A mineral of the cordylite-baiyuneboite group from Biraya, Russia

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Recent studies on the cordylite indicate that its composition was determined inaccurately: the mineral contains a considerable amount of sodium with a special position. The mineral from Bayan Obo deposit, China was named baiyuneboite – $NaBaCe_2F(CO_3)_4$. Another unnamed mineral – $Ca_{0.5}\square_{0.5}BaCe_2F(CO_3)_4$ was found at the same deposit.

We found a similar mineral at the Biraya rareearth deposit, Vitim-Patom highland. Chemical analysis shows the mineral to have the composition (wt.%): CaO 4.30, Na_2O 2.16, SrO 4.81, BaO 23.24, TR_2O_3 38.59, CO_2 24.48, F 2.38, H_2O^- 0.32, H_2O^+ 0.49, which corresponds to the formula: $(Ca_{0.529}Na_{0.481})_{1.01}Ba_{1.05}(TR_{1.623}Sr_{0.320})_{1.94}(F_{0.865}OH^+_{0.376})_{1.24}(CO_3)_{3.84}$. This composition differs from both above-mentioned minerals: Ca-Na with prevailing Ca. A deficiency of CO_3 is probably caused by TR-Sr substitution. The strongest X-ray diffraction lines in the powder pattern are the same as those for baiyuneboite, but differing in their intensivities [d, I, hkl]: 4.33 (60) (101); 3.85 (100) (006); 3.51 (95) (104); 3.19 (85) (105); 2.55 (60) (110); 2.05 (65) (1.0.10). Unfortunately, we have no X-ray data for unnamed Ca-mineral from Bayan Obo, to which our mineral bears the most similarities. The mineral is uniaxial negative. Ng 1.760, Np 1.578, hexagonal, space group $P6_3/mmc$, a: 5.102(2); c:23.119(9) Å, V: 521.2 $Å^3$, Z: 2, d_{calc}: 4.34 g/cm^3, H: 4.5. The carbonate associates with calcite, strontianite, aragonite-strontianite, dolomite, barite, allanite-(Ce), bastnaesite-(Ce), toernebohmite, amphibole, talc, ilmenite, magnetite, pyrrhotine. The abundance of the mineral in the rock is 5-10%. Supported by the Russian Foundation of Fundamental Researches, grant 97-05-65810.