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Industrial Applications of Nanocellulose and Its Nanocomposites

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14 - Nanocellulose nanocomposites for biomedical applications

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Abstract

Nanocellulose (NC), a novel form of the most abundant natural-based polymer on earth, is often used in the manufacture of bio-based composite material for numerous biomedical applications owing to its superior physical properties, remarkable biological properties (i.e., biocompatibility, biodegradability, and low toxicity). Apart from cellulose nanocrystals (CNC), and cellulose nanofibrils (CNF), bacterial nanocellulose (BNC) is an emerging biomaterial with great potential for biological implant, wound-healing, drug delivery, antimicrobial, tissue engineering, and other applications. Due to their tailorable surface chemistry, more advanced fabricating methodologies of NC-based biomedical materials are guaranteed and it is evolving the conventional diagnostic and treatment methods with better clinical outcomes. In this chapter, we describe current opportunities in the material design and fabrication strategies for the advancement of cellulose-based nanocomposites with emphasis on the suitability of the material by evaluating the design and performance requirements of each biomedical application as well as the challenges that lie on the horizon.

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