Abstract Submitted
for the SHOCK05 Meeting of
The American Physical Society

DRX-Induced Solid-State Flow and Projectile-Target Mixing During [001] Single-Crystal Tungsten Rod Penetration into Steel Targets
CARLOS PIZANA, L.E. MURR, I.A. ANCHONDO, C.Y. PINA, M.T. BAQUERA, The University of Texas at El Paso, El Paso. TX 79968 USA, T.L. TAMORIA, H.C. CHEN, General Atomics, San Diego, CA 92121 USA , SHELDON CYTRON, U.S. Army TACOM-ARDEC, Picatinny, NJ 07806 USA — Residual [001] single-crystal W penetrators have been examined by light and electron microscopy. The post-impact residual penetrators examined using energy-dispersive x-ray mapping, revealed target and penetrator mechanical mixing. Considerable intercalation activity was found to concentrate specifically within the material being eroded by DRX-assisted flow. The solid-state flow features including shear bands facilitate the mixing of the two. Peripherally along the head of the penetrator and adjacent to the shear band itself, large bands of high Ni steel appear to influence the solid-state flow of the penetrator. Residual microstructures obtained within the penetrator suggest localized melt zones due to thermal instabilities caused by the turbulent behavior in the high-pressure regime. Supported by the U.S. Army TACOM-Picatinny Arsenal.

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Date submitted: 07 Apr 2005 Electronic form version 1.4