Lovdarite $K_2Na_6(Be,Al)_4Si_{14}O_{36}\cdot 9H_2O$

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Crystal Data: Orthorhombic. *Point Group:* $mm2$. Crystals prismatic, to 2 mm; radial fibrous; compact, porcelaneous massive.

Physical Properties: *Cleavage:* Distinct on {100}, {010}, {001}; poor on {110}. *Tenacity:* Brittle. Hardness = 5–6 in aggregate. D(meas.) = 2.33(1) D(calc.) = 2.32 May fluoresce brilliant green under SW UV.

Optical Properties: Transparent to translucent. *Color:* Colorless to yellowish. *Luster:* Vitreous.
Optical Class: Biaxial (–) or (+). *Orientation:* $X = a$; $Y = b$; $Z = c$. *Dispersion:* $r < v$.
$\alpha = 1.513(2)$ $\beta = 1.516(2)$ $\gamma = 1.518(2)$ 2V(meas.) = 70°–90°

Cell Data: *Space Group:* $Pma2$. $a = 39.576(1)$ $b = 6.9308(2)$ $c = 7.1526(3)$ Z = 4

X-ray Powder Pattern: Mt. Karnasurt, Russia.
3.29 (100), 3.14 (100), 4.96 (90), 6.56 (60), 2.447 (60b), 2.288 (60), 1.785 (50)

Chemistry:

	(1)	(2)		(1)	(2)
SiO_2	56.13	57.00	Na_2O	14.95	14.51
TiO_2	0.15	0.02	K_2O	6.28	6.50
Al_2O_3	1.77	2.30	F	0.07	
Fe_2O_3	0.18	0.07	Cl	0.00	
MnO	0.003		H_2O^+	10.85	
BeO	6.90	6.70	H_2O^-	1.44	
MgO	0.06		H_2O		12.45
CaO	0.49		P_2O_5	0.05	
BaO	0.20		$-O = (F,Cl)_2$	0.02	
			Total	99.50	[99.55]

(1) Mt. Karnasurt, Russia; corresponds to $K_{1.98}(Na_{7.19}Ca_{0.13}Ba_{0.02})_{\Sigma=7.34}(Be_{4.11}Al_{0.47}Ti_{0.02}Fe_{0.02}Mg_{0.02})_{\Sigma=4.64}(Si_{13.93}Al_{0.05}P_{0.02})_{\Sigma=14.00}O_{37.66}\cdot 9.33H_2O$. (2) Do.; original total given as 99.75%, corresponds to $K_{2.0}Na_{6.9}(Be_{4.0}Al_{0.7})_{\Sigma=4.7}Si_{14}O_{37.4}\cdot 10H_2O$.

Occurrence: A late hydrothermal mineral in alkalic pegmatites in a differentiated alkalic massif.

Association: Chkalovite.

Distribution: From the Jubilee pegmatite, Mt. Karnasurt, Lovozero massif, Kola Peninsula, Russia.

Name: From the Russian phrase *dar Lovozera*, for *a gift of Lovozero*.

Type Material: National School of Mines, Paris, France; Geology Museum, Kola Branch, Academy of Sciences, Apatity, 3208; A.E. Fersman Mineralogical Museum, Academy of Sciences, Moscow, Russia.

References: (1) Men'shikov, Y.P., A.P. Denisov, Y.I. Uspenskaya, and E.A. Lipatova (1973) Lovdarite, a new hydrous beryllosilicate of alkalies. Doklady Acad. Nauk SSSR, 213, 429–432 (in Russian). (2) (1974) Amer. Mineral., 59, 874 (abs. ref. 1). (3) Khomyakov, A.P., E.I. Semenov, A.V. Bikova, A.A. Voronkov, and N.N. Smol'yaninova (1975) New data on lovdarite. Doklady Acad. Nauk SSSR, 221, 699–702 (in Russian). (4) (1983) Amer. Mineral., 68, 474 (abs. ref. 3). (5) Merlino, S. (1990) Lovdarite, $K_4Na_{12}(Be_8Si_{28}O_{72})\cdot 18H_2O$, a zeolite-like mineral: structural features and OD character. Eur. J. Mineral., 2, 809–817.

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