Contribution ID: **45** Type: **not specified**

Ion-beam implantation to simulate radiation damage in novel metallic systems for nuclear fusion applications

Wednesday 12 June 2024 13:50 (15 minutes)

Ballistic damage due to scattering plays a key role in the degradation of nuclear materials. Due to the challenge of low flux, material activation and irrelevant beam spectra, researchers into fusion materials often rely on simulating ballistic damage through ion implantation. In this work, heavy ion implantation has been carried out in HZDR using a Ti ion beam at 500 °C and a fluence of 1x10ˆ17 ions/cmˆ2 to achieve 15 dpa, in order to simulate ballistic damage on a novel metal alloy, Ta30-V30-Ti30-W5-Fe5. This alloy has been designed to show improved radiation damage resistance due to the presence of a BCC matrix phase reenforced with secondary phase. SEM, APT, GI-XRD and nanoindentation have been used to characterise the materials'radiation response and verify alloy design methods. The use of APT shows implantation -induced clustering at dislocation features, with GI-XRD showing structural stability even to high implantation levels. Nanoindentation work suggests that in the aged condition, the material resists irradiation hardening supporting the hypothesis that a secondary C15 Laves phase has potential to improve irradiation responses in BCC alloys.

Authors: YEATES, Sam (The University of Sheffield); Mr YEATES, Sam (The University Of Sheffield)

Presenters: YEATES, Sam (The University of Sheffield); Mr YEATES, Sam (The University Of Sheffield)

Session Classification: Parallel talks