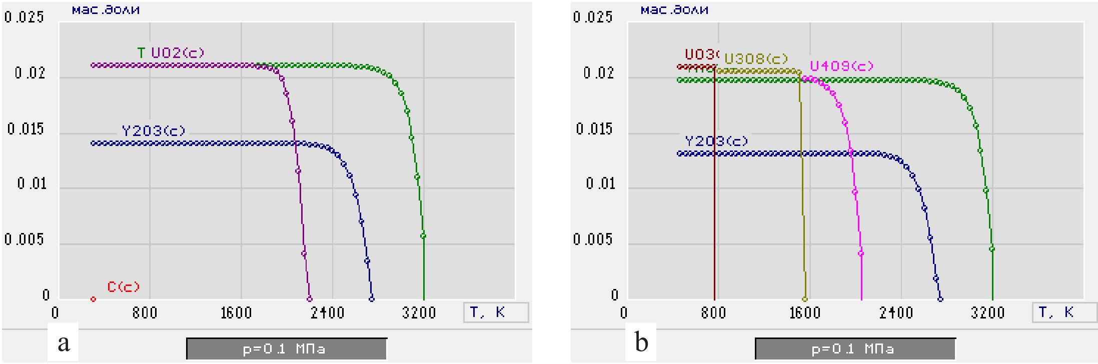

Fig. 1. *The influence of temperature on the equilibrium composition of the main products of plasma processing of the AONS solution based on acetone (α = 0.5) at a mass fraction of air of 68 % (a) and 70 % (b)*

It follows from the obtained data that the increase the mass fraction of the matrix material in the WOC leads to an increase in specific energy consumption. It is also shown that an increase in the mass fraction of air leads to the production of uranium oxide U_3O_8 instead of uranium dioxide.

It is most expedient to use a matrix based on magnesium oxide, due to the highest value of the thermal conductivity coefficient, melting temperature and other performance characteristics.

The results obtained can be used to create a technology for the plasma-chemical synthesis of FOC DNF for high-temperature gas-cooled reactors for hydrogen production.

References

1. *Alekseev S. V., Zaitsev V. A., Tolstoukhov S. S. Dispersive nuclear fuel. – M.: Technosphere, 2015. – 248 p.*
2. *Alekseev S. V., Zaitsev V. A. Thorium in nuclear power. – M.: Technosfera, 2014. – 288 p.*
3. *Tumanov Yu. N. Plasma and high-frequency processes for obtaining and processing materials in the nuclear fuel cycle: present and future. – M.: Fizmatlit, 2003. – 759 p.*

THE CONCENTRATION OF THE DEPRESSOR ADDITIVE FOR DIESEL FUELS AS A FACTOR OF ITS EFFECTIVENESS

T. A. Lakizo, Y. P. Morozova
Research supervisor – candidate of engineering sciences, associate professor M. V. Kirgina
Language supervisor – assistant teacher I. A. Bogdanov

National Research Tomsk Polytechnic University
Tomsk, Russia, Lenina Avenue, 30, tal6@tpu.ru

The pour point (PP) of diesel fuel (DF) is the temperature at which diesel fuel loses its mobility when a standard test tube is tilted by 45° for one minute. By adding depressant additives (Add) to diesel fuel, it is possible to achieve a decrease in PP.

The aim of the work is to identify trends of the Add concentration effects on the PP of the DF sample.

Blends of the straight-run DF and three different additives using concentrations of 0.5, 0.7, 1.0, 1.5, and 2.0 c.u. (where 1.0 c.u. is the manufacturer's suggested concentration) were prepared during the research. Further, following to the method presented in [1], the PP of straight-run DF samples and prepared blends was determined. The obtained results are presented in Table.

Table shows that with an increase in the concentration of Add No. 1 PP of blends decreases and reaches its minimum at a concentration of 1.5 c.u., further increase in the concentration of Add No. 1 is not advisable, PP remain stable. The temperature depression was 40 °C relative to the original sample and 1 °C relative to the sample with the concentration recommended by the manufacturer. In this case the concentration recommended by the manufacturer is optimal.

Table 1. Pour point of blends

Blends number	PP, °C					
	Concentration of Add, c.u.					
	0.0	0.5	0.7	1.0	1.5	2.0
No. 1	–15	–39	–49	–54	–55	–55
No. 2		–45	–45	–45	–52	–50
No. 3		–40	–41	–42	–45	–46

The best result is observed when using Add No. 2 at a concentration of 1.5 c.u. (this concentration is optimal). In this case, the temperature depression was 37 °C relative to the original sample and 7 °C relative to the sample with the Add concentration recommended by the manufacturer.

With an increase in the concentration of Add No. 3 PP of the blends decreases and hits a low in the studied range at a concentration of 2.0 c.u. The temperature depression was 31 °C relative to the original sample and 4 °C relative to the sample with a concentration recommended by the manufacturer, and 1 °C relative to the sample with a concentration of 1.5 c.u., so the concentration is 1.5 c.u. is optimal.

The use of all Adds made it possible to significantly reduce PP of DF. For a blend of Add No. 1, the optimal concentration is 1.0 c.u., for blends of Add No. 2 and No. 3 – 1.5 c.u. The best result was caused by the addition of Add No. 1.

References

1. *USS (State Standard System) 20287-91. Petroleum products. Methods of test for flow point and pour point. Published 01.01.1992. – Moscow: Standartinform, 2006. – 9 p.*

REGULARITIES OF FEEDSTOCK CONSUMPTION INFLUENCE ON THE DEPTH OF STABLE GAS CONDENSATE PROCESSING ON ZEOLITE CATALYST

D. M. Lukyanov, A. A. Altynov
Scientific supervisors – Candidate of technical sciences of Division for Chemical Engineering M. V. Kirgina
Linguistic advisor – assistant of Division for Chemical Engineering I. A. Bogdanov

Tomsk polytechnic university
634050, Tomsk, Lenina Avenue, 30, dml4@tpu.ru

The rational using of hydrocarbons recourses problem continues to be actual due to the growing share of hard-to-recover reserves, shifting of oil and gas production capacities to the northern latitudes and, as a result, the cost of hydrocarbons production increasing. Meanwhile, the last decade, despite the decline in 2022, is characterized by an increase in natural gas production.

Stable gas condensate (SGC) is a by-product of natural gas processing process. SGC can be used to produce motor gasoline by processing it on a zeolite catalyst (zeoforming process). A distinctive feature of zeoforming is its profitability at low capacities (30 thousand tons/year) [1].

Under the zeoforming process, conditions light hydrocarbons evaporated into the gas phase and reacts with products formation on the catalyst's surface.

This work describes the influence of SGC contact time with the catalyst during zeoforming on the products composition and the depth of feedstock conversion.

The processing of the SGC sample was carried out on a flow laboratory reactor equipped with a thermally insulated box with a heating element and a water-cooled separator at the outlet for the reaction products separation. The temperature was maintained by a heater at 400 °C and the pressure was maintained at 3.5 bar (abs.) with weak flow of nitrogen. The feedstock flow rate was controlled by a plunger pump. The set of experiments was carried out at feedstock flow rate of 0.33; 0.50; 0.67; 1.00;