

Abstract Submitted
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Dynamic Fragmentation of an Advanced Ceramic during High-Speed Impact JAMES HOGAN, LUKASZ FARBANIEC, Hopkins Extreme Materials Institute, Johns Hopkins University, Baltimore MD 21218, DEBJOY MALLICK, U.S. Army Research Laboratory, Aberdeen Proving Ground, MD, USA, JAMES W. MCCAULEY, Hopkins Extreme Materials Institute, Johns Hopkins University, Baltimore MD 21218, U.S. Army Research Laboratory, Aberdeen Proving Ground, MD, USA, K.T. RAMESH, Department of Mechanical Engineering, Johns Hopkins University, Baltimore MD 21218, HOPKINS EXTREME MATERIALS INSTITUTE COLLABORATION — The development of the next generation of light-weight protection materials requires an improved understanding of impact-induced fragmentation of advanced ceramics. We investigate the impact behavior of a hot-pressed boron carbide for impact velocities between 200 and 1000 m/s, and study the response in the context of the material properties, microstructure, and boundary conditions (e.g., confinement). We use measurements of fragment size and shapes to inform us about the mechanisms that are activated during dynamic failure. The fragment measurements are linked with physical evidence of failure processes obtained using scanning electron microscopy and Raman spectroscopy.

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