Pentagonite $Ca(V^{4+}O)Si_4O_{10}\cdot 4H_2O$

Crystal Data: Orthorhombic. *Point Group:* $mm2$. Crystals prismatic, to 1 mm, with dominant {110}, {201}, and $\{00\bar{1}\}$, elongated ‖ [001]; commonly as spherulitic rosettes, up to 5 mm. *Twinning:* Cyclical by reflection across {110}, common; as $(110) \wedge (1\bar{1}0) = 72.7°$, multiple twins result having pentagonal basal patterns closely simulating five-fold symmetry.

Physical Properties: *Cleavage:* Good on {010}. *Tenacity:* Brittle. Hardness = ~3–4 D(meas.) = n.d. D(calc.) = 2.33

Optical Properties: Transparent. *Color:* Greenish blue. *Luster:* Vitreous. *Optical Class:* Biaxial (–). *Pleochroism:* Pronounced; $X = Z$ = colorless; Y = blue. *Orientation:* $X = b$; $Y = a$; $Z = c$. *Dispersion:* $r > v$, strong. $\alpha = 1.533(2)$ $\beta = 1.544(2)$ $\gamma = 1.547(2)$ 2V(meas.) = 50(2)°

Cell Data: *Space Group:* $Ccm2_1$. $a = 10.298(4)$ $b = 13.999(7)$ $c = 8.891(2)$ $Z = 4$

X-ray Powder Pattern: Owyhee Dam, Oregon, USA.
6.071 (100), 3.920 (100), 3.755 (100), 8.298 (70), 3.500 (36), 2.569 (36), 4.446 (25)

Chemistry: Semi-quantitative XRF indicates Ca:V:Si as in cavansite, and H_2O is also the same as their unit cells have the same volume.

Polymorphism & Series: Dimorphous wih cavansite.

Occurrence: In coatings on a tuff.

Association: Cavansite, heulandite, stilbite, analcime, apophyllite, calcite.

Distribution: In the USA, about three km south of Owyhee Dam, Malheur Co., Oregon.

Name: For the unusual pseudosymmetrical five-fold or *pentagonal* habit of the twinned crystals.

Type Material: National Museum of Natural History, Washington, D.C., USA, 120584, 122769.

References: (1) Staples, L.W., H.T. Evans, Jr., and J.R. Lindsay (1973) Cavansite and pentagonite, new dimorphous calcium vanadium silicate minerals from Oregon. Amer. Mineral., 58, 405–411. (2) Evans, H.T., Jr. (1973) The crystal structures of cavansite and pentagonite. Amer. Mineral., 58, 412–424.