On genesis of diamondiferous rocks

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Peculiarities of texture and phasecomposition of metasomatized diamondiferous eclogites (the upper mantle xenoliths in kimberlites) were studied. Numerous pores of irregular form and up to 50-100 μm size as well as cracks and viens over grains of rockforming garnet and clinopyroxenes were revealed by scanning electron microscopy probably all the defects are filled with remains of a diamond-parental melts solidified into the assemblage of ferrous mafnesite $(Mg,Fe)CO_3$ orthopyroxene $(Mg,Fe)SiO_3$ and kyanite Al_2SiO_5 (by Raman spectroscopy and electrone microprobe data). Also, many diamond and carbonate microcrystals are identifed at the material inside of the defects. By the Raman specroscopy, an intense narrow peak at 1332 cm^{-1} (diamond) and group of four peaks corresponding to internal vibrations of CO_3^{2-} (Mg-carbonate) were determined. Specific typomorphic features of diamondiferous peridotites and eclogites were estimated from analytical and literature [1-6] data. The features point out onto the different sources of diamondiferous and diamond-free rocks among upper mantle xenolits in kimberlites. Syngenesis phase diagram for diamond and rockforming minerals of the peridotite-eclogite-carbonatite-diamond system (in a regime of fractional crystallization) is constracted with the use of experimental data at 7 GPa (upper mantle PT-conditions). The analytical and experimental results are generalized and applied to development of phisico-chemical model for dimondiferous peridotite and eclogite genesis at the upper mantle chambers of diamond-parental carbonatite melts.

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