

Economy Evaluation and Optimization of Moving Bed Adsorption for CO₂ Capture

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We proposed a method for carbon capture using adsorption to cope with global warming. The MBA (Moving Bed Adsorption) process is a new process for capturing CO₂ in flue gas emitted from several sources as coal-based power plants. The proposed MBA scheme consists of the adsorption bed and the desorption beds. In the adsorption bed, CO₂ adsorption occurs continuously while the adsorbents and fluid move in the opposite directions. In the desorption bed, the adsorbents are regenerated constantly while releasing adsorbed CO₂ under low pressure and high temperature. The MBA process can be regarded as a feasible realization of the existing PTSA operation in a continuous process. Economy evaluation incorporating rigorous analysis of the numerical models is carried out to elucidate the advantages of the MBA process over other conventional techniques such as PSA and absorption processes. In the course of the evaluation, various process modifications including heat integration and two-step desorption process, and optimization of operating conditions are considered.