

Vapor Phase Adsorption of m-Xylene Using Organically Modified Montmorillonite

유천용, 여상도*
경북대학교 화학공학
(syeo@ac.kr*)

m-Xylene vapor was adsorbed to non-modified montmorillonite as well as to organically modified montmorillonite. HDTMA was used to modify the surface of the clay (organoclay). In adsorption experiments, the organoclay along with the non-modified (washed) clay were used. m-Xylene was adsorbed from gaseous phase (nitrogen) using a fixed adsorption bed. The adsorption breakthrough curves and the adsorption isotherms were determined at three different temperatures (24, 34, and 44 °C). The adsorption data were modeled with the Langmuir and BET isotherm equations. It was found that the isotherm for non-modified clay exhibited a favorable Type I behavior which imply the adsorption capacity is strongly dependent on vapor concentration at low concentration range. For the organoclay, isotherms showed a slightly favorable Type II behavior with a reduced adsorption capacity at low concentrations and exhibited a linear increase at elevated vapor concentrations. The desorption profiles of m-Xylene exhibited a plateau section. The profiles at high initial loading exhibit two down steps. The first down step is sharp, followed by a plateau, and then by a second step exhibiting a tail.