

## Polezhaevaite-(Ce), NaSrCeF<sub>6</sub>, a new mineral from the Khibiny massif (Kola Peninsula, Russia)

VICTOR N. YAKOVENCHUK,<sup>1,\*</sup> EKATERINA A. SELIVANOVA,<sup>1</sup> GREGORY YU. IVANYUK,<sup>1</sup>  
YAKOV A. PAKHOMOVSKY,<sup>1</sup> JULIA A. KORCHAK,<sup>1</sup> AND ALEXANDER P. NIKOLAEV<sup>2</sup>

<sup>1</sup>Geological Institute of the Kola Science Center of the Russian Academy of Sciences, 14 Fersman Str., Apatity 184200, Murmansk Region, Russia

<sup>2</sup>JSC “Apatit,” 1 Leningradskaya Str., Kirovsk 184230, Murmansk Region, Russia

### ABSTRACT

Polezhaevaite-(Ce) NaSrCeF<sub>6</sub> is a new member of the gagarinite mineral group [hexagonal, *P*6<sub>3</sub>/*m*, *a* = 6.207(7) Å, *c* = 3.801(9) Å, *V* = 126.8(2) Å<sup>3</sup>, *Z* = 1]. It is found in a natrolitized microcline-aegirine-sodalite lens within apatite-rich urtite at Mt. Koashva (Khibiny massif, Kola Peninsula, Russia) in association with aegirine, albite, arfvedsonite, astrophyllite, burbankite, catapleite, chlorbartonite, djerfisherite, elpasolite, fluorapatite, fluorite, galena, hydroxylapatite, ilmenite, lamprophyllite, lorenzenite, leucophanite, microcline, natrolite, nepheline, orickite, pectolite, pyrochlore, sodalite, sphalerite, strontiofluorite, tainiolite, titanite, vinogradovite, and villiumite. Polezhaevaite-(Ce) occurs as parallel and sheaf-like aggregates of extremely thin fibers (up to 1 mm long and <1 μm thick), which fill leaching voids within burbankite crystals in natrolite and mantles around partially dissolved burbankite crystals in intimate association with strontiofluorite. Polezhaevaite-(Ce) is translucent (transparent in separate fibers), snowy-white, with a silky luster (in aggregates) and a white streak. Cleavage is not observed; fracture is splintery (in aggregates). The Mohs hardness of individual crystals could not be determined and approaches 3 in aggregates. In transmitted light, the mineral is colorless, uniaxial positive:  $\epsilon = 1.497(5)$ ,  $\omega = 1.490(5)$  (for  $\lambda = 589$  nm).  $D_{\text{calc}} = 4.646$  g/cm<sup>3</sup>,  $D_{\text{meas}} = >4.2$  g/cm<sup>3</sup>. The mean chemical composition determined by electron microprobe is (wt%): Na 5.27, Ca 3.08, Sr 29.72, Ba 0.48, La 11.76, Ce 14.12, Pr 0.49, Nd 3.09, F 31.95, total 99.96. Empirical formula calculated on the basis of F = 6 apfu is: (Na<sub>0.82</sub>Ca<sub>0.18</sub>)<sub>Σ=1.00</sub>(Sr<sub>1.21</sub>Ce<sub>0.36</sub>La<sub>0.30</sub>Ca<sub>0.09</sub>Nd<sub>0.08</sub>Ba<sub>0.01</sub>)<sub>Σ=2.06</sub>F<sub>6</sub> (charge imbalance is +0.05). Its simplified formula is NaSrCeF<sub>6</sub>. The strongest X-ray powder-diffraction lines [*d* in Å, (*I*), (*hkl*)] are: 5.416(40)(100), 3.120(100)(101, 110), 2.198(70)(201), 1.796(90)(121, 211, 300, 102), 1.554(30)(220), 1.173(70)(321, 231, 140, 410, 132, 312, 113). The mineral is named in honor of Lyudmila Ivanovna Polezhaeva (b. 1935), a Russian expert in electron microprobe analysis of minerals for her contribution to the mineralogy of alkaline rocks.

**Keywords:** Polezhaevaite-(Ce), new mineral, gagarinite group, peralkaline hydrothermal formation, Khibiny massif, Kola Peninsula, Russia