Improved Photoelectrochemical Glucose Oxidation on Graphene Supported CdS Nanoparticles via Decoration of CuO Nanoparticles

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In this work, visible light driven photoelectrochemical glucose sensor was developed by electrochemically deposited CuO nanoparticles (CuO NPs) on graphene (GP)-CdS nanocomposites modified electrode to achieve both the electrocatalytic and photoelectrocatalytic oxidation of glucose. Scanning electron microscopy, electrochemical impedance spectroscopy and cyclic voltammetry were used to characterize the morphology and electrochemical properties of the resultant CuO NPs/GP-CdS nanocomposites. The CV results demonstrated that modification of CuO NPs largely enhanced the photoelectrocatalytic activity of GP-CdS composites toward glucose oxidation in alkaline solution. The glucose detection sensitivity under visible light irradiation is dramatically improved compared to dark condition. Good performance was obtained for the CuO NPs/GP-CdS nanocomposites based glucose sensor. The feasibility of the present method was confirmed by good recovery results for glucose detection in human serum samples.

Keywords: Graphene; CdS, CuO nanoparticles, Glucose, Photoelectrochemical sensor.

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