Atlasovite $KCu_6Fe^{3+}BiO_4(SO_4)_5Cl$

Crystal Data: Tetragonal (by analogy to nabokoite). *Point Group:* $4/m\ 2/m\ 2/m$. Eight-sided crystals are tabular with prominent {001} modified by {110}, {012} and {014}, to 1 mm; typically intergrown with nabokoite.

Physical Properties: *Cleavage:* On {001}, perfect. Hardness = 2–2.5 D(meas.) = 4.20(5) D(calc.) = 4.12

Optical Properties: Transparent. *Color:* Dark brown; pale gray with yellow internal reflections in reflected light. *Streak:* Pale brown. *Luster:* Vitreous. *Optical Class:* Uniaxial (–). *Pleochroism:* O = red-brown; E = pale yellow. $\omega = 1.783(3)$ $\epsilon = 1.776(3)$

Cell Data: *Space Group:* $P4/ncc$. $a = 9.86(2)$ $c = 20.58(2)$ $Z = 4$

X-ray Powder Pattern: Tolbachik volcano, Russia.
10.41 (10), 10.75 (9), 2.446 (8), 3.431 (7), 2.890 (7), 4.57 (5), 7.14 (4)

Chemistry:

	(1)	(2)
SO_3	32.21	31.65
TeO_2	1.29	
V_2O_3	0.68	
Bi_2O_3	12.82	18.42
Fe_2O_3	6.26	6.31
CuO	38.15	37.73
ZnO	1.02	
PbO	2.35	
K_2O	3.85	3.72
Cs_2O	0.01	
Cl	2.92	2.80
$-O = Cl_2$	0.66	0.63
Total	100.90	100.00

(1) Tolbachik volcano, Russia; by electron microprobe, average of four analyses, total Fe as Fe_2O_3; corresponding to $K_{1.01}(Cu_{5.90}Zn_{0.15})_{\Sigma=6.05}(Fe_{0.97}V_{0.11})_{\Sigma=1.08}(Bi_{0.68}Pb_{0.12}Te_{0.10})_{\Sigma=0.90}O_{4.19}(SO_4)_{4.95}Cl_{1.01}$. (2) $KCu_6FeBiO_4(SO_4)_5Cl$.

Polymorphism & Series: Forms a series with nabokoite.

Occurrence: As a volcanic sublimate.

Association: Nabokoite, anglesite, dolerophanite, euchlorine, chloroxiphite, atacamite, piypite, chalcocyanite, alarsite, fedotovite, lammerite, klyuchevskite, langbeinite, hematite, tenorite.

Distribution: From the Tolbachik fissure volcano, Kamchatka Peninsula, Russia.

Name: For Vladimir Vasil'evich Atlasov (1661/1664–1711), Russian traveller who first explored the Kamchatka Peninsula.

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

References: (1) Popova, V.I., V.A. Popov, N.S. Rudashevskiy, S.F. Glavatskikh, V.O. Polyakov, and A.F Bushmakin (1987) Nabokoite $Cu_7TeO_4(SO_4)_5 \cdot KCl$ and atlasovite $Cu_6Fe^{3+}Bi^{3+}O_4(SO_4)_5 \cdot KCl$. New minerals of volcanic exhalations. Zap. Vses. Mineral. Obshch., 116, 358–367 (in Russian with English abs.). (2) (1988) Amer. Mineral., 73, 927–928 (abs. ref. 1). (3) Pekov, I.V. (1998) Minerals first discovered on the territory of the former Soviet Union. Ocean Pictures, 30.