

**Measuring of sound velocity in shock-compressed cerium.
Phase transitions in the metal at high pressures and temperatures**

**M.V. Zhernokletov¹, V.A. Borisenok¹, A.E. Kovalev¹, M.E. Novikov¹,
V.G. Simakov¹, K.V. Khishchenko²**

¹RFNC–VNIIEF, Sarov, ²JIHT RAS, Moscow

Sound velocity in shocked cerium was measured by counter rarefaction technique using manganin piezoresistive gauges in pressure range of 13–35 GPa, as well as using a shock and rarefaction overtake technique with carbon tetrachloride and carbogal as analyzer liquid at pressures of 35–140 GPa. Plane shock-wave generators based on high explosive charges were applied for shock loading of samples. Measured values of longitudinal and bulk sound velocities allow one to determine the Poisson coefficient, shear strength and high boundary of cerium melting on principal Hugoniot. A new multi-phase equation of state for the metal at high pressures and temperatures is proposed. A comparison of calculated results and obtained experimental data is presented.