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Doping-free tandem white organic light-emitting diodes

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Abstract

Tandem white organic light-emitting diodes (WOLEDs) are of great research interest since they can greatly boost the performance compared with the single-unit counterparts. However, their structures are more complicated than those of single-unit OLEDs. Besides, to achieve high performance, the doping technology is required to tandem OLEDs, particularly for tandem WOLEDs, further complicating the structures. Herein, doping-free tandem WOLEDs, for the first time, have been demonstrated. By managing an effective doping-free charge generation layer to interconnect doping-free emitting layers/charge transport layers, high-performance doping-free tandem WOLEDs have been developed. The blue-yellow device accomplishes the simplified structure/short fabrication time/ reduced cost/ high efficiency/ low efficiency roll-off/low voltage/high luminance trade-off, which cannot be achieved by previous tandem WOLEDs. Remarkably, the efficiency (81.2 cd A^{-1}) is ~2-fold higher than