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Development of nanostructures on plasma facing components DAVID RUZIC, PETER FIFLIS, KISHOR KUMAR KALATHIPARAMBIL, University of Iliinois at Urbana-Champaign — Exposure to low temperature helium plasma, with parameters similar to tokamak edge plasmas, have been found to induce the growth of nanostructures on tungsten. These nanostructures results in an increase in the effective surface area, and will alter the physical properties of the components. Although this has several potential applications in the industrial scenario, it is an undesired effect for fusion reactor components, and is hence necessary to understand their growth mechanisms in order to figure out suitable remedial schemes. Work done using a high density, low temperature helicon discharge plasma source with a resistively heated tungsten wire immersed in the discharge as the substrate have demonstrated the well-defined stages of the growth as a function of total fluence. The required fluence was attained by extending the exposure time. Extensive research work has also shown that a variety of other materials are also prone to develop such structures under similar conditions. In the present work, the effect of the experimental conditions on the various stages of structure development will be presented and a comparison between the structures developed on different types of substrates will be shown.

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