Abstract Submitted
for the DFD15 Meeting of
The American Physical Society

Detonation Propagation through Nitromethane Embedded Metal Foam BRANDON LIEBERTHAL, University of Illinois at Urbana-Champaign, WARREN R. MAINES, Sandia National Laboratories, D. SCOTT STEWART, University of Illinois at Urbana-Champaign — There is considerable interest in developing a better understanding of dynamic behaviors of multicomponent systems. We report results of Eulerian hydrodynamic simulations of shock waves propagating through metal foam at approximately 20% relative density and various porosities using a reactive flow model in the ALE3D software package. We investigate the applied pressure and energy of the shock wave and its effects on the fluid and the inert material interface. By varying pore sizes, as well as metal impedance, we predict the overall effects of heterogeneous material systems at the mesoscale. In addition, we observe a radially expanding blast front in these heterogeneous models and apply the theory of Detonation Shock Dynamics to the convergence behavior of the lead shock.

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Date submitted: 30 Jul 2015 Electronic form version 1.4