

淨零排放

焚燒溫度對牛糞生物炭的影響：物理化學特性及其對有機染料吸附行為的研究

Pyrolysis temperature effect on biochar-derived cow manure: physicochemical properties and adsorption behavior toward organic dyes

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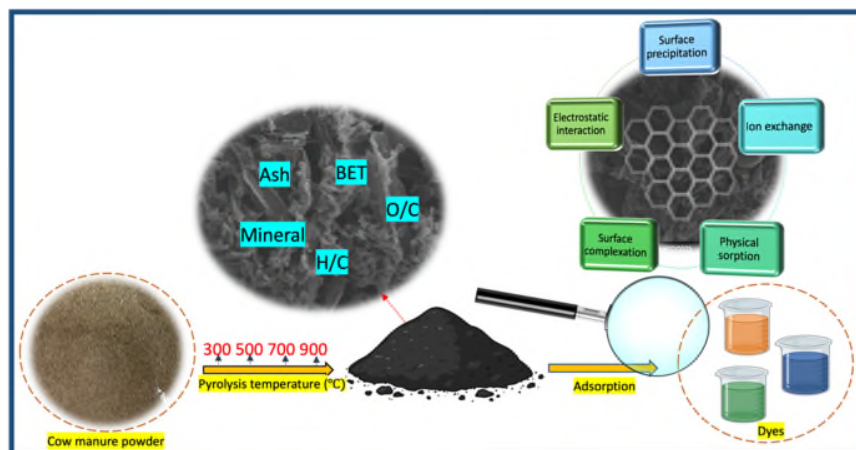
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Abstract:

Utilizing cow manure-derived biochar (CMBC) pyrolyzed at temperatures of 300, 500, 700, and 900 °C, this study examines the impact on physicochemical properties and the adsorption efficiency towards methylene blue (MB) and methyl orange (MO). CMBC900 displayed superior adsorption capacities, reaching 200 mg g⁻¹ for MB and 147 mg g⁻¹ for MO. When a dye mixture was tested, CMBC900 showed slightly lower capacities of 104.5 mg g⁻¹ for MB and 98.7 mg g⁻¹ for MO, indicating competitive adsorption. Surface analysis revealed key functional groups like -COOH, C=O, and C-O, integral to the adsorption mechanism. The reusability of CMBC was also notable, maintaining up to 97.51% efficiency for MB and 90.50% for MO after ten cycles. This research highlights the potential of high temperature pyrolyzed CMBC as an effective and sustainable adsorbent for dye remediation in wastewater.

Keywords: Cow manure; Biochar; Pyrolysis temperature; Dye wastewater treatment



Graphic abstract