The Minerals, Metals, and Materials Society (TMS) Annual Meeting,
Symposium on Mechanical Behavior, Microstructure, and Modeling of Titanium and Its Alloys, March 9 – 13, 2008, New Orleans, Louisiana

Low-Temperature Tensile and Creep Deformation Behavior of Grade 7 Commercially Pure Titanium Alloy

P.G. Oberson[1]
U.S. Nuclear Regulatory Commission
Washington, DC 20555, USA
[1]Research performed while employed by
Ankem Technologies Inc.

S. Ankem
Ankem Technologies Inc.
14616 Orangewood St.
Silver Spring, MD 20105, USA

K.T. Chiang[3] and L. Ibarra[2]
[2]Center for Nuclear Waste Regulatory Analyses
[3]Southwest Research Institute®
6220 Culebra Road
San Antonio, TX 78238, USA

ABSTRACT

The drip shield design considered by the U.S. Department of Energy includes Titanium Grade 7 (Ti-0.2wt%Pd-0.13wt%O) components. The tensile and creep behavior of Grade 7 Titanium alloy was independently investigated by the Center for Nuclear Waste Regulatory Analyses (CNWRA) at low temperatures (25 to 250 ^{o}C [77 to 482 ^{o}F]). The tensile behavior exhibited flow stress drops that increased with an increase in temperature. This behavior was attributed to a rise in the mobile dislocation density. In regard to creep deformation, there was no change in the amount of creep strain with an increase in temperature at 85% of the respective yield stress. This behavior was attributed to a change in the deformation mechanisms from slip and twinning at low temperatures (25 to 50 ^{o}C [77 to 122 ^{o}F]) to solely slip at higher temperatures.

Disclaimer: This abstract is an independent product of the CNWRA and does not necessarily reflect the view or regulatory position of the NRC. The NRC staff views expressed herein are preliminary and do not constitute a final judgment or determination of the matters addressed or of the acceptability of a license application for a geologic repository at Yucca Mountain.