

Chitosan; A Novel Adsorbent for CO₂ Capture

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Abstract: Carbon dioxide is a chief greenhouse gas found as the main combustion product of fossil fuel, which is responsible for environmental changes such as the increase in atmospheric temperatures, melting of glaciers, rising sea levels, and increasing acidity of the oceans. A comprehensive technology was developed for the absorption of CO₂ based on chemical absorption. But to mitigate climate change, developing new efficient strategies and technologies must receive considerable attention. CO₂ adsorption using biopolymer natural and abundant materials is considered as an alternative technology in commercial and industrial applications due to its generally low energy requirements, ease of operation, and low maintenance. Chitosan within natural biopolymers has been intensively studied recently for CO₂ adsorption. Chitosan may be used in CO₂ adsorption having low energy necessity, ease of processability, and low maintenance and, thus, may be deliberate as a substitute technology in commercial and industrial applications. Chitosan (poly-β-1,4-2-amino-2-deoksi-β-D-glucopyranose) is derived by deacetylation of chitin. Chitin (β-1,4-poly-N-acetyl-D-glucosamine) is a natural biopolymer, and its production in biomass of up to 10¹² tons/year makes it one of the most abundant polysaccharides on Earth. It is the main component of the cell walls of fungi, exoskeletons of arthropods such as crustaceans (crabs, lobsters, shrimps, etc.) and insects. Due to its biodegradability, renewability, biocompatibility, non-toxic, and non-antigenicity, chitosan is a green material. In this research, studies on CO₂ adsorption of chitosan biopolymer were investigated.

Keywords: Chitosan, Shellfish waste, CO₂ adsorption, Green material.