

Supporting Information

Synthesis of C₃-symmetric Triazine based Derivatives: Study their AIEE, Mechanochromic Behaviours, Detection of Picric acid and Uric acid in Aqueous Medium

Harikrishnan Muniyasamy, Chithiraikumar Chinnadurai, Malini Nelson, Ashokkumar Veeramanoharan, Murugesan Sepperumal, Siva Ayyanar*

Supramolecular and Organometallic Chemistry Laboratory, Department of Inorganic Chemistry, School of Chemistry, Madurai Kamaraj University Madurai, Tamilnadu-625 021, India.

Corresponding author Email (drasiva@gmail.com and siva.chem@mkuniversity.org)

Experimental section

Materials and Methods

All the chemicals and reagents used in this work were analytical grade. 4-Methoxy phenylboronic acid and 4-bromo thiophenol were purchased from the spectrochem, trifluoromethanesulfonic acid purchased from Sigma Aldrich, bis(pinacolato)diboron, 4-bromo aniline, 4-bromo benzonitrile, purchased from Alfa Aesar and all the other dry solvents purchased from Merck. The ^1H NMR and ^{13}C NMR spectra were recorded on Bruker (Avance) 300 and 400 MHz NMR instrument using TMS as an internal standard, CDCl_3 as a solvent. Chemical shifts are given in parts per million (δ -scale) and the coupling constants are given in Hertz. Silica gel-G plates (Merck) were used for TLC analysis with a mixture of n-hexane and ethyl acetate as an eluent. The HPLC spectra were recorded on SHIMADZU instrument, solvent mixture is acetonitrile and methanol (90:10), dual pump mode, flow rate 1 ml/ min. Column chromatography was carried out in silica gel (60-120 mesh) using n-hexane and ethyl acetate as an eluent. UV-Vis spectrum of the synthesized compounds was recorded in JASCO (V-630) spectrophotometer and emission spectra were obtained by JASCO (F-8500) fluorescence spectrophotometer. The sample was kept in a 3ml quartz cuvette to get the emission spectra. The stock solution (10^{-3} M) of the synthesized compounds were prepared in a 3ml of individual solvents (polar and non-polar solvents) after that 20 μL of the stock solution was taken into 2ml of solvents placed in a 3ml cuvette, and the total concentration of samples were 10 μM for the solvatochromism spectra in both absorbance and emission spectroscopy. In aggregation studies, the stock solution (10^{-3}M) of the **TZNET** was prepared by taking 0.0028g in 2ml of THF solvent. THF and water fraction were used in the aggregation studies, 20 μL of stock solution was taken into 2ml of total THF and water fraction, and the final concentration of the solution is 10 μM . Then, the experiment was carried out in selectivity and competitive studies of 1 equiv. of the probe and 3 equiv. of analyte.

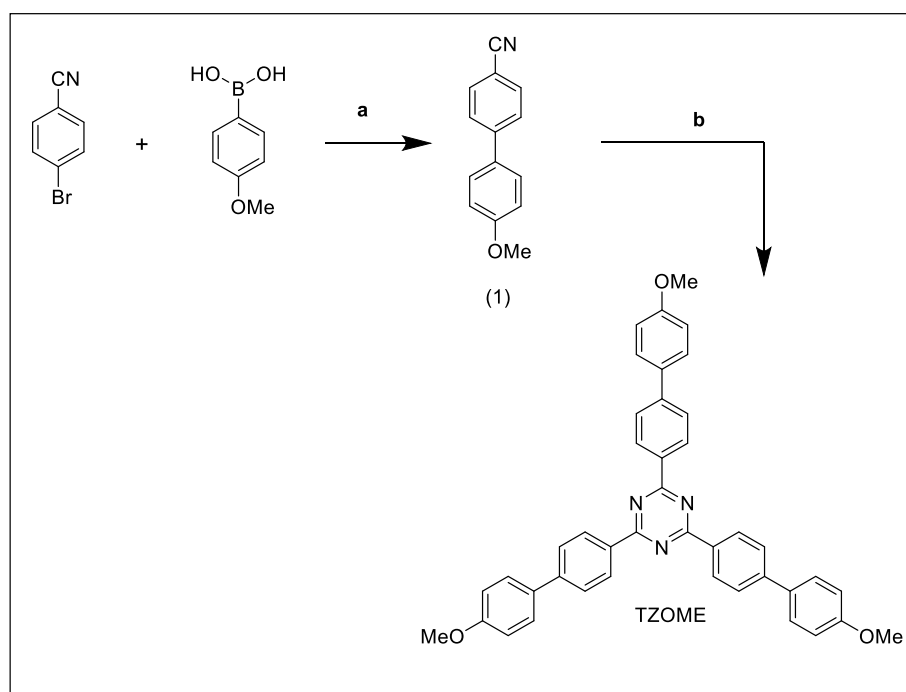
General procedure for Suzuki Miyaura coupling and trimerization reaction

Aromatic halide (1 equiv.), boronate ester compound (1.2 equiv.), $\text{Pd}(\text{PPh}_3)_4$ (0.05 equiv.), K_2CO_3 (2 equiv.) was dissolved in DMF/ H_2O and heated the reaction mixture to 90°C and maintained for about overnight. After completion of the reaction, the resulting mixture was

passed through the celite bed, washed with ethyl acetate and water. The organic layer was further washed with a saturated brine solution and dried over anhydrous Na_2SO_4 . The crude material was purified by column chromatography using petroleum ether/ethyl acetate as an eluent. Two necked RB flask containing aromatic cyano compound in chloroform stirring at 0°C under a nitrogen atmosphere and then dropwise addition of trifluoromethanesulfonic acid into the solution, once the addition was completed the mixture was warmed into the room temperature and stirred for about overnight. After the completion of the reaction, the mixture was poured into solid ice cubes, neutralized with ammonium hydroxide to form a precipitate. The precipitate was filtered and washed with water and diethyl ether three times. Then the product was dried in a vacuum oven at 55°C to afford the desired product.

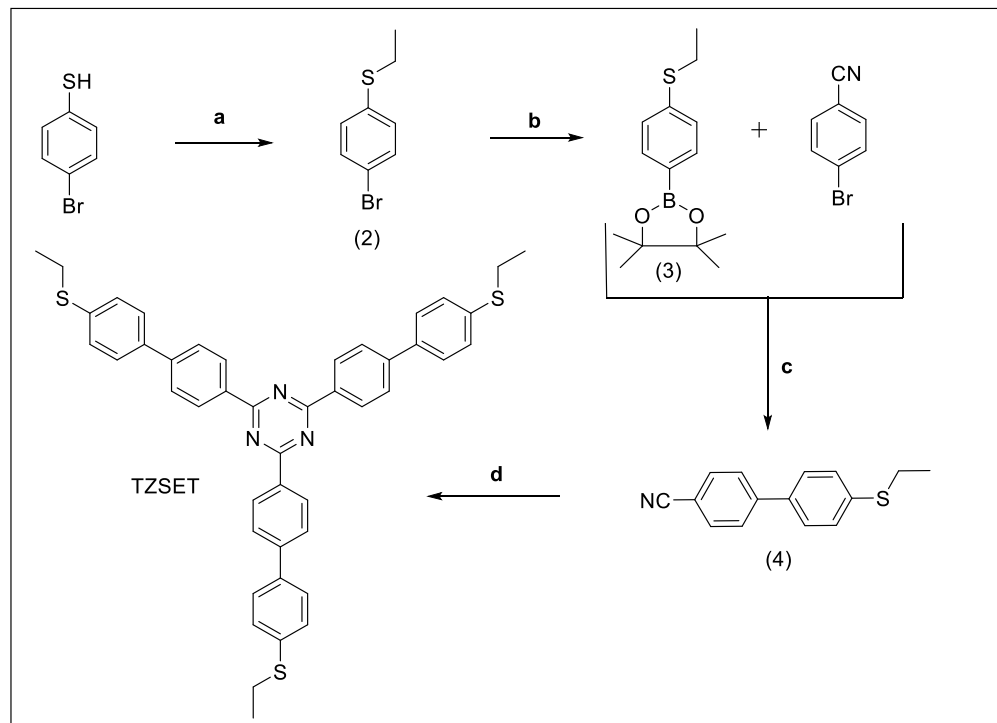
Synthetic procedure of triazine based fluorophores

Scheme S1. Synthetic route of target **TZOME**.



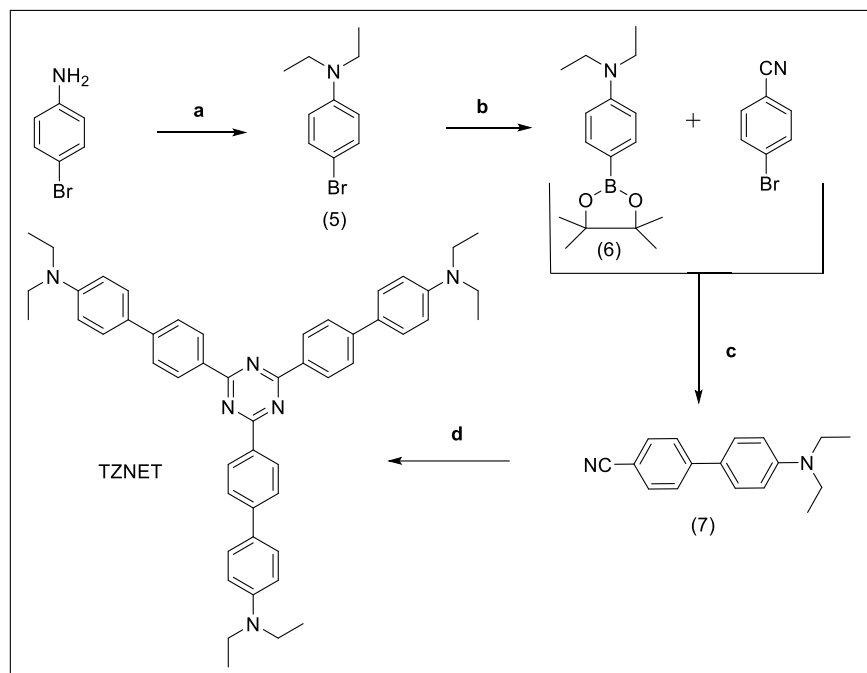
Reagent and Conditions: (a) $\text{Pd(PPh}_3)_4$, K_2CO_3 , $\text{DMF/H}_2\text{O}$ (1:1), 80°C , (b) triflic acid, CHCl_3 , RT.

Scheme S2. Synthetic route of target **TZSET**



Reagent and Conditions: (a) bromoethane, DMF, K_2CO_3 , 60°C , (b) Bis(pinacolato) diboron, $\text{Pd}(\text{dppf})\text{Cl}_2$, CH_2Cl_2 , 1,4 dioxane, KOAc, 80°C , overnight, (c) $\text{Pd}(\text{PPh}_3)_4$, K_2CO_3 , DMF/ H_2O (1:1), 80°C , (d) triflic acid, CHCl_3 , RT.

Scheme S3. Synthetic route of target **TZNET**



Reagent and Conditions: (a) bromoethane, DMF, K_2CO_3 , $60^\circ C$, (b) Bis(pinacolato) diboron, $Pd(dppf)Cl_2$, CH_2Cl_2 , 1,4 dioxane, KOAc, $80^\circ C$, overnight, (c) $Pd(PPh_3)_4$, K_2CO_3 , DMF/ H_2O (1:1), $80^\circ C$, (d) triflic acid, $CHCl_3$, RT.

Synthetic procedures for triazine based fluorophores

Synthesis of 2,4,6-tris(4'-methoxy-[1,1'-biphenyl]-4-yl)-1,3,5-triazine (TZOME)

To a Schlenk tube containing 4-bromobenzonitrile 0.50g (2.7 mmol), 4-methoxyphenylboronic acid 0.50g (3.2 mmol), $Pd(PPh_3)_4$ 32mg (0.02 mmol), K_2CO_3 0.57g (4.12 mmol) were dissolved in DMF/ H_2O and heated the reaction mixture to $90^\circ C$ and maintained for overnight. After completion of the reaction, the resulting mixture was passed through the celite bed, washed with ethyl acetate and water. The organic layer was further washed with a saturated brine solution and dried over anhydrous Na_2SO_4 . The crude material was purified by column chromatography using petroleum ether/ethyl acetate as an eluent. The white color solid powder was obtained. The yield is 80%. 1H NMR (300 MHz, $CDCl_3$) δ : 7.70 (d, $J = 8.6$ Hz, 2H), 7.64 (d, $J = 8.7$ Hz, 2H), 7.55 (d, $J = 8.9$ Hz, 2H), 7.01 (d, $J = 8.9$ Hz, 2H), 3.87 (s, 3H). Two neck RB containing compound **1** 0.5g (2.38 mmol) in 10 ml of chloroform stirring at $0^\circ C$ under a nitrogen

atmosphere and then dropwise addition of trifluoromethanesulfonic acid (1 mL) into the solution, an addition was completed, the mixture was warmed into the room temperature and stirred for overnight. After the completion of the reaction, the mixture was poured into solid ice cubes, neutralized with ammonium hydroxide to form a precipitate. The precipitate was filtered and washed with water and diethyl ether. Hereafter the product was dried in a vacuum oven at 55°C to afford the product. Yield is 85%. ¹H NMR (300 MHz, CDCl₃) δ: 8.74 (d, *J* = 8.3 Hz, 2H), 7.78 (d, *J* = 8.4 Hz, 2H), 7.64 (d, *J* = 8.6 Hz, 2H), 7.01 (d, *J* = 8.6 Hz, 2H), 3.88 (s, 3H). ¹³C NMR (75 MHz, CDCl₃) δ: 160.73, 145.63, 132.87, 131.95, 128.68, 127.46, 119.28, 115.02, 110.65, 55.75. HR-MS *m/z* (TZOME + NH₄) calcd. 645.2866, found 645.2889.

Synthesis of 2,4,6-tris(4'-(ethylthio)-[1,1'-biphenyl]-4-yl)-1,3,5-triazine (TZSET)

4-Bromothiophenol 1.0g (5.28 mmol), bromoethane 0.7g (0.67 mmol), potassium carbonate 1.0g (7.88 mmol) were added to the Schlenck tube and dissolved in dry DMF (5 ml) and it was heated at 100°C for about 7 hrs. After the completion of the reaction, the mixture was poured into the solid ice, extracted with ethyl acetate and washed with brine, dried over sodium sulphate and concentrated, finally purified by column chromatography using n-hexane as an eluent. Colourless liquid was obtained with 90% of yield. ¹H NMR (300 MHz, CDCl₃) δ: 7.39 (d, *J* = 8.6 Hz, 2H), 7.17 (d, *J* = 8.6 Hz, 2H), 2.91 (q, *J* = 7.4 Hz, 2H), 1.30 (t, *J* = 7.4 Hz, 3H).

To a Schlenck tube containing (4-bromophenyl)(ethyl)sulfane 1.0g (4.60 mmol), bis (pinacolato)diboron 2.3g (9.21 mmol), Pd(dppf)Cl₂. CH₂Cl₂ 75 mg (0.09 mmol), was dissolved in dioxane (7 ml) and then potassium acetate 1.14g (11 mmol) was added as a base and heated the reaction mixture to 80°C and maintained for overnight. After completion of the reaction, the resulting mixture was passed through the celite bed, washed with ethyl acetate and water. The organic layer was further washed with a saturated brine solution and dried over anhydrous Na₂SO₄. The crude material was purified by column chromatography using petroleum ether/ethyl acetate as an eluent. The white color solid powder was obtained with a yield of 65%. ¹H NMR (300 MHz, CDCl₃) δ: 7.71 (d, *J* = 8.3 Hz, 2H), 7.27 (d, *J* = 8.1 Hz, 2H), 2.98 (q, *J* = 7.3 Hz, 2H), 1.33 (s, 12H), 1.26 (t, *J* = 7.1 Hz, 3H).

The compound **5** was synthesized by following a procedure similar to the compound **1** synthesis. White color solid powder product obtained with 75% of yield. ¹H NMR (300 MHz,

CDCl₃) δ : 7.72 (d, J = 8.5 Hz, 2H), 7.66 (d, J = 8.5 Hz, 2H), 7.52 (d, J = 8.4 Hz, 2H), 7.40 (d, J = 8.5 Hz, 2H), 3.01 (q, J = 7.4 Hz, 2H), 1.37 (t, J = 7.4 Hz, 3H). **TZSET** was synthesized by following the procedure similar to **TZOME**. The pale green solid product was obtained with the yield of 80%. ¹H NMR (300 MHz, DMSO + CDCl₃) δ : 8.76 (d, J = 8.1 Hz, 6H), 7.81 (d, J = 8.3 Hz, 6H), 7.65 (d, J = 7.8 Hz, 6H), 7.37 (d, J = 8.1 Hz, 6H), 2.98 (q, J = 7.3 Hz, 6H), 1.29 (t, J = 7.2 Hz, 9H). ¹³C NMR (75 MHz, CDCl₃) δ : 148.52 (s), 146.01 (s), 132.87 (s), 128.47 (s), 126.47 (s), 112.21 (s), 44.80 (s), 12.98 (s). HRMS m/z (TZSET+Na) calcd 740.2204, found 740.2189.

4',4''',4''''-(1,3,5-triazine-2,4,6-triyl)tris(N,N-diethyl-[1,1'-biphenyl]-4-amine) (TZNET)

The compound **5** was synthesized by following the procedure similar to compound **2**. Colourless liquid was attained by 90% of yield. ¹H NMR (300 MHz, CDCl₃) δ : 7.68 (d, J = 9.0 Hz, 2H), 6.66 (d, J = 9.0 Hz, 2H), 3.33 (q, J = 7.1 Hz, 4H), 1.16 (t, J = 7.1 Hz, 6H). The compound **6** was synthesized by following the procedure similar to compound **3**. White color solid was obtained with the yield of 60%. ¹H NMR (300 MHz, CDCl₃) δ : 7.45 (d, J = 9.0 Hz, 2H), 6.47 (d, J = 9.0 Hz, 2H), 3.42 (q, J = 7.1 Hz, 4H), 1.32 (s, 12H), 1.19 (t, J = 7.1 Hz, 6H). The compound **7** was synthesized by following the procedure similar to compound **1** to get white color solid with the yield of 80%. ¹H NMR (300 MHz, CDCl₃) δ : 7.64 (d, 4H), 7.51 (d, J = 9.0 Hz, 2H), 6.76 (d, J = 9.0 Hz, 2H), 3.45 (q, J = 7.1 Hz, 4H), 1.23 (t, J = 7.1 Hz, 6H). The compound **TZNET** was synthesized by following a procedure similar to the compound **TZOME** to get red color solid product with 80% of yield. ¹H NMR (400 MHz, DMSO) δ : 8.85 (d, J = 11.6 Hz, 6H), 8.00 (d, J = 8 Hz, 12H), 7.54 (d, J = 8 Hz, 6H), 3.47 (q, 12H), 1.06 (t, J = 6.9 Hz, 18H). ¹³C NMR (100 MHz, DMSO) δ : 153.38, 146.14, 133.58, 133.21, 128.80, 120.71, 114.85, 112.83, 97.65, 44.18, 12.89. HRMS m/z (TZSET+H) calcd 751.4488, found 751.4408.

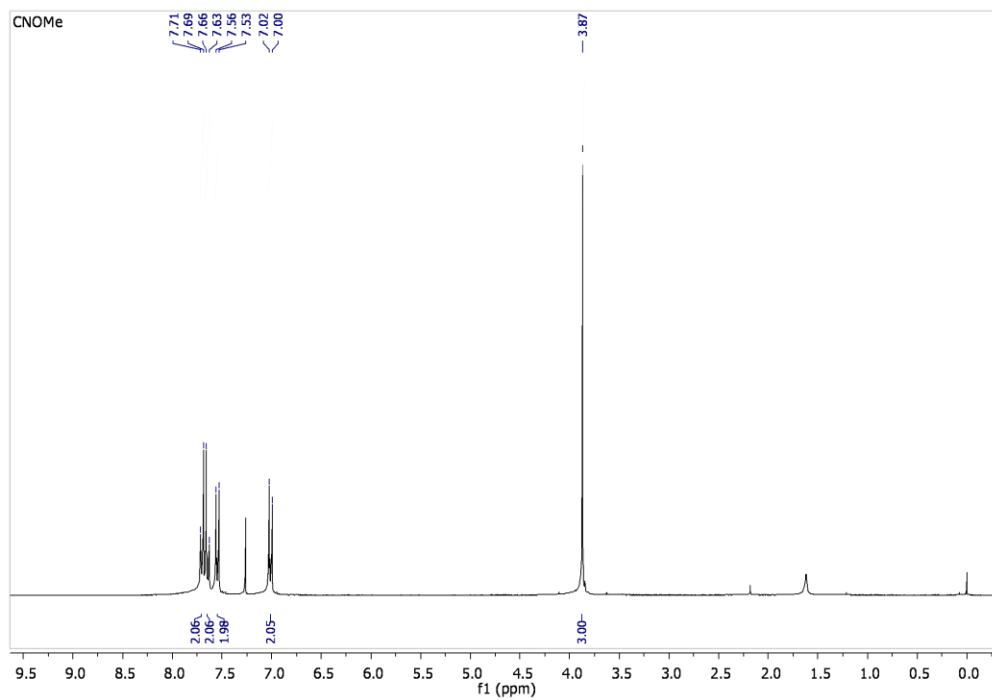


Figure S1. ^1H NMR spectrum of compound 1.

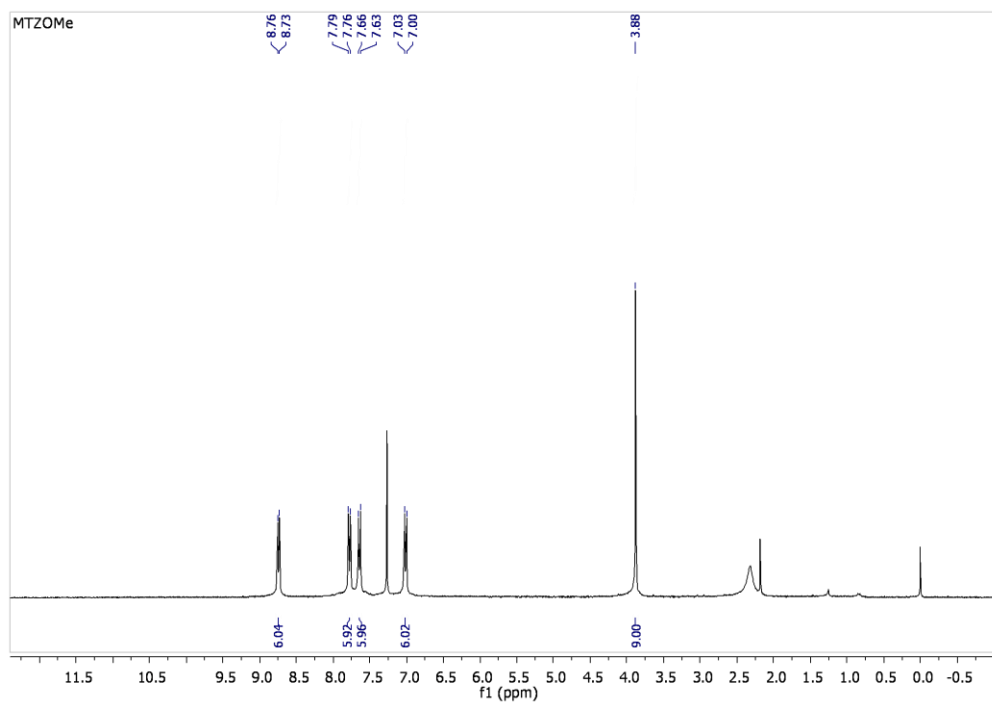


Figure S2. ^1H NMR spectrum of TZOME.

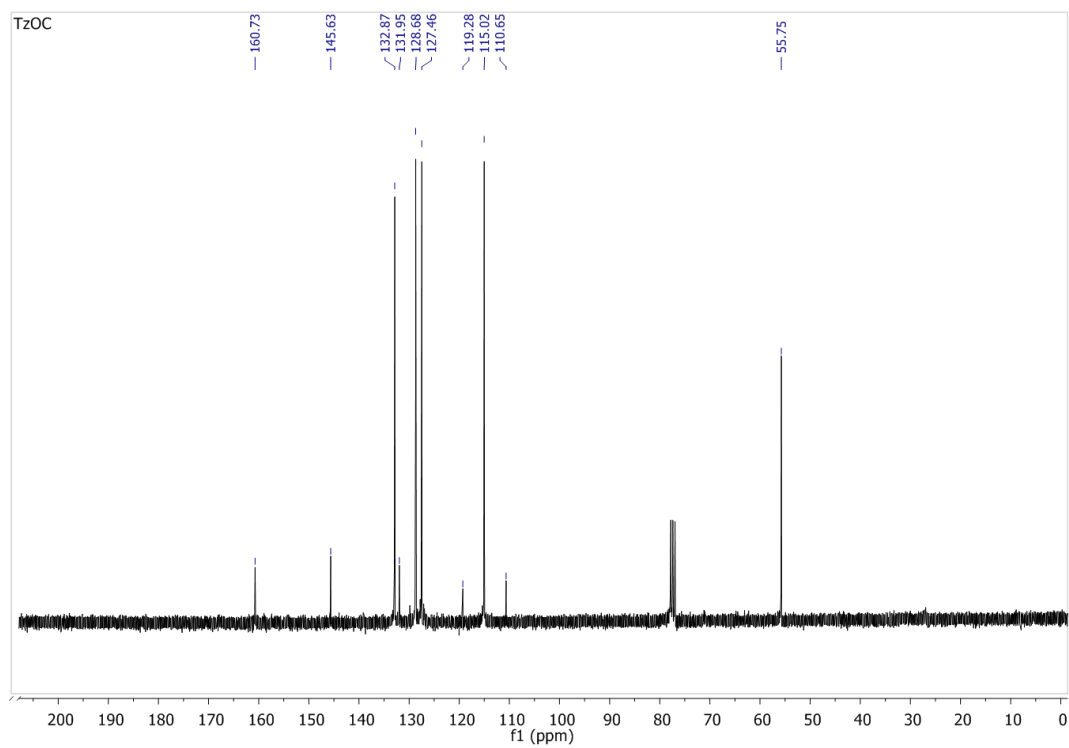


Figure S3. ^{13}C NMR spectrum of TZOME

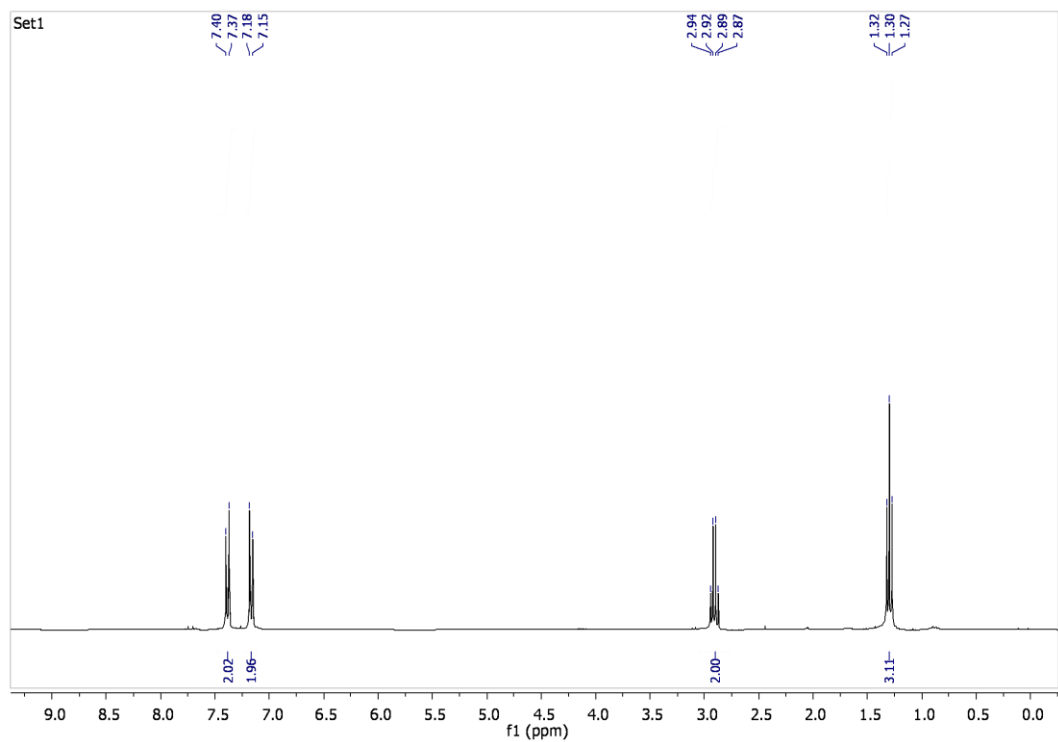


Figure S4. ^1H NMR spectrum of compound 2.

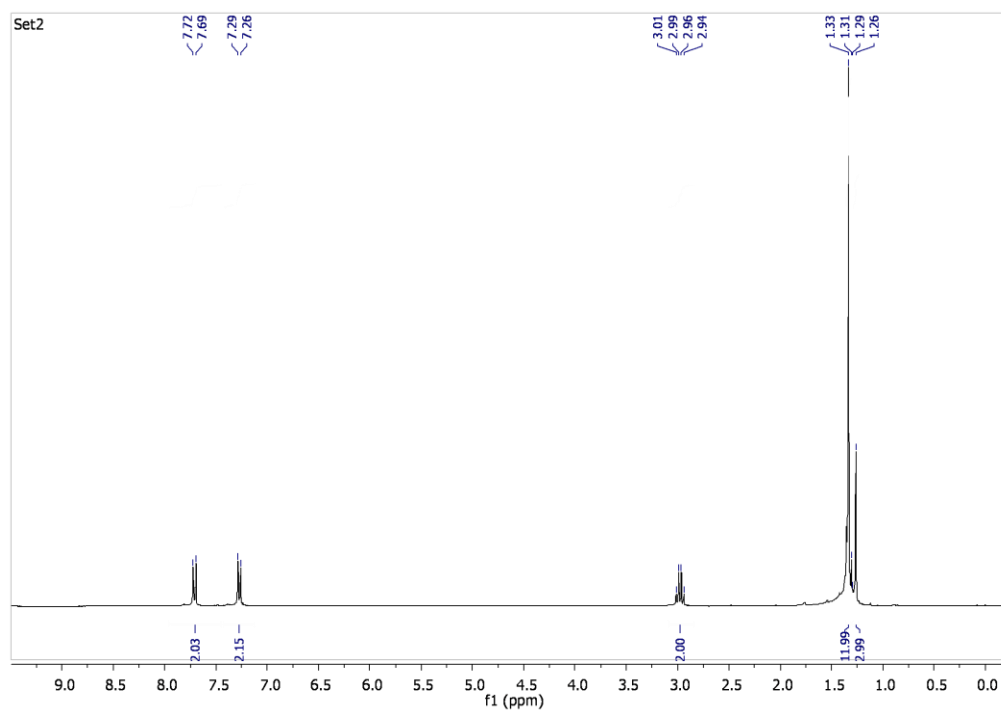


Figure S5. ^1H NMR spectrum of compound 3.

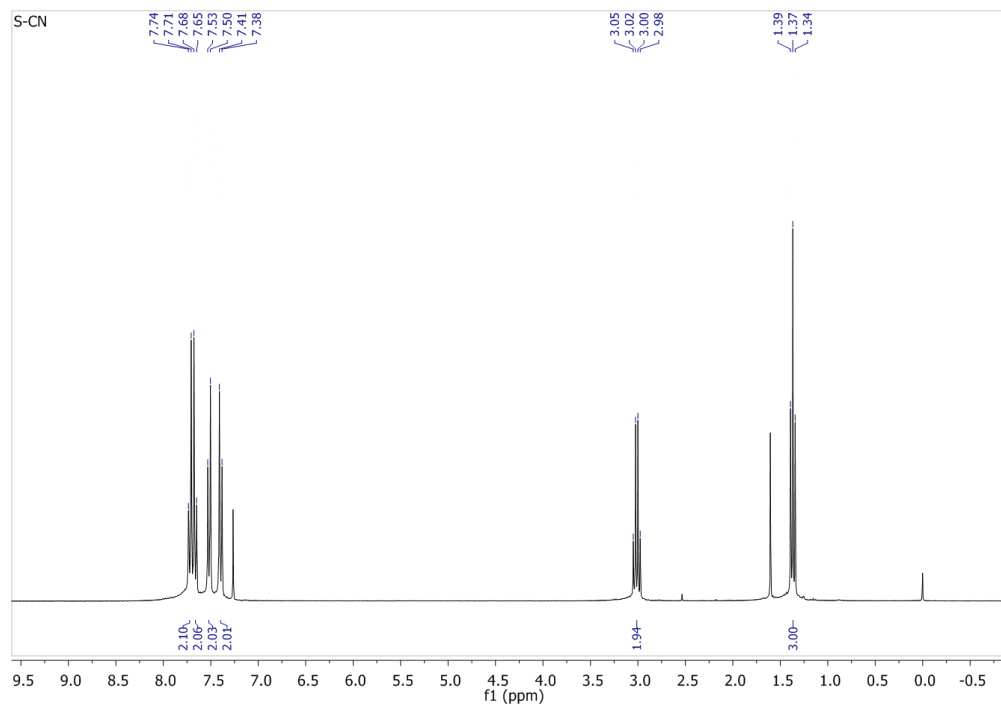


Figure S6. ^1H NMR spectrum of compound 4.

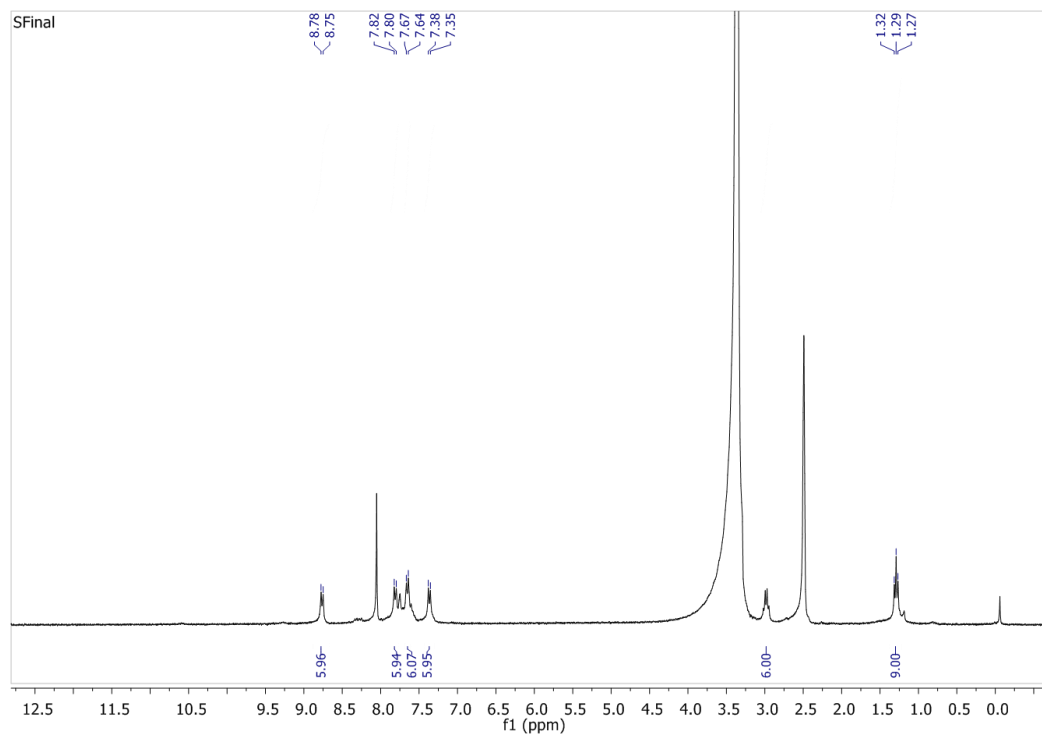


Figure S7. ^1H NMR spectrum of TZSET.

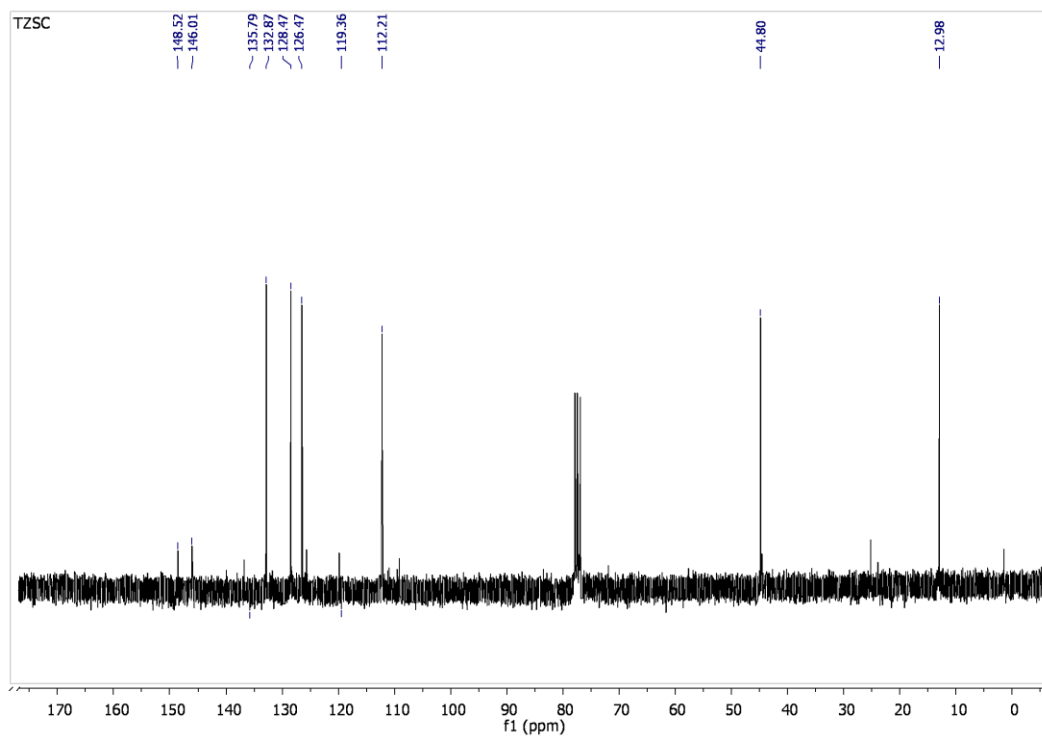


Figure S8. ^{13}C NMR spectrum of TZSET.

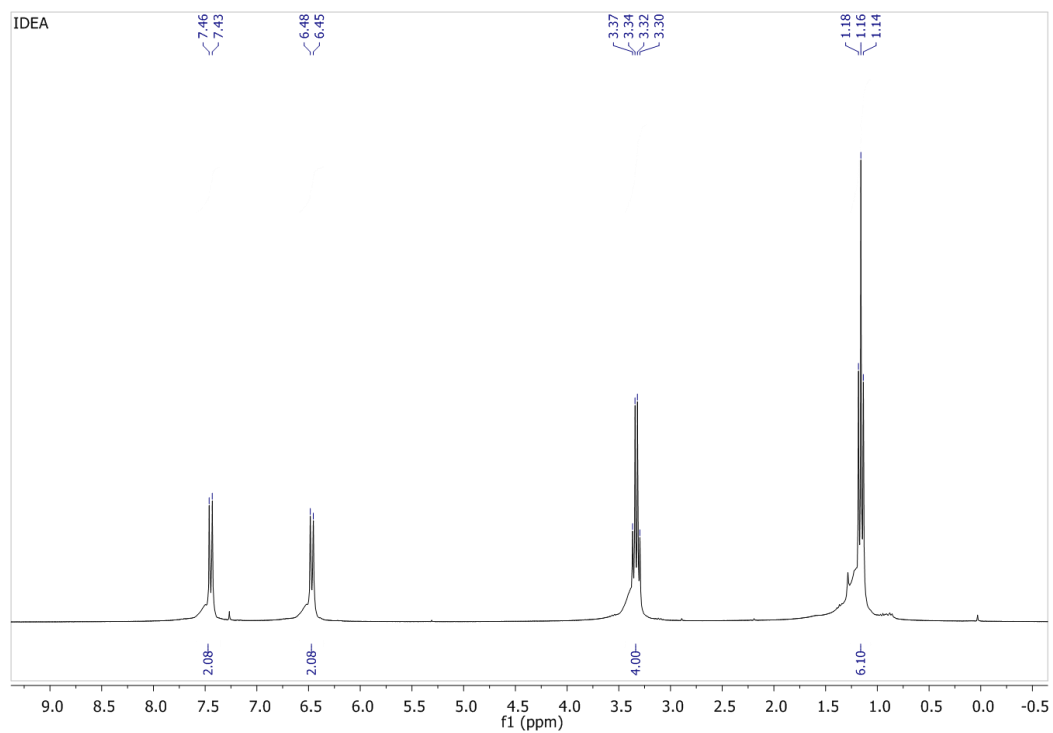


Figure S9. ^1H NMR spectrum of compound 5.

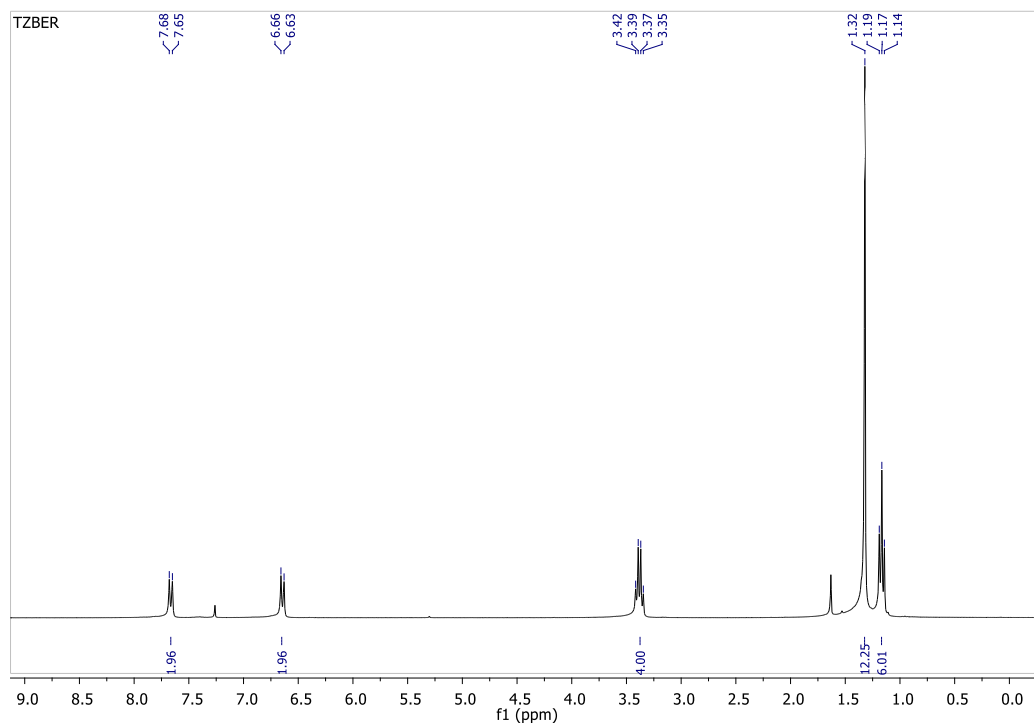


Figure S10. ^1H NMR spectrum of compound 6

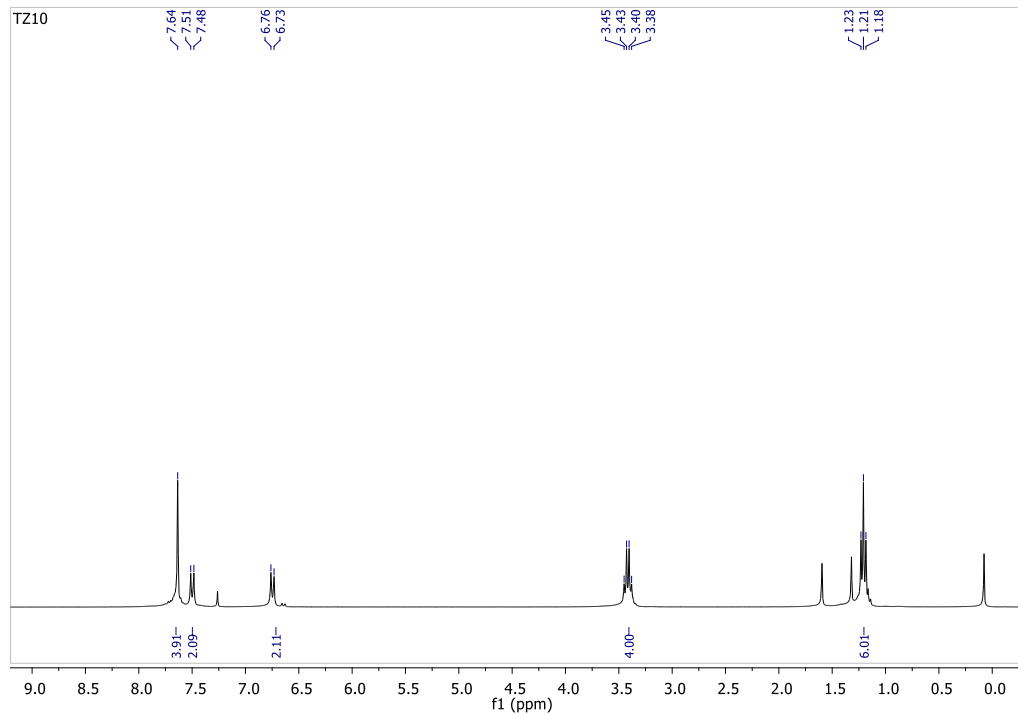


Figure S11. ^1H NMR spectrum of compound 7.

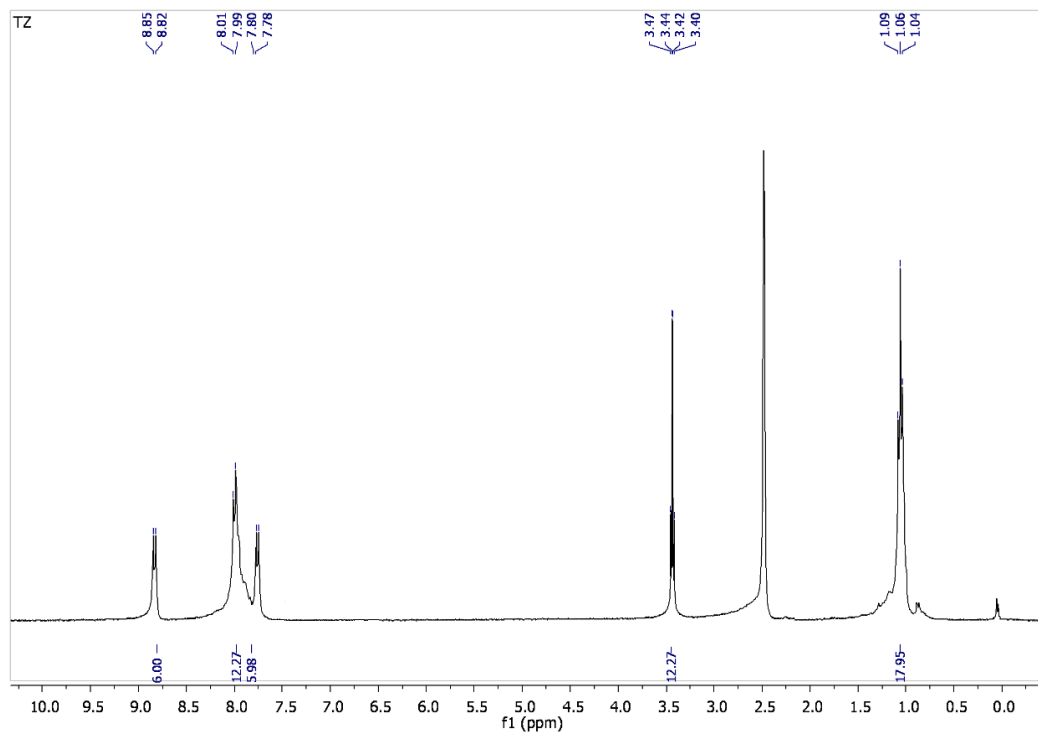


Figure S12. ^1H NMR spectrum of TZNET

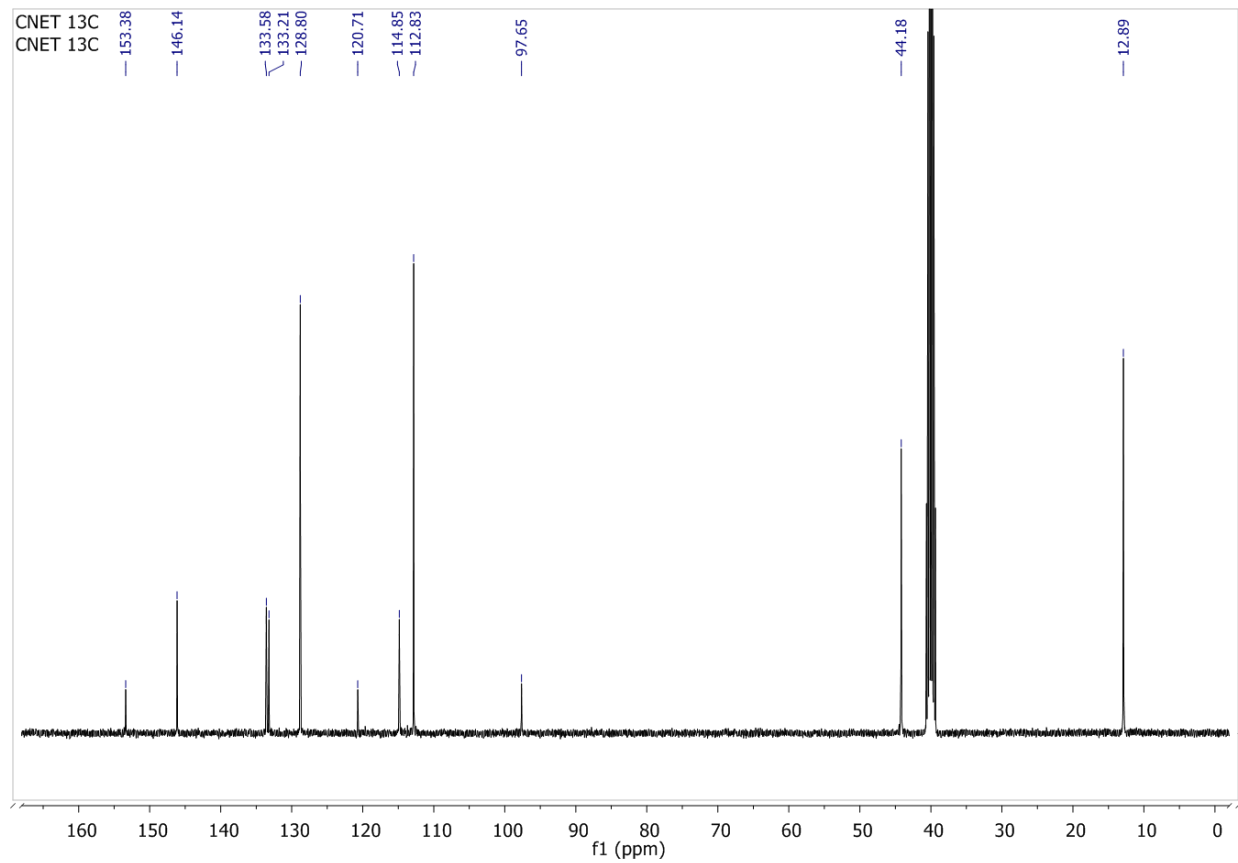


Figure S13. ^{13}C NMR spectrum of TZNET

Display Report

Analysis Info

Acquisition Date 5/19/2019 1:06:57 PM

Method tune_wide.m

Operator IIT_R

Sample Name TZOME

Instrument maXis Impact 000000.00000

Comment

Acquisition Parameter

Source Type	ESI	Ion Polarity	Positive	Set Nebulizer	0.4 Bar
Focus	Not active	Set Capillary	4500 V	Set Dry Heater	180 °C
Scan Begin	50 m/z	Set End Plate Offset	-500 V	Set Dry Gas	4.0 l/min
Scan End	3000 m/z	Set Charging Voltage	0 V	Set Divert Valve	Source
		Set Corona	0 nA	Set APCI Heater	0 °C

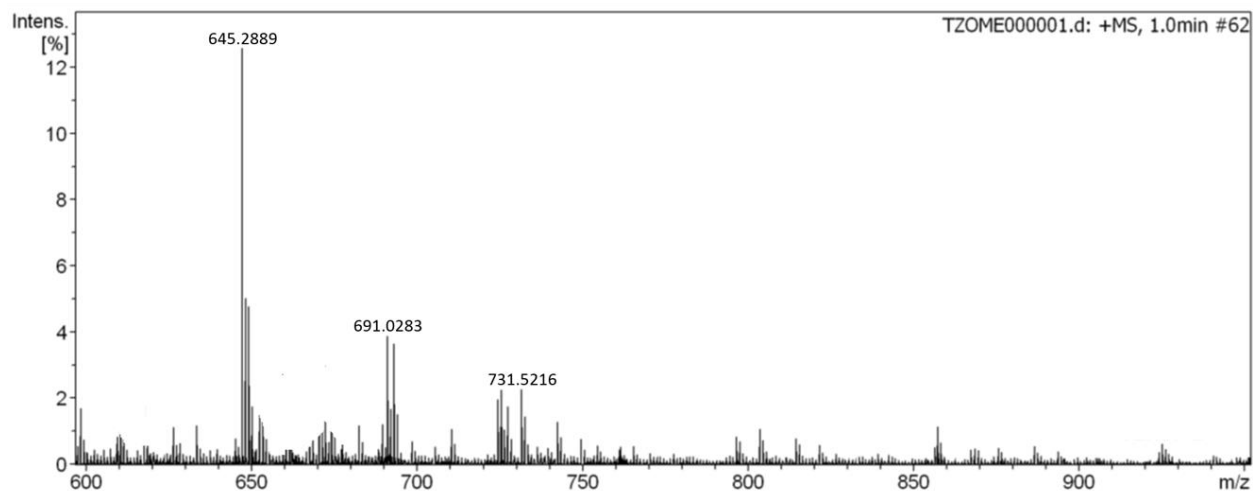


Figure S14. HR-MS spectrum of **TZOME**

Display Report

Analysis Info

Acquisition Date 5/19/2019 12:42:57 PM

Method tune_wide.m
Sample Name TZSET
Comment

Operator IIT_R
Instrument maXis Impact 000000.00000

Acquisition Parameter

Source Type	ESI	Ion Polarity	Positive	Set Nebulizer	0.4 Bar
Focus	Not active	Set Capillary	4500 V	Set Dry Heater	180 °C
Scan Begin	50 m/z	Set End Plate Offset	-500 V	Set Dry Gas	4.0 l/min
Scan End	3000 m/z	Set Charging Voltage	0 V	Set Divert Valve	Source
		Set Corona	0 nA	Set APCI Heater	0 °C

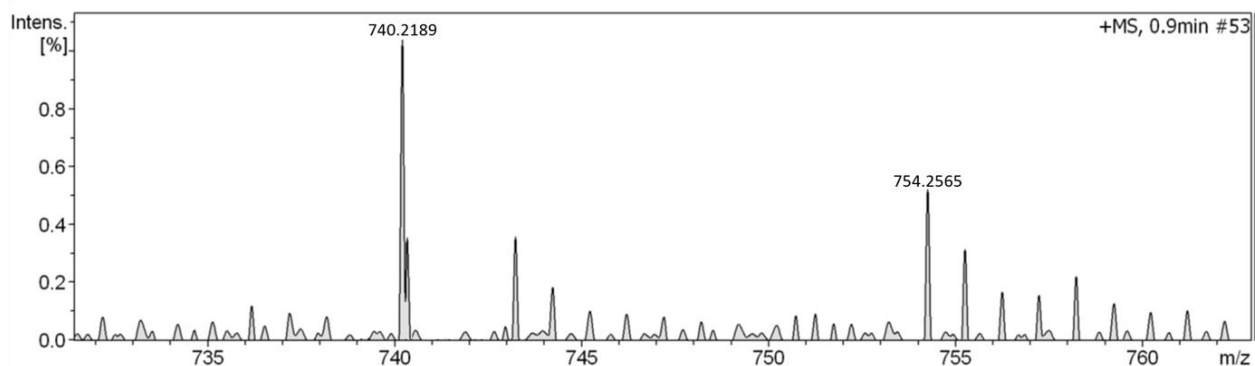


Figure S15. HR-MS spectrum of **TZSET**

Display Report					
Analysis Info			Acquisition Date 5/20/2019 2:38:32 PM		
Method	tune_wide.m		Operator	IIT_R	
Sample Name	TZNET		Instrument	maXis Impact 000000.00000	
Comment					
Acquisition Parameter					
Source Type	ESI	Ion Polarity	Positive	Set Nebulizer	0.4 Bar
Focus	Not active	Set Capillary	4500 V	Set Dry Heater	180 °C
Scan Begin	50 m/z	Set End Plate Offset	-500 V	Set Dry Gas	4.0 l/min
Scan End	3000 m/z	Set Charging Voltage	0 V	Set Divert Valve	Source
		Set Corona	0 nA	Set APCI Heater	0 °C

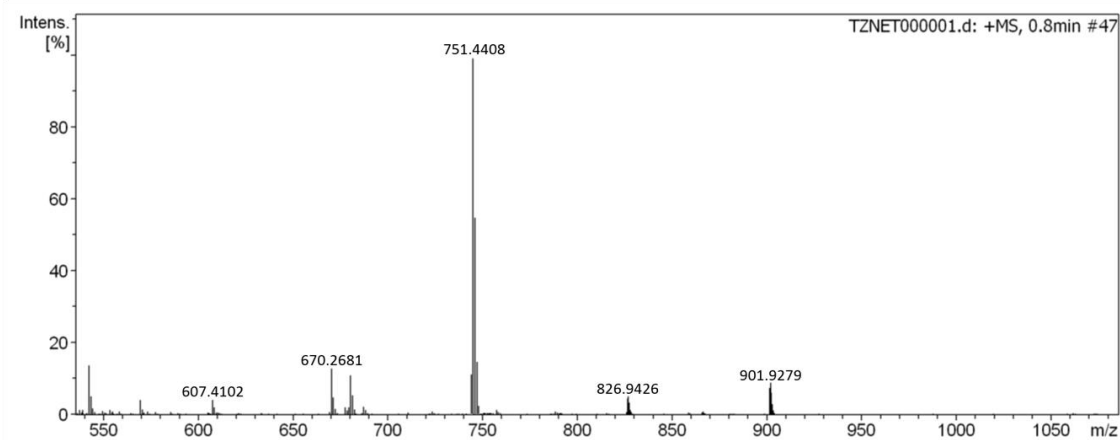


Figure S16. HR-MS spectrum of **TZNET**

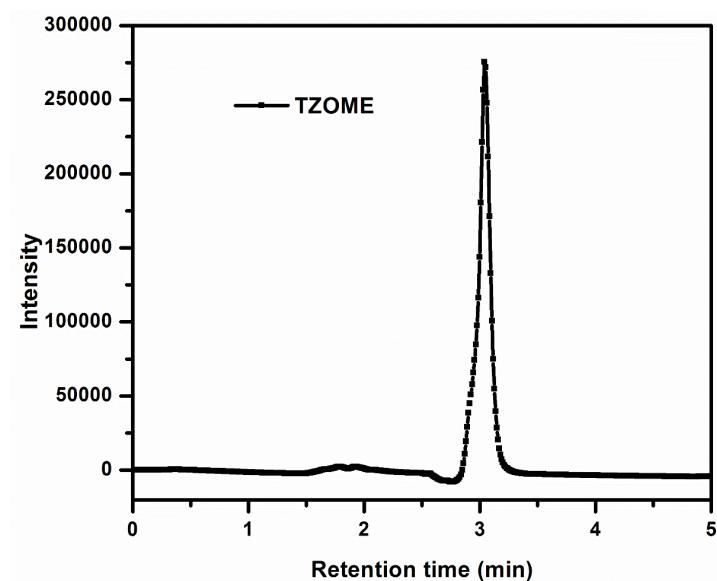


Figure S17. HPLC chromatogram of **TZOME**

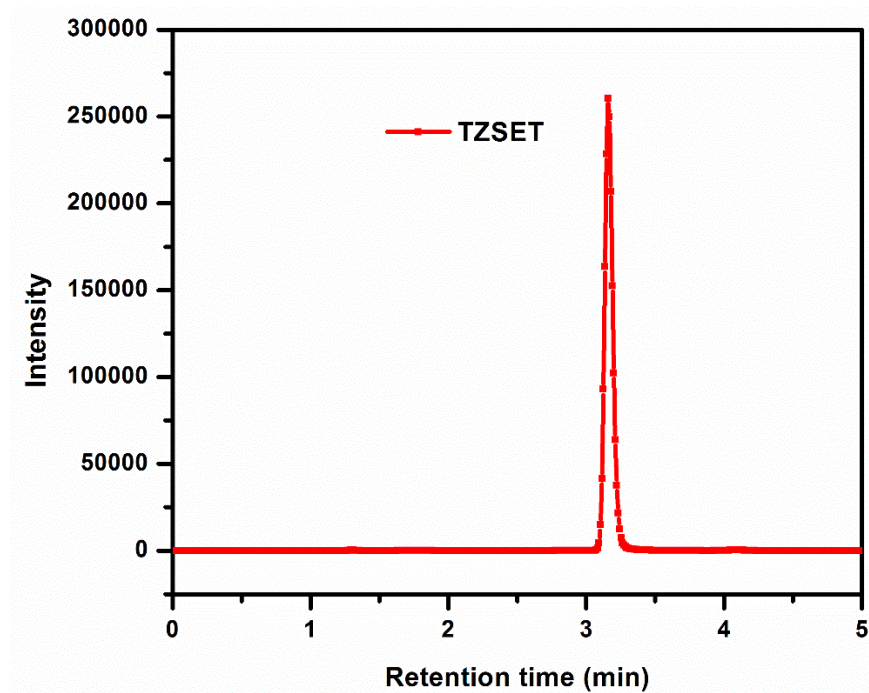


Figure S18. HPLC chromatogram of **TZSET**

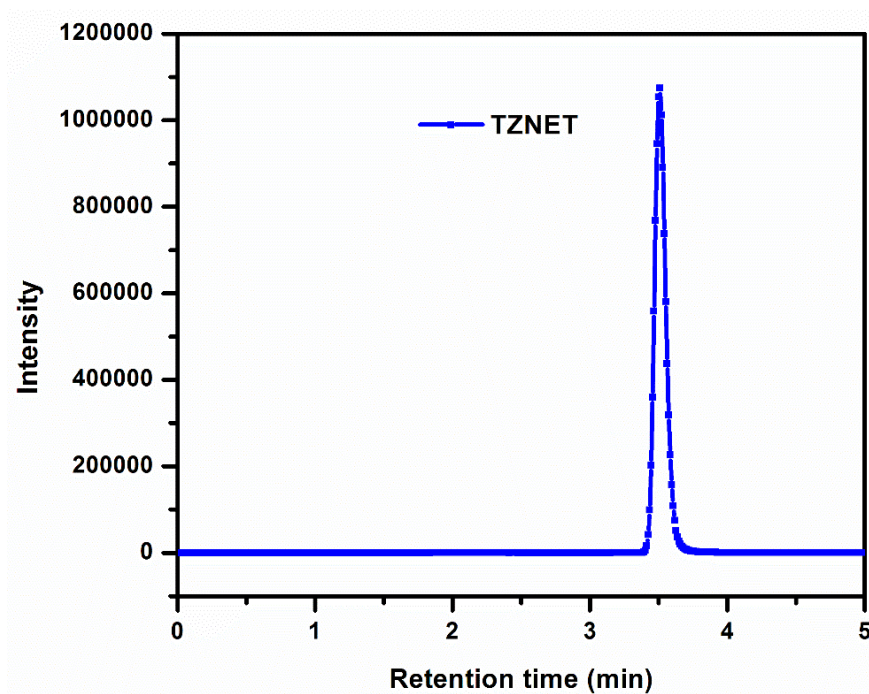


Figure S19. HPLC chromatogram of **TZNET**

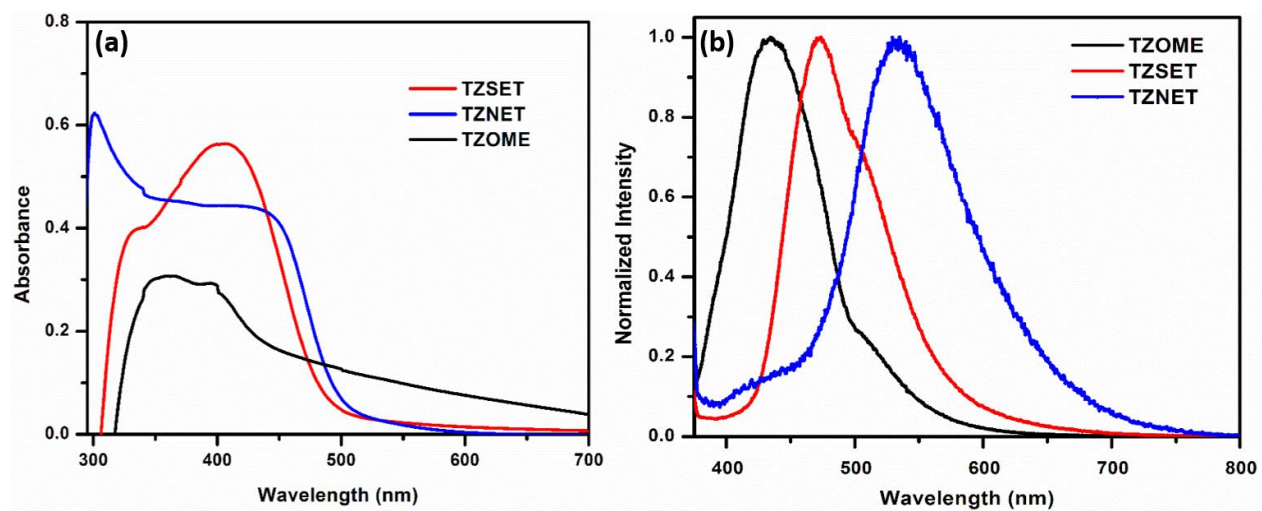


Figure S20. (a) Absorption and (b) emission spectra of triazine based materials in film phase.

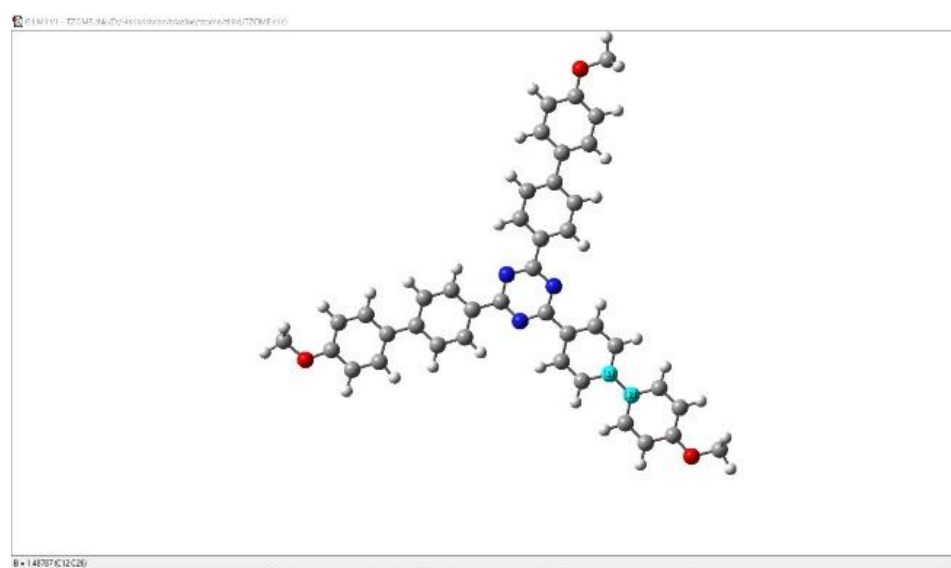


Figure S21. Optimized structure of **TZOME**

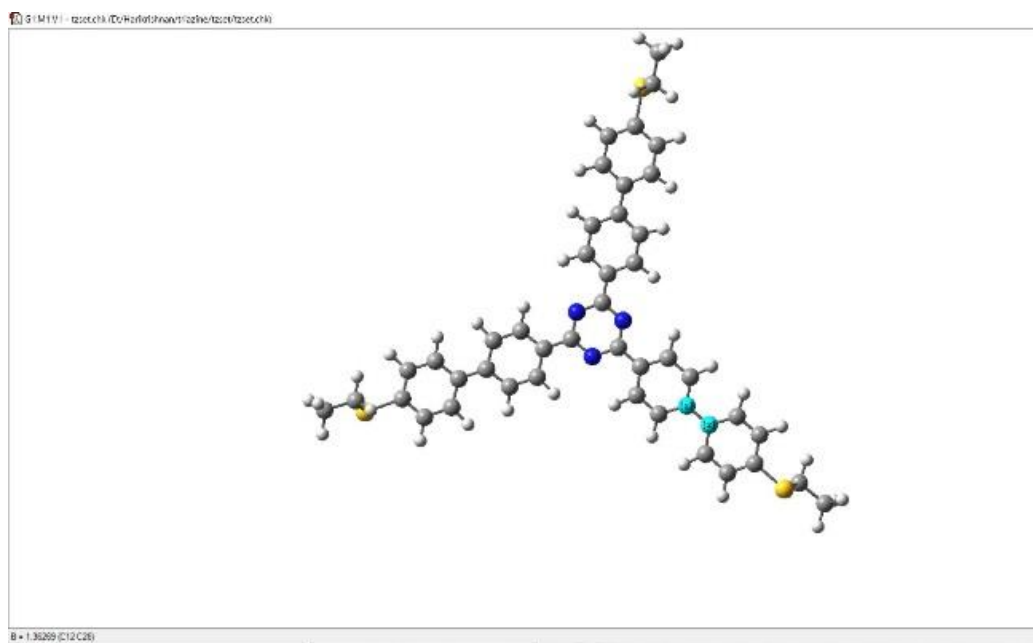


Figure S22. Optimized structure of **TZSET**

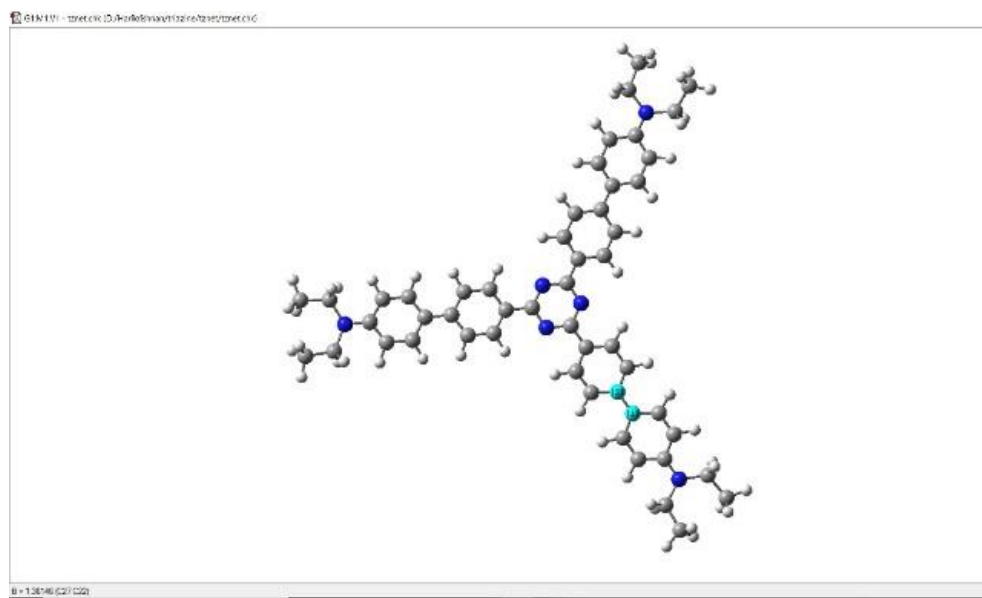


Figure S23. Optimized structure of **TZNET**

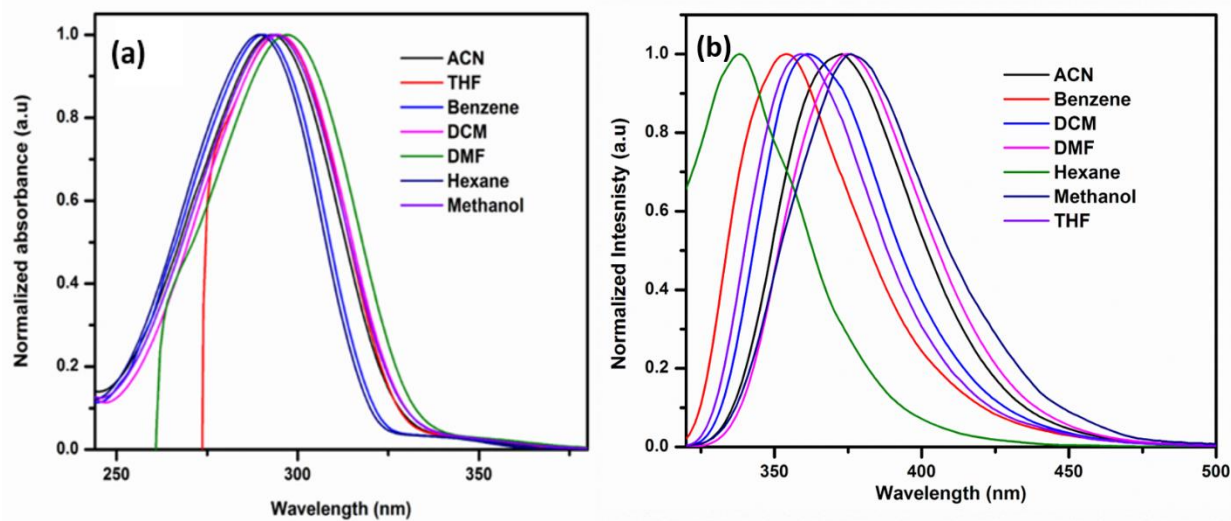


Figure S24. Solvent variation of **TZOME** in (a) absorbance (b) emission spectra.

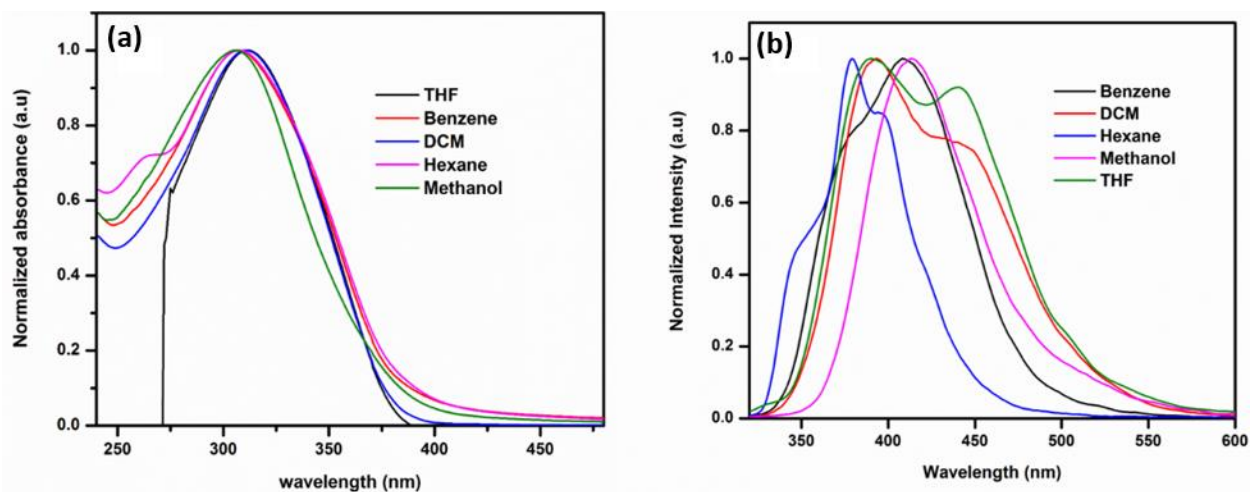


Figure S25. Solvent variation of **TZSET** in (a) absorbance (b) emission spectra.

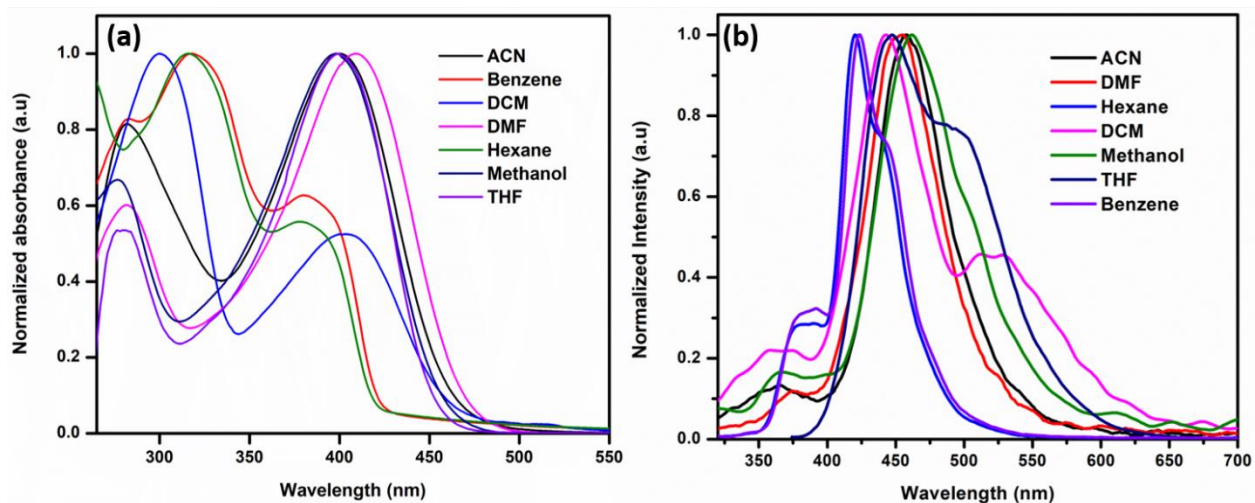


Figure S26. Solvent variation of **TZNET** in (a) absorbance (b) emission spectra.

Table S1. Photophysical Properties of triazine derivatives in solution and solid phase

S. No	compounds	Solution phase		Film phase	
		λ_{max} (nm)	λ_{emi} (nm)	λ_{max} (nm)	λ_{emi} (nm)
1.	TZOME	295	358	350	434
2.	TZSET	312	392	395	472
3.	TZNET	398	448	441	533

Table S2. Solvent effect of **TZOME**

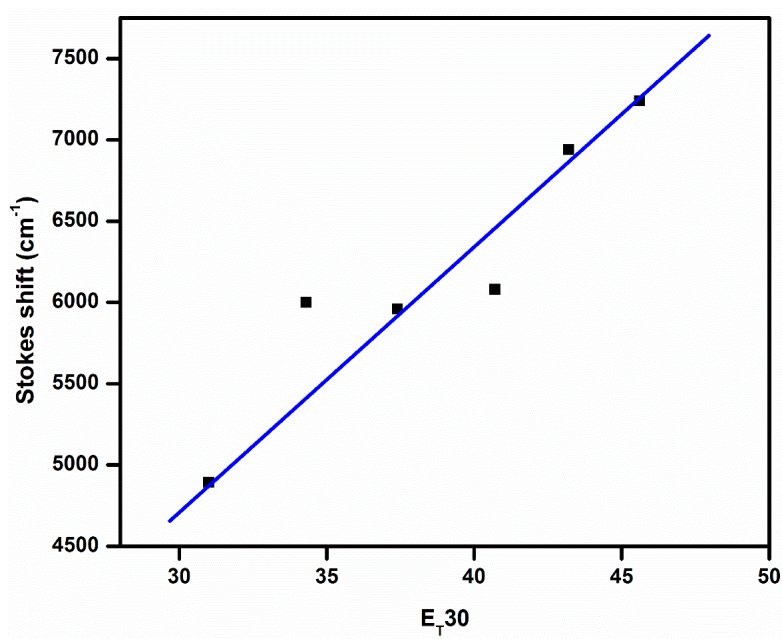
S. No	Solvent	λ_{max} (nm)	λ_{emi} (nm)	Stokes shift (cm^{-1})
1.	Hexane	290	338	4895
2.	Benzene	292	354	6000
3.	ACN	293	372	7240
4..	THF	295	358	5960
5.	DCM	296	361	6080
6.	DMF	297	374	6940
7.	Methanol	294	376	7415

Table S3. Solvent effect of **TZSET**

S. No	Solvent	λ_{max} (nm)	λ_{emi} (nm)	Stokes shift (cm^{-1})
1.	Hexane	308	379	6080
2.	Benzene	307	382	6390
3..	THF	312	392	6540
4.	DCM	310	393	6810
5.	Methanol	306	414	8530

Table S4. Solvent effect of **TZNET**

S. No	Solvent	λ_{max} (nm)	λ_{max} (nm)	Stokes shift (cm^{-1})
1.	Hexane	382	419	2310
2.	Benzene	384	422	2342
3.	ACN	401	458	3110
4..	THF	398	448	2800
5.	DCM	401	444	2370
6.	DMF	409	455	2470
7.	Methanol	399	463	3460

**Figure S27.** D-R plot of **TZOME**

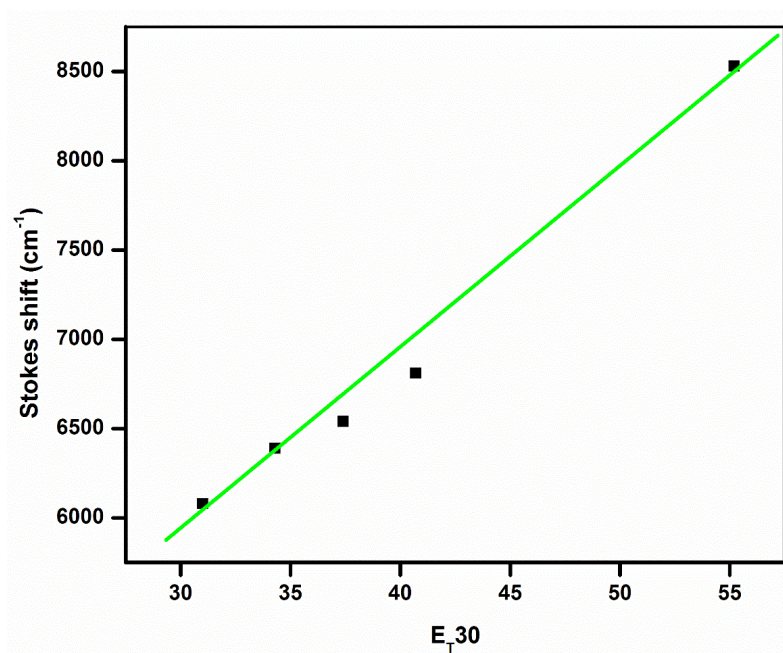


Figure S28. D-R plot of **TZSET**

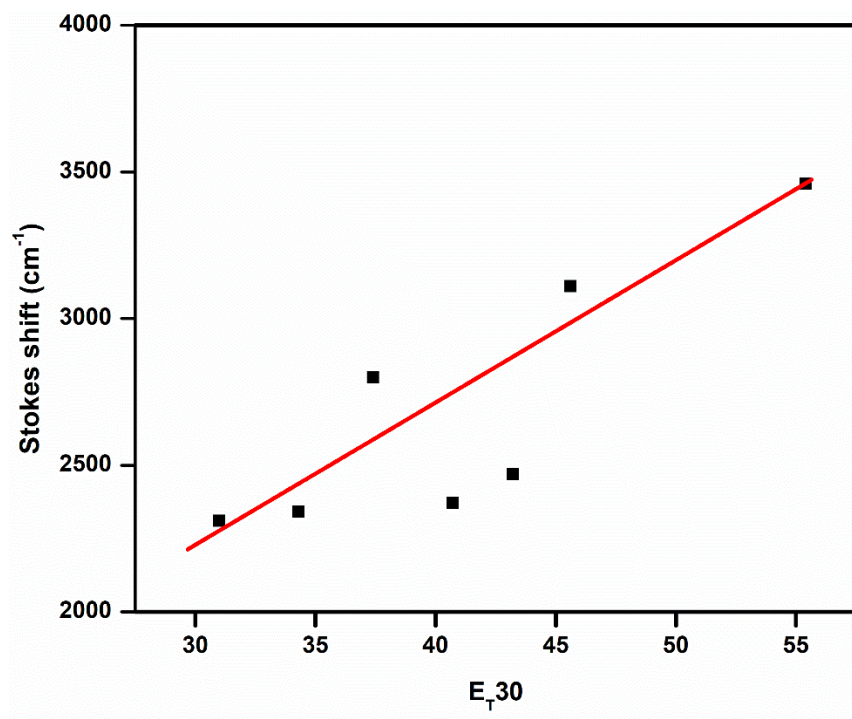


Figure S29. D-R plot of **TZNET**

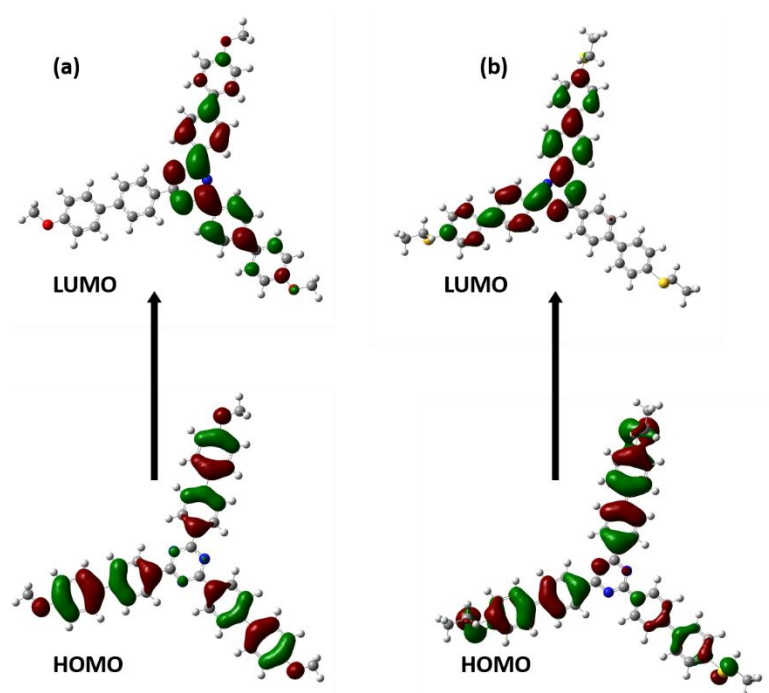


Figure S30. Frontier orbital of the (a) **TZOME** and (b) **TZSET** compound

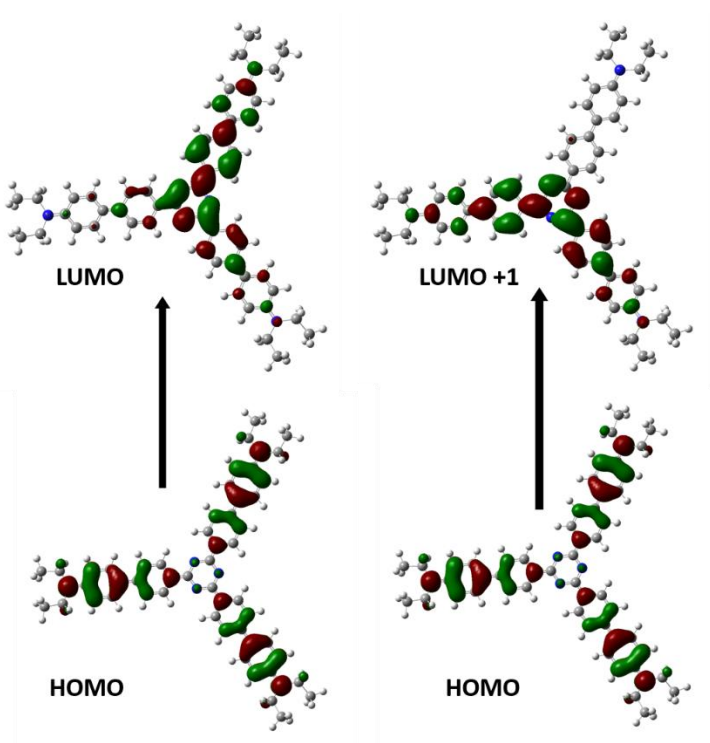


Figure S31. Frontier orbital of the **TZNET**

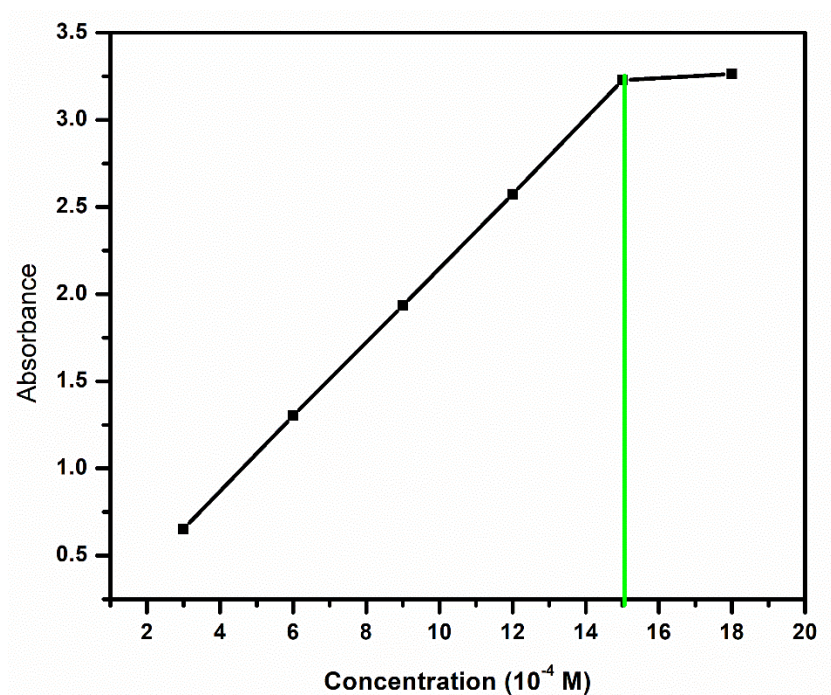


Figure S32. Various concentration of TZOME in THF solvent

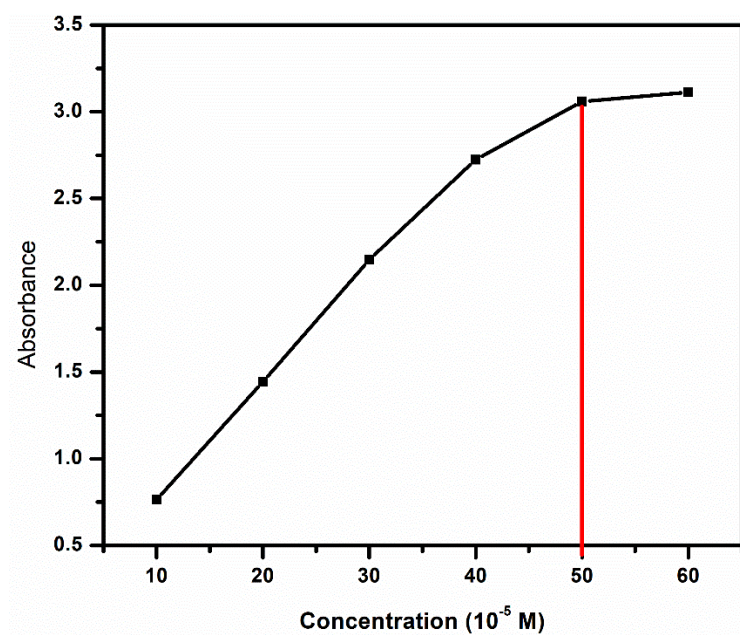


Figure S33. Various concentration of TZSET in THF solvent

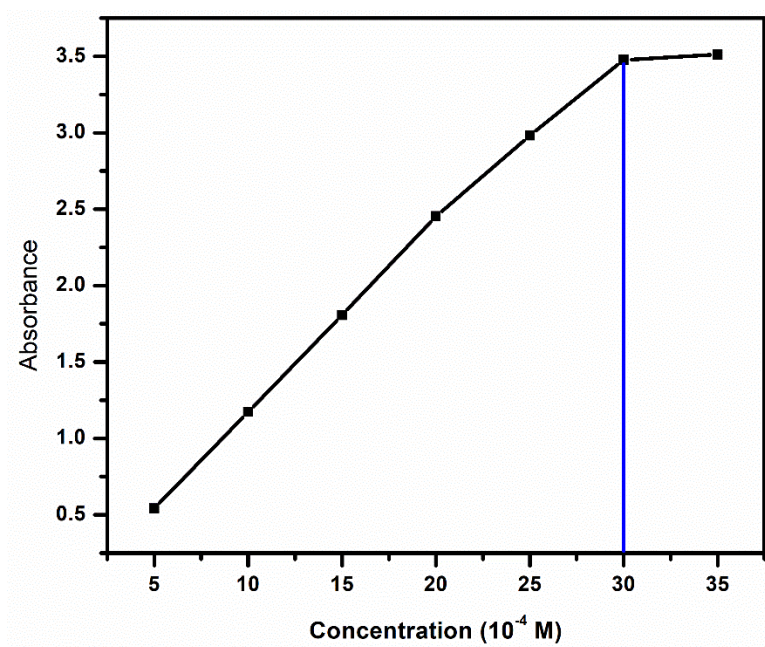


Figure S34. Various concentration of TZNET in THF solvent

Limit of Detection (LOD)

We calculate the limit of detection from emission titration and calculated on the basis of the equation $LOD = 3\sigma/K$ Where K is the slope and slope was derived from a titration curve, σ is the the standard division of the blank solutions

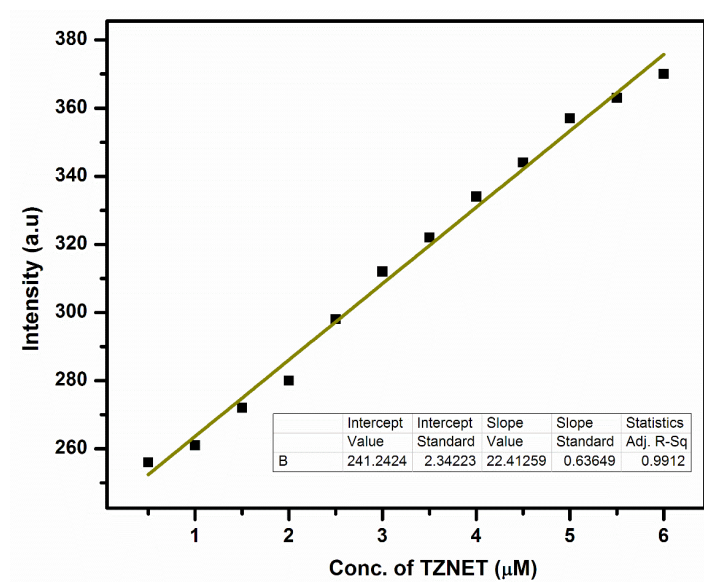


Figure S35. Linear fit of the TZNET

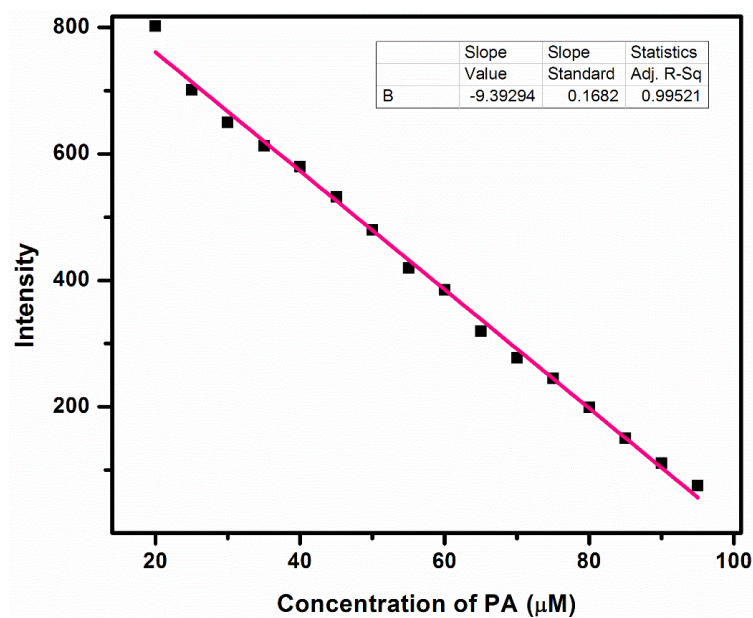


Figure S36. Linear fit of TZNET with PA

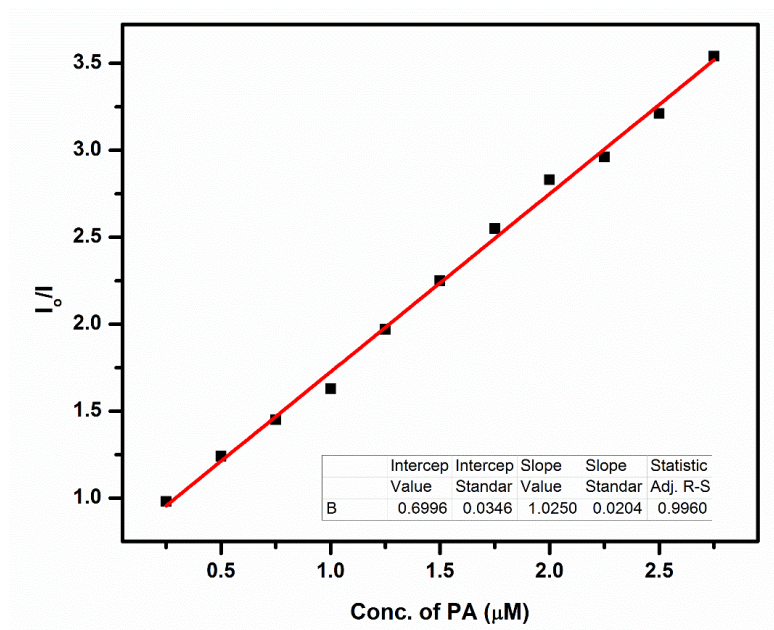


Figure S37. Determination of Stern-Volmer quenching constant of **PA** with **TZNET**

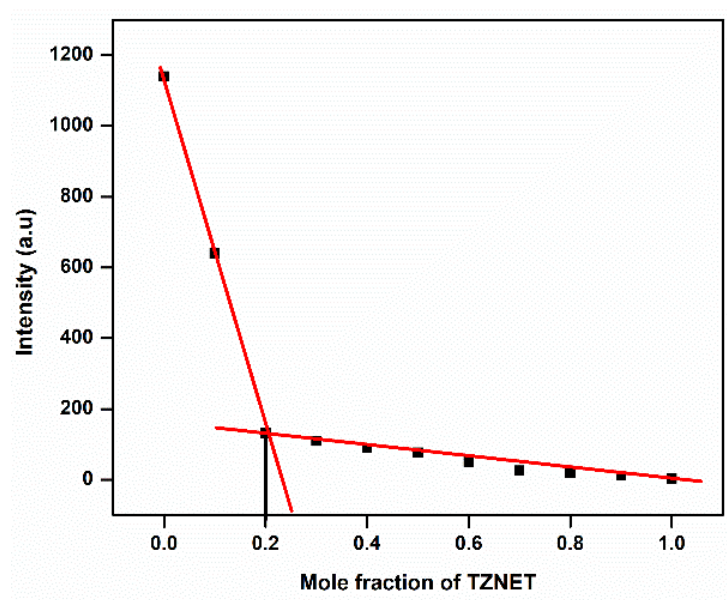


Figure S38. Job's plot of the receptor with PA.

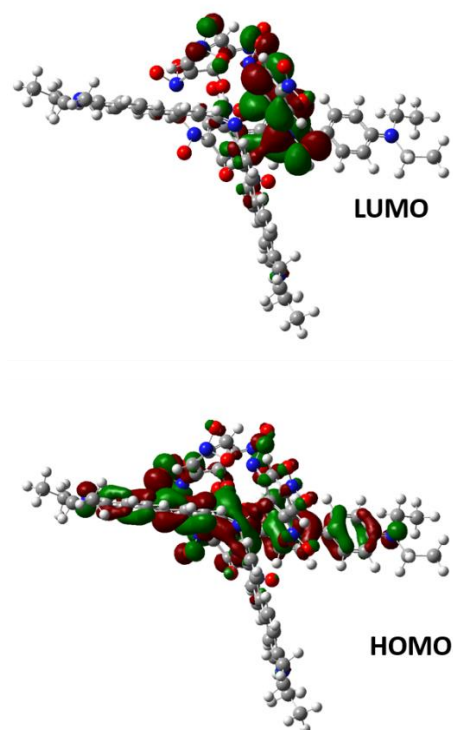


Figure S39. Frontier molecular orbital of TZNET-PA

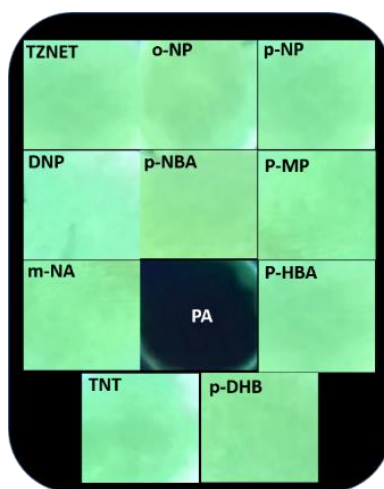


Figure S40. Test strips photograph for the selective sensing of picric acid under 365 nm UV light.

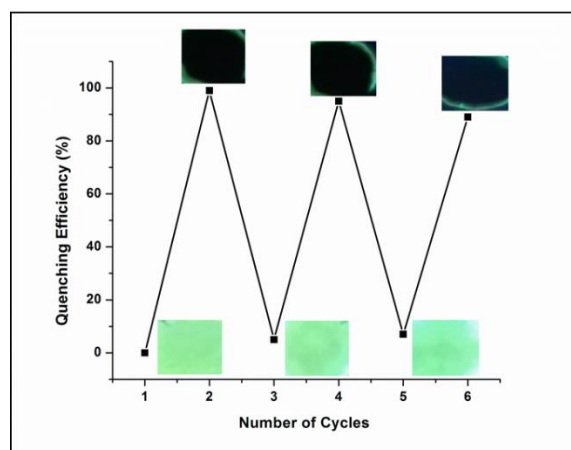


Figure 41. Recyclability of the probe with PA

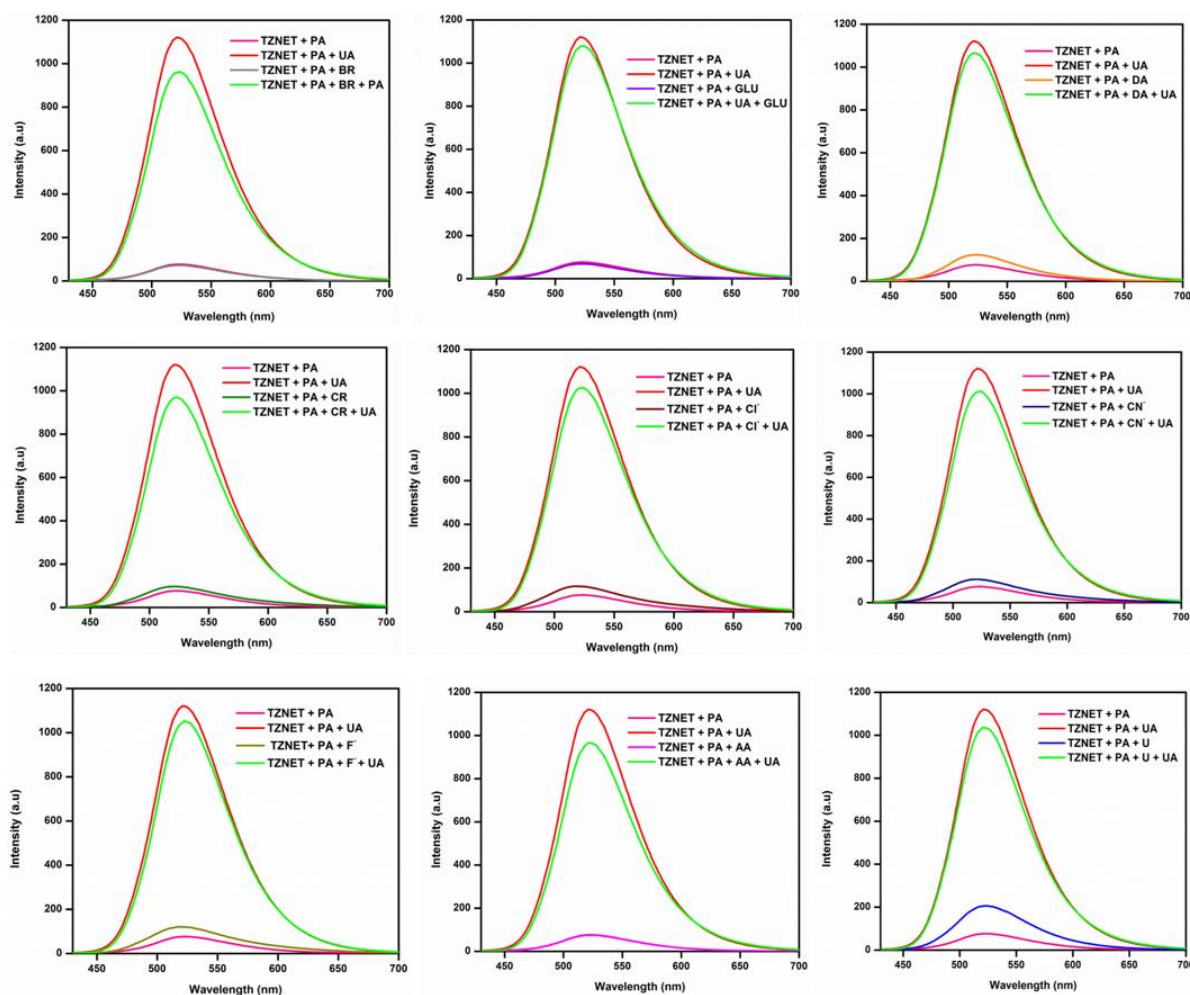


Figure S42. Competitive study of TZNET-PA-UA with various anions and biomolecules in emission spectra.

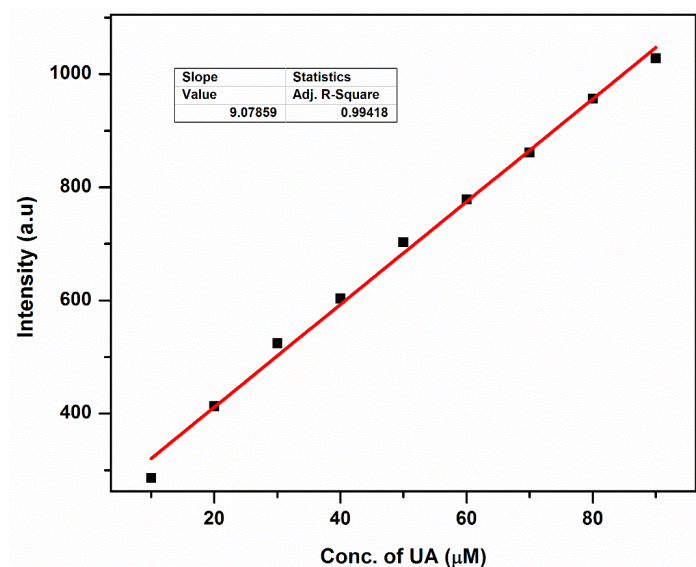


Figure S43. Linear fit of TZNET-PA with UA

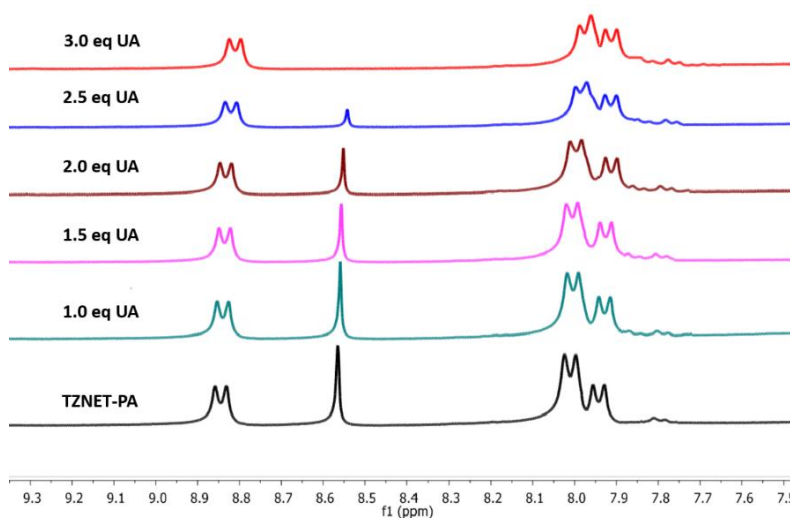


Figure S44. NMR titration spectra of TZNET-PA (10mM : 30mM) with 0 to 30mM of uric acid



Figure S45. Photographic image of grinding and treated with DCM under 365 nm

Table S5. Truth table for receptor with analyte

S. No.	Input TZNET-PA	Input TZNET-PA-UA	Output $\lambda_{\text{emi}} = 532 \text{ nm}$
1	0	0	0
2	1	0	0
3	0	1	1
4	1	1	1

Table S6. Comparison study of the picric acid with recently reported materials

S.No.	Materials	LOD (nM)	Reference
1	Zn(II)-Coordination Polymer	120	1
2	Zinc(II) based MOF	1820	2
3	Europium(III) based MOF	4890	3
4	Polymer Nanoparticles	26	4
5	Cucurbit[8]uril based MOF	3580	5
6	Supramolecular naphthalimide	12	6
7	Hydrazone-Based	12	7
8	Dy(III)-Based MOF	710	8
9	Triazine based AIEE material	203	This work

Table S7. Comparison study of the uric acid with recently reported materials

S.No.	Compounds	LOD (nM)	Reference
1	Pyrene-Functionalized MOF	1400	9
2	MoS ₂ based	1170	10
3	Biomimetic MOF	1800	11
4	Phosphonate MOF	1600	12
5	Gold Nanoclusters	1700	13
6	Triazine based AIEE material	209	This work

Reference

1. Shanmugaraju, S.; Dabadie, C.; Byrne, K.; Savyasachi, A. J. ; Umadevi, D.; Schmitt, W.; Kitchen, J. A.; Gunnlaugsson, T. A supramolecular Tröger's base derived coordination zinc polymer for fluorescent sensing of phenolic-nitroaromatic explosives in water. *Chem. Sci.* **2017**, *8*, 1535–1546.
2. Senthilkumar, S.; Goswami, R.; Obasi, N. L.; Neogi, S. Construction of Pillar-Layer Metal–Organic Frameworks for CO₂ Adsorption under Humid Climate: High Selectivity and Sensitive Detection of Picric Acid in Water. *ACS Sustainable Chem. Eng.* **2017**, *5*, 11307–11315.
3. Song, X. Z.; Song, S. Y.; Zhao, S. N.; Hao, Z. M.; Zhu, M.; Meng, X. ; Wu, L. L.; Zhang, H. J. Single-Crystal-to-Single-Crystal Transformation of a Europium(III) Metal–Organic Framework Producing a Multi-responsive Luminescent Sensor. *Adv. Funct. Mater.* **2014**, *24*, 4034–4041.
4. Liu, S. G.; Luo, D.; Li, N.; Zhang, W.; Lei, J. L.; Li, N. B.; Luo, H. Q. Water-Soluble Nonconjugated Polymer Nanoparticles with Strong Fluorescence Emission for Selective and Sensitive Detection of Nitro-Explosive Picric Acid in Aqueous Medium. *ACS Appl. Mater. Interfaces*, **2016**, *8*, 21700–21709.

5. Zhang, Y.; Zhan, T. G.; Zhou, T. Y.; Qi, Q. Y.; Xu, X. N.; Zhao, X. Fluorescence enhancement through the formation of a single-layer two-dimensional supramolecular organic framework and its application in highly selective recognition of picric acid. *Chem. Commun.* **2016**, 52, 7588–7591.
6. Qi, L.; Xiao-Wen, G.; Yan-Qing, F.; Jiao, W.; Lu, L.; Juan, L.; Hong, Yao.; You-Ming, Zhang.; Tai-Bao, Wei. Tripodal Supramolecular Sensor Successively Detect Picric Acid and CN^- through Guest Competitive Controlled AIE. *New J. Chem.* **2019**, 43, 2030–2036.
7. Sharma, S.; Dubey, G.; Sran, B. S.; Bharatam, P. V.; Hunda, G. Fabrication of a Hydrazone-Based Al(III)-Selective “Turn-On” Fluorescent Chemosensor and Ensuing Potential Recognition of Picric Acid. *ACS Omega* **2019**, 4, 18520–18529.
8. Rajak, R.; Saraf, M.; Verma, S. K.; Kumar, R.; Mobin, S. M. Dy(III)-Based Metal–Organic Framework as a Fluorescent Probe for Highly Selective Detection of Picric Acid in Aqueous Medium. *Inorg. Chem.* **2019**, 58, 16065–16074.
9. Dalapati, R.; Biswas, S. A. Pyrene-Functionalized Metal–Organic Framework for Nonenzymatic and Ratiometric Detection of Uric Acid in Biological Fluid via Conformational Change. *Inorg. Chem.* **2019**, 58, 5654–5663.
10. Sha, A. R.; Vishnu, N.; Badhulika, S. MoS₂ based ultra-low-cost, flexible, non-enzymatic and non-invasive electrochemical sensor for highly selective detection of Uric acid in human urine samples. *Sensors and Actuators B: Chemical* **2019**, 279, 53–60.
11. Liu, X.; Qi, W.; Wang, Y.; Lin, D.; Yang, X.; Su, R.; He, Z. Rational Design of Mimic Multienzyme Systems in Hierarchically Porous Biomimetic Metal–Organic Frameworks. *ACS Appl. Mater. Interfaces* **2018**, 10, 33407–33415.
12. Lian, X.; Yan, B. Phosphonate MOFs Composite as Off-On Fluorescent Sensor for Detecting Purine Metabolite Uric Acid and Diagnosing Hyperuricuria. *Inorg. Chem.* **2017**, 56, 6802–6808.
13. Liu, Y.; Li, H.; Guo, B.; Wei, L.; Chen, B.; Zhang, Y. Gold Nanoclusters as Switch-Off Fluorescent Probe for Detection of Uric Acid Based on the Inner Filter Effect of Hydrogen Peroxide-Mediated Enlargement of Gold Nanoparticles. *Biosens. Bioelectron.* **2017**, 91, 734–740.