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Lakargiite $CaZrO_3$: A new mineral of the perovskite group from the North Caucasus, Kabardino-Balkaria, Russia

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Abstract

Lakargiite $CaZrO_3$—the zirconium analog of perovskite [*Pbnm*, a = 5.556(1), b = 5.715(1), c = 7.960(1) Å, V 252.7(1) Å^3, Z = 4]—was discovered as an accessory mineral in high-temperature skarns in carbonate-silicate rocks occurring as xenoliths in ignimbrites of the Upper-Chegem (Verkhniy Chegem) volcanic structure, the North Caucasus, Kabardino-Balkaria, Russia. Lakargiite forms pseudo-cubic crystals up to 30–35 μm in size and aggregates up to 200 μm. Lakargiite is associated with spurrite, larnite, calcio-olivine, calcite, cuspidine, rondorfite, reinhardbraunsite, wadalite, perovskite, and minerals of the ellestadite group. The new perovskite mineral belongs to the ternary solid solution $CaZrO_3$-$CaTiO_3$-$CaSnO_3$ with a maximum $CaZrO_3$ content of ca. 93%, maximum $CaTiO_3$ content of 22%, and maximum $CaSnO_3$ content of 20%. Significant impurities are Sc, Cr, Fe, Ce, La, Hf, Nb, U, and Th. Raman spectra of lakargiite are similar to those of the synthetic phase $Ca(Zr,Ti)O_3$ with strong bands at 352, 437, 446, 554, and 748 cm^{-1}. Lakargiite crystallized under sanidinite-facies conditions of contact metamorphism characterized by very high temperatures and low pressures.

Keywords: Lakargiite, perovskite group, solid solution, $CaZrO_3$, $CaSnO_3$, Raman spectroscopy, skarn, Caucasus