

**Belovite-(Ce)****NaSr<sub>3</sub>(Ce, La)(PO<sub>4</sub>)<sub>3</sub>(F, OH)**

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**Crystal Data:** Hexagonal. *Point Group:*  $\bar{3}$ . As acicular to prismatic crystals, to 3 cm, with {10 $\bar{1}$ 0} and {0001} prominent, in radiating to sheaflike aggregates; also granular.

**Physical Properties:** *Cleavage:* Prismatic and pinacoidal, imperfect. *Fracture:* Irregular. *Tenacity:* Brittle. Hardness = 5 D(meas.) = 4.19 D(calc.) = [4.13]

**Optical Properties:** Semitransparent to translucent. *Color:* Honey-yellow, greenish yellow; in transmitted light, colorless to slightly yellow. *Luster:* Vitreous, greasy on fracture surfaces. *Optical Class:* Uniaxial (-).  $\omega = 1.653\text{--}1.660$   $\epsilon = 1.634\text{--}1.640$

**Cell Data:** *Space Group:*  $P\bar{3}$ .  $a = 9.692(3)$   $c = 7.201(1)$   $Z = 2$

**X-ray Powder Pattern:** Mt. Punkaruaiiv, Kola Peninsula, Russia; close to belovite-(La). 2.90 (100), 3.17 (70), 2.79 (70), 2.009 (70), 1.470 (60), 2.32 (50), 2.151 (50)

<b>Chemistry:</b>	(1)	(2)		(1)	(2)
SO <sub>3</sub>	1.12	0.03	Sm <sub>2</sub> O <sub>3</sub>		0.06
P <sub>2</sub> O <sub>5</sub>	28.88	29.53	MgO	0.16	
ThO <sub>2</sub>		0.10	CaO	5.23	0.78
SiO <sub>2</sub>	0.20	0.22	SrO	33.60	38.95
Fe <sub>2</sub> O <sub>3</sub>	0.60		BaO	0.96	1.05
RE <sub>2</sub> O <sub>3</sub>	24.00		Na <sub>2</sub> O	3.60	3.91
La <sub>2</sub> O <sub>3</sub>		8.39	K <sub>2</sub> O	0.20	
Ce <sub>2</sub> O <sub>3</sub>		12.15	F		1.84
Pr <sub>2</sub> O <sub>3</sub>		0.68	H <sub>2</sub> O	0.89	1.50
Nd <sub>2</sub> O <sub>3</sub>		1.64	-O = F <sub>2</sub>		0.78
			Total	99.44	[100.05]

(1) Mt. Punkaruaiiv, Kola Peninsula, Russia; Ce:La = 1:0.6. (2) Kola Peninsula, Russia; by electron microprobe, original total given as 100.06%; corresponds to Na<sub>0.93</sub>(Sr<sub>2.77</sub>Ca<sub>0.10</sub>Ba<sub>0.04</sub>)<sub>Σ=2.91</sub>(Ce<sub>0.55</sub>La<sub>0.39</sub>Nd<sub>0.07</sub>Pr<sub>0.03</sub>)<sub>Σ=1.04</sub>[(P<sub>1.03</sub>Si<sub>0.01</sub>)<sub>Σ=1.04</sub>O<sub>4.04</sub>]<sub>3</sub>[F<sub>0.71</sub>(OH)<sub>0.35</sub>]<sub>Σ=1.06</sub>.

**Mineral Group:** Apatite group.

**Occurrence:** As a secondary mineral in pegmatites in differentiated alkalic massifs.

**Association:** Ussingite, natrolite, chkalovite, epistolite, tugtupite, mangan-neptunite, murmanite, gaidonnayite, nordite-(La), lamprophyllite, fluorcaphite, lomonosovite, deloneite-(Ce), sitinakite, aegirine, eudialyte, sodalite, microcline, nepheline.

**Distribution:** Found in Russia, on Mts. Punkaruaiiv, Lepkhe-Nelm, Sengischorr, Karnasurt, Kedykvyrpakhk, and Alluaiv, Lovozero massif; and on Mts. Kukisvumchorr and Koashva, Khibiny massif, Kola Peninsula.

**Name:** Honoring Russian crystallographer and academician Nikolai Vasil'evich Belov (1891–1982), former Head of the Crystallography and Crystallochemistry Department, Moscow Lomonosov State University, Moscow, Russia.

**Type Material:** A.E. Fersman Mineralogical Museum, Academy of Sciences, Moscow, Russia, 56440.

**References:** (1) Borodin, L.S. and M.E. Kazakova (1954) Belovite – a new mineral from an alkaline pegmatite. Doklady Acad. Nauk SSSR, 96, 613–616 (in Russian). (2) (1955) Amer. Mineral., 40, 367–368 (abs. ref. 1). (3) Nadezhina, T.N., D.Y. Pushcharovskiy, and A.P. Khomyakov (1987) Specification of the crystal structure of belovite. Mineral. Zhurnal, 9(2), 45–48 (in Russian with English abs.). (4) Pekov, I.V., N.V. Chukanov, O.V. Yeletskaia, A.P. Khomyakov, and Y.P. Men'shikov (1995) Belovite-(Ce): new data, refined formula, and its relationship to other minerals of the apatite group. Zap. Vses. Mineral. Obsch., 124(2), 98–110 (in Russian with English abs.).

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