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INVESTIGATION ON THE CO_2 BREAKTHROUGH BEHAVIOUR OF DIFFERENT MATERIALS

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Abstract

The fabrication and manufacturing processes of industrial commodities such as iron, glass, and cement are carbon-intensive, accounting for 23% of global CO_2 emissions. Chemical absorption is one of the most promising technologies for CO_2 capture. The development of adsorption-based technologies for CO_2 capture in the post combustion processes requires finding materials with high capacity of adsorption and low cost of preparation. In recent years, carbon capture and utilization (CCU) has been proposed as a potential technological solution to the problems of greenhouse-gas emissions and the ever-growing energy demand. To combat climate change and ocean acidification as a result of anthropogenic CO_2 emissions, efforts have already been put forth to capture and sequester CO_2 from large point sources, especially power plants. In this work, zeolite 13X was used as potential materials for CO_2 adsorption. The method used for testing was based on the simulation of air flow of a certain composition using a test station, where it is the flow rate and air humidity can be adjusted. The results are presented in graphs together with adsorption capacities. For the applied conditions in this research, satisfactory results were obtained in a high percentage. Obtained results for 13X illustrate its potential as an effective adsorbent for the selective separation of CO_2 from air. Also, this method may be used for the separation of CO_2 from flue gas exhaust or other greenhouse gas emissions, and may have important applications in the pressing areas of sustainability and climate change mitigation.

Keywords: *Adsorption CO_2, Zeolite, CCU, Climate change*

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