White Light QD-LEDs

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We are developing white-light emitting quantum dot LEDs (QD-LEDs) for use as planar white-light sources in the full-color active-matrix displays with color filters and in future solid-state lighting. Our white QD-LEDs consist of organic charge transport layers with a QD monolayer sandwiched between them. This device architecture enables independent processing of the charge transport layers and the emissive layer. The independent processing of QDs is a result of the recent development of the QD printing technique, which allows for the solvent-free deposition of QD monolayers onto various organic materials [1]. By mixing different amounts of high quantum-yield colloidal core/shell QDs (red CdSe/ZnS, green ZnCdSe/ZnS, blue CdS/ZnS), we demonstrate different QD-LED colors. Figure 1a shows electroluminescence of the white QD-LED with the CIE (Commission International de l’Eclairage) coordinates of (0.42, 0.41). Figure 1b and inset of Figure 2 also show that CIE coordinates vary only slightly under the different applied bias and different operation time [2].

REFERENCES