A Novel Admittometric Sensor for Determination of Theophylline using FFT Coulometric Admittance Voltammetry and Flow Injection Analysis

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A new electrochemical analysis was established for the determination of Theophylline using FFT Coulometric Admittance Voltammetry (FFTCV) technique and a new nanocomposite electrode, which was placed in a flow-injection system. The electrode was constructed by deposition of gold nanoparticles on mixture of multiwall carbon nanotube and chitosan casted on a carbon paste electrode containing SiC NPs and ionic liquid. The analyte response was calculated to obtain the charge changes, which was integration of the admittance in selected potential range, where the background admittance was subtracted. The electrode surface characterization was studied by electrochemical impedance spectroscopy and scanning electron microscopy techniques. As result, application of the new nanocomposite catalyzed electron transfer and causes a significant enhancement in the analyte response. It was found that the response enhanced proportionally with concentrations of Theophylline in a range from 2 to 100 nM, with a detection limit of 0.39 nM.

Keywords: FFT Coulometric Admittance Voltammetry, Theophylline, Ionic liquid, Gold nanoparticles, MWCNT

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