

Effects of covalent versus non-covalent interactions on the electrocatalytic behavior of tetracarboxyphenoxyphthalocyanine in the presence of multi-walled carbon nanotubes

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Abstract

Tetracarboxyphenoxy phthalocyanine was covalently linked to multi-walled carbon nanotubes and the conjugate was used for modification of glassy carbon electrodes for the detection of hydrogen peroxide. The electrocatalytic behavior was examined by cyclic voltammetry, square wave voltammetry, and rotating disk electrode. The results show that covalent linking is attractive in terms of high detecting currents, low overpotential, and high catalytic rate constants. Very low detection limits were observed with CoTCPc-DAMN-MWCNT(linked)-GCE at 0.33 nM. The resulting catalytic rate constant was $1.1 \times 10^3 \text{ M}^{-1}\text{s}^{-1}$.