

**Sodium meta-autunite****Na<sub>2</sub>(UO<sub>2</sub>)<sub>2</sub>(PO<sub>4</sub>)<sub>2</sub>•(6–8)H<sub>2</sub>O**

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**Crystal Data:** Tetragonal. *Point Group:* 4/m 2/m 2/m. Platy crystals, to 5 mm, may be in radiating and foliated masses.

**Physical Properties:** *Cleavage:* {001}, perfect; {100}, less perfect. *Tenacity:* Brittle. Hardness = 2–2.5 D(meas.) = n.d. D(calc.) = [3.62] Yellow-green fluorescence under UV. Radioactive.

**Optical Properties:** Semitransparent. *Color:* Lemon-yellow, lettuce-yellow, greenish yellow. *Luster:* Vitreous, pearly on {001}. *Optical Class:* Uniaxial (-). *Pleochroism:* Weak; *O* = light yellow; *E* = pale yellow.  $\omega = 1.578$   $\epsilon = 1.559$

**Cell Data:** *Space Group:* P4/nmm. *a* = 6.97 *c* = 8.69 *Z* = 1

**X-ray Powder Pattern:** Kuruk deposit, Tajikistan. 3.67 (10), 2.675 (8), 1.566 (8b), 1.540 (8b), 3.23 (7), 1.639 (7), 1.364 (7)

<b>Chemistry:</b>	(1)	(2)	(3)
UO <sub>3</sub>	61.9	62.53	62.17
P <sub>2</sub> O <sub>5</sub>	15.56	14.69	15.43
CO <sub>2</sub>	0.24		
SiO <sub>2</sub>	1.6		
Al <sub>2</sub> O <sub>3</sub>	0.32		
Fe <sub>2</sub> O <sub>3</sub>	0.97		
MgO	0.43		
CaO	1.2	0.14	
Na <sub>2</sub> O	5.62	6.88	6.74
H <sub>2</sub> O <sup>+</sup>	4.05		
H <sub>2</sub> O <sup>-</sup>	9.02		
H <sub>2</sub> O		14.84	15.66
Total	100.91	99.08	100.00

(1) Kuruk deposit, Tajikistan; after deduction of impurities, stated to correspond to (Na, Ca)<sub>Σ=2.04</sub>(UO<sub>2</sub>)<sub>1.91</sub>(PO<sub>4</sub>)<sub>2.00</sub>•6.66H<sub>2</sub>O. (2) Do.; corresponds to (Na, Ca)<sub>Σ=2.12</sub>(UO<sub>2</sub>)<sub>2.1</sub>(PO<sub>4</sub>)<sub>2.00</sub>•7.9H<sub>2</sub>O. (3) Na<sub>2</sub>(UO<sub>2</sub>)<sub>2</sub>(PO<sub>4</sub>)<sub>2</sub>•8H<sub>2</sub>O.

**Mineral Group:** Autunite group.

**Occurrence:** In the oxidized zone of a uranium deposit in a granodiorite massif.

**Association:** Schoepite, gypsum, kaolinite, “limonite”.

**Distribution:** Found in the Kuruk uranium deposit, 15 km northeast of Khodzhent, Samgar Steppe, northern Tajikistan.

**Name:** The prefix *meta* indicates the dehydration product of “*sodium autunite*”, the transitory sodium analog of *meta-autunite*.

**Type Material:** A.E. Fersman Mineralogical Museum, Academy of Sciences, Moscow, Russia, 67809–67812.

**References:** (1) Chernikov, A.A., O.V. Krutetskaya, and N.I. Organova (1957) Sodium-autunite [sodium meta-autunite]. *Atomnaya Energiya*, 3, 133–140 (in Russian). (2) (1958) *Amer. Mineral.*, 43, 383 (abs. ref. 1). (3) Chernikov, A.A. and N.I. Organova (1994) Sodium autunite and sodium meta-autunite. *Doklady Acad. Nauk SSSR*, 338, 368–371 (in Russian). (4) (1995) *Amer. Mineral.*, 80, 1329–1330 (abs. ref. 3 with discussion of nomenclature). (5) Pekov, I.V. (1998) Minerals first discovered on the territory of the former Soviet Union, 190–191.

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