Nepheline $(Na,K)AlSiO_4$

Crystal Data: Hexagonal. *Point Group:* 6. As stout six- or twelve-sided prisms, terminated by dominant {0001}, typically poorly formed, to 10 cm. Also granular, compact, massive. *Twinning:* On $\{10\bar{1}0\}$, $\{33\bar{6}5\}$, and $\{11\bar{2}2\}$.

Physical Properties: *Cleavage:* Poor on $\{10\bar{1}0\}$, {0001}. *Fracture:* Subconchoidal. *Tenacity:* Brittle. Hardness = 5.5–6 D(meas.) = 2.55–2.66 D(calc.) = [2.64]

Optical Properties: Transparent to nearly opaque, from inclusions or alteration. *Color:* Colorless, white, gray, yellowish; variously colored by impurities; colorless in thin section. *Luster:* Vitreous to greasy.
Optical Class: Uniaxial (–). $\omega = 1.529–1.546$ $\epsilon = 1.526–1.542$

Cell Data: *Space Group:* $P6_3$. $a = 9.993(2)$ $c = 8.374(3)$ $Z = 8$

X-ray Powder Pattern: Synthetic $(Na_{0.67}K_{0.33})_{\Sigma=1.00}AlSiO_4$.
3.027 (100), 3.870 (60), 3.294 (40), 4.21 (35), 2.905 (35), 2.359 (30), 2.593 (20)

Chemistry:

	(1)
SiO_2	43.55
Al_2O_3	34.66
MgO	0.05
CaO	4.44
Na_2O	12.09
K_2O	4.87
H_2O^+	0.25
H_2O^-	0.25
Total	100.16

(1) Monte Somma, Italy; corresponds to $(Na_{0.56}K_{0.15}Ca_{0.11})_{\Sigma=0.82}Al_{0.97}Si_{1.04}O_4$.

Occurrence: Characteristic of alkalic rocks as nepheline syenites and gneisses, alkalic gabbros; in sodium-rich hypabyssal rocks, tuffs and lavas, and pegmatites; as a product of sodium metasomatism.

Association: Potassic feldspar, plagioclase, sodic pyroxenes, sodic amphiboles, leucite, olivine, augite, diopside.

Distribution: Wide-spread; only a few prominent localities can be mentioned. In Italy, at Vesuvius and Monte Somma, Campania. On the Katzenbuckel, Odenwald, Baden-Württemberg, Germany. In the Langesundsfjord area, Norway. In Portugal, from the Sierra de Monchique. Around the Tunugdliarfik Fjord and on the Kangerdluarssuk Plateau, in the Ilímaussaq intrusion, southern Greenland. In the Lovozero massif, Kola Peninsula, Russia. From the Nyiragongo volcano, Kivu Province, Congo (Zaire). In the USA, at Litchfield, Kennebec Co., Maine; near Magnet Cove, Hot Spring Co., and on Granite Mountain, near Little Rock, Pulaski Co., Arkansas; from Iron Hill, Gunnison Co., Colorado; at Point of Rocks, Colfax Co., New Mexico. In Canada, in the Bancroft district, Ontario, especially large crystals from Davis Hill; from Mont Saint-Hilaire, Quebec.

Name: From the Greek for *cloud*, as it becomes cloudy when treated with strong acid.

Type Material: Natural History Museum, Paris, France, Haüy collection.

References: (1) Dana, E.S. (1892) Dana's system of mineralogy, (6th edition), 423–426, 1042. (2) Deer, W.A., R.A. Howie, and J. Zussman (1963) Rock-forming minerals, v. 4, framework silicates, 231–270. (3) Smith, J.V. and F. Tuttle (1957) The nepheline-kalsilite system: I. X-ray data for the crystalline phases. Amer. J. Sci., 255, 282–305. (4) Foreman, N. and D.R. Peacor (1970) Refinement of the nepheline structure at several temperatures. Zeits. Krist., 132, 45–70. (5) Gregorkiewitz, M. (1984) Crystal structure and Al/Si ordering of a synthetic nepheline. Bull. Minéral., 107, 499–507.