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SELECTION OF OPTIMAL CONDITIONS FOR COMPLEX COMBINATION OF NICKEL (II) ION WITH DIMETHYLGLYOXIME REAGENT

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ABSTRACT

The study of the effect of nickel on dimethylglyoxime from the composition of adsorbents used in this article showed that the optimal conditions for this are graphically determined using a spectrophotometer. The analysis was detected in a photocolormeter.

KEYWORDS

Ni (II) ions, activated carbon adsorbent, used MDEA solution, Chugaev's reagent, pH.

INTRODUCTION

Photocolormetric determinations should be performed under optimal conditions that ensure the complete formation of the analytical form in solution and the avoidance or minimal deviation from the

Buger-Lambert-Beer law. , the selectivity of the analytical (photometric) reaction and the pH dependence of the optical density of the solution at a given wavelength when the concentrations of the detectable substance and reagent are constant to select the optimal value of pH for light absorption.

The most favorable conditions in colored solutions are those in which the difference between the absorption in the analytical form and the initial reagents is the largest. Under optimal conditions, small changes in pH at maximum light absorption have virtually no effect on the light absorption of the solution. The pH of the solution under photocolometric reaction is maintained using appropriate buffer solutions or sufficient amounts of acid and alkali solutions. The amount of analytical reagent to be added should be sufficient to convert all the analyte to an analytical form within a given concentration range. Excessive addition of the reagent does not increase the yield of the reaction product and does not increase the light absorption of the solution. In photocolometric analysis, the solution should remain in the true solubility in all ranges of the detected concentrations. If this condition is not met, lower concentrations should be used or preservatives should be used to prevent solid phase formation.

Selection of the optimal light filter for the complex combination of nickel (II) ion with dimethylglyoxime reagent

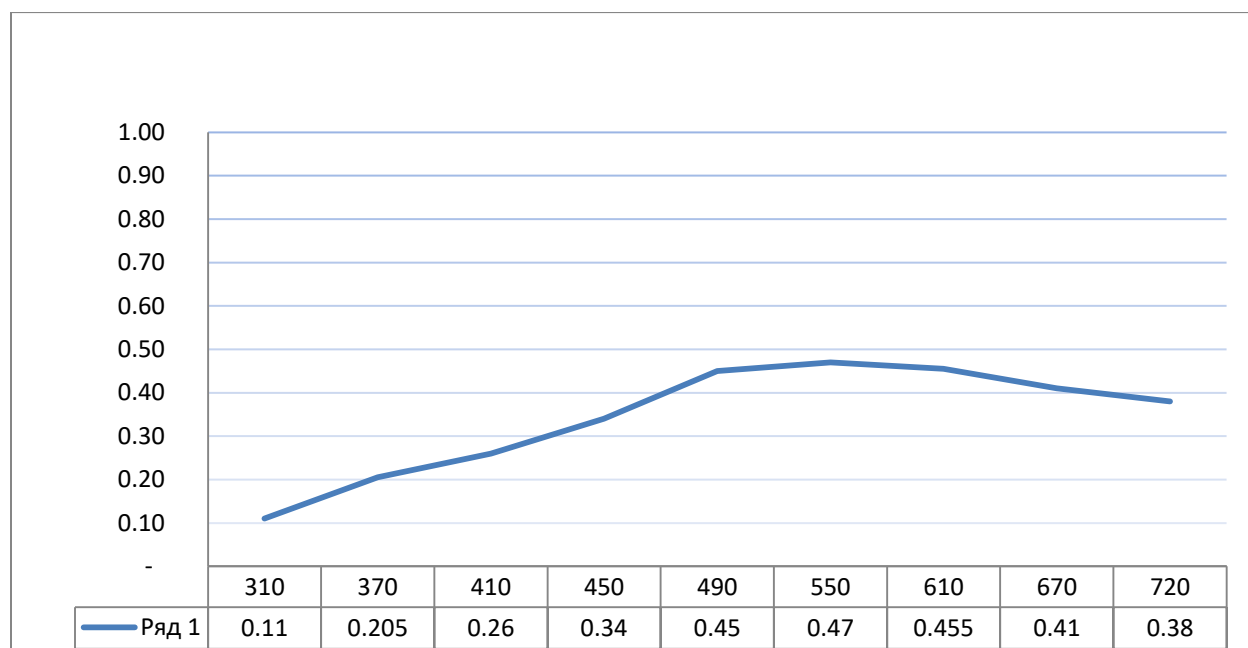
It is known that each substance absorbs light of a certain wavelength by nature, taking into account that the maximum absorption area of a complex of nickel (II) ions with dimethylglyoxime reagent was determined as follows:

Method of determination: 5 ml of buffer solution, 0.01%, 1.0 ml of reagent solution and 1.0 ml of 50 µg / ml nickel (II) solution were added to the 25 ml volumetric flask and distilled water was added to the flask mark. The optical density of the resulting complex was measured on a photocolometer KFK-2 and in a cuvette with a absorption thickness $l = 1.0$ cm at a different light filter relative to the specific solution.

A solution containing all the components except the metal ion, which is defined as the reference solution, was used. The measurement results are shown in

Table 1, Figure 1.

λ_{nm}	310	370	410	450	490	550	610	670	720
A	0.110	0.205	0.260	0.340	0.450	0.470	0.455	0.410	0.380



The results show that the complex compound 6-light filter exhibits a high optical density at $\lambda_{\text{max}} = 550 \text{ nm}$. Further work is carried out at $\lambda_{\text{max}} = 550 \text{ nm}$.

The dependence of the value of the optical density of the complex combination of nickel (II) ion with dimethylglyoxime reagent on the solution medium (pH)

Given that one of the important conditions for the reaction is the environment of the solution, universal buffer solutions with different pH are prepared in the selection of optimal conditions for the complex combination of nickel (II) ion with pyridyl-2-azophenanthroline-2 reagent. Method of determination: 5 ml of 5.0 ml of universal buffer solution with a pH of 3 to 12,

10 ml of 0.01% dimethylglyoxime solution, 5 grams of used and purified activated carbon residue in a 25 ml measuring tube. containing nickel 20ion), pour distilled water up to the mark of the flask, and pour the mixture into the cuvette: measured in a cuvette with thickness $l = 1.0 \text{ cm}$. The results are shown in Table 5,

Figure 2

pH	3	4	5	6	7	8	9	10	11	12
A	0.03	0.110	0.250	0.370	0.430	0.480	0.370	0.280	0.200	0.150

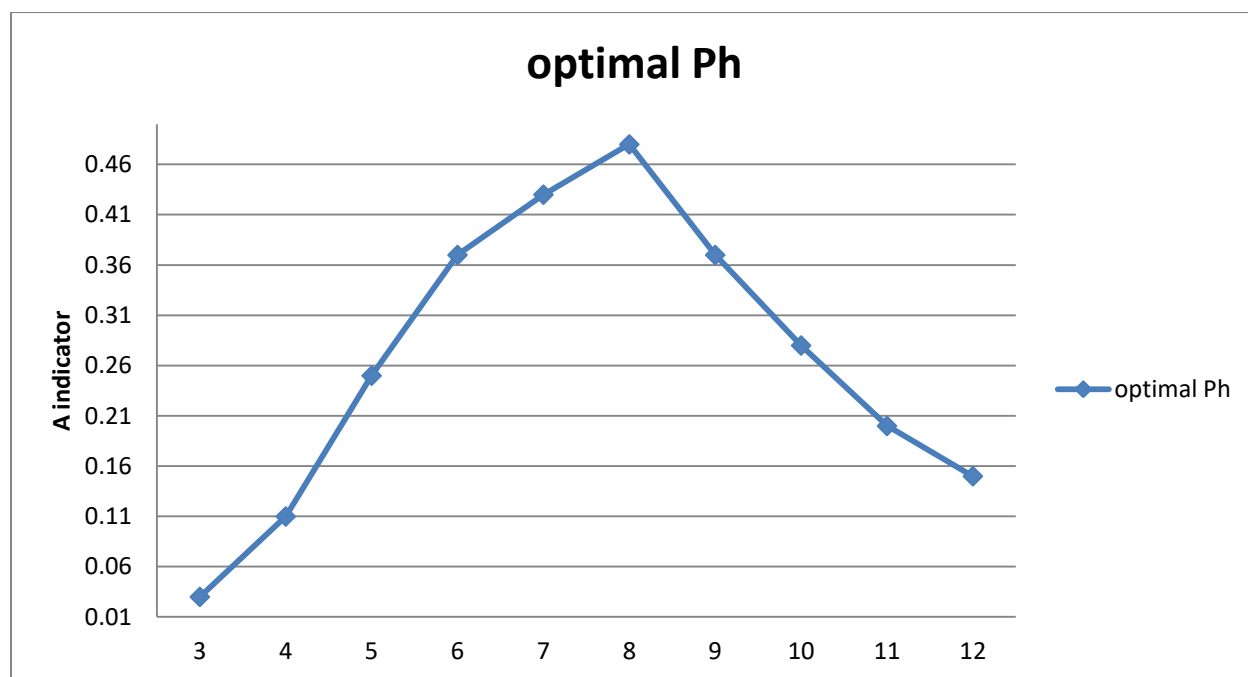


Figure 2. Graph of the dependence of the optical density of a complex compound (Ni^{2+} + -Reagent) on the solution medium (pH).

The results show that the maximum optical density of the complex compound was observed to be the highest at pH = 8.0 and pH = 8.0 was chosen as the optimal medium because the optical density in this solution medium has the maximum analytical signal. Subsequent studies used a buffer solution with a pH of 8.0.

The dependence of the optical density of a complex combination of nickel (II) ion with dimethylglyoxime reagent on the composition of the buffer solution.

A universal buffer solution with pH = 8.0 was used to study the dependence of the composition of buffer solutions on the components of the main reaction (Ni^{2+} + -Reagent).

Method of determination: for the preparation of photometric solutions, as shown in the previous work, 5.0 ml of solutions with pH = 8.0, 1.0 ml of 0.01% solution of pyridyl-2-naphthol-2 reagent in 50 ml measuring tubes, 50 mcg / ml of nickel was diluted with distilled water to the mark of the flask by adding 1.0 ml of the solution, the optical densities of the prepared analytical mixture were measured on a photocolour, in a cuvette with $l = 1.0$ cm relative to the specific solution. Results obtained 6 given in the table.

Table №6

Buffer solution name	Buffer solution name	pH	$\bar{A}_{middle}$
Universal	Phosphate acid, wine acid, bhorat Acid and alkali solution	8.0	0.480
Formic	Formic acid and formic sodium	8.0	0.405

The results of the experiments show that when a universal buffer solution was used, the complex compound solution had the maximum optical density. Subsequent studies used a universal buffer solution with pH = 8.0.

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