

Abstract Submitted  
for the SHOCK09 Meeting of  
The American Physical Society

**Impact experiments with aluminum-helium bubbles targets**

BENNY GLAM, Ben Gurion University of the Negev, Beer Sheva, Israel, SHALOM ELIEZER, DANIEL MORENO, Soreq Nuclear Research Center, Yavne 81800, Israel, LIOR BAKSHI, Ben Gurion University of the Negev, Beer Sheva, Israel, MORIS SUDAI, Soreq Nuclear Research Center, Yavne 81800, Israel, DAN ELIEZER, Ben Gurion University of the Negev, Beer Sheva, Israel — The dynamic behavior of aluminum targets with helium bubbles was investigated in plane impact experiments. The targets were obtained by melting pure aluminum with 0.15% wt.  $^{10}\text{B}$  powder. The solid targets were irradiated at the Soreq nuclear reactor to get homogeneous helium atoms inside the aluminium boron 10 matrix according to the reaction  $^{10}\text{B} + n \rightarrow ^7\text{Li} + ^4\text{He}$ . In order to get bubbles, each target was heated to an appropriate temperature during a time that was estimated from our analytic approximation of the solution to a diffusion equation with a sink. The impact experiments were performed by accelerating aluminium impactor into different targets: (1) pure aluminum, (2) Al- $^{10}\text{B}$  and (3) Al- $^{10}\text{B}$  with different radiuses and concentrations of helium bubbles. From the free surface velocity measurements the spall strength was calculated and analyzed. Theoretical comparison between spall creation due to voids growth and bubbles growth was made. The impacted targets were collected after the impact experiments and examined by TEM. These targets were compared to TEM pictures before the impact. The number of helium atoms in the bubbles was calculated from the electron energy lose spectrum (EELS). Comparison of bubble radiuses and concentration before and after the impact leads to the conclusion that helium atoms that were distributed in the aluminum before the impact were added to the bubbles after the impact.

Benny Glam  
Ben Gurion University of the Negev, Beer Sheva, Israel

Date submitted: 19 Feb 2009

Electronic form version 1.4