Fluorbarytolamprophyllite $(Ba, Sr, K)_2[(Na, Fe^{2+})_3TiF_2][Ti_2(Si_2O_7)_2O_2]$

Crystal Data: Monoclinic. *Point Group*: 2/*m*. As thin prismatic crystals to 3.5 mm flattened on (100) and elongate along [010], their radial aggregates to 0.2 mm, and as rims on crystals of fluorlamprophyllite.

Physical Properties: *Cleavage*: Perfect on {100}. *Tenacity*: Brittle. *Fracture*: Uneven. Hardness = 2.5 D(meas.) = n.d. D(calc.) = 3.662 Nonfluorescent.

Optical Properties: Translucent. *Color*: Brown, light to dark yellow in thin section. *Streak*: n.d. *Luster*: Vitreous to pearly.
Optical Class: Biaxial (+). $\alpha = 1.738(3)$ $\beta = 1.745(4)$ $\gamma = 1.777(4)$ 2V(meas.) = 55(5)° 2V(calc.) = 51° *Dispersion*: Very strong, $r > v$. *Orientation*: $X = b$, a and $c \parallel (100)$.
Pleochroism: Distinct, Z = brown, $Y \approx X$ = very pale brown to colorless. *Absorption*: $Z > Y \approx X$.

Cell Data: *Space Group*: $C2/m$. $a = 19.520(5)$ $b = 7.0995(17)$ $c = 5.3896(20)$ $\beta = 96.657(23)°$ $Z = 2$

X-Ray Diffraction Pattern: Niva intrusion, Kola Alkaline Province, northwestern Russia. 2.780 (100), 3.230 (96), 3.414 (67), 3.726 (59), 3.013 (53), 2.662 (52), 9.692 (40)

Chemistry:

	(1)		(1)
Na_2O	10.01	TiO_2	27.31
K_2O	2.65	ZrO_2	0.22
MgO	0.43	Nb_2O_5	0.91
CaO	0.64	Ta_2O_5	0.15
SrO	5.59	SiO_2	29.35
BaO	16.23	F	2.41
MnO	0.50	H_2O	0.26
FeO	4.44	-O = F	1.01
Al_2O_3	0.08	Total	100.17

(1) Niva intrusion, Kola Alkaline Province, northwestern Russia; average electron microprobe analysis supplemented by IR spectroscopy, H_2O by TGA; corresponding to $(Ba_{0.865}Sr_{0.44}K_{0.46}Na_{0.26})_{\Sigma=2.025}(Na_{2.38}Ca_{0.09}Fe_{0.47}Mn_{0.06})_{\Sigma=3.00}(Ti_{2.79}Mg_{0.09}Fe_{0.035}Nb_{0.06}Zr_{0.015}Ta_{0.01})_{\Sigma=3.00}(Si_{3.99}Al_{0.01})_{\Sigma=4.00}O_{16}[F_{1.04}O_{0.72}(OH)_{0.24}]_{\Sigma=2.00}$.

Mineral Group: Seidozerite supergroup, lamprophyllite group.

Occurrence: In agpaitic syenites of an alkaline complex.

Association: Potassium feldspar, Ti-rich aegirine-augite, aenigmatite, alkaline amphiboles, astrophyllite, natrolite, ferripyrophyllite.

Distribution: In the Niva intrusion and Mokhnatye Roga alkaline dike, Kola Alkaline Province, northwestern Russia.

Name: Indicates the F-dominant analogue of barytolamprophyllite and Ba-dominant analogue of fluorlamprophyllite.

Type Material: A.E. Fersman Mineralogical Museum, RAS, Moscow, Russia (4916/1 and 4916/2).

References: (1) Filina, M.I., S.M. Aksenov, N.V. Sorokhtina, N.V. Chukanov, N.N. Kononkova, D.I. Belakovskiy, S.N. Britvin, L.N. Kogarko, A.D. Chervonnyi, and R.K. Rastsvetaeva (2019) The new mineral fluorbarytolamprophyllite, $(Ba,Sr,K)_2[(Na,Fe^{2+})_3TiF_2][Ti_2(Si_2O_7)_2O_2]$ and chemical evolution of lamprophyllite-group minerals in agpaitic syenites of the Kola Peninsula. Mineralogy and Petrology, 113, 533-553.