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Shock-Ramp Loading of Tin and Aluminum[1] CHRISTOPHER SEAGLE, JEAN PAUL DAVIS, MATTHEW MARTIN, HEATH HANSHAW, Sandia National Laboratories — Equation of state properties for materials off the principle Hugoniot and isentrope are currently poorly constrained. The ability to directly probe regions of phase space between the Hugoniot and isentrope under dynamic loading will greatly improve our ability to constrain equation of state properties under a variety of conditions and study otherwise inaccessible phase transitions. We have developed a technique at Sandia's Z accelerator to send a steady shock wave through a material under test, and subsequently ramp compress from the Hugoniot state. The shock-ramp experimental platform results in a unique loading path and enables probing of equation of state properties in regions of phase space otherwise difficult to access in dynamic experiments. A two-point minimization technique has been developed for the analysis of shock-ramp velocity data. The technique correctly accounts for the "initial" Hugoniot density of the material under test before the ramp wave arrives. Elevated quasi-isentropes have been measured for solid aluminum up to 1.4 Mbar and liquid tin up to 1.1 Mbar using the shock ramp technique. These experiments and the analysis of the resulting velocity profiles will be discussed.

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Christopher Seagle
Sandia National Laboratories

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