Abstract Submitted
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Spall Response of Ti-Based Monolithic Bulk Metallic Glasses and their Composites[1] RENE DIAZ, MANNY GONZALES, CHRISTOPHER LO, GREG KENNEDY, Georgia Institute of Technology, DOUGLAS HOFMANN, NASA Jet Propulsion Lab, NARESH THADHANI, Georgia Institute of Technology — Titanium-based multicomponent bulk metallic glass matrix composites (BMGMCs) and monolithic bulk metallic glasses (BMGs) are investigated using uniaxial-strain plate-on-plate impact experiments to examine the effect of microstructure morphology on spall response under high pressure and their high strain-rate deformation. BMGMCs counteract the brittle nature of monolithic BMGs through in-situ formed crystalline dendrites which increase toughness and ductility. The Hugoniot Elastic Limit (HEL) and the spall strength of the samples was determined using VISAR from experiments performed at varying impact velocities. Post-mortem microstructural characterization was done on the recovered samples and correlated with the measured damage response. Preliminary experiments performed indicate spall strength decay with increased impact stress. The spall strength ranges for BMG and BMG-MC are 1.73 - 3.09 GPa and 3.54 - 4.32 GPa, respectively. The HEL ranges are 5.61 - 6.74 GPa for BMG and 5.59 - 7.41 GPa for BMGMC. Electron microscopy of fracture surfaces reveals the role that dendrites may play on spallation of BMG composites. The variation in spall strength and HEL of the as a function of increasing impact stress and associated microstructural changes will be presented.

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