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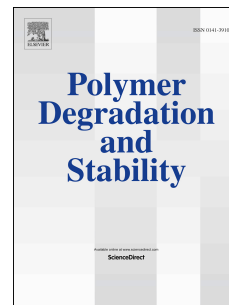
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Effect of the addition of polyester-grafted-cellulose nanocrystals on the shape memory properties of biodegradable PLA/PCL nanocomposites

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ABSTRACT

In this work the thermally-activated shape memory response of biodegradable nanocomposites based on PLA/PCL blend reinforced with different type of cellulose nanocrystals has been reported, and compared with those of the neat matrix, at the same transition temperature of 55 °C and at the same different deformations, 50 %, 100 % and 150 %. In particular, cellulose nanocrystals have been synthesized and then functionalized by “grafting from” reaction by ring opening polymerization of both PLLA and PCL using the –OH groups onto the cellulose nanocrystals surface as initiators for the reaction. The morphology, thermal and mechanical analysis have been performed in order to obtain the parameters for the thermo-mechanical shape memory cycles. Moreover, the addition of the CNC-based nanofillers on the compatibility of PLA-PCL blends in 70:30 proportion has been evaluated. All the biodegradable nanocomposite formulations showed excellent shape memory response, similar to those

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