

Abstract Submitted
for the SHOCK05 Meeting of
The American Physical Society

Microstructural Characterization of Shock Recovered AD995

Alumina JAMES MCCAULEY, US Army Research Laboratory, Aberdeen Proving Ground, MD 21005, MINGWEI CHEN, Institute for Materials Research, Tohoku University, Sendai 980-8577, Japan, NEIL BOURNE, University of Manchester, Manchester M601QD, UK, DATTATRAYA DANDEKAR — The present work was initiated to characterize the crystallographic and microstructural changes in shock recovered specimens of AD995 alumina subjected to shock induced stress between 4 and 8 GPa, below and above its HEL, i.e., 6.7 GPa. The AD995 was recovered intact, but containing macroscopic cracks, when shocked to 4 GPa, a stress well below the HEL. The AD995 specimen recovered from the plate impact test at a stress (7.8 GPa) above the HEL showed visual evidence of extensive macroscopic damage and fragmentation. The AD995 specimen recovered from the 6 GPa impact test showed evidence of localized plastic deformation and the presence of dislocations primarily in the vicinity of grain boundaries. However, the AD995 specimen recovered from the 8 GPa test exhibited deformation twins. The aforementioned change in the shock induced plastic behavior/deformation and failure in AD995 below and above the HEL was simultaneously associated with a change in the fracture behavior of AD995, from intergranular fracture below the HEL to intragranular cleavage fracture above the HEL.

Dattatraya Dandekar
US Army Research Laboratory, Aberdeen Proving Ground, MD 21005

Date submitted: 06 Apr 2005

Electronic form version 1.4