Nefedovite

\[ \text{Na}_5 \text{Ca}_4(\text{PO}_4)_4 \text{F} \]

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 = \( \sim 4.5 \) D(meas.) = 3.01(1) D(calc.) = 3.05

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

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

\[
\begin{array}{ccc}
\text{P}_2\text{O}_5 & (1) & 42.1 \\
\text{CaO} & (1) & 33.7 \\
\text{Na}_2\text{O} & (2) & 22.7 \\
\text{K}_2\text{O} & (2) & 0.8 \\
\text{F}^- & (2) & 2.5 \\
\text{O} = \text{F}_2 & (2) & 1.0 \\
\hline
\text{Total} & & 100.8 \\
\end{array}
\]

(1) Khibiny massif, Kola Peninsula, Russia; by electron microprobe, average of three analyses; corresponds to \( (\text{Na}_{4.90}\text{K}_{0.11})\Sigma=5.01\text{Ca}_{4.02}(\text{P}_{0.99}\text{O}_4)\text{F}_{0.88} \). (2) \( \text{Na}_5\text{Ca}_4(\text{PO}_4)_4\text{F} \).

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

Association: Apatite, nacaphite, eudialyte, delhayelite, canasite, djerfisherite, rasvumite, orthoclase, alkaline 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.