

**Crystal Data:** Cubic. *Point Group:*  $4/m\bar{3}2/m$ . Forms trapezohedral {211} crystals to 15  $\mu\text{m}$ , with cores of the Ti-analog of kerimasite. As rims on lakargiite. Also as poikilitic crystals < 50  $\mu\text{m}$  with inclusions of wadalite or katoite-grossular pseudomorphs after wadalite, in some cases substituted by cuspidine.

**Physical Properties:** *Cleavage:* None. *Fracture:* n.d. *Tenacity:* n.d. *Hardness:* = n.d.  
D(meas.) = n.d. D(calc.) = 4.708 [analysis 1] - 4.750 Partially metamict.

**Optical Properties:** Translucent to transparent. *Color:* Light yellow to dark brown.  
*Streak:* Creamy. *Luster:* Strongly vitreous.  
*Optical Class:* Isotropic.  $n(\text{calc.}) = 1.94$

**Cell Data:** *Space Group:*  $Ia\bar{3}d$ .  $a = 12.536(3)$   $Z = 8$

**X-ray Powder Pattern:** Calculated.

1.6752 (100), 2.5589 (95), 4.43 (87), 3.1340 (84), 2.8031 (47), 1.4016 (35), 1.3363 (29)

Chemistry:	(1)		(1)
UO <sub>3</sub>	6.30	Al <sub>2</sub> O <sub>3</sub>	6.17
Nb <sub>2</sub> O <sub>5</sub>	0.08	Sc <sub>2</sub> O <sub>3</sub>	0.05
Sb <sub>2</sub> O <sub>5</sub>	16.73	Fe <sub>2</sub> O <sub>3</sub>	19.82
SiO <sub>2</sub>	0.28	FeO	2.20
TiO <sub>2</sub>	2.62	MgO	0.02
ZrO <sub>2</sub>	4.21	CaO	23.86
SnO <sub>2</sub>	16.70	Total	99.04

(1) Upper Chegem Caldera, Northern Caucasus, Kabardino-Balkaria, Russia; average of 9 electron microprobe analyses, valences inferred from Raman spectroscopy; corresponding to (Ca<sub>2.954</sub>Fe<sup>2+</sup><sub>0.043</sub>Mg<sub>0.003</sub>) $\Sigma=3.000$ (Sn<sub>0.850</sub>Sb<sup>5+</sup><sub>0.764</sub>Zr<sub>0.121</sub>U<sup>6+</sup><sub>0.127</sub>Ti<sup>4+</sup><sub>0.070</sub>Sc<sub>0.009</sub>Nb<sup>5+</sup><sub>0.058</sub>Hf<sub>0.001</sub>) $\Sigma=2.001$ (Fe<sup>3+</sup><sub>2.051</sub>Al<sub>0.653</sub>Fe<sup>2+</sup><sub>0.182</sub>Ti<sup>4+</sup><sub>0.087</sub>Si<sub>0.028</sub>) $\Sigma=3.001$ O<sub>12</sub>.

**Polymorphism & Series:** Forms complex series within the group, {Ca<sub>3</sub>}[Sb<sup>5+</sup>Sn<sup>4+</sup>](Fe<sup>3+</sup>)O<sub>12</sub>.

**Mineral Group:** Bitikleite group, garnet supergroup.

**Occurrence:** From fluorine metasomatism of a thermally-altered carbonate-silicate xenolith (20 m long) in ignimbrite, the heat from which created sanidinite facies metamorphism in the xenolith.

**Association:** Kumtyubeite, cuspidine, fluorchegemite, larnite, fluorite, wadalite, rondorfite, hydroxyllestadite, perovskite, lakargiite, kerimasite, elbrusite, srebrodolskite, bultfonteinite, ettringite group minerals, hillebrandite, afwillite, tobermorite-like minerals, hydrocalumite, hydrogrossular.

**Distribution:** From the north end of Xenolith No.1, Upper Chegem Caldera, Northern Caucasus, Kabardino-Balkaria, Russia.

**Name:** Originally named bitikleite-(SnFe). Subsequently re-named after *Dzhulu* Mountain, located near the site from which the first specimens were collected.

**Type Material:** A.E. Fersman Mineralogical Museum, Russian Academy of Sciences, Moscow, Russia (4025/1).

**References:** (1) Galuskina, I.O., E.V. Galuskin, J. Kusz, P. Dzierzanowski, K. Prusik, V.M. Gazeev, N.N. Pertsev, and L. Dubrovinsky (2013) Dzhuluite, Ca<sub>3</sub>SbSnFe<sup>3+</sup>O<sub>12</sub>, a new bitikleite-group garnet from the Upper Chegem Caldera, Northern Caucasus, Kabardino-Balkaria, Russia. *Eur. J. Mineral.*, 25, 231-239. (2) (2015) *Amer. Mineral.*, 100, 1322-1323 (abs. ref. 1).