

Electronic Supplementary Information

Highly efficient terbium (III)-based organic light-emitting diodes obtained by exciton confinement

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1. Photophysical properties of Tb(PMIP)₃:DPPOC (1:1) and Tb(PMIP)₃:DCPPO (1:1) film

Photophysical Measurement: UV-Vis absorption spectra were recorded on a Shimadzu UV-3100 spectrometer. PL spectra were measured on an Edinburgh Analytical Instruments FLS920 spectrophotometer. PL decay lifetimes were measured by time-correlated single photon counting using an IBH Fluorocube instrument equipped with a 331 nm LED excitation source under ambient condition without encapsulation.

Co-deposited film of 70 nm was scanned at 548 nm at 298 K. Pure Tb(III) emission without any host peaks was observed. The absorbance spectra of pure Tb(PMIP)₃ shows mono wide peak around 280 nm, which is assigned to PMIP absorption. With the introduction of DPPOC and DCPPO, absorption peak around 230 nm arise from the aryl phosphine oxide moieties and peak at 280-290 nm exists from the π - π^* and n - π^* transitions of the carbazole unit.

The luminescence lifetime of Tb(PMIP)₃:DPPOC (1:1) was tested to be 764 μ s (82%), 306 μ s (18%) at 298 K.

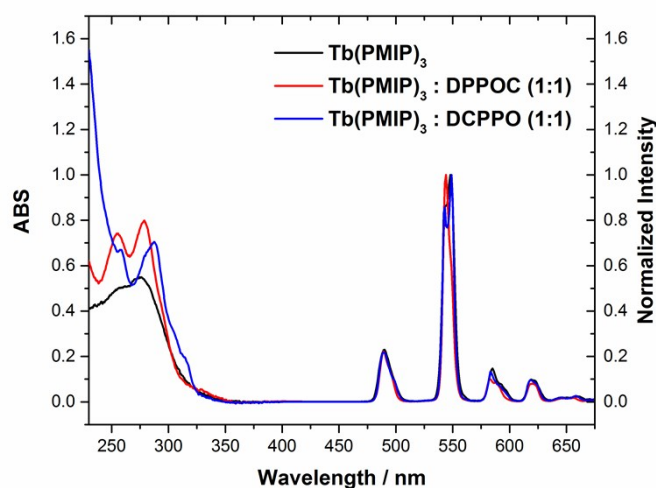


Fig S1. ABS spectra and emission spectra (ex at 280 nm) of 70 nm co-deposited film

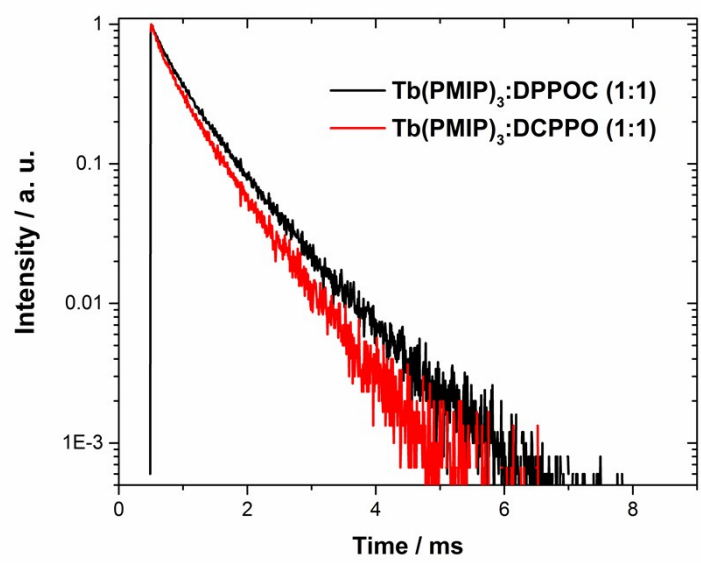


Fig S2. Transient decay spectra (ex at 280 nm) of 70 nm co-deposited film

2. Lifetime test

Device lifetime test: The devices were tested in after encapsulation in a glovebox instantly after fabrication. Then the device were tested with Keithley 2400 Sourcemeter at constant current mode. The initial Luminance were tested by a Spectra Scan PR650, and the former luminance were tested by a Hitachi F-4500 fluorescence spectrophotometer.

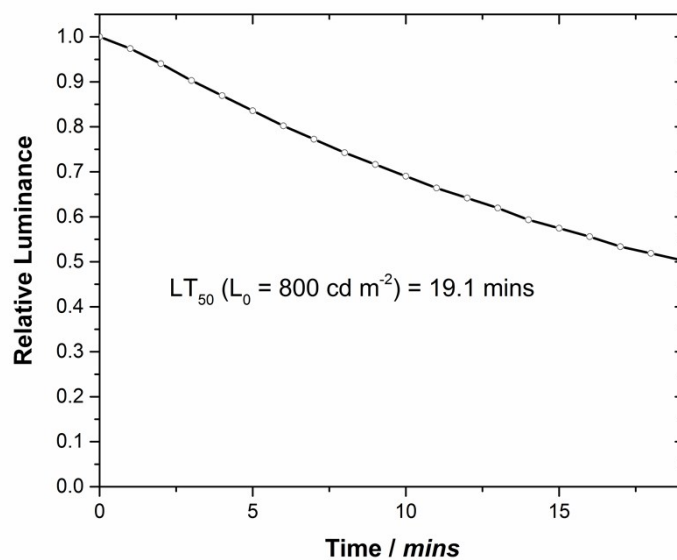


Fig S3. The operational lifetime of device E