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The perspectives of exploitation and modernization of the processing facilities in Russia in response to the sectoral sanctions from the Western countries and to the transitions in the structure of consumption of the primary energy resources in the USA

Abstracts

The consumption of specific types of energy resources is determined by the degree of the development of civilization. Humanity has a global interest concerning the de-carbonization of energy due to the need for the more efficient use of energy and the development of innovative technologies. It is well known that the lower the carbon content in the hydrocarbon, the greater the energy content per unit of weight it possesses. This evidence formed the basis for the ranging of the stages of consumption of various dominant power resources, i.e. the gradual transition from the prevalence of carbon in the energy carrier to pure hydrogen. Thus, wood was replaced first by coal then by petroleum based fuels. The next phase in the consumption of energy was characterized by the shift towards greater consumption of natural gas. This new stage will obviously form the infrastructure base for the creation of a technological complex to obtain and consume hydrogen. In recent years, natural gas consumption and production sharply increased in the USA and other developed countries. Besides the gas market, the world oil market is undergoing considerable changes. Especially because of growth of tight oil recovery in the USA and bitumen oil in Canada. A study shows the perspectives of sustainable exploitation and modernization of the processing facilities in Russia in response to the sectoral sanctions from the Western countries and to the transitions in the structure of consumption of the primary energy resources in the USA. The changes of the economical situation force the Russian oil and gas industry to seek breakthrough innovative technologies for maintaining, at least, the current level of oil production. Russia could solve these problems by the implementation of domestic technologies and the production of petrochemical products with a high added value for the creation of local high-paying jobs.

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Creation of Prototyping Center of the Republic of Bashkortostan as a step towards elimination of import dependence of national petrochemical processing

PETROLEUM PRODUCTS: TECHNOLOGY, INNOVATION, MARKET

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Cyclic ethers of neo polyols as an additive to diesel fuels

Keywords: cyclic ethers neopoliolov, anti-oxidants, diesel fuel.

Abstracts. Currently due to the intensive development of techniques the requirements for fuels and lubricants are tightened, which properties are greatly dependent on the design and effectiveness of additives which used for improving the operational characteristics of fuels and lubricants. So far as the creation of new efficient fuel additives is an actual and perspective problem, we first have synthesized and studied multifunctional additives – esters of 2.2.5.5-tetramethylol cyclopentanol (TMTCP) and 2.2.6.6-tetramethylol cyclohexanol (TMTCH) with different chemical structure.

The authors have had such persuasion, that the esters having more polar ester groups, hydroxyl groups, acid radicals of normal and branched chain as well as cyclopentane and cyclohexane moieties (naphthenic rings) should have a positive effect on the properties of fuels.

Starting polyhydric alcohols TMTCP and TMTCH are synthesized by condensation of cyclic ketones – cyclopentanone and cyclohexanone with formaldehyde in an alkaline medium by the reaction of Kannitsaro-Tischenko. Then these alcohols are esterified with aliphatic carboxylic acids, C₂-C₆ of normal and branched chain. There have been studied physico-chemical, viscosity-temperature properties, a thermal oxidative stability (TOS) of these esters. All synthesized esters are colorless, oily liquid with a boiling point 220–276°C / 2mm.Hg. Their yield ranges from 68 to 77%wt, the molecular weight – from 598 to 712 units.

The structure of these esters has been proved by elemental analysis, hydroxyl and ether properties, by the methods of IR and NMR spectroscopy. They have a high viscosity (6,89–10,19 mm²/c at 100°C), an acceptable pour point (minus 46 – minus 50°C) and viscosity index (VI) (115–141 pcs.). Esters have a high flash point (242–286°C), good viscosity-temperature characteristics in the field of negative temperatures.

After determining the thermo-oxidative stability has been revealed that they have a small acid number after oxidation – 0,10–2.08 mg KOH/g, minor corrosion of the electrodes AK-4 (0.06–0.09 mg/cm²) and SH-15 (0.07–0.12 mg/cm²), as well as a minor evaporation (0,01–0,85% wt.).

The obtained esters are investigated as additives improving the series of indicators of diesel fuels, which are added in an amount of 0,04–0,004% wt. There has been found that with the addition of 0.004% wt esters of varying structures to diesel fuels, TOS increases the sedimentation and coking decrease (in some samples it decreases from 6,5 to 0 mg/100 ml).

There has been revealed that the ethers having acid radicals of normal structure, have good indicators than branched chain radicals. Thus, we can conclude that the esters TMTCP and TMTCH can be recommended as an effective antioxidant additives to diesel fuels.

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EQUIPMENT AND DEVICES

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Device for diagnosing motor oils parameters

Keywords: motor oils, lubricating oils viscosity, lubricating oil density, measurement device.

Abstracts. A method for motor oils parameters measuring is proposed. The method is based on a pneumatic lifting analyzed fluid from automotive engine crankcase. An example of measuring the viscosity and density of the analyzed oils is provided. It is also proposed device structure measurement of oils options.

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High shear mixers for production of polymer modified bitumen, luboils and drill fluids

CHEMMOTOLOGOS

Chudinovskikh A.L., Samusenko V.D., Buyanovskiy I.A., Dotsenko A.I., Lashkhi V.L.

Lubricant effect model of oils for two-stroke gasoline engines

Abstracts. When developing oils for two-stroke gasoline engines, for their quality approbation a special complex of methods for qualification assessment of oils (KMKO) is used in domestic practice. It includes an anti-scoring properties test with motor single-pot unit (OTSU), that test is not rapid enough. Expedient is the development of a laboratory method for rapid assessment of specified properties of oils and getting results on which basis a forecast of oils behaviour under operating conditions would be possible.

At the same time, taking into account that process of greasing in two-stroke gasoline engines runs in specific conditions at the combustion moment of fuel-oil mix, it is necessary to develop and to preliminarily analyse a model of lubricant action in these conditions, and only having results of the analysis, find ways to solve methodology questions.

CONFERENCES. SEMINARS. EXHIBITIONS

Second National Oil and Gas Forum /October 22–24th, 2014, Moscow

MATERIALS of the PETROCHEMICAL and REFINERS ASSOCIATION

Extracts of the protocol #121 of ANN board meeting of 18.12.2014 / Subject – Activity of middle-capacity oil refineries within the tax manoeuvre