

Influence of Boehmite Nanoparticle Loading on the Mechanical, Thermal, and Rheological Properties of Biodegradable Polylactide/Poly(ϵ -caprolactone) Blends^a

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Abstract

Blends of polylactide (PLA) and poly(ϵ -caprolactone) (PCL) were melt-processed with boehmite (BAI) nanoparticles to produce ternary biocomposites with the intent of broadening the potential applications of PLA. The mechanical properties of the prepared composites exhibited remarkable improvement in the elongation-at-break of between 60 and 430% for increasing loadings of PCL and BAI in the blends. Furthermore, the melting temperatures of PLA and PCL were observed to shift approximately 2 degrees C toward each other in the composites, an indication of improved compatibility. This partial compatibility was also observed from the electron microscopy images, which also revealed a good dispersion of PCL in the PLA. The composite with balanced properties was found to be consisting of 70 wt% PLA, 30 wt% PCL, and 4 wt% BAI.