

Abstract Submitted  
for the SHOCK09 Meeting of  
The American Physical Society

**Yield Response of Tantalum for Quasi-Isentropic Loading and Unloading** JAMES R. ASAY, TOMMY AO, TRACY J. VOGLER, Sandia National Laboratories, GEORGE T. GRAY, III, Los Alamos National Laboratory — Magnetic loading was used to study initial yield strength of pure annealed and cold-worked polycrystalline and single crystal Ta samples for ramp loading at strain rates of  $\sim 10^6$ /s and the flow strength after peak compression to  $\sim 17$  GPa at about  $5 \times 10^4$ /s. For sample thicknesses of 0.5–6 mm, it was found that for annealed pure polycrystalline Ta, the quasi-isentropic elastic limit (IEL) was essentially constant at  $\sim 3.2$  GPa with propagation distance. There was no apparent effect of sample purity on precursor amplitude to within experimental uncertainty, although cold-working resulted in loss of the elastic peak and a reduced IEL of  $\sim 1.7$  GPa. The flow strength at peak loading stress was estimated from the quasi-elastic unloading and found to increase with peak stress. These results will be discussed in terms of constitutive models for Ta. Sandia is a multi-program laboratory operated by Sandia Corporation, a Lockheed Martin Company, for the United States Department of Energy's National Nuclear Security Administration under Contract No. DE-AC04-94AL85000.

Tommy Ao  
Sandia National Laboratories

Date submitted: 05 Feb 2009

Electronic form version 1.4