

Abstract Submitted
for the SHOCK05 Meeting of
The American Physical Society

Static X-Ray Diffraction Study of Cerium to 330 Kilobars GARY CHESNUT, WILLIAM ANDERSON, JOANNA CASSON, Los Alamos National Lab — Cerium is a fascinating f-electron metal with a complex phase diagram. Using the diamond anvil cell and synchrotron x-ray sources we have been able to study cerium to a pressure of 330 kilobars. Radial x-ray diffraction techniques have been used to ensure a more accurate pressure-volume curve at room temperature. In this study two different purities of cerium have been examined – 99.99% and 99.999%. Even at such modest pressures differences have been observed. Regarding the structural phases, the iso-structural fcc phase transition occurs at 7.3 kilobars with a volume collapse of 14.6%. The α -fcc phase to low symmetry phase and low symmetry phase to body-centered tetragonal phase were also observed. This work produces high quality data that can be used to generate an accurate multi-phase EOS for cerium. The techniques developed in these experiments can further be utilized to obtain accurate EOS data for other materials of interest.

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Date submitted: 06 Jun 2005

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