"Rhenium Ionnini Sorbtsion-Spectroscopic Creation Of Detection Technology"

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ABSTRACT

To find the mechanism of immobilization of the vismutol-2 Reagent on the carrier, and to determine the optimal conditions for their formation of a complex with the rhenium (III) ion, and metrological properties have been developed. The sorbtsion – spectroscopic method with high sensitivity and selectivity for determining the rhenium (III) ion has been shown. The developed sorption – spectroscopic method was applied to Real objects (industrial waste technological waters and cakes), the results were processed by the method of Mathematical Statistics and data were given on its application in the analysis.

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

The low content of rare metals in industrial waste is felt by the extirerance to sensitive methods. And the elimination of such a deficiency is an important factor in the development and evolution of modern physical and chemical methods and their widespread use. The copper mine of Uzbekistan (Almalyk city) is 4640.8 million. contains tons of ore. These ores contain 371,268 tons of molybdenum in about 60 g/t of molybdenum according to specific books. The amount of rhenium and molybdenum is an average of 1350 g/t. So there are rhenium reserves in 495 tons of molybdenum. The price of 1 kg of rhenium is 1500 dollors, the value of which in the Reserve is 742500 thousand dollors. This will allow to expand the production of precious metal in Uzbekistan [1].

Since rhenium is found scattered in nature, it also has very few minerals and a common single mineral is very popular bulib, which is jezcazganite- $CuReS_4$. It has been studied in the composition of cubic copper molybdenum ores. It is in the composition of Olmaliq ores that it is presented in the form of this mineral. Rhenium is found mainly in copper sulfide and molybdenum minerals in a scattering state called buladi. It is also more found in the composition of the minerals chalcopyrite, bornite, cezcazganite. That is why the extraction and properties of copper and molybdenum as rhenium satellites have been studied in technology [2].

Method of conducting the reaction: a sample weighing 0.2-2 g was thoroughly mixed in a porcelain mortar with the addition of 3-5 g of calcium oxide, 2 g of ammonium perrinate

and 0.1-0.2 g of potassium permanganate, another 2-3 g of calcium oxide was placed on it and heated in a mufel oven (SNOL giving a temperature of 1000°C). The sample is cooled after a certain time, then transferred to the Crucible (small Crucible 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, after the solution has cooled, filtered through a double filter, the resulting precipitate is dissolved with hydrochloric acid and filtered The filter was washed and cooled 6-7 times with distilled water. The solution was transferred to a measuring flask with a volume of 200 ml, the volume was brought to the mark with distilled water [3].

Bismutol-2 was selected for higher sorption capacity for organic reagent, and the 5-mercapto-3-phenyl-1,3,4-tiadiazolution-2 organic riagenti (bismutol-2) was immobilized into Pan GMDA, PPM-1, PPA-1 [H+] sorbents, selected to prepare immobilized carriers. Based on the results obtained, the results in optimal conditions for each immobilized fiber were presented in Table 1.

Table 1

Optimal carrier selection (l=1, t=25±5⁰C)

	Up to a immobilization (bismutol-2)	From a immobilized after (bismutol-2)	Δ A
	0,35	0,12 0,090 0,190	0,23 0,26 0,160

As you can see from the table, the best immobilized fiber is PPM-1, so this fiber was used in later works.

Immobilization methodology: 10 ml of 0.1% bismutol-2 Reagent was added to 100.0 ml measuring cups, 0.2000 g of fiber was inserted and mixed using a glass rod for 5-8 minutes, then the fiber was washed with distilled water and the amount of reagent sitting on the fiber was measured. The results suggest that the immobilization of bismutol-2 Reagent in fiber is expressed by the following formula.

$P\text{-}NH_2 + HC1 \rightarrow P\text{-}^{+}NH_3C1^{-}$

$P\text{-}^{+}NH_3C1^{-} + N–S–R \rightarrow P\text{-}^{+}NH_3 – N–S–R$

Бунда, $P\text{-}NH_2$- polymer carrier

Ar–N–S–R– vismutol - 2 reagent

To determine the charge of the complex, the analyzed solutions were transferred from the columns filled with cationite PPM-1.

Methods of determination: a) in a column with a diameter of 1.0 cm, 1.0 g of cationite was filled with PPM-1 and washed first 5 times with a solution of 10.0 ml of 0.10 M of hydrochloric acid, and then with 30.0 ml of distilled water from the column. Under optimal conditions found, 2.0 ml of 0.1% reagent solution, 1.0 ml (20 μg per ml) of rhenium (III) solution, 10.0 ml of universal buffer and distilled water were filled to the line. 10.0 ml of cationite of the prepared complex was transferred from PPM-1. After the cationite passed PPM-1, The Color of the ham complex remained unchanged.

b) in a column with a diameter of 1.0 cm, 1.0 g of anionita was filled with PPM-1 and washed first 5 times with 10.0 ml of 0.10 M of NaOH solution, and then with 30.0 ml of distilled water from the column. 10.0 ml of cationite of the prepared complex was transferred from PPM-1.

The reaction of complex formation from the results of determining the charge and composition of the complex can be expressed as follows:

$HR + Me^{3+} \rightarrow [MeR_3]^{-} + 3H^{+}$

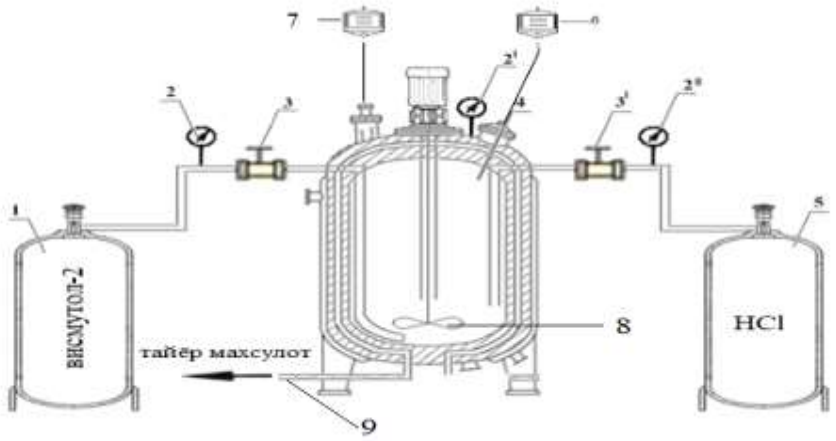

Figure 1. Technological scheme for immobilizing bismutol - 2 Reagent in PPM – 1 fiber

1-reactor (bismutol–2 (or 5-mercapto-3-phenyl-1,3,4 tiadiazolution-2 potassium solution capacity); 2. bismutol-raschodomer measuring the amount of 2;

2^1. raschodomer measuring the capacity of distilled water; 2^2. 0.1 M HCl kislata capacity measuring Observatory; 3–bismutol-2 reactor valve; 3^1-0.1 M HCl acid solution reactor valve; 4-PPM-1 fiber capacitive valve; 5. 0.1 M HCl kislata solution capacity; 6 - distilled water capacity; 7 - coating universal buffer solution capacity; 8 - mixer; 9-finished product. Take the PPM - 1 sorbent in the 4th kalonka and mix it with 0,1 M Li HCI for 1-2 hours. In reactor 6, it is washed with distilled water until neutral state, and the washed fiber is poured 0.1 M HCl through a rachodomer measuring the amount of 5 - HCl and mixed for 15-20 min (the HCl coming out as a waste is again sent to the processing technological process). Bismutol–2 (or 5-mercapto-3-phenyl-1.3.4 tiadiazolution-2 potassium) from Reactor 1 is immobilized with a 0.01% working solution using an organic riagent. The finished working solutions are mixed with the fiber passed into the chlorine form and the working solution in the 4th kalonka for 1 hour and the new sorbent is separated.

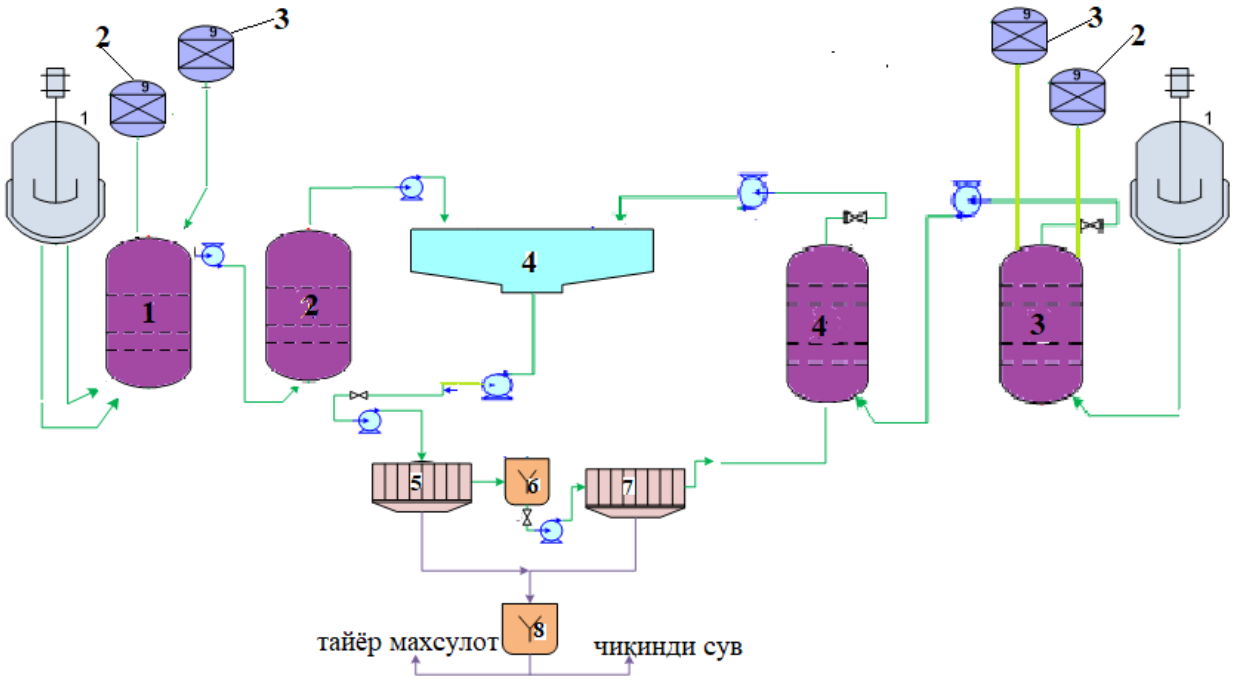

Figure 2. Technological scheme of purification of industrial wastewater from Re^{3+} ions of the output" SPRM "of the copper enrichment factory" Almalyk KMK " JSC

1-Rhenium solution Kalon from molybdenum raw materials; 2-sulfuric acid erythema kalonka; 3-аммоний гидроксид эритма калонкаси; (1- реактор; 2- реактор; (3- реактор; 4- реактор; (заҳира реактори))) 4- рений элюат; 5- десорбция қилинган сорбент; 6- кам эрийдиган бирикмаларни чўктириш; 7- эритмани қайта ишлаш жараёнига йўналтириш; 8- тайёр маҳсулот;

In the first Kalon, the industrial sewage waste technological water from the Copper enrichment factory "SPRM" of JSC "Almalyk KMK" is injected into the 1st reactor along with a solution of sulfate kislata and ammonium hydroxide, and the sorption process is directed to the 2 nd reactor. The sorption kalonka is assembled into a 4th rhenium elyuat collecting reactor, in this jarayan 1-2 kalonka sorbent goes into the desorption process after saturation, at which time 3-4 sorption kalonkas are launched. 5-the desorbed sorbent, on the other hand, is returned to the starter system again. If there are excess interfering ions in the sorption process 6 - low - soluble compounds are sent to the settling calon and from it to the 7 th solution processing process orientation calon. From the final product of solution processing, rhenium metal is obtained.

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