

Cellulose nanocrystal-based hybrid films and aerogels

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Abstract

Naturally available materials like cellulose nanocrystals (CNCs) have attracted great interest during last years, owing to their low density, high specific surface, biodegradability, abundancy, high functionalization possibilities and vast applicability.

CNCs can be transformed into different structures including films, hydrogels, foams or aerogels with their particularities and application fields. To improve the functionality of CNC-based nanocomposites properties like mechanical resistance or thermal stability need to be analysed and modified through several alternatives.

In this work, cellulose nanocrystal based nanopapers and hybrid aerogels have been synthesized by evaporation-induced self-assembly (EISA) and freeze-drying techniques respectively. These materials have been reinforced using metallic nanoparticles or metal precursor. Samples have been analysed and compared to observe and explain changes in thermal stability, UV-Visible transmittance, wettability or antimicrobial activity.

Additionally, we were able to fabricate tougher aerogels through crosslinking CNCs with alginate biopolymer.

References

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Figures



Figure 1. Image of a cellulose nanocrystal-based aerogel

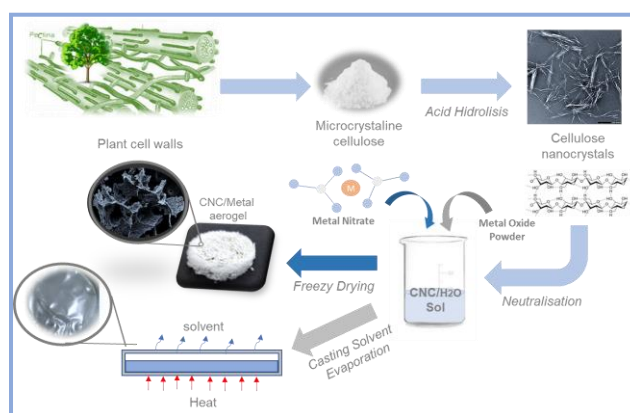


Figure 2: Illustration of the synthesis of CNC/metal nanocomposites