# Polymethylthiophene/Nafion-modified glassy carbon electrode for selective detection of dopamine in the presence of ascorbic acid

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Abstract: The possible use of an electrode modified with electroactive conductive poly(3-methylthiophene) (PMeT)/Nafion as a chemical sensor was investigated for the voltammetric analysis of Dopamine (DA). The electrochemical behavior of dopamine was examined by cyclic voltammetry (CV) and differential pulse voltammetry (DPV) techniques. By using a PMeT-modified glassy carbon (GC/PMeT) electrode, DA and Ascorbic Acid (AA) signals could be separated but the AA at high concentrations still caused significant interference by overlapping the DA peak. In comparison to the GC/PMeT electrode, the glassy carbon (GC/Nafion/PMeT) electrode modified with hybrid film Nafion/PMeT was found to permit a superior separation by shifting the oxidation of AA peak toward the less positive potential. The DPV curves for a mixture of DA and AA at an GC/Nafion/PMeT electrode in a 0.1 M $H_2SO_4$ solution showed peaks of DA and AA, at 0.45 and 0.21 V, respectively, indicating that the difference in the oxidation potential was 240 mV. In the 0.1 M $H_2SO_4$ solution, the oxidation peak current on the differential pulse voltammograms for the GC/PMeT electrode increased linearly with the concentration of DA in the range $1 \times 10^{-6}$ to $1 \times 10^{-3}$ M, and the oxidation peak current on the differential pulse voltammograms for the GC/Nafion/PMeT electrode in the range $5 \times 10^{-7}$ to $2 \times 10^{-4}$ M. The DA detection sensitivity of the GC/Nafion/PMeT electrode (26.7 $\mu A\ \mu M^{-1}\ cm^{-2}$) was 22 times higher than that of the GC/PMeT electrode (1.21 $\mu A\ \mu M^{-1}\ cm^{-2}$). © 2009 Springer Science+Business Media B.V.

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