

PO1030

**Titanium and ITO surface modification with Protein : evaluation by Non-contact and Non- destructive Kelvin probe technique**

Subrahmanyam Aryasomayajula, Priyamvada Jain, Krishnamurthy Janakiraman, V V Raghavendra Sai

Indian Institute of Technology Madras, Chennai, India

manu@iitm.ac.in

Titanium and its alloys are widely used for bio-medical implants due to their high strength, remarkable biocompatibility, resistance to corrosion, conduciveness to Osseo integration etc. Tin doped indium oxide (ITO) is a bio-compatible thin film. The tissue - metal or metal oxide surface interactions are fundamentally important in assessing the functionality of the implants. Kelvin probe is a non-contact and non-destructive technique to measure the surface work function of the metals; even after the measurement, the surface remains in this technique. The surface work function is very sensitive to any charge transfer process from proteins (a major constituent of tissues) to the surface of the metal. In the present study, piranha solution cleaned Titanium surfaces (10 mm x 10 mm) and freshly coated ITO thin films are immersed in different proteins: (I) lysozyme (14 kilo Daltons, kDa), (ii) carbonic anhydrase (30 kDa), (iii) bovine serum albumin (66 kDa) and (iv) human immunoglobulin (150 kDa). The surface work function of the virgin and protein treated Titanium and ITO surfaces have been measured. The surface work function results show substantial evidence of surface modification of Titanium and ITO with the proteins. Even after thorough washing steps, the protein dipped Titanium and ITO surfaces show significant modification. The surface work function results are being analysed to correlate the protein concentration to the surface modification.

**Keywords**

Kelvinprobe

Surface Workfunction

ITO

Protiens