

**Oxynatromicrolite****(Na, Ca, U)<sub>2</sub>Ta<sub>2</sub>O<sub>6</sub>(O, F)**

**Crystal Data:** Cubic. *Point group:*  $4/m\bar{3}2/m$ . Crystals are octahedra, rhombic dodecahedra, cubes, or their combinations, to 0.20 mm.

**Physical Properties:** *Cleavage:* None. *Tenacity:* Brittle. *Fracture:* Conchoidal. Hardness = ~ 5 VHN = 374.5-562.9, 466.3 average (100 g load). D(meas.) = 6.580(4) D(calc.) = 6.506 Metamict.

**Optical Properties:** Opaque (translucent on thin edges). *Color:* Brown or yellowish brown. *Streak:* Yellowish brown. *Luster:* Greasy to waxy.

*Optical Class:* Isotropic (recrystallized).  $n(\text{meas.}) = 1.999(5)$

R: (400) 11.36, (420) 12.18, (440) 12.18, (460) 11.98, (470) 11.88, (480) 11.80, (500) 11.65, (520) 11.52, (540) 11.42, (546) 11.42, (560) 11.36, (580) 11.10, (589) 11.05, (600) 11.00, (620) 10.92, (640) 10.74, (650) 10.69, (660) 10.67, (680) 10.54, (700) 10.38

**Cell Data:** *Space Group:*  $Fd\bar{3}m$ .  $a = 10.420(6)$   $Z = 8$

**X-ray Powder Pattern:** Guanpo, Lushi county, Henan Province, China. (Heated and recrystallized) 3.0257 (100), 6.1489 (40), 1.8441 (35), 1.5705 (30), 2.6165 (25), 1.1960 (15), 2.0089 (10)

Chemistry:	(1)		(1)
Na <sub>2</sub> O	5.41	Sb <sub>2</sub> O <sub>5</sub>	0.23
CaO	4.56	TiO <sub>2</sub>	0.05
UO <sub>2</sub>	14.60	SiO <sub>2</sub>	0.56
La <sub>2</sub> O <sub>3</sub>	0.16	SnO <sub>2</sub>	0.29
Ce <sub>2</sub> O <sub>3</sub>	0.11	F	1.04
Nd <sub>2</sub> O <sub>3</sub>	0.13	H <sub>2</sub> O	[1.50]
PbO	0.62	<u>-O = F<sub>2</sub></u>	<u>0.44</u>
Ta <sub>2</sub> O <sub>5</sub>	61.52	Total	98.53
Nb <sub>2</sub> O <sub>5</sub>	8.21		

(1) Guanpo, Lushi county, Henan Province, China; average of 18 electron microprobe analyses supplemented by IR spectroscopy and DTA, H<sub>2</sub>O calculated from stoichiometry; corresponds to [Na<sub>0.99</sub>Ca<sub>0.46</sub>U<sub>0.31</sub>Pb<sub>0.02</sub>La<sub>0.01</sub>(H<sub>2</sub>O)<sub>0.21</sub>]<sub>Σ=2.00</sub>(Ta<sub>1.58</sub>Nb<sub>0.35</sub>Si<sub>0.05</sub>Sn<sub>0.01</sub>Sb<sub>0.01</sub>)<sub>Σ=2.00</sub>O<sub>6</sub>[O<sub>0.43</sub>F<sub>0.31</sub>(H<sub>2</sub>O)<sub>0.26</sub>]<sub>Σ=1.00</sub>.

**Mineral Group:** Pyrochlore supergroup (general formula - A<sub>2</sub>B<sub>2</sub>X<sub>6</sub>Y); microlite group (B = Ta<sup>5+</sup>).

**Occurrence:** In a rare-element granitic pegmatite, crystallized from a highly evolved felsic magma or transitional magmatic-hydrothermal fluids enriched in volatile, flux and lithophile elements.

**Association:** Quartz, albite, potassium feldspar, muscovite, kaolinite, tantalite-Mn, stibiotantalite, pollucite, spodumene, montebrasite, Hf-rich zircon, tourmaline, polyolithionite, trilithionite, luanshiweite-2M<sub>1</sub>.

**Distribution:** From the No. 309 rare-element granitic pegmatite vein, Guanpo, Lushi county, Henan Province, China.

**Name:** For a member of the *microlite* group with prefixes to indicate essential oxygen (*oxy*) in the Y site and dominant sodium (*natro*) in the A site.

**Type Material:** Geological Museum of China, Beijing, China (M11940).

**References:** (1) Guang, F., G. Xiangkun, L. Guowu, Yu. Apeng, and S. Ganfu (2017) Oxynatromicrolite, (Na,Ca,U)<sub>2</sub>Ta<sub>2</sub>O<sub>6</sub>(O,F), a new member of the pyrochlore supergroup from Guanpo, Henan Province, China. *Mineral. Mag.*, 81(4), 743-751. (2) (2018) *Amer. Mineral.*, 103, 2048 (abs. ref. 1). (3) Atencio, D., M.B. Andrade, A.G. Christy, R. Gieré, and P.M. Kartashov (2010) The pyrochlore supergroup of minerals: nomenclature. *Can. Mineral.*, 48, 673-698.