Seminar

Institute for Plasma Research

Title : Study of Defects Due to Ions Irradiation in Tungsten Foil by Transmission Electron Microscopy

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Date : 21st December 2018 (Friday)

Time : 3.30 PM

Venue : Seminar Hall, IPR

Abstract :

Tungsten is a candidate material for plasma facing wall for divertor in magnetic confinement nuclear fusion reactors. Where it will be subjected to a harsh environment of high energy neutrons and charged particles bombardment. The ion beam technology is being used to imitate neutron damage in tungsten, since high energy and high flux neutron source are not available. Present work concerns irradiation of recrystallized tungsten foils with various type of ions of low and high energies. The post characterization was carried out in order to understand the effect of various ions irradiation on microstructure and defects formed during irradiation of tungsten. The high energy Gold (Au 80MeV) and Boron (B 10MeV) ions were irradiated with same fluence (1.3×10^{14} ions/cm^2) in tungsten foils. Irradiation of 10MeV Boron ions were carried out with two different fluences 1.3×10^{14} B/cm^2 and 1.0×10^{15} B/cm^2 to investigate the effect of fluence on defect structure. Apart from high energy ions irradiation, the low energy deuterium (D) ions (100keV) and helium (He) ions (250keV) were also irradiated in tungsten foils. The D and He ions irradiation were carried out with the fluence of 5×10^{17} D/cm^2 and 5×10^{15} He/cm^2. The ions irradiated foils were analyzed under electron microscopy for microstructure and defect structure investigation in the terms of defect types, their density and sizes. Same fluence of Au and B ions could create defects with different characters and a range of their densities of various sizes. The dislocations and defect clusters with varying sizes and densities were found to be in all the ions irradiated foil, on the other hand dislocation loops were observed in B and D irradiated samples.