make up the initial diesel fractions into branched isomeric hydro-carbons. As the acidic components of hydroisomerization catalysts, mesostructured aluminosilicates are of interest due to their structural features, since their pore size exceeds the size of most of the molecules that make up the feedstock. In addition, the acidity spectrum of mesoporous aluminosilicates can be varied both at the synthesis stage and by modifying already prepared materials [3,5,8-11]. In addition, platinum and palladium impart dehydro-genating properties to the catalysts, but they are not resistant to the toxic effect of contact poisons present in the diesel fraction. To address this issue, it is proposed to use catalysts promoted with metals such as Ni and Mo. This is due to the fact that the catalysts based on them have a high hydrogenating activity even with a significant sulfur content in the feedstock.
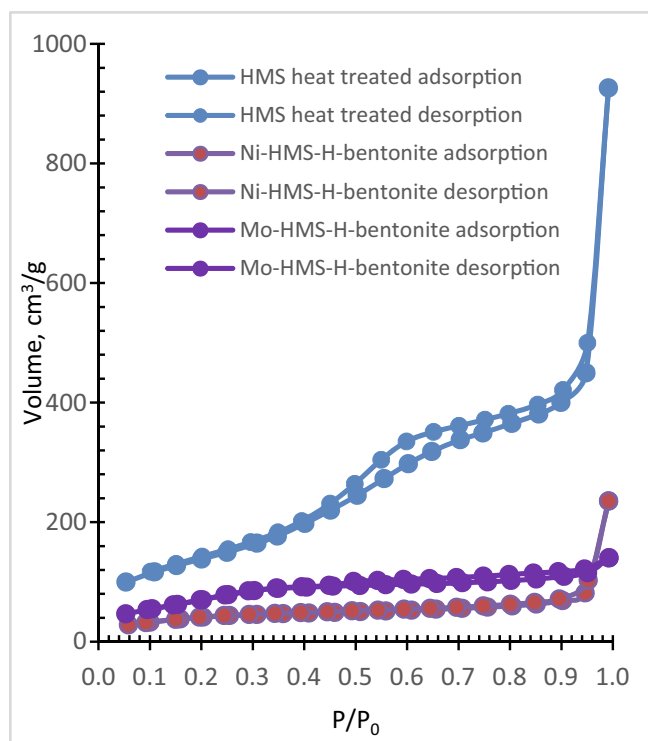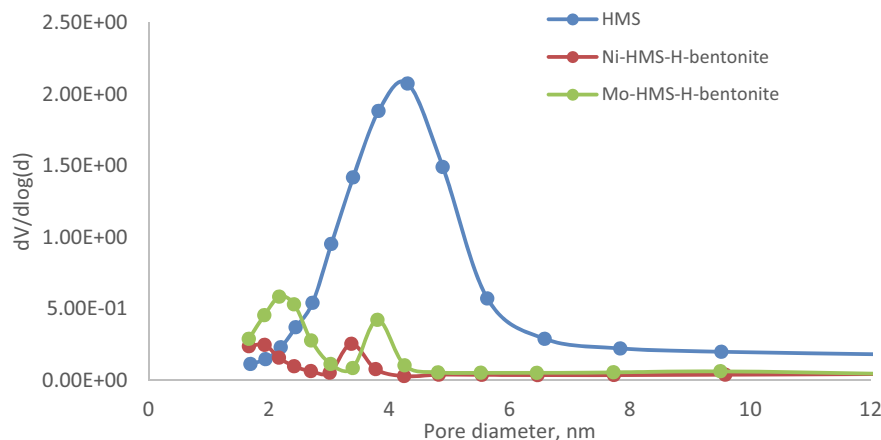
The aim of this work is a comparative analysis of bifunctional catalysts based on mesoporous aluminosilicate promoted with nickel and molybdenum during hydroisomerization of n-hexadecane.

2. Experimental part

In order to synthesize mesostructured aluminosilicates (HMS) with a high aluminum content, the copolycondensation method of $Si(OC_2H_5)_4$ tetraethylorthosilicate and aluminum secondary butoxide (*sec*-BuO)$_3$Al were used [10,12]. In this method, hexade-cylamine was used as a structure-forming template. The obtained sample became one of the components of the bifunctional catalyst carrier and was mixed with bentonite of the Tagan deposit (East Kazakhstan region), which was used as a binding agent (35% HMS and 65% H-bentonite). The synthesis of bifunctional mono-metal catalysts, 5% Ni/HMS-H-bentonite, and 1% Mo/HMS-H-bentonite, were prepared using wet impregnation techniques.

The characteristics of the porous structures of the synthesized samples and the surface area of the BET were determined using the standard method of nitrogen adsorption/desorption using a Quanta ChromeAutosorb-6 sorptometer.

The ordering of the porous structure of the synthesized materials was analyzed using the method of X-ray small angle scattering. X-ray diffraction patterns were taken on a Rigaku D/MAX 2200 diffractometer with a Cu K radiation source.

The Lewis/Brønsted acid centers in the synthesized catalysts were determined using diffuse reflectance infrared Fourier transform spectroscopy (DRIFTS) on PerkinElmer Spectrum One instrument.

The process of catalytic conversion of n-hexadecane was carried out in a laboratory setup with a fixed-bed catalyst under hydrogen in the temperature range of 280–340 °C; feed rates were $1\,h^{-1}$, hydrogen/raw materials ratio equal to $1000\,nm^3/m^3$, hydrogen pressure in the reactor is of 3 MPa. Analysis of liquid products was carried out on the "Crystal 5000″ chromatograph with linear programming of the temperature from 35 °C to 250 °C.

3. Results and discussion

Nitrogen adsorption/desorption isotherms on all the studied samples (Figs. 1 and 2) are of type IV according to the classification of Brunauer, Emmett and Teller, the presence of a hysteresis loop in it, as well as a narrow pore size distribution indicate their ordered pore structure in the mesoporous range [11]. As follows from the

Fig. 1. Nitrogen adsorption/desorption isotherms of support material and Ni, Mo impregnated catalysts.

Fig. 2. Pore-size distributions of HMS, Ni/HMS-H-bentonite and Mo/HMS-H-bentonite.