An Investigation on Structural, Electrical and Optical properties of GO/ZnO Nanocomposite

Virginia Mututu, Sunitha A K, Riya Thomas, Mayank Pandey, Manoj B*

Department of Physics & Electronics, CHRIST (Deemed to be University), Bengaluru, Karnataka, India

*E-mail: manoj.b@christuniversity.in

doi: 10.20964/2019.04.49

Received: 28 August 2018/ Accepted: 20 October 2018 / Published: 10 March 2019

Coupling of graphene oxide with metal oxide is an effective way to enhance the opto-electric properties of the composite. Herein, a hybrid structure of graphene oxide (GO) –Zinc oxide (ZnO) nanostructure was successfully designed and fabricated with varying concentrations of ZnO. The GO and ZnO nanoparticles were synthesized through Hummer's and simple precipitation method respectively. Structural and physiochemical properties were examined via X-ray powder diffraction, FTIR and UV-Vis spectroscopy. The XRD results of GO showed a peak at 2θ of 12.02° with particles of size 6nm and inter layer spacing 0.87 nm. The XRD patterns of ZnO nanoparticles showed a hexagonal unit cell structure and the average dimension of the sample was calculated to be 15 nm. The band gap of the synthesized GO is found to be 5.1 eV and that of ZnO to be 3.07 eV with the help Tauc plot. The dependence of various concentration of ZnO on the electrical behaviour is discussed by an impedance analyzer in the frequency range 100Hz to 1MHz. The ZnO/GO composite with best results have been obtained for 20% and 60 % ratios of ZnO. The composite has high dielectric permittivity and low loss tangent values and is identified as a promising candidate for energy storage applications.

Keywords: Nanocomposite, Graphene oxide, Tin oxide, physiochemical properties.

[FULL TEXT](#)

© 2019 The Authors. Published by ESG (www.electrochemsci.org). This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution license (<http://creativecommons.org/licenses/by/4.0/>).