



DEVELOPMENT OF SORBTSION-SPECTROSCOPIC METHODS FOR DETERMINING ZINC IONS IN THE COMPOSITION OF ENVIRONMENTAL OBJECTS

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Abstract. *Organic reagents are widely used in the identification of ions of heavy metals in various objects of the environment. Existing methods of detection are associated with the fact that a lot of time is spent on metal separation and subsequent detection. They have such significant disadvantages as low sensitivity and low expression of automation associated with it in the sample. In this method, the expression consists of creating dressing filtrates that are highly branched and have a strong sensitivity.*

Keywords: *heavy metals, modifications, alcohols, organic compounds, sorbents, organic reagents, optical methods, photometric, spectrophotometric, reagents.*

Introduction. In industrial monitoring of heavy metals, the demand for methods that are sensitive to the use of chemically pure substances and have a high degree of selective exposure is becoming one of the pressing problems. Many scientists have proposed the use of immobilized organic reagents as a solution to this issue[1-2]. The mechanism of the reaction of the formation of zinc, lead ions in a complex with immobilized organic reagents has been studied, and data on this topic is presented in the scientific and technical literature. But they are one of the disadvantages of veness and scarcity of recommended carriers. Therefore, when monitoring heavy metals, it is necessary to develop and apply new methods that meet the requirements of the times, using sorbents from raw materials. [3-4].

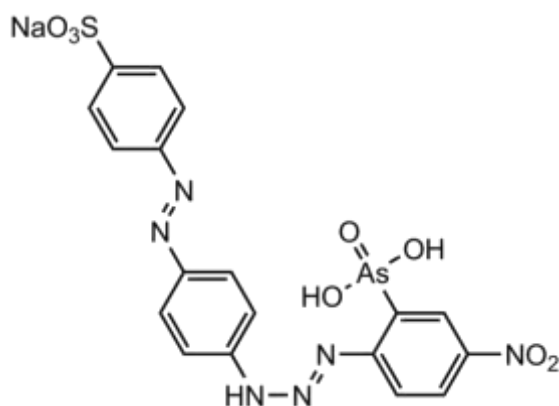
Solid-phase-spectroscopic methods, one of the newer approaches, based on the use of immobilized organic reagents, meet the requirements for sensitivity and reliability. One of the pressing issues is the creation of new methods based on

targeted immobilization of new reagents and the identification of metals with them on various natural objects. [5-6].

There are many methods of photometric and spectrophotometric detection of zinc and arid ions in the world, which are optical methods. In the results obtained by these methods, it is observed that many ions have a low halability, accuracy and sensitivity. In the industrial monitoring of heavy metals, the demand for methods with a high sensitivity to the use of chemically pure substances and selective exposure is increasing, and this is becoming one of the pressing problems. Therefore, when monitoring raw heavy metals, it is necessary to develop new methods that meet the requirements of the times.

Solid-phase-spectroscopic methods, one of the newer approaches, based on the use of immobilized organic reagents, meet the requirements for sensitivity and reliability. [7-8].

The work used sulfarsazene, an organic reagent that was widely used in the industry.



Sulfarsazen (4-((4-(3(2-Arseno 4-nitrophenyl)triase-2(Enyl)(phenyl)diazenyl)benzolsulfate sodium.
Mg = 572.32 gr / mol

Main part

Solutions: to prepare a solution of Sulfarsazene concentrate 0.01 m, a measure of 100 ml was dissolved by adding 0.057232 gr of sulfarsazene reagent to the flask and adding distilled water to the mark.

To prepare a standard 0.01 m solution of the spirit, 2.8454 gr was taken from the Salt $\text{ZnSO}_4 \cdot 7\text{H}_2\text{O}$, 1000 ml of the measure was placed in a flask and dissolved by pouring distilled water to the mark.

Various fibrous materials (a type of polyacrylonitrile) containing different functional groups have been tested as a solid phase. Sorbents were used in the wet state in the form of discs with a diameter of 20 mm and a weight of 30-40 mg, for which the carriers were stored in a 0.1 M solution of hydrochloric acid, washed with distilled water, and then stored in Petri dishes.

Equipment:

Spectrophotometers UR-10 (Karl Tseys, Jena), "Analytssystem 360 FT-IR" "Nicolet Justrument Corporation" (SSHA) were used to measure Ik-spectra in the 500-4000 cm^{-1} Fields.

To measure solution rn, pH-meter "METTLER TOLEDO" and ionomer I-130. A "X-Rite" recorder spectrophotocolorimeter and a two-beam recorder UV-Vis M-40 spectrophotometer were used to capture and study diffusing light return spectra from a solid surface. The difference in diffusional light return coefficients measured at 570 nm was taken as an analytical signal after the element was sorbted from Control, and solutions and reactions with solid-phase reagent were analyzed.

The results obtained are taxable

Sulfarsazene was measured in a solution of 0.0001 m at KFK at kyuveta thicknesses varying at wavelengths of 490 nm. Of the results obtained, the maximum optical density was observed at a thickness of 2 cm cuvette, and for further work, the cuvette with the same charge was selected.

As a carrier sorbent, nitron-based anion exchange fibers synthesized in the Department of polymer chemistry of the Faculty of Chemistry of UzMU were used. (Table 1).

0.2 g was pulled out of the resulting fibers and treated with hydrochloric acid. It was rinsed with distilled water to a neutral rection and placed for 0.5, 1, 2, 6 and

12 hours in 10 ml of a solution of 0.0001 M sulfarsazene reagent. The results obtained are shown in table 1.

Table 1

Optimal carrier selection

Sulfosarzen=0.0001 M, $\lambda_{\max}$ =490nm, l=2SM, t=25os

Sorbent	Time, min					
	30	60	120	180	360	720
Sma-1	0,43	0,45	0,45	0,46	0,46	0,45
Sma-2	0,10	0,12	0,15	0,15	0,15	0,15
Sma-3	0,08	0,10	0,10	0,09	0,11	0,10
PPA 1	0,40	0,60	0,63	0,60	0,62	0,65
PPM 1	0,75	0,86	0,90	0,90	0,88	0,90
PPD-1	0,40	0,45	0,46	0,43	0,45	0,45

The best result when using different fibers was observed in PPA-1 and sma-1,sma-3 fibers, and PPA-1 fiber was selected as the carrier, and work was carried out on 2 hours of exposure in time.

Table 2

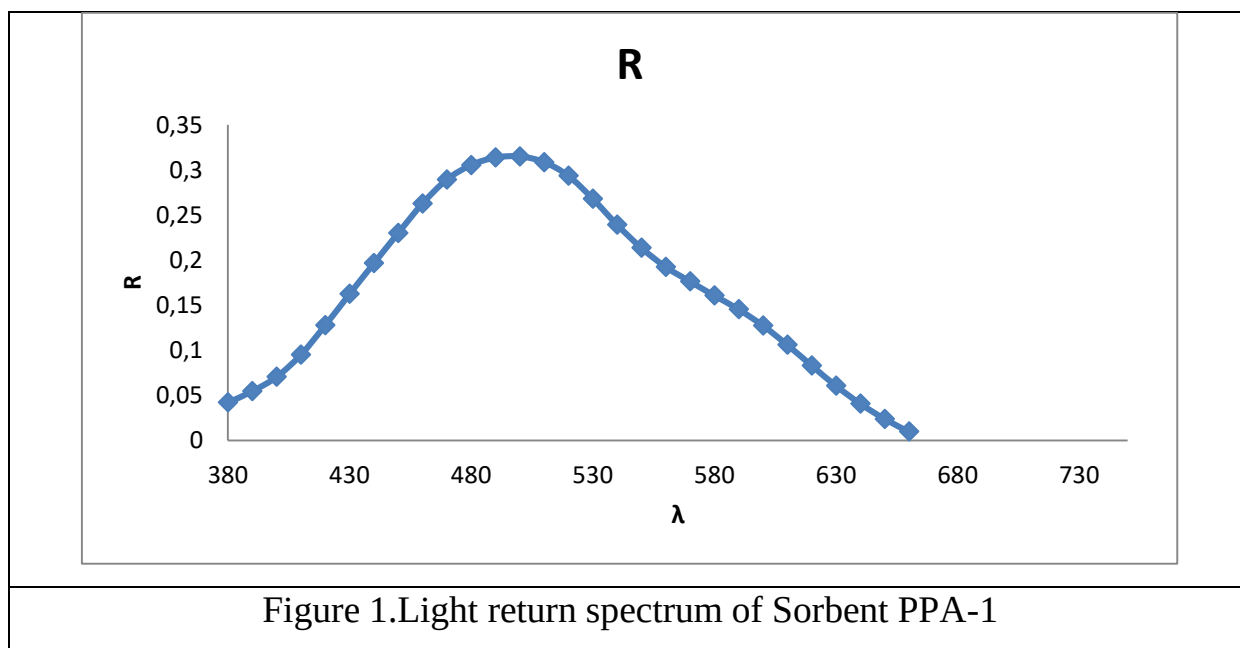
Qualitative reactions of metal ions with immobilized sulfarsazene ($m_t=0.2$ gr., $t=25os$).

Sorbent	Sma-1 lemon color	Sma-3 Dense, pink	PPA-1 pale yellow
immobilized reagent	Orange	yellow	yellow
Cu^{2+}	pale yellow	light brown	Did not change
Hg^{2+}	red	Did not change	Violet
Pb^{2+}	red	Did not change	red
Co^{2+}	Orange	Did not change	Brown

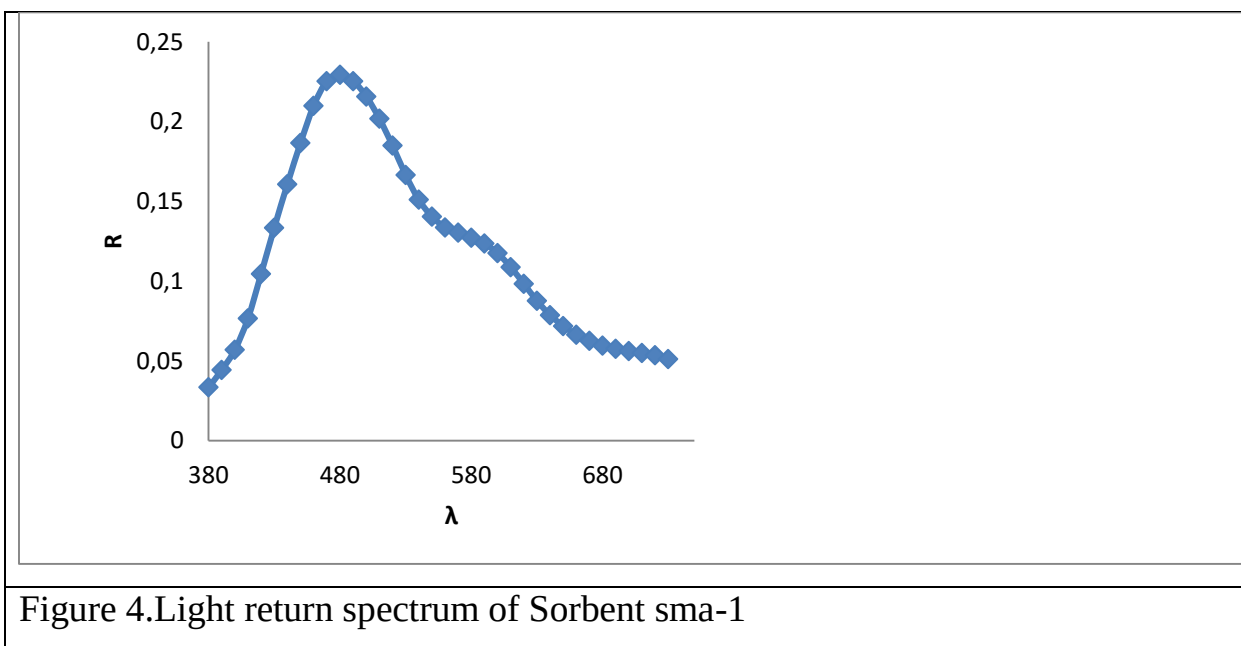
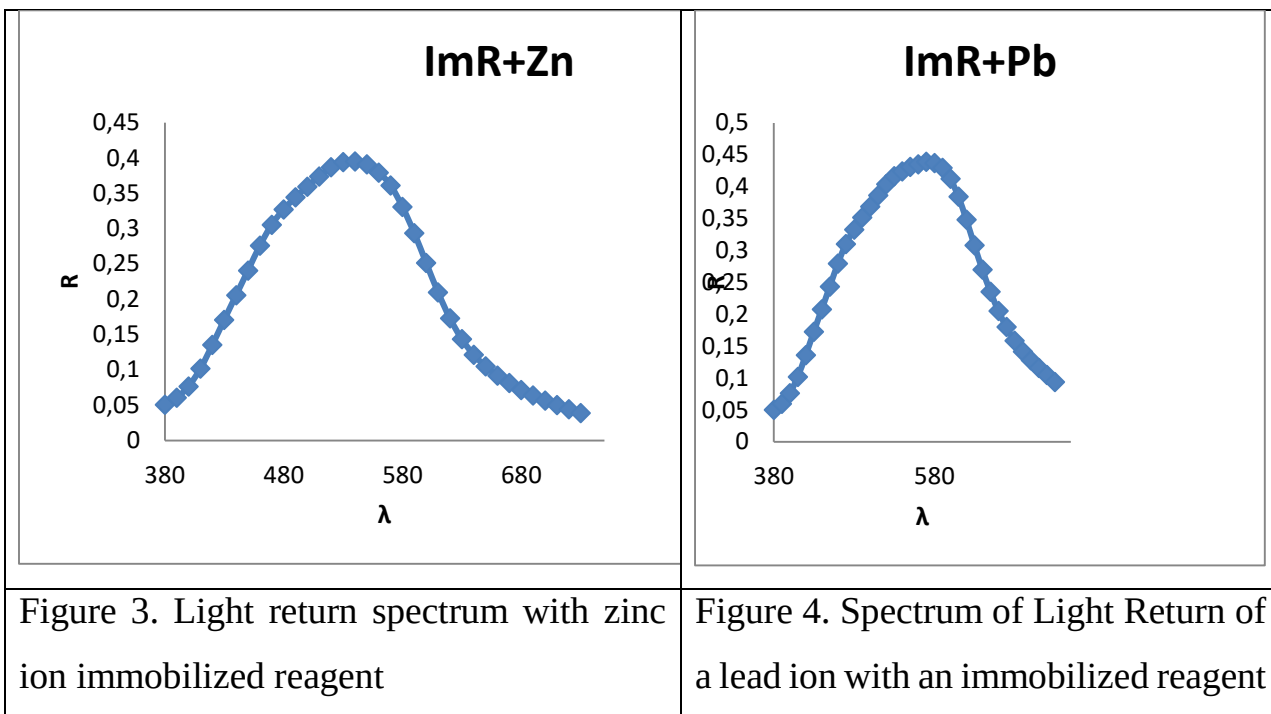
Ni^{2+}	Brown	оч сарик	Violet
Cd^{2+}	Violet	Did not change	Violet
Cr^{3+}	Did not change	light brown	Did not change
Sn^{2+}	red	Did not change	Violet

Summing up from the table, an immobilized sulfarsazene was selected for the sorbent PPA-1 fiber, which allows the detection of zinc and lead ions by visual observation, convenient for the test method [21].

The PPA-1 fiber and the reagent to it were measured in an immobilized X - Rite light - return spectrum measuring instrument, and the results were cited in figures 1 and 2.



The beam return spectrum of the resulting complex was measured and brought in figures 3 and 4 by oscillating one of the immobilized reagents from zinc and the other from a known concentrated solution of lead salt.



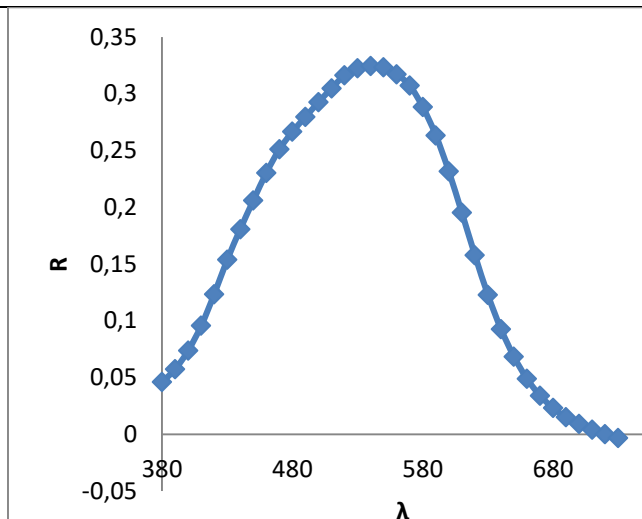


Figure 5. Light return spectrum with zinc ion immobilized reagent

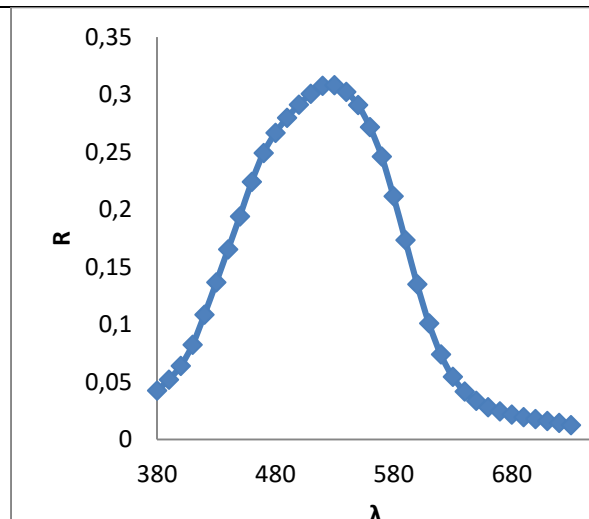


Figure 6. Spectrum of Light Return of a lead ion with an immobilized reagent

With immobilized organic reagent zinc and lead ions, minima were observed at 540 nm and 520 nm.

Table 2

Light absorption Maxima

A max					ΔA
PPA 1	490	ИмР	ИмР+Zn	ИмР+Pb	
		490-630	490-570	570-580	50
Sma 1	490	490-630	490-520	600	110

Conclusion.

The results show that a cheap, environmentally friendly, selective method of sorbtional photometric detection of lead and zinc metals has been developed using the developed method. The synthesis of sorbents used in this method on the basis of local raw materials and the regeneration of sorbents are important in solving the environmental problems encountered today.

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