

Thisis Title	Development of Electrode Sensors for the Determination of Tetracycline
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Abstract

A compact blue conducting mixed valent ruthenium oxide ruthenium cyanide film (mvRuO-RuCN) was grown on the surface of a glassy carbon electrode (GCE) by cycling the potential between -0.2 and 1.2 V vs. SCE in freshly prepared $K_4Ru(CN)_6$ and $RuCl_3$ solution in H_2SO_4 (pH 2). The thickness of the polymeric film was controlled by cycling time. Well-defined redox transitions have been attributed to the oxidative formation of $-Ru^{III}-O-$ and re-reduction in acidic media. Amperometric measurements were conducted at 1.1 V vs. SCE for the determination of tetracyclines (TCs). Linear responses to TC were obtained over the range of $0.1 - 1.7$ ppm in H_2SO_4 and $0.1 - 1.1$ ppm in K^+/H_2SC_4 at pH 1.0 with sensitivity of $0.3148 A M^{-1}$ and $0.2490 A M^{-1}$, respectively. The limit of detection were 0.59 ppm and 0.03 ppm ($S/N = 2$). Diffusion coefficient of TC in bulk solution (D_A^0), diffusion coefficient of electron in polymeric film (D_E), kinetic rate constant for catalytic reaction (k) and reaction rate were evaluated by chronoamperometry, cyclic voltammetry, rotating disk and rotating ring-disk voltammetry. The current response was independent of film thickness, suggesting that reaction occurred at the outside edge of the film. This would make diffusion of Tc through the film the rate-determining step.