

НОВЫЕ МИНЕРАЛЫ

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© Почетный чл. А. П. ХОМЯКОВ,* д. чл. Г. Н. НЕЧЕЛЮСТОВ,**
д. чл. Р. К. РАСЦВЕТАЕВА,*** К. А. РОЗЕНБЕРГ***

АНДРИАНОВИТ, $\text{Na}_{12}(\text{K}, \text{Sr}, \text{Ce})_3\text{Ca}_6\text{Mn}_3\text{Zr}_3\text{NbSi}_{25}\text{O}_{73}(\text{O}, \text{H}_2\text{O}, \text{OH})_5$ — НОВЫЙ ВЫСОКОКАЛИЕВЫЙ МИНЕРАЛ ГРУППЫ ЭВДИАЛИТА ИЗ ХИБИНСКОГО ЩЕЛОЧНОГО МАССИВА, КОЛЬСКИЙ ПОЛУОСТРОВ, РОССИЯ¹

A. P. KHOMYAKOV, G. N. NECHELYUSTOV, R. K. RASTSVETAJEVA, K. A. ROZENBERG.

ANDRIANOVITE, $\text{Na}_{12}(\text{K}, \text{Sr}, \text{Ce})_3\text{Ca}_6\text{Mn}_3\text{Zr}_3\text{NbSi}_{25}\text{O}_{73}(\text{O}, \text{H}_2\text{O}, \text{OH})_5$,
A NEW POTASSIUM-RICH MINERAL OF THE EUDIALYTE GROUP
FROM Khibiny Alkaline Massif, Kola Peninsula, Russia

- * Институт минералогии, геохимии и кристаллохимии редких элементов,
121357, Москва, ул. Вересаева, 15; e-mail: noomineral@noomin.msk.ru
- ** Всероссийский научно-исследовательский институт минерального сырья,
109017, Москва, Старомонетный пер., 31
- *** Институт кристаллографии РАН, 117333, Москва, Ленинский пр., 59

This paper describes a new member of the eudialyte group, it was named andrianovite for Valeriy Ivanovich Andrianov (1938—1991), the prominent Russian mathematical crystallographer, developer of the AREN package of programs for structural study of minerals with mixed composition. The mineral has been found in pegmatites of the Koashva apatite ore deposit in Khibiny massif (Kola Peninsula). It occurs as rims as thick as 0.1 to 1.0 mm around crystals of typical eudialyte and associates with aegirine, sodalite, microcline, natrolite, lomonosovite, lamprophyllite, mosandrite and villiaumite. The mineral is transparent or translucent; color pale-yellow; streak white; luster vitreous; Mohs' hardness 5; brittle, with the step-like fracture; cleavage imperfect on (001). $D(\text{meas.}) = 2.93(2) \text{ g/cm}^3$ (volumetric method); $D(\text{calc.}) = 3.02 \text{ g/cm}^3$. Optically uniaxial, negative, $N_o = 1.622(2)$, $N_e = 1.617(2)$; non-pleochroic; non-fluorescent under UV light; slowly dissolved and gelatinized in acid at room and elevated temperatures. Trigonal, space group $R\bar{3}m$, $a = 14.281(4)$, $c = 30.243(7) \text{ \AA}$, $V = 5342(4) \text{ \AA}^3$. Strongest XRD lines [d , \AA (hkl)]: 2.982(100)(315), 2.860(94)(404), 4.322(71)(205), 3.222(70)(208), 6.447(60)(104), 3.170(50)(217), 5.719(40)(202), 3.540(38)(027). Chemical composition (wt. %, electron probe; H_2O and CO_2 contents by wet chemistry): Na_2O 11.61, K_2O 2.05, CaO 10.26, SrO 3.11, BaO 0.19, MnO 3.97, FeO 2.43, La_2O_3 0.81, Ce_2O_3 1.73, Nd_2O_3 0.52, Y_2O_3 0.28, Al_2O_3 0.02, SiO_2 47.06, TiO_2 0.12, ZrO_2 11.32, HfO_2 0.26, Nb_2O_5 2.84, Cl 0.31, CO_2 0.57, H_2O 0.87, $-\text{O} = \text{Cl}_2$ 0.07, total 100.26. Empirical formula, at $\Sigma \text{cat.} = 53$ ($Z = 3$), is as following: $\text{Na}_{12.09}(\text{K}_{1.40}\text{Sr}_{0.97}\text{REE}_{0.60}\text{Ba}_{0.04})_{\Sigma 3.01}(\text{Ca}_{5.90}\text{Y}_{0.08})_{\Sigma 5.98} \cdot (\text{Mn}_{1.81}\text{Fe}_{1.09})_{\Sigma 2.90}(\text{Zr}_{2.96}\text{Hf}_{0.04})_{\Sigma 3.0}(\text{Nb}_{0.69}\text{Si}_{0.27}\text{Ti}_{0.05}\text{Al}_{0.01})_{\Sigma 1.02}(\text{Si}_{25}\text{O}_{73}) [(\text{O}_{2.14}(\text{OH})_{0.52})_{\Sigma 2.66}(\text{H}_2\text{O})_{1.30} \cdot (\text{CO}_3)_{0.42}\text{Cl}_{0.28}]_{\Sigma 2.0}$. The simplified formula: $\text{Na}_{12}(\text{K}, \text{Sr}, \text{Ce})_3\text{Ca}_6\text{Mn}_3\text{Zr}_3\text{NbSi}_{25}\text{O}_{73}(\text{O}, \text{H}_2\text{O}, \text{OH})_5$. IR-spectrum of the mineral and description of its crystal structure are given. The position of andrianovite in the crystal chemical systematics of the eudialyte group is shown, and its relationships with other members of the group (kentbrooksit, carbokentbrooksit, georgbarsanovite, etc.) are characterized. Type material is deposited at the Fersman Mineralogical Museum, Moscow, Russia.