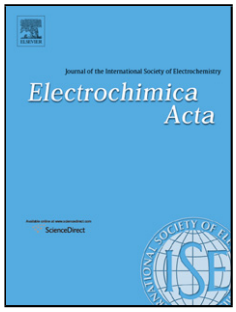

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PII: S0013-4686(15)01370-5
DOI: http://dx.doi.org/doi:10.1016/j.electacta.2015.06.013
Reference: EA 25138

To appear in: *Electrochimica Acta*

Received date: 26-4-2015
Revised date: 2-6-2015
Accepted date: 2-6-2015

Please cite this article as: Fernando H.Cincotto, Thiago C.Canevari, Sergio A.S.Machado, Alfredo Sánchez, Maria Asunción Ruiz Barrio, Reynaldo Villalonga, José M.Pingarrón, Reduced graphene oxide-Sb2O5 hybrid nanomaterial for the design of a laccase-based amperometric biosensor for estriol, Electrochimica Acta http://dx.doi.org/10.1016/j.electacta.2015.06.013

Reduced graphene oxide-Sb_2O_5 hybrid nanomaterial for the design of a laccase-based amperometric biosensor for estriol

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Graphical abstract

Abstract

A novel reduced graphene oxide/Sb_2O_5 hybrid nanomaterial was prepared by a one-pot reaction process. The nanomaterial was characterized by different spectroscopic, microscopic and electrochemical techniques, demonstrating that the graphene sheets were doped with a Sb_2O_5 thin film. A glassy carbon electrode coated with the hybrid material was further employed as support for the covalent immobilization of laccase to develop an electrochemical biosensor for estriol. The enzyme biosensor showed high sensitivity (275 mA/M) and fast analytical response (4 s) for the hormone, with a limit of detection of 11 nM in the range of 25 nM to 1.03 µM. The biosensor showed high selectivity for the analytical detection of estriol.