

Hybrid Bulk Hetero-junction Solar Cells Using Semiconductor Nanocrystals

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Bulk hetero-junction (BHJ) solar cell is one of the promising candidates for next-generation solar cells due to its advantage in low-cost production, flexibility and adaptability. BHJ photovoltaic devices consist of light absorbing polymers in contact with semiconductor nanoparticles, fullerenes or nanostructured metals. These nanomaterials affect the electro-optical properties of the conducting polymer, which include assisting in absorption of red and near-IR photons. To improve the cell efficiency, it is necessary to have interpenetrating bi-continuous networks of electron-accepting and hole-accepting components within the device structure. The recent technique of making hybrid BHJ solar cells rely on blending separately prepared nanocrystals with conjugated polymers.. In this presentation, we summary the results of the blend of polymer and semiconductor nanoparticles, as an active layer for BHJ solar cells, and especially, solvent behavior, effect of surface capping molecule on inorganic nanostructures, thin film surface morphology, and electrical and optical properties of the composite thin film are intensively investigated in an effort to improve the cell performance.