

Adsorption Equilibrium and Thermal Regeneration of Acetone Vapor in Activated Carbon and Dealuminated Y-zeolite

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Adsorption and regeneration experimental studies of acetone from nitrogen gas stream were made using a fixed bed of activated carbon and DAY-zeolites respectively. A nonequilibrium, nonadiabatic, nonadiabatic computer model was used to simulate temperature and effluent concentration data of adsorption and hot nitrogen purge regeneration. The heat transfer resistances were estimated by heating clean bed at various nitrogen temperatures and flow rates. A linear driving force mass transfer model was used to provide an acceptable fit to the measured data. Experimental and modeling results were used to study a comparison an activated carbon with DAY-zeolites which is considered as an alternative adsorbent. Regeneration parameters studied were purge gas velocity, regeneration temperature, and initial bed loading. Also, the specific energy requirement and purge gas consumption were evaluated to discuss the process efficiency for both activated carbon and DAY-zeolites bed.