

Vapor Phase Adsorption of Trichloroethane Using Organically Modified Montmorillonite

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Trichloroethane vapor was adsorbed to organically modified montmorillonite (organoclay). HDTMA was used to modify the surface of the clay, and three types of organoclays were prepared which have different HDTMA loadings. In adsorption experiments, the three organoclays along with the non-modified (washed) clay were used. TCA was adsorbed from gaseous phase (nitrogen) using a fixed adsorption bed, and 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 organoclays, isotherms showed a slightly favorable Type III behavior with a reduced adsorption capacity at low concentrations and exhibited a linear increase at elevated vapor concentrations. Desorption of TCA from clays was also performed using pure nitrogen, and desorption profiles were fitted with a theoretical model.