Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

New Strength Data on Aluminum to 160GPa[1] C.S. ALEXANDER, W.D. REINHART, J.R. ASAY, Sandia National Laboratories — Shock compression experiments were performed on 6061-T6 aluminum up to 160 GPa to probe aluminum strength in the shocked state as it passes through the melt region (∼120 – 160 GPa). Established two and three stage gas gun launch techniques were used to achieve impact velocities of 4-10 km/s. Under symmetric impact conditions, aluminum samples were shocked to states in the solid, liquid and mixed (solid-liquid coexistence) phases and subsequently released. Velocity interferometry was used to record detailed shock wave profiles from which the shocked state is determined. Strength is determined from the quasi-elastic release portion of the wave profiles. Details of the analysis will be presented along with results showing the dependence of strength on shock stress in all three phase regions. These results will also be compared to the Steinberg strength model.

[1]Sandia is a multiprogram laboratory operated by Sandia Corporation, a Lockheed Martin Company for the United States Department of Energy's National Nuclear Security Administration under contract DE-AC04-94AL85000.

Scott Alexander
Sandia National Laboratories

Date submitted: 19 Nov 2009 Electronic form version 1.4