



IAEA FEC 2014

Contribution ID: 718

Type: Poster

Neutron Irradiation Effects on Grain-Refined W and W-Alloys

Friday, October 17, 2014 8:30 AM (4 hours)

Microstructural data of neutron irradiated W such as size and number density of voids and precipitates obtained by W up to 1.5dpa irradiation in the temperature range of 400-800°C were compiled quantitatively. Nucleation and growth process of these defects were clarified and a qualitative prediction of the damage structure development and hardening of W in fusion reactor environments were made taking into account the solid transmutation effects for the first time. Irradiation behavior of grain-refined W-alloys, produced by K- or La-doping, was also examined. Expected radiation resistant W-alloys, by combined Re addition and the grain refining process, were fabricated and characterization of unirradiated state were performed.

Country or International Organisation

Japan

Paper Number

MPT/1-4

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Session Classification: Poster 7