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IN SIGHT

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The quantity and quality of used (waste) oil being in circulation in Russia

Keywords: used (waste) oil, quantity, treatment, collection, recycling (utilization) of used (waste) oils, indicators of quality, content, distribution, transportation, delivery, analysis, feasibility study, investment, project.

Abstract. Methodological aspects of determining the amount of used (waste) oils produced in Russia as a result of business end-users and other participants in the treatment of used (waste) oils. Indexes of used (waste) oil quality entering the treatment of various sources using various types of transport. The influence of some indicators of the quality of used (waste) oils on the profitability of projects on the collection and processing of used (waste) oils.

«Safety of waste handling» Consulting and analytics agency

PETROLEUM PRODUCTS: TECHNOLOGY, INNOVATION, MARKET

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Production of high-density jet fuels (T-8V and T-6)

Keywords: jet fuel, hydrogenation processes, catalyst, hydrogen pressure, upgrading, dearomatization, catalytic dewaxing, fuel yield, content of aromatic hydrocarbons (aromatics).

Abstract. The article reviews the technologies of production of T-8V and T-6 fuels by means of hydrogenated upgrading of oil feedstock. It shows that T-8V fuel can be generated by two methods: hydrotreating of kerosene distillate of West Siberian oil and hydrocracking of vacuum distillate. T-6 fuel can be generated by deep hydrogenation of strait-run kerosene fractions of naphthenic crudes or catalytic gas oils. It is proposed to produce T-6 fuel with high content of aromatics by hydrotreating process of kerosene distillates of naphthenic crudes. The catalytic dewaxing process of hydrogenation products permits to increase the T-6 fuel yield by 10–15% wt. The article quotes the quality of obtained jet fuels and the material balance of recommended processes. The developed technologies have passed successfully the commercial approbation.

(All-Russia research institute of oil refining JSC – VNII NP JSC, Moscow)

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Effect of the zeolite structure type on activity and selectivity of hydroisomerization and hydrodewaxing catalysts

Keywords: zeolite, morphology, modification, hydroisomerization and hydrodewaxing catalysts, basis of diesel fuel, basis of transformer oil, pour point.

Abstract. This study is concerned with investigation of effect of zeolite structure type on n-hexane isomerization and diesel fuels hydrodewaxing catalysts activity. Zeolites CVM (structure analog of zeolite ZSM-5), mordenite (MOR), beta (BEA) and ZSM-12 were used for catalysts preparation. All zeolites were produced under industrial conditions in Joint Stock Company “Angarsk Catalysts and Organic Synthesis Plant” and studied with powder X-ray diffraction and scanning electron microscopy. Hydroisomerization and hydrodewaxing catalytic tests were realized on flowing-and-circulatory type and flowing type catalytic test units with fixed-bed-catalyst. Activity of hydrodewaxing catalysts was valued in dewaxing of pretreated diesel fuel and hydrocracking cut fraction processes. Commercial catalysts SGK-1 and SGK-5 were used as key samples. Isomerization catalysts activity was studied in n-hexane isomerization process. Commercial catalysts Hysopar was used as control sample. It has been established that activity and selectivity of catalyst DEP-4 based on improved zeolite CVM in dewaxing of pretreated diesel fuel are higher than catalysts based on Beta and Mordenite zeolites (DEP-1 and DEP-2, respectively) and commercial catalyst SGK-1. Test results of catalyst DEP-3 based on ZSM-12 zeolite, commercial catalyst SGK-5 and catalyst DEP-4 in dewaxing of hydrocracking cut fraction showed that catalyst’s DEP-4 activity and selectivity are considerably superior to catalysts SGK-5 and DEP-3. N-hexane hydroisomerization catalysts were prepared on BEA and MOR zeolites and BEA/MOR co-crystalline zeolites. Commercial medium temperature isomerization catalyst Hisopar was used as key

sample. It has been shown that activity and selectivity of Pt-BEA and Pt/F-MOR-T catalysts are equal to activity and selectivity of commercial catalyst Hysopar. Catalytic properties of Pt-BEA/MOR(90/10) catalyst at lower temperature (250°C) are higher than catalytic properties of commercial catalyst Hysopar at 260°C. Therefore, it has been demonstrated that catalytic properties (activity and selectivity) of developed catalysts in hydroisomerization and hydrodewaxing processes are higher than catalytic properties of their commercial analogues.

(Angarsk catalysts and organic synthesis plant JSC; Irkutsk state technical university; All-Russia research institute of oil refining JSC – VNII NP JSC, Moscow)

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Investigation of hydrocarbon conversion C_5-C_6 in isomerization reaction at the catalyst based on immobilized ionic liquid

Keywords: isomerization catalysts, ionic liquids, immobilization, porous support.

Abstract. In the presented article comparative analysis of the products hydrocarbon C_5-C_6 conversion in isomerization reactions had been carried out. Ionic liquid $Et_3NHCl – AlCl_3$ immobilized on solid supports of different types was used as a catalyst. The following solid porous supports were selected as object of research: zeolite catalyst KN-30, macroporous silica gel and gamma-aluminum oxide A-64. Reaction routes of hydrocarbon conversion at reaction conditions were shown. It is disclosed, that explored catalytic systems provide a simplified scheme catalyst complex and the product mixture separation, reduce the amount of ionic liquid to 10 times, compared with its use alone and as a result reduces the corrosivity of the catalyst at hydrocarbon isomerization reaction conditions.

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Akhmetov M.M.

To the mechanism of formation of needle coke structure

Keywords: needle coke, the structure formation, the structure of fractures, mesophase, lamellar structure, column structure, anisotropic coke, ordinary coke, isotropic coke.

Abstract. The structural features of the needle, ordinary and isotropic coke (such as KNPS) have been studied. It has been shown that so-called needle coke has lamellar structure, but not fibrous or needle. Needle-like or fibrous components suggested by the world science and practice are proven to be absent in needle coke. Mechanism of formation of lamellar and column structures in the needle coke in delayed coking chambers has been proposed. Mechanism of the formation of "package" structures in needle coke of many thin 0.001-0.3 mm plates of mesophase formations has been proposed. Specified the probability of improving the structure of needle coke by obtaining the most thin carbon plates in packages of mesophase formation. The establishment of the actual lamellar structure of needle coke will give a new impetus to the improvement of its structure to increase efficiency of use.

(SUE «Institute of petroleum refining and petrochemistry of Bashkortostan Republic», Ufa)

CHEMMOTOLOGOS

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Methodical features of antiscoring properties rapid assessment of oils for two-stroke petrol engines

Keywords: two-stroke petrol engines, antiscoring properties, tribology characteristics, high-temperature deposits, operational technique.

Abstract. A laboratory technique is offered to analyse antiscoring properties of oils for two-stroke petrol engines (DTBD), based on the definition of oil tribology characteristics and tendency of the oil to form high-temperature deposits. Combination of the properties specified allows to predict quickly by a small sample amount the behaviour of oil in DTBD regarding scoring tendency of the interacting surfaces.

(All-Russia Research Institute of Oil Refining JSC; Federal autonomous institution "25 State research institute of himmotologiya of the Ministry of Defence of the Russian Federation")

MATHEMATICAL SIMULATION

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The influence of the method of sampling for restrictive standard of petroleum products

Keywords: restrictive standard; quality; petroleum products; learning sample, validation sample, general totality.

Abstract. Article «The influence of the method of sampling for restrictive standard of petroleum products» is a continuation of the publication. It considers in detail the procedure of formation of the training and validation samples, which is an integral part of the algorithm [1]. In the main part of the article outlines four possible ways to solve the problem. It also presents calculations with graphs, comparative analysis of these methods and the obtained regularities. Analysis of real data allowed to conclude that the general form of the optimal model does not depend from the method of sampling. From this, it follows that the restrictive standards does not depend on the method of formation of the training and validation samples.

(Federal State Unitary Enterprise «Russian Research Institute on Standardization of Materials and Technologies», Moscow)

HISTORY PAGES

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Structural changes in the management of the oil refining companies of the Republic of Bashkortostan from 1994 to 2009 years

Keywords: oil refining industry of the Republic of Bashkortostan, management, structural change, oil refining companies.

Abstract. In the article, the control of the oil refineries in Ufa group of the Republic of Bashkortostan from 1994 to 2009 is analyzed. Ordered the transformation of management at this stage is divided into seven periods. The analysis of the process by periods established relationships between events on the financial and economic relations (production) control components.

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