

Metaswitzerite



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Crystal Data: Monoclinic. *Point Group:* $2/m$. As tabular to bladed bent crystals, pseudomorphous after switzerite, to 5 mm.

Physical Properties: *Cleavage:* Perfect on {100}; fair on {010}. Hardness = ~ 2.5
D(meas.) = n.d. D(calc.) = 3.18 Topotactically transforms from switzerite.

Optical Properties: Translucent. *Color:* Pale golden brown. *Luster:* Adamantine to pearly.
Optical Class: Biaxial (-). *Pleochroism:* Pale to dark red-brown. *Dispersion:* $r < v$, distinct.
 $\alpha = 1.602$ $\beta = 1.628$ $\gamma = 1.632$ $2V(\text{meas.}) = 42^\circ$

Cell Data: *Space Group:* $P2/a$. $a = 17.099$ $b = 12.694$ $c = 8.282$ $\beta = 95.91^\circ$ $Z = 8$

X-ray Powder Pattern: Kings Mountain, North Carolina, USA.
8.55 (100), 2.585 (60), 7.128 (40), 6.775 (40), 3.175 (40), 2.934 (40), 2.842 (40)

Chemistry:	(1)	(2)
P ₂ O ₅	32.94	33.26
Al ₂ O ₃	0.27	
SiO ₂	0.06	
FeO	3.60	
MnO	46.05	49.86
MgO	0.15	
CaO	0.20	
H ₂ O	n.d.	16.88
Total	83.27	100.00

(1) Kings Mountain, North Carolina, USA; partial analysis by electron microprobe, average of six analyses, converted to metaswitzerite in the electron beam. (2) $\text{Mn}_3(\text{PO}_4)_2 \cdot 4\text{H}_2\text{O}$.

Occurrence: Forms by irreversible dehydration of switzerite on exposure to air.

Association: Switzerite, vivianite.

Distribution: From the Foote Mine, Kings Mountain, Cleveland Co., North Carolina, USA. On Reaphook Hill, near Blinman, from the Spring Creek mine, near Wilmington, Flinders Ranges, and in the Iron Monarch quarry, Iron Knob, South Australia.

Name: Emphasizes the close chemical and structural relations to *switzerite*.

Type Material: The Natural History Museum, London, England, 1967,407; National Museum of Natural History, Washington, D.C., USA, 120230.

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. (3) Leavens, P.B. and J.S. White, Jr. (1967) Switzerite [metaswitzerite] $(\text{Mn, Fe})_3(\text{PO}_4)_2 \cdot 4\text{H}_2\text{O}$, a new mineral. *Amer. Mineral.*, 52, 1595–1602.