Paranatrolite

\[ \text{Na}_2\text{Al}_2\text{Si}_3\text{O}_{10}^+3\text{H}_2\text{O} \]

**Crystal Data:** Monoclinic; pseudo-orthorhombic.  
*Point Group:* \( m \). As radial fibrous, sheaflike, parallel columnar crystal aggregates, to 5 mm; as epitaxial overgrowths on natrolite, or crusts on other minerals; in veinlets, massive.

**Physical Properties:**  
*Cleavage:* None.  
*Fracture:* Conchoidal.  
*Hardness:* 5-5.5  
*D(meas.) = 2.21-2.29  
*D(calc.) = 2.20  

**Optical Properties:**  
*Color:* Colorless.  
*Luster:* Vitreous.  
*Optical Class:* Biaxial (-).  
\( \alpha = 1.493(2) \)  
\( \beta = 1.499(2) \)  
\( \gamma = 1.505(2) \)  
\( 2V(\text{meas.}) = 0^\circ-10^\circ \)

**Cell Data:**  
*Space Group:* \( \text{Cc} \).  
\( a = 18.971(4) \)  
\( b = 19.204(3) \)  
\( c = 6.5952(12) \)  
\( \beta = 91.601(18)^\circ \)  
\( Z = 8 \)

**Chemistry:**  
\[
\begin{align*}
\text{SiO}_2 & = 40.18 \\
\text{Al}_2\text{O}_3 & = 28.36 \\
\text{CaO} & = 0.30 \\
\text{Na}_2\text{O} & = 15.12 \\
\text{K}_2\text{O} & = 2.50 \\
\text{H}_2\text{O}^+ & = 13.59 \\
\text{Total} & = 100.05
\end{align*}
\]

(1) Khibiny massif, Russia; corresponds to \((\text{Na}_{1.99}\text{K}_{0.02}\text{Ca}_{0.02})\text{Al}_{2.23}\text{Si}_{3.77}\text{O}_{10}^+3.08\text{H}_2\text{O}\).  
(2) Mont Saint-Hilaire, Canada; partial analysis; composition and formula based on tetranatrolite, corresponding to \((\text{Na}_{1.75}\text{Ca}_{0.10}\text{K}_{0.09})\text{Fe}_{0.01}\text{Al}_{1.98}\text{Si}_{3.02}\text{O}_{10}^+2.98\text{H}_2\text{O}\).

**Mineral Group:** Zeolite group.

**Occurrence:** In miarolitic cavities and pegmatitic dikes within nepheline syenite in an intrusive alkalic gabbro-syenite complex (Mont Saint-Hilaire, Canada); in pegmatites in nepheline syenites in differentiated alkalic massifs (Kola Peninsula, Russia). Dehydrates in air to tetranatrolite.

**Association:** Natrolite, tetranatrolite (Mont Saint-Hilaire, Canada).

**Distribution:** At Mont Saint-Hilaire and from near Saint-Amable, Québec, Canada. In the Lovozero and Khibiny (e.g. Mount Kukisvumchorr) massifs, Kola Peninsula, Russia. At the Schellkopf, near Brenk, Eifel district, Germany. From Island Magee, Co. Antrim, Ireland.

**Name:** From the Greek *para*, for near, and its relation to natrolite.

**Type Material:** Royal Ontario Museum, Toronto, M35546; Canadian Museum of Nature, Ottawa, Canada, 37132.

**References:**  
(3) Khomyakov, A.P., G.Y. Cherepivskaya, and M.G. Mikheeva (1986) First paranatrolite finds in the USSR.  