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On the dynamic tensile strength of an FCC metal NEIL BOURNE, University of Manchester, DAVID JONES, SARYU FENSIN, CARL TRUJILLO , DANIEL MARTINEZ, GEORGE T. GRAY III, Los Alamos National Laboratory
— The tensile response of polycrystalline metals is often accompanied by the formation of pores within the structure of the material. This large deformation process is broadly identified as progressive with nucleation, growth, coalescence, and failure the physical path taken over very short periods of time. These are well known to be complex processes strongly influenced by microstructure, loading path, and the loading profile, which remains a significant challenge to represent and predict numerically. In a previous study, the influence of loading path on the damage evolution in high-purity tantalum has been presented; in this paper we present complimentary measurement on a pure FCC copper. Samples were shock loaded to three different peak shock stresses using both symmetric impact, and two different composite flyer plate configurations such that upon unloading the three samples displayed nearly identical "pull-back" signals as measured via rear-surface velocimetry. The damage evolution in the "soft" recovered copper samples was quantified using optical metallography, electron-back-scatter diffraction, and tomography. We shall compare metallurgical observations, velocimetry histories and one dimensional simulations to discuss dynamic failure mechanisms in this metal.

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