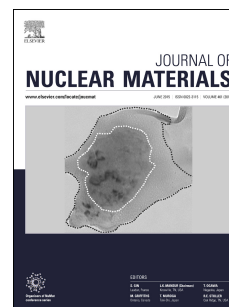


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Thermomechanical process optimization of U-10wt% Mo – Part 2: The effect of homogenization on the mechanical properties and microstructure

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ABSTRACT

In the first part of this series, it was determined that the as-cast U-10Mo had a dendritic microstructure with chemical inhomogeneity and underwent eutectoid transformation during hot compression testing. In the present (second) part of the work, the as-cast samples were heat treated at several temperatures and times to homogenize the Mo content. Like the previous as-cast material, the “homogenized” materials were then tested under compression between 500 and 800°C. The as-cast samples and those treated at 800°C for 24 hours had grain sizes of 25-30 μm , whereas those treated at 1000°C for 16 hours had grain sizes around 250 μm before testing. Upon compression testing, it was determined that the heat treatment had effects on the mechanical properties and the precipitation of the lamellar phase at sub-eutectoid temperatures.

KEYWORDS: U-10wt% Mo, Mechanical Properties, Microstructure, Compression Testing

1 Introduction

Thermomechanical processing and modeling of metals and alloys require fundamental understanding of the initial and the intermediate or developing microstructures and their corresponding mechanical properties. The eventual properties and performance of the end product is normally a function of the initial microstructure and the processing route employed. Development of uranium with 10 wt% molybdenum (U-10Mo) fuel plate for research reactors is

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