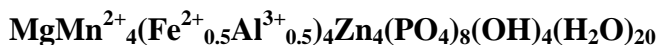


**Ferraioloite**

**Crystal Data:** Monoclinic. *Point Group:* 2/m. As plates or blades to 0.2 mm, in books or rosettes to 0.4 mm. Crystals display {010}, {100} and {011} and may have curved faces.

**Physical Properties:** *Cleavage:* Perfect on {100}. *Fracture:* Irregular. *Tenacity:* Flexible. Hardness = ~ 2 D(meas.) = n.d. D(calc.) = 2.59

**Optical Properties:** Transparent. *Color:* Greenish gray to lemon-yellow. *Streak:* n.d. *Luster:* Vitreous.

*Optical Class:* Biaxial (-).  $\alpha = 1.575(\text{calc.})$   $\beta = 1.5825(5)$   $\gamma = 1.5835(5)$   $2V(\text{meas.}) = 40(5)^\circ$   
*Dispersion:* Weak,  $r > v$ . *Orientation:*  $X \approx a, Y = b, Z \approx c$ . *Absorption:*  $Y \gg X \approx Z$ .  
*Pleochroism:* X, Z = colorless, Y = blue-grey.

**Cell Data:** *Space Group:* I2/m.  $a = 25.333(3)$   $b = 6.299(1)$   $c = 15.161(3)$   $\beta = 90.93(3)^\circ$   $Z = 2$

**X-ray Powder Pattern:** Foote mine, Kings Mountain district, North Carolina, USA. 2.6648 (100), 2.924 (8), 3.245 (7), 3.499 (5), 2.869 (5), 4.78 (4), 4.22 (4)

Chemistry:	(1)	(2)
CaO	0.65	
MgO	1.09	2.17
MnO	16.05	15.26
ZnO	18.90	17.52
FeO	8.02	7.73
Al <sub>2</sub> O <sub>3</sub>	5.58	5.48
P <sub>2</sub> O <sub>5</sub>	30.90	30.54
H <sub>2</sub> O	[21.30]	21.30
Total	102.49	100.00

(1) Foote mine, Kings Mountain district, North Carolina, USA; average of 10 electron microprobe analyses, H<sub>2</sub>O calculated; corresponds to Ca<sub>0.21</sub>Mg<sub>0.50</sub>Mn<sub>4.16</sub>Fe<sub>2.05</sub>Al<sub>2.01</sub>Zn<sub>4.27</sub>P<sub>8.00</sub>H<sub>43.59</sub>O<sub>56</sub>.  
 (2) MgMn<sup>2+</sup><sub>4</sub>(Fe<sup>2+</sup><sub>0.5</sub>Al<sup>3+</sup><sub>0.5</sub>)<sub>4</sub>Zn<sub>4</sub>(PO<sub>4</sub>)<sub>8</sub>(OH)<sub>4</sub>(H<sub>2</sub>O)<sub>20</sub>.

**Occurrence:** A secondary phase in sugary pegmatite.

**Association:** Vivianite, fairfieldite/messelite, phosphophyllite, scholzite/parascholzite, rittmannite, mangangordonite, kingsmountite, kastningite, metaswitzerite.

**Distribution:** At the Foote Lithium Company mine, Kings Mountain district, Cleveland County, North Carolina, USA.

**Name:** Honors James (Jim) Anthony Ferraiolo (1947-2014), author of *A Systematic Classification of Nonsilicate Minerals* (Bulletin 172 of the American Museum of Natural History, 1982).

**Type Material:** Museum Victoria, Melbourne, Australia (M53492 and M53493) and the Natural History Museum of Los Angeles County, Los Angeles, California, USA (65593 and 65594).

**References:** (1) Mills, S.J., I.E. Grey, A.R. Kampf, C.M. Macrae, J.B. Smith, C.J. Davidson, and A.M. Glenn (2016) Ferraioloite, MgMn<sup>2+</sup><sub>4</sub>(Fe<sup>2+</sup><sub>0.5</sub>Al<sup>3+</sup><sub>0.5</sub>)<sub>4</sub>Zn<sub>4</sub>(PO<sub>4</sub>)<sub>8</sub>(OH)<sub>4</sub>(H<sub>2</sub>O)<sub>20</sub>, a new secondary phosphate mineral from the Foote mine, USA. *Eur. J. Mineral.*, 28(3), 655-661. (2) (2016) *Amer. Mineral.*, 101, 2779 (abs. ref. 1).