

# Accepted Manuscript

Green methodology for the preparation of chitosan/graphene nanomaterial through electrochemical exfoliation and its applicability in Sunset Yellow detection

Lidia Magerusan, Florina Pogacean, Maria Coros, Crina Socaci, Stela Pruneanu, Cristian Leostean, Ioan Ovidiu Pana



PII: S0013-4686(18)31491-9

DOI: [10.1016/j.electacta.2018.06.203](https://doi.org/10.1016/j.electacta.2018.06.203)

Reference: EA 32196

To appear in: *Electrochimica Acta*

Received Date: 4 April 2018

Revised Date: 8 June 2018

Accepted Date: 30 June 2018

Please cite this article as: L. Magerusan, F. Pogacean, M. Coros, C. Socaci, S. Pruneanu, C. Leostean, I.O. Pana, Green methodology for the preparation of chitosan/graphene nanomaterial through electrochemical exfoliation and its applicability in Sunset Yellow detection, *Electrochimica Acta* (2018), doi: 10.1016/j.electacta.2018.06.203.

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.

## Green methodology for the preparation of chitosan/graphene nanomaterial through electrochemical exfoliation and its applicability in Sunset Yellow detection

Lidia Magerusan\*, Florina Pogacean, Maria Coros, Crina Socaci, Stela Pruneanu\*,  
Cristian Leostean, Ioan Ovidiu Pana

*National Institute for Research and Development of Isotopic and Molecular Technologies, Donat  
Street, No. 67-103, RO-400293, Cluj-Napoca, Romania*

*E-mail: [stela.pruneanu@itim-cj.ro](mailto:stela.pruneanu@itim-cj.ro); [lidia.magerusan@itim-cj.ro](mailto:lidia.magerusan@itim-cj.ro)*

### Abstract

Carbon-based materials are currently at the forefront of materials research due to their outstanding physical, mechanical and electrical properties and exceptional catalytic/electrocatalytic activities. The ability to be dispersed in various polymer matrix leads to a new class of polymer nanocomposites with a wide range of applicability (e.g. food packaging, biosensors, water treatment or drug delivery). The main goal of this study was to provide a facile, rapid, inexpensive way for the green, single-step and large-scale preparation of chitosan/graphene nanomaterial, through electrochemical exfoliation of graphite rods, without the use of any organic solvent. The obtained nanocomposite was characterized from morphological and structural point of view. The X-Ray Diffraction investigation indicates that the obtained material appears as a mixture of few-layer graphene (FLG - 73.75%), multi-layer graphene (MLG - 22.38%) and a small chitosan contribution (3.87%). Furthermore, the applicability of chitosan/graphene-glassy carbon modified electrode for accurate detection and quantification of Sunset Yellow was also reported. As expected, the modified electrode exhibits a wide linear range ( $2 \times 10^{-7}$  -  $10^{-4}$  M) and low detection limit ( $\text{LOD} = 6.66 \times 10^{-8}$  M;  $\text{S/N} = 3$ ).

**Keywords:** *electrochemical detection; Sunset Yellow; modified electrodes; electrochemical exfoliation*

Download English Version:

<https://daneshyari.com/en/article/6602006>

Download Persian Version:

<https://daneshyari.com/article/6602006>

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