

*Materials of Conferences***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 at 20°C – 798,6 kg/m³, 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. The cetane index (by formula) – 51,7, the cetane index (by n-anogram) – 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 above mentioned, there is actual searching of alternative ways of simplification and optimization of the given kind of raw materials reprocessing, i. e. ways which largely would allow to cut expenses on them ennoblement, by way of the specified components (sulphurous compounds, olefins, polycyclic aromatic hydrocarbons) transfer in other classes compounds which can be valuable products for the further reprocessing. Preliminary ozonizing 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 of an ozone-air mixture rate the 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 cetane number. At ozonizing initial temperature of boiling of all diesel fractions has in-

creased, °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 the results of researching show, 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) on Ni-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 in the 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 hydrocarbons of normal structure which nuclear number is equal C₁₄–C₁₅ and C₁₂–C₁₃ is included into its composition together with C₁₀–C₂₄ hydrocarbons.

Thus, the conducted researches have shown possibility of preliminary transformation of the once-run diesel fraction basic components in compounds of other classes under the effect of ozone that will exert positive influence on the process of diesel fuels hydroforming.

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THE «KENDERLYK» DEPOSIT SLATE OXIDATION BY THE NITRIC 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%). The enriched slate with organic mass (SOM) on the order of 53–55% was used for oxidation.

The characteristic of the flotation concentrate: humidity – 0,7%; on a dry concentrate, %: ashes – 47,3; volatile matters – 45,3; general sulphur – 1,0; carbon – 42,8; hydrogen – 6,5.

The oxidation was spent in the three-necked round-bottomed flask with the 1 liter capacity supplied with the reverse refrigerator, thermometer and a mixer on interchangeable ground glass joints. In the beginning 60 % nitric acid was infused (on the basis of kerogen oxidation to amber acid), and then a concentrate entered by portions at continuous interdiffusion of suspension by a mixer then electroheating has on and temperature of a reactionary mix was lead up to 90°C. Duration of experience was from 6 till 8 hour. Experiences were spent as with preliminary extraction of high-molecular matters of acidic character from organic mass of slate by boiling with 10 % solution of alkali during 3–4 hours, and without it. At small time of oxidation insoluble acids were formed which were situated on the surface of the acidic solution in the form of the resin substance which were exposed to the further oxidation.

96,3 % of SOM are oxidized at processing of the enriched slate by nitric acid during 8 hour. 85,7 % of high-molecular acids (soluble in water alkali), about 1,9 % of a benzene extract, 12,4 % of a etheric extract and 24,1 % of an n-butyl alcohol extract are formed at that. The exit of volatile acids in all experiences makes less than 1 % that point at soft conditions of process, i. e. on deep destruction of organic matter of slates.

The oxidation of Kendrylyk slate by air oxygen was spent in a column of bubbling type. In the end of experience unoxidized slate and a mineral part has separated from soluble products of oxidation by the filtration, washed out by water, dried up and their exit has defined. Soluble products of oxidation (salt of organic acids and surplus of alkali) were neutralized by hydrochloric acid to pH = 2.

Filtered, laid-down in a bottom «high-molecular acids» has dried and their exit has defined. Volatile acids with water steam has distilled from a filtrate, and the remainder has extracted by ethylacetate. An exit of oxidation products (on oxidized SOM) is following (%): High-molecular acids – 48,2; Volatile acids – 7,8; Nonvolatile acids (an ethylacetate extract) – 34,5.

The volatile acids from a water solution was extracted by the sulfuric ether. The extract was dried, and the ether was distilled. The driven out acids were dispersed on rectifying column under atmospheric pressure. Almost 80 % of acetic acid has been received as a result of rectification. The others 20 % fall on propionic, isobutyric, isovaleric and enanthic acids.

In such a manner it is shown that at SOM of Kendrylyk slate oxidation by nitric acid and air oxygen high-molecular, middle-molecular and low-molecular acids are formed. Volatile acids basically

consists of acetic acid. The exit of oxidation products depends on reaction conditions.

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THE ASSIGNMENT TO HAZARD CLASS (TOXICITY) OF INDUSTRIAL WASTE CHEMICAL ORIGIN DESIGN BY THE ESTIMATED METHODS

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The collection, accumulation, storage, waste transportation safe conditions in the buildings, on the objects' territory, in the surrounding environment are defined by the hazardous waste class, by the packing method, with due regard for the aggregation state, and the cargo safety. The hazardous waste class (e.g. the grade) for the surrounding environment, the human surrounding environment, and the human health are also taken into account at the challenges dealing with the opportunities and the technologies (e.g. the methods) of their handling, processing, use, disposal, neutralization, and location. In addition, the set for further withdrawal of the hazard class has become the basis for the fee standard establishing for the waste units disposal.

The hazardous waste class (e.g. grade) establishing procedure for the surrounding environment (e.g. hereinafter – SE) is practically such the complex and the controversial solvable challenge, which inevitable has been become the intractable disputes cause between the economic entities and the corresponding economic players, having defined the hazardous waste class, and also by the state bodies of the enforcement authorities, having coordinated the already obtained results and their findings.

Thus, the whole complexity and the ambiguity of this procedure is associated with the «Hazardous Waste Assignment Criteria, Classified as the Dangerous Classes for the Surrounding Natural Environment», methodological apparatus, having approved by the MNR Order of Russia, dated from 15.06.2001, №511 (hereinafter – the Criteria), and «The Sanitary Rules for the Hazardous Class Determination of the Production and Consumption Toxic Wastes» SR 2.1.7.1386-03, having approved by Resolution of the RF Chief State Sanitary Doctor, dated from 16.06.2003, №144 (hereinafter – SR 2.1.7.1386-03). So, according to the first normative and the regulatory document (e.g. the Criteria), the wastes, depending on the negative impact extent on the SE, have already been divided into the five classes of the risk: from the extremely dangerous ones (e.g. the I-st class) up to practically almost non – hazardous ones (the V-th class). Then, according to the second normative and the regulatory