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Cyclic voltammetry and electrochemical impedance spectroscopy of partially reduced graphene oxide - PEDOT:PSS transducer for biochemical sensing (Conference Paper)

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Abstract

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Electron-transfer kinetics and impedance at the electrode-solution interface affect biosensor performance. Cyclic voltammetry (CV) and electrochemical impedance spectroscopy (EIS) are used to understand the reversibility of electron transfer and impedance at the electrode-solution interface, respectively. Effective surface areas calculated based on the Randles-Sevcik equation for a bare screen-printed carbon electrode (SPCE), a graphene oxide (GO)-poly (3,4-ethylenedioxythiophene):polystyrenesulfonic acid (PEDOT:PSS)–modified electrode (GO-PEDOT:PSS/SPCE), a partially reduced graphene oxide-PEDOT:PSS–modified electrode (prGO-PEDOT:PSS/SPCE), and glucose oxidase (GOx) crosslinked with glutaraldehyde on partially reduced graphene oxide-PEDOT:PSS–modified electrodes (GOx/prGO-PEDOT:PSS/SPCE) are 0.0717 mm^2, 0.0794 mm^2, 0.219 mm^2, and 0.160 mm^2, respectively. Nyquist plots from EIS show charge transfer resistance (Rct) of 430 μΩ, 148.2 Ω, 200.7 Ω, and 209.6 Ω, respectively, for the same electrodes. The high effective surface area and the Rct of prGO-PEDOT:PSS/SPCE indicate that the prGO-PEDOT:PSS composite is suitable as a transducer layer for glucose biosensing. © 2018 IEEE

SciVal Topic Prominence

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Engineering uncontrolled terms: Charge transfer resistance | Effective surface area | Electrical impedance spectroscopy | Electron transfer kinetics | PEDOT:PSS | Poly-3 ,4-ethylenedioxythiophene | Reduced graphene oxides | Screen-printed carbon electrodes

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