Magnesio-ferri-fluoro-hornblende $^{A}\square\,^{B}Ca_2\,^{C}(Mg_4Fe^{3+})^{T}(Si_7Al)O_{22}\,^{W}F_2$

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(meas.) = 74(1)° 2V(calc.) = 56° *Orientation*: $X \wedge a = 47.6°$ (β obtuse), $Y \parallel b$, $Z \wedge c = 33.4$ (β acute). *Pleochroism*: Y = dark gray; Z = pale brownish gray; X = pale gray. *Absorption*: $Y > Z > X$.

Cell Data: *Space Group*: *C*2/*m*. $a = 9.839(5)$ $b = 18.078(9)$ $c = 5.319(3)$ $\beta = 104.99(3)°$ 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_2	45.34	49.67
Al_2O_3	6.18	6.02
TiO_2	1.22	
FeO_{total}	20.88	
FeO	[15.24]	
Fe_2O_3	[6.27]	9.43
MgO	9.71	19.04
MnO	0.78	
ZnO	0.06	
CaO	10.18	13.24
Na_2O	1.35	
K_2O	1.15	
F	3.22	4.49
Cl	0.30	
$-O = (F,Cl)_2$	1.42	1.89
H_2O	[0.37]	.
Total	99.95	100.00

(1) Near Portoscuso, Cagliari, Sardinia, Italy; average of 10 electron microprobe analyses, H_2O calculated, FeO/Fe_2O_3 calculated from structure; corresponds to $(Na_{0.15}K_{0.22})_{\Sigma=0.37}(Na_{0.25}Ca_{1.66}Mn_{0.09})_{\Sigma=2.00}(Mg_{2.20}Fe^{2+}_{1.94}Mn_{0.01}Zn_{0.01}Fe^{3+}_{0.72}Ti_{0.13})_{\Sigma=5.01}(Al_{1.11}Si_{6.89})_{\Sigma=8.00}O_{22}[F_{1.55}(OH)_{0.37}Cl_{0.08}]_{\Sigma=2.00}$. (2) $Ca_2(Mg_4Fe^{3+})(Si_7Al)O_{22}F_2$.

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).