

Accepted Manuscript

Tubular-Structured Polypyrrole Electrodes Decorated with Gold Nanoparticles for Electrochemical Sensing

E. Gutiérrez Pineda, M.J. Rodríguez Presa, C.A. Gervasi, A.E. Bolzán

PII: S1572-6657(18)30063-8
DOI: doi:[10.1016/j.jelechem.2018.01.047](https://doi.org/10.1016/j.jelechem.2018.01.047)
Reference: JEAC 3838

To appear in: *Journal of Electroanalytical Chemistry*

Received date: 9 August 2017
Revised date: 6 November 2017
Accepted date: 24 January 2018



Please cite this article as: E. Gutiérrez Pineda, M.J. Rodríguez Presa, C.A. Gervasi, A.E. Bolzán, Tubular-Structured Polypyrrole Electrodes Decorated with Gold Nanoparticles for Electrochemical Sensing, *Journal of Electroanalytical Chemistry* (2018), doi:[10.1016/j.jelechem.2018.01.047](https://doi.org/10.1016/j.jelechem.2018.01.047)

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.

Tubular-Structured Polypyrrole Electrodes Decorated with Gold Nanoparticles for Electrochemical Sensing

E. Gutiérrez Pineda^{a,b}, M. J. Rodríguez Presa^a, C. A. Gervasi^{a,b}, A. E. Bolzán^a

^a*Instituto de Investigaciones Fisicoquímicas Teóricas y Aplicadas (INIFTA), Universidad Nacional de La Plata - CONICET, Sucursal 4 Casilla de Correo 16 (1900) La Plata, Argentina*

^b*Area Electroquímica, Dept. Ing. Química, Facultad de Ingeniería; Universidad Nacional de La Plata, (1900) La Plata, Argentina*

Abstract

The electrosynthesis and characterisation of polypyrrole(PPy) films with a micro tubular structure decorated with gold nanoparticles is described. The PPy films were characterised by means of voltammetric and electrochemical impedance spectroscopy measurements. The tubular structure of the PPy films were obtained under potentiostatic conditions in freshly prepared sodium salicylate solutions. Voltammetric response of the PPy films shows that its behavior turns more reversible as the electropolymerization charge of the film increases. SEM images show the appearance of the tubular structure for an electrodeposition time higher than 2 min. The tubular-structured PPy film showed an rms of ca. 600 nm as determined from AFM imaging. These PPy films were subsequently decorated with gold nanoparticles obtained by a double step potentiostatic electrodeposition routine that allowed fine control of deposit characteristics. Analysis of deposits was performed by means of SEM and AFM nanoscopy. Statistical analysis of particles size distribution show that the maximum value appeared for 60 nm, but a significant amount of particles between 100–200 nm were also observed. The sensing capability of these composite electrodes was tested for the determination of hydroxylamine, nitrite and their mixture in solutions of different pH. Results showed a successful route of synthesis of a nanocomposite electrode with promising applications in electrochemical sensing.

Keywords: gold nanoparticles, polypyrrole, electrodeposition, hydroxylamine, nitrite, sensors

Download English Version:

<https://daneshyari.com/en/article/6662041>

Download Persian Version:

<https://daneshyari.com/article/6662041>

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