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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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