Name: Ekram Hamdy El-Sayed El-Ads

Faculty: Science

Dept.: Chemistry

Degree: M.Sc.

Title of Thesis: Electrochemical Sensor Modified Electrodes for the Detection of Some Neurotransmitter Compounds and Pain Reliever Drugs

Supervisors: Dr. Nada Farouk Ahmed Atta

Abstract:

The electrochemical determination of some catecholamine neurotransmitters, and pain reliever drugs was enhanced in presence of sodium dodecyl sulfate (SDS) at modified electrodes by probing cysteine self-assembled monolayers (SAM) over gold nanoparticles surface, and by depositing gold nanoparticles over poly (3,4-ethylenedioxythiophene) film. Electrochemical measurements showed that the presence of SAM of cysteine on gold nanoparticles enhances the reversibility and the long term stability of the redox signals. Moreover, the inclusion of gold nanoparticles into the conducting polymer matrices strongly increases their electrocatalytic properties towards the compounds of study in presence of SDS. Different parameters relevant to sensors were considered such as the sensitivity, selectivity, stability of the redox signals, as well as detection limits.

Keywords:
Sensor; Self-assembly monolayer; Gold nanoparticles; Conducting polymers; Surfactant; Catecholamine neurotransmitters; Ascorbic acid; Morphine; SEM; AFM.