

Synthesis and Application of Inorganic Nanoparticles for Bulk Hetero-junction Solar Cells

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For the last decade, many researcher groups tried to make the photovoltaic devices using a mixture of inorganic nanoparticles and conjugated polymers, combines the unique properties of inorganic nanoparticles with the film forming properties of conjugated polymer. Hybrid solar cells have a low power conversion efficiency of ~ 3 %, however, they have a great attendance in the PV market because of high optical absorption, low cost, simple to fabricate, and major pay back. The structure of the device is called hybrid because the active layer consists of a blend of electron donor polymer and electron acceptor inorganic. These inorganic nanoparticles have different structures like as: spherical, nanorods, elongated, hyperbranched and tetrapods, ect. They have been studied and reported in the literature for higher absorption and improved the percolation pathways for electron transport in the hybrid structure design. In this report, we will discuss in detail on hybrid bulk hetero-junction solar cells, especially on its basic principles, nanoparticles synthesized and the effects of surfactant ligand, size, and sharp on the device performance.