AMS15 abstract template

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Nanocellulose-Based Materials for Advanced Water Treatment: Applications, Challenges, and Future Prospects (Times New Roman, Font 12, Bold)

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ABSTRACT (Times New Roman, Font 12, Italic, Bold)

Nanocellulose and its derivatives have emerged as promising bio-based materials for water treatment, attributed to their high surface area, strength, and renewable nature [1]. The presence of hydroxyl groups on cellulose nanocrystals (CNCs) and cellulose nanofibrils (CNFs) facilitates various surface modifications, leading to nanocomposites with customizable properties [2]. This review investigates the applications of nanocellulose-based materials in adsorption, catalysis, filtration, and flocculation, with a focus on removing heavy metals, dyes, and pharmaceutical compounds from water. Additionally, it examines nanocellulose's role in environmental sustainability, particularly in wastewater remediation through adsorption, filtration, catalysis, and pollutant sensing [3]. The review also highlights recent advancements in the production of nanocellulose-based adsorbents and membranes, emphasizing synthesis techniques, surface modifications, and durability, which bolster their potential for commercial application in cleaner wastewater treatment technologies. This comprehensive overview addresses the challenges and future prospects for the industrial use of nanocellulose in environmental remediation, underlining its importance in tackling global concerns related to resource depletion and harmful contaminants. (Times New Roman, Font 12, 1.15 spacing)

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