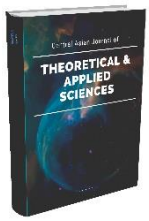

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Development of Sorbtsion-Spectroscopic Method of Determining Copper (II) Ion with Dimethylglioxime Using Immobilized Organic Reagent

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Annotation: *A new sorbtsion – spectrophotometric methodology of copper (II) ion detection has been created and a method of immobilizing the obtained reagent into the fiber has been developed. The optimal conditions for immobilization of the reagent into the fiber are selected. The effect of ambient acidity on the degree of immobilization on wave length and pH environment has been studied. The structure of theeksexi formed by the immobilized dimethylglioxime reagent Copper (II) ion is reflected.*

Keywords: *Copper, sorpsion-spectrophotometric method, immobilization, dimethylglioxime CMA-1 buffer solution.*

Introduction: spectrophotometric methods are widely used, which are currently one of the main modern physicochemical methods for the determination of heavy metals. But the cart will not always have the opportunity to determine by a spectrophotometric method, since the question of many additional operations, the dissolution of foreign ions, their separation and other preparatory work does not have a solution. Therefore, one of the urgent tasks is to create new express, responsive, selectively sensitive methods. To solve this problem, new immobilized organic reagents are used.

Sorption-photometric determination of the micrometer of elements using immobilized organic reagents is one of the new emerging methods. The sorption-photometric method is a method that does not require expensive equipment, which can be applied both in the field, quickly and inexpensively, selectively affecting the nature of the test.

To date, several methods of quantitative determination of copper have been developed. In particular, this is a photometric method based on the study of the formation of a color complex and optical densities with copper salts in a crystal case, colorimetric determination compared to the standard Cu^{2+} color, inversion-voltammetry, which examines copper up to 1 *109 g/l based on a graphite electrode, polyarography by a method that allows you to jointly detect gold nanograms, silver, copper in natural waters, chronopotentiometry and atomic absorption methods are widely used. It is very important to determine

the amount of copper and distribute it without reaching SPEECH. Especially cheap, selective, the development of a natural method is one of the main unsolved problems so far [1].

To determine copper in technical sulfur, the studied and developed method of copper (II) complexation reaction with 1,3-diazo-2-thiazobenzophenylpyridyl chloride [2] was used by macroscopic extraction-spectrophotometric method. Pyridine Catarrhal Suffering 1-(2-Pyridylazo) - 2-Naphthalene (2 Pan) [3], 4-(2- pyridyl (various) reactions of copper (II) formation with resorption (par) C have been studied. 2 Pan is quite sensitive and is one of the selectively acting reagents [4]. Of all types of copper compounds, it can be determined by the IVA method to exclude the inhibition of organic substances. Less time is spent on analysis using UB photolysis in closed conditions of high concentration of copper and its compounds [5].

In this study [6], a new highly sensitive selective reagent 2-methylthiophenyldiazoaminoazobenzene (MTDAA) was synthesized, with the help of which a photometric determination of the copper content in industrial water was carried out. In the $Na_2B_4O_7$-NaOH buffer system with copper MTDAA, it is assumed that at pH=10.00, λ_{max}=520 nm, a complex is formed in a ratio of 1:2. Ber obeys the law up to 25 micrograms in 0-15 ml of solution. The molar absorption coefficient is 1.33·108, the detection minimum is 0.27 ng/ml, the detection limit is 0.27 ng/ml, attenuators may be lost during extraction. The developed method is sensitive, simple, express [7].

By the authors [8] simultaneous real-time concentration in the form of a chelate in the form of Cu (II), Cd(II), Pb (II) tetra-(4-chlorophenyl) porphine (T4XFP) and high-performance liquid chromatography in the form of Cu-, Pb- Doses of T_4XFP, Cd- T_4XFP in the inactive phase (90:10) in 0.05 M buffer solution pyrrolidine-acetic acid (pH=10) -afafuran (TGF), focused on the concentration in the colon. Gelatin is adsorbed on the surface of the column. A phase of intense flow is formed from the hexagonal tap, in which the analytical column is captured and the gills are washed. Pyrrolidine 0.05 M-oxosidic buffer solution (pH= 10), TGB in 10% volume content, pyrrolidine 0.05 M-oxosidic acid buffer solution is isolated in a gradient mode. The range of subordination to the graph with degrees for all detected gels is 0.01-120 mcg/l. The detection limit for Cu(II), Cd (II), Pb (II) is 2.0; 1.5; 2.0 ng/l, respectively.

The authors developed a method for the determination of [9] copper (II) using a solution of dimethylglyoxime and anionic anionic anionic polyacrylonitrile AB-17 with a fiber from the solid phase.

The sorption of copper in the form of a chlorinated complex was studied when the solution medium was in the range of 5-7.5, the detection limit was 0.02 mg/l. It is determined based on the formation of Cu (II), Cd (II), Ag (I) complex in the solid phase. It is added after a solution of acetate, thiosulfate, tartrate, iodine, thiourea and EDTA-ditizone as preservatives [10].

Method of immobilization: 50.0 ml of dimethylglyoxime reagent with 10 ml of 0.1% was poured into measuring cups with 0.2000 g of fiber and mixed with a glass stick for 7-10 minutes. Then the fiber was washed with distilled water and the amount of reagent that was on the fiber was measured, the results are shown in Table 1.

1– table. The degree of immobilization of the dimethylglyoxime reagent depends on the wavelength.

Λ, nm	ΔA reagent	ΔA Immobilized reagent	ΔA complex
360	0,23	0,15	0,04
400	0,32	0,17	0,04
440	0,28	0,20	0,04
490	0,24	0,22	0,05
590	0,17	0,10	0,07
660	0,10	0,07	0,10
730	0,09	0,04	0,04

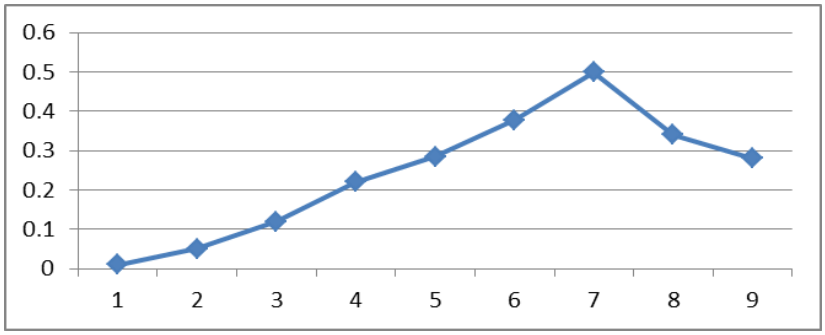
As follows from the table, for the dimethylglyoxime reagent λ_{max} = 400 nm, a change in λ_{max} = 490 nm was observed during immobilization of CMA-1. Due to the formation of the bund complex, $\Delta\lambda$ = 660 nm differed.

Determination of the content of immobilized dimethylglyoxime formed by Cu^{2+} by isomolar series method.

Solutions of equal concentrations of copper (II) and dimethylglyoxine reagent are used to determine the ratio of moles of the birikex compound by the isomolar series method. Method of determination: for each reagent in separate glasses, the selected sma–1 weighs from 0.2000 g of fiber, over which a variable amount of copper (II) solution is applied (from 1.0 ml to 9.0 ml and a variable amount of dimethylglyoxime solution), 5 ml of buffer solution (pH= 5) is injected into sorbilendi for 7 minutes. Optical densities before and after immobilization were measured in comparison with the corresponding solution. The results obtained are presented in Table 2, 2- Figures.

2- Table. Set for determining the ratio of compound moles of a hexagonal compound by the method of isomolar series.

Received VHR,	1	2	3	4	5	6	7	8	9
Received V_{Me}, мл	9	8	7	6	5	4	3	2	1
A	0,010	0,051	0,119	0,220	0,285	0,377	0,499	0,340	0,280



2-picture. Determination of the ratio of the structural moles of the complex formed by the copper (II) dimethylglyoxime reagent by the isomolar series method.

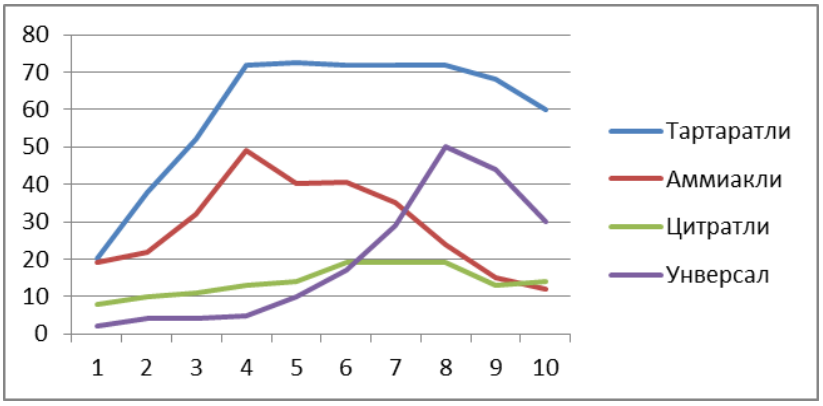
The results obtained show that R: Cu^{+2}= 2:1.

The effect of buffer solution on the level of immobilization

To study the effect of the buffer solution on immobilization, the buffer was selected based on the difference in optical densities by introducing 5 ml of various buffer solutions mixed with a glass rod for 8 minutes into an alcohol solution of 0.05% li reagents, 2 ml of 0.1% Li mercury nitrate solution per 0.2000 g of the selected sorbent in. The results are presented in Table 3 and Figure 3.

3-Table. Effect of buffer solutions on immobilization

buffer solution	pH	1	2	3	4	5	6	7	8	9	10	11	12
						$R_{\%}$							
dimethylglioxym	Universal	20	38	52	72	72,5	72	72	72	68	60		-
	Citrate		22	32	49	40,2	40,5	-	24	-	12	3	-
	Ammonium	-	10	11	13	14	19	19	19	-	14	16	9
	terteretli	-	4	-	5	10	17	29	50	44	30	14	-



3- picture. Dependence of dimethylglioxime-reagent on Buffer nature in immobilization.

In summary from the table, it was aimed to use thesalsal buffer, which increases the pH Oris large and the degree of retention.

Used literature

1. Figurovsky N. A. //"The discovery of elements and the origin of their names" Moscow. 1997. from 216.
2. Umland F., Jansen A., Tirig D., Wunsch G. Complex compounds in analytical chemistry Theory and practice of application. // Moscow: Mir, 1975. 531 P.
3. Maksimova I. M., Kukhto A. A., Morsanova E. I., Kuzmin N. M., Zolotov Yu. A., // Journal. Analyte. Himin. 1994. Vol. 49. , No. 7. p. 695.
4. Zaporozhets O., Haver O., Sukhan V. // Talent. 1998. Vol. 46. No. 6. p. 1387.
5. Pyatnitsky I. V., Glushchenko L. M. Extraction – photometric
6. Ivanchev V. P. Ditizon and its application. Ed. 1961.
7. Pilipenko A. T., Tananaiko M. M. Multi-ligand and multi-metal complexes and their application in analytical chemistry. Moscow: Chemistry, 1983. p. 224.
8. Lurie Yu. Yu. Handbook of analytical chemistry. M., Chemistry, 1979. p. 4807.
9. Kremers F., Walker N., Hixon R. Syntheses of organic preparations, sat. 1, M.; IL, 1949. p. 378.
10. Marvel S., Porter P. Syntheses of organic preparations, sat. 1. M.: ILL. 1949. p. 300.
11. Madusmanova N.K., Isakulova F.B., Yangieva S.B., Smanova Z.A. Нитросединения- как аналитические реагенты для ионов железа (II) // UNIVERSUM:ximiya i biologiya № 10(88) oktyabr, 2021 51-54 s.
12. Madusmanova N.K., Smanova Z.A. Сорбционно –спектроскопическое определение железа (II) иммобилизованными нитрозосоединениями.// UNIVERSUM:химия и биология № 9(51) 6-август, 2018 11-13 с.