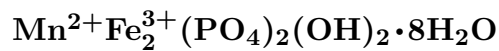


Stewartite



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Crystal Data: Triclinic. *Point Group:* $\bar{1}$. As acicular to thin tabular bladed crystals, with inclined terminations, to 4 mm, in bundles and tufts.

Physical Properties: Hardness = n.d. $D(\text{meas.}) = 2.94$ $D(\text{calc.}) = 2.48$

Optical Properties: Semitransparent. *Color:* Lemon-yellow, yellow to brownish yellow.
Optical Class: Biaxial (-). *Pleochroism:* X = colorless; Y = pale yellow; Z = yellow.
Orientation: Extinction inclined on all crystal edges. *Dispersion:* $r < v$, strong. $\alpha = 1.63$
 $\beta = 1.658$ $\gamma = 1.66$ $2V(\text{meas.}) = \text{Large}$.

Cell Data: *Space Group:* $P\bar{1}$. $a = 10.398(2)$ $b = 10.672(3)$ $c = 7.223(3)$ $\alpha = 90.10(3)^\circ$
 $\beta = 109.10(2)^\circ$ $\gamma = 71.83(2)^\circ$ $Z = 2$

X-ray Powder Pattern: Stewart mine, California, USA.
10.04 (10), 6.73 (7), 5.035 (5), 3.925 (5), 3.03 (4), 2.60 (4), 2.489 (4)

Chemistry: (1) No analysis has been made; composition established as a polymorph of laueite.

Polymorphism & Series: Trimorphous with laueite and pseudolaueite.

Occurrence: A rare oxidation product formed by the leaching of primary phosphates in complex zoned granite pegmatites.

Association: Lithiophilite, triphylite, huréaulite, strunzite, laueite, pseudolaueite, eosphorite, rockbridgeite, strengite, diadochite, phosphosiderite, Fe-Mn oxides.

Distribution: In the USA, at the Stewart mine, Pala, San Diego Co., California; in the Palermo #1 and Fletcher mines, near North Groton, Grafton Co., New Hampshire; at Newry, Oxford Co., Maine; from the Hesnard mine, three km southwest of Keystone, Pennington Co., and the Linwood, Tip Top, and White Elephant mines, near Custer, Custer Co., South Dakota; in the White Picacho district, Maricopa and Yavapai Cos., Arizona. At the Boqueirão pegmatite, three km southeast of Parelhas, Rio Grande do Norte, Brazil. In the Okatjimukuju pegmatite, near Karibib, Namibia. From Vilate, near Chanteloube, Haute-Vienne, France. At Sabugal, in the Mangualde pegmatite, near Mesquitela, and the Bendada pegmatite, near Guarda, Portugal. From Hagendorf, Bavaria, Germany. Other localities will undoubtedly be noted.

Name: For its originally noted occurrence at the Stewart mine, Pala, California, USA.

Type Material: National Museum of Natural History, Washington, D.C., USA, 93656.

References: (1) Palache, C., H. Berman, and C. Frondel (1951) Dana's system of mineralogy, (7th edition), v. II, 730. (2) Murdoch, J. (1958) Phosphate minerals of the Borborema pegmatites: II-Boqueirão. *Amer. Mineral.*, 43, 1148-1156. (3) Moore, P.B. and T. Araki (1974) Stewartite, $\text{Mn}^{2+}\text{Fe}_2^{3+}(\text{OH})_2(\text{H}_2\text{O})_6[\text{PO}_4]_2 \cdot 2\text{H}_2\text{O}$: its atomic arrangement. *Amer. Mineral.*, 59, 1272-1276. (4) Moore, P.B. (1975) Laueite, pseudolaueite, stewartite and metavauxite: a study in combinatorial polymorphism. *Neues Jahrb. Mineral., Abh.*, 123, 148-159.