Abstract Submitted
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Results from Isentropic Compression Experiments (ICE) D.G. TASKER, J.H. GOFORTH, H. OONA, P.A. RIGG, D. DENNIS-KOLLER, J. KING, D. TORRES, D. HERRERA, F. SENA, F. ABEYTA, L. TABAKA, Los Alamos National Laboratory — We have developed high explosive pulsed power (HEPP) methods to obtain accurate isentropic EOS data with the ICE technique.[1] In our ICE experiment, fast rising current pulses (with risetimes from 400 to 600 ns) at current densities exceeding many MA/cm, create continuous magnetic compression of materials to Mbar pressures. The response of materials to this isentropic loading provides the required isentropic EOS. The LANL ICE system comprises a flat-plate explosively-driven magnetic flux compression generator (FCG), a small explosively formed fuse (EFF) opening switch, and explosively-driven closing switches. By precise timing of the various components in this system we are able to optimize the current profile for various applications. The prototype system produces isentropic compression profiles in the vicinity of 0 to 3 Mbar but our larger systems may achieve 20 Mbar or more. We will discuss the factors affecting the accuracy of the results. To demonstrate the viability and accuracy of the technique we will present recent EOS data from experiments at pressures of the order of 1 Mbar.

[1]D.G. Tasker, et al., in Proc. APS Shock Compression of Condensed Matter, 2003, p.1239.

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