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The Role of the Structure of Grain Boundary Interfaces During Shock Loading ALEJANDRO PEREZ-BERGQUIST, JUAN PABLO ESCOBEDO, CARL TRUJILLO, ELLEN CERRETA, GEORGE GRAY, Los Alamos National Laboratory, DYNAMIC PROPERTIES GROUP TEAM — In order to understand the role of interface structure during shock loading, and specifically the role of interfaces in damage evolution due to shock, four copper bi-crystal boundaries were studied under shock loading and incipient spall conditions. These boundaries, two 001/111 boundaries and two 001/001 boundaries, were characterized prior to deformation using both electron back scattered diffraction (EBSD) and transmission electron microscopy (TEM) to determine axis/angle pair relationships and grain boundary structure. Samples containing these boundaries were then subjected to incipient spall at 2.5 GPa and shock loading at 10 GPa, respectively, in an 80 mm gas gun. Samples were soft recovered and characterized post-mortem via EBSD and TEM. Preliminary results indicate that typical grain boundaries readily form damage during shock loading but that special boundaries, such as S3 twin boundaries, are resistant to failure. Differences in slip and defect transmissibility across these types of boundaries likely play a role in the failure modes.

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