

Synthesis of Highly Luminescent Nanocrystals for Light Emitting Diodes

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Semiconductor nanocrystals have gotten attention for light emitting diodes(LEDs) due to its size tunable and solution processable property. In addition, high quantum yield and better photostability than OLEDs are advantageous to LEDs. For applications, one of the mainly used materials for LEDs is Cadmium Selenide. However, Cadmium is highly toxic materials for human health. A lot of candidates for Cd-free semiconducting materials are synthesized such as silicon, copper sulfide, indium phosphide, copper indium disulfide(CIS) and etc. Above all, CuInS₂ is a best candidate for Cd-free semiconducting materials since it has high fluorescence efficiency. In this research, we synthesize various CIS nanocrystals by control of the ratio of copper precursor and indium precursor. For enhancing the quantum yields, surface passivation is required, so we passivate CIS nanocrystals with wide band gap shell materials and discuss about differences among the shells.