

Crystal Data: Orthorhombic. *Point Group:* $2/m\ 2/m\ 2/m$. Crystals prismatic, elongated || [001], to 30 cm, striated || [010]. In fan-shaped aggregates, columnar, fine fibrous, massive. *Twinning:* Noted.

Physical Properties: *Cleavage:* Perfect on {110}. *Fracture:* Splintery. Hardness = 5
D(meas.) = 2.52–2.62 D(calc.) = 2.59

Optical Properties: Opaque to translucent and transparent. *Color:* White, colorless, yellowish, pale to bright orange, brownish yellow, brownish, beige, green, brick-red from inclusions. *Luster:* Silky, vitreous to waxy or dull.

Optical Class: Biaxial (+). *Orientation:* $X = c$; $Y = b$; $Z = a$. *Dispersion:* $r < v$.
 $\alpha = 1.556$ – 1.563 $\beta = 1.565$ – 1.569 $\gamma = 1.574$ – 1.577 $2V(\text{meas.}) = 76^\circ$ – 89°

Cell Data: *Space Group:* $Pbcm$. $a = 7.14(2)$ $b = 14.68(1)$ $c = 14.65(1)$ $Z = 4$

X-ray Powder Pattern: Narssârssuk, Greenland.

3.26 (100), 3.12 (70), 1.945 (70), 1.759 (70), 1.590 (70), 1.352 (70), 1.492 (60)

Chemistry:

	(1)	(2)	(3)
SiO ₂	59.44	57.13	60.11
TiO ₂	trace	0.05	
ZrO ₂	20.48	20.33	20.55
Nb ₂ O ₅		1.43	
FeO	0.14	0.14	
CaO	0.17	0.43	
Na ₂ O	10.41	9.89	10.33
K ₂ O	0.13	0.19	
F		0.12	
Cl	0.15	0.18	
H ₂ O ⁺	5.72	9.94	9.01
H ₂ O ⁻	3.89		
Total	100.53	99.83	100.00

(1) Narssârssuk, Greenland. (2) Lovozero massif, Russia. (3) Na₂ZrSi₆O₁₅•3H₂O

Occurrence: In albitized nepheline syenite and associated pegmatites, aegirine-rich granite, and fenites, in a differentiated alkalic massif (Lovozero massif, Russia).

Association: Albite, quartz, aegirine, epididymite, labuntsovite (Lovozero massif, Russia).

Distribution: At Narssârssuk and in the Ílímaussaq intrusion, southern Greenland. In Russia, from the Lovozero and Khibiny massifs, Kola Peninsula; in the Ulan-Erge massif, southeastern Tuva; and in the Burpala massif, about 120 km north of Lake Baikal, eastern Siberia. In large crystals from Tarbagatai, eastern Kazakhstan. In the Khan-Bogdinskii granite massif, Gobi, Mongolia. At Gjerdingen, near Oslo, Norway. On Rockall Island, North Atlantic. In Canada, at Mont Saint-Hilaire and near Saint-Amable, Quebec, and in the Strange Lake complex, southeast of Lac Brisson, Quebec and Labrador, Newfoundland. From Washington Pass, Okanogan Co., Washington, USA.

Name: From the Greek *hope*, named in anticipation of discovery of other interesting minerals.

Type Material: University of Copenhagen, Copenhagen, Denmark.

References: (1) Dana, E.S. (1899) Dana's system of mineralogy, (6th edition), app. I, 24. (2) Vlasov, K.A., Ed. (1966) Mineralogy of rare elements, v. II, 365–370. (3) Cannillo, E., G. Rossi, and L. Ungaretti (1973) The crystal structure of elpidite. *Amer. Mineral.*, 58, 106–109. (4) Sapozhnikov, A.N. and A.A. Kashaev (1978) Features of the crystal structure of calcium-containing elpidite. *Kristallografiya (Sov. Phys. Crystal.)*, 23, 52–56 (in Russian).

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.