

Abstract Submitted
for the SHOCK05 Meeting of
The American Physical Society

Dynamic Mechanical Behavior of Nickel-Aluminum Reinforced Epoxy Composites MORGANA MARTIN, School of Materials Science and Engineering, Georgia Institute of Technology, SATHYANARAYA HANAGUD, School of Aerospace Engineering, Georgia Institute of Technology, NARESH THADHANI, School of Materials Science and Engineering, Georgia Institute of Technology — Epoxy-based composites reinforced with a mixture of micron-sized Ni and micron or nano-sized Al powders were fabricated as bulk materials by cast/curing. The structural/mechanical behavior of these materials was evaluated using elastic and plastic property measurements via static and dynamic compression tests performed on rod shaped samples. Reverse Taylor anvil-on-rod impact tests combined with velocity interferometry gave qualitative and quantitative information about the transient deformation and failure response of the composites. The material containing 20wt% epoxy and nano-sized Al powder showed the most superior mechanical properties in terms of elastic modulus, and static and dynamic compressive strength, and strain before fracture, as compared to the other reinforced cast materials. The results illustrate that nano-sized Al particles provide significant enhancement to strength of epoxy composites by dispersing in the epoxy and generating a nano-Al containing epoxy matrix with embedded Ni particles. Funding for this research was provided by AFOSR/MURI Grant No. F49620-02-1-0382.

Morgana Martin
School of Materials Science and Engineering, Georgia Institute of Technology

Date submitted: 08 Apr 2005

Electronic form version 1.4