motor (MON) and research (RON).

In this work, we used the computer modeling system «Compounding». This system helps us calculated not only the octane numbers of different flows, but also analyze their properties. Based on the obtained results on properties and octane numbers of flow, blends of «Regular-92», «Mid-grade-95» and «Premium-98» gasoline were calculated (Table 1).

In conclusion, we can note that «Regular-92», «Mid-grade-95» and «Premium-98» gasoline, blended according to the developed formulation meet all the requirements of the Russian Federation gasoline quality standards.

References

1. *GOST R 51866-2002 «Motor fuels. Gasoline unleaded. Specifications».*
2. *TR TS 013 2011 «Requirements for automobile and aviation gasoline, diesel and marine fuel, jet fuel and fuel oil».*

STUDYING OF RAW MATERIALS COMPOSITION AND PROCESS TEMPERATURE ON THE PRODUCTION OF DIESEL FUEL OF DIFFERENT GRADES

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This paper considers the influence of feed composition and temperature in the reactor on the diesel fuel dewaxing process in terms of the grade of diesel fuel obtained.

The process of catalytic dewaxing is intended for improving various parameters of the hydrocarbon feedstock at low temperatures. One indicator is the limiting temperature of filterability. The limit of filterability temperature is the temperature at which 20 ml sample volume of diesel fuel does not have time to pass through the wire mesh in less than 20 s [1, 2].

The features of the dewaxing process: low pour point of the products; high stability of the products; good cetane properties of the products; constant product quality throughout the cycle; minimum viscosity reduction compared with other processes; flexibility, which allow to produce oil components and process oil distillates at the same unit [3].

Table 1. Composition of raw materials

	1, wt.%	2, wt.%	3, wt.%
N-paraffins C_{10}–C_{27}	16.46	14.86	19.19
N-paraffins C_5–C_9	2.22	0.60	1.15
Olefins	0.45	1.98	2.50
Naphthenes	38.34	39.85	38.91
I-paraffins	21.90	22.70	18.25
Aromatics	20.60	19.94	20.02

The calculations of the influence of feed composition and temperature on the diesel fuel dewaxing process were carried out using the mathematical model of catalytic dewaxing process based on the data derived from the refinery. The influence of tn-paraffins content and process temperature on the filterability limit temperature were studied. The grade of the fuel differs in terms of the filterability limit temperature.

The compositions of the raw material for research are presented in Table 1.

After studying the influence of n-paraffin content in the feedstock and determining the necessary temperature for the required fuel grade, we got functionality shown in Figure 1.

In the figure you can see that the dewaxing

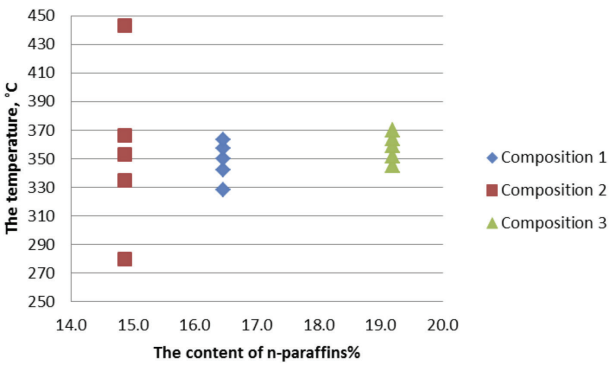

Fig. 1. *The temperature dependence on the content of n-paraffins*

process temperature rises with the increase of fuel grade. Also, the temperature of the dewaxing process rises by 15 °C with the increase of the n-paraffins content by 2 %. Maintaining of the optimal dewaxing process temperature depending on the feedstock composition allows producing a variety of fuels classes from 0 to 4 class.

Thus, it can be concluded that with an increase in fuel grade to achieve the desired low temperature characteristics, the temperature must be increased.

References

1. *"The Cold Filter Plugging Point of Distillate Fuels, "a European Test Method, CEC Report, 1974.– P.1–74.*
2. *Coley T., et al., "New Laboratory Test for Predicting Low-Temperature Operability of Diesel Fuels, " J. Inst. Petroleum, June 1966.– Vol.52.– №510.*
3. *Belinskaya N., Ivanchina E., Ivashkina E., Frantsina E., Silko G. Mathematical model of straight run diesel catalytic hydroisomerization // IOP Conference Series: Earth and Environmental Science, XVIII International Scientific Symposium in Honour of Academician M.A. Usov: Problems of Geology and Subsurface Development, PGON 2014" 2014. Article number 12030.*

MECHANICAL AND PHYSICAL PROPERTIES OF NORBORNENE-BASED COLOLYMERS

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Nowdays, major current focus on obtaining of polymers with improved properties. This production is impossible without the use of new monomers. One of the up-to-date and universal methods of the polymers synthesis is Ring Opening Metathesis Polymerization (ROMP). Ruthenium catalysts allow the using of such monomers as norbornene, dicyclopentadiene, cyclooctene and others with the preservation of the activity of functional groups [1].

At the present time, polymers based on norbornene and it's functional derivatives attract particular practical interest. Due to their unique properties such as transparency, chemical resistance, high adhesive and insulating properties [2]. One of such functional derivatives of norbornene is dimethyl esters of bicyclo [2.2.1] hept-5-ene-2,3-dicarboxylic acid (DME) was synthesized during this work. Initial reagents for DME are dicyclopentadiene and dimethylmaleate which are by-product of petroleum pyrolysis. According to Diels Adler's reaction, a mixture of isomers of exo, exo- and endo, endo-DME is formed in an amount of 40 and 60 % by weight, respectively.

A polymer based on a DME blend has a non-stereoregular linear structure of the polymer chain. In this connection, the material has insufficiently high physical and mechanical properties, and is soluble in chloroform and acetone. To increase the polymer strength, temperature stability and resistance to aggressive media, it is possible to add bi-functional co-monomers to DME having two norbornene fragments in their structure that open up during the ROMP process and form a reticulated polymer structure.

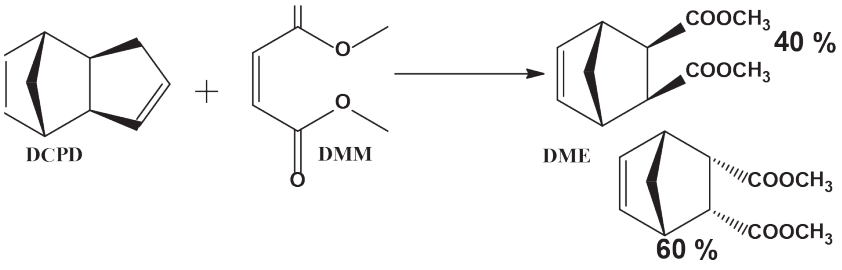

Fig. 1. *Scheme of synthesis of a mixture of exo, exo and endo, endo dimethyl esters of norbornene-2,3-dicarboxylic acid (DME)*