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Explosively Driven Shock Induced Damage in OFHC Cu[1] R.S. HIXSON, D.D. KOLLER, G.T. GRAY III, P.A. RIGG, L.B. ADDESSIO, E.K. CERRETA, J.D. MAESTAS, C.A. YABLINSKY, Los Alamos National Laboratory
— OFHC Cu samples were subjected to shock loading using plane wave HE lenses to produce a uniaxial Taylor wave profile (shock followed by immediate release). Upon arrival of the shock wave at the free surface of the sample, the wave is reflected and propagates back into the sample as a release wave. It is the interaction of initial and reflected release waves that place the material in a localized state of tension which can ultimately result in damage and possibly complete failure of the material. The peak tensile stress and its location in the material are determined by the wave shape. Damage evolution processes and localized behavior are discussed based on results from time-resolved free surface velocity (VISAR) interferometry and post shock pre-straining metallurgical analysis of the soft recovered samples.

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