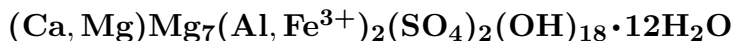


# Wermlandite



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**Crystal Data:** Hexagonal. *Point Group:*  $\bar{3} 2/m$ . Thin platy crystals, to 1 cm, showing {0001}, {10 $\bar{1}$ 0}.

**Physical Properties:** *Cleavage:* On {0001}, perfect, micaceous. *Tenacity:* Flexible but inelastic. Hardness = 1.5 D(meas.) = 1.932 D(calc.) = 1.96

**Optical Properties:** Semitransparent. *Color:* Pale greenish gray; colorless in transmitted light.

*Optical Class:* Uniaxial (-).  $\omega = 1.493$   $\epsilon = [1.482]$   $2V(\text{meas.}) = 2^\circ\text{--}5^\circ$

**Cell Data:** *Space Group:*  $P\bar{3}c1$ .  $a = 9.303(3)$   $c = 22.57(1)$   $Z = 2$

**X-ray Powder Pattern:** Långban, Sweden.

7.98 (10), 11.16 (7), 4.63 (5), 5.62 (4), 3.89 (4), 2.608 (4), 1.541 (4)

## Chemistry:

	(1)
SO <sub>3</sub>	[15.98]
Al <sub>2</sub> O <sub>3</sub>	6.16
Fe <sub>2</sub> O <sub>3</sub>	7.33
MnO	0.39
MgO	28.72
CaO	3.78
H <sub>2</sub> O	[37.64]
Total	[100.00]

(1) Långban, Sweden; recalculated after deduction of calcite 5.73%, SO<sub>3</sub> and H<sub>2</sub>O from crystal-structure analysis, (SO<sub>4</sub>)<sup>2-</sup> confirmed by IR; corresponds then to (Ca<sub>0.68</sub>Mg<sub>0.14</sub>Mn<sub>0.06</sub>)<sub>Σ=0.88</sub>Mg<sub>7.00</sub>(Al<sub>1.21</sub>Fe<sub>0.92</sub><sup>3+</sup>)<sub>Σ=2.13</sub>(SO<sub>4</sub>)<sub>2</sub>(OH)<sub>18.15</sub> • 11.86H<sub>2</sub>O.

**Occurrence:** Very rare in a metamorphosed Fe–Mn orebody in a low-temperature fissure-filling assemblage among large calcite crystals.

**Association:** Calcite, magnetite.

**Distribution:** From Långban, Värmland, Sweden.

**Name:** For Wermland, an earlier spelling of the Swedish province Värmland, in which the Långban deposit is located.

**Type Material:** Swedish Museum of Natural History, Stockholm, Sweden, 38001; National Museum of Natural History, Washington, D.C., USA, 137023, 149523.

**References:** (1) Moore, P.B. (1971) Wermlandite, a new mineral from Långban, Sweden. *Lithos*, 4, 213–217. (2) (1972) *Amer. Mineral.*, 57, 327 (abs. ref. 1). (3) Rius, J. and R. Allmann (1984) The superstructure of the double layer mineral wermlandite [Mg<sub>7</sub>(Al<sub>0.57</sub>, Fe<sub>0.43</sub><sup>3+</sup>)(OH)<sub>18</sub>]<sup>2+</sup> • [(Ca<sub>0.6</sub>, Mg<sub>0.4</sub>)(SO<sub>4</sub>)<sub>2</sub>(H<sub>2</sub>O)<sub>12</sub>]<sup>2-</sup>. *Zeits. Krist.*, 168, 133–144.