

Denisovite

(K, Na)Ca₂Si₃O₈(F, OH)

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Crystal Data: Monoclinic. *Point Group:* n.d. As acicular crystals, in parallel columnar aggregates, to 15 cm.

Physical Properties: *Cleavage:* Cleavage or parting observed \perp elongation of crystals. *Fracture:* Splintery. *Tenacity:* Brittle. Hardness = 4–5 D(meas.) = 2.76 D(calc.) = 2.81

Optical Properties: Semitransparent. *Color:* Light gray to greenish gray; colorless to faint yellow in thin section. *Luster:* Pearly to silky.

Optical Class: Biaxial (+). $\alpha = 1.565\text{--}1.569$ $\beta = 1.566\text{--}1.570$ $\gamma = 1.574\text{--}1.578$
2V(meas.) = 20°–30°

Cell Data: *Space Group:* n.d. $a = 30.92(7)$ $b = 7.20(3)$ $c = 18.27(5)$ $\beta = 95^\circ$ $Z = 20$

X-ray Powder Pattern: Khibiny massif, Russia.

3.32 (100), 2.75 (100), 3.24 (90), 3.03 (90), 3.65 (80), 3.08 (80), 2.79 (80)

Chemistry:	(1)	(2)	(1)	(2)	
SiO ₂	49.83	50.30	BaO	0.23	
TiO ₂	0.13	0.12	Li ₂ O	0.01	
Al ₂ O ₃	0.65	0.83	Na ₂ O	2.66	2.26
Fe ₂ O ₃	0.55		K ₂ O	8.94	9.30
Nb ₂ O ₅	0.14		Rb ₂ O	0.09	
FeO	0.06	0.31	F	3.95	3.00
MnO	0.83	0.53	H ₂ O ⁺	1.16	n.d.
MgO	0.35	0.08	H ₂ O ⁻	0.16	n.d.
CaO	31.16	31.50	P ₂ O ₅	0.04	
SrO	0.35	0.65	–O = F ₂	1.62	1.23
			Total	99.44	[97.88]

(1) Khibiny massif, Russia; after deduction of small amounts of contaminant minerals, corresponds to (K_{0.68}Na_{0.32}) $\Sigma=1.00$ (Ca_{1.95}Mn_{0.04}Sr_{0.01}) $\Sigma=2.00$ Si_{3.00}O₈[F_{0.54}(OH)_{0.46}] $\Sigma=1.00$.
(2) Murun massif, Russia; by electron microprobe, average of 11 grains, original total given as 98.88%; corresponds to (K_{0.69}Na_{0.26}Mn_{0.05}Fe_{0.02}Mg_{0.01}) $\Sigma=1.03$ (Ca_{1.97}Sr_{0.02}Mn_{0.01}) $\Sigma=2.00$ (Si_{2.94}Al_{0.05}) $\Sigma=2.99$ O₈F_{0.56}.

Occurrence: In nepheline syenite in a differentiated alkalic massif (Khibiny massif, Russia).

Association: Nepheline, potassic feldspar, aegirine, fluorite, apatite, biotite, yuksporite (Khibiny massif, Russia); aegirine, kalsilite, feldspar (Murun massif, Russia).

Distribution: On Mts. Eveslogchorr and Yukspor, Khibiny massif, Kola Peninsula, and in the Murun massif, southwest of Olekminsk, Yakutia, Russia.

Name: Honors Aleksander Petrovich Denisov (1918–1972), Russian specialist in X-ray investigations of minerals, of the Kola Scientific Center, Russia.

Type Material: Geology Museum, Kola Branch, Academy of Sciences, Apatity, 5774/1–2; Mining Institute, St. Petersburg, 1295/1–2; Il'menskii Preserve Museum, Miass, 5392; A.E. Fersman Mineralogical Museum, Academy of Sciences, Moscow, Russia, 82762, vis4773; The Natural History Museum, London, England, 1994,7.

References: (1) Men'shikov, Y.P. (1984) Denisovite, Ca₄(K_{1.4}Na_{0.6})₂Si₆O₁₆(F, OH)₂, a new mineral from the Khibina massif. Zap. Vses. Mineral. Obshch., 113, 718–723 (in Russian).
(2) (1985) Amer. Mineral., 70, 1329 (abs. ref. 1). (3) Konev, A.A., Y.I. Vorob'ev, L.F. Paradina, and A.N. Sapozhnikov (1987) Denisovite from the Murun pluton, its second find in the world. Doklady Acad. Nauk SSSR, 293, 196–198 (in Russian).

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