

# Accepted Manuscript

Comparative study of graphene nanoparticle and multiwall carbon nanotube filled epoxy nanocomposites based on mechanical, thermal and dielectric properties

Muhammad Razlan Zakaria, Muhammad Helmi Abdul Kudus, Hazizan Md Akil, Mohd Zharif Mohd Thirmizir



PII: S1359-8368(16)31792-9

DOI: [10.1016/j.compositesb.2017.03.023](https://doi.org/10.1016/j.compositesb.2017.03.023)

Reference: JCOMB 4957

To appear in: *Composites Part B*

Received Date: 30 August 2016

Revised Date: 14 March 2017

Accepted Date: 15 March 2017

Please cite this article as: Zakaria MR, Kudus MHA, Akil HM, Thirmizir MZM, Comparative study of graphene nanoparticle and multiwall carbon nanotube filled epoxy nanocomposites based on mechanical, thermal and dielectric properties, *Composites Part B* (2017), doi: 10.1016/j.compositesb.2017.03.023.

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

## Comparative study of graphene nanoparticle and multiwall carbon nanotube filled epoxy nanocomposites based on mechanical, thermal and dielectric properties

Muhammad Razlan Zakaria<sup>a</sup>, Muhammad Helmi Abdul Kudus<sup>a</sup>, Hazizan Md. Akil<sup>a,b\*</sup>, Mohd Zharif Mohd Thirmizir<sup>b</sup>

<sup>a</sup>School of Materials and Mineral Resources Engineering, Engineering Campus, Universiti Sains Malaysia, 14300 Nibong Tebal, Pulau Pinang, Malaysia.

<sup>b</sup>Cluster for Polymer Composite (CPC), Science and Engineering Research Center, Engineering Campus, Universiti Sains Malaysia, 14300 Nibong Tebal, Pulau Pinang, Malaysia.

\*Corresponding email: [hazizan@usm.my](mailto:hazizan@usm.my)  
Tel:04-5996161, Fax: 04-5941011

### Abstract

Nano-sized carbons, such as graphene nanoparticle (GNP) and multiwall carbon nanotube (MWCNT), have attracted a great deal of attention due to their extraordinary intrinsic properties. Extensive research has been done on each carbon material for epoxy nanocomposites but only a few have ventured into a comparison study. In this paper, the effect of GNP and MWCNT, at various filler loadings, on the mechanical, thermal and dielectric properties of epoxy nanocomposites have been investigated. The experimental results demonstrate that GNP filled epoxy nanocomposites showed higher thermal and dielectric properties, but slightly lower mechanical properties compared to the MWCNT filled epoxy nanocomposites. The tensile strength, flexural strength, thermal conductivity and dielectric constant of GNP filled epoxy nanocomposites improved up to 11%, 17%, 126%, and 171% respectively, and MWCNT filled epoxy nanocomposites improved up to 26%, 29%, 60%, and 73% respectively.

**Keywords:** Graphene; Carbon nanotubes; Polymer-matrix composites (PMCs);

Epoxy nanocomposites

Download English Version:

<https://daneshyari.com/en/article/5021601>

Download Persian Version:

<https://daneshyari.com/article/5021601>

[Daneshyari.com](https://daneshyari.com)