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Mechanical, rheological and degradation properties of PBAT nanocomposites reinforced by functionalized cellulose nanocrystals

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ABSTRACT

In this study, the effects of cellulose nanocrystals modified with octadecyl isocyanate on rheological, mechanical and degradation properties of nanocomposites based on poly (butylene adipate-co-terephthalate) (PBAT) were reported. Nanocomposites were prepared by melt mixing procedure of PBAT with 3, 5 and 7 wt% cellulose nanocrystals. The increase of PBAT-based nanocomposites mechanical strength was discussed as a function of the cellulose nanocrystals surface chemistry, and the optimal amount of nanofillers in the nanocomposites, whereas the biodegradation rate of the polymer was related to the cellulose nanocrystals hydrophobicity. The study here presented promotes further understanding of cellulose nanocrystals functionalization and its effect on the overall properties of polymeric nanocomposites.

Keywords: cellulose nanocrystals; surface modification; biodegradable polymer nanocomposites; mechanical properties; biodegradation.

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