

Crystal Data: Monoclinic. *Point Group:* 2/m. As skeletal, curved, blocky prismatic crystals, elongated along [010] or irregularly shaped grains, to 1 mm. As divergent sprays to 0.5 cm.

Physical Properties: *Cleavage:* Perfect, 1 direction || to elongation and a second || (010).
Fracture: Laminated. *Tenacity:* Brittle. Hardness = 2.5 D(meas.) = 3.35(2) D(calc.) = 3.32
Soluble in H₂O.

Optical Properties: Transparent. *Color:* Dark green, deep emerald green. *Streak:* Light green.
Luster: Vitreous.
Optical Class: Biaxial (+). $\alpha = 1.585(3)$ $\beta = \text{n.d.}$ $\gamma = 1.717(4)$ 2V(calc.) = n.d.
Orientation: Z = b. *Pleochroism:* Strong; X = very pale green, Y = n.d., Z = emerald green.
Absorption: X < Z.

Cell Data: *Space Group:* P2/c. $a = 13.9043(10)$ $b = 4.9765(3)$ $c = 23.5855(17)$ $\beta = 90.209(6)^\circ$
Z = 2

X-ray Powder Pattern: Yadovitaya fumarole, Tolbachik volcano, Kamchatka, Russia.
9.06 (100), 2.736 (33), 3.096 (31), 2.321 (26), 2.492 (24), 7.00 (23), 5.903 (12)

Chemistry:	(1)	(2)
Na ₂ O	5.61	5.79
K ₂ O	13.74	14.67
Rb ₂ O	1.42	
Cs ₂ O	1.21	
CuO	38.79	39.64
ZnO	0.18	
SO ₃	39.26	39.90
Total	100.21	100.00

(1) Yadovitaya fumarole, Tolbachik volcano, Kamchatka, Russia; average of 6 electron microprobe analyses supplemented by IR spectroscopy; corresponding to $(K_{4.75}Rb_{0.25}Cs_{0.14})_{\Sigma=5.14}Na_{2.95}(Cu_{7.95}Zn_{0.04})_{\Sigma=7.99}S_{7.99}O_{36}$. (2) $K_5Na_3Cu_8O_4(SO_4)_8$.

Occurrence: As sublimates at a fumarole as incrustations on the surface of basalt scoria or on tenorite or apthitalite crusts.

Association: Euchlorine, fedotovite, tenorite, alumoklyuchevskite, langbeinite, calciolangbeinite, chalcocyanite, steklite, orthoclase (As-bearing variety), rutile (Fe- and Sb-bearing variety), pseudobrookite, lyonsite, lammerite.

Distribution: From the Yadovitaya fumarole, Second scoria cone of the Northern Breakthrough of the Great Tolbachik Fissure Eruption, Tolbachik volcano, Kamchatka, Russia.

Name: Recognizes with the prefix *para*, from the Greek *παρά* for *near*, the similarity to *wulfite*.

Type Material: A.E. Fersman Mineralogical Museum, Russian Academy of Sciences, Moscow, Russia (94131).

References: (1) Pekov, I.V., N.V. Zubkova, V.O. Yapaskurt, D.I. Belakovskiy, N.V. Chukanov, I.S. Lykova, D.P. Savelyev, E.G. Sidorov and D.Yu. Pushcharovsky (2014) Wulfite, $K_3NaCu_4O_2(SO_4)_4$, and parawulfite, $K_5Na_3Cu_8O_4(SO_4)_8$, two new minerals from fumarole sublimates of the Tolbachik Volcano, Kamchatka, Russia. *Can. Mineral.*, 52(4), 699-716.
(2) (2016) *Amer. Mineral.*, 101, 1017-1018 (abs. ref. 1).