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SORBTION-PHOTOMETRIC DETERMINATION OF LEAD (II) ION IN 1,3,4-THIADIAZOLE-2,5-DITIOL ORGANIC REAGENT AID

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ABSTRACT

The organic reagent 1,3,4-thiadiazole-2,5-ditiol is used as an analytical reagent for the lead (II) ion. The possibility of using them as a specific analytical reagent for immobilization and determination of lead (II) ion in PPA-1 fiber carriers has been developed.

Keywords: lead (II) ion, 1,3,4-thiadiazole-2,5-ditiol organic reagent, analytical reagent, immobilization, sorbtion-photometric determination, buffer reagent.

Currently, spectrophotometric methods are widely used in the detection of toxic and strongly acting heavy metals. This method is of great importance for its sensitivity, simplicity, low time spent on analysis. Spectrophometric methods, one of the most modern equipment physical chemical methods, are widely used.

In a spectrophotometer, it is possible to determine not only the quantity of substances, but also their quality. To do this, certain light wavelengths of the light absorption of the medium are measured and the light absorption curve of the substance is obtained. The highest and shortest bulges formed in this line are characteristic only for some derived single substance. When light absorption of substances is measured, non-spectral active solvents are obtained as solvents: water, alcohol, hydrochloric acid solution, alkali solution, chloroform, etc.

Pb (II) has been identified by imoblization of 2, 2 – dipridyl and 1, 10 – phenanthroline reagents into a polymetacrylate carrier. In addition, in these techniques in Analytical Chemistry, the focus is on simultaneously concentrating and identifying. In this case, the complex characteristic of the Pb (II) ion is clearly manifested as reddish.

The possibility of using 2,2 – dipridyl and 1,10 – phenanthroline has been examined by the authors by the sorbcion – spectrophotometric and visual – test method. The solid phase allowed increased sensitivity in the detection of corgoshin with immobilized reagents. In this work, polymetacrylate fibers were selected to immobilize the 2,2 – dipridyl and 1,10 – phenanthroline reanets. Complex formation reactions of Pb (II) with Di – tretbutil – dibenzo – 18 – Kraun – 6 have been studied by the spectrophotometric method. Optimal conditions were worked at pH=2 – 2.5 , λ=360 nm, and the lower limit of detection was 0.01.

Determining the optimal joining Order of components

3 different methods of immobilization have been described: 1) determination of metal After immobilizing an organic reagent containing an active group on the hard disk; 2) immobilization of metal ions on a disk with a functional active group and addition of an organic reagent to

increase selectivity; 3) immobilization on a polymer disk to increase stability by initially forming a liquid-state R:Me complex.

When determining the order of casting of components, a complex compound was formed in different casting orders. In order to determine the optimal for reagents selected from the above methods, 25.0 ml of a solution of 50 mcg/ml of gargoshin from a solution of 1.0 ml, 0.2% of 1.3.4-thiadiazole-2.5-ditiol organic reagent was released from a universal buffer of 1.0 ml, 5.0 ml to rn= 4, and distilled water was diluted to the mark. Optical densities of each solution generated (λmax= 540 nm, l=1.0 cm) was measured relative to the specific solution. The measurement results were given in Table 1.

Table 1. Determination of the order of casting of components (n=3; P=0,95; OP - λ_{max}=540, t= 10 min, pH=4 universal buffer, PPA-1)

№	Casting order	ΔĀ
1	fiber+ Pb^{2+} R+buffer+ distilled water	0,185
2	fiber+ R + Pb^{2+} + buffer + distilled water	0,200
3	(Pb^{2+} R+ buffer)+ fiber+ distilled water	0,190

According to the results obtained, the maximum formation of the complex was observed in the order of 2–formation. Subsequent checks use: fiber+R+Pb^{2+}+buffer layout.

Determination of the composition of the complex formed by the Pb^{2+} ion with the organic reagent immobilized 1,3,4-thiadiazole-2,5-ditiol by the method of isomolar series

In determining the ratio of complex compound structural moles by the method of isomolar series, equally concentrated solutions of gargoshin (II) and 1,3,4-thiadiazole-2,5-ditiol organic reagent are used.

Method of determination: PPA – 1, selected for each reagent in individual cups, is sorbed for 5-8 minutes, from 0.5000 g in fiber, with a variable volume of the solution of gargoshin (II) on top of it (1.0 ml to 9.0 ml and a variable amount of 1.3.4-thiadiazole-2.5-ditiol organic solution), 5 ml of buffer solution (rn=4-5). The optical densities before and after immobilization were measured relative to the specific solution. The results obtained are presented in Table 2, Figure 1.

Table 2 Determination of the ratio of complex compound structural moles by the method of isomolar series

Retrieved from V_{HR},	1	2	3	4	5	6	7	8	9
Retrieved from V_{Me}, мл	9	8	7	6	5	4	3	2	1
A	0,02	0,061	0,109	0,240	0,293	0,387	0,428	0,367	0,283

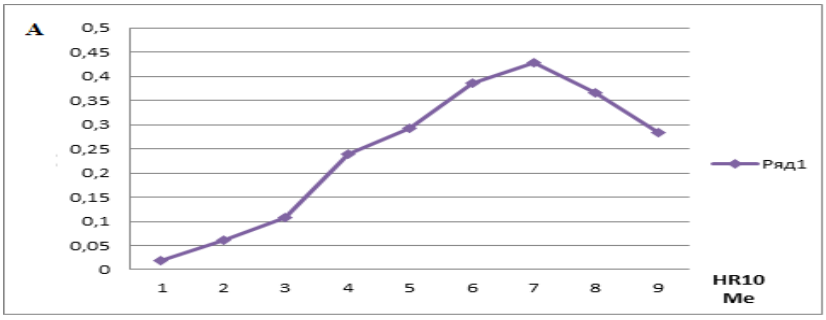

Figure 1. Determination of the ratio of structural moles of the complex formed by the organic reagent 1,3,4-thiadiazole-2,5-ditiol of corgoshin (II) using the method of isomolar series.

The results obtained show that R:Pb is in a ratio of+2=2: 1. Other methods were also used to determine the structure of the complex and calculate the ratio of moles. For this, Solutions of argan and reagents of the same concentration were prepared. Under optimal conditions determined by oscillating in different proportions from the prepared solutions, optical densities before and after sorbtion were measured.

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