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STRENGTH CHARACTERISTICS OF BENTONITE FILLER SORBENTS (PANI-PAC)

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Abstract. The article provides information on determining the strength level of a composite polymer sorbent. Bentonite filler was added to composite polymer sorbents based on local raw materials in various mass fractions. As a result, the strength of the sorbent improved with increasing bentanite content.

Keywords. polyaniline, polyacryline acid, composite polymer sorbents, raw materials, bentonite, strength, filler

I. Introduction.

Currently, there is a growing need in our country to develop new generation sorbents based on composite polymer materials. In addition, various fillers are used to improve the physicochemical properties of the developed sorbents. The use of bentonite, which is a local raw material, is especially important. The purpose of using bentonite is that this filler has not only sorbing properties, but also swelling properties. The physical properties of the sorbent is its degree of strength, that the strength of the composite polymer sorbent depends on the content of the filler and has an extreme character. The obtained curves of the dependence of the strength on the content of bentonite in the composition of the PPK are close to the static distribution curves. In the region of structures close to optimal, the curve satisfactorily follows a parabolic dependence and is practically symmetric. The maximum function corresponds to the optimal structure, and any deviation from the content of fillers means a departure from the optimum. In the static plan, the optimal structure corresponds to the minimum deviation of strength indicators. It can also be seen from the figures that at the beginning of the curve there is a decrease in the strength of the polymer, mainly due to non-formed structures at low doses of the filler. The experimental results further show that increasing the filler (bentonite) content increases the interfacial fraction. In this case, an increase in the strength of the composite by

more than 2 ÷ 3 is observed. It was found that with a further increase in the amount of filler, an even greater aggregation is observed and, as a result, a decrease in the interfacial layer. The results indicate that a higher degree of PPK filling leads to a thermodynamic meta stability of the composite, which provides an increase in strength under extreme conditions. The introduction of fillers into the composition of the composition allows in most cases to improve the sorption and electrochemical properties of sorbents. The nature of these components and their volumetric content in the composite are of great importance. For most compositions, an extreme dependence of strength on the concentration of the filler in the material appears. The practical volumetric concentration of the filler bentonite was determined, above which the strength properties of the composition deteriorate (see Figure-1).

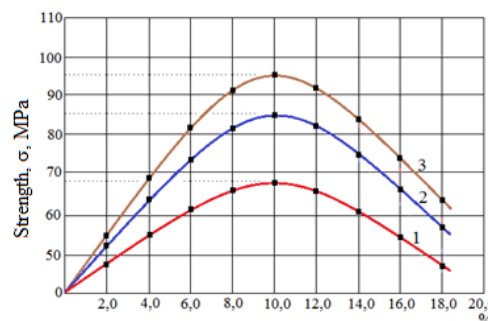


Fig. 1. Dependence of the strength of PANI-PAC on the degree of filling.

PANI-PAC (1); PANI-PAC + K (2); PANI-PAC + B (3)

Very interesting results of the study of changes in the strength of modified PPKM depending on the specific surface area of the bentonite additive (from 0,05 to 0,5 m²/g) with a constant degree of filling showed the following: bentonite with a specific surface area of 0,28-0,33 m²/g, the volume fraction of the mass - 10% is optimal for PPKM. In this case, the strength of PPKM, depending on the content of PPK - 10% by mass of the interfacial structure (IFS) was studied from 7 days to 30 days. The strength of PANI-PAC is 70 MPa. And also KPS based on PANI-PAC with 85 MPa kaolin filler. The strength of CPS based on PANI-PAC with bentonite filler is 95 MPa. As the research results have shown, the best strength indicator is shown by KPS based on PANI-PAC with a bentonite additive.

Conclusion. Finally, kaolin and bentonite were added as fillers to improve the physicochemical properties of sorbents developed from local raw materials. According to the results of the analysis, it was found that the sorbent of the bentonite filler has a higher degree of strength than the kaolin filler and sorbent without filler.

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