

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

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

**X-ray Powder Pattern:** Mont Saint-Hilaire, Canada.  
2.94 (100), 5.92 (60), 4.44 (40), 4.78 (30), 6.76 (20), 3.26 (15), 3.12 (15)

<b>Chemistry:</b>	(1)
SiO <sub>2</sub>	40.18
Al <sub>2</sub> O <sub>3</sub>	28.36
CaO	0.30
Na <sub>2</sub> O	15.12
K <sub>2</sub> O	2.50
<u>H<sub>2</sub>O<sup>+</sup></u>	<u>13.59</u>
Total	100.05

(1) Khibiny massif, Russia; corresponds to  $(\text{Na}_{1.99}\text{K}_{0.22}\text{Ca}_{0.02})_{\Sigma=2.23}\text{Al}_{2.27}\text{Si}_{2.73}\text{O}_{10}\cdot 3.08\text{H}_2\text{O}$ .

(2) Mont Saint-Hilaire, Canada; partial analysis; composition and formula based on tetranatrolite, corresponding to  $(\text{Na}_{1.75}\text{Ca}_{0.10}\text{K}_{0.09})_{\Sigma=1.94}\text{Fe}_{0.01}\text{Al}_{1.95}\text{Si}_{3.02}\text{O}_{10}\cdot 2.98\text{H}_2\text{O}$ .

**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:** (1) Chao, G.Y. (1980) Paranatrolite, a new zeolite from Mont St-Hilaire, Québec. *Can. Mineral.*, 18, 85-88. (2) (1981) *Amer. Mineral.*, 66, 1276-1277 (abs. ref. 1). (3) Khomyakov, A.P., G.Y. Cherepivskaya, and M.G. Mikheeva (1986) First paranatrolite finds in the USSR. *Doklady Acad. Nauk SSSR*, 288, 214-217 (in Russian). (4) Seryotkin, Yu.V., V.V. Bakakin, and I.A. Belitsky (2004) The crystal structure of paranatrolite. *Eur. J. Mineral.*, 16, 545-550.