Electronic Supplementary Material (ESI) for Organic Chemistry Frontiers.

Supporting Information

Stereoselective Synthesis of trans-Aziridines via Intramolecular Oxidative C(sp^3)–H Amination of *β*-amino Ketones

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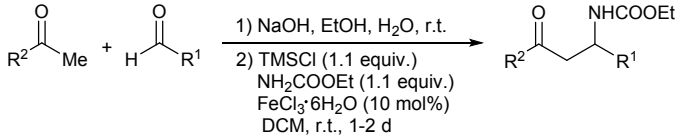
CONTENTS

1. General Information

All reactions were carried out in pressure tubes, Schlenk tubes or round-bottomed flask. The reactions were monitored by thin-layer chromatography on silica gel 60-F254 coated 0.2 mm plates. Visualization was accomplished by UV light (254 nm). The crude products were purified by flash column chromatography using silica gel (normal phase, 200-300 mesh). Melting points (uncorrected) were obtained from a RY-1 melting point instrument (from NanBei Instrument). ^{1}H NMR spectra were recorded on a 400 MHz spectrometer at ambient temperature. Data were reported as follows: (1) chemical shift in parts per million (δ, ppm) from $CDCl_3$ (7.26 ppm); (2) multiplicity (s = singlet, br = broad, d = doublet, t = triplet, q = quartet, and m = multiplet); (3) coupling constants (Hz). ^{13}C NMR spectra were recorded on a 100 MHz spectrometer at ambient temperature. Chemical shifts were reported in ppm from $CDCl_3$ (77.16 ppm). HR-MS analyses were carried out using a time-of-flight (TOF)-MS instrument with an electrospray ionization (ESI) source. All commercial materials were used as received unless otherwise noted.

2. Experimental Procedures for the Preparation of 1a-1p, 3a-3j, 5a-5c

2.1. General procedure 1:



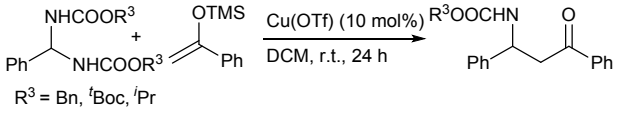
Scheme S1. General procedure for preparation of 1a-1o, 3a-3j.

The substituted aryl methyl ketone (1.0 mmol), an aqueous solution of 10% sodium hydroxide (2.5 mmol) and ethanol (5 mL) were charged into a 50 mL flask, and the mixture was stirred at room temperature for 10 min, followed by addition of substituted aromatic aldehyde **(**1.05 mmol). The reaction mixture was then stirred at room temperature and monitored using TLC until all reactants disappeared. The mixture was extracted with ethyl acetate three times, and the combined organic phase was dried over sodium sulfate and concentrated under vacuum. The residue was recrystallized from anhydrous ethanol.

$FeCl_3 \cdot 6H_2O$ (10 mol%) and the enones (1 equiv.) were dissolved in dichloromethane (10 M). Me_3SiCl (1.1 equiv.) was added. Then carbamates (1.2 equiv.) was added in one portion. The yellow solution was stirred at room temperature and conversion was monitored by TLC. After completion of the reaction, the mixtures were quenched with 5ml saturated aqueous sodium hydrogen carbonate, and the aqueous layer was extracted with dichloromethane. The combined organic layers were dried over

Na_2SO_4, filtered, and evaporated *in vacuo*. The crude product was further purified by column chromatography on silica gel (PE/EA = 10:1 to 5:1) to afford the title compound as a white solid.[S1]

2.2. General procedure 2:

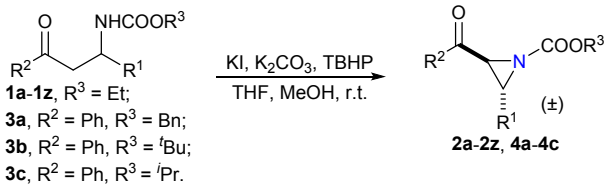


Scheme S2. General procedure for preparation of 1p-1u, 5a-5c.

To a solution of the aminal (0.10 mmol) and trimethyl((1-phenylvinyl)oxy)silane (21 mg, 0.11 mmol) in ichloromethane (1.0 mL) was added copper(II) trifluoromethanesulfonate (3.6 mg, 0.010 mmol) at room temperature. After stirring for 24 h, the crude product was further purified by column chromatography on silica gel (PE/EA = 10:1 to 5:1) to afford the title compound as a white solid.[S2]

3. Experimental Procedures for the Preparation of Aziridines 2a-2z, 4a-4c

General procedure 3:



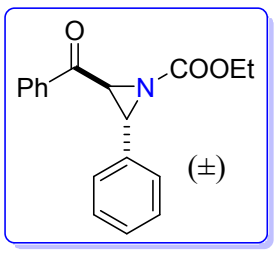
1a-1z, R^3 = Et;
3a, R^2 = Ph, R^3 = Bn;
3b, R^2 = Ph, R^3 = ^{t}Bu;
3c, R^2 = Ph, R^3 = ^{i}Pr.

2a-2z, **4a-4c**

Scheme S3. General procedure for preparation of 2a-2z, 4a-4c.

A 10 mL pressure tube was charged with Chalcone (0.2 mmol, 1.0 equiv.), KI (0.16 mmol, 26.6 mg, 0.8 equiv.), K_2CO_3 (0.24 mmol, 34.6 mg, 1.2 equiv.), THF (1.6 mL) and methanol (0.4 mL), then TBHP (4.5 mol/L in *n*-Hexane, 1.0 mmol, 200 μL, 4.5 equiv.) was added to the reaction mixture slowly, The reaction mixture was stirred at room temperate for 1 hour. The resultant solution was quenched with aqueous saturated sodium thiosulfate solution (4 mL), H_2O (10 mL) and extracted with ethyl acetate (3×30 mL), dried over anhydrous sodium sulfate, filtered and concentrated *in vacuo*. The crude product was further purified by column chromatography on silica gel (PE/DCM/EA = 30:5:1 to 25:5:1) to afford the title compound as a colorless oil.

trans-Ethyl-2-benzoyl-3-phenylaziridine-1-carboxylate (2a)



Rf = 0.6 (PE/DCM/EA = 12:5:1).

Color and State: Colorless oil.

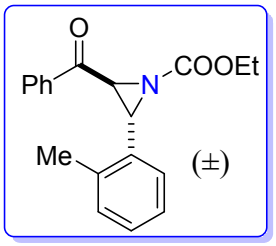
Mass and Yield: 47 mg, 80% yield.

^{1}H NMR (400 MHz, $CDCl_3$) δ 8.00 (d, *J* = 7.4 Hz, 2H), 7.62 (t, *J* = 7.4 Hz, 1H), 7.50 (t, *J* = 7.7 Hz, 2H), 7.42 – 7.32 (m, 5H), 4.31 – 4.21 (m, 2H), 4.05 (d, *J* = 2.4 Hz, 1H), 3.91 (d, *J* = 2.3 Hz, 1H), 1.27 (t, *J* = 7.1 Hz, 3H).

^{13}C NMR (100 MHz, $CDCl_3$) δ 192.28, 160.52, 136.54, 135.96, 134.15, 129.02, 128.83, 128.65, 128.61, 126.57, 62.94, 47.55, 47.31, 14.46.

HR-MS (ESI, $[M+H]^+$) calcd for $C_{18}H_{18}NO_3^+$ 296.1281, found 296.1283.

***trans*-Ethyl-2-benzoyl-3-(o-tolyl)aziridine-1-carboxylate (2b)**



Rf = 0.6 (PE/DCM/EA = 12:5:1).

Color and State: Colorless oil.

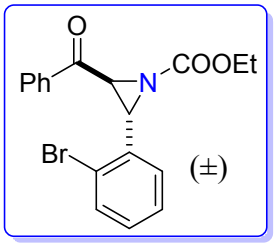
Mass and Yield: 36 mg, 58% yield.

^{1}H NMR (400 MHz, $CDCl_3$) δ 8.09 – 8.03 (m, 2H), 7.67 (t, *J* = 7.4 Hz, 1H), 7.54 (t, *J* = 7.7 Hz, 2H), 7.48 – 7.42 (m, 1H), 7.31 – 7.24 (m, 2H), 7.22 – 7.17 (m, 1H), 4.35 – 4.25 (m, 2H), 4.03 (d, *J* = 2.6 Hz, 1H), 4.01 (d, *J* = 2.4 Hz, 1H), 2.35 (s, 3H), 1.30 (t, *J* = 7.1 Hz, 3H).

^{13}C NMR (100 MHz, $CDCl_3$) δ 192.46, 160.84, 136.85, 136.41, 134.18, 130.13, 129.05, 128.54, 128.38, 126.37, 125.79, 62.88, 46.27, 46.09, 19.13, 14.45.

HR-MS (ESI, $[M+H]^+$) calcd for $C_{19}H_{20}NO_3^+$ 310.1438, found 310.1445.

***trans*-Ethyl-2-benzoyl-3-(2-bromophenyl)aziridine-1-carboxylate (2c)**



Rf = 0.6 (PE/DCM/EA = 12:5:1).

Color and State: Colorless oil.

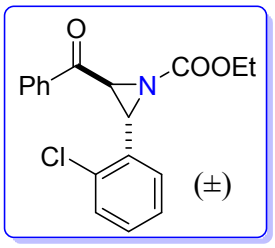
Mass and Yield: 59 mg, 79% yield.

^{1}H NMR (400 MHz, $CDCl_3$) δ 8.04 (d, *J* = 7.4 Hz, 2H), 7.63 (t, *J* = 7.4 Hz, 1H), 7.52 (ddd, *J* = 8.9, 7.5, 5.6 Hz, 4H), 7.34 (t, *J* = 7.5 Hz, 1H), 7.21 (td, *J* = 7.8, 1.4 Hz, 1H), 4.33 – 4.24 (m, 2H), 4.06 (d, *J* = 2.3 Hz, 1H), 3.95 (d, *J* = 2.5 Hz, 1H), 1.29 (t, *J* = 7.1 Hz, 3H).

^{13}C NMR (100 MHz, $CDCl_3$) δ 192.14, 160.60, 136.43, 135.73, 134.13, 132.46, 129.94, 128.97, 128.67, 128.33, 127.78, 123.72, 63.02, 48.15, 46.13, 14.47.

HR-MS (ESI, $[M+H]^+$) calcd for $C_{18}H_{17}BrNO_3^+$ 374.0386, found 374.0396.

trans-Ethyl-2-benzoyl-3-(2-chlorophenyl)aziridine-1-carboxylate (2d)



Rf = 0.6 (PE/DCM/EA = 12:5:1).

Color and State: Colorless oil.

Mass and Yield: 60 mg, 91% yield.

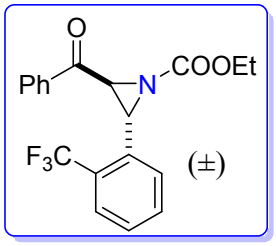
^{1}H NMR (400 MHz, $CDCl_3$) δ 8.09 – 8.02 (m, 2H), 7.65 (t, *J* = 7.4 Hz, 1H), 7.53 (t, *J* = 7.8 Hz, 3H), 7.42 – 7.36 (m, 1H), 7.34 – 7.28 (m, 2H), 4.36 – 4.27 (m, 2H), 4.15 (d, *J* = 2.4 Hz, 1H), 3.99 (d, *J* = 2.5 Hz, 1H), 1.32 (t, *J* = 7.1 Hz, 3H).

^{13}C NMR (100 MHz, $CDCl_3$) δ 192.14, 160.61, 136.40, 134.13, 134.07, 129.65, 129.31, 128.98, 128.61, 127.91, 127.20, 63.01, 46.13, 45.73,

14.46.

HR-MS (ESI, $[M+H]^+$) calcd for $C_{18}H_{17}ClNO_3^+$ 330.0891, found 330.0879.

***trans*-Ethyl 2-benzoyl-3-(2-(trifluoromethyl)phenyl)aziridine-1-carboxylate (2e)**



Rf = 0.6 (PE/DCM/EA = 12:5:1).

Color and State: Colorless oil.

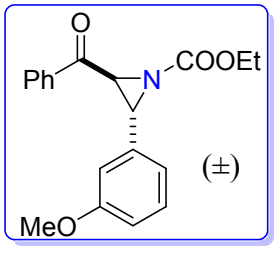
Mass and Yield: 63 mg, 87% yield.

^{1}H NMR (400 MHz, $CDCl_3$) δ 7.99 (d, *J* = 7.4 Hz, 2H), 7.73 (d, *J* = 7.8 Hz, 1H), 7.67 – 7.56 (m, 3H), 7.52 – 7.41 (m, 3H), 4.29 (q, 2H), 4.19 (br, 1H), 3.99 (d, *J* = 2.5 Hz, 1H), 1.29 (t, *J* = 7.1 Hz, 3H).

^{13}C NMR (100 MHz, $CDCl_3$) δ 191.74, 160.51, 136.40, 134.46, 134.15, 132.46, 128.95, 128.85 (q, *J* = 31.2 Hz), 128.58, 128.46, 127.86, 125.91 (q, *J* = 5.5 Hz), 124.26 (q, *J* = 273.8 Hz), 63.05, 46.42, 44.75, 14.43.

HR-MS (ESI, $[M+H]^+$) calcd for $C_{19}H_{17}F_3NO_3^+$ 364.1155, found 364.1150.

***trans*-Ethyl-2-benzoyl-3-(3-methoxyphenyl)aziridine-1-carboxylate (2f)**



Rf = 0.6 (PE/DCM/EA = 12:5:1).

Color and State: Colorless oil.

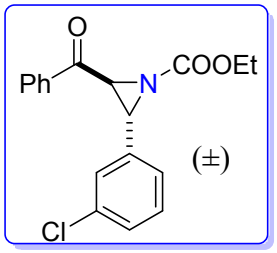
Mass and Yield: 57 mg, 88% yield.

^{1}H NMR (400 MHz, $CDCl_3$) δ 7.31 – 7.26 (m, 1H), 6.98 (d, *J* = 7.6 Hz, 1H), 6.93 (d, *J* = 2.2 Hz, 1H), 6.88 (dd, *J* = 7.9, 2.2 Hz, 1H), 4.30 – 4.21 (m, 2H), 4.04 (d, *J* = 2.4 Hz, 1H), 3.88 (d, *J* = 2.3 Hz, 1H), 3.82 (s, 3H), 1.27 (t, *J* = 7.1 Hz, 3H).

^{13}C NMR (100 MHz, $CDCl_3$) δ 192.23, 160.47, 160.14, 137.56, 136.52, 134.16, 129.91, 129.03, 128.61, 119.04, 114.60, 111.47, 62.96, 55.47, 47.49, 47.32, 14.46.

HR-MS (ESI, $[M+H]^+$) calcd for $C_{19}H_{20}NO_4^+$ 326.1387, found 326.1389.

***trans*-Ethyl-2-benzoyl-3-(3-chlorophenyl)aziridine-1-carboxylate (2g)**



Rf = 0.6 (PE/DCM/EA = 12:5:1).

Color and State: Colorless oil.

Mass and Yield: 59 mg, 90% yield.

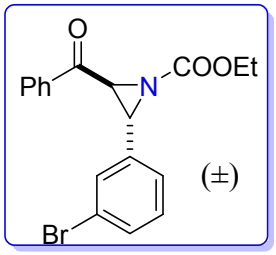
^{1}H NMR (400 MHz, $CDCl_3$) δ 8.03 – 7.96 (m, 2H), 7.63 (t, *J* = 7.4 Hz, 1H), 7.51 (t, *J* = 7.7 Hz, 2H), 7.38 (d, *J* = 1.0 Hz, 1H), 7.33 – 7.27 (m, 3H), 4.31 – 4.20 (m, 2H), 4.02 (d, *J* = 2.4 Hz, 1H), 3.88 (d, *J* = 2.3 Hz, 1H), 1.26 (t, *J* = 7.1 Hz, 3H).

^{13}C NMR δ 191.80, 160.10, 138.00, 136.28, 134.79, 134.18, 130.02, 128.97, 128.69, 128.50, 126.43, 124.87, 62.91, 47.06, 46.43, 14.34.

HR-MS (ESI, $[M+H]^+$) calcd for $C_{18}H_{17}ClNO_3^+$ 330.0891, found

330.0902.

***trans*-Ethyl-2-benzoyl-3-(3-bromophenyl)aziridine-1-carboxylate (2h)**



Rf = 0.6 (PE/DCM/EA = 12:5:1).

Color and State: Colorless oil.

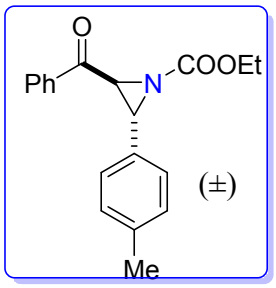
Mass and Yield: 69 mg, 93% yield.

^{1}H NMR (400 MHz, $CDCl_3$) δ 8.02 (d, *J* = 7.4 Hz, 2H), 7.66 (t, *J* = 7.4 Hz, 1H), 7.58 – 7.46 (m, 4H), 7.35 (d, *J* = 7.7 Hz, 1H), 7.26 (t, *J* = 7.8 Hz, 1H), 4.33 – 4.23 (m, 2H), 4.04 (d, *J* = 2.4 Hz, 1H), 3.89 (d, *J* = 2.3 Hz, 1H), 1.29 (t, *J* = 7.1 Hz, 3H).

^{13}C NMR (100 MHz, $CDCl_3$) δ 191.78, 160.07, 138.21, 136.27, 134.18, 131.63, 130.24, 129.32, 128.95, 128.50, 125.32, 122.91, 62.94, 47.11, 46.34, 14.32.

HR-MS (ESI, $[M+H]^+$) calcd for $C_{18}H_{17}BrNO_3^+$ 374.0386, found 374.0393.

***trans*-Ethyl-2-benzoyl-3-(p-tolyl)aziridine-1-carboxylate (2i)**



Rf = 0.6 (PE/DCM/EA = 12:5:1).

Color and State: Colorless oil.

Mass and Yield: 28 mg, 45% yield.

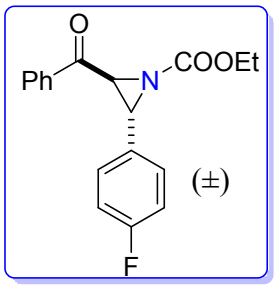
^{1}H NMR (400 MHz, $CDCl_3$) δ 8.02 – 7.97 (m, 2H), 7.62 (t, *J* = 7.4 Hz, 1H), 7.49 (t, *J* = 7.7 Hz, 2H), 7.28 (d, *J* = 8.0 Hz, 2H),

7.18 (d, J = 8.0 Hz, 2H), 4.30 – 4.20 (m, 2H), 4.03 (d, J = 2.5 Hz, 1H), 3.86 (d, J = 2.4 Hz, 1H), 2.36 (s, 3H), 1.26 (t, J = 7.1 Hz, 3H).

^{13}C NMR (100 MHz, $CDCl_3$) δ 192.32, 160.56, 138.54, 136.54, 134.08, 132.95, 129.49, 128.98, 128.56, 126.45, 62.86, 47.57, 47.34, 21.34, 14.45.

HR-MS (ESI, $[M+H]^+$) calcd for $C_{19}H_{20}NO_3^+$ 310.1438, found 310.1443.

***trans*-Ethyl-2-benzoyl-3-(4-fluorophenyl)aziridine-1-carboxylate (2j)**



Rf = 0.6 (PE/DCM/EA = 12:5:1).

Color and State: Colorless oil.

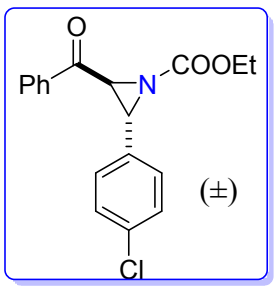
Mass and Yield: 48 mg, 77% yield.

^{1}H NMR (400 MHz, $CDCl_3$) δ 8.03 – 7.95 (m, 2H), 7.63 (t, J = 7.4 Hz, 1H), 7.50 (t, J = 7.7 Hz, 2H), 7.41 – 7.32 (m, 2H), 7.06 (dd, J = 12.0, 5.3 Hz, 2H), 4.32 – 4.18 (m, 2H), 4.01 (d, J = 2.4 Hz, 1H), 3.88 (d, J = 2.3 Hz, 1H), 1.26 (t, J = 7.1 Hz, 3H).

^{13}C NMR (100 MHz, $CDCl_3$) δ 192.08, 162.96 (d, J = 247.4 Hz), 160.38, 136.46, 134.19, 131.75 (d, J = 3.1 Hz), 128.25 (d, J = 8.3 Hz), 115.80 (d, J = 21.8 Hz), 62.96, 47.26, 46.75, 14.42.

HR-MS (ESI, $[M+H]^+$) calcd for $C_{18}H_{17}FNO_3^+$ 314.1187, found 314.1196.

***trans*-Ethyl-2-benzoyl-3-(4-chlorophenyl)aziridine-1-carboxylate (2k)**



Rf = 0.6 (PE/DCM/EA = 12:5:1).

Color and State: Colorless oil.

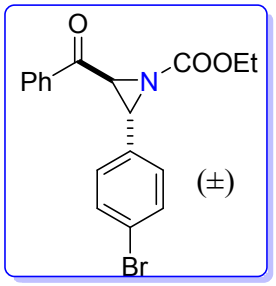
Mass and Yield: 59 mg, 89% yield.

^{1}H NMR (400 MHz, $CDCl_3$) δ 8.02 – 7.97 (m, 2H), 7.63 (t, *J* = 7.4 Hz, 1H), 7.50 (t, *J* = 7.7 Hz, 2H), 7.37 – 7.30 (m, 4H), 4.30 – 4.20 (m, 2H), 4.00 (d, *J* = 2.4 Hz, 1H), 3.87 (d, *J* = 2.4 Hz, 1H), 1.26 (t, *J* = 7.1 Hz, 4H).

^{13}C NMR (100 MHz, $CDCl_3$) δ 191.97, 160.30, 136.42, 134.52, 134.24, 129.05, 129.02, 129.02, 128.58, 127.90, 63.01, 47.27, 46.68, 14.43.

HR-MS (ESI, $[M+H]^+$) calcd for $C_{18}H_{17}ClNO_3^+$ 330.0891, found 330.0897.

***trans*-Ethyl-2-benzoyl-3-(4-bromophenyl)aziridine-1-carboxylate (2l)**



Rf = 0.6 (PE/DCM/EA = 12:5:1).

Color and State: Colorless oil.

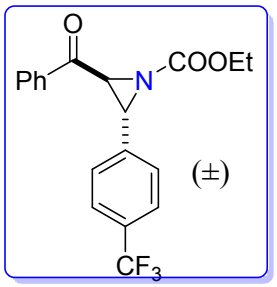
Mass and Yield: 64 mg, 85% yield.

^{1}H NMR (400 MHz, $CDCl_3$) δ 8.04 – 7.98 (m, 2H), 7.65 (t, *J* = 7.4 Hz, 1H), 7.53 (dd, *J* = 8.0, 6.8 Hz, 4H), 7.33 – 7.26 (m, 2H), 4.28 (dtt, *J* = 10.7, 7.1, 3.5 Hz, 2H), 4.03 (d, *J* = 2.4 Hz, 1H), 3.89 (d, *J* = 2.3 Hz, 1H), 1.29 (t, *J* = 7.1 Hz, 3H).

^{13}C NMR (100 MHz, $CDCl_3$) δ 191.91, 160.25, 136.37, 135.03, 134.23, 132.04, 131.93, 129.03, 128.55, 128.19, 122.60, 62.99, 47.19, 46.70, 14.41.

HR-MS (ESI, $[M+H]^+$) calcd for $C_{18}H_{17}BrNO_3^+$ 374.0386, found 374.0393.

***trans*-Ethyl-2-benzoyl-3-(4-(trifluoromethyl)phenyl)aziridine-1-carboxylate (2m)**



Rf = 0.6 (PE/DCM/EA = 12:5:1).

Color and State: Colorless oil.

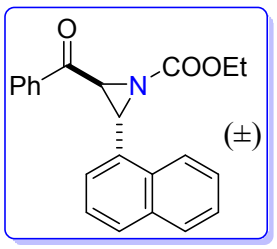
Mass and Yield: 49 mg, 67% yield.

^{1}H NMR (400 MHz, $CDCl_3$) δ 8.02 – 7.97 (m, 2H), 7.67 – 7.61 (m, 3H), 7.50 (dd, *J* = 10.9, 4.8 Hz, 4H), 4.30 – 4.21 (m, 2H), 4.04 (d, *J* = 2.4 Hz, 1H), 3.96 (d, *J* = 2.4 Hz, 1H), 1.27 (t, *J* = 7.1 Hz, 3H).

^{13}C NMR (100 MHz, $CDCl_3$) δ 191.70, 160.07, 139.90, 136.23, 134.24, 130.70 (q, *J* = 32.6 Hz), 128.98, 128.49, 126.85, 125.69 (q, *J* = 3.5 Hz), 123.98 (q, *J* = 272.1 Hz). 63.00, 47.14, 46.39, 14.29.

HR-MS (ESI, $[M+H]^+$) calcd for $C_{19}H_{17}F_3NO_3^+$ 364.1155, found 346.1148.

***trans*-Ethyl 2-benzoyl-3-(naphthalen-1-yl)aziridine-1-carboxylate (2n)**



Rf = 0.6 (PE/DCM/EA = 12:5:1).

Color and State: Colorless oil.

Mass and Yield: 62 mg, 90% yield.

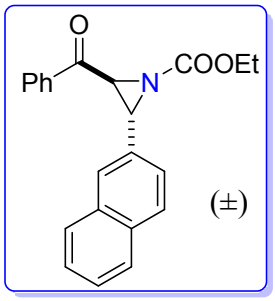
^{1}H NMR (400 MHz, $CDCl_3$) δ 8.02 (d, *J* = 7.4 Hz, 2H), 7.91 (s, 1H), 7.88 – 7.81 (m, 3H), 7.62 (t, *J* = 7.4 Hz, 1H), 7.53 – 7.45 (m, 5H), 4.34 – 4.25 (m, 2H), 4.14 (d, *J* = 2.4 Hz, 1H), 4.08 (d, *J* = 2.4 Hz,

1H), 1.29 (t, J = 7.1 Hz, 3H).

^{13}C NMR (100 MHz, $CDCl_3$) δ 192.19, 160.55, 136.53, 134.15, 133.48, 133.38, 133.30, 129.03, 128.74, 128.60, 128.02, 127.92, 126.70, 126.51, 126.18, 123.67, 62.99, 47.78, 47.50, 14.48.

HR-MS (ESI, $[M+H]^+$) calcd for $C_{22}H_{20}NO_3^+$ 346.1438, found 346.1445.

trans-Ethyl 2-benzoyl-3-(naphthalen-2-yl)aziridine-1-carboxylate (2o)



Rf = 0.6 (PE/DCM/EA = 12:5:1).

Color and State: Colorless oil.

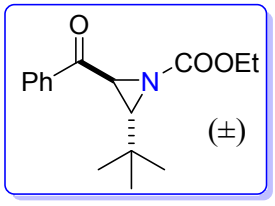
Mass and Yield: 53 mg, 76% yield.

^{1}H NMR (400 MHz, $CDCl_3$) δ 8.04 (dd, J = 9.2, 8.0 Hz, 3H), 7.92 – 7.83 (m, 2H), 7.71 – 7.61 (m, 2H), 7.55 – 7.45 (m, 5H), 4.50 (d, J = 2.1 Hz, 1H), 4.37 – 4.27 (m, 2H), 4.12 (d, J = 2.6 Hz, 1H), 1.30 (t, J = 7.1 Hz, 3H).

^{13}C NMR (100 MHz, $CDCl_3$) δ 192.62, 160.97, 136.49, 134.22, 133.49, 131.83, 131.68, 129.04, 128.96, 128.90, 128.63, 126.83, 126.21, 125.59, 124.21, 122.89, 62.96, 46.27, 45.98, 14.47.

HR-MS (ESI, $[M+H]^+$) calcd for $C_{22}H_{20}NO_3^+$ 346.1438, found 346.1439.

trans-Ethyl 2-benzoyl-3-(tert-butyl)aziridine-1-carboxylate (2p)



Rf = 0.6 (PE/DCM/EA = 12:5:1).

Color and State: Colorless oil.

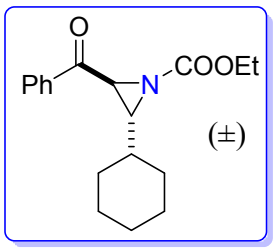
Mass and Yield: 42 mg, 78% yield.

^{1}H NMR (400 MHz, $CDCl_3$) δ 8.00 – 7.95 (m, 2H), 7.61 (t, *J* = 7.4 Hz, 1H), 7.50 (t, *J* = 7.6 Hz, 2H), 4.20 (q, *J* = 7.1 Hz, 2H), 3.94 (d, *J* = 2.8 Hz, 1H), 2.71 (d, *J* = 2.8 Hz, 1H), 1.23 (t, *J* = 7.1 Hz, 3H), 1.00 (s, 9H).

^{13}C NMR (100 MHz, $CDCl_3$) δ 193.62, 161.23, 136.62, 133.86, 128.95, 128.27, 62.47, 55.87, 40.50, 31.20, 26.53, 14.40.

HR-MS (ESI, $[M+H]^+$) calcd for $C_{22}H_{20}NO_3^+$ 276.1594, found 276.1599.

***trans*-Ethyl-2-benzoyl-3-cyclohexylaziridine-1-carboxylate (2q)**



Rf = 0.6 (PE/DCM/EA = 12:5:1).

Color and State: Colorless oil.

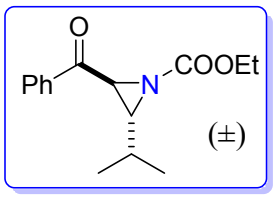
Mass and Yield: 51 mg, 85% yield.

^{1}H NMR (400 MHz, $CDCl_3$) δ 8.00 (d, *J* = 7.5 Hz, 2H), 7.61 (t, *J* = 7.4 Hz, 1H), 7.50 (t, *J* = 7.7 Hz, 2H), 4.20 (q, *J* = 7.1 Hz, 2H), 3.90 (d, *J* = 2.7 Hz, 1H), 2.70 (dd, *J* = 7.2, 2.7 Hz, 1H), 1.94 – 1.88 (m, 1H), 1.82 – 1.71 (m, 3H), 1.70 – 1.60 (m, 1H), 1.35 (tt, *J* = 9.0, 6.6 Hz, 1H), 1.27 – 1.10 (m, 8H).

^{13}C NMR (100 MHz, $CDCl_3$) δ 193.53, 161.15, 136.64, 133.86, 128.94, 128.36, 62.50, 51.73, 42.33, 39.97, 30.31, 29.92, 26.19, 25.72, 25.62, 14.42.

HR-MS (ESI, $[M+H]^+$) calcd for $C_{18}H_{24}NO_3^+$ 302.1751, found 302.1760.

***trans*-Ethyl-2-benzoyl-3-isopropylaziridine-1-carboxylate (2r)**



Rf = 0.3 (PE /EA = 20:1).

Color and State: Colorless oil.

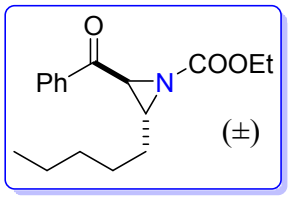
Mass and Yield: 26 mg, 52% yield.

^{1}H NMR (400 MHz, $CDCl_3$) δ 8.03 – 7.98 (m, 2H), 7.62 (ddd, J = 6.9, 2.3, 1.2 Hz, 1H), 7.55 – 7.48 (m, 2H), 4.21 (tt, J = 7.1, 3.6 Hz, 2H), 3.88 (d, J = 2.7 Hz, 1H), 2.71 (dd, J = 7.2, 2.7 Hz, 1H), 1.70 (dq, J = 13.7, 6.8 Hz, 1H), 1.24 (t, J = 7.1 Hz, 3H), 1.11 (d, J = 6.7 Hz, 3H), 1.02 (d, J = 6.8 Hz, 3H).

^{13}C NMR (100 MHz, $CDCl_3$) δ 193.51, 161.12, 136.68, 133.91, 128.98, 128.39, 62.56, 52.74, 42.45, 30.67, 19.74, 19.26, 14.44.

HR-MS (ESI, $[M+H]^+$) calcd for $C_{15}H_{20}NO_3^+$ 262.1438, found 262.1437.

***trans*-Ethyl-2-benzoyl-3-pentylaziridine-1-carboxylate (2s)**



Rf = 0.7 (PE/DCM/EA = 12:5:1).

Color and State: Colorless oil.

Mass and Yield: 20 mg, 69% yield.

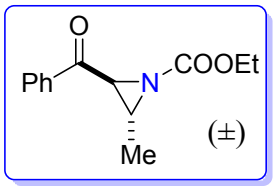
^{1}H NMR (400 MHz, $CDCl_3$) δ 8.03 – 7.99 (m, 2H), 7.63 (t, *J* = 7.4 Hz, 1H), 7.51 (t, *J* = 7.7 Hz, 2H), 4.24 – 4.16 (m, 2H), 3.82 (d, *J* = 2.7 Hz, 1H), 2.87 (td, *J* = 6.1, 2.7 Hz, 1H), 1.72 – 1.49 (m, 4H), 1.34 (dt, *J* = 8.4, 5.2 Hz, 4H), 1.24 – 1.22 (m, 3H), 0.88 (t, *J* = 7.0 Hz, 3H).

^{13}C NMR (100 MHz, $CDCl_3$) δ 193.56, 161.14, 136.69, 133.92, 128.96,

128.48, 62.61, 46.82, 43.66, 31.74, 31.45, 26.53, 22.65, 14.46, 14.11.

HR-MS (ESI, $[M+H]^+$) calcd for $C_{17}H_{24}NO_3^+$ 290.1751, found 290.1748.

trans-Ethyl-2-benzoyl-3-methylaziridine-1-carboxylate (2t)



Rf = 0.4 (PE/EA = 20:1).

Color and State: Colorless oil.

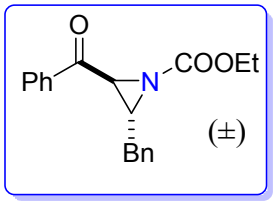
Mass and Yield: 38 mg, 81% yield.

^{1}H NMR (400 MHz, $CDCl_3$) δ 8.05 – 7.98 (m, 2H), 7.62 (ddd, *J* = 6.9, 2.3, 1.1 Hz, 1H), 7.50 (dd, *J* = 10.6, 4.7 Hz, 2H), 4.25 – 4.15 (m, 2H), 3.76 (t, *J* = 2.4 Hz, 1H), 2.93 (dq, *J* = 8.2, 2.8 Hz, 1H), 1.44 (d, *J* = 5.5 Hz, 3H), 1.24 (t, *J* = 7.1 Hz, 3H).

^{13}C NMR (100 MHz, $CDCl_3$) δ 193.53, 161.05, 136.62, 133.92, 128.93, 128.50, 62.64, 44.49, 41.99, 17.06, 14.45.

HR-MS (ESI, $[M+H]^+$) calcd for $C_{13}H_{16}NO_3^+$ 234.1125, found 234.1124.

trans-Ethyl-2-benzoyl-3-benzylaziridine-1-carboxylate (2u)



Rf = 0.6 (PE/DCM/EA = 12:5:1).

Color and State: Colorless oil.

Mass and Yield: 54 mg, 88% yield.

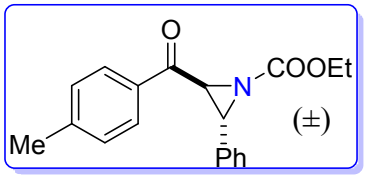
^{1}H NMR (400 MHz, $CDCl_3$) δ 7.83 (d, *J* = 7.4 Hz, 2H), 7.52 (t, *J* = 7.4 Hz, 1H), 7.39 (t, *J* = 7.7 Hz, 2H), 7.27 – 7.14 (m, 5H), 4.13 (q, *J* = 7.1 Hz, 2H), 3.77 (d, *J* = 2.2 Hz, 1H), 3.16 – 3.04 (m, 2H), 2.80 (dd, *J* = 16.6, 8.0 Hz,

1H), 1.15 (t, *J* = 7.1 Hz, 3H).

^{13}C NMR (100 MHz, $CDCl_3$) δ 193.23, 160.88, 136.91, 136.55, 133.93, 128.98, 128.92, 128.77, 128.41, 127.01, 62.68, 46.36, 43.16, 37.67, 14.40.

HR-MS (ESI, $[M+H]^+$) calcd for $C_{19}H_{20}NO_3^+$ 310.1438, found 310.1446.

***trans*-Ethyl-2-(4-methylbenzoyl)-3-phenylaziridine-1-carboxylate (4a)**



Rf = 0.6 (PE/DCM/EA = 12:5:1).

Color and State: Colorless oil.

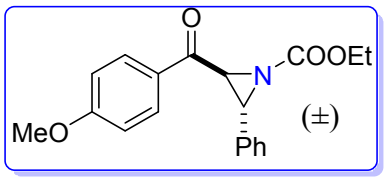
Mass and Yield: 59 mg, 95 % yield.

^{1}H NMR (400 MHz, $CDCl_3$) δ 7.81 (d, *J* = 8.2 Hz, 2H), 4.15 (pd, *J* = 7.6, 3.5 Hz, 2H), 3.93 (d, *J* = 2.4 Hz, 1H), 3.79 (d, *J* = 2.4 Hz, 1H), 2.33 (s, 3H), 1.16 (t, *J* = 7.1 Hz, 3H).

^{13}C NMR (100 MHz, $CDCl_3$) δ 191.66, 160.56, 145.22, 136.04, 134.05, 129.66, 128.76, 128.71, 128.55, 126.53, 62.83, 47.31, 47.20, 21.87, 14.42.

HR-MS (ESI, $[M+H]^+$) calcd for $C_{19}H_{20}NO_3^+$ 310.1438, found 310.1426.

***trans*-Ethyl-2-(4-methoxybenzoyl)-3-phenylaziridine-1-carboxylate (4b)**



Rf = 0.6 (PE/DCM/EA = 12:5:1).

Color and State: Colorless oil.

Mass and Yield: 63 mg, 97% yield.

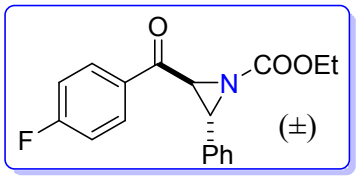
^{1}H NMR (400 MHz, $CDCl_3$) δ 8.01 – 7.97 (m, 2H), 7.43 – 7.29 (m, 5H),

6.98 – 6.93 (m, 2H), 4.29 – 4.19 (m, 2H), 4.00 (d, *J* = 2.5 Hz, 1H), 3.88 (d, *J* = 2.5 Hz, 1H), 3.87 (s, 3H), 1.25 (t, *J* = 7.1 Hz, 3H).

^{13}C NMR (100 MHz, $CDCl_3$) δ 190.31, 164.41, 160.63, 136.13, 131.02, 129.61, 128.75, 128.51, 126.53, 114.19, 62.80, 55.68, 47.09, 47.04, 14.43.

HR-MS (ESI, $[M+H]^+$) calcd for $C_{19}H_{20}NO_4^+$ 326.1387, found 326.1387.

trans-Ethyl-2-(4-fluorobenzoyl)-3-phenylaziridine-1-carboxylate (4c)



Rf = 0.6 (PE/DCM/EA = 12:5:1).

Color and State: Colorless oil.

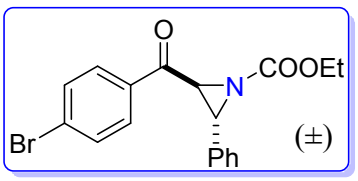
Mass and Yield: 46 mg, 74% yield.

^{1}H NMR (400 MHz, $CDCl_3$) δ 8.06 – 8.01 (m, 2H), 7.40 – 7.31 (m, 5H), 7.20 – 7.13 (m, 2H), 4.29 – 4.19 (m, 2H), 4.00 (d, *J* = 2.5 Hz, 1H), 3.90 (d, *J* = 2.4 Hz, 1H), 1.26 (t, *J* = 7.1 Hz, 3H).

^{13}C NMR (100 MHz, $CDCl_3$) δ 190.67, 166.38 (d, *J* = 256.7 Hz), 160.35, 135.77, 132.99, 131.34 (d, *J* = 9.5 Hz), 128.83, 126.52, 116.23 (d, *J* = 22.1 Hz), 62.93, 47.49, 47.05, 14.41.

HR-MS (ESI, $[M+H]^+$) calcd for $C_{18}H_{17}FNO_3^+$ 314.1187, found 314.1118.

trans-Ethyl-2-(4-bromobenzoyl)-3-phenylaziridine-1-carboxylate (4d)



Rf = 0.6 (PE/DCM/EA = 12:5:1).

Color and State: Colorless oil.

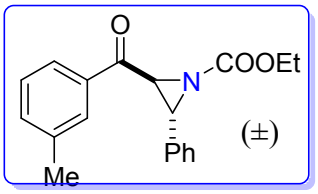
Mass and Yield: 35 mg, 47% yield.

^{1}H NMR (400 MHz, $CDCl_3$) δ 7.88 – 7.84 (m, 2H), 7.67 – 7.61 (m, 2H), 7.40 – 7.33 (m, 5H), 4.29 – 4.20 (m, 2H), 3.98 (d, *J* = 2.4 Hz, 1H), 3.90 (d, *J* = 2.4 Hz, 1H), 1.26 (t, *J* = 7.1 Hz, 3H).

^{13}C NMR (100 MHz, $CDCl_3$) δ 191.26, 160.18, 135.60, 135.10, 132.26, 129.92, 128.75, 128.63, 126.42, 62.88, 47.55, 46.95, 14.33.

HR-MS (ESI, $[M+H]^+$) calcd for $C_{18}H_{17}BrNO_3^+$ 374.0386, found 374.0378.

***trans*-Ethyl-2-(3-methylbenzoyl)-3-phenylaziridine-1-carboxylate (4e)**



Rf = 0.6 (PE/DCM/EA = 12:5:1).

Color and State: Colorless oil.

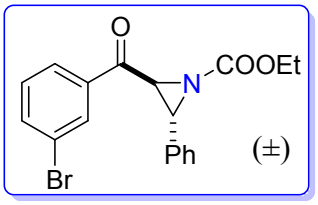
Mass and Yield: 57 mg, 85% yield.

^{1}H NMR (400 MHz, $CDCl_3$) δ 7.80 (d, *J* = 8.6 Hz, 2H), 7.45 – 7.29 (m, 7H), 3.51 (d, *J* = 5.7 Hz, 1H), 3.18 (d, *J* = 7.1 Hz, 1H), 2.67 (br, 1H), 2.41 (s, 3H).

^{13}C NMR (100 MHz, $CDCl_3$) δ 196.00, 138.84, 138.56, 136.09, 134.74, 128.86, 128.80, 128.66, 127.96, 126.36, 125.74, 44.19, 43.65, 21.44.

HR-MS (ESI, $[M+H]^+$) calcd for $C_{19}H_{20}NO_3^+$ 310.1438, found 310.1438.

***trans*-Ethyl-2-(3-bromobenzoyl)-3-phenylaziridine-1-carboxylate (4f)**



Rf = 0.6 (PE/DCM/EA = 12:5:1).

Color and State: Colorless oil.

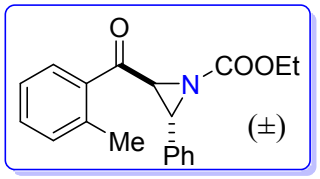
Mass and Yield: 64 mg, 85% yield.

^{1}H NMR (400 MHz, $CDCl_3$) δ 8.12 (t, *J* = 1.7 Hz, 1H), 7.92 (d, *J* = 7.8 Hz, 1H), 7.78 – 7.71 (m, 1H), 4.30 – 4.19 (m, 2H), 3.97 (d, *J* = 2.4 Hz, 1H), 3.91 (d, *J* = 2.4 Hz, 1H), 1.26 (t, *J* = 7.1 Hz, 3H).

^{13}C NMR (100 MHz, $CDCl_3$) δ 191.18, 160.24, 138.16, 136.99, 135.64, 131.57, 130.58, 128.88, 128.80, 127.13, 126.56, 123.41, 63.05, 47.86, 47.09, 14.46.

HR-MS (ESI, $[M+H]^+$) calcd for $C_{18}H_{17}BrNO_3^+$ 374.0386, found 374.0392.

***trans*-Ethyl-2-(2-methylbenzoyl)-3-phenylaziridine-1-carboxylate (4g)**



Rf = 0.6 (PE/DCM/EA = 12:5:1).

Color and State: Colorless oil.

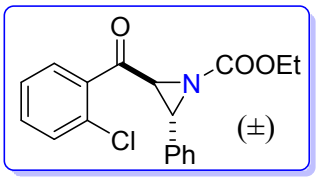
Mass and Yield: 54 mg, 87% yield.

^{1}H NMR (400 MHz, $CDCl_3$) δ 7.83 – 7.76 (m, 2H), 7.46 – 7.32 (m, 7H), 4.31 – 4.20 (m, 2H), 4.04 (d, *J* = 2.4 Hz, 1H), 3.90 (d, *J* = 2.4 Hz, 1H), 2.42 (s, 3H), 1.27 (t, *J* = 7.1 Hz, 3H).

^{13}C NMR (100 MHz, $CDCl_3$) δ 192.40, 160.53, 138.93, 136.56, 136.02, 134.93, 129.07, 128.87, 128.80, 128.60, 126.57, 125.85, 62.89, 47.51, 47.32, 21.46, 14.46.

HR-MS (ESI, $[M+H]^+$) calcd for $C_{19}H_{20}NO_3^+$ 310.1438, found 310.1431

***trans*-Ethyl-2-(2-chlorobenzoyl)-3-phenylaziridine-1-carboxylate (4h)**



Rf = 0.6 (PE/DCM/EA = 12:5:1).

Color and State: Colorless oil.

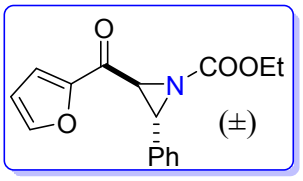
Mass and Yield: 44 mg, 67% yield.

^{1}H NMR δ 7.61 (dt, *J* = 8.6, 3.0 Hz, 1H), 7.49 – 7.36 (m, 9H), 4.34 – 4.27 (m, 2H), 3.96 (d, *J* = 2.4 Hz, 1H), 3.92 (d, *J* = 2.4 Hz, 1H), 1.34 (t, *J* = 7.1 Hz, 3H).

^{13}C NMR (100 MHz, $CDCl_3$) δ 195.13, 160.16, 137.89, 135.68, 133.16, 130.67, 130.09, 129.14, 128.76, 128.65, 127.36, 126.57, 62.97, 50.45, 48.72, 14.50.

HR-MS (ESI, $[M+H]^+$) calcd for $C_{18}H_{17}ClNO_3^+$ 326.1387, found 330.0894.

***trans*-Ethyl-2-(furan-2-carbonyl)-3-phenylaziridine-1-carboxylate (4i)**



Rf = 0.6 (PE/DCM/EA = 12:5:1).

Color and State: Colorless oil.

Mass and Yield: 42 mg, 73% yield.

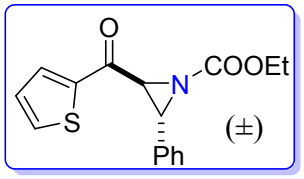
^{1}H NMR (400 MHz, $CDCl_3$) δ 7.65 (s, 1H), 7.35 (d, *J* = 7.2 Hz, 6H), 6.63 – 6.57 (m, 1H), 4.31 – 4.15 (m, 2H), 3.95 (s, 1H), 3.91 (s, 1H), 1.26 (t, *J* = 7.0 Hz, 4H).

^{13}C NMR (100 MHz, $CDCl_3$) δ 180.37, 160.18, 152.55, 147.80, 135.81, 128.74, 128.59, 126.53, 119.19, 112.98, 77.48, 77.16, 76.84, 62.93, 47.01,

46.93, 14.40.

HR-MS (ESI, $[M+H]^+$) calcd for $C_{16}H_{16}NO_4^+$ 286.1074, found 286.1051.

***trans*-Ethyl (2R,3S)-2-phenyl-3-(thiophene-2-carbonyl)aziridine-1-carboxylate (4j)**



Rf = 0.6 (PE/DCM/EA = 12:5:1).

Color and State: Colorless oil.

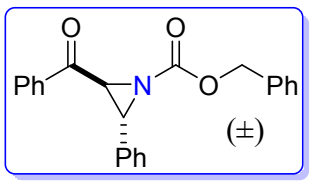
Mass and Yield: 56 mg, 92% yield.

^{1}H NMR (400 MHz, $CDCl_3$) δ 7.86 (dd, *J* = 3.9, 0.9 Hz, 1H), 7.75 (dd, *J* = 4.9, 0.9 Hz, 1H), 7.41 – 7.31 (m, 5H), 7.18 (dd, *J* = 4.8, 4.0 Hz, 1H), 4.24 (dtt, *J* = 10.7, 7.1, 3.5 Hz, 2H), 3.94 (d, *J* = 2.4 Hz, 1H), 3.89 (d, *J* = 2.4 Hz, 1H), 1.26 (t, *J* = 7.1 Hz, 3H).

^{13}C NMR (100 MHz, $CDCl_3$) δ 184.39, 160.19, 143.37, 135.80, 135.60, 133.46, 128.78, 128.70, 128.62, 126.55, 62.94, 47.69, 47.07, 14.43.

HR-MS (ESI, $[M+H]^+$) calcd for $C_{16}H_{16}NO_3S^+$ 302.0845, found 302.0787.

***trans*-Benzyl (2S,3R)-2-benzoyl-3-phenylaziridine-1-carboxylate (6a)**



Rf = 0.6 (PE/DCM/EA = 12:5:1).

Color and State: Colorless oil.

Mass and Yield: 47 mg, 65% yield.

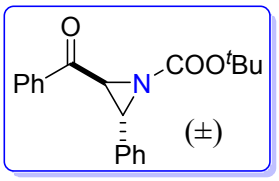
^{1}H NMR (400 MHz, $CDCl_3$) δ 7.99 (d, *J* = 7.4 Hz, 2H), 7.63 (t, *J* = 7.4 Hz, 1H), 7.50 (t, *J* = 7.7 Hz, 2H), 7.42 – 7.31 (m, 10H), 4.09 (d, *J* = 2.4 Hz,

1H), 3.97 (d, J = 2.4 Hz, 1H).

^{13}C NMR (100 MHz, $CDCl_3$) δ 192.17, 160.43, 136.38, 135.75, 135.65, 134.14, 128.97, 128.79, 128.65, 128.57, 128.53, 128.32, 126.53, 68.59, 47.58, 47.33.

HR-MS (ESI, $[M+H]^+$) calcd for $C_{23}H_{20}NO_3^+$ 358.1438, found 358.1442.

***trans*-Tert-butyl (2S,3R)-2-benzoyl-3-phenylaziridine-1-carboxylate (6b)**



Rf = 0.6 (PE/DCM/EA = 12:5:1).

Color and State: Colorless oil.

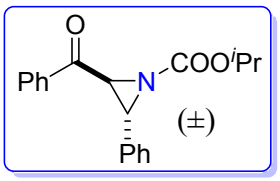
Mass and Yield: 36 mg, 55% yield.

^{1}H NMR (400 MHz, $CDCl_3$) δ 8.02 (d, J = 7.9 Hz, 2H), 7.62 (t, J = 7.5 Hz, 1H), 7.50 (t, J = 7.7 Hz, 2H), 7.37 (dd, J = 15.8, 7.8 Hz, 5H), 4.01 (d, J = 2.2 Hz, 1H), 3.94 (d, J = 2.0 Hz, 1H), 1.45 (s, 9H).

^{13}C NMR (100 MHz, $CDCl_3$) δ 192.51, 159.01, 136.90, 136.20, 133.96, 128.97, 128.75, 128.58, 128.50, 126.66, 82.21, 47.22, 28.09.

HR-MS (ESI, $[M+H]^+$) calcd for $C_{20}H_{22}NO_3^+$ 324.1594, found 324.1600.

***trans*-Isopropyl (2S,3R)-2-benzoyl-3-phenylaziridine-1-carboxylate (6c)**



Rf = 0.6 (PE/DCM/EA = 12:5:1).

Color and State: Colorless oil.

Mass and Yield: 40 mg, 63% yield.

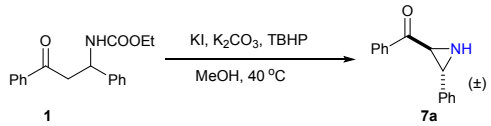
^{1}H NMR (400 MHz, $CDCl_3$) δ 8.04 – 7.98 (m, 2H), 7.62 (t, *J* = 7.4 Hz, 1H), 7.50 (t, *J* = 7.7 Hz, 2H), 7.42 – 7.33 (m, 5H), 5.09 – 4.99 (m, 1H), 4.04 (d, *J* = 2.5 Hz, 1H), 3.92 (d, *J* = 2.4 Hz, 1H), 1.31 (d, *J* = 6.2 Hz, 3H), 1.19 (d, *J* = 6.3 Hz, 3H).

^{13}C NMR (100 MHz, $CDCl_3$) δ 192.21, 160.02, 136.63, 136.01, 134.04, 128.97, 128.77, 128.57, 128.55, 126.58, 70.70, 47.38, 47.22, 22.03, 21.92.

HR-MS (ESI, $[M+H]^+$) calcd for $C_{19}H_{20}NO_3^+$ 310.1438, found 310.1427.

4. Experimental Procedures for the Preparation of Aziridines 7a-pl

4.1. Table 1. Reaction Condition Optimization of 7a

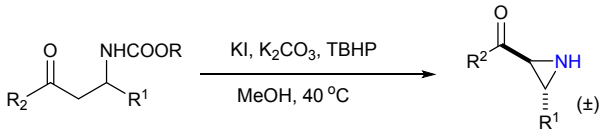


1 7a

Entry	KI (equiv.)	K_2CO_3 (equiv.)	TBHP (equiv.)	Yield (%)[a]
1	0.8	3.0	4.5	68
2	0.8	4.0	4.5	64
3	0.8	5.0	4.5	78
4	0.8	6.0	4.5	69
5	0.4	5.0	4.5	69
6	1.0	5.0	4.5	69
7	1.2	5.0	4.5	72
8	0.8	5.0	1.1	42
9	0.8	5.0	2.3	53
10	0.8	5.0	6.0	73

[a] Reaction conditions: 1 (0.2 mmol), K_2CO_3, KI in MeOH (2 mL), TBHP, 40 °C, 3 h; isolated yields.

4.2. General procedure 4:



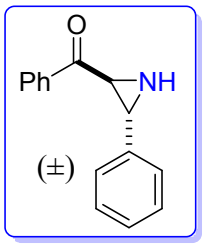
1 7a-7p

Scheme S4. General procedure for preparation of 7a-7p.

A 10 mL pressure tube was charged with Chalcone (0.2 mmol, 1.0 equiv.), KI (0.16 mmol, 26.6 mg, 0.8 equiv.), K_2CO_3 (1.0 mmol, 144 mg, 5.0 equiv.), and methanol (2.0 mL), then TBHP (4.5 mol/L in *n*-Hexane, 1.0 mmol, 200 μL, 4.5 equiv.) was added to the reaction mixture slowly, The reaction mixture was stirred at 40 °C for 1 hour. The resultant solution was quenched with aqueous saturated sodium thiosulfate solution (4 mL),

H_2O (10 mL) and extracted with ethyl acetate (3×30 mL), dried over anhydrous sodium sulfate, filtered and concentrated *in vacuo*. The crude product was further purified by column chromatography on silica gel (PE/DCM/EA = 25:5:1) to afford the title compound as a white solid.

***trans*-Phenyl*trans*-3-phenylaziridin-2-yl)methanone (7a)**[S3, S4]



Rf = 0.6 (PE/DCM/EA = 12:5:1).

Color and State: white solid.

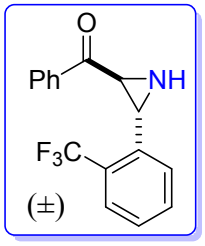
Mass and Yield: 36 mg, 81% yield.

^{1}H NMR (400 MHz, $CDCl_3$) δ 8.00 (d, *J* = 7.3 Hz, 2H), 7.61 (t, *J* = 7.4 Hz, 1H), 7.49 (t, *J* = 7.7 Hz, 2H), 7.42 – 7.27 (m, 5H), 3.55 – 3.48 (m, 1H), 3.18 (dd, *J* = 8.9, 1.7 Hz, 1H), 2.68 (t, *J* = 8.0 Hz, 1H).

^{13}C NMR (100 MHz, $CDCl_3$) δ 195.84, 138.48, 136.06, 133.95, 128.95, 128.69, 128.46, 128.02, 126.34, 44.25, 43.67.

HR-MS (ESI, $[M+H]^+$) calcd for $C_{15}H_{14}NO^+$ 224.1070, found 224.1076.

***trans*-Phenyl*trans*-3-(2-(trifluoromethyl)phenyl)aziridin-2-yl)methanone (7b)**



Rf = 0.6 (PE/DCM/EA = 12:5:1).

Color and State: white solid.

Mass and Yield: 43 mg, 73% yield.

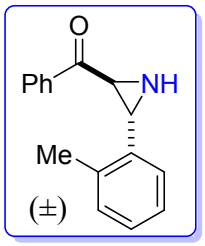
^{1}H NMR (400 MHz, $CDCl_3$) δ 7.95 – 7.87 (m, 2H), 7.71

(d, *J* = 7.8 Hz, 1H), 7.60 – 7.45 (m, 3H), 7.44 – 7.36 (m, 2H), 7.36 – 7.28 (m, 1H), 3.42 (d, *J* = 8.9 Hz, 1H), 3.34 (dd, *J* = 7.9, 2.3 Hz, 1H), 2.56 (t, *J* = 8.3 Hz, 1H).

^{13}C NMR (100 MHz, $CDCl_3$) δ 195.47, 136.85, 135.84, 134.01, 132.39, 129.46, 129.16, 128.88, 128.56, 127.74, 127.31, 125.78, 125.74, 125.69, 125.63, 123.06, 43.58, 40.24.

HR-MS (ESI, $[M+H]^+$) calcd for $C_{16}H_{13}F_3NO^+$ 292.0944, found 292.0950.

***trans*-Phenyl*trans*-3-(o-tolyl)aziridin-2-yl)methanone (7c)**



Rf = 0.6 (PE/DCM/EA = 12:5:1).

Color and State: white solid.

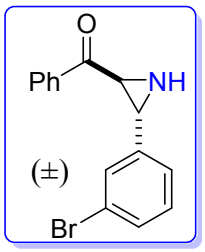
Mass and Yield: 29 mg, 61% yield.

^{1}H NMR (400 MHz, $CDCl_3$) δ 8.07 – 8.02 (m, 2H), 7.63 (ddd, *J* = 7.0, 2.4, 1.2 Hz, 1H), 7.54 – 7.46 (m, 3H), 7.25 – 7.14 (m, 3H), 3.45 (m, 1H), 3.27 (m, 1H), 2.65 – 2.53 (m, 1H), 2.31 (s, 3H).

^{13}C NMR (100 MHz, $CDCl_3$) δ 196.24, 136.76, 136.50, 135.97, 134.04, 129.97, 129.02, 128.43, 127.74, 126.38, 125.57, 42.96, 42.20, 19.22.

HR-MS (ESI, $[M+H]^+$) calcd for $C_{16}H_{16}NO^+$ 238.1226, found 238.1224.

***trans*-3-(3-Bromophenyl)aziridin-2-yl)(phenyl)methanone (7d)**



Rf = 0.6 (PE/DCM/EA = 12:5:1).

Color and State: white solid.

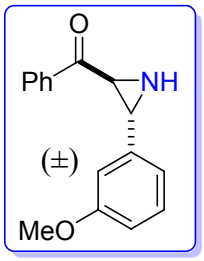
Mass and Yield: 30 mg, 49% yield.

^{1}H NMR (400 MHz, $CDCl_3$) δ 8.03 – 7.96 (m, 2H), 7.63 (t, *J* = 7.4 Hz, 1H), 7.51 (dd, *J* = 13.1, 4.9 Hz, 3H), 7.47 – 7.41 (m, 1H), 7.30 (d, *J* = 7.7 Hz, 1H), 7.22 (t, *J* = 7.8 Hz, 1H), 3.48 (dd, *J* = 8.1, 2.3 Hz, 1H), 3.13 (dd, *J* = 9.3, 2.2 Hz, 1H), 2.67 (t, *J* = 8.6 Hz, 1H).

^{13}C NMR (100 MHz, $CDCl_3$) δ 195.44, 140.89, 135.88, 134.11, 131.12, 130.21, 129.25, 129.01, 128.48, 125.21, 122.94, 44.11, 42.73.

HR-MS (ESI, $[M+H]^+$) calcd for $C_{15}H_{13}BrNO^+$ 302.0175, found 302.0173.

***trans*-3-(3-Methoxyphenyl)aziridin-2-yl)(phenyl)methanone (7e)**



Rf = 0.6 (PE/DCM/EA = 12:5:1).

Color and State: white solid.

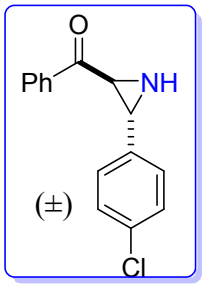
Mass and Yield: 37 mg, 72% yield.

^{1}H NMR (400 MHz, $CDCl_3$) δ 7.91 (dd, *J* = 5.1, 3.4 Hz, 2H), 7.57 – 7.49 (m, 1H), 7.40 (dd, *J* = 10.6, 4.7 Hz, 2H), 7.18 (dd, *J* = 9.5, 6.3 Hz, 1H), 6.89 (d, *J* = 7.6 Hz, 1H), 6.87 – 6.83 (m, 1H), 6.77 (ddd, *J* = 8.2, 2.6, 0.8 Hz, 1H), 3.74 (s, 3H), 3.42 (d, *J* = 5.4 Hz, 1H), 3.08 (d, *J* = 7.0 Hz, 1H), 2.58 (t, *J* = 7.5 Hz, 1H).

^{13}C NMR (100 MHz, $CDCl_3$) δ 195.79, 160.06, 140.13, 136.02, 133.96, 129.71, 128.94, 128.46, 118.90, 113.85, 111.29, 55.39, 44.19, 43.62.

HR-MS (ESI, $[M+H]^+$) calcd for $C_{16}H_{16}NO_2^+$ 254.1176, found 254.1185.

***trans*-3-(4-Chlorophenyl)aziridin-2-yl)(phenyl)methanone (7f)** [S5]



Rf = 0.6 (PE/DCM/EA = 12:5:1).

Color and State: white solid.

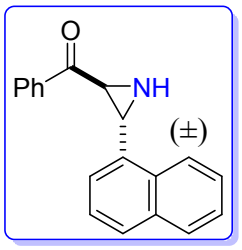
Mass and Yield: 38 mg, 74% yield.

^{1}H NMR (400 MHz, $CDCl_3$) δ 8.02 – 7.95 (m, 2H), 7.66 – 7.58 (m, 1H), 7.49 (dd, *J* = 10.7, 4.7 Hz, 2H), 7.36 – 7.28 (m, 4H), 3.45 (dd, *J* = 7.9, 2.2 Hz, 1H), 3.14 (dd, *J* = 9.2, 2.1 Hz, 1H), 2.67 (t, *J* = 8.4 Hz, 1H).

^{13}C NMR (100 MHz, $CDCl_3$) δ 195.51, 137.05, 135.93, 134.07, 133.79, 129.00, 128.86, 128.44, 127.68, 44.21, 42.89.

HR-MS (ESI, $[M+H]^+$) calcd for $C_{15}H_{13}ClNO^+$ 258.0680, found 258.0680.

***trans*-3-(Naphthalen-1-yl)aziridin-2-yl)(phenyl)methanone (7g)**



Rf = 0.6 (PE/DCM/EA = 12:5:1).

Color and State: white solid.

Mass and Yield: 35 mg, 64% yield.

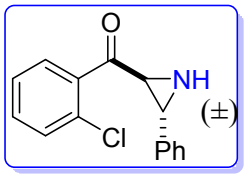
^{1}H NMR (400 MHz, $CDCl_3$) δ 8.11 – 8.04 (m, 2H), 8.01 (d, *J* = 8.4 Hz, 1H), 7.91 (d, *J* = 8.1 Hz, 1H), 7.84 (d, *J* = 8.2 Hz, 1H), 7.78 (d, *J* = 7.1 Hz, 1H), 7.63 (t, *J* = 7.4 Hz, 1H), 7.55 – 7.41 (m, 5H), 3.78 (d, *J* = 7.0 Hz, 1H), 3.60 – 3.51 (m, 1H), 2.74 (t, *J* = 7.7 Hz, 1H).

^{13}C NMR (100 MHz, $CDCl_3$) δ 196.28, 135.98, 134.15, 134.05, 133.51, 131.99, 128.98, 128.94, 128.56, 128.30, 126.51, 125.99, 125.79, 124.05,

122.83, 43.16, 41.96.

HR-MS (ESI, $[M+H]^+$) calcd for $C_{19}H_{16}NO^+$ 274.1226, found 274.1226.

***trans*-((2-Chlorophenyl)-3-phenylaziridin-2-yl)methanone (7h)**



Rf = 0.6 (PE/DCM/EA = 12:5:1).

Color and State: white solid.

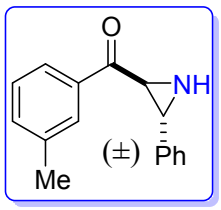
Mass and Yield: 33 mg, 64% yield.

^{1}H NMR (400 MHz, $CDCl_3$) δ 7.64 – 7.59 (m, 1H), 7.48 – 7.41 (m, 2H), 7.39 – 7.27 (m, 6H), 3.37 (s, 1H), 3.30 (s, 1H), 2.70 (s, 1H).

^{13}C NMR (100 MHz, $CDCl_3$) δ 198.50, 138.18, 137.31, 133.07, 132.53, 130.89, 130.25, 128.62, 128.03, 127.24, 126.36, 47.72, 45.18.

HR-MS (ESI, $[M+H]^+$) calcd for $C_{15}H_{13}ClNO^+$ 258.0680, found 258.0865.

***trans*-3-Phenylaziridin-2-yl)(m-tolyl)methanone (7i)**



Rf = 0.6 (PE/DCM/EA = 12:5:1).

Color and State: white solid.

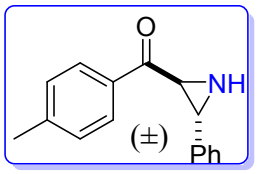
Mass and Yield: 32 mg, 68% yield.

^{1}H NMR (400 MHz, $CDCl_3$) δ 7.80 (d, *J* = 8.6 Hz, 2H), 7.46 – 7.28 (m, 7H), 3.51 (d, *J* = 5.7 Hz, 1H), 3.18 (d, *J* = 7.1 Hz, 1H), 2.67 (br, 1H), 2.41 (s, 3H).

^{13}C NMR (100 MHz, $CDCl_3$) δ 196.04, 138.88, 138.57, 136.12, 134.78, 128.89, 128.84, 128.69, 128.00, 126.39, 125.76, 44.21, 43.69, 21.47.

HR-MS (ESI, $[M+H]^+$) calcd for $C_{16}H_{16}NO^+$ 238.1226, found 238.1218.

***trans*-3-Phenylaziridin-2-yl)(p-tolyl)methanone (7j)**[S5]



Rf = 0.6 (PE/DCM/EA = 12:5:1).

Color and State: white solid.

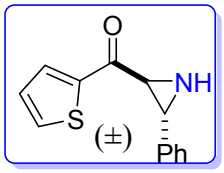
Mass and Yield: 33 mg, 69% yield.

^{1}H NMR (400 MHz, $CDCl_3$) δ 7.91 (d, *J* = 8.2 Hz, 2H), 7.40 – 7.30 (m, 5H), 7.28 (d, *J* = 8.0 Hz, 2H), 3.49 (dd, *J* = 8.0, 2.3 Hz, 1H), 3.16 (dd, *J* = 9.3, 2.3 Hz, 1H), 2.66 (t, *J* = 8.6 Hz, 1H), 2.43 (s, 3H).

^{13}C NMR (100 MHz, $CDCl_3$) δ 195.33, 144.99, 138.60, 133.58, 129.63, 128.66, 128.58, 127.94, 126.35, 44.08, 43.47, 21.88.

HR-MS (ESI, $[M+H]^+$) calcd for $C_{16}H_{16}NO^+$ 238.1226, found 238.1216.

***trans*-3-Phenylaziridin-2-yl)(thiophen-2-yl)methanone (7k)**



Rf = 0.6 (PE/DCM/EA = 12:5:1).

Color and State: white solid.

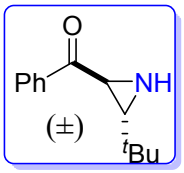
Mass and Yield: 24 mg, 52% yield.

^{1}H NMR (400 MHz, $CDCl_3$) δ 7.85 (d, *J* = 3.7 Hz, 1H), 7.73 (d, *J* = 4.8 Hz, 1H), 7.40 – 7.28 (m, 5H), 7.20 – 7.13 (m, 1H), 3.39 (d, *J* = 6.0 Hz, 1H), 3.27 (d, *J* = 7.5 Hz, 1H), 2.58 (t, *J* = 7.4 Hz, 1H).

^{13}C NMR (100 MHz, $CDCl_3$) δ 188.39, 142.96, 138.40, 134.94, 133.03, 128.67, 128.64, 128.03, 126.38, 44.50, 43.42.

HR-MS (ESI, $[M+H]^+$) calcd for $C_{13}H_{12}NOS^+$ 230.0634, found 230.0628.

***trans*-3-(tert-butyl)aziridin-2-yl)(phenyl)methanone (7l)** [S5]



Rf = 0.4 (PE/DCM/EA = 12:5:1).

Color and State: white solid.

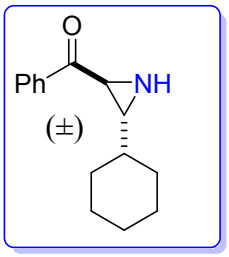
Mass and Yield: 32 mg, 77% yield.

^{1}H NMR (400 MHz, $CDCl_3$) δ 8.01 (d, *J* = 7.9 Hz, 2H), 7.61 (t, *J* = 7.3 Hz, 1H), 7.50 (t, *J* = 7.6 Hz, 2H), 3.36 (s, 1H), 2.10 – 1.99 (m, 2H), 0.98 (s, 9H).

^{13}C NMR (100 MHz, $CDCl_3$) δ 197.79, 136.23, 133.70, 128.91, 128.21, 52.78, 36.88, 31.41, 26.90.

HR-MS (ESI, $[M+H]^+$) calcd for $C_{13}H_{18}NO^+$ 204.1383, found 204.1388.

***trans*-3-Cyclohexylaziridin-2-yl)(phenyl)methanone (7m)**



Rf = 0.6 (PE/DCM/EA = 12:5:1).

Color and State: white solid.

Mass and Yield: 37 mg, 62% yield.

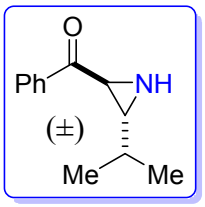
^{1}H NMR (400 MHz, $CDCl_3$) δ δ 8.06 – 7.99 (m, 2H), 7.65 – 7.58 (m, 1H), 7.51 (dd, *J* = 10.6, 4.6 Hz, 2H), 3.31 (d, *J* = 2.4 Hz, 1H), 2.05 (s, 1H), 2.00 – 1.90 (m, 2H), 1.75 (ddd, *J* = 41.8, 24.5, 11.8 Hz, 4H), 1.30 – 1.10 (m, 6H).

^{13}C NMR (100 MHz, $CDCl_3$) δ 197.50, 136.30, 133.72, 128.92, 128.28,

48.80, 41.83, 38.96, 31.10, 30.66, 26.40, 25.97, 25.84.

HR-MS (ESI, $[M+H]^+$) calcd for $C_{15}H_{20}NO^+$ 230.1539, found 230.1539.

trans-3-Isopropylaziridin-2-yl)(phenyl)methanone (7n)



Rf = 0.6 (PE/DCM/EA = 12:5:1).

Color and State: Colorless oil.

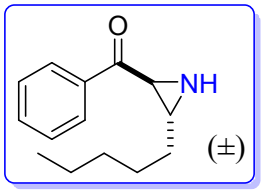
Mass and Yield: 24 mg, 65% yield.

^{1}H NMR (400 MHz, $CDCl_3$) δ 8.03 (dd, *J* = 5.2, 3.3 Hz, 2H), 7.64 – 7.59 (m, 1H), 7.51 (dd, *J* = 10.5, 4.7 Hz, 2H), 3.30 (d, *J* = 2.4 Hz, 1H), 2.07 (s, 1H), 1.97 (dd, *J* = 7.7, 2.4 Hz, 1H), 1.51 (dq, *J* = 13.9, 6.9 Hz, 1H), 1.08 (d, *J* = 6.7 Hz, 3H), 1.04 (d, *J* = 6.8 Hz, 3H).

^{13}C NMR (100 MHz, $CDCl_3$) δ 197.42, 136.28, 133.75, 128.94, 128.27, 49.95, 39.18, 32.27, 20.39, 19.82.

HR-MS (ESI, $[M+H]^+$) calcd for $C_{12}H_{16}NO^+$ 190.1226, found 190.1226.

trans-3-Pentylaziridin-2-yl)(phenyl)methanone (7o)



Rf = 0.3 (PE/DCM/EA = 12:5:1).

Color and State: white solid.

Mass and Yield: 14 mg, 68% yield.

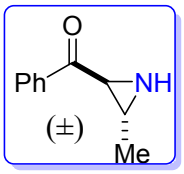
^{1}H NMR (400 MHz, $CDCl_3$) δ 8.05 – 8.00 (m, 2H), 7.62 (dd, *J* = 10.5, 4.3 Hz, 1H), 7.52 (t, *J* = 7.6 Hz, 2H), 3.31 – 3.24 (m, 1H), 2.22 – 2.06 (m, 2H), 1.64 – 1.54 (m, 2H), 1.53 – 1.45 (m, 2H), 1.37 – 1.30 (m, 4H), 0.89 (t, *J* =

7.0 Hz, 3H).

^{13}C NMR (100 MHz, $CDCl_3$) δ 197.45, 136.33, 133.77, 128.93, 128.31, 43.52, 40.00, 33.50, 31.74, 27.07, 22.73, 14.16.

HR-MS (ESI, $[M+H]^+$) calcd for $C_{14}H_{20}NO^+$ 218.1539, found 218.1538.

trans-3-Methylaziridin-2-yl)(phenyl)methanone (7p)



Rf = 0.4 (PE/DCM/EA = 12:5:1).

Color and State: Colorless oil.

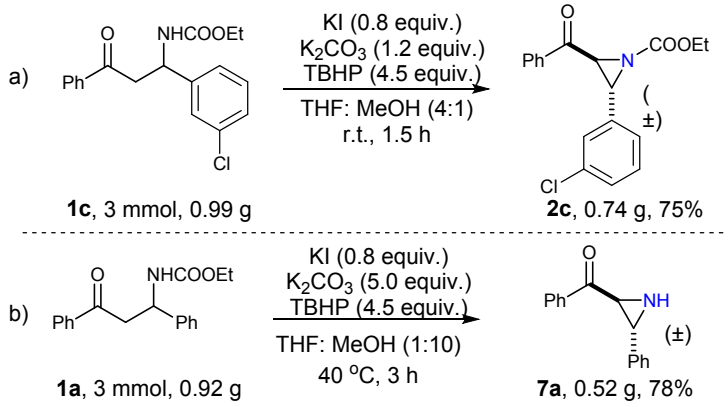
Mass and Yield: 20 mg, 65% yield.

^{1}H NMR (400 MHz, $CDCl_3$) δ 8.04 (d, *J* = 7.5 Hz, 2H), 7.65 (t, *J* = 7.4 Hz, 1H), 7.55 (t, *J* = 7.6 Hz, 2H), 3.24 (s, 1H), 2.90 – 2.90 (m, 1H), 2.30 – 2.10 (m, 2H), 1.39 (d, *J* = 5.2 Hz, 3H).

^{13}C NMR (100 MHz, $CDCl_3$) δ 197.31, 136.27, 133.83, 128.93, 128.35, 40.78, 38.43, 18.68.

HR-MS (ESI, $[M+H]^+$) calcd for $C_{10}H_{12}NO^+$ 162.0913, found 162.0913.

5. Scale-up Synthesis



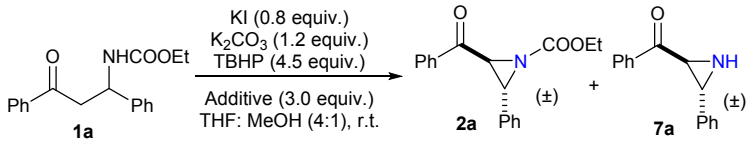
a): A 10 mL pressure tube was charged with Chalcone (3 mmol, 1.0 equiv.), KI (0.16 mmol, 26.6 mg, 0.8 equiv.), K_2CO_3 (3.6 mmol, 1.2 equiv.), THF (24 mL) and methanol (6 mL), TBHP (5.0 mol/L in *n*-Hexane, 13.5 mmol, 4.5 equiv.) was then added to the reaction mixture slowly, The reaction mixture was stirred at room temperate for 1 hour. The resultant solution was quenched with aqueous saturated sodium thiosulfate solution (10 mL), H_2O (10 mL) and extracted with ethyl acetate (3×30 mL), dried over anhydrous sodium sulfate, filtered and concentrated in vacuo. The crude product was further purified by column chromatography on silica gel (PE/DCM/EA = 30:5:1 to 25:5:1) to afford **2c** as a colorless oil.

b): A 10 mL pressure tube was charged with Chalcone (3 mmol, 1.0 equiv.), KI (0.16 mmol, 26.6 mg, 0.8 equiv.), K_2CO_3 (15 mmol, 5.0 equiv.), THF (3 mL) and methanol (30 mL), TBHP (5.0 mol/L in *n*-Hexane, 13.5 mmol, 4.5 equiv.) was then added to the reaction mixture slowly, The reaction mixture was stirred at room temperate for 1 hour. The

resultant solution was quenched with aqueous saturated sodium thiosulfate solution (10 mL), H_2O (10 mL) and extracted with ethyl acetate (3×30 mL), dried over anhydrous sodium sulfate, filtered and concentrated *in vacuo*. The crude product was further purified by column chromatography on silica gel (25:5:1) to afford **7a** as a colorless oil.

6. Control Experiments.

6.1 Control Experiments



Entry	Additive	**2a** (Isolated yield)	**7a** (Isolated yield)
1	TEMPO	49%	43%
2	BHT	30%	31%

Scheme S3. Control experiments.

A 10 mL pressure tube was charged with Chalcone (0.4 mmol, 1.0 equiv.), KI (0.32 mmol, 0.8 equiv.), K_2CO_3 (0.48 mmol, 1.2 equiv.), and TEMPO (1.2 mmol, 3.0 equiv.) (b: BHT), THF (3.2 mL) and methanol (0.8 mL), TBHP (4.5 mol/L in *n*-Hexane, 0.8 mmol, 0.4 mL, 4.5 equiv.) then was added to the reaction mixture slowly, The reaction mixture was stirred at room temperate for 1 hour. The resultant solution was quenched with aqueous saturated sodium thiosulfate solution (4 mL), H_2O (10 mL) and extracted with ethyl acetate (3×30 mL), dried over anhydrous sodium sulfate, filtered and concentrated *in vacuo*. The crude product was further purified by column chromatography on silica gel (PE/DCM/EA = 30:5:1 to 25:5:1) to afford the title compound.

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7. References

S1 L.-W. Xu, C.-G. Xia and X.-X. Hu, *Chem. Commun.,* 2003, 2570-2571.

S2 T. Kano, T. Yurino, D. Asakawa and K. Maruoka, *Angew. Chem., Int. Ed.*, 2013, **52**, 5532.

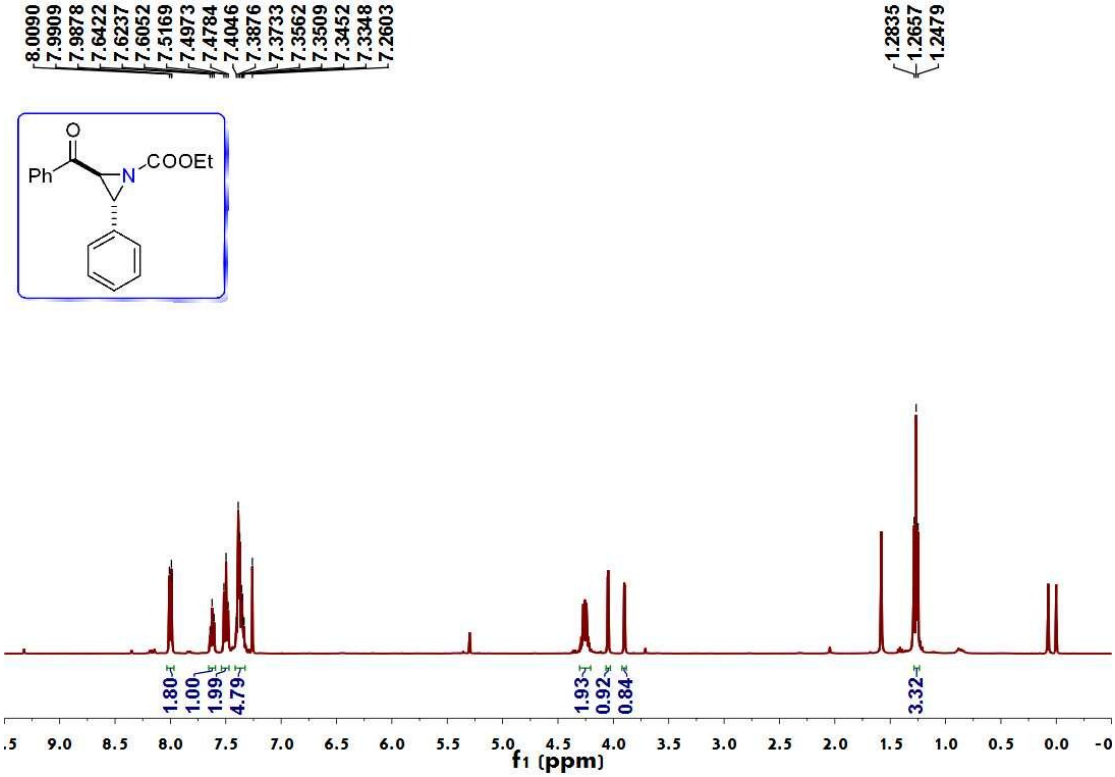
S3 Y.-M. Shen, M.-X. Zhao, J. Xu and Y. Shi, *Angew. Chem. Int. Ed.*, 2006, **45**, 8005-8008

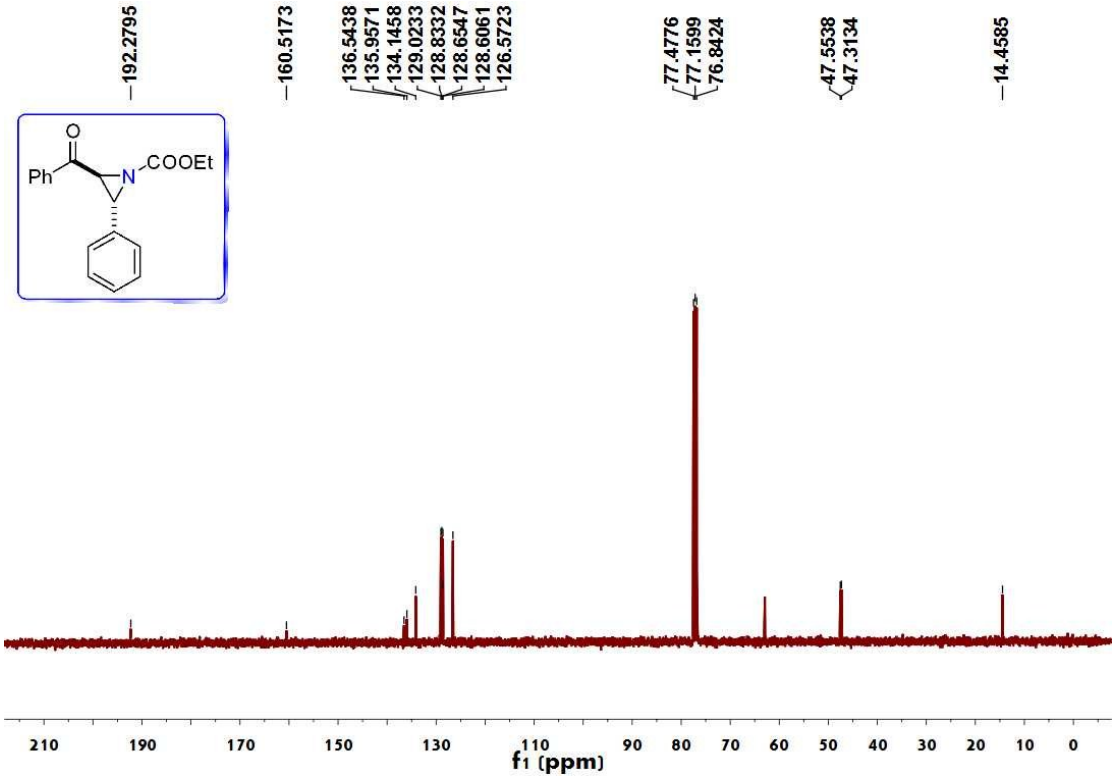
S4 S. Sabir, C. B. Pandey, A. K. Yadav, B. Tiwari and J. L. Jat, *J. Org. Chem.,* 2018, **83**, 12255−12260.

S5 A. Armstrong, C. A. Baxter, S. G. Lamont, A. R. Pape and R. Wincewicz, *Org. Lett.*, 2007, **9**, 351-353

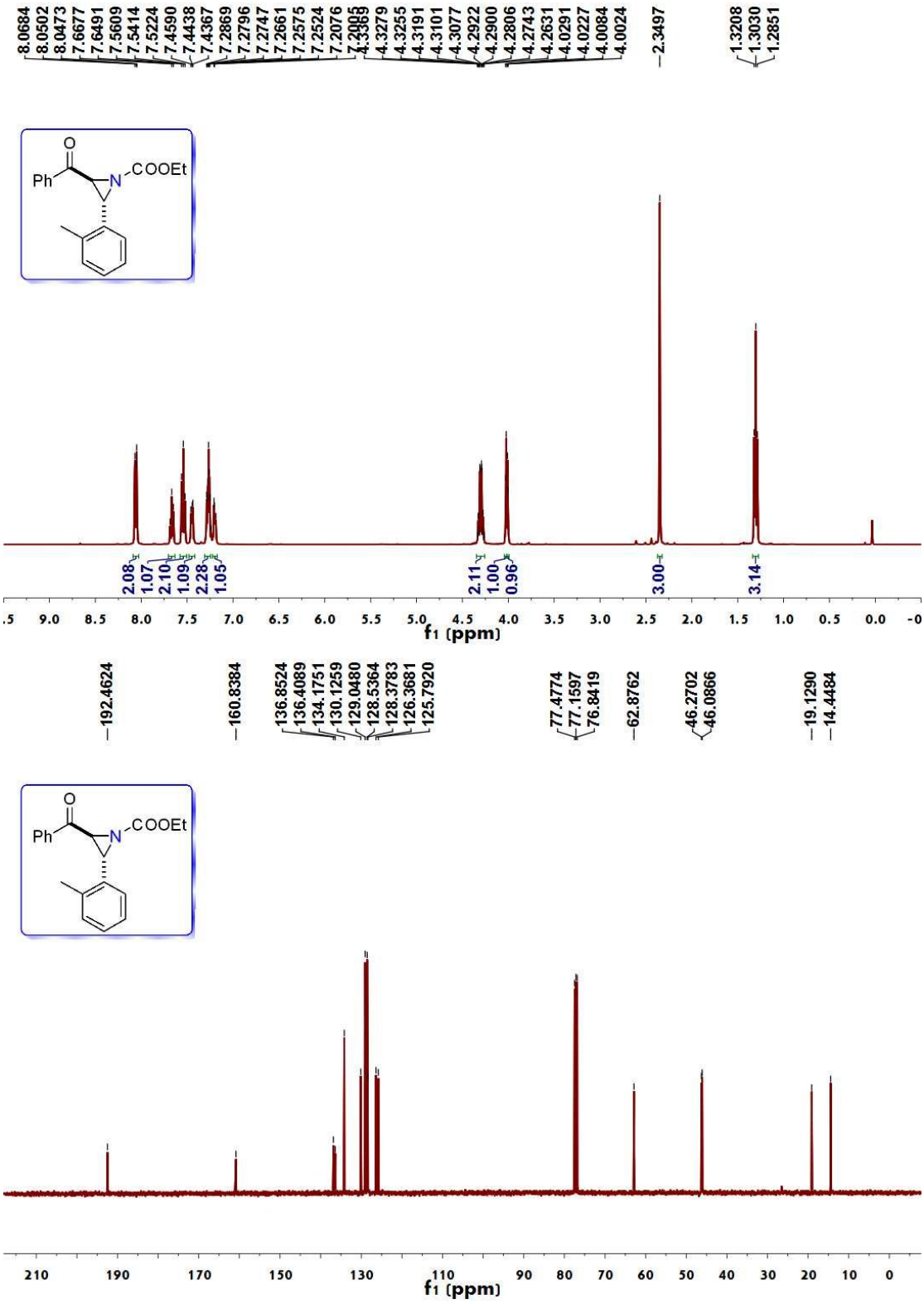
8. ^{1}H NMR and ^{13}C NMR Spectra of the Products

2a





2b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7.4367
7.2869
7.2796
7.2747
7.2661
7.2575
7.2524
7.2076
4.3279
4.3255
4.3191
4.3101
4.3077
4.2922
4.2900
4.2806
4.2743
4.2631
4.0291
4.0227
4.0084
4.0024
2.3497
1.3208
1.3030
1.2851
Ph
O
N
COOEt
2.08
1.07
2.10
1.09
2.28
1.05
2.11
1.00
0.96
3.00
3.14
f1 (ppm)
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160.8384
136.8524
136.4089
134.1751
130.1259
129.0480
128.5364
128.3783
126.3681
125.7920
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77.1597
76.8419
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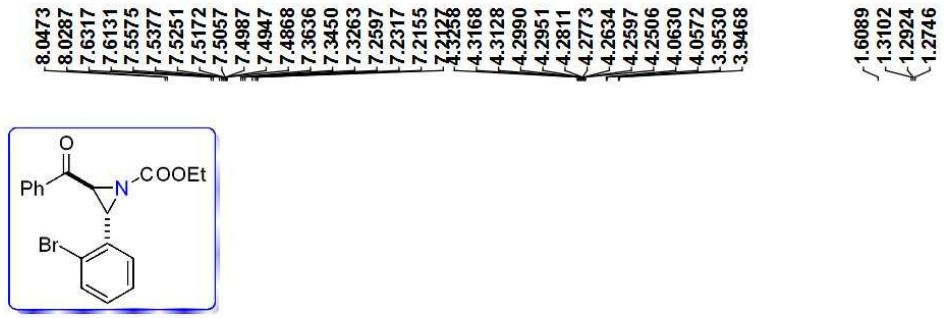
46.0866
19.1290
14.4484
f1 (ppm)

2c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7.4868
7.3636
7.3450
7.3263
7.2597
7.2317
7.2155
4.3258
4.3168
4.3128
4.2990
4.2951
4.2811
4.2773
4.2634
4.2597
4.2506
4.0630
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3.9468
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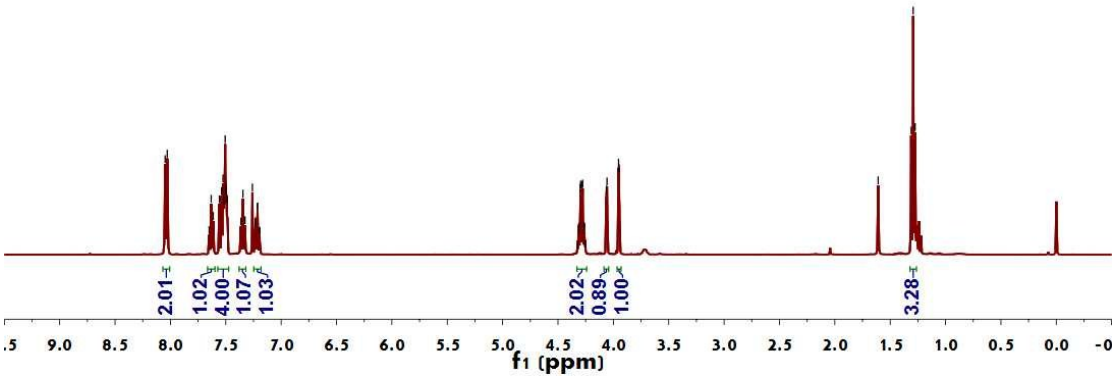
1.2746

O
Ph
N
COOEt
Br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1.02
4.00
1.07
1.03
2.02
0.89
1.00
3.28
f1 (ppm)


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136.4303
135.7287
134.1287
132.4649
129.9422
128.9687
128.6693
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123.7154
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77.1599
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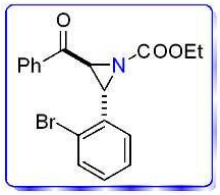
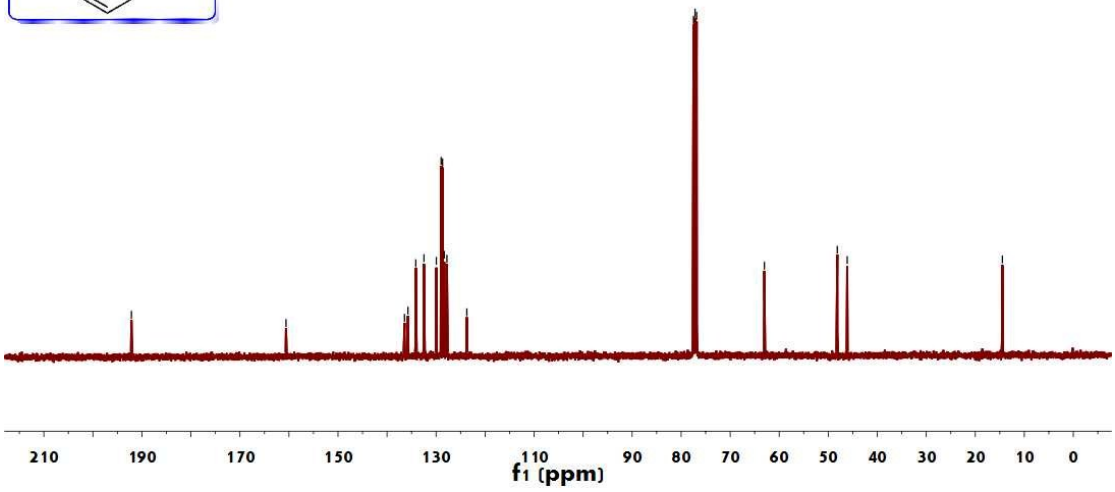
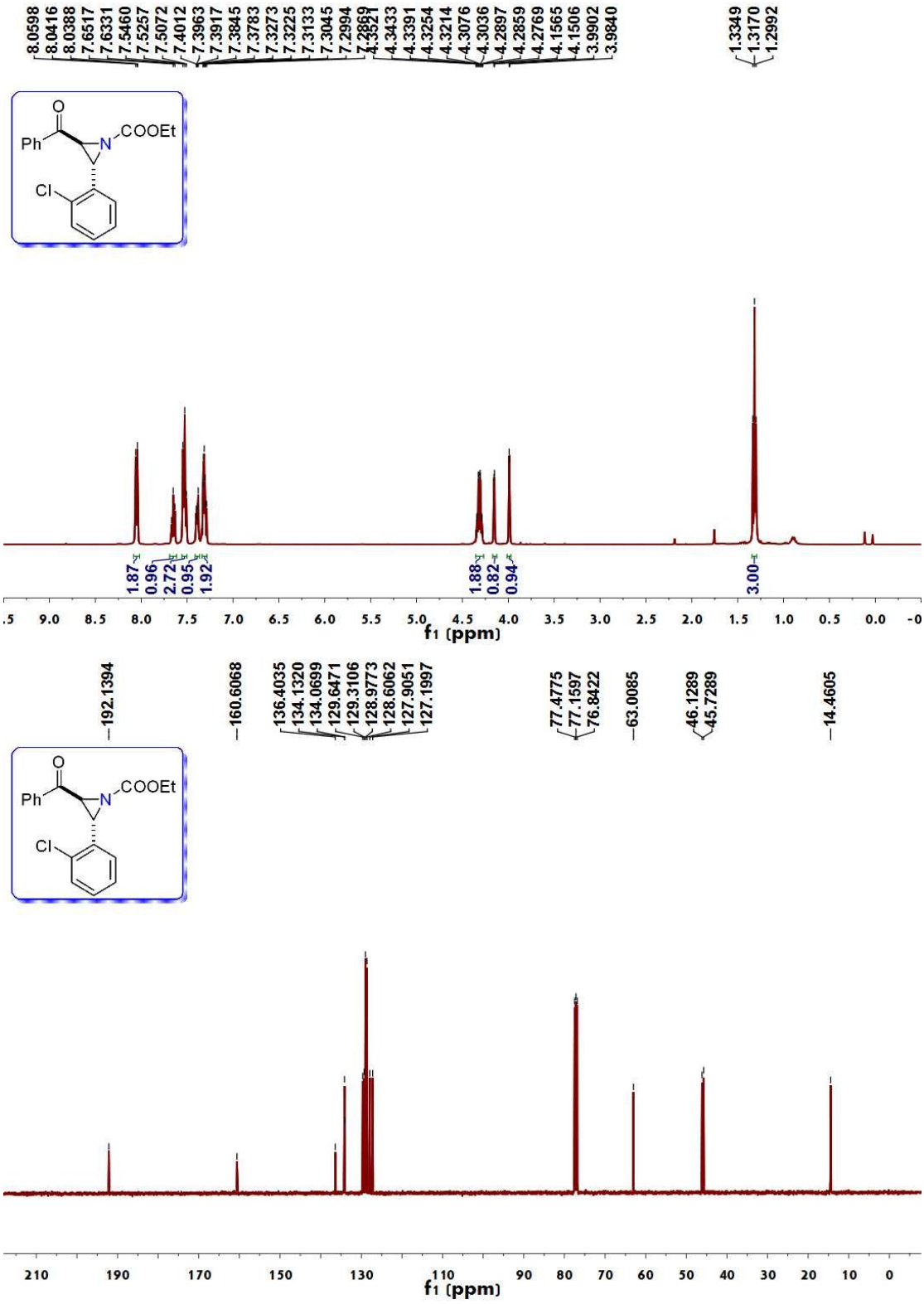
63.0244
48.1522
46.1312
14.4745


O
Ph
N
COOEt
Br


f1 (ppm)

2d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7.3783
7.3273
7.3225
7.3133
7.3045
7.2994
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4.3391
4.3254
4.3214
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Ph
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COOEt
Cl
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f1 (ppm)
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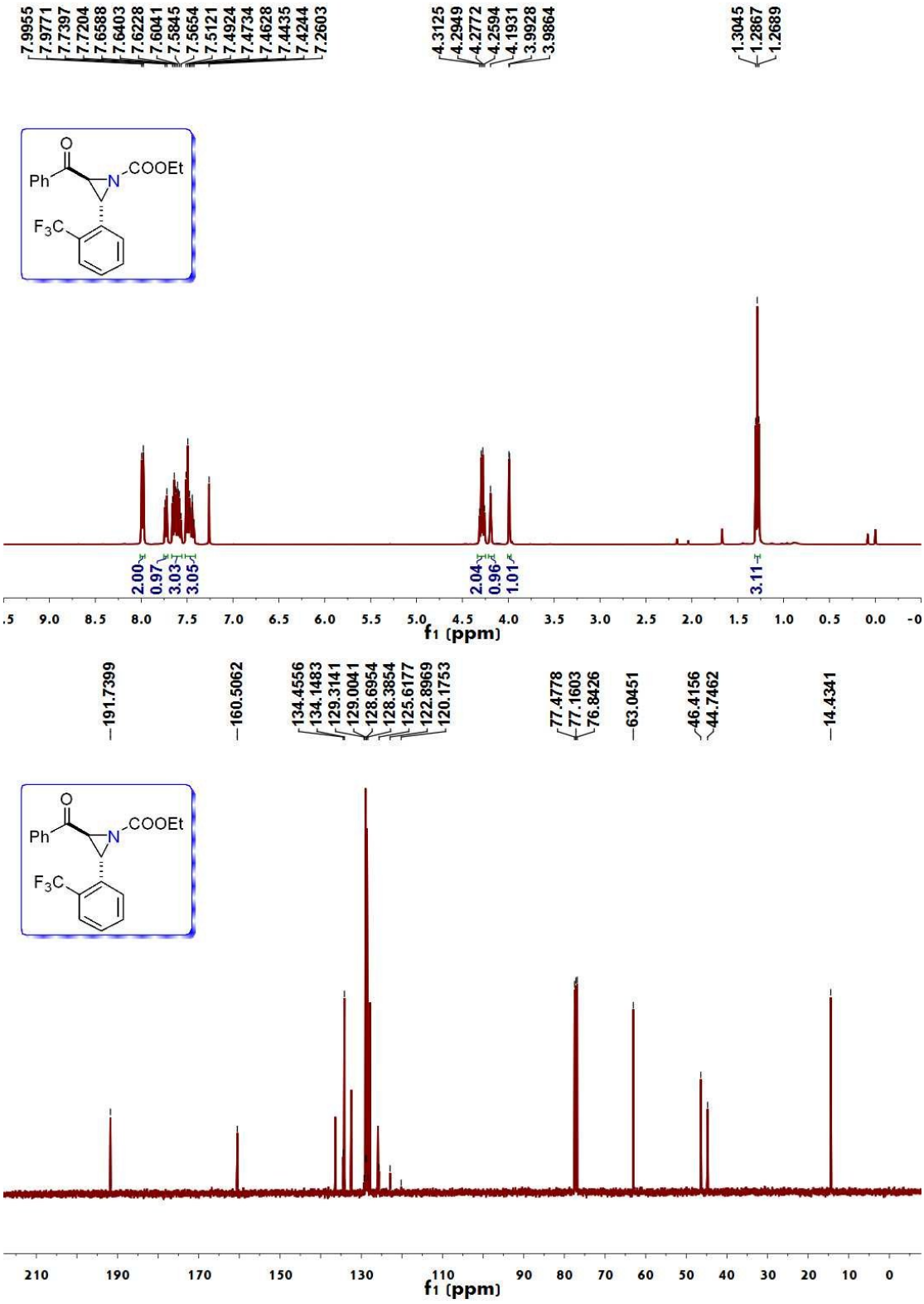
14.4605
f1 (ppm)

2e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7.4924
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7.4628
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7.4244
7.2603
4.3125
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4.1931
3.9928
3.9864
1.3045
1.2867
1.2689
Ph
N
COOEt
F3C
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0.97
3.03
3.05
2.04
0.96
1.01
3.11
f1 (ppm)
191.7399
160.5062
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129.0041
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128.3854
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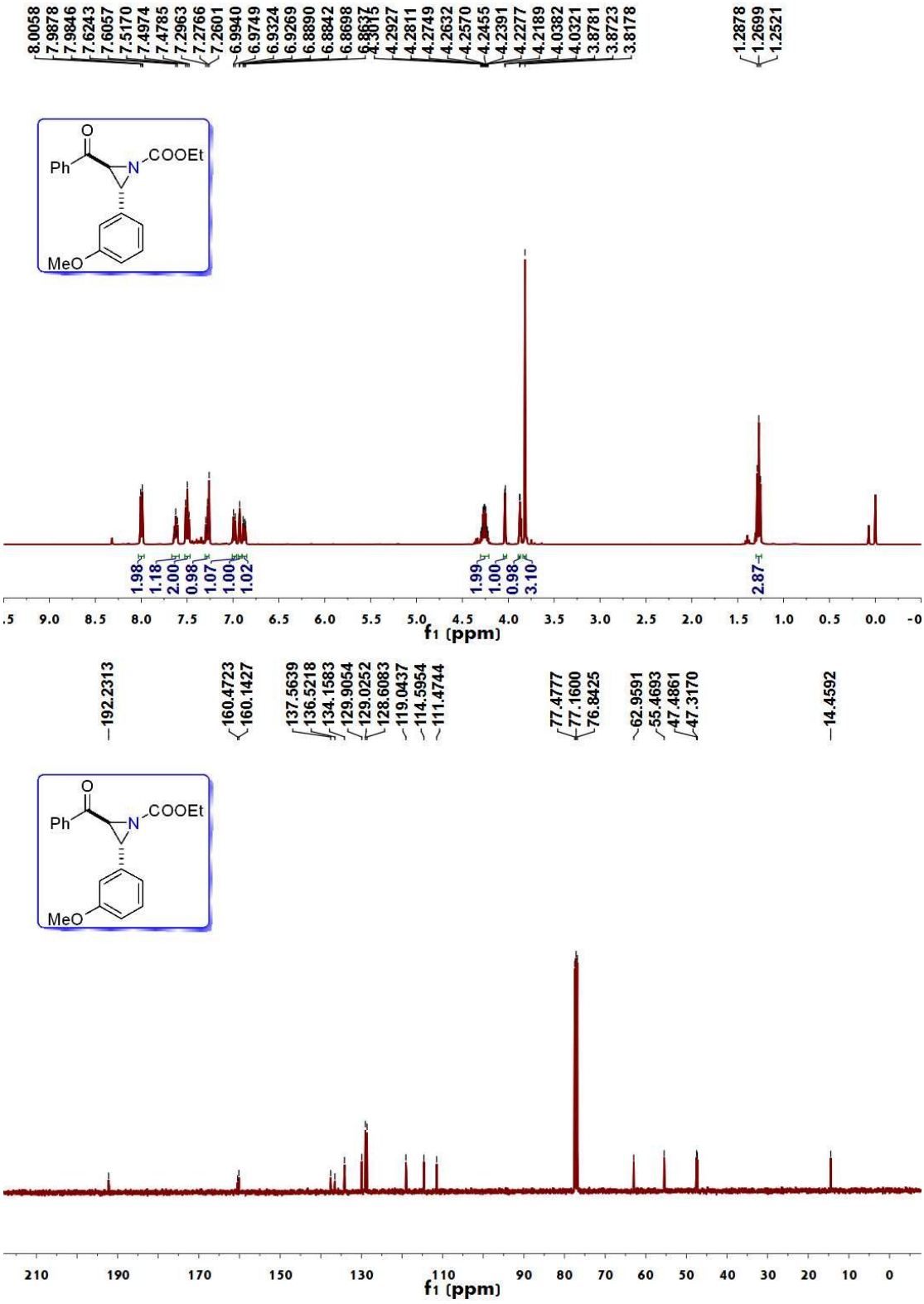
f1 (ppm)

2f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6.9269
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6.8842
6.8698
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4.2455
4.2391
4.2277
4.2189
4.0382
4.0321
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3.8723
3.8178
1.2878
1.2699
1.2521
Ph
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COOEt
MeO
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2.00
0.98
1.07
1.00
1.02
1.99
1.00
0.98
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2.87
f1 (ppm)
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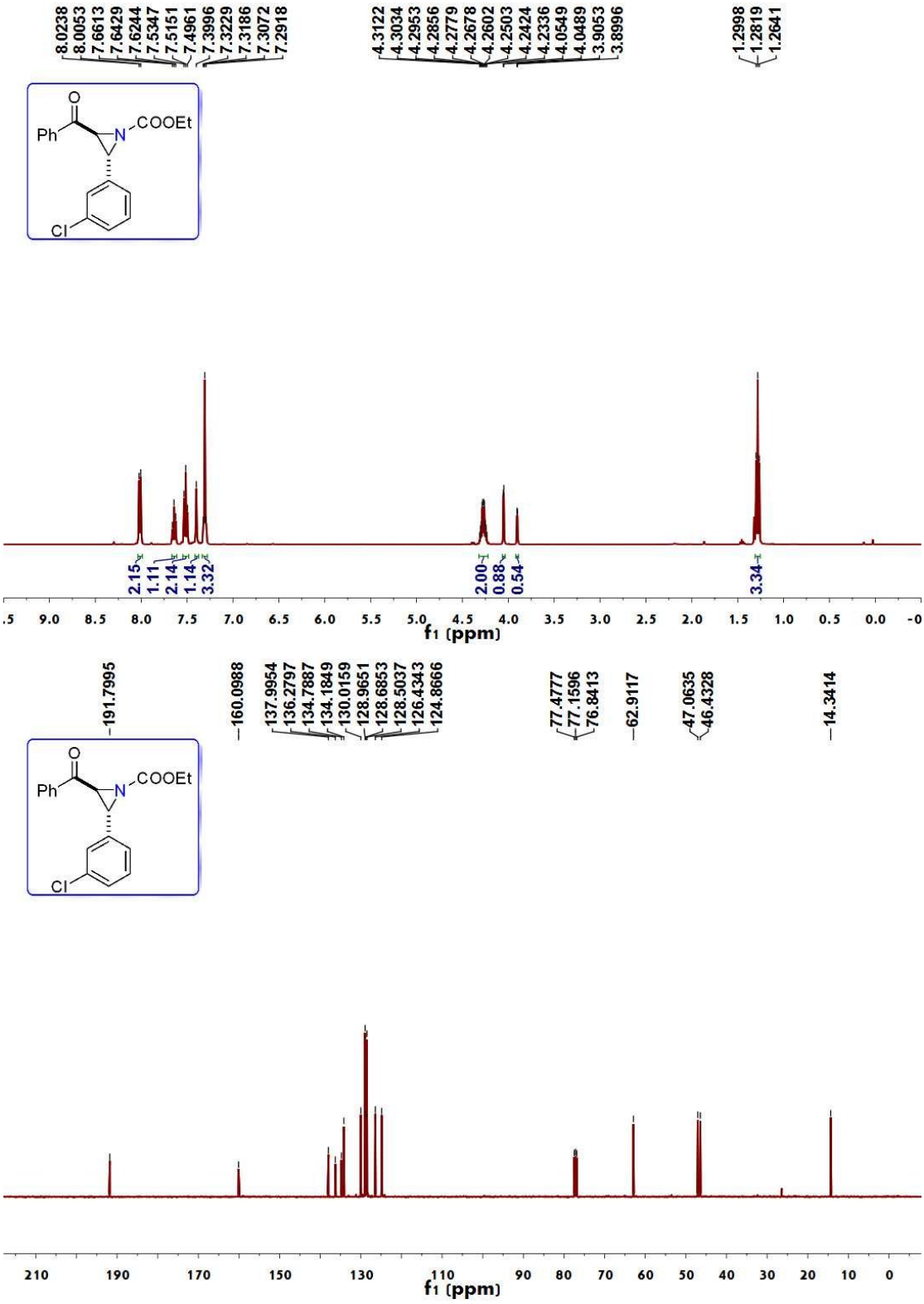
2g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4.2678
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N
COOEt
Cl
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f1 (ppm)

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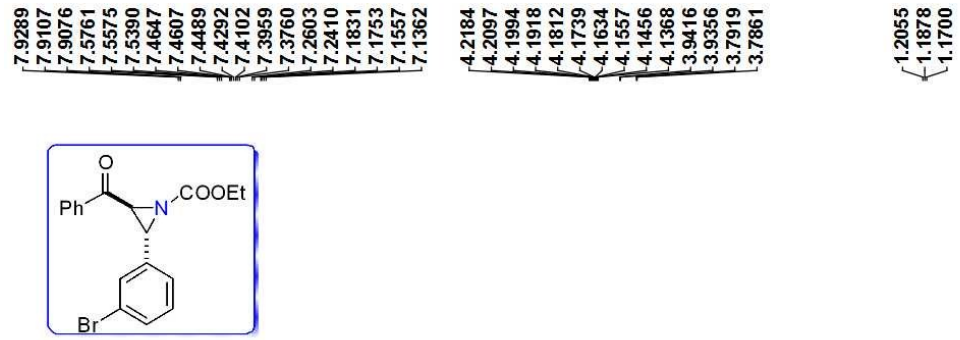
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4.1456
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Ph
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Br
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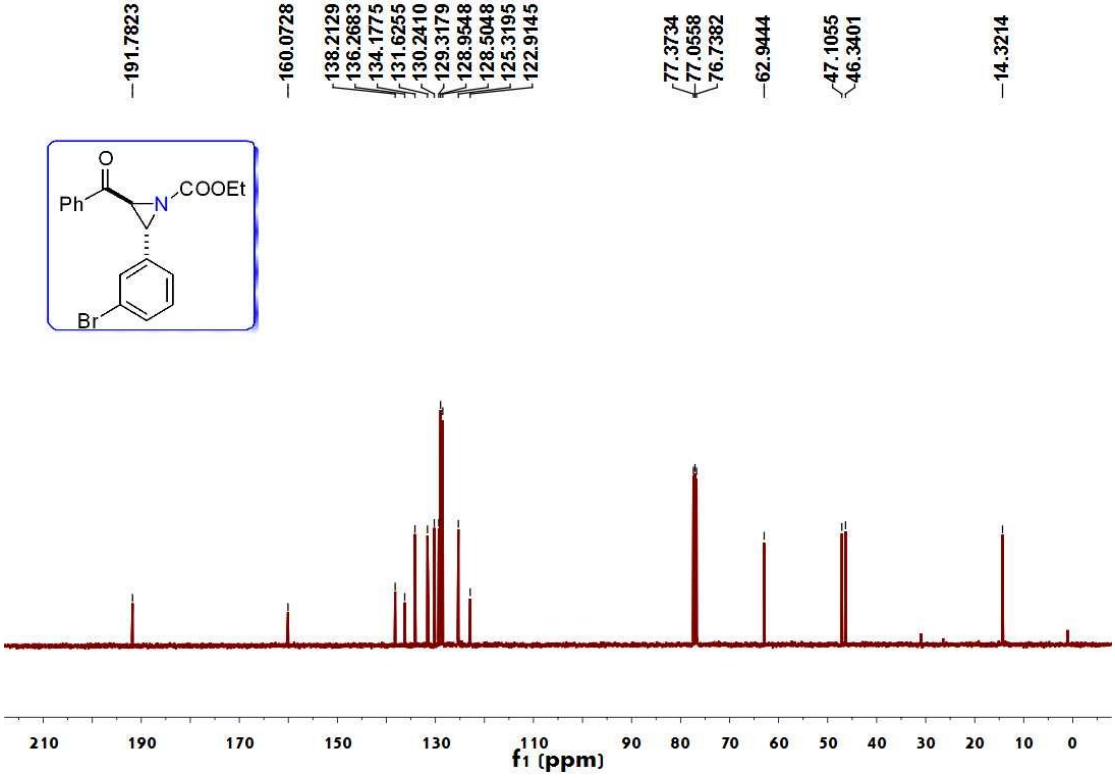
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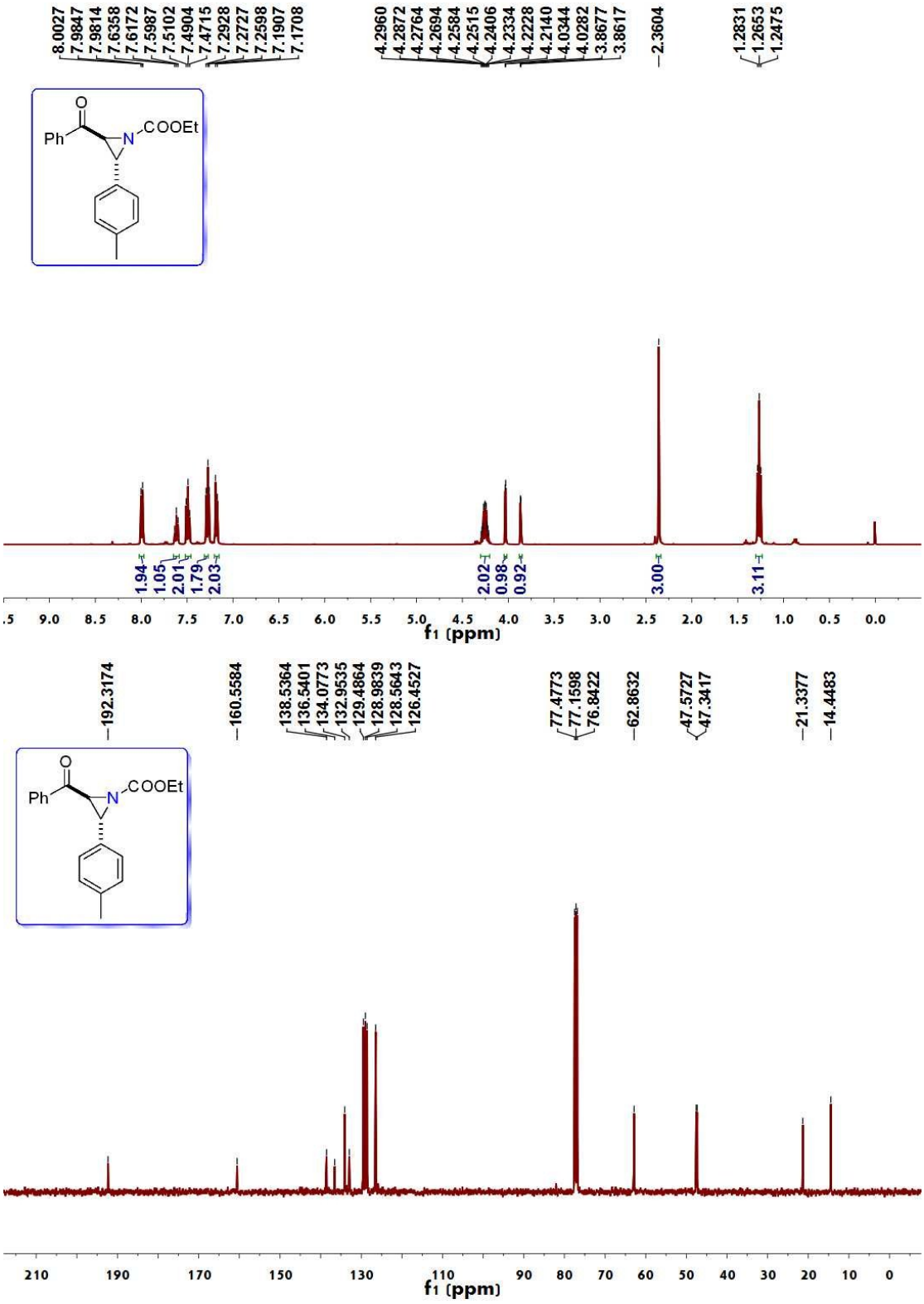
Ph
N
COOEt
Br
f1 (ppm)

2i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7.9814
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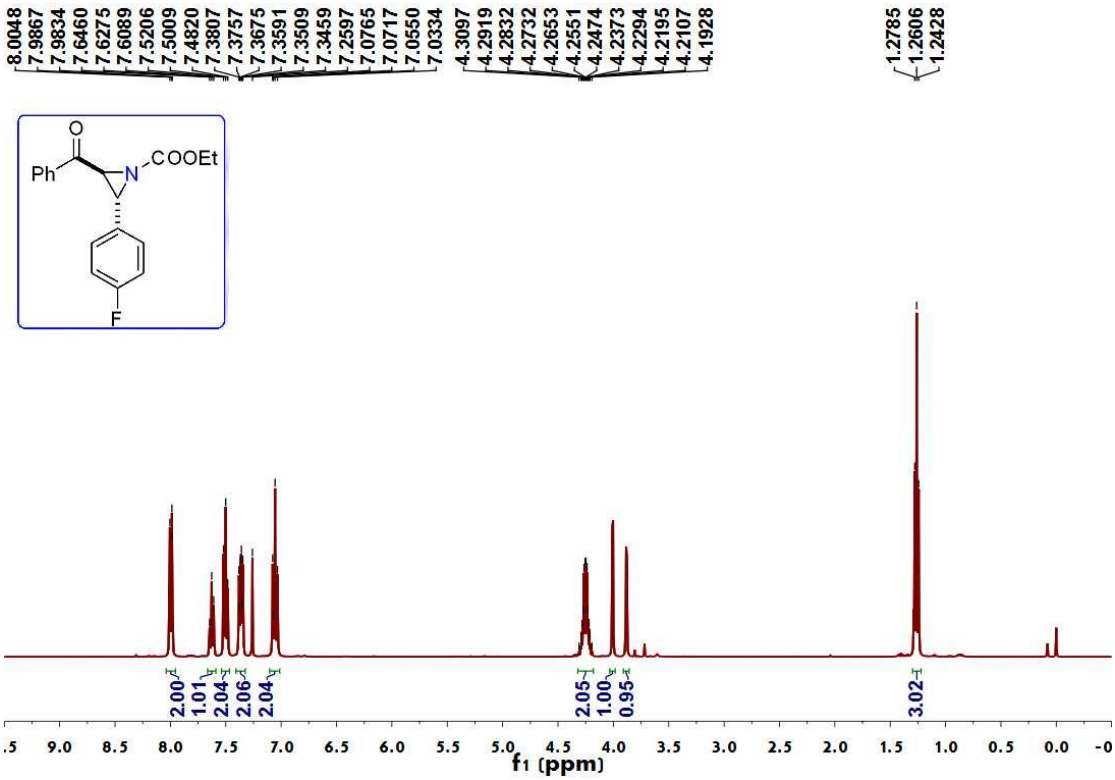
7.6172
7.5987
7.5102
7.4904
7.4715
7.2928
7.2727
7.2598
7.1907
7.1708
4.2960
4.2872
4.2764
4.2694
4.2584
4.2515
4.2406
4.2334
4.2228
4.2140
4.0344
4.0282
3.8677
3.8617
2.3604
1.2831
1.2653
1.2475
Ph
N
COOEt
1.94
1.05
2.01
1.79
2.03
2.02
0.98
0.92
3.00
3.11
f1 (ppm)
192.3174
160.5584
138.5364
136.5401
134.0773
132.9535
129.4864
128.9839
128.5643
126.4527
77.4773
77.1598
76.8422
62.8632
47.5727
47.3417
21.3377
14.4483
f1 (ppm)

2j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7.9834
7.6460
7.6275
7.6089
7.5206
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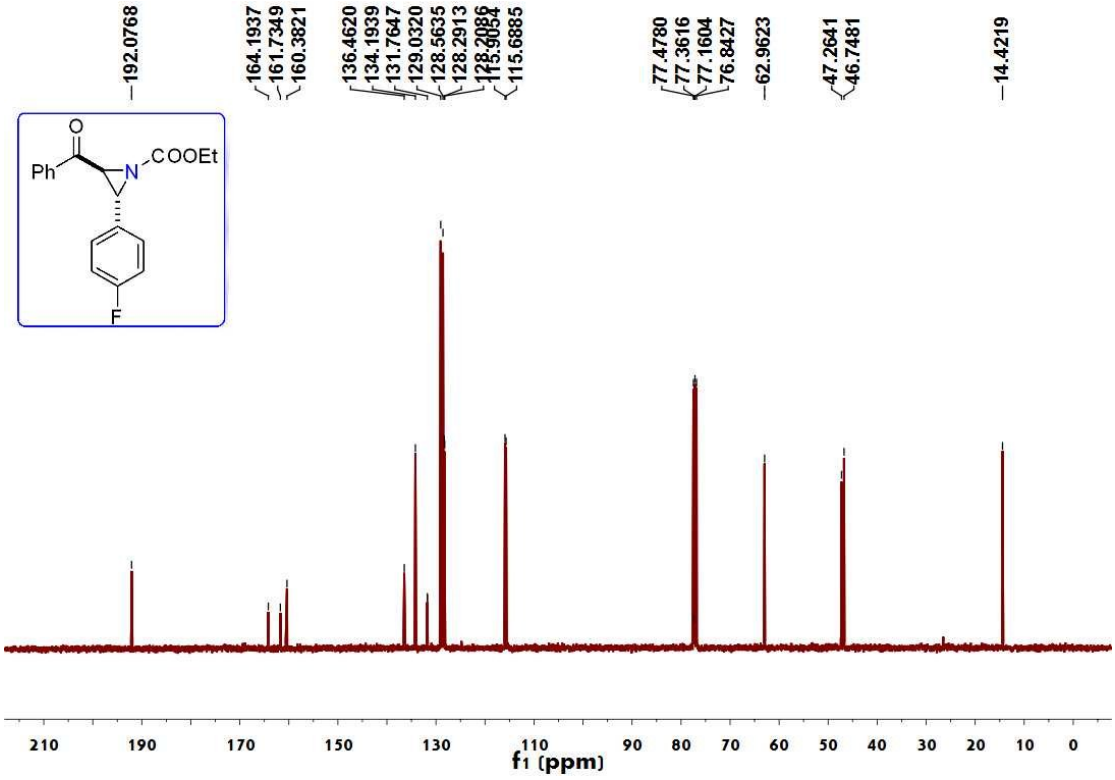
7.4820
7.3807
7.3757
7.3675
7.3591
7.3509
7.3459
7.2597
7.0765
7.0717
7.0550
7.0334
4.3097
4.2919
4.2832
4.2732
4.2653
4.2551
4.2474
4.2373
4.2294
4.2195
4.2107
4.1928
1.2785
1.2606
1.2428
Ph
N
COOEt
F
2.00
1.01
2.04
2.06
2.04
2.05
1.00
0.95
3.02
f1 (ppm)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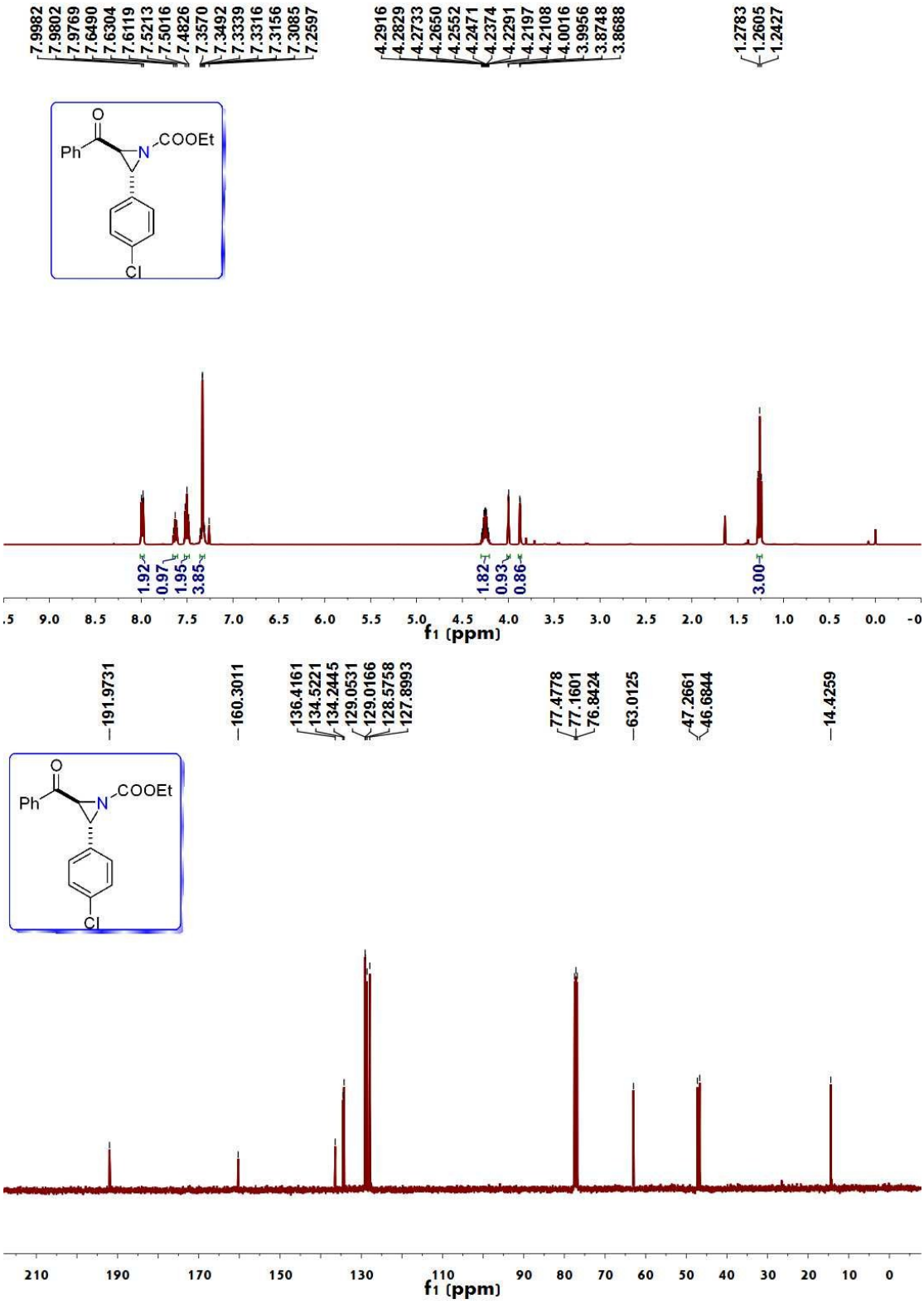
161.7349
160.3821
136.4620
134.1939
131.7647
129.0320
128.5635
128.2913
115.6885
77.4780
77.3616
77.1604
76.8427
62.9623
47.2641
46.7481
14.4219
Ph
N
COOEt
F
f1 (ppm)

2k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7.9802
7.9769
7.6490
7.6304
7.6119
7.5213
7.5016
7.4826
7.3570
7.3492
7.3339
7.3316
7.3156
7.3085
7.2597
4.2916
4.2829
4.2733
4.2650
4.2552
4.2471
4.2374
4.2291
4.2197
4.2108
4.0016
3.9956
3.8748
3.8688
1.2783
1.2605
1.2427
Ph
O
N
COOEt
Cl
1.92
0.97
1.95
3.85
1.82
0.93
0.86
3.00
f1 (ppm)
191.9731
160.3011
136.4161
134.5221
134.2445
129.0531
129.0166
128.5758
127.8993
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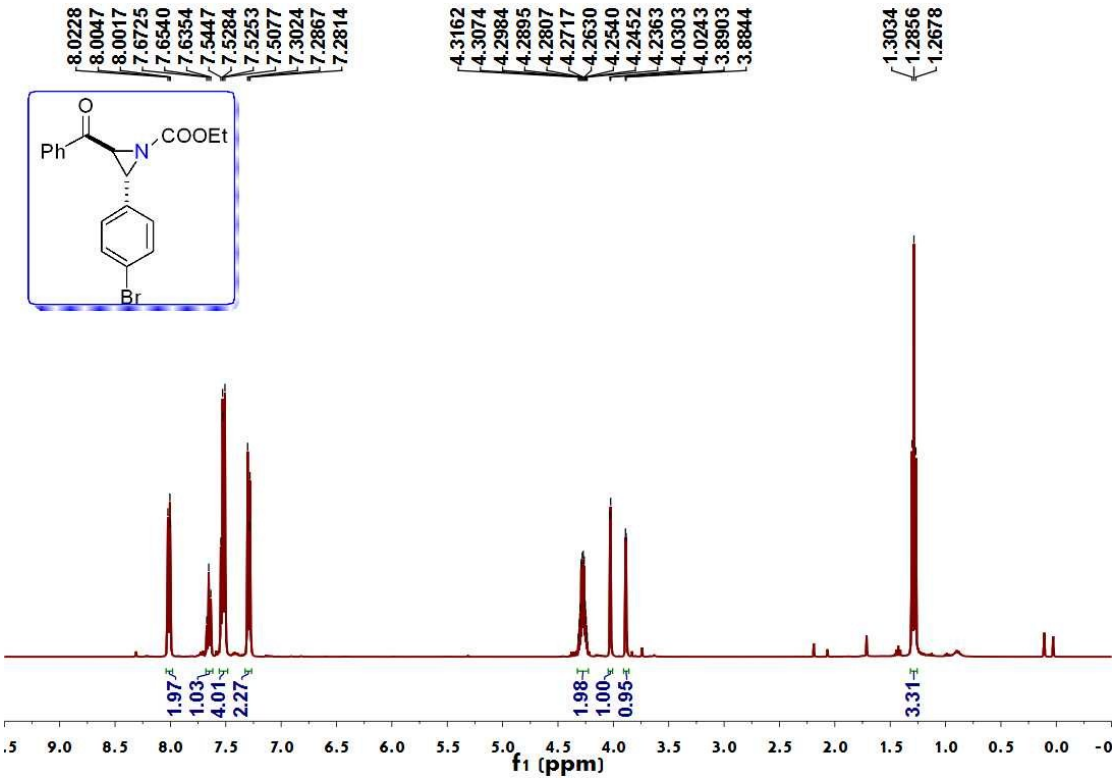
77.1601
76.8424
63.0125
47.2661
46.6844
14.4259
f1 (ppm)

2l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8.0017
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7.6354
7.5447
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7.5253
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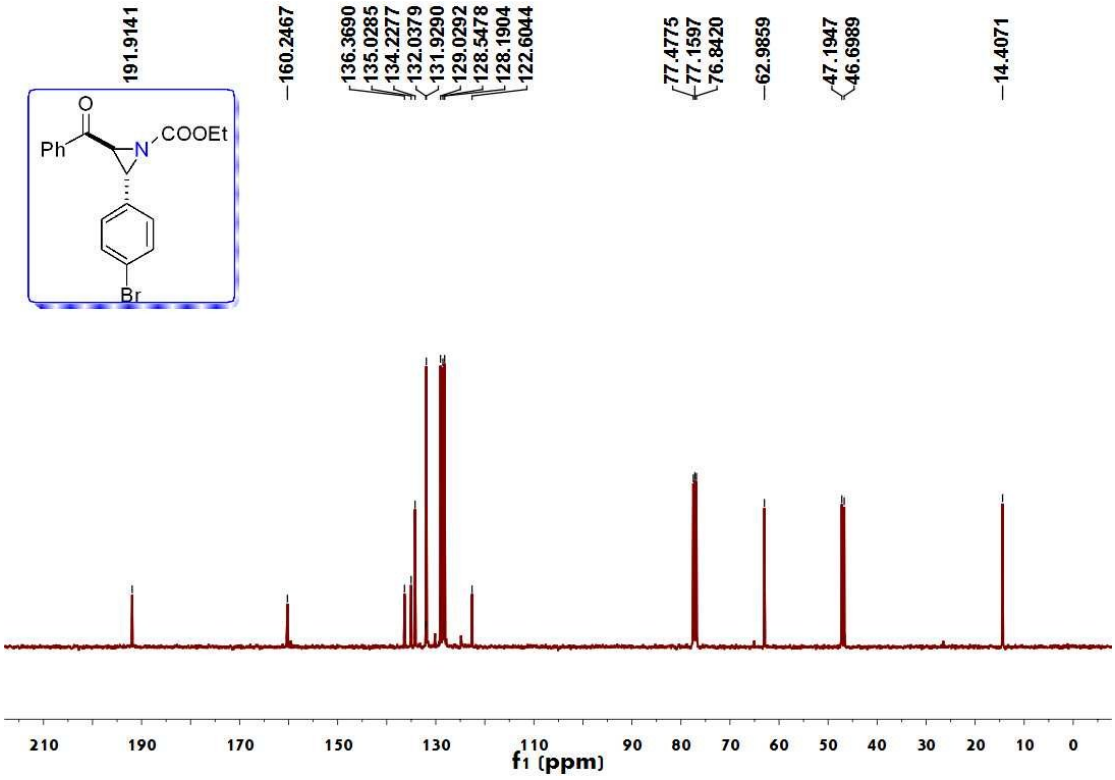
7.3024
7.2867
7.2814
4.3162
4.3074
4.2984
4.2895
4.2807
4.2717
4.2630
4.2540
4.2452
4.2363
4.0303
4.0243
3.8903
3.8844
1.3034
1.2856
1.2678
O
Ph
N
COOEt
Br
1.97
1.03
4.01
2.27
1.98
1.00
0.95
3.31
f1 (ppm)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135.0285
134.2277
132.0379
131.9290
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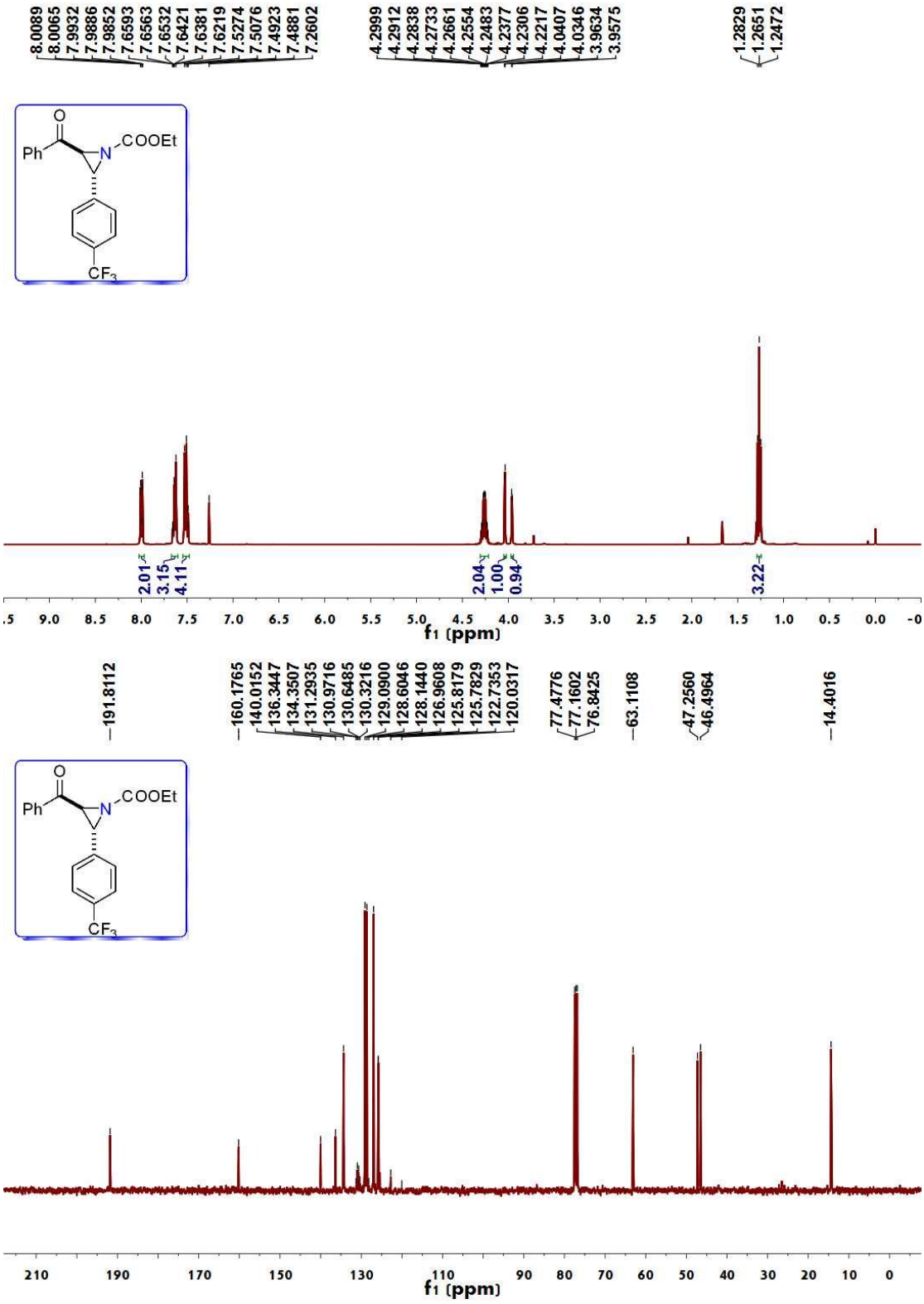
128.5478
128.1904
122.6044
77.4775
77.1597
76.8420
62.9859
47.1947
46.6989
14.4071
O
Ph
N
COOEt
Br
f1 (ppm)

2m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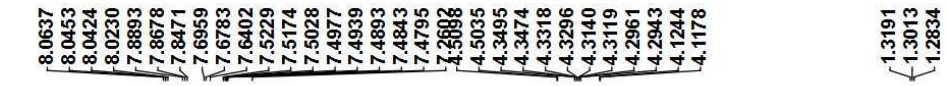
8.0065
7.9932
7.9886
7.9852
7.6593
7.6563
7.6532
7.6421
7.6381
7.6219
7.5274
7.5076
7.4923
7.4881
7.2602
4.2999
4.2912
4.2838
4.2733
4.2661
4.2554
4.2483
4.2377
4.2306
4.2217
4.0407
4.0346
3.9634
3.9575
1.2829
1.2651
1.2472
Ph
O
N
COOEt
CF3
2.01
3.15
4.11
2.04
1.00
0.94
3.22
f1 (ppm)
191.8112
160.1765
140.0152
136.3447
134.3507
131.2935
130.9716
130.6485
130.3216
129.0900
128.6046
128.1440
126.9608
125.8179
125.7829
122.7353
120.0317
77.4776
77.1602
76.8425
63.1108
47.2560
46.4964
14.4016
f1 (ppm)

2n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8.0453
8.0424
8.0230
7.8893
7.8678
7.8471
7.6959
7.6783
7.6402
7.5229
7.5174
7.5028
7.4977
7.4939
7.4893
7.4843
7.4795
7.2602
4.5098
4.5035
4.3495
4.3474
4.3318
4.3296
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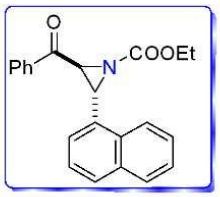
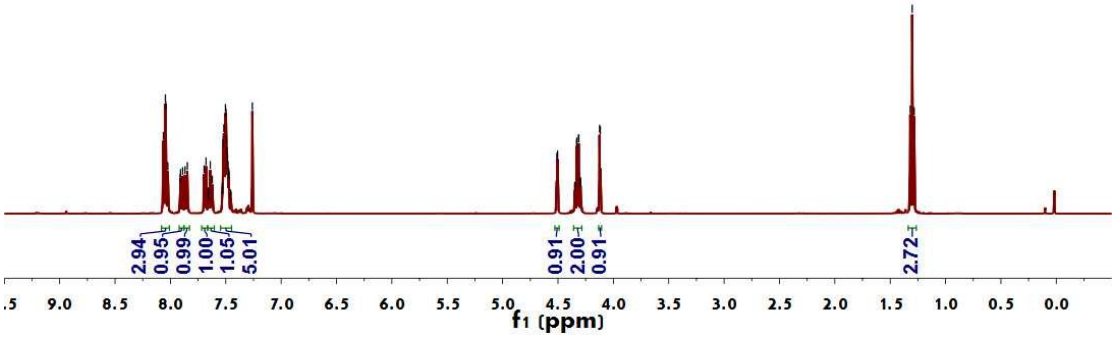
4.3119
4.2961
4.2943
4.1244
4.1178
1.3191
1.3013
1.2834


O
Ph
N
COOEt


2.94
0.95
0.99
1.00
1.05
5.01
0.91
2.00
0.91
2.72
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
f1 (ppm)


192.1875
160.5490
136.5331
134.1519
133.4808
133.3785
133.2972
129.0321
128.7388
128.5985
128.0244
127.9180
126.6970
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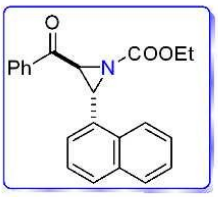
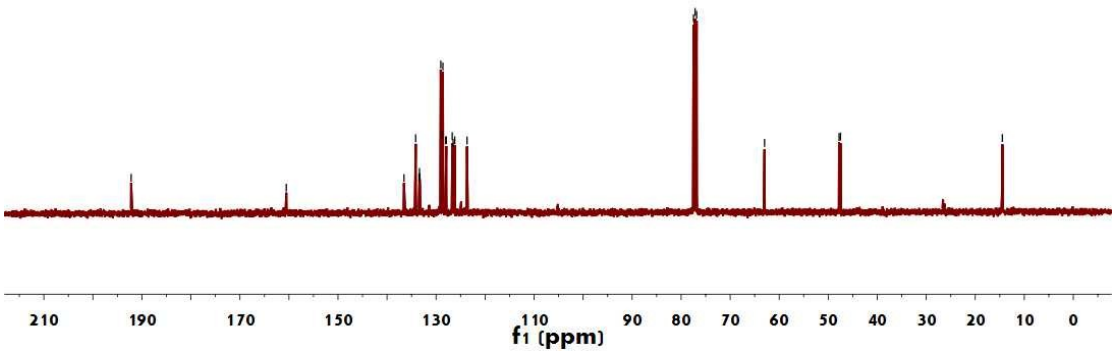
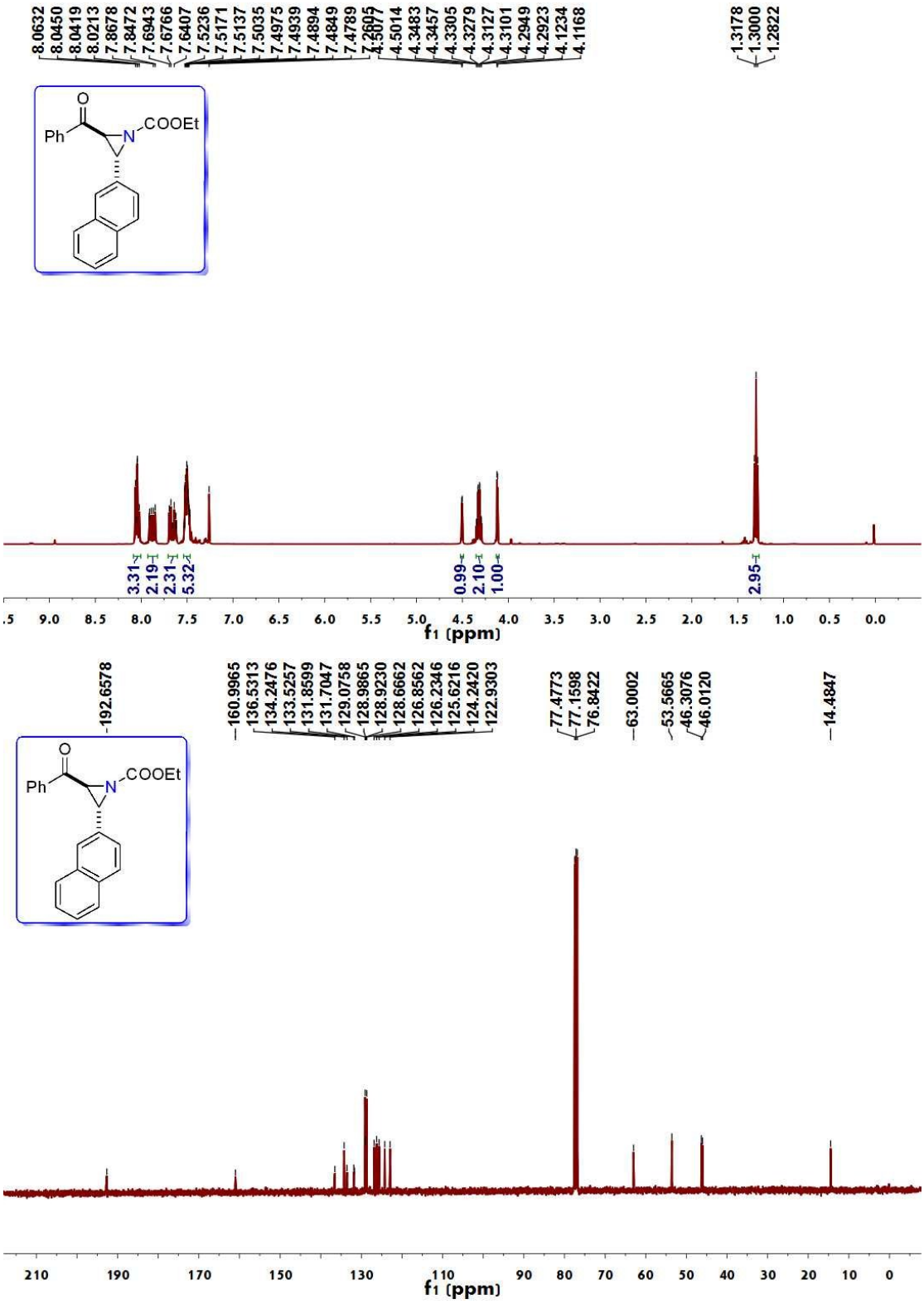
76.8423
62.9868
47.7847
47.5037
14.4769


O
Ph
N
COOEt


210
190
170
150
130
110
90
80
70
60
50
40
30
20
10
0
f1 (ppm)

2o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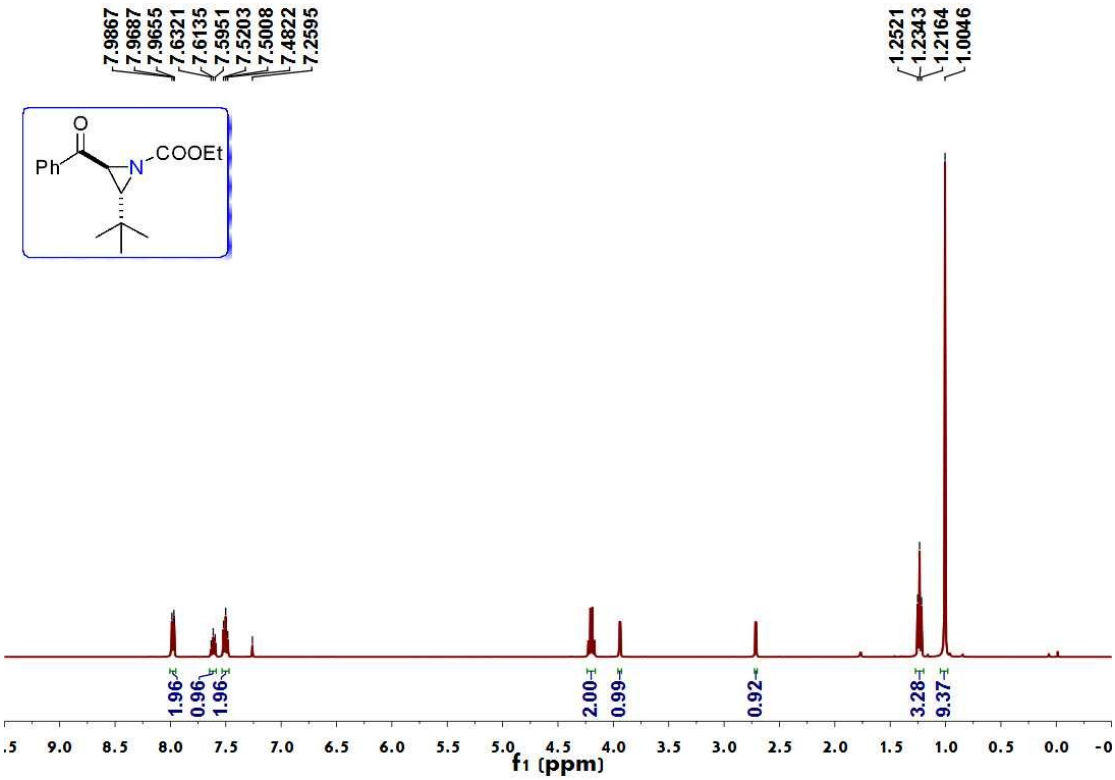
8.0419
8.0213
7.8678
7.8472
7.6943
7.6766
7.6407
7.5236
7.5171
7.5137
7.5035
7.4975
7.4939
7.4894
7.4849
7.4789
7.2605
4.5077
4.5014
4.3483
4.3457
4.3305
4.3279
4.3127
4.3101
4.2949
4.2923
4.1234
4.1168
1.3178
1.3000
1.2822
Ph
O
N
COOEt
3.31
2.19
2.31
5.32
0.99
2.10
1.00
2.95
f1 (ppm)
192.6578
160.9965
136.5313
134.2476
133.5257
131.8599
131.7047
129.0758
128.9865
128.9230
128.6662
126.8562
126.2346
125.6216
124.2420
122.9303
77.4773
77.1598
76.8422
63.0002
53.5665
46.3076
46.0120
14.4847
f1 (ppm)

2p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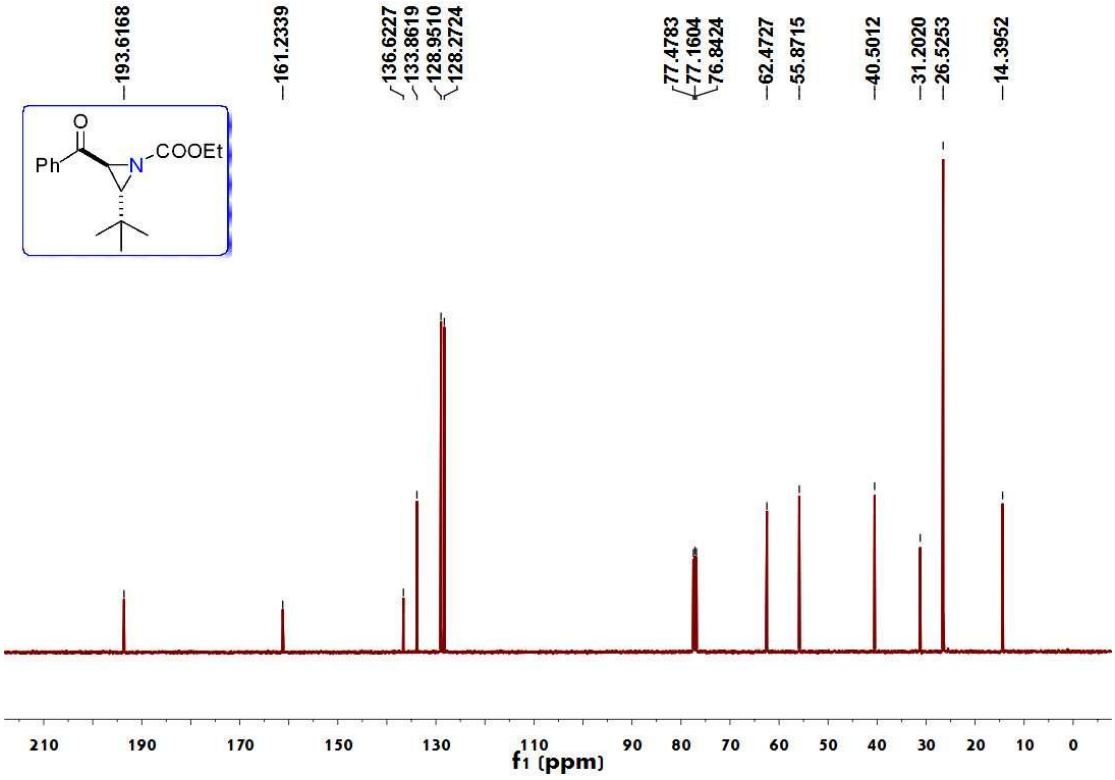
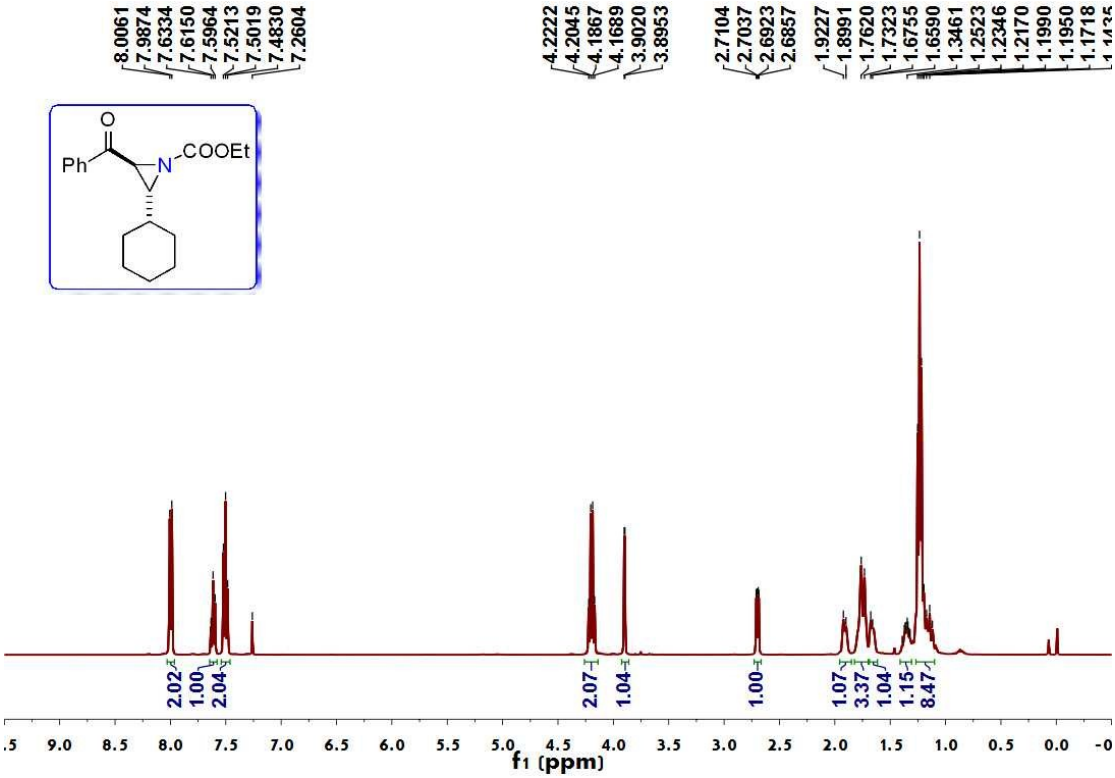
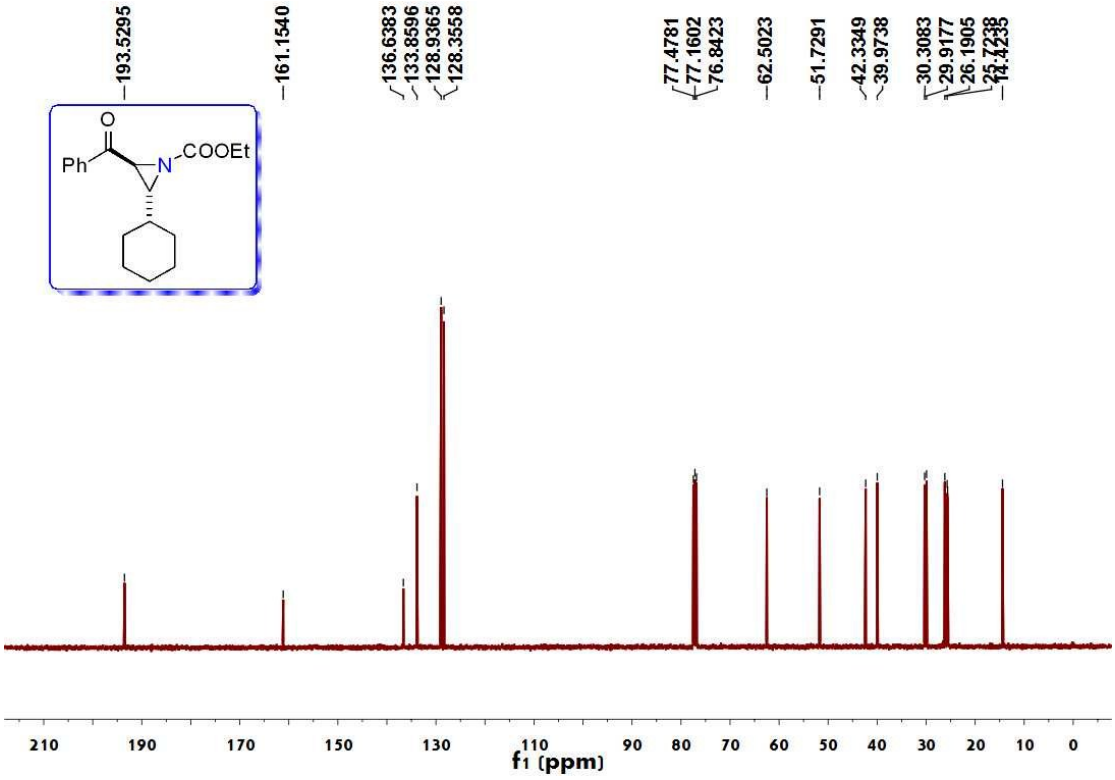
7.9655
7.6321
7.6135
7.5951
7.5203
7.5008
7.4822
7.2595
1.2521
1.2343
1.2164
1.0046
Ph
N
COOEt
1.96
0.96
1.96
2.00
0.99
0.92
3.28
9.37
f1 (ppm)


193.6168
161.2339
136.6227
133.8619
128.9510
128.2724
77.4783
77.1604
76.8424
62.4727
55.8715
40.5012
31.2020
26.5253
14.3952
Ph
N
COOEt
f1 (ppm)

2q


8.0061
7.9874
7.6334
7.6150
7.5964
7.5213
7.5019
7.4830
7.2604
4.2222
4.2045
4.1867
4.1689
3.9020
3.8953
2.7104
2.7037
2.6923
2.6857
1.9227
1.8991
1.7620
1.7323
1.6755
1.6590
1.3461
1.2523
1.2346
1.2170
1.1990
1.1950
1.1718
Ph
O
N
COOEt
2.02
1.00
2.04
2.07
1.04
1.00
1.07
3.37
1.04
1.15
8.47
f1 (ppm)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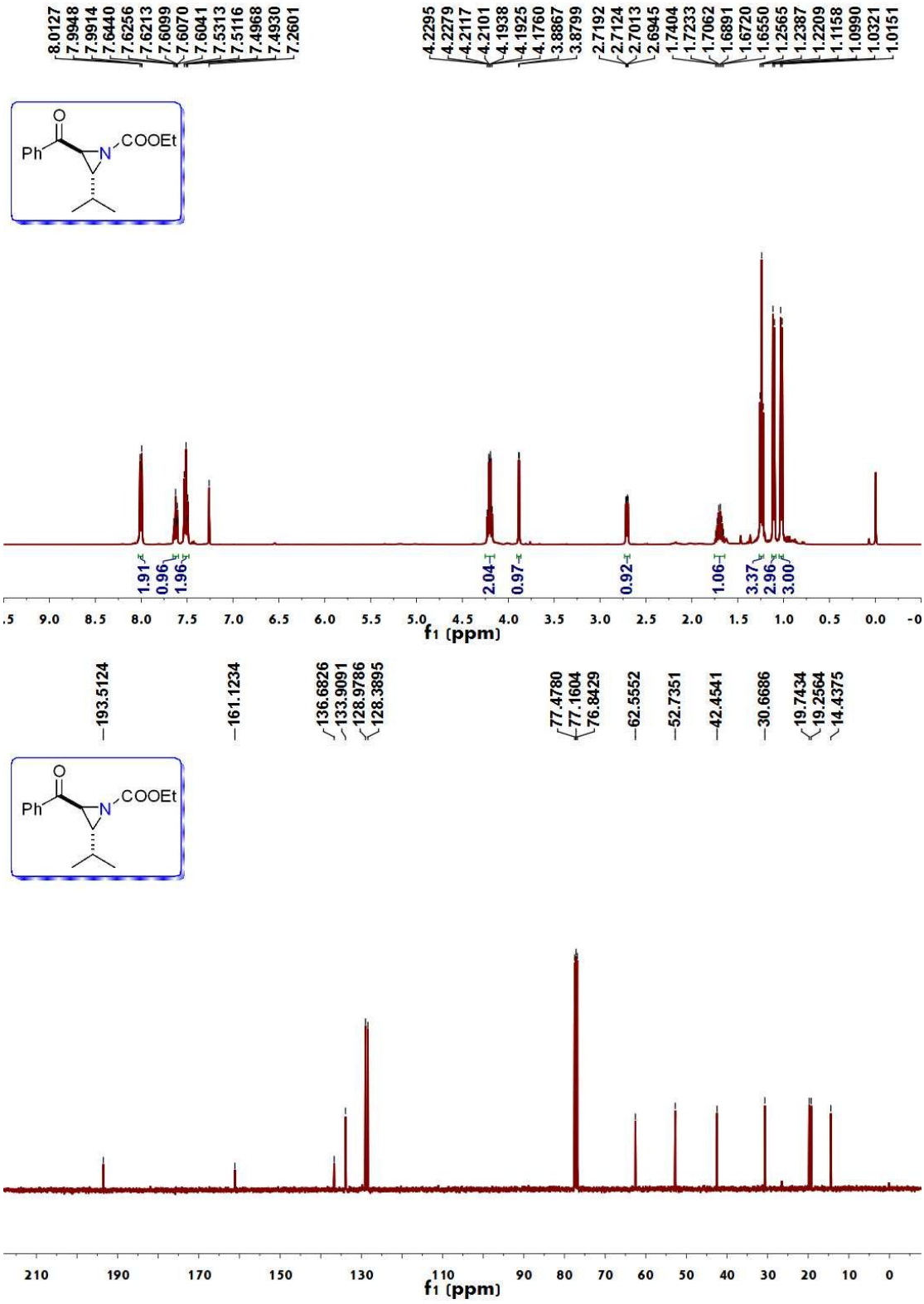
128.9365
128.3558
77.4781
77.1602
76.8423
62.5023
51.7291
42.3349
39.9738
30.3083
29.9177
26.1905
25.7238
14.4235
Ph
O
N
COOEt
f1 (ppm)

2r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7.6099
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7.6041
7.5313
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7.4968
7.4930
7.2601
4.2295
4.2279
4.2117
4.2101
4.1938
4.1925
4.1760
3.8867
3.8799
2.7192
2.7124
2.7013
2.6945
1.7404
1.7233
1.7062
1.6891
1.6720
1.6550
1.2565
1.2387
1.2209
1.1158
1.0990
1.0321
1.0151
Ph
O
N
COOEt
1.91
0.96
1.96
2.04
0.97
0.92
1.06
3.37
2.96
3.00
f1 (ppm)
193.5124
161.1234
136.6826
133.9091
128.9786
128.3895
77.4780
77.1604
76.8429
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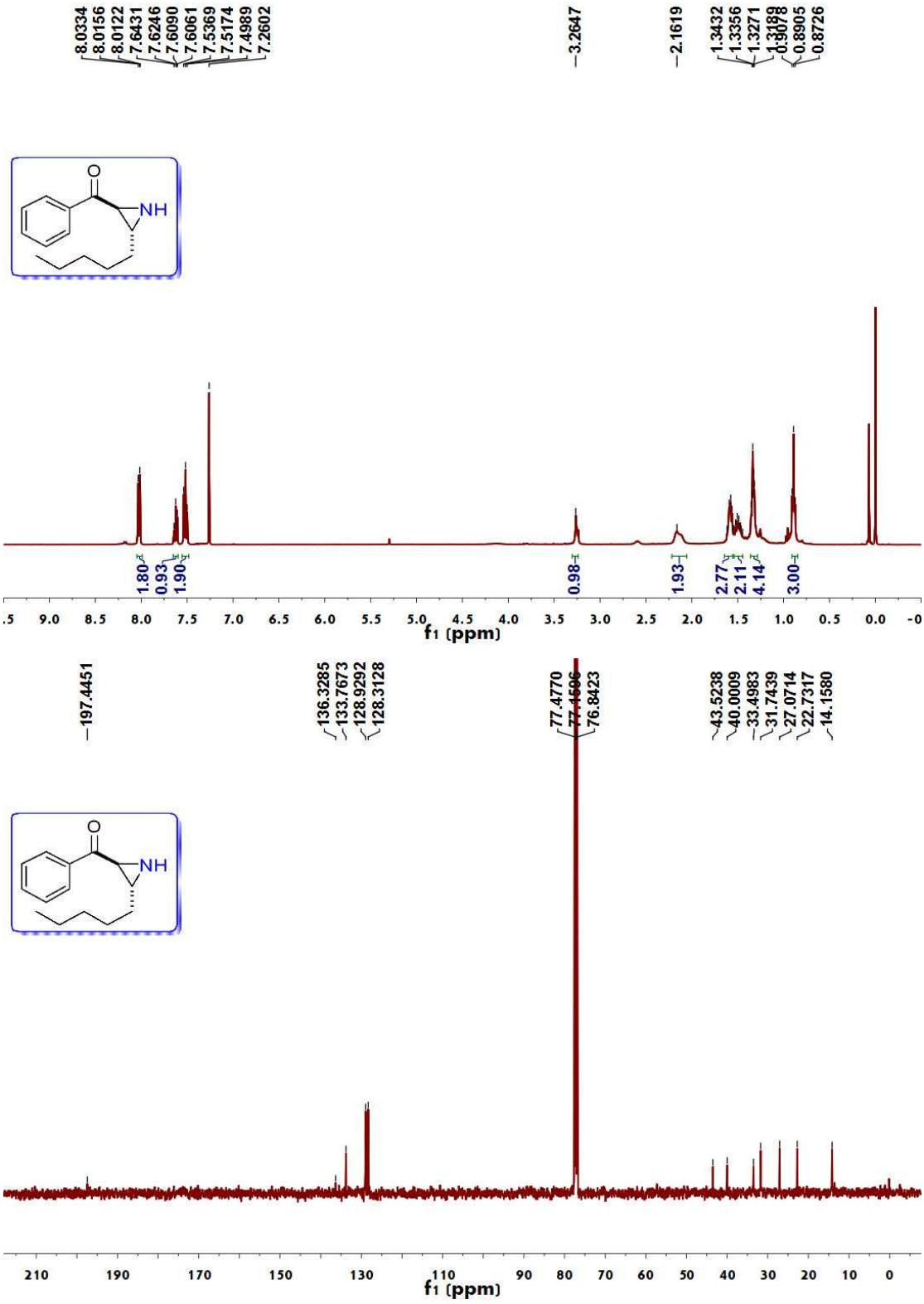
52.7351
42.4541
30.6686
19.7434
19.2564
14.4375
f1 (ppm)

2s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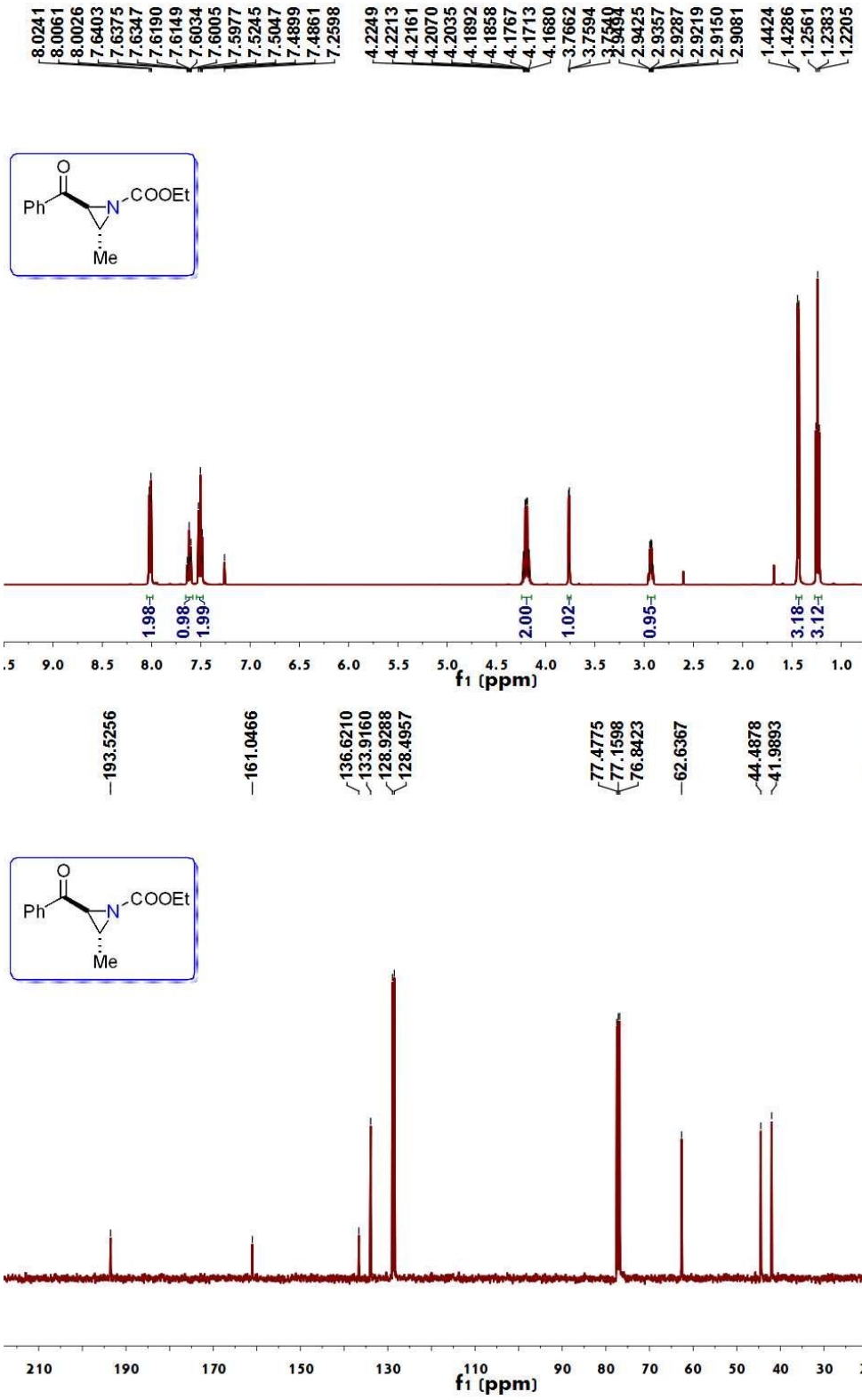
8.0122
7.6431
7.6246
7.6090
7.6061
7.5369
7.5174
7.4989
7.2602
3.2647
2.1619
1.3432
1.3356
1.3271
0.9078
0.8905
0.8726
NH
1.80
0.93
1.90
0.98
1.93
2.77
2.11
4.14
3.00
f1 (ppm)
197.4451
136.3285
133.7673
128.9292
128.3128
77.4770
77.1606
76.8423
43.5238
40.0009
33.4983
31.7439
27.0714
22.7317
14.1580
NH
f1 (ppm)

2t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8.0061
8.0026
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7.6190
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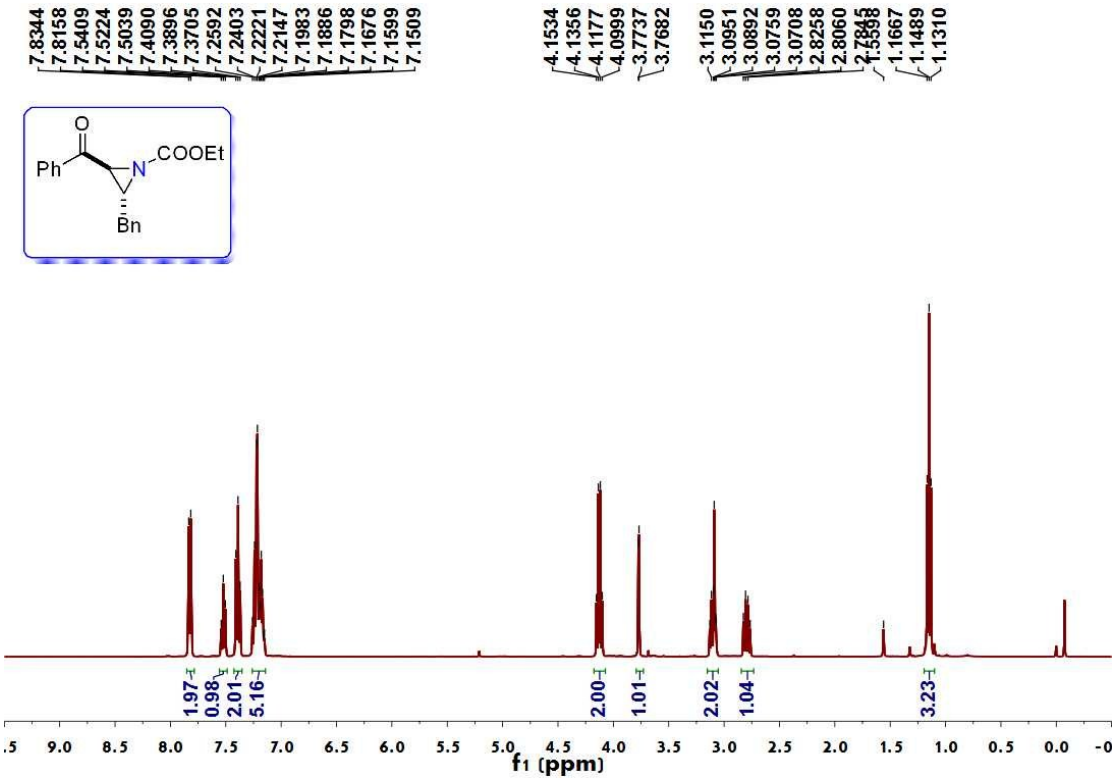
7.6034
7.6005
7.5977
7.5245
7.5047
7.4899
7.4861
7.2598
4.2249
4.2213
4.2161
4.2070
4.2035
4.1892
4.1858
4.1767
4.1713
4.1680
3.7662
3.7594
2.9425
2.9357
2.9287
2.9219
2.9150
2.9081
1.4424
1.4286
1.2561
1.2383
1.2205
Ph
N
COOEt
Me
1.98
0.98
1.99
2.00
1.02
0.95
3.18
3.12
f1 (ppm)
193.5256
161.0466
136.6210
133.9160
128.9288
128.4957
77.4775
77.1598
76.8423
62.6367
44.4878
41.9893
17.0594
14.4514
f1 (ppm)

2u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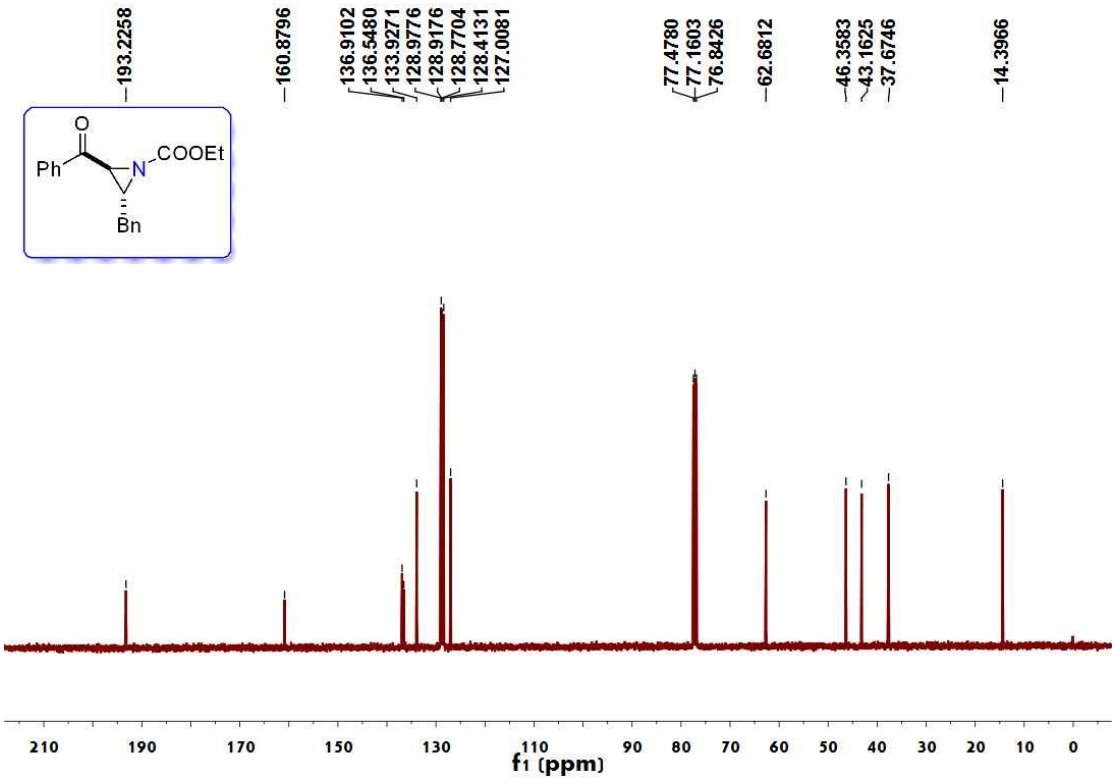
7.2592
7.2403
7.2221
7.2147
7.1983
7.1886
7.1798
7.1676
7.1599
7.1509
4.1534
4.1356
4.1177
4.0999
3.7737
3.7682
3.1150
3.0951
3.0892
3.0759
3.0708
2.8258
2.8060
1.5598
1.1667
1.1489
1.1310
Ph
O
N
COOEt
Bn
1.97
0.98
2.01
5.16
2.00
1.01
2.02
1.04
3.23
f1 (ppm)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136.9102
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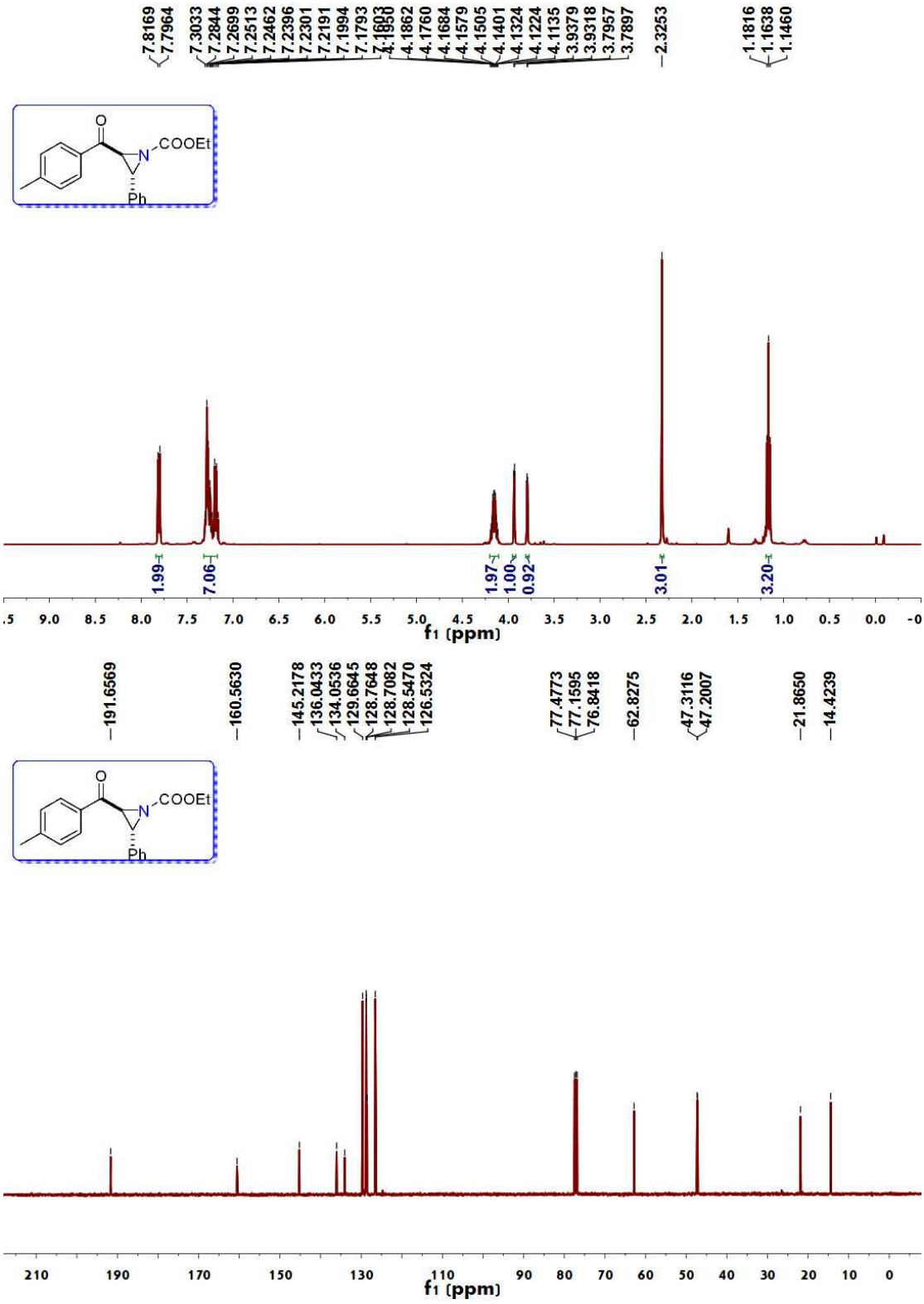
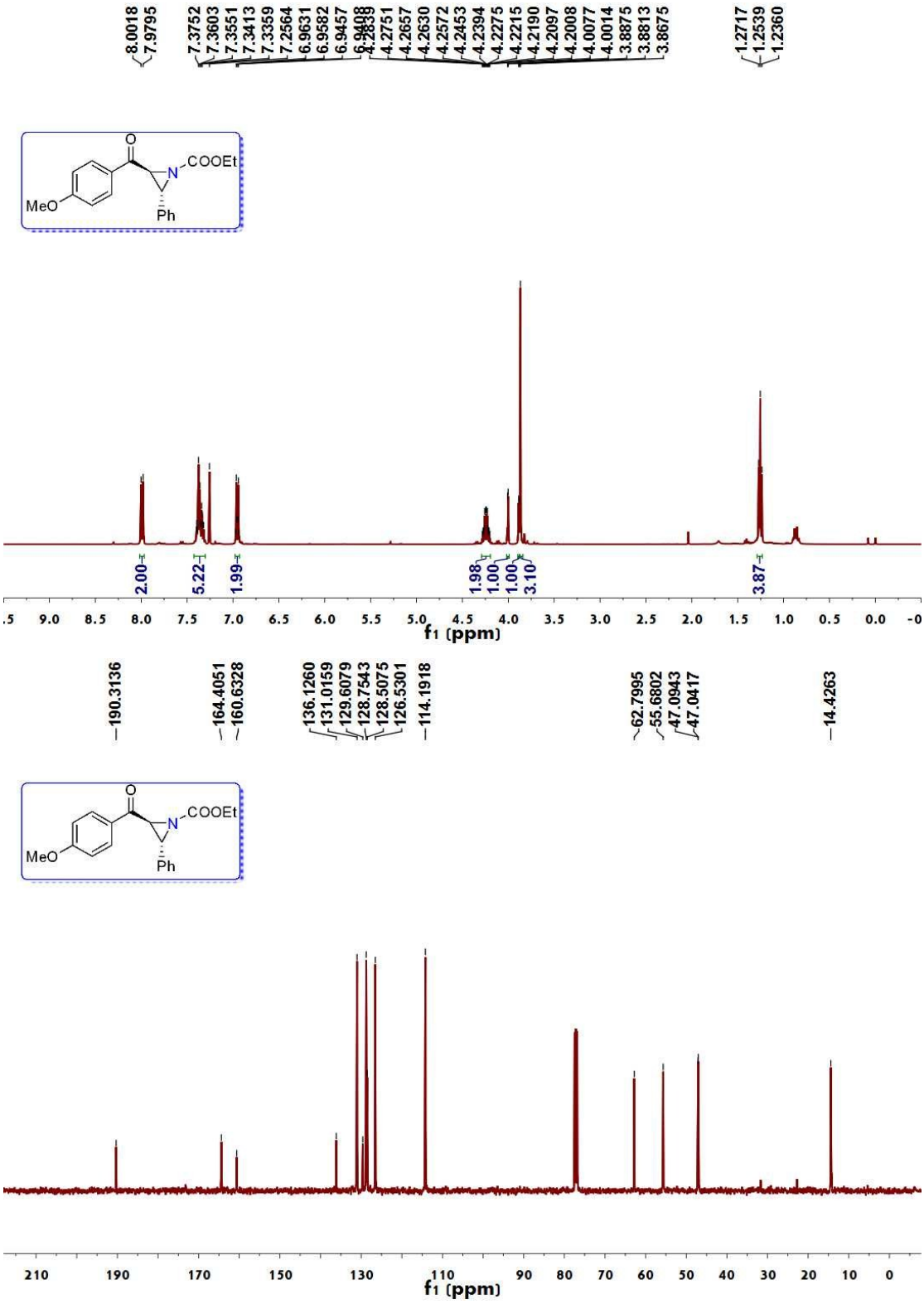
77.4780
77.1603
76.8426
62.6812
46.3583
43.1625
37.6746
14.3966
Ph
O
N
COOEt
Bn
f1 (ppm)

4a


7.8169
7.7964
7.3033
7.2844
7.2699
7.2513
7.2462
7.2396
7.2301
7.2191
7.1994
7.1793
4.1862
4.1760
4.1684
4.1579
4.1505
4.1401
4.1324
4.1224
4.1135
3.9379
3.9318
3.7957
3.7897
2.3253
1.1816
1.1638
1.1460
COOEt
Ph
1.99
7.06
1.97
1.00
0.92
3.01
3.20
f1 (ppm)
191.6569
160.5630
145.2178
136.0433
134.0536
129.6645
128.7648
128.7082
128.5470
126.5324
77.4773
77.1595
76.8418
62.8275
47.3116
47.2007
21.8650
14.4239
f1 (ppm)

4b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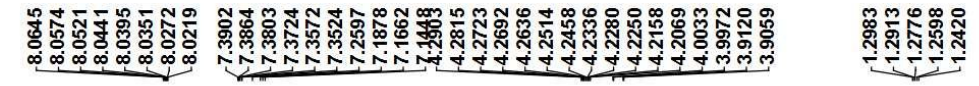
7.9795
7.3752
7.3603
7.3551
7.3413
7.3359
7.2564
6.9631
6.9582
6.9457
4.2751
4.2657
4.2630
4.2572
4.2453
4.2394
4.2275
4.2215
4.2190
4.2097
4.2008
4.0077
4.0014
3.8875
3.8813
3.8675
1.2717
1.2539
1.2360
COOEt
MeO
Ph
2.00
5.22
1.99
1.98
1.00
1.00
3.10
3.87
f1 (ppm)
190.3136
164.4051
160.6328
136.1260
131.0159
129.6079
128.7543
128.5075
126.5301
114.1918
62.7995
55.6802
47.0943
47.0417
14.4263
COOEt
MeO
Ph
f1 (ppm)

4c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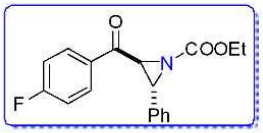
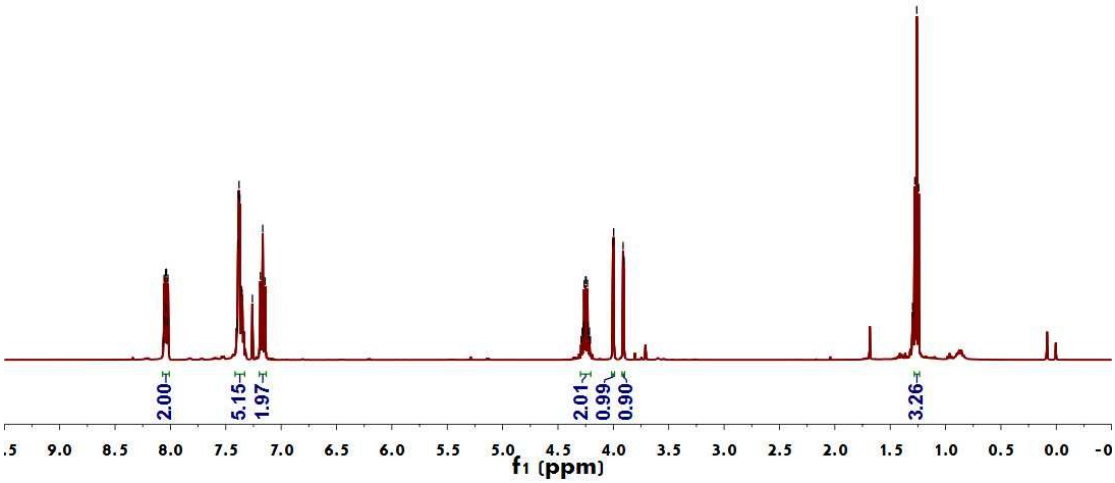
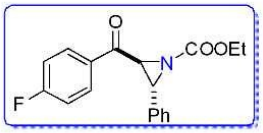
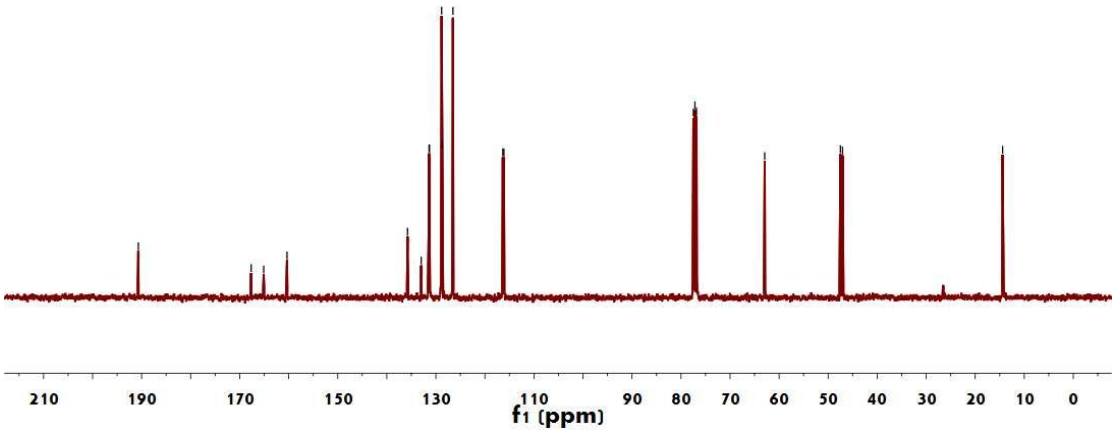
8.0521
8.0441
8.0395
8.0351
8.0272
8.0219
7.3902
7.3864
7.3803
7.3724
7.3572
7.3524
7.2597
7.1878
7.1662
4.2815
4.2723
4.2692
4.2636
4.2514
4.2458
4.2336
4.2280
4.2250
4.2158
4.2069
4.0033
3.9972
3.9120
3.9059
1.2983
1.2913
1.2776
1.2598
1.2420


O
N
COOEt
F
Ph

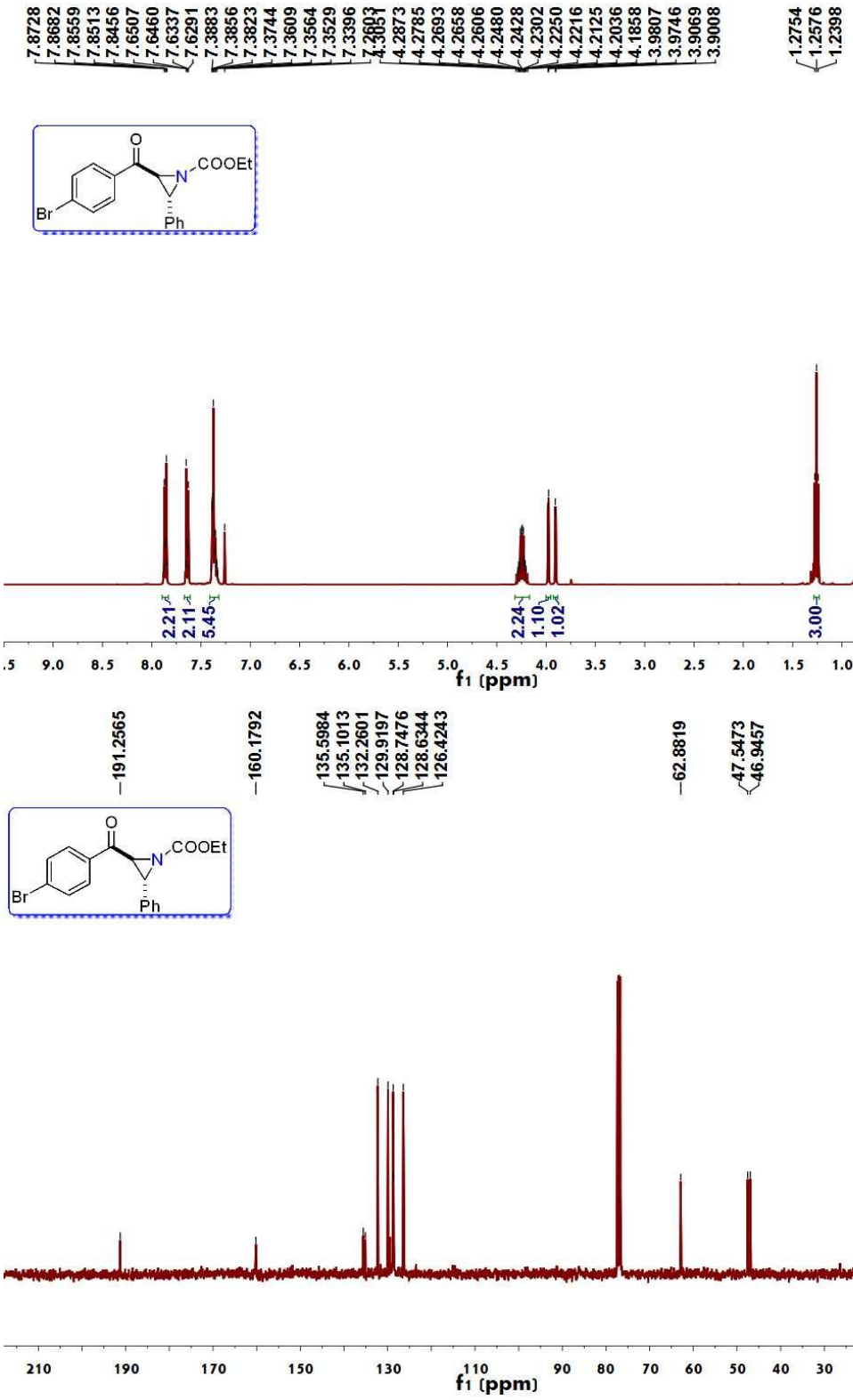

2.00
5.15
1.97
2.01
0.99
0.90
3.26
f1 (ppm)


190.6749
167.6555
165.1048
160.3475
135.7712
132.9883
131.3891
131.2945
128.8253
128.6862
126.5177
116.3391
116.1200
77.4784
77.1604
76.8429
62.9316
47.4944
47.0525
14.4127


O
N
COOEt
F
Ph


f1 (ppm)

4d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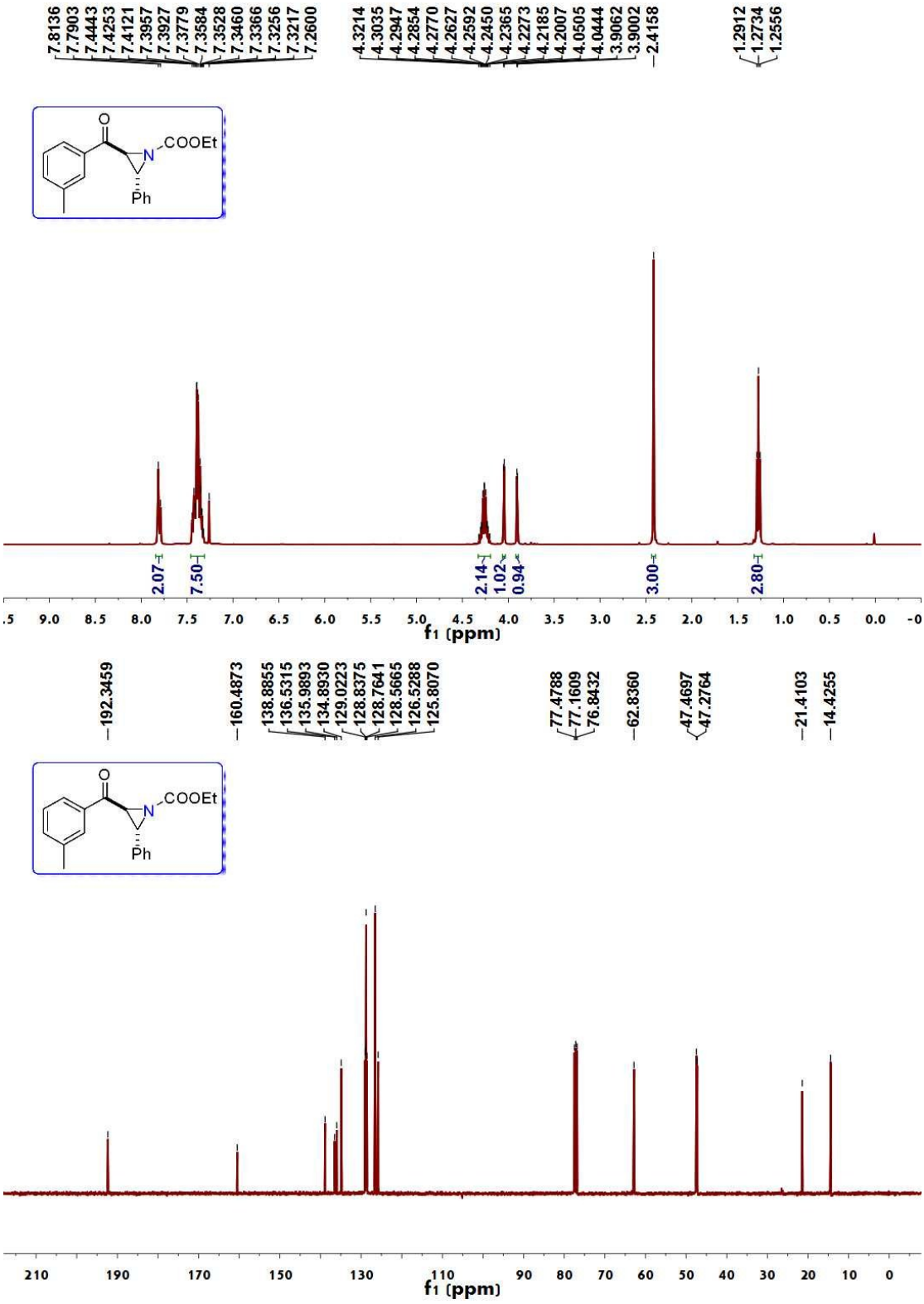
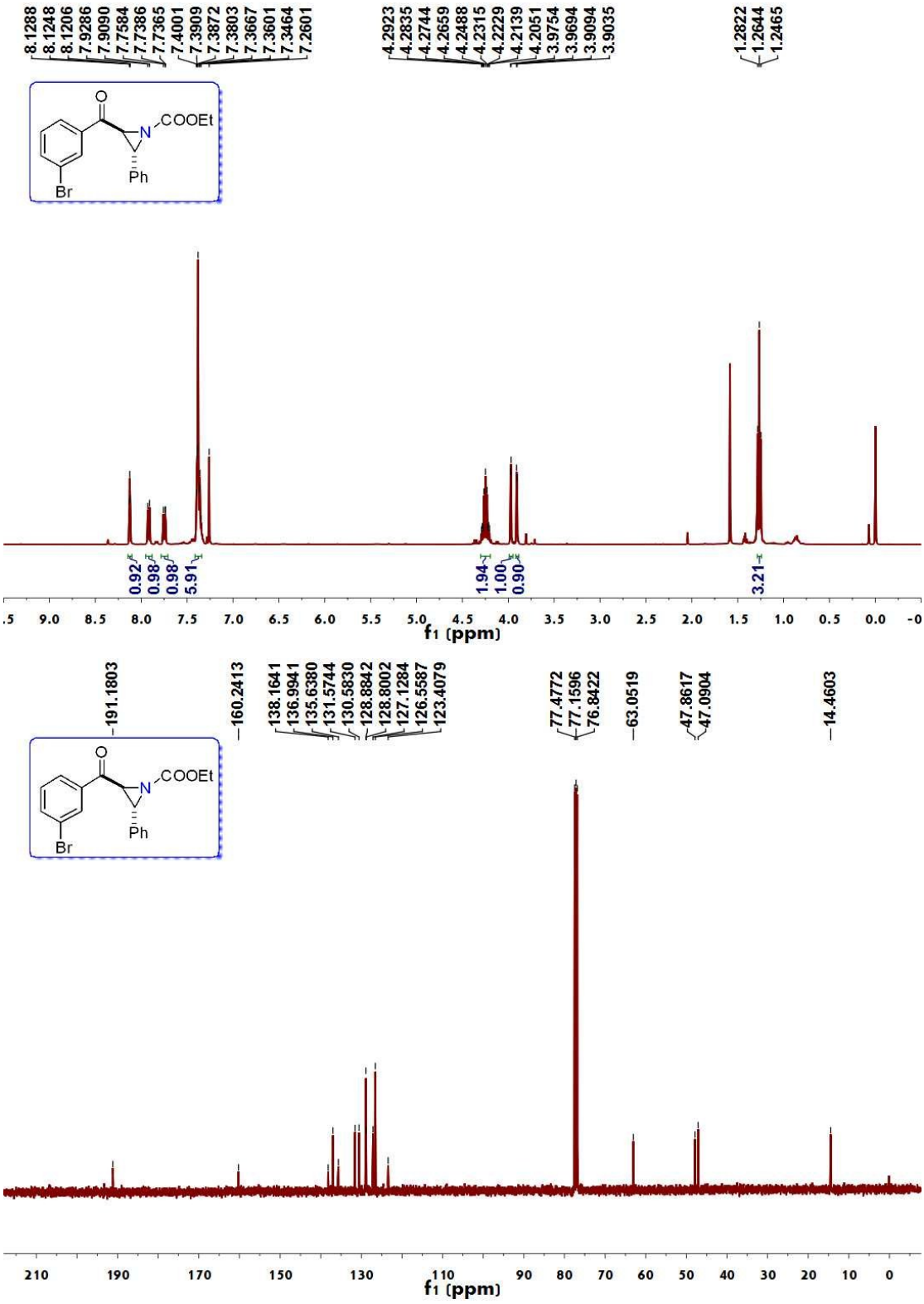
7.8682
7.8559
7.8513
7.8456
7.6507
7.6460
7.6337
7.6291
7.3883
7.3856
7.3823
7.3744
7.3609
7.3564
7.3529
7.3396
4.3051
4.2873
4.2785
4.2693
4.2658
4.2606
4.2480
4.2428
4.2302
4.2250
4.2216
4.2125
4.2036
4.1858
3.9807
3.9746
3.9069
3.9008
1.2754
1.2576
1.2398
O
N
COOEt
Br
Ph
2.21
2.11
5.45
2.24
1.10
1.02
3.00
f1 (ppm)
191.2565
160.1792
135.5984
135.1013
132.2601
129.9197
128.7476
128.6344
126.4243
62.8819
47.5473
46.9457
14.3259
f1 (ppm)

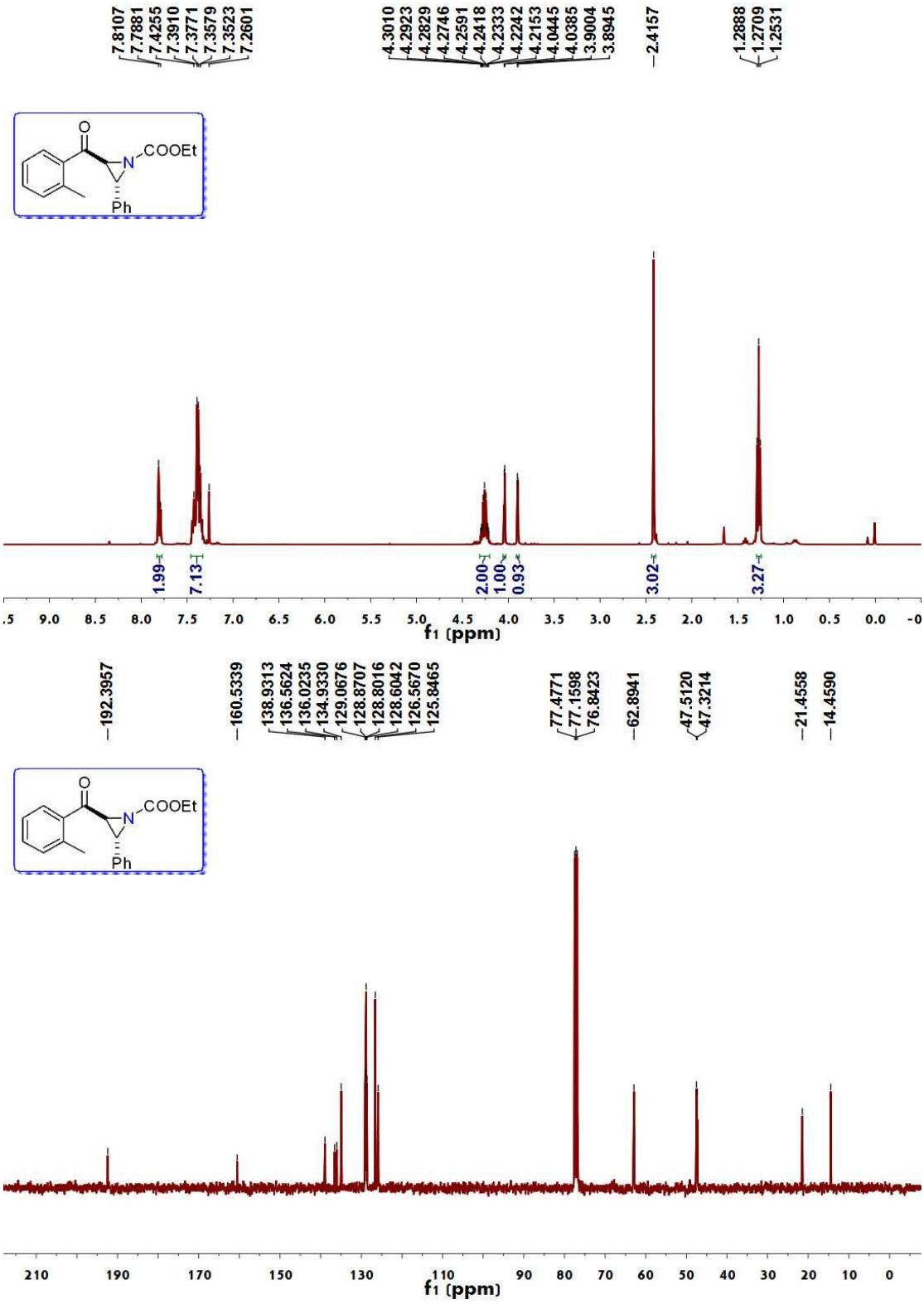
4e


7.8136
7.7903
7.4443
7.4253
7.4121
7.3957
7.3927
7.3779
7.3584
7.3528
7.3460
7.3366
7.3256
7.3217
7.2600
4.3214
4.3035
4.2947
4.2854
4.2770
4.2627
4.2592
4.2450
4.2365
4.2273
4.2185
4.2007
4.0505
4.0444
3.9062
3.9002
2.4158
1.2912
1.2734
1.2556
COOEt
Ph
2.07
7.50
2.14
1.02
0.94
3.00
2.80
f1 (ppm)
192.3459
160.4873
138.8855
136.5315
135.9893
134.8930
129.0223
128.8375
128.7641
128.5665
126.5288
125.8070
77.4788
77.1609
76.8432
62.8360
47.4697
47.2764
21.4103
14.4255
COOEt
Ph
f1 (ppm)

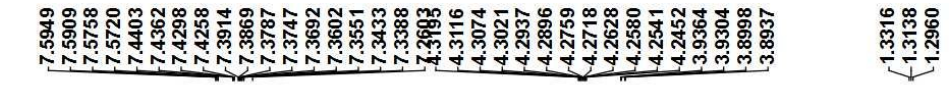
4f


8.1288
8.1248
8.1206
7.9286
7.9090
7.7584
7.7386
7.7365
7.4001
7.3909
7.3872
7.3803
7.3667
7.3601
7.3464
7.2601
4.2923
4.2835
4.2744
4.2659
4.2488
4.2315
4.2229
4.2139
4.2051
3.9754
3.9694
3.9094
3.9035
1.2822
1.2644
1.2465
COOEt
Ph
Br
0.92
0.98
0.98
5.91
1.94
1.00
0.90
3.21
f1 (ppm)
191.1803
160.2413
138.1641
136.9941
135.6380
131.5744
130.5830
128.8842
128.8002
127.1284
126.5587
123.4079
77.4772
77.1596
76.8422
63.0519
47.8617
47.0904
14.4603
f1 (ppm)

4g


7.8107
7.7881
7.4255
7.3910
7.3771
7.3579
7.3523
7.2601
4.3010
4.2923
4.2829
4.2746
4.2591
4.2418
4.2333
4.2242
4.2153
4.0445
4.0385
3.9004
3.8945
2.4157
1.2888
1.2709
1.2531
COOEt
Ph
1.99
7.13
2.00
1.00
0.93
3.02
3.27
f1 (ppm)
192.3957
160.5339
138.9313
136.5624
136.0235
134.9330
129.0676
128.8707
128.8016
128.6042
126.5670
125.8465
77.4771
77.1598
76.8423
62.8941
47.5120
47.3214
21.4558
14.4590
COOEt
Ph
f1 (ppm)

4h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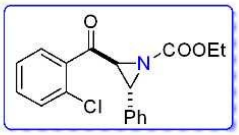
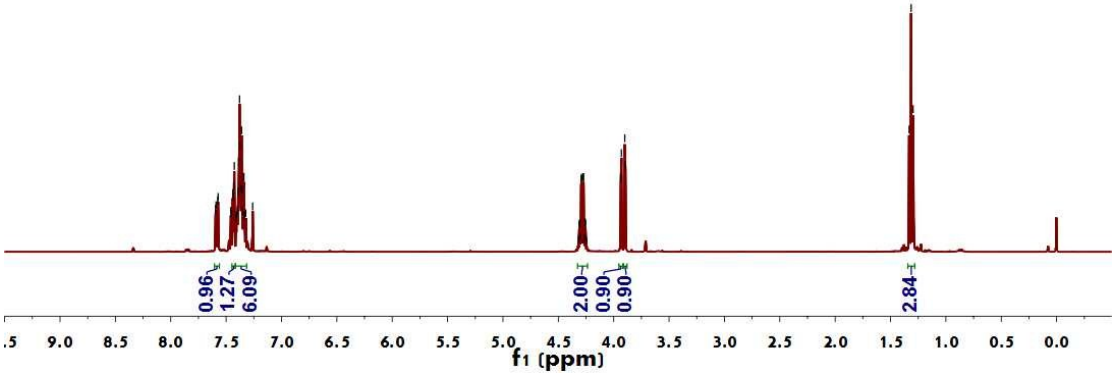
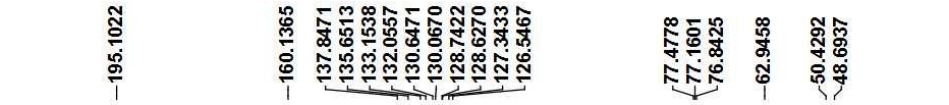
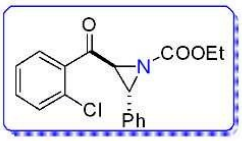
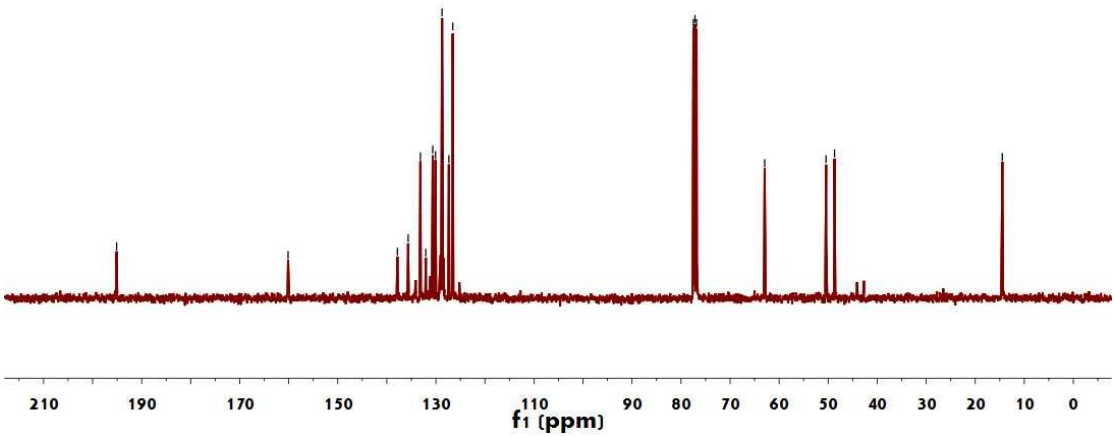
7.5909
7.5758
7.5720
7.4403
7.4362
7.4298
7.4258
7.3914
7.3869
7.3787
7.3747
7.3692
7.3602
7.3551
7.3433
7.3388
4.3116
4.3074
4.3021
4.2937
4.2896
4.2759
4.2718
4.2628
4.2580
4.2541
4.2452
3.9364
3.9304
3.8998
3.8937
1.3316
1.3138
1.2960


O
N
COOEt
Cl
Ph

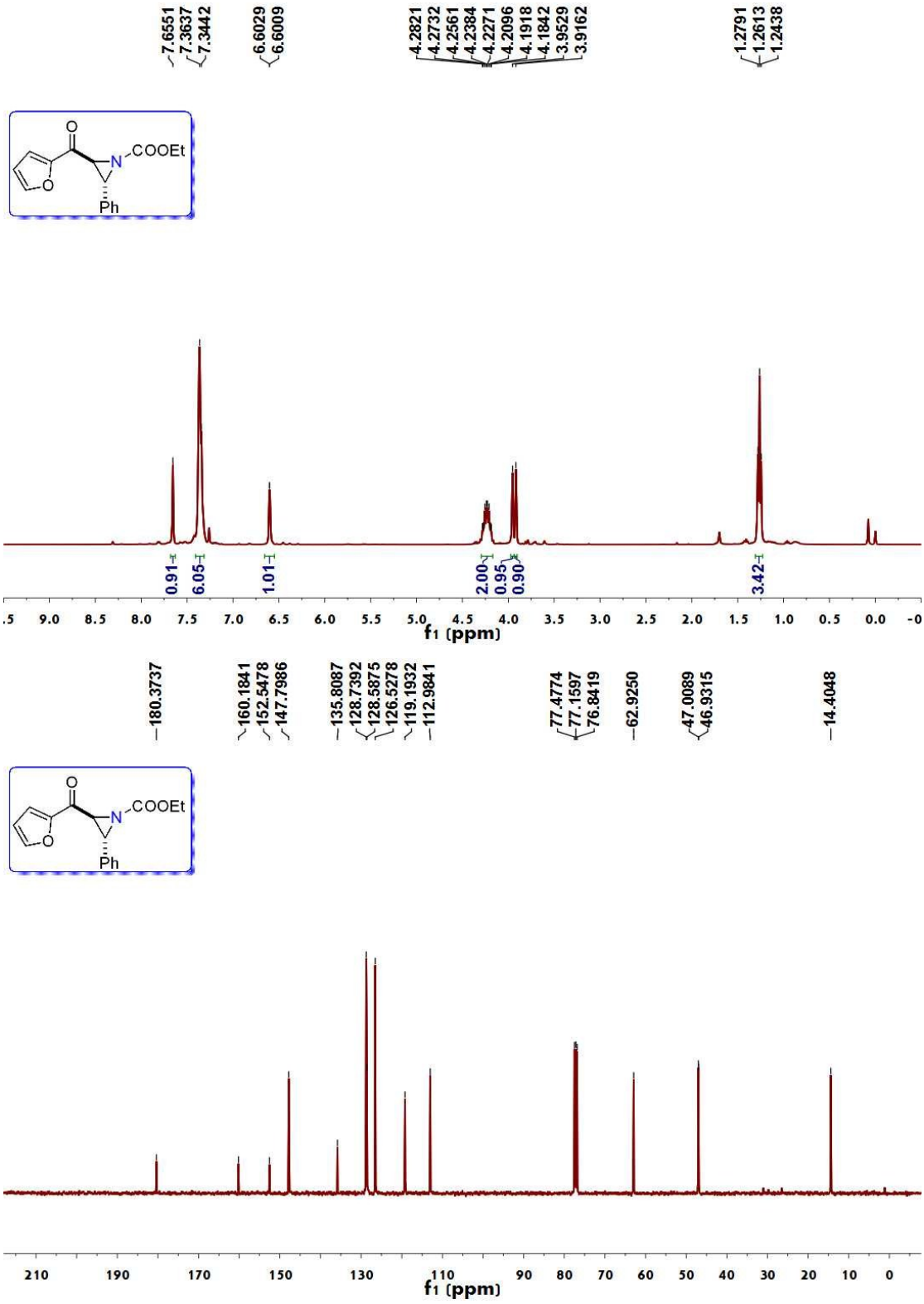

0.96
1.27
6.09
2.00
0.90
0.90
2.84
f1 (ppm)


195.1022
160.1365
137.8471
135.6513
133.1538
132.0557
130.6471
130.0670
128.7422
128.6270
127.3433
126.5467
77.4778
77.1601
76.8425
62.9458
50.4292
48.6937
14.4837

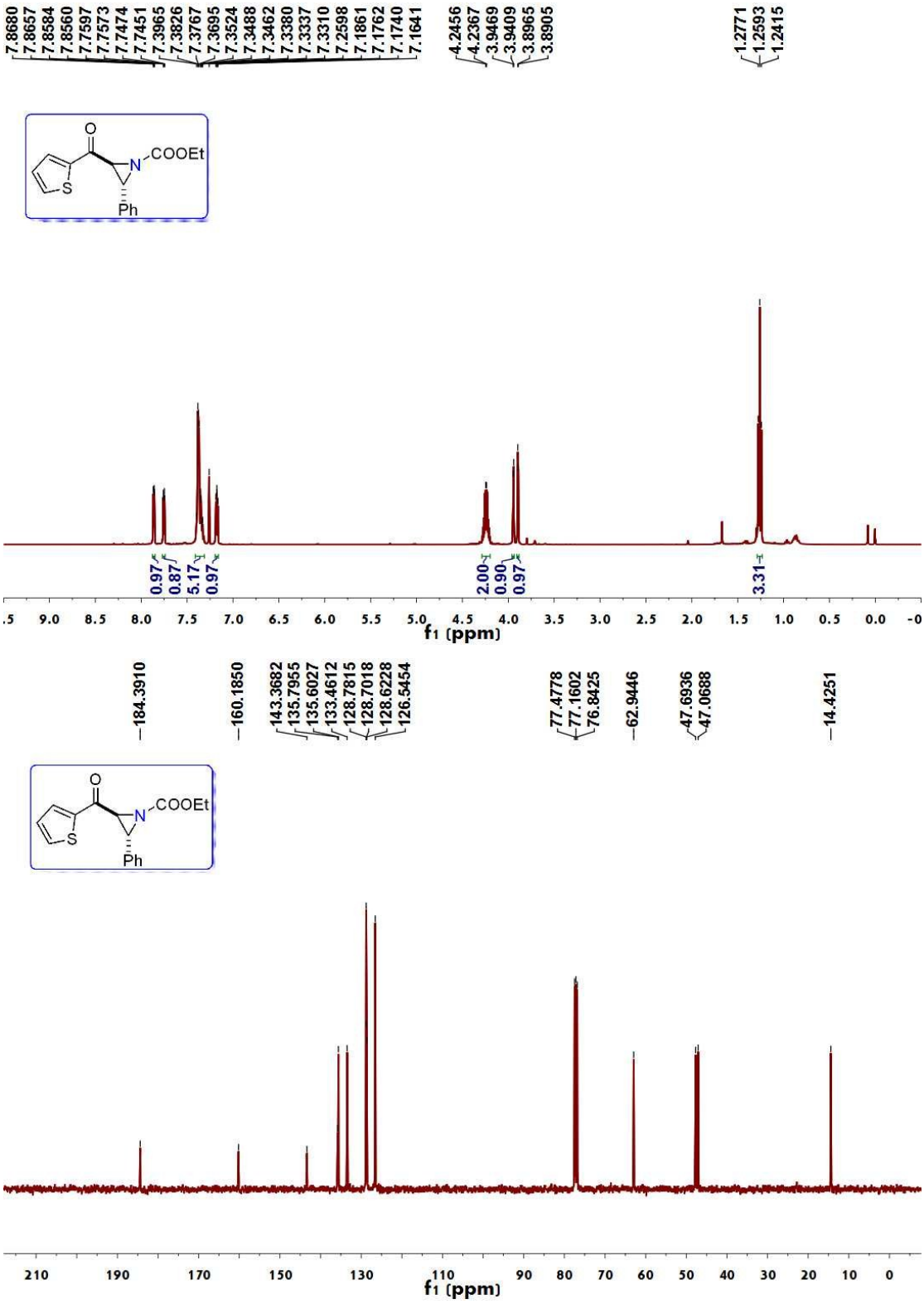

O
N
COOEt
Cl
Ph


f1 (ppm)

4i


7.6551
7.3637
7.3442
6.6029
6.6009
4.2821
4.2732
4.2561
4.2384
4.2271
4.2096
4.1918
4.1842
3.9529
3.9162
1.2791
1.2613
1.2438
COOEt
Ph
0.91
6.05
1.01
2.00
0.95
0.90
3.42
f1 (ppm)
180.3737
160.1841
152.5478
147.7986
135.8087
128.7392
128.5875
126.5278
119.1932
112.9841
77.4774
77.1597
76.8419
62.9250
47.0089
46.9315
14.4048
COOEt
Ph
f1 (ppm)

4j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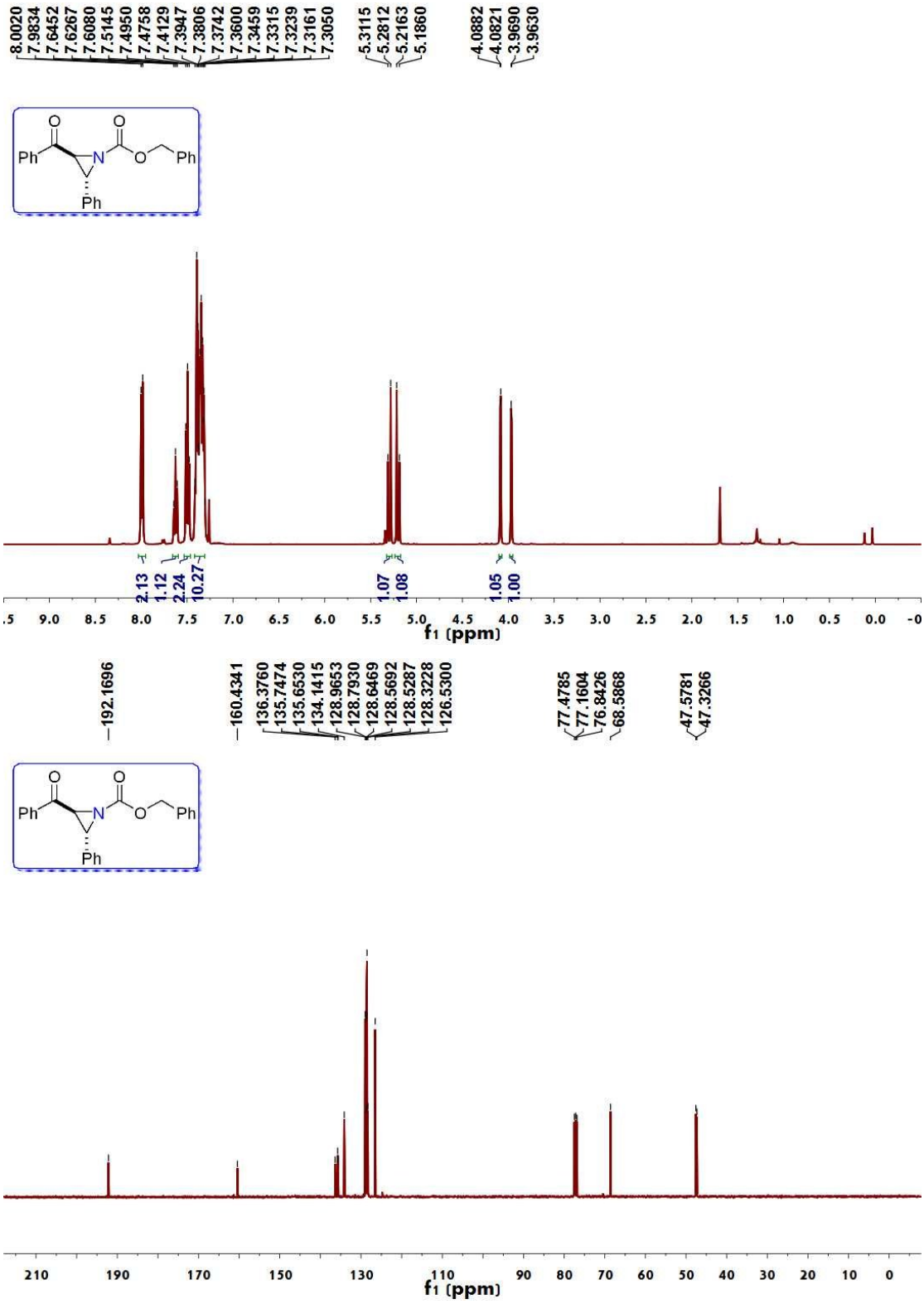
7.8657
7.8584
7.8560
7.7597
7.7573
7.7474
7.7451
7.3965
7.3826
7.3767
7.3695
7.3524
7.3488
7.3462
7.3380
7.3337
7.3310
7.2598
7.1861
7.1762
7.1740
7.1641
4.2456
4.2367
3.9469
3.9409
3.8965
3.8905
1.2771
1.2593
1.2415
COOEt
N
S
Ph
0.97
0.87
5.17
0.97
2.00
0.90
0.97
3.31
f1 (ppm)
184.3910
160.1850
143.3682
135.7955
135.6027
133.4612
128.7815
128.7018
128.6228
126.5454
77.4778
77.1602
76.8425
62.9446
47.6936
47.0688
14.4251
f1 (ppm)

6a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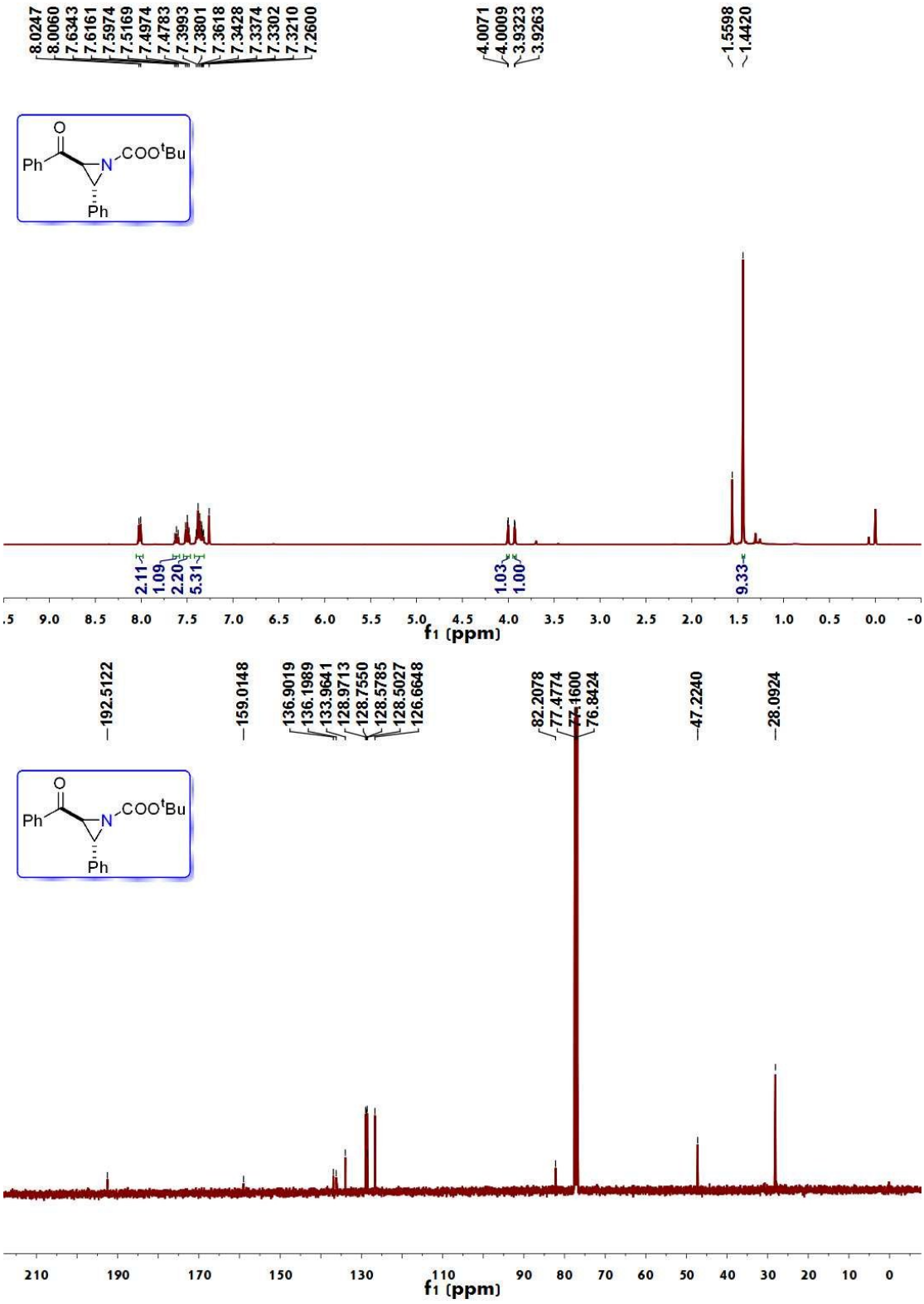
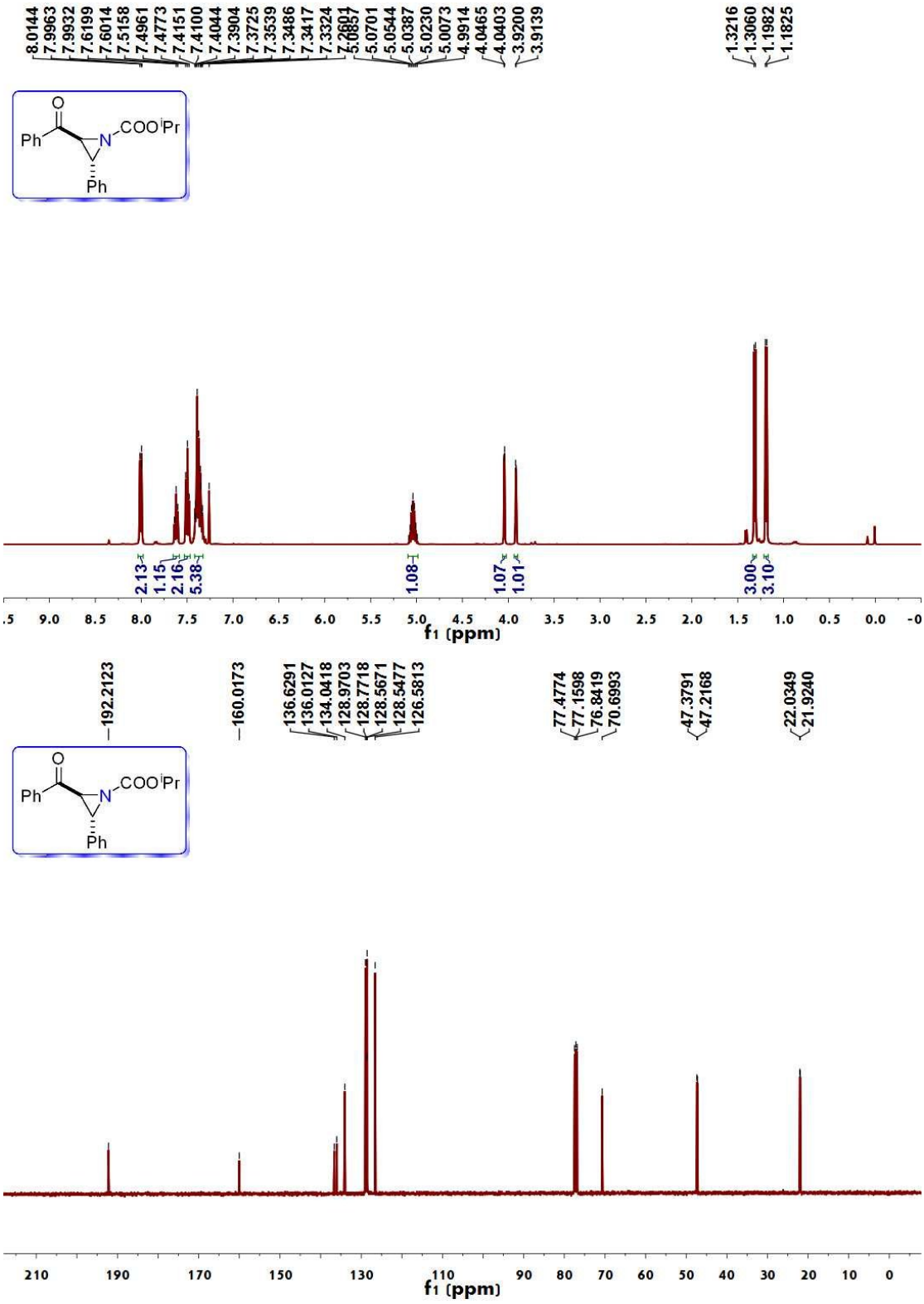
7.6267
7.6080
7.5145
7.4950
7.4758
7.4129
7.3947
7.3806
7.3742
7.3600
7.3459
7.3315
7.3239
7.3161
7.3050
5.3115
5.2812
5.2163
5.1860
4.0882
4.0821
3.9690
3.9630
Ph
N
O
Ph
Ph
2.13
1.12
2.24
10.27
1.07
1.08
1.05
1.00
f1 (ppm)
192.1696
160.4341
136.3760
135.7474
135.6530
134.1415
128.9653
128.7930
128.6469
128.5692
128.5287
128.3228
126.5300
77.4785
77.1604
76.8426
68.5868
47.5781
47.3266
f1 (ppm)

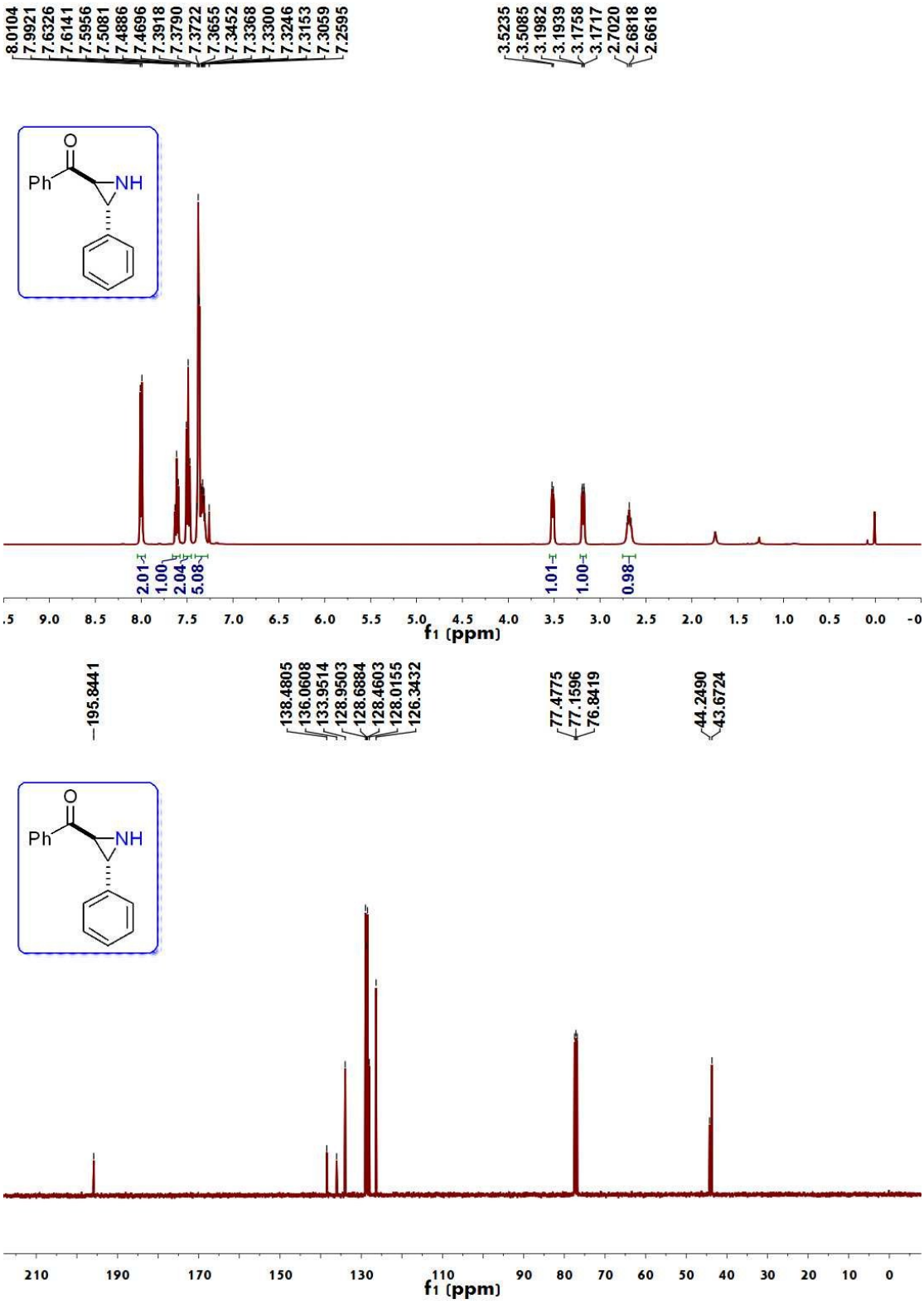
6b


8.0247
8.0060
7.6343
7.6161
7.5974
7.5169
7.4974
7.4783
7.3993
7.3801
7.3618
7.3428
7.3374
7.3302
7.3210
7.2600
4.0071
4.0009
3.9323
3.9263
1.5598
1.4420
Ph
N
COO^{t}Bu
Ph
2.11
1.09
2.20
5.31
1.03
1.00
9.33
f1 (ppm)
192.5122
159.0148
136.9019
136.1989
133.9641
128.9713
128.7550
128.5785
128.5027
126.6648
82.2078
77.4774
77.1600
76.8424
47.2240
28.0924
f1 (ppm)

6c


8.0144
7.9963
7.9932
7.6199
7.6014
7.5158
7.4961
7.4773
7.4151
7.4100
7.4044
7.3904
7.3725
7.3539
7.3486
7.3417
7.3324
5.0857
5.0701
5.0544
5.0387
5.0230
5.0073
4.9914
4.0465
4.0403
3.9200
3.9139
1.3216
1.3060
1.1982
1.1825
Ph
N
COO^{i}Pr
Ph
2.13
1.15
2.16
5.38
1.08
1.07
1.01
3.00
3.10
f1 (ppm)
192.2123
160.0173
136.6291
136.0127
134.0418
128.9703
128.7718
128.5671
128.5477
126.5813
77.4774
77.1598
76.8419
70.6993
47.3791
47.2168
22.0349
21.9240
f1 (ppm)

7a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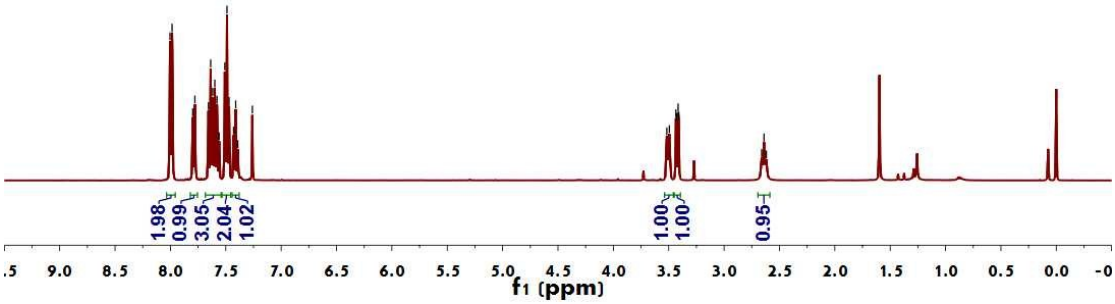
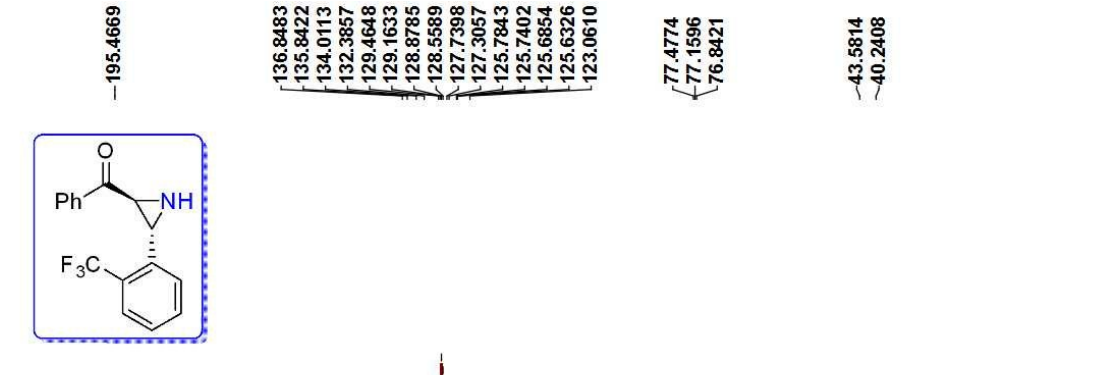
7.6326
7.6141
7.5956
7.5081
7.4886
7.4696
7.3918
7.3790
7.3722
7.3655
7.3452
7.3368
7.3300
7.3246
7.3153
7.3059
7.2595
3.5235
3.5085
3.1982
3.1939
3.1758
3.1717
2.7020
2.6818
2.6618
Ph
NH
O
2.01
1.00
2.04
5.08
1.01
1.00
0.98
f1 (ppm)
195.8441
138.4805
136.0608
133.9514
128.9503
128.6884
128.4603
128.0155
126.3432
77.4775
77.1596
76.8419
44.2490
43.6724
f1 (ppm)

7b

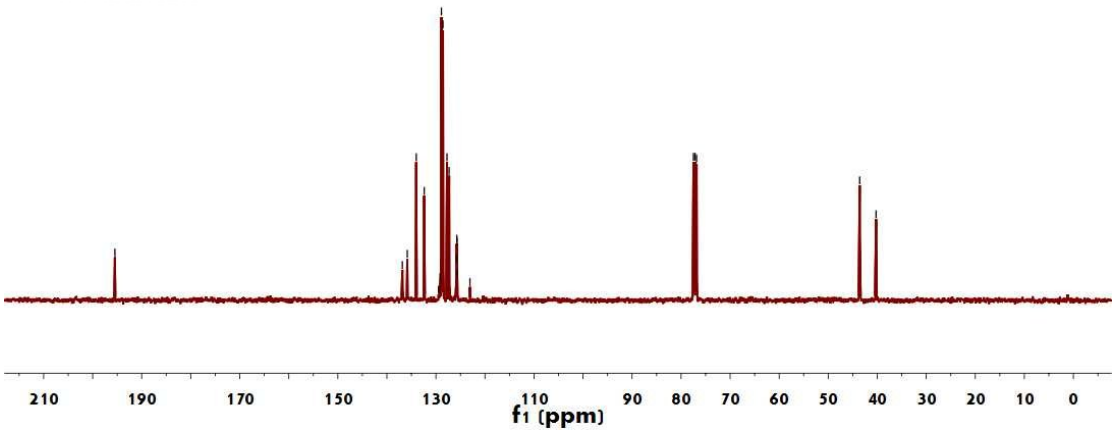

8.0036
7.9850
7.7985
7.7789
7.6561
7.6365
7.6179
7.5992
7.5795
7.5604
7.5086
7.4891
7.4701
7.4295
7.4104
7.3913
7.2600
3.5169
3.4944
3.4352
3.4294
3.4151
3.4093
2.6605
2.6395
2.6184

O
Ph
NH
F3C

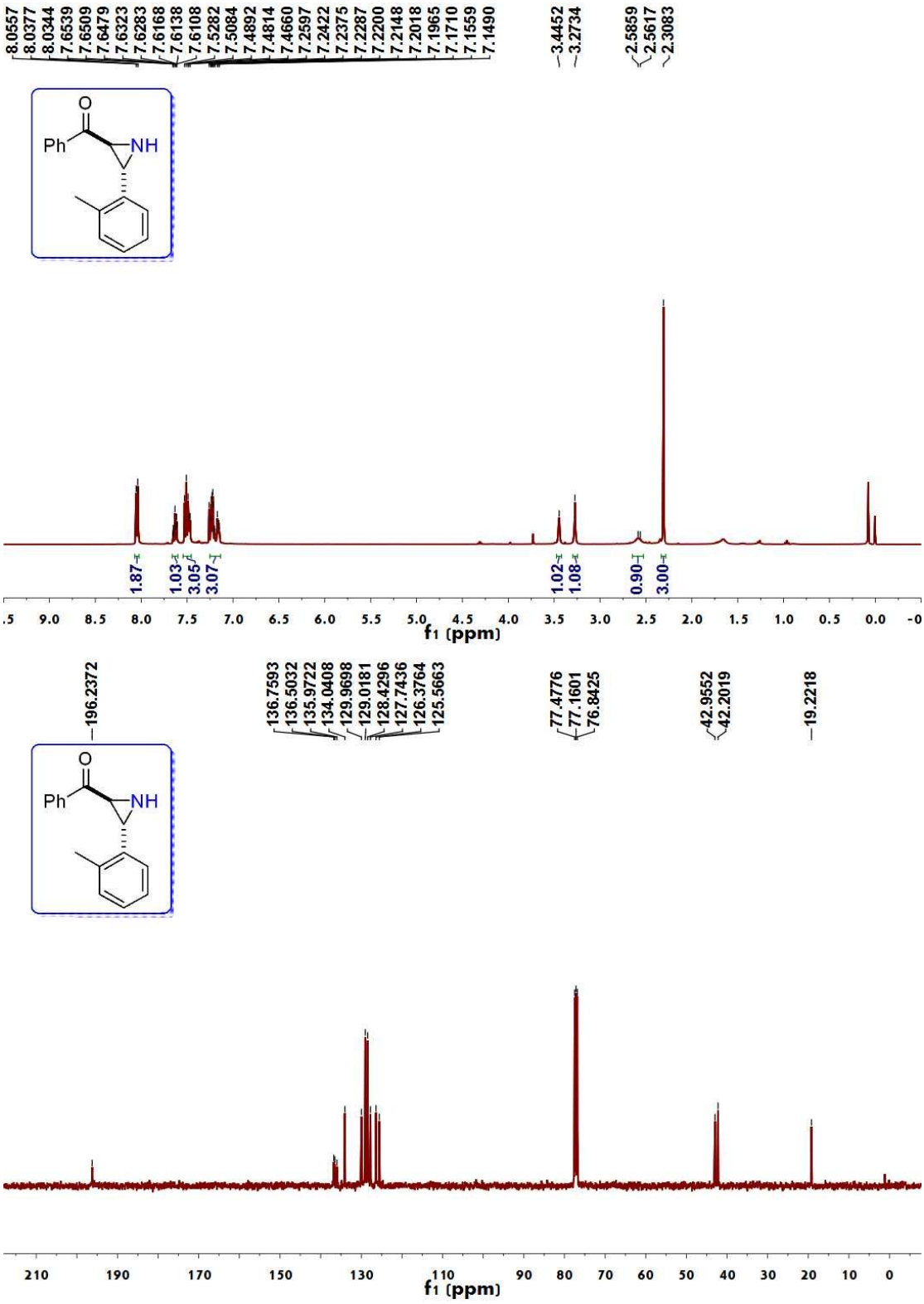

1.98
0.99
3.05
2.04
1.02
1.00
1.00
0.95
f1 (ppm)


195.4669
136.8483
135.8422
134.0113
132.3857
129.4648
129.1633
128.8785
128.5589
127.7398
127.3057
125.7843
125.7402
125.6854
125.6326
123.0610
77.4774
77.1596
76.8421
43.5814
40.2408

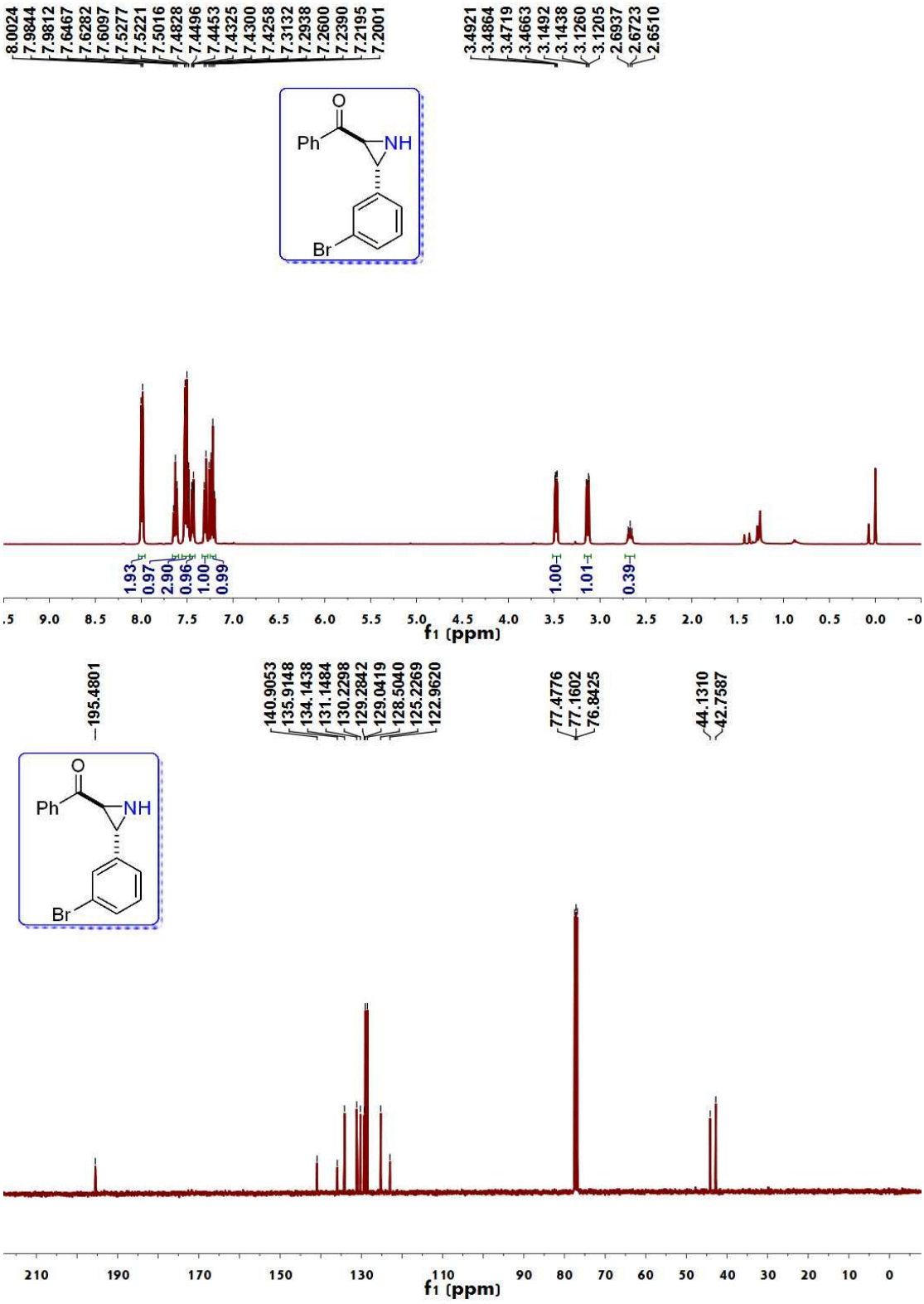
O
Ph
NH
F3C


f1 (ppm)

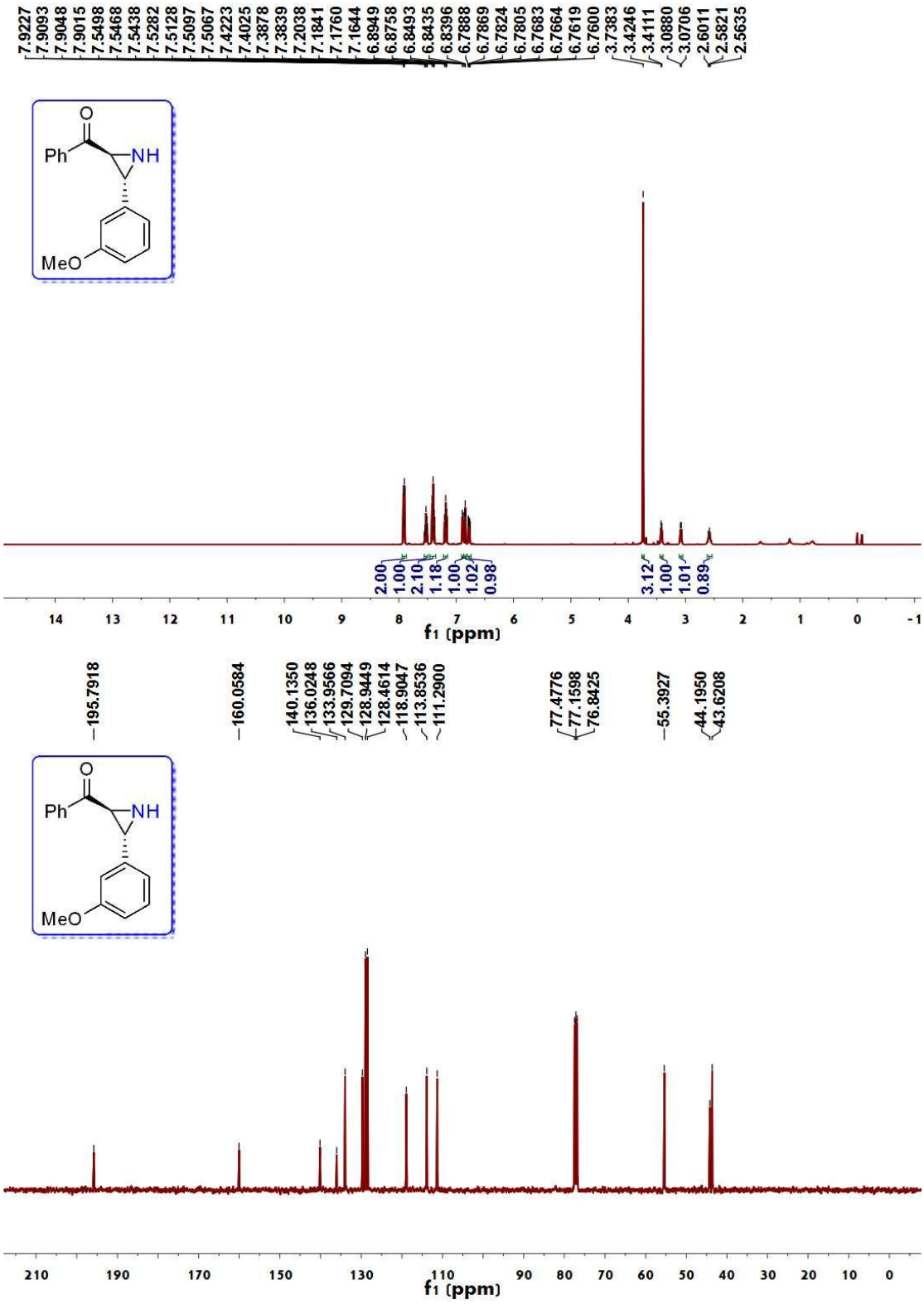
7c


8.0557
8.0377
8.0344
7.6539
7.6509
7.6479
7.6323
7.6283
7.6168
7.6138
7.6108
7.5282
7.5084
7.4892
7.4814
7.4660
7.2597
7.2422
7.2375
7.2287
7.2200
7.2148
7.2018
7.1965
7.1710
7.1559
7.1490
3.4452
3.2734
2.5859
2.5617
2.3083
O
Ph
NH
1.87
1.03
3.05
3.07
1.02
1.08
0.90
3.00
f1 (ppm)
196.2372
136.7593
136.5032
135.9722
134.0408
129.9698
129.0181
128.4296
127.7436
126.3764
125.5663
77.4776
77.1601
76.8425
42.9552
42.2019
19.2218
O
Ph
NH
f1 (ppm)

7d

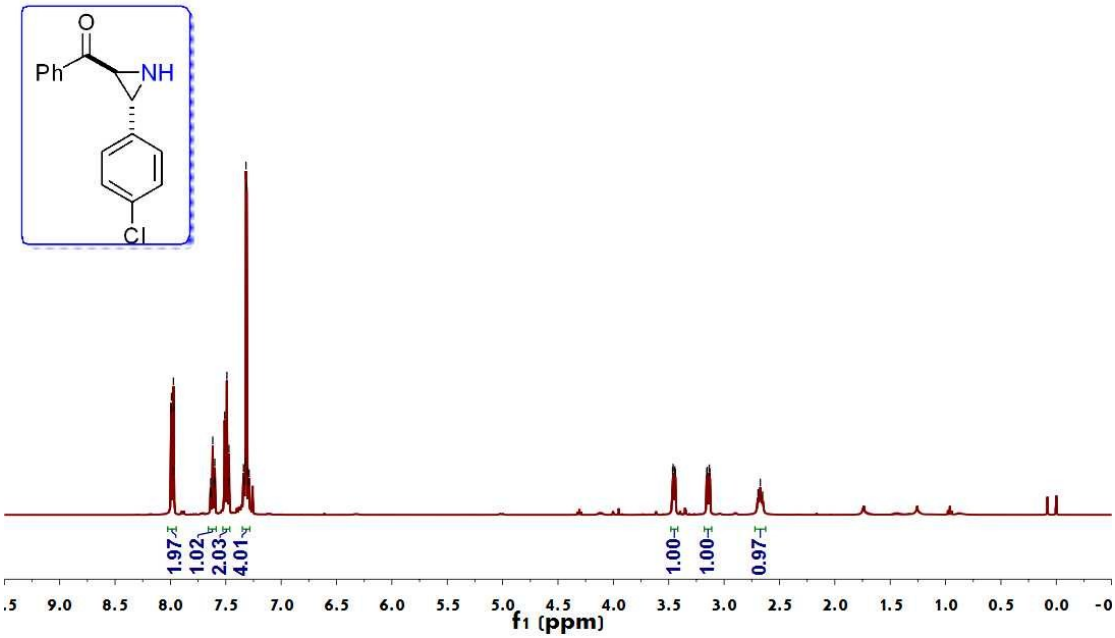

8.0024
7.9844
7.9812
7.6467
7.6282
7.6097
7.5277
7.5221
7.5016
7.4828
7.4496
7.4453
7.4325
7.4300
7.4258
7.3132
7.2938
7.2600
7.2390
7.2195
7.2001
3.4921
3.4864
3.4719
3.4663
3.1492
3.1438
3.1260
3.1205
2.6937
2.6723
2.6510
O
Ph
NH
Br
1.93
0.97
2.90
0.96
1.00
0.99
1.00
1.01
0.39
f1 (ppm)
195.4801
140.9053
135.9148
134.1438
131.1484
130.2298
129.2842
129.0419
128.5040
125.2269
122.9620
77.4776
77.1602
76.8425
44.1310
42.7587
f1 (ppm)

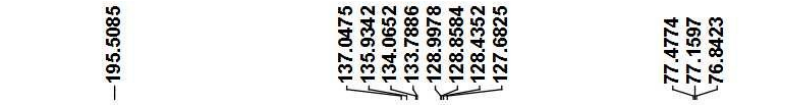
7e

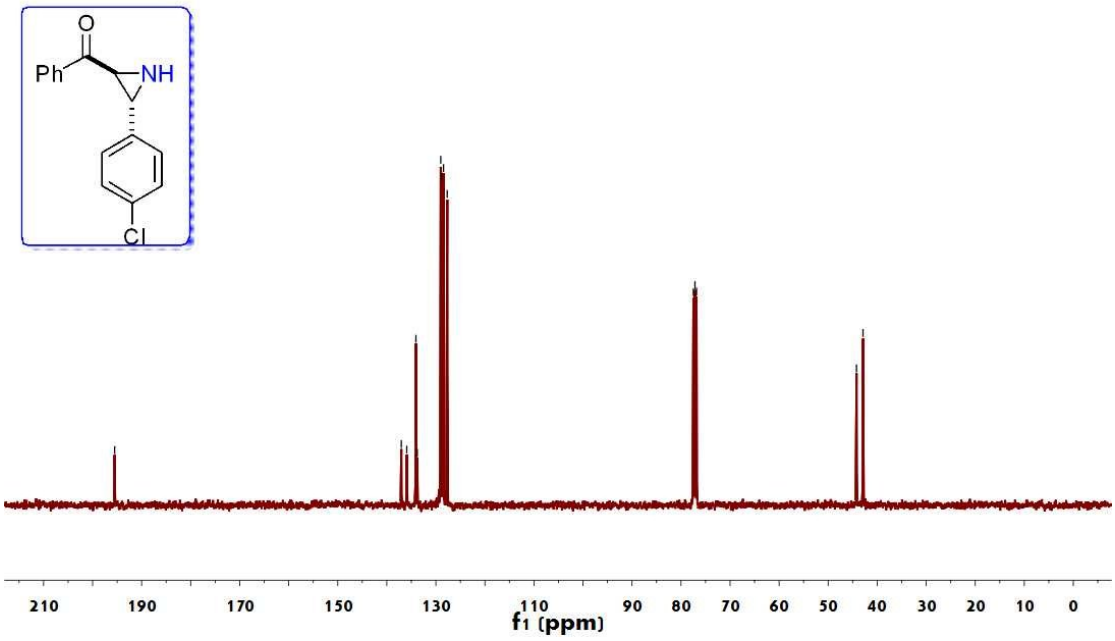

7.9227
7.9093
7.9048
7.9015
7.5498
7.5468
7.5438
7.5282
7.5128
7.5097
7.5067
7.4223
7.4025
7.3878
7.3839
7.2038
7.1841
7.1760
7.1644
6.8949
6.8758
6.8493
6.8435
6.8396
6.7888
6.7869
6.7824
6.7805
6.7683
6.7664
6.7619
6.7600
3.7383
3.4246
3.4111
3.0880
3.0706
2.6011
2.5821
2.5635
O
Ph
NH
MeO
2.00
1.00
2.10
1.18
1.00
1.02
0.98
3.12
1.00
1.01
0.89
f1 (ppm)
195.7918
160.0584
140.1350
136.0248
133.9566
129.7094
128.9449
128.4614
118.9047
113.8536
111.2900
77.4776
77.1598
76.8425
55.3927
44.1950
43.6208
f1 (ppm)

7f

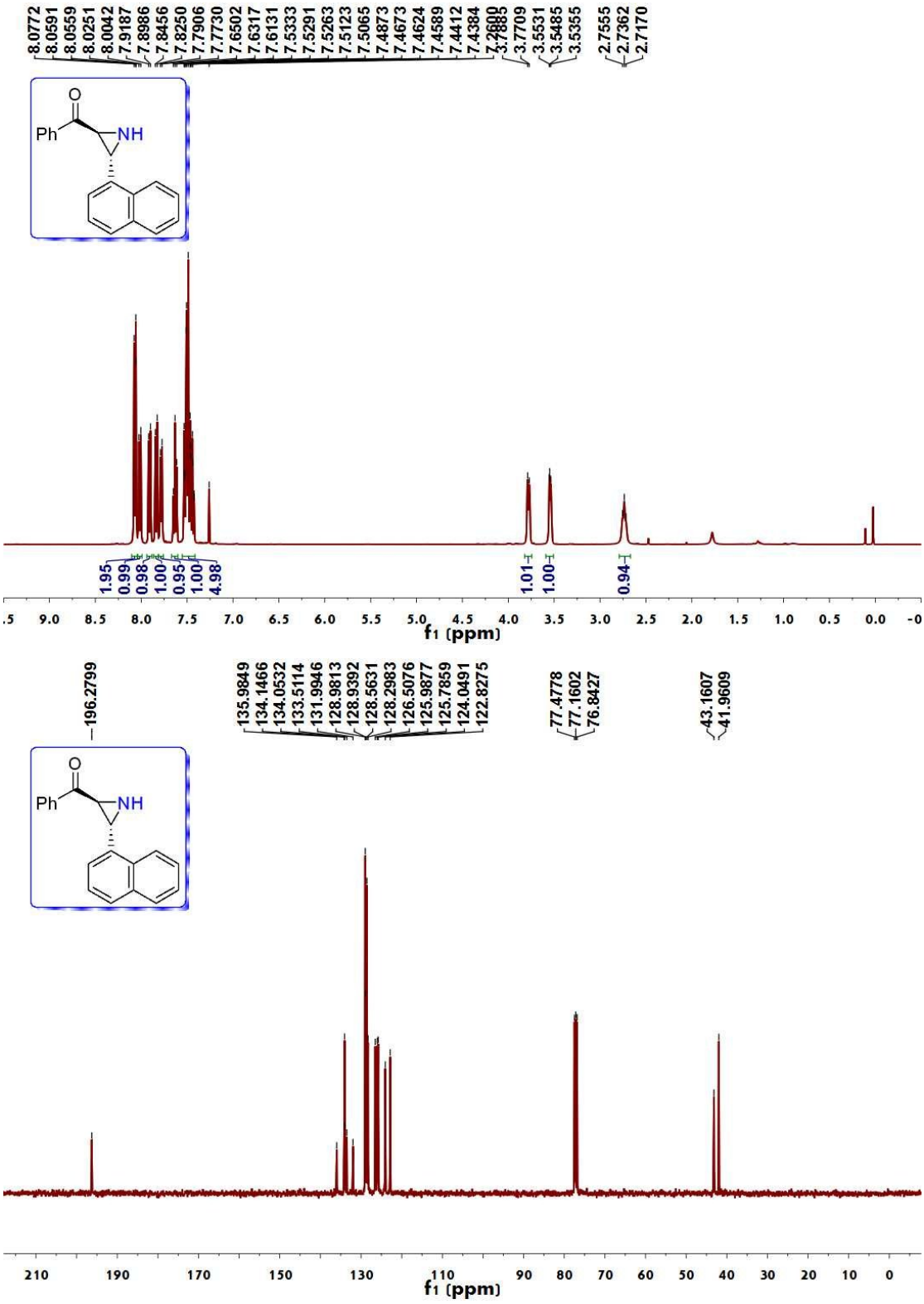

7.9924
7.9903
7.9769
7.9725
7.9691
7.6391
7.6363
7.6333
7.6177
7.6021
7.5992
7.5963
7.5096
7.4899
7.4750
7.4711
7.3399
7.3330
7.3244
7.3176
7.3115
7.3047
7.2962
7.2892
3.4652
3.4598
3.4454
3.4400
3.1567
3.1514
3.1338
3.1285
2.6938
2.6728
2.6516


O
Ph
NH
Cl
1.97
1.02
2.03
4.01
1.00
1.00
0.97
f1 (ppm)

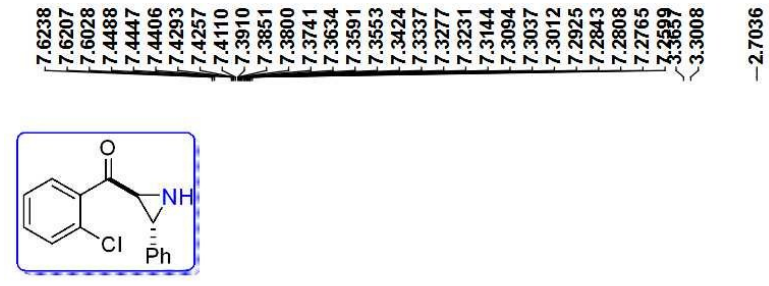

195.5085
137.0475
135.9342
134.0652
133.7886
128.9978
128.8584
128.4352
127.6825
77.4774
77.1597
76.8423
44.2123
42.8875


O
Ph
NH
Cl
f1 (ppm)

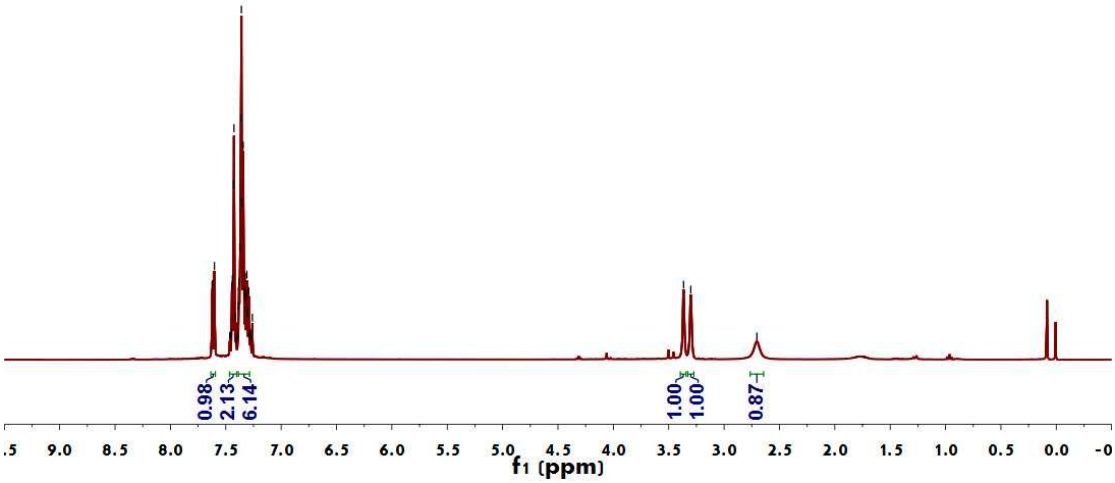
7g


8.0772
8.0591
8.0559
8.0251
8.0042
7.9187
7.8986
7.8456
7.8250
7.7906
7.7730
7.6502
7.6317
7.6131
7.5333
7.5291
7.5263
7.5123
7.5065
7.4873
7.4673
7.4624
7.4589
7.4412
7.4384
3.7709
3.5531
3.5485
3.5355
2.7555
2.7362
2.7170
Ph
NH
O
1.95
0.99
0.98
1.00
0.95
1.00
4.98
1.01
1.00
0.94
f1 (ppm)
196.2799
135.9849
134.1466
134.0532
133.5114
131.9946
128.9813
128.9392
128.5631
128.2983
126.5076
125.9877
125.7859
124.0491
122.8275
77.4778
77.1602
76.8427
43.1607
41.9609
f1 (ppm)

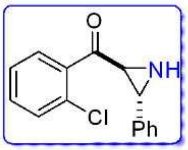
7h

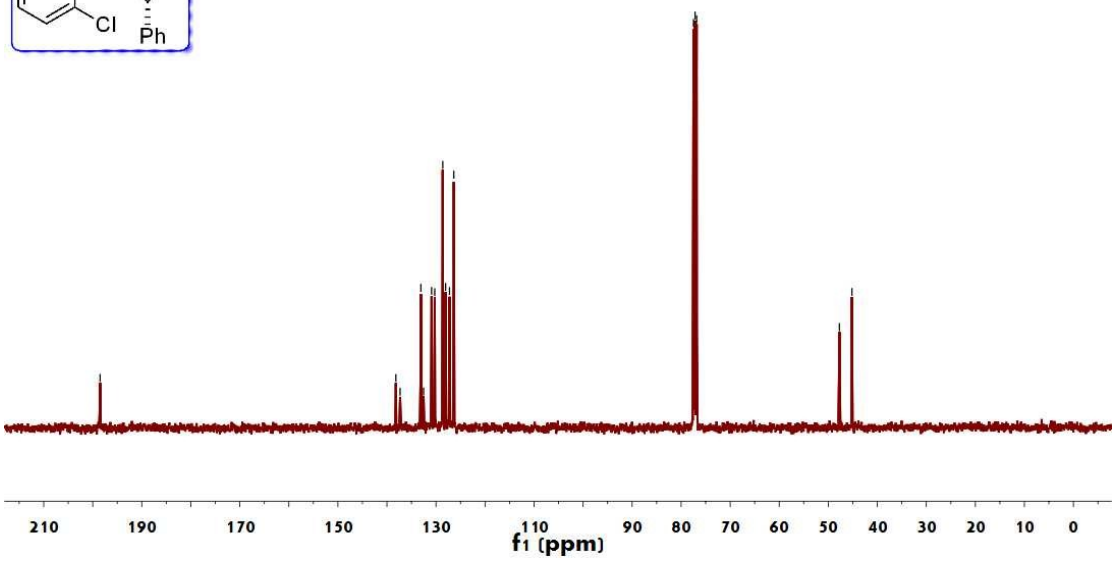

7.6238
7.6207
7.6028
7.4488
7.4447
7.4406
7.4293
7.4257
7.4110
7.3910
7.3851
7.3800
7.3741
7.3634
7.3591
7.3553
7.3424
7.3337
7.3277
7.3231
7.3144
7.3094
7.3037
7.3012
7.2925
7.2843
7.2808
7.2765
3.3857
3.3008
2.7036

O
NH
Cl
Ph

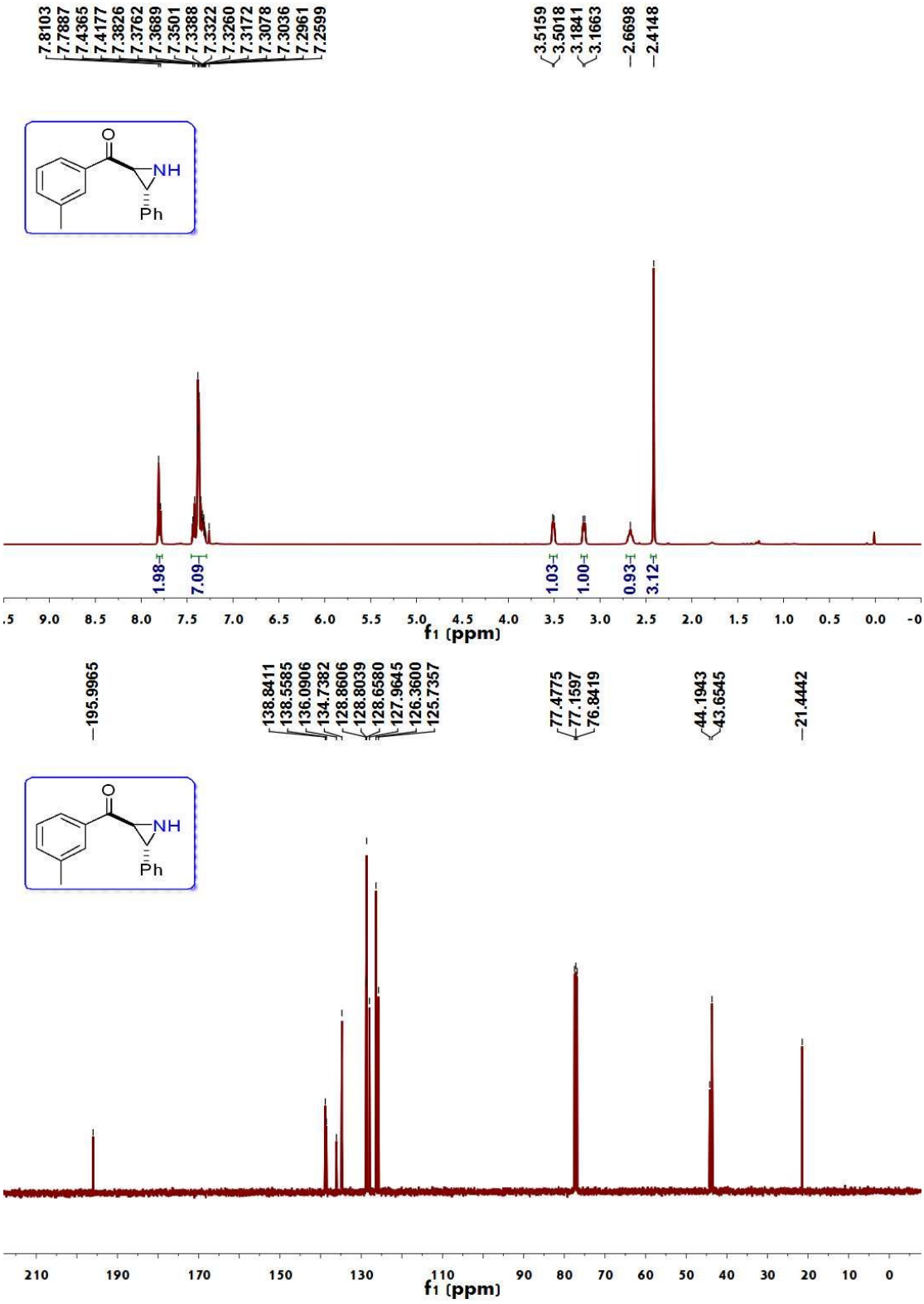

0.98
2.13
6.14
1.00
1.00
0.87
f1 (ppm)


198.4980
138.1788
137.3131
133.0746
132.5255
130.8940
130.2517
128.6202
128.0340
127.2403
126.3619
77.4776
77.1601
76.8427
47.7210
45.1750

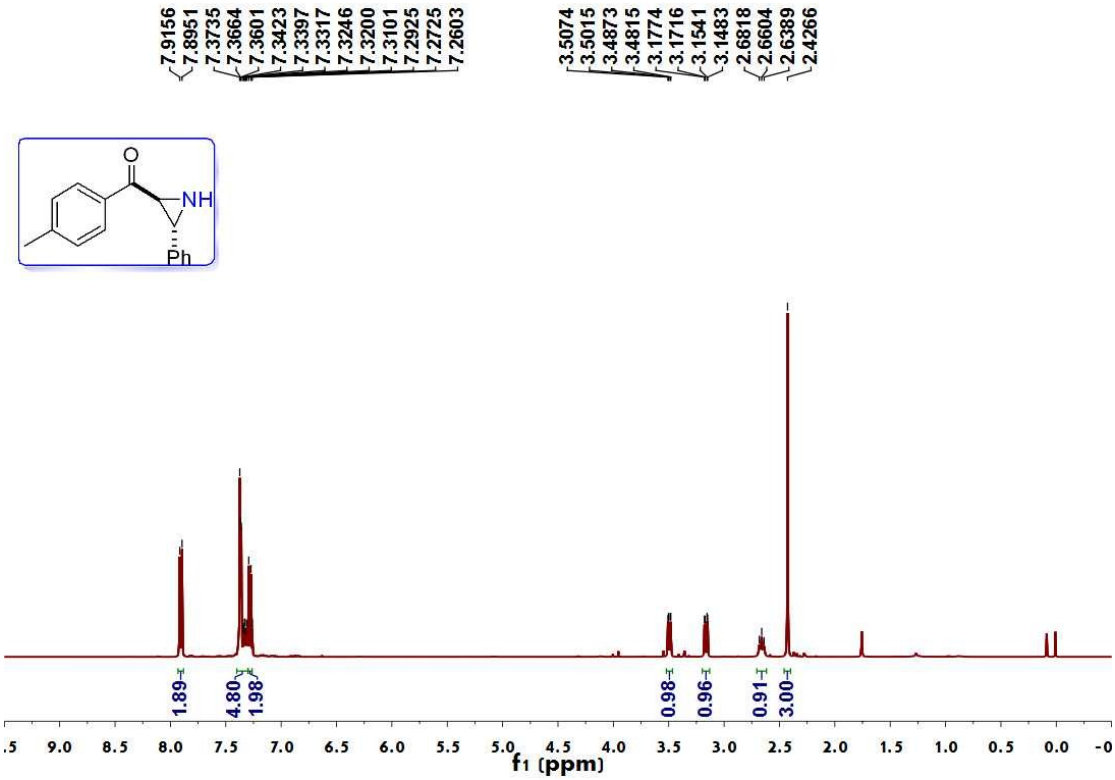

O
NH
Cl
Ph

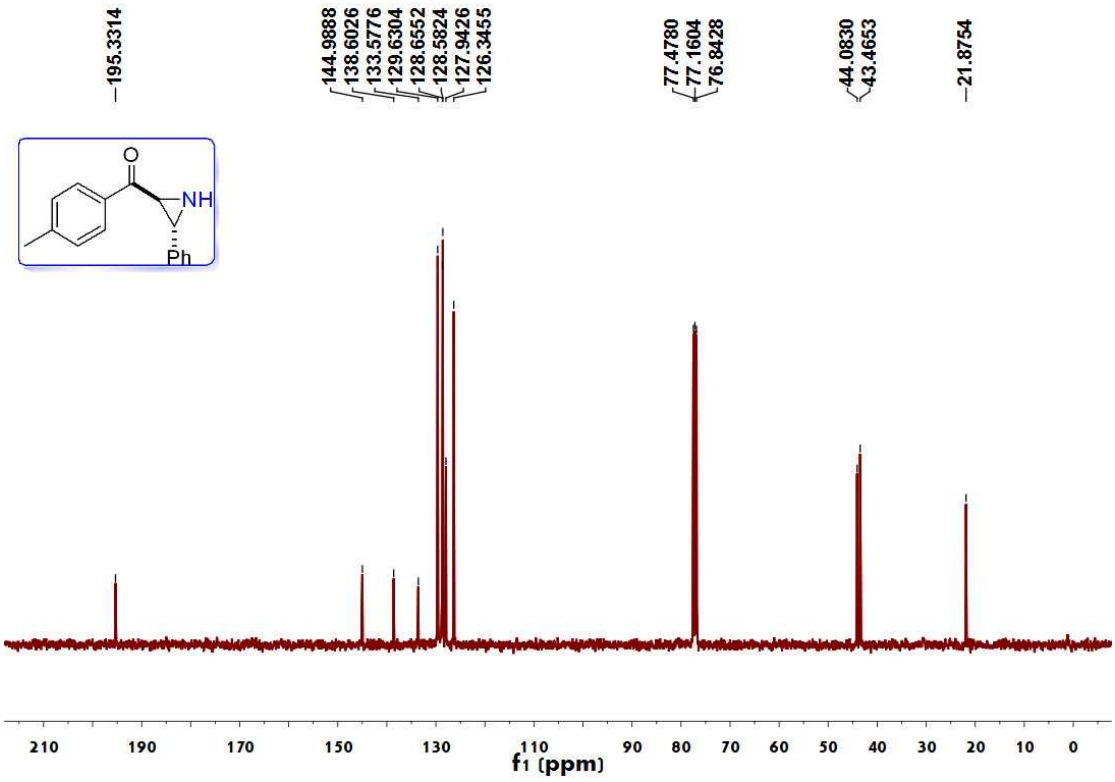

f1 (ppm)

7i

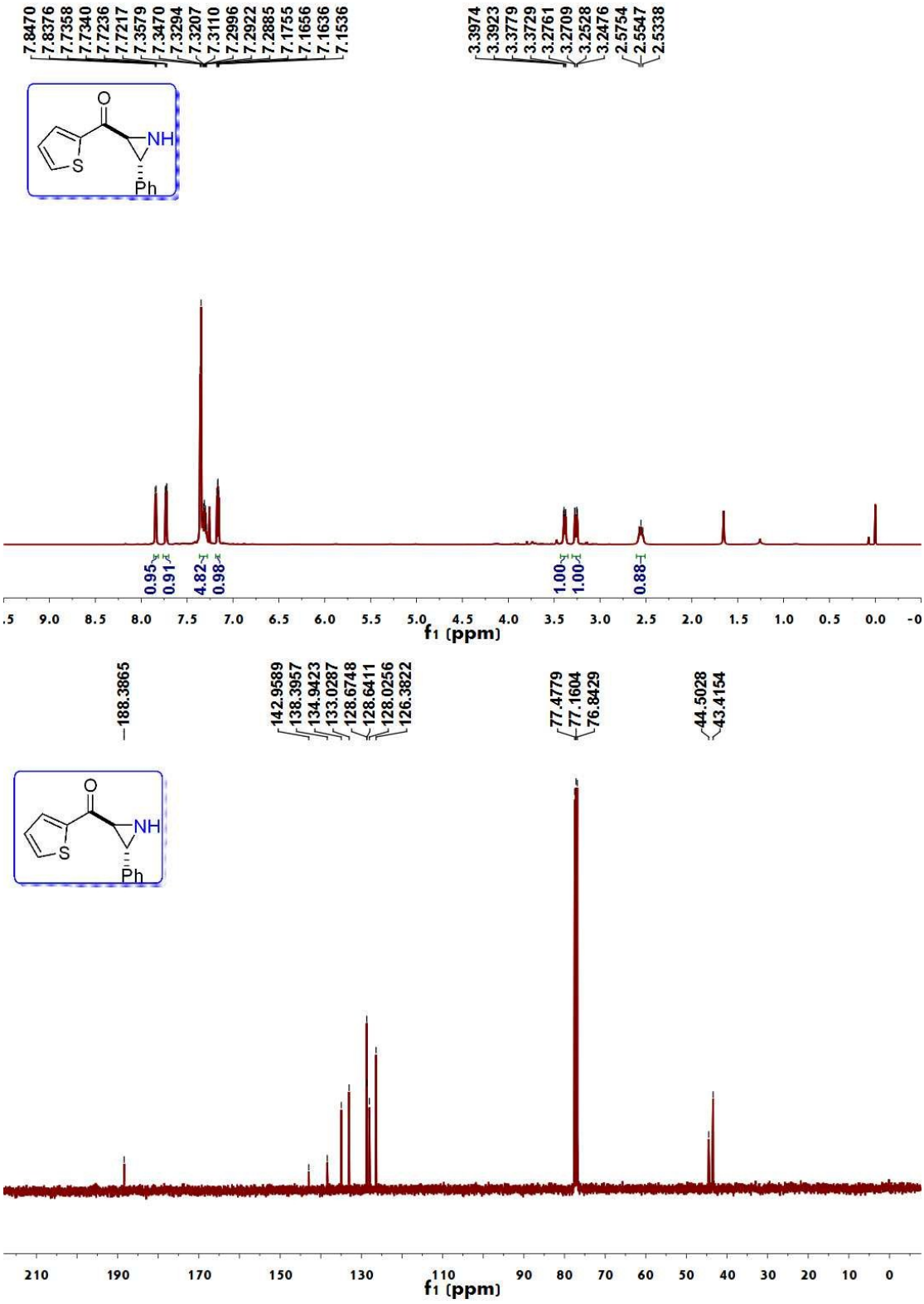

7.8103
7.7887
7.4365
7.4177
7.3826
7.3762
7.3689
7.3501
7.3388
7.3322
7.3260
7.3172
7.3078
7.3036
7.2961
7.2599
3.5159
3.5018
3.1841
3.1663
2.6698
2.4148
NH
Ph
1.98
7.09
1.03
1.00
0.93
3.12
f1 (ppm)
195.9965
138.8411
138.5585
136.0906
134.7382
128.8606
128.8039
128.6580
127.9645
126.3600
125.7357
77.4775
77.1597
76.8419
44.1943
43.6545
21.4442
NH
Ph
f1 (ppm)

7j

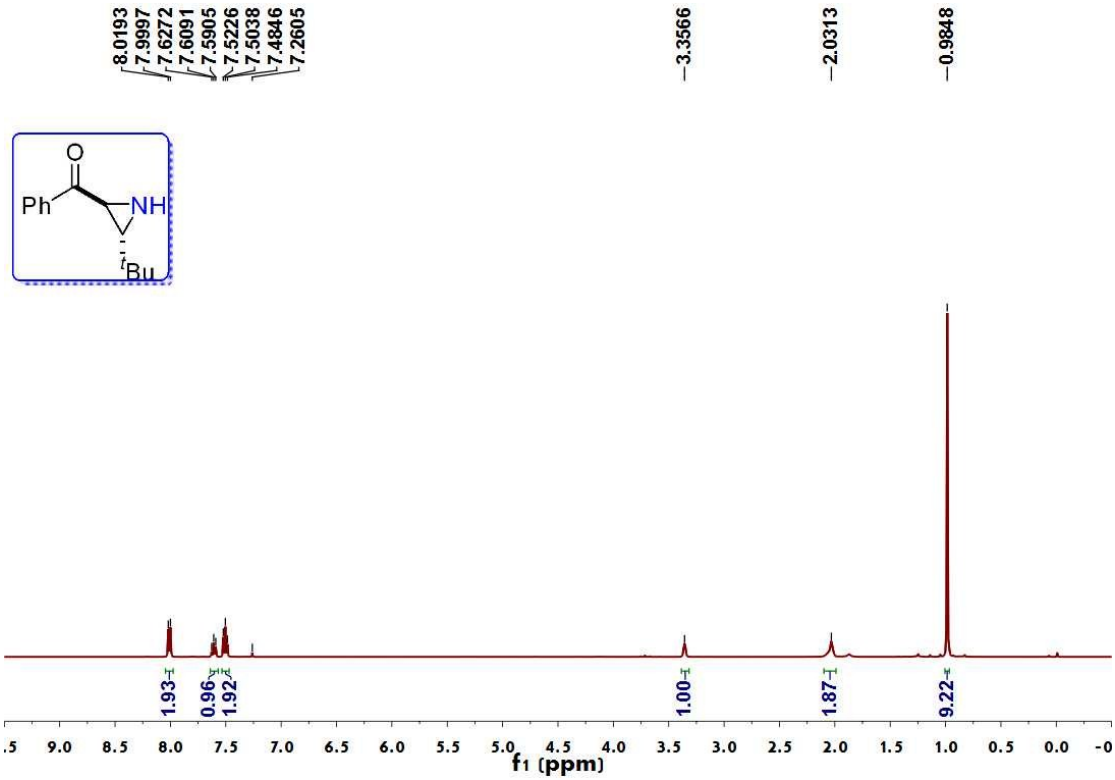

7.9156
7.8951
7.3735
7.3664
7.3601
7.3423
7.3397
7.3317
7.3246
7.3200
7.3101
7.2925
7.2725
7.2603
3.5074
3.5015
3.4873
3.4815
3.1774
3.1716
3.1541
3.1483
2.6818
2.6604
2.6389
2.4266
NH
Ph
1.89
4.80
1.98
0.98
0.96
0.91
3.00
f1 (ppm)

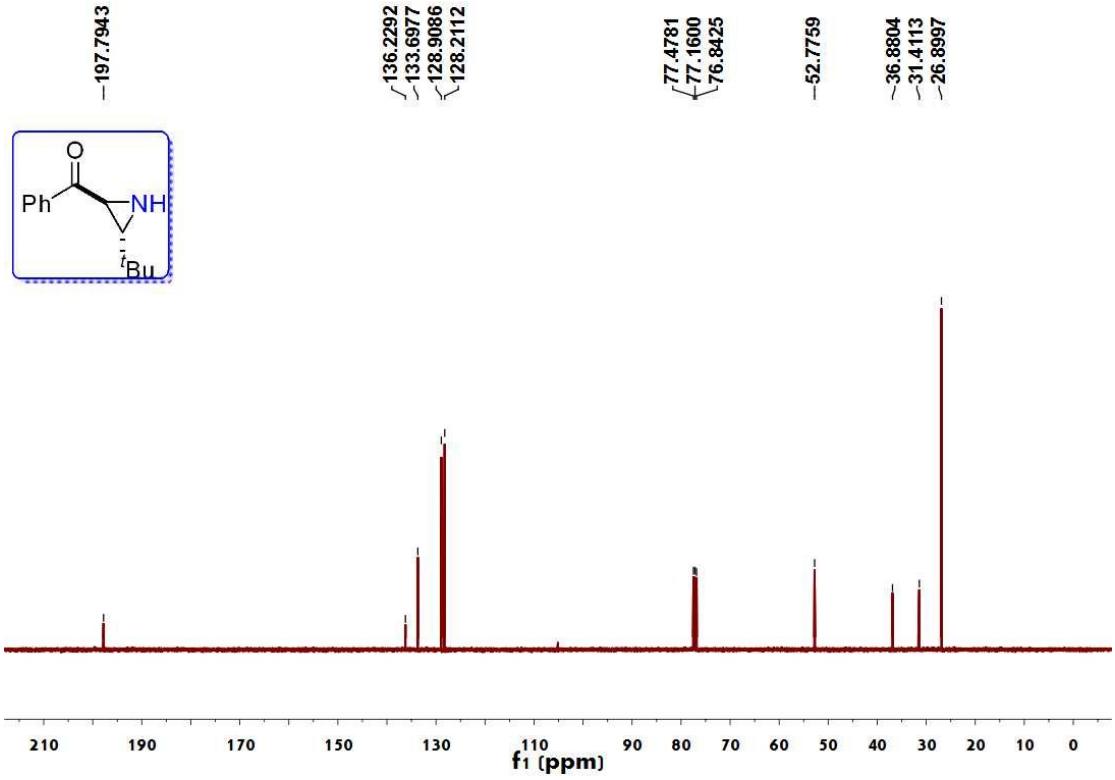

195.3314
144.9888
138.6026
133.5776
129.6304
128.6552
128.5824
127.9426
126.3455
77.4780
77.1604
76.8428
44.0830
43.4653
21.8754
NH
Ph
f1 (ppm)

7k

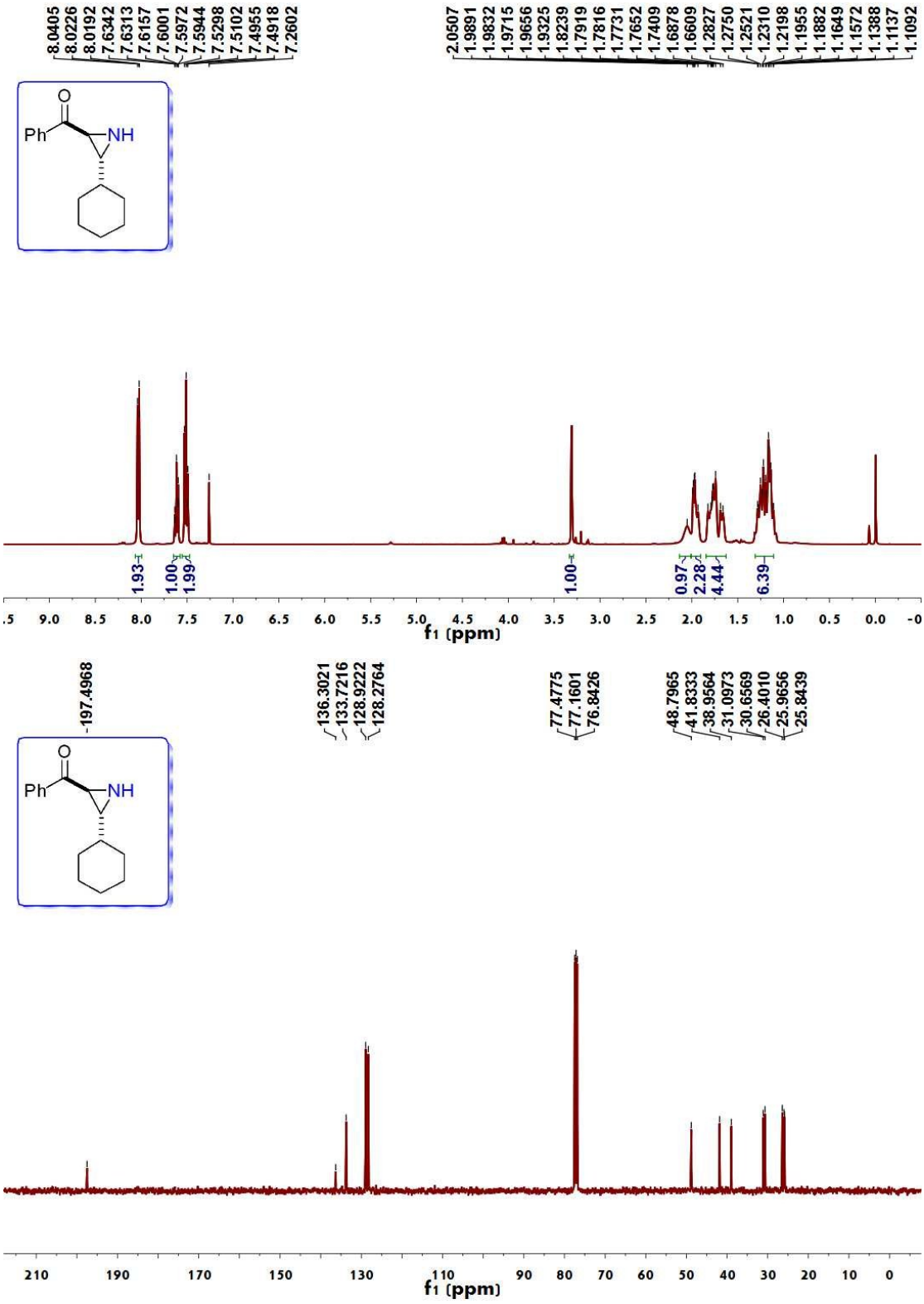

7.8470
7.8376
7.7358
7.7340
7.7236
7.7217
7.3579
7.3470
7.3294
7.3207
7.3110
7.2996
7.2922
7.2885
7.1755
7.1656
7.1636
7.1536
3.3974
3.3923
3.3779
3.3729
3.2761
3.2709
3.2528
3.2476
2.5754
2.5547
2.5338
O
NH
S
Ph
0.95
0.91
4.82
0.98
1.00
1.00
0.88
f1 (ppm)
188.3865
142.9589
138.3957
134.9423
133.0287
128.6748
128.6411
128.0256
126.3822
77.4779
77.1604
76.8429
44.5028
43.4154
O
NH
S
Ph
f1 (ppm)

7l


8.0193
7.9997
7.6272
7.6091
7.5905
7.5226
7.5038
7.4846
7.2605
3.3566
2.0313
0.9848
O
Ph
NH
tBu
1.93
0.96
1.92
1.00
1.87
9.22
f1 (ppm)


197.7943
136.2292
133.6977
128.9086
128.2112
77.4781
77.1600
76.8425
52.7759
36.8804
31.4113
26.8997
O
Ph
NH
tBu
f1 (ppm)

7m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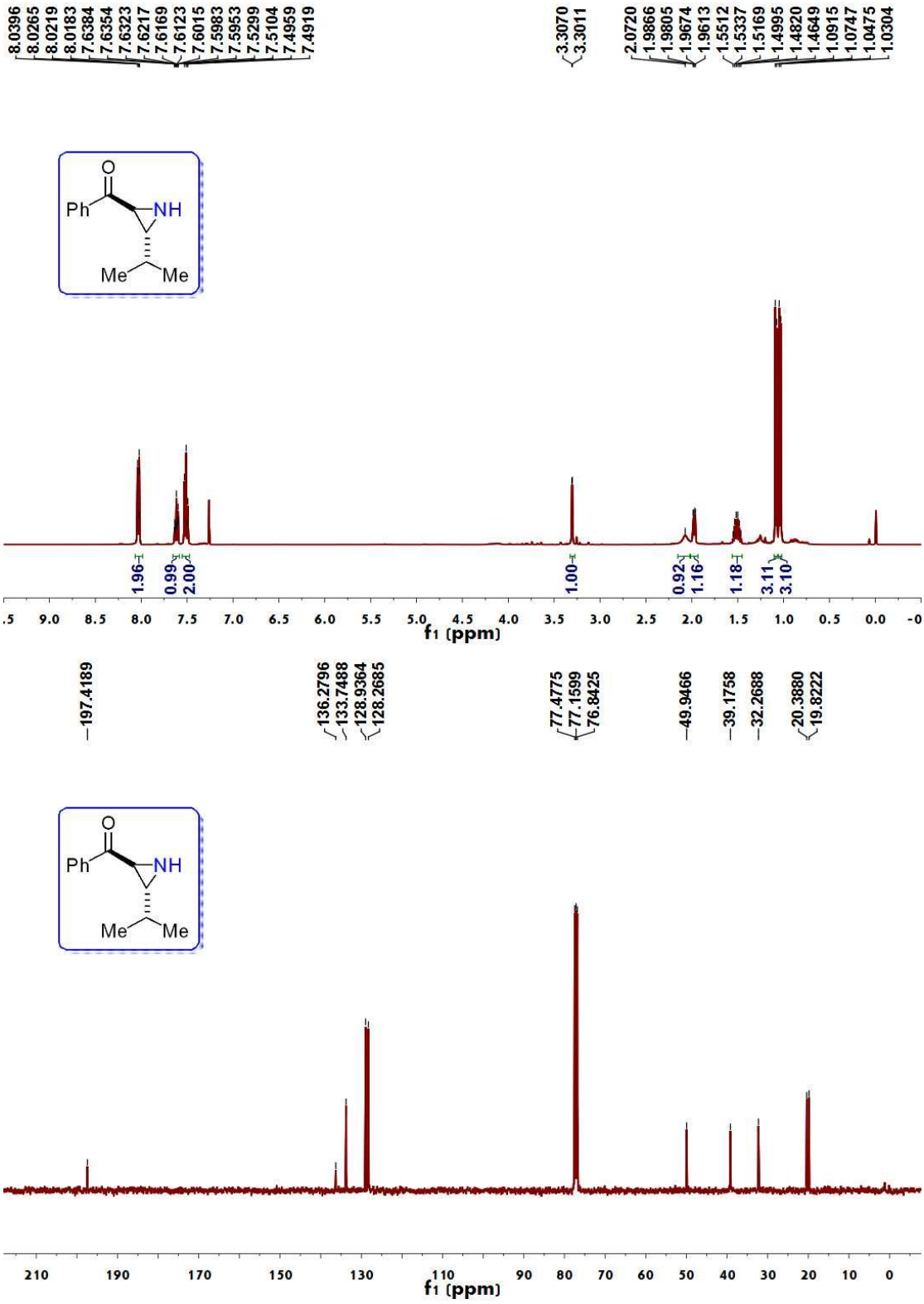
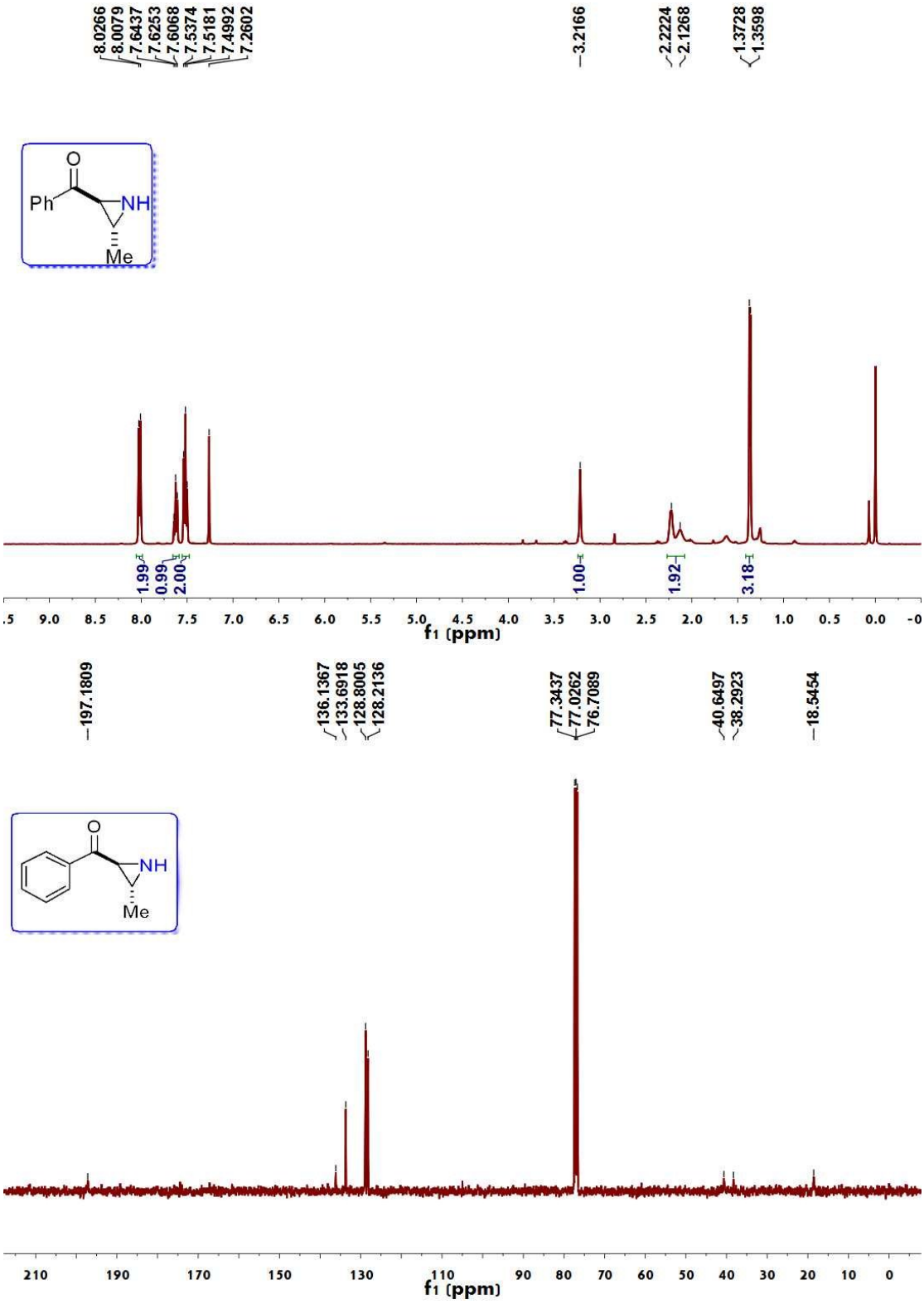
8.0226
8.0192
7.6342
7.6313
7.6157
7.6001
7.5972
7.5944
7.5298
7.5102
7.4955
7.4918
7.2602
2.0507
1.9891
1.9832
1.9715
1.9656
1.9325
1.8239
1.7919
1.7816
1.7731
1.7652
1.7409
1.6878
1.6609
1.2827
1.2750
1.2521
1.2310
1.2198
1.1955
1.1882
1.1649
1.1572
1.1388
1.1137
1.1092
Ph
NH
1.93
1.00
1.99
1.00
0.97
2.28
4.44
6.39
f1 (ppm)
-197.4968
136.3021
133.7216
128.9222
128.2764
77.4775
77.1601
76.8426
48.7965
41.8333
38.9564
31.0973
30.6569
26.4010
25.9656
25.8439
Ph
NH
f1 (ppm)

7n


8.0396
8.0265
8.0219
8.0183
7.6384
7.6354
7.6323
7.6217
7.6169
7.6123
7.6015
7.5983
7.5953
7.5299
7.5104
7.4959
7.4919
3.3070
3.3011
2.0720
1.9866
1.9805
1.9674
1.9613
1.5512
1.5337
1.5169
1.4995
1.4820
1.4649
1.0915
1.0747
1.0475
1.0304
O
Ph
NH
Me
Me
1.96
0.99
2.00
1.00
0.92
1.16
1.18
3.11
3.10
f1 (ppm)
197.4189
136.2796
133.7488
128.9364
128.2685
77.4775
77.1599
76.8425
49.9466
39.1758
32.2688
20.3880
19.8222
f1 (ppm)

7o

7p


8.0266
8.0079
7.6437
7.6253
7.6068
7.5374
7.5181
7.4992
7.2602
3.2166
2.2224
2.1268
1.3728
1.3598
Ph
NH
Me
1.99
0.99
2.00
1.00
1.92
3.18
f1 (ppm)
197.1809
136.1367
133.6918
128.8005
128.2136
77.3437
77.0262
76.7089
40.6497
38.2923
18.5454
NH
Me
f1 (ppm)