Prosperite

\[ \text{CaZn}_2(\text{AsO}_4)_2 \cdot \text{H}_2\text{O} \]

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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\}, \{101\}, \{110\}, \{111\}, and others, to 1 cm. Crystals are typically composite, multiply terminated, in subparallel to radiating groups and dense aggregates.

Physical Properties: Hardness = 4.5 \( \text{D(meas.)} = 4.31(1) \) \( \text{D(calc.)} = 4.40 \)

Optical Properties: Semitransparent. Color: White to colorless, pale blue in aggregates. Streak: White. Luster: Vitreous to silky. Optical Class: Biaxial (+). Orientation: \( Y = b; Z \wedge c = 27^\circ \). Dispersion: \( r \gg v. \) \( \alpha = 1.746(2) \) \( \beta = 1.748(2) \) \( \gamma = 1.768(2) \) \( 2V(\text{meas.}) = 34(2)^\circ \) \( 2V(\text{calc.}) = 36^\circ \)

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

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:

\[
\begin{array}{ll}
\text{As}_2\text{O}_5 & 47.92 \\
\text{CuO} & 1.35 \\
\text{ZnO} & 33.22 \\
\text{CaO} & 13.02 \\
\text{H}_2\text{O} & 4.0 \\
\hline
\text{Total} & 99.51
\end{array}
\]

(1) Tsumeb, Namibia; by electron microprobe, \( \text{H}_2\text{O} \) by TGA; corresponds to \( \text{Ca}_{1.09}(\text{Zn}_{1.91}\text{Cu}_{0.08})\Sigma=1.99(\text{As}_0.98\text{O}_3.98)\cdot 1.04\text{H}_2\text{O} \). (2) \( \text{CaZn}_2(\text{AsO}_4)_2\cdot \text{H}_2\text{O} \).

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, conichalcite, stranskiite, lavendulan, köttigite, tsuncorite, 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.
