Electrochemical Synthesis of PtAu Bimetallic Nanoparticles on Multiwalled Carbon Nanotubes and Application for Amperometric Determination of Nitrite

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In the present work, we report the amperometric detection of nitrite using the composite of PtAu nanoparticles decorated multiwalled carbon nanotubes (MWCNT) modified electrode. The MWCNTs/PtAu composite was prepared by simultaneous electrochemical deposition of Pt and Au nanoparticles on MWCNT electrode surface using 2 mM of H₂PtCl₆ and 1.8 mM HAuCl₄ mixed solutions as precursors. The surface morphology of the fabricated composite modified electrode was characterized by the scanning electron microscopy. The MWCNT/PtAu composite modified electrode shows an enhanced catalytic activity towards nitrite when compared to the response observed for Pt and Au modified MWCNT modified electrodes. Under optimum conditions, the fabricated MWCNT/PtAu composite modified electrode shows a stable amperometric response for nitrite in the linear response ranging from 0.2 μ M to 4.85 mM with the sensitivity of 1186.3 μ A mM⁻¹ cm⁻². The MWCNT/PtAu composite modified electrode shows quick response time (5s), low limit of detection (0.09 μ M) and high selectivity for the detection of nitrite.

Keywords: Multiwalled carbon nanotubes, Pt, Au, nitrite oxidation, amperometric method.

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