Uramarsite  
\((\text{NH}_4, \text{H}_3\text{O})_2(\text{UO}_2)_2(\text{AsO}_4, \text{PO}_4)_2 \cdot 6\text{H}_2\text{O}\)

**Crystal Data:** Tetragonal.  
*Point Group:* 4/m 2/m 2/m.  
As imperfect platy crystals, to 2 mm, as films and, less often, as flattened square crystals, to 0.1 mm; dominated by {001} with minor {010}.

**Physical Properties:**  
*Cleavage:* Perfect {001}, imperfect {010}.  
*Tenacity:* Brittle.  
*Hardness = 2.5*  
*D(meas.)* = 3.22  
*D(calc.)* = 3.286

**Optical Properties:**  
*Transparent.*  
*Color:* Pale green; colorless in thin section.  
*Streak:* White.  
*Luster:* Vitreous.  
*Fluoresces green in UV.*  
*Optical Class:* Anomalously biaxial (–).  
\(\alpha = 1.562(2)\)  
\(\beta \approx \gamma = 1.593(2)\)  
2\(\nu < 5^\circ\)

**Cell Data:**  
*Space Group:* \(P 4/nmm.\)  
\(a = 7.19(1)\)  
\(c = 9.15(2)\)  
\(Z = 1\)

**X-ray Powder Pattern:**  
Bota-Burum deposit, Southern Kazakhstan Region, Kazakhstan.  
9.27 (100), 4.58 (25), 3.86 (20), 2.28 (20), 2.80 (13), 1.823 (8), 1.713 (7)

**Chemistry:**

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(\text{Na}_2\text{O})</td>
<td>0.3</td>
<td></td>
</tr>
<tr>
<td>(\text{UO}_3)</td>
<td>61.8</td>
<td>59.46</td>
</tr>
<tr>
<td>(\text{As}_2\text{O}_5)</td>
<td>15.0</td>
<td>23.89</td>
</tr>
<tr>
<td>(\text{P}_2\text{O}_5)</td>
<td>5.9</td>
<td></td>
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<tr>
<td>((\text{NH}_4)_2\text{O})</td>
<td>3.2</td>
<td>5.41</td>
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<tr>
<td>(\text{H}_2\text{O})</td>
<td>13.8</td>
<td>11.24</td>
</tr>
<tr>
<td>total</td>
<td>86.2</td>
<td>100.00</td>
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</tbody>
</table>

(1) Bota-Burum deposit, Southern Kazakhstan Region, Kazakhstan; electron microprobe analysis, \(\text{NH}_4\) by ionometric electrode, \(\text{H}_2\text{O}\) by difference; water, hydronium and anionic groups confirmed by IR, corresponding to \([\text{Na}_{0.09}][\text{H}_3\text{O}_0.72\text{NH}_4_{1.15}(\text{AsO}_4)_{1.22}\text{(PO}_4)_{0.78}]\)\(\text{U}_2\text{O}_2\)\(\text{H}_2\text{O}\).

(2) \((\text{NH}_4)_2(\text{UO}_2)_2(\text{AsO}_4)_2 \cdot 6\text{H}_2\text{O}\).

**Occurrence:** In the oxidized zone of pitchblende-sulfide mineralization in highly-fractured, hydrothermally-altered felsite porphyry and tuff breccia.

**Association:** Calcite, arsenopyrite, pyrite, galena, chistyakovaite, natrouranospinite, scorodite, arseniosiderite, mansfieldite, metazeunerite, trögerite.

**Distribution:** Bota-Burum deposit, south of Alakol’ Lake, southwestern Balkhash area, Southern Kazakhstan Region, Kazakhstan.

**Name:** An acronym for the major chemical components URanium, AMmonium, ARSenate.

**Type Material:** Fedorovskiy All-Russia Research Institute of Mineral Resources, Moscow, 350/59/zel.

**References:**  