

**Nevadaite**

**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(meas.) = 2.54 D(calc.) = 2.55

**Optical Properties:** Translucent. *Color:* Turquoise-blue, pale green. *Streak:* Pale powder-blue.  
*Luster:* Vitreous.

*Optical Class:* Biaxial (-).  $\alpha = 1.540$   $\beta = 1.548$   $\gamma = 1.553$   $2V(\text{meas.}) = 76^\circ$   $2V(\text{calc.}) = 76^\circ$   
*Orientation:*  $X = c$ ;  $Y = a$ ;  $Z = b$ . *Pleochroism:* Moderate,  $X =$  pale greenish blue;  $Y =$  very pale greenish blue;  $Z =$  blue. *Absorption:*  $Z \gg X > Y$ .

**Cell Data:** *Space Group:*  $P2_1mn$ ,  $a = 12.123(2)$   $b = 18.999(2)$   $c = 4.961(1)$   $Z = 1$

**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:**

	(1)
CuO	9.24
ZnO	0.11
Al <sub>2</sub> O <sub>3</sub>	27.07
Fe <sub>2</sub> O <sub>3</sub>	0.07
V <sub>2</sub> O <sub>3</sub>	4.24
P <sub>2</sub> O <sub>5</sub>	32.54
H <sub>2</sub> O	23.48
F	9.22
<u>-O = F</u>	<u>3.88</u>
Total	102.09

(1) Gold Quarry mine, Carlin, Nevada, USA; electron microprobe analysis, H<sub>2</sub>O calculated from structure, H<sub>2</sub>O and OH<sup>-</sup> confirmed by IR and structure analysis; corresponding to  $(\text{Cu}^{2+}_{2.00}\text{Zn}_{0.02}\text{V}^{3+}_{0.98}\text{Fe}^{3+}_{0.01}\text{Al}_{1.15})_{\Sigma=4.16}\text{Al}_8\text{P}_{7.90}\text{O}_{32}[\text{F}_{8.37}(\text{OH})_{1.63}]_{\Sigma=10}(\text{H}_2\text{O})_{21.65}$ .

**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, tenticite, 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.

**References:** (1) Cooper, M.A., F.C. Hawthorne, A.C. Roberts, E.E. Foord, R.C. Erd, H.T. Evans Jr., and M.C. Jensen (2004) Nevadaite,  $(\text{Cu}^{2+}, \square, \text{Al}, \text{V}^{3+})_6[\text{Al}_8(\text{PO}_4)_8\text{F}_8](\text{OH})_2(\text{H}_2\text{O})_{22}$ , a new phosphate mineral species from the Gold Quarry mine, Carlin, Eureka County, Nevada: description and crystal structure. *Can. Mineral.*, 42, 741-752. (2) (2005) *Amer. Mineral.*, 90, 521 (abs. ref. 1).