Clintonite

\[ \text{Ca(Mg, Al)}_3(\text{Al}_3\text{Si})\text{O}_{10}(\text{OH})_2 \]

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**Crystal Data:** Monoclinic. **Point Group:** \( 2/m \). In tabular pseudohexagonal crystals, complexly twinned, to 2.5 cm; foliated or lamellar radiated; massive. **Twinning:** On \{001\}, twin axis \([010]\) or \([301]\); spiral polysynthetic twinning.

**Physical Properties:** **Cleavage:** \{001\}, perfect. **Tenacity:** Brittle. **Hardness:** 3.5 on \{001\}; 6 \( \perp \) \{001\}. **D(meas.)** = 3.0–3.1 **D(calc.)** = 3.096

**Optical Properties:** **Transparency to translucent.** **Color:** Colorless, yellow, orange, red-brown, brown, green. **Streak:** White, slightly yellow-gray. **Luster:** Vitreous, pearly, submetallic. **Optical Class:** Biaxial (\( - \)). **Pleochroism:** \( X = \) colorless, pale orange, red-brown; \( Y = Z = \) pale brownish yellow, pale green. **Orientation:** \( Y \simeq a \) or \( Y = b; Z = b \) or \( \simeq a; X \times c = 5^\circ–10^\circ \). **Dispersion:** \( r < v \), weak. **Absorption:** \( Y \simeq Z > X \). **\( \alpha = 1.643–1.648 \) \( \beta = 1.655–1.662 \) \( \gamma = 1.655–1.663 \) \( 2V(meas.) = 2^\circ–40^\circ \)

**Cell Data:** **Space Group:** \( C2/m \). \( a = 5.204 \) \( b = 9.026 \) \( c = 9.812 \) \( \beta = 100^\circ 20' \) \( Z = 2 \)

**X-ray Powder Pattern:** Zlatoust, Russia.

2.56 (100), 3.21 (70), 2.11 (70), 1.505 (60), 9.68 (50), 2.45 (50), 1.485 (50)

**Chemistry:**

\[
\begin{array}{c|c|c|c}
\text{SiO}_2 & 18.78 & 16.74 & \text{MgO} \\
\text{TiO}_2 & 0.54 & & \text{CaO} \\
\text{Al}_2\text{O}_3 & 40.00 & 42.70 & \text{F} \\
\text{Fe}_2\text{O}_3 & 2.85 & & \text{H}_2\text{O}^+ \\
\text{FeO} & 1.86 & 0.41 & \text{O} = \text{F}_2 \\
\text{MnO} & 0.00 & & \\
\hline
\end{array}
\]

(1) Amity, New York, USA; by electron microprobe, \( \text{H}_2\text{O} \) by difference; corresponds to \( \text{Ca}_{0.99}(\text{Mg}_{2.15}\text{Al}_{0.70}\text{Fe}^{2+}_{0.10}\text{Ti}_{0.03})\Sigma = 2.99(\text{Al}_{2.68}\text{Si}_{1.32})\Sigma = 4.06(\text{OH})_{1.55}\text{F}_{0.45}\Sigma = 2.00. \)  

(2) Crestmore, California, USA; corresponds to \( \text{Ca}_{0.98}(\text{Mg}_{2.09}\text{Al}_{1.70}\text{Fe}_{0.15}\text{Fe}^{2+}_{0.02})\Sigma = 2.96(\text{Al}_{2.83}\text{Si}_{1.17})\Sigma = 4.00(\text{OH})_{0.92}. \)

**Polymorphism & Series:** 1M polytype; 2M\(_1\) and 3A polytypes rare.

**Mineral Group:** Mica group.

**Occurrence:** In chlorite schists; in metasomatically altered limestones; in siliceous skarns near contact metamorphic zones.

**Association:** Talc, spinel, grossular, vesuvianite, clinopyroxene, monticellite, chondrodite, phlogopite, chlorite, quartz, calcite, dolomite.

**Distribution:** In the USA, around Amity, Edenville, and Warwick, Orange Co., New York; from Crestmore, Riverside Co., California; near Ludwig, Lyon Co., Nevada; at Sulzer, Prince of Wales Island, Alaska. On Mt. Monzoni and at Mts. Castone and Adamello, Trentino-Alto Adige, Italy. In the Pargas district, Finland. From the Akhmatovsk mine, near Zlatoust, Ural Mountains, Russia. In the Chichibu mine, Saitama Prefecture, Japan. On the Ertsberg, Irian Jaya.

**Name:** For De Witt Clinton (1769–1828), American statesman.

**References:**

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