# PHOTOCURRENT GENERATION OF ZNO/RGO NANOCOMPOSITES SYNTHESIZED USING A SOL-GEL METHOD

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**Abstract**

ZnO nanoparticles (NPs)/reduced graphen oxide (rGO) nanocomposites were synthesized using the sol-gel method in a gelatin medium. Different concentrations effects of graphene oxide (GO) on the structure and optical properties of ZnO nanoparticles (NPs) were investigated. X-ray diffraction patterns (XRD) and Fourier transform infrared spectroscopy (FTIR) indicated that the GO sheets were reduced and changed to reduced graphene oxide (rGO) during the calcination of the nanocomposites at 400 °C. In addition, the XRD patterns of the NPs indicated a hexagonal (wurtzite) structure for all the products. Field emission scanning electron and transmission electron microscope (FESEM and TEM) images showed that the NPs were decorated and dispersed on the rGO sheets very well. In addition high resolution TEM (HRTEM) images revealed that the rGO concentration had an effect on the crystal growth process for the ZnO NPs. Furthermore, these studies showed that the NPs could be grown with a single crystal quality in an optimum rGO concentration. According to the XRD results that were obtained from pure ZnO NPs, the calcinations temperature was decreased by the RGO. Optical studies showed that the optical properties of the ZnO/rGO nanocomposite were affected by the rGO concentration. Finally, the ZnO/rGO nanocomposite was used to generate a photocurrent device. Observations showed that the photocurrent intensity of the nanocomposite was dramatically increased by increasing the rGO concentration, with an optimum rGO concentration.

**Keywords:** Graphene oxide, ZnO nanoparticles, Optical properties, Photocurrent

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