Table 1 – Physico-chemical characteristics of Ni / Al-HMS-bentonite catalysts with a Si/Al ratio = 20

Catalyst	SSA, m^2/g	D_{pores}, nm	V_{pores}, cm^3/g
Ni/Al-HMS(20)-bentonite	570	4,1	0,8

As follows from the data of Figure 1, the nitrogen adsorption/desorption isotherm for the Ni/Al-HMS (20)-bentonite sample is characterized by a slightly wide hysteresis loop. Nickel promotion of catalysts based on mesoporous aluminosilicate leads to significant changes in the structural characteristics of the catalyst compared to the nitrogen adsorption/desorption isotherm for the Al-HMS (20) sample [20]. There are three peaks observed on the pore effective diameters distribution curve: one of which corresponds to the mesoporous aluminosilicate, the second - to bentonite and the third - to the promoting additive. The sample under study is characterized by a high specific surface area, which is of 570 m^2/g.

Hexadecane was used in order to establish the mechanism of heavy petroleum residues hydroisomerization in the presence of a composite based on the mesoporous aluminosilicate and bentonite, promoted by nickel.

Process of hexadecane transformation on the compositeon a basis of the promoted mesoporous aluminosilicatewas studied in a temperature interval of 300-450 °C, at a feed rates – 1 h^{-1}, under hydrogen pressure and at a hydrogen/raw materials ratio of 100 (vol.). The experimental data are provided in tables 2, 3.

Table 2 – The action of the temperature on the group hydrocarbon-type content of the products of hexadecane transformation on the Ni/Al-HMS(20)-bentonite composite, Wfeed rate = 1,0 h^{-1}, P_{H2}= 3 MPa

№	Hydrocarbon-type content	Content by mass %		
		300 °C	350 °C	450 °C
1	N-paraffins	31,98	36,39	43,02
2	Isoparaffins	45,23	39,76	12,41
3	Arenes	5,20	8,25	7,16
4	Naphthenes	8,66	8,41	15,83
5	Olefins	5,23	4,10	14,98
6	Dienes	0,70	0,80	5,30
7	Cycloolefins	2,25	2,04	0,67
8	Cyclodienes	0,75	0,25	–

From the experimantal data obtained (table 2) it is seen that isomerization process is the main direction of hexadecane transformation under the conditions of low-temperature alumiosilicate catalysis (300 °C). It also should be noted that isometric structures of hexadecane are obtained due to isomerization process, without cracking participation. As the temperature rises from 300 to 350 °C