Perspectives to intensify process of high-purity isobutylene production

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**Keywords** tert-butanol dehydration, isobutylene production, strong acid ion-exchange resin, experimental study.

**Abstract** Presented that operating equipment had a limited potential to intensify tert-butanol dehydration. Alternative process scheme was given. Tert-butanol dehydration was experimentally studied with different strong acid ion-exchange resins KU-2FPP and Purolite СТ275 for the both process schemes – operating and alternative. Experimental study showed, that at alternative process scheme specific yield of isobutylene was higher with the same type and mass of catalyst, than at operating process scheme.

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**Physical and chemical hydrodynamics of cationic copolymerization of isobutylene with isoprene**

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**Keywords:** butyl rubber, molecular-weight characteristics, suspension copolymerization, physical and chemical hydrodynamics.

**Abstract.** The physical and chemical hydrodynamics of cationic suspension copolymerization of isobutylene with isoprene was originally formalized mathematically (the catalyst is AlCl3, the solvent is CH3Cl, temperature ≥ 173 K) with the boundary conditions corresponding to reactor equipped with a mixer. It has been found that with the increase of catalyst concentration (from 4.10 to 1 mol / l) and reduction of the rotation rate of the mixer (from 4 to 0.5 rev. / sec.) the number average (from 1200 to 201 000) and weight average (from 39 400 to 406 000) molecular weight of butyl rubber will decrease at the slight change of its polydispersity index (close to 2).

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**Study of polysulfone and polyether sulfone rheokinetic laws on curing process epoxy-amine binder**

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**Keywords**: epoxy binder, epoxy oligomer, ED-20, modification, polysulfone, polyether sulfone, viscometer rheokinetic.

**Abstract.** Today, the most common type of matrix to produce adhesives, potting and impregnating composite materials are epoxy-amine composition. In the production of products based on epoxy compositions most important issue is the choice of the mode of curing, providing the desired combination of properties derived products. For information, it is advisable to use the kinetic rheokinetic approach. In this paper, we studied the effect of thermoplastic modifiers (polysulfone and polyether sulfone),on a change in viscosity during curing. The basic laws of the process are considered. The data gives an indication of the direction the process curing conditions change.

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**Thermodynamic description of the process of adsorption of vanadium to carbon sorbent**

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**Keywords**: adsorption, sorption extraction of vanadium modified carbon sorbents, vanadium pentoxide, thermodynamics of adsorption, sorption isotherms.

**Abstract**. The possibility of adsorption of extract compounds of vanadium from acidic solutions on highly developed surface of the activated charcoal, the modified cationic surfactants. Found that mainly vanadium polyoxazolines are adsorbed . It is proved that the sorption extraction of vanadium from an aqueous solution do not interfere with ions of copper, nickel, iron, calcium, magnesium, sodium and potassium. Thermodynamic studies showed that the extraction of vanadium is reduced to the physical adsorption of polyoxoanion on the positively charged surface of charcoal (the recovery rate of 84%). The end products of the burning of saturated sorbent may be vanadium pentoxide or metal vanadium. The degree of purity of the final products is 99%. As impurities only discovered manganese compounds were discovered.

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**Membrane separation methods of organic acids**

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**Keywords:**membrane technology, baromembrane processes, lactic acid, succinic acid.

**Abstract**. There are many ways of the acids purification including extraction, adsorption and ion exchange. Technology of lactic and succinic acids by fermentation includes such stages as crystallization, dissolution, clarification and evaporation. The stages of purification and separation serving to get final product are very important as well. Membrane technology, especially baromembrane processes and electrodialysis are the most promising ones for the purification of lactic and succinic acids due to the relatively low capital cost and high exploitation characteristics – rejection (selectivity) and flux (permeation flow rates). The choice various baromembrane processes type depends on the nature of the impurities containing in liquid culture, their composition, as well as the purification data required. The analyzes of separation and purification steps shows that membrane technology is prospective alternative to traditional one.

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**Comparison of calculations of double-pipe en-closed heat exchanger using typical of integral and differential techniques**

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**Keywords:** integral technique, differential technique, double-pipe enclosed heat exchanger blasting air, diesel fuel.

**Abstract.** The calculations of basic parameters of double-pipe enclosed heat exchanger using typical integral and differential techniques were performed. It is shown that when heated blasting air both techniques provide almost identical results in terms of technological and geometrical parameters and when heated diesel fuel parameter deviations can reach tens of percent. The article shows the estimation of influence of fouling resistance on the geometrical parameters of double-pipe enclosed heat exchanger when heated liquids (diesel fuel) and gases (blasting air). Revealed that an increase in the fouling resistance by 2 times leads to the necessity to increase the heat transfer surface when heated liquids on 37% and when heated gases – on 1÷2%. Therefore, heat exchangers, which are heated fluids, require regular periodic cleaning of sediments. For heat exchangers in which the gases are heated, the period between cleanings of sediments can significantly increase.

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