

Effect of fibre/matrix modification on tensile properties and water absorption behaviour of hybridized kenaf/PALF reinforced HDPE composite

Abstract

This paper compared the effect of modification on hybridized kenaf/pineapple leaf fibre (PALF) and high-density polyethylene (HDPE) composite on their composite's tensile properties and water absorption behaviour. Modification was carried out on the fibre's surface using Vinyltri (2-methoxy ethoxy) silane (silane AH172), while the HDPE matrix was modified with Poly(methylene) poly(phenil) isocyanate (PMPPIC). The influence of water uptake on the absorption behaviour of the composites was studied by immersion in distilled water for 24 hrs at 27°C. The effects of modification on both water sorption and tensile properties were evaluated. The results showed that the properties of unmodified hybrid improved after its immersion in water, unlike modified ones. Modifying the matrix and combining it with treated fibres did not give better results as expected. Combining PMPPIC with silane induced toughness in the composite as observed in the test results. In addition, PMPPIC reduced the hydrophilicity of the composite considerably. Thus, regardless of either fibre surface modification or matrix modification, reinforcement with respect to treatment depends on the type of modifier used and not where it is applied in composite formulation.

Keyword: Composite; Treatment; Strength; Water absorption; Hydrophilicity