Determination of Lead with carbon paste electrode bulk modified with conducting polymer

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The development of chemically modified electrodes continues to be an area of great interest. The modifier can be a polymer, an ether crown, or a ligand. In recent years, complexation reactions with organic or inorganic reagents in carbon paste electrodes (CPE) have been reported [1-4]. A CPE electrode modified with dithizone was used for quantification of lead from aqueous solutions [11]. Lead (II) was chemically deposited on chemically modified electrode by complexation with the modifier.

Another work concerning a carbon paste modified with clay mineral montmorillonite was used for voltammetric determination of Cd(II), Pb(II), Cu(II), and Hg(II). The CPE was modified by a newly developed procedure consisting in a direct mixing of the clay mineral with the carbon paste [2].

Carbon paste electrodes modified with conducting polymers for sensitive and selective determination of lead are proposed.

A novel method to generate a rapidly and reproducible polymer coated electrode surface is developed.

In this work we studied the electropolymerisation of 1.8-DAN when the monomer was mixed with carbon paste electrode. We showed that the electropolymerisation could be carried out without using an organic phase in solution.

We proved that 1.8-diaminonaphthalene (1.8-DAN) mixed with the carbon paste electrode leads to a conducting polymer in acidic medium while this polymer is known to be non conducting on platinum electrode in acidic medium. [5-6]

The electrode behaviour of poly(1.8DAN), electropolymerised into carbon paste electrode was investigated using a rotating disk electrode and cyclic voltammetry in the presence of ferri-ferrocyanide 10^{-3}M.

A carbon paste electrode modified with poly(1.8-DAN) has been used for determination of Pb^{II} from aqueous solutions

Lead was chemically deposited onto the electrode by complexation with the polymer. The accumulated lead after reduction was anodically stripped by differential pulse voltammetry. Different parameters, as pH of the solution, preconcentration time, and electropolymerisation conditions were studied.

For a preconcentration time of ten minutes, the calibration graph was linear from 42 to 2072ng ml^{-1} with r^2 = 0.998. The detection limit was found to be 31 ng ml^{-1} and the relative standard deviation was 6%.

We propose in this communication, a new method of generating renewable and reproducible polymer coated electrode, using an electrosynthesised poly(1,8-DAN) film.

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