

عنوان مقاله:

Trace Amount Detection of Glucose Based On CoOx/CdS/rGO Photoelectrochemical Sensor

محل انتشار:

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خلاصه مقاله:

Facile and sensitive detection of glucose still is a challenge for analysts. Enzymatic and nonenzymatic electrochemical methods using graphene based modified electrodes are simple, available and general technique for glucose measurement (1). Enzymatic glucose sensors are popular due to their high sensitivity and selectivity toward glucose detection. Complicated immobilization procedures, long-term stability and high cost of enzymes are disadvantageous for this kind of biosensors. Furthermore, glucose enzyme sensors can be easily affected by humidity, temperature and pH (2). As a result, more attempts focused on advance the non-enzymatic glucose biosensors based on transition metal, alloys, metal oxides and their composites with graphene (3). The current work describes the photoelectrocatalytic detection of glucose based on Finny Ball nanostructure (FBNs) of cobalt oxide (CoOx) which have been electrodeposited on cadmium sulfide nanoparticles / reduced graphene oxide composite (CdS/rGO). When the prepared sensor is exposed under visible light, cadmium sulfide (QD) significantly improves the sensitivity and limit of detection (4). The proposed CoOx/CdS/rGO hybrid composite is well characterized by scanning electron microscopy (SEM) and Energy Dispersive X-ray analysis (EDX) (Figure 1), and electrochemical impedance spectroscopy was used for measuring the electron transfer resistance. Those results confirm the integration of cadmium sulfide and cobalt oxide on the graphene substrate. Glucose sensing was investigated by both cyclic Voltammetry (CV) and amperometry techniques (Figure 2). The linear dynamic range and limit of detection were 1-10 and 10-1030 μM and 0.33 μM , respectively. This methodology can be used for developing glucose optical sensors with improved sensitivity.

کلمات کلیدی:

Electrodeposition; Cobalt oxide; Glucose detection; CdS Quantum Dots

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