

Mechanical and morphological properties of poly-3-hydroxybutyrate/ Poly(butyleneadipate-co-terephthalate)/layered double hydroxide nanocomposites

ABSTRACT

Nanocomposites of poly-3-hydroxybutyrate/poly(butyleneadipate-co-terephthalate)/layered double hydroxide (PHB/PBAT/LDH) were prepared from a binary blend of PHB/PBAT and stearate-Zn₃Al LDH via a solution casting method using chloroform as solvent in this study. The pristine Zn₃Al LDH was synthesized from nitrate salts solution at pH 7 by using coprecipitation technique and then was modified by stearate anions surfactant via ion exchange reaction. As a result, the basal spacing of the LDH was increased from 8.77 to 24.94 Å after the modification. Intercalated nanocomposites were formed due to the presence of diffraction peak in XRD diffractograms. The infrared spectrum of stearate-Zn₃Al LDH exhibited the existence of stearate anions in the synthesized Zn₃Al LDH. Mechanical properties with 2 wt% stearate-Zn₃Al LDH loading nanocomposites showed 56 wt% improvements in elongation at break compared to those of the blend.

Keyword: Coprecipitation technique; Double hydroxides; Elongation at break; Intercalated nanocomposites; Ion exchange reactions; Morphological properties; Poly-3-hydroxybutyrate; Solution-casting method.