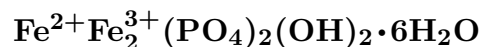


**Ferrostrunzite**

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**Crystal Data:** Triclinic, pseudomonoclinic. *Point Group:*  $\bar{1}$  or 1. Crystals are prismatic, flattened  $\parallel$  {100}, elongated along [001], to 6 mm, commonly fibrous in divergent aggregates. *Twinning:* By reflection across {110}.

**Physical Properties:** *Cleavage:* One nearly  $\parallel$  to elongation; one  $\simeq \perp$  optic normal; one  $\perp$  Bxa. *Fracture:* Very brittle. Hardness =  $\sim 4$  D(meas.) = 2.50 D(calc.) = 2.57

**Optical Properties:** Semitransparent. *Color:* Pale brown, colorless, white, straw-yellow, bright orange. *Streak:* Pale brown. *Luster:* Vitreous.

*Optical Class:* Biaxial (-). *Pleochroism:* Faint; X = yellow-green; Z = orange. *Orientation:*  $Z \wedge c \simeq 3^\circ-8^\circ$ . *Dispersion:* Moderate, asymmetric. *Absorption:* Minimum  $\parallel$  Z.  $\alpha = 1.628(2)$   $\beta = [1.682]$   $\gamma = 1.723(4)$   $2V(\text{meas.}) = 80(5)^\circ$

**Cell Data:** *Space Group:*  $P\bar{1}$  or  $P1$ .  $a = 10.17-10.23$   $b = 9.77-9.78$   $c = 7.37-7.40$   
 $\alpha = 88.63^\circ-89.65^\circ$   $\beta = 97.60^\circ-98.28^\circ$   $\gamma = 117.26^\circ-117.60^\circ$   $Z = 2$

**X-ray Powder Pattern:** Mullica Hill, New Jersey, USA; nearly identical to strunzite. 5.29 (100), 8.94 (80), 3.277 (40), 4.47 (30), 3.452 (30), 3.213 (30), 4.33 (20)

Chemistry:	(1)	(2)	(3)
P <sub>2</sub> O <sub>5</sub>	28.1	29.91	28.41
Fe <sub>2</sub> O <sub>3</sub> + FeO		43.17	
Fe <sub>2</sub> O <sub>3</sub>	30.9		31.97
FeO	13.9		14.38
MnO	trace	0.06	
H <sub>2</sub> O	[27.1]	27.5	25.24
Total	[100.0]	100.7	100.00

(1) Mullica Hill, New Jersey, USA; by electron microprobe, H<sub>2</sub>O by difference, Fe<sup>2+</sup>:Fe<sup>3+</sup> estimated at 1:2 from microchemical tests and the known isostructural strunzite formula; corresponds to Fe<sub>0.98</sub><sup>2+</sup>Fe<sub>1.96</sub><sup>3+</sup>(PO<sub>4</sub>)<sub>2</sub>(OH)<sub>1.84</sub>•6.68H<sub>2</sub>O. (2) Bethel Church, Indiana, USA; by electron microprobe, H<sub>2</sub>O by TGA; assuming Fe<sup>2+</sup>:Fe<sup>3+</sup> = 1:2, then corresponds to Fe<sub>0.95</sub><sup>2+</sup>Fe<sub>1.9</sub><sup>3+</sup>(PO<sub>4</sub>)<sub>2</sub>(OH)<sub>1.84</sub>•6H<sub>2</sub>O. (3) Fe<sup>2+</sup>Fe<sub>2</sub><sup>3+</sup>(PO<sub>4</sub>)<sub>2</sub>(OH)<sub>2</sub>•6H<sub>2</sub>O.

**Occurrence:** Replacing a belemnite (Mullica Hill, New Jersey, USA); a secondary mineral in weathered phosphatic black shale beds (Bethel Church, Indiana, USA).

**Association:** Rockbridgeite, phosphosiderite (Mullica Hill, New Jersey, USA); vivianite, aluminian strengite, diadochite, leucophosphite, beraunite, fluorapatite (Bethel Church, Indiana, USA); beraunite, cacoxenite (Arnsberg, Germany).

**Distribution:** In the USA, along Raccoon Creek, near Mullica Hill, Gloucester Co., New Jersey; near Bethel Church, Pike Co., Indiana; in the Dunton quarry, Newry, Oxford Co., Maine; from the Palermo #1 mine, near North Groton, Grafton Co., New Hampshire. In the Gravel Hill mine, Perranzabuloe, Cornwall, England. At Arnsberg, North Rhein-Westphalia, and Althütte and Waidhaus, Bavaria, Germany. Along Dry Weather road, Glenhope, New Zealand.

**Name:** For its dominant content of ferrous iron and relation to *strunzite*.

**Type Material:** National Museum of Natural History, Washington, D.C., USA, 149594.

**References:** (1) Peacor, D.R., P.J. Dunn, and W.B. Simmons (1983) Ferrostrunzite, the ferrous iron analogue of strunzite from Mullica Hill, New Jersey. *Neues Jahrb. Mineral., Monatsh.*, 524-528. (2) (1984) *Amer. Mineral.*, 69, 811 (abs. ref. 1). (3) Coveney, R.M., Jr., A.V. Allen, J.C. Blankenship, and W.B. Simmons (1984) Hawleyite and phosphate minerals from Bethel Church, Indiana, including a second occurrence for ferrostrunzite. *Mineral. Record*, 15, 351-357. (4) van Tassel, R. and E. de Grave (1992) Ferrostrunzite from Arnsberg, Sauerland, Germany. *Neues Jahrb. Mineral., Monatsh.*, 207-212.

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