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# *$He^+$ ion Irradiation on Tungsten Surface in Extreme Conditions*

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## ABSTRACT

Higher melting point (3695K), lower sputtering yield and most importantly, lower in-bulk, and co-deposit retention at elevated temperature makes tungsten (W) as a potential candidate for plasma-facing component (PFC) in the international thermonuclear experimental reactor (ITER)-divertor. Helium ion ($He^+$) bombardment on W can cause wide variety of microstructural evolution, such as dislocation loops, helium holes/bubbles and fibre-form nanostructures (Fuzz) etc. In this work, 100 eV $He^+$ ion irradiation, at temperature ranges from 500°C to 1000°C, will be performed on mechanically polished mirror like W surfaces. The surface modification and compositional analysis, due to ion irradiation, will be studied using Scanning electron- (SEM) and Atomic force- (AFM) microscopy and X-ray photoelectron spectroscopy (XPS), respectively. The formation of fibre-form nanostructures was observed for temperatures in the range of 650°C to 1000°C. It was also noted that the incident ion energy and the fluence, that the material underwent, were crucial parameters for fibre-form nanostructure formation.

## KEYWORDS

Plasma facing component, ITER, dislocation loops, helium holes, fibre-form nanostrucutres.

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