Cryolithionite $Na_3Li_3Al_2F_{12}$

Crystal Data: Cubic. *Point Group:* $4/m\ \overline{3}\ 2/m$. As dodecahedra, to 17 cm, which may show {112}; commonly as coarse granular aggregates.

Physical Properties: *Cleavage:* Distinct on {011}. *Fracture:* Uneven to subconchoidal. *Tenacity:* Brittle. Hardness = 2.5–3 D(meas.) = 2.771–2.774 D(calc.) = 2.771

Optical Properties: Transparent; often cloudy from inclusions. *Color:* Colorless to white; colorless in transmitted light. *Luster:* Vitreous.
Optical Class: Isotropic. n = 1.3393–1.3395

Cell Data: *Space Group: Ia3d.* a = 12.122(2) Z = 8

X-ray Powder Pattern: Synthetic.
4.28 (100), 3.029 (55), 1.966 (55), 2.213 (50), 2.711 (35), 2.376 (35), 1.619 (30)

Chemistry:

	(1)	(2)
Na	18.83	18.55
Li	5.35	5.60
Al	14.46	14.52
F	60.79	61.33
LOI	0.36	
Total	99.79	100.00

(1) Ivigtut, Greenland. (2) $Na_3Li_3Al_2F_{12}$.

Occurrence: In some granite pegmatites.

Association: Cryolite, quartz, fluorite, siderite (Ivigtut, Greenland); cryolite, chiolite, pachnolite, thomsenolite, ralstonite, prosopite (Miass, Russia).

Distribution: In the Ivigtut cryolite deposit, southwestern Greenland. From near Miass, Ilmen Mountains, Southern Ural Mountains, Russia. At the Zapot pegmatite, 25 km northeast of Hawthorne, Fitting district, Mineral Co., Nevada, USA.

Name: For its similarity to CRYOlite and high LITHIum content.

Type Material: University of Copenhagen, Copenhagen, Denmark; National Museum of Natural History, Washington, D.C., USA, 106833.

References: (1) Palache, C., H. Berman, and C. Frondel (1951) Dana's system of mineralogy, (7th edition), v. II, 99–100. (2) Vlasov, K.A., Ed. (1966) Mineralogy of rare elements, v. II, 3–6. (3) Geller, S. (1971) Refinement of the crystal structure of cryolithionite, $\{Na_3\}[Al_2](Li_3)F_{12}$. Amer. Mineral., 56, 18–23. (4) (1971) NBS Mono. 25, 9, 23.