Zhemchuzhnikovite $NaMg(Al, Fe^{3+})(C_2O_4)_3 \cdot 8H_2O$

Crystal Data: Hexagonal. *Point Group:* n.d. Crystals acicular to fibrous, showing {0001}, $\{11\bar{2}0\}$, $\{22\bar{4}1\}$.

Physical Properties: *Cleavage:* On {0001}, good. Hardness = 2 D(meas.) = 1.69 D(calc.) = 1.66 Soluble in H_2O, yielding a solution of about pH 5.51.

Optical Properties: Semitransparent. *Color:* Smoky green in daylight; may be violet-amethyst under artificial light. *Luster:* Vitreous.
Optical Class: Uniaxial (–). *Pleochroism:* O = greenish yellow; E = reddish violet. $\omega = 1.479$ $\epsilon = 1.408$

Cell Data: *Space Group:* n.d. $a = 16.67(5)$ $c = 12.51(3)$ $Z = 6$

X-ray Powder Pattern: n.d.

Chemistry:

	(1)
C_2O_3	42.88
Al_2O_3	6.14
Fe_2O_3	5.95
MnO	0.06
MgO	8.57
Na_2O	5.69
K_2O	0.12
H_2O	29.09
insol.	1.13
Total	[99.63]

(1) Chai-Tumus coal deposit, Russia; here converted to oxides, insoluble is coal; corresponds to $(Na_{0.92}K_{0.01})_{\Sigma=0.93}Mg_{1.06}(Al_{0.60}Fe^{3+}_{0.37})_{\Sigma=0.97}(C_2O_4)_{2.97} \cdot 8.07H_2O$.

Occurrence: In veinlets found at a depth of 230 m in a drill core in the permafrost zone, in brown coal naturally saturated with acetic acid.

Association: Calcite, dolomite, stepanovite.

Distribution: Chai-Tumus coal deposit, 200 km south of the Lena River estuary, Bulun district, polar Sakha, Russia.

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Type Material: Mining Institute, St. Petersburg, Russia, 1955/1.

References: (1) Knipovich, Y.N., A.I. Komkov, and E.I. Nefedov (1963) On stepanovite and the new mineral zhemchuzhnikovite. Trudy. Vses. Nauchno-Issled. Geol. Inst. 96, 131–135 (in Russian). (2) (1964) Amer. Mineral., 49, 442 (abs. ref. 1). (3) Pekov, I.V. (1998) Minerals first discovered on the territory of the former Soviet Union. Ocean Pictures, Moscow, 241.