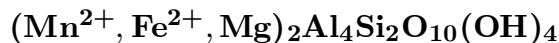


Ottrélite



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Crystal Data: Monoclinic or triclinic. *Point Group:* m or $2/m$, or 1 or $\bar{1}$.

In pseudo-hexagonal flakes, up to 4 mm, and as fine-grained scaly aggregates.

Twinning: Polysynthetic, $\parallel [001]$.

Physical Properties: *Cleavage:* $\{001\}$, perfect; $\{110\}$, likely. Hardness = 6–7

$D(\text{meas.}) = 3.52(2)$ $D(\text{calc.}) = [3.48]$

Optical Properties: Translucent. *Color:* Pistachio-green, greenish to dark gray; in transmitted light, gray-green. *Streak:* Greenish, grayish. *Luster:* Vitreous to nearly adamantine on cleavages.

Optical Class: Biaxial (+). *Pleochroism:* X = olive-yellow; Y = pale yellow with greenish

tinge; Z = very light yellow to almost colorless. *Orientation:* $X = b$; $Z \wedge \perp (001) =$

$11^\circ\text{--}23^\circ$. *Dispersion:* $r > v$, strong. $\alpha = 1.709\text{--}1.725$ $\beta = 1.712\text{--}1.726$ $\gamma = 1.716\text{--}1.732$

$2V(\text{meas.}) = 46^\circ\text{--}70^\circ$

Cell Data: *Space Group:* Cc or $C2/c$. $a = 9.505(6)$ $b = 5.484(4)$ $c = 18.214(15)$

$\beta = 101^\circ 46(2)'$ $Z = [4]$

X-ray Powder Pattern: Ottré, Belgium.

4.460 (100), 2.973 (80), 2.686 (45), 2.439 (40), 1.585 (40), 2.461 (25), 2.375 (20)

Chemistry:

	(1)
SiO ₂	23.88
Al ₂ O ₃	40.69
Fe ₂ O ₃	1.67
FeO	8.02
MnO	12.60
MgO	4.39
CaO	0.11
Na ₂ O	0.00
K ₂ O	0.00
H ₂ O ⁺	7.15
quartz	1.4
Total	99.91

(1) Ottré, Belgium; corresponds to $(\text{Mn}_{0.88}\text{Fe}_{0.55}^{2+}\text{Mg}_{0.54}\text{Fe}_{0.03}^{3+})_{\Sigma=2.00}(\text{Al}_{3.93}\text{Fe}_{0.07}^{3+})_{\Sigma=4.00}$
 $(\text{Si}_{1.97}\text{Al}_{0.03})_{\Sigma=2.00}\text{O}_{10.03}(\text{OH})_{3.94}$.

Polymorphism & Series: Monoclinic and triclinic polytypes are known.

Mineral Group: Chloritoid group.

Occurrence: Formed under nonshearing stress conditions in veins and cavities within low- to medium-grade metamorphic rocks; also a medium-temperature hydrothermal alteration mineral.

Association: Dickite, kaolinite, rutile, andalusite, chlorite, pyrophyllite, davreuxite, quartz.

Distribution: In Belgium, in the Ardennes Mountains, from Ottré, Salmchâteau, and Vielsalm.

Name: For its occurrence at Ottré, Belgium.

References: (1) Dana, E.S. (1892) Dana's system of mineralogy, (6th edition), 642.

(2) Fransolet, A.-M. (1978) Données nouvelles sur l'ottrélite d'Ottré, Belgique. Bull. Minéral., 101, 548–557 (in French with English abs.). (3) Halferdahl, L.B. (1961) Chloritoid: its composition,

X-ray and optical properties, stability and occurrences. J. Petrol., 2, 49–135.

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