EVIDENCE OF MAGMATISM, MATASOMATISM AND DEFORMATION PROCESSES OBTAINED FROM THE STUDY OF THE UNIQUE COMPOSITIONALLY COMPLEX NODULE FROM THE UDACHNAYA KIMBERLITE PIPE (YAKUTIA).

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35x20 cm nodule of sheared peridotite is characterized by disturbed and laminar subtypes of mosaic porphyroclastic texture. Rock matrix consists of monomineral aggregate of olivine neoblasts, containig rare porphyroclasts of red-orange garnet, grass-green diopside, enstatite and olivine. Garnet and pyroxenes occur as large separate porphyroclasts or bimineral intergrowths (garnet-diopside, diopside-enstatite). 3x5 mm very jointy olivine porphyroclasts of lenticular or curved flattened shapes are gradually recrystallized at periphery into fine-grained neoblast matrix. 5x3 cm large enstatite crystals with irregular boundaries are broken into fragments which are pulled apart by olivine matrix. Fracture bands and cleavage crack curving leading to formation of cleavage microtexture, are observed in enstatite. Marginal parts of separate enstatite blocks are recrystallized into fine-grained aggregate of isometric crystals. Morphologically diverse diopside porphyroclasts vary from 3-5 mm up to 6-7 cm. Usually diopside porphyroclasts are recrystallized and are transformed into lens or lenticular intercalations of fine-grained porphyroblast matrix. Diopside displays a obvious evidence of plastic flow resulting in filling of fissures and interblock spaces as well as in partial rimming the garnet porphyroclasts and enstatite. A striking feature of the studied sheared peridotite is the intensive garnet deformation. 6x3 cm garnet porphyroclast are broken into separate fragments elongated in line. Configuration of garnet porphyroclasts are quaint. Minerals of sheared peridotite are che-

mically similar to megacrysts of titanium assemblage from kimberlites. Ferruginous olivine (FeO > 13 wt.%) has the noticeable Ti and Ca contents. Enstatite enriched in Fe, Ti, Ca and Na is classified as high-titaniferous bronzite. Dioside porphyroclasts are a subcalcic variety (Ca/Ca+Mg 50%) containing 0,3-0,4 wt.% TiO_2, 1,4-1,9 wt.% Na_2O, 1,8-2,0 wt.% Al_2O_3 and 0,3-0,5 wt.% Cr_2O_3. A high Ca/Ca+Mg ratio (> 50%) as well as low contents of Al_2O_3 (0,4-0,8 wt.%), FeO (2,5-3,5 wt.%) and Na_2O (0,3-0,6 wt.%) are characteristic of diopside neoblasts. Garnet is identified as titaniferous pyrope; it has 1,3 wt % Cr_2O_3, 4,5 wt.% CaO and 0,15 wt.% Na_2O.

The deformation of garnet lherzolite was accompanied by an intensive metasomatism with separate minerals affected by melting. The melting process affects first of all marginal and weak inner zones of garnet. Microportions of melt are transformed into brown amorphous material saturated by the smallest chromite inclusions or they are crystallized into composite mineral aggregates. Interstices within garnet are composed of Al-orthopyroxene, Al-clinopyroxene, olivine, amphibole of pargasite series, Al-spinel, ilmenite, Ti-phlogopite, carbonate and sodalite. The mantle fluid components as H_2O, CO_2, Cl, F, S as well as alkalies and Ti participated in partial melting of garnet lherzolite. Besides of the above-mentionned mineral paragenesises thread veinlets of jouravskite and afwillite are observed in garnet. Clinopyroxene porphyroclasts are surrounded by an aggregate of calcic diopside neoblasts associated with Ti-phlogopite and spinel. Reactionnal olivine replacement by monticellite leading to homoaxial pseudomorphs formation is an unusual phenomenon. Ti-phlogopite and magnetite are developed between the monticellite grains and the olivine relicts. Monti-

cellite and signs of replacement of olivine by monticellite are absent in kimberlite including the nodule.

On the basis of the available data processes of textural and chemical transformation of garnet lherzolite and its genesis, are discussed.