Voltammetric Determination of Lead(II) Using Chemically Modified Carbon Paste Electrode with Bis[1-hydroxy-9,10-anthraquinone-2-methyl]sulfide

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A new preconcentration and voltammetric method for determination of Pb(II) has been proposed. The method involved the application of bis[1-hydroxy-9,10-anthraquinone-2-methyl]sulfide-modified carbon paste electrode. Differential pulse anodic stripping voltammetry was used. Several experimental parameters such as modifier composition in the carbon paste electrode, pH and concentration of supporting electrolyte, deposition potential and deposition time were optimised. A linear response was obtained in the concentration range of Pb(II): 5.96 × 10⁻¹⁰ – 5.79 × 10⁻⁶ mol L⁻¹ (n = 21, r = 0.9995) with a detection limit 3.90 × 10⁻¹⁰ mol L⁻¹ for a 11 min deposition time. For eight replicate determinations of 2.00 × 10⁻⁸ mol L⁻¹ and 2.00 × 10⁻⁶ mol L⁻¹ Pb(II), the relative standard deviations were found to be 4.4% and 3.7%, respectively. Numerous foreign metal ions had little or no effect on the determination of lead(II). The developed method was applied to the determination of lead in wastewater samples. New electrode occurred to be advantageous in respect of high stability and self-cleaning ability. It can be used repeatedly without any regeneration of its surface.