Abstract:

Anthracene sulfonic acid doped polyaniline nanomaterials were prepared through the chemical oxidative polymerisation process. Ammonium peroxydisulfate (APS) was employed as oxidant. Scanning electron microscopy (SEM) results show the resultant polyaniline (PANi) materials exhibited nanofibrillar morphology with diameter sizes less than 300 nm. Using the nanofibrillar PANI, amperometric biosensors for H2O2 and erythromycin were constructed through the drop-coating technique. Anthracene sulfonic acid (ASA) doped PANi and the test enzymes horseradish peroxidase, (HRP), or cytochrome P450 3A4, (CYP4503A4) were mixed in phosphate buffer solution before drop coating onto the electrode. The resultant biosensors displayed typical Michaelis-Menten behaviour. The apparent Michaelis- Menten constant obtained was 0.18-0.01 mM and 0.80-0.02 µM L-1 for the peroxide and erythromycin biosensor respectively. The sensitivity for the peroxide sensor was 3.3x10-3A .cm-2 mM-1, and the detection limit was found to be 1.2x10-2 mM respectively. Similarly, the sensitivity for the erythromycin sensor was in the same order at 1.57x10-3 A . cm-2 mM-1 and detection limit was found to be 7.58x10-2 µM.