

**PETROLEUM PRODUCTS:
TECHNOLOGY, INNOVATION, MARKET**

Khayrudinov R.I., Dolomatov M.Yu., Sazhina T.I., Khayrudinov I.R.

Research of the gas generation process during the thermolysis of high-sulphur petroleum feed

Keywords: High-sulphur fuel oil, thermolysis regimes, decomposition gas composition, mass values of gas output for 1 minute, velocity constant, activation energy.

Abstract. The carried out research of thermolysis process of high-sulphur fuel oil with gas sampling and compositional analysis of feed decomposition gas allowed to establish two regimes of gas generation within the range of 380–400°C and within the range of 400–450°C. The first range is characterized with higher content of hydrogen sulphide in gas. The second range is characterized with higher content of hydrocarbons C₁-C₂ and sufficient decrease of hydrogen sulphide content. On the basis of the results of the research the velocity constants have been calculated and the assessment of the values of activation energy of the thermolysis process for the given temperature ranges has been made. There are presented the data on the output of decomposition gas within wide temperature range of fuel oil heating.

*State Unitary Enterprise «Institute of petroleum refining and petrochemistry
of the Republic of Bashkortostan»;
Federal State Budgetary Educational Institution of Higher Education
«Ufa State Petrochemical Technological University»*

Komaritsyn S.O., Petrov V.V.

Combined clean diesel oil fraction: pre-ozonation and hydrotreating

Keywords: total sulfur, ozonation, oxidation, hydrotreating.

Abstract. Stricter environmental requirements to oil and oil products, including sulfur – modern requirement of the world market, caused by the need for regulatory compliance in commercial products environmental standards. The article describes the technology of removing sulfur containing compounds from the diesel fraction of oil by combining the traditional method of Hydrotreating with advanced oxidative effects of diesel fraction of ozone and the subsequent extraction of the obtained compounds. The purpose of this blending is the destruction of thiophenic sulfur compounds from the diesel fraction of oil which are not removed in the Hydrotreating process and the allocation of these compounds for further use in the chemical, petrochemical and metallurgical industries.

The article deals with the methodology of the combined clean diesel oil fraction with application of Hydrotreating and pre-ozonation of raw materials and the optimum conditions for carrying out this process. As a result of researches it is established that the combination of a Hydrotreating process with pre-ozonation reduces the final total sulfur content in the diesel fraction more than 2 times compared to traditional Hydrotreating process.

Komsomolsk-on-Amur State technical university

Lashki V.L., Chudinovskikh A.L., Kilyakova A.Yu.

Thickening ability of polymeric lube oil additives

Abstract. The condition of polymeric oil solutions and the thickening ability of viscous additives of various structure subject to their molecular mass and concentration are considered. The analysis of the results obtained from practice of thickened oils use is carried out. A summarised dependence characterising the thickening effect is offered.

*NAMI-KHiM, Moscow
Gubkin Russian State University of Oil and Gas (National Research University)*

MATHEMATICAL SIMULATION

Ahmadi Soroush, Khoutorianski F.M., Soltani Behnaz

Mathematical modeling and optimization of dehydration and desalting processes for heavy oils

Keywords: mathematical modeling, heavy high viscosity oils, fractional factorial design (FFD), response surface methodology (RSM), dehydration and desalting rate, optimal process parameters.

Abstract. The heavy and high viscosity oil production often leads to the formation of water-oil emulsions with abnormally high aggregative stability. The preparation of such oils for processing on

electric desalting plants (ELOU) at refineries requires the use of special technological solutions for the destruction of persistent water-oil emulsions. In this work, based on the Yaregskaya oil (density 0.940 g/cm^3 at 20°C) basic principles of modeling of dehydration and desalting process were illustrated for heavy high-viscosity oils. Investigation of basic factors effect on the efficiency of dehydration and desalting processes was carried out on a pilot ELOU plant. Mathematical modeling of the ELOU plant was carried out using Fractional Factorial Design (FFD) and Response Surface Methodology (RSM). Statistical regression models for prediction of dehydration and desalting rate were obtained. Then, the optimum process parameters for Yaregskoye oil and a number of other oils were obtained on the pilot ELOU plant, including heavy high viscosity oil from the Verbluzhy Field, heavy karbonskaya oil, medium Devonskaya oil and light Sostinskaya oil. Based on the data obtained, graphical models for predicting optimal values of the process parameters are determined.

*Gubkin Russian State University of Oil and Gas (National Research University)
JSC All-Russian R&D Institute of Petroleum Processing (VNII NP)*

Frantsina E.V., Belinskaya N.S., Lutsenko A.V., Maylin M.V., Afanas'eva D.A.

Influence of technological parameters of the middle distillate fractions catalytic dewaxing process on its effectiveness

Keywords: fuel, low-temperature properties of diesel fraction, catalytic dewaxing of middle distillate fractions, mathematical model of catalytic dewaxing process.

Abstract. This work considers the influence of feed rate and hydrogen-containing gas flow rate on the yield and quality of the diesel fraction obtained in the process of catalytic dewaxing of middle distillate fractions using the mathematician model. It is shown that the yield of the diesel fraction and its low-temperature properties depend on the feed rate and hydrogen-containing gas flow rate. An increase in the feed rate from 240 to $360 \text{ m}^3/\text{h}$ leads to an increase in the yield of the diesel fraction from 58 to 63% . Moreover, a decline of its low-temperature properties by $1-4^\circ\text{C}$ (at $T = 300^\circ\text{C}$) and $4-7^\circ\text{C}$ (at $T = 340^\circ\text{C}$) due to an increase in the contact time of the raw material with the catalyst. The increase of the hydrogen-containing gas flow rate from 5000 to $50000 \text{ m}^3/\text{hr}$, on the contrary, leads to a decrease in the yield of the diesel fraction by $3-5\%$. In addition, it leads to improvement of diesel fractions low-temperature properties by $3-4^\circ\text{C}$ for different feedstock compositions, which is associated with increased hydrocracking reactions leading to formation of lighter hydrocarbons with lower meanings of freezing temperature and cold filter plugging point.

National research Tomsk polytechnic university

EQUIPMENT and DEVICES

Taushev V.V., Hayrudinov I.R., Telyashev E.G., Taushev E.V., Sultanov F.M., Taushev N.A., Nizamova G.I., Tikhonov A.A., Sultanov T.G.

Delayed coking unit reconstruction for pitch and coke production from petroleum residues

Keywords: reactor, pitching, coke sediments, coking, coke mass.

Abstract. In the proposed technology for the delayed coking unit reconstruction, main products are pitch and coke produced simultaneously at one unit, and the process cycle includes the stages of pitching, coking, the reactor preparation to stop, slack time, and the reactor preparation for start-up, that are carried out sequentially in the same reactor with the above steps followed by transfer to a second reactor, then the process cycle is repeated. New technology helps to reduce the unit downtime, to fully mechanize the process of reactor cleaning, to increase the feed resources due to the residual products, to expand the range of marketable products, to reduce the petroleum products losses, to improve the environmental performance of the process, to reduce the operating and capital costs.

Kashapova L.A., Marushkin A.B., Sidorov G.M., Yakhin B.A.

Experience of using jetting hydraulic mixer for tretment crude oil in Tatarstan

Abstract. The report provides details of the use of jetting hydraulic mixer to improving oil treatment from chlorides

*Ufa State Petroleum Technological University, Ufa;
LLC «ST-Centre», Ufa*

ANALYTIC METHODS for OIL and PETROLEUM PRODUCTS

Koval'skiy B.I., Bezborodov Yu.N., Sokol'nikov A.N., Agrovichenko D.V., Petrov O.N.

Graph-Analytic method of thermooxidizing stability indicators definition of mineral engine oil Rosneft M-10G2K

Keywords: thermooxidizing stability, graphic-analytical method of calculation of indicators of thermooxidizing stability resilience to oxidation.

Abstract. The results of a research of thermooxidizing stability of diesel mineral engine oil Rosneft of M-10G2K including definition of optical properties, an evaporability, coefficient of thermooxidizing stability, resilience to oxidation, the critical temperature, a potential resource are presented. The graphic-analytical method of calculation of indicators of thermooxidizing stability in wide temperature an interval is developed.

Siberian Federal University

MATERIALS of the PETROCHEMICAL and REFINERS ASSOCIATION

Extracts of the protocol #137 of ANN board meeting of 09.08.2017 / Subject – The production and consumption of gasoline, diesel fuel, lubricating oils and additives in Russia