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Modeling brittle material failure under high velocity impact conditions: From experiments to simulations ANDREW TONGE, K.T. RAMESH, The Johns Hopkins University — Brittle materials have a deviatoric strength that is highly dependent on the applied pressure. To successfully model impact events involving brittle materials it is important to capture both the hydrostatic response, which is dominated by the equation of state, and the deviatoric response witch is dominated by the activation of microcracks within the material. The behavior of microcracks within the material is strongly affected by the applied pressure and gives rise to a material strength that is rate, size, and pressure dependent. In this work we present a material model that is based on an experimentally motivated micromechanics damage growth model coupled with a Mie-Gruneisen equation of state. We use this material model to simulate quarter inch glass spheres impacting a basalt cube at 2.2 km/s.

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