

Table 1
Physical properties of the catalysts.

Samples	SSA, m ² /g	Pore Volume, cm ³ /g	Mean pore diameter, nm
HMS	511.0	1.469	3.82
5% Ni/HMS-H-bentonite	151.7	0.3565	1.67
1% Mo/HMS-H-bentonite	283.6	0.2166	2.17

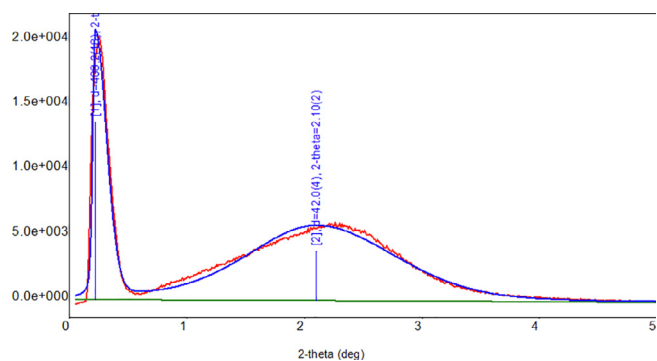


Fig. 3. Low angle XRD patterns of HMS support.

data in Fig. 1, the nitrogen adsorption/desorption isotherm for the HMS sample is characterized by a wider hysteresis loop, as compared to the Ni/HMS-H-bentonite and Mo/HMS-H-bentonite samples, which is probably due to the presence of larger pores in the HMS. The promotion of samples of catalysts based on mesoporous aluminosilicate by nickel and molybdenum leads to significant changes in the structural characteristics of the catalyst (Fig. 2). On the pore size distribution curve by effective diameters, three maxima are observed, one of which corresponds to mesoporous aluminosilicate, the second - to bentonite and the third - to the promoting additive. The surface area, average pore diameter and pore volume decreased from 511 m²/g to 151.7 m²/g, from 3.82 nm to 2.17 nm and from 1.47 cm³/g to 0.21 cm³/g, correspondingly, as a result of impregnation of Ni and Mo (Table 1). These results showed that most of the Ni and Mo was penetrated into the mesopores and deposited on the pore surface of this catalyst. This was also facilitated by a shift in the pore size distribution towards smaller pores as a result of impregnation of Ni and Mo. These results showed that some nickel was deposited on the outer surface of the HMS for Ni/HMS-H-bentonite and Mo/HMS-H-bentonite.

To confirm the mesoporosity and ordering of the porous structure of the synthesized materials, the X-ray scattering method was used. As an example, Fig. 3 shows X-ray diffraction patterns of small-angle scattering of mesoporous samples of HMS support, according to which the presence of pronounced peaks in the range

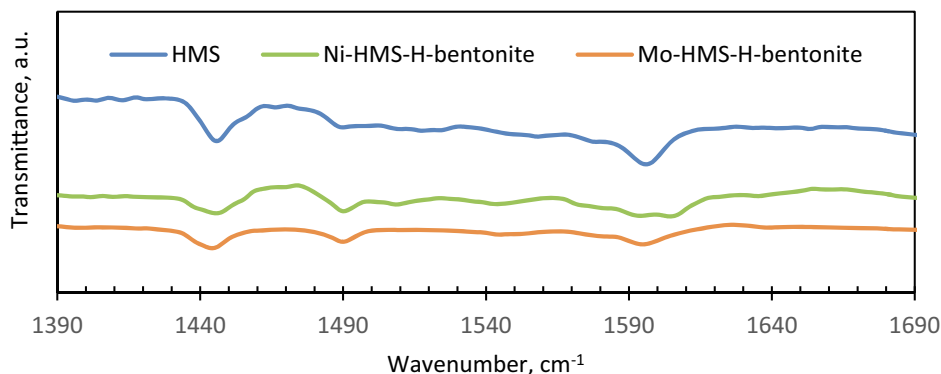


Fig. 4. DRIFTS spectra of pyridine adsorbed on mesoporous aluminosilicate and bifunctional catalysts based on it.

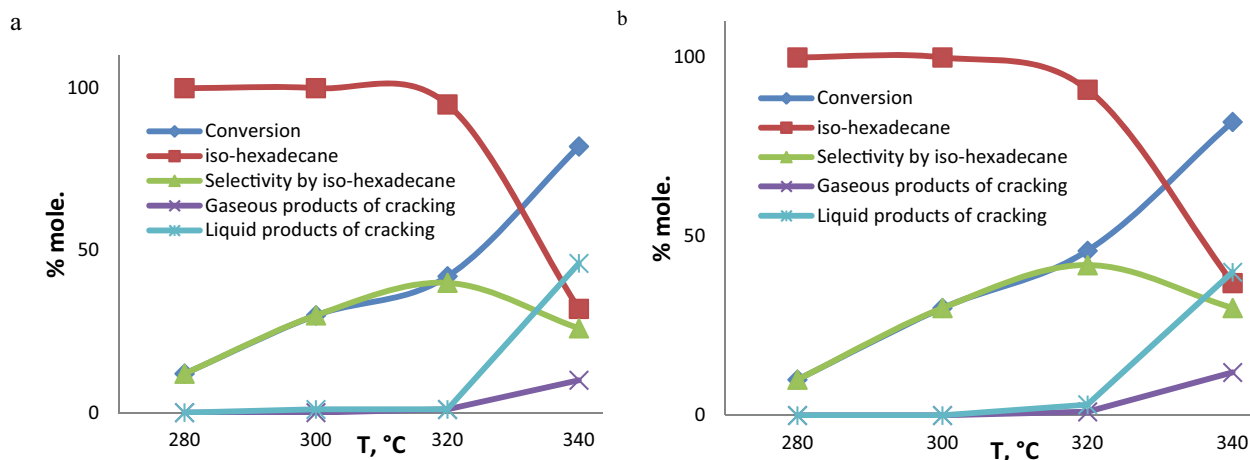


Fig. 5. Catalytic activity of (a) Ni/HMS-H-bentonite and (b) Mo/HMS-H-bentonite during the conversion of n-hexadecane.