

Effect of thermal annealing on the optoelectronic properties of CdSe nanoparticles

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Thermal annealing effect on the structural and optical properties of synthesized CdSe nanoparticles has been elucidated and applied on the performance improvement of bulk hetero-junction solar cell. Improvement in crystallinity and cell stabilization of as-synthesized CdSe nanoparticles could be achieved by controlling the annealing parameters in air or oxygen at relatively higher temperatures (250°C ~ 450°C). Synthesized and annealed CdSe nanoparticles were characterized by HR-TEM, XRD, XPS and PL measurements. XRD analysis exhibited air annealing-induced phase transition in the nanocrystalline CdSe from cubic Zinc Blende to hexagonal Wurtzite structure. After annealing, the intensity of PL emission peak was substantially increased and the solar cell with optimized active layer showed enhancement in power conversion efficiency.

This work was supported by grant No. RTI04-01-04 from the Regional Technology Innovation Program of the Ministry of Knowledge Economy (MKE) and the researchers involved in this work was supported by the 2nd phase of the BK21 Program.