Abstract Submitted
for the SHOCK15 Meeting of
The American Physical Society

Modelling and Simulation of Dynamic Recrystallization (DRX) In OFHC Copper at Very High Strain Rates GABRIEL TESTA, NICOLA BONORA, ANDREW RUGGIERO, University of Cassino and Southern Lazio, GIANLUCA IANNITTI, TECHDYN Engineering, MAGNUS HÖRNQVIST, NOOSHIN MORTAZAVI, Chalmers University of Technology — At high strain rates, the deformation process is essentially adiabatic and if the plastic work is large enough, dynamic recrystallization can occur. In this work, an examination on microstructure evolution in Dynamic Tensile Extrusion (DTE) test of OFHC copper, performed at 400 m/s, was carried out. EBSD investigations, along the center line of the fragment remaining in the extrusion die, showed a progressive elongation of the grains, and an accompanying development of a strong <001>+<111>dual fiber texture. Meta-dynamic discontinuous dynamic recrystallization (DRX) occurred at larger strains, and it was showed that nucleation occurred during straining. A criterion, based on the evolution of Zener-Hollomon parameter during the dynamic deformation process, was proposed. Finally, DTE test was simulated using the modified Rusinek-Klepaczko constitutive model incorporating restoring effects induced by recrystallization processes.

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Date submitted: 28 Jan 2015 Electronic form version 1.4