Abstract Submitted
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Examining the alpha-epsilon phase transition in cerium at high pressures BRIAN JENSEN, FRANK CHERNE, NENAD VELISAVLJEVIC, MATTHEW BEASON, DAVID HOLTKAMP, THOMAS HARTSFIELD, Los Alamos National Laboratory — The ability to understand and predict the response of matter at extreme conditions requires knowledge of a materials equation-of-state including the location of phase boundaries and associated kinetics. For cerium metal, there still remain regions of the phase diagram that are largely unexplored dynamically including the high-pressure region below the melt boundary. In this region, diamond anvil cell data show significant disagreement in the existence, location, and slope of the alpha-epsilon phase transition along a high-temperature isotherm. In this work, we couple double-shock loading used to generate a secondary Hugoniot below the melt boundary with diamond anvil cell data to study the phase transition directly. Shock experiments using pyrometry and X-ray diffraction provide additional insight into the state of the material in this high-pressure region. Details of the experimental methods and analysis results will be presented that together provide a more complete picture of this phase transition at high-pressure.

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