Bitikleite $\{Ca_3\}[Sb^{5+}Sn^{4+}](Al_3)O_{12}$

Crystal Data: Cubic. *Point Group*: 4/*m* $\bar{3}$ 2/*m*. As crystals confined by {211} to 50 μm with kimzeyite cores and thin rims of lakargiite-tazheranite-kimzeyite pseudomorphs after zircon.

Physical Properties: *Cleavage*: n.d. *Fracture*: n.d. *Tenacity*: n.d. Hardness = n.d.
D(meas.) = n.d. D(calc.) = 4.505

Optical Properties: n.d. *Color*: Light yellow or colorless. *Streak*: White.
Luster: Strong vitreous.
Optical Class: Isotropic. *n*(calc.) = 1.851

Cell Data: *Space Group*: *Ia*$\bar{3}$ *d*. *a* = 12.5240(2) Z = 8

X-ray Powder Pattern: Near Mt. Lakargi, Northern Caucasus, Kabardino-Balkaria, Russia.
1.668 (100), 2.546 (97), 3.118 (93), 4.407 (77), 2.789 (62), 1.973 (20), 1.732 (15)

Chemistry:

	(1)		(1)
UO_3	0.05	Al_2O_3	11.65
V_2O_5	0.02	Cr_2O_3	0.02
Nb_2O_5	0.07	Fe_2O_3	14.38
Sb_2O_5	25.98	FeO	1.11
SiO_2	0.28	SrO	0.01
TiO_2	2.66	MnO	0.03
ZrO_2	0.28	CaO	25.38
SnO_2	16.65	MgO	0.22
HfO_2	0.01	Y_2O_3	<0.10
		Total	98.81

(1) Near Mt. Lakargi, Northern Caucasus, Kabardino-Balkaria, Russia; average of 19 electron microprobe analyses supplemented by Raman spectroscopy; corresponding to $(Ca_{3.029}Mn^{2+}_{0.003}Sr_{0.001})_{\Sigma=3.033}(Sb^{5+}_{1.075}Sn^{4+}_{0.740}Ti^{4+}_{0.095}Mg_{0.037}Zr_{0.015}Nb^{5+}_{0.004}Cr_{0.002}U^{6+}_{0.001})_{\Sigma=1.969}$ $(Al_{1.530}Fe^{3+}_{1.206}Ti^{4+}_{0.128}Fe^{2+}_{0.104}Si_{0.031}V^{5+}_{0.001})_{\Sigma=3}O_{12}$.

Polymorphism & Series: Solid solution series with kimzeyite-schorlomite and toturite garnets.

Mineral Group: Garnet supergroup, bitikleite group.

Occurrence: In the cuspidine zone of high-temperature skarns in a carbonate-silicate xenolith at the contact with ignimbrites.

Association: Cuspidine, fluorite, wadalite, rondorfite, bultfonteinite, As-bearing fluor- and hydroxylellestadite, ettringite group minerals, perovskite, magnesioferrite, F-bearing hibschite, afwillite, hillebrandite.

Distribution: Within the Upper Chegem structure, near Mt. Lakargi, Northern Caucasus, Kabardino-Balkaria, Russia.

Name: For *Bitikle*, an old fortification near where the new mineral was discovered. Formerly bitikleite-(SnAl).

Type Material: A.E. Fersman Mineralogical Museum, Russian Academy of Sciences, Moscow, Russia (3842/1).

References: (1) Galuskina, I.O., E.V. Galuskin, T. Armbruster, B. Lazic, P. Dzierżanowski, V.M. Gazeev, K. Prusik, N.N. Pertsev, A. Winiarski, A.E. Zadov, R. Wrzalik, and A.G. Gurbanov (2010) Bitikleite-(SnAl) and bitikleite-(ZrFe): New garnets from xenoliths of the Upper Chegem volcanic structure, Kabardino-Balkaria, Northern Caucasus, Russia. Amer. Mineral., 95, 959-967.
(2) Grew, E.S., A.J. Locock, S.J. Mills, I.O. Galuskina, E.V. Galuskin, and U. Hålenius (2013) Nomenclature of the garnet supergroup. Amer. Mineral., 98, 785-811.