It is known that mechanochemical treatment leads to an increase in the surface area of the treated solid, which is often considered as the reason for the increase in reactivity. A major role in ensuring optimal properties of the surface

To confirm the influence of the different treatment on the particles stability and size we decided to carry an acoustic and electroacoustic spectrometer DT1202, Dispersion Technologies, and a Turbiscan LAB analysis.

Laboratory studies have shown that the optimal GL parameters are observed after warming up at a temperature of 110 °C for 12 hours and an exposure of 15 min to an ultrasonic treatment allow as to intensify the effect of the alkaline-peroxide treatment.

In conclusion we can say that a combination of conventional and unconventional pretreatment of the hydrolytic lignin can significantly change the chemical structure increasing the phenolic endings of the macromolecule in addition to an optimization in particle size and stability of the lignin.

These results confirm the effectivity of the heterogenous pretreatment and allow us to continue this study increasing the potential of hydrolytic lignin as source of phenolic antioxidant and aromatic groups after a catalytic conversion [2].

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ANALYSIS OF THE PRODUCTS COMPOSITION OBTAINED ON ZEOLITE FROM VARIOUS STRAIGHT-RUN DIESEL FRACTIONS

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For the most effective control and management of catalytic processes used in the oil refining industry, a deep understanding of the chemical transformations of hydrocarbons occurring during these processes is necessary.

For new, developing processes, this problem is particularly relevant. The first step in studying the chemistry of any chemical technological process and understanding the mechanisms of reactions is a thorough study of the composition of the used feedstock and the obtained products.

In this work, the group hydrocarbon composition of feedstock and products of the processing on zeolite of various straight-run diesel fractions is investigated. The process was carried out on a laboratory catalytic unit at a temperature of 375 °C, a pressure of 0.35 MPa, a volumetric flow rate of $3 \ h^{-1}$. The group hydrocarbon composition of feedstock and products was determined by the aniline method [1]. The results are shown in Figure 1.

From the results presented in Figure 1, it follows that in all straight-run diesel fractions used as process feedstock, paraffins are the predominant group of hydrocarbons, and their content in all samples is half or more. In most samples, aromatic hydrocarbons take the second place in terms of content, naphthenes make up the smallest part.

Considering the composition of obtained products, it should be noted that aromatic hydrocarbons are the predominant group of hydrocarbons, paraffins occupy the second place, and naphthenes account for the smallest part.

Thus, it can be seen that paraffin hydrocarbons are converted either into naphthenic hydrocarbons or into aromatic hydrocarbons during the processing process on a zeolite catalyst. The greatest reduction in the content of paraffins as a result of processing on zeolite was achieved for Feedstock 1, the smallest for Feedstock 4.

Since there are no metal centers in the zeolite catalyst used (zeolite ZSM-5 of the KN-30 brand), the formation of aromatic hydrocarbons cannot proceed through dehydrocyclization reactions. A probable way to form aromatic hydrocarbons in this
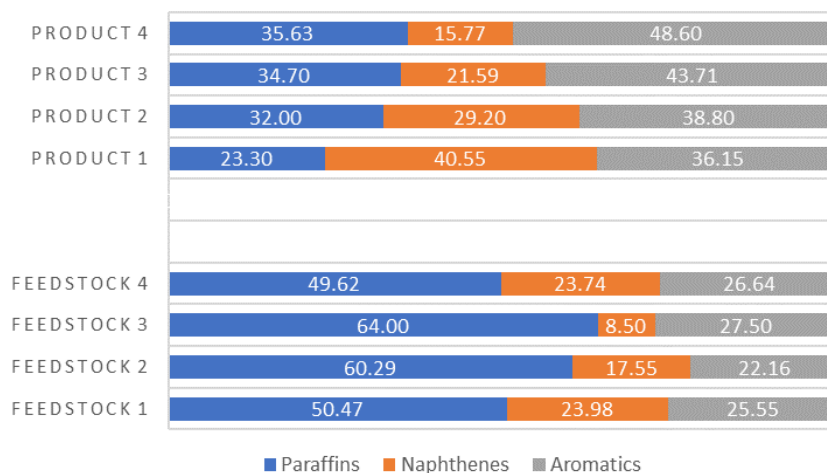
Fig. 1. *Group composition of feedstock diesel fractions and products obtained by their processing, % wt.*

case is the transfer of hydrogen in olefins formed during cracking reactions. A probable method of naphthenes formation is reactions of diene synthesis, involving olefins and diolefins formed during cracking.

The predominance of diene synthesis reactions for medium-distillate fractions is supported by the significant content of naphthenes in the resulting products. Moreover, even if there are not very many naphthenes in the feedstock (Feedstock 3), the content of this hydrocarbons group in the product exceeds 20 % wt.

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DEVELOPMENT OF NON-STATIONARY MODEL OF PYROLYSIS

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Polymers are one of the main components of almost any industrial products, as well as consumer goods. The raw materials for the production of polymers are alkenes, which are obtained mainly by the pyrolysis of hydrocarbon feedstock. However, coke deposits in the furnace coils during this process. The formation of coke leads to a decrease in the yields of target products, and the likelihood of accidents increases.

The purpose of this work is to optimize the process by controlling the rate of coking. This requires the development of a non-stationary model. It is based on a formalized reactions scheme shown in Figure 1.

Since the process is carried out at high temperatures, decomposition reactions prevail over saturation and decyclization ones. That is, for any K_i for which K_{-i} exists, $K_i \gg K_{-i}$.

The model first calculates the reaction rate constants at the current time, at the current point of the pyrolysis coil:

$$K_{j,t,l} = K_{0j} \bullet \frac{P_{0\,t,l}}{T_{t,l}^2} \bullet exp\left(\frac{-E_j}{RT_{t,l}}\right), j \in \{1...172\}$$

Next, the reaction rates are calculated at a given point in the coordinate plane, where the axes are astronomical time and distance from the entrance to the coil. Finally, the rates of change in the concentrations of the components are calculated as the sum of the corresponding reactions: