

Crystal Data: Monoclinic. *Point Group:* $2/m$, 2 or m . As imperfect crystals, tabular on $\{100\}$, to 2 mm.

Physical Properties: *Cleavage:* Perfect on $\{100\}$, imperfect on $\{001\}$. *Fracture:* Stepped. *Tenacity:* Brittle. *Hardness* = 2.5 $D(\text{meas.}) = 3.62(2)$ $D(\text{calc.}) = 3.585$ Fluoresces bright green in LW UV.

Optical Properties: Transparent to translucent. *Color:* Yellow, colorless in transmitted light. *Streak:* n.d. *Luster:* n.d. *Optical Class:* Biaxial (-). $\alpha = 1.557(2)$ $\beta = 1.580(1)$ $\gamma = 1.580(1)$ $2V(\text{meas.}) = -10(5)^\circ$ $2V(\text{calc.}) < 0^\circ$ *Orientation:* $X = a$, $Z \approx b$.

Cell Data: *Space Group:* $P2_1/m$, $P2$ or Pm . $a = 19.99(1)$ $b = 9.79(1)$ $c = 19.62(2)$ $\beta = 110.7(2)^\circ$ $Z = 8$

X-ray Powder Pattern: Bota-Burum deposit, Kazakhstan. 9.34 (100), 9.14 (100), 4.76 (27), 4.87 (20), 4.93 (18), 4.69 (17), 3.55 (14.5)

Chemistry:	(1)
Al_2O_3	4.99
UO_3	58.34
As_2O_5	21.40
P_2O_5	1.23
F	1.1
H_2O	12.2
$-\text{O} = \text{F}$	0.46
Total	98.80

(1) Bota-Burum deposit, Kazakhstan; average of 7 electron microprobe analyses supplemented by IR spectroscopy and TGA, corresponds to $\text{Al}_{0.96}(\text{UO}_2)_{2.00}[(\text{AsO}_4)_{1.83}(\text{PO}_4)_{0.17}][\text{F}_{0.57}(\text{OH})_{0.31}]\cdot 6.50\text{H}_2\text{O}$.

Occurrence: A secondary mineral in the weathered zone of a hydrothermal arsenopyrite and 'pitchblende' deposit.

Association: Arsenopyrite, pyrite, galena, scorodite, arseniosiderite, mansfieldite, metazeunerite, trögerite, sodium uranospinite.

Distribution: From the Bota-Burum deposit, south of Lake Alakol, southwestern Balkhash area, Zhambyl (Dzhambul) Region, Kazakhstan.

Name: Honors N.I. *Chistyakova*, a senior assistant at the All-Russia Research Institute of Mineral Resources (VIMS), and the dominant rare earth element, Yttrium.

Type Material: E.V. Kopchenova Collection, Mineralogical Museum, All-Russia Research Institute of Mineral Resources, Moscow (# 350/59), and at the A.E. Fersman Mineralogical Museum, Russian Academy of Sciences, Moscow, Russia (# 3286/1).

References: (1) Chukanov, N.V., G.A. Sidorenko, I.S. Naumova, A.E. Zadov, and V.I. Kuz'min (2006) Chistyakovaite, a new mineral $\text{Al}(\text{UO}_2)_2(\text{AsO}_4)_2(\text{F},\text{OH})\cdot 6.50\text{H}_2\text{O}$. Dokl. Earth Sci., 407(2), 290-293 (in English); Dokl. Akad. Nauk, 406(6), 816-819 (in Russian). (2) (2006) Amer. Mineral., 91, 1945-1946 (abs. ref. 1).