

Modification of Adsorbents for High CO₂ Content Capture from Stranded Natural Gas Reserve: A Critical Review

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Abstract. Carbon dioxide (CO₂) commonly exists as undesirable component in natural gas streams. The continuous growing of the global demand makes it necessary to overcome the high CO₂ content obstacle of stranded reserves. A wide variety of acid gas removal technologies have been developed, including chemical and physical absorption processes but none of them can combine the high efficiency and economic energy consumption. Each process has its own advantages and disadvantages. Using of adsorbents increasingly being selected for newer projects, especially for applications that have large flow, high CO₂ content and located in remote locations such as offshore where compact and highly effective technology is required. This review highlights the importance of adsorbent modification on CO₂ removal from natural gas reserve at high pressure and temperature using physical adsorbents such as zeolite and molecular sieve. Then, the focus is turned on the adsorbents chemical modification using organic amines to improve the adsorption efficiency towards CO₂.