Belkovite $\mathbf{Ba_3(Nb,Ti)_6(Si_2O_7)_2O_{12}}$

Crystal Data: Hexagonal. *Point Group:* $\bar{6}m2$. As crystals, prismatic to barrel-shaped, with triangular cross section and stepped faces, showing the forms $\{11\bar{2}0\}$ and $\{0001\}$, to 1 mm.

Physical Properties: *Fracture:* Uneven. *Tenacity:* Moderately brittle. Hardness = 6–7 VHN = 900–1030, average 970 (40 g load). D(meas.) = 4.16(3) D(calc.) = 4.25

Optical Properties: Transparent. *Color:* Brown to brownish red. *Streak:* White. *Luster:* Adamantine.
Optical Class: Uniaxial (+); anomalously biaxial. $\omega = 1.928(2)$ $\epsilon = 2.002(5)$
2V(meas.) = 0°–10°

Cell Data: *Space Group:* $P\bar{6}2m$. $a = 8.966(3)$ $c = 7.799(3)$ $Z = 1$

X-ray Powder Pattern: Vuoriyarvi complex, Russia.
2.937 (100), 3.888 (51), 7.81 (35), 1.948 (26), 2.750 (25), 3.481 (24), 2.154 (22)

Chemistry:

	(1)
SiO_2	17.80
TiO_2	5.60
ZrO_2	1.20
Al_2O_3	0.14
Fe_2O_3	1.78
Nb_2O_5	42.20
Ta_2O_5	0.15
CaO	0.05
SrO	0.00
BaO	30.30
Na_2O	0.20
K_2O	0.55
Total	99.97

(1) Vuoriyarvi complex, Russia; by electron microprobe, corresponding to $(Ba_{2.74}K_{0.16}Na_{0.09}Ca_{0.01})_{\Sigma=3.00}(Nb_{4.41}Ti_{0.97}Fe^{3+}_{0.31}Zr_{0.13}Al_{0.04}Ta_{0.01})_{\Sigma=5.87}Si_{4.12}O_{24.90}$.

Occurrence: Of secondary origin, formed by alteration of barium-rich pyrochlore during dolomitization of calcite carbonatites in pyroxenites.

Association: Magnetite, pyrochlore, phlogopite, chlorite, pyrite, pyrrhotite, dolomite, carbonate-apatite, barite, alstonite, nenadkevichite.

Distribution: In the Vuoriyarvi carbonatite complex, Kola Peninsula, Russia.

Name: For Igor Vladimirovich Bel'kov (1917–1989), Soviet mineralogist, Director, Kola Scientific Center, Apatity, Russia, who explored the Kola Peninsula.

Type Material: Mining Institute, St. Petersburg, 2036/1; Geology Museum, Kola Branch, Academy of Sciences, Apatity, 6014; A.E. Fersman Mineralogical Museum, Academy of Sciences, Moscow, Russia, p584.

References: (1) Voloshin, A.V., V.V. Subbotin, Y.A. Pakhomovskii, A.Y. Bakhchisaraitsev, N.A. Yamnova, and D.Y. Pushcharovskii (1990) Belkovite $Ba_3(Nb,Ti)_6(Si_2O_7)_2O_{12}$ new mineral from carbonatite of the Vuoriyarvi massif (Kola Peninsula). Doklady Acad. Nauk SSSR, 315, 1218–1220 (in Russian). (2) Voloshin, A.V., V.V. Subbotin, Y.A. Pakhomovskii, A.Y. Bakhchisaraitsev, N.A. Yamnova, and D.Y. Pushcharovskii (1991) Belkovite — a new barium–niobium silicate from carbonatites of the Vuoriyarvi massif (Kola Peninsula, USSR). Neues Jahrb. Mineral., Monatsh., 23–31. (3) (1991) Amer. Mineral., 76, 1728 (abs. ref. 2).