

Adsorption Dynamic Characteristics and Optimal Design of Layered Beds for Multicomponent System

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In order to optimize the performance of an adsorption bed, the adsorption dynamic characteristics were studied for multicomponent system ($H_2/CO_2/CH_4/CO$) on nonisothermal and nonadiabatic conditions. Also, in order to maximize the utilization of adsorbents, layered beds containing two different adsorbents are used for multicomponent separation. The adsorption bed in layered with activated carbon followed by zeolite 5A for hydrogen separation is used in this study. While a single rollup in each breakthrough curve is common for the pure adsorbent beds, double and multiple rollups are common with layered beds. Under the conditions of this study, combined thermal and concentration waves prevail for all components. All experimental features have been predicted by the model considering linear driving force model and Dual-Site Langmuir adsorption isotherm model.