

(Ce, La, Th)(Ti, Nb)
Karnasurtite-(Ce) (Al, Fe³⁺)(Si, P)₂O₇(OH)₄•3H₂O(?)

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Crystal Data: Amorphous; hexagonal (?). *Point Group:* n.d. Platy crystals up to 1 cm; as aggregates and individual grains.

Physical Properties: *Cleavage:* Good in one direction, imperfect in another.

Tenacity: Brittle. Hardness = 2 D(meas.) = 2.89–2.95 D(calc.) = n.d.

Optical Properties: Semitransparent. *Color:* Honey-yellow when fresh to pale yellow when altered; in thin section, pale yellow. *Streak:* Yellow. *Luster:* Greasy.

Optical Class: Uniaxial (-); may be anomalously slightly biaxial. $\omega = 1.617$ $\epsilon = 1.595$

Cell Data: *Space Group:* n.d. Z = n.d.

X-ray Powder Pattern: Mt. Karnasurt, Russia; X-ray amorphous; on heating to 900°, it yields a pattern close to that of monazite.

3.10 (7), 2.88 (7), 3.29 (6), 3.49 (5), 1.723 (5), 2.44 (4), 2.14 (4)

Chemistry:	(1)	(2)		(1)	(2)
SiO ₂	20.47	24.91	CaO	1.66	3.20
TiO ₂	12.14	12.33	BaO	0.68	
ZrO ₂		1.20	Na ₂ O	0.91	
ThO ₂	6.22	6.04	K ₂ O	0.76	
Al ₂ O ₃	7.46	5.52	F	0.91	
La ₂ O ₃		8.55	H ₂ O ⁺	7.22	7.29
Ce ₂ O ₃	17.58	8.11	H ₂ O ⁻	10.84	12.29
Fe ₂ O ₃	1.10	1.07	P ₂ O ₅	3.29	6.81
Nb ₂ O ₅	8.20	2.20	-O = F ₂	0.38	
MgO	0.91	0.60	Total	99.97	100.12

(1) Mt. Karnasurt, Russia; corresponds to (Ce_{0.54}Na_{0.15}Ca_{0.14}Th_{0.12}K_{0.08}Ba_{0.02})_{Σ=1.05}(Ti_{0.76}Nb_{0.31})_{Σ=1.07}(Al_{0.73}Mg_{0.11}Fe_{0.07}³⁺)_{Σ=0.91}(Si_{1.70}P_{0.23})_{Σ=1.93}O₇[(OH)_{3.46}F_{0.23}]_{Σ=3.69}•3H₂O.
 (2) Mt. Punkaruaiv, Russia.

Occurrence: In the intermediate replacement zone, composed largely of microcline, of a zoned pegmatite stock in a differentiated alkalic massif (Mt. Karnasurt, Russia).

Association: Manganoan pectolite, natrolite, epididymite, polyolithionite, ussingite.

Distribution: On Mts. Karnasurt and Punkaruaiv, Lovozero massif, Kola Peninsula, Russia.

Name: For the locality, Mt. Karnasurt, Kola Peninsula, Russia, and its high *cerium* content.

Type Material: A.E. Fersman Mineralogical Museum, Academy of Sciences, Moscow, Russia, 59412, vis3348; National Museum of Natural History, Washington, D.C., USA, 143823.

References: (1) Kuz'menko, M.V. and S.I. Kozhanov (1959) The new mineral karnasurtite. Trudy Inst. Mineral., Geokhim. i Kristalloghim. Redkikh Elementov, 2, 95–98 (in Russian).
 (2) Vlasov, K.A., M.V. Kuz'menko, and E.M. Es'kova (1959) The Lovozero alkali massif. Akad. Nauk SSSR, 423–425 (in Russian). (3) (1960) Amer. Mineral., 45, 1133–1134 (abs. refs. 1 and 2).