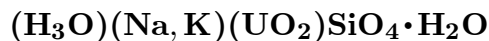


**Sodium boltwoodite**

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**Crystal Data:** Orthorhombic. *Point Group:*  $2/m\ 2/m\ 2/m$ . As flaky, radiating-fibrous aggregates and fine-grained coatings.

**Physical Properties:** *Cleavage:* Perfect on {010}, imperfect on {001}. *Hardness* = n.d. *D*(meas.) = 4.1 *D*(calc.) = 4.4 *Radioactive.*

**Optical Properties:** Translucent. *Color:* Pale yellow to white; in transmitted light, pale yellow to colorless.

*Optical Class:* Biaxial (-). *Pleochroism:* *X* = colorless; *Z* = pale yellow.  $\alpha = 1.613\text{--}1.645$   
 $\beta = [1.63\text{--}1.66]$   $\gamma = 1.645\text{--}1.672$  *2V*(meas.) = Large.

**Cell Data:** *Space Group:*  $P2_12_12_1$ .  $a = 27.40(5)$   $b = 7.02(2)$   $c = 6.65(2)$   $Z = 8$

**X-ray Powder Pattern:** Kyzylsai district, Kazakhstan.

6.71 (10), 2.92 (10), 4.70 (8), 3.49 (8), 3.37 (8), 3.10 (8), 6.92 (7)

**Chemistry:**

	(1)
SiO <sub>2</sub>	14.70
UO <sub>3</sub>	59.57
Al <sub>2</sub> O <sub>3</sub>	0.1
Fe <sub>2</sub> O <sub>3</sub>	0.45
PbO	0.00
MgO	0.00
CaO	4.35
Na <sub>2</sub> O	4.21
K <sub>2</sub> O	3.10
H <sub>2</sub> O	8.70
LOI	14.23
Total	[109.41]

(1) Kyzylsai district, Kazakhstan; contained quartz and calcite, original total given as 100.71%; after subtracting impurities, corresponds to  $(\text{H}_3\text{O})(\text{Na}_{0.7}\text{K}_{0.3})_{\Sigma=1.0}(\text{UO}_2)(\text{SiO}_4) \cdot \text{H}_2\text{O}$ .

**Occurrence:** A minor secondary mineral formed from subalkaline groundwater in the near-surface parts of uranium deposits in arid regions.

**Association:** Kaolinite, calcite, feldspar, quartz, gypsum, Fe-Mn oxides and hydroxides.

**Distribution:** Found at an unnamed uranium deposit, Kyzylsai district, Chu-Ili Mountains, Balkhash Lake region, Kazakhstan.

**Name:** For *sodium* in its composition and its relation to *boltwoodite*.

**Type Material:** n.d.

**References:** (1) Chernikov, A.A., D.P. Shashkin, and I.N. Gavrilova (1975) Sodium boltwoodite. *Doklady Acad. Nauk SSSR*, 221, 195–197 (in Russian). (2) (1976) *Amer. Mineral.*, 61, 1054–1055 (abs. ref. 1). (3) Stohl, F.V. and D.K. Smith (1981) The crystal chemistry of the uranyl silicate minerals. *Amer. Mineral.*, 66, 610–625.