Abstract Submitted
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Characterization of shocked beryllium CARL CADY, ERIC BROWN, GEORGE GRAY, CHRIS ADAMS, LAWRENCE HULL, THOMAS WYNN, MICHAEL PRIME, JAMES COOLEY, CURT BRONKHORST, FRANK ADDESSIO, Los Alamos National Laboratory — Explosively driven arrested beryllium experiments were performed with post mortem characterization to evaluate the microstructure and failure behaviors. The test samples were encapsulated in an aluminum assembly that was large relative to the sample, and the assembly features both axial and radial momentum traps. The sample carrier was inserted from the explosively loaded end and has features to lock the carrier to the surrounding cylinder using the induced plastic flow. Calculations with Lagrangian codes showed that the tensile stresses experienced by the Be sample were below the spall stress. Metallographic characterization of the arrested Be showed radial cracks present in the samples may have been caused by bending moments. Fractography showed the fractures propagated from the side of the sample closest to the explosives, the side with the highest tensile stress. There was evidence that the fractures may have propagated from the circumferential crack outward and downward radially. The EBSD results were the most informative of the characterization techniques used. EBSD provides information regarding texture, residual strain, and twinning. There was clear evidence of grain rotation as evidenced by the pole figures, the inverse pole figures and the Kernel Average Misorientation figures.

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