

# Magnesiochloritoid



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**Crystal Data:** Monoclinic. *Point Group:*  $2/m$ . As irregular grains, to 4 mm.  
*Twinning:* Common on {001}, polysynthetic.

**Physical Properties:** *Cleavage:* {001}, perfect. *Hardness* = [ $\sim 6.5$ ] (by analogy to chloritoid).  
D(meas.) = 3.25(2) D(calc.) = 3.343

**Optical Properties:** Transparent. *Color:* Pale blue-green to dark blue; in transmitted light, colorless.

*Optical Class:* Biaxial (+). *Pleochroism:* Very faint; light blue, gray-blue, yellowish.  
 $\alpha = 1.687(2)$   $\beta = 1.690(2)$   $\gamma = 1.702(2)$   $2V(\text{meas.}) = 40^\circ\text{--}50^\circ$   $2V(\text{calc.}) = 46^\circ$

**Cell Data:** *Space Group:*  $C2/c$ .  $a = 9.460(1)$   $b = 5.471(1)$   $c = 18.182(2)$   $\beta = 101.4(1)^\circ$   
 $Z = 4$

**X-ray Powder Pattern:** Monte Rosa massif, Italy.

4.46 (100), 2.964 (18), 2.306 (14), 1.574 (11), 2.356 (7), 2.459 (6), 1.482 (6)

## Chemistry:

	(1)	(2)
SiO <sub>2</sub>	25.73	27.27
TiO <sub>2</sub>	0.00	
Al <sub>2</sub> O <sub>3</sub>	43.29	46.27
FeO	12.17	
MnO	0.05	
MgO	10.56	18.29
CaO	0.00	
Na <sub>2</sub> O	0.00	
K <sub>2</sub> O	0.01	
H <sub>2</sub> O	[8.19]	8.17
Total	[100.00]	100.00

(1) Monte Rosa massif, Italy; by electron microprobe, H<sub>2</sub>O by difference; corresponds to  $(\text{Mg}_{0.61}\text{Fe}_{0.40}^{2+})_{\Sigma=1.01}\text{Al}_{1.99}\text{Si}_{1.00}\text{O}_5(\text{OH})_2$ . (2)  $\text{MgAl}_2\text{SiO}_5(\text{OH})_2$ .

**Polymorphism & Series:** Monoclinic and triclinic polytypes are known.

**Mineral Group:** Chloritoid group.

**Occurrence:** In metapelites and related rocks within high-grade blueschist rocks; stable under metamorphic conditions of near 500 °C and 18 kbar.

**Association:** Talc, chlorite, muscovite, quartz, kyanite, garnet, omphacite, rutile, apatite.

**Distribution:** In Italy, from the Monte Rosa massif, near the Ghiacciaio di Verra; in the Val d'Ayas, near the border with Switzerland; and in the Praborna mine, near St. Marcel, Val d'Aosta. From Zermatt, Valais, Switzerland. In Austria, in the Hohe Tauern Mountains.

**Name:** For *magnesium* in its composition and its relation to *chloritoid*.

**Type Material:** National School of Mines, Paris, France; Museum of Natural Science, Torino, Italy.

**References:** (1) Chopin, C. (1983) Magnesiochloritoid, a key-mineral for the petrogenesis of high-grade pelitic blueschists. *Bull. Minéral.*, 106, 715–717. (2) (1985) *Amer. Mineral.*, 70, 216–217 (abs. ref. 1). (3) Chopin, C. and P. Monié (1984) A unique magnesiochloritoid-bearing, high-pressure assemblage from the Monte Rosa, Western Alps: petrologic and <sup>40</sup>Ar–<sup>39</sup>Ar radiometric study. *Contr. Mineral. Petrol.*, 87, 388–398. (4) Ivaldi, G., M. Catti, and G. Ferraris (1988) Crystal structure at 25 and 700 °C of magnesiochloritoid from a high-pressure assemblage (Monte Rosa). *Amer. Mineral.*, 73, 358–364. (5) Chopin, C., E. Seidel, T. Theye, G. Ferraris, G. Ivaldi, and M. Catti (1992) Magnesiochloritoid, and the Fe–Mg series in the chloritoid group. *Eur. J. Mineral.*, 4, 67–76.

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