Litvinskite $Na_3ZrSi_6O_{13}(OH)_5$

Crystal Data: Monoclinic. *Point Group*: *m*. As equant grains to 7 cm, and in aggregates to 15 cm.

Physical Properties: *Cleavage*: Imperfect on {110}. *Tenacity*: Brittle. *Fracture*: Conchoidal. Hardness = ~5 D(meas.) = 2.61 D(calc.) = 2.63 Nonfluorescent.

Optical Properties: Transparent. *Color*: Dark cherry-red to reddish brown. Streak: White. *Luster*: Vitreous.
Optical Class: Biaxial (-). α = 1.546(1) β = 1.574(1) γ = 1.575(1) 2V(meas.) = <10°

Cell Data: Space Group: *Cm*. a = 10.589(7) b = 10.21(8) c = 7.355(5) β = 92.91(5)° Z = 2

X-ray Powder Pattern: Mount Alluaiv, Lovozero massif, Kola Peninsula, Russia.
5.29 (100), 3.238 (100), 3.329 (74), 7.37 (44), 2.981 (39), 2.553 (37)

Chemistry:

	(1)
Na_2O	12.43
K_2O	0.11
CaO	0.13
MnO	1.61
FeO	0.09
Ce_2O_3	0.09
SiO_2	57.67
TiO_2	0.19
ZrO_2	18.85
HfO_2	0.22
Nb_2O_5	0.07
H_2O	8.90
Total	100.36

(1) Mount Alluaiv, Lovozero massif, Kola Peninsula, Russia; electron microprobe analysis, Na by atomic absorption and H_2O by the Penfield method; corresponding to $Na_{2.51}K_{0.01}Mn^{2+}_{0.14}Ca_{0.01}Fe_{0.01}Zr_{0.96}Ti_{0.01}Hf_{0.01}Si_{6.00}O_{12.76}(OH)_{5.24}\cdot 0.47H_2O$ or as a structural formula $(Na_{1.54}K_{0.01}(H_2O)_{0.47})Na_{0.78}(Na_{0.19}Mn_{0.14}Ca_{0.01}Fe_{0.01})(Zr_{0.96}Ti_{0.01}Hf_{0.01})[Si_6O_{12}(OH)_3\{(OH)_{2.24}O_{0.76}\}]$.

Mineral Group: Lovozerite group, zirsinalite-lovozerite subgroup.

Occurrence: In a hyperagpaitic pegmatite in an alkaline massif.

Association: Aegirine, microcline, nepheline, sodalite, eudialyte, lomonosovite, ussingite, manganneptunite.

Distribution: At Mount Alluaiv, Lovozero alkaline massif, Kola Peninsula, Russia.

Name: Honors crystallographer Galina P. *Litvinsk*aya (1920-1994), Moscow State University, Russia.

Type Material: A.E. Fersman Mineralogical Museum, Moscow, Russia.

References: (1) Pekov, I.V., I.A. Ekimenkova, N.V. Chukanov, A.E. Zadov, N.A. Yamnova, and Yu.K. Egorov-Tismenko (2000) Litvinskite $Na_2(\square,Na,Mn)Zr[Si_6O_{12}(OH,O)_6]$ - a new mineral of the lovozerite group. Zapiski Vseross. Mineral. Obshch., 129(1), 45-53 (in Russian, English abs.). (2) (2001) Amer. Mineral., 86, 377 (abs. ref. 1). (3) Pekov, I.V., S.V. Krivovichev, A.A. Zolotarev, V.N. Yakovenchuk, T. Armbruster, and Y.A. Pakhomovsky (2009) Crystal chemistry and nomenclature of the lovozerite group. Eur. J. Mineral., 21, 1061-1071.