Multi-walled Carbon Nanotubes-Modified Glassy Carbon Electrode for the Detection of Anthracene

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The electrochemical oxidation of anthracene on a bare glassy carbon electrode results in electrode fouling and reduced sensitivity in its detection. Multi-walled carbon nanotubes were used to modify a glassy carbon electrode for the electrochemical detection of anthracene because of their antifouling and peak enhancement properties. The peak current for anthracene oxidation was enhanced by 73.64%, and the peak potential shifted by 53 mV to a slightly less positive value. The electrochemical process was determined to be mixed diffusion- and adsorption-controlled, and a preconcentration or accumulation time was necessary in the analysis of anthracene. Square wave voltammetry was used to analyze increasing concentrations of anthracene; a dynamic linear range of 50–146 μM ($R^2 = 0.98452$) and a limit of detection of 42 μM were established. The sensor platform was used to detect anthracene in a spiked sample of tap water, albeit at lower than expected concentrations because of its low solubility in water.

Keywords: anthracene, electrochemical detection, multi-walled carbon nanotubes, glassy carbon electrode.

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