

Semenovite-(Ce) (Na, Ca)₉(Ce, La)₂(Fe²⁺, Mn)(Si, Be)₂₀(O, OH, F)₄₈

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Crystal Data: Orthorhombic, pseudotetragonal. *Point Group:* 2/m 2/m 2/m.

As pseudotetragonal dipyrarnidal crystals, to 1 cm, and coarsely crystalline aggregates.

Twinning: Multiple interpenetration twinning on {110} with composition plane {120}, produces a pseudotetragonal habit; viewed in thin section, two sets of parallel twin boundaries produce rhombic-shaped intersections.

Physical Properties: *Fracture:* Uneven. *Hardness* = 3.5–4 *D*(meas.) = 3.140(2)
D(calc.) = 3.17

Optical Properties: Transparent, to translucent when altered. *Color:* Brown or orange-brown to grey or reddish brown when altered; colorless to greyish brown in thin section. *Luster:* Vitreous, to dull when altered.

Optical Class: Uniaxial (–) to biaxial (–). *Orientation:* *X* = *c*. $\alpha = 1.595(2)$ $\beta = 1.614(2)$
 $\gamma = 1.614(2)$ *2V*(meas.) = 55°

Cell Data: *Space Group:* *Pmnn*. *a* = 13.879(5) *b* = 13.835(5) *c* = 9.942(6) *Z* = 2

X-ray Powder Pattern: Ilímaussaq intrusion, Greenland.

3.282 (100), 2.841 (100), 2.727 (100), 8.082 (70), 6.949 (40), 5.250 (40), 3.182 (40)

Chemistry:	(1)	(2)	(3)		(1)	(2)	(3)
SiO ₂	42.8	45.1	46.2	ZnO	0.5	0.4	0.4
TiO ₂		0.2	0.2	PbO	0.5		
Al ₂ O ₃	0.7	0.1		BeO	8.2		8.3
CeO ₂	6.8			CaO	6.0	7.8	8.0
La ₂ O ₃	6.8			Na ₂ O	11.0	11.5	11.6
Y ₂ O ₃	2.3			K ₂ O	0.1	0.1	
RE ₂ O ₃	3.1	18.0	18.1	F	4.5		4.2
Fe ₂ O ₃	2.4			H ₂ O	1.9		1.5
FeO	0.8	1.9	2.1	–O = F ₂	1.9		1.8
MnO	1.8	1.1	1.2	Total	98.3		100.0

(1) Ilímaussaq intrusion, Greenland; by electron microprobe, wet chemical analysis, spectrography, AA, and TGA; RE₂O₃ = Nd₂O₃ 2.2%, Gd₂O₃ 0.6%, (Sm, Eu)₂O₃ 0.3%; corresponds to (Na_{6.74}Ca_{2.04}K_{0.04})_{Σ=8.82}(La_{0.80}Ce_{0.74}Y_{0.32}RE_{0.44})_{Σ=2.30}(Mn_{0.48}Fe_{0.21}²⁺Zn_{0.12}Pb_{0.04})_{Σ=0.85}Fe_{0.57}³⁺(Si_{13.55}Be_{6.24}Al_{0.26})_{Σ=20.05}[O_{40.40}F_{4.51}(OH)_{4.04}]_{Σ=48.95}. (2) Do.; by electron microprobe, partial analysis, average of analysis in (1) and two additional analyses; Ce > La indicated. (3) Analysis calculated from stoichiometry of the crystal structure.

Occurrence: A late-stage hydrothermal mineral developed in cavities within albitite veins cutting alkalic igneous rocks.

Association: Epididymite, eudidymite, “lithium-mica,” albite.

Distribution: North of the westernmost end of Lake Taseq, in the Ilímaussaq intrusion, southern Greenland.

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Type Material: University of Copenhagen, Copenhagen, Denmark; National Museum of Natural History, Washington, D.C., USA, 145810.

References: (1) Petersen, O.V. and J.G. Rønsbo (1972) Semenovite – a new mineral from the Ilímaussaq alkaline intrusion, South Greenland. *Lithos*, 5, 163–173. (2) (1973) *Amer. Mineral.*, 58, 1114 (abs. ref. 1). (3) Mazzi, F., L. Ungaretti, A. Dal Negro, O.V. Petersen, and J.G. Rønsbo [Rønsbo] (1979) The crystal structure of semenovite. *Amer. Mineral.*, 64, 202–210.

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