

# Prosperite

# CaZn<sub>2</sub>(AsO<sub>4</sub>)<sub>2</sub>•H<sub>2</sub>O

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**Crystal Data:** Monoclinic. *Point Group:* 2/m or m. As slender prismatic crystals, slightly bent and twisted, elongated along [001], showing {100}, { $\bar{1}01$ }, {110}, { $\bar{1}11$ }, and others, to 1 cm. Crystals are typically composite, multiply terminated, in subparallel to radiating groups and dense aggregates.

**Physical Properties:** Hardness = 4.5 D(meas.) = 4.31(1) D(calc.) = 4.40

**Optical Properties:** Semitransparent. *Color:* White to colorless, pale blue in aggregates.

*Streak:* White. *Luster:* Vitreous to silky.

*Optical Class:* Biaxial (+). *Orientation:* Y = b; Z  $\wedge$  c = 27°. *Dispersion:* r  $\gg$  v.  $\alpha$  = 1.746(2)  
 $\beta$  = 1.748(2)  $\gamma$  = 1.768(2) 2V(meas.) = 34(2)° 2V(calc.) = 36°

**Cell Data:** *Space Group:* C2/c or Cc. a = 19.238(2) b = 7.731(1) c = 9.765(1)  
 $\beta$  = 104.47(1)° Z = 8

**X-ray Powder Pattern:** Tsumeb, Namibia.

2.723 (10), 2.992 (9), 3.11 (8), 3.78 (7), 3.36 (6), 2.614 (6), 3.86 (5)

## Chemistry:

	(1)	(2)
As <sub>2</sub> O <sub>5</sub>	47.92	49.25
CuO	1.35	
ZnO	33.22	34.88
CaO	13.02	12.01
H <sub>2</sub> O	4.0	3.86
Total	99.51	100.00

(1) Tsumeb, Namibia; by electron microprobe, H<sub>2</sub>O by TGA; corresponds to Ca<sub>1.09</sub>(Zn<sub>1.91</sub>Cu<sub>0.08</sub>) $\Sigma=1.99$ (As<sub>0.98</sub>O<sub>3.98</sub>)<sub>2</sub>•1.04H<sub>2</sub>O. (2) CaZn<sub>2</sub>(AsO<sub>4</sub>)<sub>2</sub>•H<sub>2</sub>O.

**Occurrence:** A rare secondary mineral in partly altered sulfide ore from a dolostone-hosted hydrothermal polymetallic ore deposit.

**Association:** Tennantite, chalcocite, mercurian silver, cuprite, cuprian adamite, cuprian austinite, conicalcrite, stranskiite, lavendulan, köttigite, tsumcorite, koritnigite, o'danielite.

**Distribution:** From Tsumeb, Namibia.

**Name:** To honor Prosper John Williams (1910–), of Toronto, Canada, South African-Canadian mineral dealer, supplier of many Tsumeb specimens.

**Type Material:** Royal Ontario Museum, Toronto, Canada, M35388, M35389, M35391; The Natural History Museum, London, England, 1978,19; National Museum of Natural History, Washington, D.C., USA, 143732, 143733.

**References:** (1) Gait, R.I., B.D. Sturman, and P.J. Dunn (1979) Prosperite, HCaZn<sub>2</sub>(AsO<sub>4</sub>)<sub>2</sub>(OH), a new mineral from Tsumeb, South West Africa (Namibia). *Can. Mineral.*, 17, 87–92. (2) (1980) *Amer. Mineral.*, 65, 208 (abs. ref. 1). (3) Keller, P., H. Riffel, and H. Hess (1982) Die Kristallstruktur von Prosperit, Ca<sub>2</sub>Zn<sub>4</sub>[H<sub>2</sub>O/(AsO<sub>4</sub>)<sub>4</sub>]. *Zeits. Krist.*, 158, 33–42 (in German with English abs.).