Strategic Design of Zeolite Catalyst for Stabilized Performance on Hydrocarbon Related Conversion

김성탁[1,2,†]
[1]충남대학교; [2]응용화학공학과
(sunnykim@cnu.ac.kr[†])

Deactivation of zeolite-based catalysts by coke formation during chemical conversion of carbon related materials, such as CO, CO2, CH4, olefins, paraffins, alcohol, and so on, is unavoidable and challenging. One strategy to overcome coking is the synthesis of nano-sized or hierarchically structured zeolite crystals by an alkali treatment or bottom-up synthesis to improve the diffusivity of the reactants to the active sites. Another strategy is controlling the amount of acid sites, especially Brønsted or Lewis acid sites, by either increasing the Si/Al ratio during zeolite synthesis or via ion exchange with metal cations to prevent the adsorption of the hydrocarbon intermediates formed during those reactions. On top of that, metal promoter enables to modify acid-base properties of the zeolite catalysts, thereby leading to suppress the catalyst deactivation by coke formation. Particularly, Gadolinium (Gd) promoted zeolite catalysts have been shown to have excellent anti-coking abilities.