

Title : Fabrication of Polyaniline and Poly(3-aminobenzoic acid) copolymer thin film by electropolymerization

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ABSTRACT

The fabrication of thin films of polyaniline (PANI), poly(3-aminobenzoic acid) (PABA), and the PANI/PABA copolymer was carried out using the electropolymerization technique for potential applications in target biomolecule detection. The preparation of PANI and PABA thin films was conducted via cyclic voltammetry (CV) using aniline (ANI) and 3-aminobenzoic acid (3-ABA) monomer solutions, respectively, in sulfuric acid (H_2SO_4) as the electrolyte. The PANI/PABA copolymer thin film was synthesized by electropolymerization of both monomers at a 1:1 ratio onto a fluorine-doped tin oxide (FTO)-coated glass substrate, which served as the working electrode. The reference and counter electrode were Ag/AgCl and Pt wire, respectively. The electrochemical properties of the PANI, PABA, and PANI/PABA copolymer thin films were investigated using cyclic voltammetry. The results revealed that the PANI/PABA thin film exhibited a higher redox (oxidation/reduction) current than the individual PANI and PABA films, which indicating a larger active surface area and enhanced electron transfer efficiency. Furthermore, scanning electron microscopy (SEM) and ATR-FTIR (Attenuated Total Reflection Fourier Transform Infrared Spectroscopy) analyses confirmed the formation of the polymeric structures. In conclusion, the PANI/PABA thin film demonstrated promising potential for application as an electrochemical sensor for biomolecule detection, owing to its favorable electrochemical properties and high active surface area, which could further improve the sensitivity and specificity of future sensor developments.

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