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**ЧЕСНОКОВИТ  $\text{Na}_2[\text{SiO}_2(\text{OH})_2] \cdot 8\text{H}_2\text{O}$ , ПЕРВЫЙ ПРИРОДНЫЙ  
ОРТОСИЛИКАТ НАТРИЯ — НОВЫЙ МИНЕРАЛ  
ИЗ ЛОВОЗЕРСКОГО ЩЕЛОЧНОГО МАССИВА  
(КОЛЬСКИЙ ПОЛУОСТРОВ, РОССИЯ)  
И ЕГО КРИСТАЛЛИЧЕСКАЯ СТРУКТУРА<sup>1</sup>**

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CHESNOKOVITE,  $\text{Na}_2[\text{SiO}_2(\text{OH})_2] \cdot 8\text{H}_2\text{O}$ , THE FIRST NATURAL SODIUM ORTHOSILICATE  
FROM THE LOVOZERO ALKALINE MASSIF, KOLA PENINSULA, RUSSIA:  
DESCRIPTION AND CRYSTAL STRUCTURE OF A NEW MINERAL

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Chesnokovite, as a new mineral, is the first natural sodium orthosilicate, it has been found in an ussingite vein uncovered by underground mine at Kedykverpakhh Mt, Lovozero alkaline massif, Kola Peninsula, Russia. It is associated with natrolite, sodalite, vuonnemite, steenstrupine-(Ce), phosinaite-(Ce), natisite, gobbinsite, williumite, natrosilite, revdite, etc. and forms intergrowths with natrophosphate. It occurs as nests, up to  $4 \times 6 \times 10$  cm in size, consisting of chaotic aggregates of coarse lamellar crystals (up to  $0.05 \times 1 \times 2$  cm) flattened on [010]. Crystals are transparent colorless, aggregates are white to pale brownish-yellowish, streak white, luster vitreous. Cleavage (010) perfect, (100) and (001) distinct, fracture stepped. Mohs' hardness 2.5,  $D$  (meas.) 1.68,  $D$  (calc.) for the empirical formula is 1.60,  $D$  (calc.) for the idealized formula — 1.64 g/cm<sup>3</sup>. Optically biaxial (+),  $\alpha = 1.449$ ,  $\beta = 1.453$ ,  $\gamma = 1.458$ ,  $2V$  (meas) = 80°. Orientation:  $Z = b$ . IR spectrum is given. Chemical composition (wt %; Si by electron probe, Na, K, Li by atom emission analysis, H<sub>2</sub>O by Alimarin method): Na<sub>2</sub>O 21.49, K<sub>2</sub>O 0.38, Li<sub>2</sub>O 0.003, SiO<sub>2</sub> 21.42, H<sub>2</sub>O 54.86, total 98.153. The empirical formula calculated on O<sub>2</sub>(OH)<sub>2</sub> is: (Na<sub>1.96</sub>K<sub>0.02</sub>)<sub>Σ1.98</sub>Si<sub>1.005</sub>O<sub>2</sub>(OH)<sub>2</sub> · 7.58H<sub>2</sub>O. The idealized formula ( $Z = 8$ ) is: Na<sub>2</sub>[SiO<sub>2</sub>(OH)<sub>2</sub>] · 8H<sub>2</sub>O. Orthorhombic, *Ibca*. The unit cell dimensions are:  $a = 11.7119$ ,  $b = 16.973$ ,  $c = 11.5652$  Å,  $V = 2299.0$  Å<sup>3</sup>. The strongest reflections of X-ray powder diagram ( $d$ , Å— $I$ [ $hkl$ ]) are: 5.001—30 [211], 4.788—42 [022], 3.847—89 [231], 2.932—42 [400], 2.832—35 [060], 2.800—97 [332, 233], 2.774—100 [341, 143, 114]. The crystal structure was studied by the Rietveld method,  $R_p = 5.77$ ,  $R_{wp} = 7.77$ ,  $R_B = 2.07$ ,  $R_F = 1.74$ . The structure is formed by isolated [SiO<sub>2</sub>(OH)<sub>2</sub>] tetrahedra and chains of edge-connected octahedra [Na(H<sub>2</sub>O)<sub>6</sub>]. Si and Na polyhedra are bonded only by H-bonds, which cause low stability of chesnokovite under atmospheric conditions. The mineral is named in the memory of B. V. Chesnokov (1928—2005), an outstanding Russian mineralogist. Type specimen is deposited in Fersman Mineralogical Museum of Russian Academy of Sciences, Moscow.