Synthesis and Structural Characterization of New Macrocyclic Ester. Study as an Immobilization Agent for Determination of Lead by Anodic Stripping Voltammetry

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doi: 10.20964/2017.04.40

Received: 27 December 2016 / Accepted: 19 February 2017 / Published: 12 March 2017

New macrocyclic ester (L) was yielded through reaction of catechol with isophthaloylchloride and isolated as white solid, air stable at room temperature. L was characterized by melting point, mass spectra, FTIR and NMR (¹H, ¹³C) spectroscopy. The molecular structure was determined by single-crystal X-ray diffraction. The macrocyclic compound was evaluated to determine ultra-trace concentrations of Pb (II) by anodic stripping voltammetry in the presence of Cd(II). The method is based on the formation of a complex between lead and the macrocyclic ester, immobilized on a vitreous carbon electrode, allowing the oxidation of lead by voltammetric scan, using square wave modulation method. Anodic peak current was observed at -0.20 V for Pb(II). Under the best experimental conditions (pH 4.0; L concentration 10.0 mmol L⁻¹; accumulative potential (E_{acc}) -0.8 V and accumulative time (t_{acc}) of 60 s) anodic peak current was proportional to the Pb (II) concentration up to 80.0 µg L⁻¹, with a detection limit (3σ) of 0.33 µg L⁻¹. The proposed method was validated by determining Pb(II) in model solution with ultra-pure water with satisfactory results.

Keywords: Macrocyclic ester, modified electrode, lead, anodic stripping voltammetry

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