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一步法合成螺双芴及螺氧杂蒽衍生物及其在有机发光二极管中的应用：性能增强及相关的光学现象

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One-Step Synthesis of Spirobi[fluorene] and Spiro[fluorene-9,9′-xanthene] Derivatives and Their Applications in Organic Light-Emitting Devices: Performance Enhancement and Related Optical Phenomena

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Fabrication of OLED:

OLEDs were fabricated on a 180-nm thick ITO-coated glass substrate. Pre-patterned ITO coated glass substrates (10 Ω □$^{-1}$) were first cleaned with acetone, alcohol and deionized water for 10 min in sequence and then blown with N_2. The substrates were cleaned with an UV-O_3 cleaner for 3 min before spin-coating PEDOT:PSS layer. Then the PEDOT: PSS-covered ITO glasses were annealed at 100 ℃ for 15 minutes. Organic layers except PEDOT:PSS were sequentially deposited onto the substrates by thermal evaporation in a vacuum system with a pressure of less than 6×10^{-4} Pa. Organic layer's deposition rate was approximately 0.05 nm s^{-1}, which was controlled by the corresponding quartz crystal oscillators.

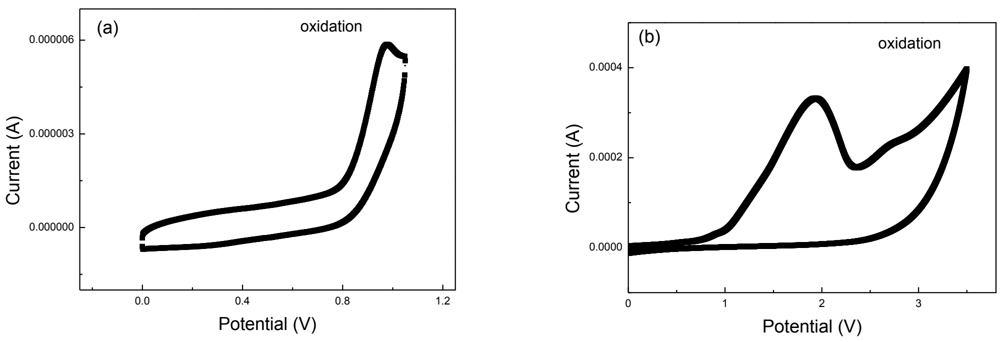

Fig.S1 Cyclic voltammograms of PF-SBF (a) and PF-SFX (b)

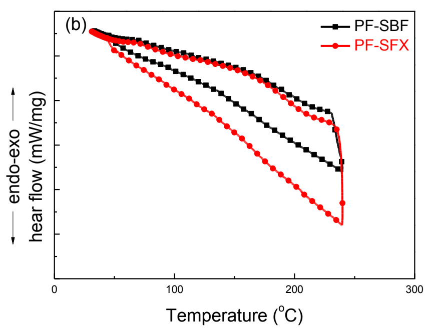

Fig.S2 DSC measurements of PF-SBF and PF-SFX

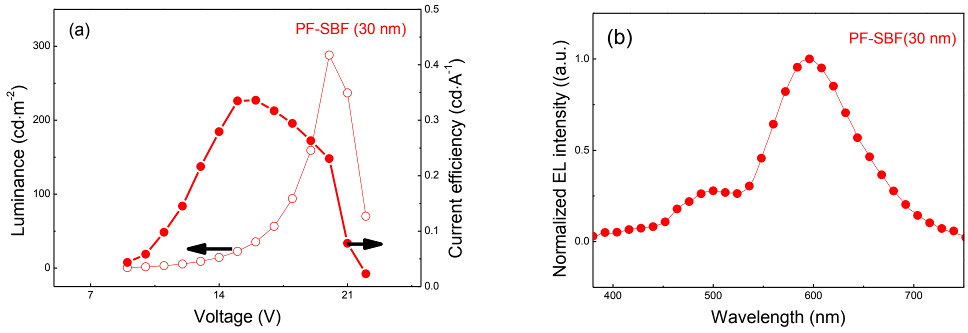

Fig.S3 *L*-*V*-CE characteristics (a) and normalized EL spectra (b) of Structure A

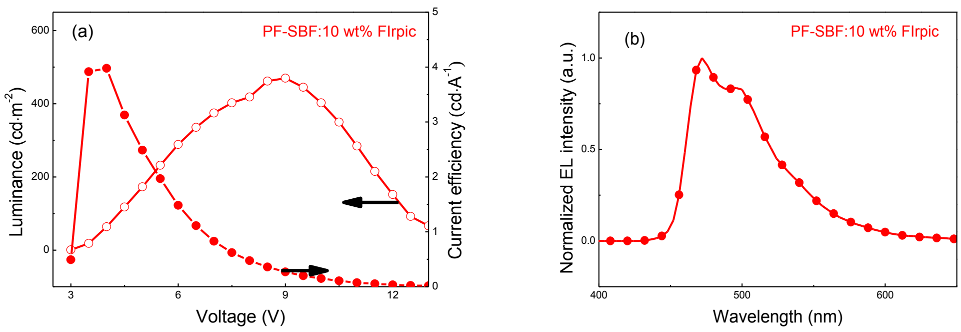

Fig.S4 *L*-*V*-CE characteristics (a) and normalized EL spectra (b) of Structure B

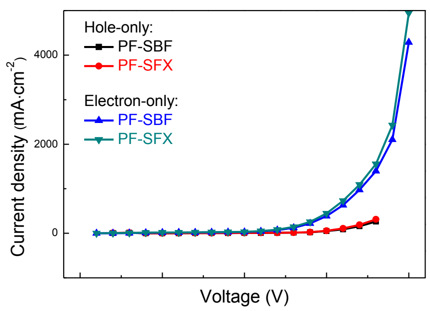

Fig.S5 Current density–voltage characteristics of the single-carrier devices for PF-SBF and PF-SFX

The structures of single-carrier devices for PF-SBF and PF-SFX are ITO/ PEDOT:PSS/TAPC (20 nm)/PF-SBF or PF-SFX (60 nm)/TAPC (20 nm)/Al (hole only) and ITO/LiF (1 nm)/TmPyPb (20 nm)/PF-SBF or PF-SFX (60 nm)/TmPyPb (20 nm)/LiF (1 nm)/Al (electron only).

Table S1 Summarized OLED performances for structures A and B

OLED Structure	Host	Guest	V_{on}[a]/V	L_{max}[b]/(cd m^{-2})	CE_{max}[c]/(cd A^{-1})
Structure A		PF-SBF	9.2	288	0.4
Structure B	PF-SBF	FIrpic	3.2	470	4.0

[a] driving voltage at 1 cd m^{-2}, [b] maximal luminance, [c] maximal current efficiency

Table S2 Summarized OLED performances for Structure C

OLED Structure	Host	Guest	V_{on}[a]/V	L_{max}[b]/(cd m^{-2})	CE_{max}[c]/(cd A^{-1})
Structure C	TAPC:PF-SBF(2:1)	FIrpic	3.3	1286	4.4
Structure C	TAPC:PF-SBF(1:1)	FIrpic	2.8	2907	5.4
Structure C	TAPC:PF-SBF(0:1)	FIrpic	3.2	470	3.8
Structure C	TAPC:PF-SBF(1:0)	FIrpic	2.8	365	2.0

[a] driving voltage at 1 cd m^{-2}, [b] maximal luminance, [c] maximal current efficiency