

Magnesiocummingtonite

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Crystal Data: Monoclinic. *Point Group:* $2/m$. As prisms or needles. *Twinning:* Multiple twinning $\parallel \{100\}$.**Physical Properties:** *Cleavage:* Good on $\{110\}$, intersecting at 54° and 126° . *Tenacity:* [Brittle.] *Hardness* = [5–6] *D(meas.)* = 3.13–3.22 *D(calc.)* = 3.18–3.24**Optical Properties:** Semitransparent. *Color:* [Light green, beige; colorless to pale green in thin section.] *Luster:* [Vitreous.]*Optical Class:* [Biaxial (–).] *Pleochroism:* [Weak, with increasing iron content; $X = Y$ = colorless; Z = pale green or yellow.] *Orientation:* [$Y = b$.] *Dispersion:* [$r < v$, weak.] $\alpha = 1.621$ $\beta = 1.632$ $\gamma = 1.643$ $2V(\text{meas.}) = 66^\circ\text{--}97^\circ$ **Cell Data:** *Space Group:* $P2_1/m$. $a = 9.49$ $b = 18.00$ $c = 5.30$ $\beta = 102.0^\circ$ $Z = 2$ **X-ray Powder Pattern:** Cooma, Australia.

3.044 (100), 3.425 (80), 3.230 (80), 2.963 (60), 3.838 (40), 2.724 (40), 2.495 (40)

Chemistry:	(1)	(2)	(1)	(2)	
SiO ₂	58.1	55.97	NiO	0.11	
TiO ₂	0.02	0.07	MgO	30.9	26.14
Al ₂ O ₃	0.06	1.47	CaO	0.52	1.25
Fe ₂ O ₃		0.01	Na ₂ O	0.00	0.32
Cr ₂ O ₃	0.01		K ₂ O	0.00	0.01
FeO	7.06	10.5	H ₂ O	2.50	
MnO	0.37	0.37	P ₂ O ₅		0.01
			Total	99.65	96.12

(1) Cima di Gagnone, Switzerland; by electron microprobe, corresponds to $(\text{Mg}_{6.26}\text{Fe}_{0.80}^{2+}\text{Ca}_{0.08}\text{Mn}_{0.04}\text{Ni}_{0.01})_{\Sigma=7.19}(\text{Si}_{7.89}\text{Al}_{0.01})_{\Sigma=7.90}\text{O}_{22}(\text{OH})_2$. (2) Cooma, Australia; by electron microprobe, $\text{Fe}^{2+}:\text{Fe}^{3+}$ confirmed by wet analysis; corresponds to $(\text{Mg}_{5.45}\text{Fe}_{1.23}^{2+}\text{Ca}_{0.19}\text{Na}_{0.09}\text{Al}_{0.07}\text{Mn}_{0.04}\text{Ti}_{0.01})_{\Sigma=7.08}(\text{Si}_{7.83}\text{Al}_{0.17})_{\Sigma=8.00}\text{O}_{22}(\text{OH})_2$.**Polymorphism & Series:** Forms a series with cummingtonite and grunerite.**Mineral Group:** Amphibole (Fe–Mn–Mg) group: $\text{Mg}/(\text{Mg} + \text{Fe}^{2+}) \geq 0.7$; $(\text{Ca} + \text{Na})_{\text{B}} < 1.34$; $\text{Li} < 1.0$; $\text{Mn} < 0.5$.**Occurrence:** In metamorphosed ultramafic rocks of the amphibolite facies; as exsolution lamellae in magnesio-arfvedsonite.**Association:** Anthophyllite, tremolite, chlorite, magnesite, talc, enstatite (Cima di Gagnone, Switzerland).**Distribution:** From near Cima di Gagnone, Ticino, Switzerland. At Cooma, New South Wales, Australia.**Name:** For *magnesium* in its composition and similarity to *cummingtonite*.**Type Material:** n.d.**References:** (1) Tilley, C.E. (1939) Kyanite-gedrite parageneses. *Geol. Mag.* London, 76, 326–330. (2) Kisch, H.J. (1969) Magnesiocummingtonite- $P2_1/m$: a Ca- and Mn-poor clino-amphibole from New South Wales. *Contr. Mineral. Petrol.*, 21, 319–331. (3) Rice, J.M. and B.W. Evans (1974) Widespread occurrence of magnesiocummingtonite in ultramafic schists, Cima di Gagnone, Ticino, Switzerland. *Contr. Mineral. Petrol.*, 43, 245–251. (4) Klein, C. (1964) Cummingtonite-grunerite series: a chemical, optical and X-ray study. *Amer. Mineral.*, 49, 963–982. (5) Ghose, S. (1961) The crystal structure of a cummingtonite. *Acta Cryst.*, 14, 622–627. (6) Phillips, W.R. and D.T. Griffen (1981) Optical mineralogy, 225–258.

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