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Modification of Carbon Nanotubes by Amphiphilic Glycosylated Proteins

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Abstract

Precise organization of nanomaterials with functional biomolecules play a key role in many natural materials. In this work, single-walled carbon nanotubes were functionalized by a self-assembling amphiphilic protein that enabled their dispersion into nanofibrillated cellulose matrix. The protein contained a hydrophobic patch and a glycosylated domain and due to its dual functionality, it was able to assemble at the interface of the carbon nanotubes and the nanofibrillated cellulose and thus enhance the interactions between them. The electrical conductivity of the nanocellulose/carbon nanotube composites was improved by approximately 5-fold when the protein modified nanotubes were applied. Also improvement of the mechanical properties due to the proteins was observed.

Keywords

Hydrophobins, Janus Particles, carbon nanotubes, cellulose nanofibrils, nanocomposites.

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