

Electrochemical MIP sensor based on pure Graphene electrode. Detection of Isoproturon

Imer Sadriu^{1,2}

Christine Vautrin-UI¹

Jimmy Nicolle¹

Fetah I. Podvorica^{2,3,4}

¹ ICMN Interfaces, Confinement, Matériaux et Nanostructures, UMR7374 - Université d'Orléans-CNRS, 1b rue de la Férollerie, 45071 Orléans Cedex 2, France

² Chemistry Department, Faculty of Natural Sciences and Mathematics University of Prishtina, rr. "Nëna Tereze" nr. 5, 10000 Prishtina, Kosovo

³ Academy of Sciences and Arts of Kosova, Rr. "Agim Ramadani" nr 305, 10000 Prishtina, Kosovo

⁴ NanoAlb-Unit of Albanian Nanoscience and Nanotechnology, 1000 Tirana, Albania

E-mail address: imersadriu01@gmail.com; fetah.podvorica@uni-pr.edu

Abstract

A new method for exfoliation of graphite rod electrode in organic media with a single stage of exfoliation is developed. It is based on cathodic electrochemical exfoliation of graphite rod electrode which enables the production of graphene flakes via intercalation of tetrabutylammonium cations in the presence 1-methyl-2-pyrrolidone (NMP) as solvent in a three-electrode cell. Chronoamperometry has been used as electrochemical method for the exfoliation of graphite rod electrode and the best results are obtained -2.5 V /SCE for a time 6h. XPS, Raman, IR spectroscopy results confirms the formation of a high-quality graphene that contains a low quantity of sp^3 carbon atoms (Figure 1) and oxygenated functional groups on its structure. This graphene is used for the fabrication of pure graphene on polystyrene (PS) electrodes with different geometrical area. The electrodes have shown good electrochemical properties and were used for the preparation of electrochemical molecular imprinted polymer (MIP) sensor for isoproturon detection.[1] The Graphene-MIP sensor was able to detect isoproturon in nano-molar concentration with good reproducibility and repeatability and shows good robustness during the 7 successive analyzes. Low limits of detections (LOD) and quantifications (LOQ) have been reached in water samples contaminated with isoproturon,

References

[1] I. Sadriu *et al.*, *Talanta*, 2020, vol. 207, p. 120222,

[2] Figures

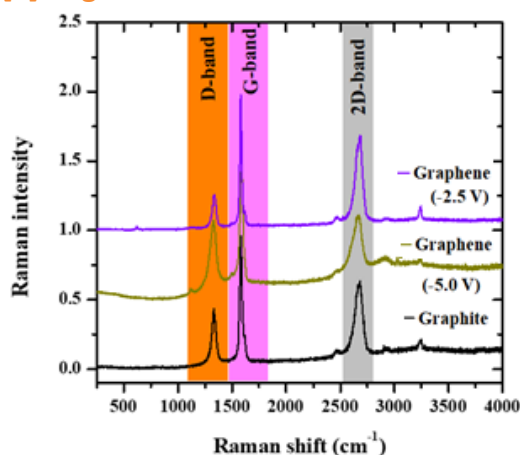


Figure 1. Raman spectra of graphite, graphene -5V, and graphene -2.5V