Abstract Submitted
for the SHOCK17 Meeting of
The American Physical Society

Characterization of the Dynamic Consolidation Behavior of Cerium Dioxide Powders as a Function of Green Density TRAVIS VOORHEES, GREGORY KENNEDY, Georgia Institute of Technology, DAVID FREDENBURG, Los Alamos National Laboratory, NARESH THADHANI, Georgia Institute of Technology, GEORGIA INSTITUTE OF TECHNOLOGY TEAM, LOS ALAMOS NATIONAL LABORATORY COLLABORATION — The uniaxial strain dynamic consolidation behavior of cerium dioxide powders as a function of particle morphology and powder compact green density is investigated in this work. Cerium dioxide is a lanthanide metal oxide powder. It is often used for the study of brittle powders exposed to extreme conditions, such as high velocity impact and shock loading. In this study, cerium dioxide powders of two particle sizes (nominally 1 and 10 μm) and two green densities (55% and 63% TMD) are shock compressed using gas gun impact and their particle and shock wave velocities are measured using optical velocimetry techniques. The velocity data collected is used to describe the Hugoniot of the shocked cerium dioxide powders and develop an improved P-α compaction model, building upon prior studies at Los Alamos National Laboratory [D. A. Fredenburg, et al, J. Appl. Phys. 115, 123511 (2014)]. In this presentation, the preliminary results regarding the suitability of the P-α compaction model to describe the experimentally determined Hugoniot response of cerium dioxide powders will be discussed.

Travis Voorhees
Georgia Inst of Tech

Date submitted: 16 May 2017 Electronic form version 1.4