

Mechanical Performances and Viscoelastic Behaviour of Starch-Grafted-Polypropylene/Kenaf Fibres Composites

Authors : A. Hamma, A. Pegoretti

Abstract : The paper focuses on the evaluation of mechanical performances and viscoelastic behaviour of starch-grafted-PP reinforced with kenaf fibres. Investigations were carried out on composites prepared by melt compounding and compression molding. Two aspects have been taken into account, the effects of various fibres loading rates (10, 20 and 30 wt.%) and the fibres aspect ratios ($L/D=30$ and 160). Good fibres/matrix interaction has been evidenced by SEM observations. However, processing induced variation of fibre length quantified by optical microscopy observations. Tensile modulus and ultimate properties, hardness and tensile impact stress, were found to remarkably increase with fibre loading. Moreover, short term tensile creep tests have proven that kenaf fibres improved considerably the creep stability. Modelling of creep behaviour by a four parameter Burger model was successfully used. An empirical equation involving Halpin-Tsai semi empirical model was also used to predict the elastic modulus of composites.

Keywords : mechanical properties, creep, fibres, thermoplastic composites, starch-grafted-PP

Conference Title : ICAMST 2014 : International Conference on Advanced Materials Science and Technology

Conference Location : Venice, Italy

Conference Dates : April 14-15, 2014