Functionalized polypyrrole/graphene nanocomposites as electrochemical biosensing platform

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Because of its outstanding properties, graphene represents an ideal candidate for the manufacturing of chemical sensors and biosensors. The incorporation of graphene as nanofiller in different polymer matrices has been shown to enhance some of its characteristics, such as redox behaviour and biocompatibility [1].

We report here a versatile strategy for obtaining enzyme electrodes starting from graphene/polypyrrole nanocomposites. First, nanocomposite layers are deposited onto platinum electrodes through the electrochemical polymerization of pyrrole monomer in the presence of reduced graphene oxide bearing phenyl sulfonate functionalities. Besides enhancing the electrical conductivity of the polymer and increasing the surface of the electrode, the graphene acts as dopant and balances the positive charges on the polymer chains.

In order to facilitate the covalent linking of enzymes via carbodiimide chemistry, the nanocomposite materials are subsequently modified with *p*-carboxyphenyl groups through the electrochemical reduction of the corresponding aryl diazonium tetrafluoroborate, a functionalization method recently reported for conducting polymers [2].

The performance of glucose biosensors obtained through this strategy is discussed.

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