



"Development Of A Method For Sorbtion-Spectroscopic Detection Of Rhenium (Iii) Ion"

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Abstract. The levels and optimal conditions of immobilization of the bismutol – 2 Reagent to various types of sorbents have been determined. It has been developed to find the mechanism of immobilization of the bismutol-2 Reagent to the carrier and to determine the optimal conditions and metrological properties of their formation of a complex with the rhenium (III) ion. A sorbtion – spectroscopic method with high sensitivity and selectivity for the determination of the rhenium (III) ion has been shown. The developed sorbtion – spectroscopic method was applied to Real objects (industrial waste technological water and cakes), the results were processed by the method of Mathematical Statistics and information about its application in the analysis.

Key words: Rhenium (III) ions, bismutol-2, analytical reagent, immobilization, sorbtion-spectroscopic detection, buffer reagent, industrial waste technological cakes.

I. Introduction

In the world, the need for Rare Metals per year is increasing every year, and to meet the need, there is a decrease in the content of ore mined by Rare Metals and a reduction in the reserves of all types of minerals, as a solution to this problem, rare metals are being extracted from ore slags, cakes, processed by secondary

The low content of rare metals in industrial waste is felt in the extensibility to sensitive methods. The elimination of such a flaw, however, has an important relevance in the development and evolution of modern physicochemical methods and their widespread use. In the Republic, a new way of extracting rare metals is carried out, including: a number of important measures are being taken to improve and introduce the complex state of ions of rare metals into synthetic sorbents and organic reagents.

The copper mine of Uzbekistan (Olmalik Shahri) has a capacity of 4,640.8 million. contains tons of ore. These ores contain 371,268 tons of molybdenum in molybdenum, up to about 60 g/t according to the census. Rhenium and molybdenite are on average 1350 g / t. Thus there are 495 tons of rhenium reserves in molybdenite. The cost of 1 kg of rhenium is 1500 Dollor, its reserve value is 742500 thousand Dollor. It makes it possible to expand the production of this valuable, precious metal in Uzbekistan.



Spectral descriptions have been identified using photometric reagent diketohydrindiamine to detect rhenium and molybdenum, and the effects of foreign ions have been studied, stoichiometric magnitudes have been calculated, and a photometric method with $Sr=0.3$ has been developed for pharmacological chemistry.

Fluorine complex compounds are characterized by the oxophthoride complex of rhenium Re^{6+} oxidation states from the BrF_3 interaction of $KReO_4$ from $KReO_4$ and perrenate potassium, rubidium, caesium silver and barium from anionic salts ReO_2F_4 , respectively, and Me_2ReF_8 for Re^{6+} oxidation states. $MeReF_7$ -containing complexes have been studied.

II. General methodology of work

2.1. Preparation of working solutions for the rhenium ion

The experiment to determine the rhenium ion in a permanganometric method is based on oxidation - reduction. Rhenium hydride is returned using amalgamated zinc and titrated with potassium permanganate to rhenium perrenate. In this case, the oxidation state of rhenium varies from -1 to +7 as well as below. To do this, boil 125 ml of concentrated H_2SO_4 and 15 ml with a stream of SO_2 to remove oxygen from a solution containing no more than 500 mg of rhenium ion. It is cooled to $5^\circ C$ in a water bath and 150 ml of H_2SO_4 is infused in this way.

An amalgam of zinc 50 ml of cooled H_2SO_4 solution (1:19) from a 50 ml solution of 0.1 n potassium permanganate through the Jones reductant column is placed in a dry conical flask, followed by an analyzed solution and the rest of H_2SO_4 and the experimental 0.05 n permanganate solution is titrated with $KMnO_4$. Alternatively, 1 mg or 0.05 mg is experimented with through a solution of 1,164 g permanganate corresponding to the rhenium ion.

Method of conducting rixia: With a weight of 0.2-2 g, the sample was thoroughly mixed in a porcelain air with the addition of 3-5 g of calcium oxide, 2 g of ammonium perrinate and 0.1-0.2 g of potassium permanganate, put another 2-3 g of calcium oxide on top and heated in a mufel oven (CHOI giving a temperature of $1000^\circ C$). The sample was cooled after a certain time, then transferred to tigel (small tigel 4 DTS 9147-80) and mixed with hot water with a volume of 40-60 ml in a tube with a volume of 200 ml, boiled for 2 hours, the solution was filtered through an additive filter after cooling, the resulting precipitate was dissolved with hydrochloric acid and filtered through.

Analysis was performed with the atom-absorption spectrometer (Optima-8300) method to determine the rhenium (III) ion in an experiment, resulting in analytical spectral lines for the rhenium (III) ion with wavelengths shown in Table 1.

Table 1.

The rhenium ion in solution has a wavelength of.

Identifiable element	Wavelength, nm
Rhenium	221,426

It is at this wavelength that we use in subsequent experiments.

Choosing a new organic reagent to determine the rhenium (III) ion: Organic reagents, or as a result of their reactions, were considered using the sorbtion-spectroscopic method to detect various metal ions.

As an organic reagent, the bismutol-2 Reagent was considered the most suitable for the rhenium (III) ion, and many of the reagents seen in the experiment were studied in the Department of Applied analytical chemistry. These reagents have been studied to exhibit good Metrological properties, high sensitivity, and selective exposure.

Taking into account all the data on the use of the bismutol-2 Reagent in the analysis of the metal ion being detected and their valuable chemical, analytical properties, the bismutol-2 Reagent allows us to come up with a prospective reagent for the determination of the rhenium (III) ion. There are a number of methods for determining the rhenium (III) ion, so in determining it, we considered the spectrophotometric capabilities of bismutol-2 reagents, and from this we studied the structure of the bismutol-2 Reagent and selected for the object presented on the basis of preliminary studies the result was presented in Table 2.

Table 2.

The structure formula and designation of the reagent under study.

Structure formulas	Brutto formula	Quantum-chemical formula in the Gaussian program	Designation by systematic nomenclature	Total: 9.7342
	$C_8H_5S_3N_2K$		5-mercapto-3-phenyl-1,3,4-thiadiazolium-2 potassium	Charges N 0.528 [N(1)] C 0.140 [C(2)] S 0.294 [S(3)] C 0.085 [C(4)] N -0.363 [N(5)] C 0.106 [C(6)] S -0.350 [S(7)] K 0.361 [K(8)] S -0.503 [S(9)] C -0.126 [C(10)] C- 0.031 [C(11)]



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In conclusion from Table 2, we selected bismutol-2 organic reagent for its high ability to be used in experiment as a reagent, taking into account its analytical properties.

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