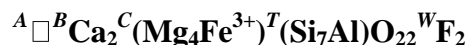


**Magnesio-ferri-fluoro-hornblende**

**Crystal Data:** Monoclinic. *Point Group:* 2/m. As prismatic crystals to 3 mm, striated parallel to elongation.

**Physical Properties:** *Cleavage:* Perfect on {110}. *Fracture:* n.d. *Tenacity:* Brittle. Hardness = n.d. D(meas.) = n.d. D(calc.) = 3.315

**Optical Properties:** Transparent. *Color:* Dark brown. *Streak:* n.d. *Luster:* Vitreous. *Optical Class:* Biaxial (-).  $\alpha = 1.669(2)$   $\beta = 1.676(2)$   $\gamma = 1.678(2)$   $2V(\text{meas.}) = 74(1)^\circ$   $2V(\text{calc.}) = 56^\circ$  *Orientation:*  $X \wedge a = 47.6^\circ$  ( $\beta$  obtuse),  $Y \parallel b$ ,  $Z \wedge c = 33.4$  ( $\beta$  acute). *Pleochroism:*  $Y = \text{dark gray}$ ;  $Z = \text{pale brownish gray}$ ;  $X = \text{pale gray}$ . *Absorption:*  $Y > Z > X$ .

**Cell Data:** *Space Group:* C2/m.  $a = 9.839(5)$   $b = 18.078(9)$   $c = 5.319(3)$   $\beta = 104.99(3)^\circ$   $Z = 2$

**X-ray Powder Pattern:** Near Portoscuso, Cagliari, Sardinia, Italy. 2.711 (100), 8.412 (89), 3.121 (64), 2.553 (61), 3.389 (55), 2.599 (45), 2.164 (36)

Chemistry:	(1)	(2)
SiO <sub>2</sub>	45.34	49.67
Al <sub>2</sub> O <sub>3</sub>	6.18	6.02
TiO <sub>2</sub>	1.22	
FeO <sub>total</sub>	20.88	
FeO	[15.24]	
Fe <sub>2</sub> O <sub>3</sub>	[6.27]	9.43
MgO	9.71	19.04
MnO	0.78	
ZnO	0.06	
CaO	10.18	13.24
Na <sub>2</sub> O	1.35	
K <sub>2</sub> O	1.15	
F	3.22	4.49
Cl	0.30	
-O = (F,Cl) <sub>2</sub>	1.42	1.89
H <sub>2</sub> O	[0.37]	
Total	99.95	100.00

(1) Near Portoscuso, Cagliari, Sardinia, Italy; average of 10 electron microprobe analyses, H<sub>2</sub>O calculated, FeO/Fe<sub>2</sub>O<sub>3</sub> calculated from structure; corresponds to (Na<sub>0.15</sub>K<sub>0.22</sub>) $\Sigma=0.37$ (Na<sub>0.25</sub>Ca<sub>1.66</sub>Mn<sub>0.09</sub>) $\Sigma=2.00$ (Mg<sub>2.20</sub>Fe<sup>2+</sup><sub>1.94</sub>Mn<sub>0.01</sub>Zn<sub>0.01</sub>Fe<sup>3+</sup><sub>0.72</sub>Ti<sub>0.13</sub>) $\Sigma=5.01$ (Al<sub>1.11</sub>Si<sub>6.89</sub>) $\Sigma=8.00$ O<sub>22</sub>[F<sub>1.55</sub>(OH)<sub>0.37</sub>Cl<sub>0.08</sub>] $\Sigma=2.00$ .  
 (2) Ca<sub>2</sub>(Mg<sub>4</sub>Fe<sup>3+</sup>)(Si<sub>7</sub>Al)O<sub>22</sub>F<sub>2</sub>.

**Mineral Group:** Amphibole supergroup.

**Occurrence:** In vugs in a welded tuff.

**Association:** Tridymite, todorokite, magnetite, hematite.

**Distribution:** Along the coast road, ~5.5 km northeast of Portoscuso, Cagliari, Sardinia, Italy.

**Name:** For a calcium amphibole with dominant magnesium and ferric iron in the C site and fluorine dominant in the W site.

**Type Material:** Mineralogical Museum, Department of Earth and Environmental Sciences, University of Pavia, Italy (2014-01).

**References:** (1) Oberti, R., M. Boiocchi, F.C. Hawthorne, N.A. Ball, and L. Chiappino (2016) Magnesio-ferri-fluoro-hornblende from Portoscuso, Sardinia, Italy: description of a newly approved member of the amphibole supergroup. *Mineral. Mag.*, 80(2), 269-275. (2) (2016) *Amer. Mineral.*, 101, 2781 (abs. ref. 1).