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# CdSe Nanocrystal Quantum Dots Based Hybrid Heterojunction Solar Cell

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Semiconductor nanocrystal quantum dots (NQDs) have recently attracted considerable interest for use in photovoltaics. Band gaps of NQDs can be tuned over a considerable range by varying the particle size thereby allowing enhance absorption of solar spectrum. NQDs, synthesized using colloidal routes, are solution processable and promise for a large-area fabrication. Recent advancements in multiple-exciton generation in NQD solutions have afforded possible efficiency improvements. Various architectures have attempted to utilize the NQDs in photovoltaics, such as NQD-sensitized solar cell, NQD-bulk-heterojuction solar cell and etc.

Here we have fabricated CdSe NQDs with the band gap of 1.8 eV to 2.1 eV on thin-layers of p-type organic crystallites (1.61 eV) to realize a donor-acceptor type heterojuction solar cell. Simple structure as it was, we could control the interface of electrode-p-layer, and n-p-layer and monitor the following efficiency changes. Specifically, surface molecules adsorbed on the NQDs were critical to enhance the carrier transfer among the n-layer where we could verify by measuring the photo-response from the NQD layers only. Further modifying the annealing temperature after the deposition of NQDs on p-layers allowed higher conversion efficiencies in the device.