A Novel Photoelectrochemical Glucose Sensor Based on Graphene-CdS Nanocomposites Decorated with CoO_x Nanosheets

Zhimin Ma, Sujuan Li*

Henan Province Key Laboratory of New Optoelectronic Functional Materials, College of Chemistry and Chemical Engineering, Anyang Normal University, Anyang, 455000, Henan, China

*E-mail: lemontree88@163.com

doi: 10.20964/2019.12.71

Received: 7 July 2019 / Accepted: 24 September 2019 / Published: 29 October 2019

In this work, visible light driven enzyme-free glucose PEC sensor was developed by electrochemically deposited CoO_x nanosheets on graphene-CdS nanocomposites modified electrode to achieve both the electrocatalytic and photoelectrocatalytic oxidation of glucose at the resultant CoO_x/graphene-CdS nanocomposites modified electrode. Scanning electron microscopy, electrochemical impedance spectroscopy and cyclic voltammetry were used to characterize the morphology and electrochemical properties of the resultant CoO_x/graphene-CdS nanocomposites. The CV results demonstrated that decoration of CoO_x nanosheets largely enhanced the photoelectrocatalytic activity of graphene-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 CoO_x/graphene-CdS nanocomposites based glucose sensor. The feasibility of the present method was confirmed by good recovery results for glucose detection in human urine samples.

Keywords: Graphene; CdS nanowires, Cobalt oxide nanosheet, Glucose, Photoelectrochemical sensor.

[FULL TEXT](#)

© 2019 The Authors. Published by ESG (www.electrochemsci.org). This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution license (<http://creativecommons.org/licenses/by/4.0/>).