Supporting Information

Enhanced Performances of Planar Heterojunction Organic Light-Emitting Diodes via Diluting N-type Transporter into a Carbazole-based Matrix

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Supplementary Figures and Tables

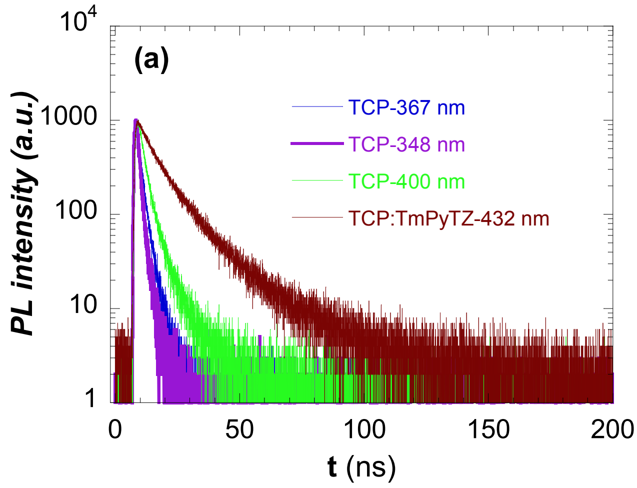

Fig. S1 Transient PL decay curves of (a) TCP pure film and its binary-mixed film with TmPyTZ (1:1, molar ratio) and (b) TAPC pure film and its binary-mixed film with TmPyTZ (1:1, molar ratio), where the observed emission wavelength is included in the legend. Obtaining transient PL decay data of TmPyTZ was unsuccessful because its emission intensity under our pulse optical source is beyond the detection limit.

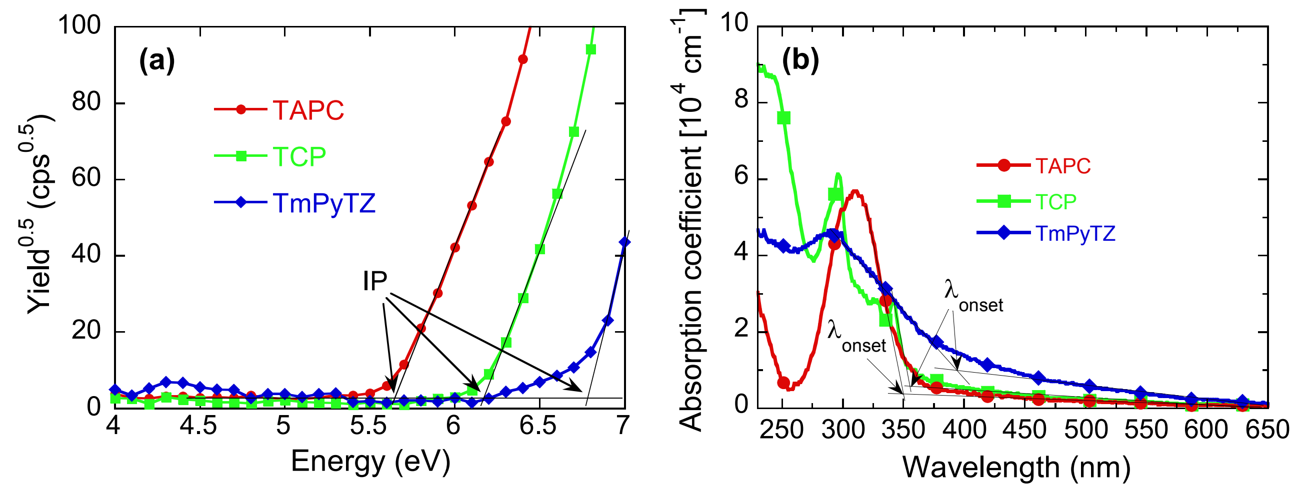

Fig. S2 (a) Ultraviolet photoelectron spectra and absorption spectra of TAPC, TCP and TmPyTZ thin films. Ionization potential (IP) value was extracted from the onset position, electron affinity (EA) value was estimated from this equation: EA=IP-E_g,^{opt}, where E_g,^{opt} was obtained from the equation: E_g,^{opt}=1240/λ_{onset}.

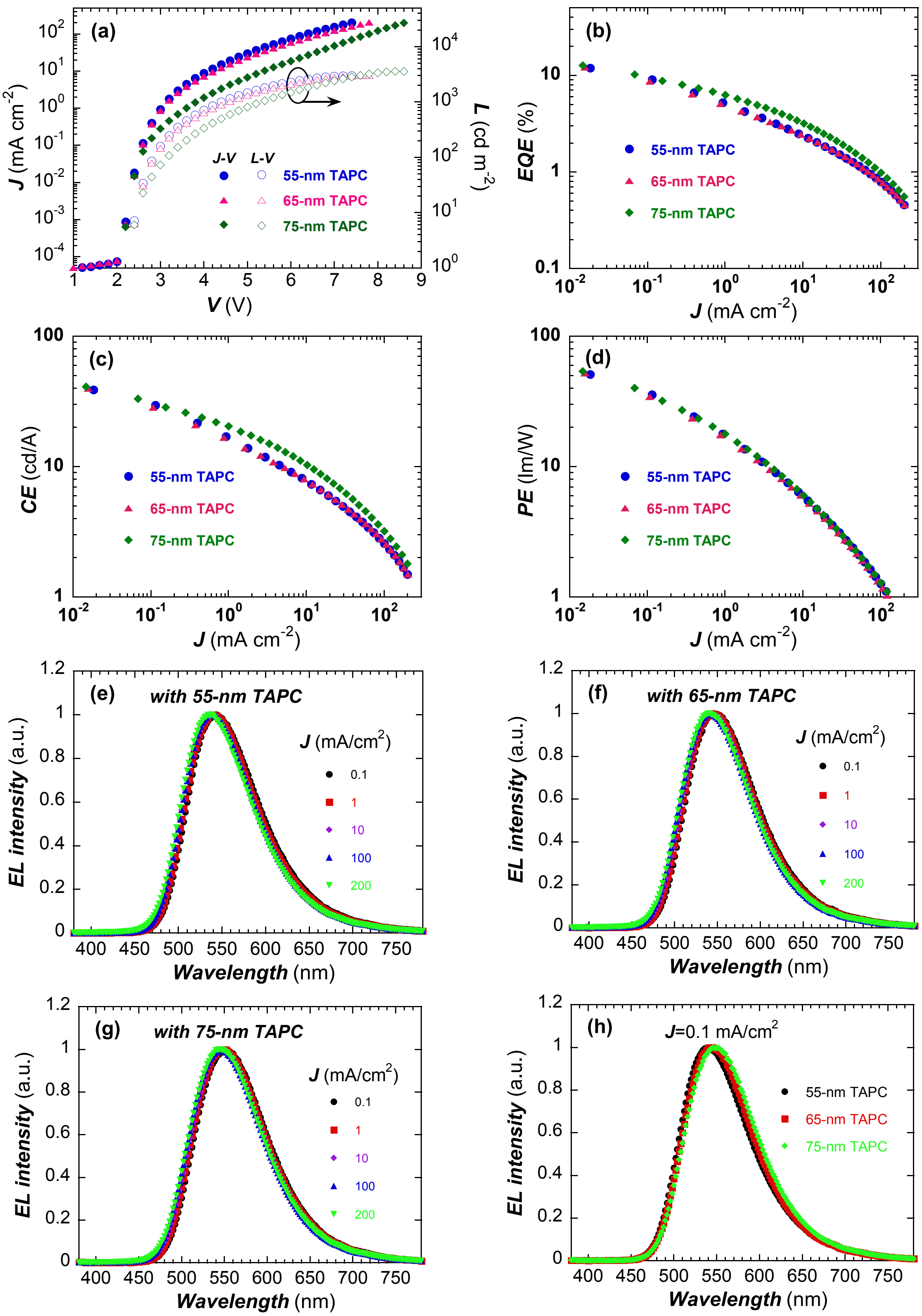

Fig. S3 Performance data of the devices with a various thickness TAPC hole transport layer and a TCP:50%TmPyTZ mixture layer: (a) J-V-L, (b) EQE-J , (c) CE-J, (d)PE-J, and EL spectra of the device under different current densities with a (e) 55-nm TAPC layer, (f) 65-nm TAPC layer and (g) 75-nm TAPC layer and (h) the comparative EL spectra of these devices under the current density of 0.1 mA/cm².

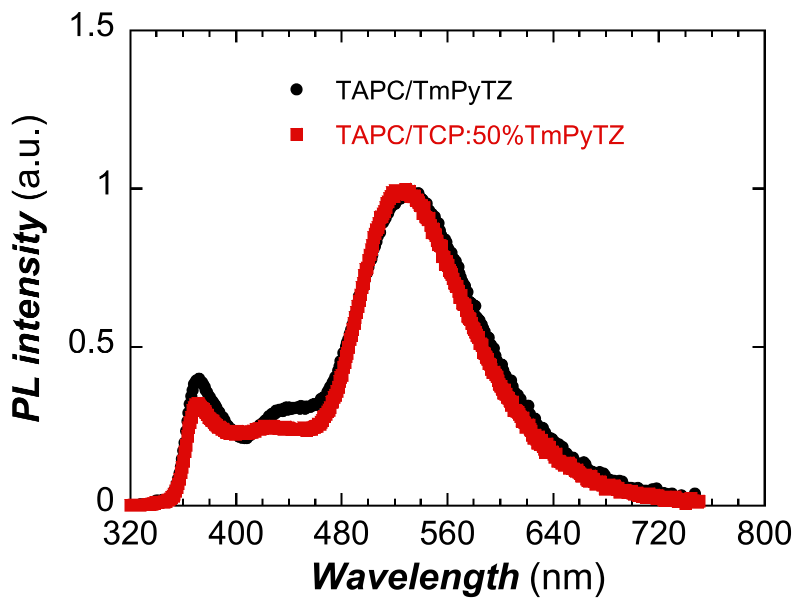

Fig. S4 Steady-state PL emission spectra of solid-state films consisting of TAPC (8 nm)/TmPyTZ (10 nm) and TAPC (8 nm)/TCP:50%TmPyTZ (10 nm). The excited light was radiated on the surface of the TAPC layer.