

Study of a Two-Bed Pressure Swing Adsorption Process for Hydrogen Separation onto Activated Carbon

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A two-column pressure swing adsorption (PSA) process with pressure equalization step was considered to study separation of hydrogen from H₂/CH₄(60vol%/40vol%) binary system onto activated carbon(6~16mesh) adsorbent on nonisothermal and nonadiabatic condition. The effects of the feed flowrate and the P/F ratio on the process performance were evaluated. PSA process simulation studied to find optimum condition. The mathematical model includes the mass and heat balance, the linear driving force (LDF) equation, and the loading ratio correlation (LRC) model representing the multi-component adsorption equilibrium. In the results of simulation, 22LPM feed flowrate, 200sec adsorption time, 11atm adsorption pressure and 0.08-0.12 P/F ratio might be optimal values to obtain more than 80% recovery and 99% purity hydrogen.