Magnesio-hastingsite $NaCa_2[(Mg,Fe^{2+})_4Fe^{3+}](Si_6Al_2)O_{22}(OH)_2$

Crystal Data: Monoclinic. *Point Group:* $2/m$. [Prismatic.] *Twinning:* [Simple or multiple twinning ∥ {100}.]

Physical Properties: *Cleavage:* [Perfect on {110}, with intersections at ∼56° and ∼124°; 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:* $Y = b$; $Z \wedge c \simeq 15°$–$19°$. $\alpha = 1.652$–1.676 $\beta = 1.664$–1.687 $\gamma = 1.672$–1.695 2V(meas.) = 80°–84°

Cell Data: *Space Group:* $C2/m$. $a = 9.880(2)$ $b = 18.012(4)$ $c = 5.324(2)$ $\beta = 105.26(2)°$ Z = 2

X-ray Powder Pattern: n.d.

Chemistry:

	(1)	(2)		(1)	(2)
SiO_2	40.26	39.83	MgO	13.98	14.44
TiO_2	3.16	2.56	CaO	12.01	12.39
Al_2O_3	11.99	14.98	Na_2O	2.54	2.27
Fe_2O_3	7.78	7.66	K_2O	1.87	1.25
FeO	5.52	3.78	H_2O^+	1.63	0.58
MnO	0.12	0.00	Total	100.86	99.74

(1) Unteriefenbach, Austria; corresponds to $(Ca_{1.90}Na_{0.73}K_{0.35})_{\Sigma=2.98}(Mg_{3.07}Fe^{3+}_{0.86}Fe^{2+}_{0.68}Ti_{0.35}Mn_{0.02}Al_{0.02})_{\Sigma=5.00}(Si_{5.94}Al_{2.06})_{\Sigma=8.00}O_{22}(OH)_{1.60}$. (2) Březno nad Labem (Grosspriesen), Czech Republic; corresponds to $(Ca_{1.97}Na_{0.65}K_{0.24})_{\Sigma=2.86}(Mg_{3.20}Fe^{3+}_{0.86}Al_{0.54}Fe^{2+}_{0.47}Ti_{0.29})_{\Sigma=5.36}(Si_{5.92}Al_{2.08})_{\Sigma=8.00}O_{22}(OH)_{0.58}$.

Polymorphism & Series: Forms a series with hastingsite.

Mineral Group: Amphibole (calcic) group: $Mg/(Mg + Fe^{2+}) \geq 0.70$; $Fe^{3+} > Al^{vi}$; $(Na + K)_A \geq 0.5$; $Na_B < 0.67$; $(Ca + Na)_B \geq 1.34$; $Si < 6.25$; $Ti < 0.5$.

Occurrence: In alkalic basalts; in andesites, latites, tephrites, and their tuffs; in carbonatites.

Association: Olivine, plagioclase, pyroxenes.

Distribution: From Untertiefenbach, Austria. At Březno 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).