

Supporting Information

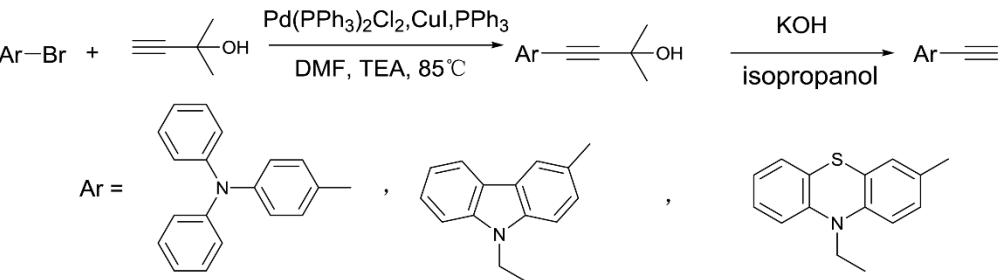
Aromatic amine-sulfone/sulfoxide conjugated D- π -A- π -D type dyes in photopolymerization under 405nm and 455nm laser beams

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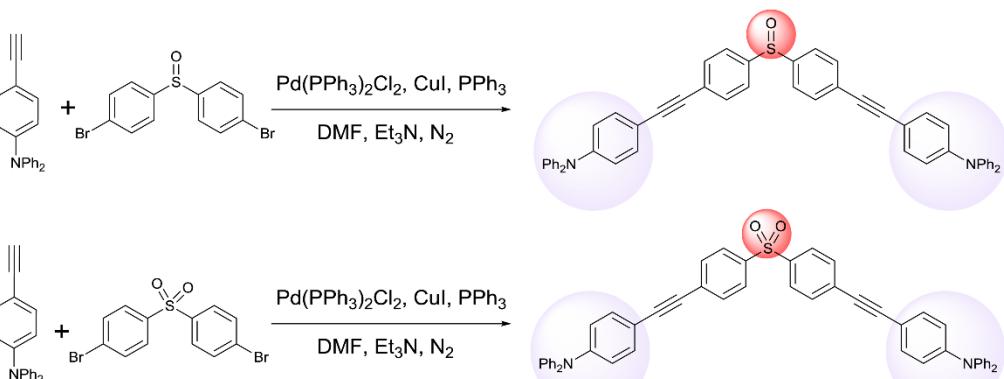
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Scheme. S1. Synthesis scheme of ethynyl aromatic amine.



Scheme.S2 Synthesis scheme of TA-SO and TA-SO2..

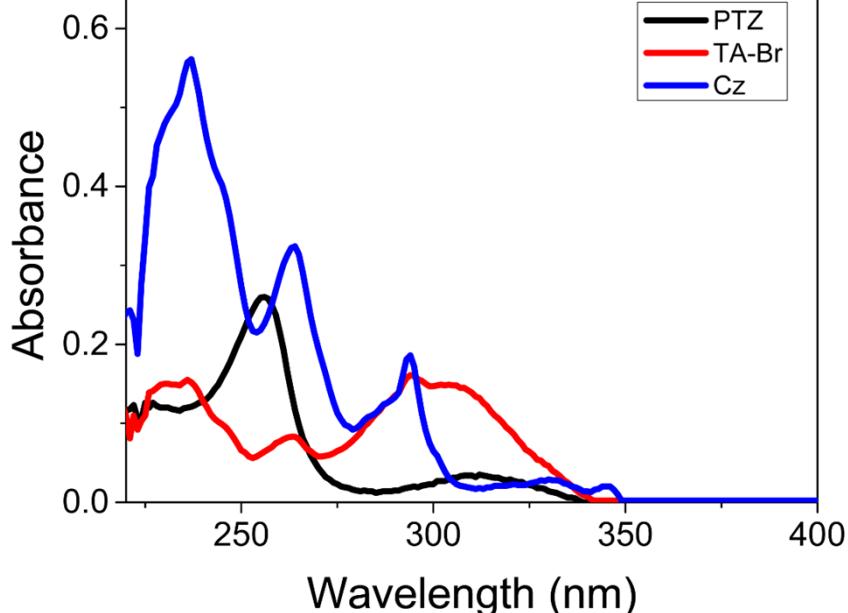


Fig. S1 UV-vis absorption spectra of PTZ, TA-Br and Cz in DCM ($M=1\times 10^{-5}\text{mol/L}$).

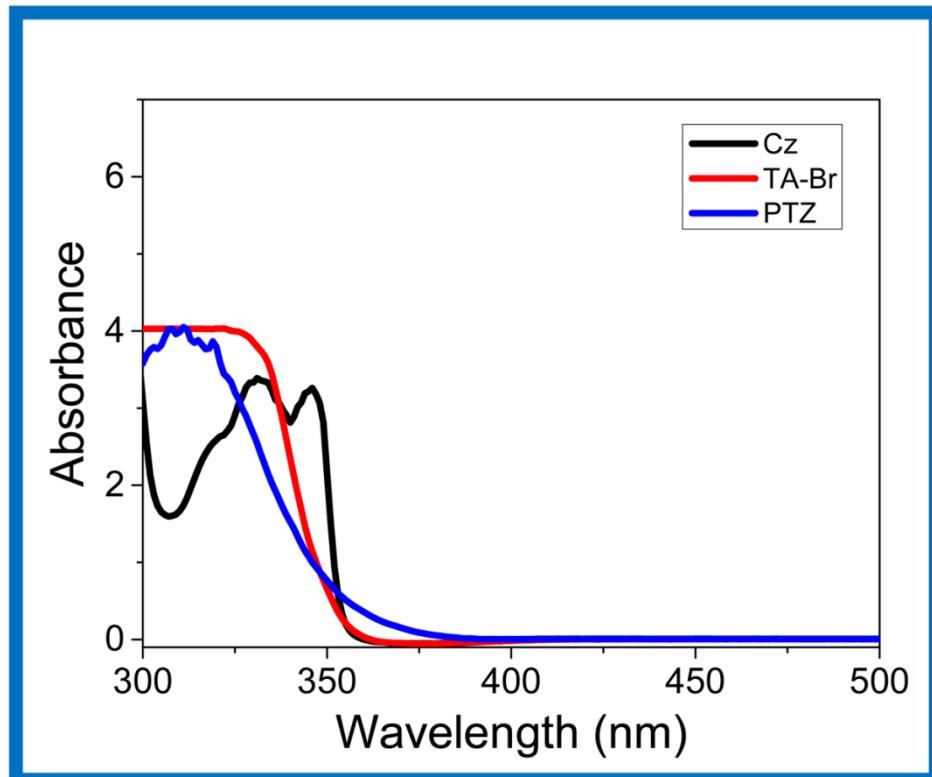


Fig. S2 UV-vis absorption spectra of PTZ, TA-Br and Cz in DCM ($M=1\times 10^{-3}\text{mol/L}$).

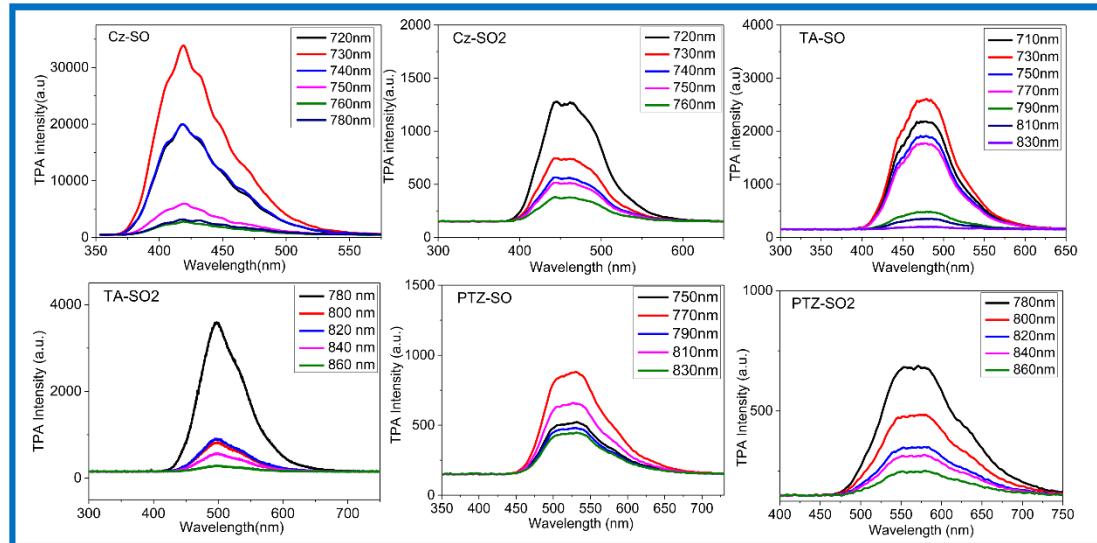


Fig.S3 Two-photon excited fluorescence spectra of Cz-SO, Cz-SO₂, TA-SO, TA-SO₂, TA-SO₂, PTZ-SO and PTZ-SO₂ in DCM under different excited laser wavelengths and laser intensity of 8.2 GW/cm². ($M_{\text{AAS}}=1\times 10^{-4}\text{ mol/L}$)

Table S1 Two-photon absorption data of Cz-SO, Cz-SO₂, TA-SO, TA-SO₂, TA-SO₂, PTZ-SO and PTZ-SO₂ under different excited laser wavelength.

| Wavelengt h (nm) | Cz-SO σ (GM) | Cz-SO ₂ σ (GM) | TA-SO σ (GM) | TA-SO ₂ σ (GM) | PTZ-SO σ (GM) | PTZ-SO ₂ σ (GM) |
|------------------------|------------------------|-------------------------------------|------------------------|-------------------------------------|-------------------------|--------------------------------------|
| 700 | | | 465.6 | | 315.4 | |
| 710 | | | 408.9 | | 302.9 | |
| 720 | 196.0 | 176.4 | 362.8 | 548.1 | 249.5 | 1060.1 |
| 730 | 220.2 | 90.6 | 448.9 | 606.6 | 319.4 | 1183.9 |
| 740 | 138.0 | 221.8 | 467.0 | 510.0 | 336.3 | 1061.9 |
| 750 | 72.7 | 95.2 | 442.2 | 777.0 | 251.6 | 1053.6 |
| 760 | 125.8 | 42.7 | 333.7 | 750.1 | 201.7 | 1207.3 |
| 770 | 5.5 | 78.2 | 327.8 | 423.9 | 269.0 | 699.0 |
| 780 | | 67.3 | 254.4 | 751.4 | 212.3 | 1254.9 |
| 790 | | 18.2 | 163.5 | 664.3 | 167.5 | 1360.5 |
| 800 | | 31.0 | 129.4 | 327.3 | 197.8 | 1774.7 |
| 810 | | 10.6 | 120.3 | 1006.8 | 333.5 | 2465.5 |
| 820 | | | 69.7 | 770.7 | 278.6 | 2218.8 |
| 830 | | | 24.5 | 362.9 | 147.0 | 1318.0 |
| 840 | | | 17.8 | 233.2 | 92.2 | 993.9 |
| 850 | | | | 166.1 | | 991.9 |
| 860 | | | | 77.8 | | 610.6 |
| 870 | | | | 47.2 | | 505.6 |

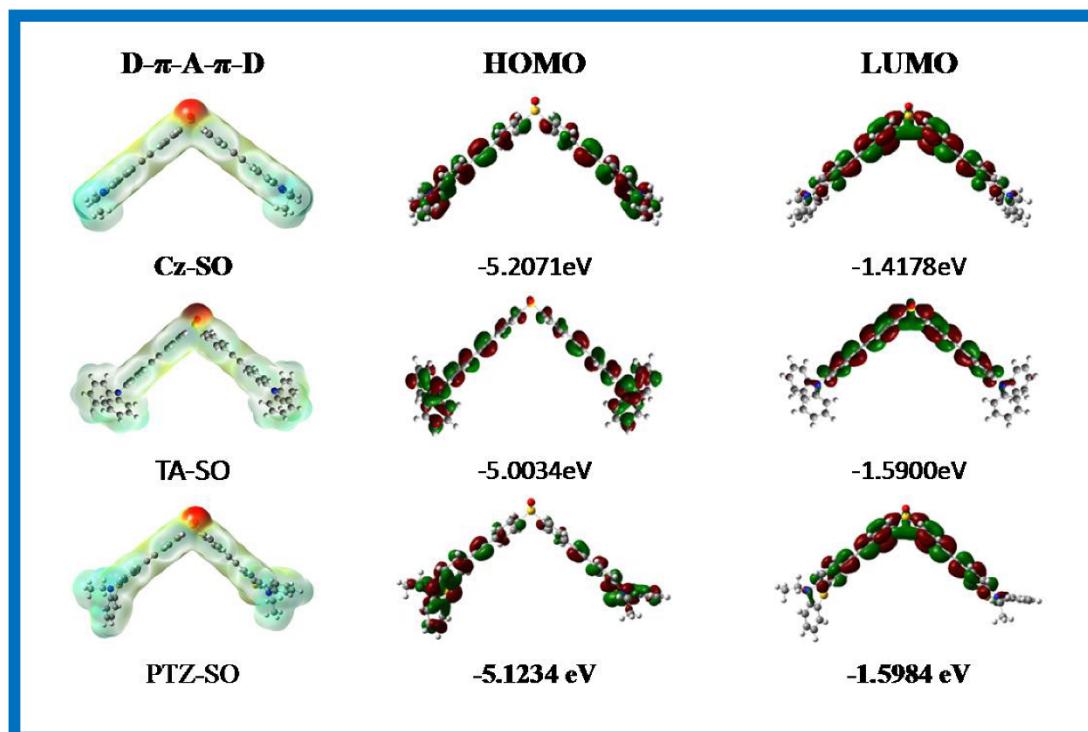


Fig. S4 Optimized geometry, highest occupied molecular orbital (HOMO) and lowest unoccupied

molecular orbital (LUMO) of CZ-SO₂, TA-SO₂ and PTZ-SO₂ at the B3LYP/6-31G* level.

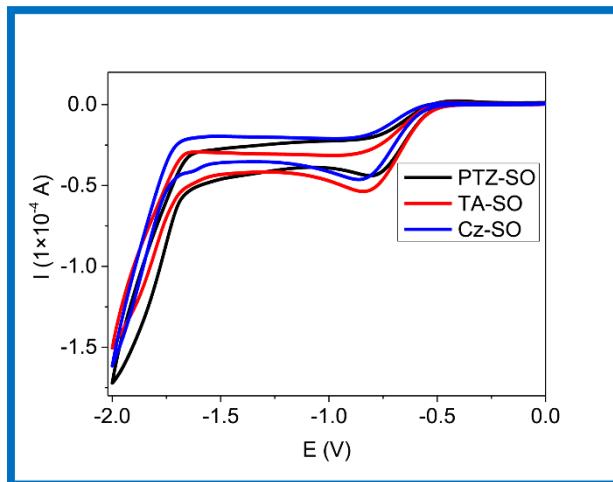


Fig. S5 Cyclic voltammogram curves of Cz2-SO, TA-SO₂ and PTZ-SO₂ in DCM

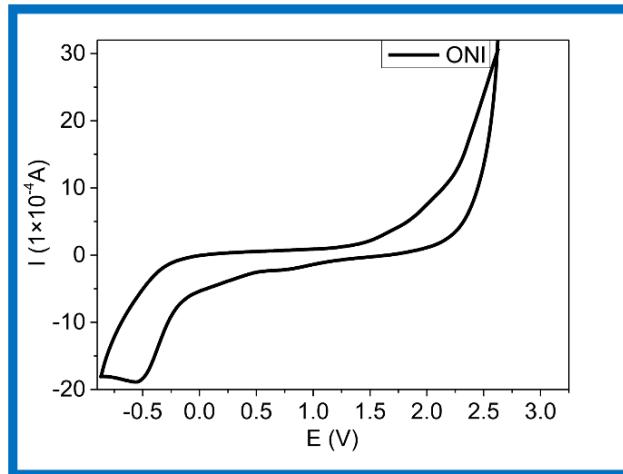


Fig. S6 Cyclic voltammogram curves of ONI in DCM.