

ADSORPTION REMOVAL OF PHENOL

Yakymchko M. M., *Kurpita A. V.*, Ivanenko I. M.

Department of Inorganic Substances Technology, Water Treatment and General Chemical Engineering, National Technical University of Ukraine "Igor Sikorsky Kyiv Polytechnic Institute", 4 buid, 37, Prosp. Peremohy, Kyiv 03056, Ukraine
irinaivanenko@hotmail.com

Phenols are organic compounds of the aromatic series. Currently, several main directions of their use can be identified. One of them is the production of medicines. Most of these drugs are derivatives of salicylic acid from phenol. The most commonly anesthetic - aspirin is nothing but acetylsalicylic acid. Another area of application of phenol is the production of synthetic fibers: nylon, nylon. But the most important area of its application is the production of phenol-formaldehyde resins. Also, phenol is used to produce additives for lubricants, for the selective purification of oils and for other purposes, it is part of some dyes, perfumery products, plasticizers for polymers, plant protection products. That is, phenols can enter the water as a consequence of economic activity, as a result of the enterprises of the oil refining, paint and varnish, and wood industry. Phenol is a very toxic substance.

The purpose of this work was to study the kinetics of adsorption phenol extraction by synthesized composite adsorbents with different aging time.

Adsorption was carried out using a model solution of phenol at a starting concentration of 5 mmol / dm³, which was determined by the bromide-bromate method, taking samples after 30, 60, 120 minutes and after 6 hours of adsorption. The degree of withdrawal (a,%) was calculated by the formula: $a = ((c_0 - c_p) / c_0) * 100$. For the study, three SnO₂ / AC composites with different aging time of 1, 3, and 7 days were synthesized. The results of this study in the form of a graph of the dependence of adsorption absorption of phenol on time (t, min) are presented in Fig. 1.

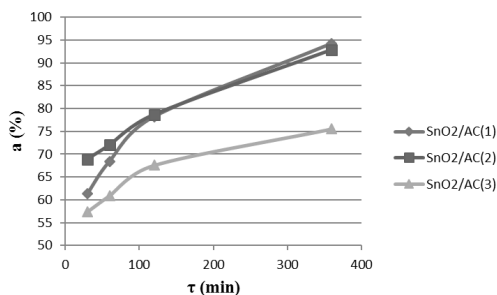


Fig. 1. Kinetics of adsorption removal of phenol composites SnO₂ / active carbon with different aging times

As can be seen from the figure, the degree of adsorption extraction of phenol increases with increasing contact time of the investigated composites with solutions.

For SnO₂ / activated carbon with aging time of 1 day, the degree of phenol extraction is 61 % with a contact time of 30 minutes, 69 % for contact 60 minutes, 79 % after 120 minutes, and after 6 hours of contact reaches 95 %, which is the highest index of the presented research.

The kinetics of adsorption of phenol by the composite SnO₂ / activated carbon with aging time of 3 days, the degree of withdrawal reaches a value of 70 % after 30 minutes of contact, which is 10 % and 15 % higher than for other samples, 72 % with a contact time of 60 minutes, 79 % after 120 minutes, and after 6 hours of contact reaches 93 %.

In the study of SnO₂ / activated carbon with an aging time of 7 days, the kinetics of adsorption has a different character. With an increase in contact time, the degree of adsorption increases and reaches 61 % with a contact time of 60 minutes, 68 % with a contact time of 120 minutes, and 76 % after 6 hours of contact.

Thus, the experimental data obtained show that when the aging time of the synthesized composites increases, their adsorption capacity in relation to phenol decreases.