

Área: ORG

Straightforward approach to the functionalized cellulose nanofibrils preparation with organic halide

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Highlights

Cellulose nanofibrils were successfully functionalized with organic halide, confirmed by FTIR, AFM-IR, EA and TG, revealing improved thermal stability and potential for innovative membrane applications.

Abstract

Chemical functionalization of cellulose nanofibrils (CNFs) was carried out with the reagent 2-chloroethylammonium chloride (2CEA) for future application as filter membranes. The reaction proceeds via a bimolecular nucleophilic substitution (S_N2) mechanism. The functionalized CNFs were characterized through Fourier transform infrared spectroscopy (FTIR), infrared nanospectroscopy (AFM-IR), elemental analysis (EA), X-ray diffraction (XRD), and thermogravimetry (TG). The chemical modification reaction under inert atmosphere was successful due to the presence of characteristic bands in the FTIR spectrum related to the modifier reagent. AFM-IR and EA results corroborate the success of the functionalization reaction. XRD analysis revealed a slight decrease in crystallinity indices after chemical modification. TG analysis of the sample with the highest nitrogen content, determined by EA, showed improved thermal properties relative to the unmodified CNF.

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