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**Effect of reduced graphene oxide on the mechanical, thermal and electrical properties of epoxy**Ahmed Alzahrany and Biqiong Chen  
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Graphene has attracted intense scientific interest over the last decade due to its outstanding electrical, mechanical and thermal properties. This work aims to investigate the effect of reduced graphene oxide (RGO) on the structure and properties of epoxy. Graphite powder was oxidized and exfoliated to produce graphene oxide (GO). GO was then reduced to RGO by a thermal reduction procedure using a high temperature. Epoxy-RGO nanocomposites were prepared by mixing epoxy resin with RGO in the presence of a solvent, tetrahydrofuran. X-ray diffraction (XRD), Fourier transform infrared spectroscopy (FT-IR) and scanning electron microscopy (SEM) were performed to characterize the structure and morphology of the graphene-based nanosheets and nanocomposites. The characteristic peaks for the functional groups of both RGO and the polymer matrix were found in the FT-IR spectra of nanocomposites. The interlayer spacing of RGO increased in nanocomposites according to the XRD results. SEM images elucidated that there was a relatively good dispersion of graphene in epoxy matrix. The incorporation of graphene into epoxy matrix raised the Young's modulus from 2.71 GPa up to 3.56 GPa (ca 35%) at 1.0 wt.% RGO. It increased the degradation temperature at 50% weight loss from 412 to 433°C. The thermal conductivity of epoxy was improved by up to 85%, reaching the maximum value of 0.36 W m<sup>-1</sup> K<sup>-1</sup> at 1.0 wt.% RGO. The same addition also significantly improved the electrical conductivity of epoxy. These epoxy-RGO nanocomposites could be explored for applications such as anti-corrosive, electrostatic-dissipative, electromagnetic interference shielding and sensing applications.

**Biography**

Ahmed Alzahrany is a PhD student in the Department of Materials Science and Engineering at the University of Sheffield. He received a BS degree in Mechanical Engineering from King Saud University and the MSc in Mechanical Engineering from the University of Portsmouth in 2009. He has been active in the area of materials science for over 10 years and has worked at Saudi Standards, Metrology and Quality Organization for 18 years. He was the Director of Laboratories in SASO. His current research involves the study of the integration of graphene nanosheets into polymer to improve their properties.

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