113-038

CARBON COATED MAGNESIUM OXIDE BASED AMPEROMETRIC GLUCOSE BIOSENSOR

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Diabetes is a serious disease that is harmful to human health since it is related to cardiovascular and stroke events. Since the first glucose oxidase (GOx) sensor, different approaches have been explored. Carbon was used to cover nano-magnesium oxide (MgO-C) forming a core-shell which was used to improve its biocompatibility and chemical stability for the preparation of GOx biosensor. MgO nanostructures have been prepared by calcination of the gel formed by the reaction of magnesium acetate tetrahydrate dissolved in cetyltrimethylammonium with the addition of tartaric acid solution. MgO-C nanostructures were obtained by heating MgO nanoparticles previously prepared together with glucose and PEG dissolved in an aqueous suspension. Reaction conditions such as concentration of magnesium precursor, temperature and aging time show important roles in the size, morphology and growth process of the final products. The core–shell structure was evidenced by SEM/FEG and XRD and showed that the product appeared to have morphological forms of nanowires. GOx was spread onto the surface of a modified carbon paste electrode (CPE) doped with MgO-C and the effect on the biosensing properties investigated by comparing the electrochemical properties of the proposed biosensor with bare and modified CPEs by cyclic voltammetry. The amount of modifier in CPE (5–75 weight% with respect to graphite) influences the peak current and the influence of different experimental parameters (enzyme percentage, pH solution and amperometric methods) was also investigated. The results demonstrate that the GOx retains its biocatalytic activity and that the bioelectrode modified can be a possible use for other nanotechnological purposes including biomedical ones.