



Micro-Dendritic Electrodeposited Bismuth and Food Colouring Sensing

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The kinetics and mechanism of cathodic electrodeposition of bismuth on a glassy carbon (GC) electrode were studied using cyclic voltammetry and chronoamperometry. The initial phase of bismuth electrodeposition was studied using the potentiostatic pulse technique in different electrolytes (nitric acid and acetate buffer solution) with and without the addition of EDTA as a complexing agent. A bismuth film (Bi-film) electrode was formed using the optimum bath parameters, deposition time and potential. The Bi(III) complexes reduction is inhibited by the specific structure of the formed Bi-film. Scanning Electron Microscopy (SEM) and cyclic voltammetry (CV) were employed to characterize the formed Bi-film. We proposed a facile electrochemical method for the determination of Artificial Food Colors (AFCs), in food samples, using Bi-film electrode.

The controversies concerning use of AFCs date back to the 1920s, when they were related with hyperactivity, hypersensitivities, learning problems, impulsive and negligent behavior and negative effects on cellular immune responses in children corresponding to the behavior pattern diagnosed with ADHD. Thus, monitoring of AFCs in foods is important.

The Bi-film exhibited an excellent recognition capacity toward SY. Finally, a procedure for quantifying SY in several food products and drinks is proposed.

Keywords: cathodic electrodeposition, bismuth film electrode, Artificial Food Colours, voltammetric methods, food analysis

References

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