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Improved solar cell based on ZnO nanowires and CdSe quantum dots[1] ATHAVAN NADARAJAH, ROBERT C WORD, ROLF KONENKAMP, Portland State University — We report a solar cell nanostructure that incorporates CdSe quantum dots embedded in a ZnO nanowire film and a hole-conducting polymer layer. This arrangement allows for enhanced light absorption and efficient collection of the carriers. Microscopic studies show the conversion of CdSe quantum dots into an inter-connected and continuous polycrystalline thin film upon annealing in cadmium chloride ambient. This structural change of the quantum dot layer destroys the quantum confinement and improves the charge transport in the layer significantly. It also provides for improved charge transfer to the adjacent contacting layers. The optimized solar cell exhibits an external quantum efficiency of 65 percent and an energy conversion efficiency above 2 percent.

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