

## Advanced Stability of Semiconductor Dot-in-Rod Structure by Controlling the Thickness of Rod

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We synthesized CdSe/CdS semiconductor dot-in-rod nanocrystals having different thickness. The surface of quantum rods as well as quantum dots is very important in a view of stability for conventional light-emitting device. Especially, lack of proper material to emit light in anisotropic shapes makes it harder to synthesize the rod structure with sufficiently high quantum yield than red emitting one. Thus, we enhanced photoluminescence quantum yield due to introduction of alloying layer and passivation with rod structure. Furthermore, we studied on separation of charge inside the semiconductor dot-in-rod structure which determines how much fluorescence diminishes with electric field on the photoluminescence based light-emitting device. To enhance charge separation in the dot-in-rod structure, we have deposited cadmium halide on the rod shell surface and exchanged the ligand on the rod shell surface into thiolate. Likewise, the enhanced conductive and enhanced luminescent nanocrystals can be a potential candidate of light emitter for quantum dot light emitting diodes and bio-imaging.