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**Experiments, constitutive modeling and FE simulations of the impact behavior of Molybdenum** GEREMY KLEISER, US Air Force Research Laboratory, BENOIT REVIL-BAUDARD, University of Florida — For polycrystalline high-purity molybdenum the feasibility of a Taylor test is questionable because the very large tensile stresses generated at impact would result in disintegration of the specimen. We report an experimental investigation and new model to account simultaneously for the experimentally observed anisotropy, tension-compression asymmetry and strain-rate sensitivity of this material. To ensure high-fidelity predictions, a fully-implicit algorithm was used for implementing the new model in the FE code ABAQUS. Based on model predictions, the impact velocity range was established for which specimens may be recovered. Taylor impact tests in this range (140-165 m/s) were successfully conducted for different specimen taken along the rolling direction (RD), the transverse direction and 45$^o$ to the RD. Comparison between the measured profiles of impact specimens and FE model predictions show excellent agreement. Furthermore, simulations were performed to gain understanding of the dynamic event: time evolution of the pressure, the extent of plastic deformation, distribution of plastic strain rates, and transition to quasi-stable deformation occurs.

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