under hydrogen pressure 1–6 MPa. The main product formed was PG and by-products were ethylene glycol, lactic acid (**LA**), and glyceric acid.

The morphology and phase composition of *in situ* formed Cu-DP and the Cu-ZnO-DP catalysts were investigated by SEM, HRTEM, XRD and XPS. The catalytic phase was established to represent nanosized particles, consisting of Cu (0) or Cu (0) and ZnO phases. It was estimated by HRTEM, that the size of Cu-ZnO-DP was no more than 150 nm.

The influence of the copper and zinc oxide molar ratio of *in situ* generated the Cu-ZnO-DP on the catalytic performance in the hydrogenolysis of GL was studied. The highest GL conversion and PG selectivity were achieved by in situ generated catalysts with a ZnO : Cu ratio of 3 mol. The dispersion of Cu-ZnO-DP was found to correlate with the content of zinc oxide. The most dispersed catalysts for GL hydrogenolysis were obtained with a ZnO : Cu ratio of 3 mol.

The addition of potassium hydroxide to the initial mixture was shown to affect the yield and selectivity of the products formed during GL hydrogenolysis. Threefold molar amount of alkalai eventually increases GL conversion from 2 to 21 %. However, the change in the ratio of KOH : Cu-ZnO from 3 to 6 mol leads to a twofold decrease in the selectivity between PG and LA with almost unchanged conversion of GL.

Increasing of the hydrogen pressure from 1 MPa to 5 MPa was found to change GL conversion from 14 to 33 % and PG yield from 9 to 30 %. During the experiment, GL conversion and PG yield were rising with the use of *in situ* formed Cu-ZnO-DP and after 48 hours achieved 81 and 77 %, respectively.

The activity of the Cu-DP and the Cu-ZnO-DP was determined to be comparable to Cu-Cr_2O_3 catalyst widely used in industry.

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INVESTIGATION OF THE DEPRESSOR ADDITIVE EFFECT ON THE POUR POINT OF SYNTHETIC AND MINERAL COMPRESSOR OIL

A. V. Saprygina
Scientific supervisor – assistant teacher I. A. Bogdanov
Linguist – assistant teacher I. A. Bogdanov

National Research Tomsk Polytechnic University
Russia, Tomsk, Lenin Avenue, 30, avs303@tpu.ru

Compressor oils prevent wear of mechanisms and ensure compatibility with seal materials. Under the temperature conditions of the Russian Federation, oils must be resistant to low temperatures conditions. Depressants are used to improve the low-temperature properties of oils.

In this work, a comparative assessment of the low-temperature properties of synthetic and mineral compressor oils with the addition of different concentrations of depressant additives (DA1 and DA2) was made.

The amount of additives added to the oils was 0.5 and 1.0 ml per 100 ml of oil, in order to determine the concentration that has the best effect on the pour points of the oils.

The initial pour point of synthetic compressor oil was –54 °C, of mineral compressor oil was –13 °C.

Table 1. Results of determining the pour point of synthetic compressor oil with additives

Characteristics	DA1 0.5 ml	DA1 1.0 ml	DA2 0.5 ml	DA2 1.0 ml
PP, °C	–52	–59	–51	–61
Δ PP, °C	↑2	↓5	↑3	↓7

Table 1 shows the results of determining the pour point (PP) of synthetic compressor oil after adding pour point depressants according to the requirements of the standard [1].

Based on the data presented in Table 1, we can conclude that when adding 0.5 ml of additive per 100 ml, the pour point of oils changes slightly. A further increase in the concentration of additives leads to an improvement in their efficiency in relation to PP (the highest decrease in the pour point was 7 °C).

Table 2 shows the results of determining the PP of mineral compressor oil after adding pour point depressants according to the requirements of the standard [1].

From the data in Table 2, we can conclude that in the case of mineral compressor oil, depressants work more efficiently. The highest change in the pour point is observed at a concentration of 1.0 ml of DA2 per 100 ml of oil (decrease in the pour point by 23 °C).

Table 2. Results of determining the pour point of mineral compressor oil with additives

Characteristics	DA1 0.5 ml	DA1 1.0 ml	DA2 0.5 ml	DA2 1.0 ml
PP, °C	–28	–32	–29	–36
Δ PP, °C	↓15	↓19	↓16	↓23

Table 3. Characteristics of compressor oil samples

Characteristics	Synthetic oil	Compressor oil
Density in 70 °C, g/cm^3	0.957	0.825
Sulfur content, mg/kg	160	0

The obtained results indicate that compressor oil composition effect on the effectiveness of depressants and that is why need to select the optimal concentration of additives.

In the case of synthetic oil, the pour point depressant worked less effectively, in the case of mineral oil, a significant effect is observed at both concentrations of the pour point depressant. This effect of the pour point depressant is due to differences in the composition of the oils (Table 3). Compressor mineral oil is lighter than synthetic, in addition, it does not contain sulfur compounds, which, being heteroatomic compounds, reduce the effectiveness of additives.

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COMPARISON OF THE EFFECTS OF N-PARAFFINS AND PETROLEUM RESINS ON EFFIECTIVENESS OF DEPRESSOR ADDITIVES

S. E. Shafer, A. M. Orlova, K. M. Titaev
Scientific supervisor – postgraduate student A. M. Orlova

National Research Tomsk Polytechnic University
634050, Tomsk, Lenin Ave., 30, ses17@tpu.ru

The data presented in [1, 2] indicates an increase in the production and consumption of diesel fuel (DF) from 2017 to 2022. At the same time, the issue of increasing the production volumes of low-freezing DF for the northern and Arctic regions does not lose its relevance. From the economic and technological point of view, the most preferable way to produce low-freezing DF is the addition of depressor additives (depressors).

However, the using of depressor additives does not always allow achieving the required low-temperature properties of DF. In order to increase the