

Abstract Submitted
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Variability in Dynamic Properties of Tantalum: Spall, Attenuation and Load/Unload MICHAEL D. FURNISH, WILLIAM D. REINHART, WAYNE M. TROTT, LALIT C. CHHABILDAS, TRACY J. VOGLER, Sandia National Laboratories, Albuquerque NM 87185 — A suite of impact experiments was conducted to assess spatial and shot-to-shot variability in dynamic properties of tantalum. Samples had a uniform refined ~ 20 micron grain structure with a strong axisymmetric [111] crystallographic texture. Two experiments performed with sapphire windows (stresses of approximately 7 and 12 GPa) clearly showed elastic-plastic loading and slightly hysteretic unloading behavior. An HEL amplitude of 2.8 GPa (corresponding to $Y \approx 1.5$ GPa) was observed. Free-surface spall experiments showed clear wave attenuation and spallation phenomena. Here, loading stresses were ~ 12.5 GPa and various ratios of impactor to target thicknesses were used. Spatial and shot-to-shot variability of the spall strength was $\pm 20\%$, and of the HEL, $\pm 10\%$. Experiments conducted with smaller diameter flyer plates clearly showed edge effects in the line and point VISAR records, indicating lateral release speeds of roughly 5 km/s. 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.

Michael Furnish
Sandia National Laboratories

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