Effect of temperature on D retention in WN_x layers exposed to low-energy, high-fluence D plasmas

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For a burning plasma device (ITER), the removal of radiative power by seed impurities will be inevitable to avoid divertor damage by excessive heat flux [1]. N_2 gas is likely to be used to reduce the power load. However, because of re-deposition phenomena, WN_x compounds will be produced in the divertor and tritium retention is issue of concern. We report experiments using the GYM linear plasma device that examined D retention in WN_x compounds exposed to D plasma at divertor relevant fluence ($\approx 10^{24}$ m^{-2}) as a function of temperature in the range of 300-750 K. In order to determine the D retention, the WN_x specimens were examined ex situ by Elastic Recoil Detection Analysis (ERDA). It is shown that WN_x compounds have very similar D retention, lower than the case of the tungsten without nitrogen and in any case lower than the acceptable limit for operation in ITER [2].

[1] *K. Tobita et al, Nucl. Fusion **49** (2009) 075029*
[2] *E. Vassallo et al, Journal of Nuclear Materials **466** (2015) 621-626*