Supporting Information

Multifunctional Pyrazoline Based AIEgens: Real-Time Tracking and Specific Protein "Fishing" of Lipid Droplets

Na Zhao,* Yan Li, Weiyao Yang, Jiabao Zhuang, Yue Li, and Nan Li*,

Key Laboratory of Macromolecular Science of Shaanxi Province, Key Laboratory of Applied Surface and Colloid Chemistry of Ministry of Education, School of Chemistry & Chemical Engineering, Shaanxi Normal University, 710119 Xi'an, P. R. China. E-mail: nzhao@snnu.edu.cn; nli@snnu.edu.cn.

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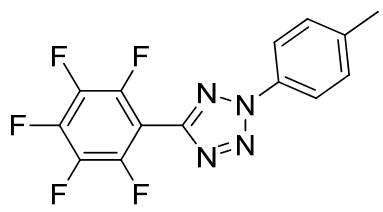
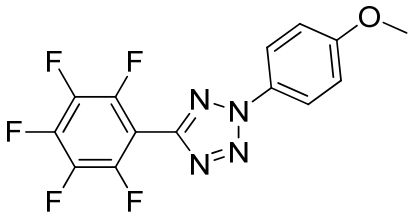
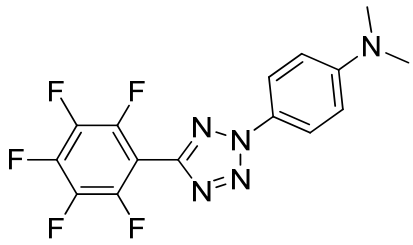
1. General Information

Petroleum ether and ethyl acetate for chromatography were distilled before used. All other reagents and solvents were used directly from the corresponding supplier without further purification. All starting materials were purchased from Sigma-Aldrich, Aladdin, Energy, Tansoole and use directly. The HCS LipidTOX™ Deep Red Neutral Lipid Stain was purchased from Thermo Fisher Scientific. Analytical thin-layer chromatography (TLC) was carried out using commercial silica gel plated (GF254). Nuclear magnetic resonance spectra (^{1}H, ^{13}C NMR) were recorded on a Bruker AV 300 (^{1}H at 300 MHz, ^{13}C at 75 MHz), a Bruker Ascend 400 (^{1}H at 400 MHz, ^{13}C at 101 MHz) or a Bruker Ascend 600 (^{1}H at 600 MHz, ^{13}C at 151 MHz). The chemical shifts are reported as ppm and solvent residual peaks were shown as following: $CDCl_3$ δ H (7.26 ppm) and δ C (77.16 ppm); d_6-DMSO δ H (2.50 ppm) and δ C (39.52 ppm). UV-visible absorption spectra were measured on Purkinje TU-1950 spectrometer. Fluorescence spectra were recorded on a Hitachi F-7000 spectrometer. Fluorescence quantum yields were measured using Hamamatsu C9920-02G. Fluorescence lifetime was measured using Edinburgh FLS-980. Single crystal was collected on *Oxford* diffraction Eos CCD detector or Bruker CMOS PHOTON 100 detector, respectively. The single crystal pictures were taken on Olympus DP80 fluorescent microscopy. The fluorescence imaging was collected on Olympus FV1200. Dynamic Light Scattering (DLS) was carried out on Malvern Zetasizer Nano ZS90. High-resolution Mass spectra (HRMS) were obtained on a Bruker Maxis and Microflex and reported as m/z (relative intensity). Accurate masses are presented as molecular ion $[M+Na]^+$ or $[M+H]^+$, respectively. All theoretical calculations reported were performed using the Gaussian 09 code.

2. Target Compounds Charts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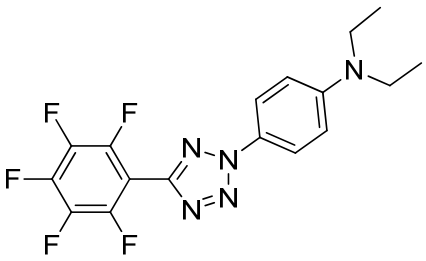	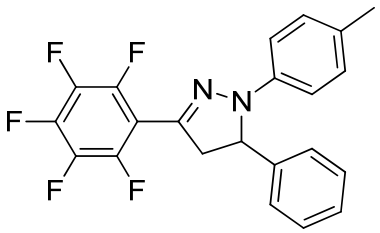	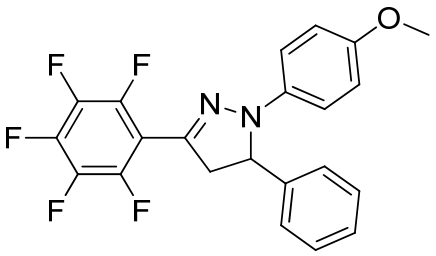
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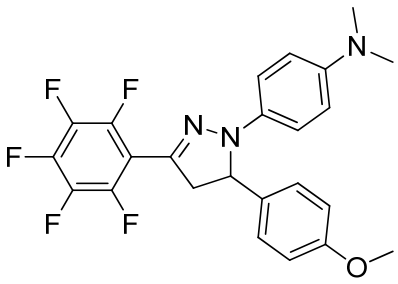
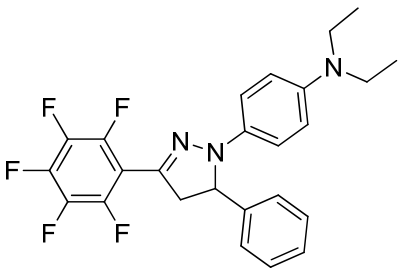
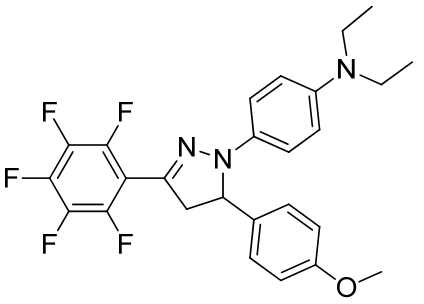
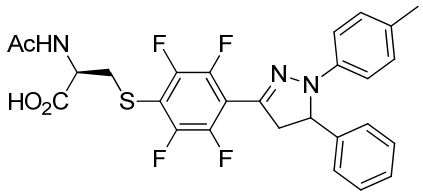
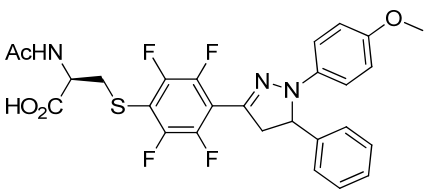
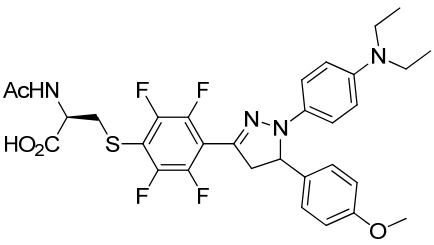
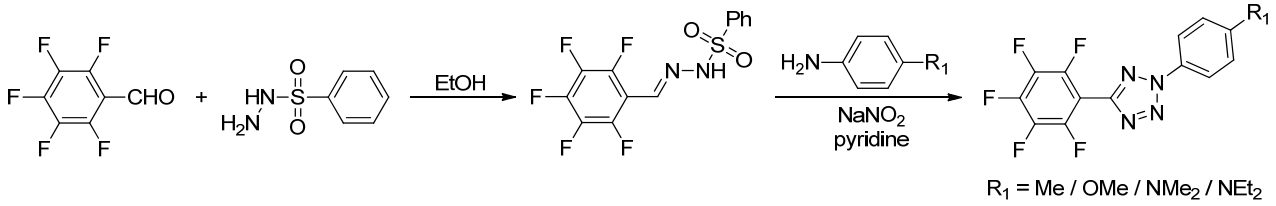
		
Pyr-3	**Pyr-4**	**Pyr-5**
		
Pyr-6	**Pyr-7**	**Pyr-8**

3. Experimental Procedure and Characterization Data

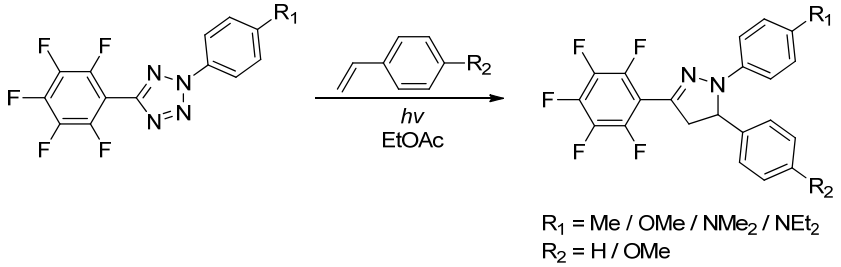
3.1 Synthesis of tetrazole (Tet) derivatives.



Scheme S1. Synthetic route of **Tet** derivatives.

(*E*)-*N*'-((perfluorophenyl)methylene)benzenesulfonohydrazide was synthesized according to the previous literature.[1] Aromatic amine (7.8 mmol) was dissolved in a mixture of EtOH and H_2O (1:1, 12 mL) and cooled to 0 ^oC. After that, 3.3 mL of concentrated HCl was added and then $NaNO_2$ (697 mg, 10.1 mmol) that dissolved in 3 mL H_2O was added dropwise with reaction temperature maintained under 5^oC. Above diazonium salt was added into (*E*)-*N*'-((perfluorophenyl)methylene)benzenesulfonohydrazide which pre-dissolved in 30 mL pyridine and then the reaction was stirred overnight. After the reaction was completed based on TLC, the solvent was evaporated under reduced pressure and the residue was purified by column chromatography on silica gel to give desired compounds.

3.2 Synthesis of pyrazoline (Pyr) probes

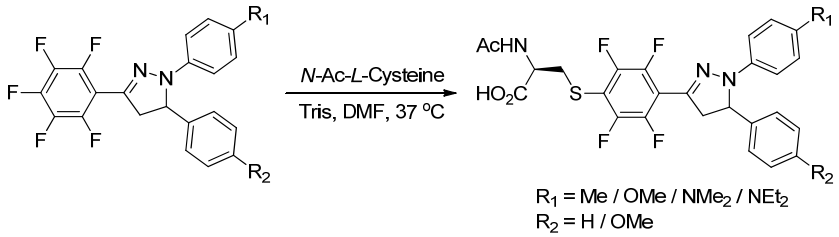


Scheme S2. Synthetic route of **Pyr** probes.

The **Tet** (0.1 mmol, 1.0 equiv) and functionalized styrene (10.0 equiv) were dissolved in EtOAc (20 mL). Then the reaction mixture was stirred at room temperature under 365 nm UV irradiation for 6 h. After the reaction was completed based on TLC, the reaction solution

was evaporated under reduced pressure and the residue was purified by column chromatography on silica gel to give the desired compounds.

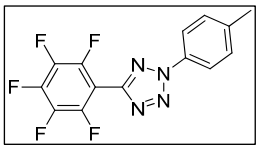
3.3 Synthesis of Cysteine modified Pyr probes



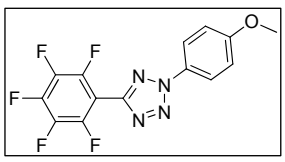
Scheme S3. Modification of *N*-Ac-*L*-Cysteine by **Pyr** probes.

The **Pyr** (0.1 mmol, 1.0 equiv), N-Acetyl-*L*-cysteine (0.12 mmol, 1.2 equiv) and Tris (1.2 mmol, 12 equiv) were dissolved in dry DMF (2.0 mL). The reaction mixture was stirred for 24 h at 37°C under N_2. After the reaction was completed based on TLC, the reaction solution was evaporated under reduced pressure and the residue was purified by column chromatography on silica gel to give the desired compounds.

3.4 Compound data

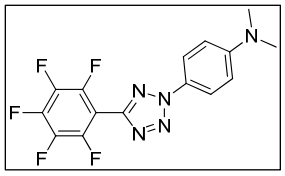


5-(perfluorophenyl)-2-(p-tolyl)-2H-tetrazole (Tet-1). Yeild: 55%. ^{1}H-NMR (300 MHz, $CDCl_3$) δ (ppm): 8.07 (d, J = 8.4 Hz, 2H, Ar H), 7.39 (d, J = 8.3 Hz, 2H, Ar H), 2.47 (s, 3H, CH_3); ^{13}C-NMR (151 MHz, $CDCl_3$) δ (ppm): 154.66, 146.38, 146.36, 146.32, 146.28, 146.24, 146.21, 144.68, 144.65, 144.61, 144.57, 144.53, 144.50, 143.63, 143.60, 143.54, 143.51, 143.48, 143.43, 143.40, 141.92, 141.89, 141.86, 141.83, 141.80, 141.77, 141.74, 141.71, 141.68, 140.90, 139.13, 139.10, 139.02, 138.99, 138.94, 138.91, 137.45, 137.42, 137.36, 137.34, 137.28, 137.24, 134.47, 130.47, 120.07, 104.00, 103.98, 103.90, 103.88, 103.80, 103.77, 21.38.

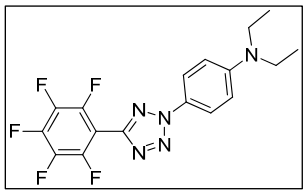


2-(4-methoxyphenyl)-5-(perfluorophenyl)-2*H*-tetrazole (Tet-2). Yeild: 55%. ^{1}H-NMR (300 MHz, $CDCl_3$) δ (ppm): 8.10 (d, J = 9.1 Hz, 2H, Ar H), 7.08 (d, J = 9.1 Hz, 2H, Ar H), 3.91 (s, 3H, CH_3); ^{13}C-NMR

(151 MHz, $CDCl_3$) δ (ppm): 161.18, 154.57, 146.37, 146.35, 146.30, 146.27, 146.22, 146.20, 144.67, 144.64, 144.60, 144.56, 144.52, 144.49, 143.57, 143.54, 143.52, 143.49, 143.45, 143.40, 143.37, 141.89, 141.86, 141.83, 141.80, 141.77, 141.74, 141.72, 141.68, 141.65, 139.13, 139.08, 139.01, 138.99, 138.93, 138.90, 137.45, 137.42, 137.36, 137.34, 137.27, 137.25, 137.23, 130.15, 121.77, 114.98, 104.04, 104.01, 103.94, 103.91, 103.84, 103.81, 55.84.

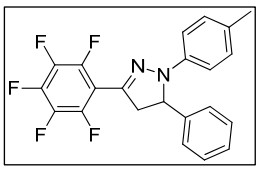


***N*,*N*-dimethyl-4-(5-(perfluorophenyl)-2*H*-tetrazol-2-yl) aniline (Tet-3).** Yeild: 20%. ^{1}H-NMR (600 MHz, $CDCl_3$) δ (ppm): 8.00 (d, *J* = 9.2 Hz, 2H, Ar H), 6.79 (d, J = 9.2 Hz, 2H, Ar H), 3.07 (s, 6H, CH_3); ^{13}C-NMR (151 MHz, $CDCl_3$) δ (ppm): 154.07, 151.57, 146.35, 146.33, 146.31, 146.28, 146.25, 146.21, 146.18, 144.65, 144.62, 144.60, 144.58, 144.54, 144.52, 144.50, 144.48, 143.42, 143.36, 143.33, 143.30, 143.27, 143.24, 143.21, 141.74, 141.71, 141.65, 141.62, 141.59, 141.56, 141.53, 139.10, 139.09, 139.07, 139.05, 139.02, 138.99, 138.96, 138.90, 138.88, 137.44, 137.42, 137.39, 137.33, 137.31, 137.28, 137.25, 137.23, 137.21, 137.20, 126.27, 121.41, 112.01, 104.35104.32, 104.25, 104.22, 104.15, 104.12, 40.44.

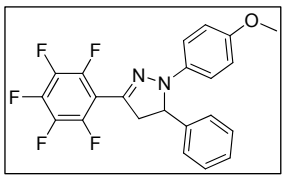


***N*,*N*-diethyl-4-(5-(perfluorophenyl)-2*H*-tetrazol-2-yl) aniline (Tet-4).** Yeild: 68%. ^{1}H-NMR (400 MHz, $CDCl_3$) δ (ppm): 7.96 (d, *J* = 9.2 Hz, 2H, Ar H), 6.75 (d, *J* = 9.2 Hz, 2H, Ar H), 3.46-3.42 (q, CH_2), 1.22 (t, *J* = 7.1 Hz, 6H, CH_3); ^{13}C-NMR (151 MHz, $CDCl_3$) δ (ppm): 153.96, 149.13, 146.34, 146.32, 146.29, 146.27, 146.24, 146.22, 146.20, 146.17, 144.64, 144.61, 144.60, 144.57, 144.54, 144.51, 144.49, 144.47, 143.41, 143.38, 143.35, 143.32, 143.29, 143.26, 143.23, 143.20, 143.17, 141.70, 141.67, 141.61, 141.58, 141.55, 141.52, 141.49, 141.46, 141.45, 139.09, 139.06, 138.98, 138.96, 138.90, 138.86, 137.46, 137.43, 137.38, 137.33,

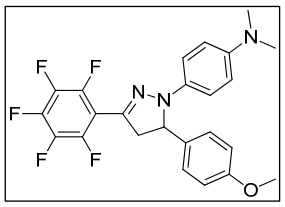
137.30, 137.24, 137.22, 137.20, 125.45, 121.69, 111.41, 104.41, 104.38, 104.31, 104.28, 104.20, 104.18, 44.76, 12.57.



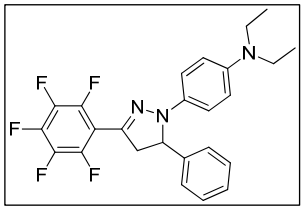
3-(perfluorophenyl)-5-phenyl -1-(p-tolyl)-4,5-dihydro-1H-pyrazole (Pyr-1). Yeild: 85%. ^{1}H-NMR (600 MHz, $CDCl_3$) δ (ppm): 7.35 (t, *J* = 7.6 Hz, 2H, Ar H), 7.30-7.27 (m, 3H, Ar H), 6.99 (d, *J* = 8.6 Hz, 2H, Ar H), 6.96 (d, *J* = 8.7 Hz, 2H, Ar H), 5.30-5.27 (q, 1H, CH), 3.93-3.88 (q, 1H, CH_2), 3.24-3.20 (q, 1H, CH_2), 2.24 (s, 3H, CH_3); ^{13}C-NMR (151 MHz, $CDCl_3$) δ (ppm): 145.90, 145.88, 145.85, 145.83, 145.80, 145.78, 145.75, 145.72, 144.22, 144.19, 144.17, 144.14, 144.12, 144.09, 144.07, 144.04, 141.82, 141.72, 141.34, 141.31, 141.25, 141.22, 141.19, 141.13, 139.65, 139.62, 139.59, 139.56, 139.53, 139.50, 139.48, 139.44, 139.03, 139.01, 138.99, 138.96, 138.93, 138.88, 138.83, 138.81, 138.80, 137.37, 137.35, 137.30, 137.26, 137.23, 137.17, 137.16, 135.27, 135.26, , 129.80, 129.66, 129.37, 127.95, 126.00, 114.03, 109.45, 109.43, 109.37, 109.34, 109.27, 109.25, 64.39, 46.13, 46.10, 46.07, 20.65. HRMS (ESI-TOF) m/z: $[M+Na]^+$ calcd for $C_{22}H_{15}F_5N_2Na^+$, 425.1053, found, 425.1046.



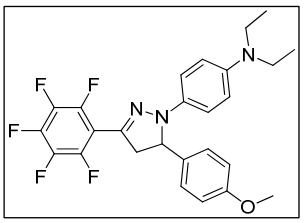
1-(4-methoxyphenyl)-3-(perfluorophenyl)-5-phenyl-4,5-dihydro-1*H*-pyrazole (Pyr-2). Yeild: 90%. ^{1}H-NMR (300 MHz, $CDCl_3$) δ (ppm): 7.38-7.28 (m, 5H, Ar H), 7.00 (d, *J* = 9.1 Hz, 2H, Ar H), 6.76 (d, *J* = 9.1 Hz, 2H, Ar H), 5.27-5.20 (q, 1H, CH), 3.94-3.73 (q, 1H, CH_2), 3.73 (s, 3H, CH_3), 3.27-3.18 (q, 1H, CH_2); ^{13}C-NMR (151 MHz, $CDCl_3$) δ (ppm): 159.36, 154.20, 145.87, 145.84, 145.78, 145.73, 144.11, 141.81, 139.06, 139.01, 138.92, 138.89, 138.84, 138.39, 137.37, 137.35, 137.34, 137.30, 137.28, 137.24, 137.16, 135.14, 132.98, 129.97, 129.37, 128.93, 128.71, 128.00, 126.83, 126.16, 115.44, 114.59, 114.34, 109.50, 109.45, 109.40, 109.38, 109.31, 109.29, 109.12, 109.10, 109.08, 65.18, 55.68, 46.22, 46.20, 46.17. HRMS (ESI-TOF) m/z: $[M+Na]^+$ calcd for $C_{22}H_{15}F_5N_2ONa^+$, 441.1002, found, 441.0978.



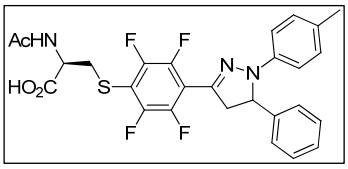
4-(5-(4-methoxyphenyl)-3-(perfluorophenyl)-4,5-dihydro-1*H*-pyrazol-1-yl)-*N*,*N*-dimethylaniline (Pyr-3). Yeild: 47%. ^{1}H-NMR (600 MHz, $CDCl_3$) δ (ppm): 7.24 (d, *J* = 8.6 Hz, 2H, Ar H), 6.98 (d, *J* = 9.1 Hz, 2H, Ar H), 6.87 (d, *J* = 8.7 Hz, 2H, Ar H), 6.66 (d, *J* = 9.1 Hz, 2H, Ar H), 5.19-5.15 (q, 1H, CH), 3.84-3.81 (m, 1H, CH_2), 3.79 (s, 3H, CH_3), 3.20-3.16 (q, 1H, CH_2), 2.83 (s, 6H, CH_3); ^{13}C-NMR (151 MHz, $CDCl_3$) δ (ppm): 159.31, 145.98, 145.80, 145.76, 145.74, 145.71, 145.69, 145.66, 144.13, 144.10, 144.08, 144.06, 144.03, 144.00, 143.98, 143.96, 141.06, 141.00, 140.98, 140.95, 140.88, 139.38, 139.32, 139.29, 139.26, 139.22, 139.19, 139.17, 139.05, 139.02, 138.94, 138.85, 138.81, 137.38, 137.36, 137.29, 137.27, 137.19, 137.17, 136.16, 134.49, 134.47, 134.45, 134.43, 134.38, 134.13, 127.47, 115.79, 114.66, 114.36, 109.81, 109.79, 109.71, 109.69, 109.61, 109.60, 65.14, 55.40, 46.13, 41.53. HRMS (ESI-TOF) m/z: $[M+H]^+$ calcd for $C_{24}H_{21}F_5N_3O^+$, 462.1605, found, 462.1608.



***N*,*N*-diethyl-4-(3-(perfluorophenyl)-5-phenyl-4,5-dihydro-1*H*-pyrazol-1-yl)aniline (Pyr-4).** Yeild: 80%. ^{1}H-NMR (400 MHz, $CDCl_3$) δ (ppm): 7.37-7.28 (m, 5H, Ar H), 6.96 (d, *J* = 9.1 Hz, 2H, Ar H), 6.60 (d, *J* = 9.1 Hz, 2H, Ar H), 5.21-5.16 (q, 1H, CH), 3.88-3.80 (q, 1H, CH_2), 3.26-3.17 (m, 5H, CH_2), 1.07 (t, *J* = 7.0 Hz, 6H, CH_3); ^{13}C-NMR (151 MHz, $CDCl_3$) δ (ppm): 145.77, 145.74, 145.72, 145.69, 145.65, 145.64, 144.08, 144.06, 144.03, 144.01, 143.98, 143.95, 143.16, 142.23, 141.04, 141.01, 140.97, 104.94, 104.91, 140.90, 140.85, 140.82, 139.02, 139.00, 138.99, 138.92, 138.89, 138.83, 138.81, 137.38, 137.36, 137.34, 137.26, 137.25, 137.23, 137.22, 137.18, 137.15, 137.14, 137.12, 135.43, 134.25, 134.23, 134.20, 129.28, 127.86, 126.31, 115.97, 114.24, 109.74, 109.71, 109.64, 109.62, 109.55, 109.52, 65.76, 46.16, 46.13, 46.11, 45.03, 12.68. HRMS (ESI-TOF) m/z: $[M+H]^+$ calcd for $C_{25}H_{23}F_5N_3^+$, 460.1812, found, 460.1807.

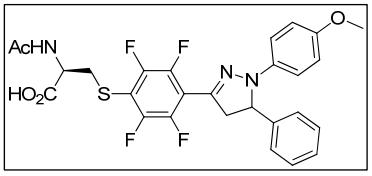


***N*,*N*-diethyl-4-(5-(4-methoxyphenyl)-3-(perfluorophenyl)-4,5-dihydro-1*H*-pyrazol-1-yl)aniline (Pyr-5).** Yeild: 84%. ^{1}H-NMR (600 MHz, $CDCl_3$) δ (ppm): 7.25 (d, *J* = 8.7 Hz, 2H, Ar H), 6.96 (d, *J* = 9.1 Hz, 2H, Ar H), 6.88 (d, *J* = 8.7 Hz, 2H, Ar H), 6.60 (d, *J* = 9.1 Hz, 2H), 5.16-5.12 (q, 1H, CH), 3.83-3.78 (m, 1H, CH_2), 3.79 (s, 3H, CH_3), 3.25-3.22 (q, 4H, CH_2), 3.20-3.15 (q, 1H, CH_2), 1.08 (t, J = 7.0 Hz, 6H, CH_3); ^{13}C-NMR (151 MHz, $CDCl_3$) δ (ppm): 159.25, 145.77, 145.75, 145.72, 145.69, 145.67, 145.65, 145.62, 144.08, 144.07, 144.04, 144.01, 143.99, 143.94, 143.91, 143.20, 143.18, 143.13, 143.12, 141.02, 140.99, 140.97, 140.96, 140.95, 140.93, 140.90, 140.88, 140.87, 140.83, 140.80, 139.33, 139.30, 139.24, 139.21, 139.18, 139.12, 139.09, 139.01, 138.99, 138.98, 138.91, 138.82, 138.78, 137.40, 137.37, 137.33, 137.28, 137.25, 137.16, 137.13, 135.50, 134.23, 130.16, 129.32, 127.50, 126.64, 124.73, 116.06, 114.61, 114.24, 109.81, 109.79, 109.72, 109.70, 109.63, 109.60, 65.33, 55.39, 46.17, 46.14, 46.12, 45.05, 12.66. HRMS (ESI-TOF) m/z: $[M+H]^+$ calcd for $C_{26}H_{25}F_5N_3O^+$, 490.1918, found, 490.1916.

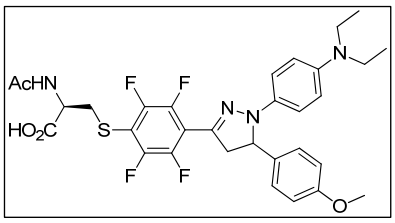


(*2R*)-2-acetamido-3-((2,3,5,6-tetrafluoro-4-(5-phenyl-1-(p-tolyl)-4,5-dihydro-1H-pyrazol-3-yl)phenyl)thio)propanoic acid (Pyr-6). Yeild: 90 %. ^{1}H-NMR (600 MHz, $CDCl_3$) δ (ppm): 7.29 (brs, 2H), 7.23 (brs, 3H), 6.94 (d, *J* = 12.2 Hz, 4H), 5.20 (brs, 1H), 4.67 (brs, 1H), 3.84 (brs, 1H), 3.45 (brs, 1H), 3.39 (brs, 1H), 3.16 (brs, 1H), 2.20 (s, 3H), 1.98 (s, 3H); ^{13}C-NMR (151 MHz, d_6-DMSO) δ (ppm): 171.83, 169.14, 147.75, 147.70, 147.67, 147.63, 147.59, 146.12, 146.09, 146.07, 146.06, 146.04, 146.01, 144.83, 144.75, 144.61, 144.59, 144.56, 144.51, 144.48, 144.47, 144.46, 143.65, 142.95, 142.93, 142.88, 142.87, 142.84, 142.81, 142.80, 141.69, 140.87, 140.81, 139.12, 137.88, 136.86, 136.35, 136.32, 136.29, 133.68, 130.60, 129.61, 129.45, 129.42, 129.23, 129.22, 129.01, 128.73, 128.66, 128.61, 127.59, 125.87, 125.20,

124.43, 120.11, 113.59, 113.52, 112.90, 112.82, 109.25, 79.18, 62.68, 53.24, 53.21, 53.19, 53.18, 53.15, 53.10, 53.09, 53.07, 53.05, 53.01, 52.98, 45.20, 35.83, 35.81, 35.76, 35.74, 35.73, 35.68, 35.63, 22.24, 20.74, 20.60, 20.09. HRMS (ESI-TOF) m/z: $[M+Na]^+$ calcd for $C_{27}H_{23}F_4N_3O_3SN_a^+$, 568.1294, found, 568.1176.



(*2R*)-2-acetamido-3-((2,3,5,6-tetrafluoro-4-(1-(4-methoxyphenyl)-5-phenyl-4,5-dihydro-1H-pyrazol-3-yl)phenyl)thio)propanoic acid (Pyr-7). Yeild: 82%. ^{1}H-NMR (600 MHz, d_6-DMSO) δ (ppm): 8.21 (s, 1H), 7.385-7.33 (m, 2H), 7.29-7.25 (m, 3H), 6.96 (d, J = 8.6 Hz, 2H), 6.80 (d, J = 8.6 Hz, 2H), 5.53-5.50 (q, 1H), 4.33 (s, 1H), 4.01-3.96 (m, 1H), 3.79 (s, 1H), 3.64 (s, 3H), 3.44-3.42 (m, 1H), 3.21-3.12 (m, 2H), 1.78 (s, 3H). ^{13}C-NMR (151 MHz, d_6-DMSO) δ (ppm): 168.98, 153.48, 147.64, 147.62, 147.61, 147.56, 147.52, 147.50, 146.04, 146.02, 146.01, 145.99, 145.92, 145.90, 145.85, 144.56, 144.54, 144.52, 144.51, 144.45, 144.44, 144.41, 144.39, 144.36, 142.89, 142.86, 142.84, 142.83, 142.79, 142.76, 142.74, 141.74, 137.31, 135.95, 135.94, 135.91, 135.89, 129.03, 127.63, 126.01, 114.92, 114.45, 113.44, 113.41, 113.31, 113.29, 113.17, 113.15, 112.71, 112.62, 112.53, 79.28, 63.35, 59.23, 56.01, 55.21, 54.18, 45.29, 36.90, 22.46, 18.56. HRMS (ESI-TOF) m/z: $[M+H]^+$ calcd for $C_{27}H_{24}F_4N_3O_4S^+$, 562.1424, found, 562.1410.



(*2R*)-2-acetamido-3-((4-(1-(4-(diethylamino)phenyl)-5-phenyl-4,5-dihydro-1H-pyrazol-3-yl)-2,3,5,6-tetrafluorophenyl)thio)propanoic acid (Pyr-8). Yeild: 70%. ^{1}H-NMR (600 MHz, d_6-DMSO) δ (ppm): 7.88 (s, 1H), 7.21 (d, J = 8.5 Hz, 2H), 6.89 (d, J = 8.4 Hz, 4H), 6.55 (d, J = 8.8 Hz, 2H), 5.39-5.35 (q, 1H), 4.21 (brs, 1H), 3.90-3.86 (q, 1H), 3.71 (s, 3H), 3.21-3.18 (q, 6H), 3.09-3.05 (q, 1H), 1.75 (s, 3H), 0.99 (t, J = 6.8 Hz, 6H); ^{13}C-NMR (151 MHz, d_6-DMSO) δ (ppm): 172.44, 172.41, 172.39, 172.38, 172.36, 172.34, 172.32, 172.30, 169.07,

158.60, 147.70, 147.67, 147.60, 147.59, 147.14, 146.09, 146.03, 146.01, 146.00, 145.97, 144.41, 144.38, 144.36, 144.32, 144.31, 142.73, 142.71, 142.70, 142.66, 142.62, 142.58, 142.47, 142.44, 134.62, 133.94, 133.87, 129.84, 127.37, 126.64, 123.29, 115.68, 114.34, 114.07, 113.25, 99.53, 63.45, 59.13, 55.21, 55.06, 53.76, 45.13, 43.91, 36.50, 22.39, 12.41.

HRMS (ESI-TOF) m/z: $[M+H]^+$ calcd for $C_{31}H_{33}F_4N_4O_4S^+$, 633.2159, found, 633.2149.

4. Photoluminescence Properties

4.1 Aggregation-induced emission properties of target compounds

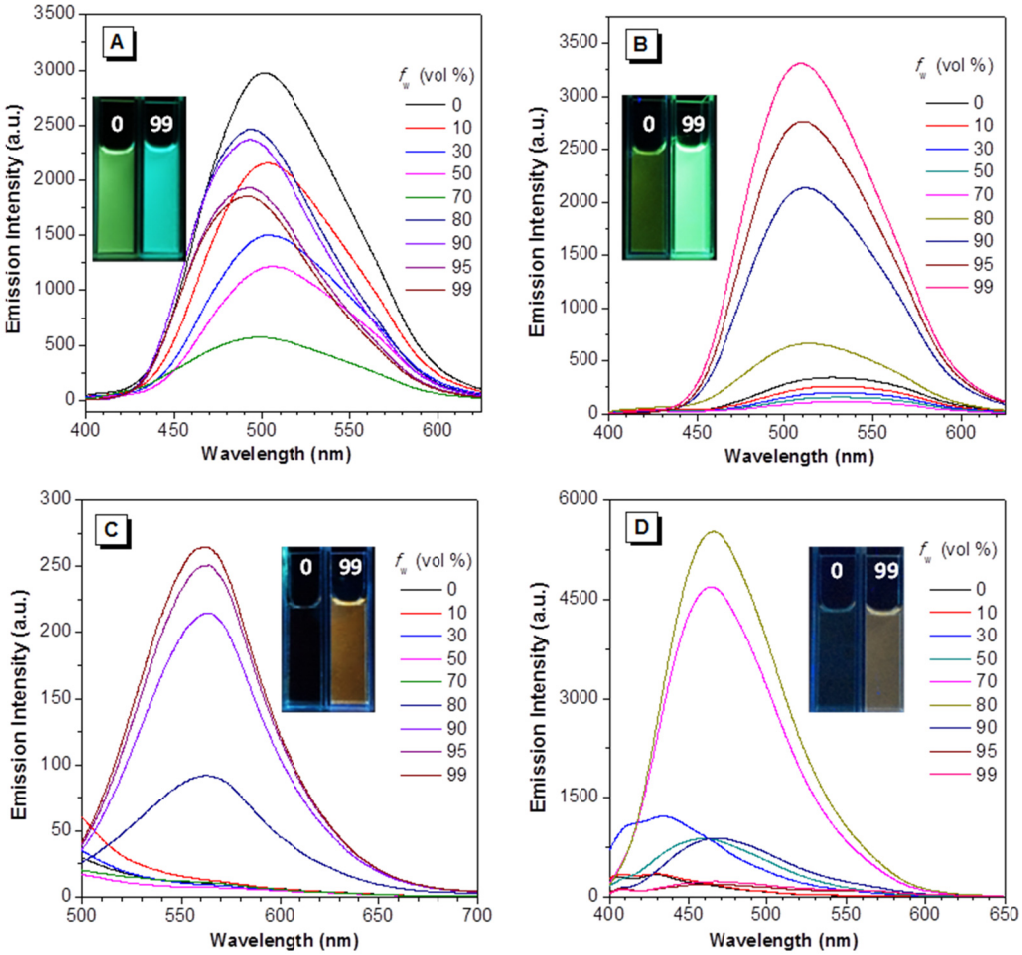


Fig. S1 Emission spectra of (A) **Pyr-1**, (B) **Pyr-2**, (C) **Pyr-3**, (D) **Pyr-4** (10 μM) in acetonitrile and acetonitrile/water mixtures with different f_w. Inset: photograph of corresponding fluorogens in acetonitrile/water mixtures with f_w values of 0 and 99% under 365 nm UV irradiation.

4.2 Dynamic light scattering (DLS) of target compounds

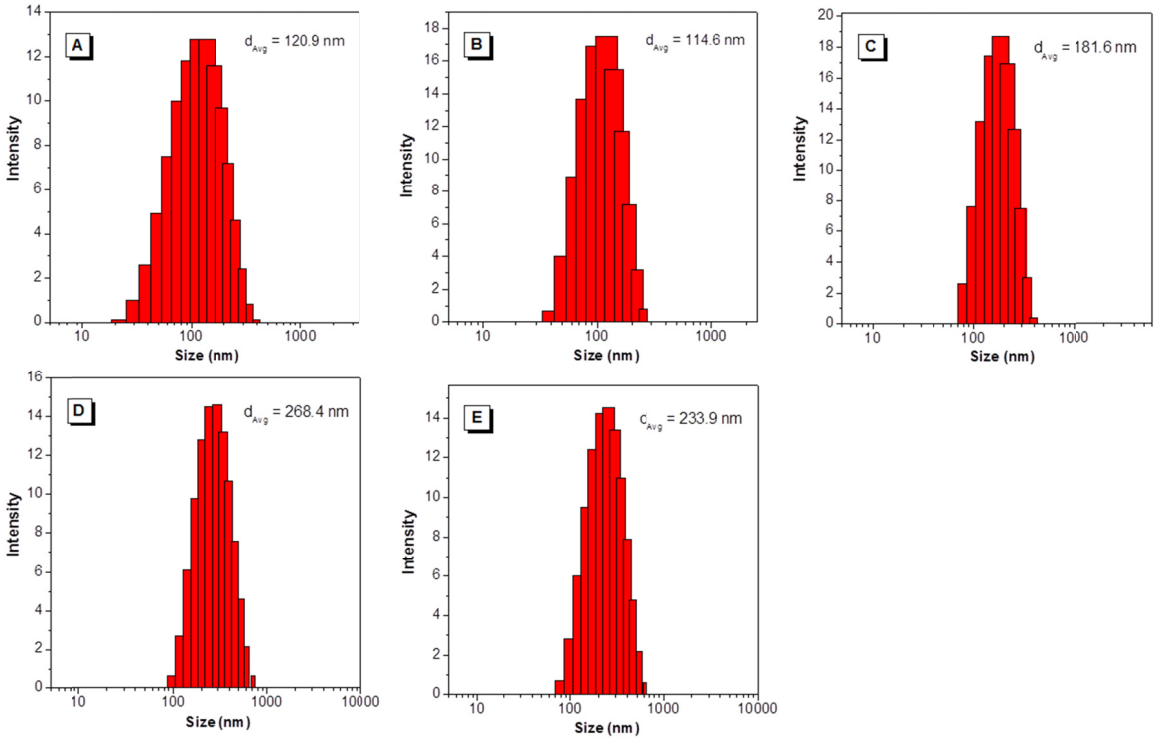


Fig. S2 Particle size distribution of (A) **Pyr-1**, (B) **Pyr-2**, (C) **Pyr-3**, (D) **Pyr-4**, (E) **Pyr-5** (10 μM) in acetonitrile/water (1:99, v/v).

4.3 The rate constants for radiative and non-radiative decay of target compounds

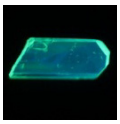
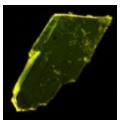
Table S1. The rate constants for radiative (k_r) and non-radiative decay (k_{nr}) were calculated from the Φ and τ values according to the formulae $k_r = \Phi_F/\tau$ and $k_{nr} = (1-\Phi_F)/\tau$.

Compd.	Solution		Solid state	
	k_r (s^{-1})	k_{nr} (s^{-1})	k_r (s^{-1})	k_{nr} (s^{-1})
Pyr-1	1.776×10^8	3.327×10^8	1.610×10^8	2.108×10^8
Pyr-2	6.053×10^7	8.167×10^8	1.156×10^8	1.402×10^8
Pyr-3	4.762×10^6	7.889×10^8	8.767×10^7	3.689×10^8
Pyr-4	5.752×10^6	4.367×10^8	2.468×10^7	4.082×10^8
Pyr-5	1.639×10^6	5.448×10^8	4.346×10^7	4.238×10^8

5. X-Ray Single Crystals Data and Packing Mode

5.1 Single crystal data summary

Table S2. Crystallographic data.

Crystal	**Pyr-1**	**Pyr-2**	**Pyr-4**
formula	$C_{22}H_{15}F_5N_2$	$C_{22}H_{15}F_5N_2O$	$C_{25}H_{22}F_5N_3$
crystal system	triclinic	monoclinic	monoclinic
space group	P -2	P 1 21/c 1	P 1 21/n 1
a [Å]	11.1225 (4)	14.0842 (5)	19.5027 (9)
b[Å]	12.8307 (5)	6.3205 (2)	5.9539 (3)
c[Å]	13.8928 (5)	42.4385 (15)	20.2366 (9)
β [deg]	91.711 (3)	92.560 (3)	111.013 (5)
V [Å^3]	1888.83 (13)	3774.0 (2)	2193.54 (19)
Z	2	4	4
μ [mm^{-1}]	1.022	1.087	0.961
T [K]	298	298	293
θ_{min}-θ_{max} [deg]	4.0900-71.7230	3.8250-71.3570	3.9230-71.1180
R	0.0614	0.0503	0.0700
wR_2	0.1799	0.1410	0.2659
GOOF	1.045	1.012	1.054
crystal pictures[a]			
CCDC number	1917277	1917274	1917276

[a]The fluorescent pictures of corresponding single crystals were taken by Olympus DP-80 fluorescence microscopy under UV irradiation.

5.2 X-ray single crystallographic packing of the corresponding compounds

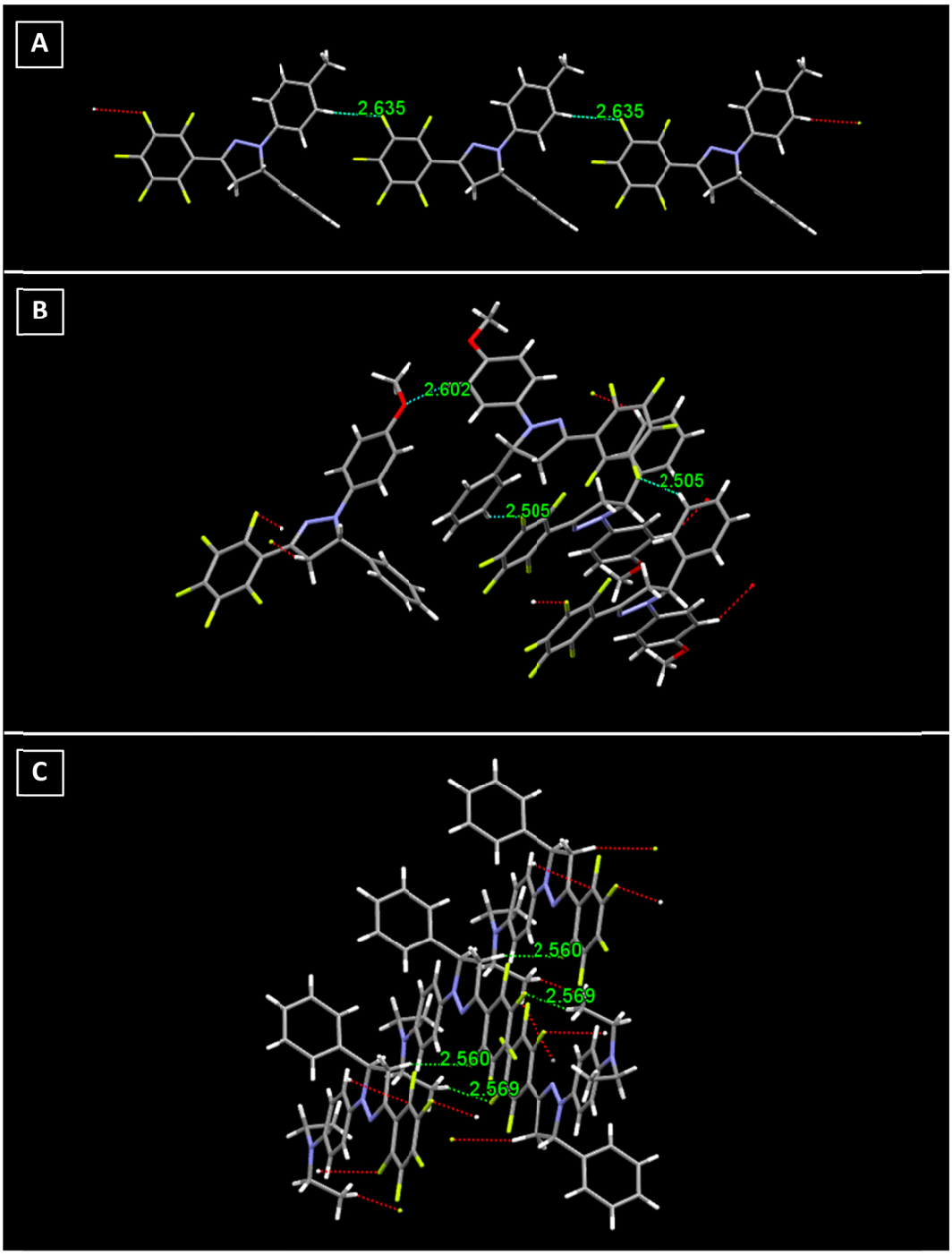


Fig. S3 Intermolecular interactions as well as short contacts of (A) **Pyr-1**, (B) **Pyr-2** and (C) **Pyr-4**. Carbon, hydrogen, and nitrogen atoms are shown in gray, white, and blue, respectively.

6. Imaging

6.1 Cytotoxicity study

To determine the cytotoxicity, a MTT based cell viability experiment was performed. HeLa cells (or CHO cells) were seeded at a density of 10000 cells per well in 96 wells plate. After 48 hours, the cells were treated with either DMEM (w/o phenol red) or **Pyr** probes in DMEM (w/o phenol red) suspension at various concentrations. After 12 hours, the cells were incubated with MTT (5 mg/mL) for another 4 h. Then, the formazan crystals were solubilized in 100 μL of lysate buffer. Absorbance at 570 nm of the wells was measured on a Spectra Max M384 (Molecular Devices) and the data recorded using Softmax Pro 6.4 software.

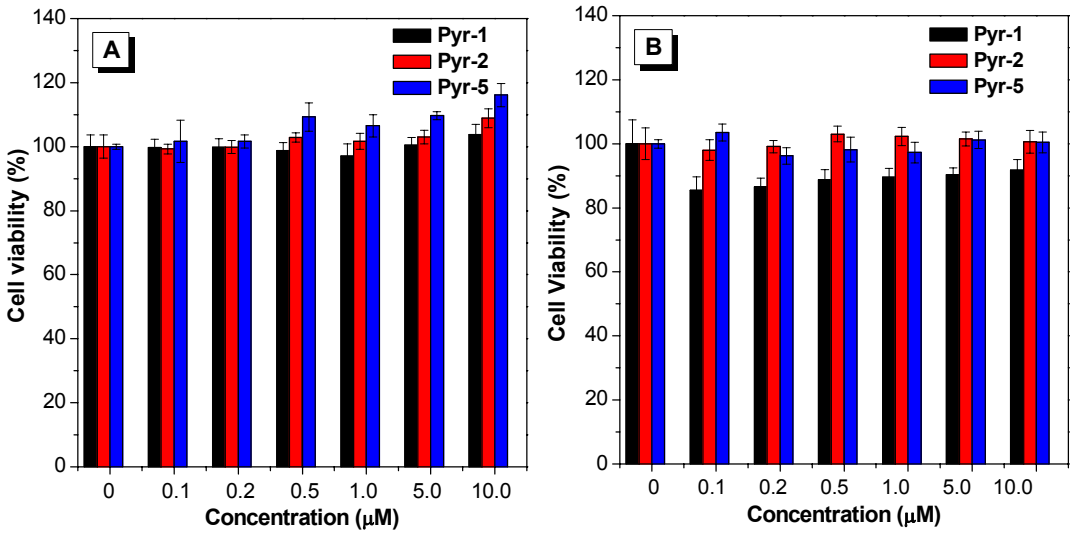


Fig. S4 The viability assay of (A) HeLa cells and (B) CHO cells after incubated with various concentrations of **Pyr-1**, **Pyr-2** and **Pyr-5**.

6.2 Cell culture and imaging

Co-localization experiments. Both cancer (HeLa) and normal (CHO) cells were cultured in DMEM containing 10% FBS, and incubated at 37°C in a 5% CO_2 atmosphere. Cells were seeded onto glass-bottom dishes and allowed to grow until the confluence reached to 50%. Prior to experiments, the cells were pretreated with 40 μM oleic acid for 4 h. Then the **Pyr**

stock solution and HCS LipidTOX^{TM} Deep Red Neutral Lipid (1: 1000 dilution) was added into the cell plates in DMEM to give the final concentration of 500 nM (for HeLa cells) or 1 μM (for CHO cells) and incubated for 30 minutes at 37^{o}C under 5% CO_2. Then the cells were washed with PBS for two times and used for bioimaging subsequently. Under confocal laser microscope system (CLSM), **Pyr-1** was excited at 405 nm and the emission was collected at range of 440-540 nm, **Pyr-2** was excited at 405 nm and the emission was collected at range of 450-550 nm, **Pyr-5** was excited at 405 nm and the emission was collected at range of 540-640 nm, HCS LipidTOX^{TM} Deep Red Neutral Lipid was excited at 635 nm and the emission was collected at range of 655-755 nm. No background fluorescence of cells was detected under the setting condition.

Wash-Free Imaging. The oleic acid-treated HeLa cells were incubated with **Pyr** probes (500 nM), BODIPY493/503 (500 nM) and Nile Red (500 nM) for 30 min, respectively. After that, the cells were imaged directly using confocal microscopy without washing by PBS. BODIPY493/503 was excited at 488 nm and the emission was collected at range of 500-540 nm, Nile Red was excited at 559 nm and the emission was collected at range of 610-660 nm.

3D imaging. The cells were cultured in DMEM containing 10% FBS, and incubated at 37°C in a 5% CO_2 atmosphere. Cells were seeded onto glass-bottom dishes and allowed to grow until the confluence reached to 50%. Prior to experiments, the cells were pretreated with 40 μM oleic acid for 4 h. Then the **Pyr** stock solution and Hoechst 33342 was added into the cell plates in DMEM to give the final concentration of 500 nM (for **Pyr**) or 5 μg/mL (for Hoechst 33342) and incubated for 30 minutes at 37^{o}C under 5% CO_2. After that, the cells were incubated with DiD Perchlorate for another 10 min with concentration of 10 μM. And then washed with PBS for two times and used for bioimaging subsequently. Under confocal laser microscope system (CLSM), Hoechst 33342 was excited at 405 nm and the emission

was collected at range of 410-470 nm, DiD Perchlorate was excited at 559 nm and the emission was collected at range of 655-755 nm. No background fluorescence of cells was detected under the setting condition.

pH-dependent imaging. HeLa cells were firstly incubated with 10 μM of **Pyr-5** (by adding 1 μL of 10 mM DMSO stock solution of **Pyr-5** into 1 mL DMEM medium) for 15 min. Then the medium was replaced by 1 mL Nigericin solutions (10 ng/mL in DMEM medium). After 10 min incubation, the culture medium was removed and washed twice with PBS. And then 1 mL HEPES buffer of pH 7 (pH 6 or pH 5) was added and incubated for another 15 min before confocal fluorescent imaging. Excitation wavelength was 405 nm. For blue channel, the emission was collected at range of 440-460 nm. For orange channel, the emission was collected at range of 550-570 nm.

Real-time monitoring of intracellular pH. HeLa cells were firstly incubated with 10 μM of **Pyr-5** (by adding 1 μL of 10 mM DMSO stock solution of **Pyr-5** into 1 mL DMEM medium) for 15 min. Then the medium was replaced by 1 mL Nigericin solutions (10 ng/mL in DMEM medium). After 10 min incubation, the culture medium was removed and washed twice with PBS. And then 1 mL HEPES buffer of pH 7 was added and incubated for 15 min before CLSM images. Then, the above cell culture medium was replaced with 1 mL HEPES buffer of pH 5 and incubated for 15 min for CLSM images. Subsequently, the medium of pH 5 was discard and the cells was re-incubated with 1 mL HEPES buffer of pH 7 for 15 min and then collected the CLSM images. Excitation wavelength was 405 nm. For blue channel, the emission was collected at range of 440-460 nm. For orange channel, the emission was collected at range of 550-570 nm.

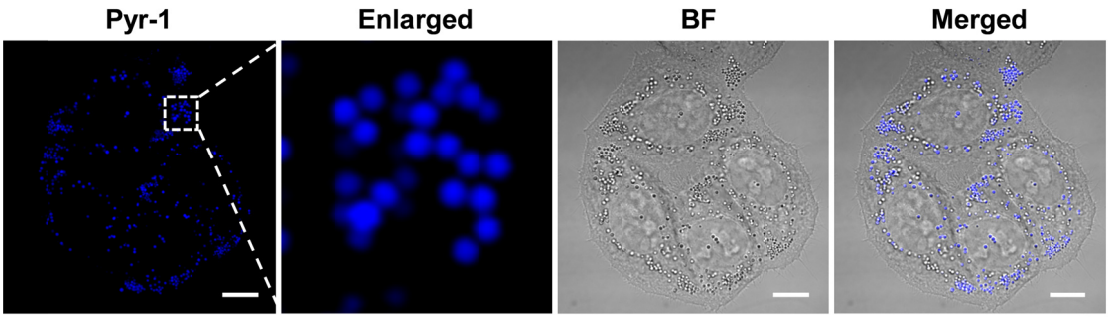


Fig. S5 CLSM image of HeLa cells stained with **Pyr-1** (1 μM) for 30 min. Scale bar: 10 μm.

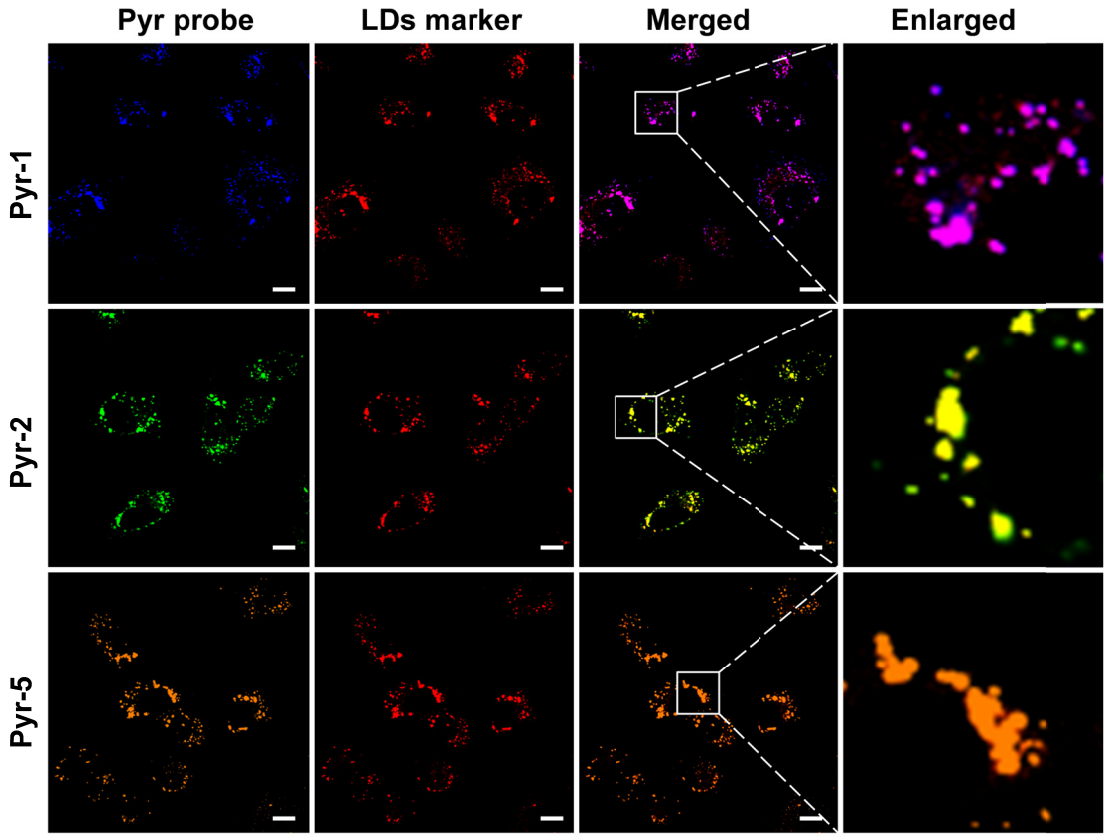


Fig. S6 Co-localization CLSM images of CHO cells stained with **Pyr** probes (1 μM) and HCS LipidTOX™ Deep Red Neutral Lipid Stain (1:1000 dilution). The Pearson's coefficients were calculated to be 0.83, 0.95 and 0.95 for **Pyr-1**, **Pyr-2** and **Pyr-5**, respectively. Scale bar: 10 μm.

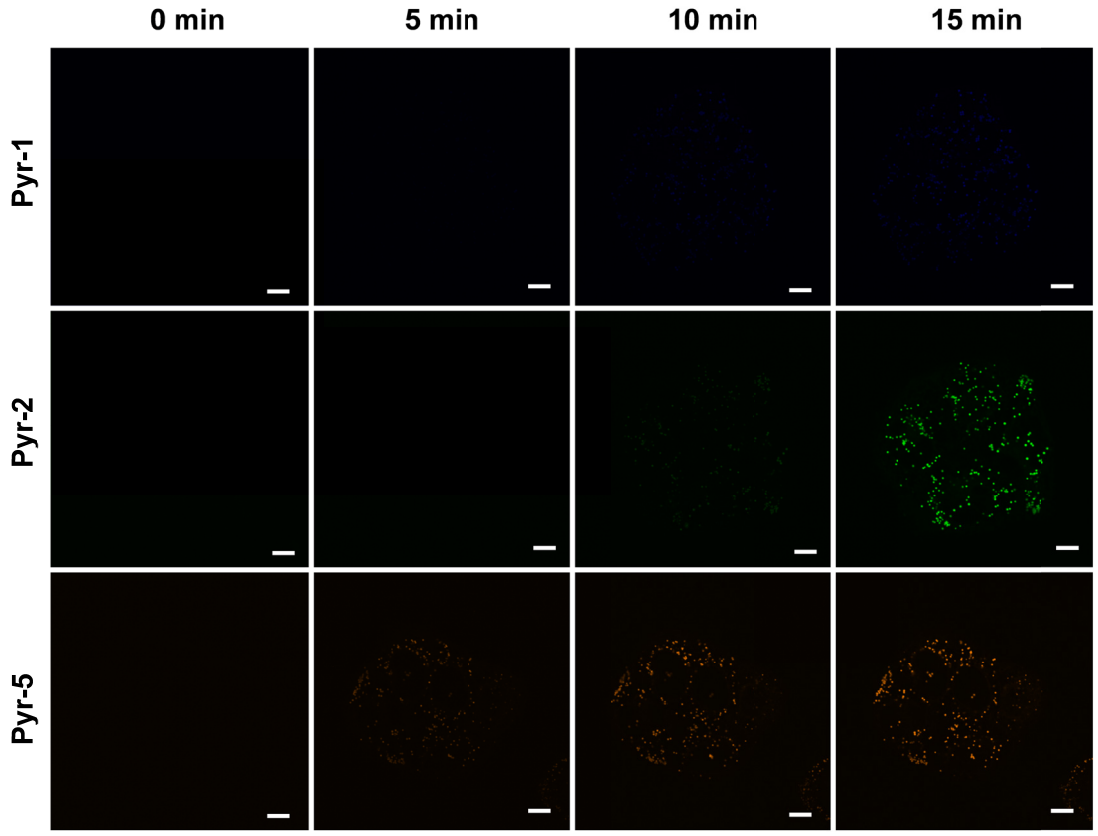


Fig. S7 Time-dependent CLSM images of HeLa cells stained with **Pyr-1**, **Pyr-2** and **Pyr-5** (500 nM) by using wash-free procedure. Scale bar: 10 μm.

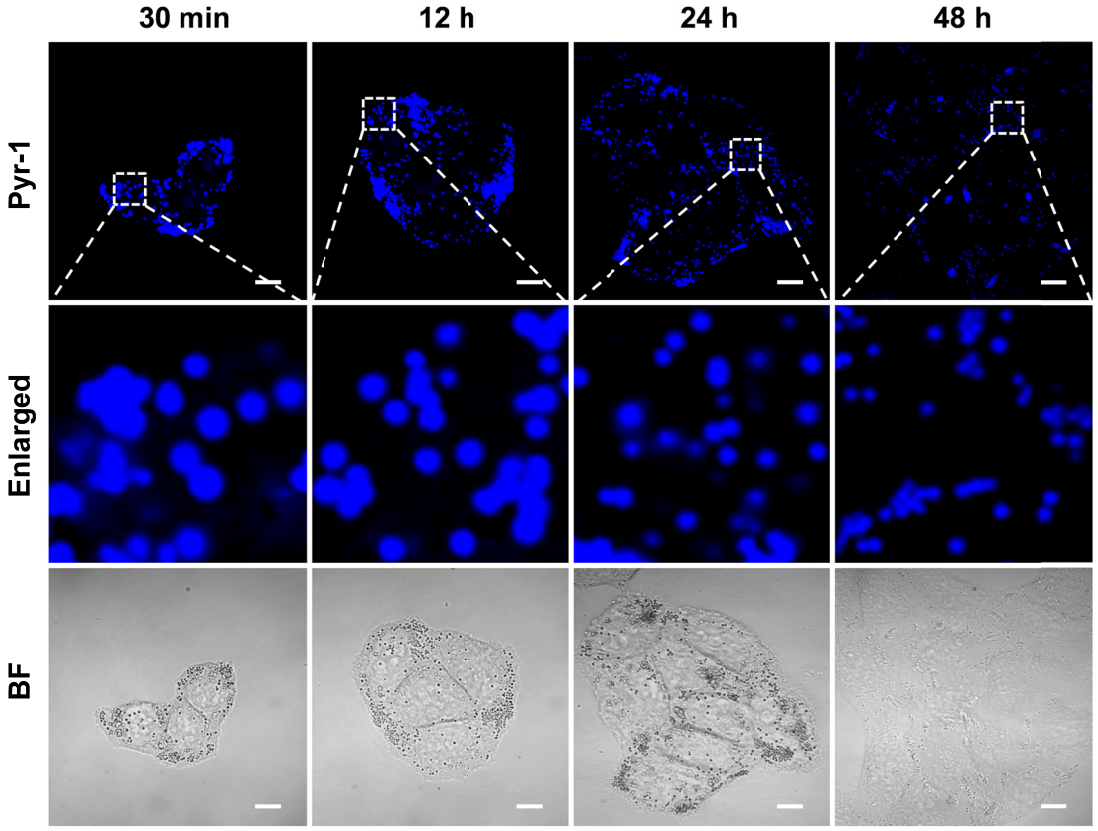


Fig. S8 CLSM images of HeLa cells at different time spot after incubated with **Pyr-1** (50 μM). Scale bar: 10 μm.

6.4 *Zebrafish* imaging

The *Zebrafish* embryos were kept at 28°C in embryo media (EM: 150 mM NaCl, 1.0 mM $CaCl_2$, 0.5 mM KCl, 2.0 mM $MgSO_4$, 0.37 mM KH_2PO_4, 0.05 mM Na_2HPO_4, 0.71 mM $NaHCO_3$ and 75 μM 1-phenyl 2-thiourea in d-H_2O, pH of 7.4) with a circadian cycle of 14 h of brightness and 10 h of darkness and bred under standard conditions.

For confocal fluorescent imaging of lipids dynamics, the *Zebrafish* embryos of 3 dpf (days post fertilization) were incubated with **Pyr** probes (2 μM) in EM media for 30 min. The stained embryos were transferred to 35 mm glass-bottom dish and then collected images with a 10x objective under 405 nm excitation at 0 h, 24 h and 48 h, respectively. During the imaging process, the embryos were anaesthetized by tricaine methanesulfonate (MS222).

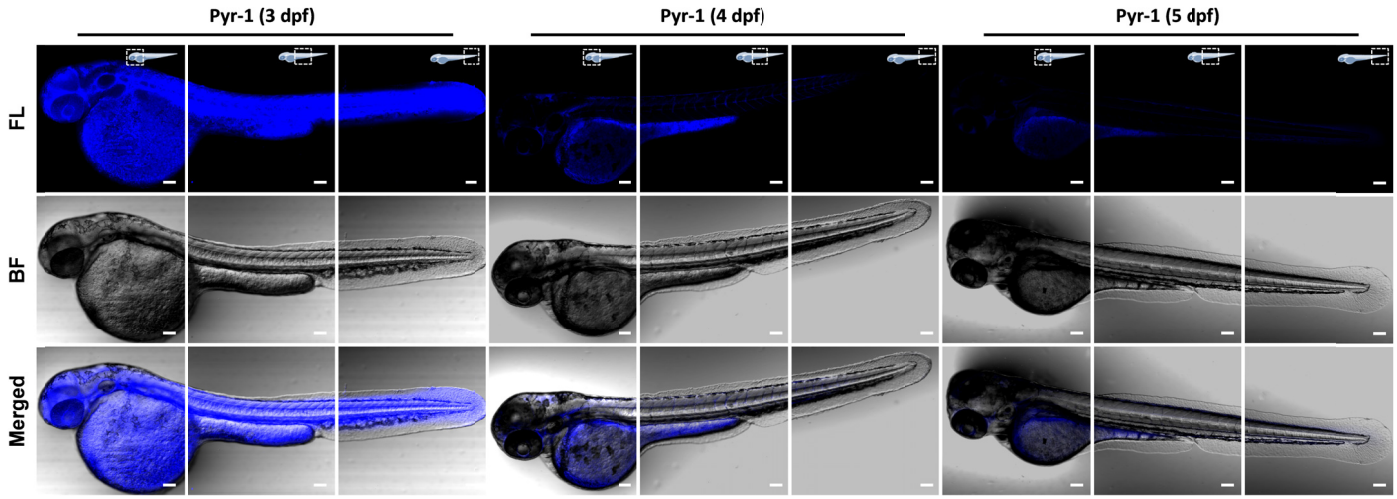


Fig. S9 The tracking of lipid metabolism in *Zebrafish* embryos at different development stages after stained with **Pyr-1** (2 μM). Scale bar: 100 μm.

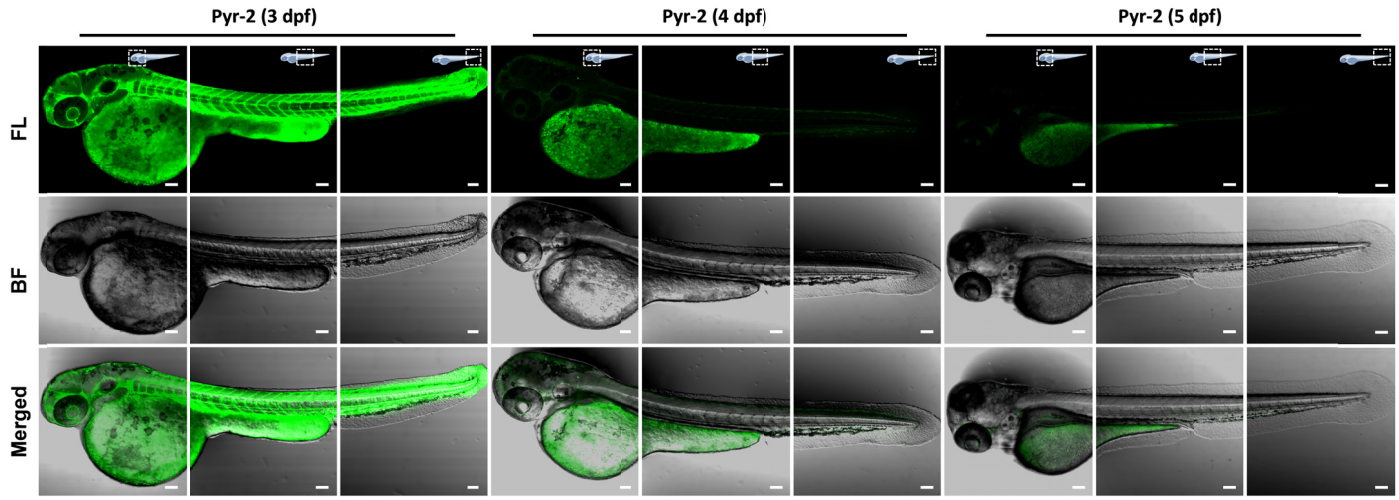


Fig. S10 The tracking of lipid metabolism in *Zebrafish* embryos at different development stages after stained with **Pyr-2** (2 μM). Scale bar: 100 μm.

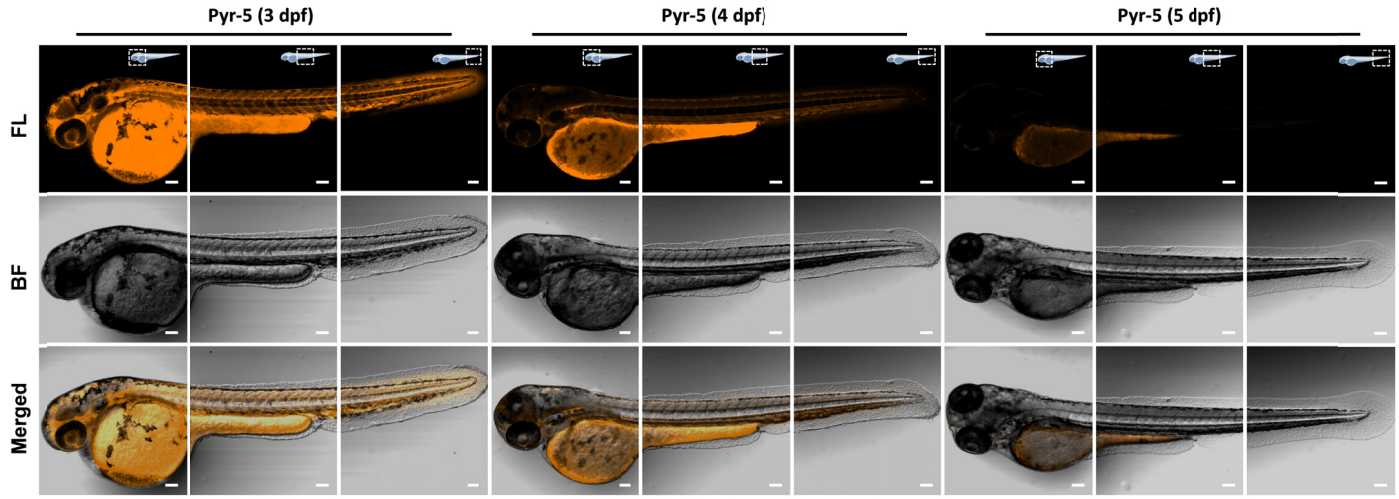


Fig. S11 The tracking of lipid metabolism in *Zebrafish* embryos at different development stages after stained with **Pyr-5** (2 μM). Scale bar: 100 μm.

6.3 *Drosophila* imaging

The fixed *Drosophila* embryos were washed twice (5 min/each) with ethanol at room temperature. After that, the re-suspended *Drosophila* embryos were washed with the following solution: 75% EtOH+25% PBT, 50% EtOH+50% PBT, 75% EtOH+25% PBT (volume fraction). Finally, the *Drosophila* embryos were washed twice with 100% PBT solution (PBT solution: 1 μL TX-100 was added into 999 μL PBS to make the final concentration of TX-100 as 0.1%). Above *Drosophila* embryos were incubated with 2 μM of **Pyr** probes for 30 min. After that, the medium was removed carefully and the resulted *Drosophila* embryos were washed twice with 100% PBT solution. Then the washed *Drosophila* embryos were placed on a glass slide before imaged under confocal fluorescent microscope.

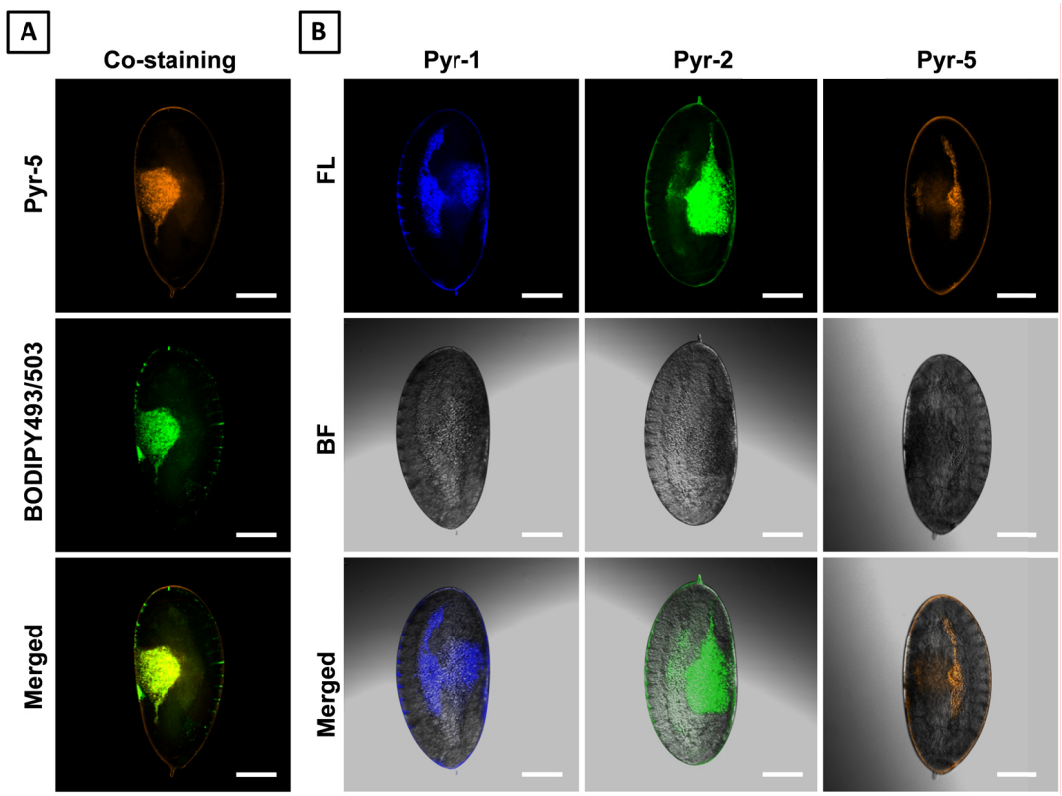


Fig. S12 (A) Co-localized CLSM images of fixed *Drosophila* embryos (stage-13) stained with **Pyr-5** (2 μM, 30 min) and BODIPY493/503 (500 nM, 30 min). (B) CLSM images of fixed *Drosophila* embryos (stage-13) stained with **Pyr-1**, **Pyr-2** and **Pyr-5** (2 μM, 30 min). Scale bar: 100 μm.

7. Labeling of Cysteine Containing Proteins

7.1 The absorption, emission spectra and energy levels of Pyr-1 and Pyr-6

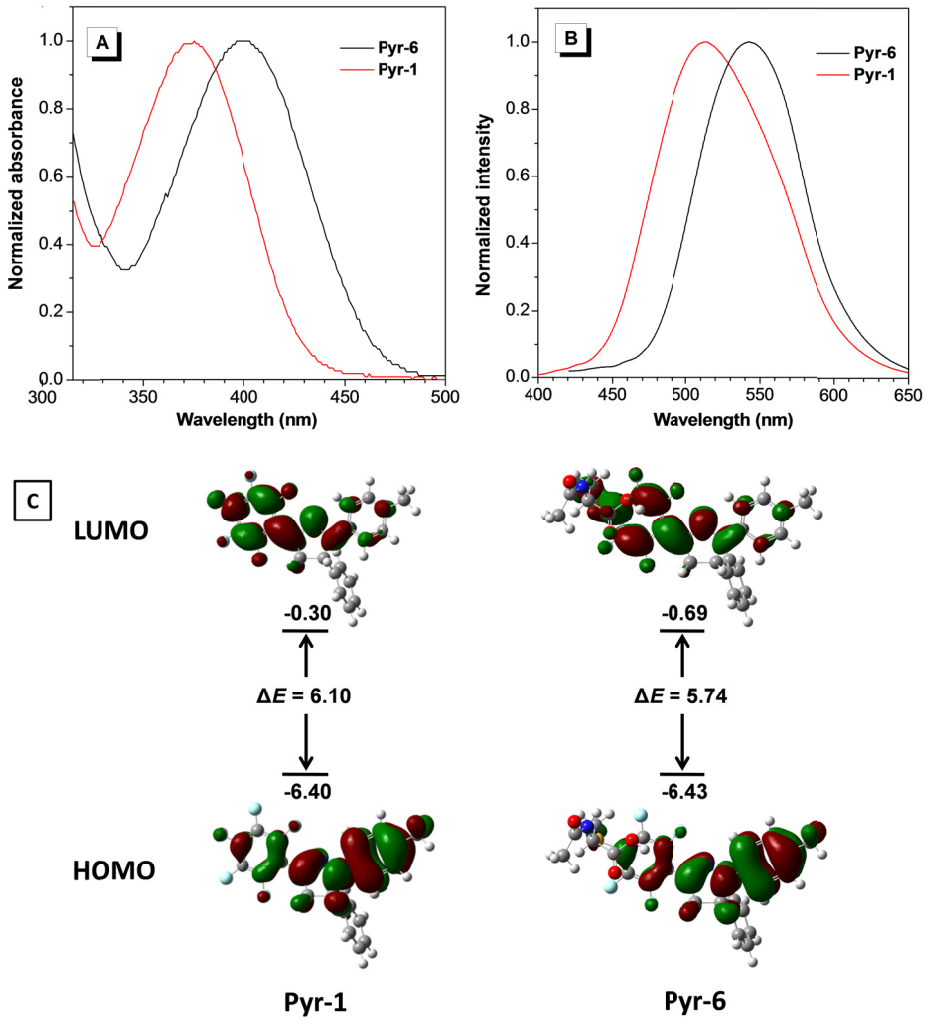


Fig. S13 (A) UV-Vis and (B) emission spectra of **Pyr-1** and **Pyr-6** in DMSO solution. (C) The HOMO and LUMO energy levels of **Pyr-1** and **Pyr-6** calculated using DFT method.

7.2 Labeling of bovine serum albumin (BSA) with Pyr-1 at different pH

After incubation of BSA (1.67 μL, 10 μM) with different **Pyr** fluorogens (6.25 μL, 500 μM) in tris buffer (pH = 6, 7, or 8.6) at 37 ^{o}C for 16 h, the reaction mixture was analyzed by SDS-PAGE electrophoresis followed by in-gel fluorescence imaging under 365 nm UV irradiation, and by staining with Coomassie Blue.

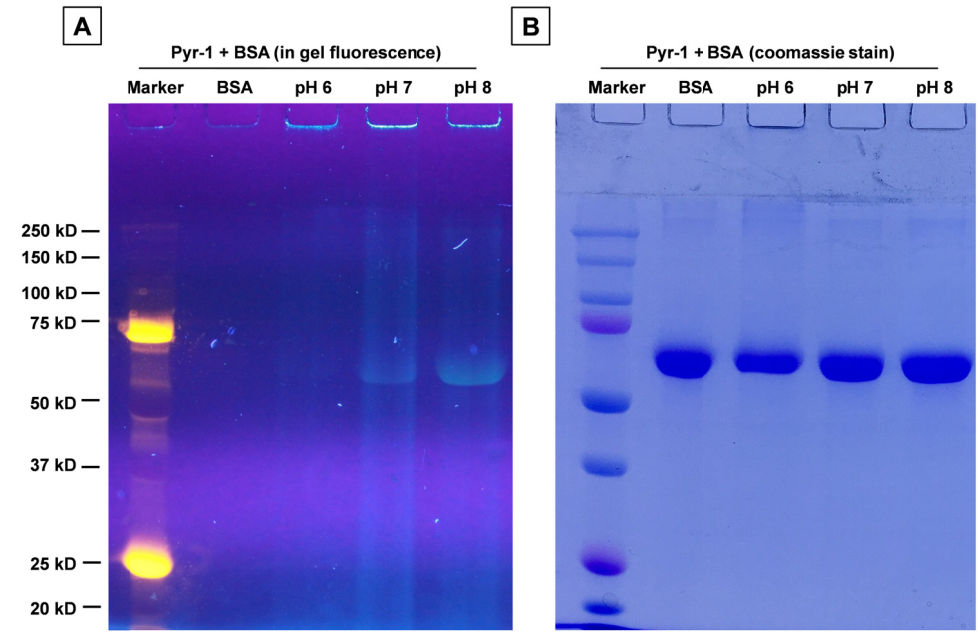


Fig. S14 BSA labeling with **Pyr-1** at different pH condition (pH = 6, 7 and 8.6). (A) In-gel fluorescence and (B) Coomassie blue staining.

7.3 Labeling of BSA with either Pyr-1 or 5HPyr-1

After incubation of BSA (1.67 µL, 10 µM) with either **Pyr-5** or **5HPyr-1** (6.25 µL, 500 µM) in tris buffer (pH = 8.6) at 37 ^{o}C for 16 h, the reaction mixture was analyzed by SDS-PAGE electrophoresis followed by in-gel fluorescence imaging under 365 nm UV irradiation, and by staining with Coomassie Blue.

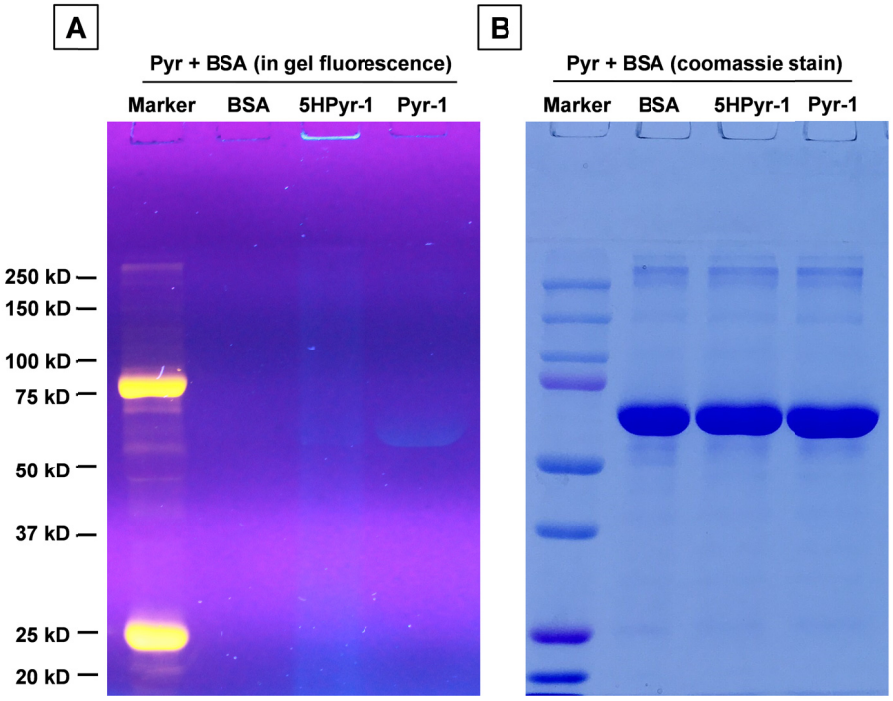


Fig. S15 BSA labeling with **Pyr-1** or **5HPyr-1** at pH 8.6. (A) In-gel fluorescence and (B) Coomassie blue staining.

7.4 Labeling of BSA with different Pyr probes

After incubation of BSA (1.67 μL, 10 μM) with **Pyr** probes (6.25 or 7.5 μL, 500 or 600 μM) in tris buffer (pH = 8.6) at 37 °C for 16 h, the reaction mixture was analyzed by SDS-PAGE electrophoresis followed by in-gel fluorescence imaging under 365 nm UV irradiation, and by staining with Coomassie Blue.

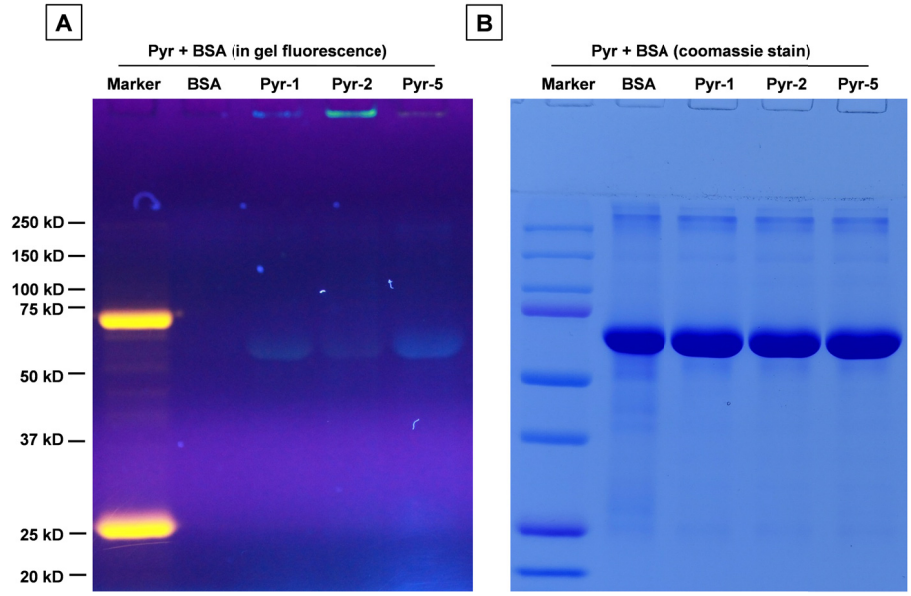


Fig. S16 BSA labeling with 50 eq. **Pyr1**, **Pyr-2** and **Pyr-5** at pH 8.6. (A) In-gel fluorescence and (B) Coomassie blue staining.

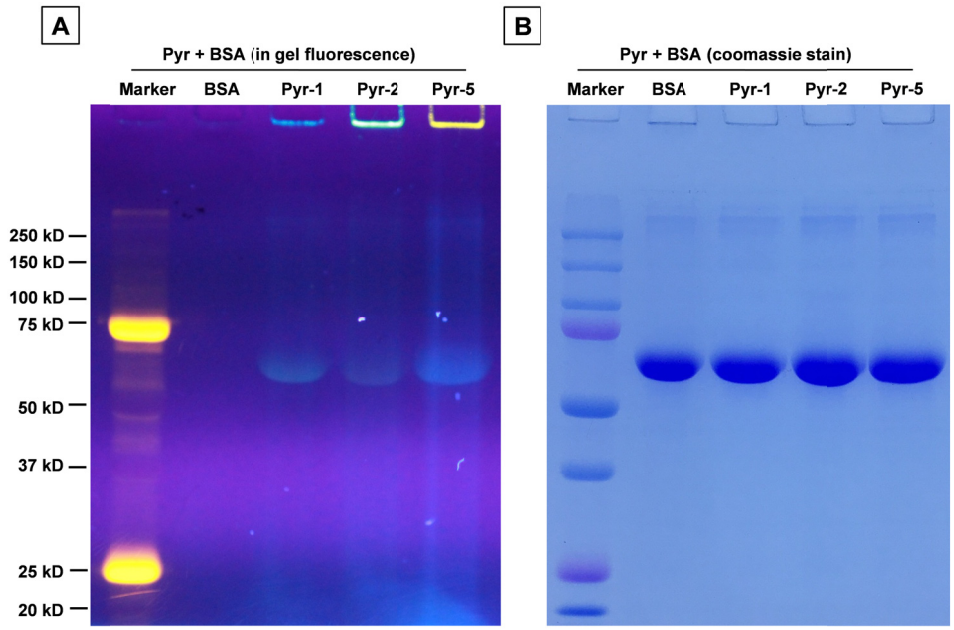


Fig. S17 BSA labeling with 60 eq. **Pyr1**, **Pyr-2** and **Pyr-5** at pH 8.6. (A) In-gel fluorescence and (B) Coomassie blue staining.

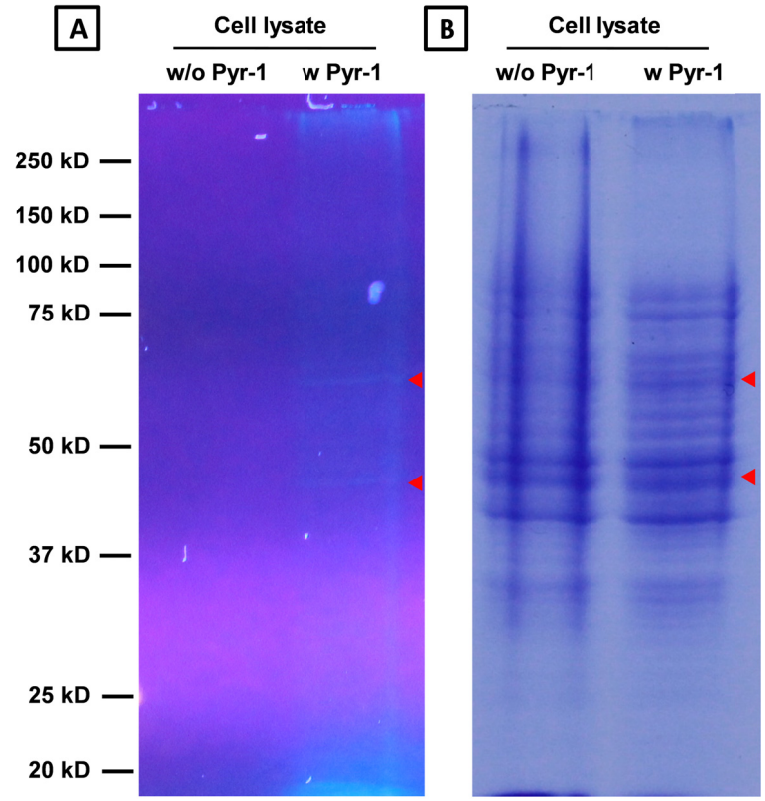


Fig. S18 BSA labeling with 60 eq. **Pyr1**, **Pyr-2** and **Pyr-5** at pH 8.6. (A) In-gel fluorescence and (B) Coomassie blue staining.

8. Cartesian Coordinates of Optimized Pyr Structures[2]

Pyr-1

Symbol	X	Y	Z
F	-2.777001	2.22006	-0.687492
F	-5.38983	1.814872	-0.464616
F	-2.018059	-2.326416	0.463886
C	-2.258606	-0.029568	-0.118743
N	0.040265	-0.686948	0.092973
F	-6.360211	-0.636621	0.228351
F	-4.629822	-2.681441	0.686196
C	-0.818981	0.201364	-0.257882
C	-4.555294	0.802409	-0.236533
C	-5.050823	-0.441065	0.116081
C	-3.187762	0.990217	-0.34792
C	-2.798798	-1.275697	0.232795
C	2.349986	-1.159266	-0.144048
C	-4.164338	-1.479924	0.350941
C	2.207179	2.106245	-0.111745
N	1.300828	-0.226971	-0.101804
C	2.13708	-2.482248	0.263058
H	1.149349	-2.780173	0.589409
C	4.459875	-3.032	-0.200616
C	3.179925	-3.390333	0.231967
H	2.992416	-4.412351	0.550579
C	2.336449	2.142931	1.275358
H	1.848022	1.380618	1.873824
C	2.854933	3.071549	-0.879191
H	2.765848	3.044768	-1.962032
C	4.651989	-1.715631	-0.602289
H	5.633684	-1.399372	-0.943447
C	1.327211	1.07443	-0.787119
H	1.680222	0.928285	-1.817086
C	-0.169452	1.465857	-0.777705
H	-0.353662	2.310013	-0.109112
H	-0.536785	1.752722	-1.764214
C	3.620278	-0.782442	-0.578286
H	3.820471	0.236855	-0.883088
C	3.615188	4.064565	-0.271956
H	4.115241	4.810019	-0.881781
C	3.738682	4.096925	1.111662
H	4.335716	4.867724	1.587804
C	3.099416	3.131868	1.882817
H	3.198785	3.146644	2.963385
C	5.578565	-4.039655	-0.229136

H	5.752618	-4.47305	0.760776
H	5.354225	-4.868586	-0.90825
H	6.514281	-3.583964	-0.560926

Pyr-2

Symbol	X	Y	Z
F	-3.25654	1.992111	-0.77057
F	-5.79333	1.253879	-0.54796
F	-1.91726	-2.37079	0.553481
C	-2.45021	-0.14801	-0.11807
N	-0.0855	-0.50603	0.089733
F	-6.44115	-1.2786	0.228479
F	-4.45946	-3.05922	0.771911
C	-1.05265	0.265941	-0.25748
C	-4.83578	0.368602	-0.27771
C	-5.16758	-0.91605	0.116686
C	-3.50384	0.731256	-0.38854
C	-2.82627	-1.44099	0.276215
C	2.263667	-0.68316	-0.15921
C	-4.15405	-1.8194	0.394129
C	1.703693	2.542186	-0.09029
N	1.104534	0.11355	-0.09617
C	2.221918	-2.02654	0.211543
H	1.280399	-2.45566	0.528376
C	4.576854	-2.26487	-0.25843
C	3.367688	-2.81134	0.164914
H	3.297681	-3.85126	0.458069
C	1.826935	2.582458	1.297307
H	1.440147	1.758099	1.887714
C	2.223004	3.589516	-0.84799
H	2.138906	3.561543	-1.9312
C	4.619553	-0.92368	-0.63129
H	5.565582	-0.50703	-0.95806
C	0.964768	1.410887	-0.77546
H	1.336639	1.317669	-1.80501
C	-0.57003	1.606202	-0.77004
H	-0.86429	2.417175	-0.0994
H	-0.96776	1.846847	-1.75683
C	3.480477	-0.13803	-0.58205
H	3.549993	0.905603	-0.86136
C	2.849839	4.665923	-0.23052
H	3.25099	5.474618	-0.83279
C	2.967657	4.701181	1.153525
H	3.461193	5.537538	1.637491
C	2.456783	3.655261	1.914913
H	2.553178	3.672628	2.995717

O	5.753598	-2.94916	-0.3419
C	5.752288	-4.30831	0.029375
H	5.080689	-4.90186	-0.60289
H	6.774034	-4.66347	-0.10538
H	5.461919	-4.44264	1.078538

Pyr-3

Symbol	X	Y	Z
F	-3.48236	2.188283	-0.76502
F	-6.10262	1.8413	-0.52285
F	-2.80679	-2.32794	0.545965
C	-3.00522	-0.04858	-0.11639
N	-0.7172	-0.7253	0.146736
F	-7.11783	-0.56502	0.261158
F	-5.42465	-2.6243	0.788805
C	-1.56296	0.148778	-0.27036
C	-5.28652	0.821628	-0.26017
C	-5.8047	-0.39826	0.138875
C	-3.91593	0.979217	-0.38102
C	-3.56835	-1.27058	0.281013
C	1.576603	-1.26904	-0.06858
C	-4.93705	-1.4442	0.409865
C	1.529088	1.98598	-0.34165
N	0.549842	-0.30181	-0.074
C	1.342646	-2.55354	0.426684
H	0.352553	-2.80836	0.781946
C	3.64592	-3.21148	-0.01889
C	2.351424	-3.50006	0.447168
H	2.115248	-4.48347	0.831981
C	1.682858	2.179798	1.034085
H	1.17189	1.515106	1.723277
C	2.211034	2.830576	-1.20679
H	2.112252	2.692427	-2.28035
C	3.859886	-1.92422	-0.52894
H	4.828563	-1.64242	-0.92001
C	0.594415	0.926852	-0.88408
H	0.907654	0.667204	-1.90551
N	4.669109	-4.15847	0.035332
C	-0.88914	1.363402	-0.87039
H	-1.03376	2.245841	-0.24191
H	-1.26517	1.612514	-1.86376
C	2.84979	-0.97084	-0.54767
H	3.07547	0.014737	-0.93476
C	3.026178	3.85644	-0.73237
H	3.543194	4.494796	-1.43728
C	3.166423	4.037703	0.640472
C	2.490712	3.188767	1.521867
H	2.622777	3.341732	2.587018
C	4.31495	-5.5414	0.269731

H	3.834528	-5.66265	1.244953
H	3.637485	-5.95251	-0.4947
H	5.223296	-6.14466	0.280968
C	5.876572	-3.90573	-0.71889
H	5.698875	-3.79573	-1.80018
H	6.374388	-2.99765	-0.36604
H	6.570891	-4.73318	-0.56932
O	3.934983	4.998013	1.217792
C	4.641463	5.880799	0.374038
H	5.18444	6.560416	1.030415
H	5.35757	5.346446	-0.26138
H	3.963311	6.461334	-0.26249

Pyr-4

Symbol	X	Y	Z
F	-4.27702	1.564883	-0.73205
F	-6.62973	0.339542	-0.63682
F	-2.15664	-2.50399	0.500077
C	-3.093	-0.40243	-0.11583
N	-0.72276	-0.27212	0.246263
F	-6.79502	-2.2984	0.03231
F	-4.52445	-3.68089	0.597966
C	-1.79953	0.278746	-0.19015
C	-5.52637	-0.35255	-0.35727
C	-5.61353	-1.69129	-0.01647
C	-4.28794	0.265562	-0.40195
C	-3.2216	-1.75814	0.2214
C	1.626135	0.006808	0.128086
C	-4.45321	-2.39102	0.273877
C	0.480012	3.06091	-0.0751
N	0.330554	0.566984	0.102055
C	1.831042	-1.29757	0.580522
H	0.977765	-1.88889	0.887017
C	4.238754	-1.11811	0.220963
C	3.101071	-1.84456	0.62146
H	3.196431	-2.86423	0.970316
C	0.551768	3.229182	1.30652
H	0.308421	2.393445	1.954547
C	0.816339	4.127225	-0.90613
H	0.77124	4.001313	-1.98471
C	4.010664	0.184904	-0.24741
H	4.832904	0.79883	-0.58987
C	-0.01595	1.763934	-0.67933
H	0.401803	1.661733	-1.69124
N	5.519452	-1.65638	0.305941
C	-1.55887	1.675275	-0.72132
H	-2.01485	2.427156	-0.07201

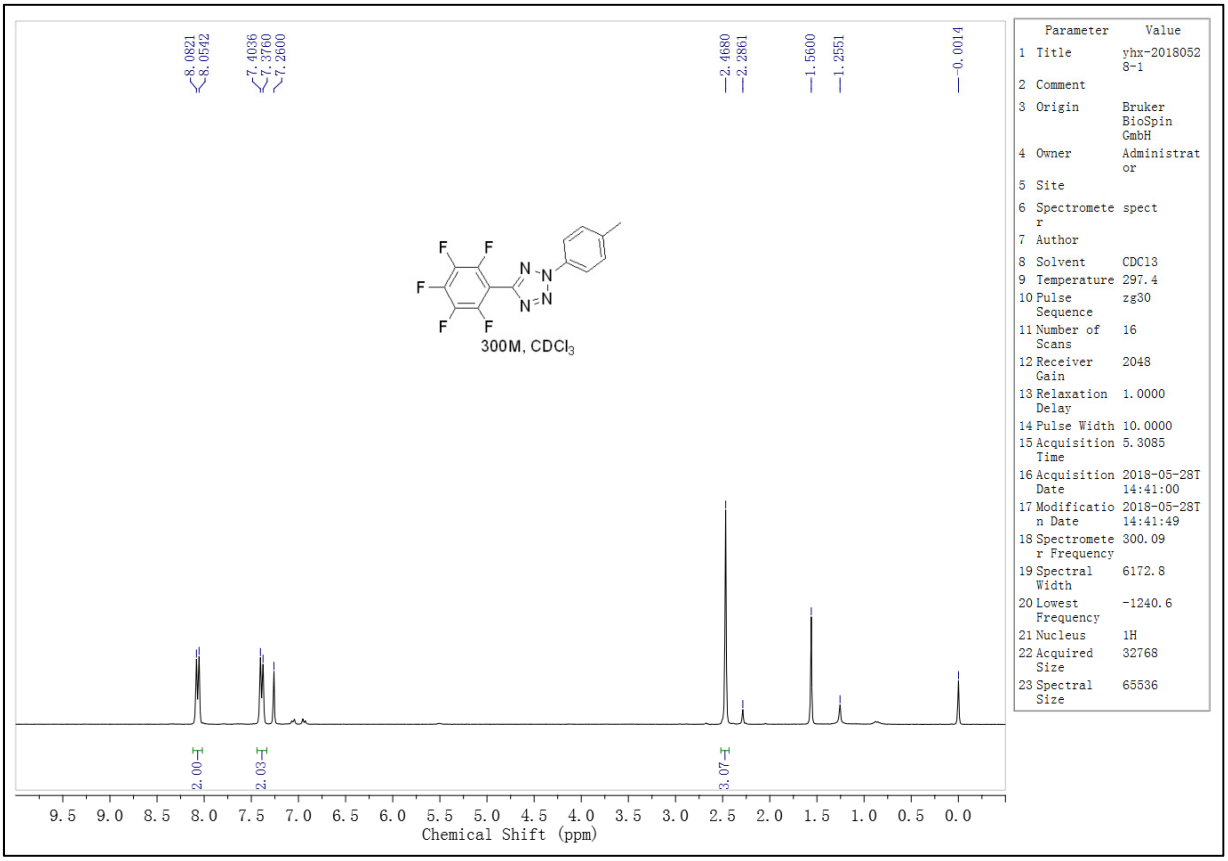
H	-1.96383	1.827984	-1.72259
C	2.736538	0.73655	-0.2871
H	2.627328	1.754211	-0.64077
C	1.210796	5.3468	-0.36775
H	1.470073	6.168989	-1.02694
C	6.664864	-0.91683	-0.18994
H	6.608866	0.116627	0.169856
H	7.556387	-1.34438	0.277771
C	1.27813	5.508832	1.010642
H	1.590451	6.458076	1.433464
C	0.950349	4.445633	1.845453
H	1.009145	4.562904	2.922767
C	5.442567	-4.09024	-0.33072
H	4.422469	-4.00907	-0.71299
H	5.571928	-5.09374	0.085992
H	6.125861	-3.98492	-1.17697
C	5.719665	-3.02804	0.735053
H	5.103602	-3.22089	1.619983
H	6.756486	-3.11589	1.072533
C	6.836884	-0.9267	-1.71028
H	5.947806	-0.53601	-2.21041
H	7.009193	-1.94061	-2.0795
H	7.69198	-0.30971	-2.0029

Pyr-5

Symbol	X	Y	Z
F	4.236963	1.605741	0.859457
F	6.723053	0.699187	0.674449
F	2.632989	-2.61618	-0.61611
C	3.302608	-0.45457	0.127569
N	0.929763	-0.6098	-0.20476
F	7.21364	-1.85103	-0.16087
F	5.128235	-3.47329	-0.8002
C	1.934552	0.050281	0.252113
C	5.713397	-0.1102	0.357701
C	5.965377	-1.40324	-0.06714
C	4.407245	0.341027	0.448265
C	3.597952	-1.75922	-0.29555
C	-1.4331	-0.63939	-0.06208
C	4.899044	-2.22546	-0.39462
C	-0.6883	2.517198	0.306286
N	-0.21901	0.077892	-0.00554
C	-1.47523	-1.92929	-0.59384
H	-0.55699	-2.38619	-0.93983
C	-3.88167	-2.0827	-0.21537
C	-2.66523	-2.63124	-0.66442

H	-2.63326	-3.63119	-1.07634
C	-0.7642	2.77223	-1.06595
H	-0.39239	2.029278	-1.76425
C	-1.19284	3.468269	1.18248
H	-1.15151	3.286452	2.253277
C	-3.8164	-0.79223	0.331699
H	-4.7065	-0.31066	0.714028
C	-0.01671	1.268993	0.835766
H	-0.40196	1.060501	1.844429
N	-5.08413	-2.77491	-0.32901
C	1.525666	1.374042	0.860161
H	1.872603	2.211562	0.24925
H	1.92276	1.524298	1.864966
C	-2.62299	-0.08475	0.401003
H	-2.63995	0.915811	0.814417
C	-1.7564	4.657056	0.722903
H	-2.14002	5.375042	1.436359
C	-6.31043	-2.21717	0.208793
H	-6.38614	-1.16479	-0.08654
H	-7.14399	-2.72351	-0.28646
C	-1.82149	4.896967	-0.64653
C	-1.32393	3.943211	-1.53927
H	-1.39457	4.146554	-2.60185
C	-4.67977	-5.20953	0.167478
H	-3.67286	-5.01691	0.544672
H	-4.6836	-6.19634	-0.30542
H	-5.35689	-5.24301	1.024624
C	-5.11067	-4.13531	-0.83318
H	-4.48962	-4.19721	-1.73351
H	-6.1327	-4.33967	-1.16517
C	-6.47149	-2.34234	1.725262
H	-5.63361	-1.87793	2.250147
H	-6.51647	-3.39078	2.029903
H	-7.39384	-1.85403	2.054414
O	-2.3505	6.014385	-1.21032
C	-2.86993	7.008856	-0.35514
H	-3.23543	7.806197	-1.00184
H	-3.70112	6.62803	0.250032
H	-2.09857	7.41228	0.311462

9. ^{1}H, ^{13}C NMR Spectra



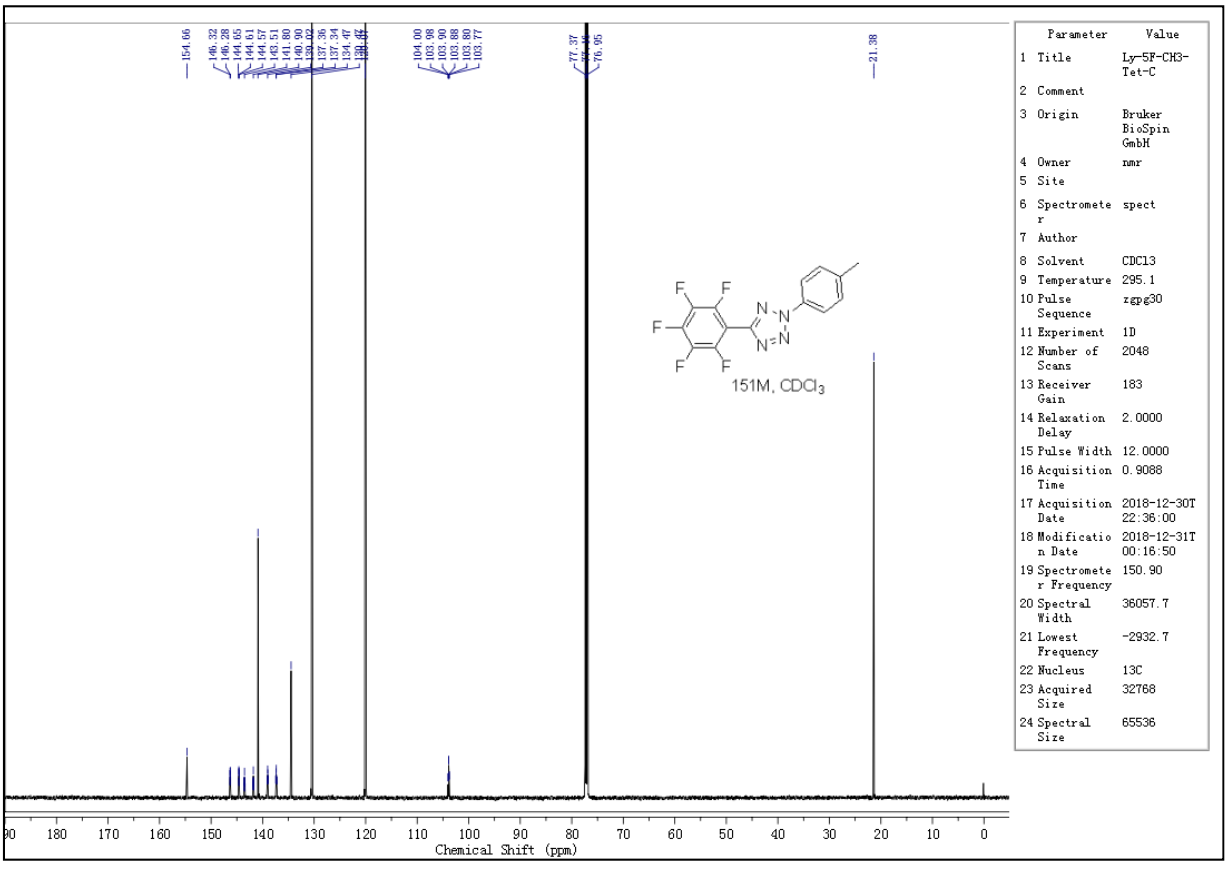
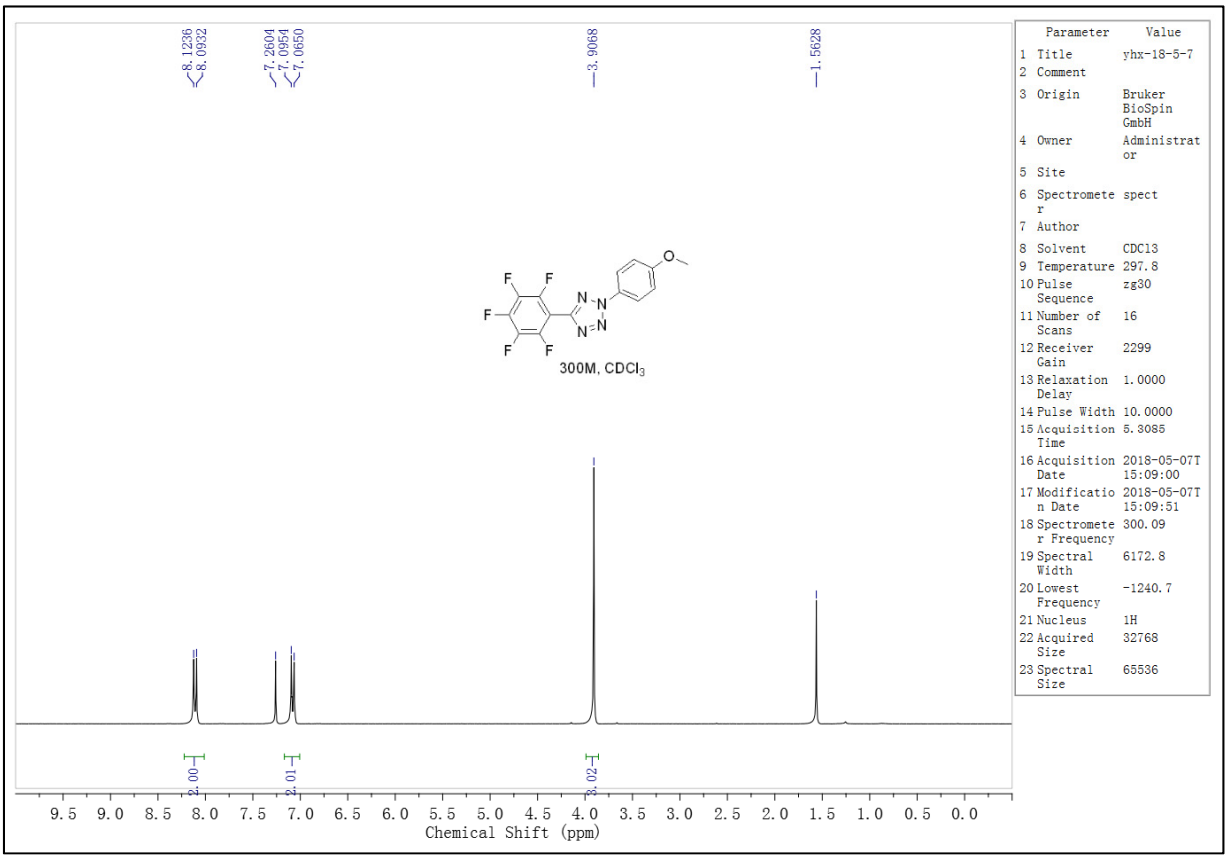


Fig. S19 ^{1}H NMR ($CDCl_3$, 300 MHz) and ^{13}C NMR ($CDCl_3$, 151 MHz) spectra of **Tet-1**.



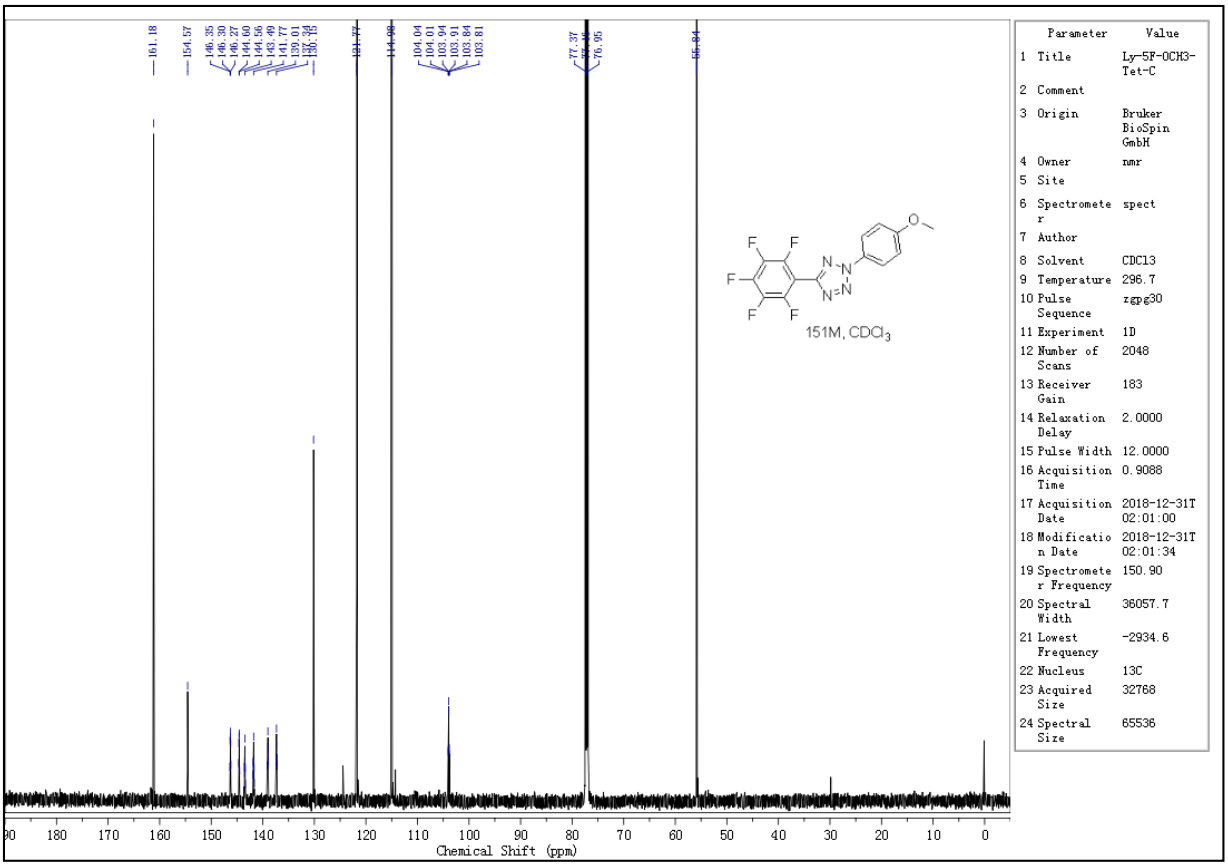
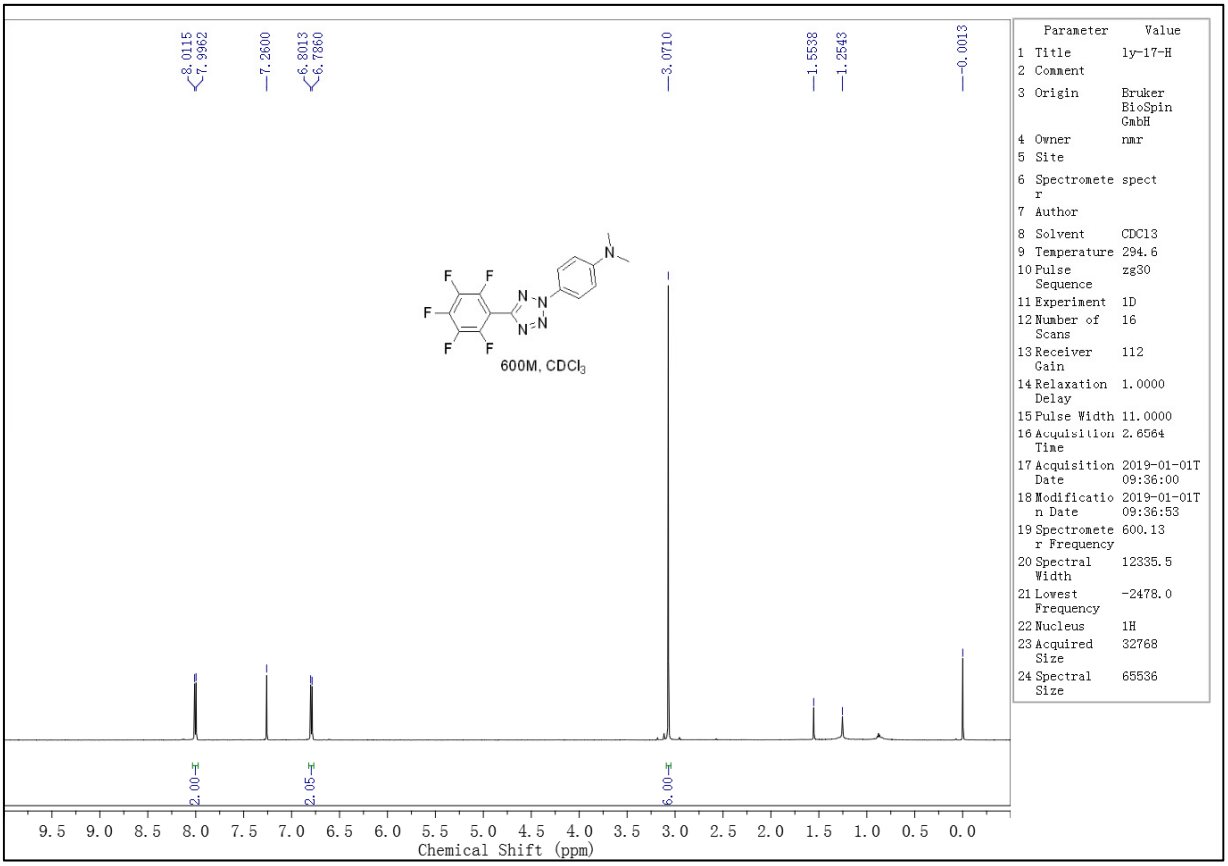


Fig. S20 ^{1}H NMR ($CDCl_3$, 300 MHz) and ^{13}C NMR ($CDCl_3$, 151 MHz) spectra of **Tet-2**.



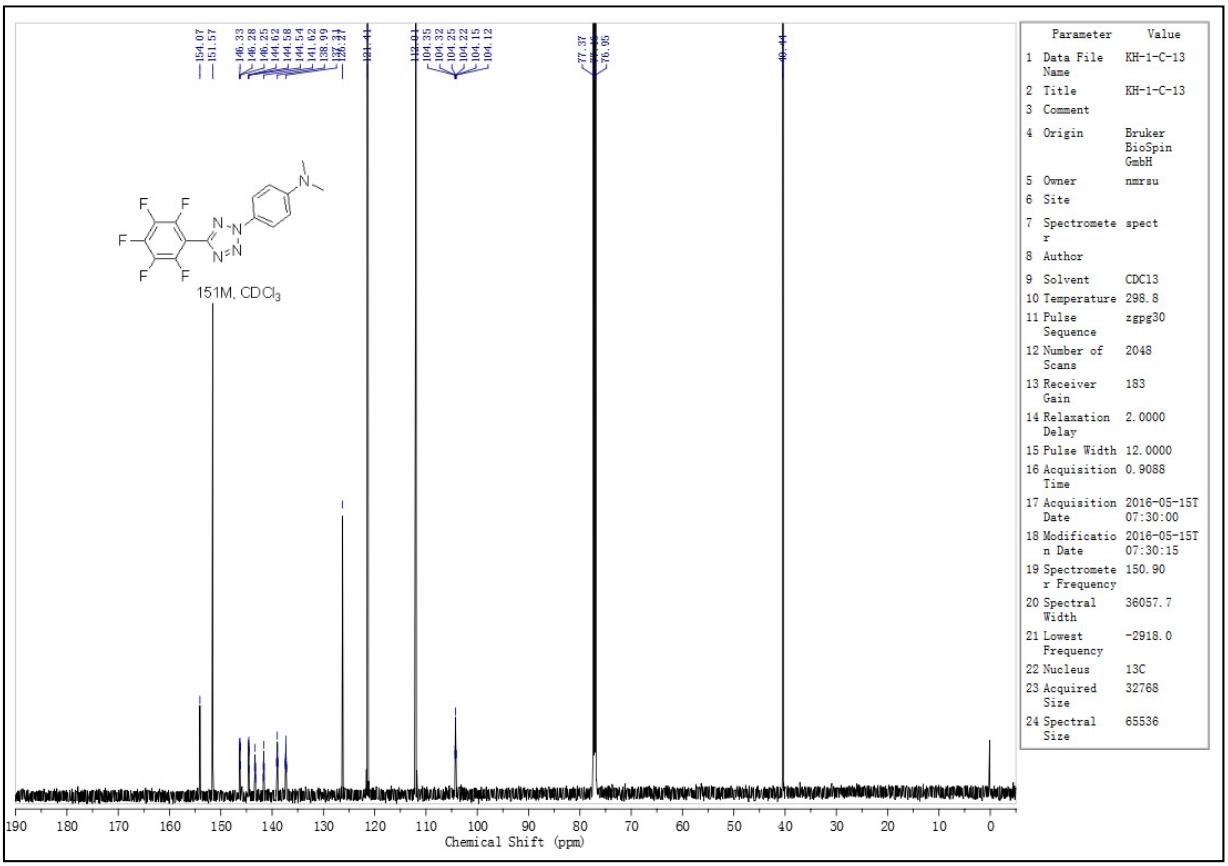
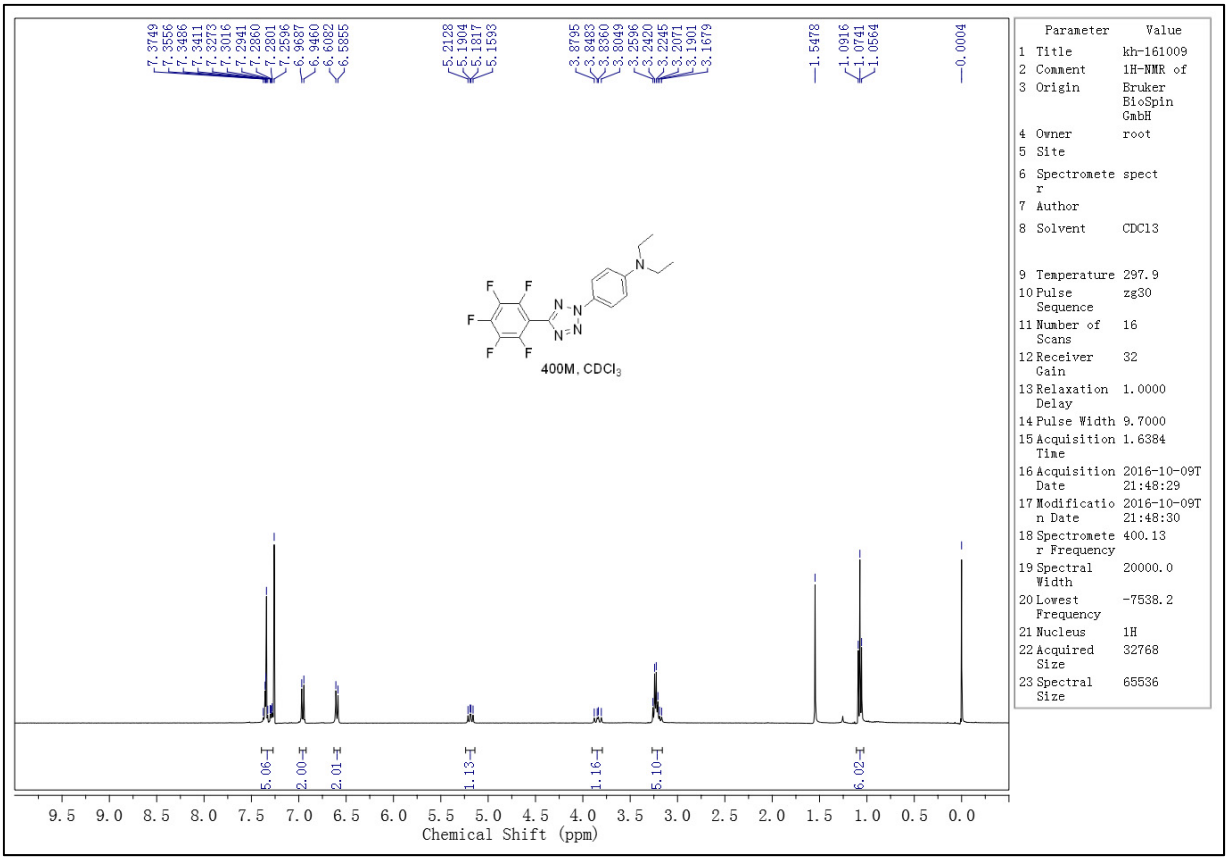


Fig. S21 ^{1}H NMR ($CDCl_3$, 600 MHz) and ^{13}C NMR ($CDCl_3$, 151 MHz) spectra of **Tet-3**.



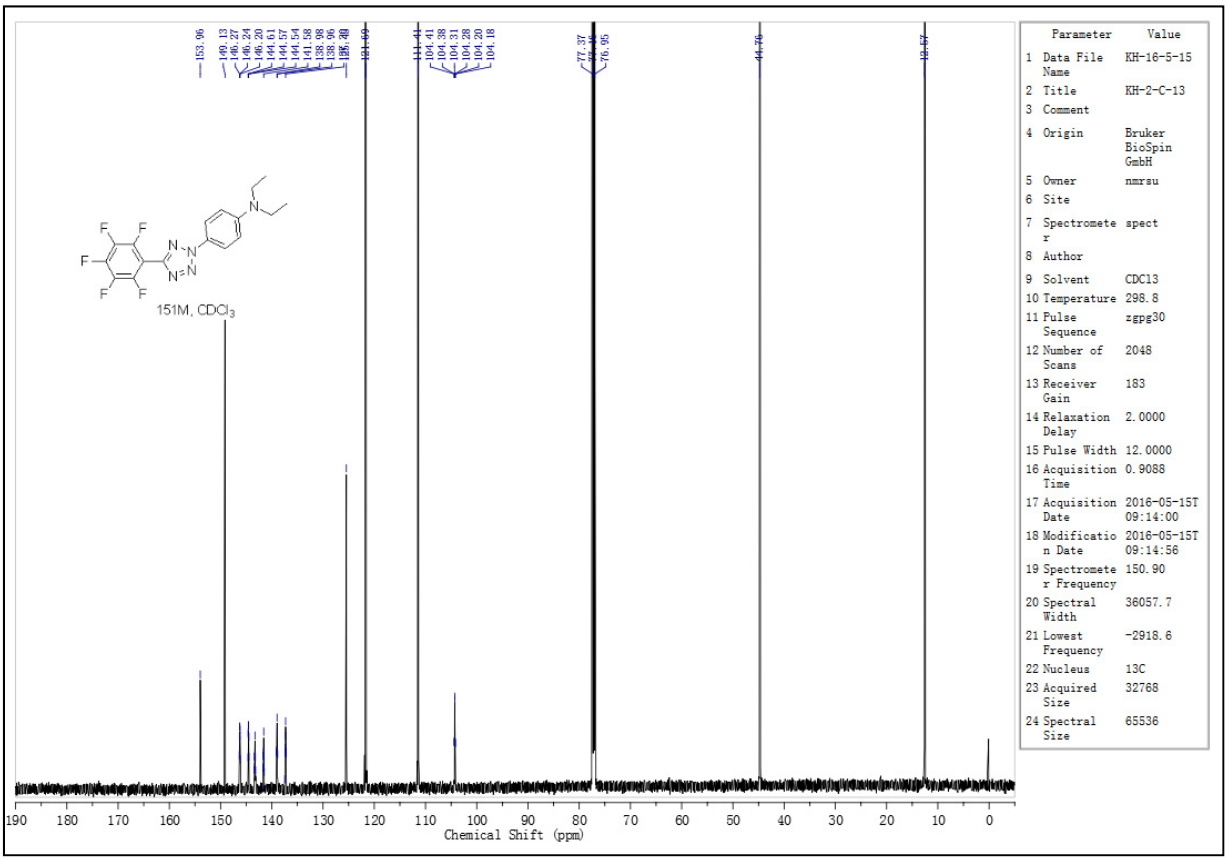
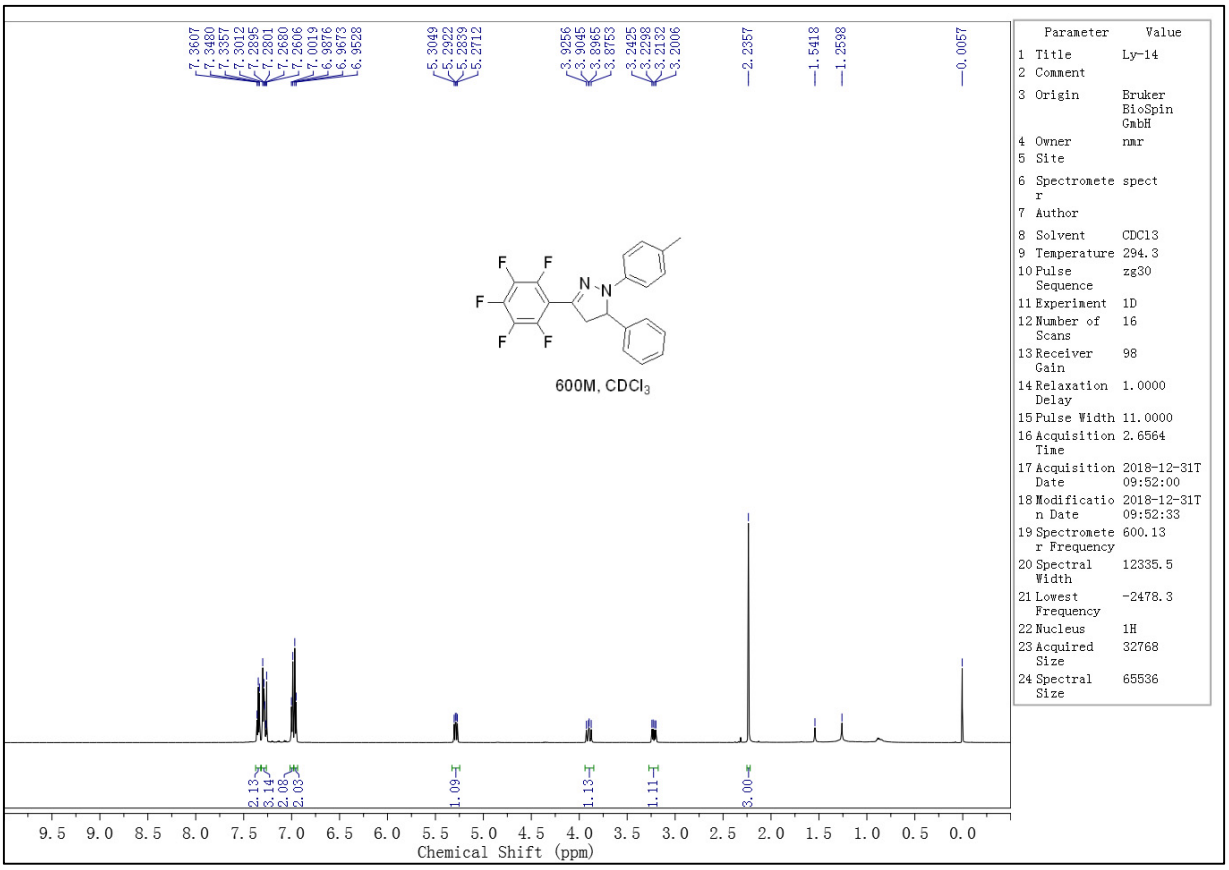


Fig. S22 ^{1}H NMR ($CDCl_3$, 400 MHz) and ^{13}C NMR ($CDCl_3$, 151 MHz) spectra of **Tet-4**.



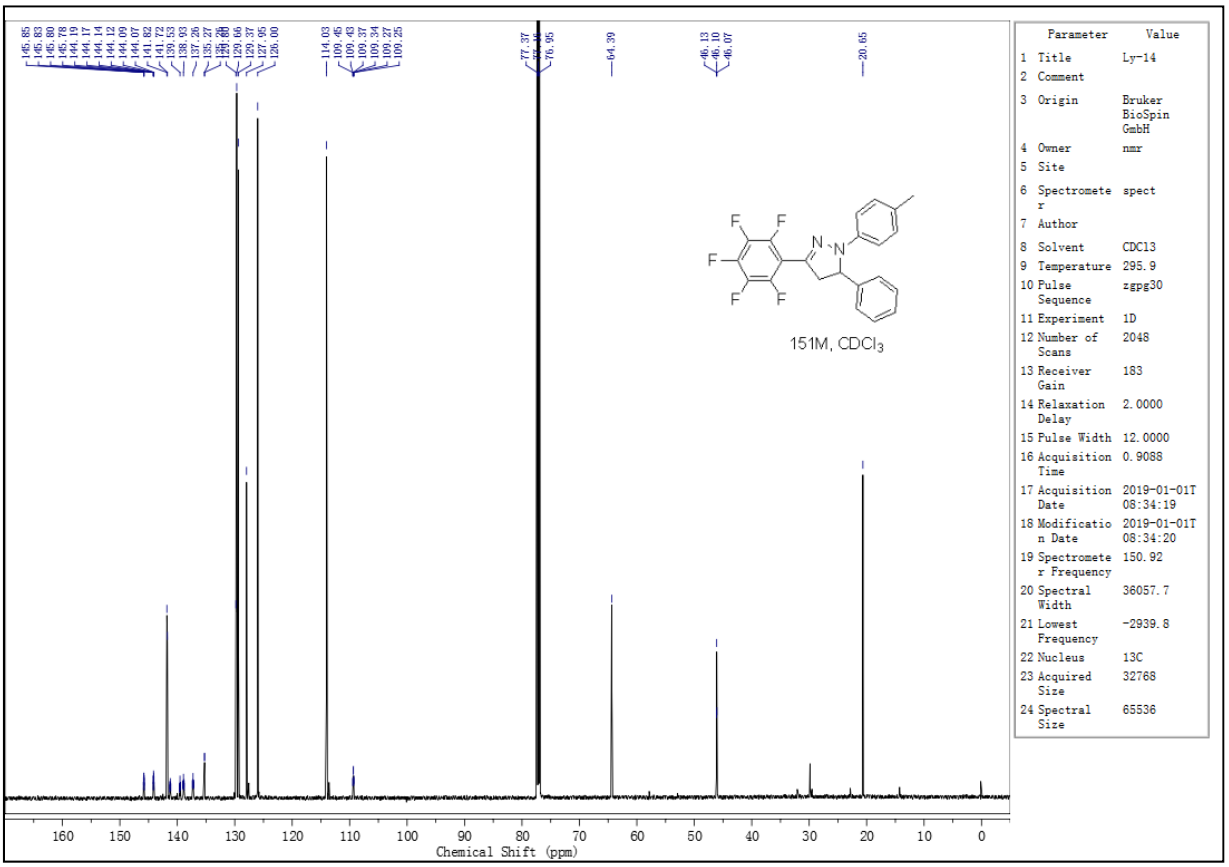
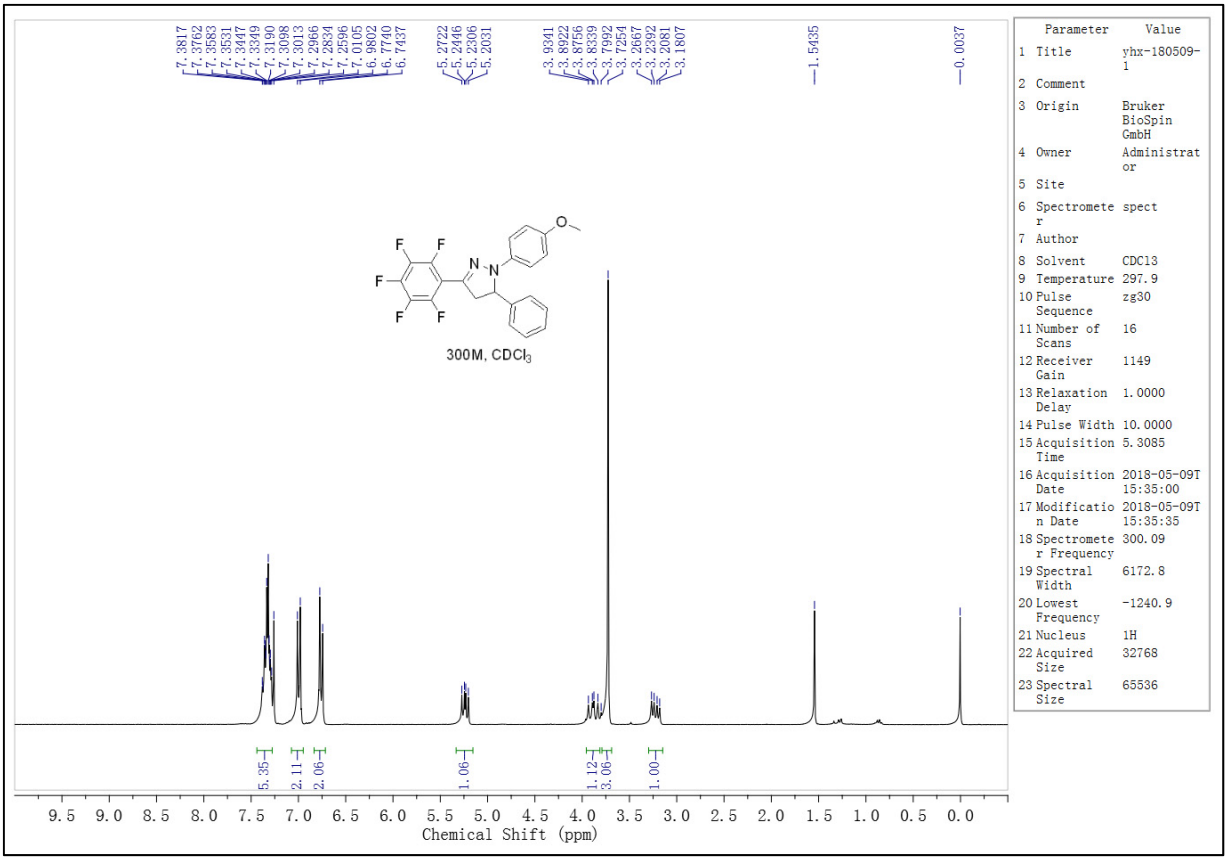


Fig. S23 ^{1}H NMR ($CDCl_3$, 600 MHz) and ^{13}C NMR ($CDCl_3$, 151 MHz) spectra of **Pyr-1**.



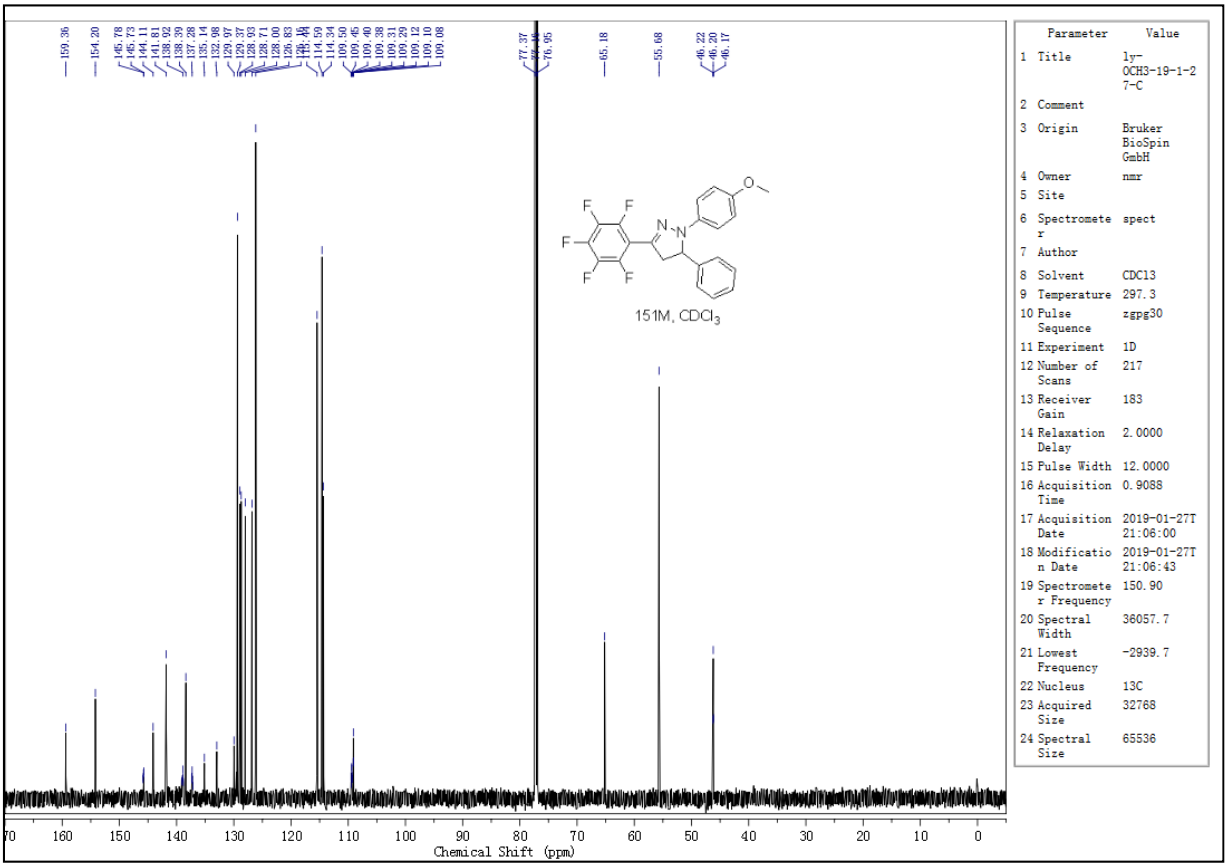
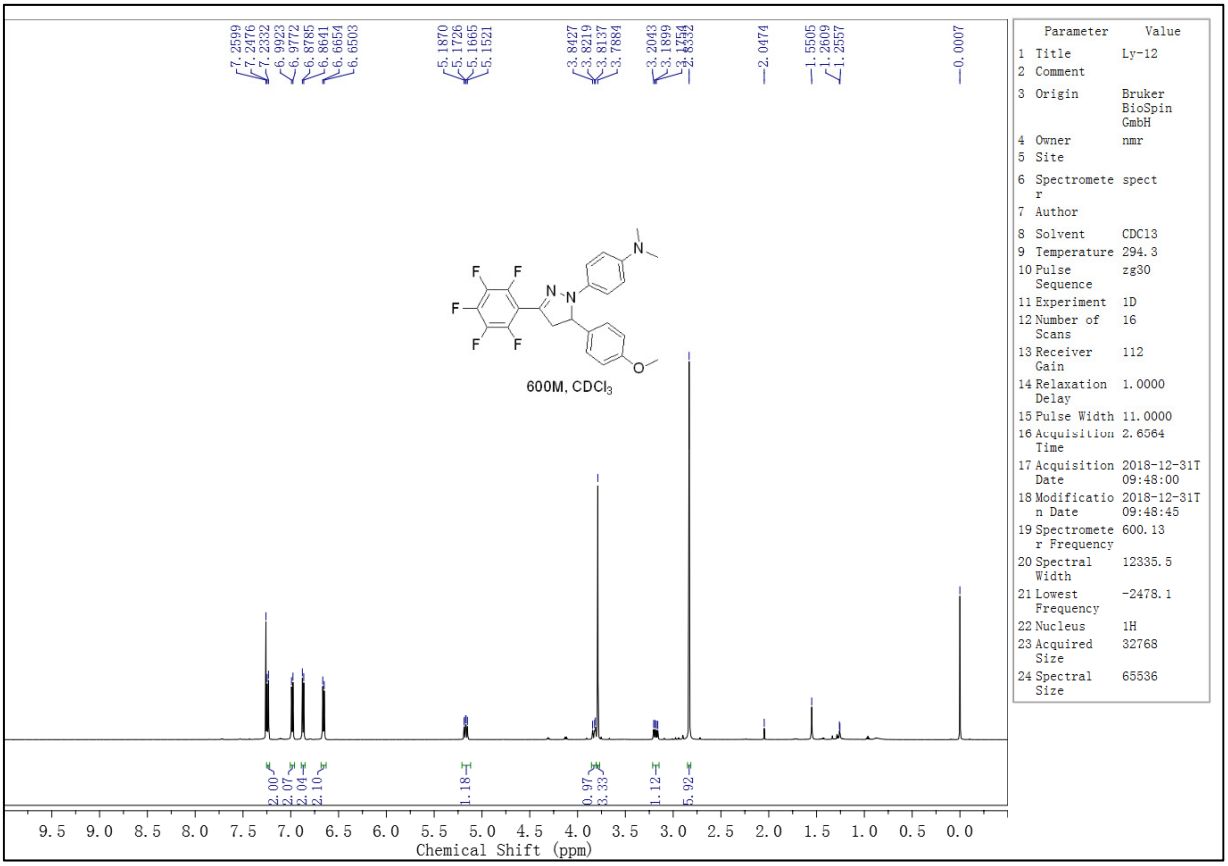


Fig. S24 ^{1}H NMR ($CDCl_3$, 300 MHz) and ^{13}C NMR ($CDCl_3$, 151 MHz) spectra of **Pyr-2**.



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5	Site	
6	Spectrometer	spect r
7	Author	
8	Solvent	CDCl3
9	Temperature	294.3
10	Pulse Sequence	zg30
11	Experiment	1D
12	Number of Scans	16
13	Receiver Gain	112
14	Relaxation Delay	1.0000
15	Pulse Width	11.0000
16	Acquisition Time	2.6564
17	Acquisition Date	2018-12-31T 09:48:00
18	Modification Date	2018-12-31T 09:48:45
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22	Nucleus	1H
23	Acquired Size	32768
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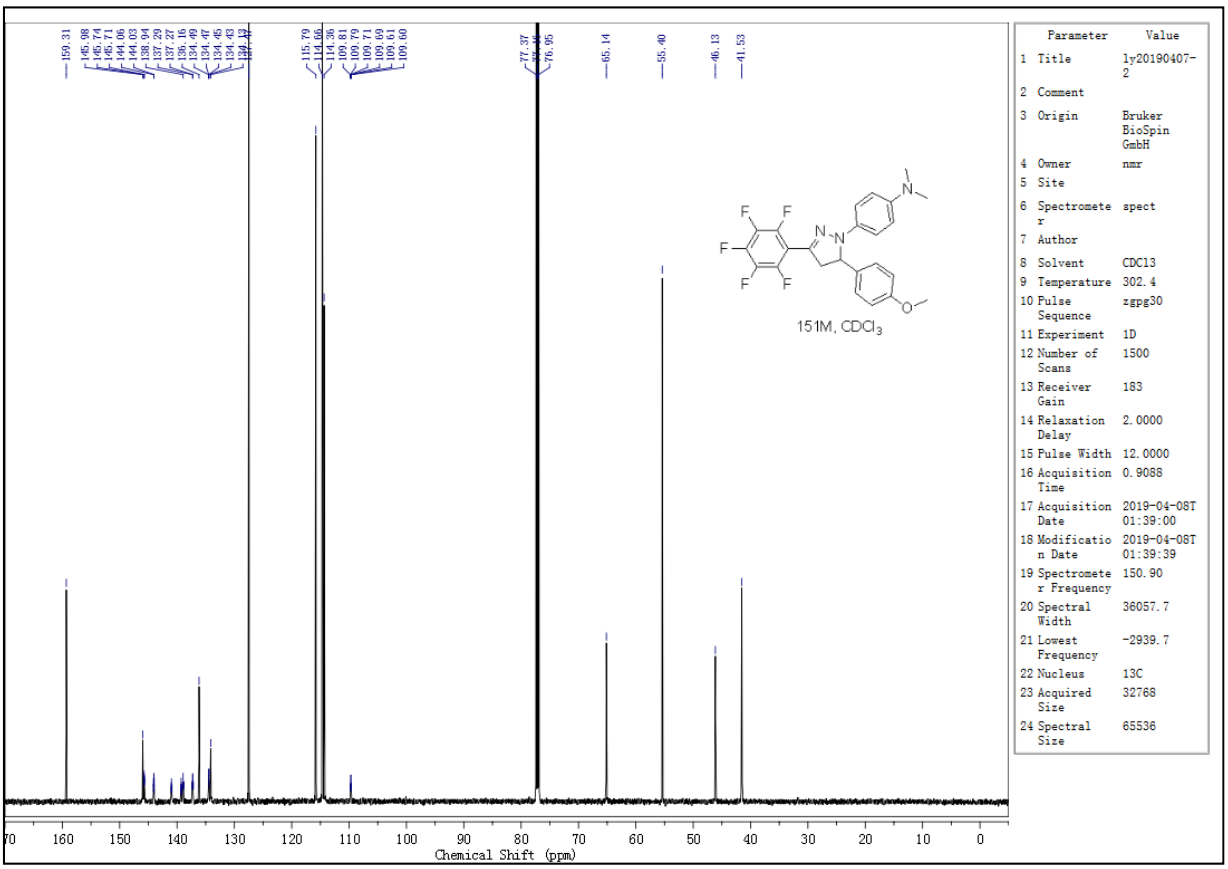

	Parameter	Value
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6	Spectrometer	spect r
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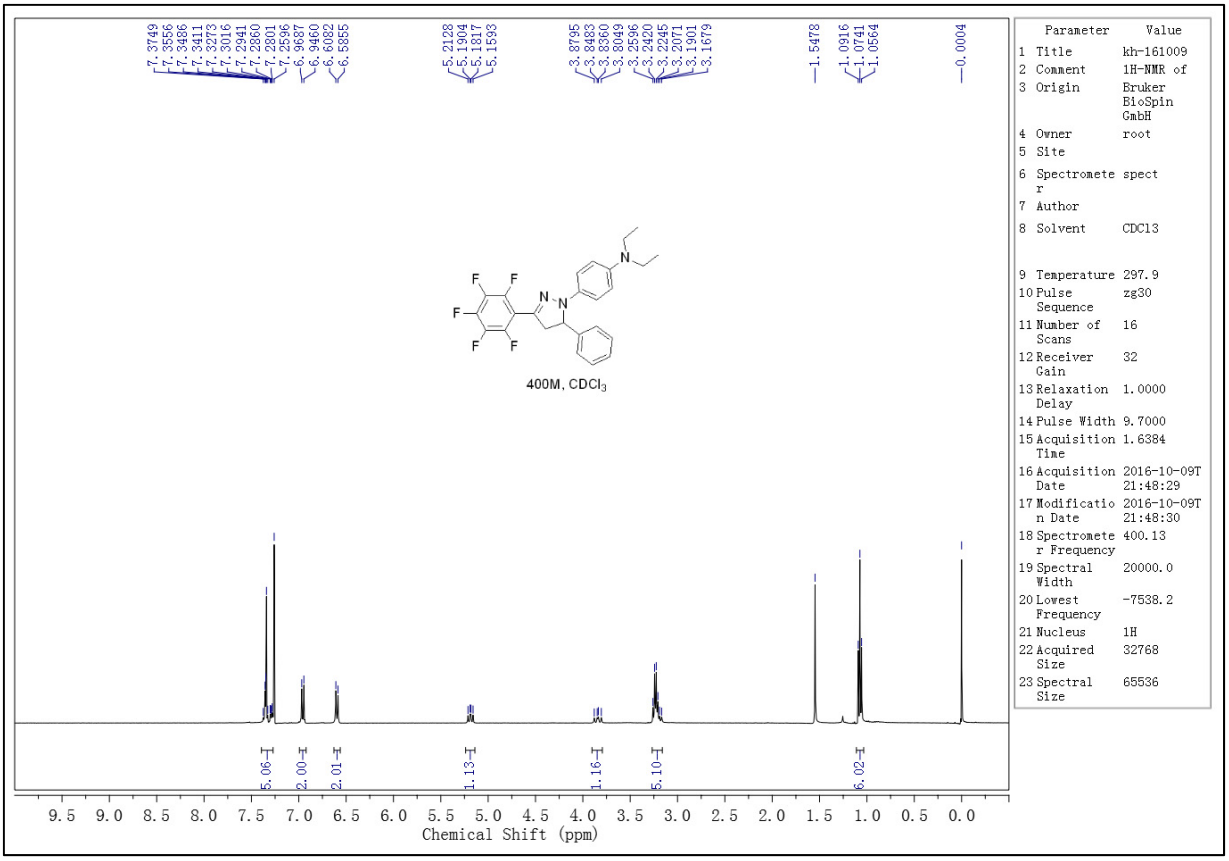
20	Spectral Width	36057.7
21	Lowest Frequency	-2939.7
22	Nucleus	13C
23	Acquired Size	32768
24	Spectral Size	65536

Fig. S25 ^{1}H NMR ($CDCl_3$, 600 MHz) and ^{13}C NMR ($CDCl_3$, 151 MHz) spectra of **Pyr-3**.



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4	Owner	root
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6	Spectrometer	spect
7	Author	
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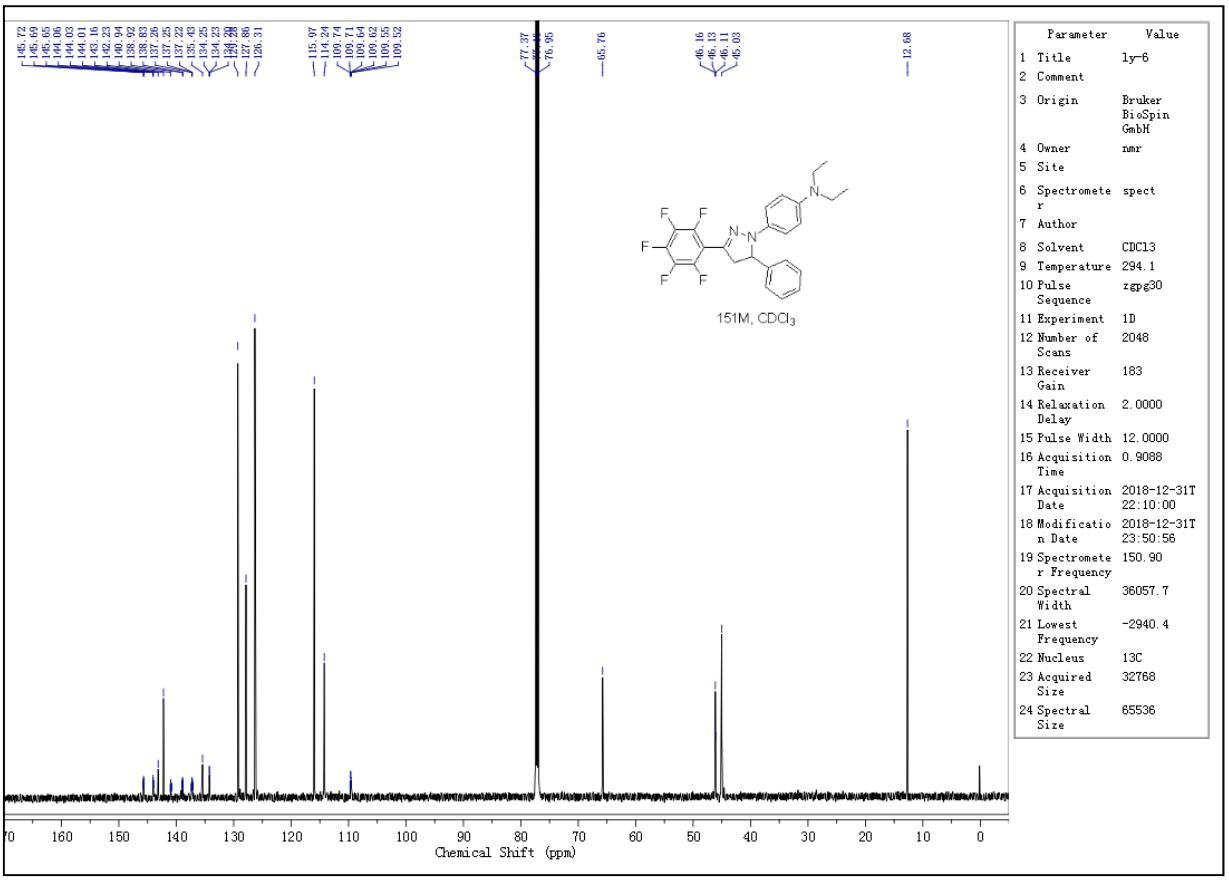
23	Spectral Size	65536



	Parameter	Value
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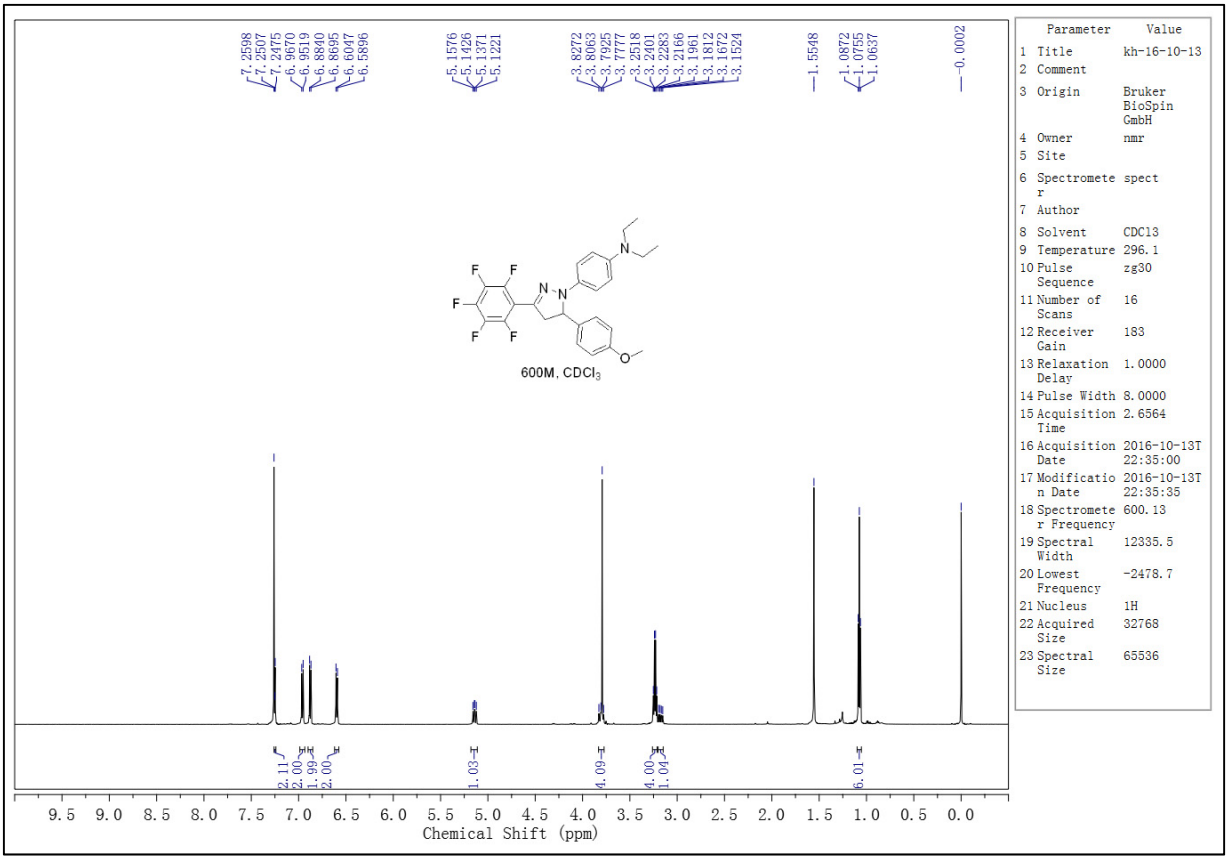
21	Lowest Frequency	-2940.4
22	Nucleus	13C
23	Acquired Size	32768
24	Spectral Size	65536

Fig. S26 ^{1}H NMR ($CDCl_3$, 400 MHz) and ^{13}C NMR ($CDCl_3$, 151 MHz) spectra of **Pyr-4**.



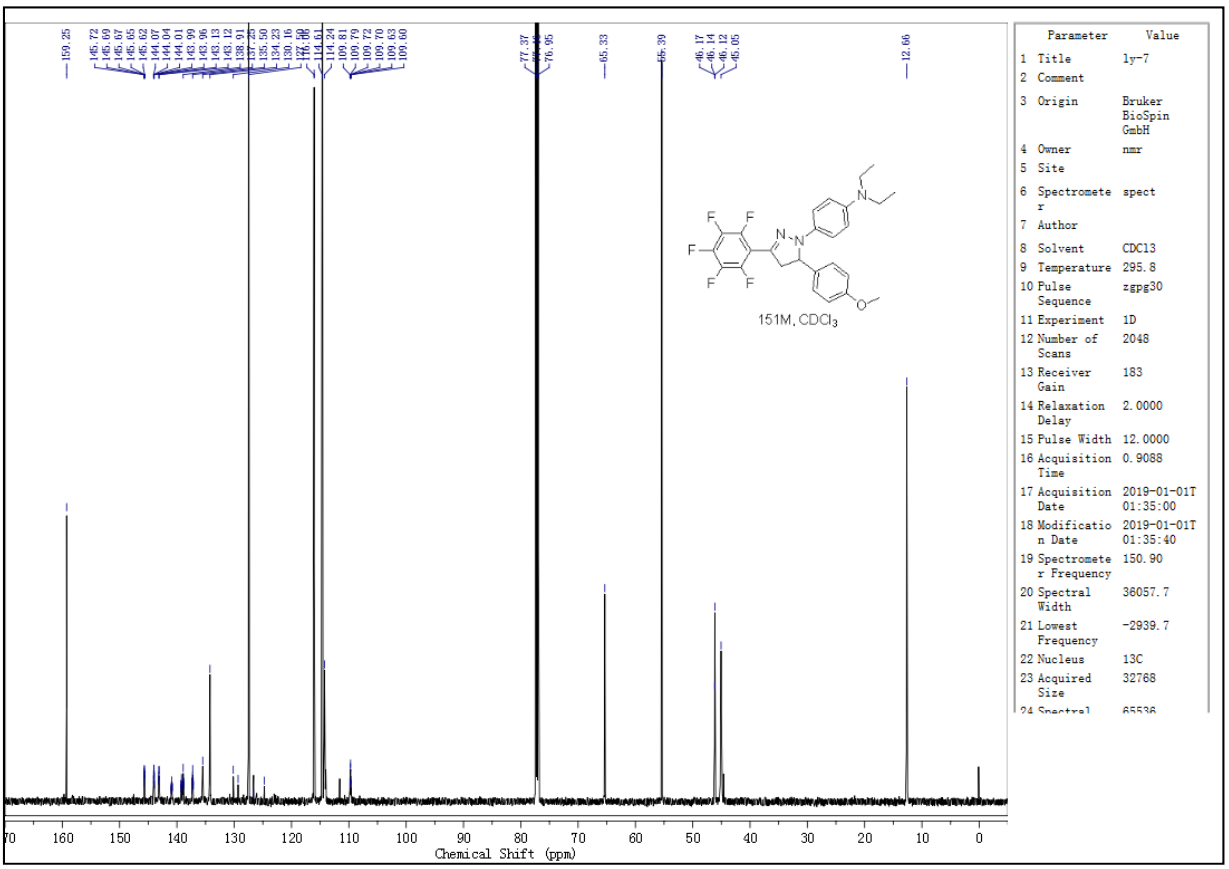
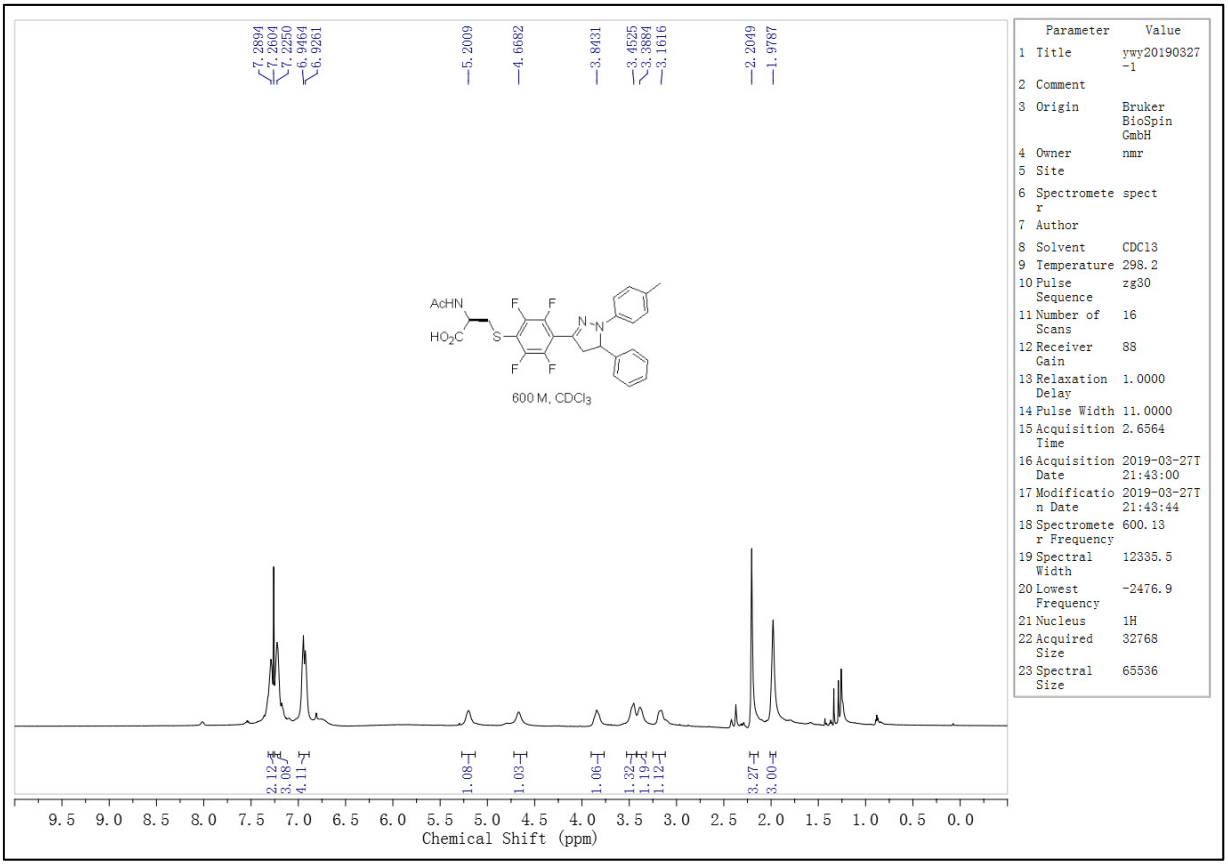


Fig. S27 ^{1}H NMR ($CDCl_3$, 600 MHz) and ^{13}C NMR ($CDCl_3$, 151 MHz) spectra of **Pyr-5**.



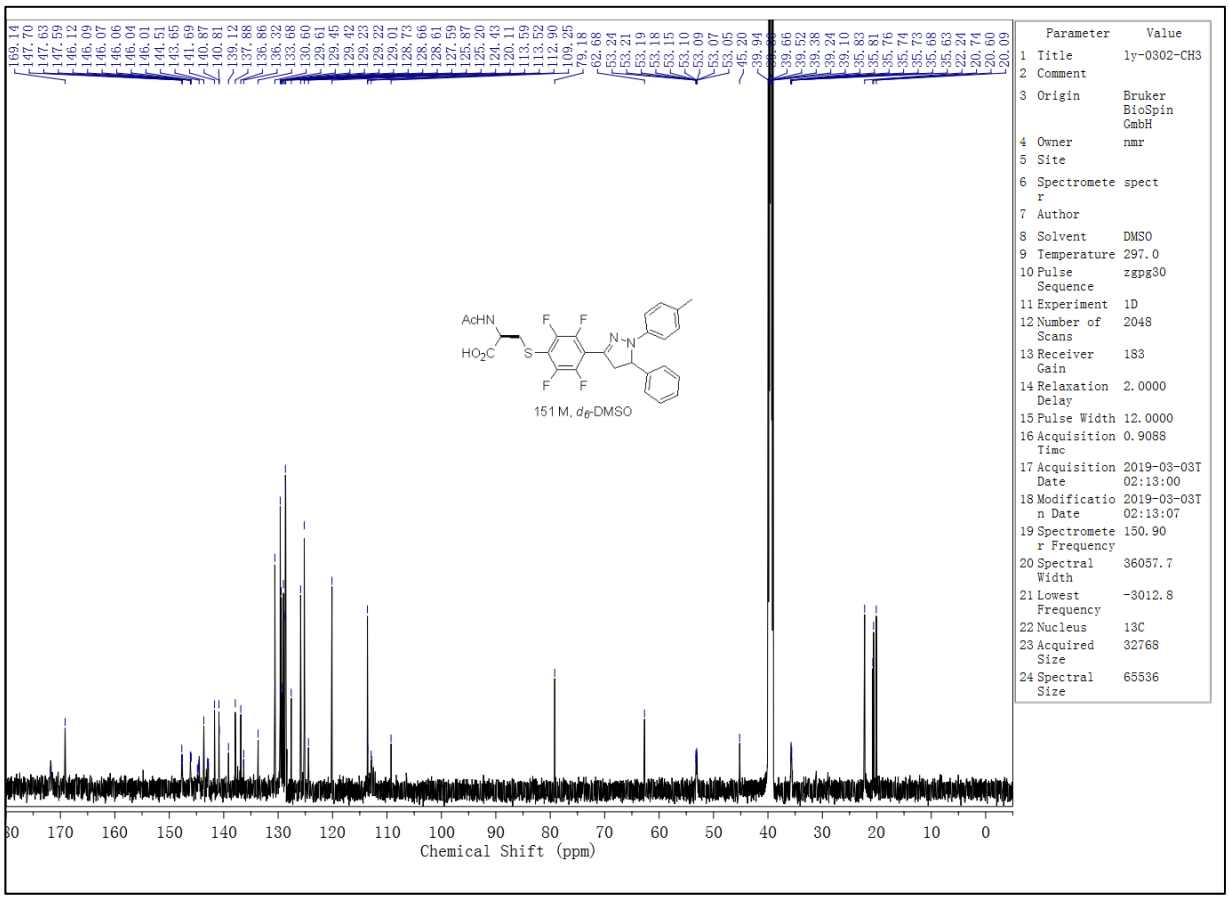
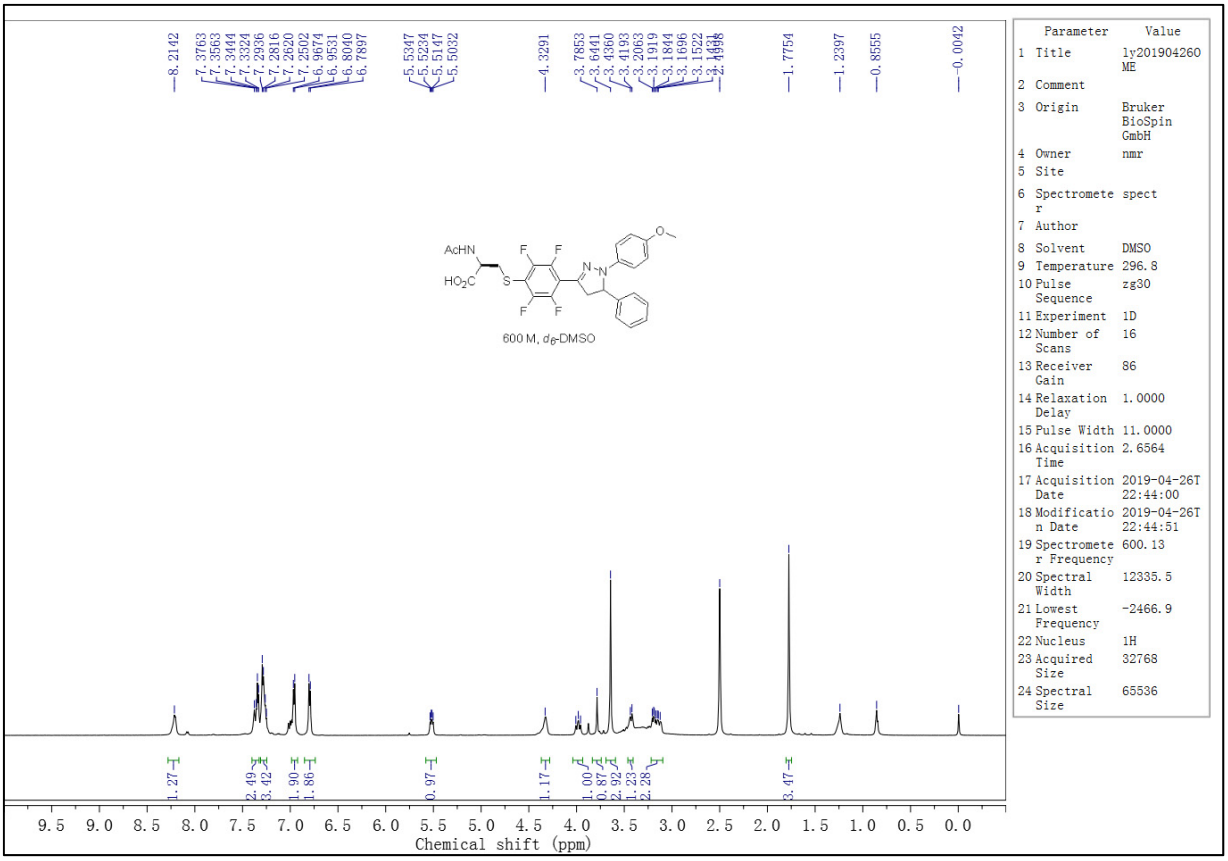


Fig. S28 ^{1}H NMR ($CDCl_3$, 600 MHz) and ^{13}C NMR (d_6-DMSO, 151 MHz) spectra of **Pyr-6**.



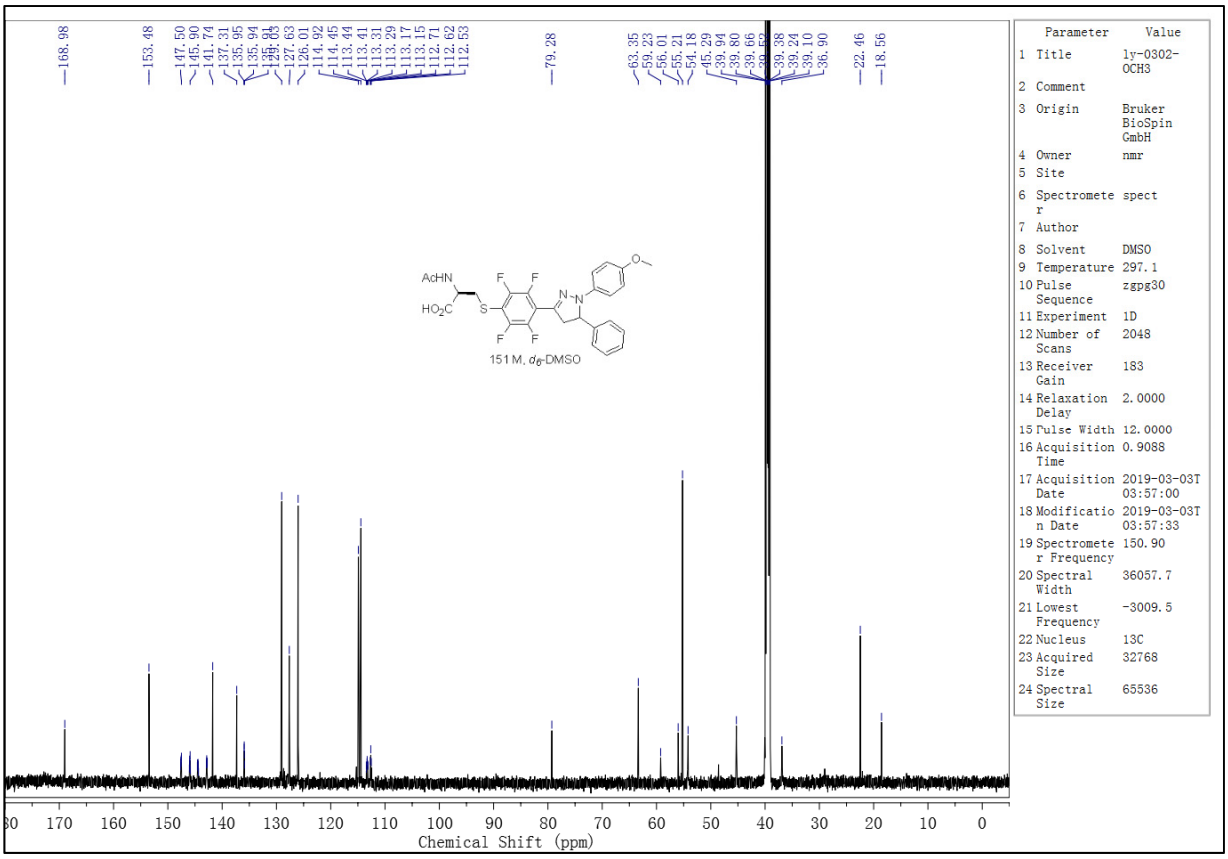
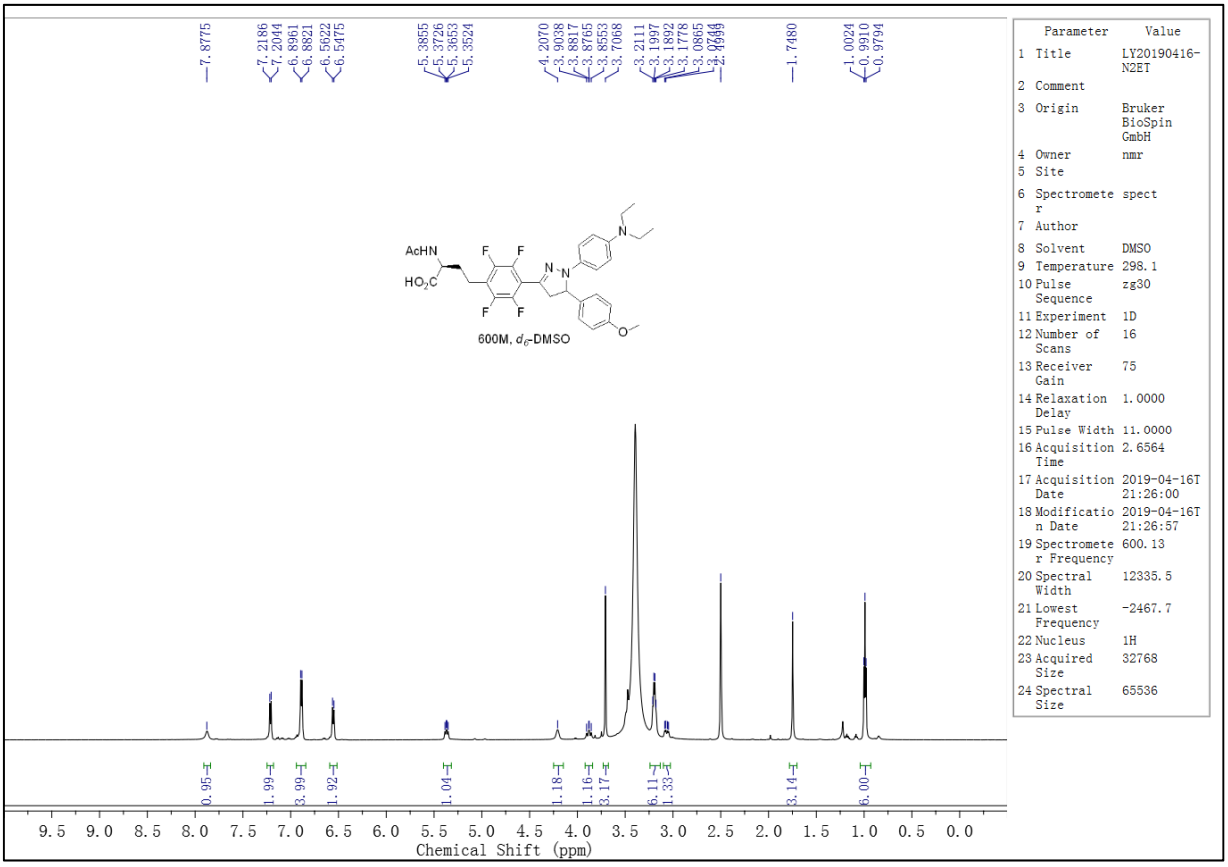


Fig. S29 ^{1}H NMR (d_6-DMSO, 600 MHz) and ^{13}C NMR (d_6-DMSO, 151 MHz) spectra of **Pyr-7**.



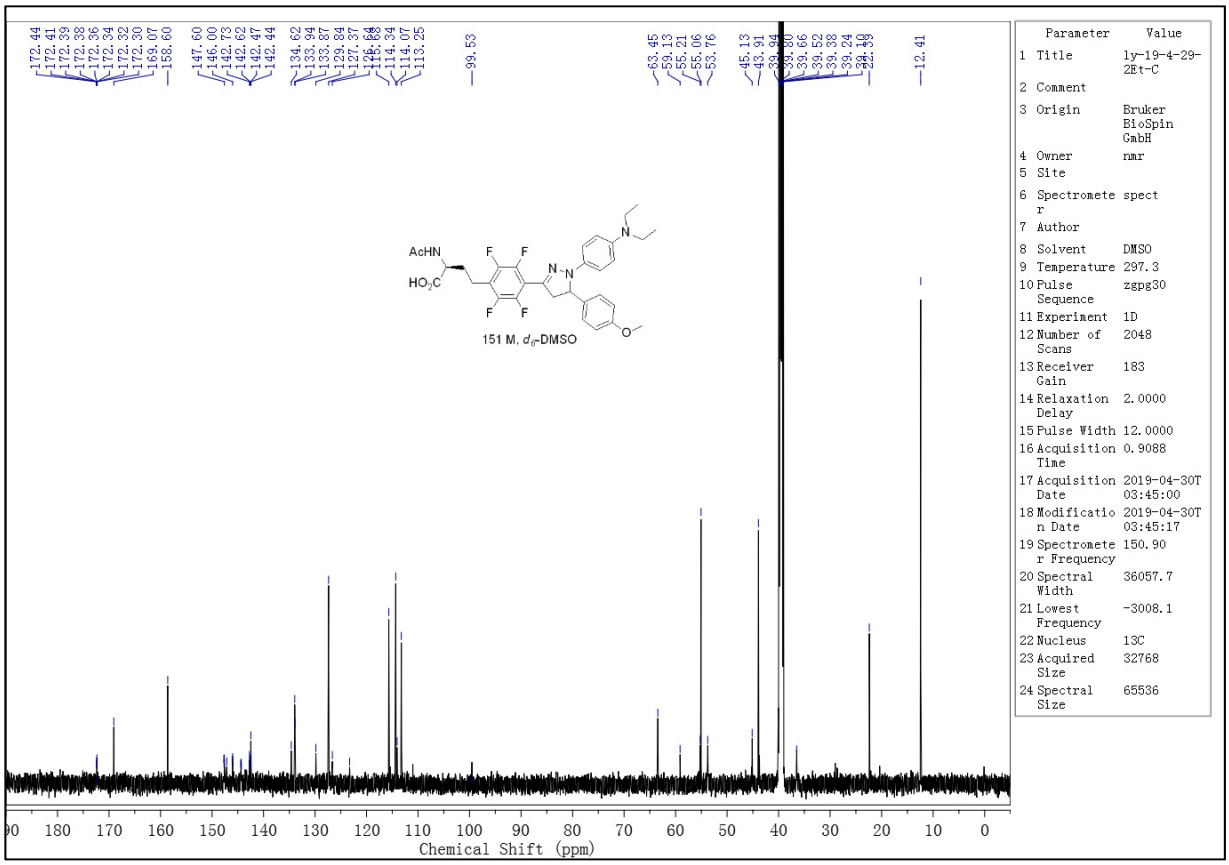


Fig. S30 ^{1}H NMR (d_6-DMSO, 600 MHz) and ^{13}C NMR (d_6-DMSO, 151 MHz) spectra of **Pyr-8**.

References

[1] Y. Wang, W. Song, W. J. Hu and Q. Lin, *Angew. Chem. Int. Ed*., 2009, **48**, 5330-5333.

[2] M. J. Frisch, G. W. Trucks, H. B. Schlegel, G. E. Scuseria, M. A. Robb, J. R. Cheeseman, G. Scalmani, V. Barone, B. Mennucci, G. A. Petersson, H. Nakatsuji, M. Caricato, X. Li, H. P. Hratchian, A. F. Izmaylov, J. Bloino, G. Zheng, J. L. Sonnenberg, M. Hada, M. Ehara, K. Toyota, R. Fukuda, J. Hasegawa, M. Ishida, T. Nakajima, Y. Honda, O. Kitao, H. Nakai, T. Vreven, J. A. Montgomery, Jr., J. E. Peralta, F. Ogliaro, M. Bearpark, J. J. Heyd, E. Brothers, K. N. Kudin, V. N. Staroverov, R. Kobayashi, J. Normand, K. Raghavachari, A. Rendell, J. C. Burant, S. S. Iyengar, J. Tomasi, M. Cossi, N. Rega, J. M. Millam, M. Klene, J. E. Knox, J. B. Cross, V. Bakken, C. Adamo, J. Jaramillo, R. Gomperts, R. E. Stratmann, O. Yazyev, A. J. Austin, R. Cammi, C. Pomelli, J. W. Ochterski, R. L. Martin, K. Morokuma, V. G. Zakrzewski, G. A. Voth, P. Salvador, J. J. Dannenberg, S. Dapprich, A. D. Daniels, O. Farkas, J. B. Foresman, J. V. Ortiz, J. Cioslowski and D. J. Fox, Gaussian 09, Revision A.1, Gaussian, Inc.: Wallingford CT, 2009.