

Abstract Submitted
for the SHOCK07 Meeting of
The American Physical Society

Experimental and computational investigation of the shock melting properties of diamond¹ MARCUS KNUDSON, MICHAEL DESJARLAIS, RAYMOND LEMKE, Sandia National Labs — The shock melting of diamond has gained interest of late due to its possible use as an ablator material in inertial confinement fusion capsules. Recently, experiments utilizing the flyer plate capability at the Sandia Z accelerator were performed to determine the Hugoniot and the shock melting properties of polycrystalline diamond. Composite aluminum/copper flyer plates were used to shock load diamond samples to pressures ranging from 5 to 14 Mbar. Multiple samples and fast diagnostics provided Hugoniot measurements with roughly 1 percent accuracy in density. Furthermore, measurements of the release behavior may provide direct indication of the extent of the coexistence region on the Hugoniot. These high precision Hugoniot and release measurements at multi-Mbar pressures allow for high fidelity comparisons with recent quantum molecular dynamics calculations, and provide insight into the shock melting of diamond.

¹Sandia 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

Marcus Knudson
Sandia National Labs

Date submitted: 08 Mar 2007

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