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PETROLEUM PRODUCTS: TECHNOLOGY, INNOVATION, MARKET

Keywords: isooctene, diisobutylene, MTBE, TAME, high-octane component, motor gasoline.

Abstract. Currently, one of the most important problems of Russian refining remains the need to expand the production of high-octane types of gasoline that meet current and future environmental requirements, as reflected in the TR TS 013/2011.
Standard practice for solving this problem for most gasoline manufacturers is to involve oxygenates into gasoline, for example, the most widely used methyl tert-butyl ether (MTBE) and methyl tert-amyl ether (TAME). Each of these substances has its advantages and disadvantages. Prospects for obtaining other high-octane components alternative to MTBE and TAME may have good prospects. One of these is the process of dimerization of isobutylene to produce diisobutylene, a product consisting mainly of isooctene isomers, which can be carried out in installations similar to the production of MTBE. So this article presents the result of studies of the physico-chemical and operational properties of diisobutylene (isooctene) sample as a component of motor gasolines are presented in comparison with the main oxygen-containing additives – MTBE and TAME.

All-Russian Research Institute of Oil Refining [VNII NP JSC], Moscow
Gubkin Russian State University of oil and gas [National Research University], Moscow

Keywords: energy efficiency, diesel fuel hydrotreating, fractionation unit, the heat exchanger network potential, process design, technical and economic criteria.

Abstract. The article presents a research work devoted to the analysis of hydrotreated diesel fuel fractionation options. Fractionation process of unstable diesel fuel provides gasoline, hydrocarbon gases, hydrogen sulfide and diesel fuel with the desired flash point. The aim of research is to select an optimal technological scheme with minimal energy consumption. Energy resources (30%), heating furnaces (20%), process optimization (15%), heat exchangers (15%), and the use of motor equipment (10%), and others (10%) are the main instruments for improving energy efficiency [1].
At the first stage of the study three different options of distillation column heat supply are investigated:
- I option - A forced recirculating fired heater reboiler;
- II option - A forced recirculating fired heater reboiler with an inert carrier gas (hydrogen containing gas);
- III option - Inert hydrogen containing gas (eliminating a forced recirculating fired heater reboiler).
The study is carried out by means of a mathematical model generated at Aspen Hysys® software.
To assess the energy efficiency of the studied options, the main criteria are: the energy resources consumption, the regime parameters of the technological scheme, the heating furnaces thermal load, the area of heat exchangers, the atmospheric emissions and economic indicators. As a result, it is proved that the III option is optimal according to technical and economic criteria.
In the case of III option, as a further step of process scheme optimization it is desirable to increase the heat recovery between the process flows of the unit. Therefore, as the second stage, this article discusses modern scientific methods for assessing the potential of the heat exchanger network.
The third stage of the study is devoted to the perennial problem of the gasoline carry over to the fuel network of the plant. To solve the problem, two options of the gasoline elimination in the hydrocarbon gases are considered: hydrocarbon gases compression or absorption by cooled diesel fuel. On the basis of a capital and operating costs comparative analysis, it has been revealed that absorption of gasoline from hydrocarbon gases is a cost-effective option.
The final stage of the study is the absorber process design calculation. It includes an algorithm for selecting the optimal number of theoretical stages and the absorbent consumption. Additionally, the hydrodynamic calculation of absorber is presented, where the optimal absorber diameter is chosen by the assessment of the flooding factor.

Gubkin Russian State University of oil and gas [National Research University], Moscow

Keywords: *n*-heptane, gas-condensate, mordenite, pentasyle, low olefins C_2-C_4, thermocouple treatment.

Absract. The catalytic properties of pentasyle type BK-zeolite and Zn modified natural mordenite in thermocatalytic transformation of n-heptane and gas-condensate for C_2-C_4 olefin hydrocarbons preparation have been studied. It was shown that the addition of Zn-H into the Zn-H pentasyle and the following thermocouple treatment of the pointed bizeolite catalytic system provides the increasing of its stability and selectivity towards C_2-C_4 olefins and also gives the opportunity for regulation of the products composition in thermocatalytic transformation of hydrocarbon feedstock. The yield of C_2-C_4 olefins from gas-condensate at the temperature of 650°C under optimal condition of TCT (700°C, 3 hours) equal to 53,1% mass.

Baku State University, Baku, Azerbaijan

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Federal Autonomous Enterprise
"The 25th State research institute of himmotology, Ministry of Defence of RF", Moscow

Keywords: fuel and lubrication materials, chimmotology, chimmotology scientific schools, chimmotology theory, chimmotology development problems, test virtualization.

Abstract. A short review for chimmotology development issue is provided below. Its specific problem is a theoretical background incompletion, which is an essential component of every region of science. The need for issuing some theory provisions is also mentioned herein under, being specific for chimmotology only, they differentiate chimmotology from other sciences as a pledge of successful functioning of fuel and lubricating materials' analysis as well as its reliability forecast. The virtual qualification procedure is suggested herein, which combines a wearing forecast, particularly of the machine friction units, on the ground of theory of similarity and graduation of this forecast according to the factor analysis results of the wearing simulation. Efficiency of that specified procedure is demonstrated.

Federal Autonomous Enterprise
"The 25th State research institute of himmotology, Ministry of Defence of RF", Moscow

Keywords: applied science Chemmotologos, reflection of the results of work, the methodology of G.P. Schedrovitsky, system-hate approach.

Abstract. Chemmotologos remote, as the science excludes from the point of view of building a scientific primed organization, as well as the methodology of G.P. Schedrovitsky. It is determined to wait for the historical approach to the pony of the scientific subject. Different types (approaches) of researches are marked. Tasks for formation of theoretical positions of Chemmotologos are outlined.

QUALITY: DOCUMENTS and COMMENTS

Keywords: specification, arctic multifunctional/multi-purpose all-season lubricating oil, internal combustion engine, arctic land-based military equipment, arctic climatic region, performance characteristics, bench 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 7 properties by 29 indicators and 2 standardized test methods on the stands simulating the operation of various types of units and gearshift behaviour. As a result of the analysis, the article lists the properties evaluated in the specification, and also describes and compares them.
Federal state unitary enterprise scientific research institute of standartization and unification (NIISU)

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