Ferrotschermakite

\[ \text{Ca}_2[(\text{Fe}^{2+}, \text{Mg})_3\text{Al}_2](\text{Si}_6\text{Al}_2)\text{O}_{22}(\text{OH})_2] \]

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Crystal Data: Monoclinic. Point Group: 2/m. [Prismatic.] Twinning: [Simple or multiple twinning || \{100\}.]

Physical Properties: Cleavage: [Perfect on \{110\}, with intersections at \(\sim 56^\circ\) and \(\sim 124^\circ\); partings on \{100\}, \{001\}.] Tenacity: [Brittle.] Hardness = [5–6] D(meas.) = 3.323–3.353 D(calc.) = [3.25]

Optical Properties: Transparent to translucent. Color: Green; green to tan in thin section. Luster: [Vitreous.]

Optical Class: Biaxial (−). Pleochroism: Distinct; \(X = \) light tan; \(Y = \) green; \(Z =\) blue-green. Orientation: \(Y = b; Z \cap c \approx 7^\circ–14^\circ.\) Absorption: \(Z = Y > X.\) \(\alpha = 1.660–1.694\)

\(\beta = 1.680–1.732\) \(\gamma = 1.688–1.736\) 2V(meas.) = 45°–75°

Cell Data: Space Group: \(C2/m.\) \(a = 9.864\) \(b = 18.130\) \(c = 5.331\) \(\beta = 104.95^\circ\) \(Z = 2\)

X-ray Powder Pattern: n.d.

Chemistry:

\[
\begin{array}{ccc}
\text{SiO}_2 & 40.51 & 40.43 \\
\text{TiO}_2 & 1.42 & 1.25 \\
\text{Al}_2\text{O}_3 & 13.39 & 12.62 \\
\text{Fe}_2\text{O}_3 & 5.32 & 4.24 \\
\text{FeO} & 17.16 & 22.15 \\
\text{MnO} & 0.35 & 0.28 \\
\text{MgO} & 6.47 & 3.80 \\
\text{CaO} & 11.43 & 11.60 \\
\end{array}
\]

\[
\begin{array}{ccc}
\text{Na}_2\text{O} & 1.05 & 0.89 \\
\text{K}_2\text{O} & 1.00 & 1.01 \\
\text{F}^- & 0.13 & 0.90 \\
\text{Cl} & 0.04 \\
\text{H}_2\text{O}^+ & 1.78 & 1.76 \\
\text{H}_2\text{O}^- & 0.02 & 0.05 \\
\text{F} & 0.06 & 0.38 \\
\end{array}
\]

Total 100.01 100.60

(1) Emeryville, New York, USA; corresponds to \((\text{Ca}_{1.87}\text{Na}_{0.31}\text{K}_{0.20})_{\Sigma=2.38}(\text{Fe}_{2.20}\text{Mg}_{1.48}\text{Fe}^{3+}_{0.61}\text{Al}_{0.60}\text{Ti}_{0.16}\text{Mn}_{0.04})_{\Sigma=5.09}(\text{Si}_{8.20}\text{Al}_{1.80})_{\Sigma=8.00}\text{O}_{22}(\text{OH})_{1.81}\text{O}_{1.12}\text{F}_{0.06}\text{Cl}_{0.01})_{\Sigma=2.00}.\) (2) Lake’s Grave, Australia; corresponds to \((\text{Ca}_{1.92}\text{Na}_{0.27}\text{K}_{0.20})_{\Sigma=2.39}(\text{Fe}_{2.86}\text{Mg}_{0.87}\text{Fe}^{3+}_{0.49}\text{Al}_{0.53}\text{Ti}_{0.15}\text{Mn}_{0.04})_{\Sigma=4.94}(\text{Si}_{6.24}\text{Al}_{1.76})_{\Sigma=8.00}\text{O}_{21.75}(\text{OH})_{1.81}\text{F}_{0.44})_{\Sigma=2.25}.\)

Polymorphism & Series: Forms a series with tschermakite.

Mineral Group: Amphibole (calcic) group: Mg/(Mg + Fe\(^{2+}\)) < 0.5; (Na + K)\(_A\) < 0.5; Na\(_B\) < 0.67; (Ca + Na)\(_B\) ≥ 1.34; Si < 6.25; Ti < 0.5.

Occurrence: A product of medium- to high-pressure metamorphism of highly aluminous rocks, producing schists, gneisses, or amphibolites; from differentiated mafic plutonic igneous rocks.

Association: Almandine, chlorite, biotite, muscovite, quartz, anorthite, apatite (metamorphic).

Distribution: From Emeryville, St. Lawrence Co., New York, USA. At Lake’s Grave, Broken Hill, New South Wales, Australia.

Name: For ferrous iron in its composition and relation to tschermakite.

Type Material: n.d.


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