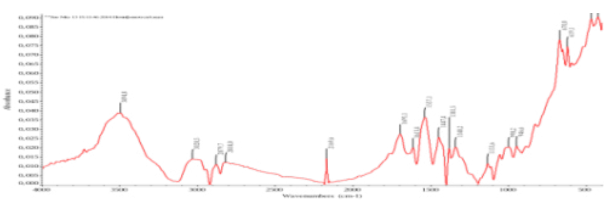

Fig. 1. *IR-spectrum of polyphenol leaf from urtica dioica L.*

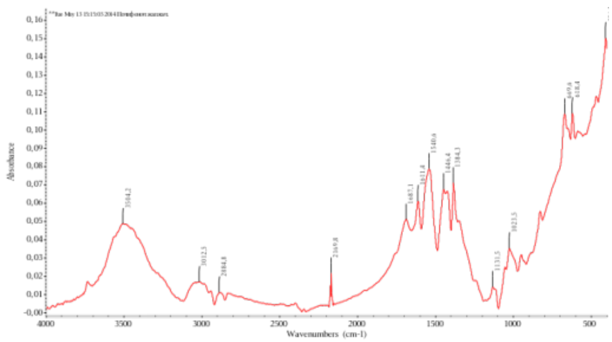

Fig. 2. *IR-spectrum of isolated polyphenol is olated*

of the visible region. The entire IR zone is a conventional electron and oscillatory transformation, in the range of 4000–12500 cm^{-1} wavelength range, in the range of 625–4000 cm^{-1} in the range of molecules oscillating, in the range 50–625 cm^{-1} with rotational fluctuations distant regions.

References

1. *Safarinejad M.R. // Urtica dioica for treatment of benign prostatic hyperplasia: a prospective, andomized, double-blind, placebo-controlled, crossover study. J Herb Pharmacother, 2005.– №5.– 1–11p.*
2. *Eskaliyeva B.K. Phitopreparattar zhane tabigi biologialyk belsendi zattardyng khimisiasy.– A.: 2013.– P.57–68.*
3. *Burasheva G.S., Eskaliyeva B.K., Umbetova A.k. Tabigi kosylystar khimiasynyng negizderi.– A.: 2013.– P.22.*
4. *Klintsevich V.N., Tumash V.YU., Flyurik Ye.A. // Mezhdunarodnyy studencheskiy nauchnyy vestnik, 2015.*

THE INFLUENCE OF ZEOFORMING PROCESS TEMPERATURE ON THE PRODUCTS COMPOSITION

A.A. Altynov, I.A. Bogdanov

Scientific adviser – PhD, associate professor M.V. Kirgina

Linguistic advisor – PhD-student A.A. Altynov

National Research Tomsk Polytechnic University 634050, Russia, Tomsk, 30 Lenin Avenue, andrey_altun@mail.ru

The most promised processes for the oil refining at the moment are processes that use zeolites as catalysts. The zeolites popularity as a catalyst is due to a number of factors – low cost, stability and resistance to catalytic poisons. Process for the production of high-octane gasoline components which uses zeolites as a catalyst, it is the Zeoforming. The purpose of this work is to consider how the process temperature effects on the products composition, as well as to determine the optimum temperature of the process, in terms of involving zeoformats in gasoline blending.

Table 1. Composition of feedstock and products

Sample	SGC % vol.	Zeoformat at a temperature, % vol.		
		375 °C	400 °C	425 °C
Aromatics	0.62	10.26	24.07	25.25
Olefins	1.14	4.81	4.31	3.62
Naphthenes	19.35	7.74	9.37	6.29
Iso-paraffins	38.25	43.94	37.86	38.98
N-paraffins	40.64	33.25	24.36	25.86
Benzene	0.17	0.07	3.94	4.17

Table 2. Gasoline blending recipes

Component content, % wt.	Gasoline brand		
	RON-92	RON-95	RON-98
Zeoformat 375 °C	75	65	55
Alkylate	5	10	15
Toluene	20	25	30

Table 3. Gasoline properties

Parameter	Gasoline brand			Requirements [1, 2]
	RON-92	RON-95	RON-98	
RON/MON	92.5/85.2	95.6/87.8	98.7/90.5	92/83; 95/85 98/88
SVP, kPa	95.6	85.0	74.4	35-100*
Density at 15 °C, kg/m^3	726.4	735.8	745.2	725-780
Benzene, % vol.	0.13	0.14	0.16	>1**
Aromatics, % vol.	24.03	27.32	30.73	>35**

**in the winter and off-season; **for 3–5 emission class*

The Zeoforming process was implemented in a laboratory catalytic unit under varying temperature conditions. Stable gas condensate (SGC) was used as the process feedstock, the feedstock volume flow rate was 2 h^{-1}, the pressure was 2.5 MPa, and the process temperature was varied between 375–425 °C with increments of 25 °C. The composition of feedstock and products were determined by gas chromatography. The results are presented in Table 1.

From the results presented in Table 1, it follows that with increasing process temperature, the aromatic hydrocarbons content in the products increase, incidentally benzene content. This effect is explained by increase in the rate of target reactions of naphthenes dehydrogenation and paraffins dehydrocyclization. In addition, from the results presented in Table 1 it follows that the most promised for the gasoline production is a product obtained at a temperature of 375 °C – for this zeoformat are observed the highest content of high-octane iso-paraffins and the lowest content of benzene and aromatic hydrocarbons, the content of which in commercial gasolines is restricted [1, 2].

To confirm the obtained results, using the software “Compounding” [3] and additional blending components (alkylate, toluene), recipes for production gasoline were developed (Table 2). The gasoline properties, obtained according to the developed recipes, are presented in Table 3.

From the results presented in table 3, it follows that gasolines produced according to the developed recipes meet the requirements of the standards [1, 2].

References

1. *USS 32513-2013 “Automotive fuels. Unleaded petrol. Specifications” [Electronic source].– URL: http://docs.cntd.ru, free access.– Accessed date: 03.02.2019.*
2. *Technical Regulations of the Customs Union TR CU 013/2011 “On requirements for automobile and aviation gasoline, diesel and marine fuel, jet fuel and heating oil” TR CU 013/2011. [Electronic source].– URL: http://docs.cntd.ru, free access.– Accessed date: 03.02.2019.*
3. *Kirgina M.V., Sakhnevich B.V., Maylin M.V., Ivanchina E.D., Chekantsev N.V. Development of intelligent computer system to support the process of motor fuels production. News of higher educational institutions.– Series: Chemistry and Chemical Technology, 2014.– Vol.57.– Is.11.– P.84–86. [in Rus.]*