

Crystal Data: Orthorhombic. *Point Group:* 2/m 2/m 2/m. As prismatic crystals along [100], to 1 mm., exhibiting {011}, {100}, {110} and possibly {111} or {101}, also as compact radial aggregates.

Physical Properties: *Cleavage:* One poor direction perpendicular to crystal length. *Fracture:* Uneven to conchoidal. *Tenacity:* Brittle. *Hardness* = 3.5 *D(meas.)* = n.d. *D(calc.)* = 3.972

Optical Properties: Transparent to translucent. *Color:* Bright blue-green to green. *Streak:* Very pale bluish. *Luster:* Vitreous. *Optical Class:* Biaxial (-). $\alpha = 1.660$ $\beta = 1.705$ $\gamma = 1.715$ $2V(\text{meas.}) = \text{n.d.}$ $2V(\text{calc.}) = 49^\circ$ *Dispersion:* $r < v$, medium. *Pleochroism:* Weak or absent, $X = Y =$ nearly colorless with a greenish tint, and $Z =$ pale bluish green. *Absorption:* $Z > X \sim Y$. *Orientation:* $Z = a$.

Cell Data: *Space Group:* Pnmn. $a = 8.3263(3)$ $b = 8.2601(3)$ $c = 5.8771(2)$ $Z = 4$

X-ray Powder Pattern: Broken Hill mines, Kabwe, Zambia. 4.7937 (100), 2.6325 (47), 5.8676 (39), 2.9351 (33), 3.6993 (22), 2.4049 (19), 2.3040 (18)

Chemistry:	(1)	(2)
Cu	26.0	26.4
Zn	27.7	27.1
P	12.8	12.9
H ₂ O	3.63	3.66

(1) Broken Hill mines, Kabwe, Zambia; average of 15 electron microprobe analyses, H₂O by difference, OH⁻ and PO₄ confirmed by IR spectroscopy; corresponding to Cu_{0.987}Zn_{1.022}(P_{0.997}O₄)OH. (2) CuZnPO₄OH.

Polymorphism & Series: Forms a solid-solution series with libethenite.

Occurrence: A secondary mineral in the oxidized zone of a polymetallic mineral deposit.

Association: Hopeite, tarbuttite (Zambia); corkite-hinsdalite, tsumebite, pyromorphite, sampleite, torbernite, dufienite, strengite, beraunite (Australia).

Distribution: Broken Hill mines, Kabwe, Zambia (formerly Northern Rhodesia). From Australia in the No 3 lens, 280RL level, Block14 open cut, Broken Hill, New South Wales.

Name: For its composition and relationship to *libethenite*.

Type Material: Institut für Mineralogie, Universität Salzburg, Austria; at the Royal Scottish Museum, Edinburgh, Scotland (RSWB 83-8), and the Natural History Museum, London, England.

References: (1) Braithwaite, R.S.W., R.G. Pritchard, W.H. Paar, and R.A.D. Patrick (2005) A new mineral, zincolibethenite, CuZnPO₄OH, a stoichiometric species of specific site occupancy. *Mineral. Mag.*, 69, 145-153. (2) (2005) *Amer. Mineral.*, 90, 1950 (abs. ref. 1). (3) Williams, P. A., P. Leverett, W. D. Birch, D. E. Hibbs, Uwe Kolitsch and T. Mihajlovic (2006) Zinc-rich zincolibethenite from Broken Hill, New South Wales. *Austral. J. Mineral.*, 12(1), 3-7.