

LA-UR-03-3171

Approved for public release;  
distribution is unlimited.

**Title:** GRAIN REFINEMENT IN BERYLLIUM BY EQUAL CHANNEL ANGULAR EXTRUSION

**Author(s):** David J. Alexander, Michael E. Mauro, Jason C. Cooley,  
Larry B. Dauelsberg  
Los Alamos National Laboratory  
MST-6  
Los Alamos, NM 87545

**Submitted to:** To be presented at 15th Target Fabrication Specialists  
Meeting, Gleneden Beach, Oregon, June 1-5, 2003



Los Alamos National Laboratory, an affirmative action/equal opportunity employer, is operated by the University of California for the U.S. Department of Energy under contract W-7405-ENG-36. By acceptance of this article, the publisher recognizes that the U.S. Government retains a nonexclusive, royalty-free license to publish or reproduce the published form of this contribution, or to allow others to do so, for U.S. Government purposes. Los Alamos National Laboratory requests that the publisher identify this article as work performed under the auspices of the U.S. Department of Energy. Los Alamos National Laboratory strongly supports academic freedom and a researcher's right to publish; as an institution, however, the Laboratory does not endorse the viewpoint of a publication or guarantee its technical correctness.

Form 836 (8/00)

Abstract for 15th Target Fabrication Specialists Meeting, Gleneden Beach, Oregon,  
June 1-5, 2003

## Grain Refinement in Beryllium by Equal Channel Angular Extrusion

David J. Alexander, Michael E. Mauro, Jason C. Cooley, Larry B. Dauelsberg  
Los Alamos National Laboratory  
MST-6, Alloy Design and Development  
Los Alamos, NM 87545

Ultrafine-grained Be is the material of choice for fabrication of the NIF target capsules. One method of producing ultrafine grains in metals is by imposing very large strains. Equal channel angular extrusion (ECAE) has been used to achieve these high strains. Previous work has shown that powder-source Be can be successfully processed by ECAE. Pure Be and Be-0.9 at% Cu alloys have been arc melted and cast into billets 5 mm in diameter by 30 mm in length. These billets were enclosed in cans fabricated from commercial purity Ni, with an electron-beam welded end plug. These cans were extruded at 425°C in ECAE tooling with a 120° angle between the inlet and outlet channels. The billets were extruded up to 4 times. The microstructures of the powder-source Be and the arc-melted Be and Be-0.9 at% Cu materials will be presented, and the effects of the ECAE processing on the grain size will be discussed.