

CHEMISTRY AND TECHNOLOGIES OF OIL-REFINING

Pp. 6–11

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Research of Rheological Properties of Polymer-Bitumen Binders

Keywords: polymer-bitumen binder; thermoplastics; styrene-butadiene-styrene block polymer; dynamic viscosity; hysteresis loop; thixotropy.

Abstract. The article analyzes the research of rheological properties of polymer-bitumen binders. The conducted studies have shown that the introduction of a polymer additive based on a styrene-butadiene-styrene block polymer into bitumen leads to a significant increase in the values of the elastic modulus of the binder and a decrease in the values of dynamic viscosity with an increase in temperature from 40 to 120 °C. It has been experimentally established that with a high content of a styrene-butadiene-styrene block copolymer, an increase in the values of the effective viscosity of the binder is observed. As a result of the conducted research, a direct correlation was established between the rheological characteristics of bitumen compositions and their standard performance indicators.

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Heat Treatment of Middle Distillate of Fluid Catalytic Cracking

Keywords: medium distillate of fluid catalytic cracking; heat treatment.

Abstract. The chemical composition of the medium distillate of catalytic cracking was investigated by chromatography-mass spectrometry. Heat treatment was carried out at various process parameters. The heat treatment mode is set, allowing to obtain a fraction boiling above 350°C in the product. Heat treatment products have been studied by a complex of physico-chemical analysis methods.

PETROCHEMISTRY: TECHNOLOGY, PROCESSES

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Analysis and Comparison of Russian Petroleum Refining Technologies

Keywords: technological processes; petroleum products; process parameters.

Abstract. The paper reviews technological processes, the integration and development of which will increase the production of demanded petroleum products for the internal market of the Russian Federation and adapt the production performance of refineries in the new scenario conditions with the required level of marginality and contribute to the socio-economic development of the country.

In the article the Russian technological potential for the production of these products is considered:

- motor gasoline: catalytic cracking, reforming, isomerization, alkylation, selective dimerization;
- aviation fuel: kerosene hydrotreating;
- marine fuel: hydrotreating of fuel oil;
- bitumens: tar oxidation;
- polymers: pyrolysis of naphtha and diesel fractions.

Pp. 30–38

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Tech-economic Evaluation of the Use of Oxygen-enriched Stream of Air for the Combustion Process in Furnace Heaters in Order to Decrease Carbon Emissivity)

Keywords: carbon emissions, combustion, oxygen, hydrocarbon gas, carbon footprint, technical and economic assessment.

Abstract

In the article, the authors solve the problem of urgent search for effective and affordable (in the short and medium perspective) technological solutions for oil and gas processing, petrochemical enterprises to reduce gross (total) emissions of carbon dioxide (CO₂) and related combustion products that fall under the definition of greenhouse gases nitrogen oxides (NO_x and N₂O) from combustion. The subject of the consideration in this article is the process of burning hydrocarbon fuel, and the object of consideration is a typical fire heater — a vertical cylindrical tubular furnace.

PETROLEUM PRODUCTS: COMPOSITION, PROPERTIES AND APPLICATION

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Investigation of the Effect of Polymer Bitumen Binders on Road Bitumen

Keywords: bitumen; petroleum road bitumen; polymer binders; application of polymers.

Abstract. Petroleum bitumen is widely used in road construction. Currently, bitumen of the 4th generation, that is bitumen modified with polymers, is considered to be the widest industry of bitumen production. They allow to provide a high level of performance indicators, such as: heat resistance, crack resistance, long-term strength, shear resistance and resistance to low-temperature cracking.

It is promising, at the moment, to create bitumen with improved operational properties by introducing high-molecular compounds (polymers and elastoplasts).

The use of PBB is due to the fact that the Russian Federation is located in a harsh climatic zone, which leads to an increase in deformation loads. To ensure long-term and reliable performance of asphalt concrete pavement in such conditions, methods for the development of organic binders were adopted. This article is written in order to expand the literature review on polymers used in bitumen production to achieve the required grades of bitumen. And also in this article, methods of introducing various polymers into bitumen binders with test results are presented.

CHEMOTOLOGY

Pp. 48–52

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Creation of New Lubricating Compositions Based on Waste Oil Regeneration Product

Keywords: regeneration; base oil; additive; motor oil; lubricating composition.

Abstract. The article presents the results of the process of regeneration of used Shell Mysella-40 motor oil used at Modular Power Plants operating in a number of regions of the republic. Samples of oil operated for 2000, 4000 and 6000 hours were examined. A number of quality indicators, such as viscosity index, antioxidant stability, density, etc., provided the basis for further research on the regeneration of a Mysella-40 motor oil sample that has worked for 6000 hours.

On the basis of the regeneration product and the corresponding additives, new lubricating compositions of motor oils were created: for diesel locomotive and industrial diesel engines of the M-14Г₂ SAE 40 API CC brand, for forced autotractor diesel engines operating with supercharging and naturally aspirated, of the M-10Г₂ SAE 30 API CC brand, for two- and four-stroke high-speed medium-loaded transport diesel engines with a tougher temperature regime of the brand M-16ИХП-3 SAE 40 API CB. The compliance of the physicochemical and operational properties of new lubricating compositions with their commercial oils was determined.

Pp. 54–56

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A Fundamental Possibility of Assessing the Persistence of Oils

Keywords: preservation of oils; coagulation; sedimentation; simbatity of the process.

Abstract. With long-term storage of oils, there are processes that cause its aging, e. g. change in the quality of the product. Therefore, predicting a possible change in the initial indicators of oils during storage is a rather urgent task of chemmotology. The article considers the possibility of analysis in order to determine the temporal trends characterizing the general condition of the oil and the possibility of its use.

EVENTS

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