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The study of Mg and Fe distribution between ternary solid solutions of clinopyroxenes and bioite

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Ternary solid solutions of alkaline clinopyroxenes (CPx3) with constant content of aegirine minal (20 mol.%) were synthesized. Based on the x-ray study the cell parameters refinement has been produced. The ternary solid solutions are characterized by alternating deviation from ideality. The cation exchange runs between CPx3 and biotite were carried out at 750ºC and 1.5 kbar under hydrothermal conditions. The isotherm of Mg,Fe distribution between clinopyroxene and biotite was obtained. The distribution coefficient of Mg between clinopyroxene and biotite (K_D) is described by following 3-order equation: $\ln(K_D) = 0.65 + 3.30*x - 5.763*x^2 - 1.0911*x^3$; where $x=(Mg/(Mg+Fe^{2+}))$ in clinopyroxene. The calculation of excess free energy of mixing of clinopyroxene was carried out based on experimental data.

Key words: solid solutions, clinopyroxene, bioite, cell parameters, coefficient of element distribution

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