Chubarovite $KZn_2(BO_3)Cl_2$

Crystal Data: Hexagonal. *Point Group*: 32. As hexagonal or trigonal lamellar to tabular crystals to 1.5 mm. Crystals display {0001}, {10$\bar{1}$ 1}, {10$\bar{1}$ 2}, {10$\bar{1}$ 3}, {10$\bar{1}$ 0} and {11$\bar{2}$ 0}. Divergent aggregates, to 1 cm, resemble flowers or an open book. *Twinning*: Contact twins around [0001] and on {0001} or as X-shaped penetration twins on (10$\bar{1}$ 3).

Physical Properties: *Cleavage*: Perfect on {0001}. *Fracture*: Laminated. *Tenacity*: Flexible, nonelastic. Hardness = ~ 2 D(meas.) = 2.68(2) D(calc.) = 2.716

Optical Properties: Transparent. *Color*: Colorless. *Streak*: White. *Luster*: Vitreous. *Optical Class*: Uniaxial (-). ω = 1.541(2) ε = 1.539(2)

Cell Data: *Space Group*: *R*32. a = 4.9429(4) c = 26.348(2) Z = 3

X-ray Powder Pattern: Arsenatnaya fumarole, Tolbachik volcano, Kamchatka, Russia. 8.79 (100), 4.074 (91), 3.590 (90), 2.470 (67), 4.394 (43), 3.324 (30), 4.225 (25)

Chemistry:	(1)	(2)
K_2O	16.48	15.72
Rb_2O	0.46	
ZnO	53.96	54.33
B_2O_3	10.98	11.62
Cl	24.48	23.67
$-O = Cl_2$	5.53	5.34
Total	100.83	100.00

(1) Arsenatnaya fumarole, Tolbachik volcano, Kamchatka, Russia; average of 4 electron microprobe analyses supplemented by FTIR spectroscopy; corresponding to $(K_{1.05}Rb_{0.01})_{\Sigma=1.06}Zn_{2.00}B_{0.95}O_{2.92}Cl_2$. (2) $KZn_2(BO_3)Cl_2$.

Occurrence: Formed as sublimates on basaltic scoria around active volcanic fumaroles.

Association: Fluoborite, krasheninnikovite, sylvite, halite, langbeinite, aphthitalite, arcanite, zincite, flinteite, wulffite, johillerite, urusovite, pseudobrookite, vanthoffite, svabite, orthoclase, fluorphlogopite, hematite, tenorite (Arsenatnaya fumarole, Second scoria cone); sellaite, fluorite, anhydrite, halite, cotunnite, challacolloite, sofiite, flinteite (First Scoria cone).

Distribution: The First scoria cone and the Arsenatnaya fumarole, Second scoria cone of the Northern Breakthrough, Great Tolbachik Fissure Eruption, Tolbachik volcano, Kamchatka, Russia.

Name: Honors the Russian mineralogist and physicist Valeriy Mikhailovich Chubarov (b. 1948), a specialist in electron microprobe analysis, Institute of Volcanology and Seismology, Far Eastern Branch, Russian Academy of Sciences, Petropavlovsk-Kamchatsky, Russia.

Type Material: A.E. Fersman Mineralogical Museum, Russian Academy of Sciences, Moscow, Russia (94379).

References: (1) Pekov, I.V., N.V. Zubkova, L.A. Pautov, V.O. Yapaskurt, N.V. Chukanov, I.S. Lykova, S.N. Britvin, E.G. Sidorov, and D.Yu. Pushcharovsky (2015) Chubarovite, $KZn_2(BO_3)Cl_2$, a new mineral species from the Tolbachik volcano, Kamchatka, Russia. Can. Mineral., 53, 273-284. (2) (2016) Amer. Mineral., 101, 1711 (abs. ref. 1).