Title: Deformation Twinning in Shock Compressed Cu/Nb Nanolaminates

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We investigate deformation of Cu/Nb nanolaminates (synthesized via physical vapor deposition) induced by flyer plate impact. The peak shock pressure is about 6 GPa and the targets are soft-recovered with proper momentum traps. The as-deposited and shock-recovered samples are examined with high resolution transmission electron microscopy for comparison. Abundant deformation twins are found in the Cu layers, and only dislocations and a small amount of stacking faults, in Nb layers after shock. Most of the deformation twins in Cu layers are at certain angles with the Cu/Nb interface plane. Our results demonstrate that most deformation twins nucleate at the sites of interface dislocations induced by the distinct atomic structure and properties of Cu and Nb, a particular effect of the hetero-phase interfaces on plastic deformation. Interface-driven twinning as revealed by this study shows promise in tuning the plastic deformation mechanisms through the design of hetero-phase interface structures.