Activated Carbon -ZnO Nanocomposite for Electrochemical Sensing of Acetaminophen

Mani Sivakumar, Mani Sakthivel, Shen-Ming Chen^{*}

Electroanalysis and Bioelectrochemistry Lab, Department of Chemical Engineering and Biotechnology, National Taipei University of Technology, Taipei 10608, Taiwan.

^{*}E-mail: smchen78@ms15.hinet.net

doi: 10.20964/2016.10.51

Received: 25 June 2016 / Accepted: 15 August 2016 / Published: 6 September 2016

In this work, we reported the preparation of AC-ZnO by using simple chemical co-precipitation and ultrasonication techniques and investigated the electrocatalytic behaviour of acetaminophen (ACP) at AC-ZnO modified glassy carbon electrode. Then, the as prepared AC-ZnO was analyzed by using spectroscopy and electrochemical techniques such as Scanning Electron Microscopy (SEM), Cyclic Voltammetry (CV), Linear Sweep Voltammetry (LSV) and Amperometry method. Fortunately, AC-ZnO modified glassy carbon electrode shows the better electrocatalytic behaviour towards ACP than ZnO-GCE and AC-GCE. Finally, from the amperometric *i-t* curve the electrochemical parameters were calculated by varying the resultant linear response current with the concentration of ACP over the range from 0.05 to 1380 μM . In addition, the corresponding sensitivity and limit of detection (LOD) were calculated of about $8.33 \mu\text{A } \mu\text{M}^{-1} \text{ cm}^{-2}$ and 0.83 μM respectively. Eventually, the proposed AC-ZnO/GCE was found as the suitable materials with unique stability, repetability and reproducibility towards ACP sensor.

Keywords: ZnO-AC, acetaminophen, electrochemical sensor.

[FULL TEXT](#)

© 2016 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/>).