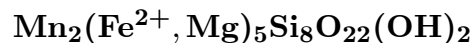


Dannemorite



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Crystal Data: Monoclinic. *Point Group:* $2/m$. Crystals prismatic, fibrous, to 1 cm; columnar or asbestiform.

Physical Properties: *Cleavage:* Perfect on $\{110\}$, with intersections at $\sim 55^\circ$ and $\sim 125^\circ$. *Tenacity:* [Brittle.] *Hardness* = [5–6] $D(\text{meas.}) = 3.50$ $D(\text{calc.}) = [3.35]$

Optical Properties: Transparent to translucent. *Color:* Yellowish brown, greenish gray, colorless. *Luster:* Silky to vitreous.

Optical Class: Biaxial (–). *Pleochroism:* X = red-violet; Y = pale violet; Z = blue. *Orientation:* $Y = b$; $Z \wedge c = 15^\circ$. *Dispersion:* $r < v$. $\alpha = 1.666$ $\beta = 1.682$ $\gamma = 1.698$ $2V(\text{meas.}) = 88^\circ$

Cell Data: *Space Group:* $C2/m$. $a = 9.561$ (ICDD 23-302). $b = 18.28$ $c = 5.348$
 $\beta = 102.09^\circ$ $Z = 2$

X-ray Powder Pattern: Väster Silfberg, Sweden. (ICDD 23-302).
8.40 (100), 3.08 (60), 3.28 (20), 2.764 (18), 4.70 (12), 2.637 (10), 2.201 (10)

Chemistry:

	(1)	(2)
SiO ₂	50.74	51.6
TiO ₂	0.06	0.13
Al ₂ O ₃	0.88	0.65
Fe ₂ O ₃	1.80	
FeO	24.13	23.9
MnO	7.38	8.1
MgO	10.57	11.1
CaO	2.00	0.83
Na ₂ O	0.22	1.1
K ₂ O	0.08	0.09
F	0.07	
H ₂ O ⁺	1.94	
Total	99.87	97.5

(1) Uttersvik, Sweden; corresponds to $(\text{Fe}_{3.10}^{2+}\text{Mg}_{2.42}\text{Mn}_{0.96}\text{Ca}_{0.33}\text{Fe}_{0.21}^{3+}\text{Na}_{0.07}\text{Ti}_{0.01}\text{K}_{0.01})_{\Sigma=7.11}(\text{Si}_{7.80}\text{Al}_{0.16})_{\Sigma=7.96}\text{O}_{22}[(\text{OH})_{1.99}\text{F}_{0.03}]_{\Sigma=2.02}$. (2) Haute-Maurienne, France; by electron microprobe.

Polymorphism & Series: Forms a series with tirodite.

Mineral Group: Amphibole (Fe–Mn–Mg) group: $\text{Mg}/(\text{Mg} + \text{Fe}^{2+}) < 0.5$; $(\text{Ca} + \text{Na})_{\text{B}} < 1.34$; $\text{Li} < 1.0$; $\text{Mn} \geq 0.5$.

Occurrence: An uncommon mineral in metamorphosed iron-poor manganese rocks.

Association: Calcite, quartz, garnet.

Distribution: From Dannemora, Uppland; Uttersvik and Närkevarn, Södermanland; in the Brunsjö mine, near Grythyttan, Örebro; and at Väster Silfberg, Värmland, Sweden. At Haute-Maurienne, Isère, France. From Guarulhos, São Paulo, Brazil. At Paddy's River mine, Australian Capital Territory, and from Broken Hill, New South Wales, Australia.

Name: For the original locality, Dannemora, Sweden.

References: (1) Dana, E.S. (1892) Dana's system of mineralogy, (6th edition), 386, 391, 395. (2) Deer, W.A., R.A. Howie, and J. Zussman (1963) Rock-forming minerals, v. 2, chain silicates, 239. (3) Mottana, A. (1986) Blueschist-facies metamorphism of manganese-rich cherts: a review of the alpine occurrences. In: B.W. Evans and E.H. Brown, Eds., Blueschists and eclogites, Geol. Soc. Amer. Memoir 164, 267–299.

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