Surface chemistry was investigated by potentiometric titration method. It has been shown that tained carbons have significant amount of acidic surface groups (1.5-3.0 mmol/g). The highest amount as achieved at impregnation ratio of 0.75. The surface groups were assigned to phosphate, carboxylic, tone, keto-enol and phenol type groups. The presence of acid surface groups is expected to be vourable for metal ion adsorption.

Methylene blue adsorption increases with increasing impregnation ratio. The trend is different from velopment of porous structure depending on impregnation ratio. Correlation analysis revealed that the ost important pore sizes, which favours methylene blue adsorption, are 1.5 and 3.2 nm. The pore sizes tatively ascribed to adsorption of one and two molecular layers of methylene blue.

Obtained carbons show high adsorption capacity towards heavy metal ions. Affinity series is $d^{2+} > Cu^{2+} > Cr^{3+} > Zn^{2+} > Ni^{2+}$. The distribution coefficient is up to 1000 for Cd^{2+} at concentration 10 ng/g.

Thus, carbon adsorbents obtained from dogwood stones by chemical activation with phosphoric acid nay be regarded as promising adsorbents for removal of organic pollutants and heavy metal ions from queous solutions.

1] Ioannidou O, Zabaniotou A. Agricultural residues as precursors for activated carbon production-A review. Renew Sustain Energy Rev 2007;11:1966–2005.
2] Сыч НВ. Переработка кизиловой косточки в высокопористые сорбционные материалы. Экотехнологии и ресурсосбережение 2008:54–7.

THE SURFACTANT ADSORPTION BY THE CHITIN ADSORBENTS

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The fundamental and applied investigation studying the addition of the polyelectrolytes in to isperse systems are urgent for searching of the ways of the control of the adsorption, flotation and occulation processes. The modern technologies of the adsorption purifying of water demand of earching of the new, ecologically friendly adsorbents as chitin and chitosan. They are limited swelling dsorbents and used for the extraction of the organic and inorganic substances from the water solutions. he main advantage of these adsorbents is their biological degradation. The analysis of the literature data lows that chitin and chitosan adsorbents have high adsorption ability in relation to mineral oils, phenols nd heavy metals. Chitin`s prevalence in the nature takes the second place after cellulose. The basic atural sources of chitin are the shells of crustacean and the biomass of fungus` mycelium. Chitin rovides the mechanical strength of the structure without rigid bonds between microfibrilles, that allows o keep the certain elasticity of a cellular wall.

The submitted researches are devoted to studying adsorption activity of the chitin received from e shells of crustacean in relation to representatives of surfactants. They are used in many technological rocesses and therefore they are the widespread pollutants of the water environment. The fraction of dsorbent with the size of particles $(0,5\text{-}1,0)\cdot10^{-3}$ m has been selected for researches. The equations of angmuir, Frendlich, Hill – De Boer , BET have been used for the description of surfactant adsorption rocess. The calculation of constants of the equations is made by the graphic method using the equations the linear form. The analysis of the received isotherms has shown, that isotherms of anionic surfactants odium alkylsulfates) adsorption by chitosan concern to L - type. the isotherms of cationic surfactants rption (alkylammonium chlorides)by chitin - to S - type according to Gilles classification.

Processing of experimental data with the help of the computer program gives satisfactory conformity of the parameters of the adsorption calculated by the various methods.

The attempt of formal use of some adsorption theories - Langmuir and Hill -De Boer theory as well as Frendlich equation to experimental adsorption isotherms has been done to obtain the basic characteristics of adsorption interaction of molecules surfactants with chitosan. Langmuir and Frendlich equations are suitable to describe the initial fragments of adsorption isotherms corresponding to monomolecular adsorption (concentrations (0.5-1.7) 10^{-4} mol/l) whereas Hill De Bur equation describes the part of isotherms corresponding to small packing of adsorbent surface by adsorbate (θ = 0.3-0.6). This equation is suitable only on the part of rise of adsorption isotherm. The values of constants K_1 describing the affinity of adsorbate to adsorbent, and K_2 describing intermolecular interaction in an adsorptive layer are equal 0,5-4,9. The values of standard differential change of a free Gibbs energy during adsorption (ΔG^0_{ads}) are from -24,5 up to - 32,0 kJ/mol. The obtained data show the considerable affinity of surfactants to chitosan surface and considerably strong intermolecular interactions in the surface (adsorptive) layer. The positive values of standard differential change of entropy (ΔS_0) are caused by expulsion from the adsorptive layer of water molecules and by desolvation of adsorbates molecules polar groups. The analysis of the obtained adsorption parameters shows that the adsorption of surfactants has preferentially physical character.

The IR-spectroscopic researches also have shown, that adsorption has the physical mechanism. The results of IR-spectroscopic research of samples of chitin and surfactants have confirmed, that during adsorption in researched systems there is no chemical interaction, and the formation of the hydrogen bonds between the functional groups of chitin and surfactants is observed. It testifies the displacement of characteristic band of the hydroxides groups (3600 - 3000 sm^{-1}) into more long-wave area (3000 - 2500 sm^{-1}).

INFLUENCE OF ETHONIUM ON STRUCTURE FORMATION IN AQUEOUS DISPERSIONS OF NANOSILICA

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Gemini surfactants, including quaternary ammonium salts, are widely used in many industrial, agricultural and medical applications for emulsification, dispersing, wetting, cleaning, foaming and anti-foaming, stabilization of dispersions due to their unique physicochemical and biological properties [1]. These surfactants have excellent solubilizing and foaming properties, elevated surface activity, extremely low critical micelle concentration (CMC) and may have very low Krafft temperatures [2]. One of the common gemini surfactants is ethonium (other names aethonium and 1,2-bis[dimethyl(decyloxycarbonylmethyl)amino]ethane-dichloride. Ethonium is used in many industries as emulsifier, water-repellent agent, softener of fabric, stabllizer of dispersions, and floating agent. The interactions between components in composite systems, including aqueous dispersions, may significantly change basic properties of colloidal systems. Structure formation in aqueous dispersions is determined by the balance of surface forces in disjoining pressure formation [3]. This balance changes due to surfactant adsorption on dispersed particles. It affects the processes of structure formation in dispersions, such as: the distribution of particle size, sedimentation and aggregative stability and structural and mechanical properties of dispersions [4]. Considering the surfactant impact on aqueous dispersions properties requires clarifying the structure formation in silica dispersions with surfactants.

Adsorption studies were carried out under equilibrium conditions at room temperature. A certain amount of the polymer solution (from 0.05 to 0.65 wt. %) was added to 0.1 wt.% silica dispersion and stirred. The systems were equilibrated for one day. Then the silica dispersions were centrifuged, and