

**Crystal Data:** Monoclinic. *Point Group:*  $2/m$ . Crystals, to 3 cm, are pseudocubic or short prismatic along [001], striated on {110} ||  $[1\bar{1}1]$ ,  $[1\bar{1}\bar{1}]$ , and  $[1\bar{1}0]$ ; typically massive or coarsely granular. *Twinning:* Common, according to one or more of 13 distinct twin laws, producing penetration, repeated, or polysynthetic twins.

**Physical Properties:** *Cleavage:* Partings on {001} and {110}. *Fracture:* Uneven. *Tenacity:* Brittle. Hardness = 2.5 D(meas.) = 2.97 D(calc.) = 2.973(2) Weakly thermoluminescent; may fluoresce intense yellow under SW UV, with yellow phosphorescence, pale yellow fluorescence under LW UV.

**Optical Properties:** Transparent to translucent. *Color:* Colorless, white, pale brown, pink, smoky to black; colorless in thin section. *Streak:* White. *Luster:* Vitreous to greasy or waxy, pearly on {001}.

*Optical Class:* Biaxial (+). *Orientation:*  $X = b$ ;  $Z \wedge c = -44^\circ$ . *Dispersion:*  $r < v$ .  $\alpha = 1.338$   
 $\beta = 1.338$   $\gamma = 1.339$   $2V(\text{meas.}) = 43^\circ$

**Cell Data:** *Space Group:*  $P2_1/n$ .  $a = 5.4024(2)$   $b = 5.5959(2)$   $c = 7.7564(3)$   
 $\beta = 90.278(1)^\circ$   $Z = 2$

**X-ray Powder Pattern:** Synthetic. (ICDD 25-772).

2.748 (100), 1.943 (95), 3.886 (65), 4.54 (55), 4.44 (40), 1.571 (35), 2.337 (30)

**Chemistry:**

	(1)	(2)
Na	32.41	32.85
Al	13.01	12.85
F	54.28	54.30
Total	99.70	100.00

(1) Ivigtut, Greenland. (2) Na<sub>3</sub>AlF<sub>6</sub>.

**Occurrence:** A late-stage mineral in some granite pegmatites; in tin-bearing alkalic granites; a vapor-phase mineral along fractures and in the groundmass of some fluorine-rich, topaz-bearing rhyolites; in pods in a carbonatite vein cutting fenitized biotite gneiss. Also as a rare authigenic component of the marlstones and shales of the Green River Formation.

**Association:** Pachnolite, thomsenolite, gearsutite, cryolithionite, weberite, jarlite, prosopite, chiolite, microcline, quartz, fluorite, siderite, topaz (Ivigtut, Greenland); sodalite, villiaumite, eudialyte, lovozerite, natrolite, chabazite, aegirine (Mont St. Hilaire, Canada).

**Distribution:** Formerly in a large deposit at Ivigtut, southwestern Greenland. In the USA, from St. Peters Dome, near Pikes Peak, El Paso Co., in the Goldie carbonatite, Fremont Co., and the Green River Formation, Colorado; in the Round Top intrusion, Sierra Blanca Peaks, Hudspeth Co., Texas; from the Zapot pegmatite, 25 km northeast of Hawthorne, Fitting district, Mineral Co., Nevada; in the Morefield pegmatite, Amelia, Amelia Co., Virginia. From the Francon quarry, Montreal Island, Montreal, at Mont Saint-Hilaire, and from near Saint-Amable, Quebec, Canada. From Miass, Ilmen Mountains, Southern Ural Mountains, the Khibiny massif, Kola Peninsula, and elsewhere in Russia. In the Madeira and Agua Boa granites, Pitinga region, Amazonas, Brazil. Several other minor occurrences are known.

**Name:** From the Greek for *ice* and *stone*, alluding to its appearance.

**Type Material:** University of Copenhagen, Copenhagen, Denmark.

**References:** (1) Palache, C., H. Berman, and C. Frondel (1951) Dana's system of mineralogy, (7th edition), v. II, 110–113. (2) Donnay, J.D.H. (1952) Cryolite twinning. *Amer. Mineral.*, 37, All rights reserved. No part of this publication may be reproduced, stored in a retrieval system or transmitted in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise without the prior written permission of Mineral Data Publishing.

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