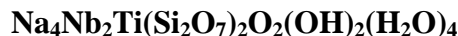


**Epistolite**

**Crystal Data:** Triclinic. *Point Group:*  $\bar{1}$ . As crystals, rectangular and tabular on (001), to 5 cm. Also as irregular plates and curved lamellar masses.

**Physical Properties:** *Cleavage:* Perfect on {001}, distinct on {110}. *Tenacity:* Very brittle to friable. Hardness = 1.5-3 D(meas.) = 2.65-2.89 D(calc.) = 2.987

**Optical Properties:** Opaque to translucent, transparent in thin sheets. *Color:* White, gray, yellow-gray, tan, light brown; in thin section, colorless. *Luster:* Pearly to silky. *Optical Class:* Biaxial (-). *Orientation:*  $Z \wedge c = 70^\circ$ . *Dispersion:*  $r > v$ ; inclined.  $\alpha = 1.610$   $\beta = 1.650-1.720$   $\gamma = 1.682-1.770$   $2V(\text{meas.}) = 60-80^\circ$

**Cell Data:** *Space Group:*  $P\bar{1}$ .  $a = 5.460(1)$   $b = 7.170(1)$   $c = 12.041(2)$   $\alpha = 103.63(3)^\circ$   $\beta = 96.01(3)^\circ$   $\gamma = 89.98(3)^\circ$   $Z = 1$

**X-ray Powder Pattern:** Ilímaussaq alkaline complex intrusion, Greenland. 4.322 (10), 2.99 (9), 2.869 (9), 12.00 (8), 5.902 (7), 1.790 (7), 2.155 (6)

<b>Chemistry:</b>	(1)	(2)	(3)		(1)	(2)	(3)
SiO <sub>2</sub>	27.59	25.60	29.59	CaO	0.77	0.00	1.89
TiO <sub>2</sub>	7.22	14.55	10.24	Na <sub>2</sub> O	17.59	4.97	14.45
ZrO <sub>2</sub>		0.00		K <sub>2</sub> O	trace	0.70	0.27
Al <sub>2</sub> O <sub>3</sub>		2.05		F	1.98	0.00	1.32
Nb <sub>2</sub> O <sub>5</sub>	33.56	31.40	31.43	H <sub>2</sub> O <sup>+</sup>	9.26	7.35	
Ta <sub>2</sub> O <sub>5</sub>		0.90	0.28	H <sub>2</sub> O <sup>-</sup>	1.75	8.20	
Fe <sub>2</sub> O <sub>3</sub>			0.35	H <sub>2</sub> O <sub>(calc)</sub>			10.46
FeO	0.20	0.90		P <sub>2</sub> O <sub>5</sub>		2.10	0.36
MnO	0.30	1.20	0.34	<u>-O = F<sub>2</sub></u>	<u>0.83</u>		
MgO	0.13	0.00		Total	99.52	99.92	100.43

(1) Julianehåb district, Greenland; material partly altered. (2) Lovozero massif, Russia. (3) Ilímaussaq alkaline complex, South Greenland; electron microprobe analysis, H<sub>2</sub>O calculated from structure analysis; K and P considered contaminants; corresponding to  $(\text{Na}_{3.79}\text{Ca}_{0.27}\text{Mn}_{0.04})_{\Sigma=4.06}(\text{Nb}_{1.92}\text{Ti}_{1.04}\text{Fe}_{0.04}^{3+})_{\Sigma=3.00}(\text{Si}_2\text{O}_7)_2\text{O}_2(\text{OH}_{1.44}\text{F}_{0.56})(\text{H}_2\text{O})_4$ .

**Occurrence:** A low temperature mineral in alkalic pegmatites, albitites, sodalite xenoliths, and hydrothermal veins.

**Association:** Aegirine, albite, murmanite, sphalerite, manganoan pectolite, neptunite, steenstrupine, sodalite, eudialyte, nenadkevichite.

**Distribution:** At a number of localities in the Ilímaussaq alkaline complex intrusion, southern Greenland. From the Lovozero massif, Kola Peninsula, Russia. At Mont Saint-Hilaire and near Saint-Amable, Quebec, Canada.

**Name:** From the Greek for *letter*, in allusion to the flat rectangular crystal habit and white color.

**Type Material:** University of Copenhagen, Copenhagen, Denmark, 319, 320.

**References:** (1) Dana, E.S. and W.E. Ford (1909) Dana's system of mineralogy, (6th edition), app. II, 39. (2) Vlasov, K.A., Ed. (1966) Mineralogy of rare elements, v. II, 562-564. (3) Khalilov, A.P., Y.S. Makarov, K.S. Mamedov, and L.A. P'yanzina (1965) Crystal structure of minerals of the murmanite-lomonosovite group. Doklady Acad. Nauk SSSR, 162, 179-182 (in Russian). (4) Karup-Møller, S. (1986) Epistolite from the Ilímaussaq alkaline complex in South Greenland. Neues Jahrb. Mineral., Abh., 155, 289-304. (5) Mandarino, J.A. and V. Anderson (1989) Montereian Treasures. Cambridge Univ. Press, 76. (6) Sokolova, E., and F.C. Hawthorne (2004) The crystal chemistry of epistolite. Can. Mineral., 42, 797-806.