

# **Oxygen free graphene/TiO<sub>2</sub> nanocomposite synthesis technique for dye-sensitized solar cells photo-anode**

## **ABSTRACT**

This article presents the techniques for the synthesis of oxygen-free graphene for doped in titanium dioxide TiO<sub>2</sub>. This work hypothesised the introduction of a new method for incorporating graphene nanoplatelets GNP in Anatase TiO<sub>2</sub> using adhesive nanocomposite material, which has been done to enhance the conductivity of the nanocomposite. This work also argues with lamina problems in Graphene oxide, which reduce electron mobility and cause the electron pathways to be rerouted. The characteristics of the nanocomposite measure the colour difference, the photocurrent-voltage measurement (I-V measurement), Raman Spectroscopy, and Energy Dispersive Spectroscopy EDS. Simple visual observation results for various thin films show a colour shade difference due to the better dispersion of the nanocomposites. The uniform colour change with different weight ratios can also show the distribution of graphene sheets. Similarly, similar ratios to photocurrent-voltage readings were obtained by the different nanocomposite weights in I-V measurement. The Raman spectroscopy also recognises the existence of well-composed 2D energy band GNP sheets cooperated inside the TiO<sub>2</sub>. Finally, the work concludes with the reduction of the oxygen in weight ratios atomic, which lead to a better atomic level and the optimal weight ratio of GNP sheets to Titanium to increase the free mobility of electrons.

**Keyword:** Tio<sub>2</sub>; GNP; Nanocomposite; Low-Cost method; Dsscs