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Effect of coupling agent on durian skin fibre nanocomposite reinforced polypropylene

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Abstract

This paper reports on the development of a composite-based natural fiber to reduce the reliance on petroleum-based product in order to amplify environmental awareness. The production of Durian Skin Nanofiber (DSNF) was conducted using biological fermentation method via rhizopus oryzae in order to obtain the nano dimension of the particle size.

Polypropylene (PP) and DSNF were produced using Haake internal mixer via melt blending technique. The significant effect of maleic anhydride grafted polypropylene (MAPP) on the properties of PP/DSNF nanocomposite was investigated to study its mechanical properties which are tensile strength and thermal stability using thermogravimetric (TGA) and differential scanning analysis (DSC). The tensile property of PP nanocomposites increased from 33 MPa to 38 MPa with the presence of MAPP. The addition of MAPP also increased the thermal stability of PP/DSNF nanocomposite where the char residue increased by 52%. Besides that, the thermal degradation of PP/DSNF and PP/DSNF-MAPP were higher than PP where they exerted higher amount of weight loss at an elevated temperature. The percentage of crystallinity, %Xc, of PP nanocomposites improved with the addition of MAPP by 35% based on the differential scanning calorimetry (DSC) result. The SEM analysis showed that the PP/DSNF-MAPP exerts ductile fracture while PP/DSNF exerts brittle fracture.

Keywords

KeyWords Plus: PLA BIOCOMPOSITES; COMPOSITES

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