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Development of a Mechanistic Understanding of High-Temperature Deformation of Alloy EP-823: Task 10, First Quarter Report

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Task 10. First Quarter Report

MEMORANDUM

To: Drs. Anthony Hechanova and Gary Cerefice, HRC
From: Drs. Ajit Roy and Brendan O'Toole, MEG
Date: November 26, 2001

Subject: AAA Task-10 Quarterly (9/1 – 11/30, 2001) Report

Introduction

The objective of this task is to evaluate the elevated temperature tensile properties of Alloy EP-823, a leading target material for accelerator-driven waste transmutation applications. The test material will be thermally treated prior to evaluation of its tensile properties at temperatures relevant to the transmutation applications. The deformation characteristics of tensile specimens, upon completion of testing, will be evaluated by surface analytical techniques including scanning electron microscopy (SEM) and transmission electron microscopy (TEM). The overall results are expected to provide a mechanistic understanding of high-temperature deformation behavior of Alloy EP-823 as a function of heat treatment.

Personnel

The current project participants are listed below.

Principal Investigators: Dr. Ajit K. Roy
Dr. Brendan J. O'Toole
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Investigators (UNLV): Mr. Martin Lewis (M.S. Student)
Mr. John Motaka (Undergraduate Student)
Department of Mechanical Engineering, UNLV
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Motaka: Phone: (702) 205-4203 email: primo_w@yahoo.com

Collaborator (DOE): Dr. Stuart A. Maloy, Los Alamos National Laboratory, New Mexico
Phone: (505) 667-9784 email: Maloy@lanl.gov

Highlights of Accomplishment

- Mr. Martin Lewis has joined the Department of Mechanical Engineering (MEG) as a graduate student (M.S.) pursuing his M.S. thesis in the subject research topic. In addition, Mr. John Motaka, an undergraduate MEG student, is also assisting in experimental work.
- An expenditure request form has been prepared and submitted to procure a high-temperature and inert gas chamber with extension rod assembly and system software to perform high-temperature mechanical testing of Alloy EP-823 using an existing MTS machine in the Engineering Building. The approximate cost of this chamber assembly is \$47,000.
- Three experimental heats of Alloy EP-823 have been melted. These ingots are currently being processed by hot working to convert them into bars at the vendor's facility, and will subsequently be shipped to UNLV for thermal treatments and specimen machining.

Problems

The future location of the MTS equipment is yet to be established. Assuming that it stays in its current location in B#150, no problems are anticipated.

Status of Funds

Expenditures incurred during this quarter are within the target amount allocated.

Plans for Next Quarter

- Prepare test matrices.
- Heat treat test materials, machine and prepare test specimens.
- Initiate mechanical testing using MTS with new chamber.