Stiffness prediction of hybrid kenaf/glass fiber reinforced polypropylene composites using rule of mixtures (ROM) and rule of hybrid mixtures (RoHM)

ABSTRACT

In this report, rules of mixture (ROM) and rule of hybrid mixtures (RoHM) were utilized to predict the mechanical properties of kenaf/glass fiber reinforced polypropylene short random oriented hybrid composites material. Three hybrid composition were studied with total fiber contents 30 vol%, 40 vol% and 50 vol% and the relative glass fiber contents are varied from 0 to 100 vol%. Analytical results using the both micromechanical models show that the hybridization between kenaf with glass fiber in short fiber form using polypropylene matrix give positive hybrid effect to the overall hybrid stiffness at minimum relative glass fiber volume fraction of 87.5% compared to the kenaf/polypropylene composites single system for all total fiber volume content cases. Similarly, it was also observed that the stiffness of the hybrid short and randomly oriented composites increases as the overall fiber volume contents increases. The overall results have provided useful insight of the hybridization effects to the stiffness of the final hybrid composites especially for the application in product development process using similar hybrid short randomly oriented kenaf/glass fiber reinforced polypropylene composite materials.