Facile Synthesis of NiO/CuO/reduced Graphene Oxide Nanocomposites for Use in Enzyme-free Glucose Sensing

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In this work, reduced graphene oxide (rGO) supported biocatalyst of NiO/CuO nanocomposites were prepared on glassy carbon electrode (GCE) through a facile and direct electrochemical method. Scanning electron microscopy, energy dispersive X-ray spectroscopy (EDX) and electrochemical techniques were used to characterize the obtained modified electrode. In alkaline solution, the NiO/CuO/rGO nanocomposites exhibited superior electrocatalytic performance to glucose oxidation compared to monometallic oxide counterparts of NiO/rGO and CuO/rGO. The influences of NaOH concentration, duration time for electrodeposition, and applied potential on the amperometric responses of glucose were optimized. Under optimal conditions, the amperometric sensor demonstrated the wide linear range (5 μM -4.85 mM), high sensitivity (1046 $\mu\text{A mM}^{-1} \text{cm}^{-2}$), low detection limit (0.5 μM) and good selectivity to glucose determination.

Keywords: Electrodeposition, Copper oxide, Nickle oxide, Graphene, Glucose

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