# OLIVIN FRACTIONATION IN DIFFERENTIATION PROCESS OF CALCIUM-RICH LARNIT-NORMATIVE MELTS CLOSE ON COMPOSITION TO KIMBERLITES

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Calcium-rich undersaturated with silica larnite-normative melts are parental magmas of ultrabasic-alkaline formations including melilite rocks, ijolites, melteigites, carbonatites and nepheline syenites of agpaitic and miaskitic class. Phase equilibria during melting of larnite-normative melilitic magmas are insufficiently investigated, especially in the range of high pressures. There are some data on experimental melting modelling and crystalisation with high calcium melts. But they substantially differ from natural magmas. [1, 2]

In the largest ultrabasic-alkaline Polar Siberia province (Meymecha-Kotuy) a thick dyke number of non-saturated with silica calcium-rich magmas (melilite nephelinites grading into kimberlite) is increased. Among these rocks dykes of carbonatites and carbonate-bearing phonolites and trachytes are found frequently.

In present paper for the first time the olivin's structure in process of crystallization larnite-normative turjaite was investigated in detail, whose composition is analogous to with natural dyke rock Meymecha-Kotuy province. Experiments were performed with piston-cylinder in the pressure interval 0.5 - 60 GPA and temperature range 1050 - 1500°C. Starting composition (glass) was synthesized from the mix of carbonates and oxides. Required quantities of starting material either were put in graphite capsules or in container prepared from spectrally pure iron, or in the case of experiments with volatile components were put in with distilled water and silver oxalate (the source of carbon dioxide) in platinum and silver-palladium ampules. Data of tests carried out in dry conditions enabled to draw a phase equilibrium diagram of melilite nephelinite in coordinates temperature-pressure.

Experiments demonstrated that melilite nephelinite is characterized by broad fields of crystallization of melilite, clinopyroxene and olivine, which is liquidus phase up to 30 kb. This considerably exceeds the pressure of olivine field of stability in tholeitic and alkaline basalts with the same MgO content. Very interesting feature of olivine compositions are high calcium concentrations up to 3.5 %. Highlycalcic olivines are very rare in nature, apparently due to decompression of solid solutions and release of monticellite at lower temperatures [3]. With increasing temperature the olivine MgO content and calcium solubility in olivine increases, pressure exerts the opposite effect. Under the condtidions of high calcium activity in melt changes the value of distribution coefficient of Mg and Fe in equilibrium olivine-melt.

According to Roedder and Emslie's [4] data for the majority of magmatic systems $Kd_{Mg/Fe}$ practically doesn't change with temperature, pressure, and approximates to value 0,3. For investigated highlycalcic melts the distribution coefficient $D^{Mg/Fe}_{Ol\text{-}L}$ reduces to 0.20-0.23.

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