

Theoretical Prediction of CNT-CF/PP Composite Tensile Properties Using Various Numerical Modeling Methods.

ABSTRACT

Development of effective models to predict tensile properties of ‘carbon nanotube coated carbon fibre reinforced polypropylene (CNT-CF/PP)’ composites is briefly discussed. The composite taken as the reference is based on the highest growth mechanism of CNTs over carbon fibres. Halpin-Tsai and Combined Voigt-Reuss model has been implemented. Young's modulus for CNT-CF/PP composites has been found 4.5368 GPa and the tensile strength has been estimated 45.367 MPa considering the optimum operating condition of chemical vapor deposition (CVD) technique. Stiffness of the composite is represented through the stress-strain plots; stiffness is proportional to the steepness of the slope. There are slight deviations of results that have been found theoretically over the experimental issues.

Keyword: Carbon nanotube; Hierarchical composites; CNT-CF/PP; Tensile properties; Stiffness