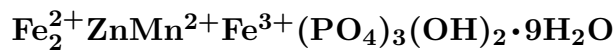


**Schoonerite**

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**Crystal Data:** Orthorhombic. *Point Group:*  $2/m\ 2/m\ 2/m$ . Lathlike and strawlike crystals, elongated along [100], flattened on {010}, showing {001}, {010}, {100}, to 2 mm, typically curved and crinkled, as rosettes, scales, in sprays and mats.

**Physical Properties:** *Cleavage:* {010}, perfect; {001}, good. *Hardness* =  $\sim 4$   
D(meas.) = 2.87–2.92 D(calc.) = 2.79

**Optical Properties:** Transparent to translucent. *Color:* Pale tan to brown, greenish brown, yellowish brown; copper-red to bronzy on exposure. *Streak:* Pale brown. *Luster:* Subvitreous to waxy.

*Optical Class:* Biaxial (-). *Pleochroism:* Weak; X = pale yellow; Y = pale brown; Z = brown.  
*Orientation:* X = b; Y = c; Z = a. *Absorption:* Z > Y > X.  $\alpha = 1.618(5)$   $\beta = 1.652(3)$   
 $\gamma = 1.682(3)$   $2V(\text{meas.}) = 70^\circ\text{--}80^\circ$

**Cell Data:** *Space Group:*  $Pmab$ .  $a = 11.119(4)$   $b = 25.546(11)$   $c = 6.437(3)$   $Z = 4$

**X-ray Powder Pattern:** Palermo #1 mine, New Hampshire, USA.  
12.77 (10), 2.768 (9), 8.356 (7), 6.43 (4), 3.761 (4), 3.182 (4), 1.600 (4)

**Chemistry:**

|                                | (1)      | (2)    |
|--------------------------------|----------|--------|
| P <sub>2</sub> O <sub>5</sub>  | 29.45    | 27.69  |
| Al <sub>2</sub> O <sub>3</sub> | 0.73     |        |
| Fe <sub>2</sub> O <sub>3</sub> |          | 10.38  |
| FeO                            | 29.84    | 18.69  |
| MnO                            | 7.32     | 9.23   |
| ZnO                            | 7.95     | 10.58  |
| MgO                            | 1.74     |        |
| CaO                            | 1.38     |        |
| K <sub>2</sub> O               | 0.47     |        |
| H <sub>2</sub> O               | [23.43]  | 23.43  |
| Total                          | [102.31] | 100.00 |

(1) Palermo #1 mine, New Hampshire, USA; by electron microprobe, total Fe as FeO, H<sub>2</sub>O from theory. (2) Fe<sub>2</sub><sup>2+</sup>ZnMn<sup>2+</sup>Fe<sup>3+</sup>(PO<sub>4</sub>)<sub>3</sub>(OH)<sub>2</sub>•9H<sub>2</sub>O.

**Occurrence:** A rare late-stage low-temperature hydrothermal alteration and weathering product formed from earlier more reduced phases.

**Association:** Mitridatite, laueite, strunzite, whitmoreite, siderite, ludlamite, messelite, vivianite, whitlockite, hydroxylapatite, childrenite, jahnsite, arrojadite, Fe–Mn oxyhydroxides (Palermo #1 mine, New Hampshire, USA).

**Distribution:** From the Palermo #1 mine, near North Groton, Grafton Co., New Hampshire, and at Newry, Oxford Co., Maine, USA. At Hagendorf, Bavaria, Germany.

**Name:** To honor Richard Schooner (1925–), Woodstock, Connecticut, USA, student and collector of New England minerals.

**Type Material:** National Museum of Natural History, Washington, D.C., USA, 135934, 137019.

**References:** (1) Moore, P.B. and A.R. Kampf (1977) Schoonerite, a new zinc-manganese-iron phosphate mineral. *Amer. Mineral.*, 62, 246–249. (2) Kampf, A.R. (1977) Schoonerite: its atomic arrangement. *Amer. Mineral.*, 62, 250–255.