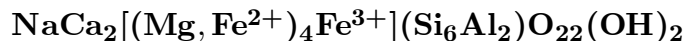


**Magnesio-hastingsite**

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**Crystal Data:** Monoclinic. *Point Group:*  $2/m$ . [Prismatic.] *Twinning:* [Simple or multiple twinning || {100}.]**Physical Properties:** *Cleavage:* [Perfect on {110}, with intersections at  $\sim 56^\circ$  and  $\sim 124^\circ$ ; partings on {001}, {100}.] *Tenacity:* [Brittle.] *Hardness* = [5–6] *D*(meas.) = 3.18–3.22 *D*(calc.) = 3.243**Optical Properties:** Semitransparent. *Color:* Green. *Luster:* [Vitreous.] *Optical Class:* Biaxial (-). *Pleochroism:*  $X$  = pale brown;  $Y$  = dark brown;  $Z$  = green-brown. *Orientation:*  $Y = b$ ;  $Z \wedge c \simeq 15^\circ\text{--}19^\circ$ .  $\alpha = 1.652\text{--}1.676$   $\beta = 1.664\text{--}1.687$   $\gamma = 1.672\text{--}1.695$   $2V$ (meas.) =  $80^\circ\text{--}84^\circ$ **Cell Data:** *Space Group:*  $C2/m$ .  $a = 9.880(2)$   $b = 18.012(4)$   $c = 5.324(2)$   
 $\beta = 105.26(2)^\circ$   $Z = 2$ **X-ray Powder Pattern:** n.d.

<b>Chemistry:</b>	(1)	(2)		(1)	(2)
SiO <sub>2</sub>	40.26	39.83	MgO	13.98	14.44
TiO <sub>2</sub>	3.16	2.56	CaO	12.01	12.39
Al <sub>2</sub> O <sub>3</sub>	11.99	14.98	Na <sub>2</sub> O	2.54	2.27
Fe <sub>2</sub> O <sub>3</sub>	7.78	7.66	K <sub>2</sub> O	1.87	1.25
FeO	5.52	3.78	H <sub>2</sub> O <sup>+</sup>	1.63	0.58
MnO	0.12	0.00	Total	100.86	99.74

(1) Unteriefenbach, Austria; corresponds to  $(\text{Ca}_{1.90}\text{Na}_{0.73}\text{K}_{0.35})_{\Sigma=2.98}(\text{Mg}_{3.07}\text{Fe}_{0.86}^{3+}\text{Fe}_{0.68}^{2+}\text{Ti}_{0.35}\text{Mn}_{0.02}\text{Al}_{0.02})_{\Sigma=5.00}(\text{Si}_{5.94}\text{Al}_{2.06})_{\Sigma=8.00}\text{O}_{22}(\text{OH})_{1.60}$ . (2) Brezno nad Labem (Grosspriesen), Czech Republic; corresponds to  $(\text{Ca}_{1.97}\text{Na}_{0.65}\text{K}_{0.24})_{\Sigma=2.86}(\text{Mg}_{3.20}\text{Fe}_{0.86}^{3+}\text{Al}_{0.54}\text{Fe}_{0.47}^{2+}\text{Ti}_{0.29})_{\Sigma=5.36}(\text{Si}_{5.92}\text{Al}_{2.08})_{\Sigma=8.00}\text{O}_{22}(\text{OH})_{0.58}$ .

**Polymorphism & Series:** Forms a series with hastingsite.**Mineral Group:** Amphibole (calcic) group:  $\text{Mg}/(\text{Mg} + \text{Fe}^{2+}) \geq 0.70$ ;  $\text{Fe}^{3+} > \text{Al}^{\text{vi}}$ ;  $(\text{Na} + \text{K})_{\text{A}} \geq 0.5$ ;  $\text{Na}_{\text{B}} < 0.67$ ;  $(\text{Ca} + \text{Na})_{\text{B}} \geq 1.34$ ;  $\text{Si} < 6.25$ ;  $\text{Ti} < 0.5$ .**Occurrence:** In alkalic basalts; in andesites, latites, tephrites, and their tuffs; in carbonatites.**Association:** Olivine, plagioclase, pyroxenes.**Distribution:** From Untertiefenbach, Austria. At Brezno nad Labem (Grosspriesen), Czech Republic. In Germany, from the Radersberg, Eifel district. From Gillinge and Långban, Värmland, Sweden. In Russia, from the Khibiny massif, Kola Peninsula. At the Gardiner complex, beyond the head of the Kangerdlugssuaq Fjord, Greenland. From Lyndoch, Ontario, Canada. In the USA, at Iron Hill, Gunnison Co., Colorado. From the Marangudzi ring complex, Zimbabwe.**Name:** For *magnesium* in its composition and relation to *hastingsite*.**Type Material:** n.d.**References:** (1) Billings, M.P. (1928) The chemistry, optics and genesis of the hastingsite group of amphiboles. *Amer. Mineral.*, 13, 287 [hypothetical end member]. (2) Deer, W.A., R.A. Howie, and J. Zussman (1963) Rock-forming minerals, v. 2, chain silicates, 263–314 [hornblende, in part], 315–320 [basaltic hornblende]. (3) Walitzi, E.M. and F. Walter (1981) Verfeinerung der Kristallstruktur eines basaltischen Magnesio-Hastingsites. *Zeits. Krist.*, 156, 197–208 (in German).

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