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The reuse of wastepaper for the extraction of cellulose nanocrystals

(Article)

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Abstract

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The study reports on the preparation of cellulose nanocrystals (CNCs) from wastepaper, as an environmental friendly approach of source material, which can be a high availability and low-cost precursor for cellulose nanomaterial processing. Alkali and bleaching treatments were employed for the extraction of cellulose particles followed by controlled-conditions of acid hydrolysis for the isolation of CNCs. Attenuated total reflectance Fourier Transform Infrared (ATR FTIR) spectroscopy was used to analyze the cellulose particles extracted while Transmission electron microscopy images confirmed the presence of CNCs. The diameters of CNCs are in the range of 3-10 nm with a length of 100-300 nm while a crystallinity index of 75.9% was determined from X-ray diffraction analysis. The synthesis of this high aspect ratio of CNCs paves the way toward alternative reuse of wastepaper in the production of CNCs. © 2014 Elsevier Ltd.

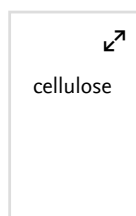
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Fourier transform infrared spectroscopy Nanostructured materials
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Engineering uncontrolled terms

Attenuated total reflectance Fourier transform infrared Bleaching treatment
Cellulose nano-crystals Cellulose nanocrystal (CNCs) Crystallinity index
Environmental friendly approach Low-cost precursor Transmission electron microscopy images

Engineering main heading:

Nanocrystals

PaperChem Variable:

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MeSH:

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Methods for Extraction of Nanocellulose from Various Sources

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