In situ-Mercury Film Electrode for Simultaneous Determination of Lead and Cadmium Using Nafion Coated New Coumarin Schiff Base as Chelating-Adsorbent

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Reaction of *o*-phenylenediamine and 8-formyl-7-hydroxycoumarin yield a new coumarin salen ligand, (CSB) which was isolated as orange air-stable solid and characterized by melting point, thermogravimetric analysis (TGA), mass spectra, infrared and NMR (¹H, ¹³C) spectroscopy. New CSB was dispersed in nafion and nafion-CSB composite was deposited on a glassy carbon electrode. The modified electrode nafion-CSB/GCE allowed the formation in-situ of mercury film for detection of Pb (II) and Cd(II) by anodic stripping voltammetry (ASV) in buffer phosphate solution pH 3.0 and 4.0. Optimal conditions were studied (mercury concentration: C_{Hg} 40.0 mg L⁻¹; CSB concentration; C_{CSB}; 20.0 μmol L⁻¹; pH 3.0 and pH 4.0; E_{ACC}: -1.1 V and t_{ACC}: 80). The detection limit (3σ/b) for Pb (II) Cd (II) were of 0.15 μg L⁻¹ for Pb(II) and Cd(II) at pH 3.0. Moreover, 0.071 and 0.080 μg L⁻¹ for Pb(II) and Cd(II), respectively at pH 4.0, The method was validated using ICP multi-element standard solution IX (Merck) containing As, Be, Cd, Cr(VI), Hg, Ni, Pb, Se and Tl 100 mg L⁻¹. Finally, river, tap and mineral waters were analyzed.

Keywords: Schiff base, 7-hydroxycoumarin, Anodic stripping voltammetry, Modified electrode, Lead, Cadmium, water samples

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