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Tensile and morphology properties of PLA/MMT-TiO_2 bionanocomposites

Abstract

The aim of this study is to produce PLA nanocomposites by solvent casting incorporating Montmorillonite nanoclays (MMT) and titanium dioxide (TiO2) nanoparticles. The effects of difference loadings of MMT in PLA and different loadings of TiO2 on mechanical and morphology properties were studied. The nanocomposites were prepared by solvent casting at different loadings of MMT (0, 2, 4, 6 and 8 wt %) and different loadings of TiO2 (1 and 3 wt %) respectively. The properties such as tensile properties (tensile strength, elongation at break, and modulus of elasticity) and morphology were determined. The results indicate that 4 wt% of MMT loading produced the best tensile properties. However, the incorporation of TiO2 showed an improvement in the modulus of elasticity of PLA/MMT nanocomposites mainly at 1 wt % loading of TiO2.

Keywords

Bionanocomposite; Montmorillonite; Poly(lactic acid); Tensile properties; Titanium dioxide