Supporting Information

Acid-induced Multicolor Fluorescence of Pyridazine Derivative

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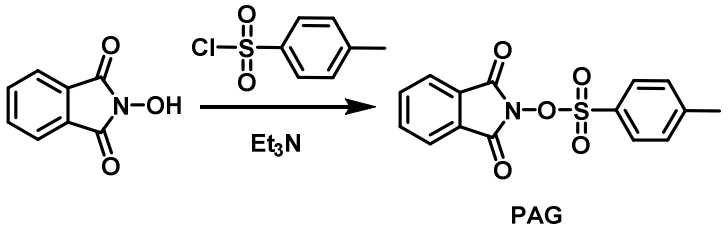
Experimental Section.

*Synthesis of **TPP**:* 80% hydrazine (1.2 mmol, 75 mg) were added to the solution of **TPBD-1** (1 mmol, 508 mg) in ethanol (20 mL) at 0 ^{o}C. Then the mixture was heated to reflux for 2 h. After cooling to room temperature, the reaction mixture was extracted with ethyl acetate. The combined organic extracts were dried over anhydrous $MgSO_4$, filtered and concentrated under vacuum. The residue was purified by flash column chromatography with petroleum ether/ethyl acetate (3:1, v/v) to afford **TPP** as a pale yellow solid (278 mg, 55%). ^{1}H NMR ($CDC1_3$, 400 MHz): δ 7.26 (d, J = 8.5 Hz, 4H, ArH), 6.88 (dd, J = 7.8, 5.5 Hz, 8H, ArH), 6.63 (d, J = 8.4 Hz, 4H, ArH), 3.80 (s, 6H, CH_3), 3.71 (s, 6H, CH_3). ^{13}C NMR ($CDCl_3$, 100 MHz): δ 158.7, 157.3, 132.5, 131.88, 130.1, 127.8, 124.1, 119.2, 113.7, 113.1, 55.2, 55.0.MALDI-TOF (m/z), calculated for $C_{32}H_{29}N_2O_4$ $[M+H]^+$, 505.2122; found, 505.1835.



Scheme S1. The structure and synthetic route of photoacid generator (**PAG**).

Synthesis of photoacid generator (PAG):[S1] Triethylamine (2 mmol, 202 mg) was added dropwise to the mixture of *N*-(hydroxy)phthalimide (1 mmol, 163 mg), *p*-toluene sulfonyl chloride (1.5 mmol, 258 mg) and THF (20 ml). After stirring for about 2h, the reaction mixture was extracted with EA, and then recrystallized from

EA to give the product as a white powder (222 mg, 70%). ^{1}H NMR ($CDC1_3$, 400 MHz): δ 7.96 (d, J = 8.4 Hz, 2H, ArH), 7.87 (m, 2H, ArH), 7.80 (m, 2H, ArH), 7.41 (d, J = 8.0 Hz, 2H, ArH), 2.50 (s, 3H, CH_3). ^{13}C NMR ($CDCl_3$, 100 MHz): δ 161.3, 147.0, 135.1, 130.9, 130.1, 129.6, 128.6, 124.3, 22.0.

Supporting Figures.

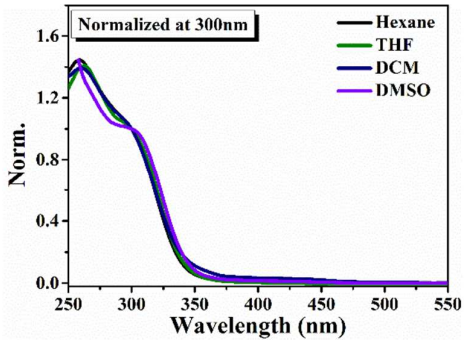


Figure S1. UV-vis absorption spectra of **TPP** in different solvents. Concentration of **TPP**: 3×10^{-5} M.

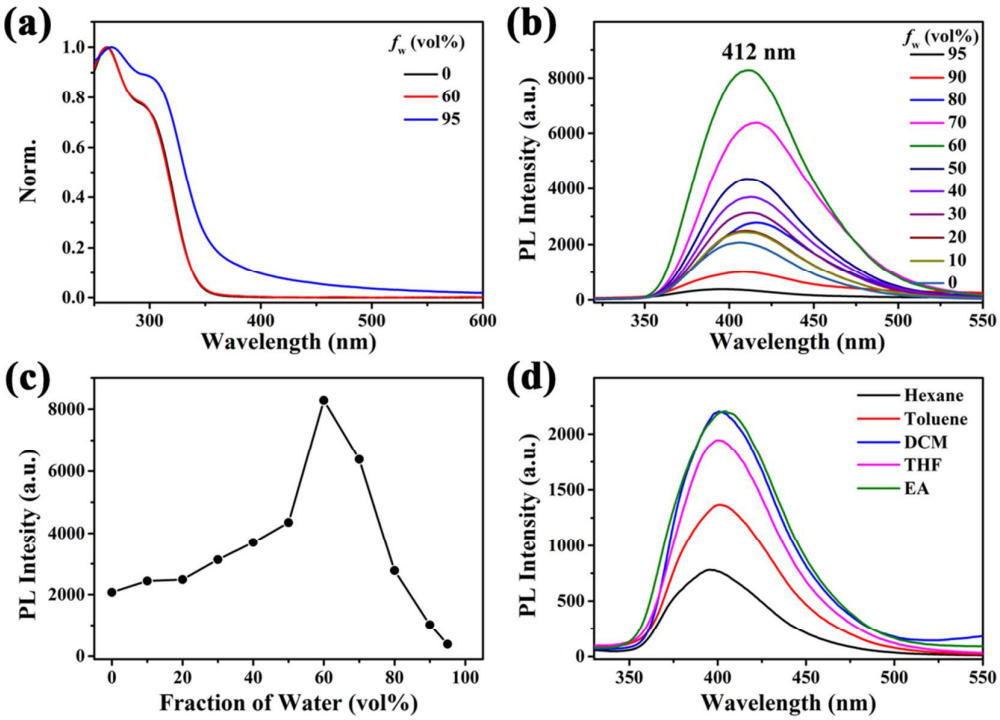


Figure S2. (a) Normalized UV-vis absorption and (b) PL fluorescence spectra of **TPP** in THF/water mixtures with different water fractions (f_w). (c) Plot of relative PL intensity (I/I_0) *vs* f_w. (d) PL fluorescence spectra of **TPP** in different solvents. Concentration: 3×10^{-5} M, excitation wavelength: 300 nm.

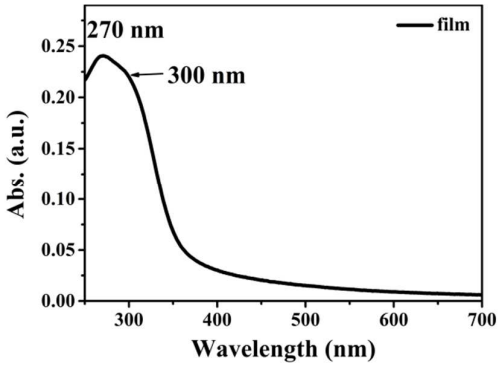


Figure. S3. UV-vis absorption spectrum of **TPP** in film state. Excitation wavelength: 300 nm.

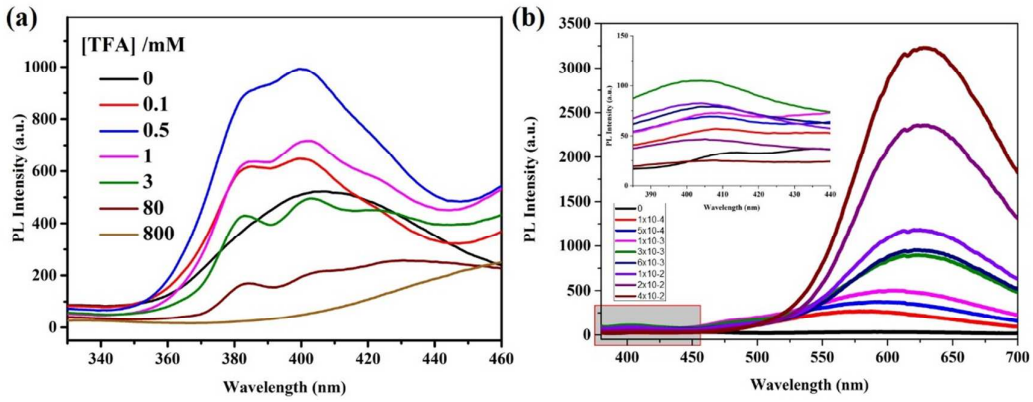


Figure S4. The changes of the emission peak at ca. 400 nm for **TPP** in chloroform with different concentrations of TFA: excitation wavelength: for (a) 300 nm and for (b) 365 nm. Concentration of **TPP**: 3×10^{-5} M.

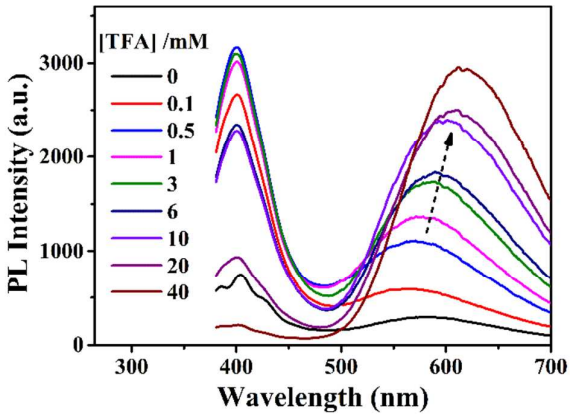


Figure S5. Fluorescence spectra of **TPP** in DCM with different concentrations of TFA. Concentration: 3×10^{-5} M, excitation wavelength: 365 nm.

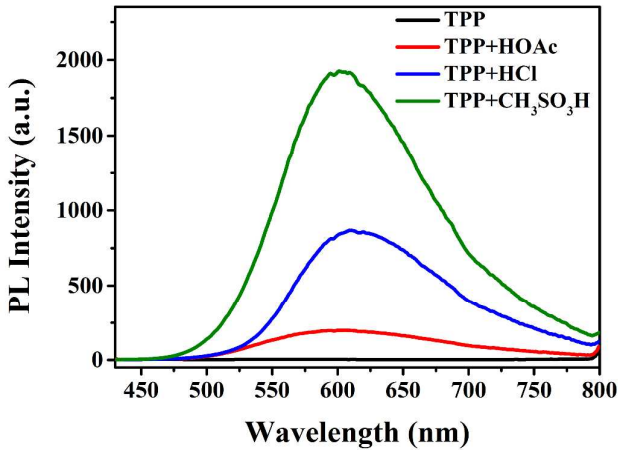


Figure. S6. Fluorescence spectra of **TPP** treated with different acids in DCM. Concentration of **TPP**: 3×10^{-5} M; concentration of acids: HOAc (0.875 M), HCl (0.718 M), CH_3SO_3H (0.077 M), excitation wavelength: 410 nm.

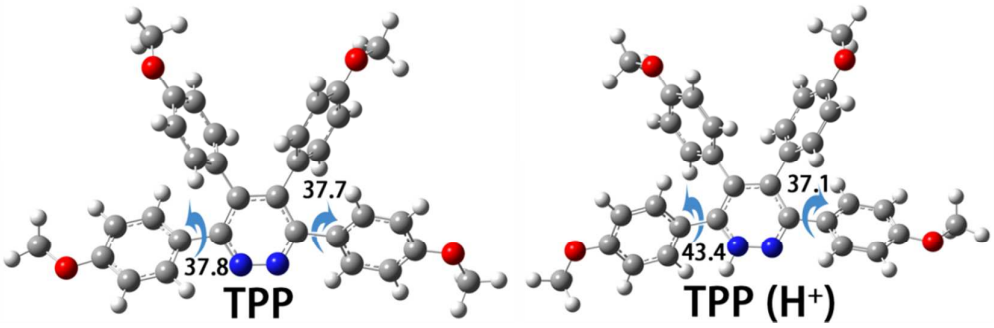


Figure S7. Optimized geometric structures and torsion angles of **TPP** and **TPP (H^+)** in the gas phase, as calculated at the level of B3LYP/6-31G*.

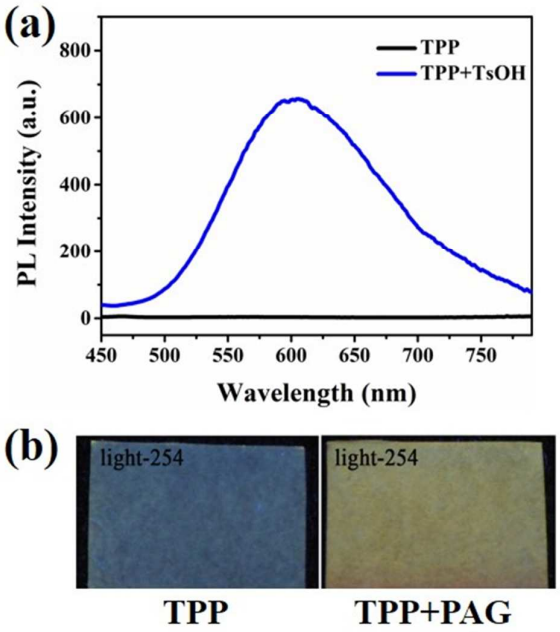


Figure S8. (a) Fluorescence spectra of **TPP** before and after treated with *p*-toluene sulfonyl acid (TsOH) in DCM. Concentration of **TPP**: 3×10^{-5} M; concentration of TsOH: 6×10^{-3} M, excitation wavelength: 410 nm. (b) Images of pure **TPP** film (left) and solid state sensor with **TPP** and **PAG** (right) after the irradiation of UV light (254 nm) for 5 min (Images were taken under the illumination with 365 nm UV light).

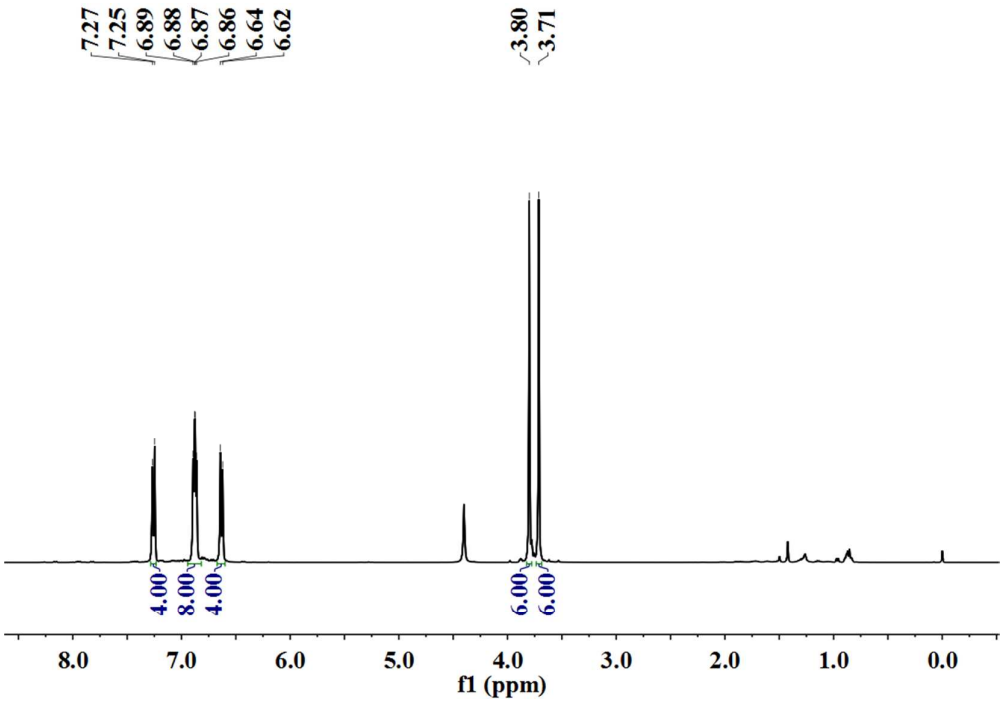


Figure S9. ^{1}H NMR spectrum of **TPP** in $CDCl_3$.

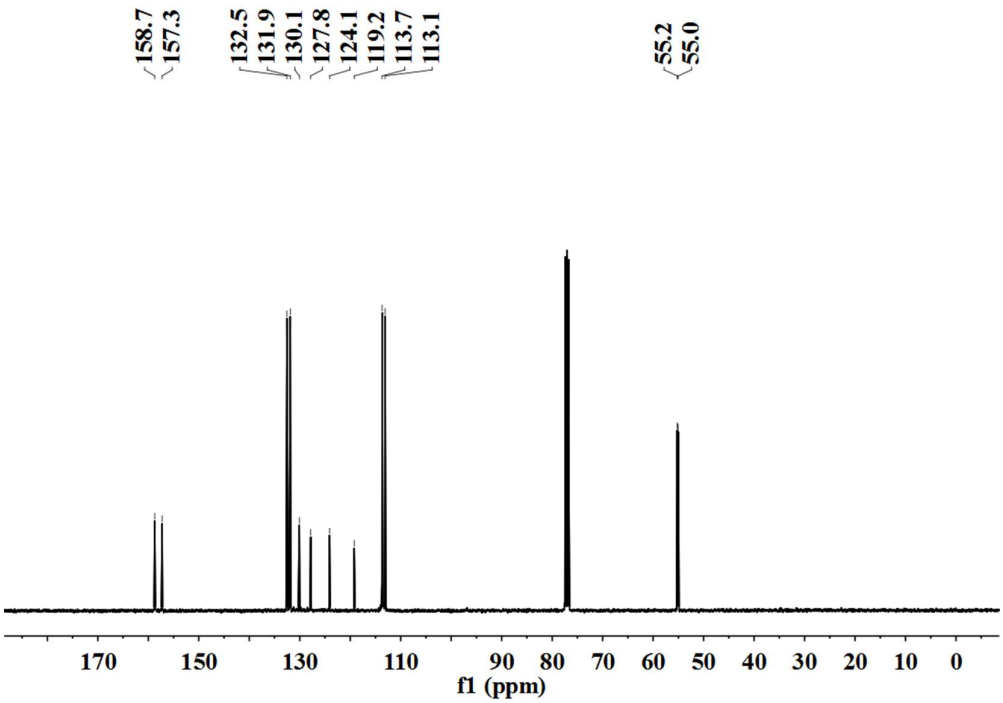


Figure S10. ^{13}C NMR spectrum of **TPP** in $CDCl_3$.

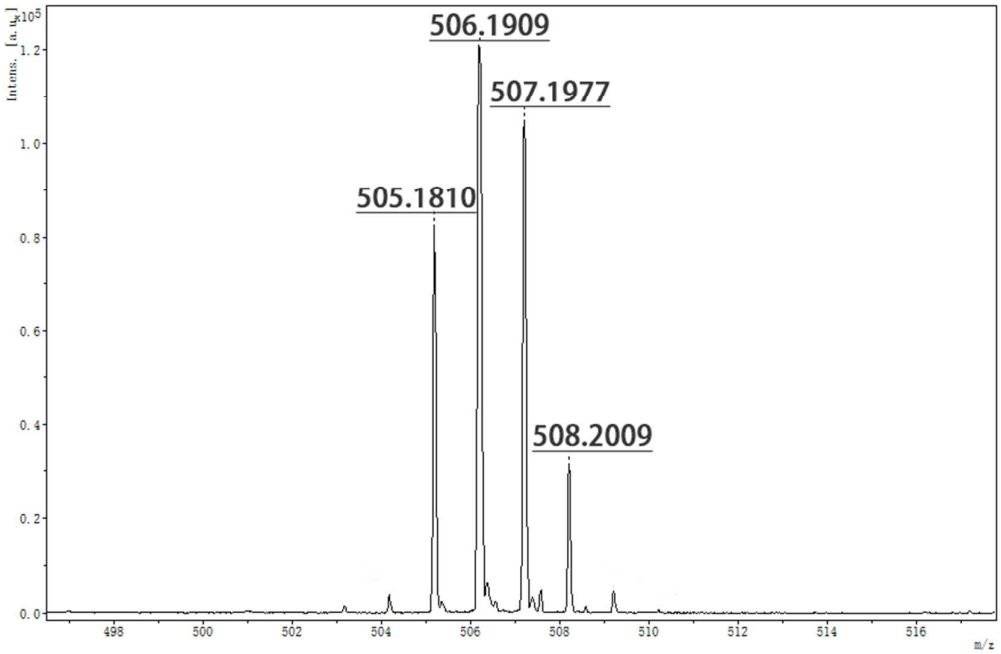


Figure S11. MALDI-TOF spectrum of **TPP**.

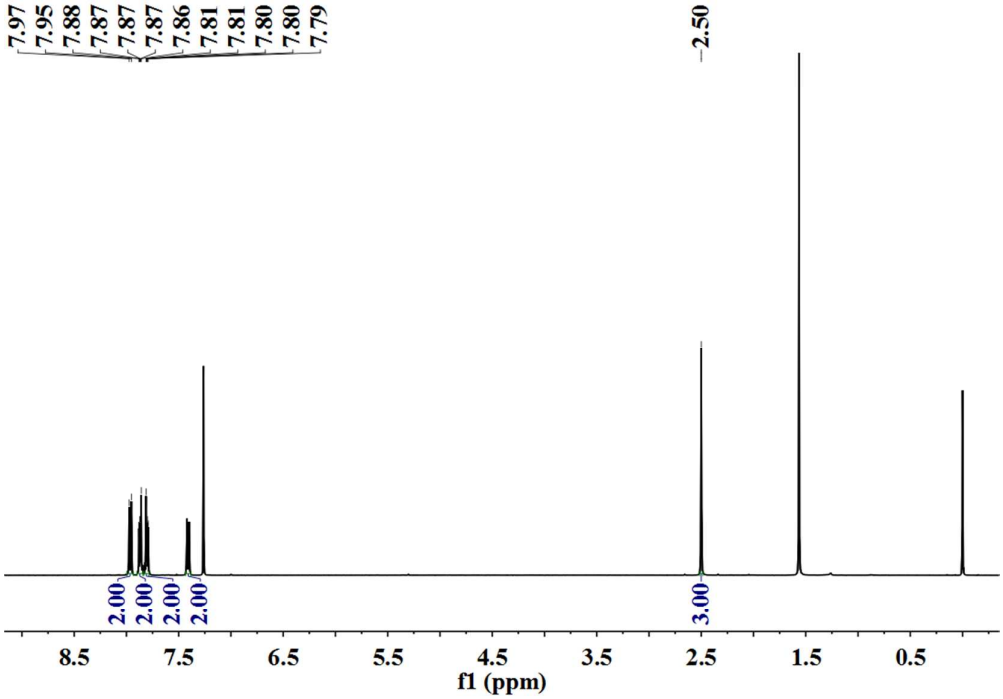


Figure S12. ^{1}H NMR spectrum of **PAG** in $CDCl_3$.

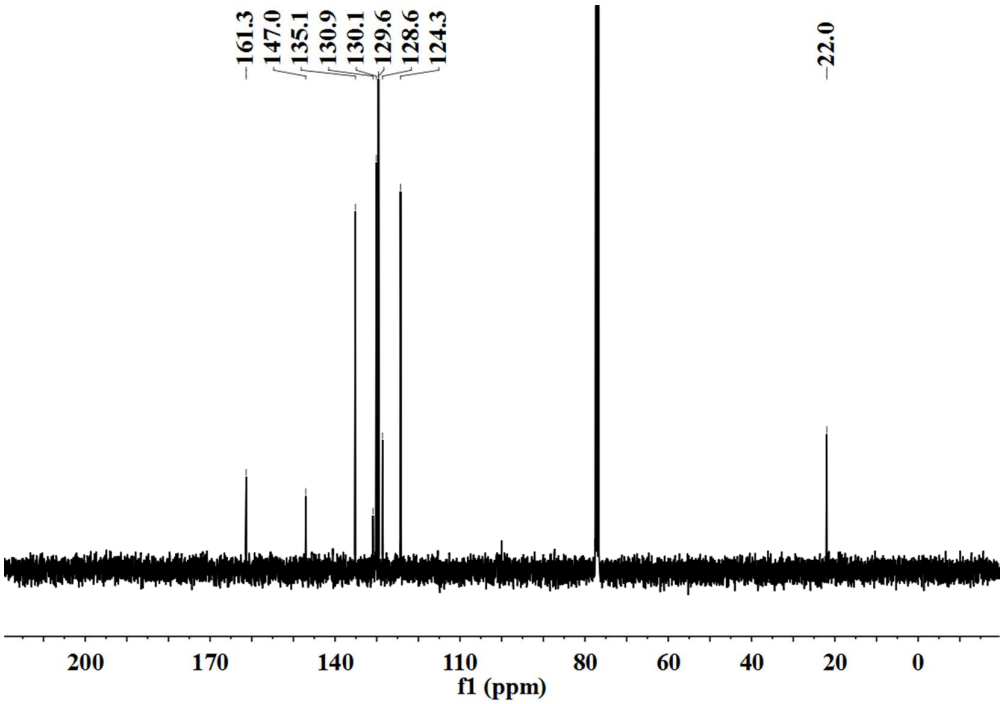


Figure S13. ^{13}C NMR spectrum of **PAG** in $CDCl_3$.

Reference.

S1. Wang, J.; Yang, H.; Li, Q.; Xie, J. Synthesis and Characterization of One of The Benzene Sulfonates as Photoacid Generator *Applied Chemical Industry* **2014**, *43*, 1830–1832.