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Investigation of the activity catalytic system of the Pr/NH_4(ZSM) in the conversion of *n*-hexane

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Abstract

Due to the rapid growth of consumption of high-quality, environmentally friendly motor fuels and the exhaustion of oil reserves, the modernization of existing technologies and processes for the production of high-octane gasoline remains relevant. One of these processes, which allows to obtain fuels that meet environmental standards, is the process of catalytic reforming.

This work is devoted to the study of the activity of the pure carrier – NH_4(ZSM) and the catalytic system Pr/NH_4(ZSM) (the amount of praseodymium is 0.7% wt.) Prepared by the impregnation method based on pure zeolite NH_4(ZSM) (*n*-hexane transformation). The analysis of the obtained conversion products was performed by gas-liquid chromatography. The activity of the catalyst was evaluated according to parameters such as the degree of conversion of raw materials, the selectivity of the formation of products. On the basis of experimental data, it was shown that when *n*-hexane is converted on a catalyst in an air flow, high-octane components of the fuel can be obtained. As a result of systematic studies of pure NH_4(ZSM), it was shown that with an increase in temperature, the conversion of *n*-hexane to 99.6% at a temperature of 500 ºC increases. The introduction of praseodymium into the catalyst leads to a redistribution of the number of acid and metal reaction centers, which is accompanied by a maximum conversion rate of 99.5% at a temperature of 350 ºC, an increase in the proportion of aromatic and gaseous compounds in the conversion products. As a result of the conversion of *n*-hexane on the two systems, valuable gaseous and liquid products were obtained.

All liquid products obtained at different temperatures have large octane number values, which is explained by the high content of isomer products at low temperatures of the experiment and aromatic products at high temperatures of the experiment.

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