

ILYUKHINITE (H₃O,Na)₁₄Ca₆Mn₂Zr₃Si₂₆O₇₂(OH)₂ · 3H₂O, A NEW MINERAL OF THE EUDIALYTE GROUP

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A new mineral ilyukhinite, ideally (H₃O,Na)₁₄Ca₆Mn₂Zr₃Si₂₆O₇₂(OH)₂ · 3H₂O, has been found in a peralkaline pegmatite at the Mount Kukisvumchorr, Khibiny alkaline massif, Kola Peninsula, Russia. It occurs as brownish-orange, with vitreous luster, anhedral grains up to 1 mm across in a hydrothermally altered peralkaline rock, in association with aegirine, murmanite, albite, microcline, rhabdophane-(Ce), fluorite, sphalerite and molybdenite. Mohs' hardness is 5; cleavage is not observed. D_{meas} 2.67(2), D_{calc} 2.703 g/cm³. Ilyukhinite is optically uniaxial (-): ω = 1.585(2), ε = 1.584(2). IR spectrum is given. The chemical composition of ilyukhinite (wt %; electron microprobe, ranges are given in parentheses; H₂O determined by gas chromatography) is: Na₂O 3.07 (3.63-4.43), K₂O 0.32 (0.28-0.52), CaO 10.63 (10.26-10.90), MnO 3.06 (2.74-3.22), FeO 1.15 (0.93-1.37), La₂O₃ 0.79 (0.51-0.89), Ce₂O₃ 1.21 (0.97-1.44), Nd₂O₃ 0.41 (0.30-0.56), TiO₂ 0.90 (0.77-1.12), ZrO₂ 10.94 (10.15-11.21), Nb₂O₅ 1.40 (0.76-1.68), SiO₂ 51.24 (49.98-52.28), SO₃ 1.14 (0.89-1.37), Cl 0.27 (0.19-0.38), H₂O 10.9(5), -O = C1 -0.06, total 98.27. The empirical formula is: H_{36.04}(Na_{3.82}K_{0.20})(Ca_{5.65}Ce_{0.22}La_{0.14}Nd_{0.07})(Mn_{1.285}Fe_{0.48})(Zr_{2.645}Ti_{0.34})Nb_{0.31}Si_{25.41}SO_{0.42}Cl_{0.23}O_{86.82}. The crystal structure is solved (R = 0.046). Ilyukhinite is trigonal, R3m; a = 14.1695(6) Å, c = 31.026(1) Å, V = 5394.7(7) Å³, Z = 3. The strongest reflections of the powder X-ray diffraction pattern [d, Å (I, %) (hkl)] are: 11.44 (82) (101), 7.09 (70) (110), 6.02 (44) (021), 4.371 (89) (205), 3.805 (47) (303, 033), 3.376 (41) (131), 2.985 (100) (315, 128), 2.852 (92) (404). Ilyukhinite was named in memory of the outstanding Russian crystallographer Vladimir V. Ilyukhin (1934-1982). Type specimen is deposited in collections of the Geological Museum, Natural History Museum, University of Oslo, Norway.