

Square Wave Anodic Stripping Voltammetry of Copper (II) at the Tetracarbonylmolybdenum(0) MWCNT Paste Electrode

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Abstract : A highly selective and sensitive electrode for determination of trace amounts of Cu (II) using square wave anodic stripping voltammetry (SWASV) was proposed. The electrode was made of the paste of multiwall carbon nanotubes (MWCNT) and 2,6-diacetylpyridine-di-(1R)-(-)-fenchone diazine tetracarbonylmolybdenum(0) at 100:5 (w/w). Under optimal conditions the electrode showed a linear relationship with concentration in the range of 1.0×10^{-10} to 1.0×10^{-6} M Cu (II) and limit of detection 8.0×10^{-11} M Cu (II). The relative standard deviation ($n = 5$) of response to 1.0×10^{-6} M Cu(II) was 0.036. The interferences of cations such as Ni(II), Mg(II), Cd(II), Co(II), Hg(II), and Zn(II) (in 10 and 100-folds concentration) are negligible except from Pb (II). Electrochemical impedance spectroscopy (EIS) showed that the charge transfer at the electrode-solution interface was favorable. Result of analysis of Cu(II) in several water samples agreed well with those obtained by inductively coupled plasma-optical emission spectrometry (ICP-OES). The proposed electrode was then recommended as an alternative to spectroscopic technique in analyzing Cu (II).

Keywords : chemically modified electrode, Cu(II), Square wave anodic stripping voltammetry, tetracarbonylmolybdenum(0)

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