Paranatrolite $Na_2Al_2Si_3O_{10}\cdot 3H_2O$

Crystal Data: Monoclinic, probable; pseudo-orthorhombic. *Point Group:* $mm2$, 222, or $2/m\ 2/m\ 2/m$ for the pseudo-orthorhombic cell. 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: *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(meas.) = 0°–10°

Cell Data: *Space Group:* $Fmm2$, $Fm2m$, $F2mm$, $F222$, or $Fmmm$ for the pseudo-orthorhombic cell. $a = 19.07(1)$ $b = 19.13(1)$ $c = 6.580(3)$ 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)

Chemistry:

	(1)
SiO_2	40.18
Al_2O_3	28.36
CaO	0.30
Na_2O	15.12
K_2O	2.50
H_2O^+	13.59
Total	100.05

(1) Khibiny massif, Russia; corresponds to $(Na_{1.99}K_{0.22}Ca_{0.02})_{\Sigma=2.23}Al_{2.27}Si_{2.73}O_{10}\cdot 3.08H_2O$.
(2) Mont Saint-Hilaire, Canada; partial analysis not given as unstable in air; composition and formula based on tetranatrolite, corresponding to $(Na_{1.75}Ca_{0.10}K_{0.09})_{\Sigma=1.94}Fe_{0.01}Al_{1.95}Si_{3.02}O_{10}\cdot 2.98H_2O$.

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).

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

Distribution: At Mont Saint-Hilaire and from near Saint-Amable, Quebec, Canada. In the Khibiny and Lovozero 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).