The role of shell thickness of quanutm dots to Performance of Light-Emitting Devices Based on Type-I Core/Shell Heterostructure

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The structure of quantum dots(QDs) is the keypoint which determines the performance of quantum dot light emitting devices. Here, we synthesized core/shell heterostructureCdSe/Zn1-XCdXS QDs with different shell thicknesses and tested the QDs in electroluminescent device. Accroding to spectroscopic analysis, the non-radiative decay pathways in QDs (e.g. energy transfer, charging, and non-radiative Auger recombination) are attenuated while the shell thickness increase. As a consequence of attenuation, the device efficiency and the efficiency roll-off characteristics on high current densities are enhanced. The devices contained CdSe/Zn1-XCdXS with the thickest shell (core radius: 2 nm, total size: 8.3 nm) presenthigher device efficiency (peak E.Q.E. ~ 7.4 %) and brightness(Max luminance > 100,000 cd/m2) than thin shell one (core radius: 2nm, total size: 4.5 nm).