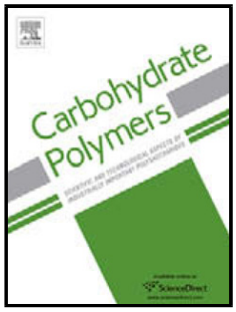

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Rapid Fabrication of Transparent Film Directly from Wood Fibers with Microwave-assisted Ionic Liquids Technology

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Highlights

- A new way of MILT was used to obtain a highly transparent all-cellulose film.
- • The time of MILT is significantly less than other methods.
- MILT can improve the dissolubility of the cellulose in the ionic liquid.
- Tensile property and optical transmission have been greatly improved after MILT.

Abstract:

Presently flexibly transparent film or nanopaper from all cellulose was mostly fabricated by assembling cellulose nanofibers disintegrated from macroscopic wood fibers which mostly suffers from potential environmental toxicity or high cost. In this work, we firstly reported an all-cellulose transparent film fabricated by a novel microwave-assisted ionic liquids technology (MILT). The use of MILT for treating the original wood paper brings nearly 2.6 fold-increases in optical transmission, and 2.0 fold-increases in tensile property compared to those without microwave assistance. More importantly, by contrast with the partial dissolution of cellulose in typical DMAC/LiCl, ILs, NaOH/urea, the MILT is extremely time-saved with responding to the highest increase in mechanical property because the high efficient surface dissolution and welding bind individual sheets together under a micro environment.

Keywords: Ionic liquid; Microwave; Transparency; Mechanical properties;