

Abstract Submitted
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High-precision measurements of the equation of state (EOS) of polymers at 100-1000 GPa using laser-driven shock waves¹ M.A. BARRIOS, D.E. FRATANDUONO, T.R. BOEHLI, D.D. MEYERHOFER, D.G. HICKS, J. EGGER, P. CELLIER, G. COLLINS, UNIVERSITY OF ROCHESTER/ LLE COLLABORATION, LAWRENCE LIVERMORE NATIONAL LABORATORY COLLABORATION — The behavior of polymer materials at high-pressure (>100 GPa) is important for the design inertial-confinement-fusion capsules and the effect of stoichiometry at high-pressures. To address these we performed EOS measurements on polystyrene (CH), polypropylene (CH₂), and GDP (C₄₃H₅₆O) at shock pressures of ~ 100 -1000 GPa. These experiments use laser-driven shocks to drive impedance-match measurements using alpha quartz as a standard material. Shock velocities in these transparent samples and the standard can be measured to $\sim 1\%$ or precision. This refines the impedance-match technique for laser-driven shock experiments to produce precise data at extreme pressures. A novel method for also acquiring re-shock data is presented. These data are compared to various EOS models and other experiments driven by gas guns and lasers.

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