Supporting information

High efficiency green TADF emitters of acridine donor and triazine acceptor D-A-D structure

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1 These authors contributed equally to this work

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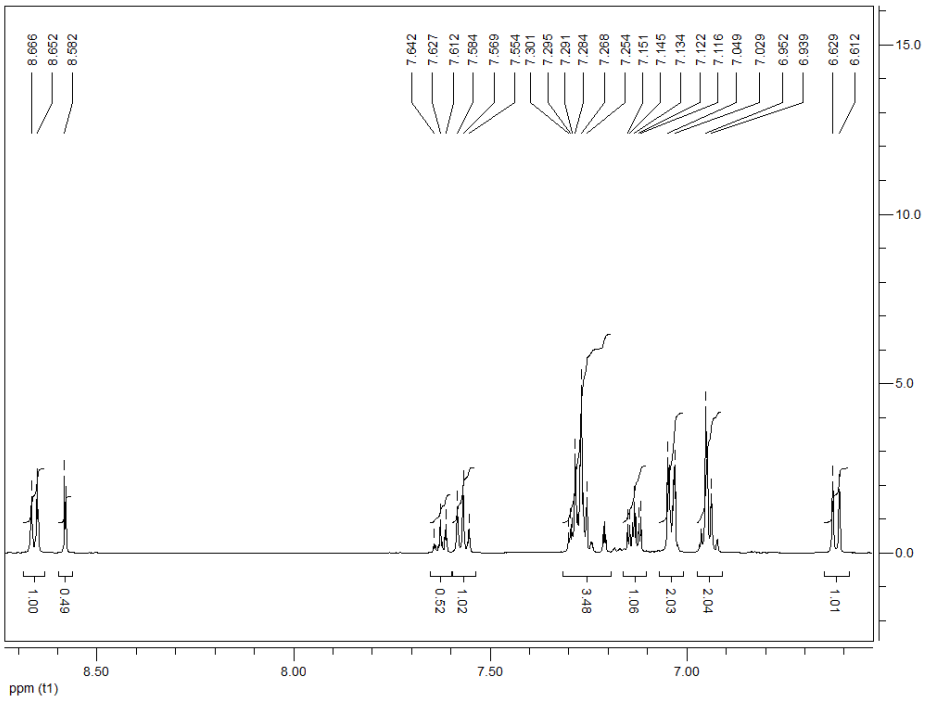

Figure S1. ^{1}H NMR spectra of TRZ-DDPAc.

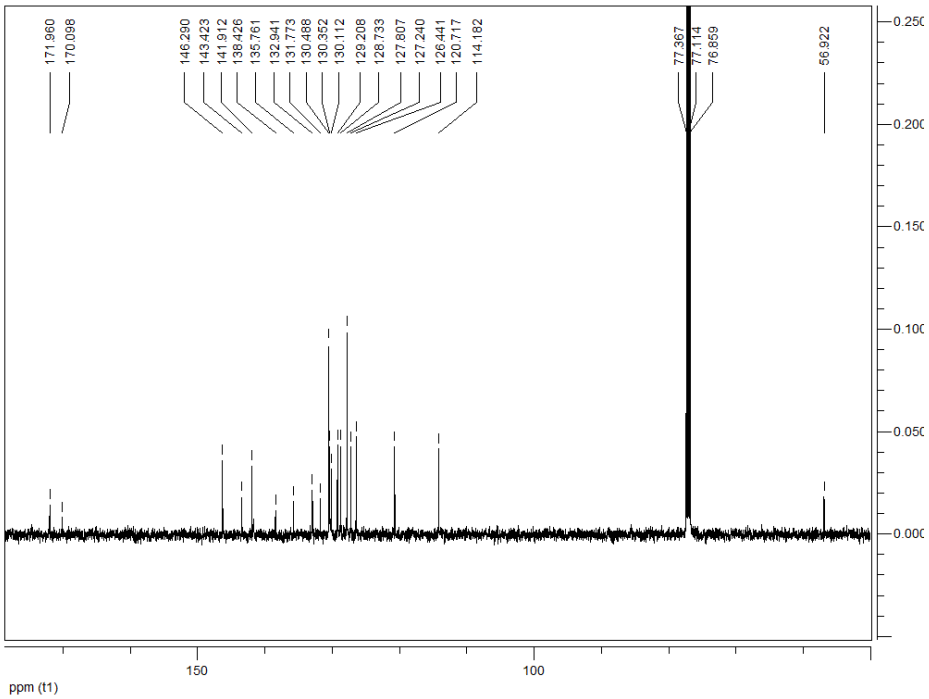

Figure S2. ^{13}C NMR spectra of TRZ-DDPAc.

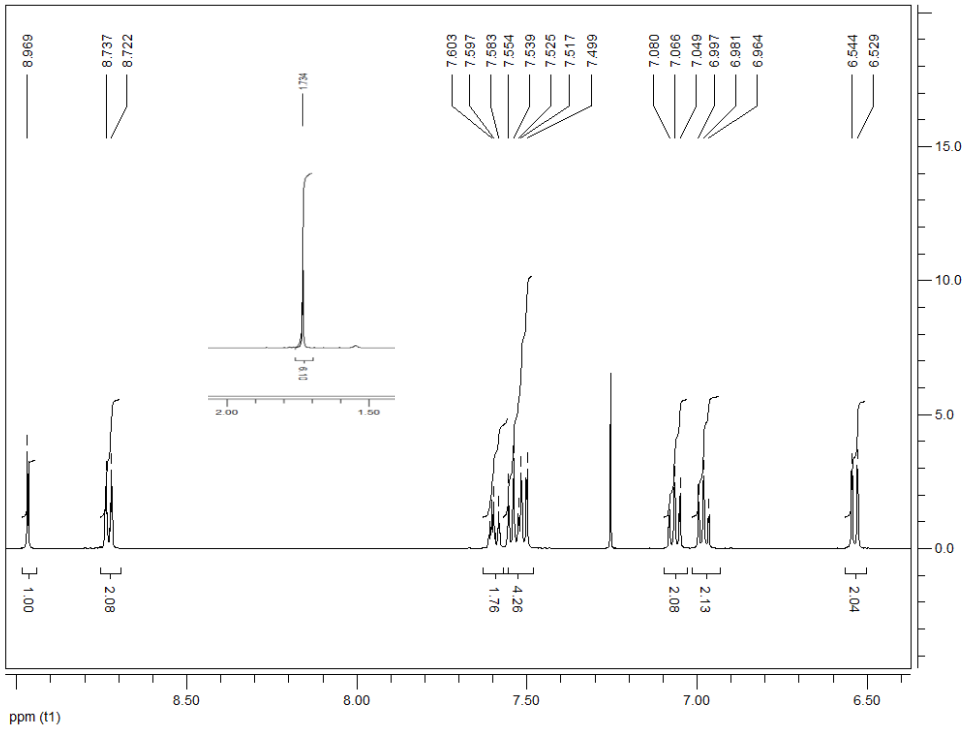

Figure S3. ^{1}H NMR spectra of TRZ-DDMAc.

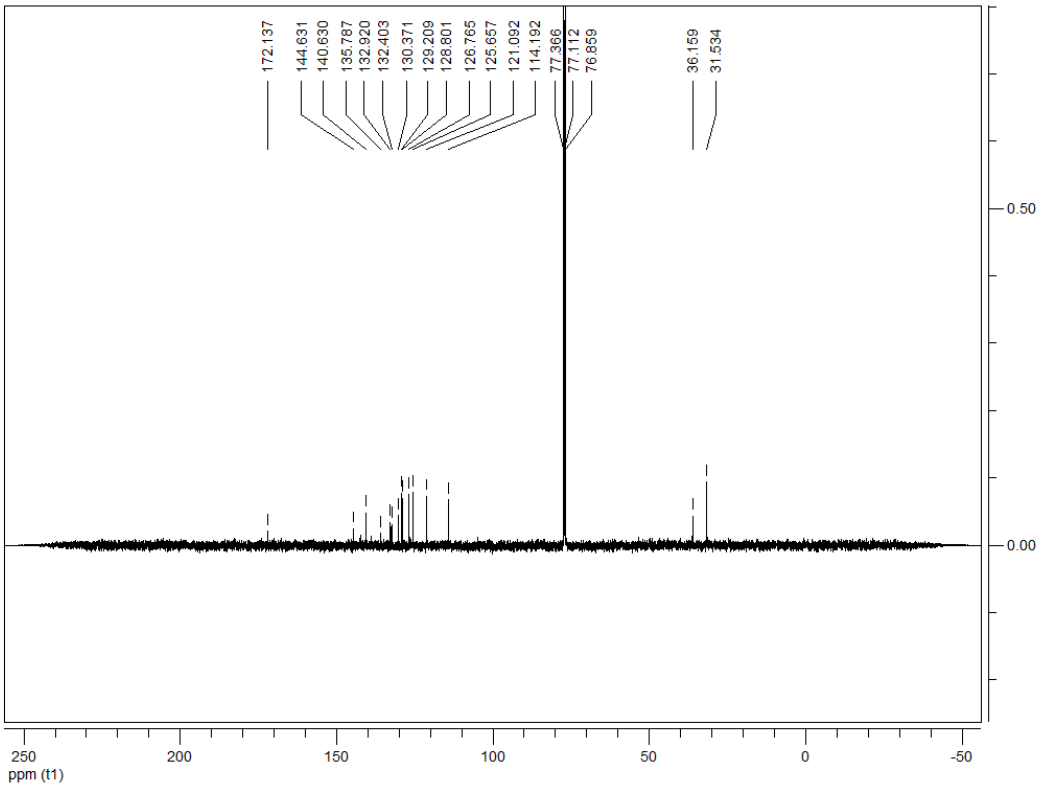

Figure S4. ^{13}C NMR spectra of TRZ-DDPAc.

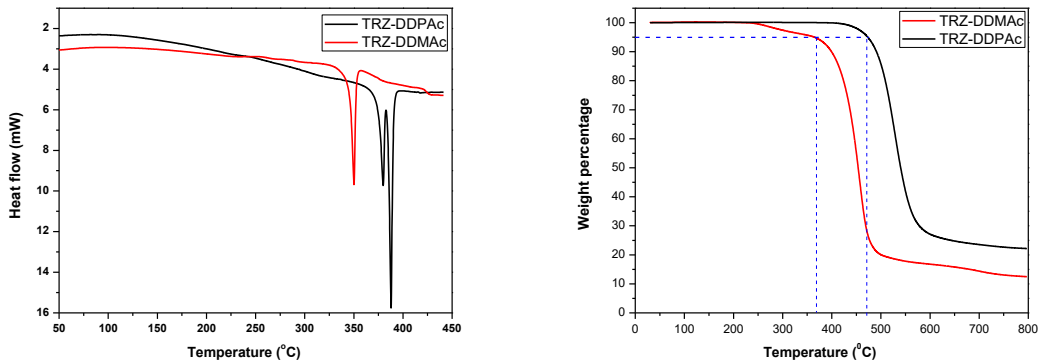

Figure S5. Differential scanning calorimetry (DSC) and thermo gravimetric analysis of both TADF emitters.

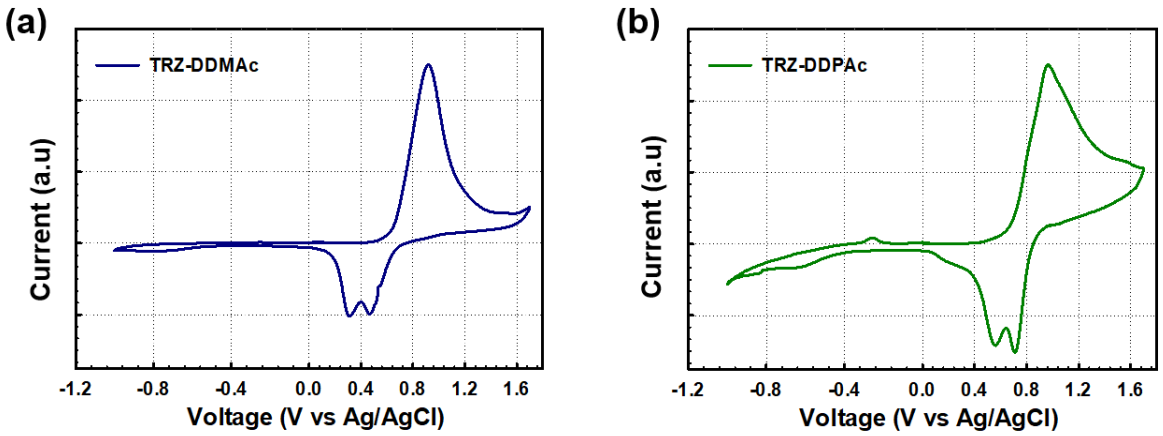

Figure S6. Cyclic voltammetry curve of (a) TRZ-DDMAc, and (b) TRZ-DDPAc.

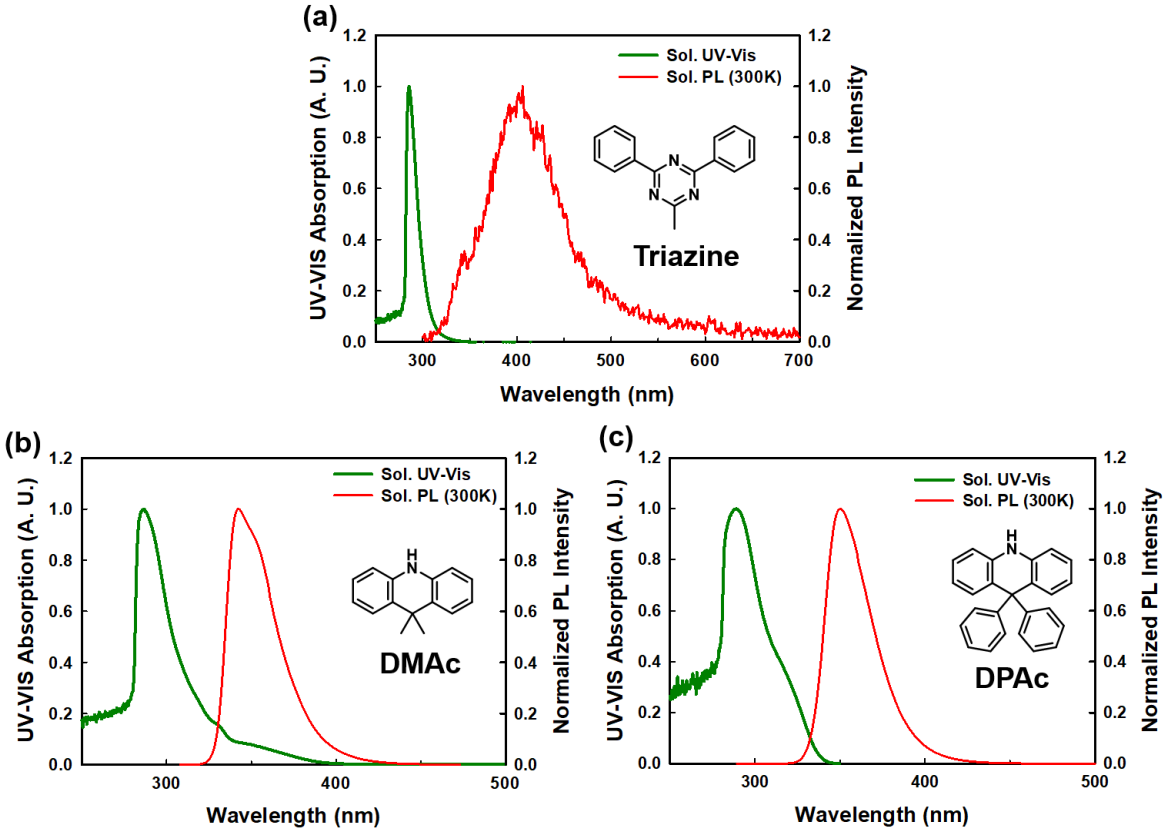

Figure S7. UV-vis absorption and photoluminescence spectra (in Toluene) of (a) traizine, (b) DMAc, (c) DPAc, respectively.

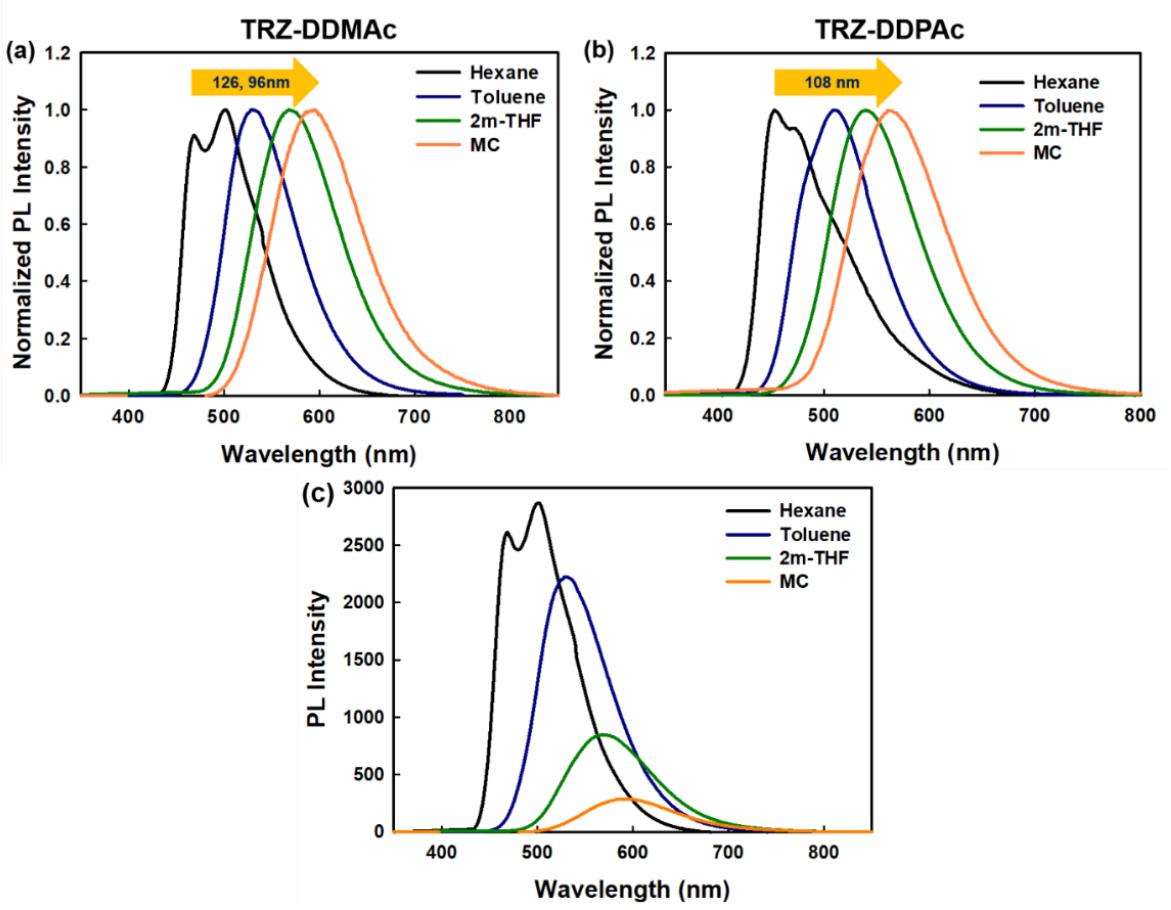

Figure S8. Solvatochromic effect of (a) TRZ-DDMAc and (b) TRZ-DDPAc (c) decreasing photoluminescence intensity of TRZ-DDMAc with respect to polarity of solvents.

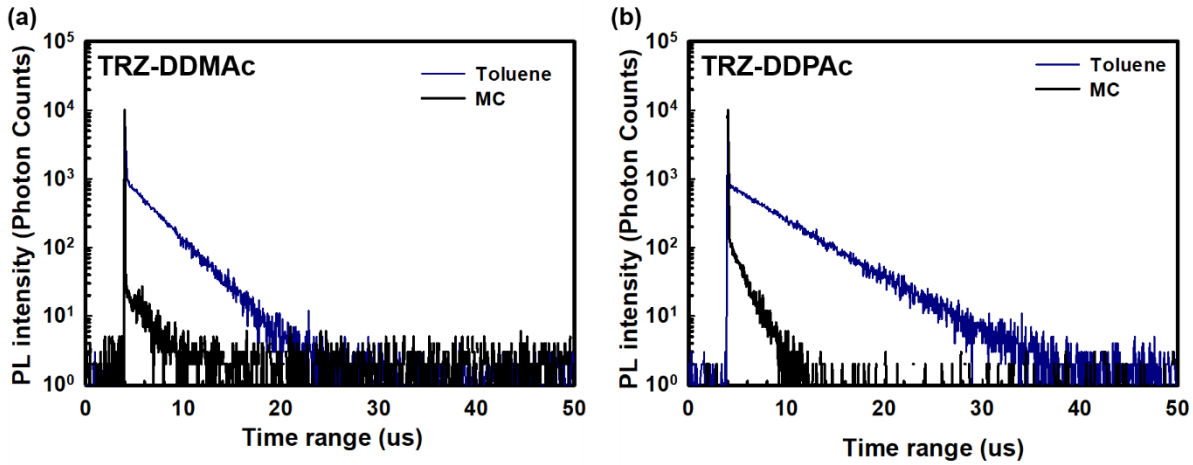

Figure S9. Transient PL data of (a) TRZ-DDMAc and (b) TRZ-DDPAc under nitrogen atmosphere.

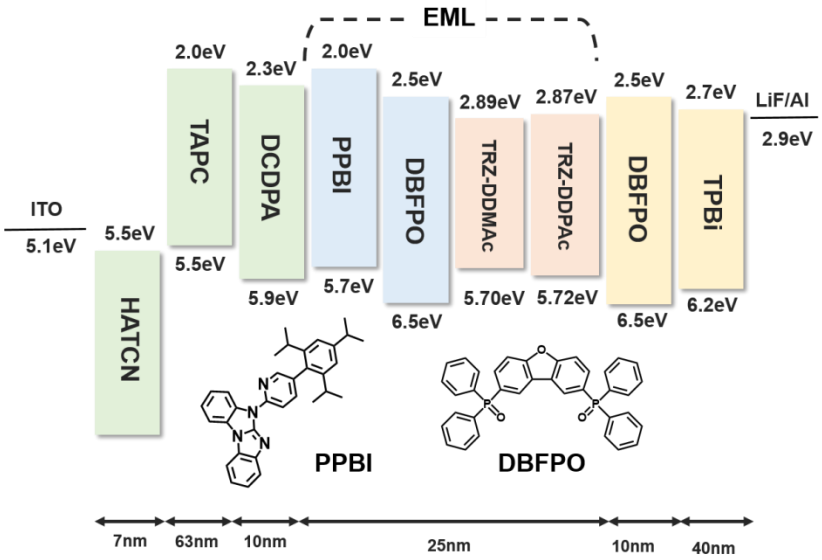

Figure S10. OLED device structures based on TADF emitters and different host materials.

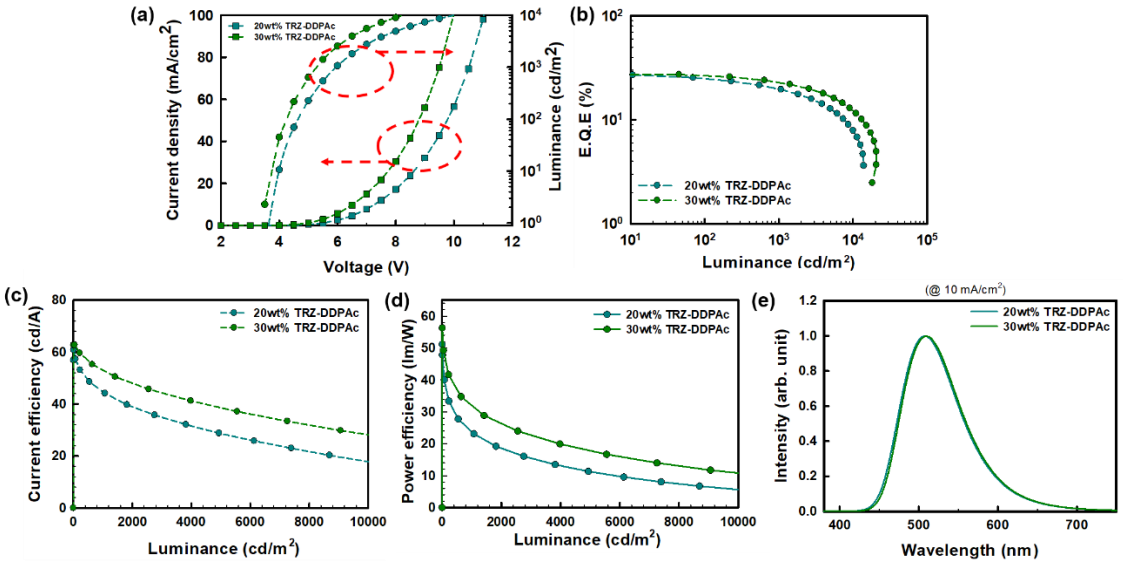

Figure S11. (a) Current density-voltage (J-V) and luminescence-voltage (L-V) characteristics, (b) EQE versus luminance, (c) current efficiency versus luminance, (d) power efficiency versus luminance, (e) Electro luminance (EL) spectra of 20wt% and 30wt% of TRZ-DDPAc devices.

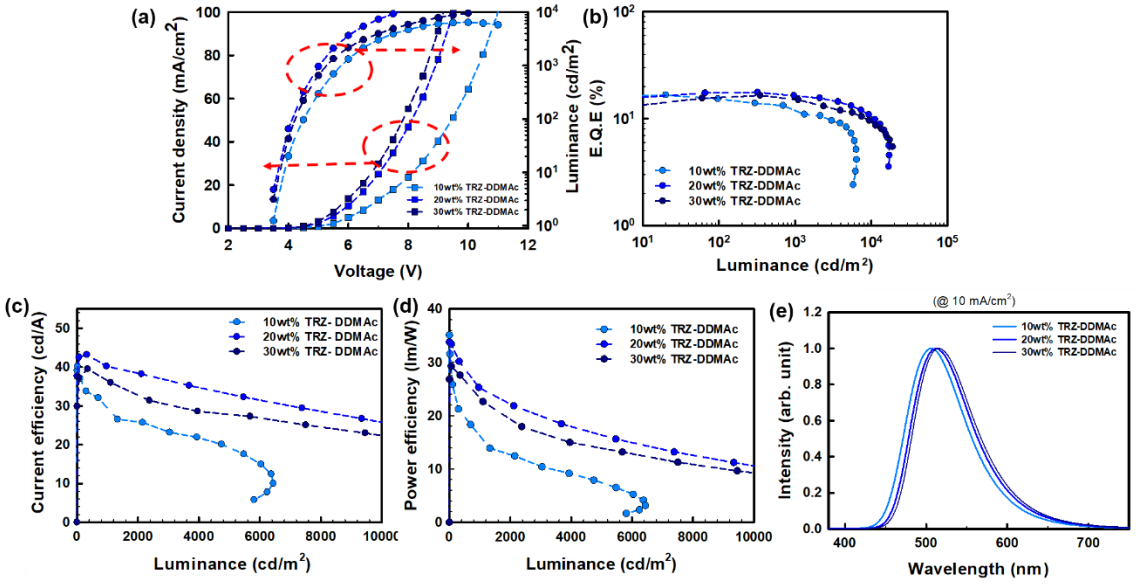

Figure S12. (a) Current density-voltage (J-V) and luminescence-voltage (L-V) characteristics, (b) EQE versus luminance, (c) current eff iciency versus luminance, (d) power efficiency versus luminance, (e) Electroluminance (EL) spectra of 10wt%, 20wt% and 30wt% of TRZ-DDMAc devices.

Table S1. The PLQY value of various doping concentration with DBFPO and PPBI hosts.

	20wt% DBFPO	**20wt% PPBI**
TRZ-DDMAc	47.95 %	52.73 %
	30wt% DBFPO	**30wt% PPBI**
TRZ-DDPAc	79.67%	74.45%

Table S2. The calculated rate constant values of TRZ-DDMAc with reported method[1].

TADF emitter	Φ_{total}[a] (%)	Φ_p[b] (%)	Φ_d[b] (%)	τ_p[c] (ns)	T_d[c] (μs)	k_p[d] ($\times 10^7$ s^{-1})	k_d[d] ($\times 10^4$ s^{-1})	k_{ISC}[d] ($\times 10^7$ s^{-1})	k_{nr}[Sd] ($\times 10^5$ s^{-1})
TRZ-DDMAc[e]	47.9	15.2	32.7	38.9	8.01	2.57	12.5	1.76	42.4

[a]Absolute PLQYs measured doped film in the integral sphere, [b]The prompt or delayed portion of total PLQY under N_2 atmosphere, [c]The prompt and delayed exciton lifetimes of each molecule in doped films at 300 K under N_2 atmosphere, [d]The rate constants of the prompt fluorescence decay, the delayed fluorescence decay, ISC, and non-radiative, [e]TRZ-DDMAc film was doped 20 % in DBFPO host.

Table S3. Prompt and delayed time of TADF emitters in different solvents.

TADF emitters	Prompt (ns) τ_p		Delayed (us) τ_d	
	Tol	MC	Tol	MC
TRZ-DDMAc	56	11	2.92	1.79
TRZ-DDPAc	39.2	25.8	5.08	1.29

Table S4. Device characteristics of TRZ-DDPAc with different doping concentration.

Devices	Turn-on voltage at 1 cd/m^2 (V)	Driving voltage (V)	Current efficiency (cd/A)	Power efficiency (lm/W)	External quantum efficiency (%)	(CIE color)
DBFPO: 20% TRZ-DDPAc	3.5	5.8 [b]	60.9 [a] 45.2 [b]	51.1 [a] 23.7 [b]	27.0 [a] 201 [b]	(0.24, 0.50) [c]
DBFPO: 30% TRZ-DDPAc	3.2	5.3 [b]	62.8 [a] 52.9 [b]	56.3 [a] 32.5 [b]	27.3 [a] 23.8 [b]	(0.25, 0.52) [c]

[a]Maximum value, [b]Measured at 1000 cd/m^2, [c]Measured at 10 mA/cm^2.

Table S5. Device characteristics of TRZ-DDMAc with different doping concentration.

Devices	Turn-on voltage at 1 cd/m^2 (V)	Driving voltage (V)	Current efficiency (cd/A)	Power efficiency (Im/W)	External quantum efficiency (%)	(CIE color)
PPBI : 10% TRZ-DDMAc	3.4	5.7 [b]	40.2 [a] 30.0 [b]	35.1[a] 16.3 [b]	16.6 [a] 12.3 [b]	(0.24, 0.50) [c]
PPBI : 20% TRZ-DDMAc	3.2	5.0 [b]	43.2 [a] 41.0 [b]	33.7 [a] 25.2 [b]	17.6 [a] 16.4 [b]	(0.26 0.54)[c]
PPBI : 30% TRZ-DDMAc	3.1	4.9 [b]	39.5 [a] 36.0 [b]	29.3 [a] 23.4 [b]	16.5 [a] 15.1 [b]	(0.28 0.56)[c]

[a]Maximum value, [b]Measured at 1000 cd/m^2, [c]Measured at 10 mA/cm^2.

Reference

1. K.-C. Pan, S.-W. Li, Y.-Y. Ho, Y.-J. shiu, W.-L. Tsai, M. Jiao, W.-K. Lee, C.-C. Wu, C.-L. Chung, T. Chatterjee, Y.-S. Li, K.-T. Wong, H._C. Hu, C.-C. Chen and M.-T. Lee, *Advanced Functional Materials*, 2016, 26, 7560-7571.