

Abstract

Ni–Co Bimetallic Nanostructures Based Electrochemical Sensors for Glucose Detection †

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† Presented at the 5th International Symposium on Sensor Science (I3S 2017), Barcelona, Spain, 27–29 September 2017.

Published: 11 December 2017

Electrochemical sensors based on metallic nanoparticles and different forms of carbon have been intensively studied in the past years as electroanalytical measurement devices. A key aspect in the study of metallic nanostructures as electrocatalysts is the preparation and characterization of nanoparticulate electrodes, which often consist of metallic nanoparticles dispersed or anchored on a carbon support material [1]. The formation and electrochemistry of Ni–Co nanoparticles at the electrode surface as well as their variations with different electrodeposition conditions have been determined by cyclic voltammetry. The changes in chemical composition and morphology of the nanoparticles-modified electrode surface has been studied by the scanning electron microscopy technique (SEM), including microanalysis by the energy dispersive X-ray method. Cyclic voltammetry and amperometry methods were used to study the electrocatalytic measurements of glucose in 0.1 M KOH electrolyte solution. Comparative modification of the electrodes through electrochemical deposition of nickel–cobalt bimetallic nanoparticles onto carbonaceous materials is evaluated. Optimizing the electrodeposition parameters and conditions enables effective control over the morphology of bimetallic nanostructures, thus providing a great opportunity to improve their electrochemical properties [2]. The electrocatalytic activity of the Ni–Co nanoparticles deposited on graphene, carbon nanotubes and fullerene was comparatively assessed by voltammetry and amperometry towards the glucose oxidation, corroborated with SEM images, demonstrating the enhanced analytical response of modified electrodes with MWNT used as support materials for electrodeposited nanoparticles.

Acknowledgments: Romanian National Authority for Scientific Research and Innovation, CNCS/CCCDI-UEFISCDI, project number PN-III-P3-3.6-H2020-2016-0011.

References

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