Nevadaite

\((\text{Cu}^{2+}, \square, \text{Al}, \text{V}^{3+})_6\text{[Al}_8\text{(PO}_4)_8\text{F}_8]\text{(OH)}_2\text{(H}_2\text{O})_{22}\)

**Crystal Data:** Orthorhombic. *Point Group: mm2.* Crystals prismatic on [001] in radiating clusters to 1 mm.

**Physical Properties:** *Cleavage:* None. *Fracture:* Conchoidal. *Tenacity:* Brittle. Hardness = 3  \(D\text{(meas.)} = 2.54\)  \(D\text{(calc.)} = 2.55\)

\[\alpha = 1.540 \quad \beta = 1.548 \quad \gamma = 1.553 \]  
2V(meas.) = 76°  \(\text{2V(calc.)} = 76°\)  
*Orientation:* \(X = c; Y = a; Z = b\). *Pleochroism:* Moderate, \(X =\text{pale greenish blue}; Y =\text{very pale greenish blue}; Z =\text{blue.} \) *Absorption:* \(Z >> X > Y\).

**Cell Data:** *Space Group: P2\(_1\)mn,* \(a = 12.123(2)\)  \(b = 18.999(2)\)  \(c = 4.961(1)\)  \(Z = 1\)

**X-ray Powder Pattern:** Gold Quarry mine, Carlin, Nevada, USA.  
6.077 (100), 5.618 (90), 9.535 (80), 2.983 (60), 3.430 (40), 2.661 (40), 1.844 (40)

**Chemistry:**

\[
\begin{array}{ll}
\text{CuO} & 9.24 \\
\text{ZnO} & 0.11 \\
\text{Al}_2\text{O}_3 & 27.07 \\
\text{Fe}_2\text{O}_3 & 0.07 \\
\text{V}_2\text{O}_3 & 4.24 \\
\text{P}_2\text{O}_5 & 32.54 \\
\text{H}_2\text{O} & 23.48 \\
\text{F} & 9.22 \\
\text{-O = F} & 3.88 \\
\text{Total} & 102.09 \\
\end{array}
\]

(1) Gold Quarry mine, Carlin, Nevada, USA; electron microprobe analysis, \(\text{H}_2\text{O}\) calculated from structure, \(\text{H}_2\text{O}\) and \(\text{OH}\) confirmed by IR and structure analysis; corresponding to \((\text{Cu}^{2+})_{2.00}\text{Zn}_{0.02}\text{V}^{3+}_{0.98}\text{Fe}^{3+}_{0.01}\text{Al}_{1.15}\text{P}_{7.96}\text{O}_{32}\text{[F}_{8.37}\text{(OH)}_{1.63}\text{]}_{2-10}\text{(H}_2\text{O})_{21.65}\).

**Occurrence:** A weathering-derived mineral above a low grade, disseminated gold deposit in hydrothermally altered sedimentary rocks.

**Association:** Intermediate members of the strengite-variscite series, fluellite, hewettite, and more rarely anatase, kazakhstanite, leucophosphite, tinticite, torbernite, tyuyamunite, wavellite.

**Name:** For the US state from which the first specimens were collected.

**Distribution:** From the open-pit Gold Quarry mine, near Carlin, Eureka County, Nevada, USA.

**Type Material:** Systematic Reference Series, National Mineral Collection of Canada, Geological Survey of Canada, Ottawa, Ontario, Canada; NMCC68091.

(2) (2005) Amer. Mineral., 90, 521 (abs. ref. 1).