

摘 要

由於奈米碳管本身具有優良的特性，包含高強度、高剛性、高導電性、熱傳導性佳等優點。本文主要研究奈米碳管/酚醛樹脂複合材料，探討添加不同重量百分比的碳管對酚醛樹脂的抗拉強度、疲勞壽命、導電性的影響，並經過溫濕效應七天和熱循環 500 週次效應的環境條件對以上特性是否有所變化。結果顯示隨著碳管含量的增加，抗拉強度明顯有提升；電阻則是呈現下降的趨勢；而在相同的疲勞壽命下，添加碳管的複合材料的絕對應力比純酚醛高。受到溫濕與熱循環效應的試片，其抗拉強度比室溫低；電阻也比室溫高；而在相同的疲勞壽命下，添加碳管的複合材料的絕對應力也比室溫低。所有試片的破壞斷面經過 SEM 的觀察，瞭解其破壞的情形。



Abstract

Due to carbon nanotubes with excellent mechanical and electrical properties such as high stiffness, light weight, heat stability, excellent heat conductivity, and excellent electrical conductivity. This study was aimed to investigate the properties of composites consisting of adding several different proportions of carbon nanotubes to phenolic resin, which contained tensile strength, fatigue life and electrical properties. The experimental results showed that the electric resistance decreases as the weight percentage of the nanotubes increases. But the tensile strength increased as the nanotubes increased. After the different moisture-temperature circumstances and thermal cycling, the increase of the electric resistance was compared to the pristine composites. The experimental results hoped to be understood from the fracture surface observations by scanning electron microscope (SEM).

