

Accepted Manuscript

Ultra-sensitive phenol sensor based on overcoming surface fouling of reduced graphene oxide-zinc oxide composite electrode

Rinky Sha, Sampath Kumar Puttapati, Vadali VSS Srikanth, Sushmee Badhulika



PII: S1572-6657(16)30695-6
DOI: doi: [10.1016/j.jelechem.2016.12.001](https://doi.org/10.1016/j.jelechem.2016.12.001)
Reference: JEAC 2997

To appear in: *Journal of Electroanalytical Chemistry*

Received date: 27 September 2016
Revised date: 30 November 2016
Accepted date: 1 December 2016

Please cite this article as: Rinky Sha, Sampath Kumar Puttapati, Vadali VSS Srikanth, Sushmee Badhulika, Ultra-sensitive phenol sensor based on overcoming surface fouling of reduced graphene oxide-zinc oxide composite electrode. The address for the corresponding author was captured as affiliation for all authors. Please check if appropriate. *Jeac*(2016), doi: [10.1016/j.jelechem.2016.12.001](https://doi.org/10.1016/j.jelechem.2016.12.001)

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

**Ultra-sensitive phenol sensor based on overcoming surface fouling of Reduced Graphene
Oxide-Zinc Oxide composite electrode**

Rinky Sha¹, Sampath Kumar Puttapati², Vadali VSS Srikanth² and Sushmee Badhulika^{1*}

¹Department of Electrical Engineering, Indian Institute of Technology,

Hyderabad, 502285, India.

²School of Engineering Sciences and Technology, University of Hyderabad, Gachibowli,

Hyderabad 500046, India

**Corresponding author: E-mail: sbadh@iith.ac.in; Telephone: +040-23018443*

Abstract

A major drawback of non-enzymatic approach for phenol detection is surface fouling which results from the electrochemical oxidation of phenol to polymeric products, thereby restraining the electrode process to low concentrations and limited to single time use. In this work, we report a novel approach for stable, non-enzymatic phenol detection using reduced Graphene Oxide (rGO)-Zinc Oxide (ZnO) composite modified Glassy Carbon Electrode (GCE) which eliminates the surface fouling effect by allowing precise selection of the sensing peak. Here, the rGO-ZnO composite was synthesized using a wet chemical method wherein rGO and ZnO were formed in-situ from GO and Zinc Acetate, respectively. The phenol sensing was investigated by differential pulse voltammetry (DPV) which yielded two peaks at 0.35 V and 0.94 V. Phenol detection was performed at a lower potential (0.35 V) as it eliminates the need for surface renewal of the electrode prior to each scan caused due to surface fouling thus facilitating stable and reproducible detection. The as-fabricated sensor responded linearly to phenol over two ranges, one in the range 2-15 μ M with a ultrahigh sensitivity of 1.79 μ A/ μ M cm² and the other in the range 15-40 μ M with a sensitivity of 0.389 μ A/ μ M cm² with good reproducibility, stability,

Download English Version:

<https://daneshyari.com/en/article/4908069>

Download Persian Version:

<https://daneshyari.com/article/4908069>

[Daneshyari.com](https://daneshyari.com)