Poster

CARBON NANOTUBE-BASED ELECTRODES FOR ELECTROCHEMICAL TRANSDUCTION AND BIOSENSING

E. Bellido, M. Pacios, M. del Valle, M.J. Esplandiu
Grupo de Sensores y Biosensores, Departamento de Química,
Universidad Autónoma de Barcelona
08193 Bellaterra, Barcelona, SPAIN
Elena.bellido@uab.es

Carbon nanotubes (CNTs) combine in a unique way a rich electrical behavior, an extremely high mechanical strength and a remarkable chemical robustness for (bio)functionalization. These special properties of both single and multi-walled CNTs have attracted the interest in the area of electrochemical sensors and sensors based on a field-effect transistor configuration.

Motivated by these attractive properties, this work focuses on the transduction and sensing capabilities of different carbon nanotube-based systems. On one side, the electrochemical properties of carbon nanotube composites have been analyzed with special emphasis on the study of the electron transfer resistance. To accomplish that, cyclic voltammetry and electrochemical impedance spectroscopy have been used to characterize and compare CNT transducers to reference carbon systems (in particular, epoxy-graphite electrodes and HOPG electrodes).

On the other side, this work aims at the development of (bio)functionalization schemes on carbon nanotube sidewalls by non-covalent attachment using pyrene linkers. Specifically, ion receptor and protein immobilization protocols are reported. Characterization of the (bio)functionalization process has been performed by either electrochemical means or by surface characterization techniques.

The acquired knowledge of the transduction and (bio)functionalization processes constitutes a relevant issue for the enhancement of the performance of biosensors based on single-walled and multi-walled carbon nanotubes.