

Pentagonite



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

Physical Properties: *Cleavage:* Good on $\{010\}$. *Tenacity:* Brittle. Hardness = $\sim 3\text{--}4$
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. $\alpha = 1.533(2)$ $\beta = 1.544(2)$ $\gamma = 1.547(2)$
 $2V(\text{meas.}) = 50(2)^\circ$

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 with 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.