

**Crystal Data:** Monoclinic. *Point Group:*  $2/m$ . As imperfect acicular crystals to 1 mm in aggregates to 2 mm [TL] or as cuboid prismatic crystals to 1 mm [Poland].

**Physical Properties:** *Cleavage:* None. *Tenacity:* Brittle, thin fibers flexible. *Fracture:* Uneven. Hardness = 1-2 D(meas.) = n.d. D(calc.) = 1.504 Nonfluorescent. Soluble in water.

**Optical Properties:** Transparent to translucent. *Color:* Colorless, white. *Streak:* White. *Luster:* Vitreous.

*Optical Class:* Biaxial (+).  $\alpha = 1.469(2)$   $\beta = 1.479(2)$   $\gamma = 1.496(2)$   $2V(\text{meas.}) = 80(10)^\circ$   $2V(\text{calc.}) = 75.7^\circ$  *Dispersion:*  $r > v$ , very weak. *Orientation:*  $c \wedge Z = 40^\circ$ . Nonpleochroic.

**Cell Data:** *Space Group:*  $C2/c$ .  $a = 9.2709(3)$   $b = 9.5361(2)$   $c = 13.2741(4)$   $\beta = 90.054(3)^\circ$   $Z = 4$

**X-Ray Diffraction Pattern:** Plosky Tolbachik volcano, Kamchatka Peninsula, Russia. 3.330 (100), 2.976 (45), 2.353 (29), 3.825 (26), 1.997 (25), 3.883 (22), 2.253 (18)

Chemistry:	(1)	(2)
N	3.8	5.46
O	35.2	37.38
Mg	9.3	9.47
Cl	34.5	41.41
K	6.7	
<u>H</u>	<u>[5.5]</u>	<u>6.28</u>
Total	89.5	100.00

(1) Plosky Tolbachik volcano, Kamchatka Peninsula, Russia; average electron microprobe analysis supplemented by IR spectroscopy,  $\text{H}_2\text{O}$  calculated from structure; corresponding to  $[(\text{NH}_4)_{0.70}\text{K}_{0.45}]_{\Sigma=1.15}\text{Mg}_{1.00}\text{Cl}_{2.55} \cdot 6\text{H}_{1.92}\text{O}_{0.96}$ . (2)  $(\text{NH}_4)\text{MgCl}_3 \cdot 6\text{H}_2\text{O}$ .

**Occurrence:** Formed on basaltic lava by exposure of the host rocks to eruptive gas exhalations enriched in HCl and  $\text{NH}_3$ . Abundant on a burning coal dump (Radlin).

**Association:** Gypsum, halite (Tolbachik).

**Distribution:** From the 2012-2013 Tolbachik fissure eruption at the Plosky Tolbachik volcano, Kamchatka Peninsula, Russia [TL]. On coal dumps, at Radlin, Rybnik area, Upper Silesia, Poland and near Chelabinsk, Southern Urals, Russia ('redikortsevite').

**Name:** Honors Prokopyy Trifonovich *Novograbenov* (1892-1934), a researcher of the Kamchatka Peninsula, a teacher, naturalist, geographer, and geologist.

**Type Material:** A.E. Fersman Mineralogical Museum, RAS, Moscow, Russia (5003/1).

**References:** (1) Okrugin, V.M., S.S. Kudaeva, O.V. Karimova, O.V. Yakubovich, D.I. Belakovskiy, N.V. Chukanov, A.A. Zolotarev, V.V. Gurzhiy, N.G. Zinovieva, A.A. Shiryayev, and P.M. Kartashov (2019) The new mineral novograbenovite,  $(\text{NH}_4, \text{K})\text{MgCl}_3 \cdot 6\text{H}_2\text{O}$  from the Tolbachik volcano, Kamchatka, Russia: mineral description and crystal structure. *Mineral. Mag.*, 83, 223-231. (2) Parafiniuk, J., M. Stachowicz, and K. Woźniak (2021) Novograbenovite from Radlin, Upper Silesia, Poland and its relation to 'redikortsevite'. *Mineral. Mag.*, 85, 132-141.