

STUDY OF THE FLOCCULATION ABILITY OF HIGH-MOLECULAR COMPOUNDS

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The modern technologies of the flocculation require of searching of new, ecologically friendly flocculants such as nature polymers (chitin, chitosan and sodium alginate). The main advantage of these flocculants is their biological degradation. The analysis of the literature data shows that chitin and chitosan have high adsorption ability in relation to mineral oils, phenols and heavy metals. The basic natural sources of chitin are shells of crustacean and the biomass of fungus` mycelium. Chitin provides the mechanical strength of the structure without rigid bonds between microfibrilles, that allows to keep the certain elasticity of a cellular wall. Chitosan and sodium alginate have a complex of environmental and physico-chemical properties: biodegradability, playback of the raw material base, reaction and complexing ability, compatibility with living tissues without toxicity. Researches had shown that chitosan can be used for flocculation and sorption from aqueous solutions of surfactants [1].

The submitted researches are devoted to studying flocculation ability of the chitin, chitosan, sodium alginate in relation to suspensions ground sediments and kaolin.

As a model system, we used an aqueous suspension of kaolin, in which the surface layer of the particle has a negative charge due to the silanol groups. Kaolin was dried to constant weight at 100⁰ C and kept in a desiccator. The concentration of the dispersed phase in the suspensions was 0,3-7,0 %. Before testing the slurry was stirred for uniform distribution of particles.

It was studied colloid-chemical properties of polymers solutions in organic and inorganic acids, defined average molar mass and the degree of deacetylation of the chitosan by potentiometric and spectroscopic methods. It was made investigations for selection the most suitable solvent. The result of the research shows that the most stable macromolecular chitosan is observed in 0.3 M acetic acid. The viscosity of solutions of chitosan in acetic acid depends on the concentration. It was shown that the reduction of viscosity in the selected solvent is connected not with destruction of the chitosan polymer chain. The reduction of viscosity is connected with changes of macromolecule conformations.

It was study the process of formation of nanoscale complexes based on chitosan and sodium alginate in solution. The existence of polymer-colloid complexes in solution was proved to change of surface-active and rheological properties. Reducing the viscosity shows minimized polyelectrolyte macromolecules.

It was shown that the sedimentation stability defines as flocculants characteristics such as molecular weight, concentration and nature of flocculants, polyelectrolyte`s charge density and nature of the suspensions. It was found that natural flocculants of chitosan and sodium alginate are more effective than synthetic polyacrylamide type flocculants. It was shown that the presence of surfactants in the nanoscale complex causes a change in its flocculating ability. The surfactant can have a flocculating or stabilizing effect. This is determined by the nature of the functional groups and the conformation of macromolecules of polymer, a surfactant`s nature, the nature of the active centers of the surface of solids. The flocculant adsorbed on a few particles and aggregates them on the mechanism of formation of specific bridges.

The findings suggest that the studied natural flocculants have significant potential for use, thanks to a number of advantages: the efficiency of their action, low reagent consumption, environmental safety.

1. *Tymchuk A.F.* Mechanism of Formation of Complexes in the Surfactant –Polyelectrolyte system //Issues of Chemistry and Chemical Technology. – 2015. – V.3 (101), p. 49-54.