Elbrusite $Ca_3(U^{6+}_{0.5}Zr_{1.5})(Fe^{3+}O4)_3$

Crystal Data: Cubic. *Point Group*: $4/m\ \bar{3}\ 2/m$. As skeletal crystals to 15 μm with dominant {110} and minor {211}. Often as zones and spots within Fe^{3+}-dominant kimzeyite crystals.

Physical Properties: *Cleavage*: None. *Tenacity*: Brittle. *Fracture*: Irregular. Hardness = n.d. D(meas.) = n.d. D(calc.) = 4.801 Radioactive and nearly completely metamict.

Optical Properties: Transparent to translucent. *Color*: Dark-brown to black. *Streak*: Brown. *Luster*: Vitreous to dull, resinous.
Optical Class: [Isotropic.] n = n.d.

Cell Data: *Space Group*: $Ia\bar{3}\ d$. $a \approx 12.55$

X-ray Powder Pattern: n.d.

Chemistry:

	(1)		(1)
UO_3	25.14	Al_2O_3	3.67
V_2O_5	0.05	Cr_2O_3	0.02
ThO_2	0.65	Y_2O_3	0.02
HfO_2	0.25	Fe_2O_3	16.80
SnO_2	5.13	FeO	5.36
ZrO_2	17.11	CaO	22.76
TiO_2	2.12	MgO	0.02
SiO_2	0.79	Total	99.87

(1) Upper Chegem caldera, Northern Caucasus, Russia; average of 6 electron microprobe analyses supplemented by Raman spectroscopy; corresponding to $(Ca_{3.040}Th_{0.018}Y_{0.001})_{\Sigma=3.059}(U^{6+}_{0.658}Zr_{1.040}Sn_{0.230}Hf_{0.009}Mg_{0.004})_{\Sigma=1.941}(Fe^{3+}_{1.575}Fe^{2+}_{0.559}Al_{0.539}Ti^{4+}_{0.199}Si_{0.099}Sn_{0.025}V^{5+}_{0.004})_{\Sigma=3}O_{12}$.

Polymorphism & Series: Complex solid solutions with kimzeyite and toturite described by $Ca_3(U,Zr,Sn,Ti,Sb,Sc,Nb...)_2(Fe,Al,Si,Ti)_3O_{12}$.

Mineral Group: Garnet supergroup, bitikleite group.

Occurrence: In spurrite zones in skarn developed in xenoliths in ignimbrite.

Association: Spurrite, rondorfite, wadalite, kimzeyite, perovskite, lakargiite, ellestadite-(OH), hillebrandite, afwillite, hydrocalumite, ettringite group minerals, hydrogrossular.

Distribution: From the Upper Chegem caldera, near Mt. Lakargi, on the interfluve between the Chegem and Kenstanty Rivers, Kabardino-Balkaria, Northern Caucasus, Russia.

Name: For the highest peak in Europe, Mt. *Elbrus* (5642 m), Northern Caucasus, Russia.

Type Material: A.E. Fersman Mineralogical Museum, Russian Academy of Sciences, Moscow, Russia (3840/1).

References: (1) Galuskina, I.O., E.V. Galuskin, T. Armbruster, B. Lazic, J. Kusz, P. Dzierżanowski, V.M. Gazeev, N.N. Pertsev, K. Prusik, A.E. Zadov, A. Winiarski, R. Wrzalik, and A.G. Gurbanov (2010) Elbrusite-(Zr) - A new uranian garnet from the Upper Chegem caldera, Kabardino-Balkaria, Northern Caucasus, Russia. Amer. Mineral., 95, 1172-1181. (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., 95, 785-811.