

Abstract Submitted  
for the SHOCK07 Meeting of  
The American Physical Society

**Phase transitions of  $C_{70}$  fullerite under step-like shock compression** SERGEY SOKOLOV, VLADIMIR MILYAVSKIY, TATIANA BORODINA, VLADIMIR FORTOV, IHED of JIHT RAS — Shock-induced phase transitions of  $C_{70}$  fullerite were studied with use of recovery assemblies of planar geometry at pressures 8 to 52 GPa. Two types of starting material were investigated: polyphase [1] and monophase  $C_{70}$  with hcp-structure. We have found that the results of shock-wave compression of fullerite  $C_{70}$  with various initial phase compositions qualitatively coincide in all explored pressure range. Rhombohedral modification of  $C_{70}$  completely disappears already at pressure 9 GPa. At the same time, crystalline modification of  $C_{70}$  with hcp-structure in conditions of step-like shock-wave compression does not undergo phase changes down to 9 GPa and practically completely disappears from the recovered material only at 23.5 GPa. Shock-induced transformation of hcp into fcc structure was fixed at pressures in the range 9 to 23.5 GPa. Depth of this transformation is increasing with growth of shock pressure. In the specimens recovered from 23.5 GPa, the only crystalline phase of fullerite  $C_{70}$  with fcc structure is observed (about 5 %) and for the first time formation of a graphite-like carbon is fixed (about 95 %). With growth of shock pressure up to 26 GPa and higher, destruction of  $C_{70}$  molecules occurs. The work was supported by RFBR and RSSF. [1] V.V. Milyavskiy, T.I. Borodina, S.N. Sokolov, A.Z. Zhuk. *Diamond and Rel. Mat.* **14** (2005) 1924.

Sergey Sokolov  
IHED of JIHT RAS

Date submitted: 20 Feb 2007

Electronic form version 1.4