ELECTRONIC SUPPORTING INFORMATION

Reaction condition controlled nickel-catalyzed C-C cross coupling of alcohols

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General Information

All catalytic experiments were carried out under anatmosphere of purified nitrogen. Complex $[Zn(dmpymt)_2]_n$ was prepared according to a literaturemethod.[S1]All reagents obtained from commercial sources were used directly without further purification. All solvents were obtained from commercial sources and were purified according to standard procedures. Column chromatography was performed on silica gel. ^1H NMR spectra were recorded at 400 MHz or 600MHz and ^{13}C NMR spectra were measured at 150 MHz or 100 MHz using a Varian UNITY plus-400 spectrometer with $CDCl_3$ as solvent. Elemental analyses for C, H, and N were performed on a Carlo-Erbo CHNO-S microanalyzer. High resolution mass spectra (HRMS) were obtained with a GCT Premier (Micromass UK limited) chemical ionization time-of-flight mass spectrometer (CI-TOF). IR spectra (KBr disc) were recorded on a Nicolet MagNa-IR550 FT-IR spectrometer (4000-400 cm^{-1}). Product yields were measured on an Agilent 1260 HPLC.

Synthesis of $[Ni(dmpymt)_2]_6$ (1a)

To a solution of $[Zn(dmpymt)_2]_n$ (0.68 g, 2 mmol) in CH_2Cl_2/MeOH (20 mL, 2/1) was added a MeOH solution (10 mL) of $Ni(NO_3)_2{\cdot}6H_2O$ (0.58 g, 2 mmol). The mixture was stirred overnight and the resulting dark green solution was reduced to dryness under vacuum. The residue was washed with water, MeOH, diethyl ether, and dried in air. The crude product was dissolved in CH_2Cl_2 and MeOH and filtered. Diethyl ether wasslowly diffused into the filtrate to form dark green crystals of **1a**, which were collected by filtration, washed with Et_2O, and dried *in vacuo*.Yield: 687.0 mg (75%, based on Ni). Anal. Calcd for $C_{72}H_{84}Ni_6N_{24}S_{12}$: C 42.76, H 4.19, N 16.62. Found: C 42.72, H 4.22, N 16.54 %. IR (KBr pellet, ν/cm^{-1}): 1582 (s), 1530 (m), 1435 (m), 1385 (w), 1343 (w), 1263 (s), 1030 (w), 955 (w), 886 (w).

Procedure for Synthesis of *α*-Alkylated Ketones

1a (5 mol % Ni), KOH (0.5 mmol), primary alcohol (1.5 mmol) and secondary alcohol (1.0 mmol) were mixed with toluene (3.0 mL) in a 50 mL Schlenk tube under N_2. The tube was placed in a 100 °C oil bath and srirred for 24 h under a slow, steady stream of N_2. The mixture was cooled to room temperature and water (10 mL) added. The aqueous solution was extracted with CH_2Cl_2 (3 × 10 mL) and the combined extracts dried over anhydrous Na_2SO_4. The solvent was removed and the crude product purified on a short flash chromatography column.

Procedure for Synthesis of α,β-Unsaturated Ketones

1a (5 mol % Ni), KOH (1.0 mmol), primary alcohol (1.5 mmol) and secondary alcohol (1.0 mmol) were mixed with toluene (2.5 mL)/*t*-BuOH (0.5 mL) in a 50 mL Schlenk tube under N_2. The tube was placed in a 70 °C oil bath and srirred for 36 h under aslow, steady stream of N_2.The mixture

was cooled to room temperature and water (10 mL) was added. The aqueous solution was extractedwithCH_2Cl_2 (3 × 10 mL) and the combined extracts dried over anhydrous Na_2SO_4.The solvent was removed and the crude product purified on a short flash chromatography column.

Procedure for Synthesis of *β*-AlkylatedSecondary Alcohols

1a (2 mol % Ni), KOH (0.75 mmol), primary alcohol (0.75 mmol) and secondary alcohol (0.5 mmol) were mixed with toluene (1.0 mL) in a 15 mL Teflon Schlenk tube, which was sealed under N_2,. The tube was heated at 120 ºC with stirring for 24 h. After cooling to room temperature, water (10 mL) was added and the aqueous solution extracted with CH_2Cl_2 (3 × 10 mL). The combined extracts were dried over anhydrous Na_2SO_4, solvent removed and the crude product was purified on a short flash chromatography column.

Procedure forSynthesis of Quinoline Derivatives

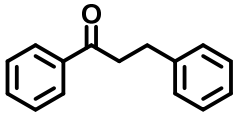
1a (5 mol % Ni), KOH (0.5 mmol), 2-aminobenzyl alcohol (1.0 mmol) and secondary alcohol (1.2 mmol) were mixed withtoluene (3 mL) in a 50 mL Schlenk tube under N_2. The tube was placed in a 110 °C oil bath and srirred for 24 h under a slow, steady stream of N_2. After cooling to room temperature, water (10 mL) was added and the aqueous solution was extracted with CH_2Cl_2 (3 × 10 mL). The combined extracts were dried over anhydrous Na_2SO_4, solvent removed and the crude product purified on a short flash chromatography column.

Single Crystal X-ray Crystallography

Single crystals of **1a** were obtained directly from the above preparation. X-ray diffraction data collection was performed on an Xcalibur, Atlas, Gemini X-ray diffractometer using graphite monochromated Mo K_α (λ = 0.71073 Å). The single crystal was mounted on a glass fiber with grease and cooled in a liquid nitrogen stream at 216 K. The crystal structure of $[Ni(dmpymt)_2]_6$ was solved by direct methods using the SHELXL-2014/7 and refined by full matrix least-squares on F^2.[S2] All of the non-H atoms were refined on F^2 anisotropically by the full-matrix least squares method. All H atoms were introduced at the calculated positions and included in the structure-factor calculations. Crystal structural data for **1a**·9MeOH (CCDC 1884968) is contained in the CIF.

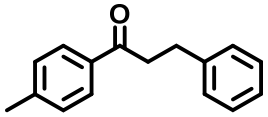
The ^{1}H and ^{13}C NMR data of products

***3-diphenylpropan-1-one*(4aa)**[S3]



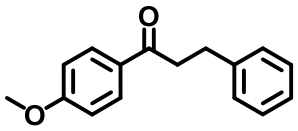
White solid (193.3 mg, 92% yield).^{1}H NMR (400 MHz, $CDCl_3$, ppm) δ 7.94 (d, *J* = 7.8 Hz, 2H), 7.52 (t, *J* = 7.3 Hz, 1H), 7.42 (t, *J* = 7.5 Hz, 2H), 7.27 (dt, *J* = 14.7, 7.4 Hz, 4H), 7.21–7.16 (m, 1H), 3.27 (t, *J* = 7.7 Hz, 2H), 3.05 (t, *J* = 7.7 Hz, 2H).^{13}C NMR (101 MHz, $CDCl_3$, ppm) δ 199.2, 141.4, 136.9, 133.1, 128.7, 128.6, 128.5, 128.1, 40.5, 30.2.HRMS *m/z* calcd for $C_{15}H_{14}O$ $[M+H]^+$ 211.1123, found 211.1123.

***3-phenyl-1-(p-tolyl)propan-1-one*(4ab)**[S3]



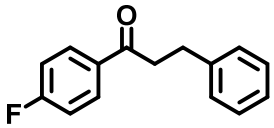
White solid (199.5 mg, 89% yield).^{1}H NMR (400 MHz, $CDCl_3$, ppm)δ 7.85 (d, *J* = 8.2 Hz, 2H), 7.30 (dd, *J* = 10.3, 4.2 Hz, 2H), 7.26–7.22 (m, 4H), 7.22–7.16 (m, 1H), 3.30–3.23 (m, 2H), 3.09 – 3.02 (m, 2H), 2.40 (s, 3H). ^{13}C NMR (101 MHz, $CDCl_3$, ppm)δ 199.0, 143.9, 141.5, 134.5, 129.4, 128.6, 128.3, 126.2, 40.5, 30.3, 21.7.HRMS *m/z* calcd for $C_{16}H_{16}O$ $[M+H]^+$225.1279, found 225.1279.

***1-(4-methoxyphenyl)-3-phenylpropan-1-one* (4ac)**[S3]



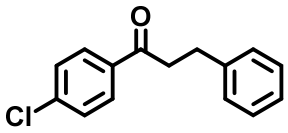
White solid (223.2 mg, 93% yield).^{1}H NMR (400 MHz, $CDCl_3$, ppm)δ 7.94 (d, *J* = 8.7 Hz, 2H), 7.36–7.16 (m, 5H), 6.92 (d, *J* = 8.7 Hz, 2H), 3.86 (s, 3H), 3.30–3.20 (m, 2H), 3.05 (t, *J* = 7.7 Hz, 2H).^{13}C NMR (101 MHz, $CDCl_3$, ppm)δ 197.8, 163.5, 141.5, 130.4, 130.0, 128.5, 126.1, 113.8, 55.5, 40.1, 30.4.HRMS *m/z* calcd for $C_{16}H_{16}O_2$ $[M+H]^+$ 241.1229, found 241.1225.

***1-(4-fluorophenyl)-3-phenylpropan-1-one*(4ad)**[S4]



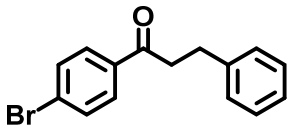
White solid (191.5 mg, 84% yield).^{1}H NMR (400 MHz, $CDCl_3$, ppm) δ 7.93 (dd, *J* = 8.5, 5.6 Hz, 2H), 7.33–7.12 (m, 5H), 7.06 (t, *J* = 8.6 Hz, 2H), 3.22 (t, *J* = 7.6 Hz, 2H), 3.03 (t, *J* = 7.6 Hz, 2H).^{13}C NMR (101 MHz, $CDCl_3$, ppm)δ 197.5, 166.9, 164.4, 141.2, 133.3, 130.6, 128.5, 126.2, 115.7, 115.5, 40.3, 30.0.HRMS *m/z* calcd for $C_{15}H_{13}FO$ $[M+H]^+$229.1029, found 229.1029.

***1-(4-chlorophenyl)-3-phenylpropan-1-one*(4ae)[S3]**



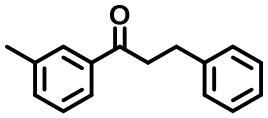
White solid (212.3 mg, 87% yield). ^{1}H NMR (600 MHz, $CDCl_3$, ppm)δ 7.88 (d, *J* = 8.2 Hz, 2H), 7.41 (d, *J* = 8.1 Hz, 2H), 7.29 (t, *J* = 7.5 Hz, 2H), 7.22 (dt, *J* = 14.5, 5.5 Hz, 3H), 3.26 (t, *J* = 7.7 Hz, 2H), 3.05 (t, *J* = 7.6 Hz, 2H).^{13}C NMR (151 MHz, $CDCl_3$, ppm) δ 198.1, 141.2, 139.6, 135.3, 129.6, 129.0, 128.7, 128.5, 126.4, 40.6, 30.2.HRMS *m/z* calcd for $C_{15}H_{13}ClO$ $[M+H]^+$ 245.0733, found 245.0729.

***1-(4-bromophenyl)-3-phenylpropan-1-one*(4af)[S3]**



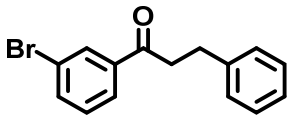
White solid (235.3 mg, 82% yield). ^{1}H NMR (600 MHz, $CDCl_3$, ppm)δ 7.80 (d, *J* = 8.2 Hz, 2H), 7.57 (d, *J* = 8.3 Hz, 2H), 7.29 (t, *J* = 7.4 Hz, 2H), 7.25–7.16 (m, 3H), 3.25 (t, *J* = 7.6 Hz, 2H), 3.05 (t, *J* = 7.6 Hz, 2H).^{13}C NMR (151 MHz, $CDCl_3$, ppm) δ 198.2, 141.1, 135.7, 132.0, 129.7, 128.7, 128.5, 128.3, 126.3, 40.5, 30.1. HRMS *m/z* calcd for $C_{15}H_{13}BrO$ $[M+H]^+$ 288.0150, found 288.0148.

***3-phenyl-1-(m-tolyl)propan-1-one*(4ag)[S4]**



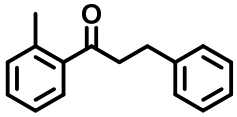
White solid (194.9 mg, 87% yield). ^{1}H NMR (400 MHz, $CDCl_3$, ppm) δ 7.76 (s, 2H), 7.41–7.14 (m, 7H), 3.27 (d, *J* = 6.5 Hz, 2H), 3.06 (d, *J* = 4.4 Hz, 2H), 2.39 (s, 3H). ^{13}C NMR (151 MHz, $CDCl_3$, ppm) δ 199.5, 141.5, 138.5, 137.0, 133.9, 128.6, 126.2, 125.3, 40.6, 30.3, 21.5.HRMS *m/z* calcd for $C_{16}H_{16}O$ $[M+H]^+$ 225.1279, found 225.1273.

***1-(3-bromophenyl)-3-phenylpropan-1-one* (4ah)[S5]**



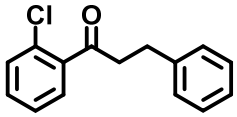
White solid (230.4 mg, 80% yield).^{1}H NMR (400 MHz, $CDCl_3$, ppm) δ 8.08 (s, 1H), 7.87 (d, *J* = 7.7 Hz, 1H), 7.68 (d, *J* = 7.7 Hz, 1H), 7.32 (dd, *J* = 18.1, 7.8 Hz, 3H), 7.26–7.15 (m, 3H), 3.27 (t, *J* = 7.6 Hz, 2H), 3.06 (t, *J* = 7.5 Hz, 2H).^{13}C NMR (151 MHz, $CDCl_3$, ppm)δ 197.9, 141.1, 138.7, 136.0, 131.3, 130.3, 128.7, 128.5, 127.2, 126.5, 123.1, 40.7, 30.1. HRMS *m/z* calcd for $C_{15}H_{13}BrO$ $[M+H]^+$ 289.0228, found 289.0224.

***3-phenyl-1-(o-tolyl)propan-1-one* (4ai)[S4]**



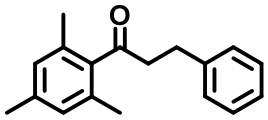
White solid (181.4 mg, 81% yield).^{1}H NMR (400 MHz, $CDCl_3$, ppm)δ 7.56 (d, *J* = 7.7 Hz, 1H), 7.32 (t, *J* = 7.4 Hz, 1H), 7.26 (t, *J* = 7.4 Hz, 2H), 7.18 (dd, *J* = 16.2, 7.7 Hz, 5H), 3.19 (t, *J* = 7.6 Hz, 2H), 3.02 (t, *J* = 7.6 Hz, 2H), 2.45 (s, 3H).^{13}C NMR (101 MHz, $CDCl_3$, ppm)δ 203.3, 141.2, 138.1, 137.9, 132.0, 131.3, 128.6, 128.5, 128.4, 126.2, 125.7, 43.2, 30.4, 21.3. HRMS *m/z* calcd for $C_{16}H_{16}O$ $[M+H]^+$ 225.1279, found 225.1275.

***1-(2-chlorophenyl)-3-phenylpropan-1-one*(4aj)**[S6]



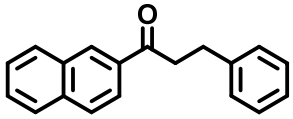
White solid (187.8 mg, 77% yield).^{1}H NMR (400 MHz, $CDCl_3$, ppm)δ 7.95 (d, *J* = 7.4 Hz, 2H), 7.54 (t, *J* = 7.0 Hz, 1H), 7.44 (t, *J* = 7.2 Hz, 2H), 7.29 (d, *J* = 7.5 Hz, 2H), 7.21 (d, *J* = 7.7 Hz, 2H), 3.29 (t, *J* = 7.5 Hz, 2H), 3.07 (t, *J* = 6.5 Hz, 2H).^{13}C NMR (101 MHz, $CDCl_3$, ppm)δ 199.2, 141.3, 136.9, 133.1, 128.8, 128.4, 128.1, 126.2, 40.5, 30.2.HRMS *m/z* calcd for $C_{15}H_{13}ClO$ $[M+H]^+$ 245.0733, found 245.0730.

***1-mesityl-3-phenylpropan-1-one* (4ak)**[S4]



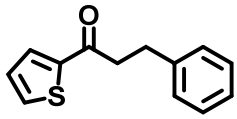
Yellow solid (189.0 mg, 75% yield).^{1}H NMR (400 MHz, $CDCl_3$, ppm)δ 7.35–7.12 (m, 5H), 6.80 (s, 2H), 3.10–2.95 (m, 4H), 2.25 (s, 3H), 2.11 (s, 6H).^{13}C NMR (101 MHz, $CDCl_3$, ppm) δ 209.8, 141.0, 139.6, 138.4, 132.6, 128.6, 126.2, 46.4, 29.6, 21.1, 19.1.HRMS *m/z* calcd for $C_{18}H_{20}O$ $[M+H]^+$ 253.1592, found 253.1588.

***1-(naphthalen-2-yl)-3-phenylpropan-1-one*(4al)**[S3]



White solid (239.2 mg, 92% yield). ^{1}H NMR (400 MHz, $CDCl_3$, ppm)δ 8.47 (s, 1H), 8.06 (d, *J* = 8.5 Hz, 1H), 7.99–7.84 (m, 3H), 7.58 (dt, *J* = 14.7, 7.0 Hz, 2H), 7.37–7.29 (m, 4H), 7.28–7.19 (m, 1H), 3.45 (t, *J* = 7.7 Hz, 2H), 3.15 (t, *J* = 7.7 Hz, 2H).^{13}C NMR (151 MHz, $CDCl_3$, ppm)δ 199.2, 141.5, 135.7, 134.3, 132.6, 129.8, 129.6, 128.6, 127.9, 126.9, 126.3, 40.7, 30.4.HRMS *m/z* calcd for $C_{19}H_{16}O$ $[M+H]^+$ 261.1279, found 261.1275.

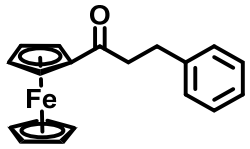
***3-phenyl-1-(thiophen-2-yl)propan-1-one*(4am)**[S3]



Yellow oil (157.7 mg, 73% yield).^{1}H NMR (400 MHz, $CDCl_3$, ppm)δ 7.68 (d, *J* = 3.3 Hz, 1H), 7.61 (d, *J* = 4.7 Hz, 1H), 7.36–7.27 (m, 2H), 7.25 (s, 1H), 7.23 (d, *J* = 5.8 Hz, 1H), 7.21–7.14 (m,

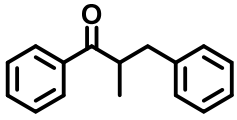
1H), 7.10 (t, *J* = 4.2 Hz, 1H), 3.23 (t, *J* = 7.7 Hz, 2H), 3.07 (t, *J* = 7.6 Hz, 2H). ^{13}C NMR (101 MHz, $CDCl_3$, ppm)δ 192.3, 144.3, 141.1, 133.7, 131.9, 128.6, 128.2, 126.3, 41.3, 30.5.HRMS *m/z* calcd for $C_{13}H_{12}OS$ $[M+H]^+$ 217.0687, found 217.0685.

3-phenyl-1-(ferrocenyl)propan-1-one **(4an)**[S3]



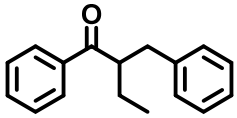
Red solid (285.3 mg, 90% yield).^{1}H NMR (400 MHz, $CDCl_3$, ppm) δ 7.31 (s, 4H), 7.22 (d, *J* = 6.0 Hz, 1H), 4.77 (s, 2H), 4.48 (s, 2H), 4.08 (s, 5H), 3.04 (s, 4H).^{13}C NMR (151 MHz, $CDCl_3$, ppm) δ 203.2, 141.7, 128.7, 126.3, 72.3, 69.8, 69.4, 41.6, 30.3.HRMS *m/z* calcd for $C_{19}H_{18}FeO$ $[M+H]^+$318.0707, found 318.0695.

2-methyl-1,3-diphenylpropan-1-one**(4ao)**[S3]



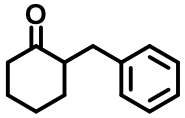
Colorless oil (197.1 mg, 88% yield). ^{1}H NMR (400 MHz, $CDCl_3$, ppm)δ 7.93 (d, *J* = 7.6 Hz, 2H), 7.58 (t, *J* = 7.3 Hz, 1H), 7.47 (t, *J* = 7.6 Hz, 2H), 7.40 (d, *J* = 7.4 Hz, 2H), 7.34 (t, *J* = 7.4 Hz, 2H), 7.25 (t, *J* = 6.9 Hz, 1H), 5.24 (s, 1H), 3.71 (dd, *J* = 9.9, 6.8 Hz, 2H), 1.19 (d, *J* = 7.2 Hz, 3H).^{13}C NMR (101 MHz, $CDCl_3$, ppm)δ 205.8, 142.0, 135.8, 133.7, 128.9, 128.6, 128.4, 127.4, 126.2, 73.2, 47.2, 11.3. HRMS *m/z* calcd for $C_{16}H_{16}O$ $[M+H]^+$ 225.1279, found 225.1273.

2-benzyl-1-phenylbutan-1-one**(4ap)**[S7]



Colorless oil (195.2 mg, 82% yield). ^{1}H NMR (400 MHz, $CDCl_3$, ppm) δ 7.89 (d, *J* = 7.6 Hz, 2H), 7.55 (t, *J* = 7.3 Hz, 1H), 7.49–7.36 (m, 4H), 7.30 (t, *J* = 7.4 Hz, 2H), 7.21 (t, *J* = 7.1 Hz, 1H), 5.07 (d, *J* = 4.7 Hz, 1H), 3.75 (dt, *J* = 8.8, 4.3 Hz, 1H), 3.43–2.81 (m, 1H), 2.11–1.87 (m, 1H), 1.85–1.68 (m, 1H), 0.79 (t, *J* = 7.5 Hz, 3H). ^{13}C NMR (101 MHz, $CDCl_3$, ppm)δ 205.3, 142.1, 137.5, 133.4, 128.7, 128.3, 127.5, 126.2, 73.9, 54.2, 20.6, 12.2.HRMS *m/z* calcd for $C_{17}H_{18}O$ $[M+H]^+$ 239.1436, found 239.1432.

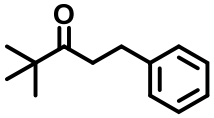
2-benzylcyclohexan-1-one**(4aq)**[S3]



White solid (161.7 mg, 86% yield). ^{1}H NMR (400 MHz, $CDCl_3$, ppm)δ 7.25 (t, *J* = 7.4 Hz, 2H), 7.16 (dd, *J* = 13.7, 7.3 Hz, 3H), 3.22 (dd, *J* = 13.8, 4.6 Hz, 1H), 2.53 (dt, *J* = 12.2, 4.9 Hz, 1H), 2.40 (dd, *J* = 13.6, 9.1 Hz, 2H), 2.30 (td, *J* = 12.9, 5.7 Hz, 1H), 2.09–1.95 (m, 2H), 1.80 (d, *J* = 13.0 Hz, 1H), 1.73–1.47 (m, 2H), 1.42–1.23 (m, 1H). ^{13}C NMR (101 MHz, $CDCl_3$, ppm) δ 212.4,

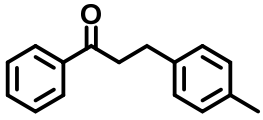
140.3, 129.1, 128.3, 125.9, 52.4, 42.1, 35.5, 33.4, 28.0, 25.0.HRMS *m/z* calcd for $C_{13}H_{16}O$ $[M+H]^+$ 189.1279, found 189.1275.

***4,4-dimethyl-1-phenylpentan-3-one*(4ar)**[S5]



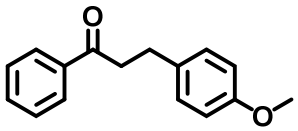
Colorless oil (152.0 mg, 80% yield).^{1}H NMR (400 MHz, $CDCl_3$, ppm)δ 7.31–7.23 (m, 2H), 7.18 (d, *J* = 6.5 Hz, 3H), 2.91–2.83 (m, 2H), 2.83–2.75 (m, 2H), 1.10 (s, 9H). ^{13}C NMR (101 MHz, $CDCl_3$, ppm)δ 215.0, 141.7, 128.5, 126.1, 44.2, 38.6, 30.2, 26.4.HRMS *m/z* calcd for $C_{13}H_{18}O$ $[M+H]^+$ 191.1436, found 191.1432.

***1-phenyl-3-(p-tolyl)propan-1-one*(4ba)**[S3]



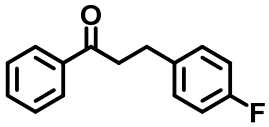
White solid (194.9 mg, 87% yield). ^{1}H NMR (400 MHz, $CDCl_3$, ppm) δ 7.96 (d, *J* = 7.6 Hz, 2H), 7.56 (t, *J* = 7.3 Hz, 1H), 7.46 (t, *J* = 7.6 Hz, 2H), 7.14 (q, *J* = 7.9 Hz, 4H), 3.29 (t, *J* = 7.7 Hz, 2H), 3.04 (t, *J* = 7.7 Hz, 2H), 2.33 (s, 3H). ^{13}C NMR (151 MHz, $CDCl_3$, ppm)δ 199.5, 138.3, 137.0, 135.8, 133.2, 129.3, 128.7, 128.4, 128.2, 40.8, 29.9, 21.1. HRMS *m/z* calcd for $C_{16}H_{16}O$ $[M+H]^+$ 225.1279, found 225.1275.

***3-(4-methoxyphenyl)-1-phenylpropan-1-one*(4ca)**[S3]



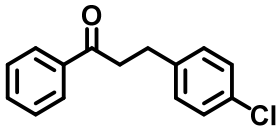
White solid (213.6 mg, 89% yield).^{1}H NMR (400 MHz, $CDCl_3$, ppm) δ 7.96 (d, *J* = 7.3 Hz, 2H), 7.55 (d, *J* = 6.7 Hz, 1H), 7.46 (d, *J* = 7.3 Hz, 2H), 7.18 (d, *J* = 8.1 Hz, 2H), 6.85 (d, *J* = 8.2 Hz, 2H), 3.79 (s, 3H), 3.27 (dd, *J* = 9.8, 5.1 Hz, 2H), 3.02 (t, *J* = 7.4 Hz, 2H). ^{13}C NMR (101 MHz, $CDCl_3$, ppm)δ 199.5, 158.1, 137.0, 133.5, 133.2, 129.5, 128.7, 128.2, 114.1, 55.4, 40.9, 29.4.HRMS *m/z* calcd for $C_{16}H_{16}O_2$ $[M+H]^+$ 241,1229, found 241.1229.

***3-(4-fluorophenyl)-1-phenylpropan-1-one*(4da)**[S4]



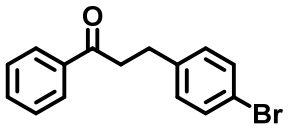
White solid (184.7mg, 81% yield).^{1}H NMR (400 MHz, $CDCl_3$, ppm) δ 7.96 (d, *J* = 7.6 Hz, 2H), 7.56 (t, *J* = 6.9 Hz, 1H), 7.46 (t, *J* = 7.2 Hz, 2H), 7.25–7.15 (m, 2H), 6.98 (t, *J* = 8.0 Hz, 2H), 3.29 (t, *J* = 7.4 Hz, 2H), 3.05 (t, *J* = 7.3 Hz, 2H).^{13}C NMR (151 MHz, $CDCl_3$, ppm)δ 199.0, 162.4, 160.8, 137.0, 133.2, 129.9, 128.7, 128.1, 115.4, 115.3, 40.5, 29.4.HRMS *m/z* calcd for $C_{15}H_{13}FO$ $[M+H]^+$229.1029, found 229.1025.

***3-(4-chlorophenyl)-1-phenylpropan-1-one*(4ea)**[S3]



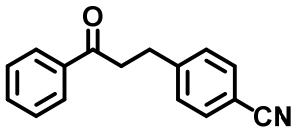
White solid (205.0 mg, 84% yield).^{1}H NMR (400 MHz, $CDCl_3$, ppm) δ 7.95 (d, *J* = 7.5 Hz, 2H), 7.55 (t, *J* = 7.3 Hz, 1H), 7.44 (t, *J* = 7.5 Hz, 2H), 7.35–7.27 (m, 2H), 7.25–7.19 (m, 2H), 3.30 (t, *J* = 7.7 Hz, 2H), 3.07 (t, *J* = 7.6 Hz, 2H).^{13}C NMR (101 MHz, $CDCl_3$, ppm)δ 199.3, 141.4, 137.0, 133.2, 128.7, 128.6, 128.5, 128.2, 126.3, 40.6, 30.2.HRMS *m/z* calcd for $C_{15}H_{13}ClO$ $[M+H]^+$ 245.0733, found 245.0727.

***3-(4-bromophenyl)-1-phenylpropan-1-one*(4fa)**[S3]



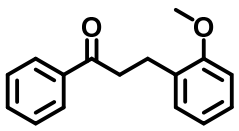
White solid (230.4 mg, 80% yield).^{1}H NMR (400 MHz, $CDCl_3$, ppm) δ 7.94 (dd, *J* = 5.2, 3.4 Hz, 2H), 7.60–7.53 (m, 1H), 7.45 (dd, *J* = 10.5, 4.7 Hz, 2H), 7.43–7.37 (m, 2H), 7.13 (d, *J* = 8.3 Hz, 2H), 3.28 (t, *J* = 7.5 Hz, 2H), 3.03 (t, *J* = 7.5 Hz, 2H).^{13}C NMR (101 MHz, $CDCl_3$, ppm)δ 198.9, 140.4, 136.9, 133.3, 131.7, 130.4, 128.8, 128.1, 120.0, 40.2, 29.6.HRMS *m/z* calcd for $C_{15}H_{13}BrO$ $[M+H]^+$ 289.0228, found 289.0224.

***4-(3-oxo-3-phenylpropyl)benzonitrile*(4ga)**[S8]



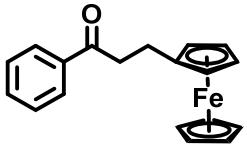
White solid (141.0 mg, 60% yield).^{1}H NMR (400 MHz, $CDCl_3$, ppm) δ 7.99–7.91 (m, 2H), 7.57 (dd, *J* = 10.0, 4.6 Hz, 3H), 7.46 (t, *J* = 7.6 Hz, 2H), 7.37 (d, *J* = 8.1 Hz, 2H), 3.33 (t, *J* = 7.3 Hz, 2H), 3.14 (t, *J* = 7.3 Hz, 2H). ^{13}C NMR (101 MHz, $CDCl_3$, ppm) δ 198.4, 147.1, 136.7, 133.5, 132.5, 129.5, 128.9, 128.1, 119.1, 110.2, 39.6, 30.1.HRMS *m/z* calcd for $C_{16}H_{13}NO$ $[M+H]^+$ 236.1075, found 236.1069.

***3-(2-methoxyphenyl)-1-phenylpropan-1-one*(4ha)**[S3]



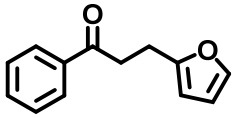
White solid (192.0 mg, 80% yield).^{1}H NMR (400 MHz, $CDCl_3$, ppm) δ 7.96 (d, *J* = 7.6 Hz, 2H), 7.54 (t, *J* = 7.2 Hz, 1H), 7.44 (t, *J* = 7.5 Hz, 2H), 7.21–7.06 (m, 4H), 3.29–3.18 (m, 2H), 3.09–2.99 (m, 2H), 2.34 (s, 3H).^{13}C NMR (151 MHz, $CDCl_3$, ppm)δ 199.4, 139.4, 136.9, 136.0, 133.1, 130.4, 128.7, 128.1, 126.4, 126.2, 39.2, 27.6, 19.4.HRMS *m/z* calcd for $C_{16}H_{16}O_2$$[M+H]^+$ 241,1229, found 241.1225.

***1-phenyl-3-(ferrocenyl)propan-1-one*(4ia)**[S3]



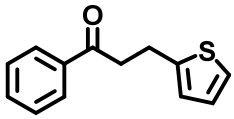
Red solid (279.8 mg, 88% yield).^{1}H NMR (400 MHz, $CDCl_3$, ppm)δ 8.00–7.95 (m, 2H), 7.60–7.53 (m, 1H), 7.47 (t, *J* = 7.6 Hz, 2H), 4.15 (d, *J* = 4.1 Hz, 7H), 4.09 (s, 2H), 3.25–3.16 (m, 2H), 2.83–2.75 (m, 2H).^{13}C NMR (101 MHz, $CDCl_3$, ppm)δ 199.6, 137.0, 133.1, 128.7, 128.2, 88.3, 68.8, 68.3, 67.6, 40.4, 24.2.HRMS *m/z* calcd for $C_{19}H_{18}FeO$ $[M+H]^+$ 319.0785, found 319.0781.

***3-(furan-2-yl)-1-phenylpropan-1-one*(4ja)**[S3]



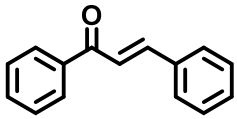
Yellow solid (158.0 mg, 79% yield).^{1}H NMR (400 MHz, $CDCl_3$, ppm)δ 7.98 (d, *J* = 7.7 Hz, 2H), 7.57 (t, *J* = 7.2 Hz, 1H), 7.47 (t, *J* = 7.5 Hz, 2H), 7.31 (s, 1H), 6.29 (s, 1H), 6.06 (s, 1H), 3.34 (t, *J* = 7.4 Hz, 2H), 3.10 (t, *J* = 7.4 Hz, 2H).^{13}C NMR (151 MHz, $CDCl_3$, ppm)δ 198.8, 154.9, 141.2, 136.9, 133.3, 128.7, 128.1, 110.4, 105.4, 37.1, 22.6.HRMS *m/z* calcd for $C_{13}H_{12}O_2$ $[M+H]^+$ 201.0916, found 201.0910.

***1-phenyl-3-(thiophen-2-yl)propan-1-one*(4ka)**[S5]



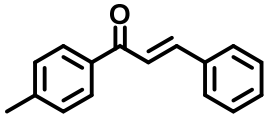
Yellow solid (176.3 mg, 82% yield).^{1}H NMR (400 MHz, $CDCl_3$, ppm)δ 7.98 (d, *J* = 7.6 Hz, 2H), 7.57 (t, *J* = 7.2 Hz, 1H), 7.47 (t, *J* = 7.5 Hz, 2H), 7.13 (d, *J* = 4.9 Hz, 1H), 6.97–6.90 (m, 1H), 6.87 (s, 1H), 3.43–3.34 (m, 2H), 3.34–3.25 (m, 2H). ^{13}C NMR (151 MHz, $CDCl_3$, ppm) δ 198.7, 144.0, 136.9, 133.3, 128.8, 128.2, 127.0, 124.8, 123.5, 40.7, 24.4.HRMS *m/z* calcd for $C_{13}H_{12}OS[M+H]^+$ 216.0609, found 216.0605.

***chalcone*(5aa)**[S9]



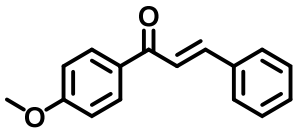
Yellow solid (183.0 mg, 88% yield).^{1}H NMR (600 MHz, $CDCl_3$, ppm)δ 8.06–8.01 (m, 2H), 7.82 (d, *J* = 15.7 Hz, 1H), 7.64 (dd, *J* = 6.4, 2.8 Hz, 2H), 7.57 (dd, *J* = 13.9, 6.6 Hz, 2H), 7.51 (dd, *J* = 16.7, 8.9 Hz, 2H), 7.45–7.39 (m, 3H).^{13}C NMR (151 MHz, $CDCl_3$, ppm) δ 190.5, 144.8, 138.2, 134.9, 132.8, 130.6, 129.0, 128.6, 128.5, 122.1. HRMS *m/z* calcd for $C_{15}H_{12}O[M+H]^+$ 209.0966, found 209.0970.

***3-phenyl-1-(p-tolyl)prop-2-en-1-one*(5ab)**[S9]



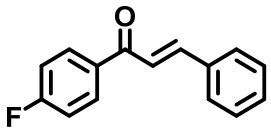
Yellow solid (206.5 mg, 93% yield).^{1}H NMR (600 MHz, $CDCl_3$, ppm)δ 7.95 (d, *J* = 8.0 Hz, 2H), 7.81 (d, *J* = 15.7 Hz, 1H), 7.68–7.62 (m, 2H), 7.54 (d, *J* = 15.6 Hz, 1H), 7.42 (dd, *J* = 4.9, 1.7 Hz, 3H), 7.31 (d, *J* = 8.0 Hz, 2H), 2.44 (s, 3H). ^{13}C NMR (151 MHz, $CDCl_3$, ppm) δ 190.1, 144.5, 143.8, 135.8, 135.1, 130.5, 129.5, 129.1, 128.8, 128.5, 122.2, 21.8.HRMS *m/z* calcd for $C_{16}H_{14}O[M+H]^+$ 223.1123, found 223.1124.

***1-(4-methoxyphenyl)-3-phenylprop-2-en-1-one*(5ac)**[S9]



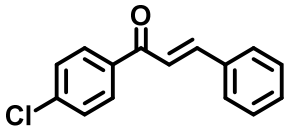
Yellow solid (216.6 mg, 91% yield).^{1}H NMR (600 MHz, $CDCl_3$, ppm)δ 8.05 (d, *J* = 8.3 Hz, 2H), 7.80 (d, *J* = 15.6 Hz, 1H), 7.64 (d, *J* = 7.0 Hz, 2H), 7.55 (d, *J* = 15.6 Hz, 1H), 7.46–7.36 (m, 3H), 6.99 (d, *J* = 8.3 Hz, 2H), 3.89 (s, 3H).^{13}C NMR (151 MHz, $CDCl_3$, ppm) δ 188.8, 163.6, 144.1, 135.2, 131.2, 130.9, 130.4, 129.0, 128.5, 122.0, 114.0, 55.6. HRMS *m/z* calcd for $C_{16}H_{14}O_2$ $[M+H]^+$ 239.1072, found 239.1070.

***1-(4-fluorophenyl)-3-phenylprop-2-en-1-one*(5ad)**[S10]



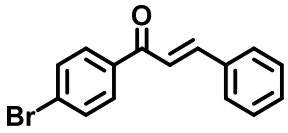
Yellow solid (185.3 mg, 82% yield).^{1}H NMR (600 MHz, $CDCl_3$, ppm) δ 8.08–8.03 (m, 2H), 7.81 (d, *J* = 15.7 Hz, 1H), 7.64 (dd, *J* = 6.3, 2.7 Hz, 2H), 7.50 (d, *J* = 15.6 Hz, 1H), 7.45–7.39 (m, 3H), 7.17 (t, *J* = 8.5 Hz, 2H). ^{13}C NMR (151 MHz, $CDCl_3$, ppm) δ 188.8, 166.5, 164.8, 145.1, 134.9, 134.6, 131.2, 130.7, 129.1, 128.6, 121.7, 115.9, 115.8.HRMS *m/z* calcd for $C_{15}H_{11}FO[M+H]^+$ 227.0872, found 227.0870.

***1-(4-chlorophenyl)-3-phenylprop-2-en-1-one*(5ae)**[S11]



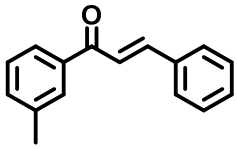
Yellow solid (205.7 mg, 85% yield).^{1}H NMR (600 MHz, $CDCl_3$, ppm) δ 7.96 (d, *J* = 8.4 Hz, 2H), 7.82 (d, *J* = 15.7 Hz, 1H), 7.68–7.61 (m, 2H), 7.48 (dd, *J* = 12.0, 5.3 Hz, 3H), 7.45–7.39 (m, 3H). ^{13}C NMR (151 MHz, $CDCl_3$, ppm) δ 189.3, 145.5, 139.3, 136.6, 134.8, 130.9, 130.0, 129.1, 128.6, 121.6.HRMS *m/z* calcd for $C_{15}H_{11}ClO[M+H]^+$ 243.0577, found 243.0573.

***1-(4-bromophenyl)-3-phenylprop-2-en-1-one*(5af)**[S10]



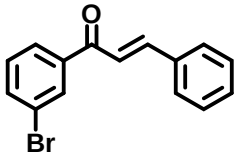
Yellow solid (228.8 mg, 80% yield).^{1}H NMR (600 MHz, $CDCl_3$, ppm) δ 7.88 (d, *J* = 8.5 Hz, 2H), 7.81 (d, *J* = 15.7 Hz, 1H), 7.67–7.61 (m, 4H), 7.47 (d, *J* = 15.7 Hz, 1H), 7.44–7.39 (m, 3H). ^{13}C NMR (151 MHz, $CDCl_3$, ppm) δ 189.4, 145.5, 137.0, 134.8, 132.0, 130.8, 130.1, 129.1, 128.6, 128.0, 121.5.HRMS *m/z* calcd for $C_{15}H_{11}BrO[M+H]^+$ 287.0072, found 287.0060.

***3-phenyl-1-(m-tolyl)prop-2-en-1-one*(5ag)**[S12]



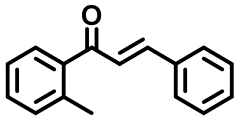
Yellow solid (195.4 mg, 88% yield).^{1}H NMR (600 MHz, $CDCl_3$, ppm)δ 7.95 (d, *J* = 8.0 Hz, 2H), 7.81 (d, *J* = 15.7 Hz, 1H), 7.68–7.62 (m, 2H), 7.54 (d, *J* = 15.6 Hz, 1H), 7.42 (dd, *J* = 4.9, 1.7 Hz, 3H), 7.31 (d, *J* = 8.0 Hz, 2H), 2.44 (s, 3H).^{13}C NMR (151 MHz, $CDCl_3$, ppm)δ 190.7, 144.6, 138.5, 138.3, 135.0, 133.6, 130.5, 129.0, 128.5, 125.8, 122.3, 21.4.HRMS *m/z* calcd for $C_{16}H_{14}O[M+H]^+$ 223.1123, found 223.1118.

***(3-bromophenyl)-3-phenylprop-2-en-1-one*(5ah)**[S12]



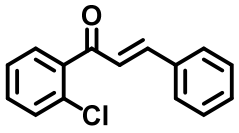
Yellow solid (228.8 mg, 80% yield).^{1}H NMR (600 MHz, $CDCl_3$, ppm)δ 8.12 (d, *J* = 1.3 Hz, 1H), 7.91 (d, *J* = 7.7 Hz, 1H), 7.80 (dd, *J* = 15.7, 1.3 Hz, 1H), 7.69–7.65 (m, 1H), 7.64–7.59 (m, 2H), 7.44 (dd, *J* = 15.7, 1.3 Hz, 1H), 7.40 (dd, *J* = 3.8, 1.6 Hz, 3H), 7.37–7.32 (m, 1H). ^{13}C NMR (151 MHz, $CDCl_3$, ppm)δ 188.8, 145.6, 139.9, 135.6, 134.6, 131.5, 130.8, 130.2, 129.0, 128.6, 127.0, 123.0, 121.3.HRMS *m/z* calcd for $C_{15}H_{11}BrO[M+H]^+$ 287.0072, found 287.0076.

***3-phenyl-1-(o-tolyl)prop-2-en-1-one*(5ai)**[S12]



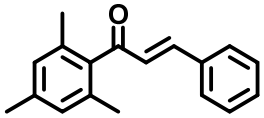
Yellowoil (188.7 mg, 85% yield).^{1}H NMR (600 MHz, $CDCl_3$, ppm)δ 7.57 (dd, *J* = 6.6, 2.9 Hz, 2H), 7.49 (dd, *J* = 17.0, 11.8 Hz, 2H), 7.43–7.36 (m, 4H), 7.28 (t, *J* = 7.4 Hz, 2H), 7.15 (d, *J* = 16.0 Hz, 1H), 2.46 (s, 3H). ^{13}C NMR (151 MHz, $CDCl_3$, ppm)δ 196.6, 146.0, 139.2, 137.0, 134.7, 131.4, 130.7, 130.6, 129.1, 128.5, 128.2, 126.8, 125.6, 20.3. HRMS *m/z* calcd for $C_{16}H_{14}O[M+H]^+$ 223.1123, found 223.1123.

***(2-chlorophenyl)-3-phenylprop-2-en-1-one*(5aj)**[S13]



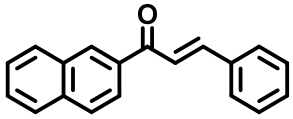
Yellowoil (196.0 mg, 81% yield).^{1}H NMR (600 MHz, $CDCl_3$, ppm)δ 7.56 (dd, *J* = 7.1, 2.2 Hz, 2H), 7.50–7.44 (m, 3H), 7.43–7.38 (m, 4H), 7.36 (td, *J* = 7.4, 1.1 Hz, 1H), 7.14 (d, *J* = 16.1 Hz, 1H). ^{13}C NMR (151 MHz, $CDCl_3$, ppm)δ 193.9, 146.3, 139.2, 134.5, 131.4, 131.0, 130.4, 129.4, 129.1, 128.6, 126.9, 126.3.HRMS *m/z* calcd for $C_{15}H_{11}ClO[M+H]^+$ 243.0577, found 243.0571.

***1-mesityl-3-phenylprop-2-en-1-one*(5ak)**[S14]



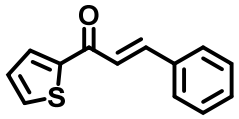
White solid (207.5 mg, 83% yield).^{1}H NMR (400 MHz, $CDCl_3$, ppm)δ 7.57 – 7.43 (m, 2H), 7.37 (d, *J* = 4.5 Hz, 3H), 7.26–7.13 (m, 1H), 7.00–6.83 (m, 3H), 2.32 (s, 3H), 2.19 (s, 6H).^{13}C NMR (151 MHz, $CDCl_3$, ppm)δ 201.2, 146.5, 138.4, 137.4, 134.6, 134.2, 130.8, 129.0, 128.8, 128.4, 21.2, 19.4.HRMS *m/z* calcd for $C_{18}H_{18}O[M+H]^+$ 251.1436, found 251.1427.

***1-(naphthalen-2-yl)-3-phenylprop-2-en-1-one*(5al)**[S10]



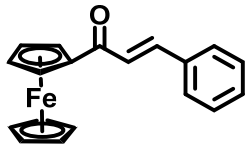
White solid (237.4 mg, 92% yield).^{1}H NMR (600 MHz, $CDCl_3$, ppm)δ 8.54 (s, 1H), 8.12 (dd, *J* = 8.5, 1.3 Hz, 1H), 8.00 (d, *J* = 8.0 Hz, 1H), 7.94 (d, *J* = 8.5 Hz, 1H), 7.92–7.86 (m, 2H), 7.70 (dd, *J* = 9.0, 6.6 Hz, 3H), 7.61 (dd, *J* = 11.0, 3.9 Hz, 1H), 7.57 (t, *J* = 7.0 Hz, 1H), 7.48–7.41 (m, 3H).^{13}C NMR (151 MHz, $CDCl_3$, ppm)δ 190.4, 144.8, 135.6, 135.1, 132.7, 130.6, 130.0, 129.6, 129.1, 128.6, 127.9, 126.9, 124.6, 122.2. HRMS *m/z* calcd for $C_{19}H_{14}O[M+H]^+$ 259.1123, found 259.1130.

***3-phenyl-1-(thiophen-2-yl)prop-2-en-1-one*(5am)**[S12]



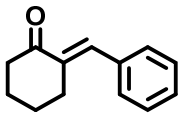
Yellow solid (156.2 mg, 73% yield).^{1}H NMR (600 MHz, $CDCl_3$, ppm)δ 7.86 (t, *J* = 10.3 Hz, 2H), 7.70–7.66 (m, 1H), 7.66–7.61 (m, 2H), 7.42 (t, *J* = 9.3 Hz, 4H), 7.20–7.16 (m, 1H). ^{13}C NMR (151 MHz, $CDCl_3$, ppm) δ 182.1, 145.6, 144.1, 134.8, 134.0, 131.9, 130.7 129.0, 128.6 128.4 121.7. HRMS *m/z* calcd for $C_{13}H_{10}OS[M+H]^+$ 215.0531, found 215.0535.

***1-ferrocenyl-3-phenyl-2-propen-1-one*(5an)**[S15]



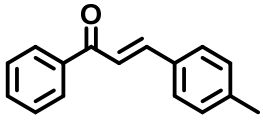
Red solid (284.4 mg, 90% yield).^{1}H NMR (40 MHz, $CDCl_3$, ppm)δ 7.81 (d, *J* = 15.4 Hz, 1H), 7.66 (s, 2H), 7.43 (s, 3H), 7.26 (s, 1H), 7.14 (d, *J* = 15.4 Hz, 1H), 4.92 (s, 2H), 4.60 (s, 2H), 4.22 (s, 5H).^{13}C NMR (151 MHz, $CDCl_3$, ppm)δ 193.1, 141.0, 135.3, 130.2, 129.1, 128.4, 123.1, 80.8, 72.9, 70.2, 69.9.HRMS *m/z* calcd for $C_{19}H_{16}FeO$ $[M+H]^+$317.0629, found 317.0634.

***2-benzylidenecyclohexan-1-one*(5aq)[S16]**



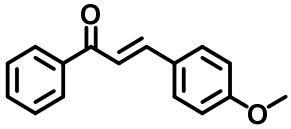
Yellowoil (152.2 mg, 82% yield). ^{1}H NMR (400 MHz, $CDCl_3$, ppm) δ 7.50 (t, *J* = 2.1 Hz, 1H), 7.43–7.35 (m, 4H), 7.32 (ddd, *J* = 8.5, 5.1, 2.7 Hz, 1H), 2.84 (td, *J* = 6.6, 2.1 Hz, 2H), 2.54 (t, *J* = 6.7 Hz, 2H), 1.99–1.88 (m, 2H), 1.82–1.72 (m, 2H).^{13}C NMR (101 MHz, $CDCl_3$, ppm) δ 201.9, 136.8, 135.7, 130.4, 128.6, 40.5, 29.1, 24.0, 23.5.HRMS *m/z* calcd for $C_{13}H_{14}O[M+H]^+$187.1123, found 187.1117.

***1-phenyl-3-(p-tolyl)prop-2-en-1-one*(5ba)[S9]**



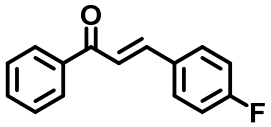
Yellowsolid (208.7 mg, 94% yield).^{1}H NMR (600 MHz, $CDCl_3$, ppm)δ 8.03 (d, *J* = 8.1 Hz, 2H), 7.81 (d, *J* = 15.7 Hz, 1H), 7.60–7.53 (m, 3H), 7.53–7.46 (m, 3H), 7.22 (d, *J* = 7.8 Hz, 2H), 2.39 (s, 3H). ^{13}C NMR (151 MHz, $CDCl_3$, ppm)δ 190.7, 145.0, 141.2, 138.4, 132.7, 132.2, 129.8, 128.8, 128.4, 121.2, 21.6.HRMS *m/z* calcd for $C_{16}H_{14}O[M+H]^+$ 223.1123, found 223.1127.

***3-(4-methoxyphenyl)-1-phenylprop-2-en-1-one*(5ca)[S9]**



Yellowsolid (214.2 mg, 90% yield).^{1}H NMR (600 MHz, $CDCl_3$, ppm)δ 8.01 (d, *J* = 7.3 Hz, 2H), 7.78 (d, *J* = 15.6 Hz, 1H), 7.62–7.53 (m, 3H), 7.48 (t, *J* = 7.6 Hz, 2H), 7.41 (d, *J* = 15.6 Hz, 1H), 6.92 (d, *J* = 8.6 Hz, 2H), 3.83 (s, 3H). ^{13}C NMR (151 MHz, $CDCl_3$, ppm)δ 190.6, 161.7, 144.7, 138.6, 132.6, 130.3, 128.6, 128.5, 127.7, 119.8, 114.5, 55.4.HRMS *m/z* calcd for $C_{16}H_{14}O_2$ $[M+H]^+$ 239.1072, found 239.1068.

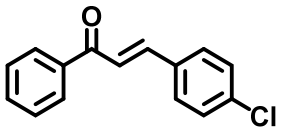
***3-(4-fluorophenyl)-1-phenylprop-2-en-1-one*(5da)[S12]**



Yellowsolid (198.9 mg, 88% yield).^{1}H NMR (400 MHz, $CDCl_3$, ppm)δ 8.01 (d, *J* = 7.8 Hz, 2H), 7.77 (d, *J* = 15.7 Hz, 1H), 7.69–7.55 (m, 3H), 7.49 (dd, *J* = 19.4, 11.6 Hz, 3H), 7.10 (t, *J* = 8.3 Hz, 2H).^{13}C NMR (151 MHz, $CDCl_3$, ppm)δ 190.4, 165.0, 163.4, 143.5, 138.3, 132.9, 131.4, 130.4,

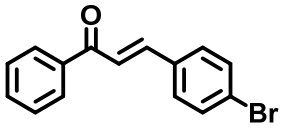
128.7, 128.6, 122.1, 116.3, 116.2.HRMS *m/z* calcd for $C_{15}H_{11}FO[M+H]^+$ 227.0872, found 227.0873.

***3-(4-chlorophenyl)-1-phenylprop-2-en-1-one*(5ea)**[S9]



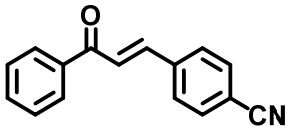
Yellowsolid (215.4 mg,89% yield).^{1}H NMR (400 MHz, $CDCl_3$, ppm)δ 8.01 (d, *J* = 7.6 Hz, 2H), 7.76 (d, *J* = 15.7 Hz, 1H), 7.59 (dd, *J* = 12.2, 7.7 Hz, 3H), 7.54–7.44 (m, 3H), 7.39 (d, *J* = 8.2 Hz, 2H).^{13}C NMR (101 MHz, $CDCl_3$, ppm)δ 190.3, 143.4, 138.1, 136.5, 133.5, 133.1, 129.7, 129.4, 128.7, 122.6. HRMS *m/z* calcd for $C_{15}H_{11}ClO[M+H]^+$ 243.0577, found 243.0572.

***3-(4-bromophenyl)-1-phenylprop-2-en-1-one*(5fa)**[S9]



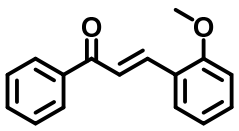
Yellowsolid (237.4 mg, 83% yield).^{1}H NMR (600 MHz, $CDCl_3$, ppm)δ 8.01 (d, *J* = 7.3 Hz, 2H), 7.72 (d, *J* = 15.7 Hz, 1H), 7.58 (t, *J* = 7.4 Hz, 1H), 7.52 (t, *J* = 9.1 Hz, 3H), 7.49 (dd, *J* = 8.2, 4.3 Hz, 4H).^{13}C NMR (151 MHz, $CDCl_3$, ppm) δ 190.2, 143.4, 138.1, 133.9, 133.0, 132.3, 129.9, 128.8, 128.6, 124.9, 122.6.HRMS *m/z* calcd for $C_{15}H_{11}BrO[M+H]^+$ 287.0072, found 287.0063.

***4-(3-oxo-3-phenylprop-1-en-1-yl)benzonitrile*(5ga)**[S17]



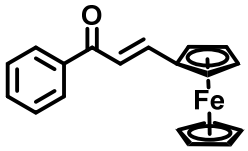
Yellowsolid (177.1 mg, 76% yield).^{1}H NMR (600 MHz, $CDCl_3$, ppm) δ 8.02 (d, *J* = 8.1 Hz, 2H), 7.76 (d, *J* = 15.7 Hz, 1H), 7.71 (q, *J* = 8.3 Hz, 4H), 7.64–7.58 (m, 2H), 7.52 (t, *J* = 7.6 Hz, 2H).^{13}C NMR (151 MHz, $CDCl_3$, ppm) δ 189.8, 142.2, 139.3, 137.7, 133.4, 132.8, 128.8, 128.7, 125.2, 118.5, 113.6.HRMS *m/z* calcd for $C_{16}H_{11}NO[M+H]^+$ 234.0919, found 234.0914.

***3-(2-methoxyphenyl)-1-phenylprop-2-en-1-one*(5ha)**[S12]



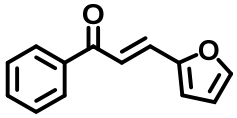
Yellowsolid (204.7 mg, 86% yield).^{1}H NMR (400 MHz, $CDCl_3$, ppm)δ 8.11 (d, *J* = 15.6 Hz, 1H), 8.02 (d, *J* = 7.5 Hz, 2H), 7.67 (d, *J* = 7.4 Hz, 1H), 7.50 (dt, *J* = 25.6, 12.3 Hz, 4H), 7.32–7.12 (m, 3H), 2.43 (s, 3H).^{13}C NMR (151 MHz, $CDCl_3$, ppm) δ 190.2, 142.3, 138.2, 133.8, 132.7, 130.9, 130.2, 128.5, 126.3, 123.0, 19.8. HRMS *m/z* calcd for $C_{16}H_{14}O_2$ $[M+H]^+$ 239.1072, found 239.1070.

***3-ferrocenyl-1-phenylprop-2-enone*(5ia)**[S18]



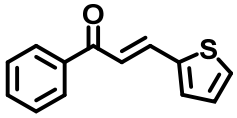
Red solid (271.8 mg, 86% yield).^{1}H NMR (600 MHz, $CDCl_3$, ppm) δ 8.00 (d, *J* = 7.5 Hz, 2H), 7.77 (d, *J* = 15.3 Hz, 1H), 7.55 (t, *J* = 6.9 Hz, 1H), 7.48 (t, *J* = 7.1 Hz, 2H), 7.15 (d, *J* = 15.3 Hz, 1H), 4.59 (s, 2H), 4.47 (s, 2H), 4.16 (s, 4H). ^{13}C NMR (101 MHz, $CDCl_3$, ppm) δ 189.7, 146.8, 138.6, 132.4, 128.5, 128.3, 119.1, 79.1, 71.4, 69.8, 69.0. HRMS *m/z* calcd for $C_{19}H_{16}FeO$ $[M+H]^+$ 317.0629, found 317.0634.

***3-(furan-2-yl)-1-phenylprop-2-en-1-one*(5ja)**[S12]



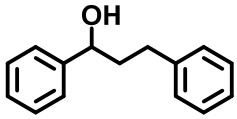
Yellow solid (162.4 mg, 82% yield).^{1}H NMR (400 MHz, $CDCl_3$, ppm)δ 8.03 (d, *J* = 7.5 Hz, 2H), 7.58 (dd, *J* = 15.2, 11.4 Hz, 2H), 7.54–7.41 (m, 4H), 6.71 (d, *J* = 2.9 Hz, 1H), 6.51 (s, 1H).^{13}C NMR (101 MHz, $CDCl_3$, ppm)δ 189.9, 151.7, 145.0, 138.2, 132.8, 130.7, 128.6, 119.4, 116.3, 112.8.HRMS *m/z* calcd for $C_{13}H_{10}O_2$ $[M+H]^+$ 199.0759, found 199.0764.

***1-phenyl-3-(thiophen-2-yl)prop-2-en-1-one*(5ka)**[S12]



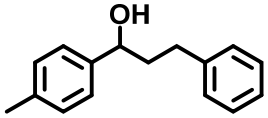
Yellow solid (179.8 mg, 84% yield).^{1}H NMR (600 MHz, $CDCl_3$, ppm)δ 8.02–7.97 (m, 2H), 7.93 (d, *J* = 15.3 Hz, 1H), 7.58–7.53 (m, 1H), 7.48 (t, *J* = 7.5 Hz, 2H), 7.39 (d, *J* = 5.0 Hz, 1H), 7.35–7.29 (m, 2H), 7.08–7.04 (m, 1H).^{13}C NMR (151 MHz, $CDCl_3$, ppm) δ 189.8, 140.4, 138.1, 137.2, 132.8, 132.1, 128.9, 128.6, 128.4, 120.7.HRMS *m/z* calcd for $C_{13}H_{10}OS[M+H]^+$ 215.0531, found 215.0538.

***1,3-diphenylpropan-1-ol*(6aa)**[S19]



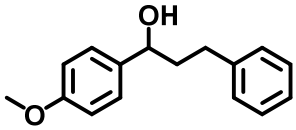
Colorless oil (188.7 mg, 89% yield).^{1}H NMR (600 MHz, $CDCl_3$, ppm) δ 7.42–7.35 (m, 4H), 7.34–7.29 (m, 3H), 7.25–7.20 (m, 3H), 4.70 (dd, *J* = 7.8, 5.4 Hz, 1H), 2.82–2.74 (m, 1H), 2.74–2.66 (m, 1H), 2.20–2.12 (m, 1H), 2.06 (dq, *J* = 13.9, 6.2 Hz, 2H).^{13}C NMR (151 MHz, $CDCl_3$, ppm) δ 144.7, 141.9, 128.7, 128.4, 127.7, 126.0, 73.9, 40.6, 32.1.HRMS *m/z* calcd for $C_{15}H_{16}O[M]$ 212.1201, found 212.1201.

***3-phenyl-1-(p-tolyl)propan-1-ol*(6ab)**[S19]



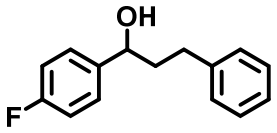
Colorless oil (205.7 mg, 91% yield).^{1}H NMR (600 MHz, $CDCl_3$, ppm) δ 7.31 (t, *J* = 7.6 Hz, 2H), 7.26 (t, *J* = 5.6 Hz, 2H), 7.24–7.20 (m, 3H), 7.19 (d, *J* = 7.9 Hz, 2H), 4.65 (dd, *J* = 7.3, 5.9 Hz, 1H), 2.79–2.72 (m, 1H), 2.71–2.64 (m, 1H), 2.38 (s, 3H), 2.20–2.11 (m, 1H), 2.10–1.98 (m, 2H).^{13}C NMR (151 MHz, $CDCl_3$, ppm)δ 142.0, 141.7, 137.3, 129.3, 128.5, 126.0, 73.8, 40.5, 32.2, 21.2.HRMS *m/z* calcd for $C_{16}H_{18}O$[M]226.1358, found 206.1351.

***1-(4-methoxyphenyl)-3-phenylpropan-1-ol*(6ac)[S19]**



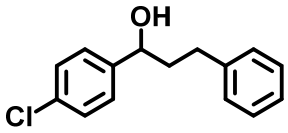
Colorless oil (201.3 mg, 94% yield).^{1}H NMR (600 MHz, $CDCl_3$, ppm)δ 7.28 (d, *J* = 8.0 Hz, 4H), 7.18 (t, *J* = 7.3 Hz, 3H), 6.89 (d, *J* = 8.5 Hz, 2H), 4.64 (t, *J* = 6.6 Hz, 1H), 3.81 (s, 3H), 2.77–2.69 (m, 1H), 2.69–2.61 (m, 1H), 2.14 (dt, *J* = 14.0, 8.0 Hz, 1H), 2.05–1.96 (m, 1H), 1.76 (s, 1H).^{13}C NMR (151 MHz, $CDCl_3$, ppm) δ 159.3, 142.0, 136.8, 128.6, 127.4, 126.0, 114.0, 73.7, 55.5, 40.5, 32.3.HRMS *m/z* calcd for $C_{16}H_{18}O_2$ [M]242.1307, found 242.1307.

***1-(4-fluorophenyl)-3-phenylpropan-1-ol*(6ad)[S19]**



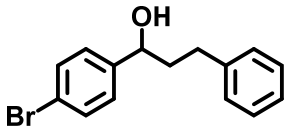
Colorless oil (179.5 mg,78% yield).^{1}H NMR (600 MHz, $CDCl_3$, ppm)δ 7.35–7.27 (m, 4H), 7.23–7.17 (m, 3H), 7.07–7.02 (m, 2H), 4.67 (dd, *J* = 7.7, 5.5 Hz, 1H), 2.77–2.70 (m, 1H), 2.70–2.63 (m, 1H), 2.16–2.09 (m, 1H), 2.07–1.94 (m, 2H).^{13}C NMR (151 MHz, $CDCl_3$, ppm)δ 163.1, 161.5, 141.7, 140.4, 128.5, 127.7, 126.1, 115.5, 115.4, 73.3, 40.7, 32.1.HRMS *m/z* calcd for $C_{15}H_{15}FO$[M] 230.1107, found 230.1106.

***1-(4-chlorophenyl)-3-phenylpropan-1-ol*(6ae)[S19]**



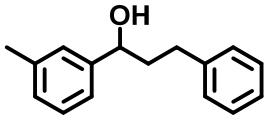
Colorless oil (196.9 mg, 80% yield).^{1}H NMR (600 MHz, $CDCl_3$, ppm)δ 7.33 (d, *J* = 8.3 Hz, 2H), 7.29 (t, *J* = 7.7 Hz, 4H), 7.20 (t, *J* = 8.6 Hz, 3H), 4.69–4.65 (m, 1H), 2.77–2.70 (m, 1H), 2.70–2.63 (m, 1H), 2.14–2.07 (m, 1H), 2.04–1.96 (m, 1H), 1.83 (s, 1H). ^{13}C NMR (151 MHz, $CDCl_3$, ppm) δ 143.2, 141.6, 133.4, 128.8, 128.6, 127.4, 126.1, 73.3, 40.6, 32.1.HRMS *m/z* calcd for $C_{15}H_{15}ClO$[M] 246.0811, found 246.0810.

***1-(4-bromophenyl)-3-phenylpropan-1-ol*(6af)[S19]**



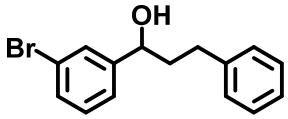
Colorless oil (240.7 mg, 83% yield).^{1}H NMR (600 MHz, $CDCl_3$, ppm) δ 7.48 (d, *J* = 8.3 Hz, 2H), 7.29 (t, *J* = 7.5 Hz, 2H), 7.23 (d, *J* = 8.3 Hz, 2H), 7.19 (t, *J* = 8.3 Hz, 3H), 4.66 (dd, *J* = 7.6, 5.5 Hz, 1H), 2.73 (ddd, *J* = 15.1, 9.6, 5.9 Hz, 1H), 2.70–2.63 (m, 1H), 2.14–2.06 (m, 1H), 2.03–1.95 (m, 1H), 1.79 (s, 1H). ^{13}C NMR (151 MHz, $CDCl_3$, ppm) δ 143.7, 141.6, 131.7, 128.6, 127.8, 126.1, 121.5, 73.3, 40.6, 32.1.HRMS *m/z* calcd for $C_{15}H_{15}BrO$[M] 290.0306, found 290.0300.

***3-phenyl-1-(m-tolyl)propan-1-ol*(6ag)**[S20]



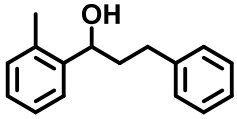
Colorless oil (196.7 mg, 87% yield). ^{1}H NMR (600 MHz, $CDCl_3$, ppm) δ 7.29 (t, *J* = 7.6 Hz, 2H), 7.24 (d, *J* = 7.5 Hz, 1H), 7.23–7.18 (m, 3H), 7.18 (s, 1H), 7.15 (d, *J* = 7.6 Hz, 1H), 7.10 (d, *J* = 7.4 Hz, 1H), 4.66 (dd, *J* = 7.8, 5.4 Hz, 1H), 2.80–2.73 (m, 1H), 2.71–2.64 (m, 1H), 2.36 (s, 3H), 2.18–2.10 (m, 1H), 2.07–2.00 (m, 1H).^{13}C NMR (151 MHz, $CDCl_3$, ppm)δ 144.7, 142.0, 138.3, 128.5, 126.8, 126.0, 123.1, 74.0, 40.6, 32.3, 21.6.HRMS *m/z* calcd for $C_{16}H_{18}O$[M] 226.1358, found 226.1353.

***1-(3-bromophenyl)-3-phenylpropan-1-ol*(6ah)**[S20]



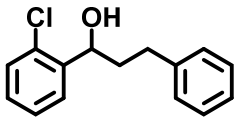
Colorless oil (234.9 mg, 81% yield). ^{1}H NMR (600 MHz, $CDCl_3$, ppm) δ 7.55 (s, 1H), 7.45 (d, *J* = 7.7 Hz, 1H), 7.34 (t, *J* = 7.4 Hz, 2H), 7.29 (d, *J* = 7.4 Hz, 1H), 7.25–7.21 (m, 3H), 4.66 (dd, *J* = 7.3, 5.7 Hz, 1H), 2.82–2.75 (m, 1H), 2.75–2.67 (m, 1H), 2.18 (s, 1H), 2.12 (td, *J* = 14.2, 8.4 Hz, 1H), 2.03 (dt, *J* = 14.2, 6.0 Hz, 1H).^{13}C NMR (151 MHz, $CDCl_3$, ppm) δ 147.0, 141.5, 130.7, 130.2, 129.1, 128.5, 126.1, 124.6, 122.7, 73.2, 40.5, 32.0. HRMS *m/z* calcd for $C_{15}H_{15}BrO$[M] 290.0306, found 290.0305.

***3-phenyl-1-(o-tolyl)propan-1-ol*(6ai)**[S20]



Colorless oil (185.4 mg, 82% yield).^{1}H NMR (400 MHz, $CDCl_3$, ppm) δ 7.50 (d, *J* = 7.5 Hz, 1H), 7.30 (t, *J* = 7.4 Hz, 2H), 7.20 (dd, *J* = 19.7, 7.4 Hz, 5H), 7.13 (d, *J* = 7.3 Hz, 1H), 4.91 (dd, *J* = 8.1, 4.4 Hz, 1H), 2.91–2.80 (m, 1H), 2.79–2.67 (m, 1H), 2.24 (s, 3H), 2.12–1.95 (m, 3H).^{13}C NMR (151 MHz, $CDCl_3$, ppm) δ 142.8, 141.9, 134.5, 130.5, 128.5, 127.3, 126.4, 126.0, 125.2, 67.0, 39.5, 32.4, 19.0.HRMS *m/z* calcd for $C_{16}H_{18}O$[M] 226.1358, found 226.1352.

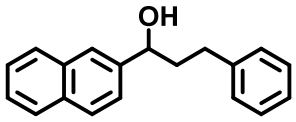
***1-(2-chlorophenyl)-3-phenylpropan-1-ol*(6aj)**[S19]



Colorless oil (187.0 mg, 76% yield).^{1}H NMR (400 MHz, $CDCl_3$, ppm) δ 7.59 (dd, *J* = 7.7, 1.6 Hz, 1H), 7.35–7.32 (m, 1H), 7.30–7.29 (m, 1H), 7.27 (s, 1H), 7.22 (dd, *J* = 7.0, 5.3 Hz, 3H), 7.19 (t, *J*

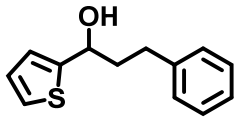
= 5.7 Hz, 2H), 5.15 (dd, *J* = 8.4, 4.1 Hz, 1H), 2.93–2.82 (m, 1H), 2.76 (ddd, *J* = 13.8, 9.8, 6.7 Hz, 1H), 2.19–2.08 (m, 1H), 2.07–1.96 (m, 1H).^{13}C NMR (101 MHz, $CDCl_3$, ppm) δ 142.0, 141.7, 131.9, 129.5, 129.1, 128.6, 128.2, 127.1, 125.9, 125.3, 70.3, 39.0, 32.2.HRMS *m/z* calcd for $C_{15}H_{15}ClO$[M] 246.0811, found 246.0810.

***1-(naphthalen-2-yl)-3-phenylpropan-1-ol*(6al)**[S19]



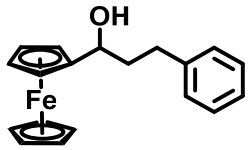
White solid (238.4 mg, 91% yield).^{1}H NMR (600 MHz, $CDCl_3$, ppm)δ 7.85 (t, *J* = 6.5 Hz, 3H), 7.79 (s, 1H), 7.48 (dd, *J* = 13.1, 7.8 Hz, 3H), 7.29 (t, *J* = 7.5 Hz, 2H), 7.24–7.17 (m, 3H), 4.89–4.85 (m, 1H), 2.83–2.75 (m, 1H), 2.75–2.67 (m, 1H), 2.23 (dt, *J* = 14.3, 8.0 Hz, 1H), 2.14 (dt, *J* = 14.6, 6.1 Hz, 1H), 1.99 (s, 1H).^{13}C NMR (151 MHz, $CDCl_3$, ppm) δ 142.0, 141.9, 133.4, 133.2, 128.7, 128.4, 128.1, 127.8, 126.3, 126.0, 124.8, 124.2, 74.1, 40.5, 32.2. HRMS *m/z* calcd for $C_{19}H_{18}O$[M] 262.1358, found 262.1357.

***3-phenyl-1-(thiophen-2-yl)propan-1-ol*(6am)**[S21]



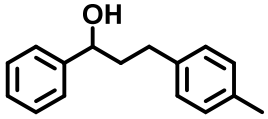
Yellow oil (170.0 mg, 78% yield). ^{1}H NMR (600 MHz, $CDCl_3$, ppm)δ 7.29 (t, *J* = 7.6 Hz, 2H), 7.25 (s, 1H), 7.23–7.17 (m, 3H), 7.03–6.94 (m, 2H), 4.95–4.90 (m, 1H), 2.78 (ddd, *J* = 15.2, 9.5, 6.0 Hz, 1H), 2.74–2.68 (m, 1H), 2.26–2.18 (m, 1H), 2.18–2.11 (m, 1H), 2.04 (s, 1H). ^{13}C NMR (151 MHz, $CDCl_3$, ppm) δ 148.6, 141.6, 128.6, 126.8, 126.1, 124.8, 124.1, 69.7, 40.8, 32.2.HRMS *m/z* calcd for $C_{13}H_{14}OS$[M] 218.0765, found 218.0759.

***1-ferrocenyl-2-phenyl-ethanol*(6an)**[S22]



Red oil (291.2 mg, 91% yield). ^{1}H NMR (400 MHz, $CDCl_3$, ppm)δ 7.39 (t, *J* = 13.6 Hz, 5H), 4.68 (t, *J* = 6.2 Hz, 1H), 4.15 (d, *J* = 13.4 Hz, 9H), 2.61 (s, 1H), 2.57–2.45 (m, 1H), 2.45–2.28 (m, 1H), 2.22–1.89 (m, 2H).^{13}C NMR (101 MHz, $CDCl_3$, ppm) δ 142.1, 128.5, 125.8, 94.2, 68.8, 68.3, 68.0, 67.2, 65.5, 39.7, 32.3.HRMS *m/z* calcd for $C_{19}H_{20}FeO$ [M] 320.0864, found 320.0861.

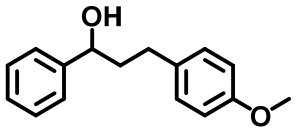
***1-phenyl-3-(p-tolyl)propan-1-ol*(6ba)**[S19]



Colorless oil (207.9 mg, 92% yield).^{1}H NMR (600 MHz, $CDCl_3$, ppm) δ 7.43–7.34 (m, 4H), 7.34–7.27 (m, 1H), 7.16–7.09 (m, 4H), 4.69 (dd, *J* = 7.5, 5.7 Hz, 1H), 2.77–2.69 (m, 1H), 2.69–2.61 (m, 1H), 2.34 (s, 3H), 2.13 (ddd, *J* = 14.0, 11.4, 7.6 Hz, 1H), 2.07–2.00 (m, 1H).^{13}C

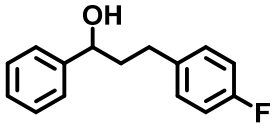
NMR (151 MHz, $CDCl_3$, ppm) δ 144.7, 138.8, 135.4, 129.2, 128.6, 128.4, 127.7, 126.1, 74.0, 40.7, 31.7, 21.1.HRMS *m/z* calcd for $C_{16}H_{18}O$[M] 226.1358, found 226.1357.

***3-(4-methoxyphenyl)-1-phenylpropan-1-ol*(6ca)**[S19]



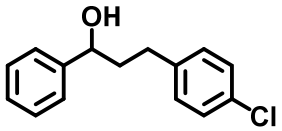
Colorless oil (225.1 mg, 93% yield). ^{1}H NMR (600 MHz, $CDCl_3$, ppm)δ 7.41–7.33 (m, 4H), 7.33–7.28 (m, 1H), 7.13 (d, *J* = 8.4 Hz, 2H), 6.85 (d, *J* = 8.4 Hz, 2H), 4.67 (dd, *J* = 7.7, 5.4 Hz, 1H), 3.80 (s, 3H), 2.75–2.67 (m, 1H), 2.67–2.59 (m, 1H), 2.16–2.05 (m, 2H), 2.05–1.95 (m, 1H).^{13}C NMR (151 MHz, $CDCl_3$, ppm) δ 157.9, 144.7, 133.9, 129.4, 128.6, 127.7, 126.0, 113.9, 73.9, 55.3, 40.8, 31.2.HRMS *m/z* calcd for $C_{16}H_{18}O_2$[M]242.1307, found 242.1304.

***3-(4-fluorophenyl)-1-phenylpropan-1-ol*(6da)**[S19]



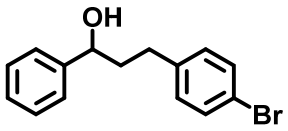
Colorless oil (184.0 mg, 80% yield).^{1}H NMR (600 MHz, $CDCl_3$, ppm)δ 7.39–7.33 (m, 4H), 7.33–7.29 (m, 1H), 7.14 (dd, *J* = 8.3, 5.6 Hz, 2H), 6.98 (t, *J* = 8.7 Hz, 2H), 4.66 (dd, *J* = 7.7, 5.4 Hz, 1H), 2.77–2.69 (m, 1H), 2.68–2.61 (m, 1H), 2.22–2.16 (m, 1H), 2.15–2.06 (m, 1H), 2.04–1.95 (m, 1H).^{13}C NMR (151 MHz, $CDCl_3$, ppm) δ 162.1, 160.5, 144.6, 137.5, 129.8, 128.6, 127.8, 126.0, 115.2, 115.1, 73.8, 40.6, 31.3.HRMS *m/z* calcd for $C_{15}H_{15}FO$[M] 230.1107, found 230.1107.

***3-(4-chlorophenyl)-1-phenylpropan-1-ol*(6ea)**[S19]



Colorless oil (204.2 mg, 83% yield). ^{1}H NMR (600 MHz, $CDCl_3$, ppm)δ 7.37–7.31 (m, 4H), 7.29 (t, *J* = 6.8 Hz, 1H), 7.24 (d, *J* = 8.6 Hz, 2H), 7.11 (d, *J* = 8.2 Hz, 2H), 4.65 (dd, *J* = 7.7, 5.5 Hz, 1H), 2.75–2.67 (m, 1H), 2.67–2.60 (m, 1H), 2.14–2.05 (m, 1H), 1.98 (ddd, *J* = 14.0, 9.4, 5.2 Hz, 1H), 1.94 (s, 1H).^{13}C NMR (151 MHz, $CDCl_3$, ppm) δ 144.5, 140.3, 131.7, 129.9, 128.6, 127.8, 126.0, 73.8, 40.4, 31.5. HRMS *m/z* calcd for $C_{15}H_{15}ClO$[M] 246.0811, found 246.0810.

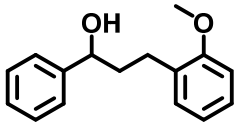
***3-(4-bromophenyl)-1-phenylpropan-1-ol*(6fa)**[S19]



Colorless oil (232.0 mg, 80% yield). ^{1}H NMR (600 MHz, $CDCl_3$, ppm) δ 7.36–7.30 (m, 4H), 7.27 (t, *J* = 6.8 Hz, 1H), 7.22 (d, *J* = 8.6 Hz, 2H), 7.09 (d, *J* = 8.2 Hz, 2H), 4.63 (dd, *J* = 7.7, 5.5 Hz,

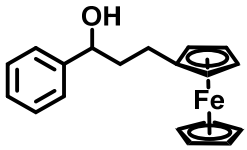
1H), 2.73–2.66 (m, 1H), 2.65–2.58 (m, 1H), 2.12–2.03 (m, 1H), 1.97 (ddd, *J* = 14.0, 9.4, 5.2 Hz, 1H), 1.92 (s, 1H). ^{13}C NMR (151 MHz, $CDCl_3$, ppm) δ 144.5, 140.3, 131.7, 129.9, 128.6, 127.8, 126.0, 73.8, 40.4, 31.5.HRMS *m/z* calcd for $C_{15}H_{15}BrO$[M] 290.0306, found 290.0302.

***3-(2-methoxyphenyl)-1-phenylpropan-1-ol*(6ha)**[S19]



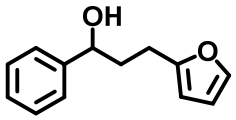
Colorless oil (205.7 mg, 85% yield). ^{1}H NMR (400 MHz, $CDCl_3$, ppm)δ 7.42 (d, *J* = 4.1 Hz, 4H), 7.38–7.31 (m, 1H), 7.20 (s, 4H), 4.81–4.69 (m, 1H), 2.88–2.75 (m, 1H), 2.73–2.61 (m, 1H), 2.33 (s, 3H), 2.22–1.93 (m, 2H).^{13}C NMR (151 MHz, $CDCl_3$, ppm) δ 144.6, 140.1, 136.0, 130.2, 128.8, 128.5, 127.6, 126.0, 74.2, 39.3, 29.4, 19.3.HRMS *m/z* calcd for $C_{16}H_{18}O_2$[M] 242.1307, found 242.1306.

***3-ferrocenyl-1-phenylpropan-1-ol*(6ia)**[S23]



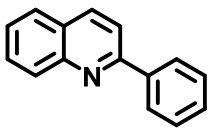
Red oil (288.0 mg, 90% yield). ^{1}H NMR (400 MHz, $CDCl_3$, ppm)δ 7.25 (t, *J* = 13.6 Hz, 5H), 4.54 (t, *J* = 6.2 Hz, 1H), 4.01 (d, *J* = 13.4 Hz, 9H), 2.47 (s, 1H), 2.43–2.31 (m, 1H), 2.31–2.14 (m, 1H), 2.08–1.75 (m, 2H).^{13}C NMR (151 MHz, $CDCl_3$, ppm)δ 144.7, 128.5, 127.6, 126.0, 88.6, 74.1, 68.6, 68.0, 67.2, 40.0, 25.7.HRMS *m/z* calcd for $C_{19}H_{18}FeO$ [M] 320.0867, found 320.0864.

***3-(furan-2-yl)-1-phenylpropan-1-ol*(6ja)**[S19]



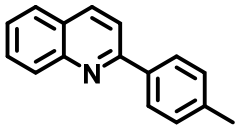
Yellow oil (159.6 mg, 79% yield). ^{1}H NMR (400 MHz, $CDCl_3$, ppm)δ 7.36 (d, *J* = 4.2 Hz, 4H), 7.29 (dd, *J* = 8.9, 4.2 Hz, 2H), 6.29 (s, 1H), 6.01 (d, *J* = 2.2 Hz, 1H), 4.71 (dd, *J* = 7.3, 5.9 Hz, 1H), 2.81–2.65 (m, 2H), 2.12 (ddd, *J* = 30.2, 14.7, 7.6 Hz, 2H), 1.98 (s, 1H).^{13}C NMR (151 MHz, $CDCl_3$, ppm) δ 155.7, 144.5, 141.1, 128.7, 127.8, 126.0, 110.3, 105.2, 73.8, 37.3, 24.5.HRMS *m/z* calcd for $C_{13}H_{14}O_2$ [M] 202.0994, found 202.0996.

***2-phenylquinoline*(8a)**[S3]



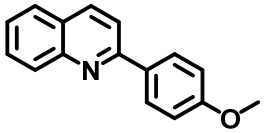
Yellow solid (131.2 mg, 64% yield).^{1}H NMR (400 MHz, $CDCl_3$, ppm)δ 8.20 (dd, *J* = 12.6, 8.3 Hz, 4H), 7.85 (dd, *J* = 19.3, 8.3 Hz, 2H), 7.74 (t, *J* = 7.3 Hz, 1H), 7.62–7.43 (m, 4H).^{13}C NMR (101 MHz, $CDCl_3$, ppm)δ 157.4, 148.3, 139.7, 137.0, 129.8, 129.5, 129.0, 127.7, 127.3, 126.4, 119.1.HRMS *m/z* calcd for $C_{15}H_{11}N$ $[M+H]^+$ 206.0970, found 206.0966.

***2-(p-tolyl)quinoline*(8b)**[S24]



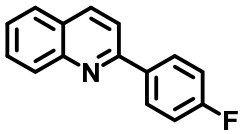
Yellow solid (146.7 mg, 67% yield).^{1}H NMR (400 MHz, $CDCl_3$, ppm)δ 8.24–8.16 (m, 2H), 8.09 (d, *J* = 7.1 Hz, 2H), 7.83 (dd, *J* = 17.8, 8.3 Hz, 2H), 7.73 (t, *J* = 7.6 Hz, 1H), 7.52 (t, *J* = 7.4 Hz, 1H), 7.34 (d, *J* = 7.6 Hz, 2H), 2.44 (s, 3H).^{13}C NMR (101 MHz, $CDCl_3$, ppm) δ 157.4, 148.3, 139.6, 136.9, 129.7, 127.6, 127.2, 126.2, 119.0, 21.5.HRMS *m/z* calcd for $C_{16}H_{13}N$ $[M+H]^+$ 220.1126, found 220.1122.

***2-(4-methoxyphenyl)quinolone*(8c)**[S3]



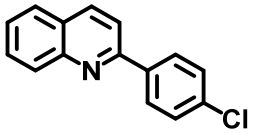
Yellow solid (164.5 mg, 70% yield).^{1}H NMR (400 MHz, $CDCl_3$, ppm)δ 8.16 (t, *J* = 8.7 Hz, 4H), 7.87–7.76 (m, 2H), 7.71 (t, *J* = 7.5 Hz, 1H), 7.50 (t, *J* = 7.1 Hz, 1H), 7.05 (d, *J* = 8.4 Hz, 2H), 3.88 (d, *J* = 1.3 Hz, 3H). ^{13}C NMR (101 MHz, $CDCl_3$, ppm)δ 161.0, 157.0, 148.3, 136.9, 132.2, 130.1, 129.9, 129.7, 129.1, 127.6, 127.0, 126.1, 118.7, 114.4, 55.5.HRMS *m/z* calcd for $C_{16}H_{13}NO$ $[M+H]^+$ 236.1075, found 236.1069.

***2-(4-fluorophenyl)quinolone*(8d)**[S3]



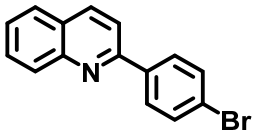
Yellow solid (116.0 mg,52% yield).^{1}H NMR (600 MHz, $CDCl_3$, ppm)δ 8.20 (d, *J* = 8.6 Hz, 1H), 8.17 (d, *J* = 8.5 Hz, 3H), 7.82 (d, *J* = 8.3 Hz, 2H), 7.73 (t, *J* = 7.6 Hz, 1H), 7.53 (t, *J* = 7.4 Hz, 1H), 7.21 (t, *J* = 8.5 Hz, 2H).^{13}C NMR (151 MHz, $CDCl_3$, ppm) δ 164.8, 163.1, 156.3, 148.3, 137.0, 135.9, 129.9, 129.7, 129.5, 127.6, 127.2, 126.5, 118.7, 116.0, 115.8.HRMS *m/z* calcd for $C_{15}H_{10}FN$ $[M+H]^+$ 224.0876, found 224.0880.

***2-(4-chlorophenyl)quinolone*(8e)**[S3]



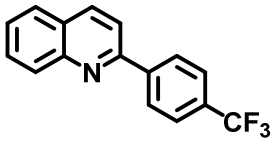
Yellow solid (136.2 mg, 57% yield).^{1}H NMR (600 MHz, $CDCl_3$, ppm) δ 8.23 (d, *J* = 8.6 Hz, 1H), 8.18 (d, *J* = 8.5 Hz, 1H), 8.13 (d, *J* = 8.5 Hz, 2H), 7.84 (dd, *J* = 8.2, 4.3 Hz, 2H), 7.74 (t, *J* = 7.7 Hz, 1H), 7.54 (t, *J* = 7.5 Hz, 1H), 7.50 (d, *J* = 8.5 Hz, 2H).^{13}C NMR (151 MHz, $CDCl_3$, ppm) δ 156.1, 148.2, 138.0, 137.2, 135.8, 130.0, 129.7, 129.2, 129.0, 127.6, 127.4, 126.7, 118.7.HRMS *m/z* calcd for $C_{15}H_{10}ClN$ $[M+H]^+$ 240.0580, found 240.0572.

***2-(4-bromophenyl)quinolone*(8f)**[S3]



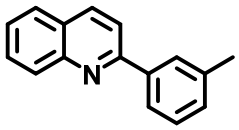
Yellow solid (149.5 mg, 53% yield). ^{1}H NMR (600 MHz, $CDCl_3$, ppm) δ 8.22 (d, *J* = 8.6 Hz, 1H), 8.19 (d, *J* = 8.5 Hz, 1H), 8.06 (d, *J* = 8.4 Hz, 2H), 7.83 (d, *J* = 8.4 Hz, 2H), 7.74 (t, *J* = 7.6 Hz, 1H), 7.65 (d, *J* = 8.4 Hz, 2H), 7.54 (t, *J* = 7.5 Hz, 1H).^{13}C NMR (101 MHz, $CDCl_3$, ppm) δ 156.1, 148.2, 138.4, 137.3, 132.1, 130.1, 129.7, 129.3, 127.6, 127.4, 126.7, 124.1, 118.7.HRMS *m/z* calcd for $C_{15}H_{10}BrN$ $[M+H]^+$ 282.9997, found 282.9990.

***2-(4-(trifluoromethyl)phenyl)quinolone*(8g)**[S25]



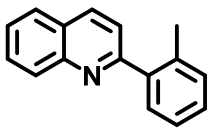
Yellow solid (136.0 mg, 50% yield). ^{1}H NMR (400 MHz, $CDCl_3$, ppm) δ 8.27 (t, *J* = 8.5 Hz, 3H), 8.21 (d, *J* = 8.5 Hz, 1H), 7.94–7.82 (m, 2H), 7.77 (t, *J* = 8.7 Hz, 3H), 7.57 (t, *J* = 7.4 Hz, 1H). ^{13}C NMR (101 MHz, $CDCl_3$, ppm) δ 155.8, 148.3, 143.0, 137.3, 130.2, 129.9, 128.0, 127.6, 127.0, 125.9, 118.9. HRMS *m/z* calcd for $C_{16}H_{10}F_3N$ $[M+H]^+$ 273.0765, found 273.0770.

***2-(m-tolyl)quinolone*(8h)**[S3]



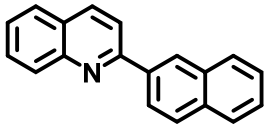
Yellow solid (133.6 mg, 61% yield).^{1}H NMR (400 MHz, $CDCl_3$, ppm) δ 8.22 (t, *J* = 7.7 Hz, 2H), 8.03 (s, 1H), 7.94 (d, *J* = 7.6 Hz, 1H), 7.85 (dd, *J* = 16.9, 8.3 Hz, 2H), 7.74 (t, *J* = 7.6 Hz, 1H), 7.53 (t, *J* = 7.4 Hz, 1H), 7.43 (t, *J* = 7.6 Hz, 1H), 7.30 (d, *J* = 7.4 Hz, 1H), 2.49 (s, 3H).^{13}C NMR (101 MHz, $CDCl_3$, ppm) δ 157.6, 138.7, 137.2, 130.4, 130.0, 129.6, 128.9, 128.5, 127.6, 127.3, 126.5, 125.0, 119.4, 21.7.HRMS *m/z* calcd for $C_{16}H_{13}N$ $[M+H]^+$ 220.1126, found 220.1125.

***2-(o-tolyl)quinolone*(8i)**[S3]



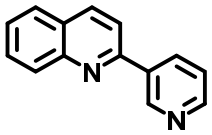
Yellow solid (122.6 mg, 56% yield). ^{1}H NMR (400 MHz, $CDCl_3$, ppm) δ 8.21 (dd, *J* = 19.1, 8.5 Hz, 2H), 7.85 (d, *J* = 8.1 Hz, 1H), 7.76 (t, *J* = 7.6 Hz, 1H), 7.55 (dd, *J* = 11.9, 6.0 Hz, 3H), 7.37 (s, 3H), 2.46 (s, 3H). ^{13}C NMR (151 MHz, $CDCl_3$, ppm) δ 160.2, 147.8, 140.7, 136.0, 130.8, 129.8, 129.4, 128.5, 127.5, 126.7, 126.4, 126.0, 122.3, 20.4.HRMS *m/z* calcd for $C_{16}H_{13}N$ $[M+H]^+$ 220.1126, found 220.1125.

***2-(naphthalen-2-yl)quinoline*(8j)**[S24]



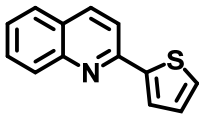
Yellow solid (181.1 mg, 71% yield).^{1}H NMR (400 MHz, $CDCl_3$, ppm) δ 8.63 (s, 1H), 8.38 (d, *J* = 8.5 Hz, 1H), 8.31–8.21 (m, 2H), 8.06–7.98 (m, 3H), 7.91 (dd, *J* = 5.9, 3.4 Hz, 1H), 7.84 (d, *J* = 8.1 Hz, 1H), 7.76 (t, *J* = 7.6 Hz, 1H), 7.59–7.51 (m, 3H). ^{13}C NMR (101 MHz, $CDCl_3$, ppm) δ 157.2, 148.3, 137.1, 136.9, 134.0, 133.6, 129.9, 129.7, 129.0, 128.7, 127.8, 127.6, 127.4, 126.9, 126.5, 125.2, 119.3.HRMS *m/z* calcd for $C_{19}H_{13}N$ $[M+H]^+$ 256.1126, found 256.1136.

***2-(pyridin-3-yl)quinolone*(8k)**[S3]



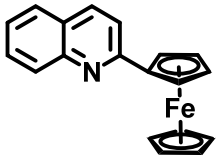
Brown solid (133.9 mg, 65% yield). ^{1}H NMR (400 MHz, $CDCl_3$, ppm)δ 9.35 (s, 1H), 8.69 (d, *J* = 4.6 Hz, 1H), 8.50 (d, *J* = 7.9 Hz, 1H), 8.24 (d, *J* = 8.6 Hz, 1H), 8.17 (d, *J* = 8.5 Hz, 1H), 7.91–7.79 (m, 2H), 7.74 (t, *J* = 7.7 Hz, 1H), 7.55 (t, *J* = 7.5 Hz, 1H), 7.44 (dd, *J* = 7.7, 4.9 Hz, 1H). ^{13}C NMR (101 MHz, $CDCl_3$, ppm) δ 154.7, 150.2, 148.9, 148.5, 137.3, 135.2, 130.1, 129.9, 127.6, 126.9, 123.8, 118.6.HRMS *m/z* calcd for $C_{14}H_{10}N_2$ $[M+H]^+$ 207.0922, found 207.0923.

***2-(thiophen-2-yl)quinoline*(8l)**[S3]



Yellow solid (128.7 mg, 61% yield).^{1}H NMR (400 MHz, $CDCl_3$, ppm)δ 8.18–8.07 (m, 2H), 7.84–7.73 (m, 3H), 7.70 (t, *J* = 7.7 Hz, 1H), 7.48 (dd, *J* = 8.4, 6.7 Hz, 2H), 7.20–7.12 (m, 1H). ^{13}C NMR (101 MHz, $CDCl_3$, ppm) δ 152.4, 148.1, 145.4, 136.8, 130.0, 129.3, 128.8, 128.2, 127.6, 127.3, 126.2, 117.8.HRMS *m/z* calcd for $C_{13}H_9NS$ $[M+H]^+$ 212.0534, found 212.0539.

***2-(ferrocenyl)quinoline*(8m)**[S3]



Red solid (209.7 mg, 67% yield). ^{1}H NMR (400 MHz, $CDCl_3$, ppm)δ 8.06 (t, *J* = 9.5 Hz, 2H), 7.75 (d, *J* = 7.7 Hz, 1H), 7.67 (t, *J* = 7.3 Hz, 1H), 7.58 (d, *J* = 8.2 Hz, 1H), 7.48 (t, *J* = 7.1 Hz, 1H), 5.09 (s, 2H), 4.48 (s, 2H), 4.07 (s, 5H). ^{13}C NMR (101 MHz, $CDCl_3$, ppm)δ 159.6, 148.4, 135.6, 129.5, 129.1, 127.6, 126.8, 125.5, 119.6, 84.0, 70.6, 69.8, 68.1.HRMS *m/z* calcd for $C_{19}H_{15}FeN$ $[M+H]^+$ 314.0632, found 314.0630.

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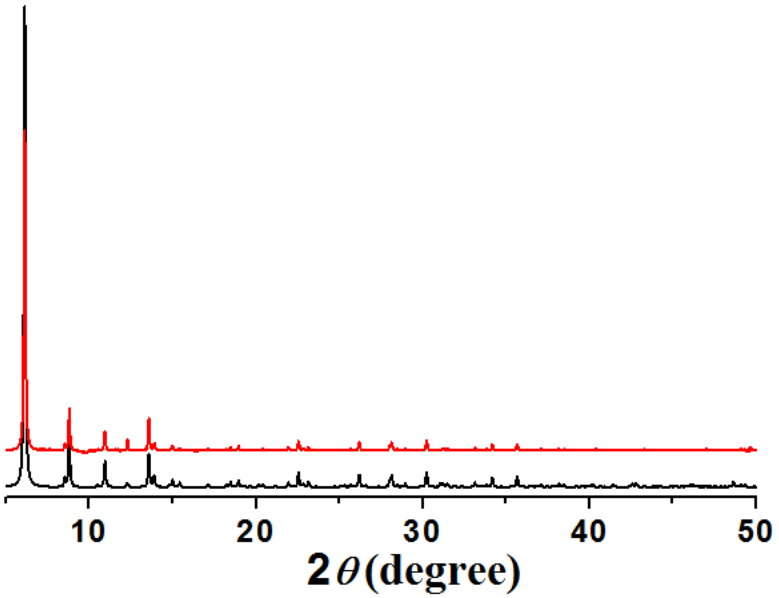


Fig. S1 The observed (red) and simulated (black) PXRD patterns for **1a**.

The ^{1}H and ^{13}C NMR spectra of products

Fig. S2 The ^{1}H and ^{13}C NMR spectra for 1,3-diphenylpropan-1-one (**4aa**)

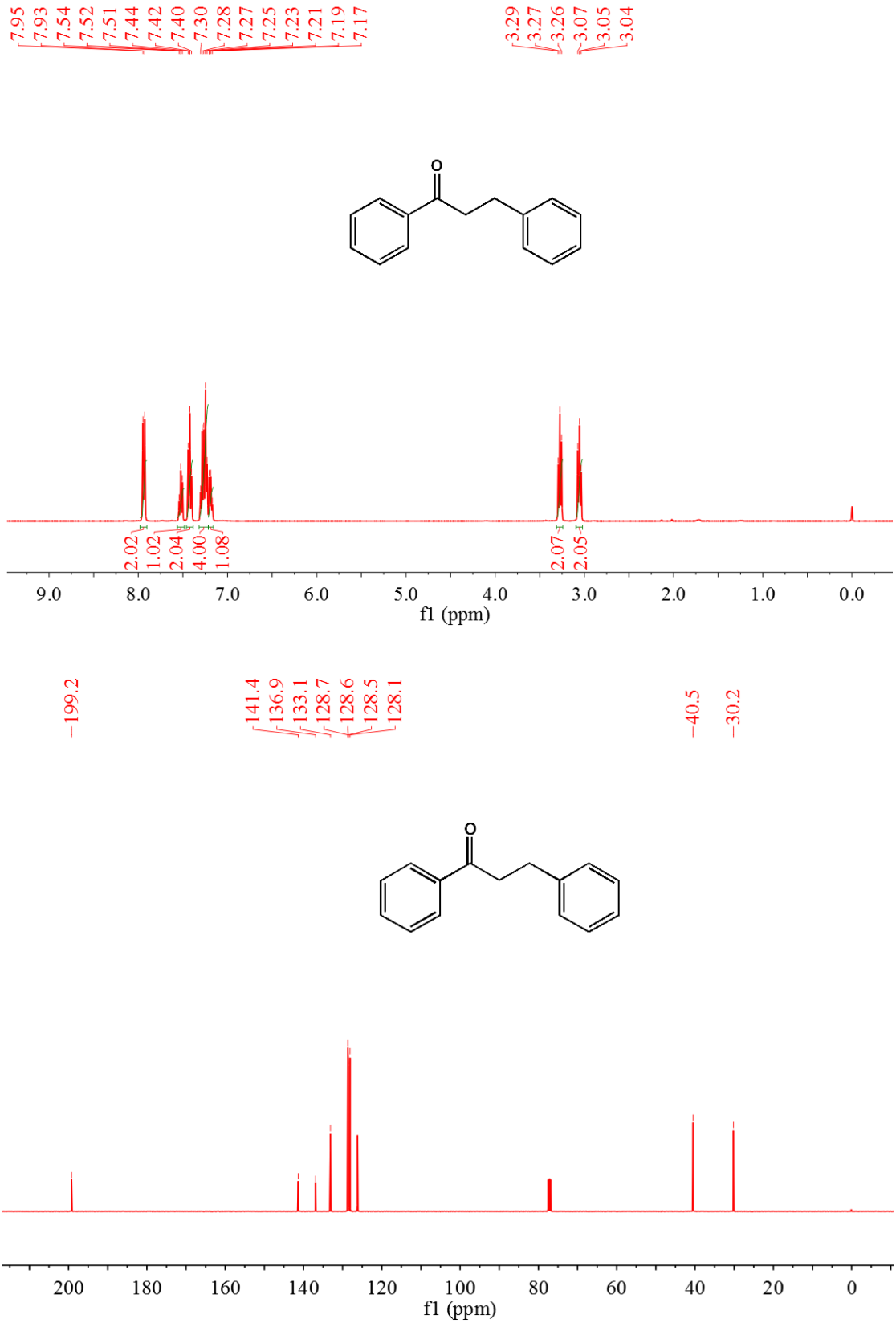


Fig. S3 The ^{1}H and ^{13}C NMR spectra for 3-phenyl-1-(*p*-tolyl)propan-1-one(**4ab**)

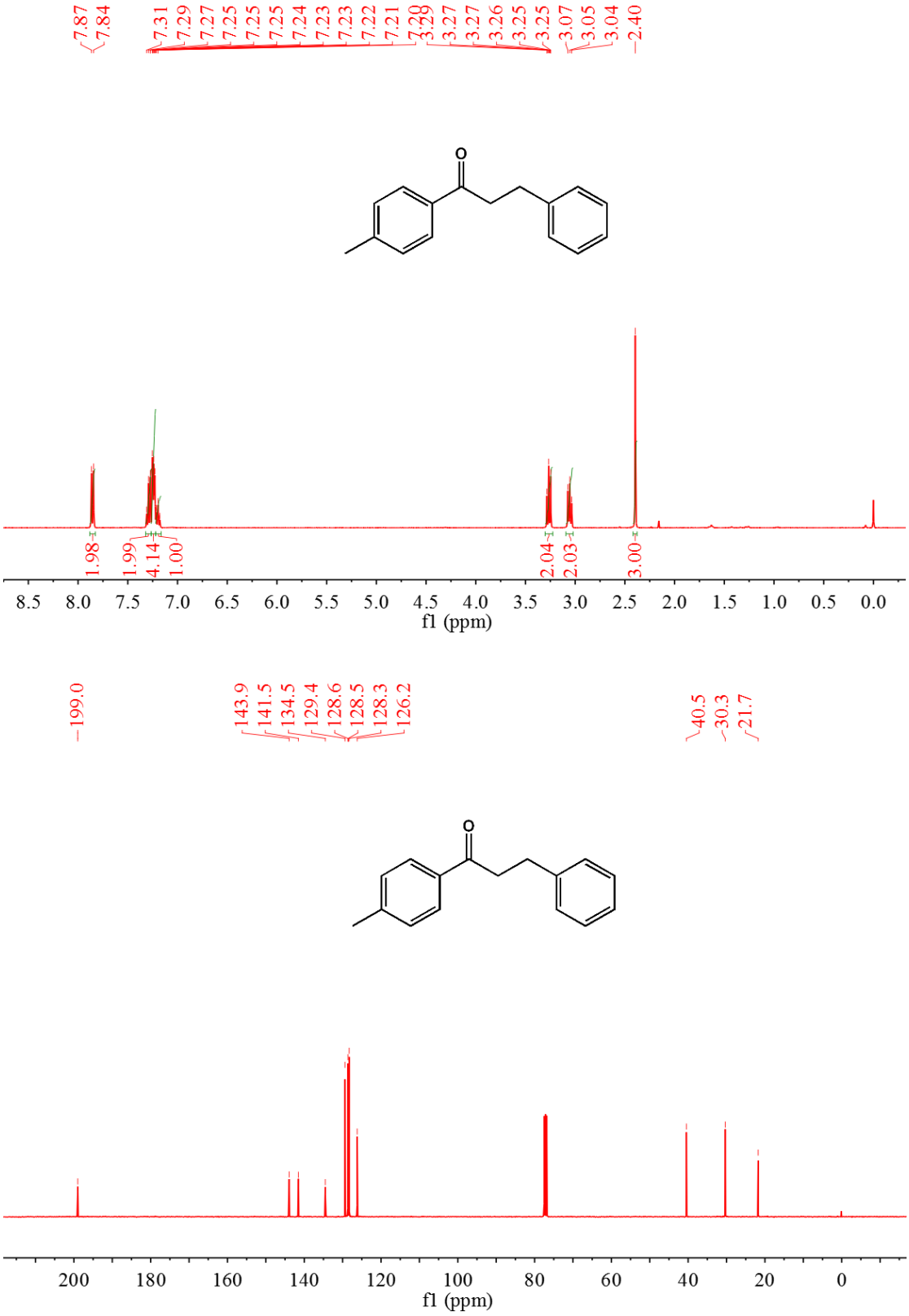


Fig. S4 The ^{1}H and ^{13}C NMR spectra for 1-(4-methoxyphenyl)-3-phenylpropan-1-one(**4ac**)

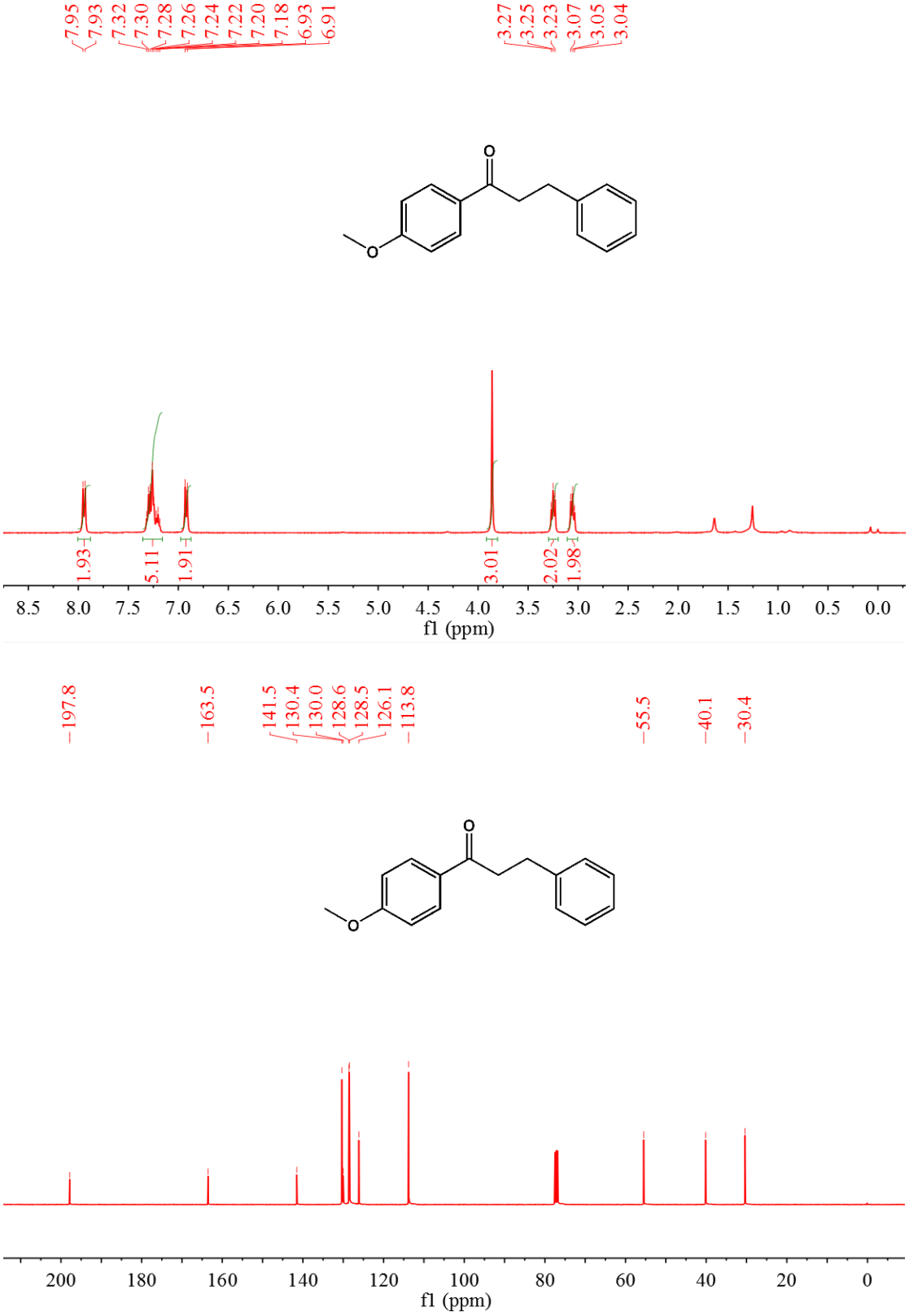


Fig. S5 The ^{1}H and ^{13}C NMR spectra for 1-(4-fluorophenyl)-3-phenylpropan-1-one (**4ad**)

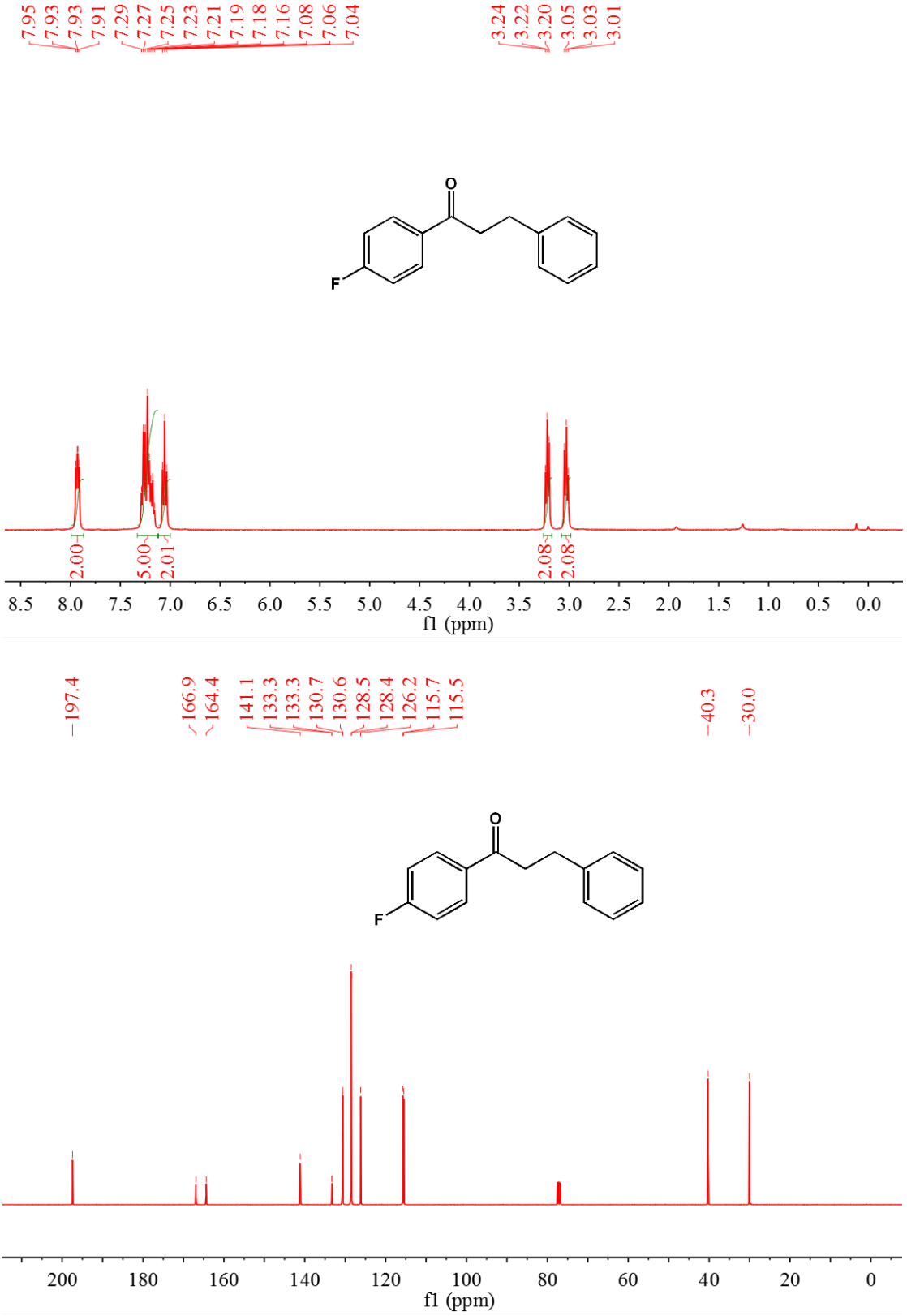


Fig. S6 The ^{1}H and ^{13}C NMR spectra for 1-(4-chlorophenyl)-3-phenylpropan-1-one(**4ae**)

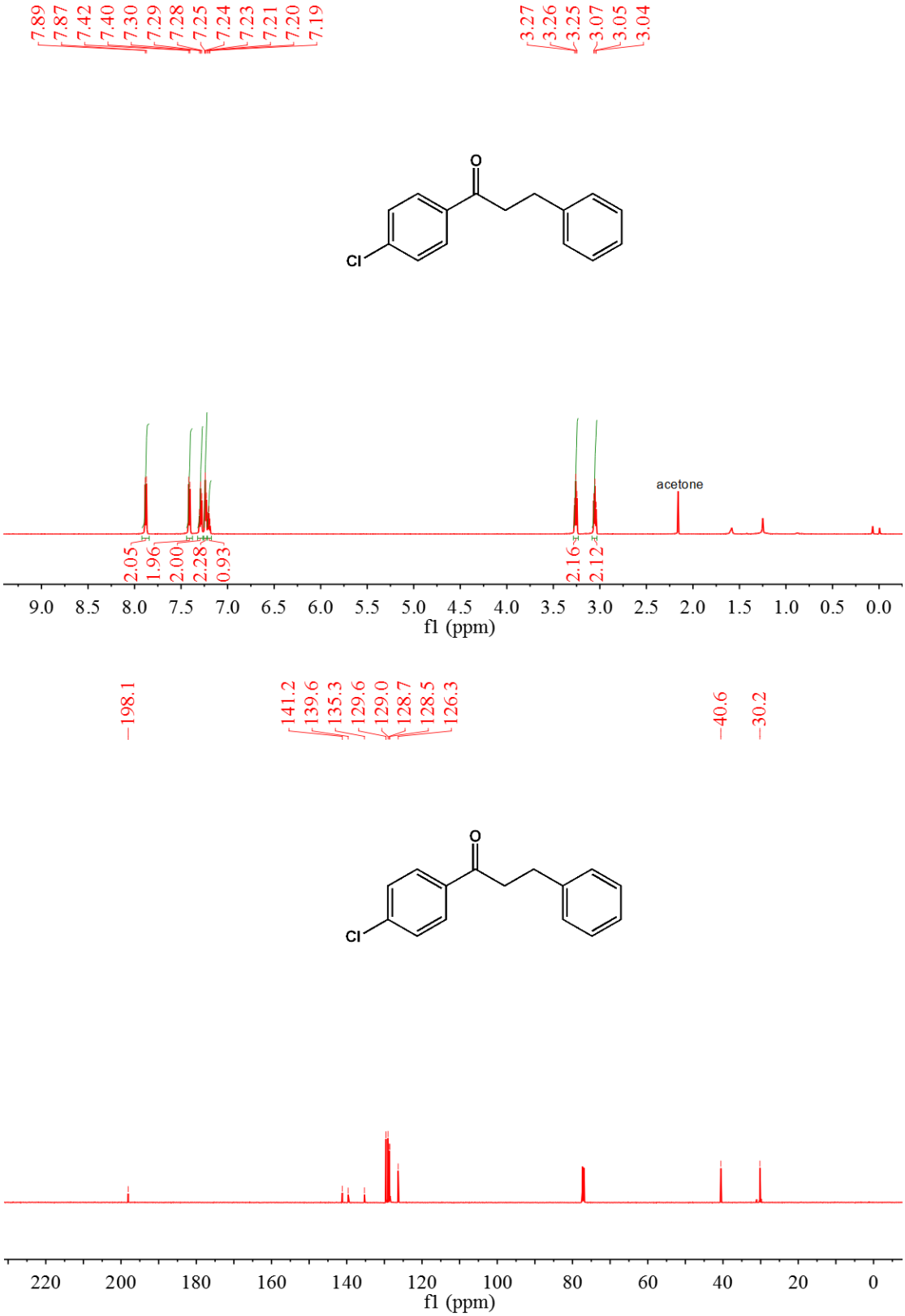


Fig. S7 The ^{1}H and ^{13}C NMR spectra for 1-(4-bromophenyl)-3-phenylpropan-1-one(**4af**)

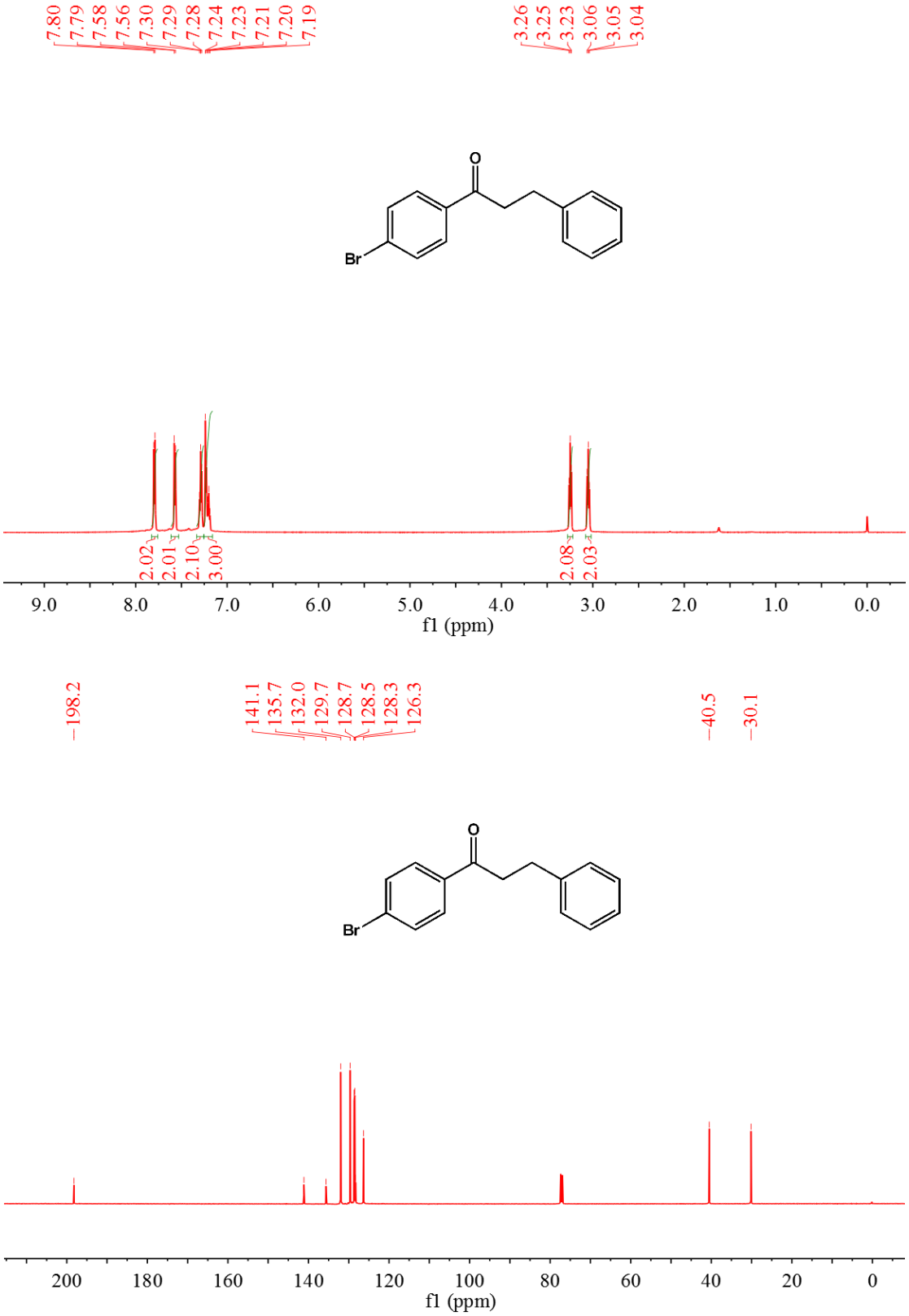


Fig. S8 The ^{1}H and ^{13}C NMR spectra for 3-phenyl-1-(m-tolyl)propan-1-one(**4ag**)

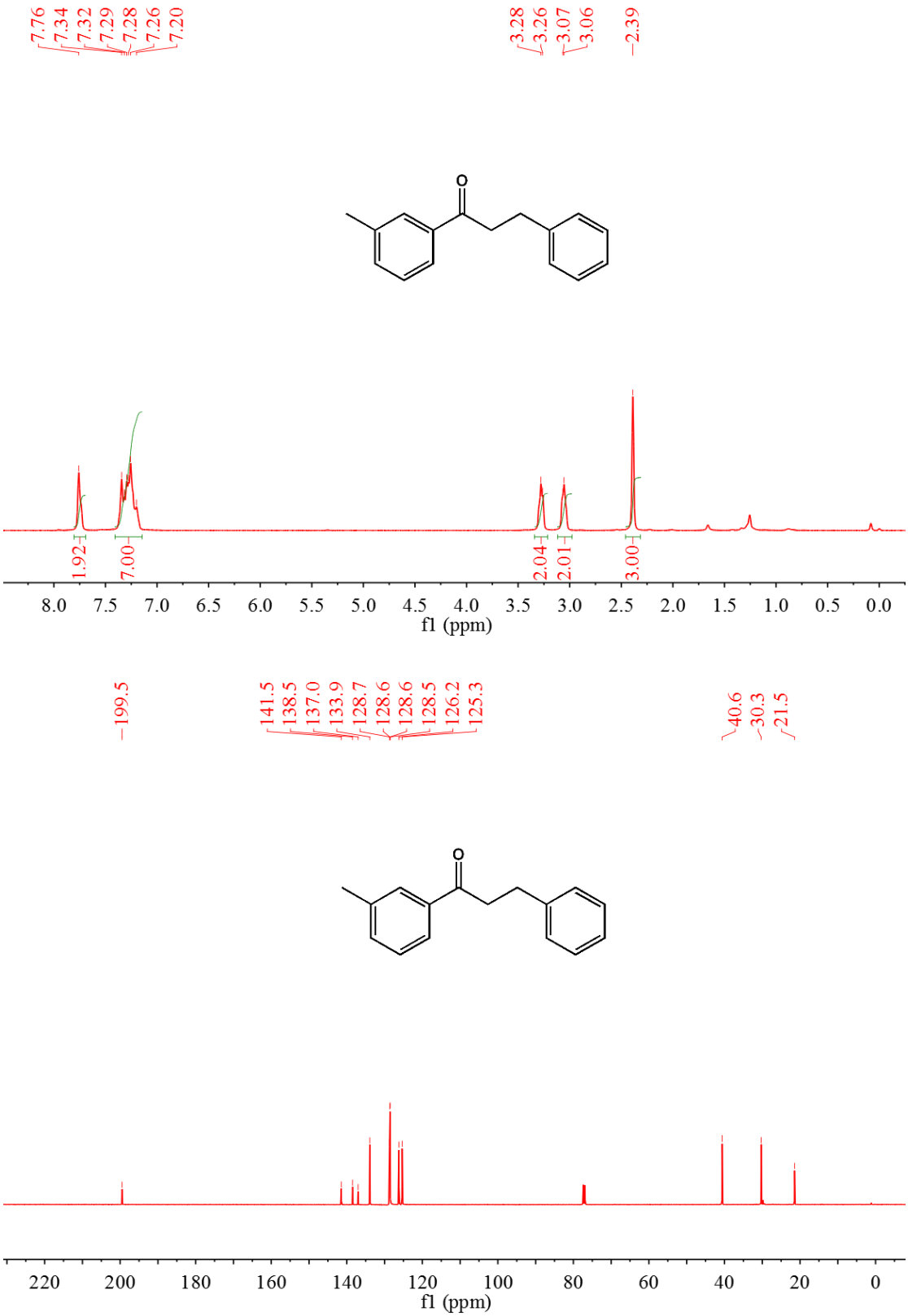


Fig. S9 The ^{1}H and ^{13}C NMR spectra for 1-(3-bromophenyl)-3-phenylpropan-1-one(**4ah**)

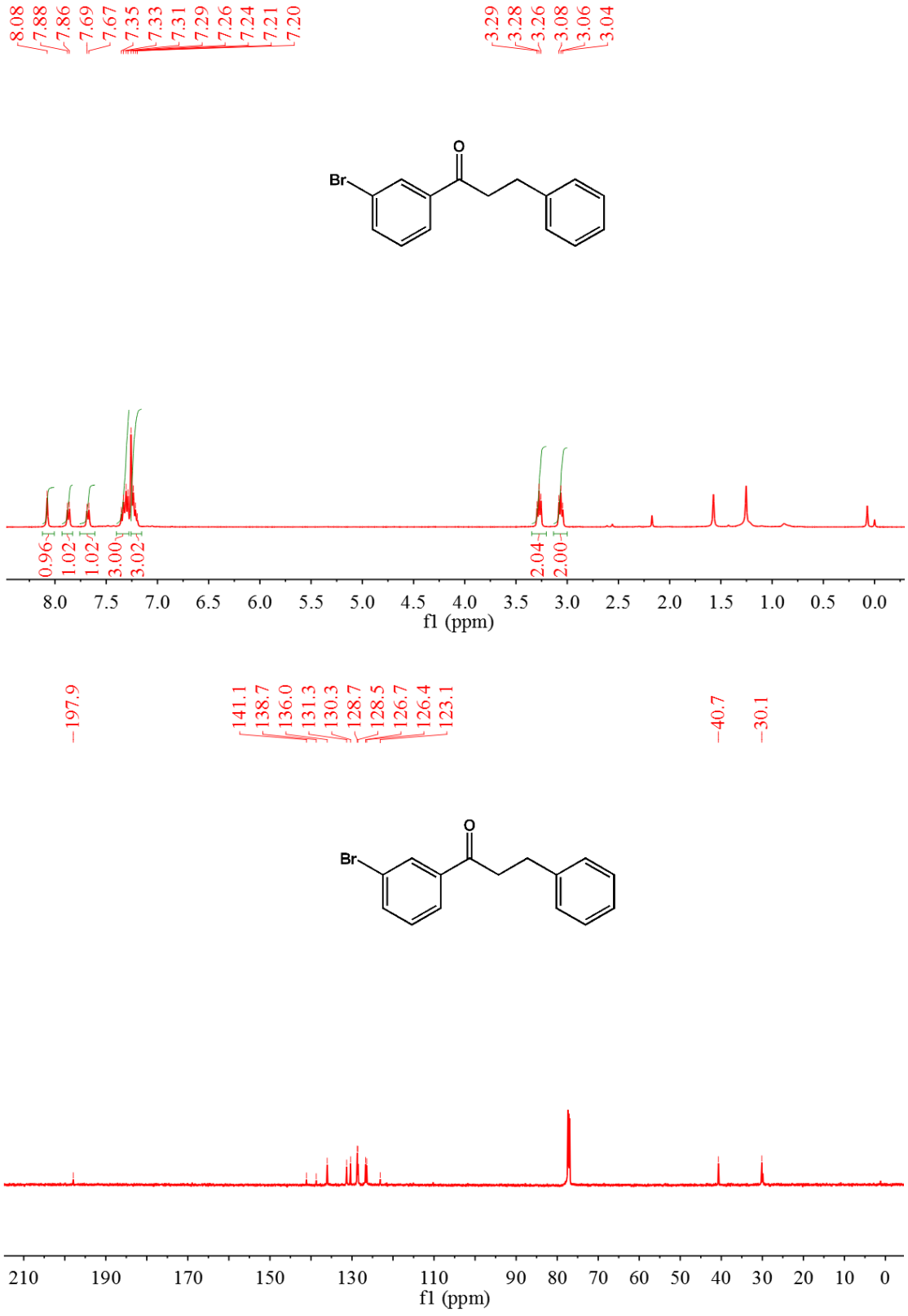


Fig. S10 The ^{1}H and ^{13}C NMR spectra for 3-phenyl-1-(o-tolyl)propan-1-one(**4ai**)

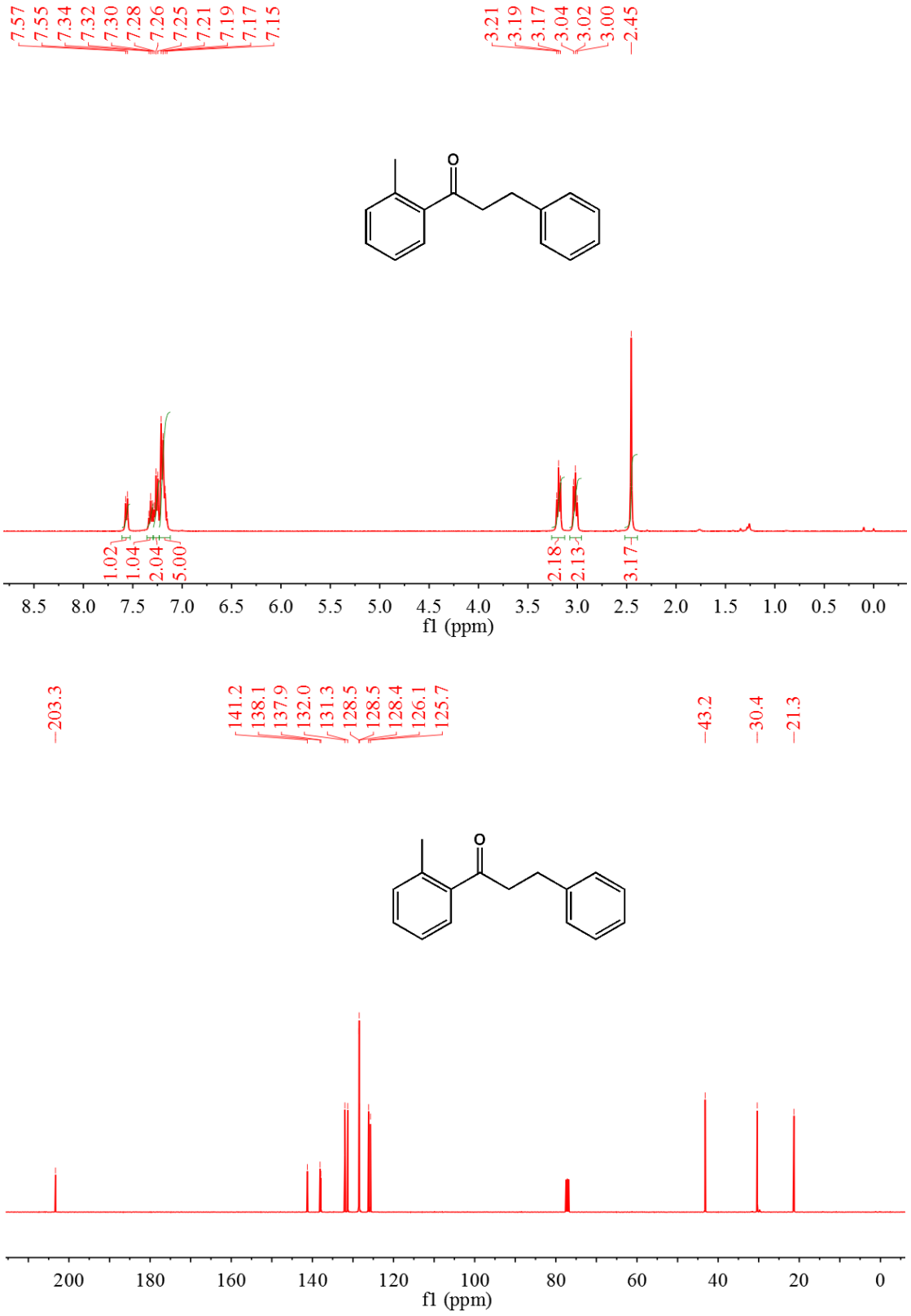


Fig. S11 The ^{1}H and ^{13}C NMR spectra for 1-(2-chlorophenyl)-3-phenylpropan-1-one(**4aj**)

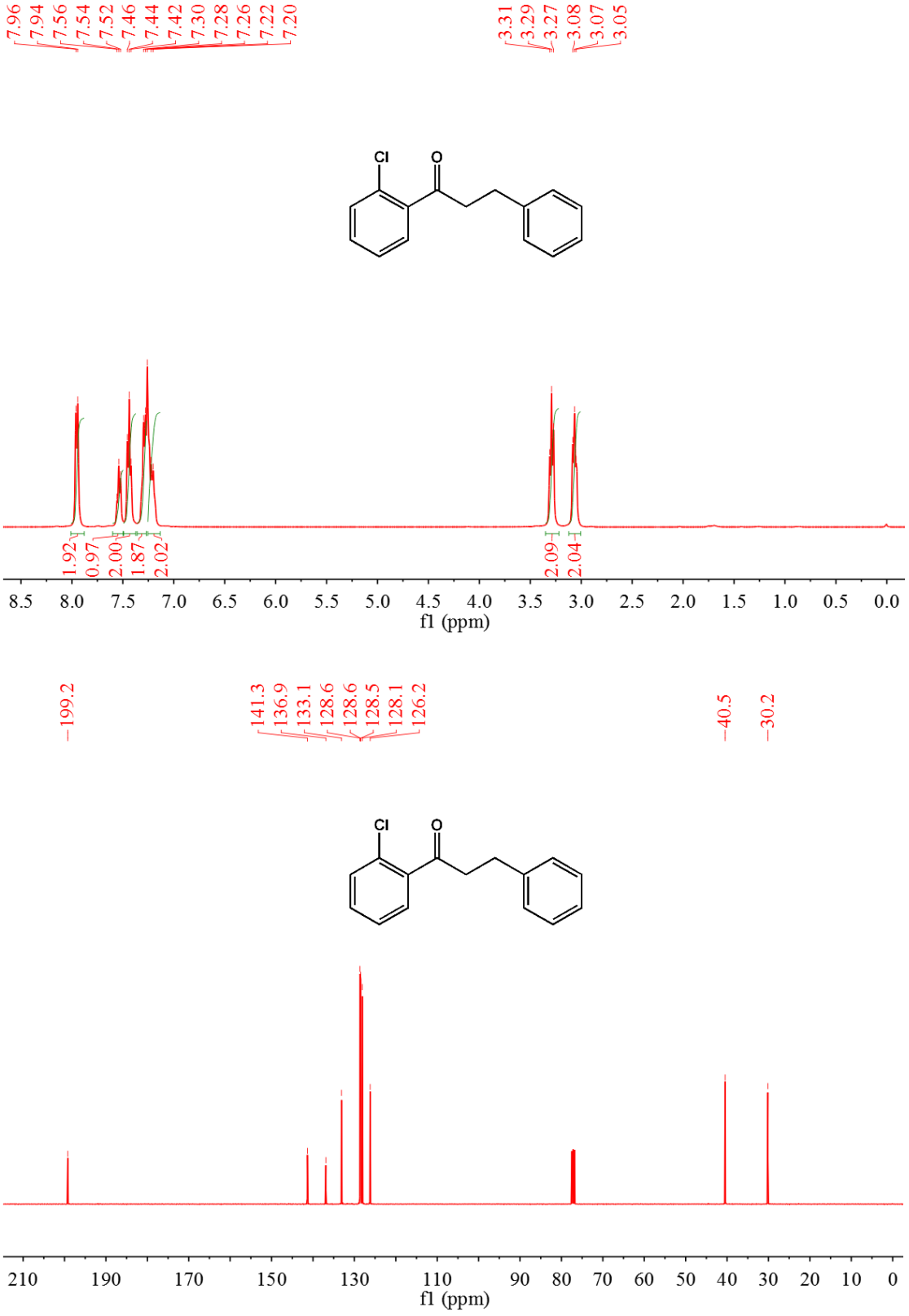


Fig. S12 The ^{1}H and ^{13}C NMR spectra for 1-mesityl-3-phenylpropan-1-one(**4ak**)

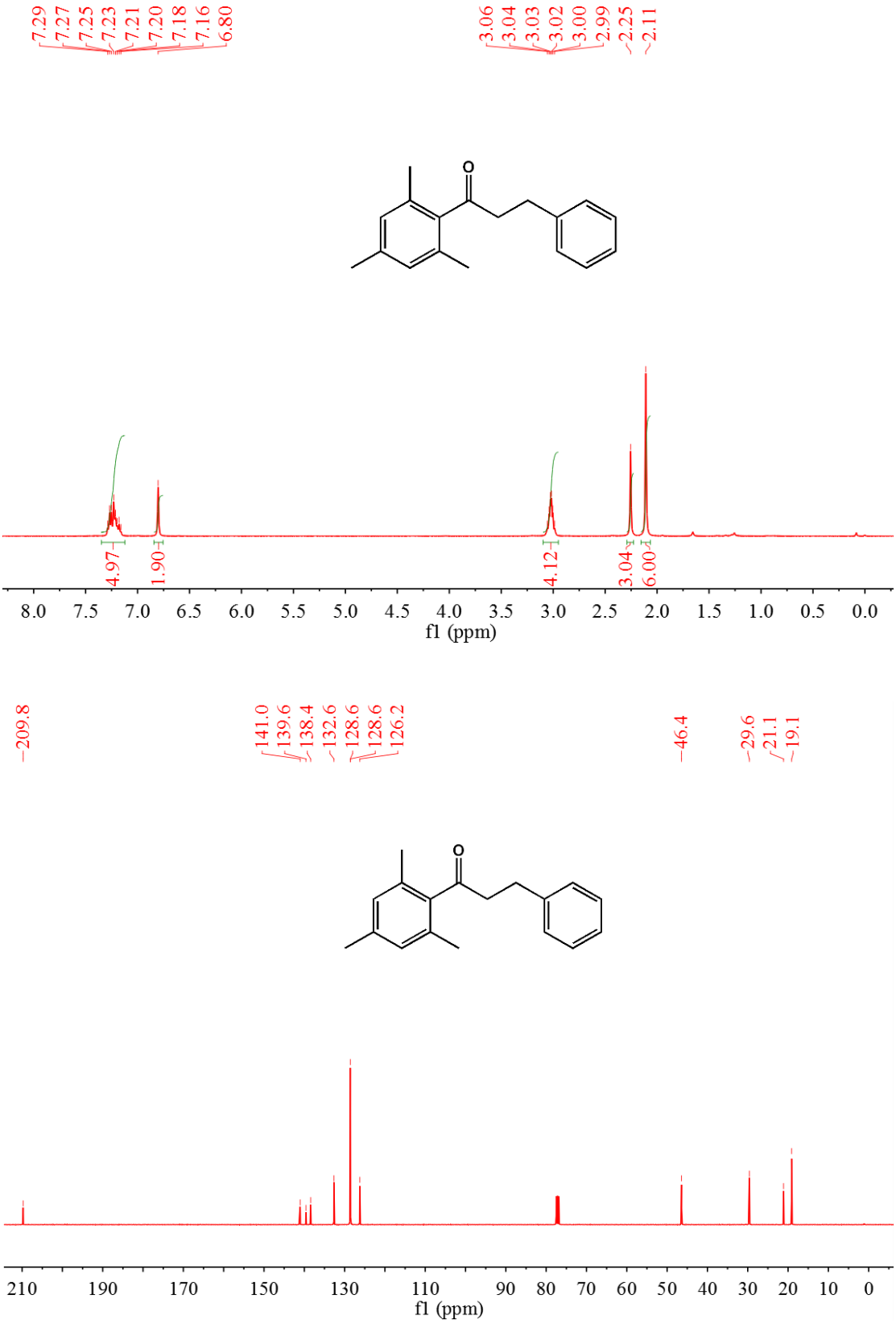


Fig. S13 The ^{1}H and ^{13}C NMR spectra for 1-(naphthalen-2-yl)-3-phenylpropan-1-one(**4al**)

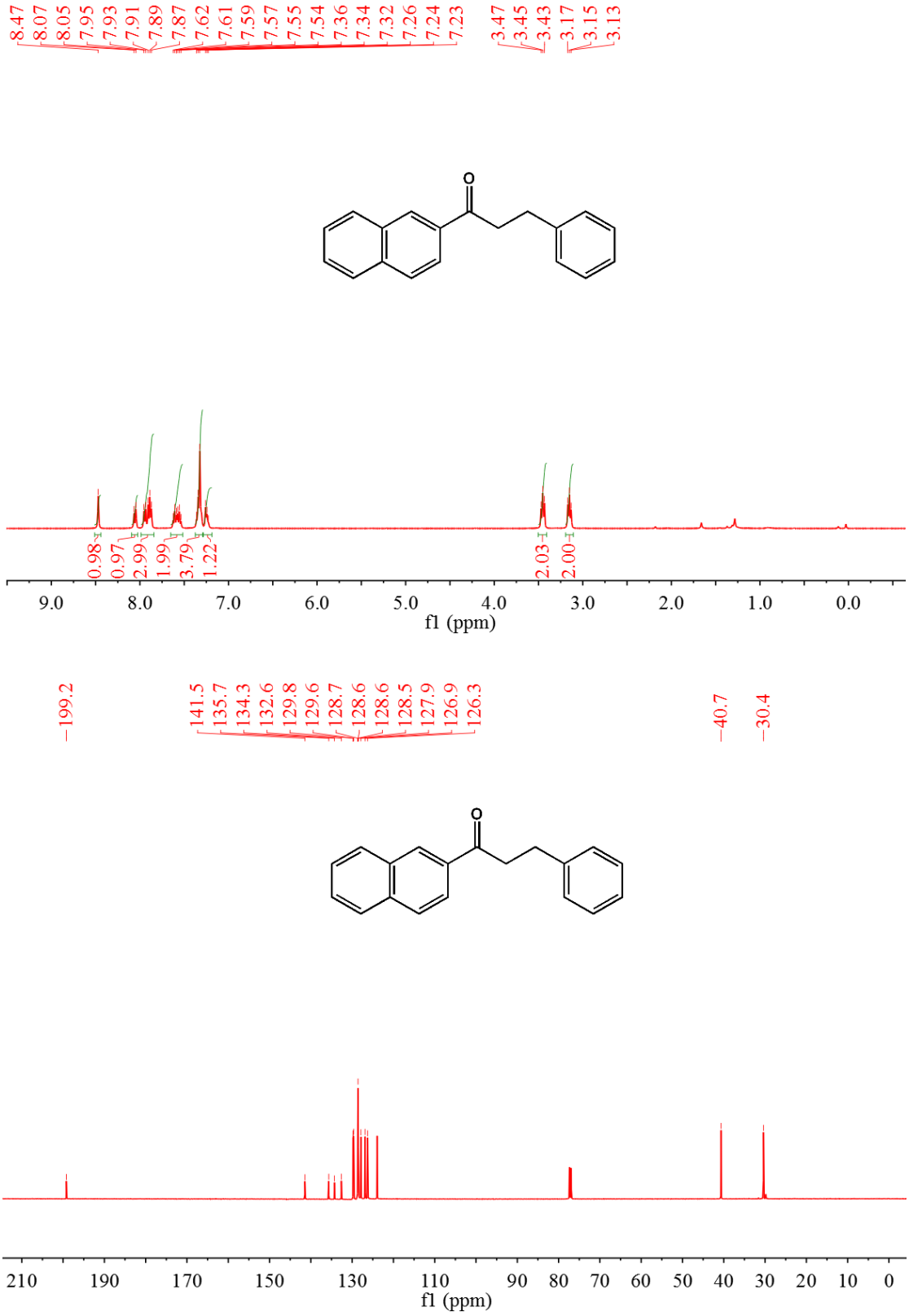


Fig. S14 The ^{1}H and ^{13}C NMR spectra for 1-(naphthalen-2-yl)-3-phenylpropan-1-one(**4am**)

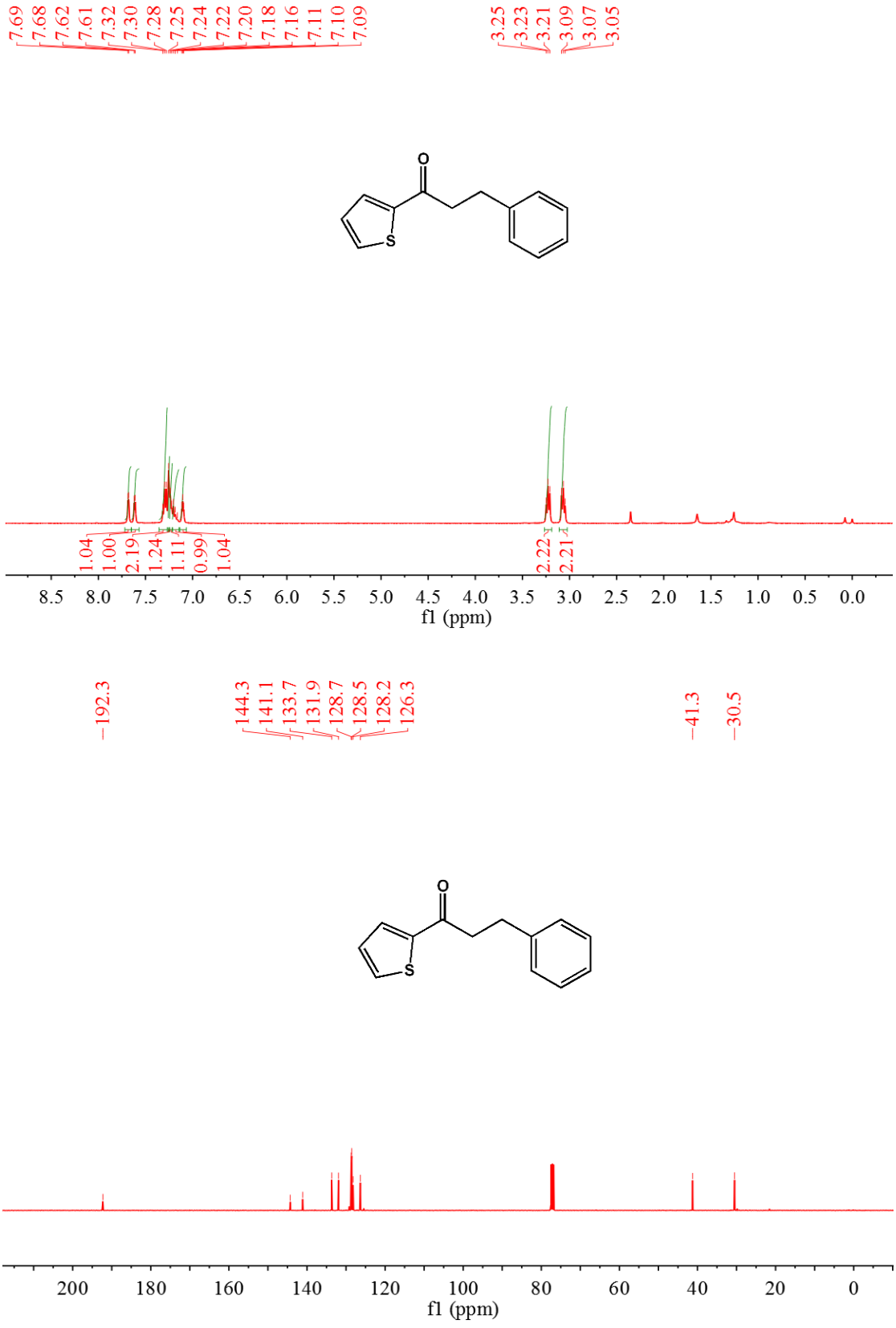


Fig. S15 The ^{1}H and ^{13}C NMR spectra for 3-phenyl-1-(ferrocenyl)propan-1-one (**4an**)

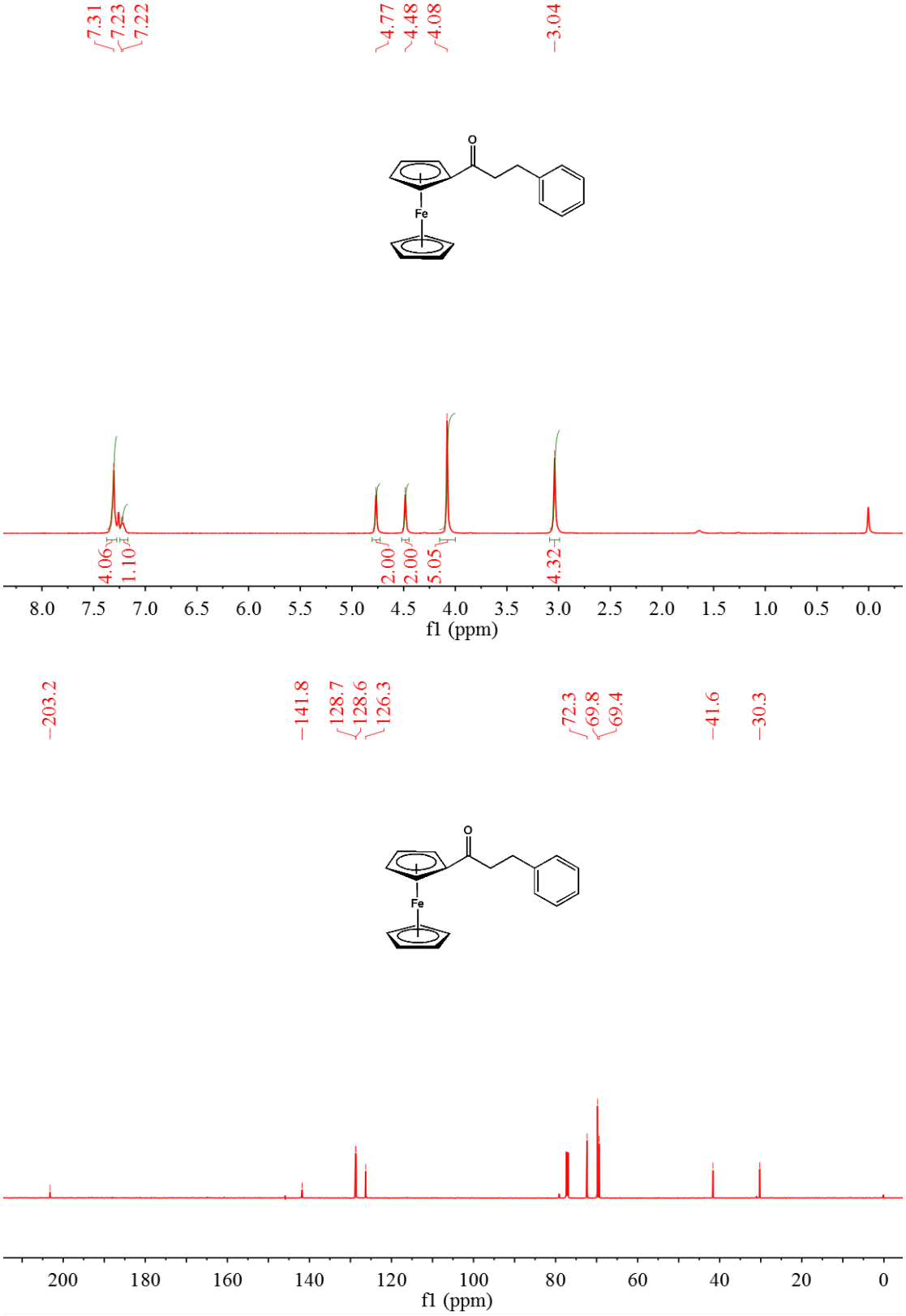


Fig. S16 The ^{1}H and ^{13}C NMR spectra for 2-methyl-1,3-diphenylpropan-1-one(**4ao**)

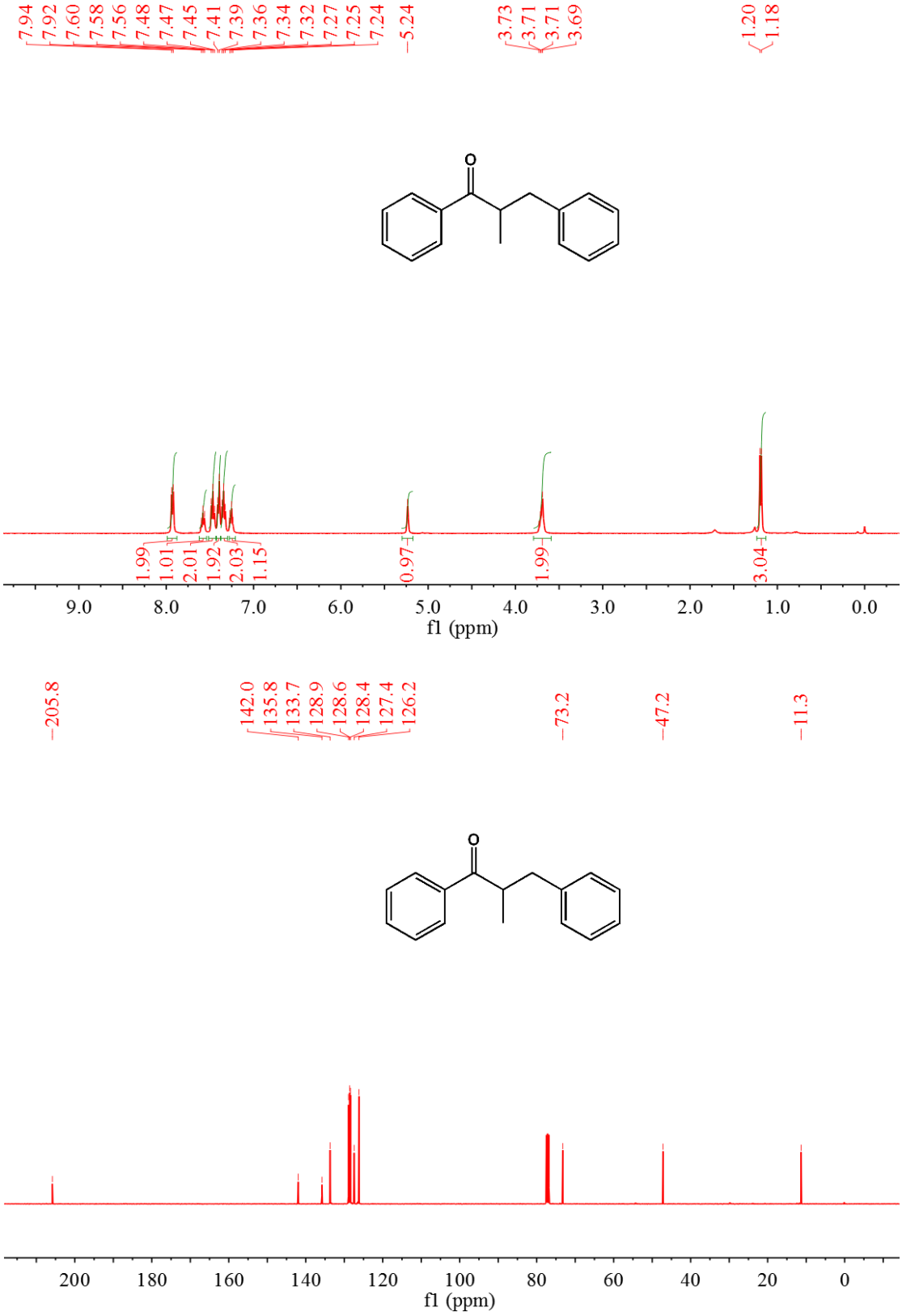


Fig. S17 The ^{1}H and ^{13}C NMR spectra for 2-benzyl-1-phenylbutan-1-one(**4ap**)

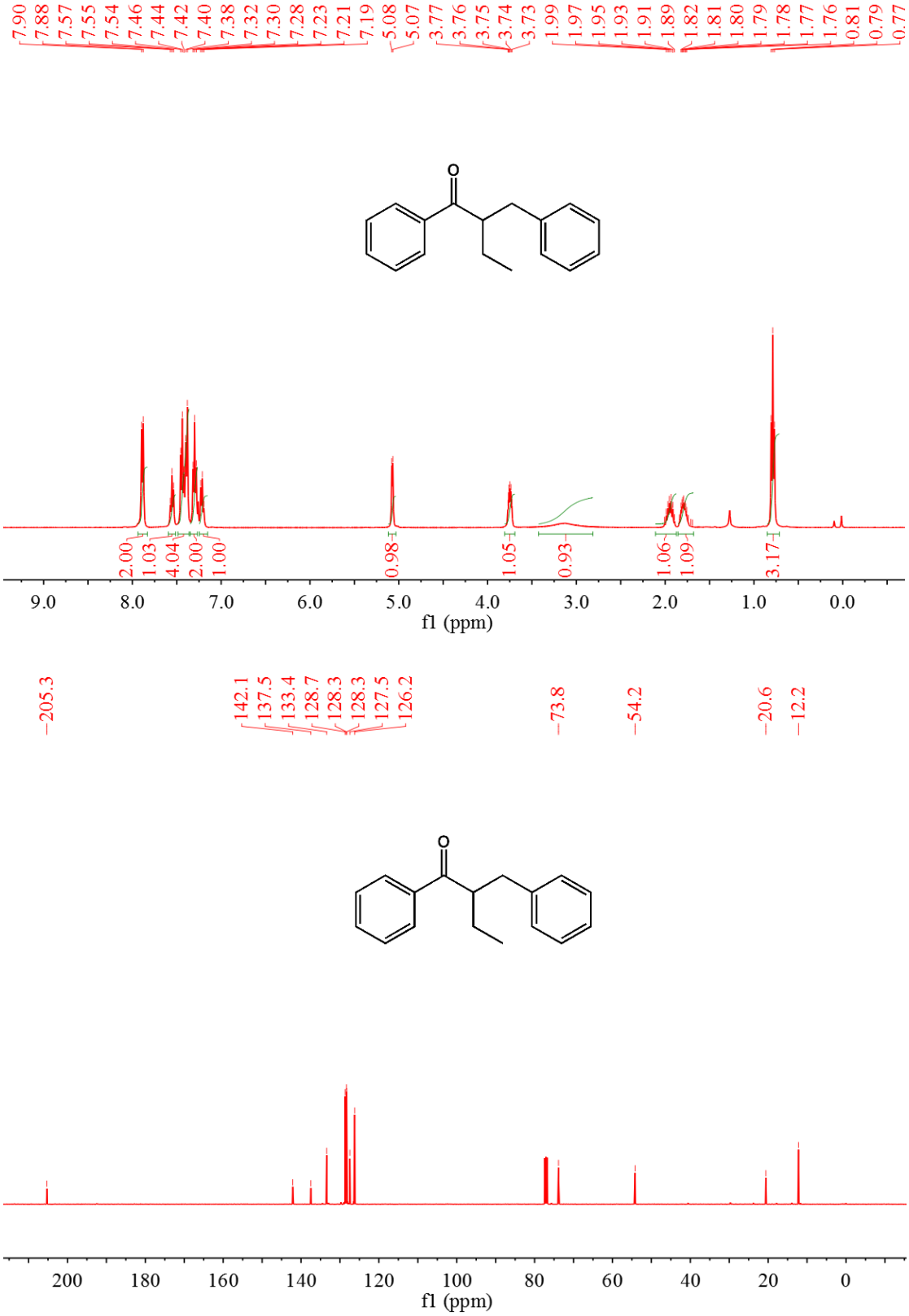


Fig. S18 The ^{1}H and ^{13}C NMR spectra for 2-benzylcyclohexan-1-one(**4aq**)

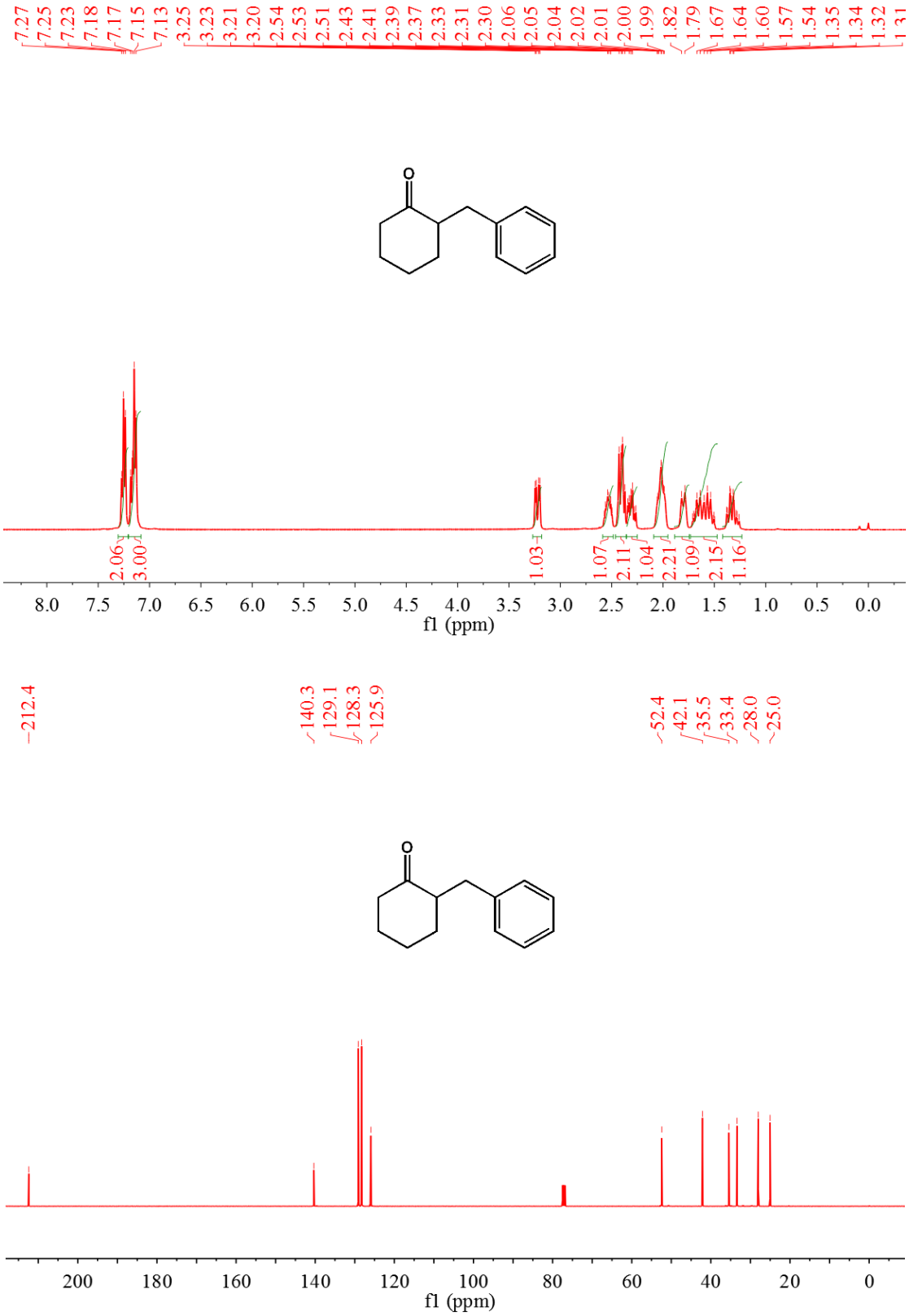
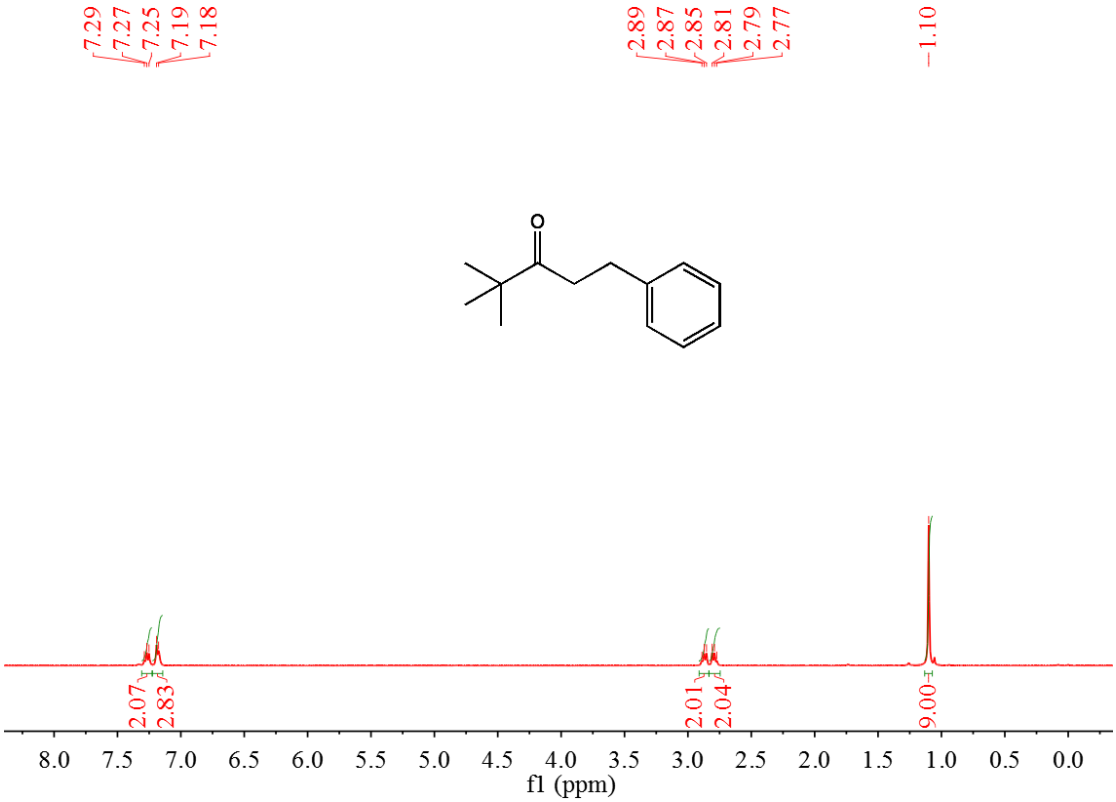


Fig. S19 The ^{1}H and ^{13}C NMR spectra for 4,4-dimethyl-1-phenylpentan-3-one(**4ar**)



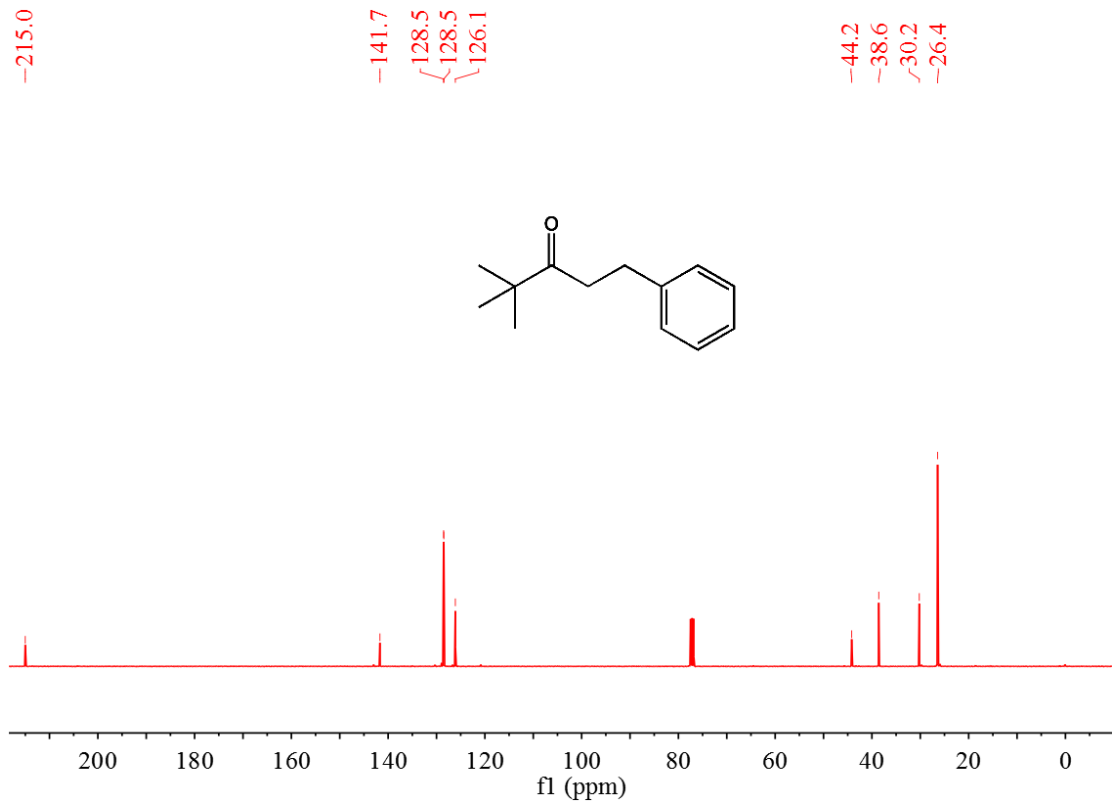


Fig. S20 The ^{1}H and ^{13}C NMR spectra for 1-phenyl-3-(p-tolyl)propan-1-one(**4ba**)

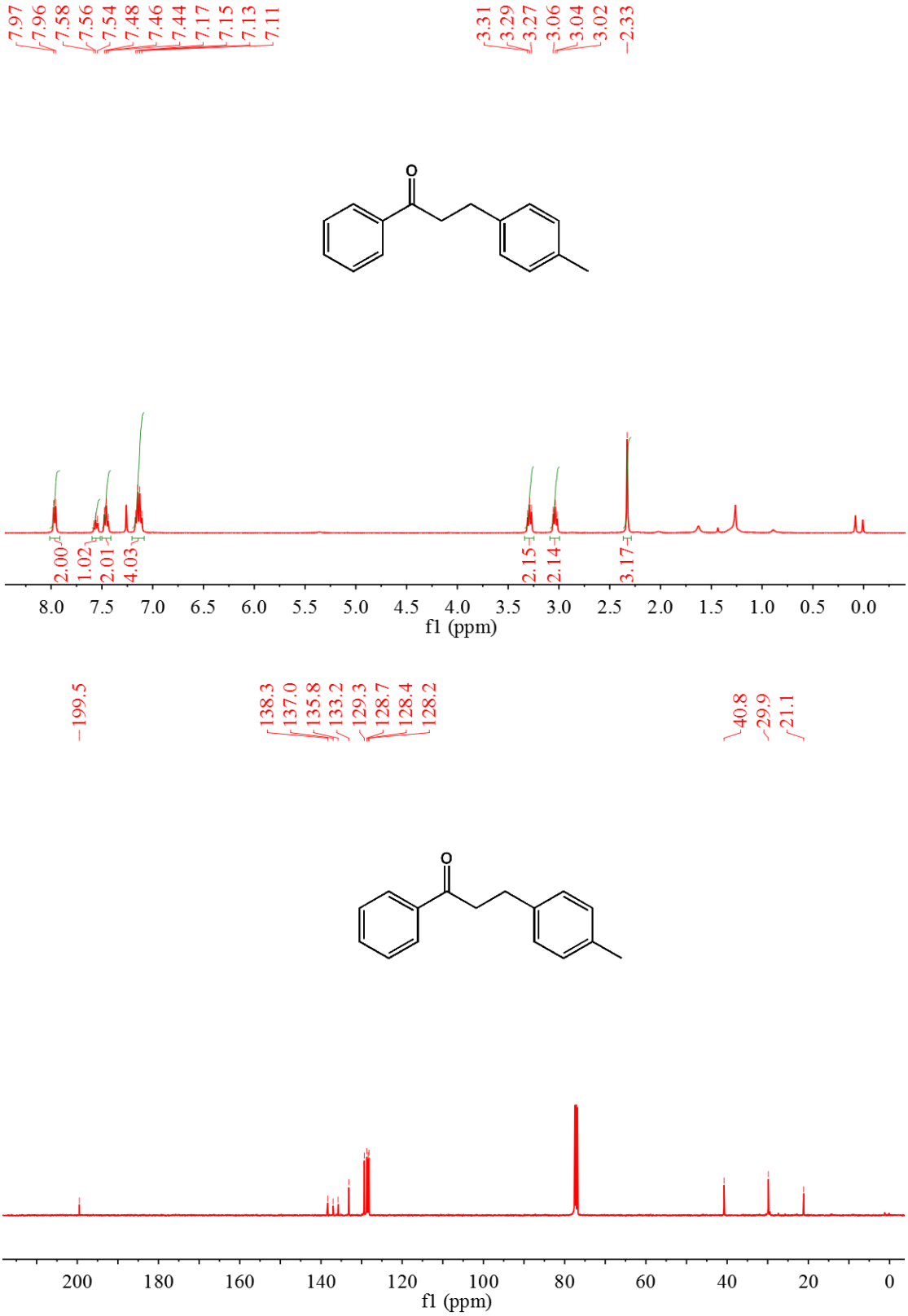


Fig. S21 The ^{1}H and ^{13}C NMR spectra for 3-(4-methoxyphenyl)-1-phenylpropan-1-one(**4ca**)

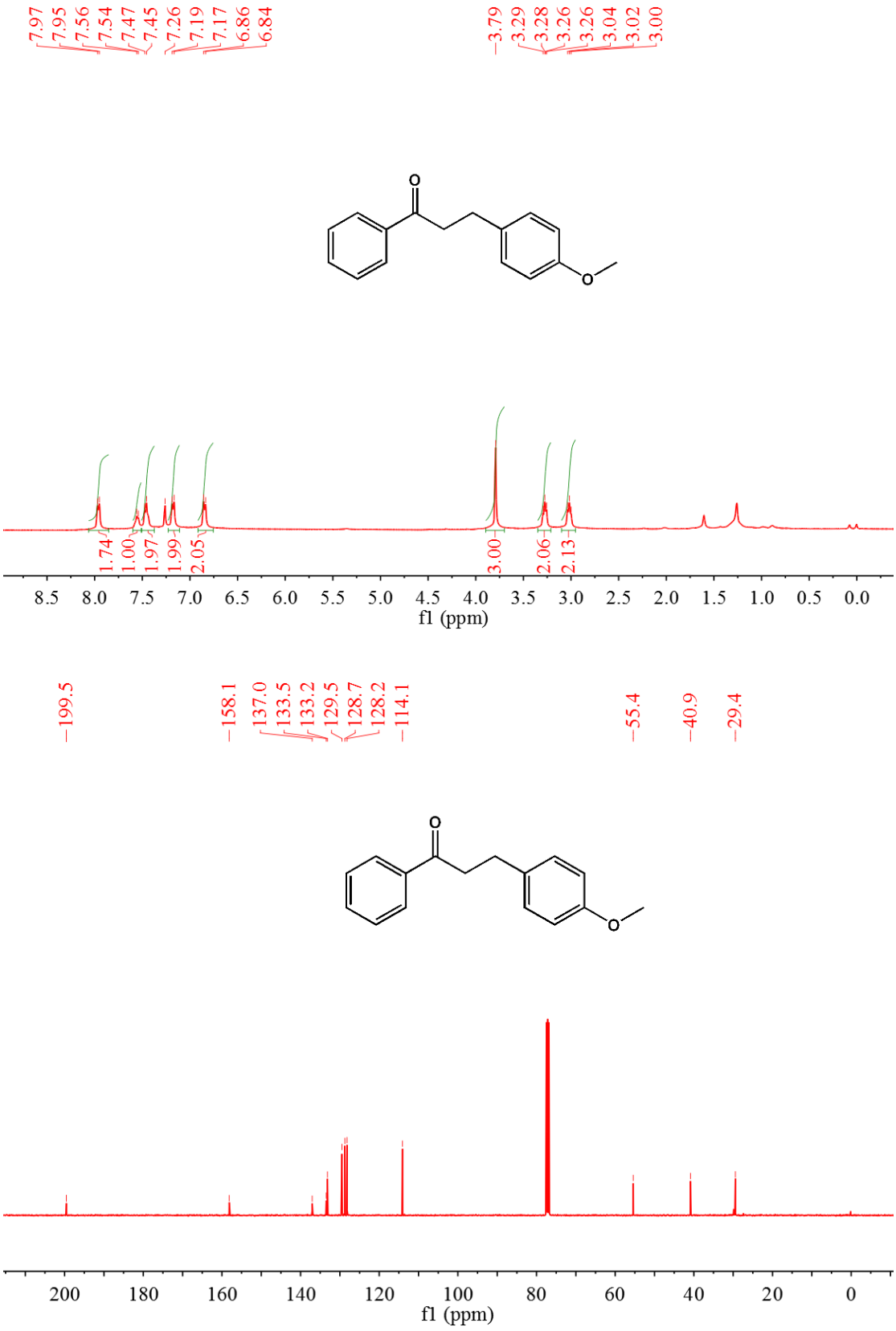


Fig. S22 The ^{1}H and ^{13}C NMR spectra for 3-(4-fluorophenyl)-1-phenylpropan-1-one(**4da**)

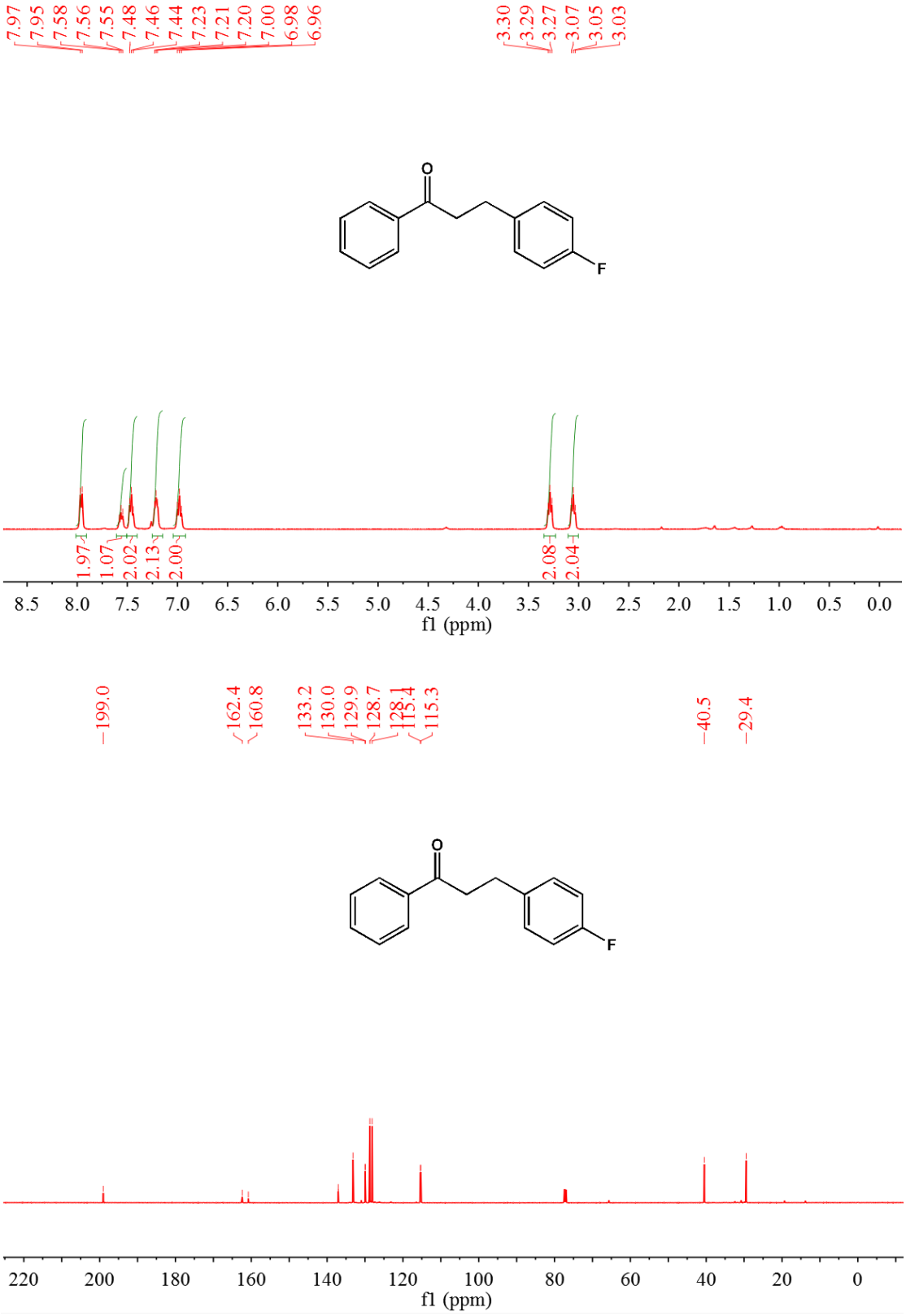


Fig. S23 The ^{1}H and ^{13}C NMR spectra for 3-(4-chlorophenyl)-1-phenylpropan-1-one(**4ea**)

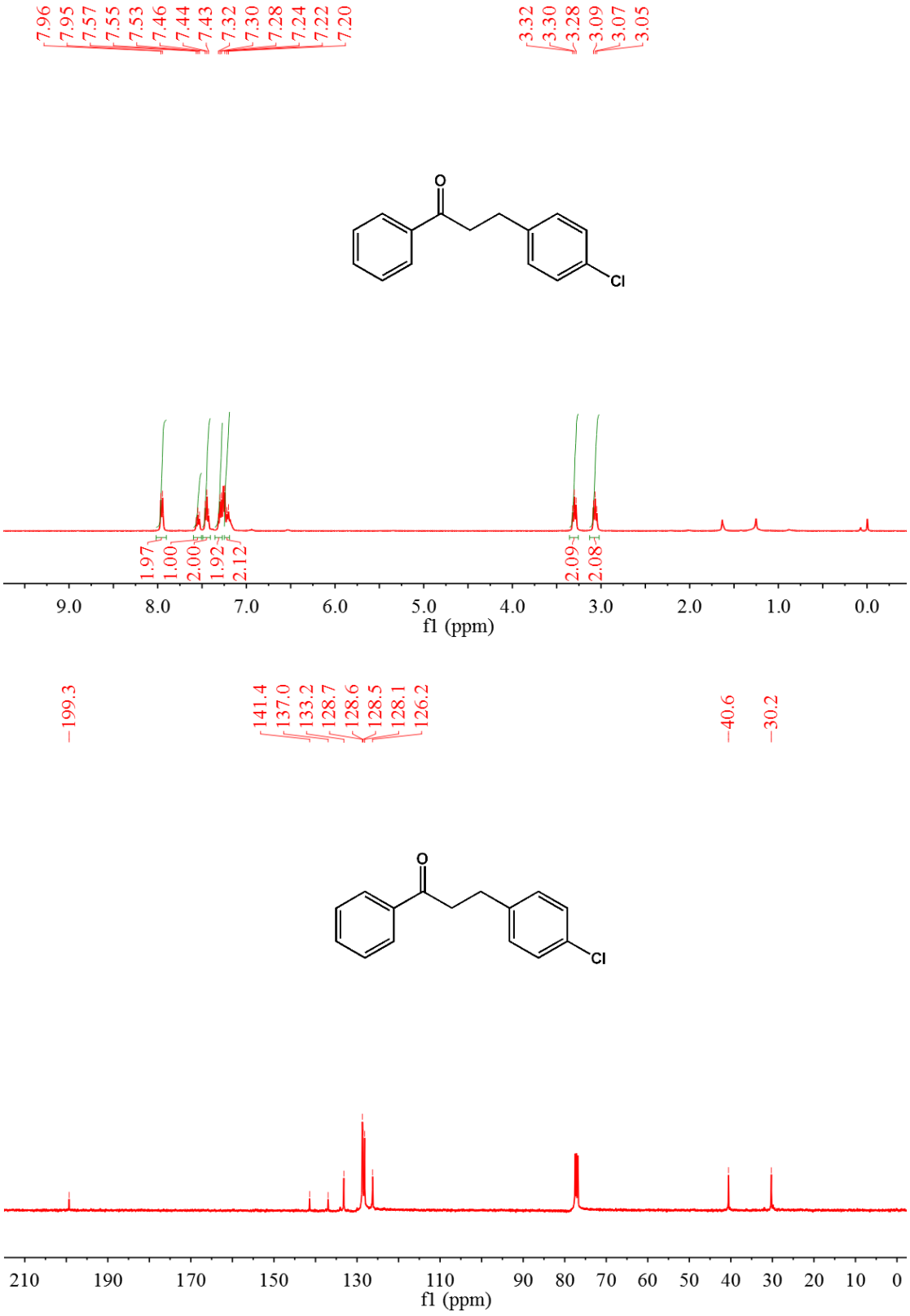


Fig. S24 The ^{1}H and ^{13}C NMR spectra for 3-(4-bromophenyl)-1-phenylpropan-1-one(**4fa**)

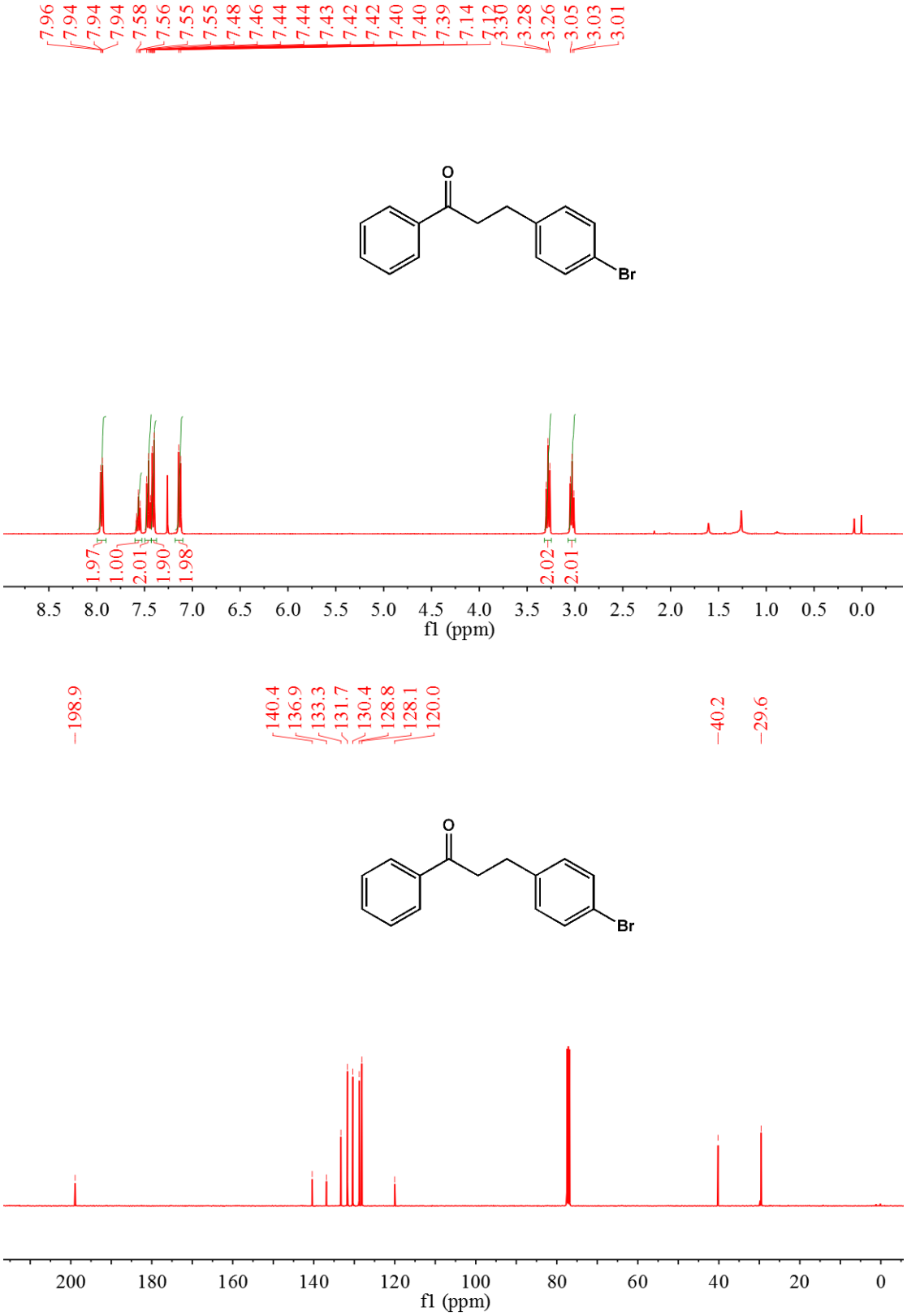


Fig. S25 The ^{1}H and ^{13}C NMR spectra for 4-(3-oxo-3-phenylpropyl)benzonitrile(**4ga**)

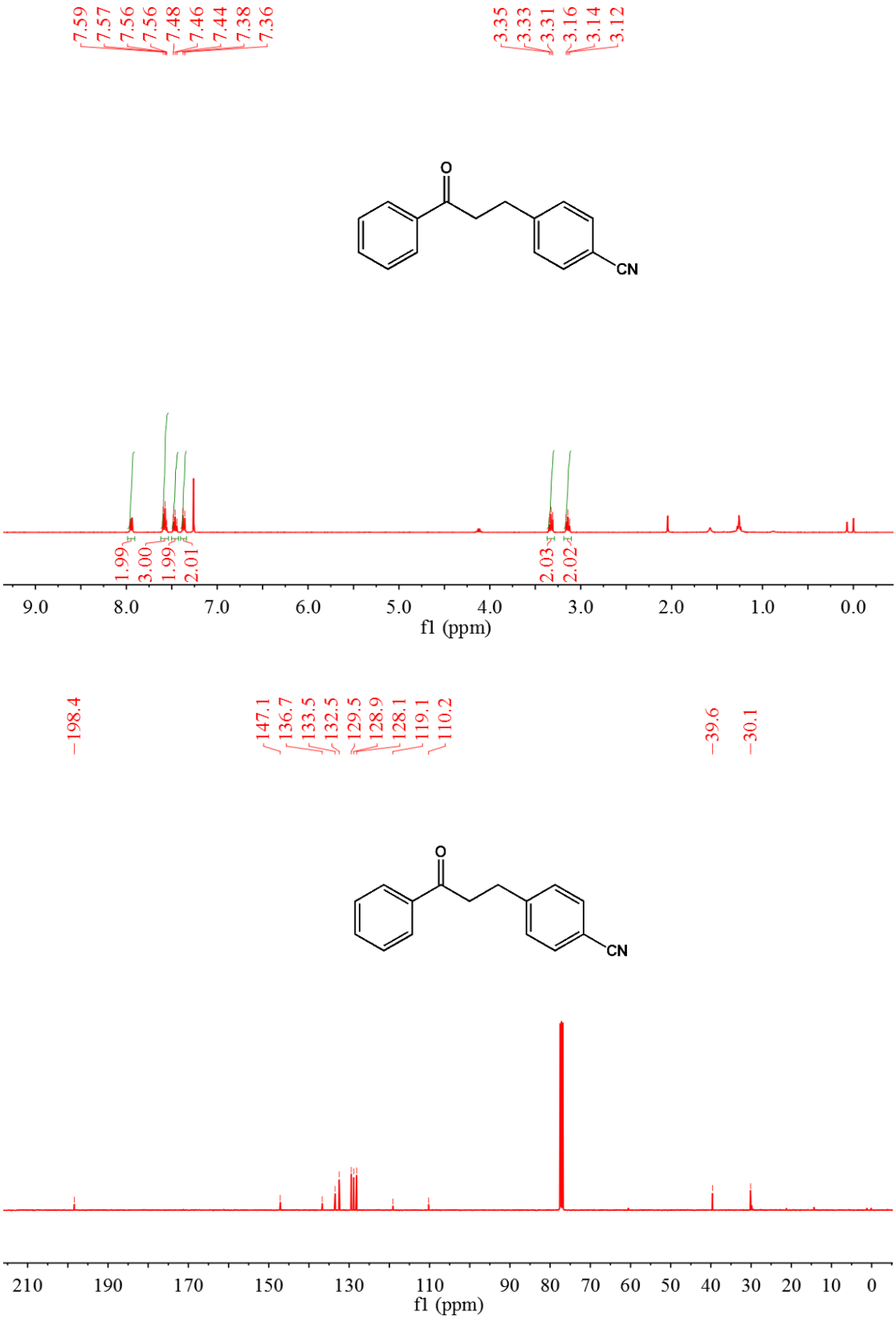


Fig. S26 The ^{1}H and ^{13}C NMR spectra for 3-(2-methoxyphenyl)-1-phenylpropan-1-one(**4ha**)

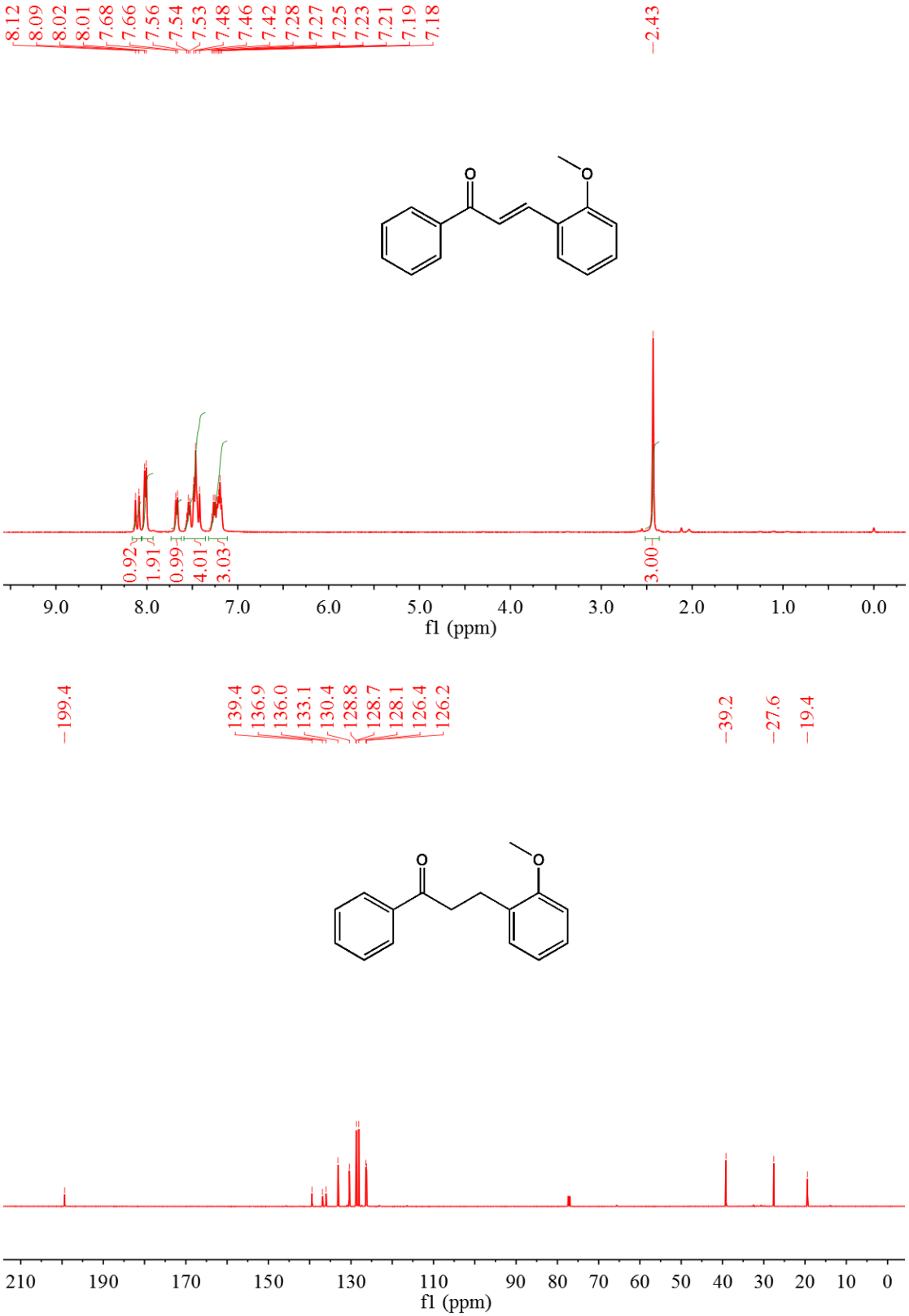


Fig. S27 The ^{1}H and ^{13}C NMR spectra for 1-phenyl-3-(ferrocenyl)propan-1-one(**4ia**)

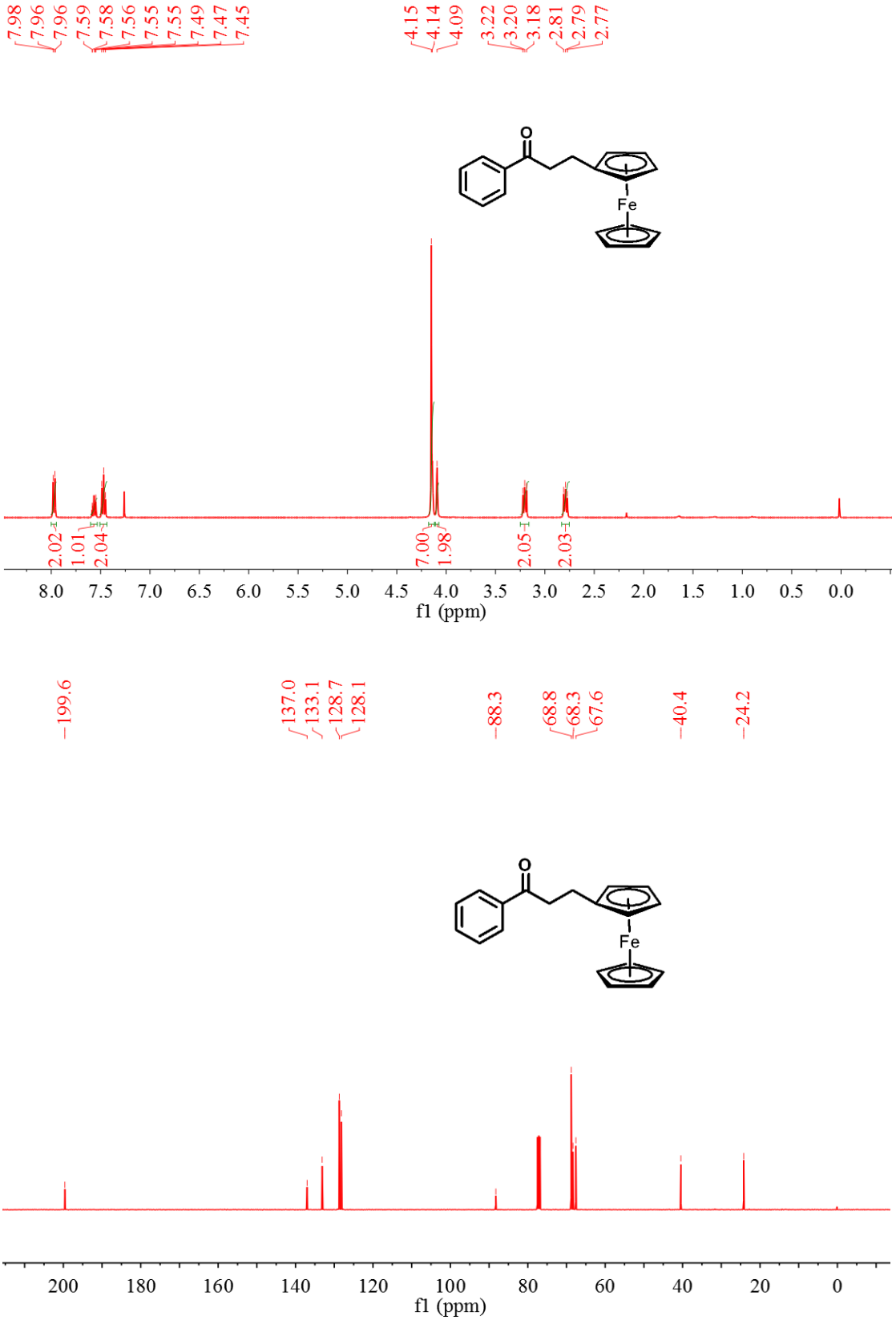


Fig. S28 The ^{1}H and ^{13}C NMR spectra for 3-(furan-2-yl)-1-phenylpropan-1-one(**4ja**)

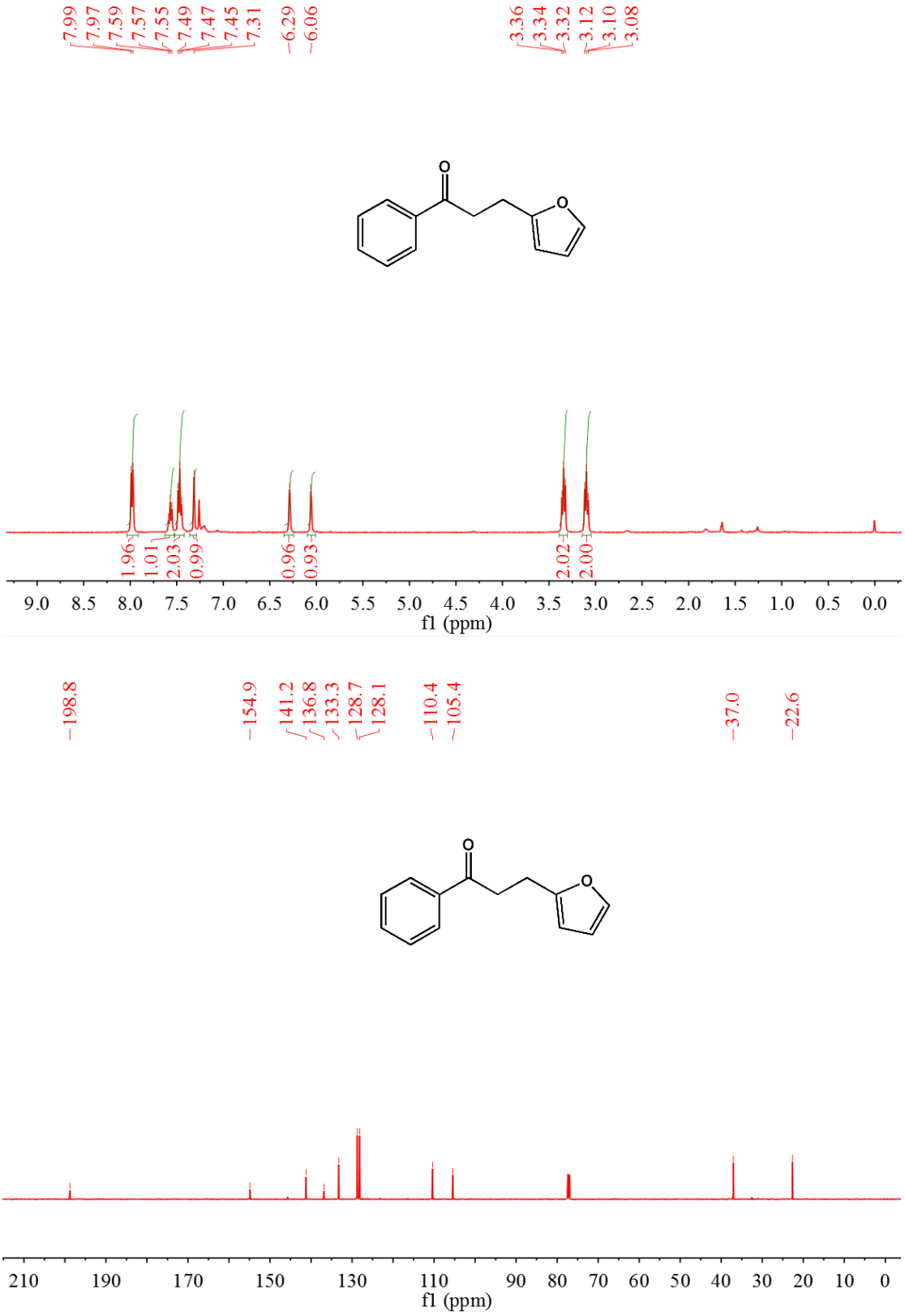


Fig. S29 The ^{1}H and ^{13}C NMR spectra for 1-phenyl-3-(thiophen-2-yl)propan-1-one(**4ka**)

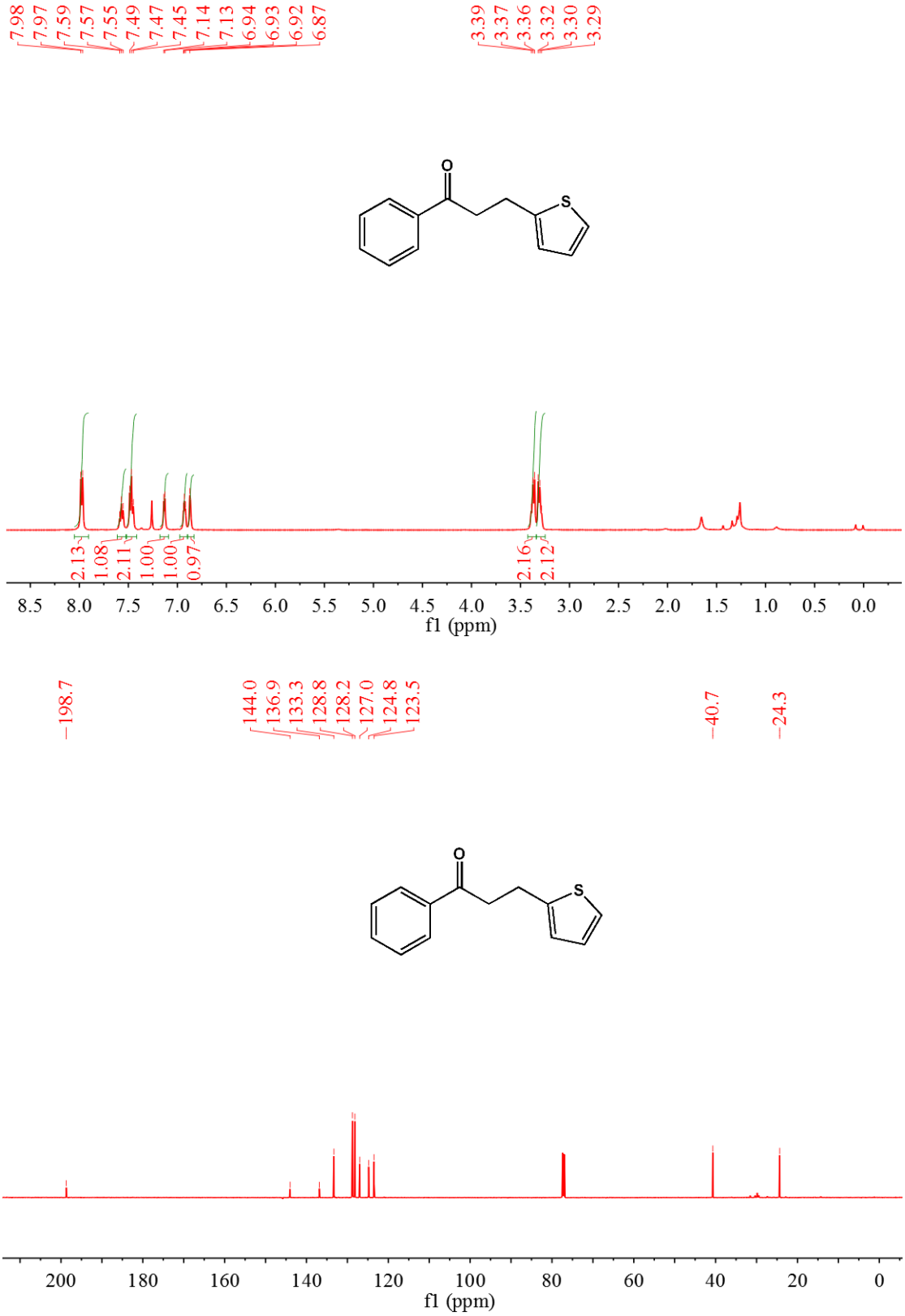


Fig. S30 The ^{1}H and ^{13}C NMR spectra for chalcone(**5aa**)

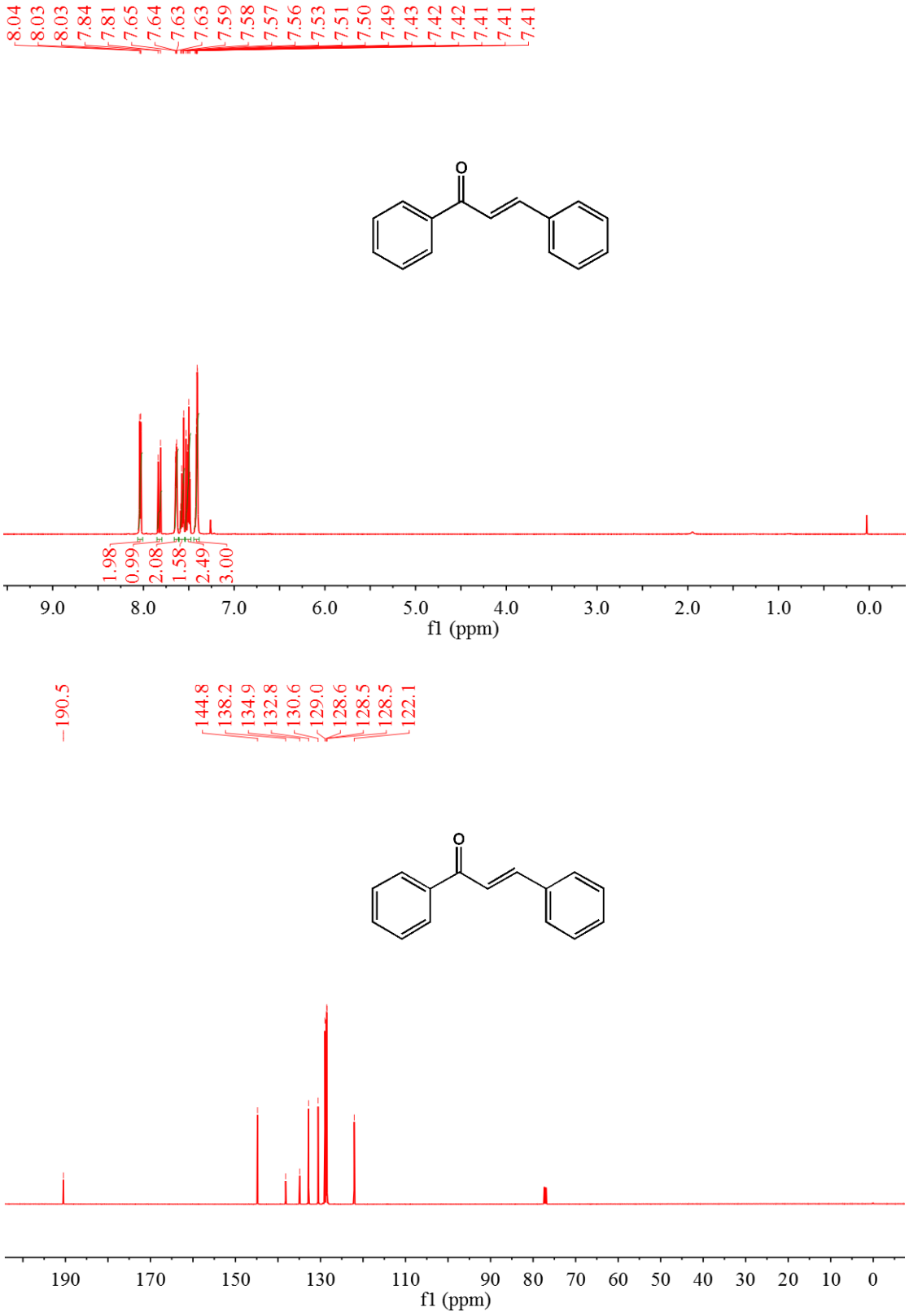


Fig. S31 The ^{1}H and ^{13}C NMR spectra for 3-phenyl-1-(p-tolyl)prop-2-en-1-one(**5ab**)

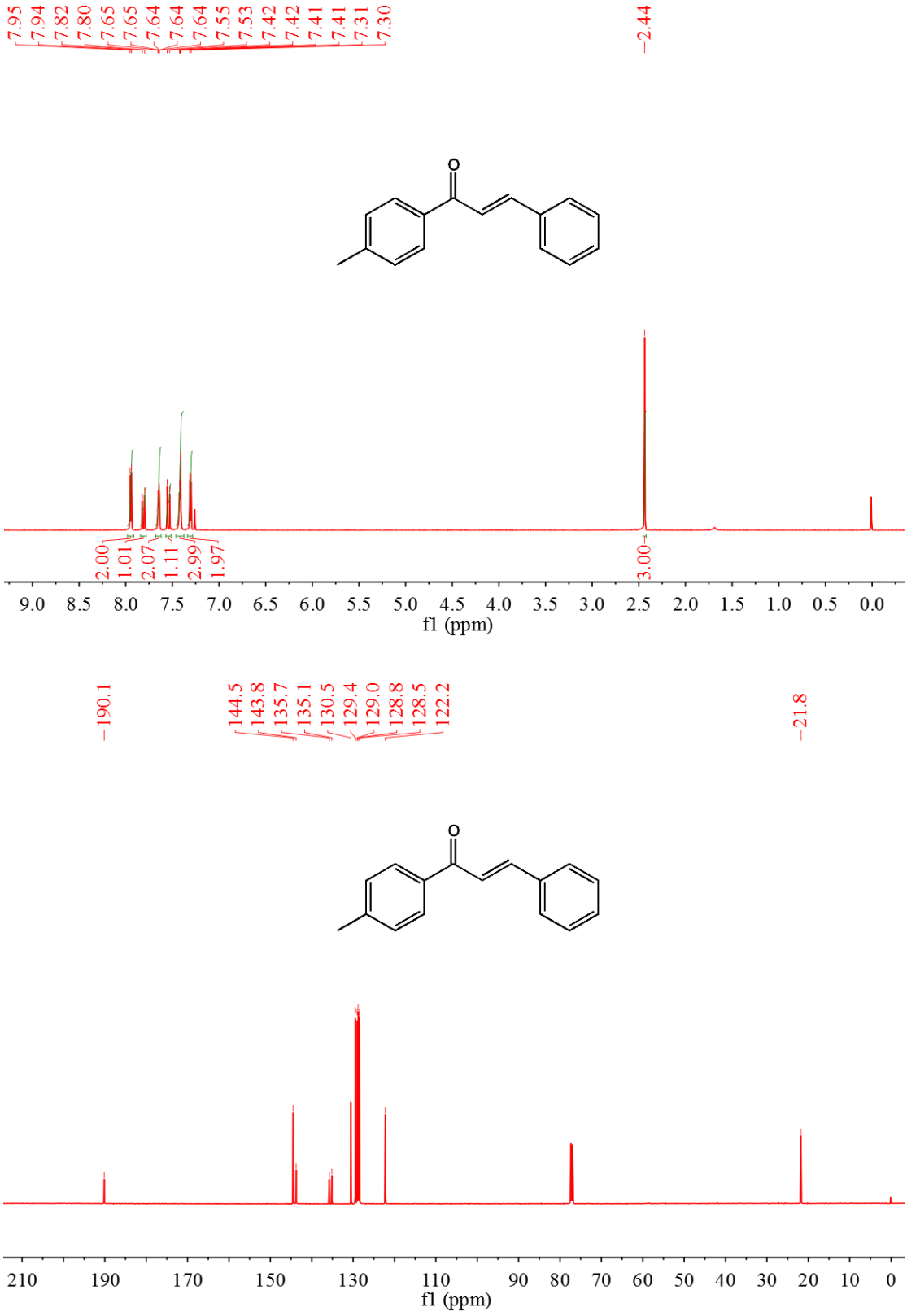


Fig. S32 The ^{1}H and ^{13}C NMR spectra for 1-(4-methoxyphenyl)-3-phenylprop-2-en-1-one(**5ac**)

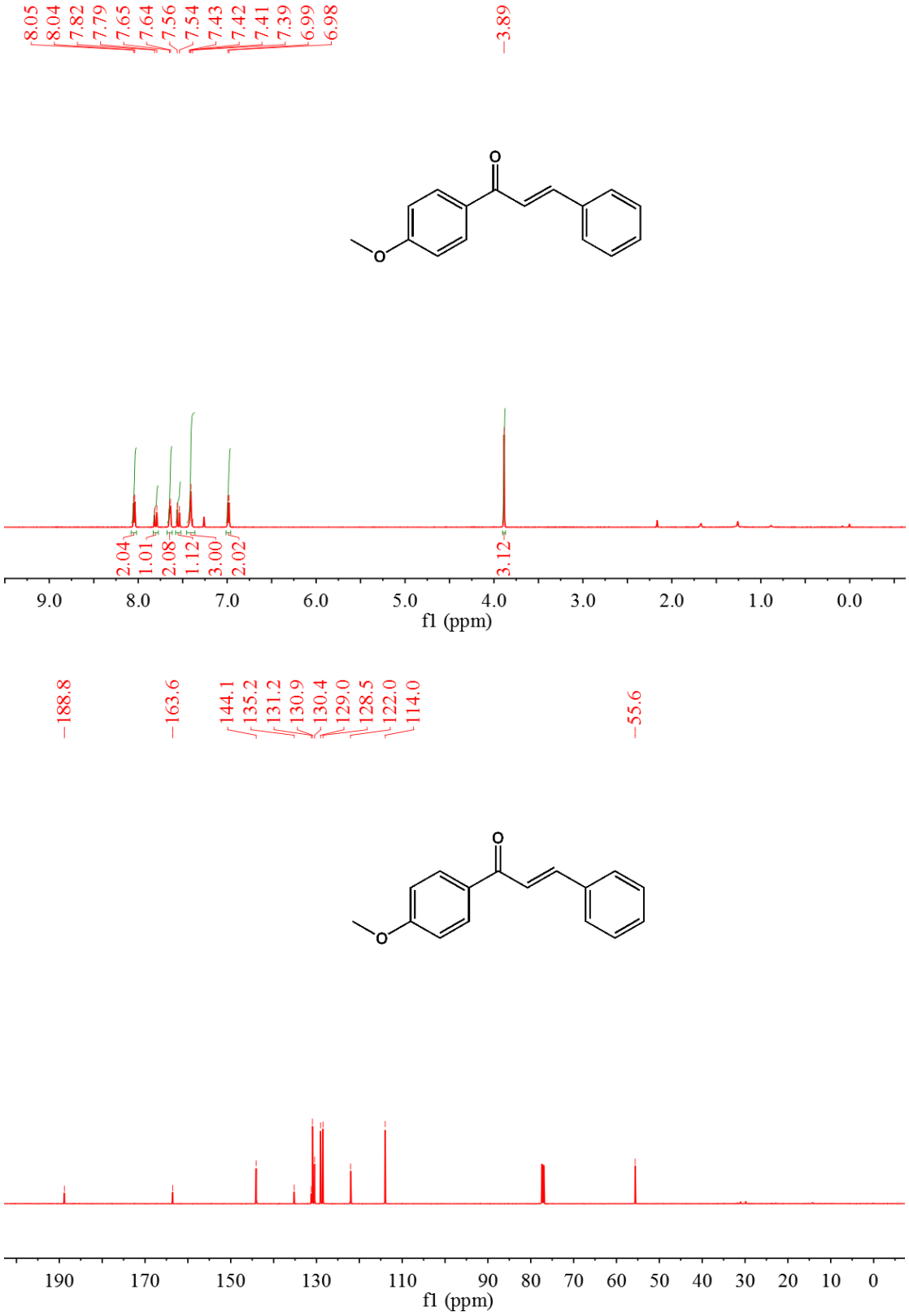


Fig. S33 The ^{1}H and ^{13}C NMR spectra for 1-(4-fluorophenyl)-3-phenylprop-2-en-1-one(**5ad**)

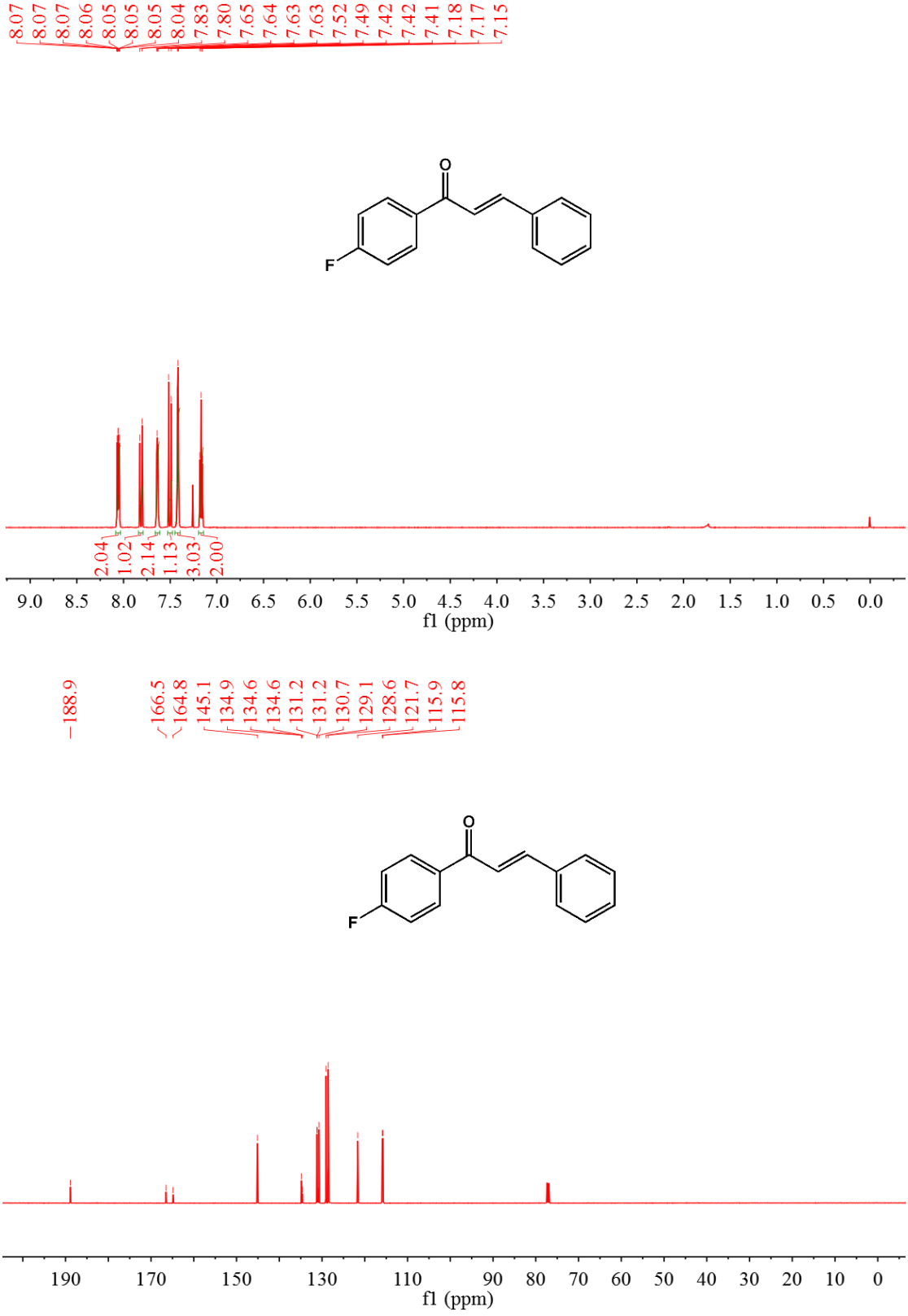


Fig. S34 The ^{1}H and ^{13}C NMR spectra for 1-(4-chlorophenyl)-3-phenylprop-2-en-1-one(**5ae**)

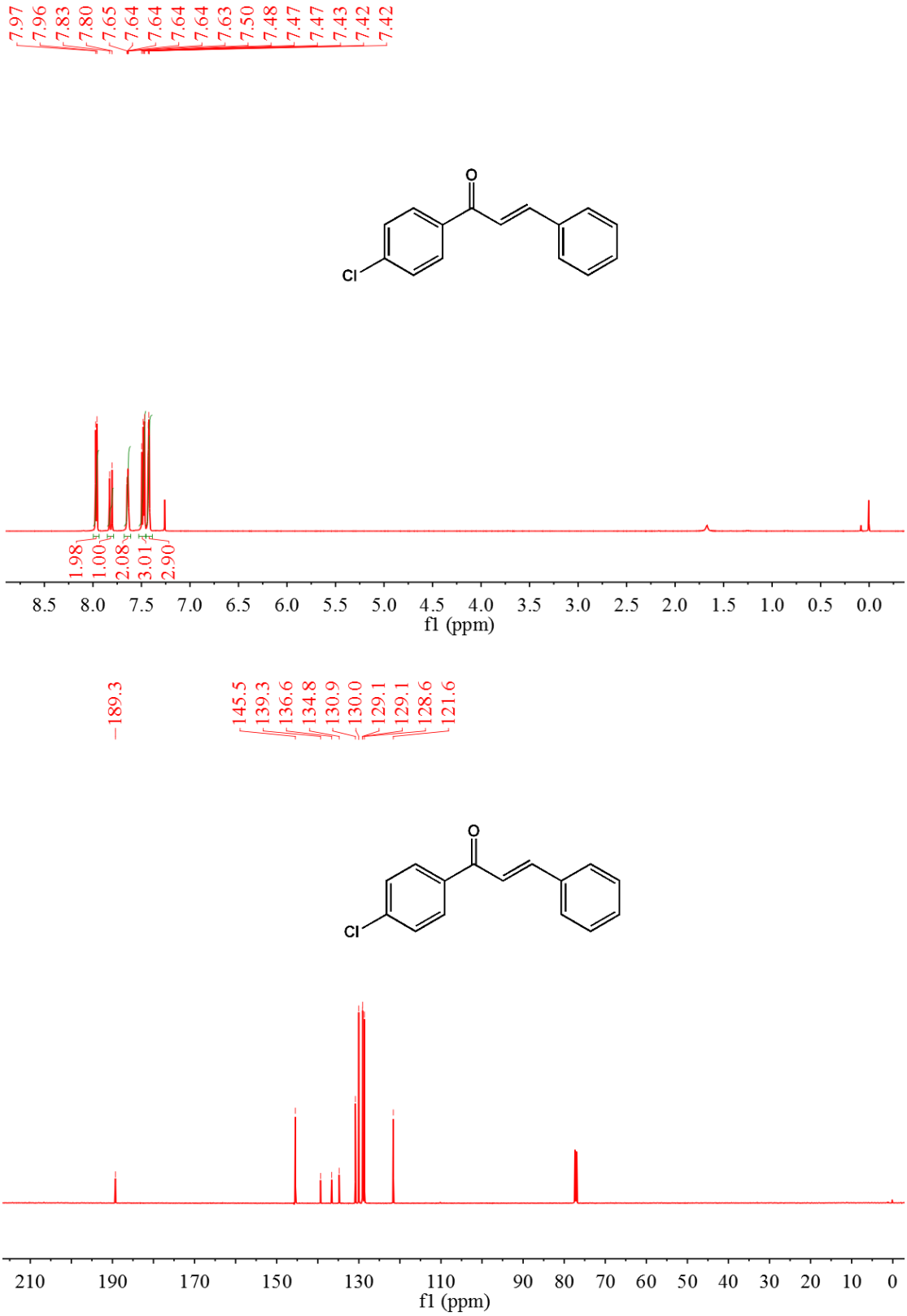


Fig. S35 The ^{1}H and ^{13}C NMR spectra for 1-(4-bromophenyl)-3-phenylprop-2-en-1-one(**5af**)

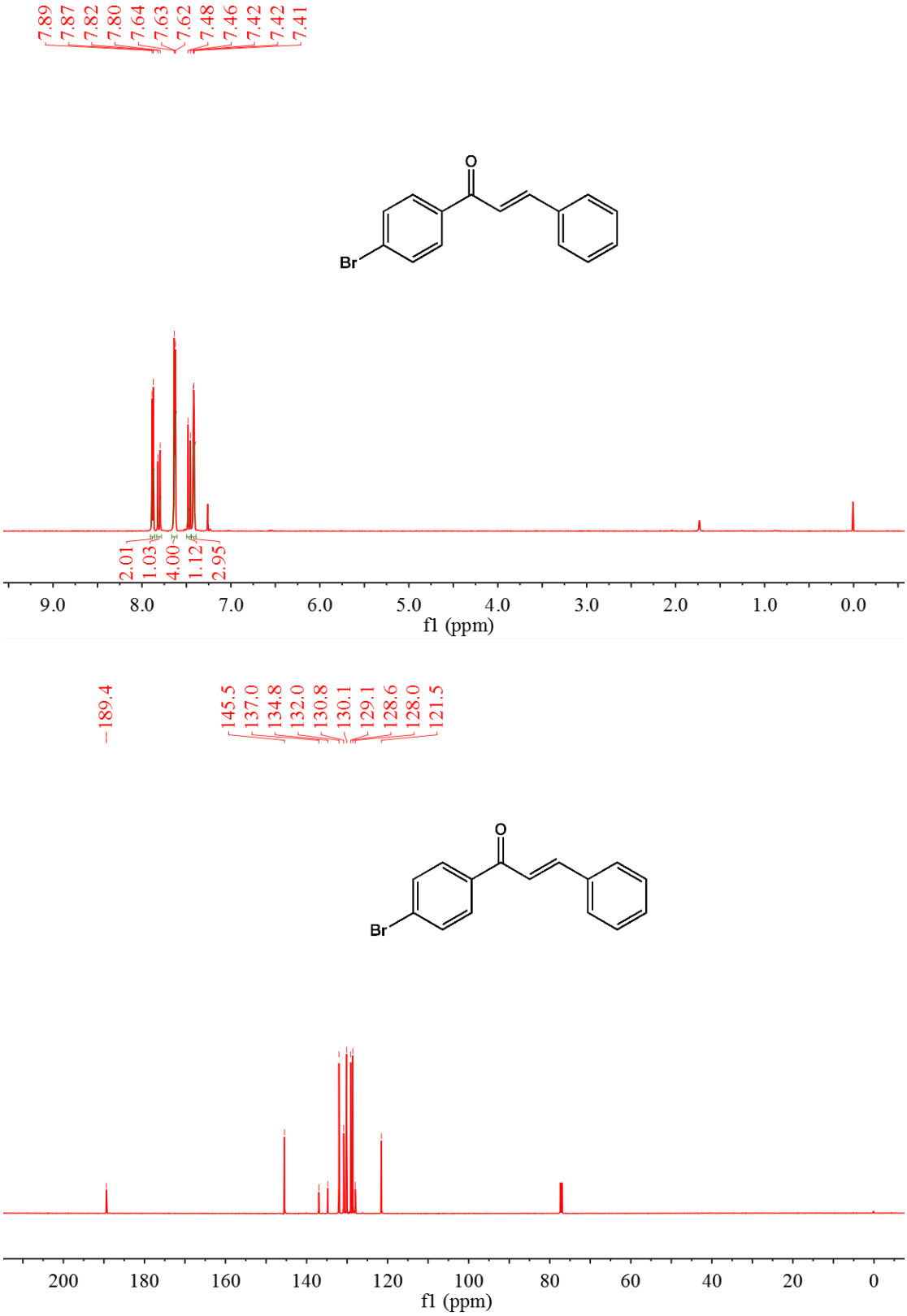


Fig. S36 The ^{1}H and ^{13}C NMR spectra for 3-phenyl-1-(m-tolyl)prop-2-en-1-one(**5ag**)

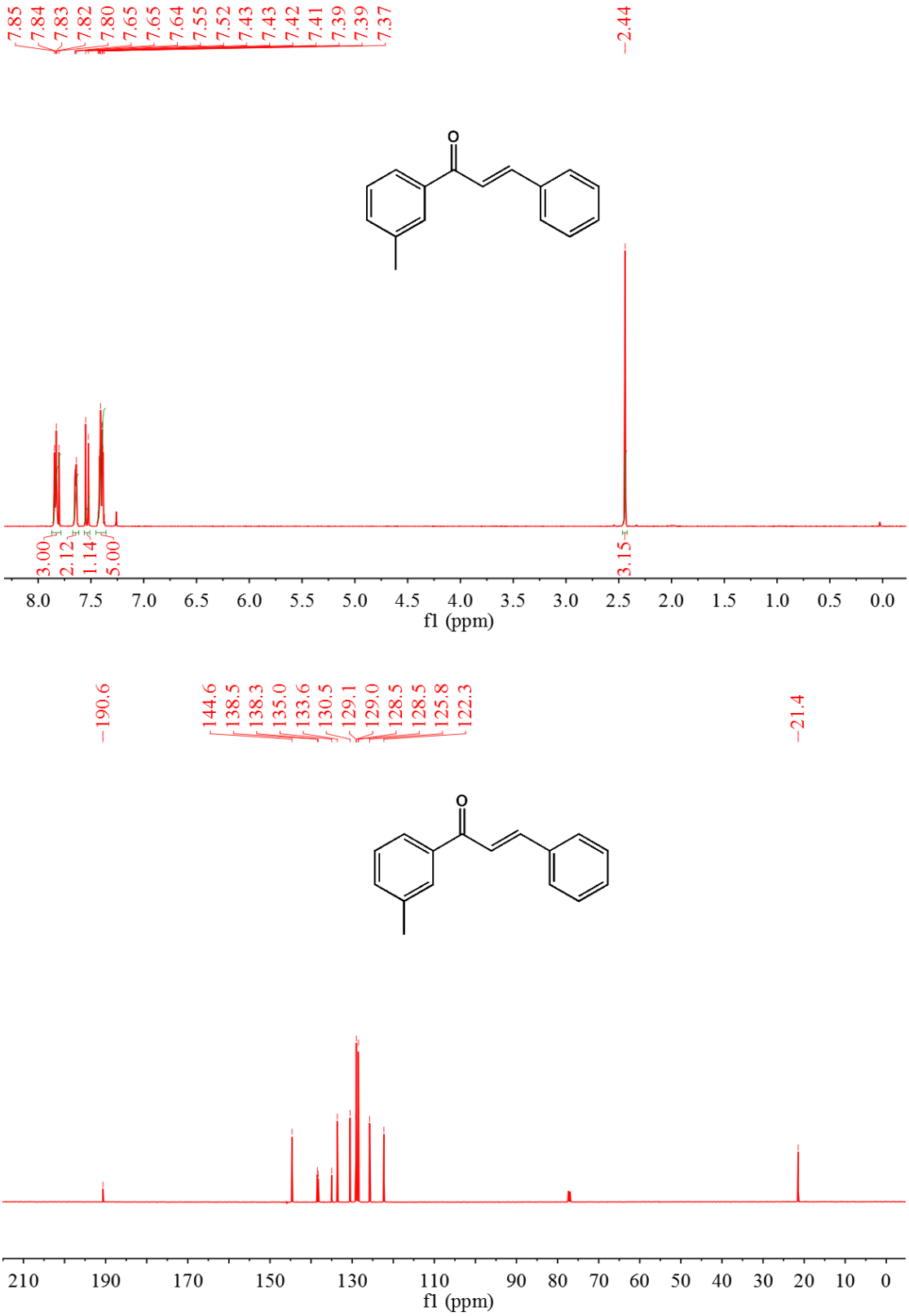


Fig. S37 The ^{1}H and ^{13}C NMR spectra for (3-bromophenyl)-3-phenylprop-2-en-1-one(**5ah**)

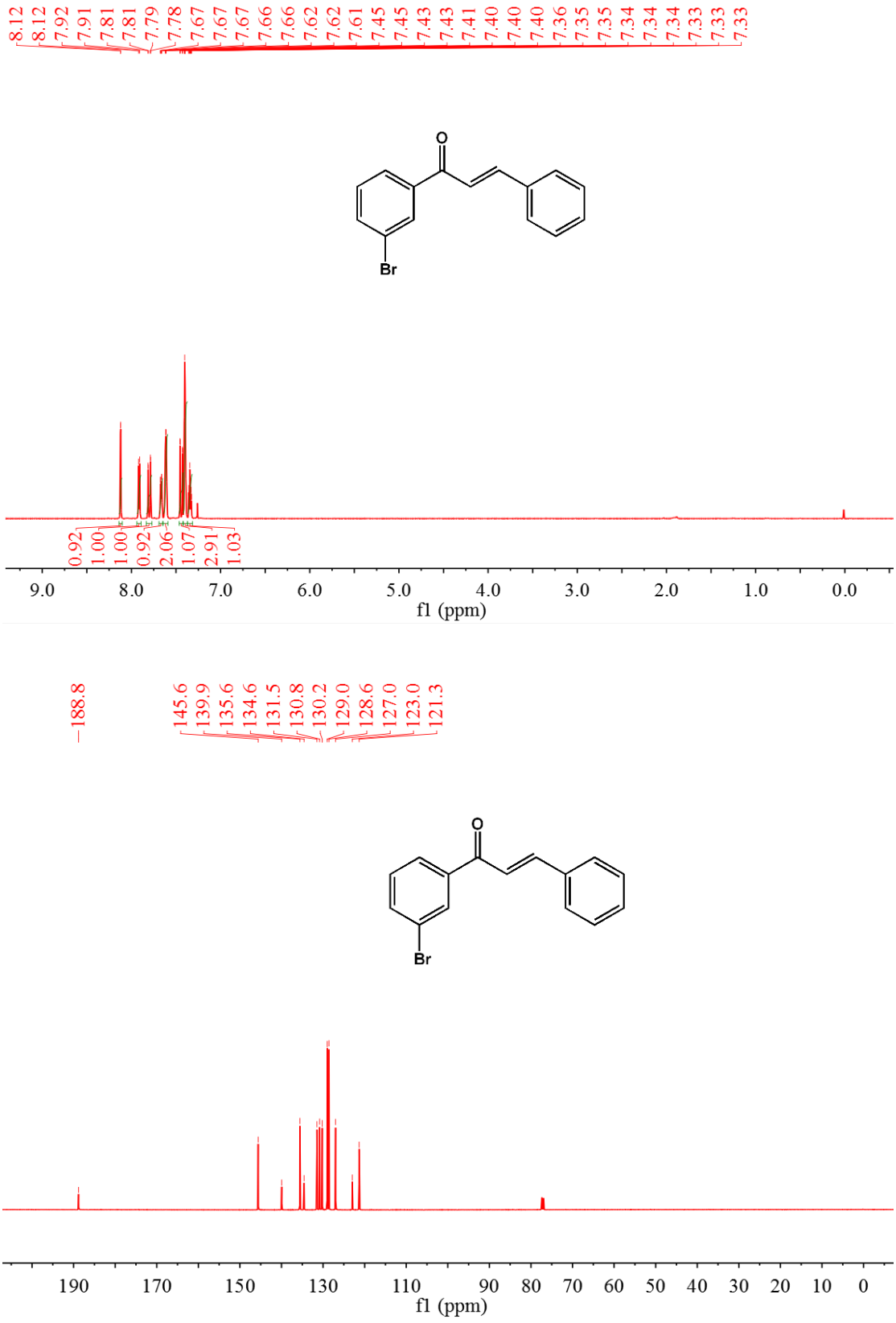


Fig. S38 The ^{1}H and ^{13}C NMR spectra for 3-phenyl-1-(o-tolyl)prop-2-en-1-one(**5ai**)

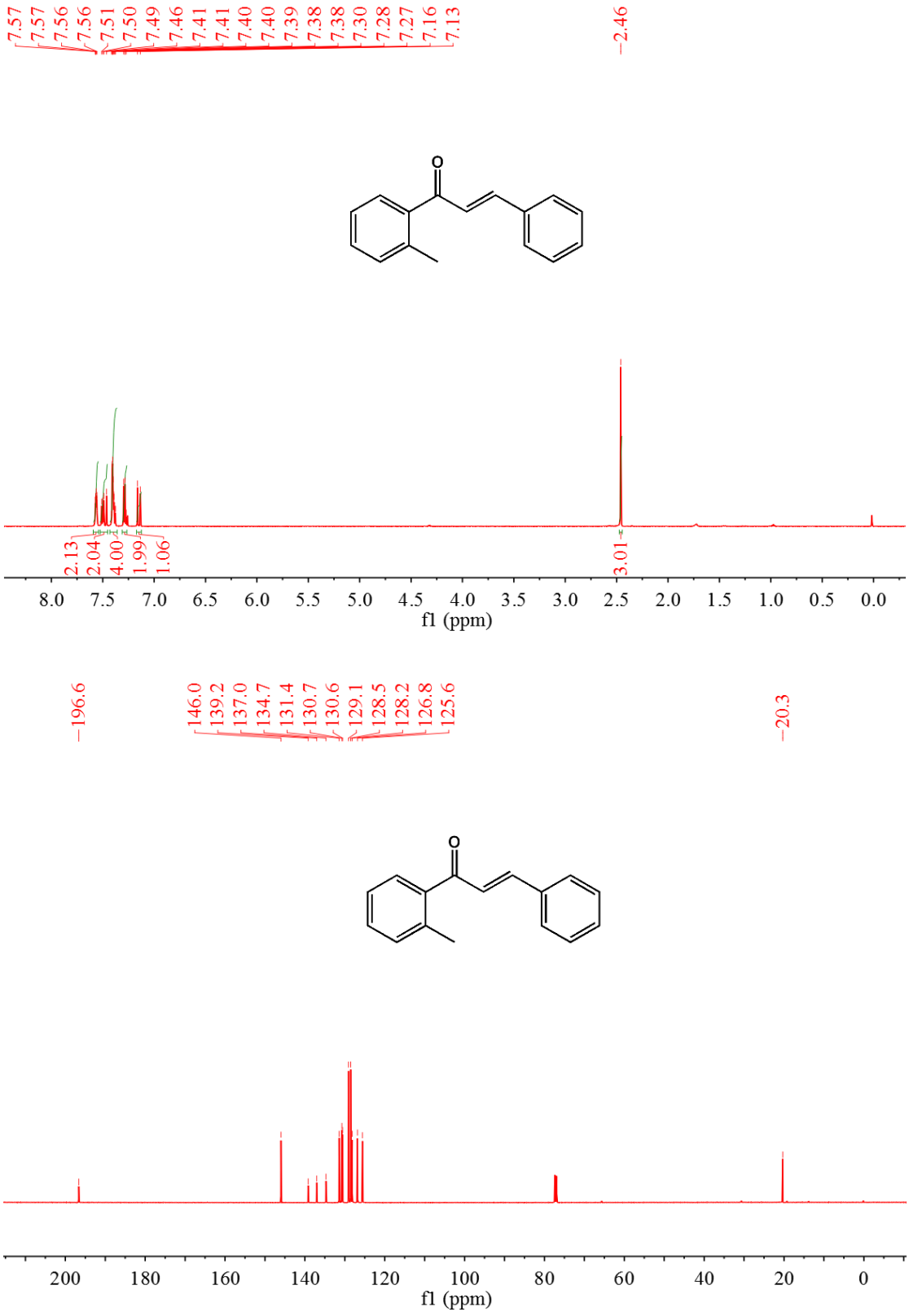


Fig. S39 The ^{1}H and ^{13}C NMR spectra for (2-chlorophenyl)-3-phenylprop-2-en-1-one(**5aj**)

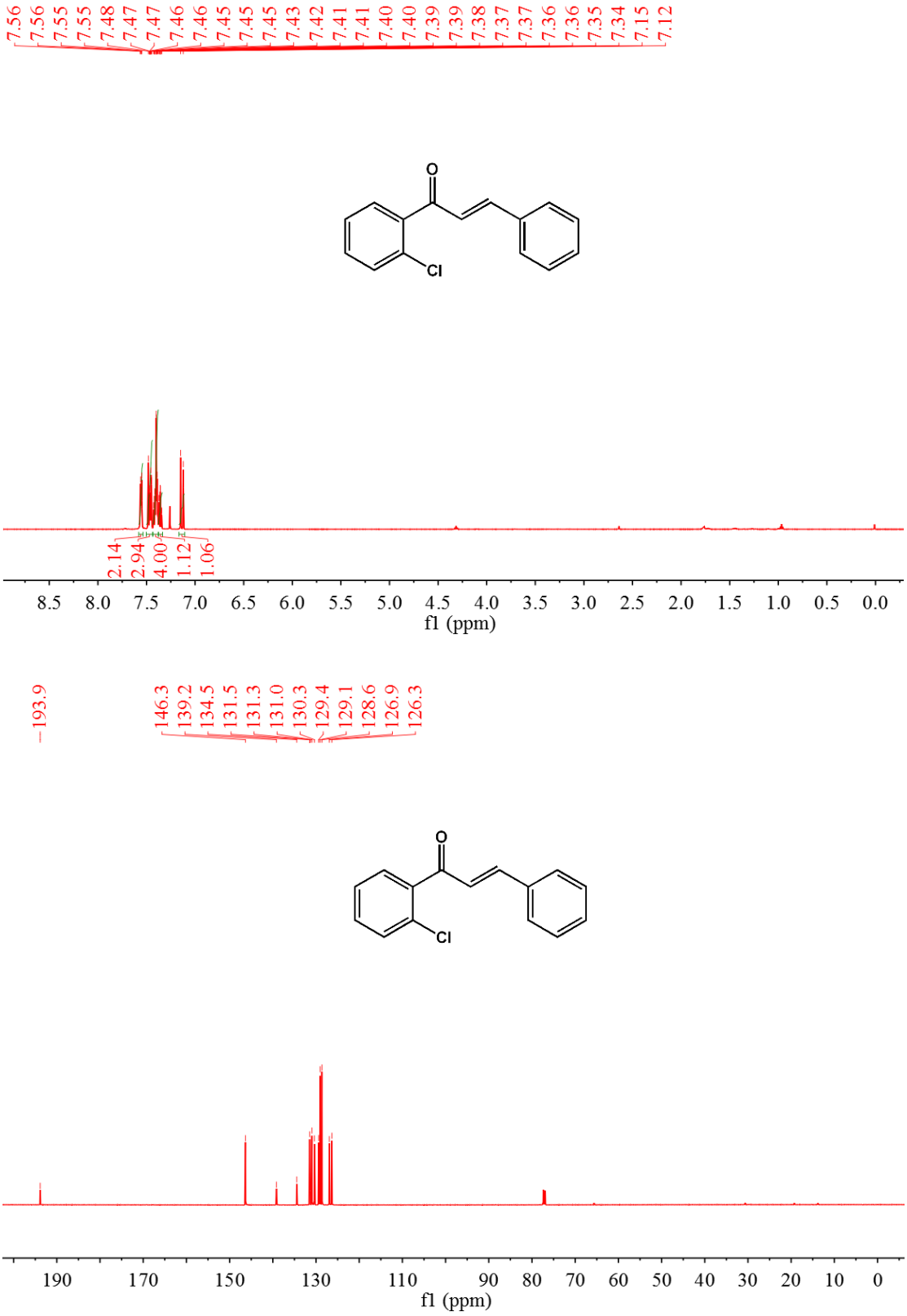


Fig. S40 The ^{1}H and ^{13}C NMR spectra for 1-mesityl-3-phenylprop-2-en-1-one(**5ak**)

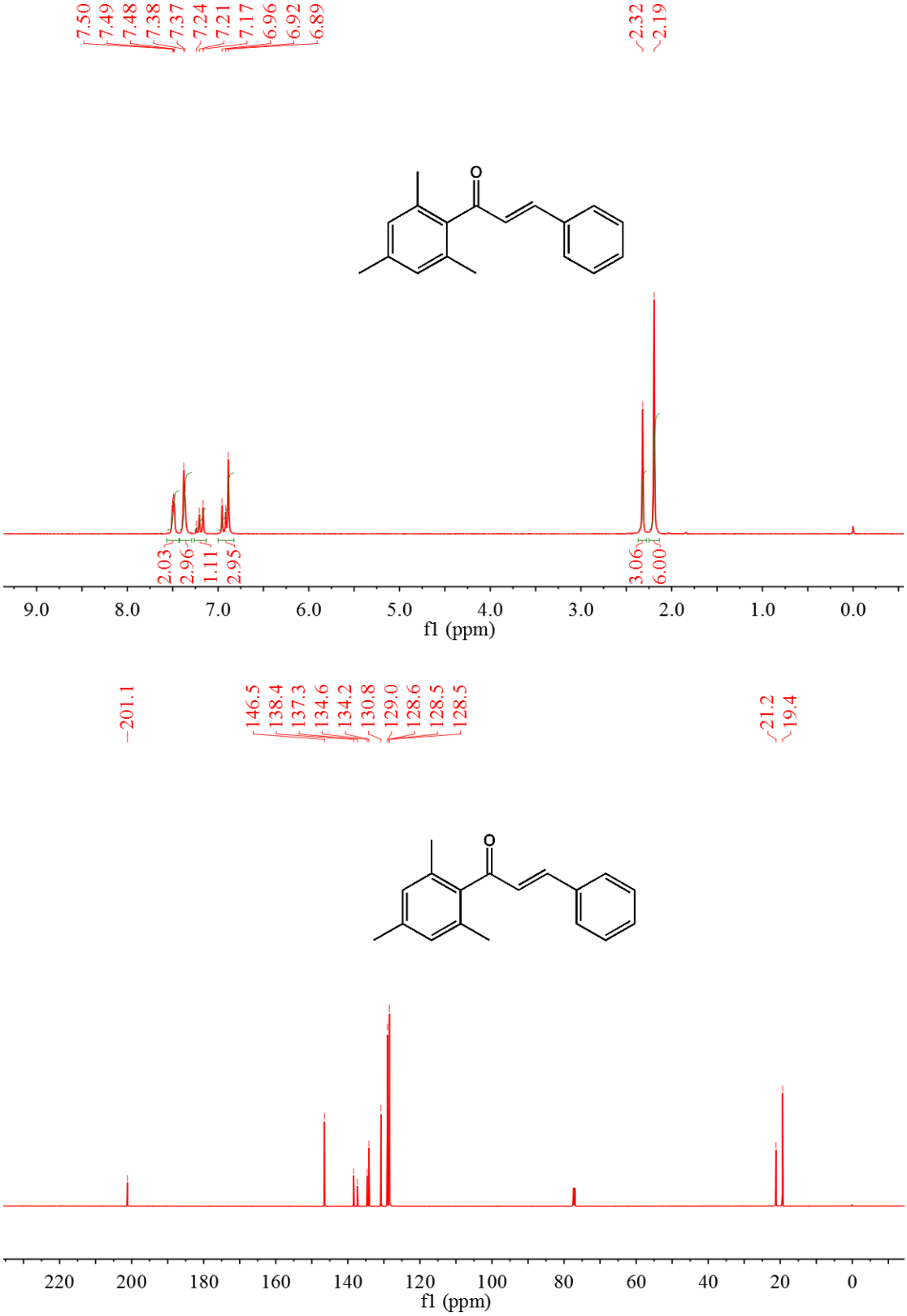


Fig. S41 The ^{1}H and ^{13}C NMR spectra for 1-(naphthalen-2-yl)-3-phenylprop-2-en-1-one(**5al**)

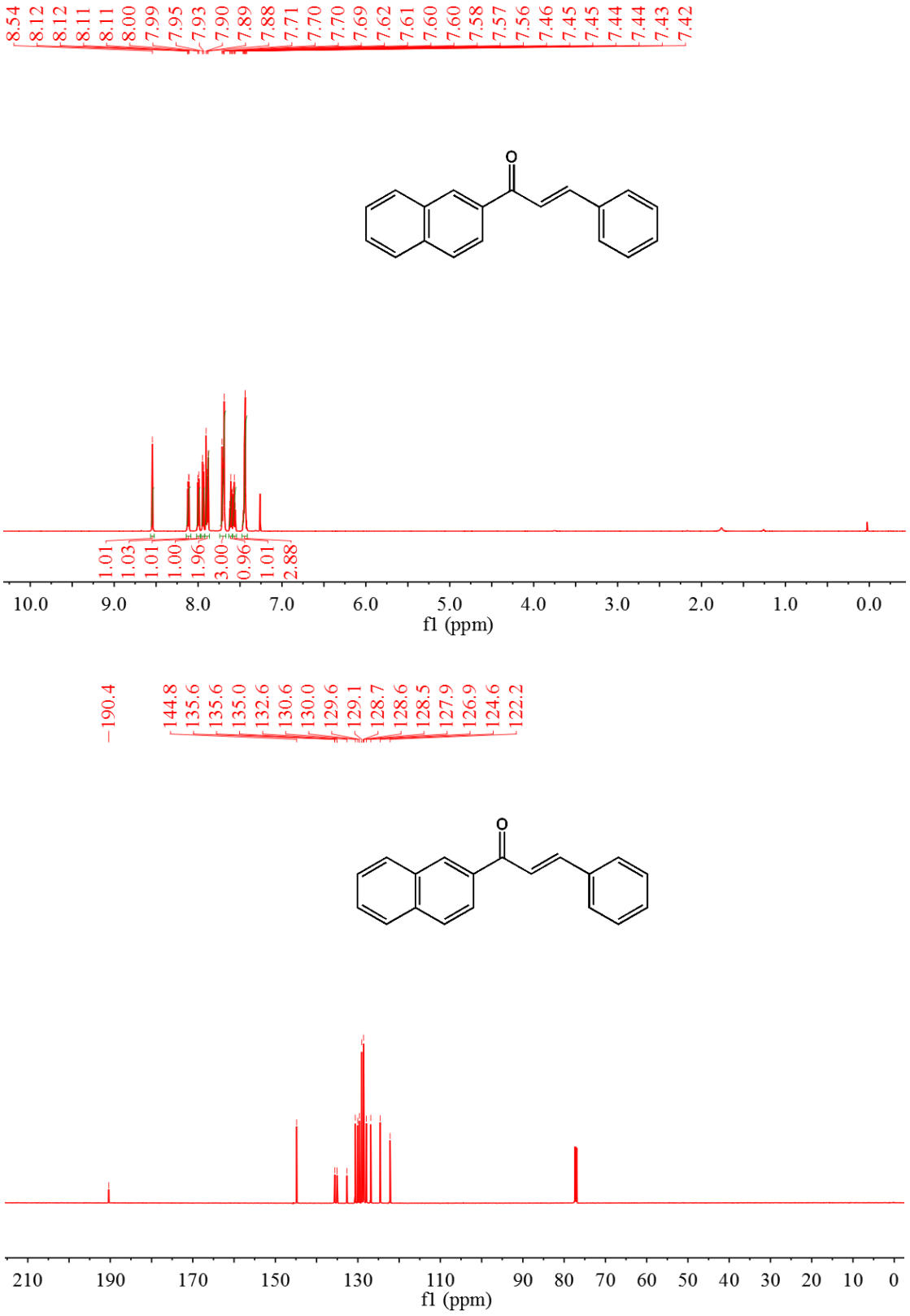


Fig. S42 The ^{1}H and ^{13}C NMR spectra for 3-phenyl-1-(thiophen-2-yl)prop-2-en-1-one(**5am**)

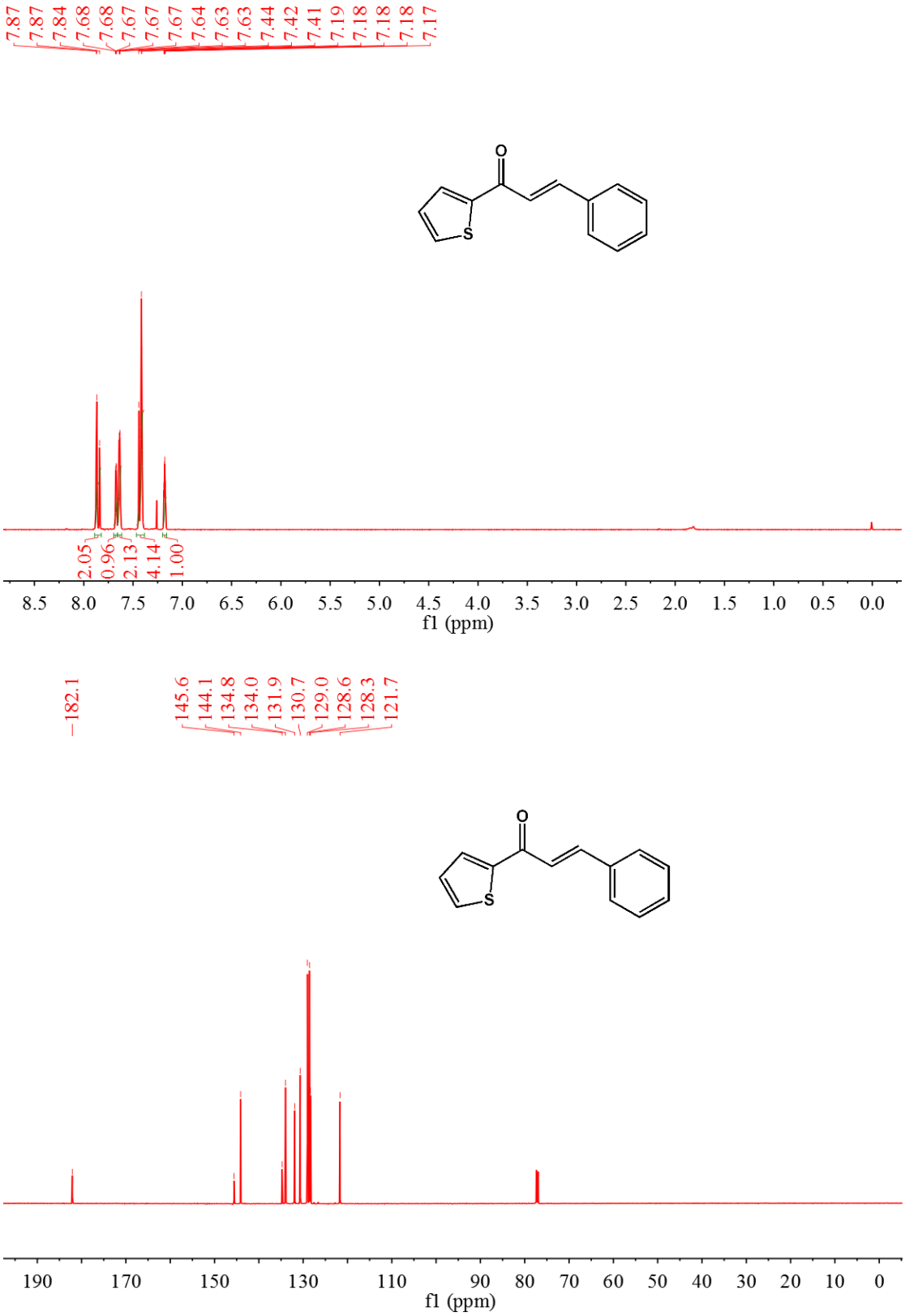


Fig. S43 The ^{1}H and ^{13}C NMR spectra for 1-ferrocenyl-3-phenyl-2-propen-1-one(**5an**)

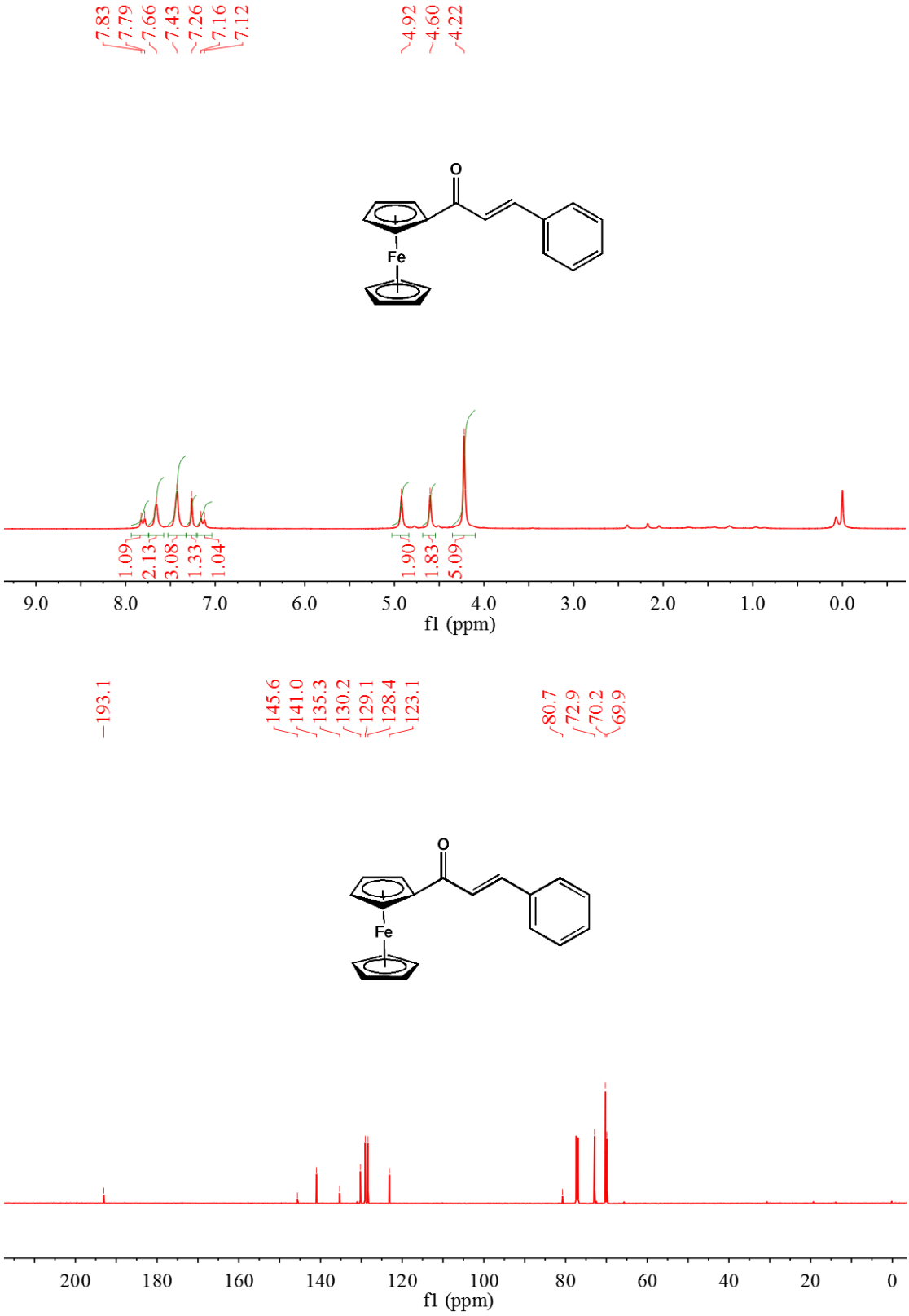


Fig. S44 The ^{1}H and ^{13}C NMR spectra for 2-benzylidenecyclohexan-1-one**(5aq)**

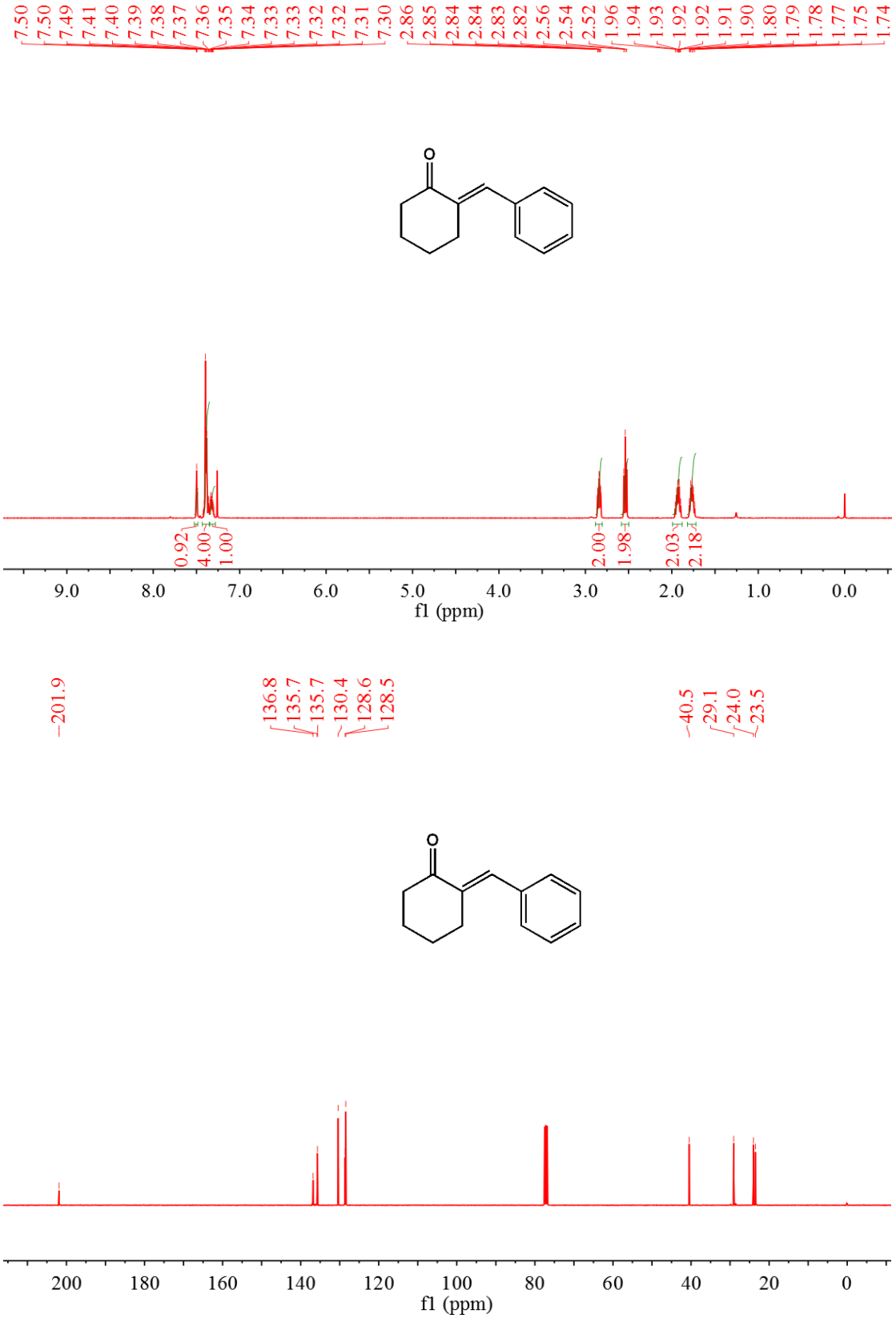


Fig. S45 The ^{1}H and ^{13}C NMR spectra for 1-phenyl-3-(p-tolyl)prop-2-en-1-one(**5ba**)

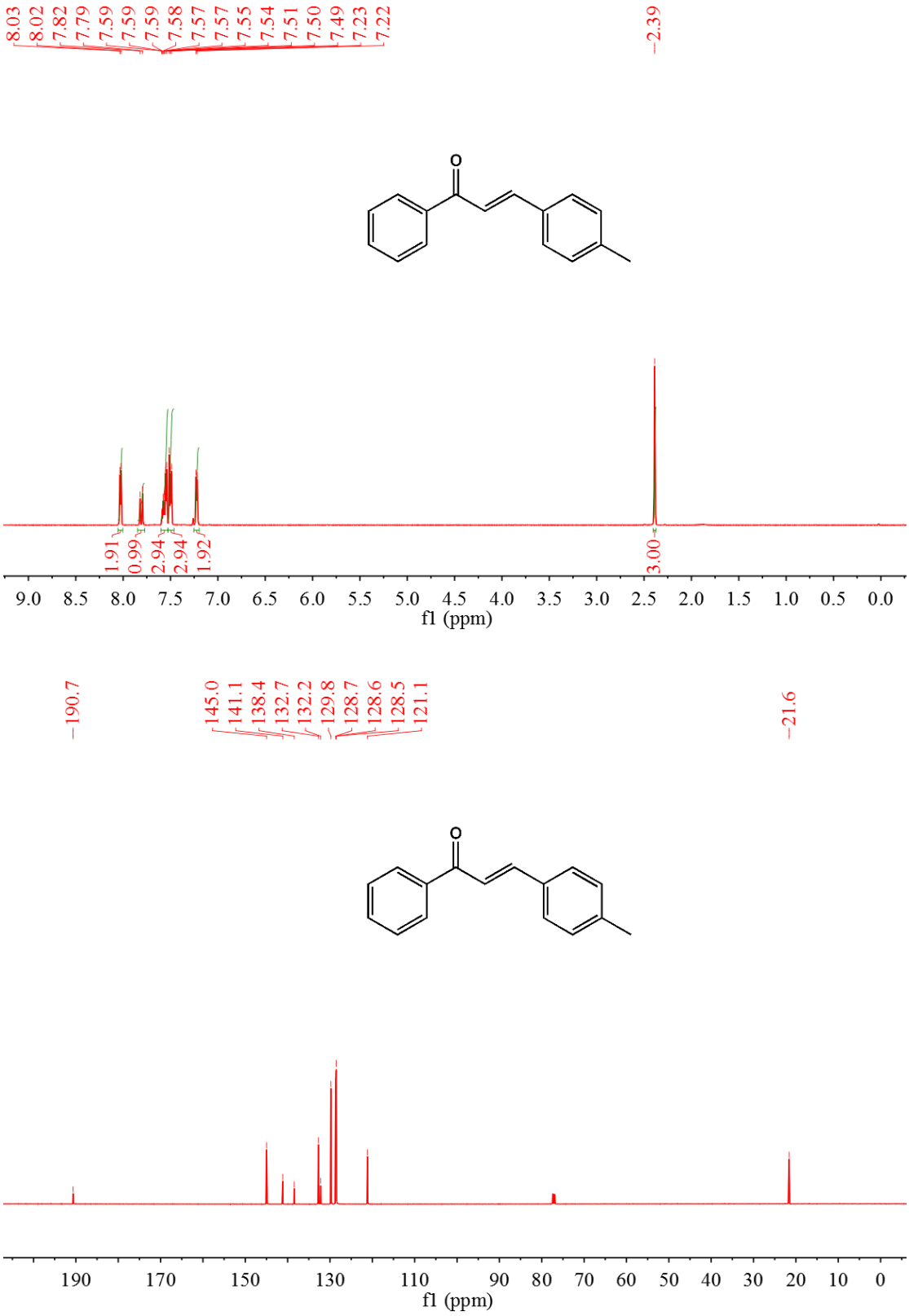


Fig. S46 The ^{1}H and ^{13}C NMR spectra for 3-(4-methoxyphenyl)-1-phenylprop-2-en-1-one(**5ca**)

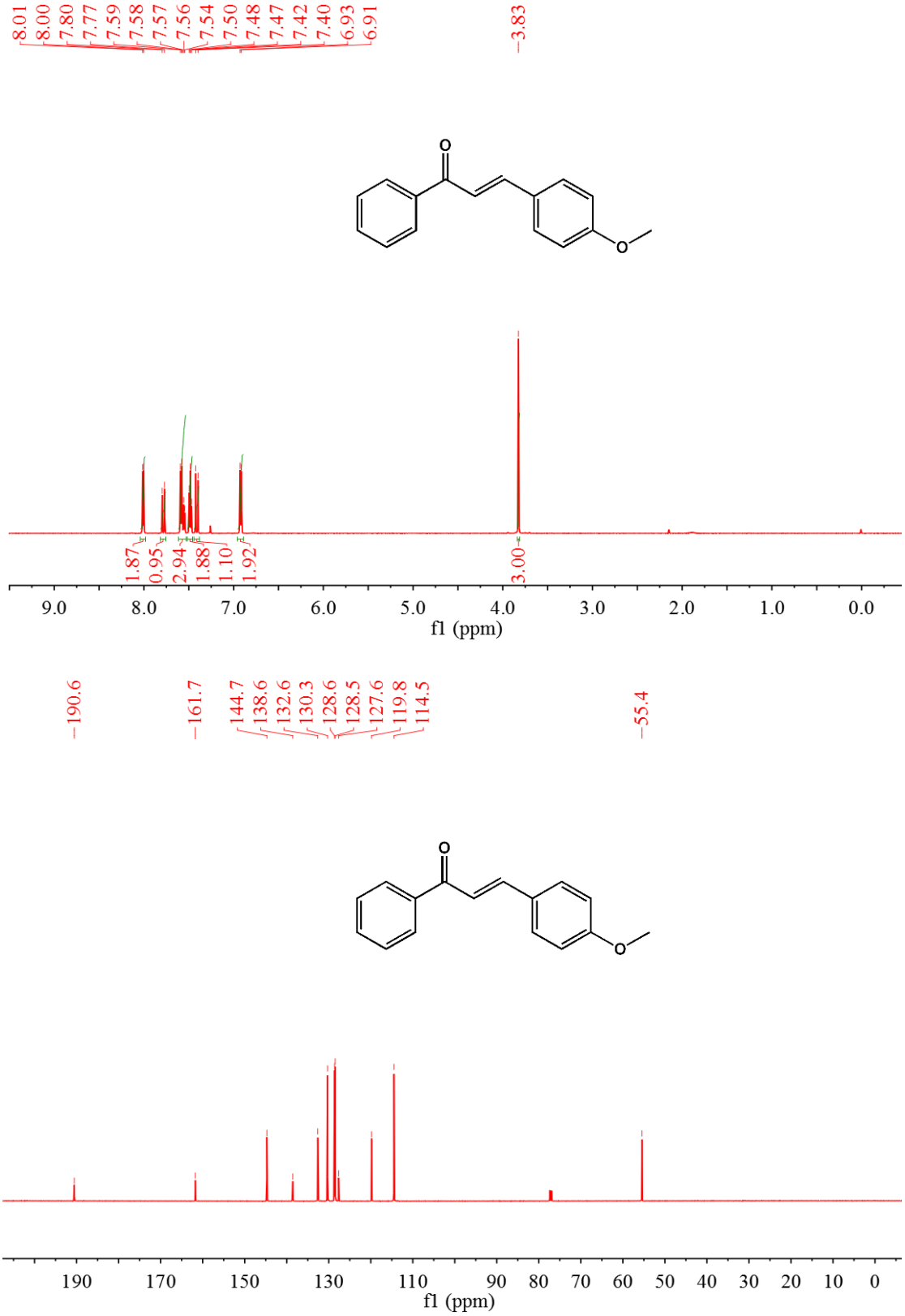


Fig. S47 The ^{1}H and ^{13}C NMR spectra for 3-(4-fluorophenyl)-1-phenylprop-2-en-1-one(**5da**)

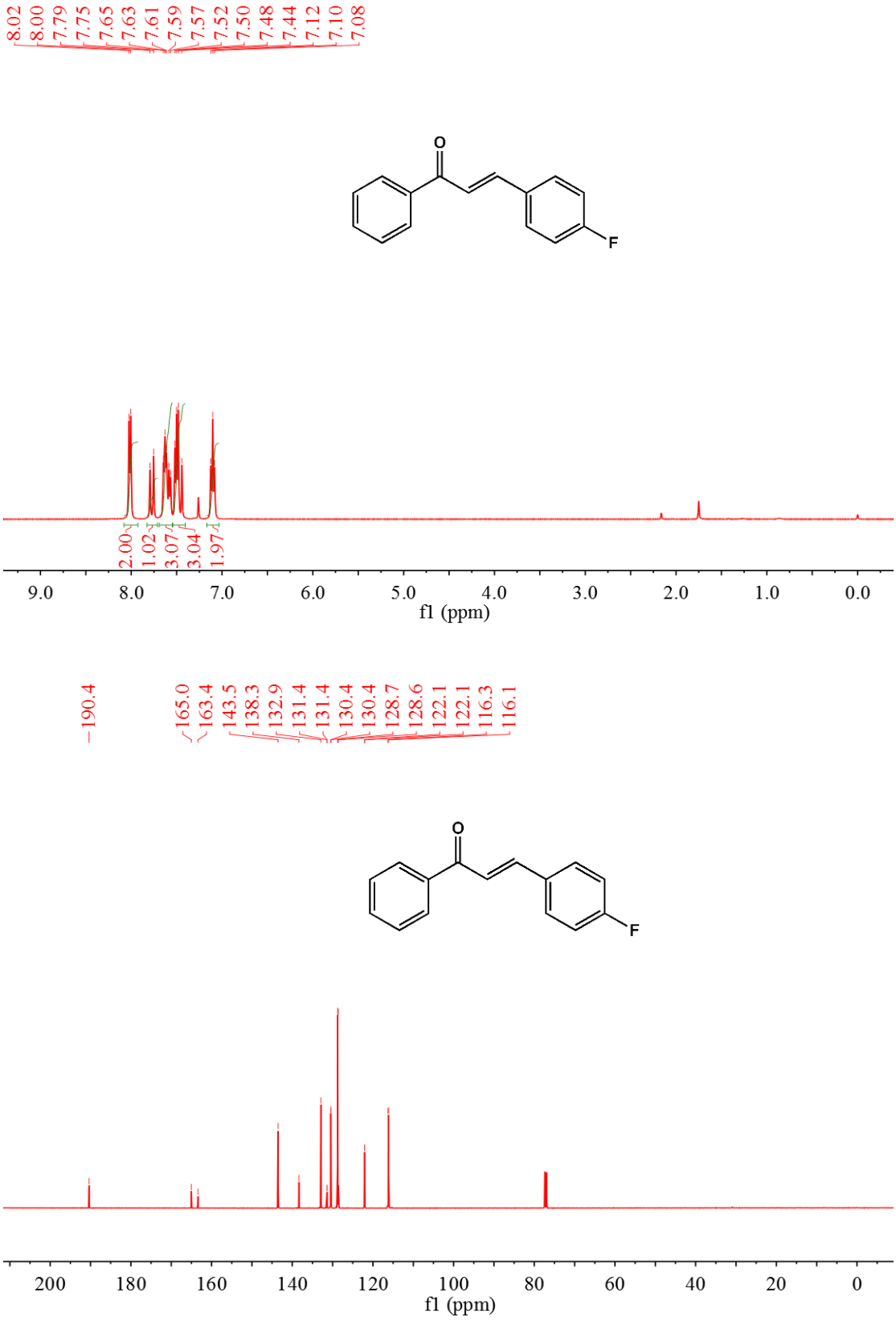


Fig. S48 The ^{1}H and ^{13}C NMR spectra for 3-(4-chlorophenyl)-1-phenylprop-2-en-1-one(**5ea**)

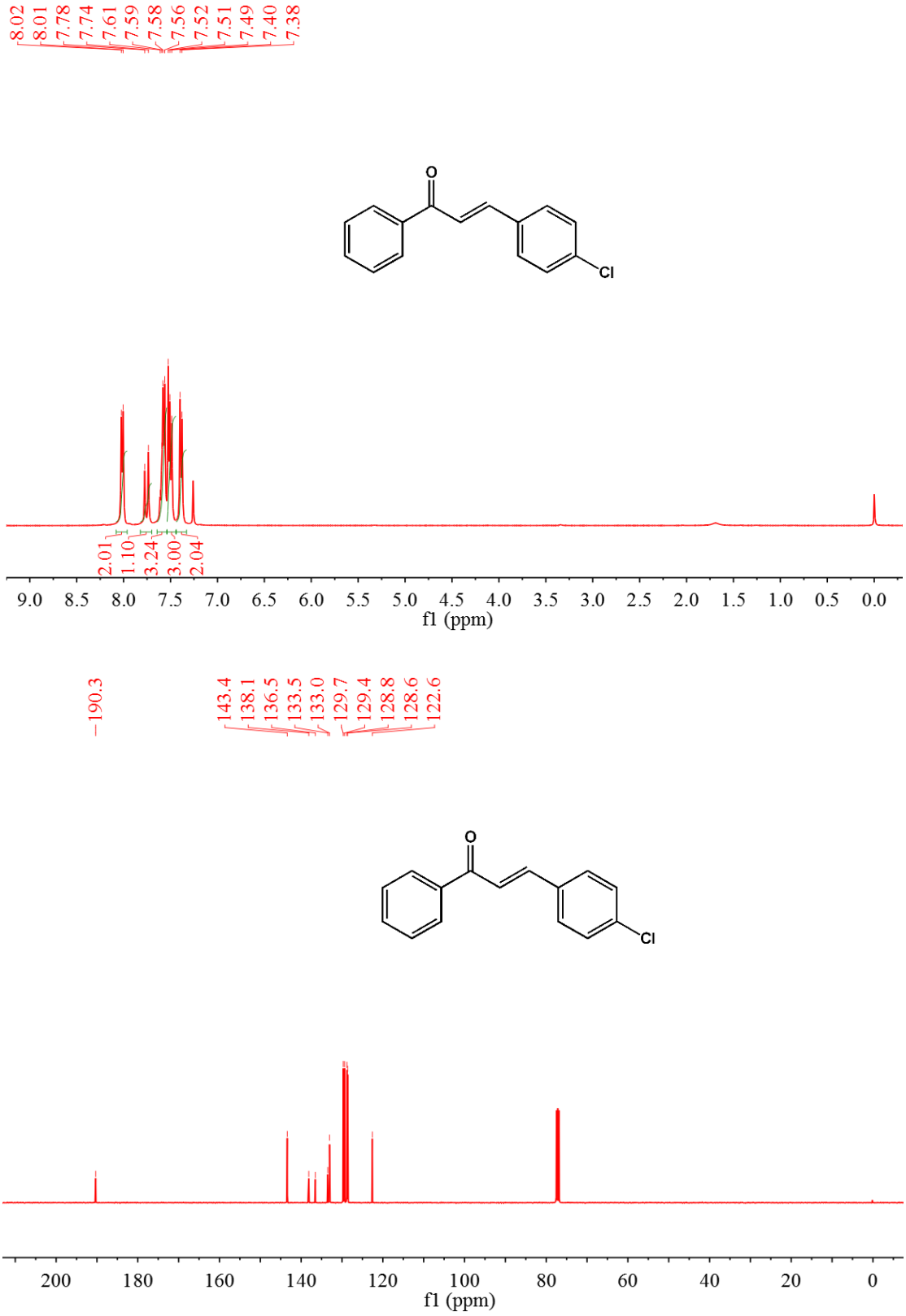


Fig. S49 The ^{1}H and ^{13}C NMR spectra for 3-(4-bromophenyl)-1-phenylprop-2-en-1-one(**5fa**)

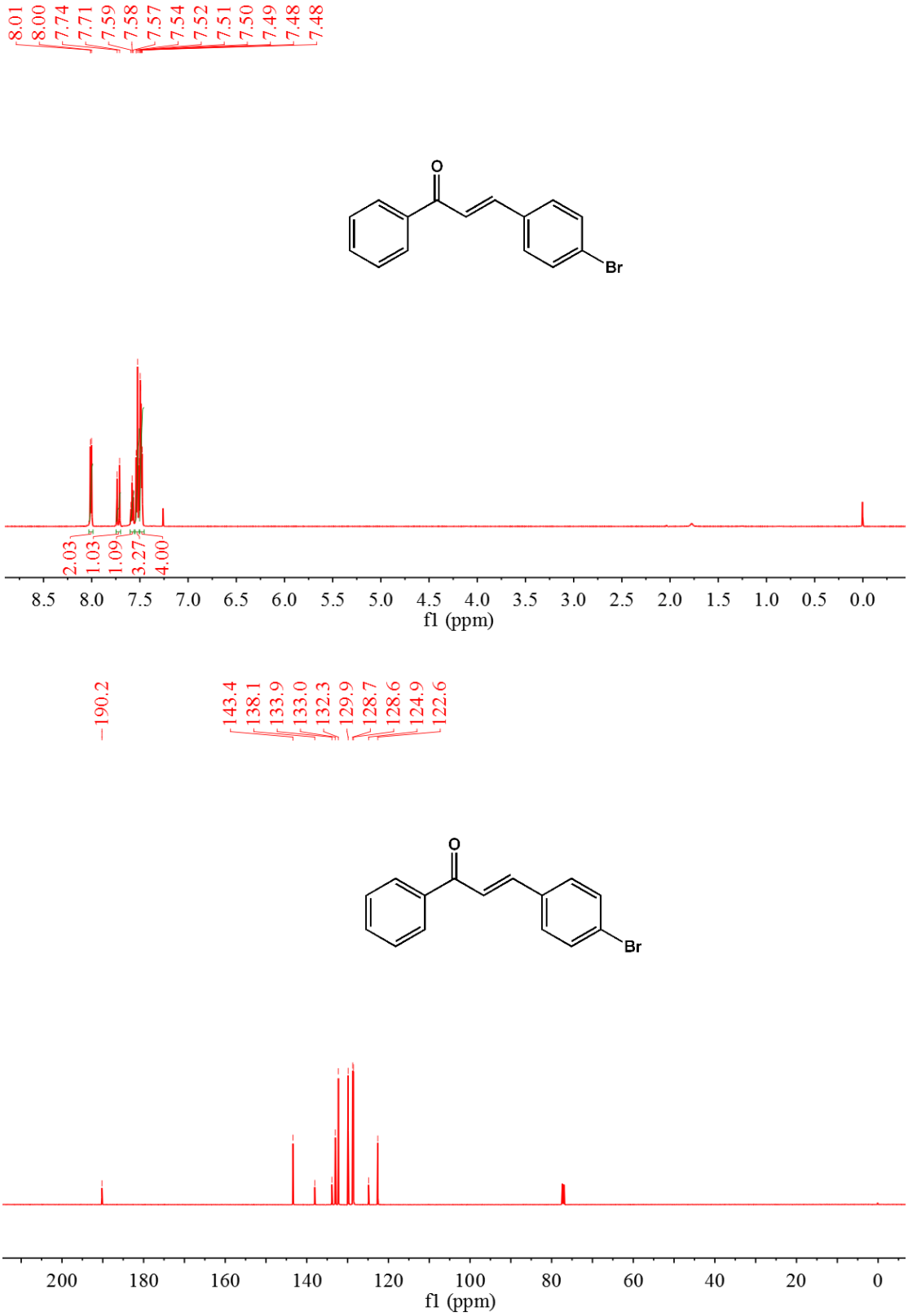


Fig. S50 The ^{1}H and ^{13}C NMR spectra for 4-(3-oxo-3-phenylprop-1-en-1-yl)benzonitrile(**5ga**)

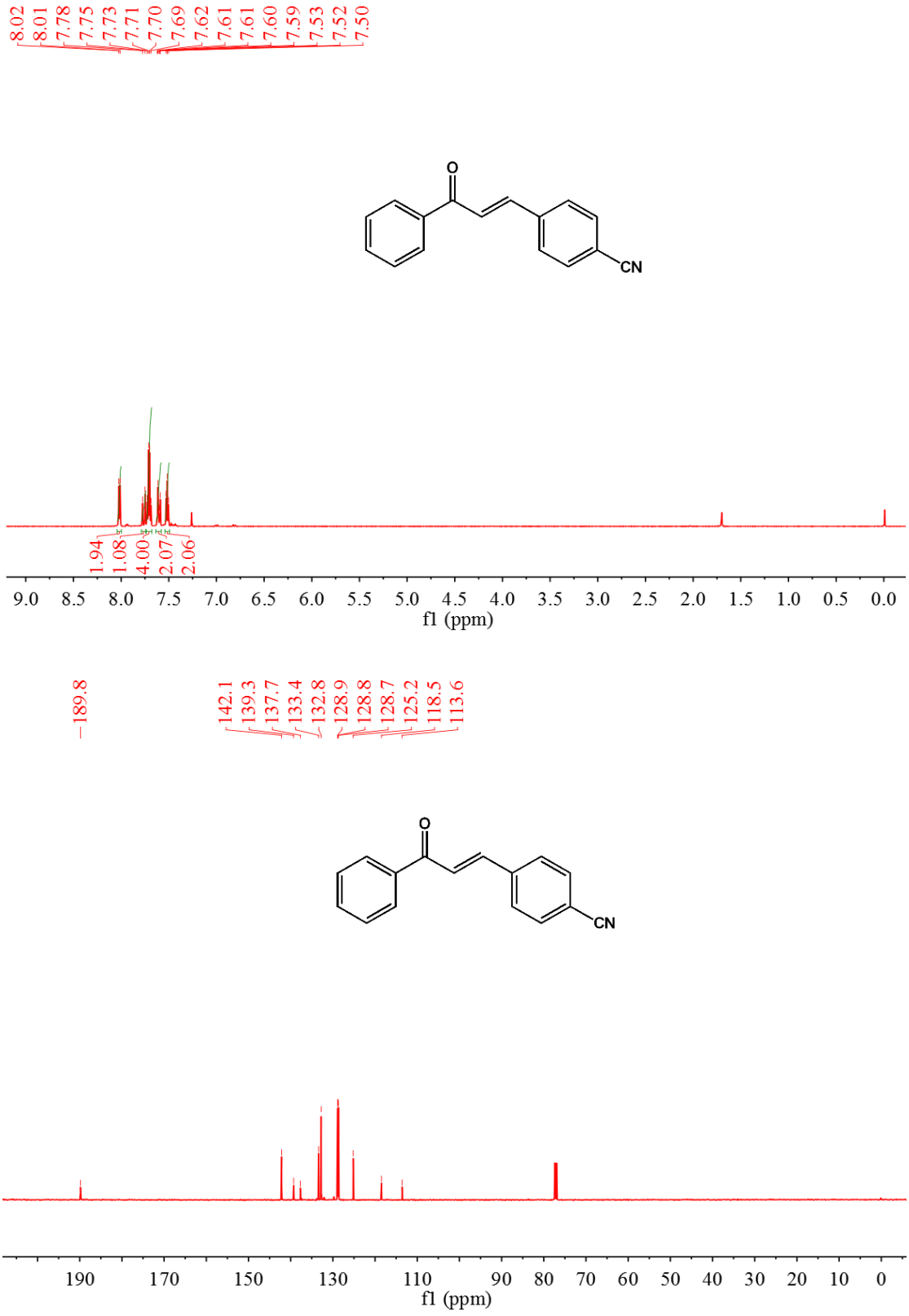


Fig. S51 The ^{1}H and ^{13}C NMR spectra for 3-(2-methoxyphenyl)-1-phenylprop-2-en-1-one(**5ha**)

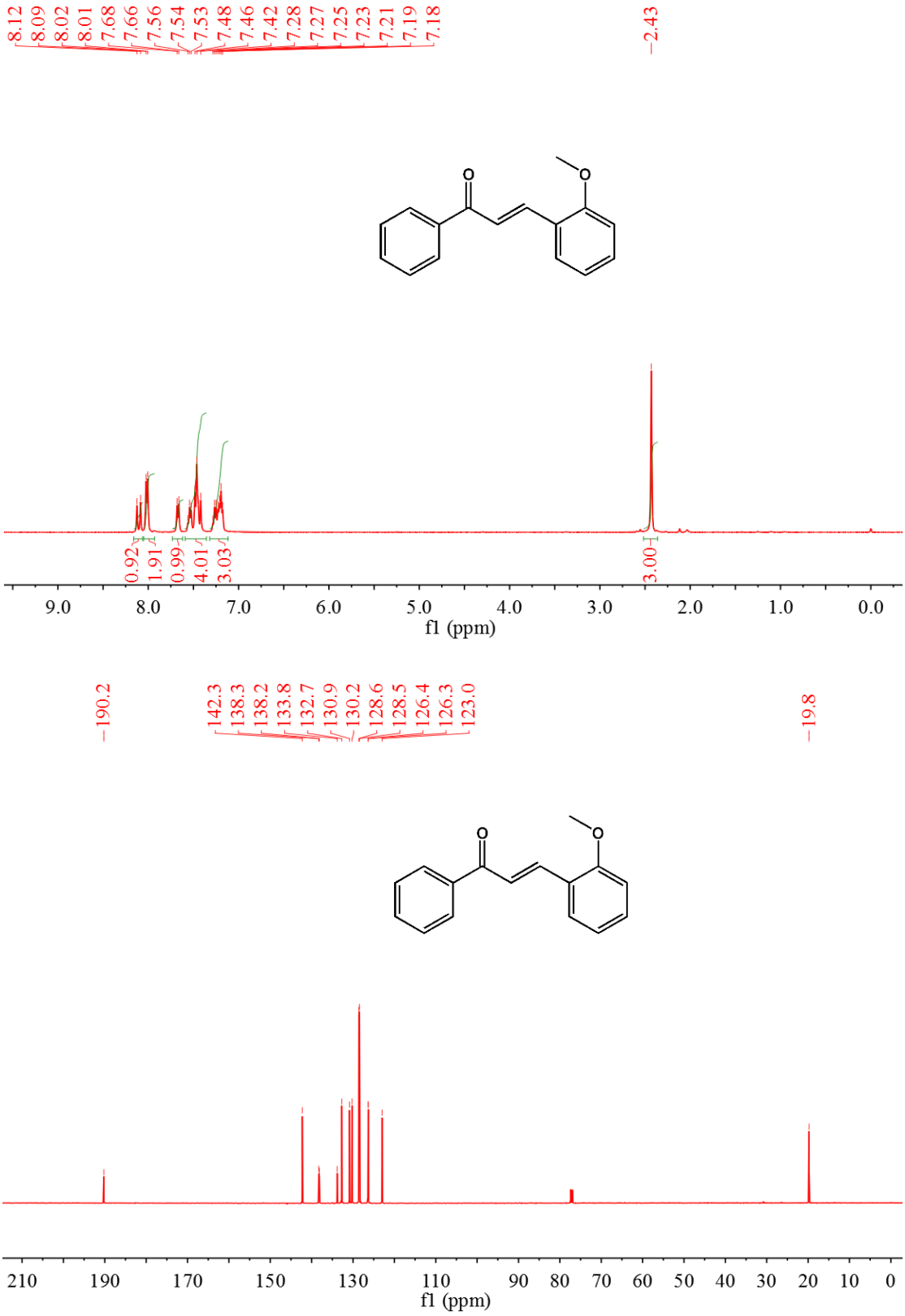
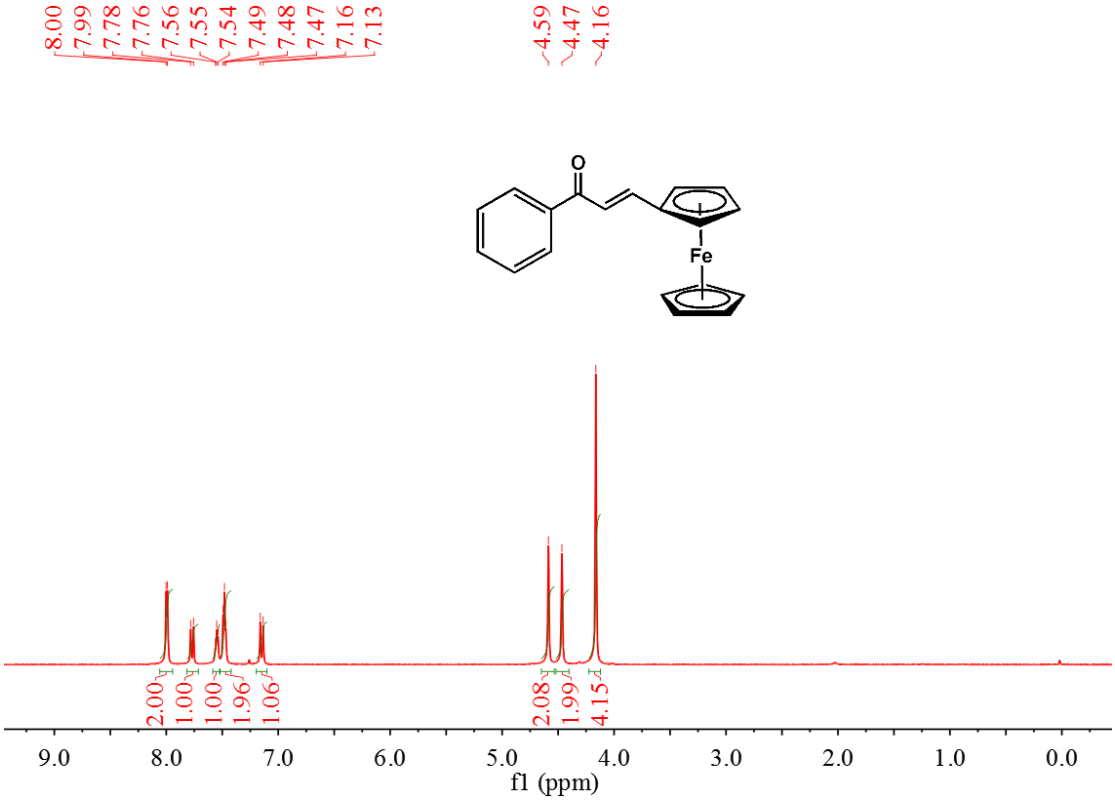


Fig. S52 The ^{1}H and ^{13}C NMR spectra for 3-ferrocenyl-1-phenylprop-2-enone (**5ia**)



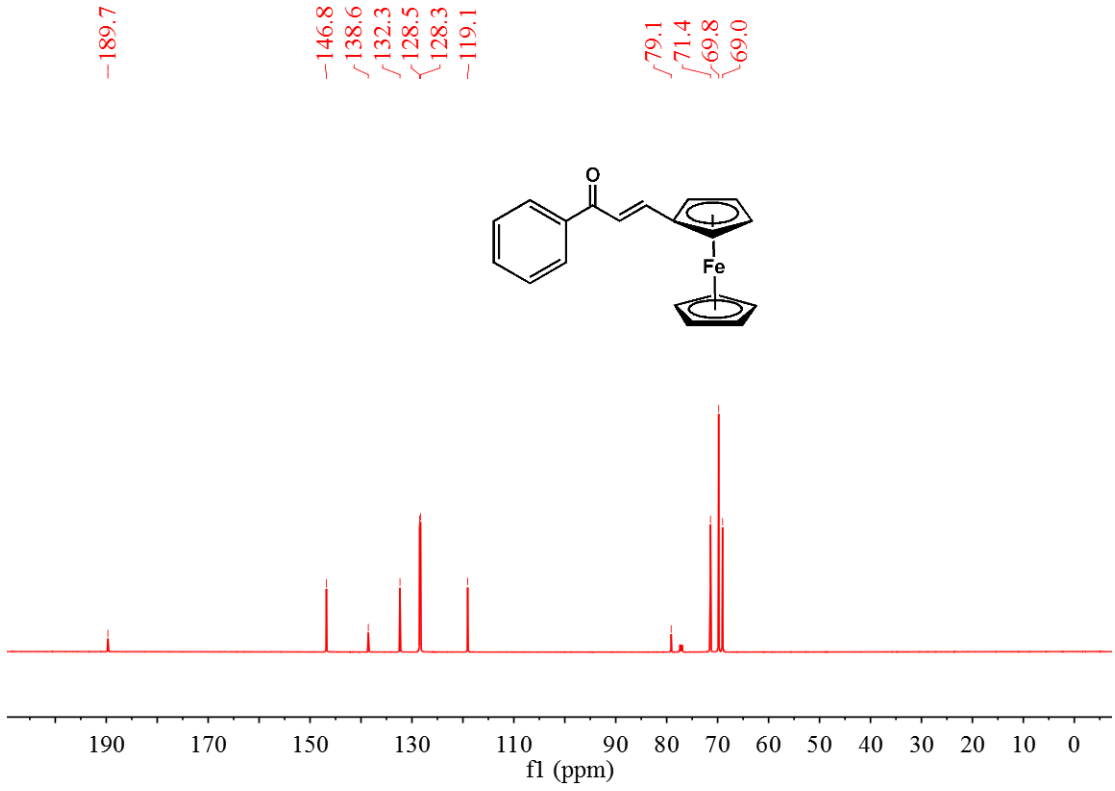


Fig. S53 The ^{1}H and ^{13}C NMR spectra for 3-(furan-2-yl)-1-phenylprop-2-en-1-one(**5ja**)

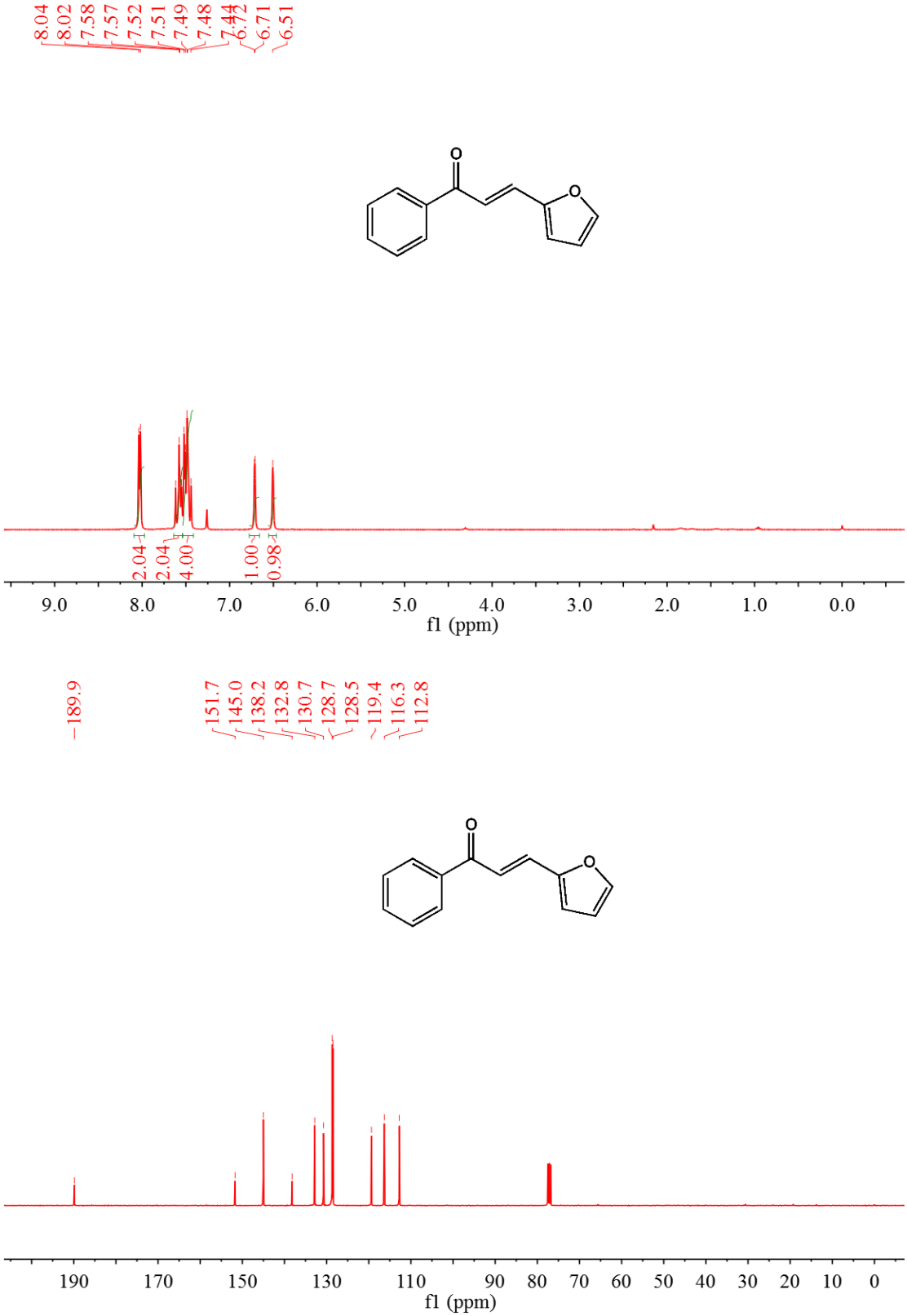


Fig. S54 The ^{1}H and ^{13}C NMR spectra for 1-phenyl-3-(thiophen-2-yl)prop-2-en-1-one(**5ka**)

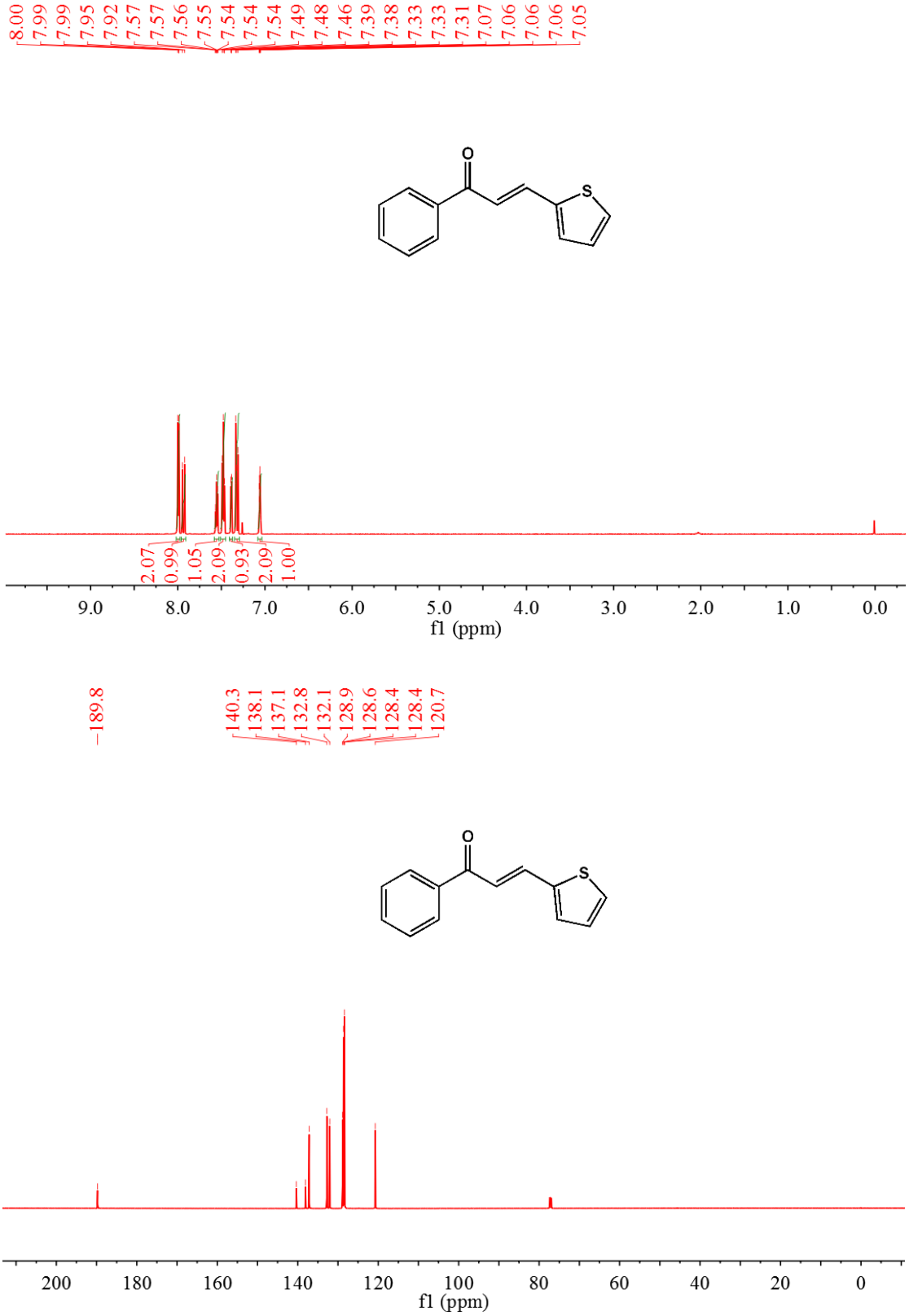


Fig. S55 The ^{1}H and ^{13}C NMR spectra for 1,3-diphenylpropan-1-ol(**6aa**)

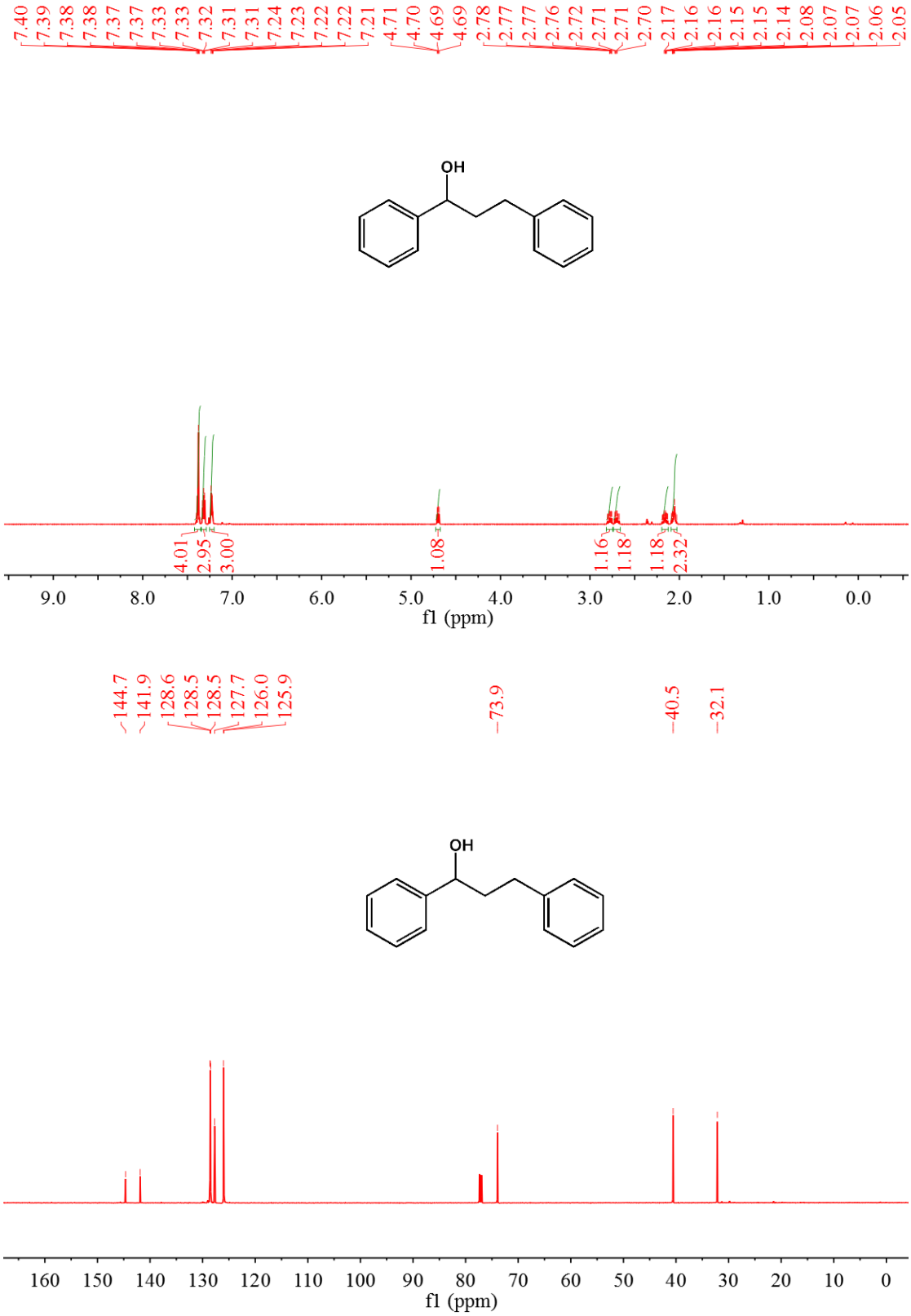


Fig. S56 The ^{1}H and ^{13}C NMR spectra for 3-phenyl-1-(p-tolyl)propan-1-ol(**6ab**)

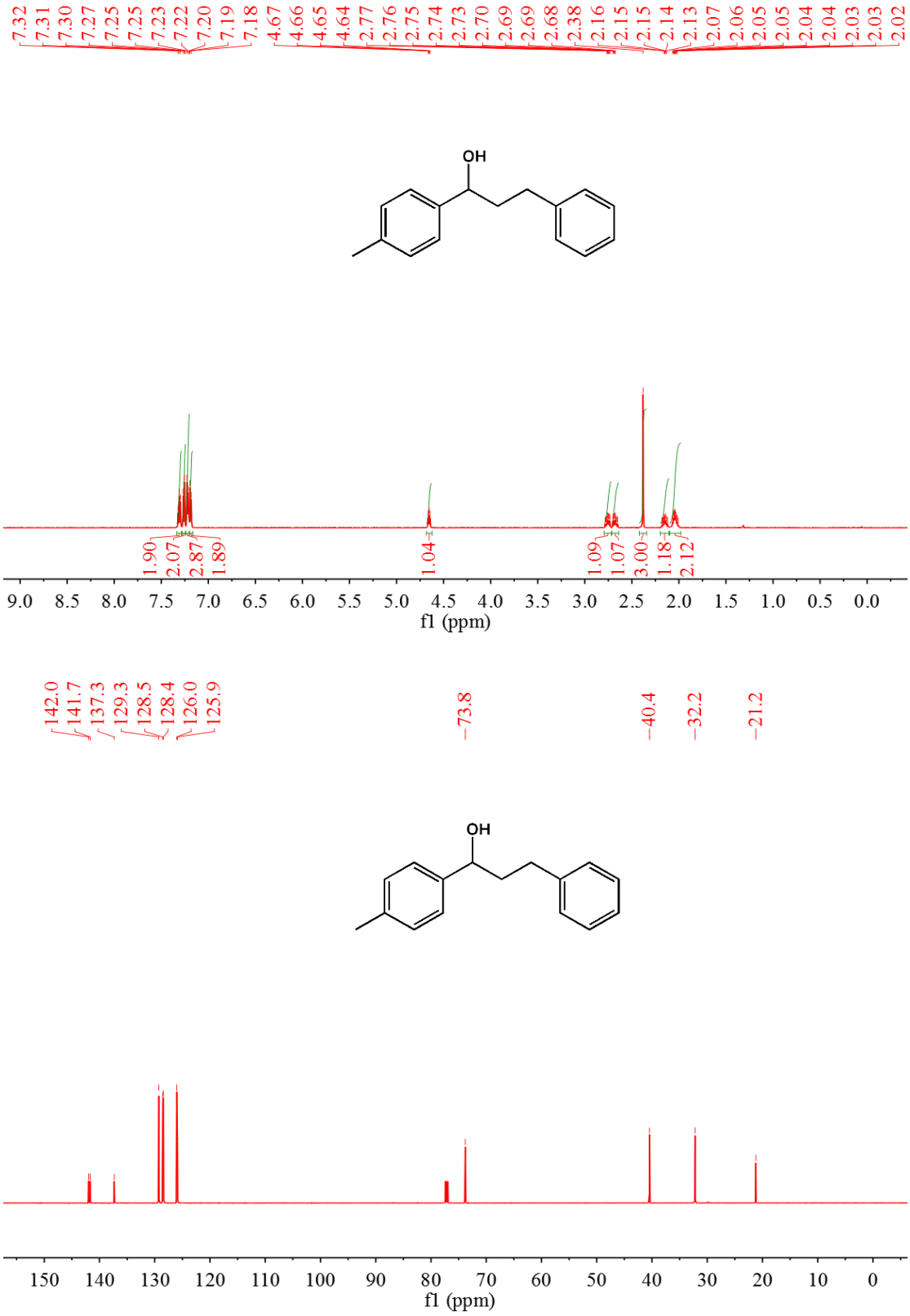


Fig. S57 The ^{1}H and ^{13}C NMR spectra for 1-(4-methoxyphenyl)-3-phenylpropan-1-ol(**6ac**)

Fig. S58 The ^{1}H and ^{13}C NMR spectra for 1-(4-fluorophenyl)-3-phenylpropan-1-ol(**6ad**)

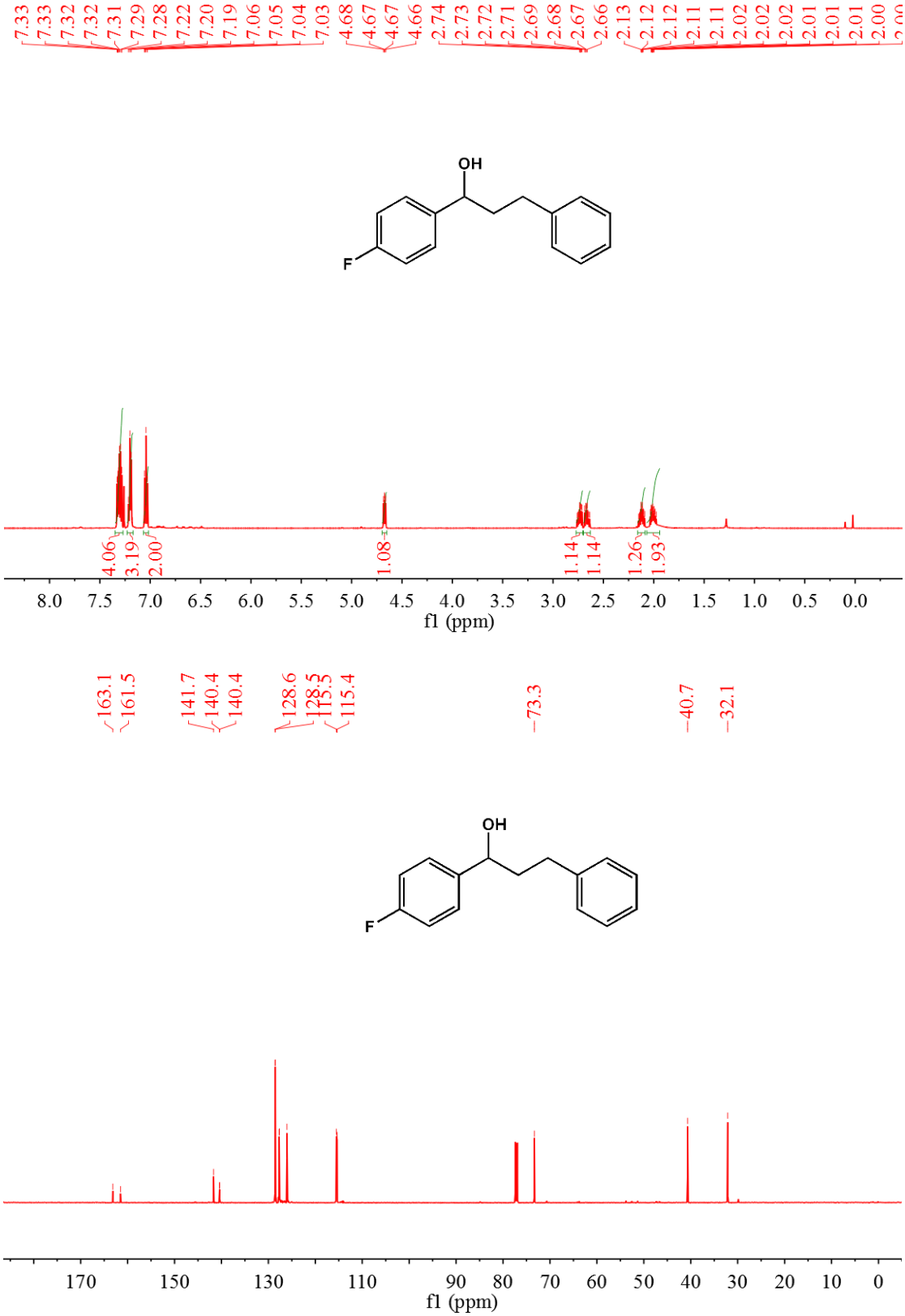


Fig. S59 The ^{1}H and ^{13}C NMR spectra for1-(4-chlorophenyl)-3-phenylpropan-1-ol (**6ae**)

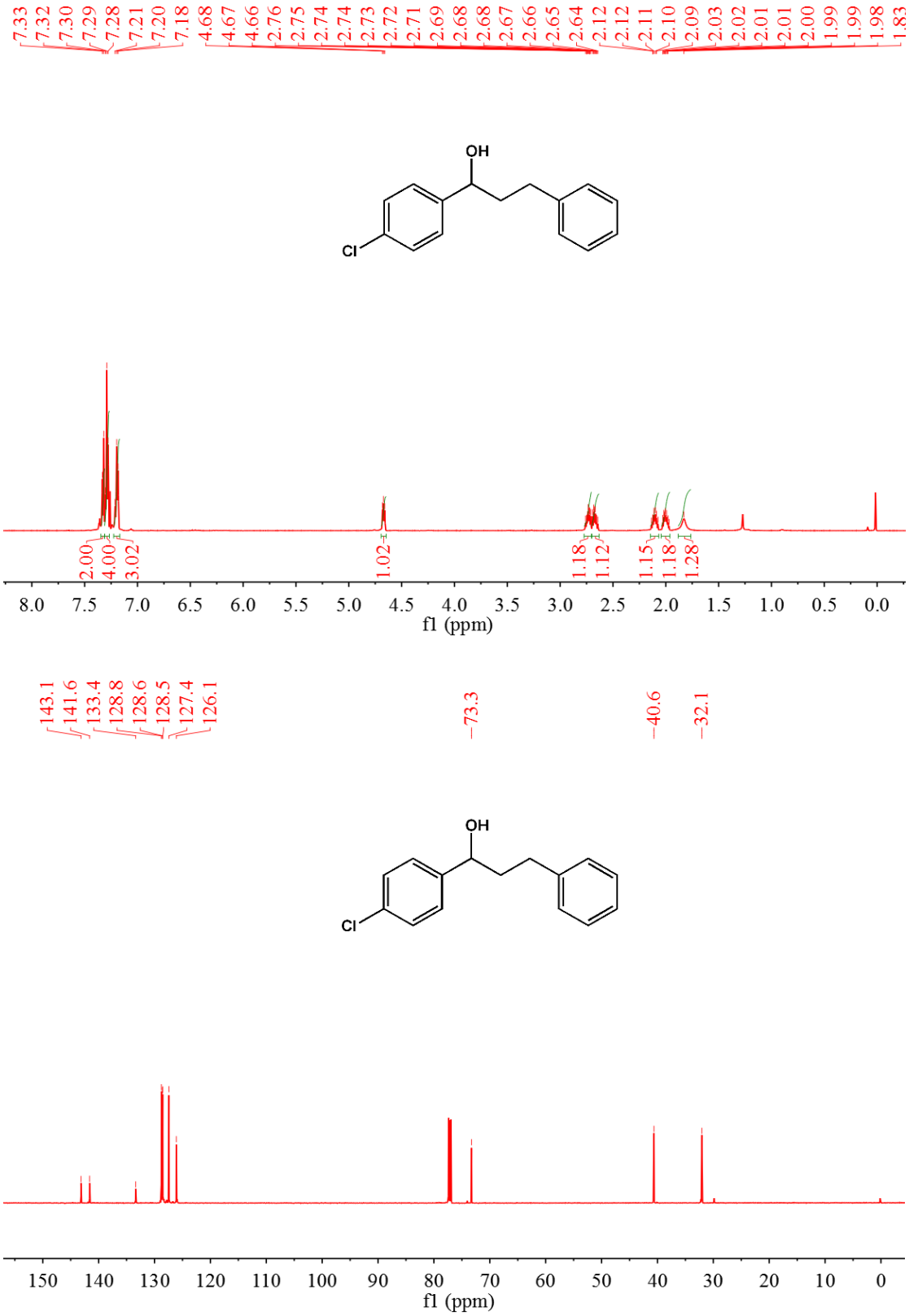


Fig. S60 The ^{1}H and ^{13}C NMR spectra for 1-(4-bromophenyl)-3-phenylpropan-1-ol(**6af**)

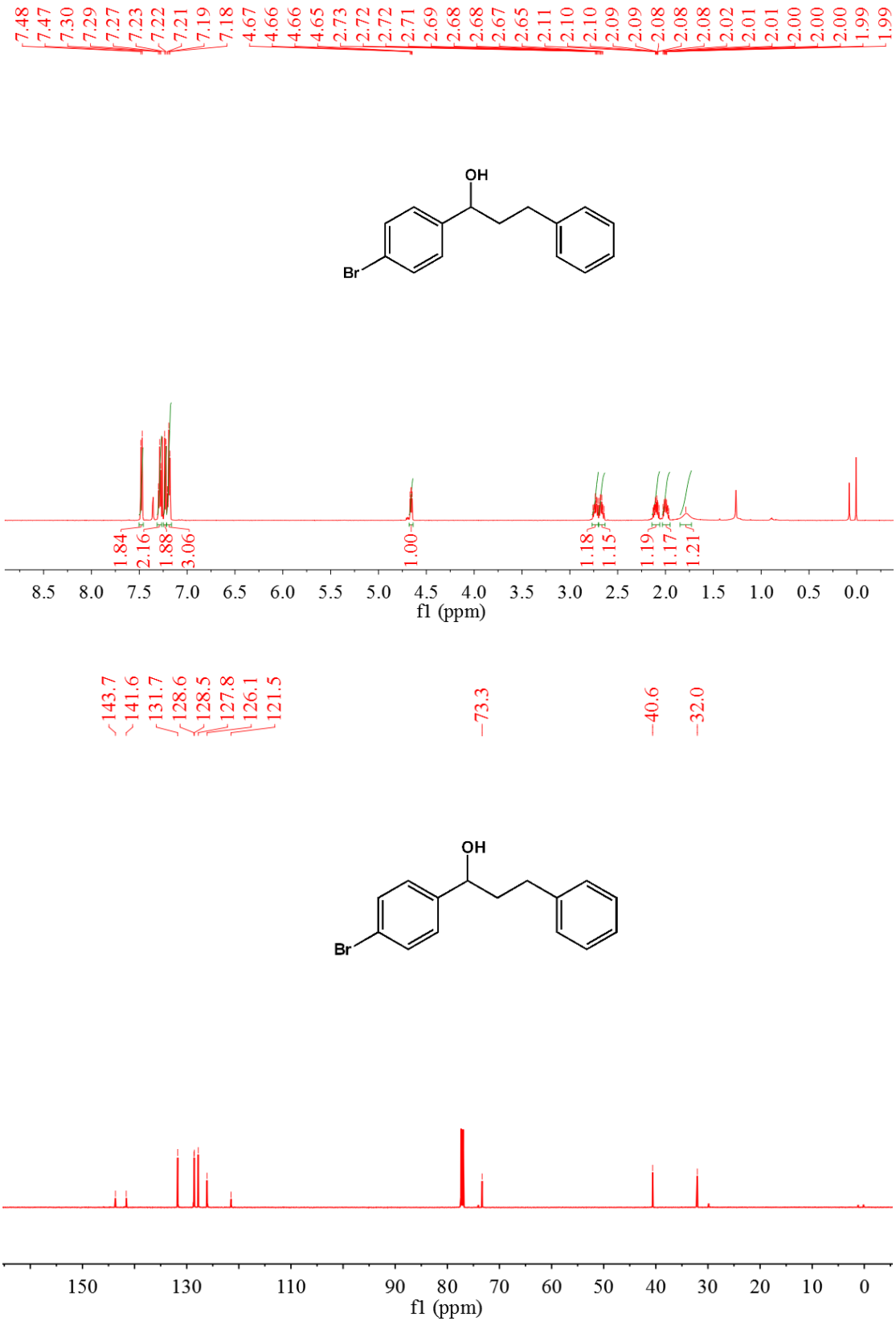


Fig. S61 The ^{1}H and ^{13}C NMR spectra for 3-phenyl-1-(m-tolyl)propan-1-ol(**6ag**)

Fig. S62 The ^{1}H and ^{13}C NMR spectra for 1-(3-bromophenyl)-3-phenylpropan-1-ol(**6ah**)

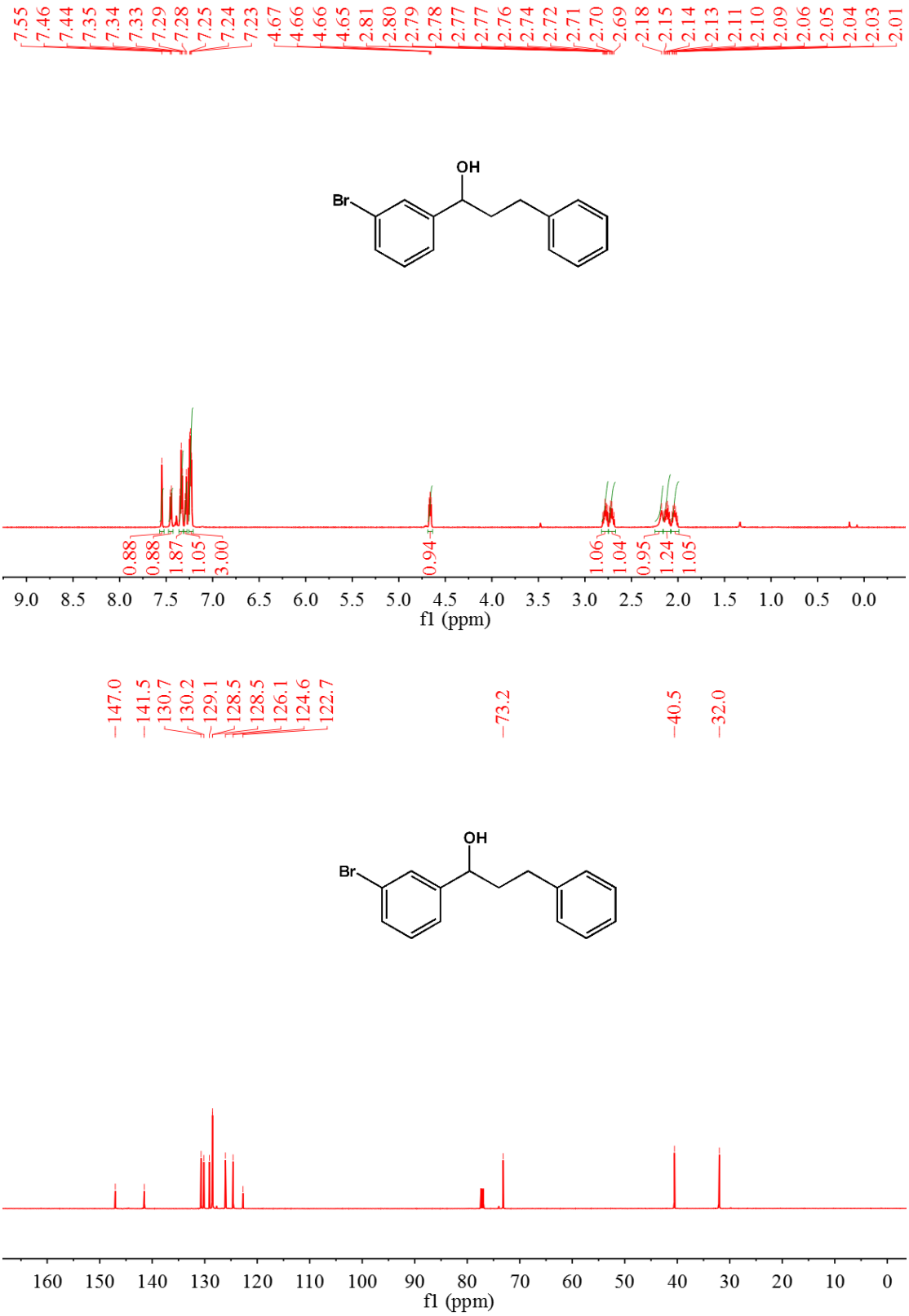


Fig. S63 The ^{1}H and ^{13}C NMR spectra for 3-phenyl-1-(o-tolyl)propan-1-ol(**6ai**)

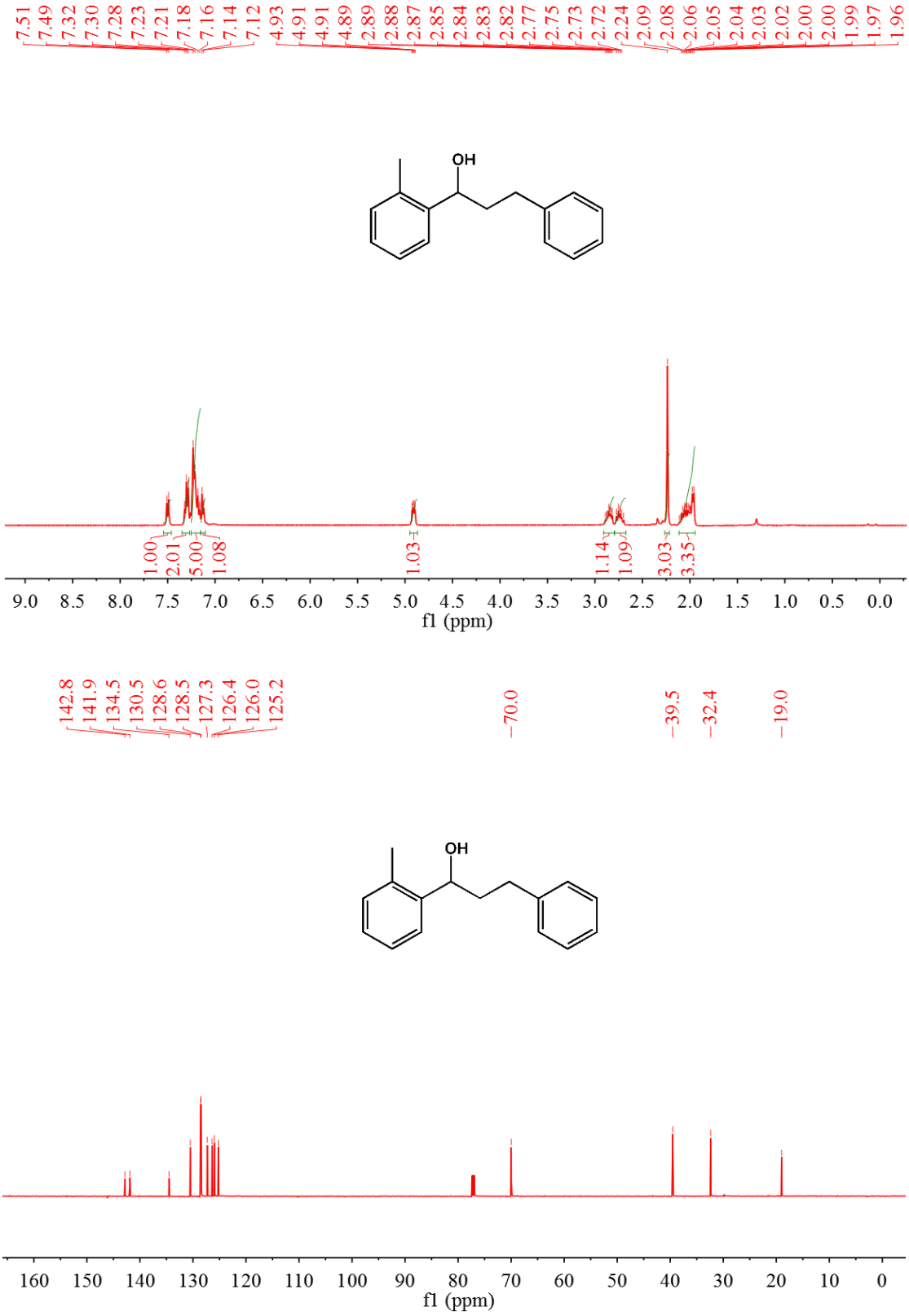


Fig. S64 The ^{1}H and ^{13}C NMR spectra for 1-(2-chlorophenyl)-3-phenylpropan-1-ol(**6aj**)

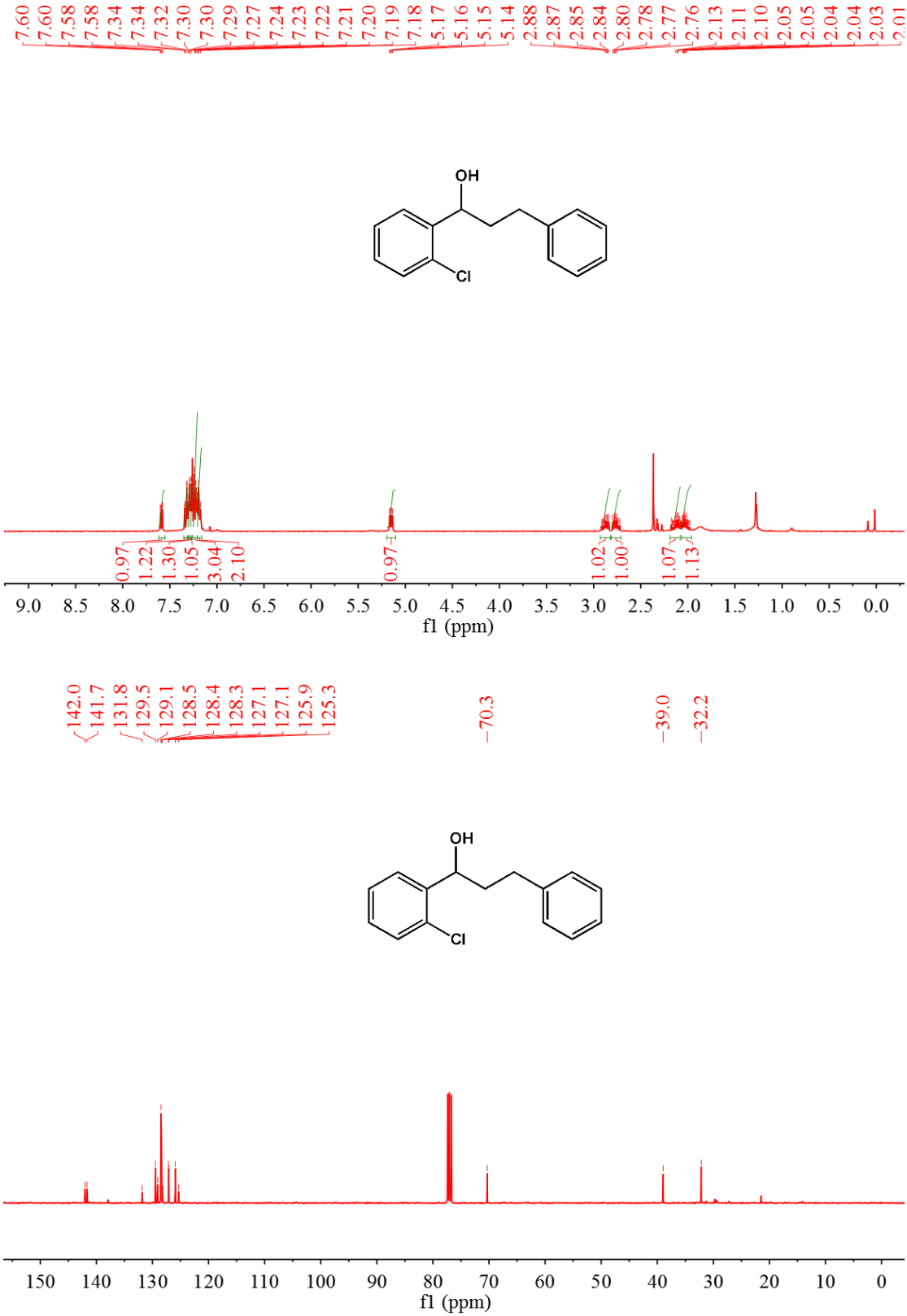


Fig. S65 The ^{1}H and ^{13}C NMR spectra for 1-(naphthalen-2-yl)-3-phenylpropan-1-ol(**6al**)

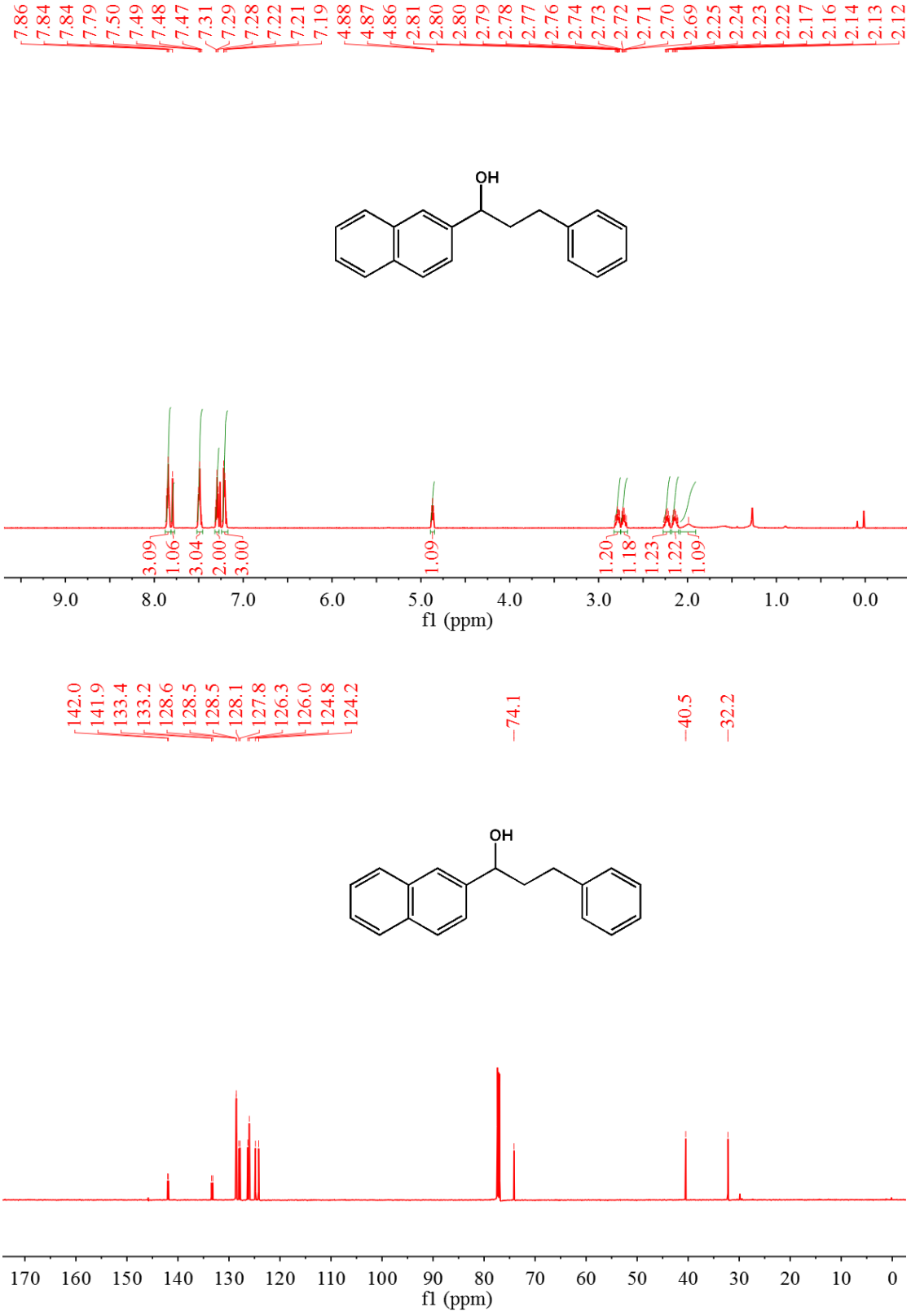


Fig. S66 The ^{1}H and ^{13}C NMR spectra for 3-phenyl-1-(thiophen-2-yl)propan-1-ol(**6am**)

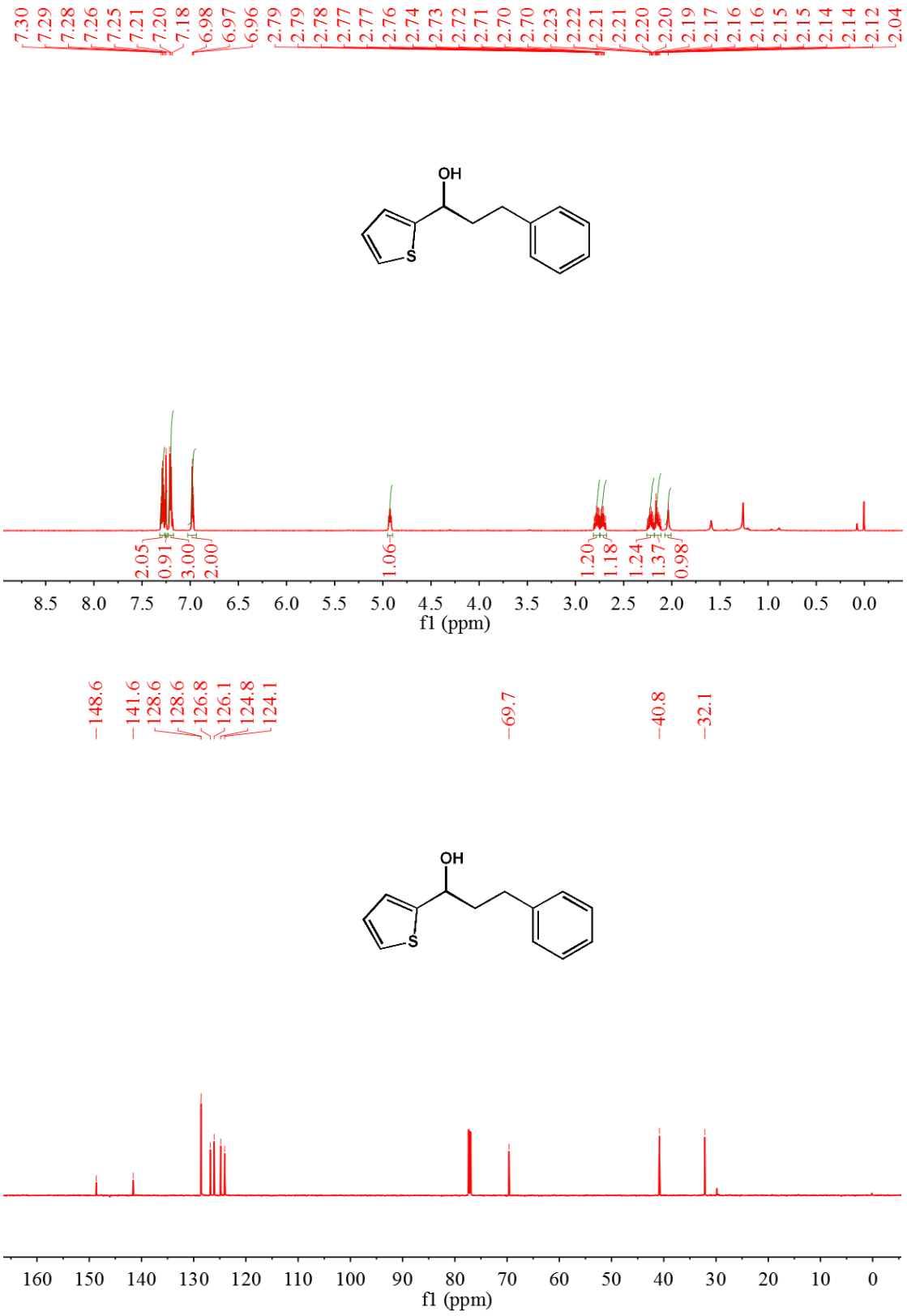


Fig. S67 The ^{1}H and ^{13}C NMR spectra for 1-ferrocenyl-2-phenyl-ethanol (**6an**)

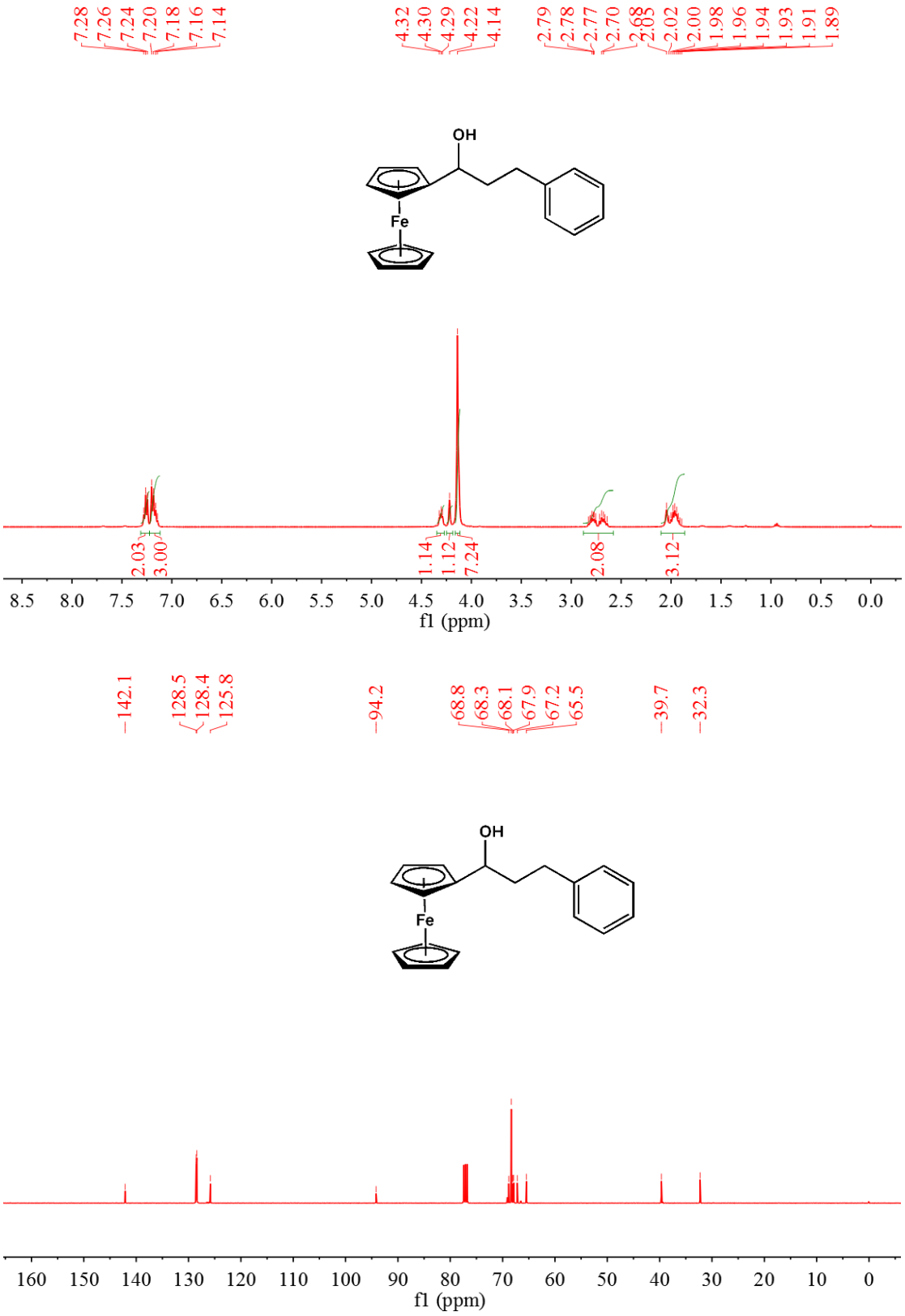


Fig. S68 The ^{1}H and ^{13}C NMR spectra for 1-phenyl-3-(p-tolyl)propan-1-ol(**6ba**)

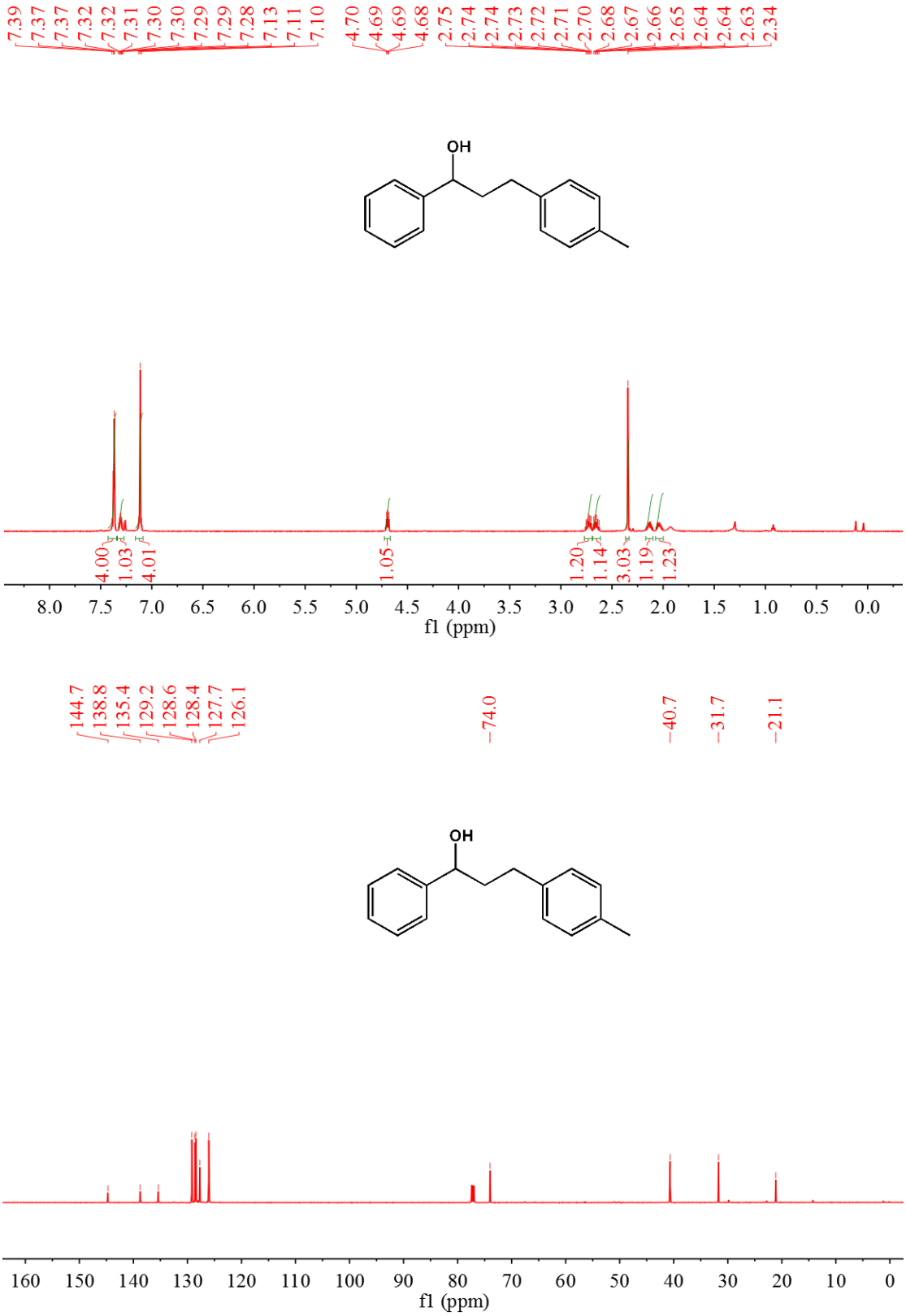


Fig. S69 The ^{1}H and ^{13}C NMR spectra for 3-(4-methoxyphenyl)-1-phenylpropan-1-ol(**6ca**)

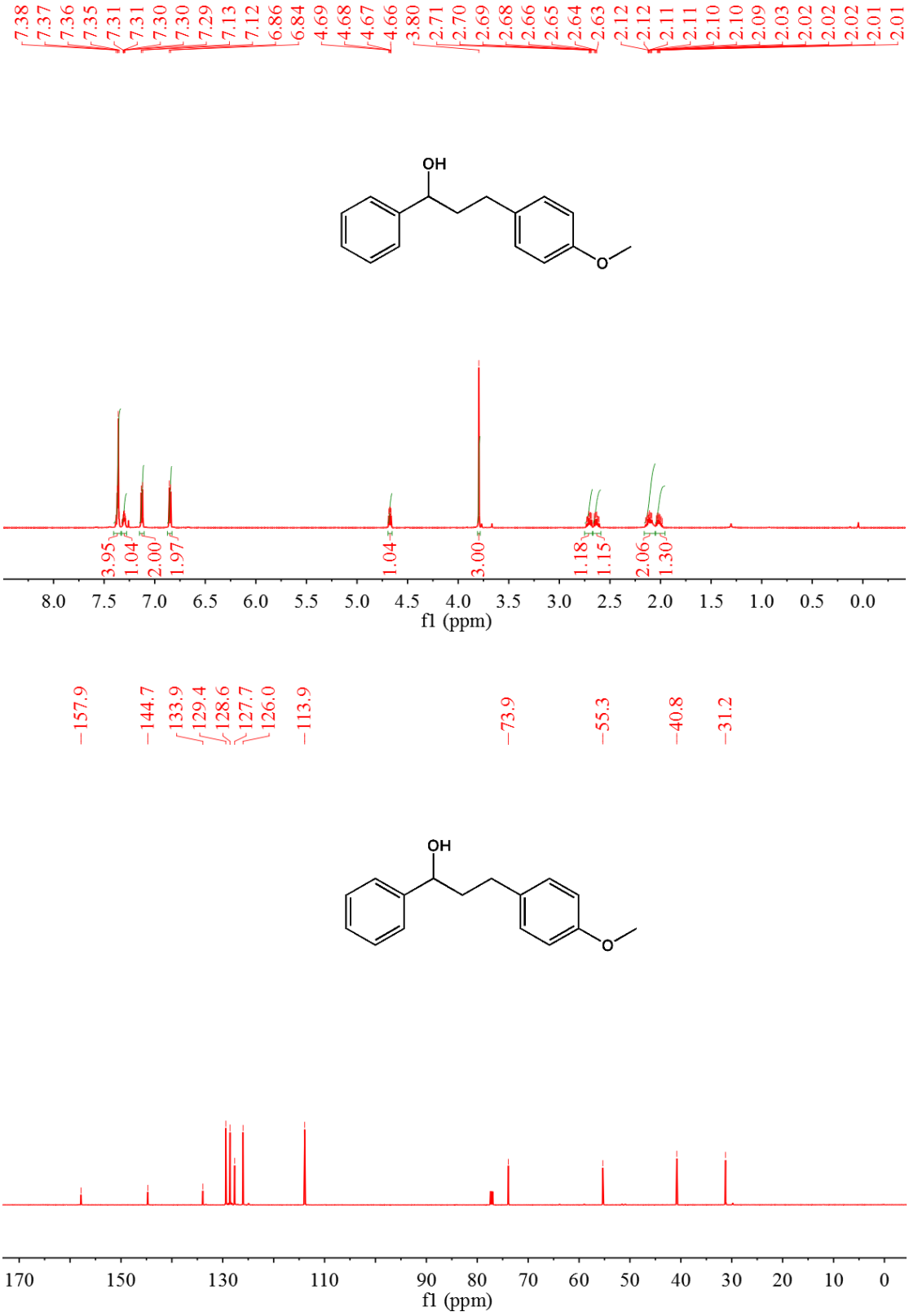


Fig. S70 The ^{1}H and ^{13}C NMR spectra for 3-(4-fluorophenyl)-1-phenylpropan-1-ol(**6da**)

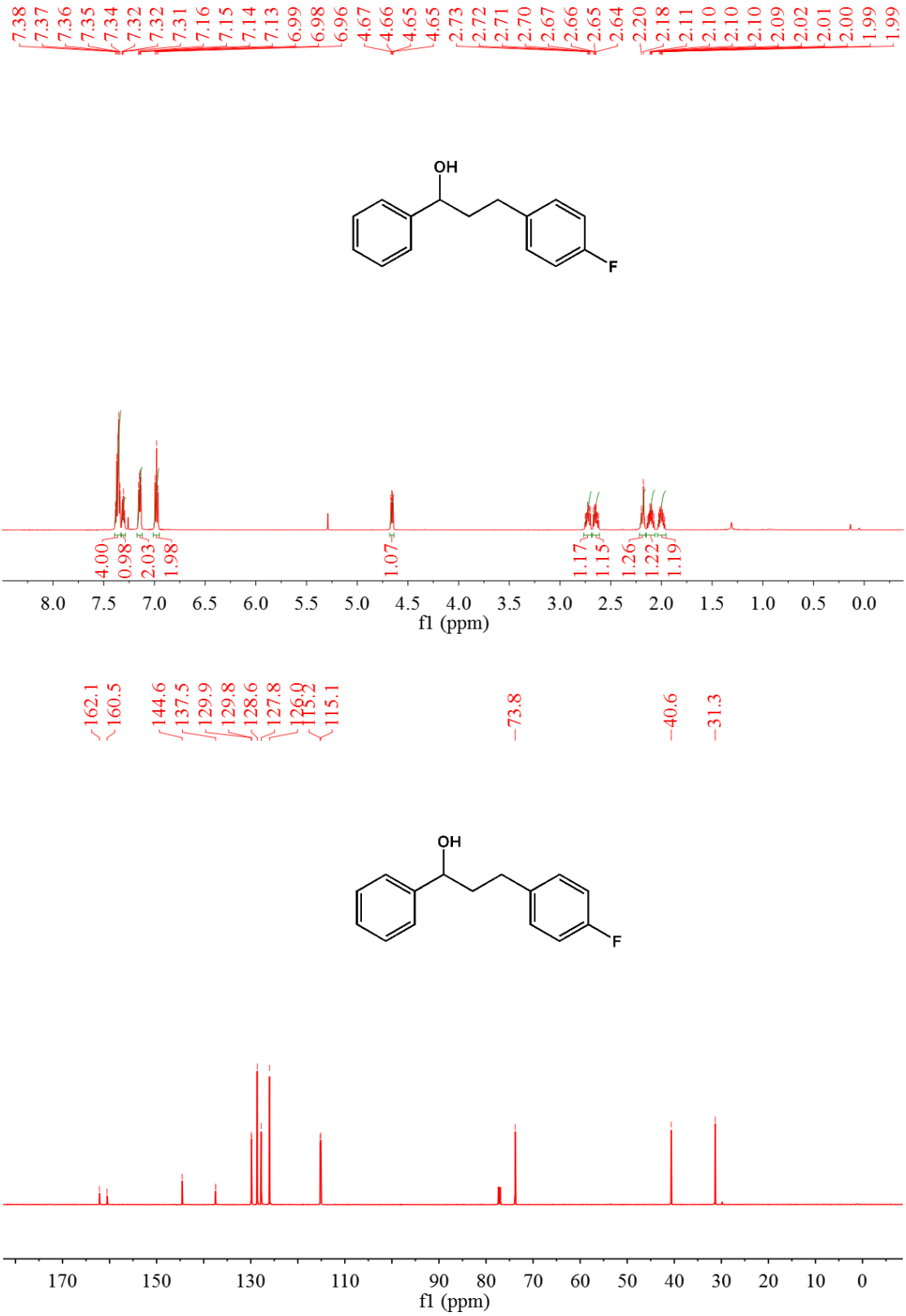


Fig. S71 The ^{1}H and ^{13}C NMR spectra for 3-(4-chlorophenyl)-1-phenylpropan-1-ol(**6ea**)

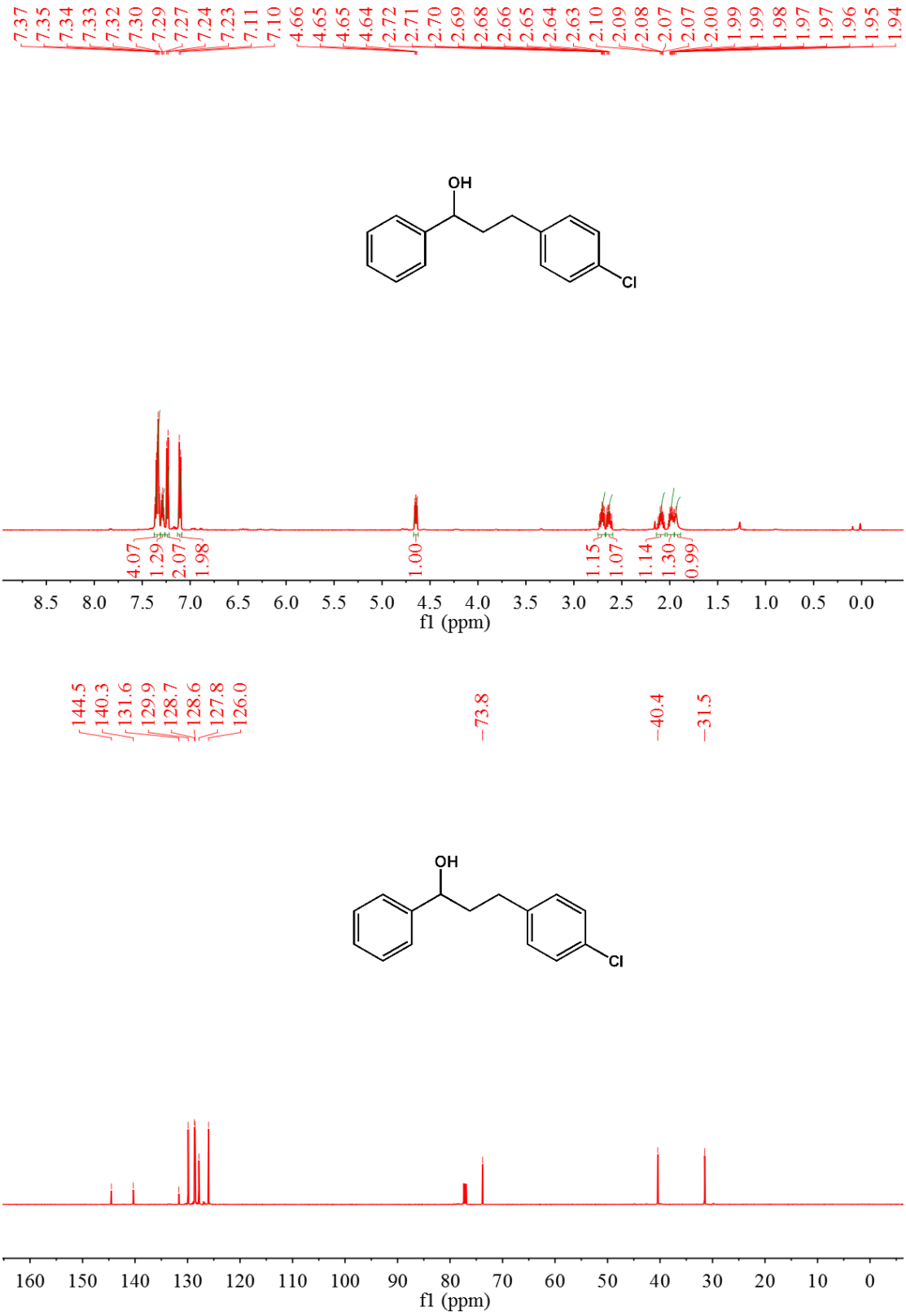


Fig. S72 The ^{1}H and ^{13}C NMR spectra for 3-(4-bromophenyl)-1-phenylpropan-1-ol(**6fa**)

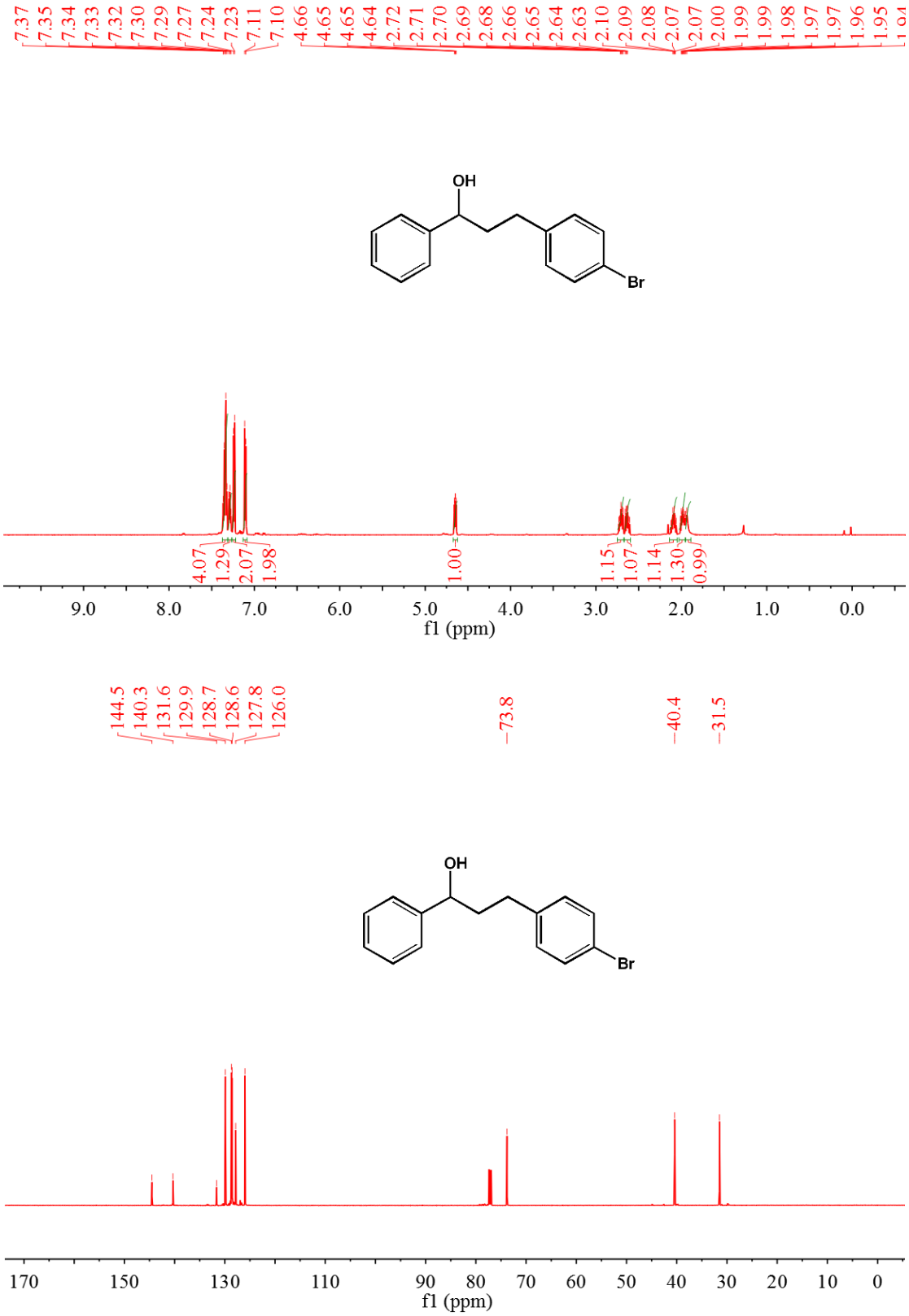


Fig. S73 The ^{1}H and ^{13}C NMR spectra for 3-(2-methoxyphenyl)-1-phenylpropan-1-ol(**6ha**)

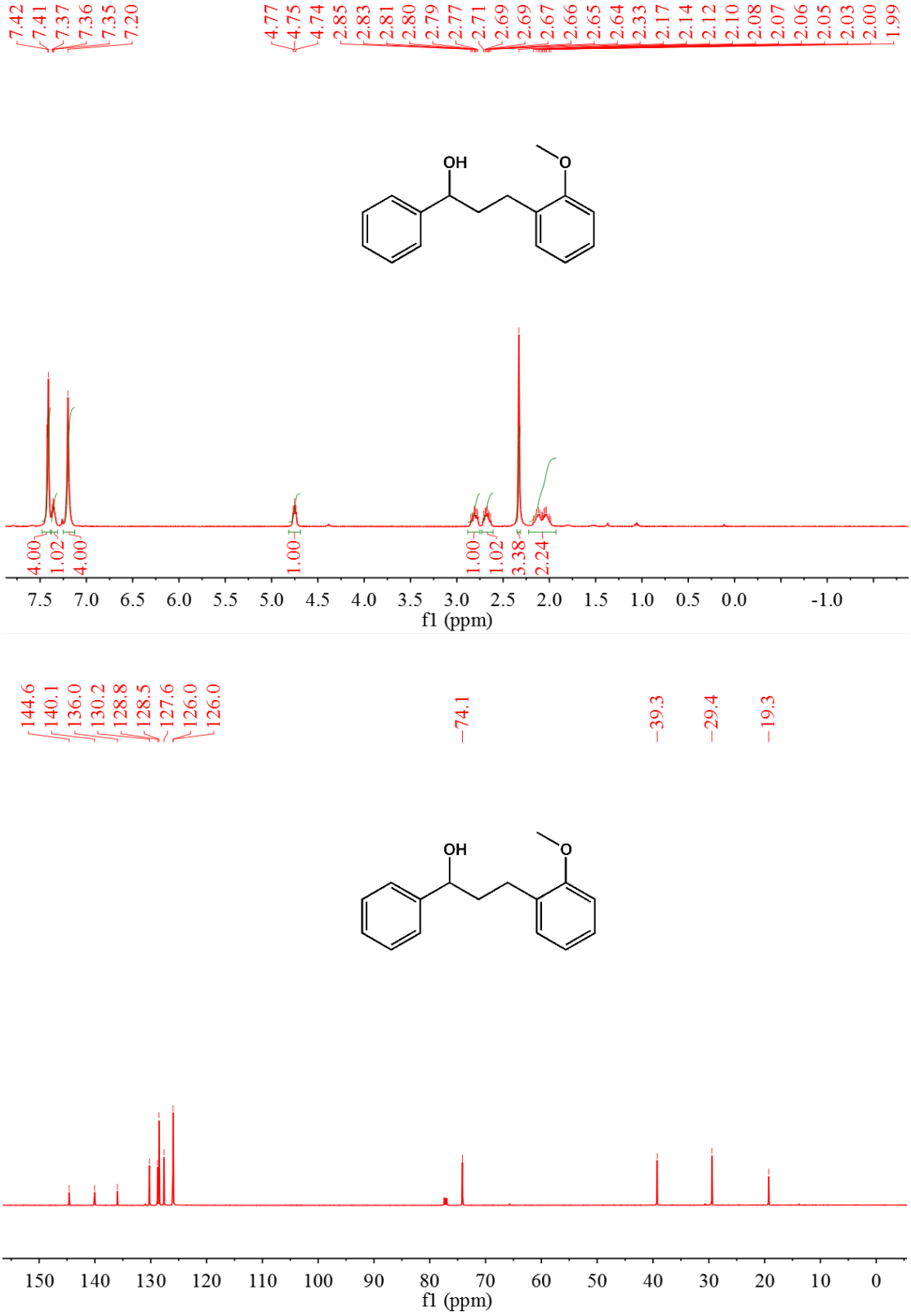


Fig. S74 The ^{1}H and ^{13}C NMR spectra for 3-ferrocenyl-1-phenylpropan-1-ol (**6ia**)

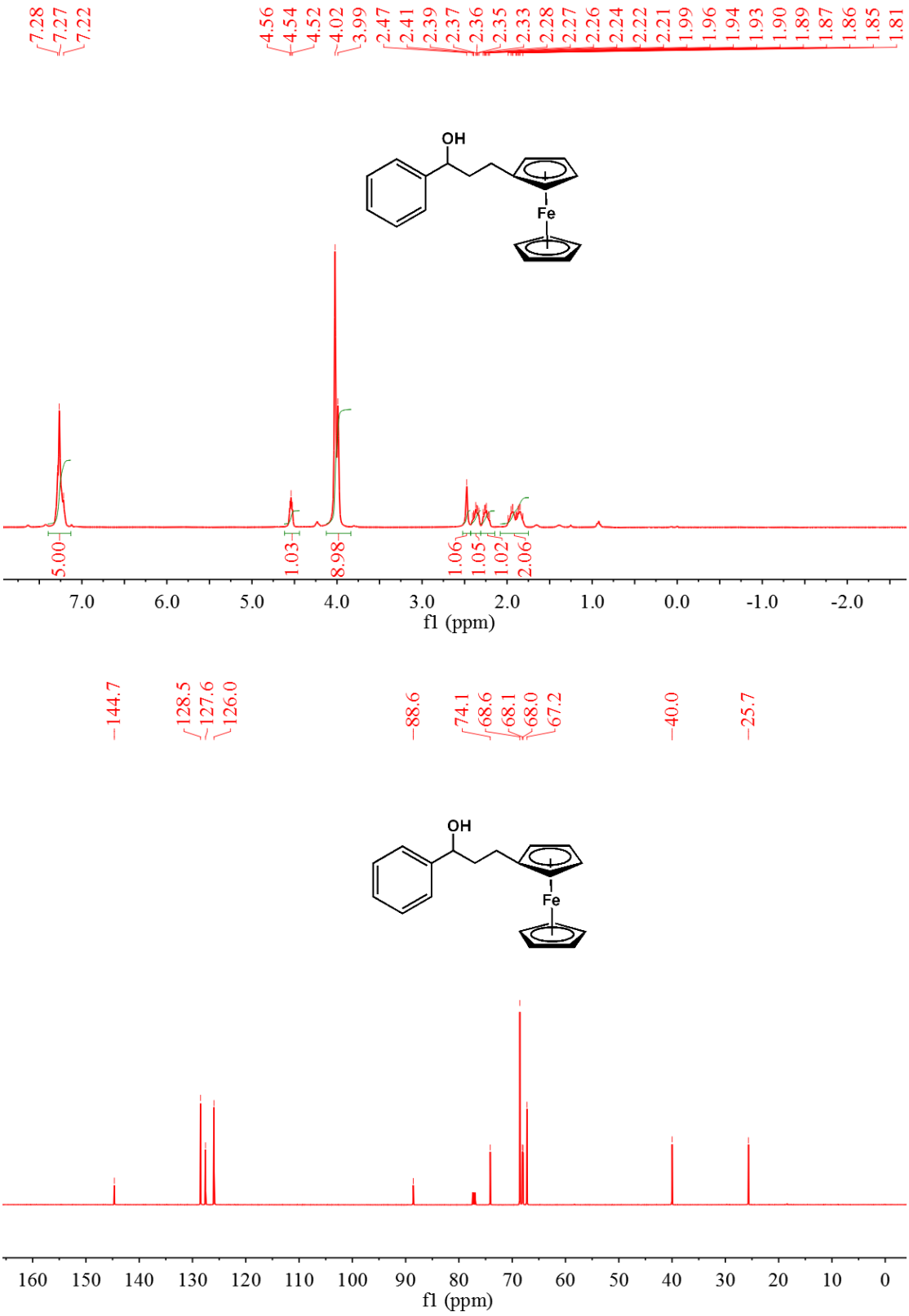


Fig. S75 The ^{1}H and ^{13}C NMR spectra for 3-(furan-2-yl)-1-phenylpropan-1-ol(**6ja**)

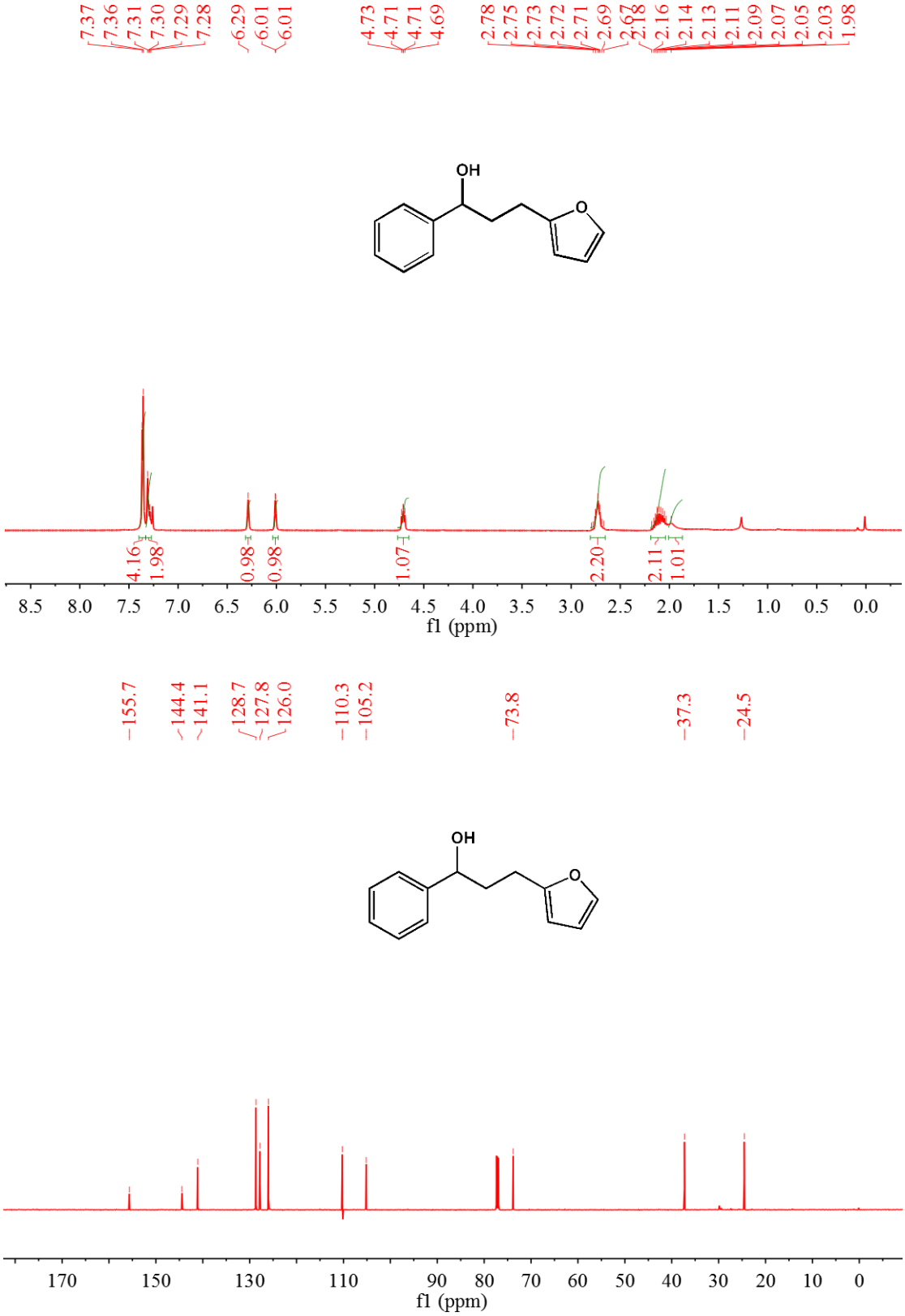


Fig. S76 The ^{1}H and ^{13}C NMR spectra for 2-phenylquinoline(**8a**)

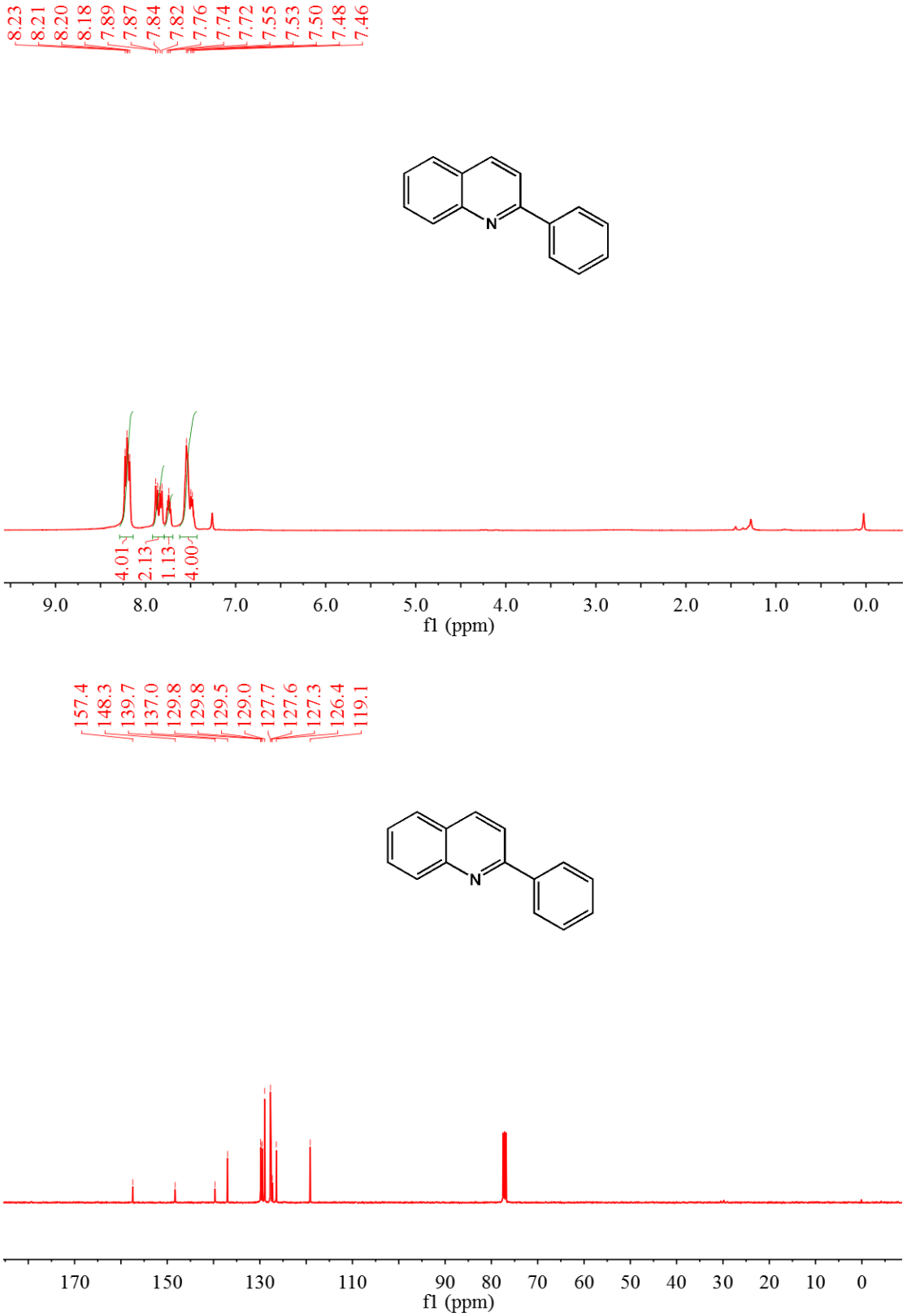


Fig. S77 The ^{1}H and ^{13}C NMR spectra for 2-(p-tolyl)quinolone (**8b**)

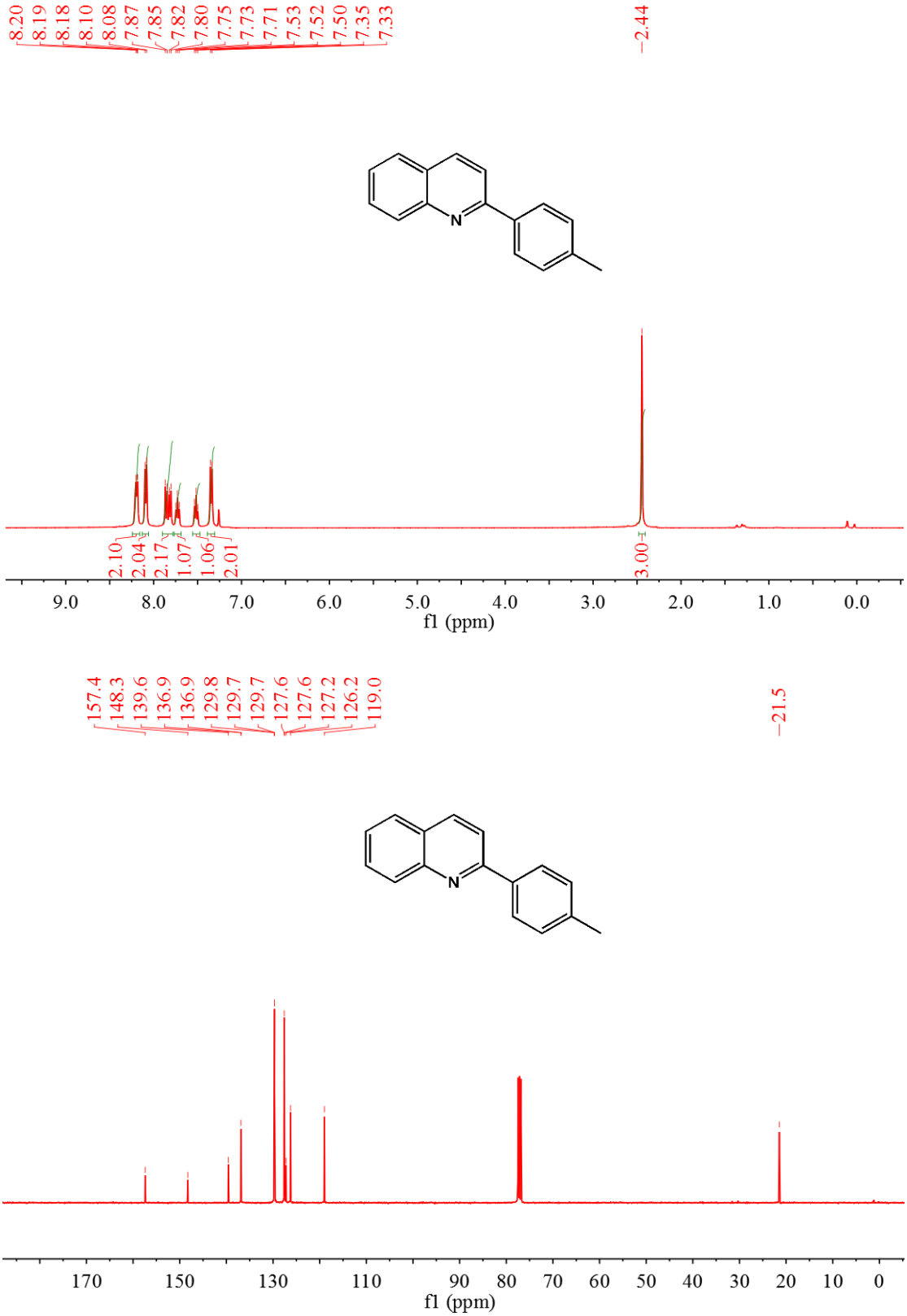


Fig. S78 The ^{1}H and ^{13}C NMR spectra for 2-(4-Methoxyphenyl)quinolone (**8c**)

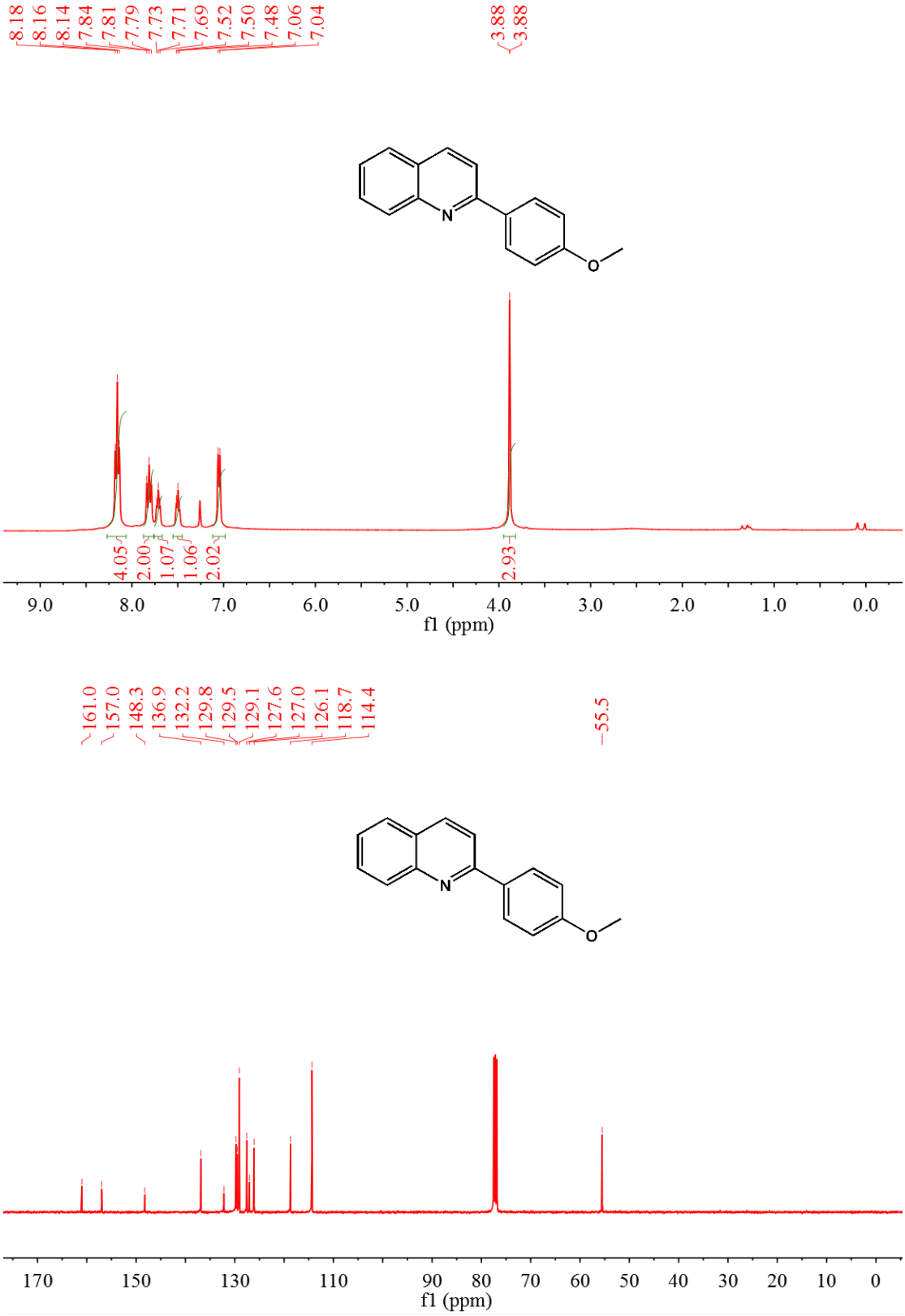


Fig. S79 The ^{1}H and ^{13}C NMR spectra for 2-(4-fluorophenyl)quinolone (**8d**)

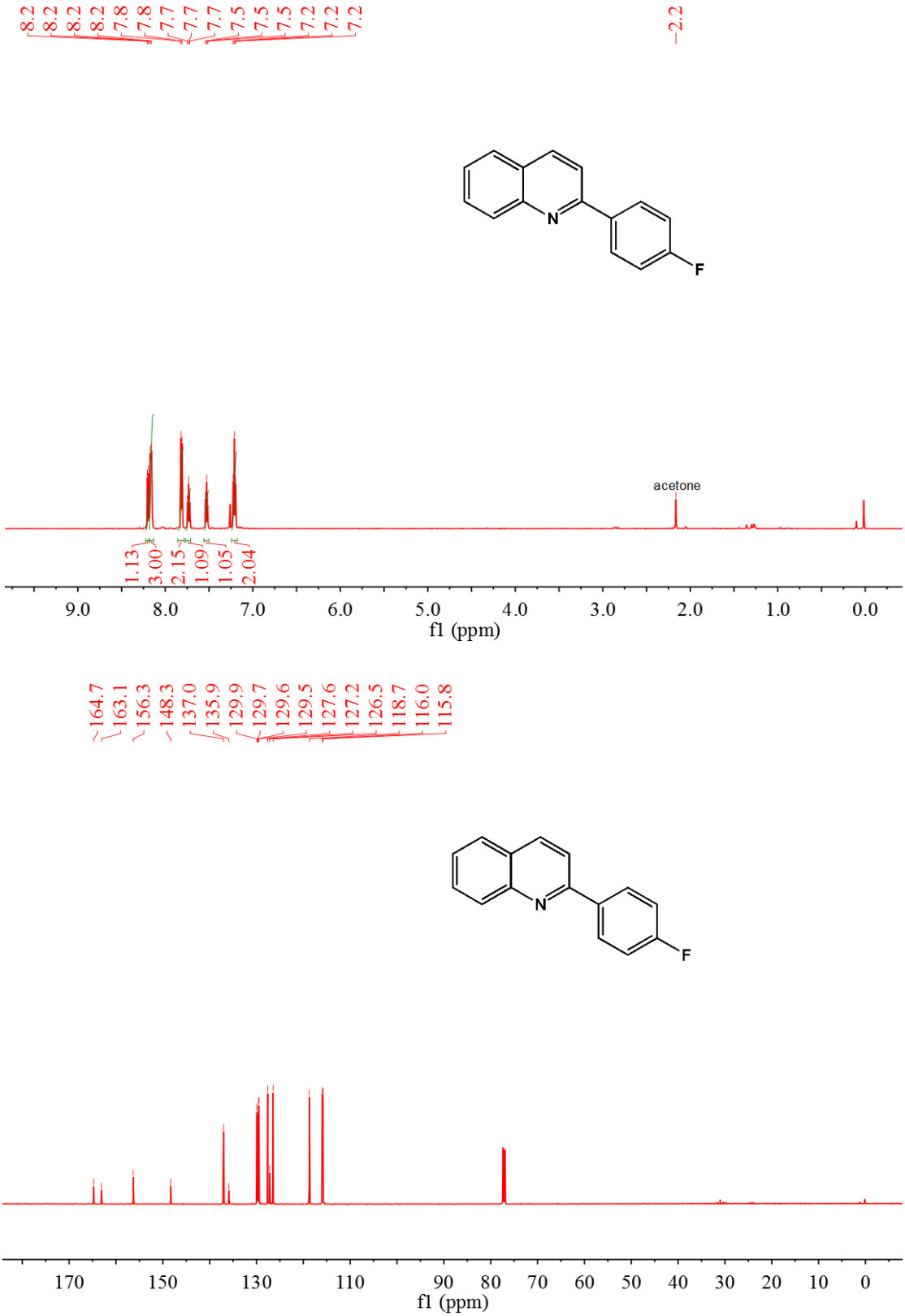


Fig. S80 The ^{1}H and ^{13}C NMR spectra for 2-(4-chlorophenyl)quinolone (**8e**)

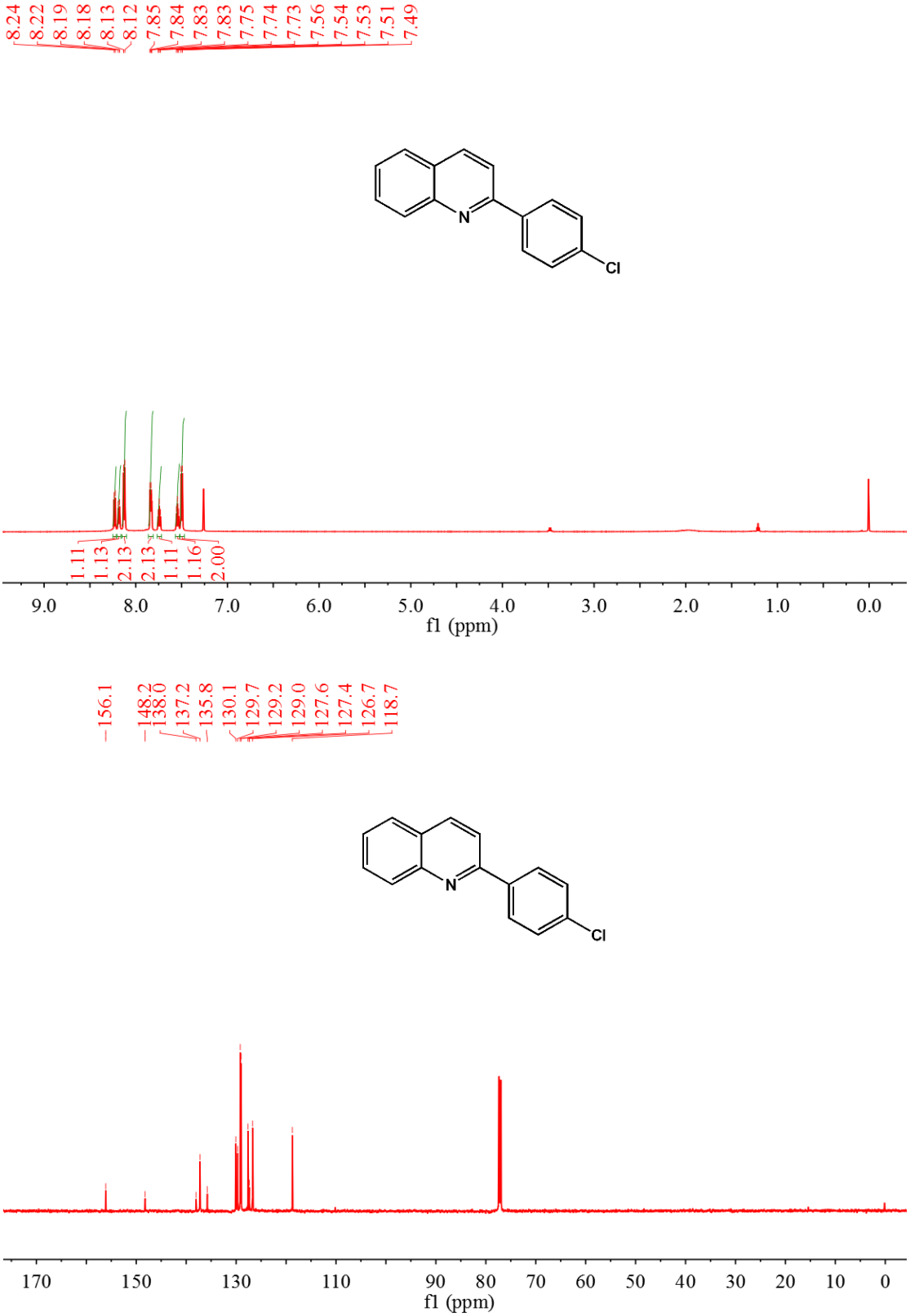


Fig. S81 The ^{1}H and ^{13}C NMR spectra for 2-(4-bromophenyl)quinolone (**8f**)

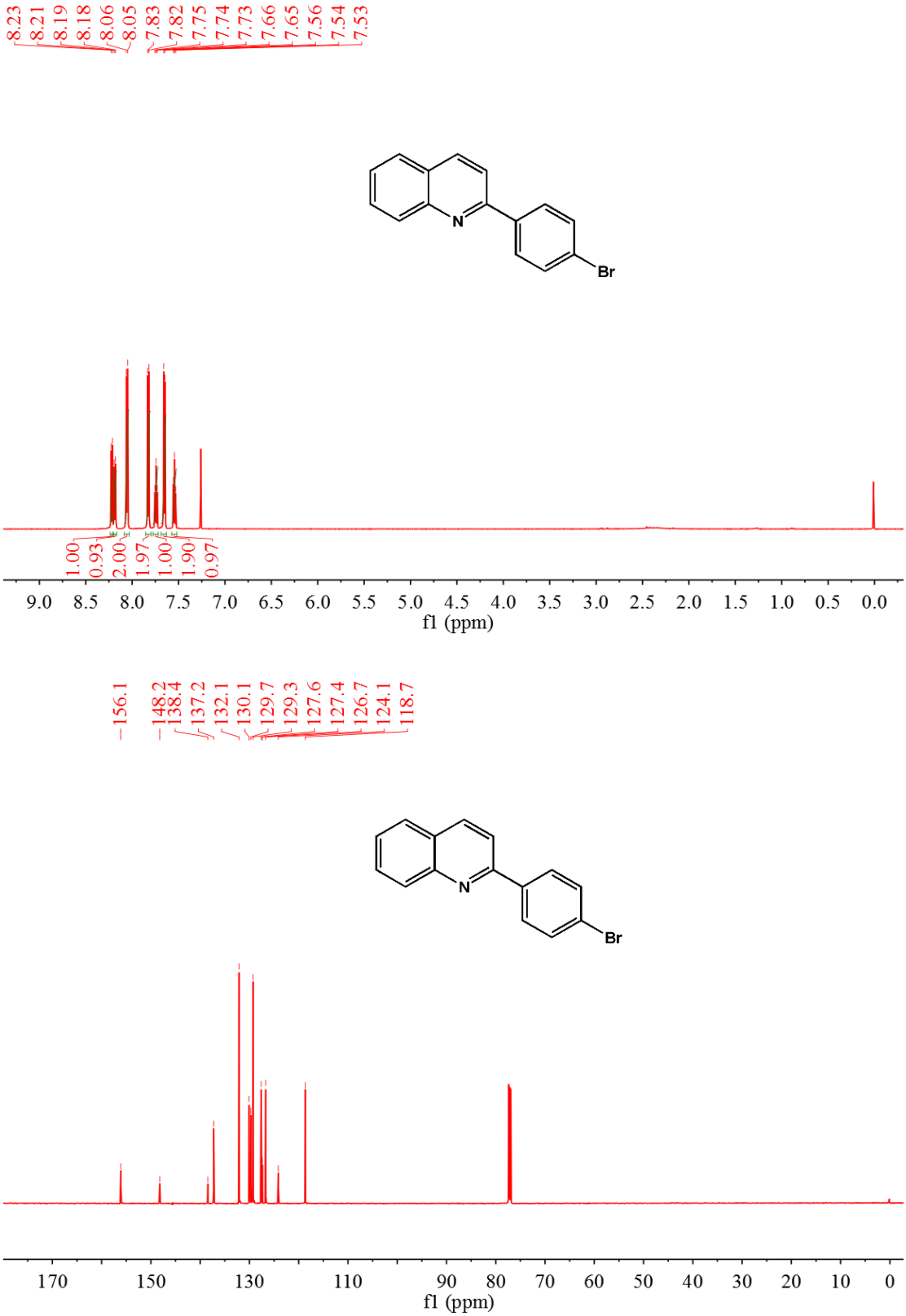


Fig. S82 The ^{1}H and ^{13}C NMR spectra for 2-(4-(trifluoromethyl)phenyl)quinolone(**8g**)

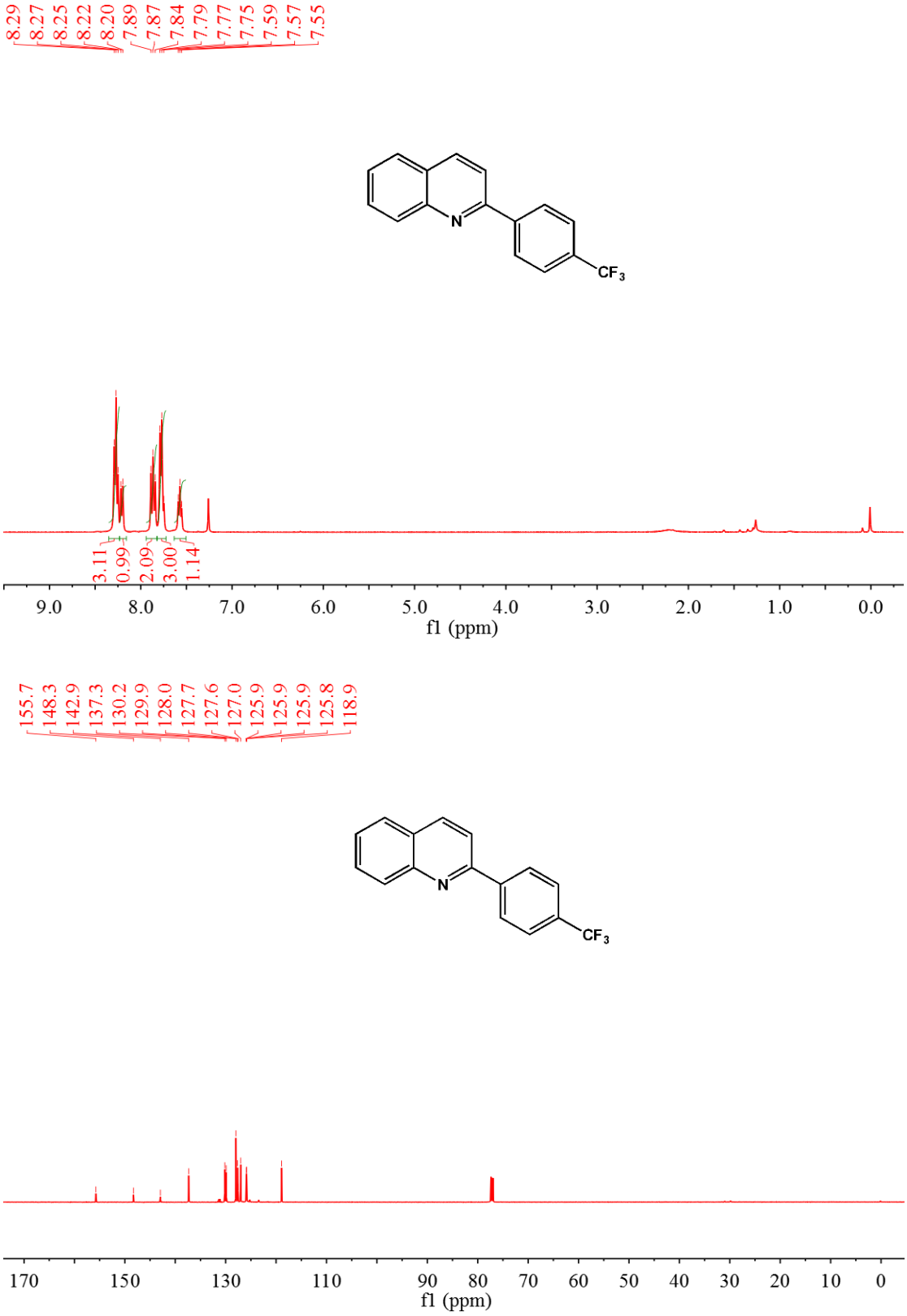


Fig. S83 The ^{1}H and ^{13}C NMR spectra for 2-(m-tolyl)quinolone (**8h**)

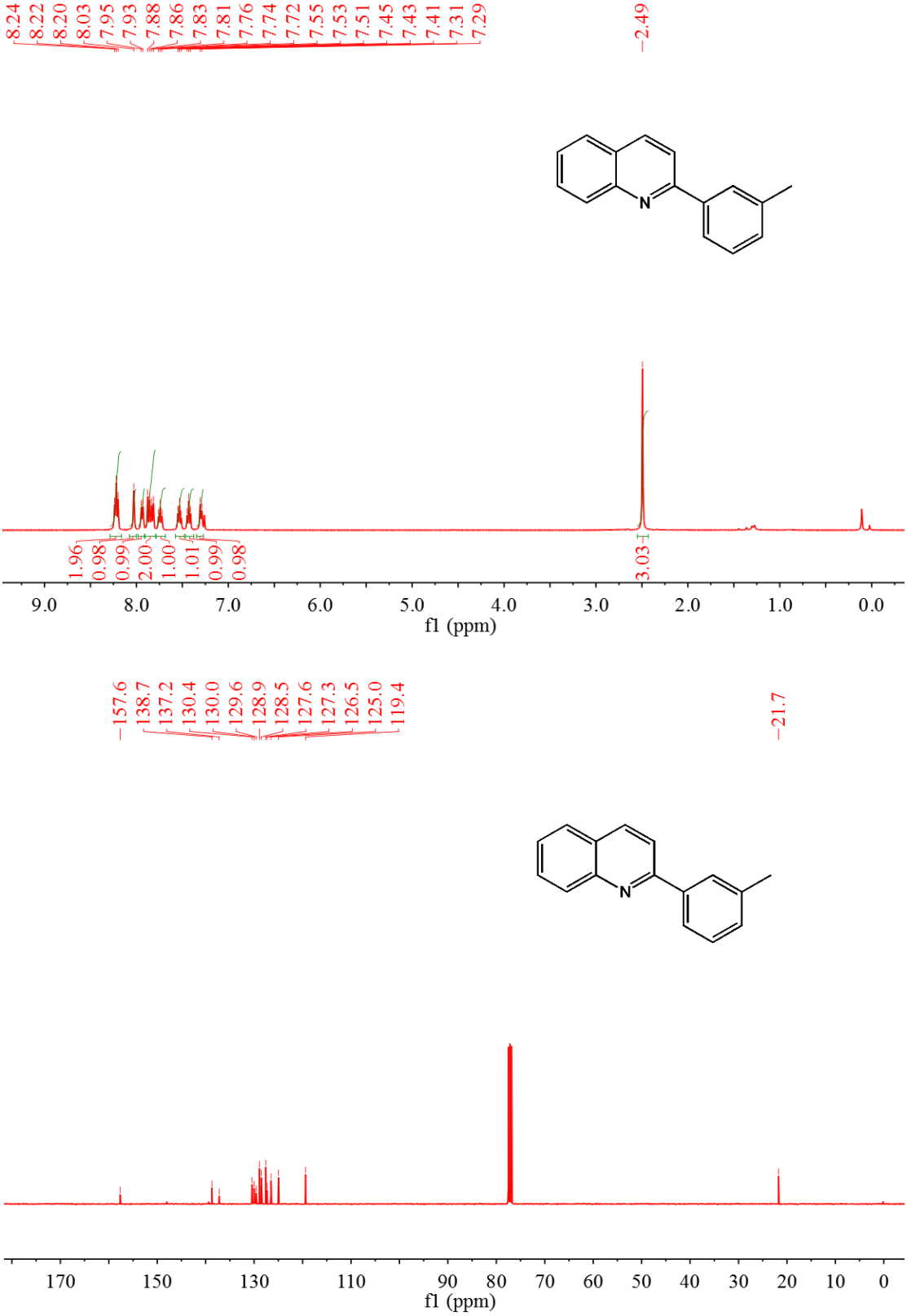


Fig. S84 The ^{1}H and ^{13}C NMR spectra for 2-(o-tolyl)quinolone (**8i**)

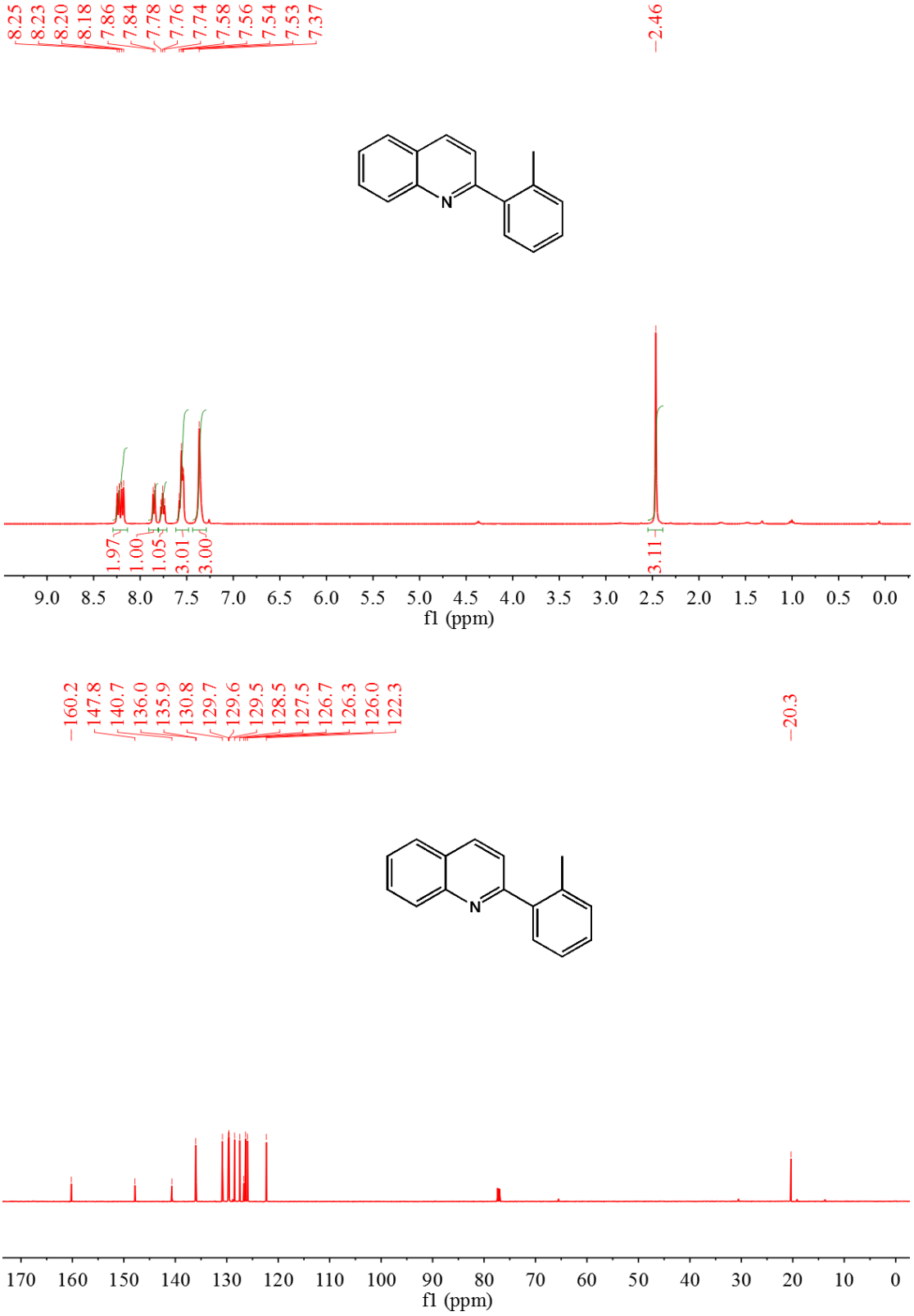


Fig. S85 The ^{1}H and ^{13}C NMR spectra for 2-(naphthalen-2-yl)quinolone (**8j**)

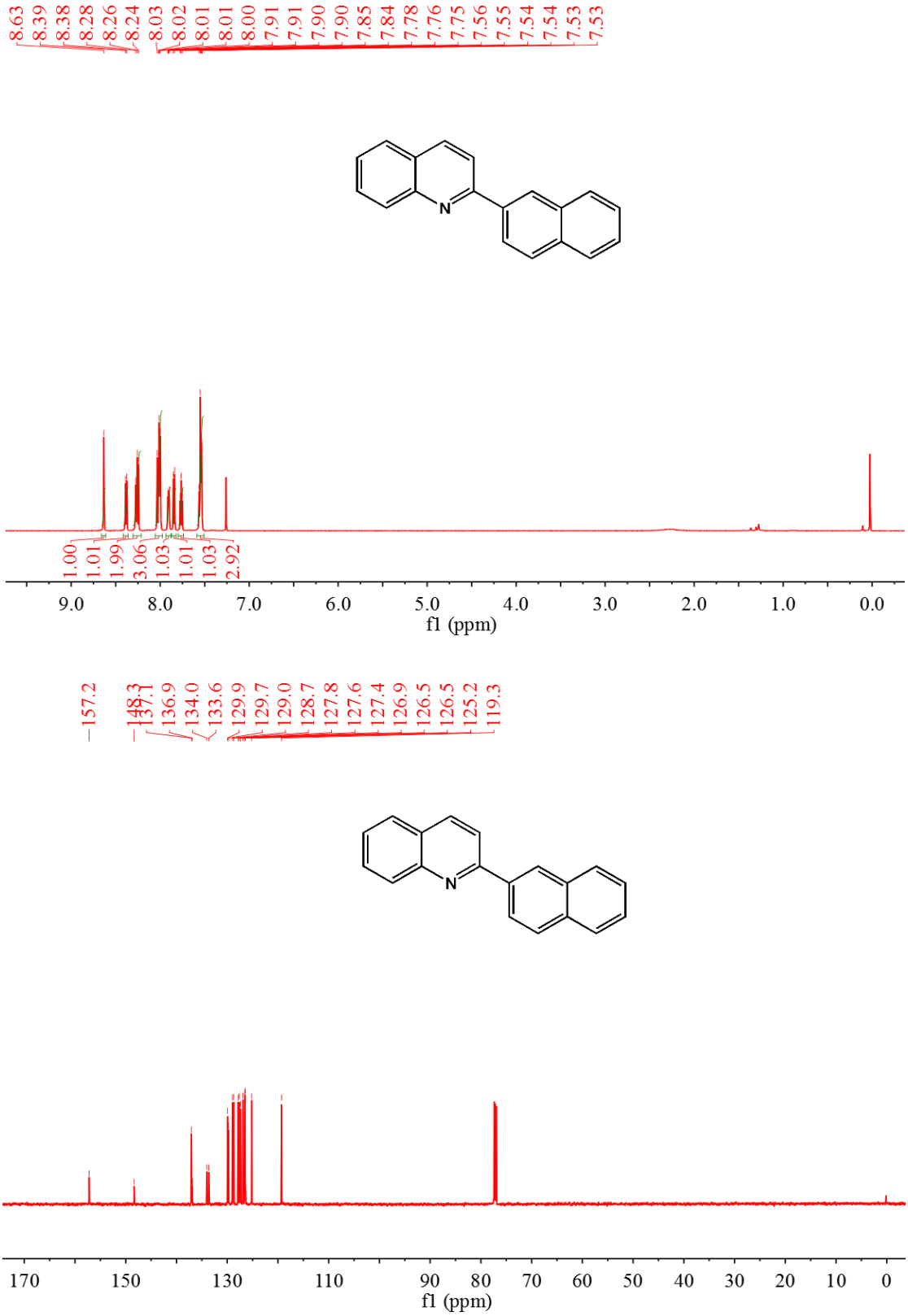


Fig. S86 The ^{1}H and ^{13}C NMR spectra for 2-(pyridin-3-yl)quinolone (**8k**)

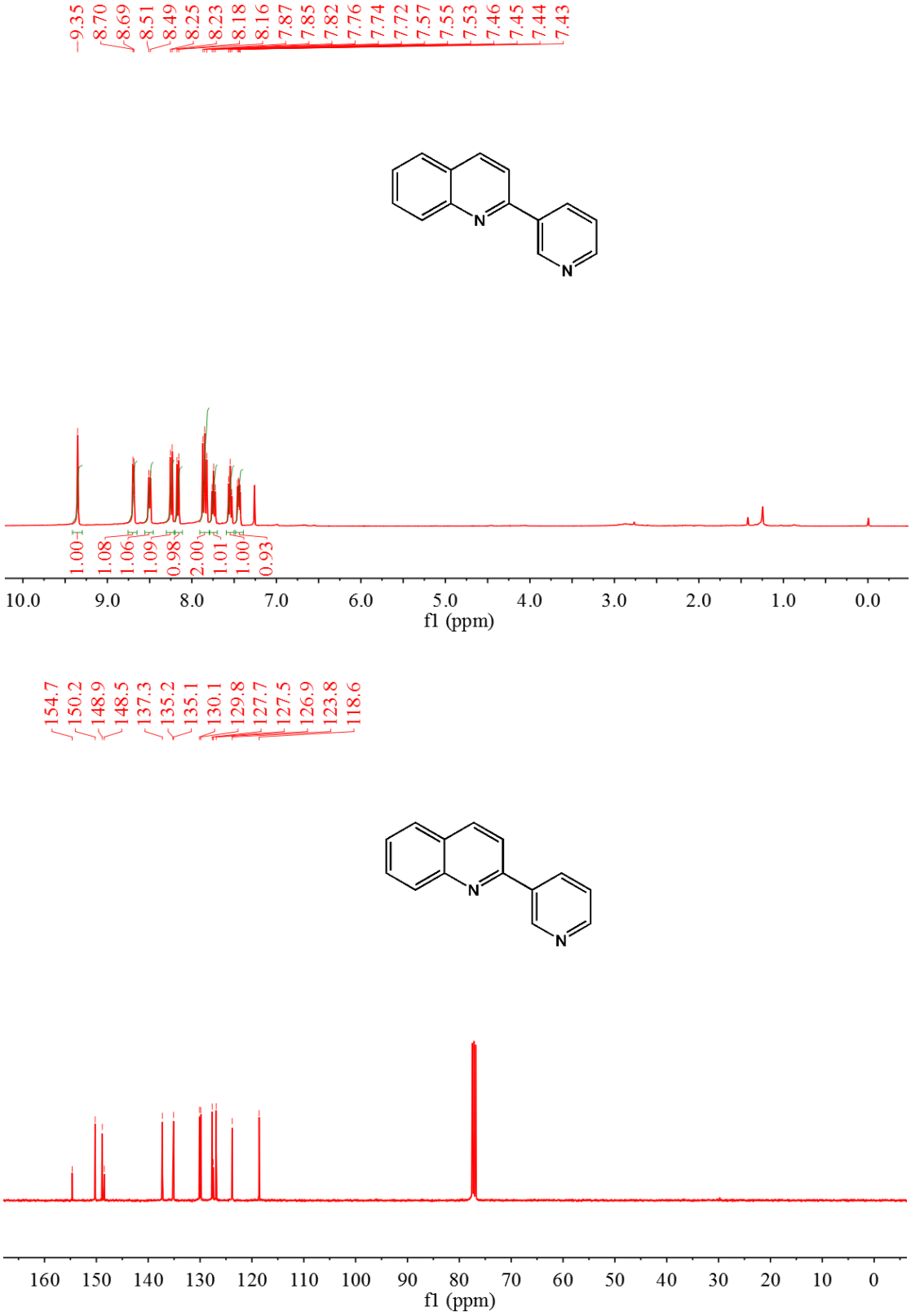


Fig. S87 The ^{1}H and ^{13}C NMR spectra for 2-(thiophen-2-yl)quinolone (**8l**)

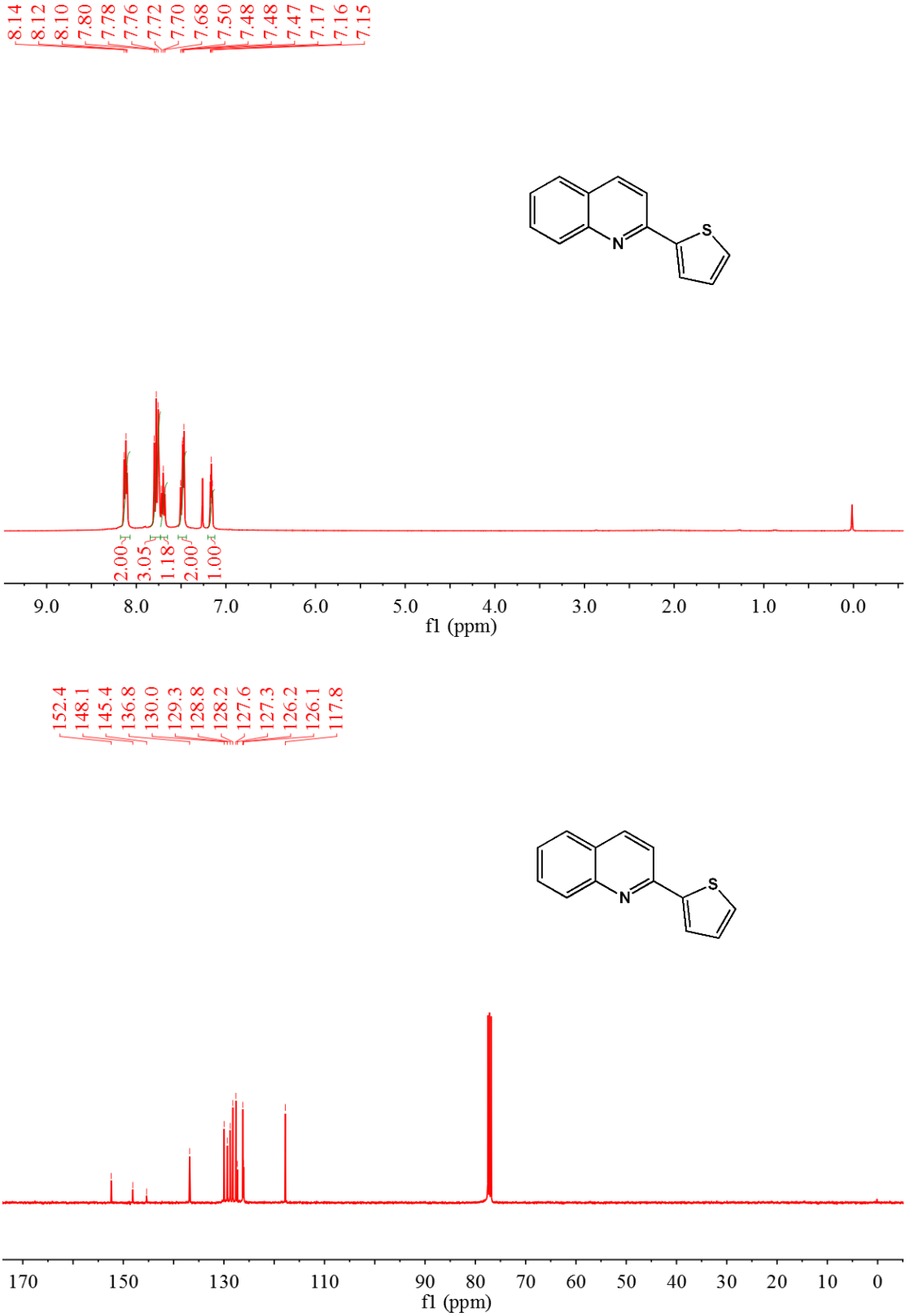


Fig. S88 The ^{1}H and ^{13}C NMR spectra for 2-(ferrocenyl)quinolone (**8m**)