Sodium uranospinite  \((Na_2, Ca)(UO_2)2(AsO_4)_2 \cdot 5H_2O\)

Crystal Data:  Tetragonal.  \(Point\ Group: 4/m\ 2/m\ 2/m\).  Imperfect lathlike to fibrous elongated crystals, to 2 cm, in divergent or irregular aggregates, and as incrustations.

Physical Properties:  Cleavage: On \{001\}, perfect; on \{010\}, distinct.  Hardness = 2.5  \(D(\text{meas.}) = 3.846\  D(\text{calc.}) = [3.66]\  \text{Fluoresces bright yellowish green under UV. Radioactive.}\)

Optical Properties:  Semitransparent.  \(Color: \) Yellow-green, lemon-yellow, straw-yellow.  \(Luster: \) Vitreous, pearly on cleavages.  \(Optical\ Class: \) Uniaxial (−), commonly anomalously biaxial (−).  \(Pleochroism: \) Faint; \(X=\) colorless; \(Y=Z=\) yellow.  \(\omega = 1.612\  \epsilon = 1.585\  2V(\text{meas.}) = \text{Small.}\)

Cell Data:  \(\text{Space\ Group: [}P4/nmm\text{]}\)  (by analogy to meta-autunite).  \(a = 7.12\  c = 8.61\  Z = 1\)

X-ray Powder Pattern:  Bota-Burum deposit, Kazakhstan.  
8.48 (10), 3.68 (10), 3.292 (9), 1.837 (9), 1.987 (8), 1.634 (8), 5.45 (7)

Chemistry:  
\[
\begin{array}{cc}
\text{Component} & \text{Abundance} \\
\text{UO}_3 & 58.29 \\
\text{P}_2\text{O}_5 & 1.65 \\
\text{As}_2\text{O}_5 & 20.84 \\
\text{SiO}_2 & 2.39 \\
\text{Al}_2\text{O}_3 & 0.91 \\
\text{Fe}_2\text{O}_3 & 0.57 \\
\text{MgO} & \text{trace} \\
\text{CaO} & 1.87 \\
\text{Na}_2\text{O} & 3.91 \\
\text{K}_2\text{O} & 0.00 \\
\text{H}_2\text{O}^+ & 3.49 \\
\text{H}_2\text{O}^- & 6.00 \\
\text{Total} & 99.92 \\
\end{array}
\]

(1)  Bota-Burum deposit, Kazakhstan; neglecting Si, Al, Fe as impurities, corresponds to  \((Na_{1.26}\text{Ca}_{0.34})\Sigma=1.60(UO_2)_{2.04}(AsO_4)_{1.82}(PO_4)_{0.22}\Sigma=2.04 \cdot 5.27H_2O\).

Mineral Group:  Meta-autunite group.

Occurrence:  In the oxidized zone of a uranium–sulfide deposit in felsite porphyry and sodium-bearing tuffaceous breccias (Bota-Burum deposit, Kazakhstan).

Association:  Realgar, orpiment, scorodite, mansfieldite, trögerite, arseniosiderite, metatorbernite, metazeunerite, uranophane, uraninite, arsenopyrite, pyrite, galena (Bota-Burum deposit, Kazakhstan).

Distribution:  In the Bota-Burum uranium deposit, 15 km southwest of Alakol Lake, Chu-Ili Mountains, southwestern Balkhash district, Kazakhstan.  At the Buhlskopf mine, near Ellweiler, Rhineland-Palatinate, Germany.  On the Clyde Long property, Elk Park, San Juan Co., Colorado, USA.

Name:  For its dominant sodium content and relation to uranospinite.

Type Material:  A.E. Fersman Mineralogical Museum, Academy of Sciences, Moscow, Russia, 72124–74126.


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