

26th Symposium on Fusion Technology, 27 September - 1 October 2010, Porto - Portugal**PLASMA CLEANING TECHNIQUE FOR THE REMOVAL OF MIXED MATERIALS**

E. Vassallo¹, A. Cremona¹, D. Dellasega², F. Delleri¹, F. Ghezzi¹, G. Grosso¹, L. Laguardia¹

¹*Istituto di Fisica del Plasma "P. Caldirola" CNR, EURATOM-ENEA-CNR Association, Milano, Italy*

²*NEMAS and Dipartimento di Energia, Politecnico di Milano, Milano, Italy*

Corresponding author: vassallo@ifp.cnr.it

Erosion of materials by physical sputtering is the most fundamental of plasma–surface interactions in tokamaks[1]. Carbon and tungsten materials planned to be used in ITER divertor can be eroded producing local redeposition of mixed layers. Tritium retention in mixed materials is the major concern due to the limits imposed for safety reason by nuclear licensing. No technique has yet been proven capable of remove trapped tritium in the ITER operating environment. In-situ oxidative cleaning techniques have been developed to remove co-deposits[2]. Since oxygen can be incompatible with Be first wall (getter effect), a plasma cleaning using H₂, N₂ and noble gases has been proposed in this work. The mixed materials was produced by capacitively coupled rf plasma sputtering. The process has been investigated by the mass spectrometry and the optical emission spectroscopy. The morphology and chemical state of mixed materials have been investigated by the use of SEM and XPS analyses.

[1] R.A. Langley et al., Nucl. Fus., Special Issue 1984, IAEA, Vienna (1984).

[2] F.L. Tabares et al., Plasma Phys. Control. Fus. 46 (2004) B381.