Abstract Submitted
for the SHOCK17 Meeting of
The American Physical Society

Radiance Measurement on Shock-Ramp Loaded Tin JEFFREY NGUYEN, MINTA AKIN, Lawrence Livermore Natl Lab, PAUL ASIMOW, California Institute of Technology, NEIL HOLMES, Lawrence Livermore Natl Lab — An accurate material temperature is not only an essential component of an equation of state, but also a good measure of a phase transition, its kinetics, and associated thermal transport properties. In a series of experiments, we measured particle velocity and thermal emission at the tin-LiF interfaces on shock and ramp loading experiments. Using a graded density impactor, we drive the tin sample through melting with the initial shock and then further ramp-compress it back into the solid phase. Various configurations of experimental set-up were used to simultaneously measure particle velocity and thermal emission from which we deduce pressure, density, sound velocity and temperature. A gray body radiation is assumed in these calculations. We present here more recent results and updated analysis of shock-and-ramp-loaded tin experiments. The measured particle velocity shows a traditional signature for phase transition, while thermal radiance exhibits a change consistent with the heat of solidification. We will discuss here the mechanical and thermal aspects of this phase transition, its kinetics, and thermal transport issues in this experiment. This work was performed under the auspices of the U.S. Department of Energy by Lawrence Livermore National Laboratory under Contract DE-AC52-07NA27344.

Jeffrey Nguyen
Lawrence Livermore Natl Lab

Date submitted: 23 Feb 2017 Electronic form version 1.4