

## Supporting Information

# Efficient Synthesis of SCF<sub>3</sub>-Substituted Tryptanthrins by a Radical Tandem Cyclization

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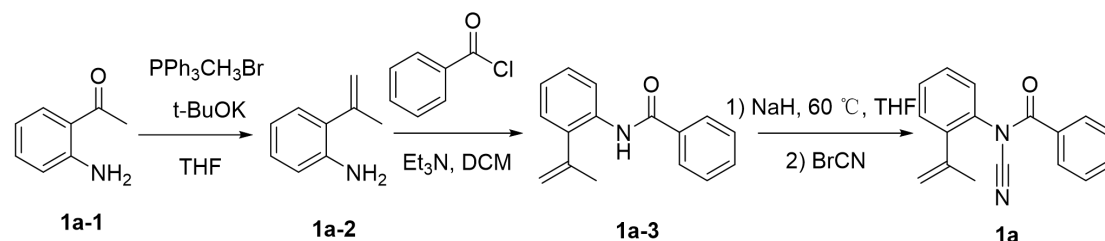
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## 1. General Information.

Reagents were purchased from commercial sources and were used as received.  $^1\text{H}$  and  $^{13}\text{C}$  Nuclear Magnetic Resonance (NMR) spectra were recorded on Bruker Avance 400 Ultrashield NMR spectrometers. Chemical shifts ( $\delta$ ) were given in parts per million (ppm) and were measured downfield from internal tetramethylsilane. High-resolution mass spectrometry (HRMS) data were obtained on an FTICR-MS instrument (Ionspec 7.0 T). The melting points were determined on an X-4 microscope melting point apparatus and are uncorrected. Conversion was monitored by thin layer chromatography (TLC). Flash column chromatography was performed over silica gel (100-200 mesh).

## 2. General procedures for the synthesis of oxime 1a~1z.



A round-bottom flask was charged with methyltriphenylphosphonium bromide (5.36 g, 15 mmol) and dry THF (20 mL) under N<sub>2</sub> atmosphere, followed by the addition of potassiumtert-butoxide (1.68 g, 15 mmol) at 0 °C. The reaction mixture was allowed to warm to ambient temperature and stir for 0.5 h. Next, 2-aminoacetophenone (**1a-1**) (1.21 g, 10 mmol) was added. The reaction mixture was stirred at room temperature overnight. After completion, the reaction was quenched with saturated NaHCO<sub>3</sub> solution, and extracted with EtOAc (100 mL). The organic phase was dried over anhydrous MgSO<sub>4</sub> and concentrated under reduced pressure. The reaction mixture was purified via column chromatography to give **1a-2** (0.88 g, 74%).

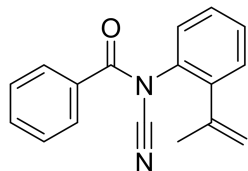
To a solution of **1a-2** (0.99 g, 7.4 mmol) and Et<sub>3</sub>N (1.53 g, 11.1 mmol) in CH<sub>2</sub>Cl<sub>2</sub> (15 mL) was added the solution of benzoylchloride (1.0 mL, 8.9 mmol) in dichloromethane (5 mL) dropwise at 0 °C. After completion, the reaction mixture was purified via column chromatography to give **1a-3** (3.89 g, 99%).

A round-bottom flask was charged with NaH (640 mg, 60%wt, 16 mmol) and dry THF (15mL) under N<sub>2</sub> atmosphere, then **1a-3** (700 mg, 3 mmol) in THF (5 mL) was added dropwise. The reaction mixture was allowed to warm to 60 °C and stir for

2 h. Next, cyanogenbromide (1.2 g, 12mmol) was added. The reaction mixture was stirred at room temperature overnight, filtered and purified via column chromatography to give the title compound **1a** (448 mg, 56%).

Analogues **1b-z** were synthesized by using similar procedures.

***N*-Cyano-*N*-(2-(prop-1-en-2-yl)phenyl)benzamide (**1a**):**

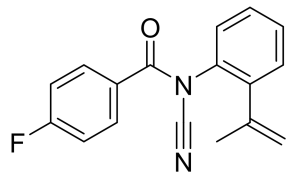


**1a**

White solid, 56% yield, mp: 96-98 °C, <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) δ 7.80 (d, *J* = 7.5 Hz, 2H), 7.60 (t, *J* = 7.5 Hz, 1H), 7.53 – 7.41 (m, 5H), 7.35 (d, *J* = 7.3 Hz, 1H), 5.32 (s, 1H), 5.06 (s, 1H), 2.04 (s, 3H). <sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>) δ 168.1, 141.7, 141.2, 133.3, 132.5, 130.7, 130.0, 139.6, 139.0, 128.7, 128.6, 127.9, 117.0, 110.6, 23.5.

HRMS (ESI) calcd for C<sub>17</sub>H<sub>15</sub>N<sub>2</sub>O [M+H]<sup>+</sup> 263.1179, found 263.1179.

**4-Fluoro-*N*-cyano-*N*-(2-(prop-1-en-2-yl)phenyl)benzamide (**1b**):**

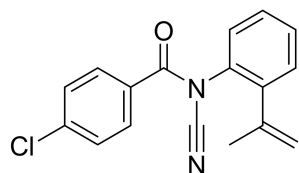


**1b**

White solid, 54% yield, mp: 87-89 °C, <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) δ 7.84 (dd, *J* = 7.5, 5.7 Hz, 2H), 7.49 – 7.39 (m, 3H), 7.35 (d, *J* = 7.3 Hz, 1H), 7.16 (t, *J* = 8.5 Hz, 2H), 5.31 (s, 1H), 5.04 (s, 1H), 2.03 (s, 3H). <sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>) δ 167.0, 165.6 (d, *J* = 255.8 Hz), 141.7, 141.2, 132.4, 131.8, 131.8, 129.9 (d, *J* = 45.8 Hz), 128.7, 127.8, 126.8 (d, *J* = 3.1 Hz), 117.0), 116.0 (d, *J* = 22.4 Hz), 110.6, 23.5.

HRMS (ESI) calcd for C<sub>17</sub>H<sub>14</sub>FN<sub>2</sub>O [M+H]<sup>+</sup> 281.1085, found 281.1084.

**4-Chloro-*N*-cyano-*N*-(2-(prop-1-en-2-yl)phenyl)benzamide (**1c**):**

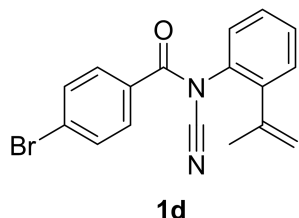


**1c**

White solid, 51% yield, mp: 82-84 °C, <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) δ 7.74 (d, *J* = 7.9 Hz, 2H), 7.51 – 7.39 (m, 5H), 7.35 (d, *J* = 7.3 Hz, 1H), 5.31 (s, 1H), 5.03 (s, 1H), 2.03

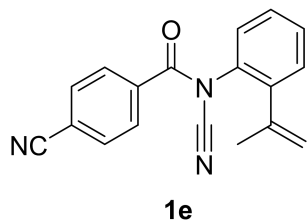
(s, 3H).  $^{13}\text{C}$  NMR (100 MHz,  $\text{CDCl}_3$ )  $\delta$  167.2, 141.6, 141.2), 139.8, 132.2, 130.5, 130.2, 129.7, 129.0, 128.9, 128.8, 127.7, 117.1, 110.4, 23.5. HRMS (ESI) calcd for  $\text{C}_{17}\text{H}_{14}\text{ClN}_2\text{O}$   $[\text{M}+\text{H}]^+$  297.0789, found 297.0789.

**4-Bromo-*N*-cyano-*N*-(2-(prop-1-en-2-yl)phenyl)benzamide (1d):**



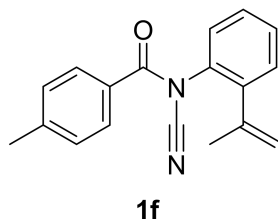
White solid, 66% yield, mp: 90-92 °C,  $^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ )  $\delta$  7.48 – 7.61 (m, 4H), 7.49 – 7.38 (m, 3H), 7.35 (d,  $J$  = 7.3 Hz, 1H), 5.30 (s, 1H), 5.03 (s, 1H), 2.03 (s, 3H).  $^{13}\text{C}$  NMR (100 MHz,  $\text{CDCl}_3$ )  $\delta$  167.3, 141.6, 141.2, 132.2, 132.0, 130.5, 130.2, 129.7, 129.4, 128.8, 128.4, 127.8, 117.1, 110.4, 23.5. HRMS (ESI) calcd for  $\text{C}_{17}\text{H}_{14}\text{BrN}_2\text{O}$   $[\text{M}+\text{H}]^+$  341.0284, found 341.0281.

***N*,4-Dicyano-*N*-(2-(prop-1-en-2-yl)phenyl)benzamide (1e):**



White solid, 91% yield, mp: 121-122 °C,  $^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ )  $\delta$  7.95 – 7.82 (m, 3H), 7.92 – 7.72 (m, 3H), 7.52 – 7.39 (m, 3H), 7.36 (d,  $J$  = 7.2 Hz, 1H), 5.33 (s, 1H), 5.03 (s, 1H), 2.03 (s, 3H).  $^{13}\text{C}$  NMR (100 MHz,  $\text{CDCl}_3$ )  $\delta$  166.6, 141.6, 141.2, 134.6, 132.4, 131.8, 130.5, 129.8, 129.5, 128.9, 127.7, 117.4, 117.2, 116.7, 109.9, 23.5. HRMS (ESI) calcd for  $\text{C}_{18}\text{H}_{14}\text{N}_3\text{O}$   $[\text{M}+\text{H}]^+$  288.1131, found 288.1127.

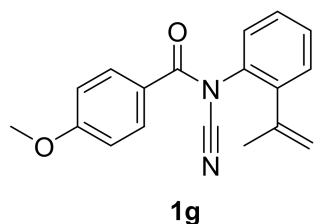
**4-Methyl-*N*-cyano-*N*-(2-(prop-1-en-2-yl)phenyl)benzamide (1f):**



White solid, 51% yield, mp: 89-90 °C,  $^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ )  $\delta$  7.71 (d,  $J$  = 7.9 Hz, 2H), 7.47 – 7.37 (m, 3H), 7.36 – 7.31 (m, 1H), 7.27 (d,  $J$  = 8.3 Hz, 2H), 5.30 (s, 1H), 5.05 (s, 1H), 2.42 (s, 3H), 2.03 (s, 3H).  $^{13}\text{C}$  NMR (100 MHz,  $\text{CDCl}_3$ )  $\delta$  168.1, 144.3, 141.7, 141.2, 132.6, 129.9, 129.6, 129.3, 129.2, 128.6, 127.9, 127.8, 117.0,

110.8, 23.5, 21.7. **HRMS** (ESI) calcd for  $C_{18}H_{17}N_2O$   $[M+H]^+$  277.1335, found 277.1340.

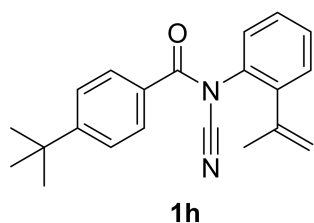
**4-Methoxy-*N*-cyano-*N*-(2-(prop-1-en-2-yl)phenyl)benzamide (1g):**



Mixture of raw material and product (1: 10), can't purified, white solid,  $^1H$  NMR (400 MHz,  $CDCl_3$ )  $\delta$  7.81 (d,  $J = 8.8$  Hz, 2H), 7.47 – 7.38 (m, 3H), 7.36– 7.30 (m, 3H), 6.95 (d,  $J = 8.9$  Hz, 2H), 5.29 (s, 1H), 5.05 (s, 1H), 3.87 (s, 3H), 2.03 (s, 3H).

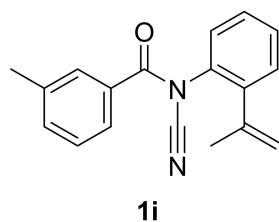
**HRMS** (ESI) calcd for  $C_{18}H_{17}N_2O_2$   $[M+H]^+$  293.1285, found 293.1285.

**4-(*tert*-Butyl)-*N*-cyano-*N*-(2-(prop-1-en-2-yl)phenyl)benzamide (1h):**



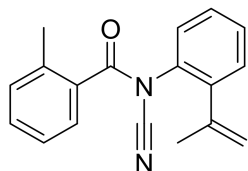
Mixture of raw material and product (2: 5), can't purified, colorless liquid,  $^1H$  NMR (400 MHz,  $CDCl_3$ )  $\delta$  7.78 (d,  $J = 8.3$  Hz, 2H), 7.49 (t,  $J = 8.1$  Hz, 3H), 7.46 – 7.40 (m, 2H), 7.36 – 7.30 (m, 1H), 5.29 (s, 1H), 5.06 (s, 1H), 2.03 (s, 3H), 1.33 (s, 9H). **HRMS** (ESI) calcd for  $C_{21}H_{23}N_2O$   $[M+H]^+$  319.1805, found 319.1806.

**3-Methyl-*N*-cyano-*N*-(2-(prop-1-en-2-yl)phenyl)benzamide (1i):**



White solid, 69% yield, mp: 90-91 °C,  $^1H$  NMR (400 MHz,  $CDCl_3$ )  $\delta$  7.59 (s, 2H), 7.47 – 7.31 (m, 6H), 5.31 (s, 1H), 5.06 (s, 1H), 2.39 (s, 3H), 2.04 (s, 3H).  $^{13}C$  NMR (100 MHz,  $CDCl_3$ )  $\delta$  168.3, 141.8, 141.2, 138.7, 134.0, 132.5, 130.6, 130.0, 129.6, 129.5, 128.6, 128.4, 127.9, 126.0, 117.0, 110.7, 23.5, 21.4. **HRMS** (ESI) calcd for  $C_{18}H_{17}N_2O$   $[M+H]^+$  277.1335, found 277.1336.

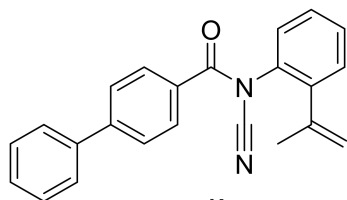
***N*-Cyano-2-methyl-*N*-(2-(prop-1-en-2-yl)phenyl)benzamide (1j):**



**1j**

White solid, 69% yield, mp: 89-90 °C, <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) δ 7.56 – 7.45 (m, 1H), 7.45 – 7.27 (m, 5H), 7.27 – 7.16 (m, 2H), 5.38 – 5.30 (m, 1H), 5.09 (s, 1H), 2.45 (s, 3H), 2.06 (s, 3H). <sup>13</sup>C NMR (101 MHz, CDCl<sub>3</sub>) δ 168.9, 142.1, 141.4, 137.2, 131.9, 131.4, 131.1, 130.1, 129.6, 128.7, 128.1, 127.5, 125.8, 117.0, 110.3, 23.8, 19.5. HRMS (ESI) calcd for C<sub>18</sub>H<sub>17</sub>N<sub>2</sub>O [M+H]<sup>+</sup> 277.1335, found 277.1338.

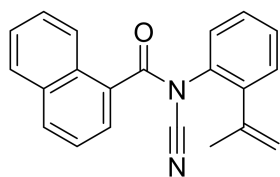
***N*-Cyano-*N*-(2-(prop-1-en-2-yl)phenyl)-[1,1'-biphenyl]-4-carboxamide (1k):**



**1k**

White solid, 56% yield, mp: 148-149 °C, <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) δ 7.89 (d, *J* = 8.1 Hz, 2H), 7.69 (d, *J* = 8.3 Hz, 2H), 7.62 (d, *J* = 7.2 Hz, 2H), 7.51 – 7.39 (m, 6H), 7.36 (dd, *J* = 7.6, 2.0 Hz, 1H), 5.33 (s, 1H), 5.08 (s, 1H), 2.06 (s, 3H). <sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>) δ 167.9, 146.2, 141.7, 141.2, 139.5, 130.0, 129.7, 129.6, 129.2, 129.0, 128.7, 128.5, 127.9, 127.3, 127.2, 117.1, 110.7, 23.5. HRMS (ESI) calcd for C<sub>23</sub>H<sub>19</sub>N<sub>2</sub>O [M+H]<sup>+</sup> 339.1492, found 339.1490.

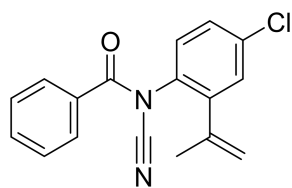
***N*-Cyano-*N*-(2-(prop-1-en-2-yl)phenyl)-1-naphthamide (1l):**



**1l**

White solid, 68% yield, mp: 120-121 °C, <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) δ 8.13 (d, *J* = 8.3 Hz, 1H), 8.04 (d, *J* = 8.3 Hz, 1H), 7.92 (d, *J* = 7.8 Hz, 1H), 7.83 (s, 1H), 7.66 – 7.42 (m, 6H), 7.38 (d, *J* = 6.8 Hz, 1H), 5.39 (s, 1H), 5.17 (s, 1H), 2.09 (s, 3H). <sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>) δ 168.3, 142.1, 141.4, 133.7, 132.9, 130.2, 130.1, 129.6, 128.7, 128.7, 128.2, 128.1, 128.0, 127.0, 127.0, 124.5, 124.2, 117.1, 110.2, 23.7. HRMS (ESI) calcd for C<sub>21</sub>H<sub>17</sub>N<sub>2</sub>O [M+H]<sup>+</sup> 313.1335, found 313.1336.

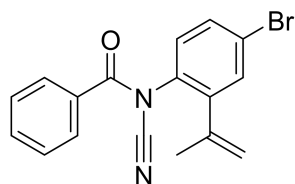
***N*-(4-Chloro-2-(prop-1-en-2-yl)phenyl)-*N*-cyanobenzamide (1m):**



**1m**

White solid, 47% yield, mp: 96-97 °C,  $^1\text{H NMR}$  (400 MHz,  $\text{CDCl}_3$ )  $\delta$  7.81 (d,  $J = 7.6$  Hz, 2H), 7.62 (t,  $J = 7.5$  Hz, 1H), 7.56 – 7.48 (m, 4H), 7.32 (d,  $J = 8.4$  Hz, 1H), 5.34 (s, 1H), 5.08 (s, 1H), 2.04 (s, 3H).  $^{13}\text{C NMR}$  (100 MHz,  $\text{CDCl}_3$ )  $\delta$  167.8, 143.6, 140.2, 133.5, 132.7, 131.8, 131.5, 130.3, 129.5, 129.0, 128.7, 124.0, 117.9, 110.2, 23.3. **HRMS** (ESI) calcd for  $\text{C}_{17}\text{H}_{14}\text{ClN}_2\text{O}$   $[\text{M}+\text{H}]^+$  297.0789, found 297.0788.

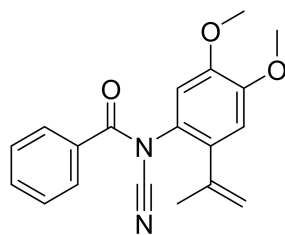
***N*-(4-Bromo-2-(prop-1-en-2-yl)phenyl)-*N*-cyanobenzamide (1n):**



**1n**

White solid, 50% yield, mp: 92-93 °C,  $^1\text{H NMR}$  (400 MHz,  $\text{CDCl}_3$ )  $\delta$  7.80 (d,  $J = 7.6$  Hz, 2H), 7.61 (t,  $J = 7.4$  Hz, 1H), 7.48 (t,  $J = 7.6$  Hz, 2H), 7.41 – 7.36 (m, 2H), 7.34 (s, 1H), 5.34 (d,  $J = 0.9$  Hz, 1H), 5.08 (s, 1H), 2.04 (s, 3H).  $^{13}\text{C NMR}$  (100 MHz,  $\text{CDCl}_3$ )  $\delta$  167.9, 143.4, 140.2, 135.9, 133.5, 131.0, 130.4, 129.7, 129.3, 129.0, 128.8, 128.7, 117.8, 110.3, 23.3. **HRMS** (ESI) calcd for  $\text{C}_{17}\text{H}_{14}\text{BrN}_2\text{O}$   $[\text{M}+\text{H}]^+$  341.0284, found 341.0281.

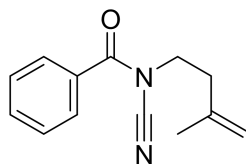
***N*-Cyano-*N*-(4,5-dimethoxy-2-(prop-1-en-2-yl)phenyl)benzamide (1o):**



**1o**

Mixture of raw material and product (1: 5), can't purified, white solid,  $^1\text{H NMR}$  (400 MHz,  $\text{CDCl}_3$ )  $\delta$  7.78 (d,  $J = 7.1$  Hz, 2H), 7.58 (t,  $J = 7.3$  Hz, 1H), 7.46 (t,  $J = 7.6$  Hz, 2H), 6.90 (s, 1H), 6.76 (s, 1H), 5.29 (s, 1H), 5.03 (s, 1H), 3.91 (s, 6H), 2.00 (s, 3H). **HRMS** (ESI) calcd for  $\text{C}_{19}\text{H}_{19}\text{N}_2\text{O}_3$   $[\text{M}+\text{H}]^+$  323.1390, found 323.1390.

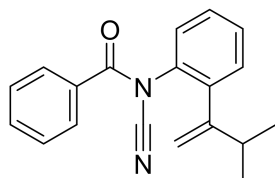
***N*-Cyano-*N*-(3-methylbut-3-en-1-yl)benzamide (1p):**



**1p**

Colorless liquid, 56% yield,  $^1\text{H NMR}$  (400 MHz,  $\text{CDCl}_3$ )  $\delta$  7.78 (d,  $J = 7.3$  Hz, 1H), 7.60 (t,  $J = 7.5$  Hz, 1H), 7.48 (t,  $J = 7.7$  Hz, 2H), 4.93 (s, 1H), 4.88 (s, 1H), 3.91 (t,  $J = 7.0$  Hz, 2H), 2.52 (t,  $J = 7.0$  Hz, 2H), 1.83 (s, 3H).  $^{13}\text{C NMR}$  (100 MHz,  $\text{CDCl}_3$ )  $\delta$  168.5, 140.6, 133.1, 131.2, 128.6, 128.5, 114.0, 111.0, 45.6, 35.6, 22.0. **HRMS** (ESI) calcd for  $\text{C}_{13}\text{H}_{15}\text{N}_2\text{O}$   $[\text{M}+\text{H}]^+$  215.1179, found (ESI $^+$ ) 215.1177.

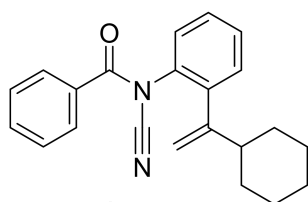
***N*-Cyano-*N*-(2-(3-methylbut-1-en-2-yl)phenyl)benzamide (1q):**



**1q**

Colorless liquid, 57% yield,  $^1\text{H NMR}$  (400 MHz,  $\text{CDCl}_3$ )  $\delta$  7.83 (d,  $J = 7.4$  Hz, 2H), 7.61 (t,  $J = 7.5$  Hz, 1H), 7.54 – 7.41 (m, 5H), 7.31 (dd,  $J = 6.7, 1.5$  Hz, 1H), 5.29 (s, 1H), 5.02 (s, 1H), 1.11 (d,  $J = 6.8$  Hz, 6H).  $^{13}\text{C NMR}$  (100 MHz,  $\text{CDCl}_3$ )  $\delta$  168.3, 151.8, 142.2, 133.4, 132.6, 130.6, 130.0, 129.0, 128.7, 128.6, 128.5, 114.1, 110.7, 34.2, 21.8. **HRMS** (ESI) calcd for  $\text{C}_{19}\text{H}_{19}\text{N}_2\text{O}$   $[\text{M}+\text{H}]^+$  291.1492, found 291.1492.

***N*-Cyano-*N*-(2-(1-cyclohexylvinyl)phenyl)benzamide (1r):**

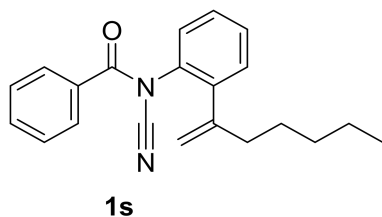


**1r**

Colorless liquid, 43% yield,  $^1\text{H NMR}$  (400 MHz,  $\text{CDCl}_3$ )  $\delta$  7.83 (d,  $J = 7.4$  Hz, 2H), 7.61 (t,  $J = 7.5$  Hz, 1H), 7.55 – 7.40 (m, 5H), 7.34 – 7.29 (m, 1H), 5.26 (s, 1H), 5.01 (s, 1H), 2.24 (t,  $J = 10.9$  Hz, 1H), 1.92 – 1.72 (m, 4H), 1.73 – 1.62 (m, 1H), 1.38 – 1.08 (m, 6H).  $^{13}\text{C NMR}$  (100 MHz,  $\text{CDCl}_3$ )  $\delta$  168.4, 151.1, 142.2, 133.3, 132.6, 130.6, 130.0, 129.0, 128.7, 128.5, 128.5, 114.3, 110.7, 44.2, 32.4, 26.6, 26.2. **HRMS** (ESI) calcd for  $\text{C}_{22}\text{H}_{23}\text{N}_2\text{O}$   $[\text{M}+\text{H}]^+$  331.1805, found 331.1808.

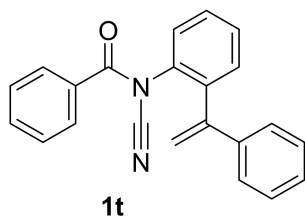
***N*-Cyano-*N*-(2-(hept-1-en-2-yl)phenyl)benzamide (1s):**





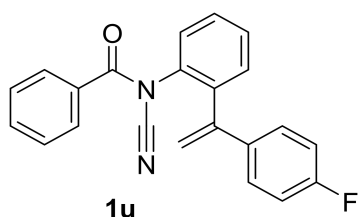
Colorless liquid, 56% yield,  $^1\text{H NMR}$  (400 MHz,  $\text{CDCl}_3$ )  $\delta$  7.82 (d,  $J = 7.5$  Hz, 2H), 7.60 (t,  $J = 7.4$  Hz, 1H), 7.51 – 7.39 (m, 5H), 7.32 (d,  $J = 6.6$  Hz, 1H), 5.29 (s, 1H), 5.06 (s, 1H), 2.34 (t,  $J = 7.5$  Hz, 2H), 1.47 – 1.40 (m, 2H), 1.35 – 1.20 (m, 6H), 0.90 – 0.78 (m, 4H).  $^{13}\text{C NMR}$  (100 MHz,  $\text{CDCl}_3$ )  $\delta$  168.2, 145.9, 141.9, 133.3, 132.6, 130.7, 130.2, 130.0, 129.0, 128.6, 128.2, 115.8, 110.6, 36.8, 31.5, 27.5, 22.5, 14.0. **HRMS** (ESI) calcd for  $\text{C}_{21}\text{H}_{23}\text{N}_2\text{O}$   $[\text{M}+\text{H}]^+$  319.1805, found 331.1811.

***N*-Cyano-*N*-(2-(1-phenylvinyl)phenyl)benzamide (1t):**



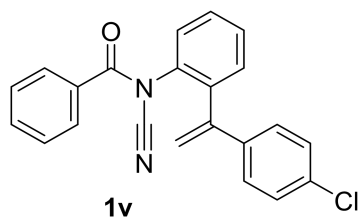
White solid, 48% yield, mp: 131-133 °C,  $^1\text{H NMR}$  (400 MHz,  $\text{DMSO-}d_6$ )  $\delta$  7.82 – 7.77 (m, 1H), 7.70 – 7.61 (m, 3H), 7.54 – 7.49 (m, 1H), 7.46 (t,  $J = 7.8$  Hz, 2H), 7.40 – 7.35 (m, 3H), 7.35 – 7.31 (m, 2H), 7.28 – 7.22 (m, 2H), 5.89 (s, 1H), 5.31 (s, 1H).  $^{13}\text{C NMR}$  (100 MHz,  $\text{CDCl}_3$ )  $\delta$  167.3, 145.8, 139.8, 139.4, 133.1, 132.2, 130.2, 129.5, 128.9, 128.8, 128.5, 128.3, 128.1, 126.8, 118.2, 110.1. **HRMS** (ESI) calcd for  $\text{C}_{22}\text{H}_{17}\text{N}_2\text{O}$   $[\text{M}+\text{H}]^+$  325.1335, found 325.1339.

***N*-Cyano-*N*-(2-(1-(4-fluorophenyl)vinyl)phenyl)benzamide (1u):**



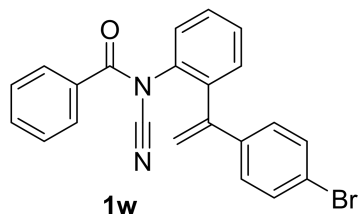
White solid, 47% yield, mp: 141-142 °C,  $^1\text{H NMR}$  (400 MHz,  $\text{CDCl}_3$ )  $\delta$  7.58 – 7.50 (m, 3H), 7.50 – 7.43 (m, 2H), 7.43 – 7.33 (m, 4H), 7.25 – 7.22 (m, 1H), 7.05 – 6.91 (m, 2H), 5.74 (s, 1H), 5.38 (s, 1H).  $^{13}\text{C NMR}$  (100 MHz,  $\text{CDCl}_3$ )  $\delta$  167.3, 164.1, 161.6, 144.6, 139.6, 135.6, 133.3, 133.1, 132.0, 130.2, 130.1, 129.6, 128.8, 128.6, 128.6, 128.4, 128.2, 118.0, 115.7, 115.5, 110.0. **HRMS** (ESI) calcd for  $\text{C}_{22}\text{H}_{16}\text{FN}_2\text{O}$   $[\text{M}+\text{H}]^+$  343.1241, found 343.1239.

***N*-(2-(1-(4-Chlorophenyl)vinyl)phenyl)-*N*-cyanobenzamide (1v):**



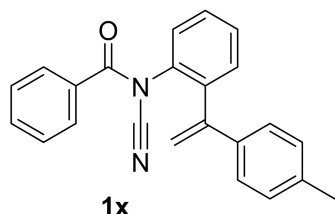
Mixture of raw material and product (1: 5), can't purified, white solid,  $^1\text{H NMR}$  (400 MHz,  $\text{CDCl}_3$ )  $\delta$  7.58 – 7.42 (m, 5H), 7.42 – 7.27 (m, 6H), 7.21 (d,  $J = 8.2$  Hz, 2H), 5.78 (s, 1H), 5.44 (s, 1H). **HRMS** (ESI) calcd for  $\text{C}_{22}\text{H}_{16}\text{ClN}_2\text{O}$   $[\text{M}+\text{H}]^+$  359.0946, found 359.0946.

***N*-(2-(1-(4-Bromophenyl)vinyl)phenyl)-*N*-cyanobenzamide (1w):**



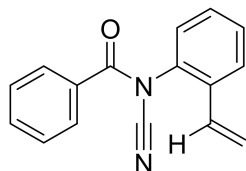
Mixture of raw material and product (1: 5), can't purified, white solid,  $^1\text{H NMR}$  (400 MHz,  $\text{CDCl}_3$ )  $\delta$  7.58 – 7.28 (m, 11H), 7.15 (d,  $J = 6.7$  Hz, 2H), 5.79 (s, 1H), 5.44 (s, 1H). **HRMS** (ESI) calcd for  $\text{C}_{22}\text{H}_{16}\text{BrN}_2\text{O}$   $[\text{M}+\text{H}]^+$  403.0441, found 403.0440.

***N*-Cyano-*N*-(2-(1-(*p*-tolyl)vinyl)phenyl)benzamide (1x):**



White solid, 50% yield, mp: 115-116 °C,  $^1\text{H NMR}$  (400 MHz,  $\text{CDCl}_3$ )  $\delta$  7.57 – 7.45 (m, 5H), 7.39 – 7.30 (m, 4H), 7.19 (d,  $J = 8.2$  Hz, 2H), 7.12 (d,  $J = 8.1$  Hz, 2H), 5.77 (s, 1H), 5.36 (s, 1H), 2.34 (s, 3H).  $^{13}\text{C NMR}$  (100 MHz,  $\text{CDCl}_3$ )  $\delta$  167.4, 145.6, 140.0, 138.4, 136.6, 133.1, 132.2, 130.3, 130.1, 129.4, 128.9, 128.2, 128.1, 126.8, 117.4, 110.1, 21.2. **HRMS** (ESI) calcd for  $\text{C}_{23}\text{H}_{19}\text{N}_2\text{O}$   $[\text{M}+\text{H}]^+$  339.1492, found 339.1494.

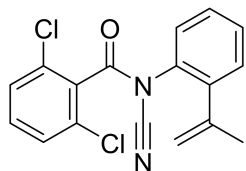
***N*-Cyano-*N*-(2-vinylphenyl)benzamide (1y):**



**1y**

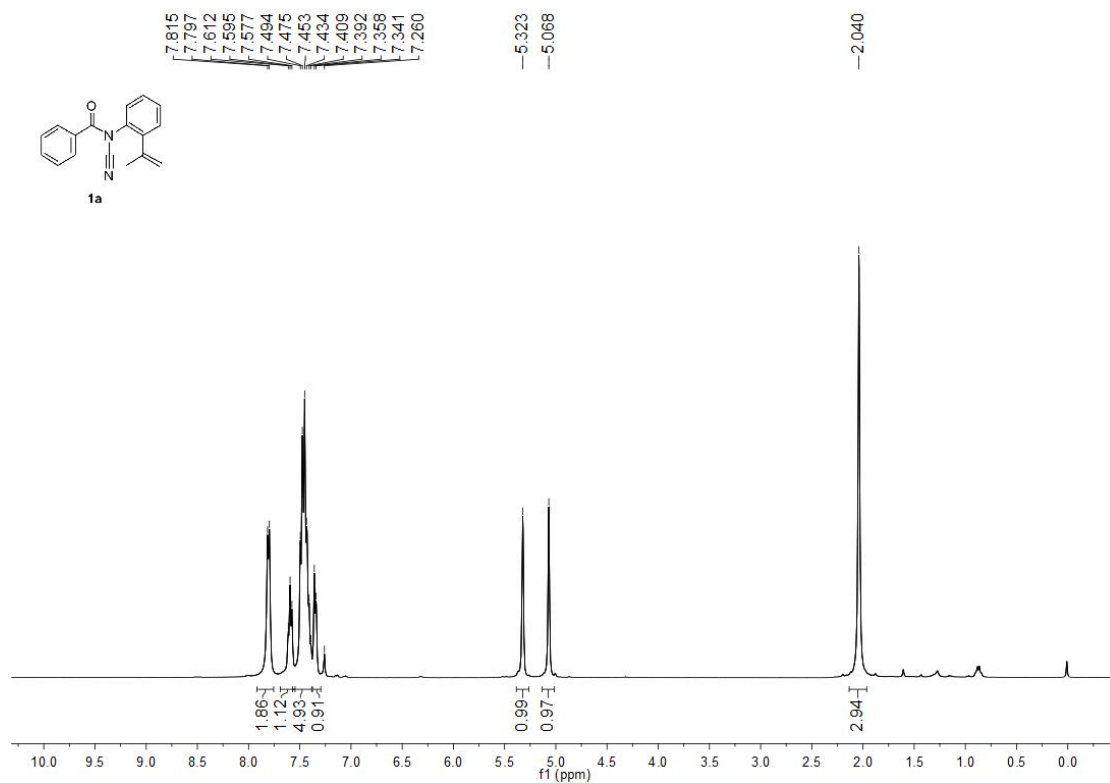
White solid, 50% yield, mp: 85-87 °C,  $^1\text{H NMR}$  (400 MHz,  $\text{DMSO-}d_6$ )  $\delta$  7.81 (d,  $J = 6.9$  Hz, 3H), 7.65 (t,  $J = 8.7$  Hz, 2H), 7.52 (t,  $J = 7.5$  Hz, 3H), 7.45 (t,  $J = 7.6$  Hz, 1H), , 7.06 – 6.88 (m, 1H), 5.97 (d,  $J = 17.3$  Hz, 1H), 5.53 (d,  $J = 11.1$  Hz, 1H).  $^{13}\text{C NMR}$  (100 MHz,  $\text{DMSO-}d_6$ )  $\delta$  168.1, 134.5, 133.0, 132.8, 130.5, 130.0, 129.5, 128.7, 128.6, 128.5, 126.8, 119.3, 109.9. **HRMS** (ESI) calcd for  $\text{C}_{16}\text{H}_{13}\text{N}_2\text{O}$   $[\text{M}+\text{H}]^+$  249.1022, found 249.1025.

**2,6-Dichloro-*N*-cyano-*N*-(2-(prop-1-en-2-yl)phenyl)benzamide (1z):**

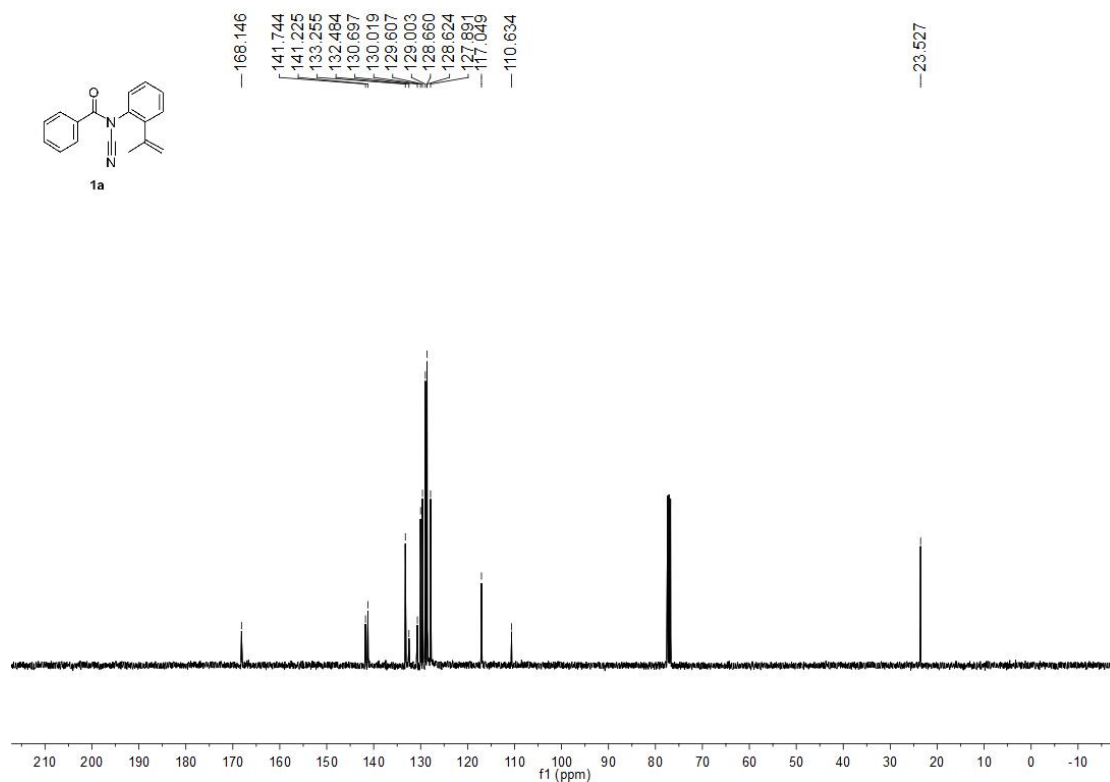


**1z**

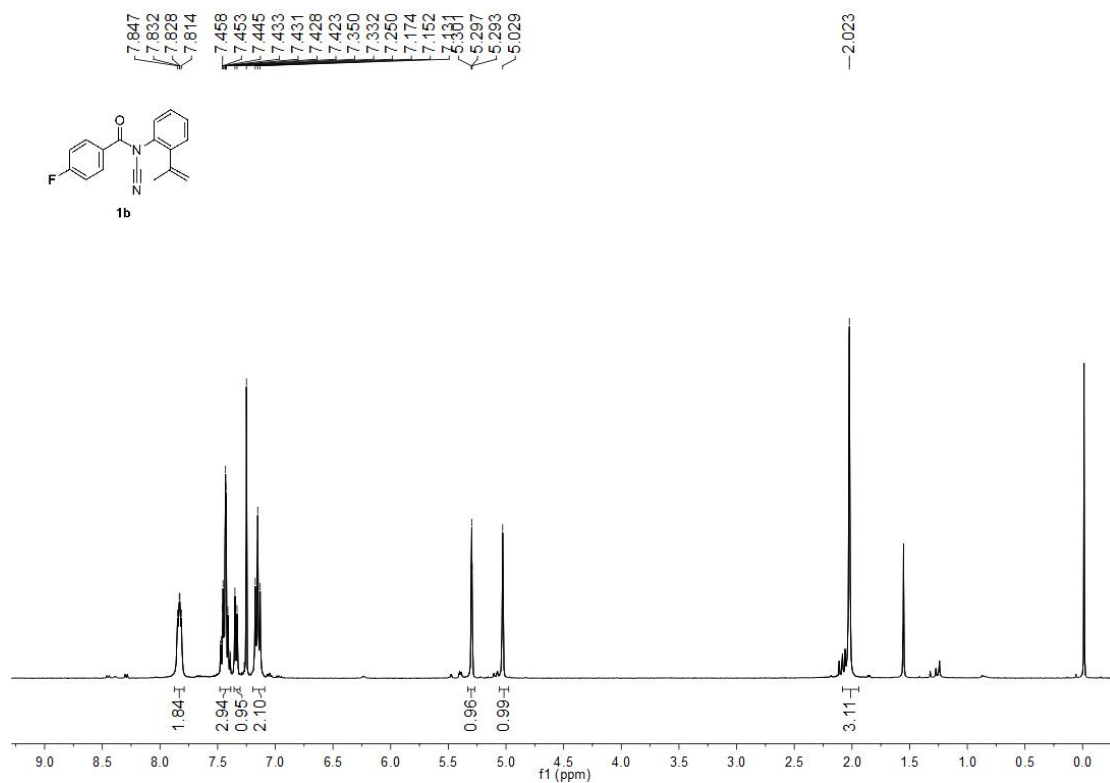
White solid, 76% yield, mp: 103-105 °C,  $^1\text{H NMR}$  (400 MHz,  $\text{DMSO-}d_6$ )  $\delta$  7.51 – 7.46 (m, 2H), 7.46 – 7.41 (m, 4H), 7.41 – 7.37 (m, 1H), 5.36 (s, 1H), 5.13 (s, 1H), 2.16 (s, 3H).  $^{13}\text{C NMR}$  (100 MHz,  $\text{DMSO-}d_6$ )  $\delta$  164.3, 142.8, 140.4, 132.6, 132.5, 131.9, 130.8, 130.4, 129.9, 128.6, 128.4, 128.0, 117.9, 108.9, 24.0. **HRMS** (ESI) calcd for  $\text{C}_{17}\text{H}_{13}\text{Cl}_2\text{N}_2\text{O}$   $[\text{M}+\text{H}]^+$  331.0399, found 331.0396.



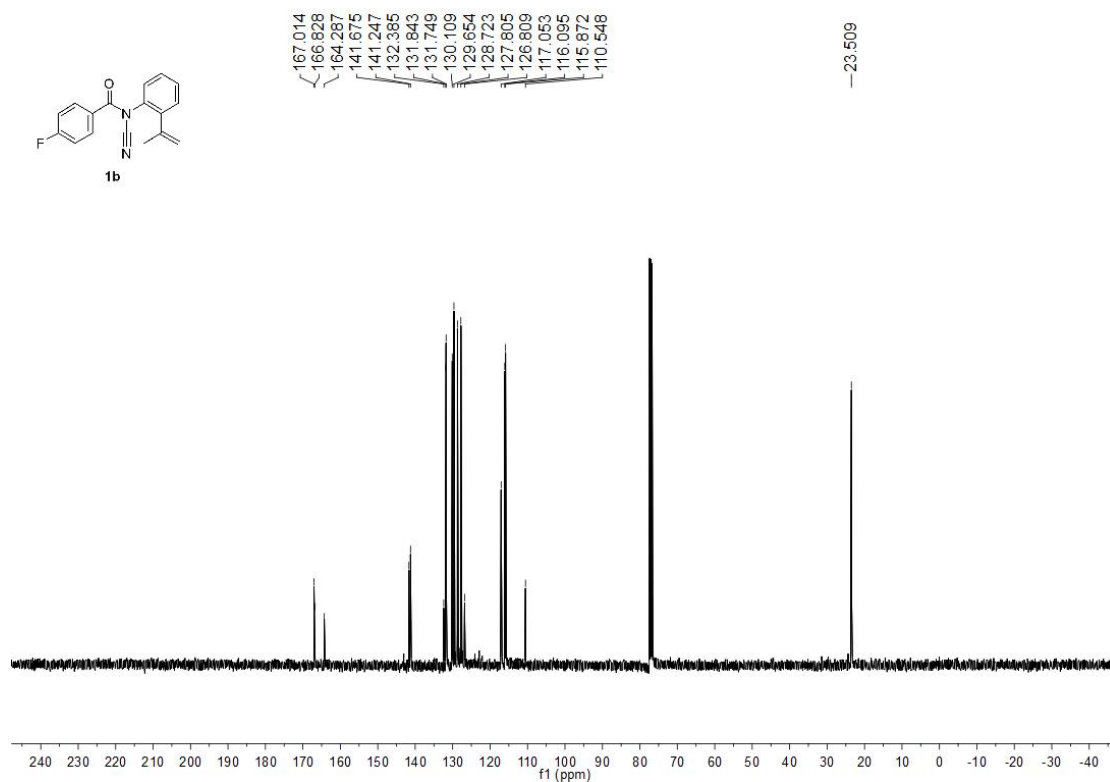
<sup>1</sup>H NMR spectrum of compound **1a**



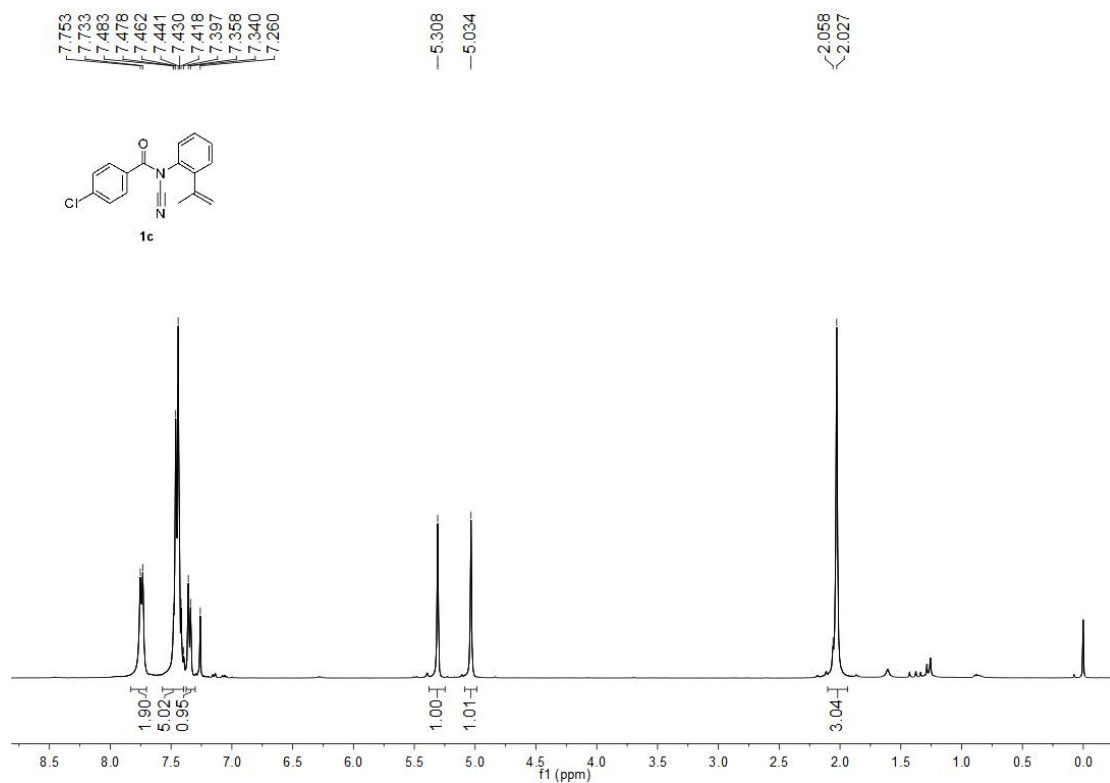
<sup>13</sup>C NMR spectrum of compound **1a**



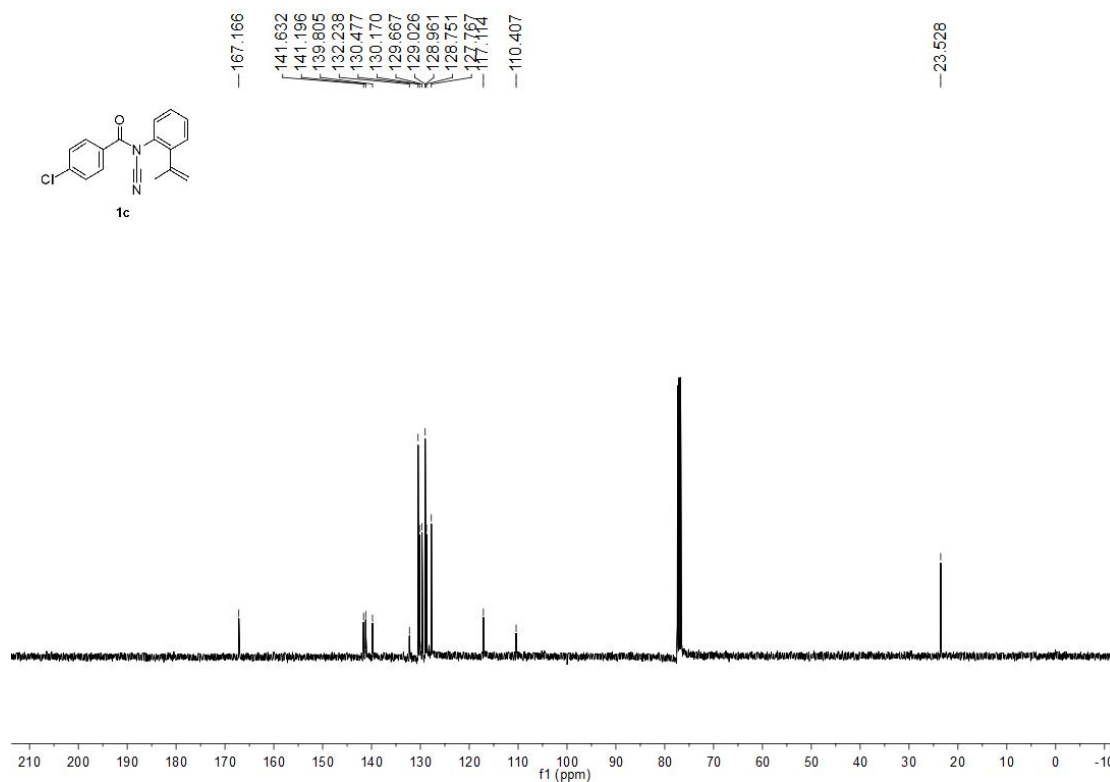
<sup>1</sup>H NMR spectrum of compound **1b**



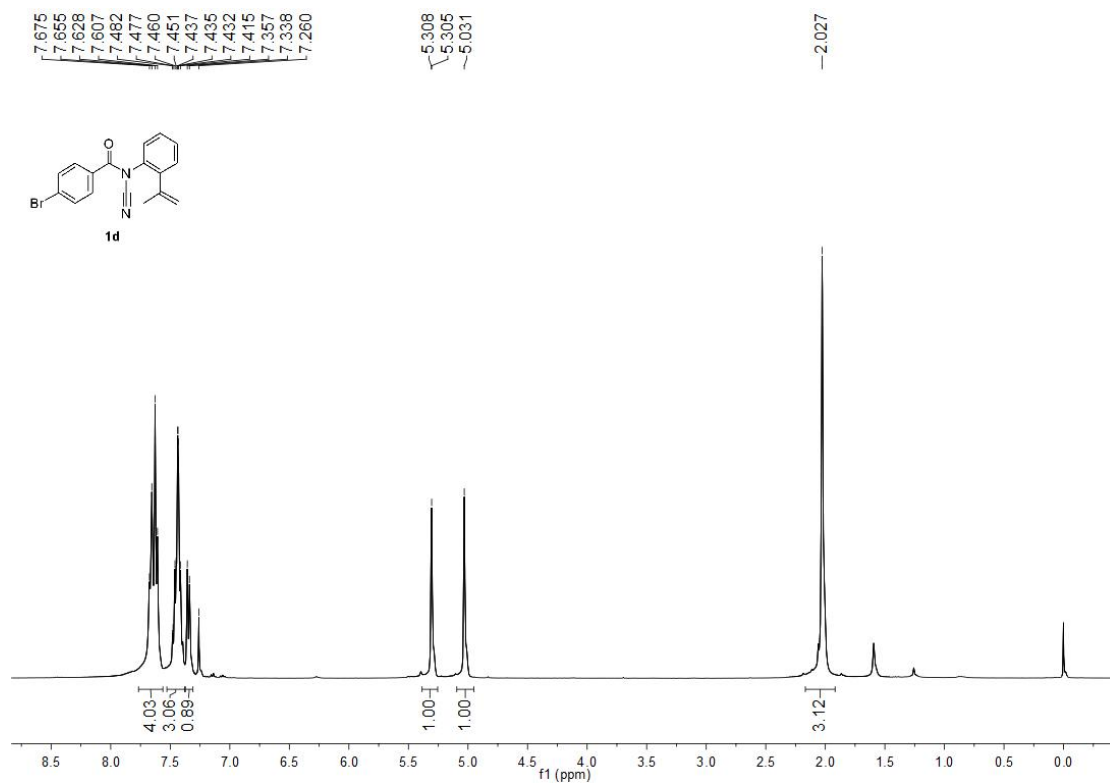
<sup>13</sup>C NMR spectrum of compound **1b**



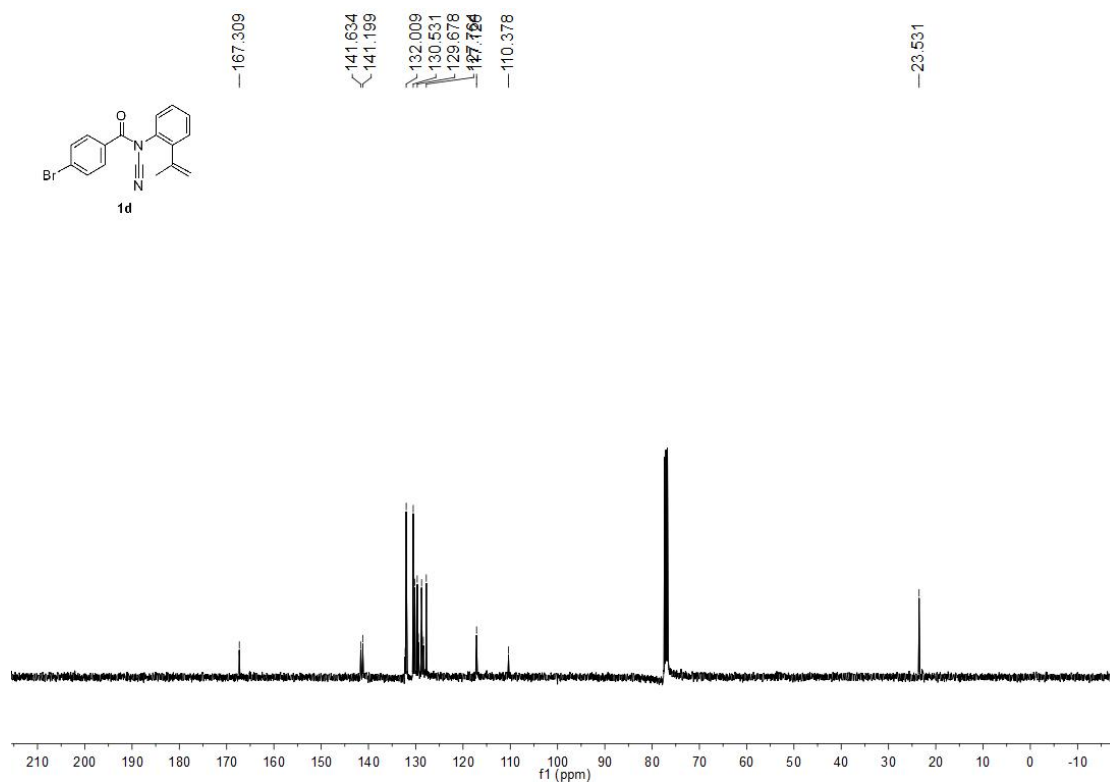
<sup>1</sup>H NMR spectrum of compound **1c**



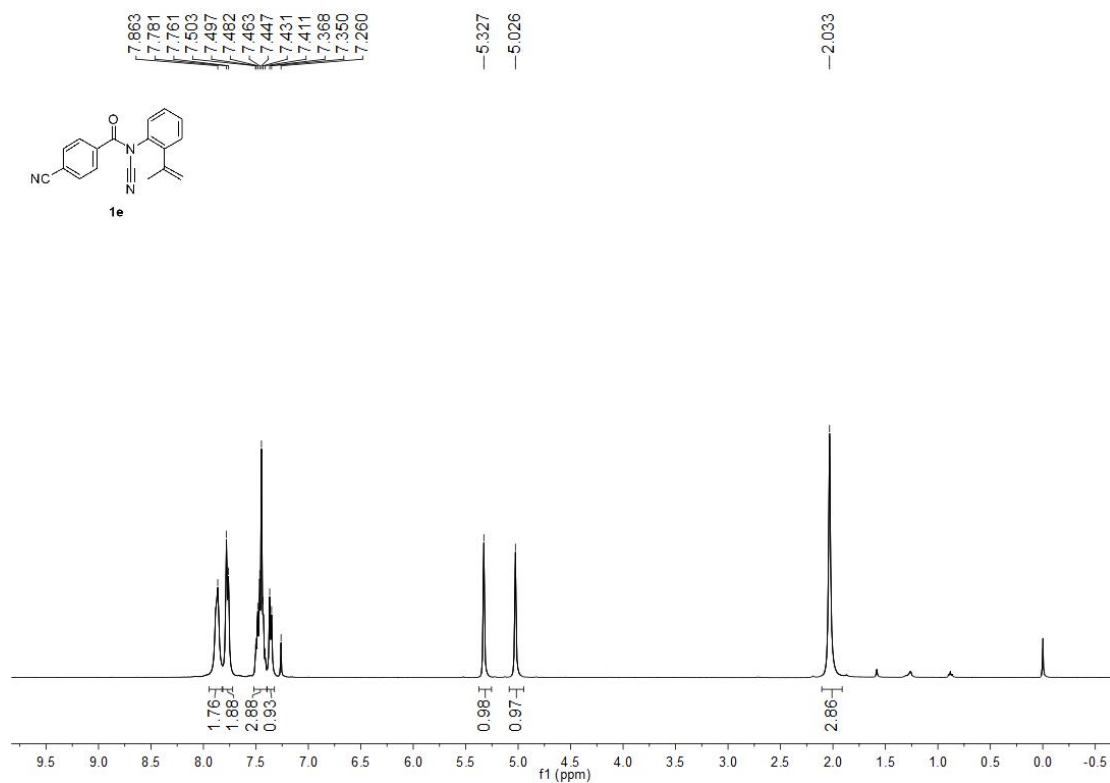
<sup>13</sup>C NMR spectrum of compound **1c**



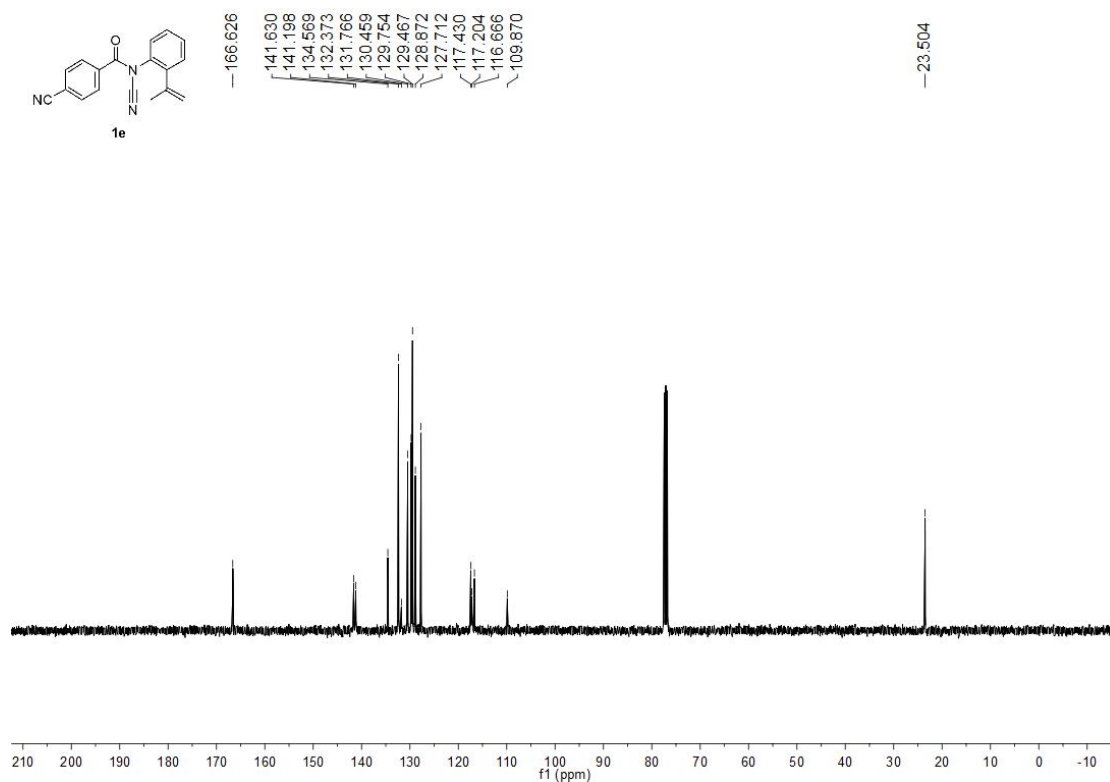
<sup>1</sup>H NMR spectrum of compound **1d**



<sup>13</sup>C NMR spectrum of compound **1d**

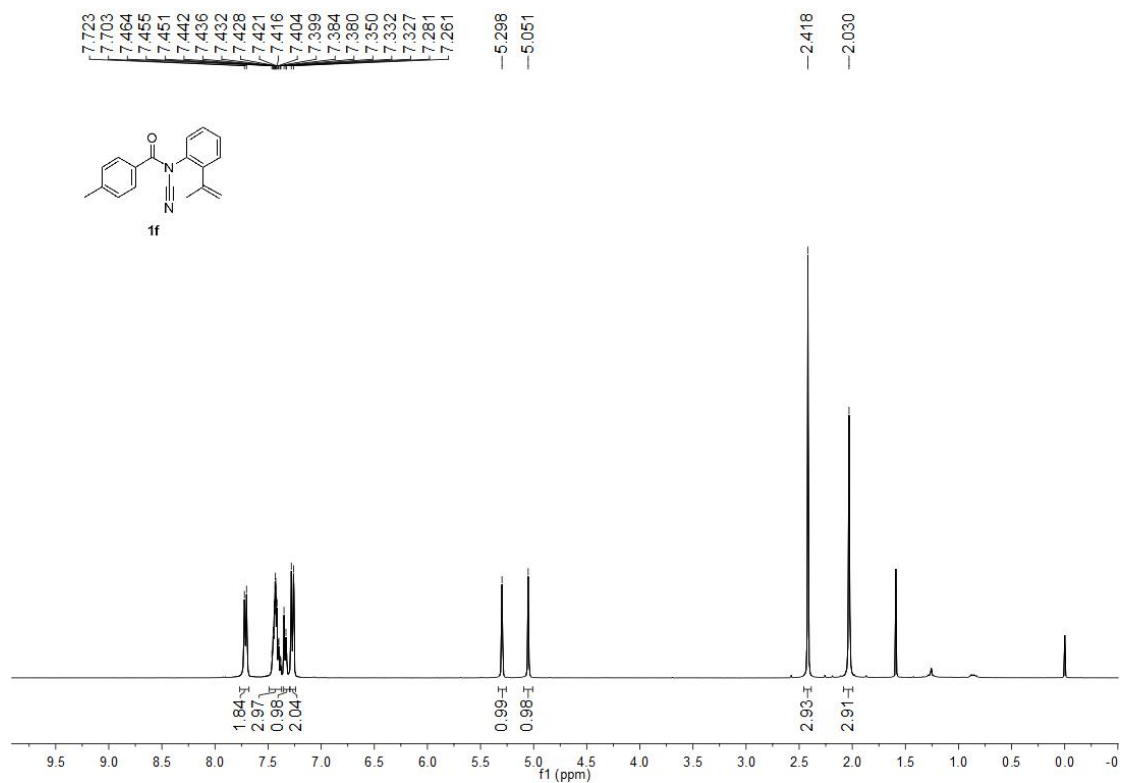


<sup>1</sup>H NMR spectrum of compound **1e**

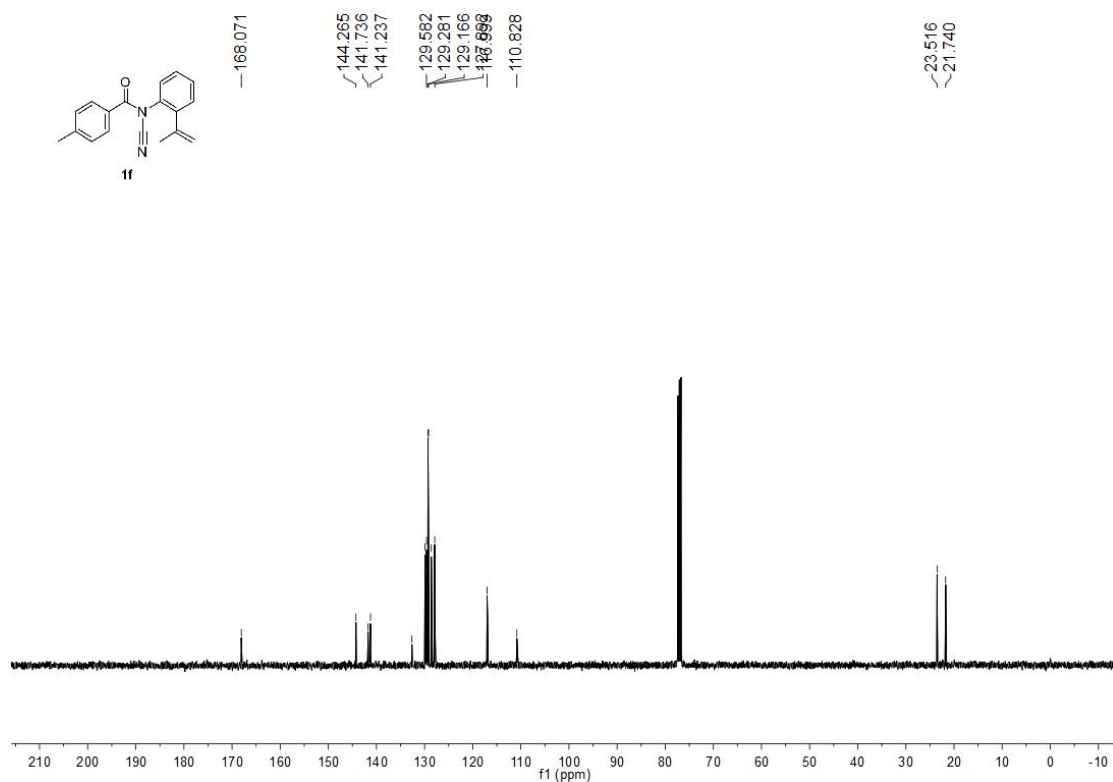


<sup>13</sup>C NMR spectrum of compound **1e**

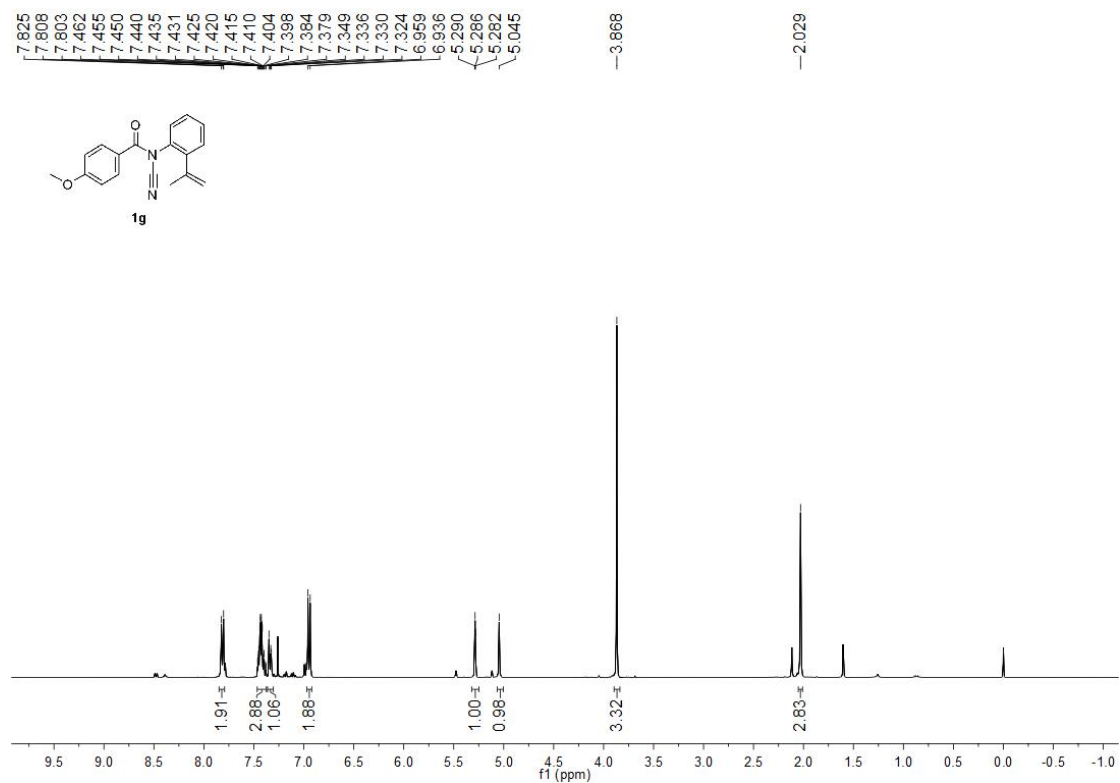




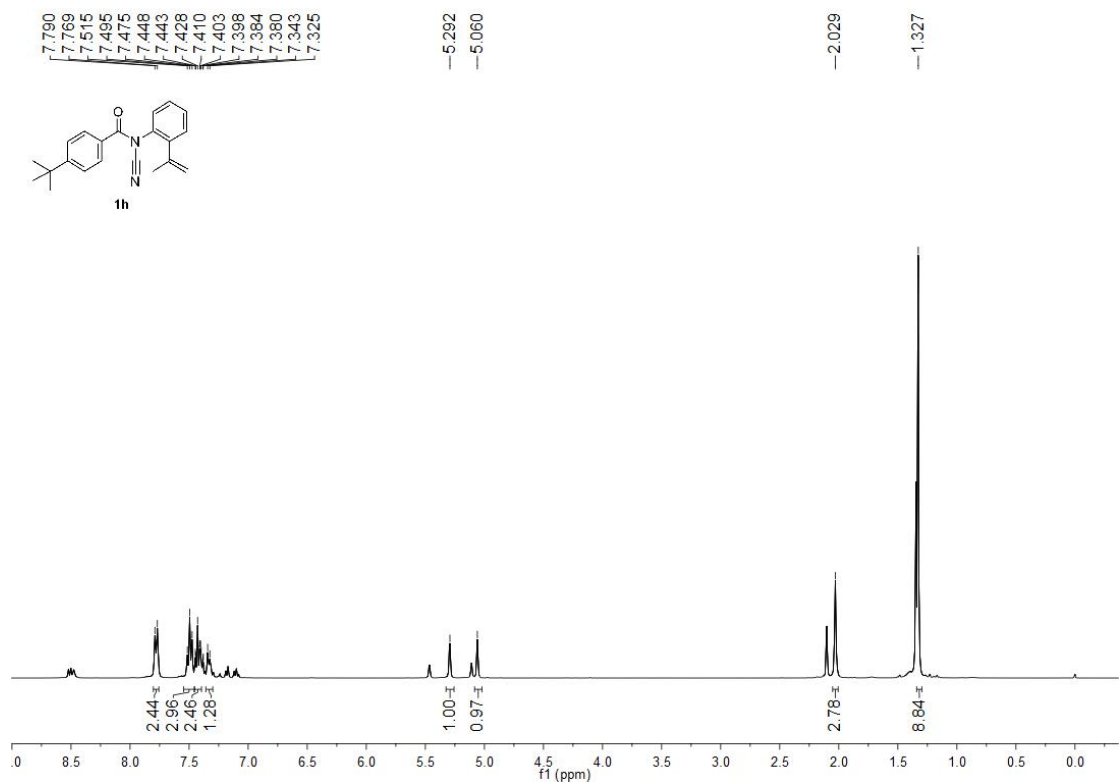
<sup>1</sup>H NMR spectrum of compound **1f**



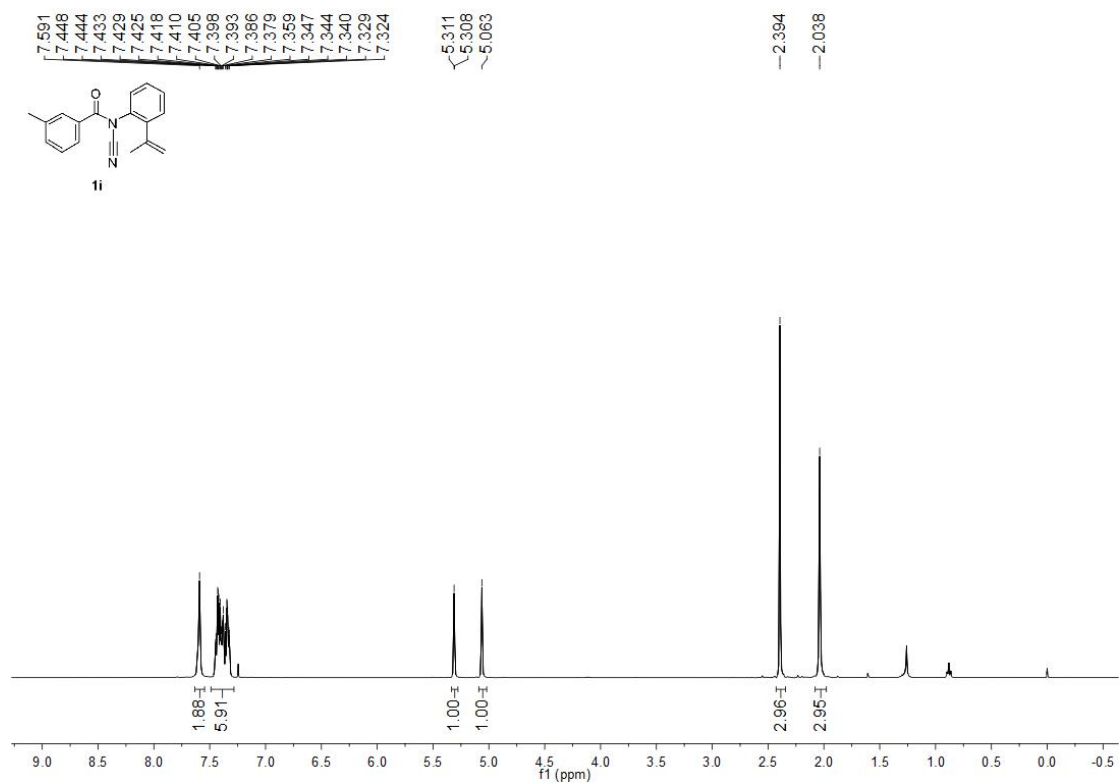
<sup>13</sup>C NMR spectrum of compound **1f**



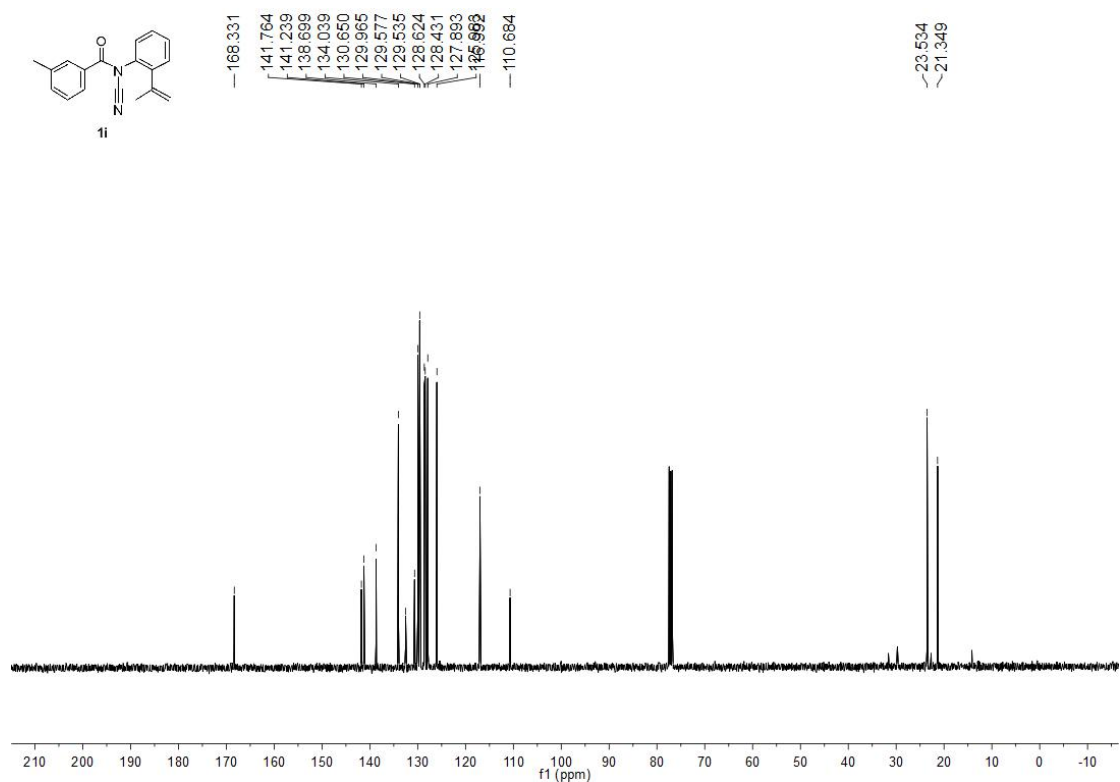
<sup>1</sup>H NMR spectrum of compound **1g**



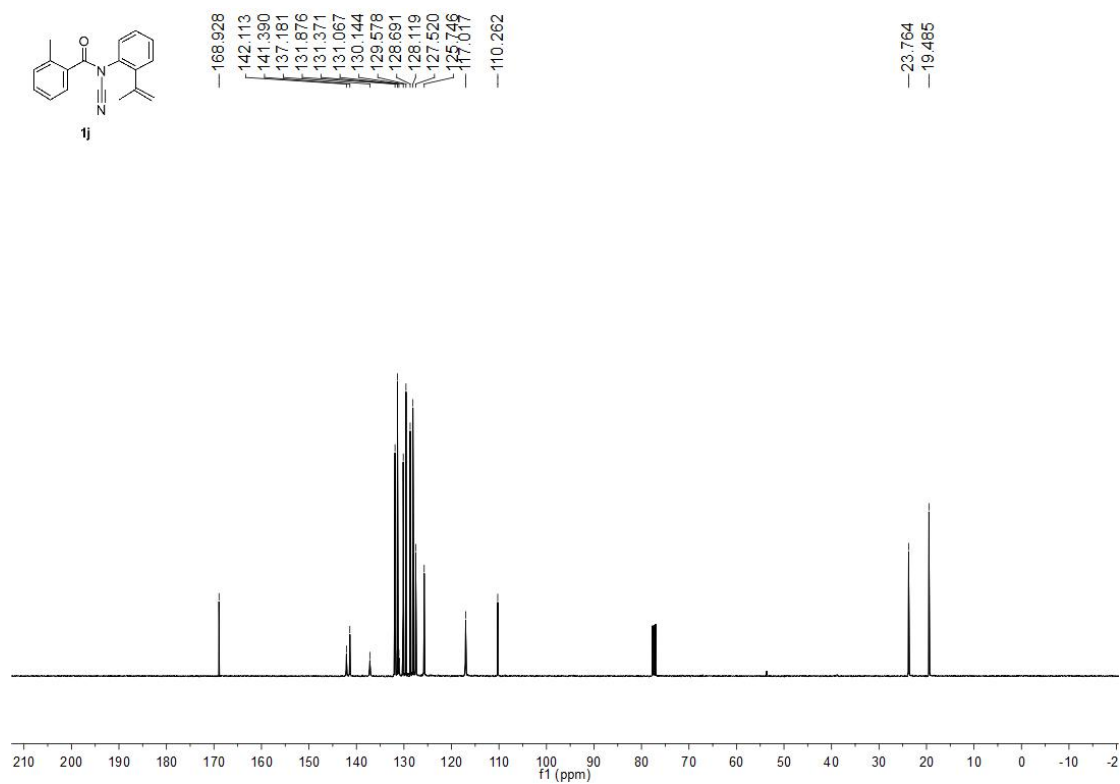
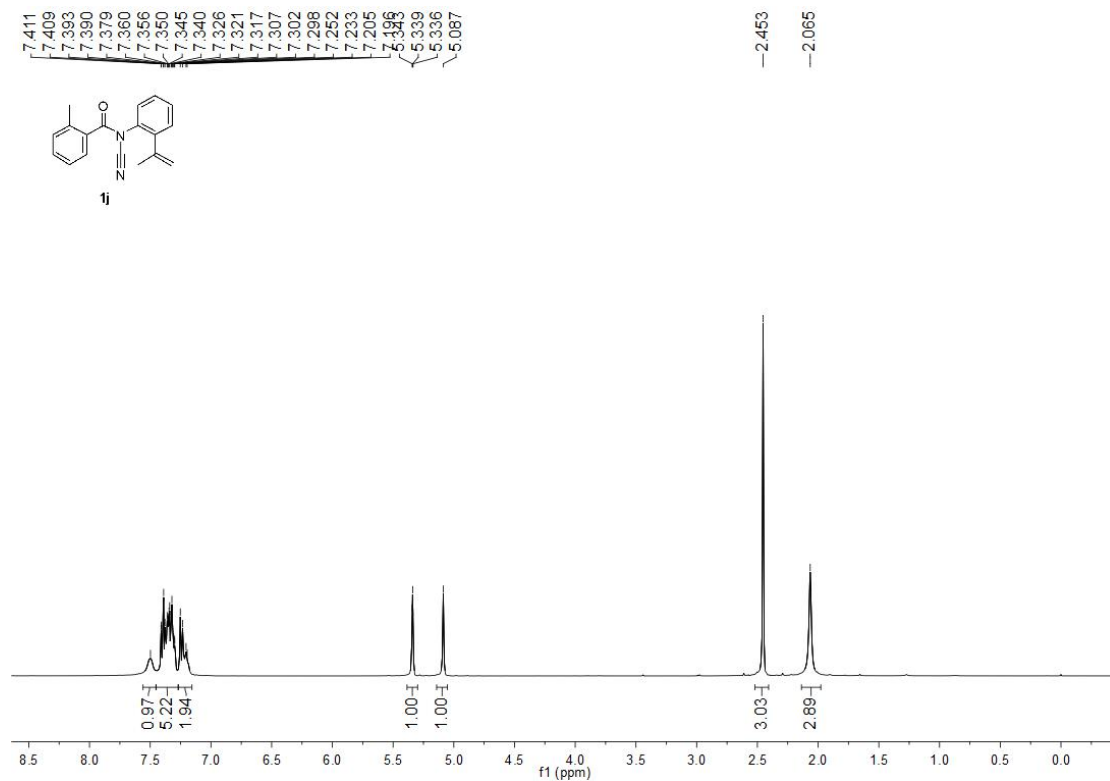
<sup>1</sup>H NMR spectrum of compound **1h**

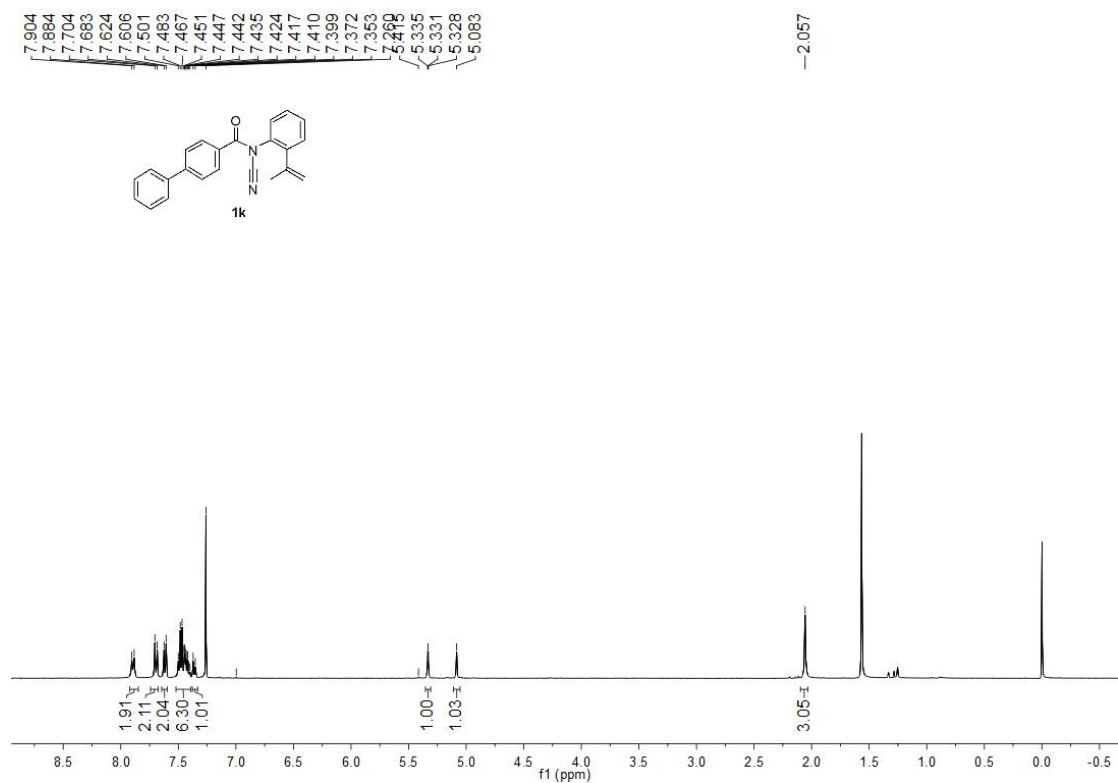


<sup>1</sup>H NMR spectrum of compound **1i**

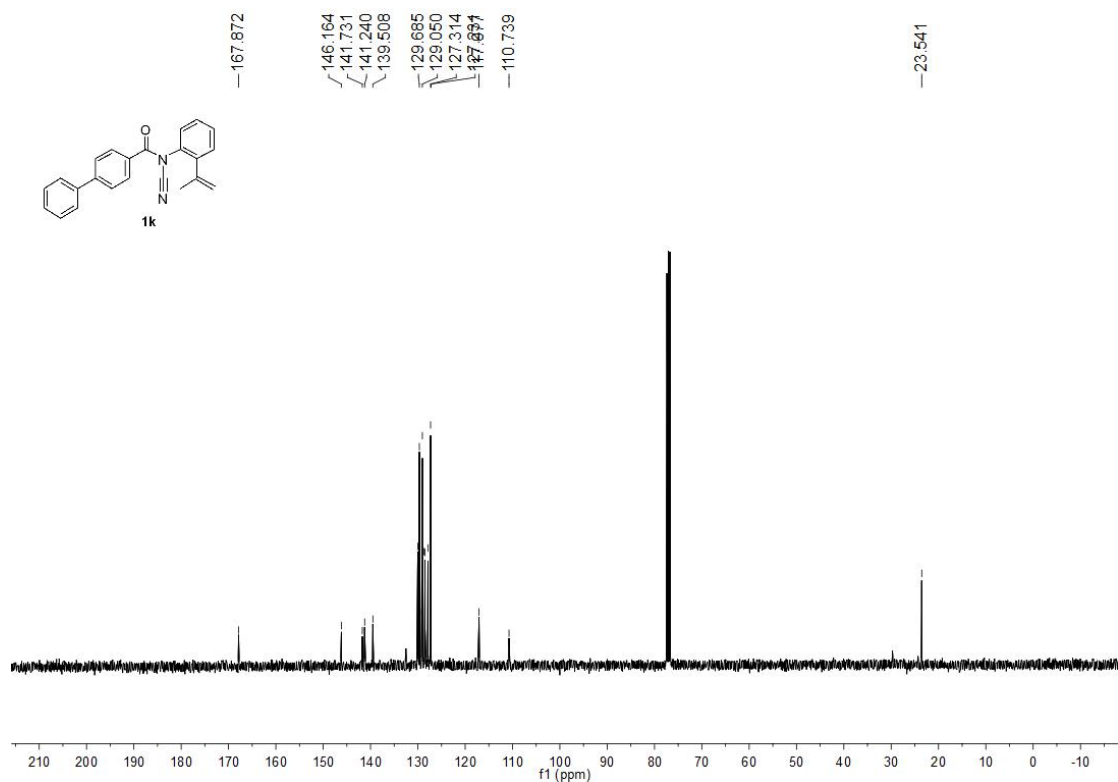


<sup>13</sup>C NMR spectrum of compound **1i**

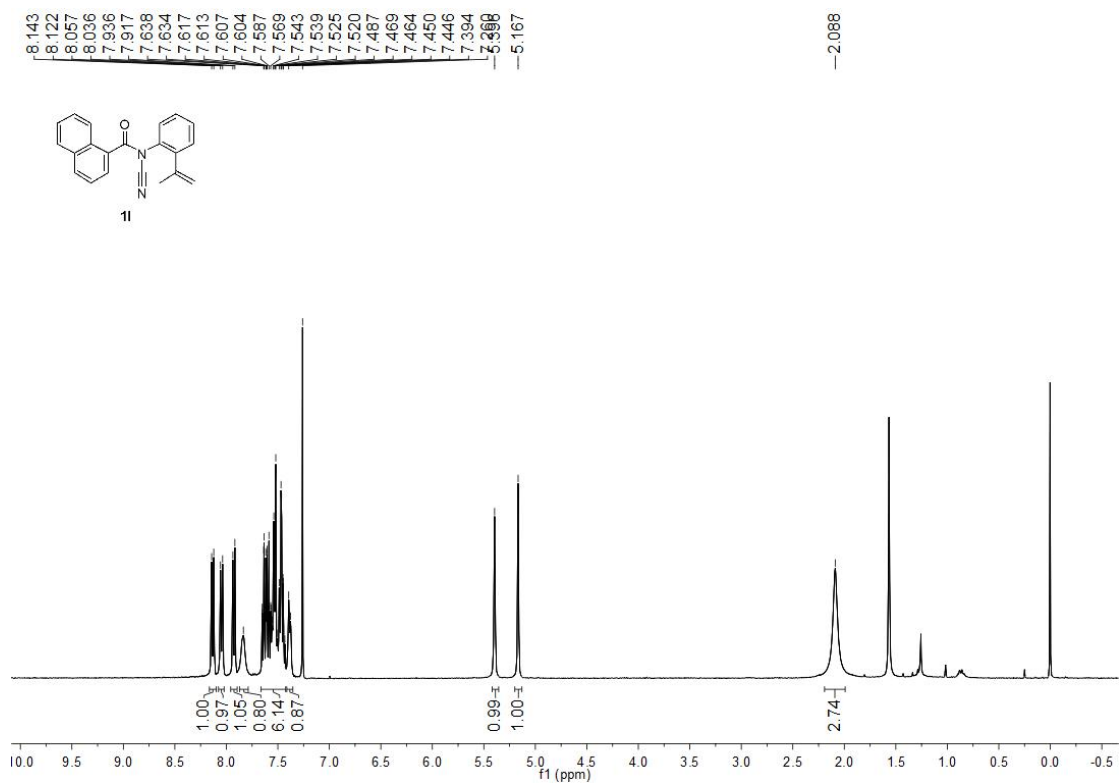




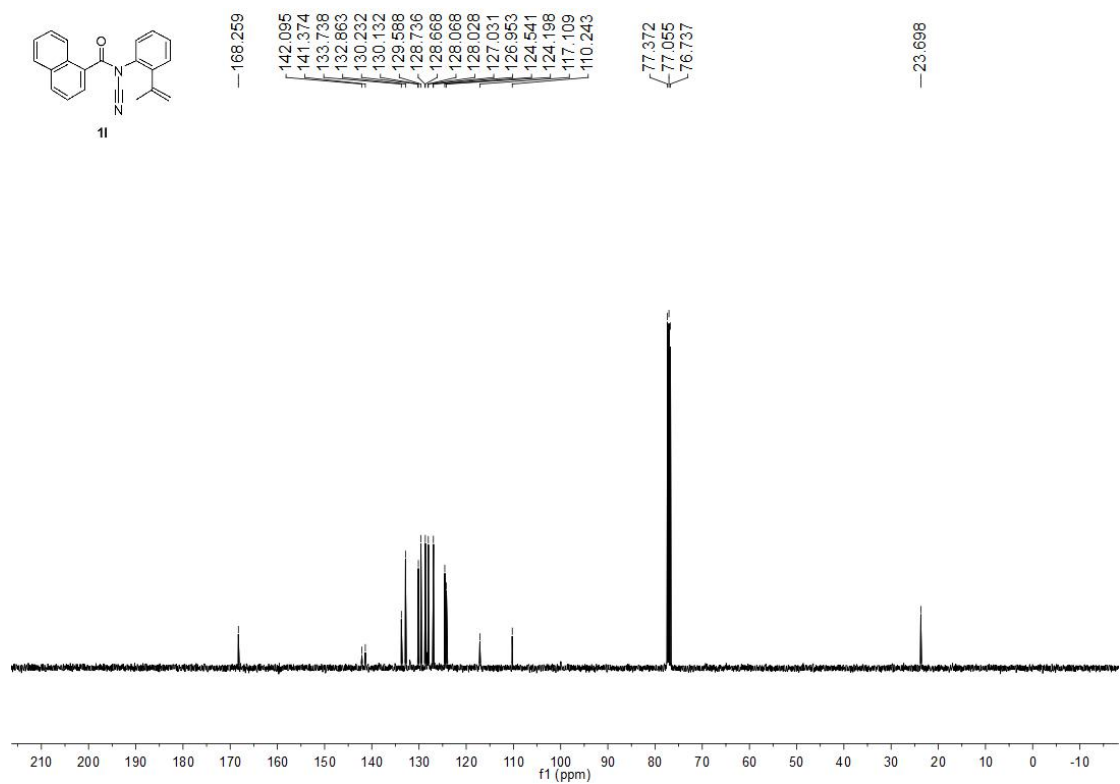
<sup>1</sup>H NMR spectrum of compound **1k**



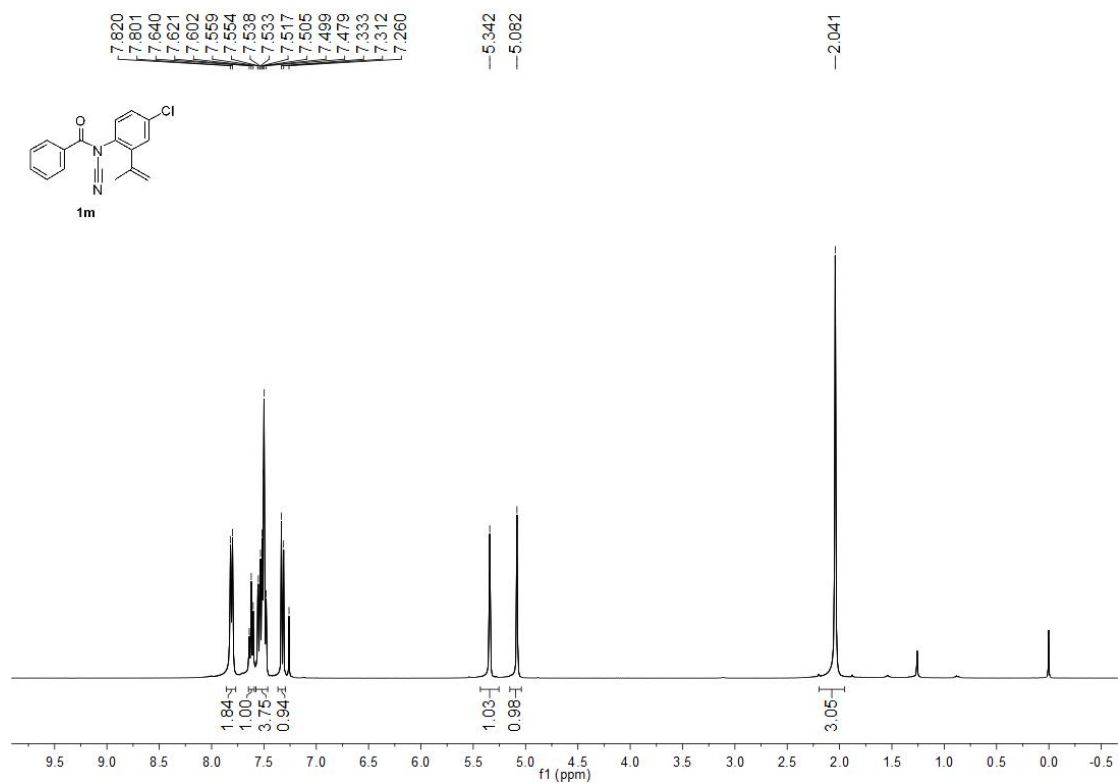
<sup>13</sup>C NMR spectrum of compound **1k**



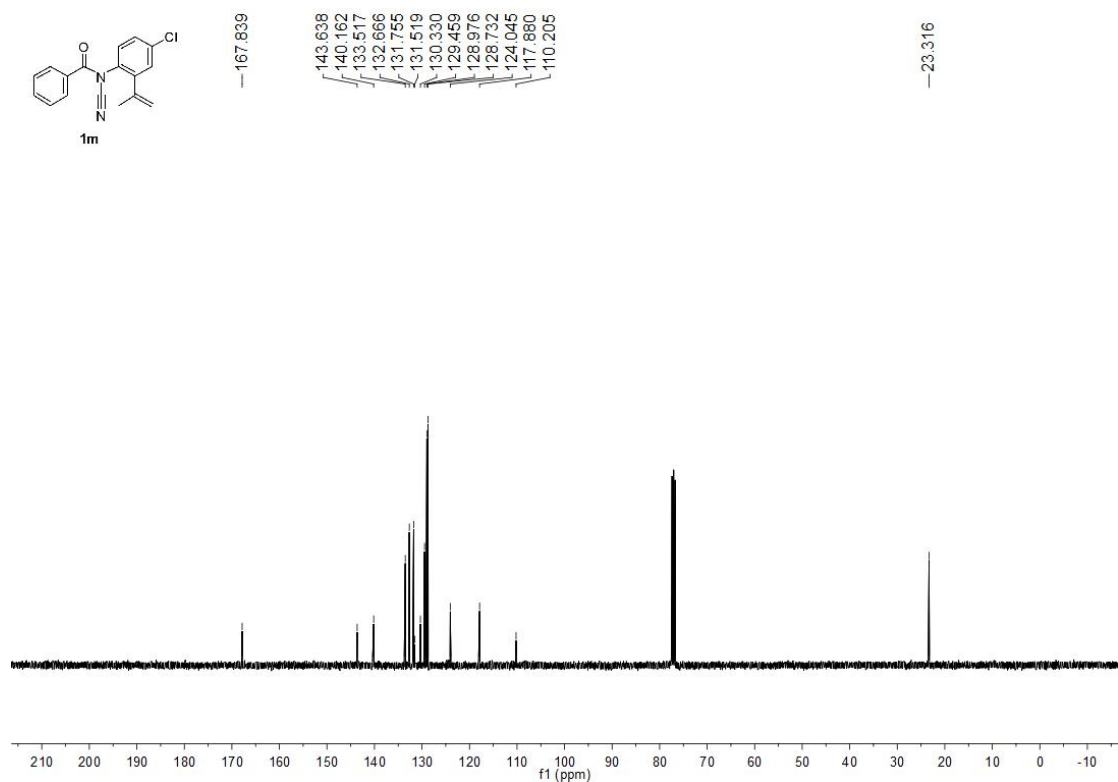
<sup>1</sup>H NMR spectrum of compound **11**



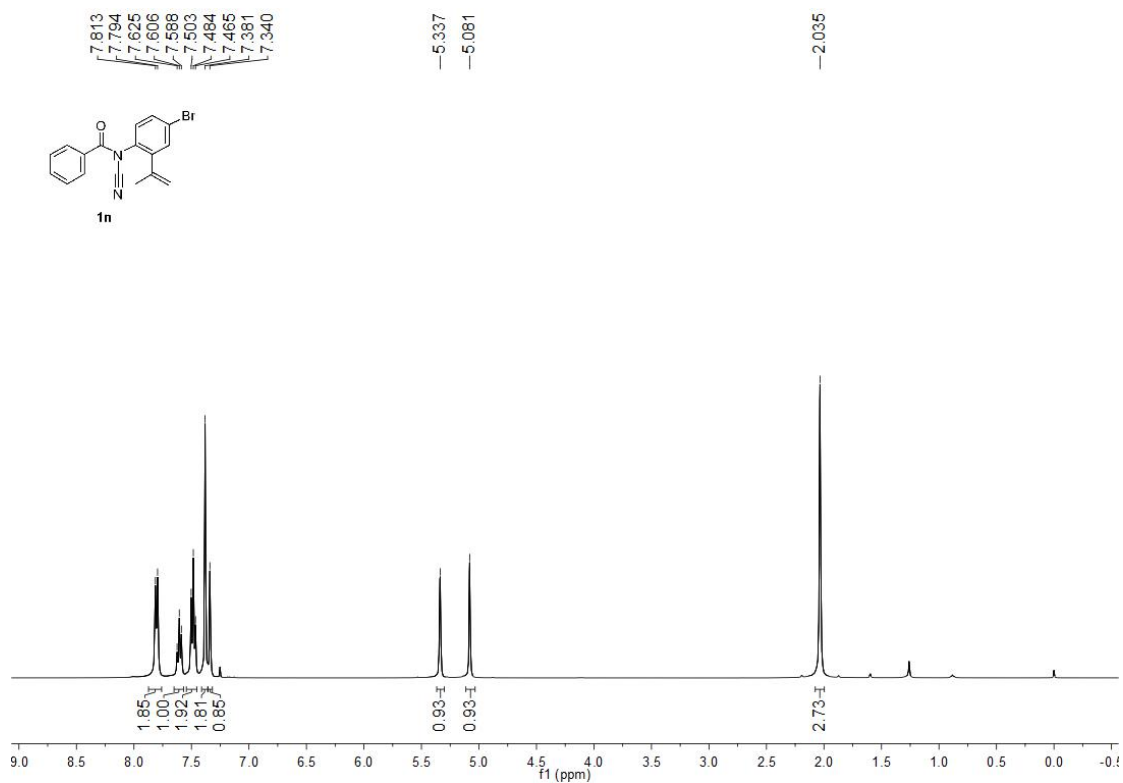
<sup>13</sup>C NMR spectrum of compound **11**



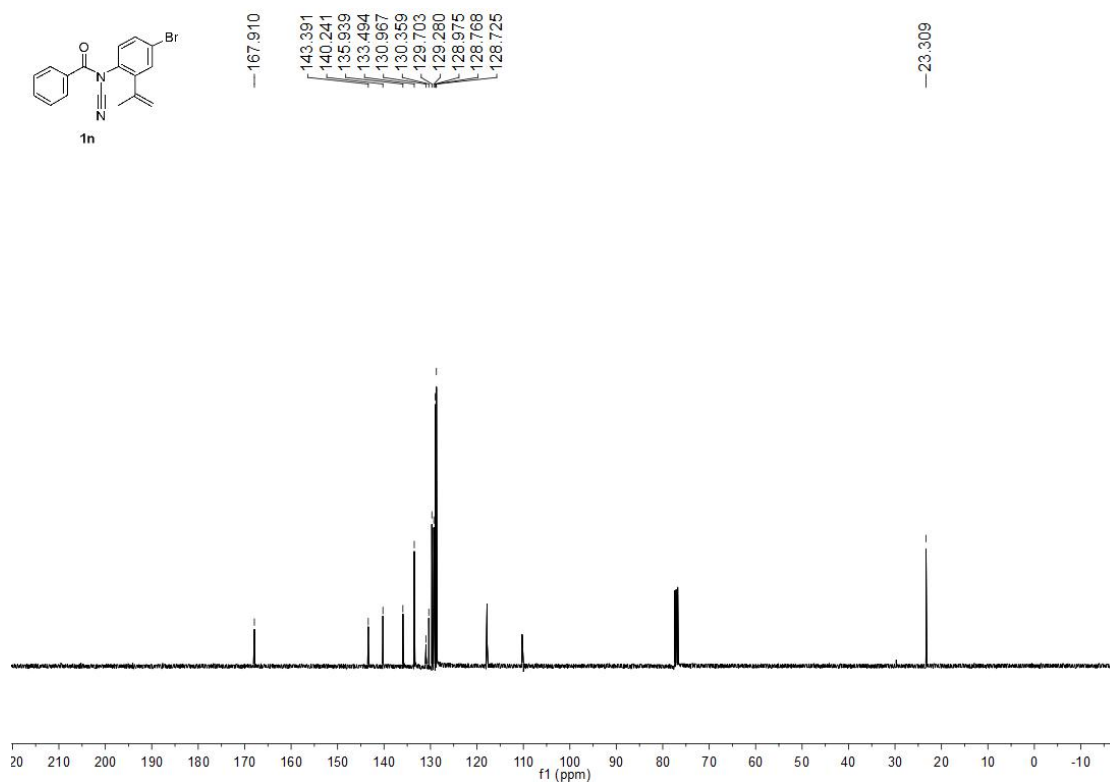
$^1\text{H}$  NMR spectrum of compound **1m**



$^{13}\text{C}$  NMR spectrum of compound **1m**

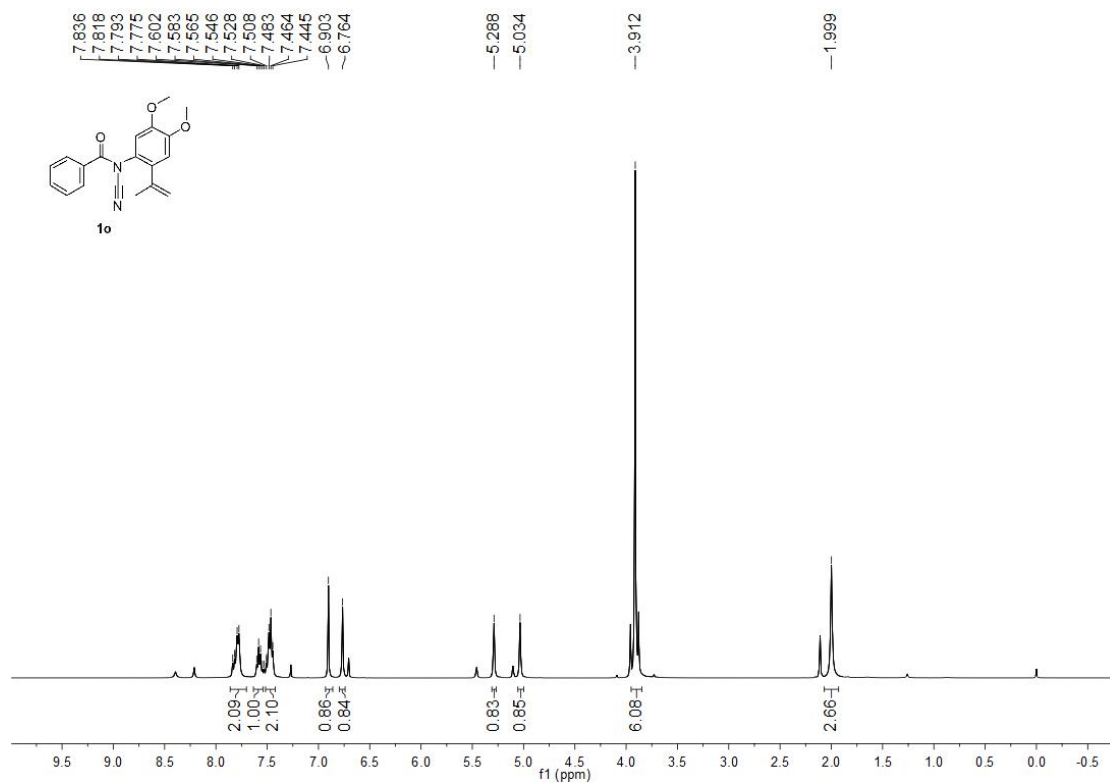


<sup>1</sup>H NMR spectrum of compound **1n**

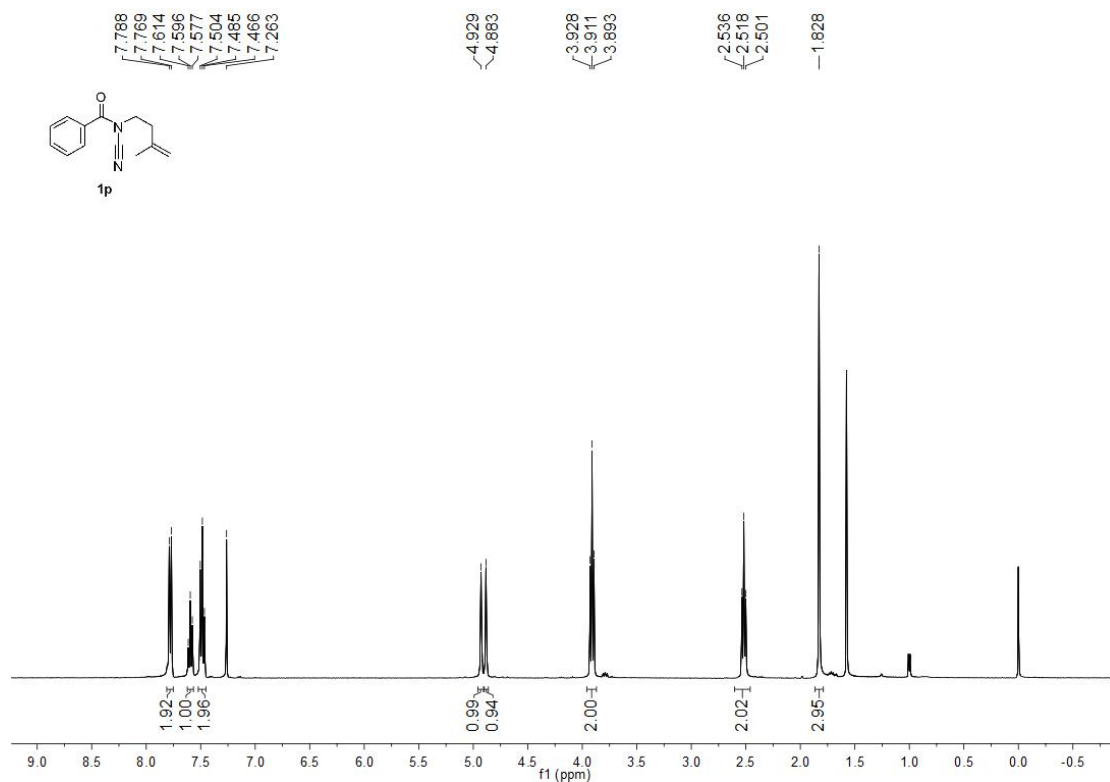


<sup>13</sup>C NMR spectrum of compound **1n**

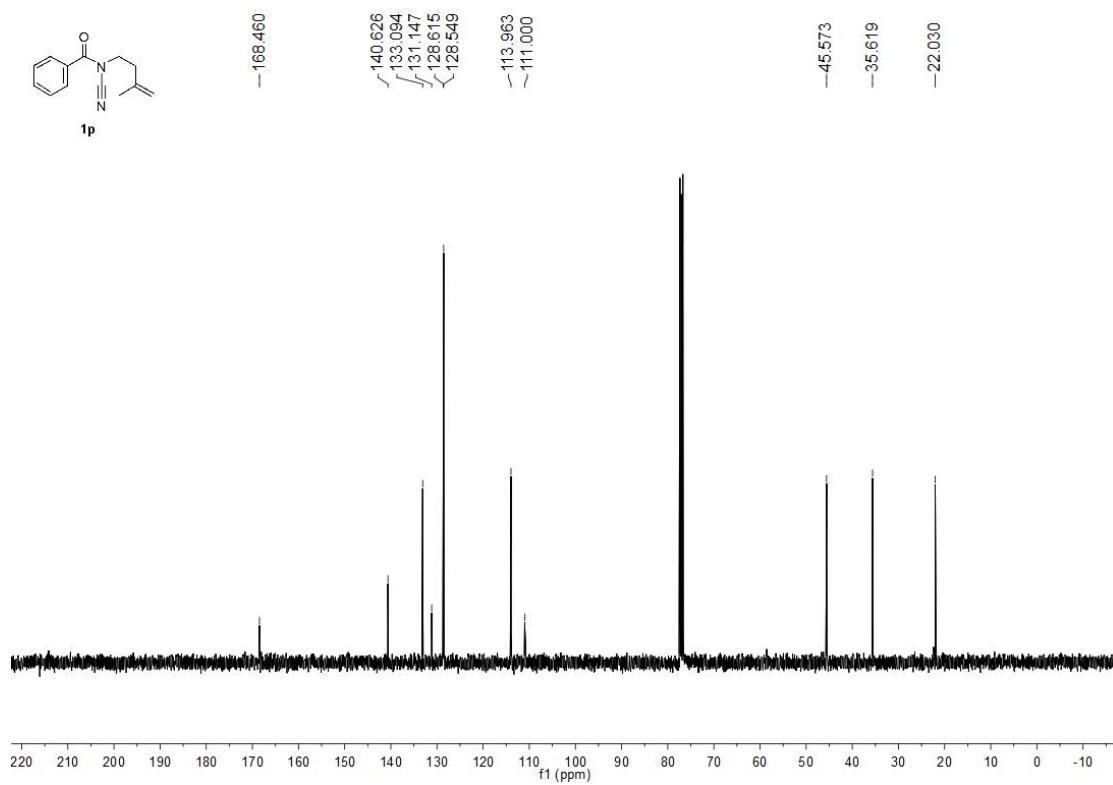




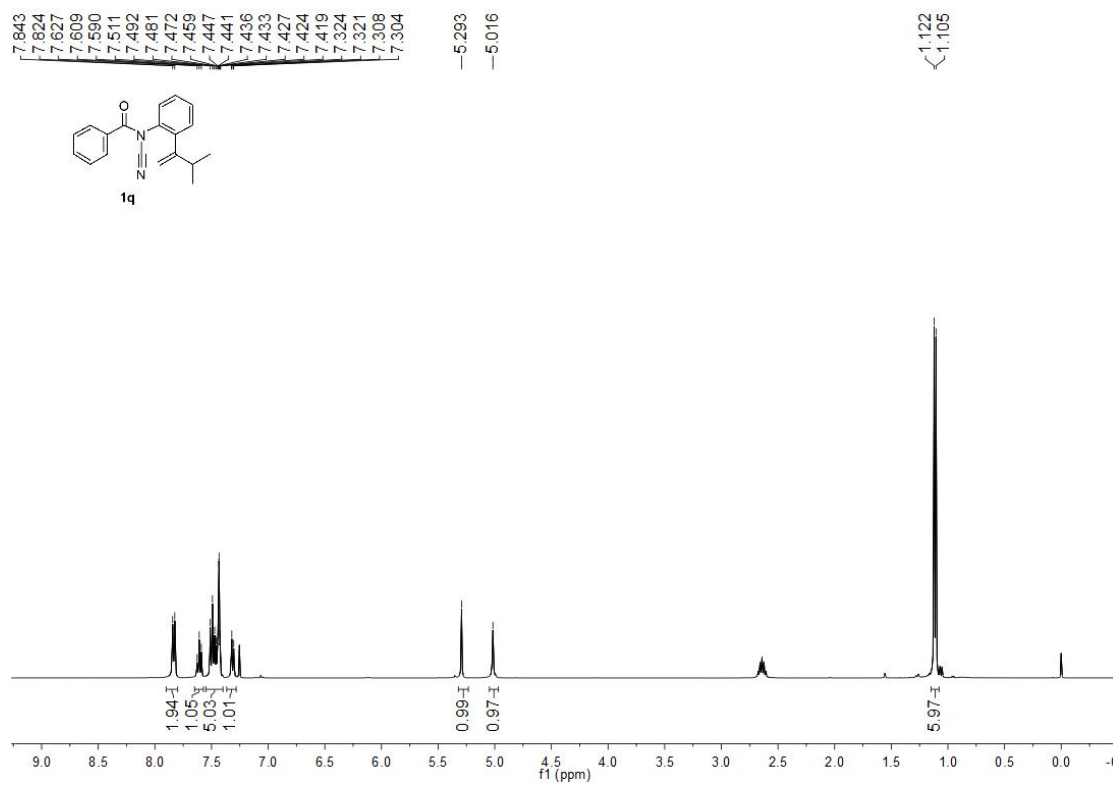
<sup>1</sup>H NMR spectrum of compound **1o**



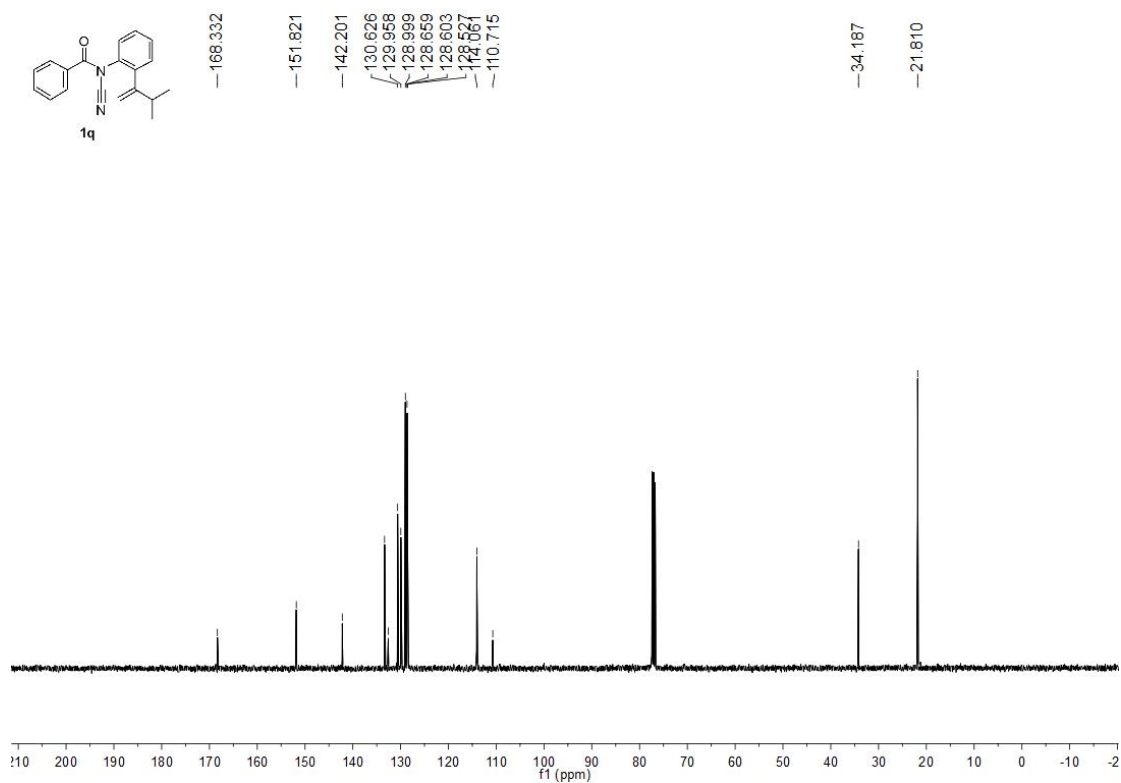
<sup>1</sup>H NMR spectrum of compound **1p**



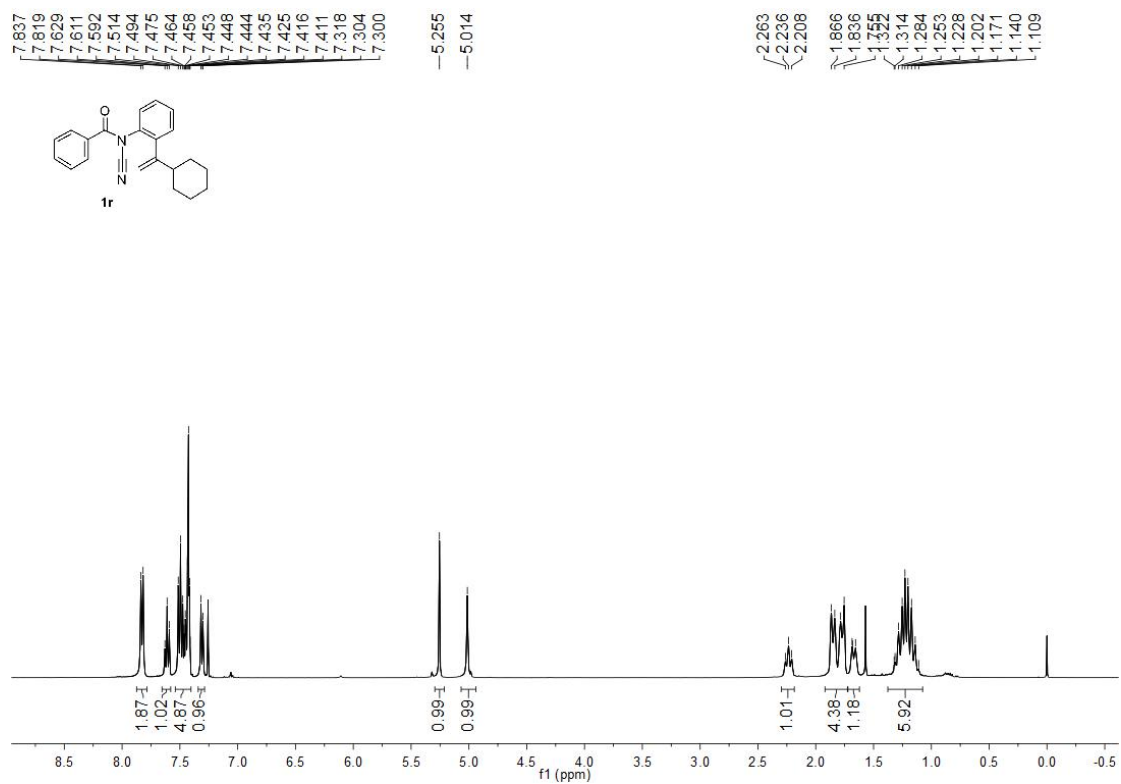
<sup>13</sup>C NMR spectrum of compound **1p**



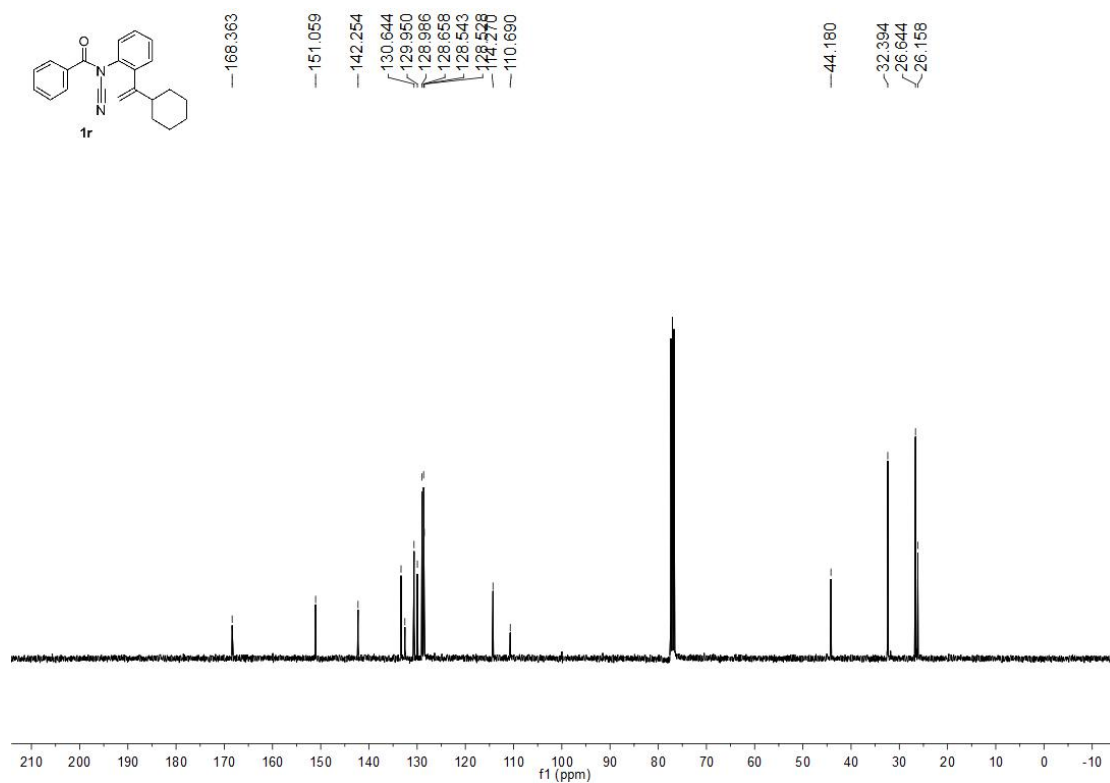
<sup>1</sup>H NMR spectrum of compound **1q**



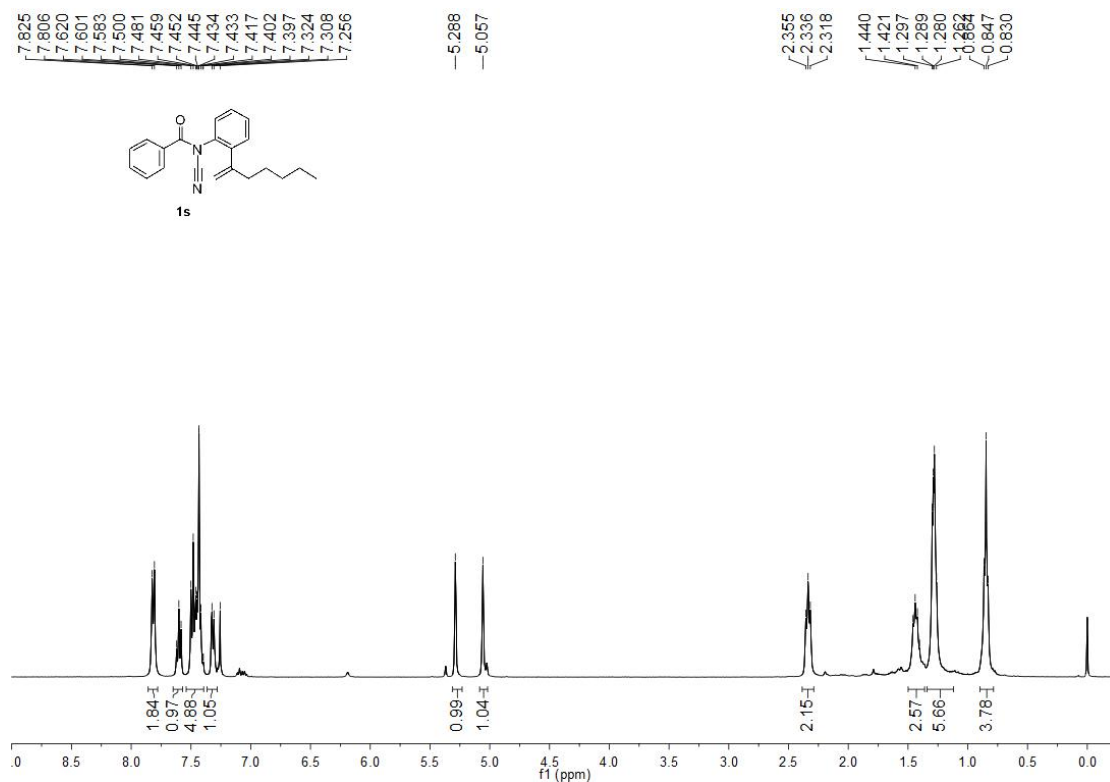
<sup>13</sup>C NMR spectrum of compound **1q**



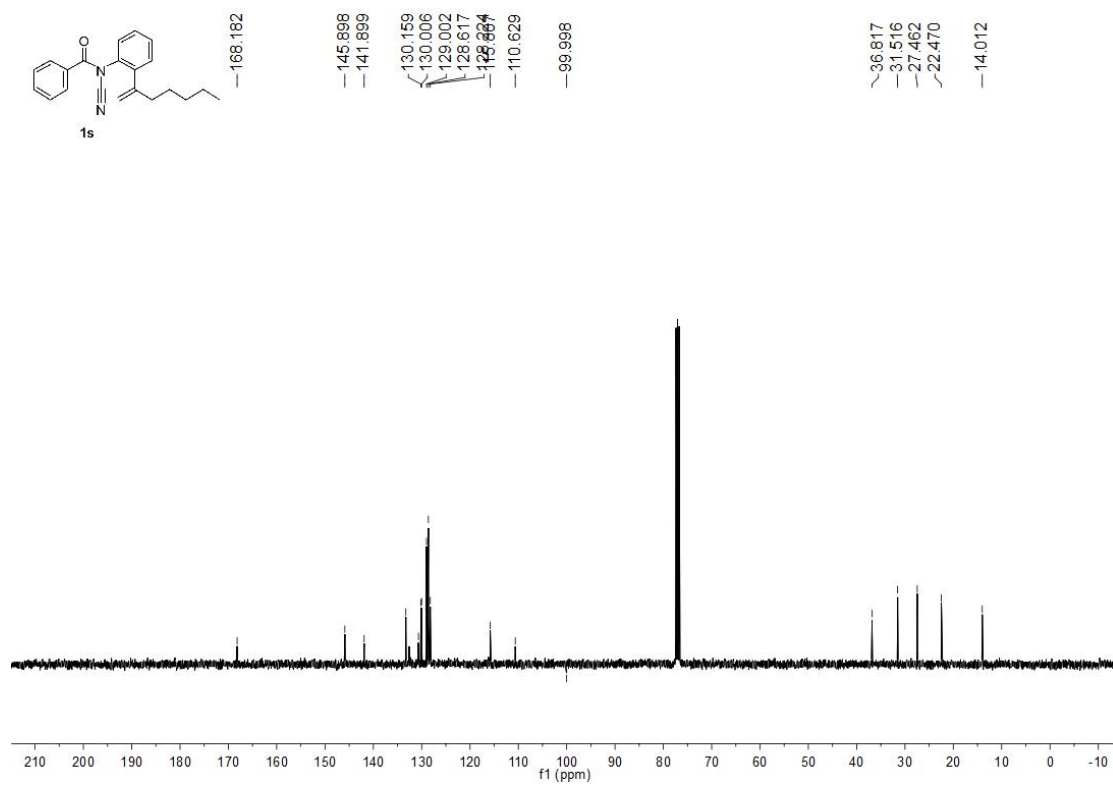
<sup>1</sup>H NMR spectrum of compound **1r**



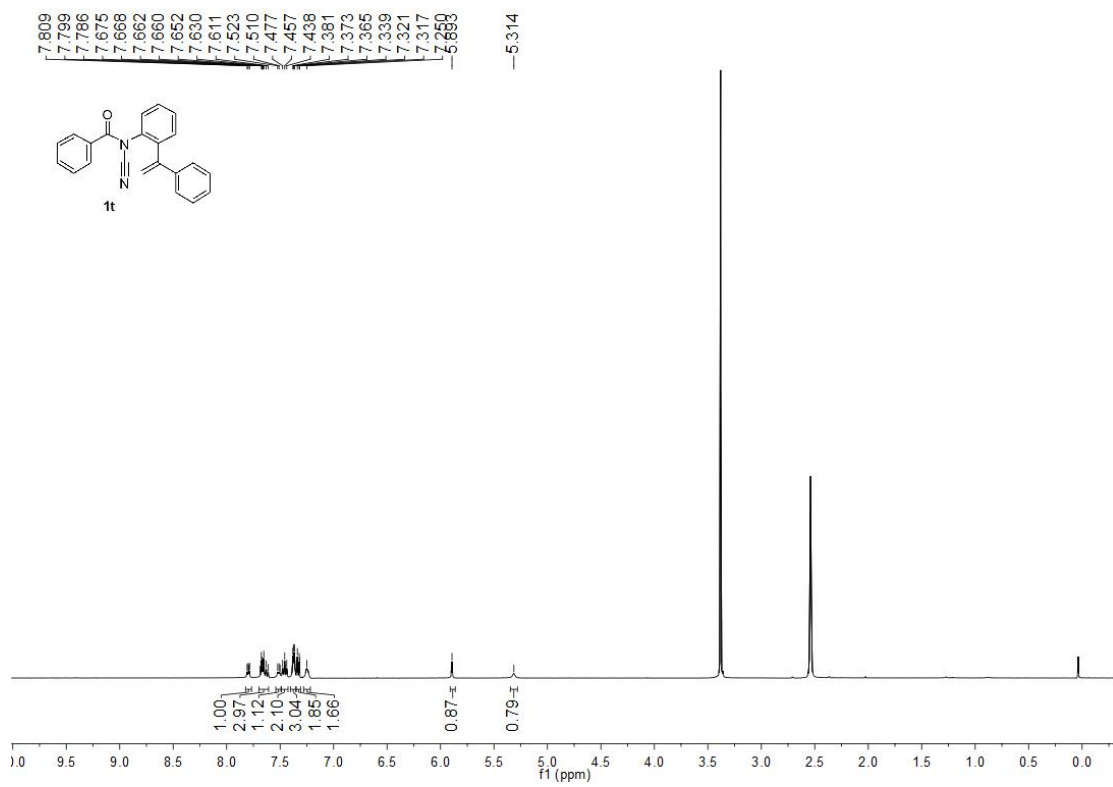
$^{13}\text{C}$  NMR spectrum of compound **1r**



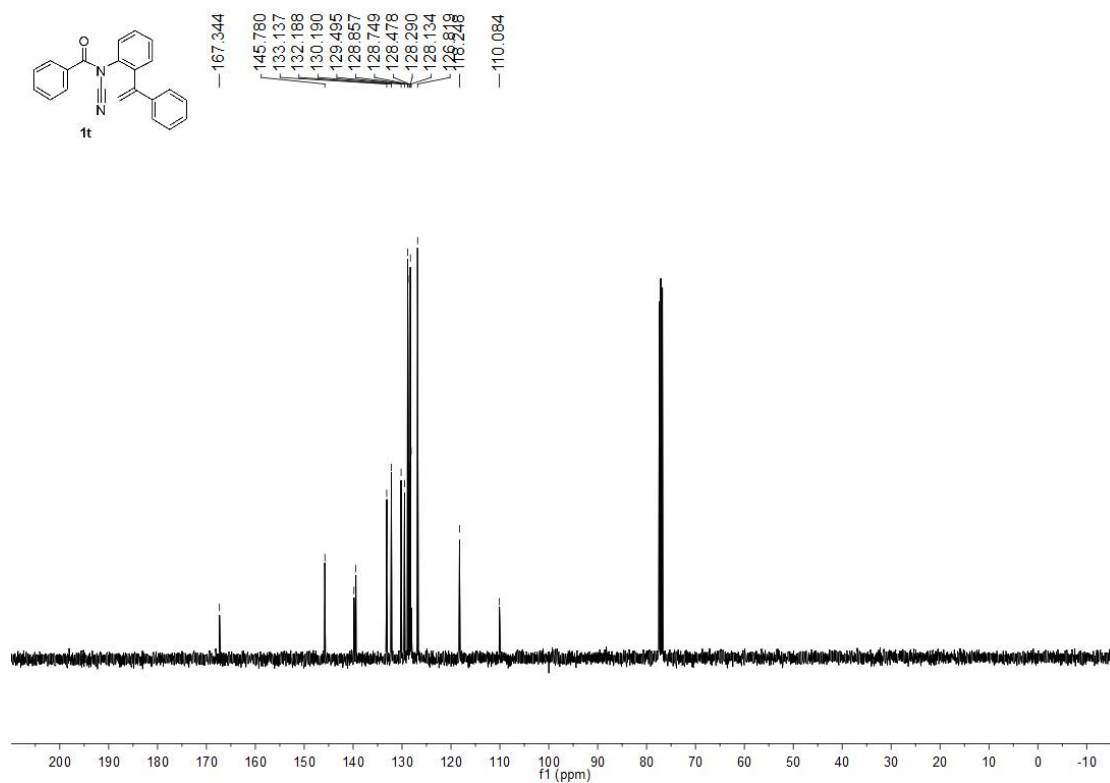
$^1\text{H}$  NMR spectrum of compound **1s**



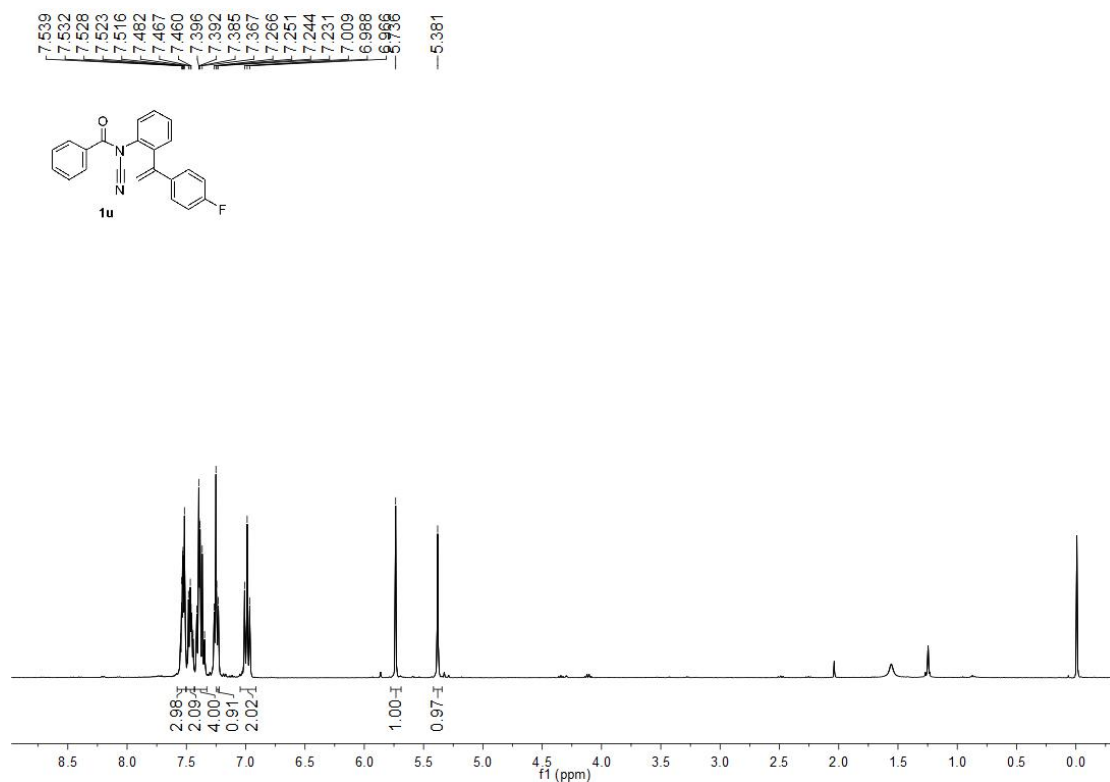
<sup>13</sup>C NMR spectrum of compound **1s**



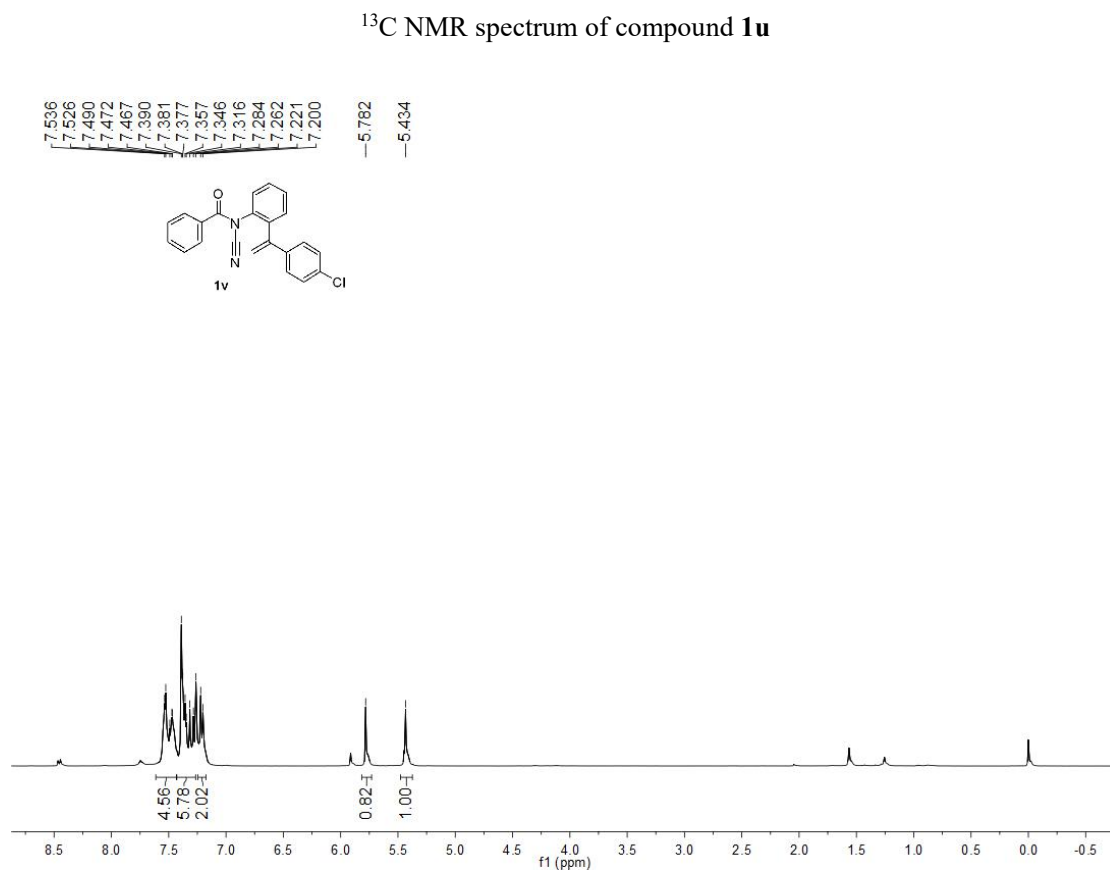
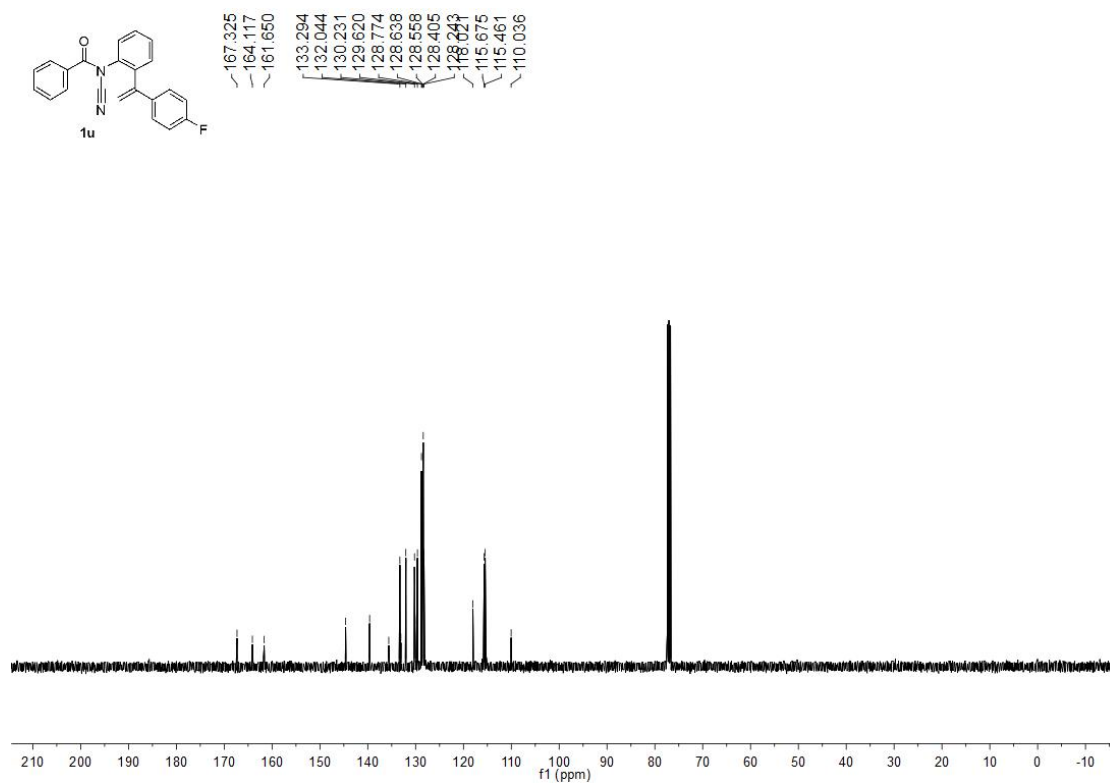
<sup>1</sup>H NMR spectrum of compound **1t**

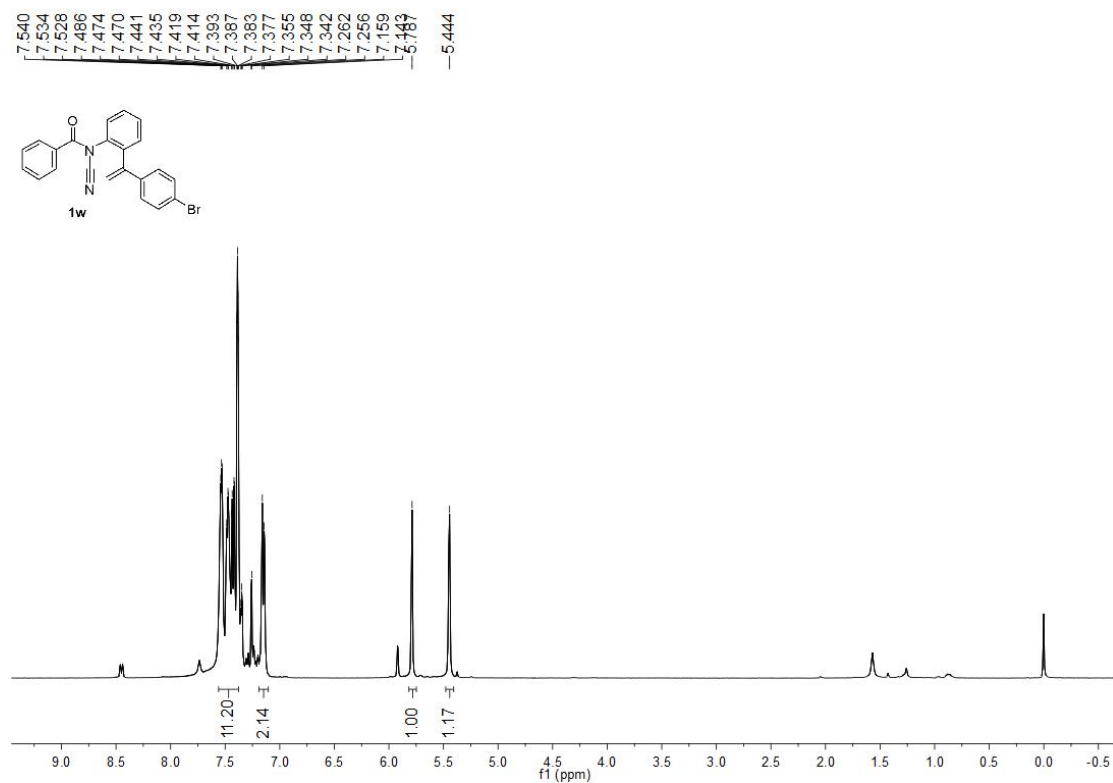


<sup>13</sup>C NMR spectrum of compound **1t**

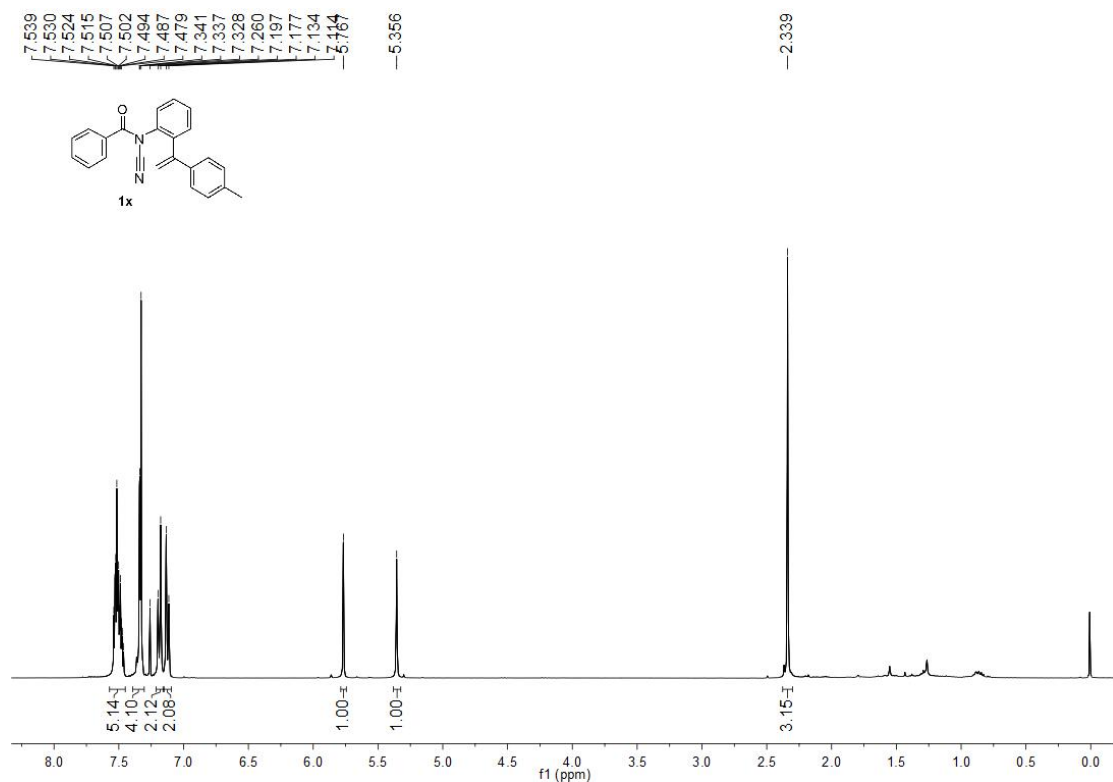


<sup>1</sup>H NMR spectrum of compound **1u**



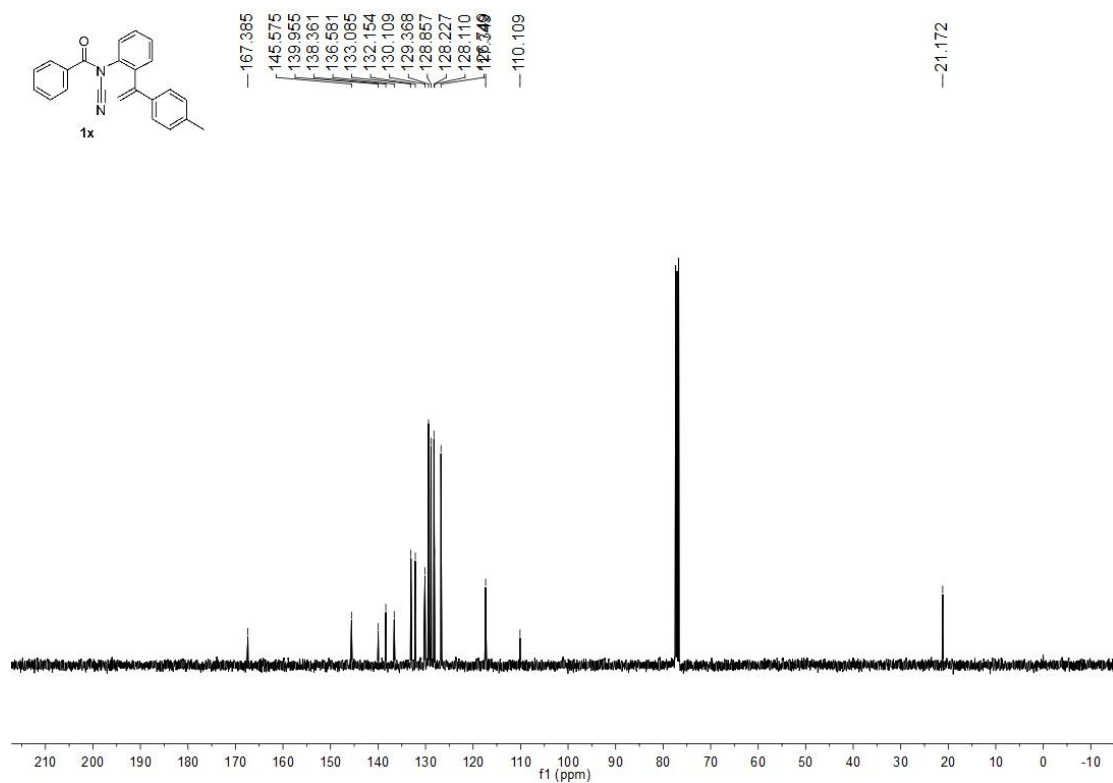


<sup>1</sup>H NMR spectrum of compound **1w**

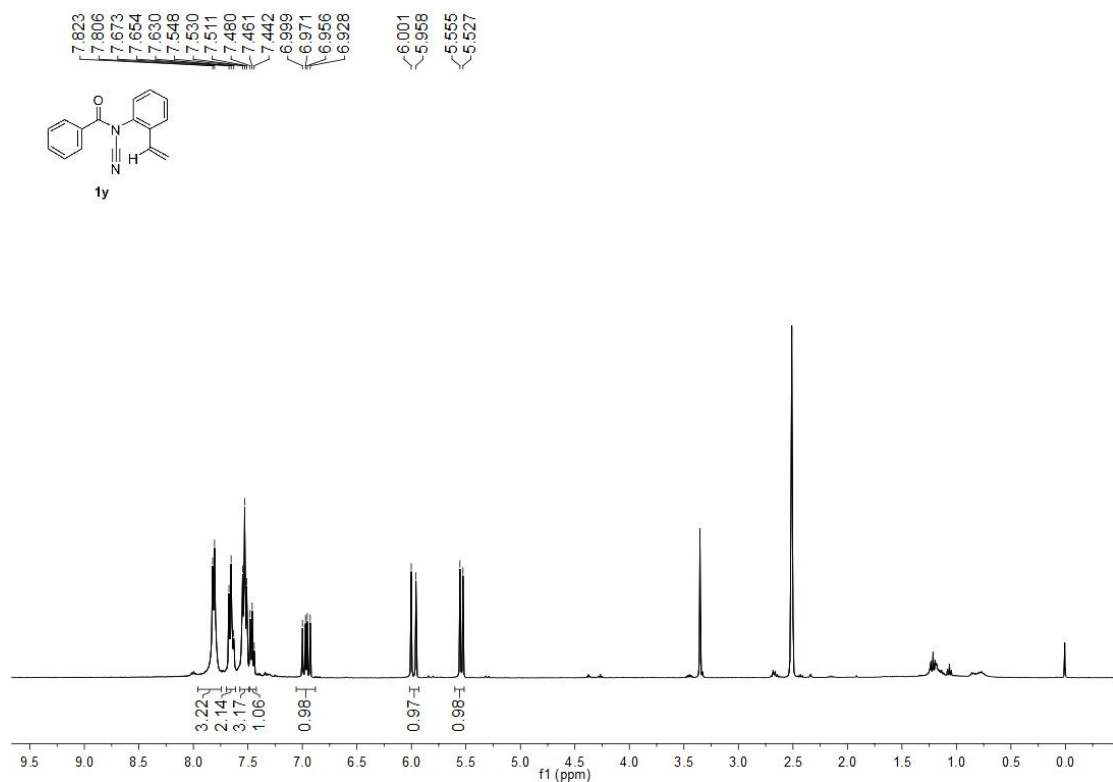


<sup>1</sup>H NMR spectrum of compound **1x**

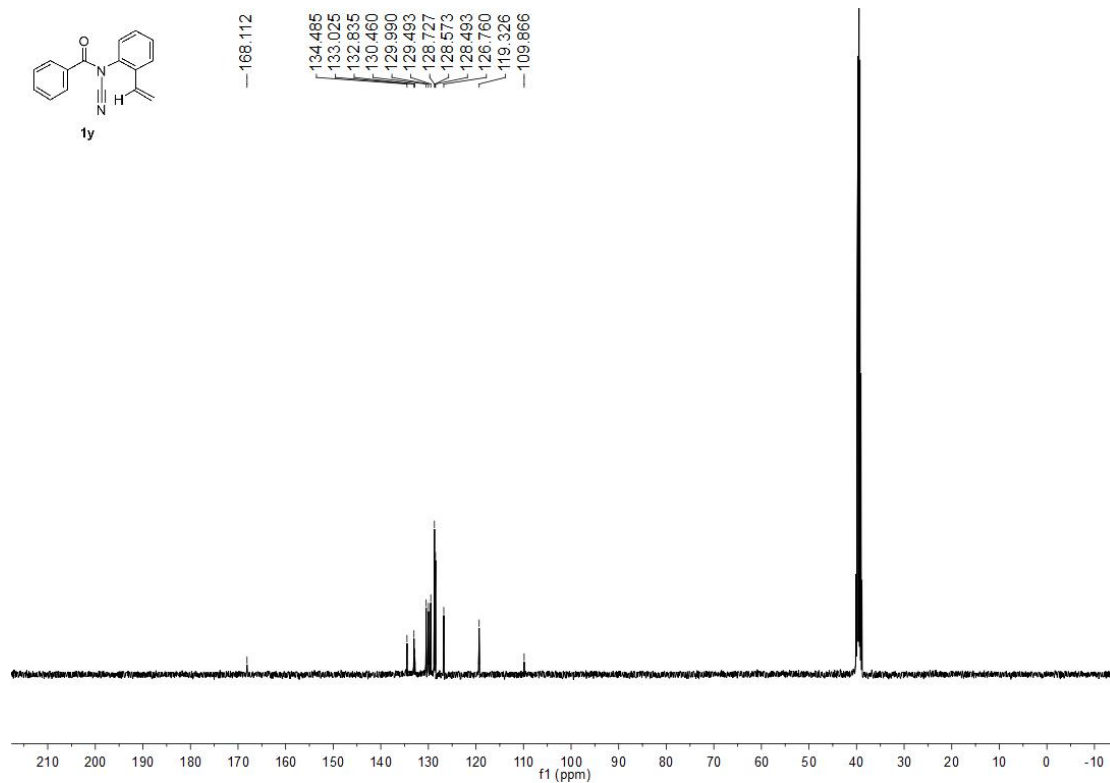




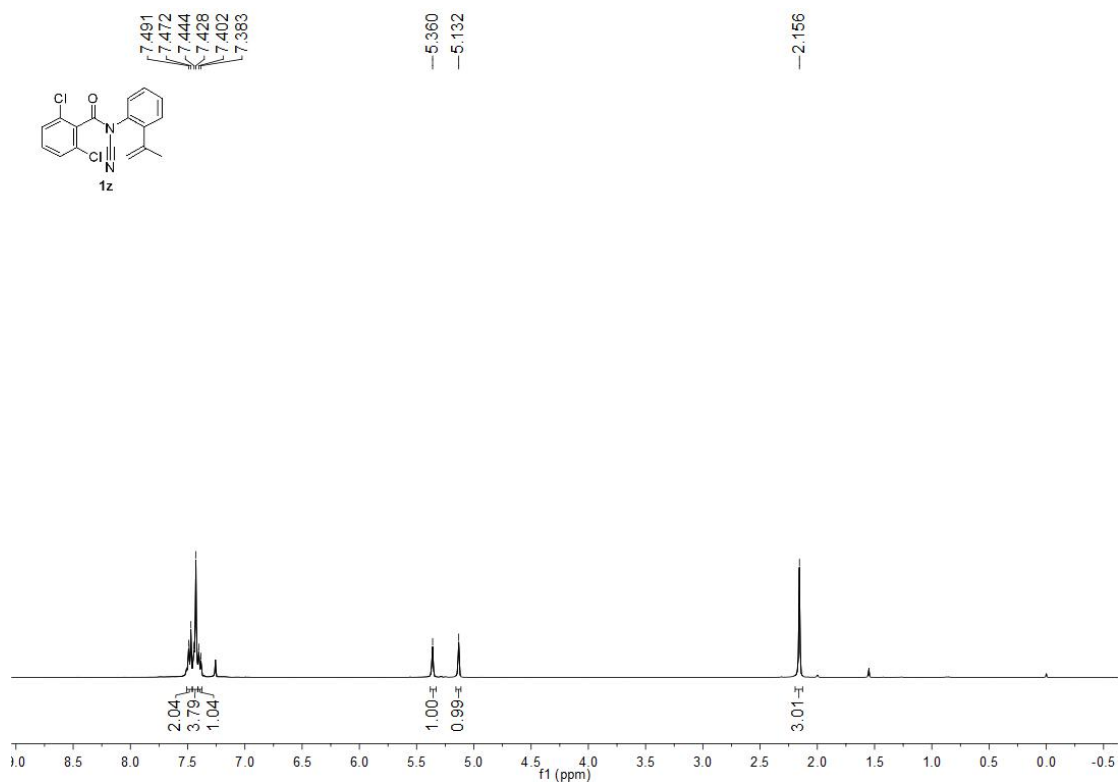
<sup>13</sup>C NMR spectrum of compound **1x**



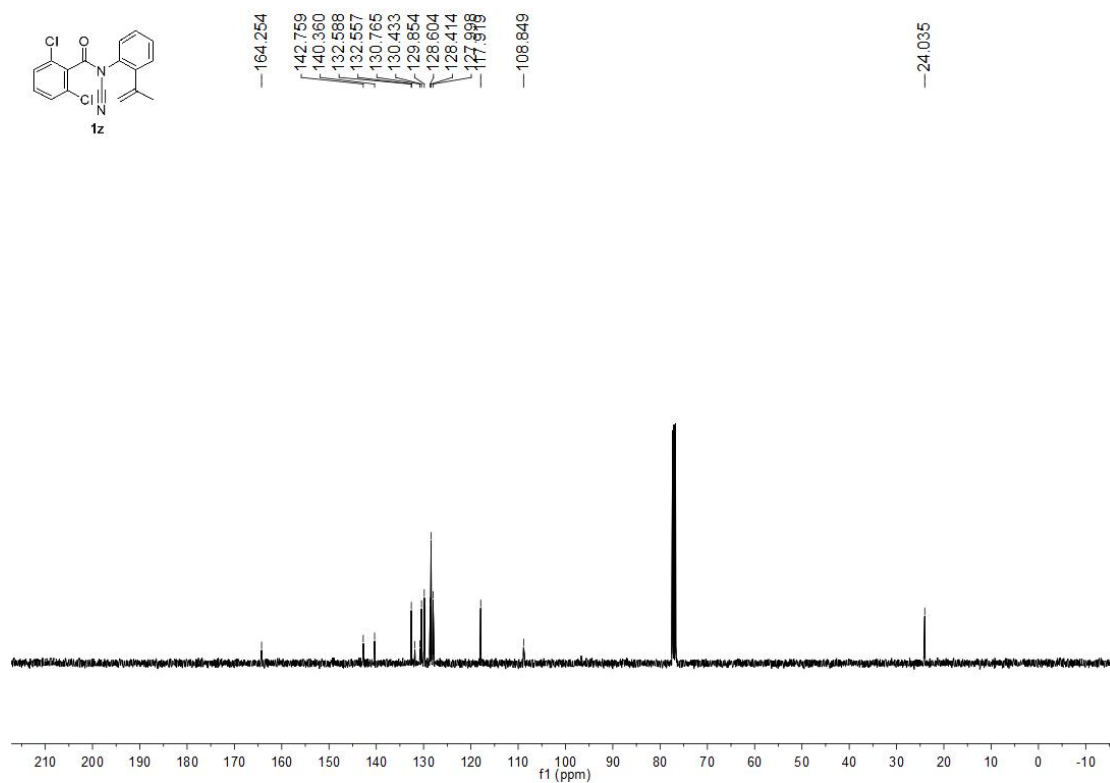
<sup>1</sup>H NMR spectrum of compound **1y**



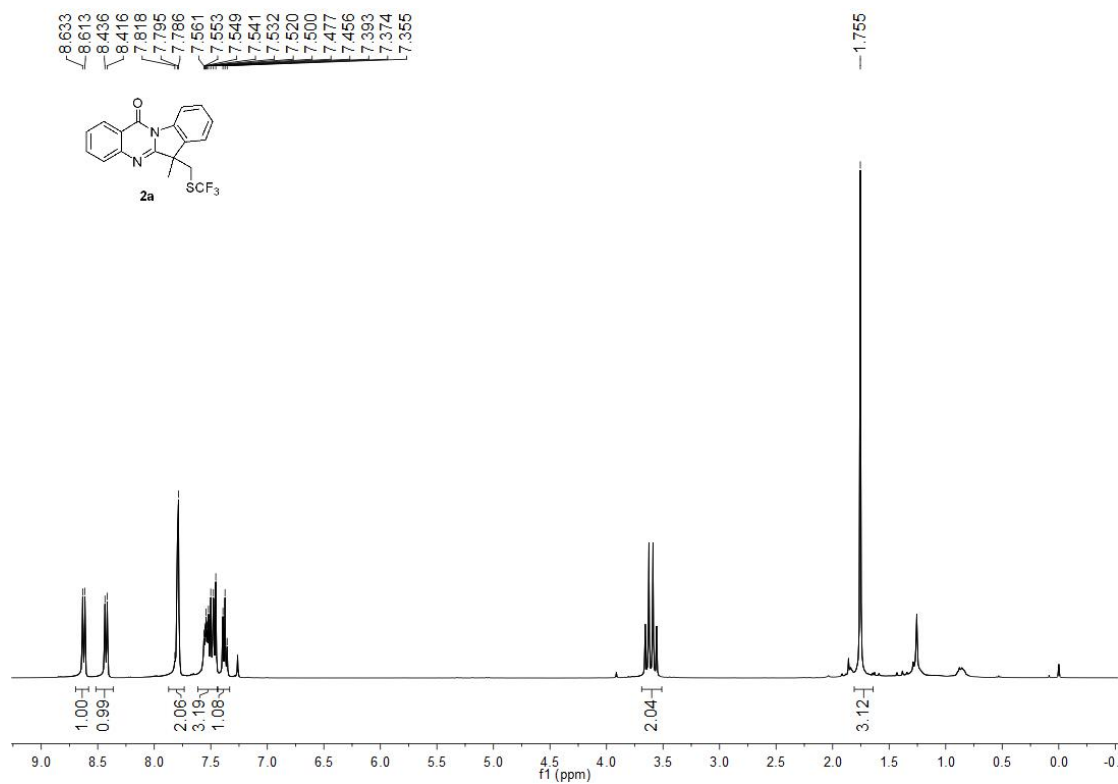
<sup>13</sup>C NMR spectrum of compound **1y**



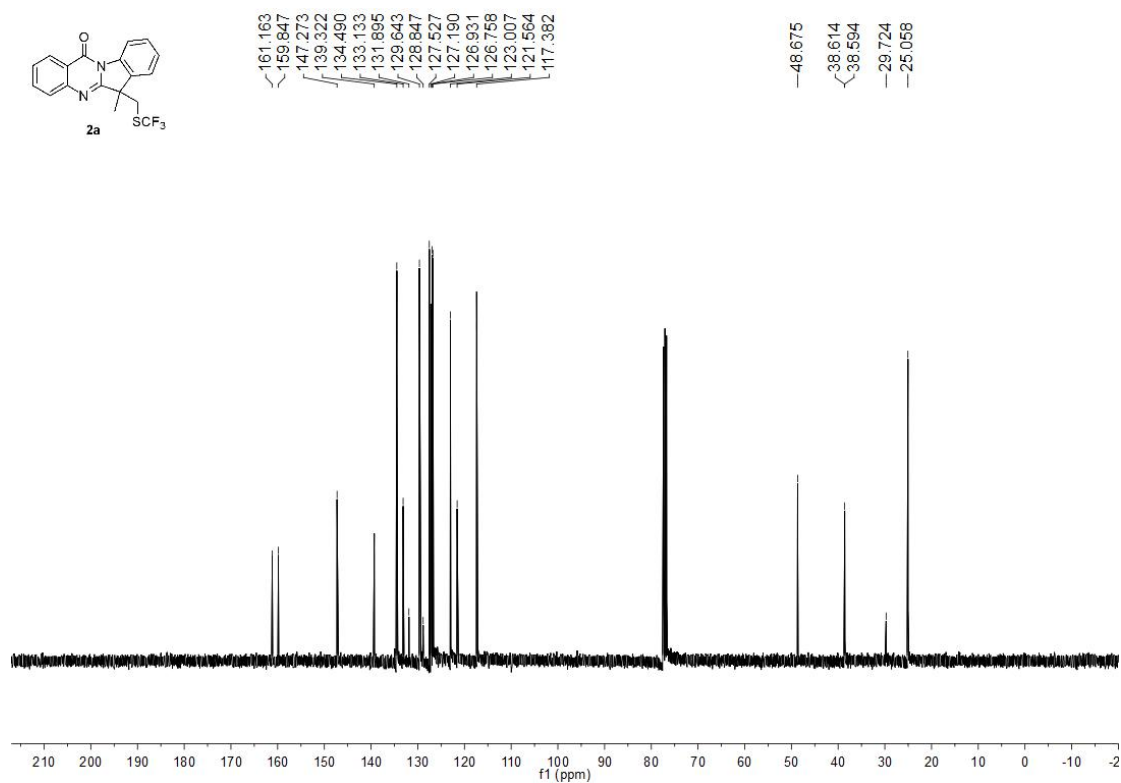
<sup>1</sup>H NMR spectrum of compound **1z**



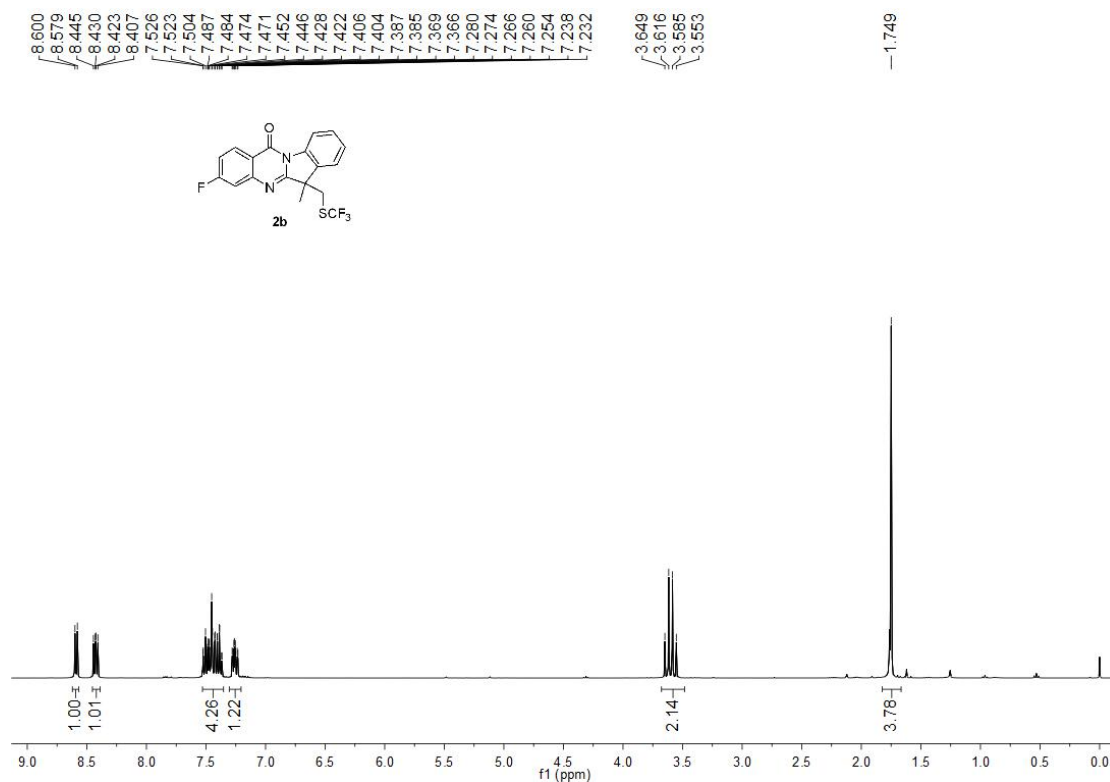
<sup>13</sup>C NMR spectrum of compound **1z**



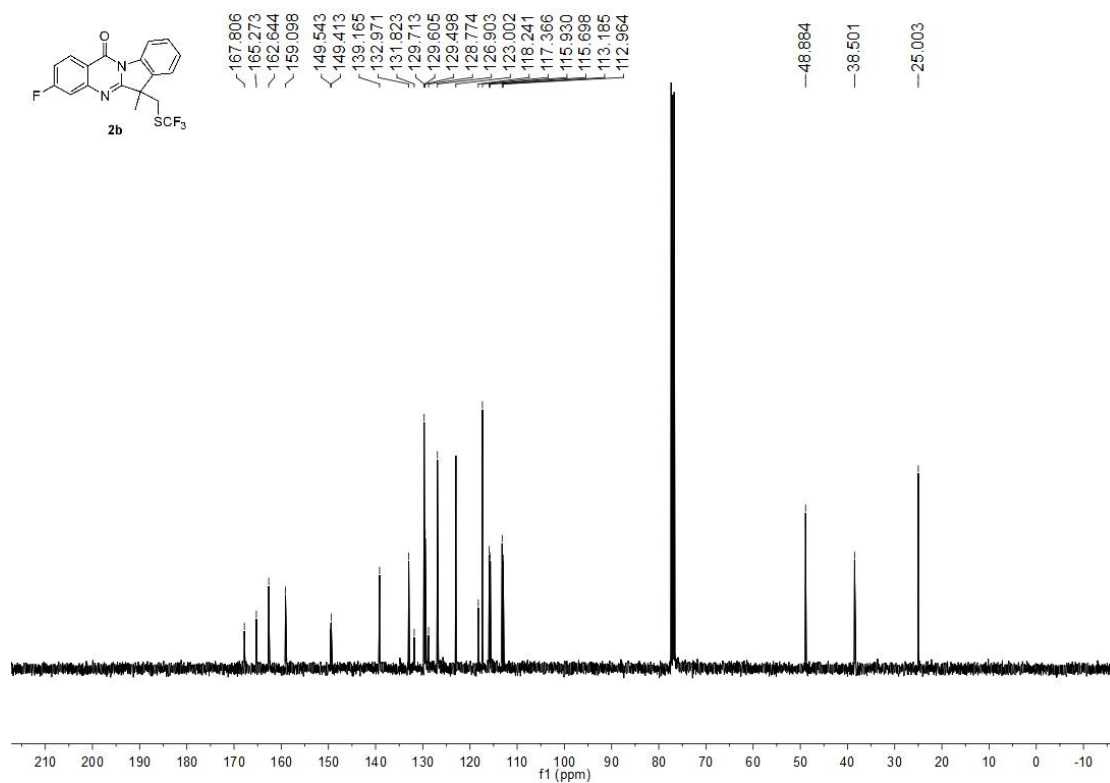
<sup>1</sup>H NMR spectrum of compound **2a**



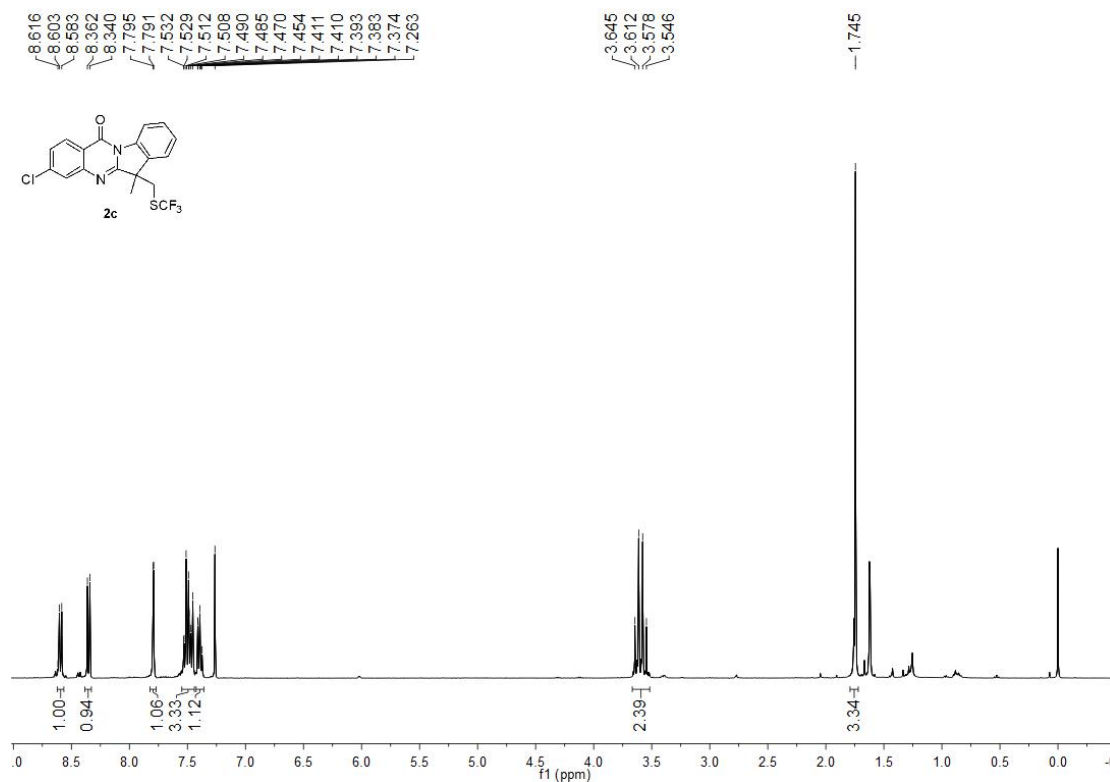
<sup>13</sup>C NMR spectrum of compound **2a**



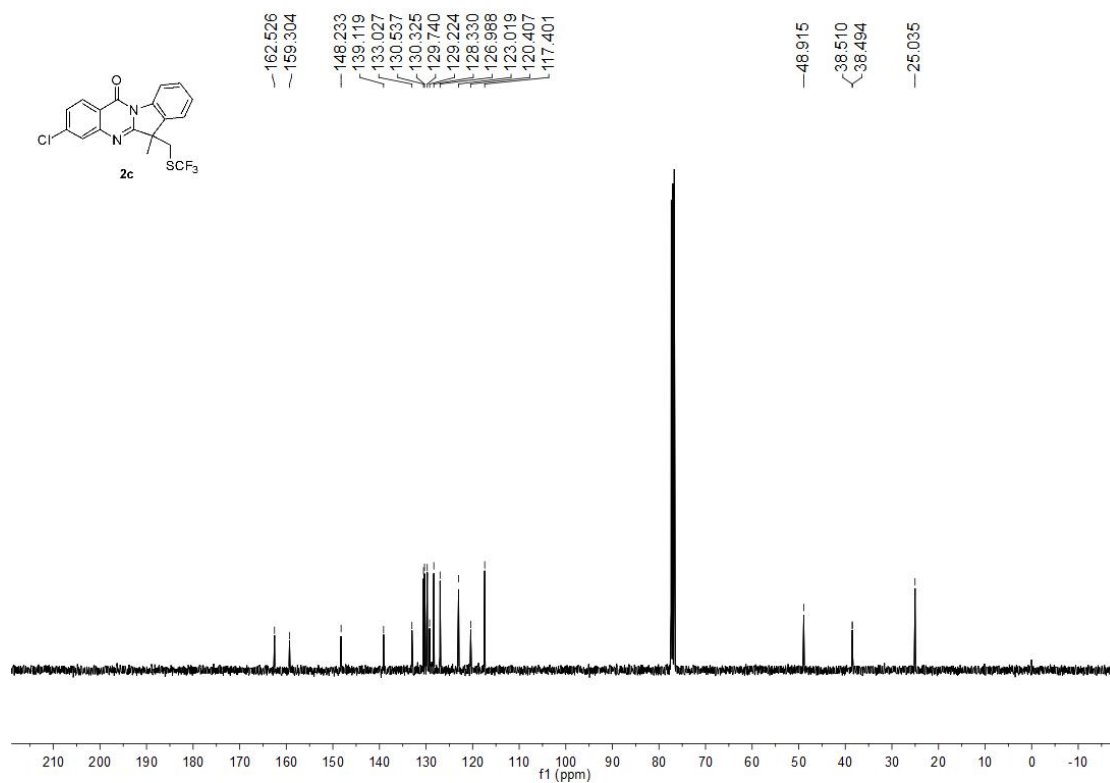
<sup>1</sup>H NMR spectrum of compound **2b**



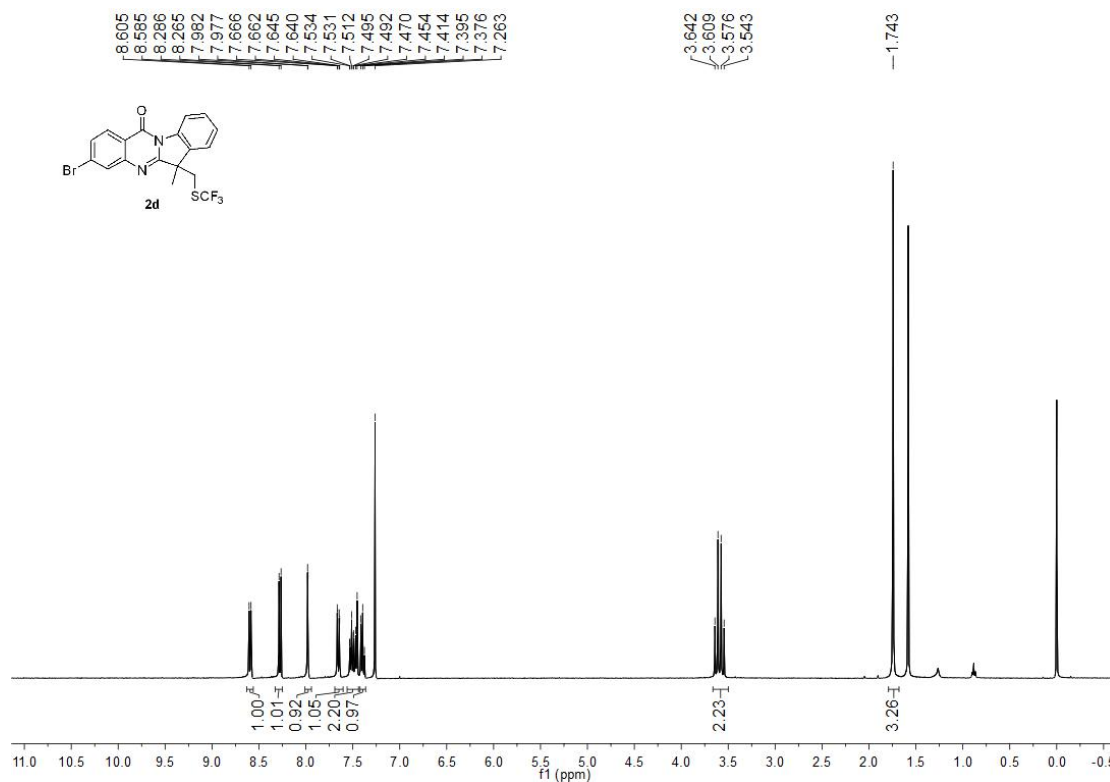
<sup>13</sup>C NMR spectrum of compound **2b**



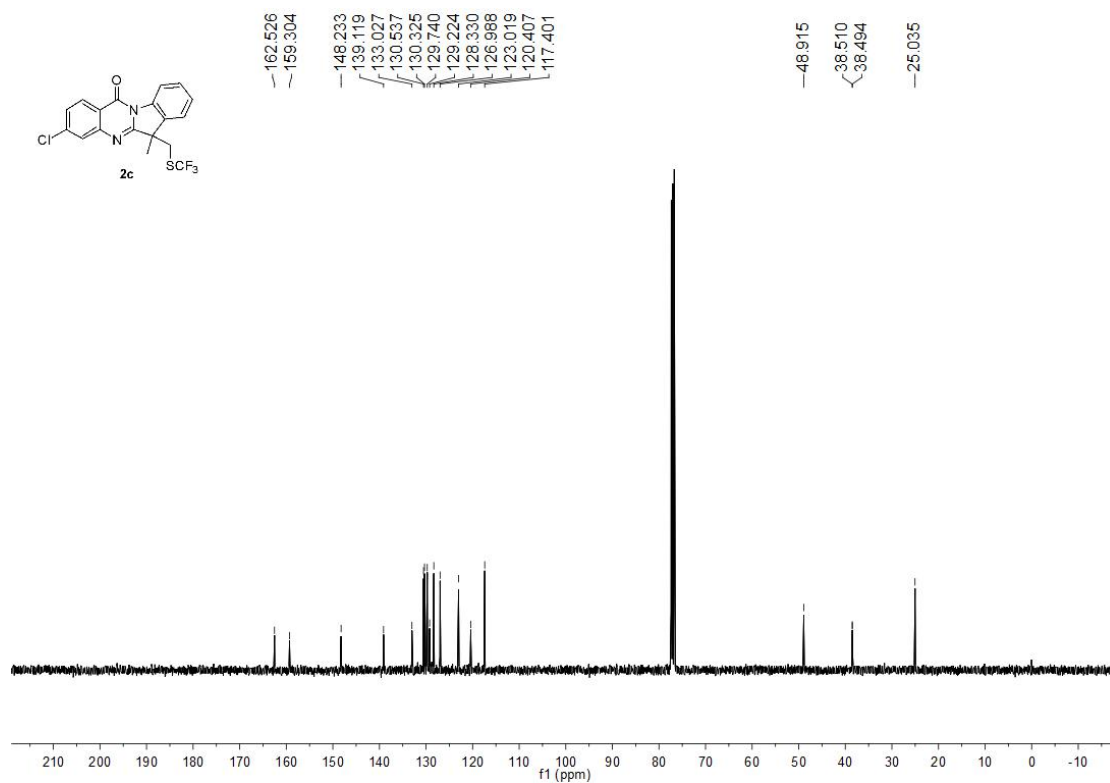
<sup>1</sup>H NMR spectrum of compound **2c**



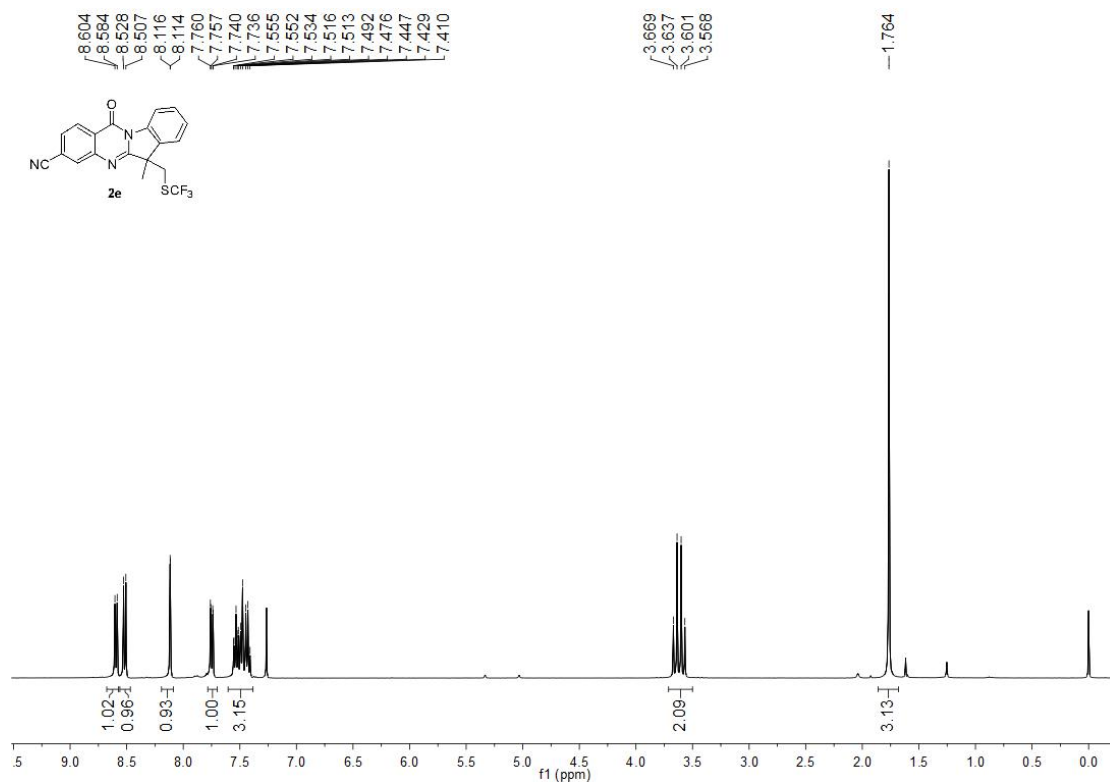
$^{13}\text{C}$  NMR spectrum of compound **2c**



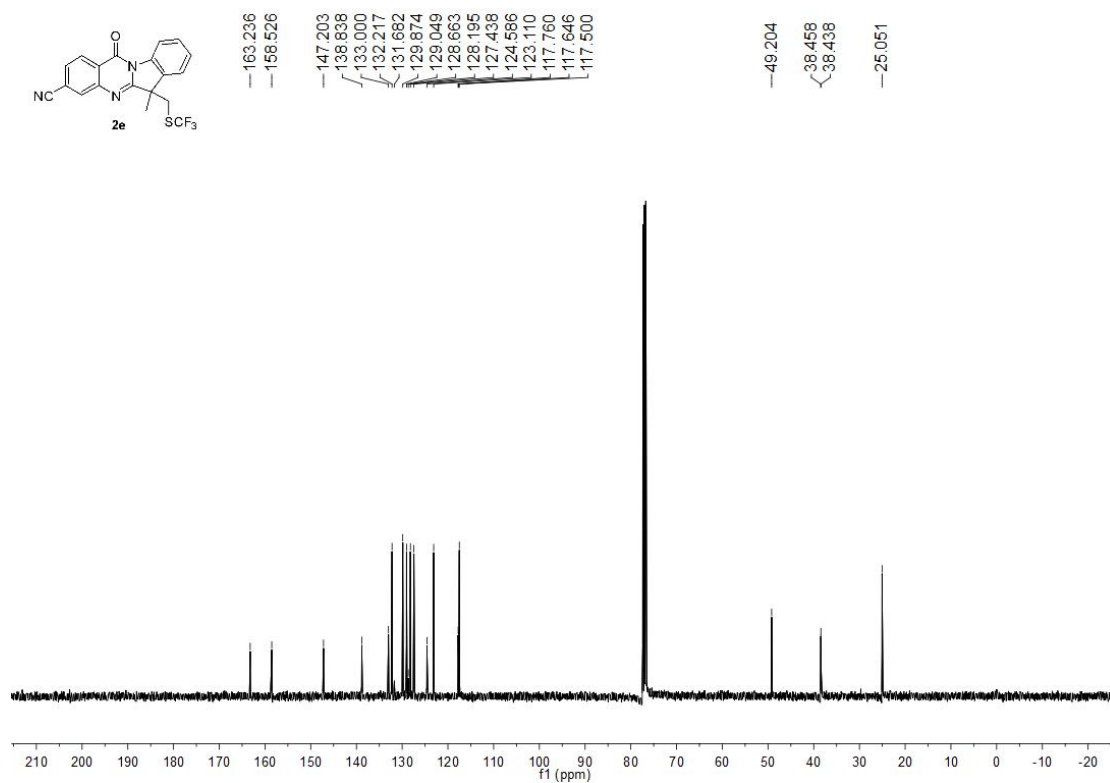
$^1\text{H}$  NMR spectrum of compound **2d**



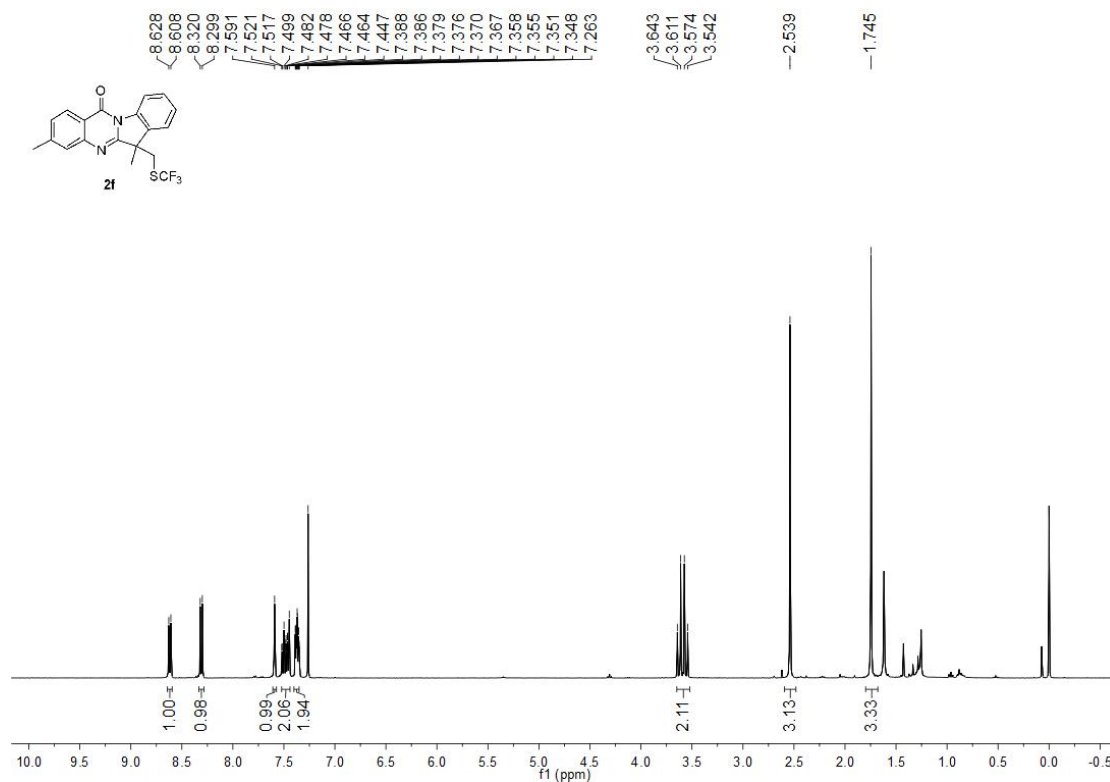
<sup>13</sup>C NMR spectrum of compound **2d**



<sup>1</sup>H NMR spectrum of compound **2e**

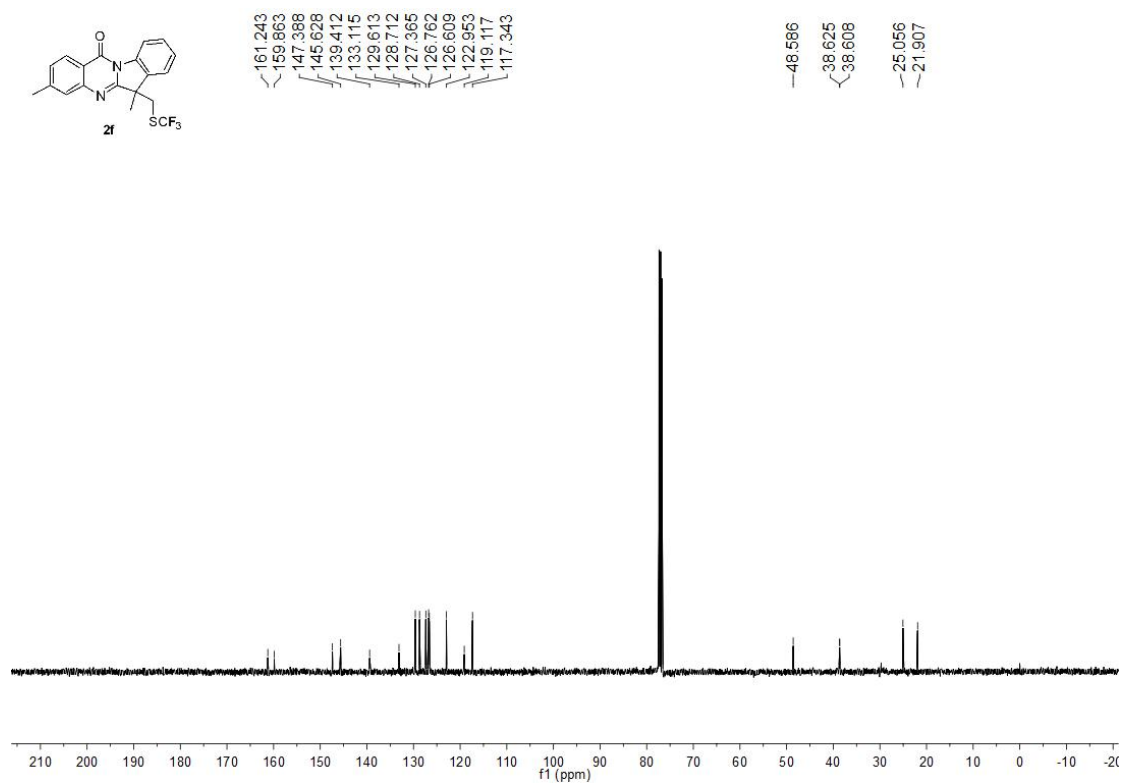


<sup>13</sup>C NMR spectrum of compound **2e**

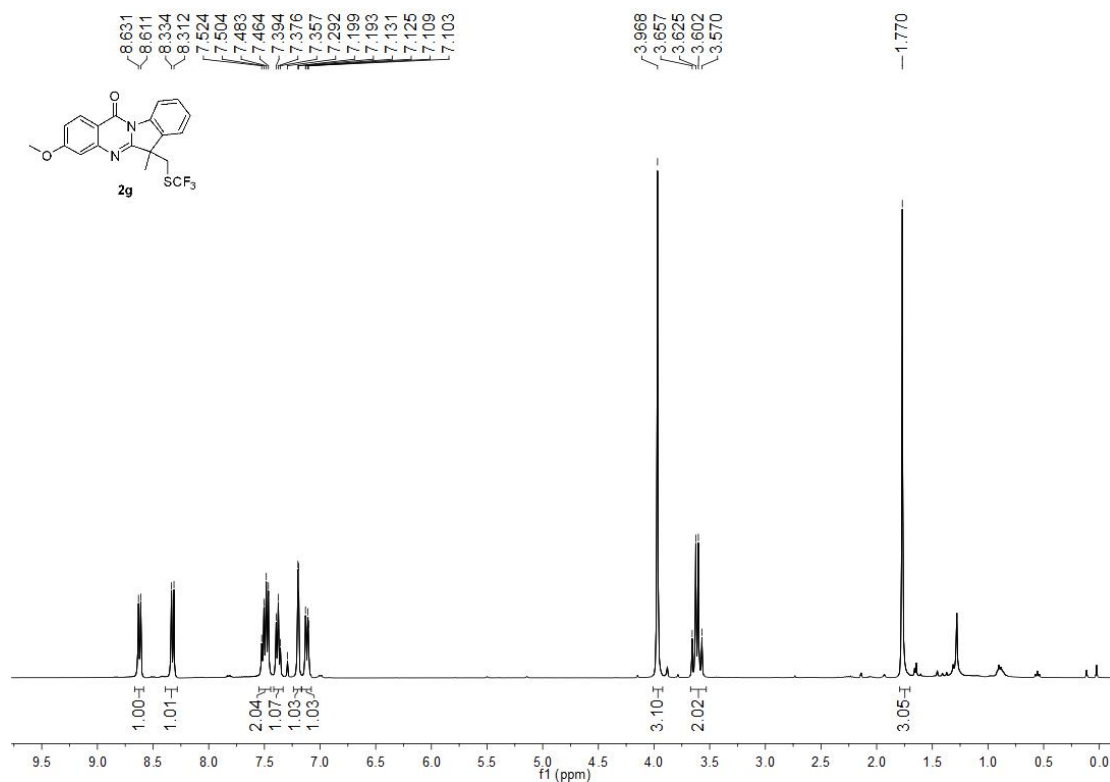


<sup>1</sup>H NMR spectrum of compound **2f**

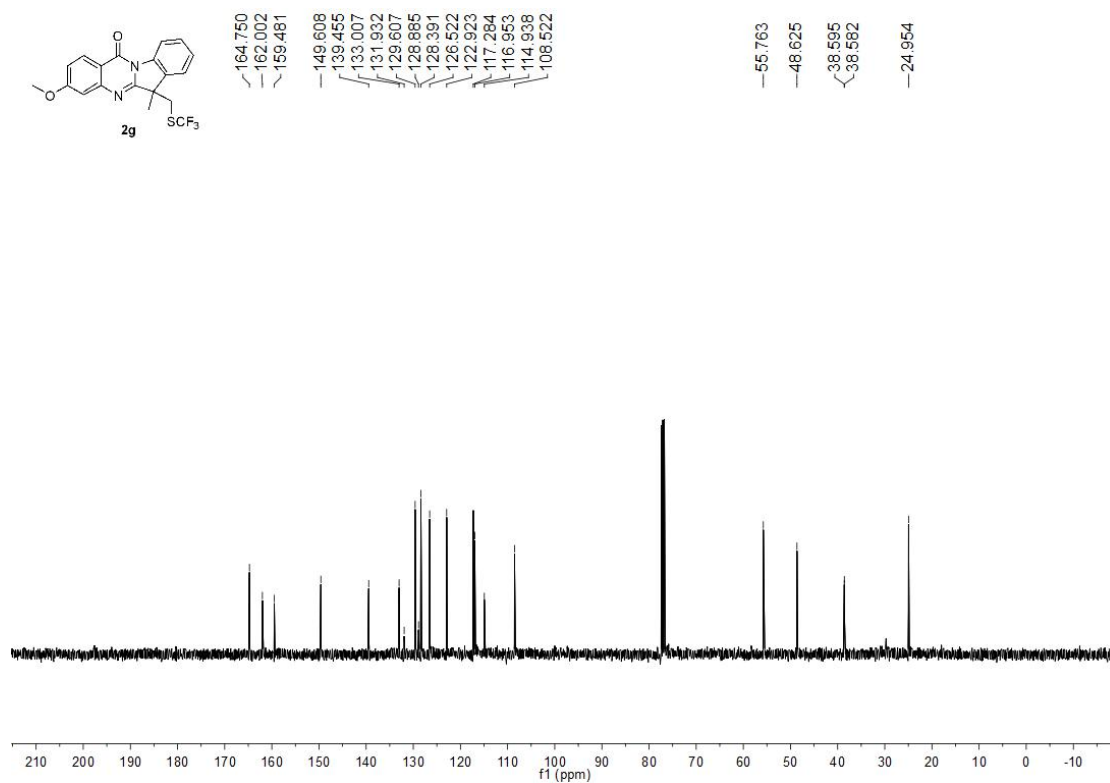




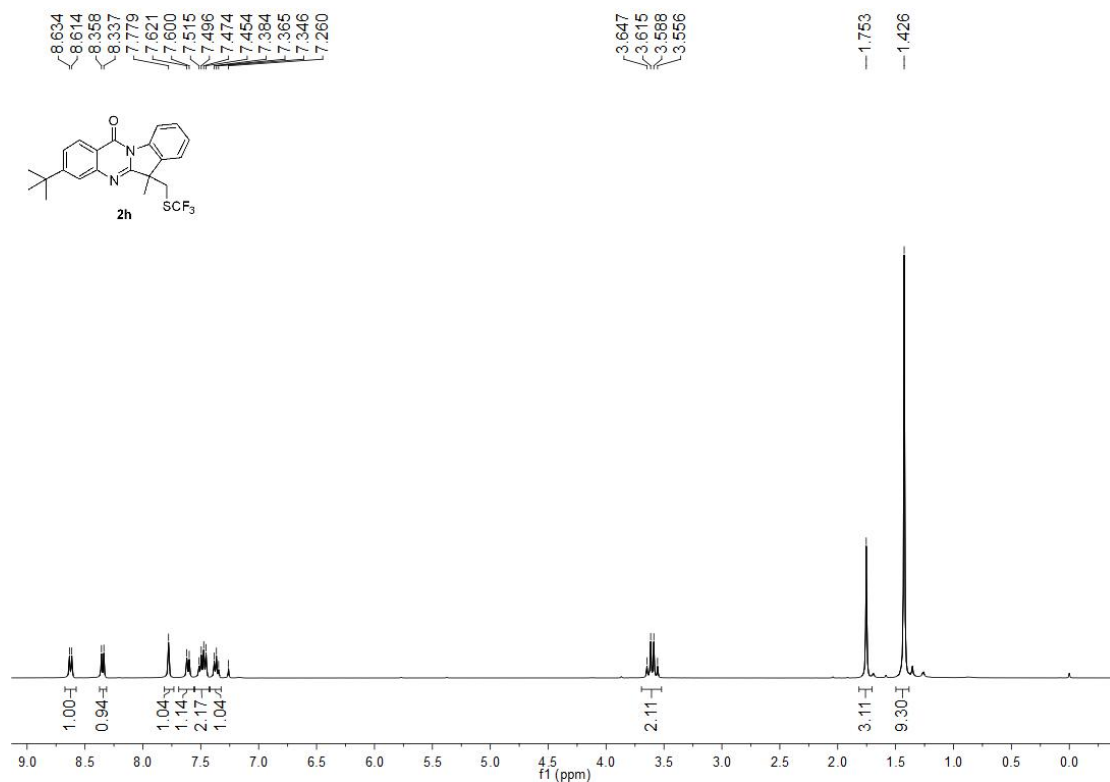
<sup>13</sup>C NMR spectrum of compound **2f**



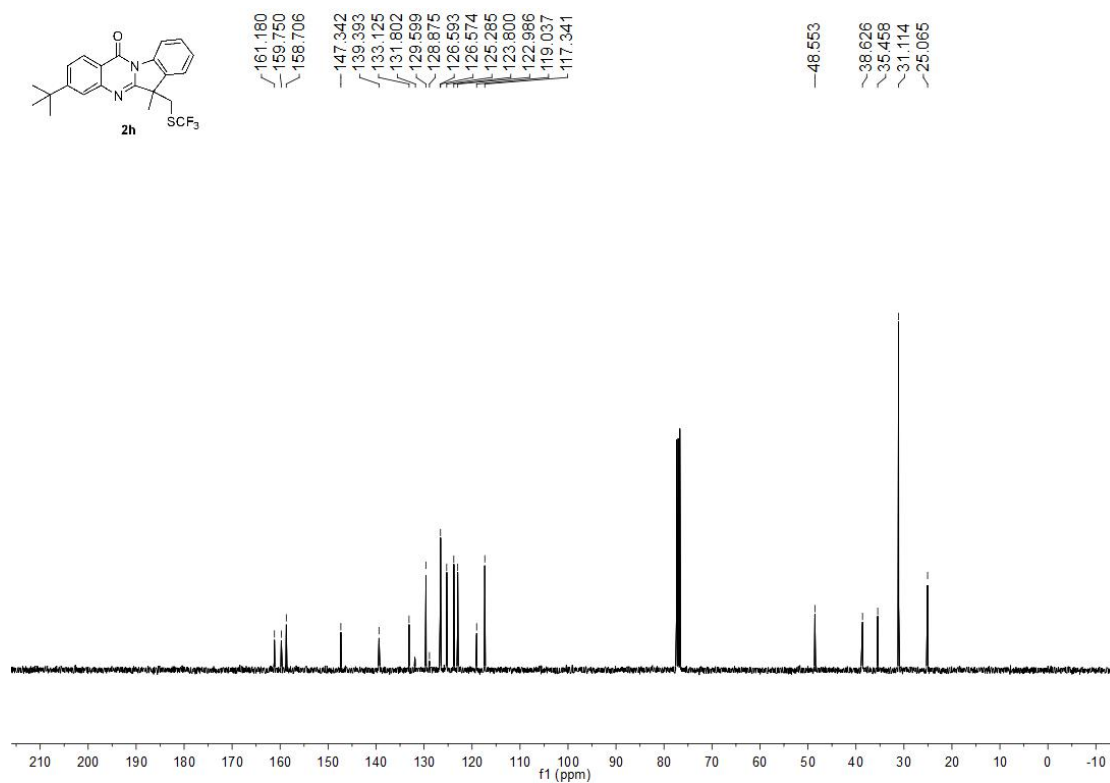
<sup>1</sup>H NMR spectrum of compound **2g**



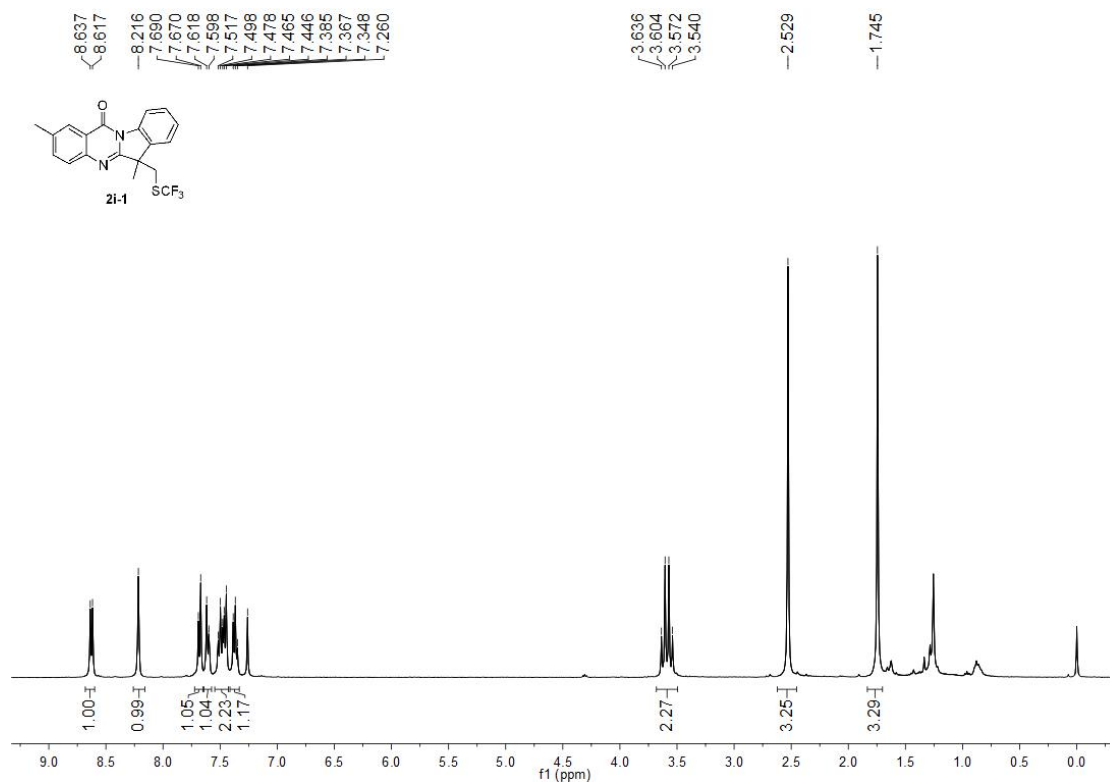
<sup>13</sup>C NMR spectrum of compound **2g**



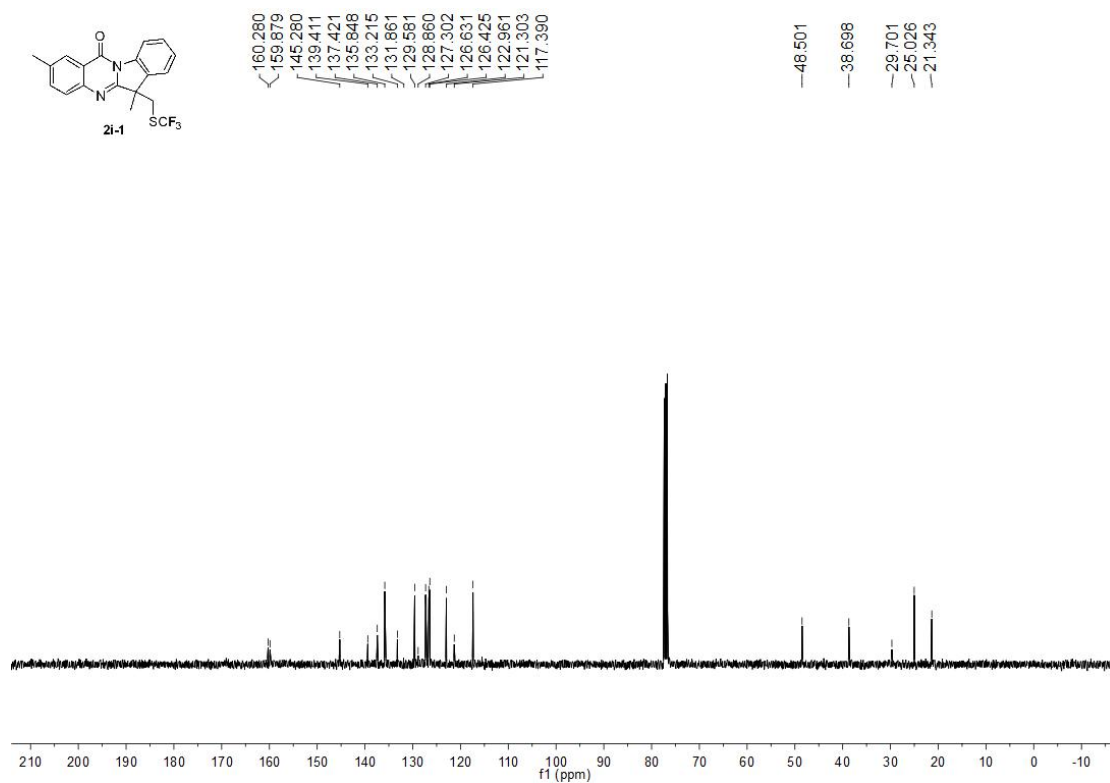
<sup>1</sup>H NMR spectrum of compound **2h**



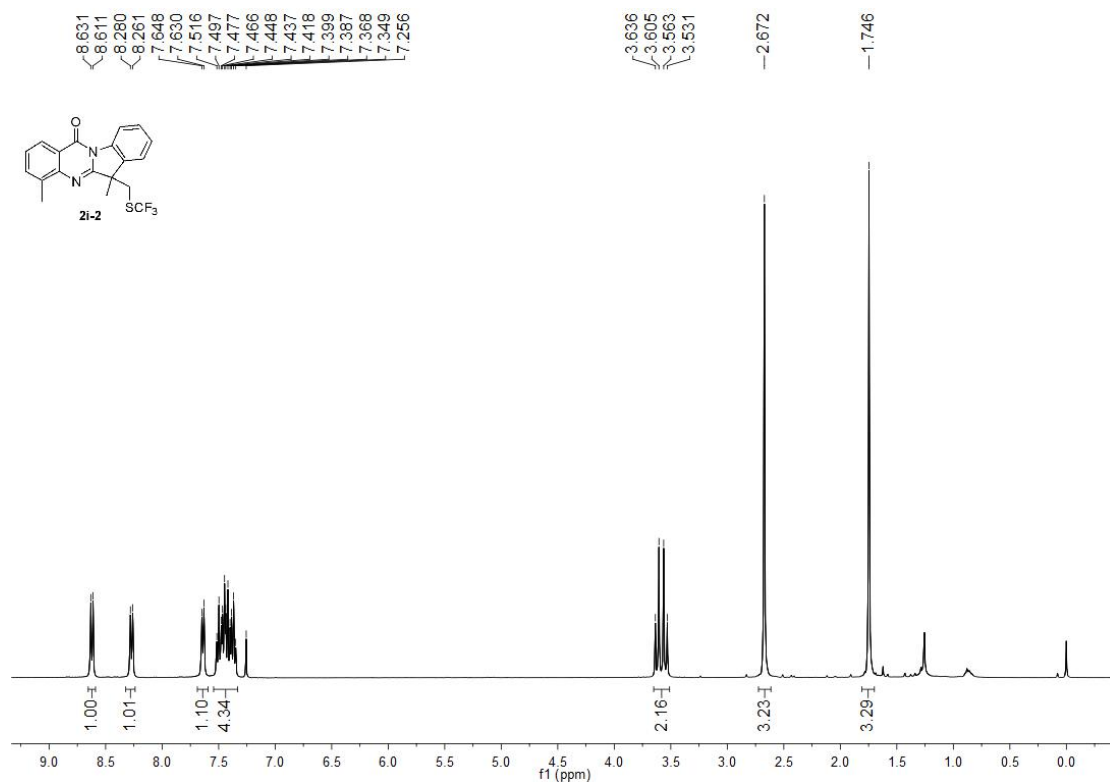
<sup>13</sup>C NMR spectrum of compound **2h**



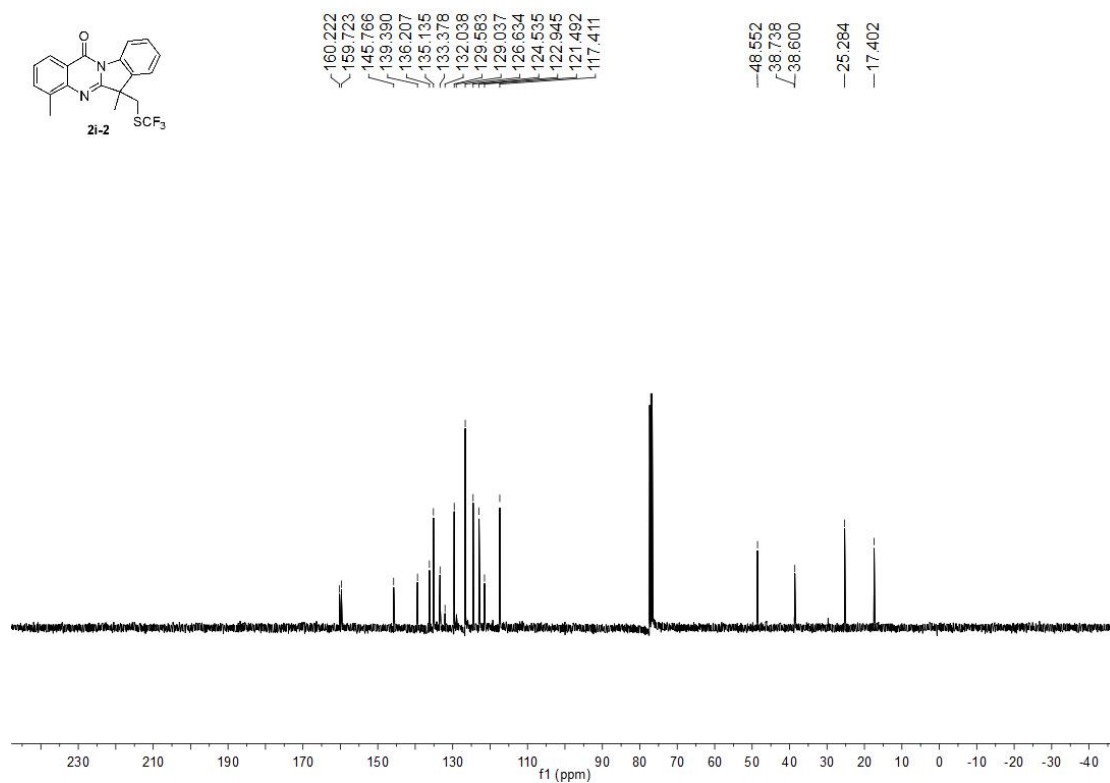
<sup>1</sup>H NMR spectrum of compound **2i-1**



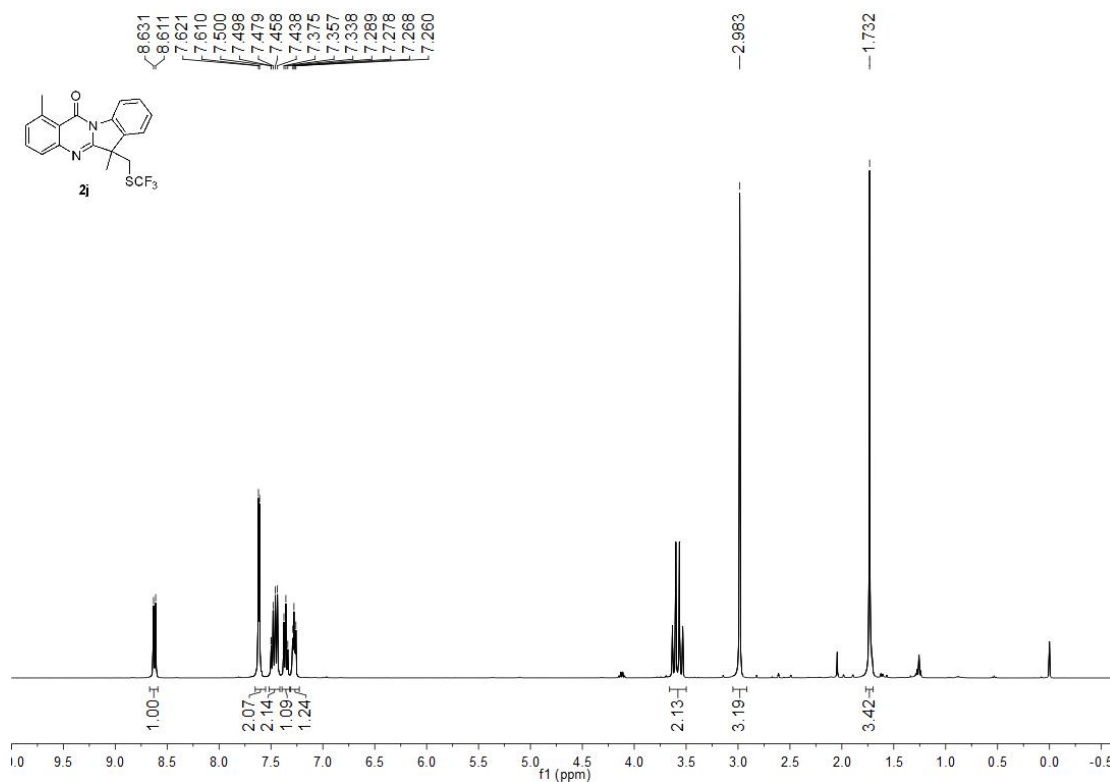
<sup>13</sup>C NMR spectrum of compound **2i-1**



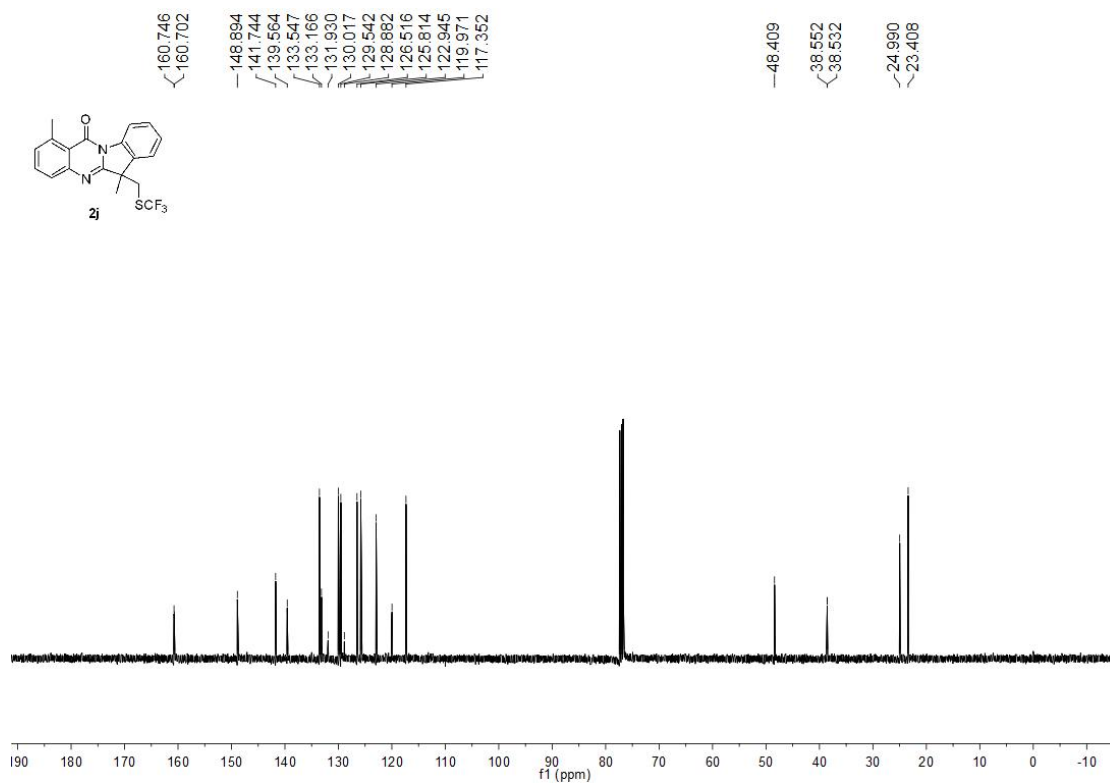
<sup>1</sup>H NMR spectrum of compound **2i-2**



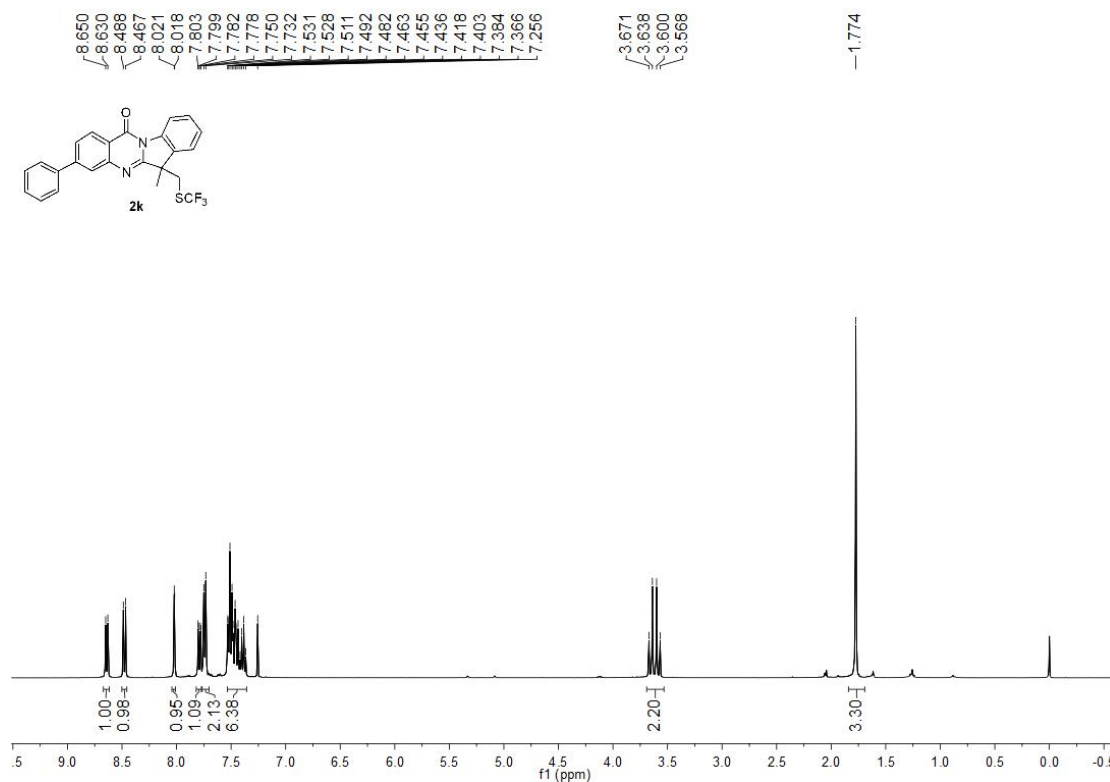
<sup>13</sup>C NMR spectrum of compound **2i-2**



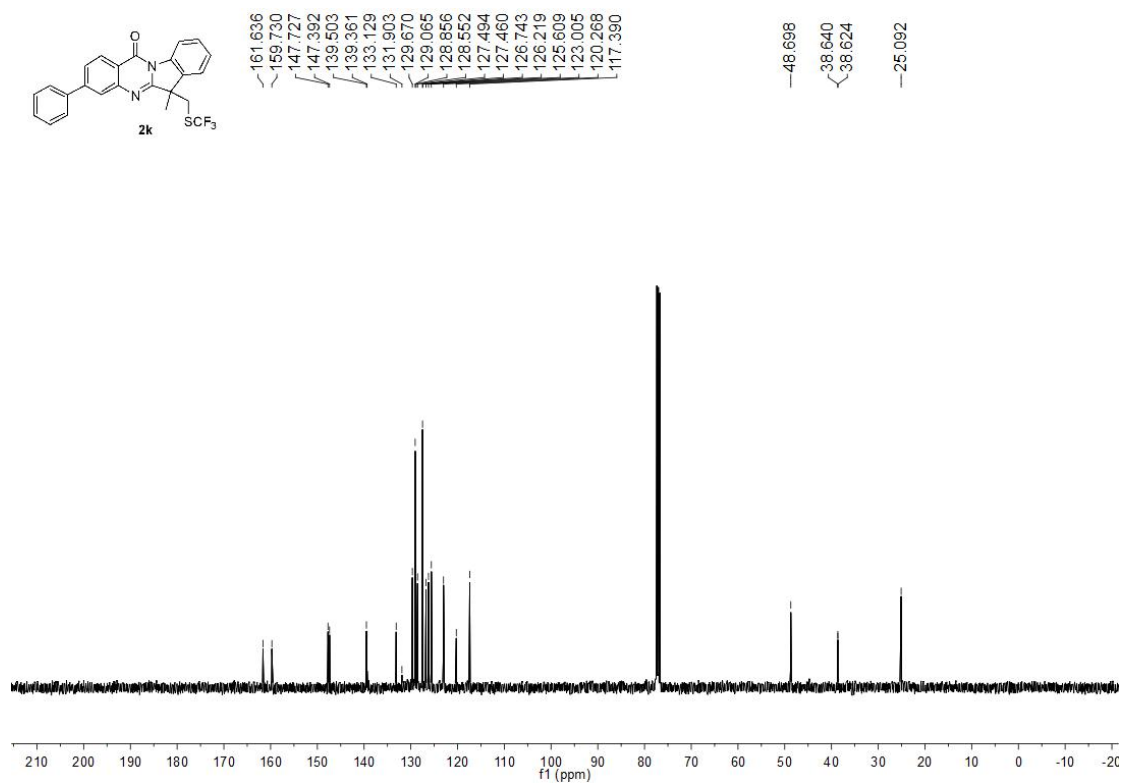
<sup>1</sup>H NMR spectrum of compound **2j**



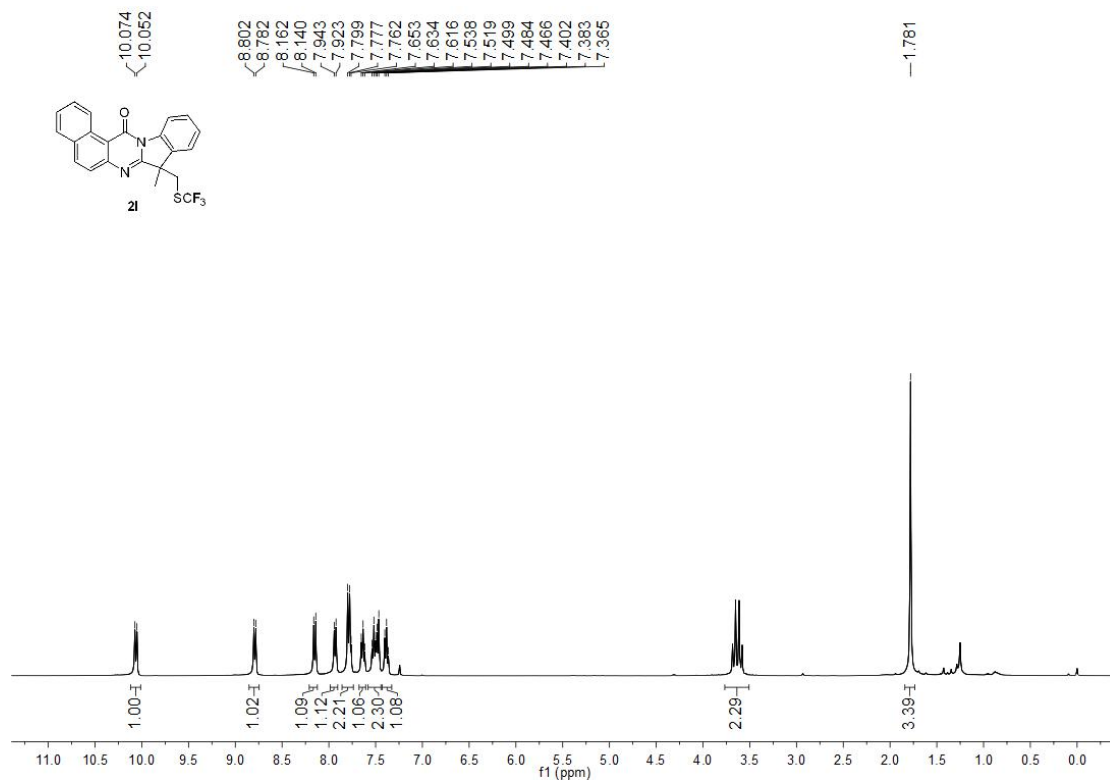
$^{13}\text{C}$  NMR spectrum of compound **2j**



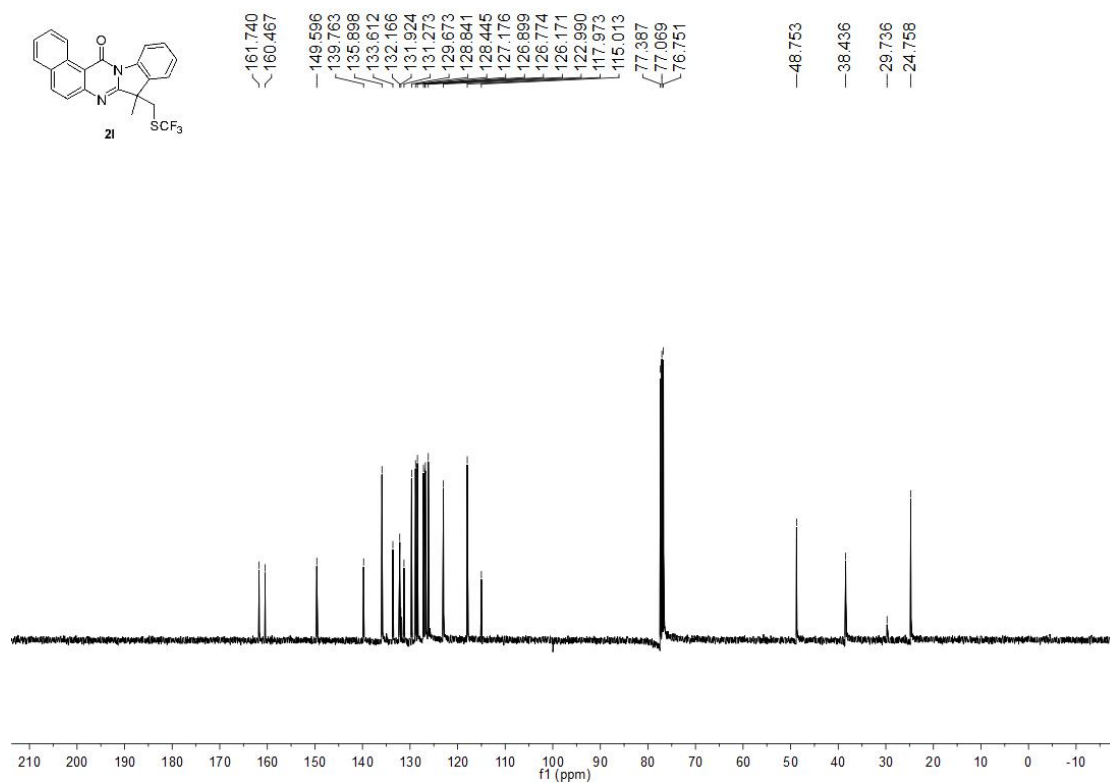
$^1\text{H}$  NMR spectrum of compound **2k**



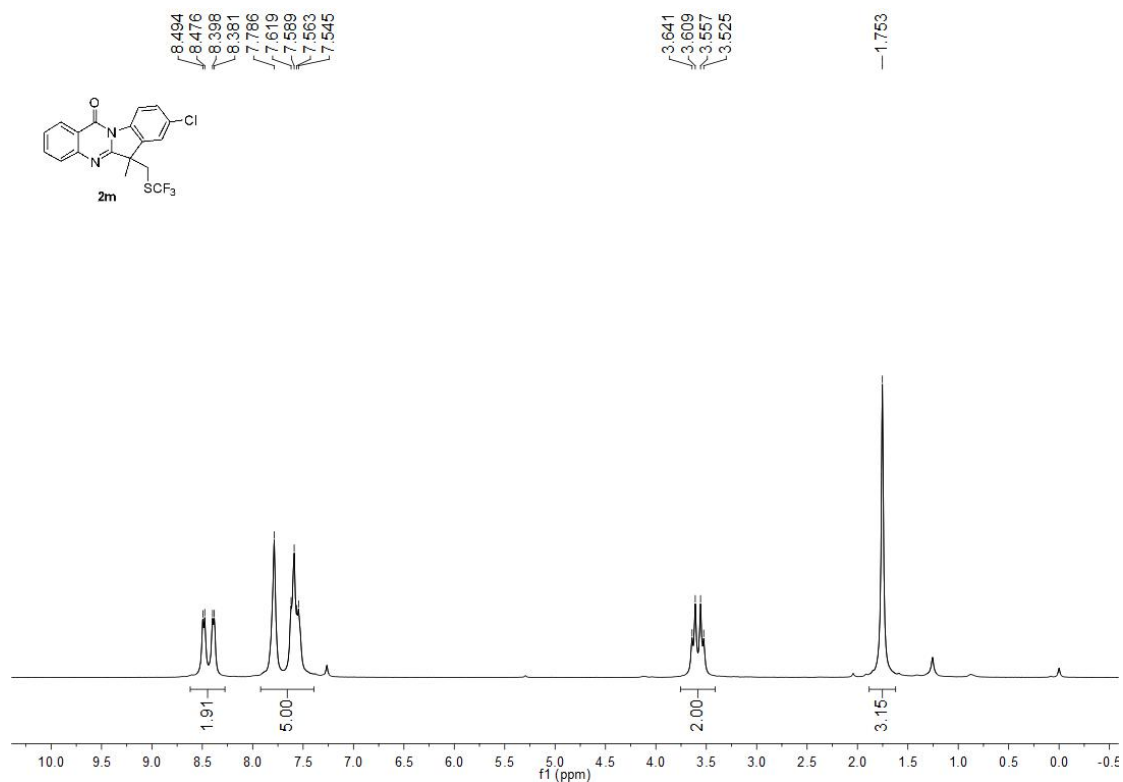
**<sup>13</sup>C NMR spectrum of compound 2k**



**<sup>1</sup>H NMR spectrum of compound 2l**

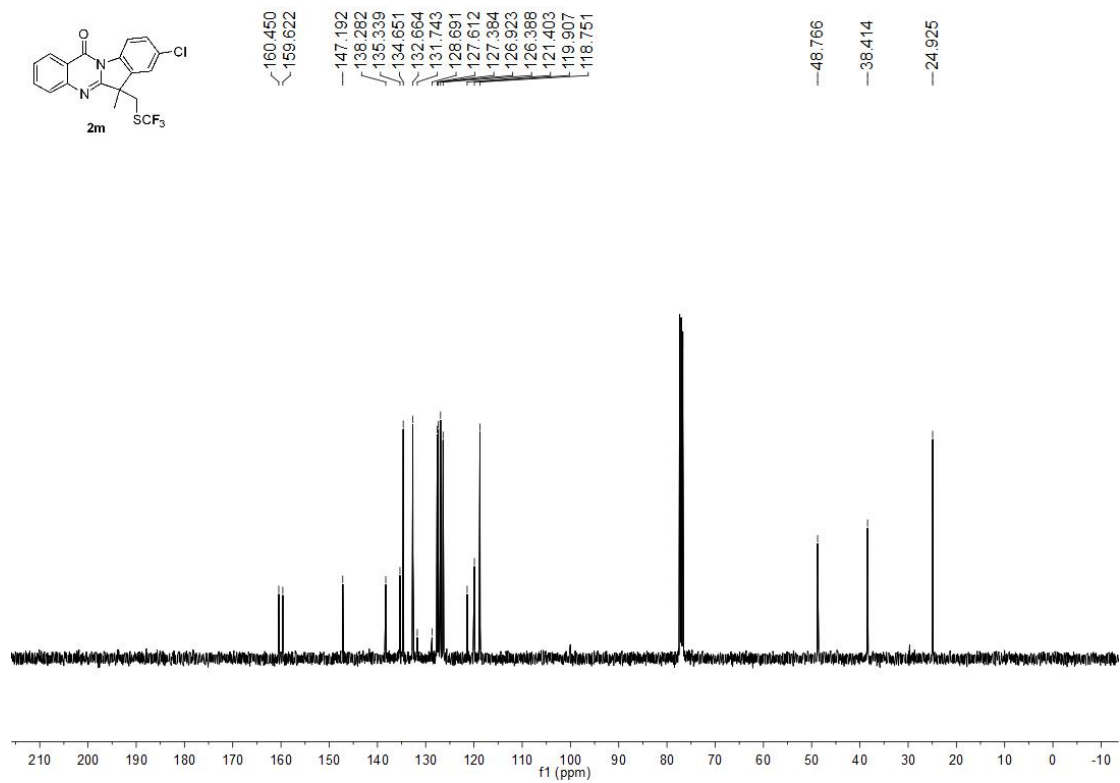


$^{13}\text{C}$  NMR spectrum of compound **2l**

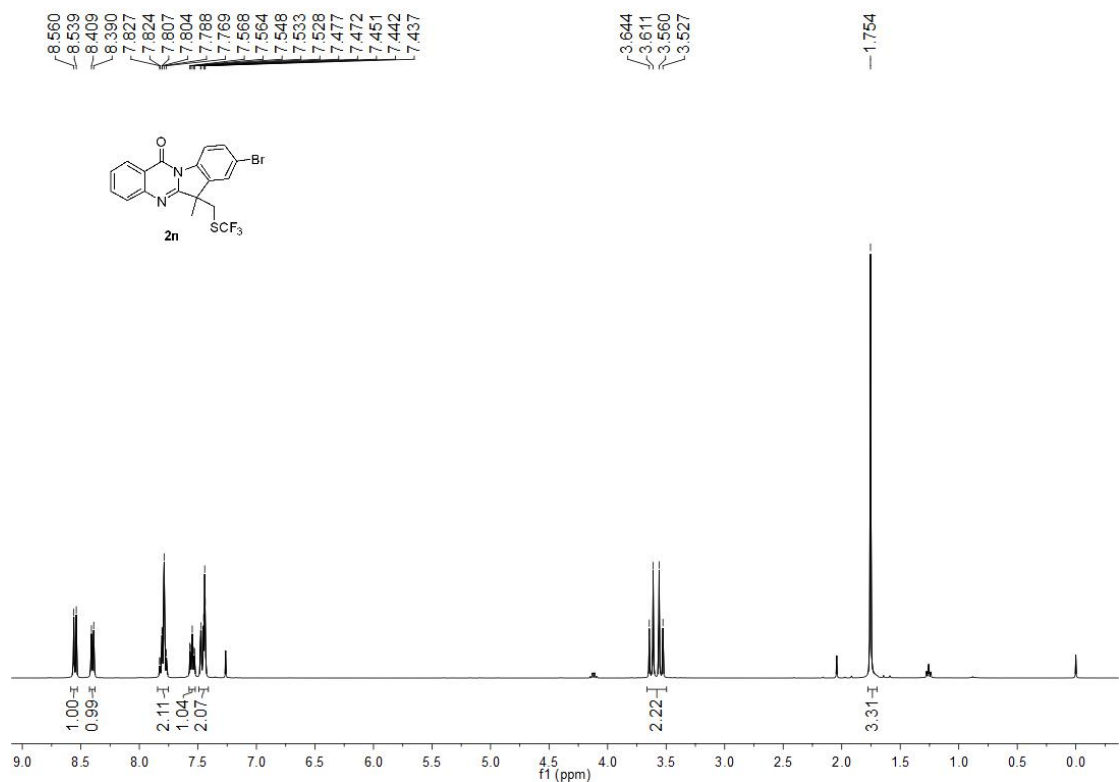


$^1\text{H}$  NMR spectrum of compound **2m**

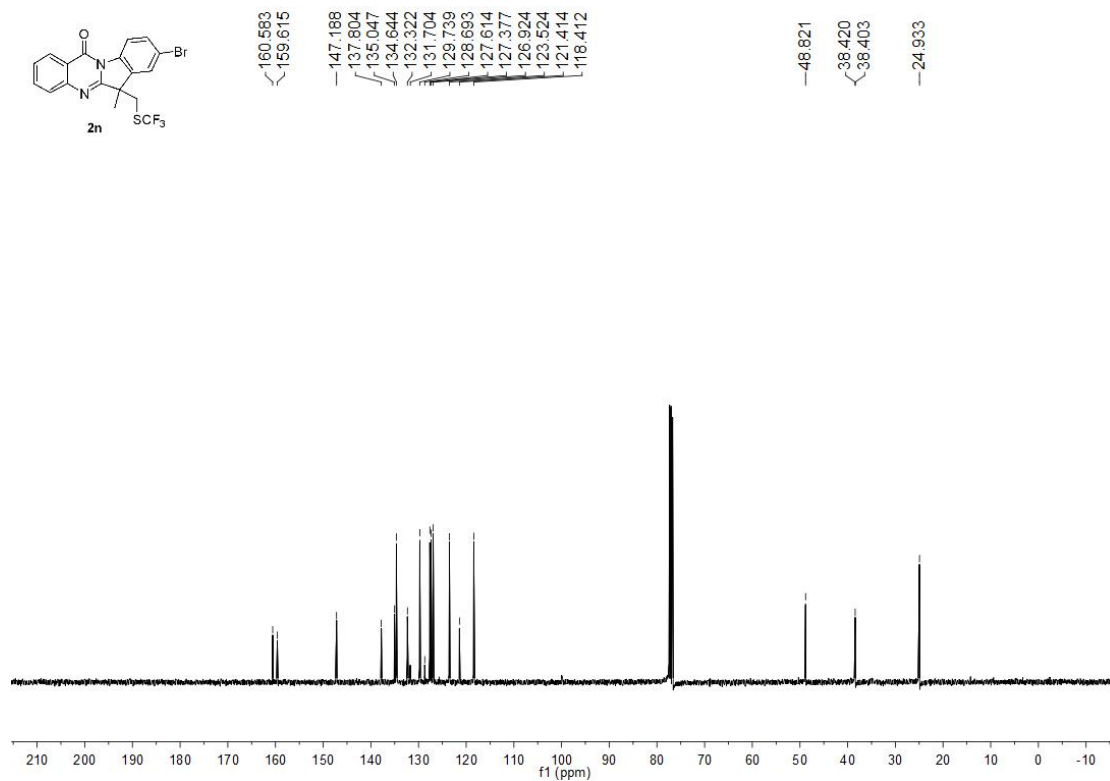




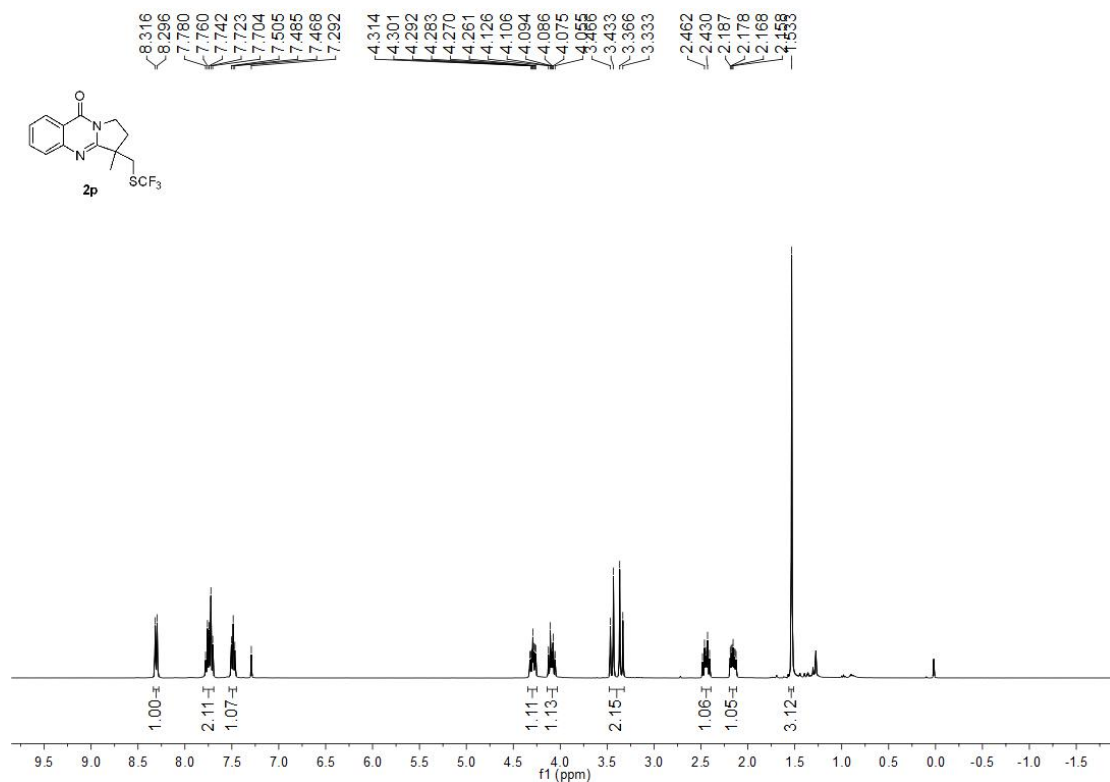
<sup>13</sup>C NMR spectrum of compound **2m**



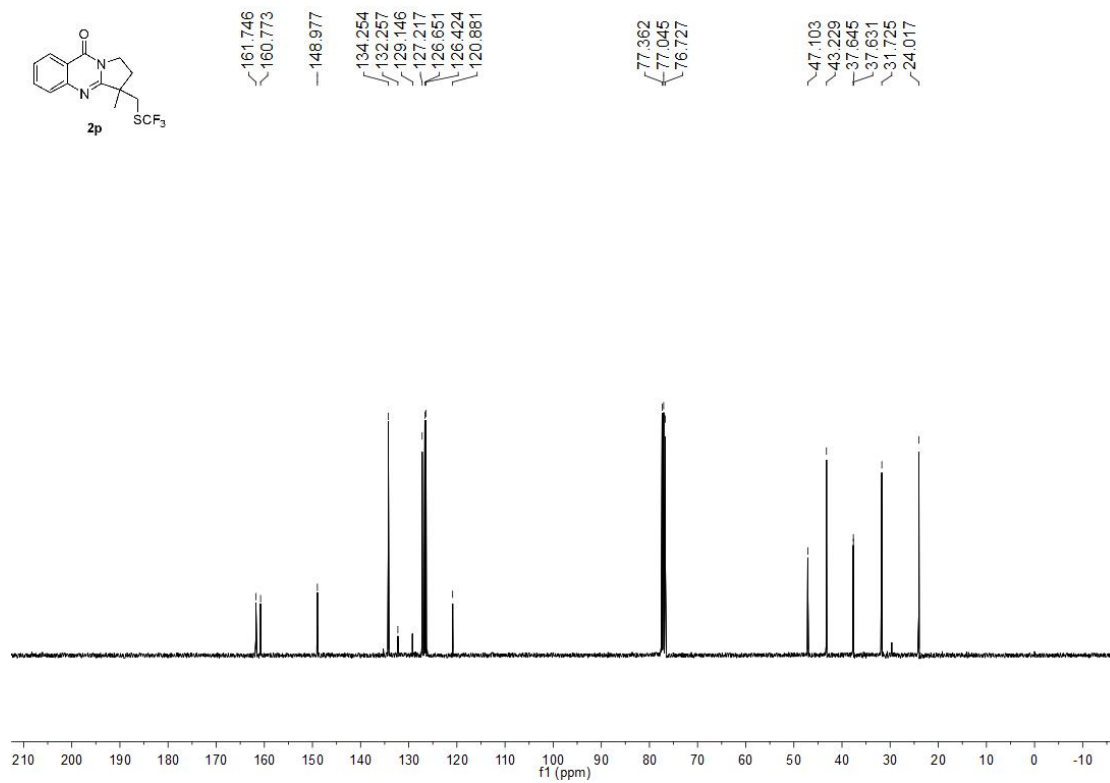
<sup>1</sup>H NMR spectrum of compound **2n**



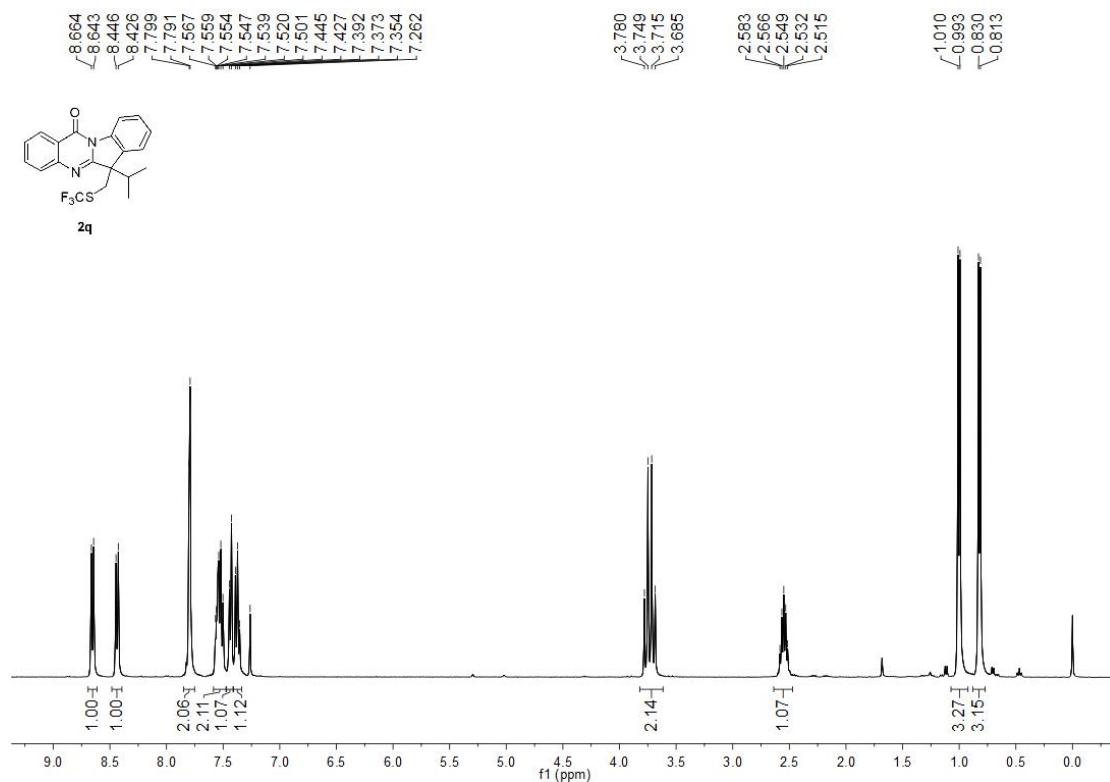
$^{13}\text{C}$  NMR spectrum of compound **2n**



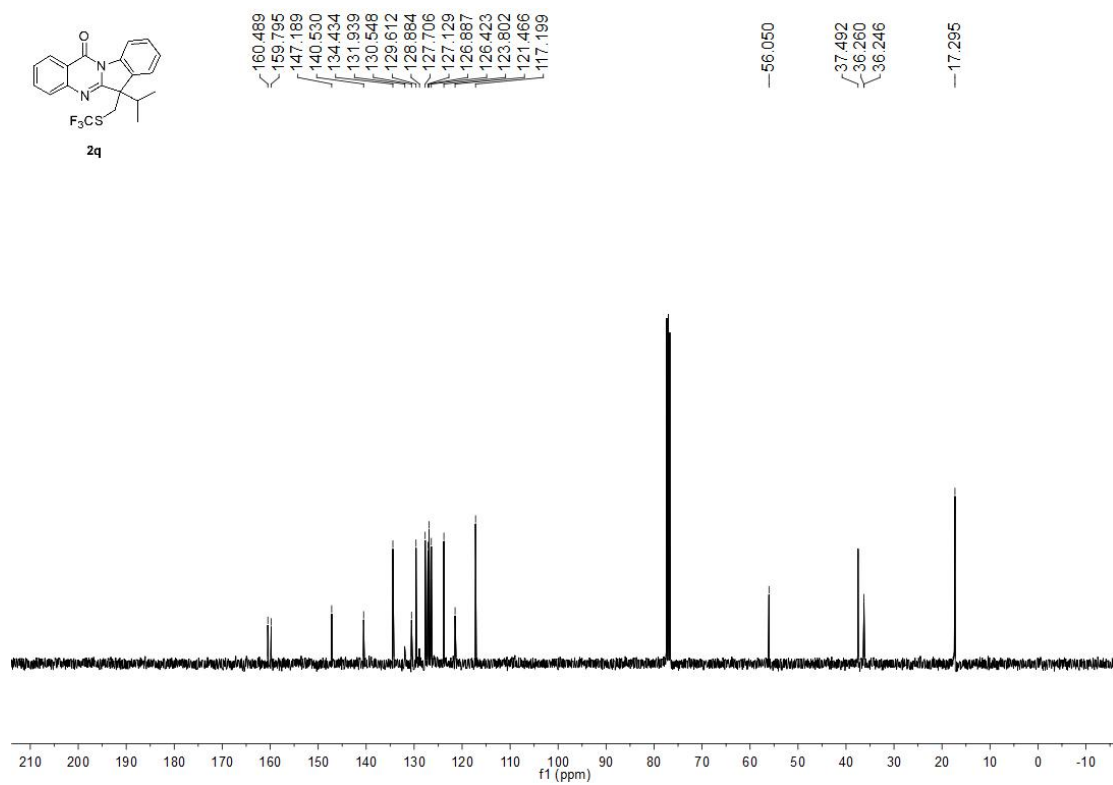
$^1\text{H}$  NMR spectrum of compound **2p**



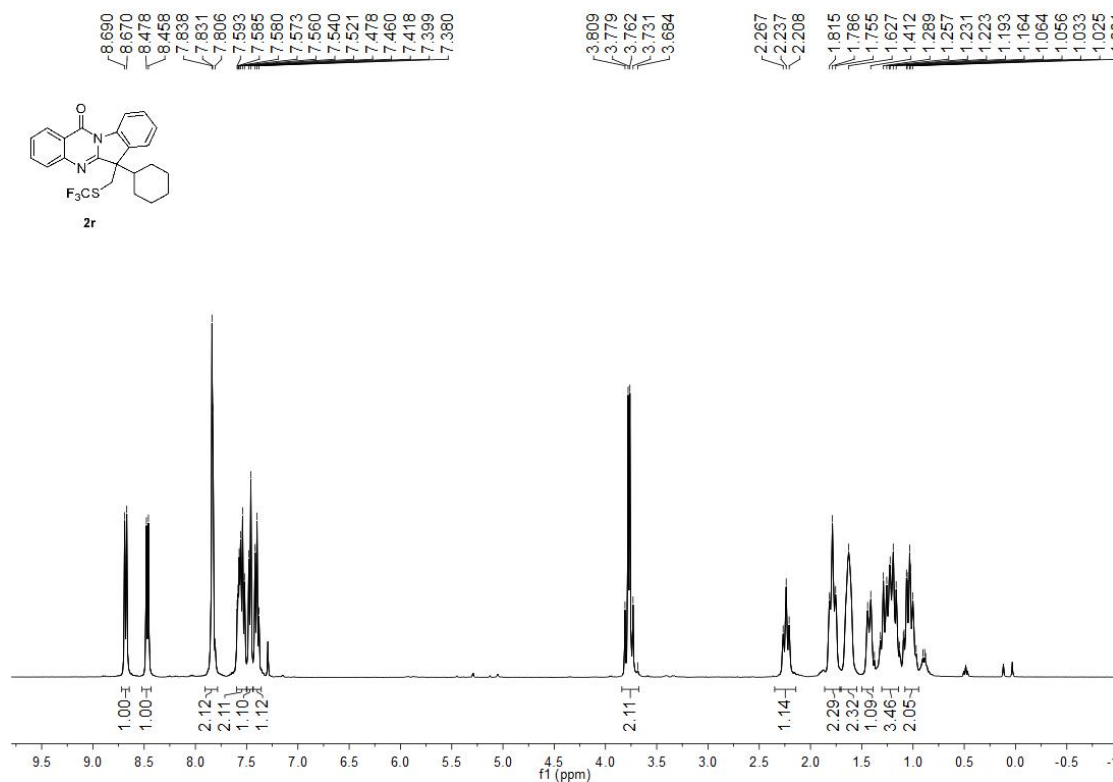
<sup>13</sup>C NMR spectrum of compound **2p**



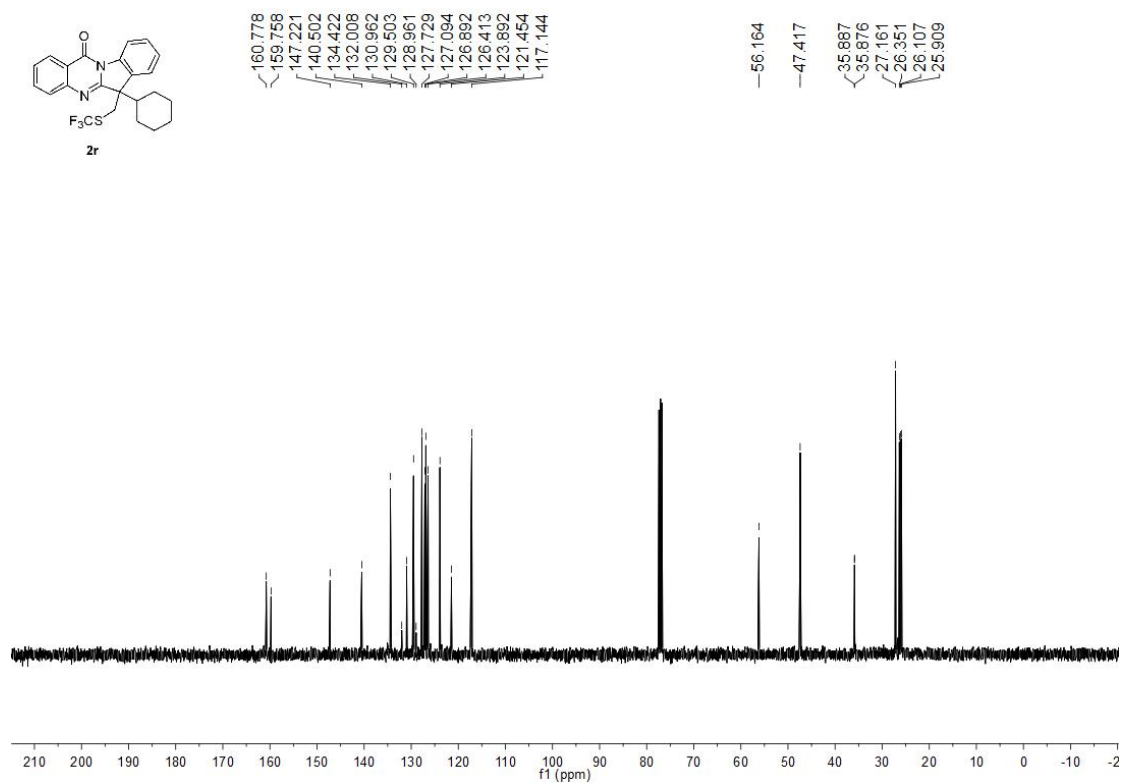
<sup>1</sup>H NMR spectrum of compound **2q**



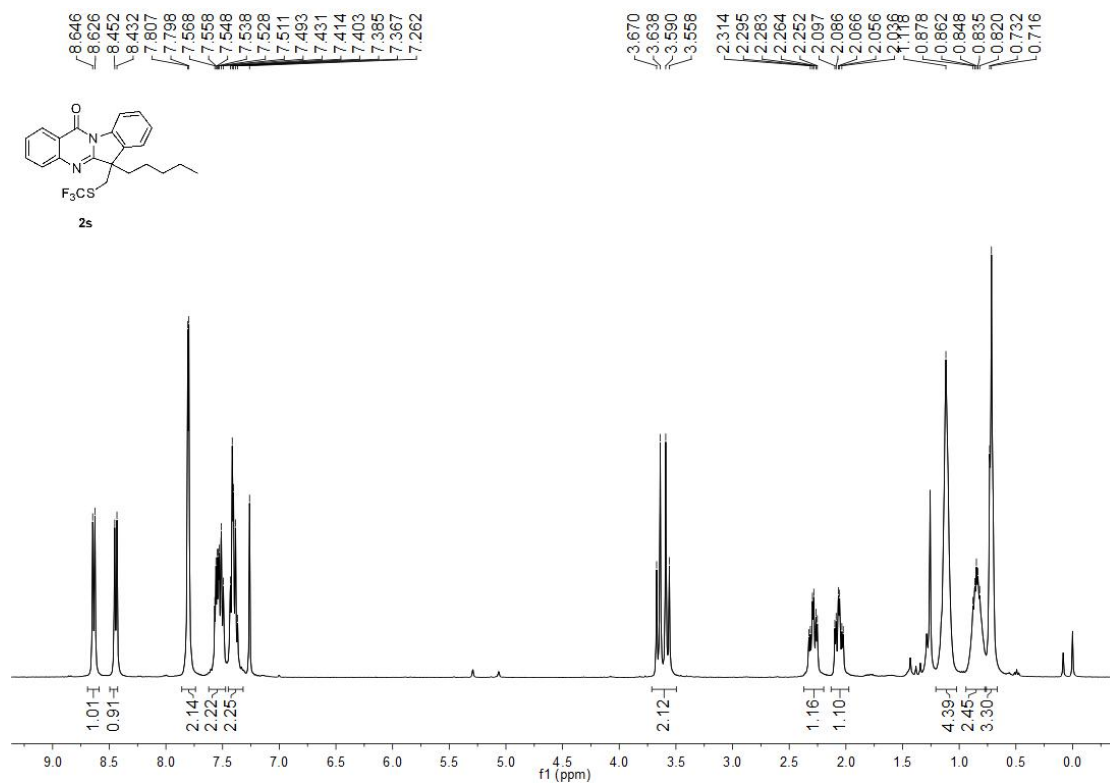
<sup>13</sup>C NMR spectrum of compound **2q**



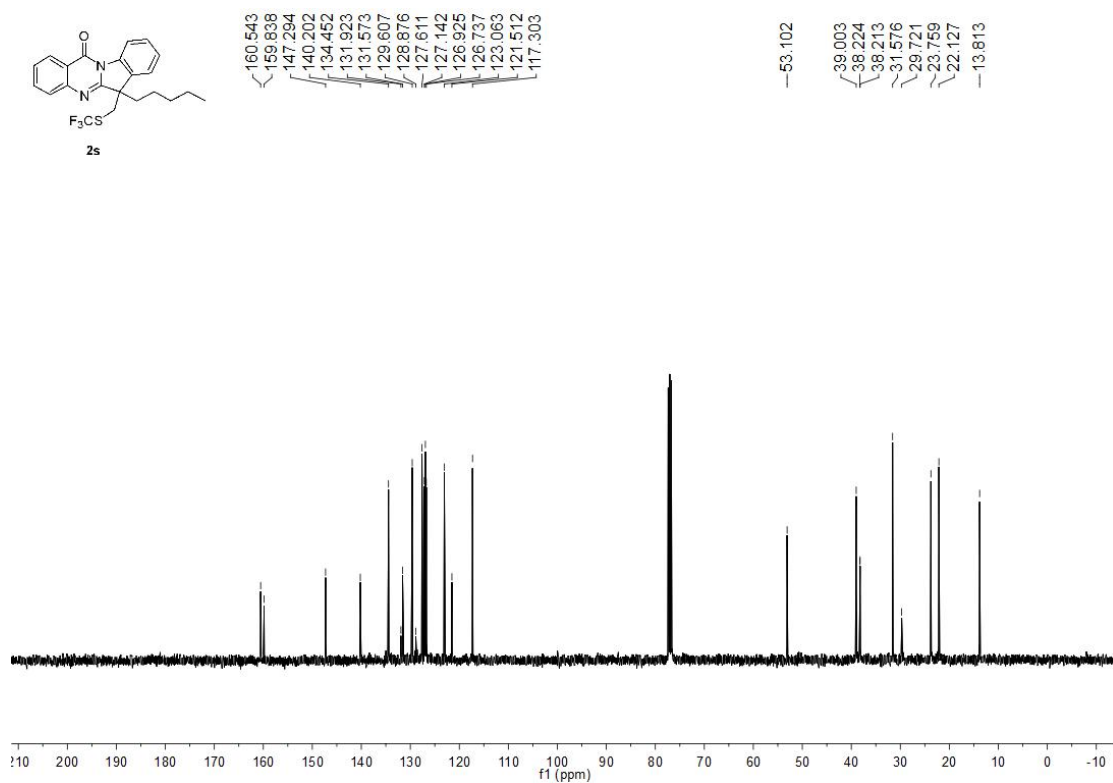
<sup>1</sup>H NMR spectrum of compound **2r**



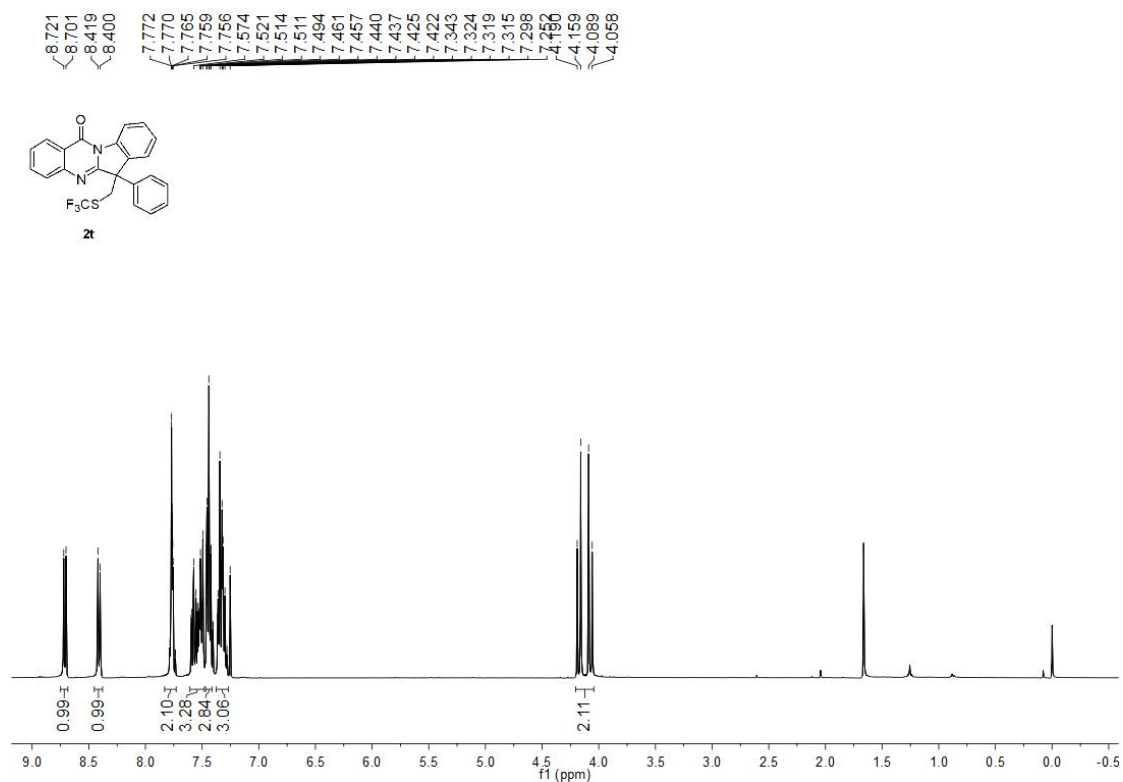
<sup>13</sup>C NMR spectrum of compound **2r**



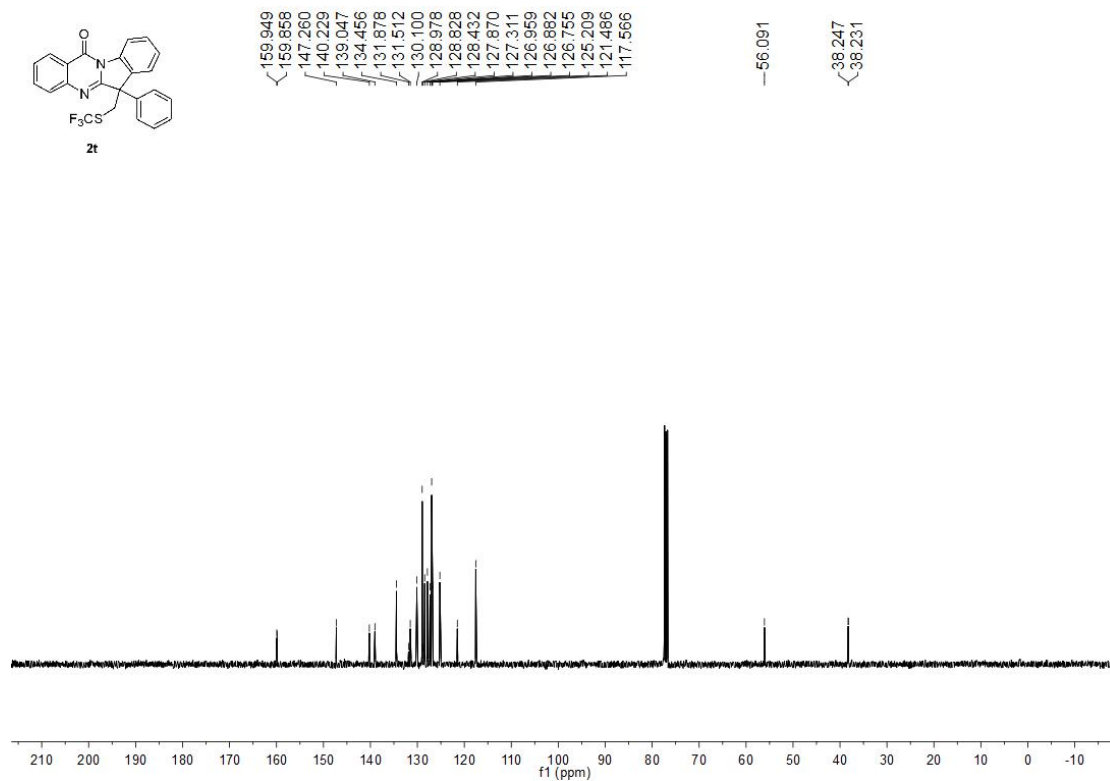
<sup>1</sup>H NMR spectrum of compound **2s**



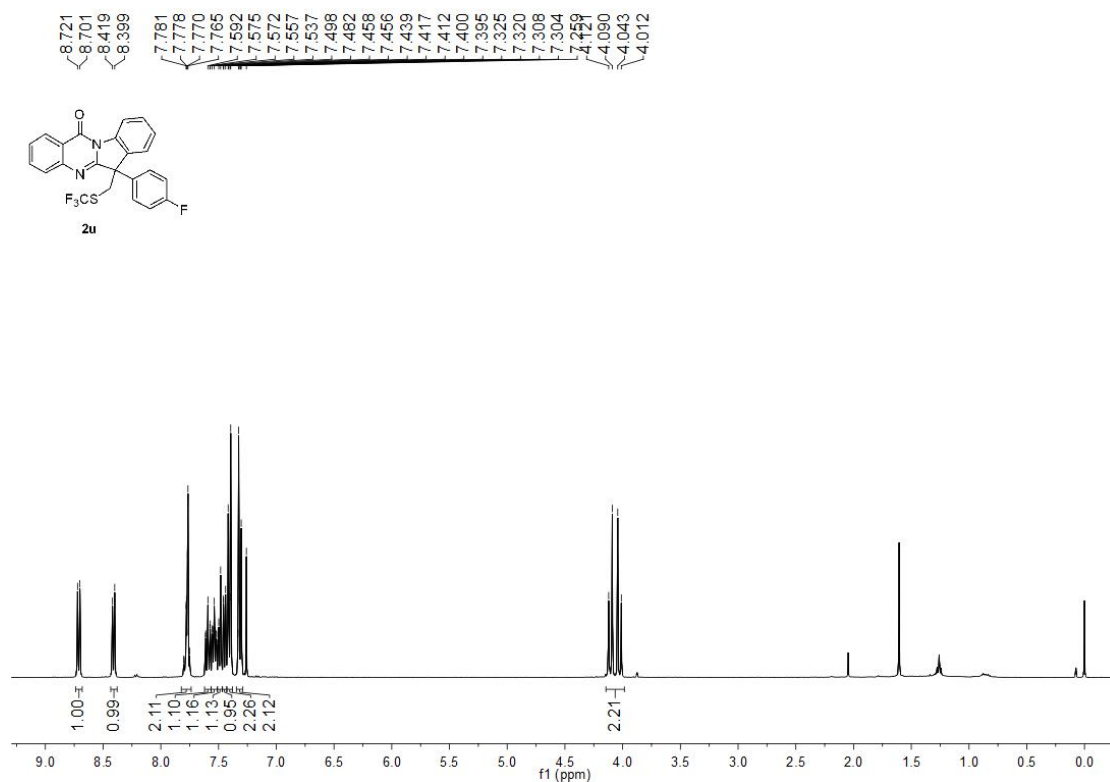
$^{13}\text{C}$  NMR spectrum of compound **2s**



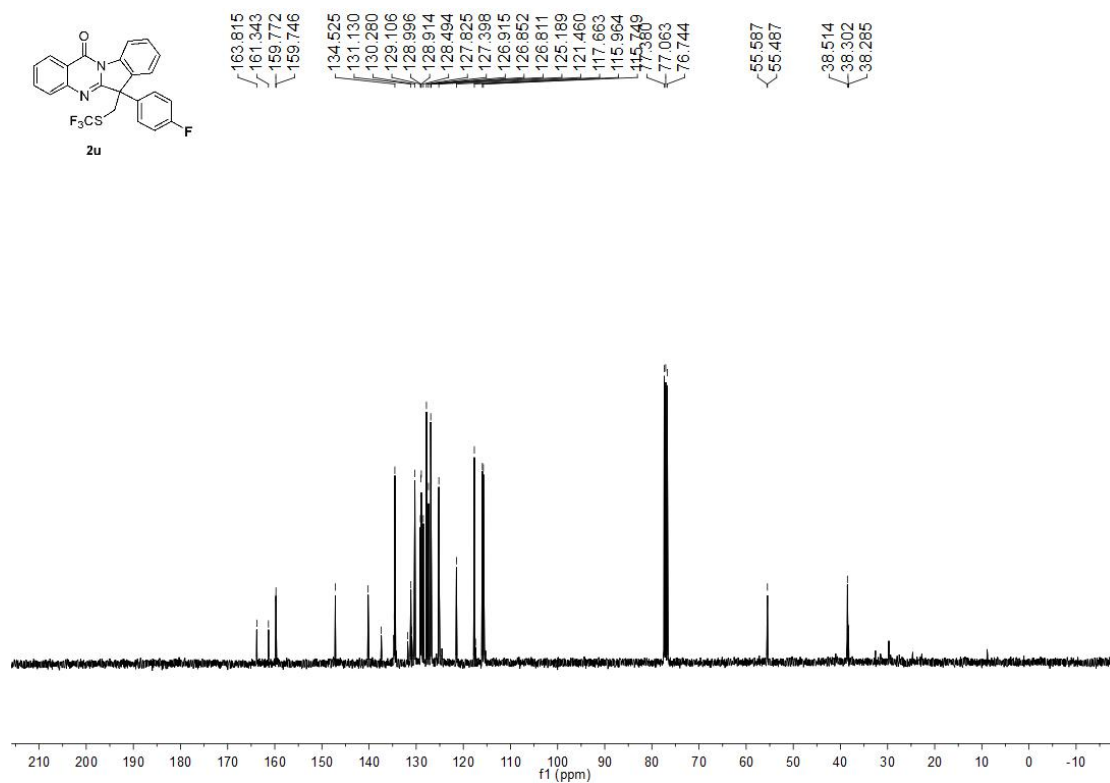
$^1\text{H}$  NMR spectrum of compound **2t**



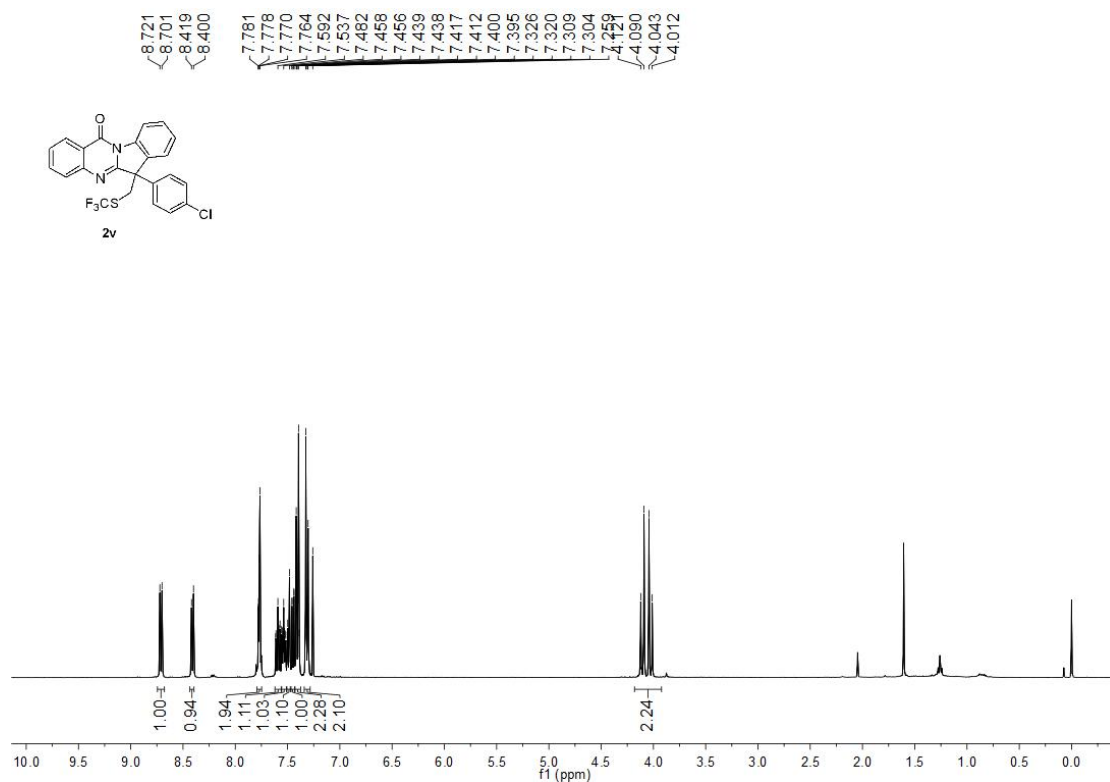
$^{13}\text{C}$  NMR spectrum of compound **2t**



$^1\text{H}$  NMR spectrum of compound **2u**

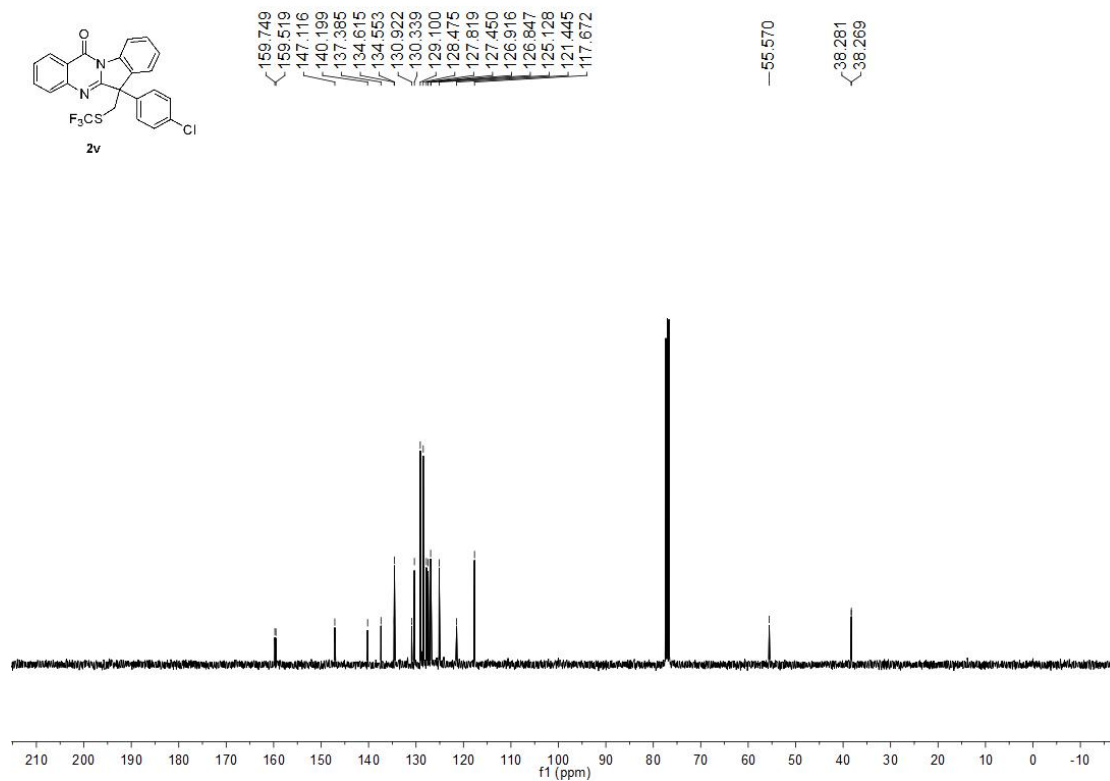


<sup>13</sup>C NMR spectrum of compound **2u**

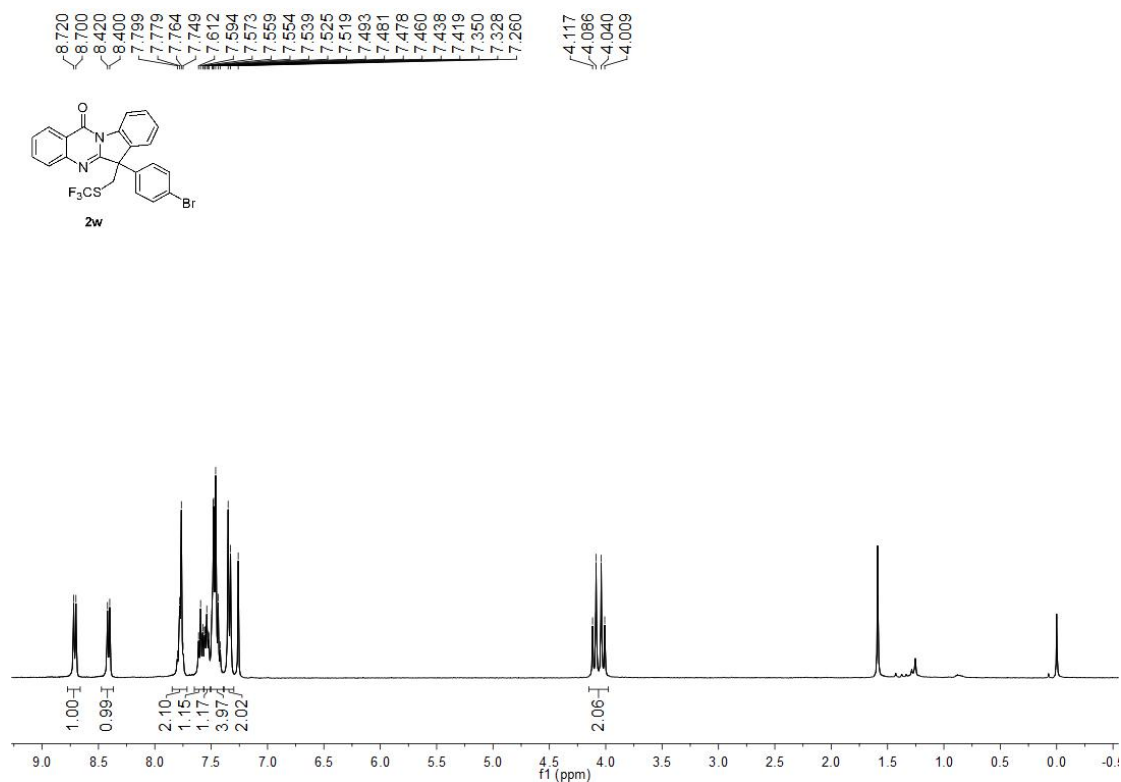


<sup>1</sup>H NMR spectrum of compound **2v**

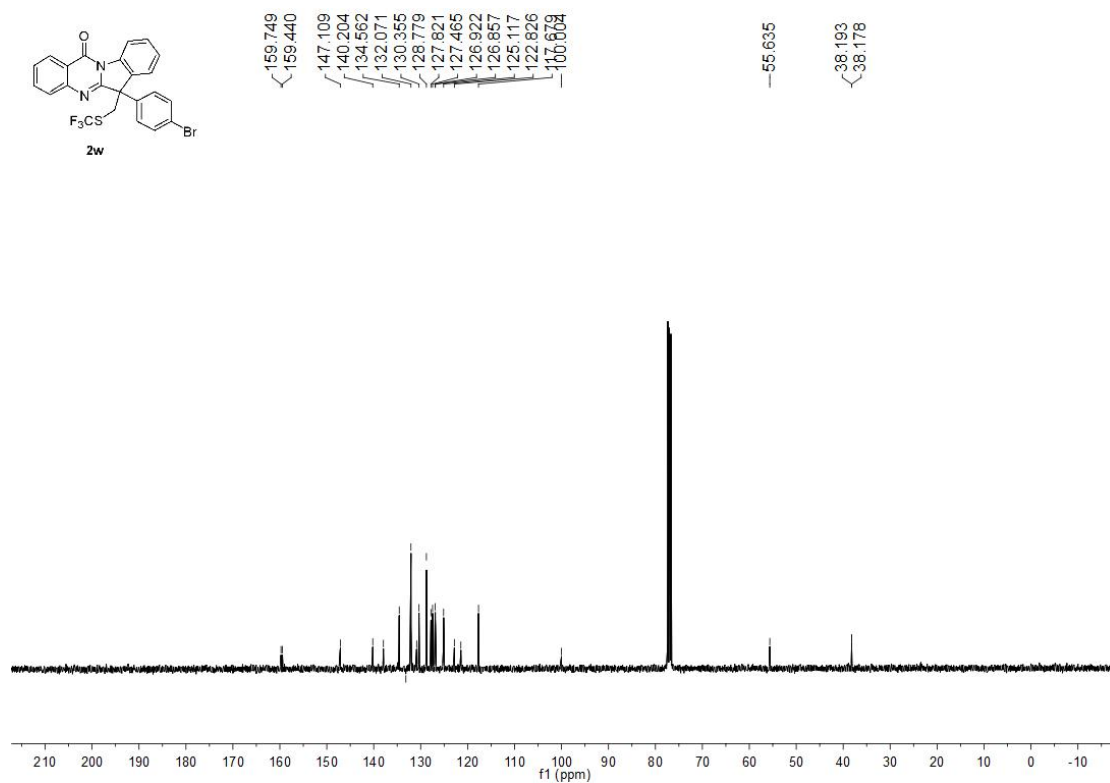




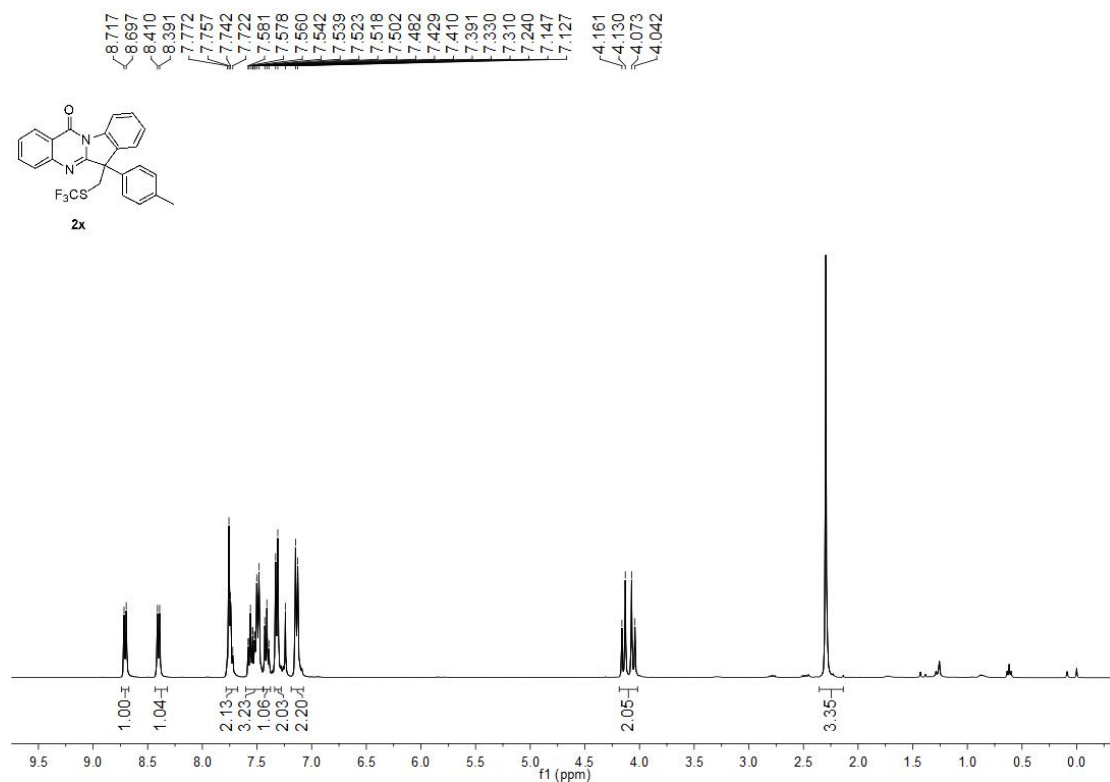
$^{13}\text{C}$  NMR spectrum of compound **2v**



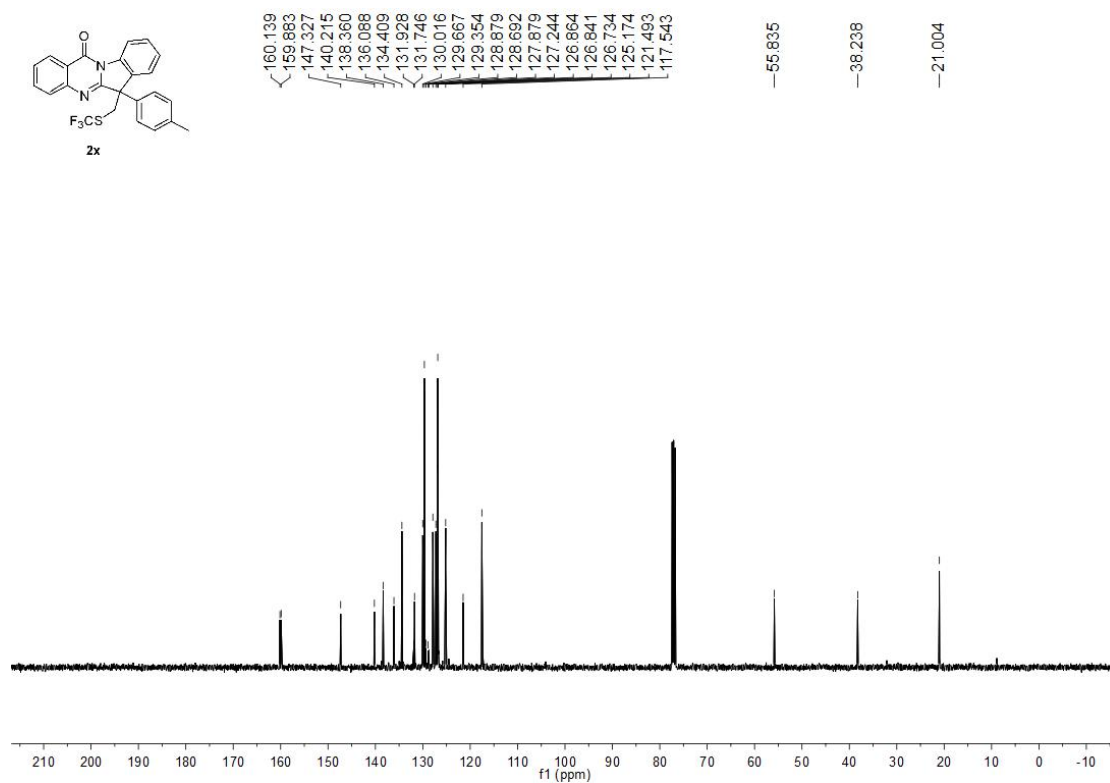
$^1\text{H}$  NMR spectrum of compound **2w**



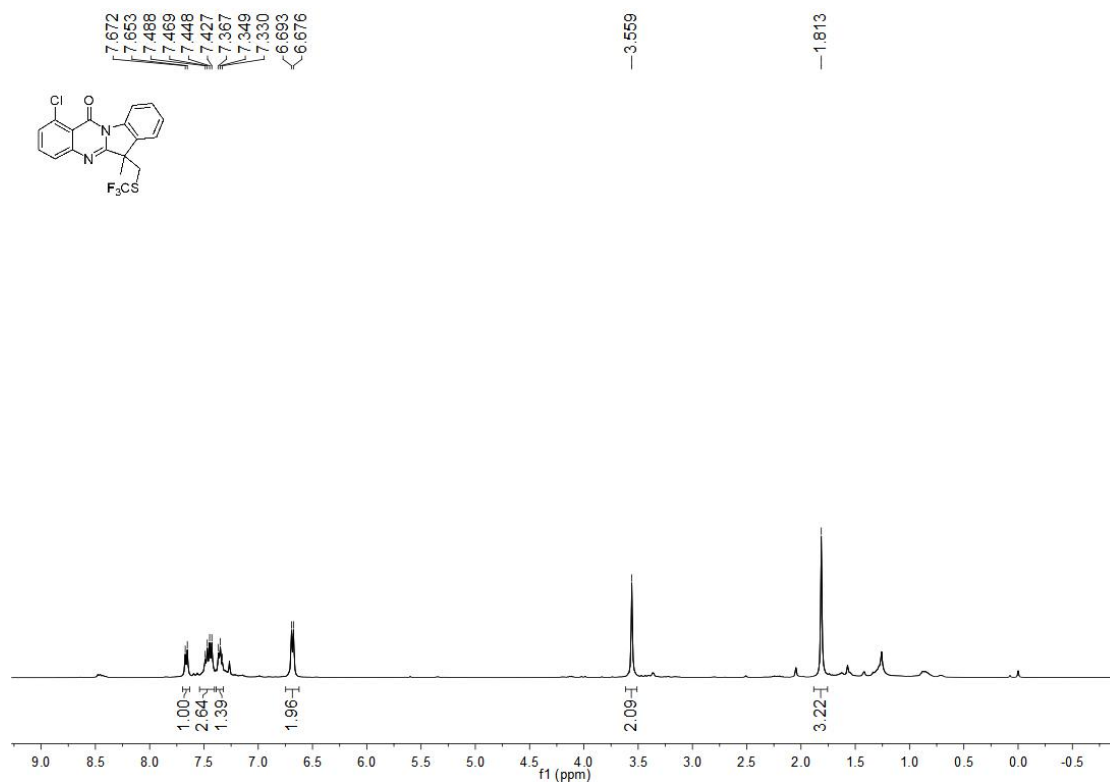
$^{13}\text{C}$  NMR spectrum of compound **2w**



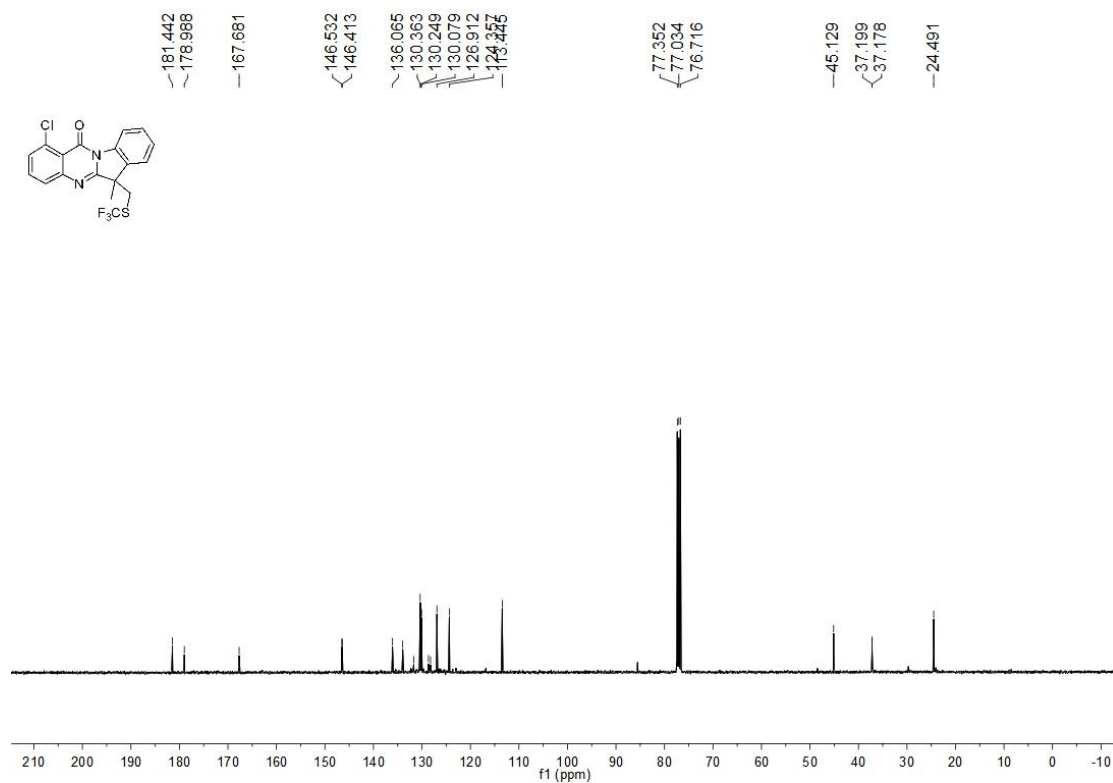
$^1\text{H}$  NMR spectrum of compound **2x**



<sup>13</sup>C NMR spectrum of compound **2x**



<sup>1</sup>H NMR spectrum of compound **2z**



$^{13}\text{C}$  NMR spectrum of compound **2z**