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Improvement in thermomechanical properties of injection molded nano-modified hybrid biocomposite (Article)

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Abstract

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Biopolymers and their composites are one of the best alternatives for replacing petroleum-based plastic commodities. The main drawback of biopolymer is its high cost that restricts its applications; however, biopolymers filled with natural fibers are able to reduce cost but suffer lower impact strength and fracture toughness. Nanoclay which has a very high aspect ratio shows a significant effect on mechanical and thermal properties. This article concentrates on hybridization of nanoclay and natural fibers. Mechanical properties show that with the addition of nanoclay, impact strength increases more than 50%; however, other mechanical properties are also increased, which are proved by fractography analysis. Thermal analysis shows that hybrid biocomposite exhibits higher storage modulus, decomposition temperature and higher percentage of crystallinity. Fourier-transform infrared (FT-IR) analysis confirms formation of new bond between nanoclay and polymer matrix which is the main reason for improving thermal and mechanical properties of the hybrid biocomposite. © The Author(s) 2012.

Author keywords

dynamic mechanical analysis (DMA) Hybrid biocomposite kenaf fiber thermomechanical properties transmission electron microscopy (TEM)

Indexed keywords

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