Johnsenite-(Ce) $Na_{12}(Ce,La,Sr,Ca,\square)_3Ca_6Mn_3Zr_3W(Si_{25}O_{73})(CO_3)(OH,Cl)_2$

Crystal Data: Hexagonal. *Point Group*: 3*m*. As deeply etched, skeletal crystals, to 4 mm and in aggregates to 1 cm; crystals display partial {0001} and {$10\bar{1}$ 1}.

Physical Properties: *Cleavage*: None. *Fracture*: Uneven. *Tenacity*: Brittle. *Hardness* = 5-6
D(meas.) = 3.24(3) D(calc.) = 3.23

Optical Properties: Transparent to translucent. *Color*: Pale yellow to bright orange.
Streak: White. *Luster*: Vitreous.
Optical Class: Uniaxial (-). ω = 1.648(1) ε = 1.637(1)

Cell Data: *Space Group*: *R*3*m*. *a* = 14.2675(7) *c* = 30.0369(14) Z = 3

X-ray Powder Pattern: Poudrette Quarry, Mont Saint-Hilaire, Quebec, Canada.
2.966 (100), 11.299 (95), 9.452 (81), 2.847 (81), 3.164 (75), 3.544 (44), 3.392 (38)

Chemistry:

	(1)		(1)
Na_2O	10.47	Gd_2O_3	0.33
K_2O	0.25	Dy_2O_3	0.14
CaO	8.98	TiO_2	0.73
SrO	1.60	ZrO_2	9.60
MnO	5.43	HfO_2	0.04
FeO	1.61	Nb_2O_5	0.82
Y_2O_3	0.70	WO_3	5.23
La_2O_3	1.56	SiO_2	43.16
Ce_2O_3	3.01	Cl	0.77
Pr_2O_3	1.14	CO_2	[1.27]
Nd_2O_3	0.89	H_2O	[0.32]
Sm_2O_3	0.12	-O = Cl	0.17
		Total	98.00

(1) Poudrette Quarry, Mont Saint-Hilaire, Canada; average of 8 electron microprobe analyses supplemented by IR spectroscopy, H_2O and CO_2 calculated from structure analysis; corresponds to $Na_{11.74}([Ce_{0.64}La_{0.33}Dy_{0.03}]_{\Sigma=1.00}Sr_{0.54}Ca_{0.51}Y_{0.22}K_{0.19}Hf_{0.01})_{\Sigma=2.47}(Ca_{5.06}[Pr_{0.24}Nd_{0.18}Gd_{0.06}Sm_{0.02}]_{\Sigma=0.50}Mn_{0.44})_{\Sigma=6.00}(Mn_{2.22}Fe_{0.78})_{\Sigma=3.00}(Zr_{2.71}Ti_{0.32})_{\Sigma=3.03}(W_{0.78}Nb_{0.21})_{\Sigma=0.99}Si_{24.97}O_{73}(CO_3)(OH_{1.25}Cl_{0.75})_{\Sigma=2.00}$.

Mineral Group: Eudialyte group.

Occurrence: In a cavity near the margin of a marble xenolith in an igneous breccia along the contact between porphyritic nepheline syenite and sodalite syenite in an alkaline igneous complex.

Association: Albite, calcite, pectolite, aegirine, fluorapophyllite, zirsilite-(Ce), a burbankite group mineral, dawsonite, rhodochrosite, epididymite, galena, molybdenite, pyrite, pyrrhotite, quartz, an amphibole-group mineral, sphalerite, stillwellite-(Ce), titanite, cerite-(Ce), tuperssuatsiaite, steacyite, catapleiite, zakharovite, natrolite, microcline.

Distribution: From level 7 bench, SE wall, Poudrette Quarry, Mont Saint-Hilaire, Quebec, Canada.

Name: Honors Ole *Johnsen* (b. 1940), Geological Museum, University of Copenhagen, Denmark, for his research on the eudialyte group and the minerals of Greenland, and for the dominant rare earth element, *Ce*sium.

Type Material: Canadian Museum of Nature, Ottawa, Ontario, Canada (CMNMC 84395).

References: (1) Grice, J.D. and R.A. Gault (2006) Johnsenite-(Ce): a new member of the eudialyte group from Mont Saint-Hilaire, Quebec, Canada. Can. Mineral., 44, 105-115. (2) (2006) Amer. Mineral., 91, 1947 (abs. ref. 1).