010}; as hollow crusts of radiating crystals and fanlike aggregates.

**Physical Properties:** *Cleavage:* Poor on {010}; good on {021}. *Tenacity:* Brittle. Hardness = 3 D(meas.) = 4.45(2) D(calc.) = 4.455

**Optical Properties:** Transparent. *Color:* Green; dark green in transmitted light. *Streak:* Pale green.

*Optical Class:* Biaxial (+). *Pleochroism:* Distinct; X = pale bluish green; Y = dark yellow-green; Z = dark emerald-green. *Orientation:* X = a; Y = c; Z = b. *Dispersion:*  $r > v$ ; moderate. *Absorption:*  $Z \simeq Y \gg X$ .  $\alpha = 1.880(8)$   $\beta = 1.928(8)$   $\gamma = 2.029(8)$   
 $2V(\text{meas.}) = \text{n.d.}$   $2V(\text{calc.}) = 72^\circ$

**Cell Data:** *Space Group:*  $Pbcn$ .  $a = 8.624(16)$   $b = 11.878(16)$   $c = 5.872(16)$   $Z = 2$

**X-ray Powder Pattern:** Oriental mine, Mexico.  
5.934 (100), 3.490 (92), 4.889 (71), 2.358 (70), 2.379 (38), 1.592 (34), 2.156 (28)

Chemistry:	(1)	(2)
TeO <sub>2</sub>	38.92	39.55
CuO	49.95	49.29
H <sub>2</sub> O	11.00	11.16
Total	99.87	100.00

(1) Oriental mine, Mexico; by electron microprobe, average of four analyses, total Te as TeO<sub>2</sub>, H<sub>2</sub>O on a separate sample by the Penfield method; corresponds to Cu<sub>5.07</sub>(TeO<sub>3</sub>)<sub>1.97</sub>(OH)<sub>6.20</sub> · 1.83H<sub>2</sub>O. (2) Cu<sub>5</sub>(TeO<sub>3</sub>)<sub>2</sub>(OH)<sub>6</sub> · 2H<sub>2</sub>O.

**Occurrence:** A secondary mineral in an oxidized Cu–Te–Pb sulfide deposit (Oriental mine, Mexico).

**Association:** Argentinian gold, teineite, carlfriesite, xocomecatlite (Oriental mine, Mexico); utahite, leisingite, jensenite, hematite (Centennial Eureka mine, Utah, USA).

**Distribution:** From the Oriental (Bambollita) mine, northeast of the Moctezuma (Bambolla) mine, 12 km south of Moctezuma, Sonora, Mexico. In the USA, at Tombstone, Cochise Co., Arizona, and from the Centennial Eureka mine, Tintic district, near Eureka, Juab Co., Utah.

**Name:** Honors Dr. Fabian Cesbron (1938– ), French mineralogist with the Bureau de Recherches Géologiques et Minières, Orléans, France.

**Type Material:** Natural History Museum, Paris; National School of Mines, Paris, France; The Natural History Museum, London, England, 1976,405; National Museum of Natural History, Washington, D.C., USA, 144518.

**References:** (1) Williams, S.A. (1974) Cesbronite, a new copper tellurite from Moctezuma, Sonora. *Mineral. Mag.*, 39, 744–746. (2) (1979) *Amer. Mineral.*, 64, 653 (abs. ref. 1).