

## Supporting Information

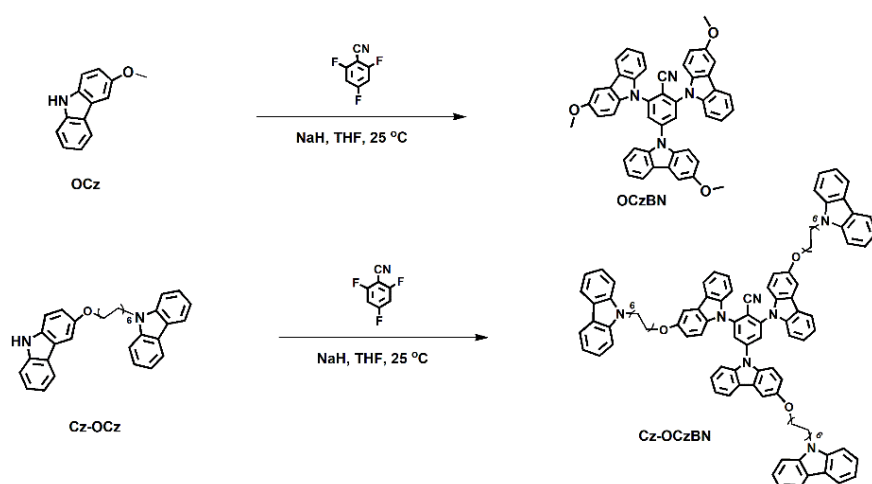
### Design of efficient thermally activated delayed fluorescence blue host for high performance solution-processed hybrid white organic light emitting diodes

Xinxin Ban,<sup>\*ab</sup> Feng Chen,<sup>a</sup> Yan Liu,<sup>a</sup> Jie Pan,<sup>a</sup> Aiyun Zhu,<sup>a</sup> Wei Jiang<sup>\*b</sup> and Yueming Sun<sup>b</sup>

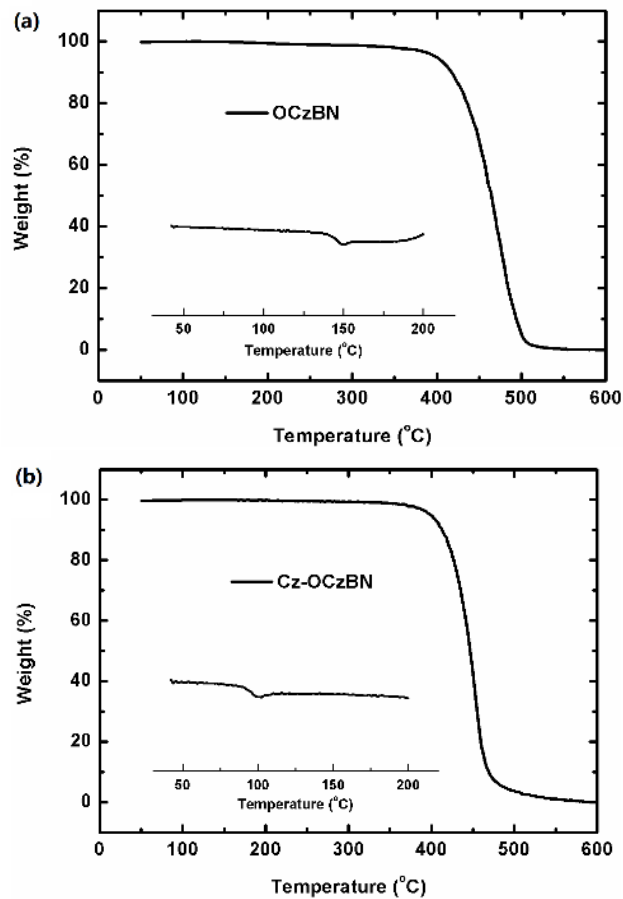
<sup>a</sup> Jiangsu Key Laboratory of Function Control Technology for Advanced Materials, School of Chemical Engineering, Huaihai Institute of Technology, Lianyungang, Jiangsu, 222005, China

<sup>b</sup> School of Chemistry and Chemical Engineering, Southeast University, Nanjing, Jiangsu, 211189, China

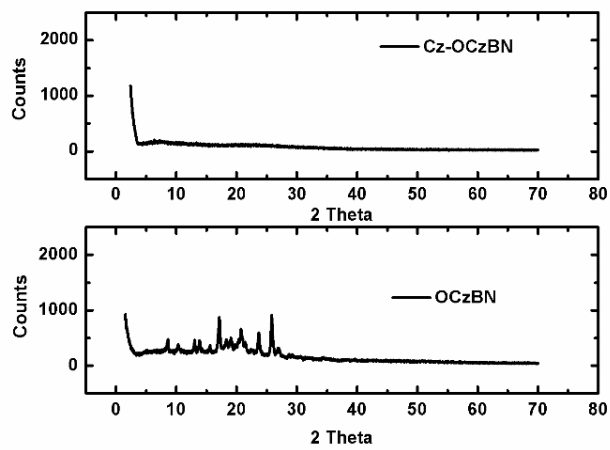
E-mail: [banxx@hhit.edu.cn](mailto:banxx@hhit.edu.cn) (X. X. Ban), [jiangw@seu.edu.cn](mailto:jiangw@seu.edu.cn) (W. Jiang)



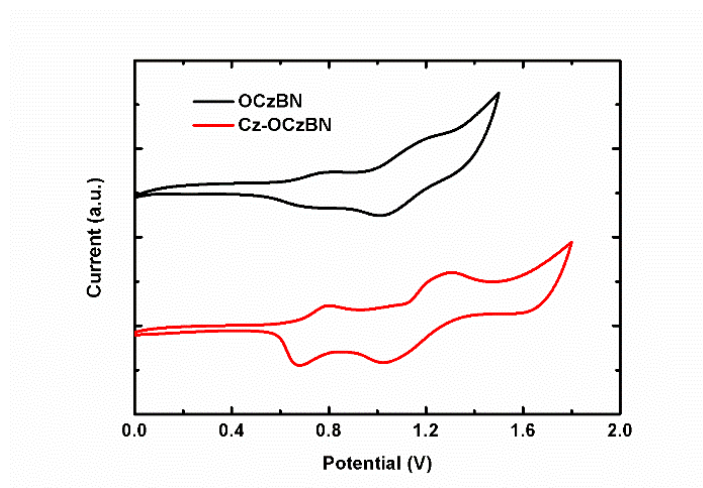
**Scheme 1.** Synthetic route of OCzBN and Cz-OCzBN.



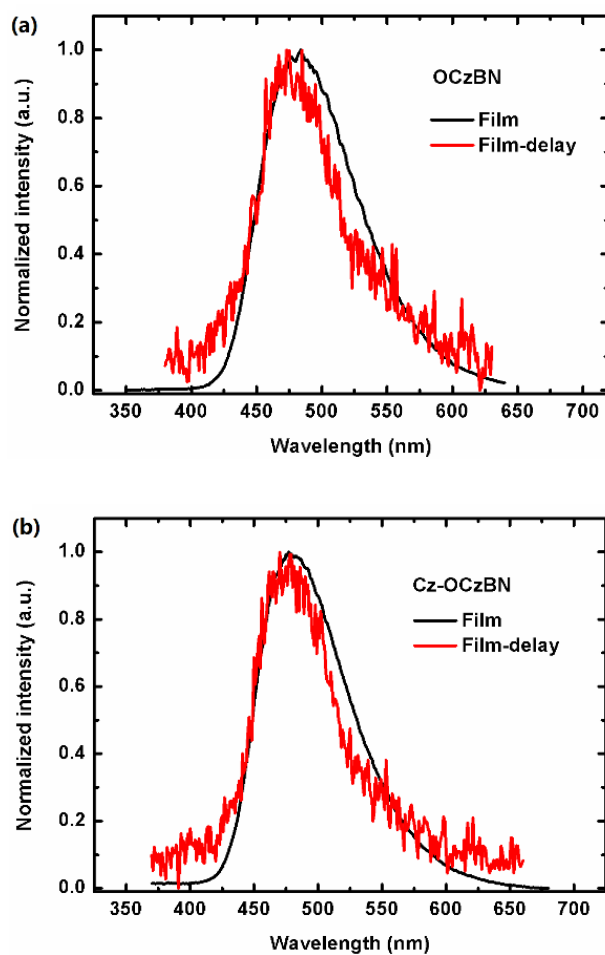
**Fig. S1** TGA curve of (a) OCzBN and (b) Cz-OCzBN recorded at a heating rate of  $10\text{ }^{\circ}\text{C min}^{-1}$ ; Inset: DSC trace recorded at a heating rate of  $10\text{ }^{\circ}\text{C min}^{-1}$ .



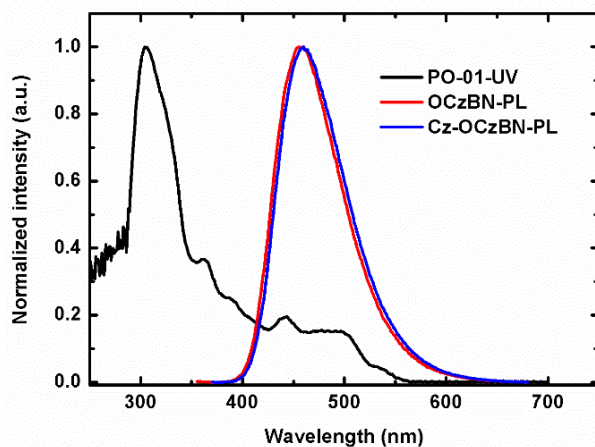
**Fig. S2** The XRD spectra of solid state OCzBN and Cz-OCzBN.



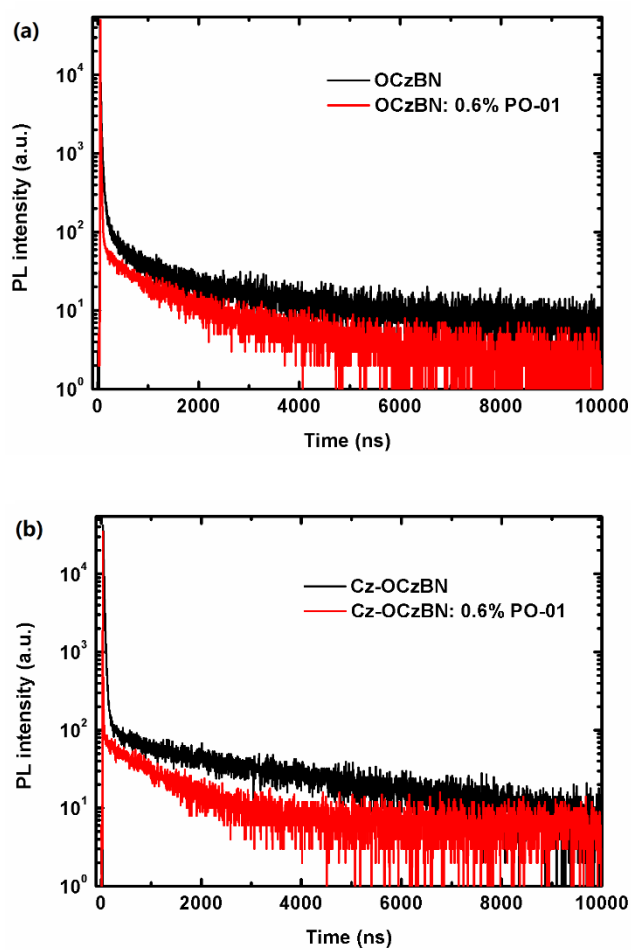
**Fig. S3** Cyclic voltammogram of OCzBN and Cz-OCzBN in  $\text{CH}_2\text{Cl}_2$  solution.



**Fig. S4** Photoluminescence spectra of (a) OCzBN and (b) Cz-OCzBN films before and after applying delay time.



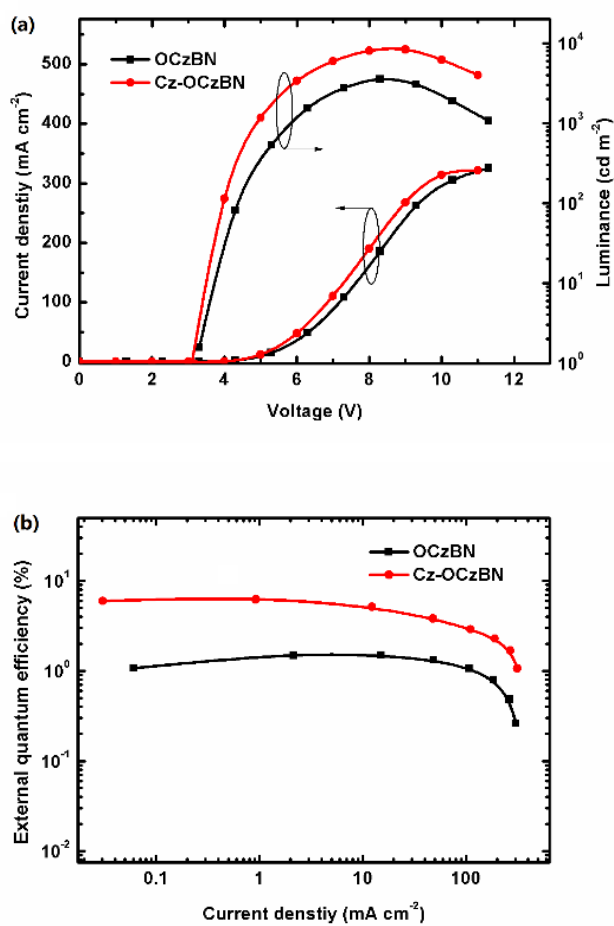
**Fig. S5.** The absorption spectrum of PO-01 and the emission spectra of TADF blue hosts.



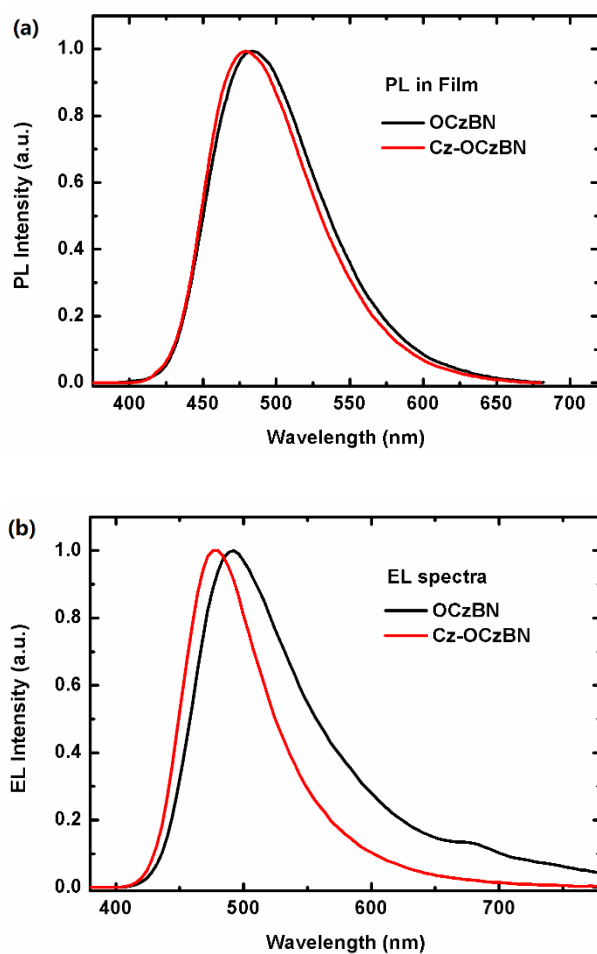
**Fig. S6.** The transient PL decay curves of the films excited by 280 nm laser and detected at 480 nm, (a) OCzBN and OCzBN:0.6% PO-01 and (b) Cz-OCzBN and Cz-OCzBN:0.6% PO-01.

**Table S1** Transient decay characteristics of the films.

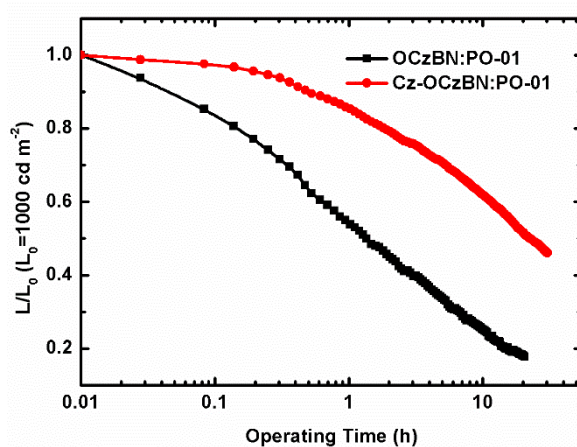
	$\tau_s$ (ns)	$k_s$ ( $s^{-1}$ )	$k_{ET}$ ( $s^{-1}$ )	$\eta_{ET}$ (%)
OCzBN	26	$3.84 \times 10^7$	-/-	-/-
OCzBN:1%PO-01	14	$7.14 \times 10^7$	$3.29 \times 10^7$	46.1
Cz- OCzBN	32	$3.12 \times 10^7$	-/-	-/-
Cz- OCzBN: 1%PO-01	11	$9.09 \times 10^7$	$5.96 \times 10^7$	65.6



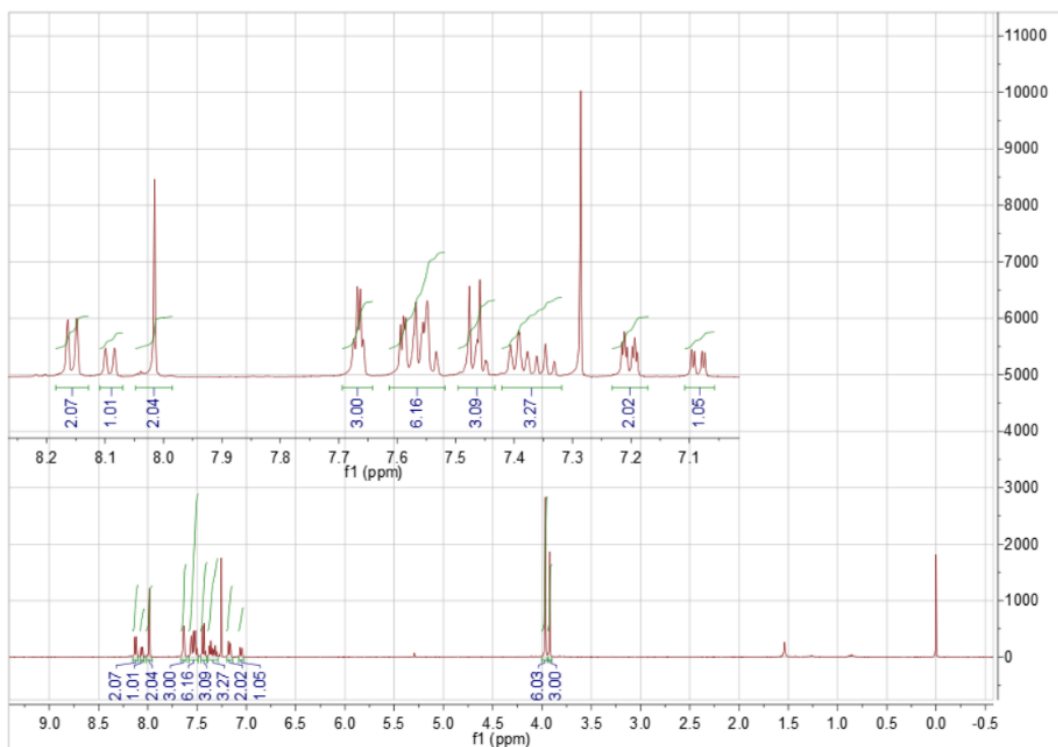
**Fig. S7.** (a) Current density-voltage-luminance (J-V-L) characteristics; (b) External quantum efficiencies versus current density plots of the blue devices.



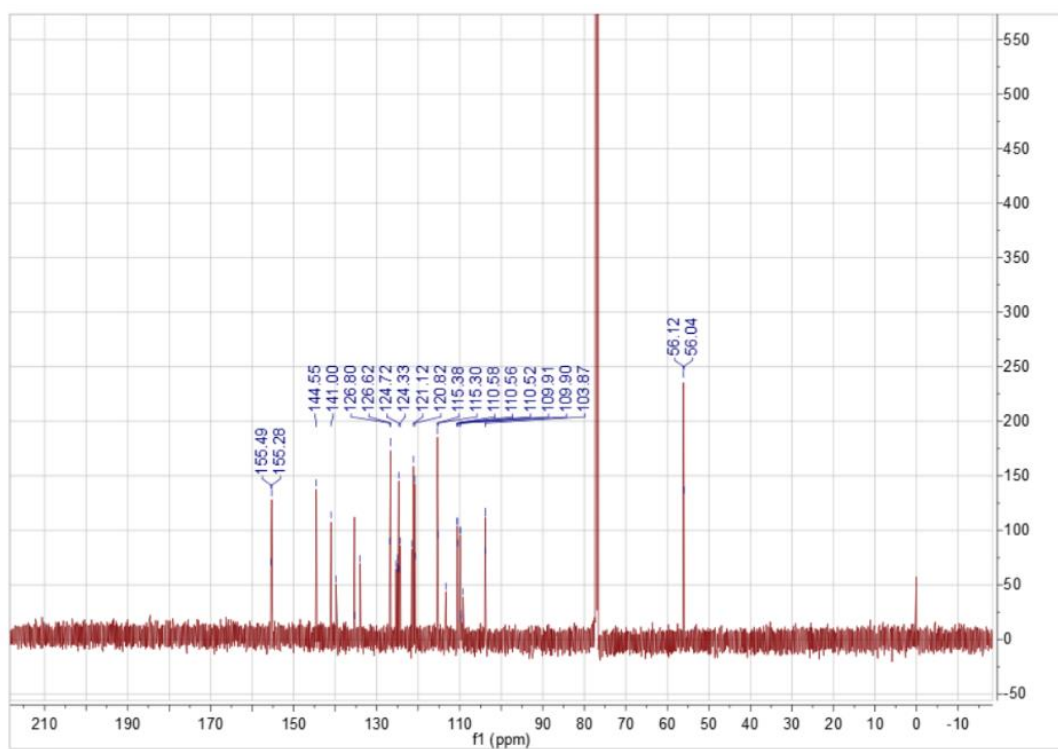
**Fig. S8.** (a) Photoluminescence (PL) spectra of OCzBN and Cz-OCzBN; (b) Electroluminescence (EL) spectra of OCzBN and Cz-OCzBN.



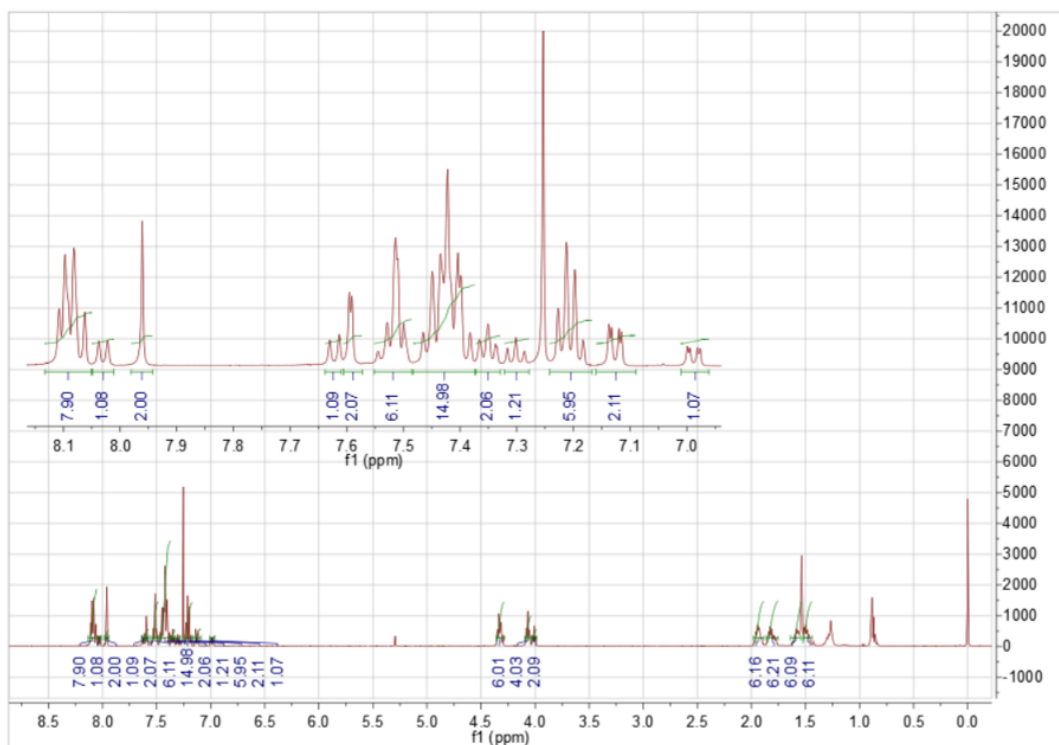
**Fig. S9** Lifetimes of the hybrid WOLEDs with OCzBN and Cz-OCzBN as blue host measured with an initial brightness of  $1000 \text{ cd m}^{-2}$ .



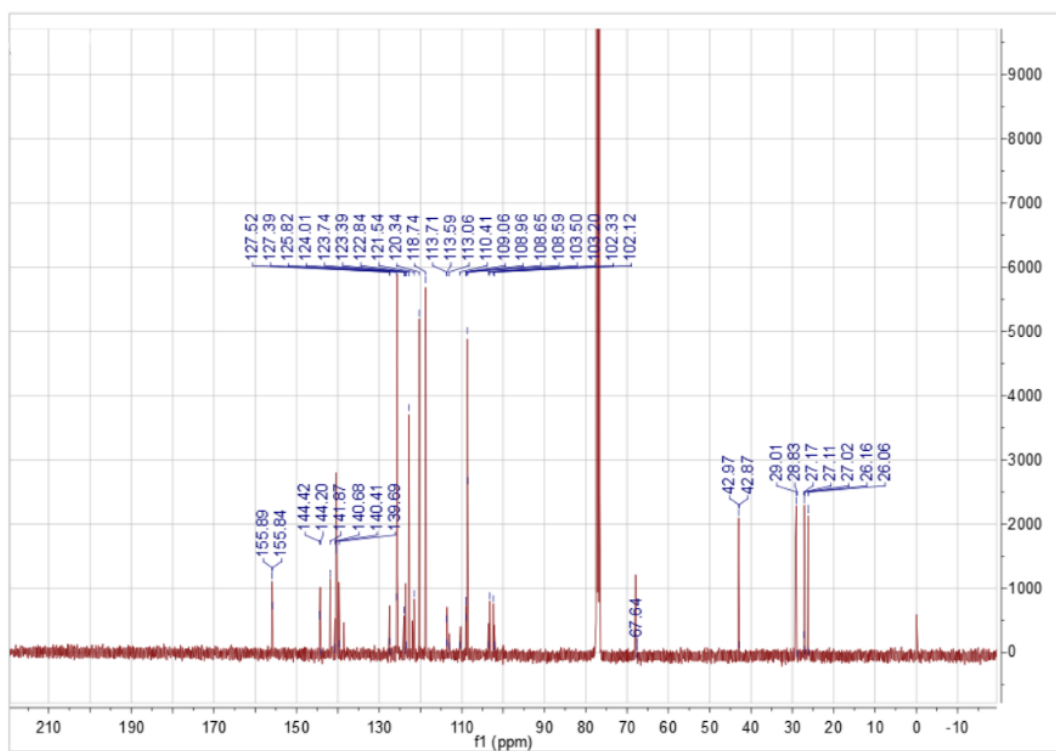
**Fig. S10.**  $^1\text{H}$ -NMR spectrum of OCzBN.



**Fig. S11.**  $^{13}\text{C}$ -NMR spectrum of OCzBN.



**Fig. S12.**  $^1\text{H-NMR}$  spectrum of Cz-OCzBN.



**Fig. S13.**  $^{13}\text{C-NMR}$  spectrum of Cz-OCzBN.