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# Biomedical Materials Cellulose

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## Editorial

Cellulose-based materials have generated a growing interest in enhancing biomedicine because to their outstanding biocompatibility, biodegradability, and low toxicity. Self-assembly is a natural process that allows the development of structured objects with certain functions and features without any additional processing. This page covers a wide range of solvents, including NMMO, DMAc/LiCl, several molten salt hydrates, some aqueous metal complex solutions, ionic liquids, and the NaOH-water system, among others. Modifications such as esterification, etherification, ATRP, RAFT, ROP, and other novel techniques were extensively utilised. Temperature, pH, light, and redox-responsive cellulose-based materials have been developed as a result of their outstanding performance [1].

Self-assembly is one of the most promising methods for manufacturing micelles from amphiphilic polymers. Despite the presence of both hydrophilic and hydrophobic groups in the backbone of the molecular chain, amphiphilic block copolymers in solution can self-assemble into a variety of nanoscale structures, including micelles and vesicles [2]. Polymer micelles could be used in a variety of biomedical applications, including pharmaceutical or gene delivery, biosensors, and bioimaging. Due to their high price and potential biotoxicity, many synthetic block polymers are limited in their application on a large scale. As a result, there has been a surge in interest in developing amphiphilic polymers from natural polysaccharides because of their multiple benefits, including their abundance, low cost, safety, non-toxicity, biocompatibility, and biodegradability [3].

Self-assembling cellulose-based materials have shown a lot of promise in the field of biomedicine so far. We investigated how recently self-assembled cellulose materials have advanced in biomedicine. We started with the disintegration and alteration of cellulose and its derivatives. In the meantime, the self-assembly of cellulose-based polymers was elucidated in detail. Following that, cellulose-based materials with diverse stimuli responsive features were emphasised, including temperature, pH, light, and redox. Finally, we discussed how self-assembled cellulose materials can be employed in biomedicine for drug/gene delivery, bio imaging, biosensors, and a variety of other applications. This review aims to provide a comprehensive understanding of self-assembled cellulose materials by covering them from theory to practise [4].

The most plentiful and renewable biomass energy is cellulose. Furthermore, amphiphilic cellulose-based polymers have been shown to self-assemble into a range of 3D forms with enormous application potential. More types of functional cellulose-based materials with a variety of benefits are possible thanks to a variety of effective cellulose solvents and practical cellulose modification processes. These cellulose-based polymers offer outstanding possibilities for the fabrication of self-assembled materials that could be exploited in biomedicine and other sectors due to their particular functionality and equilibrated balance of hydrophobic and hydrophilic components. The ultimate goal is for the self-assembling cellulose-based composites to be used in clinical practise [5].

## Conflict of Interest

None.

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