

Adsorption behaviors of olefins and paraffins on zeolite 13X pellets

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Olefins, especially C_3H_6 and C_2H_4 , are one of the most important products in the petrochemical industry. Since these materials are mainly produced by steam cracking of naphtha, additional separating processes are indispensable. Due to their similar physical properties, these processes are bound to be complicated. Conventional separating method for these mixture is a cryogenic distillation, which is highly energy-intensive process. Therefore, numerous studies have been conducted to develop a low energy consumption process, and the cyclic adsorption process was considered as a possible alternative.

In this study, adsorption behaviors of the olefins and paraffins on zeolite 13X pellets were investigated. Adsorption isotherms of C_3H_8 , C_3H_6 , C_2H_6 and C_2H_4 gases on zeolite 13X was measured via a volumetric method at temperatures from 303 to 343K, then well correlated with Isotherm models. Accordingly, isosteric heat of adsorption of them were calculated. Adsorption kinetics for each gas were also evaluated by applying non-isothermal sorption model to experimental uptake. The results could contribute to design cyclic adsorption processes using zeolite 13X for olefin separation.