Electronic supplementary information

Isomeric thermally activated delayed fluorescence emitters based on indolo[2,3-*b*]acridine electron-donor: a compromising optimization for efficient orange-red organic light-emitting diodes

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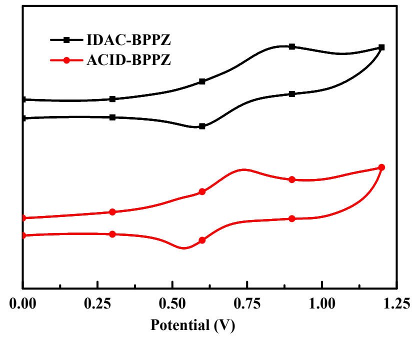


Fig. S1 Cyclic voltammograms of IDAC-BPPZ and ACID-BPPZ.

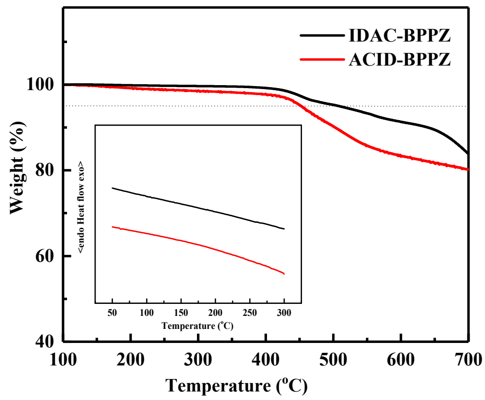


Fig. S2. TGA and DSC (inset) curves for IDAC-BPPZ and ACID-BPPZ recorded at a heating rate of 10 °C min^{-1} under N_2.

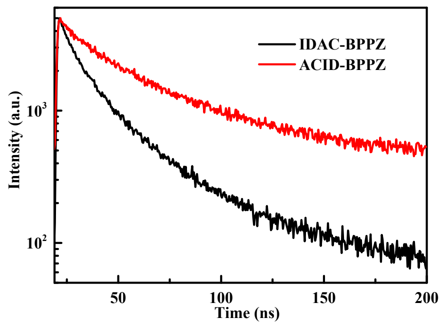


Fig. S3. The room temperature transient PL decay curves of prompt emission of IDAC-BPPZ and ACID-BPPZ.

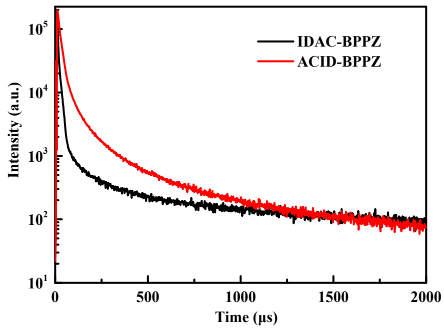


Fig. S4 Transient PL decay curve of IDAC-BPPZ and ACID-BPPZ at 77K.

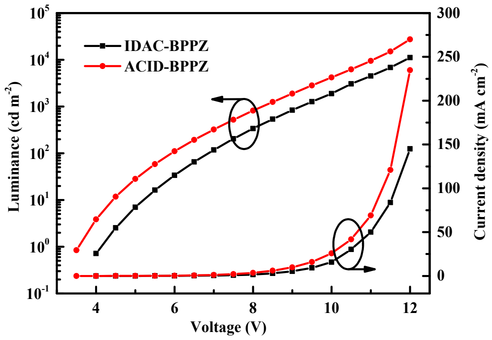
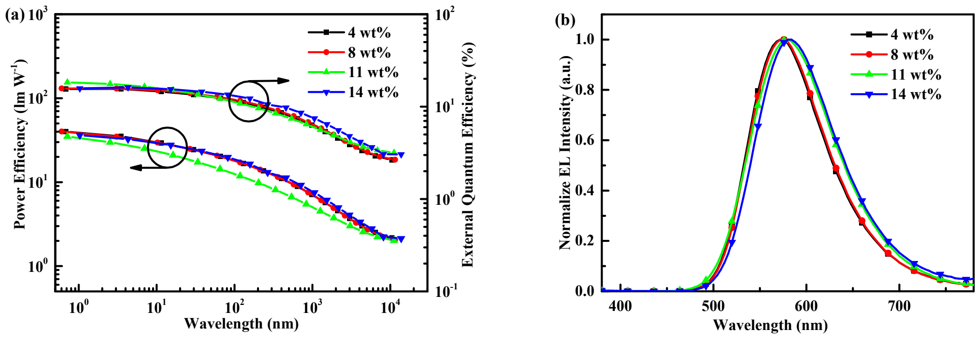


Fig. S5 Current density-voltage-luminance characteristics of the optimized OLEDs based on IDAC-BPPZ and ACID-BPPZ.



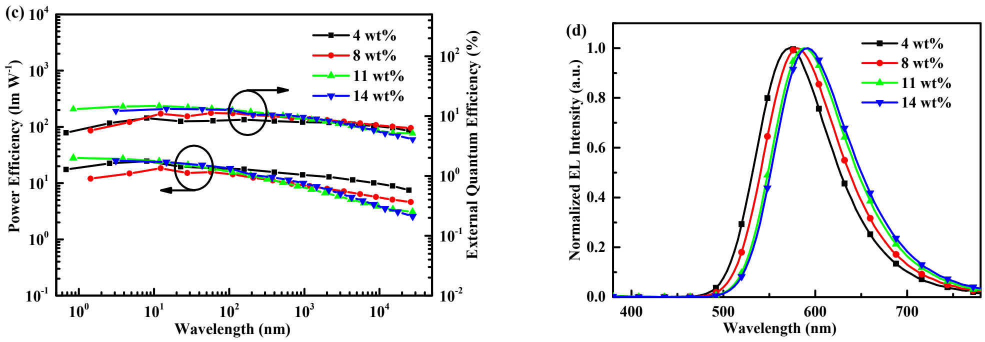


Fig. S6 EQE/PE and EL spectra of IDAC-BPPZ (a)/(b) and ACID-BPPZ (c)/(d) at different concentrations.

Table S1 EL spectra and EQEs of IDAC-BPPZ/ACID-BPPZ as dopants at different concentrations.

		4%	8%	11%	14%
λ_{EL}	IDAC-BPPZ	572	576	580	584
	ACID-BPPZ	572	580	588	592
EQE_{max}	IDAC-BPPZ	9.2%	11.2%	14.7%	13.1%
	ACID-BPPZ	15.5%	15.7%	18.3%	16.2%

Table S2 Summary of device performances of orange to red TADF emitters (ELmax≥ 580 nm).

Emitter	EL_{max} (nm)	EQE (%)	PE (lm W^{-1})	CE (cd A^{-1})	Ref.
IDAC-BPPZ	580	18.3	35.0	44.6	This work
ACID-BPPZ	588	14.7	27.9	35.1	This work
HAP-3TPA	610	17.5	22.1	25.9	1
MeODP-DBPHZ	≈600	≈10	–	–	2
POZ-DBPHZ	≈610	≈16	–	–	2
m-Px2BBP	586	4.2	–	11.1	3
4CzTPN-Ph	≈590	11.2	–	–	4
PPZ-DPS	≈600	≈5	–	–	5
b2	637	9.0	–	–	6
b1	624	12.5	–	–	6
b4	584	6.9	–	–	6
DMAC-DCPP	624	12.8	12.2	10.1	7
NAI-DMAC	597	29.2	79.7	76.2	8
Da-CNBQx (3)	617	20.0	32.4	28.9	9

TPA-DCPP	668	9.8	–	4.0	10
APDC-DTPA	693	10.19	–	–	11

References

1 J. Li, T. Nakagawa, J. MacDonald, Q. Zhang, H. Nomura, H. Miyazaki and C. Adachi, *Adv. Mater.*, 2013, **25**, 3319-3323.

2 P. Data, P. Pander, M. Okazaki, Y. Takeda, S. Minakata and A. P. Monkman, *Angew. Chem. Int. Ed.*, 2016, **55**, 5739-5744.

3 S. Y. Lee, T. Yasuda, Y. S. Yang, Q. Zhang and C. Adachi, *Angew. Chem. Int. Ed.*, 2014, **53**, 6402-6406.

4 H. Uoyama, K. Goushi, K. Shizu, H. Nomura and C. Adachi, *Nature*, 2012, **492**, 234-238.

5 Q. Zhang, B. Li, S. Huang, H. Nomura, H. Tanaka and C. Adachi, *Nat. Photonics*, 2014, **8**, 326-332.

6 Q. Zhang, H. Kuwabara, W. J. Potscavage, S. Huang, Y. Hatae, T. Shibata and C. Adachi, *J. Am. Chem. Soc.*, 2014, **136**, 18070-18081.

7 S. Wang, Z. Cheng, X. Song, X. Yan, K. Ye, Y. Liu, G. Yang and Y. Wang, *ACS Appl. Mater. Interfaces*, 2017, **9**, 9892-9901.

8 W. Zeng, H.-Y. Lai, W.-K. Lee, M. Jiao, Y.-J. Shiu, C. Zhong, S. Gong, T. Zhou, G. Xie, M. Sarma, K.-T. Wong, C.-C. Wu and C. Yang, *Adv. Mater.*, 2018, **30**, 1704961.

9 R. Furue, K. Matsuo, Y. Ashikari, H. Ooka, N. Amanokura and T. Yasuda, *Adv. Opt. Mater.*, 2018, **6**, 1701147.

10 S. Wang, X. Yan, Z. Cheng, H. Zhang, Y. Liu and Y. Wang, *Angew. Chem. Int. Ed.*, 2015, **54**, 13068-13072.

11 Y. Yuan, Y. Hu, Y.-X. Zhang, J.-D. Lin, Y.-K. Wang, Z.-Q. Jiang, L.-S. Liao and S.-T. Lee, *Adv. Funct. Mater.*, 2017, **27**, 1700986.