

Effect of chemical treatment on mechanical and physical properties of non-woven kenaf fiber mat reinforced polypropylene biocomposites

Abstract

Kenaf fibre mat (KFM) reinforced polypropylene (PP) biocomposites have been prepared using sandwich structure and hot press moulding technique. To enhance the interfacial bonding between PP and kenaf fibre, KFM was chemically treated with two different chemicals which are 5% hydrogen peroxide and 2% silane. Fourier transform infrared (FTIR) was used to characterize the chemical constituents in both treated and untreated kenaf fibres. Universal tensile machine (UTM) was used to determine mechanical properties (tensile and flexural strength, tensile and flexural modulus) of both treated and untreated KFM-PP biocomposites. Water absorption test was also conducted in order to evaluate its water-resistance performance. The result shows that peroxide treatment demonstrated the highest performance in mechanical and water absorption properties compared to other chemical treatment. SEM morphological studies proved that almost all treated KFM showing good fibre-matrix interfacial adhesion which less fibre pull out, void and and small interface gap. Thus, the chemical treatment on KFM improved fibre-matrix adhesion, which also contributed to the enhancement of mechanical properties and physical properties compared to untreated KFM reinforced PP biocomposites.