

Evaluation of cobalt in the cyanocobalamin solution using the method of inverse voltammetry with a rotating disk electrode

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Abstract

Inverse voltammetry is a very perspective method due to its relative simplicity, cost effectiveness, and sensibility. Universality of this method allows scientists to find new objectives, both organic and inorganic nature, for the use of the method. Some results of the improvement and adaptation of the standardized methodology for cobalt identification with a rotating disk electrode implemented on the analyzer «*Ecotest-VA*» with the «EM-04» module for the identification of the mass concentration of this metal in the medication «*Cyanocobalamin*» is presented in this article.

The arrival of an analytical signal in the form of peaks on a voltamperogram during the quantitative determination of cobalt results from the adsorptive concentration of cobalt-dimethylglyoxime complexes on the surface of the working cathode. Cathode current registered when $E_{\max} = (-1.1) - (-1.2) V$ is compliant with catalytic current of electrochemical reduction of hydrogen from adsorbed cobalt dimethylglyoxime and is an analytical signal of a measured ion, in the present case – of cobalt. Peak height (area) is proportional to the metal-ion concentration in the solution.

It is necessary to carry out the sample preparation of the medication and a solution for additive components for the implementation of the analysis method when determining the mass concentration of the metal in the cyanocobalamin solution. The cyanocobalamin solution with the addition of hydrogen peroxide is maintained in a photolysis camera for the transportation of cobalt into the solution as a Co^{3+} . The solution for additive components is boiled with hydrogen peroxide to convert Co^{2+} into Co^{3+} .

Using the developed method, the evaluation of cobalt in the medication «*Cyanocobalamin*» (0.5 mg/cm^3) was conducted. Validation of the results obtained was carried out with the use of the technique «entered-identified».

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