Uramarsite $(NH_4, H_3O)_2(UO_2)_2(AsO_4, PO_4)_2 \cdot 6H_2O$

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}. *Fracture*: Stepped. *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 (–). $\alpha = 1.562(2)$ $\beta \approx \gamma = 1.593(2)$ $2V < 5°$
Orientation: $X = c$; $Y \approx b$.

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:

	(1)	(2)
Na_2O	0.3	
UO_3	61.8	59.46
As_2O_5	15.0	23.89
P_2O_5	5.9	
$(NH_4)_2O$	3.2	5.41
H_2O	13.8	11.24
total	86.2	100.00

(1) Bota-Burum deposit, Southern Kazakhstan Region, Kazakhstan; electron microprobe analysis, NH_4 by ionometric electrode, H_2O by difference; water, hydronium and anionic groups confirmed by IR, corresponding to $[(NH_4)_{1.15}(H_3O)_{0.72}Na_{0.09}]_{\Sigma=1.96}(UO_2)_{2.02}[(AsO_4)_{1.22}(PO_4)_{0.78}]_{\Sigma=2} \cdot 6.1H_2O$.
(2) $(NH_4)_2(UO_2)_2(AsO_4)_2 \cdot 6H_2O$.

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: (1) Sidorenko, G.A., N.V. Chukanov, N.I. Chistyakova, G.I. Bebeshko, A.E. Zadov, and I.S. Naumova (2007) Uramarsite $(NH_4, H_3O)_2(UO_2)_2(AsO_4, PO_4)_2 \cdot 6H_2O$: a new mineral of the metaautunite group. Dokl. Akad. Nauk 415, 804–808 (in Russian); Dokl. Earth Sci. 415A, 965–969 (in English). (2) (2009) Amer. Mineral., 94, 405 (abs. ref. 1).