

Modification of energy band gap in natural dye-sensitized ZnO nano particles

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The dye-sensitized solar cells (DSSCs) based on nano crystalline TiO₂ exhibit high power conversion efficiency one of the most commonly substitutes for low cost solar-energy-conversion devices at high temperature. ZnO is another promising metal-oxide semiconductor that can be replace TiO₂ because of its higher electronic mobility as compared to TiO₂ and its energy level of conduction band is similar as in TiO₂. In this research, Nanocrystalline particles of ZnO have been prepared by sol gel method using prepared nano particles to prepare mesoporous electrodes for dye-sensitized solar cells. The anatase phase of ZnO has been confirmed using XRD. Transmission Electron Microscopy (TEM) has been used to confirm the particle size of the ZnO nano particles. The coating of natural dyes extracted from spinach and marry gold has been done on ZnO nano particles. The Scanning Electron Microscope and EDX study reveals the morphology and elemental composition of the pure and natural dye coated ZnO nano particles. Tauc's plot confirmed decrease in band gap of ZnO nanoparticles with natural dye coating. Raman scattering spectra reveal active phonon modes for all of the synthesized samples. The natural dye coated nano particles are found to be better candidates for DSSCs.

Biography:

Prof Dalvinder Singh Grewal has been Dean Research Desh Bhagat University, Group Director and Advisor Group of institutions having 40 years teaching/research experience. He has 3 PhDs (Computer Science, Management and English) and has guided 28 research students up to Ph D level including in Nanotechnology. He has written 45 books and 276 papers: chaired 8 international and presented papers in 46 national and international seminars. He started B.Tech, M.tech and PhD Courses in Nanotechnology in India first of all. He is on the editorial panel of 12 international Journals including SAGE.