Supporting Information

Developing versatile dendrimer host material for solution-processed phosphorescence, TADF and multi-resonance narrow-band OLEDs

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1. Characterization.

^{1}H NMR and ^{13}C NMR spectra were recorded in $CDCl_3$ using a Bruker AVANCE 400 spectrometer. Absorption spectra were measured by a UV-Vis spectrophotometer (UV-2450) in the range of 200–500 nm. Photoluminescence (PL) spectra were recorded using a HORIBA FLUOROMAX-4 spectrofluorometer containing a liquid N_2 attachment. Differential scanning calorimetry (DSC) curves were obtained with a DSC 2910 Modulation Calorimeter at a heating rate of 10 ℃ min^{-1} under a nitrogen flow. Thermal gravimetric analyzer was carried out on a Netzsch simultaneous thermal analyzer system (STA 409PC) under a nitrogen atmosphere at a heating rate of 20 ℃ min^{-1}. The Cyclic voltammetry cell consisted of a glassy carbon electrode, a Pt wire counter electrode, and a standard Ag reference electrode in CH_2Cl_2 solution. All quantum chemical calculations were performed using the Gaussian 09 program package.

2. Device Fabrication and Characterization

The ITO glass substrates are ultrasonically treated with a cleaning agent prior to device manufacture. The glass substrates are then sonicated with anhydrous ethanol, acetone and isopropanol in that order and finally dried at 120 °C for 30 min. The dried glass substrate was placed in a clean petri dish and then treated in a UV-ozone environment for 15 min. After hydrophilic treatment by plasma for ten minutes, the PSS: PEDOT aqueous solution was spin-coated on the ITO substrate. The emission layer (10 mg mL^{-1}) was then spin-coated on top of the PEDOT: PSS layer. After heat-treatment for another 15 min, all the substrates were transferred into deposition system. The devices were fabricated under the pressure of below 1.0×10^{-4} Torr. The electron transport layer TPBi (40 nm) was continuously thermally evaporated at a rate of 2.0 Å s^{-1}. Then, the hole-injection layer Cs_2CO_3 (1 nm) was carefully deposited on the organic surface at a rate of 0.1 Å s^{-1}, and finally the 100 nm aluminum electrode was thermally evaporated at a rate of 3.0 Å s^{-1}. The electroluminescence characteristics of the devices were measured using a Keithley 2400 source meter at room temperature under atmospheric environment without any encapsulation. EL spectra, device brightness and current density-voltage characteristics are recorded using a combination of Photo-Research PR-655 Spectra Scan and Keithley 2400 Source meter.

3. Supporting Figures and Tables

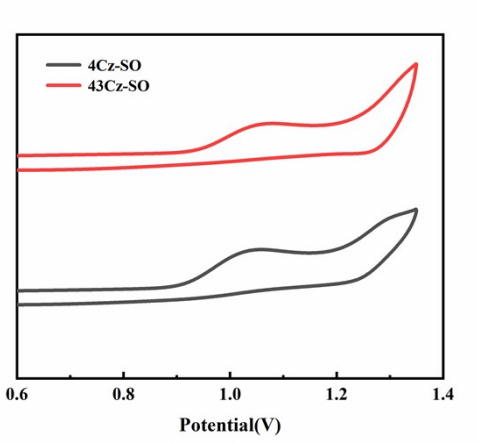

Figure S1. Cyclic voltammetry curves of 4Cz-SO and 43Cz-SO in DCM.

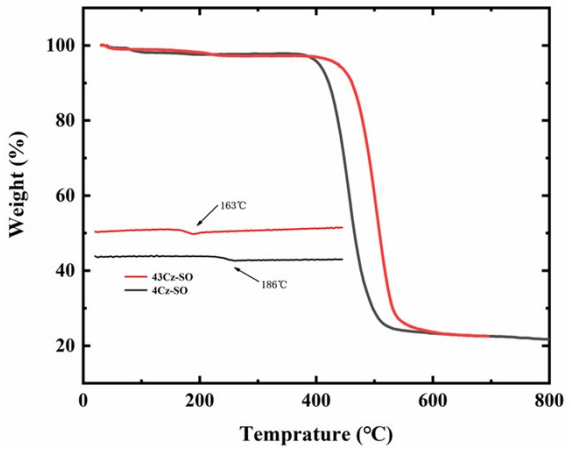

Figure S2. TGA and DSC curves of 4Cz-SO and 43Cz-SO (heating rate: 10℃ min^{-1})

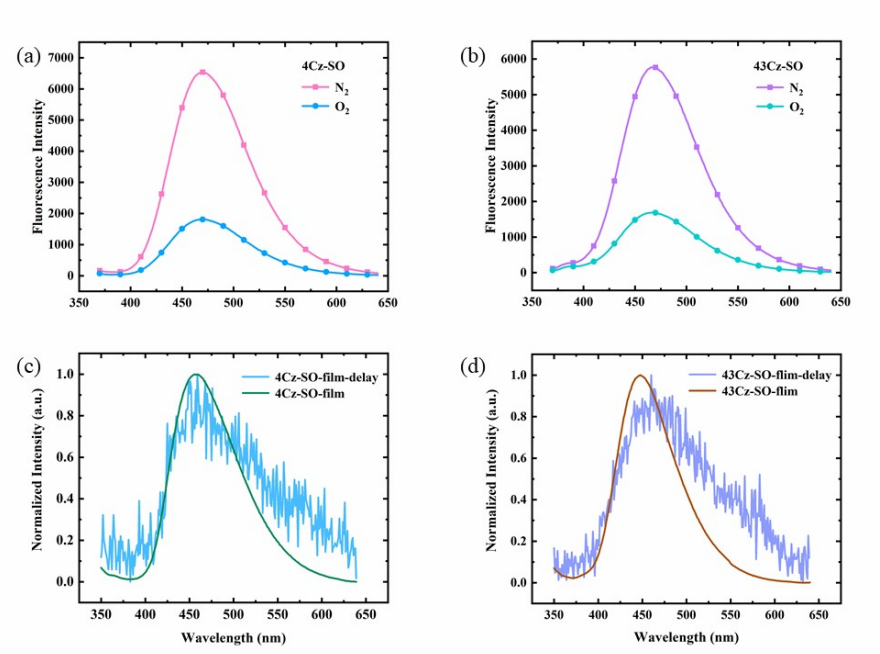

Figure S3. Fluorescence emission spectra of 4Cz-SO (a) and 43Cz-SO (b) in nitrogen and oxygen; Emission spectra and delayed emission spectra of 4Cz-SO (c) and 43Cz-SO (d) films.

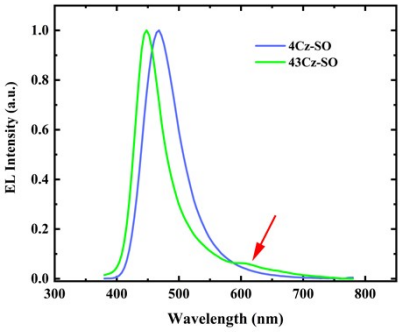

Figure S4. EL spectra for 4Cz-SO and 43Cz-SO

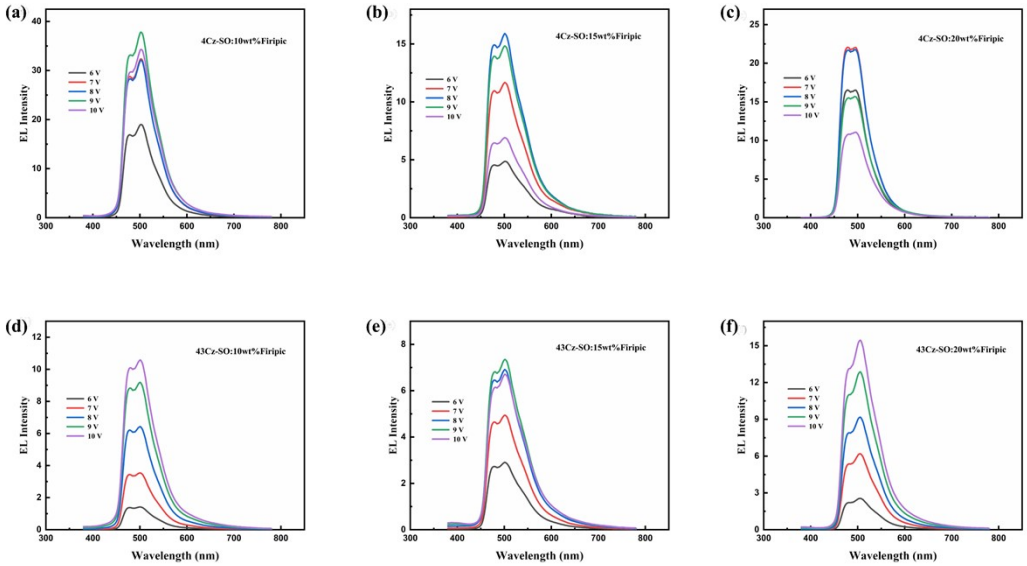

Figure S5. Electroluminescence spectra of 4Cz-SO:Firpic and 43Cz-SO:Firpic in devices at different voltages

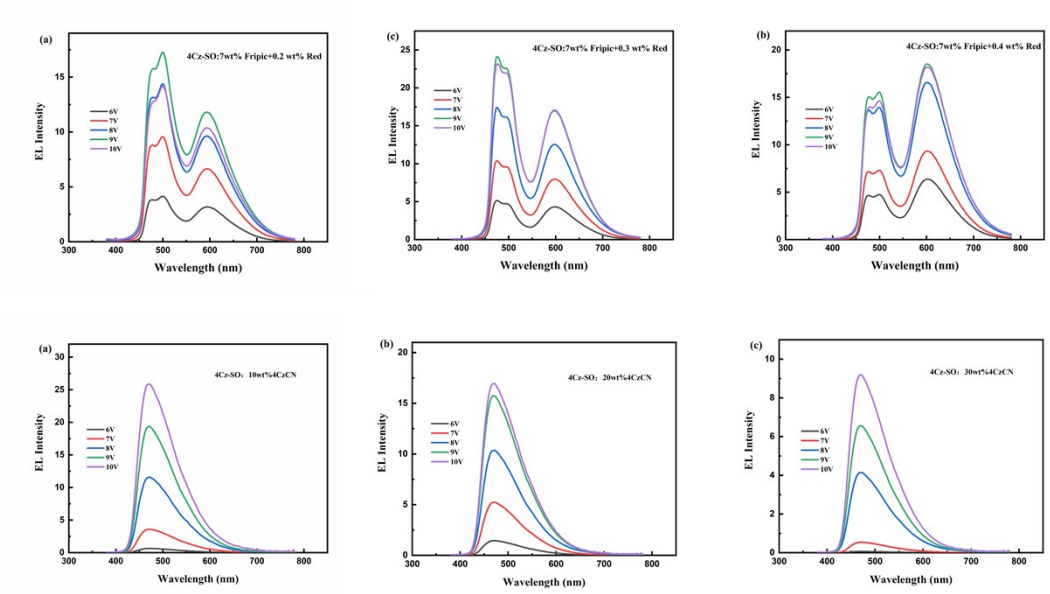

Figure S6. Electroluminescence spectra of 4Cz-SO: Firpic: Red and 4Cz-SO:4CzCN in devices at different voltages

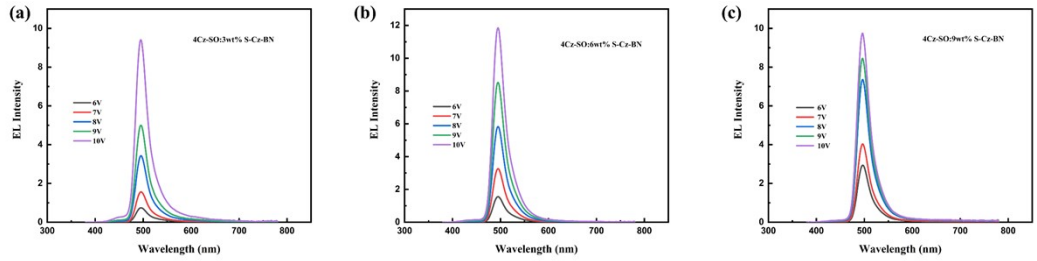

Figure S7. Electroluminescence spectra of 4Cz-SO:S-Cz-BN in devices at different voltages

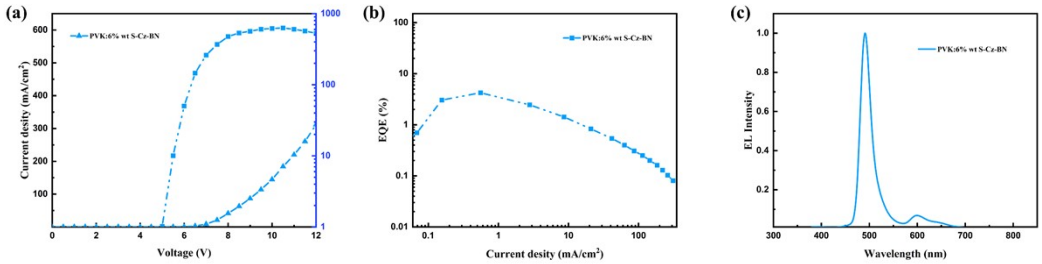

Figure S8. (a) J−V−L curves, (b) EQE versus Current density, and (c) EL spectra (inset: photograph of the device) for PVK : 6% S-Cz-BN

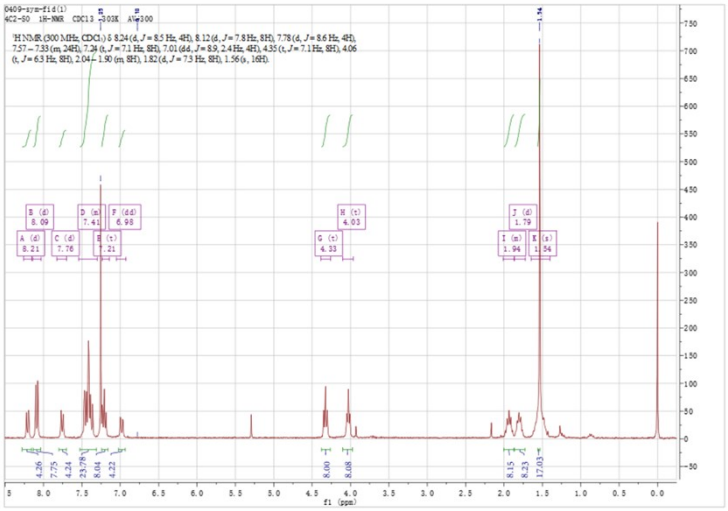

Figure S9. ^{1}H NMR spectrum of 4Cz-SO.

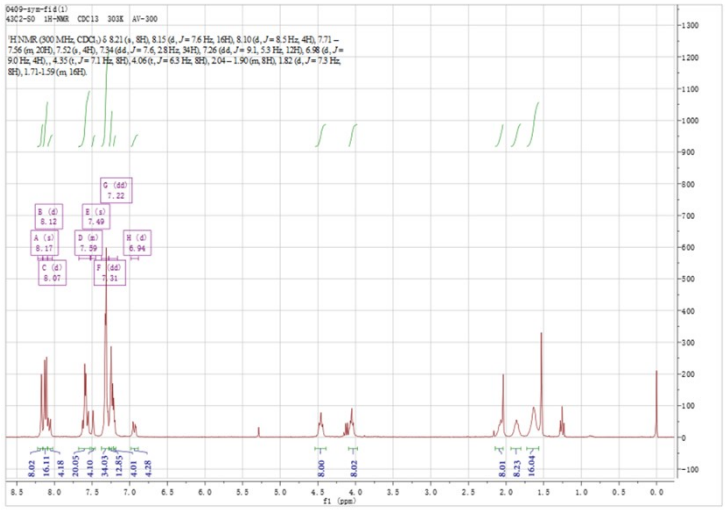

Figure S10. ^{1}H NMR spectrum of 43Cz-SO.

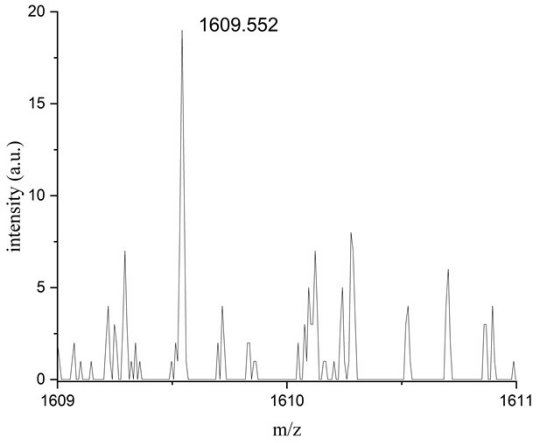

Figure S11. MS spectrum of 4Cz-SO.

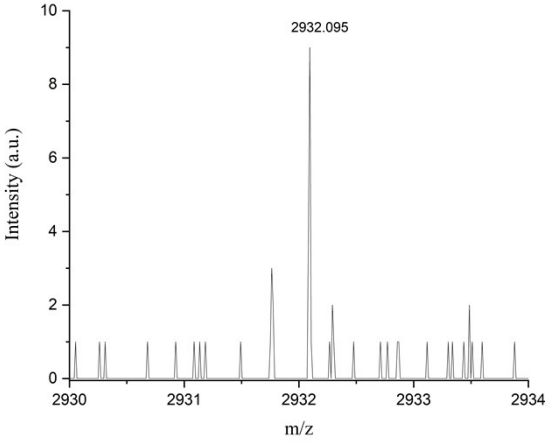

Figure S12. MS spectrum of 43Cz-SO.