

Product selectivity and aromatics distribution in aromatization of propane and butane fraction over Ga and Zn zeolite

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Lower paraffins, such as propane and butane, are contained in natural gas, formed as byproducts in Fischer-Tropsch synthesis of hydrocarbons in gasoline and diesel fuel production. The hydrocarbons produced in the FT process are predominantly linear. The linearity of the hydrocarbon chains significantly influences the quality of the diesel and the gasoline. The production of aromatics in the FT process at low temperatures is very low, C₃/C₄ hydrocarbons production is high. FT products are sulphur and nitrogen compounds free. The synthetic gasoline had an insufficiently octane number, which after addition aromatic concentrate increased.

Influence of duration of operation and regeneration cycles on the product selectivity, distribution of aromatics in the aromatization of propane and butane fraction over Zn and Ga ZSM type zeolite has been thoroughly investigated. The propane and butane fraction-to-aromatics conversion, product selectivity and the distribution of aromatics are influenced by the reaction time and regeneration.

Zn and Ga zeolite shows high activity and selectivity in butane aromatization and low activity in propane aromatization at temperature 550-580 °C, pressure 0,3 MPa and space velocities 270-500 h⁻¹. The conversion and the selectivity to aromatic hydrocarbons over the Ga-ZSM catalyst were higher than that of the Zn-ZSM catalyst. The butane conversion and selectivity to aromatic hydrocarbons over the catalysts decreased slightly with time. The decrease in the butane conversion and aromatic selectivity could be due to the coke formation over the strong Bronsted acid sites. The activity of the Ga catalyst is restored after regeneration.