

고정층 흡착탑에서 열전달 계수의 영향과 톨루엔의 흡착 및 열재생

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**The Effect of Heat Transfer Coefficient and Adsorption and Thermal
Regeneration of Toluene in the Fixed Bed**

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초 록

Gas phase adsorption is a separation process which finds varied industrial application. Removal of volatile organic compounds (VOCs) from air by a separation process is common engineering practice. Adsorption has been widely recognized as an effective means of controlling emissions to the atmosphere and, in some applications, of recovering recyclable materials from process exhaust streams. Solvent recovery process is a particularly common application of adsorption for VOCs emission control.

First, these effects of heat transfer parameters in a fixed bed were experimentally and theoretically elucidated by the hot nitrogen heating. And then, the adsorption and thermal regeneration (hot purge gas) dynamics of toluene in the fixed bed were studied experimentally and theoretically. Adsorbents, activated carbon and DAY-zeolite, were used and compared each other to measure adsorption capacity and regeneration of adsorbents for operating conditions. DAY-zeolite requires the lower energy than that of activated carbon in hot purge regeneration, while DAY-zeolite had a smaller adsorption capacity for toluene than that for activated carbon. Parameters of regeneration of a fixed bed adsorber were investigated such as initial bed condition, the quantity of regeneration required, the total energy required, and the total regeneration time. Regeneration time was not affected by changes in feed concentration during the adsorption step. Therefore, data of regeneration gathered at one concentration should be applicable to other concentrations within a reasonable range, and more efficient use of regeneration energy is made by a heavily loaded bed.