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## Synthesis and characterization of CdSe quantum dots of phosphine-free colloidal method under various conditions

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Recently, quantum dots have been investigated as promising optoelectronic materials because of its unique optoelectronic properties and high stability compared with bulk material by quantum confinement effect. Quantum dots have been studied to solve the limitations of commotional optoelectronic device. For example, the luminescence wavelength can be shifted to a visible wavelength range with quantum dots. Therefore, quantum dots optoelectronics can be applied into not only biochemical applications but also light emitting diodes (LEDs), laser and fluoresent biological label. The composite semiconductor nanocrystals such as CdS, CdSe and ZnSe have been studied for photoluminescent quantum dots materials. Above all, CdSe is advantageous materials because it has bright luminescence in the visible range of the optical spectrum and easily fabricable in well-dispersed nano-sized crystals. The properties of CdSe quantum dots core such as reaction temperature, concentrations and time can be varied using the synthetic parameters. The most of cases, CdSe quantum dots were synthesized by a colloidal process with phosphine (PH<sub>3</sub>) precursor such as TOP, TOPO and TBP. However, conventional colloidal methods with PH<sub>3</sub> were suitable, hazardous and pollutive. In this study, quantum dots are successfully synthesized using phosphine-free colloidal method under various conditions is confirmed to control surface properties. In order to evaluate the size dependence of CdSe crystal, synthesis temperatures were changed from 240°C to 300°C and precursor ratio (Cd:Se) was controlled. The optical properties of the synthesized CdSe quantum dots were confirmed using photoluminescence (PL). The microstructure and phase developments were measured by transmission electron microscopy (TEM) and X-ray diffractometer (XRD) respectively.

### Biography

Hye Mi Cho had a BS in Materials Engineering and a Master of Ceramic Engineering degree. So, as a structural analysis expert, I am doing analysis work to help research.

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