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## Poly(lactic acid)/Natural rubber/Cellulose nanocrystal bionanocomposites

## Part I. Processing and morphology

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## Abstract

PLA/NR/cellulose nanowhisker composites were prepared using three types of cellulose nanocrystals (CNC), i.e. unmodified CNC obtained from acid hydrolysis of microcrystalline cellulose and two surface modified CNC. The two modification reactions, consisting on the grafting of long alkyl chains and of PLA chains onto the cellulose nanocrystals were carried out in order to facilitate the incorporation of the nanocrystals in the PLA/NR blend. A novel processing method was optimized combining solvent casting and extrusion in order to obtain a homogeneous dispersion of the nanofillers in the blend. The CNC modifications determined their location in the PLA/NR blend and influenced its morphology.

## Keywords:

Cellulose nanocrystal, surface modification, bionanocomposite, poly(lactic acid), melt blending, morphology.

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