Tremolite

\[ \text{Ca}_2(\text{Mg, Fe}^{2+})_5\text{Si}_8\text{O}_{22}(\text{OH})_2 \]

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Crystal Data: Monoclinic. Point Group: 2/m. Elongated, stout prismatic, or flattened bladed crystals, to 20 cm; also fibrous, granular or columnar aggregates. Twinning: Simple or multiple, common \{100\}; rarely multiple \{001\}.


Optical Class: Biaxial (−). Orientation: \( Y = b; Z \cap c = -21° \) to \(-19°; X \cap a = -6° \) to \( -4° \). Dispersion: \( r < v \), weak. \( \alpha = 1.605–1.613 \); \( \beta = 1.616–1.624 \); \( \gamma = 1.630–1.636 \).

Cell Data: Space Group: \( \text{C2}/\text{m} \). \( a = 9.863(1) \); \( b = 18.048(2) \); \( c = 5.285(1) \). \( \beta = 104.79(1)° \). \( Z = 2 \).

X-ray Powder Pattern: St. Gotthard, Switzerland. 8.38 (100), 3.121 (100), 2.705 (90), 3.268 (75), 1.892 (50), 2.805 (45), 2.015 (45).

Chemistry:

\[
\begin{array}{cccc}
\text{SiO}_2 & 56.57 & 59.30 & \text{Na}_2\text{O} \\
\text{TiO}_2 & 0.01 & \text{trace} & \text{K}_2\text{O} \\
\text{Al}_2\text{O}_3 & 1.41 & 0.26 & \text{F} \\
\text{FeO} & 0.08 & \text{trace} & \text{Cl} \\
\text{MnO} & 0.03 & \text{trace} & \text{H}_2\text{O}^+ \\
\text{MgO} & 24.41 & 24.58 & -\Omega = (\text{F, Cl})_2 \\
\text{CaO} & 12.25 & 12.03 & \text{Total} \\
\end{array}
\]

\( (1) \) Gouverneur, New York, USA; \( \text{Fe}_2\text{O}_3 \) trace; corresponds to \( (\text{Ca}_{1.80}\text{Na}_{0.36}\text{K}_{0.12})_{\Sigma = 2.30} \) \( (\text{Mg}_{5.00}\text{Fe}^{2+}_{0.01})_{\Sigma = 5.00} \text{Si}_{7.77}\text{Al}_{0.23})_{\Sigma = 8.00} \text{Si}_{22}[(\text{OH})_{1.34}\text{F}_{0.66}\text{Cl}_{0.01})_{\Sigma = 2.01} \). \( (2) \) Balmat No. 3 mine, St. Lawrence Co., New York; by electron microprobe, original total given as 101.47%; corresponds to \( (\text{Ca}_{1.74}\text{Na}_{0.54}\text{K}_{0.10})_{\Sigma = 2.38} \text{Mg}_{4.95}\text{Al}_{0.04})_{\Sigma = 4.99} \text{Si}_{8.01}\text{O}_{22}[(\text{F, OH})_{1.46}\text{Cl}_{0.01})_{\Sigma = 2.00} \).

Polymorphism & Series: Forms a series with actinolite and ferro-actinolite.

Mineral Group: Amphibole (calcic) group: \( \text{Mg}/(\text{Mg} + \text{Fe}^{2+}) \geq 0.90 \); \( (\text{Na} + \text{K})_{X} < 0.5 \); \( \text{Na}_B \leq 0.67 \); \( (\text{Ca} + \text{Na})_{B} > 1.34 \); Si ≥ 7.5.

Occurrence: From contact metamorphism of \( \text{Ca-Mg} \) siliceous sediments; in greenschist facies metamorphics derived from ultramafic or magnesium carbonate rocks.

Association: Calcite, dolomite, calcian garnet, wollastonite, talc, diopside, forsterite, cummingtonite, magnesio-cummingtonite, riebeckite, winchite.

Distribution: Notable localities include: on Campolungo Alp, Ticino, and Bristenstock, Uri, Switzerland. From St. Marcel, Piedmont, Italy. At Blin, Czech Republic. In the USA, from Pierrepont, Gouverneur, Edwards, and Macomb, St. Lawrence Co., New York; at Franklin, Sussex Co., New Jersey; and Lee, Berkshire Co., Massachusetts. At Wilberforce, Ontario, Canada. From Kozano, Badakhshan Province, Afghanistan. At Lelatema, Tanzania. In the Brumado mine, Bahia, Brazil.

Name: For an occurrence in the Tremola Valley, southern St. Gotthard Mountains, Switzerland.