

**Master 2016**

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**Coating of Implantable Electrodes with PEDOT for Neural Recording and Stimulation.**

***ABSTRACT - Masterthesis***

It is necessary to develop new materials with low interface impedance and large charge transfer capacity for the process of neural prostheses. In this process implantable electrodes will be coated by PEDOT, which simultaneously record and stimulate neural activity. For this application, usage of conducting polymer poly (3,4-ethylenedioxythiophene) (PEDOT) will be explored.

Characterization will be performed using electrochemical impedance spectroscopy for impedance measurements and cyclic voltammetry will be performed to measure the charge transfer capacity. The major advantage of using PEDOT for electrode coating is its stability compared to other polymers. Previous studies revealed that PEDOT coated electrodes showed a charge injection limit 15 times higher than Platinum Iridium (PtIr) and electroplated Iridium Oxide (IrOx) electrodes when using constant current stimulation at zero voltage bias.

Before performing the coating analyses, electrodes will be designed using CoventorWare software and later fabrication of electrodes will be done at cleanroom IMSAS used for characterization. The main intention of the project is to find out the optimum values of Impedance, Charge Storage Capacity, Deposition time, Current Density by varying deposition parameter of the PEDOT coating.