

Abstract Submitted
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Incipient Fracture of Ceramics Under Ballistic Impact¹ BRIAN SCHUSTER, ANDREW TONGE, NICHOLAS LORENZO, Army Research Laboratory — We will present results of small-scale terminal ballistic experiments of pure copper rods impacting commercial grade boron carbide and silicon carbide at striking velocities ranging from 1-2.5 km/s. Incipient deformation and fracture of these materials was examined using propagation-based phase contrast imaging (PCI) at a characteristic interval of 153.4 ns in the first 1-2 microseconds after impact. At the lowest striking velocities, the penetrator undergoes dwell or interface defeat and the target response is consistent with the cone crack formation at the impact site. At higher striking velocities there is a distinct transition to massive fragmentation leading to the onset of penetration. Continuum and microstructural scale simulations of the response will be used to assist in describing the critical stress states and resulting failure modes.

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