

Abstract Submitted  
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**Mixed equation of state: dynamical materials experiments on Z and multi-scale simulations**<sup>1</sup> T.R. MATTSSON, S. ROOT, T.A. HALL, Sandia National Laboratories, N.L. BRUNER, Voss Scientific, R.W. LEMKE, Sandia National Laboratories — Significant progress in understanding properties of pure materials under extreme conditions has been made recently, with experiments and first-principles theoretical work providing detailed insights for many pure materials. Mixing poses additional fundamental questions regarding the fidelity of first-principles calculations, the reliability of mixing rules for equations of state, as well as the accuracy of experimental approaches. We will present experimental and theoretical results for mixed equation of state. By shock impact of magnetically launched flyer plates on doped poly(4-methyl-1-pentene) foams, we create multi-Mbar pressures in a dense plasma mixture of hydrogen, carbon, and dopant at temperatures of several eV. We analyze the system by multi-scale simulations, from density functional theory to continuum magneto-hydrodynamics simulations.

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