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CdSe Quantum Dot-P3HT Polymer Composite Solar Cells

최상현, 박일규, 이성훈
광주과학기술원 신소재공학과

We report experiments on combining classical inorganic photovoltaic materials based on the CdSe Quantum Dots and regioregular poly(3-hexylthiophene)(P3HT) polymer to form bulk heterojunction solar cells.

We produced high-quality bare CdSe Quantum Dots(QDs) using wet chemical synthetic methods. X-ray Powder Diffraction and Transmission Electron Microscopy(TEM) and UV-Vis absorption and photoluminescence spectroscopies are consistent with nanocrystals containing nearly monodisperse CdSe QDs. X-ray diffraction pattern and TEM show that CdSe QDs is wurtzite crystalline structure.

We find a significant shift of the effective photoluminescence, indicating that charge separation occurs at the polymer/nanocrystal interface. We also support our interpretation of the optical characterization with detailed TEM and SEM studies of the morphology of the composite materials.