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Dynamic mechanical properties of pultruded kenaf reinforced unsaturated polyester resin using various frequencies

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Abstract

The study aimed to investigate the effect of dynamic mechanical analysis (DMA) of pultruded kenaf reinforced unsaturated polyester resin (PKRC). The polymeric composites were prepared using a pultrusion processing with a ratio of 70% fiber and 30% of unsaturated polyester resin (UPS). The DMA was carried out with special reference to the effects of frequency and temperature. It was found that the dynamic mechanical properties and glass transition temperature, Tg of PKRC were positively increased with increasing the operating frequencies (0.1 Hz, 1 Hz, 10 Hz, and 100 Hz).

Key words: *Fibers, Polymer–matrix composites (PMCs), Thermal degradation, Dynamic mechanical analysis (DMA), Pultrusion*

1. Introduction

Manufacturing high performance composites from natural fibers is one ambitious goal currently being pursued by researchers across the globe (Joseph *et al*., 1996; Varma *et al*., 1989; Geethamma *et al*., 1998; Sreekala *et al*., 1997) The ecological benefits of natural fibers materials are clearly saving the valuable resources, environmentally sound and do not cause health problems. Meanwhile, they are also readily available and their specific properties are comparable to synthetic fibers used for this purpose.

Among the natural fibers, kenaf based composites have already been proven to be a potential material for variety structural and non structural low load bearing capacity. Kenaf belongs to the genus hibiscus cannabinus is an example of a number of woody-stemmed herbaceous dicotyledons grown in the tropic and subtropics, from the bast of which stems from fiber can be extracted. Kenaf has higher strength and modulus than plastic and is a good substitute for conventional fibers in many situations (Sanadi *et al*., 1995).

The rapidly expanding usage of composite components in automotive, construction, sports and

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