Electronic Supplementary Material (ESI) for Materials Chemistry Frontiers.

Supporting Information

Substituent dependent deep-blue pyrene-based chemosensor for trace nitroanilines sensing

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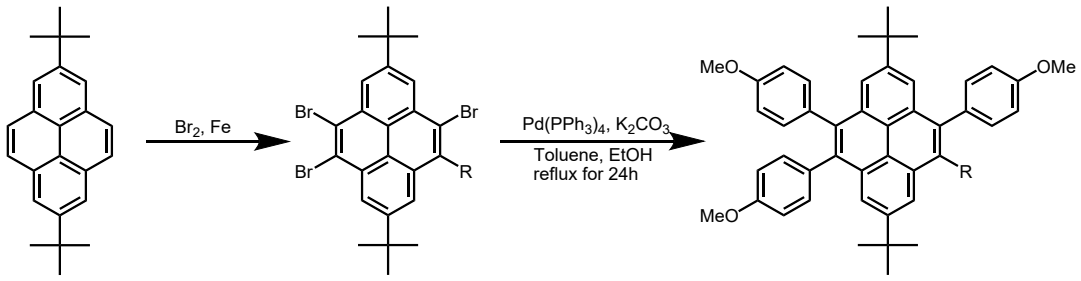

Scheme S1. Synthetic procedure for the substituted pyrene derivatives.

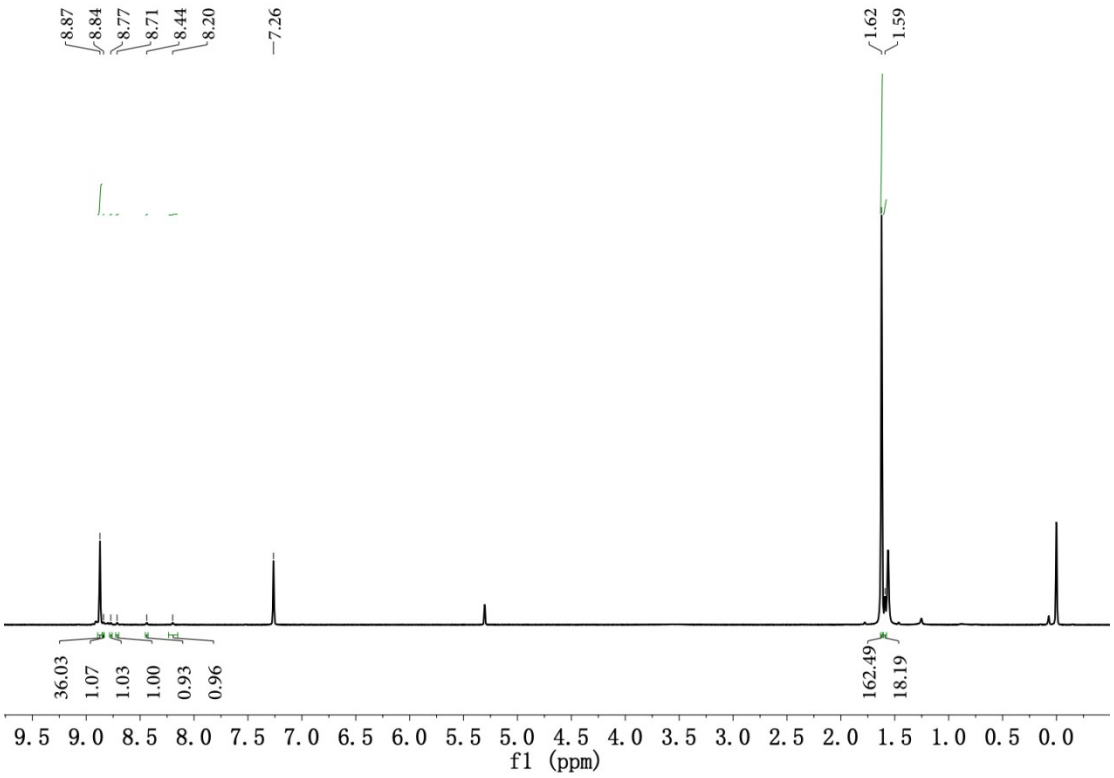

Figure S1. ^{1}H NMR spectrum of **TriBrPy** and **TetraBrPy** (400 MHz, 293 K, $CDCl_3$).

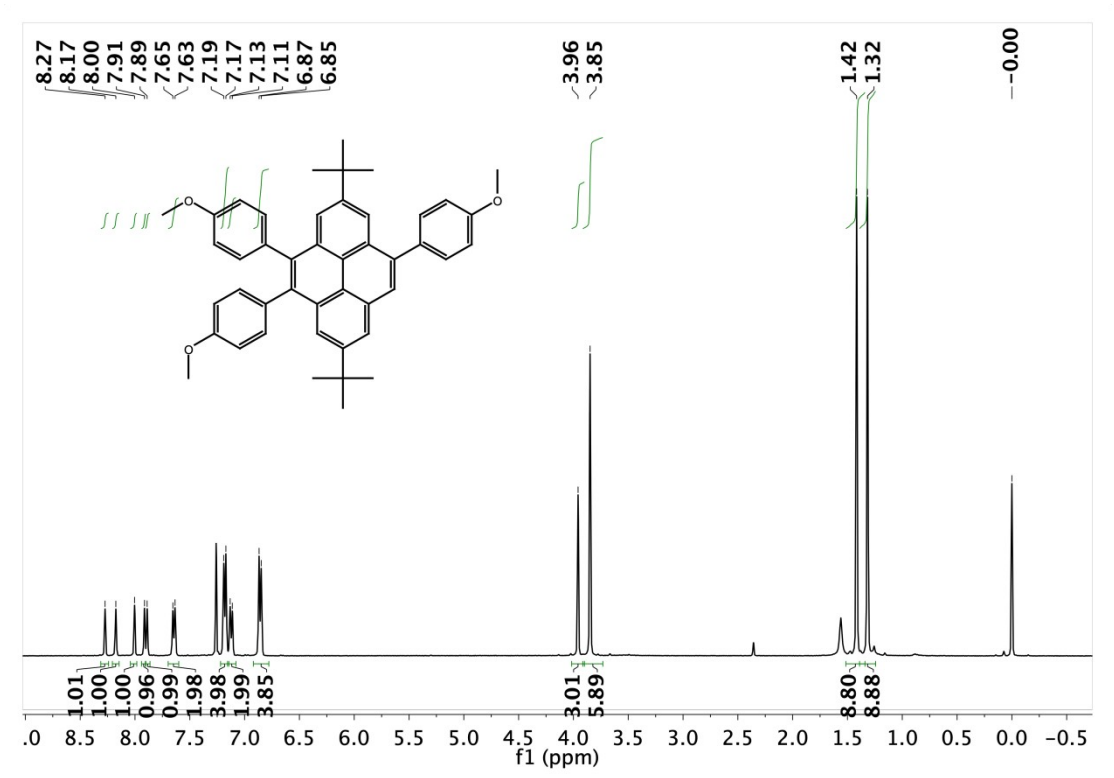

Figure S2. ^{1}H NMR spectrum of **TriPhPy** (400 MHz, 293 K, $CDCl_3$).

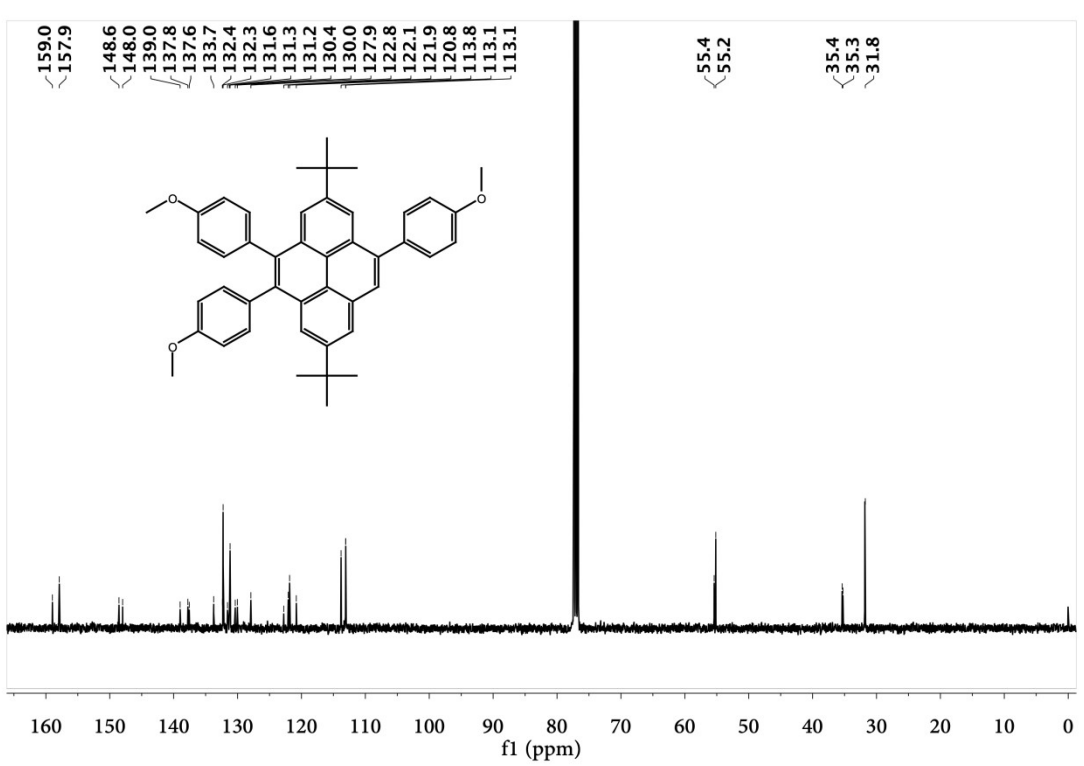

Figure S3. ^{13}C NMR spectrum of **TriPhPy** (100 MHz, 293 K, $CDCl_3$).

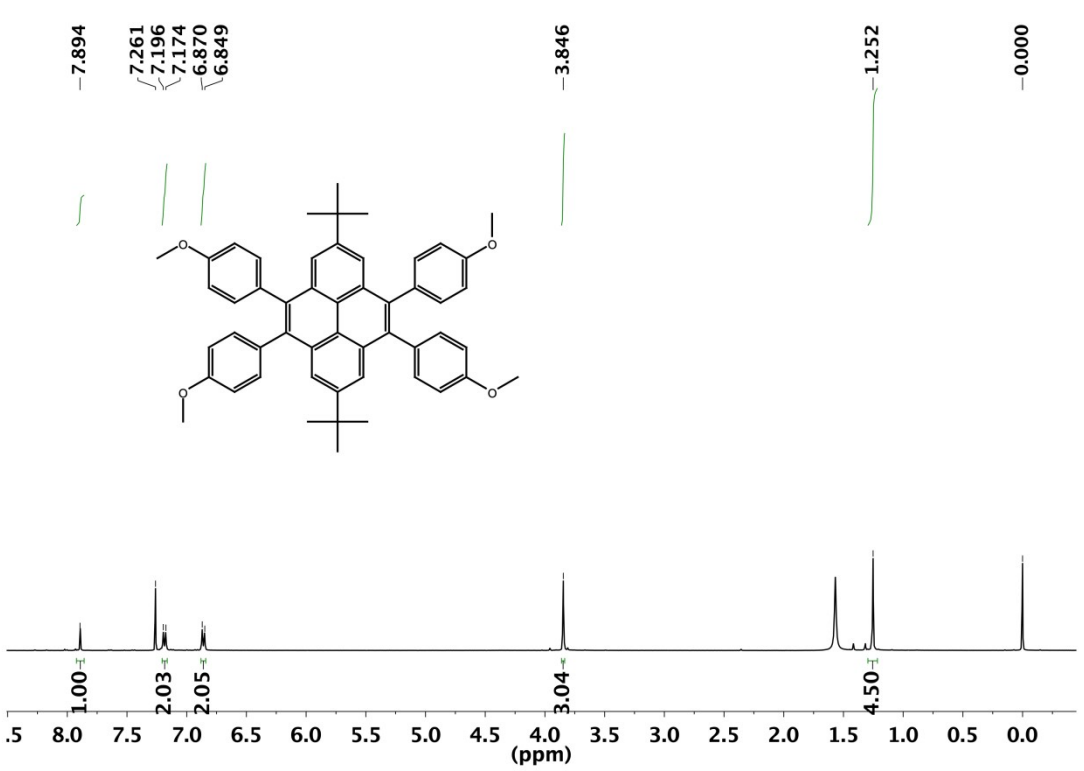

Figure S4. ^{1}H NMR spectrum of **TetraPhPy** (400 MHz, 293 K, $CDCl_3$).

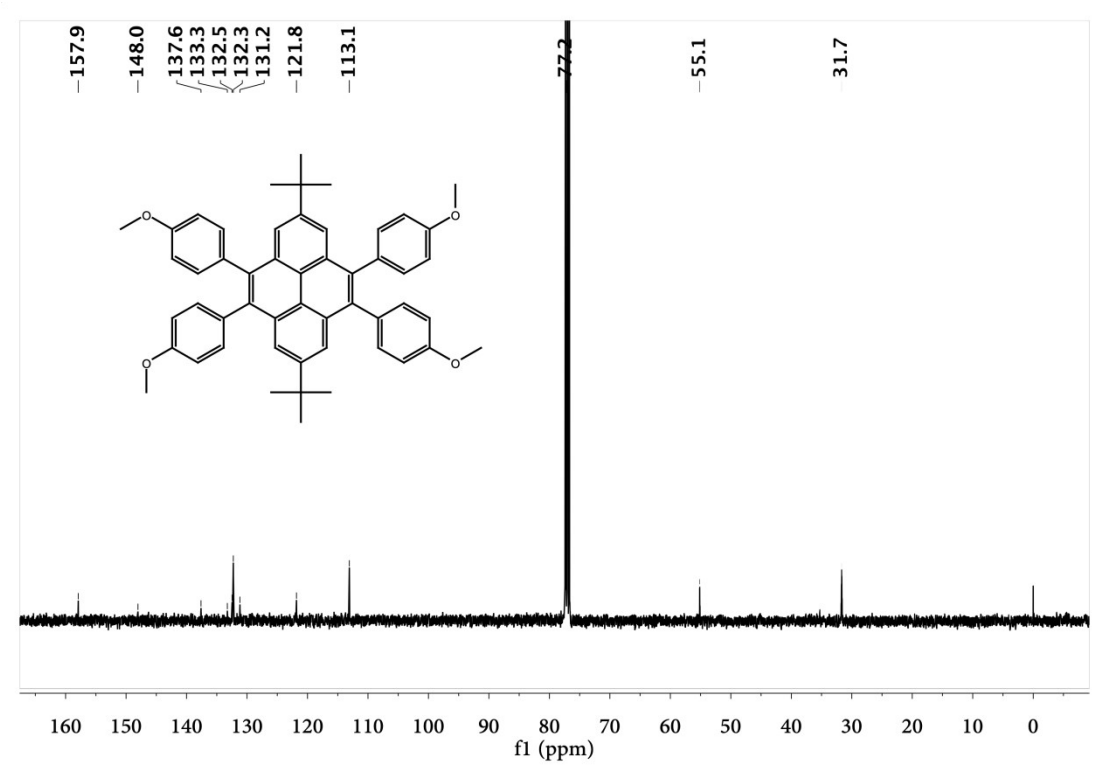

Figure S5. ^{1}H NMR spectrum of **TetraPhPy** (400 MHz, 293 K, $CDCl_3$).

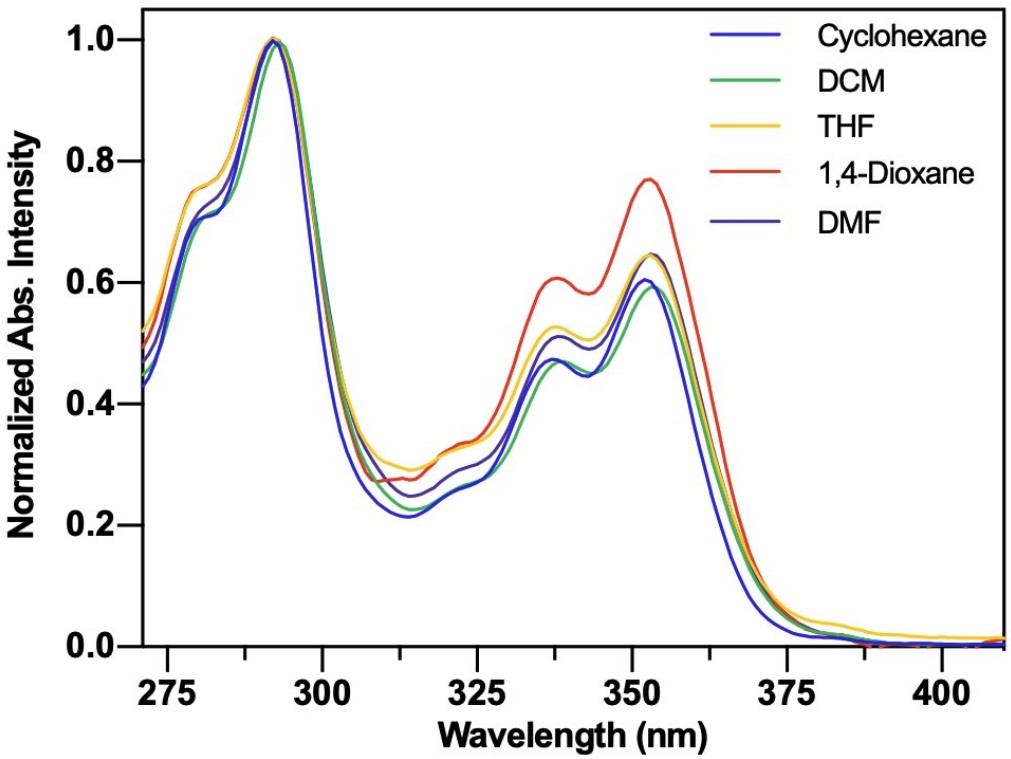

Figure S6. Solvatochromism effect of UV-vis absorbance spectra of **TriPhPy** at a concentration of 10 μM at 25 °C.

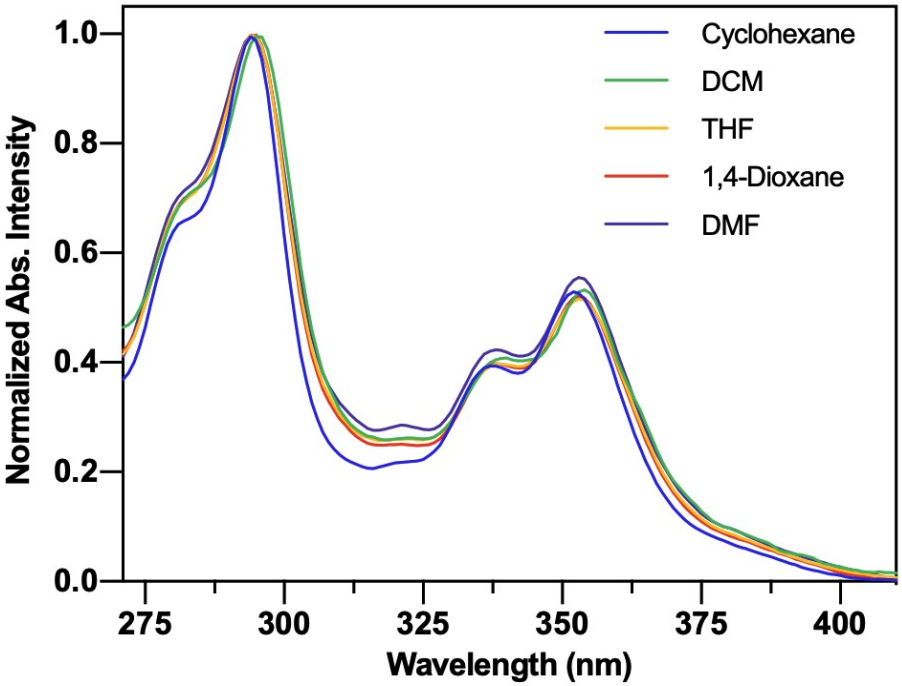

Figure S7. Solvatochromism effect of UV-vis absorbance spectra of **TetraPhPy** at a concentration of 10 μM at 25 °C.

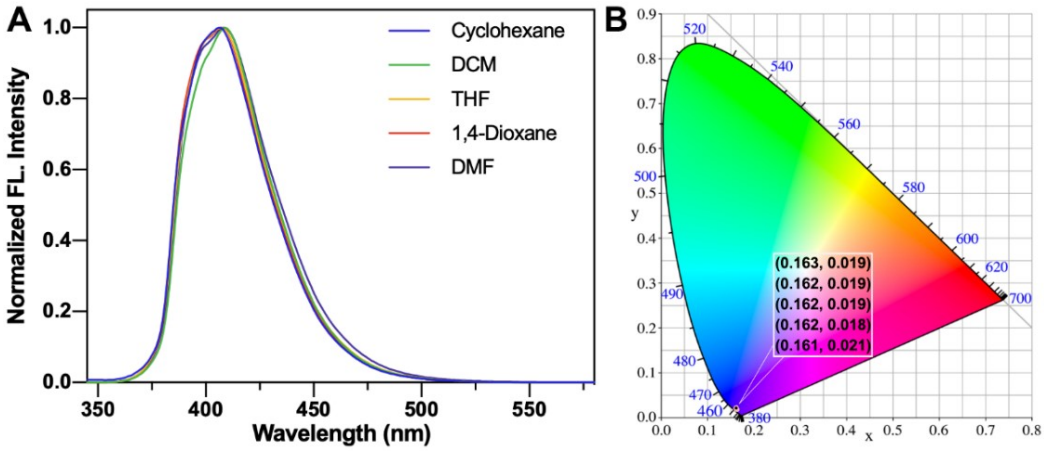

Figure S8. Solvatochromism effect in the emission spectra (A) and the CIE 1931 chromaticity diagram (B) for **TriPhPy** in cyclohexane, 1,4-dioxane, THF, DCM and DMF, respectively.

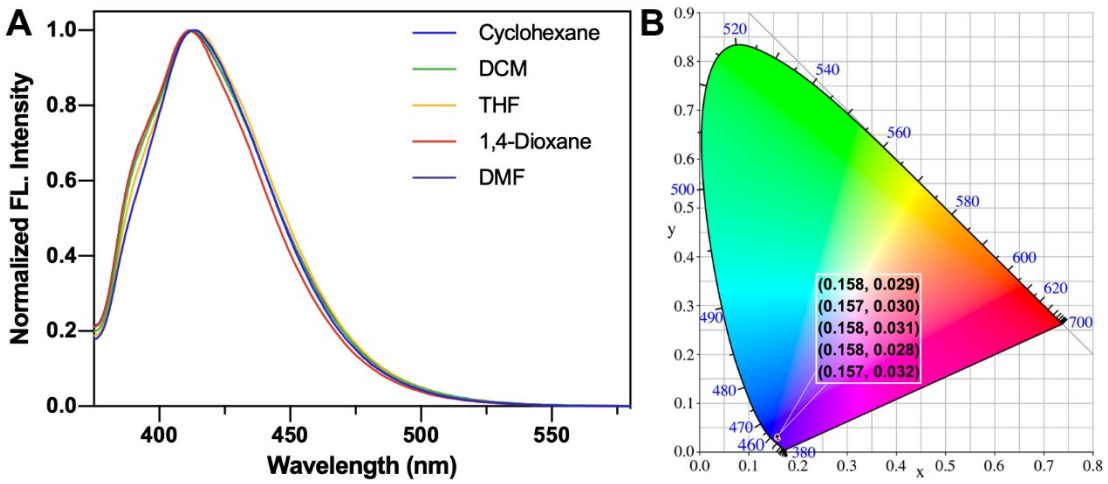

Figure S9. Solvatochromism effect of emission spectra (A) and CIE 1931 chromaticity diagram (B) for **TetraPhPy** in cyclohexane, 1,4-dioxane, THF, DCM and DMF, respectively.

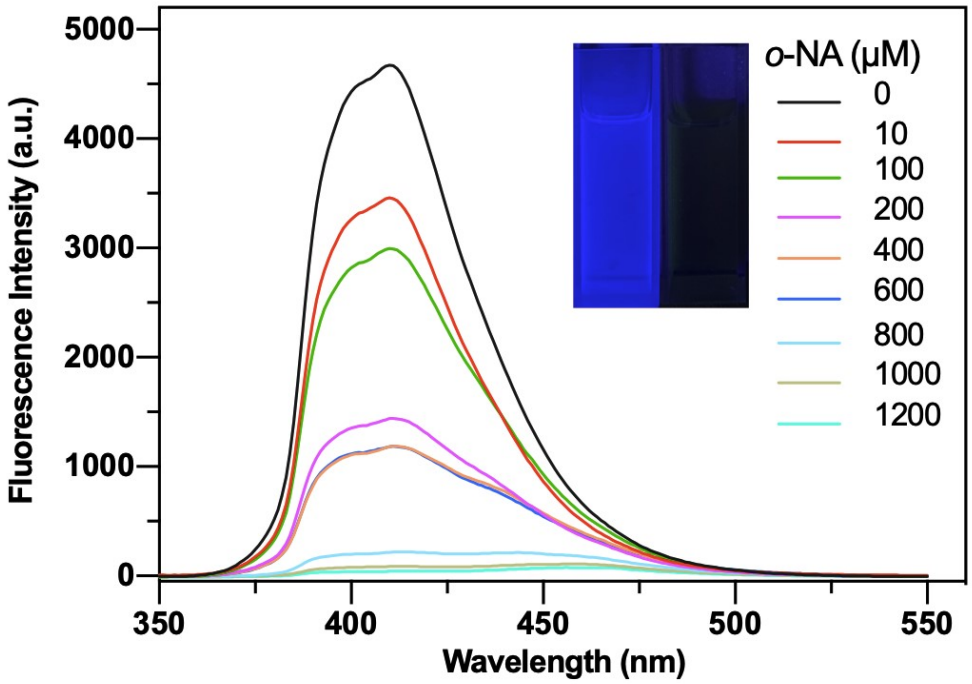

Figure S10. Fluorescence quenching spectra of **TriPhPy** with incremental concentration addition of ***o*-NA**.

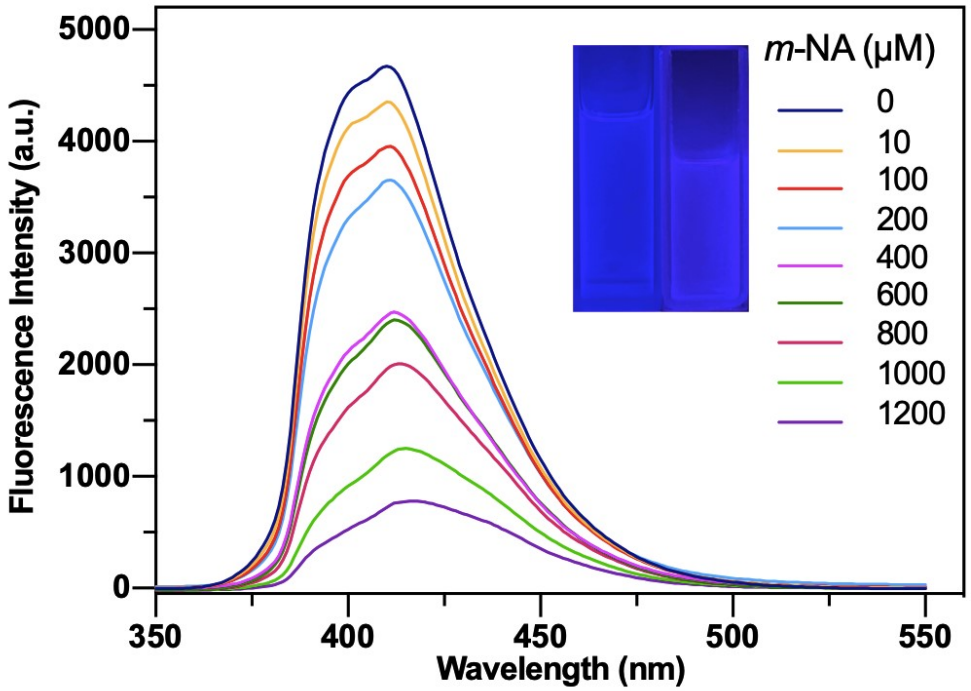

Figure S11. Fluorescence quenching spectra of **TriPhPy** with incremental concentration addition of ***m*-NA**.

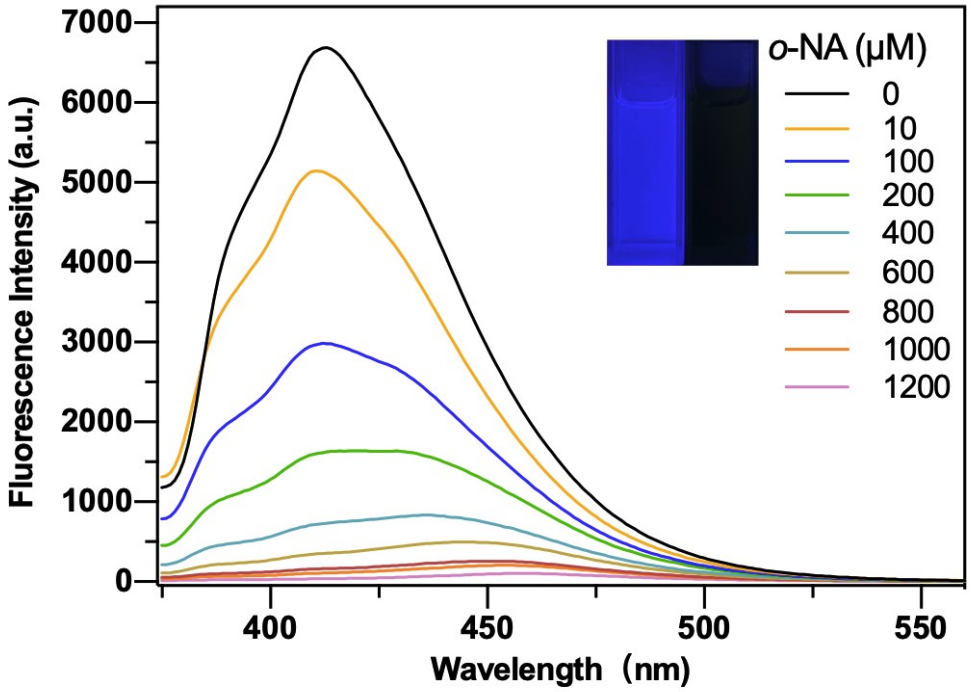

Figure S12. Fluorescence quenching spectra of **TetraPhPy** with incremental concentration addition of ***o*-NA**.

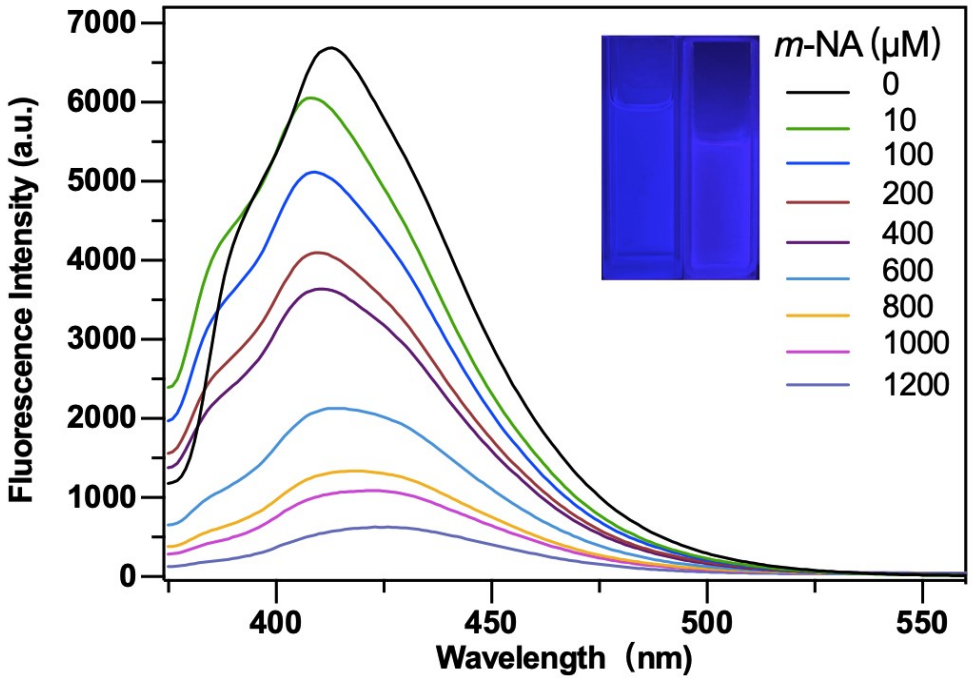

Figure S13. Fluorescence quenching spectra of **TetraPhPy** with incremental concentration addition of ***m*-NA**.

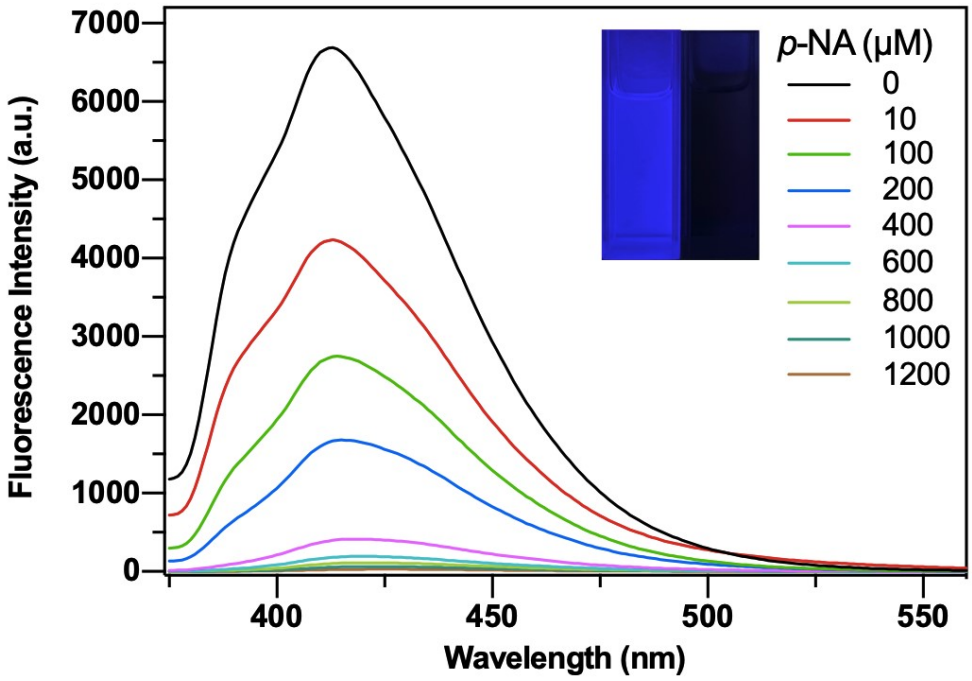

Figure S14. Fluorescence quenching spectra of **TetraPhPy** with incremental concentration addition of ***p*-NA**.

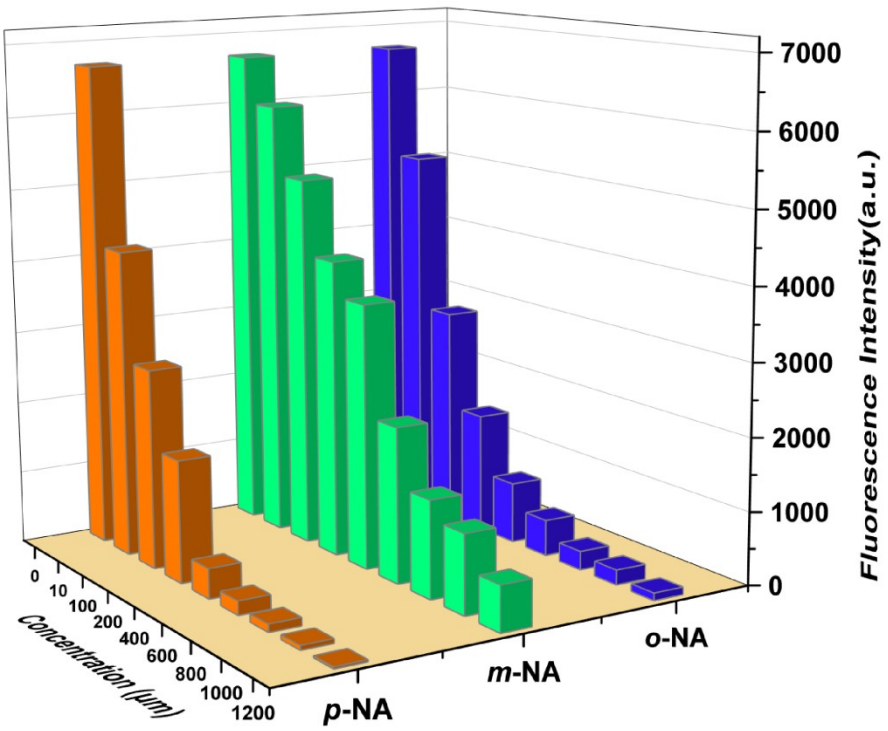

Figure S15. Histogram of fluorescence quenching of **TetraPhPy** with **NA**.

Standard deviation and detection limit calculations

To calculate the standard deviation and detection limit of this detection method, fine particles of **TriPhPy**/**TetraPhPy** with fine particles was made into a solution (1×10^{-5} M, DCM). Then, a nitroaniline (***o*-NA**, ***p*-NA**, ***m*-NA**) solution (10 mM) was added to the respective solution and the fluorescent intensities were recorded. The standard deviation (σ) was calculated from five blank tests of **TriPhPy**/**TetraPhPy** solution (0.0162, 0.1321 respectively) and the limit of detection (LOD) was calculated via the formula: $3\sigma/K$ (K: the slope of the linear region). The LODs of **TriPhPy** was calculated to be 1.25×10^{-8} M, 1.36×10^{-8} M for ***o*-NA**, ***m*-NA**, the LODs of **TetraPhPy** was calculated to be 5.62×10^{-8} M, 6.01×10^{-8} M, 6.48×10^{-8} M for ***o*-NA**, ***p*-NA**, ***m*-NA**, respectively.