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Obtaining Wood Sorbents Based on AILANTH Tree and Development of Their Effective Composition

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ABSTRACT: The article presents the results of research on the production of activated wood sorbents based on ailanthus wood and the development of their effective composition. As a result of the presence of a large amount of lignin in the composition of the ailanthus tree and its activation, this leads to an increase in the number of active centers in the pores, which increases the sorption properties. The possibility of selecting an effective composition of sorbents by activating Ailanta charcoal and activating them at different temperatures was used.

KEYWORDS: mineral, sorbent, waste water, raw material, modification.

I.INTRODUCTION

Nowadays, in the world, by developing and using various wood materials and sorbents based on them, the metallurgical industry is able to purify wastewater and at the same time separate non-ferrous, heavy and precious metal ions from them. demand is increasing. Therefore, special attention is paid to the creation of wood sorbents or high-performance sorbents based on them for the treatment of industrial wastewater and the separation of non-ferrous metal ions in the indicated areas of industry.

Currently, in foreign countries, scientific researchers on the development of wooden sorbents with high sorption capacity and physical-mechanical properties and a long service life occupy an important place.

Therefore, the problem of creating a new generation of composite sorbents on the basis of organominerals obtained from local raw materials and production waste, intended for the treatment of wastewater generated in the metallurgical industry and the extraction of precious metal ions from them, is an urgent problem.

II. SIGNIFICANCE OF THE SYSTEM

The article presents the results of research on the production of activated wood sorbents based on ailanthus wood and the development of their effective composition. The study of methodology is explained in section III, section IV covers the experimental results of the study, and section V discusses the future study and conclusion.

III. METHODOLOGY

The scientific significance of the research results is that the strength and sorption properties of adsorbents were determined by determining the laws of influence of the type and composition of local minerals and activated charcoal. explained by The practical significance of the research is the treatment of metallurgical wastewater and the extraction of non-ferrous metal ions using adsorbents based on local minerals and activated charcoal.

IV. EXPERIMENTAL RESULTS

Carbon adsorbents were prepared by thermal activation of Ailanta wood chips for 1.5 hours in a pyrolysis unit designed for laboratory conditions in an airless environment at 300, 400, 500, 600, 700, 800 ^{o}C. The resulting carbon

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adsorbents were conventionally called ACAT. Ailanthus wood is a microporous product that retains large amounts of carbon as a result of pyrolysis. The composition and structure of these coals depends on the pyrolysis temperature and the activation method. In most cases, pyrolysis is carried out at a temperature of 450-550 °C, resulting in the formation of a high molecular weight product in an amorphous state. Charcoal has a predominantly aliphatic and aromatic structure. It contains 80-92% C, 4-5% H, 5.0-15% N, O and 1-3% inorganic compounds (elements such as K, Na, Ca, Mg, Si, Al, Fe are mainly carbonates and oxides). 'in the form) occurs.

In order to determine the values of the static exchange capacity of the sorbent obtained by activation of bentonite and Ailanta wood shavings, a study was carried out in a 0.1 N HCl solution. In this case, ACAT sorbents were added to sample BS-1 in a ratio of 1:0.5; 1:0.6; 1:0.7; 1:0.8; 1:0.9; 1:1; 1:1,1; it was crushed to a size of 0.1 mm using a grinder, added in mass proportions and heated for 2 hours at 300 °C under airless conditions. After this, samples of the adsorbent were taken, activating them with water vapor at a temperature of 750-800 ºC for 10 minutes and conditionally BA-1 (1: 0.5), BA-2 (1: 0.6), BA-3 (1: 0.5). 0.7), BA-4(1:0.8), BA-5(1:0.9), BA-6(1:1) and BA-7(1:1.1). At the same time, the value of the static exchange capacity of our sample of adsorbent BA-6 gave a higher result compared to other samples; the value of the static exchange capacity is 2.55 mg·ekv/g. The results obtained are presented in Figure 1.

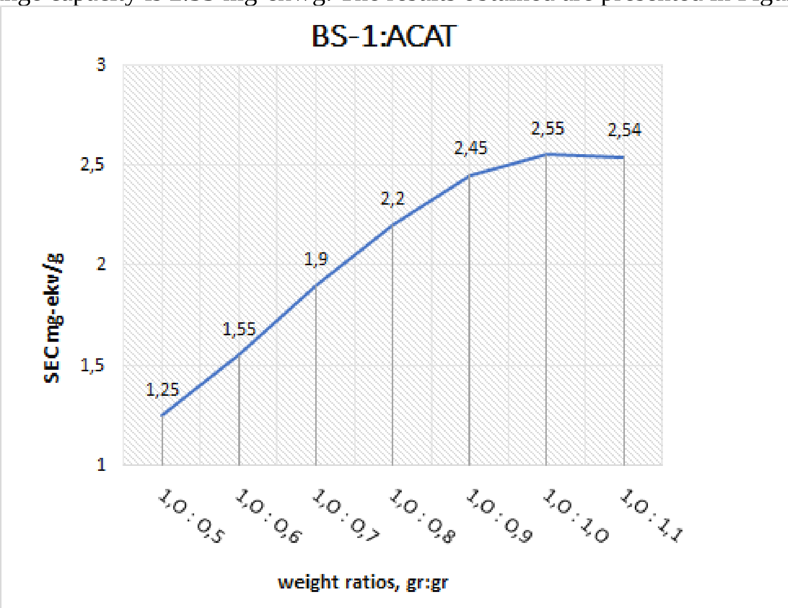

Figure 1. Dependence of the static exchange capacity of the BA sorbent in a 0.1 N HCl solution on the mass ratio of BS and ACAT

From the results obtained it follows that as the mass ratio of the "Ailanthus Activated Charcoal" sorbents to the BS-1 sample increases, i.e. the value of Static exchange capacity in BA-1(1:0.5) is 1.25 mg·ekv/g, BA-1. 2(1:0.6) The value of the static exchange capacity is 1.55 mg·ekv/g, BA-3(1:0.7) The value of the static exchange capacity is 1.9 mg·ekv/g, BA- 4(1:0.8) The value of the static exchange capacity is 2.2 mg·ekv/g, BA-5(1:0.9) The value of the static exchange capacity is 2.45 mg·ekv/g, We see that the value of the static exchange capacity BA-6 (1:1) is 2.55 mg·ekv/g. In addition, the value of the static exchange capacity of BA-7(1:1.1) was 2.54 mg·ekv/g, and a deterioration in the sorption properties of this adsorbent was observed. Based on the research, it was concluded that 2.55 mg·ekv/g is the highest value of the static exchange capacity of the BA-6 sorbent as an effective composition.

This can be explained by the diffusion of the BA-6 macromolecule and solution ions penetrating into the internal pores. The adsorbent of the BA-6 composition has a higher static exchange capacity than other compositions, and if the filler is alkaline bentonite, which is hydrophilic in BA-6 brand adsorbents, then it exhibits low hydrophilicity compared to ACAT bentonite. a filler with good hydrophilic properties is a filler with good sorption properties and, as a consequence, fillers with specific gravity are explained by the fact that BA-6 is a sorbent with a high static exchange capacity.

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V. CONCLUSION AND FUTURE WORK

In this chapter, the research object for obtaining composite polymer sorbents was selected, and their properties were studied based on the methods. Methods of sampling composite polymer sorbents based on polymer-polymer complexes and organomineral ingredients, methods of studying the most important physicochemical properties of composite polymer sorbents developed using modern physicochemical research methods, methods of determining the sorption capacity of composite polymer sorbents, composite study of desorption and regeneration of polymer sorbents and methods of extraction of non-ferrous, heavy and precious metals, methods of studying the strength level of composite polymer sorbents, mathematical static processing of experimental results were carried out.

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