

PETROLEUM PRODUCTS: technology, innovation, market

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The effect of length and structure of the alkyl radical consisting of industrial dialkyldithiophosphate additives (ZDDP) on the properties of hydraulic oils

Keywords: dialkyldithiophosphate zinc, hydraulic oils, additives.

Abstract. The comparative study of the influence on the quality of industrial hydraulic oils grades dialkyldithiophosphate additives (ZDDP), alkyl radicals comprising from 3 to 8 carbon atoms, the normal and iso-structural. Additives introduced in the base oil, were examined in terms of «Filterability with water and without water», «Hydrolytic stability», «oxidative stability», «Anti-wear properties». The influence of the structure of the alkyl radical in zinc dialkyldithiophosphates on the performance properties of hydraulic oils was established.

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MATHEMATICAL SIMULATION

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Improving the resource-efficiency of ethylbenzene synthesis with use of computer modeling system

Keywords: ethylbenzene, alkylation, transalkylation, mathematical modeling, optimization

Abstract. This article deals with the use of computer modeling system to optimize the operation of alkylation and transalkylation units equipment at the ethylbenzene synthesis plant by the zeolite technology. We showed that parameters that affect the economic efficiency of ethylbenzene production are following: distribution of ethylene between catalyst layers in the alkylation reactor, the overall ratio of benzene to ethylene ratio, the benzene to diethylbenzene molar ratio and temperature transalkylation feed flow. In the current research, ranging the benzene/ethylene molar ratio in the alkylation reactor from 2,4 to 3,6 revealed that with an increase in the molar ratio the ethylbenzene yield also increases, resulting in the economic efficiency improvement. When approaching to the benzene/ethylene molar ratio of 4 mol/mol, the product yield growth slows down. Although it was shown that the ethylbenzene yield increases along with the benzene/ethylene molar ratio, the operating costs of production also increase. The influence of temperature of the transalkylation reactor feedstock is more intense, as stated, it can be easily adjusted by opening or closing the bypass line.

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Decreasing of kinematic viscosity tolerance for marine fuels by accurate measurement of viscosity of its components

Keywords: marine oil, LP-model, kinematic viscosity.

Abstract. A new approach of kinematic viscosity estimation of heavy oil fractions at temperature of 50°C was considered in the paper. The approach allows getting the quality value even in the cases of freezing fractions at low temperature. The suggested method was used in measurement of viscosity of marine fuels components. It improved accuracy of development of blended marine fuel recipes by LP-model and decreased of kinematic viscosity tolerance for the oil products.

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Optimization of the process of catalytic alkylation of cyclopentadiene by *n*-heptyl alcohol

Keywords: cyclopentadiene, *n*-heptanol, alkylation, optimization, synthetic lubricants.

Abstract. On the basis of experimental data the regression mathematical model of the process of obtaining synthons for synthetic cyclopentane oils - alkyl substituted cyclopentadiene by catalytic alkylation of cyclopentadiene with aliphatic monohydric alcohols of C₆-C₁₀ series, reflecting the influence of the main technological factors (the ratio of the initial reagents, temperature, amount of catalyst) to desired product yield has been developed. Statistical analysis of the resulting model has been carried out, and the adequacy of the developed model to experimental data has been proved. The optimal values of the input parameters for the reaching of the maximum yield of alkylated cyclopentadienes have been founded.

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Mathematical model of data preparation on raw oil and gas condensate for the technological calculations

Keywords: mathematical model, raw oil and gas condensate, fractional composition, extension and expansion of membership.

Abstract. Reflects the results of modeling the process of data preparation for the technological calculations. The algorithm shows the example of implementation of the algorithm in our program, allowing with minimal information about the composition of the raw material with known common density in a given volume or mass percentage, specify necessary for technological calculations of the fractional composition (enhanced and extended) with the calculation of the densities of individual fractions.

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CHEMMOTOLOGOS

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Features functional facilities, transmission and hydraulic oils

Keywords: functional features the use of oils, hydraulic and transmission oil, test results of oil Mobil ATF 220.

Abstract. A study of the conditions of the oils in automatic and mechanical gear boxes shows the need for more careful consideration of functional facilities oils. To clarify this, tests were conducted oil Mobil ATF 220. The result of the research mainly confirmed the functionality of the tested oil specified by the manufacturer.

FAE «The 25th State research institute of chemmotology of the Ministry of Defence», Moscow

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Features of burning of hydrocarbon fuel in internal combustion engines and boiler installations

Keywords: hydrocarbons, an internal combustion engine, boiler installation, the combustion chamber, evaporation, mixing, air-fuel mixture, ignition, burning, speed of distribution of a flame, chemical compound.

Abstract. Are resulted definition of process of burning, its chemical nature and physical bases of face-to-face and explosive distribution of a flame in space with various speed is stated. The mechanism of processes of non-stationary burning fuels in piston and stationary – in air-jet engines and boiler installations is considered. Influence of structure and physical and chemical properties hydrocarbonic fuels for speed of process of burning in internal combustion engines is shown.

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ECOLOGY and INDUSTRIAL SAFETY

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Method bioremediation of water from oil product

Keywords: Bioremediation, bacteria *Candida*, *Aspergillus* Sp., lag-phase, growth medium.

Abstract. The purpose of screening paraffin oxidizing microorganisms and optimization of culture conditions on n-paraffins and oil products. The study on the ability to use hydrocarbons separated fungus culture that morphological characteristics attributed to the genus *Aspergillus*. The features *Aspergillus* growth on hydrocarbons, the optimization of cultivation on hydrocarbons in a laboratory fermenter. It was shown that the lag phase duration and duration of fermentation depends on the accumulation of monocarboxylic acids. The duration of the lag phase of the fungus on a medium with paraffins was 10 hours. The duration of the lag phase is reduced by the introduction of 0.2% on oxidants obtained by ozonation n-paraffins. In the result of study was concluded that on the medium with 4% oil of biomass up to 150%. Probably the selected culture can be used to produce protein-containing feed and for cleaning oil products from water and soil.

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Inhibition of sulfate-reducing bacteria on field objects by «Darsan-B» reagent

Keywords: sulfate-reducing bacterium, hydrogen sulfide, bactericide, oil treating point, corrosion inhibitor.

Abstract. There are given results of tests on various field facilities of bactericide «Darsan-B», with the aim to suppress growing of anaerobic sulfate-reducing bacteria, which produce hydrogen sulfide in process life activity. Darsan-B was mixed with water, which injected in pressure well, with the aim to keep seam pressure. Almost absolutely suppression of sulfate-reducing bacteria occurred. Efficiency of bactericide using depends on its consumption and dosage duration.

Ufa State Petroleum Technological University; JSC «Astrakhan Gas Processing Plant»; LLC «TER», Tol'yatti