Nefedovite $Na_5Ca_4(PO_4)_4F$

Crystal Data: Triclinic, pseudotetragonal. *Point Group:* $\overline{1}$ or 1; pseudo $\overline{4}$. As irregular rounded grains, to 1 mm, in aggregates, typically replacing apatite.

Physical Properties: *Fracture:* Conchoidal. Hardness = ∼4.5 D(meas.) = 3.01(1) D(calc.) = 3.05

Optical Properties: Transparent. *Color:* Colorless. *Luster:* Vitreous. *Optical Class:* Biaxial (+); sensibly uniaxial (+). $\alpha = 1.571(2)$ $\beta = 1.571(2)$ $\gamma = 1.590(2)$ 2V(meas.) = n.d.

Cell Data: *Space Group:* $P\overline{1}$ or $P1$. $a = 5.401(6)$ $b = 11.647(8)$ $c = 16.484(7)$ $\alpha = 134.99(3)°$ $\beta = 90.04(6)°$ $\gamma = 89.96(7)°$ Z = 2, or, for the pseudotetragonal cell: *Space Group:* $I\overline{4}$. $a = 11.644(2)$ $c = 5.396(1)$ Z = 2

X-ray Powder Pattern: Khibiny massif, Kola Peninsula, Russia. 2.772 (100), 3.73 (80b), 2.508 (80), 2.290 (80), 2.703 (70), 1.877 (60), 5.83 (40)

Chemistry:

	(1)	(2)
P_2O_5	42.1	42.11
CaO	33.7	33.27
Na_2O	22.7	22.99
K_2O	0.8	
F	2.5	2.82
$-O = F_2$	1.0	1.19
Total	100.8	100.00

(1) Khibiny massif, Kola Peninsula, Russia; by electron microprobe, average of three analyses; corresponds to $(Na_{4.90}K_{0.11})_{\Sigma=5.01}Ca_{4.02}(P_{0.99}O_4)_4F_{0.88}$. (2) $Na_5Ca_4(PO_4)_4F$.

Occurrence: In pegmatitic segregations in nepheline syenite in a differentiated alkalic massif.

Association: Apatite, nacaphite, eudialyte, delhayelite, canasite, djerfisherite, rasvumite, orthoclase, alkalic amphibole, titanite.

Distribution: On Mt. Yukspor and from a drillcore in the Kuniok River valley, Khibiny massif, Kola Peninsula, Russia.

Name: To honor Dr. Yevgeny I. Nefedov (1910–1976), Russian mineralogist, St. Petersburg, Russia, involved in the discovery of a number of Kola minerals.

Type Material: Mining Institute, St. Petersburg, 1302/1; A.E. Fersman Mineralogical Museum, Academy of Sciences, Moscow, Russia, 82759.

References: (1) Khomyakov, A.P., G.N. Nechelyustov, and G.I. Dorokhova (1983) Nefedovite $Na_5Ca_4(PO_4)_4F$ – a new mineral. Zap. Vses. Mineral. Obshch., 112, 479–483 (in Russian). (2) (1983) Mineral. Abs., 35, 193–194 (abs. ref. 1). (3) (1984) Amer. Mineral., 69, 812–813 (abs. ref. 1). (4) Sebais, M., G.I. Dorokhova, E.A. Pobedimskaya, and A.P. Khomyakov (1984) Crystal structure and typomorphism of nefedovite. Sov. Phys. Doklady Acad. Nauk SSSR, 29, 700–703 (in Russian).