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Review

Insight into metal-impregnated biomass based activated carbon for enhanced carbon dioxide adsorption: A review

Jayaprina Gopalan [a], Archina Buthiyappan [b,*], Abdul Aziz Abdul Raman [a]

[a] Department of Chemical Engineering, Faculty of Engineering, Universiti Malaya, 50603 Kuala Lumpur, Malaysia
[b] Institute of Ocean and Earth Sciences, C308, Institute for Advanced Studies Building, Universiti Malaya, 50603 Kuala Lumpur, Malaysia

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ABSTRACT

Recently, biomass has been understood and investigated to develop adsorbents for carbon dioxide (CO_2) adsorption due to their non-hazardous nature, availability, low disposal cost, and thermal stability. In this perspective, the sustainable approach of converting biomass into activated carbon (BAC) for the adsorption of CO_2 is promising for solid waste management while reducing anthropogenic greenhouse gas emissions. Among other biomass adsorbents, metal oxide impregnated activated carbon (MBAC) has demonstrated excellent adsorption affinity for CO_2 adsorption. Therefore, in this review, an evaluation and detailed study of various MBACs for CO_2 adsorption is presented for the first time. BAC synthesize method, including various carbonization techniques, surface activation and functionality approaches have been discussed. This study also provides detailed overview of MBAC in the context of various preparation methods, critical factors and operating parameters for a high CO_2 adsorption capacity. Besides, the solid–gas reactor configuration, cyclic regeneration techniques, CO_2 adsorption process mechanism, and CO_2 adsorption kinetics also have been discussed. Finally, concluding remarks and future perspectives for biomass-derived MBAC for CO_2 adsorption capture were addressed. This review will also assist in the search for alternatives to CO_2 adsorption technology, which is both cost-effective and environmentally friendly.

Contents

* Corresponding author.
E-mail address: archina@um.edu.my (A. Buthiyappan).

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