Ex Situ Poly(3,4-ethylenedioxythiophene)-sodium Dodecyl Sulfate-Antimony Film Electrode for Anodic Stripping Voltammetry Determination of Lead and Cadmium.

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A poly(3,4-ethylenedioxythiophene)-sodium dodecyl sulfate coated antimony film electrode PEDOT-SDS-SbFE was prepared ex situ and applied to determine Pb(II) and Cd(II) by anodic stripping voltammetry (ASV). The PEDOT-SDS-SbFE exhibited well developed signals for the oxidation of Pb and Cd at -0.12 and -0.40 V respectively, with higher current compared to unmodified electrodes. The optimum parameters for PEDOT-SDS-SbFE preparation consisted in an EDOT 0.01 mol L^{-1} in KCl 0.1 mol L^{-1} with SDS $1.0 \times 10^{-3} \text{ mol L}^{-1}$ solution at scanning rate of 50 mVs^{-1} (10 cycles -0.1 a 1.6 V), 200 mg L^{-1} Sb(III) in 0.5 mol L^{-1} HCl at -1.2 V (150 s) and for the determination of Pb(II) and Cd(II) were pH = 4.0 (acetate buffer); $E_{acc} = -1.0$ V and $t_{acc} = 60$ s. The electrode showed good linear behavior in concentration range from 4.5 to $140.0 \text{ } \mu\text{g L}^{-1}$ for both metal ions. The limit of detection (3σ) was 0.50 and $0.80 \text{ } \mu\text{g L}^{-1}$ for Pb(II) and Cd(II) respectively. The RSD for a Pb(II) a Cd(II) $47.0 \text{ } \mu\text{g L}^{-1}$ was 1.5% for seven successive assays. The method was validated using model solutions with satisfactory results. The method was applied to the determination of Pb(II) and Cd(II) in commercial mineral water and river water samples.

Keywords: Electrochemically deposited PEDOT; Antimony film; SDS; Chemically modified electrode; Cadmium and lead.

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