

*Supporting Information*

**SbCl<sub>3</sub> Initiated Conjunctive C-H Bond Functionalization  
and Carbochlorination between Glycine Esters and  
Methylenecyclopropanes (MCPs)**

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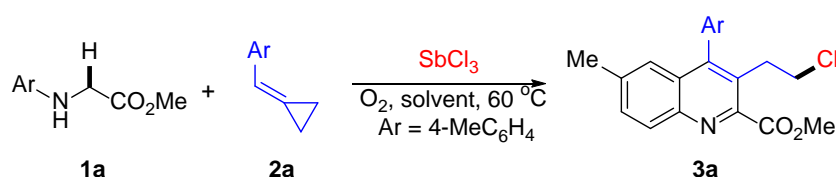
<b>Content</b>	<b>page</b>
<b>General</b>	<b>S2</b>
<b>Optimization of reaction conditions</b>	<b>S2</b>
<b>General experimental procedure</b>	<b>S3</b>
<b>Detection of the intermediates by HRMS</b>	<b>S4</b>
<b>XPS analysis of the reaction between SbCl<sub>3</sub> and O<sub>2</sub></b>	<b>S5</b>
<b>Analytical data for compounds</b>	<b>S7</b>
<b><sup>1</sup>H, <sup>13</sup>C and HRMS spectra</b>	<b>S21</b>

## General:

Antimony trichloride was purchased from commercial source and used without further purification. Flash chromatography was carried out with silica gel (200-300 mesh). Analytical TLC was performed with silica gel GF254 plates, and the products were visualized by UV detection.  $^1\text{H}$  NMR and  $^{13}\text{C}$  NMR (400 MHz and 100 MHz, respectively) spectra were recorded in  $\text{CDCl}_3$ . Chemical shifts ( $\delta$ ) are reported in ppm using TMS as internal standard and spin-spin coupling constants ( $J$ ) are given in Hz. The high resolution mass spectra (HRMS) were measured on an electrospray ionization (ESI) apparatus using time of flight (TOF) mass spectrometry.

## Optimization of reaction conditions

### 1. $\text{SbCl}_3/\text{O}_2$ initiated synthesis of chlorinated quinolines



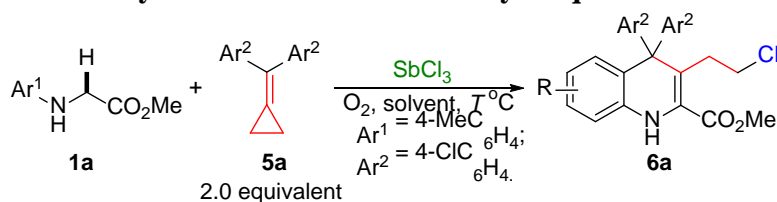
Entry	[Sb]	Solvent	Yield (%) <sup>a</sup>
1	$\text{SbCl}_3$ (1 equiv)	MeCN	41
2	$\text{SbCl}_3$ (2 equiv)	MeCN	76
3	$\text{SbCl}_3$ (2 equiv)	THF	58
4	$\text{SbCl}_3$ (2 equiv)	anisole	66
5	$\text{SbCl}_3$ (2 equiv)	toluene	73
6	$\text{SbCl}_3$ (2 equiv)	DCE	n. r.
7	$\text{SbF}_3$ (2 equiv)	MeCN	n. r.
8	$\text{Sb}_2\text{O}_3$ (2 equiv)	MeCN	n. r.
9	$\text{Sb}_2\text{O}_5$ (2 equiv)	MeCN	n. r.
10	$\text{SbCl}_5$ (2 equiv)	MeCN	25
<b>11</b>	<b><math>\text{SbCl}_3</math> (3 equiv)</b>	<b>MeCN</b>	<b>84 (79)<sup>b</sup></b>

<sup>a</sup> Yields were determined by crude  $^1\text{H}$  NMR using 1,3,5-trimethoxybenzene as an internal standard; <sup>b</sup> The yield in the parentheses is the isolated yield.

The model reaction of glycine **1a** and MCP **2a** was conducted in the presence of one equivalent of  $\text{SbCl}_3$  under dioxygen atmosphere (Table 1), and as our expected, the conjunctive C-H bond oxidation and carbochlorination occurred smoothly, affording the desired chlorinated quinoline **3a** in 41% yield (entry 1). Increasing the amount of  $\text{SbCl}_3$  to 2 equivalent, the reaction efficiency was enhanced to 76% yield (entry 2), and the solvent screen showed that MeCN is still the best solvent (entries 3-6). Other antimony reagents were also evaluated (entries 7-10), however, only  $\text{SbCl}_5$  gave the chlorinated quinolines in 25% yield (entry 10), probably due to that high

concentration of the Sb(V) would cause over-oxidation of the substrates. When the amount of  $\text{SbCl}_3$  was increased to 3 equivalent, the best result was obtained and the desired product **3a** was provided in 84%  $^1\text{H NMR}$  and 79% isolated yields, respectively (entry 11).

## 2. $\text{SbCl}_3/\text{O}_2$ initiated synthesis of chlorinated dihydroquinolines



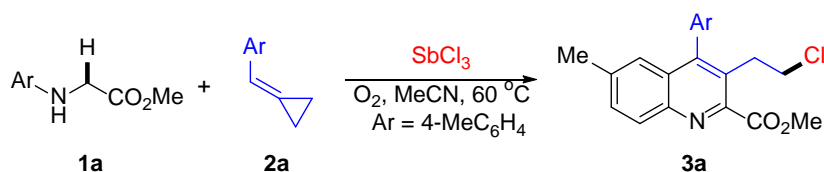
Entry	$\text{SbCl}_3$ (x equiv)	Solvent	Yield (%) <sup>a</sup>
1	2	MeCN	44
<b>2</b>	<b>2.5</b>	<b>MeCN</b>	<b>52</b>
3	3	MeCN	35
4	3	MeCN	30 <sup>b</sup>
5	2.5	THF	18
6	2.5	1,4-dioxane	n. r.
7	2.5	toluene	22
8	2.5	anisole	16
9	2.5	MeCN	21 <sup>c</sup>
10	2.5	MeCN	22 <sup>d</sup>
11	2.5	MeCN	54 <sup>e</sup>
12	2.5	MeCN	23 <sup>f</sup>

<sup>a</sup> The yields in the parentheses are the isolated yields; <sup>b</sup> In the presence of 3 equivalent of **5a**; <sup>c</sup> The reaction was conducted at 50°C; <sup>d</sup> The reaction was conducted at 70°C; <sup>e</sup> 10 mol % CuBr; <sup>f</sup> 10 mol % CuCl.

Using MeCN as the solvent, the desired dihydroquinoline **6a** was isolated in 44% yield (entry 1). Increasing the amount of  $\text{SbCl}_3$  to 2.5 equivalent, the reaction outcome was improved to 52% yield (entry 2). However, further increasing the amount of  $\text{SbCl}_3$  resulted in the decrease of the yields (entries 3-4), and the reaction became complicated with a series of unidentified side-products. Next, a solvent screen was performed, and the results showed that MeCN is still the best solvent (entries 5-8). Evaluation of the reaction temperature revealed that this reaction is sensitive to the reaction temperature (entries 9-10), and at 60°C, the best result was provided. To improve the reaction efficiency, the model reaction was conducted in the presence of CuX (entries 11-12), and the results showed that CuCl decreased the yield of **6a** to 23%. It is believed that in the absence of the terminal aromatization as the driving-force, the efficiency of this  $sp^3$  C-H bond oxidation will be greatly reduced, which is consistent with our previous research.

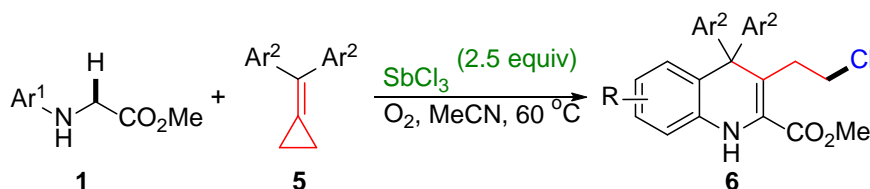
## General Experimental Procedure

### 1. $\text{SbCl}_3/\text{O}_2$ initiated synthesis of chlorinated quinolines



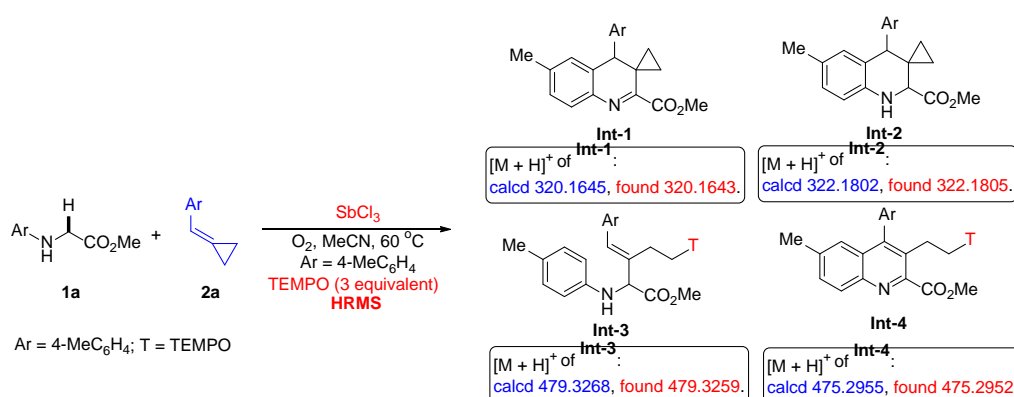
A solution of **1a** (0.3 mmol) and **2a** (0.6 mmol) in MeCN (5 mL) was mixed fully, then SbCl<sub>3</sub> (0.9 mmol) was added dropwise under O<sub>2</sub> atmosphere. The reaction solution was stirred at 60 °C (oil bath). After completion monitored by TLC (by UV visualization), the solvent was removed under reduced pressure. The products were separated by silica gel column chromatography eluted with petroleum ether/ethyl acetate (v/v 5:1) to afford the product **3a** in 79% yield.

## 2. SbCl<sub>3</sub>/O<sub>2</sub> initiated synthesis of chlorinated dihydroquinolines

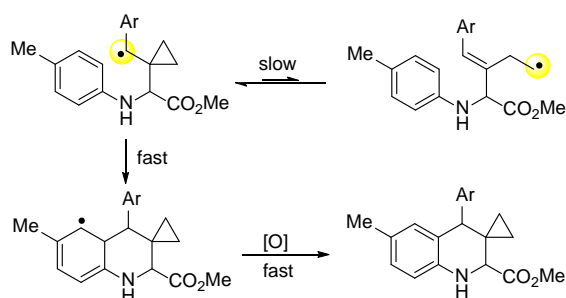


A solution of **1** (0.3 mmol) and **5** (0.6 mmol) in MeCN (5 mL) was mixed fully, then SbCl<sub>3</sub> (0.75 mmol) was added dropwise under O<sub>2</sub> atmosphere. The reaction solution was stirred at 60 °C (oil bath). After completion monitored by TLC (by UV visualization), the solvent was removed under reduced pressure. The products were separated by silica gel column chromatography eluted with petroleum ether/ethyl acetate (v/v 6:1) to afford the product.

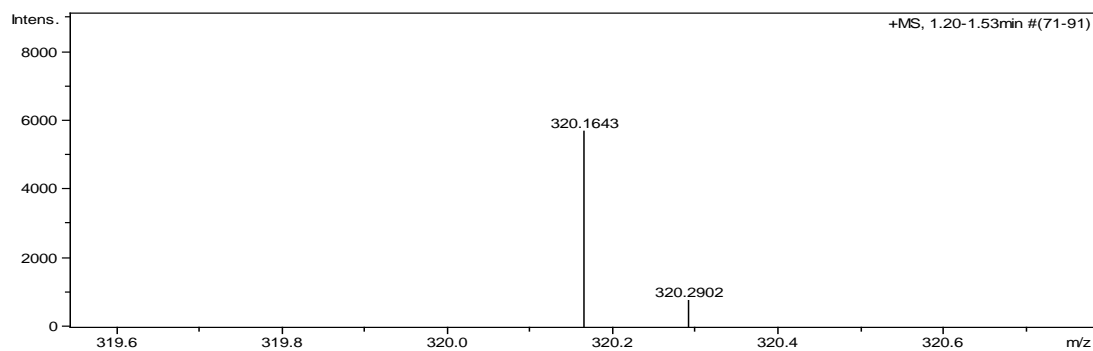
## Detection of the intermediate by HRMS



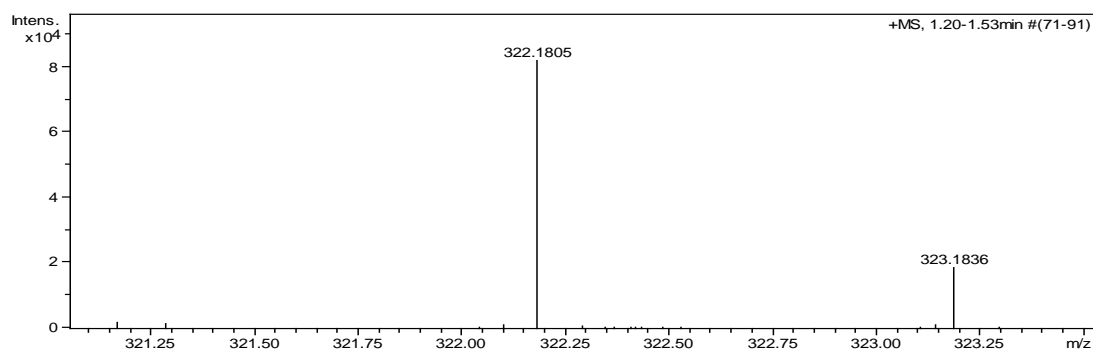
A solution of **1a** (0.3 mmol) and **2a** (0.6 mmol) in MeCN (5 mL) was mixed fully, then SbCl<sub>3</sub> (0.9 mmol) was added dropwise under O<sub>2</sub> atmosphere. The reaction solution was stirred under 60 °C (oil bath). After stirring for 3 hours, 3 equivalent of TEMPO was added and then the reaction mixture was tested by HRMS. Fortunately, several intermediates (**Int-1** to **4**) were detected. These intermediates imply that this reaction is mediated by a radical intermediate and the intramolecular cyclization of the generated radical might be faster than the β-fragmentation of the cyclopropylmethylene radical.



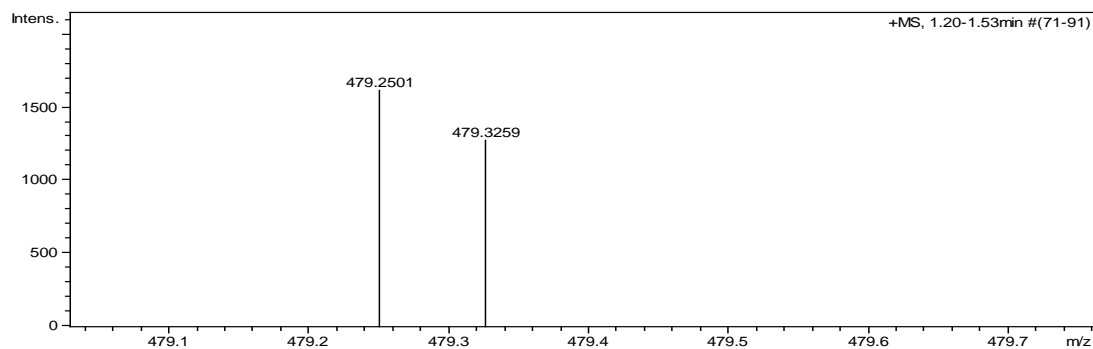
### Int-1:



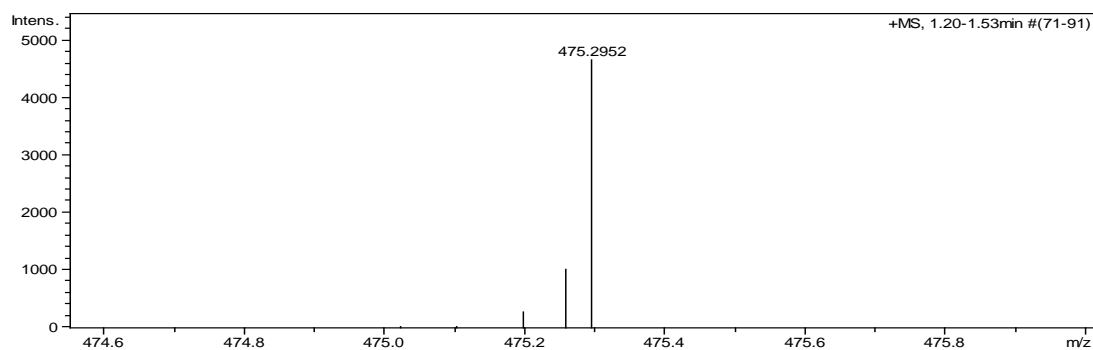
### Int-2:



### Int-3:



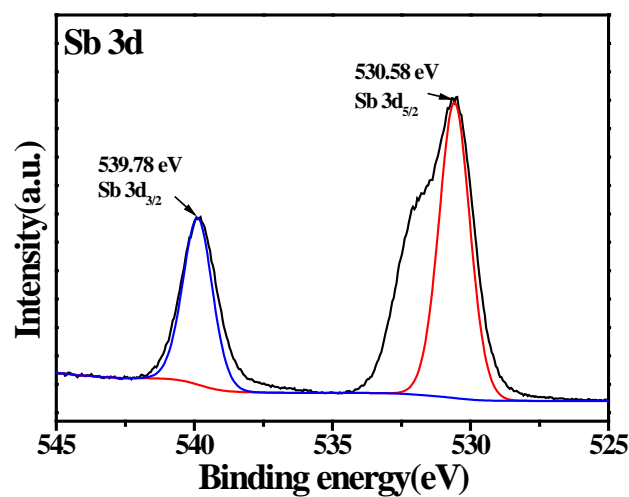
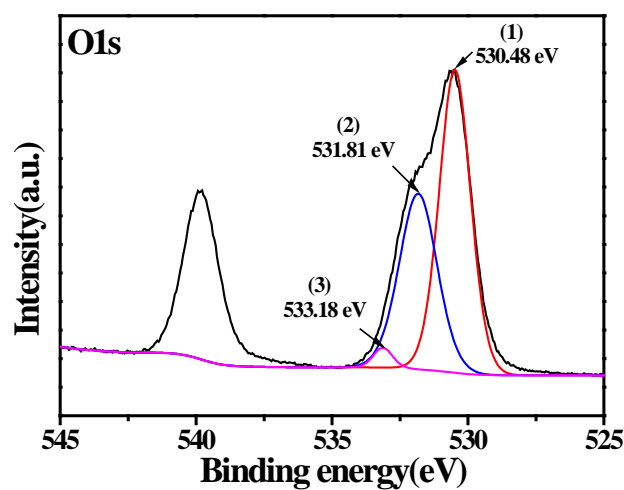
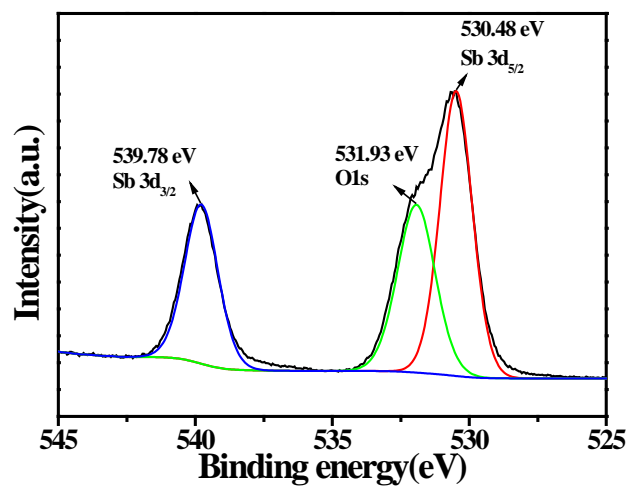
### Int-4:



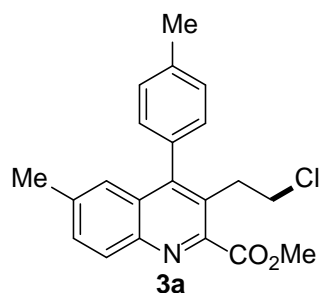
## XPS analysis of the reaction between SbCl<sub>3</sub> and O<sub>2</sub>

A solution of SbCl<sub>3</sub> (0.3 mmol) in MeCN (5 mL) was mixed stirred at 60 °C (oil bath) under O<sub>2</sub> atmosphere. After stirring for 6 hours, the reaction mixture was tested by XPS, and to our

delight, both peaks of Sb 3d<sub>5/2</sub> (530.58 eV) and Sb 3d<sub>3/2</sub> (539.8 eV) of the Sb<sup>5+</sup> species were detected, suggesting that in the presence of dioxygen, SbCl<sub>3</sub> was oxidized to the Sb(V) species.

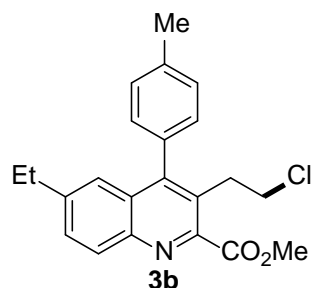


## Analytical data for compounds



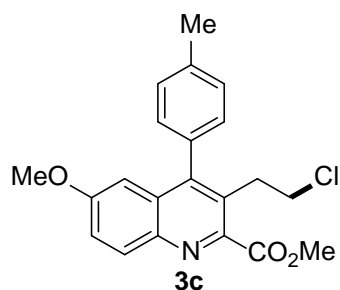
### Methyl 3-(2-chloroethyl)-6-methyl-4-(p-tolyl)quinoline-2-carboxylate (3a)

Reddish brown solid, m.p.: 113-116 °C; 84mg (79%); Elution: petroleum ether/ethyl acetate = 5:1 (v : v); <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) δ 8.09 (d, *J* = 8.5 Hz, 1H), 7.53 (d, *J* = 8.6 Hz, 1H), 7.34 (d, *J* = 7.2 Hz, 2H), 7.10 (d, *J* = 7.6 Hz, 2H), 7.07 (s, 1H), 4.06 (s, 3H), 3.55 (t, *J* = 7.2 Hz, 2H), 3.23 (t, *J* = 7.2 Hz, 2H), 2.48 (s, 3H), 2.38(s, 3H); <sup>13</sup>C NMR (101 MHz, CDCl<sub>3</sub>) δ 167.4, 149.7, 148.9, 144.6, 138.5, 138.2, 132.8, 132.2, 129.6, 129.5, 129.0, 128.7, 127.4, 125.1, 53.2, 43.7, 33.1, 21.9, 21.4; HRMS (ESI) *m/z*: [M + H]<sup>+</sup> Calcd for C<sub>21</sub>H<sub>21</sub>ClNO<sub>2</sub>, 354.1255; Found, 354.1251.



### Methyl 3-(2-chloroethyl)-6-ethyl-4-(p-tolyl)quinoline-2-carboxylate (3b)

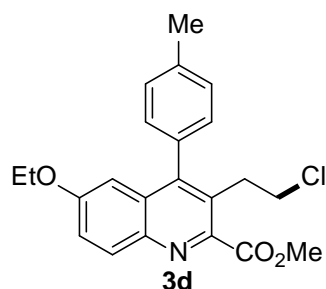
Yellow solid, m.p.: 93-96 °C; 79mg (72%); Elution: petroleum ether/ethyl acetate = 5:1 (v : v); <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) δ 8.12 (d, *J* = 8.7 Hz, 1H), 7.57 (dd, *J* = 8.7, 1.9 Hz, 1H), 7.34 (d, *J* = 7.8 Hz, 2H), 7.12 (d, *J* = 8.0 Hz, 2H), 7.08 (d, *J* = 1.1 Hz, 1H), 4.06 (s, 3H), 3.58 – 3.51 (m, 2H), 3.28 – 3.22 (m, 2H), 2.67 (q, *J* = 7.6 Hz, 2H), 2.48 (s, 3H), 1.17 (t, *J* = 7.6 Hz, 3H); <sup>13</sup>C NMR (101 MHz, CDCl<sub>3</sub>) δ 167.4, 149.9, 149.0, 144.8, 144.7, 138.2, 132.8, 131.0, 129.8, 129.5 (two <sup>13</sup>C), 129.0 (two <sup>13</sup>C), 128.7, 127.4, 124.0, 53.2, 43.8, 33.1, 29.2, 21.4, 15.4; HRMS (ESI) *m/z*: [M + Na]<sup>+</sup> Calcd for C<sub>22</sub>H<sub>22</sub>ClNO<sub>2</sub>Na, 390.1231; Found, 390.1229.



### Methyl 3-(2-chloroethyl)-6-methoxy-4-(p-tolyl)quinoline-2-carboxylate (3c)

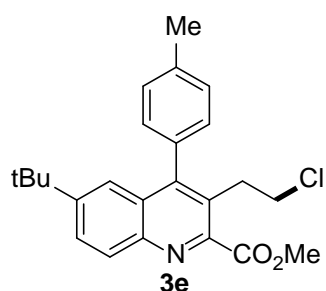
Yellow solid, m.p.: 91-95 °C; 75mg (68%); Elution: petroleum ether/ethyl acetate = 5:1 (v : v); <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) δ 8.10 (d, *J* = 9.2 Hz, 1H), 7.41 – 7.28 (m, 2H), 7.13 (d, *J* = 7.9 Hz, 2H), 6.55 (d, *J* =

2.6 Hz, 1H), 4.06 (s, 3H), 3.68 (s, 3H), 3.56 (t,  $J = 7.8$  Hz, 2H), 3.39 – 3.14 (m, 2H), 2.48 (s, 3H);  $^{13}\text{C}$  NMR (101 MHz,  $\text{CDCl}_3$ )  $\delta$  167.2, 159.1, 149.0, 147.0, 142.0, 138.2, 132.9, 131.4, 130.1, 129.6, 128.9, 128.0, 122.6, 104.1, 55.4, 53.2, 43.8, 33.2, 21.4; HRMS (ESI)  $m/z$ :  $[\text{M} + \text{Na}]^+$  Calcd for  $\text{C}_{21}\text{H}_{20}\text{ClNO}_3\text{Na}$ , 392.1024; Found, 392.1054.



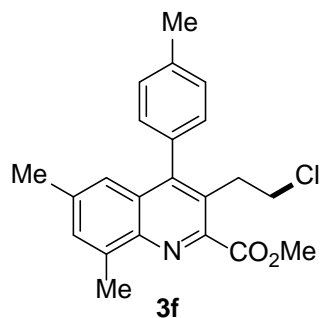
### Methyl 3-(2-chloroethyl)-6-ethoxy-4-(p-tolyl)quinoline-2-carboxylate (3d)

Reddish brown solid, m.p.: 106-108 °C; 82mg (71%); Elution: petroleum ether/ethyl acetate = 6:1 (v : v);  $^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ )  $\delta$  8.08 (d,  $J = 9.2$  Hz, 1H), 7.40 – 7.27 (m, 3H), 7.10 (d,  $J = 8.0$  Hz, 2H), 6.52 (d,  $J = 2.7$  Hz, 1H), 4.04 (s, 3H), 3.85 (q,  $J = 7.0$  Hz, 2H), 3.59 – 3.51 (m, 2H), 3.31 – 3.19 (m, 2H), 2.46 (s, 3H), 1.36 – 1.29 (m, 3H);  $^{13}\text{C}$  NMR (101 MHz,  $\text{CDCl}_3$ )  $\delta$  167.3, 158.5, 148.9, 146.9, 142.0, 138.2, 133.0, 131.5, 130.2, 129.6, 128.9, 127.9, 122.7, 104.9, 63.6, 53.1, 43.8, 33.2, 21.4, 14.5; HRMS (ESI)  $m/z$ :  $[\text{M} + \text{Na}]^+$  Calcd for  $\text{C}_{22}\text{H}_{22}\text{ClNO}_3\text{Na}$ , 406.1180; Found, 406.1197.



### Methyl 6-(tert-butyl)-3-(2-chloroethyl)-4-(p-tolyl)quinoline-2-carboxylate (3e)

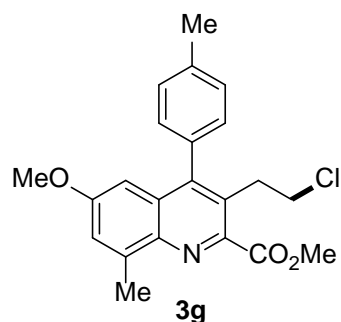
Yellow solid, m.p.: 132-136 °C; 90mg (76%); Elution: petroleum ether/ethyl acetate = 6:1 (v : v);  $^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ )  $\delta$  8.14 (d,  $J = 8.9$  Hz, 1H), 7.80 (dd,  $J = 8.9, 2.1$  Hz, 1H), 7.34 (d,  $J = 7.8$  Hz, 2H), 7.25 (s, 1H), 7.13 (d,  $J = 8.0$  Hz, 2H), 4.06 (s, 3H), 3.62 – 3.49 (m, 2H), 3.32 – 3.20 (m, 2H), 2.48 (s, 3H), 1.28 (s, 9H);  $^{13}\text{C}$  NMR (151 MHz,  $\text{CDCl}_3$ )  $\delta$  167.5, 151.3, 150.3, 149.3, 144.6, 138.2, 132.8, 129.4 (two  $^{13}\text{C}$ ), 129.0, 128.9, 128.4, 127.3, 121.3, 53.2, 43.8, 35.2, 33.1, 31.0, 21.4; HRMS (ESI)  $m/z$ :  $[\text{M} + \text{Na}]^+$  Calcd for  $\text{C}_{24}\text{H}_{26}\text{ClNO}_2\text{Na}$ , 418.1544; Found, 418.1546.



### Methyl 3-(2-chloroethyl)-6,8-dimethyl-4-(p-tolyl)quinoline-2-carboxylate (3f)

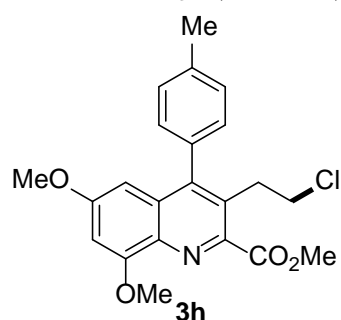


Yellow solid, m.p.: 126-128 °C; 47mg (43%); Elution: petroleum ether/ethyl acetate = 6:1 (v : v); <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) δ 7.38 (s, 1H), 7.33 (d, *J* = 7.8 Hz, 2H), 7.10 (d, *J* = 7.9 Hz, 2H), 6.90 (s, 1H), 4.06 (s, 3H), 3.59 – 3.48 (m, 2H), 3.24 – 3.14 (m, 2H), 2.80 (s, 3H), 2.48 (s, 3H), 2.33 (s, 3H); <sup>13</sup>C NMR (101 MHz, CDCl<sub>3</sub>) δ 167.9, 149.4, 148.1, 143.9, 138.0, 137.9, 137.5, 133.3, 132.2, 129.4, 129.0, 128.7, 126.5, 123.1, 52.9, 43.7, 33.2, 21.9, 21.4, 17.8; HRMS (ESI) *m/z*: [M + Na]<sup>+</sup> Calcd for C<sub>22</sub>H<sub>22</sub>ClNO<sub>2</sub>Na, 390.1231; Found, 390.1236.



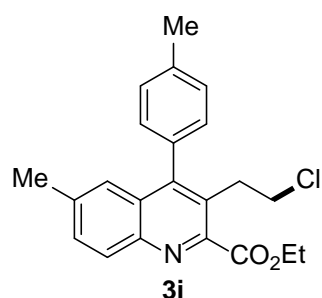
**Methyl 3-(2-chloroethyl)-6-methoxy-8-methyl-4-(p-tolyl)quinoline-2-carboxylate (3g)**

Yellow solid, m.p.: 125-127 °C; 49mg (43%); Elution: petroleum ether/ethyl acetate = 6:1 (v : v); <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) δ 7.32 (d, *J* = 7.7 Hz, 2H), 7.21 – 7.19 (m, 1H), 7.10 (d, *J* = 8.0 Hz, 2H), 6.38 (d, *J* = 2.7 Hz, 1H), 4.05 (s, 3H), 3.64 (s, 3H), 3.58 – 3.50 (m, 2H), 3.25 – 3.18 (m, 2H), 2.79 (s, 3H), 2.47 (s, 3H); <sup>13</sup>C NMR (101 MHz, CDCl<sub>3</sub>) δ 167.8, 158.5, 148.7, 146.2, 141.6, 139.9, 138.0, 133.4, 130.1, 129.5, 128.9, 127.3, 122.2, 102.0, 55.2, 52.8, 43.7, 33.3, 21.4, 17.91; HRMS (ESI) *m/z*: [M + Na]<sup>+</sup> Calcd for C<sub>22</sub>H<sub>22</sub>ClNO<sub>3</sub>Na, 406.1180; Found, 406.1182.



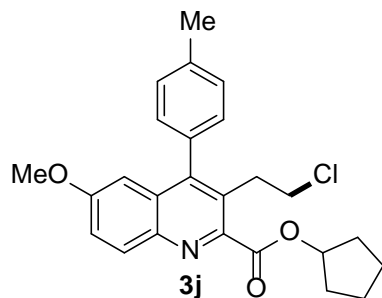
**Methyl 3-(2-chloroethyl)-6,8-dimethoxy-4-(p-tolyl)quinoline-2-carboxylate (3h)**

White solid, m.p.: 161-163 °C; 42mg (35%); Elution: petroleum ether/ethyl acetate = 5:1 (v : v); <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) δ 7.33 (d, *J* = 7.7 Hz, 2H), 7.11 (d, *J* = 7.9 Hz, 2H), 6.66 (d, *J* = 2.4 Hz, 1H), 6.10 (d, *J* = 2.4 Hz, 1H), 4.04 (s, 3H), 4.02 (s, 3H), 3.64 (s, 3H), 3.61 – 3.50 (m, 2H), 3.35 – 3.24 (m, 2H), 2.46 (s, 3H); <sup>13</sup>C NMR (101 MHz, CDCl<sub>3</sub>) δ 167.0, 159.8, 156.6, 148.9, 145.1, 138.1, 134.9, 133.3, 131.1, 129.5, 129.3, 128.8, 101.1, 95.9, 56.3, 55.4, 53.0, 43.8, 33.2, 21.4; HRMS (ESI) *m/z*: [M + Na]<sup>+</sup> Calcd for C<sub>22</sub>H<sub>22</sub>ClNO<sub>4</sub>Na, 422.1130; Found, 422.1128.



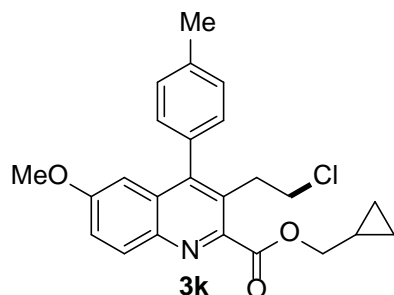
### Ethyl 3-(2-chloroethyl)-6-methyl-4-(p-tolyl)quinoline-2-carboxylate (3i)

Dark brown solid, m.p.: 88-90 °C; 33mg (30%); Elution: petroleum ether/ethyl acetate = 8:1 (v : v); <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) δ 8.09 (d, *J* = 8.6 Hz, 1H), 7.53 (d, *J* = 8.6 Hz, 1H), 7.36 (d, *J* = 7.9 Hz, 1H), 7.12 (d, *J* = 7.8 Hz, 1H), 7.08 (s, 1H), 4.56 (q, *J* = 7.1 Hz, 2H), 3.64 – 3.36 (m, 2H), 3.30 – 3.03 (m, 2H), 2.49 (s, 2H), 2.39 (s, 2H), 1.49 (t, *J* = 7.1 Hz, 2H); <sup>13</sup>C NMR (101 MHz, CDCl<sub>3</sub>) δ 167.1, 149.9, 149.5, 144.6, 138.3, 138.2, 132.8, 132.1, 129.6, 129.5, 128.9, 128.5, 126.8, 125.1, 62.3, 43.5, 33.3, 21.9, 21.4, 14.2; HRMS (ESI) m/z: [M + Na]<sup>+</sup> Calcd for C<sub>22</sub>H<sub>22</sub>ClNO<sub>2</sub>Na, 390.1231; Found, 390.1257.



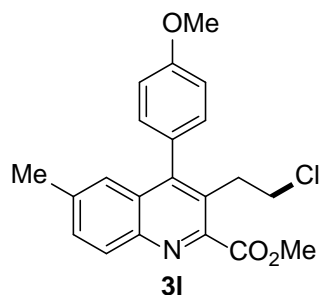
### Cyclopentyl 3-(2-chloroethyl)-6-methoxy-4-(p-tolyl)quinoline-2-carboxylate (3j)

White solid, m.p.: 130-133 °C; 25mg (20%); Elution: petroleum ether/ethyl acetate = 8:1 (v : v); <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) δ 8.06 (d, *J* = 9.2 Hz, 1H), 7.33 (dd, *J* = 8.9, 2.9 Hz, 3H), 7.11 (d, *J* = 8.0 Hz, 2H), 6.53 (d, *J* = 2.7 Hz, 1H), 5.55 (tt, *J* = 6.3, 3.3 Hz, 1H), 3.66 (s, 3H), 3.54 – 3.46 (m, 2H), 3.20 – 3.12 (m, 2H), 2.47 (s, 3H), 2.11 – 1.92 (m, 4H), 1.88 – 1.76 (m, 2H), 1.72 – 1.63 (m, 2H); <sup>13</sup>C NMR (101 MHz, CDCl<sub>3</sub>) δ 167.3, 158.7, 149.0, 148.5, 142.3, 138.2, 132.9, 131.4, 129.7, 129.6, 128.8, 126.5, 122.3, 104.1, 79.4, 55.4, 43.4, 33.4, 32.7, 23.9, 21.4; HRMS (ESI) m/z: [M + Na]<sup>+</sup> Calcd for C<sub>25</sub>H<sub>26</sub>ClNO<sub>3</sub>Na, 446.1493; Found, 446.1486.



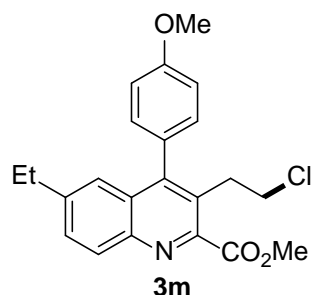
### Cyclopropylmethyl 3-(2-chloroethyl)-6-methoxy-4-(p-tolyl)quinoline-2-carboxylate (3k)

Yellowish solid, m.p.: 108-110 °C; 22mg (18%); Elution: petroleum ether/ethyl acetate = 6:1 (v : v); <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) δ 8.10 (d, *J* = 9.2 Hz, 1H), 7.35 (dd, *J* = 9.2, 2.4 Hz, 2H), 7.14 (d, *J* = 8.0 Hz, 2H), 6.56 (d, *J* = 2.7 Hz, 1H), 4.32 (d, *J* = 7.4 Hz, 2H), 3.68 (s, 2H), 3.63 – 3.41 (m, 2H), 3.45 – 3.15 (m, 2H), 2.49 (s, 2H), 1.49 – 1.32 (m, 1H), 0.66 (q, *J* = 6.0 Hz, 1H), 0.43 (q, *J* = 4.8 Hz, 2H); <sup>13</sup>C NMR (101 MHz, CDCl<sub>3</sub>) δ 167.3, 158.9, 148.7, 148.4, 142.2, 138.2, 132.9, 131.5, 129.9, 129.6, 128.8, 127.1, 122.3, 104.1, 71.1, 55.4, 43.5, 33.4, 21.4, 9.9, 3.6; HRMS (ESI) m/z: [M + Na]<sup>+</sup> Calcd for C<sub>24</sub>H<sub>24</sub>ClNO<sub>3</sub>Na, 432.1337; Found, 432.1332.



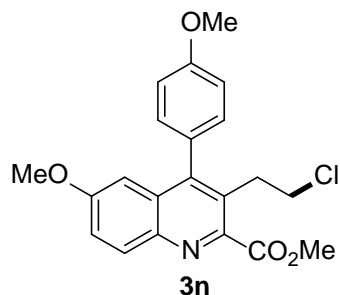
**Methyl 3-(2-chloroethyl)-4-(4-methoxyphenyl)-6-methylquinoline-2-carboxylate (3l)**

Yellow solid, m.p.: 144-147 °C; 51mg (46%); Elution: petroleum ether/ethyl acetate = 5:1 (v : v); <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) δ 8.09 (d, *J* = 8.6 Hz, 1H), 7.54 (dd, *J* = 8.6, 1.7 Hz, 1H), 7.15 (d, *J* = 8.6 Hz, 2H), 7.07 (d, *J* = 8.7 Hz, 3H), 4.06 (s, 3H), 3.92 (s, 3H), 3.55 (t, *J* = 7.8 Hz, 2H), 3.29 – 3.23 (m, 2H), 2.40 (s, 3H); <sup>13</sup>C NMR (101 MHz, CDCl<sub>3</sub>) δ 167.4, 159.5, 149.4, 149.0, 144.6, 138.5, 132.1, 130.3, 129.7, 128.9, 127.9, 127.7, 125.1, 114.2, 55.3, 53.2, 43.7, 33.1, 22.0; HRMS (ESI) *m/z*: [M + Na]<sup>+</sup> Calcd for C<sub>21</sub>H<sub>20</sub>ClNO<sub>3</sub>Na, 392.1024; Found, 392.1024.



**Methyl 3-(2-chloroethyl)-6-ethyl-4-(4-methoxyphenyl)quinoline-2-carboxylate (3m)**

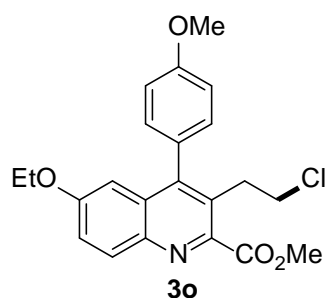
Yellow solid, m.p.: 114-117 °C; 63mg (55%); Elution: petroleum ether/ethyl acetate = 6:1 (v : v); <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) δ 8.12 (d, *J* = 8.7 Hz, 1H), 7.58 (dd, *J* = 8.7, 1.9 Hz, 1H), 7.19 – 7.13 (m, 2H), 7.13 – 7.05 (m, 3H), 4.06 (s, 3H), 3.92 (s, 3H), 3.57 – 3.53 (m, 2H), 3.28 – 3.24 (m, 2H), 2.68 (q, *J* = 7.6 Hz, 2H), 1.18 (t, *J* = 7.6 Hz, 3H); <sup>13</sup>C NMR (101 MHz, CDCl<sub>3</sub>) δ 167.4, 159.5, 149.6, 149.1, 144.8, 144.7, 131.0, 130.3, 129.8, 129.0, 127.9, 127.6, 123.9, 114.2, 55.3, 53.2, 43.7, 33.1, 29.2, 15.3; HRMS (ESI) *m/z*: [M + Na]<sup>+</sup> Calcd for C<sub>22</sub>H<sub>22</sub>ClNO<sub>3</sub>Na, 406.1180; Found, 406.1179.



**Methyl 3-(2-chloroethyl)-6-methoxy-4-(4-methoxyphenyl)quinoline-2-carboxylate (3n)**

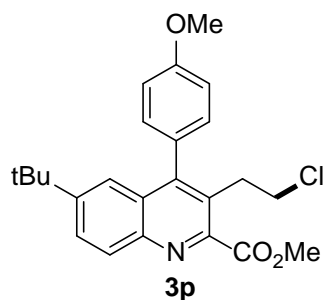
Dark brown solid, m.p.: 114-116 °C; 72mg (62%); Elution: petroleum ether/ethyl acetate = 5:1 (v : v); <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) δ 8.11 (d, *J* = 9.2 Hz, 1H), 7.36 (dd, *J* = 9.2, 2.8 Hz, 1H), 7.17 (d, *J* = 8.7

Hz, 2H), 7.08 (d,  $J = 8.7$  Hz, 2H), 6.57 (d,  $J = 2.7$  Hz, 1H), 4.07 (s, 2H), 3.92 (s, 3H), 3.69 (s, 2H), 3.57 (t,  $J = 7.8$  Hz, 2H), 3.38 – 3.01 (m, 2H);  $^{13}\text{C}$  NMR (101 MHz,  $\text{CDCl}_3$ )  $\delta$  167.3, 159.5, 159.1, 148.7, 147.1, 142.1, 131.5, 130.4, 130.2, 128.3, 128.0, 122.5, 114.3, 104.0, 55.3, 53.2, 43.7, 33.2, 30.2; HRMS (ESI)  $m/z$ :  $[\text{M} + \text{Na}]^+$  Calcd for  $\text{C}_{21}\text{H}_{20}\text{ClNO}_4\text{Na}$ , 408.0973; Found, 408.1005.



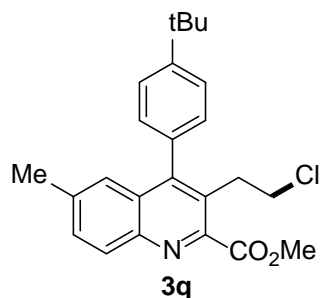
**Methyl 3-(2-chloroethyl)-6-ethoxy-4-(4-methoxyphenyl)quinoline-2-carboxylate (3o)**

Yellow solid, m.p.: 107-110 °C; 83mg (69%); Elution: petroleum ether/ethyl acetate = 5:1 (v : v);  $^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ )  $\delta$  8.09 (d,  $J = 9.2$  Hz, 1H), 7.34 (dd,  $J = 9.2, 2.7$  Hz, 1H), 7.20 – 7.11 (m, 2H), 7.07 (d,  $J = 8.7$  Hz, 2H), 6.54 (d,  $J = 2.7$  Hz, 1H), 4.05 (s, 3H), 3.92 (s, 3H), 3.87 (q,  $J = 7.0$  Hz, 2H), 3.57 – 3.54 (m, 2H), 3.29 – 3.25 (m, 2H), 1.35 (t,  $J = 7.0$  Hz, 3H);  $^{13}\text{C}$  NMR (101 MHz,  $\text{CDCl}_3$ )  $\delta$  167.3, 159.5, 158.5, 148.6, 146.9, 142.0, 131.5, 130.4, 130.2, 128.2, 128.1, 122.7, 114.3, 104.8, 63.7, 55.3, 53.1, 43.7, 33.2, 14.5; HRMS (ESI)  $m/z$ :  $[\text{M} + \text{Na}]^+$  Calcd for  $\text{C}_{22}\text{H}_{22}\text{ClNO}_4\text{Na}$ , 422.1130; Found, 422.1124.



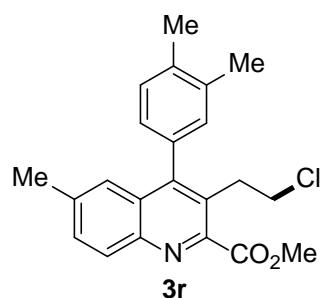
**Methyl 6-(tert-butyl)-3-(2-chloroethyl)-4-(4-methoxyphenyl)quinoline-2-carboxylate (3p)**

Yellow solid, m.p.: 147-149 °C; 74mg (60%); Elution: petroleum ether/ethyl acetate = 7:1 (v : v);  $^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ )  $\delta$  8.13 (d,  $J = 9.0$  Hz, 1H), 7.80 (dd,  $J = 8.9, 2.2$  Hz, 1H), 7.28 (d,  $J = 1.9$  Hz, 1H), 7.21 – 7.15 (m, 2H), 7.11 – 7.03 (m, 2H), 4.06 (s, 3H), 3.92 (s, 3H), 3.58 – 3.51 (m, 2H), 3.27 (t,  $J = 7.8$  Hz, 2H), 1.25 (s, 9H);  $^{13}\text{C}$  NMR (101 MHz,  $\text{CDCl}_3$ )  $\delta$  167.4, 159.5, 151.3, 150.0, 149.2, 144.5, 130.3, 129.4, 128.8, 128.6, 127.9, 127.5, 121.3, 114.1, 55.3, 53.2, 43.7, 35.1, 33.1, 30.9; HRMS (ESI)  $m/z$ :  $[\text{M} + \text{Na}]^+$  Calcd for  $\text{C}_{24}\text{H}_{26}\text{ClNO}_3\text{Na}$ , 434.1493; Found, 434.1486.



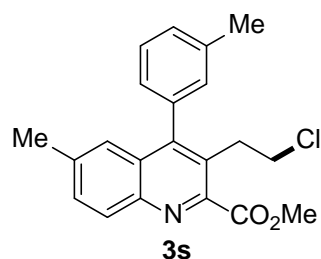
**Methyl 4-(4-(tert-butyl)phenyl)-3-(2-chloroethyl)-6-methylquinoline-2-carboxylate (3q)**

Yellow solid, m.p.: 96-98 °C; 104mg (88%); Elution: petroleum ether/ethyl acetate = 5:1 (v : v); <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) δ 8.08 (d, *J* = 8.6 Hz, 1H), 7.57 – 7.49 (m, 3H), 7.15 (d, *J* = 8.2 Hz, 2H), 7.07 (s, 1H), 4.06 (s, 3H), 3.54 (t, *J* = 7.8 Hz, 2H), 3.24 (t, *J* = 7.8 Hz, 2H), 2.39 (s, 3H), 1.42 (s, 9H); <sup>13</sup>C NMR (101 MHz, CDCl<sub>3</sub>) δ 167.4, 151.3, 149.7, 149.0, 144.6, 138.5, 132.8, 132.1, 129.6, 128.8, 128.7, 127.4, 125.6, 125.2, 53.2, 43.8, 34.8, 33.1, 31.4, 22.0; HRMS (ESI) *m/z*: [M + Na]<sup>+</sup> Calcd for C<sub>24</sub>H<sub>26</sub>ClNO<sub>2</sub>Na, 418.1544; Found, 418.1552.



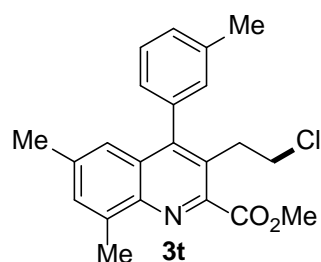
**Methyl 3-(2-chloroethyl)-4-(3,4-dimethylphenyl)-6-methylquinoline-2-carboxylate (3r)**

Yellow liquid; 25mg (23%); Elution: petroleum ether/ethyl acetate = 8:1 (v : v); <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) δ 8.09 (d, *J* = 8.6 Hz, 1H), 7.54 (d, *J* = 8.6 Hz, 1H), 7.30 (d, *J* = 7.5 Hz, 1H), 7.10 (s, 1H), 7.03 – 6.81 (m, 2H), 4.07 (s, 2H), 3.64 – 3.44 (m, 2H), 3.44 – 3.13 (m, 2H), 2.40 (s, 3H), 2.40 (s, 3H), 2.35 (s, 3H); <sup>13</sup>C NMR (101 MHz, CDCl<sub>3</sub>) δ 167.4, 149.9, 149.0, 144.5, 138.4, 137.0, 136.8, 133.2, 132.1, 130.1, 130.0, 129.6, 128.7, 127.3, 126.5, 125.2, 53.2, 43.8, 33.1, 21.9, 19.9, 19.7; HRMS (ESI) *m/z*: [M + Na]<sup>+</sup> Calcd for C<sub>22</sub>H<sub>22</sub>ClNO<sub>2</sub>Na, 390.1231; Found, 390.1222.



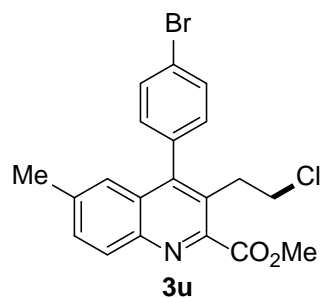
**Methyl 3-(2-chloroethyl)-6-methyl-4-(m-tolyl)quinoline-2-carboxylate (3s)**

Dark brown liquid; 58mg (55%); Elution: petroleum ether/ethyl acetate = 8:1 (v : v); <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) δ 8.32 (d, *J* = 8.6 Hz, 1H), 7.64 (d, *J* = 7.6 Hz, 1H), 7.45 (t, *J* = 7.8 Hz, 1H), 7.35 (d, *J* = 7.5 Hz, 1H), 7.11 (s, 1H), 7.04 (d, *J* = 6.6 Hz, 2H), 4.10 (s, 3H), 3.61 – 3.49 (m, 2H), 3.39 – 3.22 (m, 2H), 2.45 (s, 3H), 2.41 (s, 3H); <sup>13</sup>C NMR (101 MHz, CDCl<sub>3</sub>) δ 165.1, 153.3, 146.1, 141.8, 140.0, 138.8, 135.0, 134.2, 129.7, 129.3, 129.1, 128.8, 128.4, 127.5, 125.9, 125.4, 53.9, 43.5, 32.7, 22.1, 21.6; HRMS (ESI) *m/z*: [M + Na]<sup>+</sup> Calcd for C<sub>21</sub>H<sub>20</sub>ClNO<sub>2</sub>Na, 376.1075; Found, 376.1075.



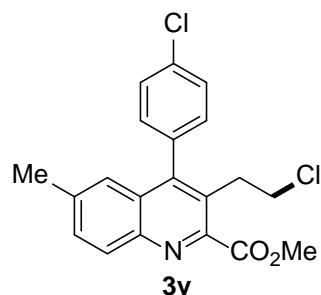
### Methyl 3-(2-chloroethyl)-6,8-dimethyl-4-(m-tolyl)quinoline-2-carboxylate (3t)

White solid, m.p.: 105-108 °C; 54mg (49%); Elution: petroleum ether/ethyl acetate = 8:1 (v : v); <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) δ 7.44 – 7.39 (m, 2H), 7.31 (d, *J* = 7.5 Hz, 1H), 7.02 (d, *J* = 7.4 Hz, 2H), 6.89 (s, 1H), 4.06 (s, 3H), 3.57 – 3.53 (m, 2H), 3.25 – 3.17 (m, 2H), 2.81 (s, 3H), 2.44 (s, 3H), 2.34 (s, 3H); <sup>13</sup>C NMR (101 MHz, CDCl<sub>3</sub>) δ 167.9, 149.4, 148.1, 143.8, 138.4, 137.9, 137.6, 136.3, 132.2, 129.7, 129.0, 128.5, 126.4, 126.2, 123.1, 52.9, 43.7, 33.2, 21.9, 21.6, 17.8 (one <sup>13</sup>C signal lost for overlap); HRMS (ESI) *m/z*: [M + Na]<sup>+</sup> Calcd for C<sub>22</sub>H<sub>22</sub>ClNO<sub>2</sub>Na, 390.1231; Found, 390.1230.



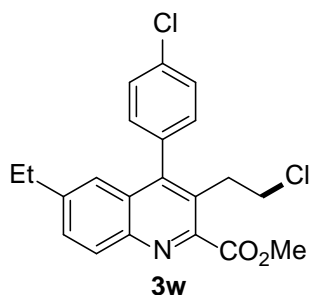
### Methyl 4-(4-bromophenyl)-3-(2-chloroethyl)-6-methylquinoline-2-carboxylate (3u)

Reddish brown solid, m.p.: 135-138 °C; 67mg (53%); Elution: petroleum ether/ethyl acetate = 5:1 (v : v); <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) δ 8.10 (d, *J* = 8.6 Hz, 1H), 7.71 – 7.67 (m, 2H), 7.55 (dd, *J* = 8.6, 1.7 Hz, 1H), 7.15 – 7.11 (m, 2H), 7.00 (s, 1H), 4.06 (s, 3H), 3.55 (t, *J* = 7.6 Hz, 2H), 3.24 (t, *J* = 7.7 Hz, 2H), 2.40 (s, 3H); <sup>13</sup>C NMR (101 MHz, CDCl<sub>3</sub>) δ 167.2, 148.8, 148.1, 144.5, 139.0, 134.9, 132.4, 132.1, 130.9, 129.8, 128.2, 127.3, 124.7, 122.8, 53.3, 43.6, 32.9, 22.0; HRMS (ESI) *m/z*: [M + Na]<sup>+</sup> Calcd for C<sub>20</sub>H<sub>17</sub>BrClNO<sub>2</sub>Na, 440.0023; Found, 440.0017.



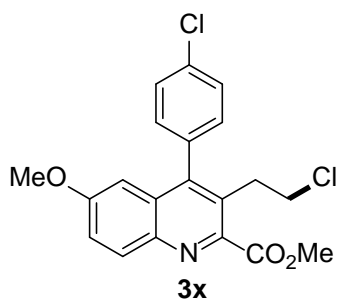
### Methyl 3-(2-chloroethyl)-4-(4-chlorophenyl)-6-methylquinoline-2-carboxylate (3v)

Dark brown solid, m.p.: 91-94 °C; 94mg (84%); Elution: petroleum ether/ethyl acetate = 5:1 (v : v); <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) δ 8.10 (d, *J* = 8.6 Hz, 1H), 7.58 – 7.51 (m, 3H), 7.21 – 7.17 (m, 2H), 6.99 (d, *J* = 7.1 Hz, 1H), 4.06 (s, 3H), 3.55 (t, *J* = 7.7 Hz, 2H), 3.24 (t, *J* = 7.7 Hz, 2H), 2.40 (s, 3H); <sup>13</sup>C NMR (101 MHz, CDCl<sub>3</sub>) δ 167.1, 148.8, 148.2, 144.5, 139.0, 134.6, 134.3, 132.4, 130.6, 129.8, 129.1, 128.3, 127.4, 124.7, 53.2, 43.6, 33.0, 21.9; HRMS (ESI) *m/z*: [M + Na]<sup>+</sup> Calcd for C<sub>20</sub>H<sub>17</sub>Cl<sub>2</sub>NO<sub>2</sub>Na, 396.0529; Found, 396.0538.



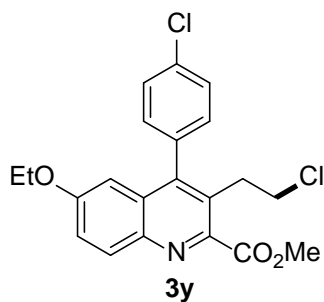
**Methyl 3-(2-chloroethyl)-4-(4-chlorophenyl)-6-ethylquinoline-2-carboxylate (3w)**

Yellow solid, m.p.: 98-101 °C; 101mg (87%); Elution: petroleum ether/ethyl acetate = 5:1 (v : v); <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) δ 8.13 (d, *J* = 8.7 Hz, 1H), 7.60 (dd, *J* = 8.7, 1.9 Hz, 1H), 7.57 – 7.52 (m, 2H), 7.23 – 7.18 (m, 2H), 7.01 (d, *J* = 1.1 Hz, 1H), 4.06 (s, 3H), 3.57 (t, *J* = 7.6 Hz, 2H), 3.26 (t, *J* = 7.7 Hz, 2H), 2.69 (q, *J* = 7.6 Hz, 2H), 1.19 (t, *J* = 7.6 Hz, 3H); <sup>13</sup>C NMR (101 MHz, CDCl<sub>3</sub>) δ 167.2, 148.9, 148.3, 145.1, 144.7, 134.6, 134.4, 131.2, 130.6, 130.0, 129.1, 128.3, 127.4, 123.6, 53.3, 43.6, 33.0, 29.2, 15.4; HRMS (ESI) *m/z*: [M + Na]<sup>+</sup> Calcd for C<sub>21</sub>H<sub>19</sub>Cl<sub>2</sub>NO<sub>2</sub>Na, 410.0685; Found, 410.0681.



**Methyl 3-(2-chloroethyl)-4-(4-chlorophenyl)-6-methoxyquinoline-2-carboxylate (3x)**

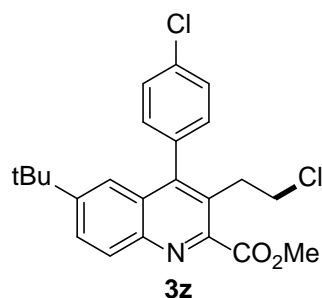
Yellow solid, m.p.: 151-154 °C; 74mg (63%); Elution: petroleum ether/ethyl acetate = 5:1 (v : v); <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) δ 8.12 (d, *J* = 9.2 Hz, 1H), 7.54 (d, *J* = 8.4 Hz, 2H), 7.37 (dd, *J* = 9.2, 2.7 Hz, 1H), 7.21 (d, *J* = 8.4 Hz, 2H), 6.46 (d, *J* = 2.7 Hz, 1H), 4.06 (s, 3H), 3.69 (s, 3H), 3.56 (t, *J* = 7.6 Hz, 2H), 3.26 (t, *J* = 7.6 Hz, 2H); <sup>13</sup>C NMR (101 MHz, CDCl<sub>3</sub>) δ 167.1, 159.4, 147.4, 146.9, 142.1, 134.7, 134.5, 131.7, 130.6, 129.7, 129.3, 128.0, 122.7, 103.7, 55.4, 53.2, 43.7, 33.0; HRMS (ESI) *m/z*: [M + Na]<sup>+</sup> Calcd for C<sub>20</sub>H<sub>17</sub>Cl<sub>2</sub>NO<sub>3</sub>Na, 412.0478; Found, 412.0472.



**Methyl 3-(2-chloroethyl)-4-(4-chlorophenyl)-6-ethoxyquinoline-2-carboxylate (3y)**

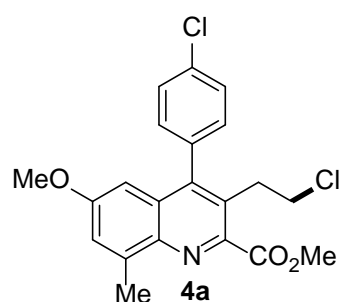
Dark green solid, m.p.: 108-112 °C; 82mg (68%); Elution: petroleum ether/ethyl acetate = 5:1 (v : v); <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) δ 8.11 (d, *J* = 9.2 Hz, 1H), 7.53 (d, *J* = 8.5 Hz, 2H), 7.37 (dd, *J* = 9.2, 2.7 Hz, 1H), 7.22 – 7.18 (m, 2H), 6.45 (d, *J* = 2.6 Hz, 1H), 4.06 (s, 3H), 3.88 (q, *J* = 7.0 Hz, 2H), 3.56 (t, *J* = 7.7

Hz, 2H), 3.25 (t,  $J = 7.7$  Hz, 3H), 1.36 (t,  $J = 7.0$  Hz, 3H);  $^{13}\text{C}$  NMR (101 MHz,  $\text{CDCl}_3$ )  $\delta$  167.1, 158.7, 147.3, 146.7, 142.0, 134.6, 134.6, 131.7, 130.6, 129.7, 129.3, 128.0, 122.9, 104.4, 63.8, 53.2, 43.7, 33.1, 14.5; HRMS (ESI)  $m/z$ :  $[\text{M} + \text{Na}]^+$  Calcd for  $\text{C}_{21}\text{H}_{19}\text{Cl}_2\text{NO}_3\text{Na}$ , 426.0634; Found, 426.0626.



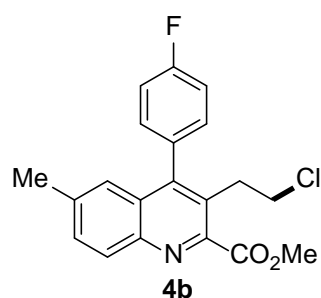
### Methyl 6-(tert-butyl)-3-(2-chloroethyl)-4-(4-chlorophenyl)quinoline-2-carboxylate (**3z**)

Reddish brown solid, m.p.: 141-143 °C; 83mg (67%); Elution: petroleum ether/ethyl acetate = 5:1 (v : v);  $^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ )  $\delta$  8.14 (d,  $J = 8.9$  Hz, 1H), 7.82 (dd,  $J = 8.9, 1.8$  Hz, 1H), 7.54 (d,  $J = 8.2$  Hz, 2H), 7.22 (d,  $J = 8.2$  Hz, 2H), 7.18 (s, 1H), 4.06 (s, 3H), 3.54 (t,  $J = 7.6$  Hz, 2H), 3.25 (t,  $J = 7.6$  Hz, 2H), 1.24 (s, 9H);  $^{13}\text{C}$  NMR (101 MHz,  $\text{CDCl}_3$ )  $\delta$  167.2, 151.7, 149.1, 148.7, 144.5, 134.6, 134.4, 130.6, 129.6, 129.1, 129.0, 127.9, 127.3, 120.8, 53.2, 43.6, 35.2, 32.9, 30.9; HRMS (ESI)  $m/z$ :  $[\text{M} + \text{Na}]^+$  Calcd for  $\text{C}_{23}\text{H}_{23}\text{Cl}_2\text{NO}_2\text{Na}$ , 438.0998; Found, 438.1007.



### Methyl 3-(2-chloroethyl)-4-(4-chlorophenyl)-6-methoxy-8-methylquinoline-2-carboxylate (**4a**)

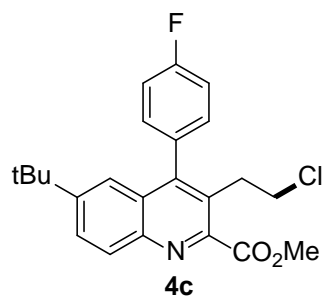
Reddish brown solid, m.p.: 134-138 °C; 24mg (20%); Elution: petroleum ether/ethyl acetate = 5:1 (v : v);  $^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ )  $\delta$  7.52 (d,  $J = 8.4$  Hz, 2H), 7.23 – 7.21 (m, 1H), 7.18 (d,  $J = 8.4$  Hz, 2H), 6.29 (d,  $J = 2.7$  Hz, 1H), 4.04 (s, 3H), 3.65 (s, 3H), 3.56 (t,  $J = 7.7$  Hz, 2H), 3.22 (t,  $J = 7.7$  Hz, 2H), 2.79 (s, 3H);  $^{13}\text{C}$  NMR (101 MHz,  $\text{CDCl}_3$ )  $\delta$  167.6, 158.8, 147.1, 146.0, 141.6, 140.1, 135.0, 134.5, 130.6, 129.7, 129.2, 127.3, 122.4, 101.6, 55.2, 52.9, 43.6, 33.1, 17.9; HRMS (ESI)  $m/z$ :  $[\text{M} + \text{Na}]^+$  Calcd for  $\text{C}_{21}\text{H}_{19}\text{Cl}_2\text{NO}_3\text{Na}$ , 426.0634; Found, 426.0627.





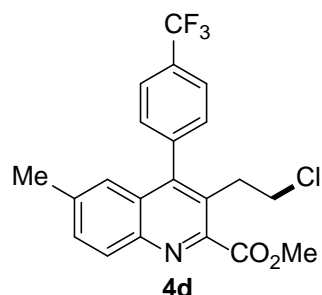
**Methyl 3-(2-chloroethyl)-4-(4-fluorophenyl)-6-methylquinoline-2-carboxylate (4b)**

White solid, m.p.: 170-173 °C; 82mg (77%); Elution: petroleum ether/ethyl acetate = 5:1 (v : v); <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) δ 8.10 (d, *J* = 8.6 Hz, 1H), 7.55 (dd, *J* = 8.6, 1.8 Hz, 1H), 7.30 – 7.17 (m, 4H), 6.99 (d, *J* = 9.6 Hz, 1H), 4.06 (s, 3H), 3.55 (t, *J* = 7.7 Hz, 2H), 3.24 (t, *J* = 7.7 Hz, 2H), 2.40 (s, 3H); <sup>13</sup>C NMR (101 MHz, CDCl<sub>3</sub>) δ 167.2, 162.7 (d, *J*<sub>C-F</sub> = 248.3 Hz), 148.9, 148.4, 144.6, 138.9, 132.3, 131.8 (d, *J*<sub>C-F</sub> = 3.6 Hz), 131.0 (d, *J*<sub>C-F</sub> = 8.1 Hz), 129.8, 128.5, 127.6, 124.8, 116.0 (d, *J*<sub>C-F</sub> = 21.6 Hz), 53.2, 43.6, 33.0, 22.0; HRMS (ESI) *m/z*: [M + Na]<sup>+</sup> Calcd for C<sub>20</sub>H<sub>17</sub>ClFNO<sub>2</sub>Na, 380.0824; Found, 380.0822.



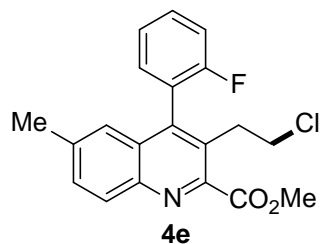
**Methyl 6-(tert-butyl)-3-(2-chloroethyl)-4-(4-fluorophenyl)quinoline-2-carboxylate (4c)**

Dark brown solid, m.p.: 144-147 °C; 90mg (75%); Elution: petroleum ether/ethyl acetate = 5:1 (v : v); <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) δ 8.15 (d, *J* = 8.9 Hz, 1H), 7.82 (dd, *J* = 9.0, 2.1 Hz, 1H), 7.28 – 7.23 (m, 4H), 7.18 (d, *J* = 2.0 Hz, 1H), 4.07 (s, 3H), 3.55 (t, *J* = 7.7 Hz, 2H), 3.27 (t, *J* = 7.7 Hz, 2H), 1.24 (s, 9H); <sup>13</sup>C NMR (101 MHz, CDCl<sub>3</sub>) δ 167.3, 162.6 (d, *J*<sub>C-F</sub> = 248.3 Hz), 151.6, 149.0 (d, *J*<sub>C-F</sub> = 13.0 Hz), 144.5, 131.8 (d, *J*<sub>C-F</sub> = 3.6 Hz), 131.0, 130.9, 129.6, 129.0, 128.2, 127.4, 120.9, 115.9 (d, *J*<sub>C-F</sub> = 21.6 Hz), 53.2, 43.6, 35.2, 33.0, 30.9; HRMS (ESI) *m/z*: [M + H]<sup>+</sup> Calcd for C<sub>23</sub>H<sub>24</sub>ClFNO<sub>2</sub>, 400.1474; Found, 400.1474.



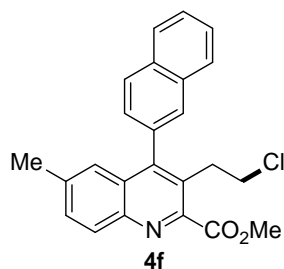
**Methyl 3-(2-chloroethyl)-6-methyl-4-(4-(trifluoromethyl)phenyl)quinoline-2-carboxylate (4d)**

Yellow solid, m.p.: 125-128 °C; 26mg (21%); Elution: petroleum ether/ethyl acetate = 4:1 (v : v); <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) δ 8.12 (d, *J* = 8.6 Hz, 1H), 7.83 (d, *J* = 8.0 Hz, 2H), 7.57 (dd, *J* = 8.6, 1.7 Hz, 1H), 7.40 (d, *J* = 7.9 Hz, 2H), 6.93 (s, 1H), 4.07 (s, 3H), 3.56 (t, *J* = 7.5 Hz, 2H), 3.24 (t, *J* = 7.6 Hz, 2H), 2.40 (s, 3H); <sup>13</sup>C NMR (101 MHz, CDCl<sub>3</sub>) δ 167.1, 148.8, 147.8, 144.5, 139.9, 139.2, 132.5, 130.79 (q, *J*<sub>C-F</sub> = 32.8 Hz), 129.8 (two <sup>13</sup>C), 127.9, 127.2, 126.7 (q, *J*<sub>C-F</sub> = 272.3 Hz), 125.8 (q, *J*<sub>C-F</sub> = 3.7 Hz), 124.5, 53.2, 43.6, 32.9, 21.9; HRMS (ESI) *m/z*: [M + Na]<sup>+</sup> Calcd for C<sub>21</sub>H<sub>17</sub>ClF<sub>3</sub>NO<sub>2</sub>Na, 430.0792, Found, 430.0792.



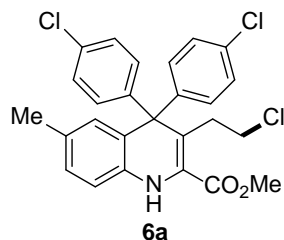
**Methyl 3-(2-chloroethyl)-4-(2-fluorophenyl)-6-methylquinoline-2-carboxylate (4e)**

Light yellow solid, m.p.: 101-105 °C; 52mg (49%); Elution: petroleum ether/ethyl acetate = 5:1 (v : v); <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) δ 8.12 (d, *J* = 8.6 Hz, 1H), 7.62 – 7.51 (m, 2H), 7.38 – 7.32 (m, 1H), 7.29 (t, *J* = 8.9 Hz, 1H), 7.22 (td, *J* = 7.4, 1.6 Hz, 1H), 7.02 (s, 1H), 4.07 (s, 3H), 3.67 – 3.48 (m, 2H), 3.36 – 3.14 (m, 2H), 2.40 (s, 3H); <sup>13</sup>C NMR (101 MHz, CDCl<sub>3</sub>) δ 167.1, 159.4 (d, *J*<sub>C-F</sub> = 246.5 Hz), 148.7, 144.6, 143.3, 139.1, 132.4, 131.4 (d, *J*<sub>C-F</sub> = 3.1 Hz), 131.0 (d, *J*<sub>C-F</sub> = 7.9 Hz), 129.9, 128.3 (d, *J*<sub>C-F</sub> = 11.4 Hz), 124.6 (d, *J*<sub>C-F</sub> = 3.6 Hz), 124.3, 123.3 (d, *J*<sub>C-F</sub> = 17.2 Hz), 116.3 (d, *J*<sub>C-F</sub> = 21.5 Hz), 53.3, 43.2, 33.6, 22.0; HRMS (ESI) m/z: [M + Na]<sup>+</sup> Calcd for C<sub>20</sub>H<sub>17</sub>ClFNO<sub>2</sub>Na, 380.0824; Found, 380.0822.



**Methyl 3-(2-chloroethyl)-6-methyl-4-(naphthalen-2-yl)quinoline-2-carboxylate (4f)**

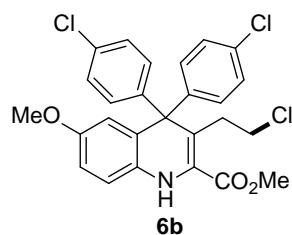
Yellow solid, m.p.: 123-126 °C; 41mg (35%); Elution: petroleum ether/ethyl acetate = 5:1 (v : v); <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) δ 8.12 (t, *J* = 9.4 Hz, 1H), 8.02 (t, *J* = 7.4 Hz, 1H), 8.01 – 7.96 (m, 1H), 7.93 – 7.86 (m, 1H), 7.74 (s, 1H), 7.65 – 7.52 (m, 3H), 7.35 (dd, *J* = 8.3, 1.4 Hz, 1H), 7.05 (s, 1H), 4.08 (s, 3H), 3.58 (t, *J* = 7.7 Hz, 2H), 3.39 – 3.22 (m, 2H), 2.34 (s, 3H); <sup>13</sup>C NMR (101 MHz, CDCl<sub>3</sub>) δ 167.3, 149.4, 149.0, 144.6, 138.8, 133.4, 133.1, 132.9, 132.3, 129.7, 128.6 (two <sup>13</sup>C), 128.3, 128.2, 128.0, 127.6, 127.0, 126.9, 126.8, 125.1, 53.2, 43.8, 33.1, 21.9; HRMS (ESI) m/z: [M + Na]<sup>+</sup> Calcd for C<sub>24</sub>H<sub>20</sub>ClNO<sub>2</sub>Na, 412.1075; Found, 412.1068.



**Methyl 3-(2-chloroethyl)-4,4-bis(4-chlorophenyl)-6-methyl-1,4-dihydroquinoline-2-carboxylate (6a)**

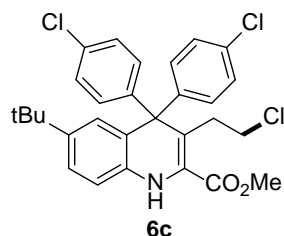
Yellow solid, m.p.: 86-89 °C; 76mg (52%); Elution: petroleum ether/ethyl acetate = 6:1 (v : v); <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) δ 7.30 (d, *J* = 8.7 Hz, 4H), 7.19 (d, *J* = 8.7 Hz, 4H), 6.89 (dd, *J* = 8.1, 1.3 Hz, 1H), 6.79 (s, *NH*, 1H), 6.64 (s, 1H), 6.60 (d, *J* = 8.1 Hz, 1H), 3.95 (s, 3H), 2.76 (s, 4H), 2.15 (s, 3H); <sup>13</sup>C NMR (101 MHz, CDCl<sub>3</sub>) δ 163.5, 143.7, 134.8, 132.7, 131.3, 131.0, 130.8, 130.1, 128.5, 128.3, 127.5, 125.0,

118.5, 114.0, 57.9, 52.9, 43.3, 35.6, 21.0; HRMS (ESI)  $m/z$ :  $[M + Na]^+$  Calcd for  $C_{26}H_{22}Cl_3NO_2Na$ , 508.0608; Found, 508.0580.



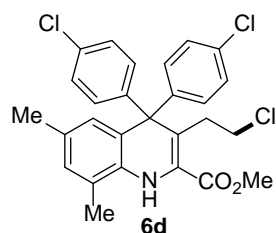
**Methyl 3-(2-chloroethyl)-4,4-bis(4-chlorophenyl)-6-methoxy-1,4-dihydroquinoline-2-carboxylate (6b)**

Yellow oil; 41mg (27%); Elution: petroleum ether/ethyl acetate = 5:1 (v : v);  $^1H$  NMR (400 MHz,  $CDCl_3$ )  $\delta$  7.27 (t,  $J$  = 8.1 Hz, 4H), 7.18 (d,  $J$  = 8.5 Hz, 4H), 6.73 (s, *NH*, 1H), 6.68 (dd,  $J$  = 8.7, 2.1 Hz, 1H), 6.63 (d,  $J$  = 8.7 Hz, 1H), 6.39 (d,  $J$  = 2.0 Hz, 1H), 3.94 (s, 3H), 3.62 (s, 3H), 2.76 (s, 4H);  $^{13}C$  NMR (101 MHz,  $CDCl_3$ )  $\delta$  163.5, 154.6, 143.3, 132.8, 131.4, 131.2, 128.3, 127.7, 126.2, 117.2, 115.4, 114.8, 113.5, 58.2, 55.6, 52.9, 43.3, 35.5; HRMS (ESI)  $m/z$ :  $[M + Na]^+$  Calcd for  $C_{26}H_{22}Cl_3NO_3Na$ , 524.0558; Found, 524.0559.



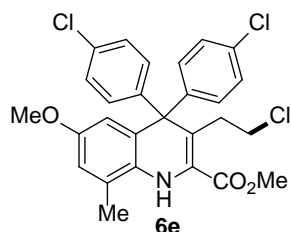
**Methyl 6-(tert-butyl)-3-(2-chloroethyl)-4,4-bis(4-chlorophenyl)-1,4-dihydroquinoline-2-carboxylate (6c)**

Yellow solid, m.p.: 109-112 °C; 47mg (30%); Elution: petroleum ether/ethyl acetate = 5:1 (v : v);  $^1H$  NMR (400 MHz,  $CDCl_3$ )  $\delta$  7.36 – 7.22 (m, 4H), 7.16 (d,  $J$  = 8.7 Hz, 4H), 7.10 (dd,  $J$  = 8.3, 2.1 Hz, 1H), 6.87 (d,  $J$  = 1.8 Hz, 1H), 6.78 (s, *NH*, 1H), 6.62 (d,  $J$  = 8.4 Hz, 1H), 3.94 (s, 3H), 2.75 (s, 3H), 1.13 (s, 9H);  $^{13}C$  NMR (101 MHz,  $CDCl_3$ )  $\delta$  163.5, 144.5, 143.7, 134.8, 132.7, 131.2, 128.2, 127.6, 127.0, 124.6, 124.5, 118.5, 113.5, 58.2, 52.9, 43.2, 35.5, 34.2, 31.3; HRMS (ESI)  $m/z$ :  $[M + Na]^+$  Calcd for  $C_{29}H_{28}Cl_3NO_2Na$ , 550.1078; Found, 550.1074.



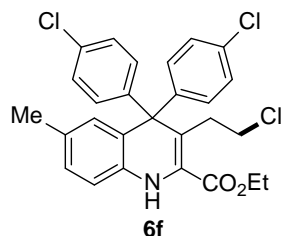
**Methyl 3-(2-chloroethyl)-4,4-bis(4-chlorophenyl)-6,8-dimethyl-1,4-dihydroquinoline-2-carboxylate (6d)**

Yellow solid, m.p.: 75-78°C; 69mg (46%); Elution: petroleum ether/ethyl acetate = 5:1 (v : v);  $^1H$  NMR (400 MHz,  $CDCl_3$ )  $\delta$  7.29 (d,  $J$  = 8.7 Hz, 4H), 7.18 (d,  $J$  = 8.7 Hz, 4H), 6.79 – 6.80 (m, 2H), 6.51 (s, 1H), 3.97 (s, 3H), 2.78 (s, 4H), 2.21 (s, 3H), 2.13 (s, 3H);  $^{13}C$  NMR (101 MHz,  $CDCl_3$ )  $\delta$  163.7, 143.8, 133.3, 132.6, 131.3, 130.2, 129.7, 128.2, 128.0, 127.5, 124.7, 120.8, 118.8, 58.1, 53.0, 43.3, 35.6, 20.9, 16.7; HRMS (ESI)  $m/z$ :  $[M + Na]^+$  Calcd for  $C_{27}H_{24}Cl_3NO_2Na$ , 522.0765; Found, 522.0764.



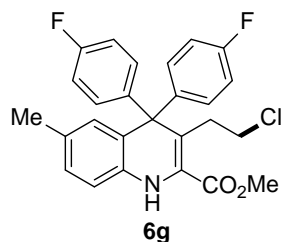
**Methyl 3-(2-chloroethyl)-4,4-bis(4-chlorophenyl)-6-methoxy-8-methyl-1,4-dihydroquinoline-2-carboxylate (6e)**

Yellow oil; 26mg (17%); Elution: petroleum ether/ethyl acetate = 5:1 (v : v);  $^1\text{H NMR}$  (400 MHz,  $\text{CDCl}_3$ )  $\delta$  7.28 (d,  $J = 8.6$  Hz, 4H), 7.18 (d,  $J = 8.5$  Hz, 4H), 6.72 (s, *NH*, 1H), 6.59 (d,  $J = 2.2$  Hz, 1H), 6.26 (d,  $J = 2.2$  Hz, 1H), 3.96 (s, 3H), 3.61 (s, 3H), 2.82 – 2.74 (m, 4H), 2.23 (s, 3H);  $^{13}\text{C NMR}$  (101 MHz,  $\text{CDCl}_3$ )  $\delta$  163.8, 154.0, 143.4, 132.7, 131.2, 130.0, 128.2, 127.7, 125.7, 122.2, 117.6, 115.0, 113.1, 58.4, 55.6, 52.9, 43.3, 35.5, 17.1; HRMS (ESI)  $m/z$ :  $[\text{M} + \text{Na}]^+$  Calcd for  $\text{C}_{27}\text{H}_{24}\text{Cl}_3\text{NO}_3\text{Na}$ , 538.0714; Found, 538.0719.



**Ethyl 3-(2-chloroethyl)-4,4-bis(4-chlorophenyl)-6-methyl-1,4-dihydroquinoline-2-carboxylate (6f)**

Yellow oil; 22mg (15%); Elution: petroleum ether/ethyl acetate = 5:1 (v : v);  $^1\text{H NMR}$  (400 MHz,  $\text{CDCl}_3$ )  $\delta$  7.29 (d,  $J = 8.6$  Hz, 3H), 7.19 (d,  $J = 8.6$  Hz, 4H), 6.88 (d,  $J = 7.9$  Hz, 1H), 6.81 (s, *NH*, 1H), 6.63 (s, 1H), 6.60 (d,  $J = 8.1$  Hz, 1H), 4.41 (q,  $J = 7.1$  Hz, 2H), 2.75 (s, 4H), 2.14 (s, 3H), 1.43 (t,  $J = 7.1$  Hz, 3H);  $^{13}\text{C NMR}$  (101 MHz,  $\text{CDCl}_3$ )  $\delta$  163.4, 143.7, 134.8, 132.7, 131.3, 130.9, 130.1, 128.4, 128.2, 127.7, 125.0, 117.8, 114.0, 62.4, 58.0, 43.2, 35.6, 20.9, 14.1; HRMS (ESI)  $m/z$ :  $[\text{M} + \text{Na}]^+$  Calcd for  $\text{C}_{27}\text{H}_{24}\text{Cl}_3\text{NO}_2\text{Na}$ , 522.0765; Found, 522.0738.

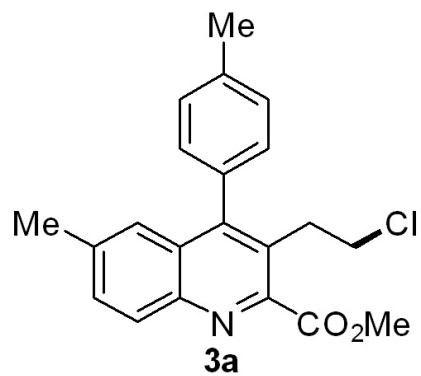


**Methyl 3-(2-chloroethyl)-4,4-bis(4-fluorophenyl)-6-methyl-1,4-dihydroquinoline-2-carboxylate (6g)**

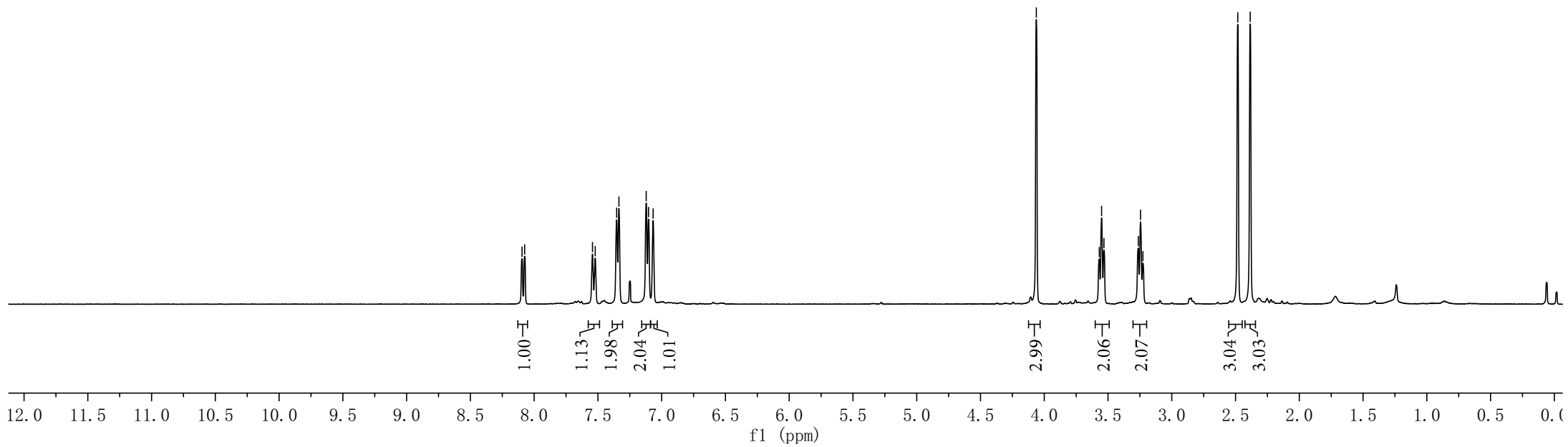
Yellow oil; 31mg (23%); Elution: petroleum ether/ethyl acetate = 5:1 (v : v);  $^1\text{H NMR}$  (400 MHz,  $\text{CDCl}_3$ )  $\delta$  7.23 (d,  $J = 8.6$  Hz, 2H), 7.21 (d,  $J = 8.6$  Hz, 2H), 7.01 (t,  $J = 8.6$  Hz, 4H), 6.88 (d,  $J = 8.0$  Hz, 1H), 6.77 (s, *NH*, 1H), 6.67 (s, 1H), 6.60 (d,  $J = 8.1$  Hz, 1H), 3.95 (s, 3H), 2.76 (s, 4H), 2.16 (s, 3H);  $^{13}\text{C NMR}$  (101 MHz,  $\text{CDCl}_3$ )  $\delta$  163.5, 161.3 (d,  $J_{\text{C-F}} = 247.1$  Hz), 141.2 (d,  $J_{\text{C-F}} = 3.3$  Hz), 134.8, 131.5 (d,  $J_{\text{C-F}} = 7.8$  Hz), 130.8, 130.2, 128.3, 127.3, 125.5, 119.2, 114.9 (d,  $J_{\text{C-F}} = 21.2$  Hz), 113.9, 57.7, 52.8, 43.3, 35.7, 20.9; HRMS (ESI)  $m/z$ :  $[\text{M} + \text{Na}]^+$  Calcd for  $\text{C}_{26}\text{H}_{22}\text{ClF}_2\text{NO}_2\text{Na}$ , 476.1199; Found, 476.1198.

S21

<sup>1</sup>H NMR (400M, CDCl<sub>3</sub>)



8.095 8.074 7.543 7.521 7.353 7.335 7.121 7.103 7.067 4.062 3.568 3.550 3.532 3.262 3.245 3.226 2.483 2.385

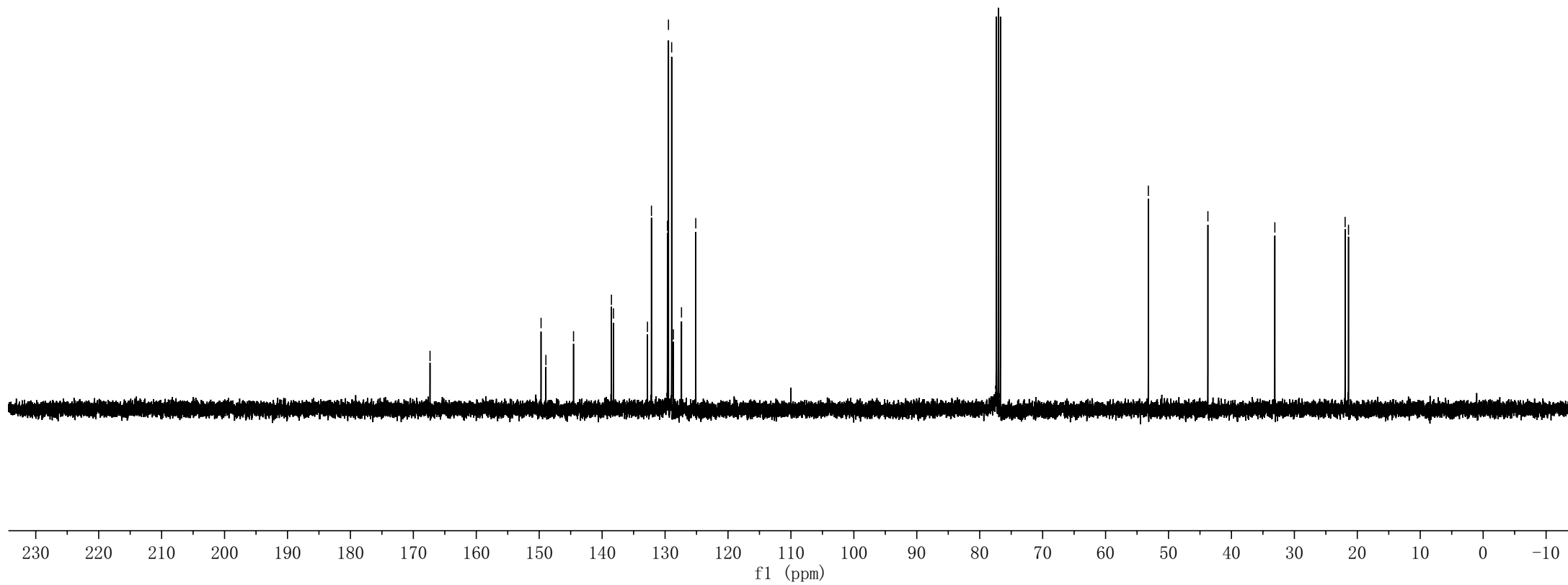
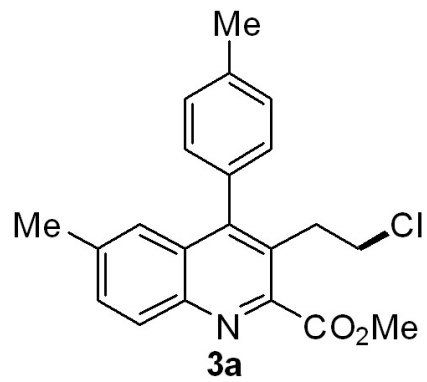


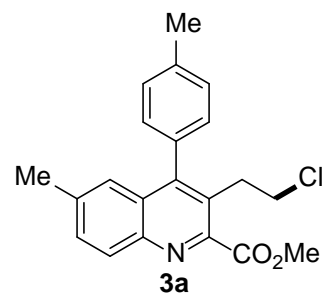
S22

167.348  
149.707  
148.938  
144.545  
138.520  
138.203  
132.798  
132.163  
129.620  
129.459  
128.951  
128.676  
127.390  
125.122

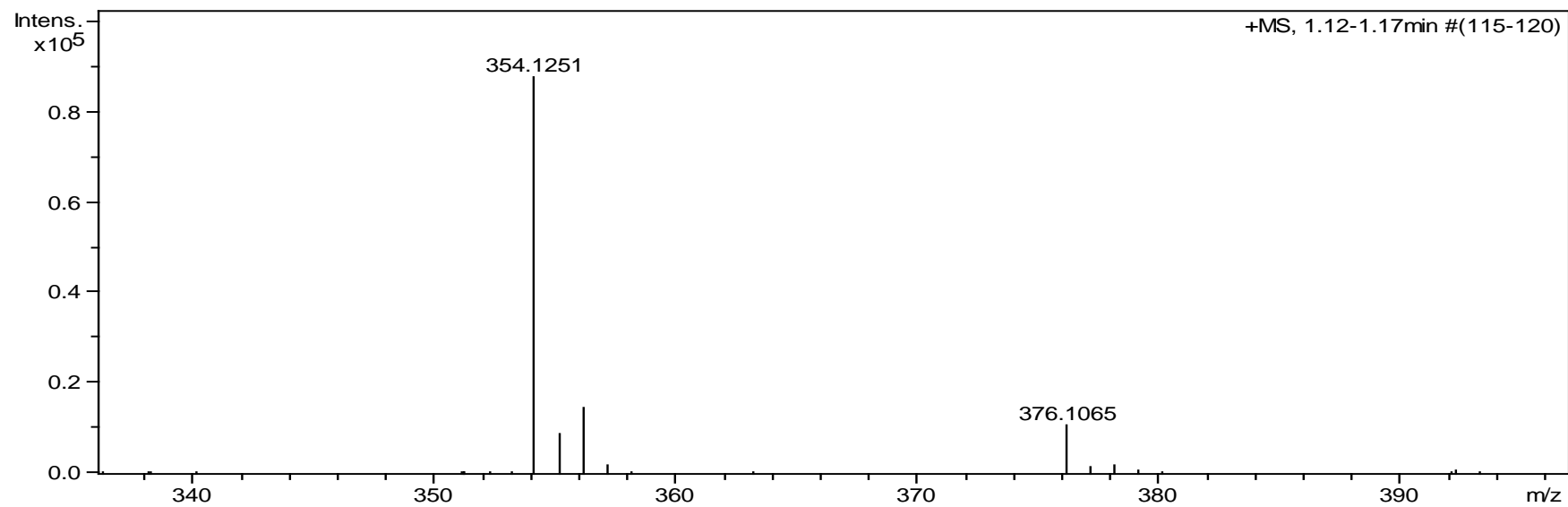
53.204  
43.740  
33.102  
21.937  
21.397

$^{13}\text{C}$  NMR (100M,  $\text{CDCl}_3$ )



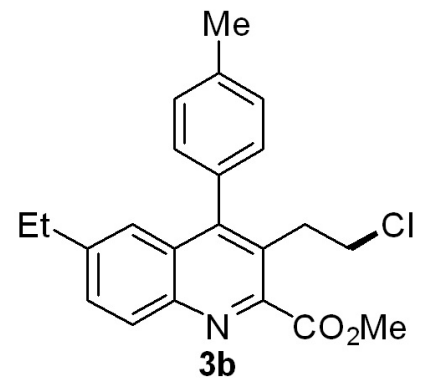


**Methyl 3-(2-chloroethyl)-6-methyl-4-(p-tolyl)quinoline-2-carboxylate (3a)**



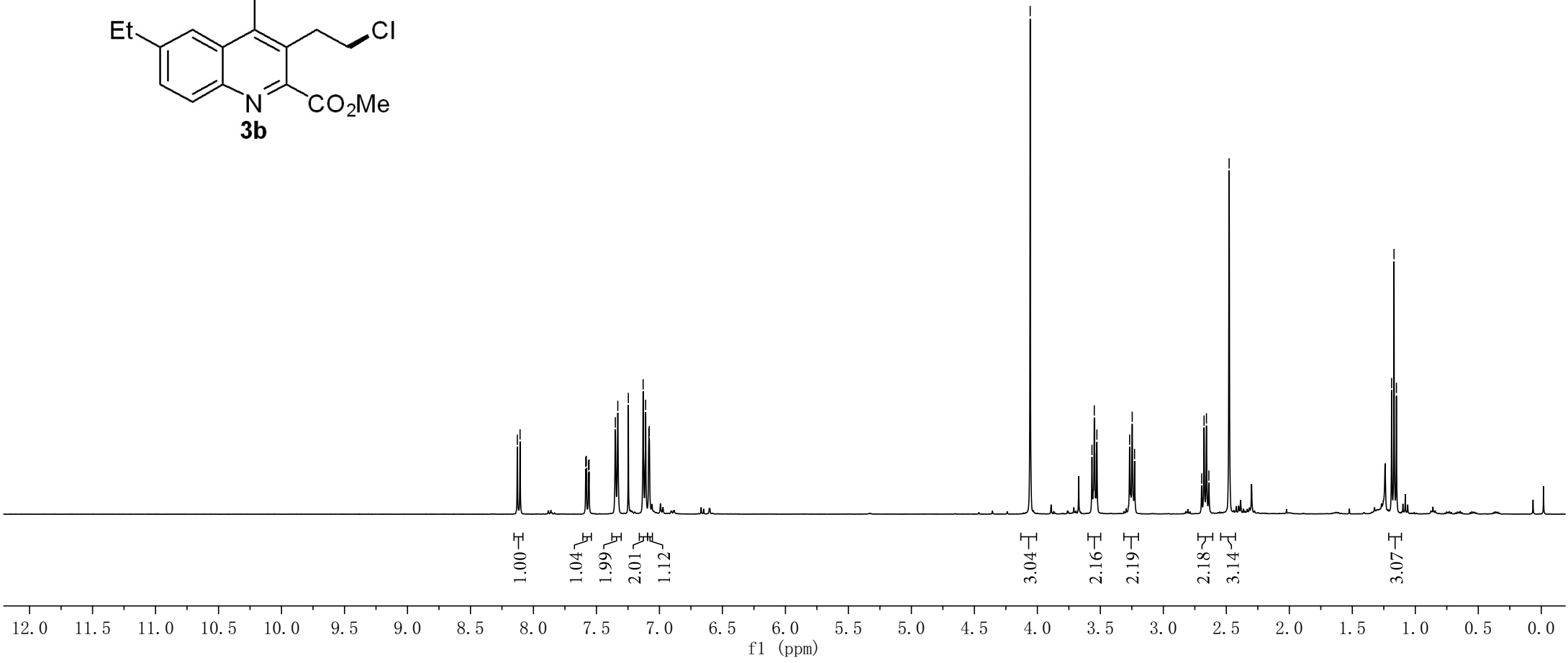
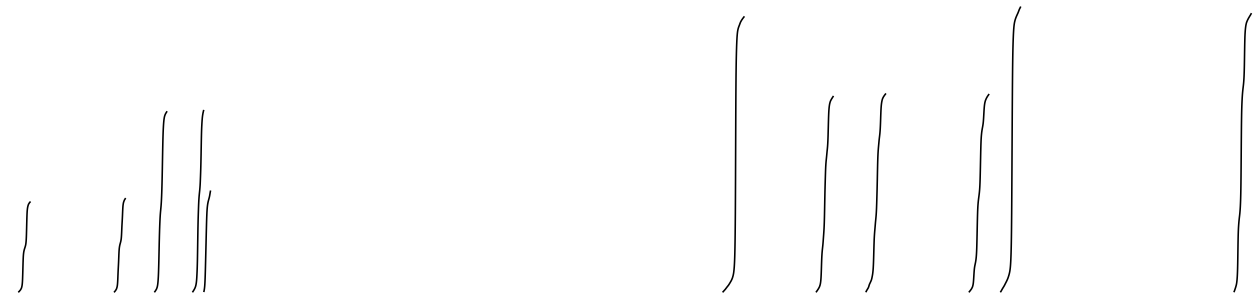
S24

<sup>1</sup>H NMR (400M, CDCl<sub>3</sub>)



8.128  
8.106  
7.585  
7.580  
7.563  
7.559  
7.350  
7.331  
7.247  
7.130  
7.110  
7.084  
7.081

4.057  
3.567  
3.548  
3.528  
3.268  
3.247  
3.228  
2.696  
2.677  
2.658  
2.639  
2.478  
1.188  
1.169  
1.150



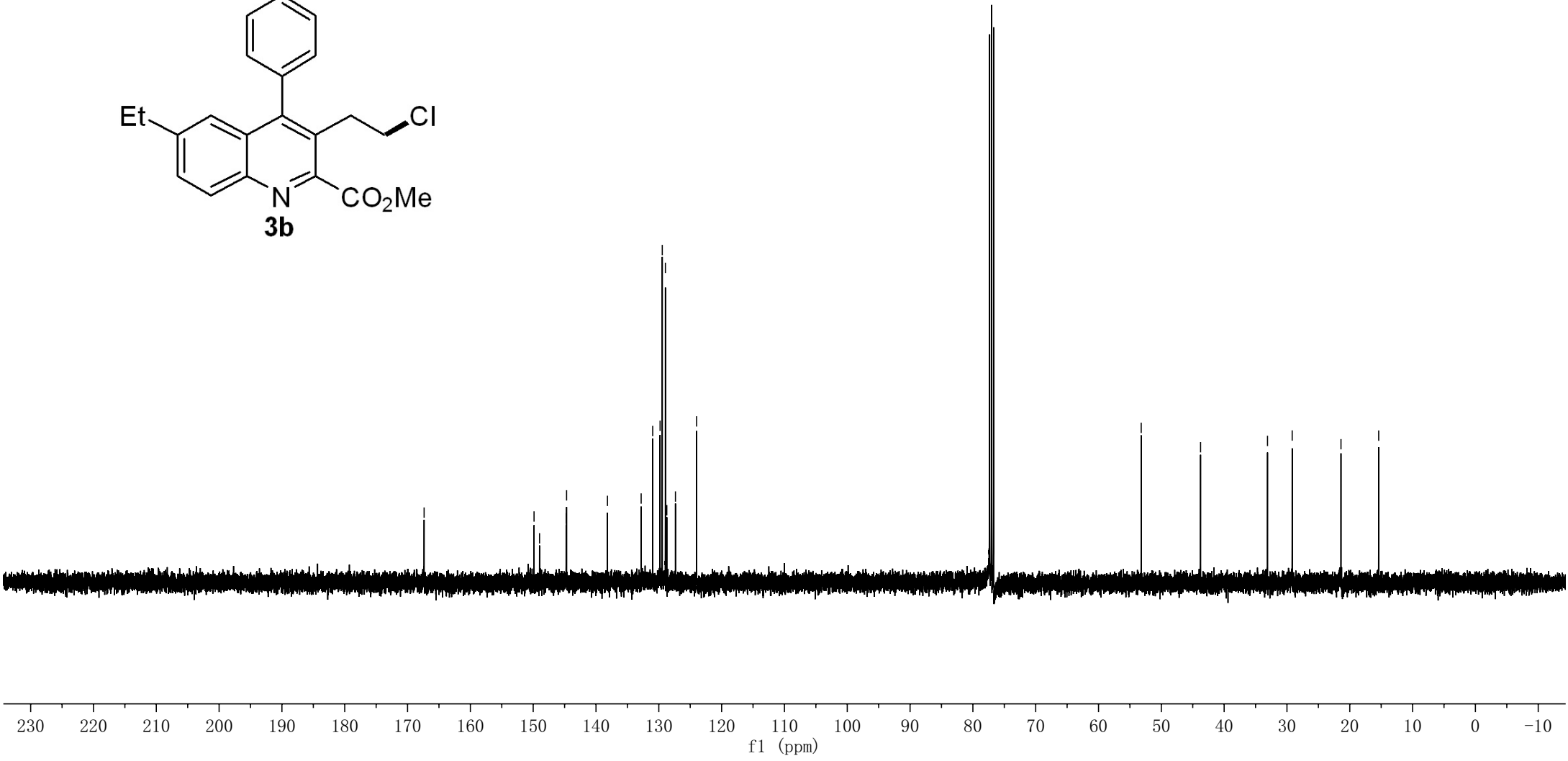
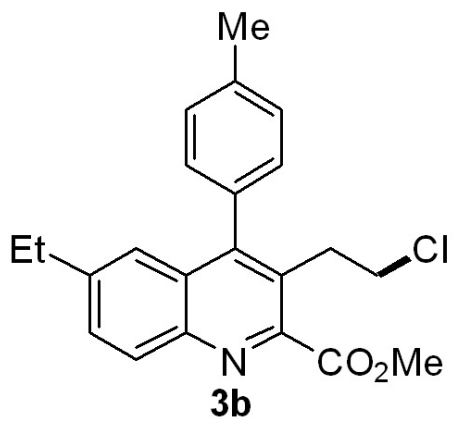


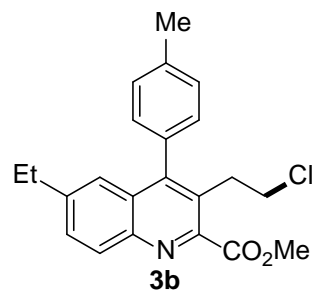
S25

167.364  
149.862  
148.988  
144.751  
144.681  
138.176  
132.811  
130.971  
129.798  
129.450  
128.950  
128.728  
127.351  
123.982

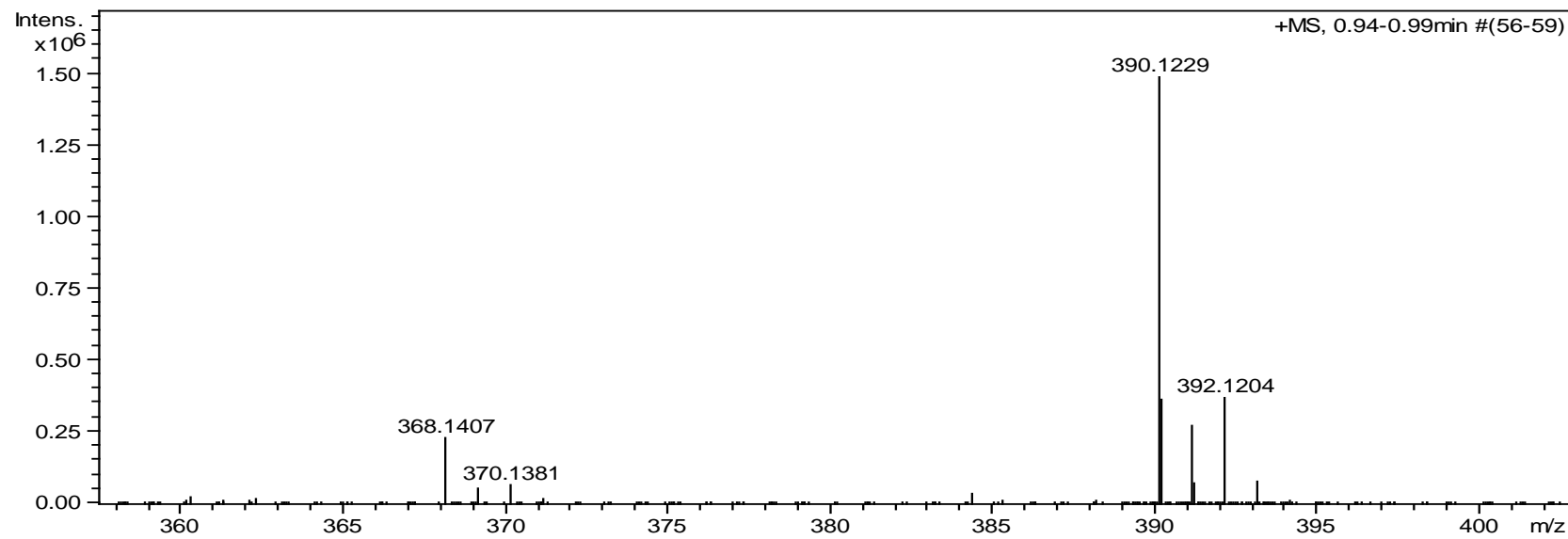
53.204  
43.754  
33.096  
29.168  
21.400  
15.395

<sup>13</sup>C NMR (100M, CDCl<sub>3</sub>)

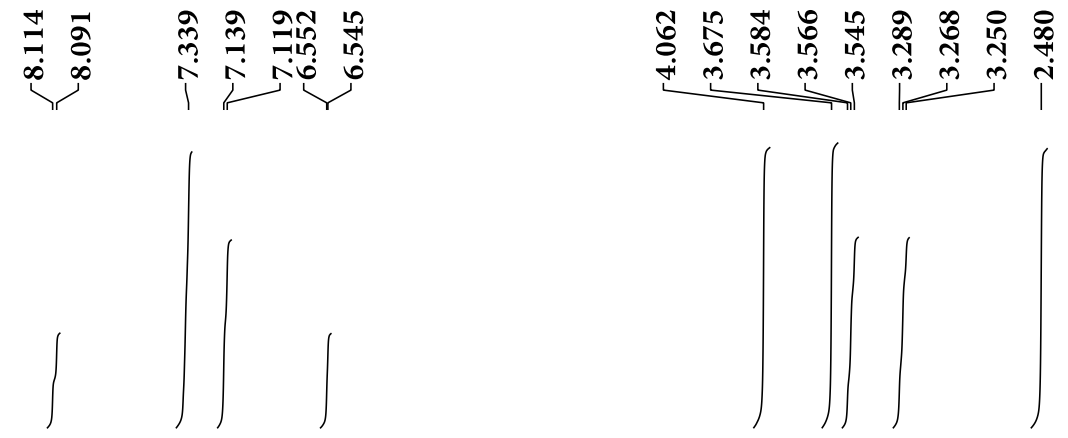




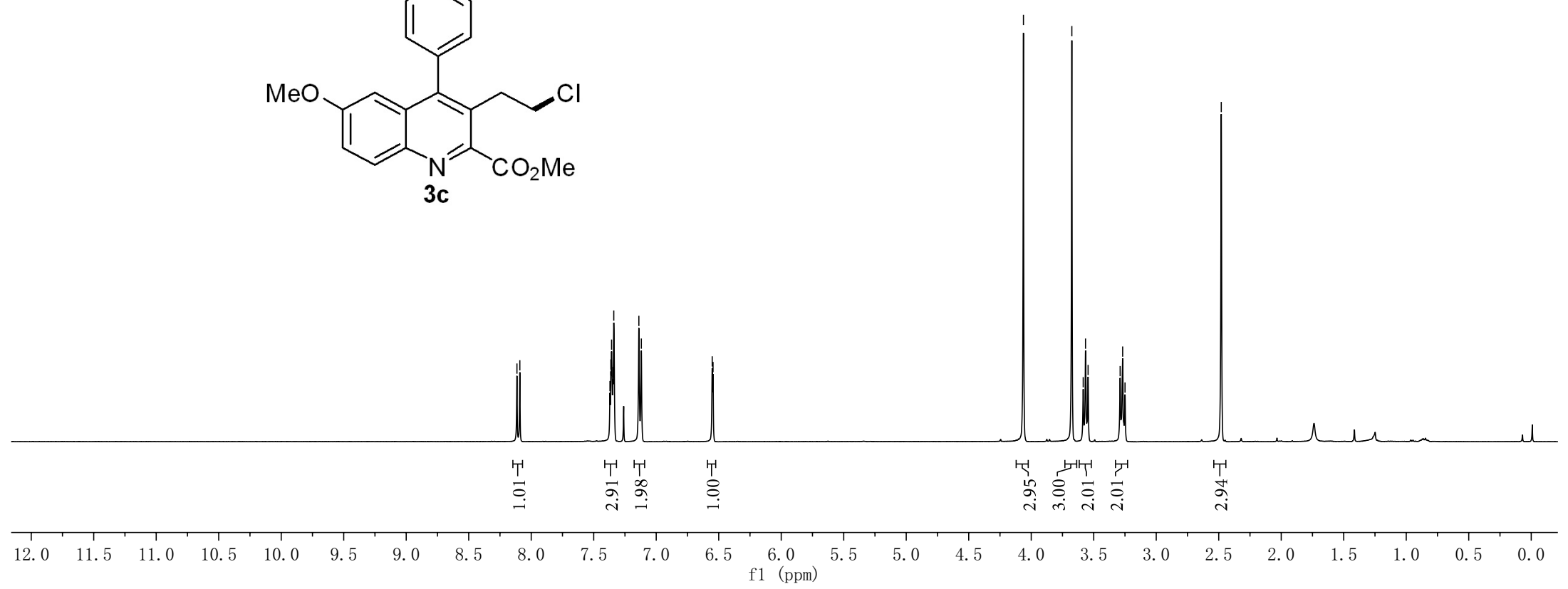
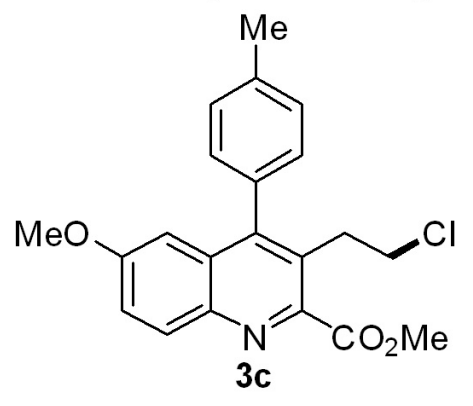
**Methyl 3-(2-chloroethyl)-6-ethyl-4-(p-tolyl)quinoline-2-carboxylate (3b)**



S27



<sup>1</sup>H NMR (400M, CDCl<sub>3</sub>)

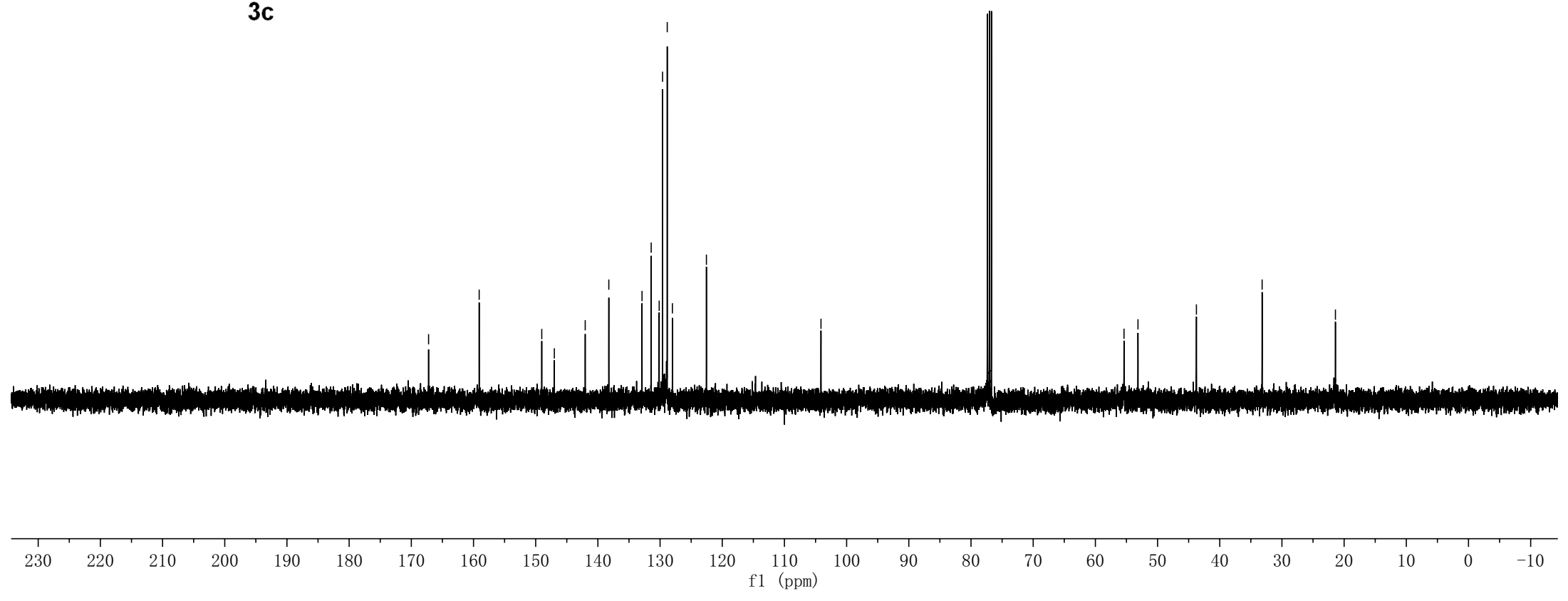
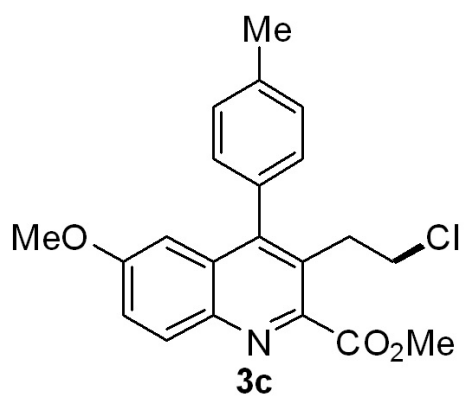


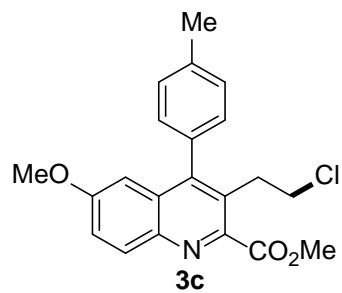
S28

167.224  
159.087  
149.022  
147.003  
142.035  
138.241  
132.900  
131.428  
130.140  
129.596  
128.847  
128.016  
122.546  
—104.124

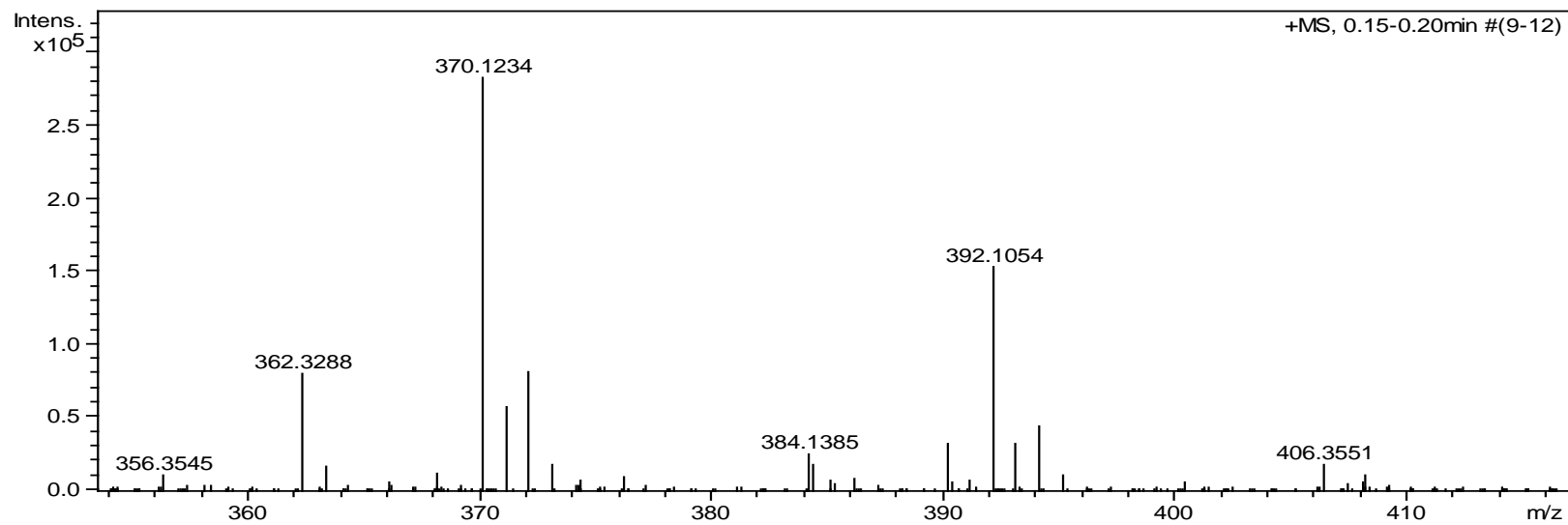
55.394  
53.150  
43.752  
33.184  
—21.398

<sup>13</sup>C NMR (100M, CDCl<sub>3</sub>)



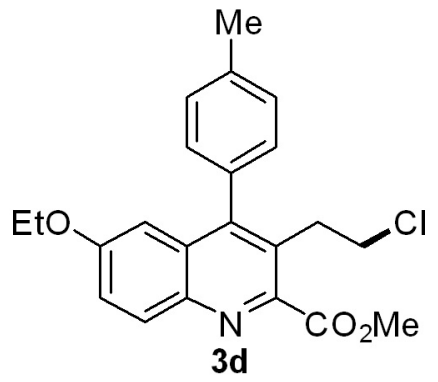


Methyl 3-(2-chloroethyl)-6-methoxy-4-(p-tolyl)quinoline-2-carboxylate (3c)

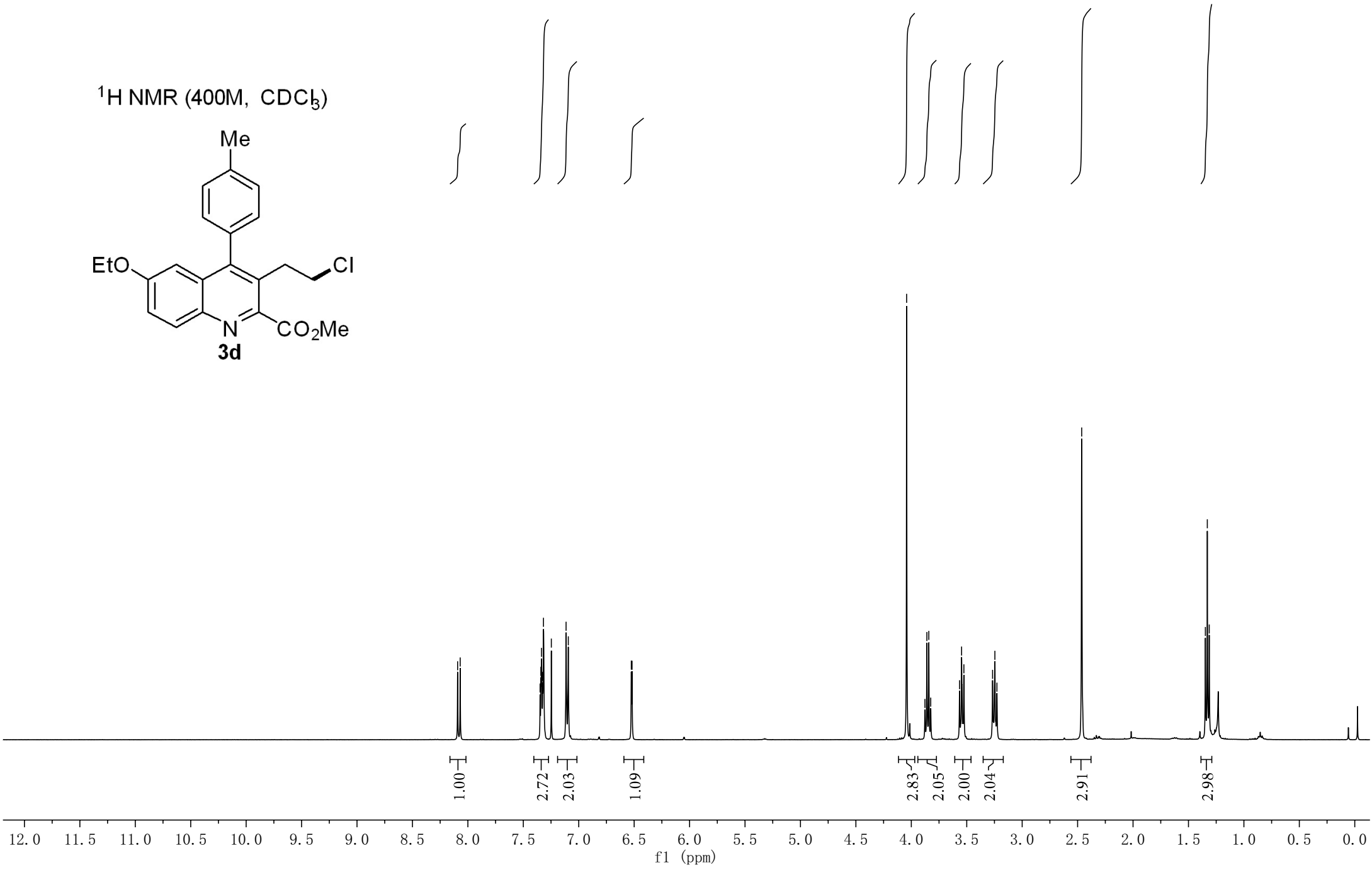


S30

<sup>1</sup>H NMR (400M, CDCl<sub>3</sub>)



8.092 8.069 7.318 7.114 7.094 6.526 6.519 4.042 3.877 3.860 3.842 3.825 3.565 3.546 3.526 3.267 3.246 3.228 2.463 1.347 1.330 1.313

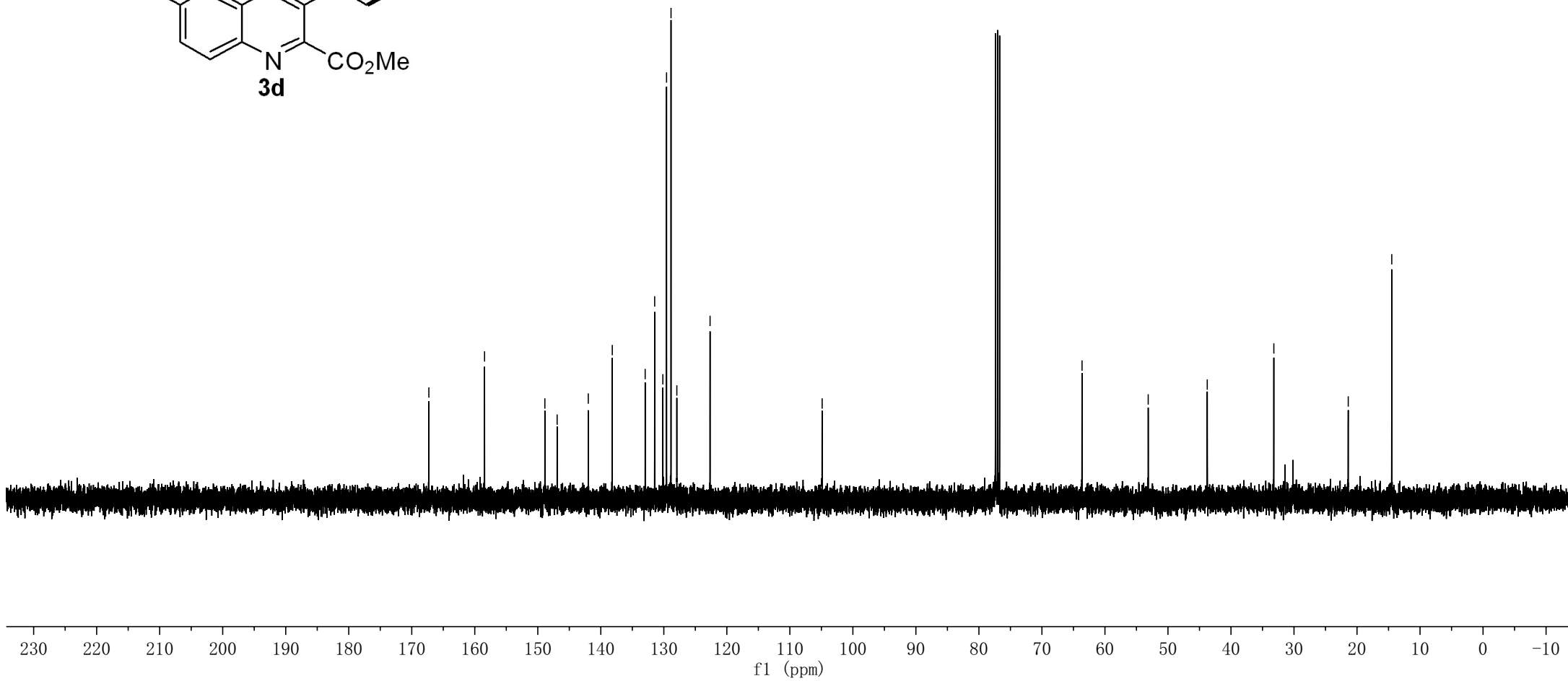
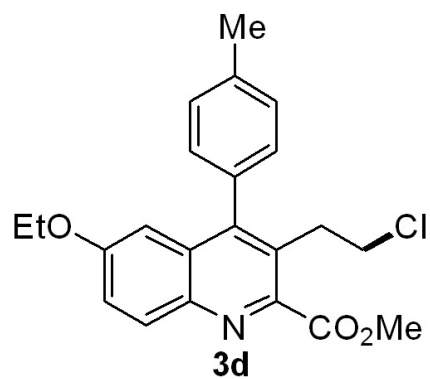


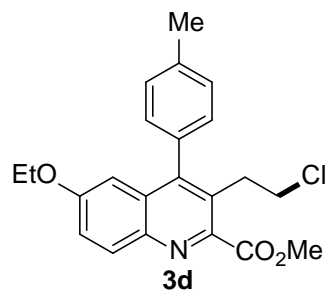
S31

167.284  
158.447  
148.876  
146.930  
141.987  
138.179  
132.959  
131.452  
130.152  
129.568  
128.858  
127.936  
122.661  
—104.875

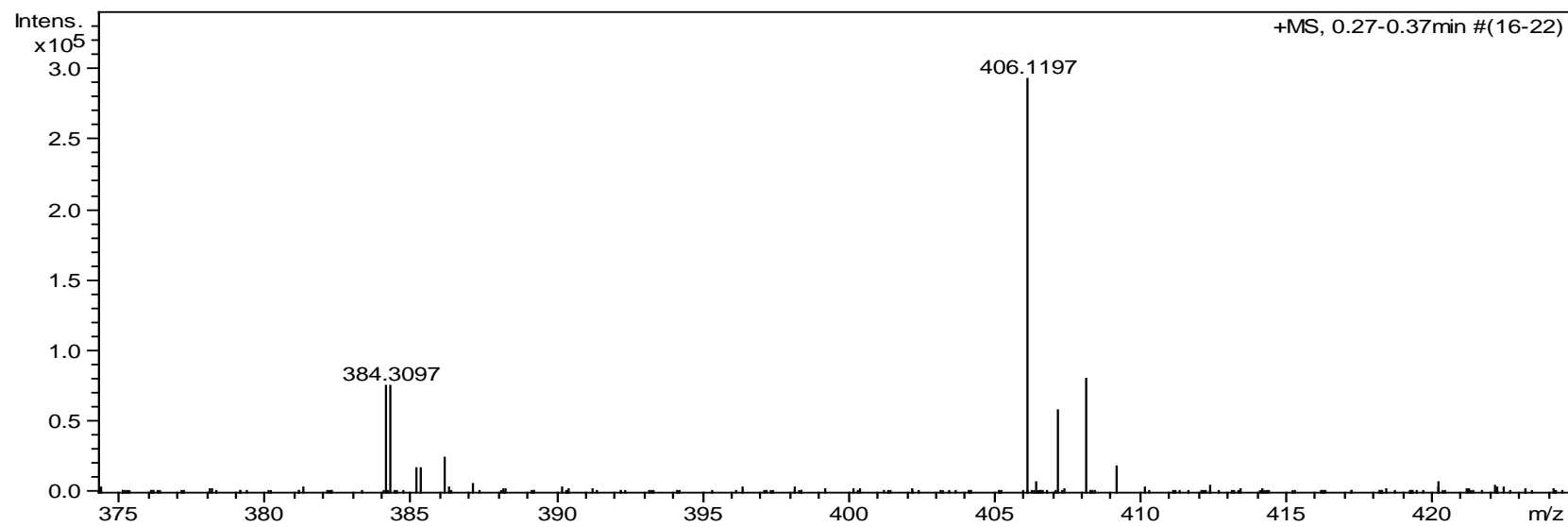
63.633  
53.134  
43.765  
33.198  
—21.391  
—14.485

$^{13}\text{C}$  NMR (100M,  $\text{CDCl}_3$ )





Methyl 3-(2-chloroethyl)-6-ethoxy-4-(p-tolyl)quinoline-2-carboxylate (3d)





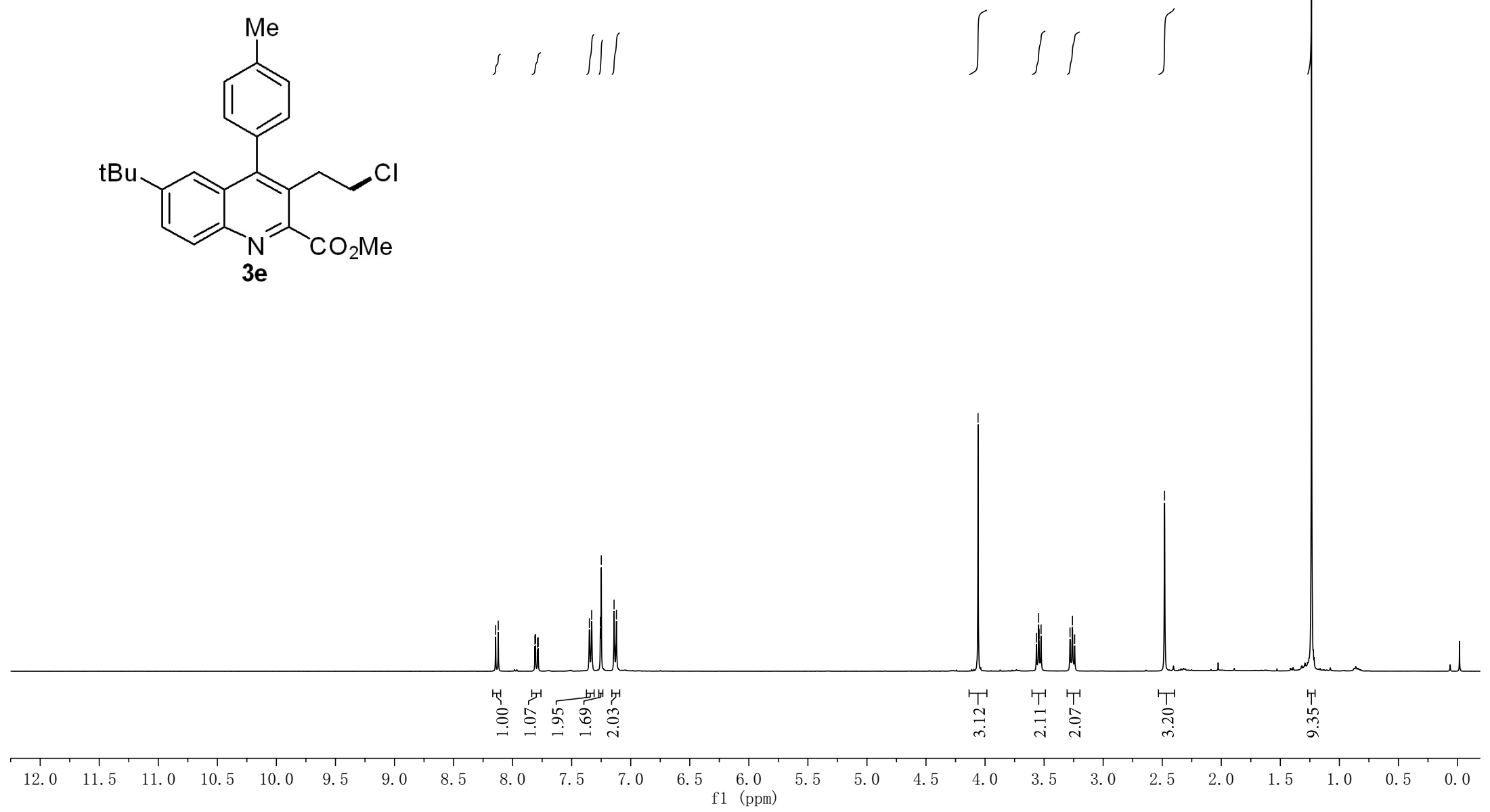
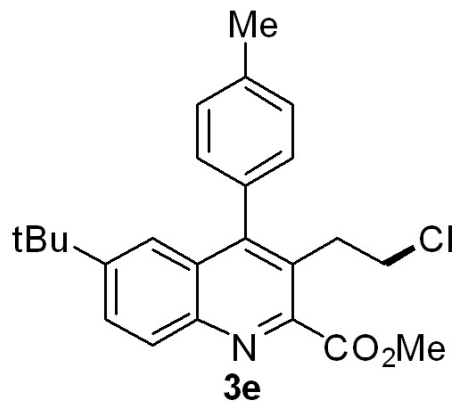
S33

8.144  
8.121  
7.811  
7.806  
7.789  
7.783  
7.350  
7.331  
7.257  
7.249  
7.141  
7.121

4.059  
3.565  
3.546  
3.543  
3.526  
3.280  
3.260  
3.241  
2.480

1.236

<sup>1</sup>H NMR (400M, CDCl<sub>3</sub>)

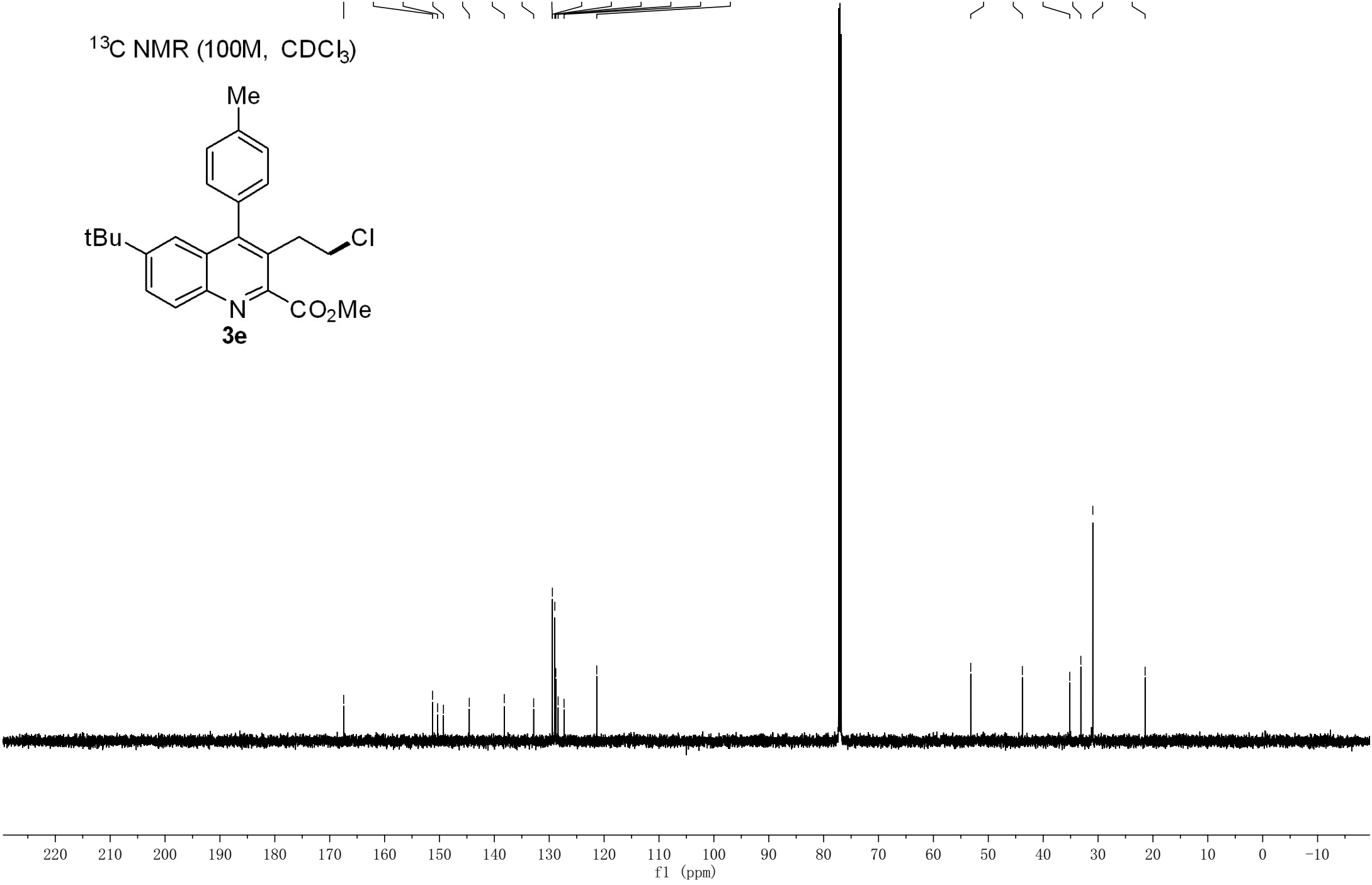
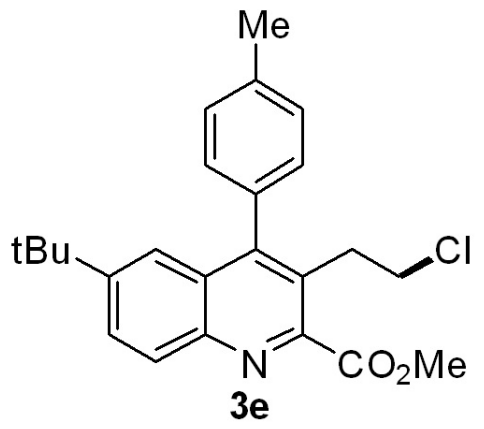


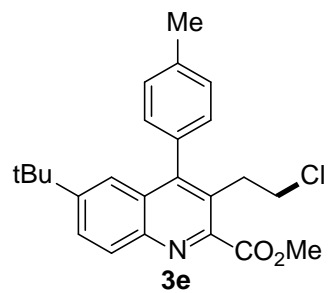
S34

167.454  
151.253  
150.337  
149.279  
144.566  
138.187  
132.834  
129.444  
129.424  
128.978  
128.805  
128.384  
127.300  
121.344

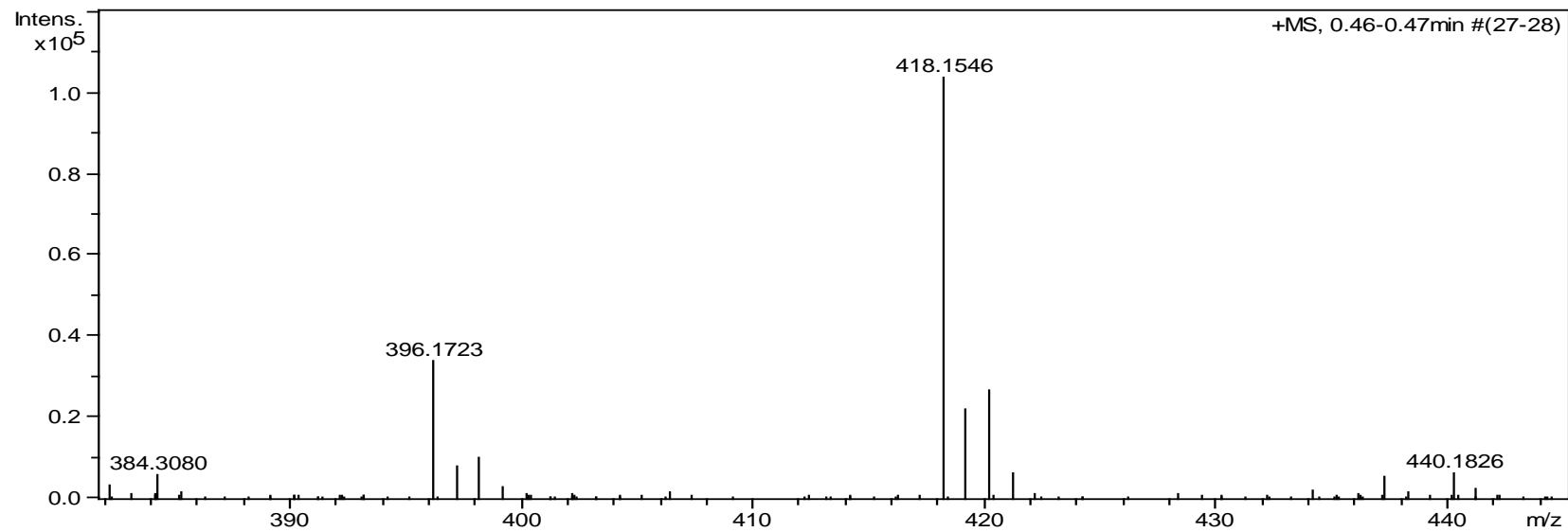
53.200  
43.791  
35.158  
33.132  
30.952  
21.426

<sup>13</sup>C NMR (100M, CDCl<sub>3</sub>)



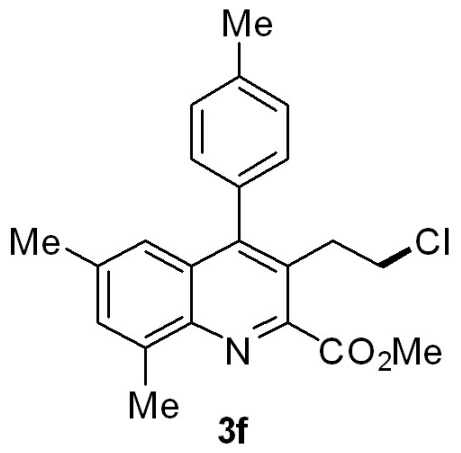


**Methyl 6-(tert-butyl)-3-(2-chloroethyl)-4-(p-tolyl)quinoline-2-carboxylate (3e)**



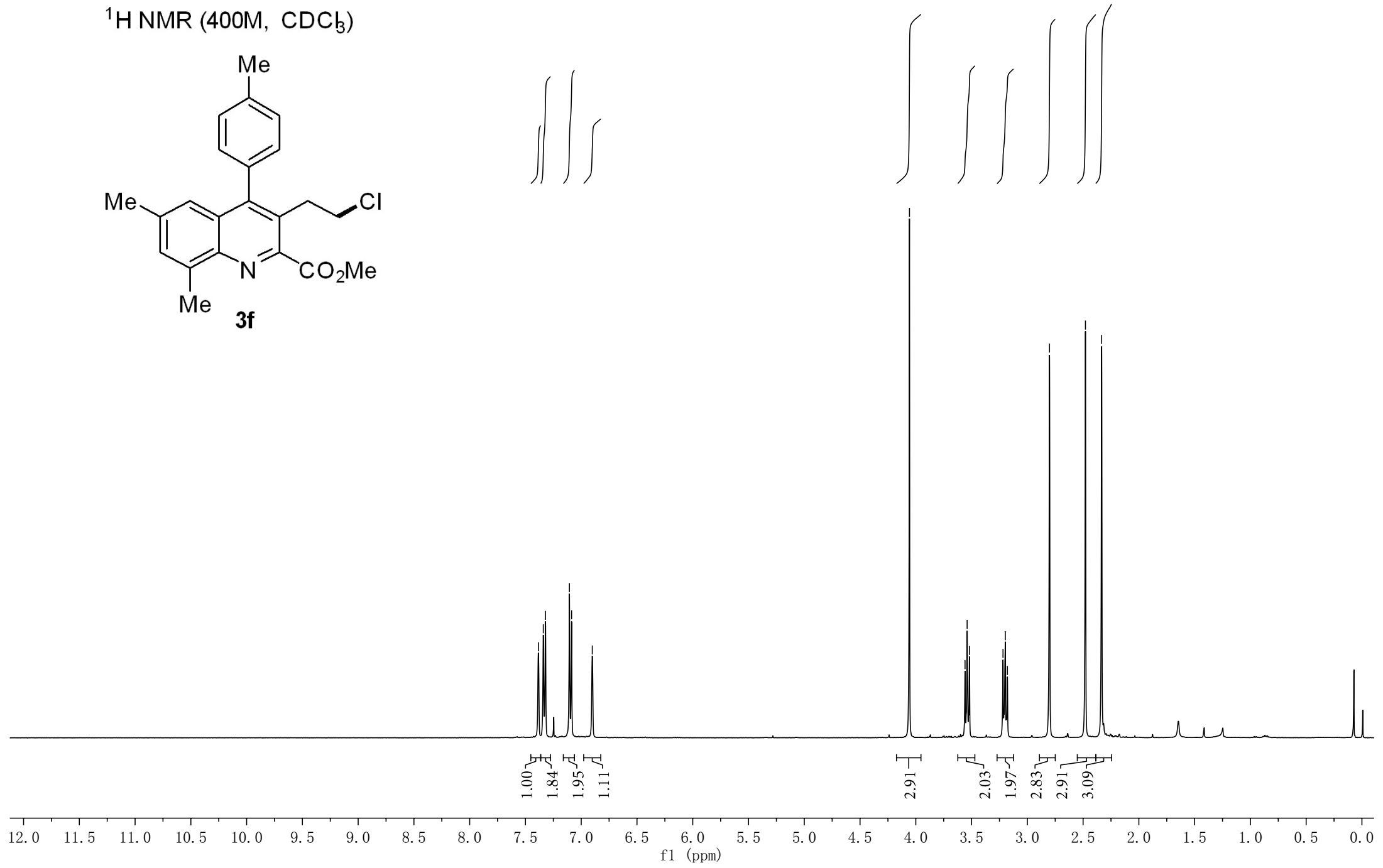
S36

<sup>1</sup>H NMR (400M, CDCl<sub>3</sub>)



7.384  
7.340  
7.320  
7.106  
7.086  
6.901

4.057  
3.558  
3.540  
3.519  
3.218  
3.197  
3.179  
2.801  
2.479  
2.334

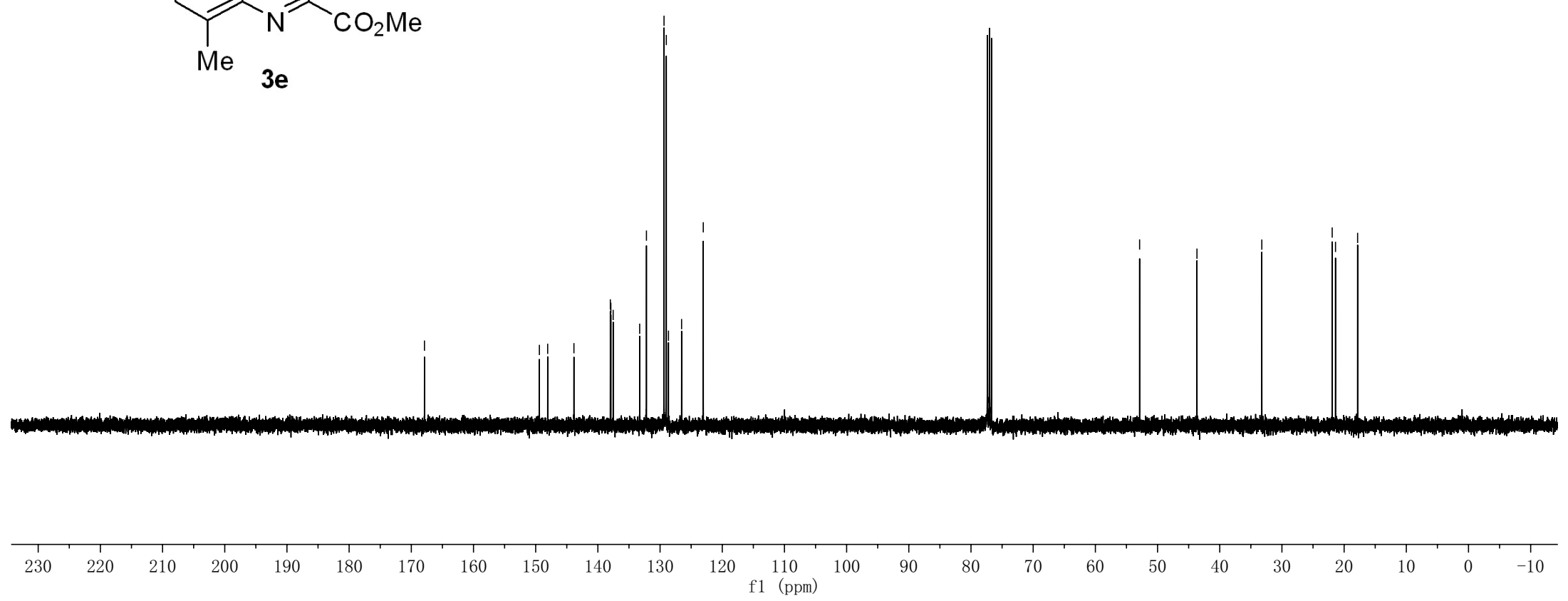
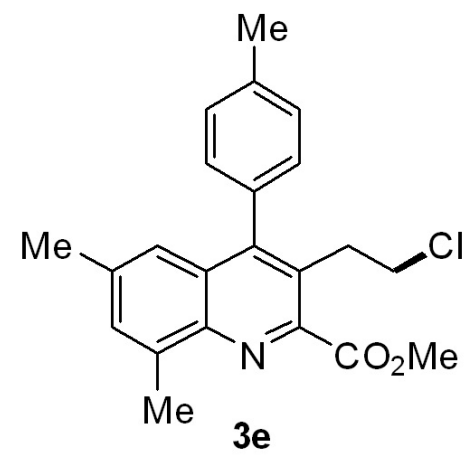


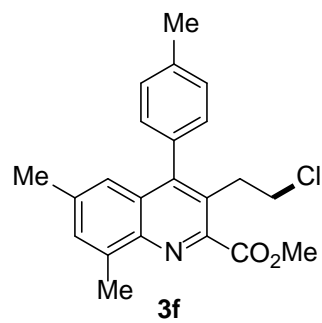
S37

167.885  
149.407  
148.073  
143.849  
137.996  
137.913  
137.541  
133.278  
132.191  
129.362  
128.997  
128.649  
126.538  
123.052

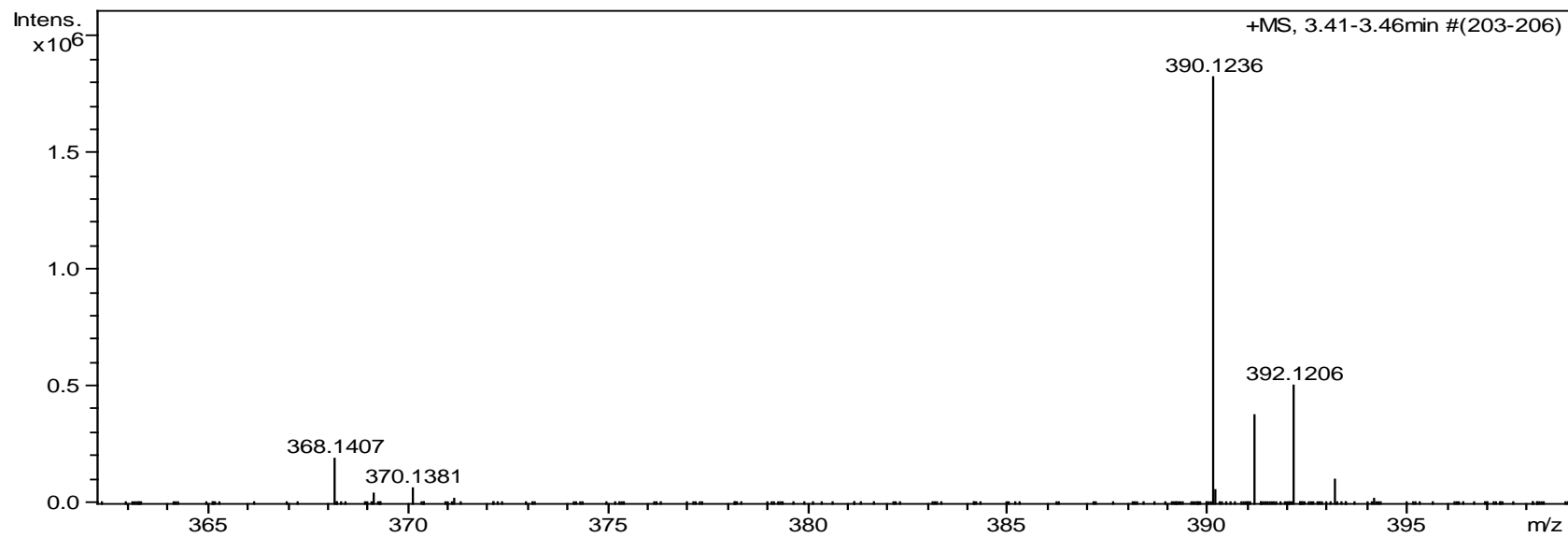
52.887  
43.664  
33.234  
21.918  
21.385  
17.830

<sup>13</sup>C NMR (100M, CDCl<sub>3</sub>)





Methyl 3-(2-chloroethyl)-6,8-dimethyl-4-(p-tolyl)quinoline-2-carboxylate (**3f**)

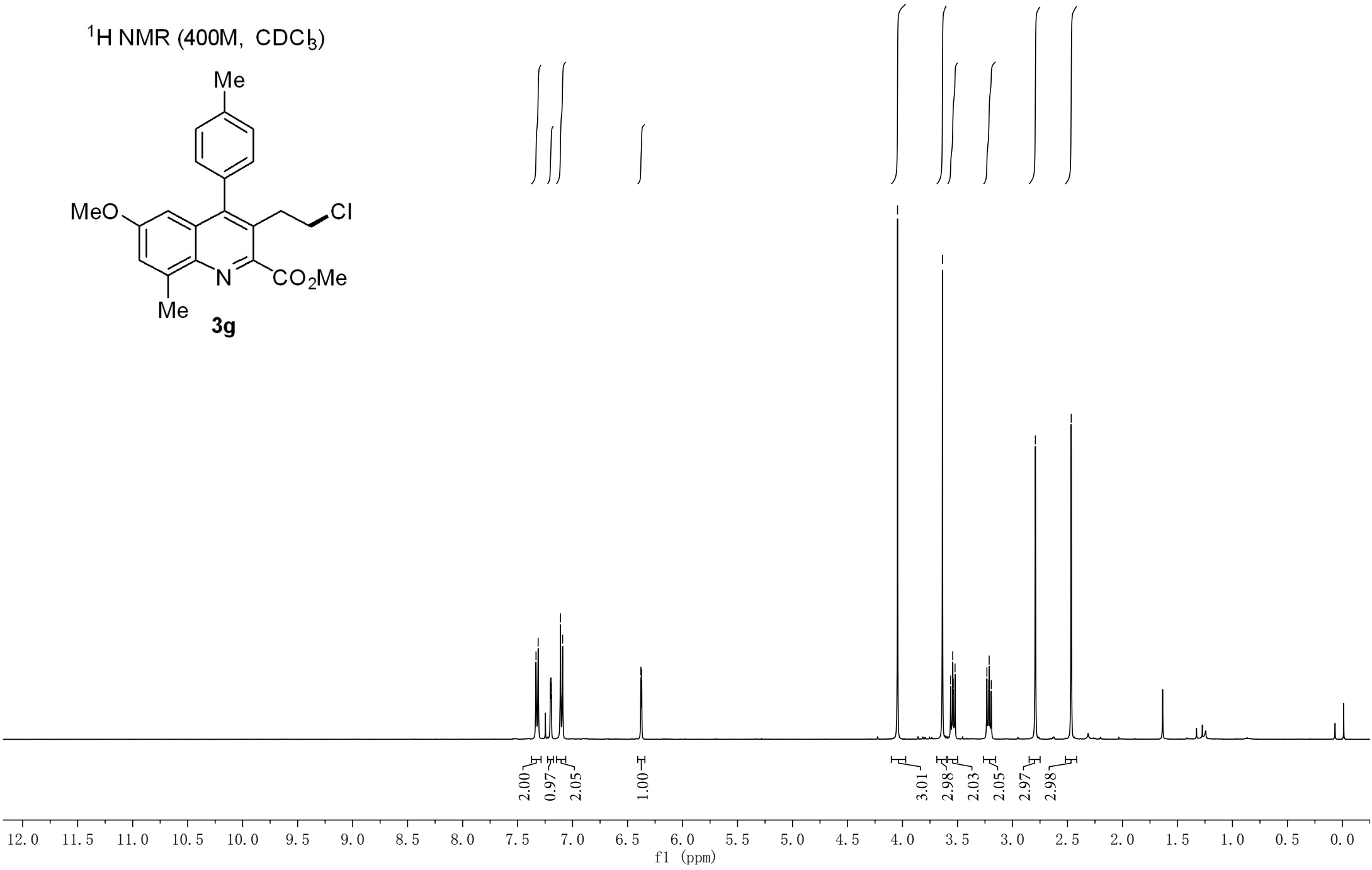
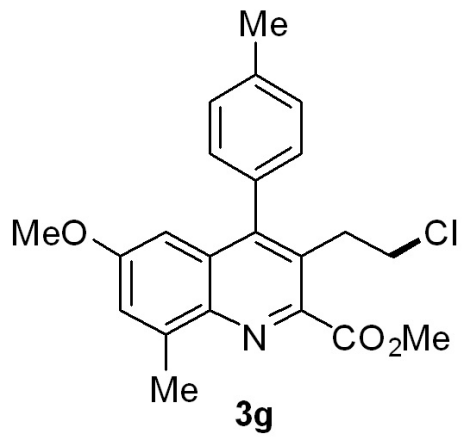


S39

7.333  
7.313  
7.203  
7.200  
7.198  
7.196  
7.193  
7.111  
7.091  
6.379  
6.372

4.045  
3.637  
3.562  
3.544  
3.539  
3.523  
3.233  
3.216  
3.212  
3.193  
2.792  
2.466

<sup>1</sup>H NMR (400M, CDCl<sub>3</sub>)



S40

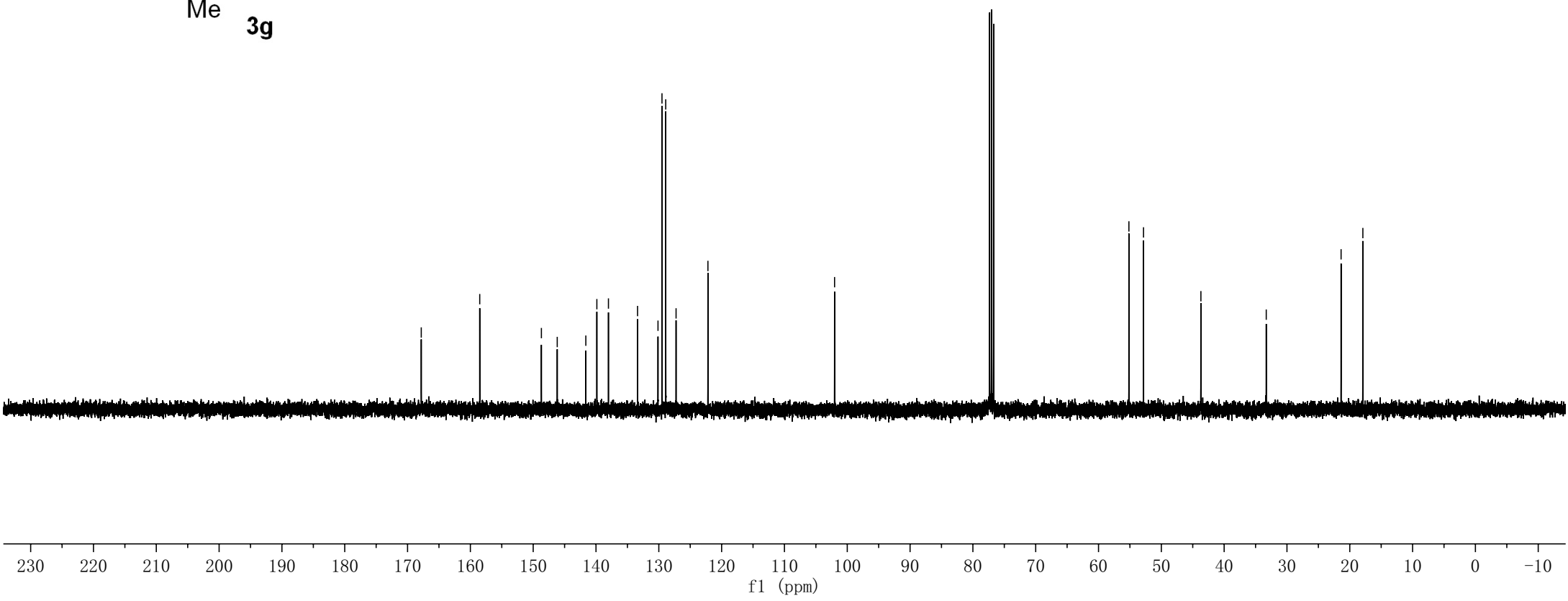
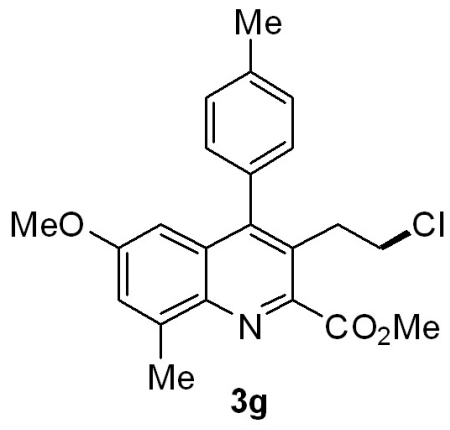
167.819  
158.508  
148.693  
146.171  
141.619  
139.863  
138.018  
133.384  
130.130  
129.495  
128.899  
127.252  
122.182

102.019

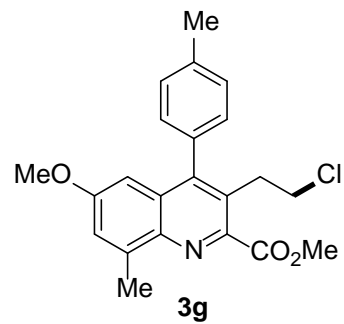
55.163  
52.836  
43.701  
33.297

21.383  
17.917

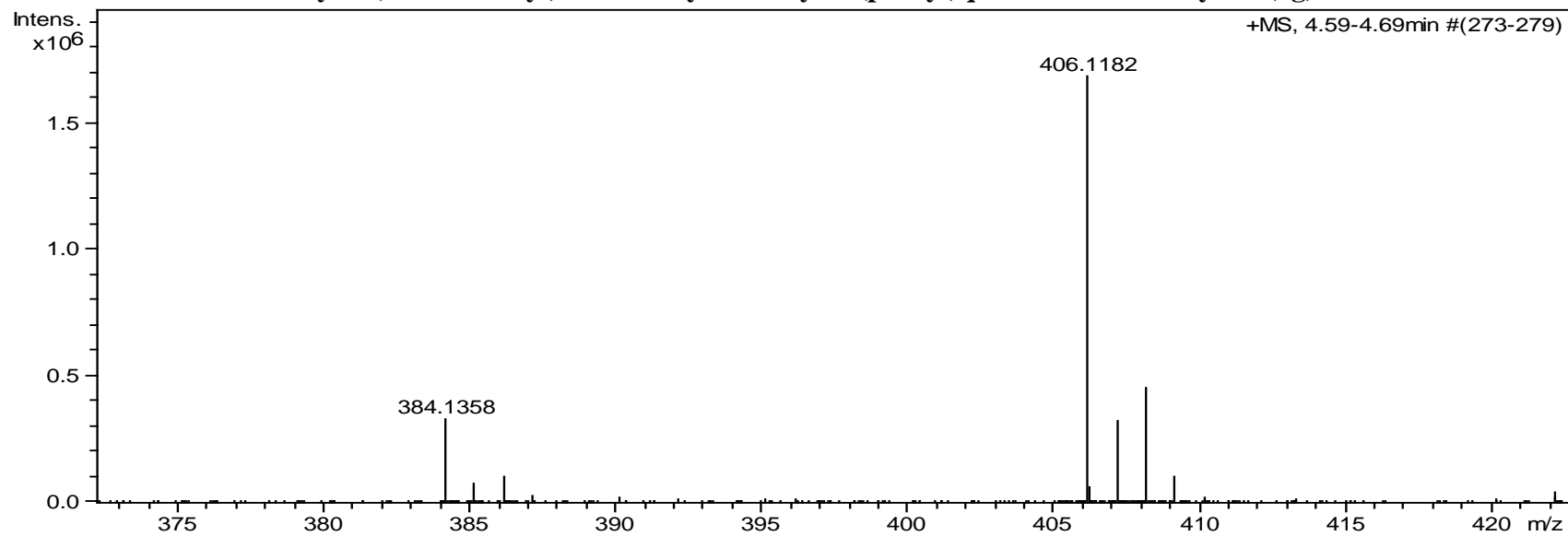
<sup>13</sup>C NMR (100M, CDCl<sub>3</sub>)





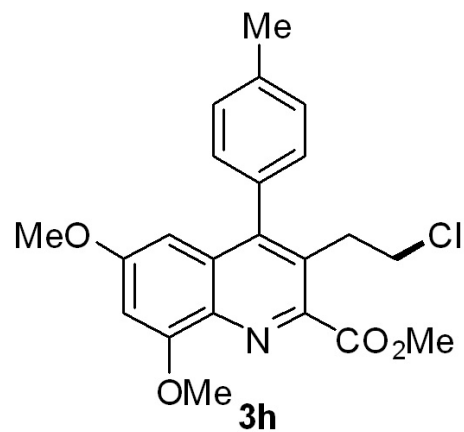


**Methyl 3-(2-chloroethyl)-6-methoxy-8-methyl-4-(p-tolyl)quinoline-2-carboxylate (3g)**

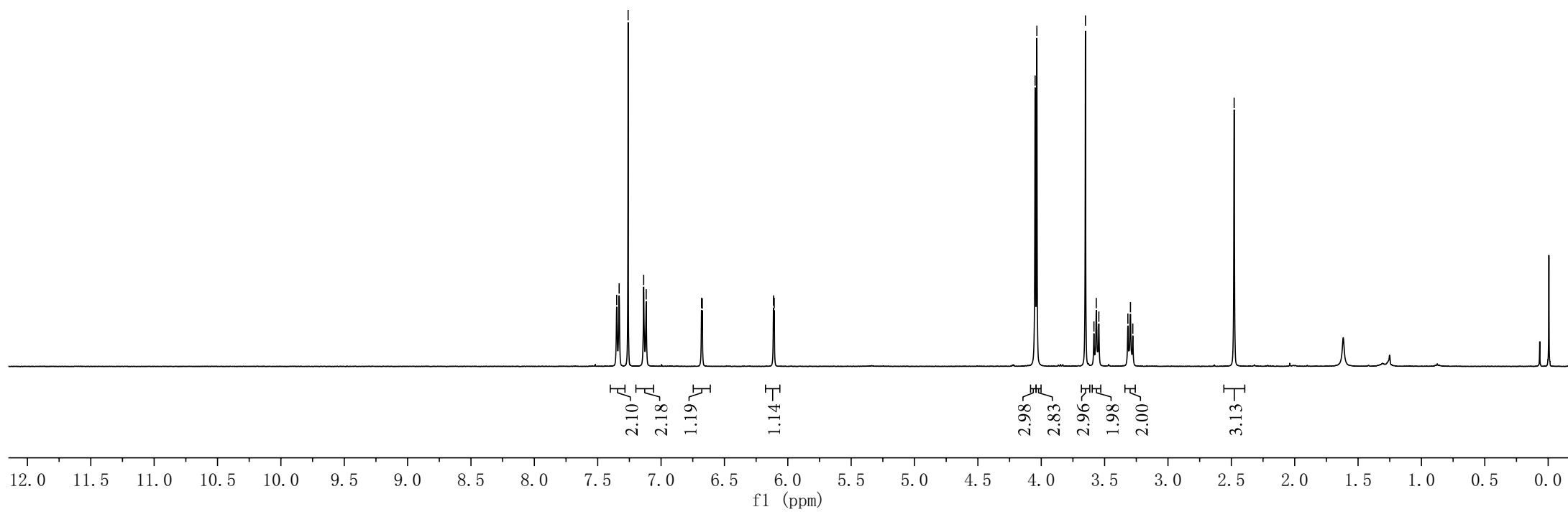


S42

<sup>1</sup>H NMR (400M, CDCl<sub>3</sub>)



7.350  
7.331  
7.260  
7.137  
7.117  
6.681  
6.675  
6.113  
6.107  
4.048  
4.035  
3.651  
3.584  
3.566  
3.545  
3.316  
3.296  
3.278  
2.478



S43

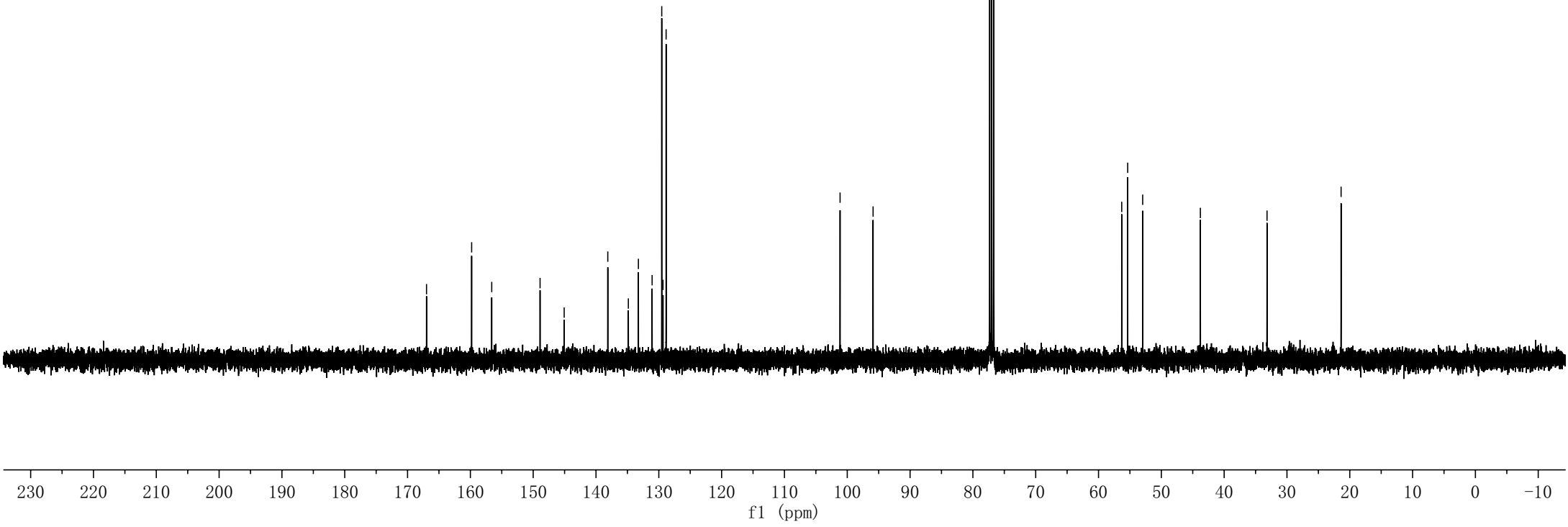
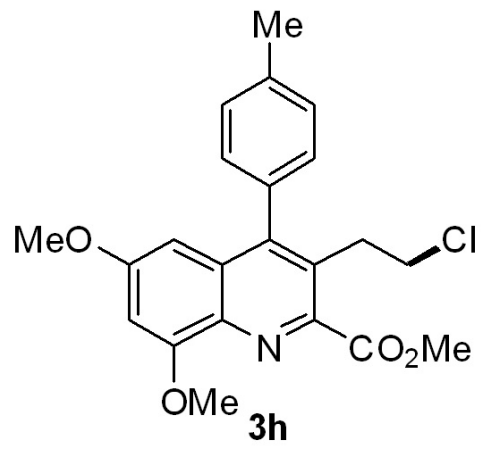
166.980  
159.796  
156.598  
148.904  
145.066  
138.123  
134.850  
133.249  
131.065  
129.533  
129.330  
128.838

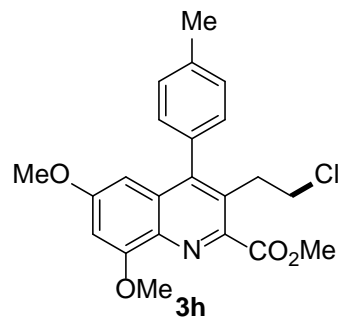
101.143  
95.888

56.305  
55.353  
52.968  
43.785  
33.174

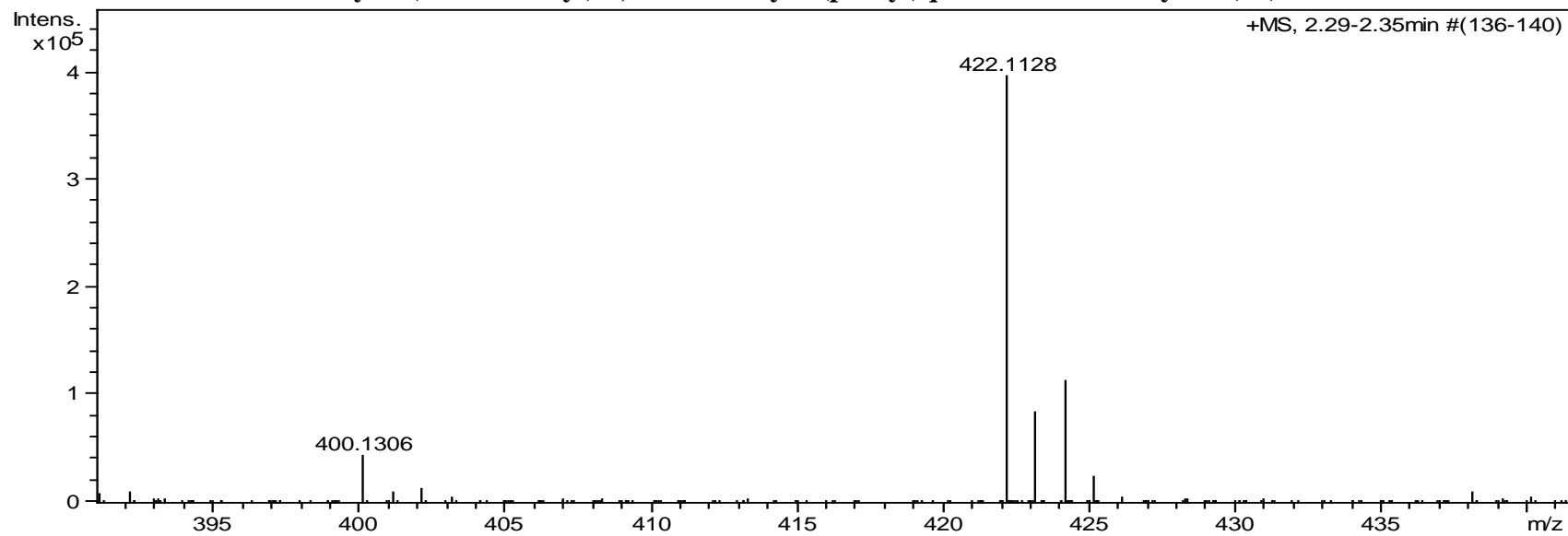
21.383

<sup>13</sup>C NMR (100M, CDCl<sub>3</sub>)



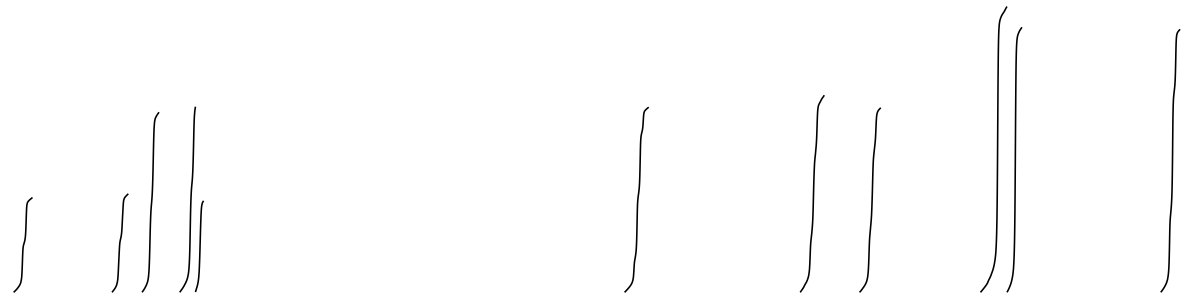


Methyl 3-(2-chloroethyl)-6,8-dimethoxy-4-(p-tolyl)quinoline-2-carboxylate (3h)

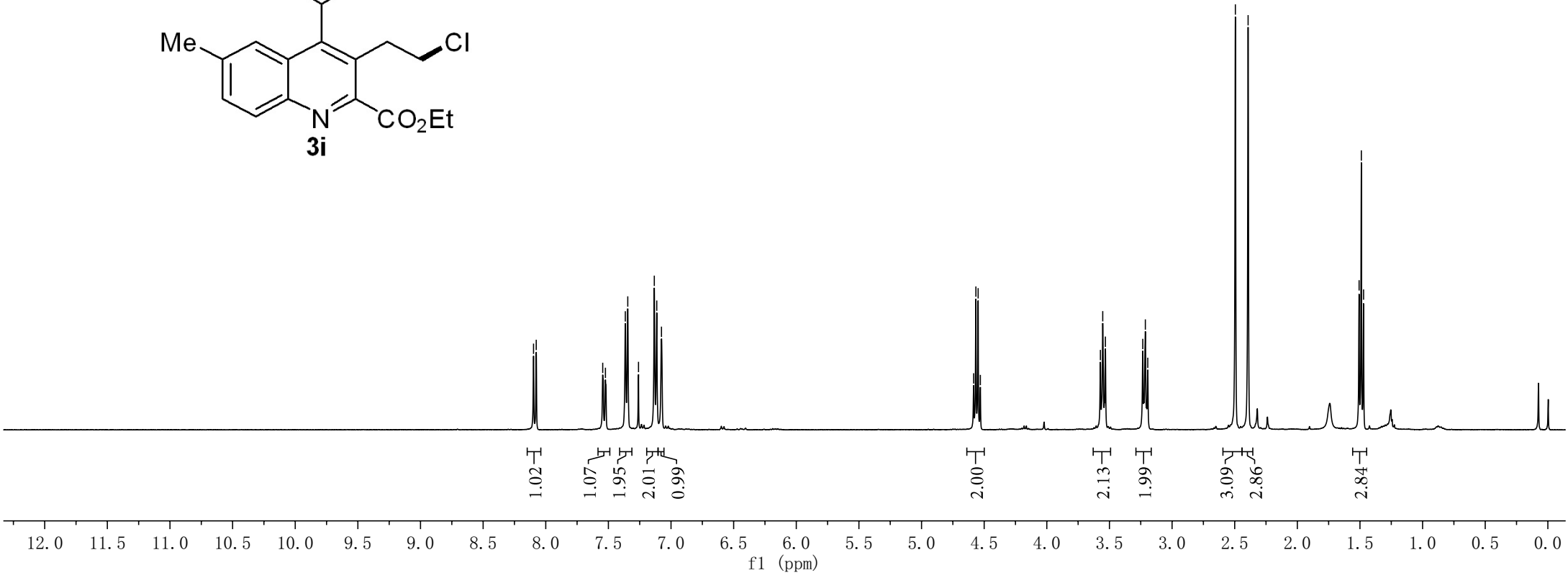
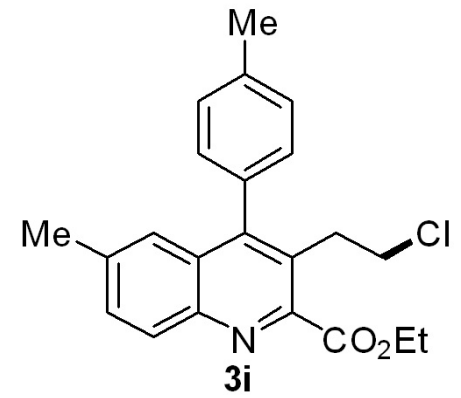


S45

8.098 8.076 7.545 7.524 7.365 7.345 7.260 7.133 7.114 7.076  
4.584 4.566 4.548 4.530  
3.553 3.532 3.234 3.213 2.495 2.393  
1.507 1.489 1.471

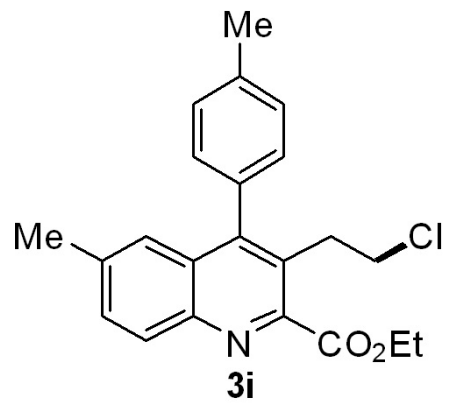


<sup>1</sup>H NMR (400M, CDCl<sub>3</sub>)



S46

<sup>13</sup>C NMR (100M, CDCl<sub>3</sub>)



167.144  
149.868  
149.506  
144.624  
138.265  
138.186  
132.802  
132.064  
129.578  
129.447  
128.937  
128.524  
126.748  
125.064

62.298

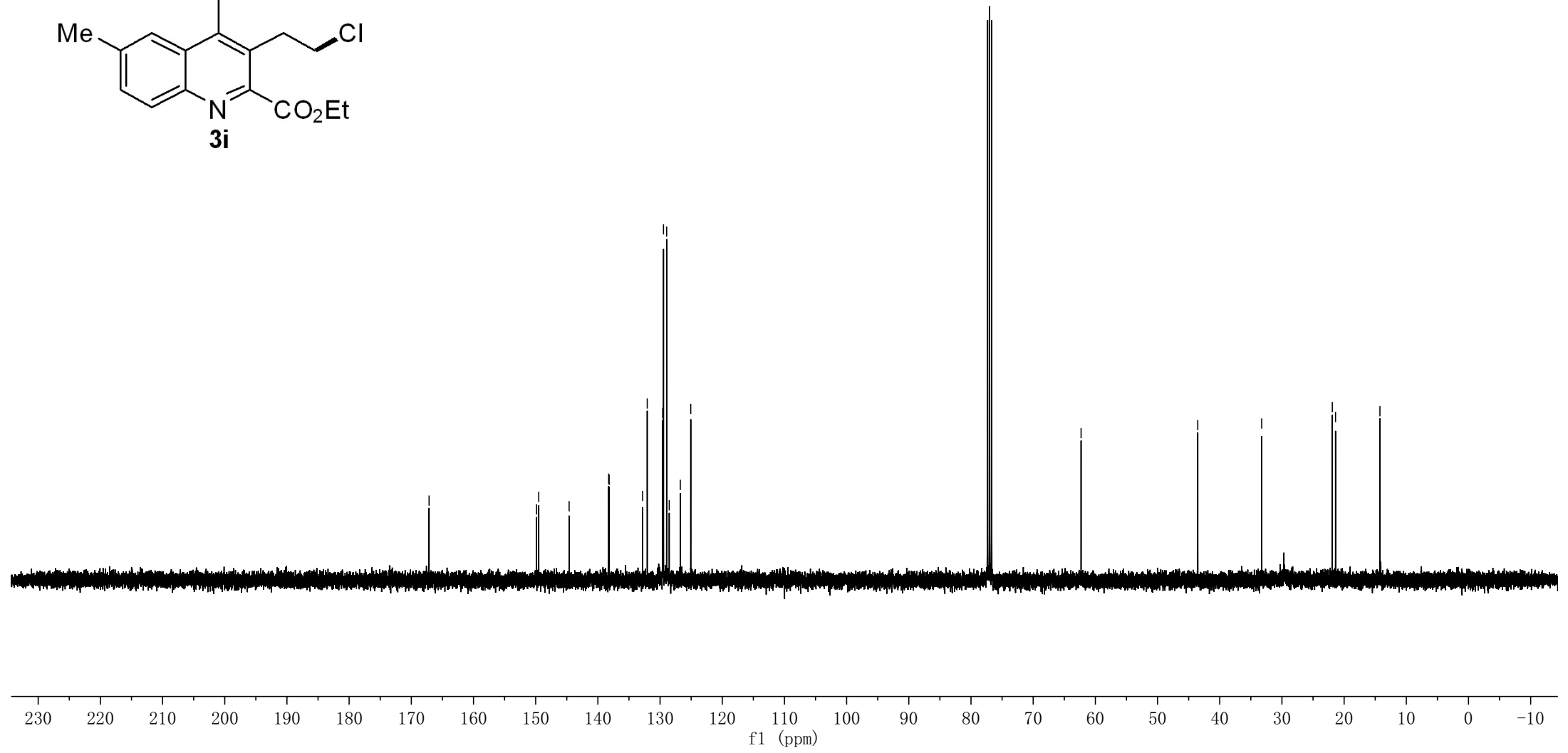
43.534

33.251

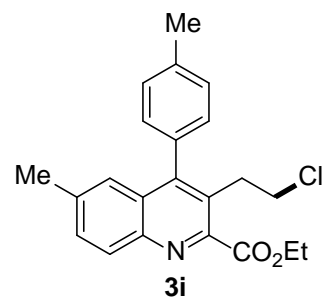
21.901

21.381

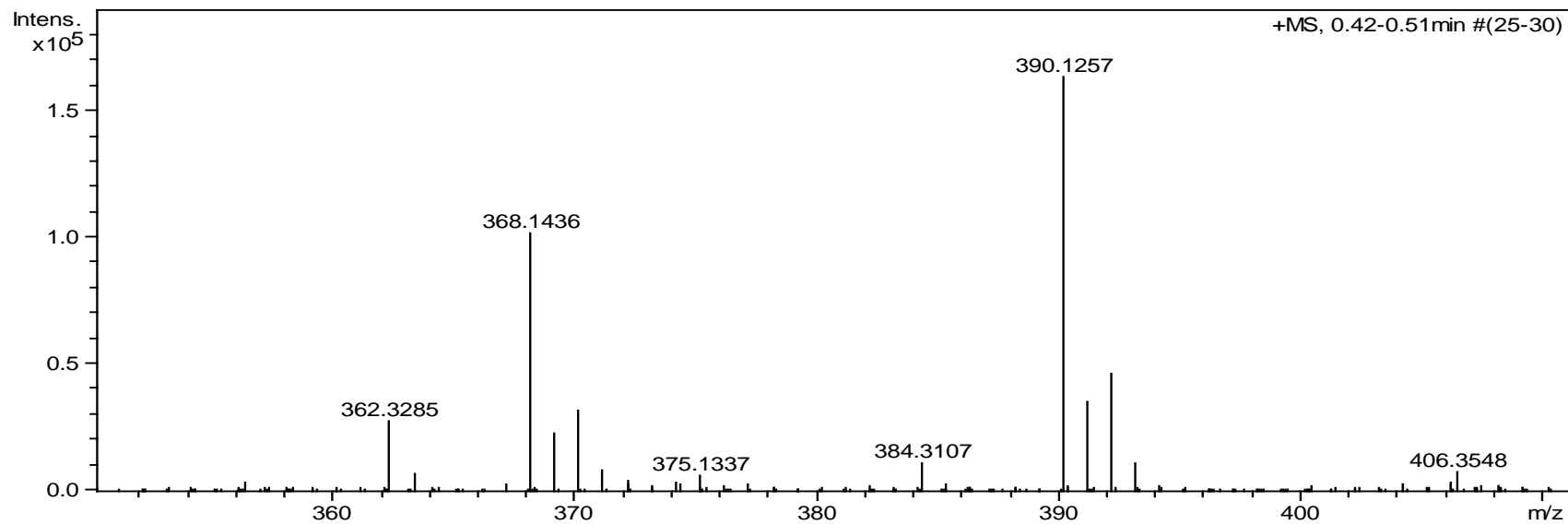
14.243



S47

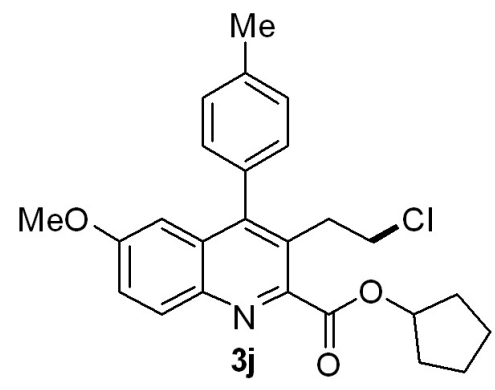


**Ethyl 3-(2-chloroethyl)-6-methyl-4-(p-tolyl)quinoline-2-carboxylate (3i)**

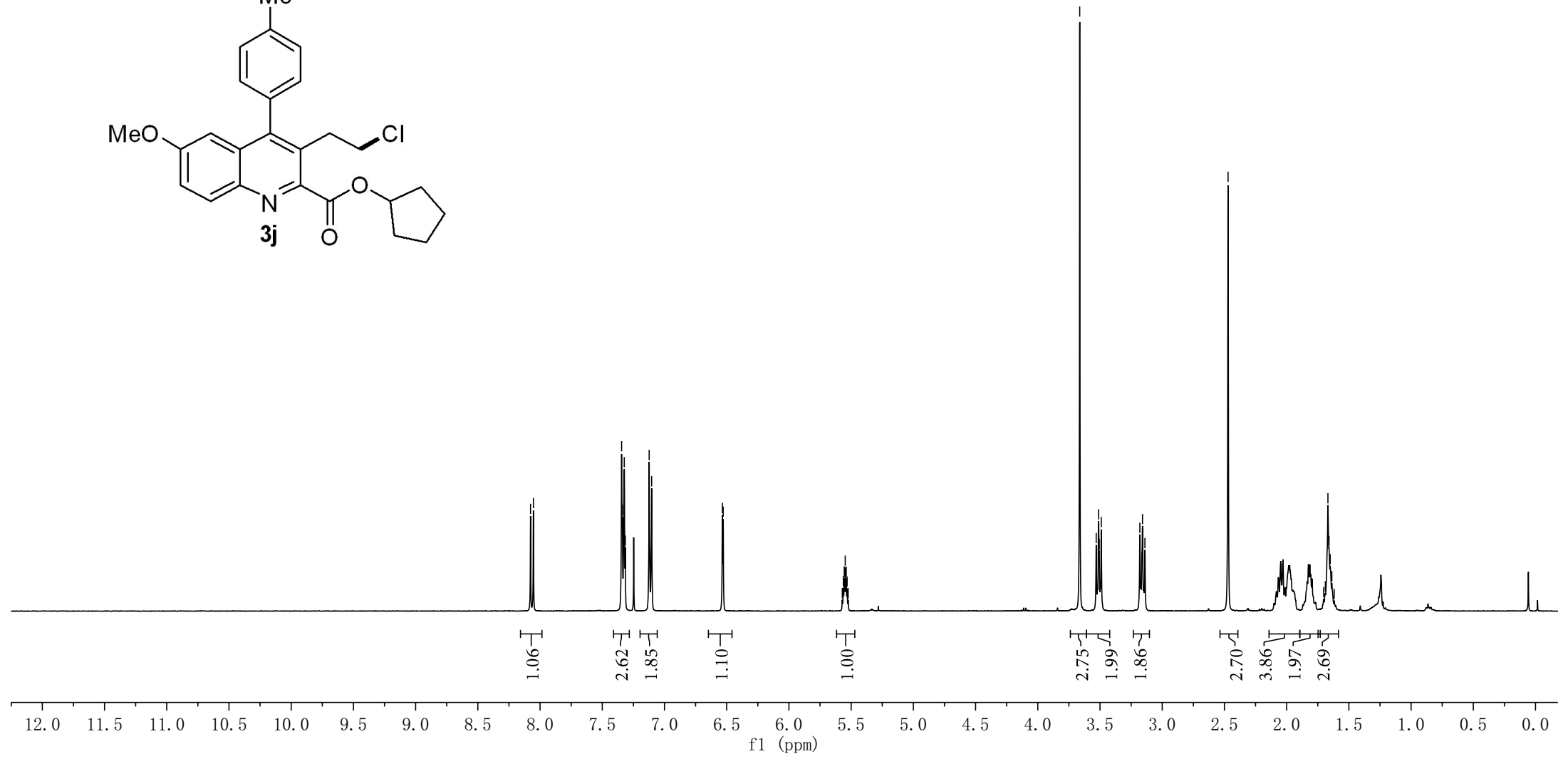


S48

<sup>1</sup>H NMR (400M, CDCl<sub>3</sub>)



8.076  
8.053  
7.345  
7.323  
7.123  
6.535  
6.528  
5.571  
5.563  
5.555  
5.547  
5.540  
5.532  
3.663  
3.531  
3.511  
3.490  
3.180  
3.158  
3.139  
2.471  
1.702  
1.689  
1.668  
1.660  
1.650  
1.637  
1.618





S49

167.326  
158.737  
148.968  
148.523  
142.299  
138.210  
132.873  
131.432  
129.722  
129.589  
128.807  
126.520  
122.254

104.064

79.376

55.348

43.356

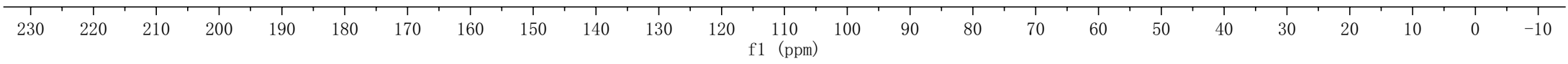
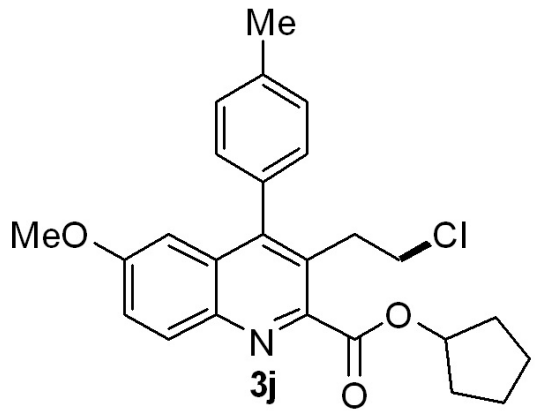
33.408

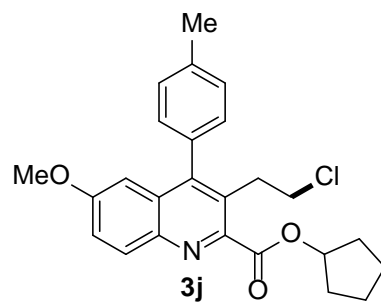
32.683

23.854

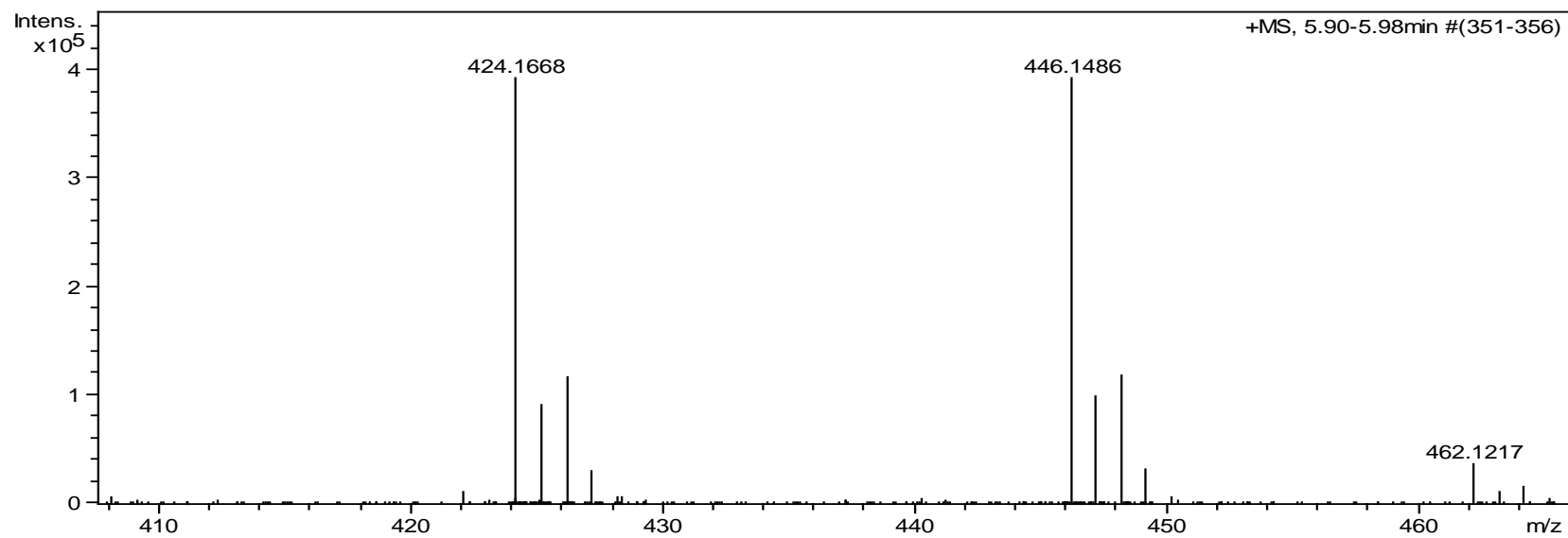
21.398

<sup>13</sup>C NMR (100M, CDCl<sub>3</sub>)

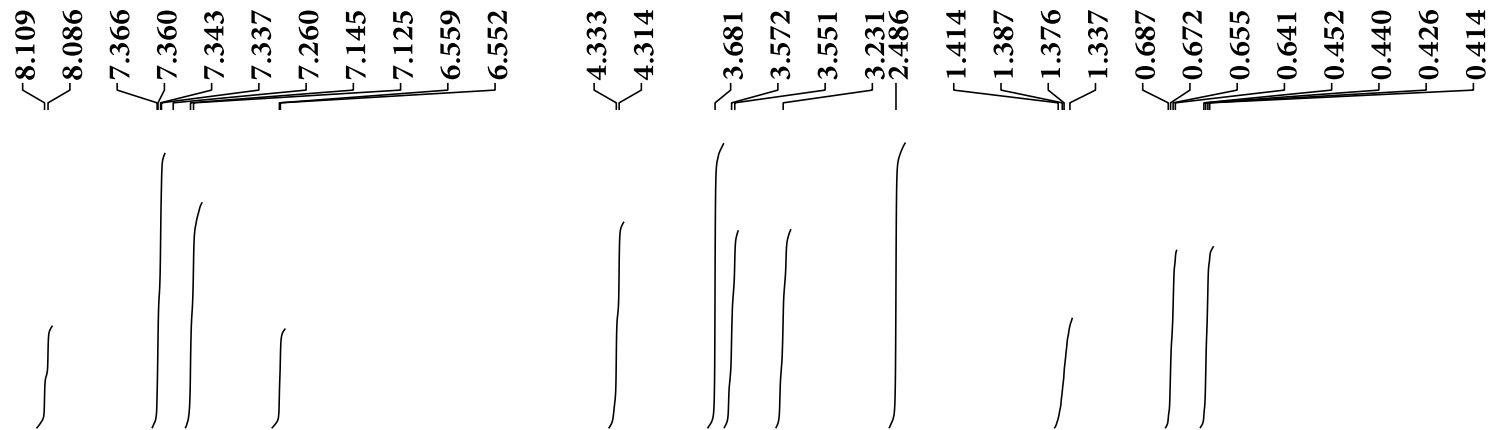




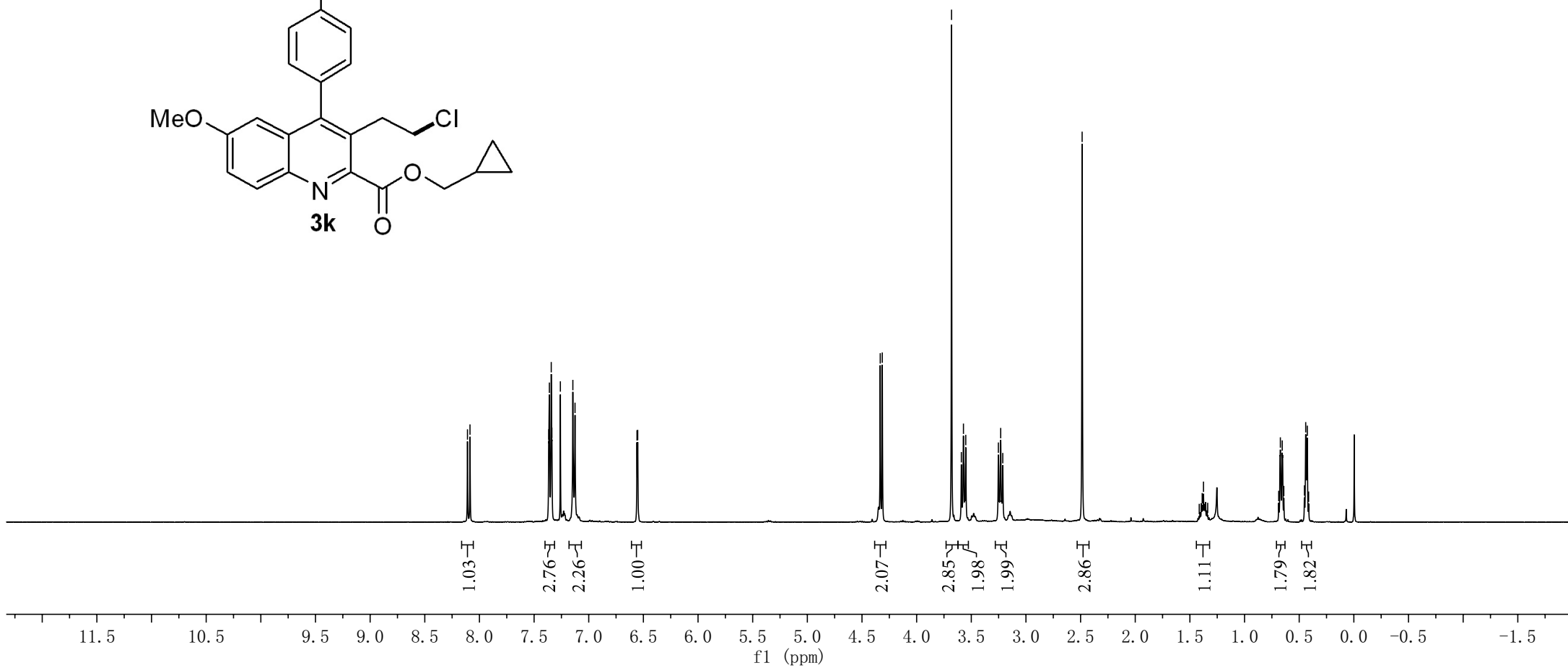
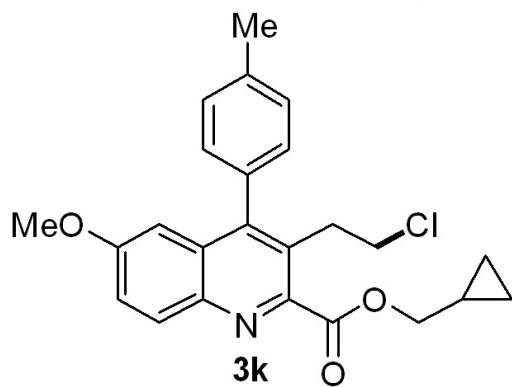
Cyclopentyl 3-(2-chloroethyl)-6-methoxy-4-(p-tolyl)quinoline-2-carboxylate (3j)



S51



<sup>1</sup>H NMR (400M, CDCl<sub>3</sub>)

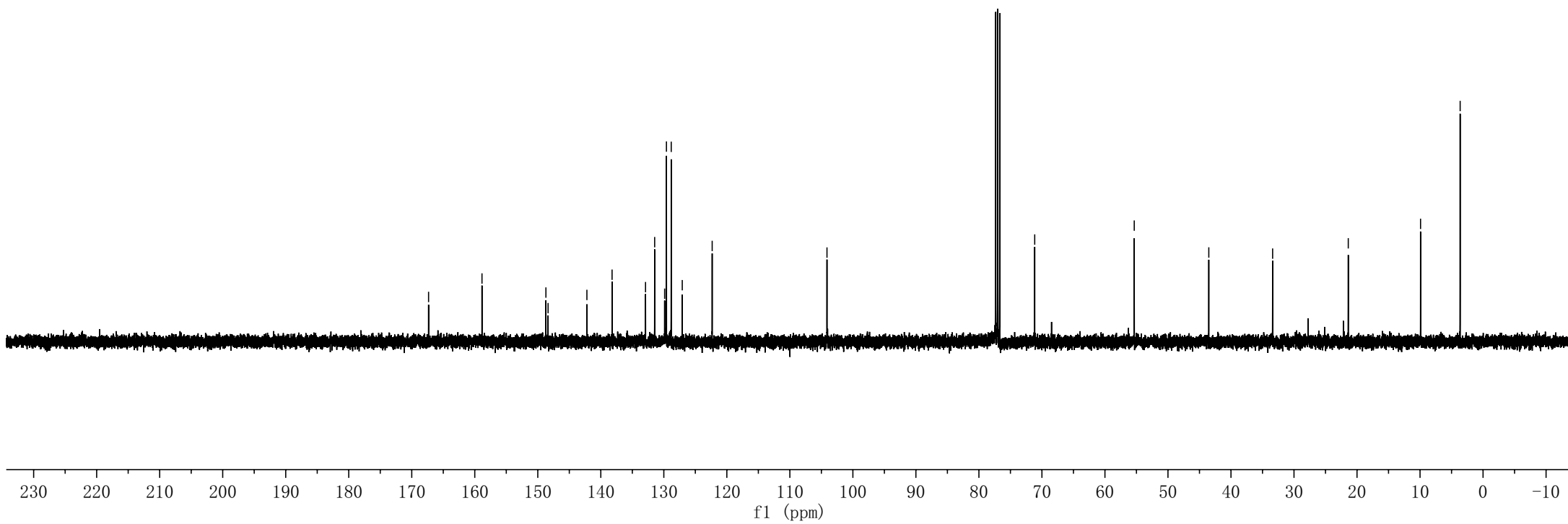
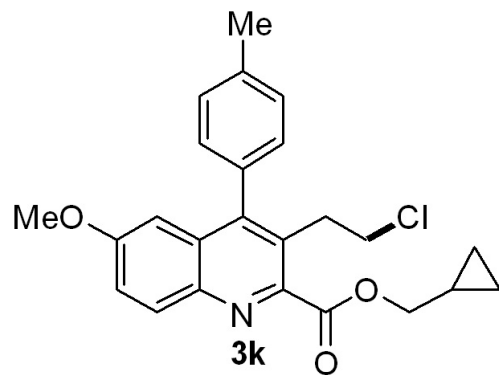


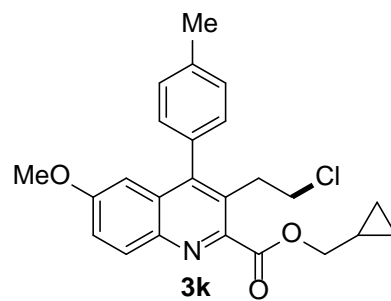
S52

167.330  
158.854  
148.711  
148.367  
142.207  
138.212  
132.903  
131.453  
129.871  
129.585  
128.826  
127.075  
122.327  
—104.109

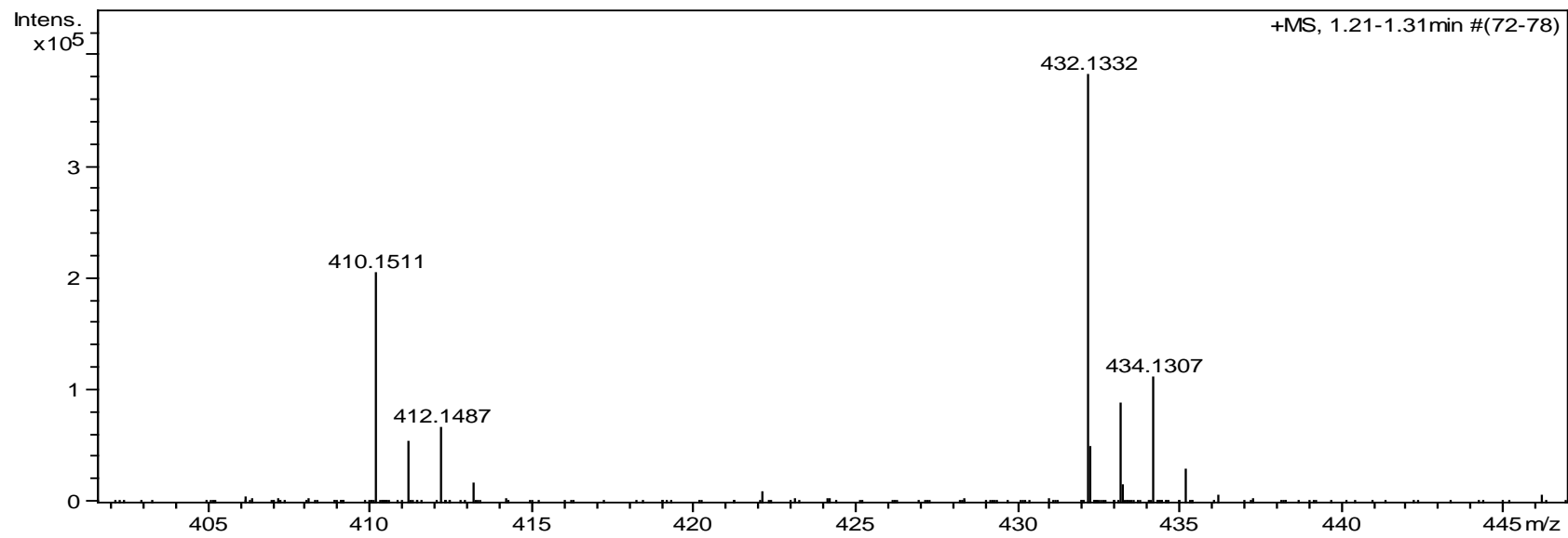
—71.145  
—55.351  
—43.519  
—33.390  
—21.388  
—9.917  
—3.633

<sup>13</sup>C NMR (100M, CDCl<sub>3</sub>)



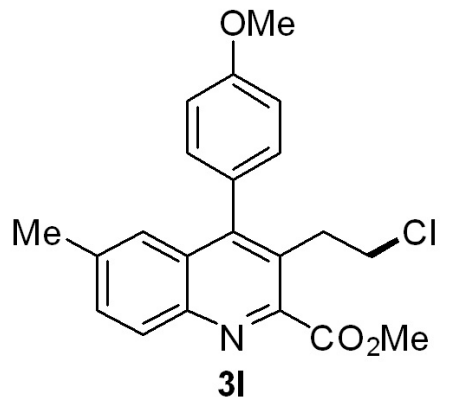


Cyclopropylmethyl 3-(2-chloroethyl)-6-methoxy-4-(p-tolyl)quinoline-2-carboxylate (**3k**)



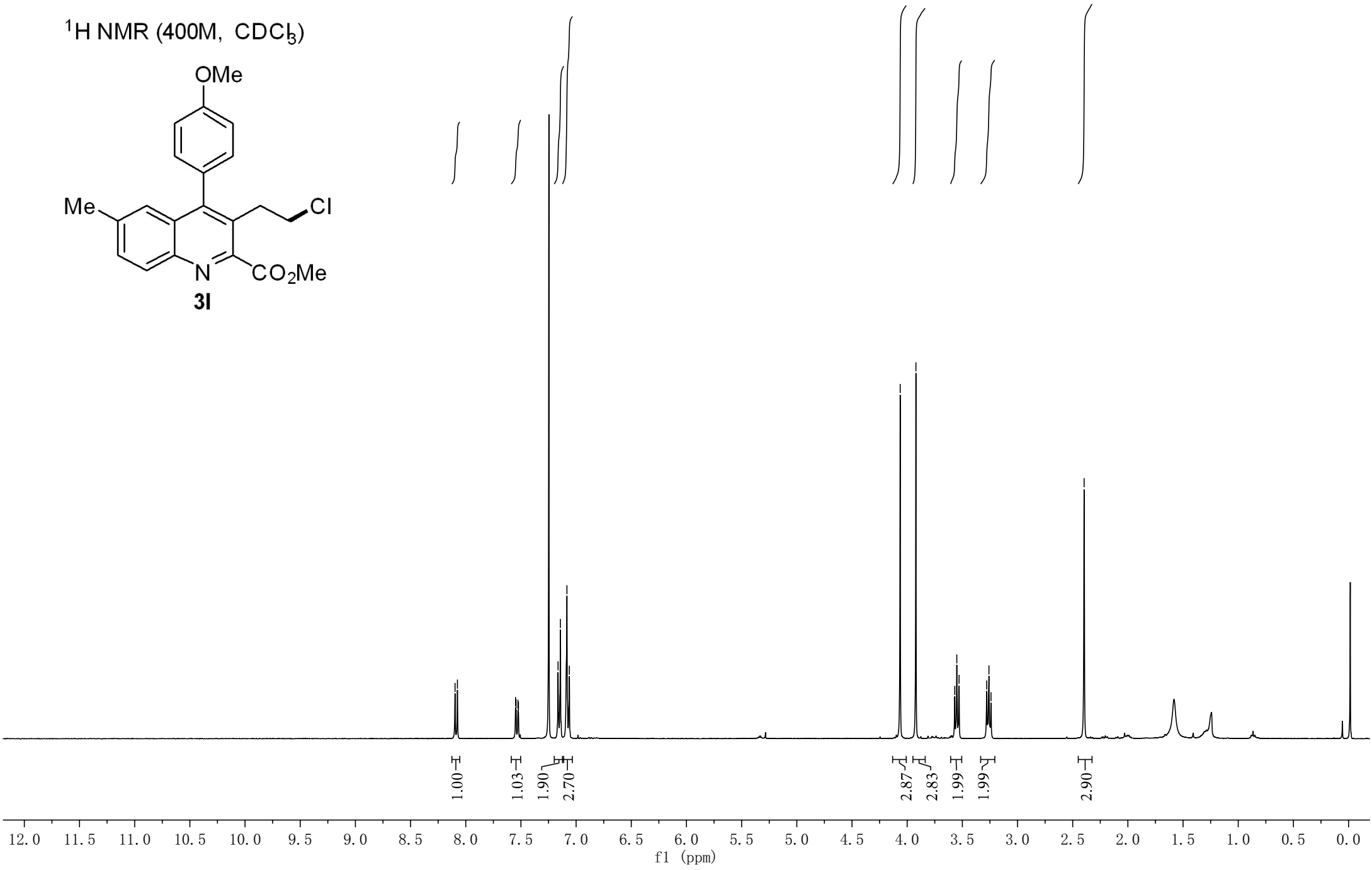
S54

<sup>1</sup>H NMR (400M, CDCl<sub>3</sub>)



8.097  
8.076  
7.548  
7.544  
7.527  
7.523  
7.164  
7.142  
7.083  
7.061

4.063  
3.921  
3.569  
3.550  
3.530  
3.279  
3.259  
3.240  
2.396

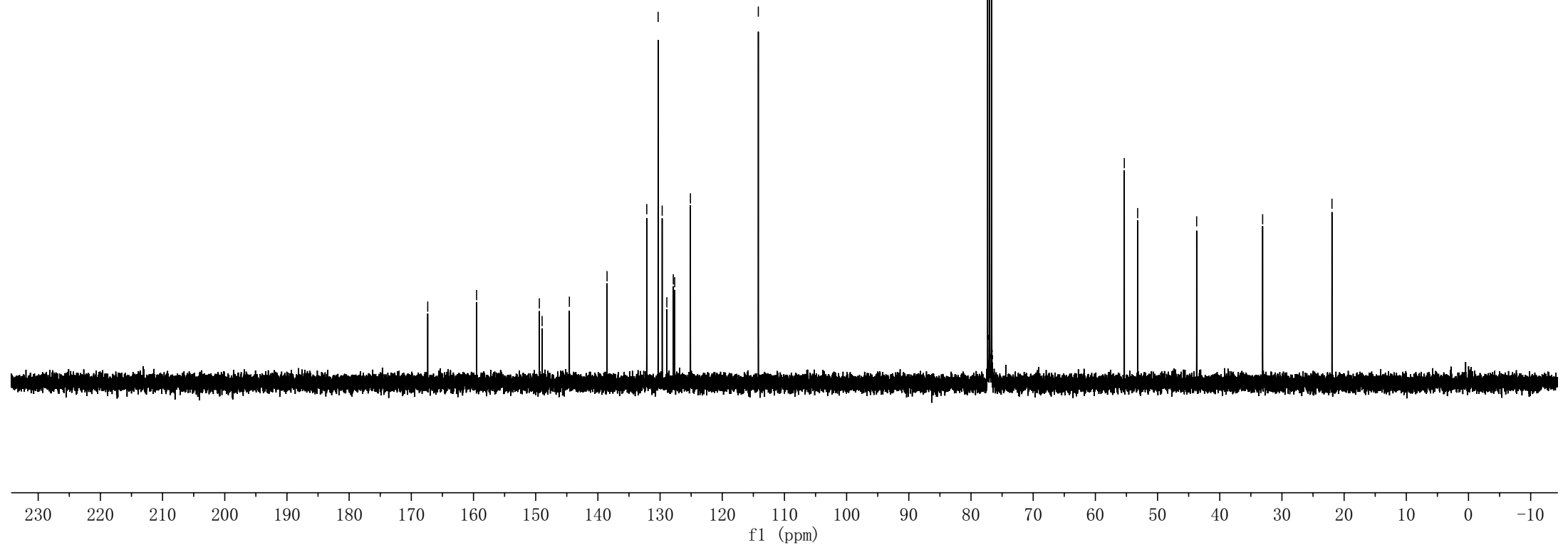
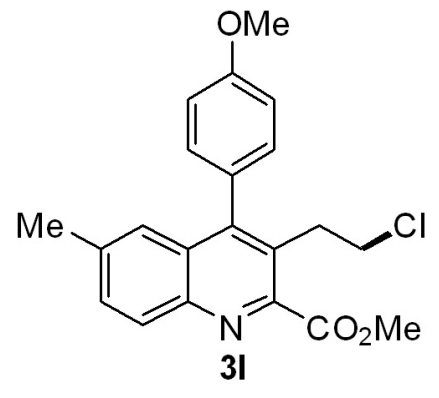


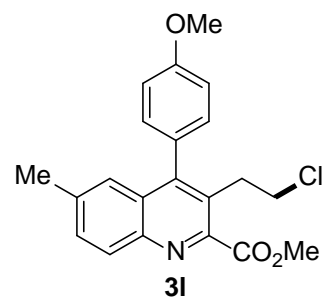
S55

167.360  
159.504  
149.411  
148.967  
144.583  
138.523  
132.139  
130.313  
129.658  
128.911  
127.871  
127.651  
125.116  
114.198

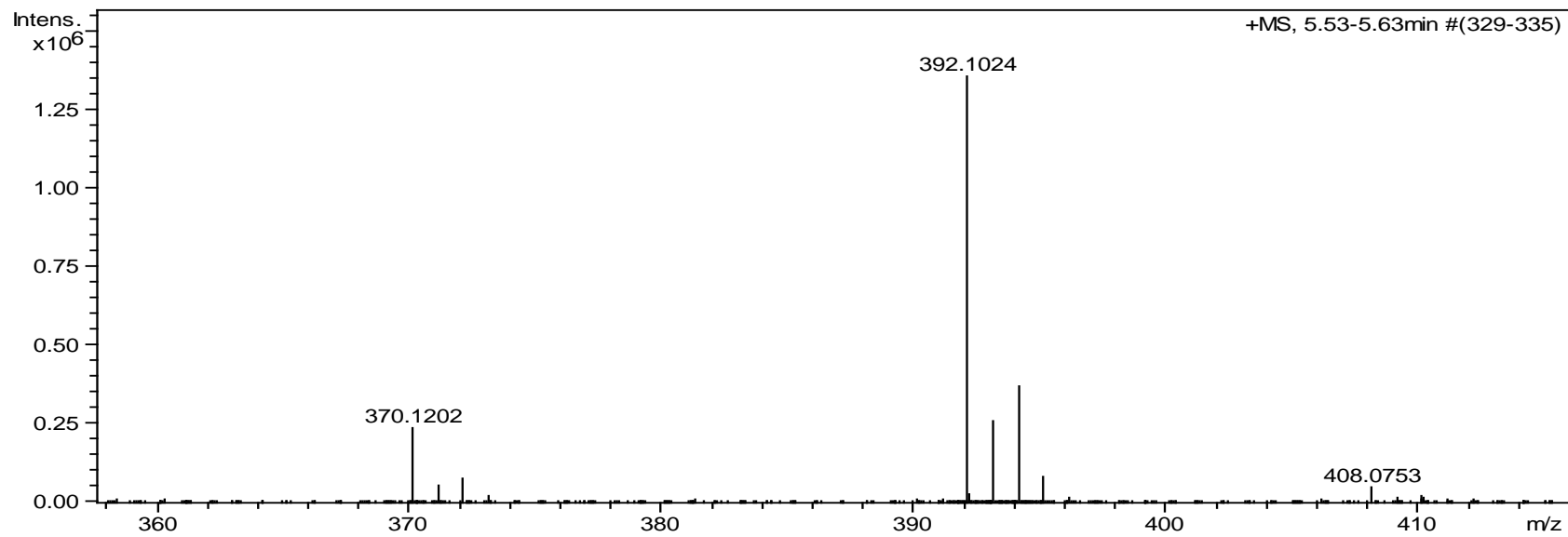
55.345  
53.201  
43.712  
33.102  
21.955

<sup>13</sup>C NMR (100M, CDCl<sub>3</sub>)





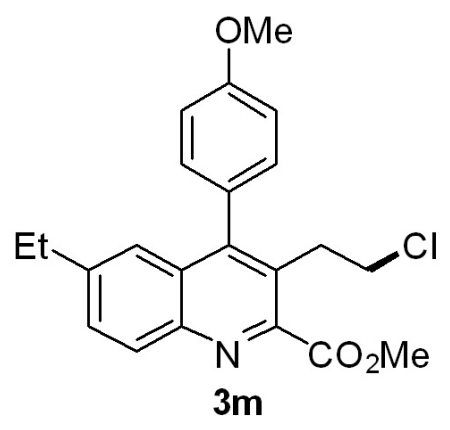
**Methyl 3-(2-chloroethyl)-4-(4-methoxyphenyl)-6-methylquinoline-2-carboxylate (31)**





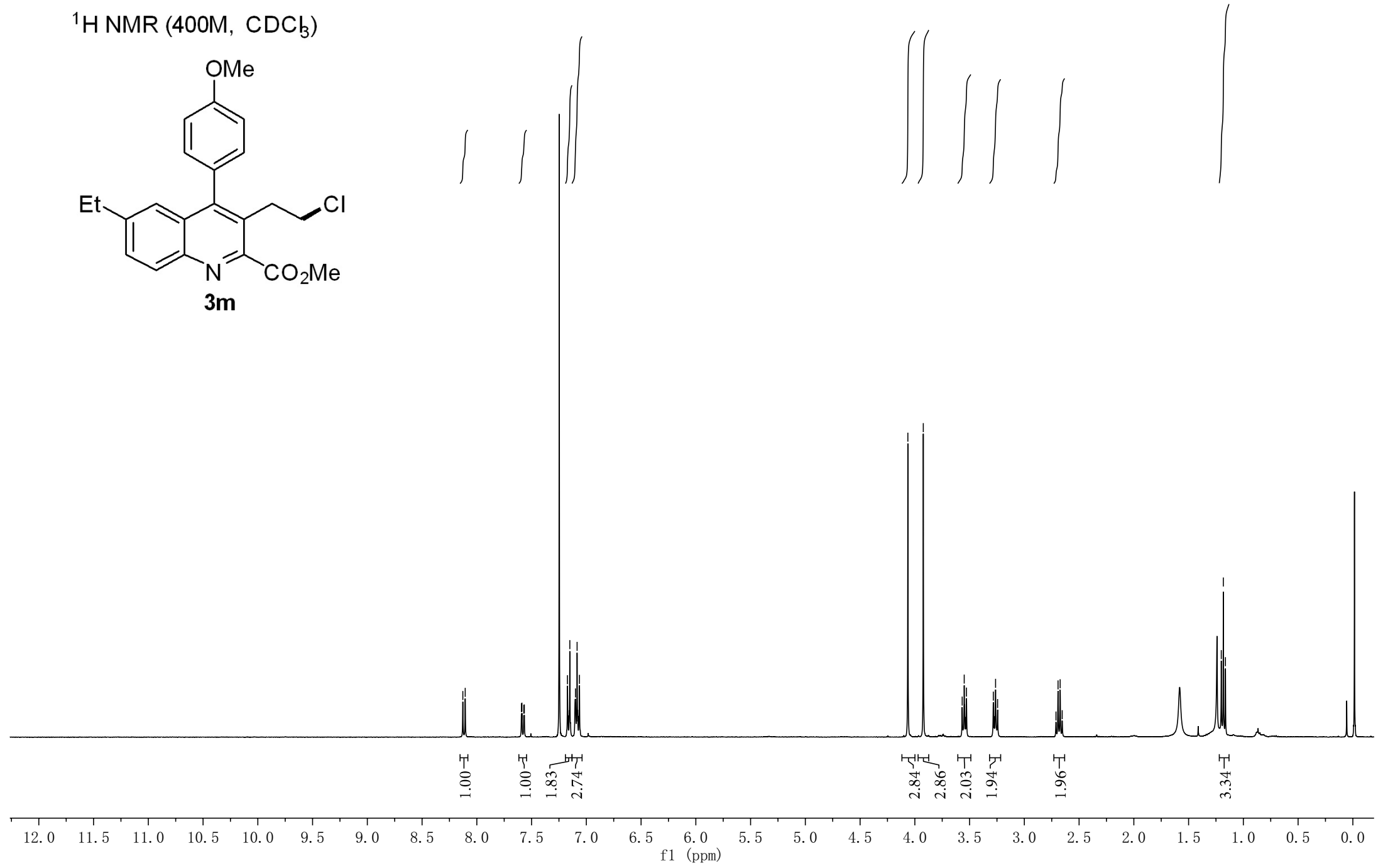
S57

<sup>1</sup>H NMR (400M, CDCl<sub>3</sub>)



8.128  
8.106  
7.593  
7.588  
7.571  
7.566  
7.173  
7.151  
7.099  
7.084  
7.063

4.064  
3.923  
3.568  
3.549  
3.537  
3.529  
3.283  
3.275  
3.263  
3.244  
2.711  
2.692  
2.673  
2.654  
1.202  
1.183  
1.164



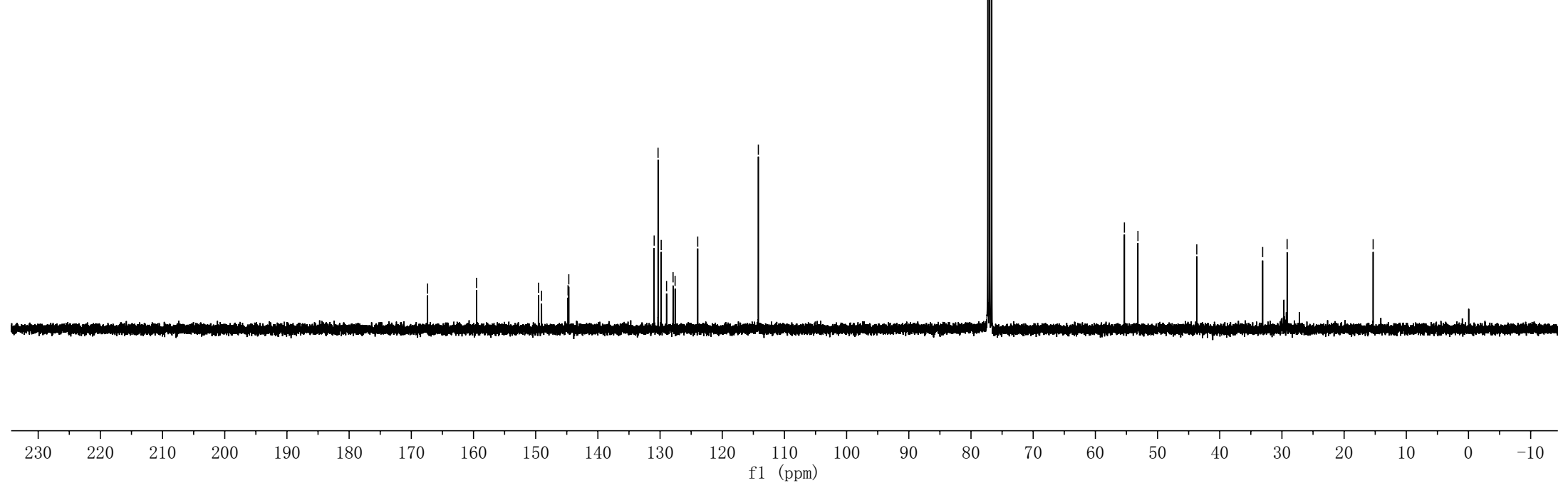
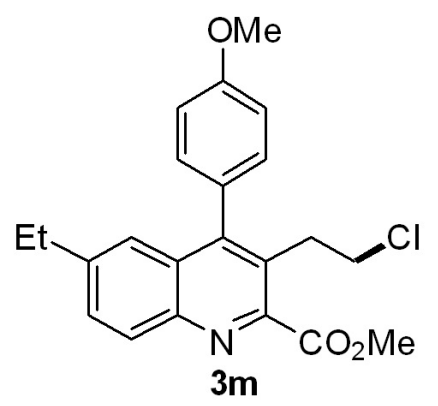
S58

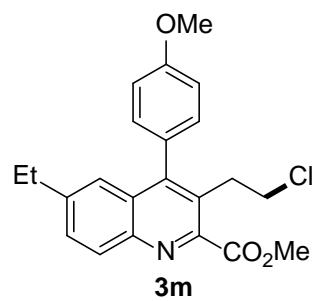
167.382  
159.510  
149.549  
149.054  
144.800  
144.675  
130.948  
130.322  
129.817  
128.955  
127.910  
127.581  
123.943  
114.196

55.330  
53.156  
43.694  
33.096  
29.165

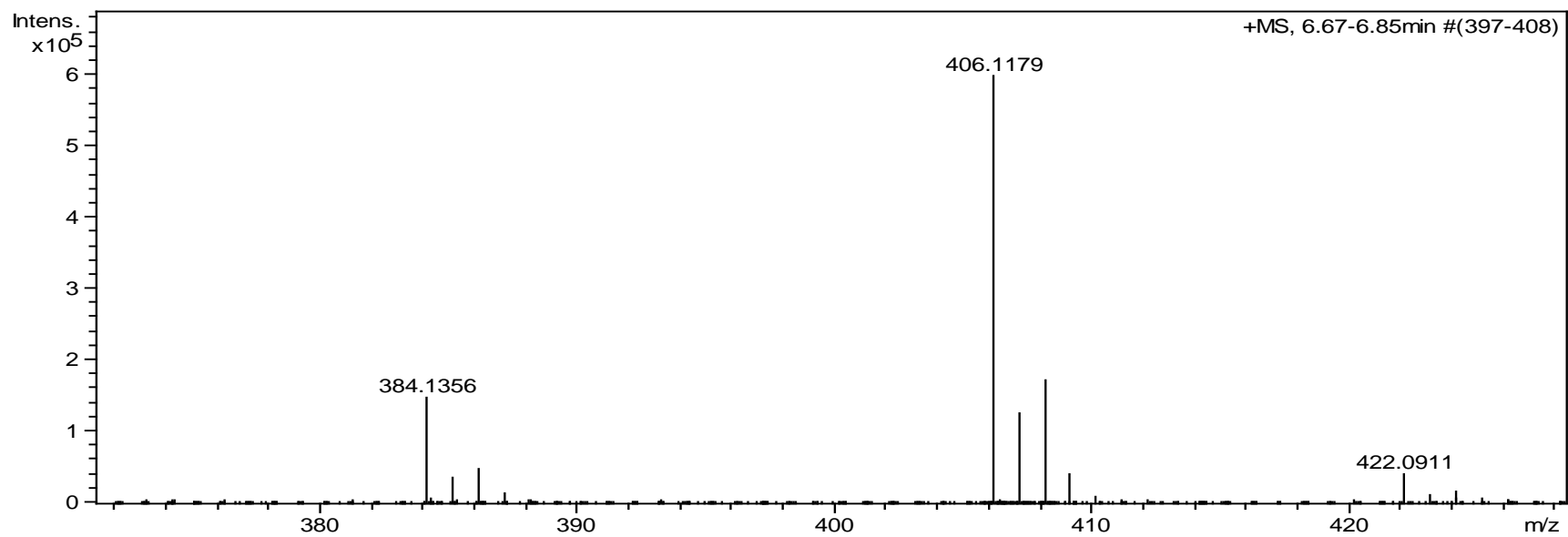
15.334

<sup>13</sup>C NMR (100M, CDCl<sub>3</sub>)



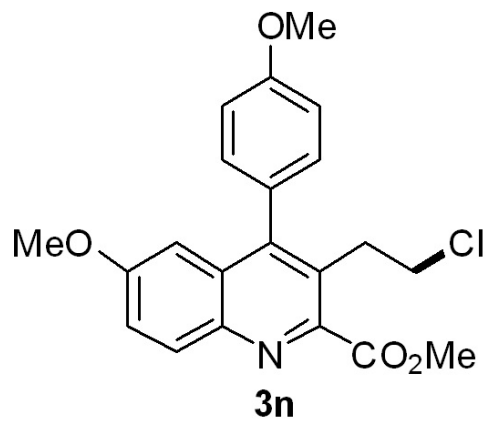


**Methyl 3-(2-chloroethyl)-6-ethyl-4-(4-methoxyphenyl)quinoline-2-carboxylate (3m)**

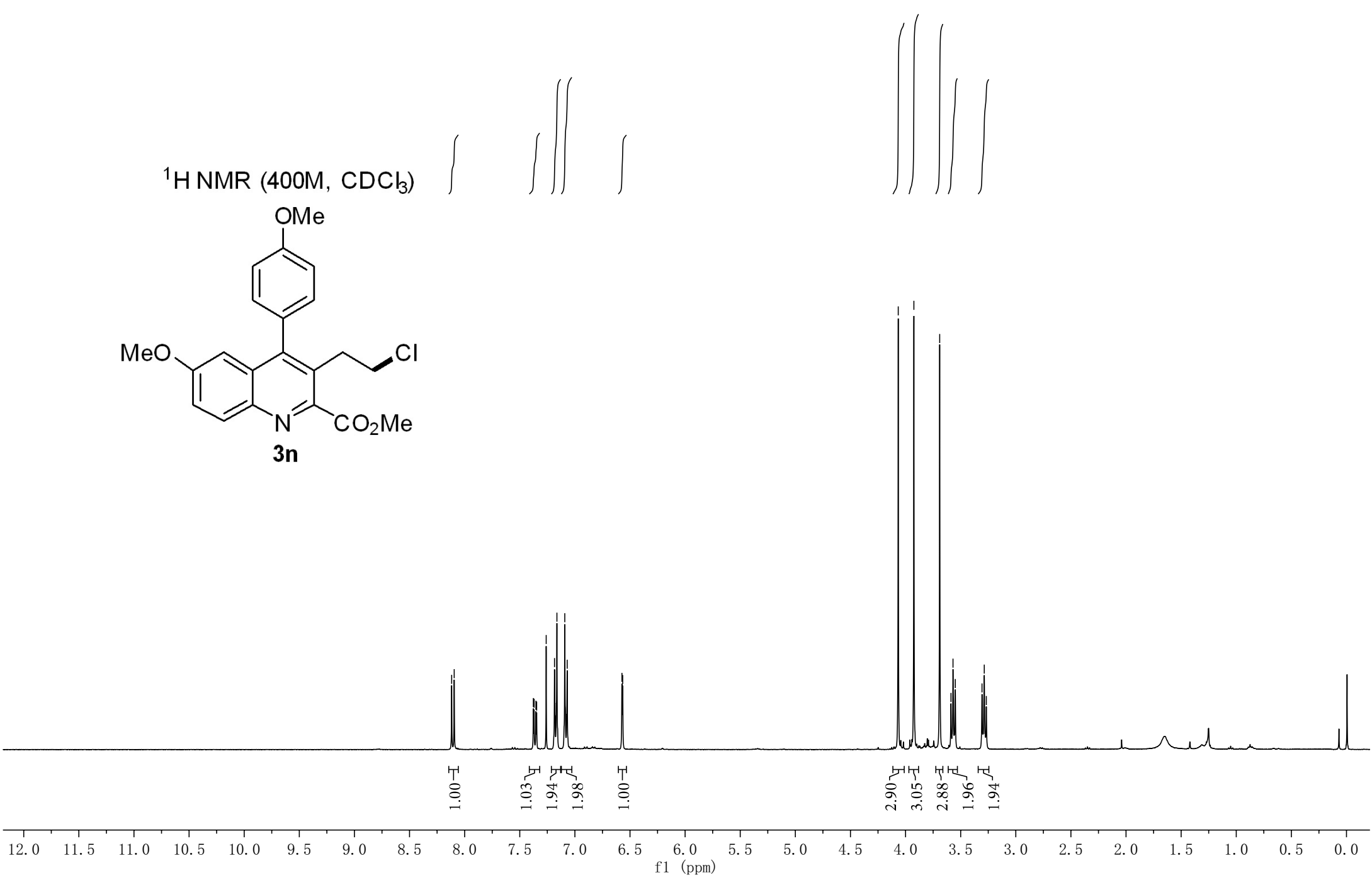


S60

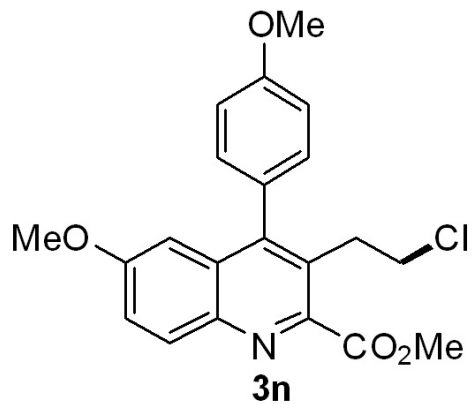
<sup>1</sup>H NMR (400M, CDCl<sub>3</sub>)



8.118  
8.095  
7.377  
7.370  
7.354  
7.260  
7.185  
7.163  
7.092  
7.070  
6.573  
6.566  
4.066  
3.925  
3.690  
3.588  
3.570  
3.549  
3.306  
3.286  
3.267

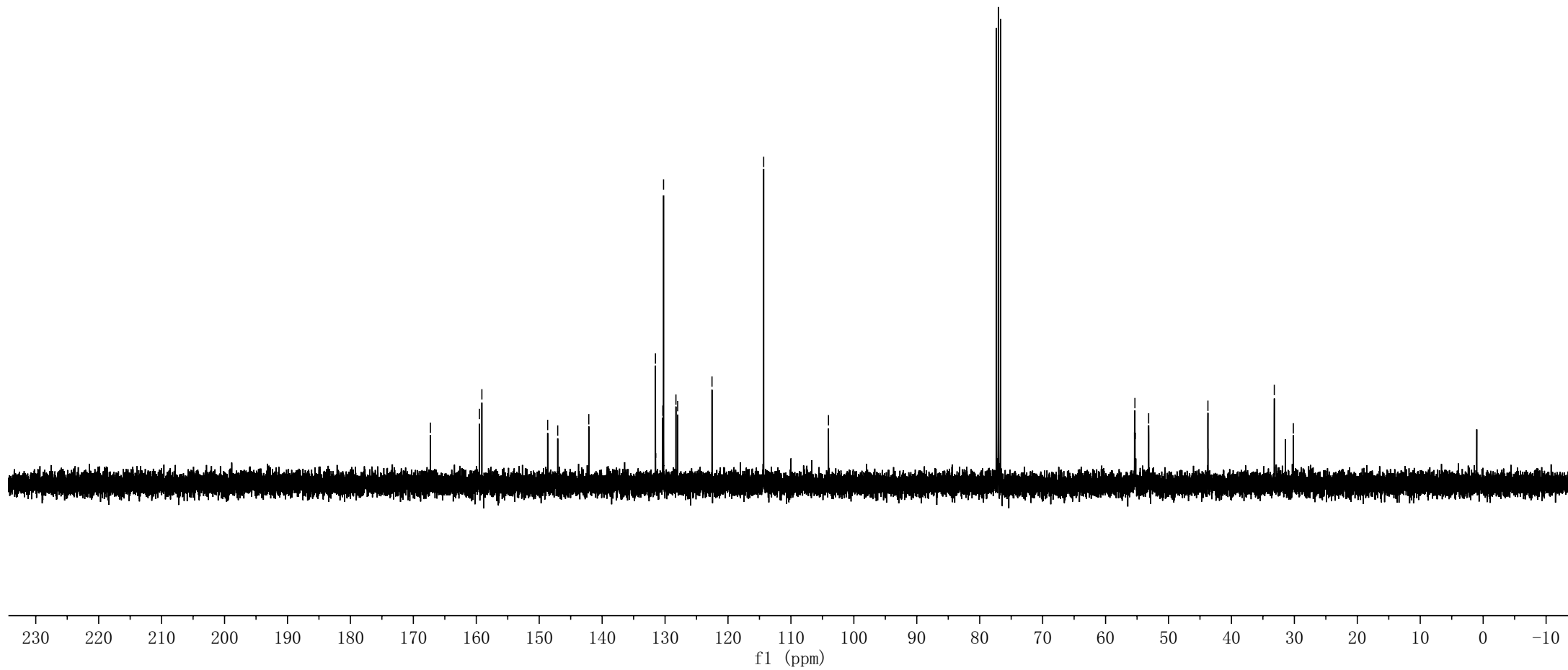


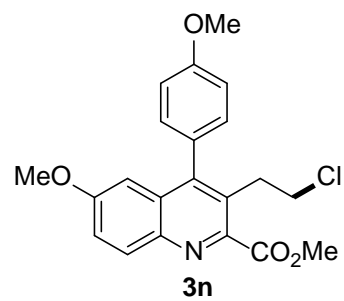
S61  
<sup>13</sup>C NMR (100M, CDCl<sub>3</sub>)



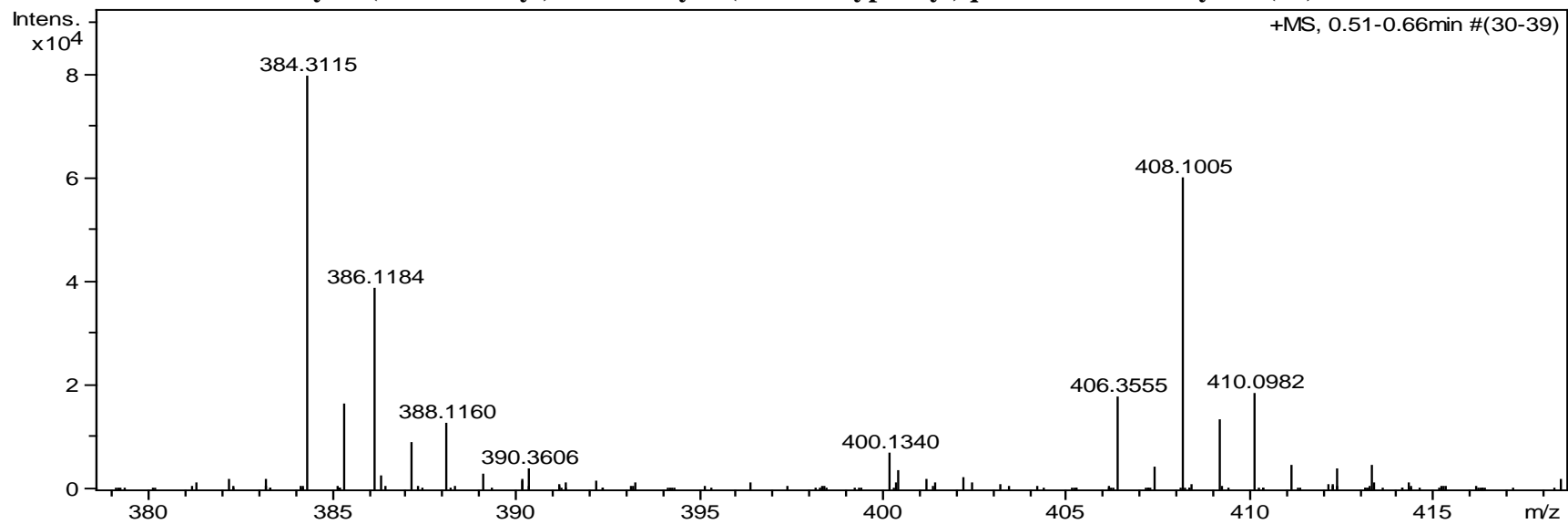
167.287  
159.501  
159.108  
148.656  
147.058  
142.121  
131.529  
130.364  
130.238  
128.273  
127.999  
122.541  
114.330  
104.035

55.338  
53.156  
43.736  
33.191  
30.164

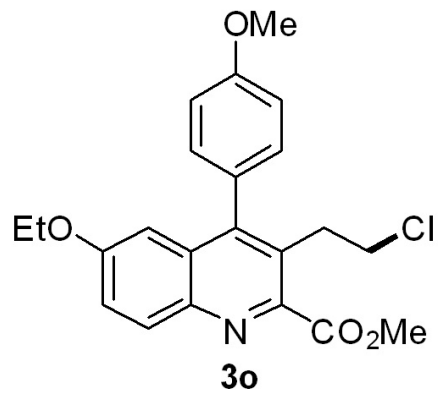




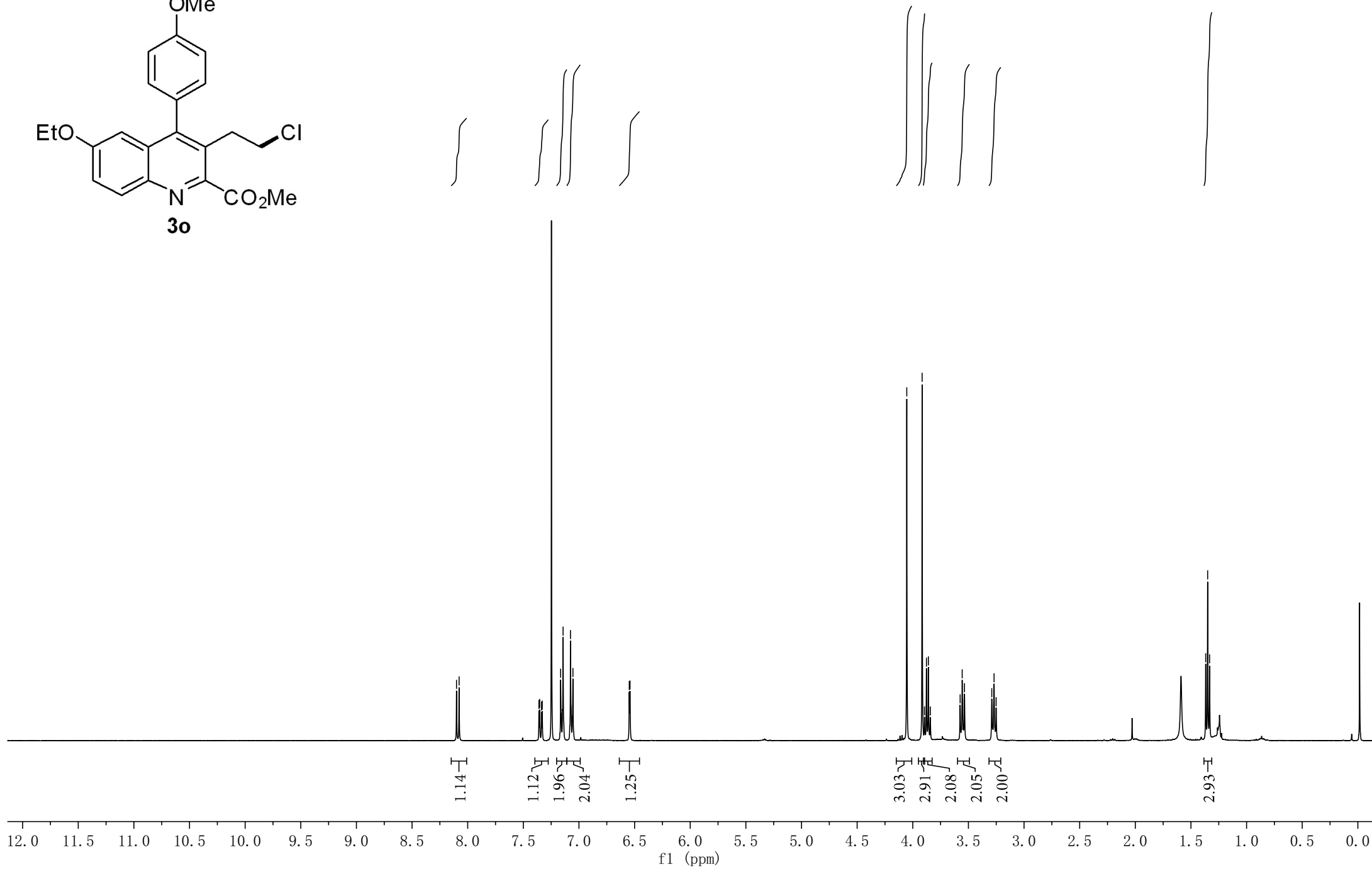
**Methyl 3-(2-chloroethyl)-6-methoxy-4-(4-methoxyphenyl)quinoline-2-carboxylate (3n)**



S63  
<sup>1</sup>H NMR (400M, CDCl<sub>3</sub>)



8.100  
8.077  
7.360  
7.353  
7.330  
7.165  
7.143  
7.076  
7.054  
6.548  
6.541  
4.054  
3.916  
3.895  
3.877  
3.860  
3.842  
3.574  
3.556  
3.535  
3.290  
3.269  
3.251  
1.367  
1.350  
1.332



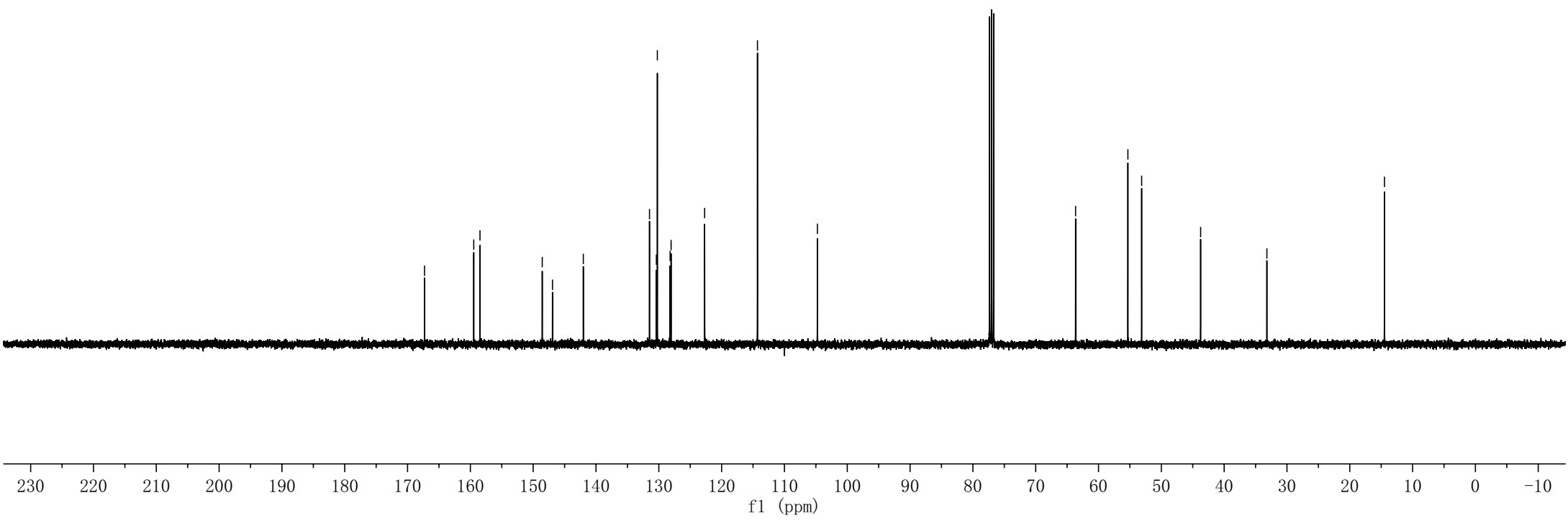
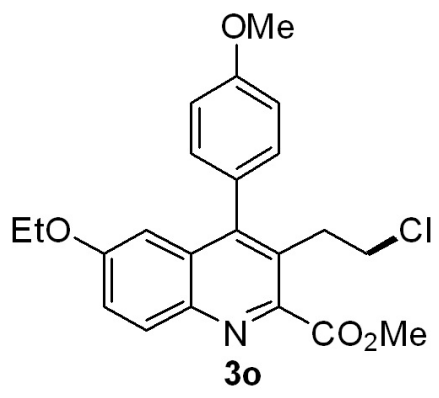
S64

167.299  
159.459  
158.468  
148.557  
146.929  
142.018  
131.483  
130.389  
130.233  
128.199  
128.046  
122.704  
114.296  
104.753

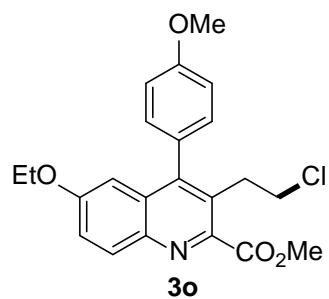
63.650  
55.323  
53.133  
43.743  
33.196

14.476

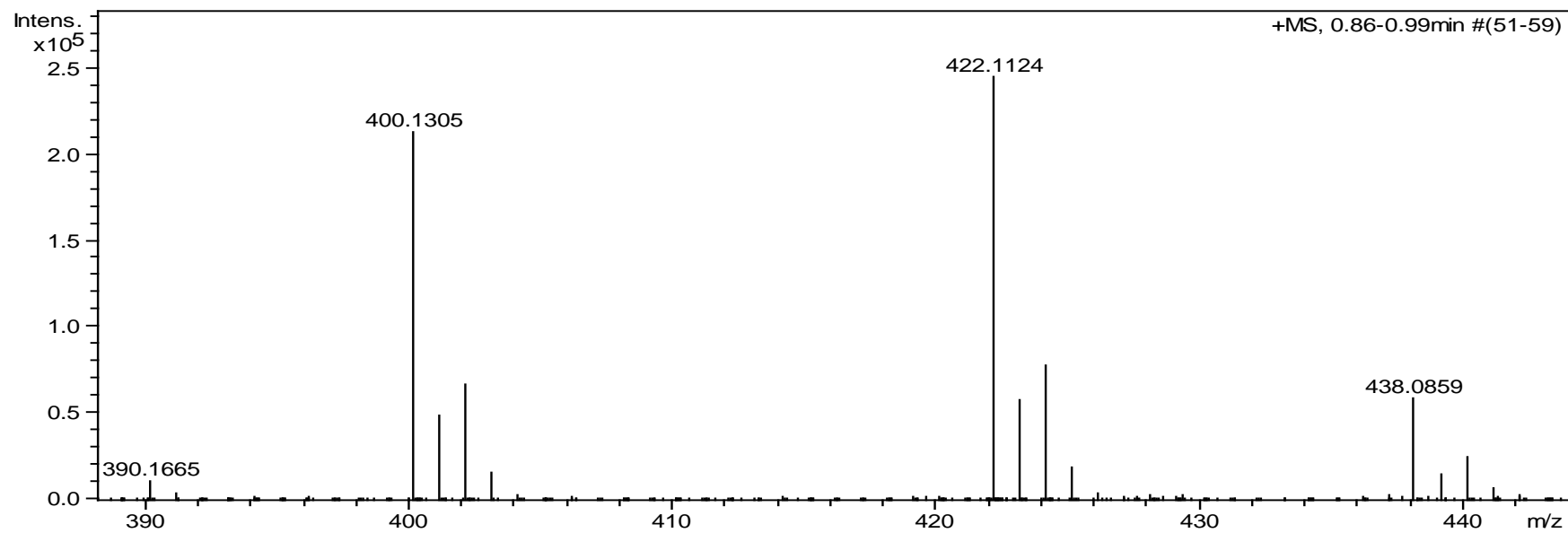
<sup>13</sup>C NMR (100M, CDCl<sub>3</sub>)







**Methyl 3-(2-chloroethyl)-6-ethoxy-4-(4-methoxyphenyl)quinoline-2-carboxylate (3o)**



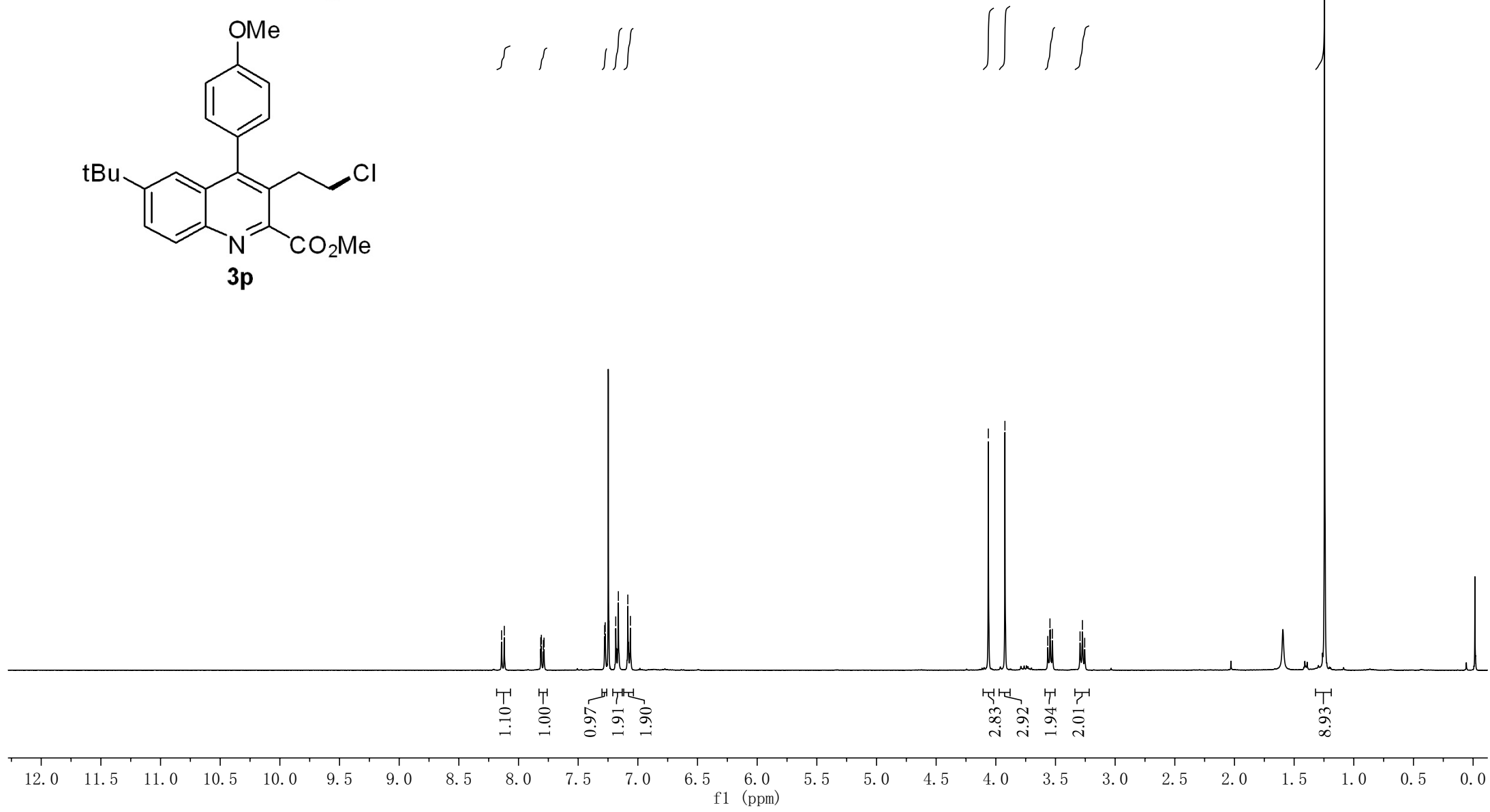
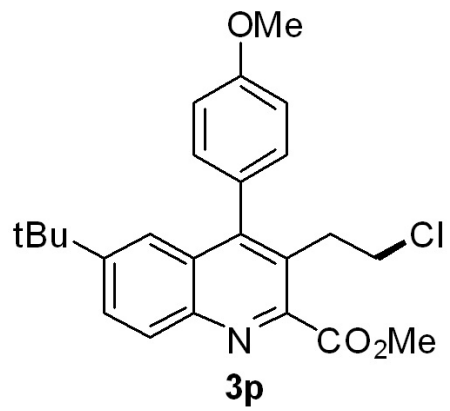
S66

8.142  
8.119  
7.814  
7.808  
7.791  
7.786  
7.278  
7.273  
7.185  
7.163  
7.084  
7.062

4.063  
3.924  
3.565  
3.546  
3.542  
3.526  
3.294  
3.274  
3.255

1.245

<sup>1</sup>H NMR (400M, CDCl<sub>3</sub>)

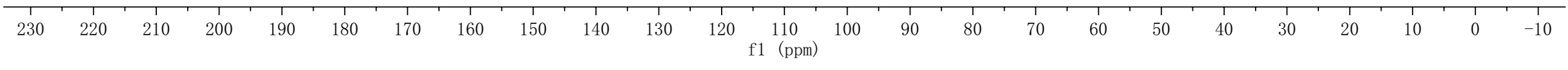
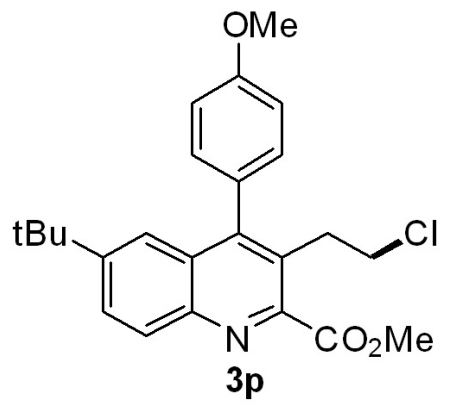


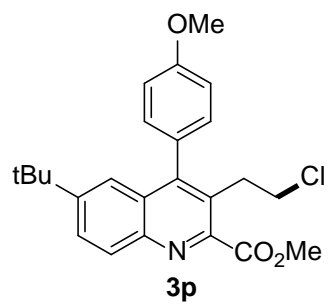
S67

167.411  
159.465  
151.255  
150.002  
149.216  
144.538  
130.313  
129.418  
128.793  
128.562  
127.876  
127.534  
121.260  
114.130

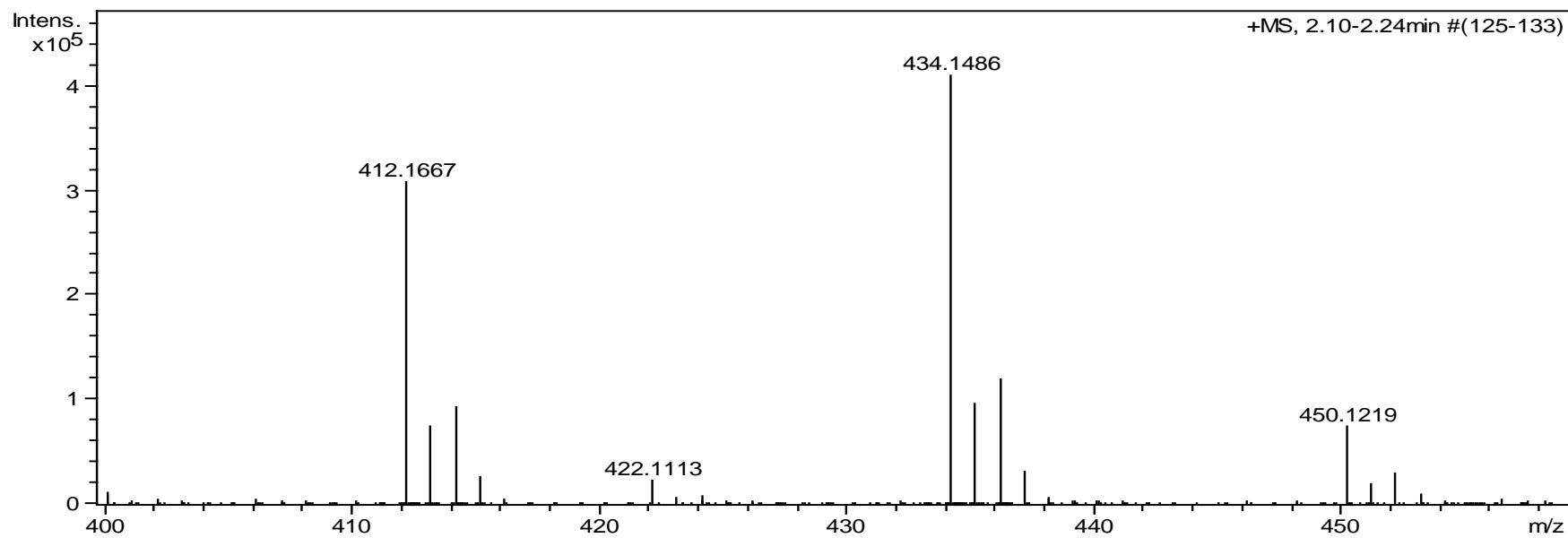
55.327  
53.193  
43.745  
35.136  
33.092  
30.931

<sup>13</sup>C NMR (100M, CDCl<sub>3</sub>)



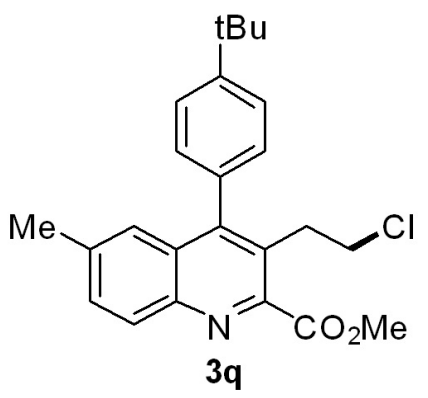


**Methyl 6-(tert-butyl)-3-(2-chloroethyl)-4-(4-methoxyphenyl)quinoline-2-carboxylate (3p)**

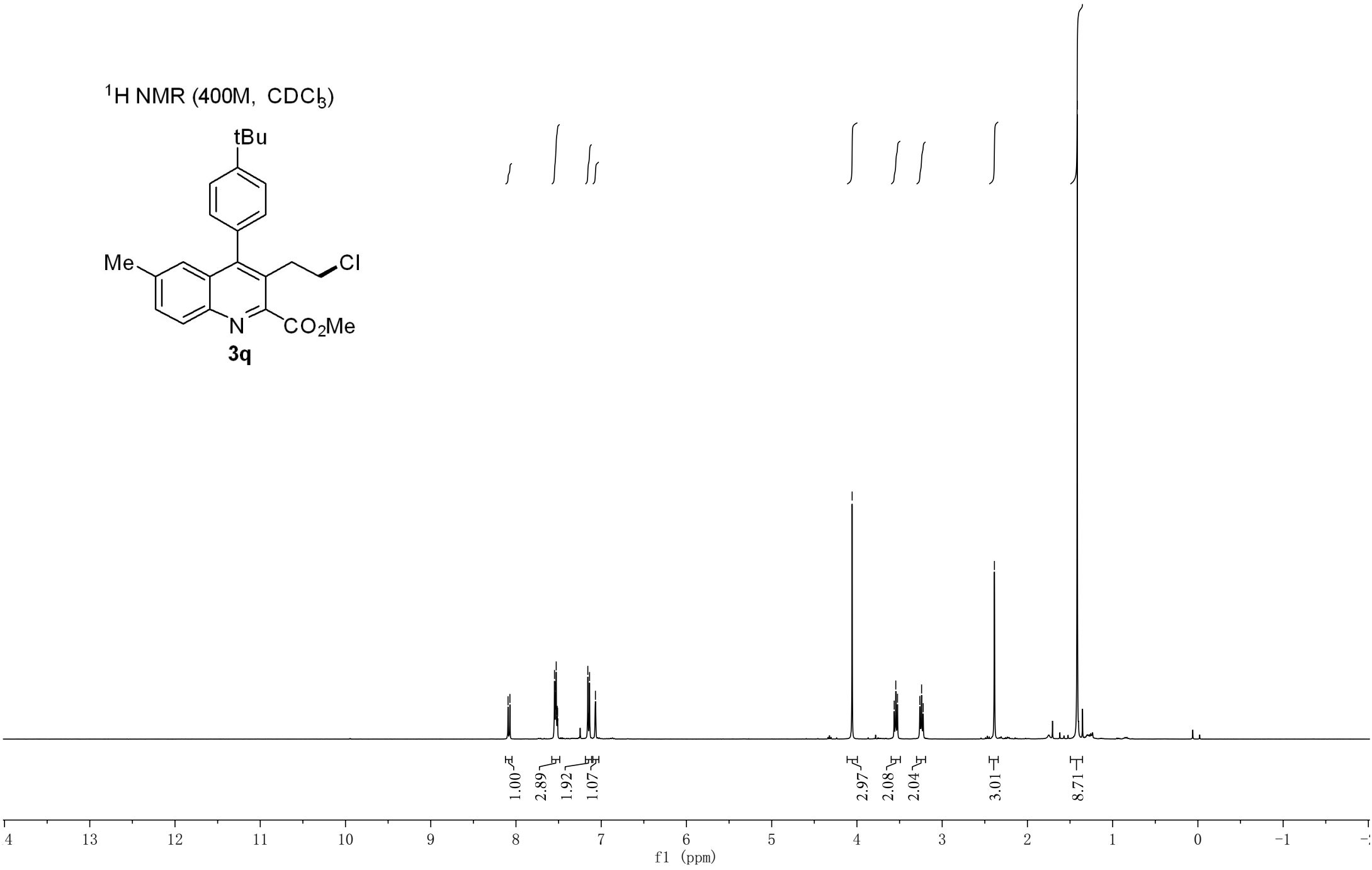


S69

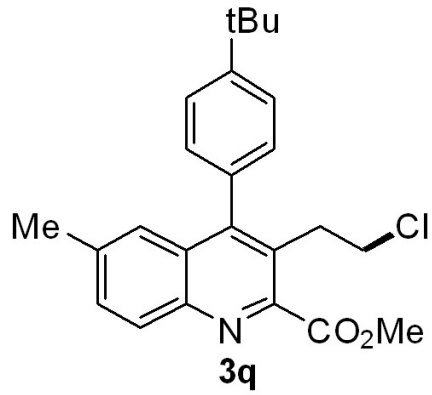
<sup>1</sup>H NMR (400M, CDCl<sub>3</sub>)



8.093  
8.071  
7.548  
7.537  
7.532  
7.528  
7.516  
7.512  
7.157  
7.137  
7.068  
4.056  
3.563  
3.544  
3.524  
3.262  
3.242  
3.223  
2.387  
1.416

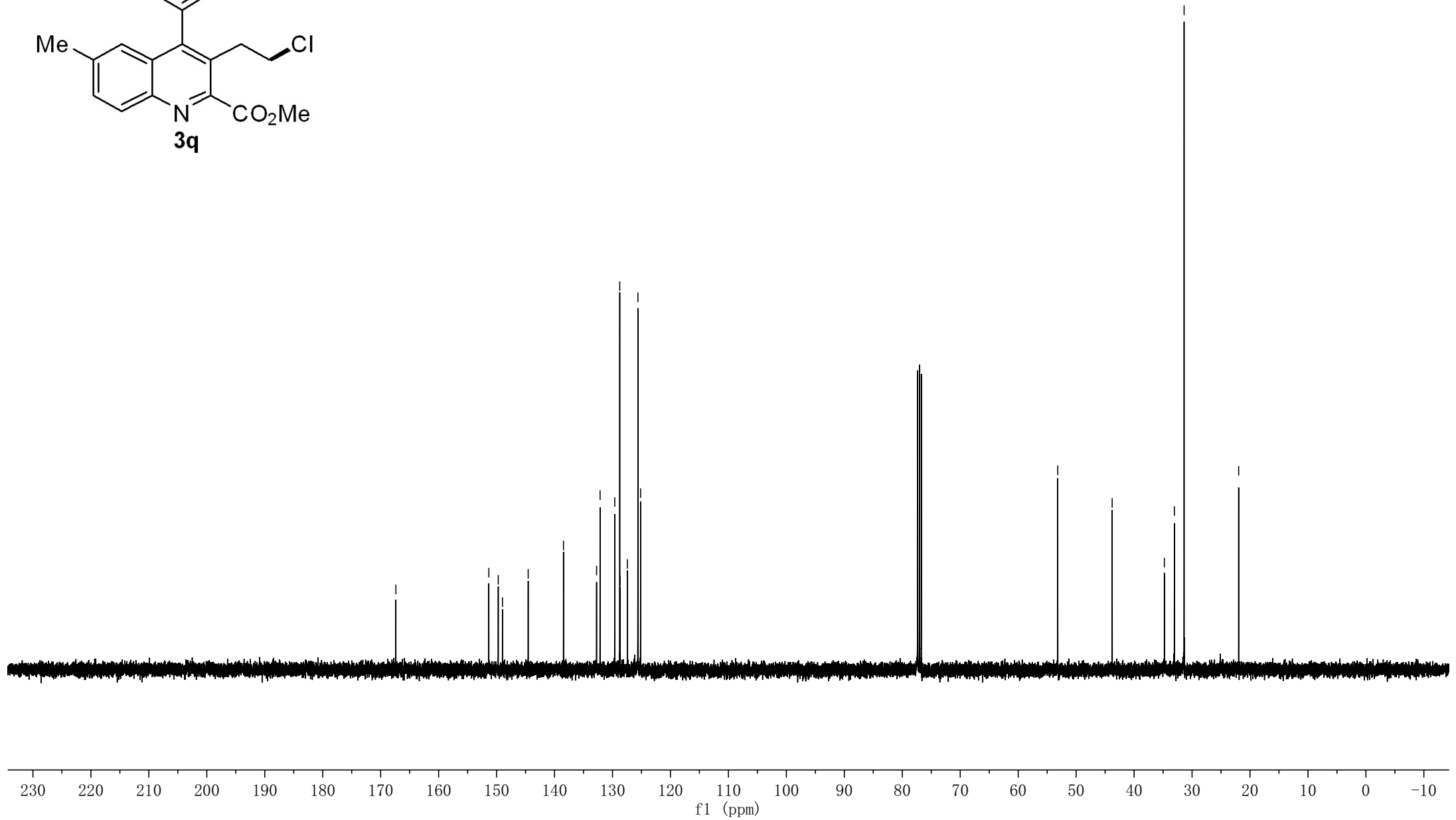


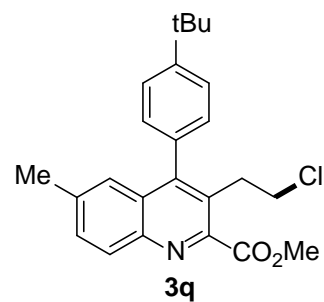
S70  
<sup>13</sup>C NMR (100M, CDCl<sub>3</sub>)



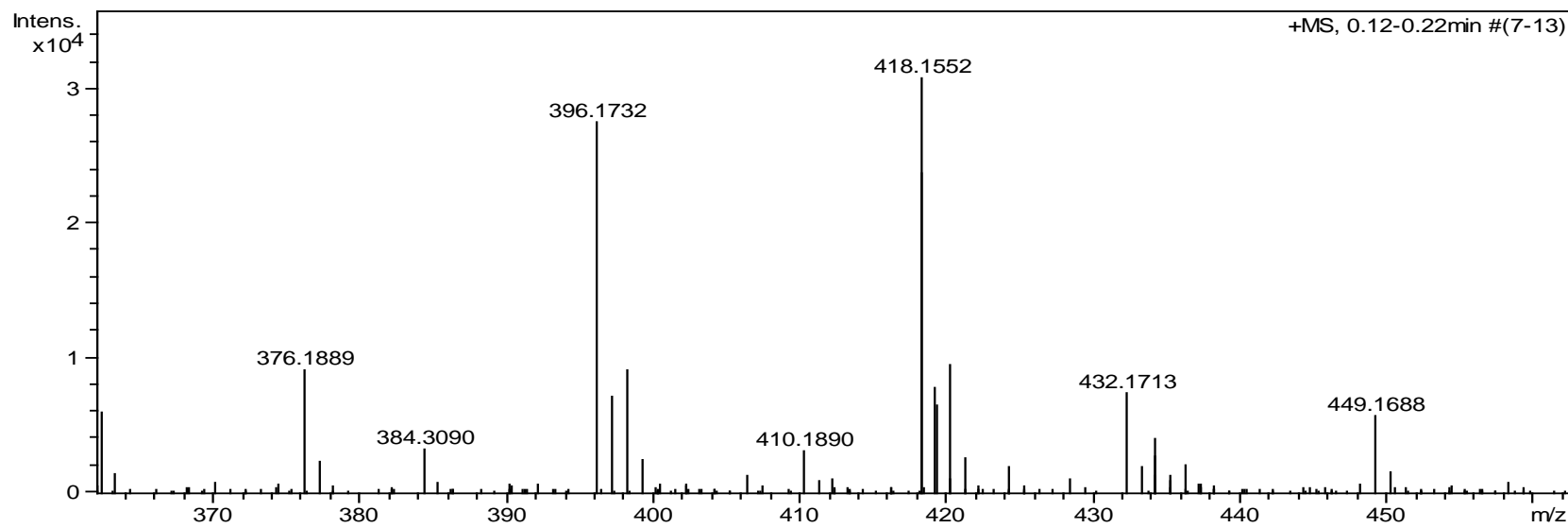
167.376  
151.338  
149.712  
148.980  
144.547  
138.455  
132.749  
132.142  
129.607  
128.747  
128.694  
127.427  
125.613  
125.149

53.171  
43.784  
34.778  
33.046  
31.372  
21.957



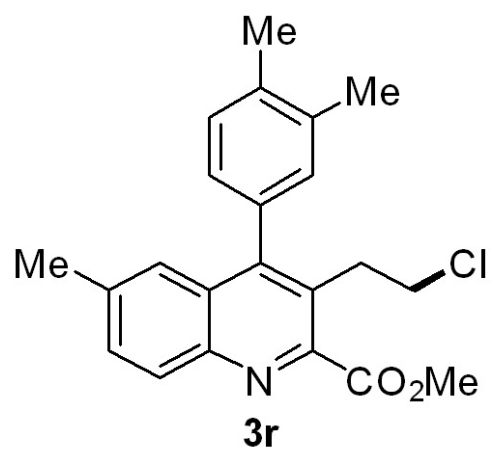


**Methyl 4-(4-(tert-butyl)phenyl)-3-(2-chloroethyl)-6-methylquinoline-2-carboxylate (3q)**

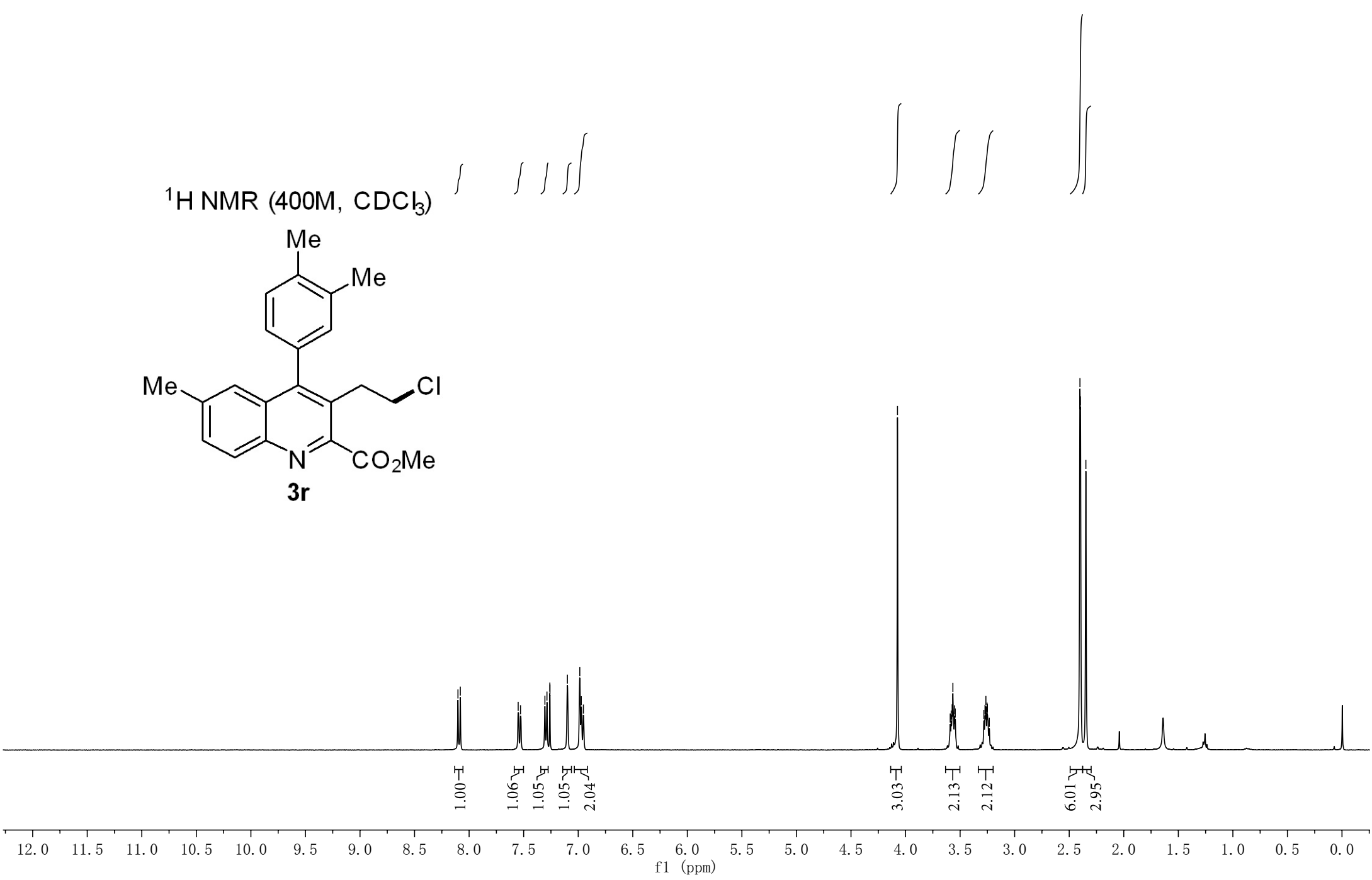


S72

<sup>1</sup>H NMR (400M, CDCl<sub>3</sub>)



8.102 8.081 7.550 7.529 7.305 7.287 7.260 7.259 7.099 6.986 6.972 6.953 4.074 3.582 3.573 3.566 3.551 3.544 3.282 3.272 3.264 3.253 3.250 2.402 2.397 2.347



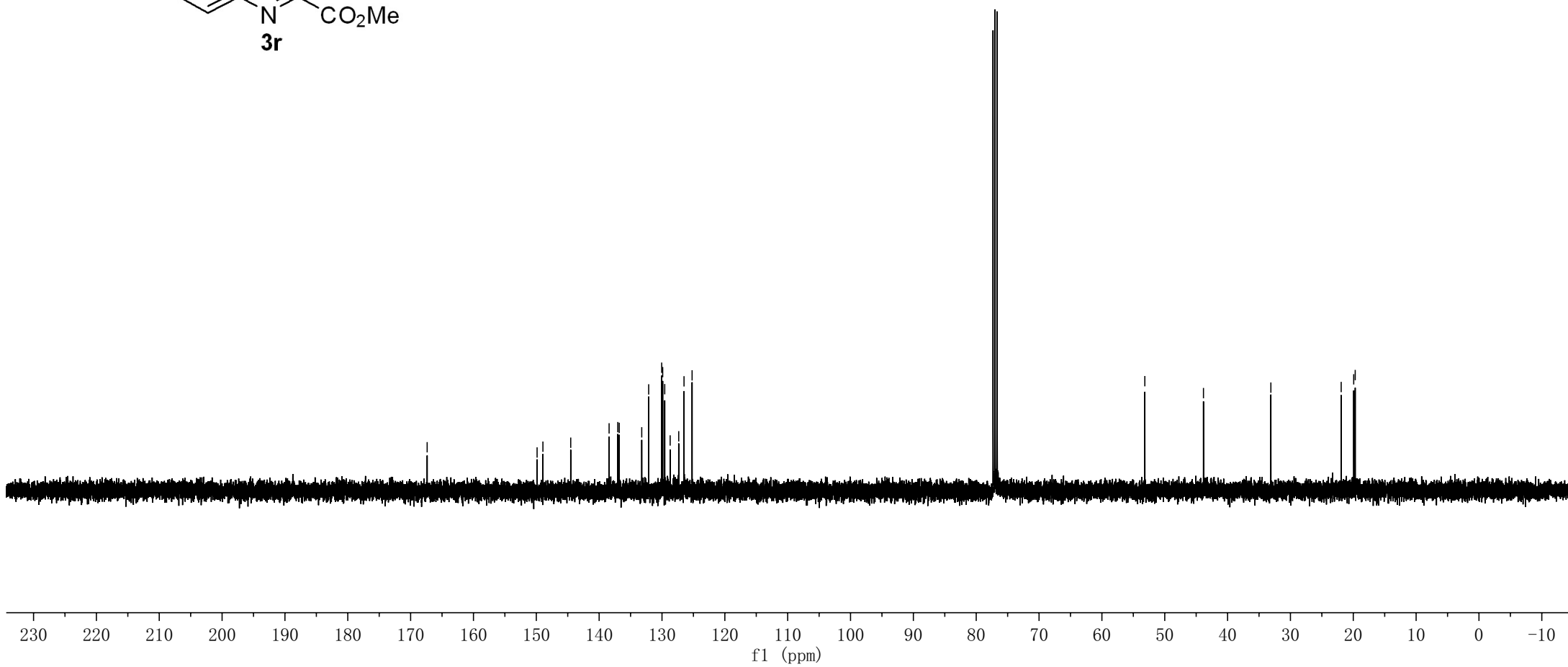
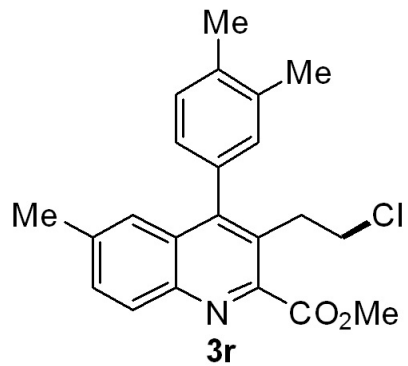


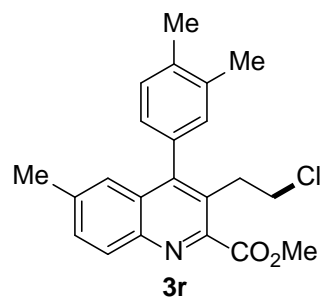
S73

167.368  
149.875  
148.948  
144.523  
138.416  
137.032  
136.800  
133.223  
132.118  
130.048  
129.889  
129.565  
128.700  
127.339  
126.494  
125.210

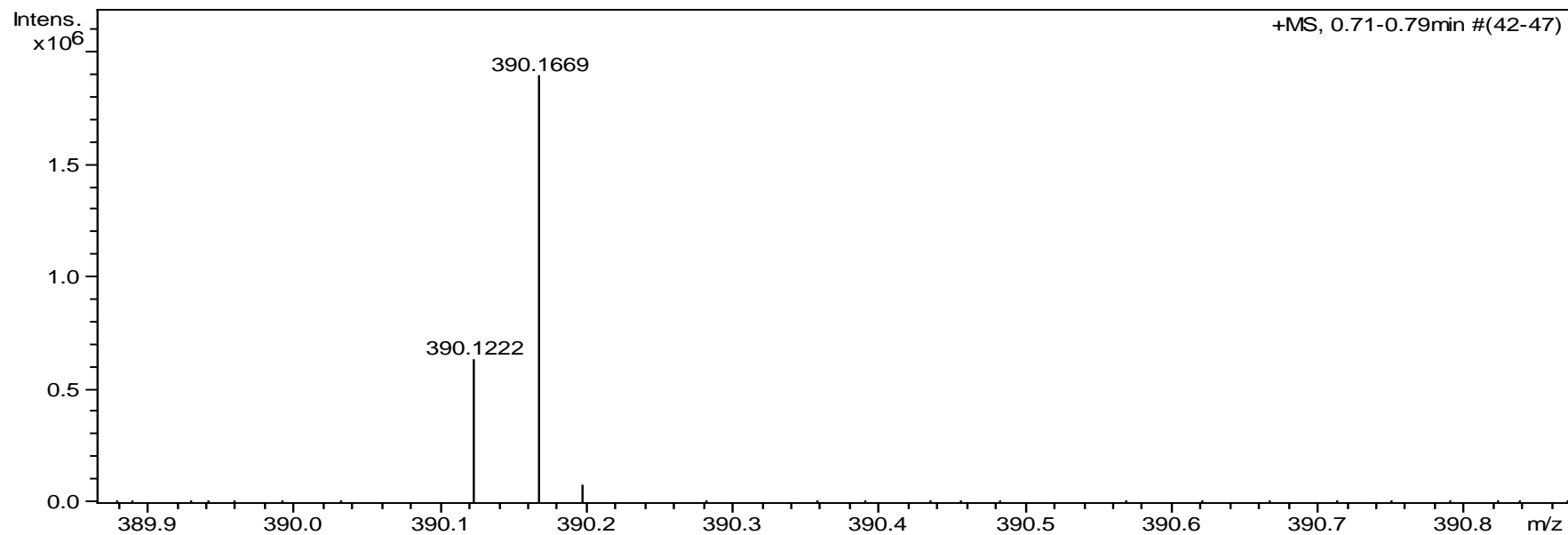
53.168  
43.837  
33.113  
21.924  
19.930  
19.691

<sup>13</sup>C NMR (100M, CDCl<sub>3</sub>)



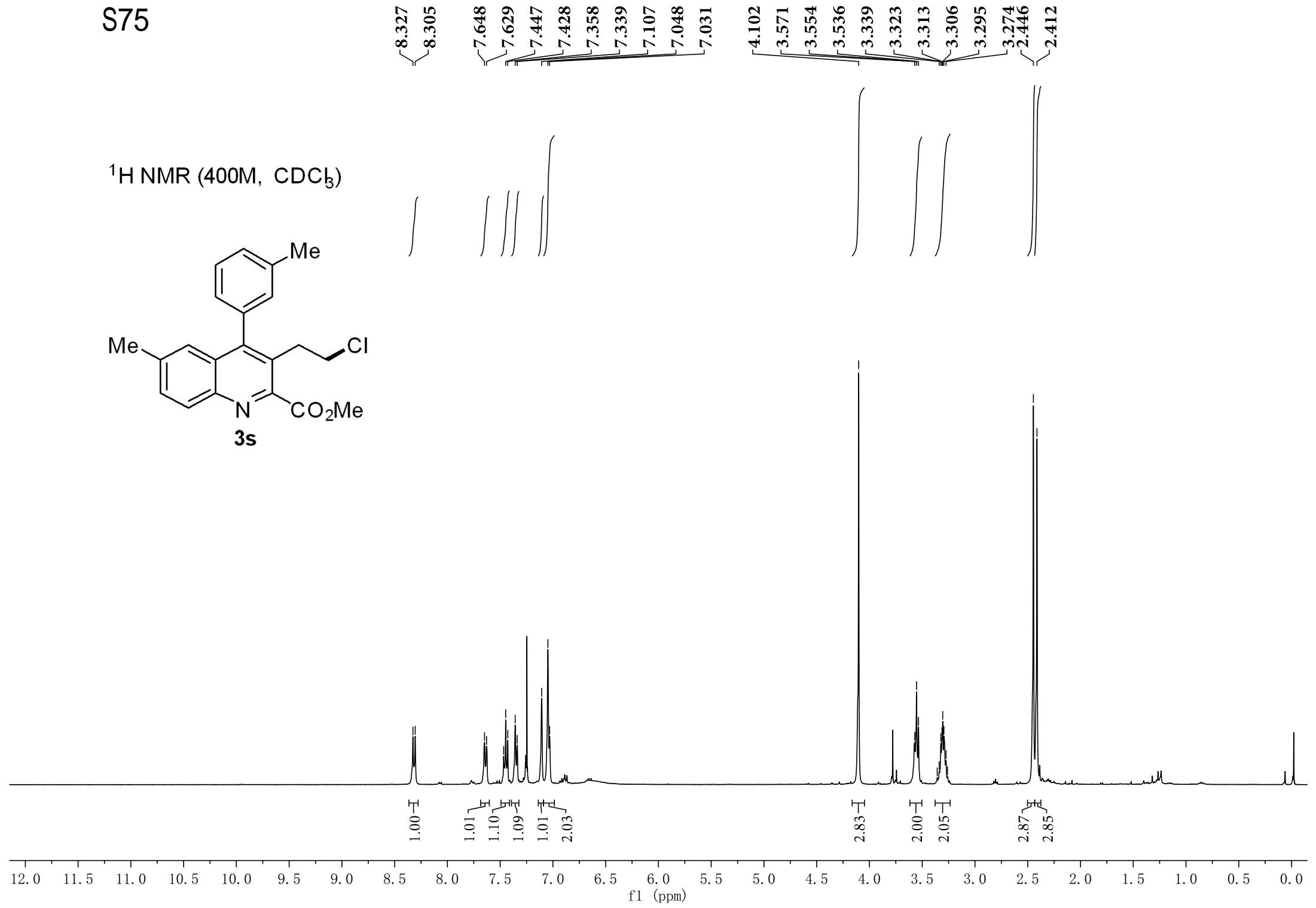
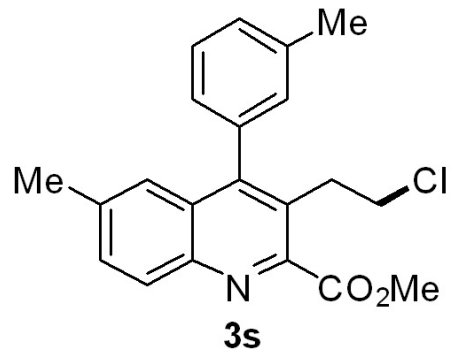


**Methyl 3-(2-chloroethyl)-4-(3,4-dimethylphenyl)-6-methylquinoline-2-carboxylate (3r)**

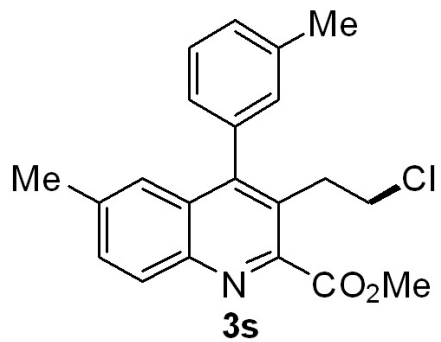


S75

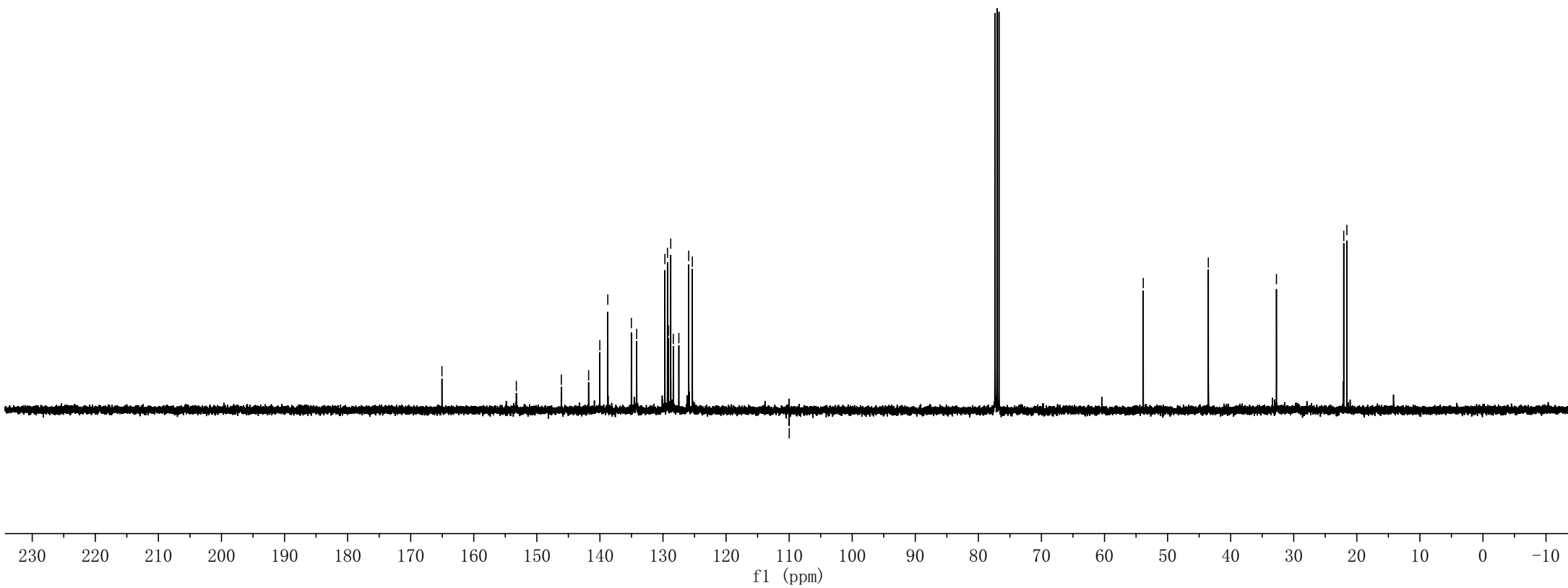
<sup>1</sup>H NMR (400M, CDCl<sub>3</sub>)

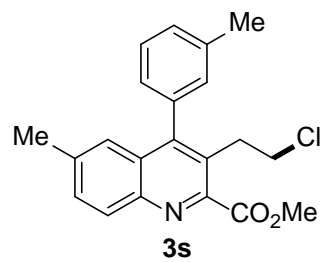


S76  
<sup>13</sup>C NMR (100M, CDCl<sub>3</sub>)

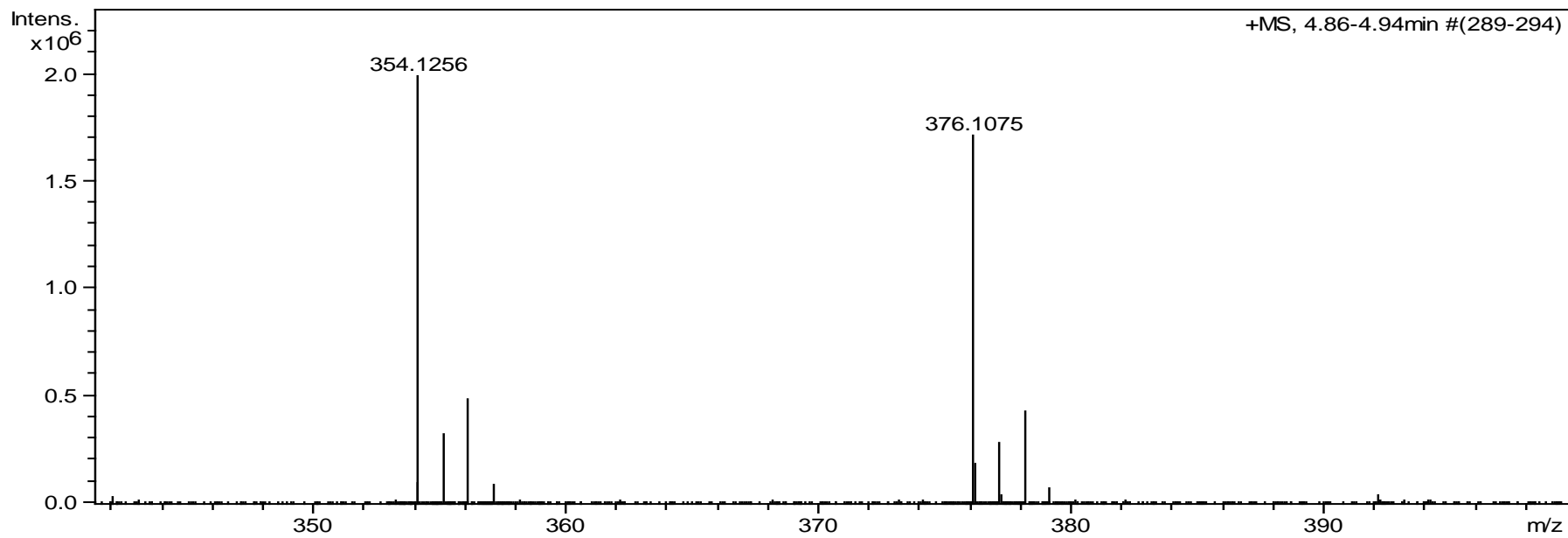


165.047  
138.750  
135.015  
134.175  
129.698  
129.287  
129.139  
128.769  
125.923  
125.347  
109.983  
53.860  
43.542  
32.743  
22.073  
21.575



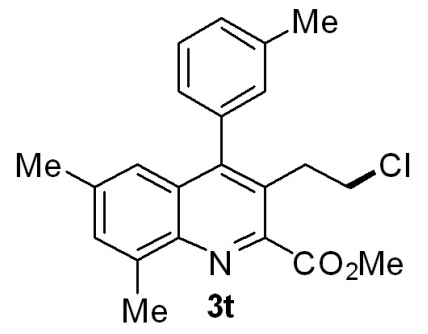


Methyl 3-(2-chloroethyl)-6-methyl-4-(m-tolyl)quinoline-2-carboxylate (3s)

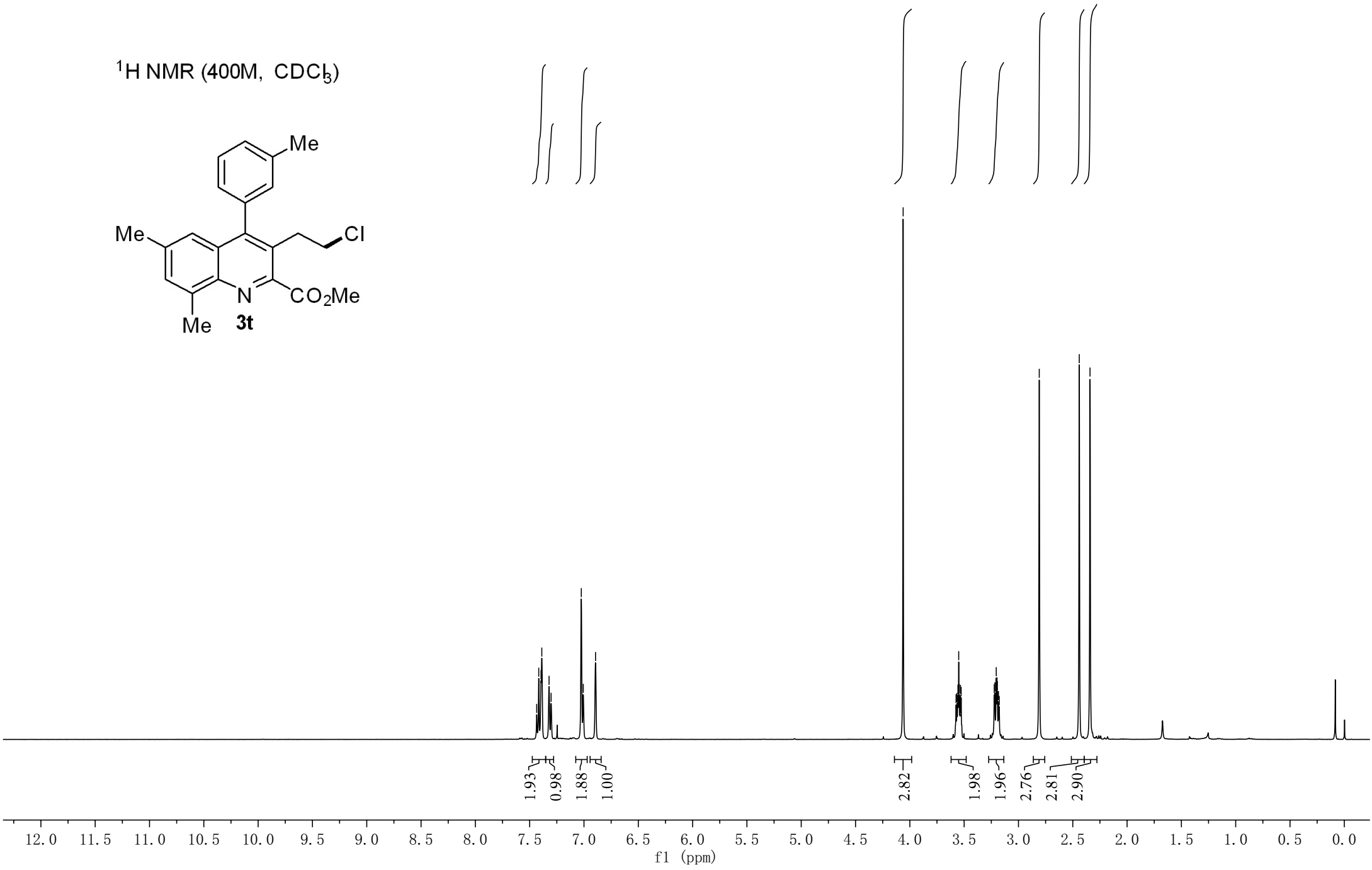


S78

<sup>1</sup>H NMR (400M, CDCl<sub>3</sub>)



7.435 7.416 7.396 7.388 7.322 7.303 7.025 7.006 6.894 4.062 3.574 3.566 3.557 3.550 3.545 3.540 3.534 3.528 3.223 3.217 3.205 3.197 3.194 3.184 3.177 2.809 2.440 2.341

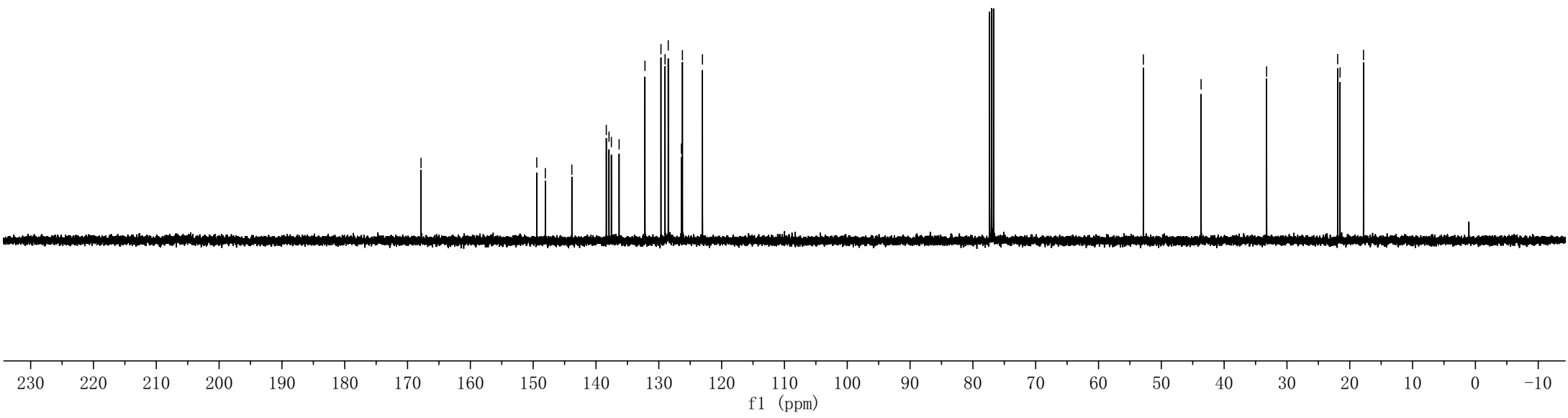
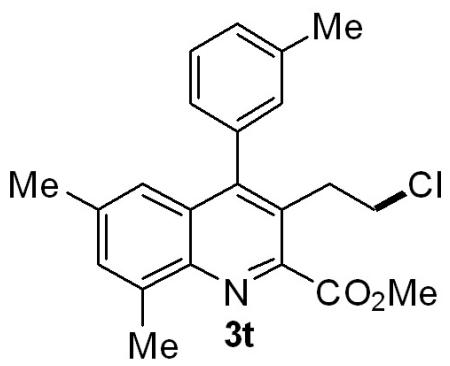


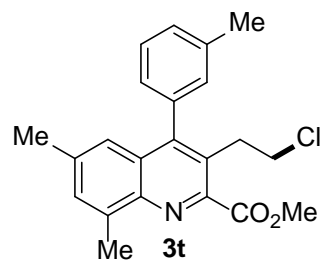
S79

167.856  
149.426  
148.068  
143.845  
138.360  
137.930  
137.550  
136.318  
132.207  
129.659  
129.009  
128.499  
126.403  
126.239  
123.052

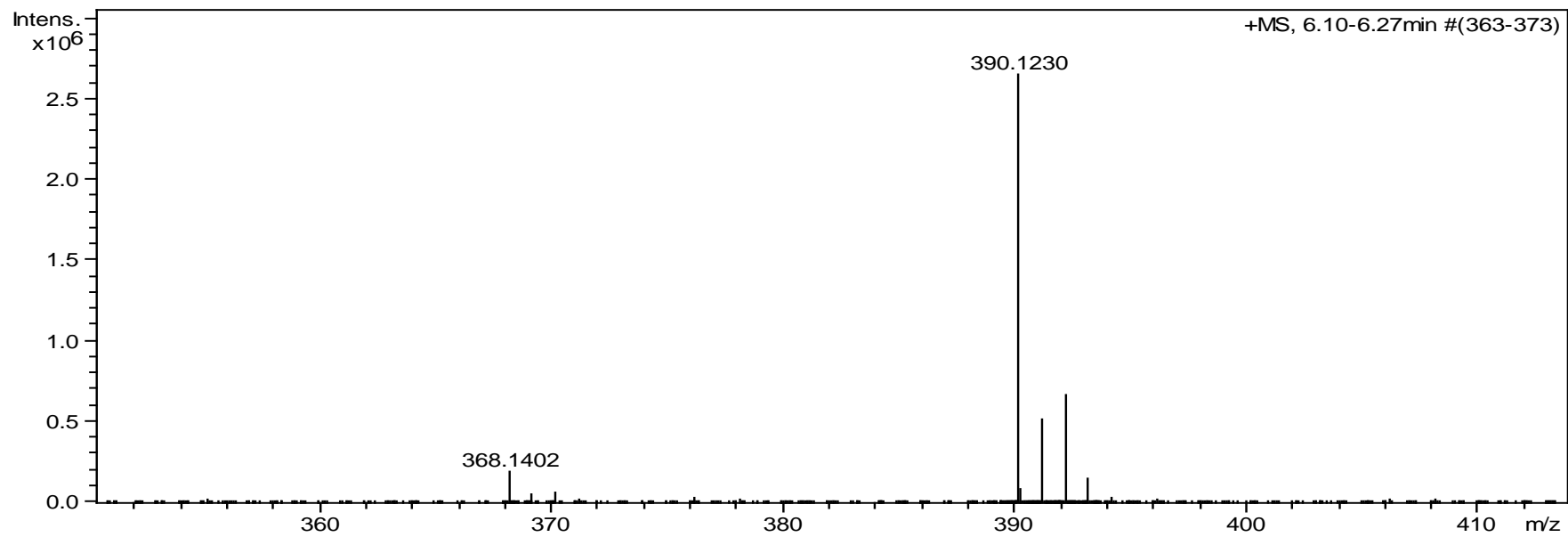
52.864  
43.673  
33.242  
21.928  
21.550  
17.814

<sup>13</sup>C NMR (100M, CDCl<sub>3</sub>)





**Methyl 3-(2-chloroethyl)-6,8-dimethyl-4-(m-tolyl)quinoline-2-carboxylate (3t)**



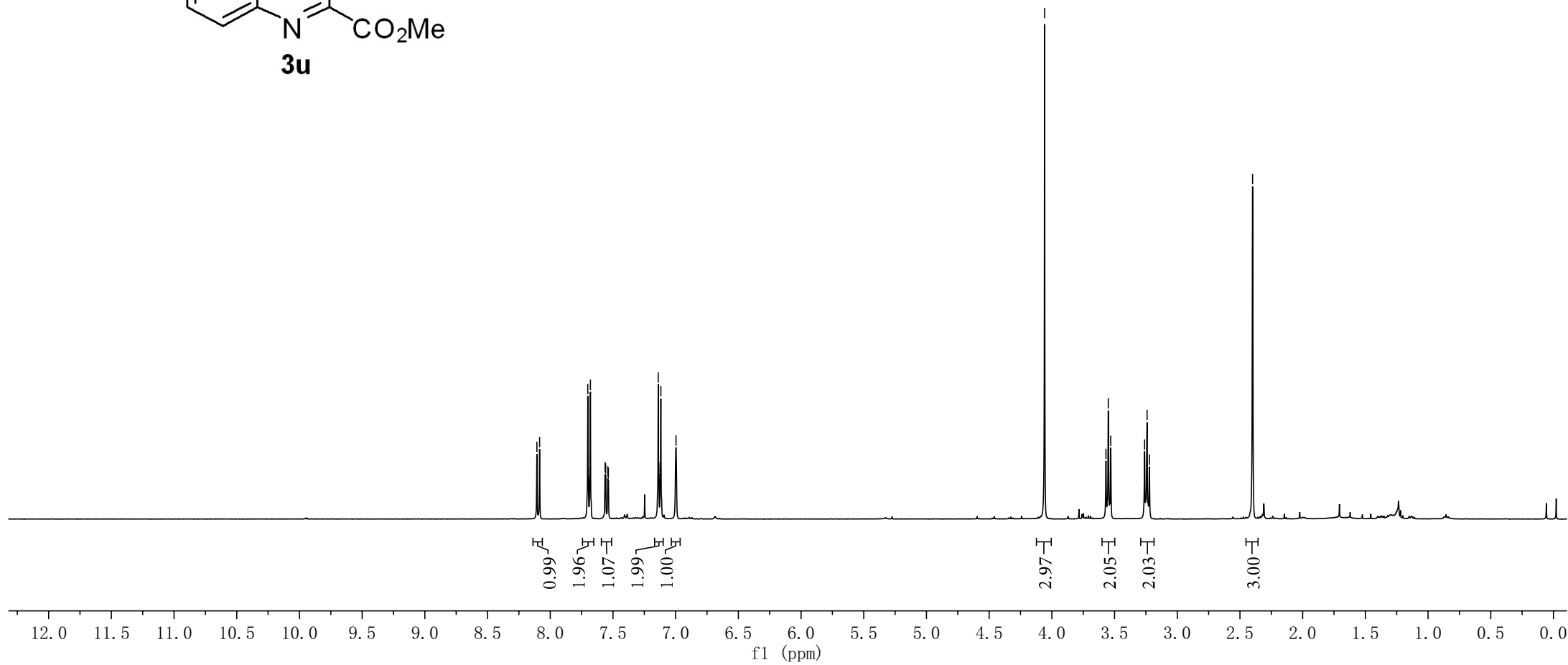
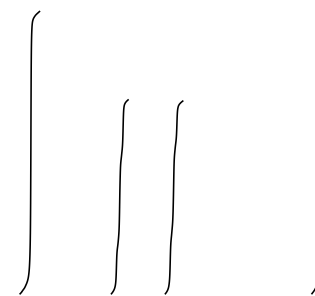
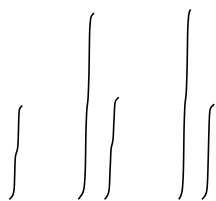
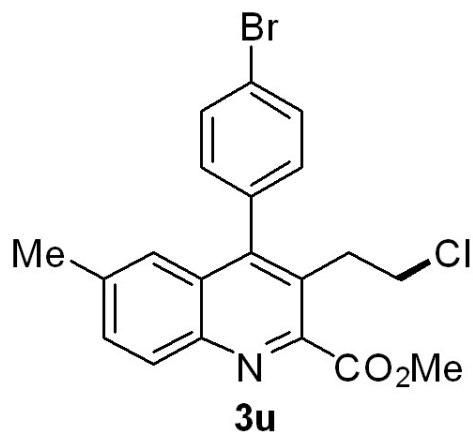


S81

8.107  
8.085  
7.701  
7.684  
7.680  
7.563  
7.558  
7.541  
7.537  
7.139  
7.134  
7.118  
6.997

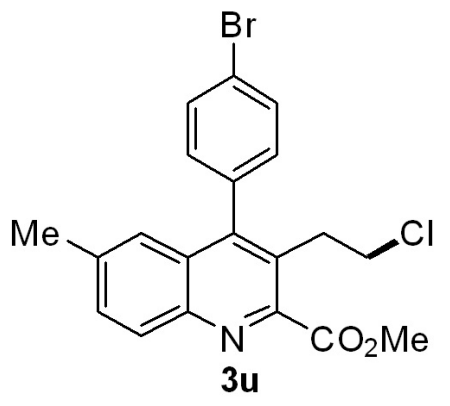
4.058  
3.569  
3.550  
3.530  
3.260  
3.241  
3.222  
2.399

<sup>1</sup>H NMR (400M, CDCl<sub>3</sub>)



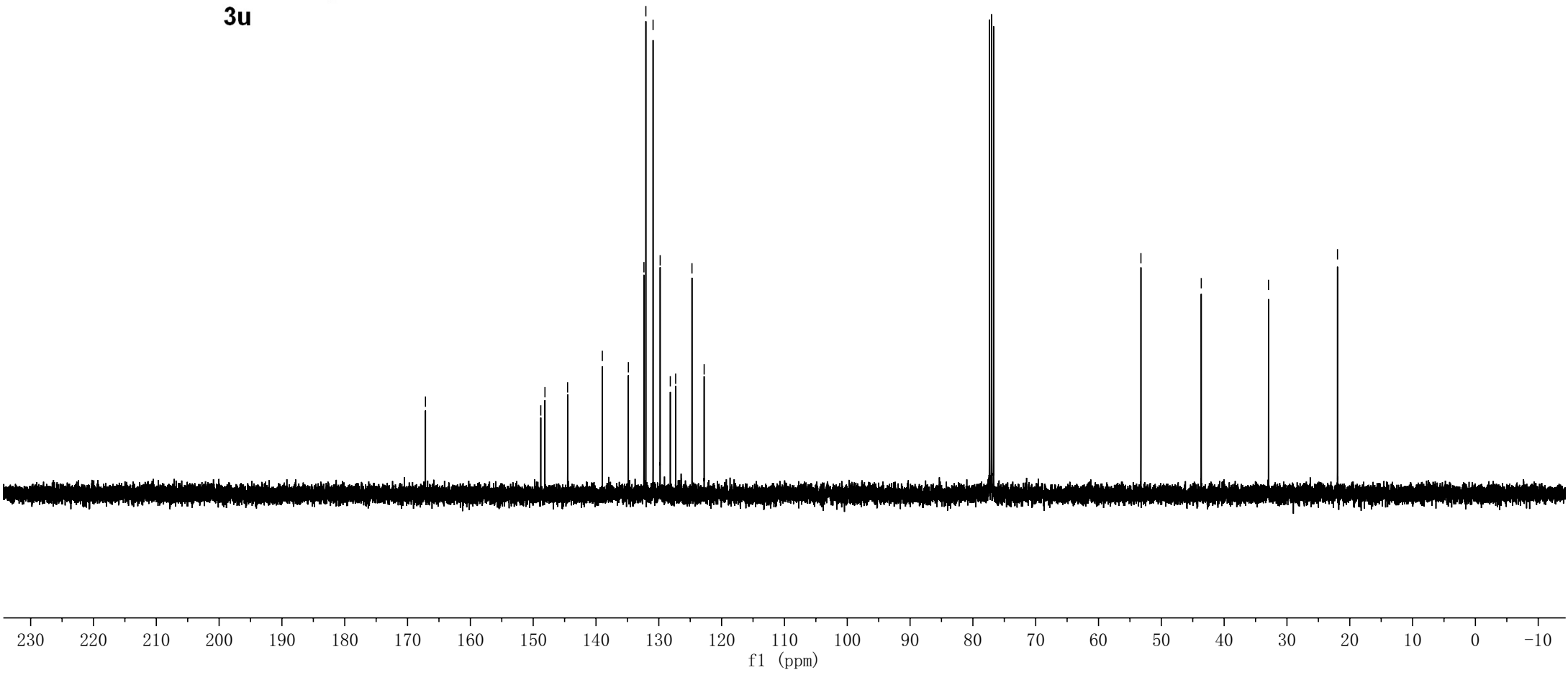
S82

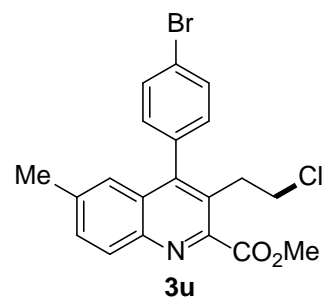
<sup>13</sup>C NMR (100M, CDCl<sub>3</sub>)



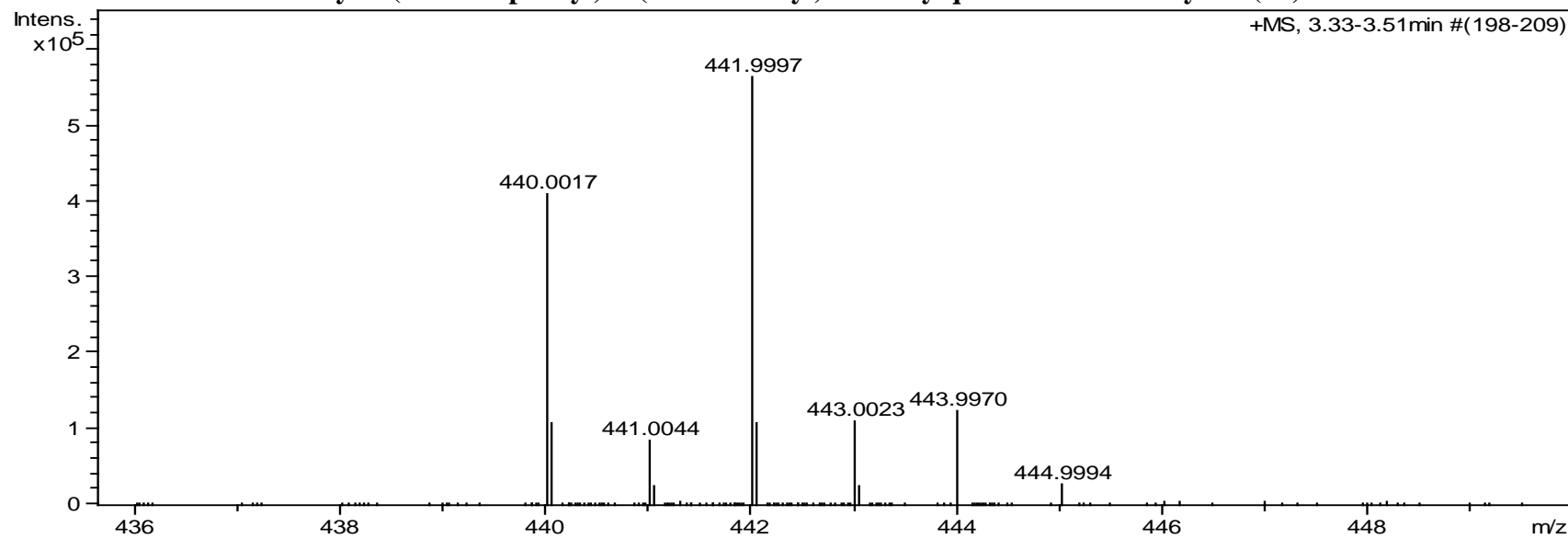
167.148  
148.790  
148.126  
144.520  
138.992  
134.847  
132.368  
132.061  
130.913  
129.784  
128.172  
127.317  
124.720  
122.781

53.247  
43.643  
32.936  
21.956



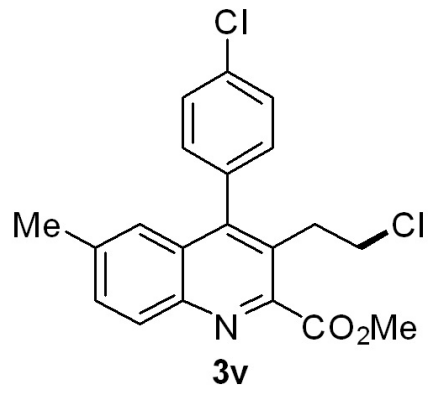


**Methyl 4-(4-bromophenyl)-3-(2-chloroethyl)-6-methylquinoline-2-carboxylate (3u)**



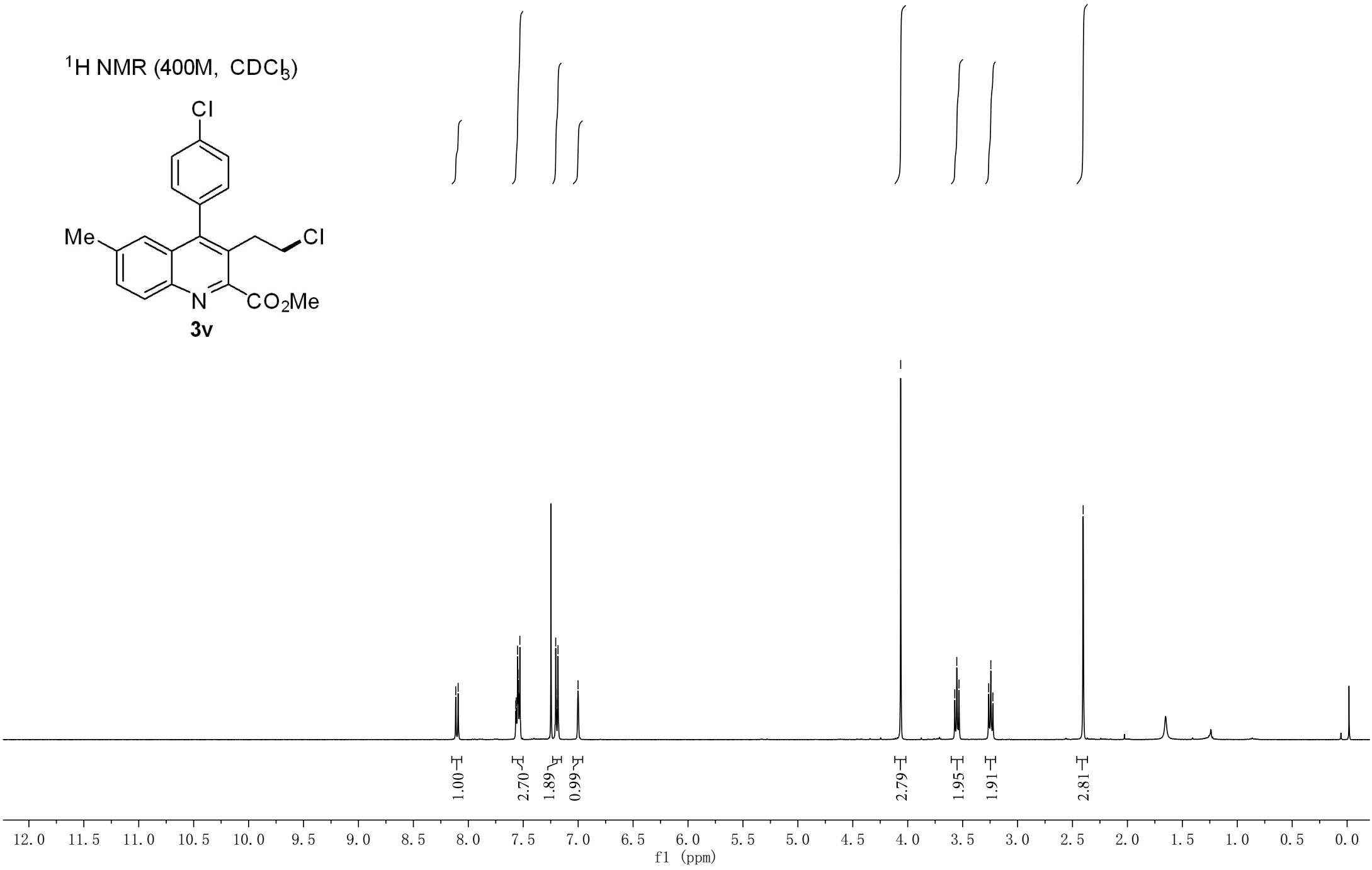
S84

<sup>1</sup>H NMR (400M, CDCl<sub>3</sub>)



8.114  
8.093  
7.568  
7.564  
7.552  
7.547  
7.542  
7.536  
7.531  
7.204  
7.200  
7.188  
7.183  
7.001

4.064  
3.572  
3.553  
3.533  
3.263  
3.243  
3.225  
2.403

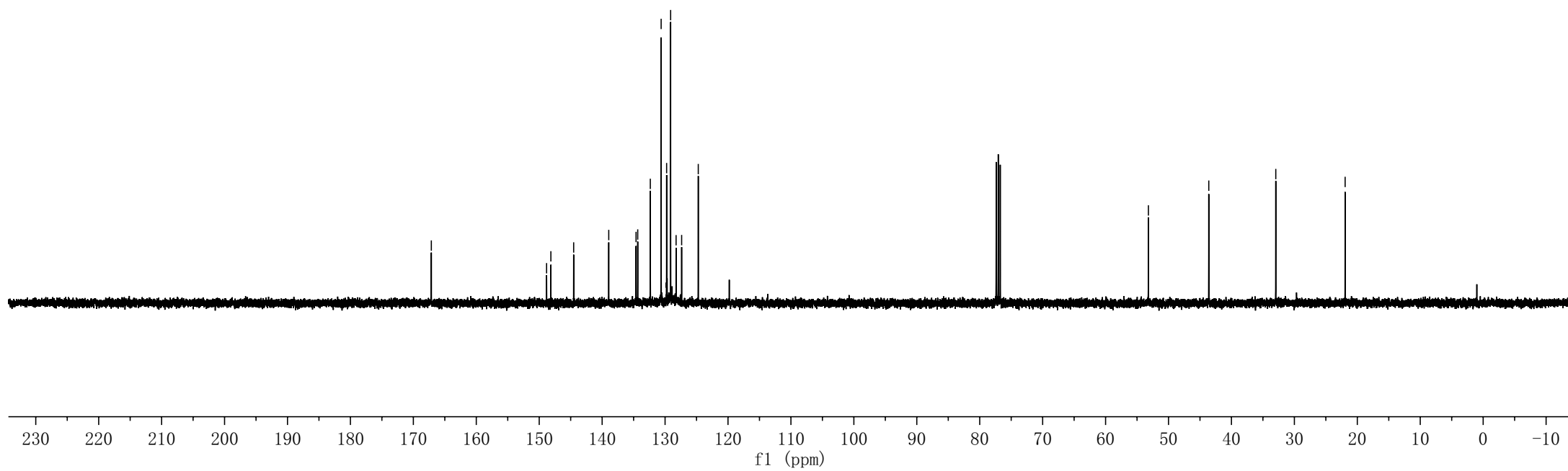
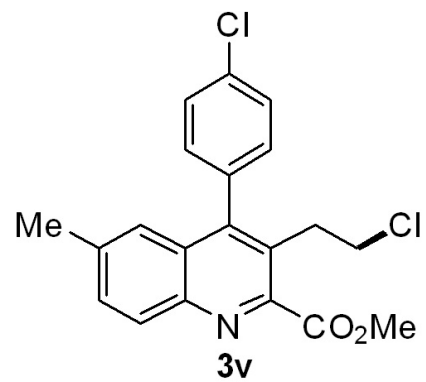


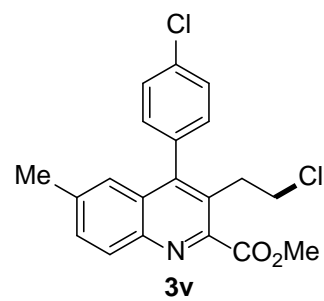
S85

167.143  
148.828  
148.146  
144.525  
138.950  
134.612  
134.345  
132.345  
130.625  
129.753  
129.116  
128.249  
127.366  
124.725

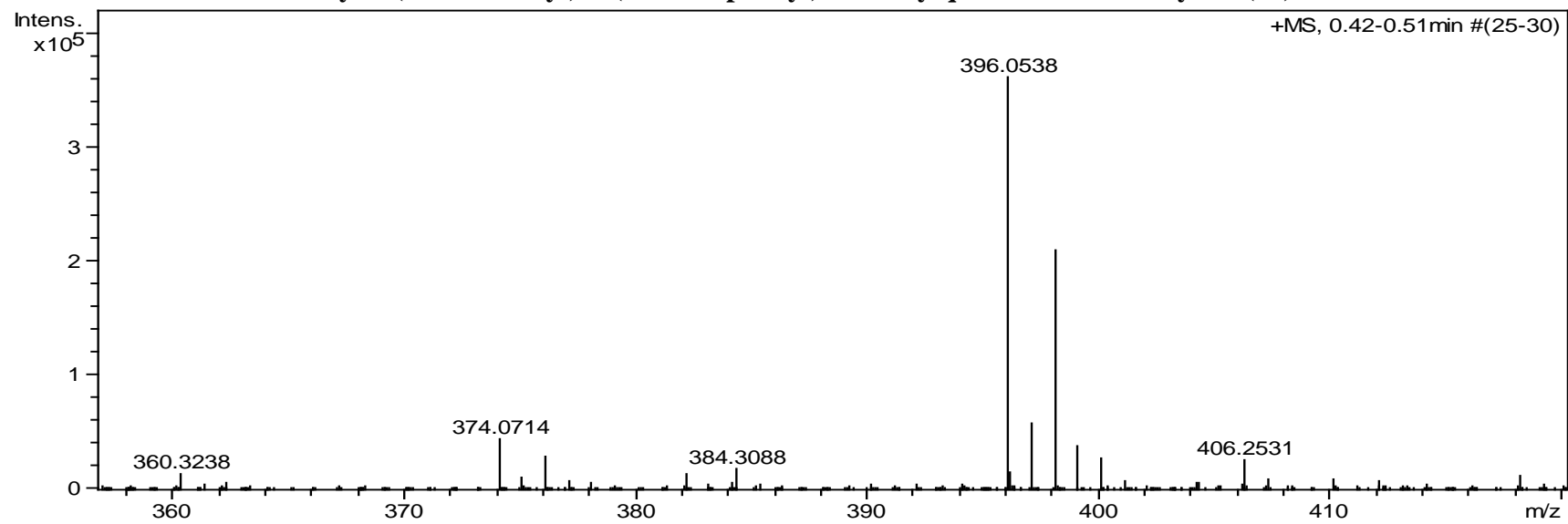
53.193  
43.601  
32.954  
21.934

$^{13}\text{C}$  NMR (100M,  $\text{CDCl}_3$ )



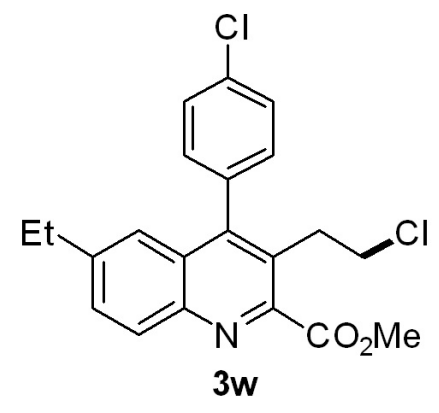


**Methyl 3-(2-chloroethyl)-4-(4-chlorophenyl)-6-methylquinoline-2-carboxylate (3v)**



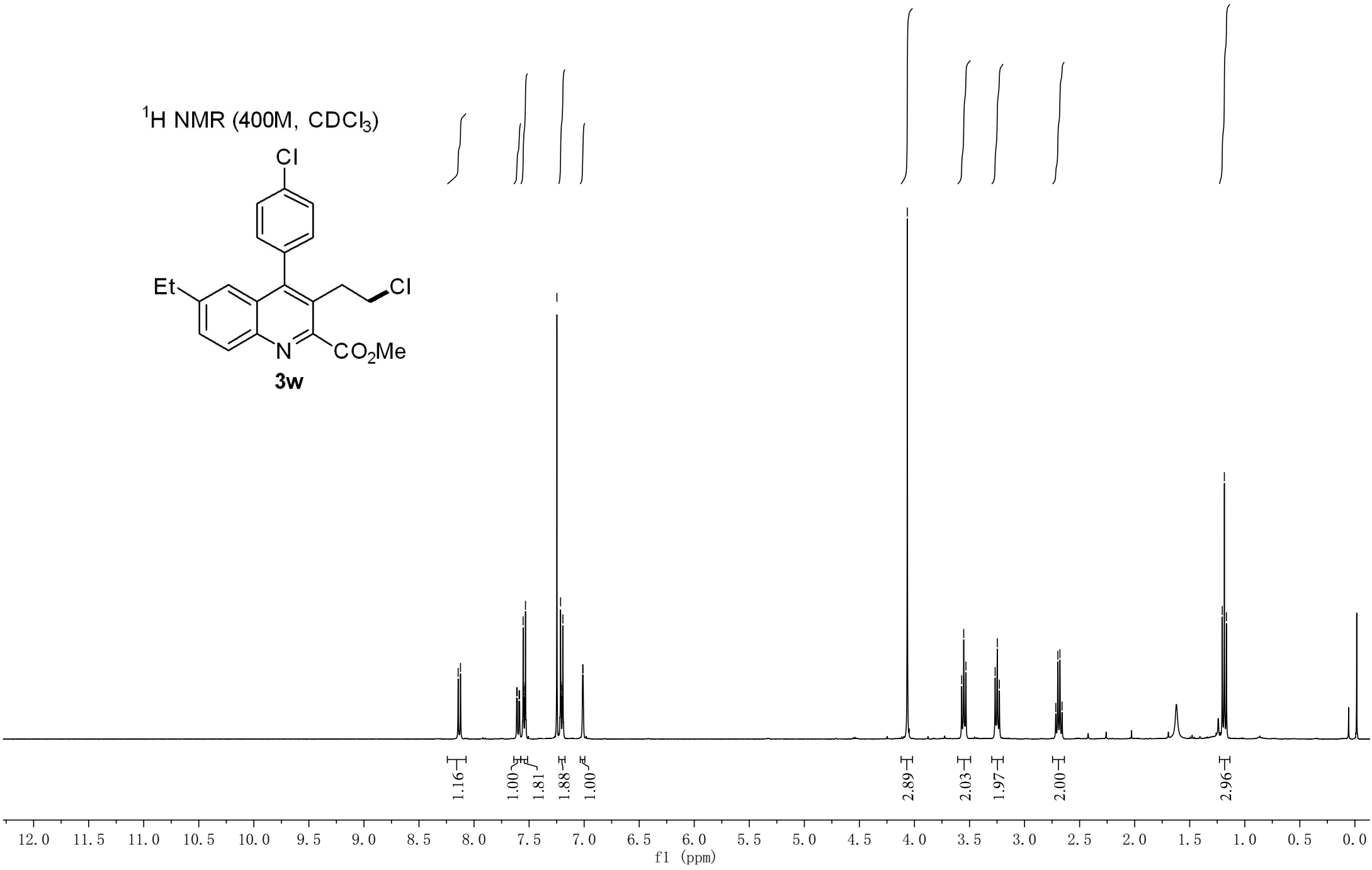
S87

<sup>1</sup>H NMR (400M, CDCl<sub>3</sub>)



8.144  
8.123  
7.613  
7.608  
7.591  
7.586  
7.554  
7.549  
7.538  
7.533  
7.247  
7.214  
7.209  
7.198  
7.193  
7.013  
7.010

4.065  
3.571  
3.553  
3.533  
3.267  
3.247  
3.229  
2.716  
2.697  
2.679  
2.660  
1.204  
1.185  
1.166



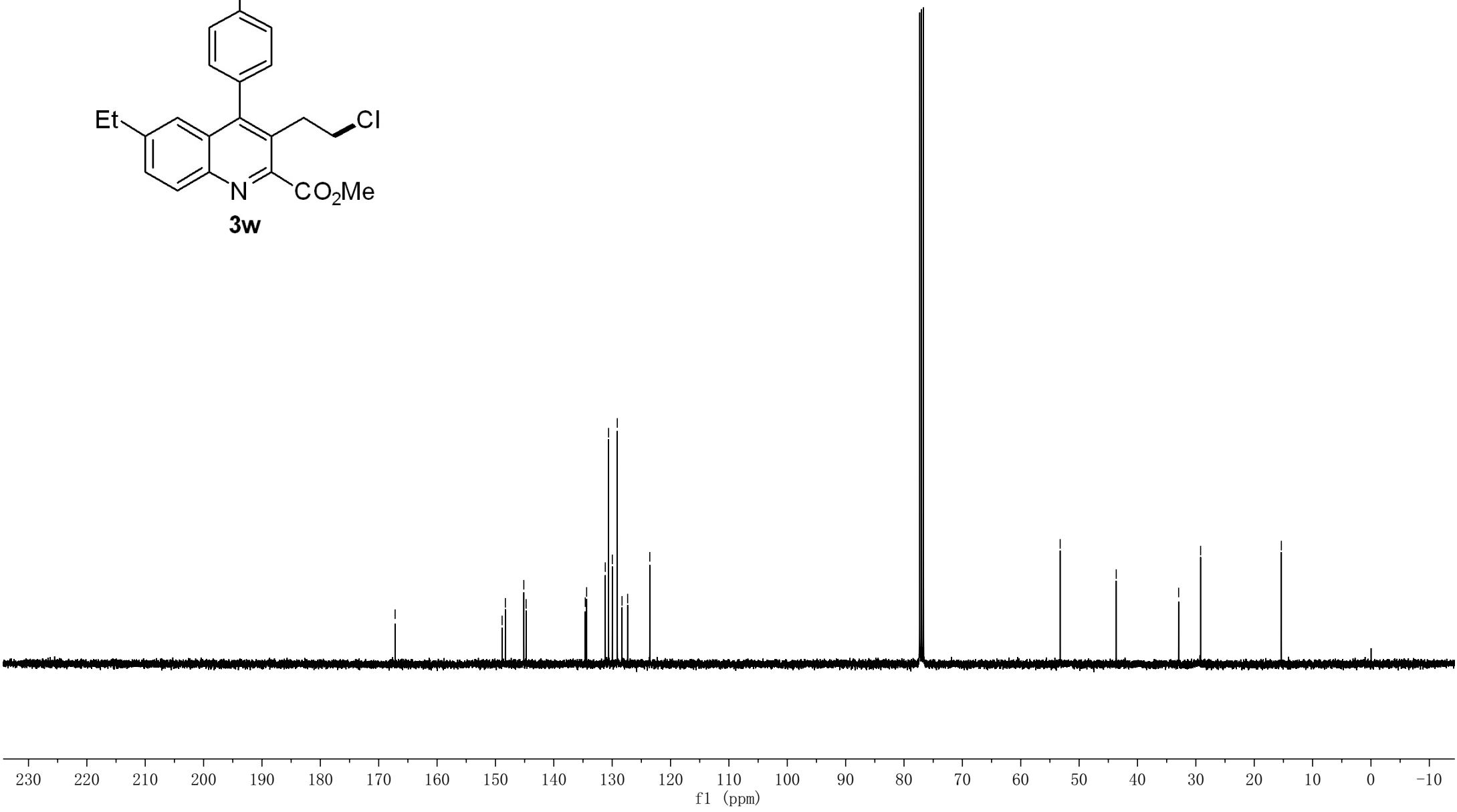
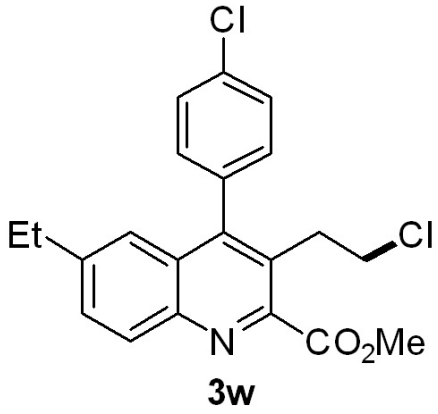
S88

167.187  
148.857  
148.300  
145.138  
144.744  
134.609  
134.376  
131.183  
130.618  
129.974  
129.124  
128.311  
127.351  
123.555

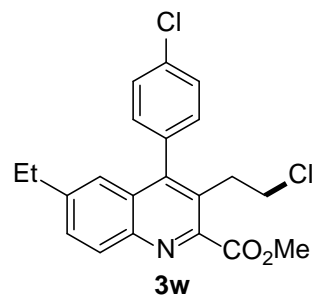
53.246  
43.640  
32.948  
29.185

15.351

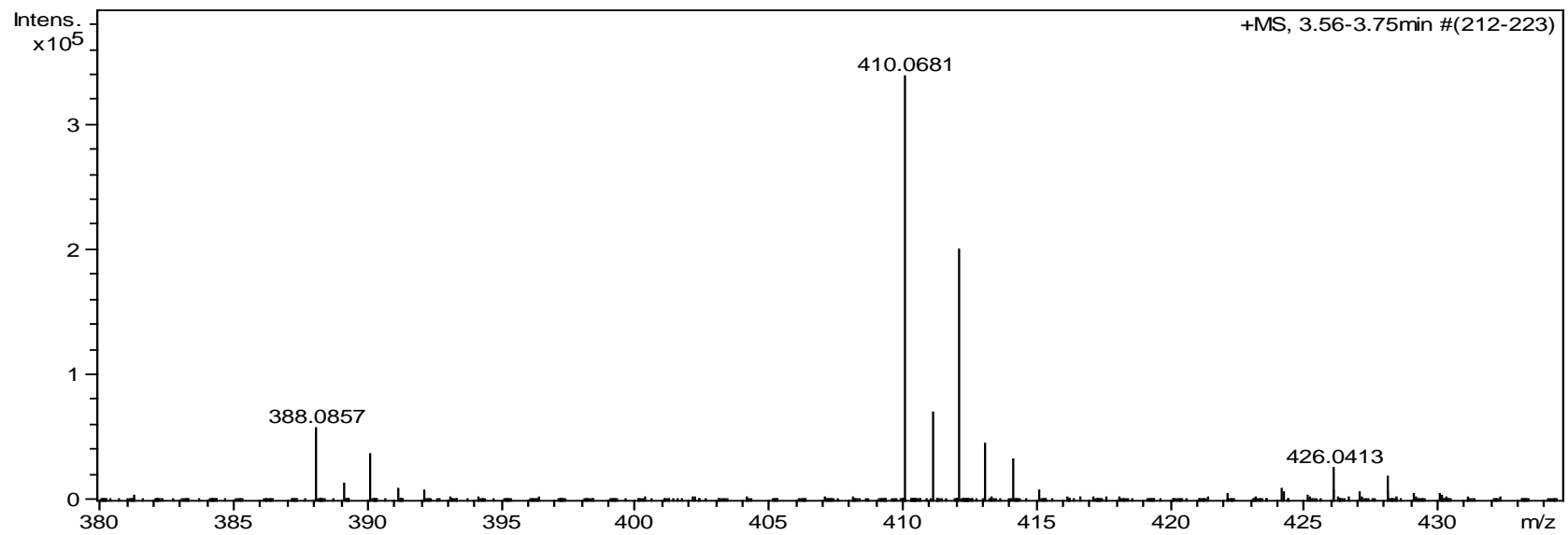
<sup>13</sup>C NMR (400M, CDCl<sub>3</sub>)





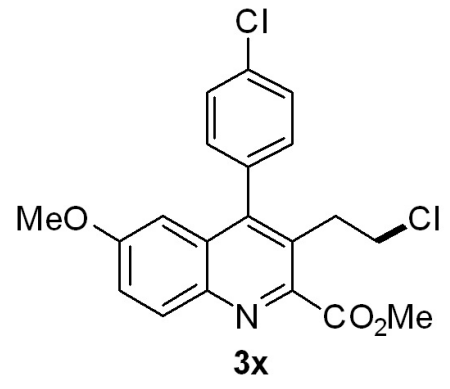


**Methyl 3-(2-chloroethyl)-4-(4-chlorophenyl)-6-ethylquinoline-2-carboxylate (3w)**

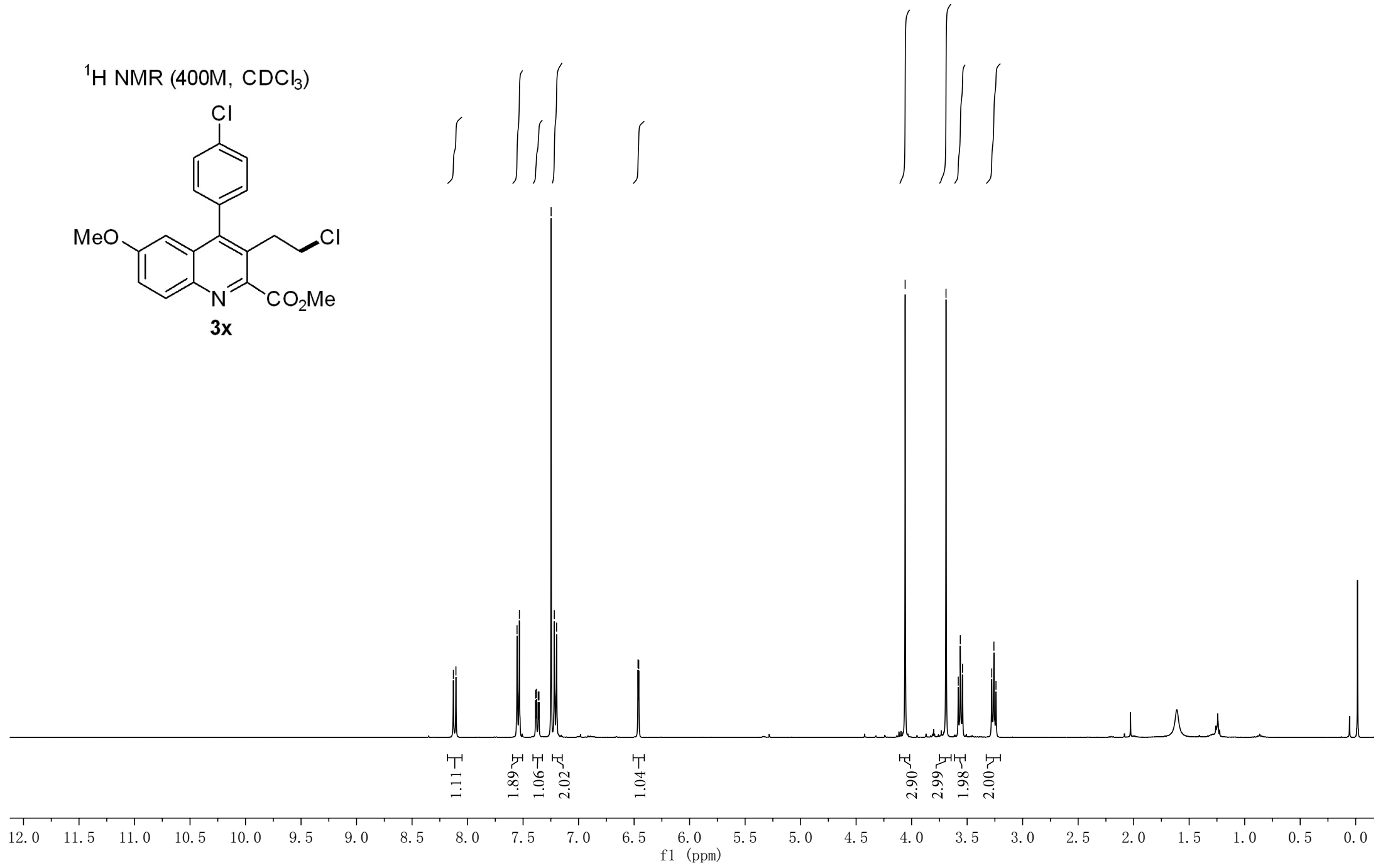


S90

<sup>1</sup>H NMR (400M, CDCl<sub>3</sub>)



8.128  
8.105  
7.533  
7.247  
7.219  
7.198  
6.465  
6.458  
4.058  
3.690  
3.580  
3.562  
3.542  
3.279  
3.259  
3.240

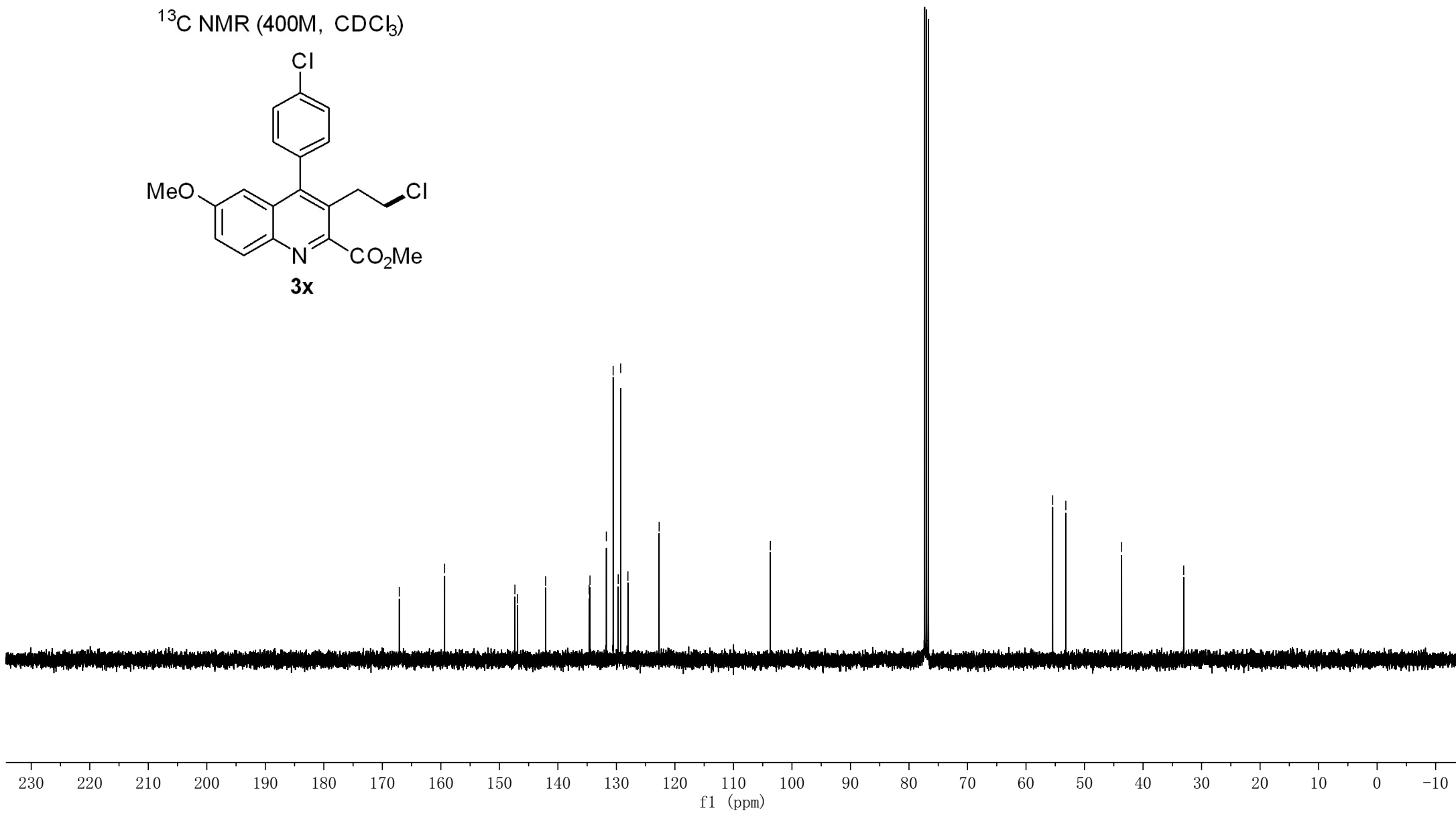
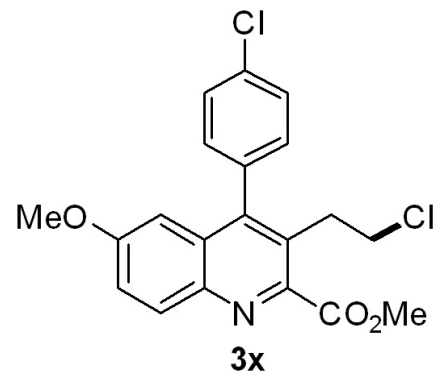


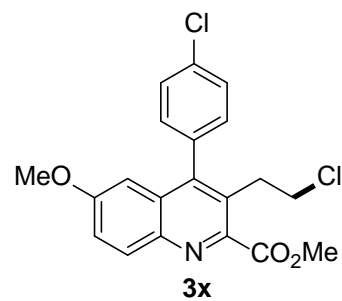
S91

—167.106  
—159.356  
/147.348  
/142.091  
/134.515  
/131.721  
/130.558  
/129.693  
/129.266  
/128.034  
/122.698  
—103.695

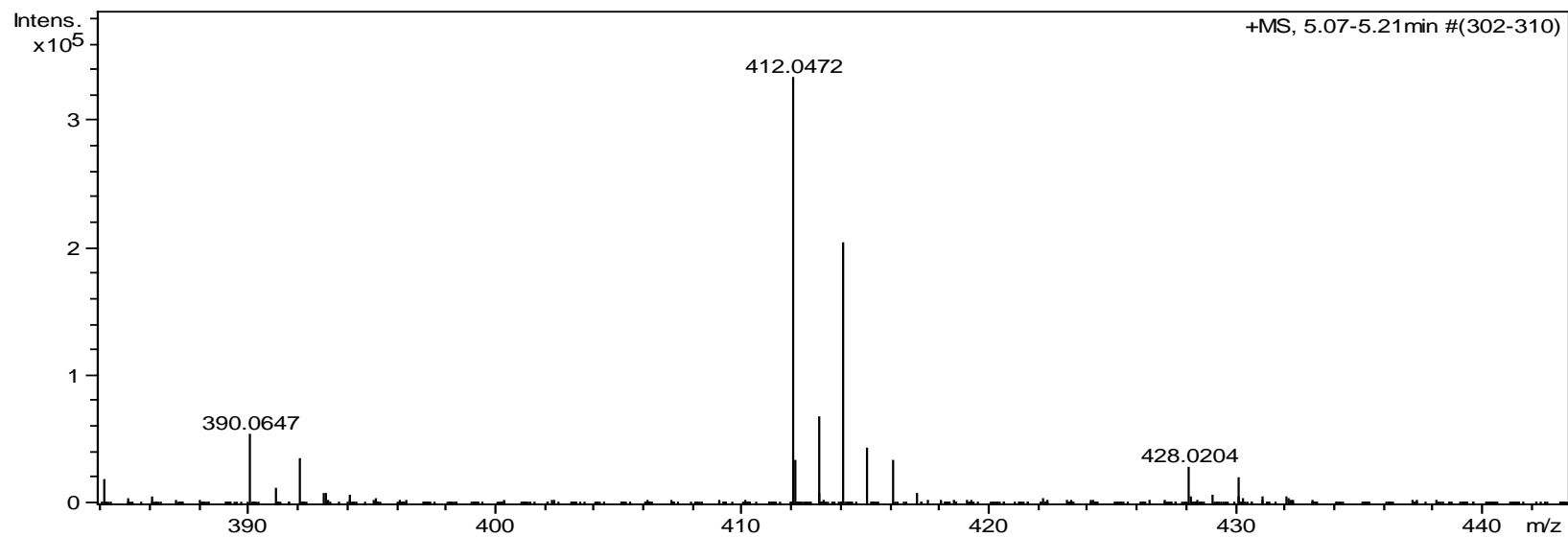
55.444  
53.197  
43.659  
33.048

<sup>13</sup>C NMR (400M, CDCl<sub>3</sub>)



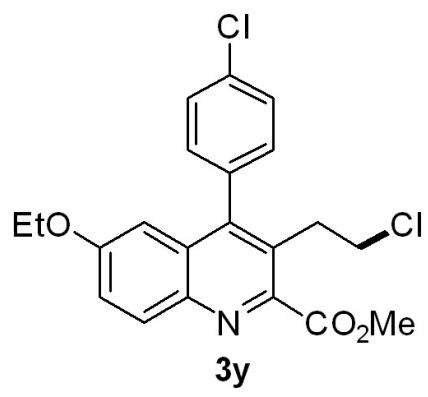


**Methyl 3-(2-chloroethyl)-4-(4-chlorophenyl)-6-methoxyquinoline-2-carboxylate (3x)**

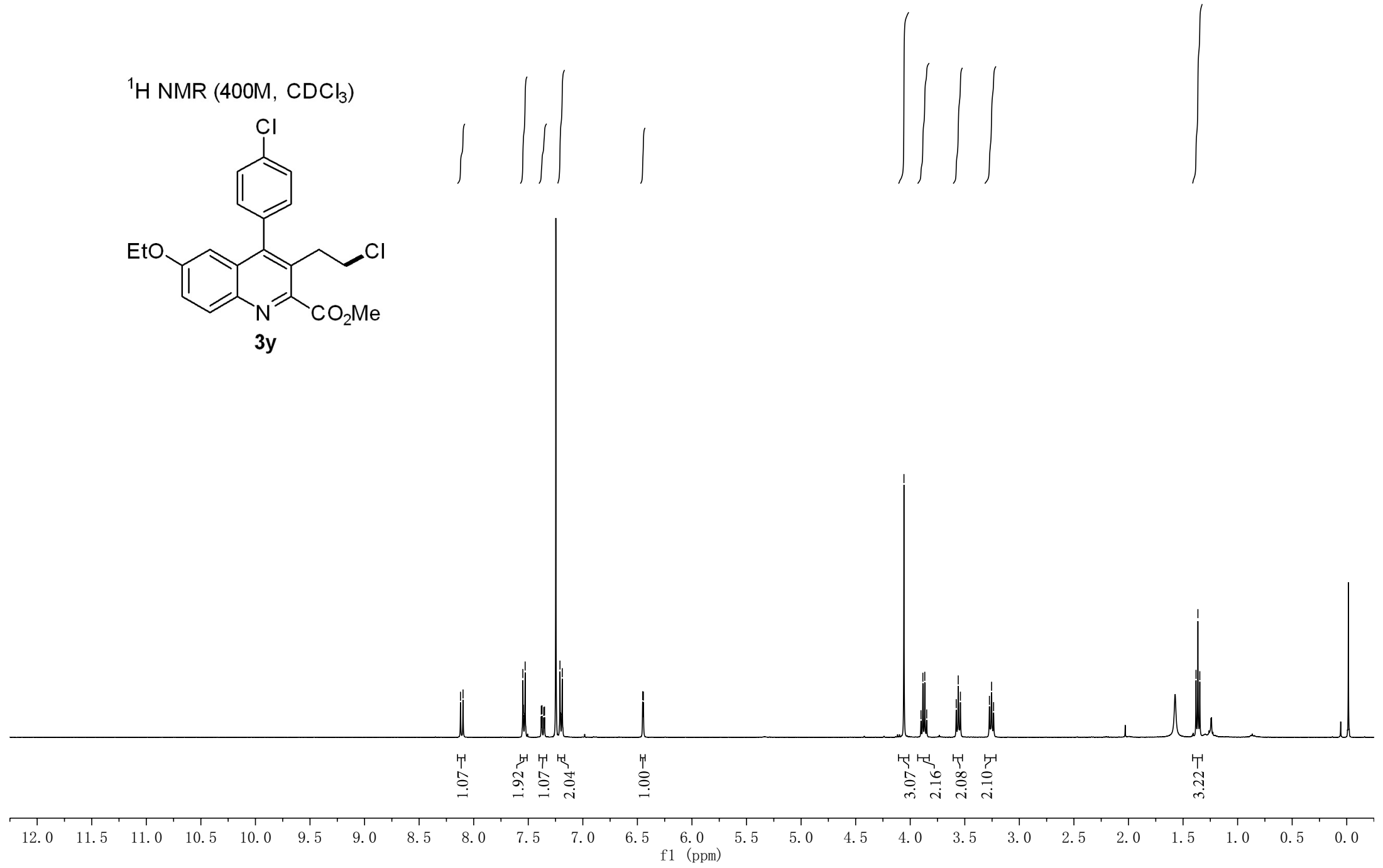


S93

<sup>1</sup>H NMR (400M, CDCl<sub>3</sub>)



8.121 8.098 7.550 7.529 7.210 7.188 6.452 6.445 4.057 3.901 3.884 3.867 3.849 3.578 3.560 3.540 3.274 3.254 3.236 1.381 1.364 1.346



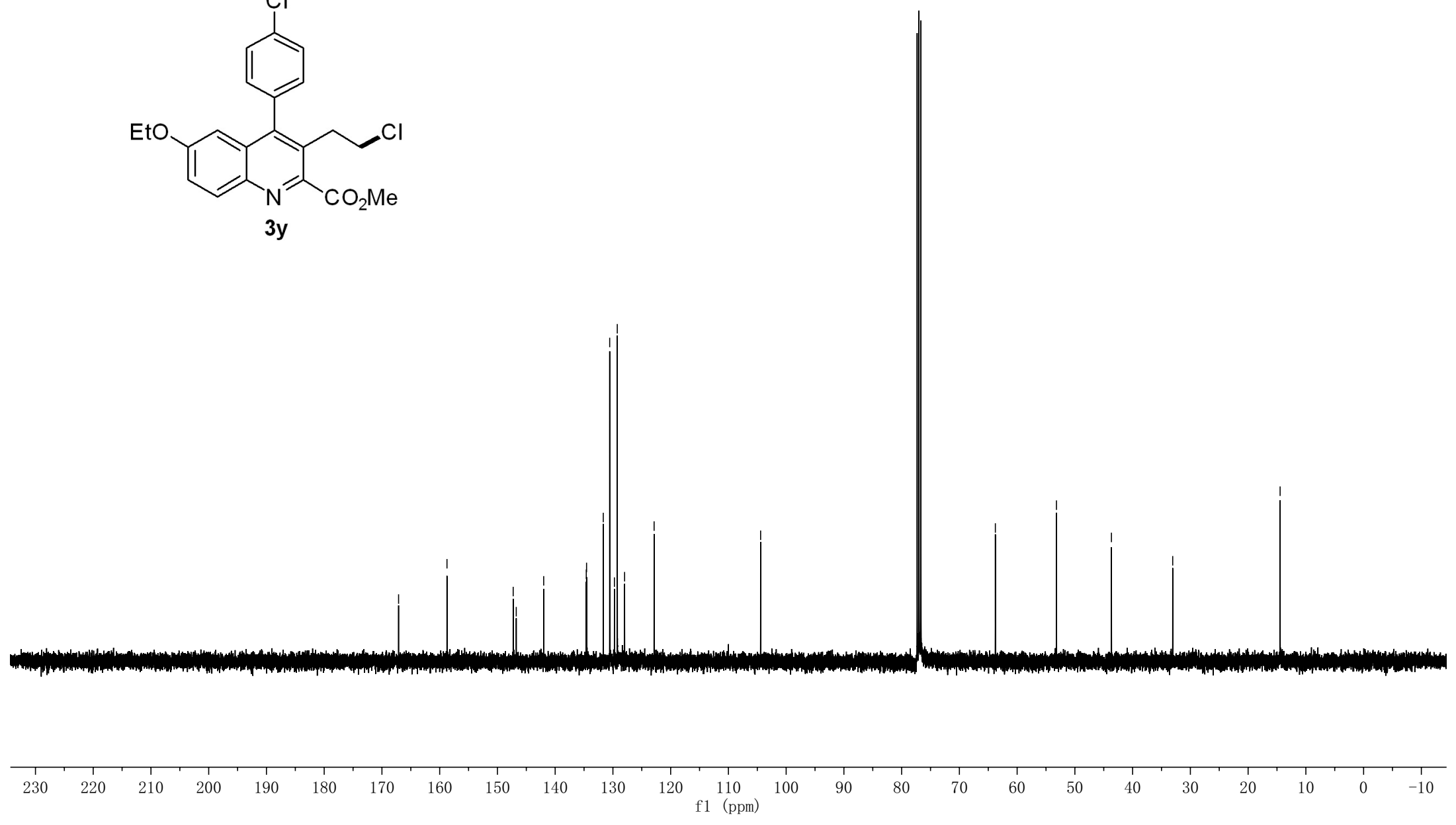
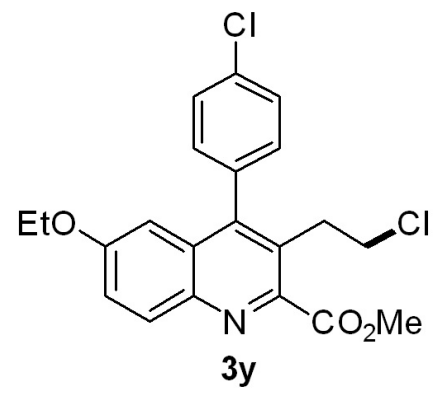
S94

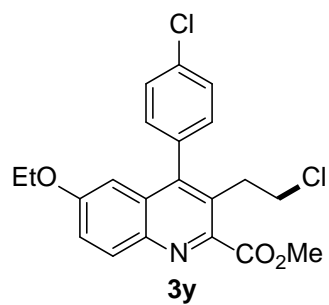
—167.117  
—158.735  
141.986  
134.614  
134.563  
131.670  
130.558  
129.737  
129.244  
127.976  
122.866  
104.421

63.770  
53.189  
43.669  
33.057

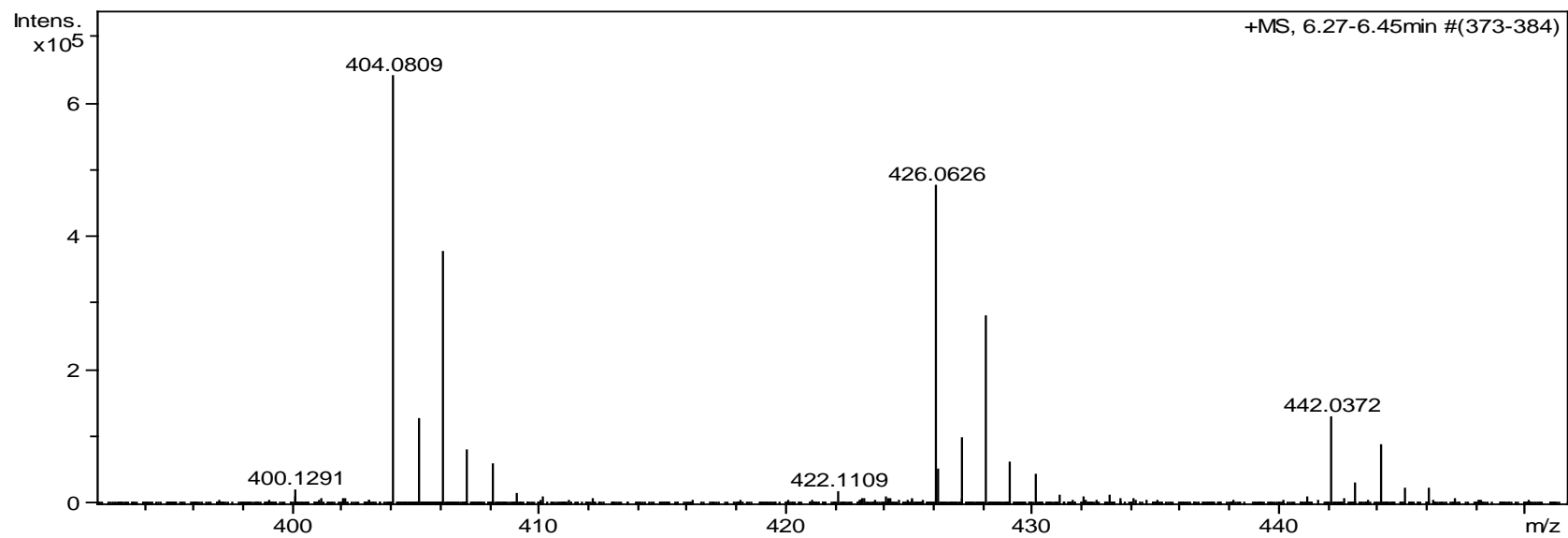
—14.459

<sup>13</sup>C NMR (400M, CDCl<sub>3</sub>)





**Methyl 3-(2-chloroethyl)-4-(4-chlorophenyl)-6-ethoxyquinoline-2-carboxylate (3y)**

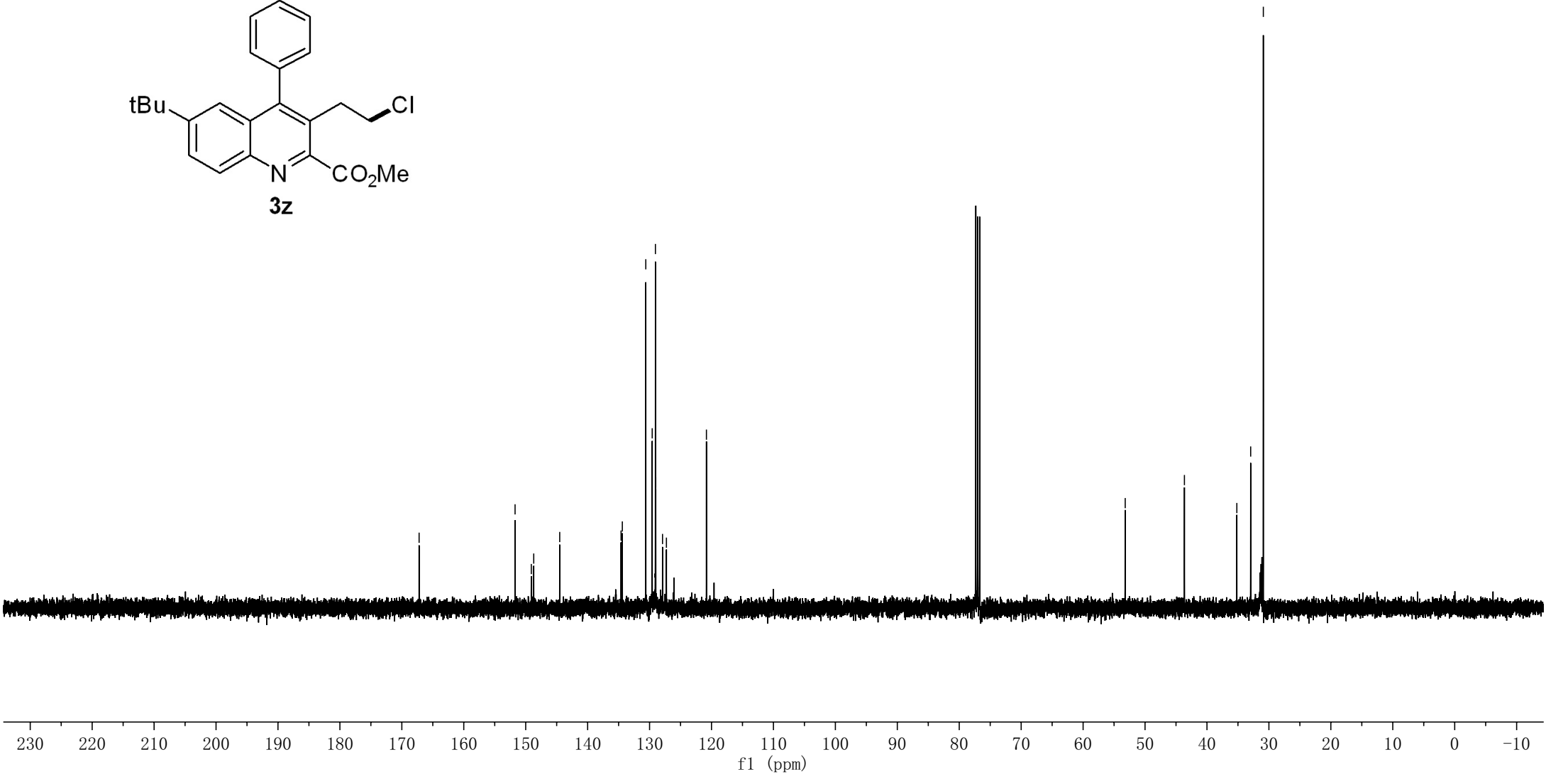
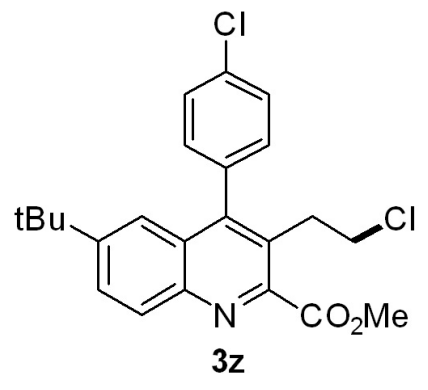


S96

167.211  
151.717  
149.095  
148.703  
144.508  
134.603  
134.398  
130.609  
129.575  
129.056  
129.001  
127.908  
127.279  
120.819

53.200  
43.642  
35.177  
32.944  
30.899

<sup>13</sup>C NMR (400M, CDCl<sub>3</sub>)





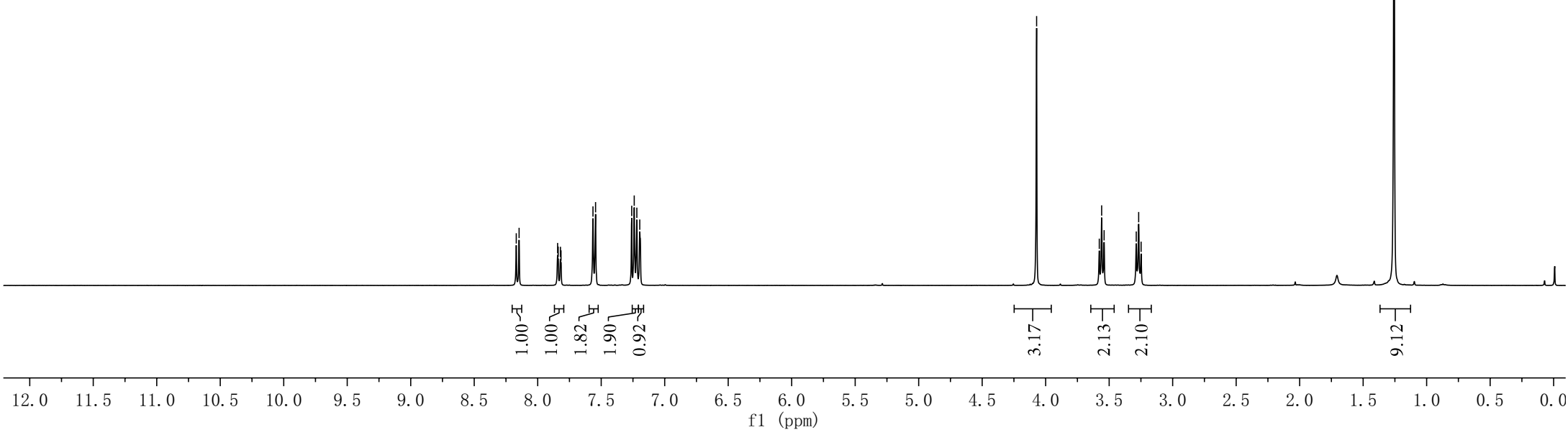
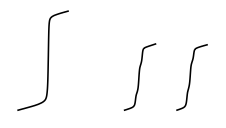
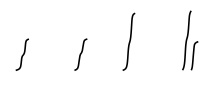
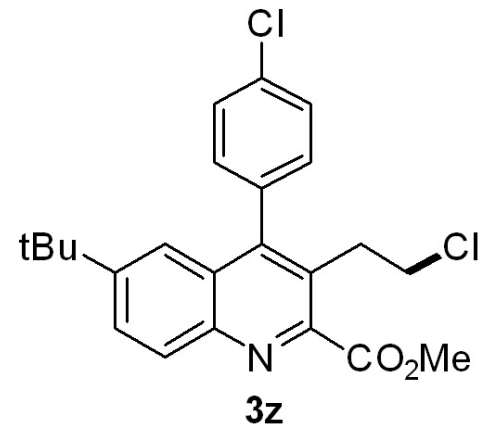
S97

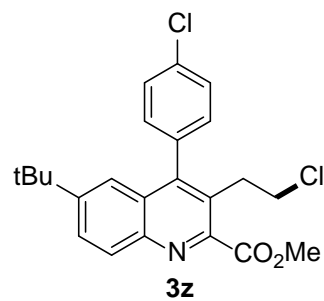
8.169  
8.147  
7.843  
7.839  
7.821  
7.816  
7.565  
7.544  
7.260  
7.240  
7.219  
7.196

4.071  
3.578  
3.559  
3.540  
3.287  
3.268  
3.249

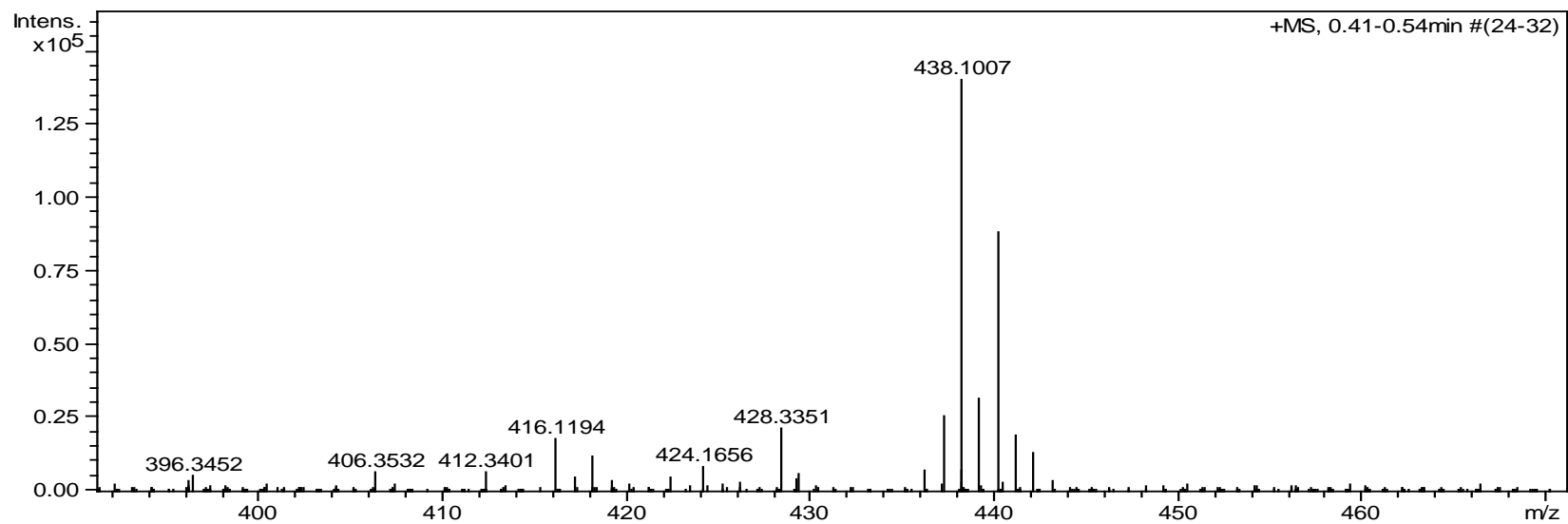
1.256

<sup>1</sup>H NMR (400M, CDCl<sub>3</sub>)

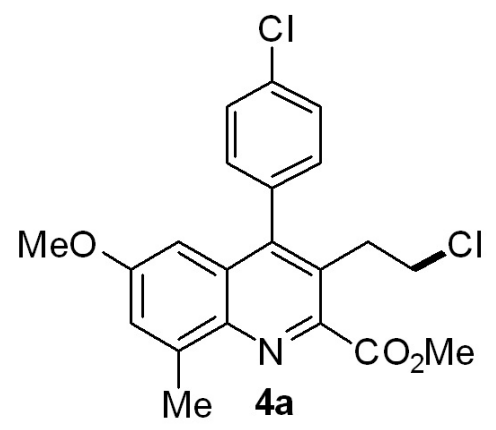




**Methyl 6-(tert-butyl)-3-(2-chloroethyl)-4-(4-chlorophenyl)quinoline-2-carboxylate (3z)**

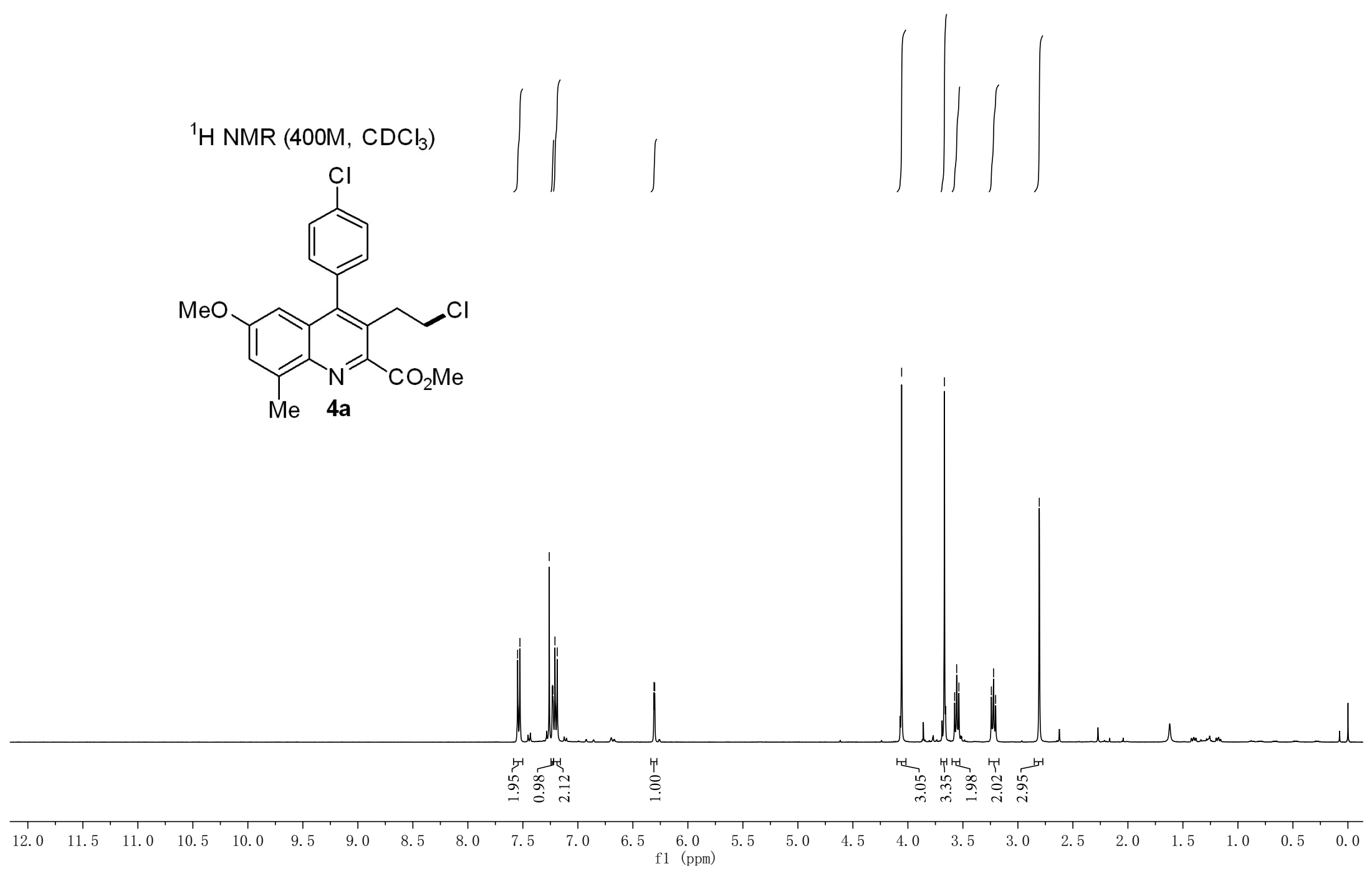


<sup>1</sup>H NMR (400M, CDCl<sub>3</sub>)



7.548  
7.527  
7.260  
7.233  
7.231  
7.226  
7.208  
7.187  
6.308  
6.301

4.057  
3.668  
3.575  
3.557  
3.536  
3.241  
3.221  
3.202  
2.806

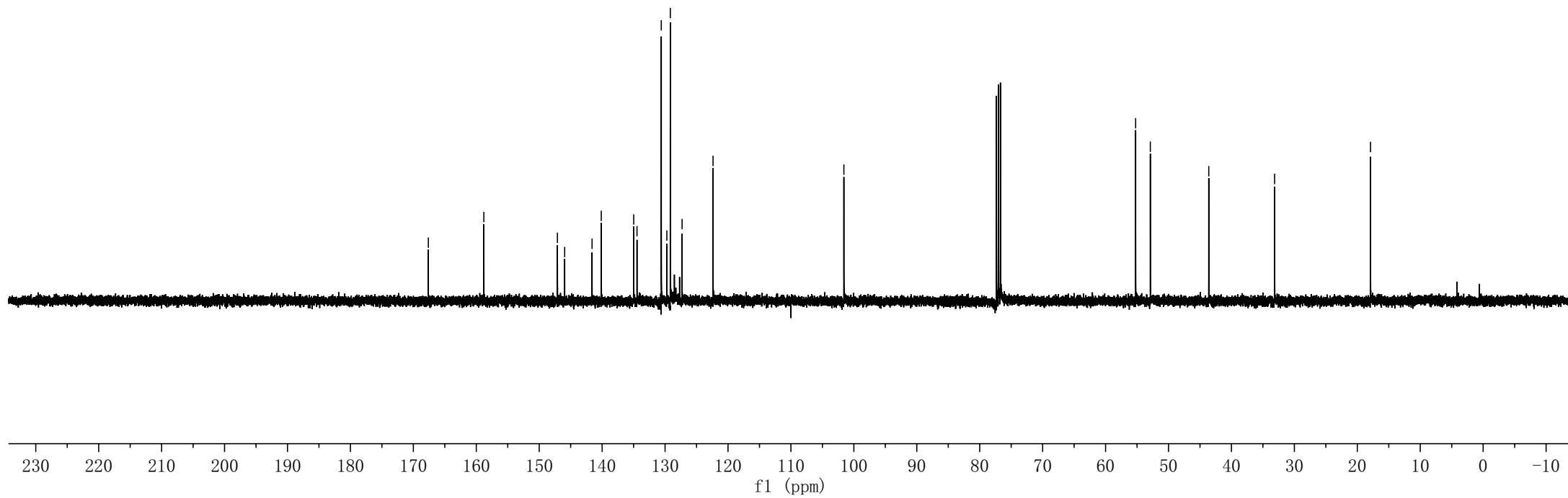
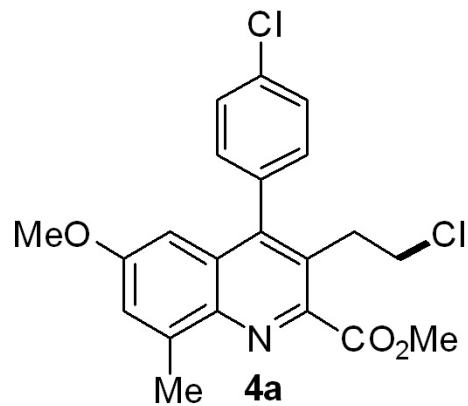


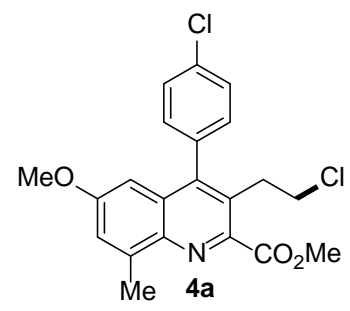
S100

—167.618  
—158.797  
—147.108  
—140.137  
—134.983  
—134.461  
—130.604  
—129.716  
—129.166  
—127.299  
—122.379  
—101.585

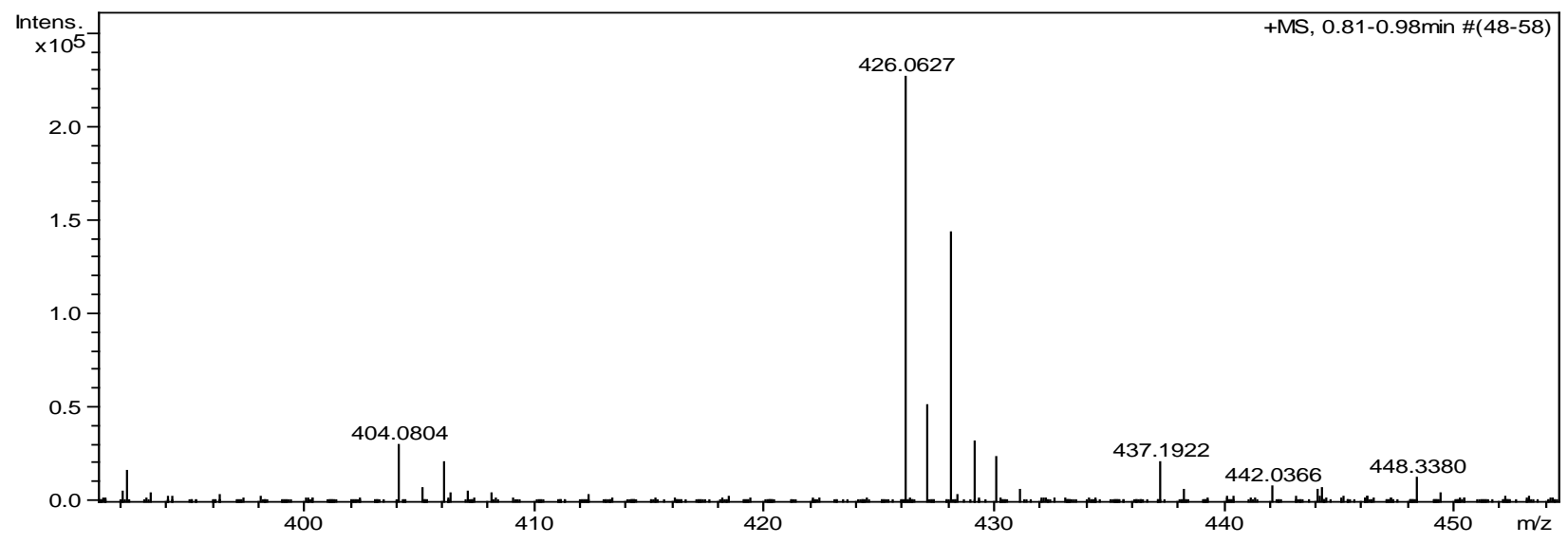
—55.223  
—52.889  
—43.603  
—33.142  
—17.901

$^{13}\text{C}$  NMR (400M,  $\text{CDCl}_3$ )



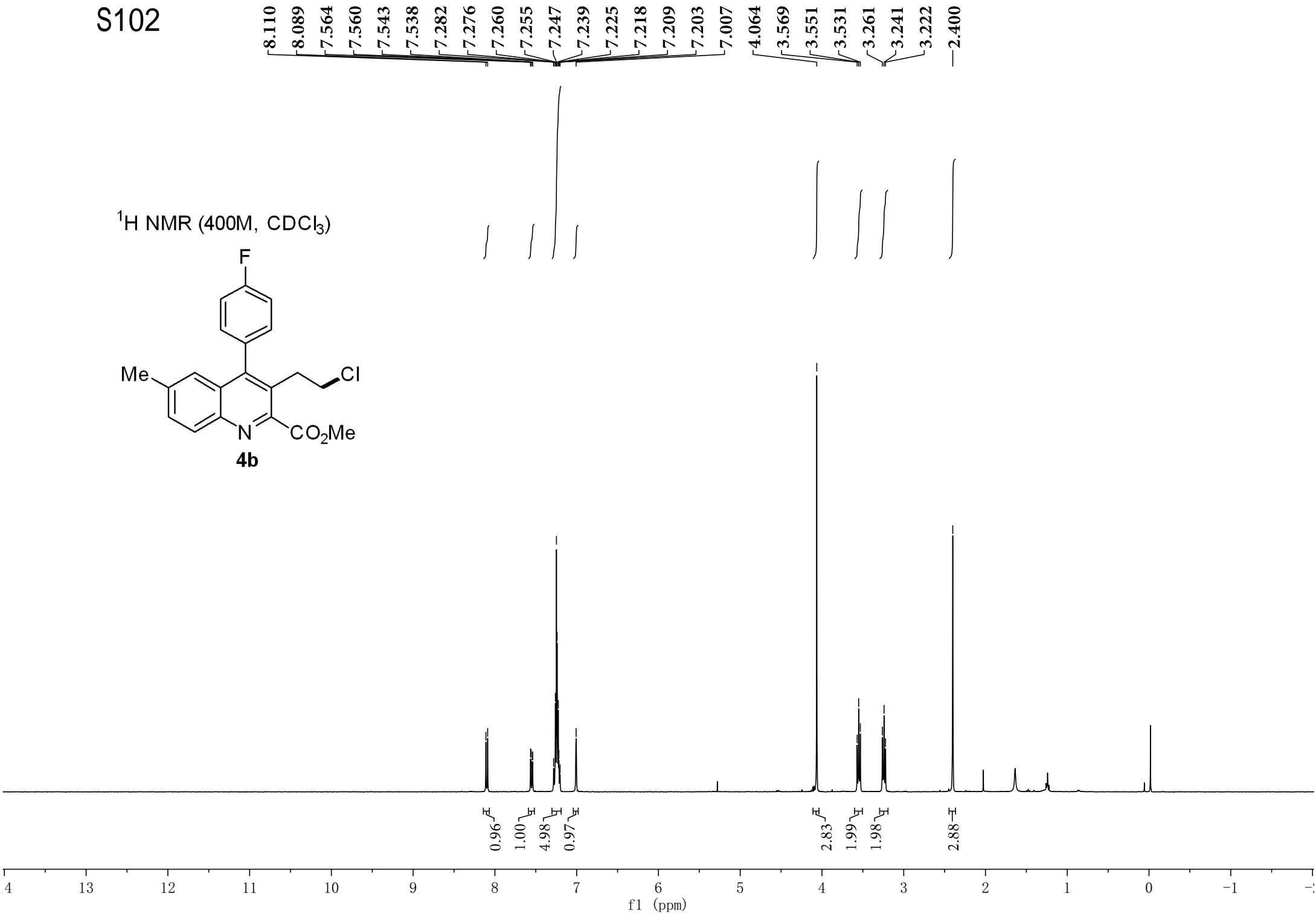
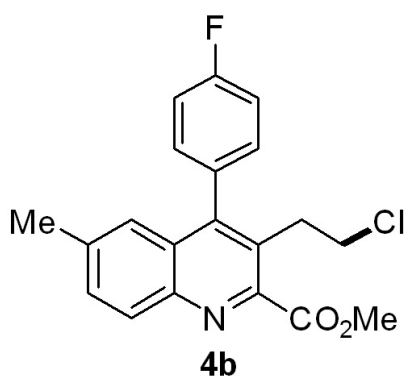


**Methyl 3-(2-chloroethyl)-4-(4-chlorophenyl)-6-methoxy-8-methylquinoline-2-carboxylate (4a)**



S102

<sup>1</sup>H NMR (400M, CDCl<sub>3</sub>)

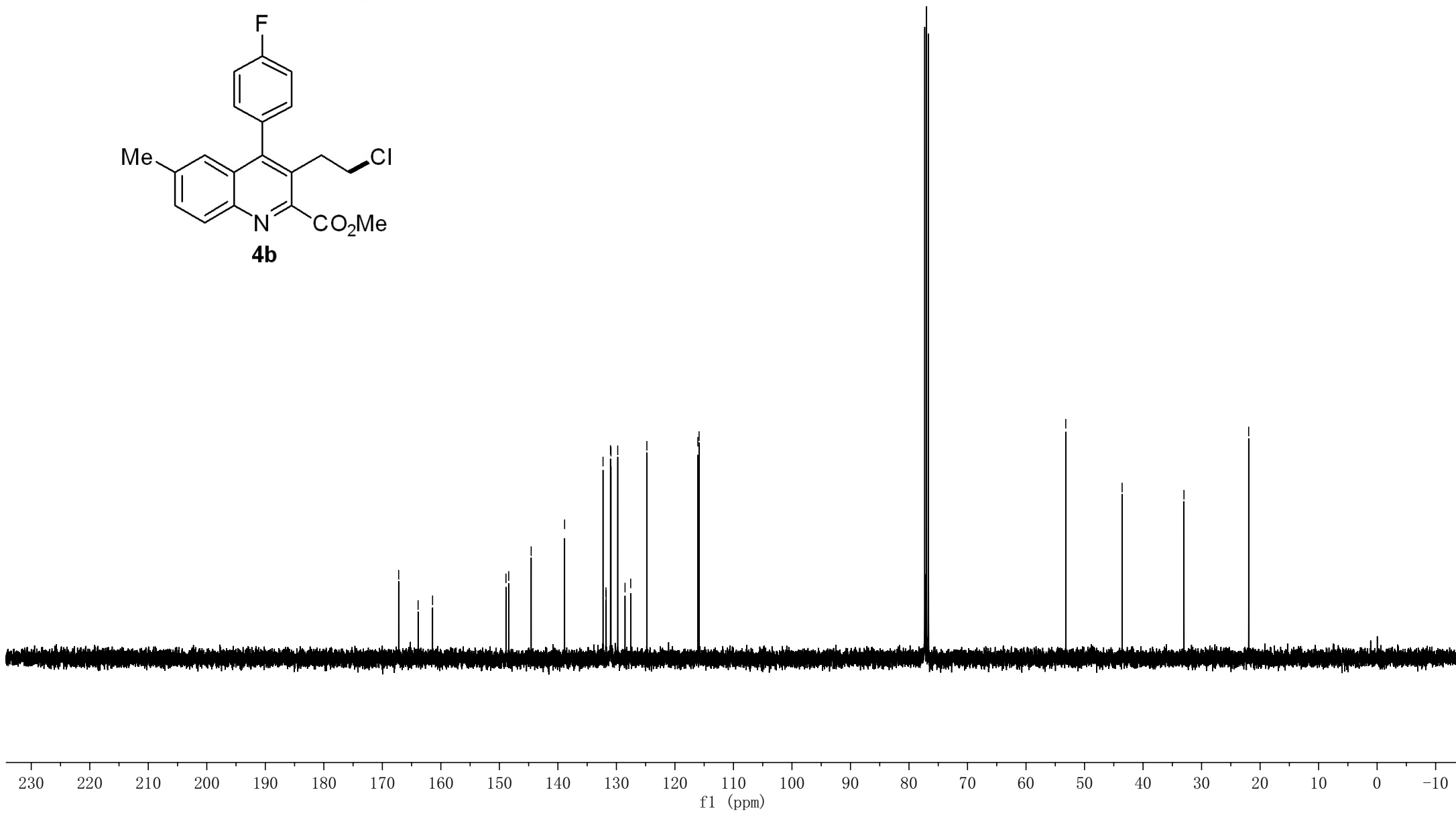
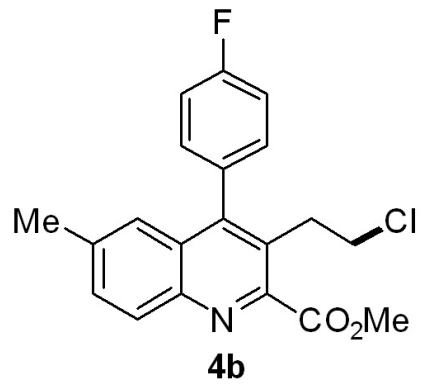


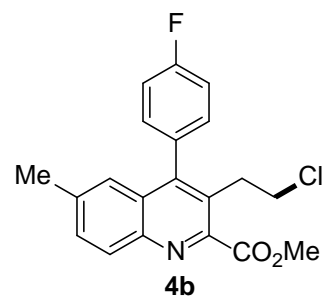
S103

167.208  
163.887  
161.417  
148.872  
148.407  
144.566  
138.852  
132.285  
131.784  
131.748  
131.012  
130.932  
129.772  
128.526  
127.558  
124.793  
116.089  
115.874

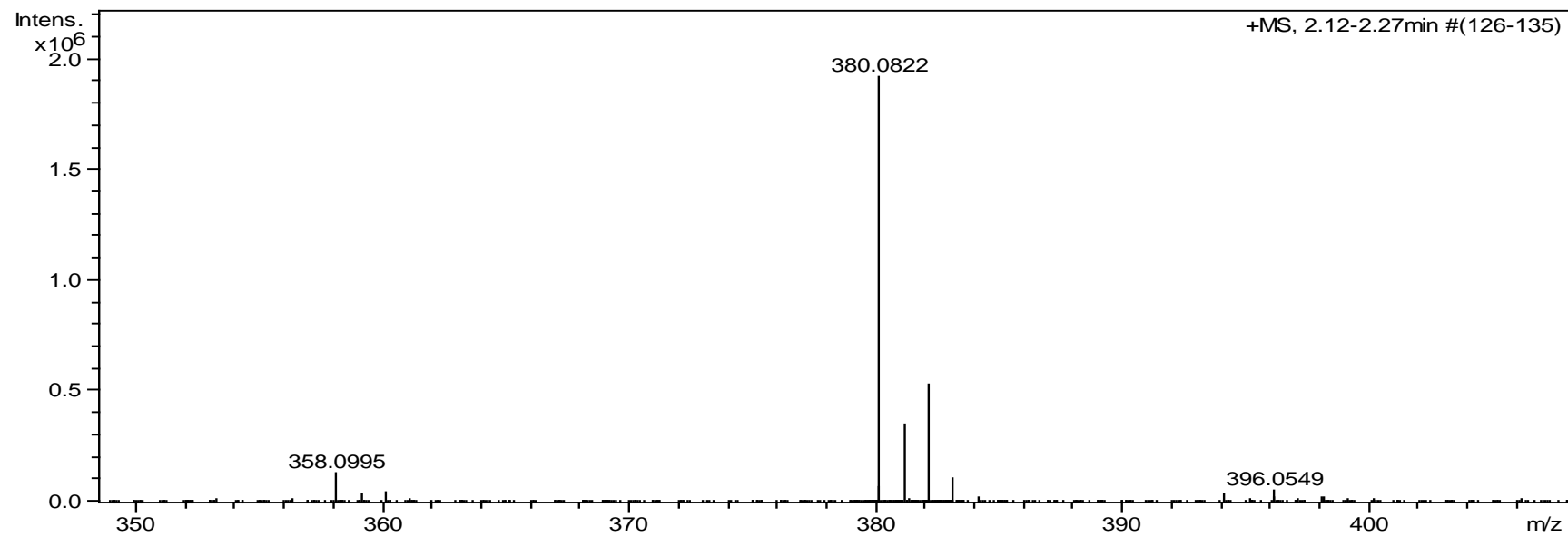
53.205  
43.576  
33.007  
21.947

<sup>13</sup>C NMR (400M, CDCl<sub>3</sub>)





**Methyl 3-(2-chloroethyl)-4-(4-fluorophenyl)-6-methylquinoline-2-carboxylate (4b)**





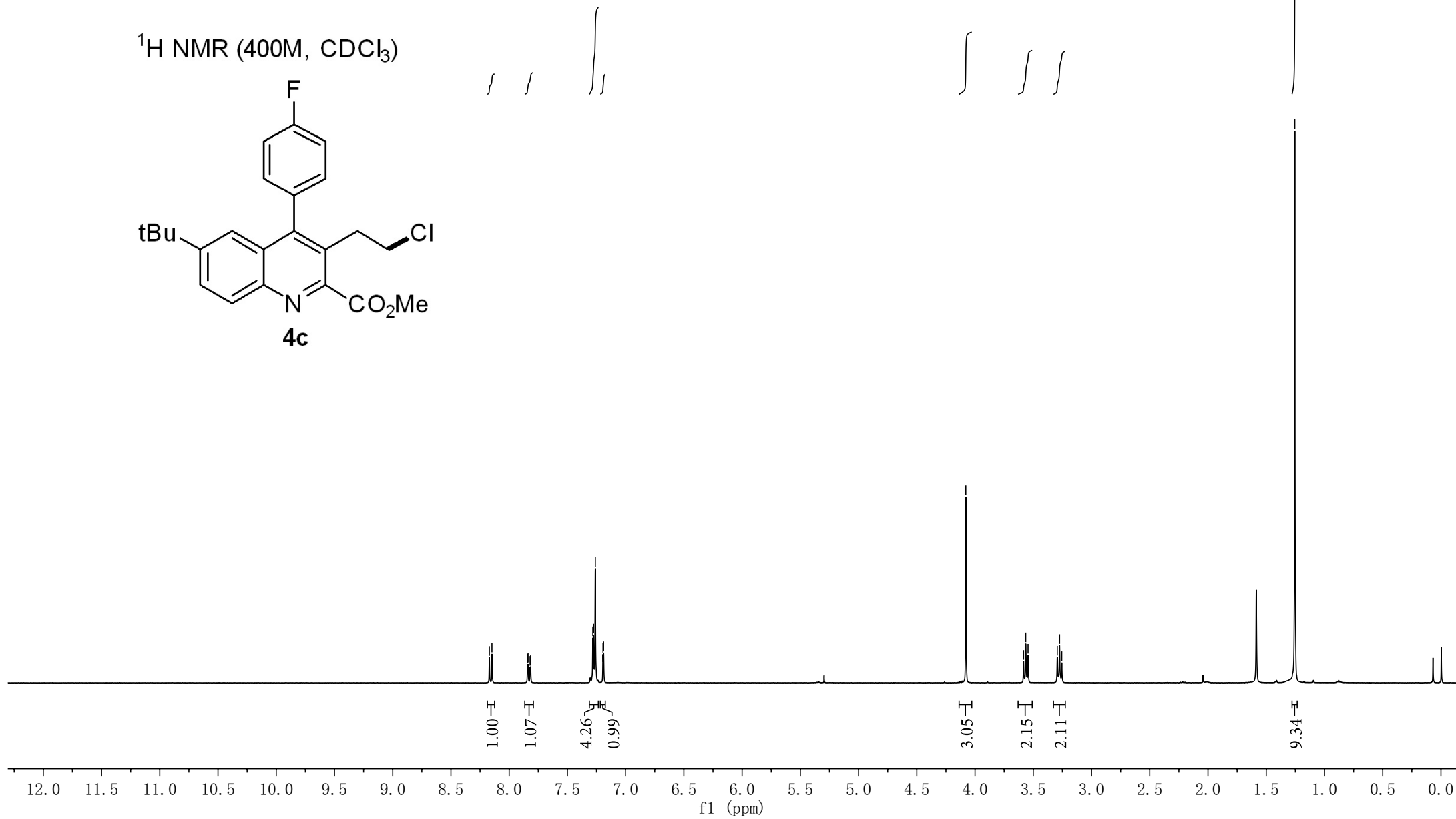
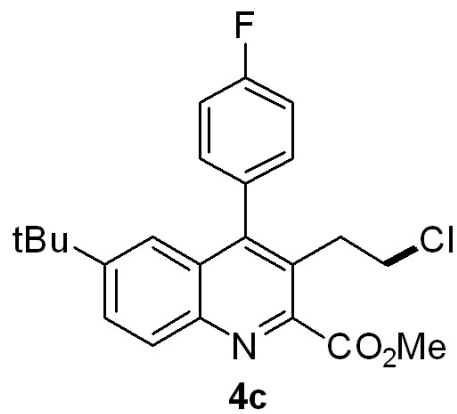
S105

8.170  
8.148  
7.843  
7.838  
7.820  
7.815  
7.282  
7.275  
7.260  
7.194  
7.189

4.079  
3.583  
3.565  
3.545  
3.294  
3.274  
3.255

1.255

<sup>1</sup>H NMR (400M, CDCl<sub>3</sub>)

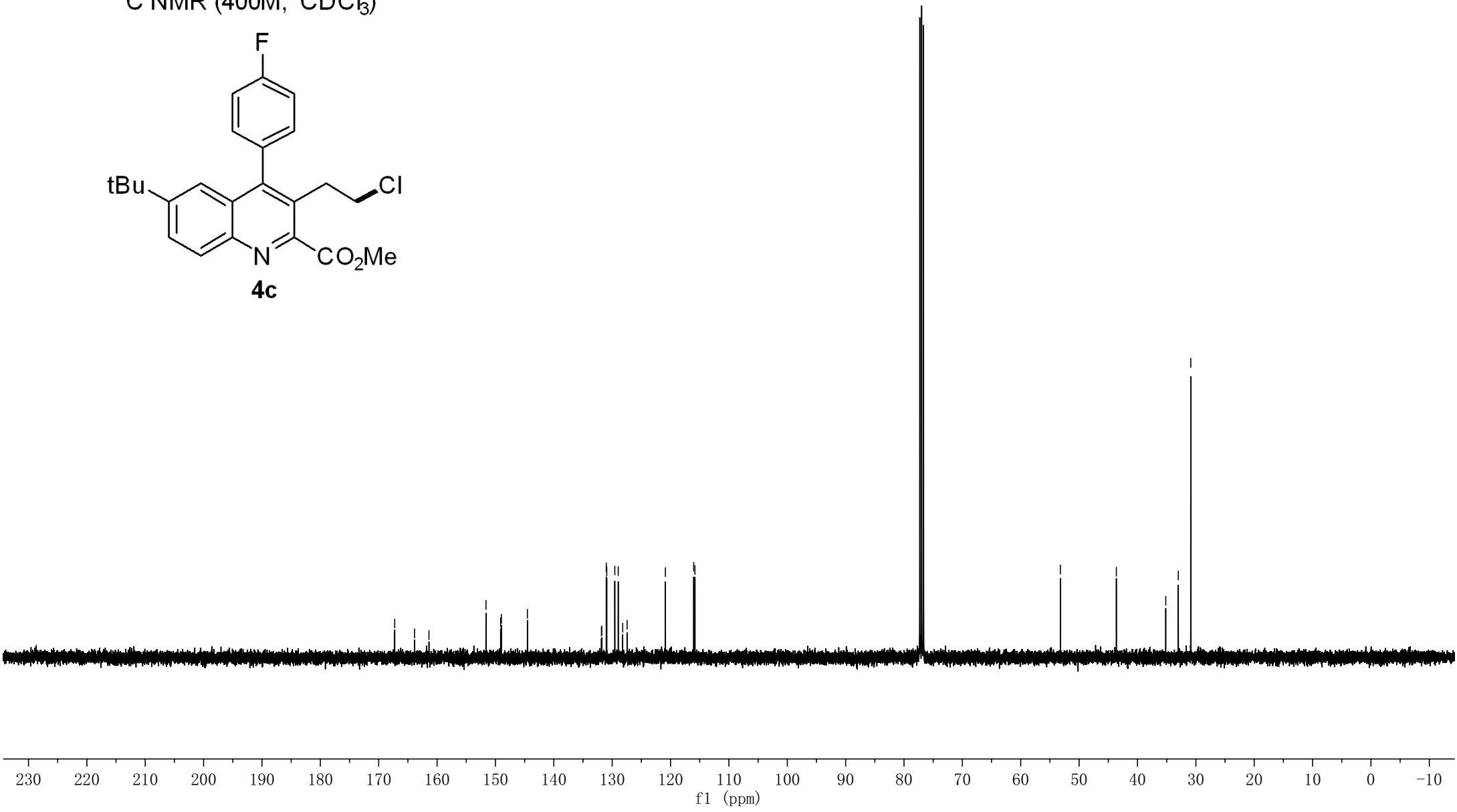
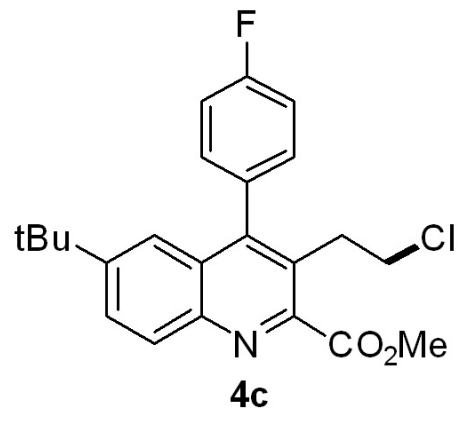


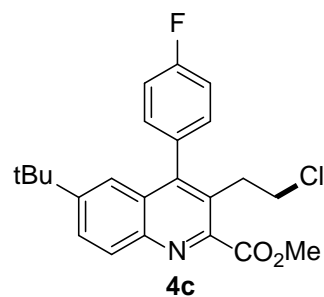
S106

167.257  
163.857  
161.386  
151.616  
149.109  
148.979  
144.524  
131.836  
131.800  
131.011  
130.930  
129.550  
128.962  
128.199  
127.440  
120.882  
116.031  
115.816

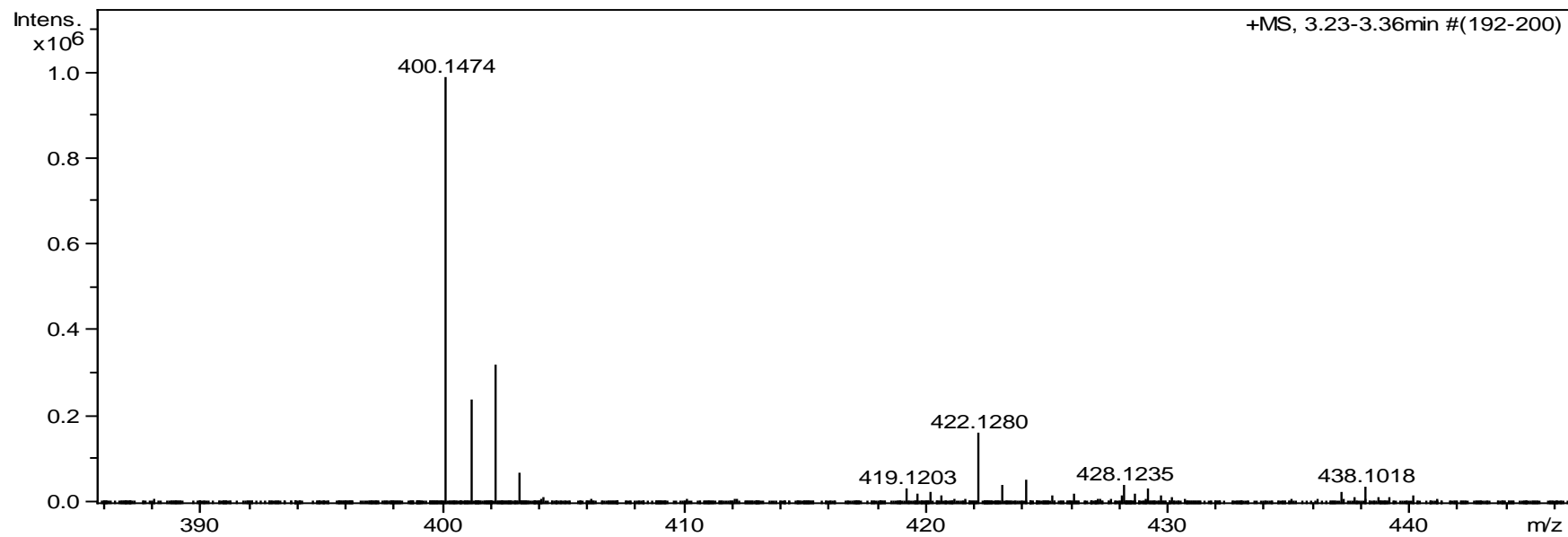
53.210  
43.621  
35.158  
33.005  
30.871

<sup>13</sup>C NMR (400M, CDCl<sub>3</sub>)





**Methyl 6-(tert-butyl)-3-(2-chloroethyl)-4-(4-fluorophenyl)quinoline-2-carboxylate (4c)**

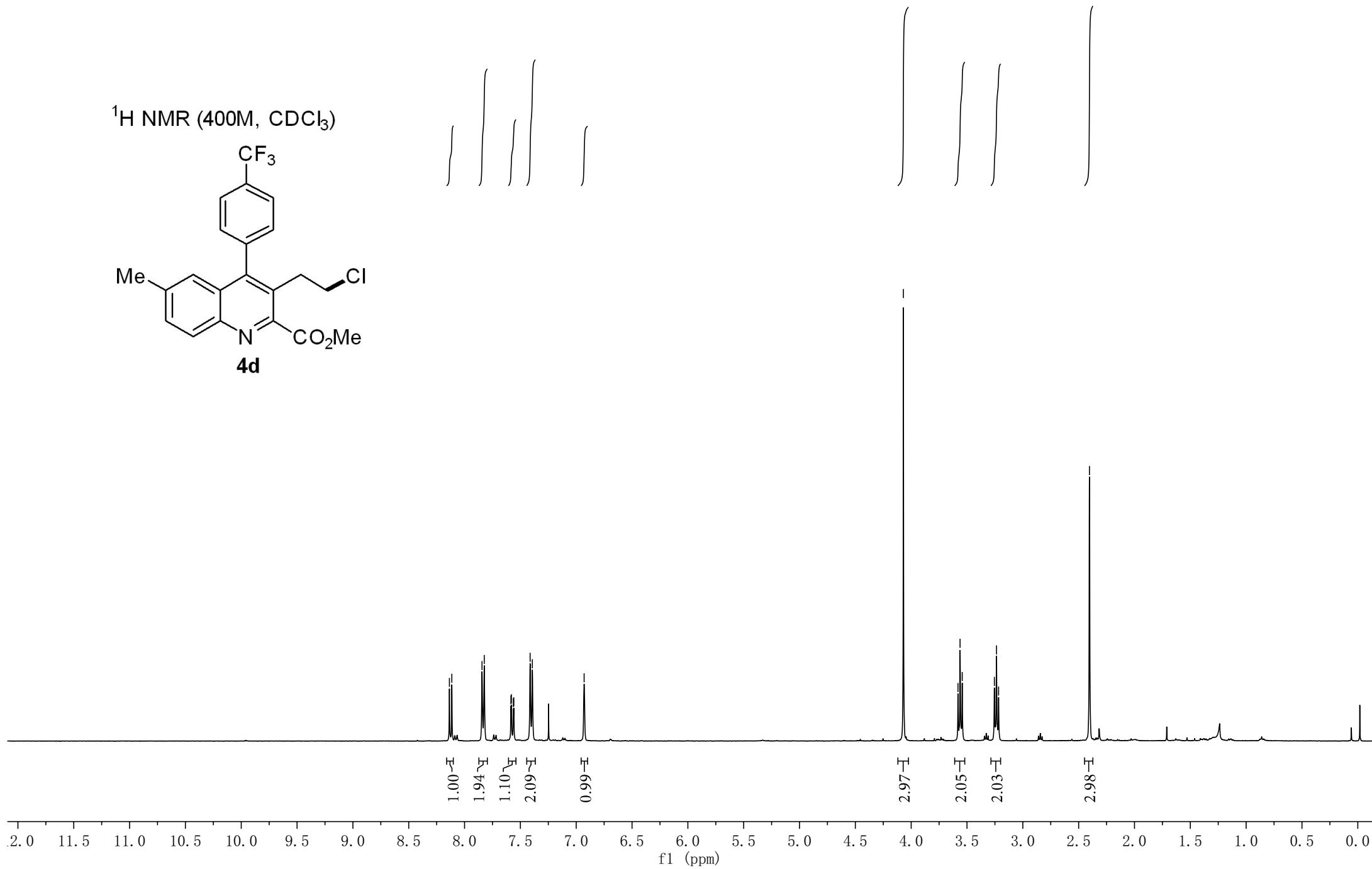
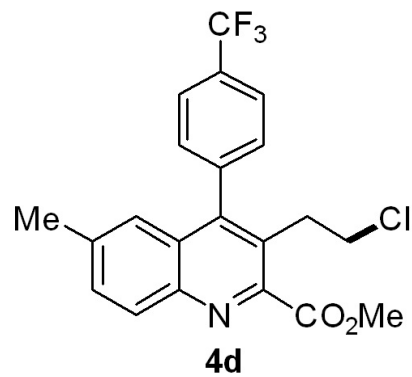


S108

8.136  
8.114  
7.844  
7.824  
7.585  
7.580  
7.563  
7.559  
7.413  
7.393  
6.929

4.070  
3.581  
3.562  
3.543  
3.255  
3.236  
3.217  
2.403

<sup>1</sup>H NMR (400M, CDCl<sub>3</sub>)

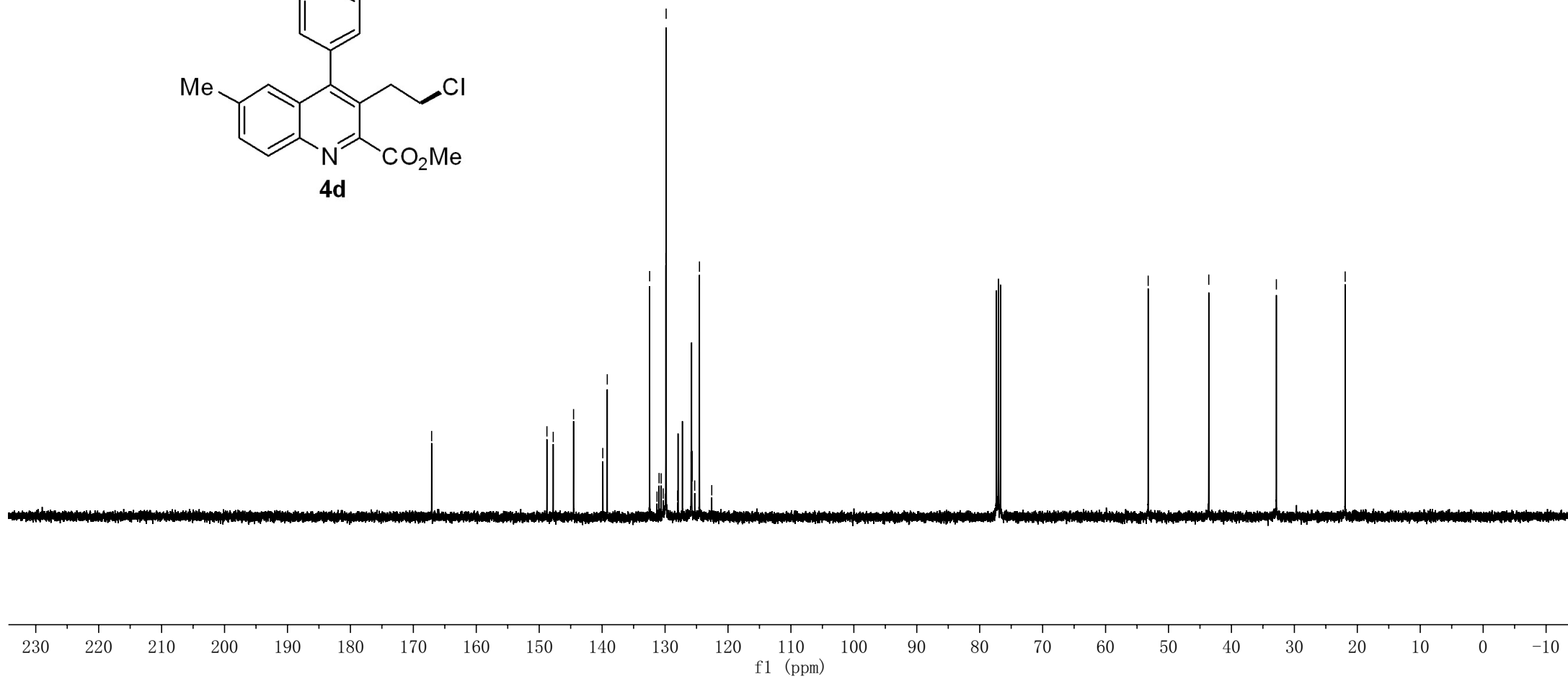
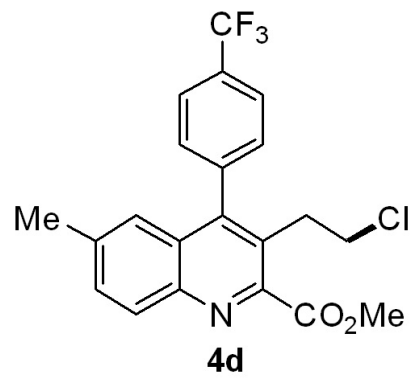


S109

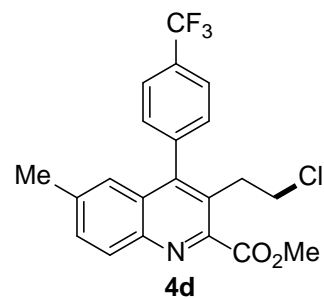
167.093  
148.772  
147.771  
144.538  
139.899  
139.185  
132.449  
131.277  
130.950  
130.624  
130.298  
129.874  
129.829  
128.002  
125.290  
124.534  
122.581

53.229  
43.600  
32.859  
21.928

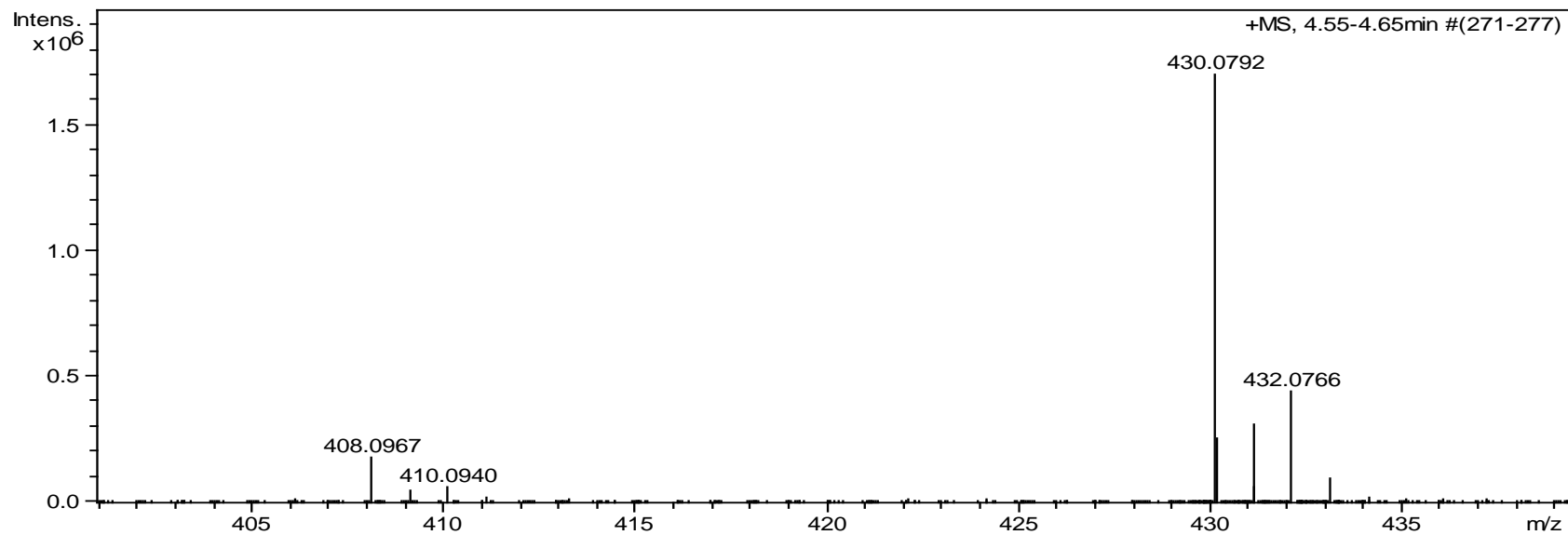
<sup>13</sup>C NMR (100M, CDCl<sub>3</sub>)



S110



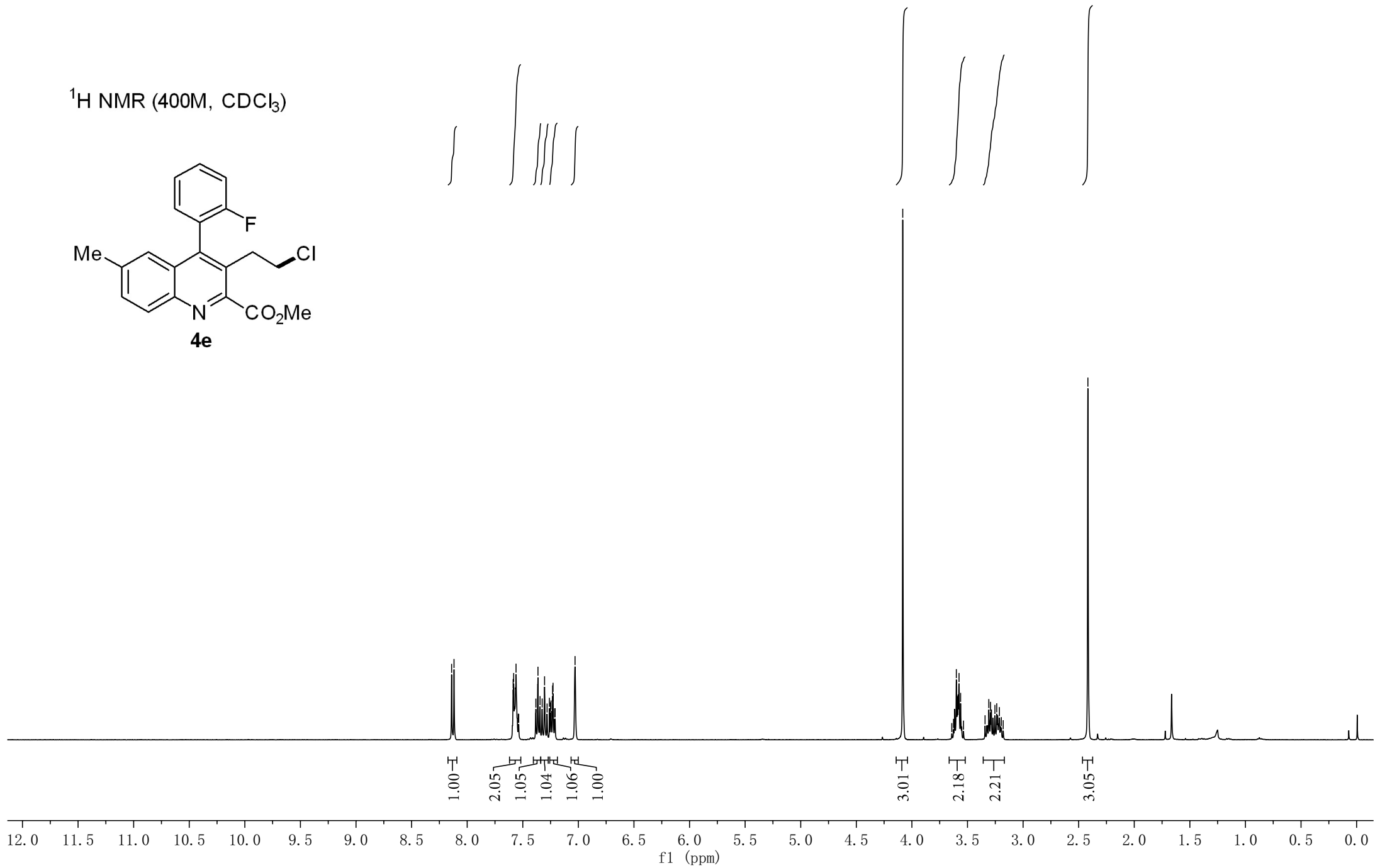
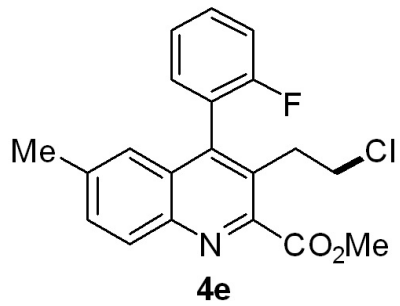
Methyl 3-(2-chloroethyl)-6-methyl-4-(4-(trifluoromethyl)phenyl)quinoline-2-carboxylate (4d)



S  
8.144  
8.119  
7.586  
7.582  
7.561  
7.541  
7.536  
7.382  
7.363  
7.345  
7.326  
7.304  
7.281  
7.260  
7.250  
7.246  
7.232  
7.228  
7.214  
7.209  
7.030

4.083  
3.600  
3.576  
3.562  
3.342  
3.308  
3.293  
3.253  
3.237  
3.213  
3.196  
2.417

<sup>1</sup>H NMR (400M, CDCl<sub>3</sub>)

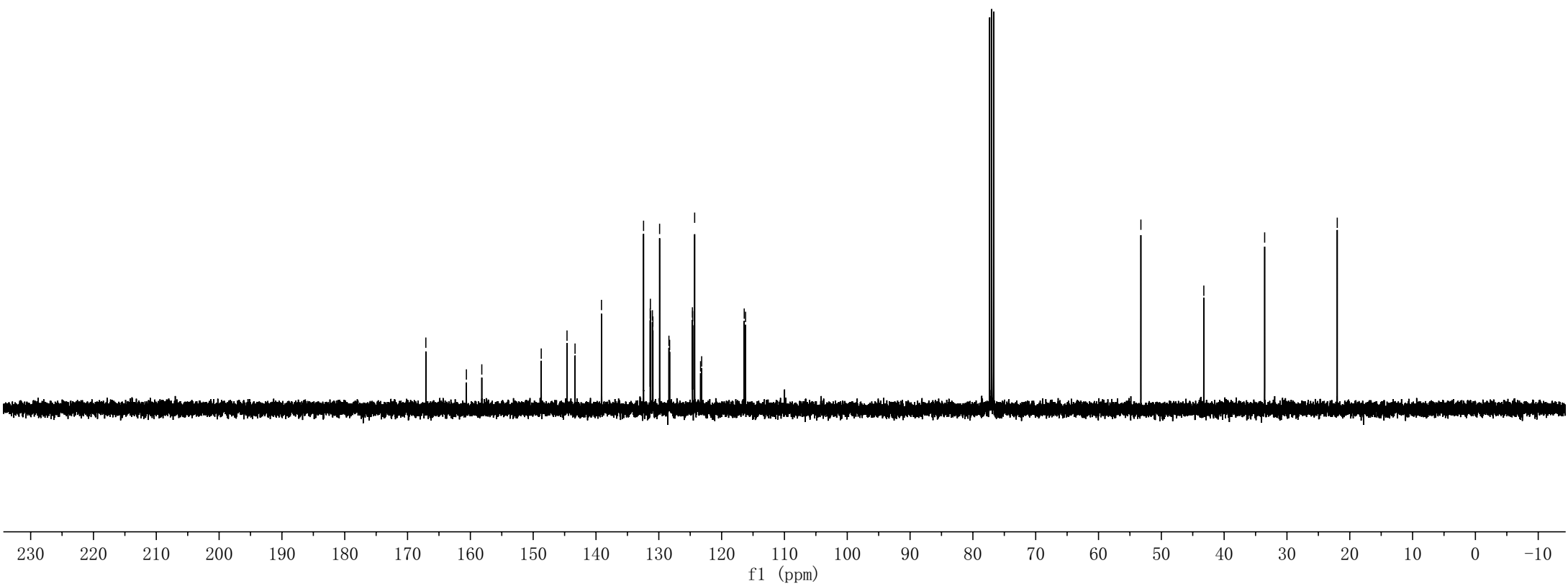
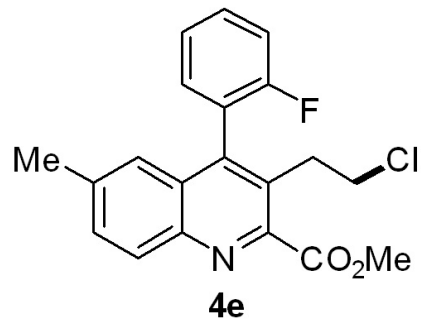


S112

167.087  
160.632  
158.180  
148.717  
144.614  
143.336  
139.128  
132.428  
131.374  
131.343  
131.021  
130.942  
129.874  
128.390  
128.277  
124.649  
124.613  
124.294  
123.351  
123.180  
116.402  
116.188

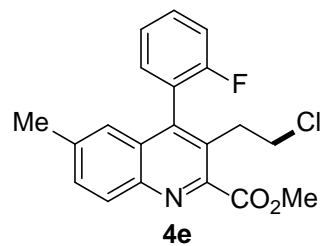
53.253  
43.234  
33.550  
21.993

<sup>13</sup>C NMR (400M, CDCl<sub>3</sub>)

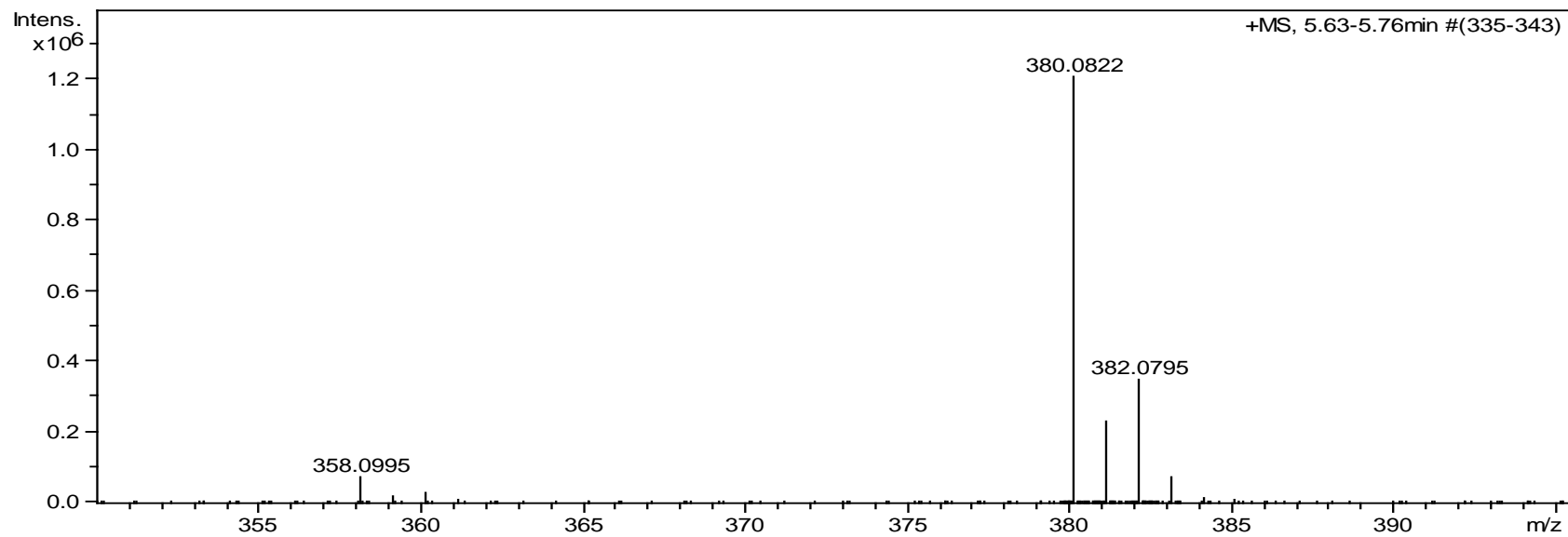




S113



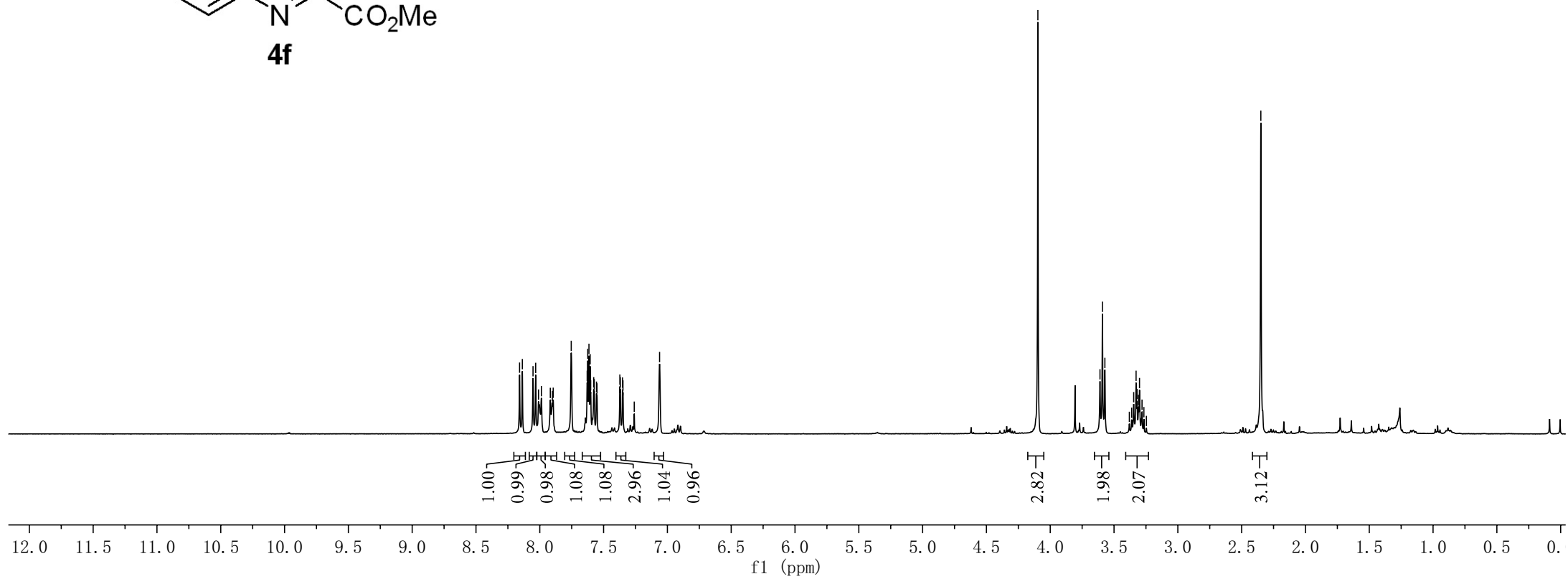
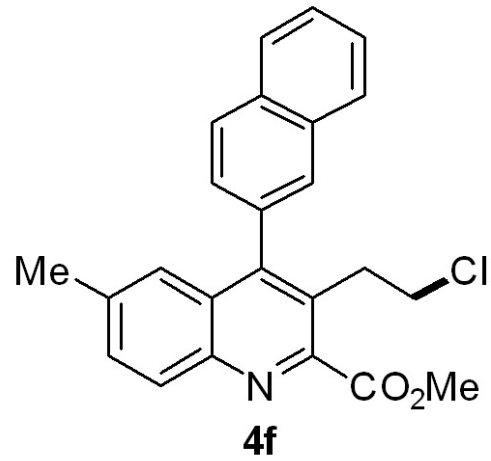
**Methyl 3-(2-chloroethyl)-4-(2-fluorophenyl)-6-methylquinoline-2-carboxylate (4e)**



8.158  
8.137  
8.114  
8.072  
8.010  
7.987  
7.918  
7.902  
7.895  
7.754  
7.629  
7.624  
7.615  
7.605  
7.601  
7.577  
7.573  
7.556  
7.552  
7.373  
7.369  
7.352  
7.348  
7.061

4.097  
3.610  
3.591  
3.572  
3.346  
3.327  
3.320  
3.308  
3.300  
3.281  
3.266  
2.350

<sup>1</sup>H NMR (400M, CDCl<sub>3</sub>)



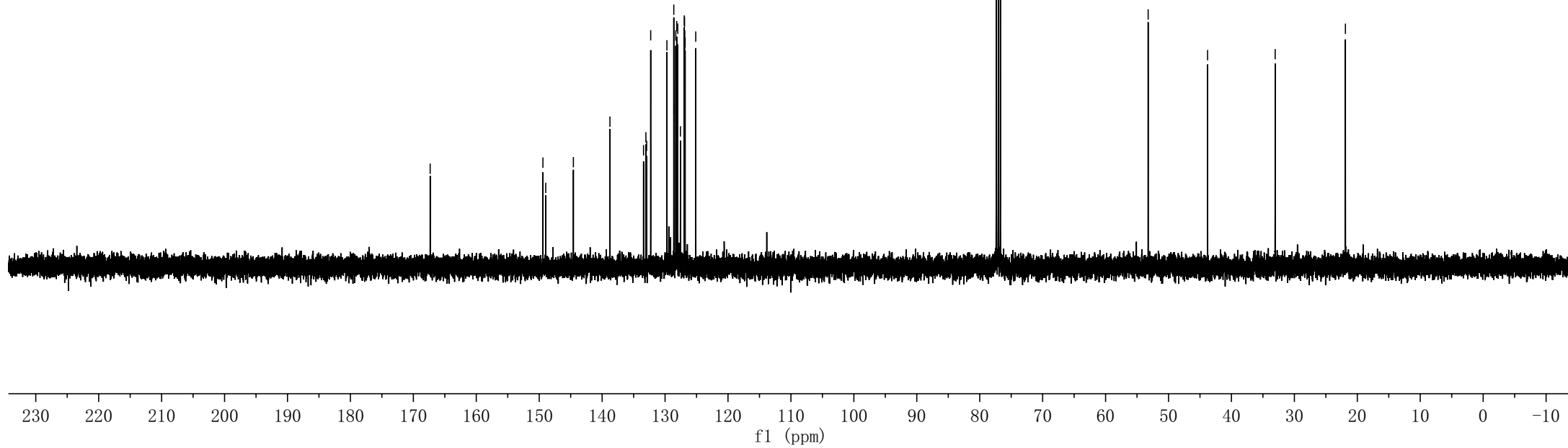
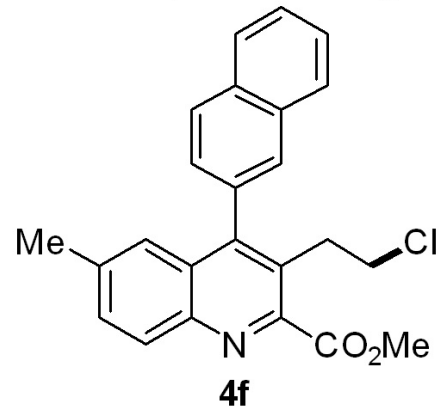
S115

167.326  
149.411  
148.965  
144.570  
138.759  
133.421  
133.048  
132.927  
132.282  
129.707  
128.614  
128.600  
128.297  
128.151  
127.986  
127.562  
126.952  
126.906  
126.812  
125.124

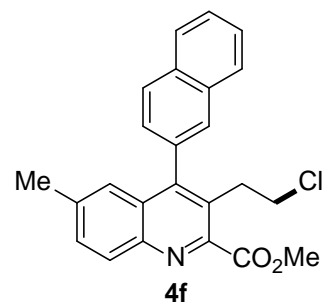
53.235  
43.792  
33.051

21.890

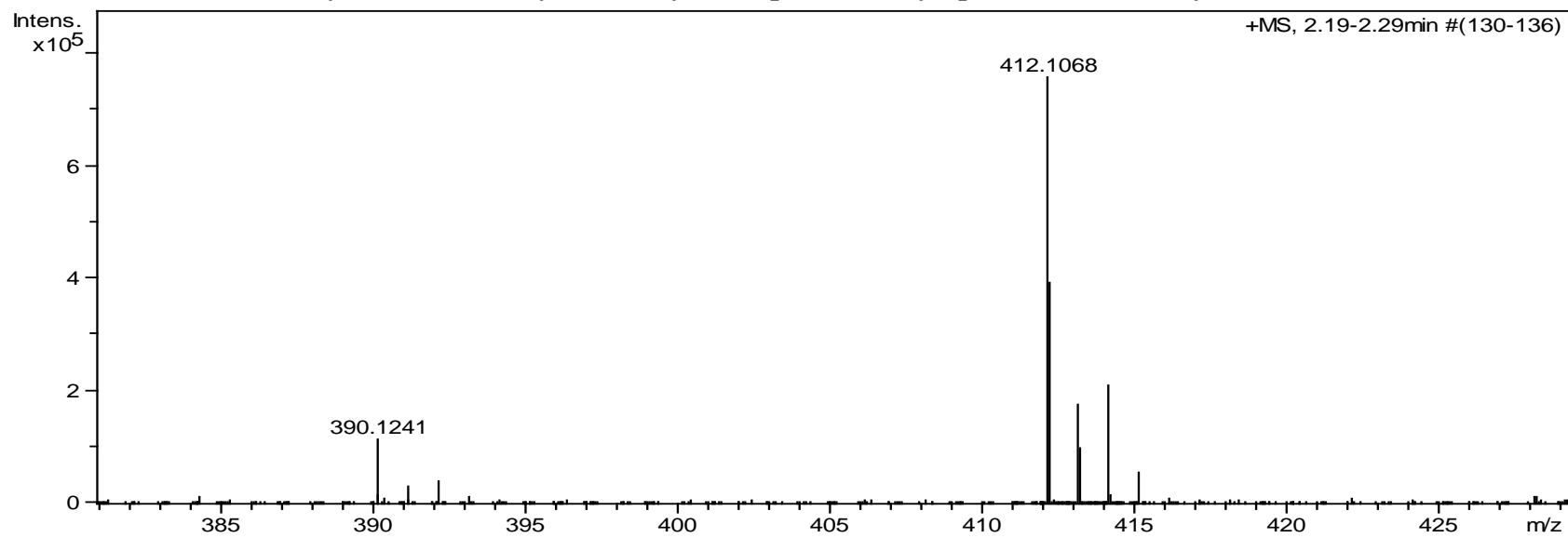
<sup>13</sup>C NMR (400M, CDCl<sub>3</sub>)



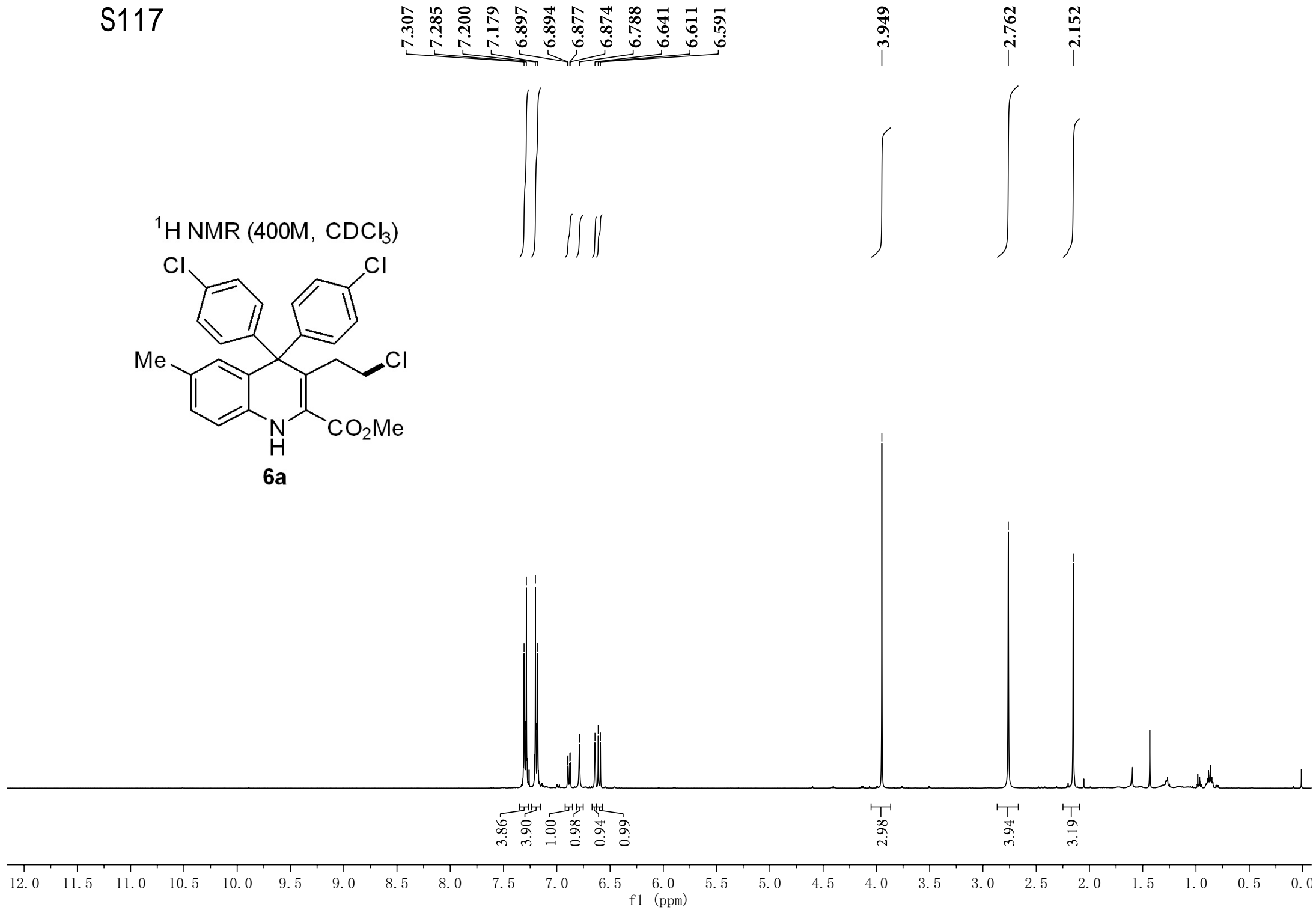
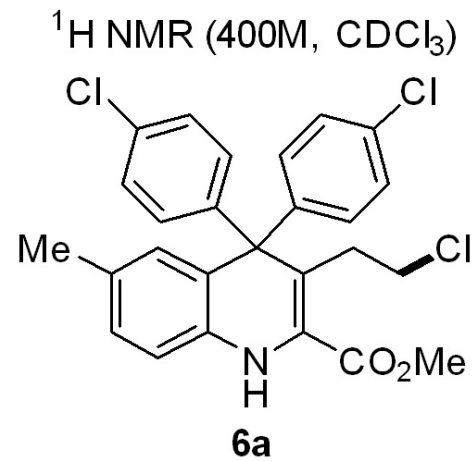
S116



**Methyl 3-(2-chloroethyl)-6-methyl-4-(naphthalen-2-yl)quinoline-2-carboxylate (4f)**



S117

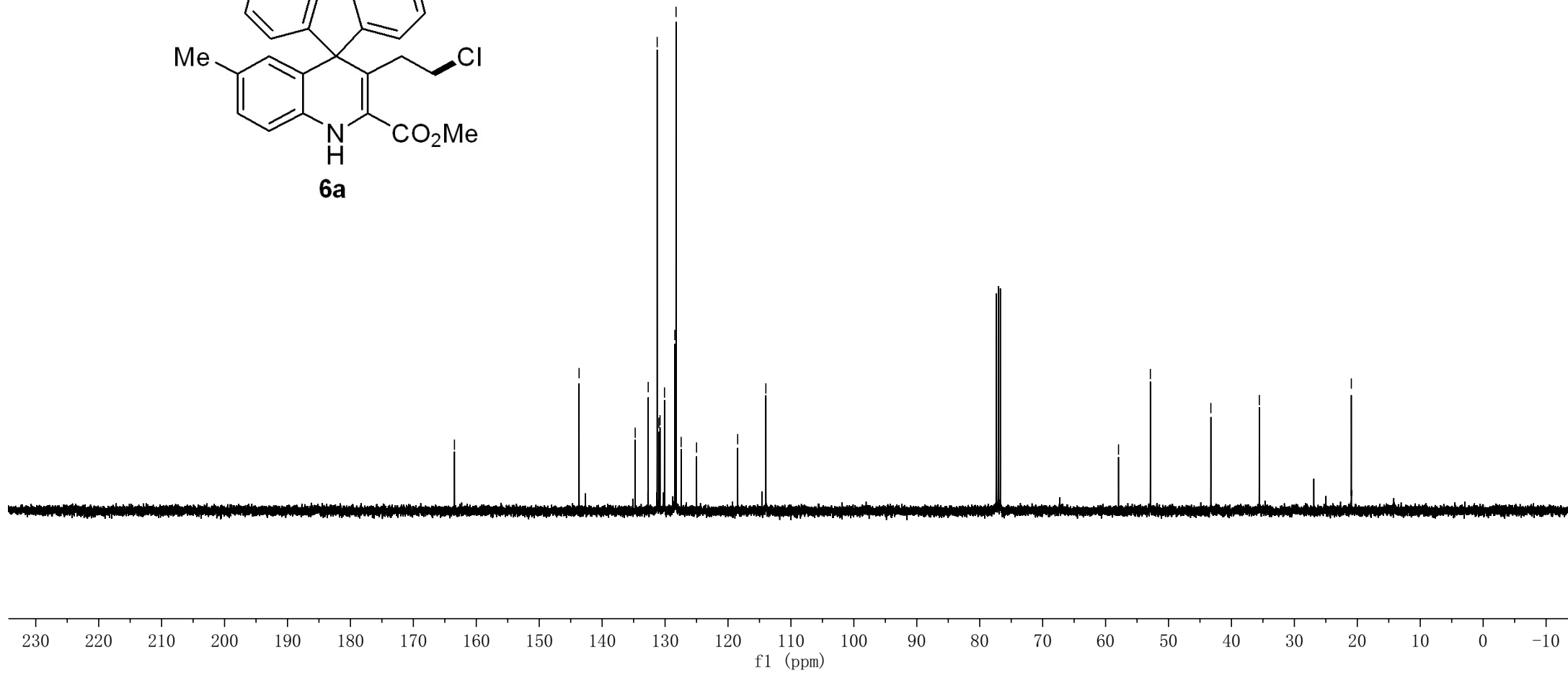
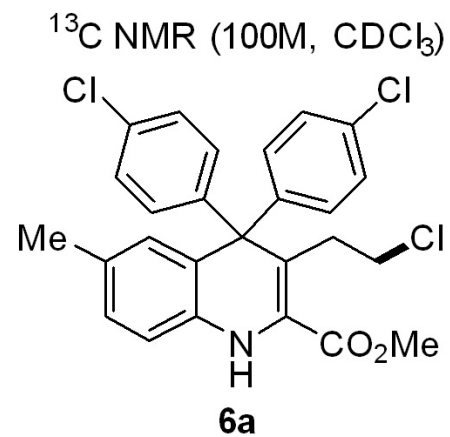


S118

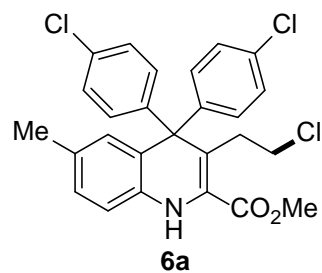
163.469  
143.664  
134.747  
132.681  
131.252  
130.985  
130.800  
130.092  
128.453  
128.255  
127.446  
124.996  
118.461  
113.984

57.944  
52.881  
43.271  
35.568

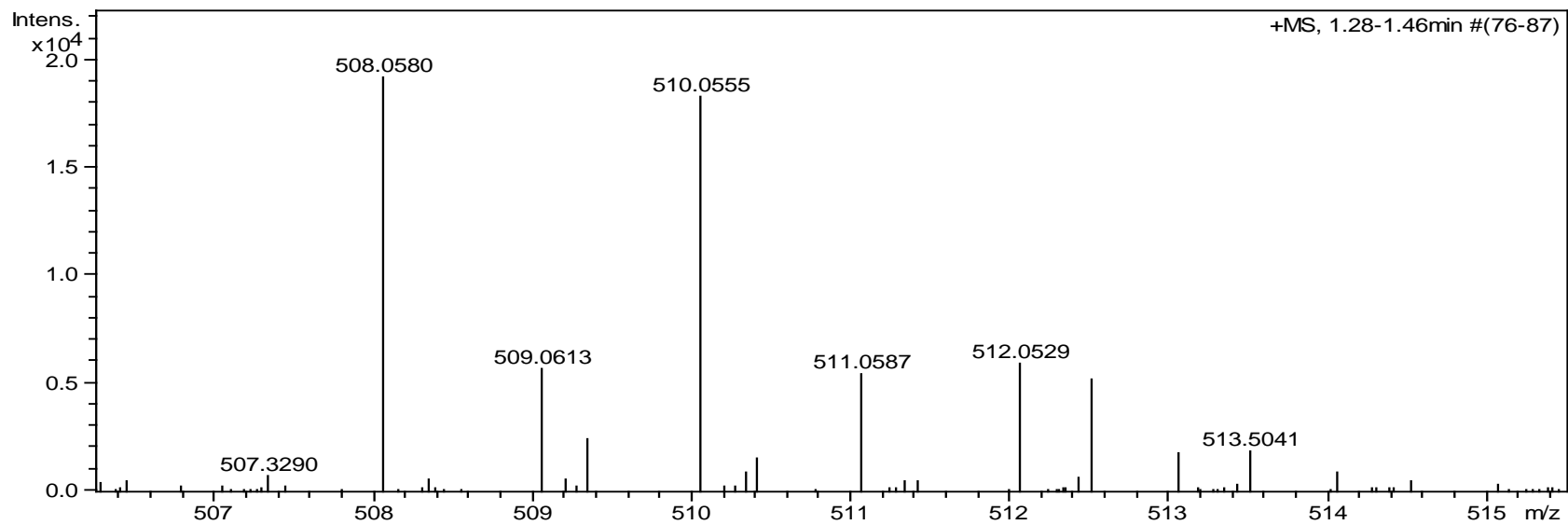
20.948



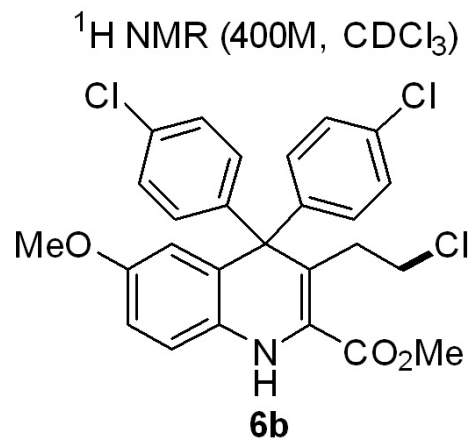
S119



**methyl 3-(2-chloroethyl)-4,4-bis(4-chlorophenyl)-6-methyl-1,4-dihydroquinoline-2-carboxylate (6a)**

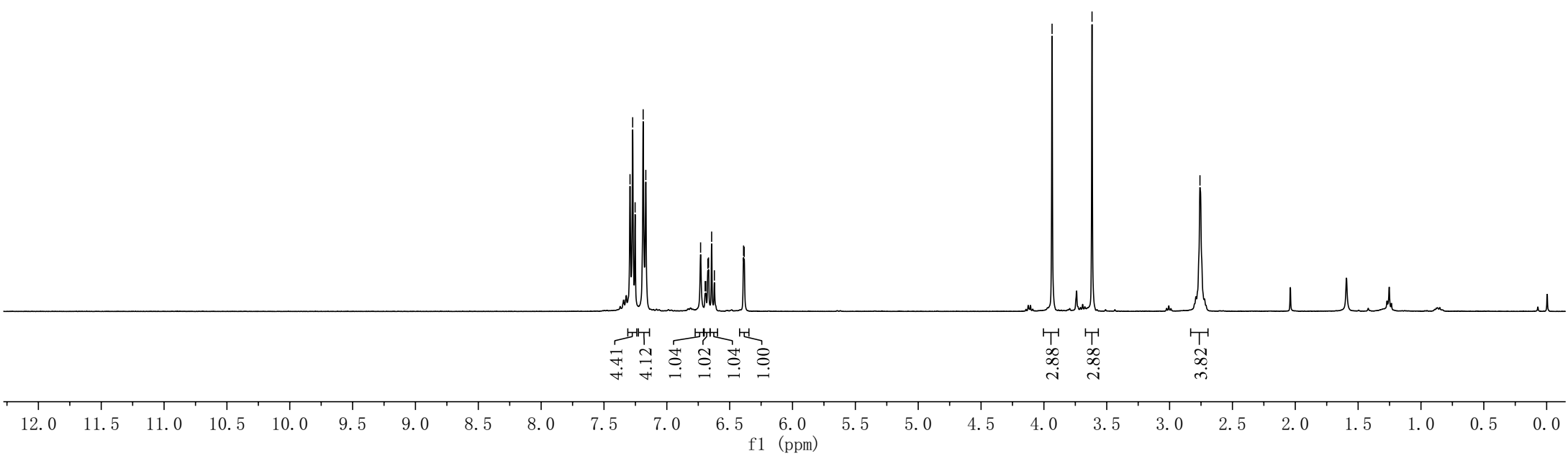


S120



7.293  
7.272  
7.252  
7.188  
7.167  
6.731  
6.695  
6.690  
6.674  
6.668  
6.643  
6.622  
6.390  
6.385

—3.935  
—3.617  
—2.758



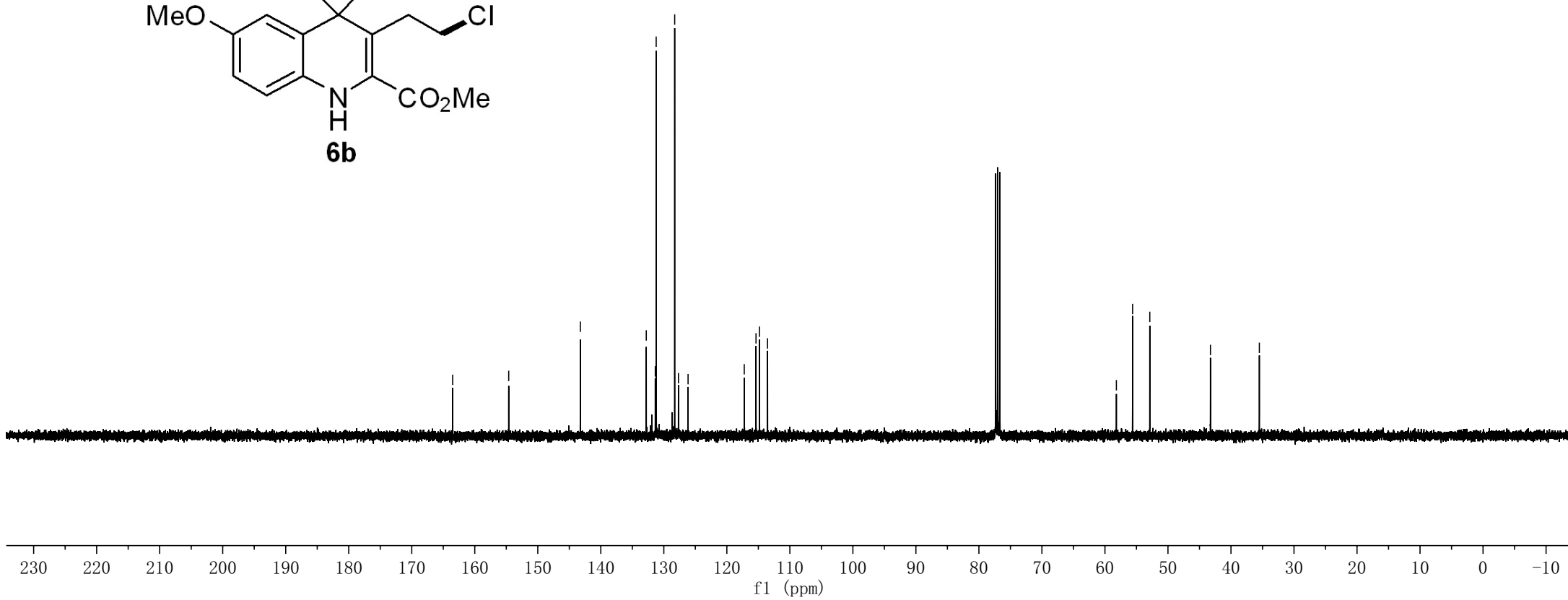
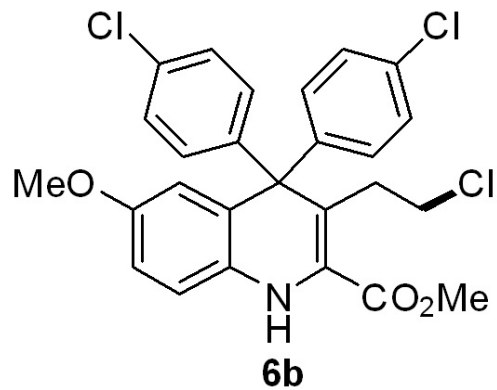


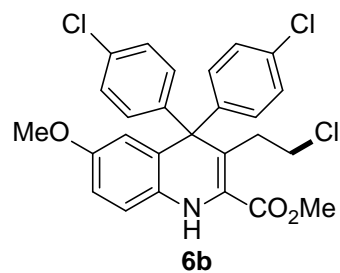
S121

163.506  
154.613  
143.247  
132.787  
131.354  
131.214  
128.276  
127.677  
126.152  
117.238  
115.370  
114.822  
113.545

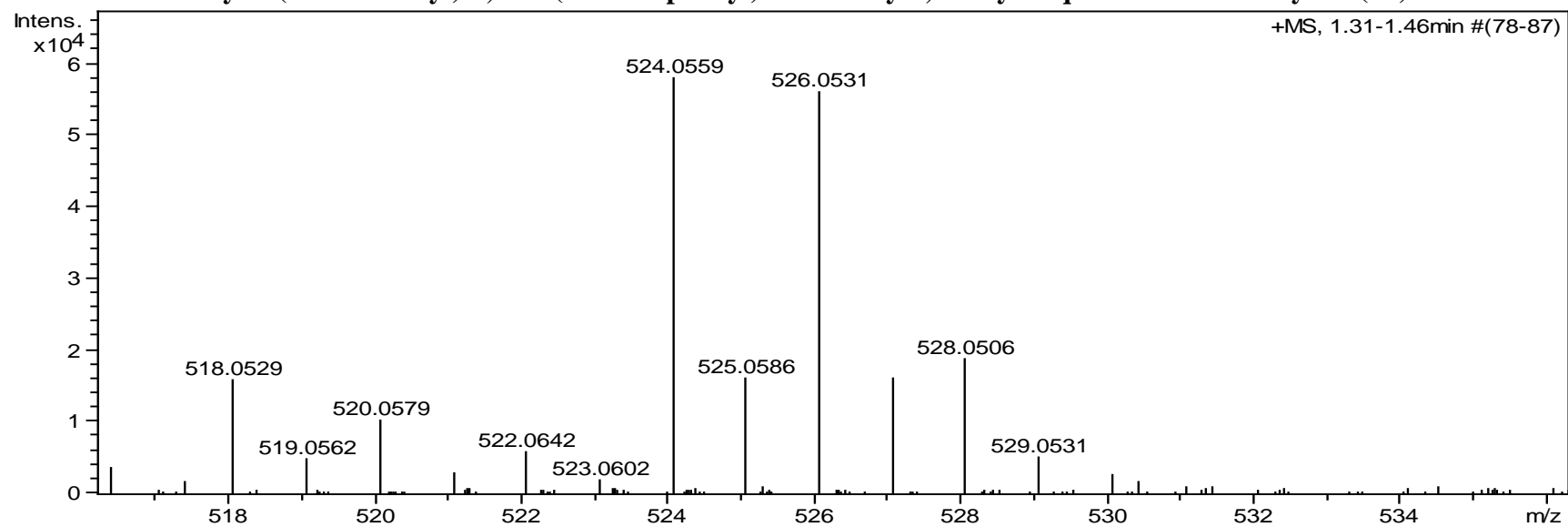
58.185  
55.611  
52.883  
43.256  
35.497

<sup>13</sup>C NMR (100M, CDCl<sub>3</sub>)





**Methyl 3-(2-chloroethyl)-4,4-bis(4-chlorophenyl)-6-methoxy-1,4-dihydroquinoline-2-carboxylate (6b)**



S123

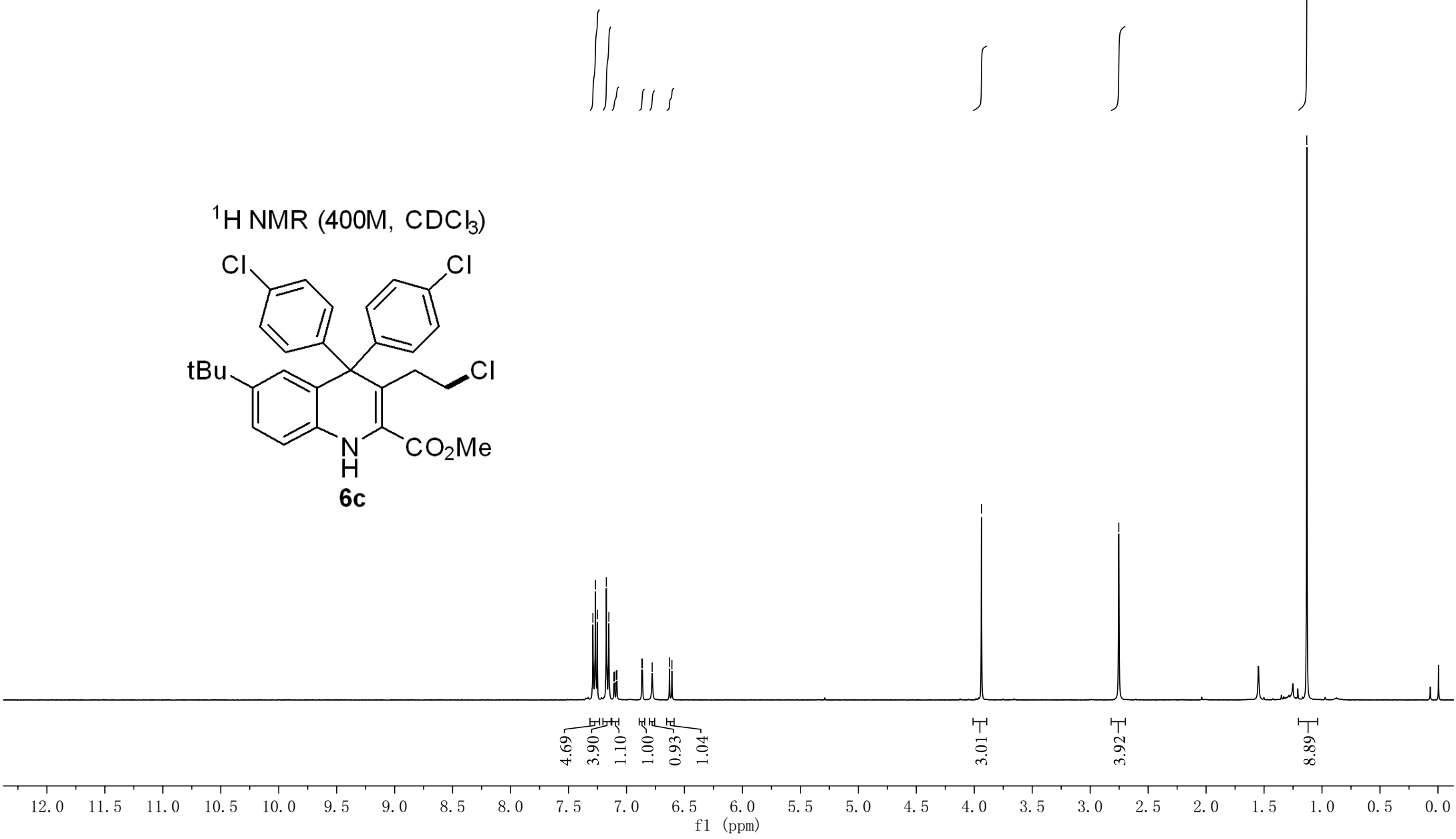
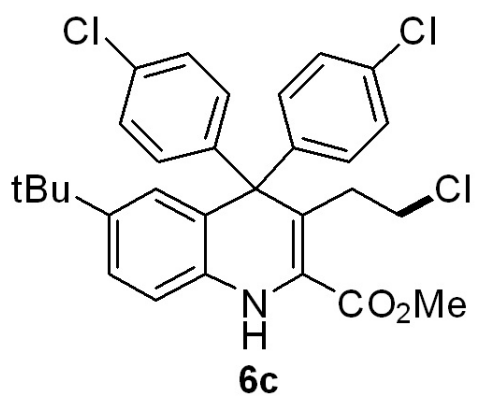
7.290  
7.268  
7.252  
7.174  
7.152  
7.109  
7.103  
7.088  
7.082  
6.868  
6.863  
6.779  
6.629  
6.608

3.938

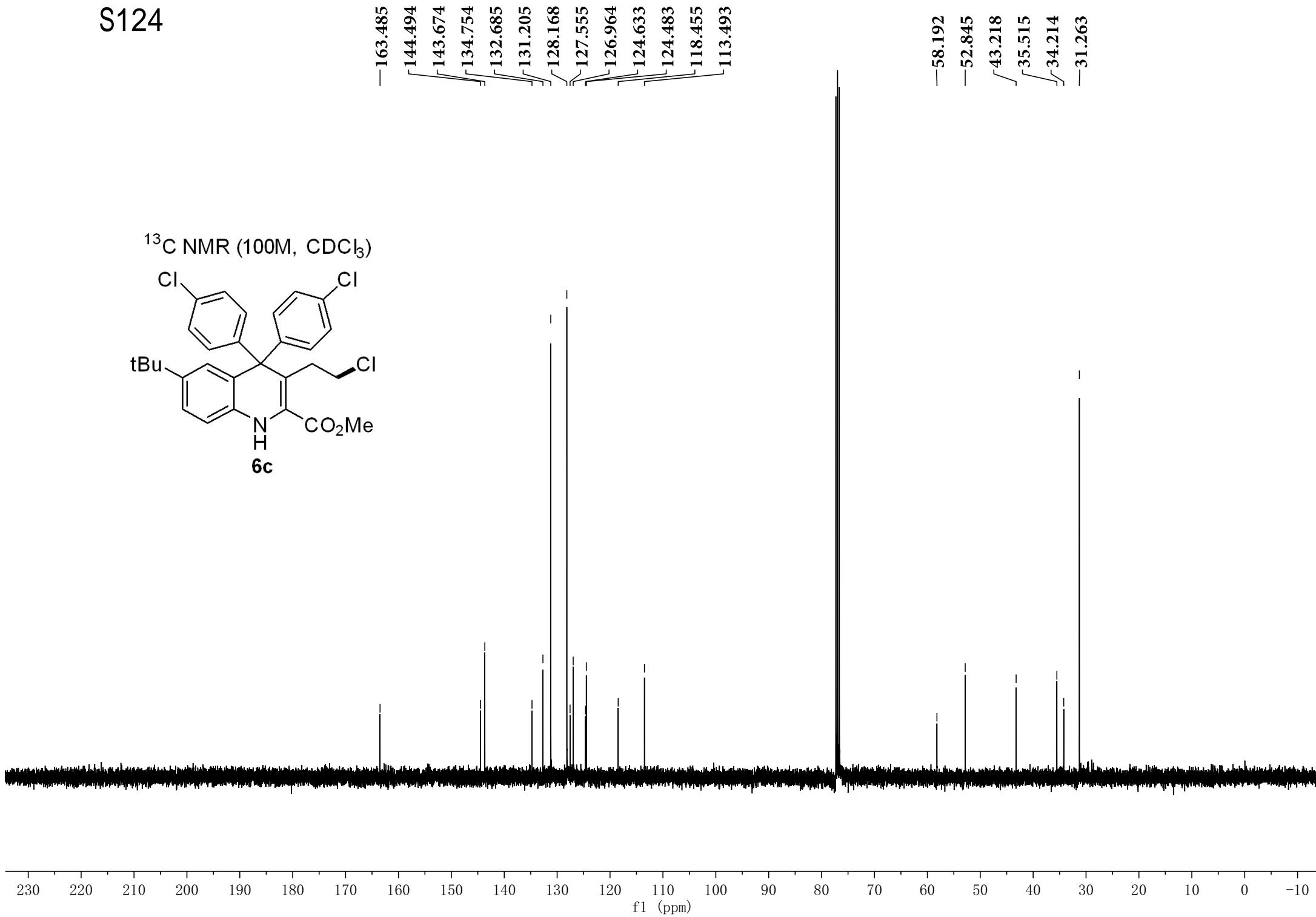
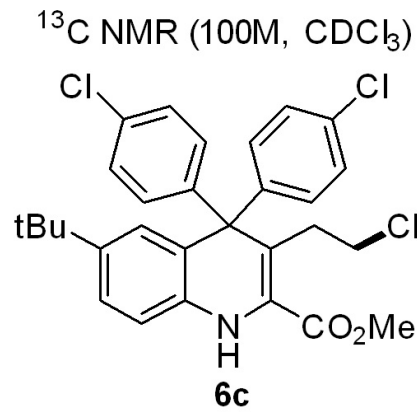
2.753

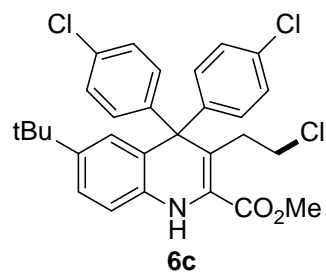
1.132

<sup>1</sup>H NMR (400M, CDCl<sub>3</sub>)

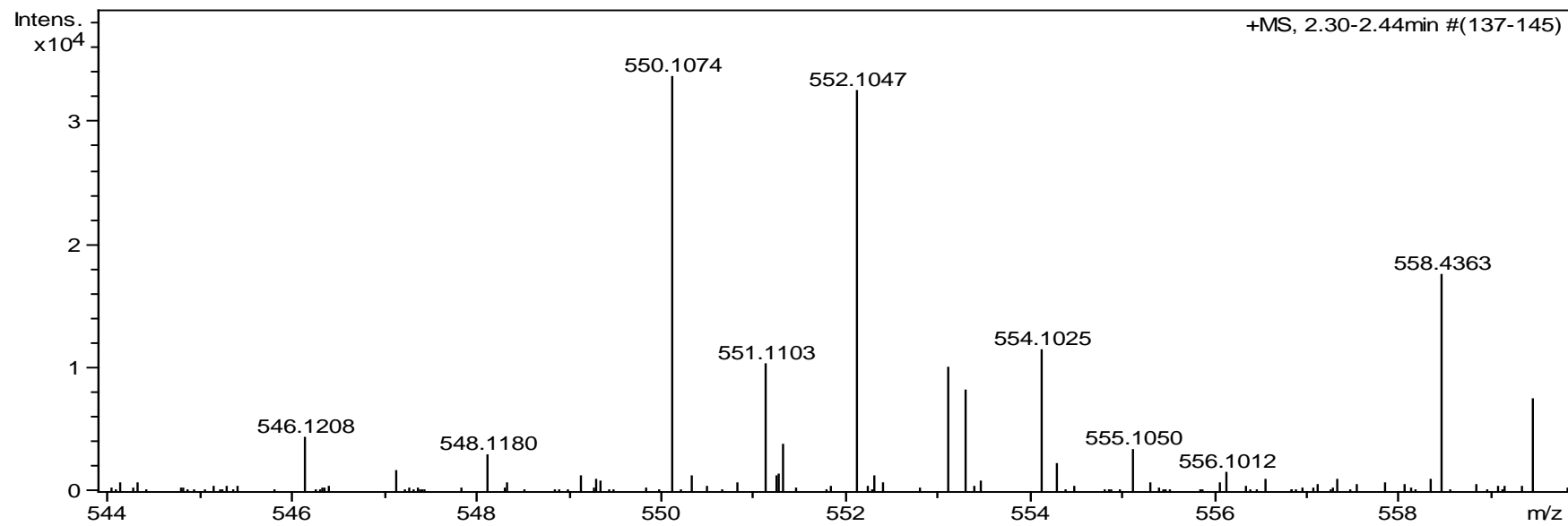


S124

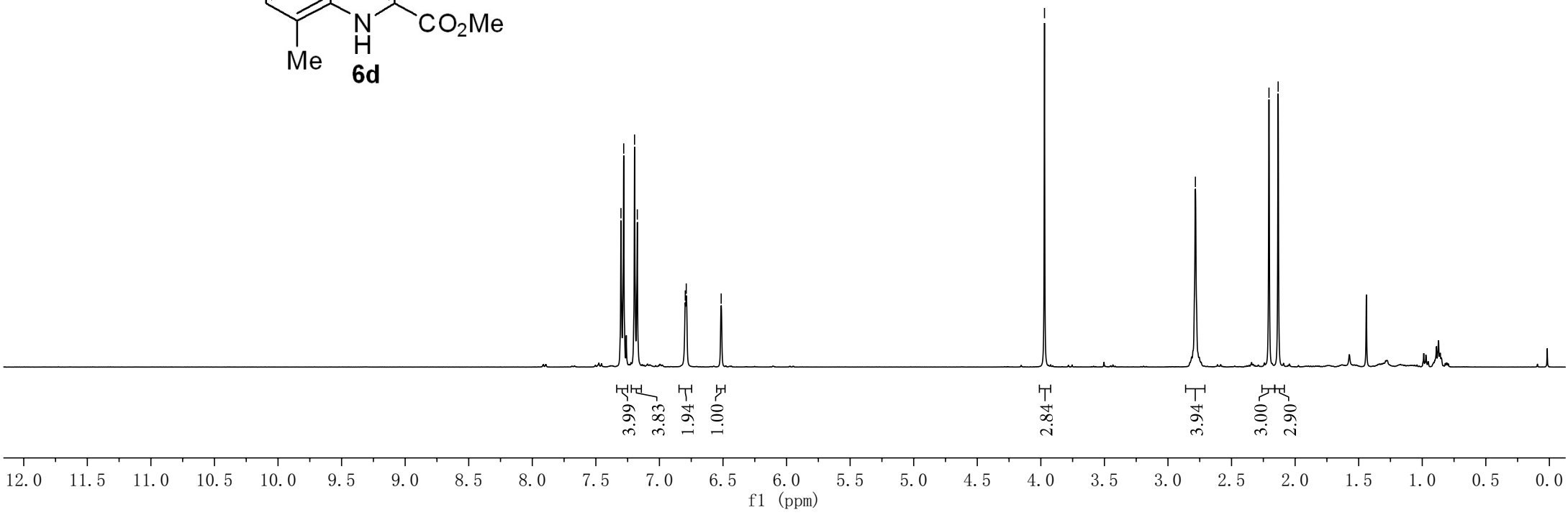
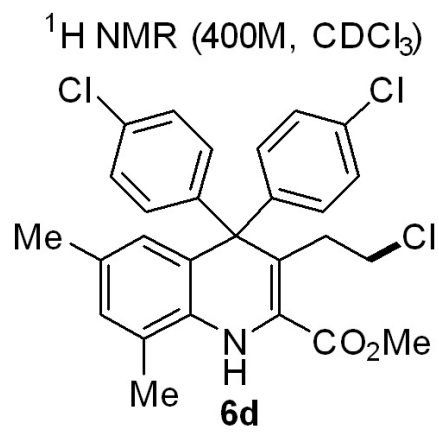
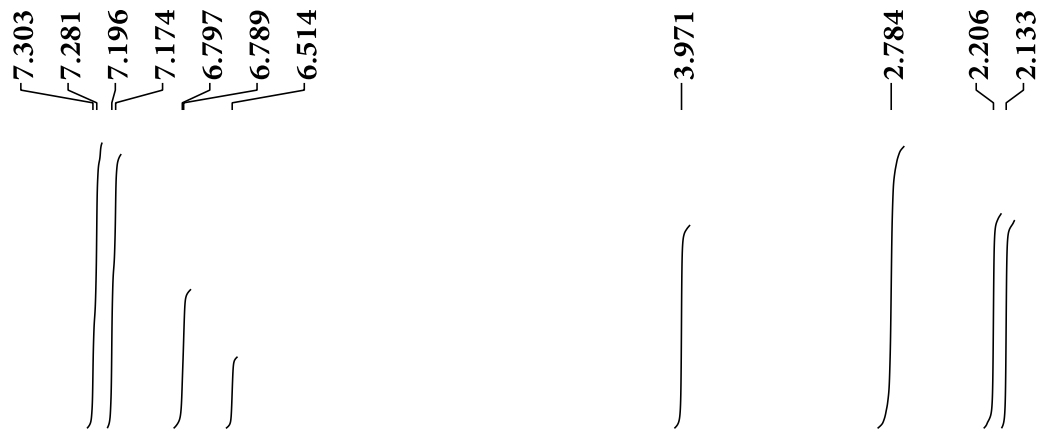




**Methyl 6-(tert-butyl)-3-(2-chloroethyl)-4,4-bis(4-chlorophenyl)-1,4-dihydroquinoline-2-carboxylate (6c)**



S126

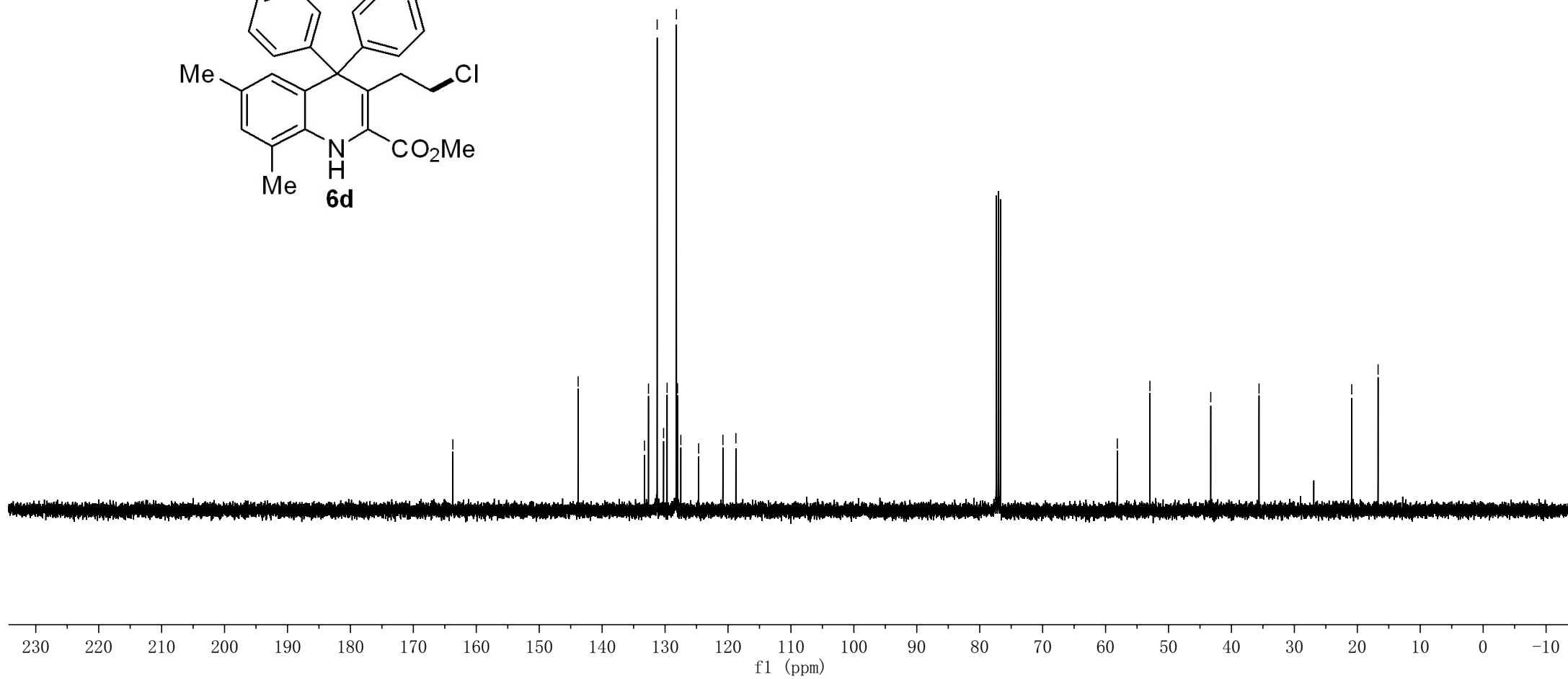
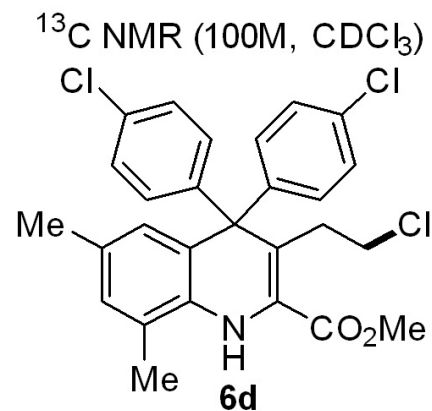


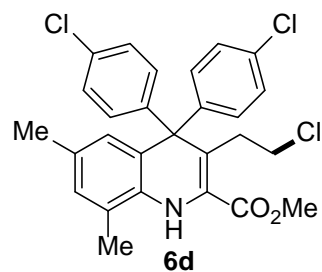
S127

163.721  
143.815  
133.269  
132.633  
131.253  
130.236  
129.677  
128.196  
128.019  
127.496  
124.666  
120.809  
118.745

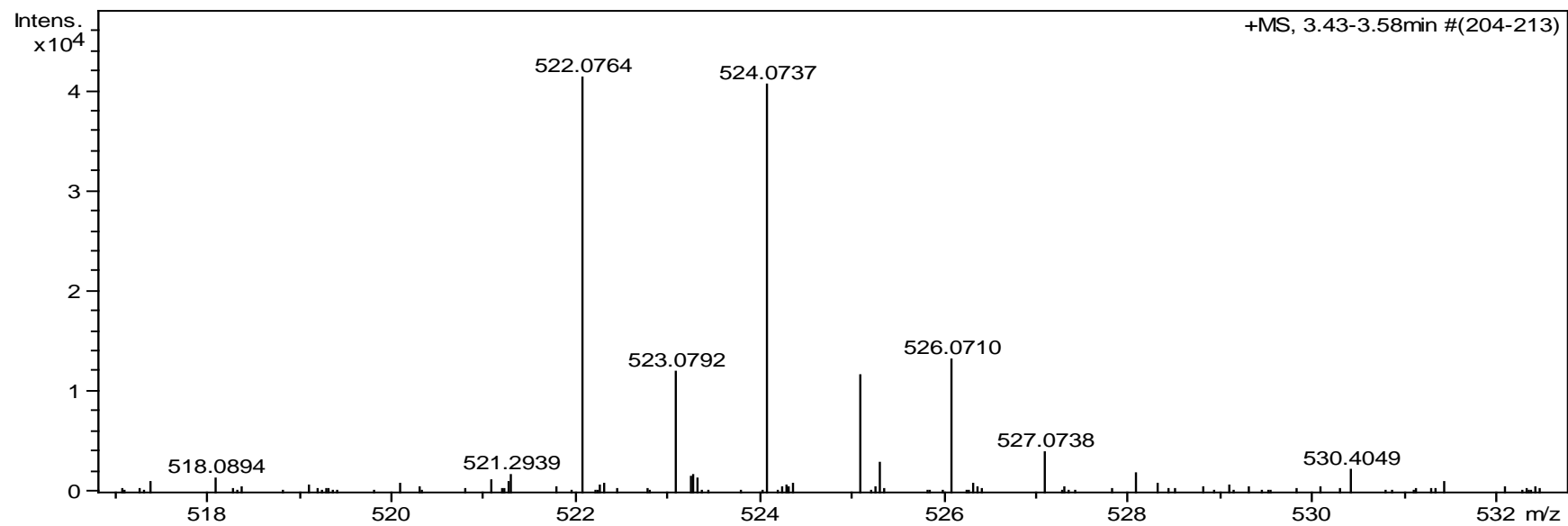
58.135  
52.954  
43.286  
35.614

20.886  
16.696



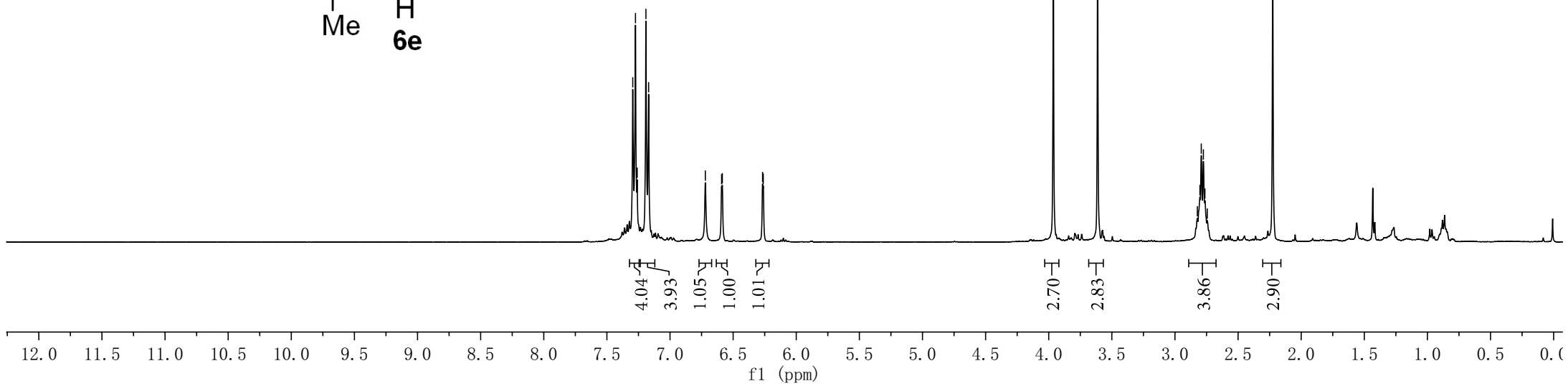
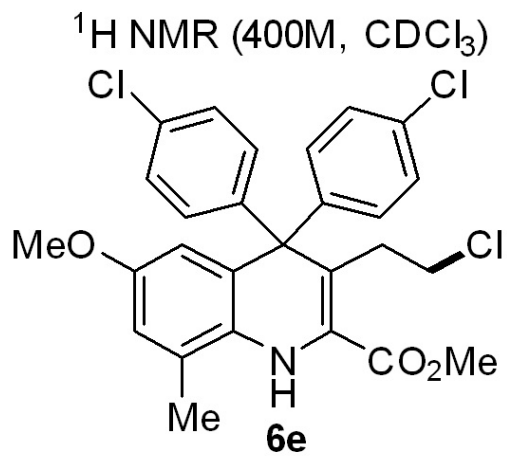
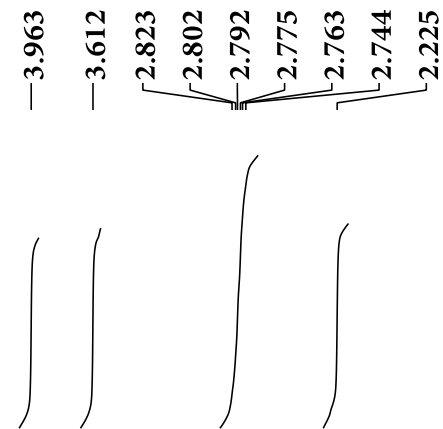
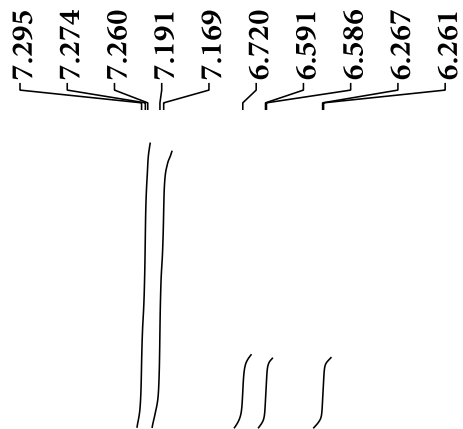


**Methyl 3-(2-chloroethyl)-4,4-bis(4-chlorophenyl)-6,8-dimethyl-1,4-dihydroquinoline-2-carboxylate (6d)**





S129



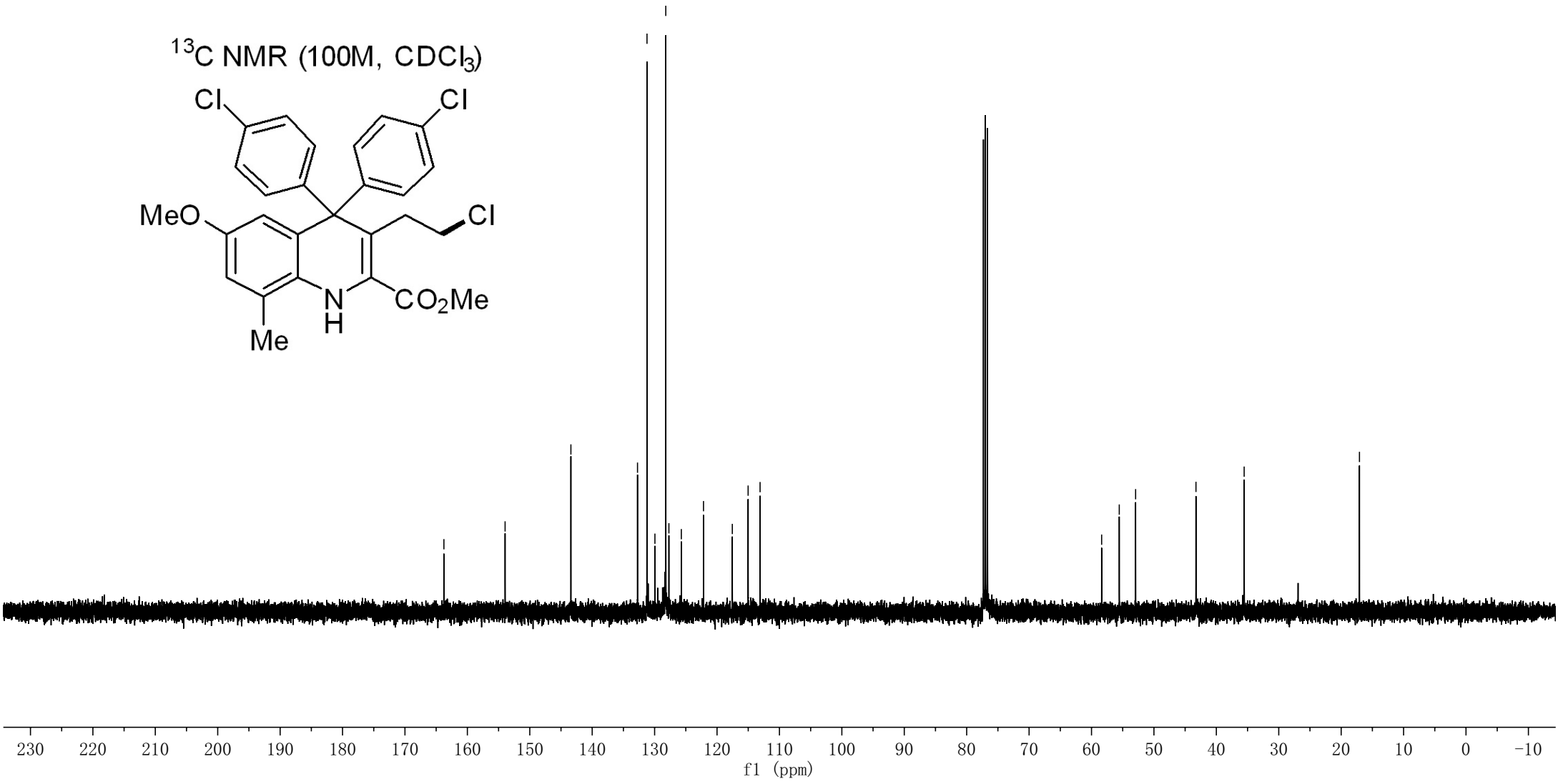
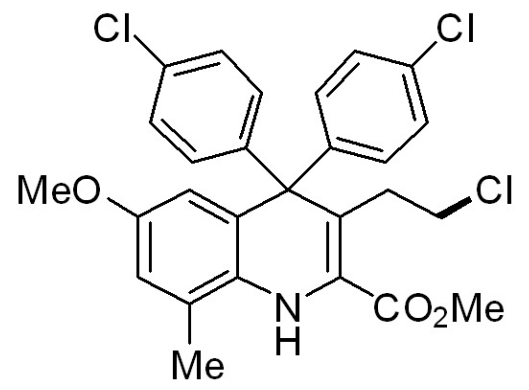
S130

163.760  
153.955  
143.412  
132.740  
131.220  
129.951  
128.210  
127.711  
125.719  
122.166  
117.551  
115.018  
113.102

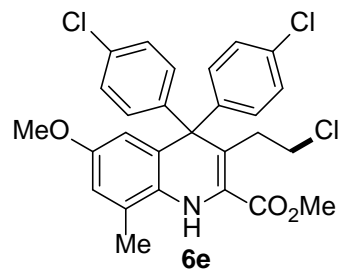
58.376  
55.553  
52.934  
43.263  
35.543

17.070

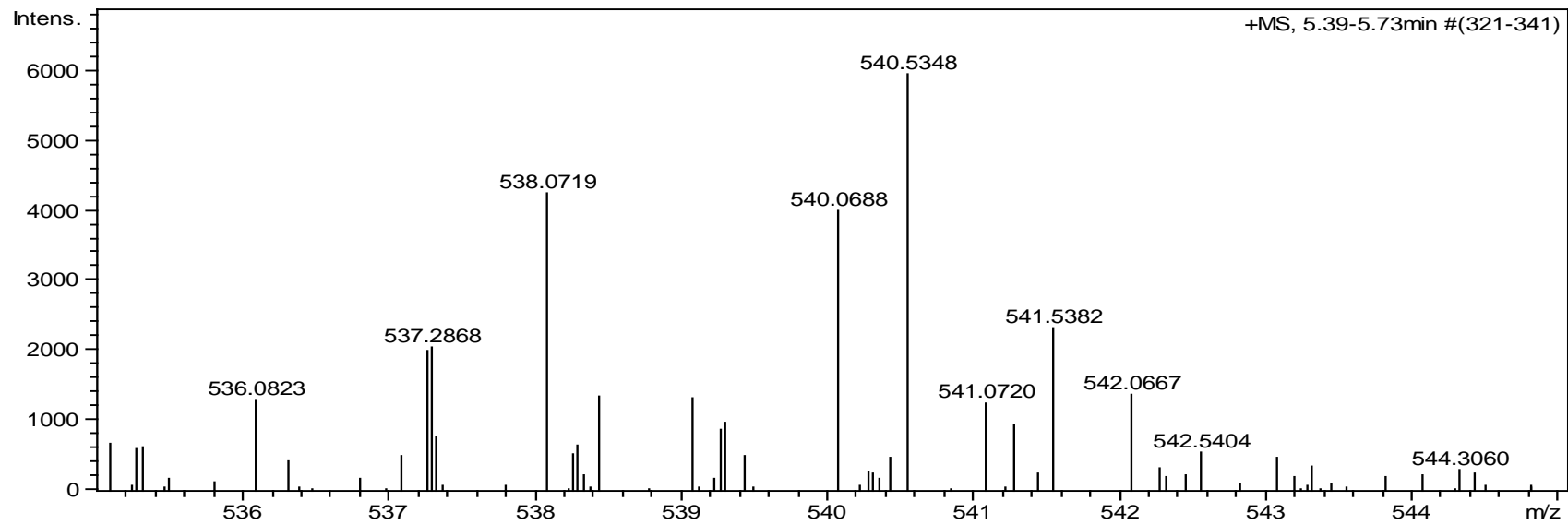
<sup>13</sup>C NMR (100M, CDCl<sub>3</sub>)



S131



Methyl 3-(2-chloroethyl)-4,4-bis(4-chlorophenyl)-6-methoxy-8-methyl-1,4-dihydroquinoline-2-carboxylate (6e)



S132

7.302  
7.281  
7.256  
7.197  
7.175  
6.886  
6.866  
6.805  
6.629  
6.607  
6.587

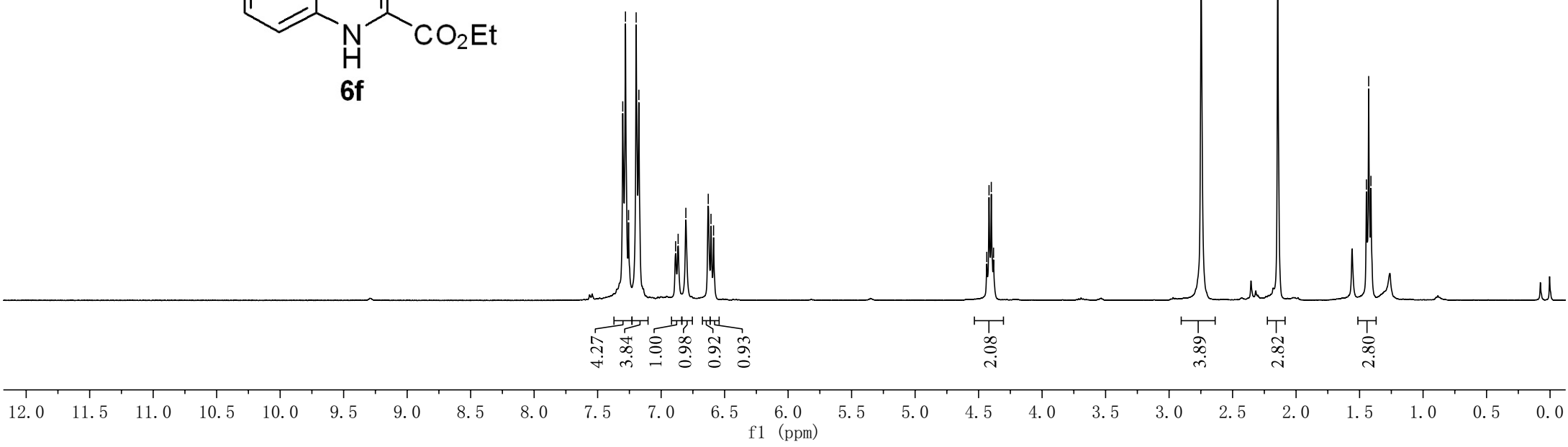
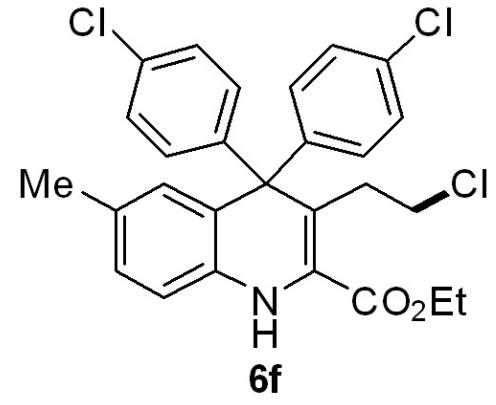
4.436  
4.418  
4.400  
4.382

2.747

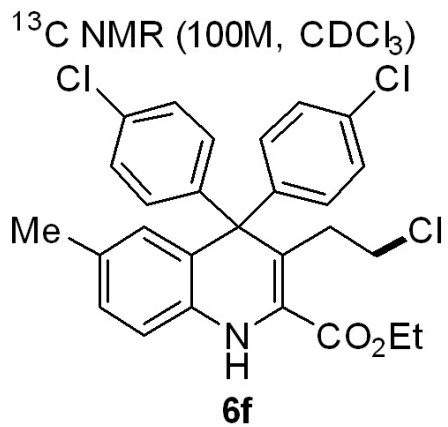
2.144

1.446  
1.428  
1.410

<sup>1</sup>H NMR (400M, CDCl<sub>3</sub>)



S133

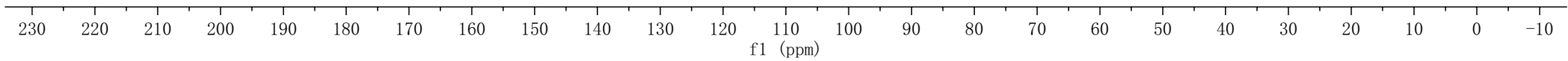


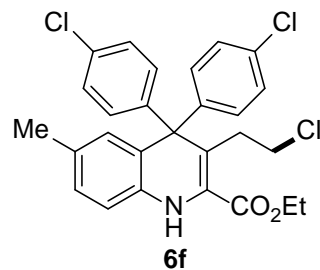
163.406  
143.715  
134.794  
132.667  
131.253  
130.903  
130.074  
128.416  
128.233  
127.648  
125.023  
117.841  
113.962

62.422  
57.992

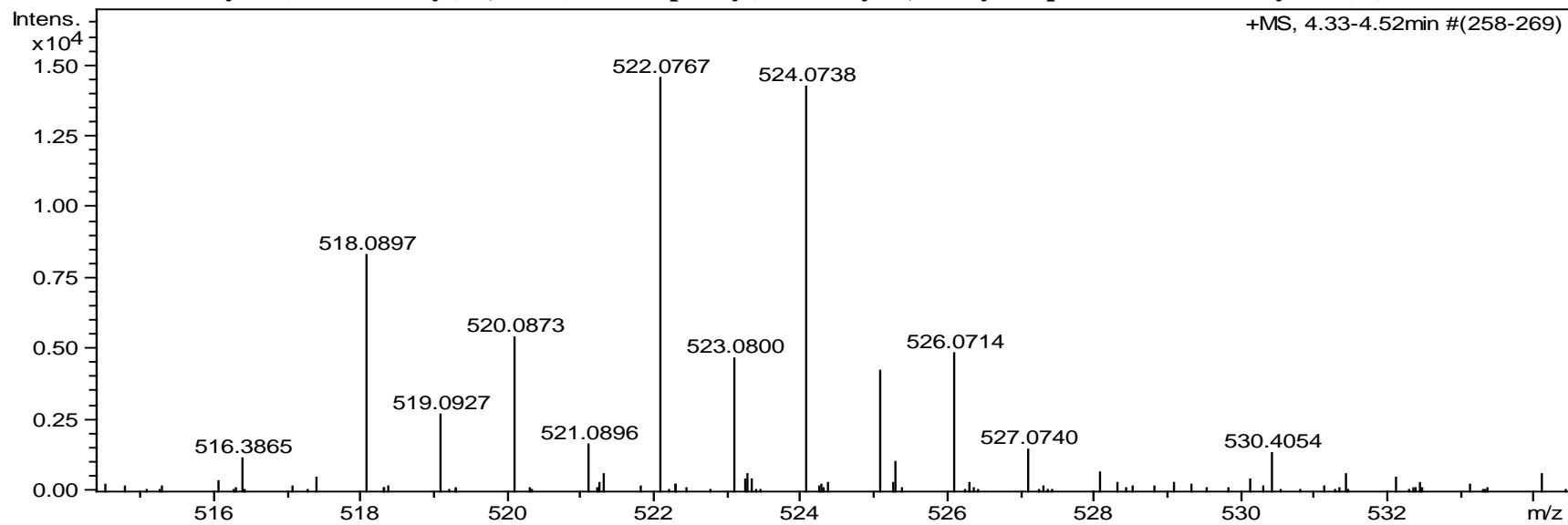
43.241  
35.592

20.931  
14.133

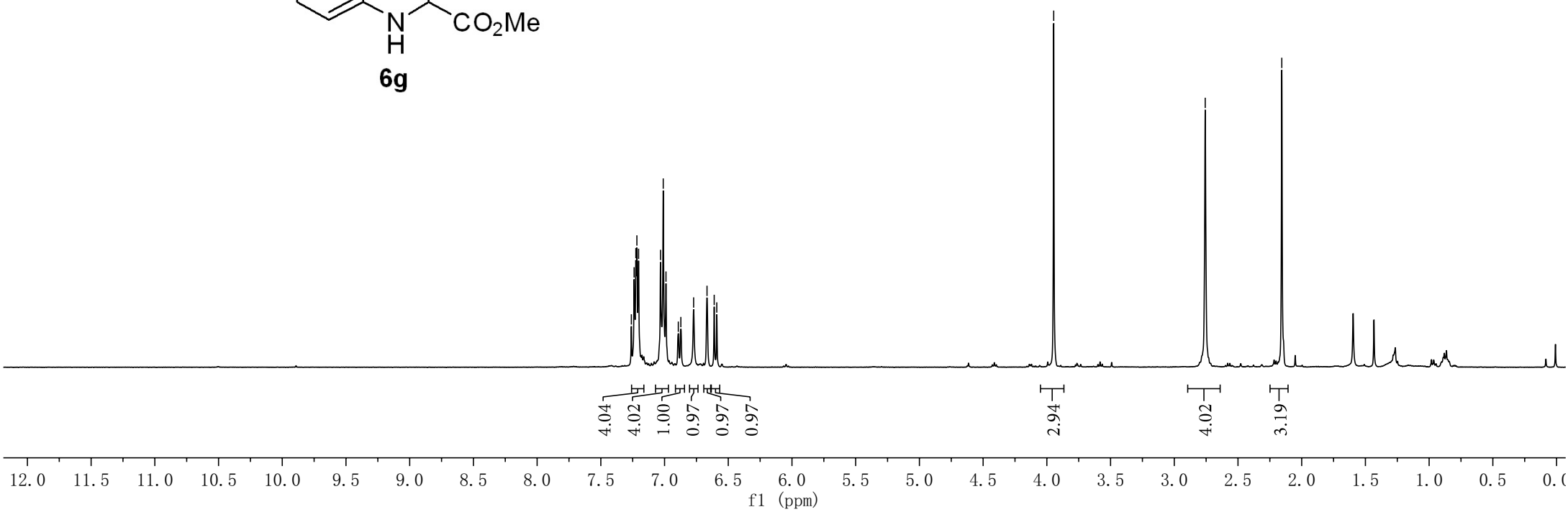
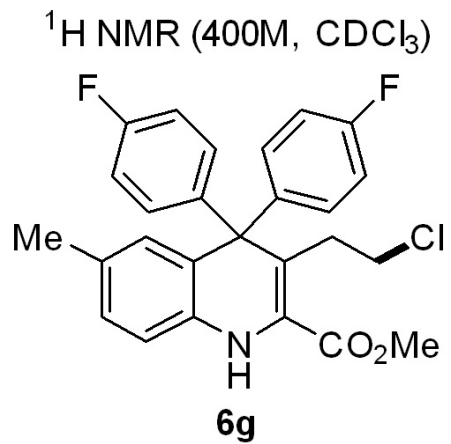
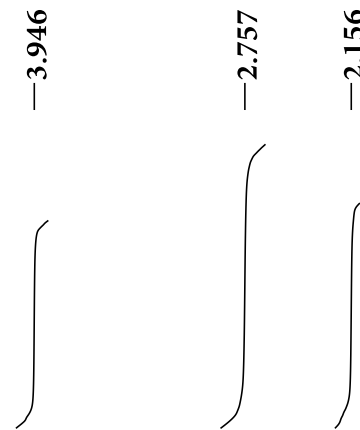
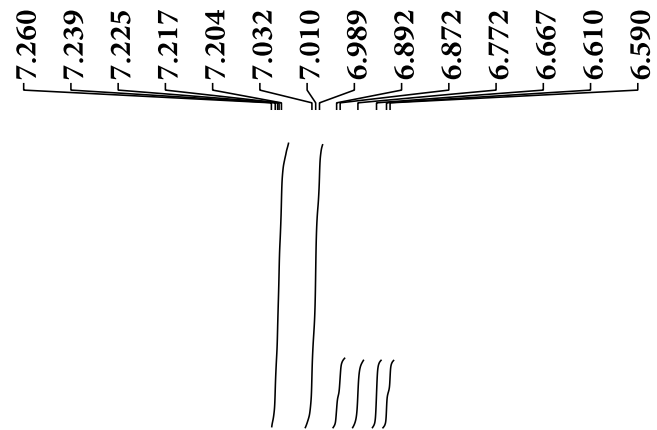




**Ethyl 3-(2-chloroethyl)-4,4-bis(4-chlorophenyl)-6-methyl-1,4-dihydroquinoline-2-carboxylate (6f)**



S135



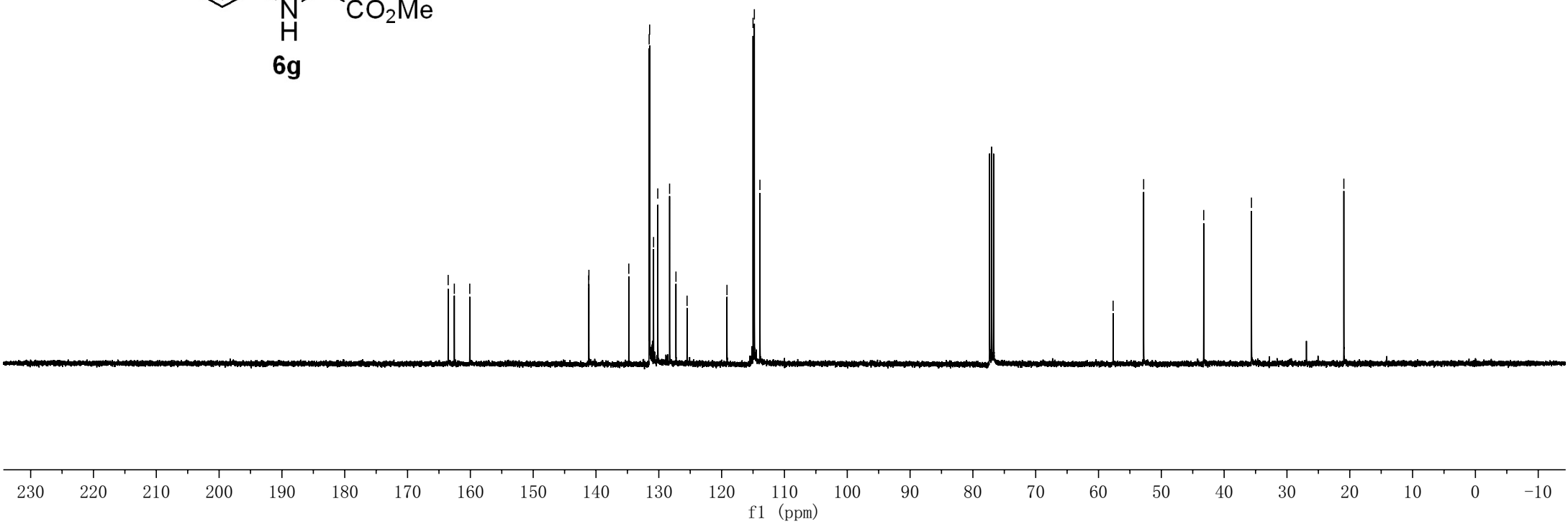
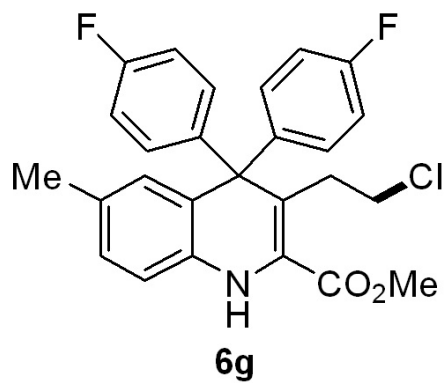
S136

163.535  
162.555  
160.096  
141.162  
141.130  
134.779  
131.538  
131.459  
130.835  
130.165  
128.284  
127.271  
125.502  
119.149  
115.002  
114.792  
113.904

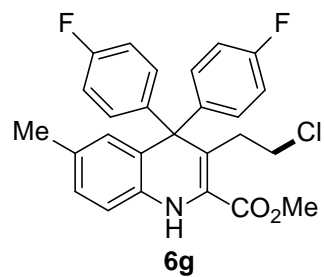
57.672  
52.814  
43.253  
35.651

20.942

<sup>13</sup>C NMR (100M, CDCl<sub>3</sub>)







**Methyl 3-(2-chloroethyl)-4,4-bis(4-fluorophenyl)-6-methyl-1,4-dihydroquinoline-2-carboxylate (6g)**

