

ПРОБЛЕМЫ ГЕОЛОГИИ И ОСВОЕНИЯ НЕДР

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STUDING THE PRESSURE INFLUENCE ON THE PROCESS OF DIESEL FUEL CATALYTIC DEWAXING

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For Russia, due to the peculiarities of climatic conditions and geographical location, the production of winter and Arctic grades of diesel fuel with appropriate low-temperature and environmental characteristics is of particular importance [2]. In addition, the share of processing of heavy and high-sulfur oils is increasing annually.

One of the processes of winter and Arctic diesel fuels production is catalytic dewaxing. It is important to improve the process of catalytic dewaxing using the method of mathematical modeling to regulate the technological conditions of the process of dewaxing of diesel fractions, which will ensure the achievement of optimal product yield and compliance with standards for low-temperature characteristics when changing the hydrocarbon composition of raw materials [1].

The aim of this work was to study the influence of pressure on the process of catalytic dewaxing of diesel fuel.

For calculations the computer modeling system of catalytic dewaxing process [3], created on the basis of mathematical model of this process, was used.

Two types of raw materials with different content of n-paraffins were chosen for the study. Data on the component composition are presented in Table 1.

Table 1

The composition of the raw materials of the catalytic dewaxing process

Component	Raw materials-1	Raw materials-2
N-paraffins C ₁₀ -C ₂₇	15,50	22,50
N-paraffins C ₅ -C ₉	0,60	0,69
Olefins	1,98	1,09
Naphthenes	37,75	31,44
Isoparaffins	24,23	24,23
Monoaromatic hydrocarbons	18,82	18,82
Polyaromatic hydrocarbons	1,12	1,23

For each type of raw material, the influence of temperature on the content of n-paraffins, the output of the diesel fraction and the limit temperature of filterability was studied. The results are presented in the following graphs:

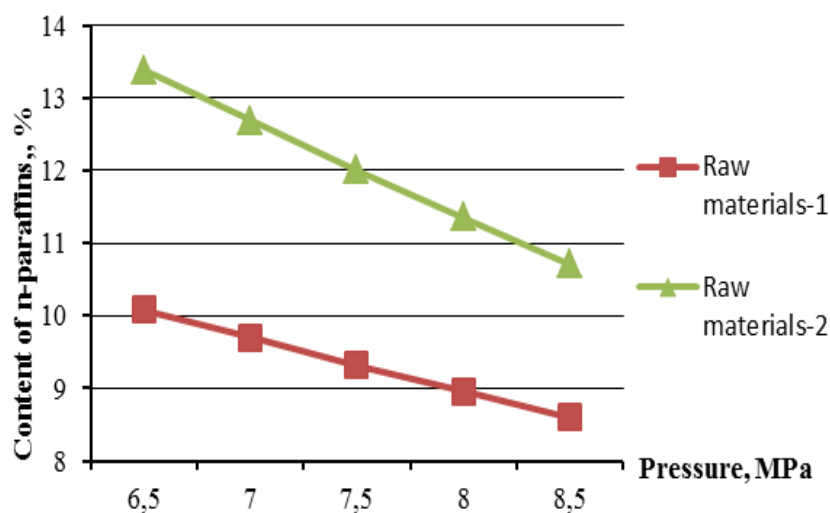


Fig. 1 The dependence of the content of n-paraffins C₁₀-27 on the pressure

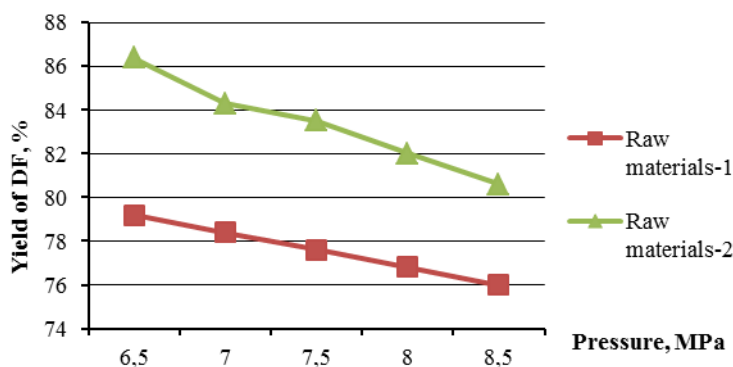


Fig.2 The dependence of the yield of diesel fuel on the pressure

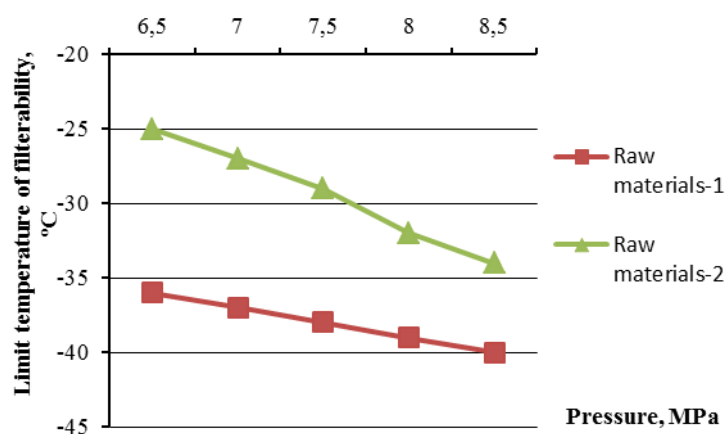


Fig. 3 The dependence of the limit temperature of filterability on the pressure

According to the obtained results, it can be seen that an increase in the pressure in the hydrodewaxing reactor by 2 MPa leads to a decrease in n-paraffins C10–C27 by 1.48% for raw materials-1 (from 10.08% to 8.6%) and for raw materials with a high content of n-paraffins C10–C27 by 2.67% (from 13.38% to 10.71%).

Analysis of the influence of pressure showed that with increasing pressure of the process, the output of the diesel fraction decreases, as well as the content of paraffin hydrocarbons decreases, which is associated with the physico-chemical regularities of the transformations of hydrocarbons of the average distillate fractions in the reactions of hydrocracking and hydrogenation.

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