

Improved electro catalytic oxidation of guanine and its determination at PSA/Nio-MCM-41/Gr polymer Nanocomposite modified glassy carbon electrode.

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Guanine is one of the two principal purine bases found in nucleic acids, with the smallest (among the other bases) redox potential. This compound is believed to play a key role in the oxidation of DNA by various types of oxidants and free radicals. The abnormal changes in the concentration of DNA bases such as guanine may lead to the mutation of gene information, suggesting the deficiency of the immunity system and the present of carious diseases, such as epilepsy, cancers and HIV. In this research, a new polymer nanocomposite consisting of NiO-MCM-41 nanocomposite and poly (5-solfusalicylic acid) (PSA) were prepared by electropolymerization and used to modify the graphite/glassy carbone (Gr/GCE) electrode surface for the sensitive determination of guanine. The structure of nanocomposite and polymer nanocomposite was investigate by field emission scanning electrode microscopy, fourier transform infrared spectroscopy and energy dispersive x-ray. Under the optimum operating conditions the electrochemical behavior of guanine at the surface of PSA/NiO-MCM-41/Gr/GCE was investigated using differential pulse voltammetry. The as-proposed modified electrode achieved satisfactory dynamic range between the anodic peak current and the concentration of guanine at the concentration ranges of 0.001-10 μM and the detection limit was obtained to be 0.5 nM. The resulting sensor was successfully used to determination of guanine in such as fish sperm DNA sample.

Keywords : NiO-MCM-41 nanocomposite; Electropolymerization; poly 5-solfusalicylic acid; Guanine; DNA sample

