

Measurement of Quantum dots light-emitting devices stability with spectroscopic analysis

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We have investigated quantum dots light emitting diodes (QD-LEDs) stability with Time-Correlated Single Photon Counting System (TCSPC). We have synthesized inverted QD-LEDs with CdSe/Zn1-XCdXS core/shell Type-1 heterostructured QDs (Core radius: 2nm, Shell thickness: 6nm, total diameter: 16nm) but with different organic hole transport layer (HTL). While operating device we measured QDs lifetime with TCSPC. QDs degradation occurred in very early time of device operation and it affect little in device efficiency. QDs are stable but as time goes by device brightness decreases. With different HTL, QD-LEDs have shown different lifetime. Spectroscopic analysis reveals that degradation in QD-LEDs is resulted from QDs charging and HTL degradation. More stable device could be realized with different HTL.