# **Accepted Manuscript**

Effect of Irradiation Mode on the Microstructure of Self-Ion Irradiated Ferritic-Martensitic Alloys

E. Getto, Z. Jiao, A.M. Monterrosa, K. Sun, G.S. Was

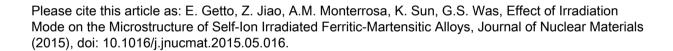
PII: S0022-3115(15)30006-4

DOI: 10.1016/j.jnucmat.2015.05.016

Reference: NUMA 49096

To appear in: Journal of Nuclear Materials

Received Date: 4 March 2015
Revised Date: 18 May 2015
Accepted Date: 25 May 2015



This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.



### ACCEPTED MANUSCRIPT

## Effect of Irradiation Mode on the Microstructure of Self-Ion Irradiated Ferritic-Martensitic Alloys

E. Getto<sup>1a</sup>, Z. Jiao<sup>a</sup>, A.M. Monterrosa<sup>a</sup>, K. Sun<sup>b</sup>, G.S.Was<sup>a,b</sup>

#### **Abstract**

The microstructures of ferritic-martensitic alloys HT9 and T91 were characterized following 5 MeV Fe<sup>++</sup> ion irradiation to 140 displacements per atom (dpa) at 440°C with either a raster-scanned or defocused beam. Alloys were pre-implanted with 0-100 appm He and then subjected to either a raster-scanned beam or a defocused beam. Relative to the defocused beam, a raster-scanned beam suppressed microstructural evolution, evidenced by decreased diameter and number densities of voids, loop and precipitates, which lead to decreased void swelling, precipitate volume fraction and total dislocation loop line density. These results were consistent with the Fully Dynamic Rate Theory (FDRT) model which predicts that raster-scanning should lead to a decrease in defect population and suppression of nucleation and growth processes.

Keywords: Void Swelling; Ferritic-Martensitic alloys, Radiation effects; Raster-scanned, Defocused

1

<sup>&</sup>lt;sup>a</sup> Department of Nuclear Engineering and Radiological Sciences, University of Michigan, Ann Arbor, MI 48109 United States

<sup>&</sup>lt;sup>b</sup> Department of Materials Science Engineering, University of Michigan, Ann Arbor, MI 48109 United States

<sup>&</sup>lt;sup>1</sup>Cooresponding Author: Phone: +1-734-736-0266; Email: <a href="mailto:embecket@umich.edu">embecket@umich.edu</a>; Address: 2355 Bonisteel Blvd, Ann Arbor, MI 48190

## Download English Version:

# https://daneshyari.com/en/article/7965155

Download Persian Version:

https://daneshyari.com/article/7965155

<u>Daneshyari.com</u>