Abstract Submitted
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Growth of tungsten nano-tendrils in the Alcator C-Mod lower divertor[1] G.M. WRIGHT, MIT Plasma Science and Fusion Center, Cambridge, MA, D. BRUNNER, B. LABOMBARD, B. LIPSCHULTZ, J.L. TERRY, D.G. WHYTE, ALCATOR C-MOD TEAM — The conditions for the growth of tungsten (W) nano-tendrils have been well defined in linear plasma devices ($T_{surface}$ >900 K, Γ_{He+} >10^{22} $m^{-2}s^{-1}$, 10 eV<E_{He+} <150 eV) but, until now, there has been no documented nano-tendril growth in a tokamak environment. We have exploited the high power density and all-metal wall in Alcator C-Mod to successfully grow W nano-tendrils on a Langmuir probe (ramped $\sim 10^o$ into the parallel plasma flux) in the lower divertor during a single run day. Scanning electron microscopy shows fully formed nano-tendrils over the surface of the probe after an estimated 15-30 seconds of growth time. Having shown that these nano-tendrils can form in a tokamak divertor and given that the growth conditions are met in an all-W ITER divertor during the DT phase, this provides strong evidence that these types of "fuzzy" surfaces will be present in the ITER divertor. The effects of this extreme surface morphology on plasma-surface interactions remains unclear, but possible implications for ITER operation will be discussed.

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