Abstract Submitted
for the SHOCK15 Meeting of
The American Physical Society

Effects of chemical composition and test conditions on the dynamic tensile response of Zr-based metallic glasses F. WANG[1], State Key Laboratory of Explosion Science and Technology, Beijing Institute of Technology, K.J. LAWS, UNSW Australia, C.P. TRUJILLO, MST-8, Los Alamos National Laboratory, A.D. BROWN, School of Engineering and Information Technology, UNSW Canberra, E.K. CERRETA, MST-8, Los Alamos National Laboratory, P.J. HAZELL, School of Engineering and Information Technology, UNSW Canberra, M.Z. QUADIR, M. FERRY, UNSW Australia, J.P. ESCOBEDO, School of Engineering and Information Technology, UNSW Canberra — The effects of impact velocity and temperature on the dynamic mechanical behavior of two bulk metallic glasses (BMG) with slightly different elemental compositions ($Zr_{55}Cu_{30}Ni_5Al_{30}$ and $Zr_{46}Cu_{38}Ag_8Al_{38}$) have been investigated. Bullet-shaped samples were accelerated by a gas gun to speeds in the $400 \sim 600$m/s range and tested at room temperature and 250 °C. The specimens impacted a steel extrusion die which subjected them to high strains at high strain-rates. The extruded samples were subsequently soft recovered by using low density foams. The deformed specimens were examined by optical and electron microscopy, x-ray diffraction and hardness measurements. The characterization results aided to assess the effect of chemical composition on the microstructural evolution, i.e. phase changes or crystallization, which might influence the ductility on the nominally brittle amorphous BMGs. The most significant results from this study will be presented.

[1]School of Engineering and Information Technology, UNSW Canberra

Juan Escobedo
Univ of New South Wales

Date submitted: 30 Jan 2015 Electronic form version 1.4