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Microstructural examination of the α-ω Two-Phase Shock-Induced Microstructure in Zirconium BENJAMIN M. MORROW, Los Alamos National Laboratory, J. PABLO ESCOBEDO, University of New South Wales, ROBERT D. FIELD, ROBERT M. DICKERSON, PATRICIA O. DICKERSON, CARL P. TRUJILLO, ELLEN K. CERRETA, Los Alamos National Laboratory —
Omega phase can be formed in alpha-phase Zr during shock loading. Interestingly, the high pressure phase can be retained upon release allowing for post-mortem study of the omega phase. Currently, the transformation pathway is not well understood. To provide more insight into this pathway during dynamic loading, shocked-induced microstructures of Zr have been studied. Soft recovered, plate impact specimens have been examined via electron backscatter diffraction (EBSD) and transmission electron microscopy (TEM) to characterize the orientation relationships (OR) and habit planes (HP) between phases. This enables a better understanding of transformation path that is then compared to Molecular Dynamics (MD) simulations. Based on key microstructural features observed in the post-mortem microstructures, a significant amount of the observed alpha phase appears to have originated from the reverse transformation upon release. Results of microstructural analysis will be discussed, along with implications toward phase transformation pathways.

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