Abstract Submitted
for the SHOCK05 Meeting of
The American Physical Society

Mechanical Behavior of Nanostructured Materials at High Strain Rates. Computer Simulation VLADIMIR SKRIPNYAK, EVGENIA SKRIPNYAK, MIHAIL NAZAROV, Tomsk State University — In this paper, we present the new model of mechanical behavior of nanostructural materials (NsM) and nanocrystalline materials (NM) in wide range of strain rates. The model was used for computer simulation of shock wave dynamics in NsM α-Ti, Al, Cu, g and NM Al_2O_3, ZrO_2-Y_2O_3 ceramics. The inelastic strain causes by the deformation mechanisms at micro- and meso- scale levels. The results testify to distinctions of the mechanical behavior nanostructural and a course-grained ceramic materials and a metal alloys at shock wave loading. The model predicts that the shear stress of NM and NsM at high strain rates is less than ones of course-grained materials due to contributions to inelastic deformation of the grain boundary sliding.

Vladimir Skripnyak
Tomsk State University

Date submitted: 21 Jan 2005 Electronic form version 1.4