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Shock compression of C₇₀ fullerite with use of recovery assemblies¹ SERGEY SOKOLOV, VLADIMIR MILYAVSKIY, TATIANA BORDINA, ANDREY ZHUK, Institute for High Energy Densities RAS — Shock-induced phase transitions of C₇₀ fullerite were studied with use of recovery assemblies of planar geometry. The starting material consisted of two crystalline phases: phase with hexagonal close-packed (hcp) and phase with rhombohedral structure. In the specimens, maximal shock pressures were reached after several reverberations of the waves between the walls of the recovery ampoule (step-like shock-wave compression) and were ranged from 9 to 52 GPa. We have found that C₇₀ fullerite undergoes a series of shock-induced polymorphic phase transitions. In the samples, recovered from 9, 14 and 19 GPa, a dominant phase was fullerite C₇₀ with cubic structure. Also, some amount of C₇₀ with hcp structure was observed. The quantity of hcp phase was decreasing with increasing of intensity of shock compression. With further growth of shock pressure, destruction of C₇₀ molecules occurs. In the specimens recovered after shock compression up to pressures over 19 GPa, the main phase was graphite with a low degree of three-dimensional regularity.

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