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Hugoniot of C₆₀ fullerite: new results¹ VLADIMIR MILYAVSKIY, IHED RAS, ALEXANDER UTKIN, IPCP RAS, ANDREY ZHUK, IHED RAS, VLADISLAV YAKUSHEV, IPCP RAS, VLADIMIR FORTOV, IHED RAS — Recently, we have experimentally studied shock compressibility of C₆₀ fullerite and sound velocity in shock-compressed fullerite at the pressure range up to ~50 GPa [1]. In this work we present the results of new shock experiments executed with C₆₀ fullerite in the same pressure range. On the base of new experimental results, we have made some correction of our concept [1] of the processes occurring in C₆₀ fullerite at shock compression. In particular, the anomalous behavior of the rear surface velocity profiles was detected at pressure ~9 GPa [1]. Additional experiments have shown that this anomalous behavior was caused by jump of the sound velocity in C₆₀ because of formation of more hard carbon phase. We assume that it is a polymerized C₆₀ phase. In the pressure region 9-25 GPa, destruction of this phase and formation of a graphite-like carbon occurs. With further growth of shock pressure, phase transition of the graphite-like carbon to a diamond-like phase is observed with a transition onset pressure ~25 GPa. If shock pressures higher than ~33 GPa, Hugoniot of C₆₀ is determined by the thermodynamic properties of the diamond-like phase. [1] V.V. Milyavskiy, A.V. Utkin, E.B. Zaretsky, A.Z. Zhuk, V.V. Yakushev, V.E. Fortov. AIP CP 706 (2004) 667.

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