

## PVSA Process for High Purity O<sub>2</sub> Generation and Purification from Ambient Air

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A PVSA process with two equilibrium beds and one kinetic bed was developed to overcome the limitation of 94% O<sub>2</sub> purity from air in the adsorption technology. From PVSA processes, higher than 90% O<sub>2</sub> from air and 99.8+ % O<sub>2</sub> from oxygen enriched feeds (higher than 90% oxygen) could be produced. Then, two different cycles of the PVSA process combined an equilibrium separation with a kinetic separation were designed. The PVSA process 1 introducing single blow-down step produced the O<sub>2</sub> product with 97.4% purity and 67% recovery while the PVSA process 2 with two-consecutive blowdown step produced the O<sub>2</sub> product with 99.2% purity and 47% recovery. A non-isothermal dynamic model incorporating mass, energy, and momentum balances was developed to predict the process dynamics and experimental results. Using the linear driving force(LDF) model with constant diffusivity for the equilibrium separation bed and a modified LDF model with concentration dependency of the diffusion rate for the kinetic separation bed, the dynamic model was able to accurately predict the results of the experiment.