

Preparation and characterization of poly(3-hydroxybutyrate-co-3-hydroxyhexanoate) (PHBHHx)/cellulose microcrystalline biocomposites

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Keywords. PHBHHx, cellulose microcrystalline, biocomposites

Abstract.

Polyhydroxyalkanoates (PHAs), generated by microorganisms, have highly attracted attention in various fields due to their unique physicochemical properties [1]. However, the extension of PHAs to other industrial fields is rather limited due mainly to its slow crystallization rate, high crystallinity and high thermal sensitivity [2]. The addition of cellulosic fillers to PHAs could be one of the most efficient routes to improve the properties of the biocomposites. In this study, biocomposites of PHBHHx/cellulose microcrystalline (MCC) extracted from olive husk flour were prepared by melt compounding at filler content of 10, 20 and 30 wt%. The effect of the MCC content on the morphology, thermal stability, crystallinity and water uptake of the PHBHHx biocomposites was investigated. The results showed that the addition of MCC to PHBHHx decreases the onset degradation temperature of the biocomposites compared to that of neat polymer, however more pronounced at higher loading rates. This probably results from the tendency of MCC particles to agglomerate, inducing heterogeneities and defects within the polymer matrix besides the lower thermal stability of the MCC [3]. Further, both crystallinity and water uptake after 24h of immersion, increase with the filler content.

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