

Iron(III)-Tosylate Doped PEDOT and PEG: A Nanoscale Conductivity Study of an Electrochemical System with Biosensing Applications

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Abstract : The addition of PEG of different molecular weights has important effects on the physical, electrical and electrochemical properties of iron(III)-tosylate doped PEDOT. This particular polymer can be easily spin coated over plastic discs, optimizing thickness and uniformity of the PEDOT-PEG films. The conductivity and morphological analysis of the hybrid PEDOT-PEG polymer by 4-point probe (4PP), 12-point probe (12PP), and conductive AFM (C-AFM) show strong effects of the PEG doping. Moreover, the conductive films kinetics at the nanoscale, in response to different bias voltages, change radically depending on the PEG molecular weight. The hybrid conductive films show also interesting electrochemical properties, making the PEDOT PEG doping appealing for biosensing applications both for EIS-based and amperometric affinity/catalytic biosensors.

Keywords : atomic force microscopy, biosensors, four-point probe, nano-films, PEDOT

Conference Title : ICBEET 2017 : International Conference on Biomedical Engineering and Biosensor Technologies

Conference Location : Barcelona, Spain

Conference Dates : November 02-03, 2017