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Pressure-Shear plate impact experiments of Magnesium at high pressures. SURAJ RAVINDRAN, ZEV LOVINGER, CHRISTIAN KETTENBEIL, MICHAEL MELLO, GURUSWAMI RAVICHANDRAN, California Institute of Technology — Magnesium and its alloys are widely used in the aerospace, automotive and defense industries, taking advantage of its high strength to weight ratio. However, these materials show strong anisotropy with its hexagonal close pack structure and texture, which must be understood under desired loading conditions. The experimental investigations probing into the anisotropic behavior of these materials at high pressures and strain rates are limited. In this study, experiments are conducted on extruded commercially pure magnesium and equal channel angular pressed AZ31B using pressure shear plate impact (PSPI) experiments. The strength and the behavior of the materials are measured at pressures up to 15 GPa and strain rates of 10^6 s^{-1}. The PSPI experiments enable to measure the materials under unique conditions, loading the material simultaneously in two directions. Different orientations of anisotropy are examined, where, normal compressive stresses are aligned in one direction and shear stresses, probing the material strength, are aligned perpendicular to it. The effect of anisotropy on the behavior of these materials under high pressures and strain rates are discussed and compared with the previous work on these materials. Keywords: Shock, Magnesium, AZ31B, Strength.

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