

Supplementary Information

Photocatalytic selective synthesis of (*E*)- β -aminovinyl sulfones and (*E*)- β -amidovinyl sulfones

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Content

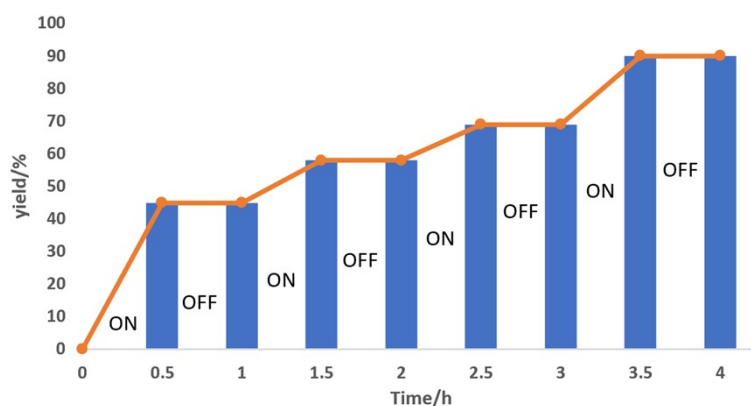
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General Information

^1H NMR (^{13}C NMR) spectra were measured on a Bruker DPX 400 MHz spectrometer in CDCl_3 with chemical shift (δ) given in ppm relative to TMS as internal standard [(s = singlet, d = doublet, t = triplet, brs = broad singlet, m = multiplet), coupling constant (Hz)]. High-resolution mass spectra (HRMS) were obtained on an Agilent mass spectrometer using ESI-TOF (electrospray ionization-time of flight). X-Ray crystallographic analysis was performed with a Siemens SMART CCD and a Siemens P4 diffractometer. Column chromatography was generally performed on silica gel (200-300 mesh) and reactions were monitored with thinlayer chromatography (TLC) using 254 nm UV light. The melting points were measured with digital melting point detector.

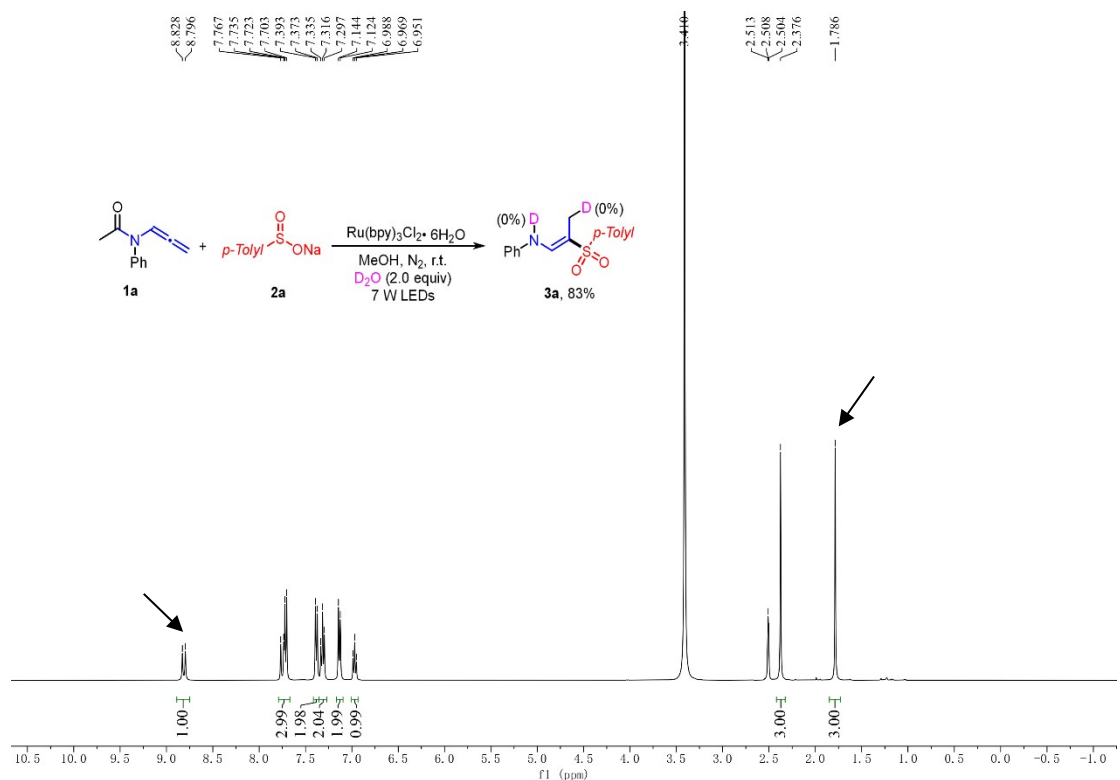
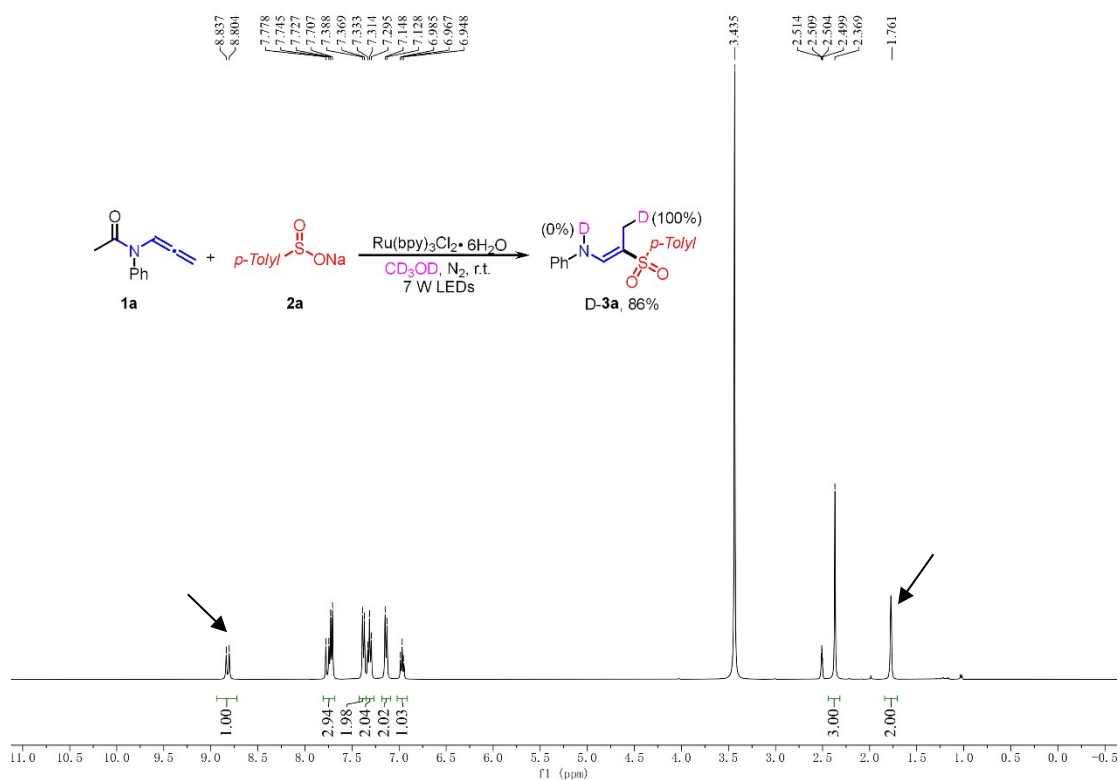
Light/Dark Experiment Procedure

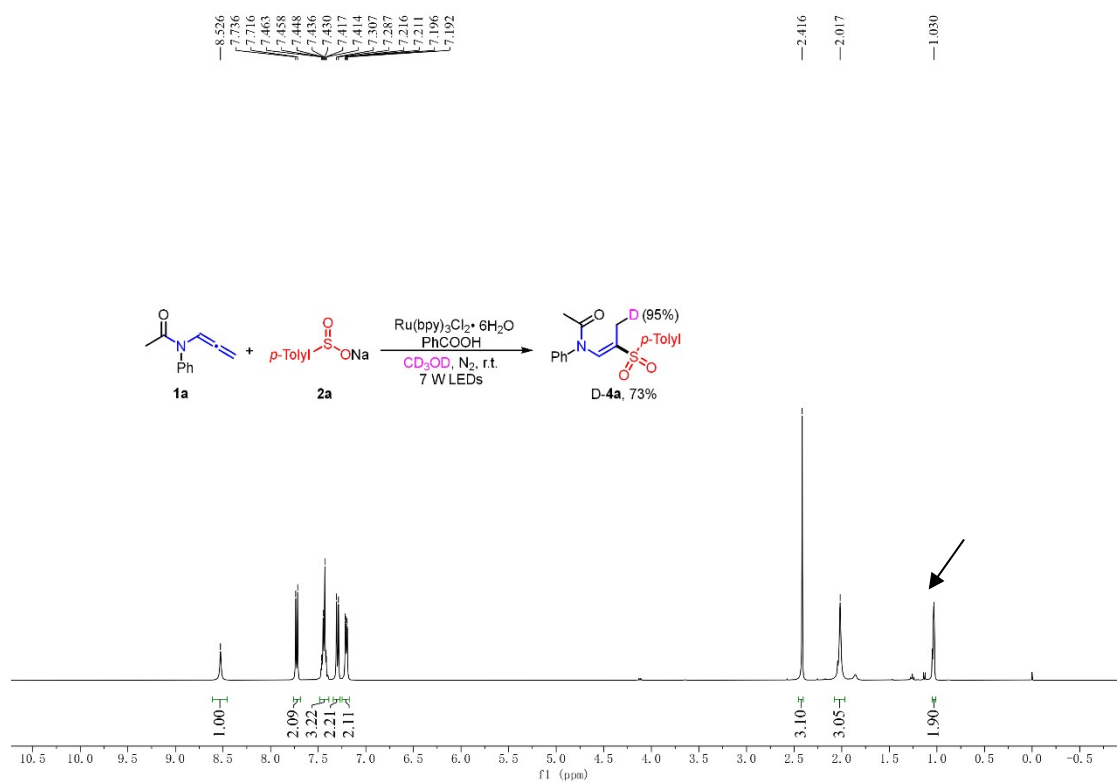
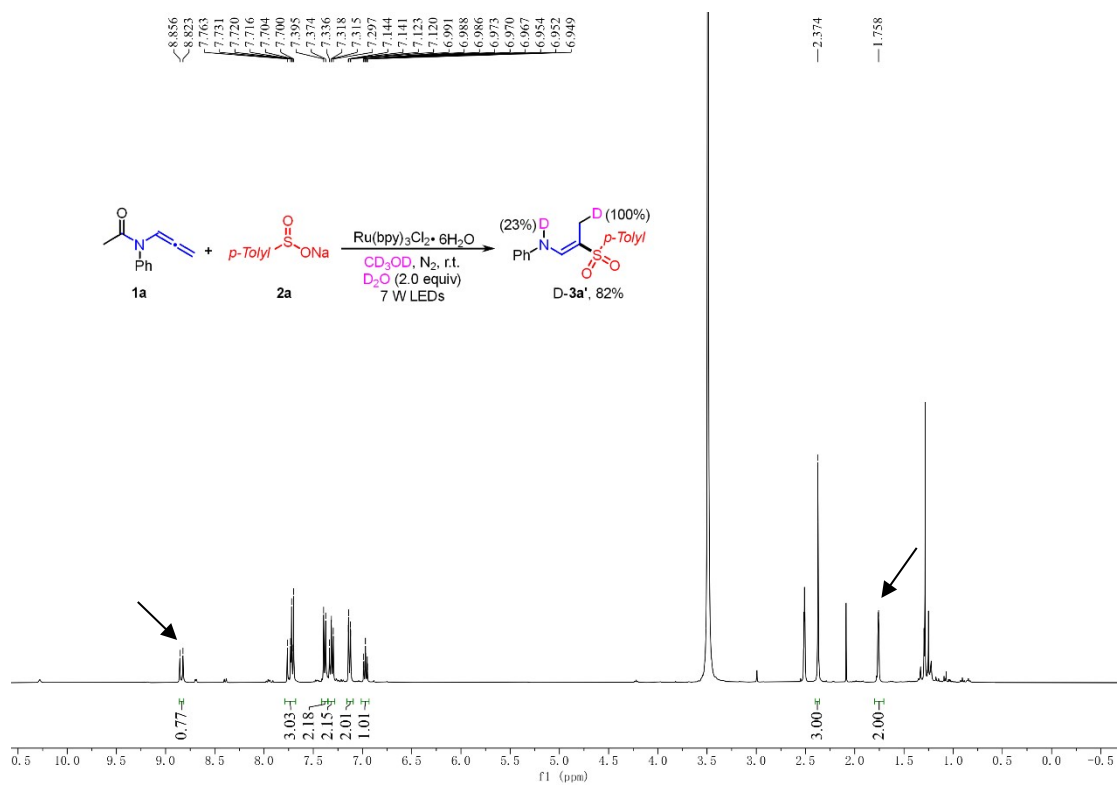
To an oven-dried 10mL Schlenk tube under N_2 conditions, allenamide **1a** (0.2 mmol, 1.0 equiv), sodium sulfinate **2a** (0.4 mmol, 2.0 equiv), $\text{Ru}(\text{bpy})_3\text{Cl}_2 \cdot 6\text{H}_2\text{O}$ (3 mol%) and dry EtOH (2 mL) were successively added. The mixture was degassed by three cycles of freeze-pump-thaw and then placed in the irradiation apparatus equipped with a 7 W blue LED. The light was turned off every one hour, and the reaction was allowed to stir in the dark for one hour before the LED was turned back on. 50 μL samples for analysis were removed via microsyringe immediately before the light was turned off/on. Yields were calculated by ^1H NMR using 1,3,5- trimethoxybenzene as the internal standard. An increase in yield was observed under irradiation, while no significant increase was observed when irradiation was stopped.



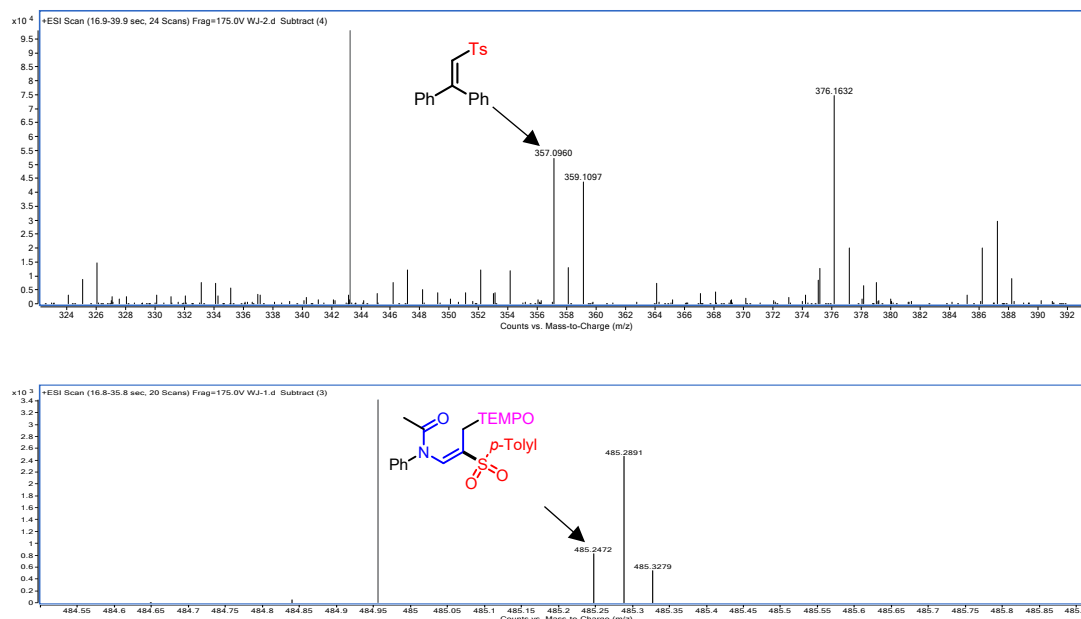
Scheme S1 On/off experiments of **3a**

Deuterium-Labeling Experiment Results

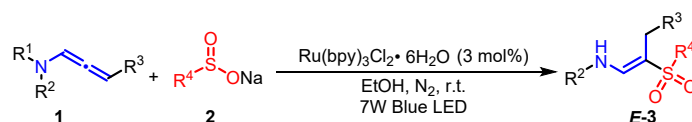




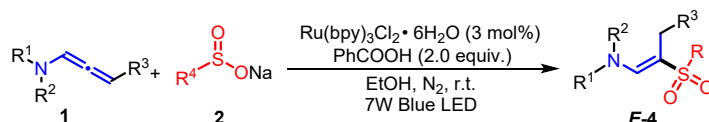
Copies of HRMS Data of reaction mixture:



General Procedure for the Synthesis of Compound 3 and 4

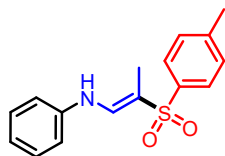


To an oven-dried 10mL Schlenk tube under N_2 conditions, allenamide **1** (0.2 mmol, 1.0 equiv), sodium sulfinate **2** (0.4 mmol, 2.0 equiv), $\text{Ru(bpy)}_3\text{Cl}_2 \cdot 6\text{H}_2\text{O}$ (3 mol%) and dry EtOH (2 mL) were successively added. Then, the resulting mixture was stirred at 25°C for 6 h under 7-W blue LEDs until complete consumption of **1** as monitored by TLC analysis. Evaporate the solvent of the mixture and use PE/EA as the eluent to purify the residue through silica gel column chromatography to obtain the desired product **3**.



To an oven-dried 10mL Schlenk tube under N_2 conditions, allenamide **1** (0.2 mmol, 1.0 equiv), sodium sulfinate **2** (0.4 mmol, 2.0 equiv), $\text{Ru(bpy)}_3\text{Cl}_2 \cdot 6\text{H}_2\text{O}$ (3 mol%), PhCOOH (2.0 equiv.) and dry EtOH (2 mL) were successively added. Then, the resulting mixture was stirred at 25°C for 6 h under 7-W blue LEDs until complete consumption of **1** as monitored by TLC analysis. Evaporate the solvent of the mixture and use PE/EA as the eluent to purify the residue through silica gel column chromatography to obtain the desired product **4**.

Characterization Data of Compounds 3 and 4



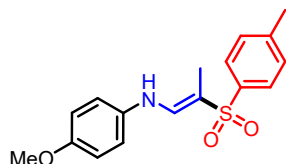
(*E*)-*N*-(2-tosylprop-1-en-1-yl)aniline (**3a**)

White solid; 92% yield; mp: 133.3-136.0°C;

¹H NMR (400 MHz, DMSO-*d*₆) δ 8.82 (d, *J* = 13.2 Hz, 1H), 7.77 (d, *J* = 12.8 Hz, 1H), 7.72 (d, *J* = 8.4 Hz, 2H), 7.38 (d, *J* = 8.0 Hz, 2H), 7.34-7.29 (m, 2H), 7.14 (d, *J* = 8.0 Hz, 2H), 6.97 (t, *J* = 7.2 Hz, 1H), 2.37 (s, 3H), 1.80 (s, 3H).

¹³C NMR (100 MHz, DMSO-*d*₆) δ 143.17, 142.20, 139.19, 137.33, 130.16, 129.99, 127.40, 122.21, 115.83, 106.44, 21.43, 10.38.

HRMS (ESI-TOF) *m/z*: [M+H]⁺ Calcd for C₁₆H₁₈NO₂S⁺ 288.1053; Found 288.1052.



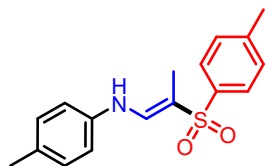
(*E*)-4-methoxy-*N*-(2-tosylprop-1-en-1-yl)aniline (**3b**)

White solid; 64% yield; mp: 145.6-147.1°C;

¹H NMR (400 MHz, DMSO-*d*₆) δ 8.69 (d, *J* = 10.4 Hz, 1H), 7.76-7.61 (m, 3H), 7.41-7.33 (m, 2H), 7.16-7.03 (m, 2H), 6.99-6.86 (m, 2H), 3.71 (s, 3H), 2.36 (s, 3H), 1.75 (s, 3H).

¹³C NMR (100 MHz, DMSO-*d*₆) δ 155.06, 142.99, 139.46, 138.37, 135.73, 130.12, 127.30, 117.39, 115.23, 104.57, 55.71, 21.41, 10.31.

HRMS (ESI-TOF) *m/z*: [M+H]⁺ Calcd for C₁₇H₂₀NO₃S⁺ 318.1158; Found 318.1161.



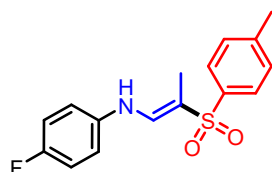
(*E*)-4-methyl-*N*-(2-tosylprop-1-en-1-yl)aniline (**3c**)

White solid; 74% yield; mp: 144.8-145.8°C;

¹H NMR (400 MHz, DMSO-*d*₆) δ 8.76 (d, *J* = 12.8 Hz, 1H), 7.78-7.68 (m, 3H), 7.37 (d, *J* = 8.0 Hz, 2H), 7.12 (d, *J* = 8.0 Hz, 2H), 7.03 (d, *J* = 8.0 Hz, 2H), 2.37 (s, 3H), 2.24 (s, 3H), 1.77 (s, 3H).

¹³C NMR (100 MHz, DMSO-*d*₆) δ 143.06, 139.83, 139.35, 137.68, 131.14, 130.38, 130.13, 127.33, 115.90, 105.55, 21.41, 20.67, 10.34.

HRMS (ESI-TOF) *m/z*: [M+H]⁺ Calcd for C₁₇H₂₀NO₂S⁺ 302.1209; Found 302.1212.



(E)-4-fluoro-N-(2-tosylprop-1-en-1-yl)aniline (3d)

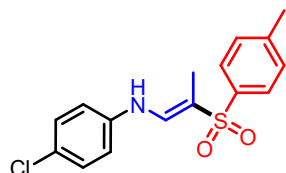
White solid; 69% yield; mp: 136.5-138.8°C;

¹H NMR (400 MHz, DMSO-*d*₆) δ 8.83 (d, *J* = 13.2 Hz, 1H), 7.80-7.64 (m, 3H), 7.38 (d, *J* = 8.4 Hz, 2H), 7.23-7.10 (m, 4H), 2.37 (s, 3H), 1.76 (s, 3H).

¹³C NMR (100 MHz, DMSO-*d*₆) δ 157.97 (d, *J* = 236.6 Hz), 143.17, 139.17, 138.79 (d, *J* = 2.4 Hz), 137.78, 130.15, 127.41, 117.42 (d, *J* = 8.0 Hz), 116.52 (d, *J* = 22.3 Hz), 106.25, 21.42, 10.37.

¹⁹F NMR (376 MHz, DMSO-*d*₆) δ -122.26.

HRMS (ESI-TOF) *m/z*: [M+H]⁺ Calcd for C₁₆H₁₇FNO₂S⁺ 306.0959; Found 306.0963.



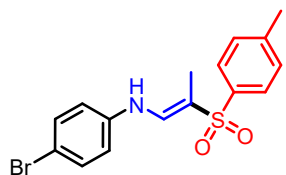
(E)-4-chloro-N-(2-tosylprop-1-en-1-yl)aniline (3e)

White solid; 66% yield; mp: 152.3-154.9°C;

¹H NMR (400 MHz, DMSO-*d*₆) δ 8.91 (d, *J* = 12.8 Hz, 1H), 7.75-7.69 (m, 3H), 7.38 (d, *J* = 8.1 Hz, 2H), 7.35 (d, *J* = 8.8 Hz, 1H), 7.17 (d, *J* = 8.9 Hz, 1H), 2.37 (s, 3H), 1.79 (s, 3H).

¹³C NMR (100 MHz, DMSO-*d*₆) δ 143.27, 141.22, 139.00, 136.95, 130.16, 129.74, 127.46, 125.75, 117.39, 107.45, 21.43, 10.41.

HRMS (ESI-TOF) *m/z*: [M+H]⁺ Calcd for C₁₆H₁₇ClNO₂S⁺ 322.0663; Found 322.0667.



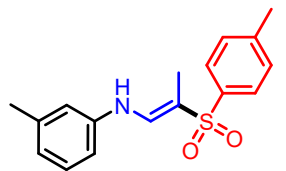
(E)-4-bromo-N-(2-tosylprop-1-en-1-yl)aniline (3f)

White solid; 62% yield; mp: 136.5-138.2°C;

¹H NMR (400 MHz, DMSO-*d*₆) δ 8.91 (d, *J* = 12.8 Hz, 1H), 7.75-7.68 (m, 3H), 7.47 (d, *J* = 8.8 Hz, 2H), 7.38 (d, *J* = 8.0 Hz, 2H), 7.12 (d, *J* = 8.8 Hz, 2H), 2.37 (s, 3H), 1.78 (s, 3H).

¹³C NMR (100 MHz, DMSO-*d*₆) δ 143.28, 141.63, 138.97, 136.81, 132.61, 130.17, 127.46, 117.82, 113.53, 107.60, 21.43, 10.42.

HRMS (ESI-TOF) *m/z*: [M+H]⁺ Calcd for C₁₆H₁₇BrNO₂S⁺ 366.0158; Found 366.0159.



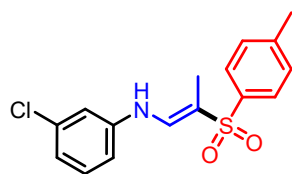
(E)-3-methyl-N-(2-tosylprop-1-en-1-yl)aniline (3g)

White solid; 60% yield; mp: 148.2-149.5°C;

¹H NMR (400 MHz, DMSO-*d*₆) δ 8.76 (d, *J* = 13.2 Hz, 1H), 7.84-7.69 (m, 3H), 7.38 (d, *J* = 8.0 Hz, 2H), 7.19 (t, *J* = 7.6 Hz, 1H), 7.01-6.88 (m, 2H), 6.79 (d, *J* = 7.6 Hz, 1H), 2.37 (s, 3H), 2.30 (s, 3H), 1.79 (s, 3H).

¹³C NMR (100 MHz, DMSO-*d*₆) δ 143.14, 142.15, 139.37, 139.23, 137.36, 130.15, 129.81, 127.38, 123.01, 116.15, 113.20, 106.17, 21.61, 21.42, 10.35.

HRMS (ESI-TOF) m/z : $[M+H]^+$ Calcd for $C_{17}H_{20}NO_2S^+$ 302.1209; Found 302.1212.



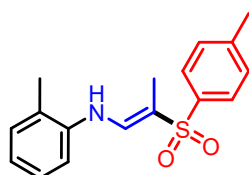
(*E*)-3-chloro-*N*-(2-tosylprop-1-en-1-yl)aniline (3h)

White solid; 57% yield; mp: 148.9-151.3°C;

1H NMR (400 MHz, DMSO- d_6) δ 8.91 (d, J = 12.8 Hz, 1H), 7.80-7.68 (m, 3H), 7.39 (d, J = 8.0 Hz, 2H), 7.32 (t, J = 8.0 Hz, 1H), 7.22 (t, J = 2.0 Hz, 1H), 7.12 (dd, J = 8.0, 2.4 Hz, 1H), 6.99 (dd, J = 8.0, 2.0 Hz, 1H), 2.38 (s, 3H), 1.78 (s, 3H).

^{13}C NMR (100 MHz, DMSO- d_6) δ 143.78, 143.34, 138.88, 136.65, 134.41, 131.57, 130.16, 127.55, 121.66, 115.49, 114.25, 108.18, 21.43, 10.42.

HRMS (ESI-TOF) m/z : $[M+H]^+$ Calcd for $C_{16}H_{17}ClNO_2S^+$ 322.0663; Found 322.0667.



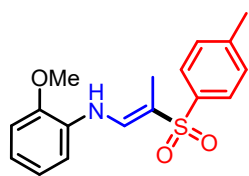
(*E*)-2-methyl-*N*-(2-tosylprop-1-en-1-yl)aniline (3i)

White solid; 59% yield; mp: 129.8-130.4°C;

1H NMR (400 MHz, DMSO- d_6) δ 7.91 (d, J = 12.8 Hz, 1H), 7.71 (d, J = 8.0 Hz, 2H), 7.56 (d, J = 12.8 Hz, 1H), 7.39 (d, J = 8.0 Hz, 2H), 7.27-7.16 (m, 2H), 7.11 (d, J = 8.0 Hz, 1H), 7.01 (t, J = 7.6 Hz, 1H), 2.38 (s, 3H), 2.27 (s, 3H), 1.81 (s, 3H).

^{13}C NMR (100 MHz, DMSO- d_6) δ 143.08, 140.83, 140.32, 139.37, 131.37, 130.15, 128.74, 127.57, 127.36, 123.95, 119.07, 105.82, 21.42, 17.98, 10.26.

HRMS (ESI-TOF) m/z : $[M+H]^+$ Calcd for $C_{17}H_{20}NO_2S^+$ 302.1209; Found 302.1212.



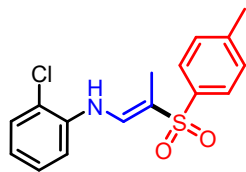
(*E*)-2-methoxy-*N*-(2-tosylprop-1-en-1-yl)aniline (3j)

White solid; 71% yield; mp: 112.9-114.1°C;

1H NMR (400 MHz, DMSO- d_6) δ 7.86 (d, J = 13.2 Hz, 1H), 7.74-7.67 (m, 3H), 7.38 (d, J = 8.0 Hz, 2H), 7.16 (dd, J = 7.6, 1.2 Hz, 1H), 7.07-6.99 (m, 2H), 6.98-6.93 (m, 1H), 3.83 (s, 3H), 2.37 (s, 3H), 1.78 (s, 3H).

^{13}C NMR (100 MHz, DMSO- d_6) δ 149.41, 143.12, 139.32, 138.99, 131.00, 130.15, 127.33, 123.65, 121.59, 117.19, 112.26, 106.20, 56.21, 21.42, 10.05.

HRMS (ESI-TOF) m/z : $[M+H]^+$ Calcd for $C_{17}H_{20}NO_3S^+$ 318.1158; Found 318.1161.



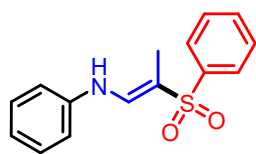
(E)-2-chloro-N-(2-tosylprop-1-en-1-yl)aniline (3k)

White solid; 70% yield; mp: 129.6-130.1°C;

¹H NMR (400 MHz, DMSO-*d*₆) δ 8.07 (d, *J* = 12.4 Hz, 1H), 7.73 (d, *J* = 8.4 Hz, 2H), 7.63 (dd, *J* = 12.8, 1.2 Hz, 1H), 7.48 (dd, *J* = 7.6, 1.2 Hz, 1H), 7.40 (d, *J* = 8.0 Hz, 2H), 7.37-7.32 (m, 2H), 7.14-7.06 (m, 1H), 2.38 (s, 3H), 1.81 (s, 3H).

¹³C NMR (100 MHz, DMSO-*d*₆) δ 143.38, 138.87, 138.78, 130.56, 130.21, 128.95, 127.51, 124.73, 123.70, 120.11, 108.44, 21.44, 10.19.

HRMS (ESI-TOF) *m/z*: [M+H]⁺ Calcd for C₁₆H₁₇ClNO₂S⁺ 322.0663; Found 322.0667.



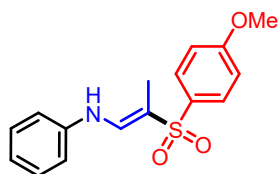
(E)-N-(2-(phenylsulfonyl)prop-1-en-1-yl)aniline (3m)

White solid; 68% yield; mp: 132.2-133.4°C;

¹H NMR (400 MHz, DMSO-*d*₆) δ 8.87 (d, *J* = 12.8 Hz, 1H), 7.85 (d, *J* = 6.8 Hz, 2H), 7.79 (d, *J* = 12.8 Hz, 1H), 7.67-7.55 (m, 3H), 7.32 (t, *J* = 8.0 Hz, 2H), 7.16 (d, *J* = 8.0 Hz, 2H), 6.98 (t, *J* = 7.6 Hz, 1H), 1.81 (s, 3H).

¹³C NMR (100 MHz, DMSO-*d*₆) δ 142.15, 142.07, 137.77, 132.87, 129.99, 129.72, 127.32, 122.31, 115.91, 106.06, 10.40.

HRMS (ESI-TOF) *m/z*: [M+H]⁺ Calcd for C₁₅H₁₆NO₂S⁺ 274.0896; Found 274.0898.



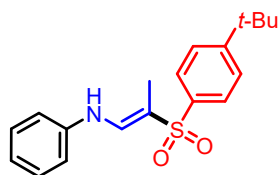
(E)-N-(2-((4-methoxyphenyl)sulfonyl)prop-1-en-1-yl)aniline (3n)

White solid; 53% yield; mp: 129.1-132.3°C;

¹H NMR (400 MHz, DMSO-*d*₆) δ 8.79 (d, *J* = 12.8 Hz, 1H), 7.81-7.71 (m, 3H), 7.35-7.27 (m, 2H), 7.13 (d, *J* = 7.6 Hz, 2H), 7.10 (d, *J* = 8.8 Hz, 2H), 6.96 (t, *J* = 7.3 Hz, 1H), 3.83 (s, 3H), 1.79 (s, 3H).

¹³C NMR (100 MHz, DMSO-*d*₆) δ 162.65, 142.26, 136.88, 133.65, 129.98, 129.55, 122.12, 115.77, 114.87, 106.94, 56.10, 10.37.

HRMS (ESI-TOF) *m/z*: [M+H]⁺ Calcd for C₁₆H₁₈NO₃S⁺ 304.1002; Found 304.1006.



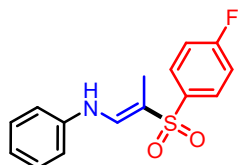
(E)-N-(2-((4-(tert-butyl)phenyl)sulfonyl)prop-1-en-1-yl)aniline (3o)

White solid; 59% yield; mp: 142.6-145.2°C;

¹H NMR (400 MHz, DMSO-*d*₆) δ 8.83 (d, *J* = 12.8 Hz, 1H), 7.79-7.72 (m, 3H), 7.59 (d, *J* = 8.0 Hz, 2H), 7.31 (t, *J* = 7.6 Hz, 2H), 7.14 (d, *J* = 8.0 Hz, 2H), 7.01-6.93 (m, 1H), 1.81 (s, 3H), 1.28 (s, 9H).

¹³C NMR (100 MHz, DMSO-*d*₆) δ 155.81, 142.20, 139.30, 137.45, 129.99, 127.21, 126.54, 122.23, 115.85, 106.49, 35.26, 31.26, 10.46.

HRMS (ESI-TOF) *m/z*: [M+H]⁺ Calcd for C₁₉H₂₄NO₂S⁺ 330.1522; Found 330.1525.



(*E*)-N-(2-((4-fluorophenyl)sulfonyl)prop-1-en-1-yl)aniline (3p)

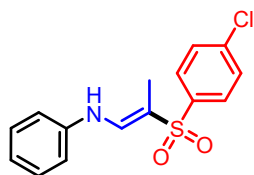
White solid; 71% yield; mp: 143.7-144.4°C;

¹H NMR (400 MHz, DMSO-*d*₆) δ 8.89 (d, *J* = 13.2 Hz, 1H), 7.92 (dd, *J* = 8.4, 5.2 Hz, 2H), 7.79 (d, *J* = 12.8 Hz, 1H), 7.41 (t, *J* = 8.8 Hz, 2H), 7.32 (t, *J* = 8.0 Hz, 2H), 7.16 (d, *J* = 8.0 Hz, 2H), 6.98 (t, *J* = 7.6 Hz, 1H), 1.81 (s, 3H).

¹³C NMR (100 MHz, DMSO-*d*₆) δ 164.63 (d, *J* = 249.4 Hz), 142.10, 138.48 (d, *J* = 2.9 Hz), 137.97, 130.41 (d, *J* = 9.4 Hz), 129.97, 122.36, 116.82 (d, *J* = 22.5 Hz), 115.97, 105.81, 10.32.

¹⁹F NMR (376 MHz, DMSO-*d*₆) δ -107.02.

HRMS (ESI-TOF) *m/z*: [M+H]⁺ Calcd for C₁₅H₁₅FNO₂S⁺ 292.0802; Found 292.0807.



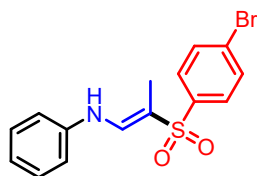
(*E*)-N-(2-((4-chlorophenyl)sulfonyl)prop-1-en-1-yl)aniline (3q)

White solid; 85% yield; mp: 161.5-162.7°C;

¹H NMR (400 MHz, DMSO-*d*₆) δ 8.93 (d, *J* = 12.8 Hz, 1H), 7.86 (d, *J* = 8.4 Hz, 2H), 7.80 (d, *J* = 13.2 Hz, 1H), 7.64 (d, *J* = 8.4 Hz, 2H), 7.32 (t, *J* = 7.6 Hz, 2H), 7.16 (d, *J* = 8.0 Hz, 2H), 6.98 (t, *J* = 7.6 Hz, 1H), 1.81 (s, 3H).

¹³C NMR (100 MHz, DMSO-*d*₆) δ 142.04, 141.02, 138.30, 137.78, 129.98, 129.83, 129.33, 122.44, 116.02, 105.44, 10.31.

HRMS (ESI-TOF) *m/z*: [M+H]⁺ Calcd for C₁₅H₁₅ClNO₂S⁺ 308.0507; Found 308.0511.



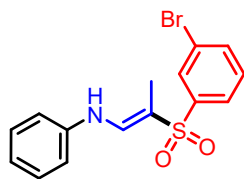
(*E*)-N-(2-((4-bromophenyl)sulfonyl)prop-1-en-1-yl)aniline (3r)

White solid; 69% yield; mp: 168.8-170.1°C;

¹H NMR (400 MHz, DMSO-*d*₆) δ 8.93 (d, *J* = 12.8 Hz, 1H), 7.86-7.74 (m, 5H), 7.32 (t, *J* = 7.6 Hz, 2H), 7.16 (d, *J* = 8.0 Hz, 2H), 6.98 (t, *J* = 7.6 Hz, 1H), 1.81 (s, 3H).

¹³C NMR (100 MHz, DMSO-*d*₆) δ 142.03, 141.44, 138.32, 132.78, 129.98, 129.43, 126.74, 122.45, 116.02, 105.38, 10.31.

HRMS (ESI-TOF) m/z : $[M+H]^+$ Calcd for $C_{15}H_{15}BrNO_2S^+$ 352.0001; Found 352.0002.



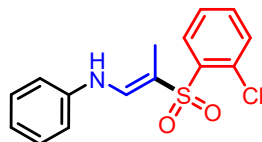
(*E*)-*N*-(2-((3-bromophenyl)sulfonyl)prop-1-en-1-yl)aniline (3s)

White solid; 36% yield; mp: 153.2-156.5°C;

1H NMR (400 MHz, $DMSO-d_6$) δ 8.95 (d, $J = 13.2$ Hz, 1H), 8.00 (s, 1H), 7.88-7.78 (m, 3H), 7.55 (t, $J = 8.0$ Hz, 1H), 7.33 (t, $J = 7.6$ Hz, 2H), 7.18 (d, $J = 8.0$ Hz, 2H), 6.99 (t, $J = 7.2$ Hz, 1H), 1.82 (s, 3H).

^{13}C NMR (100 MHz, $DMSO-d_6$) δ 144.31, 141.98, 138.80, 135.76, 132.01, 129.96, 129.60, 126.51, 122.69, 122.51, 116.13, 104.97, 10.33.

HRMS (ESI-TOF) m/z : $[M+H]^+$ Calcd for $C_{15}H_{15}BrNO_2S^+$ 352.0001; Found 352.0002.



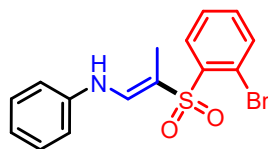
(*E*)-*N*-(2-((2-chlorophenyl)sulfonyl)prop-1-en-1-yl)aniline (3t)

White solid; 35% yield; mp: 168.9-170.0°C;

1H NMR (400 MHz, $DMSO-d_6$) δ 9.07 (d, $J = 13.2$ Hz, 1H), 8.09 (dd, $J = 7.6, 1.6$ Hz, 1H), 7.86 (d, $J = 13.2$ Hz, 1H), 7.70-7.55 (m, 3H), 7.34 (t, $J = 7.6$ Hz, 2H), 7.14 (d, $J = 8.0$ Hz, 2H), 7.00 (t, $J = 7.6$ Hz, 1H), 1.75 (s, 3H).

^{13}C NMR (100 MHz, $DMSO-d_6$) δ 142.05, 140.46, 137.84, 134.84, 132.63, 131.64, 131.22, 130.13, 128.28, 122.60, 115.98, 103.31, 10.20.

HRMS (ESI-TOF) m/z : $[M+H]^+$ Calcd for $C_{15}H_{15}ClNO_2S^+$ 308.0507; Found 308.0511.



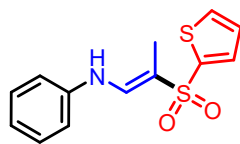
(*E*)-*N*-(2-((2-bromophenyl)sulfonyl)prop-1-en-1-yl)aniline (3u).

White solid; 32% yield; mp: 184.5-186.6°C;

1H NMR (400 MHz, $DMSO-d_6$) δ 9.06 (d, $J = 12.8$ Hz, 1H), 8.13 (dd, $J = 7.6, 1.6$ Hz, 1H), 7.89 (d, $J = 13.2$ Hz, 1H), 7.83 (dd, $J = 8.0, 1.2$ Hz, 1H), 7.67-7.61 (m, 1H), 7.59-7.52 (m, 1H), 7.37-7.29 (m, 2H), 7.16 (d, $J = 8.0$ Hz, 2H), 7.00 (t, $J = 7.2$ Hz, 1H), 1.73 (s, 3H).

^{13}C NMR (100 MHz, $DMSO-d_6$) δ 142.08, 140.90, 139.21, 136.17, 134.79, 131.89, 130.12, 128.78, 122.58, 120.00, 116.06, 102.84, 10.23.

HRMS (ESI-TOF) m/z : $[M+H]^+$ Calcd for $C_{15}H_{15}BrNO_2S^+$ 352.0001; Found 352.0002.



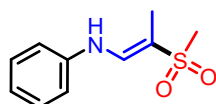
(*E*)-*N*-(2-(thiophen-2-ylsulfonyl)prop-1-en-1-yl)aniline (3v).

White solid; 44% yield; mp: 121.8-123.5°C;

¹H NMR (400 MHz, DMSO-*d*₆) δ 8.94 (d, *J* = 13.2 Hz, 1H), 7.94 (dd, *J* = 4.8, 1.2 Hz, 1H), 7.77 (d, *J* = 12.8 Hz, 1H), 7.65 (dd, *J* = 3.6, 1.2 Hz, 1H), 7.32 (t, *J* = 8.0 Hz, 2H), 7.19 (dd, *J* = 4.8, 3.6 Hz, 1H), 7.14 (d, *J* = 8.0 Hz, 2H), 6.98 (t, *J* = 7.6 Hz, 1H), 1.91 (s, 3H).

¹³C NMR (100 MHz, DMSO-*d*₆) δ 143.93, 142.02, 137.59, 133.56, 132.58, 130.04, 128.49, 122.47, 115.96, 106.80, 10.42.

HRMS (ESI-TOF) *m/z*: [M+H]⁺ Calcd for C₁₃H₁₄NO₂S₂⁺ 280.0460; Found 280.0468.



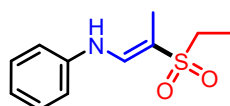
(E)-N-(2-(methylsulfonyl)prop-1-en-1-yl)aniline (3w)

White solid; 51% yield; mp: 130.6-132.9°C;

¹H NMR (400 MHz, DMSO-*d*₆) δ 8.73 (d, *J* = 12.8 Hz, 1H), 7.52 (d, *J* = 12.8 Hz, 1H), 7.30 (t, *J* = 7.6 Hz, 2H), 7.09 (d, *J* = 7.6 Hz, 2H), 6.94 (t, *J* = 7.6 Hz, 1H), 2.94 (s, 3H), 1.99 (s, 3H).

¹³C NMR (100 MHz, DMSO-*d*₆) δ 142.39, 136.76, 129.97, 121.95, 115.59, 107.11, 42.13, 10.56.

HRMS (ESI-TOF) *m/z*: [M+H]⁺ Calcd for C₁₀H₁₄NO₂S⁺ 212.0740; Found 212.0746.



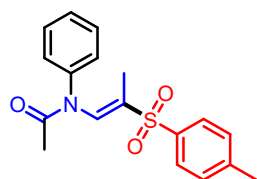
(E)-N-(2-(ethylsulfonyl)prop-1-en-1-yl)aniline (3x)

White solid; 69% yield; mp: 104.9-106.4°C;

¹H NMR (400 MHz, DMSO-*d*₆) δ 8.78 (d, *J* = 12.8 Hz, 1H), 7.47 (d, *J* = 13.2 Hz, 1H), 7.30 (t, *J* = 8.0 Hz, 2H), 7.08 (d, *J* = 8.0 Hz, 2H), 6.95 (t, *J* = 7.6 Hz, 1H), 3.00 (q, *J* = 7.2 Hz, 2H), 1.95 (s, 3H), 1.12 (t, *J* = 7.6 Hz, 3H).

¹³C NMR (100 MHz, DMSO-*d*₆) δ 142.32, 137.78, 129.99, 122.01, 115.60, 104.29, 46.98, 10.66, 7.88.

HRMS (ESI-TOF) *m/z*: [M+H]⁺ Calcd for C₁₁H₁₆NO₂S⁺ 226.0896; Found 226.0903.



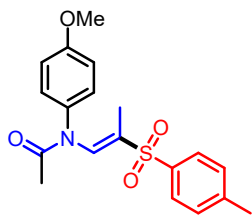
(E)-N-phenyl-N-(2-(tosyl)prop-1-en-1-yl)acetamide (4a)

White solid; 79% yield; mp: 165.5-166.6°C;

¹H NMR (400 MHz, Chloroform-*d*) δ 8.53 (s, 1H), 7.73 (d, *J* = 8.0 Hz, 2H), 7.51-7.40 (m, 3H), 7.30 (d, *J* = 8.0 Hz, 2H), 7.24-7.17 (m, 2H), 2.42 (s, 3H), 2.02 (s, 3H), 1.05 (s, 3H).

¹³C NMR (100 MHz, Chloroform-*d*) δ 170.63, 143.83, 139.71, 136.83, 134.47, 129.95, 129.71, 129.21, 128.63, 127.94, 120.73, 22.99, 21.56, 10.71.

HRMS (ESI-TOF) *m/z*: [M+H]⁺ Calcd for C₁₈H₂₀NO₃S⁺ 330.1158; Found 330.1159.



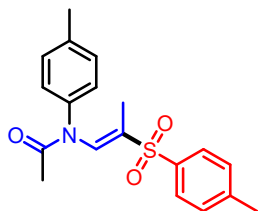
(*E*)-*N*-(4-methoxyphenyl)-*N*-(2-tosylprop-1-en-1-yl)acetamide (4b)

White solid; 86% yield; mp: 133.2-134.7°C;

¹H NMR (400 MHz, Chloroform-*d*) δ 8.53 (s, 1H), 7.72 (d, *J* = 8.0 Hz, 2H), 7.29 (d, *J* = 8.0 Hz, 2H), 7.10 (d, *J* = 8.8 Hz, 2H), 6.93 (d, *J* = 8.8 Hz, 2H), 3.83 (s, 3H), 2.41 (s, 3H), 2.00 (s, 3H), 1.10 (s, 3H).

¹³C NMR (100 MHz, Chloroform-*d*) δ 171.08, 159.86, 143.75, 136.96, 134.58, 132.23, 129.70, 129.68, 127.94, 120.21, 114.98, 55.58, 22.93, 21.56, 10.70.

HRMS (ESI-TOF) *m/z*: [M+H]⁺ Calcd for C₁₉H₂₂NO₄S⁺ 360.1264; Found 360.1268.



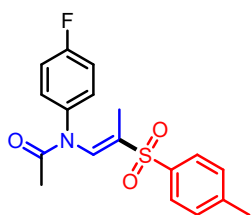
(*E*)-*N*-(p-tolyl)-*N*-(2-tosylprop-1-en-1-yl)acetamide (4c)

White solid; 77% yield; mp: 132.8-133.3°C;

¹H NMR (400 MHz, Chloroform-*d*) δ 8.52 (s, 1H), 7.72 (d, *J* = 8.4 Hz, 2H), 7.29 (d, *J* = 9.2 Hz, 2H), 7.23 (d, *J* = 7.6 Hz, 2H), 7.07 (d, *J* = 8.4 Hz, 2H), 2.42 (s, 3H), 2.39 (s, 3H), 2.00 (s, 3H), 1.07 (s, 3H).

¹³C NMR (100 MHz, Chloroform-*d*) δ 170.91, 143.78, 139.39, 137.02, 136.88, 134.48, 130.52, 129.70, 128.35, 127.94, 120.36, 22.98, 21.59, 21.20, 10.73.

HRMS (ESI-TOF) *m/z*: [M+H]⁺ Calcd for C₁₉H₂₂NO₃S⁺ 344.1315; Found 344.1322.



(*E*)-*N*-(4-fluorophenyl)-*N*-(2-tosylprop-1-en-1-yl)acetamide (4d)

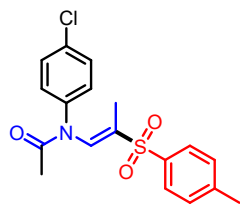
White solid; 85% yield; mp: 125.9-126.7°C;

¹H NMR (400 MHz, Chloroform-*d*) δ 8.49 (s, 1H), 7.72 (d, *J* = 8.4 Hz, 2H), 7.31 (d, *J* = 8.0 Hz, 2H), 7.24-7.18 (m, 2H), 7.18-7.11 (m, 2H), 2.42 (s, 3H), 2.03 (s, 3H), 1.10 (s, 3H).

¹³C NMR (100 MHz, Chloroform-*d*) δ 170.56, 162.41 (d, *J* = 249.2 Hz), 143.99, 136.61, 135.68, 134.46, 130.40 (d, *J* = 8.5 Hz), 129.78, 127.97, 120.88, 117.0 (d, *J* = 22.8), 22.99, 21.60, 10.89.

¹⁹F NMR (376 MHz, Chloroform-*d*) δ -110.69.

HRMS (ESI-TOF) *m/z*: [M+H]⁺ Calcd for C₁₈H₁₉FNO₃S⁺ 348.1064; Found 348.1066.



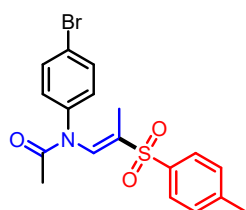
(E)-N-(4-chlorophenyl)-N-(2-tosylprop-1-en-1-yl)acetamide (4e)

White solid; 84% yield; mp: 111.8-113.9°C;

¹H NMR (400 MHz, Chloroform-*d*) δ 8.43 (s, 1H), 7.72 (d, *J* = 8.4 Hz, 2H), 7.42 (d, *J* = 8.8 Hz, 2H), 7.31 (d, *J* = 8.0 Hz, 2H), 7.15 (d, *J* = 8.4 Hz, 2H), 2.42 (s, 3H), 2.05 (s, 3H), 1.12 (s, 3H).

¹³C NMR (100 MHz, Chloroform-*d*) δ 170.29, 144.02, 138.25, 136.59, 135.05, 134.51, 130.16, 129.82, 129.78, 127.98, 121.59, 22.96, 21.58, 11.11.

HRMS (ESI-TOF) *m/z*: [M+H]⁺ Calcd for C₁₈H₁₉ClNO₃S⁺ 364.0769; Found 364.0773.



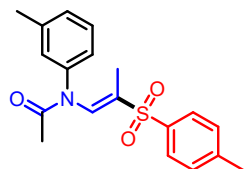
(E)-N-(4-bromophenyl)-N-(2-tosylprop-1-en-1-yl)acetamide (4f)

White solid; 79% yield; mp: 154.5-156.2°C;

¹H NMR (400 MHz, Chloroform-*d*) δ 8.43 (s, 1H), 7.72 (d, *J* = 8.0 Hz, 2H), 7.58 (d, *J* = 8.4 Hz, 2H), 7.31 (d, *J* = 8.0 Hz, 2H), 7.09 (d, *J* = 8.4 Hz, 2H), 2.42 (s, 3H), 2.05 (s, 3H), 1.12 (s, 3H).

¹³C NMR (100 MHz, Chloroform-*d*) δ 170.26, 144.05, 138.75, 136.53, 134.45, 133.17, 130.13, 129.80, 127.98, 123.02, 121.57, 23.01, 21.61, 11.15.

HRMS (ESI-TOF) *m/z*: [M+H]⁺ Calcd for C₁₈H₁₉BrNO₃S⁺ 408.0264; Found 408.0271.



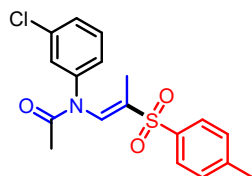
(E)-N-(m-tolyl)-N-(2-tosylprop-1-en-1-yl)acetamide (4g)

White solid; 60% yield; mp: 152.5-154.3°C;

¹H NMR (400 MHz, Chloroform-*d*) δ 8.51 (s, 1H), 7.73 (d, *J* = 8.4 Hz, 2H), 7.33-7.26 (m, 3H), 7.22 (d, *J* = 7.6 Hz, 1H), 7.03-6.97 (m, 2H), 2.42 (s, 3H), 2.36 (s, 3H), 2.02 (s, 3H), 1.06 (s, 3H).

¹³C NMR (100 MHz, Chloroform-*d*) δ 170.75, 143.80, 140.20, 139.57, 136.84, 134.42, 129.96, 129.70, 129.66, 129.06, 127.97, 125.65, 120.46, 22.99, 21.60, 21.28, 10.73.

HRMS (ESI-TOF) *m/z*: [M+H]⁺ Calcd for C₁₉H₂₂NO₃S⁺ 344.1315; Found 344.1322.



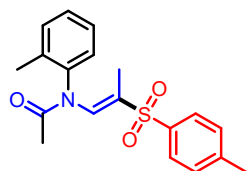
(E)-N-(3-chlorophenyl)-N-(2-tosylprop-1-en-1-yl)acetamide (4h)

White solid; 57% yield; mp: 156.8-158.1°C;

¹H NMR (400 MHz, Chloroform-*d*) δ 8.42 (s, 1H), 7.73 (d, *J* = 8.4 Hz, 2H), 7.43-7.34 (m, 2H), 7.31 (d, *J* = 8.0 Hz, 2H), 7.24-7.20 (m, 1H), 7.18-7.08 (m, 1H), 2.42 (s, 3H), 2.07 (s, 3H), 1.12 (s, 3H).

¹³C NMR (100 MHz, Chloroform-*d*) δ 170.16, 144.08, 140.81, 136.48, 135.52, 134.33, 130.91, 129.81, 129.43, 128.73, 128.00, 126.84, 121.70, 23.01, 21.61, 11.10.

HRMS (ESI-TOF) *m/z*: [M+H]⁺ Calcd for C₁₈H₁₉ClNO₃S⁺ 364.0769; Found 364.0773.



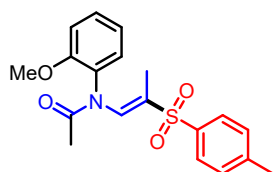
(*E*)-N-(*o*-tolyl)-N-(2-tosylprop-1-en-1-yl)acetamide (4i)

White solid; 55% yield; mp: 129.6-130.4°C;

¹H NMR (400 MHz, Chloroform-*d*) δ 8.65 (s, 1H), 7.72 (d, *J* = 7.6 Hz, 2H), 7.38-7.22 (m, 5H), 7.14 (d, *J* = 7.6 Hz, 1H), 2.42 (s, 3H), 2.13 (s, 3H), 1.91 (s, 3H), 0.98 (s, 3H).

¹³C NMR (100 MHz, Chloroform-*d*) δ 170.59, 143.78, 138.23, 136.94, 136.35, 132.84, 131.44, 129.87, 129.70, 129.28, 127.94, 127.60, 119.11, 22.60, 21.60, 17.56, 9.76.

HRMS (ESI-TOF) *m/z*: [M+H]⁺ Calcd for C₁₉H₂₂NO₃S⁺ 344.1315; Found 344.1322.



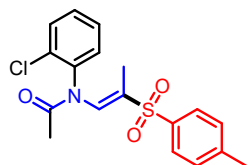
(*E*)-N-(2-methoxyphenyl)-N-(2-tosylprop-1-en-1-yl)acetamide (4j)

White solid; 66% yield; mp: 131.6-132.5°C;

¹H NMR (400 MHz, Chloroform-*d*) δ 8.52 (s, 1H), 7.73 (d, *J* = 8.4 Hz, 2H), 7.40 (t, *J* = 8.0 Hz, 1H), 7.30 (s, 1H), 7.15 (dd, *J* = 8.0, 1.6 Hz, 1H), 7.00 (dd, *J* = 7.6, 1.2 Hz, 1H), 6.96 (dd, *J* = 8.2, 1.2 Hz, 1H), 3.79 (s, 3H), 2.41 (s, 3H), 1.06 (s, 3H).

¹³C NMR (100 MHz, Chloroform-*d*) δ 171.14, 155.38, 143.64, 137.09, 134.65, 130.96, 130.00, 129.62, 128.19, 127.91, 121.21, 119.45, 111.87, 55.68, 22.12, 21.59, 10.07.

HRMS (ESI-TOF) *m/z*: [M+H]⁺ Calcd for C₁₉H₂₂NO₄S⁺ 360.1264; Found 360.1268.



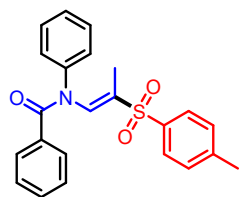
(*E*)-N-(2-chlorophenyl)-N-(2-tosylprop-1-en-1-yl)acetamide (4k)

White solid; 73% yield; mp: 133.2-134.7°C;

¹H NMR (400 MHz, Chloroform-*d*) δ 8.57 (s, 1H), 7.73 (d, *J* = 8.0 Hz, 2H), 7.51 (dd, *J* = 7.2, 2.0 Hz, 1H), 7.45-7.36 (m, 2H), 7.35-7.27 (m, 3H), 2.42 (s, 3H), 1.96 (s, 3H), 1.06 (s, 3H).

¹³C NMR (100 MHz, Chloroform-*d*) δ 170.00, 143.87, 137.20, 136.73, 133.78, 133.44, 131.01, 130.83, 130.68, 129.72, 128.46, 127.94, 119.92, 22.36, 21.60, 9.99.

HRMS (ESI-TOF) *m/z*: [M+H]⁺ Calcd for C₁₈H₁₉ClNO₃S⁺ 364.0769; Found 364.0773.



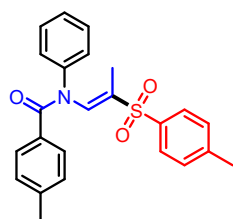
(*E*)-*N*-phenyl-*N*-(2-tosylprop-1-en-1-yl)benzamide (4l)

White solid; 84% yield; mp: 183.5-186.5°C;

¹H NMR (400 MHz, Chloroform-*d*) δ 8.10 (d, *J* = 1.2 Hz, 1H), 7.74 (d, *J* = 8.0 Hz, 2H), 7.46-7.42 (m, 2H), 7.41-7.38 (m, 1H), 7.34-7.31 (m, 3H), 7.31-7.24 (m, 4H), 7.11-7.08 (m, 2H), 2.44 (s, 3H), 1.26 (s, 3H).

¹³C NMR (100 MHz, Chloroform-*d*) δ 170.55, 144.14, 140.34, 137.41, 136.57, 133.97, 131.44, 129.85, 129.49, 129.24, 128.25, 127.97, 127.88, 127.72, 124.62, 21.65, 11.93.

HRMS (ESI-TOF) *m/z*: [M+H]⁺ Calcd for C₂₃H₂₂NO₃S⁺ 392.1315; Found 392.1316.



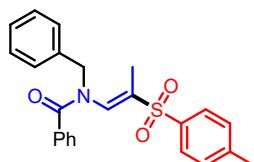
(*E*)-4-methyl-*N*-phenyl-*N*-(2-tosylprop-1-en-1-yl)benzamide (4m)

White solid; 57% yield; mp: 150.1-151.4°C;

¹H NMR (400 MHz, Chloroform-*d*) δ 8.08 (d, *J* = 1.6 Hz, 1H), 7.74 (d, *J* = 8.0 Hz, 2H), 7.37-7.28 (m, 6H), 7.27-7.24 (m, 1H), 7.12-7.07 (m, 4H), 2.44 (s, 3H), 2.34 (s, 3H), 1.25 (s, 3H).

¹³C NMR (100 MHz, Chloroform-*d*) δ 170.58, 144.06, 142.15, 140.54, 137.79, 136.70, 131.03, 129.81, 129.46, 128.93, 127.94, 127.74, 127.65, 124.23, 21.62, 21.56, 11.93.

HRMS (ESI-TOF) *m/z*: [M+H]⁺ Calcd for C₂₄H₂₄NO₃S⁺ 406.1471; Found 406.1476.



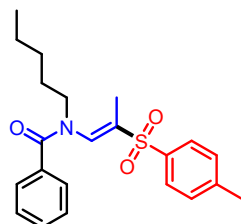
(*E*)-*N*-benzyl-*N*-(2-tosylprop-1-en-1-yl)acetamide (4n)

White solid; 67% yield; mp: 100.5-102.2°C;

¹H NMR (400 MHz, Chloroform-*d*) δ 7.51 (s, 1H), 7.44 (d, *J* = 7.6 Hz, 2H), 7.39 (d, *J* = 8.0 Hz, 2H), 7.35 (d, *J* = 7.6 Hz, 1H), 7.27 (s, 1H), 7.26-7.21 (m, 4H), 7.20-7.13 (m, 4H), 4.89 (s, 2H), 2.35 (s, 3H), 1.40 (d, *J* = 1.3 Hz, 3H).

¹³C NMR (100 MHz, Chloroform-*d*) δ 170.93, 144.21, 138.51, 136.34, 136.01, 134.39, 131.46, 129.75, 128.86, 128.56, 128.40, 128.29, 127.78, 127.42, 50.92, 21.60, 12.33, 1.04.

HRMS (ESI-TOF) *m/z*: [M+H]⁺ Calcd for C₂₄H₂₄NO₃S⁺ 406.1471; Found 406.1476.



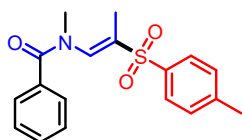
(E)-N-pentyl-N-(2-tosylprop-1-en-1-yl)benzamide (4o)

White solid; 63% yield; mp: 95.5-97.9°C;

¹H NMR (400 MHz, Chloroform-*d*) δ 7.58 (d, *J* = 8.0 Hz, 2H), 7.52 (d, *J* = 1.2 Hz, 1H), 7.46-7.42 (m, 2H), 7.41-7.38 (m, 1H), 7.33-7.27 (m, 4H), 3.75-3.69 (m, 2H), 2.44 (s, 3H), 1.69-1.59 (m, 5H), 1.41-1.23 (m, 4H), 0.89 (t, *J* = 6.9 Hz, 3H).

¹³C NMR (100 MHz, Chloroform-*d*) δ 170.97, 144.26, 138.67, 136.20, 134.81, 131.19, 129.81, 128.43, 128.32, 127.86, 126.87, 47.63, 28.91, 28.07, 22.36, 21.62, 13.98, 12.39.

HRMS (ESI-TOF) *m/z*: [M+H]⁺ Calcd for C₂₂H₂₈NO₃S⁺ 386.1784; Found 386.1788.



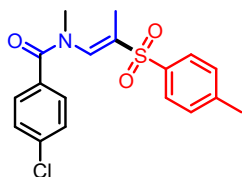
(E)-N-methyl-N-(2-tosylprop-1-en-1-yl)benzamide (4p)

White solid; 65% yield; mp: 124.5-125.7°C;

¹H NMR (400 MHz, Chloroform-*d*) δ 7.67 (d, *J* = 1.2 Hz, 1H), 7.63 (d, *J* = 8.4 Hz, 2H), 7.53-7.44 (m, 3H), 7.43-7.37 (m, 2H), 7.34-7.30 (m, 2H), 3.36 (s, 3H), 2.45 (s, 3H), 1.92 (s, 3H).

¹³C NMR (100 MHz, Chloroform-*d*) δ 171.63, 144.31, 140.12, 136.38, 134.26, 131.56, 129.86, 128.58, 128.54, 127.92, 123.77, 35.19, 21.65, 12.53.

HRMS (ESI-TOF) *m/z*: [M+H]⁺ Calcd for C₁₈H₂₀NO₃S⁺ 330.1158; Found 330.1161.



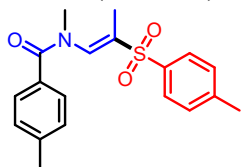
(E)-4-chloro-N-methyl-N-(2-tosylprop-1-en-1-yl)benzamide (4q)

White solid; 60% yield; mp: 105.9-108.2°C;

¹H NMR (400 MHz, Chloroform-*d*) δ 7.62 (d, *J* = 8.4 Hz, 2H), 7.59 (d, *J* = 1.6 Hz, 1H), 7.41-7.37 (m, 2H), 7.35-7.29 (m, 4H), 3.33 (s, 3H), 2.46 (s, 3H), 1.85 (s, 3H).

¹³C NMR (100 MHz, Chloroform-*d*) δ 170.29, 144.54, 139.43, 137.70, 136.15, 132.66, 129.95, 129.91, 128.76, 127.94, 125.79, 35.25, 21.63, 12.51.

HRMS (ESI-TOF) *m/z*: [M+H]⁺ Calcd for C₁₈H₁₉ClNO₃S⁺ 364.0769; Found 364.0773.



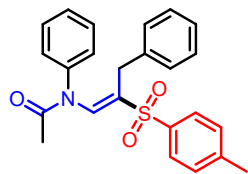
(E)-N,4-dimethyl-N-(2-tosylprop-1-en-1-yl)benzamide (4r)

White solid; 70% yield; mp: 104.9-105.3°C;

¹H NMR (400 MHz, Chloroform-*d*) δ 7.70 (d, *J* = 1.6 Hz, 1H), 7.65 (d, *J* = 8.0 Hz, 2H), 7.36 (d, *J* = 8.0 Hz, 2H), 7.32 (d, *J* = 8.0 Hz, 2H), 7.19 (d, *J* = 8.0 Hz, 2H), 3.34 (s, 3H), 2.45 (s, 3H), 2.40 (s, 3H), 1.91 (s, 3H).

¹³C NMR (100 MHz, Chloroform-*d*) δ 171.67, 144.19, 142.10, 140.38, 136.56, 131.30, 129.81, 129.14, 128.76, 127.93, 123.24, 35.09, 21.61, 21.58, 12.51.

HRMS (ESI-TOF) *m/z*: [M+H]⁺ Calcd for C₁₉H₂₂NO₃S⁺ 344.1315; Found 344.1316.



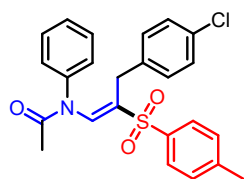
(E)-N-phenyl-N-(3-phenyl-2-tosylprop-1-en-1-yl)acetamide (4s)

White solid; 60% yield; mp: 131.1-133.5°C;

¹H NMR (400 MHz, Chloroform-*d*) δ 7.93 (s, 1H), 7.86 (d, *J* = 8.0 Hz, 2H), 7.35 (d, *J* = 8.4 Hz, 2H), 7.31-7.25 (m, 2H), 7.25-7.14 (m, 4H), 6.85 (s, 2H), 6.83 (s, 2H), 4.88 (s, 2H), 2.46 (s, 3H), 1.70 (s, 3H).

¹³C NMR (100 MHz, Chloroform-*d*) δ 170.52, 144.45, 142.98, 140.59, 136.64, 136.04, 132.71, 129.84, 129.32, 129.19, 128.82, 128.64, 128.59, 128.34, 128.05, 41.60, 22.61, 21.68.

HRMS (ESI-TOF) *m/z*: [M+H]⁺ Calcd for C₂₄H₂₄NO₃S⁺ 406.1471; Found 406.1479.



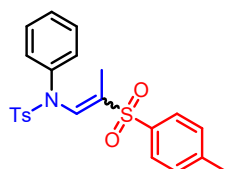
(E)-N-(3-(4-chlorophenyl)-2-tosylprop-1-en-1-yl)-N-phenylacetamide (4t)

White solid; 35% yield; mp: 159.9-161.7°C;

¹H NMR (400 MHz, Chloroform-*d*) δ 7.86 (s, 2H), 7.84 (s, 1H), 7.35 (d, *J* = 8.4 Hz, 2H), 7.26-7.16 (m, 5H), 6.86 (d, *J* = 6.8 Hz, 2H), 6.77 (d, *J* = 8.4 Hz, 2H), 4.84 (s, 2H), 2.46 (s, 3H), 1.70 (s, 3H).

¹³C NMR (100 MHz, Chloroform-*d*) δ 170.55, 144.62, 141.53, 140.60, 137.41, 135.79, 135.33, 131.14, 129.95, 129.89, 129.45, 128.85, 128.63, 128.59, 128.21, 41.66, 22.58, 21.68.

HRMS (ESI-TOF) *m/z*: [M+H]⁺ Calcd for C₂₄H₂₃ClNO₃S⁺ 440.1082; Found 440.1089.



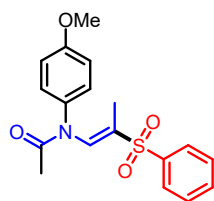
4-methyl-N-phenyl-N-(2-tosylprop-1-en-1-yl)benzenesulfonamide (4u)

White solid; 79% yield; mp: 139.5-141.3°C;

¹H NMR (400 MHz, Chloroform-*d*) δ 8.23 (d, *J* = 1.6 Hz, 1H), 7.71 (d, *J* = 8.4 Hz, 2H), 7.52 (d, *J* = 8.4 Hz, 2H), 7.37-7.27 (m, 7H), 7.02-6.97 (m, 2H), 2.45 (s, 4H), 2.42 (s, 3H), 1.00 (d, *J* = 1.2 Hz, 4H).

¹³C NMR (100 MHz, Chloroform-*d*) δ 145.16, 143.96, 136.85, 136.51, 136.23, 133.80, 129.93, 129.77, 129.30, 129.25, 127.94, 119.17, 21.71, 21.60, 10.87.

HRMS (ESI-TOF) *m/z*: [M+H]⁺ Calcd for C₂₃H₂₄NO₄S₂⁺ 442.1141; Found 442.1144.



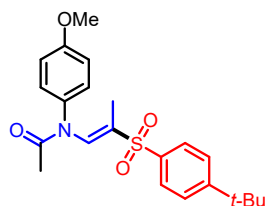
(*E*)-*N*-(4-methoxyphenyl)-*N*-(2-(phenylsulfonyl)prop-1-en-1-yl)acetamide (4v)

White solid; 61% yield; mp: 130.4-131.6°C;

¹H NMR (400 MHz, Chloroform-*d*) δ 8.57 (s, 1H), 7.89-7.82 (m, 2H), 7.62-7.54 (m, 1H), 7.53-7.47 (m, 2H), 7.15-7.07 (m, 2H), 6.97-6.89 (m, 2H), 3.83 (s, 3H), 2.00 (s, 3H), 1.10 (s, 3H).

¹³C NMR (100 MHz, Chloroform-*d*) δ 171.16, 159.89, 139.88, 134.88, 132.91, 132.12, 129.71, 129.07, 127.88, 119.67, 115.00, 55.59, 22.97, 10.71.

HRMS (ESI-TOF) *m/z*: [M+H]⁺ Calcd for C₁₈H₂₀NO₄S⁺ 346.1108; Found 346.1113.



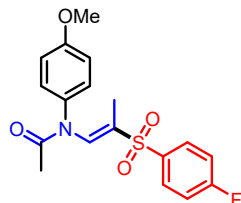
(*E*)-*N*-(2-((4-(tert-butyl)phenyl)sulfonyl)prop-1-en-1-yl)-*N*-(4-methoxyphenyl)acetamide (4w)

White solid; 65% yield; mp: 179.2-180.9°C;

¹H NMR (400 MHz, Chloroform-*d*) δ 8.54 (s, 1H), 7.76 (d, *J* = 8.8 Hz, 2H), 7.50 (d, *J* = 8.4 Hz, 2H), 7.12 (d, *J* = 8.8 Hz, 2H), 6.93 (d, *J* = 8.8 Hz, 2H), 3.83 (s, 3H), 2.00 (s, 3H), 1.33 (s, 9H), 1.11 (s, 3H).

¹³C NMR (101 MHz, Chloroform-*d*) δ 171.11, 159.85, 156.67, 136.82, 134.61, 132.23, 129.73, 127.74, 126.06, 120.14, 114.97, 55.59, 35.16, 31.09, 22.97, 10.80.

HRMS (ESI-TOF) *m/z*: [M+H]⁺ Calcd for C₂₂H₂₈NO₄S⁺ 402.1743; Found 402.1745.



(*E*)-*N*-(2-((4-fluorophenyl)sulfonyl)prop-1-en-1-yl)-*N*-(4-methoxyphenyl)acetamide (4x)

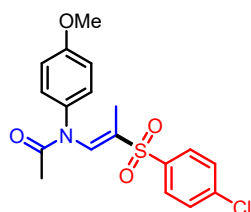
White solid; 49% yield; mp: 116.0-117.4°C;

¹H NMR (400 MHz, Chloroform-*d*) δ 8.56 (s, 1H), 7.91-7.82 (m, 2H), 7.23-7.15 (m, 2H), 7.14-7.08 (m, 2H), 6.98-6.90 (m, 2H), 3.84 (s, 3H), 2.00 (s, 3H), 1.10 (s, 3H).

¹³C NMR (100 MHz, Chloroform-*d*) δ 171.16, 165.30 (d, *J* = 253.6 Hz), 159.95, 135.99 (d, *J* = 3.1 Hz), 134.98, 132.04, 130.67 (d, *J* = 9.4 Hz), 129.71, 119.43, 116.34 (d, *J* = 22.4 Hz), 115.04, 55.60, 22.95, 10.66.

¹⁹F NMR (376 MHz, Chloroform-*d*) δ -104.76.

HRMS (ESI-TOF) *m/z*: [M+H]⁺ Calcd for C₁₈H₁₉FNO₄S⁺ 364.1013; Found 364.1016.



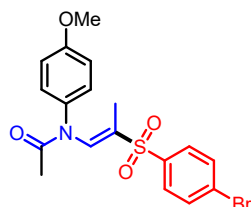
(*E*)-*N*-(2-((4-chlorophenyl)sulfonyl)prop-1-en-1-yl)-*N*-(4-methoxyphenyl)acetamide (4y)

White solid; 42% yield; mp: 107.7-109.9°C;

¹H NMR (400 MHz, Chloroform-*d*) δ 8.57 (s, 1H), 7.79 (d, *J* = 8.8 Hz, 2H), 7.48 (d, *J* = 8.4 Hz, 2H), 7.11 (d, *J* = 8.8 Hz, 2H), 6.94 (d, *J* = 8.8 Hz, 2H), 3.84 (s, 3H), 2.00 (s, 3H), 1.09 (s, 3H).

¹³C NMR (100 MHz, Chloroform-*d*) δ 171.16, 159.97, 139.49, 138.51, 135.19, 131.99, 129.71, 129.39, 119.12, 115.05, 55.60, 22.96, 10.65.

HRMS (ESI-TOF) *m/z*: [M+H]⁺ Calcd for C₁₈H₁₉ClNO₄S⁺ 380.0718; Found 380.0720.



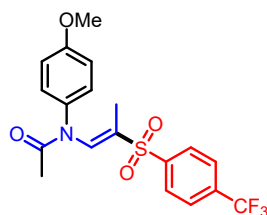
(*E*)-*N*-(2-((4-bromophenyl)sulfonyl)prop-1-en-1-yl)-*N*-(4-methoxyphenyl)acetamide (4z)

White solid; 90% yield; mp: 1112.0-113.6°C;

¹H NMR (400 MHz, Chloroform-*d*) δ 8.57 (s, 1H), 7.71 (d, *J* = 8.4 Hz, 1H), 7.64 (d, *J* = 8.8 Hz, 2H), 7.11 (d, *J* = 8.8 Hz, 2H), 6.94 (d, *J* = 8.8 Hz, 2H), 3.84 (s, 3H), 2.00 (s, 3H), 1.08 (s, 3H).

¹³C NMR (100 MHz, Chloroform-*d*) δ 171.16, 159.98, 139.06, 135.21, 132.36, 131.96, 129.72, 129.48, 128.04, 119.01, 115.05, 55.61, 22.96, 10.65.

HRMS (ESI-TOF) *m/z*: [M+H]⁺ Calcd for C₁₈H₁₉BrNO₄S⁺ 424.0213; Found 424.0220.



(*E*)-*N*-(4-methoxyphenyl)-*N*-(2-((4-(trifluoromethyl)phenyl)sulfonyl)prop-1-en-1-yl)acetamide (4aa)

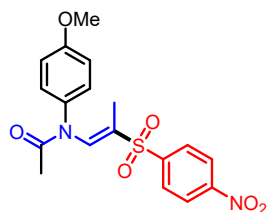
White solid; 38% yield; mp: 151.0-152.1°C;

¹H NMR (400 MHz, Chloroform-*d*) δ 8.61 (s, 1H), 7.98 (d, *J* = 8.4 Hz, 2H), 7.77 (d, *J* = 8.0 Hz, 2H), 7.14-7.08 (m, 2H), 6.98-6.91 (m, 2H), 3.84 (s, 3H), 2.00 (s, 3H), 1.10 (s, 3H).

¹³C NMR (100 MHz, Chloroform-*d*) δ 171.13, 160.07, 143.74, 135.83, 134.55 (q, *J* = 33.0 Hz), 131.89, 129.71, 128.43, 126.20 (q, *J* = 3.7 Hz), 123.25 (q, *J* = 271.3 Hz), 118.50, 115.09, 55.59, 22.90, 10.65.

¹⁹F NMR (376 MHz, Chloroform-*d*) δ -63.09.

HRMS (ESI-TOF) *m/z*: [M+H]⁺ Calcd for C₁₉H₁₉F₃NO₄S⁺ 414.0981; Found 414.0988.



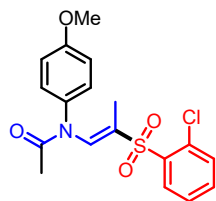
(*E*)-*N*-(4-methoxyphenyl)-*N*-(2-((4-nitrophenyl)sulfonyl)prop-1-en-1-yl)acetamide (4ab)

Yellow solid; 21% yield; mp: 145.5-148.4°C;

¹H NMR (400 MHz, Chloroform-*d*) δ 8.64 (s, 1H), 8.34 (d, *J* = 8.8 Hz, 2H), 8.04 (d, *J* = 8.4 Hz, 2H), 7.11 (d, *J* = 8.8 Hz, 2H), 6.95 (d, *J* = 8.8 Hz, 2H), 3.84 (s, 3H), 2.01 (s, 3H), 1.10 (s, 3H).

¹³C NMR (100 MHz, Chloroform-*d*) δ 171.18, 160.16, 150.27, 146.02, 136.38, 131.72, 129.70, 129.19, 124.31, 117.84, 115.15, 55.61, 22.89, 10.63.

HRMS (ESI-TOF) *m/z*: [M+H]⁺ Calcd for C₁₈H₁₉N₂O₆S⁺ 391.0958; Found 391.0963.



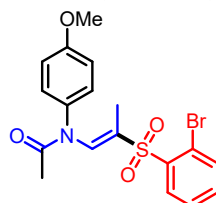
(*E*)-N-(2-((2-chlorophenyl)sulfonyl)prop-1-en-1-yl)-N-(4-methoxyphenyl)acetamide (4ac)

White solid; 68% yield; mp: 117.6-119.3°C;

¹H NMR (400 MHz, Chloroform-*d*) δ 8.63 (s, 1H), 8.13 (d, *J* = 6.8 Hz, 1H), 7.57-7.48 (m, 2H), 7.46-7.40 (m, 1H), 7.19-7.12 (m, 2H), 6.99-6.92 (m, 2H), 3.84 (s, 3H), 2.05 (s, 3H), 1.05 (s, 3H).

¹³C NMR (100 MHz, DMSO-*d*₆) δ 166.23, 155.12, 132.97, 131.58, 129.46, 127.90, 127.36, 127.30, 125.03, 122.31, 112.45, 110.22, 50.82, 18.22, 5.89.

HRMS (ESI-TOF) *m/z*: [M+H]⁺ Calcd for C₁₈H₁₉ClNO₄S⁺ 380.0718; Found 380.0720.



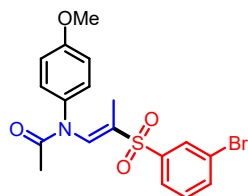
(*E*)-N-(2-((2-bromophenyl)sulfonyl)prop-1-en-1-yl)-N-(4-methoxyphenyl)acetamide (4ad)

White solid; 62% yield; mp: 121.5-122.6°C;

¹H NMR (400 MHz, Chloroform-*d*) δ 8.59 (s, 1H), 8.09 (dd, *J* = 8.0, 1.6 Hz, 1H), 7.64 (d, *J* = 7.6 Hz, 1H), 7.43-7.29 (m, 2H), 7.08 (d, *J* = 8.4 Hz, 2H), 6.87 (d, *J* = 8.4 Hz, 2H), 3.76 (s, 3H), 1.97 (s, 3H), 0.94 (s, 3H).

¹³C NMR (100 MHz, Chloroform-*d*) δ 169.97, 158.87, 137.12, 136.76, 134.69, 133.16, 131.32, 131.08, 128.78, 126.65, 119.80, 115.54, 113.95, 54.55, 21.95, 9.61.

HRMS (ESI-TOF) *m/z*: [M+H]⁺ Calcd for C₁₈H₁₉BrNO₄S⁺ 424.0213; Found 424.0220.



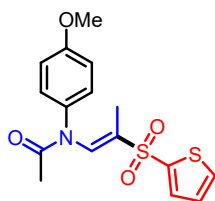
(*E*)-N-(2-((3-bromophenyl)sulfonyl)prop-1-en-1-yl)-N-(4-methoxyphenyl)acetamide (4ae)

White solid; 72% yield; mp: 131.5-132.2°C;

¹H NMR (400 MHz, Chloroform-*d*) δ 8.59 (s, 1H), 7.98 (t, *J* = 1.6 Hz, 1H), 7.82-7.75 (m, 1H), 7.72-7.66 (m, 1H), 7.39 (t, *J* = 8.0 Hz, 1H), 7.15-7.10 (m, 2H), 6.98 – 6.92 (m, 2H), 3.84 (s, 3H), 2.01 (s, 3H), 1.10 (s, 3H).

¹³C NMR (100 MHz, Chloroform-*d*) δ 171.16, 160.01, 141.94, 135.96, 135.45, 131.93, 130.69, 130.62, 129.74, 126.50, 123.07, 118.67, 115.06, 55.61, 22.97, 10.70.

HRMS (ESI-TOF) *m/z*: [M+H]⁺ Calcd for C₁₈H₁₉BrNO₄S⁺ 424.0213; Found 424.0220.



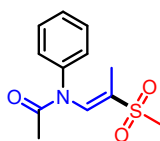
(*E*)-*N*-(4-methoxyphenyl)-*N*-(2-(thiophen-2-ylsulfonyl)prop-1-en-1-yl)acetamide (4af)

White solid; 81% yield; mp: 122.2-123.4°C;

¹H NMR (400 MHz, Chloroform-*d*) δ 8.58 (s, 1H), 7.64 (dd, *J* = 5.2, 1.2 Hz, 1H), 7.61 (dd, *J* = 3.6, 1.2 Hz, 1H), 7.15-7.11 (m, 2H), 7.11-7.08 (m, 1H), 6.99-6.92 (m, 2H), 3.85 (s, 3H), 2.01 (s, 3H), 1.22 (s, 3H).

¹³C NMR (100 MHz, DMSO-*d*₆) δ 166.33, 155.20, 136.87, 130.03, 128.64, 128.39, 127.32, 124.99, 122.83, 115.59, 110.27, 50.84, 18.20, 5.99.

HRMS (ESI-TOF) *m/z*: [M+H]⁺ Calcd for C₁₆H₁₈NO₄S₂⁺ 352.0672; Found 352.0669.



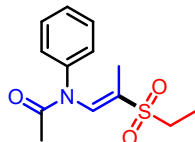
(*E*)-*N*-(2-(methylsulfonyl)prop-1-en-1-yl)-*N*-phenylacetamide (4ag)

White solid; 63% yield; mp: 122.5-123.2°C;

¹H NMR (400 MHz, Chloroform-*d*) δ 8.34 (s, 1H), 7.55-7.43 (m, 3H), 7.28-7.24 (m, 2H), 2.88 (s, 3H), 2.02 (s, 3H), 1.27 (s, 3H).

¹³C NMR (100 MHz, Chloroform-*d*) δ 170.64, 139.60, 135.08, 130.07, 129.40, 128.74, 119.73, 40.96, 22.97, 10.95.

HRMS (ESI-TOF) *m/z*: [M+H]⁺ Calcd for C₁₂H₁₆NO₃S⁺ 254.0845; Found 254.0849.



(*E*)-*N*-(2-(ethylsulfonyl)prop-1-en-1-yl)-*N*-phenylacetamide (4ah)

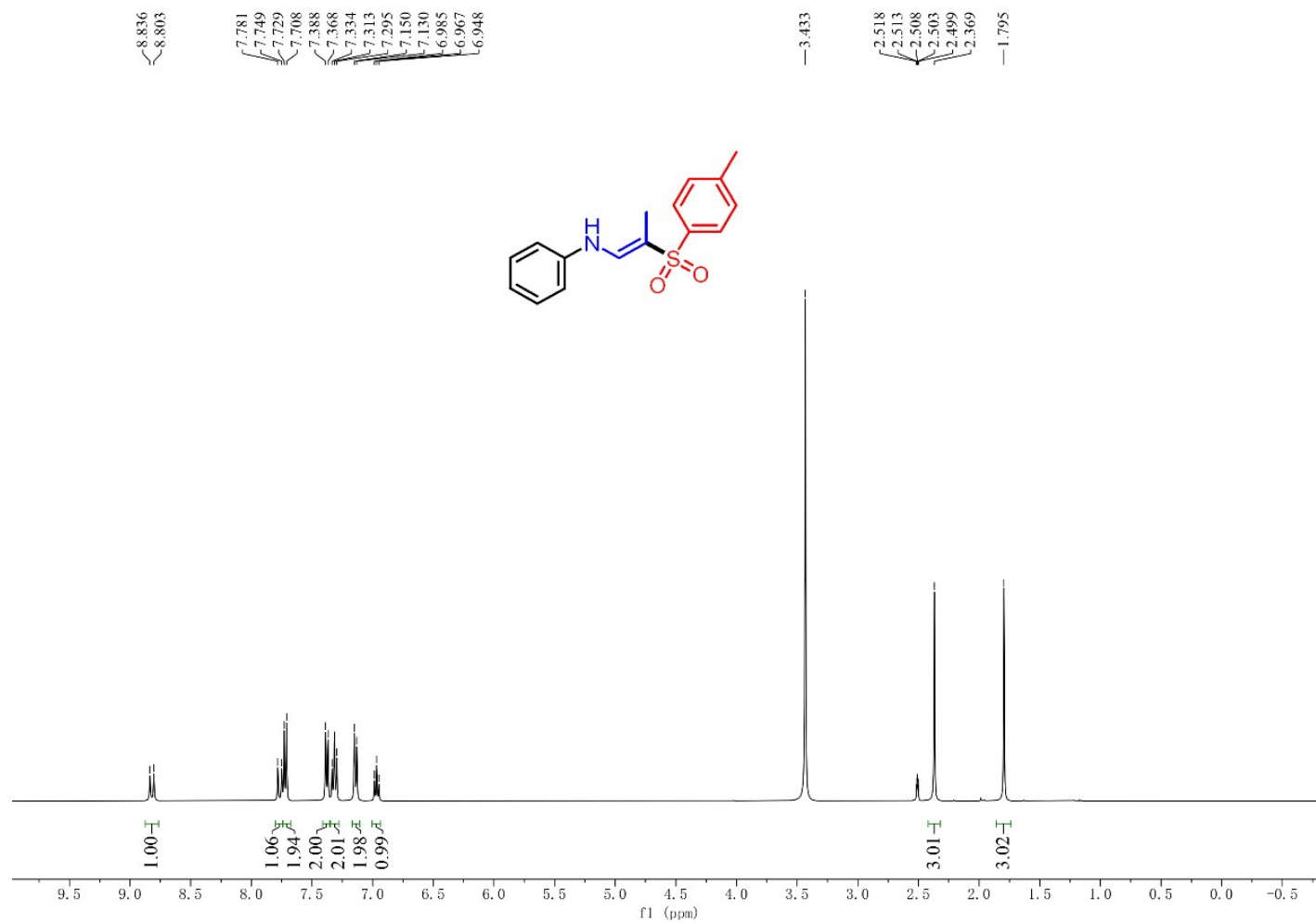
White solid; 62% yield; mp: 101.9-102.6°C;

¹H NMR (400 MHz, Chloroform-*d*) δ 8.24 (s, 1H), 7.57-7.43 (m, 3H), 7.28-7.23 (m, 2H), 2.94 (q, *J* = 7.6 Hz, 2H), 2.02 (s, 3H), 1.30 (t, *J* = 7.6 Hz, 3H), 1.24 (s, 3H).

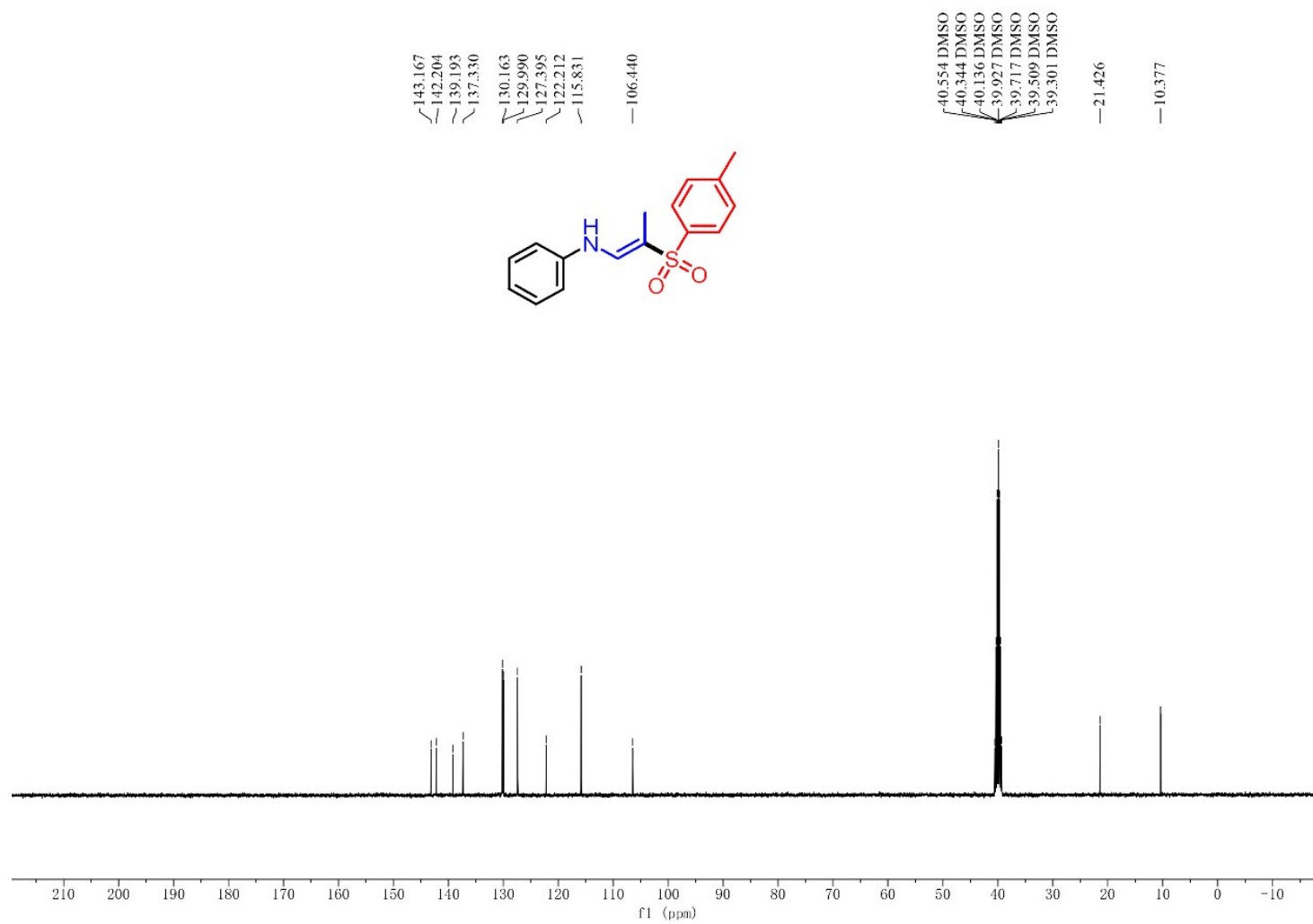
¹³C NMR (100 MHz, Chloroform-*d*) δ 170.56, 139.72, 136.12, 130.05, 129.33, 128.69, 117.91, 46.67, 22.95, 11.10, 7.30.

HRMS (ESI-TOF) *m/z*: [M+H]⁺ Calcd for C₁₃H₁₈NO₃S⁺ 268.1002; Found 268.1008.

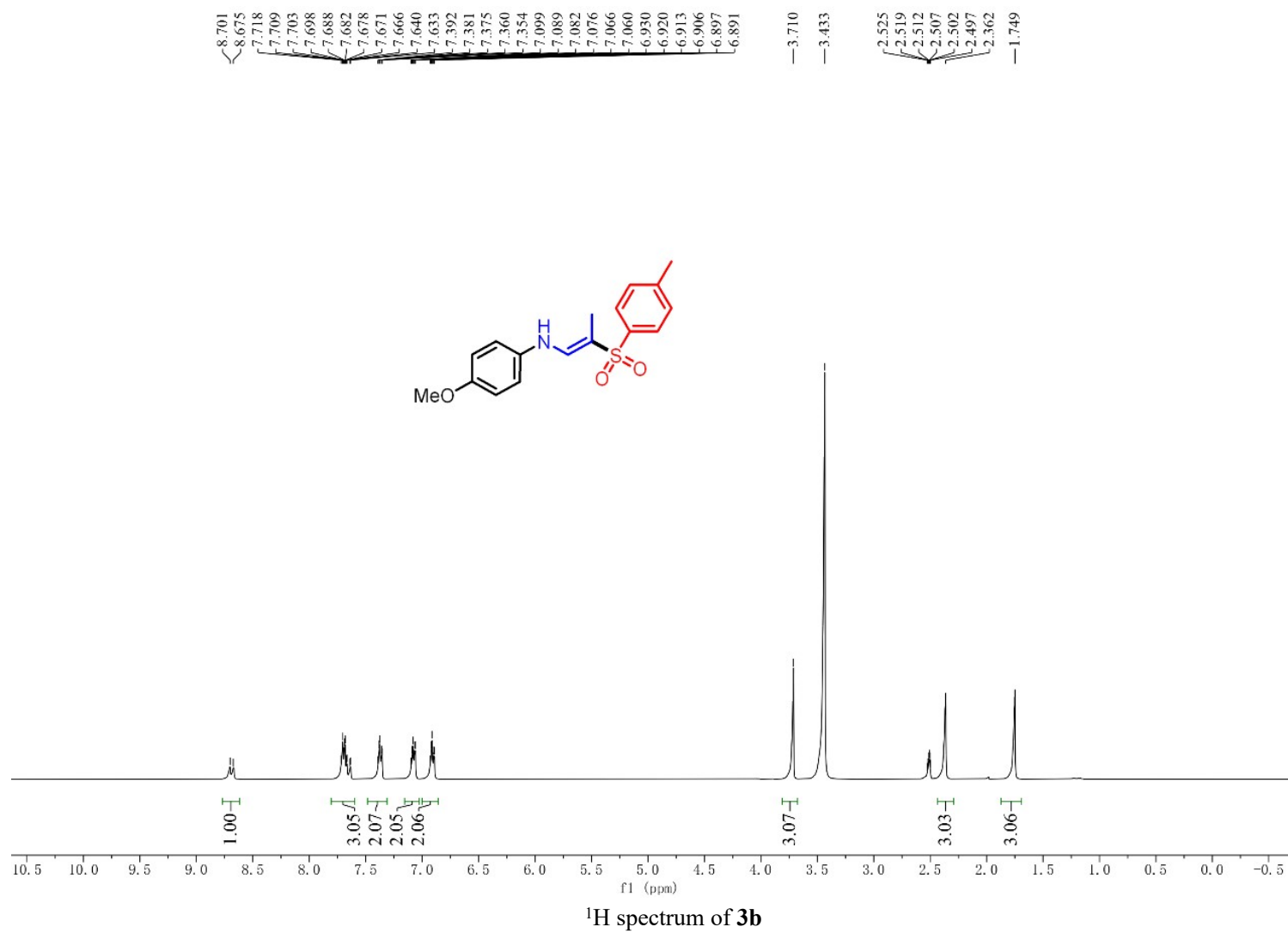
Spectra

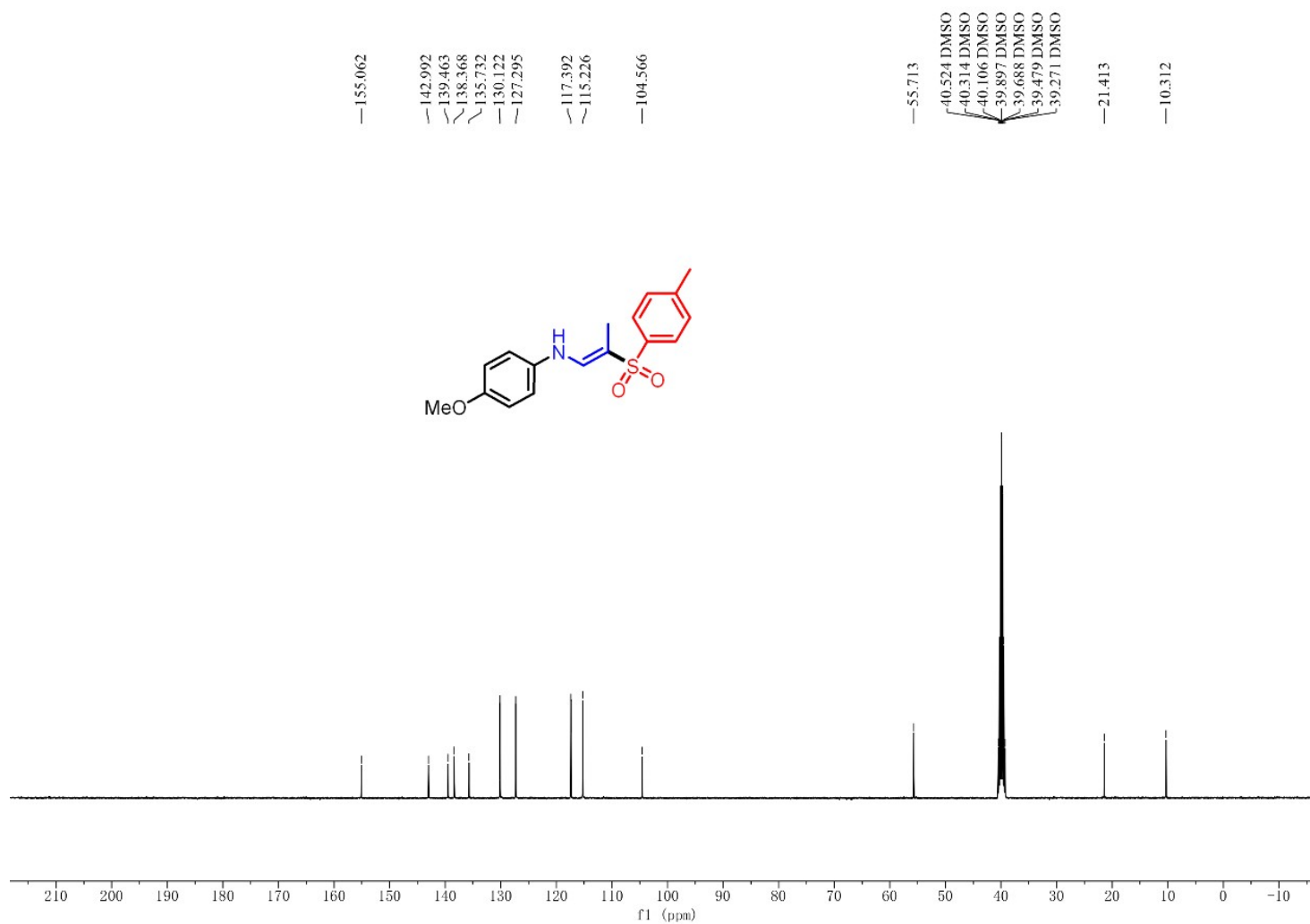


¹H spectrum of 3a

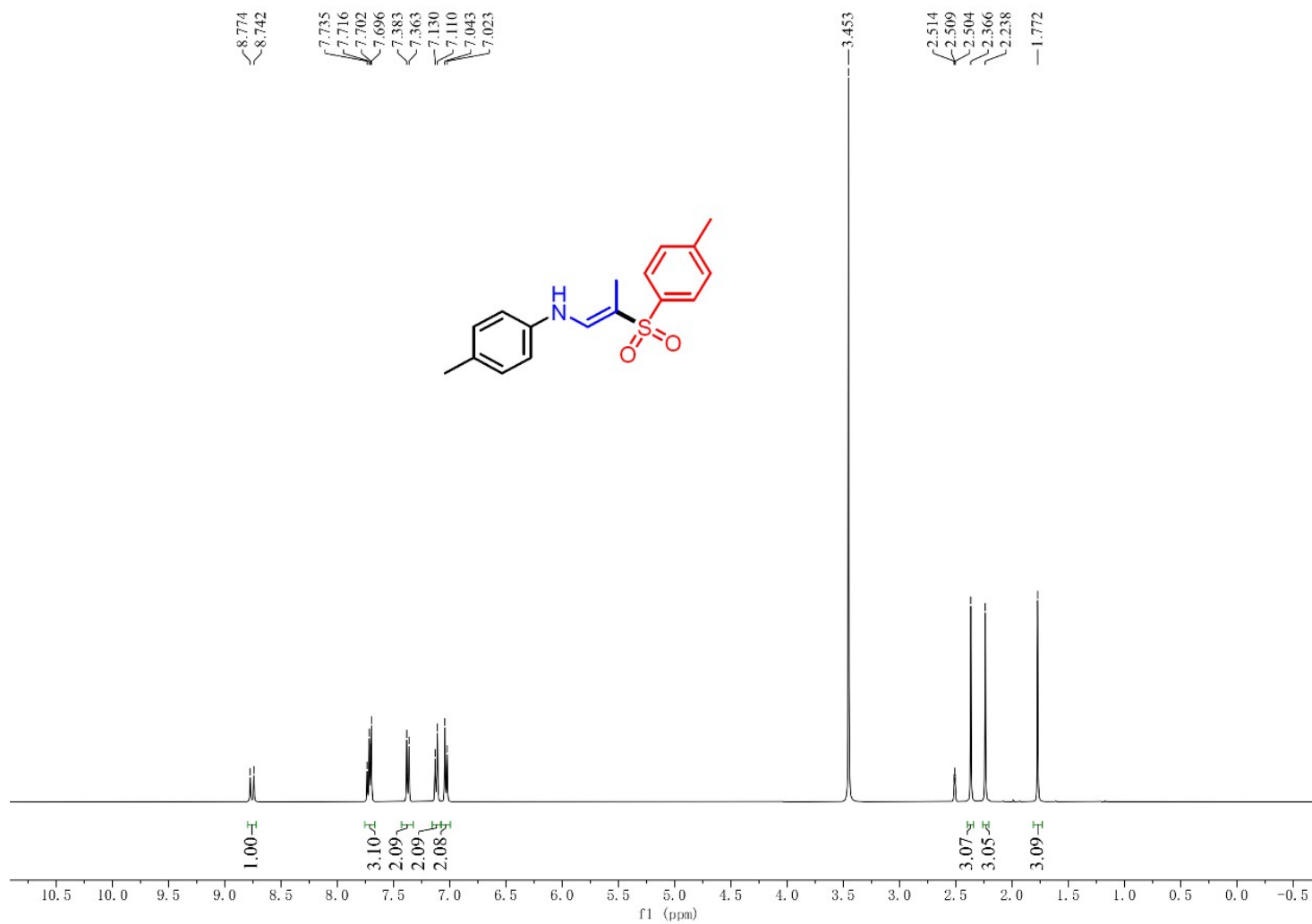


¹³C spectrum of **3a**

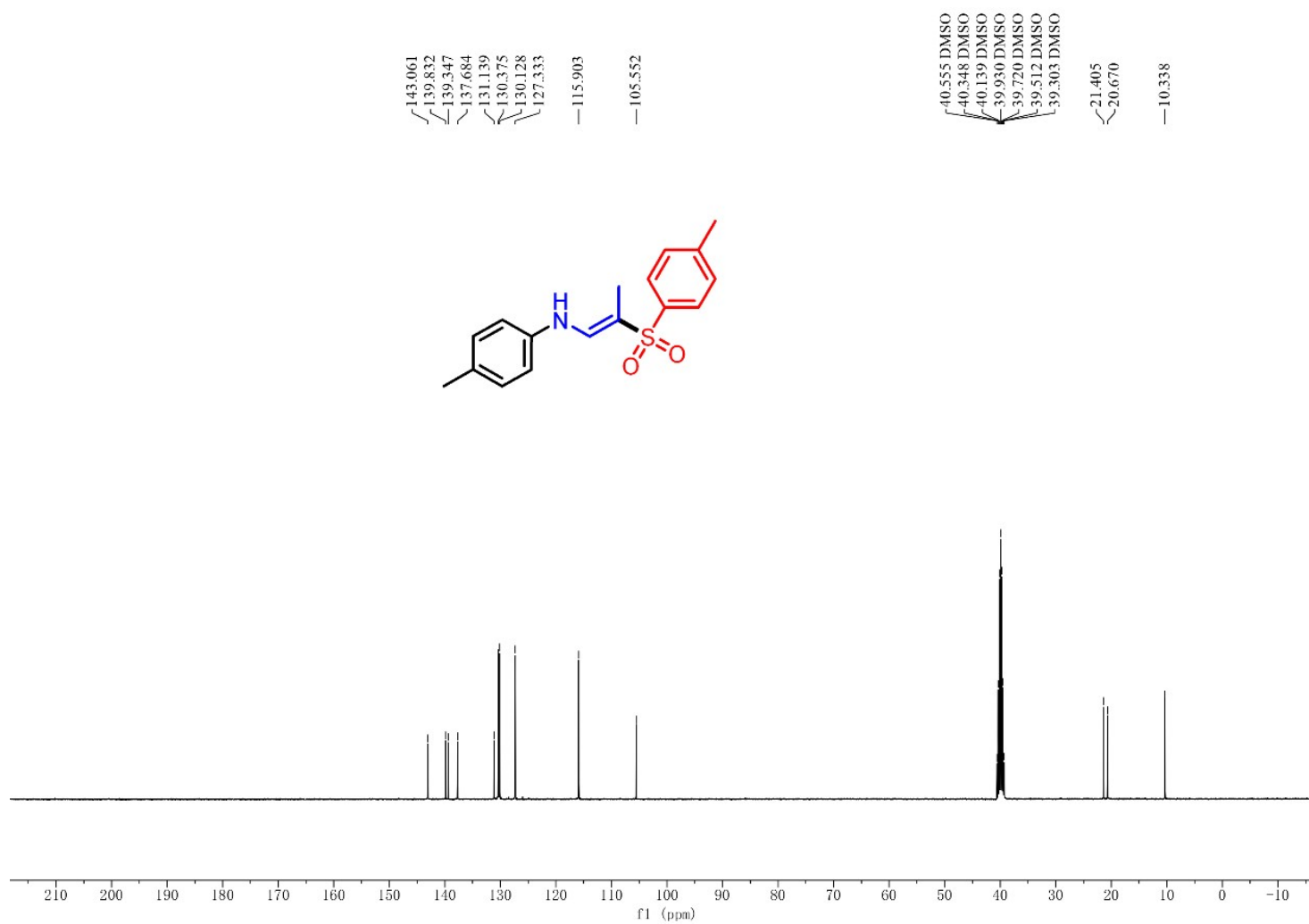




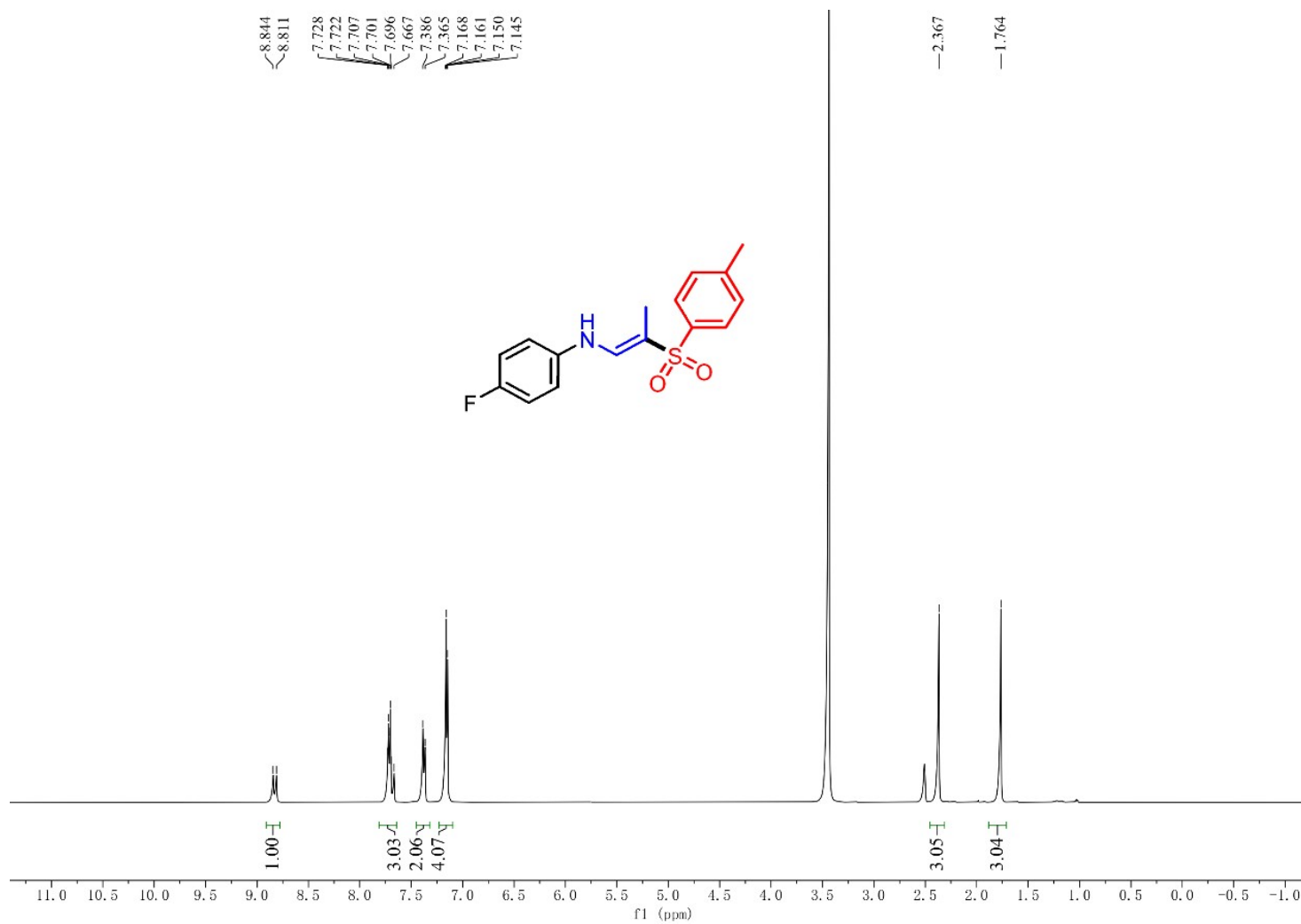
¹³C spectrum of **3b**



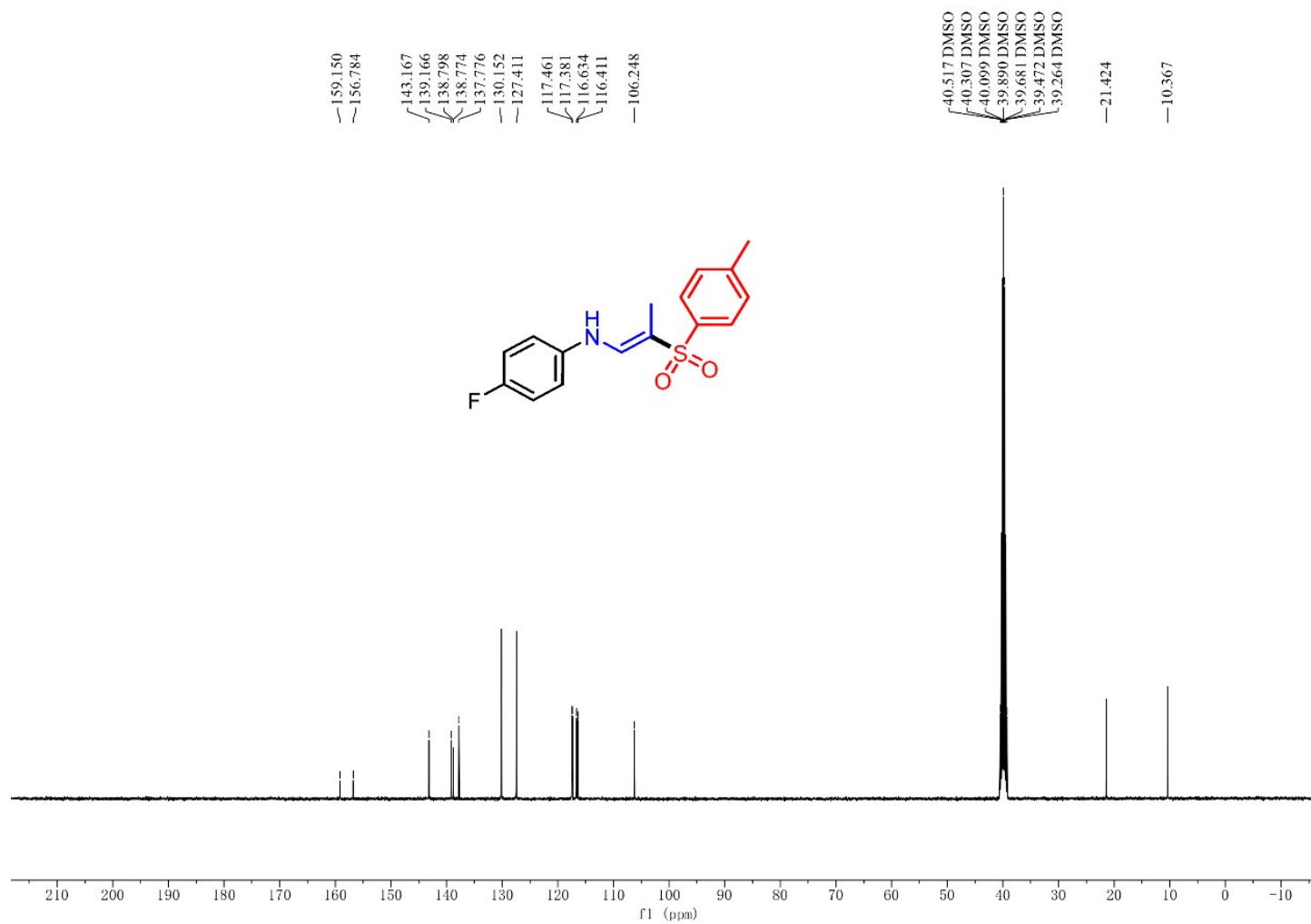
¹H spectrum of **3c**



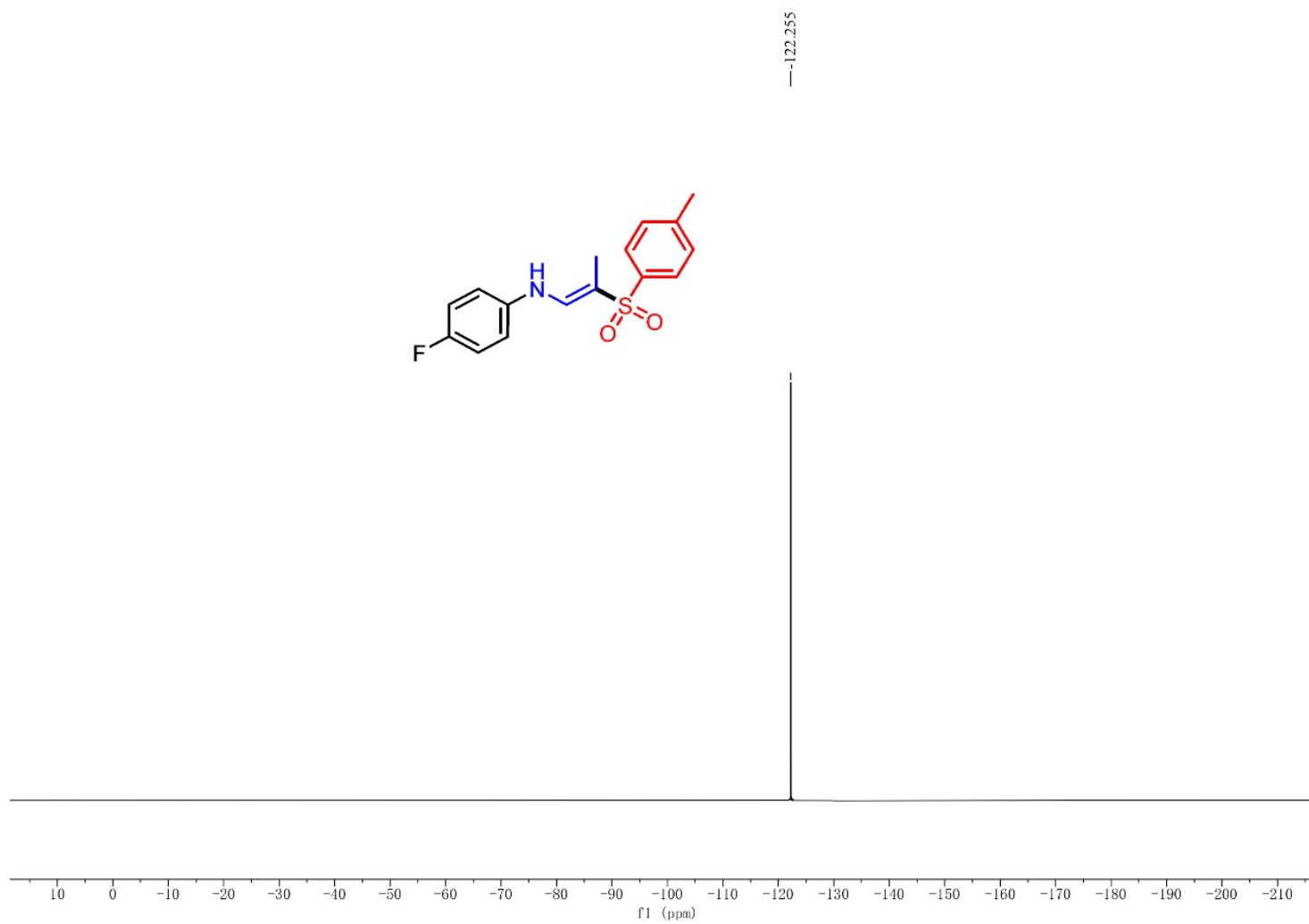
¹³C spectrum of **3c**



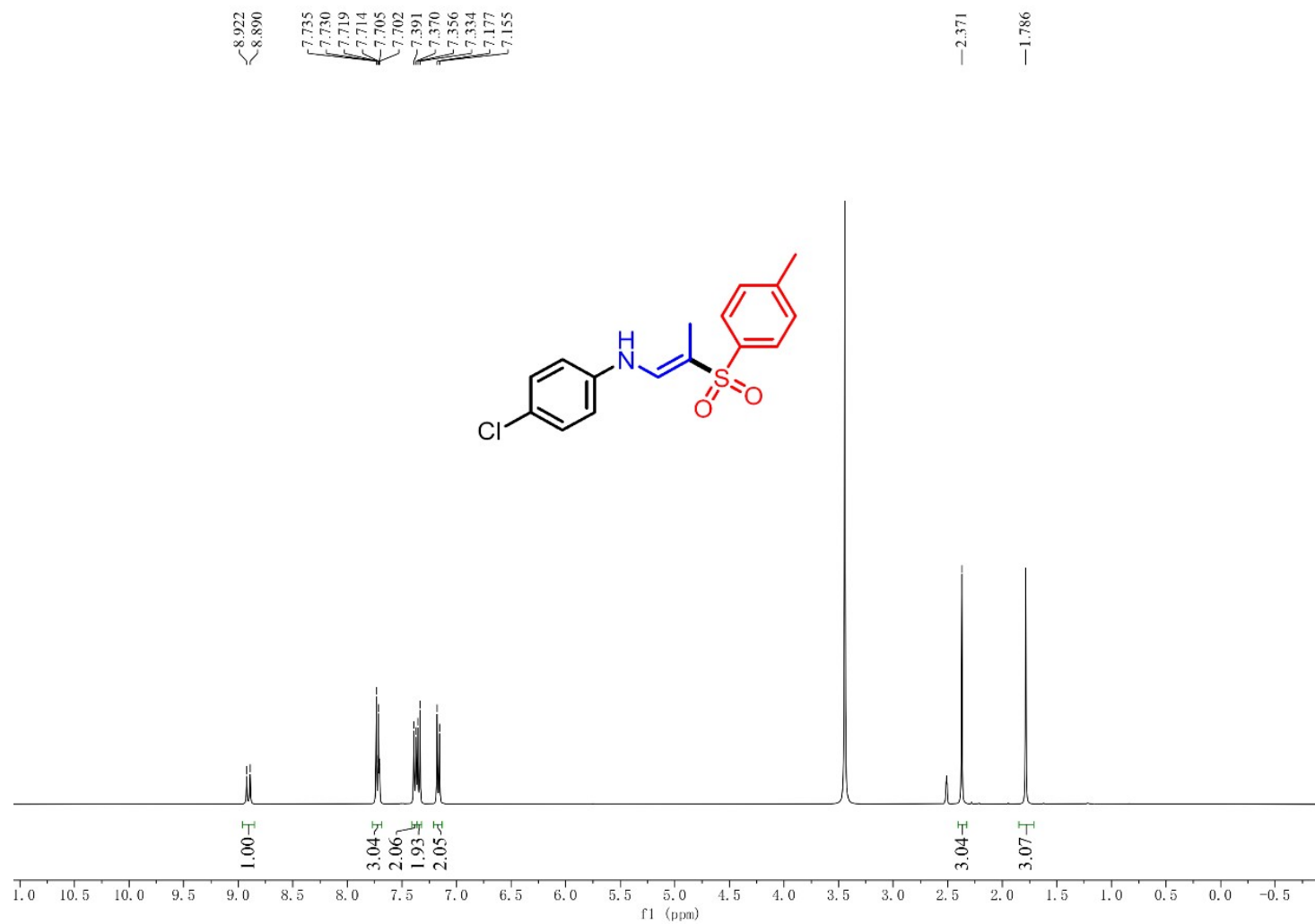
¹H spectrum of **3d**



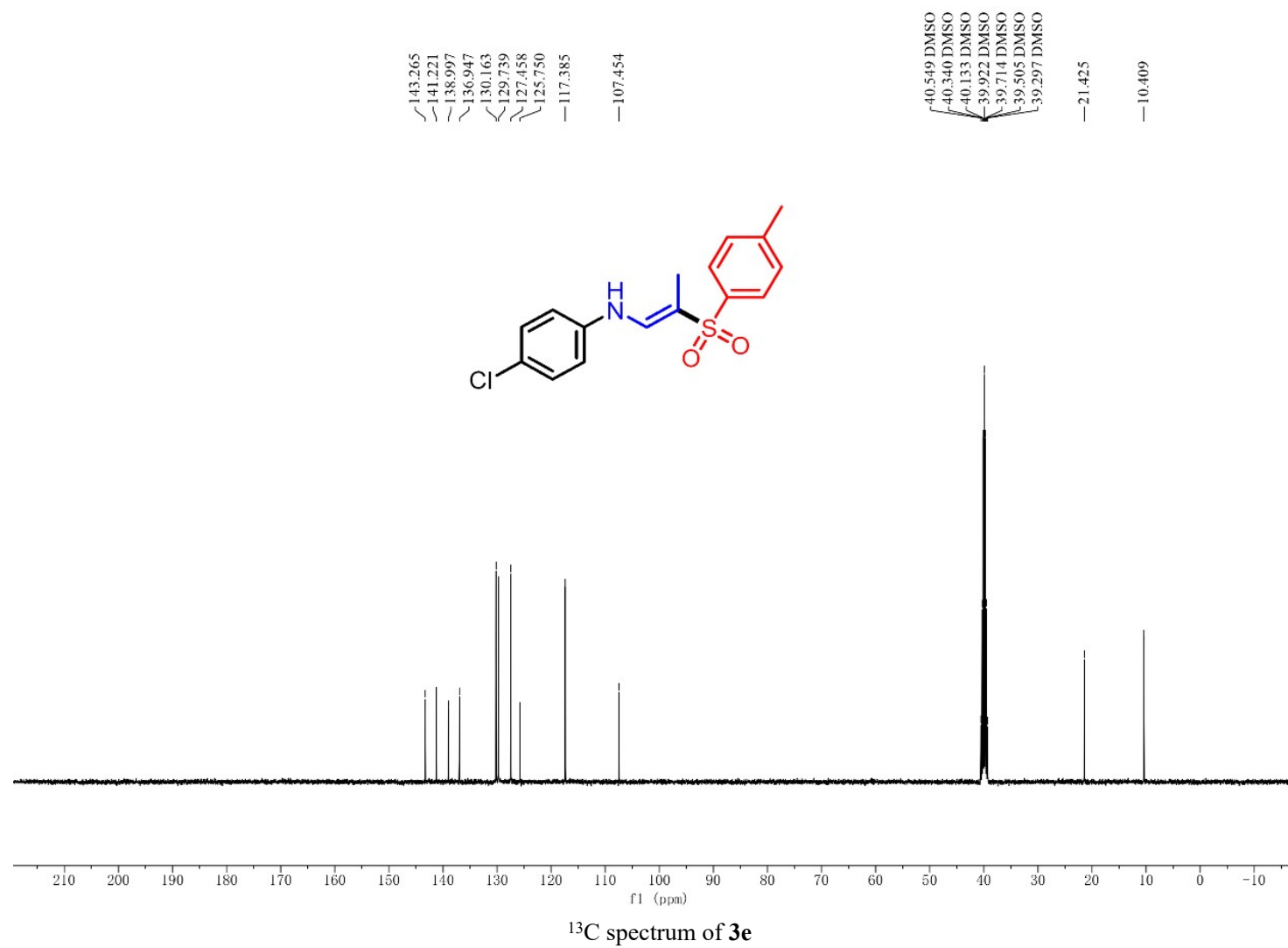
¹³C spectrum of **3d**

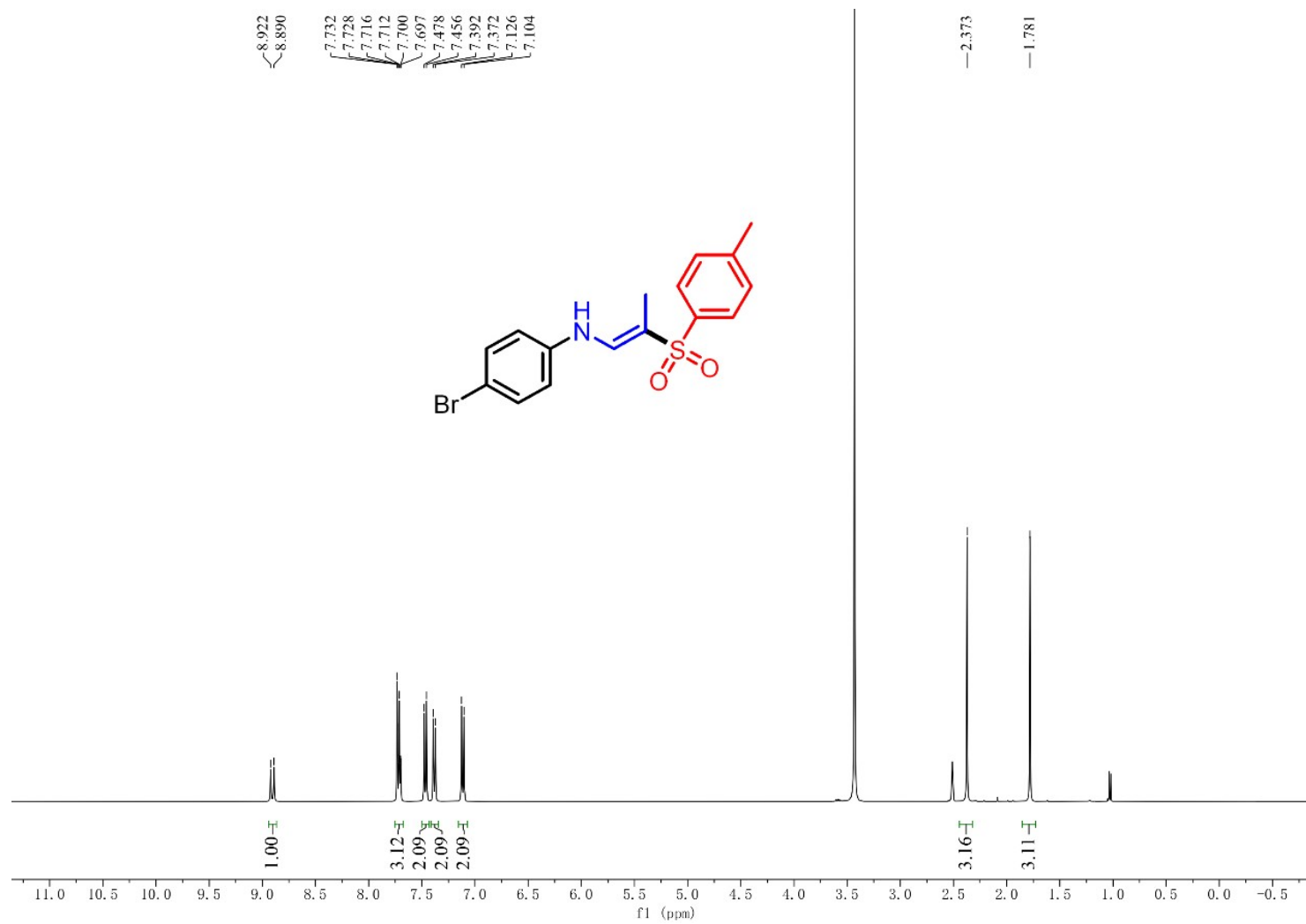


^{19}F spectrum of **3d**

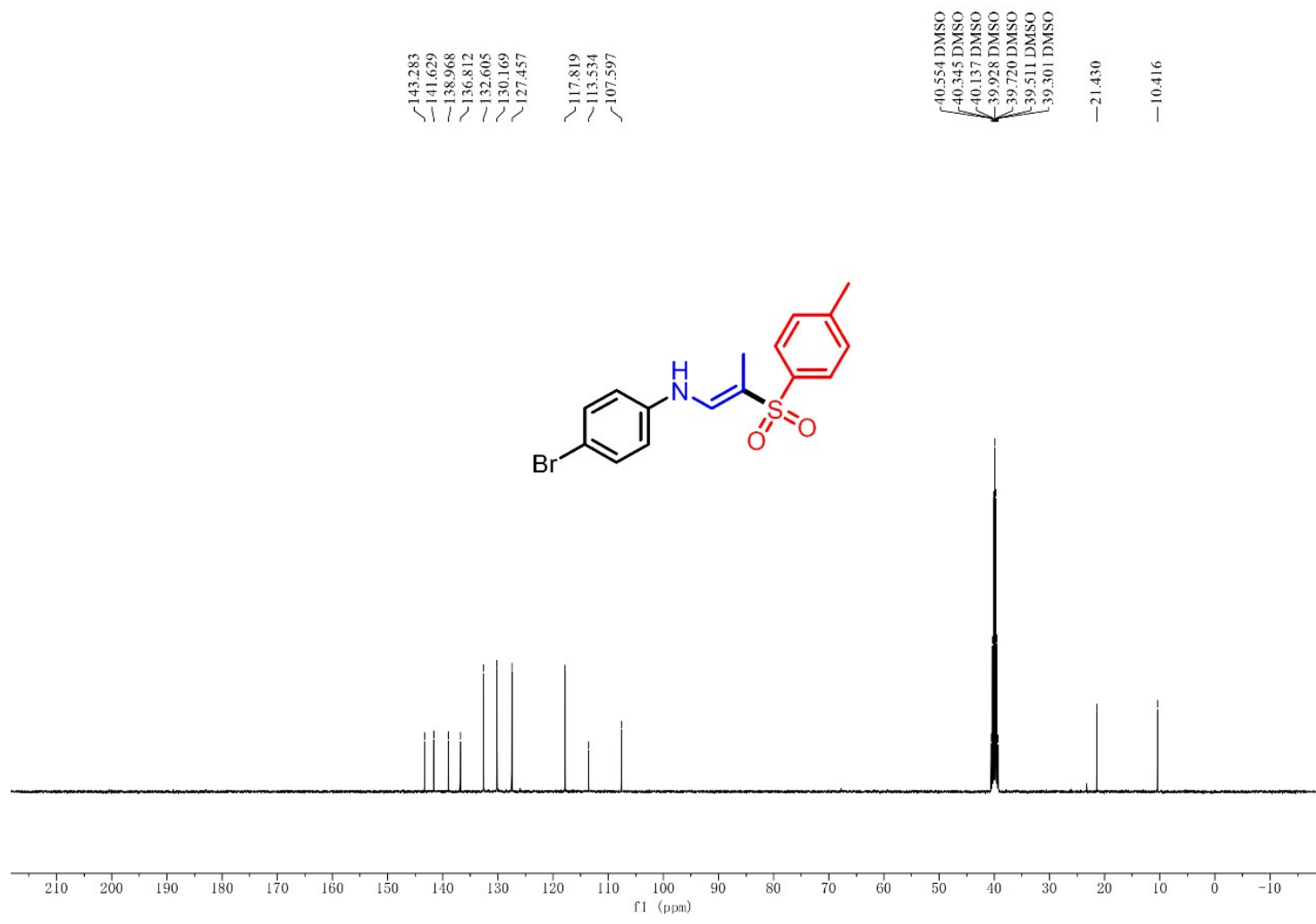


¹H spectrum of **3e**

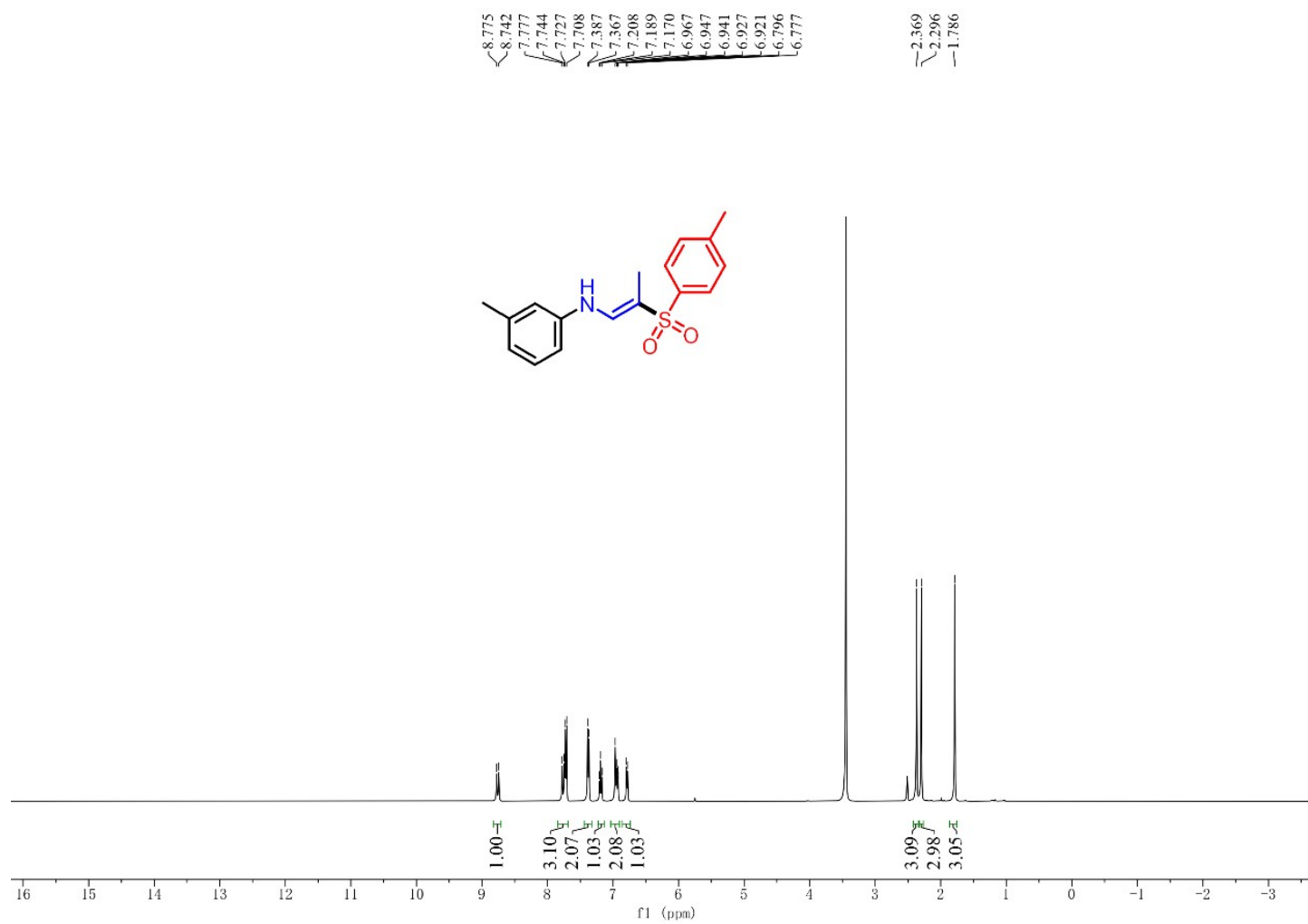




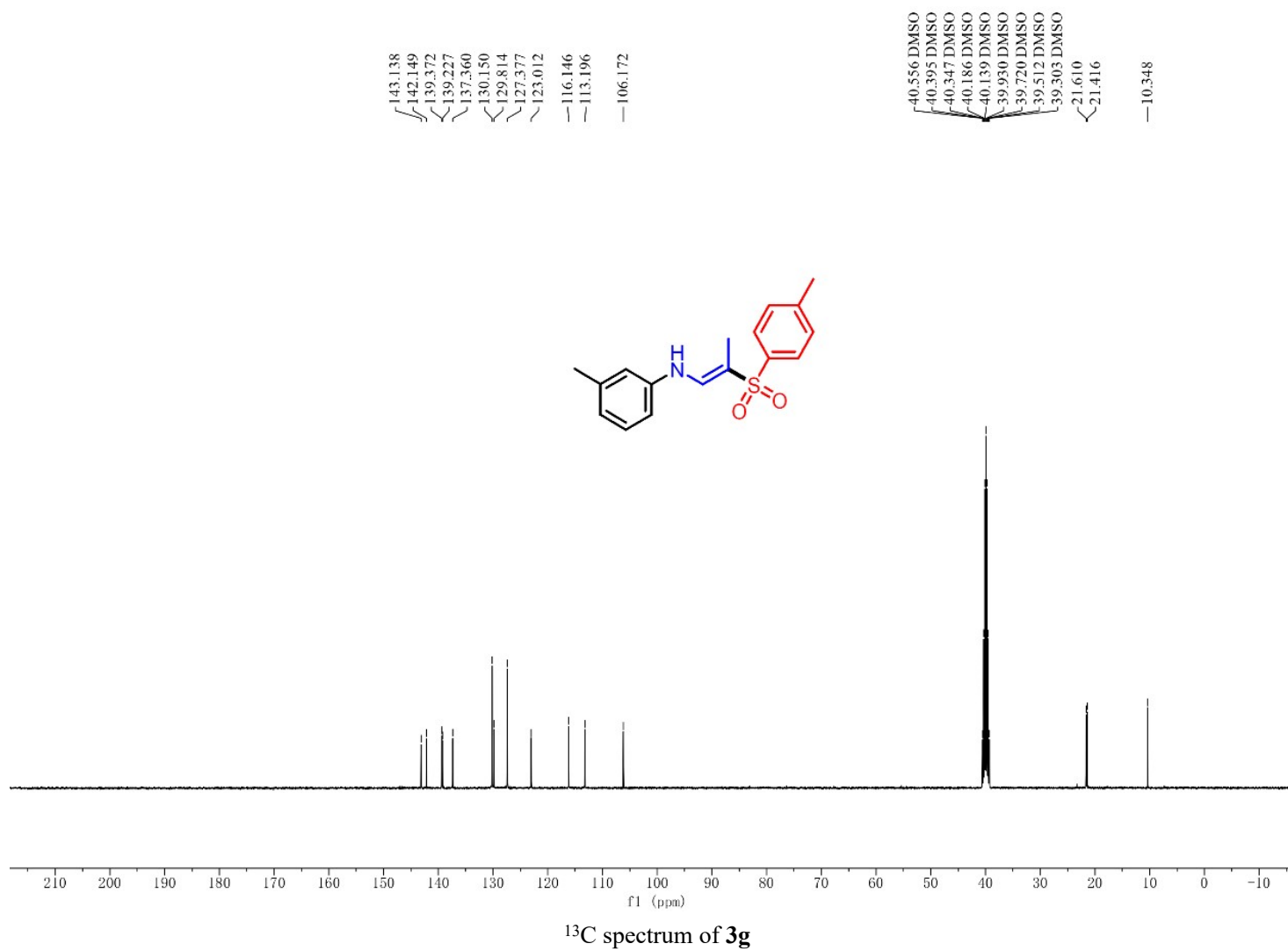
¹H spectrum of **3f**

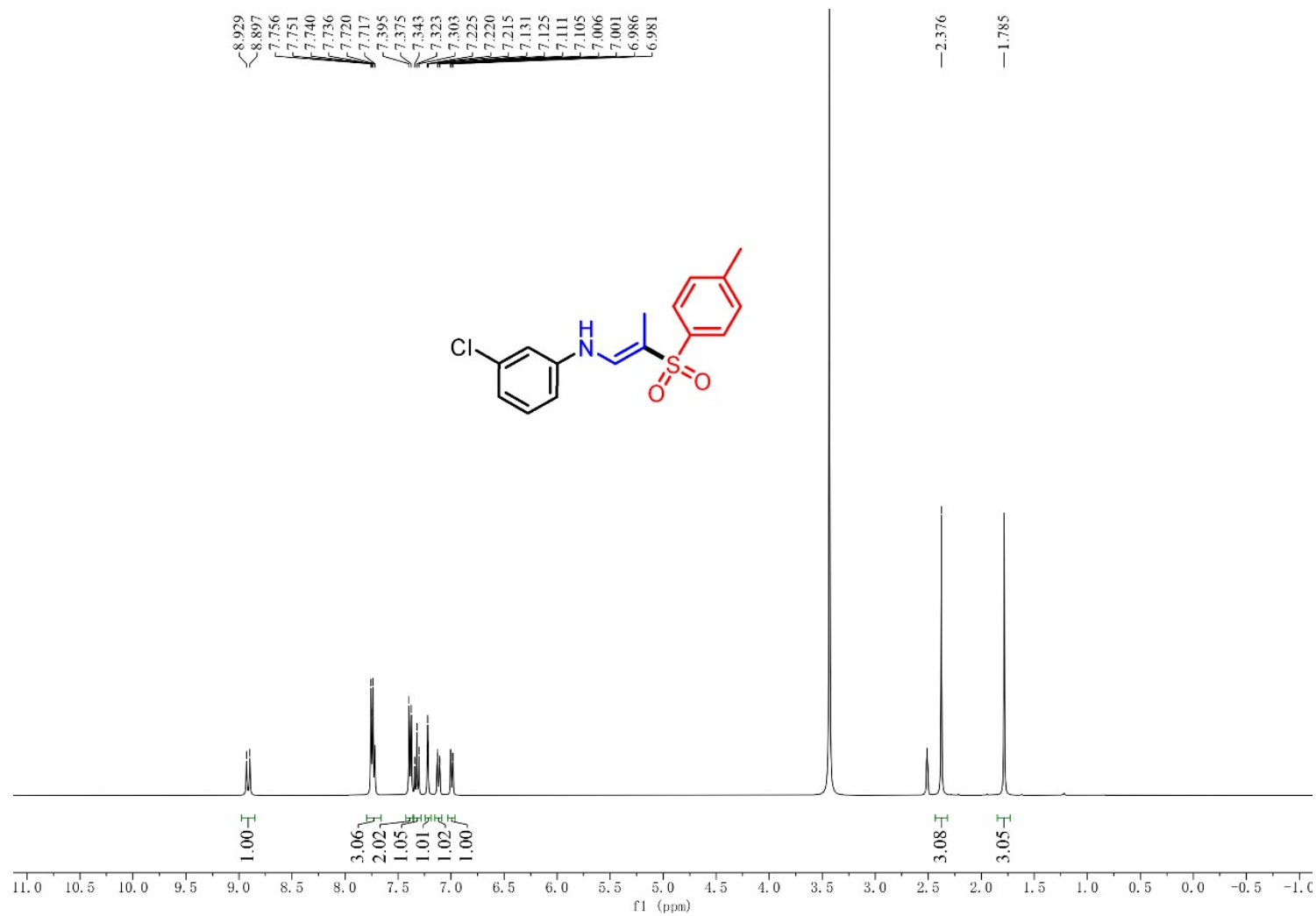


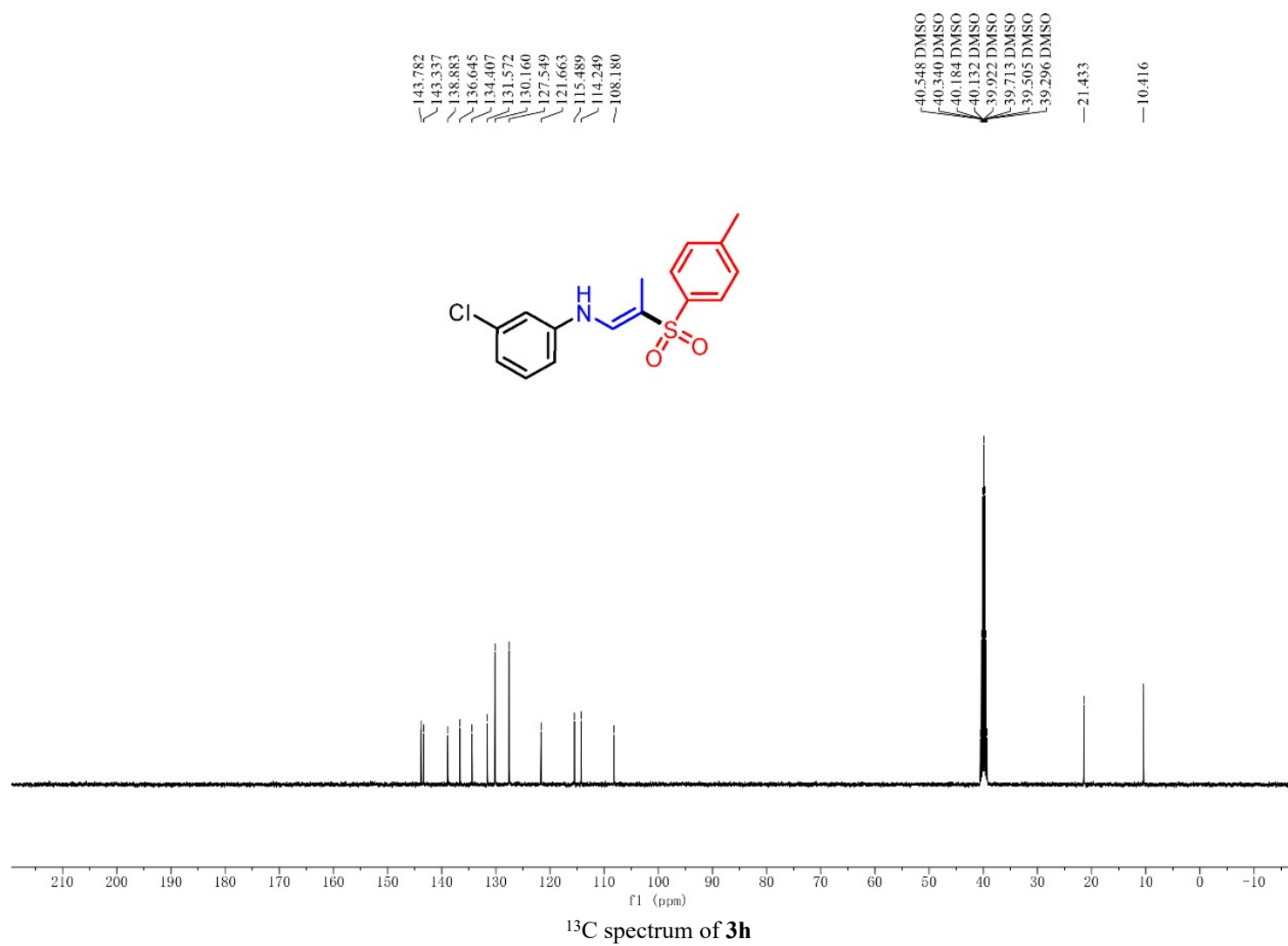
¹³C spectrum of **3f**

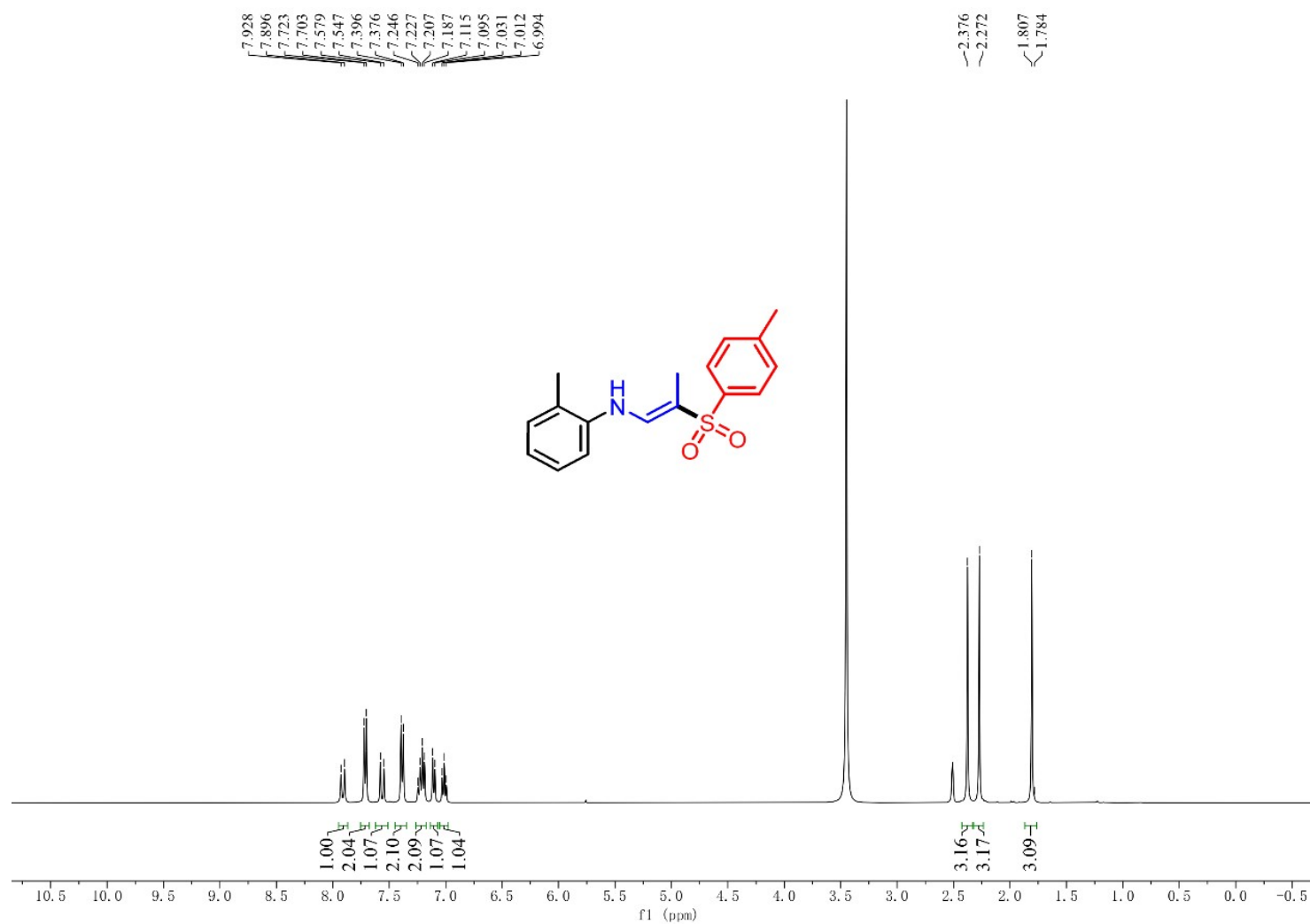


¹H spectrum of **3g**

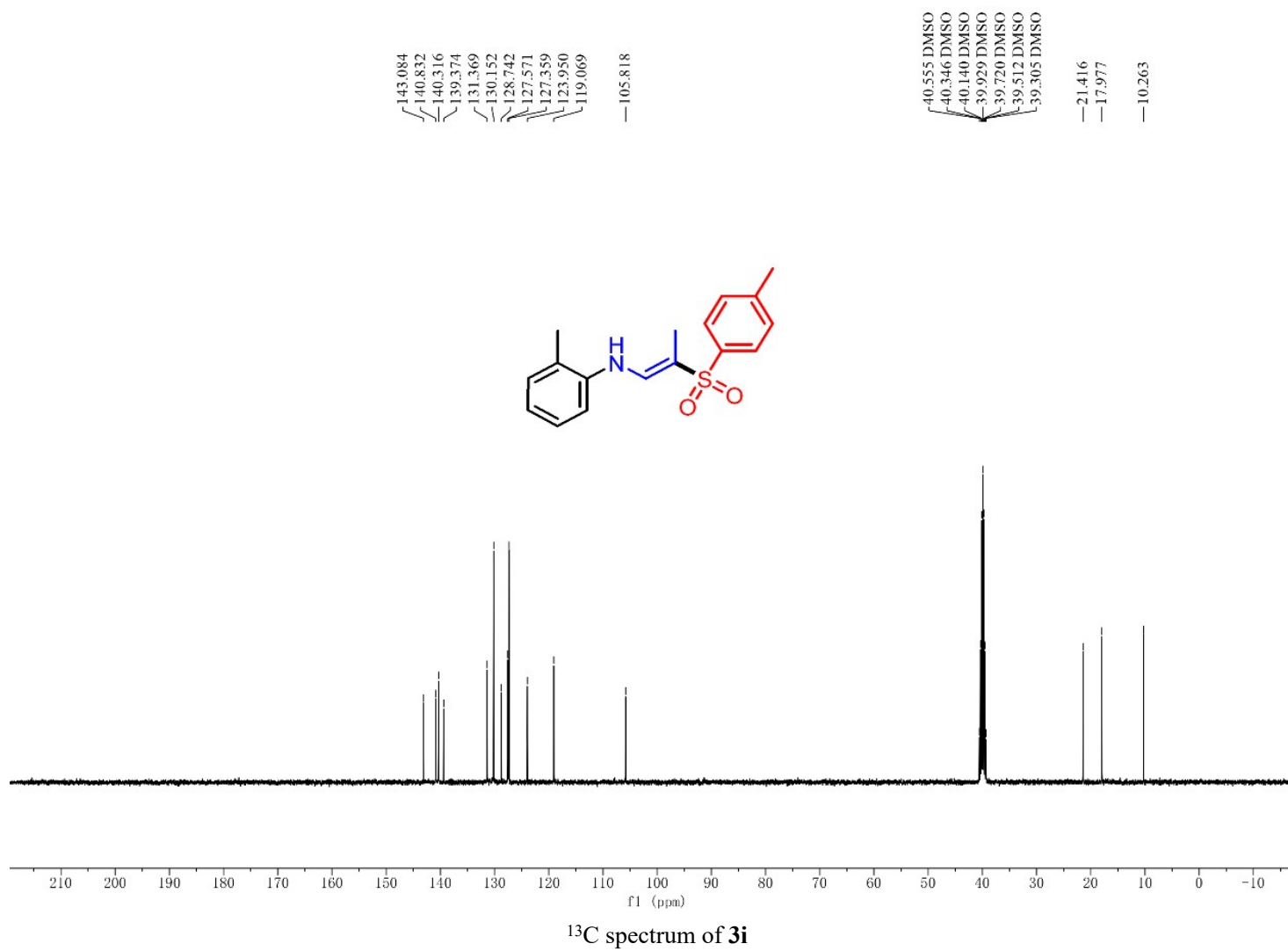


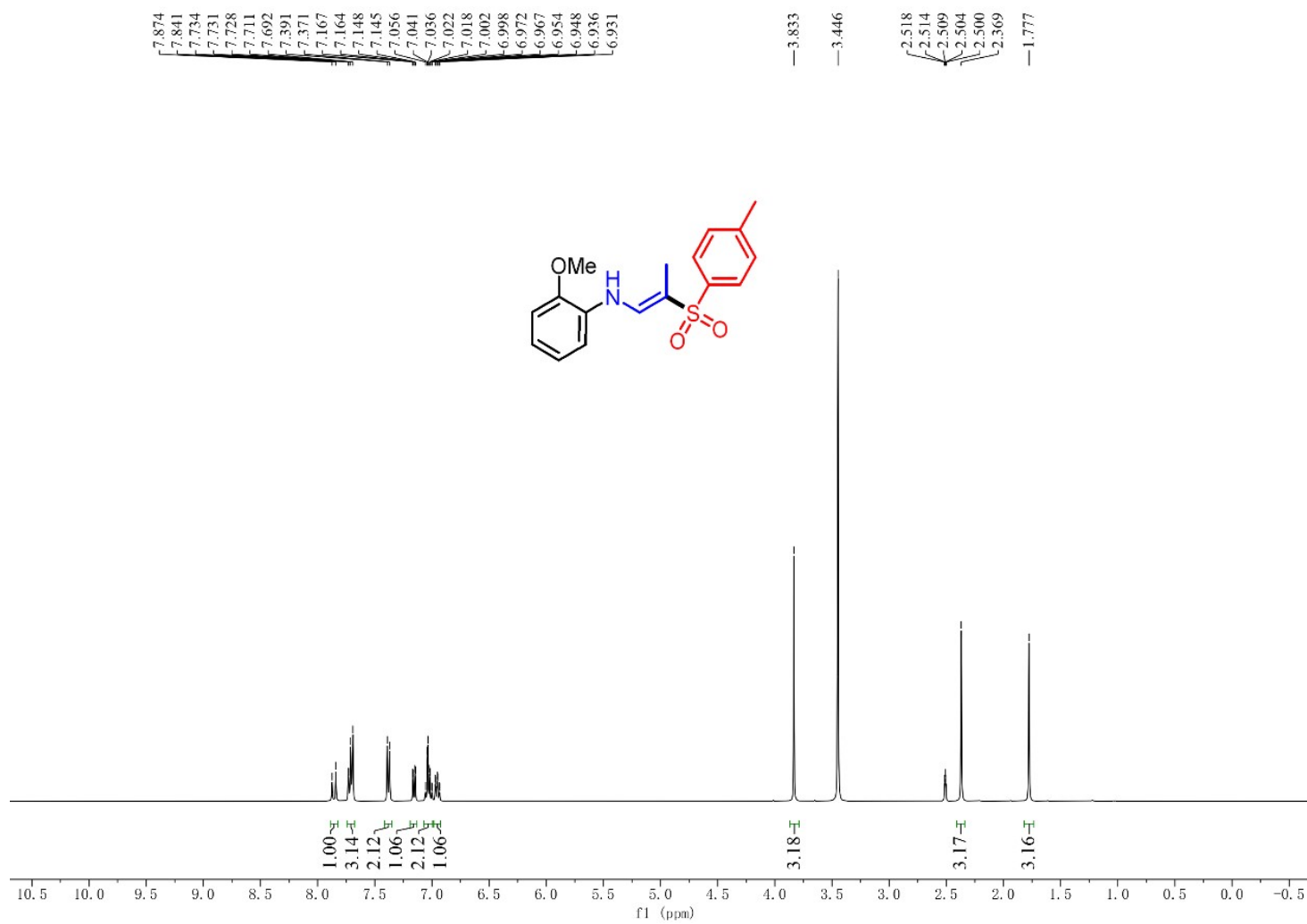




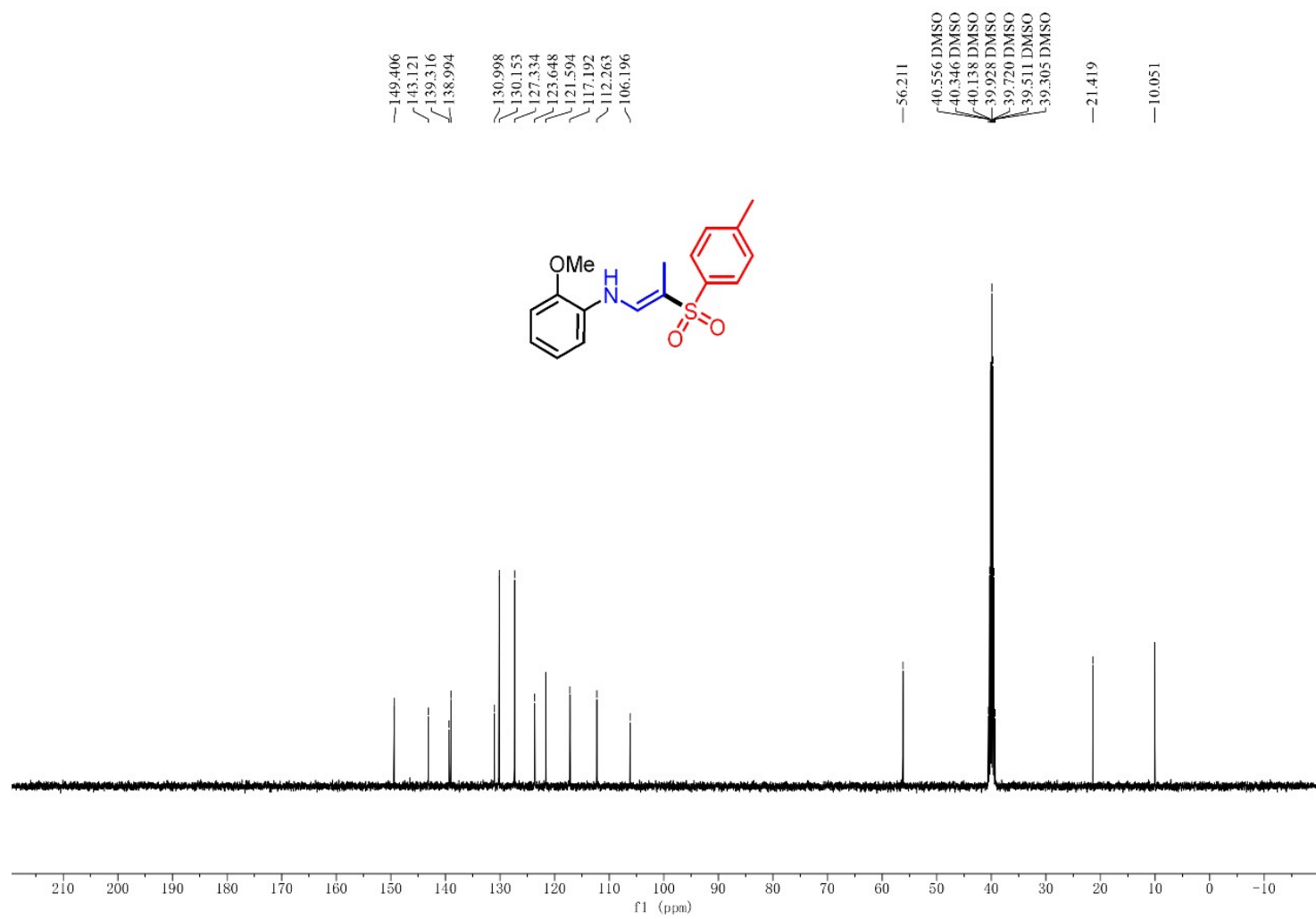


¹H spectrum of **3i**

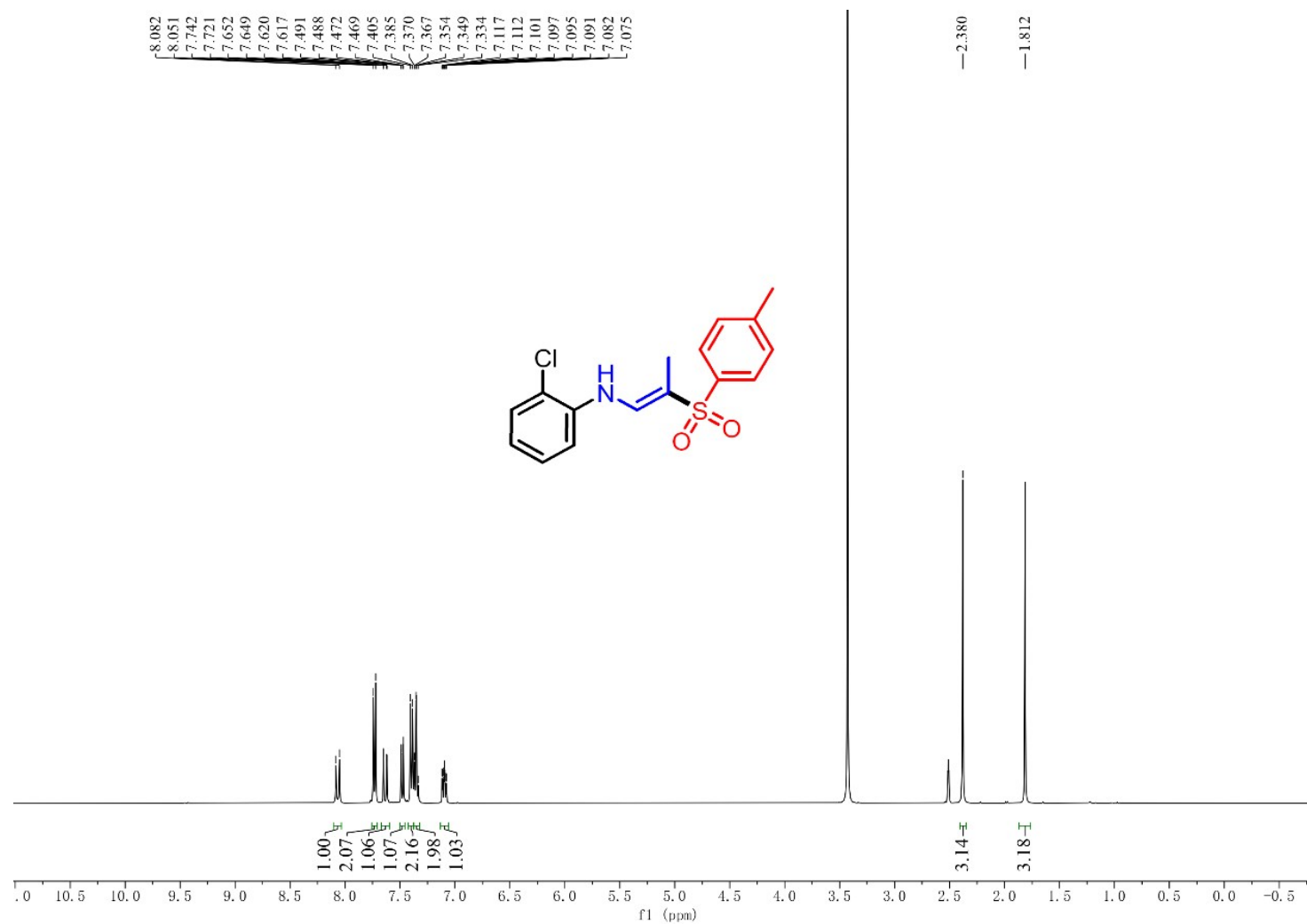




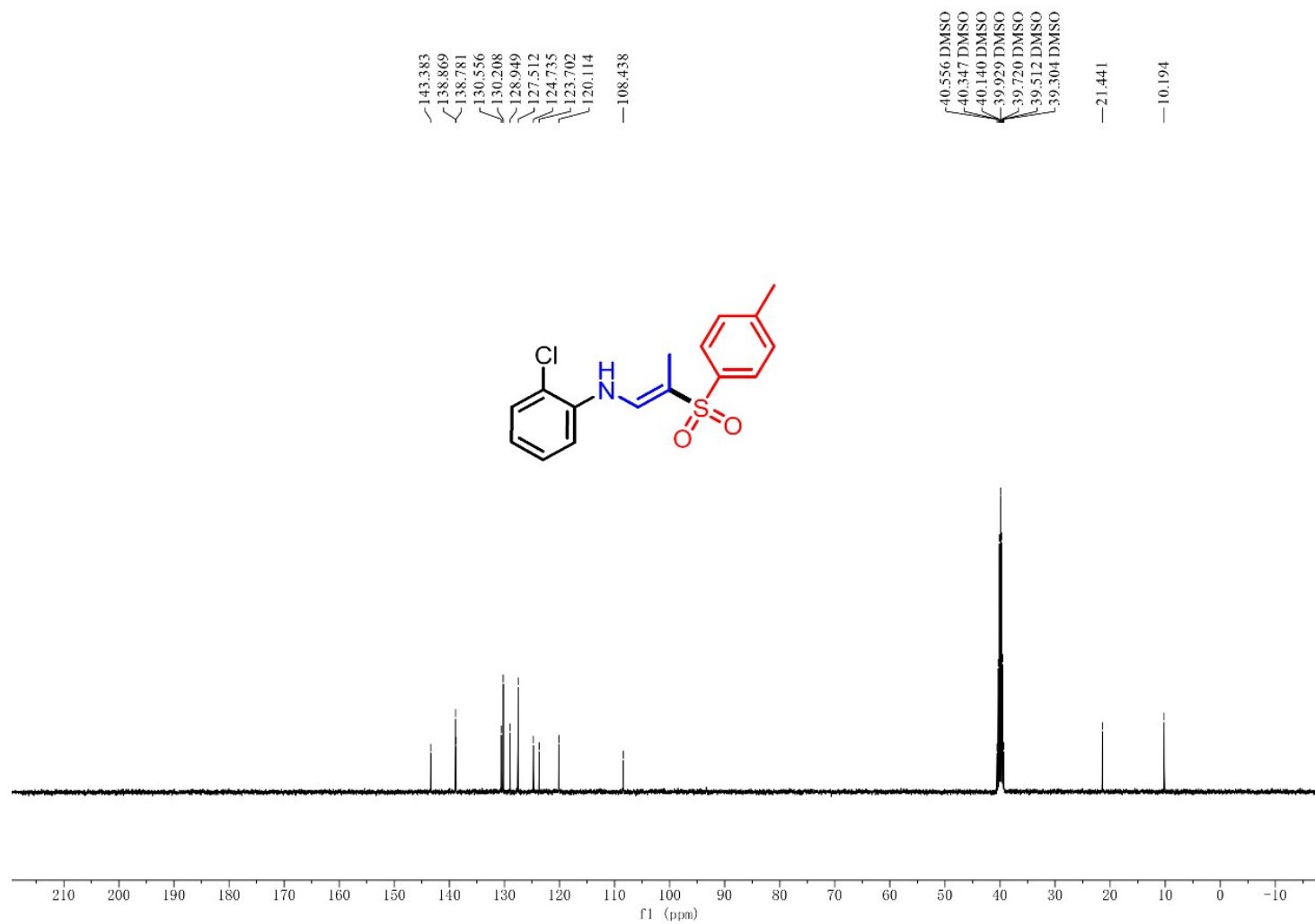
¹H spectrum of **3j**



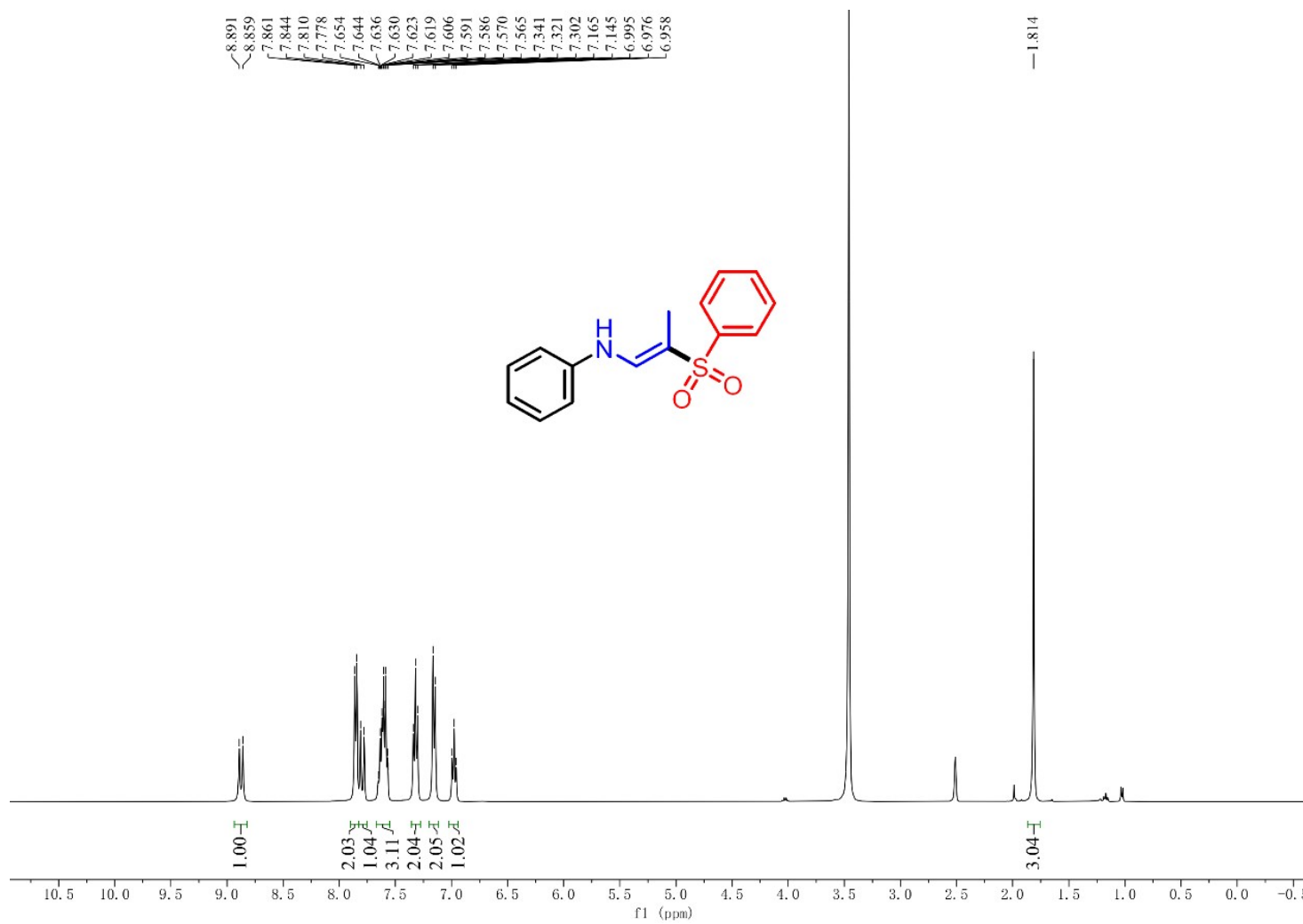
¹³C spectrum of **3j**



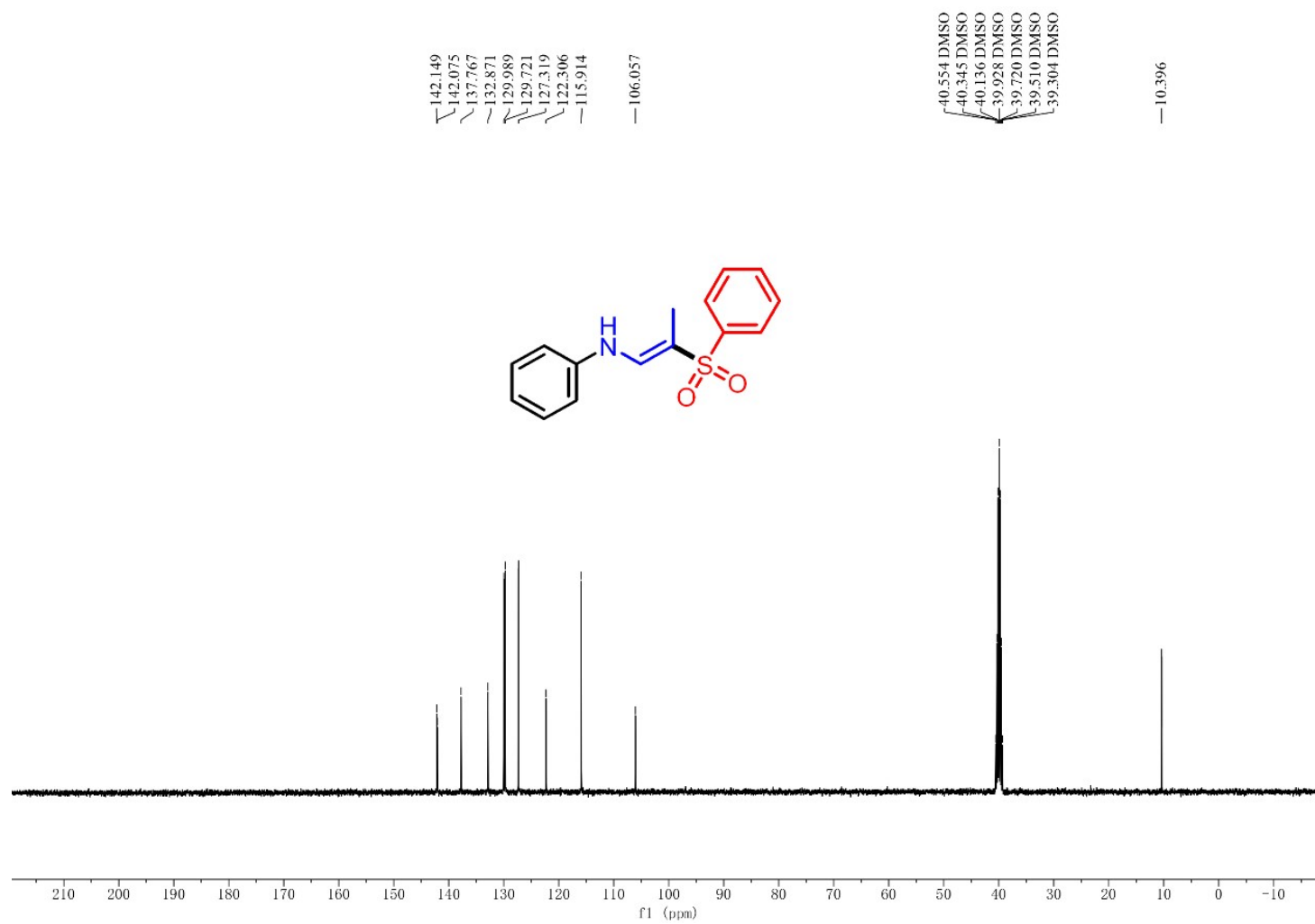
¹H spectrum of **3k**



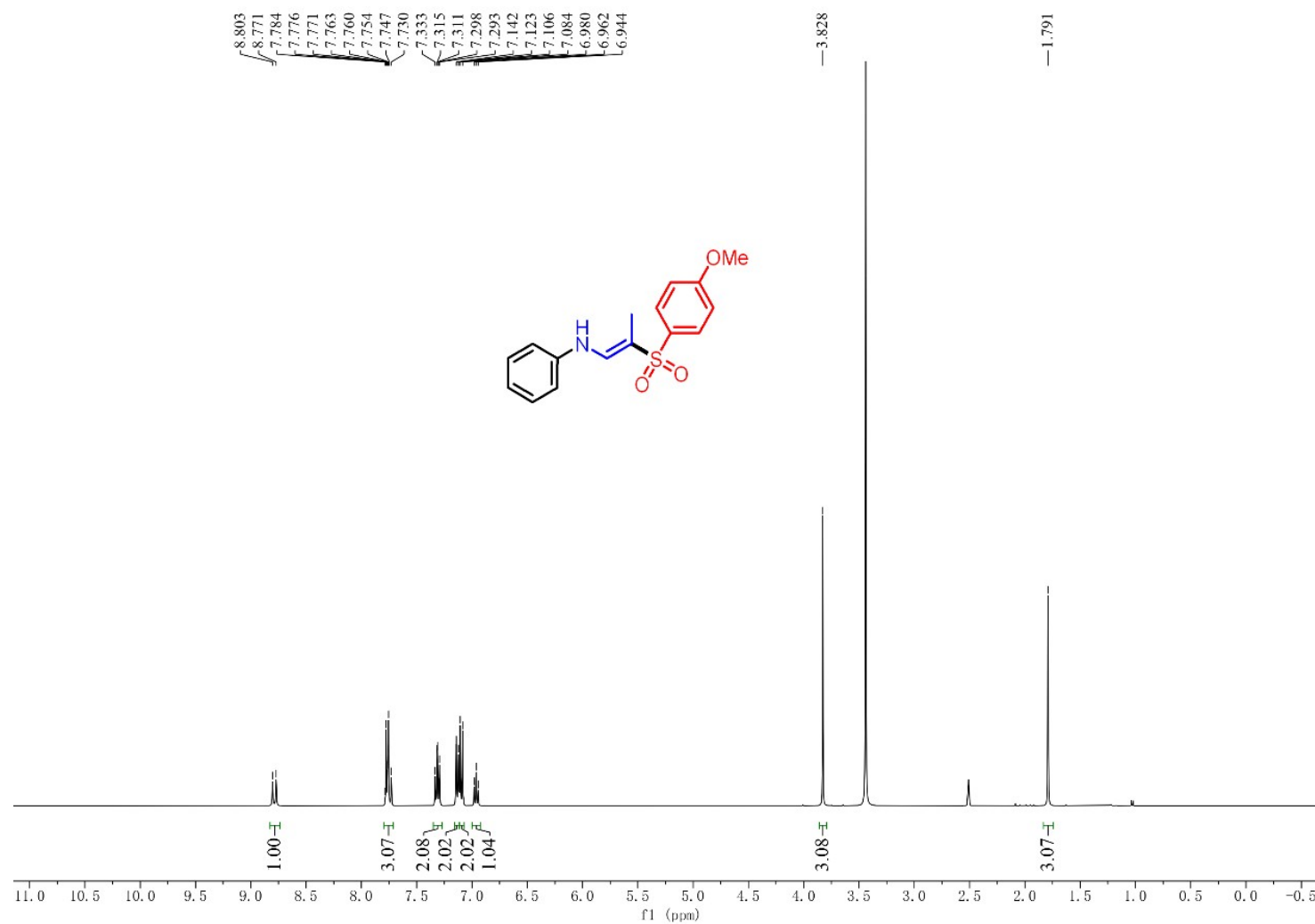
¹³C spectrum of **3k**

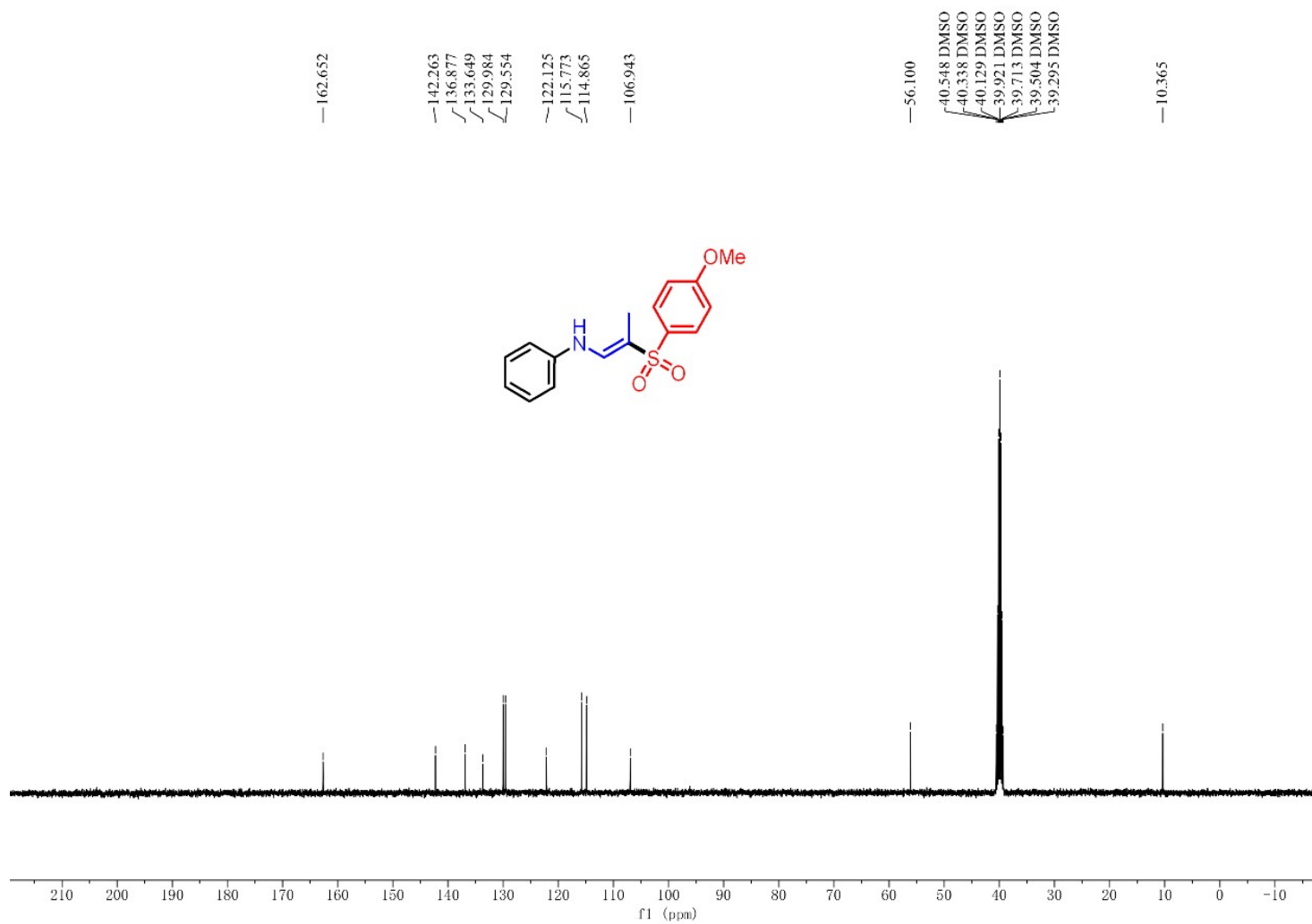


¹H spectrum of **3m**

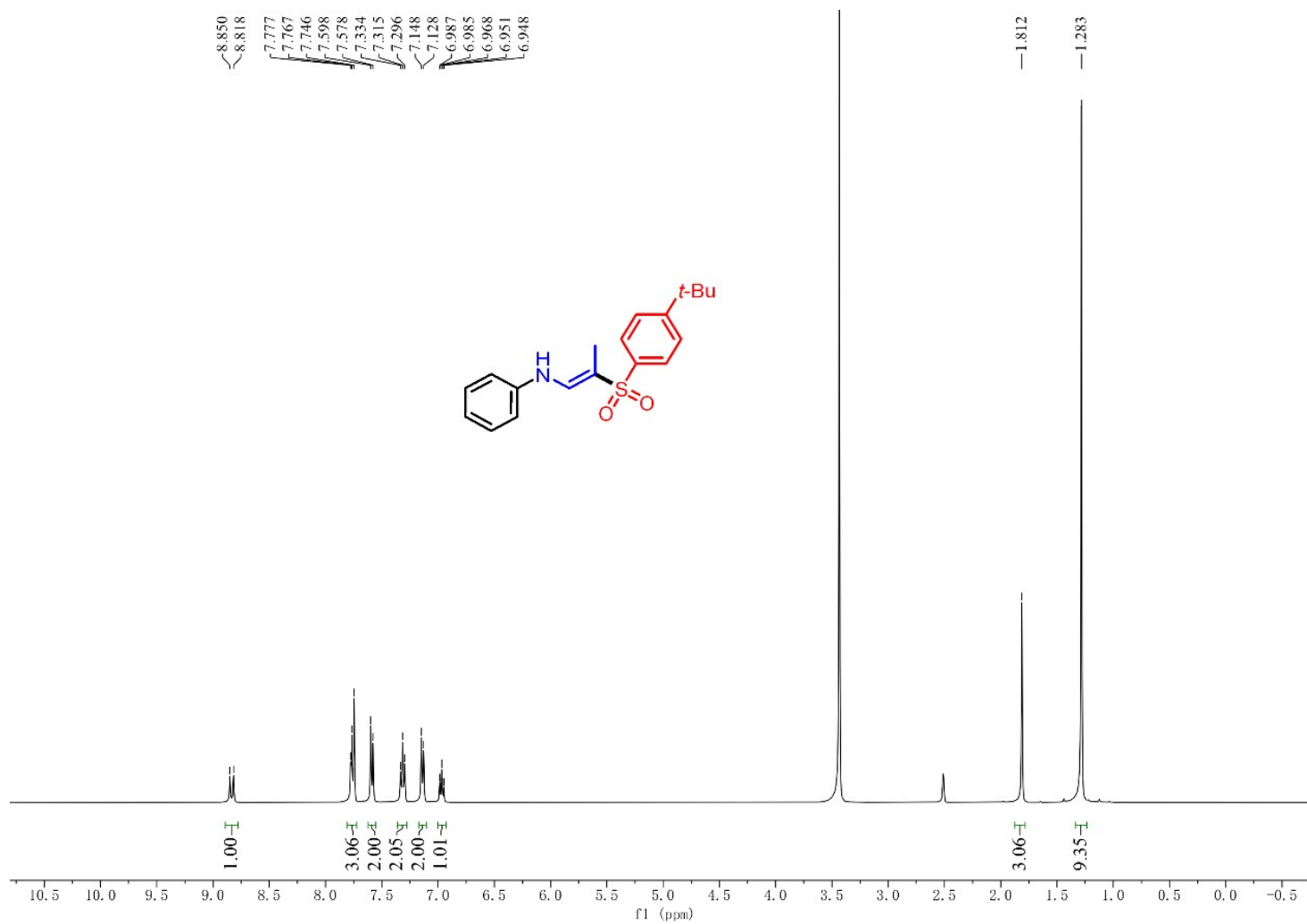


^{13}C spectrum of **3m**

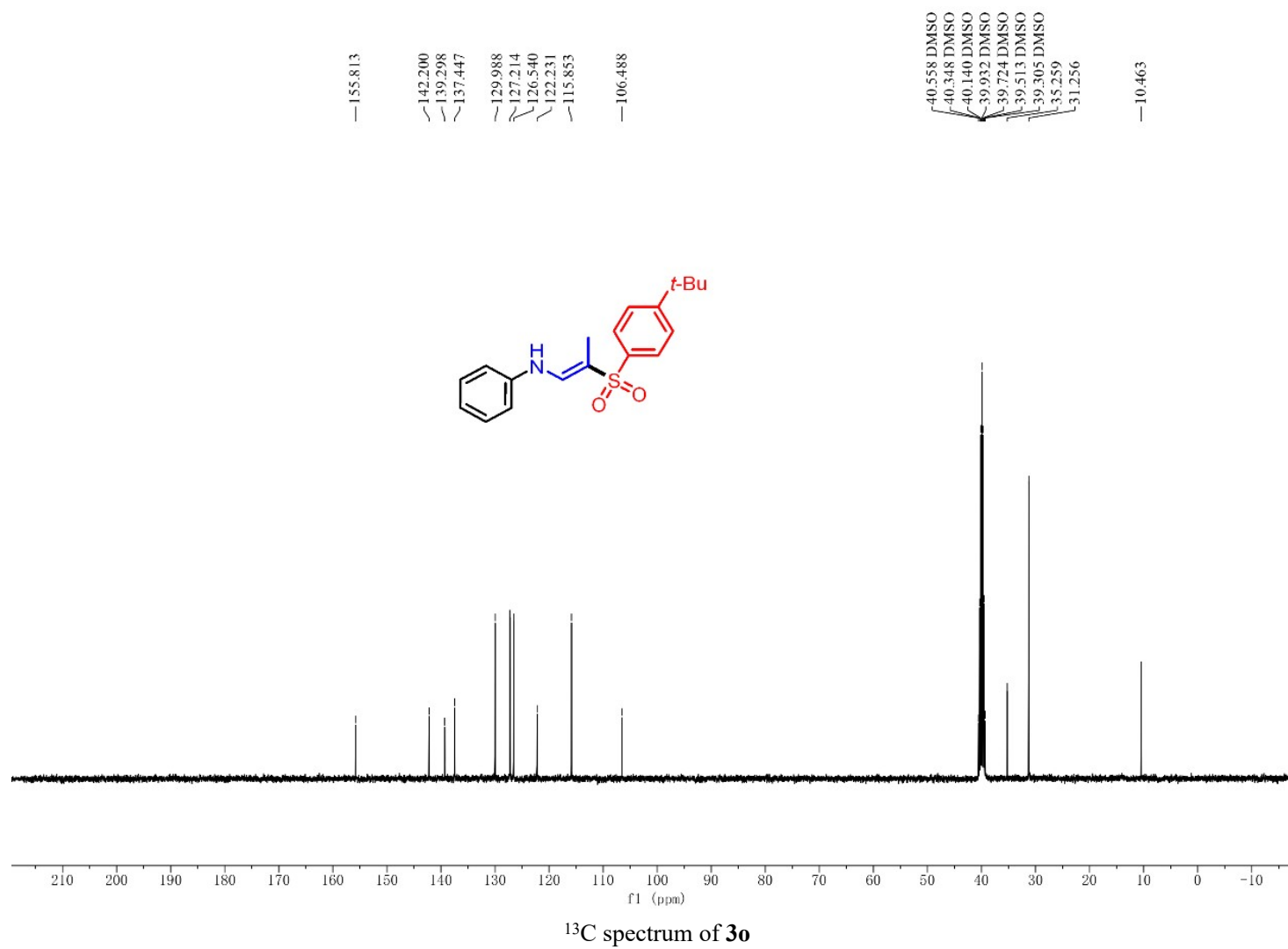


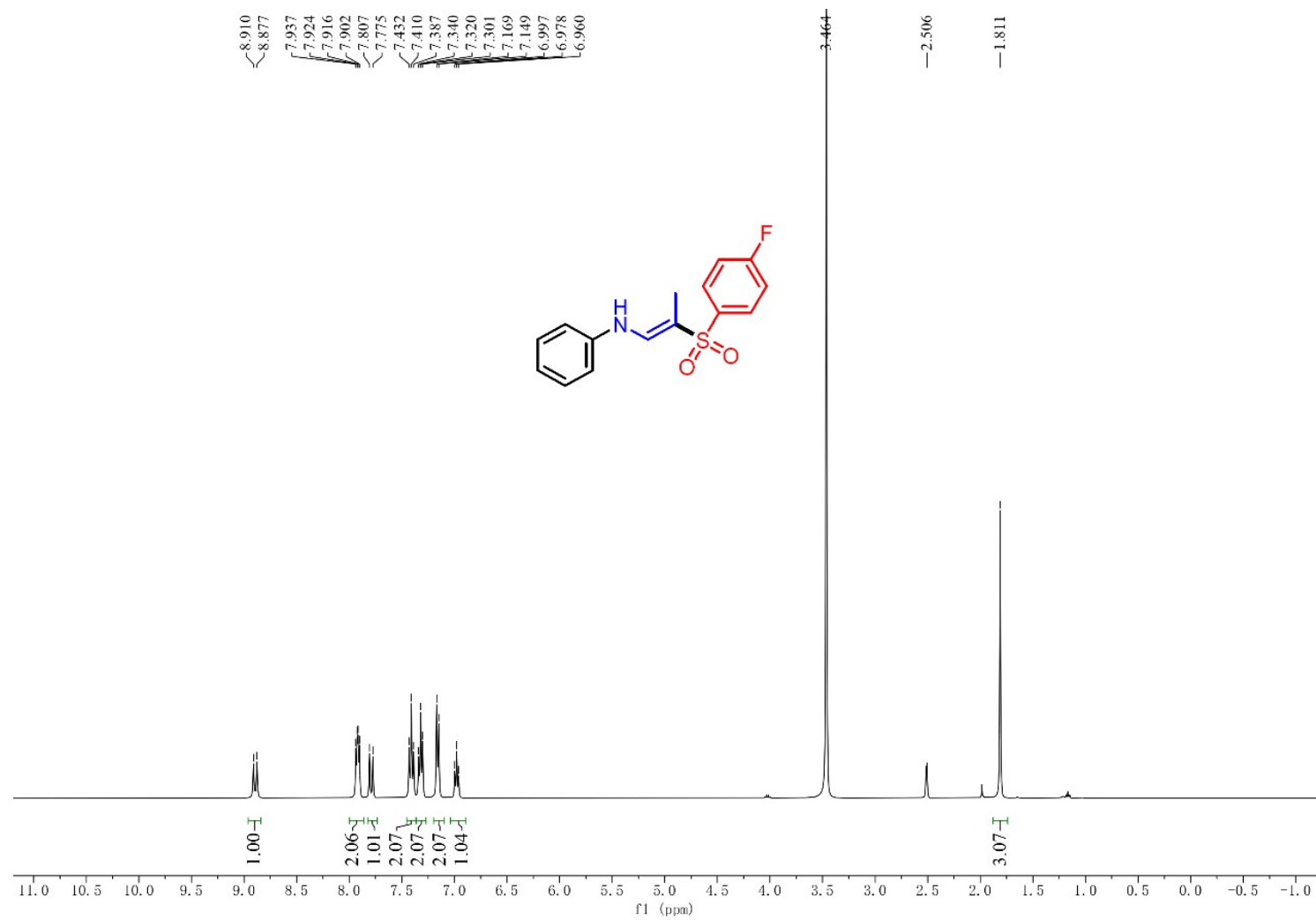


¹³C spectrum of **3n**

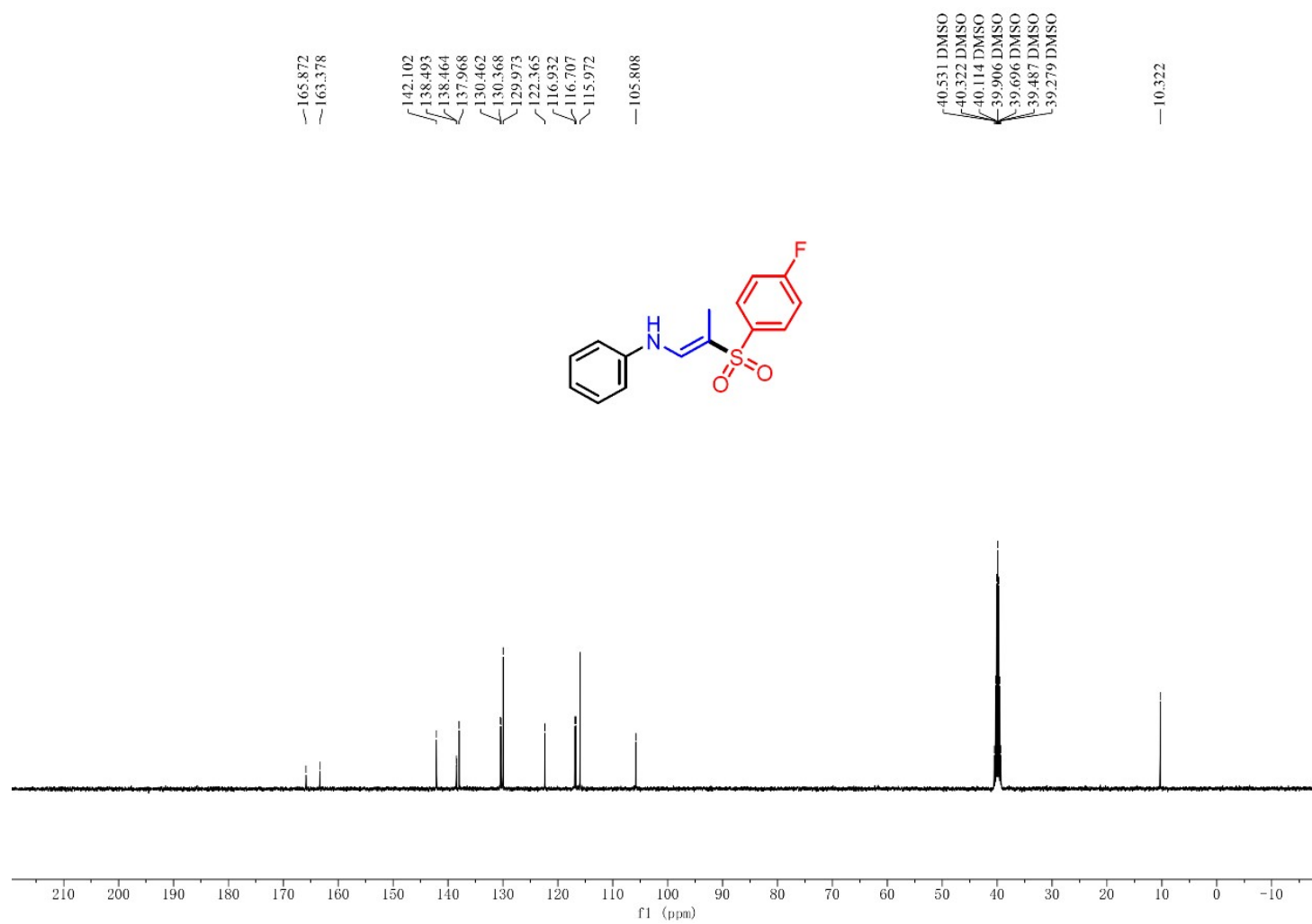


¹H spectrum of **3o**

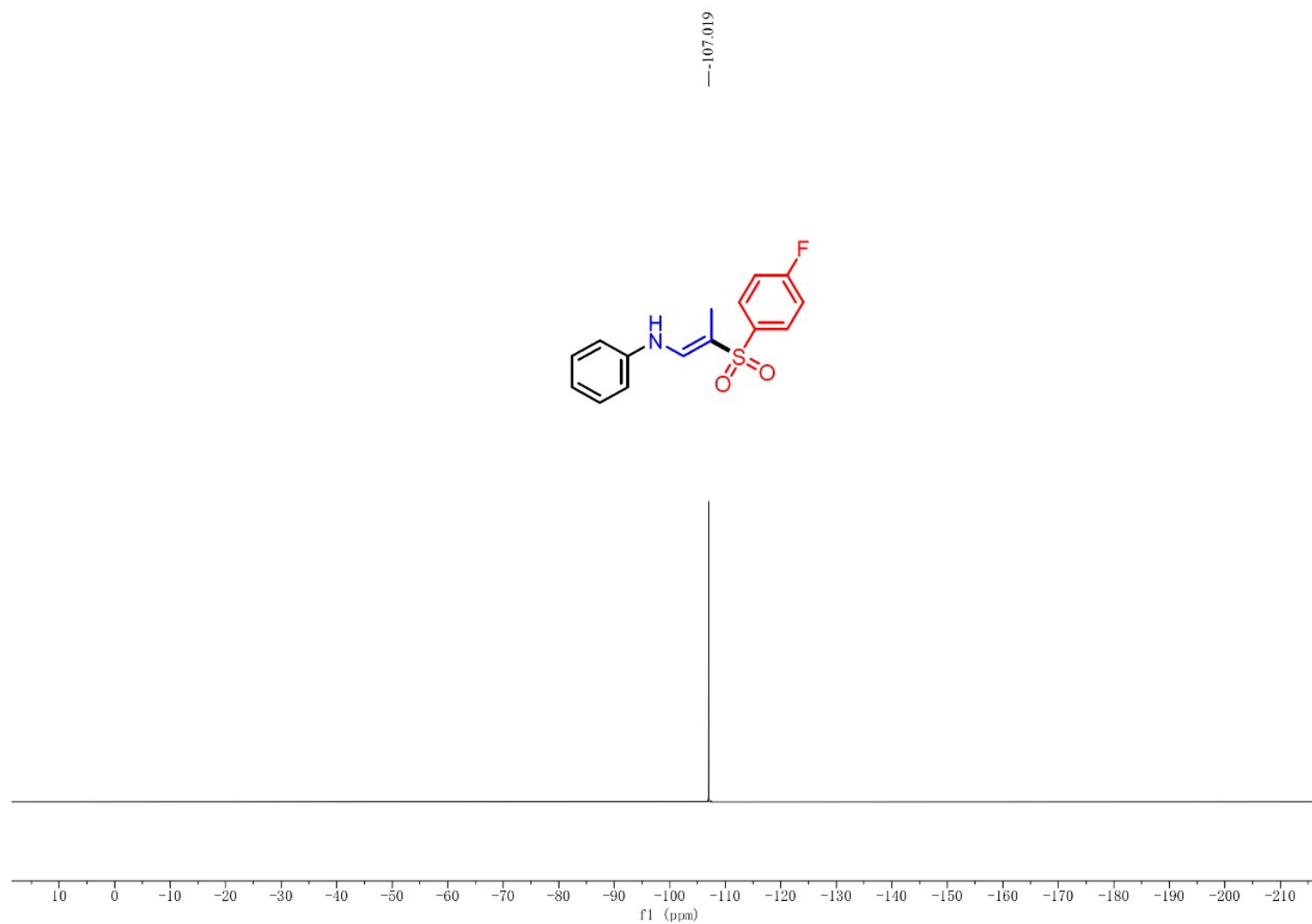




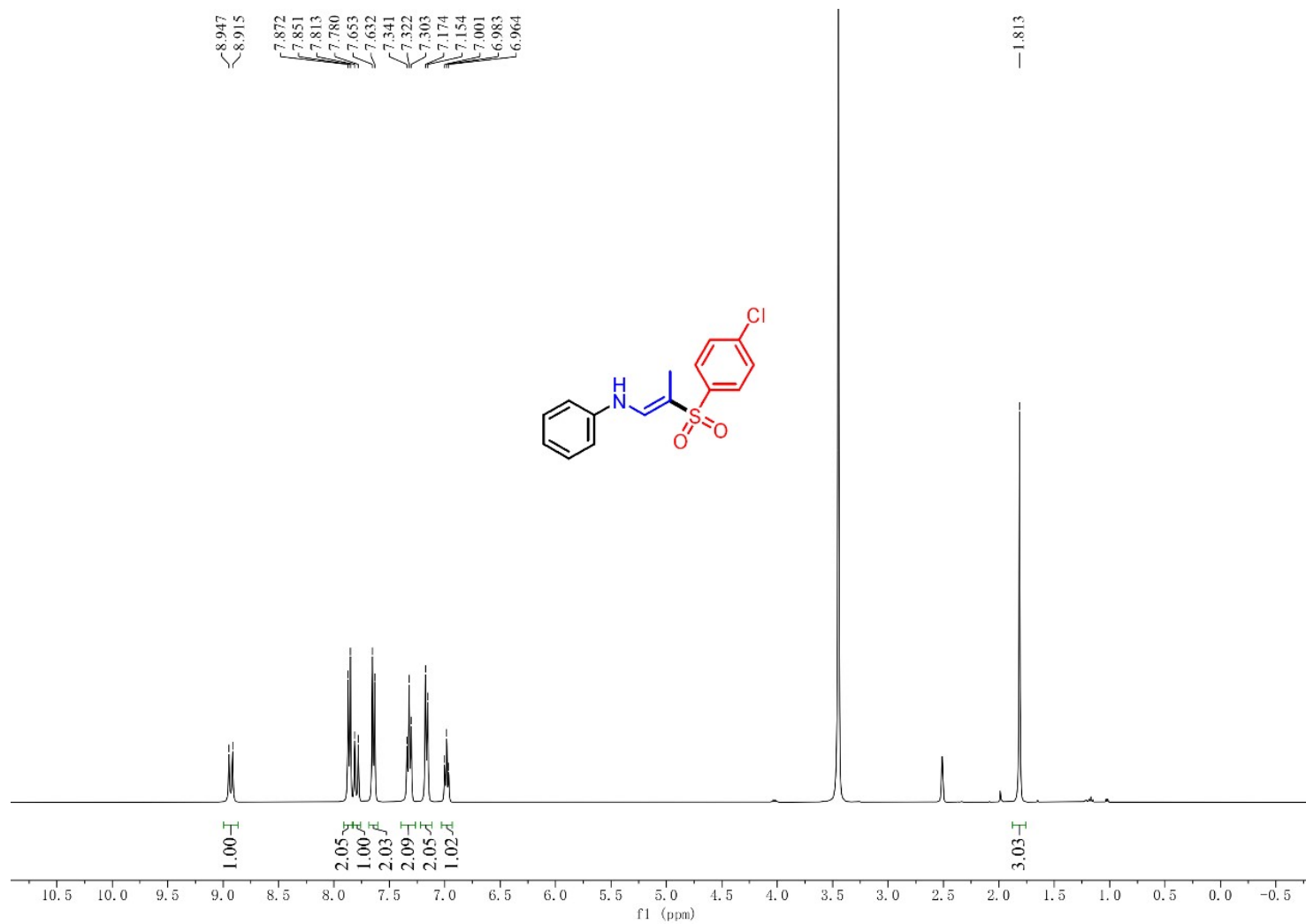
¹H spectrum of **3p**



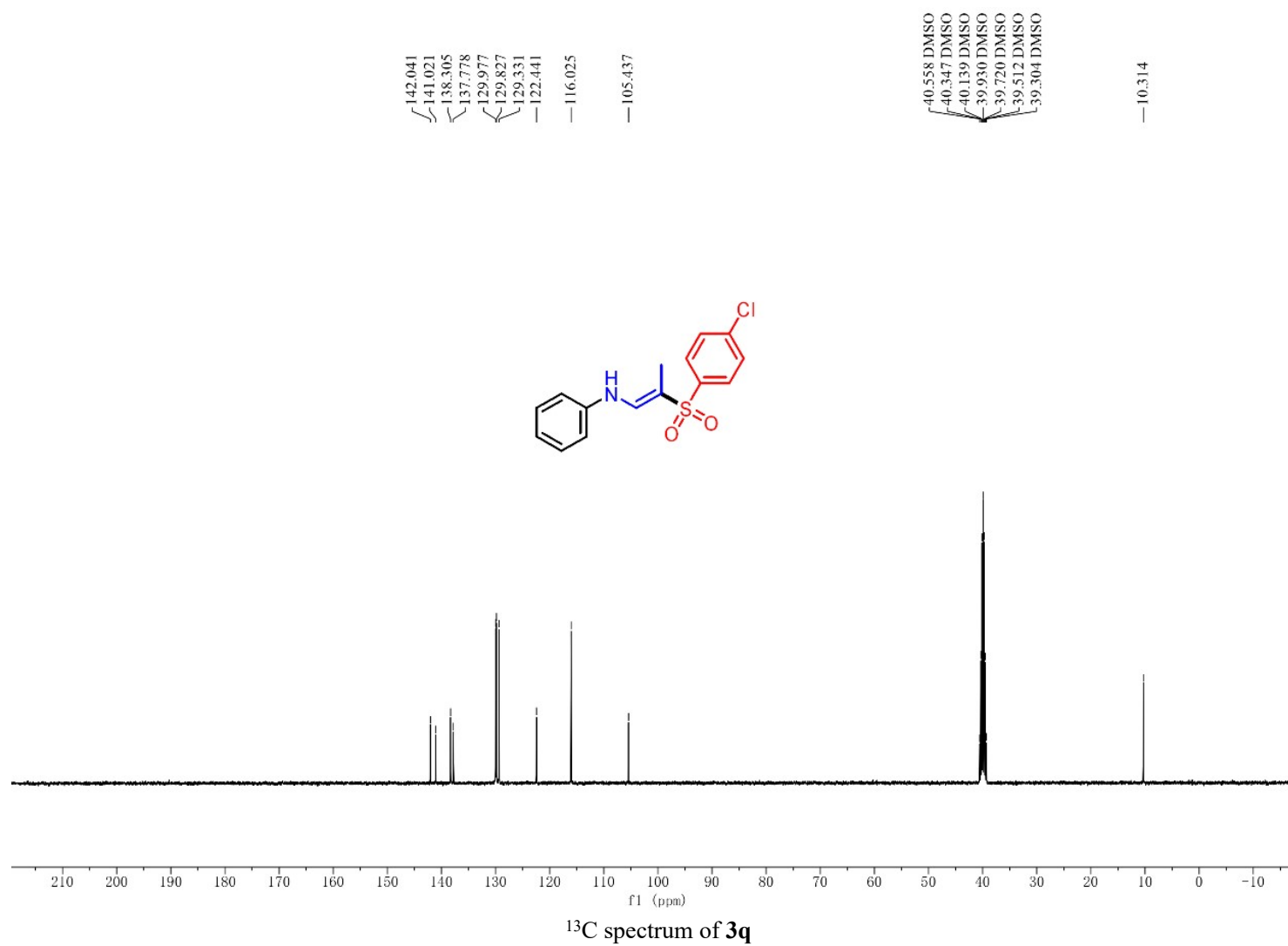
¹³C spectrum of **3p**

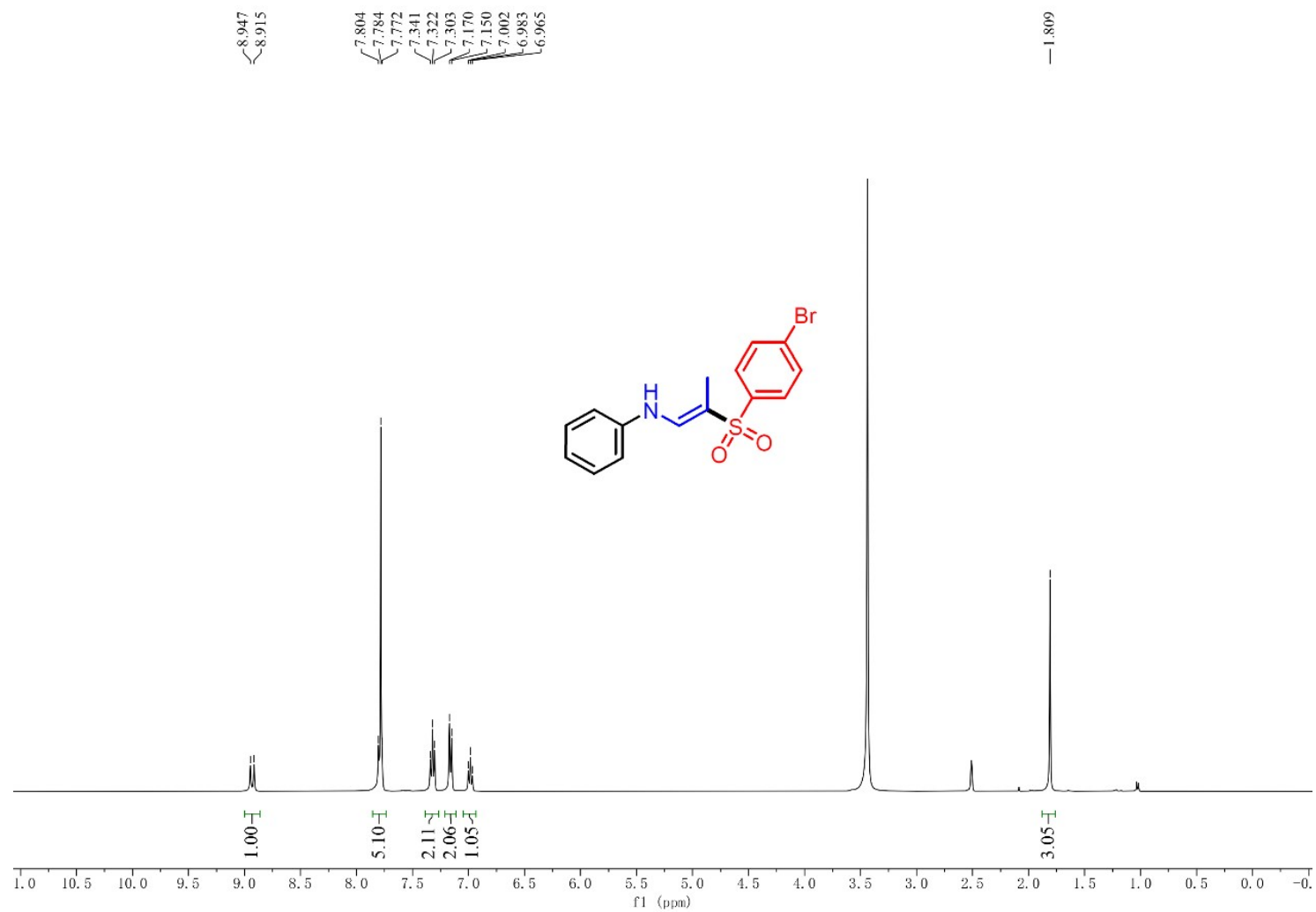


^{19}F spectrum of **3p**

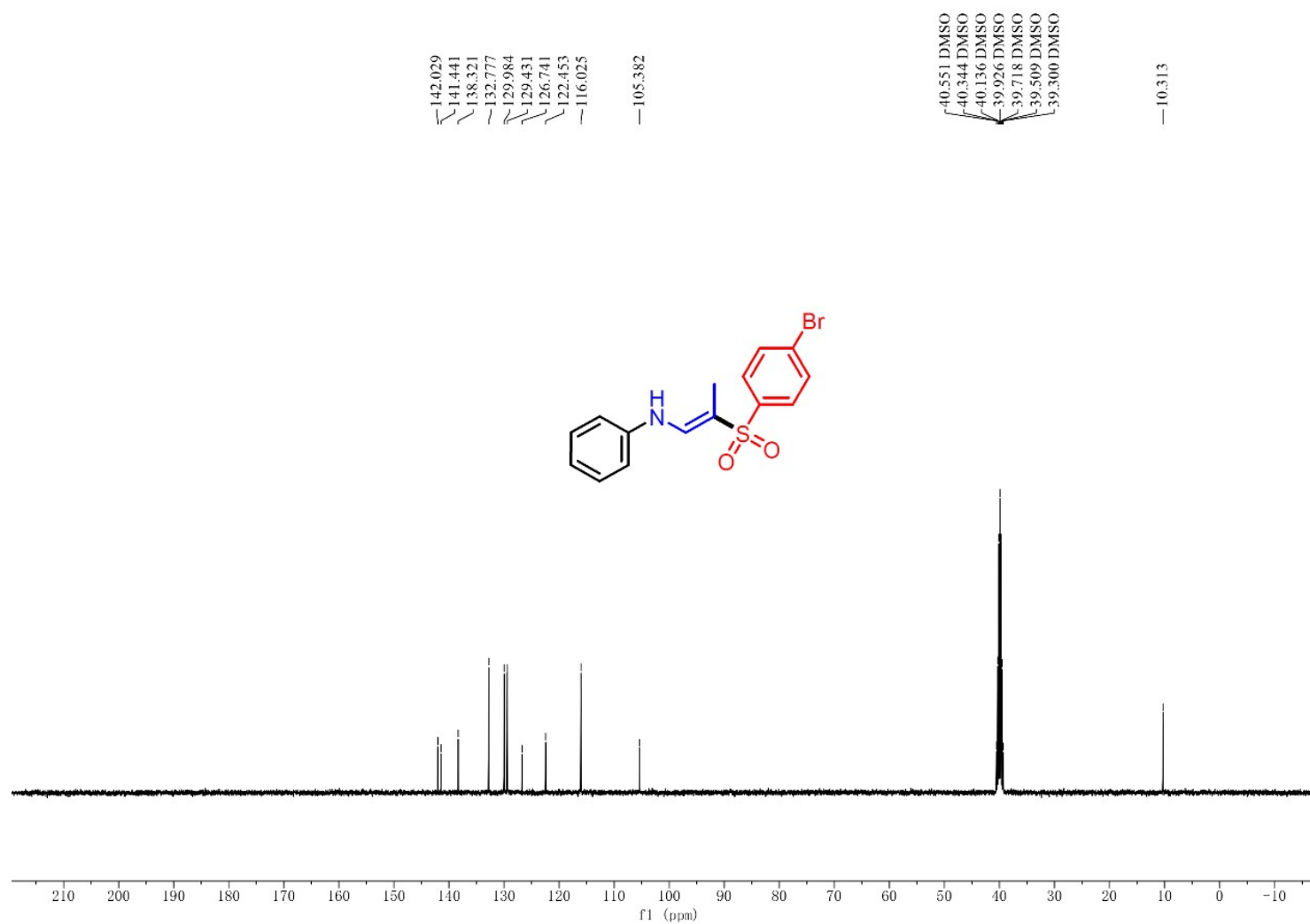


¹H spectrum of 3q

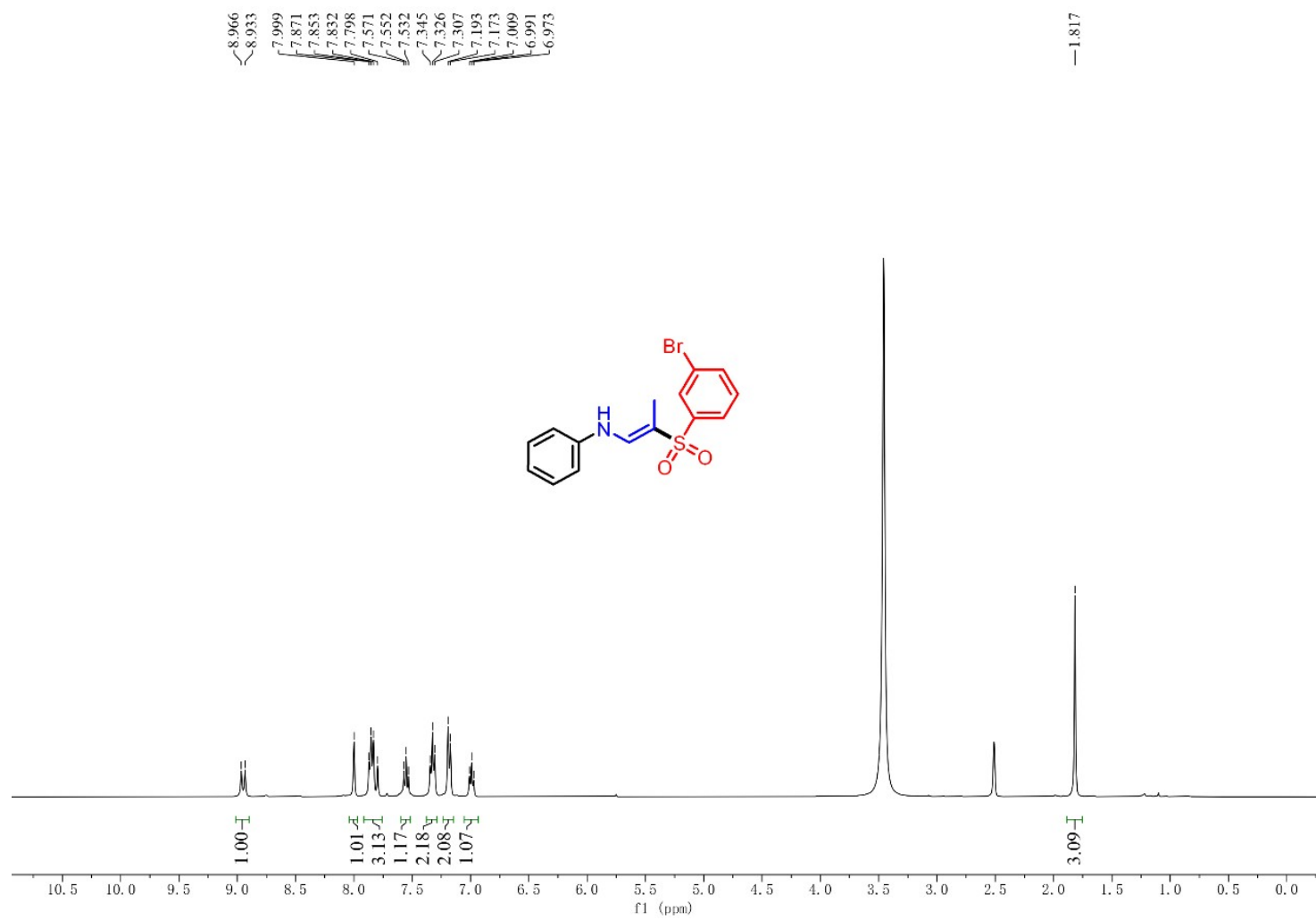




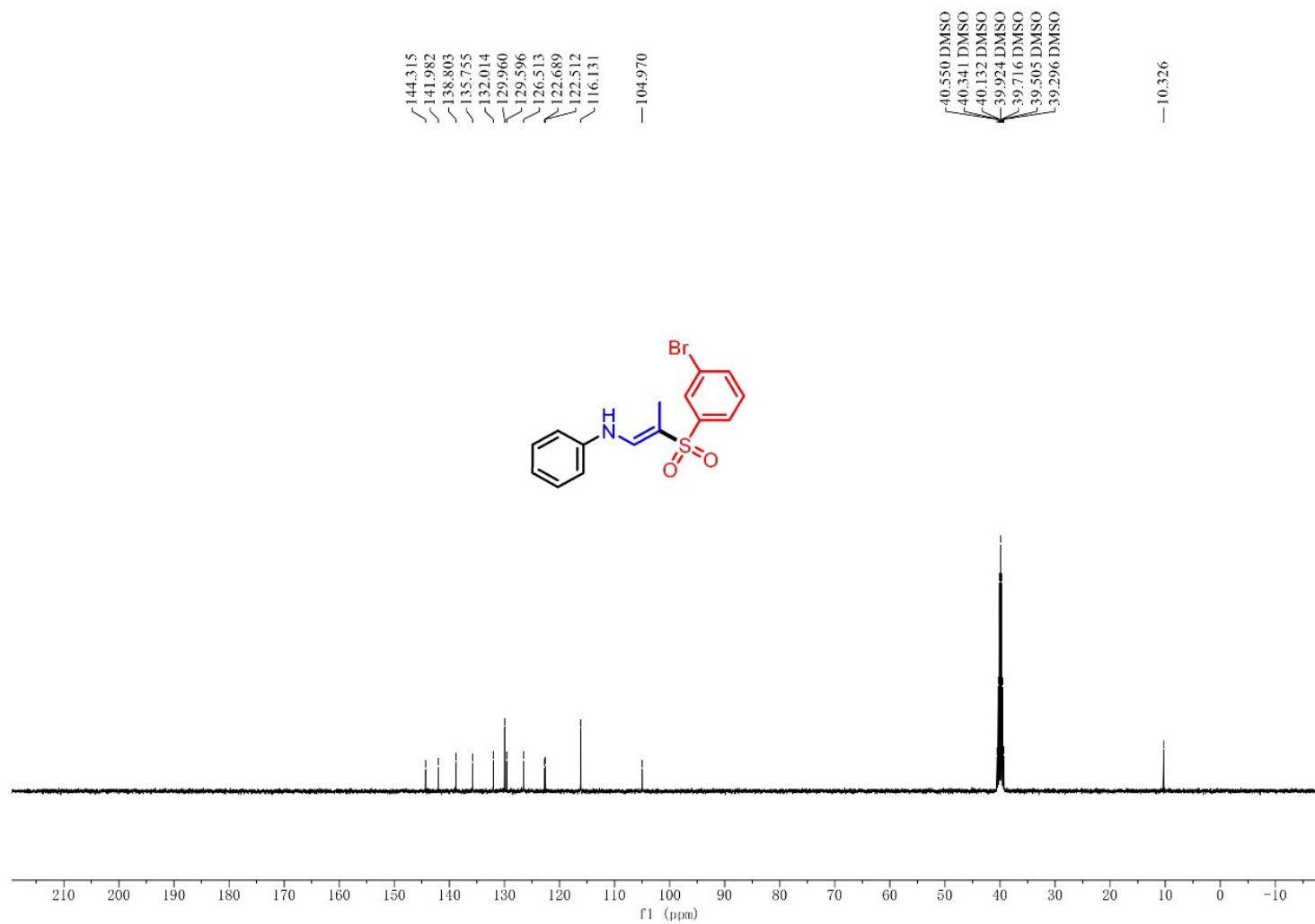
¹H spectrum of **3r**



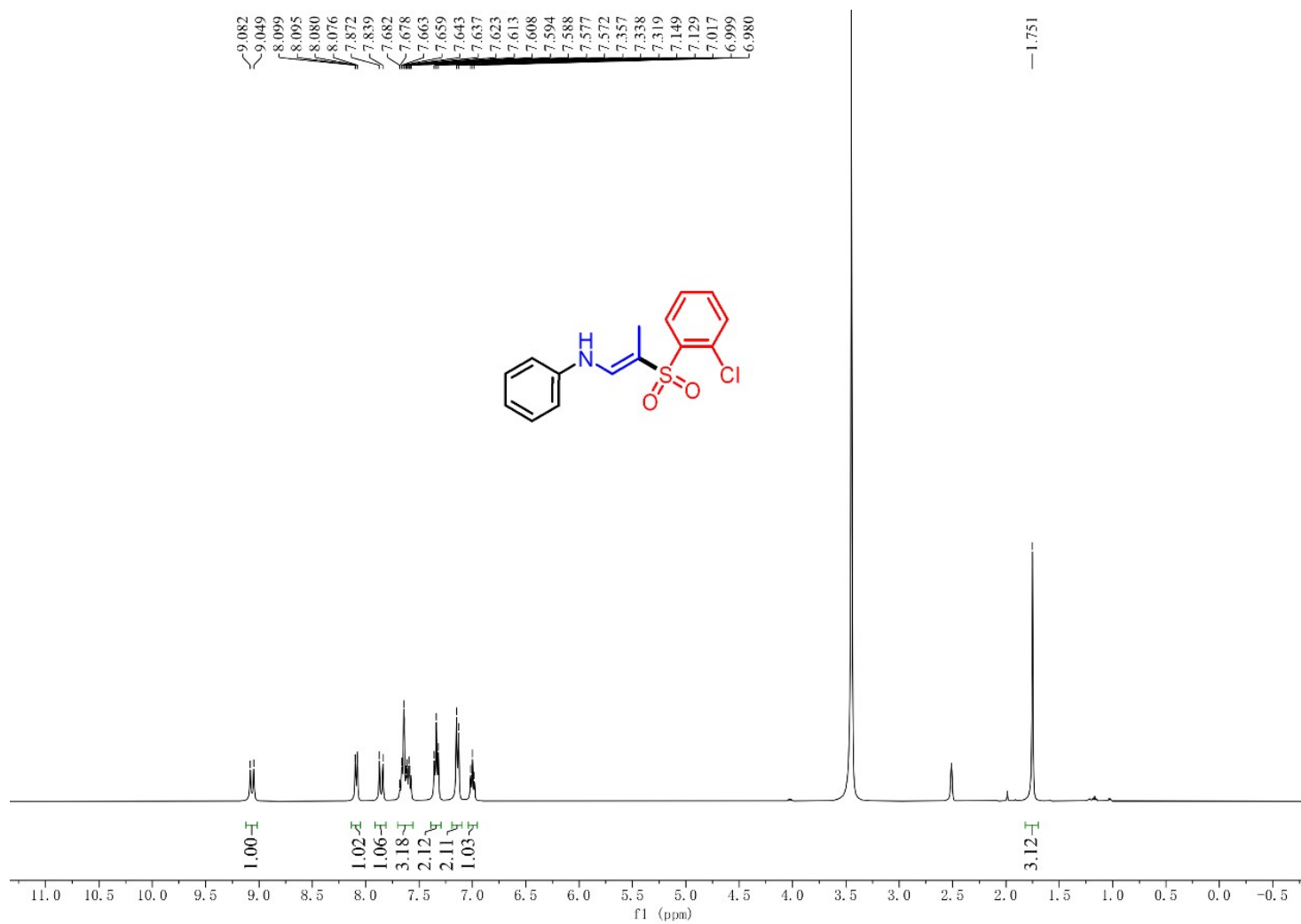
¹³C spectrum of **3r**



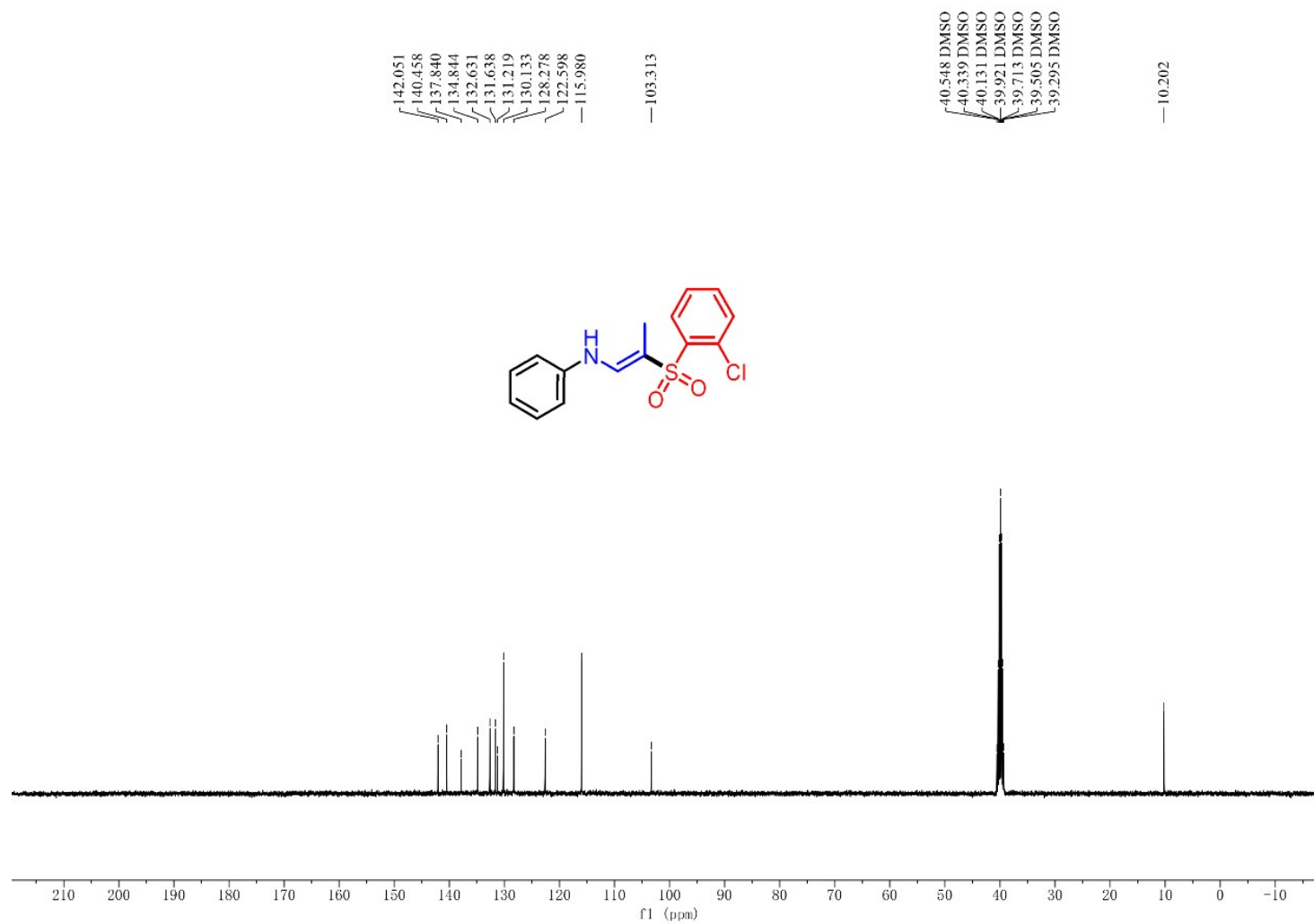
¹H spectrum of **3s**



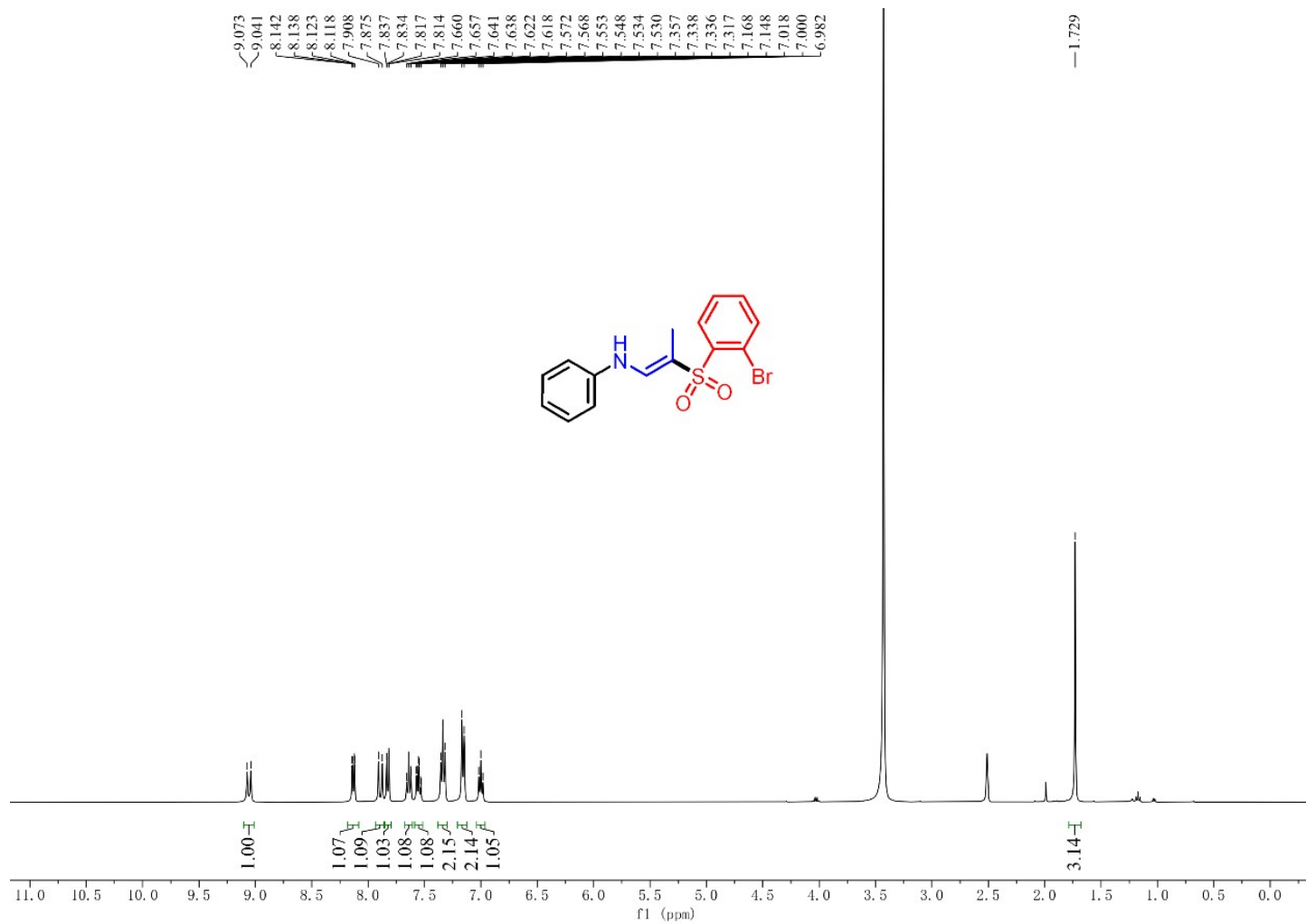
¹³C spectrum of **3s**



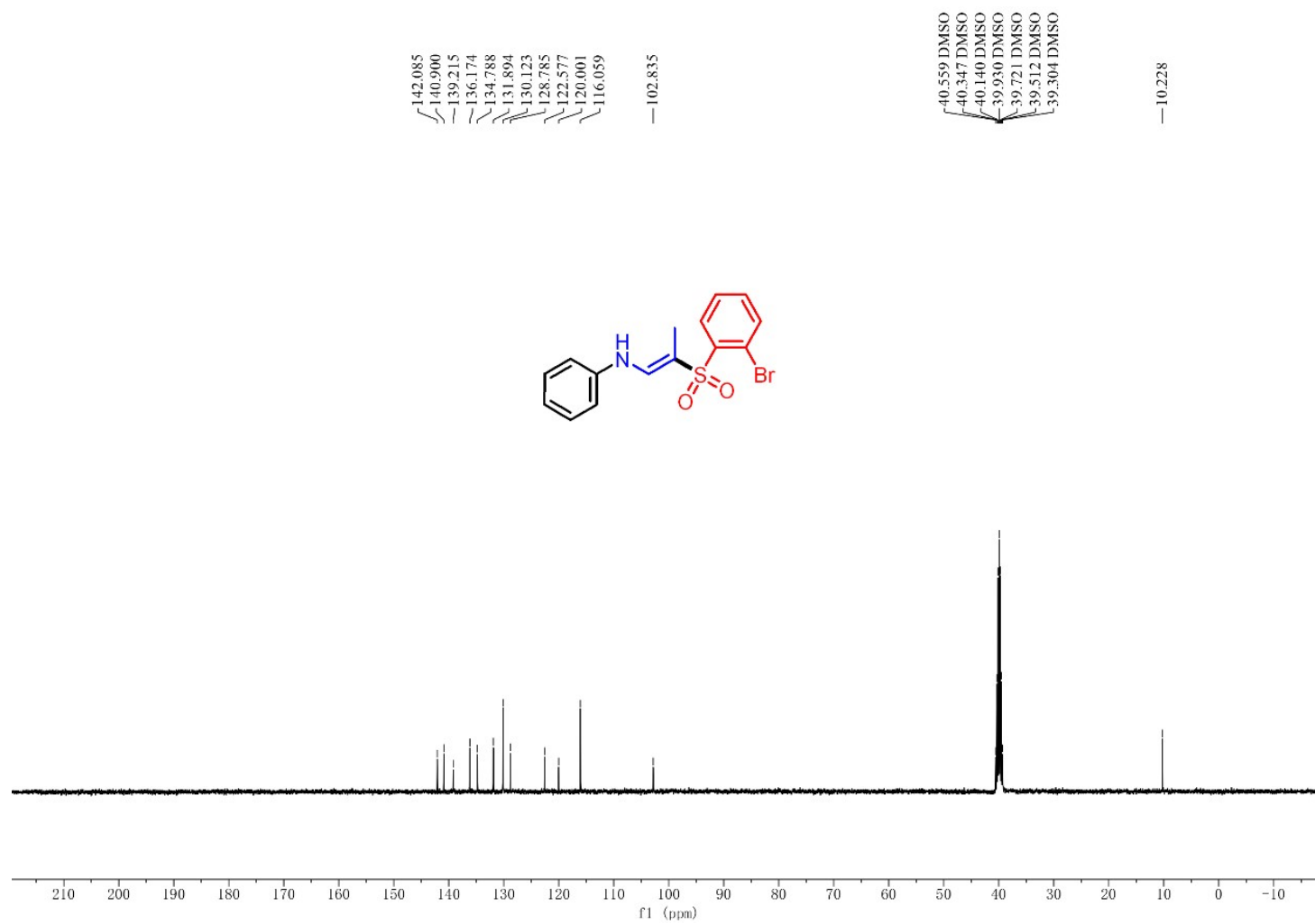
¹H spectrum of 3t



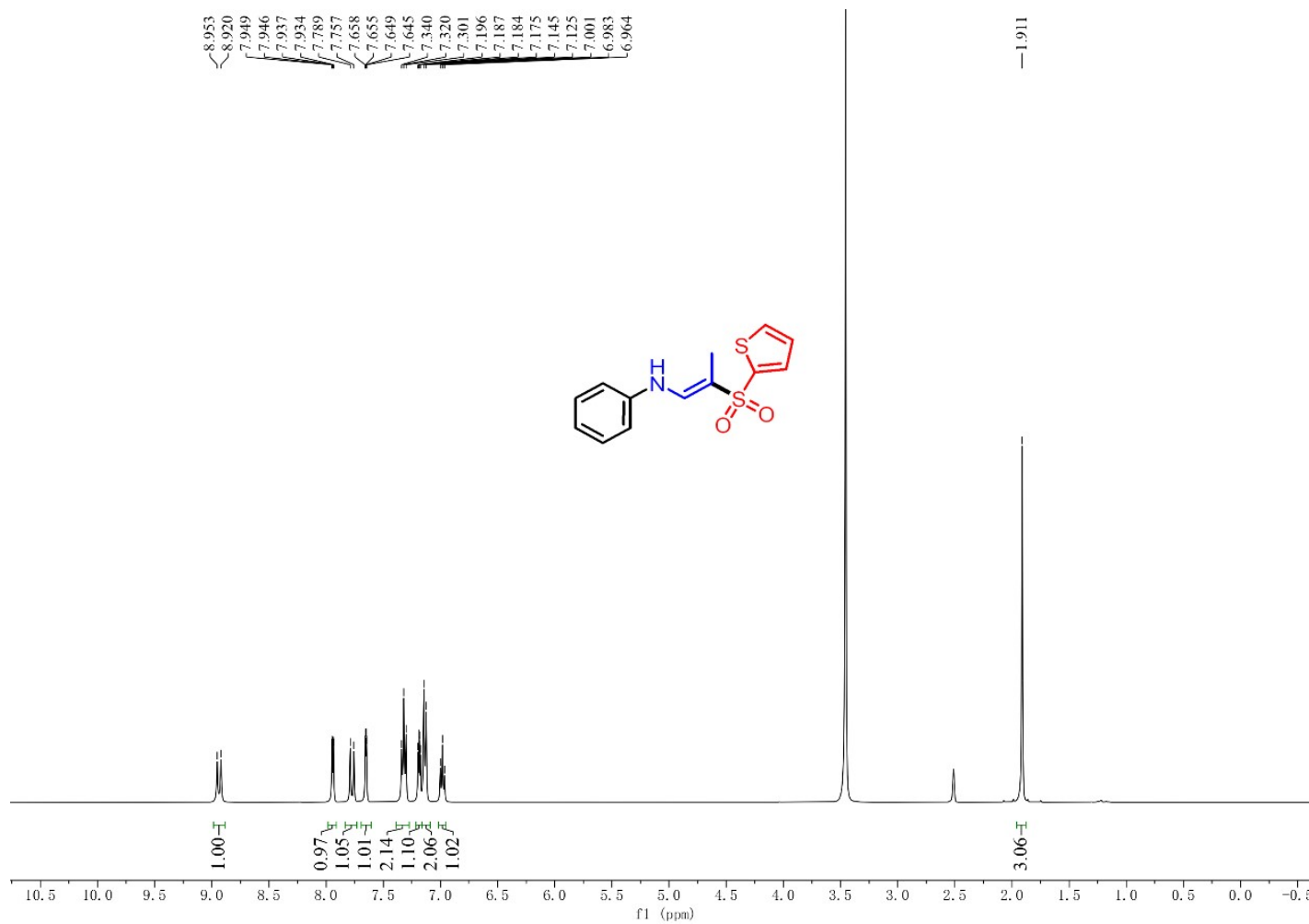
¹³C spectrum of **3t**



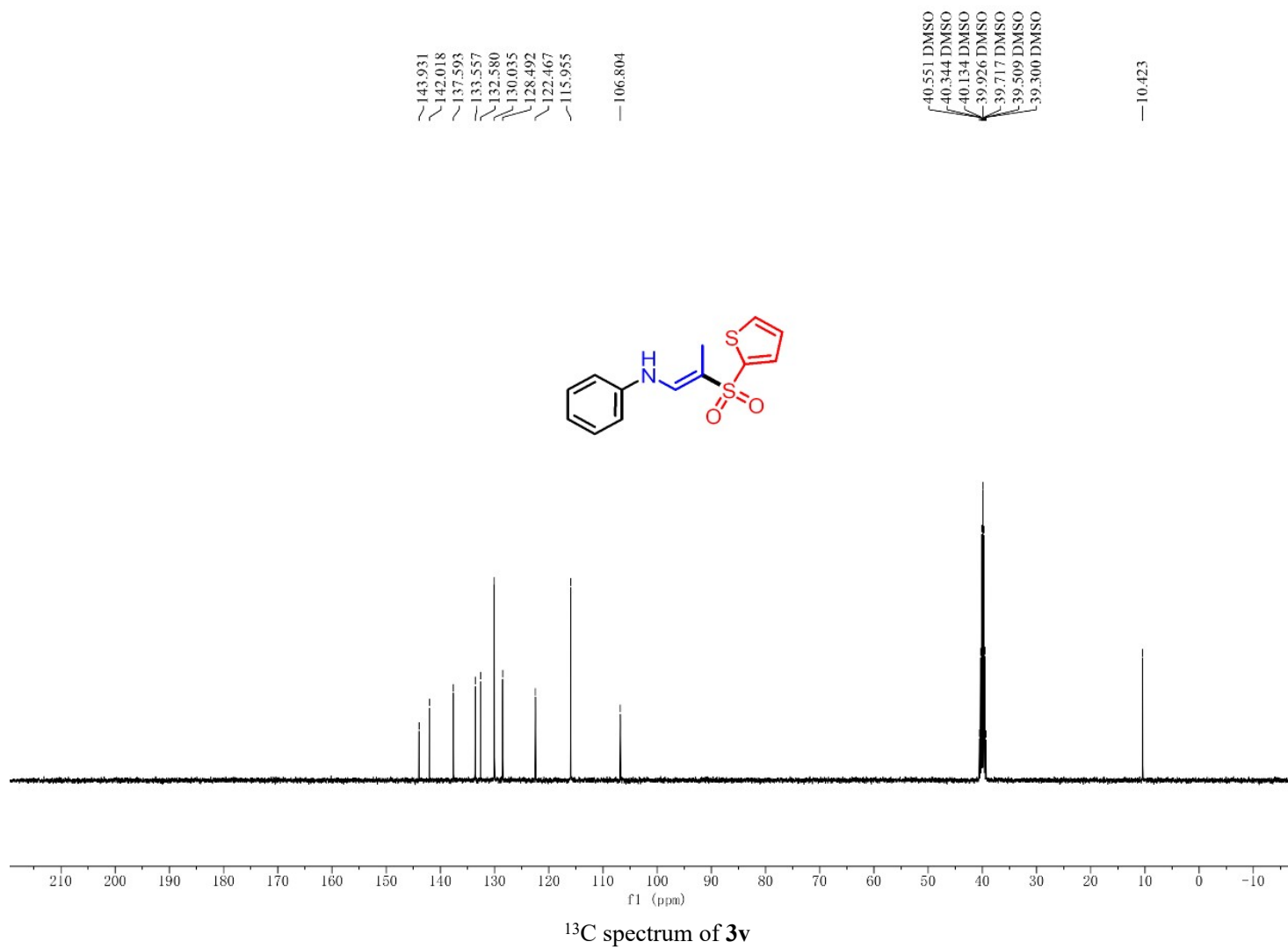
¹H spectrum of **3u**

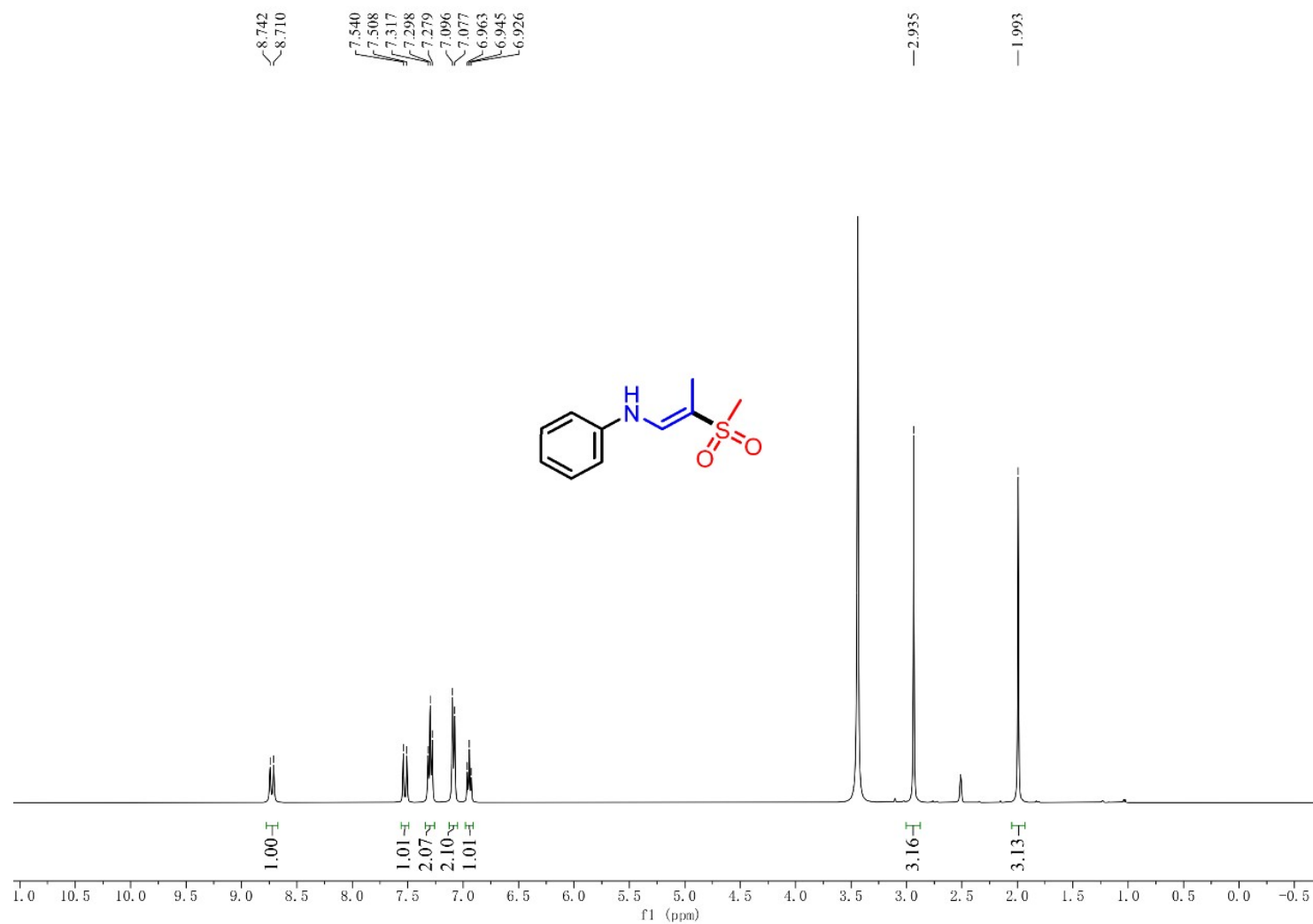


¹³C spectrum of **3u**

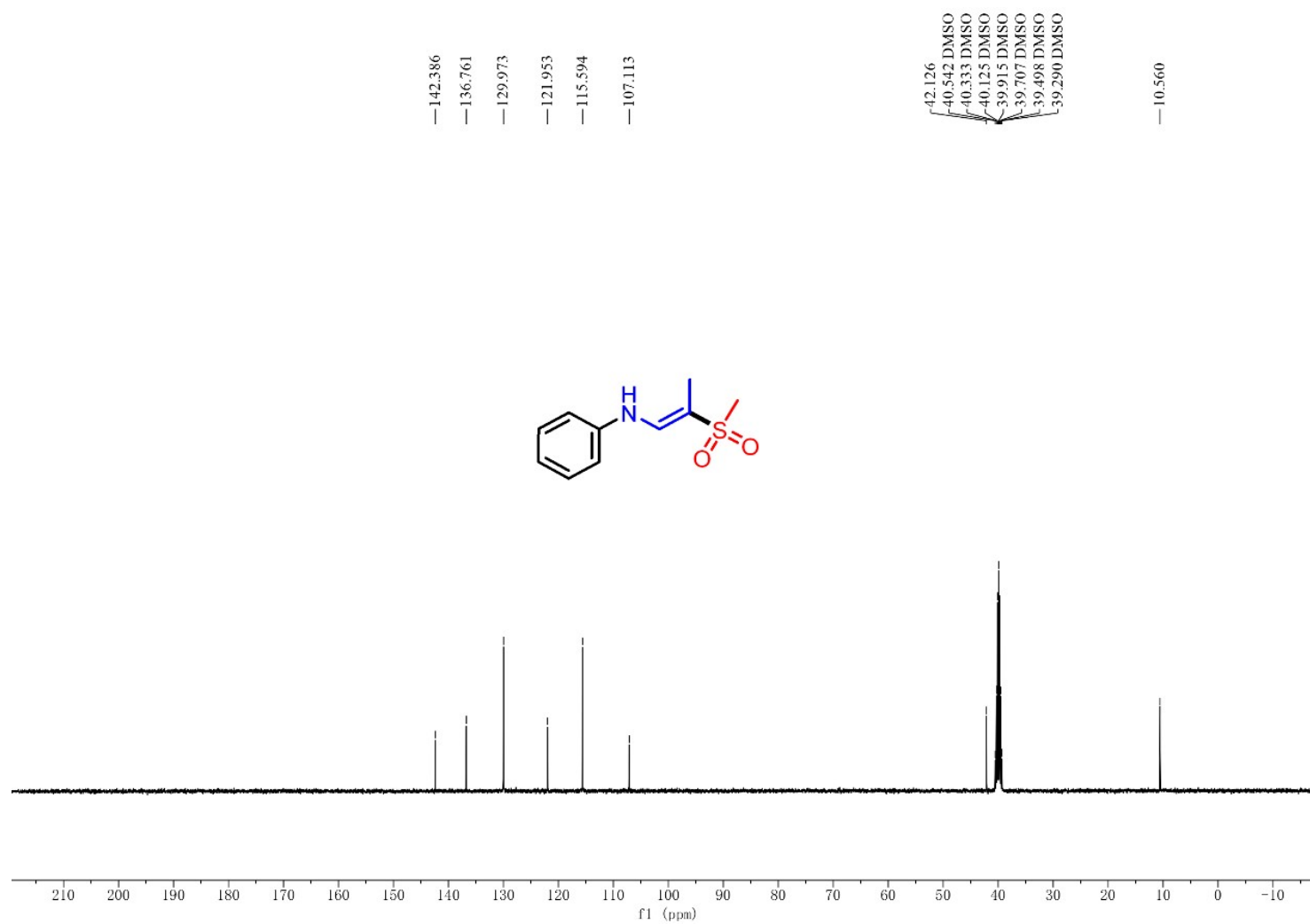


¹H spectrum of **3v**

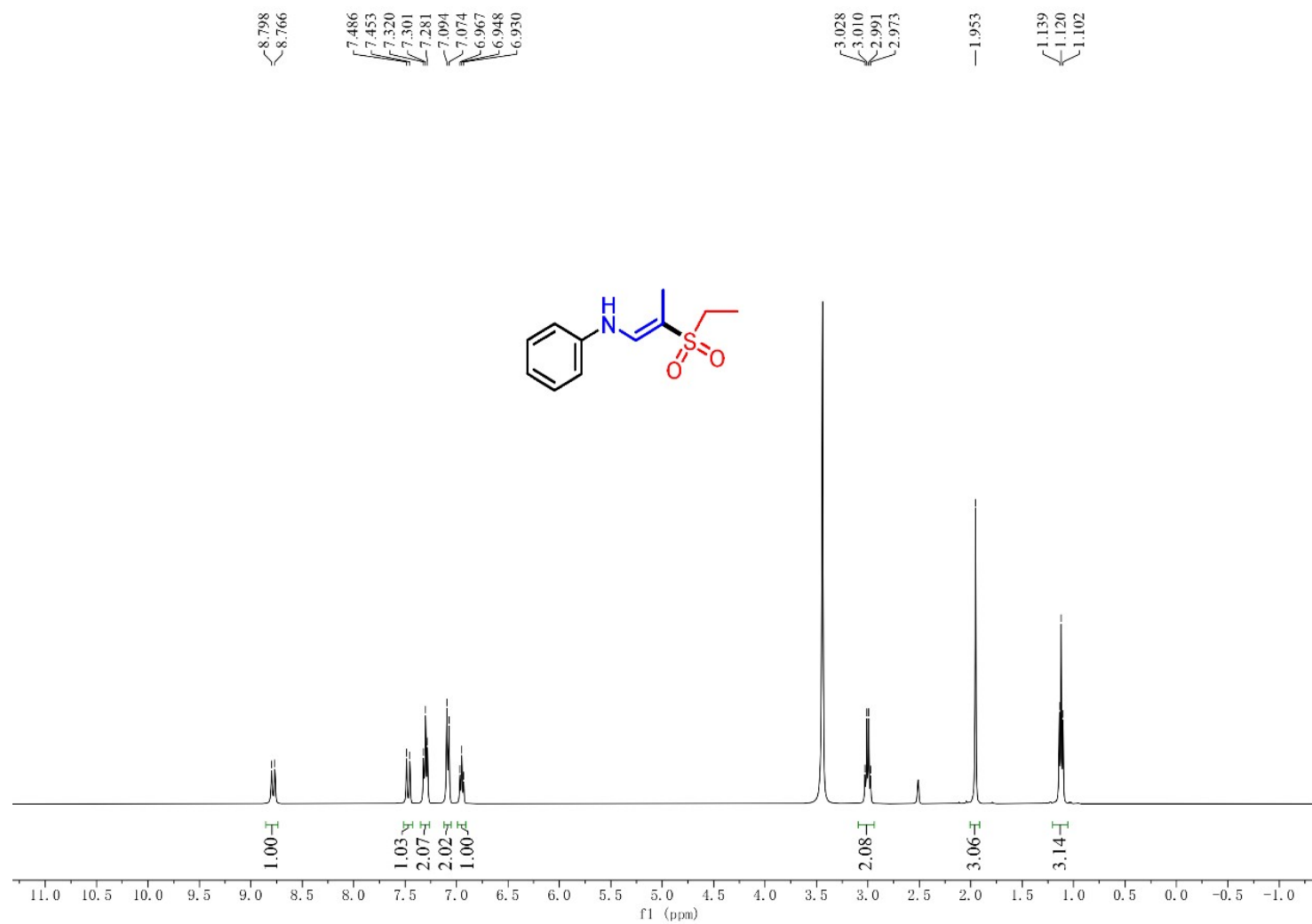




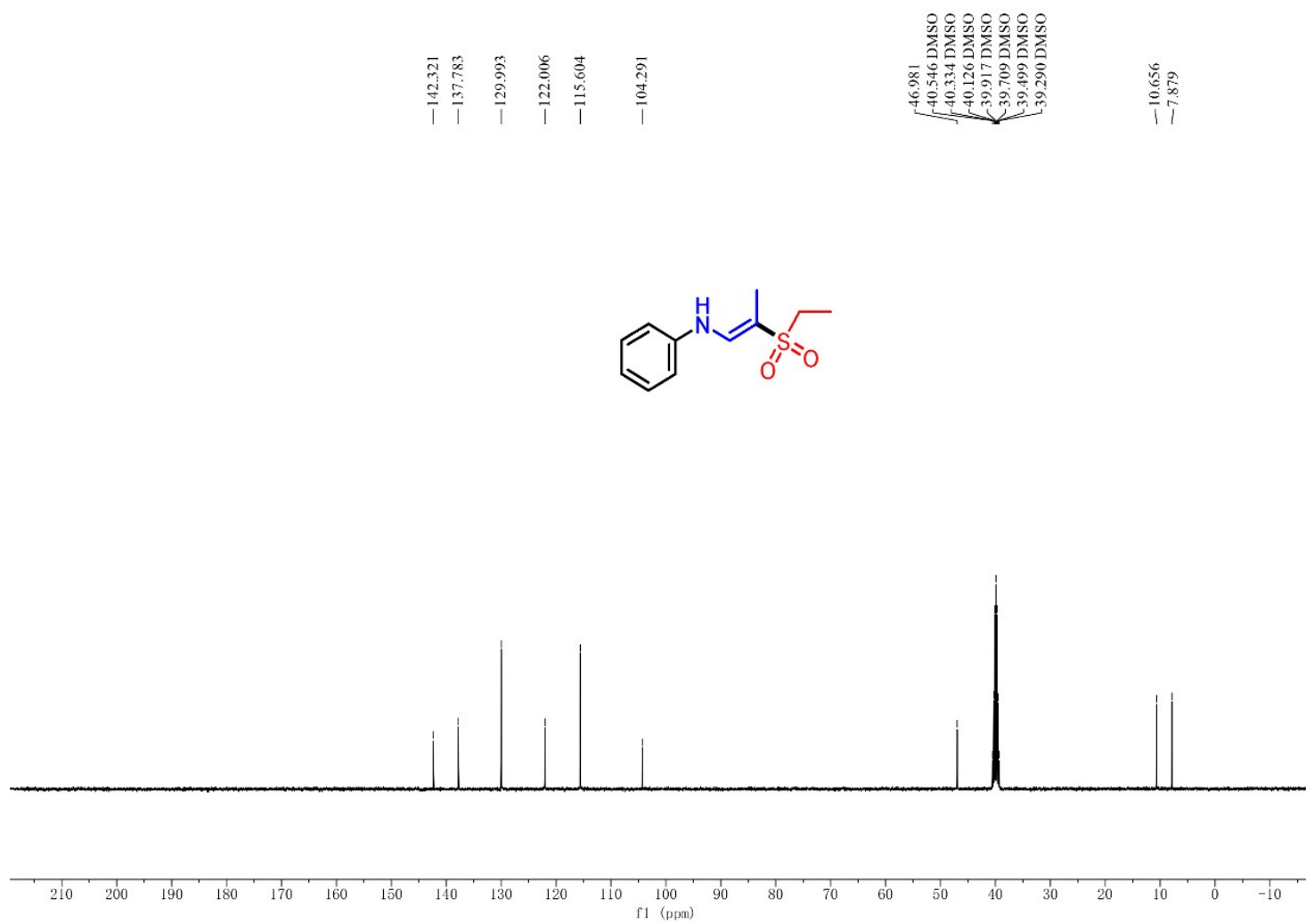
¹H spectrum of **3w**



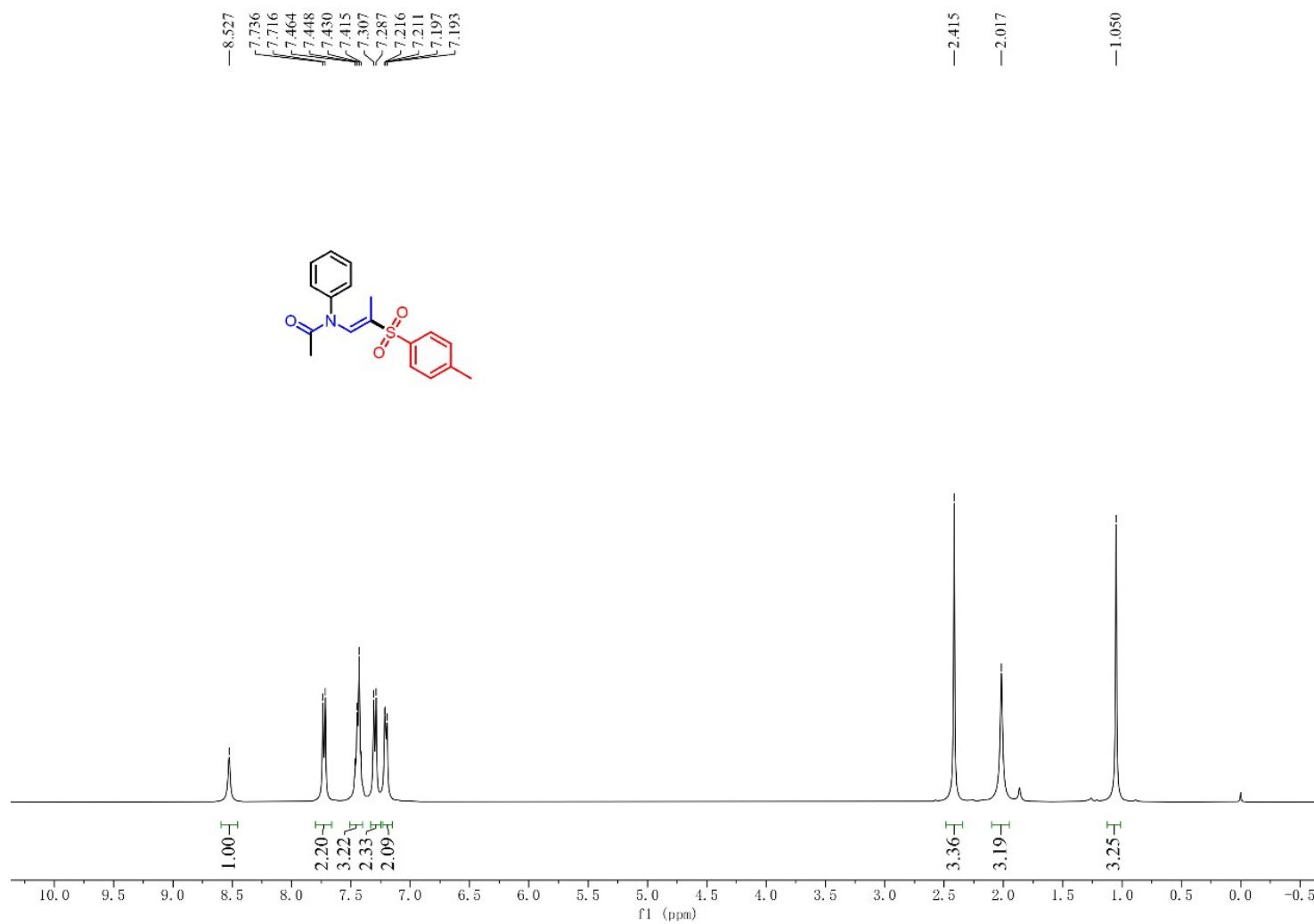
¹³C spectrum of **3w**



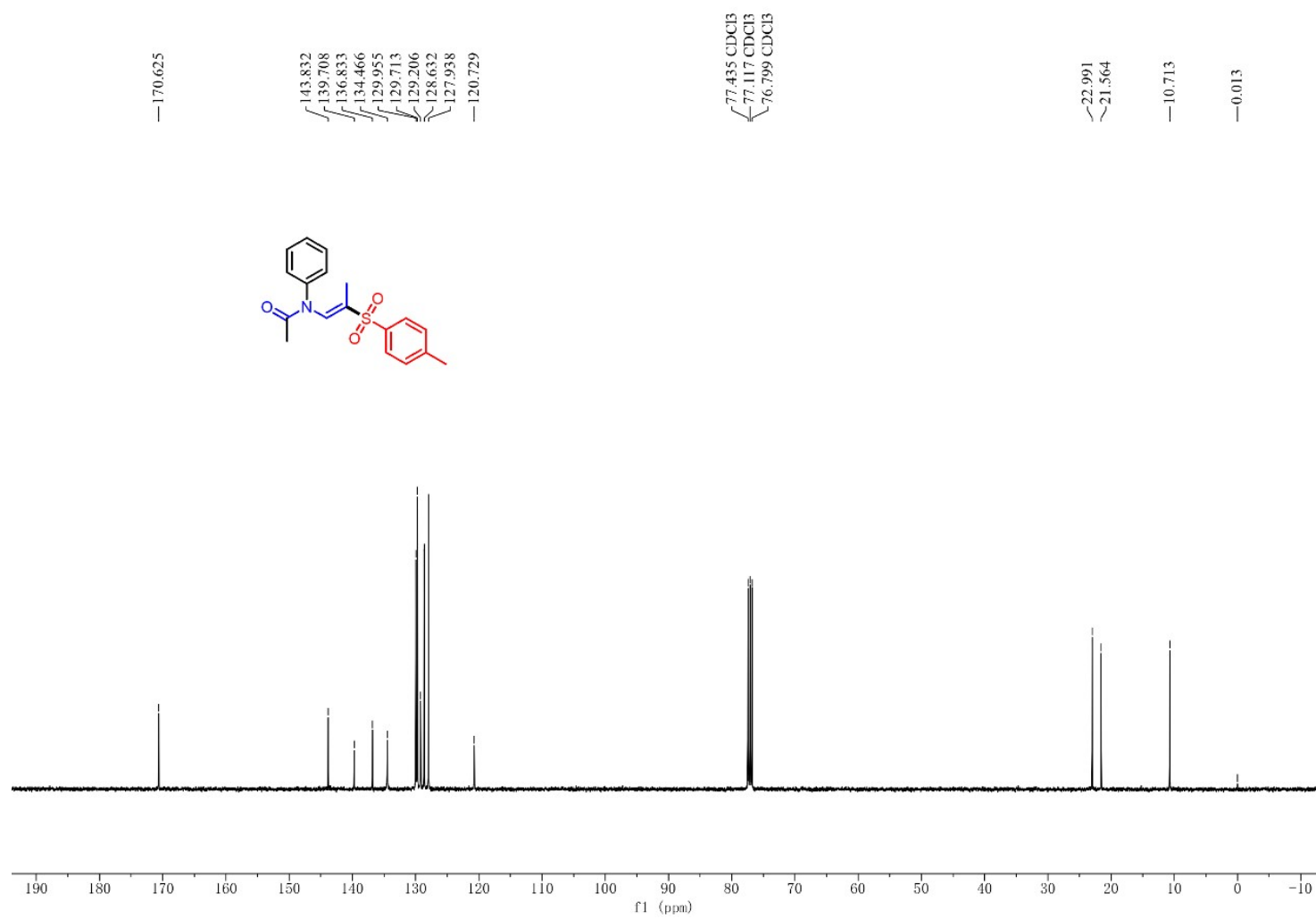
¹H spectrum of **3x**



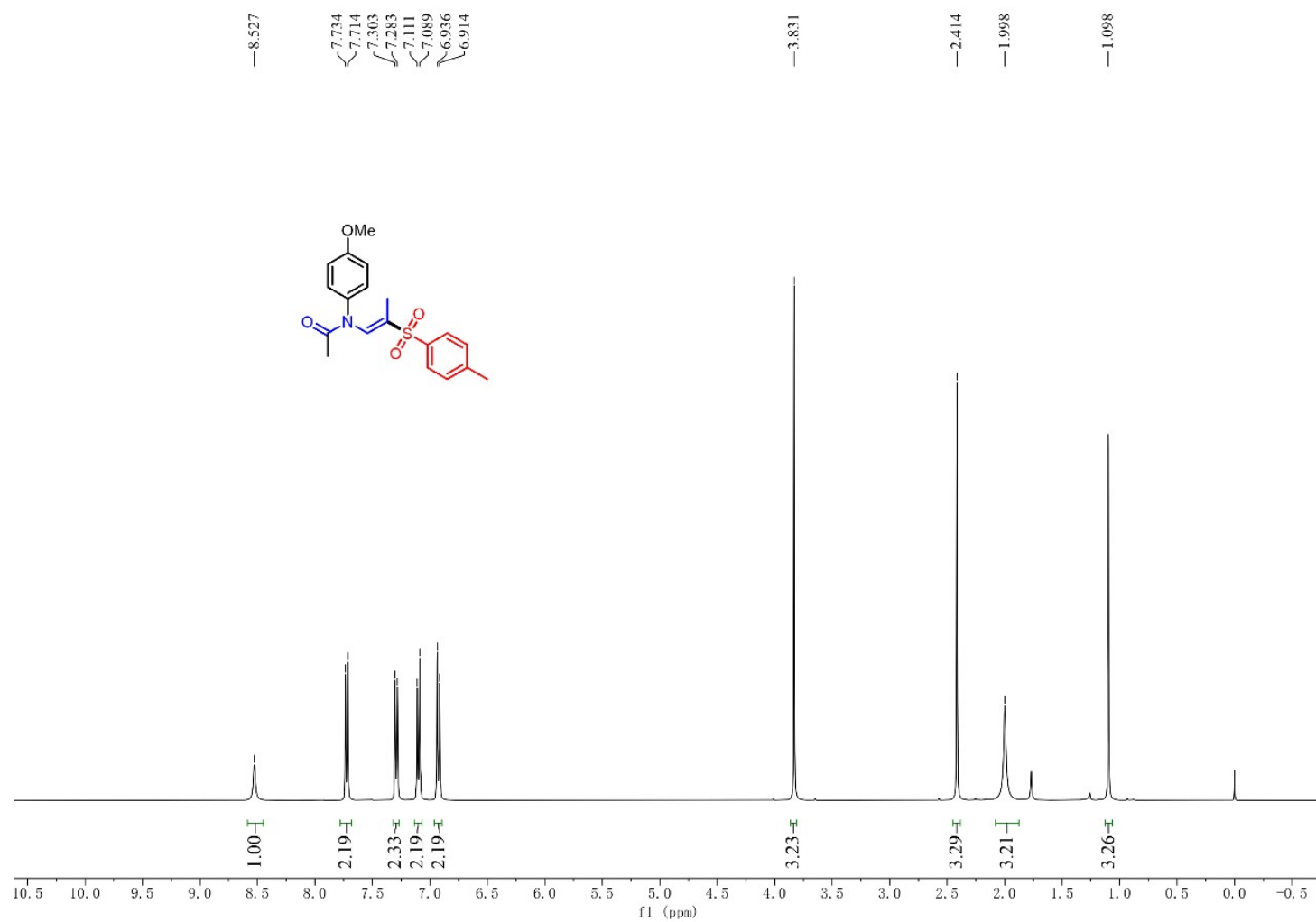
¹³C spectrum of **3x**



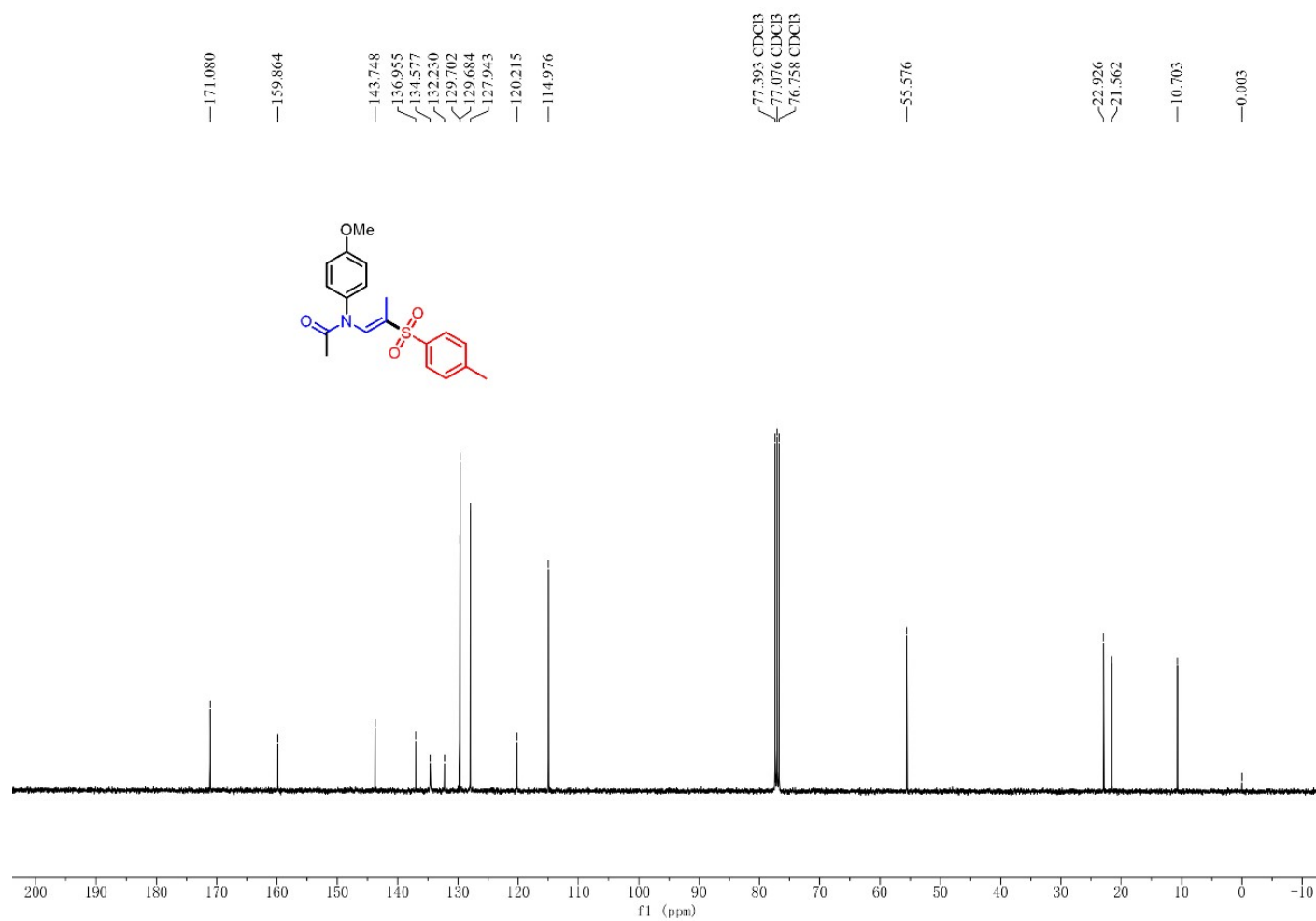
¹H spectrum of **4a**



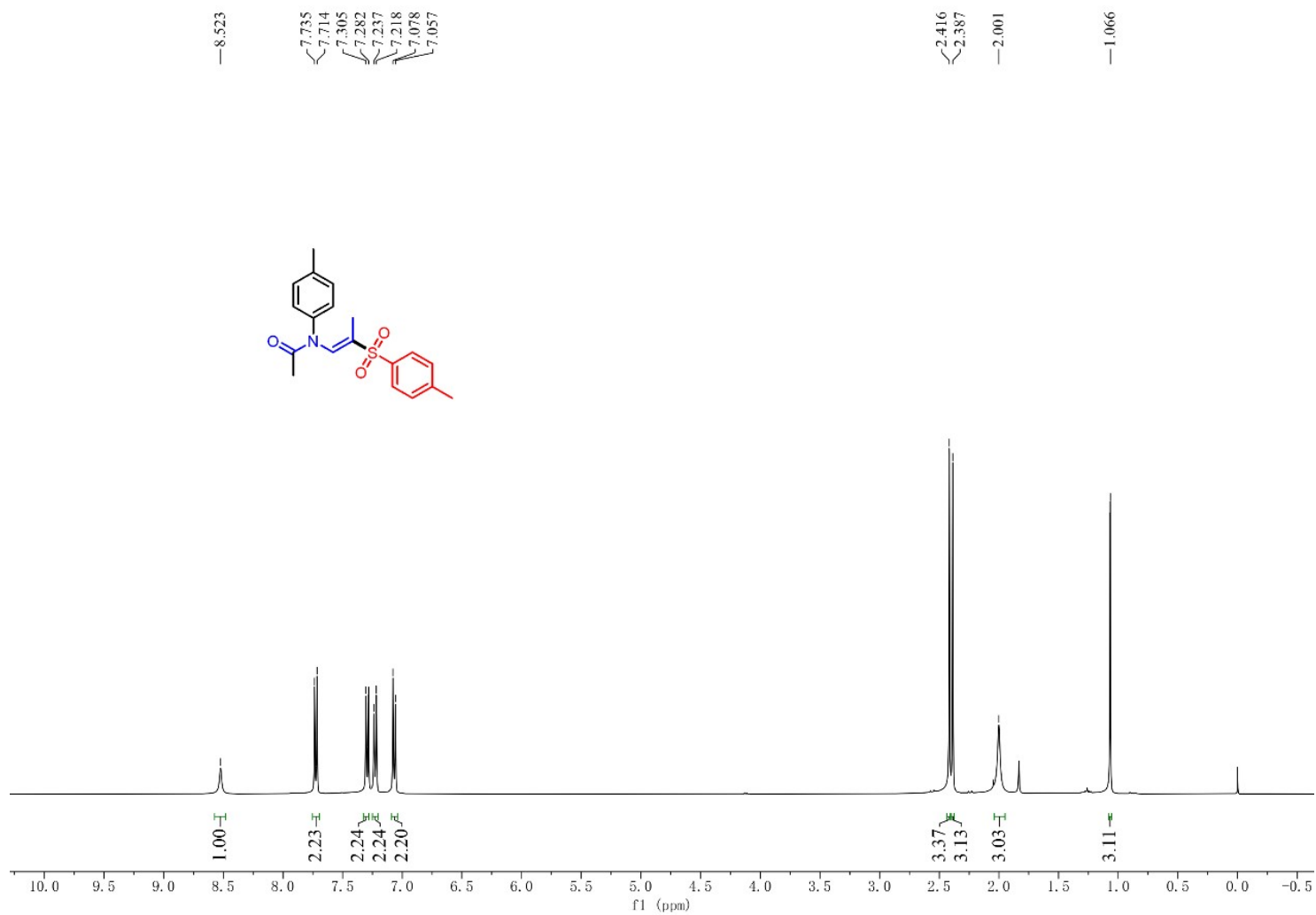
¹³C spectrum of **4a**



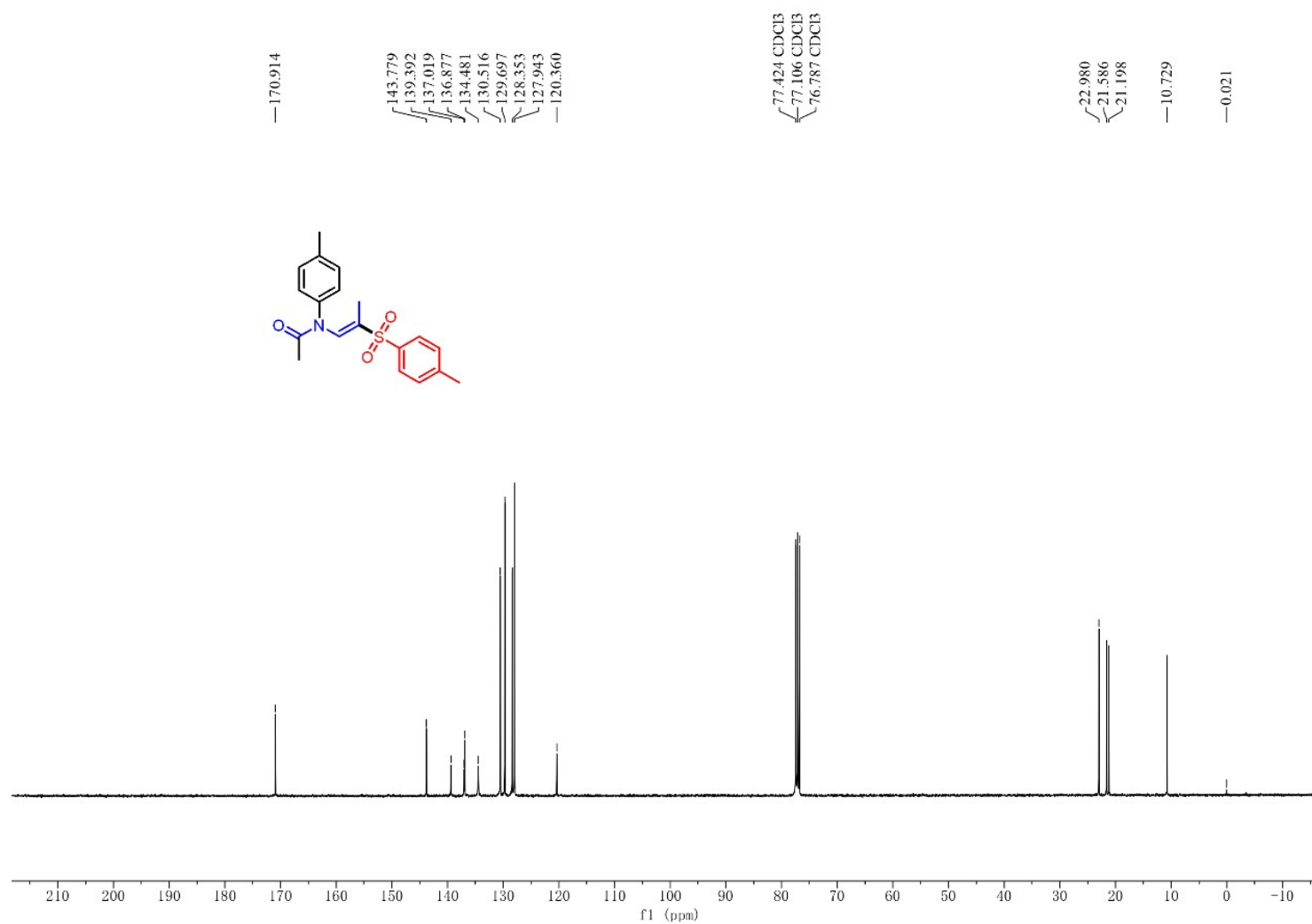
¹H spectrum of **4b**



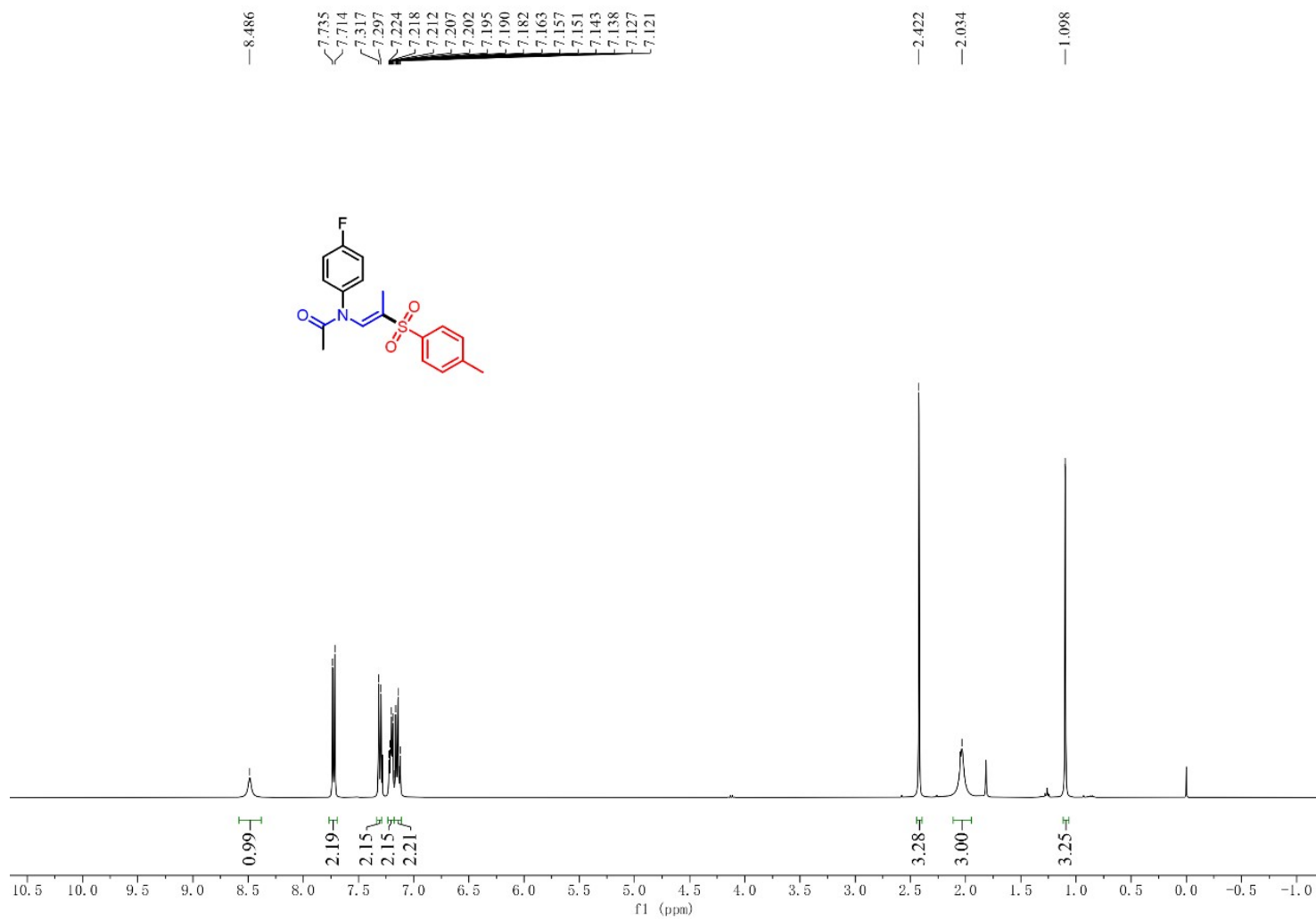
¹³C spectrum of **4b**



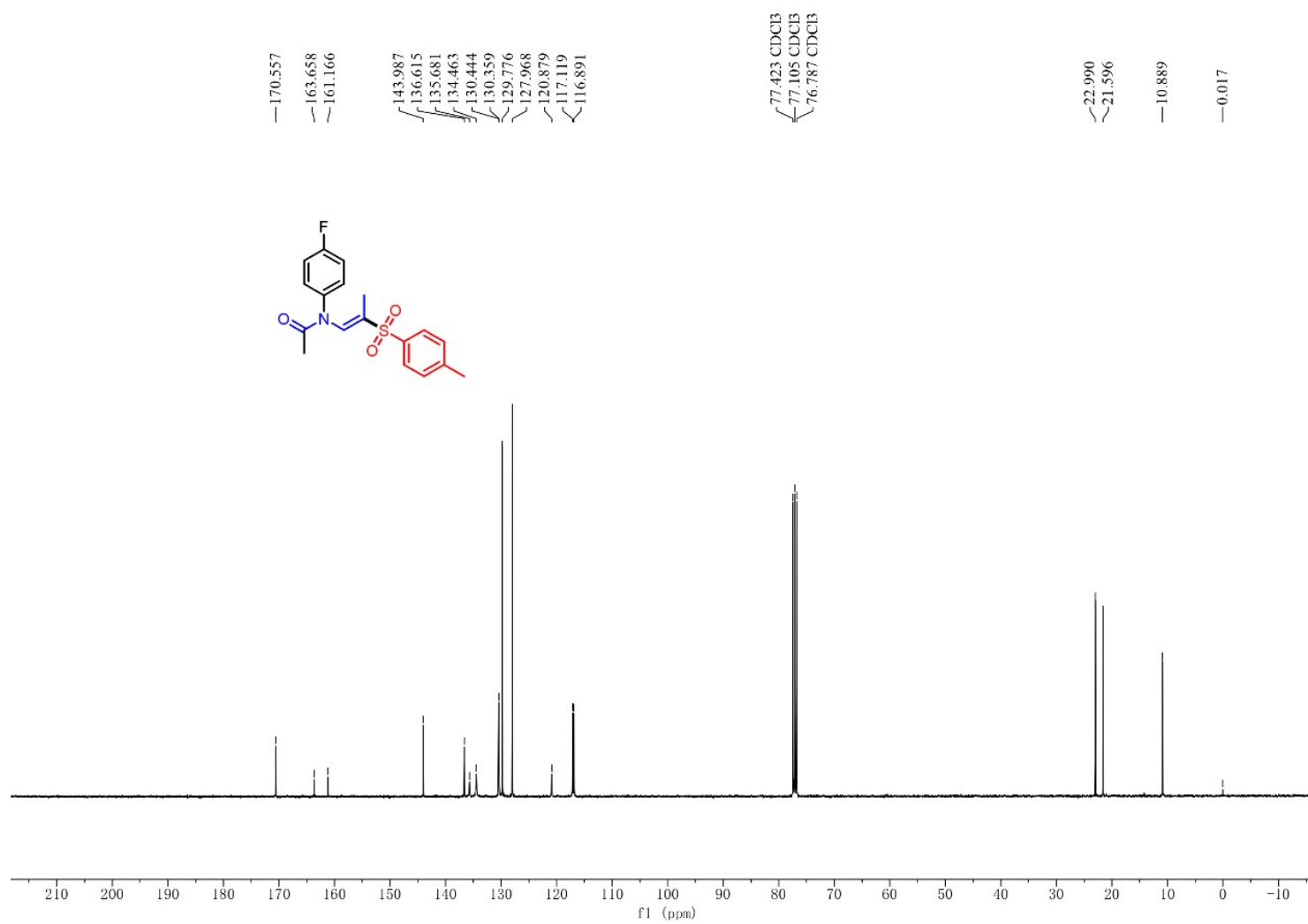
¹H spectrum of **4c**



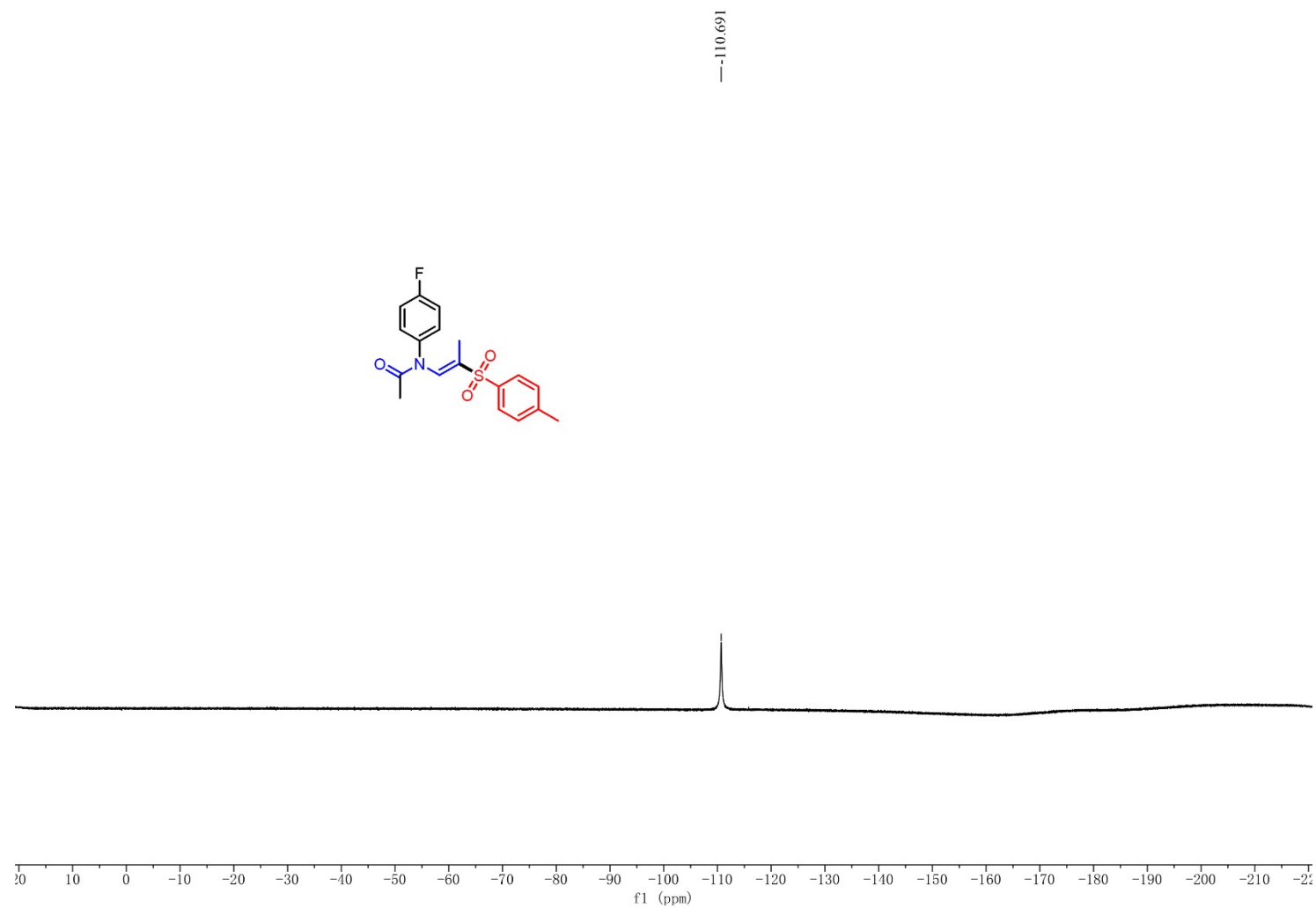
^{13}C spectrum of **4c**



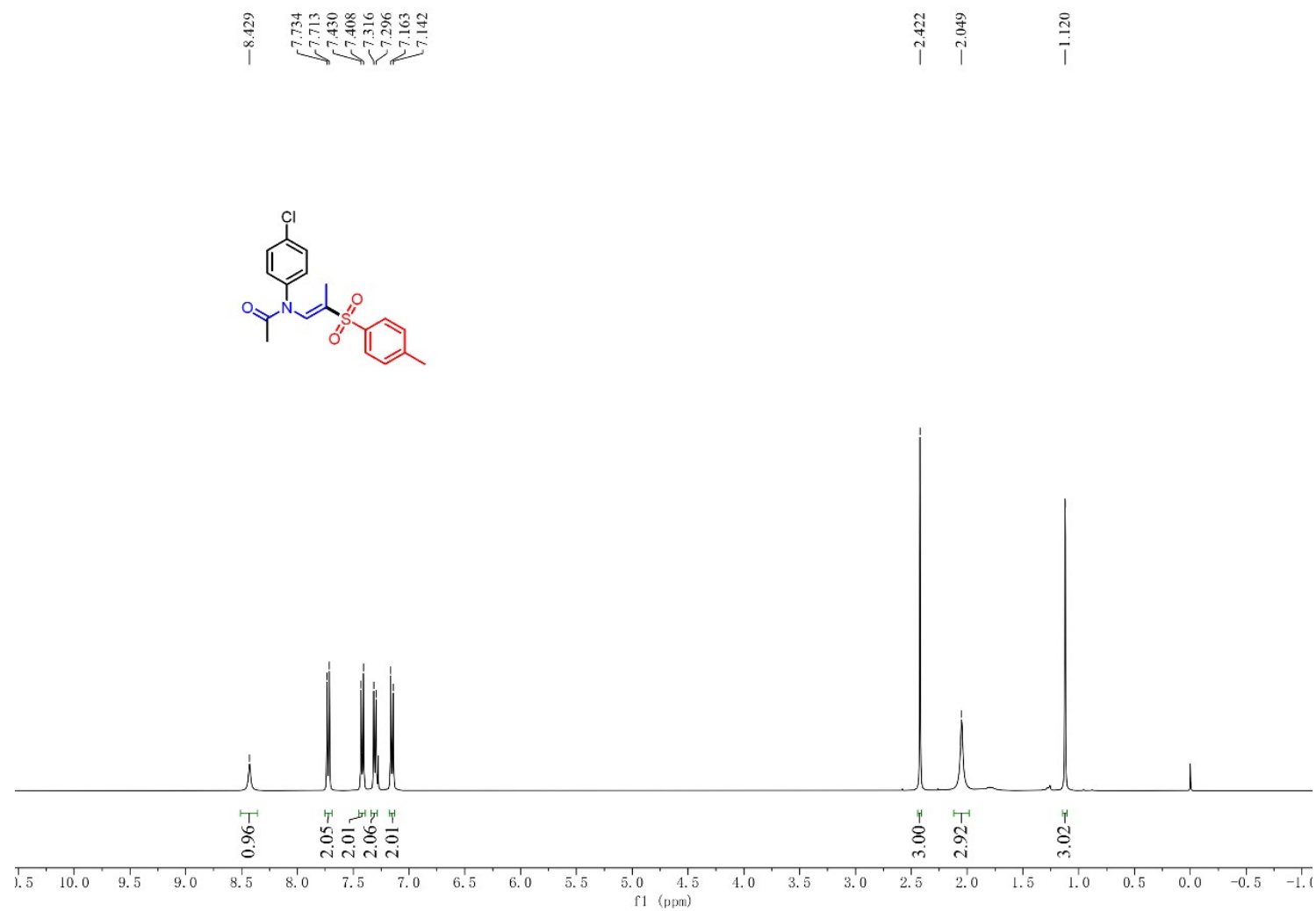
¹H spectrum of **4d**

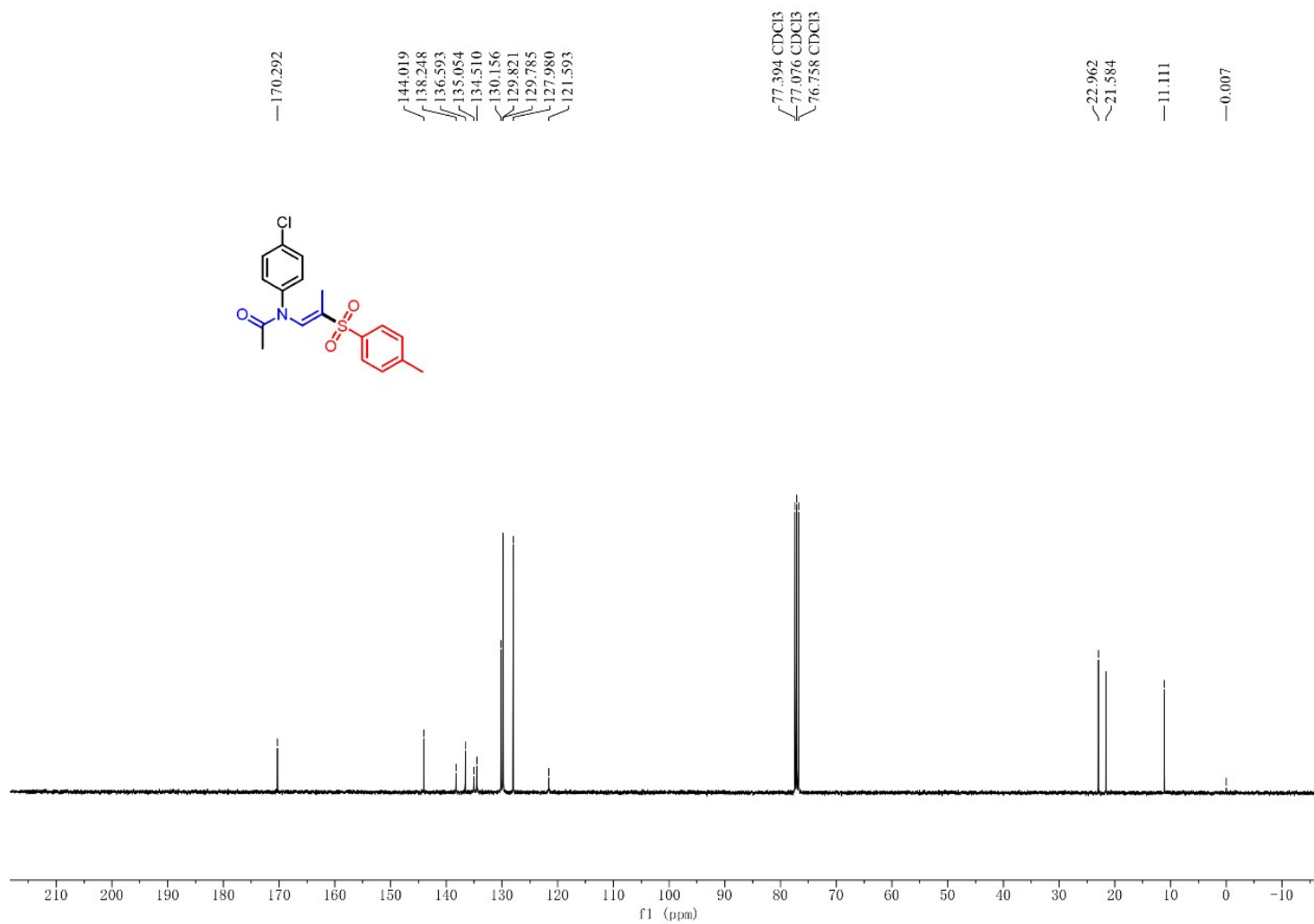


¹³C spectrum of **4d**

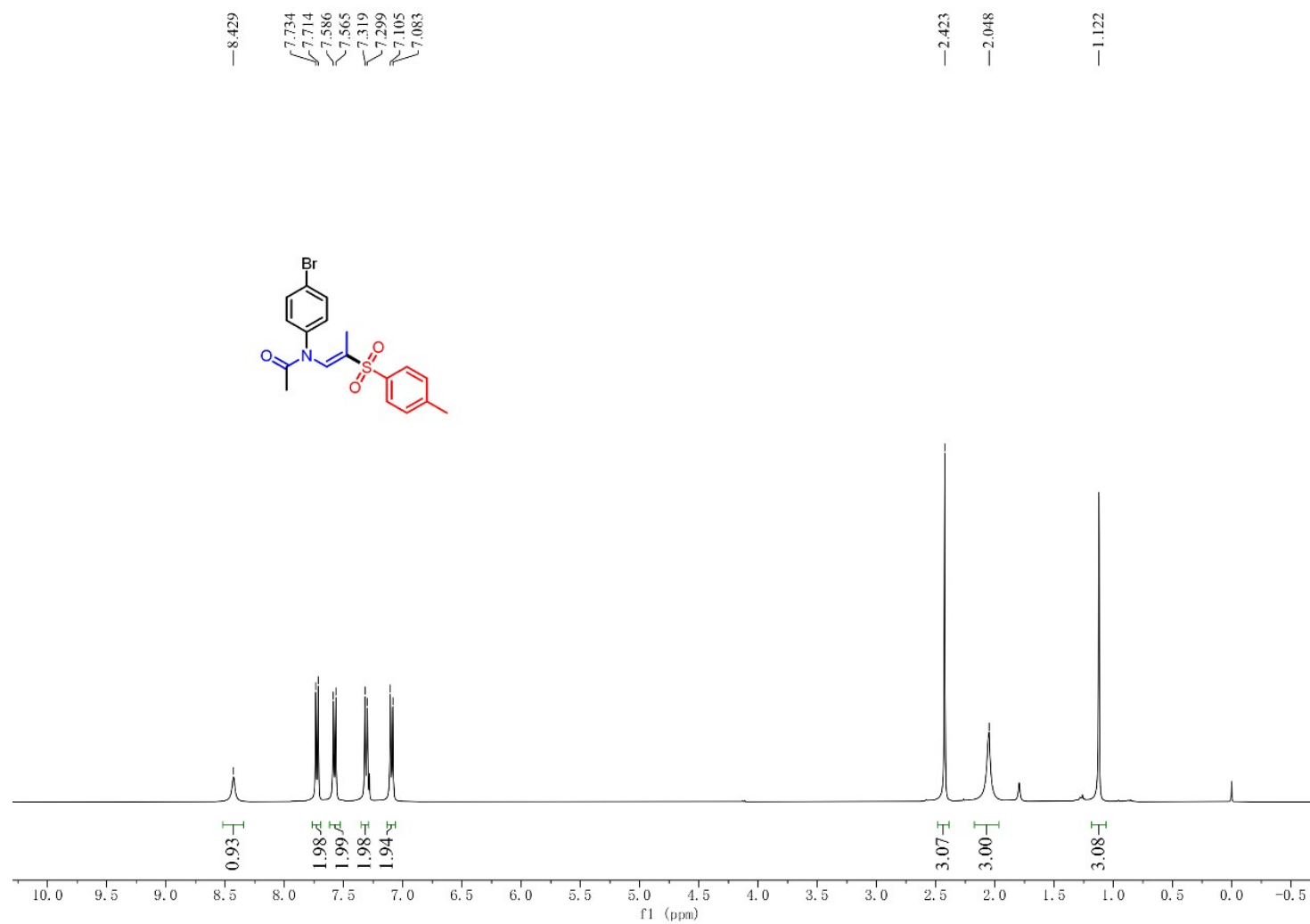


^{19}F spectrum of **4d**

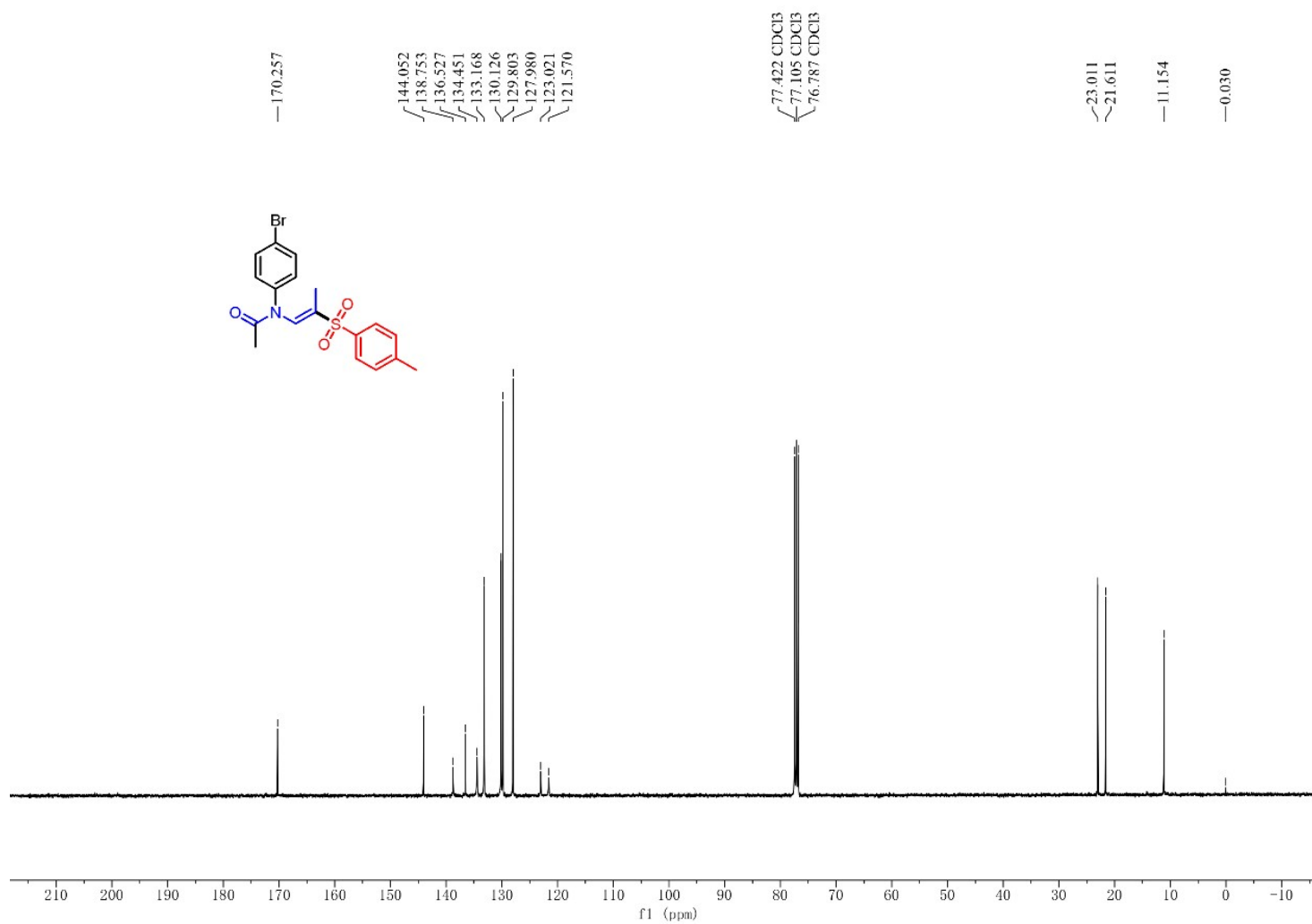




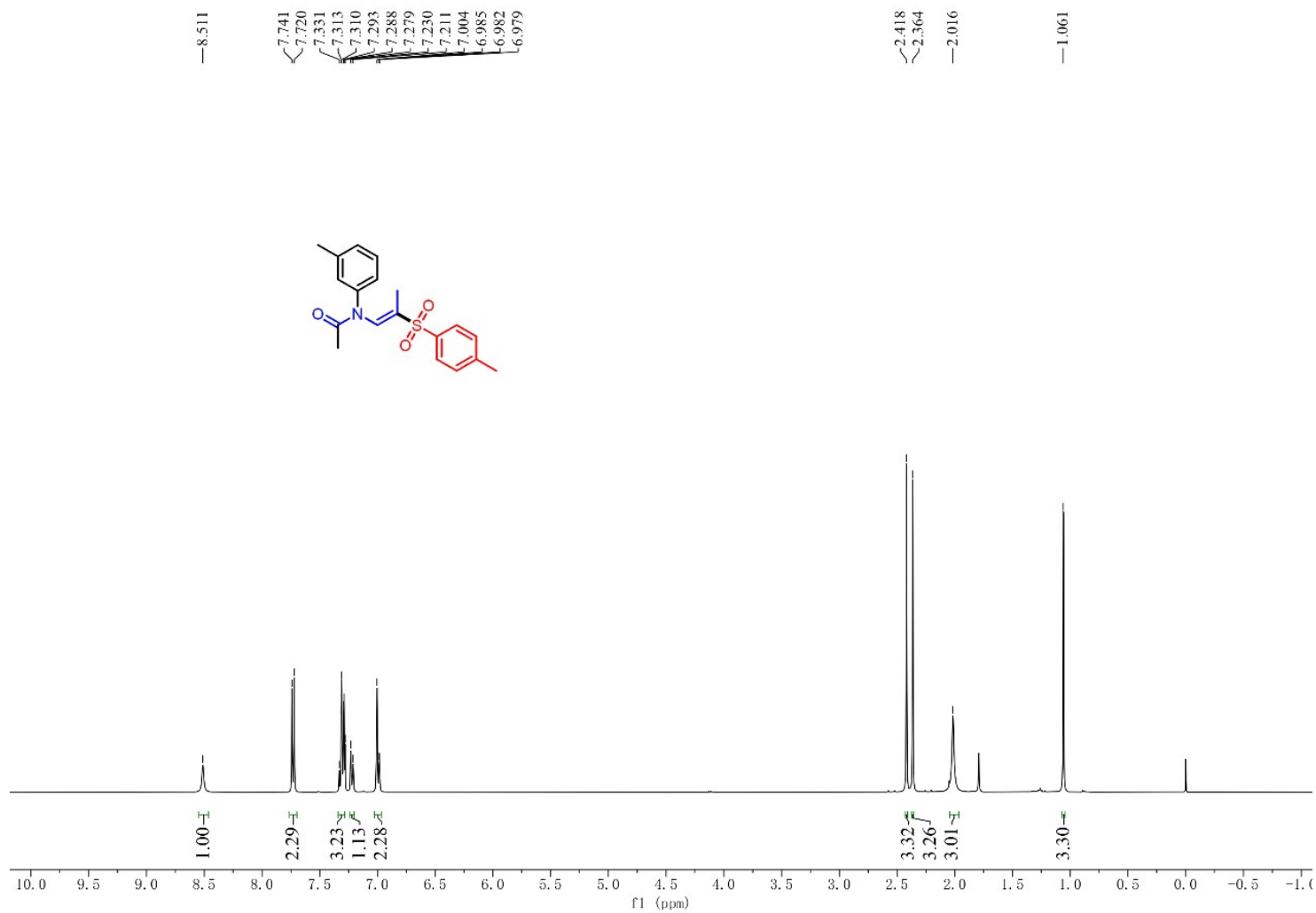
¹³C spectrum of **4e**



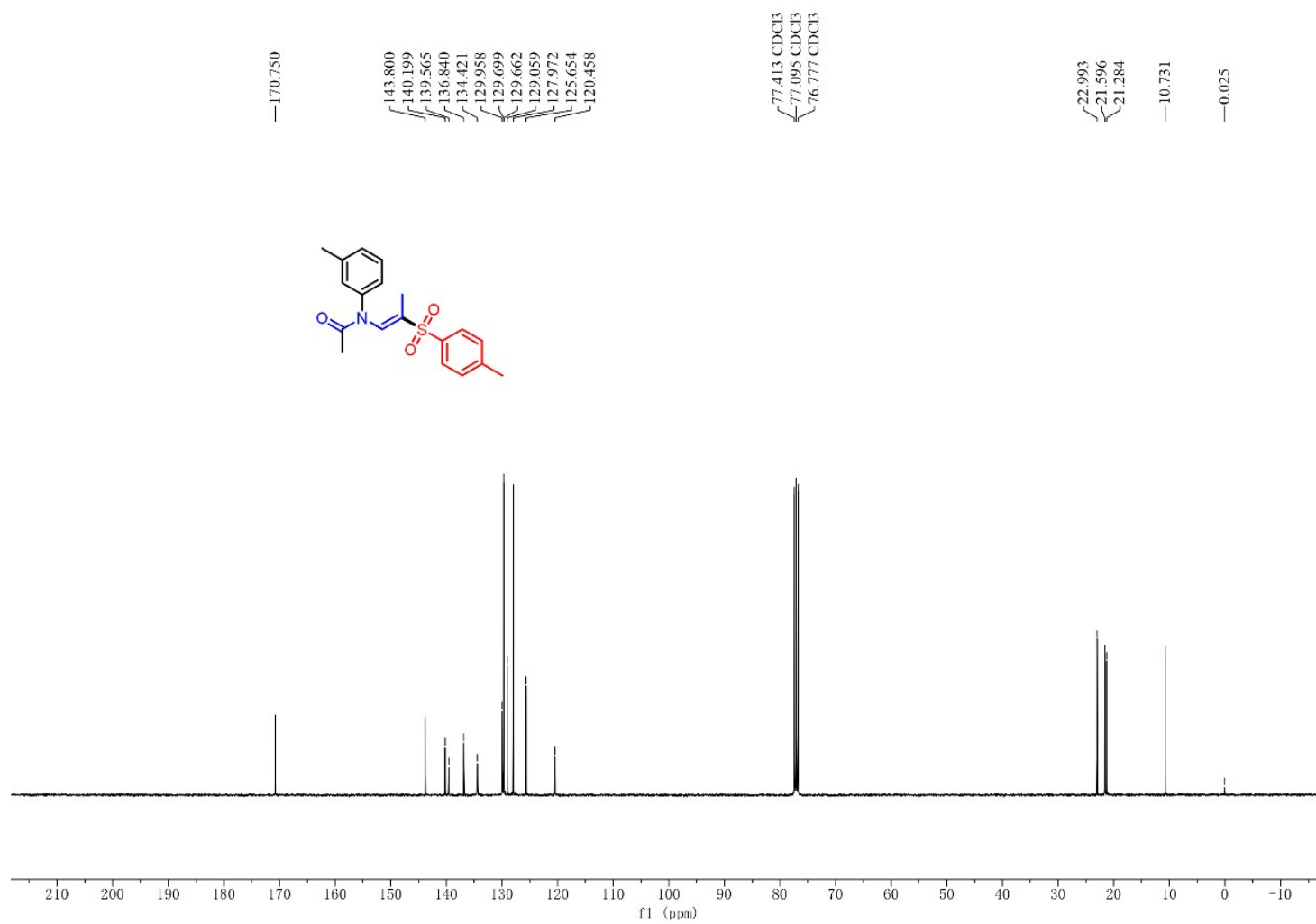
¹H spectrum of **4f**



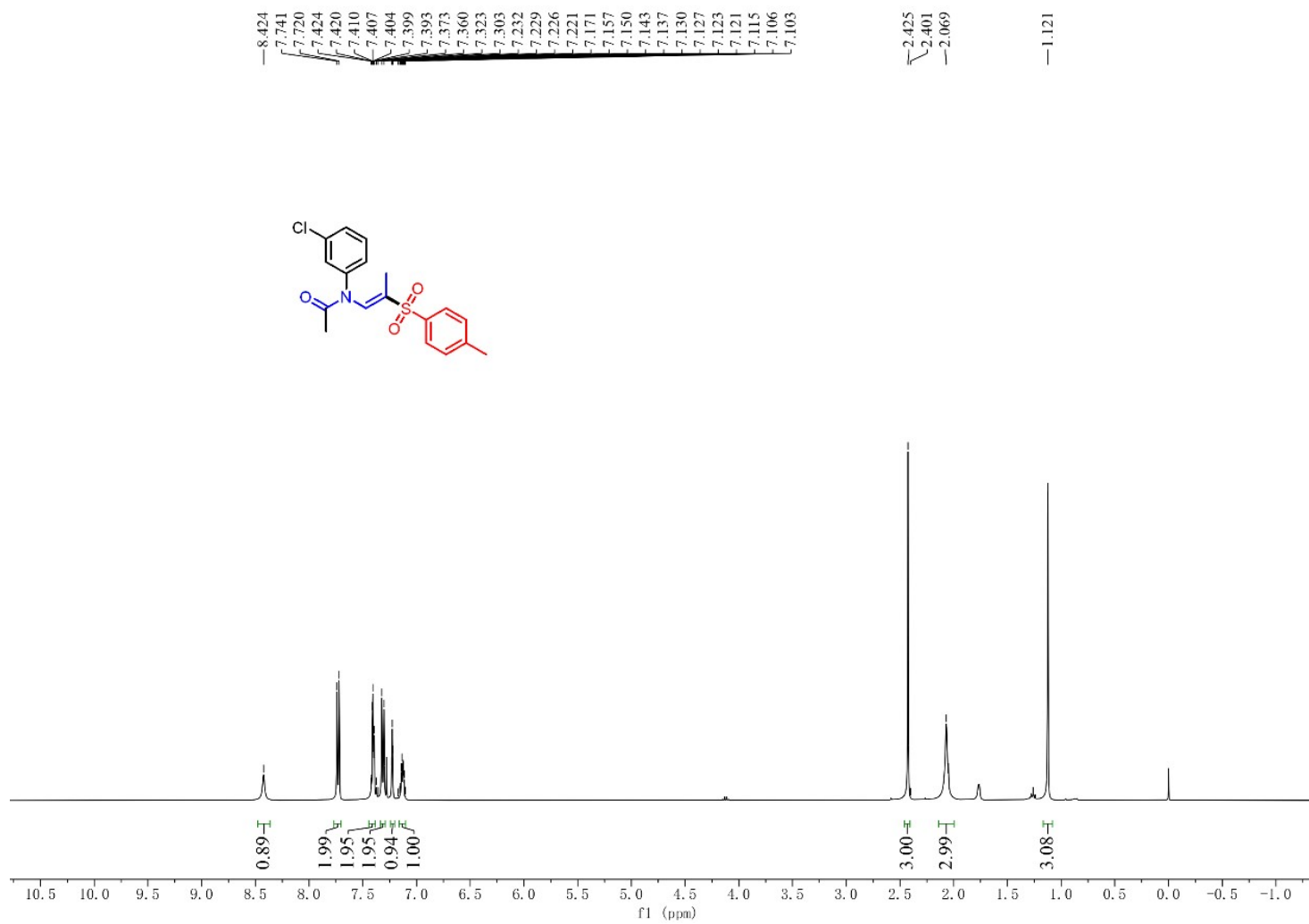
¹³C spectrum of **4f**



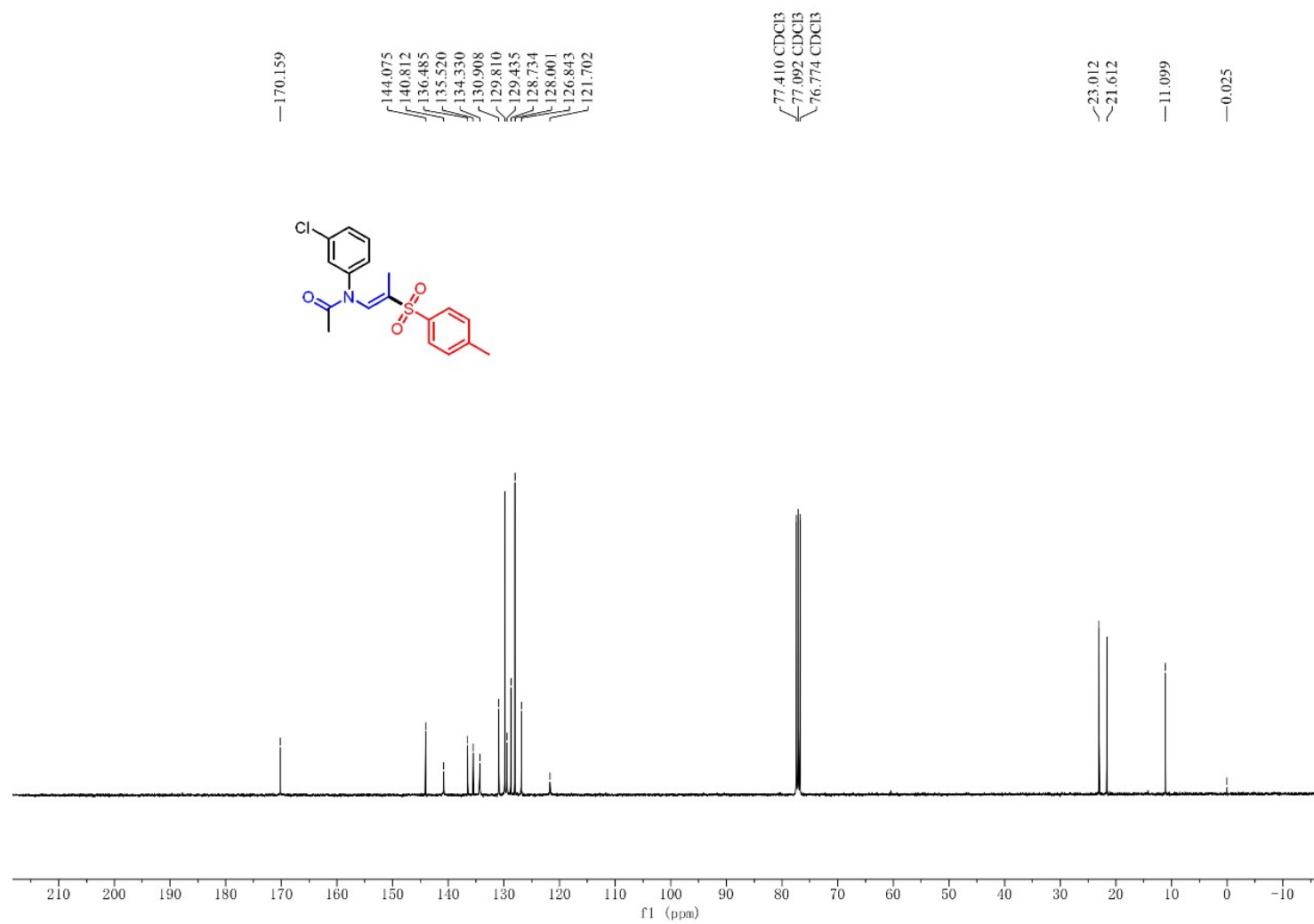
¹H spectrum of **4g**



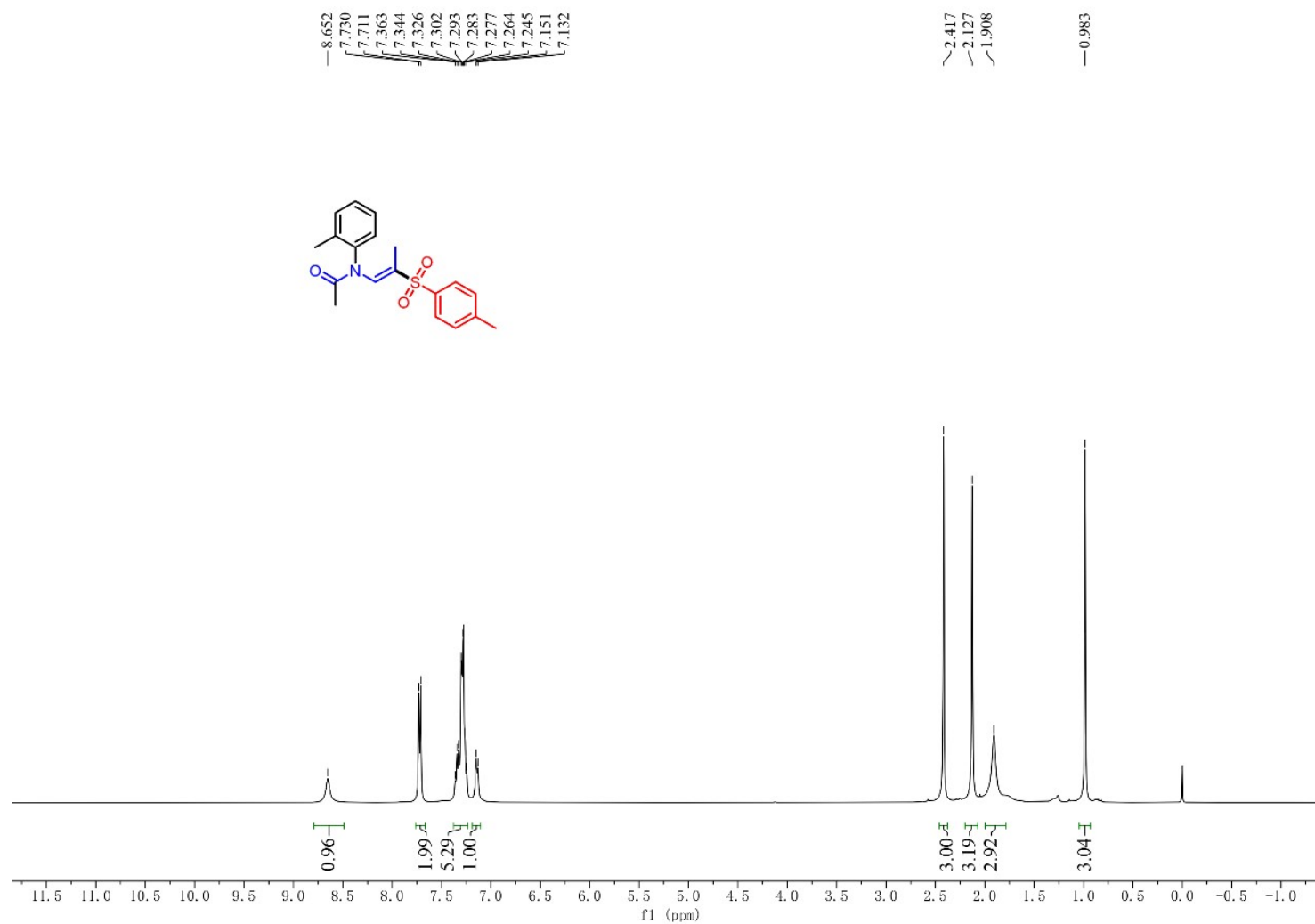
¹³C spectrum of **4g**



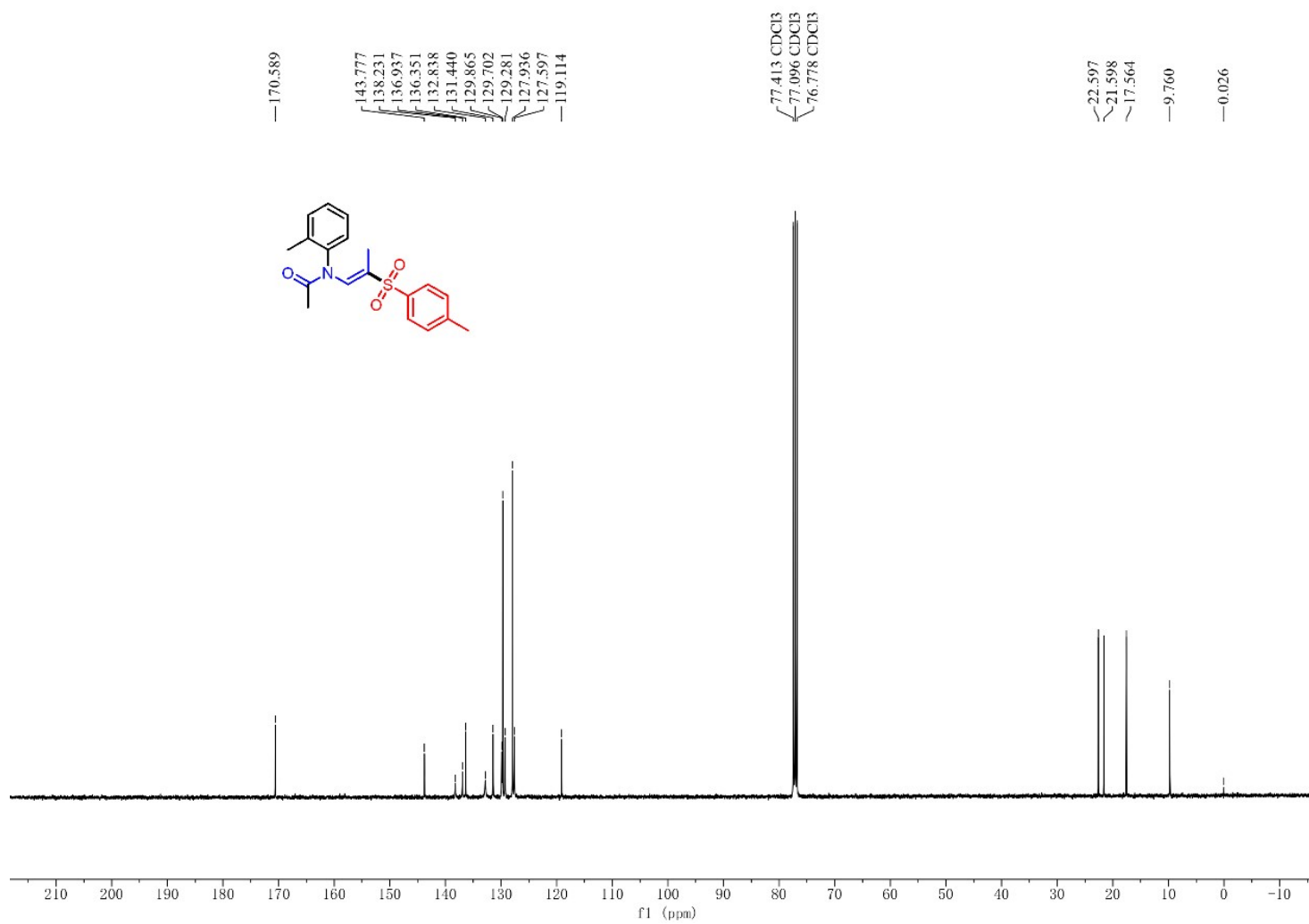
¹H spectrum of **4h**



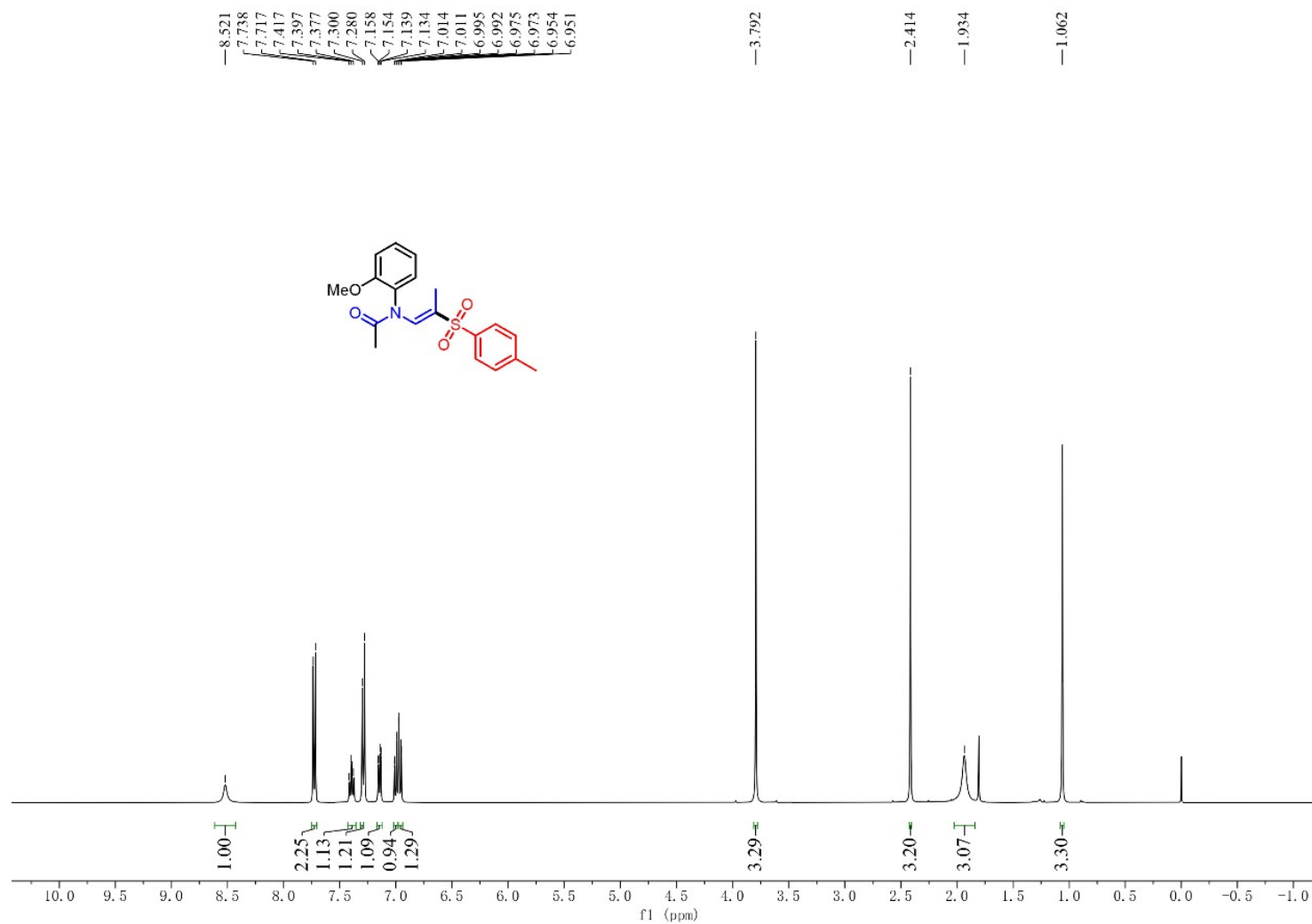
¹³C spectrum of **4h**



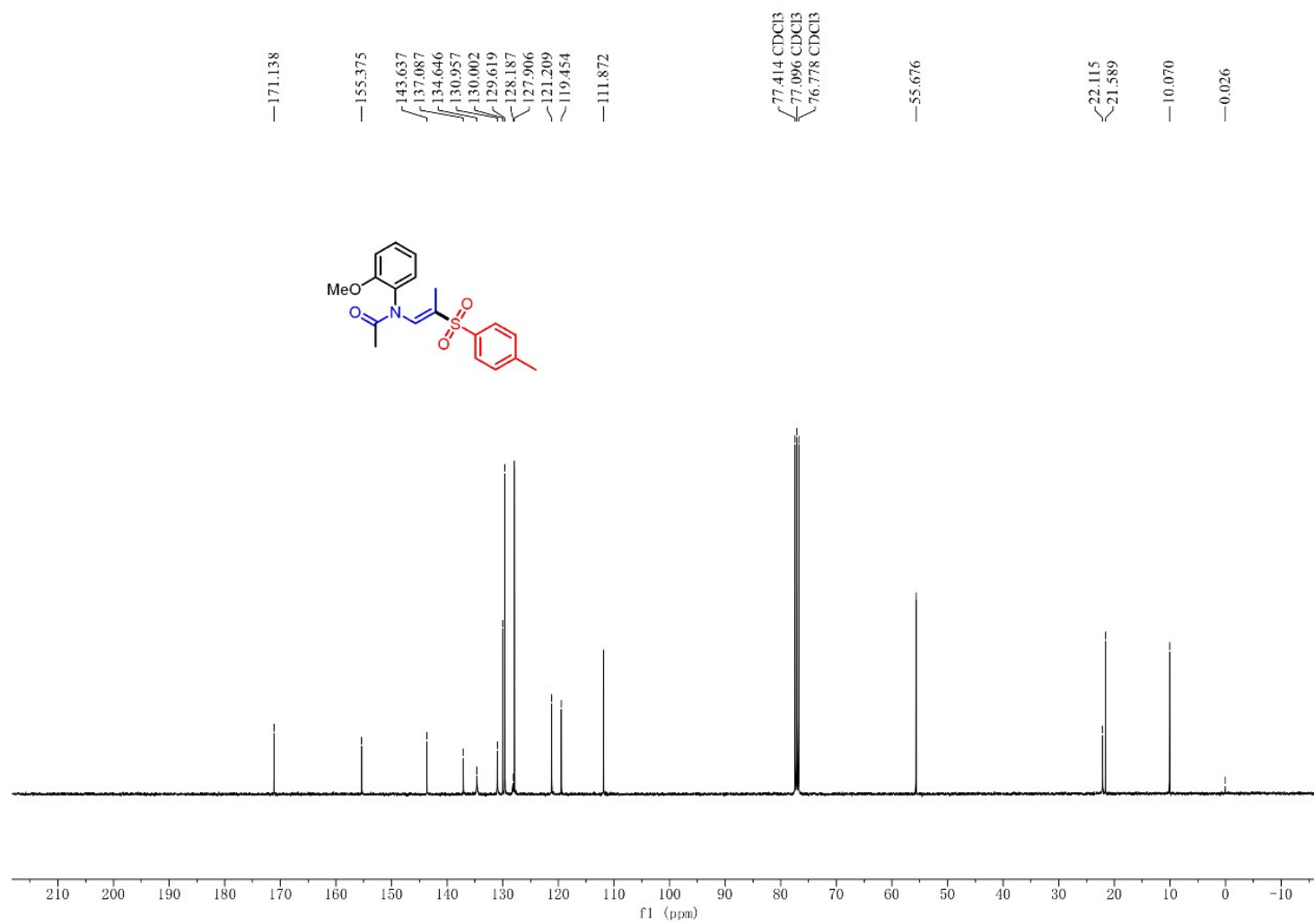
¹H spectrum of **4i**



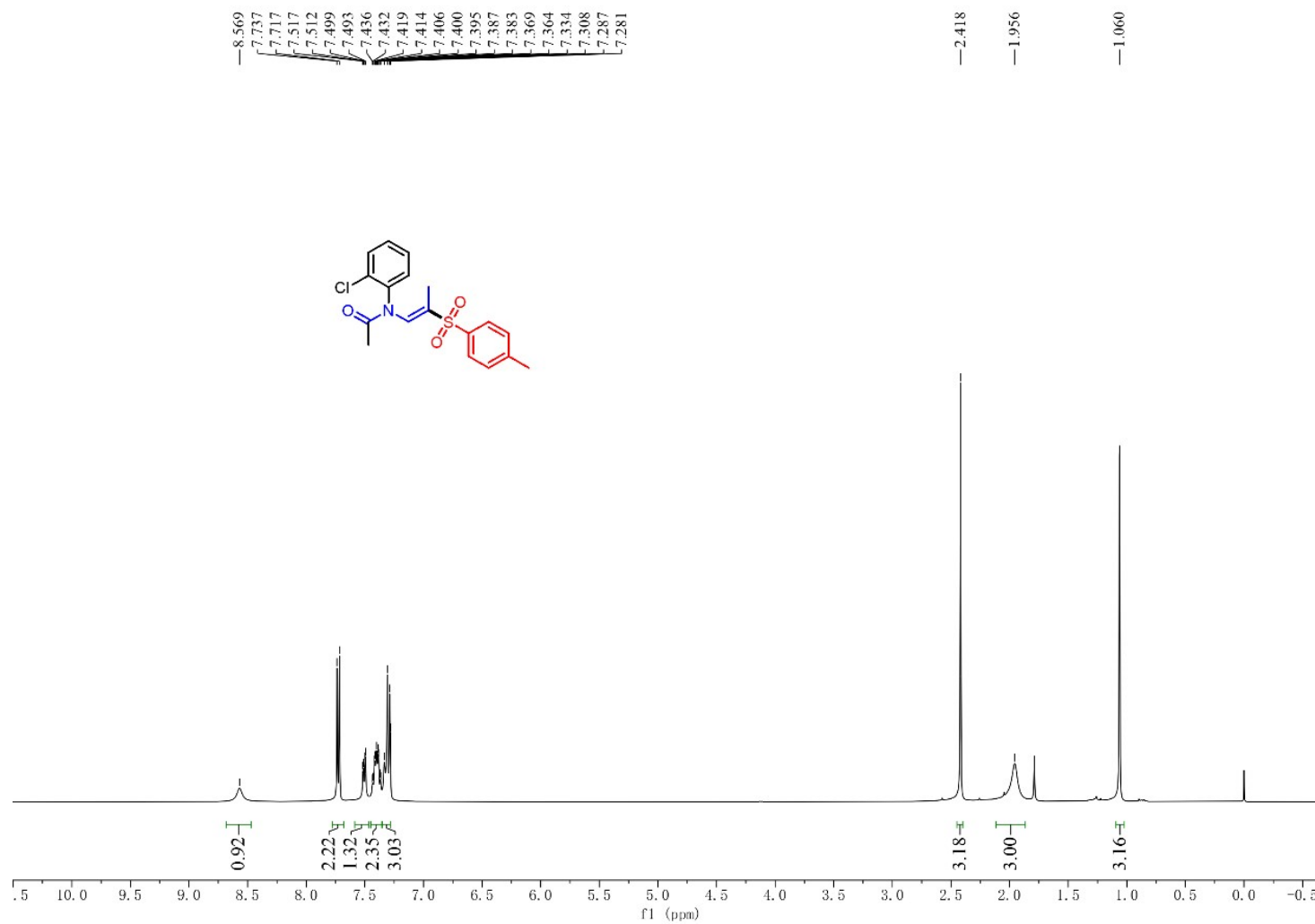
¹³C spectrum of **4i**

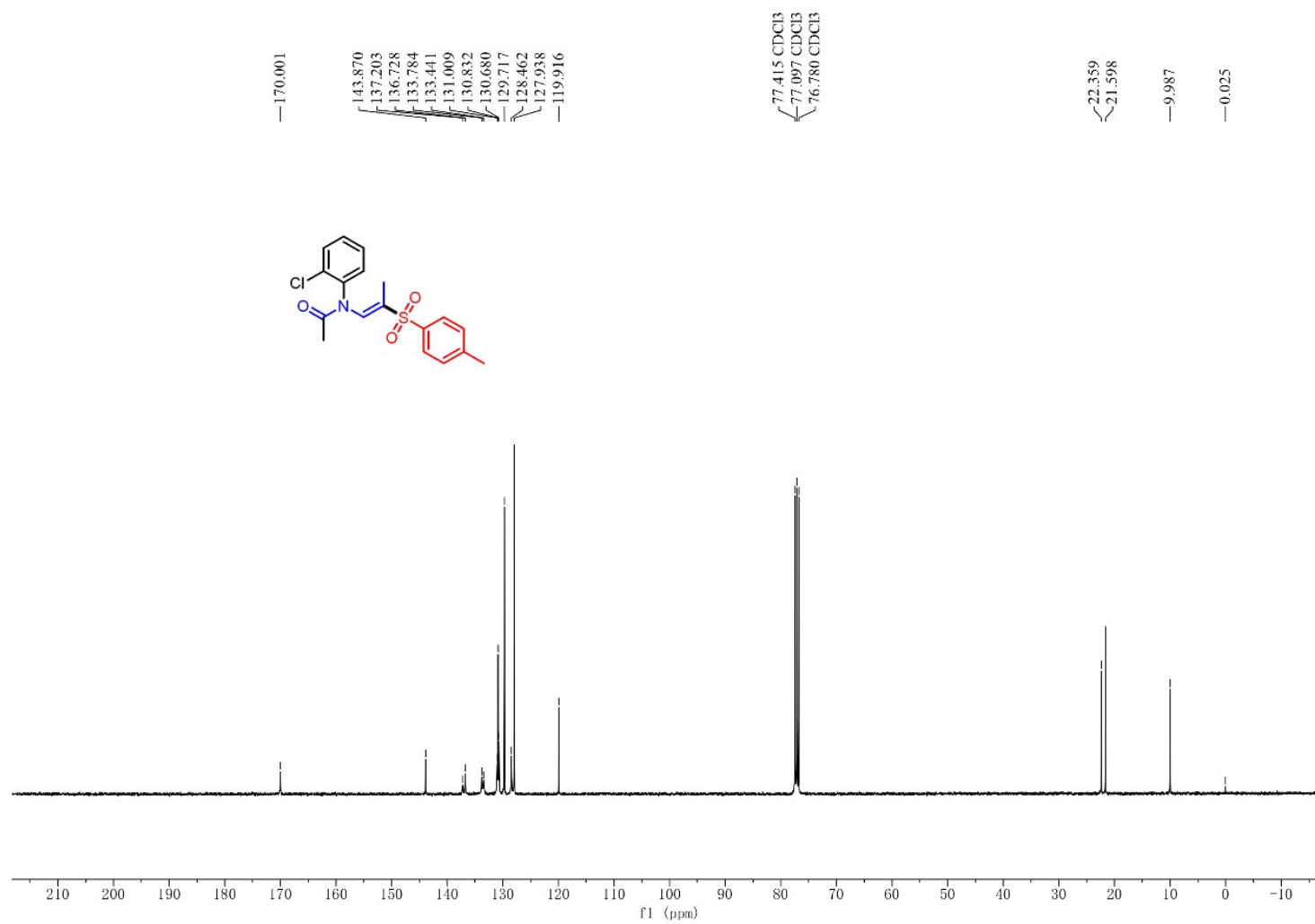


¹H spectrum of **4j**

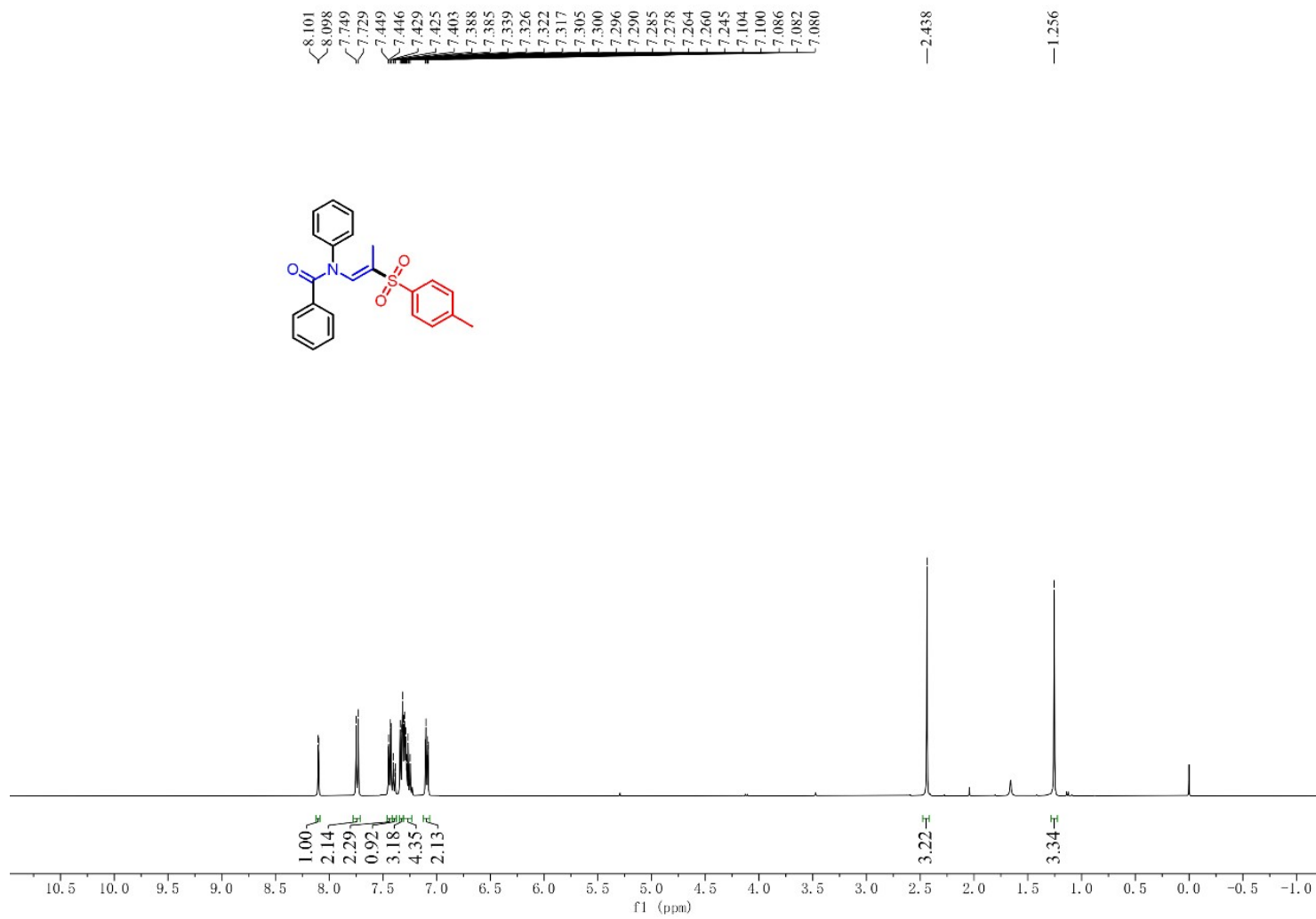


¹³C spectrum of **4j**

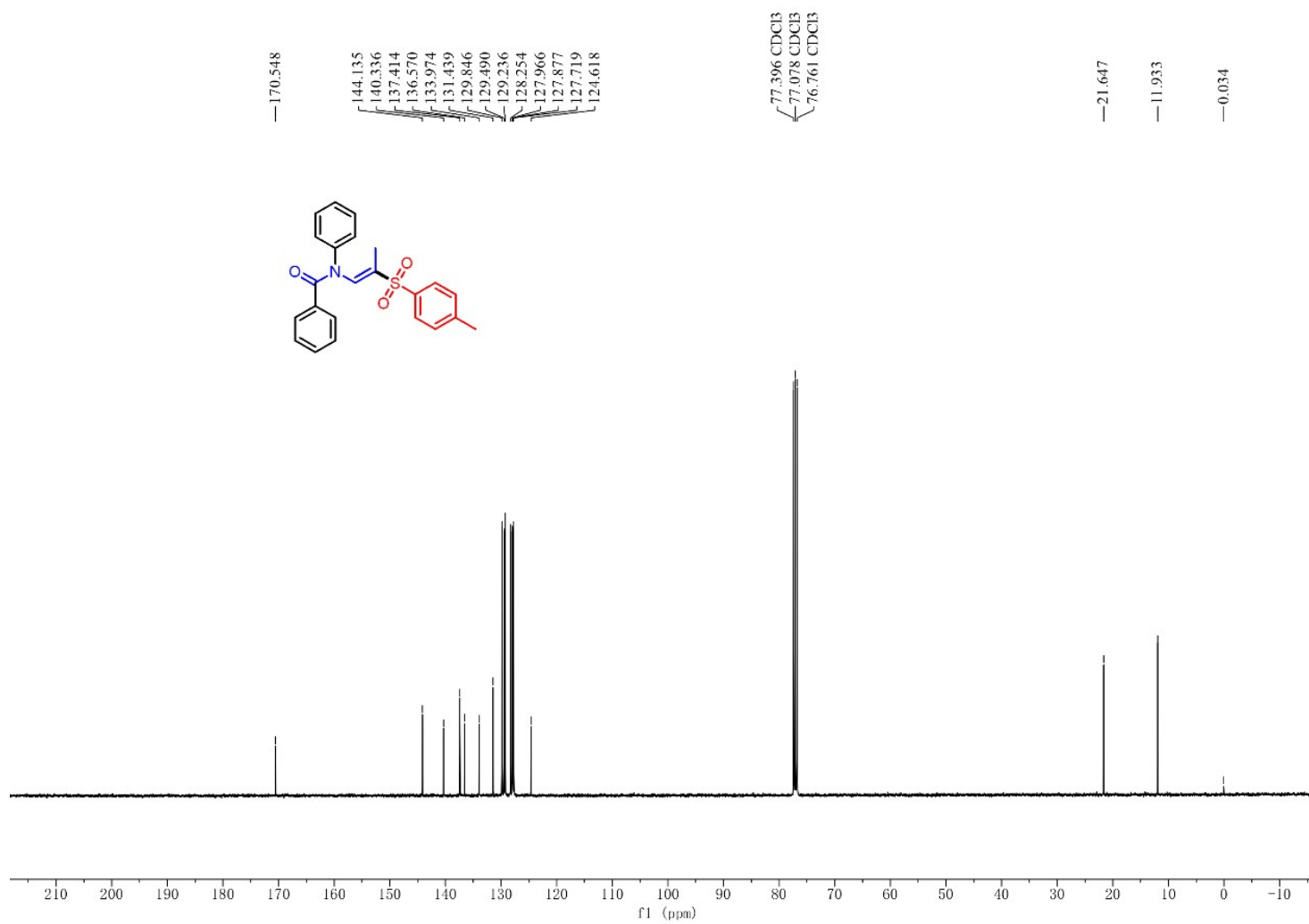




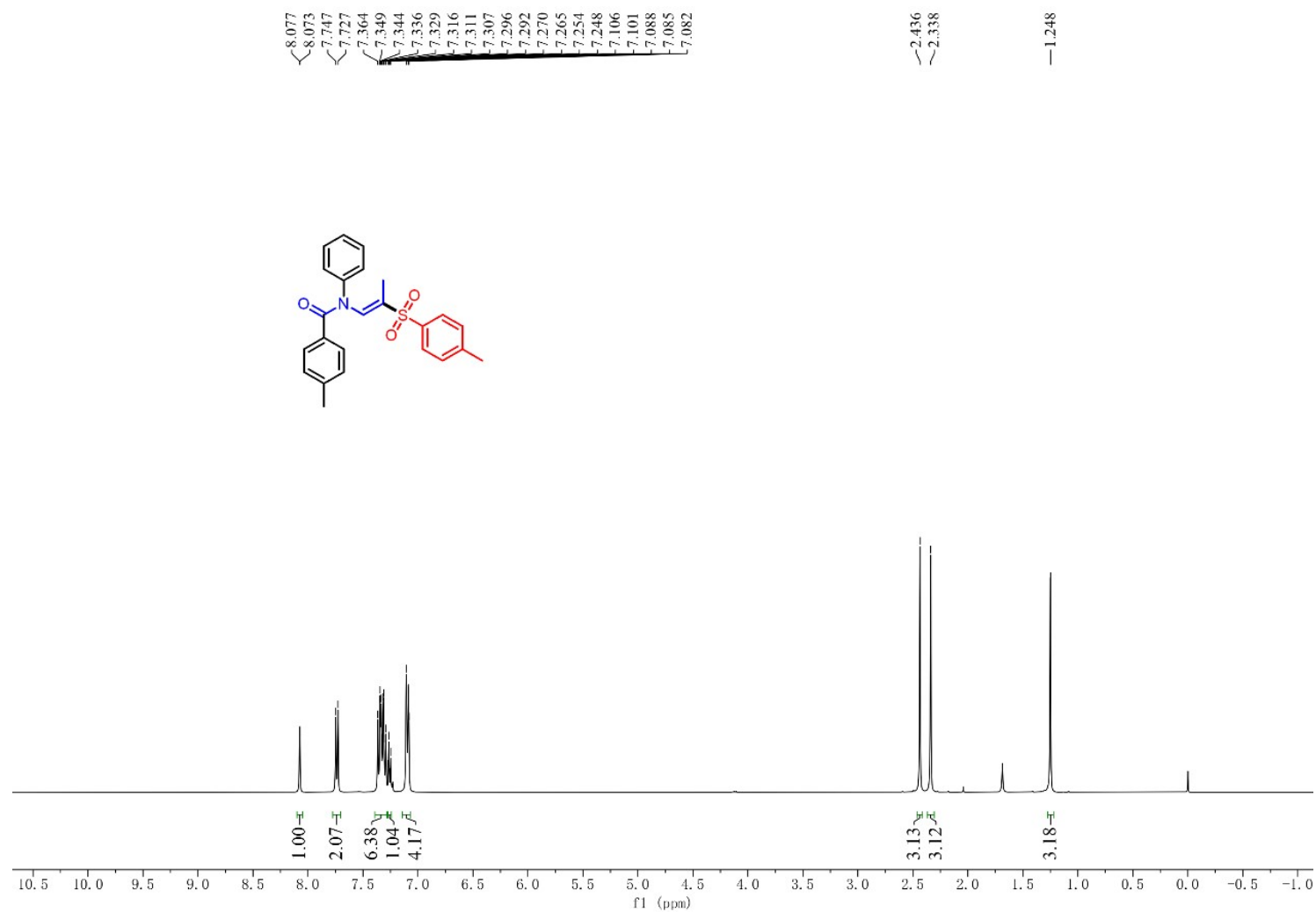
¹³C spectrum of **4k**



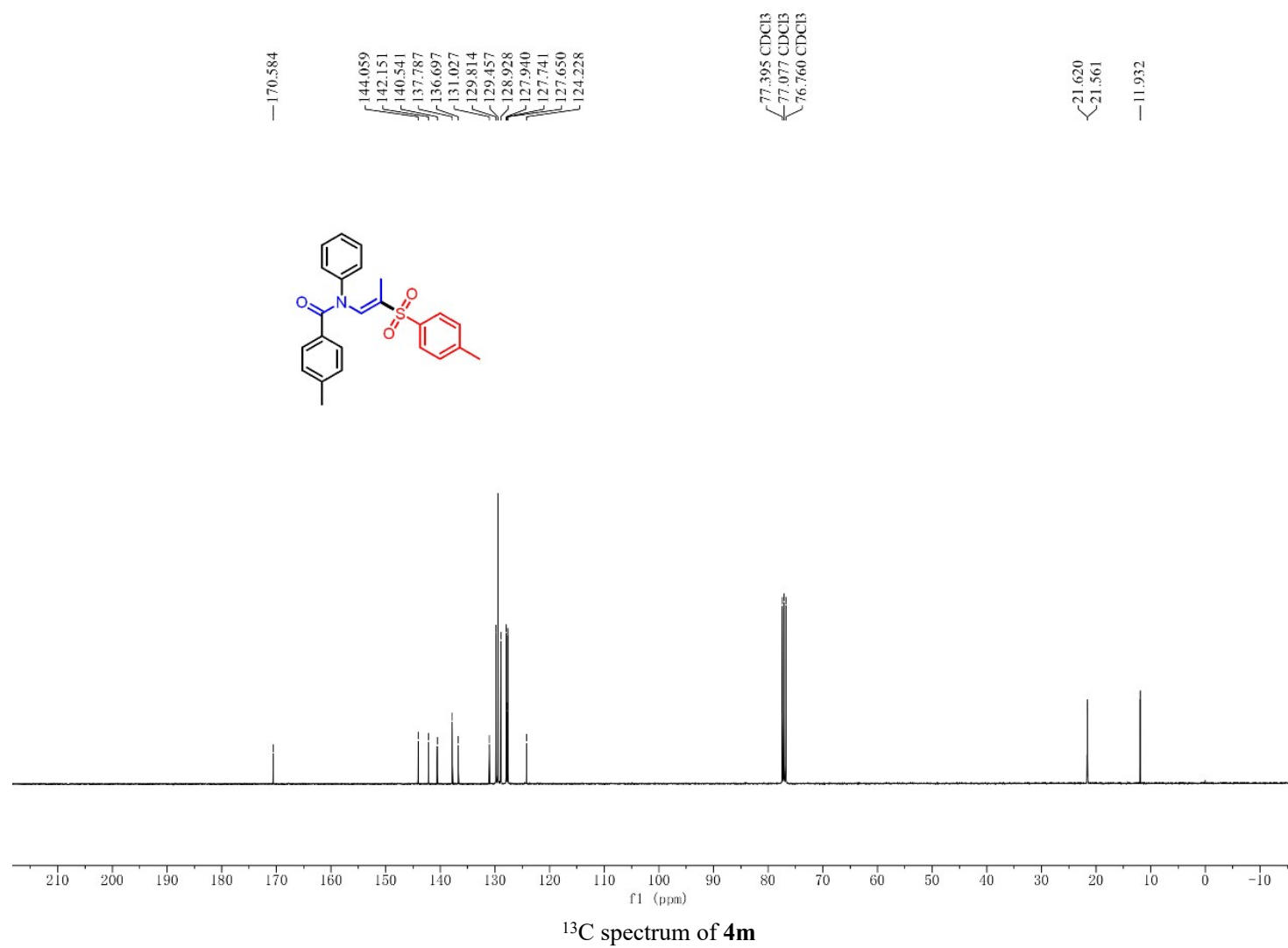
^1H spectrum of 4l

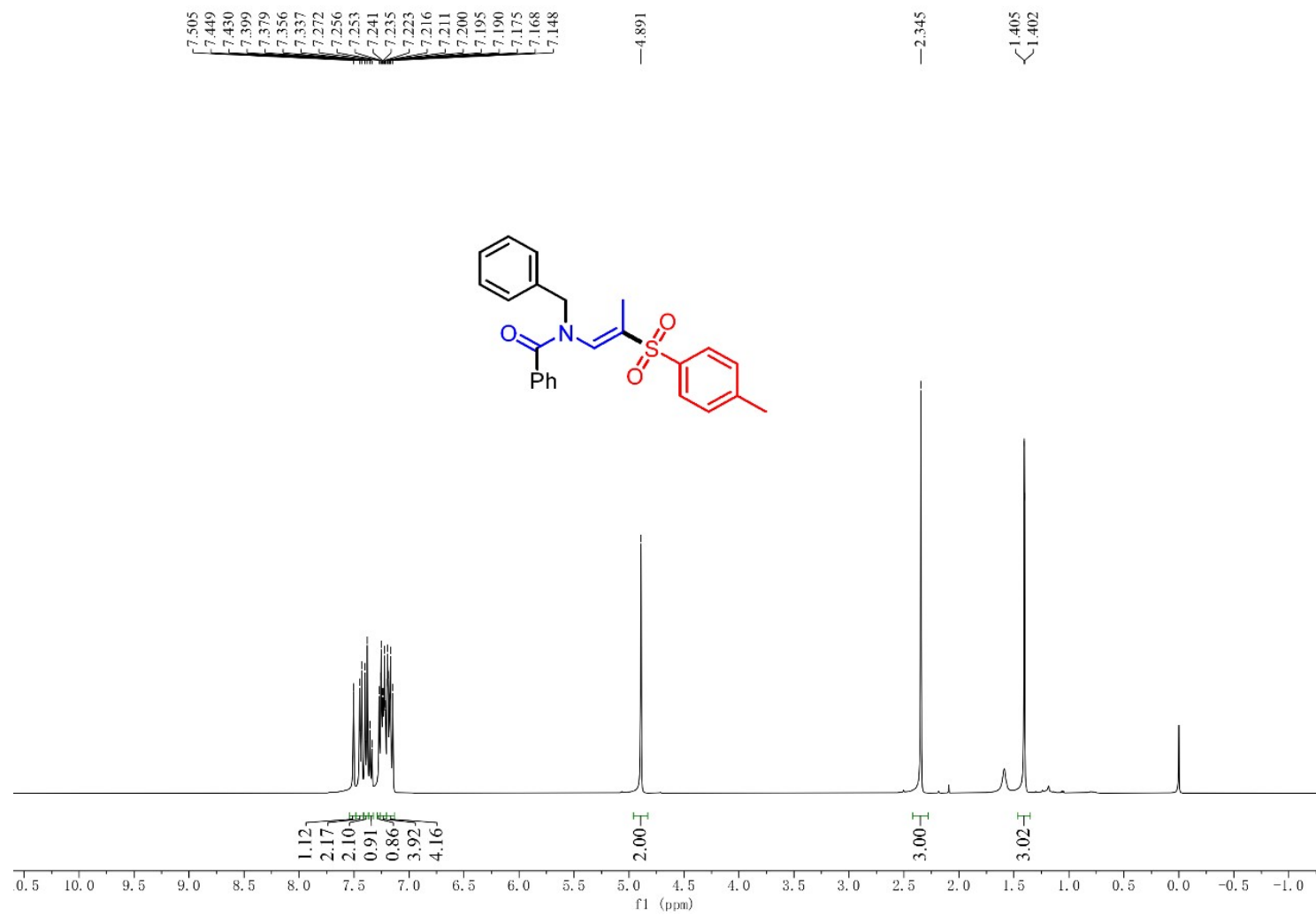


¹³C spectrum of **4l**

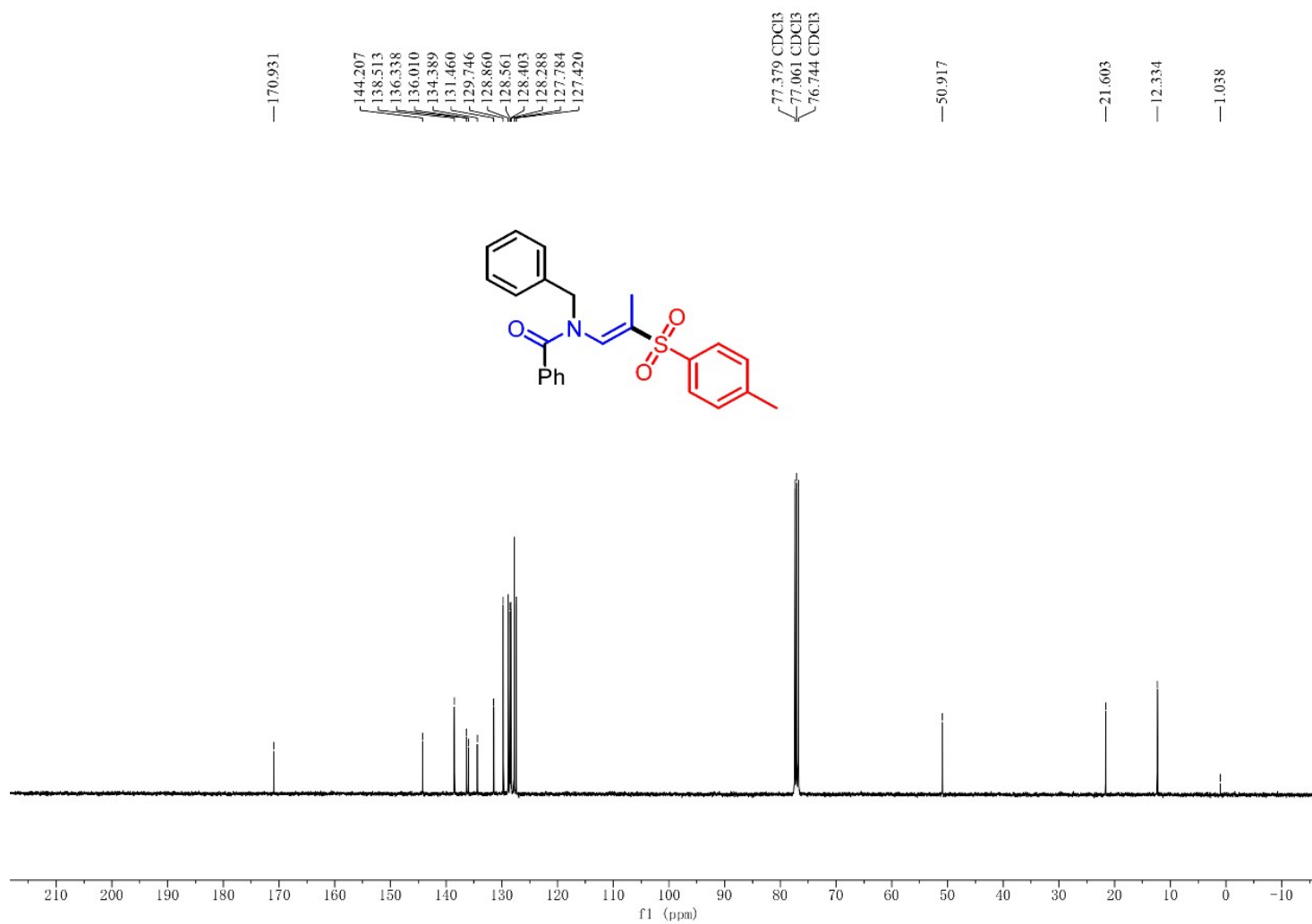


¹H spectrum of **4m**

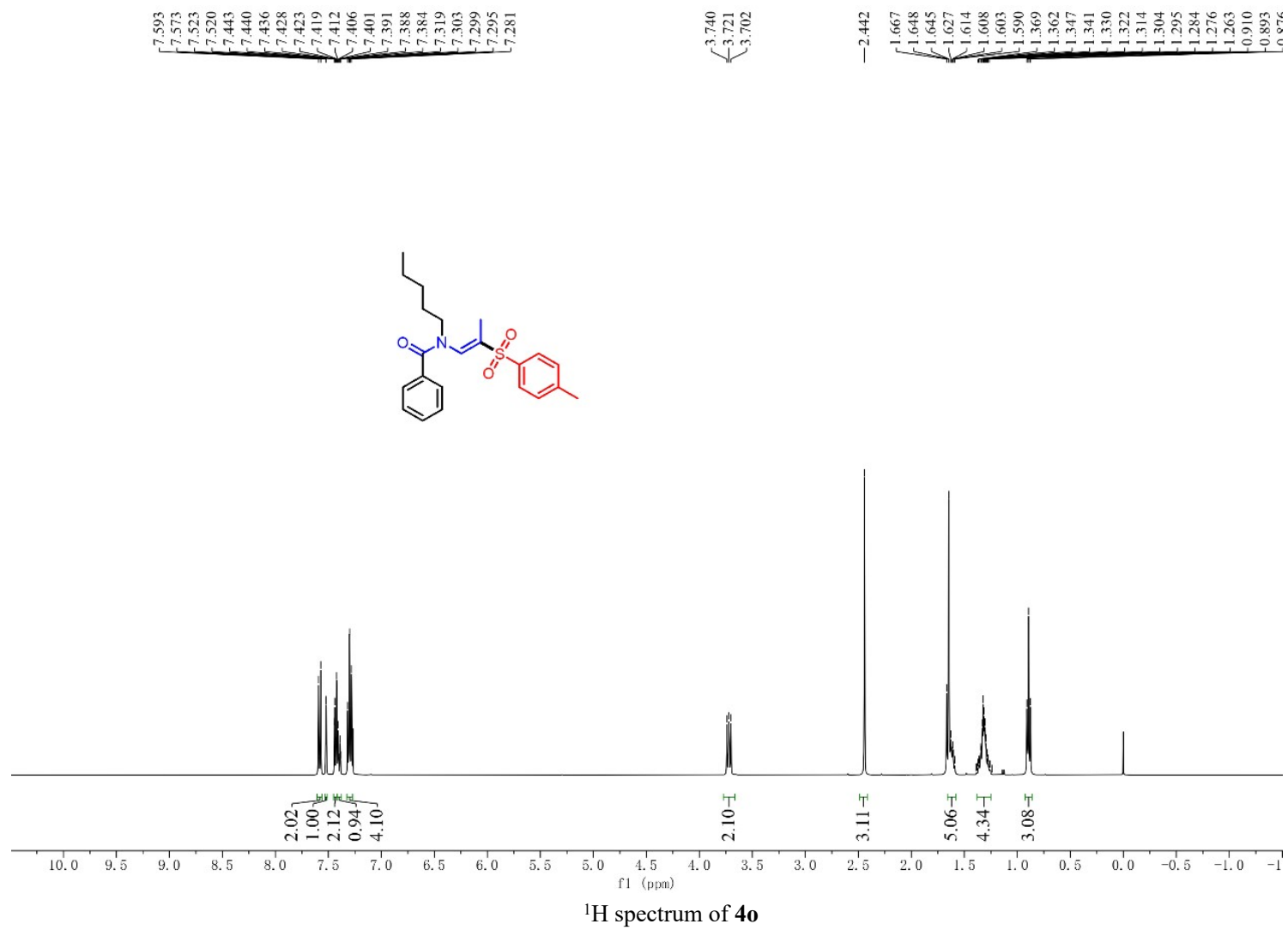


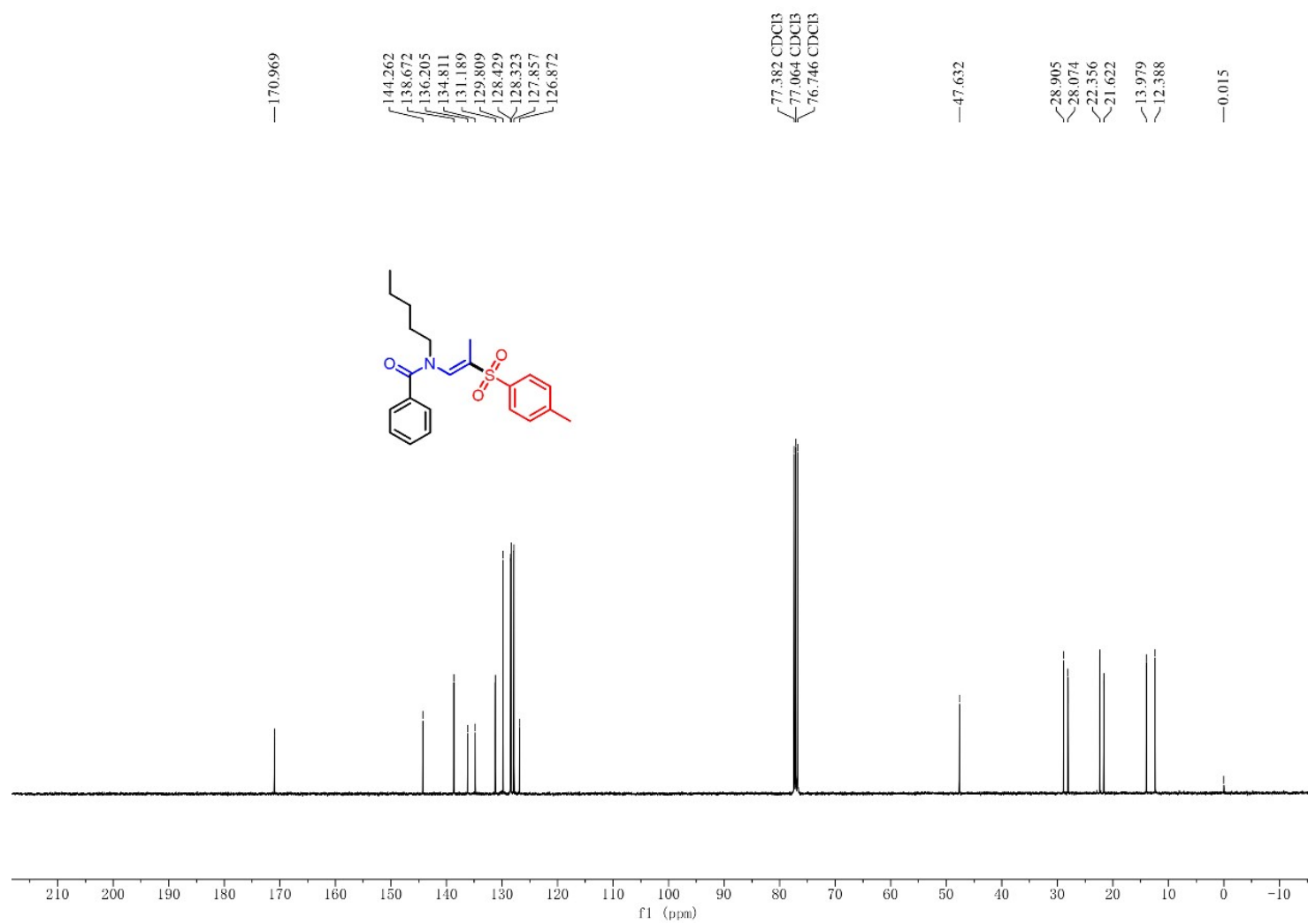


¹H spectrum of **4n**

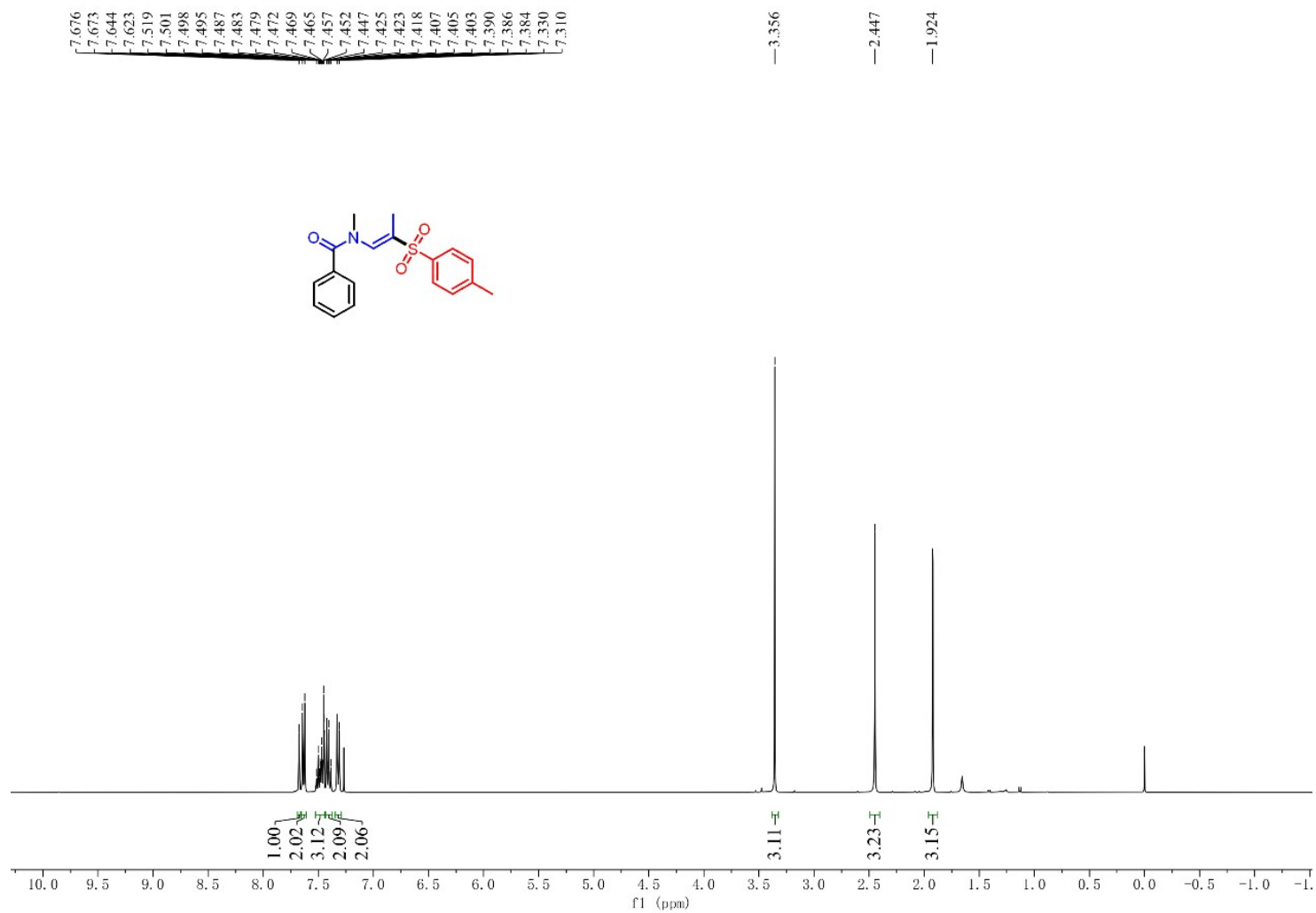


¹³C spectrum of **4n**

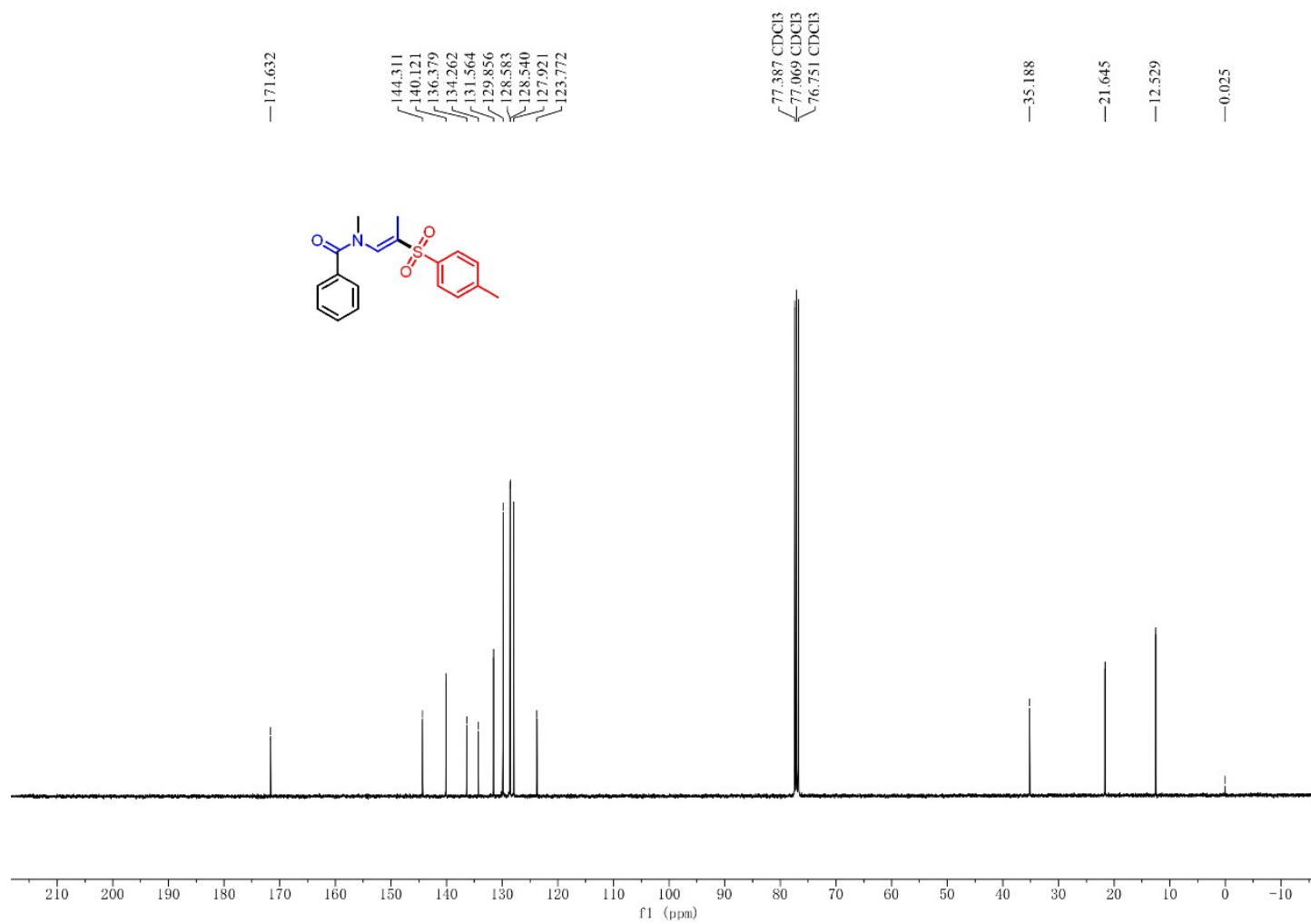




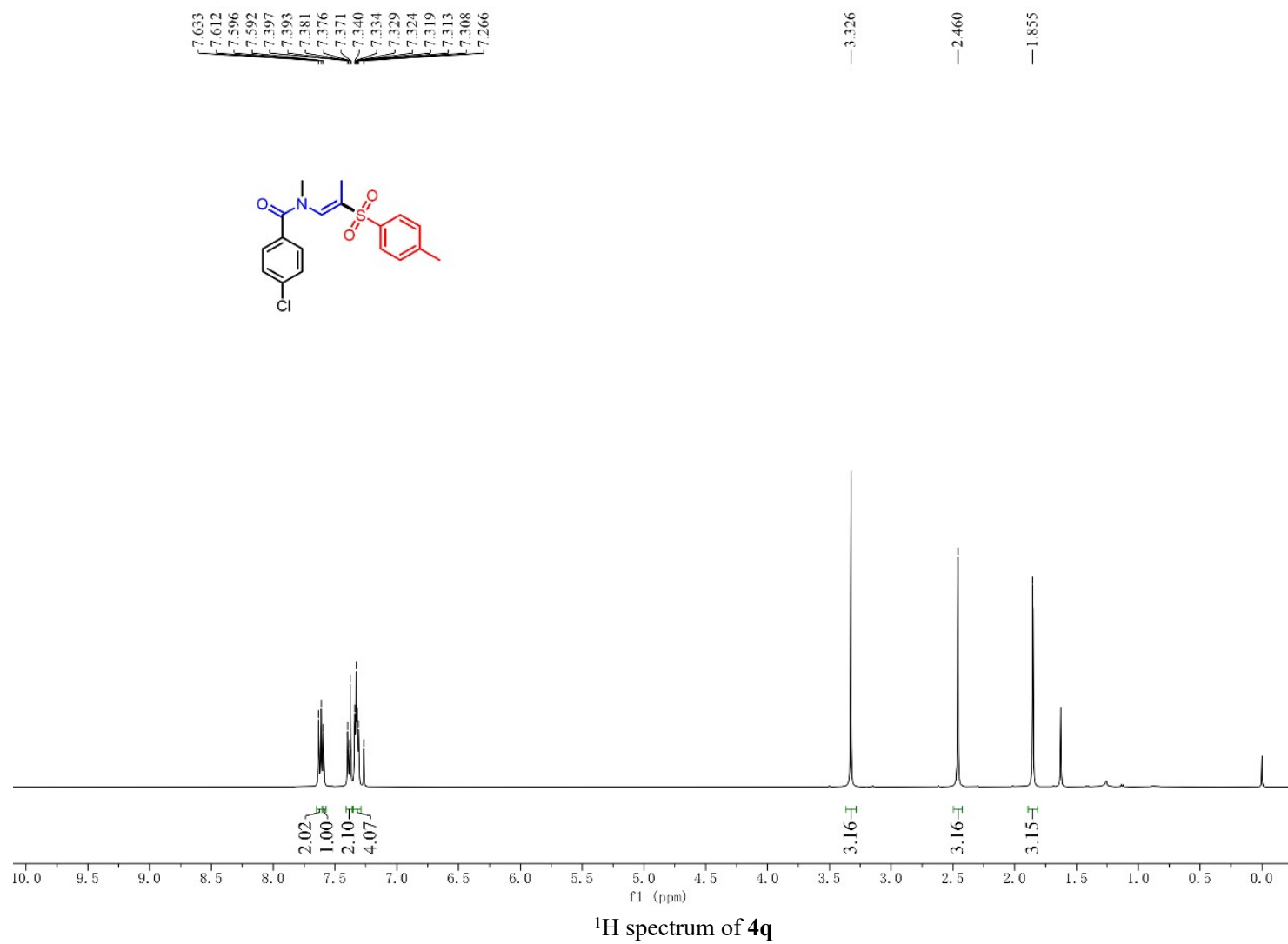
¹³C spectrum of **4o**

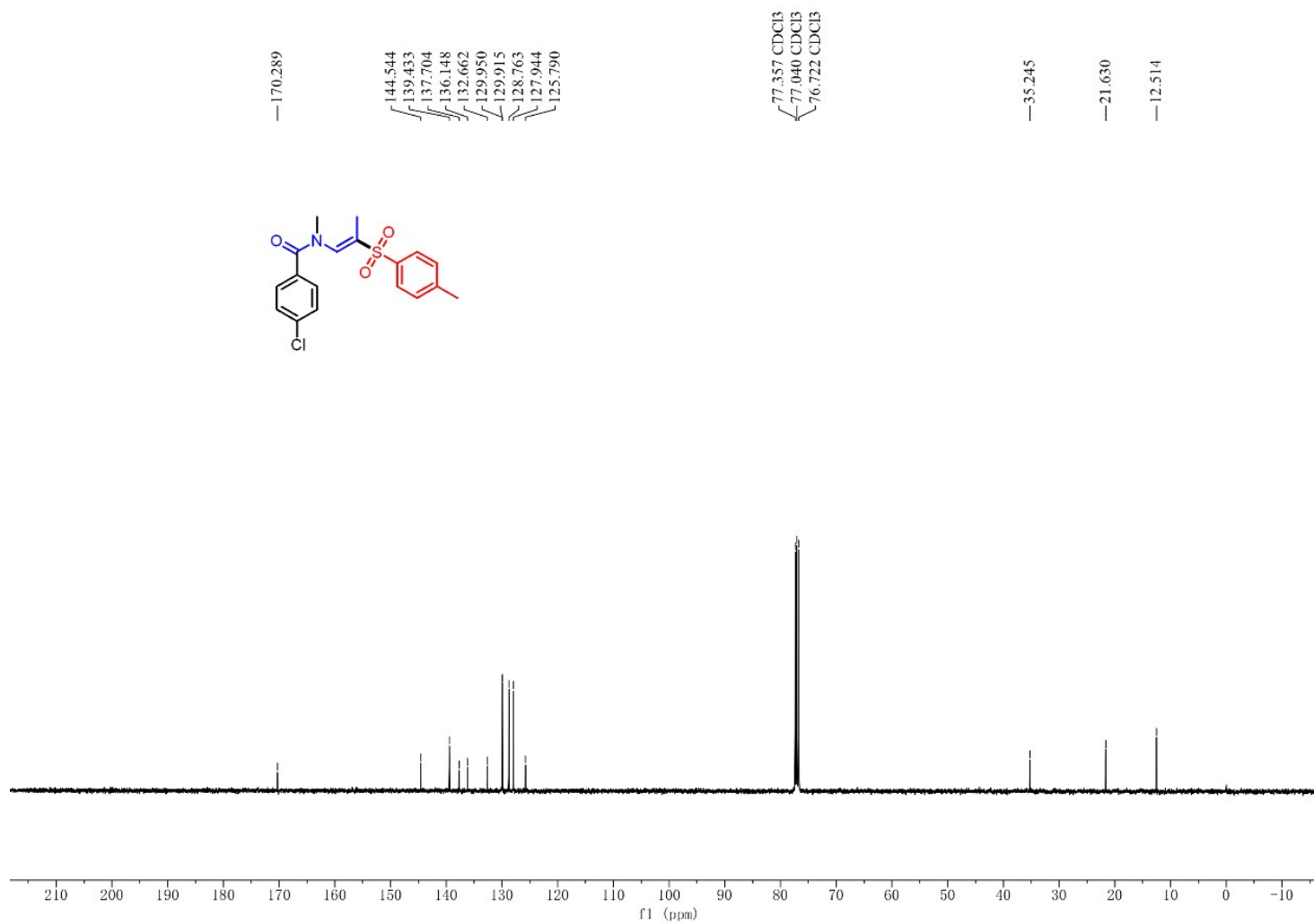


¹H spectrum of **4p**

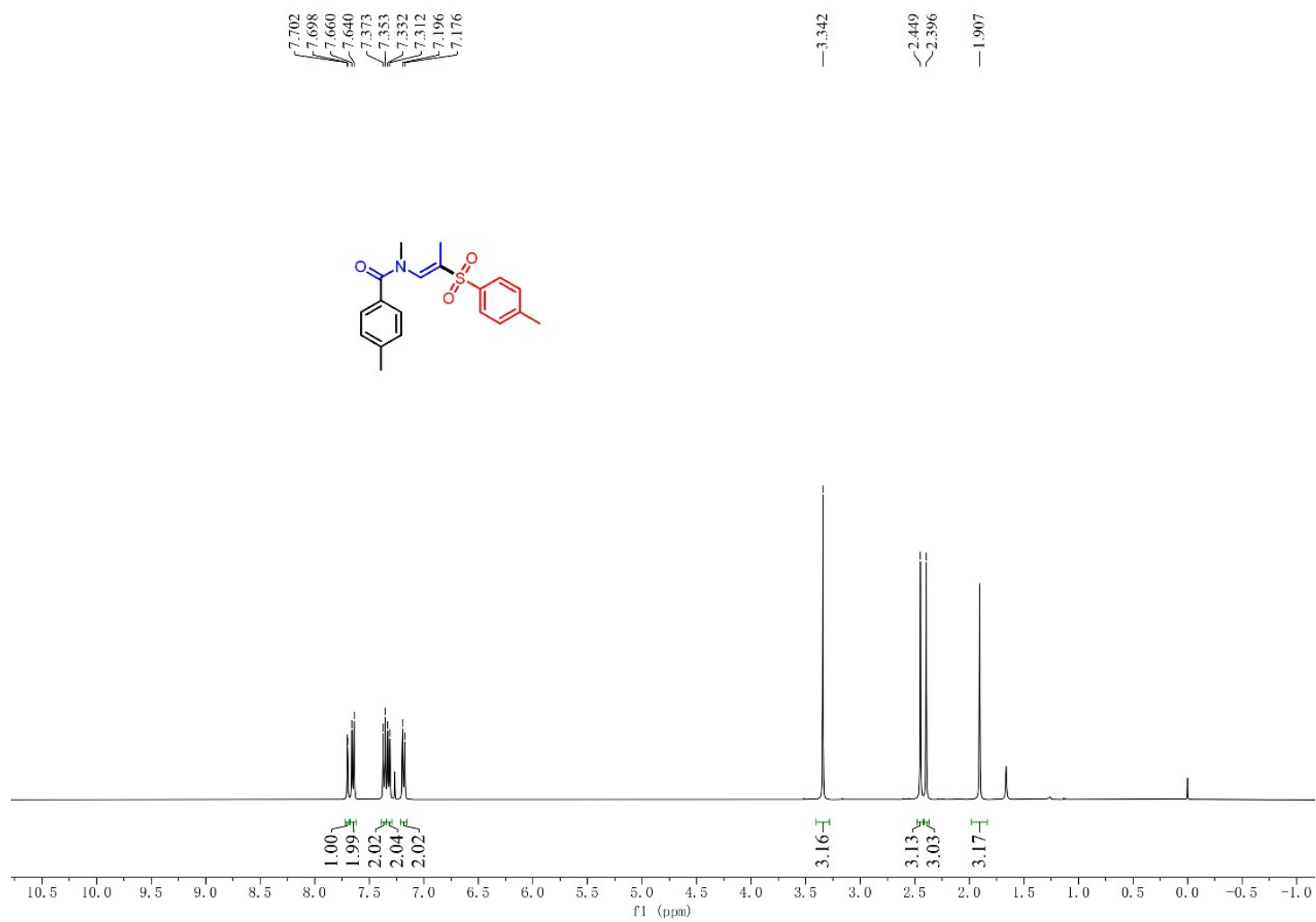


¹³C spectrum of **4p**

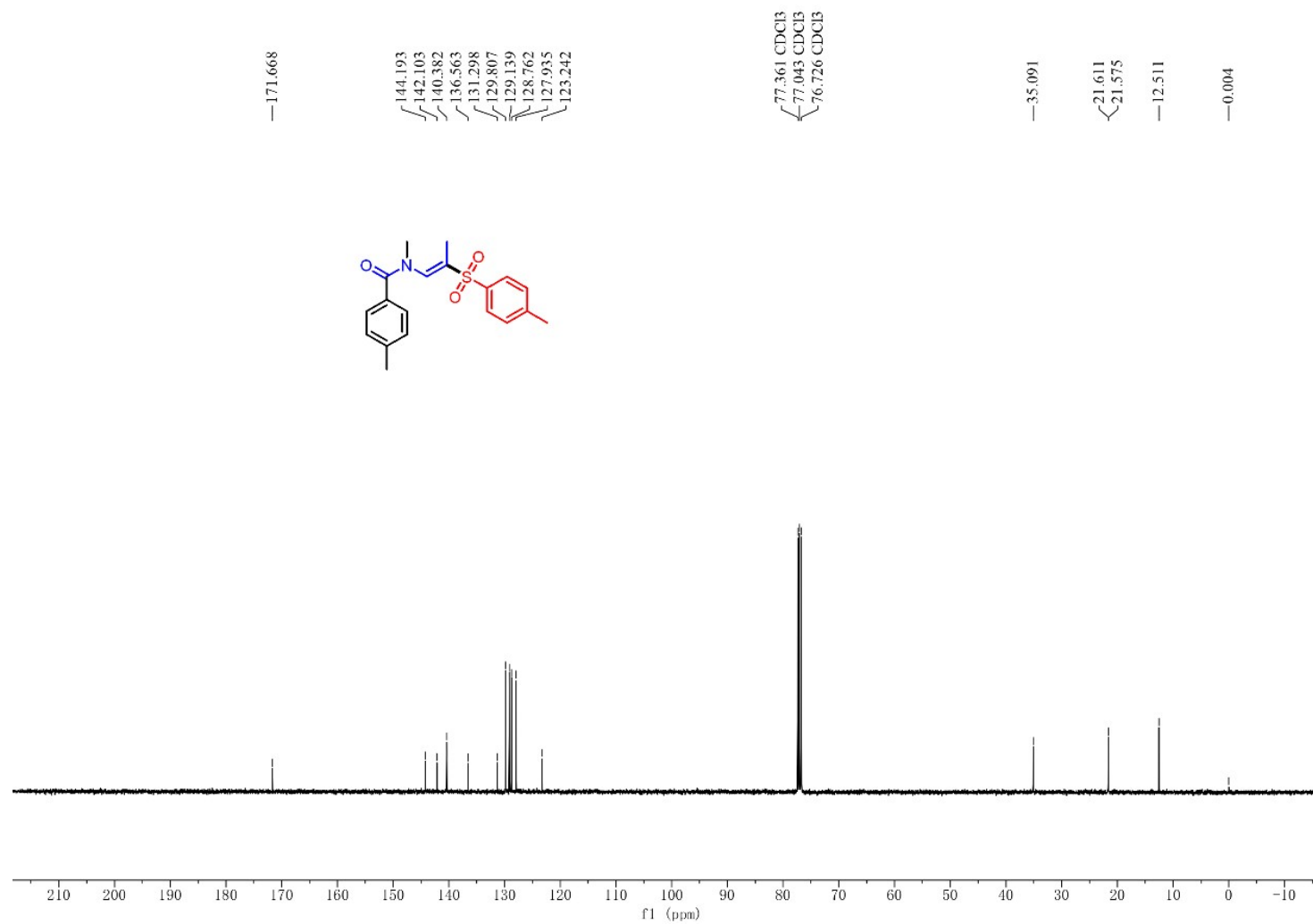




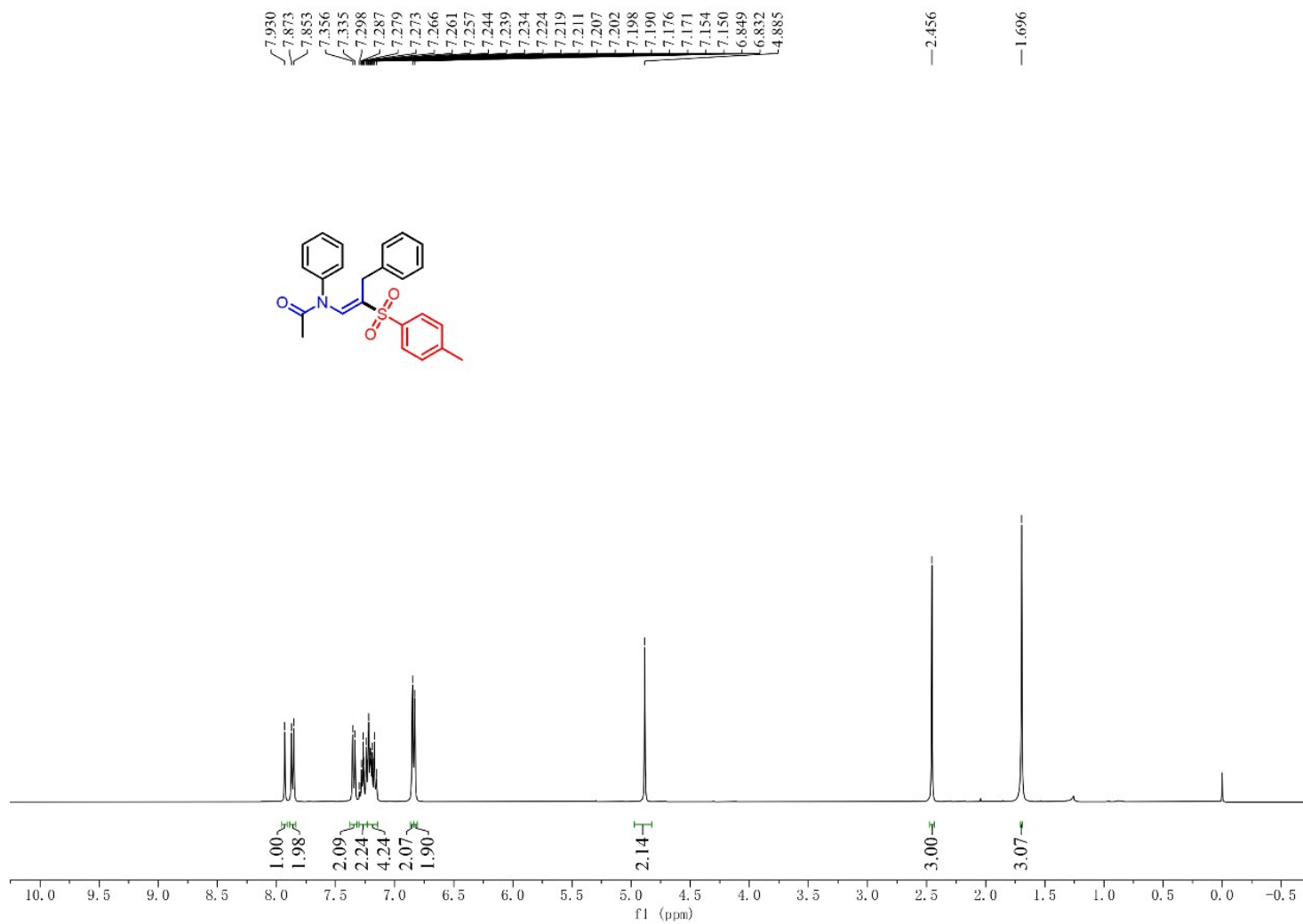
¹³C spectrum of **4q**



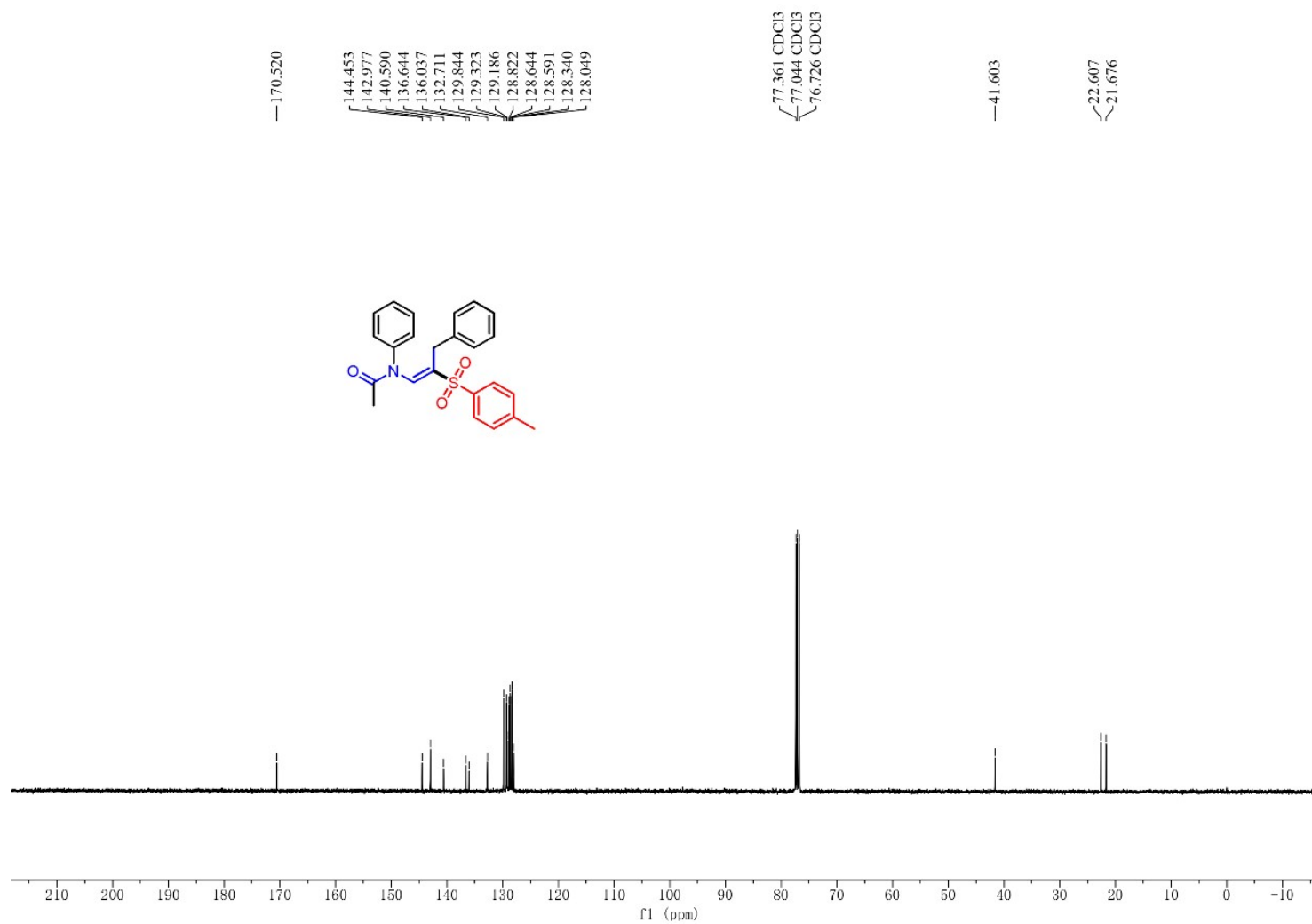
¹H spectrum of **4r**



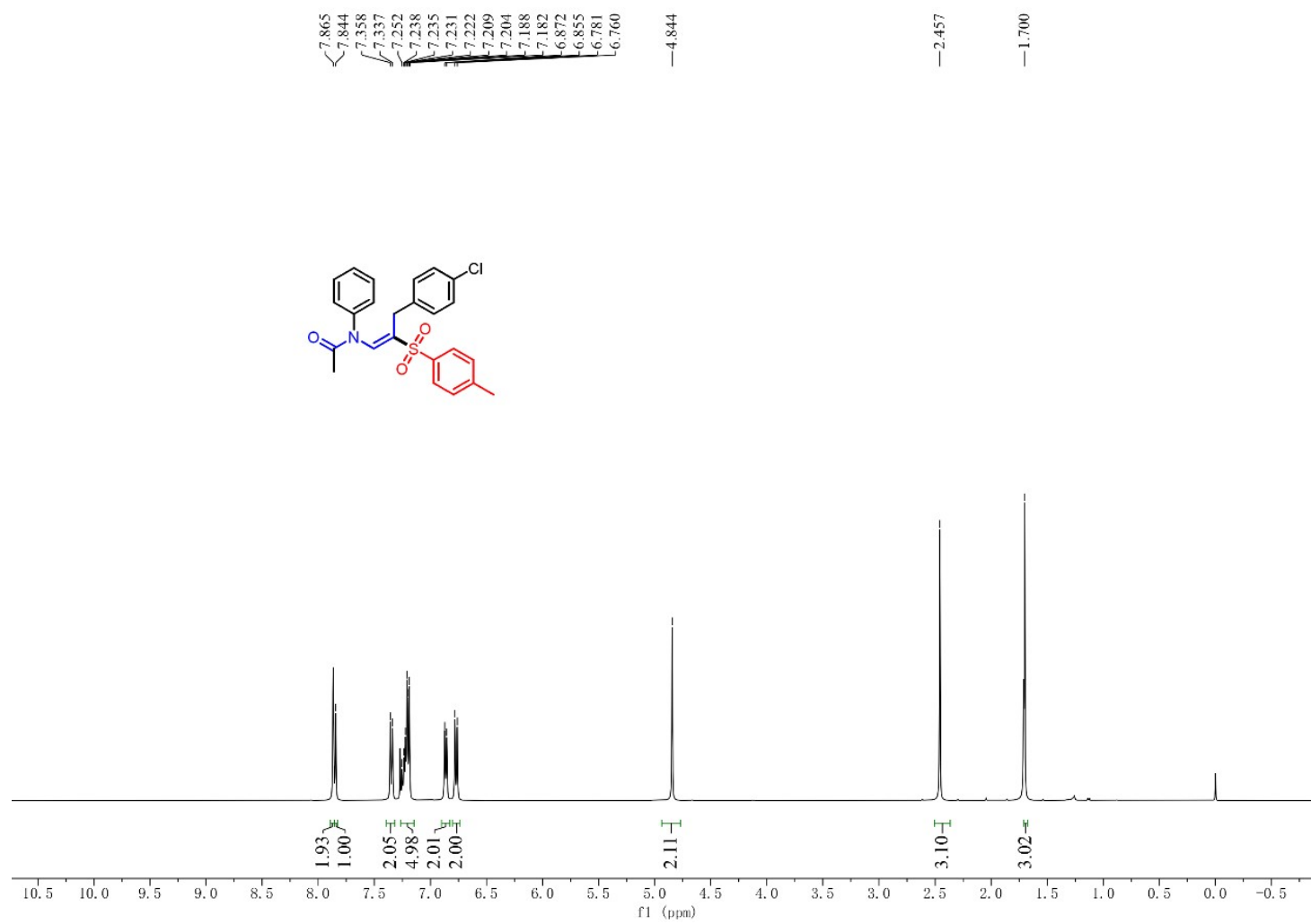
¹³C spectrum of **4r**



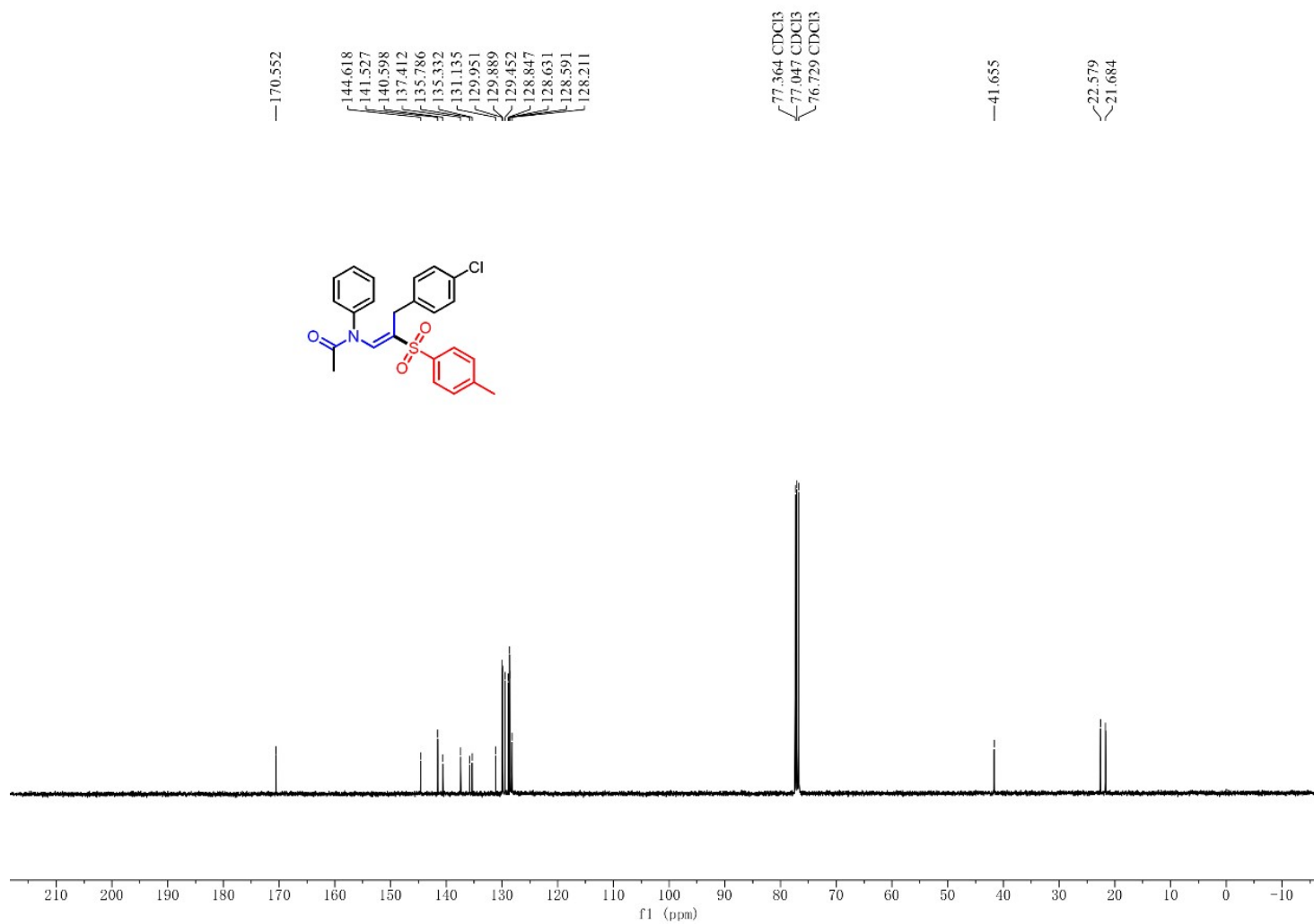
¹H spectrum of **4s**



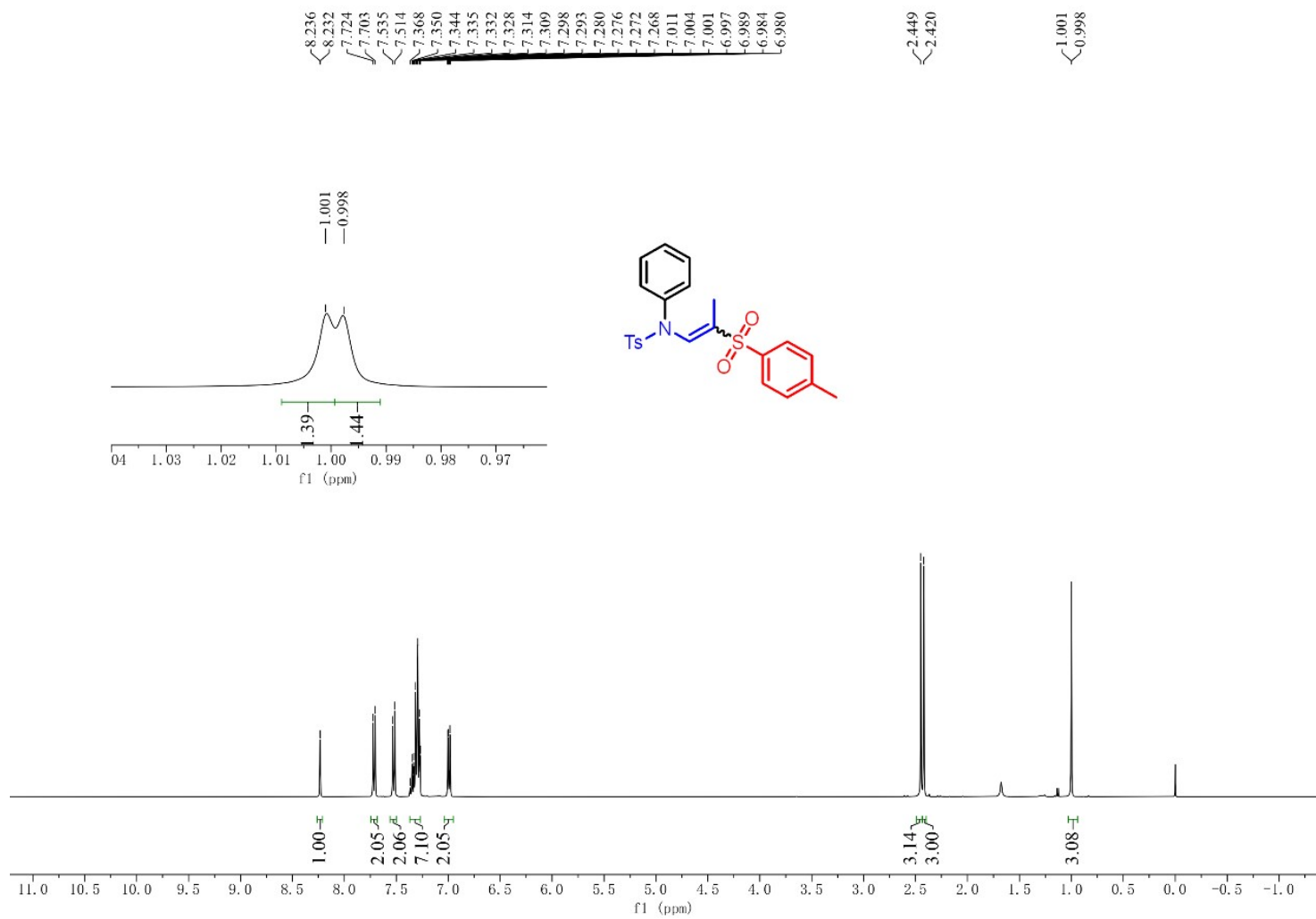
¹³C spectrum of **4s**



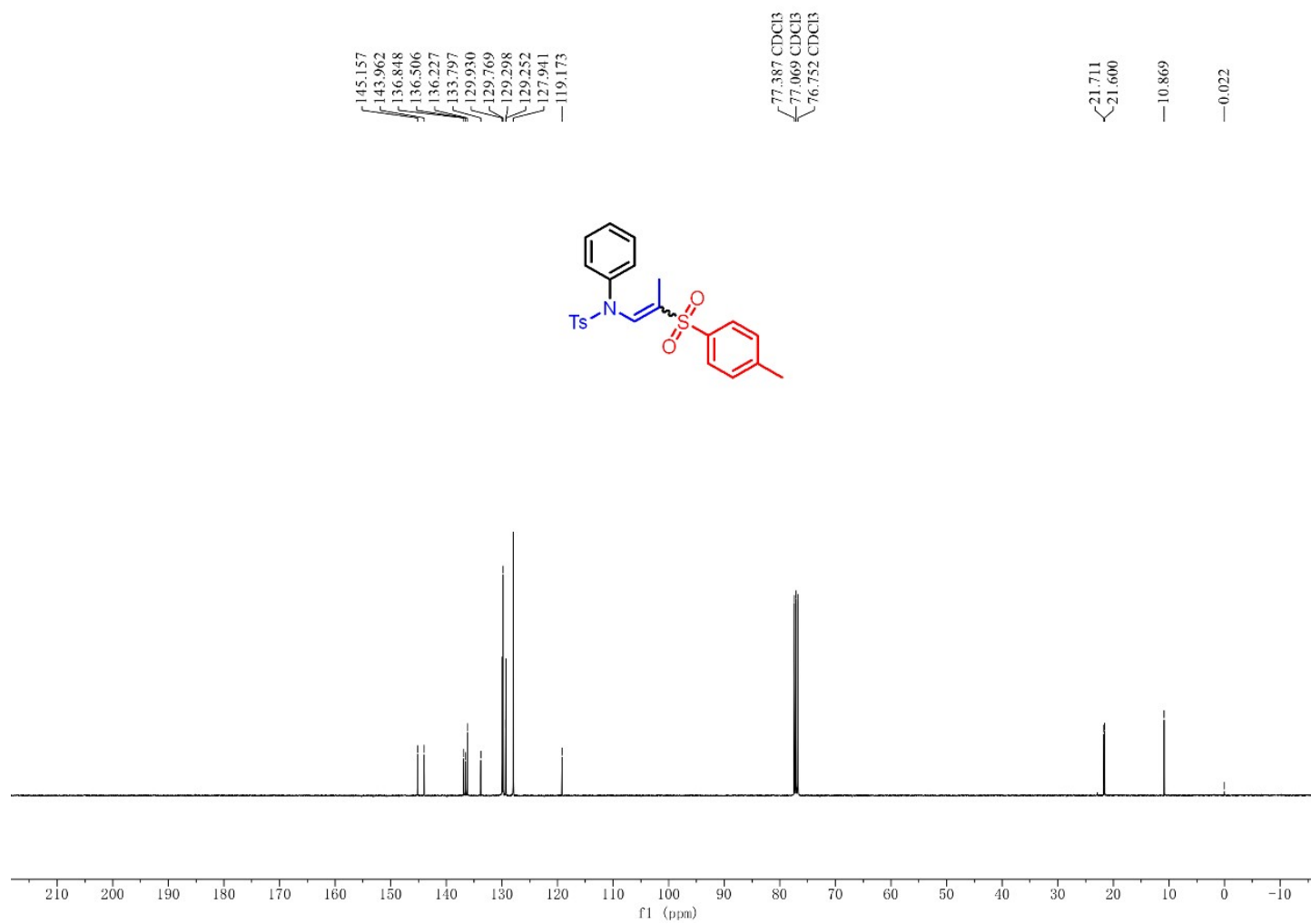
¹H spectrum of **4t**



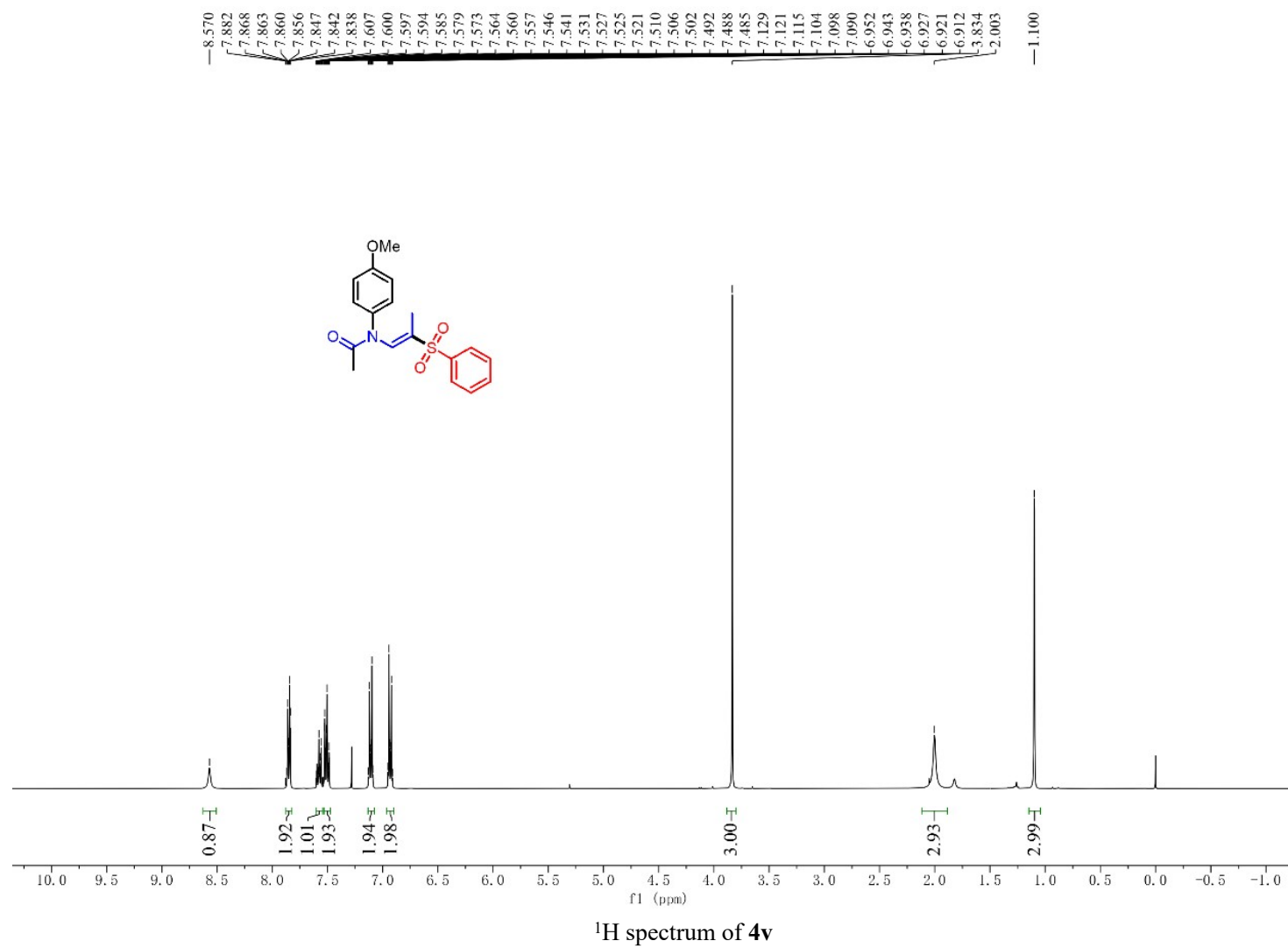
¹³C spectrum of **4t**

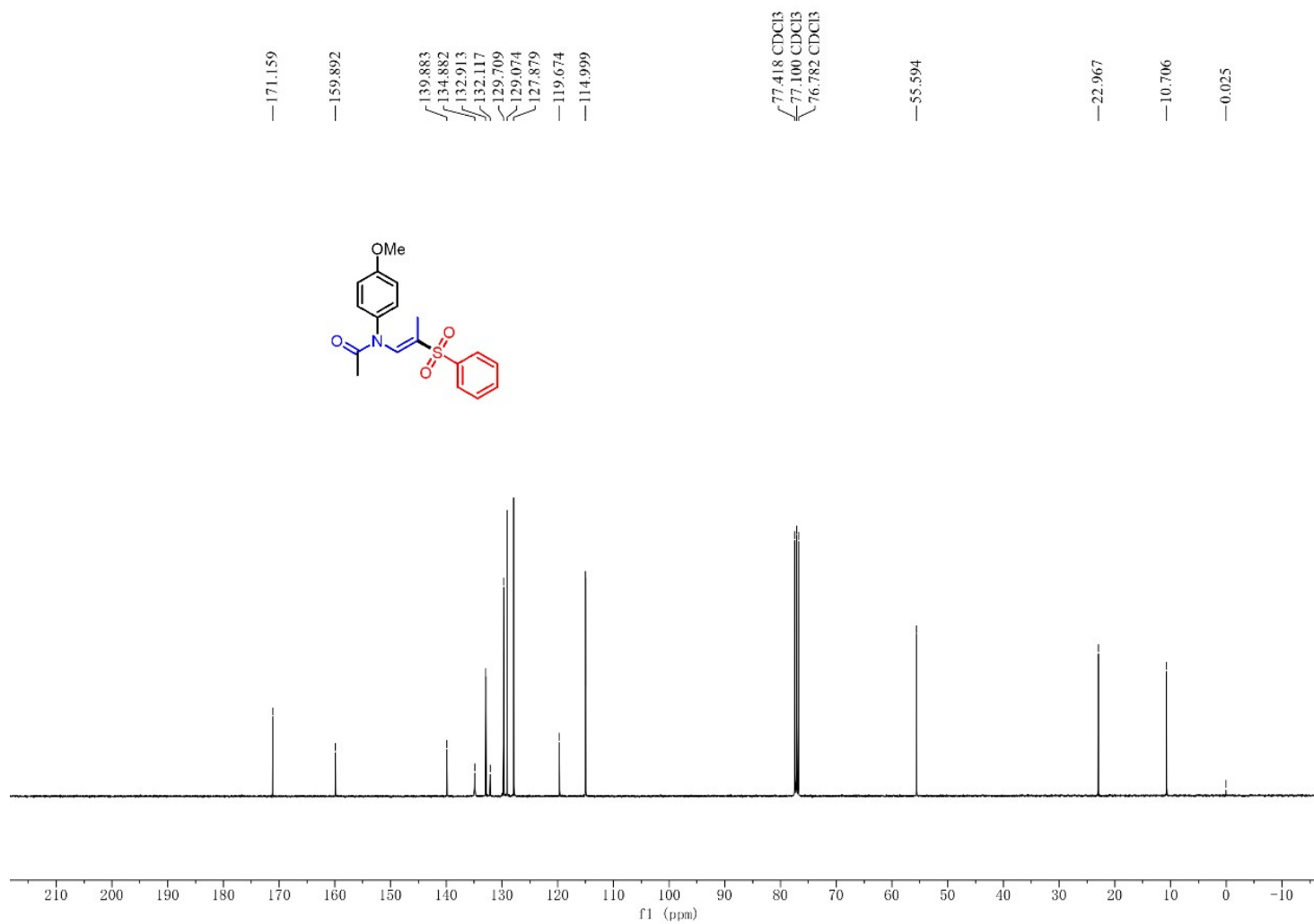


¹H spectrum of **4u**

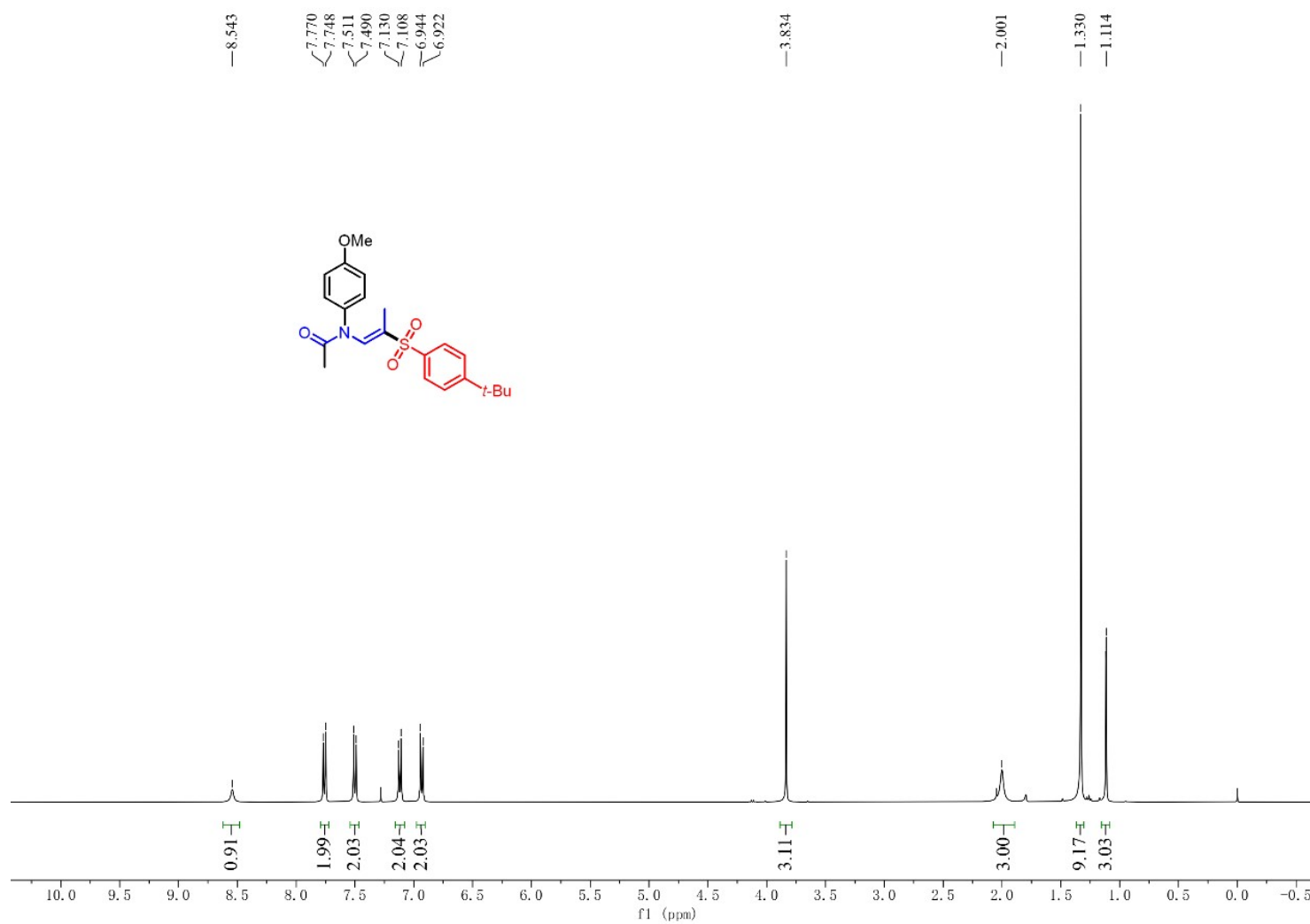


¹³C spectrum of **4u**

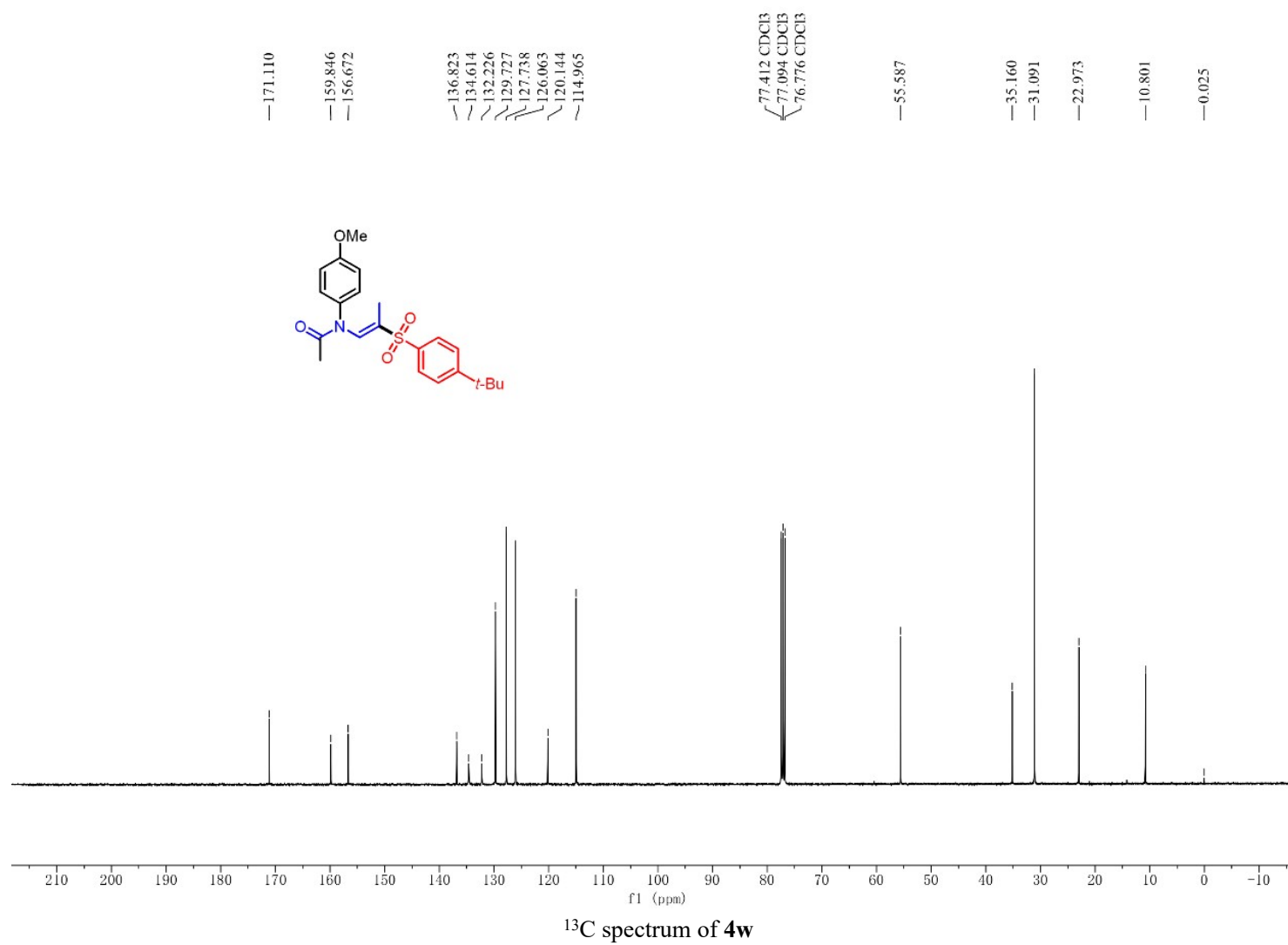


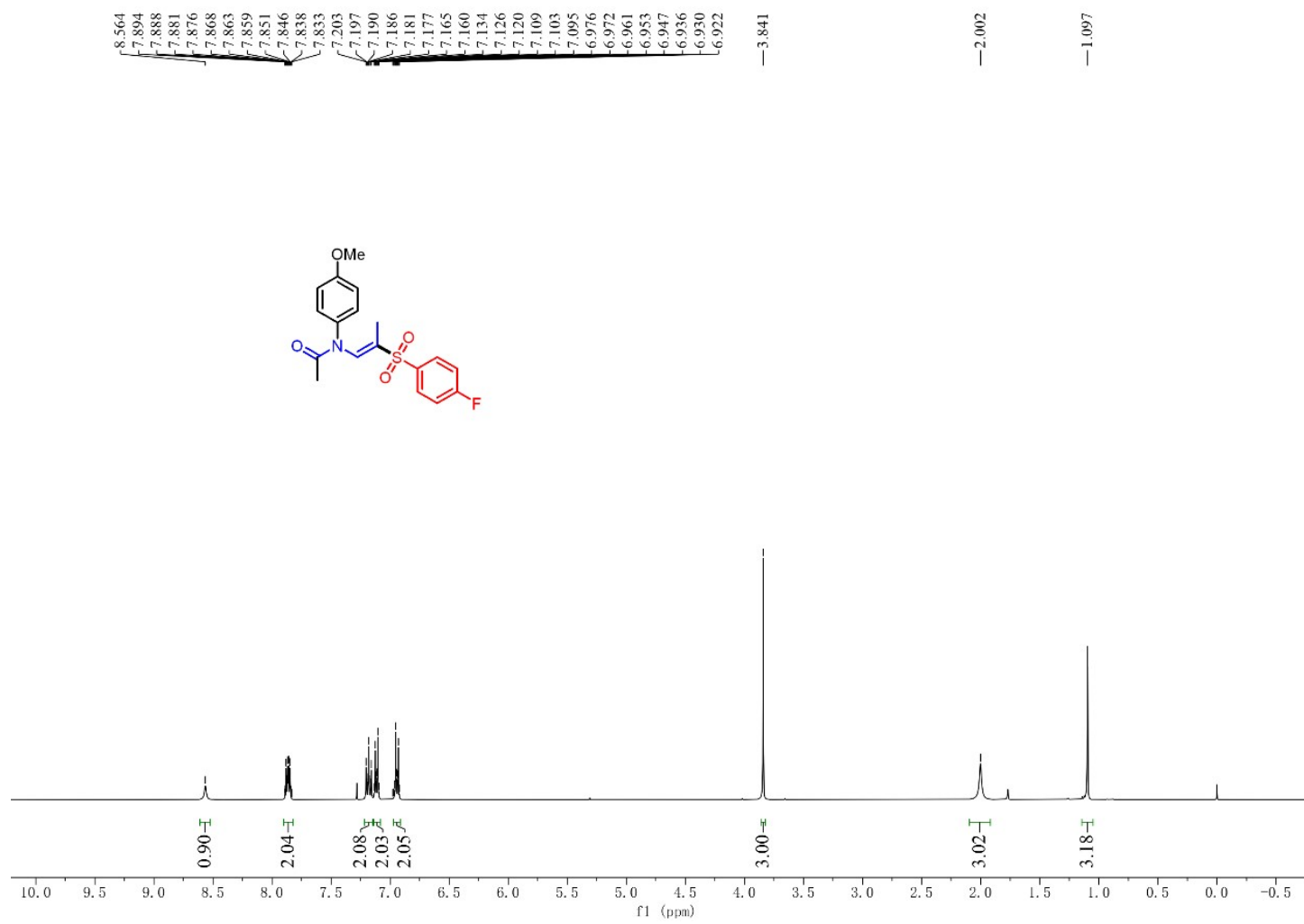


¹³C spectrum of **4v**

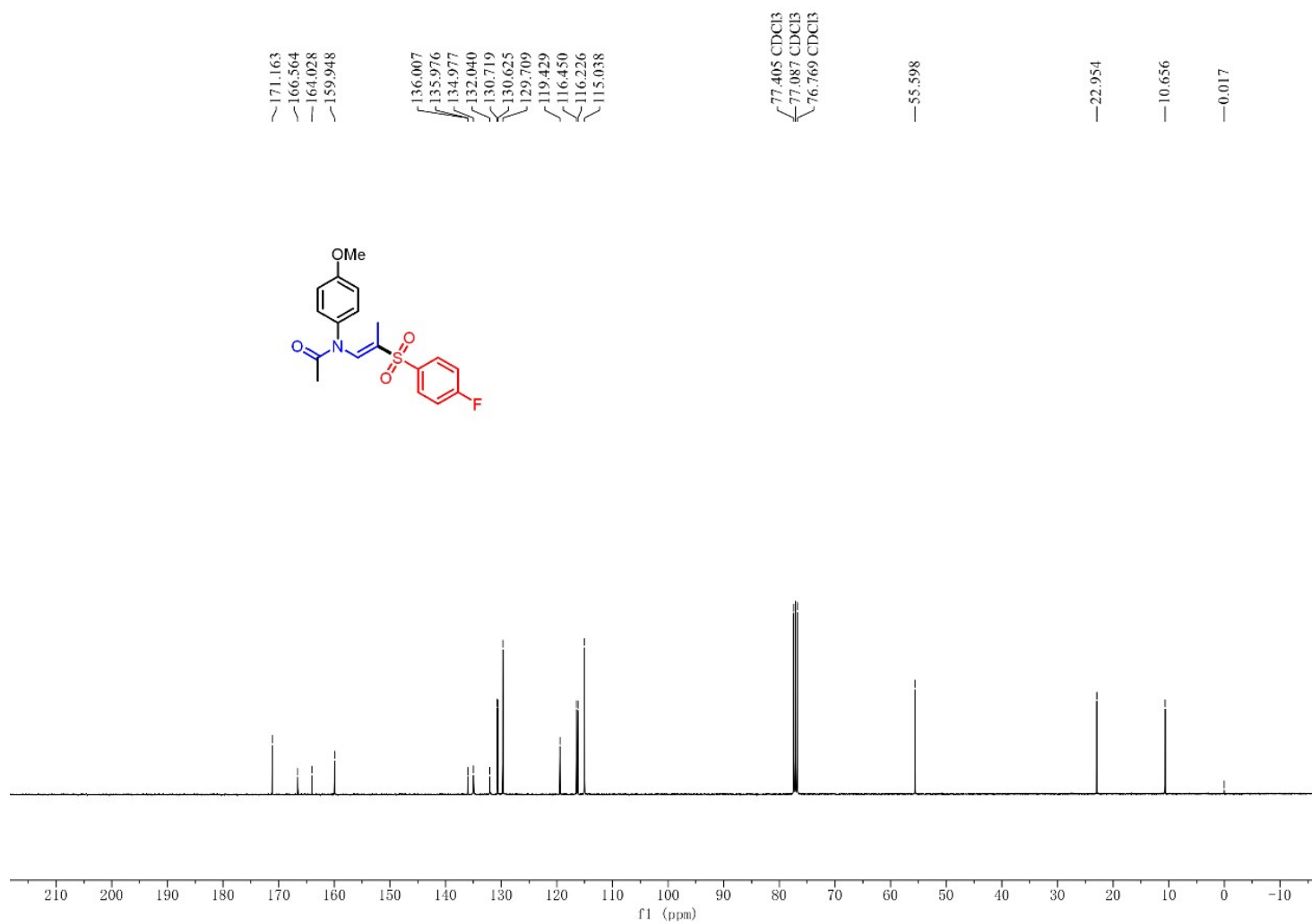


^1H spectrum of **4w**

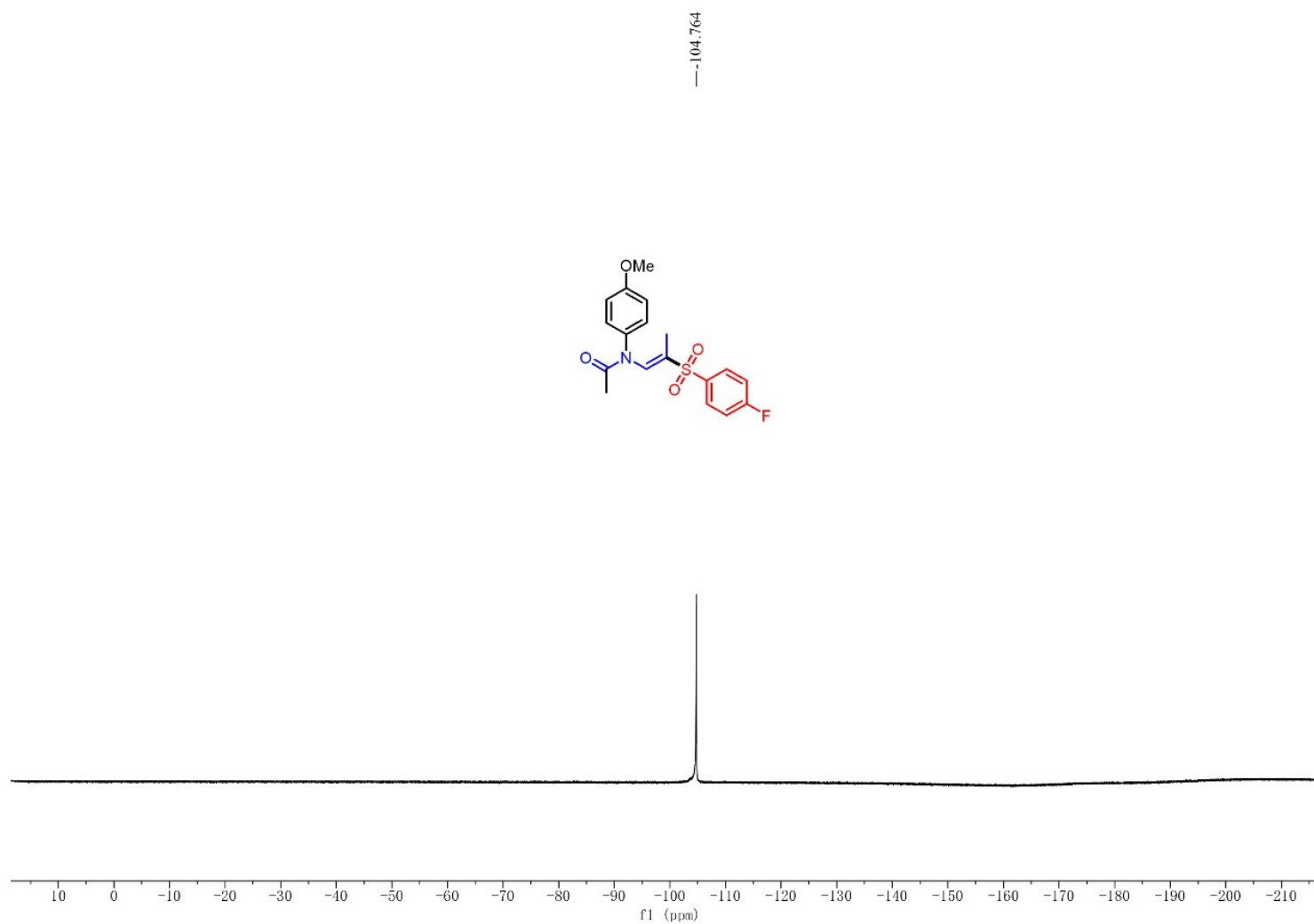




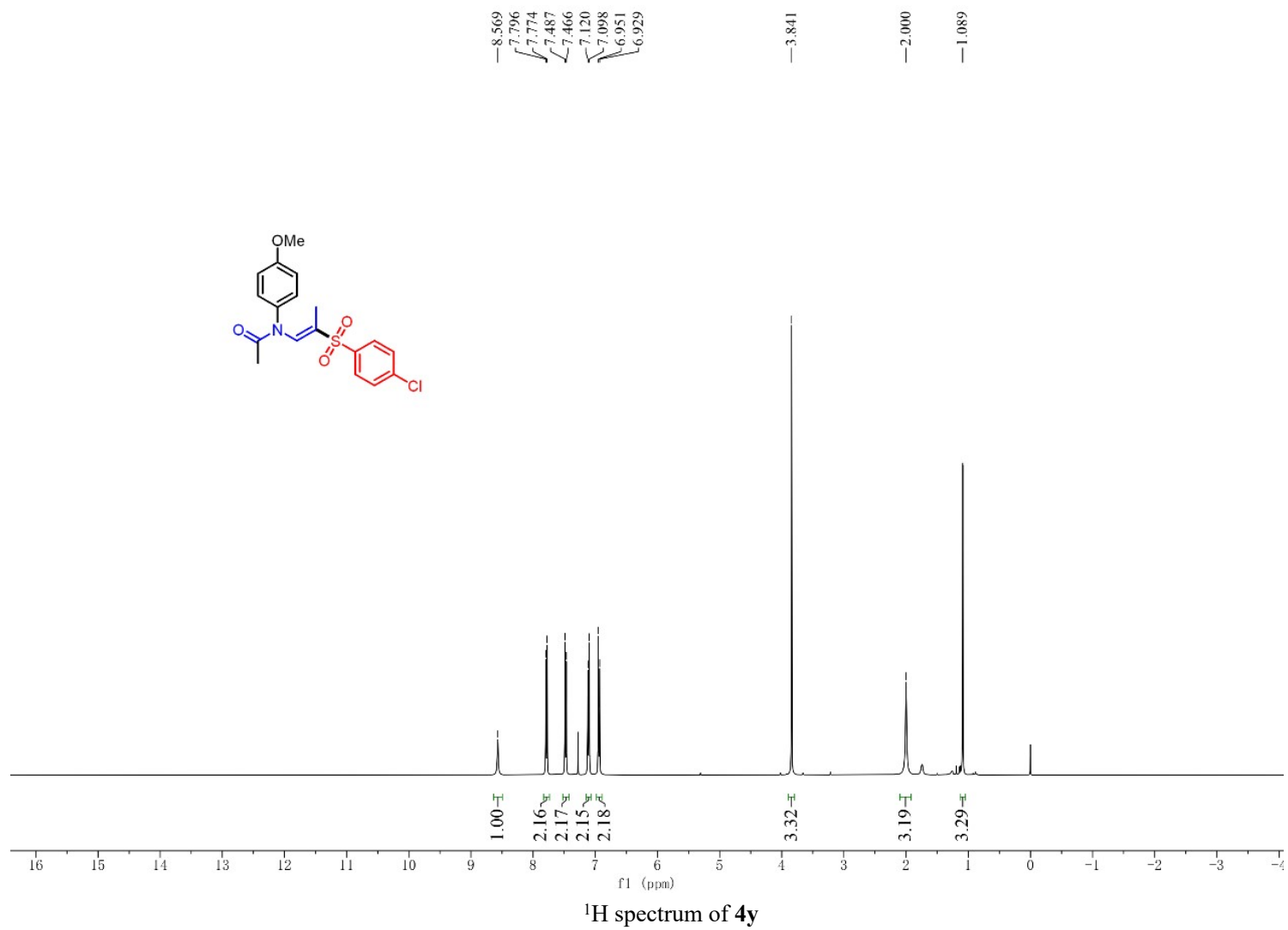
¹H spectrum of **4x**

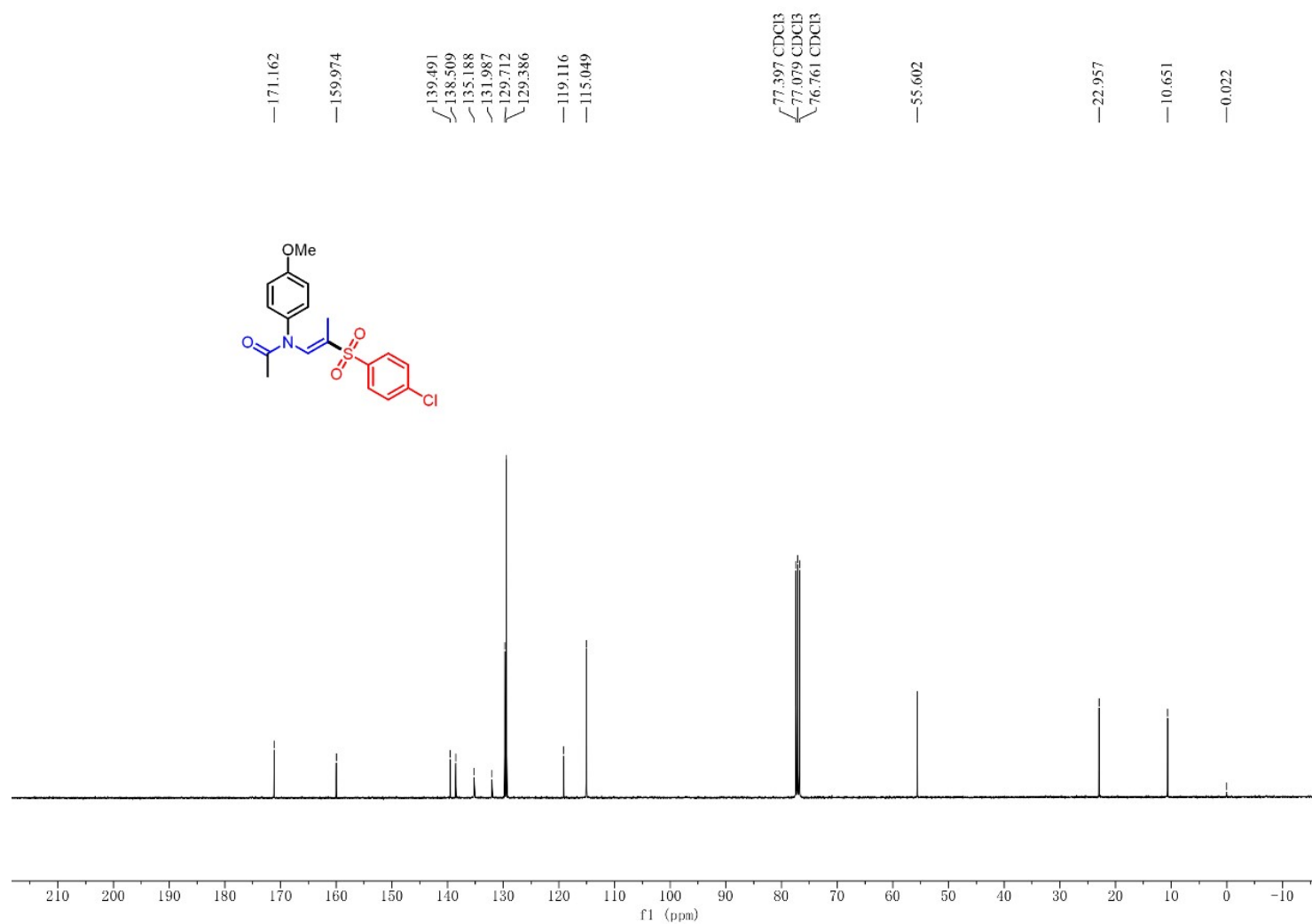


¹³C spectrum of **4x**

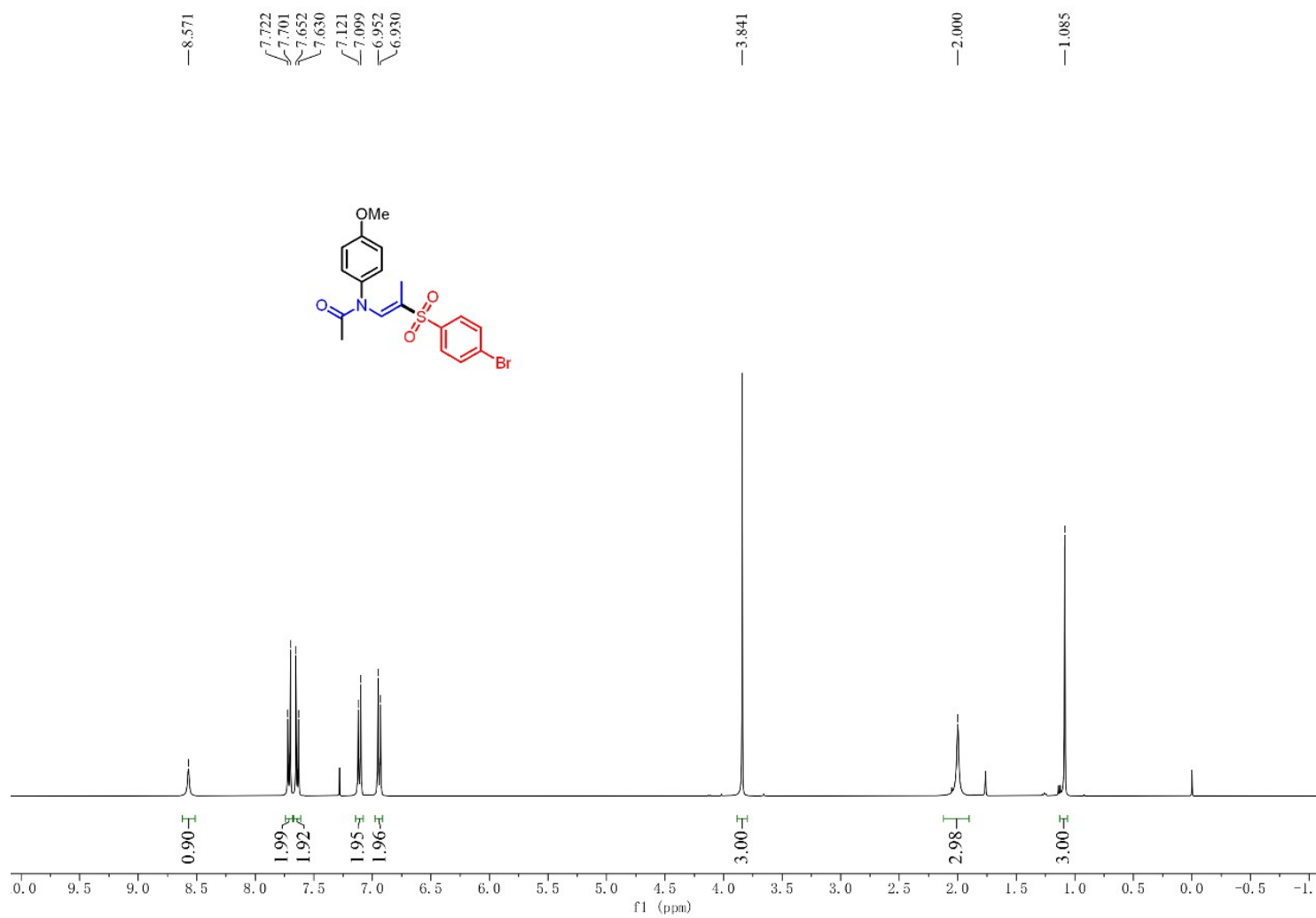


^{19}F spectrum of **4x**

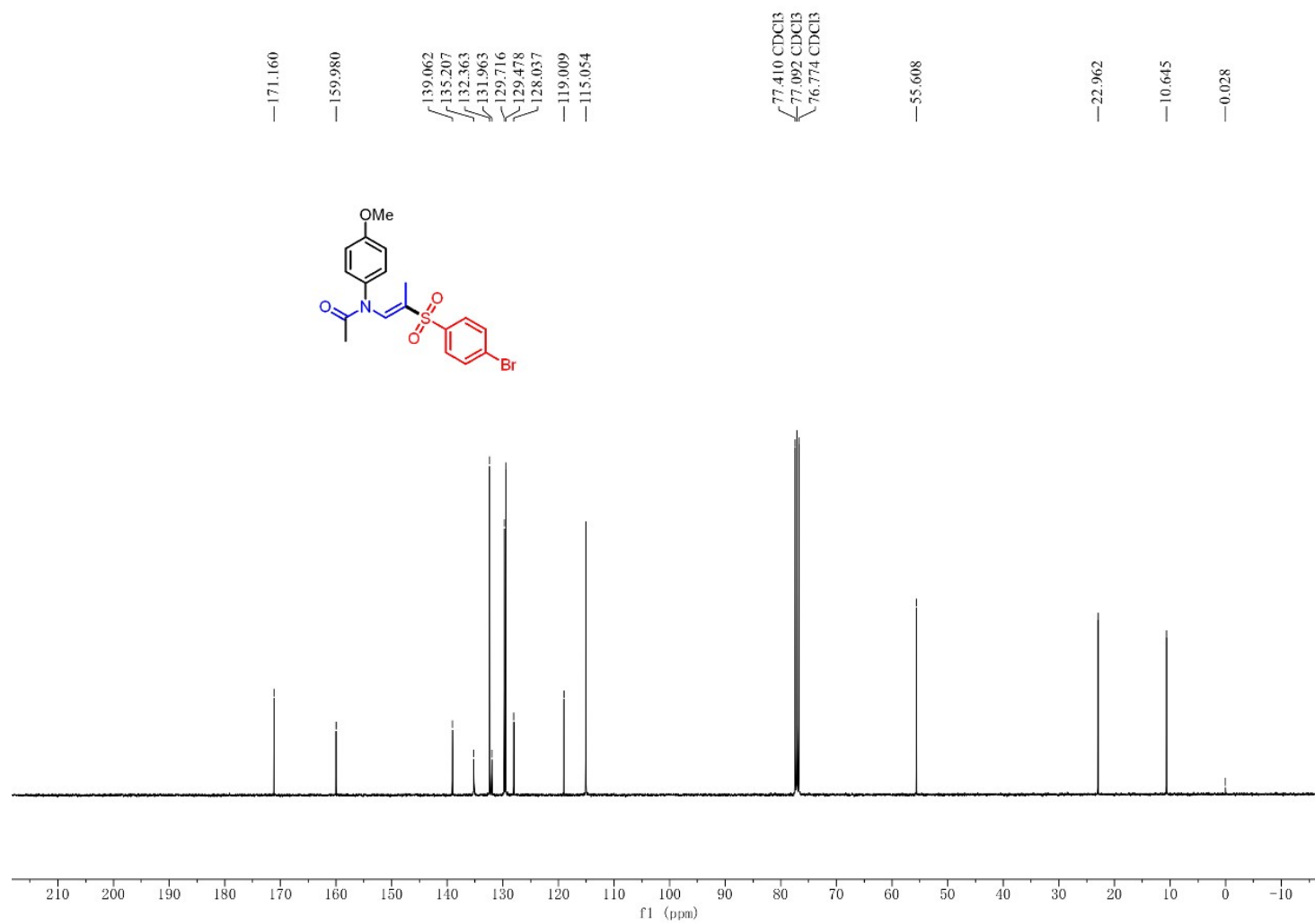




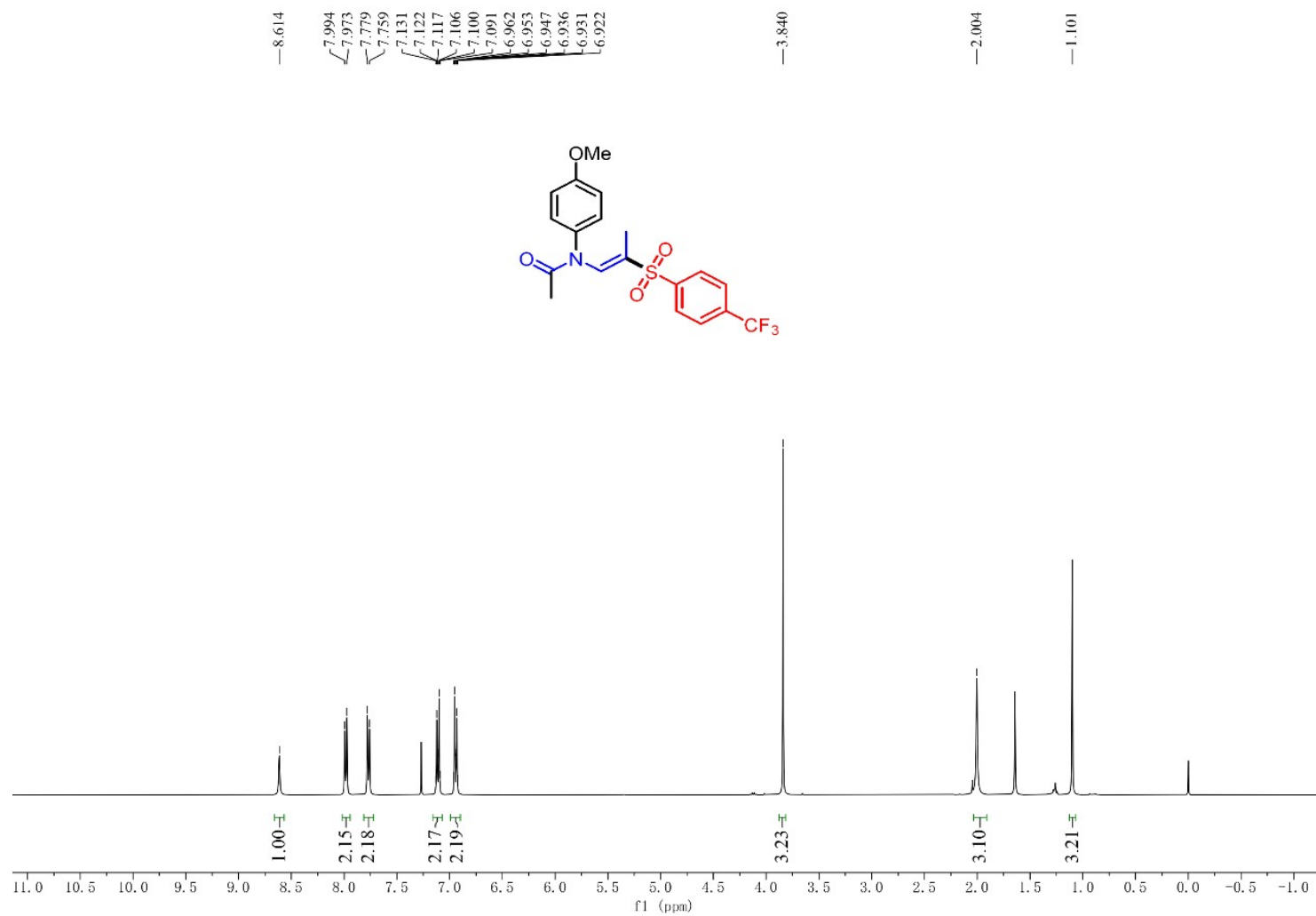
¹³C spectrum of **4y**



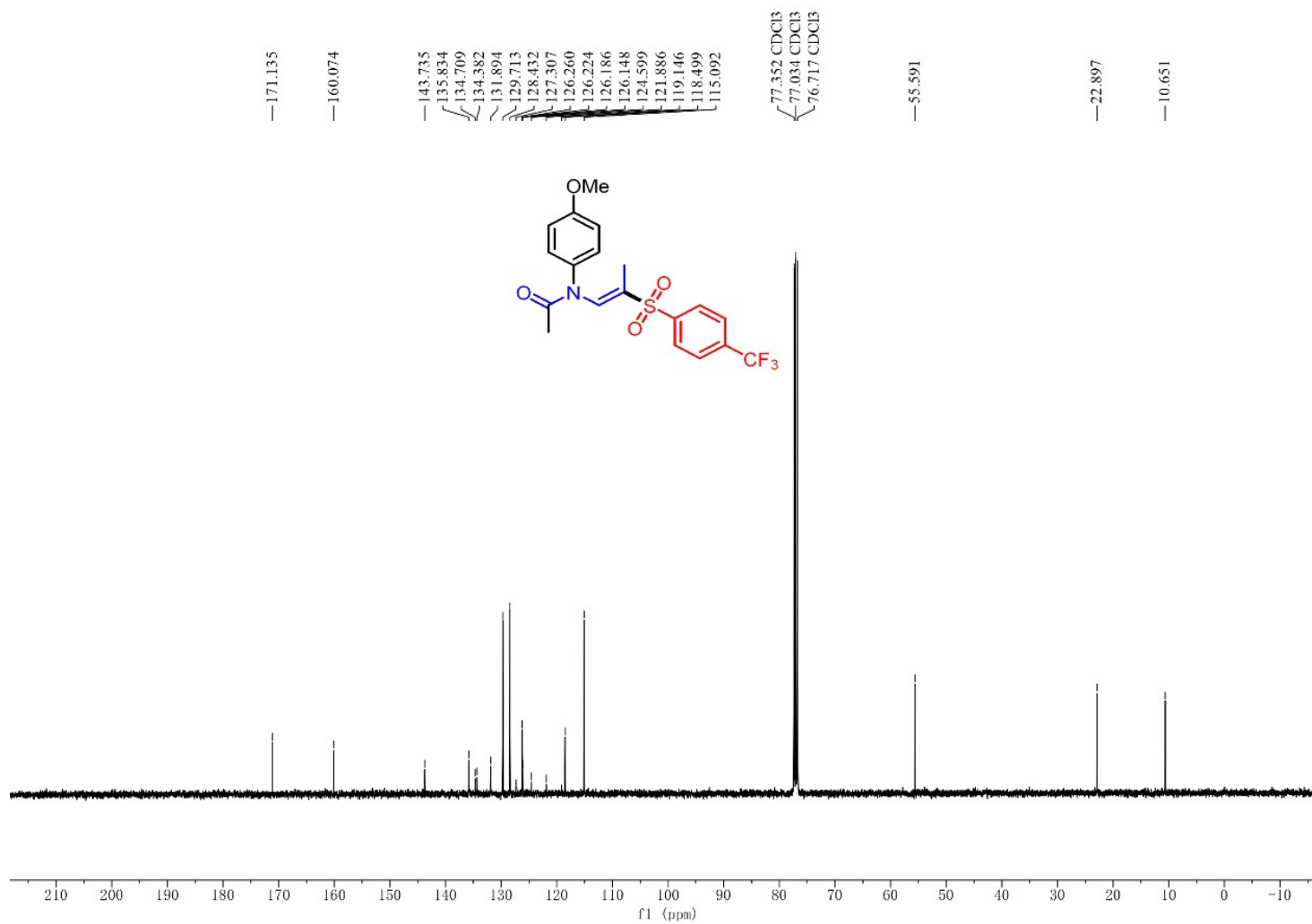
^1H spectrum of **4z**



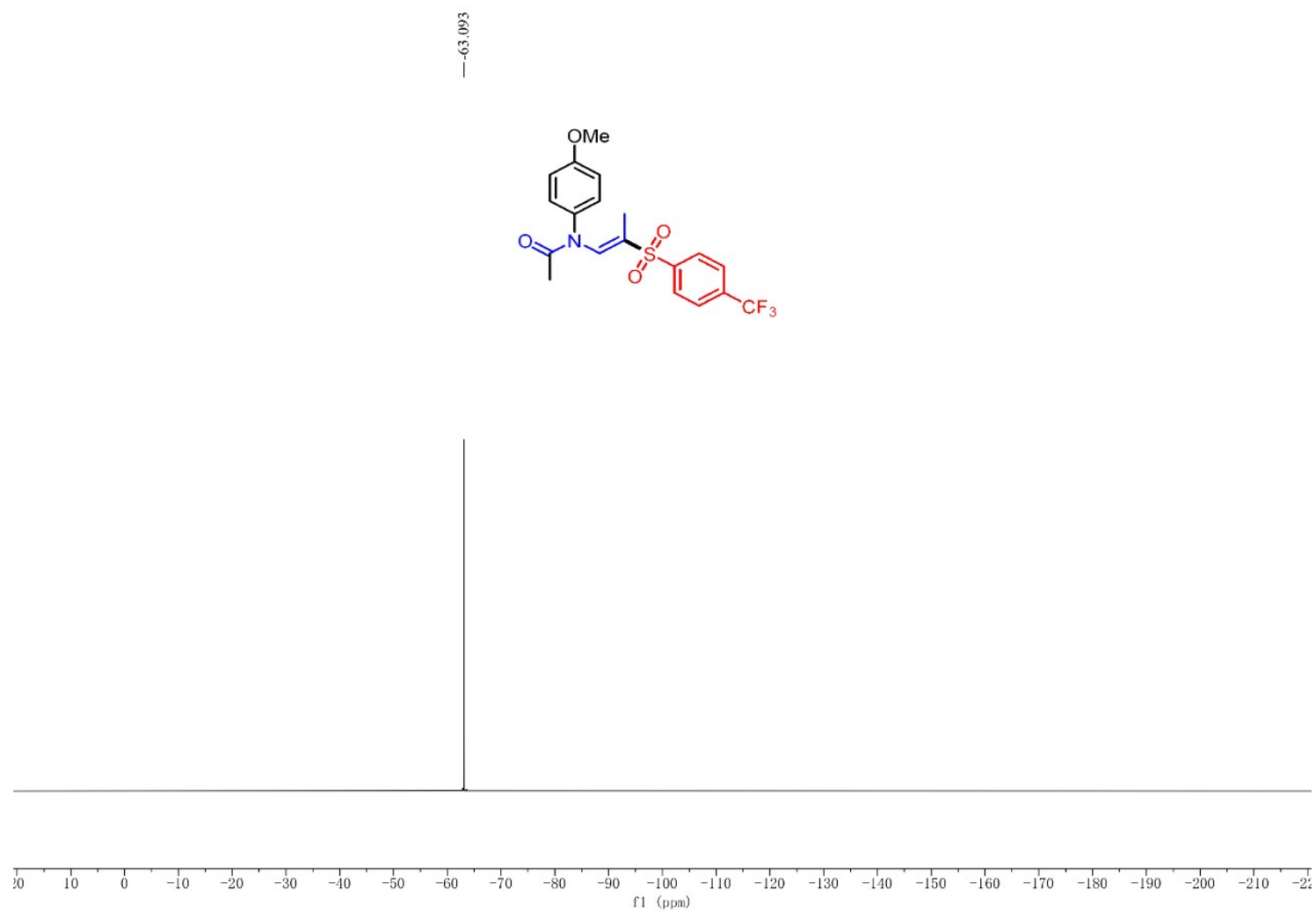
¹³C spectrum of **4z**



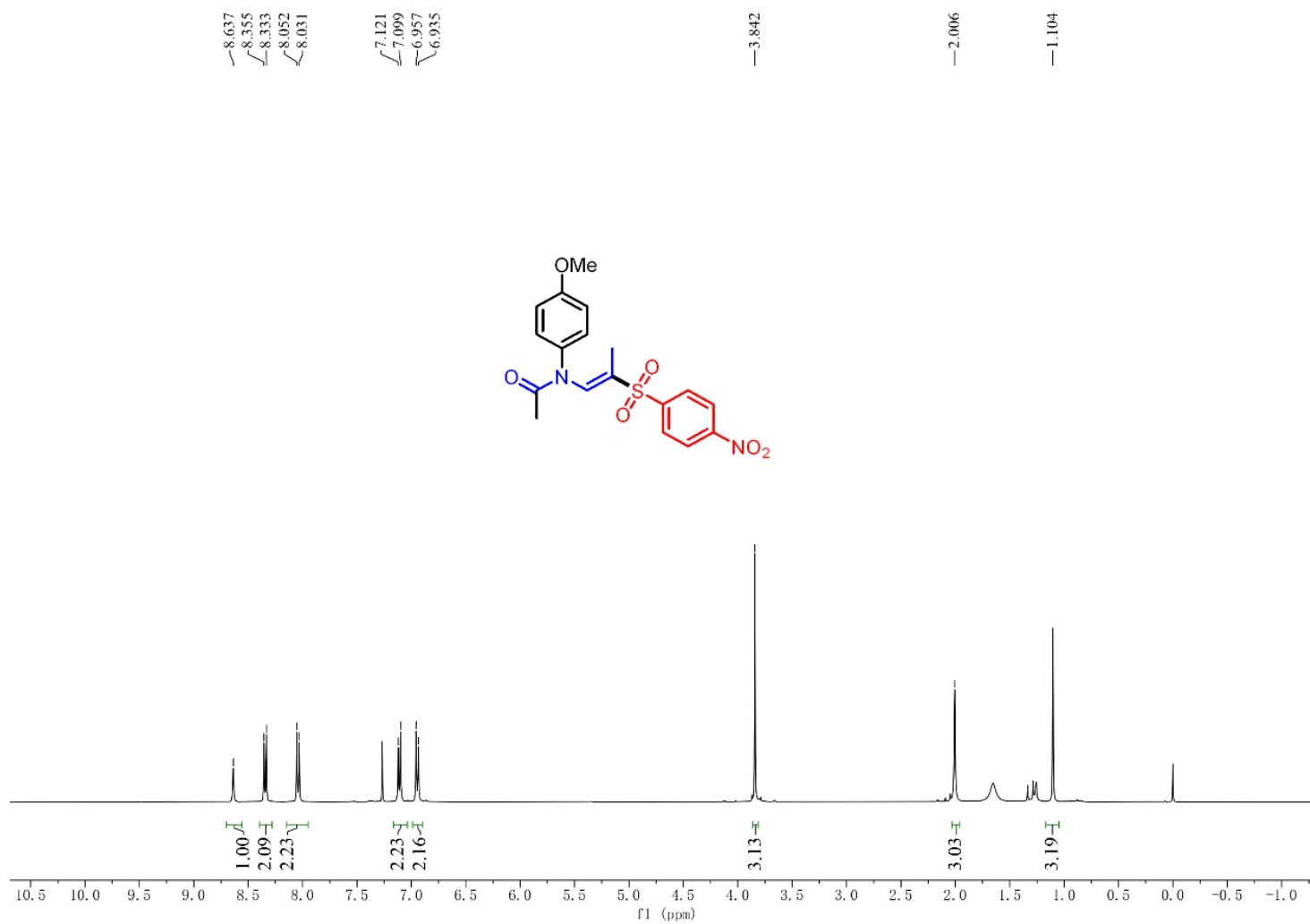
¹H spectrum of **4aa**

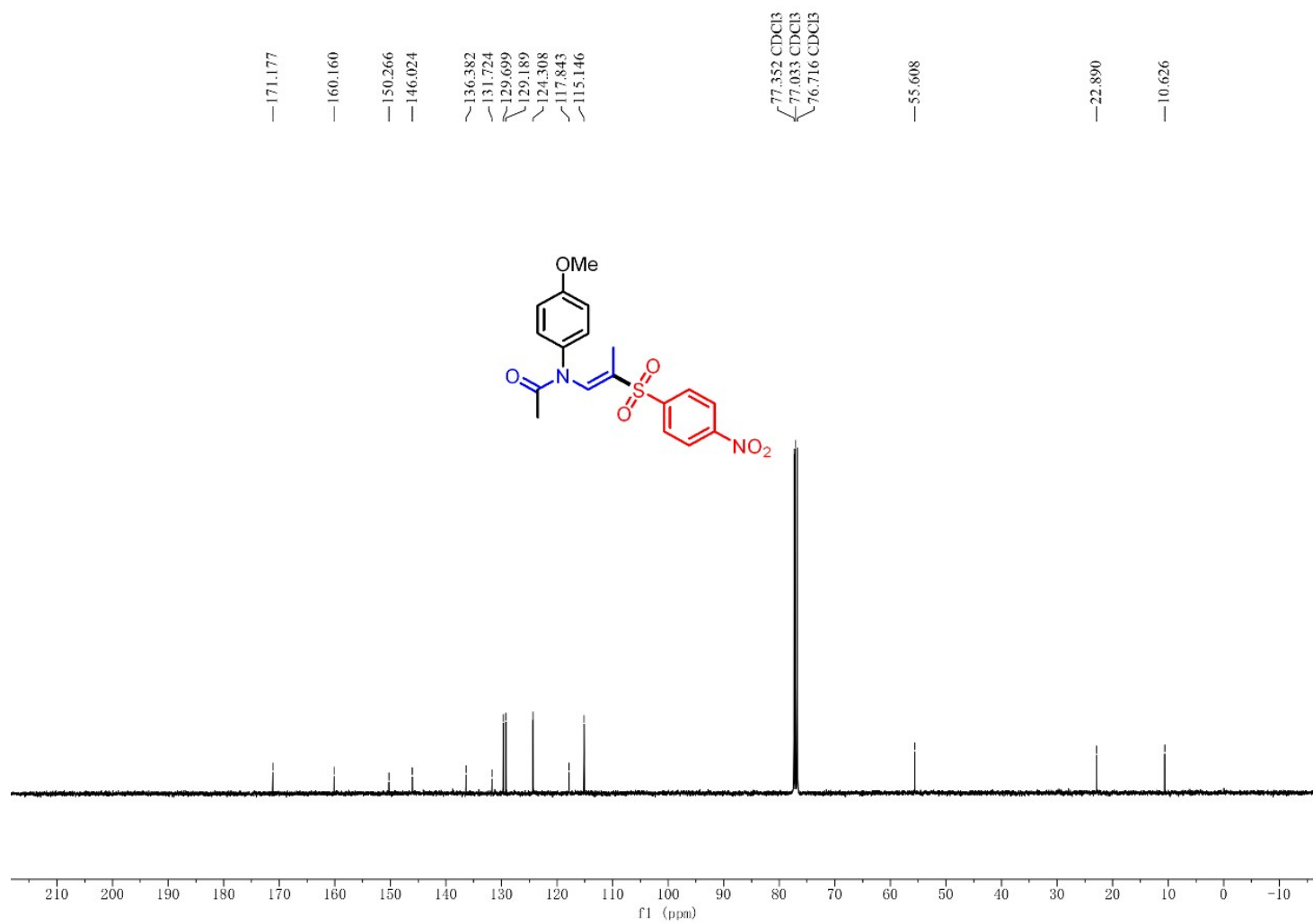


¹³C spectrum of 4aa

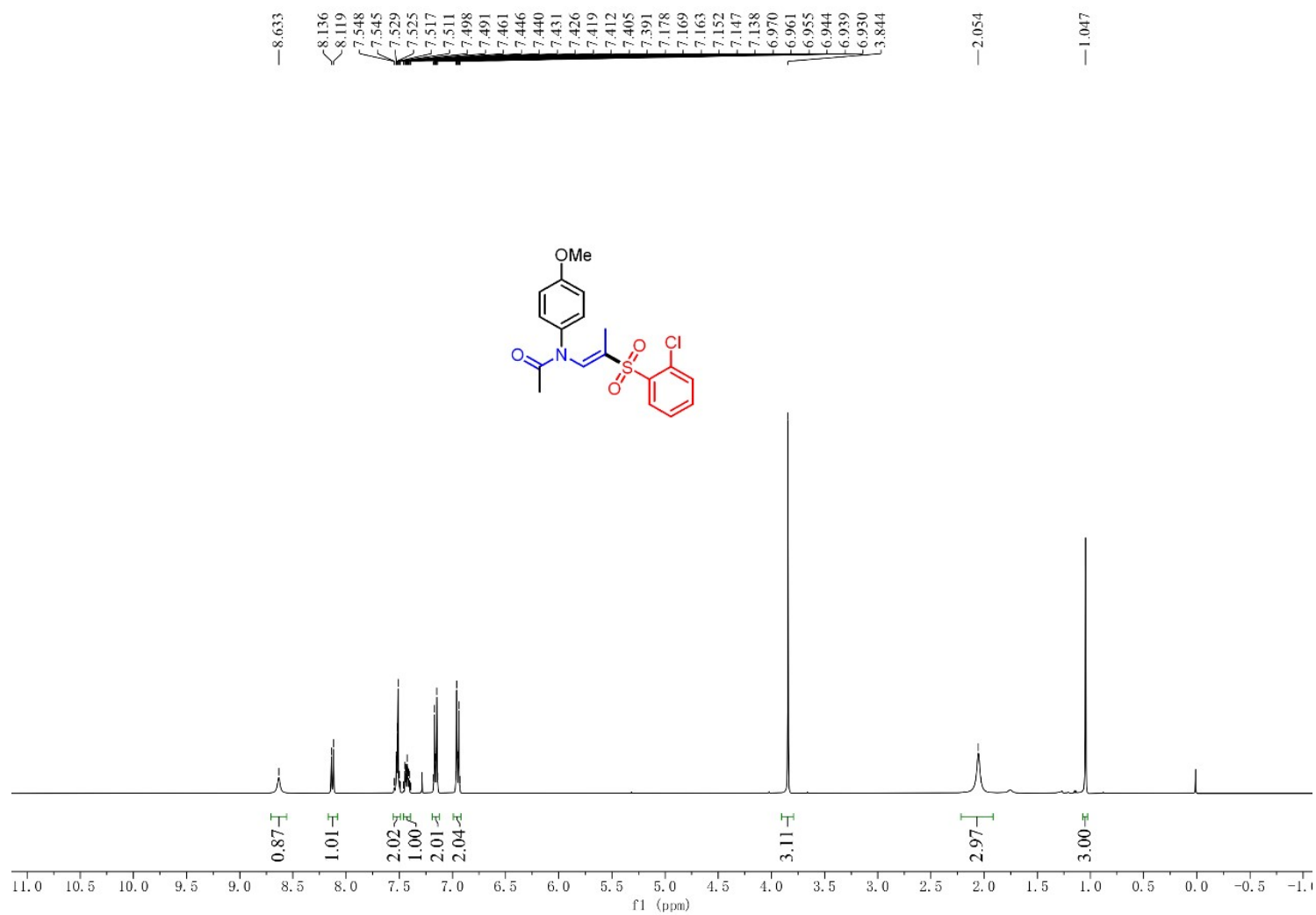


^{19}F spectrum of **4aa**

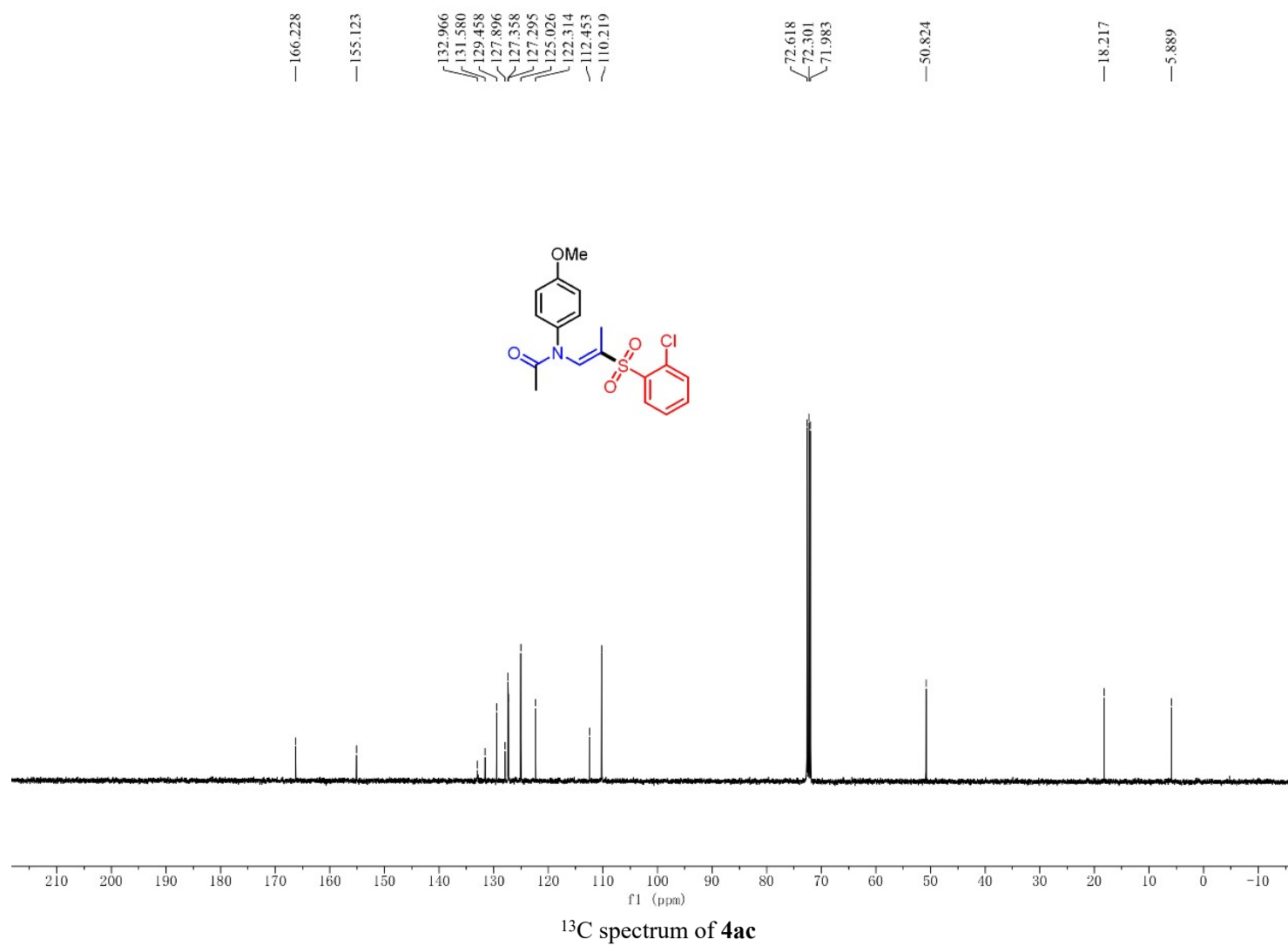


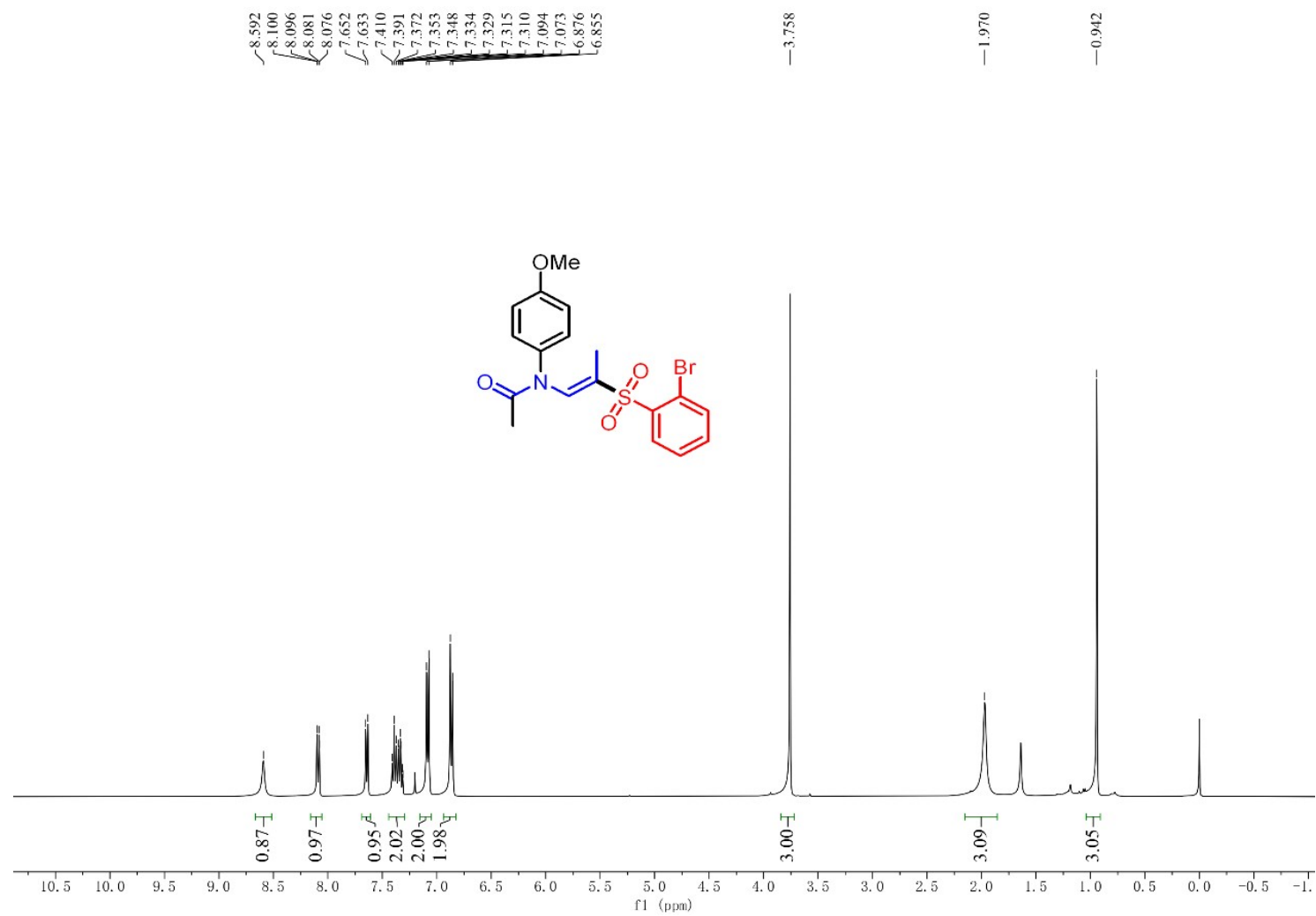


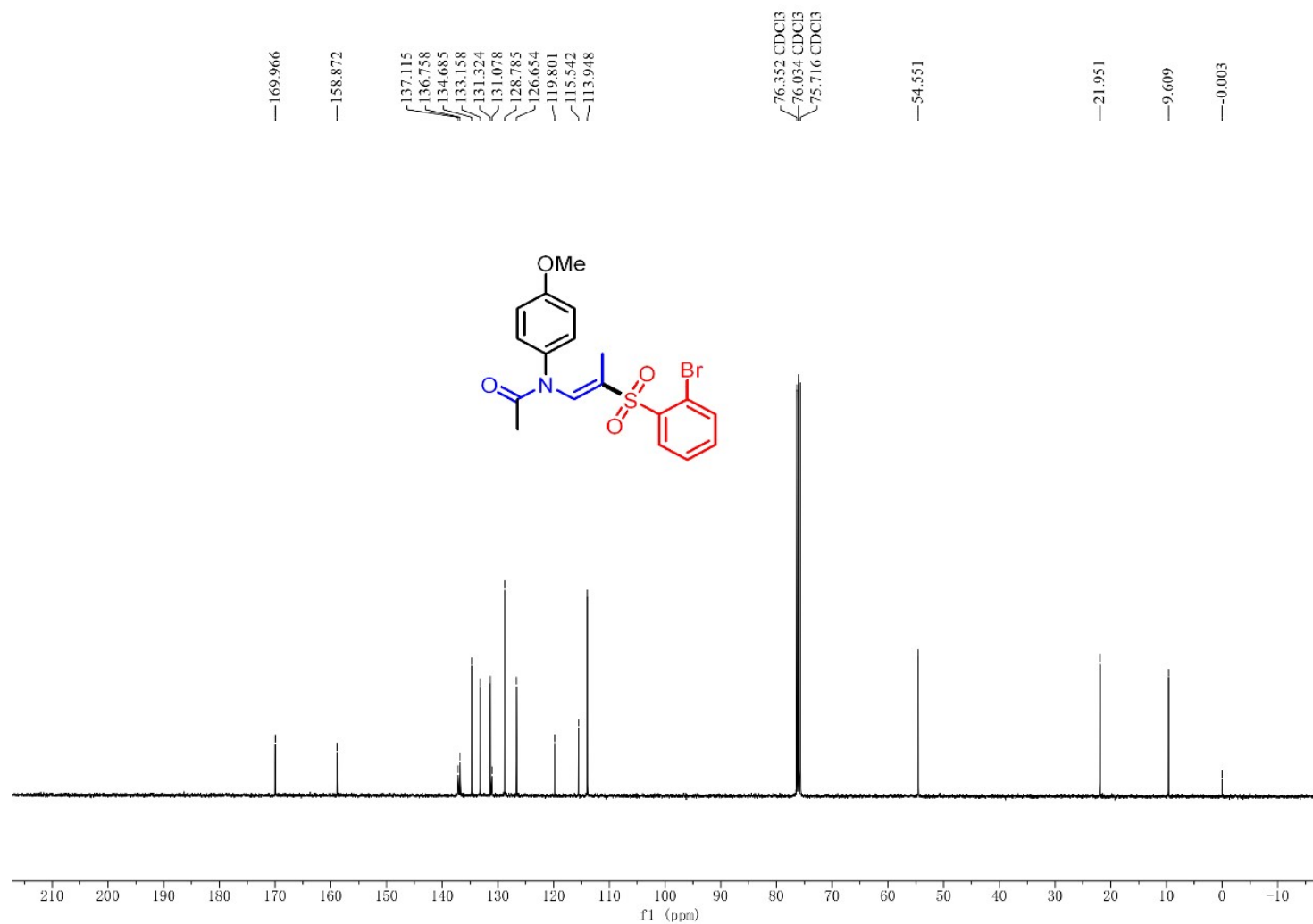
¹³C spectrum of **4ab**



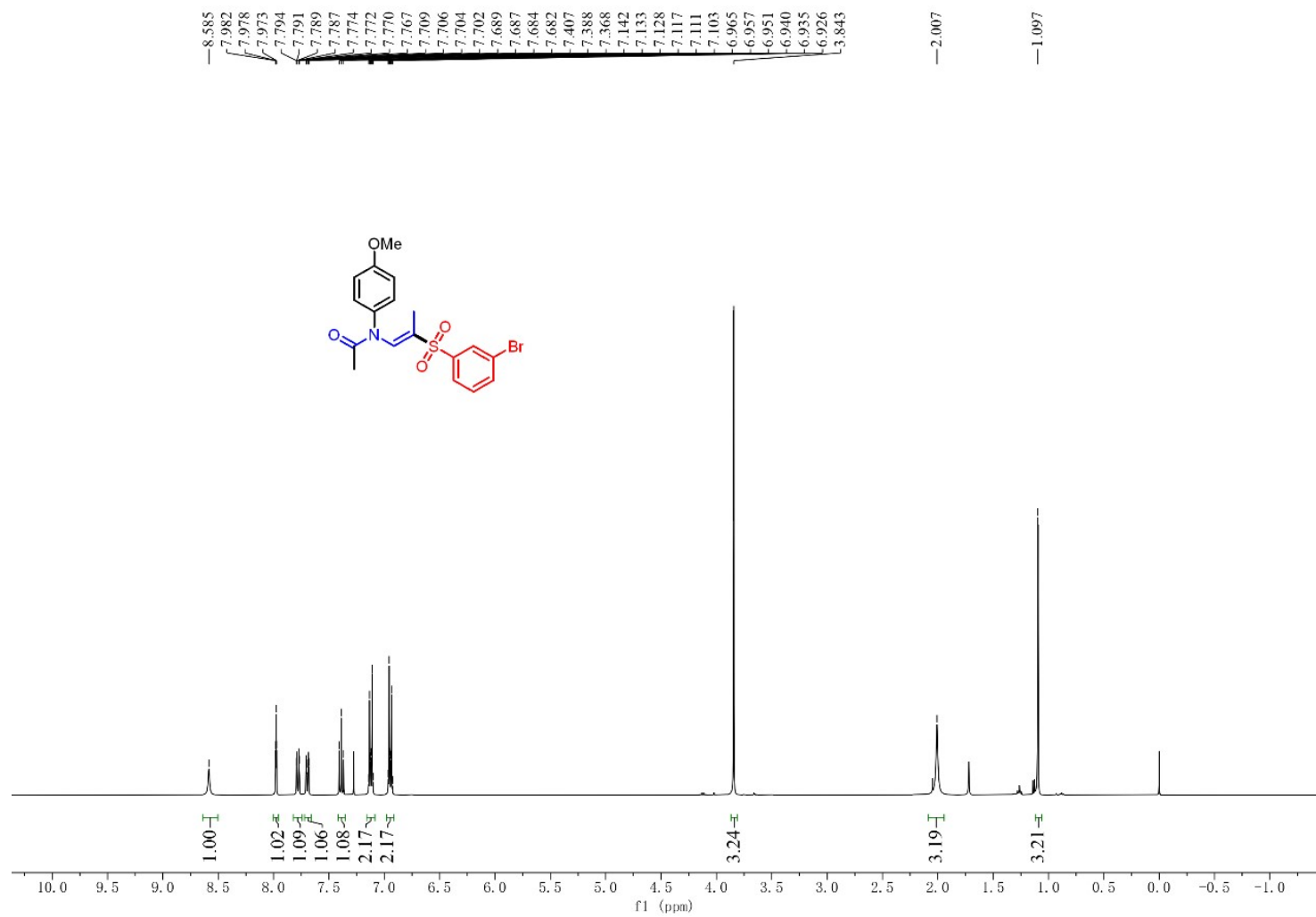
¹H spectrum of **4ac**



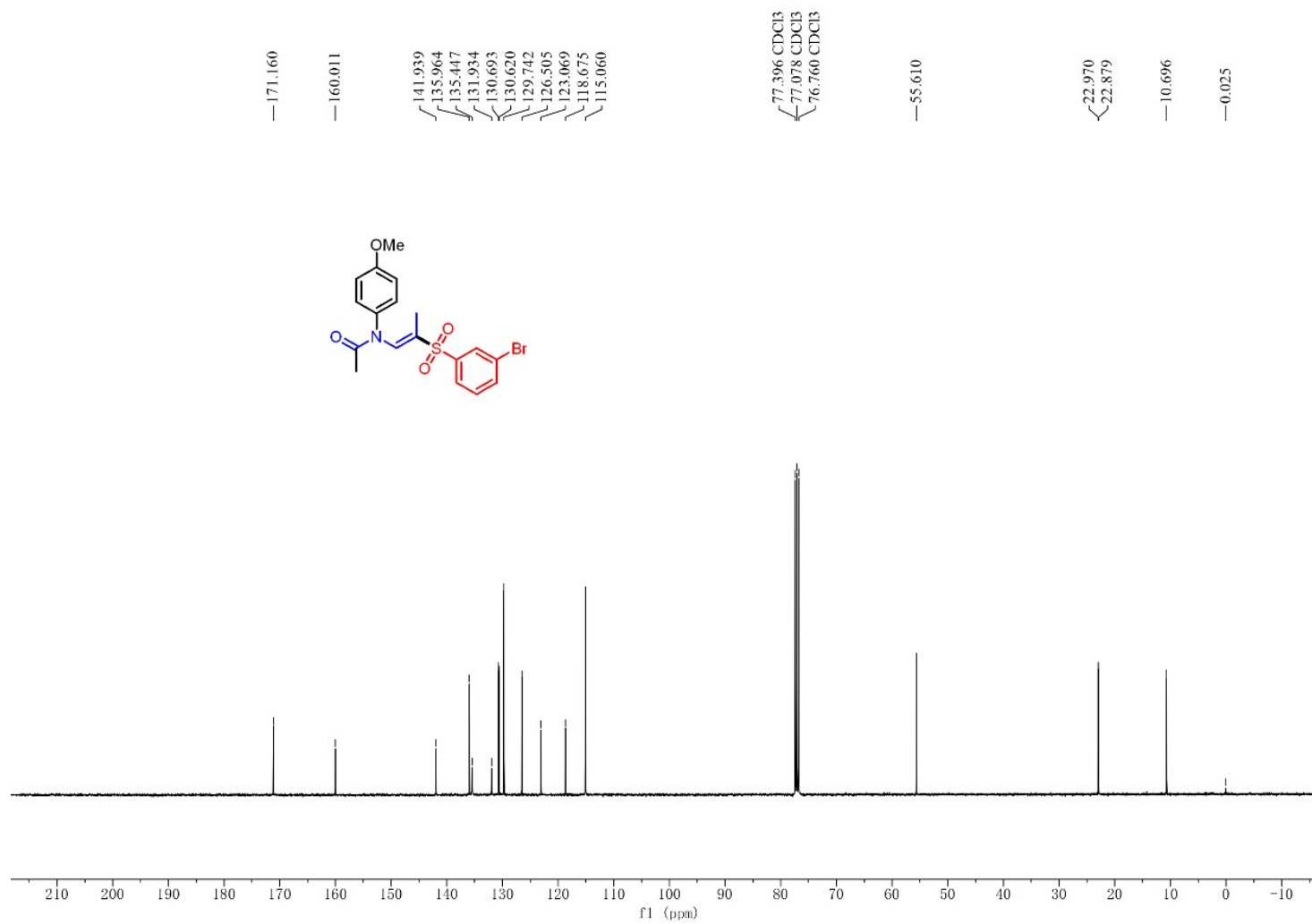




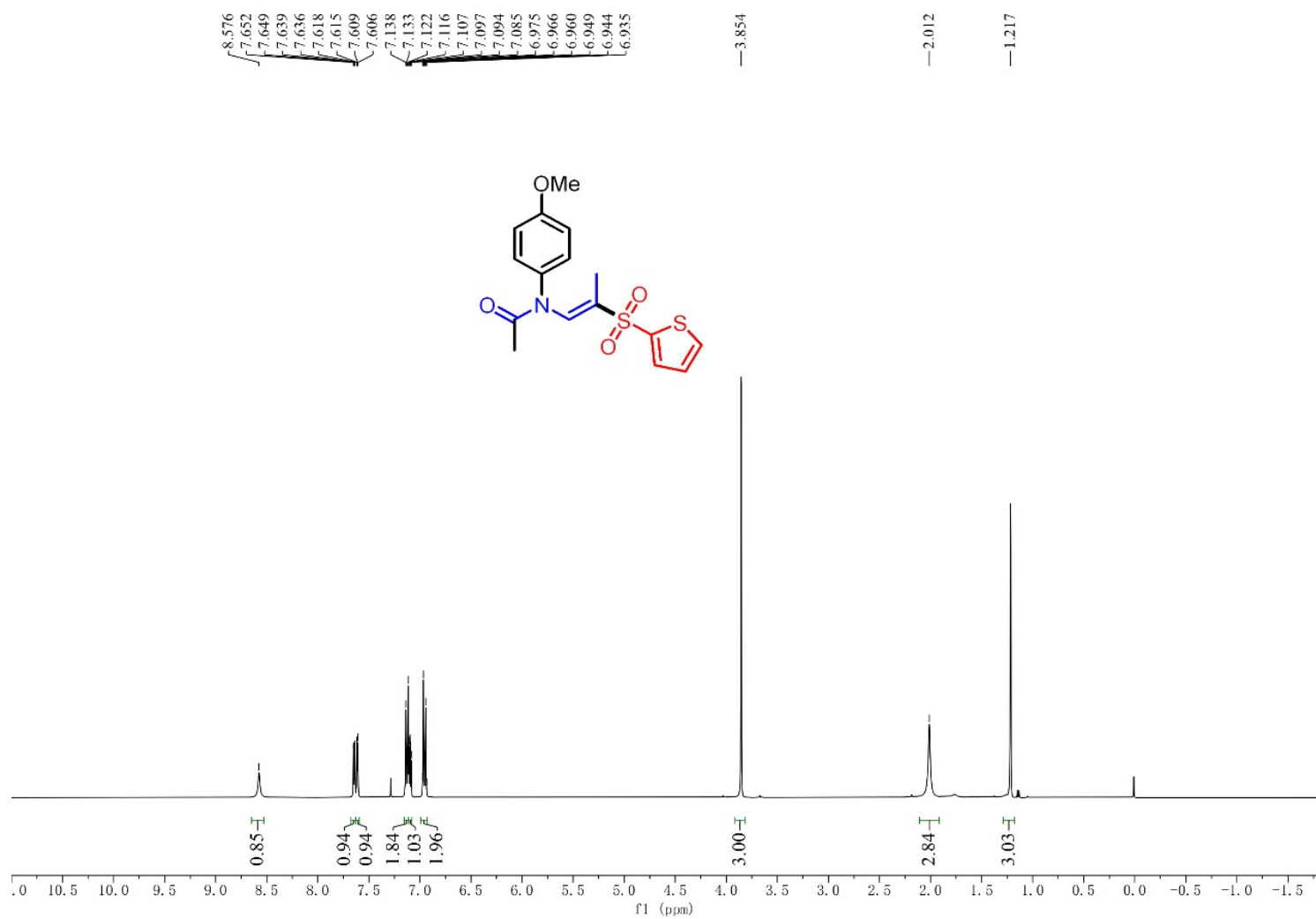
¹³C spectrum of 4ad



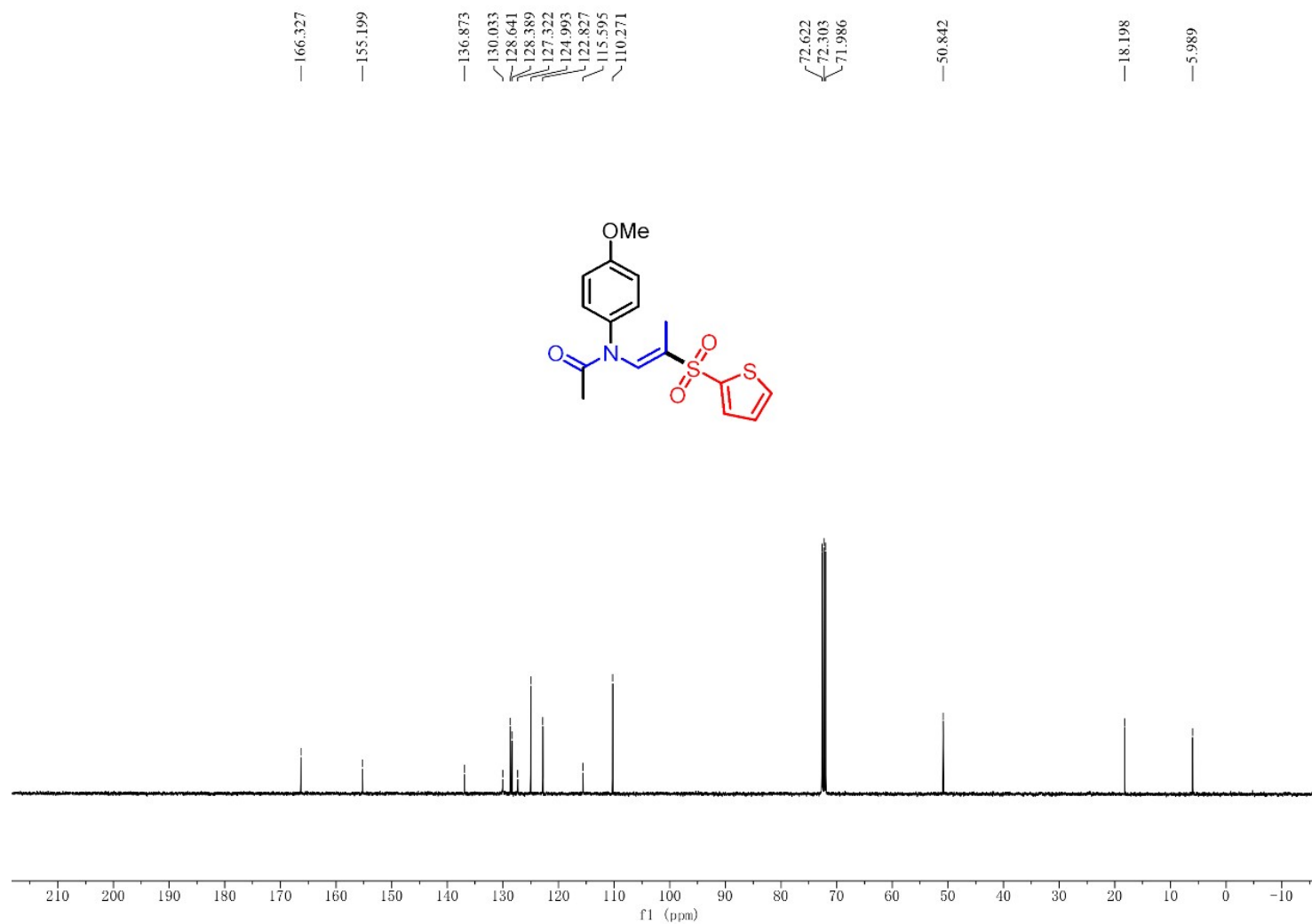
¹H spectrum of **4ae**



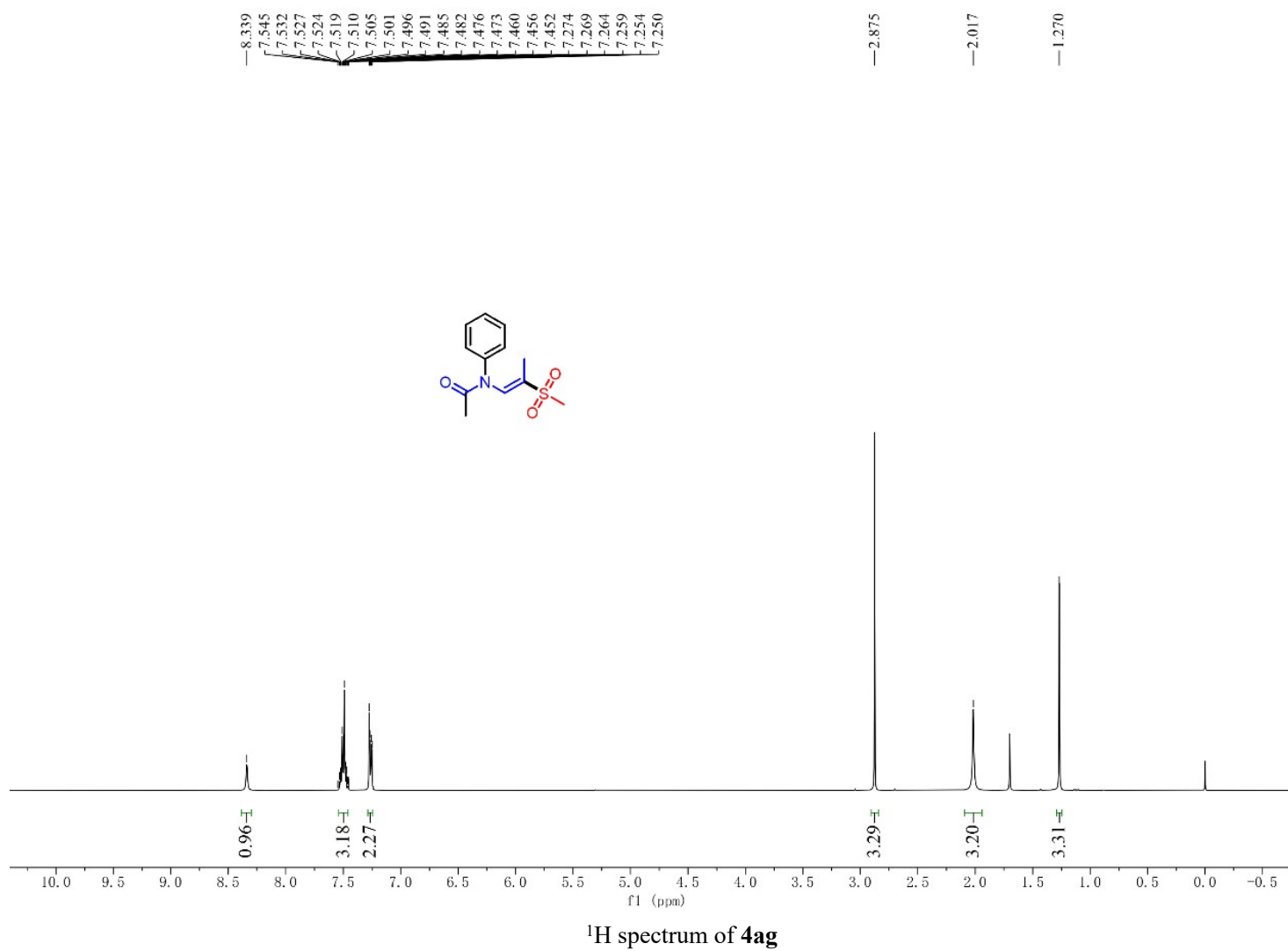
¹³C spectrum of **4ae**

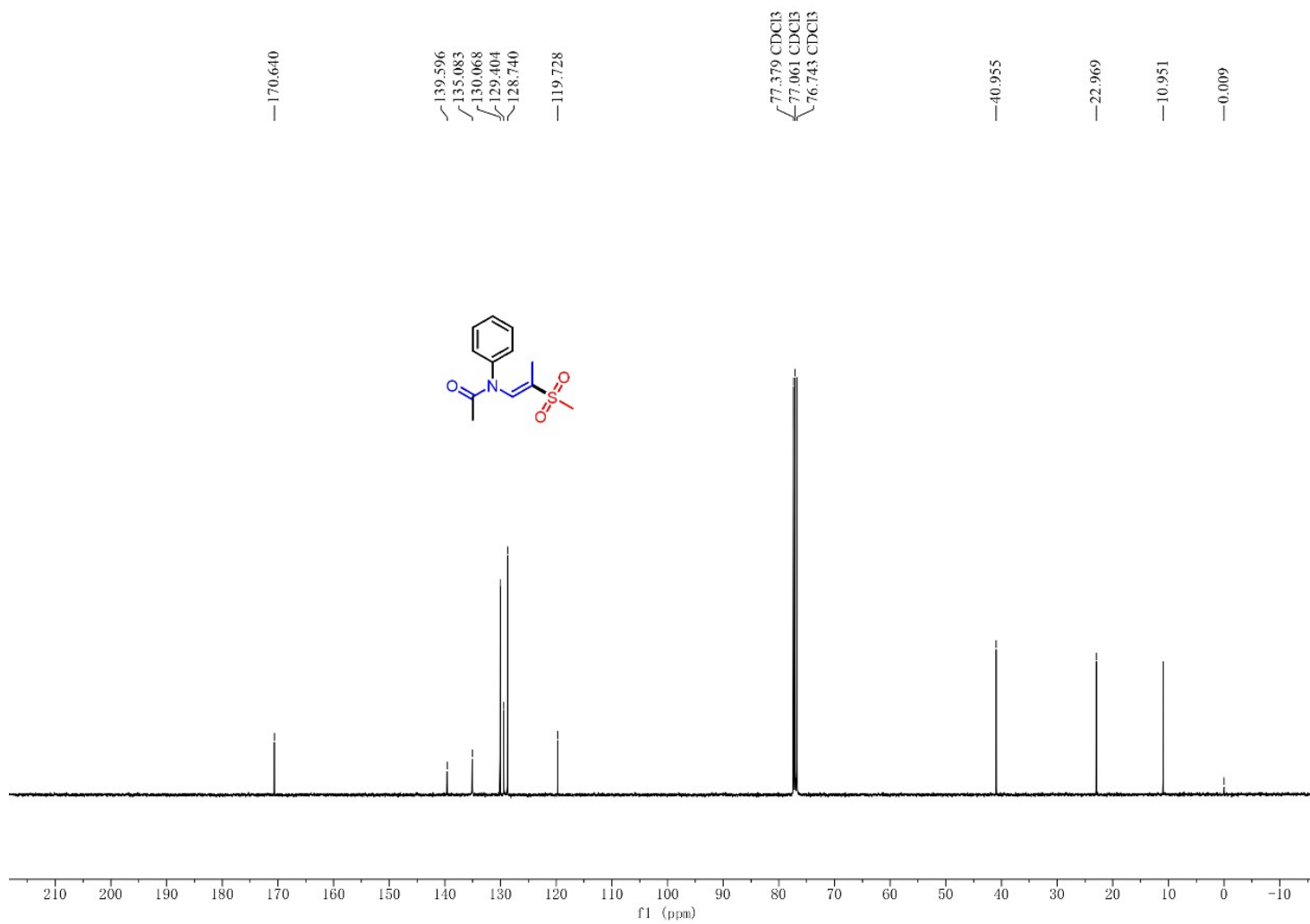


¹H spectrum of **4af**

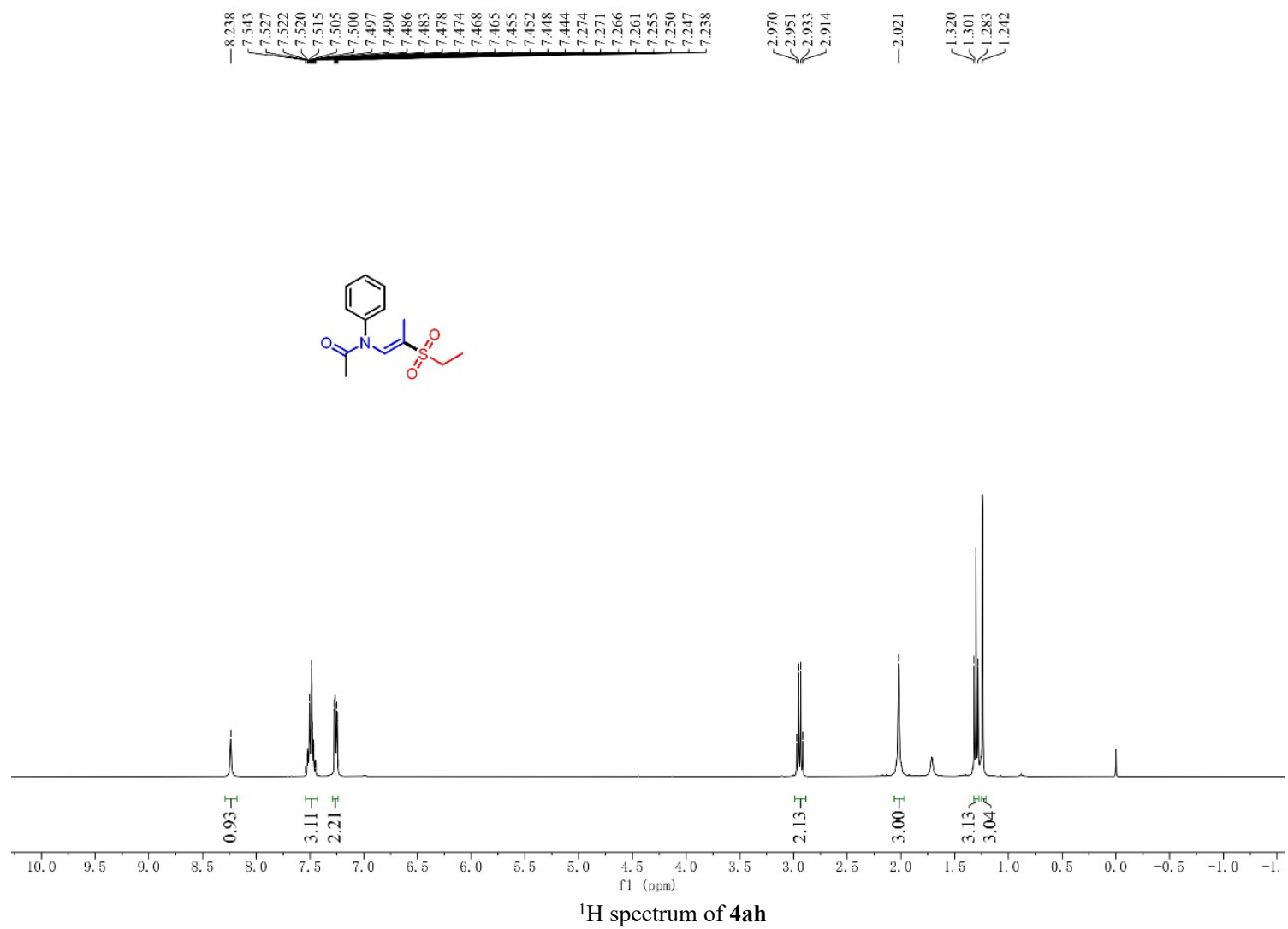


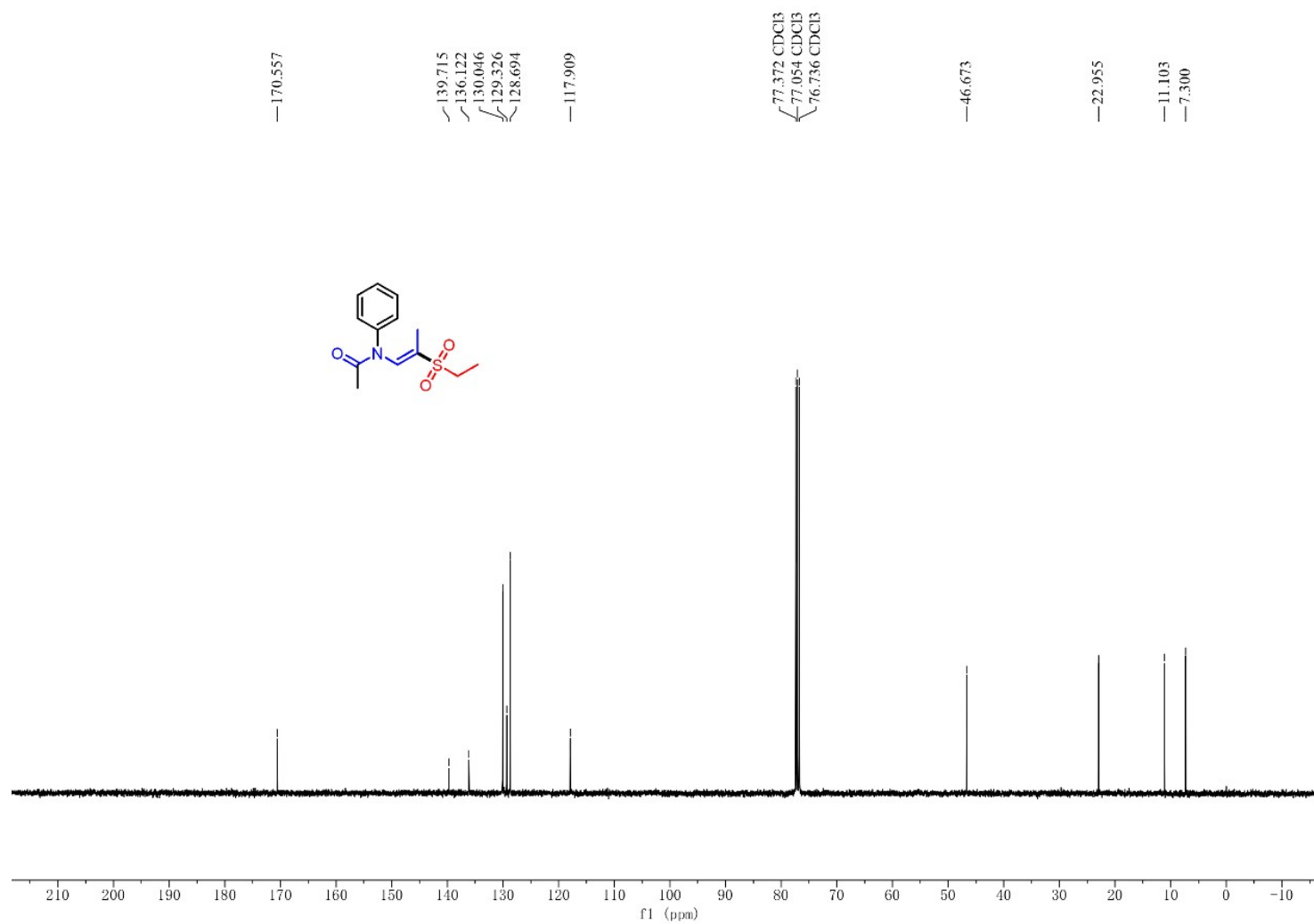
^{13}C spectrum of **4af**





^{13}C spectrum of **4ag**





¹³C spectrum of **4ah**