Abstract Submitted
for the SHOCK11 Meeting of
The American Physical Society

Modeling ductile metals under large strain, pressure and high strain rates incorporating damage and microstructure evolution GIANLUCA IANNITTI, NICOLA BONORA, ANDREW RUGGIERO, SIMONE DICHIARO, University of Cassino, Italy — In this work, a constitutive modeling that couples plasticity, grain size evolution (due to plastic deformation and dynamic recrystallization) and ductile damage has been developed. The effect of grain size on the material yield stress (Hall-Petch) and on the melting temperature has been considered. The model has been used to investigate computationally the behaviour of high purity copper in dynamic tensile extrusion test (DTE). An extensive numerical simulation work, using implicit finite element code with direct integration, has been performed and the results have been compared with available experimental data. The major finding is that the proposed model is capable to predict most of the observed features such as the increase of material ductility with the decreasing average grain size, the overall number and size of fragments and the average grain size distribution in the fragment trapped into the dime

Gianluca Iannitti
University of Cassino

Date submitted: 02 Feb 2011 Electronic form version 1.4