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# *Comparison the kinetics for cracking and hydro-cracking of n-heptane over USY- Zeolite catalysts*

*A project*

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## *Abstract*

The optimization of catalytic processes including cracking and hydro cracking had been investigated over the years. So many studies were focused on the optimization of reaction condition (i.e. pressures and temperatures) and/or other operating conditions. Recently, the research goes in the direction of optimizing the catalyst function, which is seen to be the main factor can enhance the production yields of catalytic processes. Type USY-Zeolite catalyst was applied in this project as it is seem to be an ideal cracking catalyst according the review of the literature. Data of cracking and hydro-cracking of n-heptane over four different structure types from USY-Zeolite catalyst – that treated by using steaming dealumination – were carefully selected and employed to make the comparison of the kinetics between both catalytic processes.

The effect of changing the catalyst structure on it is performance throughout both endothermic cracking and exothermic hydro-cracking reactions under the same operating conditions were investigated. The obtained cracking results over these catalysts have shown that the overall conversion especially the isomer hydrocarbon conversion was extensively increased during the hydro-cracking reactions along with increasing the rate of reactions and decreasing the activation energies, when compared with cracking reactions.

In spite of the similar USY-Type zeolite catalyst was used, but improvement of catalyst structure via post synthesis modification was led to supply widely different products from the smaller chain hydrocarbon components in both catalytic processes, which can be related to provide a new mechanism to the reactions and to change the reaction kinetic by means of using different structure types from USY-Zeolite catalysts.