Marsturite  
\[ \text{NaCaMn}^{2+}_3\text{Si}_5\text{O}_{14}(\text{OH}) \]  
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**Crystal Data:** Triclinic.  
**Point Group:** 1 or \( \bar{1} \). As imperfectly terminated prismatic crystals, elongated along \([010]\), with pinacoids \{100\} and \{001\}, to 2 mm, striated on \{001\} \( \parallel [100] \); also as crusts.

**Physical Properties:**  
**Cleavage:** Imperfect on \{100\} and \{001\}.  
**Hardness:** \( \sim 6 \)  
\( D(\text{meas.}) = 3.46 \quad D(\text{calc.}) = 3.465 \)

**Optical Properties:**  
**Translucent.**  
**Color:** Colorless, white to very light pink.  
**Luster:** Frosty, on the tips of crystals.  
**Optical Class:** Biaxial (+).  
**Orientation:** \( X \approx c; Z' \parallel b = 4^\circ \perp \{011\}; Z' \parallel b = 15^\circ \perp \{100\} \).  
**Dispersion:** \( r > v \), very weak.  
\( \alpha = 1.686(2) \quad \beta = 1.691(1) \quad \gamma = 1.708(1) \quad 2V(\text{meas.}) = 60(1)^\circ \quad 2V(\text{calc.}) = 57.4^\circ \)

**Cell Data:**  
**Space Group:** n.d.  
\[ a = 7.70(1) \quad b = 12.03(3) \quad c = 6.78(1) \quad \alpha = 85.26(35)^\circ \quad \beta = 94.10(26)^\circ \quad \gamma = 111.04(12)^\circ \quad Z = 2 \]

**X-ray Powder Pattern:** Franklin, New Jersey, USA.  
2.725 (100), 2.916 (90), 2.999 (80), 3.18 (40), 1.441 (40), 3.11 (30), 2.219 (30)

**Chemistry:**

\[
\begin{array}{ll}
\text{SiO}_2 & 48.94 \\
\text{FeO} & 0.24 \\
\text{MnO} & 34.16 \\
\text{MgO} & 0.12 \\
\text{CaO} & 12.46 \\
\text{Na}_2\text{O} & 4.08 \\
\text{H}_2\text{O} & \text{n.d.} \\
\hline
\text{Total} & 100.00 \\
\end{array}
\]

(1) Franklin, New Jersey, USA; by electron microprobe, average of three analyses; corresponding to \( \text{Na}_{0.81}\text{Ca}_{1.36}(\text{Mn}_{2.96}\text{Fe}_{0.02}\text{Mg}_{0.02})\text{Si}_{3.00}\text{O}_{15} \).

**Occurrence:** Implanted on manganaxinite and epitaxially overgrown on rhodonite in a metamorphosed stratiform zinc deposit (Franklin, New Jersey, USA).

**Association:** Rhodonite, manganaxinite, ganophyllite, willemite, franklinite (Franklin, New Jersey, USA); natronambulite, kozulite (Tanohata mine, Japan).

**Distribution:** From Franklin, Sussex Co., New Jersey, USA. In the Tanohata mine, Iwate Prefecture, Japan. From the Molinello manganese mine, near Chiavari, Val Graveglia, Liguria, Italy.

**Name:** For MARion STUart, of Bellevue, Idaho, USA, benefactress of fossil and mineral collections in the USA.

**Type Material:** National Museum of Natural History, Washington, D.C., USA, 127923.

**References:**  
(1) Peacor, D.R., P.J. Dunn, and B.D. Sturman (1978) Marsturite, \( \text{Mn}_3\text{CaNaHSi}_5\text{O}_{15} \), a new mineral of the nambulite group from Franklin, New Jersey.  

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