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UNMODIFIED/TiO_2-MODIFIED CARBON NANOTUBES COMPOSITE ELECTRODES FOR PENTACHLOROPHENOL DETECTION FROM WATER

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Abstract

In this work, cyclic voltammetry (CV) and differential-pulsed voltammetry (DPV) were used to detect pentachlorophenol (PCP) at two types of multi-walled carbon nanotubes (CNT)-based composite electrode, *i.e.*, TiO_2-modified-CNT-Epoxy (TiO_2-CNT-Epoxy) and CNT-Epoxy in 0.1 M sodium sulphate solution supporting electrolyte. The electrochemical behaviour of the electrodes was investigated in the absence and presence of UV irradiation. A single oxidation peak at a potential value of about +1 V versus SCE with the characteristics of an irreversible reaction was noticed for PCP electrooxidation. The linear dependence of current versus PCP concentrations was reached in a wide concentration range from 10 to 100 μM PCP. A series of optimization studies were performed on the pulsed voltammetric parameters. The best electroanalytical performance for PCP detection was obtained in the case of TiO_2-CNT-Epoxy electrode under UV irradiation, which informed about the its photoelectrocatalytic activity towards PCP oxidation.

Key words: cyclic voltammetry, differential-pulsed voltammetry, pentachlorophenol, carbon nanotubes composite electrodes

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