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SPECTROSCOPIC ANALYSIS OF THE PROCESS OF COMPLEX FORMATION OF ALUMINUM ION WITH OXYAZOREAGENTS

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In recent years, we can observe an increase in environmental pollution, that is, poisoning of the environment with various heavy and toxic metals. The reason for this is the increase in anthropogenic influence, that is, the increase in production and industry. Among the main national threats that threaten the ecological security of our country, it is necessary to highlight the pollution of water resources, natural and man-made disasters, production and household waste, radiation pollution of some areas and groundwater pollution[1-3].

Allowable amounts of aluminum ions from the environment, food, drinking water and wastewater, if not controlled, pose a risk to public health. Today, the requirements for the metrological and analytical properties of the methods developed for the determination of toxic metals are increasing, which requires the development of modern methods for the determination of the ions of these metals [4-7].

It is appropriate to use spectroscopic methods, including the luminescence method, as a method that meets the above requirements for the determination of aluminum ion. In this case, improvement of its chemical-analytical properties is achieved by immobilizing the organic reagents used in the determination. According to the conducted studies and literature analysis, oxyazo reagents are the most suitable reagents.

Studies have been conducted with various reagents for the determination of aluminum ion, including eriochrome red B, morin, and quercetin. A complex combination of aluminum ion with eriochrome red B belonging to the class of oxyazo reagents was obtained.

IR-spectroscopic examination was conducted to study the structure of the complex formed as a result of the reaction. According to the obtained results, a change in the vibration fields of the groups –OH, N=N, C=O was observed in the IR spectra of the

reagent and the complex. The corridors of the OH group are widened and shifted to the lower area by 150-160 cm^{-1}. The frequencies of N=N and C=O groups shifted to the long-wave range by 18-38 cm^{-1} (Table 1). The analysis of these provides the basis for concluding that these groups are involved in the formation of the complex.

Table 1 The results obtained in the IR-spectrum

Compound	$\lambda_{N=N}$ cm^{-1}	$\lambda_{C=O}$ cm^{-1}	$\lambda_{O=H}$ cm^{-1}
Eriochrome red B	1410	1700	3200-3300 $см^{-1}$ wide corridor in the field
Eriochrome red B – aluminum	1440 (Δ30)	1718 (Δ 18)	

Based on the study of the chemistry of complex formation and the results of IR-spectroscopic analysis, it can be said that hydroxide, azo group and carbonyl group participate in the formation of the quasi-aromatic metal-chelate complex cycle.

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