

**Supporting Information for**

**White organic light-emitting diodes with extremely low turn-on voltage at 1.5 V**

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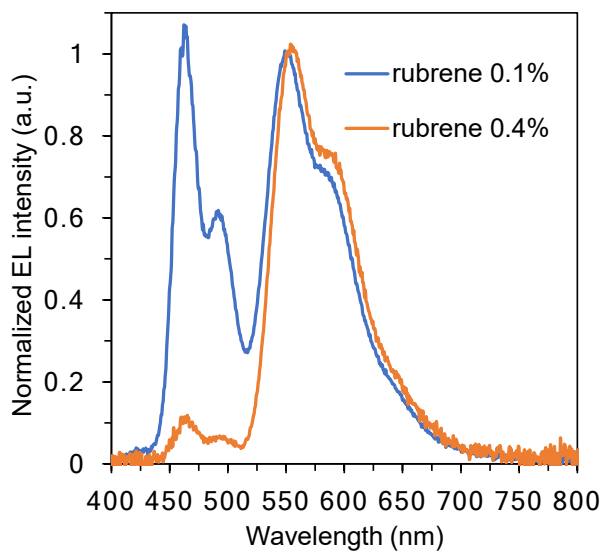
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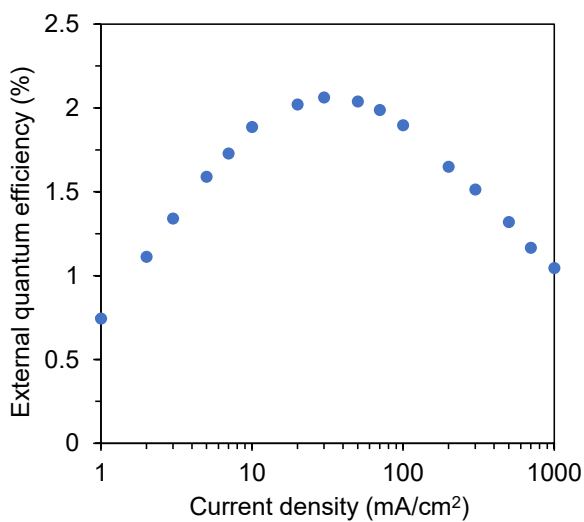
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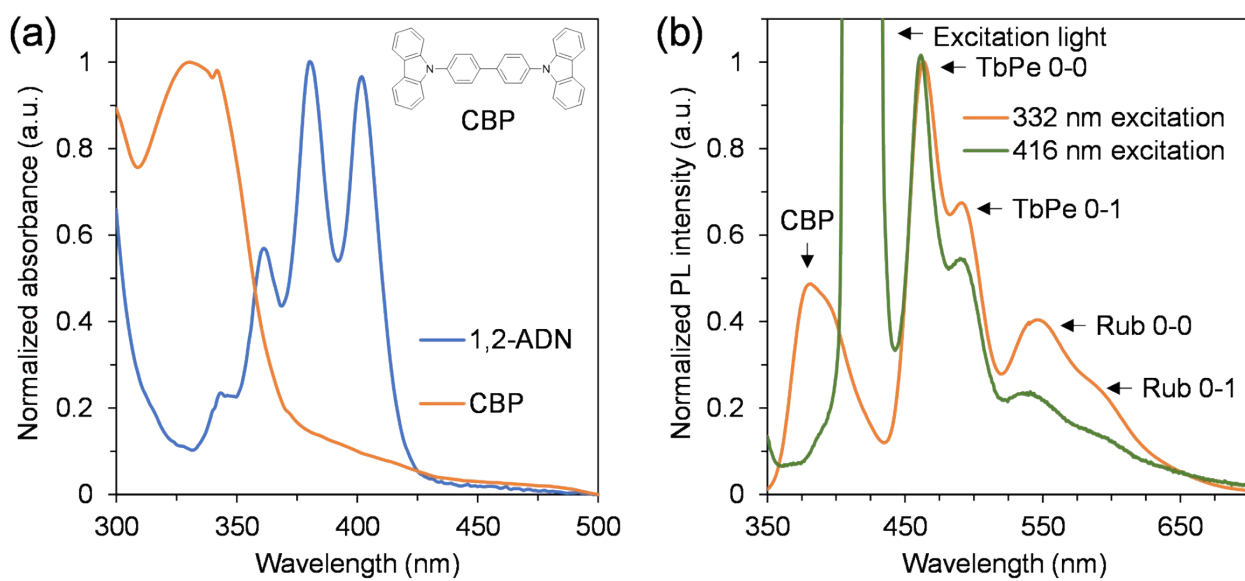
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**Figure S1.** (a) Normalized EL emission spectra of the double-doped UC-OLED with 0.65% of TbPe and 0.1% of rubrene, and with 0.4% of TbPe and 0.4% of rubrene at 10 mA/cm<sup>2</sup>.



**Figure S2.** External quantum efficiency of the double-doped UC-OLED with 0.65% of TbPe and 0.1% of rubrene.



**Figure S3.** (a) Absorption spectra of 1,2-ADN and CBP in the thin film. Inset: Chemical structures of CBP. (b) PL spectra of CBP film doped with 0.65% of TbPe and 0.1% of rubrene excited by 332 nm and 416 nm.