

Layer-by-Layer Deposition of Quantum Dots for Optoelectronic Application

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The layer-by-layer deposition method has been considered to be one of the most promising methods to incorporate nano-objects into controlled structures or phases. In present study, we demonstrate the preparation of all-QD multilayer films to take advantage of QD's promising photophysical properties. The all-QD multilayer films, fabricated by spin-assisted layer-by-layer deposition method, demonstrate the linear growth behavior with increase in the number of QD bilayers. Oscillating periodic tendency was observed in both UV-vis. and PL spectra which were in good agreement with the microcavity model. The EL devices comprising all-QD multilayer films show improved performance compared with devices comprising QD/polymer multilayer films in terms of turn-on voltage, current density, and brightness. These characteristics suggest that all-quantum dot films are suitable for optoelectronic applications such as light emitting diodes, chemo / bio sensors, and lasing materials.