

Quetzalcoatlite **$\text{Zn}_6\text{Cu}_3(\text{Te}^{6+}\text{O}_6)_2(\text{OH})_6 \cdot [0.24\text{AgCl} \cdot 0.30\text{PbCl}_2]$**

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Crystal Data: Hexagonal. *Point Group:* $\bar{3} 2/m$. Needlelike hexagonal crystals, to 0.4 mm, bounded by $\{10\bar{1}0\}$ and $\{0001\}$, in sprays and crystalline crusts.

Physical Properties: *Cleavage:* On $\{10\bar{1}0\}$, fair. *Tenacity:* Brittle. Hardness = 3
D(meas.) = 6.05(30) D(calc.) = 4.82

Optical Properties: Semitransparent. *Color:* Capri blue; green in transmitted light.
Streak: Pale blue, almost white. *Luster:* Pearly to dull.
Optical Class: Uniaxial (-). *Pleochroism:* *O* = blue-green; *E* = almost colorless. *Orientation:* Parallel extinction, length-fast. $\omega = 1.802$ $\epsilon = 1.740$ 2V(meas.) = n.d.

Cell Data: *Space Group:* $P\bar{3}1m$. $a = 10.145(1)$ $c = 4.9925(9)$ $Z = 1$

X-ray Powder Pattern: Moctezuma mine, Mexico.
8.752 (100), 2.748 (70), 2.520 (42b), 3.531 (40), 3.273 (31), 1.766 (28), 5.054 (21)

Chemistry:

	(1)	(2)	(3)
TeO ₃	33.4	31.71	31.02
CuO	20.0	20.31	21.08
ZnO	39.4	43.10	43.13
H ₂ O		[4.88]	4.77
Total		[100.00]	100.00

(1) Moctezuma mine, Mexico; by electron microprobe, average of 20 analyses on 3 grains, H₂O 10.1% by the Penfield method on one sample; as part of the H₂O is probably zeolitic, (OH)¹⁻ here calculated for charge balance; then corresponds to Zn_{5.75}Cu_{2.98}(TeO₆)_{2.26}(OH)_{3.90}. (2) Blue Bell claims, California, USA; average of 9 analyses on 3 grains; recalculated to 100% from an original total of 96.59% after deduction of Ag₂O 4.33%, PbO 0.83%, and Cl 2.39% as impurities in structural channels, H₂O calculated by difference, (OH)¹⁻ here calculated for charge balance; then corresponds to Zn_{6.04}Cu_{2.91}(Te⁶⁺O₆)_{2.05}(OH)_{5.60} • 0.28H₂O. (3) Zn₆Cu₃(TeO₆)₂(OH)₆.

Occurrence: A rare mineral in the oxidized zone of tellurium-bearing hydrothermal ore deposits.

Association: Hessite, galena, bornite, cerussite, azurite, chlorargyrite, teineite, quartz, barite, clay (Moctezuma mine, Mexico); khinite, dugganite, chlorargyrite, gold (Old Guard mine, Arizona, USA).

Distribution: From the Oriental (Bambollita) mine, northeast of the Moctezuma mine, Moctezuma, Sonora, Mexico. In the USA, at the Old Guard mine, Tombstone, Cochise Co., Arizona; from the Blue Bell claims, San Bernardino Co., California; and at the Centennial Eureka mine, Tintic district, Juab Co., Utah.

Name: For *Quetzalcoatl*, the Toltec and Aztec feathered serpent god of the sea, in allusion to its sea-blue color.

Type Material: Natural History Museum, Paris, France; The Natural History Museum, London, England, 1986,55; National Museum of Natural History, Washington, D.C., USA, 135055.

References: (1) Williams, S. (1973) Quetzalcoatlite, Cu₄Zn₈(TeO₃)₃(OH)₁₈, a new mineral from Moctezuma, Sonora. *Mineral. Mag.*, 39, 261–263. (2) Burns, P.C., J.J. Pluth, J.V. Smith, P. Eng, I. Steele, and R.M. Housley (2000) Quetzalcoatlite: a new octahedral-tetrahedral structure from a 2 x 2 x 40 μm³ crystal at the Advanced Photon Source-GSE-CARS facility. *Amer. Mineral.*, 85, 604–607.