

A novel non-enzymatic H₂O₂ sensor based on polypyrrole nanofibers- silver nanoparticles decorated reduced graphene oxide nano composites

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Abstract

Graphene oxide (GO) decorated with silver nanoparticles (AgNPs), was electrochemically reduced on glassy carbon electrode (GCE) by an amperometry method (AMP-AgNPs-rGO/GCE). Then, Pyrrole was electropolymerized on the surface of the modified electrode through amperometry process in order to obtain nanofibers of polypyrrole (AMP-PpyNFs-AgNPs-rGO). Fourier-transform infrared transmission spectroscopy and X-ray diffraction approved that during the amperometry process, the GO and Ppy nanofibers were reduced and polymerized respectively and the silver nanoparticles were formed. Field emission scanning electron microscope images indicated that the silver nanoparticles were homogeneously distributed on the rGO surface with a narrow nano size distribution and polypyrrole synthesized in the form of nanofibers with diameter around 100 nm. The first linear section was in the range of 0.1 mM to 5 mM with a limit of detection of 1.099 and the second linear section raised to 90 mM with a correlation factor of 0.085 (S/N of 3).

Keywords: Silver nanoparticles; Reduced Graphene Oxide; Polypyrrole; H₂O₂

Sensor

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