

Comparative analysis of the properties : microcrystalline cellulose fiber polyamide composites filled with ethylene copolymer and olefin elastomer

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ABSTRACT

Polyamide 6.10 (PA) composites, reinforced with microcrystalline cellulose fibers, were prepared separately using two types of coupling agents, Exxelor VA1803 (VA) and Bondyram 7103 (BR), using extrusion followed by an injection molding process. The fiber loading was fixed to 30 wt%, whereas the coupling agent was fixed to 5 wt%. The properties of the composites were characterized by the tensile properties, impact testing, differential scanning calorimetry, dynamic thermomechanical, thermogravimetric, and X-ray diffraction analyses. The distribution of the fibers into the PA was examined by a scanning electron microscope. It was found that the VA improved the mechanical and thermomechanical properties slightly compared to BR-based samples. Overall, the structural, morphological, and thermal properties of the composites were also improved comparatively using VA.

KEYWORDS

Polyamide composite; Microcrystalline cellulose; Maleic anhydride-modified olefin elastomer; Maleic anhydride-based ethylene copolymer; Dynamic thermomechanical analysis

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