with the growth of chemical reactions rate leading to synthesis of products having higher RON. Speaking in a concrete way, cracking reactions resulting in obtaining of aromatic hydrocarbons by the way of hydrogen redistribution in olefins.

As for the pressure impact from Figure 2, RON of products decreases linearly as pressure grows. The impact of pressure is explained with suppression of cracking reactions.

According to Figure 3, the dependence of RON on the feedstock flow rate has a parabolic form. Such dependence can be explained in a following way: when feedstock flow rate grows, the feedstock-catalyst residence time is not enough yet in order to cracking reaction proceed. Afterwards the aromatic hydrocarbons are obtained leading to RON decreasing. At the same moment the residence time is enough for isomerization reactions and if feedstock flow rate rises, then RON rises too.

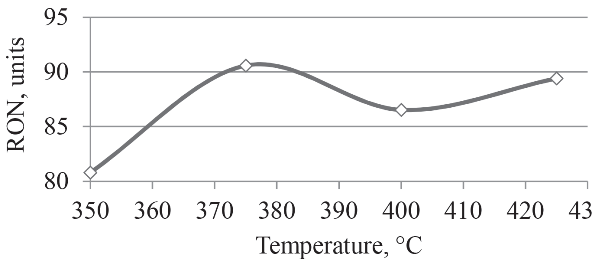

Fig. 1. *Dependence of RON on temperature*

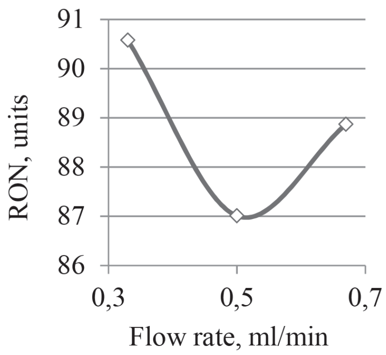

Fig. 3. *Dependence of RON on flow rate*

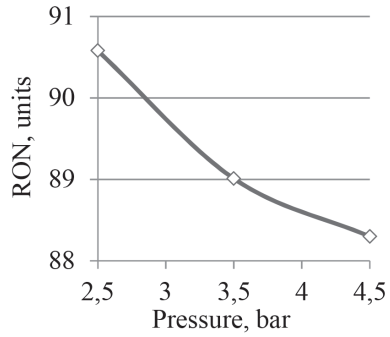

Fig. 2. *Dependence of RON on pressure*

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PARAMETERS OF DIESEL FUEL COMPOSITION THAT AFFECT THE EFFICIENCY OF DEPRESSANT ADDITIVES

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Depressant additives do not always have a pronounced effect on the low-temperature properties of diesel fuel (DF). Adding the same depressant to fuel samples with significantly different fractional and hydrocarbon compositions can have a positive, negative, or no effect on the low-temperature characteristics of DF. This phenomenon is largely dependent on the content of n-paraffin and aromatic hydrocarbons [1] as well as heteroatomic compounds in the fuel composition.

In order to identify the patterns of the effect of DF composition on the efficiency of depressants, studies were conducted on the controlled modification of the fuel composition by introducing individual hydrocarbons of different classes. Two aromatic hydrocarbons of different structures (tetralin and toluene), as well as n-paraffin hydrocarbons with different numbers of carbon atoms (hexa- and heptadecane, docosane and heneicosane) were taken as studied hydrocarbons.

The following regularities of the influence of DF composition on the efficiency of depressant additives were established as a result of the studies:

1) The content of heavy n-paraffins (such as heneicosane and docosane) in small amounts positively affects the efficiency of depressant action.

2) Medium molecular weight n-paraffins (such as heptadecane) increase the efficiency of depressant additives.

3) The content of light n-paraffins (such as cetane) and aromatic hydrocarbons (such as toluene and tetralin) in DF has a negative effect on the efficiency of depressant action.

4) The content of less polar aromatic hydrocarbons (such as toluene) in DF has a less pronounced negative effect on the action of depressants than the content of more polar ones (such as tetralin).

The effect associated with the polarity of aromatic hydrocarbons can be explained as follows: the polar tetralin interacts more actively with the depressant and reduces its effectiveness in relation to n-paraffins, since its dipole moment is almost twice as high as that of toluene.

The effect of adding n-paraffinic hydrocarbons is related to the mechanism of action of depressant additives: the depressant can only start working when initial crystal nucleation centers appear. When heavy n-paraffins are added, their crystallization occurs first, which allows the additive to start working more effectively by slowing down crystal growth and preventing fuel solidification. In the case of a high content of heavy n-paraffins in diesel fuel composition, the effectiveness of the additive is reduced due to the inability to act on such a large number of nucleating crystals. It should be noted that the negative impact on the low-temperature properties of diesel fuel by heavy n-paraffins in high concentrations may also be due to the extremely unsatisfactory low-temperature characteristics of these compounds.

The influence of heteroatomic compounds, namely nitrogen and sulfur-containing compounds, in diesel fuel on the effectiveness of depressants is currently not fully understood. However, based on the work [2], it appears that introducing nitrogen bases and sulfur-aromatic concentrates into the oil composition has a positive effect on the low-temperature properties of the tested samples. In this case, the additives themselves serve as depressants, which is related to their polarity. Therefore, it is logical to assume that introducing heteroatomic compounds into diesel fuel may have a positive impact on low-temperature characteristics, but for polar depressant additives, a negative impact is expected. These trends can be identified through further research.

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