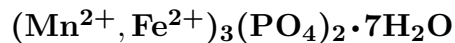


Switzerite

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Crystal Data: Monoclinic. *Point Group:* $2/m$. Thin crystals, tabular on {001}, or bladed by elongation along [100], to 5 mm.

Physical Properties: *Cleavage:* Perfect on {001}. *Tenacity:* Brittle, somewhat flexible. Hardness = Soft. $D(\text{meas.}) = 2.535$ $D(\text{calc.}) = 2.562$ Rapidly and irreversibly topotactically transforms in air to metaswitzerite.

Optical Properties: Transparent to translucent. *Color:* Pink, becoming yellowish or brownish on dehydration. *Luster:* Vitreous, pearly on {001}.

Optical Class: Biaxial (-). *Orientation:* $Z = b$; $X \perp \{001\}$. $\alpha = 1.560(1)$ $\beta = 1.574(1)$
 $\gamma = 1.580(1)$ $2V(\text{meas.}) = 70^\circ$ $2V(\text{calc.}) = 66^\circ$

Cell Data: *Space Group:* $P2_1/a$. $a = 8.528(4)$ $b = 13.166(5)$ $c = 11.812(4)$
 $\beta = 110.05(3)^\circ$ $Z = 4$

X-ray Powder Pattern: Foote mine, North Carolina, USA.

11.12 (100), 3.37 (90), 8.47 (50), 2.137 (50), 2.353 (40), 2.94 (30), 1.612 (30)

Chemistry:

	(1)
P ₂ O ₅	32.94
SiO ₂	0.06
Al ₂ O ₃	0.27
FeO	3.60
MnO	46.05
MgO	0.15
CaO	0.20
H ₂ O	n.d.
Total	83.27

(1) Foote mine, North Carolina, USA; by electron microprobe, total Fe as FeO, total Mn as MnO; due to loss of H₂O in electron beam, all elements are high, H₂O in formula from crystal-structure analysis; corresponds to $(\text{Mn}_{2.79}\text{Fe}_{0.21})_{\Sigma=3.00}(\text{PO}_4)_2 \cdot 7\text{H}_2\text{O}$.

Occurrence: In complex zoned granite pegmatites.

Association: Metaswitzerite, vivianite (Foote mine, North Carolina, USA) huréaulite (Tip Top mine, South Dakota, USA); triplite, bermanite, phosphosiderite, leucophosphite, strengite, phosphosiderite, paulkerrite (7U7 Ranch, Arizona, USA); scholzite, parahopeite, phosphophyllite rockbridgeite; (Reaphook Hill, Australia).

Distribution: In the USA, from the Foote mine, Kings Mountain, Cleveland Co., North Carolina; at the Tip Top mine, 8.5 km southwest of Custer, Custer Co., South Dakota; from the 7U7 Ranch, 40 km west of Hillside, Bagdad district, Yavapai Co., Arizona; in the Emmons quarry, Greenwood, and the Bell Pit, Newry, Oxford Co., Maine. From the Tanco pegmatite, Bernic Lake, Manitoba, Canada. At Hagendorf, Bavaria, Germany. In the Mangualde pegmatite, near Mesquitela, Portugal. From near Eräjärvi, Finland. At Reaphook Hill, near Blinman, Flinders Ranges, and in the Iron Monarch quarry, Iron Knob, South Australia.

Name: To honor Dr. George Shirly Switzer (1915–), Chairman Emeritus, Department of Mineral Sciences, United States National Museum, Smithsonian Institution, Washington, D.C., USA.

Type Material: National Museum of Natural History, Washington, D.C., USA, 120871.

References: (1) White, J.S., Jr., P.B. Leavens, and P.F. Zanazzi (1986) Switzerite redefined as $\text{Mn}_3(\text{PO}_4)_2 \cdot 7\text{H}_2\text{O}$, and metaswitzerite, $\text{Mn}_3(\text{PO}_4)_2 \cdot 4\text{H}_2\text{O}$. *Amer. Mineral.*, 71, 1221–1223. (2) Zanazzi, P.F., P.B. Leavens, and J.S. White, Jr. (1986) Crystal structure of switzerite, $\text{Mn}_3(\text{PO}_4)_2 \cdot 7\text{H}_2\text{O}$, and its relationship to metaswitzerite, $\text{Mn}_3(\text{PO}_4)_2 \cdot 4\text{H}_2\text{O}$. *Amer. Mineral.*, 71, 1224–1228.

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