Abstract Submitted
for the SHOCK17 Meeting of
The American Physical Society

Simulation Twins Evolution of Polycrystalline Beryllium under Shock Wave Loading HAO PAN, XIAOMIAN HU, ZIHUI WU, Institute of Applied Physics and Computational Mathematics, Beijing — Beryllium is a metal with low density and high strength, so it has a wide use in the energy engineering and aeronautics. As a typical HCP material, twinning is another important mechanism for the plastic deformation of Be. On the basis of the thermo elastic viscoplatic crystal plasticity model, we consider the twinning deformation. We suggest that the twin deformation does not always increase along with the shear stress. When the volume fraction of twinning reaches a certain level, the grain will be fragmented. Using this model, the twinning evolution of the Be material under shock compression and the followed releasing is numerically simulated. The calculation of the shock/releasing velocity profiles of Be are in agreement with the experimental data. Be begins to undergo twinning at a lower pressure. Texture evolution and shear stress is very sensitive to the evolution of twinning. In the releasing process, we find the volume fraction of the twins also has a certain degree of increase.

Hao Pan
Institute of Applied Physics and Computational Mathematics, Beijing

Date submitted: 21 Feb 2017 Electronic form version 1.4