Abstract Submitted
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Deformation of an Iron-based bulk metallic glass at high strain-rates[1] GAURI KHANOLKAR, VERONICA ELIASSON, University of Southern California — Bulk metallic glasses (BMG) are multi-component, amorphous alloys that have garnered recent interest due to their high strength and hardness. Although extensive work on their response to quasi-static, uniaxial loading exists, the behavior of BMG, especially Iron-based ones, under dynamic shock loading has not been fully explored. In this work, we conduct reverse-Taylor plate impact experiments of an iron-based alloy commonly known as SAM2X5 at impact velocities up to 300 m/s using a gas gun, and at higher velocities of up to 2000 m/s using a powder gun, in order to determine its response to high strain-rate loading. Resulting deformation is observed under a Scanning Electron Microscope. Experiments at higher velocities are instrumented using a Velocity Interferometer System for Any Reflector. In addition, a Zr-based BMG commonly known as Vitreloy 106a will be also subjected to the same impact conditions, in order to compare its dynamic response with that SAM2X5. Since Iron alloys have higher densities than Zr ones (7.6 g/cc compared with 6.7 g/cc), it is expected to result in more superior strength properties for the former. A comparison of fracture morphologies and differences in spall strengths, Hugoniot elastic limits, magnitudes of strain-to-failure etc are studied.

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