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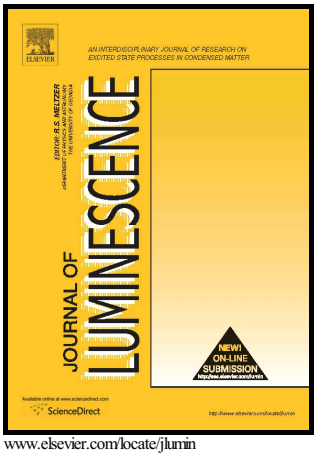

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Strong microcavity effects in hybrid quantum dot/ blue organic light-emitting diodes using Ag based electrode

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Abstract

We investigated the color conversion characteristics of a quantum dot/organic light-emitting diode (QD/OLED) by altering blue emission using the microcavity effect. Compared to the ITO-based OLED, the WO_3/Ag/WO_3 (WAW)-based OLED has a narrow shape of resonance and high cavity enhancement factor. As a result, the peak emission intensity wavelength remarkably shifts as the thickness of the WO_3 layer increases and the WAW-based OLED with inner WO_3 thickness of 120 nm shows an additional emission peak at 420 nm due to the second resonance. As the thickness of the WO_3 layer increases, the color coordinates of the hybrid QD/OLED with the ITO anode are nearly unchanged. However, hybrid WAW-based devices exhibit distinct color coordinates, such as nearly blue light, nearly green light and nearly white light with color coordinates of (0.31, 0.37).

Keywords

OLED, quantum dot (QD), microcavity, WO_3/Ag/WO_3, color conversion