

Electrocatalytic Oxidation of Diethylaminoethanethiol and Hydrazine at Single-walled Carbon Nanotubes Modified with Prussian Blue Nanoparticles

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ABSTRACT

In this work, edged plane pyrolytic graphite electrode EPPGE was modified with functionalised single-walled carbon nanotubes and Prussian blue nanoparticles (PB). The modified electrode was characterised by techniques such as TEM, FTIR, XPS, EDX and cyclic voltammetry. The EPPGE-SWCNT-PB platform exhibited enhanced electron transport and catalytic efficiency towards the oxidation of Diethylaminoethanethiol (DEAET) and hydrazine compared with the other electrodes studied. The EPPGE-SWCNT-PB showed good electrochemical stability in the analytical solution, showing limit of detection in the micromolar range and catalytic rate constant of 3.71×10^6 and $7.56 \times 10^6 \text{ cm}^3 \text{ mol}^{-1} \text{ s}^{-1}$ for DEAET and hydrazine respectively. The adsorption properties of these analytes that impact on their detection at the SWCNT-PB film modified electrode were evaluated and discussed.