Oneillite $Na_{15}Ca_3Mn_3Fe_3Zr_3Nb(Si_{25}O_{73})(O, OH, H_2O)_3(OH, Cl)_2$

Crystal Data: Hexagonal. *Point Group*: 3. As anhedral grains to 2 mm.

Physical Properties: Cleavage: None. *Tenacity*: Brittle. *Fracture*: Uneven. Hardness = 5-6 D(meas.) = 3.20(3) D(calc.) = 3.22 Nonfluorescent.

Optical Properties: Transparent to translucent. *Color*: Yellowish brown. *Streak*: White. *Luster*: Vitreous.
Optical Class: Uniaxial (-). ω = 1.6450(3) ε = 1.6406(3); some grains anomalously biaxial with 2V(meas.) up to 15°.

Cell Data: *Space Group*: *R*3. a = 14.2084(8) c = 29.959(3) Z = 3

X-ray Powder Pattern: Poudrette quarry, Mont Saint-Hilaire, Quebec, Canada.
2.964 (100), 2.844 (89), 11.348 (44), 3.389 (43), 4.291 (37), 6.021 (36), 3.150 (35)

Chemistry:

	(1)		(1)
Na_2O	13.60	Nd_2O_3	1.45
K_2O	0.28	Gd_2O_3	0.20
CaO	2.90	SiO_2	43.46
MnO	7.70	ZrO_2	11.44
FeO	3.00	HfO_2	0.16
SrO	0.09	Nb_2O_5	3.48
Al_2O_3	0.18	Ta_2O_5	0.14
Y_2O_3	0.78	Cl	0.76
La_2O_3	2.88	H_2O	[0.63]
Ce_2O_3	5.14	- O = Cl	0.17
Pr_2O_3	0.48	Total	98.58

(1) Poudrette quarry, Mont Saint-Hilaire, Quebec, Canada; electron microprobe analysis supplemented by IR spectroscopy, H_2O calculated; corresponds to $(Na_{14.37}REE_{1.53}K_{0.20}Sr_{0.03})_{\Sigma=16.13}(Ca_{1.77}REE_{0.59}Na_{0.66})_{\Sigma=3.02}(Mn_{2.76}Y_{0.24})_{\Sigma=3.00}(Fe_{1.43}Mn_{0.96}Zr_{0.25})_{\Sigma=2.64}(Zr_{2.93}Nb_{0.05}Hf_{0.03})_{\Sigma=3.01}(Nb_{0.85}Ta_{0.02})_{\Sigma=0.87}(Si_{24.77}Al_{0.12})_{\Sigma=24.89}O_{73}(O,OH,H_2O)_{3.09}[(OH)_{1.27}Cl_{0.73}]_{\Sigma=2.00}$.

Mineral Group: Eudialyite group. Distinguished by Mn dominance in the M(1) site.

Occurrence: Along the contact between a vein of albite and its host nepheline syenite in an alkaline intrusive complex.

Association: Albite, sodalite, pyrite, aegirine.

Distribution: At the Poudrette quarry, Mont Saint-Hilaire, Quebec, Canada.

Name: Honors John J. *O'Neill* (1886-1966) of McGill University, who was the first to describe the geology of Mont Saint-Hilaire.

Type Material: Canadian Museum of Nature, Ottawa, Ontario (CMNMC 81565).

References: (1) Johnsen, O., J.D. Grice, and R.A. Gault (1999) Oneillite: a new Ca-deficient and REE-rich member of the eudialyte group from Mont Saint-Hilaire, Quebec, Canada. Can. Mineral., 37, 1295-1301. (2) (2000) Amer. Mineral., 85, 1323 (abs. ref. 1). (3) Johnsen, O. and J.D. Grice (1999) The crystal chemistry of the eudialyte group. Can. Mineral., 37(4), 865-891.