

Accepted Manuscript

Research paper

Boron-doped multi-walled carbon nanotubes as sensing material for analysis of dopamine and epinephrine in presence of uric acid

Nikos G. Tsierkezos, Uwe Ritter, Yudi Nugraha Thaha, Andrea Knauer, Diogo Fernandes, Antonios Kelarakis, Eoin K. McCarthy

PII: S0009-2614(18)30725-5
DOI: <https://doi.org/10.1016/j.cplett.2018.09.007>
Reference: CPLETT 35919

To appear in: *Chemical Physics Letters*

Received Date: 25 July 2018
Revised Date: 20 August 2018
Accepted Date: 3 September 2018

Please cite this article as: N.G. Tsierkezos, U. Ritter, Y. Nugraha Thaha, A. Knauer, D. Fernandes, A. Kelarakis, E.K. McCarthy, Boron-doped multi-walled carbon nanotubes as sensing material for analysis of dopamine and epinephrine in presence of uric acid, *Chemical Physics Letters* (2018), doi: <https://doi.org/10.1016/j.cplett.2018.09.007>

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.



Boron-doped multi-walled carbon nanotubes as sensing material for analysis of dopamine and epinephrine in presence of uric acid

Nikos G. Tsierkezos,^{1*} Uwe Ritter,¹ Yudi Nugraha Thaha,¹ Andrea Knauer,² Diogo Fernandes,³ Antonios Kelarakis,³ and Eoin K. McCarthy⁴

¹ Department of Chemistry, Institute of Chemistry and Biotechnology, Ilmenau University of Technology, Weimarer Straße 25, 98693 Ilmenau, Germany

² Department of Physical Chemistry and Micro Reaction Technology, Institute of Chemistry and Biotechnology, Ilmenau University of Technology, Ilmenau, Germany

³ Centre for Materials Science, School of Physical Sciences and Computing, University of Central Lancashire, Preston, Lancashire PR1 2HE, UK

⁴ Advanced Microscopy Laboratory, CRANN, Trinity College Dublin, Dublin 2, Ireland

ABSTRACT

Boron-doped multi-walled carbon nanotubes (B-MWCNTs) were synthesized, treated with hydrochloric acid, “piranha” solution, and decorated with gold nanoparticles (AuNPs). B-MWCNTs were characterized using Raman spectroscopy, scanning electron- and transmission electron microscopy, and electrochemical techniques. The results exhibit enhanced response and sensitivity of B-MWCNTs upon modification with AuNPs. Analysis of dopamine (DA) and epinephrine (EP) in presence of uric acid (UA) was investigated on B-MWCNTs/AuNPs in pig blood serum. Limits of detection of 0.20 and 0.30 μM were estimated for DA and EP, respectively. The findings demonstrate that B-MWCNTs/AuNPs is proper for analysis of DA and EP under coexistence of UA.

Keywords Blood serum • Boron-doped multi-walled carbon nanotubes • Dopamine • Electrochemical sensing • Epinephrine • Gold nanoparticles

Electronic supplementary material: The online version of article contains supplementary material, which is available to authorized users.

* Corresponding author at: Department of Chemistry, Institute of Chemistry and Biotechnology, Ilmenau University of Technology, Weimarer Straße 25, 98693 Ilmenau, Germany. Tel: +49 3677 69 3647. E-mail address: nikos.tsierkezos@tu-ilmenau.de (Nikos G. Tsierkezos)

Download English Version:

<https://daneshyari.com/en/article/10135378>

Download Persian Version:

<https://daneshyari.com/article/10135378>

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