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CARBON NANOTUBES COMPOSITE FOR ENVIRONMENTALLY FRIENDLY SENSING

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Abstract

The performances of two types of multi-walled carbon nanotubes-based composite electrodes, i.e., MWCNT-Epoxy (CNT-Epoxy) and Natural Zeolite-modified- MWCNT- Epoxy (NZ-CNT-Epoxy) are described in order to use them for electroanalytical application. Both electrodes were synthesized, electrically and electrochemically characterized and tested for the detection of ascorbic acid (AA) in aqueous solutions. The electrochemical characterization using classical potassium ferricyanide method showed a higher electroactive surface area of the NZ-CNT-Epoxy electrode, which was selected as optimum electrode for the further detection experiments. The NZ-CNT-Epoxy electrode was tested as environmentally friendly sensor for the detection of AA, and the electroanalytical performance of this composite electrode was determined in 0.1 M Na2SO4 supporting electrolyte using cyclic voltammetry (CV) and chronoamperometry (CA). The linear dependence of the current versus AA concentration was reached in the concentration range between 2 to 20 mM AA. In addition, some mechanistic aspects regarding AA oxidation on MWCNT-Natural Zeolite-Epoxy (CNT-NZ-Epoxy) electrode were discussed by performing CV at different scan rates. The electroanalytical performance of this electrode and good electroanalytical results of the determination of AA from real samples recommend the use of this composite electrode for practical sensing applications.

Key words: ascorbic acid, electroanalytical application, electrochemical detection, environmentally friendly sensor, Natural Zeolite-modified—MWCNT-Epoxy

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