Majzlanite $K_2Na(ZnNa)Ca(SO_4)_4$

Crystal Data: Monoclinic. *Point Group*: 2/*m*. As irregular grains to 80 μm.

Physical Properties: *Cleavage*: None. *Tenacity*: Brittle. *Fracture*: Uneven. Hardness = 2-3
D(meas.) = n.d. D(calc.) = 2.961 Nonfluorescent. Soluble in warm H_2O.

Optical Properties: Translucent. *Color*: Gray with a bluish tint. *Streak*: White. *Luster*: Vitreous.
Optical Class: n.d.

Cell Data: *Space Group: C*2/*c*. a = 16.007(2) b = 9.524(1) c = 9.118(1) β = 94.828(7)° Z = 16

X-Ray Diffraction Pattern: Yadovitaya fumarole, Tolbachik volcano, Kamchatka, Russia.
2.874 (100), 2.835 (70), 3.106 (65), 3.147 (56), 2.949 (50), 2.803 (45), 2.616 (41)

Chemistry:

	(1)	(2)
Na_2O	9.73	10.10
K_2O	15.27	15.34
ZnO	11.20	13.26
CaO	7.03	9.13
CuO	4.26	
MgO	1.07	
Al_2O_3	0.47	
SO_3	51.34	52.17
SiO_2	0.12	.
Total	100.49	100.00

(1) Yadovitaya fumarole, Tolbachik volcano, Kamchatka, Russia; average EDS analysis; corresponding to $K_2Na(Zn_{0.88}Na_{0.60}Cu_{0.36}Mg_{0.16})(Ca_{0.76}Na_{0.24})(S_{0.98}Al_{0.015}Si_{0.005}O_4)_4$.
(2) $K_2Na(ZnNa)Ca(SO_4)_4$.

Occurrence: A sublimate at an active volcanic fumarole.

Association: Langbeinite, K-bearing thenardite, euchlorine.

Distribution: From the Yadovitaya ('Poisonous') fumarole, Second scoria cone, Northern Breakthrough of the Great Tolbachik Fissure Eruption, Tolbachik volcano, Kamchatka peninsula, Far-Eastern Region, Russia.

Name: Honors Professor Dr. Juraj *Majzlan* (b. 1973), Institute of Geosciences, Friedrich-Schiller-University, Jena, Germany. Among his achievements and contributions to mineralogy and crystallography, in general, are those to the mineralogy of sulfates.

Type Material: Mineralogical Museum, Department of Mineralogy, St. Petersburg State University, St. Petersburg, Russia (1/19690).

References: (1) Siidra, O.I., E.V. Nazarchuk, A.N. Zaitsev, and V.V. Shilovskikh (2020) Majzlanite, $K_2Na(ZnNa)Ca(SO_4)_4$, a new anhydrous sulfate mineral with complex cation substitutions from Tolbachik volcano. Mineral. Mag., 84, 153-158.