

Optimization the Morphology of Polymer-Nanoparticle Composite Film for Bulk Hetero-Junction Solar Cells

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Fabrication of the bulk hetero-junction solar cells based on CdSe and P3HT composite active layer were performance, and the morphology control of nanocrystal-polymer composite films was investigated to reduce the surface roughness of the active layer. We demonstrate that the use of binary solvent mixture in which one component is a ligand for the nanocrystal is effective in controlling the dispersion of nanocrystal in the polymer matrix. The concentration of the solvent mixture was varying; phase separation behavior between the nanocrystal and polymer could be controlled from micrometer to nanometer scale. The nanocrystal-polymer blended solar cells fabricated in this study showed the efficiency of 0.042% under AM 1.5 solar simulator light source (100 mW/cm²).

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