

Compatibilizing Poly(lactic acid)/Cellulose Nanowhisker Green Composites with Maleic Anhydride-Grafted Poly(lactic acid)

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Recently, PLA has been getting a lot of interests in step with global concerns on green technology because it is biodegradable with high mechanical strength and can be processed quite easily. But, PLA softens at lower temperatures compared to other commodity polymers. Therefore, in this study, cellulose nanowhiskers (CNWs) were prepared from microcrystalline cellulose by acid hydrolysis and used as reinforcing nanofillers for PLA. To improve interfacial adhesion between PLA and CNWs maleic anhydride (MA)-graft PLA was prepared by melt-blending and used as a compatibilizer for the PLA/CNW green composites. The structure of the CNWs was investigated by TEM. Physical properties of the PLA/CNW composites were investigated by UTM, izod impact tester, DSC, and DMA. The best compositions and processing conditions for the PLA/CNW green composites were determined, and the effects of MA-grafted PLA on the performance of the composites were elucidated.