Abstract Submitted
for the SHOCK09 Meeting of
The American Physical Society

The effect of nano-particles on the one-dimensional shock compaction of Al-MnO_2-Epoxy mixtures[1] ANDREW FRASER, JOHN BORG, Marquette University, JENNIFER JORDAN, AFRL/RWME — This work numerically explores the effect of nano-particles on the dynamic behavior of Al-MnO_2-Epoxy mixtures in a planar shock configuration. One-dimensional flyer plate experiments were conducted on the heterogenous mixture where stress wave signatures were measured with VISAR, manganin or PVDF gauges. Mesoscale simulations were carried out using the Eulerian hydrodynamic code CTH to simulate a planar shock wave propagating across the heterogeneous mixture; these simulations resolve the grain interactions, explore potential hot spot formations, and investigate the stress history. Simulation results are compared to experimental data in order to verify the method, then the state space is explored with the addition of nano-particles of aluminum. Average longitudinal stress measurements obtained from the mesoscale simulations compare favorably with the stress measurements obtained from the experiments.

[1]NSF/Navy, Grant CTS-0521602

Andrew Fraser
Marquette University

Date submitted: 13 Feb 2009 Electronic form version 1.4