Sodalite $Na_8Al_6Si_6O_{24}Cl_2$

Crystal Data: Cubic. *Point Group:* $\bar{4}3m$. Crystals rare, typically dodecahedra, to 10 cm; as embedded grains or massive. *Twinning:* On {111}, common, forming pseudohexagonal prisms by elongation along [111].

Physical Properties: *Cleavage:* {110}, poor. *Fracture:* Uneven to conchoidal. *Tenacity:* Brittle. Hardness = 5.5–6 D(meas.) = 2.27–2.33 D(calc.) = 2.31 Bright red-orange cathodoluminescence and fluorescence under LW and SW UV, with yellowish phosphorescence; may be photochromic in magentas; may give off the odor of H_2S on fracture.

Optical Properties: Transparent to translucent. *Color:* Colorless, white, yellowish, greenish, light to dark blue, reddish; in thin section, colorless to gray. *Streak:* White. *Luster:* Vitreous to greasy.
Optical Class: Isotropic. $n = 1.483–1.487$

Cell Data: *Space Group:* $P\bar{4}3n$. $a = 8.870–8.882$ $Z = 1$

X-ray Powder Pattern: Ice River, Canada. (ICDD 20-1070).
3.63 (100), 6.30 (80), 2.10 (80), 2.57 (70), 2.38 (70), 1.569 (60), 1.480 (60)

Chemistry:

	(1)
SiO_2	37.95
Al_2O_3	31.42
FeO	0.39
MnO	0.08
Na_2O	24.16
K_2O	0.05
Cl	7.33
SO_3	0.09
$-O = Cl_2$	1.65
Total	99.82

(1) Mont Saint-Hilaire, Canada; by electron microprobe, corresponds to $Na_{7.50}Fe_{0.05}Al_{5.93}Si_{6.07}O_{23.83}[Cl_{1.99}(SO_4)_{0.01}]_{\Sigma=2.00}$.

Mineral Group: Sodalite group.

Occurrence: Formed in nepheline syenites, phonolites, and related rock types. In metasomatized calcareous rocks, and in cavities in ejected volcanic blocks.

Association: Nepheline, cancrinite, titanian andradite, aegirine, microcline, sanidine, albite, calcite, fluorite, ankerite, barite.

Distribution: Widespread; some prominent localities include: on the Kangerdluarssuk Plateau and around the Tunugdliarfik Fjord, in the Ilímaussaq intrusion, southern Greenland. From the Langesundsfjord, Norway. In the Khibiny and Lovozero massifs, Kola Peninsula, Russia. From Monte Somma and Vesuvius, Campania, Italy. At the Bellerberg volcano, two km north of Mayen, and elsewhere in the Eifel district, Germany. From Litchfield, Kennebec Co., Maine, and at Magnet Cove, Hot Spring Co., Arkansas, USA. In Canada, from Bancroft, Ontario; at Mont Saint-Hilaire, Quebec; and along the Ice River, at Kicking Horse Pass, British Columbia. From Cerro Sapo, Cochabamba, Bolivia.

Name: In allusion to its *sodium* content.

References: (1) Dana, E.S. (1892) Dana's system of mineralogy, (6th edition), 429–431. (2) Deer, W.A., R.A. Howie, and J. Zussman (1963) Rock-forming minerals, v. 4, framework silicates, 289–302. (3) Peterson, R.C. (1983) The structure of hackmanite, a variety of sodalite, from Mont St-Hilaire, Quebec. Can. Mineral., 21, 549–552. (4) Hassan, I. and H.D. Grundy (1984) The crystal structures of sodalite-group minerals. Acta Cryst., 40, 6–13.