Abstract Submitted
for the SHOCK07 Meeting of
The American Physical Society

Shock compression and equation of state of C_{60} fullerite VLADIMIR MILYAVSKIY, KONSTANTIN KHISHCHENKO, IHED of JIHT RAS, ALEXANDER UTKIN, VLADISLAV YAKUSHEV, IPCP RAS, ANDREY ZHUK, VLADIMIR FORTOV, JIHT RAS — Recently, we have experimentally studied shock compressibility of C_{60} fullerite and sound velocity in shock-compressed fullerite [1]. The Hugoniot of C_{60} fullerite had a set of peculiarities. Appearance of a rather hard carbon phase was detected at shock pressure $\sim$ 9 GPa. We assume that it is a 2D-polymerized C_{60} phase. With increase of shock pressure, destruction of this phase and formation of a graphite-like carbon occurs. With further increase of shock pressure, the graphite- like carbon transforms to a diamond-like phase. If shock pressure is higher than $\sim$ 33 GPa, shock compressibility of C_{60} fullerite is determined by the thermodynamic properties of the diamond-like phase. The results of the shock-wave measurements were used for the description of thermodynamic properties of C_{60} fullerite and products of its transformations in a wide range of pressures and temperatures. A semiempirical equation of state for the simple cubic phase of C_{60} fullerite is proposed. The EOS we have developed for fullerite C_{60} provides a consistent representation of the available experimental data. The work was supported by RFBR. [1] Milyavskiy V.V., Utkin A.V., Zhuk A.Z., Yakushev V.V. and Fortov V.E. Diamond and Rel. Mat. 14 (2005) 1920.

Vladimir Milyavskiy
IHED of JIHT RAS

Date submitted: 20 Feb 2007 Electronic form version 1.4