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# Enhanced the Photovoltaic Performance of Dye Sensitized Solar Cells using Cu and Mn doped CdSe Nanoparticles

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**Abstract :** Cadmium selenide (CdSe), Cu and Mn-CdSe nanoparticles were synthesized by solvothermal method using polyethylene glycol as a capping agent. The structures, elements, shape and spectral properties of these nanocrystals are investigated. The obtained Cu-CdSe and Mn-CdSe nanocrystal are consistent with the hexagonal wurtzite crystal structure and the crystallite sizes were found to be 13.70 nm, 8.05 nm, and 6.3 nm respectively. The band gap energy was computed from the absorption data as 1.7 eV for CdSe nanoparticles, 2.7 eV and 3.9 eV for Cu and Mn-CdSe nanoparticles respectively. Scanning electron microscope (SEM) illustrated that the dopants adhered to the substrate uniformly and the effective doping was further confirmed by EDX spectral analysis. The solar cell was fabricated using $TiO_2$ as photoanode, CdSe and Cu, Mn-CdSe as a counter electrode, ruthenium dye as sensitizer and $I^-/I_3^-$ as electrolyte and the maximum conversion efficiency of solar cells were found to be 3.57 % for CdSe, 4.16 % for Cu-CdSe and 5.52 % for Mn-CdSe nanoparticles.
**Key words :** semiconductors, solvothermal, Cu, Mn-CdSe nanoparticles, solar cell.

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