

XPS ANALYSIS OF SS304 SURFACES MODIFIED BY NITROGEN PIII USING MAGNETIC FIELD

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Plasma immersion ion implantation (PIII) in the inner of tubes was performed in presence of magnetic field. Metallic tubes with 40 mm diameter and 150 mm length were placed in a large vacuum chamber of 600 liters after to carry out the PIII treatment. For generation of the axial magnetic field, four magnetic coils were mounted on the PIII chamber [1]. Nitrogen gas at 6×10^{-2} mbar was used to create the plasma while the pulse parameters were kept constant in 6kV/20 μ s/400 Hz. Two arrangements were used in presence of magnetic field: (1) tube without auxiliary electrode (AE) and (2) tube with a grounded AE. For studying the effects of the treatment, several disks made of stainless steel (SS) 304 were placed inside tube to be treated for 60 min. The aim of this work is to show the possibility of routine application of XPS in analyzing surfaces modified. The study of the surface composition of a material is not always sufficient. In the case of PIII, it becomes necessary to know the chemical composition of the inner layers. To reach these layers, we use an etching ion gun to clean the specimen surface quite rapidly. This technique is a complement to XPS and allows determining the concentration profile of the species making up the material. An argon beam is used for etching. These ions are accelerated and bombard the surface of the specimen. The ion impacts on the material pull out the superficial atoms. This etching reveals a new layer which is then characterized by XPS. Metallic and oxide states were observed in all cases, with significantly reduced oxidation on the sample treated in discharges inside a conducting tube with the presence of the AE. Work supported by FAPESP, Capes and CNPq Proc. 30008/2015-7/PCI-DA. [1] E.J.D.M.Pillaca, M. Ueda, S.F.M.Mariano, R.M. Oliveira. Surf.& Coat. Tech., 249, 104-108 (2014).