

Electrical conductivity of graphene-glass and carbon-glass epoxy composites

Abstract

In this paper, an experimental investigation is conducted to examine the electrical conductivity of glass epoxy composites containing graphene and carbon nanofillers. The hand lay-up technique was used to fabricate the GN-glass, MWCN-glass, and GN-MWCN-glass hybrid epoxy composites. The nanofiller weight fraction at 1.5 and 3 wt. % was analysed. The electrical conductivity test was carried out using two-probe methods to evaluate the GN and MWCN nanofiller's contribution to forming conductive networks within the epoxy matrix and glass fibre. The result indicates a higher electrical conductivity value of GN-MWCN-glass hybrid epoxy composites due to hybrid nanofillers incorporation. Field emission scanning electron microscope analyses the nanofiller's dispersion and random distribution in the composites. The good conductivity was related to the better bond formation of the nanofillers with the epoxy matrix. The electrical conductivity results obtained from this study will serve as a basis for investigating the correlation between electrical resistance and strain characteristics in the self-sensing monitoring composite for future research.