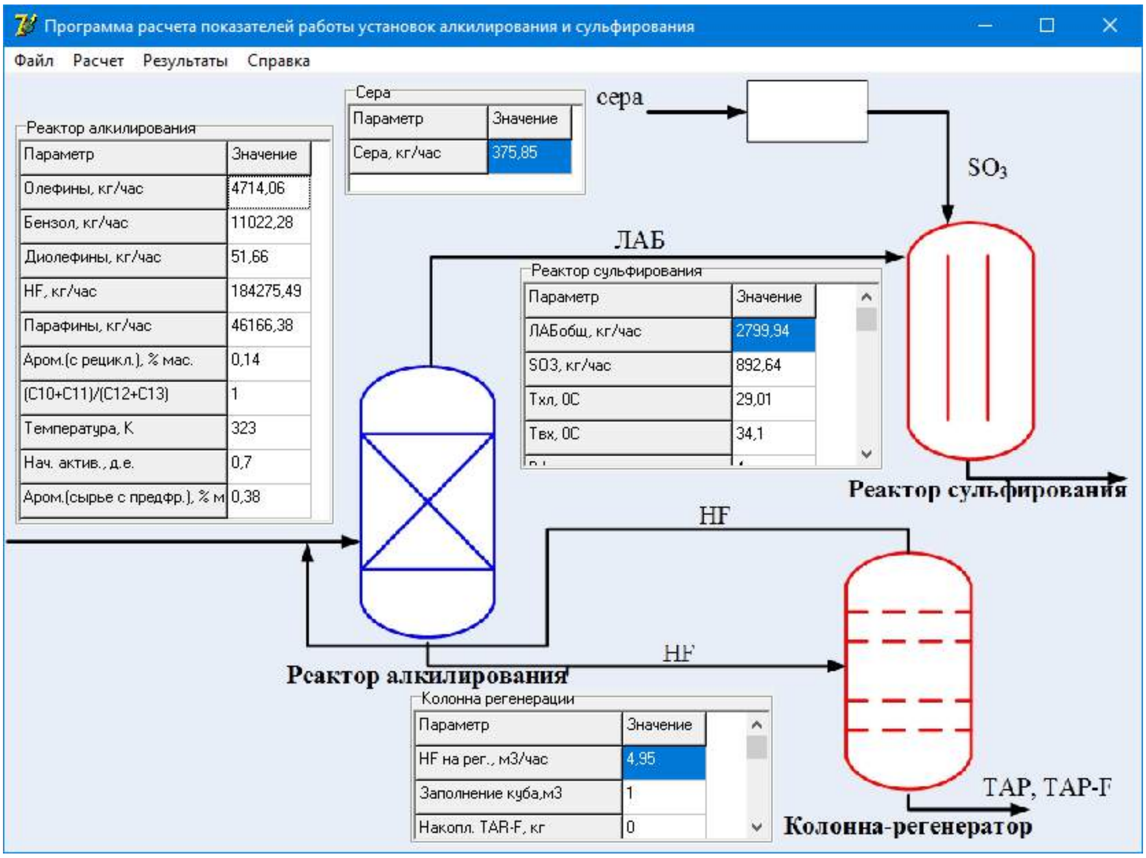

Fig. 2. *Active window of the alkylation and sulfonation blocks calculation module*

The physicochemical regularities of liquid-phase processes established in present work are not limited to the technology of ABSA synthesis. They can be extended to other liquid-phase processes occurring in industrial reactors, for example, liquid-phase alkylation processes in technologies for the synthesis of ethylbenzene, styrene, high-octane components of gasoline, as well as sulfonation processes in technologies for the production of high-tech sulfonate additives for motor oils, surfactants for the oil industry and etc.

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INCREASING THE EFFECTIVENESS OF A DEPRESSANT BY ADDING A WEIGHTING COMPONENT: ANALYSIS BASED ON CHROMATOMASS SPECTROMETRY DATA

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To obtain the necessary low-temperature properties of diesel fuel (DF), the most promising method is the introduction of depressant additives. The addition of weighting components (WC) to the DF makes it possible to increase the additive effectiveness and thus achieve compliance with the necessary requirements [1].

The purpose of this work is to study the results of chromatography-mass spectrometry to substantiate an increase in the depressant additive effectiveness with the addition of a WC to a commercial DF.

Two samples of commercial DF (B_1 and B_2) from automobile gas stations in Tomsk were used as the object of research. Vacuum gas oil obtained from fuel oil (VG_1) and a fraction with a high content of paraffins (P_1) in low concentrations were used as WC. The used concentration of the depressant additive is 0.26 ml per 100 ml of diesel fuel, according to the manufacturer's recommendations.

For the B_1 DF sample, the addition of P_1 at a concentration of 5 % vol. made it possible to increase the depressant additive effectiveness – reduce the CFPP from –23 to –27 °C and obtain an off-season DF brand from the summer brand.

For the B_2 DF sample, the addition of VG_1 at a concentration of 1 % vol. made it possible to increase the depressant additive effectiveness – reduce the CFPP from –24 to –28 °C and obtain an off-season DF brand from the summer brand.

For a more detailed study of the data obtained, the results of chromatography-mass spectrometric analysis were obtained (Figure 1–2).

Based on the results in Figure 1, it can be seen that the B_1 DF sample is characterized by the presence of a large amount of n-paraffin hydrocarbons of medium molecular weight. The addition of a WC makes it possible to compensate for the lack of light and heavy n-paraffin hydrocarbons and increase the depressant additive effectiveness.

According to the results in Figure 2, the B_2 DF sample is characterized by a lack of heavy n-paraffin hydrocarbons. Therefore, to increase the depressant additive effectiveness, a heavier WC will be required, but in a relatively small concentration.

Thus, in order to maximize the depressant additive effectiveness, it is necessary that the ratio of light and heavy n-paraffin hydrocarbons in the fuel composition be balanced.

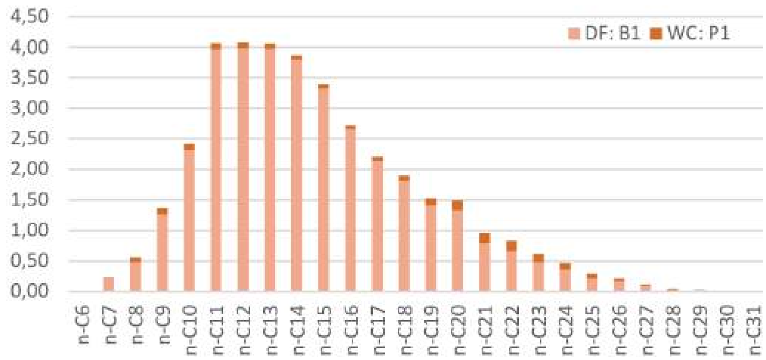

Fig. 1. *Content of n-paraffinic hydrocarbons in B_1 sample with the addition of 5 % vol. of P_1*

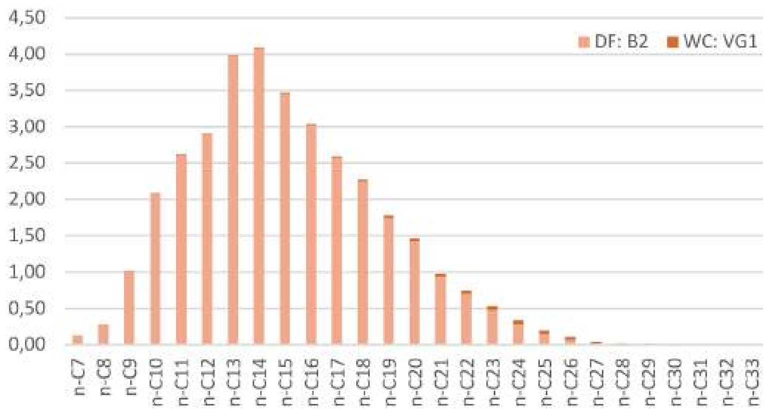

Fig. 2. *Content of n-paraffinic hydrocarbons in B_2 sample with the addition of 1 % vol. of VG_1*

References

1. *GOST 305-2013. Diesel fuel. Technical specifications. – Moscow : Standartinform, 2014. – 12 p.*