Transformation Conditions of Plagioclase and Dark-Colour Minerals from Puchezh-Katunki Astrobleme Rocks. L. Sazonova, V. Feldman, N. Korotaeva. Moscow State University, Geological Department, Moscow, 119899, Russia.

Transformation peculiarities of plagioclases, garnets, amphiboles, biotites from plagioclase-amphibole schists, plagiogneisses, gneisses of the Puchezh-Katunki astrobleme central uplift have been studied. The average shock loads on the rocks were 25-30 GPa. These average shock loads have been estimated by the appearance of large amount of quartz and plagioclase diaplectic glasses and some quantity of melted glass and by the presence of diffusion components (Na and Ca) in diaplectic plagioclases.

The residual temperature in the rocks after the removal of 30 GPa shock loading has been assumed to be approximately 850°C. The value has been taken from the experimental data for andesite [1]. Plagioclase from the rocks of the Puchezh-Katunki astrobleme central uplift undergoing such shock loading has been greatly recrystallized. This plagioclase has been transformed into microfibre, microgranoblastic aggregate of a secondary plagioclase and orthoclase. In accordance with plagioclase-orthoclase geothermometer [2] the formation temperatures of such aggregate are 840-860 °C (at P=0.1 kb), which agrees with the assumed residual temperature.

Decomposition of dark-colour minerals (garnet, amphibole, biotite) have been observed in the rock undergoing shock loading of 25-30 GPa. These dark-colour minerals are transformed into aggregates of new phases. Relicts of initial minerals are often present in these aggregates. Garnet and amphibole are transformed into an aggregate of orthopyroxenes, clinopyroxenes, plagioclases, magnetites sometimes orthoclases. Biotite is transformed into an aggregate of orthoclases and oxides of Fe and Ti. In accordance with plagioclase-orthoclase geothermometer [2] decomposition of dark-colour minerals into an aggregate of new phases took place at the temperature of 800-900 °C. These data well agree with the experimental data of hornblende, garnet, biotite decomposition. These temperatures as well as those for plagioclase are close to assumed residual temperature. Thus it may assumed that dark-colour mineral decomposition and extensive recrystallization of diaplectic plagioclase and quartz glasses took place under the action of residual heating appearing in the rocks after shock wave removal. Great thickness of the upper lying rocks contributes to heat conservation.


Fig. 1. The composition of initial garnet (I) and products of their decomposition. II - the aggregate composition into garnet. A - Plagioclase-
amphibole schists. B - Plagiogneisses. Fig. 2. The composition of initial amphibole (I) and products of their decomposition; II - the aggregate composition into amphibole. Fig. 3. Transformation of biotites into aggregates of new phases. I - The composition of initial biotites. II - The composition of aggregates. --- plagiogneisses; - - - - plagioclase-amphibole schists.