Abstract Submitted
for the SHOCK11 Meeting of
The American Physical Society

The Resistance to Deformation and Facture of Magnesium MA2-1 Under Shock-Wave Loading at 293 K and 823 K of the Temperature GENNADY GARKUSHIN, Institute of Problems of Chemical Physics RAS, Chernogolovka, 142432 Russia, GENNADY KANEL, Joint Institute for High Temperatures RAS, Moscow, 125412 Russia, SERGEY RAZORENOV, Institute of Problems of Chemical Physics RAS, Chernogolovka, 142432 Russia — The spall strength and elastic-plastic response have been measured with the VISAR for MA2-1 (94.2% Mg, 0.4 % Mn, 4.4% Al, 1% Zn) alloy at temperatures from 293 K to 823 K. The decay of elastic precursor wave at 293 K is approximately in reverse proportionality with the cubic root from the distance that corresponds to decrease of plastic strain rate from 5×10^5 s^{-1} at 0.25 mm (213 MPa of the shear stress) down to 5×10^3 s^{-1} at 10 mm (63 MPa shear stress). An analysis of the rise times of plastic shock waves shows by order of magnitude faster plastic strain rates at corresponding shear stresses than that at the HEL. The decay of elastic precursor wave is weaker and the dependence of initial plastic strain rate on the shear stress at HEL is stronger than that was observed for aluminum. Unlike to aluminum, the magnesium alloy does not exhibit anomalous thermal hardening: the HEL values at 823 K are close to the values at room temperatures. The temperature increase from 293 K to 823 K has led to significant decrease of the spall strength.

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Date submitted: 08 Feb 2011 Electronic form version 1.4