9_2018

PORTRAITS

IN SIGHT

Keywords: low-tonnage and medium-tonnage chemical products, production chains, import substitution in low-tonnage chemistry.

Abstract. The data on the state of some key areas of the chemical and petrochemical industry in Russia at the stage preceding the application of sanctions by countries supplying and supplying chemical products to the Russian market, primarily for industrial enterprises. The analysis of the current state of the sub-sectors of low-tonnage and medium-tonnage chemistry, considered the largest and most important product segments. A set of factors determining the position of low-tonnage and medium-tonnage chemistry at the time preceding import substitution was revealed.

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ACCENT of the ISSUE: prtrochemicals in Azerbaijan

Keywords: stearic acid, decarboxylation, nano-sized magnesium oxide, heptadecane, fuel

Abstract. The present state of research on the decarboxylation of stearic acid and the production of *n*-heptadecane is outlined. Catalytic decarboxylation of stearic acid isolated from vegetable oils in the presence of synthesized nano-sized magnesium oxide was carried out. Perspectives of the use of heptadecane as fuel-like hydrocarbons in industry.

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Keywords: esterification reaction, cyclic diacetic acid, low-viscosity lubricating oils, operational properties.

Abstract. A number of esters of oxypropylated 1,2 (cyclohex-4-ene) diacetic acid (CHDAA) with aliphatic alcohols C_4-C_8 were synthesized and their physicochemical, viscosity-temperature, thermooxidative (TOS) properties and application possibilities of the obtained compounds as lubricating materials were studied.

The structures of synthesized compounds are confirmed by IR and NMR spectroscopy methods, as well as the determination of molecular weight, acid and ether numbers. The obtained esters are colorless liquids with a high boiling point. Data on molecular weights correspond to those calculated, their yield is 83-92% by weight from the theoretical.

The synthesized esters have an average viscosity level at 100°C (4.80-6.12 mm^2/s), high flash points (225-275°C) and a viscosity index (130-140 units), low pour points (negative 40 - negative 50°C) and viscosity at -40^0C (2200-3800 mm^2/s). The thermo-oxidative stability of the esters was determined in accordance with ГОСТ 23797-79 in the volume, corrosive aggressiveness on the plates of the aluminum

alloy AK-4 and steel IIIX-15 during oxidation of 30 g. diesters with air (air feed rate-50 ml / min, 200°C, 10 h).
After oxidation, the viscosity of the esters at 100°C increases from 4.95 to 6.44 mm^2/s, the acid number is from 3.42 to 5.28 mgKOH/g. The sediment is insoluble in isooctane 0.013-0.044%, evaporability 0.40-0,76% by weight. There is an insignificant corrosion of the aluminum alloy AK-4 (0.015-0.056 mg/cm^2) and steel IIIX-15 (0.039-0.076 mg/cm^2).
When comparing the hydrogenated ethers of oxypropylated CHDAA with the corresponding unhydrogenated ones, it was revealed that they differ little from each other. This is explained by the fact that in this case the double bond is in a cycle, behaves inertly, which has an insignificant effect on the properties of the ethers.
When comparing the results of viscosity-temperature and TOS of ethers of hydroxypropylated CHDAA and the requirements for oils 36/1 КУ "А", it is established that the synthesized esters in all indices are not inferior to the specified oil.
Thus, the study of diesters of oxypropylated 1,2(cyclohex-4-ene) diacetic acid as base lubricating oils showed that they have good viscosity-temperature properties at positive and negative temperatures, as well as good thermo-oxidative characteristics, meet the requirements for low viscosity aviation oils, in particular to oil 36/1 КУ "А" and can be offered as its replacement.

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Naghiyeva M.V., Aghamaliyev Z.Z., Nazarov I.G., Mamedov A.M., Rasulov Ch.K.
Alkylation of phenol by methyl ethers of cyclohexencarbonic acid in the presence of phosphorush containing zeolite

Keywords: phenol, methyl esters of cyclohexenecarboxylic acid, phosphorus-containing zeolite, cycloalkylation, Claisen rearrangement.

Abstract. The reactions of cycloalkylation of phenol with methyl esters of cyclohexenecarboxylic acid in the presence of a phosphorus-containing zeolite-Y catalyst were studied. The reaction was carried out as follows: the calculated amount of phenol, methyl esters of cyclohexenecarboxylic acid and zeolite-Y catalyst, impregnated with orthophosphoric acid, is loaded into a three-necked flask equipped with a stirrer, thermometer and dropping funnel and heated. When the temperature reaches 40°C, we gradually introduce the required amount of ether into the flask from the dropping funnel. The resulting mixture of components in the presence of the catalyst is heated and at a temperature of T = 80-120°C with stirring for 2-6 hours. After cooling the mixture at T= 45°C, the catalyst is separated by filtration of the reaction mixture. Then a mixture of rectification was subjected. During distillation, the ether and phenol (up to 200°C), which were not included in the reaction, were distilled off at atmospheric pressure, and then the target reaction products were isolated at low pressure (5 mm Hg) and their purity and physicochemical parameters were determined.
The structure and composition of the desired products (methyl 4-(4-hydroxyphenyl)- and 4-methyl-(4-hydroxyphenyl) cyclohexanecarboxylic acids) were determined by 1H NMR- and IR-spectroscopy. In order to find the optimal conditions ensuring the maximum yield of the target products, the effect of temperature, reaction time, phenol molar ratio to ether, the amount of catalyst at the outlet and the selectivity of the reaction products. It was found that under optimum conditions the yield is 74.3-77.8% of the theory for the phenol taken, and the selectivity for the target product is 94.6-95.2%.

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MATHEMATICAL SIMULATION TECHNOLOGICAL PROCESS

Yakupov Sh.I., Golubev I.Yu., Shamanin M.V., Gubin K.A., Grishin D.F., Abramov D.P.
Operational monitoring of the activity of catalytic systems of diesel fuel hydrotreatment units in LLC "LUKOIL-Nizhegorodnefteorgsintez"

Keywords: Hydrotreatment, diesel fuel, catalyst, simulation, process monitoring, «LUKOIL-Nizhegorodnefteorgsintez» LLC (subsidiary of «LUKOIL» JSC)

Abstract. In the scheme of LUKOIL-Nizhegorodnefteorgsintez most economically profitable technology facilities are the processes connected with production of light oil products. Among them

especially should be noted catalytic cracking processes, hydrofluoric alkylation and diesel fuel hydrotreating. This fact causes first priority of carrying out optimization actions for these processes.
In this work the analysis catalytic systems operation on LCh-24/2000 and L-24/7 diesel fuel hydro treaters is carried out. The results received during research can be used for practical implementation at the enterprises PAO "Lukoil" and the similar enterprises of other oil refining companies that will allow to optimize mode and to increase energy efficiency of hydrotreating process of diesel fuels.
Mathematical processing and the regression analysis of statistical data of work of hydrotreaters with use of complex of the differential equations describing operation of the reactor of ideal replacement is carried out. Empirical dependences are defined and on its basis the system of operational monitoring of hydrotreating catalytic systems activity, including the function of process optimal temperature calculation is developed. The solutions proposed allow to reduce inertance of hydrotreating control due to timely forecasting of optimum temperature in hydrotreating reactors.
The developed system of catalytic systems activity monitoring allows to increase economic efficiency of management decisions, in particular:

- to carry out assessment of duration of catalytic systems operation cycle, hydrotreating of diesel fuel that will allow to plan more precisely the shutdown date of facilities for repair during which catalyst replacement is carried out;
- to predict the process optimum temperature that will allow to reduce hydrotreating duration, and as a result will reduce power consumption of the unit and will provide decrease in deactivation of the catalyst;
- if necessary to carry out adjusting actions on the directions the difficult processed components of raw materials to the unit with more active catalytic system that will allow to operate the LCh-24/2000 and LCh-24/7 on the maximum loading on raw materials with preservation of required duration of cycle of catalytic system.

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ANALYTIC METHODS for OIL and PETROLEUM PRODUCTS

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Keywords: thermooxidation stability, thermostating, light flux absorption coefficient, optical density, volatility, wear spot diameter, antiwear property criterion.
Abstract. The results of the study of the thermal and oxidative stability of Lukoil Standard 10W-40 SF / CC mineral oil with the use of the optical method and two parameters of the absorption coefficient of the light flux and optical density are presented. It is established that more promising from the point of view of mathematical processing of experimental data is the use of the optical density as an indicator of the oxidation process.

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QUALITY: documents and comments

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Keywords: specification, arctic multifunctional/multi-purpose all-season lubricating oil, internal combustion engine, arctic land-based military equipment, arctic climatic region, performance characteristics, laboratory tests.
Abstract. This article is devoted to the analysis of the dynamics of changes in the requirements of the modifications of the specification MIL-PRF-46167D to laboratory tests. Particular attention is focused to the nomenclature of test methods, regulated by the requirements of the modifications of MIL-PRF-46167D, allowing to evaluate 23 properties by 37 indicators. As a result of the analysis, the article lists the properties evaluated in the specification, and also describes and compares them.

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