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Plastic Response of Grain Boundaries in Copper under Shock Loading CHRISTIAN BRANDL, TIMOTHY C. GERMANN, Los Alamos National Laboratory — Previous molecular dynamics (MD) simulations have revealed that the preferred nucleation sites for dislocations at grain boundaries are related to the local atomic interface structure. Moreover, shock experiments discovered different post-mortem defect structures for low-energy and high-energy grain boundaries. In the present study, MD simulations are conducted to understand the structural origin of the differences in dislocation activity under shock compression, and failure upon unloading. We present MD simulations of shock loading conditions in copper bicrystals corresponding to grain boundaries studied in recent shock experiments of a columnar polycrystal. The defect structures produced in the MD studies are compared with the experimental post-mortem defect analysis, and the differences in the dynamic response are discussed in terms of the local grain boundary structures.

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