

Abstract Submitted  
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**In-situ experiments at DCS to capture the alpha-omega phase transformation in titanium during dynamic loading** BENJAMIN MORROW, DAVID JONES, Los Alamos National Laboratory, PAULO RIGG, Washington State University, ELLEN CERRETA, Los Alamos National Laboratory — Under sufficient stresses, such as during dynamic loading, titanium experiences a phase transformation from hcp alpha phase to hexagonal omega phase. Omega phase is often retained in the microstructure after unloading, and has a strong influence on subsequent mechanical properties. Simulations suggest there are multiple pathways and underlying mechanisms for this transformation. Due to the incredibly short timescales involved, experimental measurements for model validation have been difficult. However, new capabilities at the Advanced Photon Source have enabled diffraction measurements during plate impact experiments to study the microstructural evolution of titanium during transformation. These high-rate data allow us to probe the mechanism and kinetics of phase transformations in new ways. Recent results from the Dynamic Compression Sector (DCS) on shock compression in Ti will be presented and compared to similar ex-situ dynamic tests. Advantages of the new technique and challenges associated with quantification of such phase data will also be discussed.

Benjamin Morrow  
Los Alamos National Laboratory

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