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## The Role of Mixed Graphene/Carbon Nanotubes on the Coating Performance of G/CNTs/Epoxy Resin Nanocomposites

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### Abstract

There is no doubt that, epoxy resin is one of the most important materials that has been widely used in coating technology. The present work is aimed to fabricate a new series of epoxy resin nanocomposites in the form of G/CNTs/EPY1-4 using simple dissolution method and ultrasonic assistance. The expected nanocomposites have been fabricated using 10% loading of different mixed ratios from G/CNTs. Four different G/CNTs mixed ratios were used 20/80%, 40/60%, 60/40%, and 80/20%. The structure of the G/CNT/EPY1-4 nanocomposites has been investigated and confirmed by normal characterization techniques including: X-ray diffraction (XRD), Fourier transforms infrared spectroscopy (FT-IR), Thermogravimetric analysis (TGA), Differential Thermal gravimetry (DTG) and field emission scanning electron microscopy (FE-SEM). T-25 and T-50 values for G/CNT/EPY1-4 nanocomposites were slightly higher than elegant epoxy. R-500 values for the fabricated materials were in the range of 8.98-10.04%. Furthermore, the role of mixed G/CNTs on the coating properties of epoxy resin was determined using electrochemical impedance and technique. The coating resistance of epoxy composites in the form of G/CNT/EPY1-4 was larger than that observed for elegant epoxy coating. G/CNT/EPY3 and G/CNT/EPY1 showed highest and the lowest coating impedance values respectively. In addition to that, the water sorption technique has been used as a complementary method for such coating behaviour. The water uptake was efficiently decreased in all the formulations compared to the epoxy due to the presence of G/CNTs reinforcing agents.

### Keywords

**Author Keywords:** [Epoxy resin](#); [Mixed Graphene/Carbon nanotubes](#); [Coating performance](#); [Electrochemical impedance](#)

**KeyWords Plus:** [CONDUCTIVE POLYMER COMPOSITES](#); [EPOXY-RESIN](#); [MECHANICAL-PROPERTIES](#); [THERMAL-CONDUCTIVITY](#); [DIELECTRIC-PROPERTIES](#); [CARBON NANOTUBES](#); [NANOPARTICLES](#); [FABRICATION](#); [FILMS](#); [COMBINATIONS](#)

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