

CHEMISTRY AND TECHNOLOGY OF FUEL AND HIGH-ENERGY SUBSTANCES

Pp. 6–10

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Determination of optimal conditions for hydrogenolysis of sulfur compounds of straight-run jet fuel

Keywords: jet fuel; sulfur compounds; total sulfur content; mercaptan sulfur content; hydrogenolysis; hydrotreatment; hydrodemercaptanization; laboratory unit.

Abstract. This paper describes comparison of characteristics of jet fuels TS-1 and RT, their production technologies and peculiarities. In case when total sulfur content minus mercaptans content in straight-run jet fuel is less than 0.2 % by weight it is advisable to use hydrotreating, in other cases hydrotreating might be treated as excessible and it is efficient to remove only mercaptans. The design, principle of operation and an example of application of laboratory unit for determination of optimal parameters for hydrogenolysis of sulfur compounds of typical straight-run jet fuel is described. The possibility to obtain fuel grade TS-1 with the use of hydrodemercaptanization is shown.

DIGITALIZATION, AUTOMATION, MATHEMATICAL SIMULATION

Pp. 12–13

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Prediction of unit operation of vacuum distillate catalytic cracking using a non-stationary mathematical model

Keywords: catalytic cracking; mathematical modeling; kinetic scheme; prediction; optimization; material balance; heat balance; zeolite-containing catalyst; catalyst deactivation; coke.

Abstract. This work presents the development of catalytic cracking mathematical model which is based on the thermodynamic and kinetic patterns of hydrocarbon conversions and takes into account the catalyst deactivation. This model provides a prediction of the catalytic cracking performance when the mixture of vacuum distillate from heavy Kazakhstan and West Siberian oils converts. The mathematical model helps predict the yield and composition of products depending on the feedstock properties and the operating variables of the riser. We develop practical recommendations to organize the riser technological mode to ensure the maximum yield of gasoline (52.6-56.1 wt.%), PPF and BBF (8.3-11.2 and 15.2-20.1 wt.%) when saturated and resinous feedstock converts.

PETROCHEMISTRY: TECHNOLOGY, PROCESSES

P. 22–26

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Research of gas permeability of protective liquids of hot water supply tanks

Keywords: sealing liquid; hot water storage tank; water supply system; polyisobutylene; gas permeability; water evaporation; corrosion; protective properties; adhesion; thermal-oxidative stability.

Abstract. The gas permeability of protective (sealing) liquids is the most important operational indicator, which determines the permeability of air oxygen through the coating film and the evaporation of water from under their layer. The results of the study of the evaporation of water located under a layer of sealing liquid are presented. The dependence of water evaporation on the composition and thickness of the sealing liquid layer on the water surface is established. It is shown that the sealing liquids, which include polyisobutylene of the P-200 brand, have the lowest gas permeability. The interrelation of gas permeability of sealing liquids with other operational indicators – thermal and oxidative stability, surface and protective properties is revealed.

Pp. 29–32

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Research of electric conductivity of esters of (C₄–C₁₀) terminal dicarboxylic acids depending on their chemical structure

Keywords: symmetric ester; complex ester; terminal dicarboxylic acid; electrical conductivity.

Abstract. Using a teraohmmeter, the resistance indices of synthesized symmetric, asymmetric and complex esters of terminal dicarboxylic acids (TDA) of various structures were determined. The specific resistance and electrical conductivity of the obtained samples were determined. The properties of electrical conductivity are investigated depending on the structure of diesters and complex esters of TDA. It was found that in complex esters of TDA containing 3 or 4 ester groups, with an increase in the length of the carbon chain in the acid molecule, the electrical conductivity decreases. It was revealed that symmetric, asymmetric and complex esters of succinic acid, complex ester of adipic acid (based on octanol-1, ethylene glycol and caproic acid) and dibenzyl ester of sebacic acid have relatively good electrical conductivity.

Pp. 34–41

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Composite rubber-polymer-bitumen binder based on the feed materials obtained by MELANGE technology

Keywords: vacuum tower bottom heavy residues, hydrocracking of heavy vacuum residues, H-oil AXENS, MELANGE technology, bitumen, rubber-polymer-bitumen binder RPBB, asphalt concrete mix, Superpave.

Abstract. The innovative MELANGE technology makes it possible to obtain feed materials for the production of a combined rubber-polymer-bitumen binder RPBB. In this case, a mixture of unoxidized straight run vacuum residue and heavy residue obtained from the bottom of the vacuum tower of the H-oil hydrocracking process by AXENS is used as a feedstock.

EVENT

Pp. 40–44

Alkov I. D., Ogay A. I.

Exchange mirror of the oil products market. The issues of the fuel market were discussed at the SPIMEX forum

CHEMOTOLOGY

Pp. 45–48

Dunaev S. V.¹, Isaev A. V.¹, Katorgin V. A.², Kulikov A. B.¹, Lesin A. V.¹, Ozerenko A. A.¹, Popov V. P.¹

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To the issue of the system of admission of new petrol, oil and lubricants for use in various types of equipment

Keywords: fuel and lubricants; quality control; safe operation; test system; admission to use.

Abstract. In article the problem of safe and effective operation of the equipment in connection with objective change of structure and properties of commodity fuels, oils, lubricants and special liquids - the it is combustible lubricants (IICL) is considered. It was noted that in the USSR and Russia until 2008 there were systems of admission to the production and use of new and modernized fuel and lubricants based on their tests in order to assess the physicochemical and operational properties. It is indicated that the simple compliance of the fuel and lubricants quality indicators with the requirements of standards and technical regulations is not enough to fully guarantee the safety of use and operational reliability of the equipment. The need to recreate a unified state system of quality control of fuel and lubricants (System) in the Russian Federation is justified. The main goal and main tasks of the System are formulated, priority activities for its enforcement are proposed.

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Chemical and phase analysis of carbon deposits in the light of the development of compositions for the maintenance of automatic small arms

Keywords: shot products, small arms, metal corrosion, rifle (gun) oils.

Abstract. In this paper, an attempt is made on the basis of the data of chemical and phase analysis of carbon deposits to outline the range of chemical compounds that, when added to oil and/or water products, will contribute to the effective removal of carbon deposits, copper plating and, in general, the care of modern small arms. The results of the study of carbon deposits settling in the barrel of the machine gun after the shot are presented. It is shown that domestic rifle oils or their foreign analogues do not completely remove carbon from the barrels of small arms, so it is necessary to develop new special compositions. A number of new rifle oil with additives were tested, which showed an improvement cleaning properties oils, due to the introduction of the additives in concentration of 0.25-0.5%.