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RECEPTION OF ECOLOGICALLY CLEAN DIESEL FUEL BY THE OZONOLYSIS METHOD OF MIDDLE-DISTILLATE OIL FRACTIONS

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The diesel fractions of the «Zhanazhol» deposit oil and commercial diesel fuels have been chosen as the object of researching.Physical and chemical characteristics of the researching object are defined: density at20°C – 798,6 kg/m^3, Iodic number – 28,88, S – 0,1002%, (°C) T_{filter} – (–36,1), T_{turbid} – (–31,0), T_{freez} – (–42,2), Fractional composition: (°C) 10% – 147, 50% – 217, 90% – 275. Thecetaneindex (by formula) – 51,7, the cetaneindex (bynanogram) – 51,5.

Thiophene compounds and polycyclic aromatic structures in their composition demanding a high pressure and the hydrogen pressure hinder to effective process of such diesel fractions hydroforming.

In our opinion, in connection with abovementioned, there is actual searchingof alternative ways of simplification and optimization of the given kindsof raw materials reprocessing, i. e. ways which largely would allow to cutexpenses on them ennoblement, by way of the specified components (sulphurouscompounds, olefins, polycyclic aromatic hydrocarbons)transfer in other classes compounds which can be valuable productsfor the further reprocessing. Preliminaryozonizing of raw materials can be one of such methods.

The temperature and ozone specific expense influence to physical and chemical characteristics of diesel fuels are defined.

Generalization of the received data on physical and chemical characteristics was spent in comparison with the data on direct hydrogenation and ozonolysis of diesel fractions. With increase ofan ozone-air mixture ratethe cetane number raises: 51,9 < 52,6 < 54,5 < 54,6 < 54,8 < 54,9 < 55,01 < < 55,02 < 55,05. Conversely, in the process of ozonizing the density decrease is observed: 0, 803 > 0,801 > 0,800 > 0,799 > 0,798 > 0,797. Iodic number, accordingly, in initial diesel fuel – 28,8, after hydrogenation – 28,0, and after ozonizing has considerably decreased – 26,4 (0,125 l/min, 30 min) > 22,0 (0,5 l/min, 60 min) > 26,4 (0; 1,24 l/min, 30 min). The improvement of diesel fuel fraction composition is observed in connection with alteration of cetanenumber. At ozonizing initial temperature of boiling of all diesel fractions has increased, °C: 147 < 160 < 167 < 169 < 171 < 174 < < 179, and the density, on the contrary,decreases: 0,803 > 0,801 > 0,800 > 0,799 > 0,798 > 0,797. Iodic number decreased after ozonizing – 21,2.

As theresults of researchingshow,the content of sulphur decreases from 0,1 to 0,04 weight.% at realization of ozonizing process in optimum conditions (0,125 l/min, 60 min) onNi-Re catalyst

Further the cycle of experimental researches on an establishment of ozonizing process parameters influence on change of diesel fuels functional groups is spent. Initial composition of once-run diesel fraction and commercial diesel fuels taken by the object of research have defined by the method of infrared spectroscopy. The IR-spectrum of once-run fraction from a «Zhanazhol» deposit is determined inthe following absorption areas: 3000–2800 cm^{-1} interval (alkanes), 1460,29 cm^{-1} interval (arenes), 1377,63 cm^{-1} (methylbenzenes), 722,55 cm^{-1} (cis-dienes). The IR-spectrum of commercial diesel fraction is determined in the following absorption areas:3000–2800 cm^{-1} interval (alkanes), 1377,41 cm^{-1} (methylbenzenes), 812,63 cm^{-1} (alkylchlorides), 722,48 cm^{-1} (cis-dienes), 699 cm^{-1} (alkylbromides), 740,98 cm^{-1} (cis-dienes).Analyzing composition of synthetic diesel fuel we have found out that hydrocarbonsof normal structure which nuclear number is equal C_{14}–C_{15} and C_{12}–C_{13} is included into its composition together with C_{10}–C_{24} hydrocarbons.

Thus, the conducted researches have shown possibility of preliminarytransformation of the once-run diesel fractionbasic components in compounds of otherclasses under the effect of ozone that will exert positive influence on the processof diesel fuels hydroforming.

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THE «KENDERLYK» DEPOSITSLATE OXIDATION BYTHENITRIC ACID AND THE AIR OXYGEN

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The present work is devoted to oxidation (by the air and the nitric acid) of combustible slates of the «Kendyrlyk» deposit which are notable for big ash content (up to 75%). Theenriched slate with organic mass (SOM)on the order of 53–55% was usedfor oxidation.