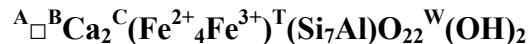


Ferro-ferri-hornblende



Crystal Data: Monoclinic. *Point Group:* 2/m. Crystals acicular to lamellar.

Physical Properties: *Cleavage:* Perfect on {110}. *Fracture:* n.d. *Tenacity:* Brittle. Hardness = [6] D(meas.) = 3.362 D(calc.) = 3.35

Optical Properties: Transparent. *Color:* Dark green. *Streak:* n.d. *Luster:* Vitreous. *Optical Class:* Biaxial (-). $\alpha = 1.697(2)$ $\beta = 1.722(5)$ $\gamma = 1.726(5)$ $2V(\text{meas.}) = 35.7^\circ$ $2V(\text{calc.}) = 43^\circ$ *Orientation:* $X \wedge a = 26.2^\circ$ (β obtuse), $Y // b$, $Z \wedge c = 11.5^\circ$ (β acute). *Pleochroism:* Weak; X = medium gold/brown, Y = dark brown/black, Z = dark gray. *Absorption:* $X < Z < Y$.

Cell Data: *Space Group:* C2/m. $a = 9.9307(5)$ $b = 18.2232(10)$ $c = 5.3190(3)$ $\beta = 104.857(1)^\circ$ $Z = 2$

X-ray Powder Pattern: Traversella iron mine, Val Chiusella, Ivrea, Piemonte, Italy. 8.493 (100), 2.728 (69), 3.151 (47), 2.555 (37), 2.615 (32), 2.359 (28), 3.406 (26)

Chemistry:	(1)	(2)	(1)	(2)
SiO ₂	46.63	43.41	ZnO	0.03
TiO ₂	0.05		CaO	11.59
Al ₂ O ₃	4.67	5.26	Na ₂ O	0.56
FeO _{total}	28.08		K ₂ O	0.63
FeO	[24.65]	29.66	F	0.02
Fe ₂ O ₃	[3.81]		Cl	0.38
MnO	0.48		-O = (F,Cl) ₂	0.09
MgO	4.99		H ₂ O	[1.82]
			Total	100.22
				100.00

(1) Traversella iron mine, Val Chiusella, Ivrea, Piemonte, Italy; average of 10 electron microprobe analyses, H₂O and FeO:Fe₂O₃ calculated from structure; corresponding to ^A(Na_{0.10}K_{0.13})_{Σ=0.23} ^B(Ca_{1.93}Na_{0.07})_{Σ=2.00} ^C(Fe²⁺_{3.21}Mg_{1.16}Mn_{0.06}Fe³⁺_{0.45}Al_{0.12}Ti_{0.01})_{Σ=5.01} ^T(Si_{7.26}Al_{0.74})_{Σ=8.00}O₂₂^W[(OH)_{1.89}F_{0.01}Cl_{0.10}]_{Σ=2.00}. (2) ^A□^BCa₂^C(Fe²⁺₄Fe³⁺)^T(Si₇Al)₂₂^W(OH)₂.

Mineral Group: Amphibole group, calcium amphibole subgroup.

Occurrence: In a contact metamorphic rock (skarn).

Association: Tremolite, hastingsite, magnesio-hastingsite, quartz, calcite.

Distribution: From the Traversella iron mine, Val Chiusella, Ivrea, Piemonte, Italy.

Name: Signifies an amphibole in the compositional range of *hornblende* with essential Fe²⁺ > Fe³⁺ and in the C structural site.

Type Material: Mineral Museum, University of Pavia, Italy (2015-01).

References: (1) Oberti, R., M. Boiocchi, F.C. Hawthorne, N.A. Ball, F. Cámara, R. Pagano, and A. Pagano (2016) Ferro-ferri-hornblende from the Traversella mine (Ivrea, Italy): occurrence, mineral description and crystal-chemistry. *Mineral. Mag.*, 80(7), 1233-1242. (2) (2017) Amer. Mineral., 102, 695 (abs. ref. 1).