The Investigation of Physical Properties of Synthesized Tributylamine capped CdSe Nanoparticles by XPS, XRD and PL

트롱윈탐윈, 박진호*
영남대학교
(chpark@ynu.ac.kr*)

Cadmium selenide is a great attention to used II-VI group semiconductor whose band gap energy (1.74 eV) lies in visible spectrum and have been used as n-type materials active layer for the simple, low-cost high performance bulk hetero-junction solar cells.
We report the CdSe nanoparticles of 2 ~ 7 nm sizes have been synthesized by hot injection method and capped by tributylamine surfactant. The surfactant was found to instead of original trioctylphosphine oxide (TOPO) surfactant which purpose to improve of power conversion efficiency of the bulk hetero-junction solar cells performance. The physical properties of CdSe nanoparticles have been analyzed by using the systematically techniques. Resulting, the photoluminescence emission peak was blue shifted to higher energy when the surfactant exchanged from TOPO-capped to tributylamine capped CdSe. The surface composition and the structure of CdSe nanoparticles can be determined by XPS and XRD. Finally, tributylamine also exhibits good charge transport behavior showing the increase in short circuit current density (Jsc) as compare with TOPO in the BHJ solar cells performance.