

Adsorption dynamic characteristics and simulations in a layered bed for hydrogen mixtures

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Adsorption characteristics in a layered bed packed with activated carbon and zeolite 5A were studied experimentally and theoretically through the breakthrough experiments of binary (H_2/CO , H_2/CO_2) and ternary ($H_2/CO/CO_2$) mixtures. The effects of adsorption pressure, feed flow rate, and carbon-to-zeolite ratio on the breakthrough curve were observed. In this study, the energy balance was essential to the prediction of the adsorption phenomenon. The results predicted with a mathematical model agreed well with the experimental data. As a result, it is important to determine the optimum carbon ratio in PSA process because the change of carbon ratio might yield a great many different results.