TUBULAR EXPLOSIVE DEVICES FOR QUASI-ISENTRONIC COMPRESSION OF GASES TO PRESSURES OF 200–400 GPa

*Ternovoi V.Ya.,* Nikolaev D.N., Shutov A.V.  
IPCP RAS, Chernogolovka, Russia  
*ternovoi@ficp.ac.ru*

Tubular explosive devices with the speed of waves in the magnesium rod 15 km/s for multiple and isentropic compression of gases up to 200–400 GPa have been created. A series of cells for measuring the conductive properties of sapphire and gases are designed and manufactured. The size of region for one-dimensional and uniform compression of helium inside of the experimental cell have been determined by two-dimensional numerical hydrodynamic modeling. It is established that for a cell with an initial thickness of 2 mm with helium at a temperature of 78 K and the initial pressure 20 MPa required conditions of homogeneity and one-dimensionality of the gas compression is performed in the central region of the cell with diameter 6 mm.

To increase the size of area of homogeneous and one-dimensional compression it is proposed to increase the diameter of the tube copper liner 1.5 times with a corresponding increase in the mass of charge up to 13.5 kg.