

Green Synthesis of Zinc Oxide Nano Particles Using Tomato (*Lycopersicon esculentum*) Extract and Its Application for Solar Cell

Authors : Prasanta Sutradhar, Mitali Saha

Abstract : With an increasing awareness of green and clean energy, zinc oxide based solar cells were found to be suitable candidates for cost-effective and environmentally friendly energy conversion devices. In this work, we have reported the green synthesis of zinc oxide nanoparticles (ZnO) by thermal method and under microwave irradiation using the aqueous extract of tomatoes as non-toxic and ecofriendly reducing material. The synthesized ZnO nanoparticles were characterised by UV-Visible spectroscopy (UV-Vis), infra-red spectroscopy (IR), particle size analyser (DLS), scanning electron microscopy (SEM), atomic force microscopy (AFM), and X-ray diffraction study (XRD). A series of ZnO nanocomposites with titanium dioxide nanoparticles (TiO₂) and graphene oxide (GO) were prepared for photovoltaic application. Structural and morphological studies of these nanocomposites were carried out using UV-vis, SEM, XRD, and AFM. The current-voltage measurements of the nanocomposites demonstrated enhanced power conversion efficiency of 6.18% in case of ZnO/GO/TiO₂ nanocomposite.

Keywords : ZnO, green synthesis, microwave, nanocomposites, I-V characteristics

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