

Author's Accepted Manuscript

Gold nanoparticle-modified graphite pencil electrode for the high-sensitivity detection of hydrazine

Md. Abdul Aziz, Abdel-Nasser Kawde



www.elsevier.com/locate/talanta

PII: S0039-9140(13)00353-6
DOI: <http://dx.doi.org/10.1016/j.talanta.2013.04.038>
Reference: TAL13831

To appear in: *Talanta*

Received date: 27 February 2013
Revised date: 16 April 2013
Accepted date: 17 April 2013

Cite this article as: Md. Abdul Aziz, Abdel-Nasser Kawde, Gold nanoparticle-modified graphite pencil electrode for the high-sensitivity detection of hydrazine, *Talanta*, <http://dx.doi.org/10.1016/j.talanta.2013.04.038>

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 galley proof before it is published in its final citable 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.

Gold nanoparticle-modified graphite pencil electrode for the high-sensitivity detection of hydrazine

Md. Abdul Aziz¹, Abdel-Nasser Kawde^{1,2*}

¹ Chemistry Department, King Fahd University of Petroleum and Minerals, Dhahran, 31261, Saudi Arabia.

² Chemistry Department, Faculty of Science, Assiut University, Assiut 71516, Egypt.

Tel: +966 3 860 2145

Fax: +966 3 860 4277

E-mail: akawde@kfupm.edu.sa

ABSTRACT

A novel gold nanoparticle-modified graphite pencil electrode (AuNP-GPE) is prepared just by immersing a bare GPE in AuNP solution, followed by heating for 15 min. The bare and modified GPEs are characterized by FE-SEM imaging and cyclic voltammetry. The AuNP-GPEs showed excellent electrocatalytic activities with respect to hydrazine oxidation, with good reproducibility. To reduce the quantification and detection limits, and increase the hydrazine sensitivity, the pH and square wave voltammetry parameters are optimized. A square wave voltammetry study as a function of the hydrazine concentration showed that the AuNP-GPE detector's quantification limit was 100 nmol L⁻¹ hydrazine, much lower than the value obtained using amperometry (10 μmol L⁻¹). The limits of detection (at 3σ) for hydrazine sensing at AuNP-GPEs using square wave voltammetry and amperometry were 42 nmol L⁻¹ and 3.07 μmol L⁻¹. Finally, the modified electrode was used to determine the hydrazine concentration in drinking water, and satisfactory results are obtained. This simple, rapid, low-cost method for

Download English Version:

<https://daneshyari.com/en/article/7681895>

Download Persian Version:

<https://daneshyari.com/article/7681895>

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