

Ferrohornblende



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Crystal Data: Monoclinic. *Point Group:* $2/m$. As prismatic crystals, to 10 cm, and as rims on pyroxenes. *Twinning:* [Simple or lamellar twinning || {100}.]

Physical Properties: *Cleavage:* Perfect on {110}, with intersections at 56° and 124° ; may show partings on {100}, {010}. *Tenacity:* [Brittle.] *Hardness* = [5–6] *D*(meas.) = 3.12–3.30 *D*(calc.) = n.d.

Optical Properties: Semitransparent. *Color:* Green, greenish brown. *Luster:* [Vitreous.] *Optical Class:* Biaxial (-). *Pleochroism:* *X* = light brown, greenish yellow; *Y* = light green, olive-green; *Z* = dark green, bluish green. *Orientation:* *Y* = *b*, $Z \wedge c \simeq 18^\circ$. $\alpha = 1.641\text{--}1.704$ $\beta = 1.657\text{--}1.718$ $\gamma = 1.662\text{--}1.727$ $2V$ (meas.) = $57^\circ\text{--}79^\circ$

Cell Data: *Space Group:* [$C2/m$.] *a* = n.d. *b* = n.d. *c* = n.d. β = n.d. *Z* = n.d.

X-ray Powder Pattern: n.d.

Chemistry:	(1)	(2)	(1)	(2)
SiO ₂	45.24	42.73	MgO	8.90
TiO ₂	1.26	3.32	CaO	10.21
Al ₂ O ₃	10.77	7.35	Na ₂ O	1.34
Fe ₂ O ₃	0.41	7.05	K ₂ O	0.42
FeO	19.33	25.86	H ₂ O ⁺	1.50
MnO	0.75	0.48	H ₂ O ⁻	0.00
			Total	100.13
				99.13

(1) Centennial mine, Broken Hill, New South Wales, Australia; corresponds to $(\text{Ca}_{1.65}\text{Na}_{0.39}\text{K}_{0.08})_{\Sigma=2.12}(\text{Fe}^{2+}_{2.43}\text{Mg}_{2.00}\text{Al}_{0.72}\text{Ti}_{0.14}\text{Mn}_{0.09}\text{Fe}^{3+}_{0.05})_{\Sigma=5.43}(\text{Si}_{6.81}\text{Al}_{1.19})_{\Sigma=8.00}\text{O}_{22}[(\text{OH})_{1.50}\text{O}_{0.50}]_{\Sigma=2.00}$. (2) Mayurbhanj district, Orissa, India; corresponds to $(\text{Ca}_{1.60}\text{Na}_{0.34}\text{K}_{0.19})_{\Sigma=2.13}(\text{Fe}^{2+}_{3.51}\text{Fe}^{3+}_{0.86}\text{Ti}_{0.40}\text{Al}_{0.34}\text{Mg}_{0.10}\text{Mn}_{0.06})_{\Sigma=5.27}(\text{Si}_{6.93}\text{Al}_{1.07})_{\Sigma=8.00}\text{O}_{22}(\text{OH})_{0.81}$.

Polymorphism & Series: Forms a series with magnesiohornblende.

Mineral Group: Amphibole (calcic) group: $\text{Mg}/(\text{Mg} + \text{Fe}^{2+}) < 0.50$; $(\text{Na} + \text{K})_{\text{A}} < 0.5$; $\text{Na}_{\text{B}} < 0.67$; $(\text{Ca} + \text{Na})_{\text{B}} \geq 1.34$; 6.50 Si 7.24.

Occurrence: From granites, granodiorites, and metabasalts; common in amphibolites and schists. As reaction rims on ferroan hedenbergite.

Association: Hedenbergite (granite); biotite, epidote, albite, quartz (amphibolite).

Distribution: Very widespread, but many locality references lack qualifying chemical analyses. A few historic localities for well-crystallized material include: at Monte Somma and Vesuvius, Campania, Italy. From Pargas, Finland. At Kragerö, Arendal, and around the Langesundsfjord, Norway. From Bílina and Schima, Czech Republic. In the USA, from Franklin and Sterling Hill, Ogdensburg, Sussex Co., New Jersey; from Edwards, Pierrepont, and Gouverneur, St. Lawrence Co., New York. From Bancroft, Pakenham, and Eganville, Ontario, Canada. From Broken Hill, New South Wales, Australia.

Name: For its *ferrous* iron content and from the German for *horn* and *to deceive*, in allusion to its similarity to valuable minerals in ores.

References: (1) Dana, E.S. (1892) Dana's system of mineralogy, (6th edition), 385–398 [hornblende, in part]. (2) Leake, B.E. (1968) A catalog of analyzed calciferous and subcalciferous amphiboles together with their nomenclature and associated minerals. Geol. Soc. Amer. Special Paper 98, 210 p. [analysis 754]. (3) Iyengar, S.V.P. and K.K. Basu (1980) Ferro-hornblende, an iron-rich end member from Simlipal Granite, Mayurbhanj District, Orissa. J. Geol. Soc. India, 21, 558–561.

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