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LETTER

Ultrapotassic clinopyroxene from the Kumdy-Kol microdiamond mine, Kokchetav Complex, Kazakhstan: Occurrence, composition and crystal-chemical characterization

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ABSTRACT

We report data on the composition and crystal structure of the most K-rich (3.61 wt% K_2O) natural clinopyroxene yet discovered. The studied crystal was found as a tiny inclusion in garnet from a garnet-clinopyroxene rock of the Kumdy-Kol microdiamond mine, Kokchetav complex, Northern Kazakhstan. Microprobe analysis yields the formula $(Ca_{0.61}Fe_{0.13}Mg_{0.04}Mn_{0.01}K_{0.17}Na_{0.05})(Al_{0.61}Mg_{0.39})(Si_{1.61}Al_{0.39})O_{6.00}$. Lattice parameters are: $a = 9.773(1)$, $b = 8.926(1)$, $c = 5.269(1)$ Å, $\beta = 105.75(1)°$. The structure was refined up to $R_{all} = 2.42\%$ using 982 independent reflections. Substitution of K for Ca causes significant modification of the average structure. No evidence for an additional M2' position was found. Crystal-chemical characteristics are compared with published data on both natural and synthetic K-bearing clinopyroxenes.