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HyFIRE: Hypervelocity Facility for Impact Research at Johns Hopkins University GARY SIMPSON, MATTHEW SHAEFFER, K.T. RAMESH, Johns Hopkins University — The Hopkins Extreme Materials Institute (HEMI) has installed a hypervelocity impact facility (HyFIRE) including a two-stage light gas gun at the Homewood Campus of JHU in Baltimore, MD. The HyFIRE launcher has a launch tube bore diameter of 7.62 mm and can attain launch velocities in up to 7 km/s. The enclosed ballistic range and terminal test chamber provide multiple axes with which to view both projectile free flight and terminal impact, maximizing diagnostic access to events of interest. Initial test diagnostics include ultra-high-speed optical video and orthogonal 300 kV flash x-ray imaging. Photon doppler velocimetry for surface velocity measurementcurrently used in HEMIs laser shock facilityas well as emission spectroscopy/pyrometry are planned, providing researchers across multiple disciplines with the ability to investigate the coupling of mechanics, physics and chemistry present in high energy impact events. We present initial experiments on the fragmentation of inert and reactive impactors on anvil targets, with an aim towards identifying the dominant mechanisms controlling the fragmentation characteristics, temperature distributions and trajectories of generated debris fields.

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