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Experimental simulation of the alkali-carbonate metasomatism

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Close association of alkaline and ultrabasic rocks, carbonatites, apatitic and sulfidic mineralization, features of structure testify about mantle a source and the important role alcalic-carbonaceous fluids in genesis of these rocks. Formation alkaline silicate, carbonaceous and sulfidic melts, phase relationship, behaviour of the ti-tan, phosphorus, sulphur and zircon has been experimentally studied at pressure 3.9 GPa, temperature 1250º in system peridotit-basalt (eclogite)-alcalic-carbonaceous fluid with additives in quality acces-sory minerals, apatite, nickel-containing pyrrhotite, ilmenite, zircon.

Experiments were carried out using of apparatus high pressure (piston cilinder and anvil with hole) by a quenching technique. It was used two ampoules (platinum and peridotite, content basalt powder) method. Duration of experiments was 6-8 hours. Products of experiments were studied on electronic scanning microscope Tescan VEGA TS 5130MM with YAG detector of secondary and reflected elec-tron and energy-dispersive the x-ray microanalyzer with semi-conductor Si (Li) detector INCA Energy 350. The morphology, structure and relationship of glass, inclusions of carbonatic and sulfidic globules specify in existence in the conditions of experiment immiscibility silicate, carbonate and sulfidic melts. The composition of silicate melt answered phonolite, carbonaceous melts it is essential calciferous composition with an impurity of alkaline metals and silicate components.

Solubility of zircon in silicate melts reached 0.8 wt.% ZrO2, in co-existing carbonaceous melt - 1.5 wt.%. Concentration TiO2 and 25 in silicate melt reached 2 wt.%, in carbonaceous melt - 1.7 wt.% TiO2 and up to 14 wt.% 25. Concentration of sulphur in these melts did not exceed 0.2 . %. From minerals of liqudus the main concentrators of the titan and phosphorus were the X-phase and phlogopite - up to 8 wt.% TiO2 and up to 3 wt.% 25 in the X-phase, up to 6 wt. % TiO2 and to 2.5 wt. % 25 in phlogopite. Absence ilmenite and apatite in experimental samples under the studied conditions is obviously caused by their high solubility in co-existing phases.

The composition of X-phase is similar to composition of Cpx, but X-phase enrich in TiO2 and de-plete in SiO2 . The partition coefficient of oxides some elements between silicate and carbonaceous melts Dka/si increasing from SiO2 (D<1) to CaO (D>10).

Reduction of solubility of apatite in alkaline silicate melt at pressure decline promotes silicate-phosphate stratification and formation of apatite mineralization at introduction of mantle magmas into the earth crust.

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