

Supporting Information

Copper-catalyzed Enantioselective C-H Functionalization of Indoles with an Axially Chiral Bipyridine Ligand

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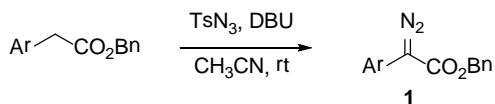
1. General

Commercially available reagents were used without further purification. Solvents were treated prior to use according to the standard methods. ^1H NMR and ^{13}C NMR spectra were recorded at room temperature in CDCl_3 or $\text{DMSO}-d_6$ on 400 MHz instrument with TMS (tetramethylsilane) as internal standard. Enantiomeric excess was determined by HPLC analysis, using chiral column described below in detail. Optical rotations were measured by polarimeter. Flash column chromatography was performed on silica gel (200-300 mesh).

2. General Procedure for Synthesis of α -Aryl- α -diazoactates

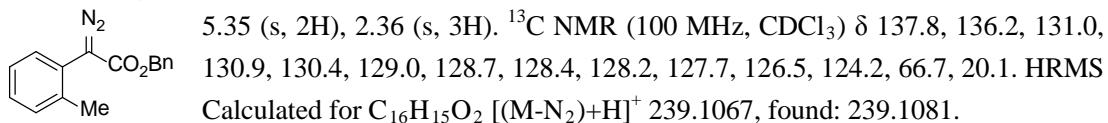
α -Aryl- α -diazoactates **1** can be conveniently synthesized according to the known literature procedures.^[1] All α -aryl- α -diazoactates are the known compounds^[2-4] except benzyl 2-diazo-2-*o*-tolylacetate **1g**, benzyl 2-(3-methoxyphenyl)-2-diazoacetate **1i** and benzyl 2-(2-chlorophenyl)-2-diazoacetate **1k**.

Synthesis of Benzyl α -Aryl- α -diazoactates



Following a known literature procedure,^[1] benzyl arylacetates (10.0 mmol) was dissolved in 20 mL acetonitrile at room temperature under an inert atmosphere. Tosyl azide (2.367 g, 12.0 mmol) was added, and then 1,8-diazabicyclo[5.4.0]undec-7-ene (2.283 g, 15.0 mmol) dissolved in 10 mL acetonitrile was added dropwise over 30 min with stirring. After 12 h, the solvent was evaporated and the residue was purified by silica gel chromatography using hexanes/ethyl acetate (100/1) as eluent to afford α -aryl- α -diazoactates **1**.

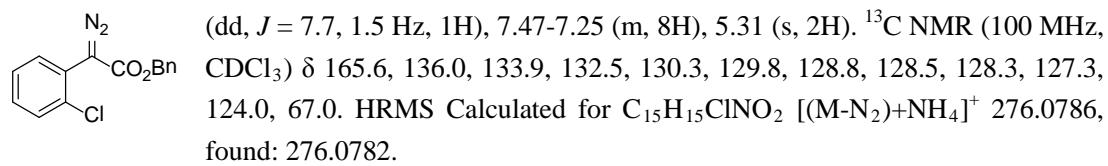
Benzyl 2-diazo-2-*o*-tolylacetate (1g): unknown compound, red oil, yield: 91%, $R_f = 0.45$ (hexanes/ethyl acetate 20:1). ^1H NMR (400 MHz, CDCl_3) δ 7.50-7.35 (m, 6H), 7.34-7.27 (m, 3H),



Benzyl 2-(3-methoxyphenyl)-2-diazoacetate (1i): unknown compound, yellow solid, m.p. = 68-69 °C, yield: 74%, $R_f = 0.40$ (hexanes/ethyl acetate 10:1). ^1H NMR (400 MHz, CDCl_3) δ



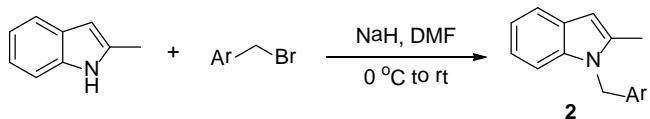
Benzyl 2-(2-chlorophenyl)-2-diazoacetate (1k): unknown compound, yellow solid, m.p. = 51-52 °C, yield: 95%, $R_f = 0.40$ (hexanes/ethyl acetate 20:1). ^1H NMR (400 MHz, CDCl_3) δ 7.57



3. General Procedure for Synthesis of *N*-Protected Indoles

N-protected indoles **2** can be conveniently synthesized according to the known literature procedures.^[5] All *N*-protected indoles are the known compounds^[5-12] except 2-methyl-1-(naphthalen-2-ylmethyl)-1*H*-indole (**2e**) and 1-(4-bromobenzyl)-2-methyl-1*H*-indole (**2f**).

Synthesis of *N*-protected indoles

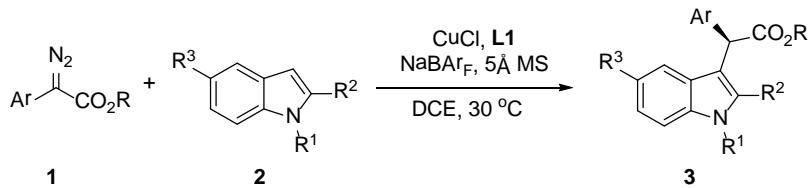


Following a known literature procedure,^[5] under an inert atmosphere, sodium hydride (0.240 g, 6.0 mmol) was added to 5 mL *N,N*-dimethylformamide (DMF) at 0 °C and stirred for 5 min. 2-methylindole (0.656 g, 5.0 mmol) dissolved in 5 mL *N,N*-dimethylformamide was added dropwise over 10 min with stirring. After 0.5 h, aryl methylbromide (5.5 mmol) dissolved in 5 mL *N,N*-dimethylformamide was added dropwise, the mixture was slowly warmed to room temperature and kept stirring until the reaction completed indicated by TLC. After quenching by aqueous ammonium chloride, the phases were separated and aqueous phase was extracted with ethyl acetate (10 mL×3). The combined organic layer was washed with brine, dried over anhydrous sodium sulfate and concentrated under reduced pressure. The residue was purified by flash chromatography using hexanes/ethyl acetate (100/1) to give *N*-protected indoles **2**.

2-Methyl-1-(naphthalen-2-ylmethyl)-1*H*-indole (2e**):** yield: 42%, unknown compound, white solid, m.p. = 101–102 °C, R_f = 0.70 (hexanes/ethyl acetate 20:1). ^1H NMR (400 MHz, CDCl₃) δ 7.79–7.66 (m, 2H), 7.65–7.53 (m, 2H), 7.43–7.33 (m, 2H), 7.29 (s, 1H), 7.24–7.15 (m, 1H), 7.15–7.00 (m, 3H), 6.34 (s, 1H), 5.35 (s, 2H), 2.33 (s, 3H). ^{13}C NMR (100 MHz, CDCl₃) δ 137.4, 136.9, 135.5, 133.5, 132.8, 128.8, 128.4, 127.9, 127.8, 126.4, 126.0, 124.6, 124.3, 121.0, 119.9, 119.7, 109.4, 100.7, 46.8, 12.9. HRMS Calculated for C₂₀H₁₈N [M+H]⁺ 272.1434, found: 272.1438.

1-(4-Bromobenzyl)-2-methyl-1*H*-indole (2f**):** yield: 43%, unknown compound, white solid, m.p. = 109–110 °C, R_f = 0.60 (hexanes/ethyl acetate 20:1). ^1H NMR (400 MHz, CDCl₃) δ 7.61–7.52 (m, 1H), 7.41–7.34 (m, 2H), 7.18–7.04 (m, 3H), 6.84 (s, 1H), 6.81 (s, 1H), 6.33 (s, 1H), 5.24 (s, 2H), 2.35 (s, 3H). ^{13}C NMR (100 MHz, CDCl₃) δ 137.2, 137.1, 136.7, 132.1, 128.4, 127.9, 121.3, 121.1, 120.0, 119.9, 109.2, 101.0, 46.1, 12.9. HRMS Calculated for C₁₆H₁₅BrN [M+H]⁺ 300.0382, found: 300.0385.

4. Copper-Catalyzed Enantioselective C-H Functionalization of Indoles



General Procedure: The powdered CuCl (1.0 mg, 0.01 mmol, 5.0 mol%), (*R_a,S,S*)-C4-ACBP **L₁** (2.7 mg, 0.01 mmol, 5.0 mol%), NaBAR_F (21.2 mg, 0.024 mmol, 12.0 mol%) and 200 mg 5 Å molecular sieves were introduced into an oven-dried Schlenk tube under nitrogen. After 1,2-dichloroethane (2.0 mL) was injected into the Schlenk tube, the solution was stirred at 30 °C under nitrogen for 2 h. Protected indoles **2** (0.30 mmol) and α -aryl- α -diazoactates **1** (0.20 mmol) was then introduced in one portion. The resulting mixture was stirred at 60 °C until the full consumption of **1**. After filtrating and removing solvent in vacuum, the product **3** was isolated by flash chromatography (hexanes/ethyl acetate = 30:1, v/v).

(R)-Benzyl 2-(1-benzyl-2-methyl-1*H*-indol-3-yl)-2-phenylacetate (3aa): yield: 97%, colorless oil, known compound,^[13] ee: 94%, $[\alpha]^{20}_D = -54.30$ (*c* 1.00, CHCl₃) [lit.^[13]: $[\alpha]^{20}_D = -51.20$ (*c* 1.08,

$\text{Ph}-\text{CH}(\text{Bn})-\text{CH}(\text{Me})-\text{C}_6\text{H}_3\text{N}-\text{C}_6\text{H}_4-\text{CH}(\text{Ph})-\text{CO}_2\text{Bn}$

 Bn Me

CHCl₃) for 97% ee (*R*), R_f = 0.35 (hexanes/ethyl acetate 20:1). ¹H NMR (400 MHz, CDCl₃) δ 7.49 (d, *J* = 7.9 Hz, 1H), 7.34-7.15 (m, 14H), 7.12-7.05 (m, 1H), 7.00 (t, *J* = 7.5 Hz, 1H), 6.96-6.88 (m, 2H), 5.39 (s, 1H), 5.28 (s, 2H), 5.23-5.11 (m, 2H), 2.23 (s, 3H). ¹³C NMR (100 MHz, CDCl₃) δ 173.1, 138.8, 137.9, 136.8, 136.1, 134.9, 129.0, 128.6, 128.5, 128.5, 128.3, 128.2, 127.5, 127.3, 126.9, 126.1, 121.3, 119.8, 109.3, 108.7, 66.8, 48.5, 46.7, 10.9. HPLC (AS-H column, *i*PrOH/hexane 10/90, 0.7 mL/min, 254 nm): t₁ = 11.1 min, t₂ = 12.1 min (major).

(R)-Benzyl 2-(1,2-dimethyl-1*H*-indol-3-yl)-2-phenylacetate (3ab): yield: 85%, colorless oil, known compound,^[13] ee: 91%, $[\alpha]^{20}_D = -76.33$ (*c* 0.90, CHCl₃) [lit.^[13]: $[\alpha]^{20}_D = -78.42$ (*c* 0.95,

$\text{Ph}-\text{CH}(\text{Bn})-\text{CH}(\text{Me})_2-\text{C}_6\text{H}_3\text{N}-\text{C}_6\text{H}_4-\text{CH}(\text{Ph})-\text{CO}_2\text{Bn}$

 Me Me

CHCl₃) for 97% ee (*R*), R_f = 0.35 (hexanes/ethyl acetate 20:1). ¹H NMR (400 MHz, CDCl₃) δ 7.45 (d, *J* = 8.0 Hz, 1H), 7.33-7.08 (m, 12H), 7.03-6.94 (m, 1H), 5.35 (s, 1H), 5.16 (dd, *J* = 35.6, 12.4 Hz, 2H), 3.60 (s, 3H), 2.28 (s, 3H). ¹³C NMR (100 MHz, CDCl₃) δ 173.2, 139.0, 136.8, 136.1, 135.0, 128.6, 128.4, 128.4, 128.4, 128.2, 127.1, 126.9, 120.9, 119.6, 119.4, 108.8, 107.9, 66.9, 48.5, 29.7, 10.9. HPLC (AS-H column, *i*PrOH/hexane 10/90, 0.7 mL/min, 254 nm): t₁ = 11.1 min, t₂ = 12.8 min (major).

(R)-Benzyl 2-(1-ethyl-2-methyl-1*H*-indol-3-yl)-2-phenylacetate (3ac): yield: 94%, colorless oil, unknown compound, ee: 91%, $[\alpha]^{20}_D = -65.82$ (*c* 1.03, CHCl₃), R_f = 0.35 (hexanes/ethyl

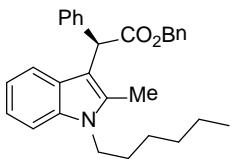
$\text{Ph}-\text{CH}(\text{Bn})-\text{CH}(\text{Et})-\text{CH}(\text{Me})-\text{C}_6\text{H}_3\text{N}-\text{C}_6\text{H}_4-\text{CH}(\text{Ph})-\text{CO}_2\text{Bn}$

 Et Me

acetate 20:1). ¹H NMR (400 MHz, CDCl₃) δ 7.45 (d, *J* = 7.7 Hz, 1H), 7.31-7.08 (m, 12H), 7.03-6.95 (m, 1H), 5.36 (s, 1H), 5.17 (dd, *J* = 28.9, 12.5 Hz, 2H), 4.10 (q, *J* = 7.2 Hz, 2H), 2.29 (d, *J* = 1.2 Hz, 3H), 1.31 (t, *J* = 7.1 Hz, 3H). ¹³C NMR (100 MHz, CDCl₃) δ 173.2, 139.0, 136.2, 135.8, 134.2, 128.6, 128.5, 128.4, 128.3, 128.2, 127.3, 126.9, 120.9, 119.3, 108.8, 107.9, 66.8, 48.5, 38.0, 15.5, 10.7. HPLC (AS-H column, *i*PrOH/hexane 05/95, 0.7 mL/min, 254 nm): t₁ = 12.0 min, t₂ = 13.3 min (major). HRMS Calculated for C₂₆H₂₆NO₂ (M+H)⁺ 384.1958, found: 384.1954.

(R)-Benzyl 2-(1-hexyl-2-methyl-1*H*-indol-3-yl)-2-phenylacetate (3ad): yield: 93%, colorless oil, unknown compound, ee: 93%, $[\alpha]^{20}_D = -58.83$ (*c* 1.03, CHCl₃), R_f = 0.40 (hexanes/ethyl

acetate 20:1). ^1H NMR (400 MHz, CDCl_3) δ 7.45 (d, $J = 7.9$ Hz, 1H), 7.30-7.09 (m, 12H), 6.98 (t, $J = 7.3$ Hz, 1H), 5.36 (s, 1H), 5.17 (dd, $J = 27.8, 12.5$ Hz, 2H), 4.11-3.96 (m, 2H), 2.29 (s, 3H), 1.70 (dd, $J = 14.7, 7.4$ Hz, 2H), 1.37-1.21 (m, 6H), 0.87 (t, $J = 6.9$ Hz, 3H). ^{13}C NMR (100 MHz, CDCl_3) δ 173.2, 139.0, 136.2, 134.6, 128.6, 128.5, 128.4, 128.3, 128.2, 127.2, 126.9, 120.8, 119.7, 119.3, 109.1, 107.9, 66.8, 48.5, 43.6, 31.7, 30.3, 26.9, 22.8, 14.2, 10.9. HPLC (AS-H column, $^i\text{PrOH}/\text{hexane}$ 02/98, 0.7 mL/min, 254 nm): $t_1 = 9.0$ min, $t_2 = 9.7$ min (major). HRMS Calculated for $\text{C}_{30}\text{H}_{34}\text{NO}_2$ ($\text{M}+\text{H}$) $^+$ 440.2584, found: 440.2580.

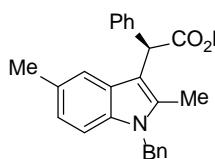


(R)-Benzyl 2-(2-methyl-1-(naphthalen-2-ylmethyl)-1H-indol-3-yl)-2-phenylacetate (3ae): yield: 96%, colorless oil, unknown compound, ee: 95%, $[\alpha]^{20}_D = -32.73$ (c 0.95, CHCl_3), $R_f = 0.25$ (hexanes/ethyl acetate 20:1). ^1H NMR (400 MHz, CDCl_3) δ 7.80-7.66 (m, 2H), 7.62-7.49 (m, 2H), 7.44-7.35 (m, 2H), 7.32-7.15 (m, 12H), 7.14-7.06 (m, 2H), 7.02 (t, $J = 7.4$ Hz, 1H), 5.42 (s, 1H), 5.41 (s, 2H), 5.26-5.10 (m, 2H), 2.24 (s, 3H). ^{13}C NMR (100 MHz, CDCl_3) δ 173.2, 138.8, 136.9, 136.1, 135.4, 135.0, 133.5, 132.9, 128.9, 128.6, 128.5, 128.5, 128.3, 128.2, 127.9, 127.8, 127.4, 127.0, 126.5, 126.1, 124.7, 124.3, 121.4, 119.8, 119.8, 109.3, 108.8, 66.9, 48.5, 47.0, 10.9. HPLC (AD-H column, $^i\text{PrOH}/\text{hexane}$ 10/90, 0.7 mL/min, 254 nm): $t_1 = 20.9$ min, $t_2 = 23.1$ min (major). HRMS Calculated for $\text{C}_{35}\text{H}_{30}\text{NO}_2$ ($\text{M}+\text{H}$) $^+$ 496.2271, found: 496.2272.

(R)-Benzyl 2-(1-(4-bromobenzyl)-2-methyl-1H-indol-3-yl)-2-phenylacetate (3af): yield: 89%, colorless oil, unknown compound, ee: 93%, $[\alpha]^{20}_D = -36.56$ (c 0.93, CHCl_3), $R_f = 0.50$ (hexanes/ethyl acetate 20:1). ^1H NMR (400 MHz, CDCl_3) δ 7.49 (d, $J = 8.0$ Hz, 1H), 7.35-7.13 (m, 13H), 7.10 (t, $J = 7.5$ Hz, 1H), 7.01 (t, $J = 7.4$ Hz, 1H), 6.76 (d, $J = 8.3$ Hz, 2H), 5.38 (s, 1H), 5.24-5.16 (m, 4H), 2.21 (s, 3H). ^{13}C NMR (100 MHz, CDCl_3) δ 173.1, 138.7, 136.9, 136.6, 136.0, 134.7, 132.1, 128.6, 128.5, 128.5, 128.3, 128.3, 127.8, 127.4, 127.0, 121.5, 121.3, 120.0, 119.9, 109.1, 109.0, 66.9, 48.4, 46.2, 10.9. HPLC (AS-H column, $^i\text{PrOH}/\text{hexane}$ 05/95, 0.7 mL/min, 254 nm): $t_1 = 18.6$ min, $t_2 = 20.1$ min (major). HRMS Calculated for $\text{C}_{31}\text{H}_{27}\text{BrNO}_2$ ($\text{M}+\text{H}$) $^+$ 524.1220, found: 524.1217.

(R)-Benzyl 2-(2-methyl-1-phenyl-1H-indol-3-yl)-2-phenylacetate (3ag): yield: 99%, colorless oil, known compound, ^[13] ee: 88%, $[\alpha]^{20}_D = -45.32$ (c 0.94, CHCl_3) [lit.^[13]: $[\alpha]^{20}_D = -51.31$ (c 1.14, CHCl_3) for 97% ee (*R*)], $R_f = 0.35$ (hexanes/ethyl acetate 20:1). ^1H NMR (400 MHz, CDCl_3) δ 7.53-7.37 (m, 4H), 7.35-7.18 (m, 12H), 7.10-6.99 (m, 3H), 5.41 (s, 1H), 5.21 (q, $J = 12.4$ Hz, 2H), 2.17 (s, 3H). ^{13}C NMR (100 MHz, CDCl_3) δ 173.1, 138.7, 138.0, 137.8, 136.1, 135.2, 129.6, 128.6, 128.5, 128.5, 128.4, 128.3, 128.1, 127.3, 127.0, 121.5, 120.2, 119.7, 110.2, 109.4, 77.2, 66.9, 48.6, 11.7. HPLC (OD-H column, $^i\text{PrOH}/\text{hexane}$ 05/95, 0.7 mL/min, 254 nm): $t_1 = 12.5$ min (major), $t_2 = 14.0$ min.

(R)-Benzyl 2-(1-benzyl-2,5-dimethyl-1H-indol-3-yl)-2-phenylacetate (3ah): yield: 92%, colorless oil, unknown compound, ee: 94%, $[\alpha]^{20}_D = -55.37$ (c 1.06, CHCl_3), $R_f = 0.35$ (hexanes/ethyl acetate 20:1).



138.9, 138.0, 136.2, 135.2, 135.0, 129.0, 128.6, 128.5, 128.3, 128.2, 127.6, 127.4, 126.9, 126.1, 122.9, 119.4, 109.0, 108.1, 66.9, 48.4, 46.8, 21.7, 10.9. HPLC (AS-H column, $^i\text{PrOH}/\text{hexane}$ 10/90, 0.7 mL/min, 254 nm): $t_1 = 9.3$ min, $t_2 = 11.9$ min (major). HRMS Calculated for $\text{C}_{32}\text{H}_{30}\text{NO}_2$ ($\text{M}+\text{H}$) $^+$ 460.2271, found: 460.2269.

(R)-Benzyl 2-(1-benzyl-5-methoxy-2-methyl-1*H*-indol-3-yl)-2-phenylacetate (3ai): yield: 84%, colorless oil, unknown compound, ee: 91%, $[\alpha]^{20}_D = -49.60$ (c 1.00, CHCl_3), $R_f = 0.20$

(hexanes/ethyl acetate 20:1). ^1H NMR (400 MHz, CDCl_3) δ 7.35-7.14 (m, 13H), 7.08 (d, $J = 8.8$ Hz, 1H), 6.85-6.95 (m, 3H), 6.80-6.70 (m, 1H), 5.37 (s, 1H), 5.25 (s, 2H), 5.19 (s, 2H), 3.63 (s, 3H), 2.22 (s, 3H). ^{13}C NMR (100 MHz, CDCl_3) δ 173.2, 154.2, 138.7, 138.0, 136.1, 135.5, 132.0, 129.0, 128.6, 128.5, 128.2, 127.7, 127.4, 127.0, 126.0, 111.2, 110.0, 108.2, 101.9, 66.8, 55.8, 48.5, 46.9, 11.0. HPLC (AS-H column, $^i\text{PrOH}/\text{hexane}$ 10/90, 0.7 mL/min, 254 nm): $t_1 = 12.7$ min, $t_2 = 14.9$ min (major). HRMS Calculated for $\text{C}_{32}\text{H}_{30}\text{NO}_3$ ($\text{M}+\text{H}$) $^+$ 476.2220, found: 476.2235.

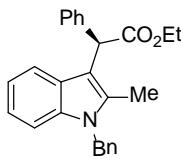
(R)-Benzyl 2-(1-benzyl-5-fluoro-2-methyl-1*H*-indol-3-yl)-2-phenylacetate (3aj): yield: 89%, yellowish oil, unknown compound, ee: 90%, $[\alpha]^{20}_D = -31.70$ (c 1.00, CHCl_3), $R_f = 0.30$

(hexanes/ethyl acetate 20:1). ^1H NMR (400 MHz, CDCl_3) δ 7.29-7.17 (m, 13H), 7.15-7.05 (m, 2H), 6.95-6.87 (m, 2H), 6.81 (td, $J = 9.0, 2.5$ Hz, 1H), 5.33 (s, 1H), 5.26 (s, 2H), 5.19 (s, 2H), 2.24 (s, 3H). ^{13}C NMR (100 MHz, CDCl_3) δ 172.9, 157.5 (d, $J = 233$ Hz), 138.4, 137.6, 136.7, 136.0, 133.3, 129.1, 128.6, 128.4, 128.3, 128.3, 127.6 (d, $J = 9.9$ Hz), 127.6, 127.1, 126.0, 109.8 (d, $J = 9.6$ Hz), 109.5 (d, $J = 26$ Hz), 108.8 (d, $J = 5.0$ Hz), 105.1 (d, $J = 24$ Hz), 67.0, 48.5, 47.0, 11.0. ^{19}F NMR (376 MHz, CDCl_3) δ -124.37. HPLC (AD-H column, $^i\text{PrOH}/\text{hexane}$ 10/90, 0.7 mL/min, 254 nm): $t_1 = 17.0$ min (major), $t_2 = 17.9$ min. HRMS Calculated for $\text{C}_{31}\text{H}_{27}\text{FNO}_2$ ($\text{M}+\text{H}$) $^+$ 464.2020, found: 464.2029.

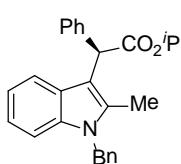
(R)-Benzyl 2-(1-benzyl-1*H*-indol-3-yl)-2-phenylacetate (3ak): yield: 90%, colorless oil, known compound,^[13] ee: 64%, $[\alpha]^{20}_D = -20.10$ (c 0.96, CHCl_3) [lit.^[13]: $[\alpha]^{20}_D = -4.20$ (c 1.12, CHCl_3) for 12% ee (*R*), $R_f = 0.35$ (hexanes/ethyl acetate 20:1). ^1H NMR (400 MHz, CDCl_3) δ 7.46-7.35 (m, 3H), 7.34-7.16 (m, 12H), 7.15-7.07 (m, 2H), 7.06-6.95 (m, 3H), 5.32 (s, 1H), 5.23 (s, 2H), 5.17 (q, $J = 12.4$ Hz, 2H). ^{13}C NMR (100 MHz, CDCl_3) δ 172.9, 138.7, 137.6, 136.8, 136.0, 128.9, 128.7, 128.7, 128.3, 127.7, 127.6, 127.5, 127.4, 126.8, 122.2, 119.7, 119.5, 112.7, 110.0, 67.0, 50.3, 49.2. HPLC (AS-H column, $^i\text{PrOH}/\text{hexane}$ 10/90, 0.7 mL/min, 254 nm): $t_1 = 13.1$ min (major), $t_2 = 14.6$ min.

(R)-Methyl 2-(1-benzyl-2-methyl-1*H*-indol-3-yl)-2-phenylacetate (3ba): yield: 88%, colorless oil, unknown compound, ee: 92%, $[\alpha]^{20}_D = -64.25$ (c 1.08, CHCl_3), $R_f = 0.20$ (hexanes/ethyl acetate 20:1). ^1H NMR (400 MHz, CDCl_3) δ 7.52 (d, $J = 7.8$ Hz, 1H), 7.33-7.16 (m, 9H), 7.13-7.00 (m, 2H), 6.95 (d, $J = 7.2$ Hz, 2H), 5.34 (s, 1H), 5.29 (s, 2H), 3.72 (s, 3H), 2.28 (s, 3H). ^{13}C NMR (100 MHz, CDCl_3) δ 173.9, 138.9, 137.8, 136.8, 134.9, 129.0, 128.5, 128.4, 127.5, 127.3, 127.0, 126.1, 121.3, 119.8, 119.7, 109.3, 108.7, 52.4, 48.4, 46.8, 10.9. HPLC (IC column, $^i\text{PrOH}/\text{hexane}$ 10/90, 0.7 mL/min, 254 nm): $t_1 = 9.9$ min, $t_2 = 11.7$ min (major). HRMS Calculated for $\text{C}_{25}\text{H}_{24}\text{NO}_2$ ($\text{M}+\text{H}$) $^+$ 370.1802, found: 370.1802.

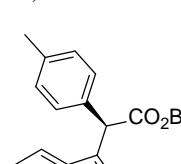
(R)-Ethyl 2-(1-benzyl-2-methyl-1*H*-indol-3-yl)-2-phenylacetate (3ca): yield: 91%, colorless


oil, unknown compound, ee: 91%, $[\alpha]^{20}_D = -44.20$ (*c* 1.00, CHCl_3), $R_f = 0.20$ (hexanes/ethyl acetate 20:1). ^1H NMR (400 MHz, CDCl_3) δ 7.53 (d, *J* = 7.8 Hz, 1H), 7.32-7.17 (m, 9H), 7.14-6.99 (m, 2H), 6.95 (d, *J* = 6.7 Hz, 2H), 5.33 (s, 1H), 5.31 (s, 2H), 4.27-4.13 (m, 2H), 2.28 (s, 3H), 1.21 (t, *J* = 7.2 Hz, 3H). ^{13}C NMR (100 MHz, CDCl_3) δ 173.3, 139.1, 137.9, 136.8, 134.9, 128.9, 128.4, 128.4, 127.4, 127.4, 126.9, 126.1, 121.2, 119.8, 119.7, 109.3, 108.8, 61.2, 48.5, 46.7, 14.4, 10.9. HPLC (AD-H column, $^i\text{PrOH}/\text{hexane}$ 10/90, 0.7 mL/min, 254 nm): $t_1 = 9.6$ min, $t_2 = 10.1$ min (major). HRMS Calculated for $\text{C}_{26}\text{H}_{26}\text{NO}_2$ ($\text{M}+\text{H}$) $^+$ 384.1958, found: 384.1953.

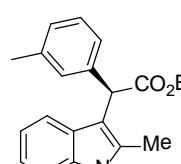
(R)-Isopropyl 2-(1-benzyl-2-methyl-1*H*-indol-3-yl)-2-phenylacetate (3da): yield: 81%, colorless oil, unknown compound, ee: 84%, $[\alpha]^{20}_D = -28.98$ (*c* 1.08, CHCl_3), $R_f = 0.35$ (hexanes/ethyl acetate 20:1).


 ^1H NMR (400 MHz, CDCl_3) δ 7.53 (d, *J* = 7.9 Hz, 1H), 7.33-7.17 (m, 9H), 7.13-6.98 (m, 2H), 6.93 (d, *J* = 6.7 Hz, 2H), 5.31 (s, 2H), 5.30 (s, 1H), 5.08 (dt, *J* = 12.5, 6.2 Hz, 1H), 2.28 (s, 3H), 1.23 (d, *J* = 6.2 Hz, 3H), 1.14 (d, *J* = 6.2 Hz, 3H). ^{13}C NMR (100 MHz, CDCl_3) δ 172.8, 139.1, 138.0, 136.8, 134.9, 129.0, 128.4, 127.4, 126.8, 126.0, 121.2, 120.0, 119.6, 109.2, 109.0, 68.6, 48.8, 46.7, 22.0, 21.9, 11.0. HPLC (OD-H column, $^i\text{PrOH}/\text{hexane}$ 10/90, 0.7 mL/min, 254 nm): $t_1 = 10.6$ min, $t_2 = 11.7$ min (major). HRMS Calculated for $\text{C}_{27}\text{H}_{28}\text{NO}_2$ ($\text{M}+\text{H}$) $^+$ 398.2115, found: 398.2113.

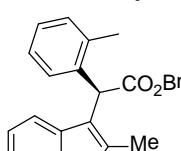
(R)-Benzyl 2-(1-benzyl-2-methyl-1*H*-indol-3-yl)-2-*p*-tolylacetate (3ea): yield: 85%, colorless oil, unknown compound, ee: 85%, $[\alpha]^{20}_D = -39.49$ (*c* 0.98, CHCl_3), $R_f = 0.35$ (hexanes/ethyl acetate 20:1).


 ^1H NMR (400 MHz, CDCl_3) δ 7.51 (d, *J* = 7.9 Hz, 1H), 7.34-7.13 (m, 11H), 7.12-6.84 (m, 6H), 5.35 (s, 1H), 5.26 (s, 2H), 5.22-5.10 (m, 2H), 2.29 (s, 3H), 2.22 (s, 3H). ^{13}C NMR (100 MHz, CDCl_3) δ 173.3, 137.9, 136.8, 136.5, 136.2, 135.8, 134.8, 129.2, 129.0, 128.5, 128.4, 128.3, 128.2, 127.4, 127.4, 126.1, 121.3, 119.8, 119.7, 109.2, 108.8, 66.8, 48.1, 46.7, 21.2, 10.9. HPLC (AS-H column, $^i\text{PrOH}/\text{hexane}$ 10/90, 0.7 mL/min, 254 nm): $t_1 = 10.5$ min, $t_2 = 12.0$ min (major). HRMS Calculated for $\text{C}_{32}\text{H}_{30}\text{NO}_2$ ($\text{M}+\text{H}$) $^+$ 460.2271, found: 460.2272.

(R)-Benzyl 2-(1-benzyl-2-methyl-1*H*-indol-3-yl)-2-*m*-tolylacetate (3fa): yield: 90%, colorless oil, unknown compound, ee: 93%, $[\alpha]^{20}_D = -43.07$ (*c* 1.04, CHCl_3), $R_f = 0.35$ (hexanes/ethyl acetate 20:1).


 ^1H NMR (400 MHz, CDCl_3) δ 7.51 (d, *J* = 7.8 Hz, 1H), 7.35-6.97 (m, 15H), 6.96-6.88 (m, 2H), 5.36 (s, 1H), 5.28 (s, 2H), 5.23-5.11 (m, 2H), 2.26 (s, 3H), 2.22 (s, 3H). ^{13}C NMR (100 MHz, CDCl_3) δ 173.2, 138.7, 138.0, 137.9, 136.8, 136.2, 134.9, 129.2, 129.0, 128.6, 128.3, 128.3, 128.2, 127.7, 127.4, 126.1, 125.5, 121.3, 119.7, 109.2, 108.8, 66.8, 48.4, 46.7, 21.7, 10.9. HPLC (AS-H column, $^i\text{PrOH}/\text{hexane}$ 05/95, 0.7 mL/min, 254 nm): $t_1 = 12.5$ min, $t_2 = 13.5$ min (major). HRMS Calculated for $\text{C}_{32}\text{H}_{30}\text{NO}_2$ ($\text{M}+\text{H}$) $^+$ 460.2271, found: 460.2274.

(R)-Benzyl 2-(1-benzyl-2-methyl-1*H*-indol-3-yl)-2-*o*-tolylacetate (3ga): yield: 58%, colorless


oil, unknown compound, ee: 58%, $[\alpha]^{20}_D = -31.04$ (*c* 1.06, CHCl_3), $R_f = 0.35$ (hexanes/ethyl acetate 20:1). ^1H NMR (400 MHz, CDCl_3) δ 7.47 (d, *J* = 7.9 Hz, 1H), 7.30-6.97 (m, 15H), 6.92 (d, *J* = 7.5 Hz, 2H), 5.41 (s, 1H), 5.31 (s, 2H), 5.24-5.10 (m, 2H), 2.24 (s, 3H), 2.19 (s, 3H). ^{13}C NMR (100 MHz, CDCl_3) δ

173.1, 137.9, 137.0, 136.7, 136.1, 134.8, 130.6, 129.0, 128.6, 128.4, 128.2, 127.7, 127.5, 127.3, 126.1, 126.0, 121.3, 119.8, 119.5, 109.3, 107.9, 66.9, 46.7, 46.5, 19.9, 10.8. HPLC (AS-H column, i PrOH/hexane 05/95, 0.7 mL/min, 254 nm): $t_1 = 12.1$ min, $t_2 = 13.3$ min (major). HRMS Calculated for $C_{32}H_{30}NO_2$ ($M+H$)⁺ 460.2271, found: 460.2274.

(R)-Benzyl 2-(1-benzyl-2-methyl-1*H*-indol-3-yl)-2-(4-methoxyphenyl)acetate (3ha): yield: 84%, colorless oil, unknown compound, ee: 37%, $[\alpha]^{20}_D = -16.41$ (c 1.00, $CHCl_3$), $R_f = 0.40$ (hexanes/ethyl acetate 10:1). 1H NMR (400 MHz, $CDCl_3$) δ 7.49 (d, $J = 7.8$ Hz, 1H), 7.32-7.15 (m, 11H), 7.13-7.06 (m, 1H), 7.05-6.97 (m, 1H), 6.97-6.89 (m, 2H), 6.85-6.76 (m, 2H), 5.33 (s, 1H), 5.30 (s, 2H), 5.23-5.10 (m, 2H), 3.75 (s, 3H), 2.23 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 173.5, 158.5, 137.9, 136.8, 136.2, 134.8, 130.9, 129.5, 129.0, 128.6, 128.3, 128.2, 127.5, 127.3, 126.1, 121.3, 119.8, 119.8, 113.9, 109.3, 108.9, 66.8, 55.4, 47.7, 46.7, 10.9. HPLC (AS-H column, i PrOH/hexane 10/90, 0.7 mL/min, 254 nm): $t_1 = 15.5$ min, $t_2 = 18.2$ min (major). HRMS Calculated for $C_{32}H_{30}NO_3$ ($M+H$)⁺ 476.2220, found: 476.2225.

(R)-Benzyl 2-(1-benzyl-2-methyl-1*H*-indol-3-yl)-2-(3-methoxyphenyl)acetate (3ia): yield: 95%, colorless oil, unknown compound, ee: 95%, $[\alpha]^{20}_D = -46.90$ (c 1.00, $CHCl_3$), $R_f = 0.25$ (hexanes/ethyl acetate 20:1). 1H NMR (400 MHz, $CDCl_3$) δ 7.53 (d, $J = 7.8$ Hz, 1H), 7.26-7.16 (m, 11H), 7.13-6.97 (m, 2H), 6.95-6.81 (m, 4H), 6.75 (dd, $J = 8.2, 2.2$ Hz, 1H), 5.37 (s, 1H), 5.27 (s, 2H), 5.24-5.08 (m, 2H), 3.65 (s, 3H), 2.22 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 173.0, 159.7, 140.4, 137.9, 136.8, 136.1, 134.9, 129.4, 129.0, 128.6, 128.3, 128.2, 127.4, 127.4, 126.1, 121.3, 120.9, 119.8, 119.7, 114.3, 112.3, 109.3, 108.6, 66.8, 55.2, 48.4, 46.7, 10.9. HPLC (AS-H column, i PrOH/hexane 10/90, 0.7 mL/min, 254 nm): $t_1 = 15.1$ min, $t_2 = 16.7$ min (major). HRMS Calculated for $C_{32}H_{30}NO_3$ ($M+H$)⁺ 476.2220, found: 476.2223.

(R)-Benzyl 2-(1-benzyl-2-methyl-1*H*-indol-3-yl)-2-(4-chlorophenyl)acetate (3ja): yield: 79%, colorless oil, unknown compound, ee: 94%, $[\alpha]^{20}_D = -60.31$ (c 0.95, $CHCl_3$), $R_f = 0.30$ (hexanes/ethyl acetate 10:1). 1H NMR (400 MHz, $CDCl_3$) δ 7.45 (d, $J = 7.9$ Hz, 1H), 7.30-6.97 (m, 15H), 6.92 (d, $J = 7.2$ Hz, 2H), 5.32 (s, 1H), 5.29 (s, 2H), 5.22-5.10 (m, 2H), 2.23 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 172.8, 137.7, 137.3, 136.8, 135.9, 135.0, 132.8, 129.9, 129.0, 128.6, 128.6, 128.3, 127.5, 127.1, 126.1, 121.5, 119.9, 119.6, 109.4, 108.2, 67.0, 47.8, 46.8, 10.9. HPLC (OD-H column, i PrOH/hexane 10/90, 0.7 mL/min, 254 nm): $t_1 = 18.5$ min, $t_2 = 22.1$ min (major). HRMS Calculated for $C_{31}H_{27}ClNO_2$ ($M+H$)⁺ 480.1725, found: 480.1723.

(R)-Benzyl 2-(1-benzyl-2-methyl-1*H*-indol-3-yl)-2-(2-chlorophenyl)acetate (3ka): yield: 96%, colorless oil, unknown compound, ee: 84%, $[\alpha]^{20}_D = -134.77$ (c 0.92, $CHCl_3$), $R_f = 0.35$ (hexanes/ethyl acetate 20:1). 1H NMR (400 MHz, $CDCl_3$) δ 7.53 (d, $J = 7.9$ Hz, 1H), 7.38 (dd, $J = 7.8, 1.2$ Hz, 1H), 7.26-7.05 (m, 13H), 7.05-6.98 (m, 1H), 6.94-6.88 (m, 2H), 5.63 (s, 1H), 5.29 (s, 2H), 5.17 (dd, $J = 28.0, 12.5$ Hz, 2H), 2.23 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 172.2, 137.7, 136.8, 136.7, 136.0, 135.2, 134.5, 130.5, 129.5, 129.0, 128.6, 128.5, 128.3, 128.2, 127.5, 127.4, 126.9, 126.0, 121.4, 120.0, 119.5, 109.4, 107.1, 67.0, 46.8, 46.5, 10.8. HPLC (AS-H column, i PrOH/hexane 10/90, 0.7 mL/min, 254 nm): $t_1 = 10.0$ min, $t_2 = 11.2$ min (major). HRMS Calculated for $C_{31}H_{27}ClNO_2$ ($M+H$)⁺ 480.1725, found: 480.1728.

(R)-Benzyl 2-(1-benzyl-2-methyl-1*H*-indol-3-yl)-2-(4-bromophenyl)acetate (3la): yield:

87%, colorless oil, unknown compound, ee: 95%, $[\alpha]^{20}_D = -48.12$ (*c* 1.01, CHCl₃), R_f = 0.30 (hexanes/ethyl acetate 20:1). ¹H NMR (400 MHz, CDCl₃) δ 7.45 (d, *J* = 7.9 Hz, 1H), 7.37 (d, *J* = 8.3 Hz, 2H), 7.32-7.06 (m, 12H), 7.01 (t, *J* = 7.5 Hz, 1H), 6.95-6.86 (m, 2H), 5.30 (s, 1H), 5.28 (s, 2H), 5.22-5.10 (m, 2H), 2.22 (s, 3H). ¹³C NMR (100 MHz, CDCl₃) δ 172.7, 137.8, 137.7, 136.8, 135.9, 135.0, 131.5, 130.3, 129.0, 128.6, 128.3, 127.5, 127.1, 126.1, 121.5, 120.9, 119.9, 119.6, 109.4, 108.1, 67.0, 47.9, 46.8, 10.9. HPLC (AS-H column, ⁱPrOH/hexane 05/95, 0.7 mL/min, 254 nm): t₁ = 16.2 min, t₂ = 17.6 min (major). HRMS Calculated for C₃₁H₂₇BrNO₂ (M+H)⁺ 524.1220, found: 524.1240.

(R)-Benzyl 2-(1-benzyl-2-methyl-1*H*-indol-3-yl)-2-(naphthalen-2-yl)acetate (3ma): yield:

97%, white solid, known compound,^[13] ee: 94%, $[\alpha]^{20}_D = -26.04$ (*c* 0.96, CHCl₃) [lit.^[13]: $[\alpha]^{20}_D = -26.73$ (*c* 1.10, CHCl₃) for 95% ee (*R*)], R_f = 0.25 (hexanes/ethyl acetate 20:1). ¹H NMR (400 MHz, CDCl₃) δ 7.89-7.60 (m, 4H), 7.52 (d, *J* = 7.9 Hz, 1H), 7.47-7.34 (m, 3H), 7.33-7.17 (m, 9H), 7.10 (t, *J* = 7.4 Hz, 1H), 7.05-6.88 (m, 3H), 5.55 (s, 1H), 5.31 (s, 2H), 5.29-5.15 (m, 2H), 2.25 (s, 3H). ¹³C NMR (100 MHz, CDCl₃) δ 173.1, 137.9, 136.8, 136.4, 136.1, 135.1, 133.4, 132.6, 129.0, 128.6, 128.4, 128.3, 128.2, 128.1, 127.7, 127.5, 127.5, 127.1, 126.7, 126.1, 126.1, 125.9, 121.4, 119.9, 119.7, 109.3, 108.6, 67.0, 48.6, 46.8, 11.0. HPLC (AS-H column, ⁱPrOH/hexane 10/90, 0.7 mL/min, 254 nm): t₁ = 13.9 min, t₂ = 18.8 min (major).

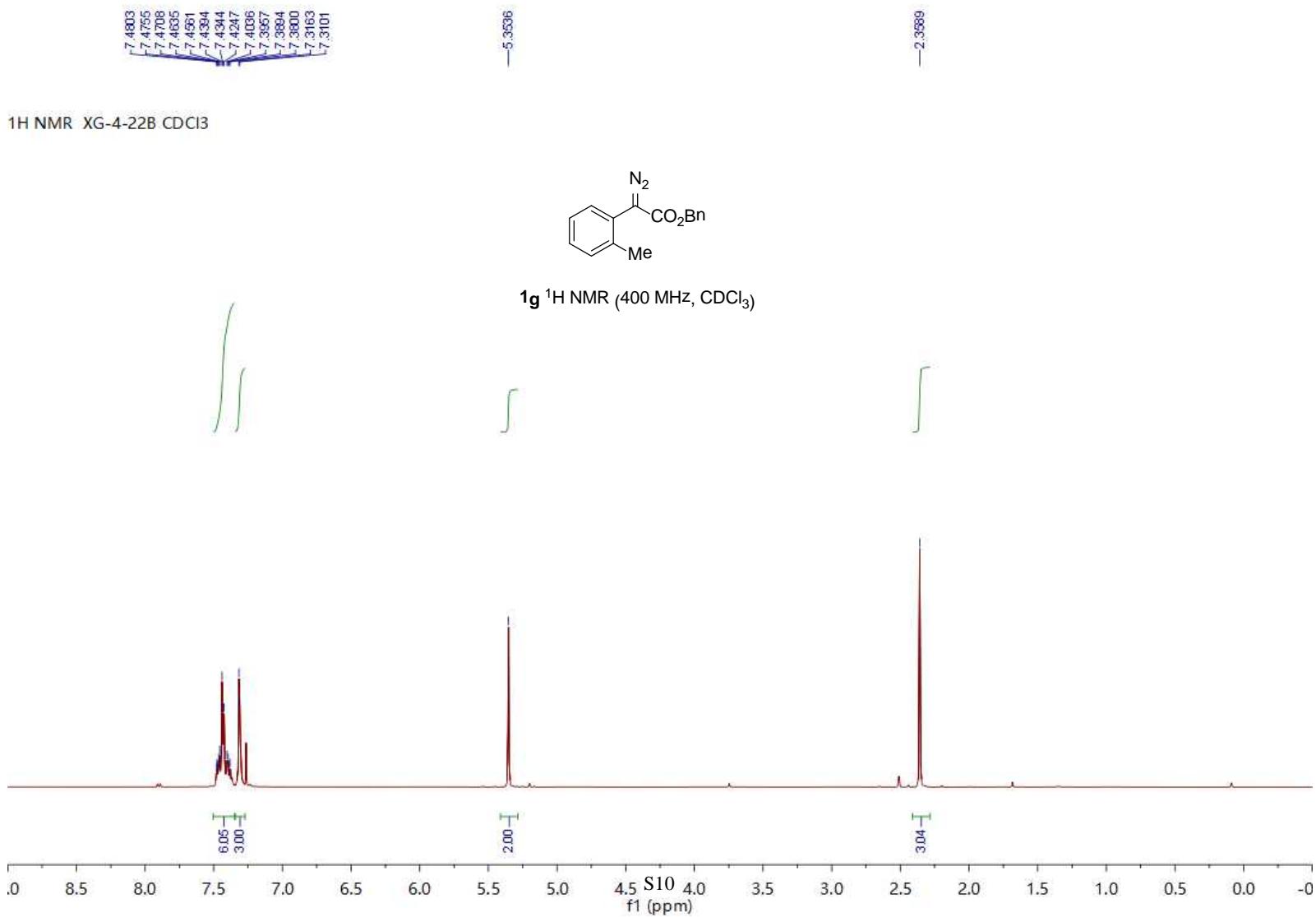
(R)-Benzyl 2-(1-benzyl-2-methyl-1*H*-indol-3-yl)propanoate (3na): yield: 65%, colorless oil, unknown compound, ee: 49%, $[\alpha]^{20}_D = -20.67$ (*c* 0.60, CHCl₃), R_f = 0.35 (hexanes/ethyl acetate

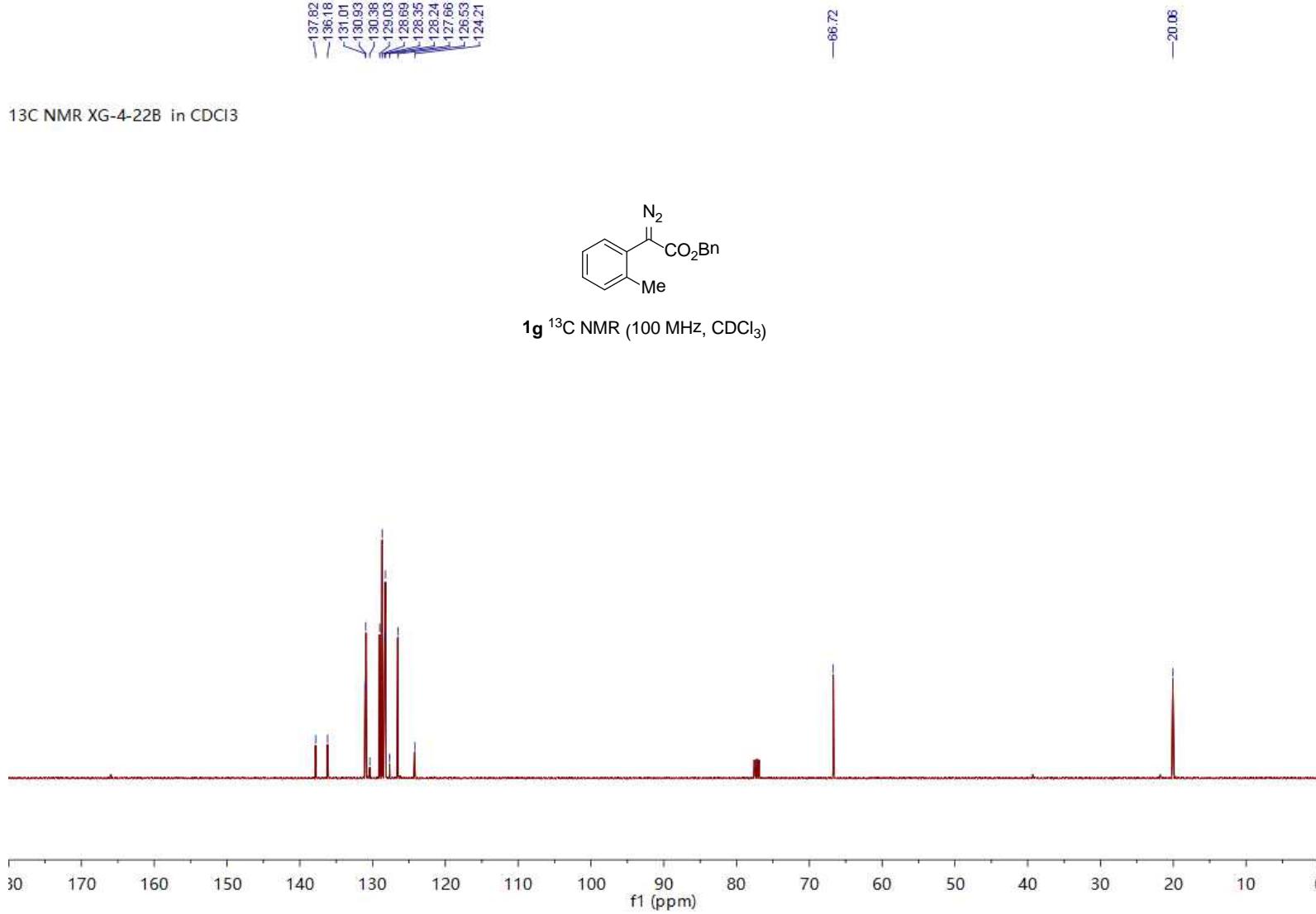
20:1). ¹H NMR (400 MHz, CDCl₃) δ 7.70 (d, *J* = 7.8 Hz, 1H), 7.39-7.16 (m, 9H), 7.16-7.05 (m, 2H), 7.03-6.88 (m, 2H), 5.31 (s, 2H), 5.13 (s, 2H), 2.32 (s, 3H), 1.67 (d, *J* = 7.0 Hz, 3H). ¹³C NMR (100 MHz, CDCl₃) δ 175.0, 138.0, 136.8, 136.5, 133.3, 129.0, 128.5, 128.1, 128.0, 127.4, 126.7, 126.1, 121.2, 119.6, 119.3, 111.1, 109.3, 66.4, 46.7, 37.2, 17.6, 10.6. HPLC (AD-H column, ⁱPrOH/hexane 10/90, 0.7 mL/min, 254 nm): t₁ = 10.5 min, t₂ = 12.9 min (major). HRMS Calculated for C₂₆H₂₆NO₂ (M+H)⁺ 384.1958, found: 384.1958.

7. References

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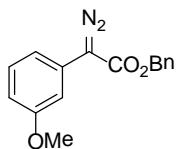
7. Copy of NMR and HPLC for Racemic and Chiral Compounds



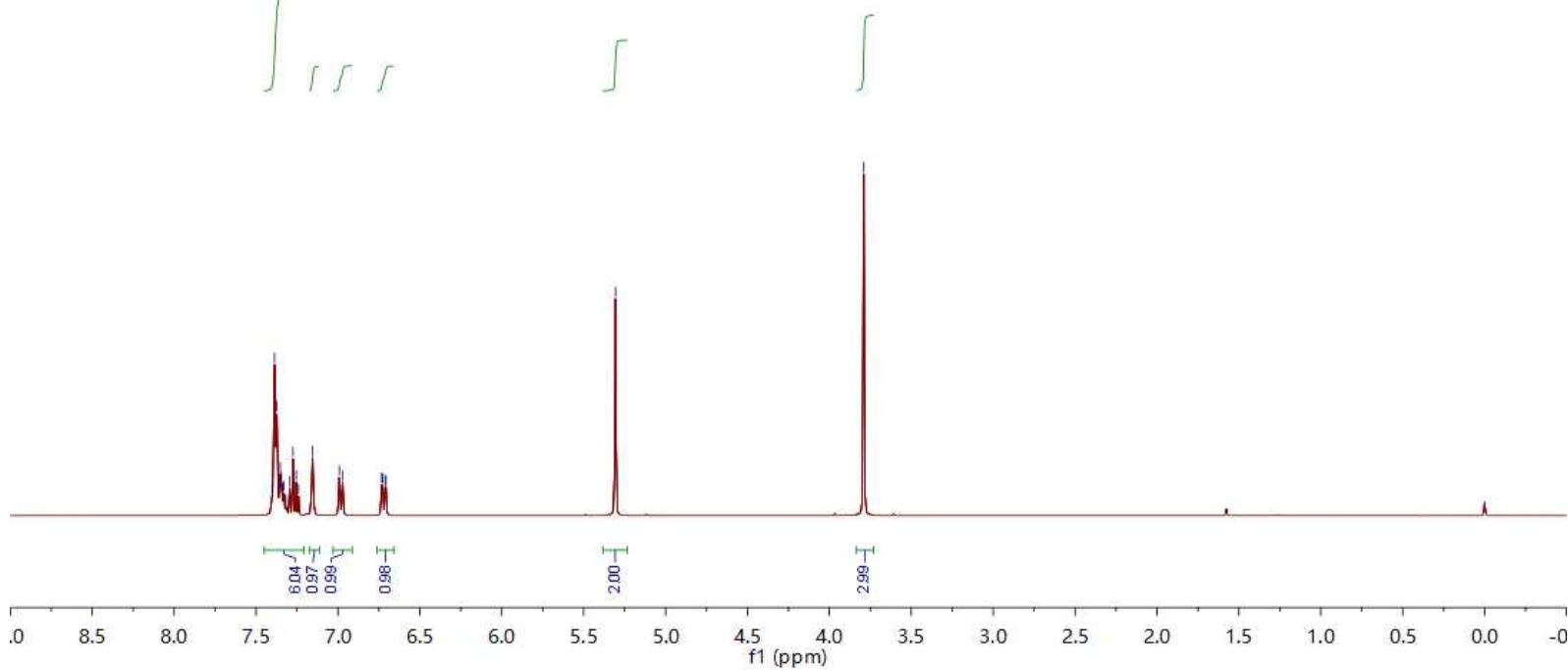


7.4015
7.3871
7.3729
7.3518
7.3446
7.3386
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7.2542
7.2399
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6.7118
6.7094

^1H NMR XG-6-57B in CDCl_3

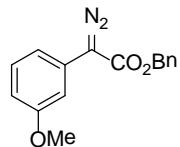


1i ^1H NMR (400 MHz, CDCl_3)

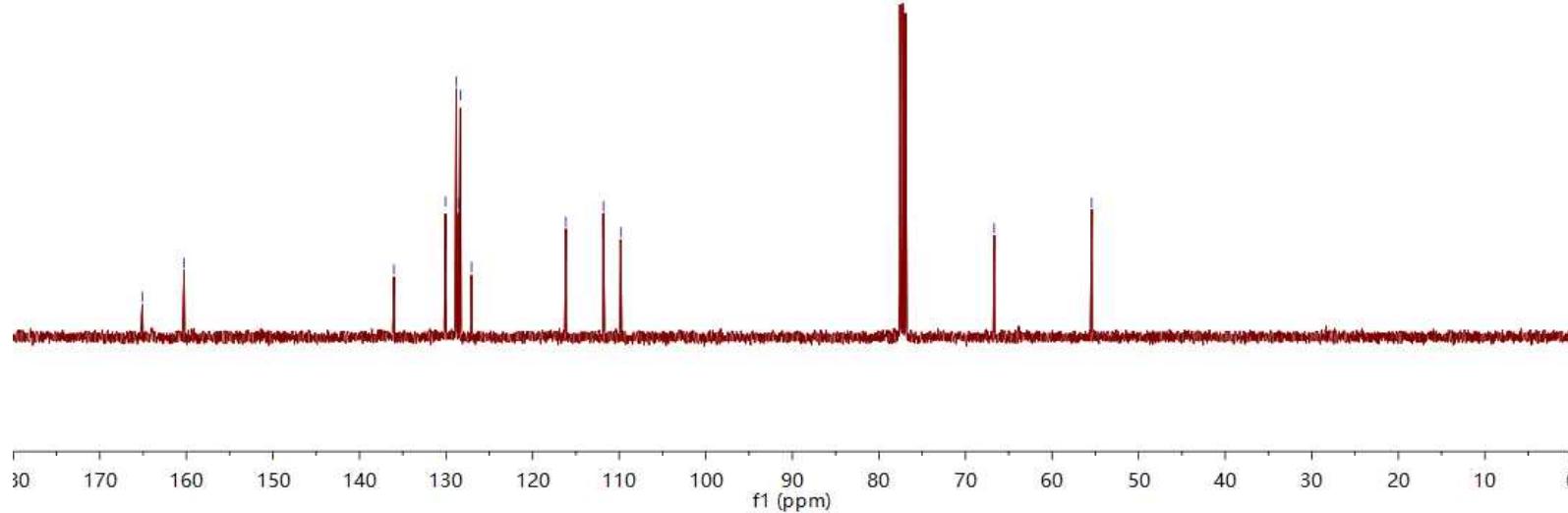


—165.08
—160.26
—136.02
—130.06
—128.82
—128.54
—128.35
—127.06
—116.17
—111.82
—109.82
—66.68
—55.43

¹³C NMR XG-6-57B in CDCl₃



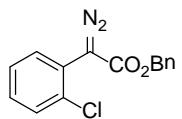
1i ¹³C NMR (100 MHz, CDCl₃)



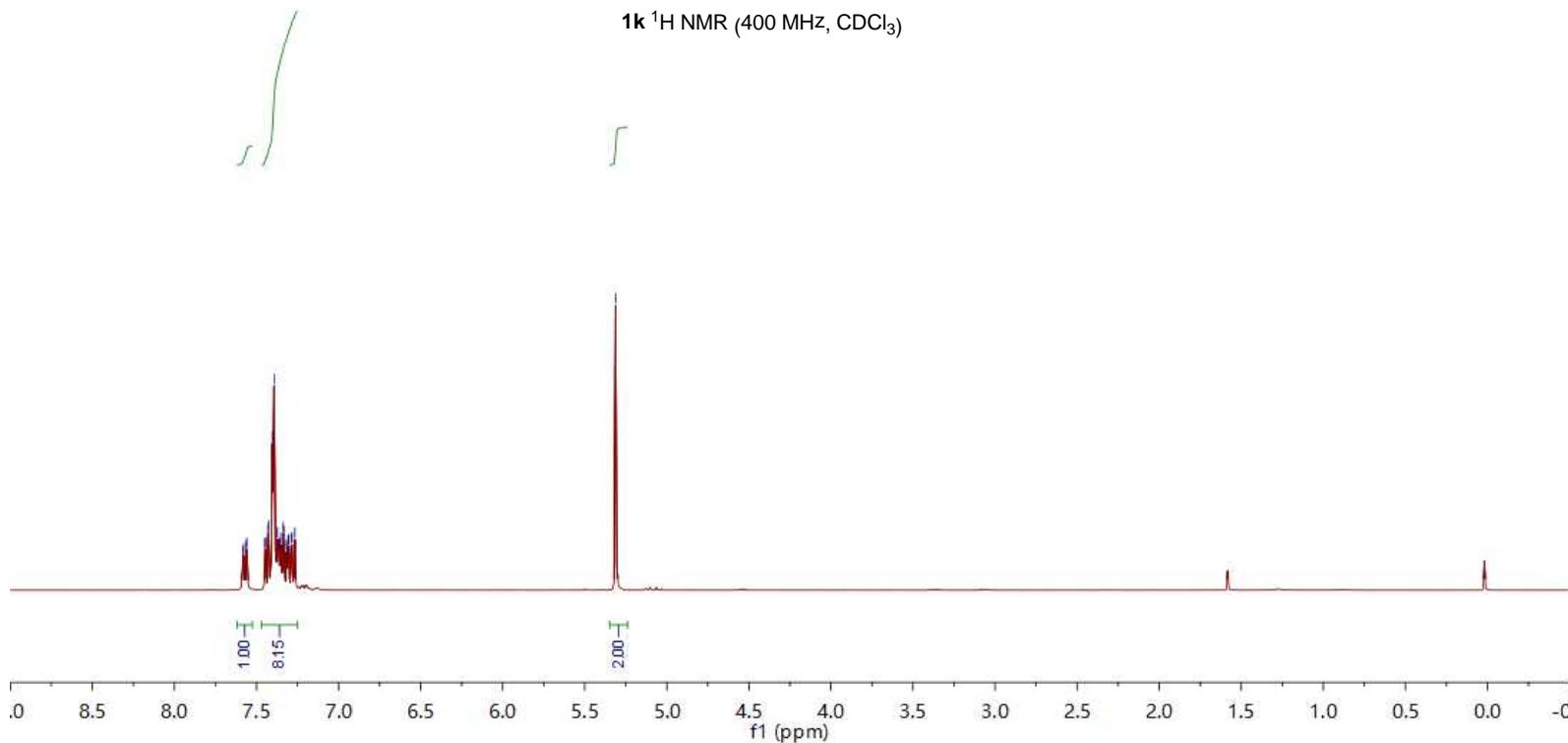
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7.3619
7.3548
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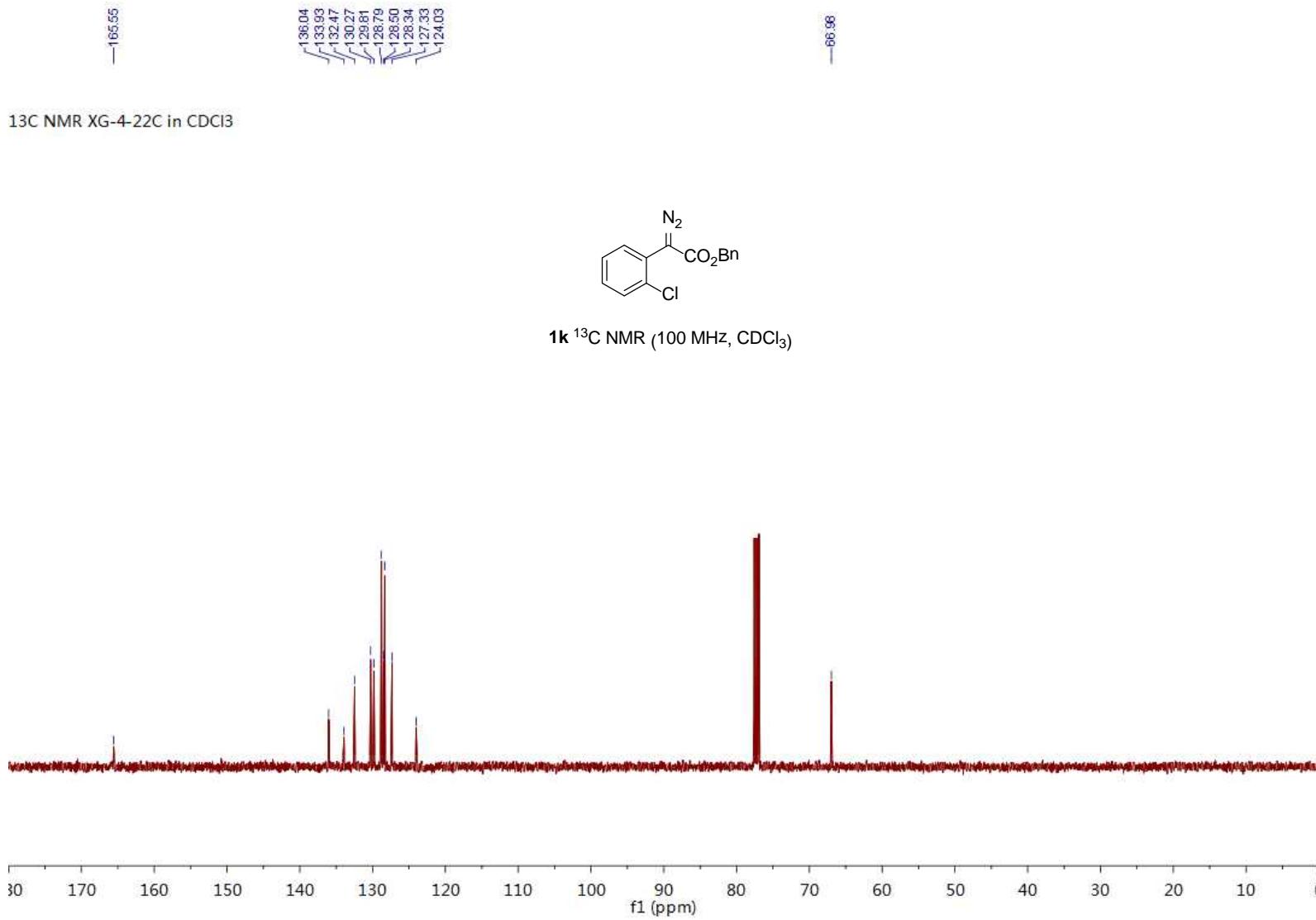
—5.3125

^1H NMR XG-4-22C in CDCl_3



1k ^1H NMR (400 MHz, CDCl_3)



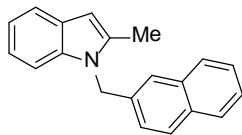


7.7423
7.7333
7.7200
7.7052
7.6839
7.6292
7.6161
7.6066
7.5891
7.5800
7.5677
7.3841
7.3731
7.3618
7.2890
7.2016
7.1889
7.1800
7.1178
7.0869
7.0760
7.0653
6.3448

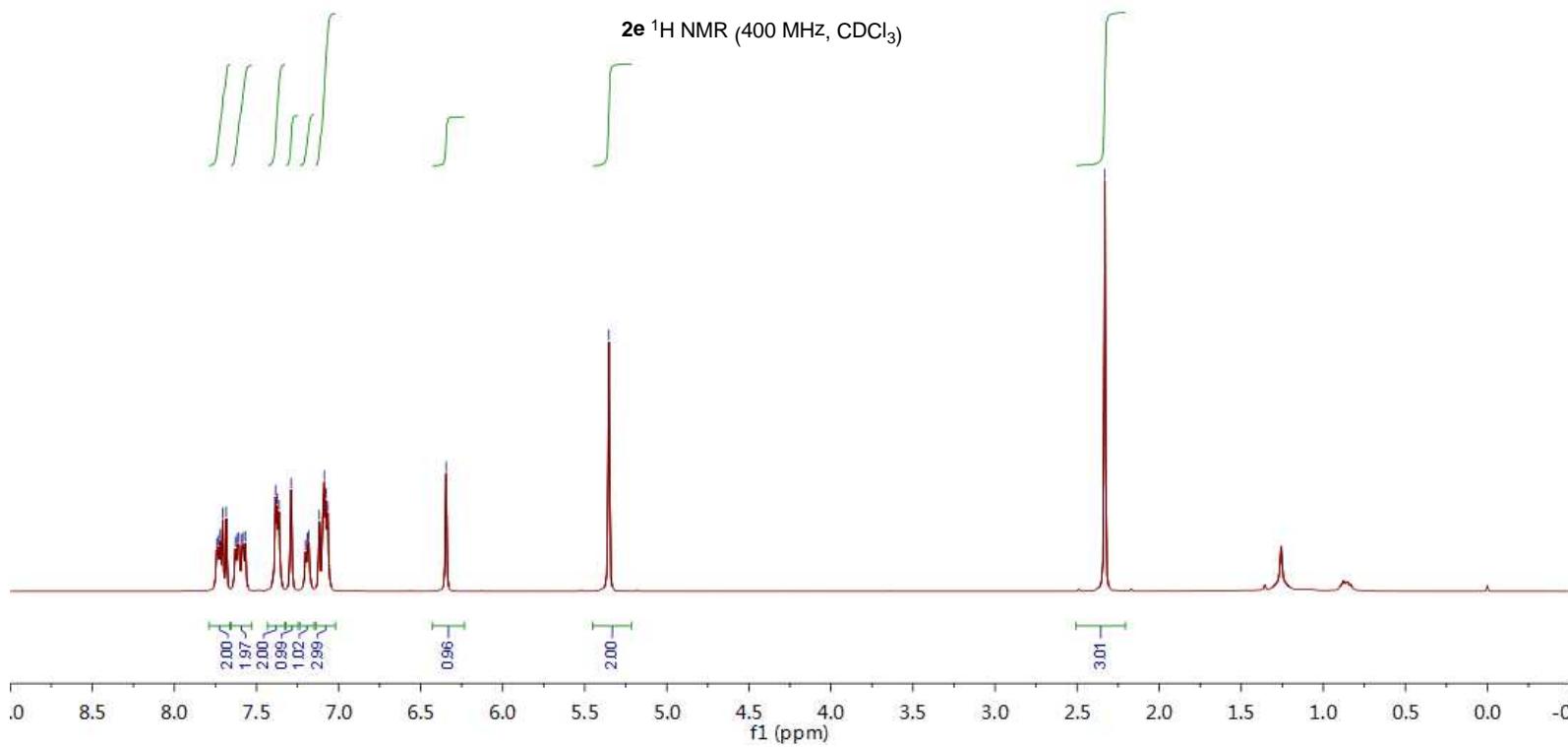
—5.3528

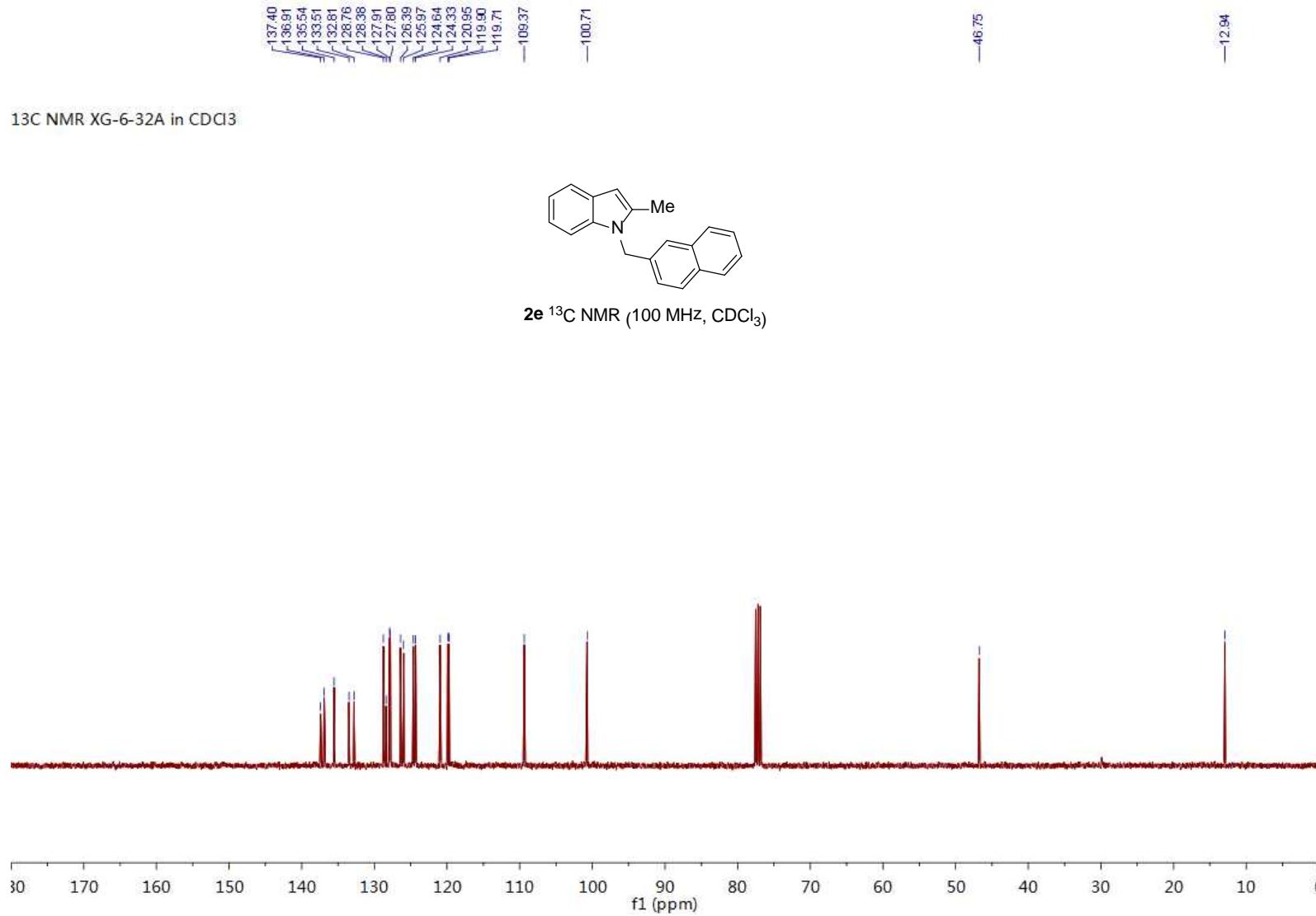
—2.3311

^1H NMR XG-6-32A in CDCl_3



2e ^1H NMR (400 MHz, CDCl_3)





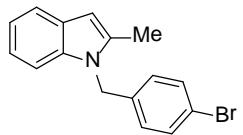
7.5987
7.5571
7.5516
7.5447
7.3865
7.3810
7.3889
7.3645
7.1640
7.1574
7.1506
7.1410
7.1169
7.1043
7.0869
7.0807
6.8999
6.8141

-6.3301

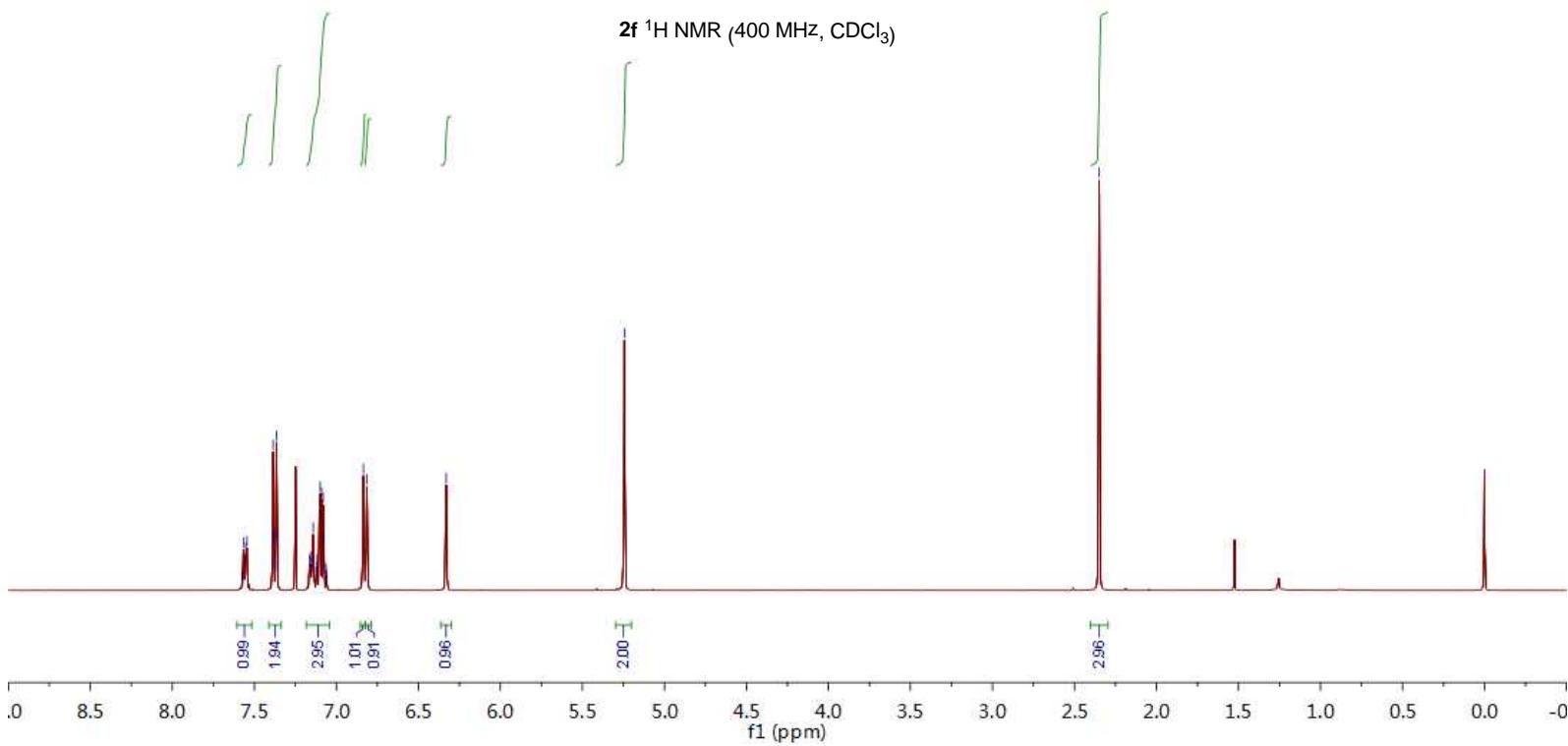
-5.2436

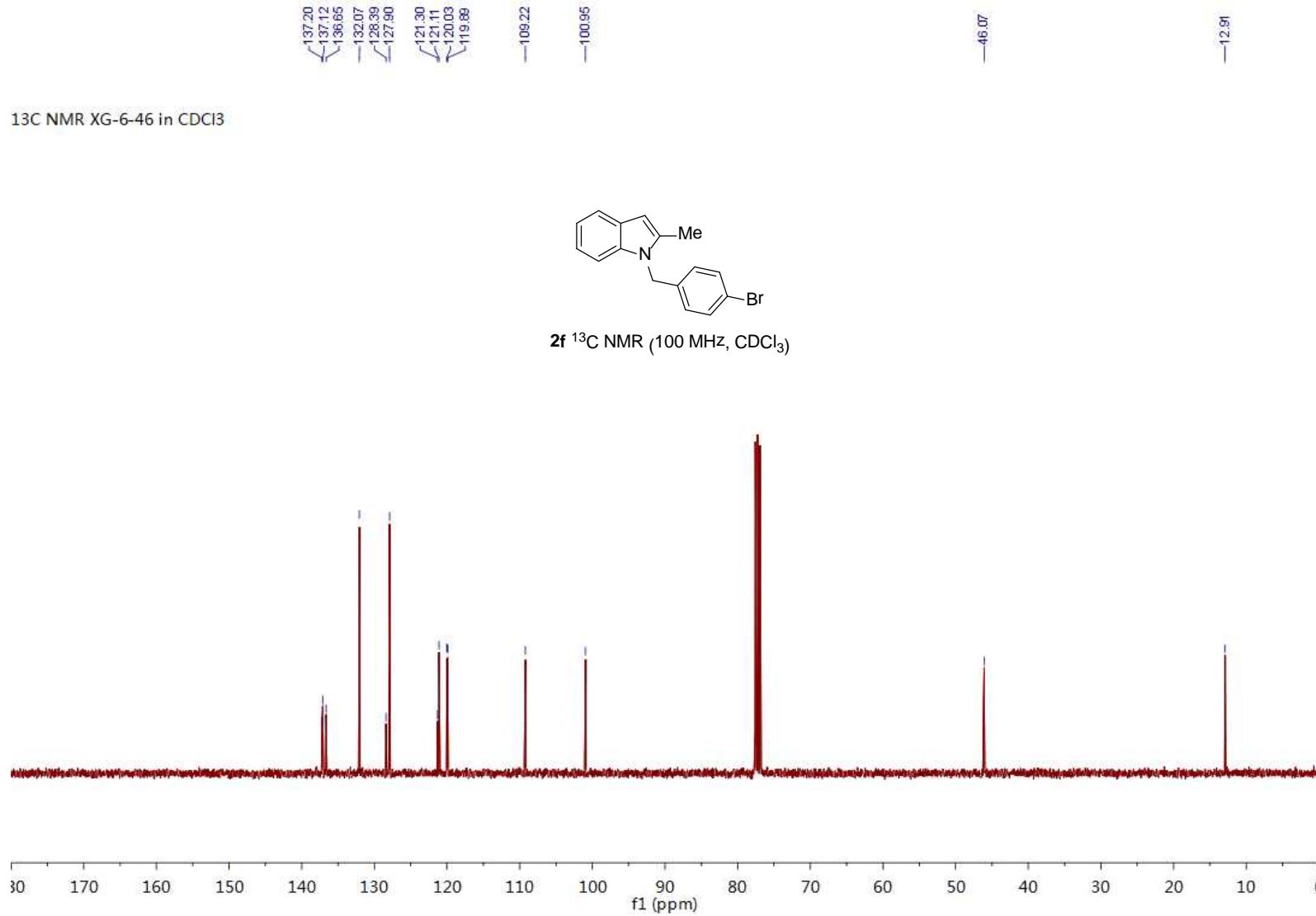
-2.3497

^1H NMR XG-6-46 in CDCl_3



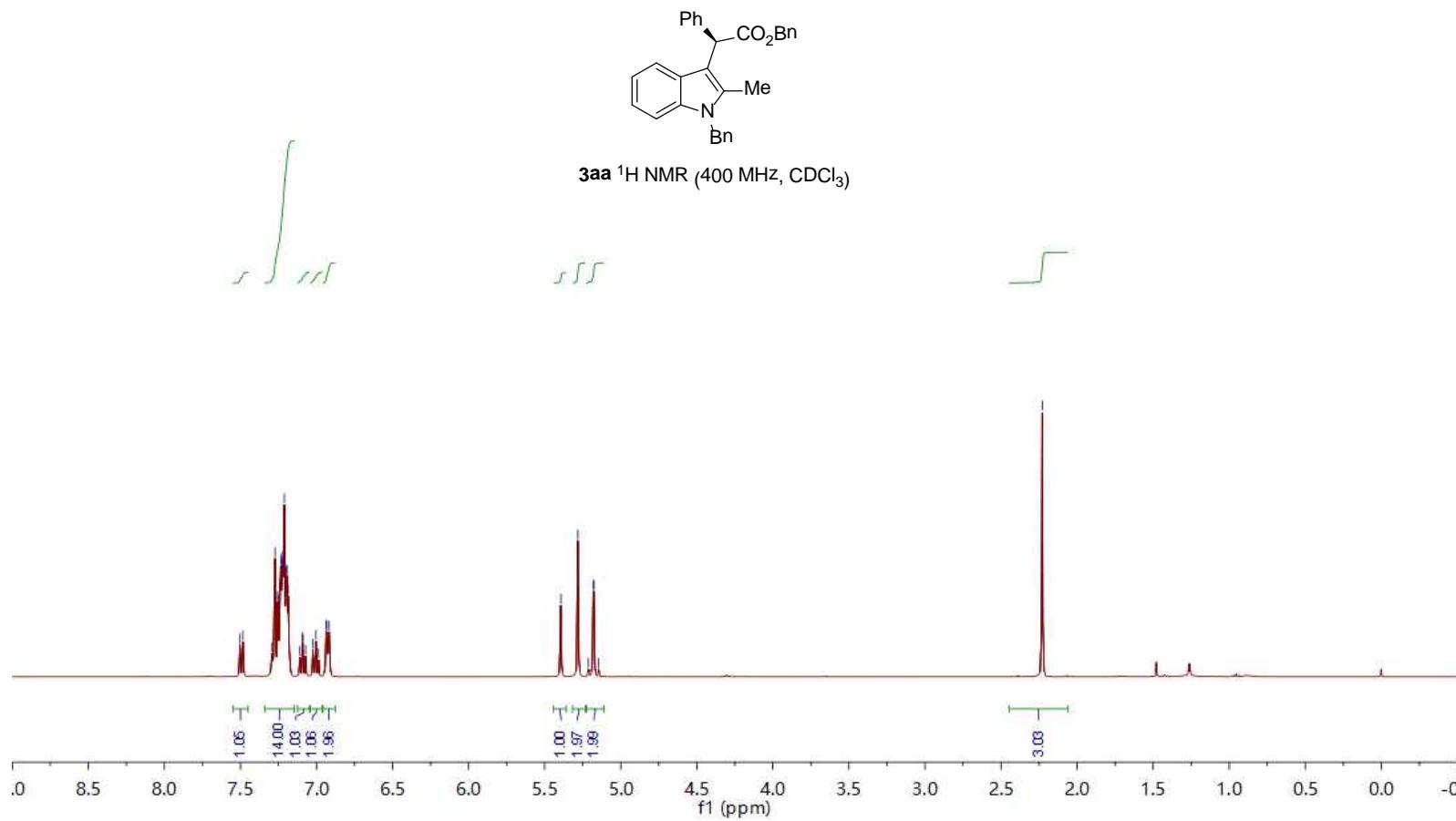
2f ^1H NMR (400 MHz, CDCl_3)

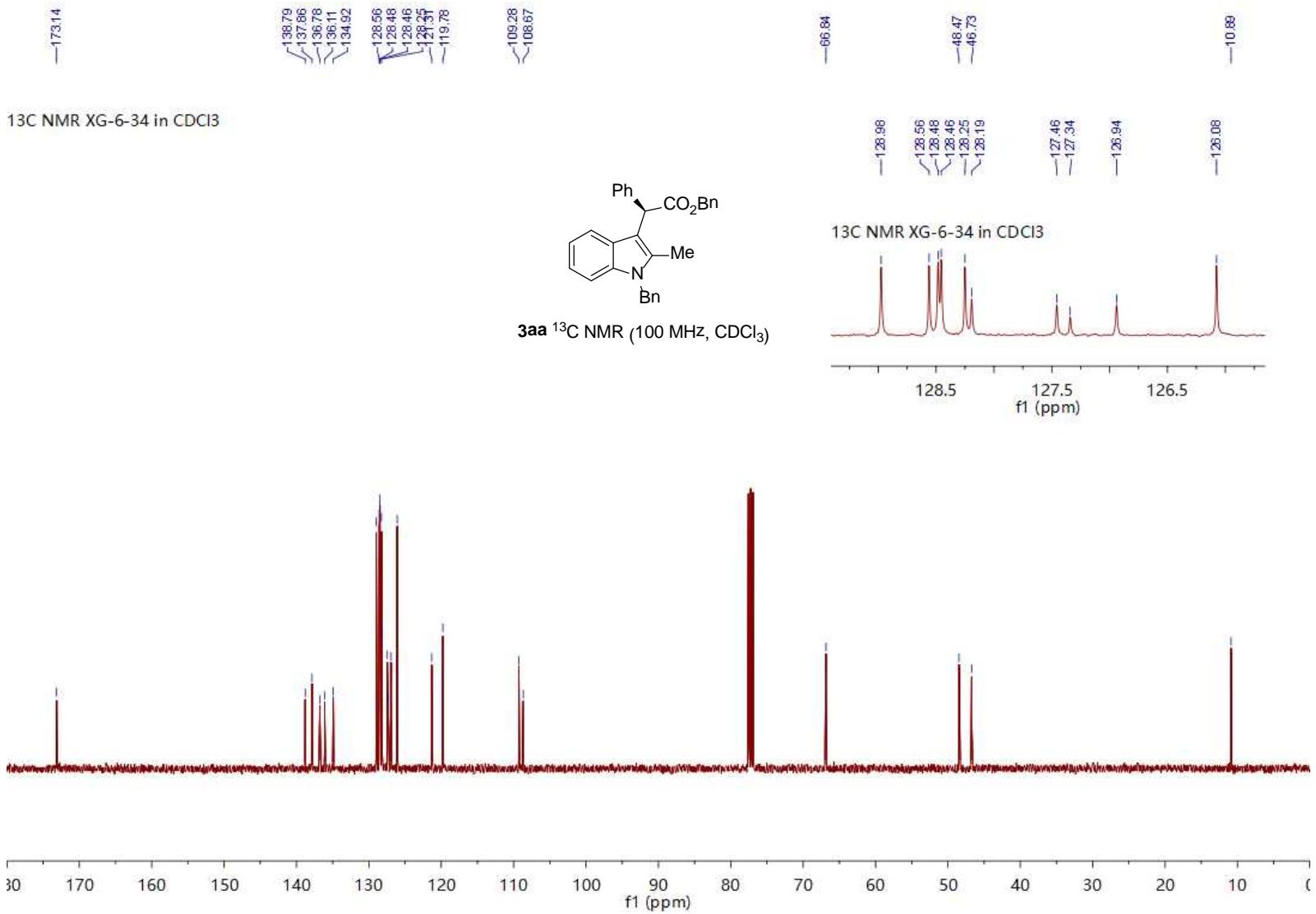


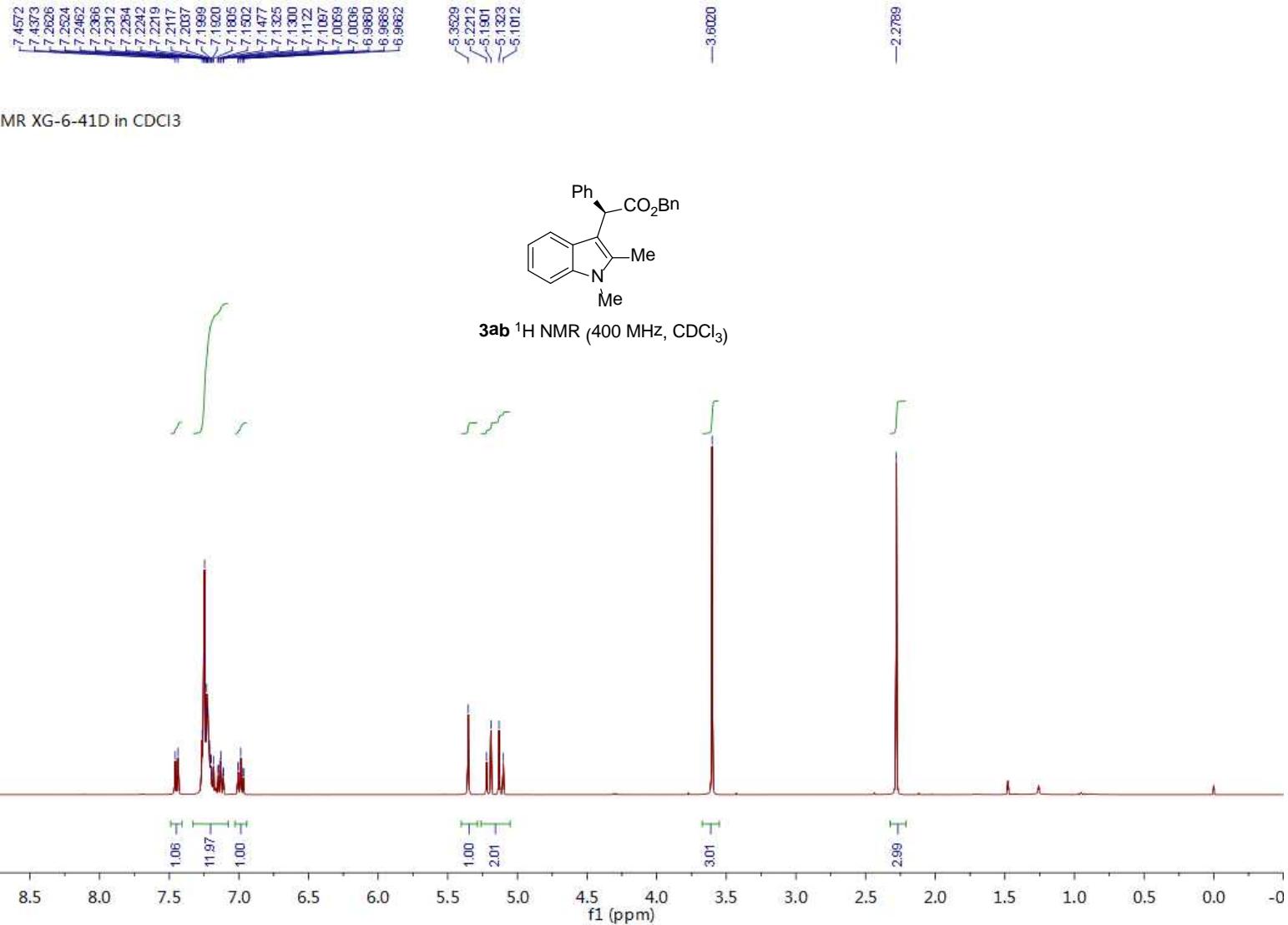


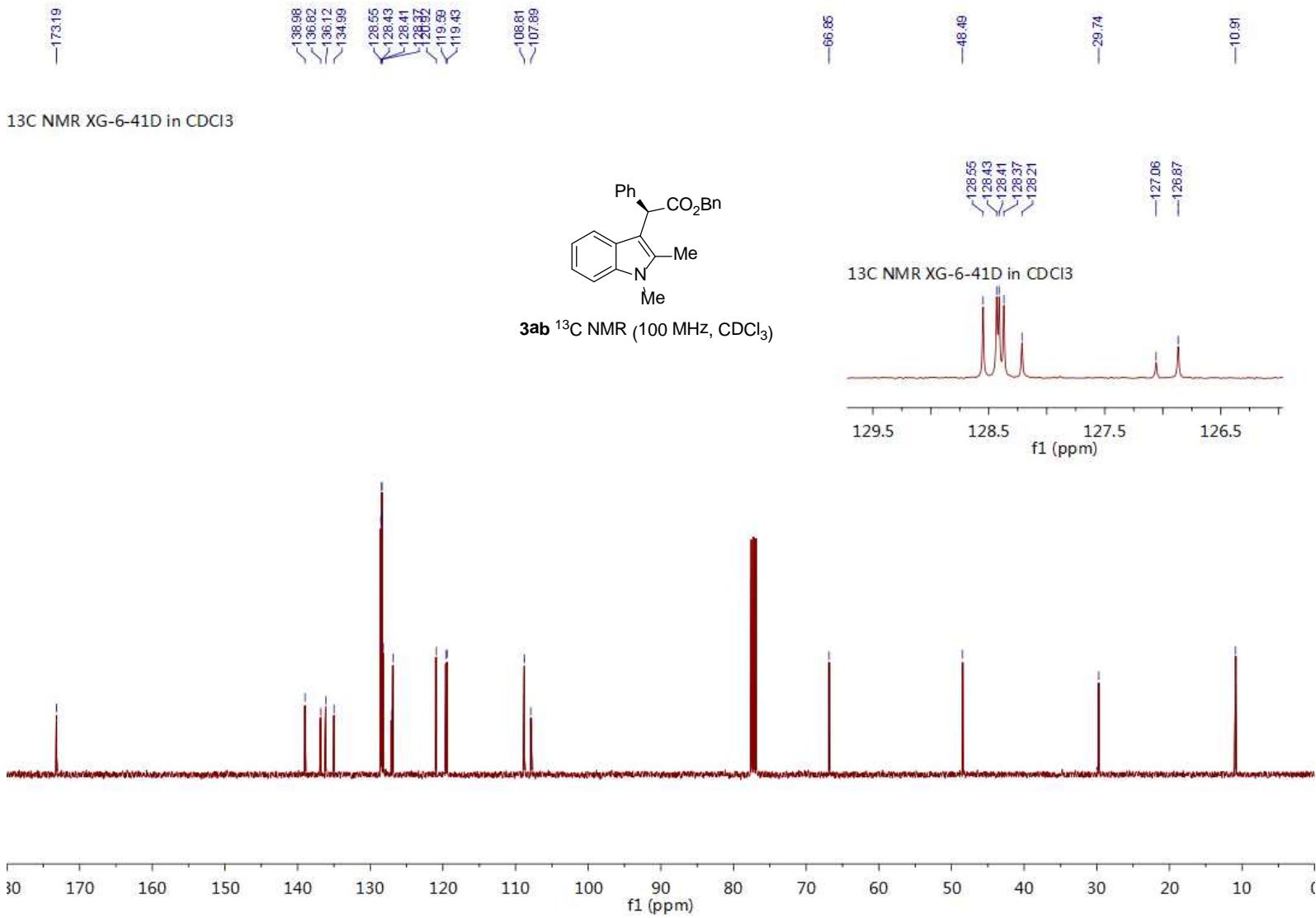


¹H NMR XG-6-34 in CDCl₃









7.4642
 7.4450
 7.2752
 7.2520
 7.2459
 7.2162
 7.2116
 7.1924
 7.1449
 7.1270
 7.1059
 7.0023
 6.9644
 6.9825
 6.9648

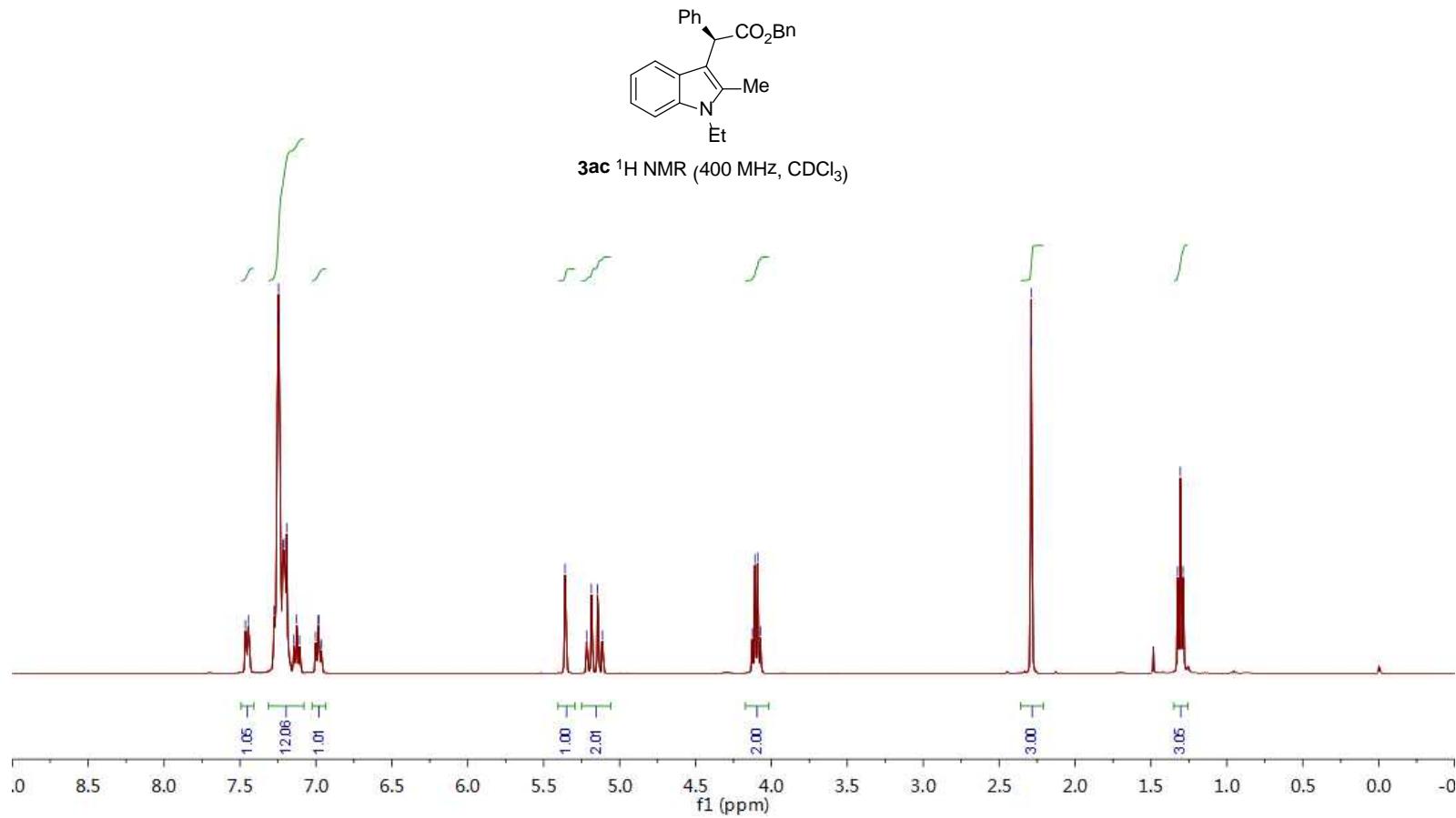
5.3995
 5.2170
 5.1688
 5.1448
 5.1137

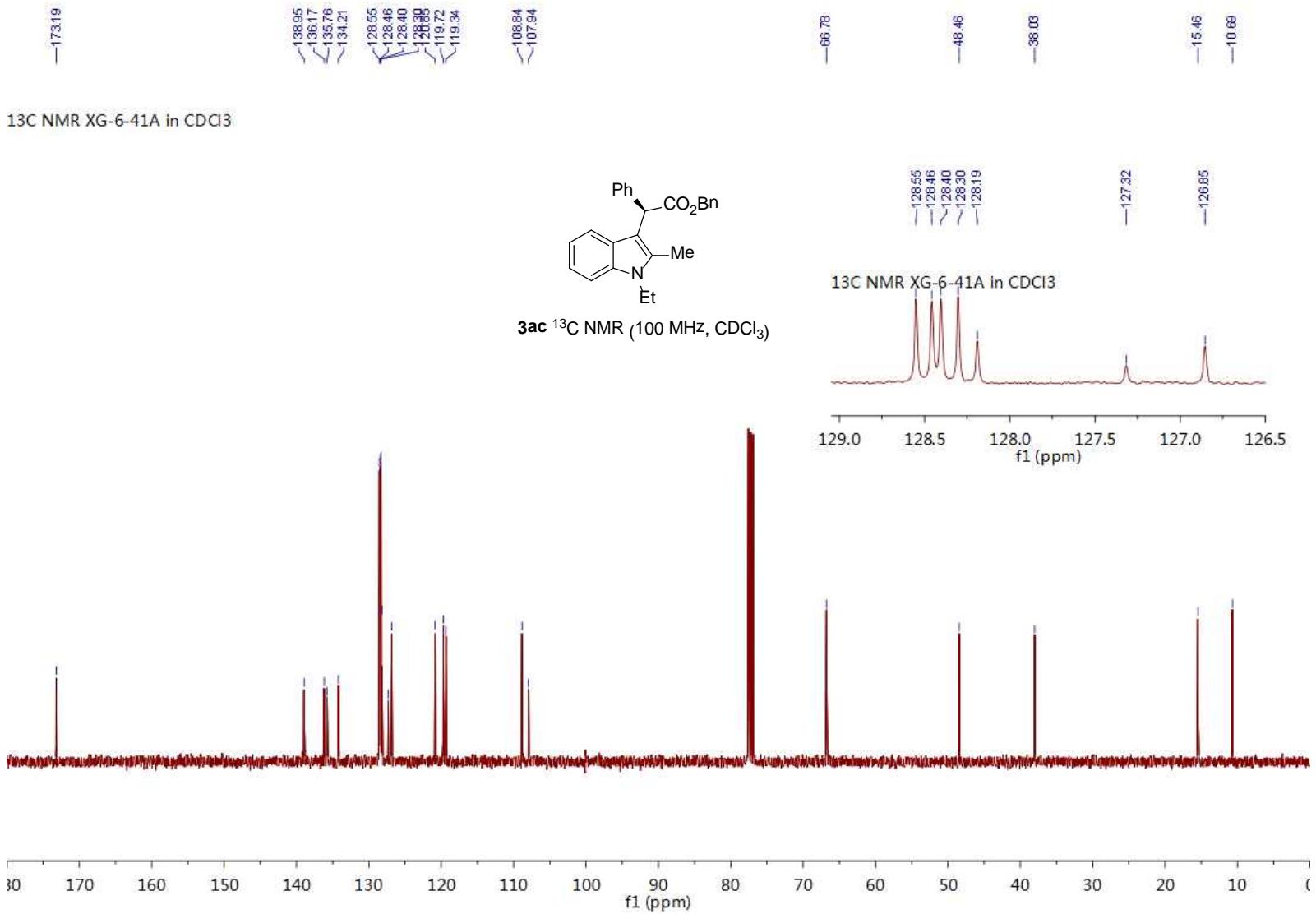
4.1262
 4.1053
 4.0902
 4.0722

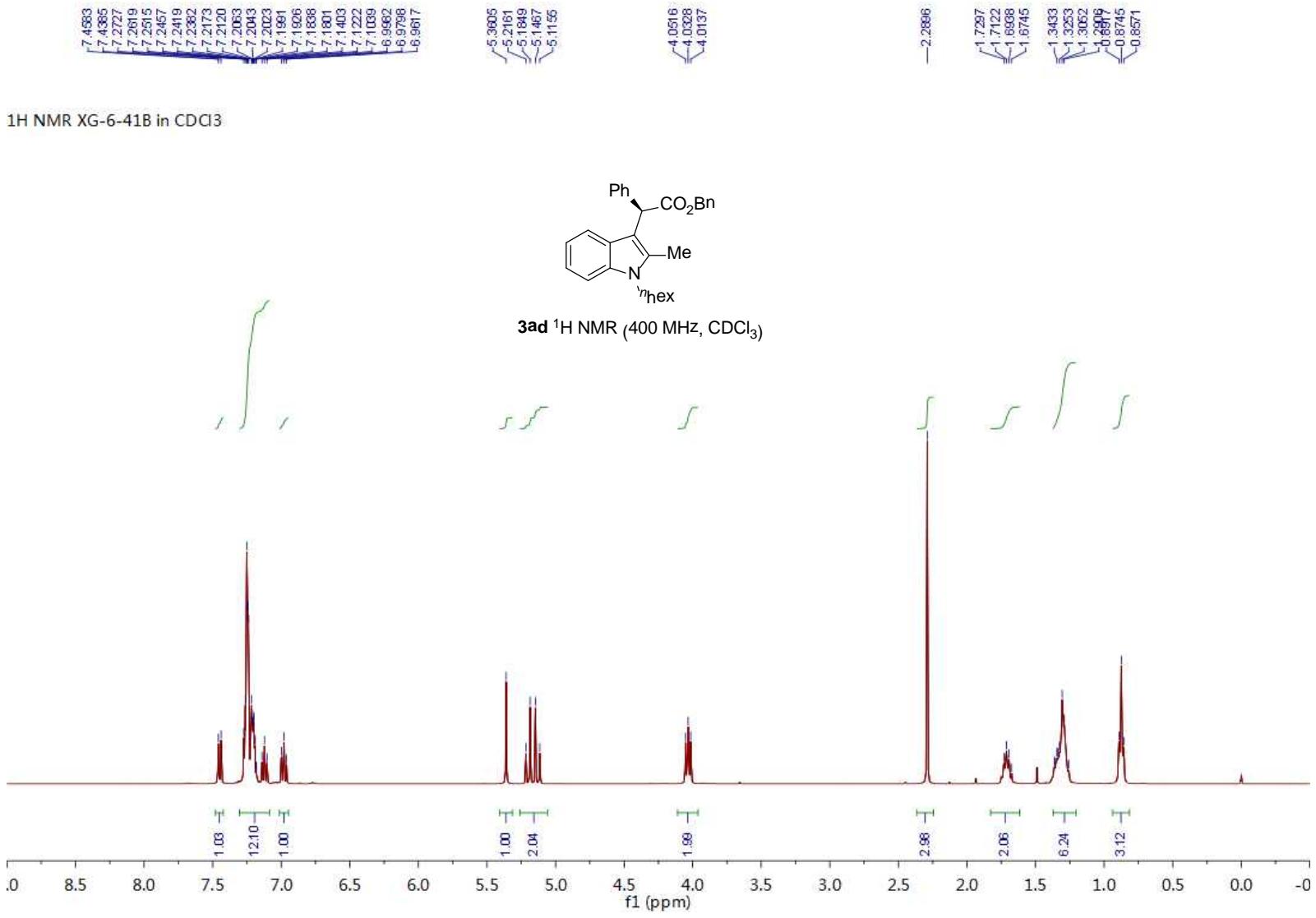
2.2899
 2.2889

1.3242
 1.3058
 1.2886

¹H NMR XG-6-41A in CDCl₃

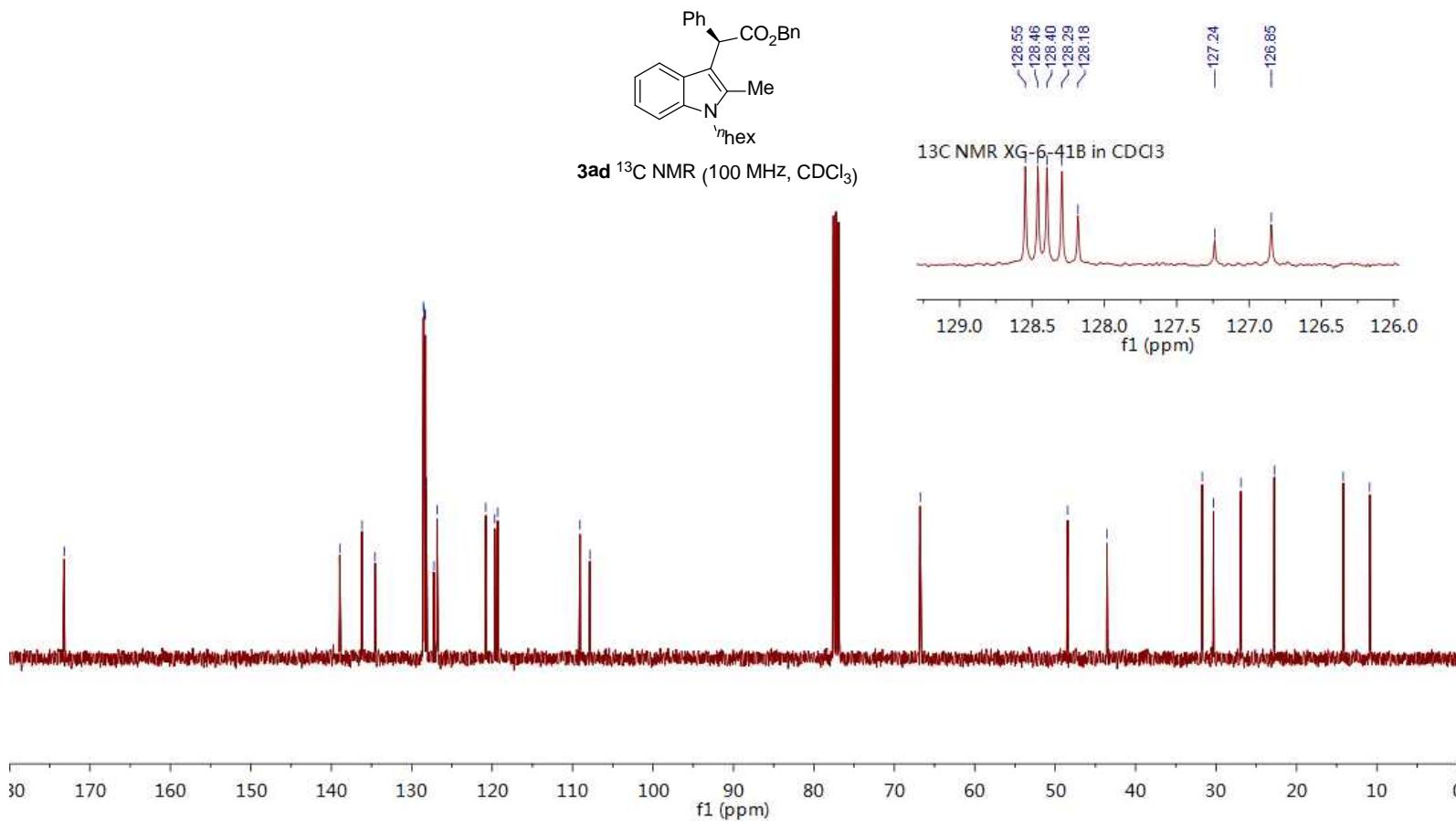


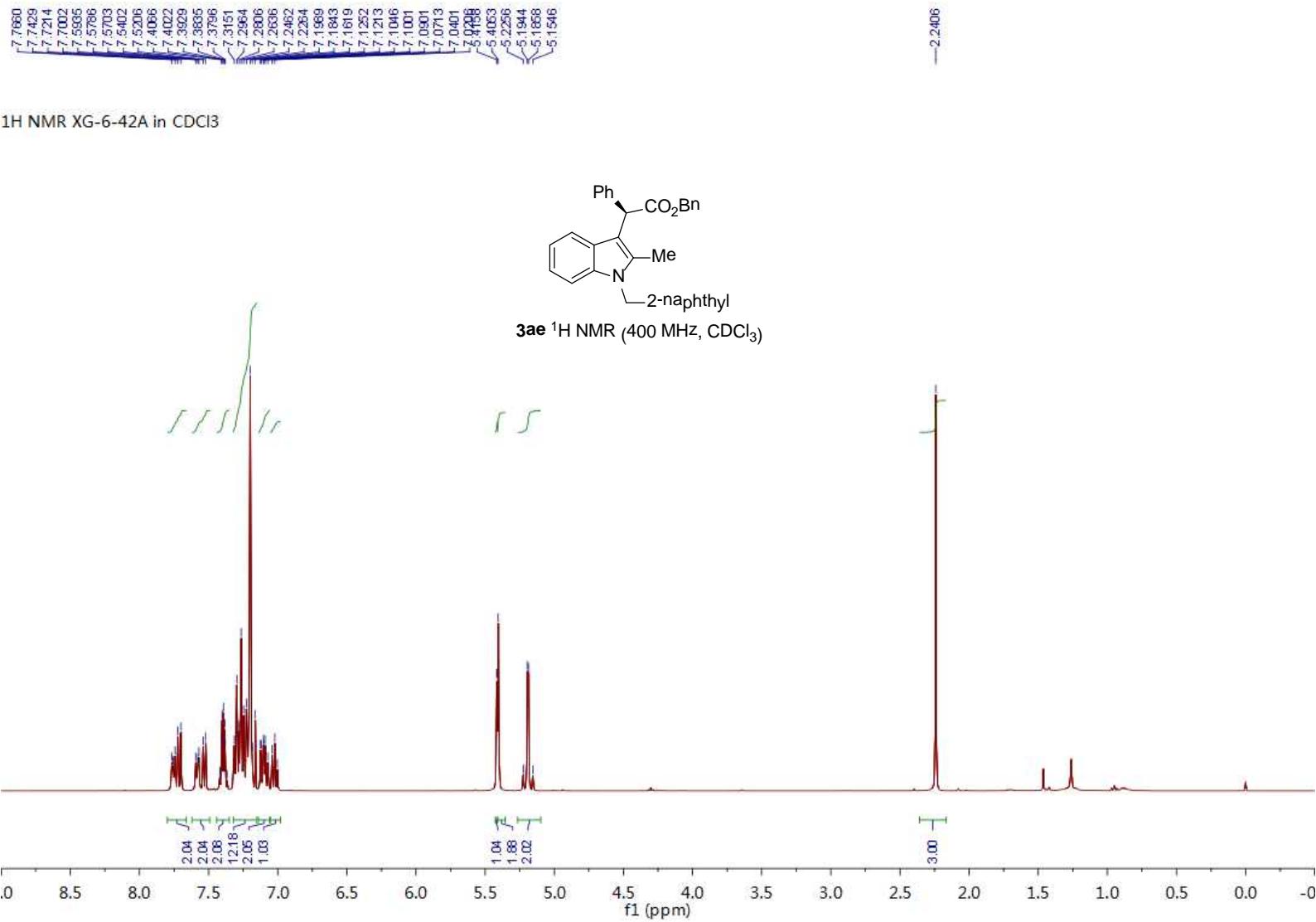


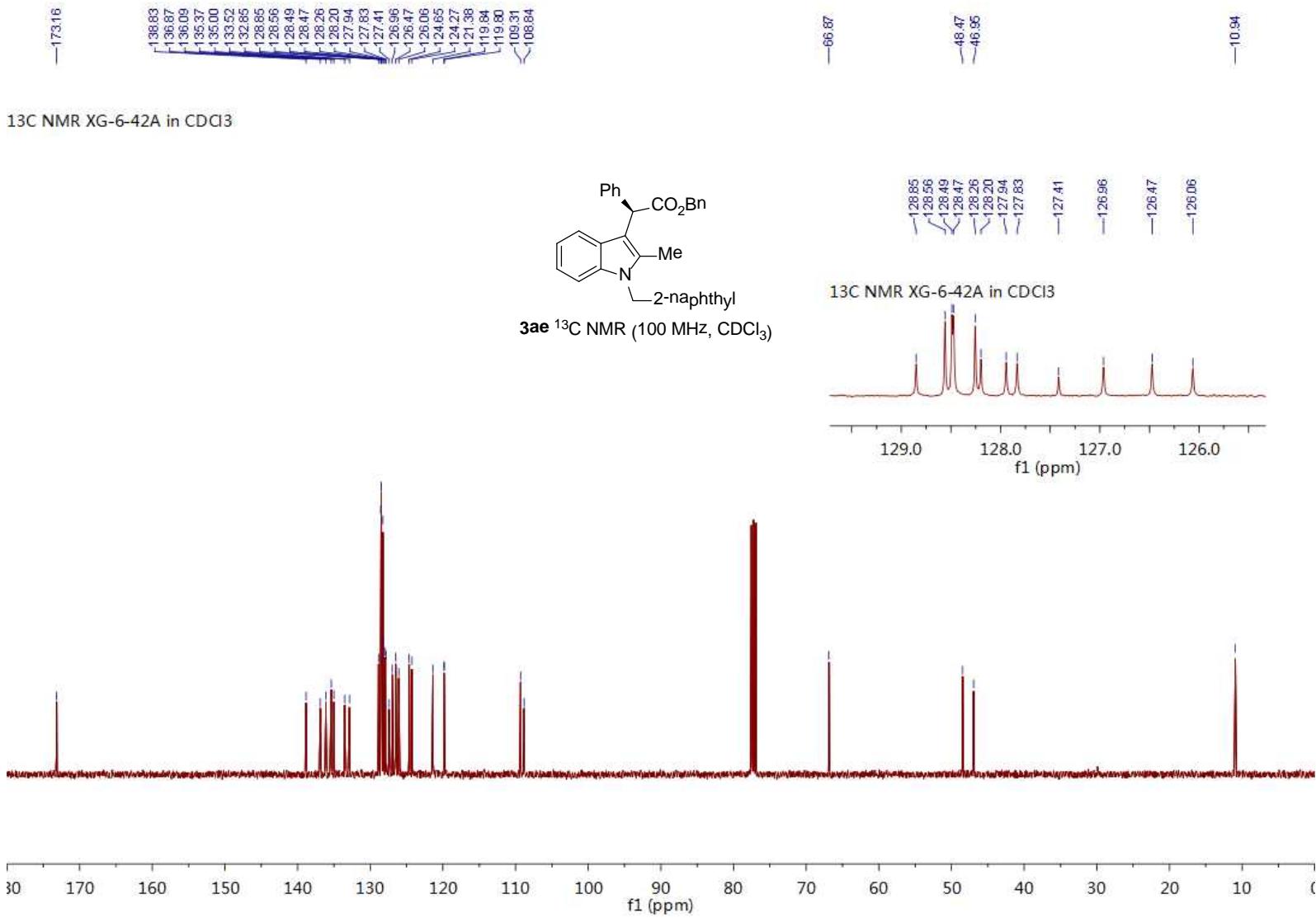


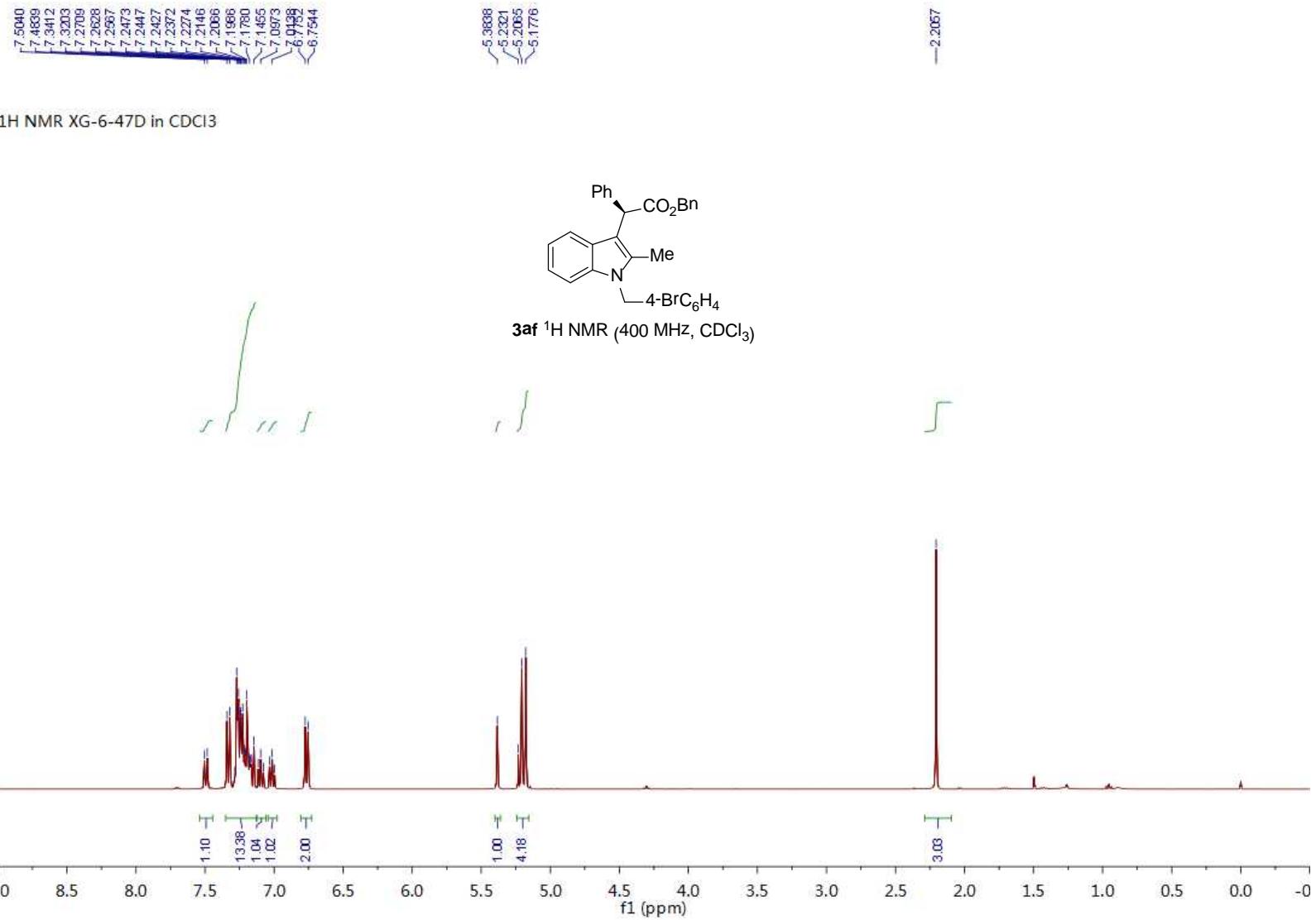
—173.21

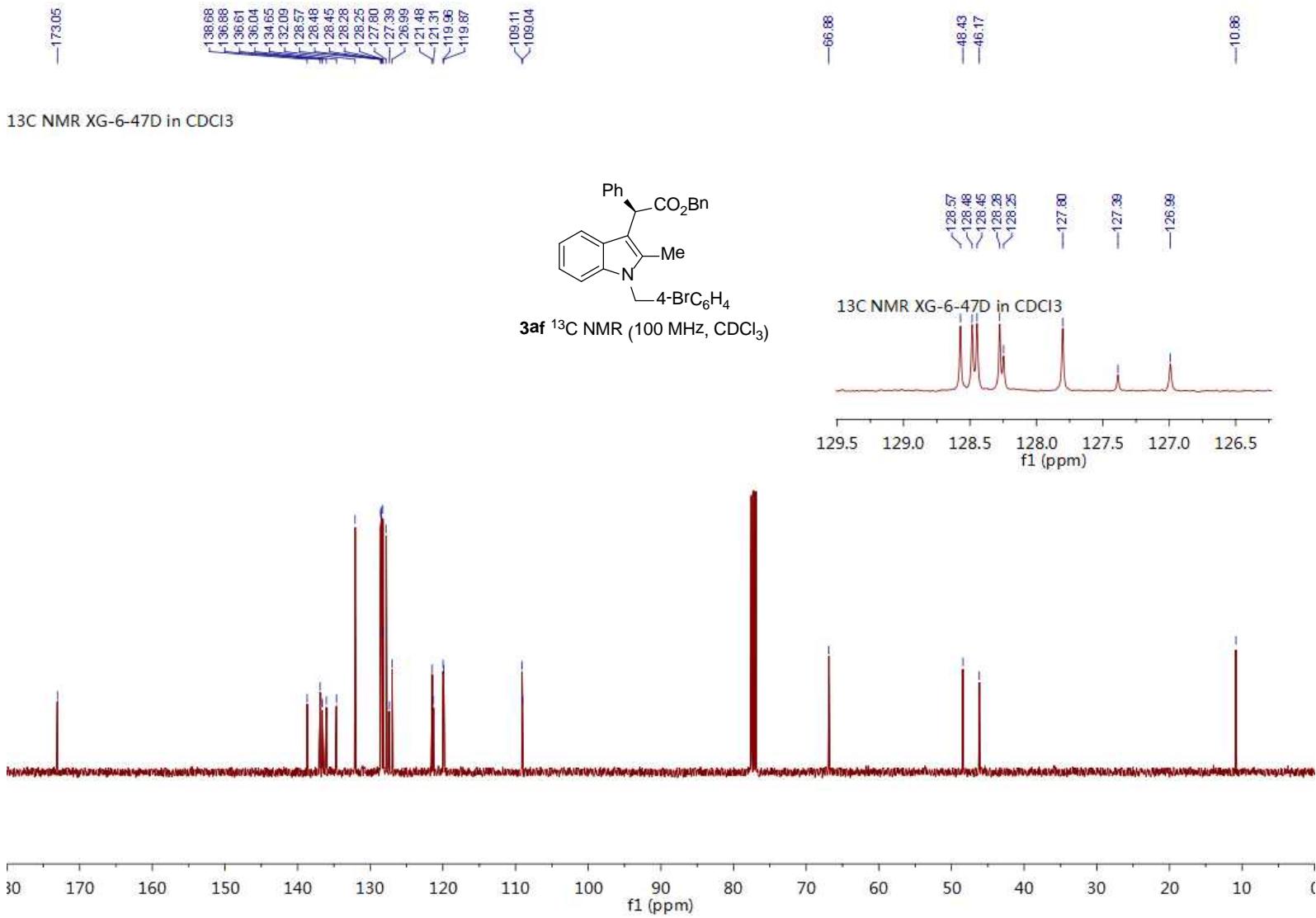
¹³C NMR XG-6-41B in CDCl₃



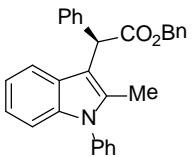




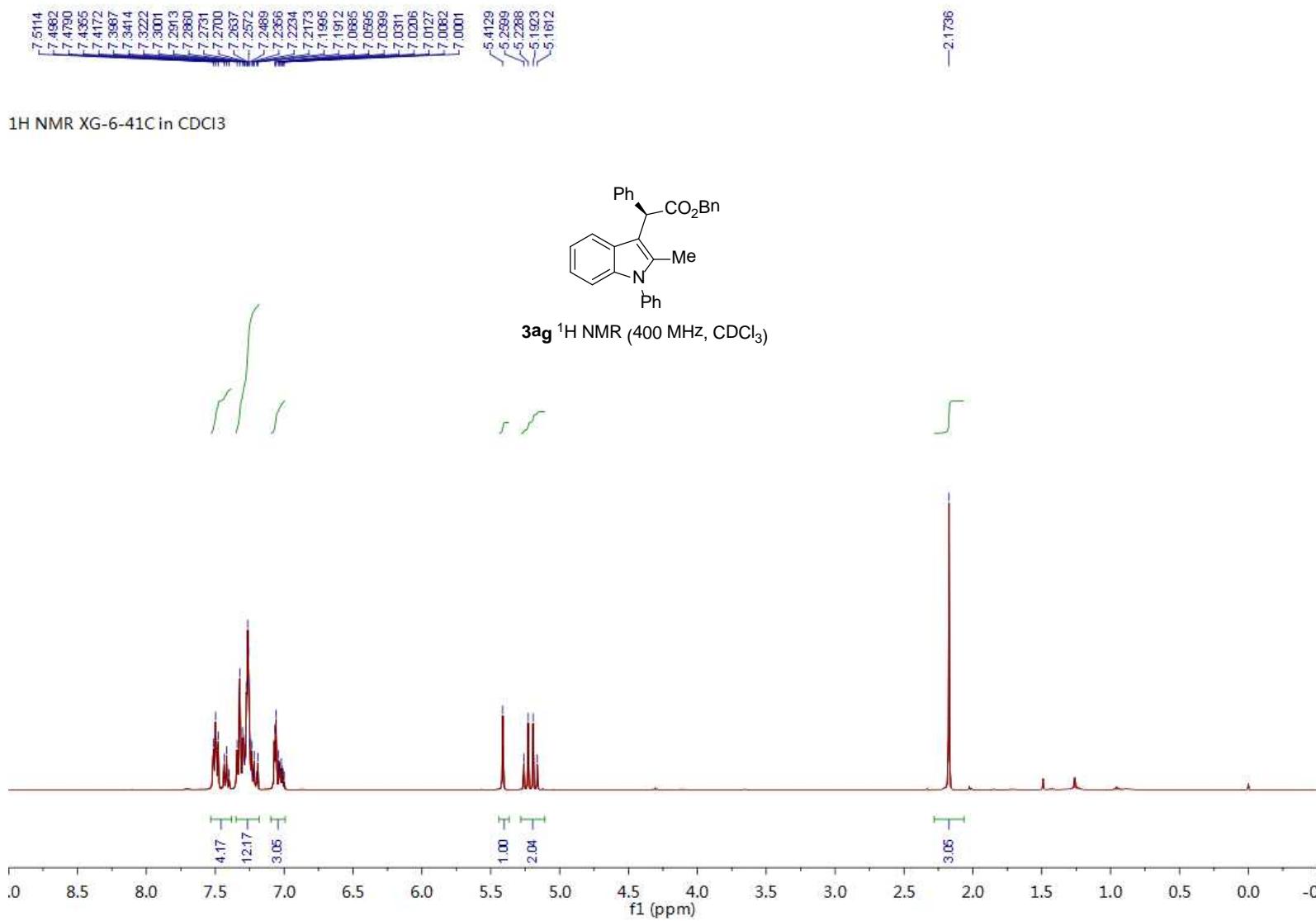


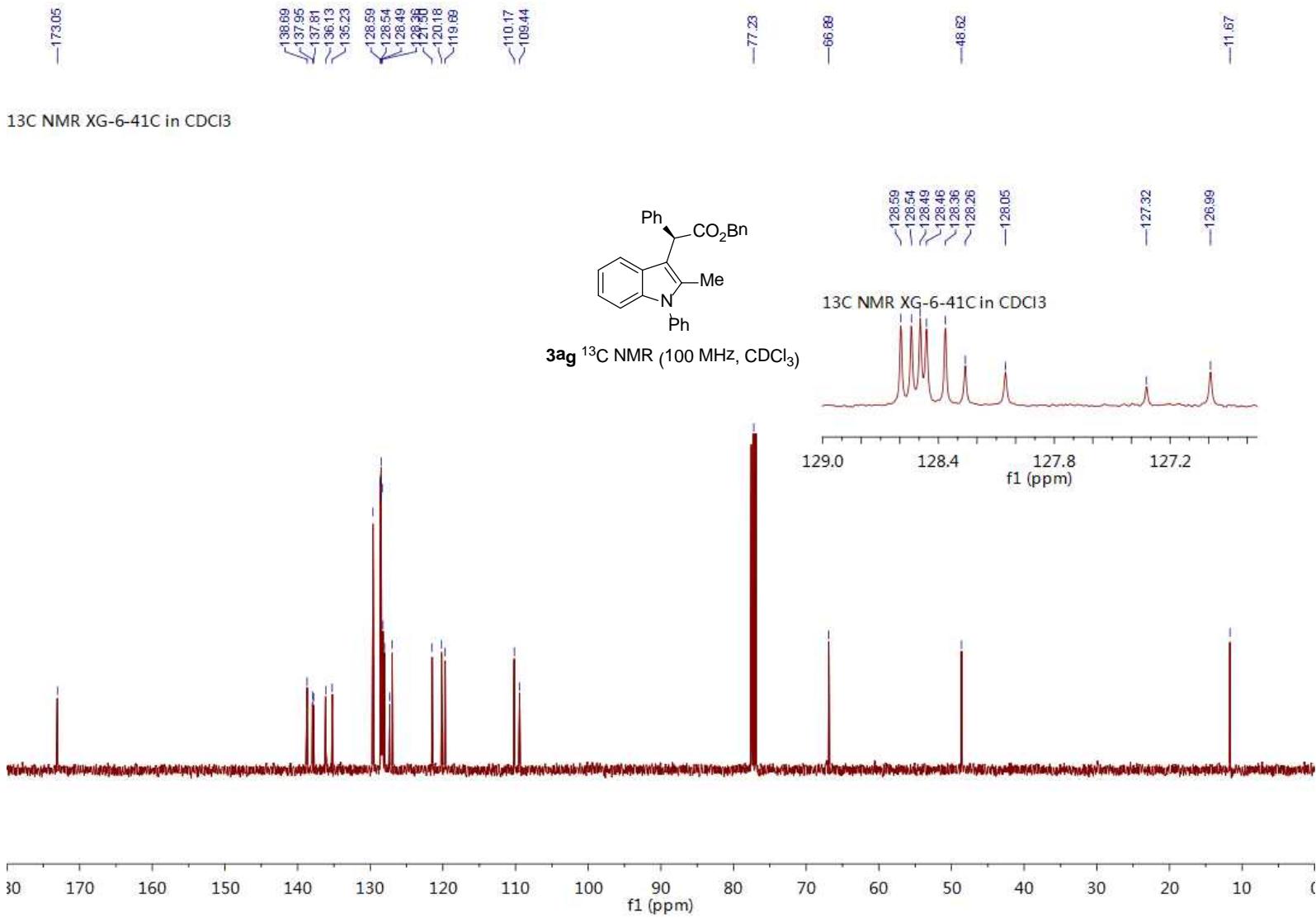


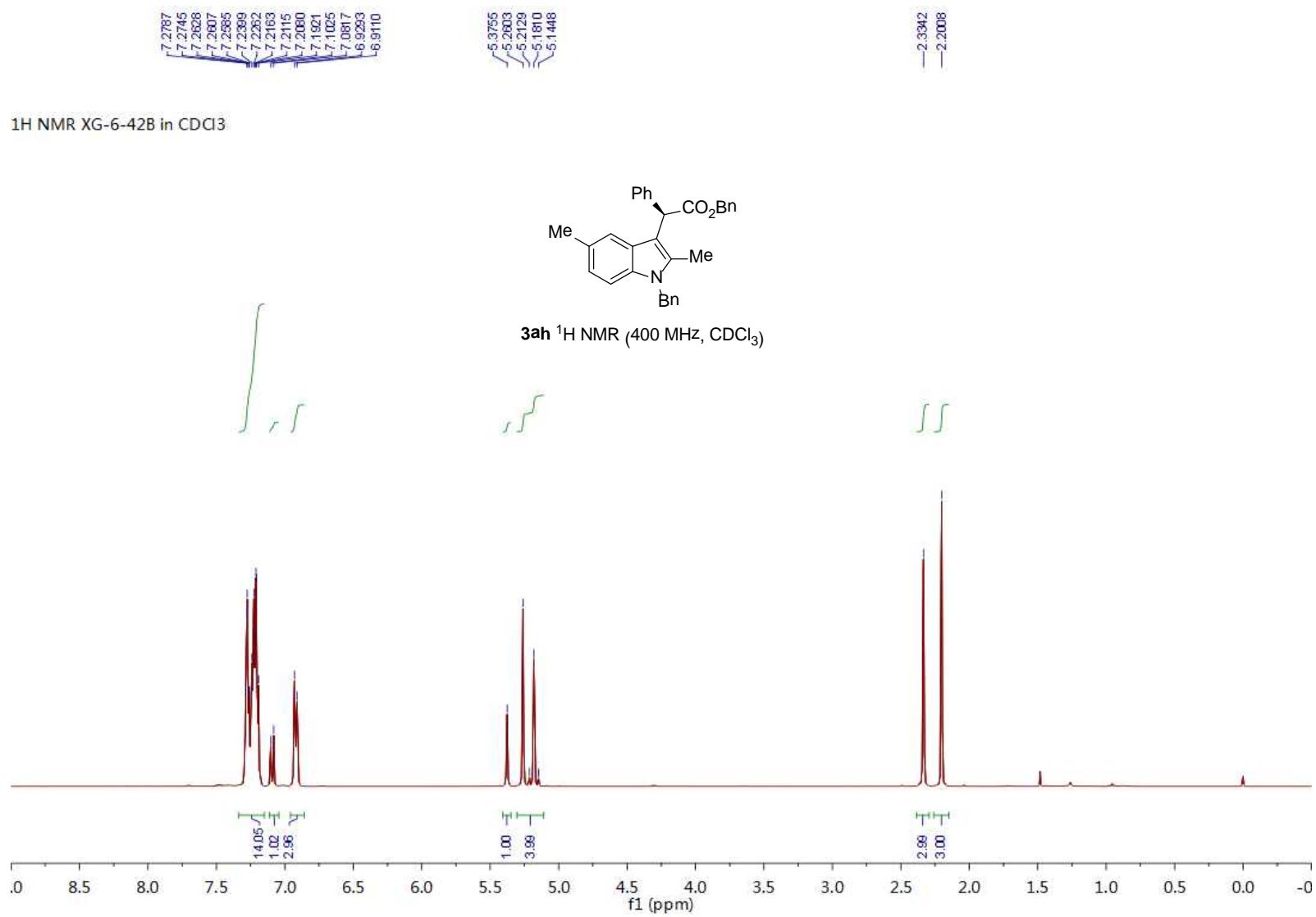
¹H NMR XG-6-41C in CDCl₃

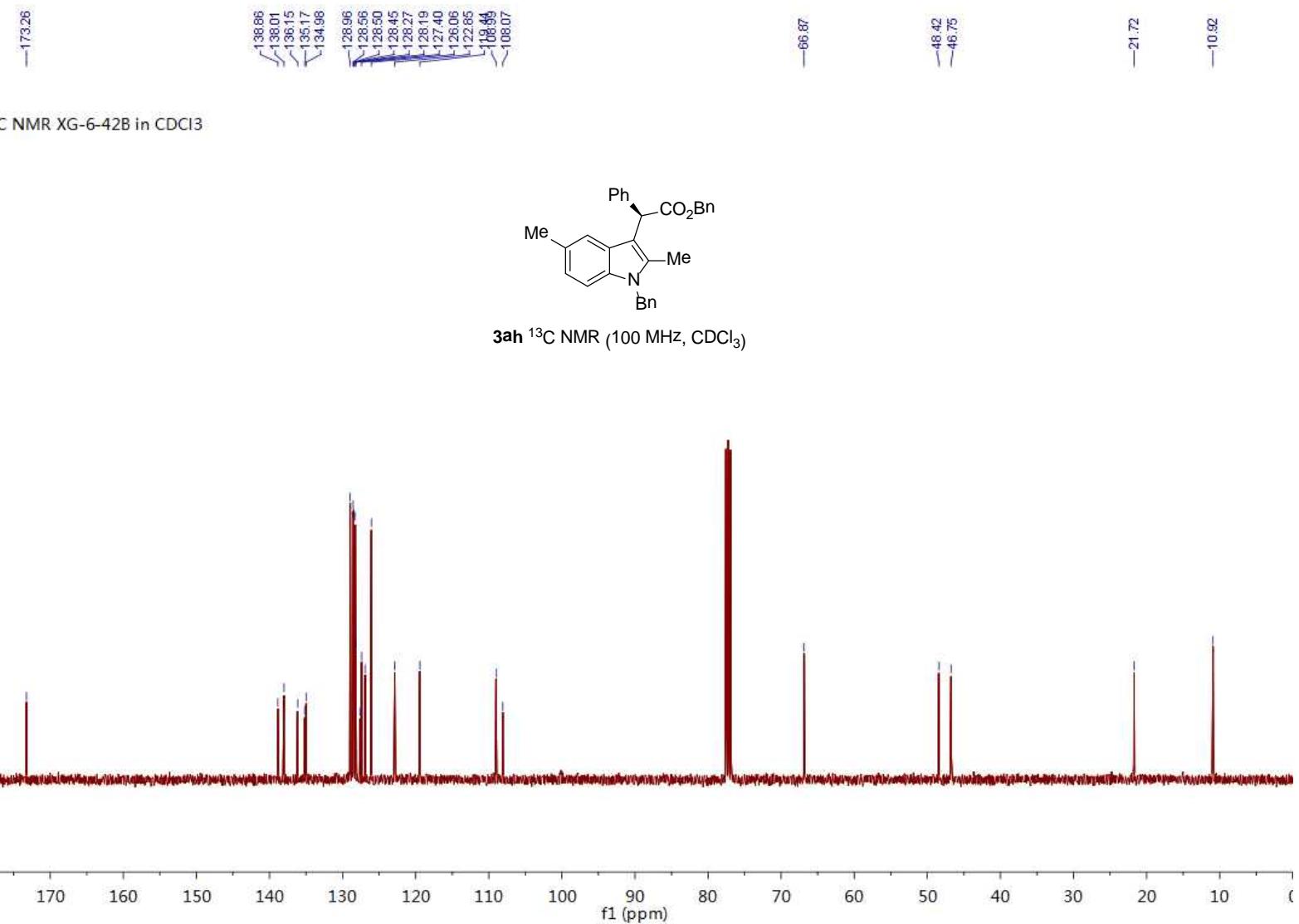


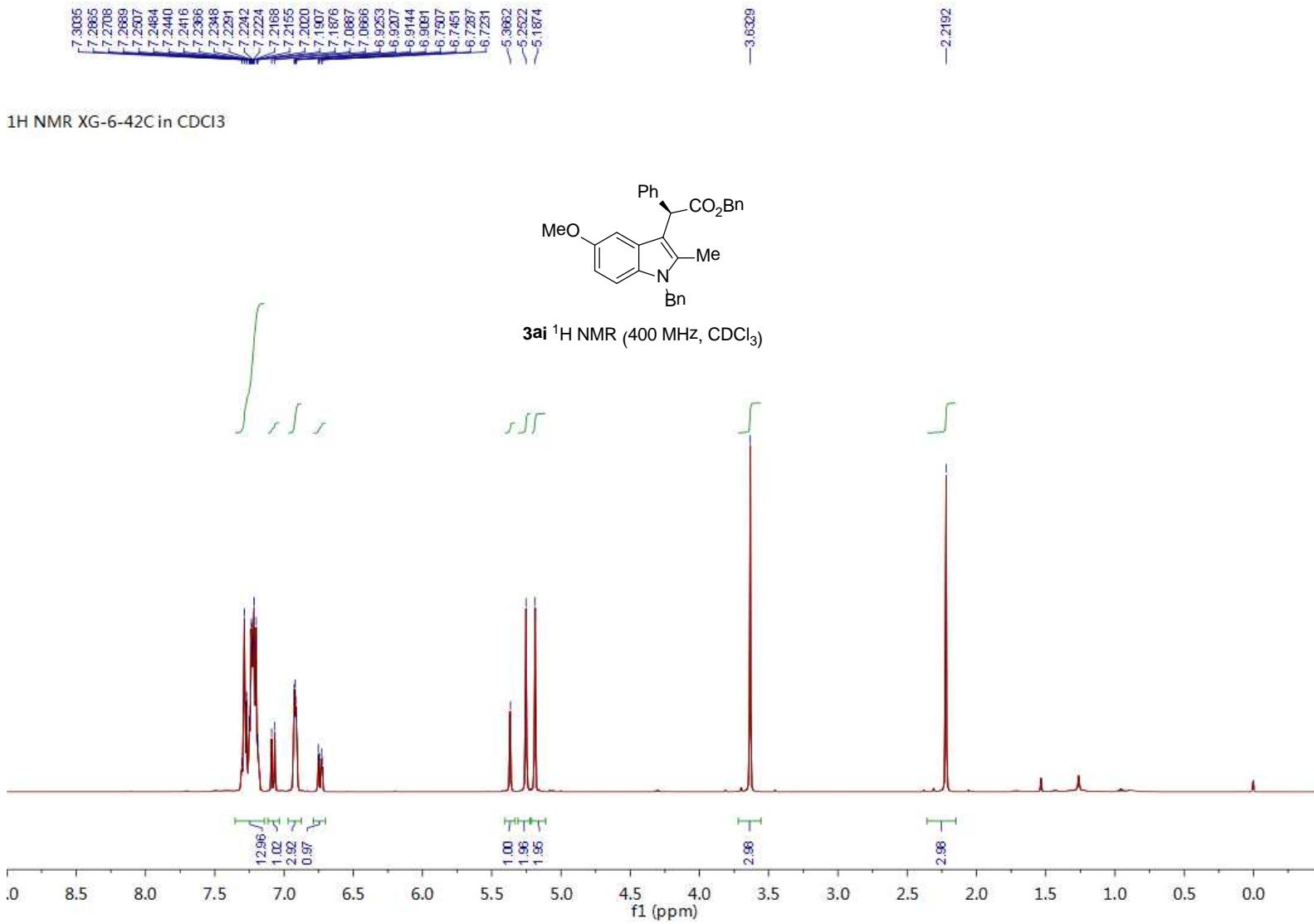
3ag ^1H NMR (400 MHz, CDCl_3)

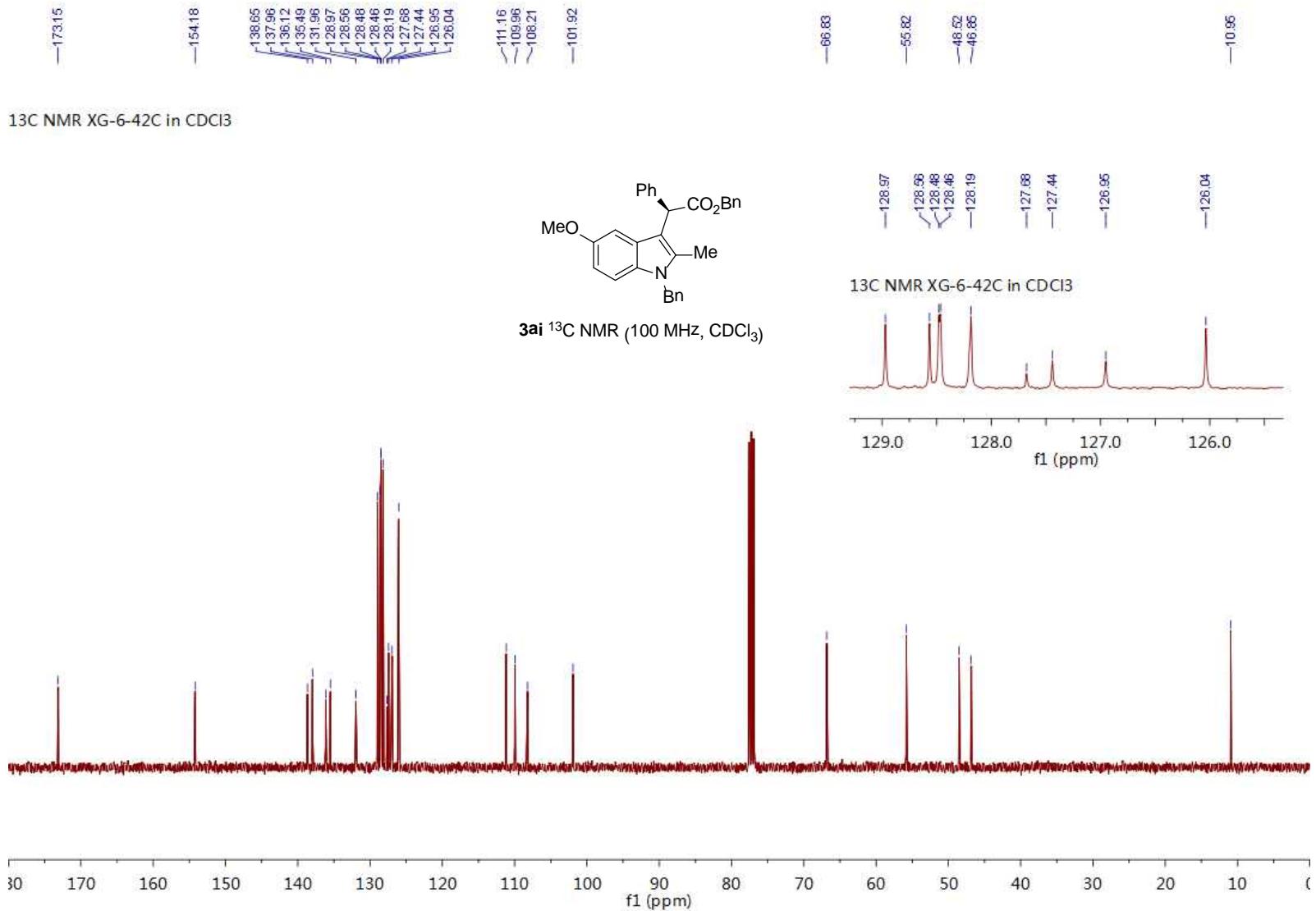






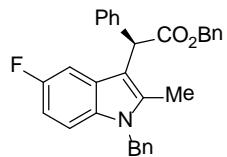




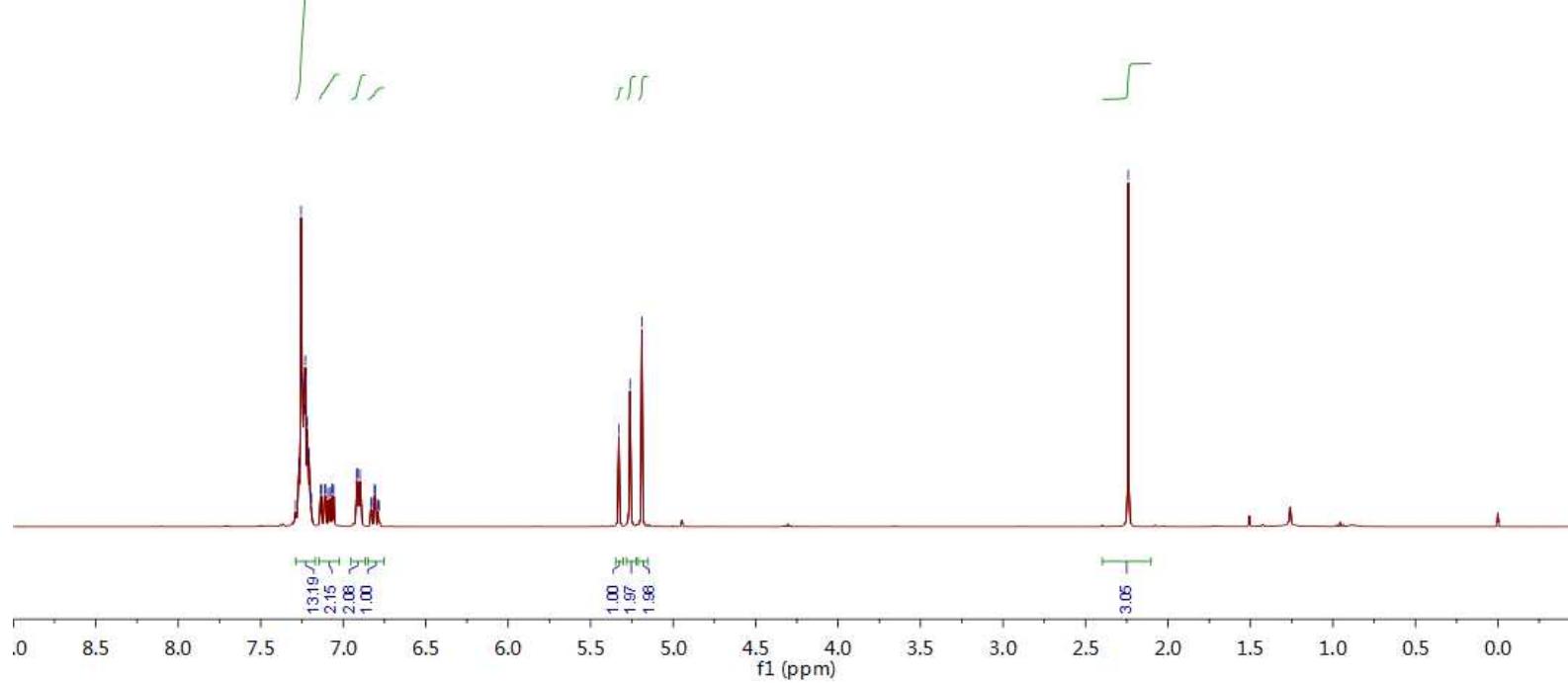


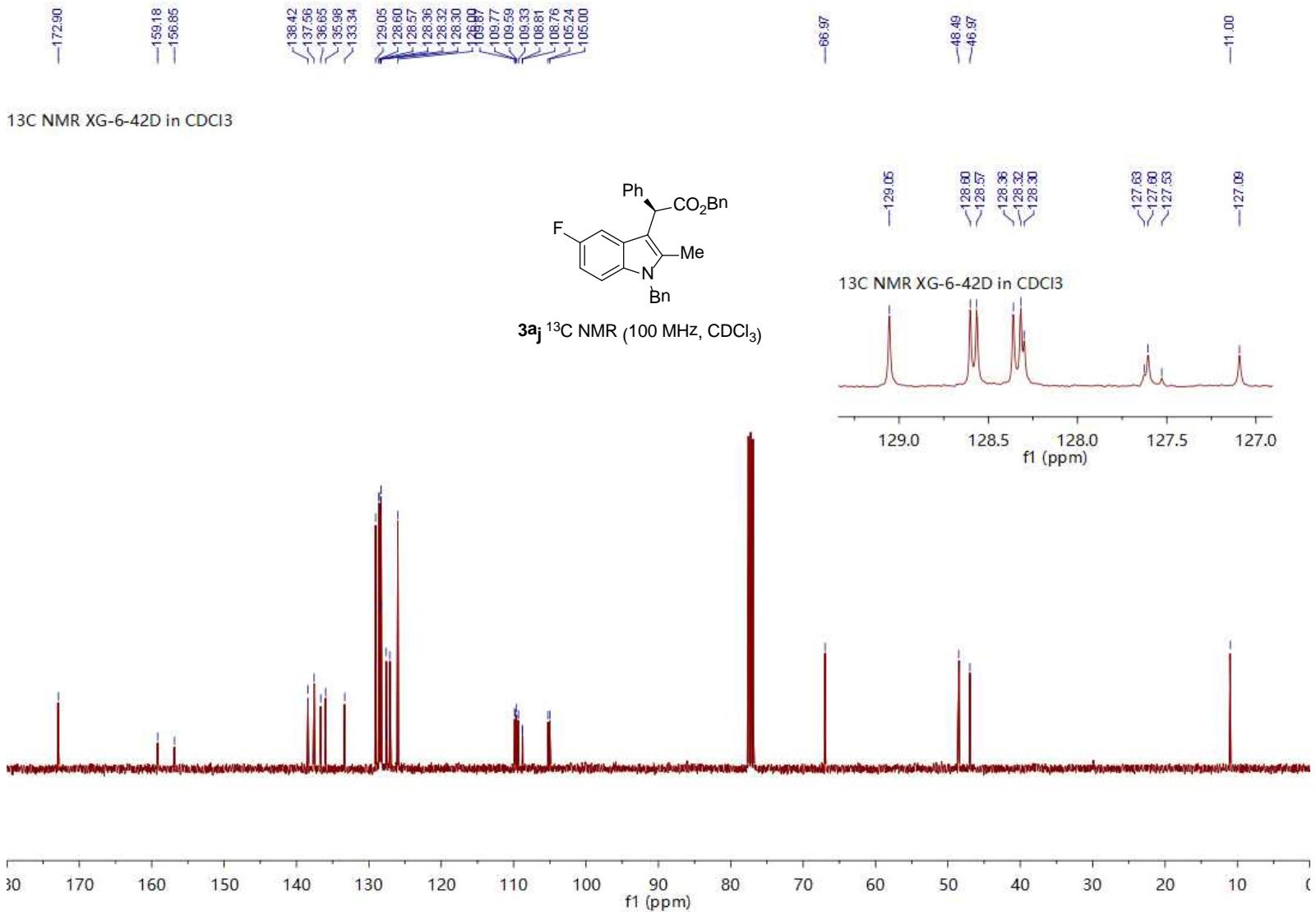
7.2900
 7.2885
 7.2865
 7.2855
 7.2844
 7.2830
 7.2833
 7.2811
 7.2811
 7.2804
 7.1989
 7.1933
 7.1375
 7.1314
 7.1124
 7.1093
 7.0887
 7.0789
 7.0675
 7.0667
 6.9173
 6.9124
 6.8975
 6.8331
 6.8268
 6.8105
 6.8043
 6.7880
 6.7818
 5.3290
 5.2614
 5.1888
 —2.2408

¹H NMR XG-6-42D in CDCl₃

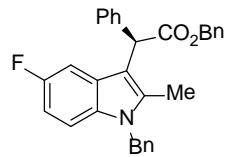


3aj ¹H NMR (400 MHz, CDCl₃)

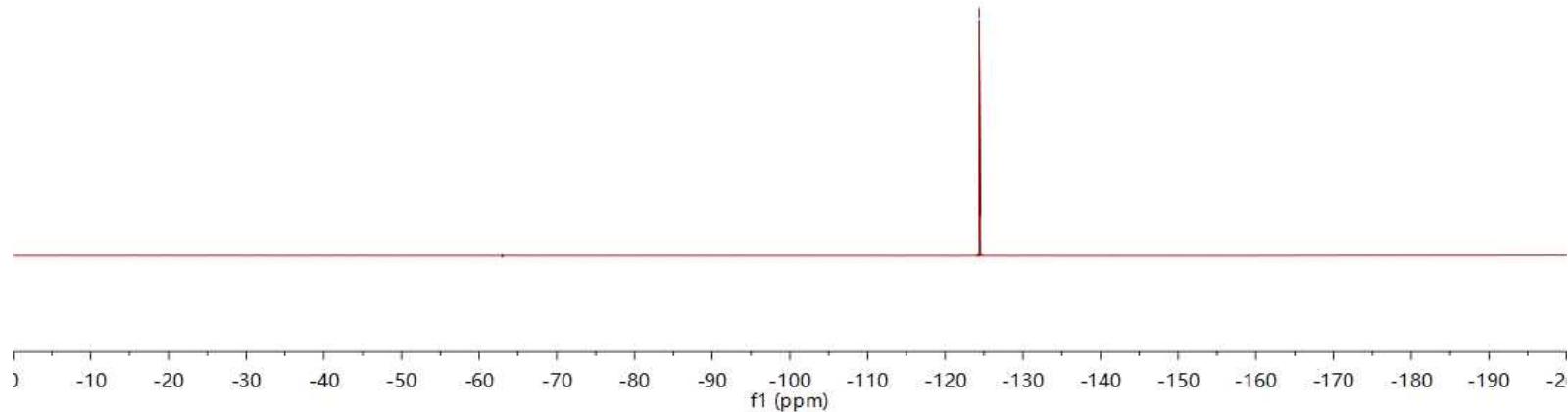




¹⁹F NMR XG-6-42D in CDCl₃

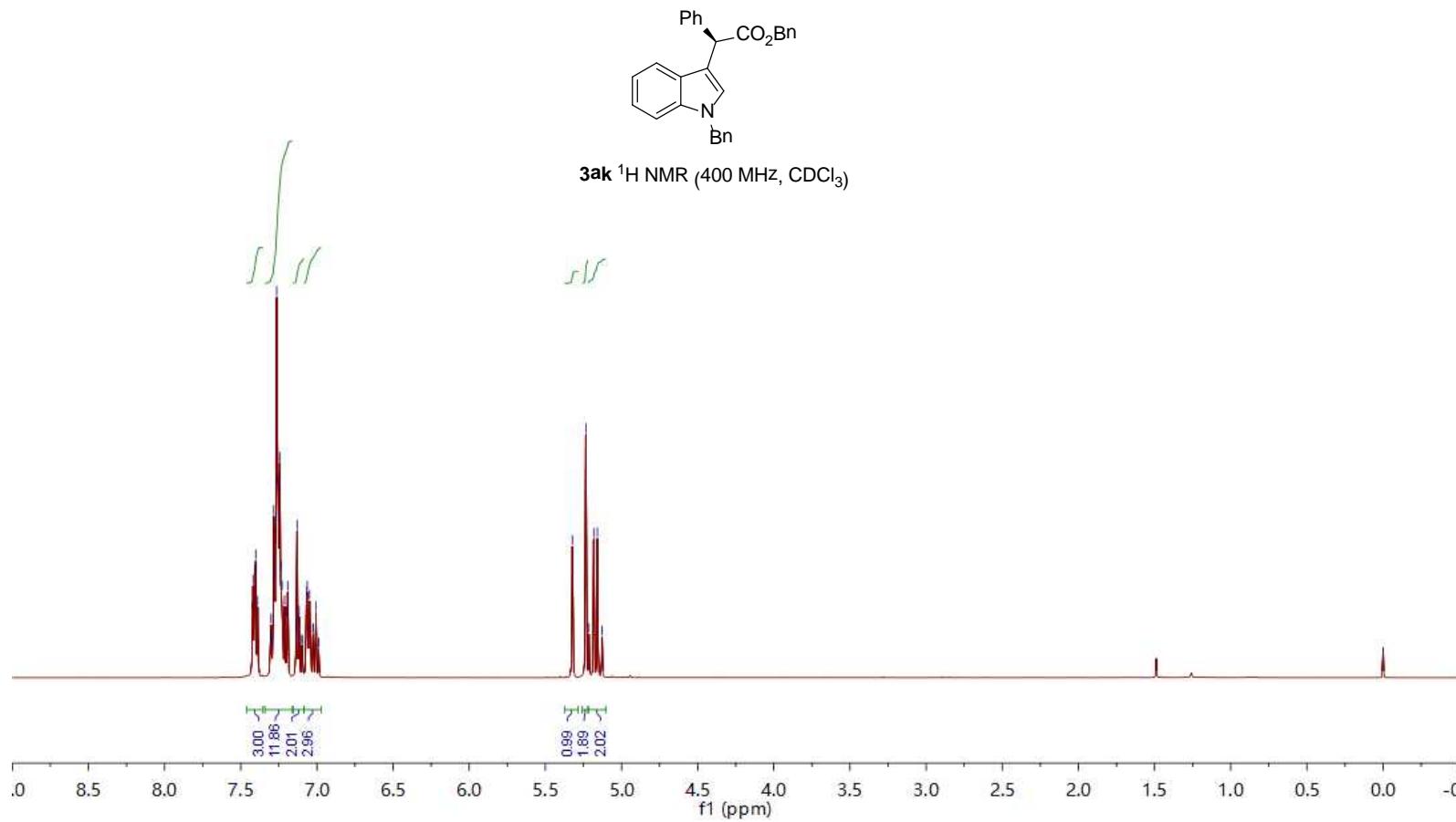


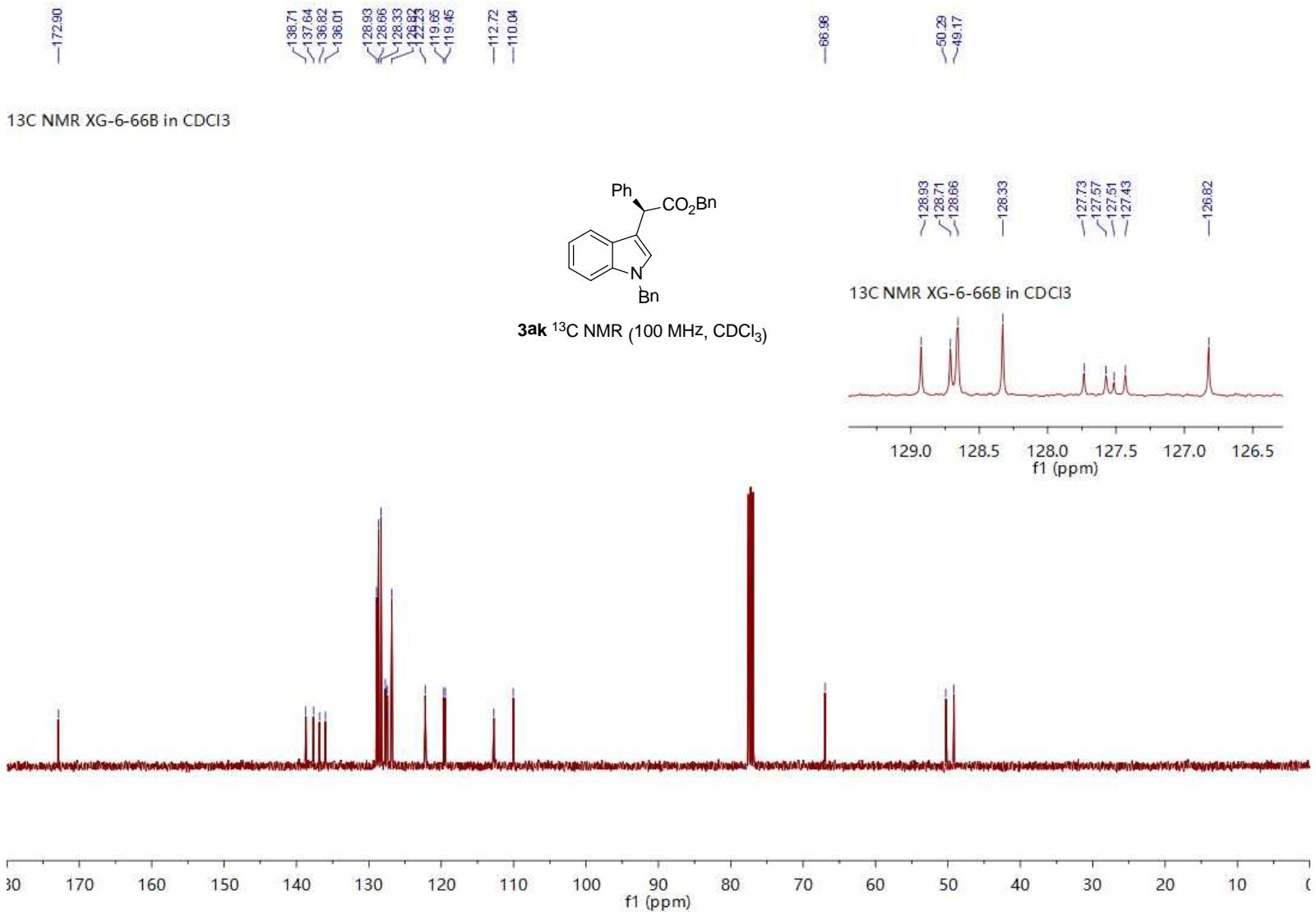
3aj ¹⁹F NMR (376 MHz, CDCl₃)

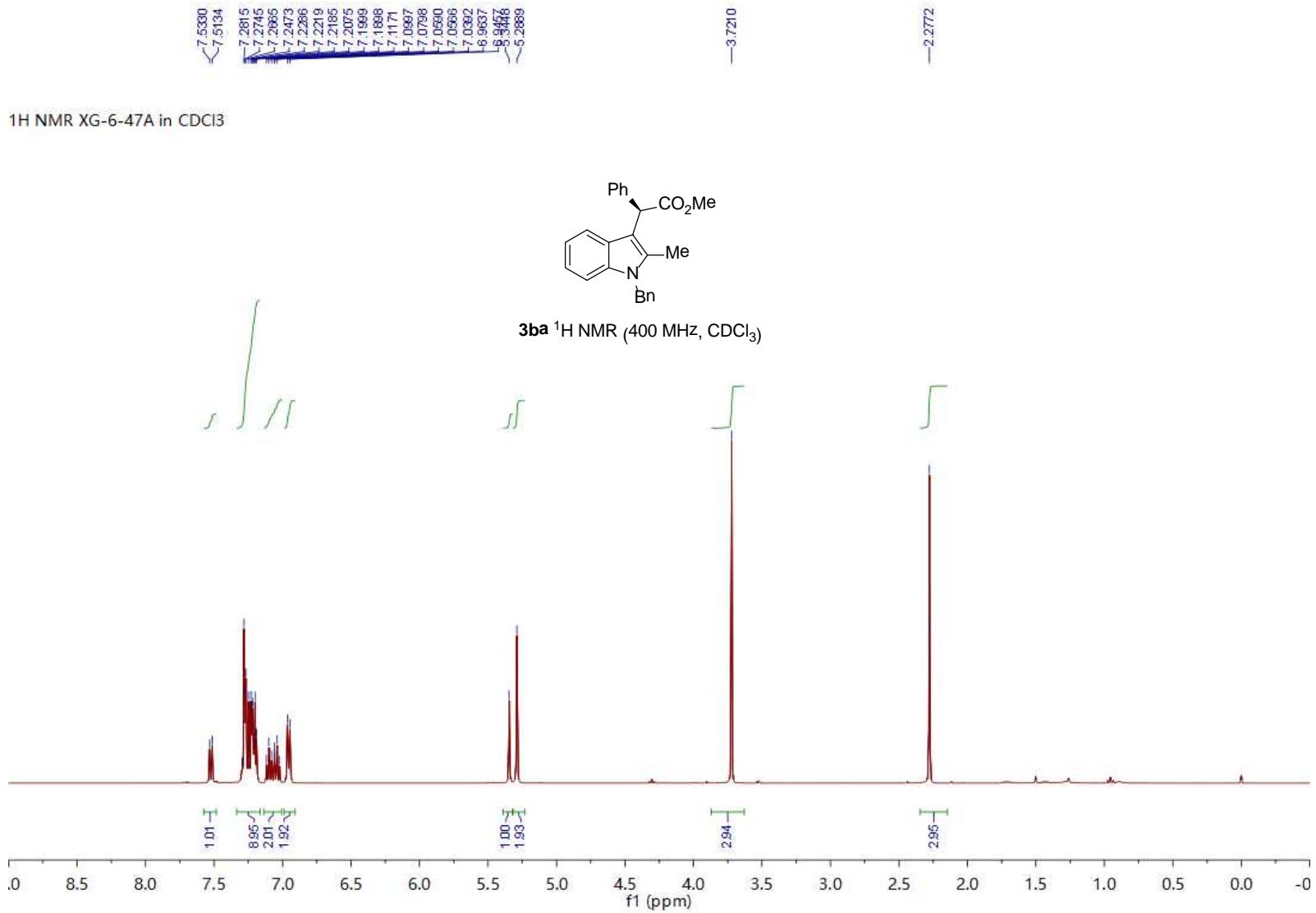


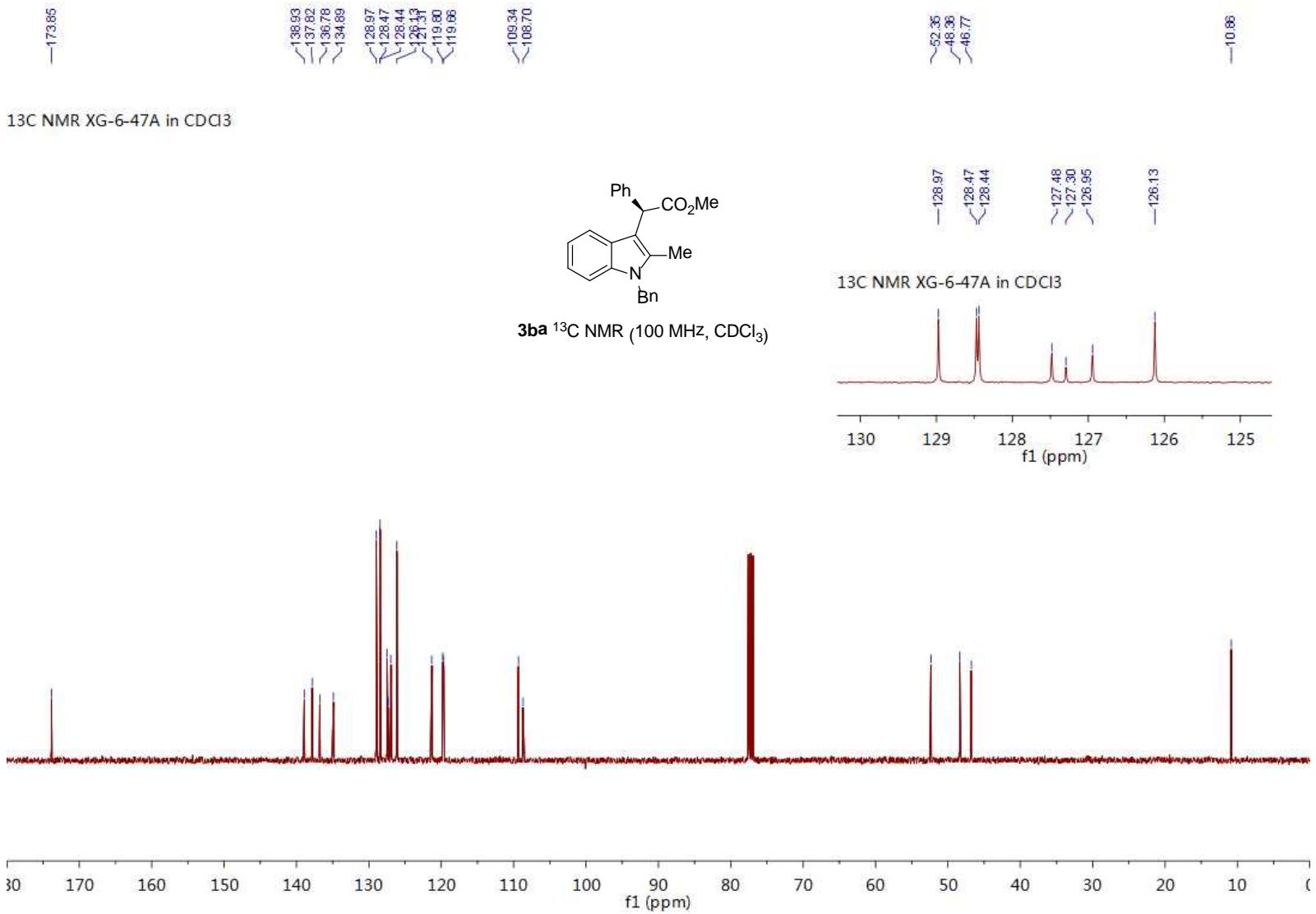
7.4231
7.4191
7.4060
7.4017
7.3886
7.3045
7.3006
7.2884
7.2761
7.2709
7.2636
7.2681
7.2541
7.2437
7.2361
7.2291
7.2119
7.1985
7.1918
7.1365
7.1301
7.1194
7.1169
7.0889
7.0964
7.0880
7.0637
7.0479
7.0262
7.0240
7.9998
5.3240
5.2132
5.1821
5.1832
5.1274

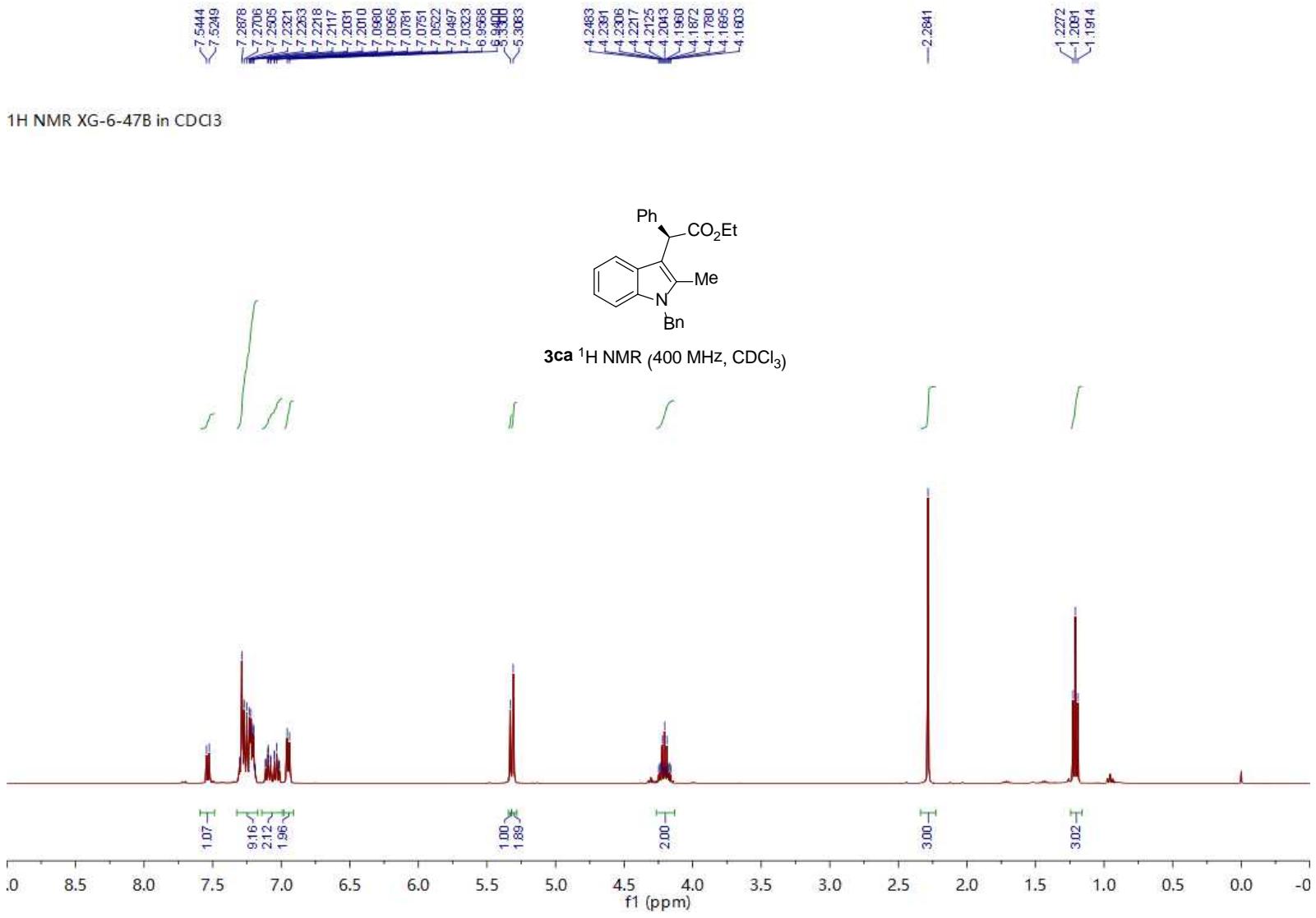
¹H NMR XG-6-66B in CDCl₃

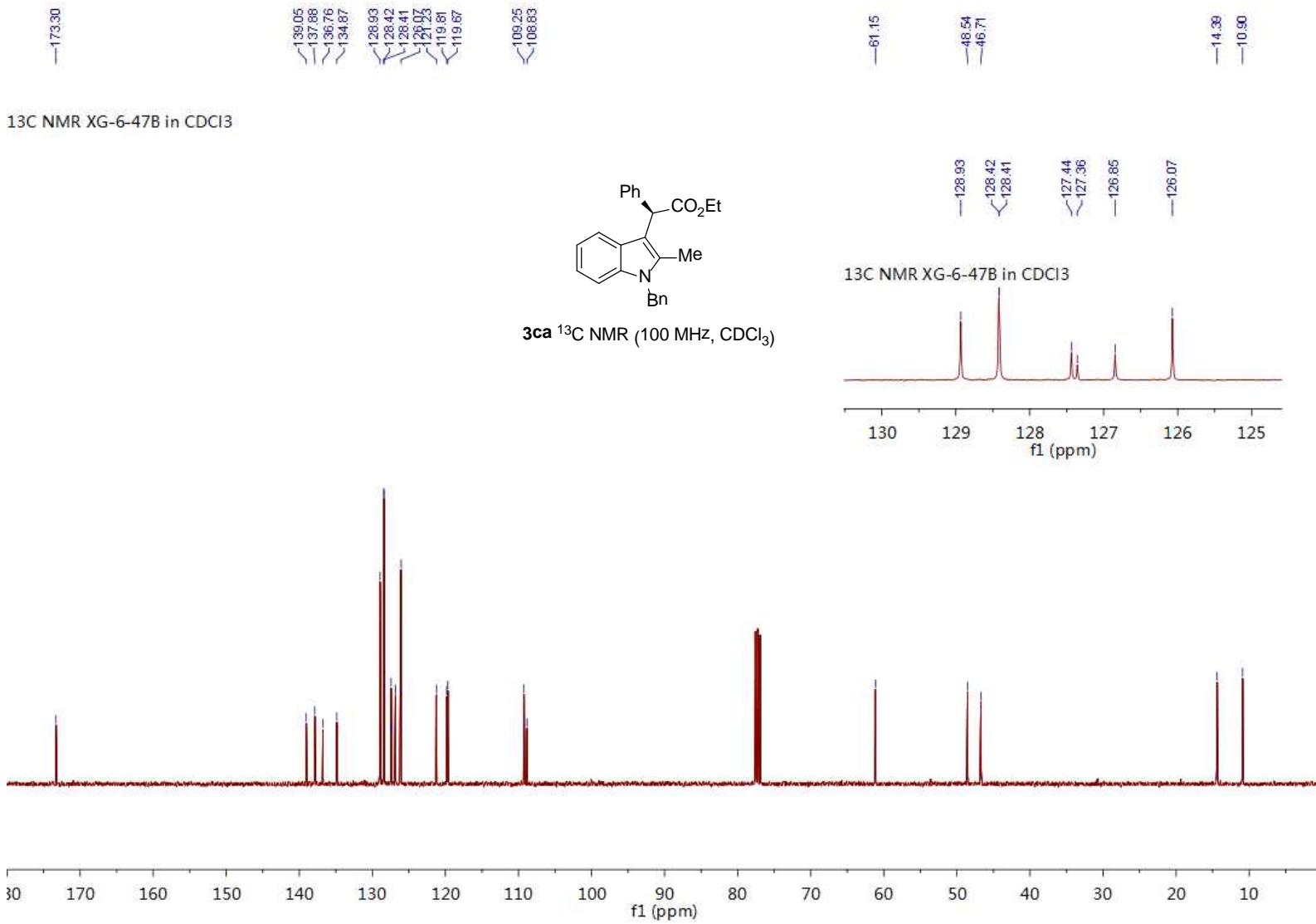












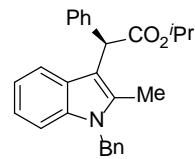
7.5389
7.5190
7.3072
7.2871
7.2896
7.2808
7.2547
7.2498
7.2437
7.2253
7.2165
7.2116
7.2000
7.1939
7.1939
7.1074
7.1053
7.0678
7.0701
7.0677
7.0417
7.0396
7.0218
7.0044
7.0026
6.9375
6.9207

¹H NMR XG-6-47C in CDCl₃

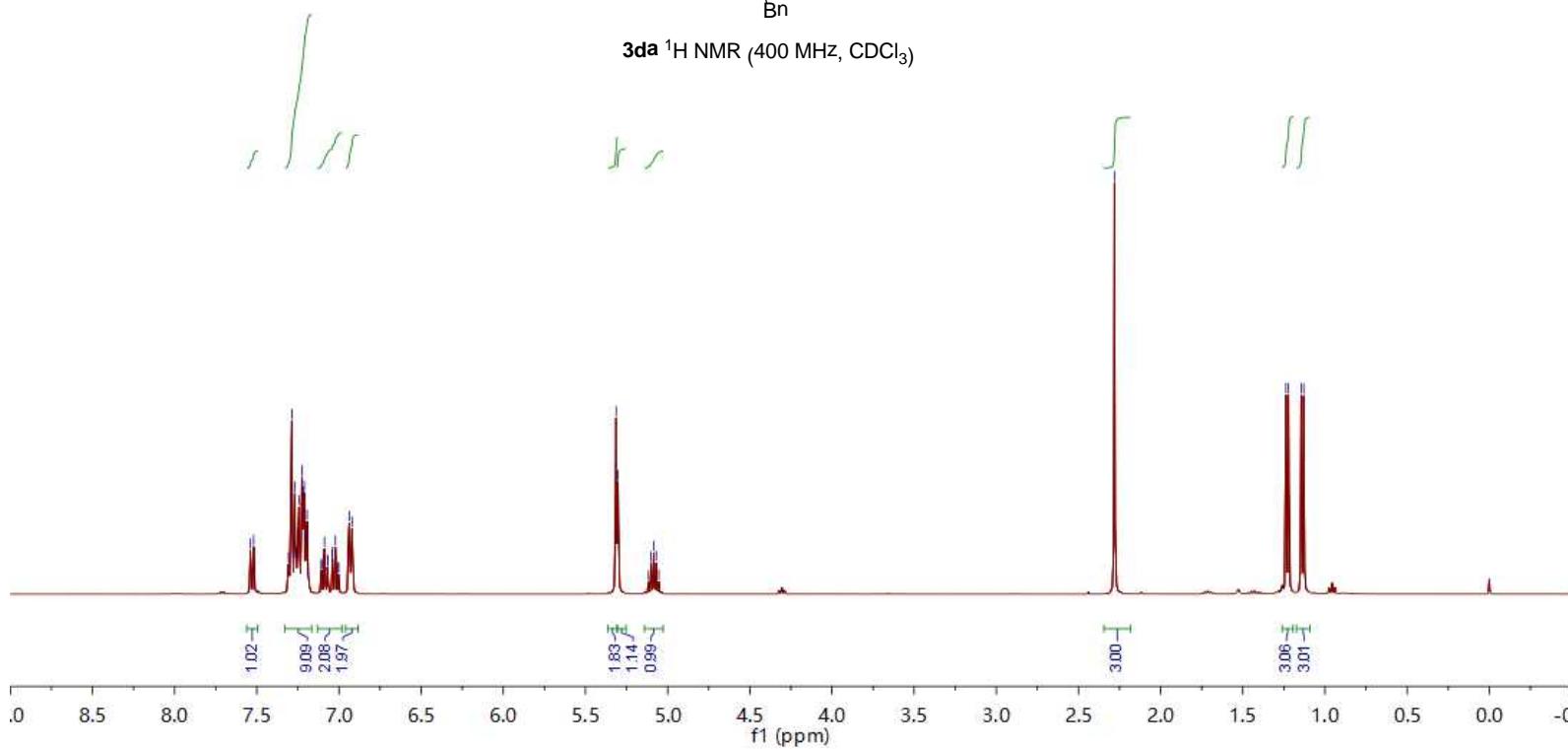
5.3134
5.3021
5.1163
5.1007
5.0849
5.0693
5.0637

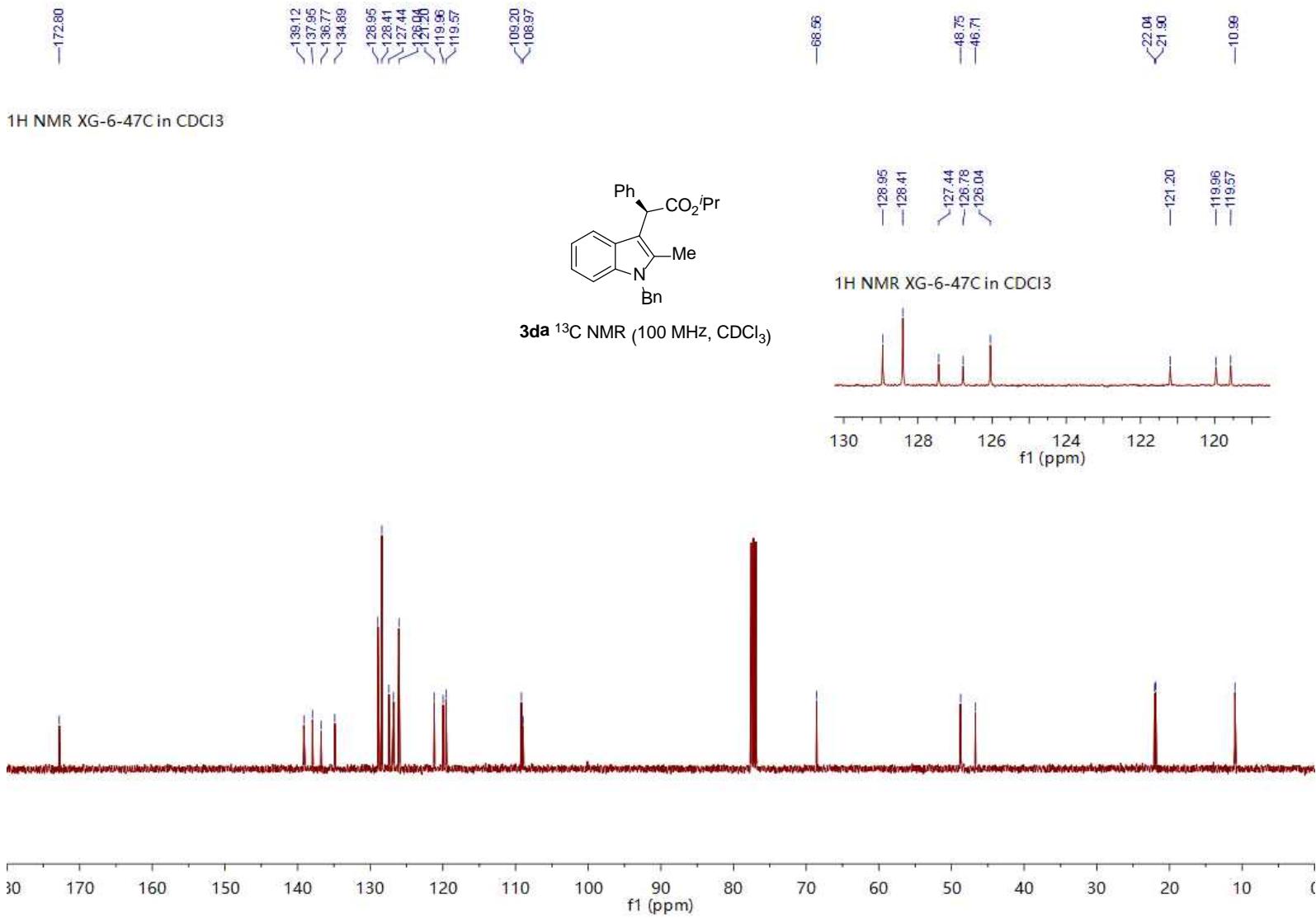
-2.2810

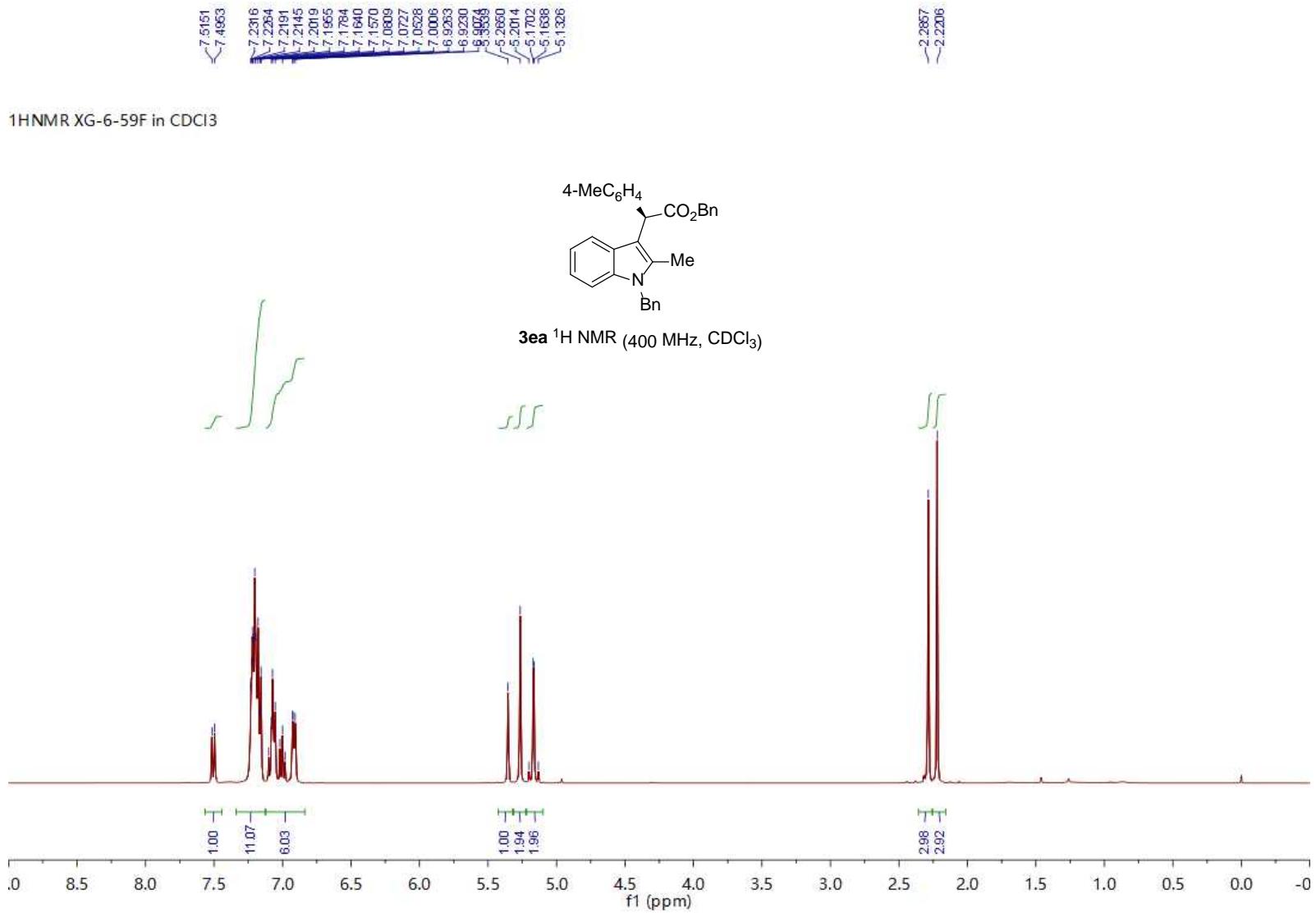
1.12372
1.12216
1.11449
1.11293

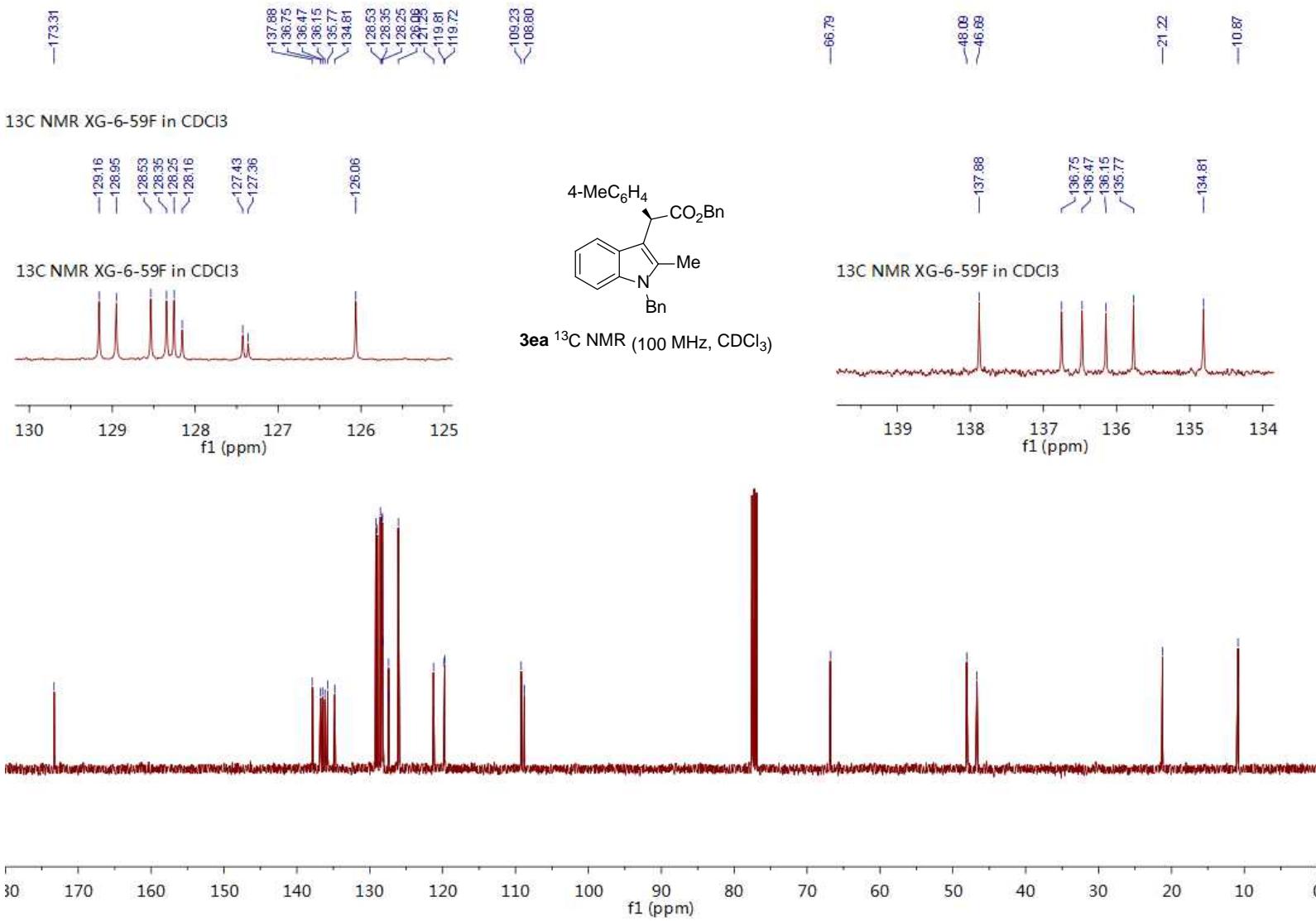


3da ¹H NMR (400 MHz, CDCl₃)



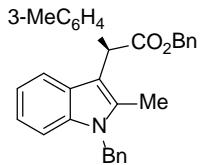




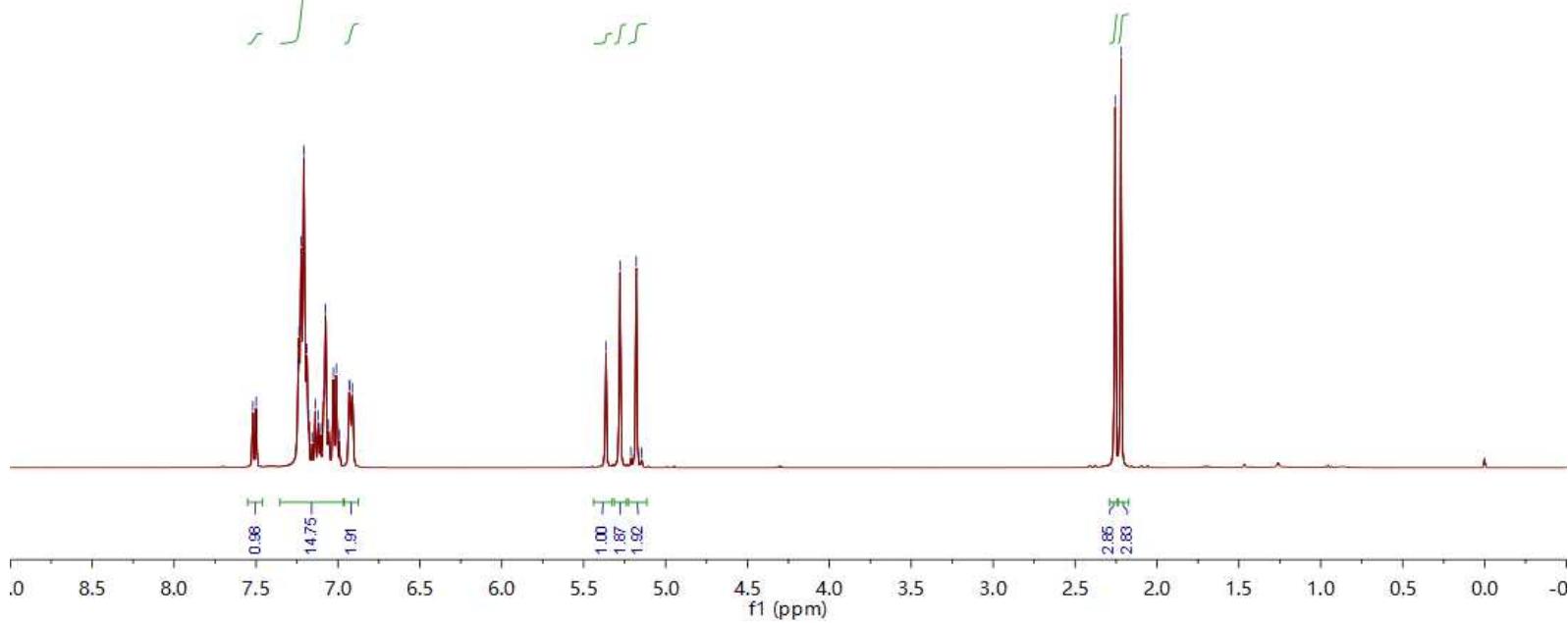


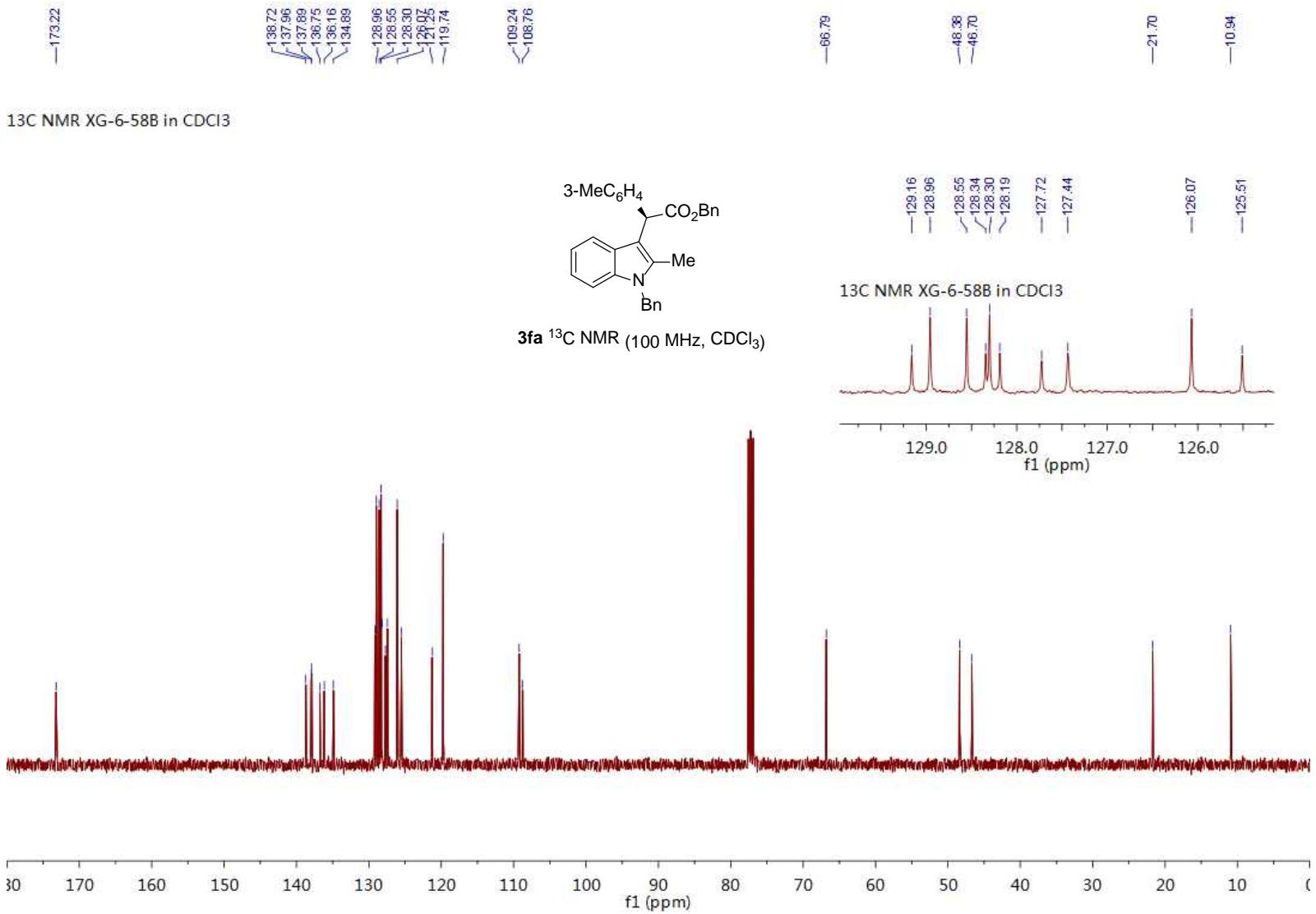
7.5187
 7.4991
 7.2422
 7.2370
 7.2247
 7.2079
 7.1893
 7.1780
 7.1386
 7.1199
 7.1098
 7.0875
 7.0759
 7.0667
 7.0277
 7.0093
 6.9305
 6.9274
 6.8145
 5.2780
 5.2108
 5.1784
 5.1454

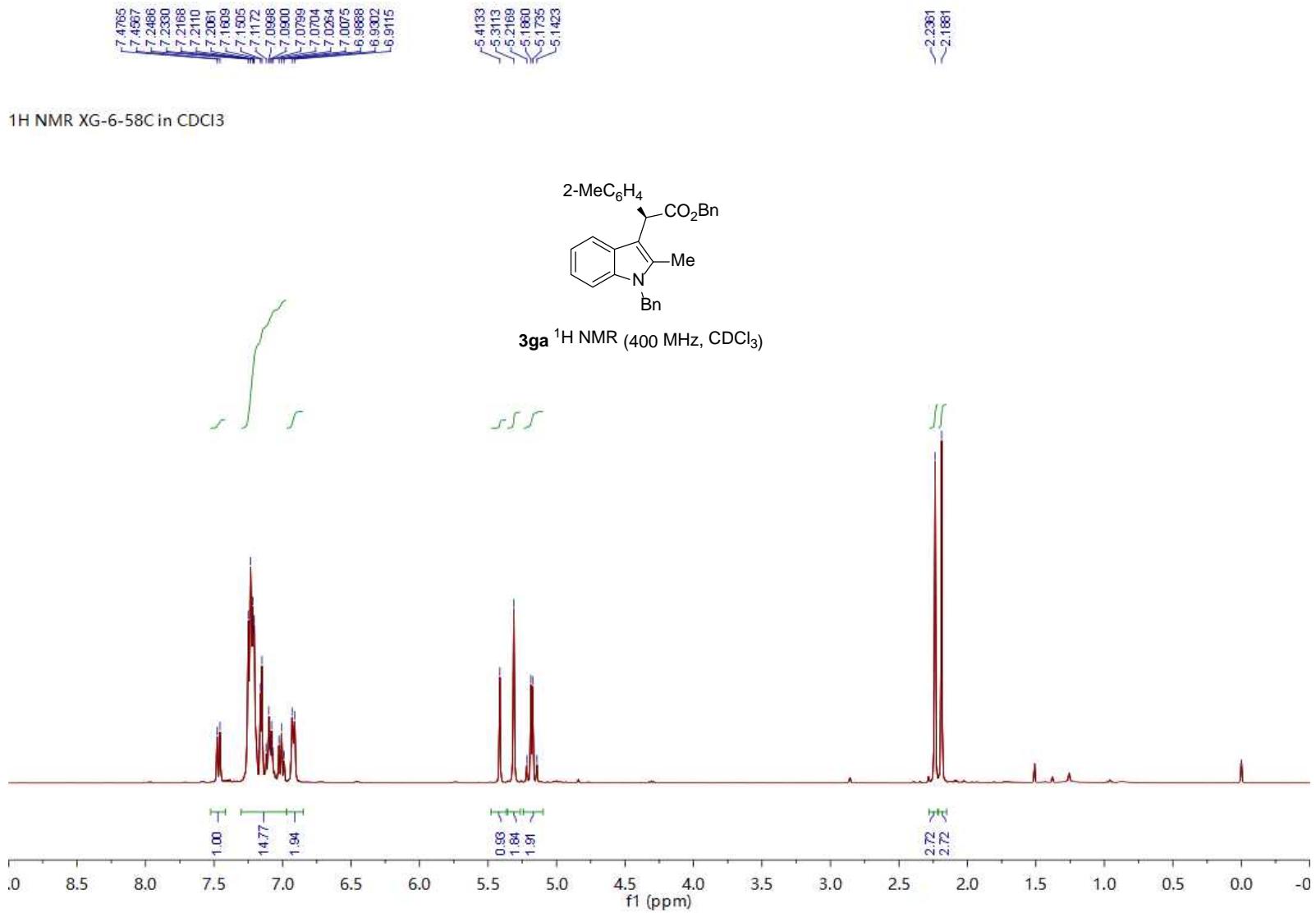
¹H NMR XG-6-58B in CDCl₃

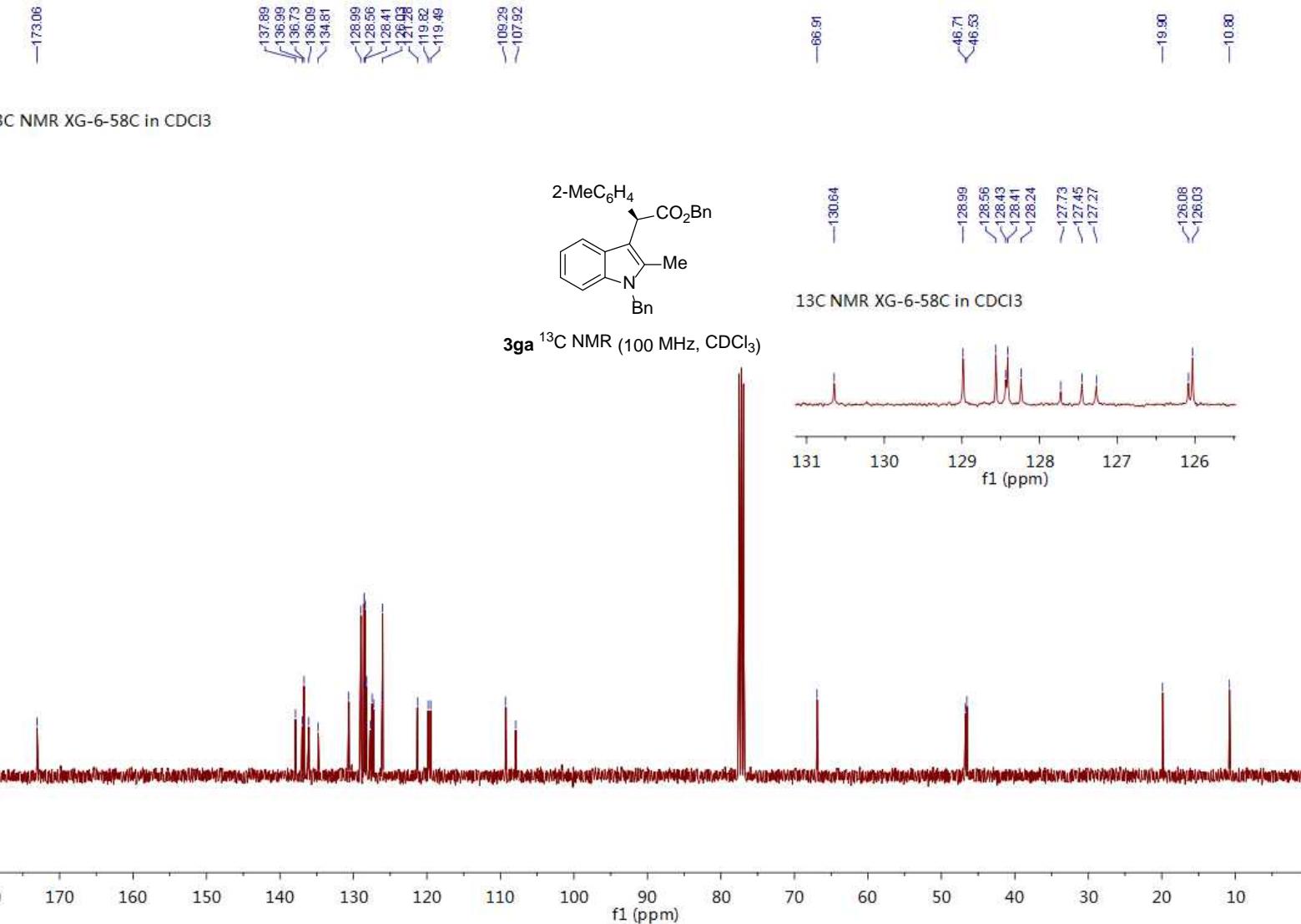


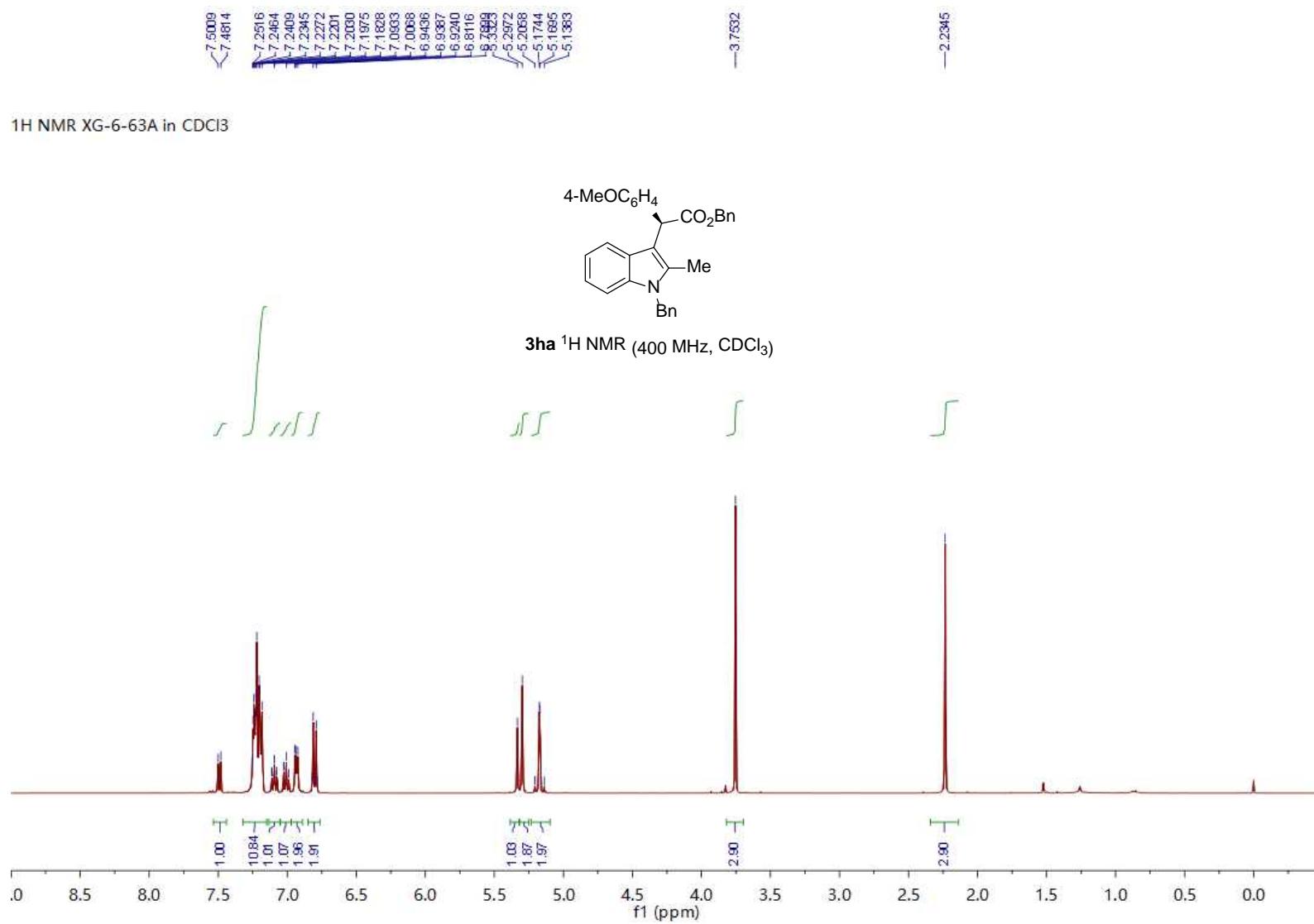
3fa ¹H NMR (400 MHz, CDCl₃)

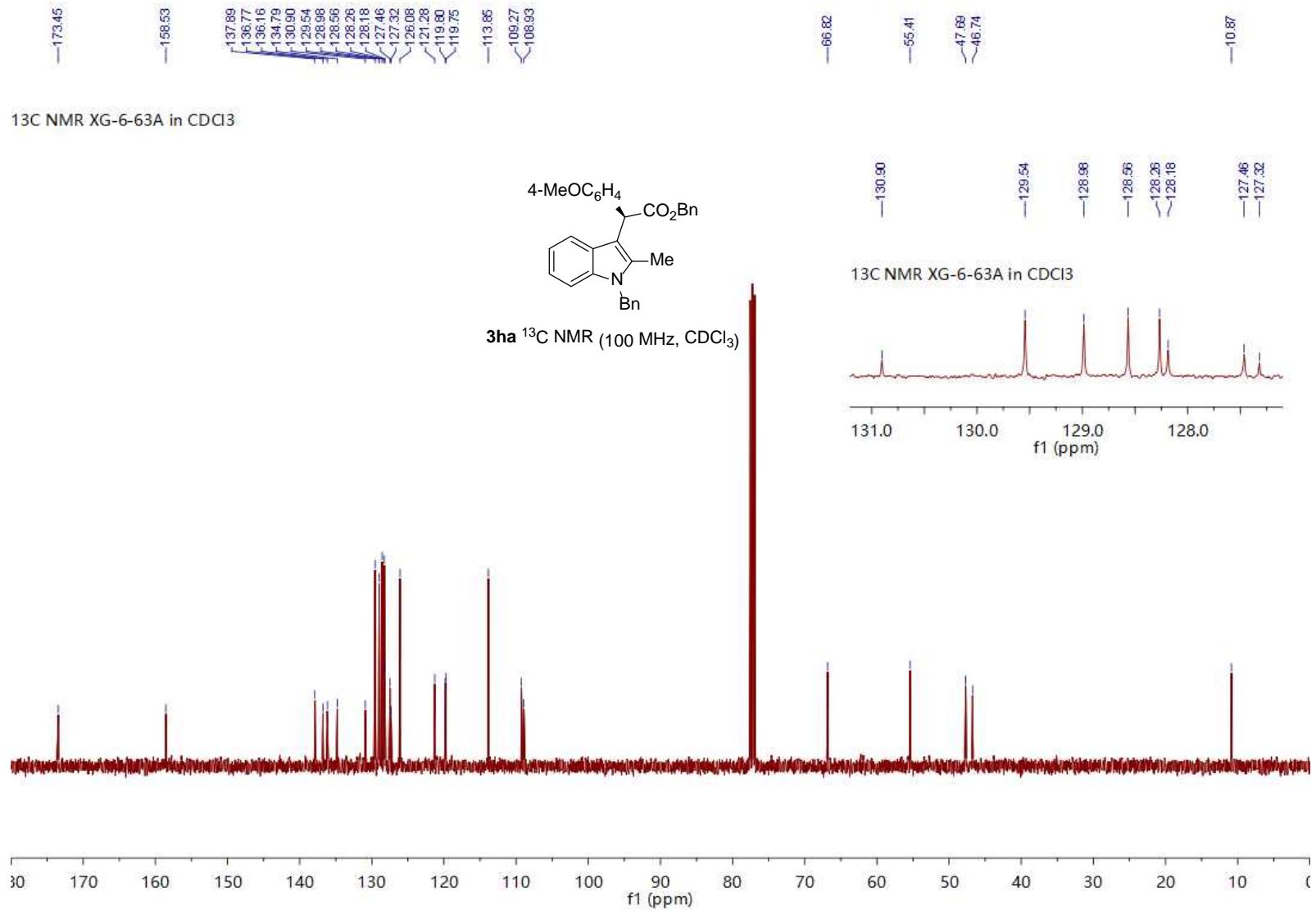


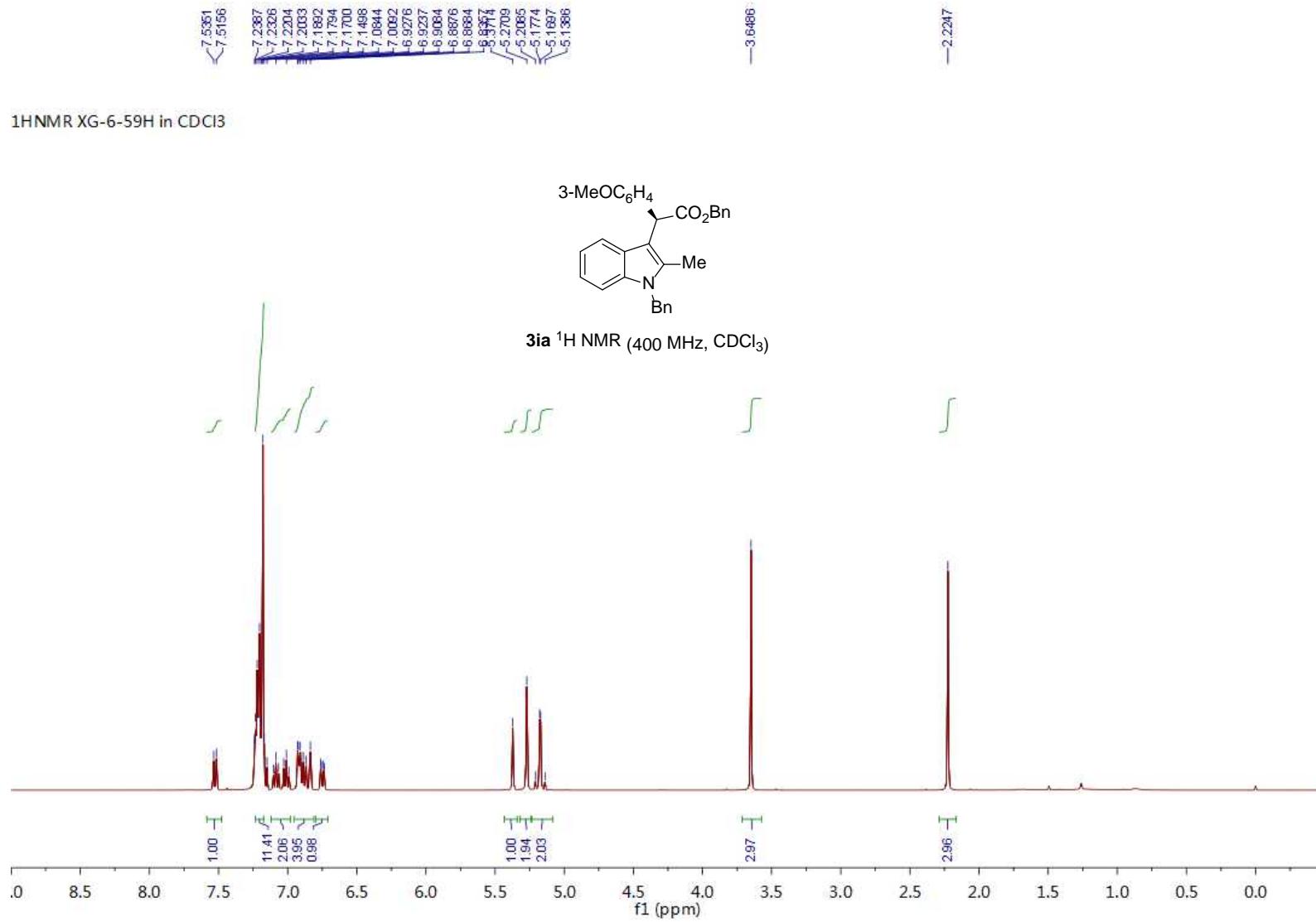


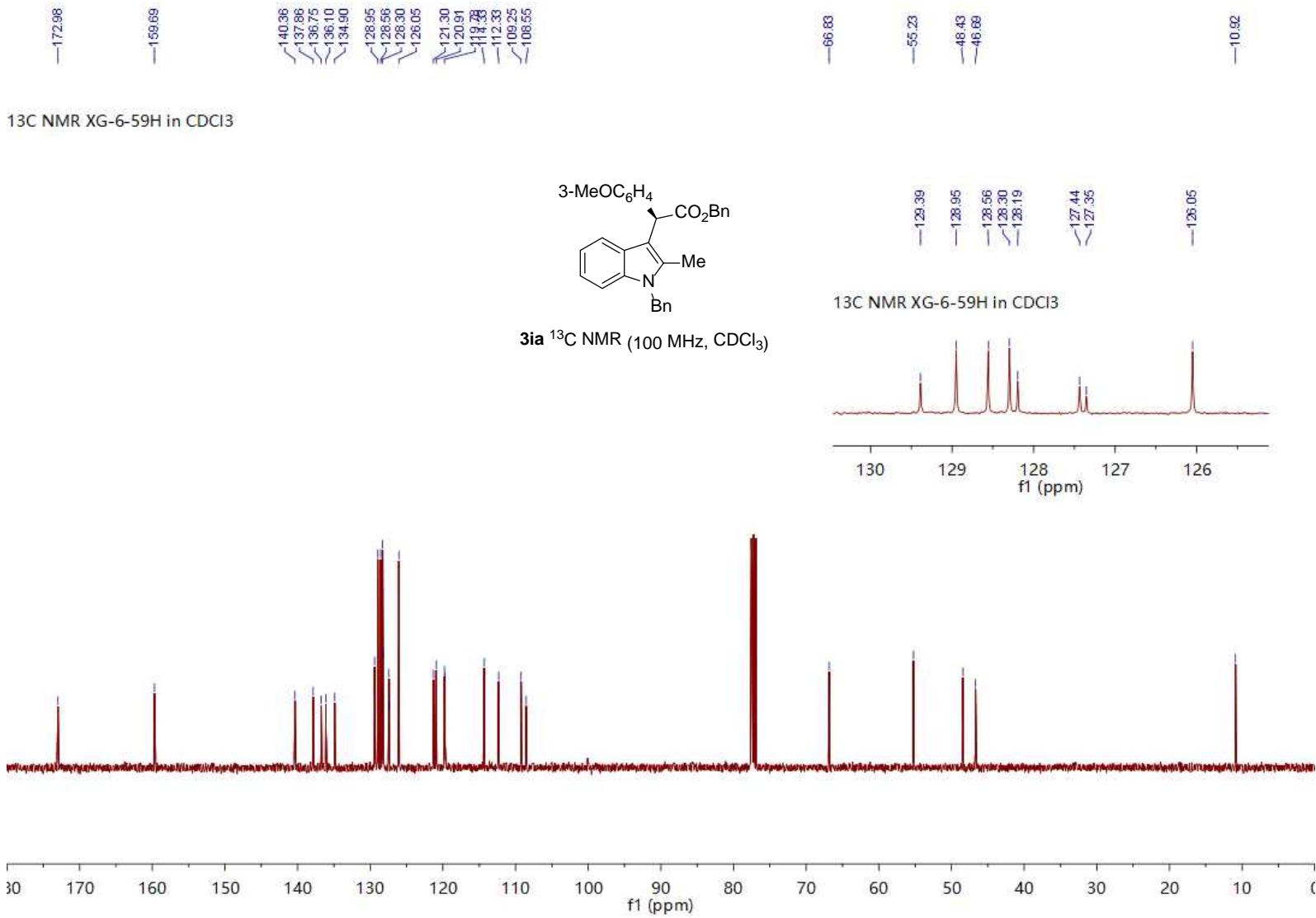






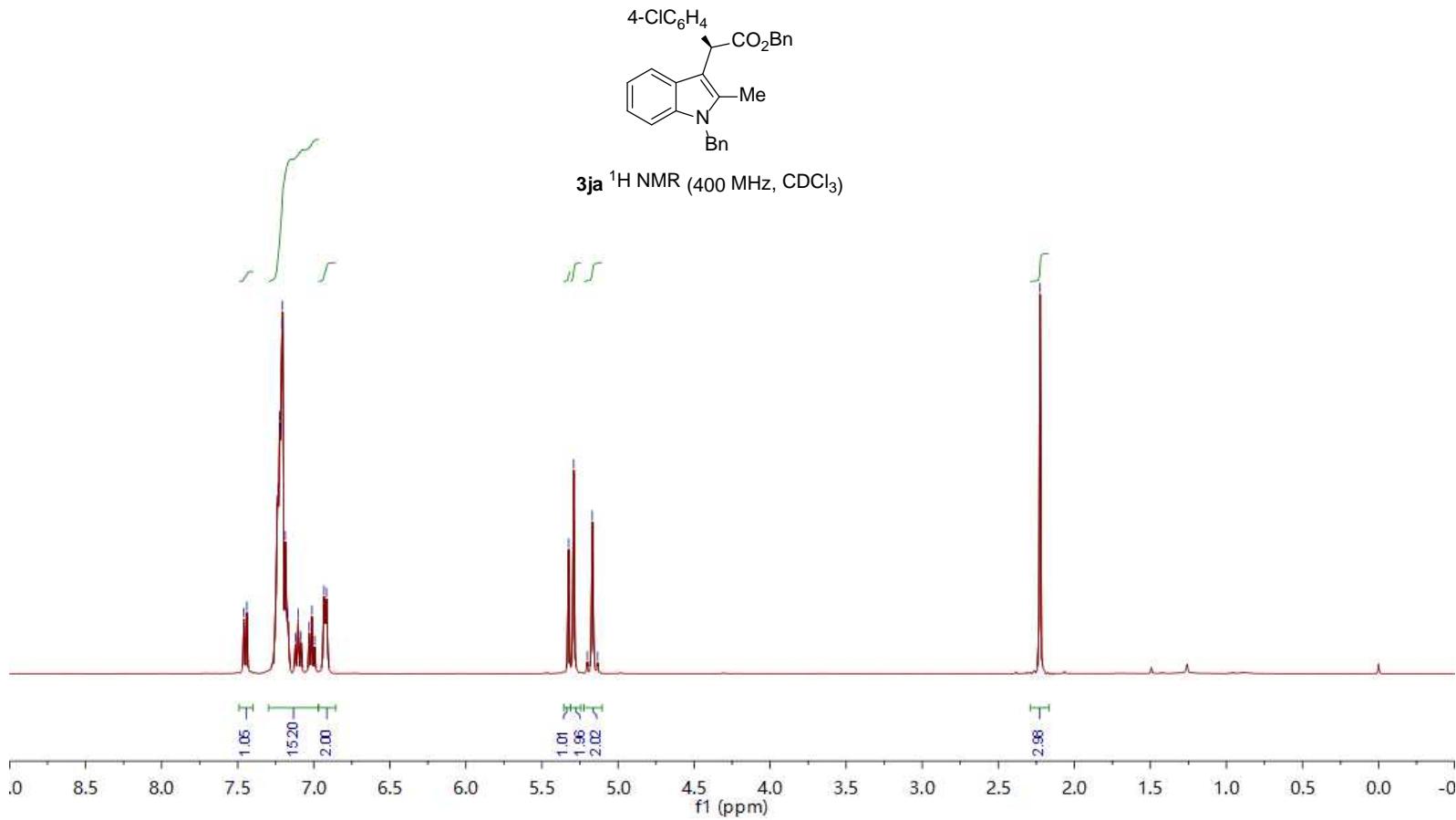


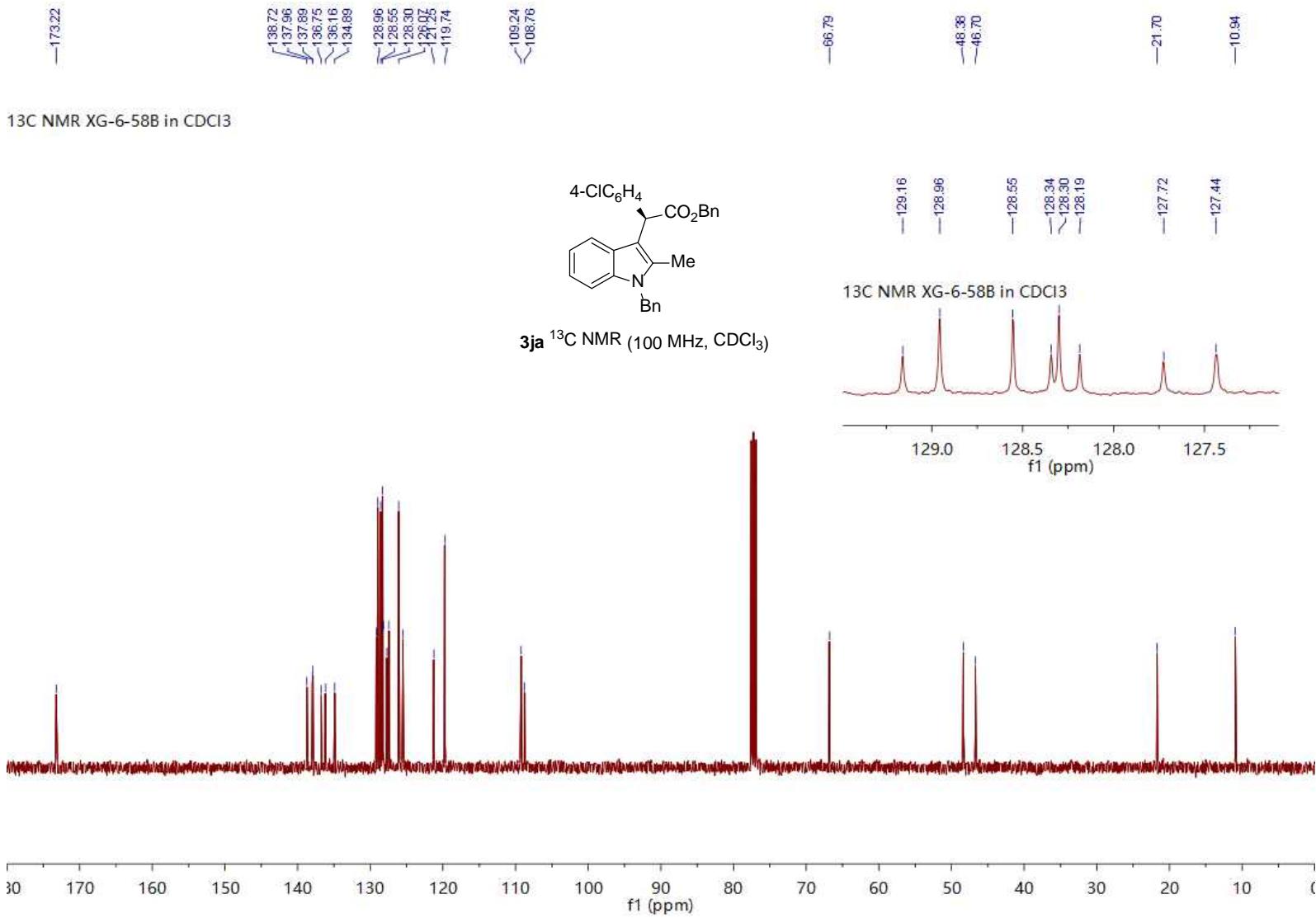


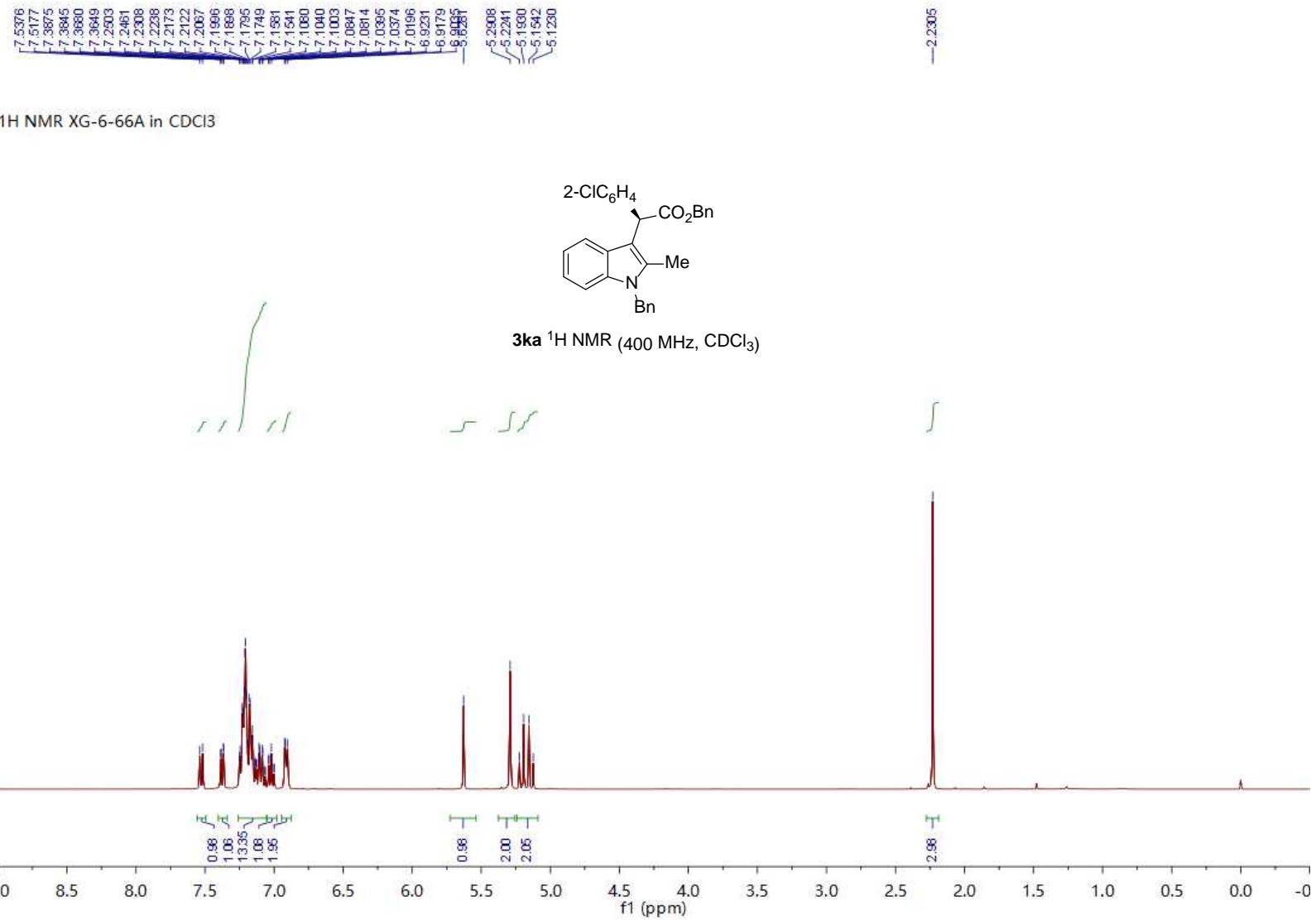


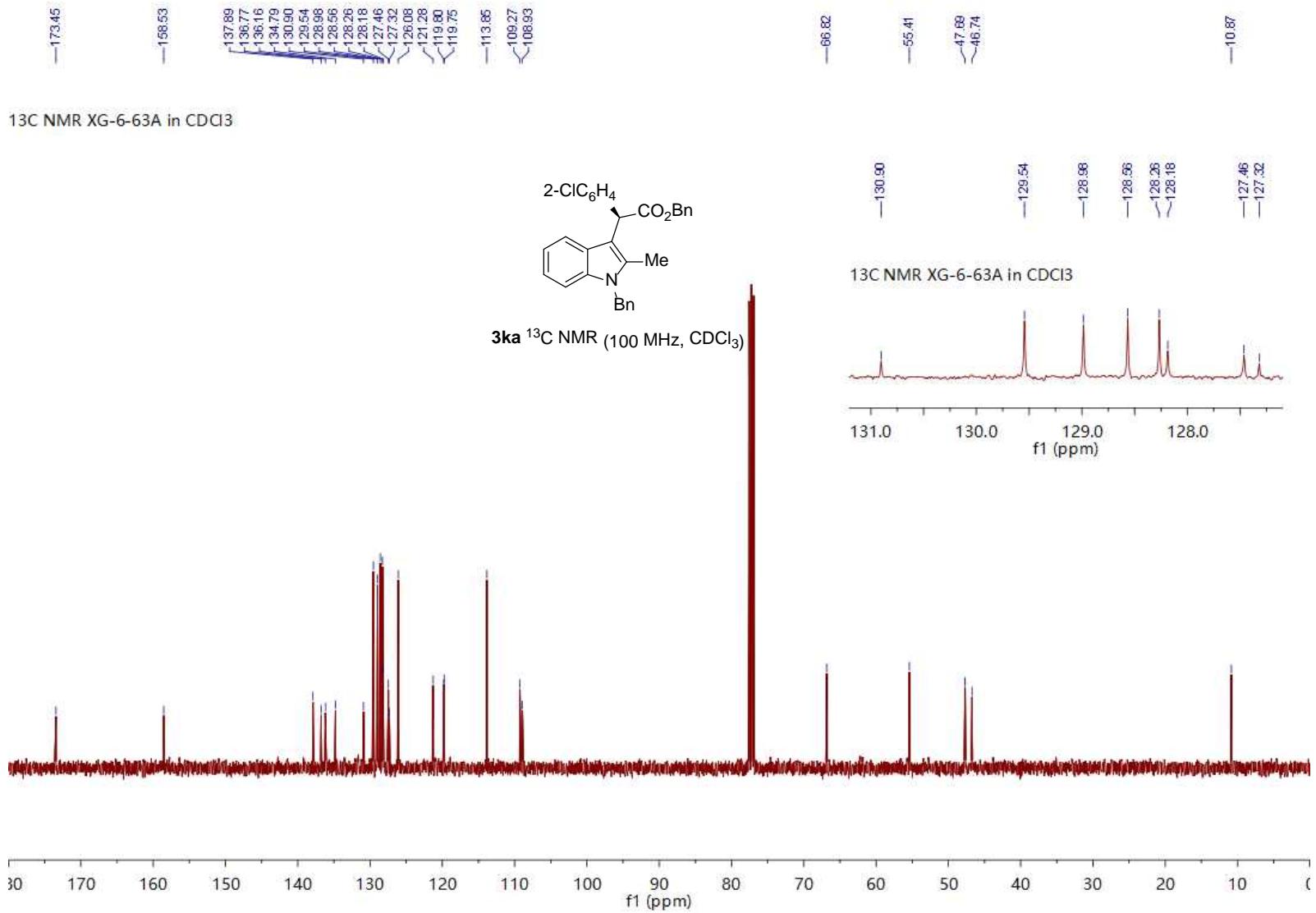


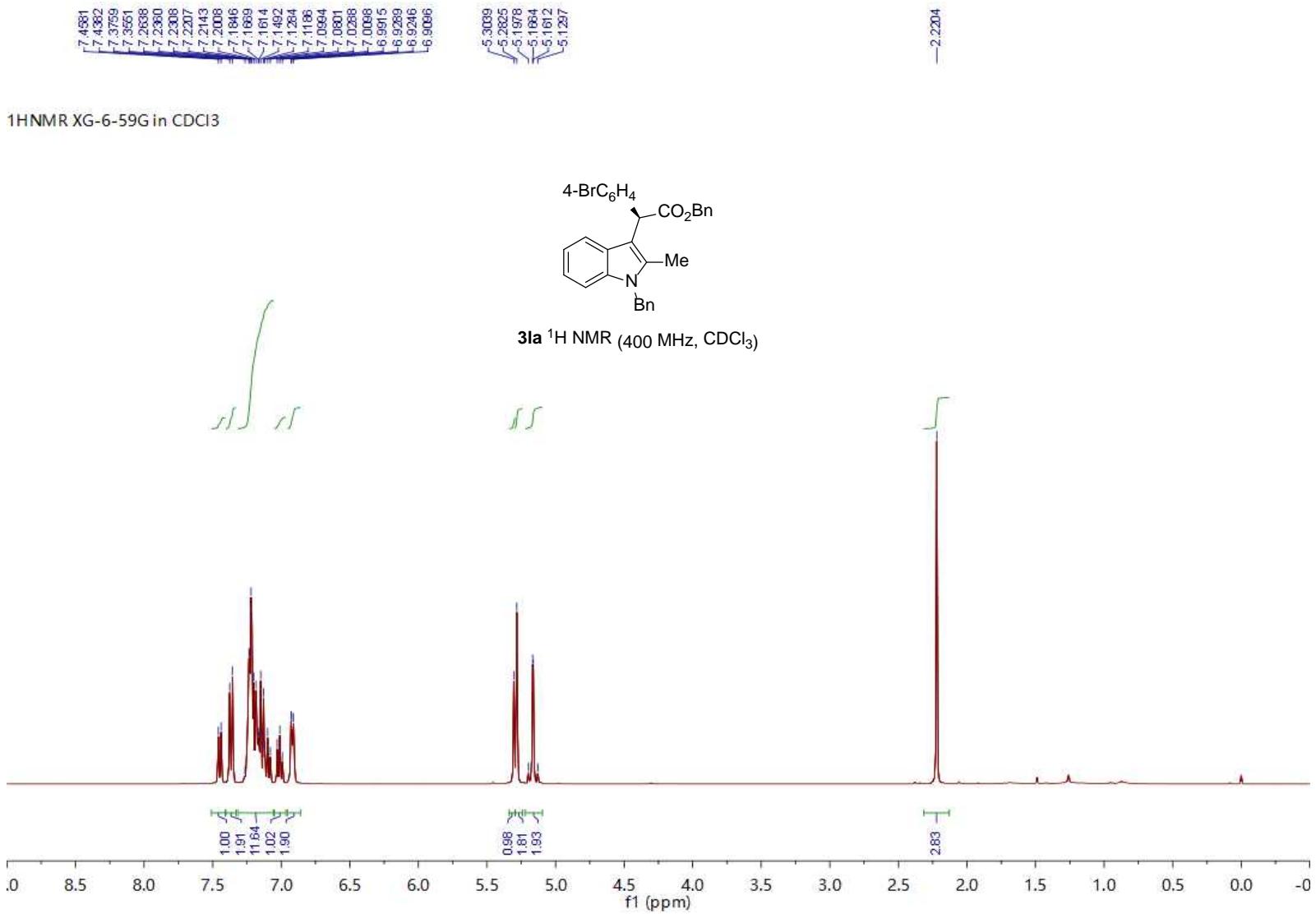
^1H NMR XG-6-56B in CDCl_3

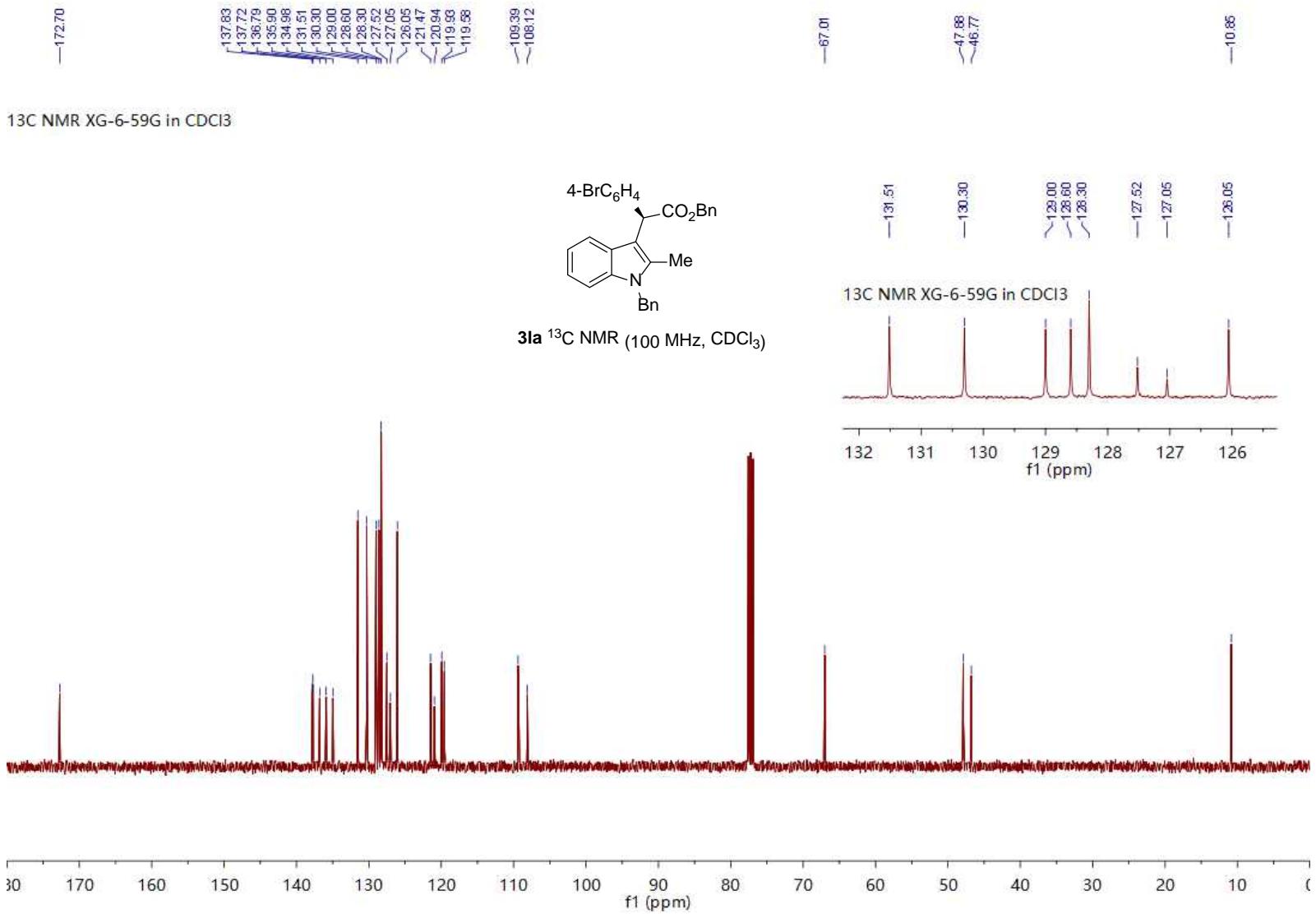






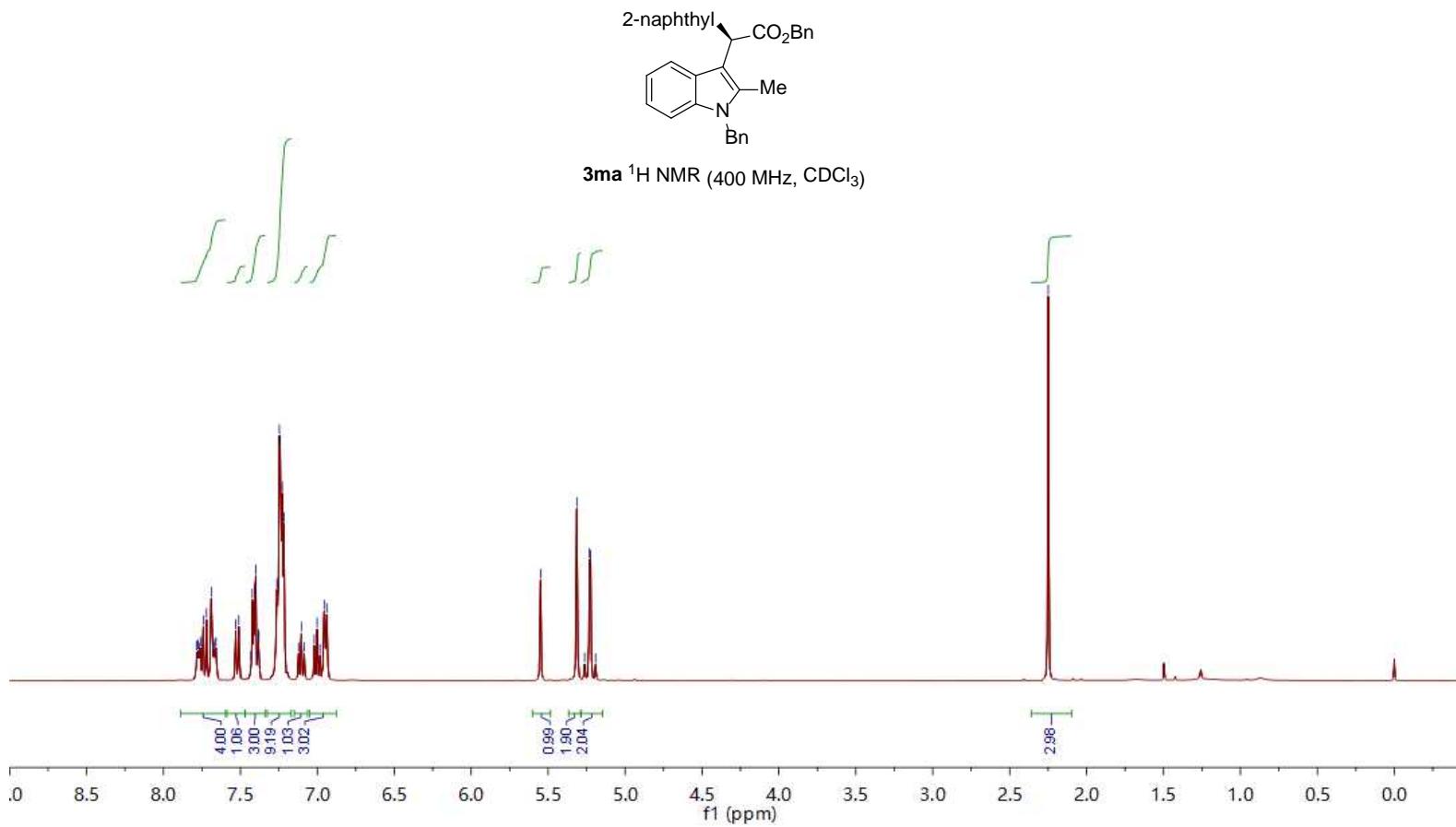


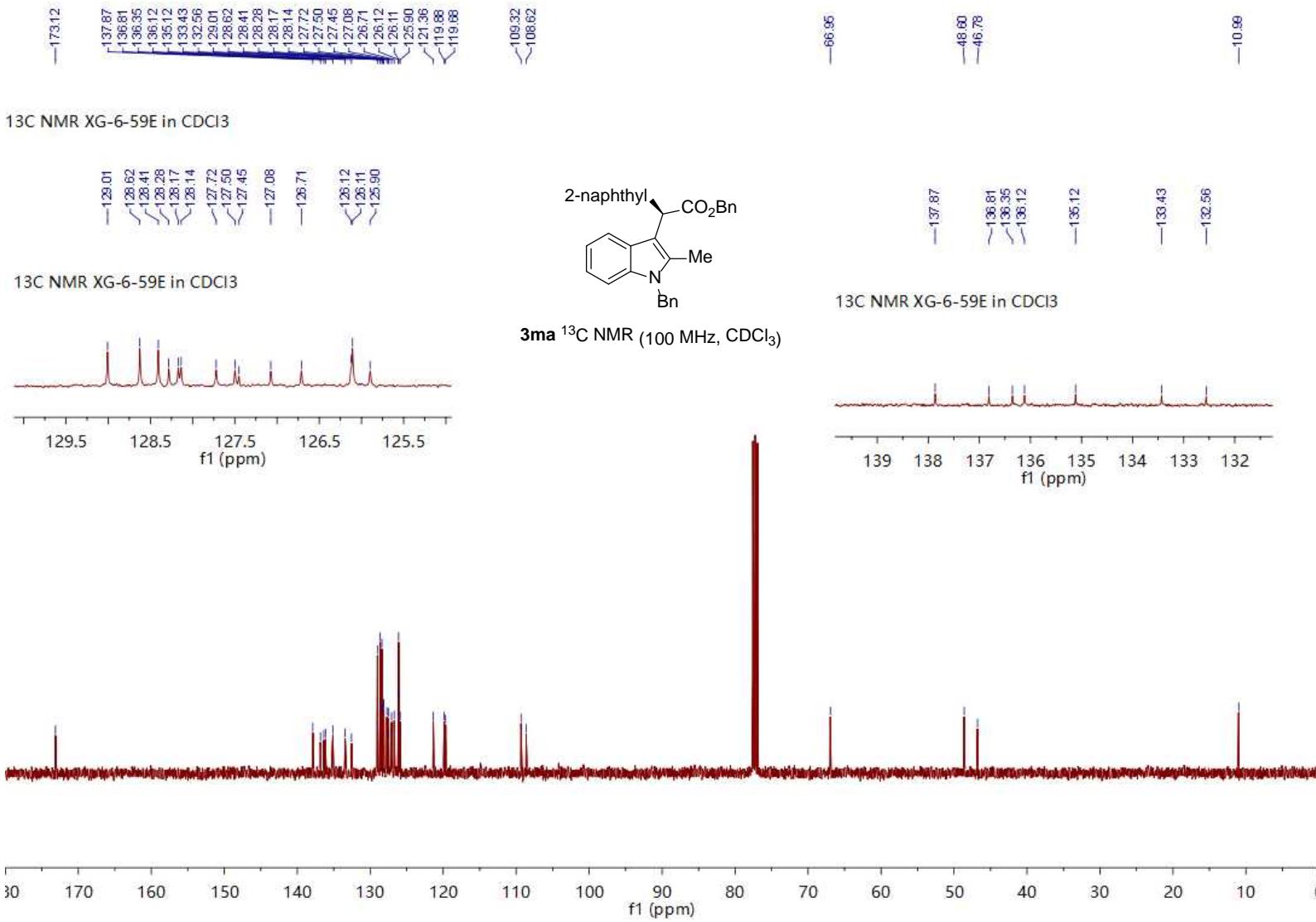


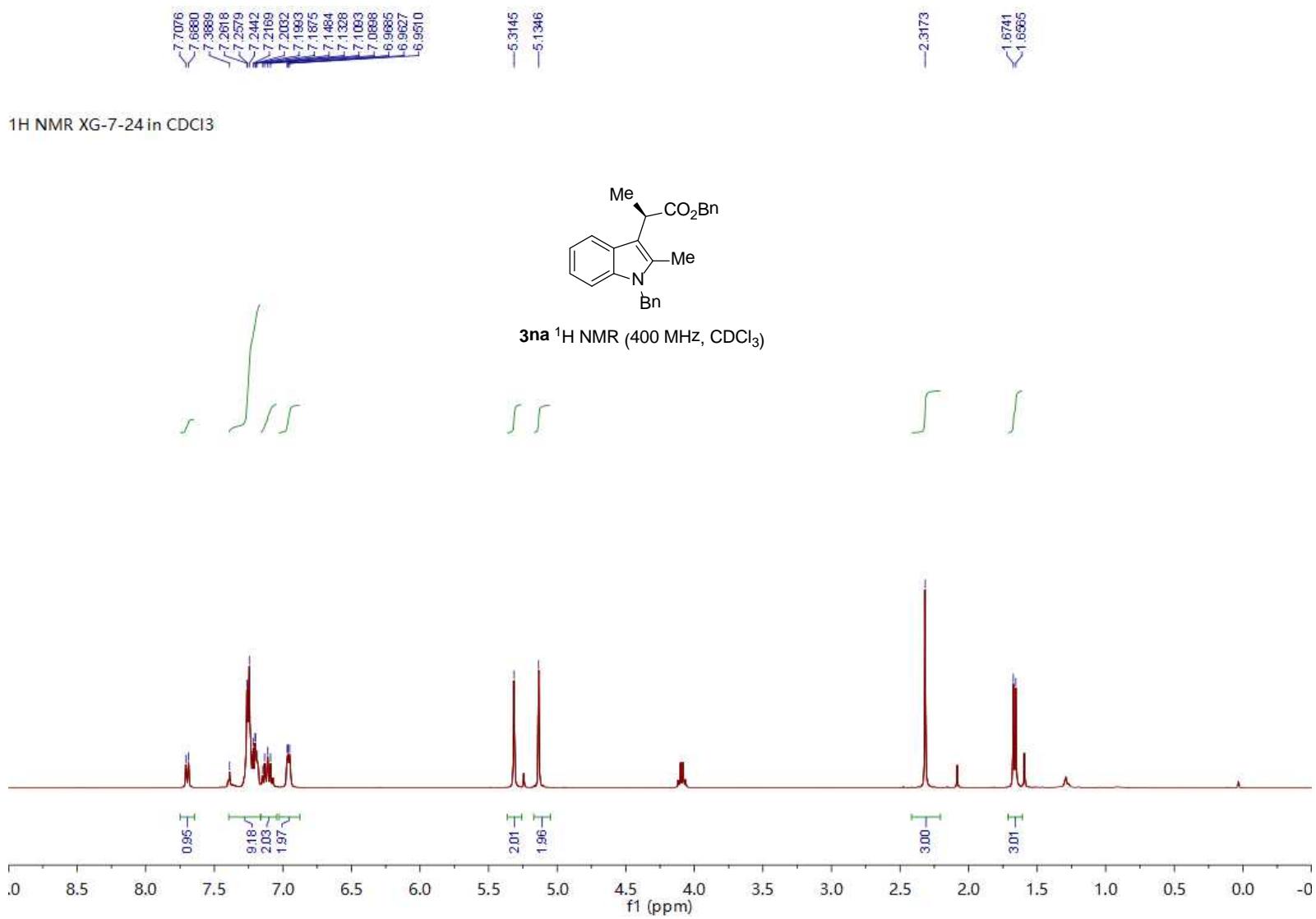


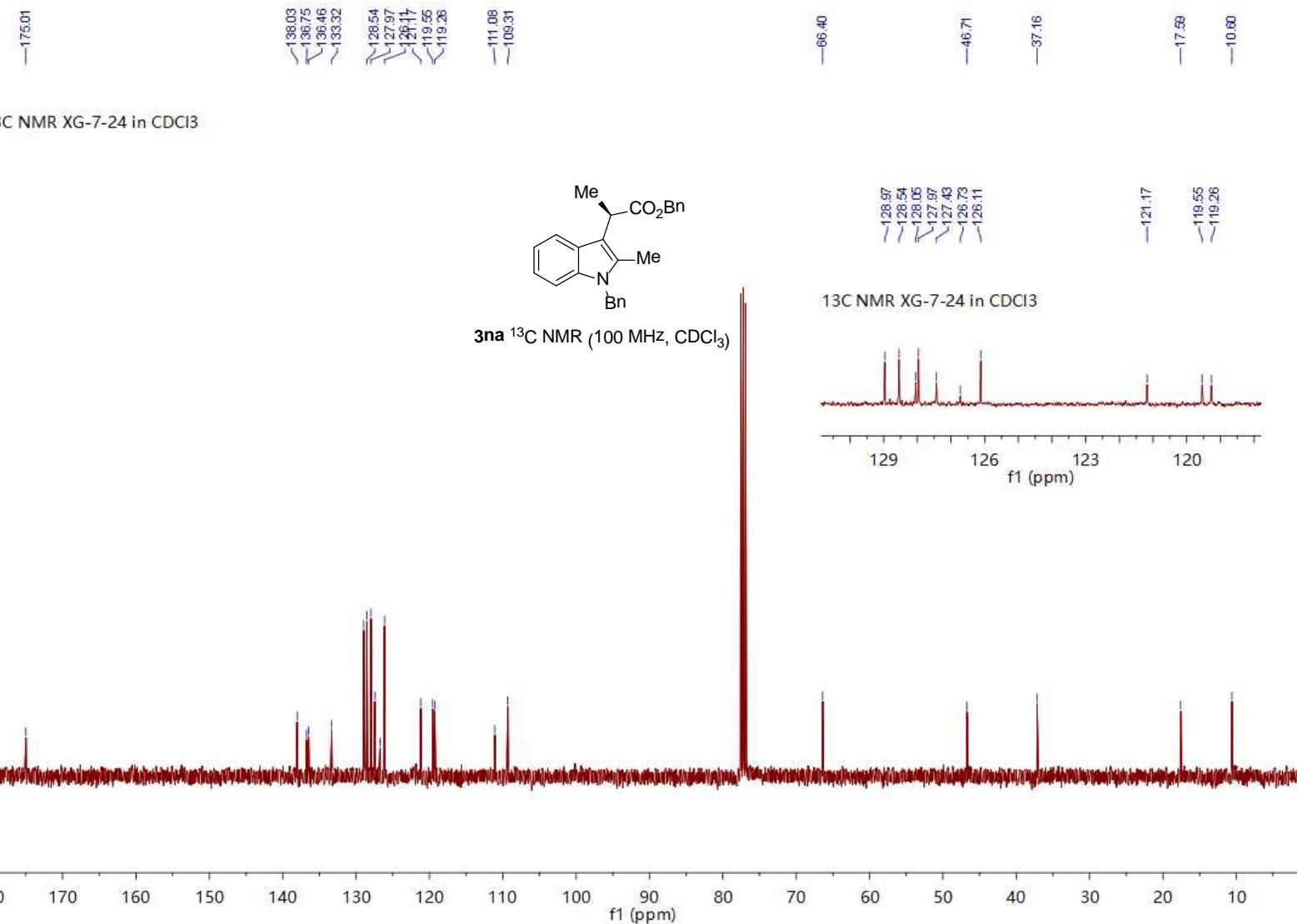


¹H NMR XG-6-59E in CDCl₃



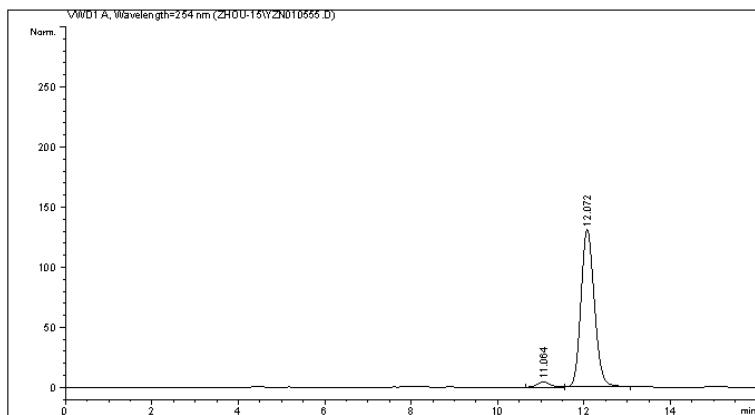






Data File C:\CHEM32\1\DATA\ZHOU-15\YZN010555.D
Sample Name: XG-6-44E

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Acq. Operator :                               Location : Vial 1
Acq. Instrument : Instrument 1             Location : Vial 1
Injection Date : 1/2/2016 9:21:41 PM
Acq. Method : C:\CHEM32\1\METHODS\DEF_LC.M
Last changed : 1/2/2016 9:20:42 PM
(modified after loading)
Analysis Method : C:\CHEM32\1\METHODS\DEF_LC.M
Last changed : 3/7/2016 9:03:22 PM
(modified after loading)
Sample Info : AS-H, H/i-PrOH = 90/10, 0.7 mL/min, 30 oC, 254 nm
```



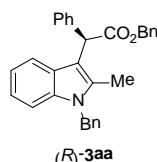
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=====
Area Percent Report
=====
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Sorted By : Signal
Multiplier: : 1.0000
Dilution: : 1.0000
Use Multiplier & Dilution Factor with ISTDs
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Signal 1: VWD1 A, Wavelength=254 nm

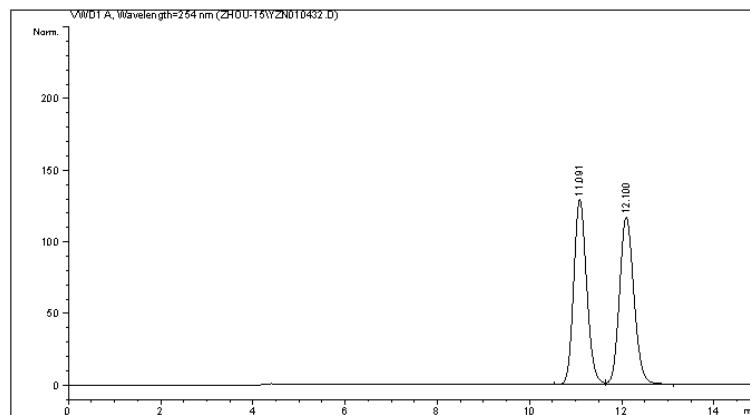
Peak #	RetTime [min]	Type	Width [min]	Area [mAU]	Height *s	Area %
1	11.064	BV	0.3167	85.78130	4.25577	2.9384
2	12.072	VB	0.3355	2833.56592	130.91690	97.0616

Totals : 2919.34722 135.17268



Data File C:\CHEM32\1\DATA\ZHOU-15\YZN010432.D
Sample Name: XG-6-34+

```
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Acq. Operator :                               Location : Vial 1
Acq. Instrument : Instrument 1             Location : Vial 1
Injection Date : 12/22/2015 9:47:14 PM
Acq. Method : C:\CHEM32\1\METHODS\DEF_LC.M
Last changed : 12/22/2015 9:24:28 PM
(modified after loading)
Analysis Method : C:\CHEM32\1\METHODS\DEF_LC.M
Last changed : 1/4/2016 7:19:15 PM
(modified after loading)
Sample Info : AS-H, H/i-PrOH = 90/10, 0.7 mL/min, 30 oC, 254 nm
```



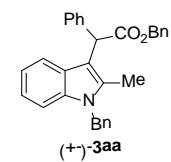
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=====
Area Percent Report
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```

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Sorted By : Signal
Multiplier: : 1.0000
Dilution: : 1.0000
Use Multiplier & Dilution Factor with ISTDs
```

Signal 1: VWD1 A, Wavelength=254 nm

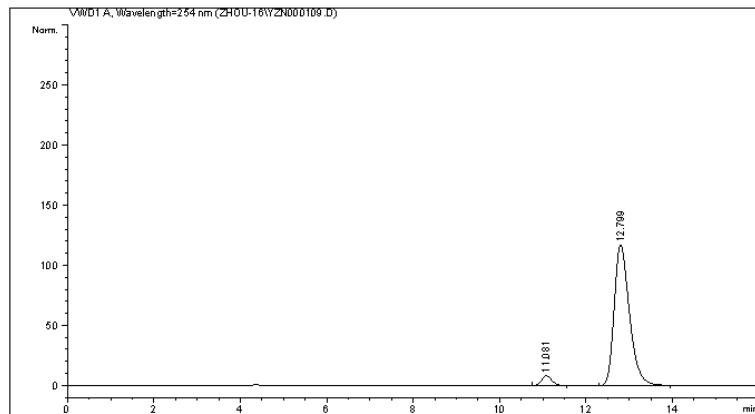
Peak #	RetTime [min]	Type	Width [min]	Area [mAU]	Height *s	Area %
1	11.091	VV	0.3045	2530.49854	129.05930	49.8389
2	12.100	VB	0.3374	2546.85376	116.81419	50.1611

Totals : 5077.35229 245.87349



Data File C:\CHEM32\1\DATA\ZHOU-16\YZN000109.D
Sample Name: XG-6-50A

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Acq. Instrument : Instrument 1             Location : Vial 1
Injection Date : 1/10/2016 8:13:58 PM
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Last changed : 1/10/2016 8:03:43 PM
(modified after loading)
Analysis Method : C:\CHEM32\1\METHODS\DEF_LC.M
Last changed : 3/7/2016 9:03:22 PM
(modified after loading)
Sample Info : AS-H, H/i-PrOH = 90/10, 0.7 mL/min, 30 oC, 254 nm
```



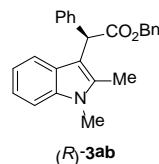
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Area Percent Report
=====
```

```
Sorted By : Signal
Multiplier: : 1.0000
Dilution: : 1.0000
Use Multiplier & Dilution Factor with ISTDs
```

Signal 1: VWD1 A, Wavelength=254 nm

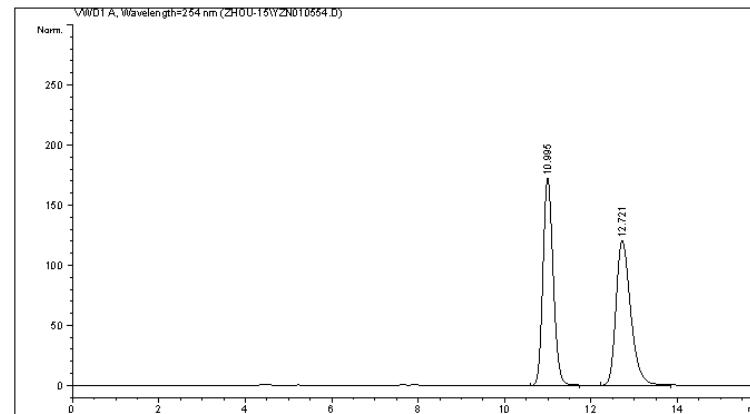
Peak	RetTime	Type	Width	Area	Height	Area		
#	[min]		[min]	[mAU]	*s	[mAU]	1	%
1	11.081	BB	0.2623	136.19603	8.07428	4.5245		
2	12.799	BB	0.3769	2873.96069	116.97456	95.4755		

Totals : 3010.15672 125.04884



Data File C:\CHEM32\1\DATA\ZHOU-15\YZN010554.D
Sample Name: XG-6-41D

```
=====
Acq. Operator :                               Location : Vial 1
Acq. Instrument : Instrument 1             Location : Vial 1
Injection Date : 1/2/2016 9:00:29 PM
Acq. Method : C:\CHEM32\1\METHODS\DEF_LC.M
Last changed : 1/2/2016 8:43:30 PM
(modified after loading)
Analysis Method : C:\CHEM32\1\METHODS\DEF_LC.M
Last changed : 3/7/2016 9:03:22 PM
(modified after loading)
Sample Info : AS-H, H/i-PrOH = 90/10, 0.7 mL/min, 30 oC, 254 nm
```



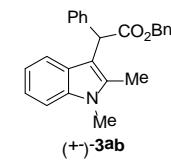
```
=====
Area Percent Report
=====
```

```
Sorted By : Signal
Multiplier: : 1.0000
Dilution: : 1.0000
Use Multiplier & Dilution Factor with ISTDs
```

Signal 1: VWD1 A, Wavelength=254 nm

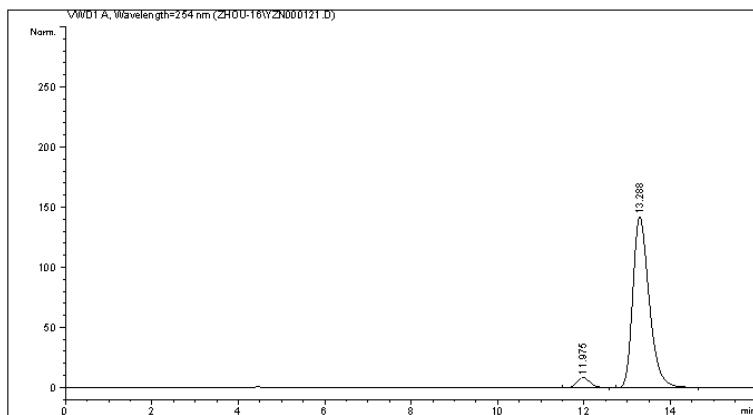
Peak	RetTime	Type	Width	Area	Height	Area		
#	[min]		[min]	[mAU]	*s	[mAU]	1	%
1	10.995	BB	0.2554	2825.36914	172.30434	50.0539		
2	12.721	BB	0.3596	2819.28320	120.10401	49.9461		

Totals : 5644.65234 292.40835



Data File C:\CHEM32\1\DATA\ZHOU-16\YZN000121.D
Sample Name: XG-6-50B

```
=====
Acq. Operator :                               Location : Vial 1
Acq. Instrument : Instrument 1             Location : Vial 1
Injection Date : 1/11/2016 7:18:44 PM
Acq. Method : C:\CHEM32\1\METHODS\DEF_LC.M
Last changed : 1/11/2016 7:16:31 PM
(modified after loading)
Analysis Method : C:\CHEM32\1\METHODS\DEF_LC.M
Last changed : 3/7/2016 9:13:09 PM
(modified after loading)
Sample Info : AS-H, H/i-PrOH =95/05, 0.7 mL/min, 30 oC, 254 nm
```



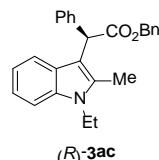
```
=====
Area Percent Report
=====
```

```
Sorted By : Signal
Multiplier: : 1.0000
Dilution: : 1.0000
Use Multiplier & Dilution Factor with ISTDs
```

Signal 1: VWD1 A, Wavelength=254 nm

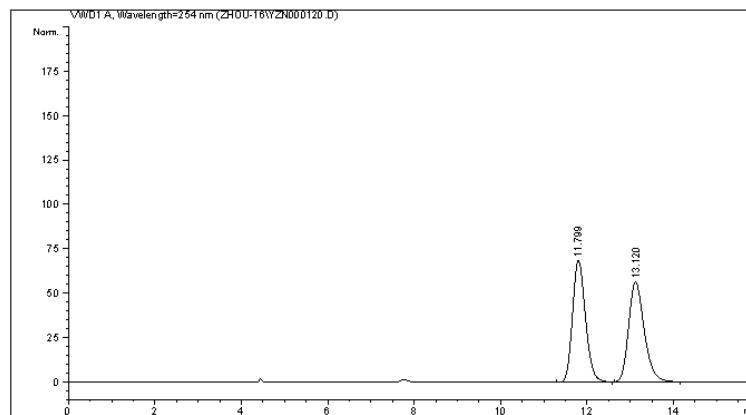
Peak	RetTime	Type	Width	Area	Height	Area
#	[min]		[min]	[mAU]	*s	[mAU]
1	11.975	VB	0.3317	180.16792	8.35310	4.5982
2	13.288	BB	0.4034	3738.06128	141.91223	95.4018

Totals : 3918.22920 150.26533



Data File C:\CHEM32\1\DATA\ZHOU-16\YZN000120.D
Sample Name: XG-6-41A

```
=====
Acq. Operator :                               Location : Vial 1
Acq. Instrument : Instrument 1             Location : Vial 1
Injection Date : 1/11/2016 6:59:25 PM
Acq. Method : C:\CHEM32\1\METHODS\DEF_LC.M
Last changed : 1/11/2016 6:52:22 PM
(modified after loading)
Analysis Method : C:\CHEM32\1\METHODS\DEF_LC.M
Last changed : 3/7/2016 9:11:59 PM
(modified after loading)
Sample Info : AS-H, H/i-PrOH =95/05, 0.7 mL/min, 30 oC, 254 nm
```



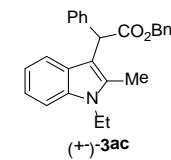
```
=====
Area Percent Report
=====
```

```
Sorted By : Signal
Multiplier: : 1.0000
Dilution: : 1.0000
Use Multiplier & Dilution Factor with ISTDs
```

Signal 1: VWD1 A, Wavelength=254 nm

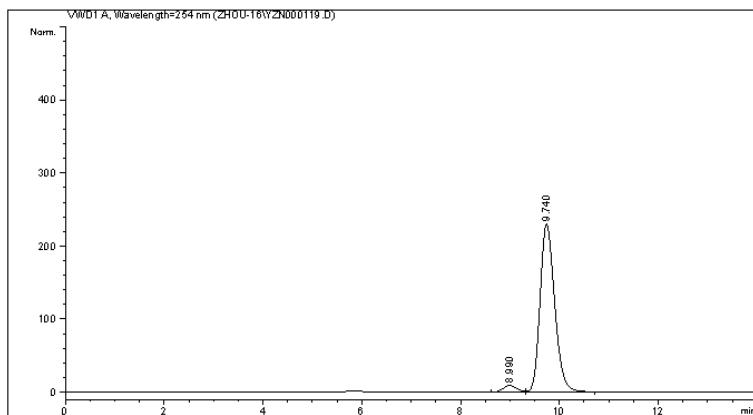
Peak	RetTime	Type	Width	Area	Height	Area
#	[min]		[min]	[mAU]	*s	[mAU]
1	11.799	VB	0.3243	1437.06848	68.66238	50.1478
2	13.120	BB	0.3680	1428.59924	56.52765	49.6522

Totals : 2865.66772 125.19003



Data File C:\CHEM32\1\DATA\ZHOU-16\YZN000119.D
Sample Name: XG-6-50C

```
=====
Acq. Operator :                               Location : Vial 1
Acq. Instrument : Instrument 1             Location : Vial 1
Injection Date : 1/11/2016 6:32:57 PM
Acq. Method : C:\CHEM32\1\METHODS\DEF_LC.M
Last changed : 1/11/2016 6:31:05 PM
(modified after loading)
Analysis Method : C:\CHEM32\1\METHODS\DEF_LC.M
Last changed : 3/7/2016 9:16:16 PM
(modified after loading)
Sample Info : AS-H, H/i-PrOH =98/02, 0.7 mL/min, 30 oC, 254 nm
```



```
=====
Area Percent Report
=====
```

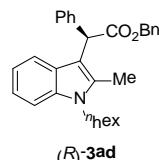
Sorted By : Signal
Multiplier: : 1.0000
Dilution: : 1.0000
Use Multiplier & Dilution Factor with ISTDs

Signal 1: VWD1 A, Wavelength=254 nm

Peak #	RetTime [min]	Type	Width [min]	Area [mAU]	Height *s	Area [mAU]	Area %
1	8.990	BV	0.2930	167.95099	8.89787	3.4380	
2	9.740	VB	0.3168	4717.25098	229.62430	96.5620	

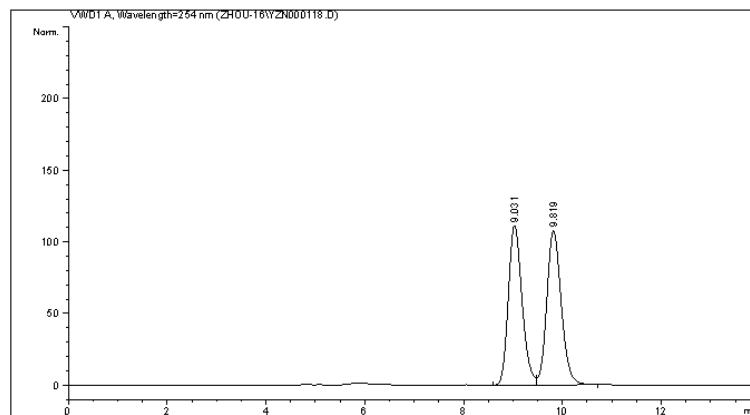
Totals : 4885.20197 238.52217

```
=====
*** End of Report ***
=====
```



Data File C:\CHEM32\1\DATA\ZHOU-16\YZN000118.D
Sample Name: XG-6-41B

```
=====
Acq. Operator :                               Location : Vial 1
Acq. Instrument : Instrument 1             Location : Vial 1
Injection Date : 1/11/2016 6:13:07 PM
Acq. Method : C:\CHEM32\1\METHODS\DEF_LC.M
Last changed : 1/11/2016 6:09:49 PM
(modified after loading)
Analysis Method : C:\CHEM32\1\METHODS\DEF_LC.M
Last changed : 3/7/2016 9:14:13 PM
(modified after loading)
Sample Info : AS-H, H/i-PrOH =98/02, 0.7 mL/min, 30 oC, 254 nm
```



```
=====
Area Percent Report
=====
```

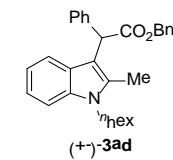
Sorted By : Signal
Multiplier: : 1.0000
Dilution: : 1.0000
Use Multiplier & Dilution Factor with ISTDs

Signal 1: VWD1 A, Wavelength=254 nm

Peak #	RetTime [min]	Type	Width [min]	Area [mAU]	Height *s	Area [mAU]	Area %
1	9.031	BV	0.2979	2149.71973	111.41555	49.4498	
2	9.819	VB	0.3137	2197.55933	107.73711	50.5502	

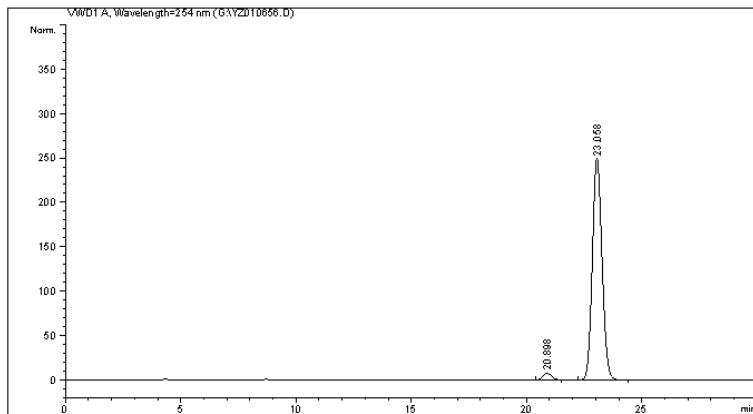
Totals : 4347.27905 219.15266

```
=====
*** End of Report ***
=====
```



Data File G:\YZ010656.D
Sample Name: XG-6-50E

```
=====
Acq. Operator : 
Acq. Instrument : Instrument 1 Location : Vial 1
Injection Date : 6/14/2016 10:35:15 AM
Acq. Method : C:\HPCHEM\1\METHODS\DEF LC.M
Last changed : 6/14/2016 10:10:08 AM by 
(modified after loading)
Analysis Method : C:\CHEM32\1\METHODS\DEF_LC.M
Last changed : 6/13/2016 10:11:38 PM
(modified after loading)
Sample Info : AD-H, H/i-PrOH = 90/10, 0.7 mL/min, 30 oC, 254 nm
```



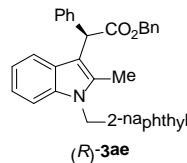
```
=====
Area Percent Report
=====
```

```
Sorted By : Signal
Multiplier: : 1.0000
Dilution: : 1.0000
Use Multiplier & Dilution Factor with ISTDs
```

Signal 1: VWD1 A, Wavelength=254 nm

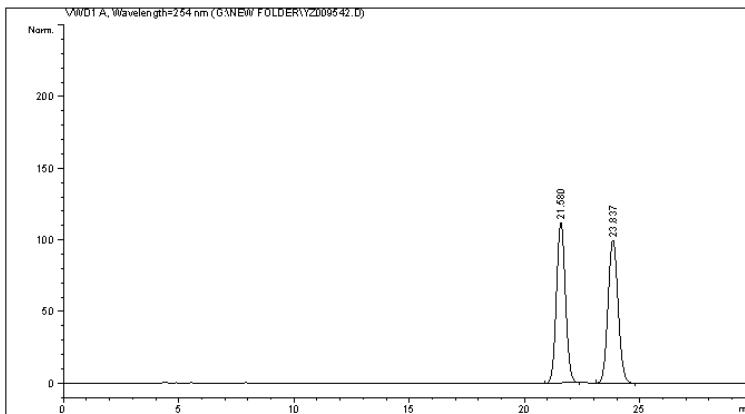
Peak	RetTime	Type	Width	Area	Height	Area
#	[min]		[min]	[mAU]	*s	[mAU]
1	20.898	BV	0.4016	189.76154	7.31651	2.5387
2	23.058	VB	0.4576	7285.01563	249.15849	97.4613

Totals : 7474.77716 256.47500



Data File G:\NEW FOLDER\YZ009542.D
Sample Name: XG-6-42A

```
=====
Acq. Operator : i
Acq. Instrument : Instrument 1 Location : Vial 1
Injection Date : 1/2/2016 7:42:26 AM
Acq. Method : C:\HPCHEM\1\METHODS\DEF LC.M
Last changed : 1/2/2016 7:23:44 AM by i
(modified after loading)
Analysis Method : C:\CHEM32\1\METHODS\DEF_LC.M
Last changed : 3/7/2016 10:07:30 PM
(modified after loading)
Sample Info : AD-H, Hexane/iPrOH = 90/10, 0.7 mL/min, 30 oC, 254 nm
```



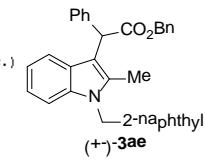
```
=====
Area Percent Report
=====
```

```
Sorted By : Signal
Multiplier: : 1.0000
Dilution: : 1.0000
Sample Amount: : 1.00000 [ng/uL] (not used in calc.)
Use Multiplier & Dilution Factor with ISTDs
```

Signal 1: VWD1 A, Wavelength=254 nm

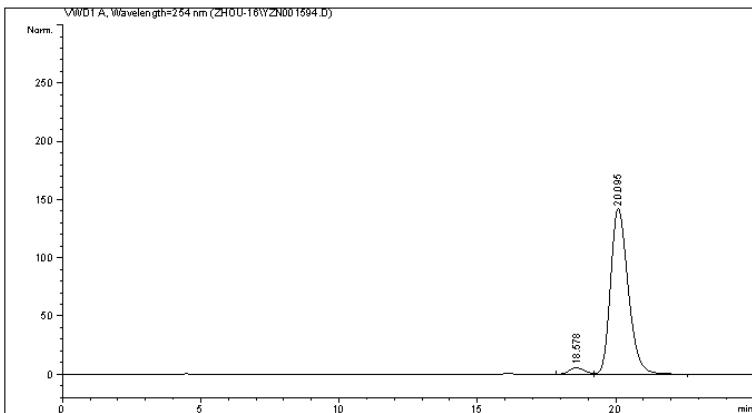
Peak	RetTime	Type	Width	Area	Height	Area
#	[min]		[min]	[mAU]	*s	[mAU]
1	21.580	BB	0.4197	3016.72437	111.77599	49.8741
2	23.837	BB	0.4752	3031.95386	99.81839	50.1259

Totals : 6048.67822 211.59438



Data File C:\CHEM32\1\DATA\ZHOU-16\YZN001594.D
Sample Name: XG-6-50F

```
=====
Acq. Operator :                               Location : Vial 1
Acq. Instrument : Instrument 1             Location : Vial 1
Injection Date : 6/13/2016 9:22:10 PM
Acq. Method : C:\CHEM32\1\METHODS\DEF_LC.M
Last changed : 6/13/2016 9:06:26 PM
(modified after loading)
Analysis Method : C:\CHEM32\1\METHODS\DEF_LC.M
Last changed : 6/13/2016 9:54:17 PM
(modified after loading)
Sample Info : AS-H, Hex/i-PrOH = 95/05, 0.7 mL/min, 30oC, 254 nm
```



```
=====
Area Percent Report
=====
```

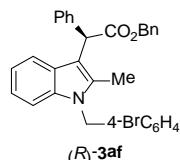
Sorted By : Signal
Multiplier: : 1.0000
Dilution: : 1.0000
Use Multiplier & Dilution Factor with ISTDs

Signal 1: VWD1 A, Wavelength=254 nm

Peak	RetTime	Type	Width	Area	Height	Area
#	[min]		[min]	[mAU]	*s	[mAU]
1	18.578	BV	0.6043	214.47176	5.52503	3.2933
2	20.095	VB	0.6861	6297.93994	142.05199	96.7067

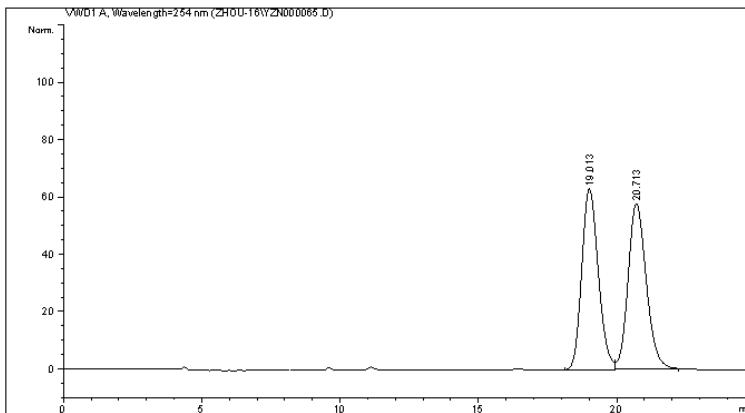
Totals : 6512.41170 147.57701

```
=====
*** End of Report ***
=====
```



Data File C:\CHEM32\1\DATA\ZHOU-16\YZN000065.D
Sample Name: XG-6-47D

```
=====
Acq. Operator :                               Location : Vial 1
Acq. Instrument : Instrument 1             Location : Vial 1
Injection Date : 1/7/2016 8:53:42 PM
Acq. Method : C:\CHEM32\1\METHODS\DEF_LC.M
Last changed : 1/7/2016 8:52:26 PM
(modified after loading)
Analysis Method : C:\CHEM32\1\METHODS\DEF_LC.M
Last changed : 3/7/2016 9:37:04 PM
(modified after loading)
Sample Info : AS-H, H/i-PrOH = 95/05, 0.7 mL/min, 30 oC, 254 nm
```



```
=====
Area Percent Report
=====
```

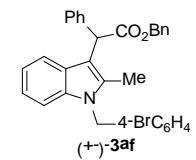
Sorted By : Signal
Multiplier: : 1.0000
Dilution: : 1.0000
Use Multiplier & Dilution Factor with ISTDs

Signal 1: VWD1 A, Wavelength=254 nm

Peak	RetTime	Type	Width	Area	Height	Area
#	[min]		[min]	[mAU]	*s	[mAU]
1	19.013	BV	0.6473	2624.50439	63.03932	49.8191
2	20.713	VB	0.7092	2643.56128	57.70258	50.1809

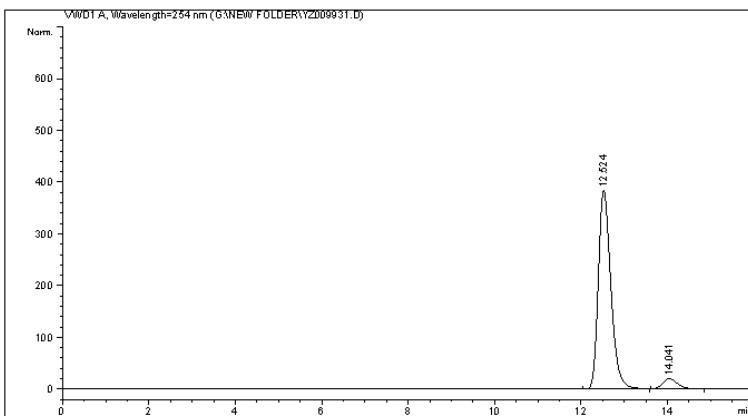
Totals : 5268.06567 120.74190

```
=====
*** End of Report ***
=====
```



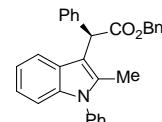
Data File G:\NEW FOLDER\YZ009931.D
Sample Name: XG-6-67B

```
=====
Acq. Operator : i
Acq. Instrument : Instrument 1 Location : Vial 1
Injection Date : 3/3/2016 6:20:23 AM
Acq. Method : C:\HPCHEM\1\METHODS\DEF LC.M
Last changed : 3/3/2016 5:41:27 AM by i
(modified after loading)
Analysis Method : C:\CHEM32\1\METHODS\DEF_LC.M
Last changed : 3/7/2016 10:02:20 PM
(modified after loading)
Sample Info : OD-H, H/iPrOH = 95/05, 0.7 mL/min, 30 oC, 254 nm
```



```
=====
Area Percent Report
=====
```

```
Sorted By : Signal
Multiplier: : 1.0000
Dilution: : 1.0000
Sample Amount: : 1.00000 [ng/uL] (not used in calc.)
Use Multiplier & Dilution Factor with ISTDs
```



Signal 1: VWD1 A, Wavelength=254 nm

Peak #	RetTime [min]	Type	Width [min]	Area mAU	*s	Height [mAU]	Area %
1	12.524	VB	0.3091	7748.64160	384.92593	94.0380	
2	14.041	BB	0.3761	491.26270	19.95269	5.9620	

Totals : 8239.90430 404.87863

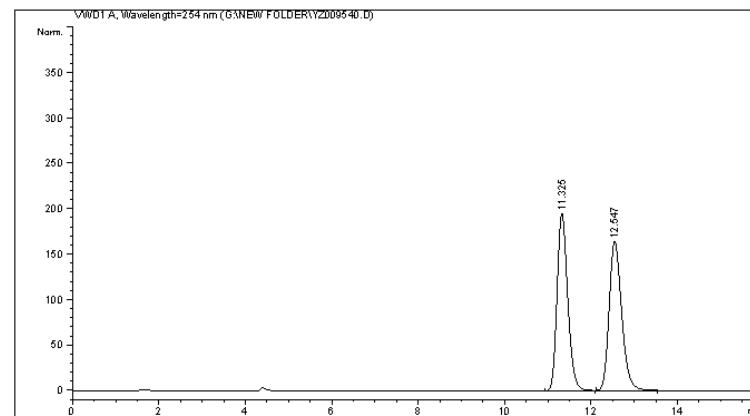
```
=====
*** End of Report ***
=====
```

Instrument 1 3/7/2016 10:02:27 PM

Page 1 of 1

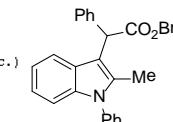
Data File G:\NEW FOLDER\YZ009540.D
Sample Name: XG-6-41C

```
=====
Acq. Operator : i
Acq. Instrument : Instrument 1 Location : Vial 1
Injection Date : 1/2/2016 6:20:20 AM
Acq. Method : C:\HPCHEM\1\METHODS\DEF LC.M
Last changed : 1/2/2016 6:09:55 AM by i
(modified after loading)
Analysis Method : C:\CHEM32\1\METHODS\DEF_LC.M
Last changed : 3/7/2016 10:05:00 PM
(modified after loading)
Sample Info : OD-H, Hexane/iPrOH = 95/05, 0.7 mL/min, 30 oC, 254 nm
```



```
=====
Area Percent Report
=====
```

```
Sorted By : Signal
Multiplier: : 1.0000
Dilution: : 1.0000
Sample Amount: : 1.00000 [ng/uL] (not used in calc.)
Use Multiplier & Dilution Factor with ISTDs
```



Signal 1: VWD1 A, Wavelength=254 nm

Peak #	RetTime [min]	Type	Width [min]	Area mAU	*s	Height [mAU]	Area %
1	11.325	BB	0.2639	3342.57178	195.12173	50.2354	
2	12.547	BB	0.3109	3311.24121	164.24190	49.7646	

Totals : 6653.81299 359.36363

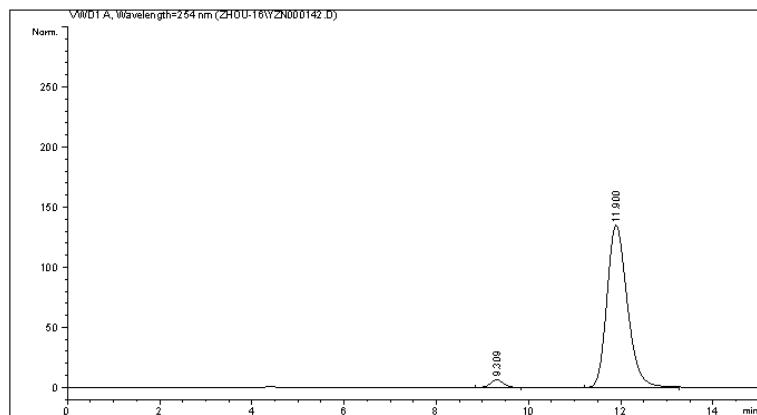
```
=====
*** End of Report ***
=====
```

Instrument 1 3/7/2016 10:05:21 PM

Page 1 of 1

Data File C:\CHEM32\1\DATA\ZHOU-16\YZN000142.D
Sample Name: XG-6-52A

```
=====
Acq. Operator :                               Location : Vial 1
Acq. Instrument : Instrument 1             Location : Vial 1
Injection Date : 1/12/2016 9:20:22 PM
Acq. Method : C:\CHEM32\1\METHODS\DEF_LC.M
Last changed : 1/12/2016 9:05:26 PM
(modified after loading)
Analysis Method : C:\CHEM32\1\METHODS\DEF_LC.M
Last changed : 3/7/2016 9:40:28 PM
(modified after loading)
Sample Info : AS-H, H/i-PrOH = 90/10, 0.7 mL/min, 30 oC, 254 nm
```



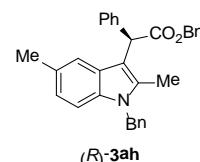
```
=====
Area Percent Report
=====
```

```
Sorted By : Signal
Multiplier: : 1.0000
Dilution: : 1.0000
Use Multiplier & Dilution Factor with ISTDs
```

Signal 1: VWD1 A, Wavelength=254 nm

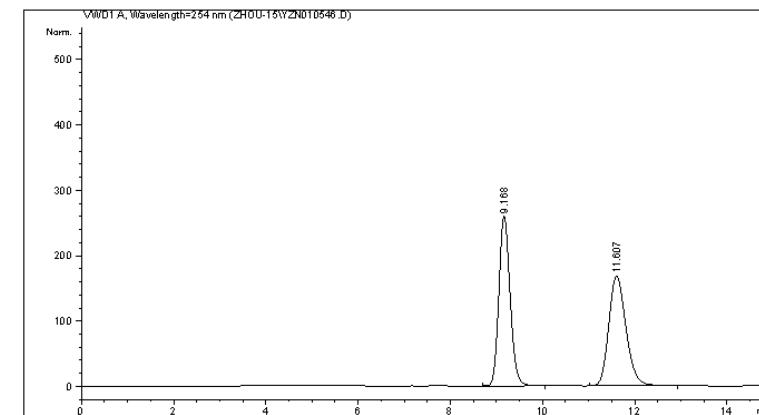
Peak RetTime	Type	Width	Area	Height	Area		
#	[min]	[min]	[mAU]	*s	[mAU]	1	%
1	BB	0.3037	126.90623	6.45159	2.9881		
2	BB	0.4714	4120.15430	134.89708	97.0119		

Totals : 4247.06052 141.34867



Data File C:\CHEM32\1\DATA\ZHOU-15\YZN010546.D
Sample Name: XG-6-42B

```
=====
Acq. Operator :                               Location : Vial 1
Acq. Instrument : Instrument 1             Location : Vial 1
Injection Date : 1/1/2016 2:59:42 PM
Acq. Method : C:\CHEM32\1\METHODS\DEF_LC.M
Last changed : 1/1/2016 2:57:12 PM
(modified after loading)
Analysis Method : C:\CHEM32\1\METHODS\DEF_LC.M
Last changed : 3/7/2016 9:42:56 PM
(modified after loading)
Sample Info : AS-H, H/i-PrOH = 90/10, 0.7 mL/min, 30 oC, 254 nm
```



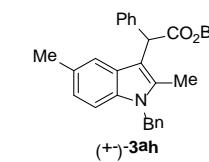
```
=====
Area Percent Report
=====
```

```
Sorted By : Signal
Multiplier: : 1.0000
Dilution: : 1.0000
Use Multiplier & Dilution Factor with ISTDs
```

Signal 1: VWD1 A, Wavelength=254 nm

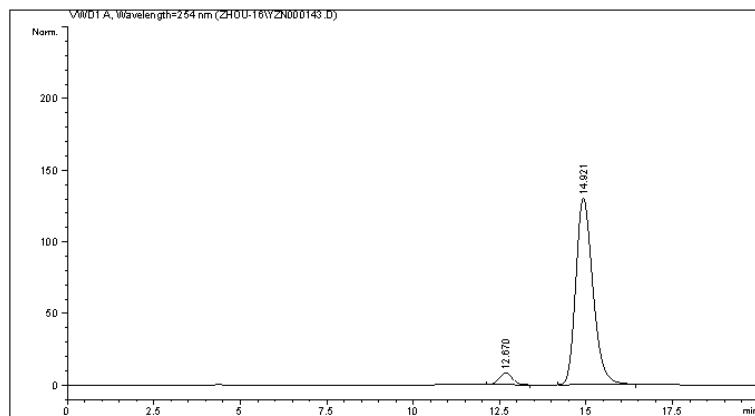
Peak RetTime	Type	Width	Area	Height	Area		
#	[min]	[min]	[mAU]	*s	[mAU]	1	%
1	BB	0.2630	4393.90771	259.56833	50.0246		
2	BB	0.4033	4389.58545	168.28770	49.9754		

Totals : 8783.49316 427.85603



Data File C:\CHEM32\1\DATA\ZHOU-16\YZN000143.D
Sample Name: XG-6-52B

```
=====
Acq. Operator : Location : Vial 1
Acq. Instrument : Instrument 1
Injection Date : 1/12/2016 9:39:52 PM
Acq. Method : C:\CHEM32\1\METHODS\DEF_LC.M
Last changed : 1/12/2016 9:37:16 PM
(modified after loading)
Analysis Method : C:\CHEM32\1\METHODS\DEF_LC.M
Last changed : 3/7/2016 9:45:29 PM
(modified after loading)
Sample Info : AS-H, H/i-PrOH = 90/10, 0.7 mL/min, 30 oC, 254 nm
```



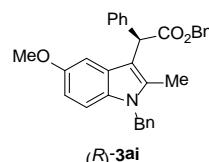
```
=====
Area Percent Report
=====
```

```
Sorted By : Signal
Multiplier: : 1.0000
Dilution: : 1.0000
Use Multiplier & Dilution Factor with ISTDs
```

Signal 1: VWD1 A, Wavelength=254 nm

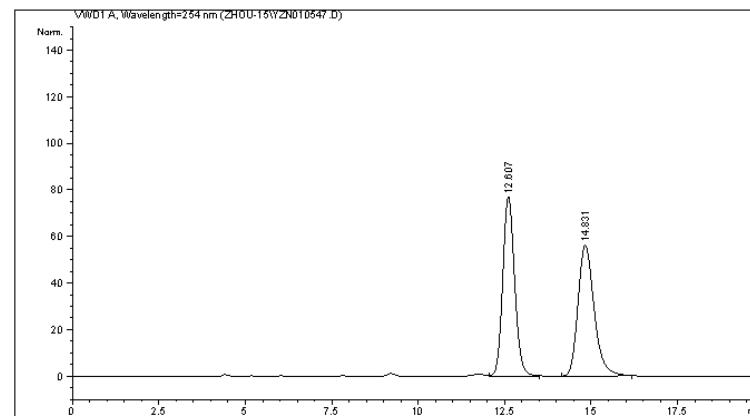
Peak	RetTime	Type	Width	Area	Height	Area
#	[min]		[min]	[mAU]	*s	[mAU]
1	12.670	WB	0.4135	219.43579	8.21655	4.6810
2	14.921	BB	0.5285	4466.39551	130.19730	95.3190

Totals : 4687.83130 138.41385



Data File C:\CHEM32\1\DATA\ZHOU-15\YZN010547.D
Sample Name: XG-6-42C

```
=====
Acq. Operator : Location : Vial 1
Acq. Instrument : Instrument 1
Injection Date : 1/1/2016 3:18:25 PM
Acq. Method : C:\CHEM32\1\METHODS\DEF_LC.M
Last changed : 1/1/2016 3:16:07 PM
(modified after loading)
Analysis Method : C:\CHEM32\1\METHODS\DEF_LC.M
Last changed : 3/7/2016 9:47:35 PM
(modified after loading)
Sample Info : AS-H, H/i-PrOH = 90/10, 0.7 mL/min, 30 oC, 254 nm
```



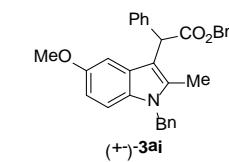
```
=====
Area Percent Report
=====
```

```
Sorted By : Signal
Multiplier: : 1.0000
Dilution: : 1.0000
Use Multiplier & Dilution Factor with ISTDs
```

Signal 1: VWD1 A, Wavelength=254 nm

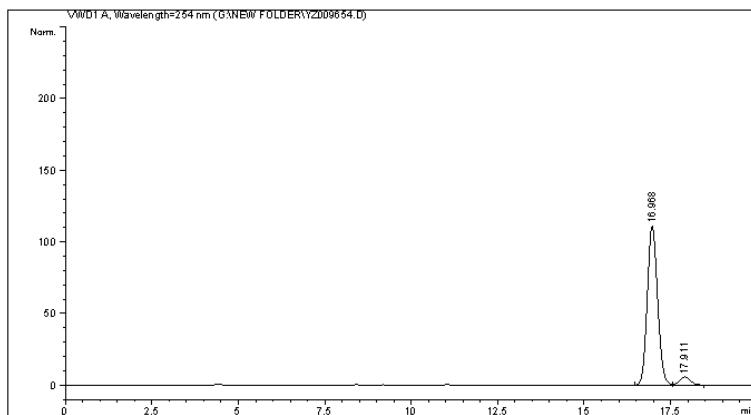
Peak	RetTime	Type	Width	Area	Height	Area
#	[min]		[min]	[mAU]	*s	[mAU]
1	12.607	WB	0.3679	1835.91248	77.14127	50.0552
2	14.831	BB	0.4990	1831.86377	56.30327	49.9448

Totals : 3667.77625 133.44454



Data File G:\NEW FOLDER\YZ009654.D
Sample Name: XG-4-52C

```
=====
Acc. Operator : i
Acq. Instrument : Instrument 1 Location : Vial 1
Injection Date : 1/12/2016 11:18:48 AM
Acq. Method : C:\HPCHEM\1\METHODS\DEF_LC.M
Last changed : 1/12/2016 10:34:34 AM by j
(modified after loading)
Analysis Method : C:\CHEM32\1\METHODS\DEF_LC.M
Last changed : 3/7/2016 10:13:08 PM
(modified after loading)
Sample Info : AD-H, Hexane/iPrOH = 90/10, 0.7 mL/min, 30 oC, 254 nm
```



```
=====
Area Percent Report
=====

Sorted By : Signal
Multiplier: : 1.0000
Dilution: : 1.0000
Sample Amount: : 1.00000 [ng/uL] (not used in calc.)
Use Multiplier & Dilution Factor with ISTDs
```

Signal 1: VWD1 A, Wavelength=254 nm

Peak #	RetTime [min]	Type	Width [min]	Area mAU	Height *s	[mAU]	Area %
1	16.968	BV	0.3208	2300.76123	110.83591	94.8856	
2	17.911	BV	0.3421	124.01315	5.61484	5.1144	

Totals : 2424.77438 116.45075

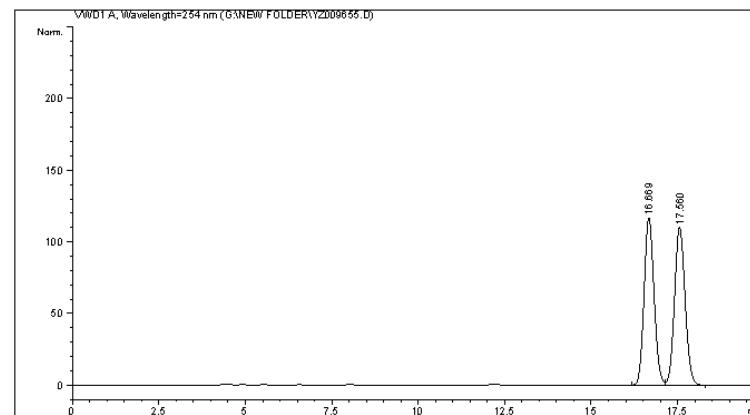
```
=====
*** End of Report ***
=====
```

Instrument 1 3/7/2016 10:14:33 PM

Page 1 of 1

Data File G:\NEW FOLDER\YZ009655.D
Sample Name: XG-4-42D

```
=====
Acc. Operator : i
Acq. Instrument : Instrument 1 Location : Vial 1
Injection Date : 1/12/2016 11:43:21 AM
Acq. Method : C:\HPCHEM\1\METHODS\DEF_LC.M
Last changed : 1/12/2016 10:34:34 AM by j
(modified after loading)
Analysis Method : C:\CHEM32\1\METHODS\DEF_LC.M
Last changed : 3/7/2016 10:13:08 PM
(modified after loading)
Sample Info : AD-H, Hexane/iPrOH = 90/10, 0.7 mL/min, 30 oC, 254 nm
```



```
=====
Area Percent Report
=====

Sorted By : Signal
Multiplier: : 1.0000
Dilution: : 1.0000
Sample Amount: : 1.00000 [ng/uL] (not used in calc.)
Use Multiplier & Dilution Factor with ISTDs
```

Signal 1: VWD1 A, Wavelength=254 nm

Peak #	RetTime [min]	Type	Width [min]	Area mAU	Height *s	[mAU]	Area %
1	16.669	BV	0.3131	2346.97754	116.76530	49.9377	
2	17.560	BV	0.3323	2352.83228	110.11171	50.0623	

Totals : 4699.80981 226.87701

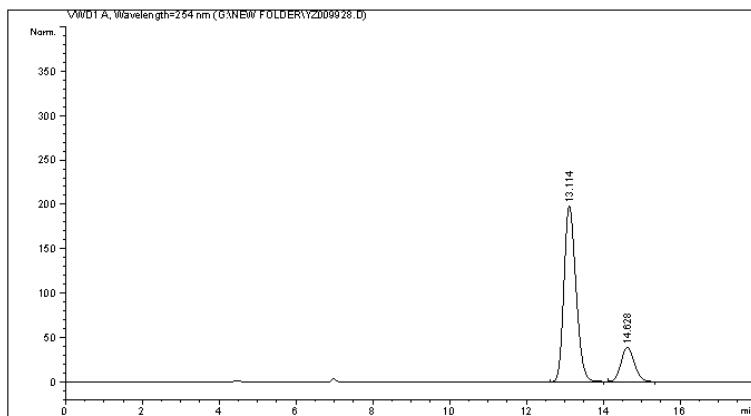
```
=====
*** End of Report ***
=====
```

Instrument 1 3/7/2016 10:13:20 PM

Page 1 of 1

Data File G:\NEW FOLDER\YZ009928.D
Sample Name: XG-6-66B

```
=====
Acq. Operator : i
Acq. Instrument : Instrument 1 Location : Vial 1
Injection Date : 3/2/2016 1:25:20 PM
Acq. Method : C:\HPCHEM\1\METHODS\DEF LC.M
Last changed : 3/2/2016 12:54:06 PM by j
(modified after loading)
Analysis Method : C:\CHEM32\1\METHODS\DEF_LC.M
Last changed : 3/7/2016 10:38:21 PM
(modified after loading)
Sample Info : AS-H, H/iPrOH = 90/10, 0.7 mL/min, 30 oC, 254 nm
```



```
=====
Area Percent Report
=====
```

Sorted By : Signal
Multiplier: : 1.0000
Dilution: : 1.0000
Sample Amount: : 1.00000 [ng/uL] (not used in calc.)
Use Multiplier & Dilution Factor with ISTDs

Ph
|
| CO₂Bn
|
|
N
Bn

(R)-3ak

Signal 1: VWD1 A, Wavelength=254 nm

Peak RetTime	Type	Width	Area	Height	Area	
# [min]		[min]	[mAU]	*s	[mAU]	%
1 13.114	BB	0.3373	4318.86768	198.12257	82.0989	
2 14.628	BB	0.3769	941.69830	38.72620	17.9011	
Totals :			5260.56598		236.84878	

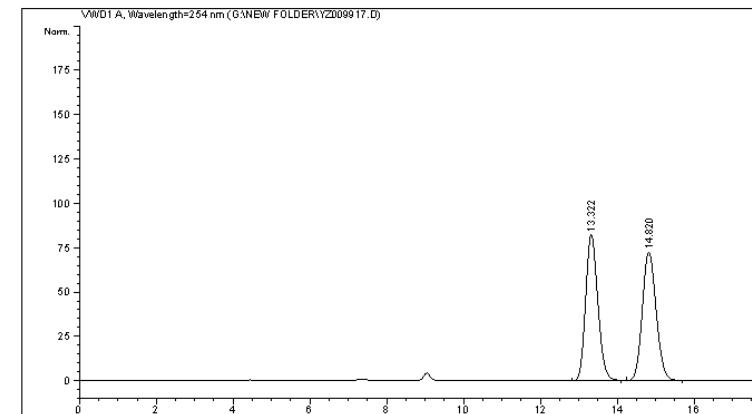
```
=====
*** End of Report ***
=====
```

Instrument 1 3/7/2016 10:38:27 PM

Page 1 of 1

Data File G:\NEW FOLDER\YZ009917.D
Sample Name: XG-6-66B+-

```
=====
Acq. Operator : i
Acq. Instrument : Instrument 1 Location : Vial 1
Injection Date : 3/1/2016 1:50:17 PM
Acq. Method : C:\HPCHEM\1\METHODS\DEF LC.M
Last changed : 3/1/2016 1:38:33 PM by i
(modified after loading)
Analysis Method : C:\CHEM32\1\METHODS\DEF_LC.M
Last changed : 3/7/2016 10:39:17 PM
(modified after loading)
Sample Info : AS-H, H/iPrOH = 90/10, 0.7 mL/min, 30 oC, 254 nm
```



```
=====
Area Percent Report
=====
```

Sorted By : Signal
Multiplier: : 1.0000
Dilution: : 1.0000
Sample Amount: : 1.00000 [ng/uL] (not used in calc.)
Use Multiplier & Dilution Factor with ISTDs

Ph
|
| CO₂Bn
|
|
N
Bn

(+)-3ak

Signal 1: VWD1 A, Wavelength=254 nm

Peak RetTime	Type	Width	Area	Height	Area	
# [min]		[min]	[mAU]	*s	[mAU]	%
1 13.322	BB	0.3436	1816.00171	82.20667	50.0191	
2 14.820	BB	0.3917	1814.61707	72.33704	49.9809	
Totals :			3630.61877		154.54372	

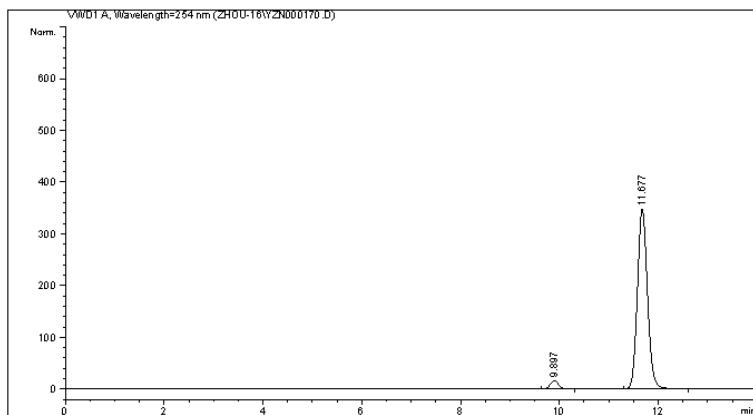
```
=====
*** End of Report ***
=====
```

Instrument 1 3/7/2016 10:39:23 PM

Page 1 of 1

Data File C:\CHEM32\1\DATA\ZHOU-16\YZN000170.D
Sample Name: XG-6-53A

```
=====
Acq. Operator : Location : Vial 1
Acq. Instrument : Instrument 1
Injection Date : 1/14/2016 3:36:39 PM
Acq. Method : C:\CHEM32\1\METHODS\DEF_LC.M
Last changed : 1/14/2016 3:25:36 PM
(modified after loading)
Analysis Method : C:\CHEM32\1\METHODS\DEF_LC.M
Last changed : 3/8/2016 6:37:42 PM
(modified after loading)
Sample Info : IC, H/i-PrOH = 90/10, 0.7 mL/min, 30 oC, 254 nm
```



```
=====
Area Percent Report
```

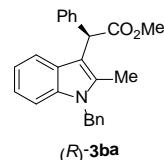
```
Sorted By : Signal
Multiplier: : 1.0000
Dilution: : 1.0000
Use Multiplier & Dilution Factor with ISTDs
```

Signal 1: VWD1 A, Wavelength=254 nm

Peak #	RetTime [min]	Type	Width [min]	Area [mAU]	Height *s [mAU]	Area 1	Area %
1	9.897	BB	0.1818	193.60626	16.52686	3.7729	
2	11.677	BB	0.2196	4937.91699	347.56619	96.2271	

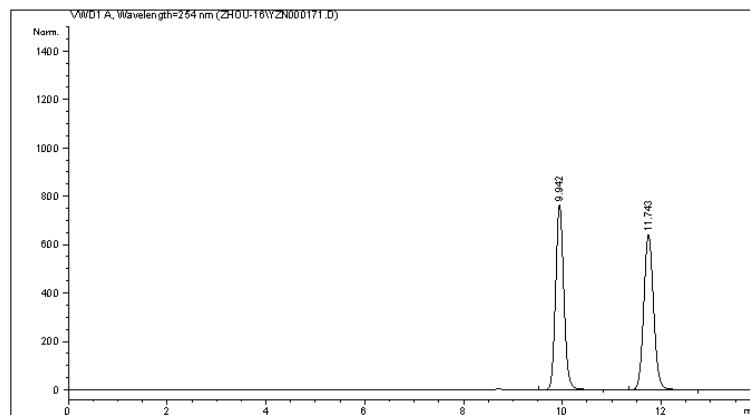
Totals : 5131.52325 364.09305

```
=====
*** End of Report ***
```



Data File C:\CHEM32\1\DATA\ZHOU-16\YZN000171.D
Sample Name: XG-6-47A

```
=====
Acq. Operator : Location : Vial 1
Acq. Instrument : Instrument 1
Injection Date : 1/14/2016 3:53:40 PM
Acq. Method : C:\CHEM32\1\METHODS\DEF_LC.M
Last changed : 1/14/2016 3:51:48 PM
(modified after loading)
Analysis Method : C:\CHEM32\1\METHODS\DEF_LC.M
Last changed : 3/8/2016 6:38:54 PM
(modified after loading)
Sample Info : IC, H/i-PrOH = 90/10, 0.7 mL/min, 30 oC, 254 nm
```



```
=====
Area Percent Report
```

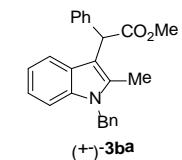
```
Sorted By : Signal
Multiplier: : 1.0000
Dilution: : 1.0000
Use Multiplier & Dilution Factor with ISTDs
```

Signal 1: VWD1 A, Wavelength=254 nm

Peak #	RetTime [min]	Type	Width [min]	Area [mAU]	Height *s [mAU]	Area 1	Area %
1	9.942	BB	0.1784	8839.59473	765.43243	49.9413	
2	11.743	BB	0.2137	8860.36035	641.02533	50.0587	

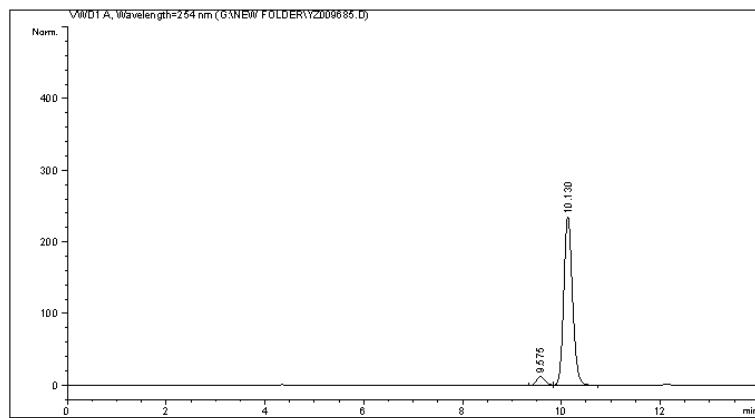
Totals : 1.77000e4 1406.45776

```
=====
*** End of Report ***
```



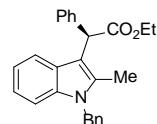
Data File G:\NEW FOLDER\YZ009685.D
Sample Name: xg-6-53b

```
=====
Acq. Operator : i
Acq. Instrument : Instrument 1 Location : Vial 1
Injection Date : 1/15/2016 6:15:50 AM
Acq. Method : C:\HPCHEM\1\METHODS\DEF LC.M
Last changed : 1/15/2016 5:48:59 AM by j
(modified after loading)
Analysis Method : C:\CHEM32\1\METHODS\DEF_LC.M
Last changed : 3/7/2016 10:15:55 PM
(modified after loading)
Sample Info : AD-H, Hexane/iPrOH = 90/10, 0.7 mL/min, 30 oC, 254 nm
```



```
=====
Area Percent Report
=====

Sorted By : Signal
Multiplier: : 1.0000
Dilution: : 1.0000
Sample Amount: : 1.00000 [ng/uL] (not used in calc.)
Use Multiplier & Dilution Factor with ISTDs
```



(R)-3ca

Signal 1: VWD1 A, Wavelength=254 nm

Peak #	RetTime [min]	Type	Width [min]	Area [mAU]	Height *s	[mAU]	Area %
1	9.575	BV	0.1783	141.02113	12.22559	4.6512	
2	10.130	VB	0.1899	2890.92236	235.38834	95.3468	

Totals : 3031.94350 247.61393

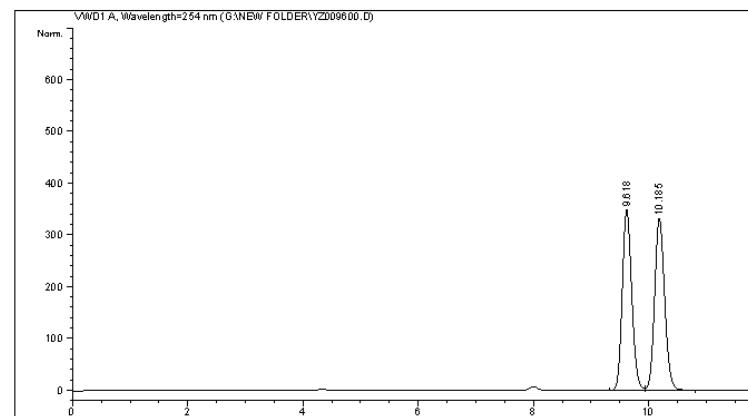
```
=====
*** End of Report ***
=====
```

Instrument 1 3/7/2016 10:16:07 PM

Page 1 of 1

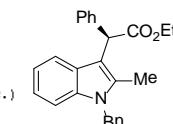
Data File G:\NEW FOLDER\YZ009600.D
Sample Name: XG-6-47B

```
=====
Acq. Operator : i
Acq. Instrument : Instrument 1 Location : Vial 1
Injection Date : 1/8/2016 1:59:14 PM
Acq. Method : C:\HPCHEM\1\METHODS\DEF LC.M
Last changed : 1/8/2016 1:44:08 PM by i
(modified after loading)
Analysis Method : C:\CHEM32\1\METHODS\DEF_LC.M
Last changed : 3/7/2016 10:10:48 PM
(modified after loading)
Sample Info : AD-H, Hexane/iPrOH = 90/10, 0.7 mL/min, 30 oC, 254 nm
```



```
=====
Area Percent Report
=====

Sorted By : Signal
Multiplier: : 1.0000
Dilution: : 1.0000
Sample Amount: : 1.00000 [ng/uL] (not used in calc.)
Use Multiplier & Dilution Factor with ISTDs
```



(+)-3ca

Signal 1: VWD1 A, Wavelength=254 nm

Peak #	RetTime [min]	Type	Width [min]	Area [mAU]	Height *s	[mAU]	Area %
1	9.618	BV	0.1771	3983.78784	348.34528	49.8724	
2	10.185	VB	0.1872	4004.18091	332.12943	50.1276	

Totals : 7987.96875 680.47470

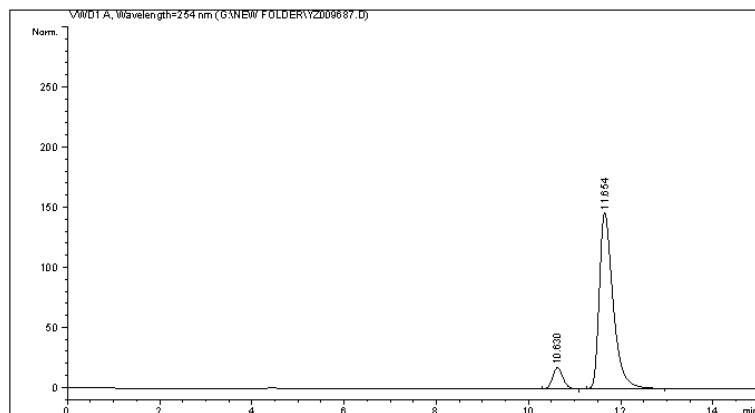
```
=====
*** End of Report ***
=====
```

Instrument 1 3/7/2016 10:10:56 PM

Page 1 of 1

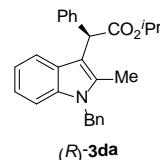
Data File G:\NEW FOLDER\YZ009687.D
Sample Name: XG-6-53C

```
=====
Acq. Operator : i
Acq. Instrument : Instrument 1 Location : Vial 1
Injection Date : 1/15/2016 7:21:36 AM
Acq. Method : C:\HPCHEM\1\METHODS\DEF LC.M
Last changed : 1/15/2016 6:41:44 AM by j
(modified after loading)
Analysis Method : C:\CHEM32\1\METHODS\DEF_LC.M
Last changed : 3/7/2016 10:20:23 PM
(modified after loading)
Sample Info : OD-H, Hexane/iPrOH = 90/10, 0.7 mL/min, 30 oC, 254 nm
```



```
=====
Area Percent Report
=====

Sorted By : Signal
Multiplier: : 1.0000
Dilution: : 1.0000
Sample Amount: : 1.00000 [ng/uL] (not used in calc.)
Use Multiplier & Dilution Factor with ISTDs
```



Signal 1: VWD1 A, Wavelength=254 nm

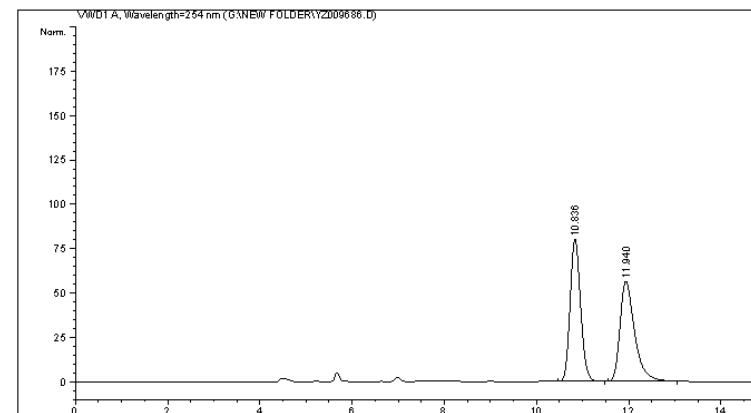
Peak #	RetTime [min]	Type	Width [min]	Area mAU	*s	Height [mAU]	Area %
1	10.630	BB	0.2401	274.59952	17.76283	8.2787	
2	11.654	BB	0.3125	3042.34424	146.32516	91.7213	

Totals : 3316.94376 164.08800

```
=====
*** End of Report ***
=====
```

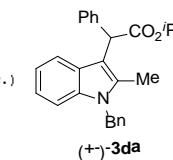
Data File G:\NEW FOLDER\YZ009686.D
Sample Name: XG-6-47C

```
=====
Acq. Operator : i
Acq. Instrument : Instrument 1 Location : Vial 1
Injection Date : 1/15/2016 7:00:04 AM
Acq. Method : C:\HPCHEM\1\METHODS\DEF LC.M
Last changed : 1/15/2016 6:41:44 AM by j
(modified after loading)
Analysis Method : C:\CHEM32\1\METHODS\DEF_LC.M
Last changed : 3/7/2016 10:19:14 PM
(modified after loading)
Sample Info : OD-H, Hexane/iPrOH = 90/10, 0.7 mL/min, 30 oC, 254 nm
```



```
=====
Area Percent Report
=====

Sorted By : Signal
Multiplier: : 1.0000
Dilution: : 1.0000
Sample Amount: : 1.00000 [ng/uL] (not used in calc.)
Use Multiplier & Dilution Factor with ISTDs
```



Signal 1: VWD1 A, Wavelength=254 nm

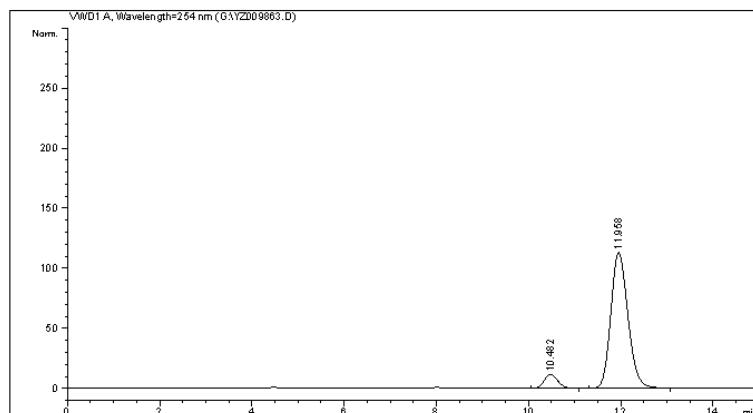
Peak #	RetTime [min]	Type	Width [min]	Area mAU	*s	Height [mAU]	Area %
1	10.836	BB	0.2441	1266.16162	80.09705	50.3884	
2	11.940	BB	0.3335	1246.64160	56.42488	49.6116	

Totals : 2512.80322 136.52193

```
=====
*** End of Report ***
=====
```

Data File G:\YZ009863.D
Sample Name: XG-6-59F

```
=====
Acq. Operator : i
Acq. Instrument : Instrument 1 Location : Vial 1
Injection Date : 1/27/2016 1:44:04 PM
Acq. Method : C:\HPCHEM\1\METHODS\DEF_LC.M
Last changed : 1/27/2016 12:19:08 PM by j
(modified after loading)
Analysis Method : C:\CHEM32\1\METHODS\DEF_LC.M
Last changed : 5/2/2016 7:37:20 PM
(modified after loading)
Sample Info : AS-H, Hexane/iPrOH = 90/10, 0.7 mL/min, 30 oC, 254 nm
```



```
=====
Area Percent Report
=====
Sorted By : Signal
Multiplier: : 1.0000
Dilution: : 1.0000
Sample Amount: : 1.00000 [ng/uL] (not used in calc.)
Use Multiplier & Dilution Factor with ISTDs
```

Signal 1: VWD1 A, Wavelength=254 nm

Peak #	RetTime	Type	Width	Area	Height	Area %
	[min]		[min]	[mAU]	*s	[mAU]
1	10.482	BB	0.3170	240.60120	11.77421	7.6100
2	11.958	BB	0.4007	2921.04224	112.96391	92.3900

Totals : 3161.64343 124.73812

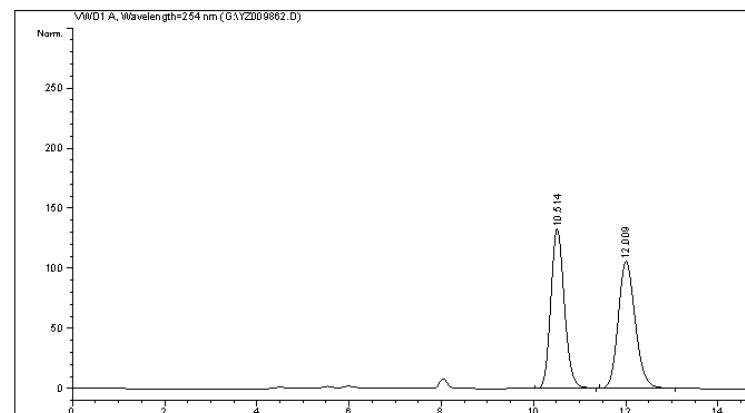
```
=====
*** End of Report ***
=====
```

Instrument 1 5/2/2016 7:38:52 PM

Page 1 of 1

Data File G:\YZ009862.D
Sample Name: XG-6-59F+-

```
=====
Acq. Operator : i
Acq. Instrument : Instrument 1 Location : Vial 1
Injection Date : 1/27/2016 1:25:19 PM
Acq. Method : C:\HPCHEM\1\METHODS\DEF_LC.M
Last changed : 1/27/2016 12:19:08 PM by j
(modified after loading)
Analysis Method : C:\CHEM32\1\METHODS\DEF_LC.M
Last changed : 5/2/2016 7:37:20 PM
(modified after loading)
Sample Info : AS-H, Hexane/iPrOH = 90/10, 0.7 mL/min, 30 oC, 254 nm
```



```
=====
Area Percent Report
=====
Sorted By : Signal
Multiplier: : 1.0000
Dilution: : 1.0000
Sample Amount: : 1.00000 [ng/uL] (not used in calc.)
Use Multiplier & Dilution Factor with ISTDs
```

Signal 1: VWD1 A, Wavelength=254 nm

Peak #	RetTime	Type	Width	Area	Height	Area %
	[min]		[min]	[mAU]	*s	[mAU]
1	10.514	BB	0.3179	2717.01172	132.47614	50.0681
2	12.009	BB	0.3956	2709.61963	105.55109	49.9319

Totals : 5426.63135 238.02723

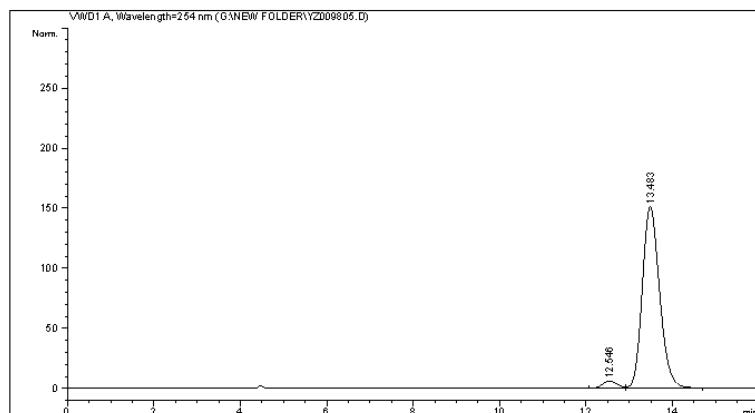
```
=====
*** End of Report ***
=====
```

Instrument 1 5/2/2016 7:37:35 PM

Page 1 of 1

Data File G:\NEW FOLDER\YZ009805.D
Sample Name: XG-6-58B

```
=====
Acq. Operator : i
Acq. Instrument : Instrument 1 Location : Vial 1
Injection Date : 1/24/2016 2:58:01 AM
Acq. Method : C:\HPCHEM\1\METHODS\DEF_LC.M
Last changed : 1/24/2016 2:37:16 AM by j
(modified after loading)
Analysis Method : C:\CHEM32\1\METHODS\DEF_LC.M
Last changed : 3/7/2016 10:21:37 PM
(modified after loading)
Sample Info : AS-H, Hexane/iPrOH = 95/05, 0.7 mL/min, 30 oC, 254 nm
```



```
=====
Area Percent Report
=====
```

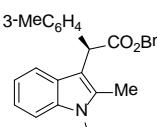
Sorted By : Signal

Multiplier: : 1.0000

Dilution: : 1.0000

Sample Amount: : 1.00000 [ng/uL] (not used in calc.)

Use Multiplier & Dilution Factor with ISTDs

3-MeC₆H₄ 

Signal 1: VWD1 A, Wavelength=254 nm

Peak #	RetTime [min]	Type	Width [min]	Area [mAU]	*s	Height [mAU]	Area %
1	12.546	BV	0.3880	146.47371		5.91368	3.3671
2	13.483	VB	0.4311	4203.71191		151.00238	96.6329

Totals : 4350.18562 156.91606

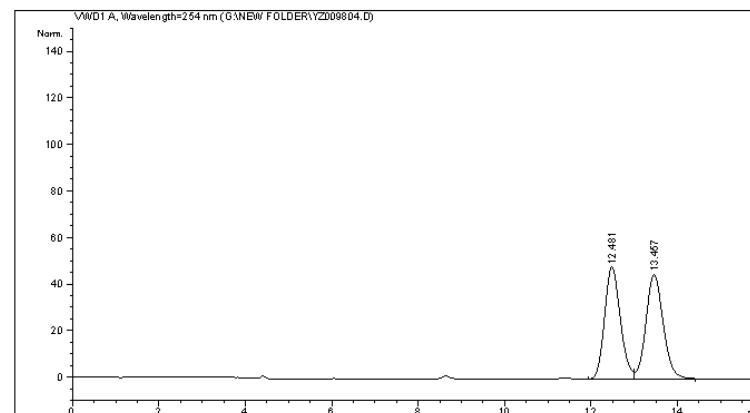
```
=====
*** End of Report ***
=====
```

Instrument 1 3/7/2016 10:21:45 PM

Page 1 of 1

Data File G:\NEW FOLDER\YZ009804.D
Sample Name: XG-6-58B+-

```
=====
Acq. Operator : i
Acq. Instrument : Instrument 1 Location : Vial 1
Injection Date : 1/24/2016 2:38:31 AM
Acq. Method : C:\HPCHEM\1\METHODS\DEF_LC.M
Last changed : 1/24/2016 2:37:16 AM by j
(modified after loading)
Analysis Method : C:\CHEM32\1\METHODS\DEF_LC.M
Last changed : 3/7/2016 10:22:44 PM
(modified after loading)
Sample Info : AS-H, Hexane/iPrOH = 95/05, 0.7 mL/min, 30 oC, 254 nm
```



```
=====
Area Percent Report
=====
```

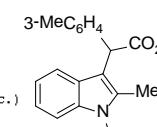
Sorted By : Signal

Multiplier: : 1.0000

Dilution: : 1.0000

Sample Amount: : 1.00000 [ng/uL] (not used in calc.)

Use Multiplier & Dilution Factor with ISTDs

3-MeC₆H₄ 

Signal 1: VWD1 A, Wavelength=254 nm

Peak #	RetTime [min]	Type	Width [min]	Area [mAU]	*s	Height [mAU]	Area %
1	12.481	BV	0.3916	1216.25391		48.01952	49.4119
2	13.457	VB	0.4302	1245.20544		44.84958	50.5881

Totals : 2461.45935 92.86910

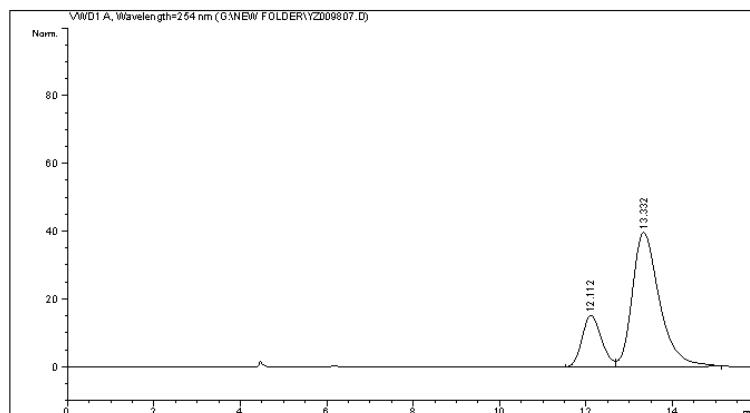
```
=====
*** End of Report ***
=====
```

Instrument 1 3/7/2016 10:22:52 PM

Page 1 of 1

Data File G:\NEW FOLDER\YZ009807.D
Sample Name: XG-6-58C

```
=====
Acq. Operator : i
Acq. Instrument : Instrument 1 Location : Vial 1
Injection Date : 1/24/2016 5:19:49 AM
Acq. Method : C:\HPCHEM\1\METHODS\DEF_LC.M
Last changed : 1/24/2016 5:20:27 AM by j
(modified after loading)
Analysis Method : C:\CHEM32\1\METHODS\DEF_LC.M
Last changed : 3/7/2016 10:24:57 PM
(modified after loading)
Sample Info : AS-H, Hexane/iPrOH = 95/05, 0.7 mL/min, 30 oC, 254
nm
```



```
=====
Area Percent Report
=====
```

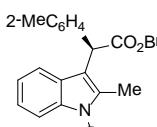
Sorted By : Signal

Multiplier: : 1.0000

Dilution: : 1.0000

Sample Amount: : 1.00000 [ng/uL] (not used in calc.)

Use Multiplier & Dilution Factor with ISTDs

2-MeC₆H₄ 

Signal 1: VWD1 A, Wavelength=254 nm

Peak #	RetTime [min]	Type	Width [min]	Area [mAU]	Height *s	[mAU]	Area %
1	12.112	BV	0.4760	472.41968	15.26677	21.5126	
2	13.332	VB	0.6598	1723.59448	39.66540	78.4874	

Totals : 2196.01416 54.93217

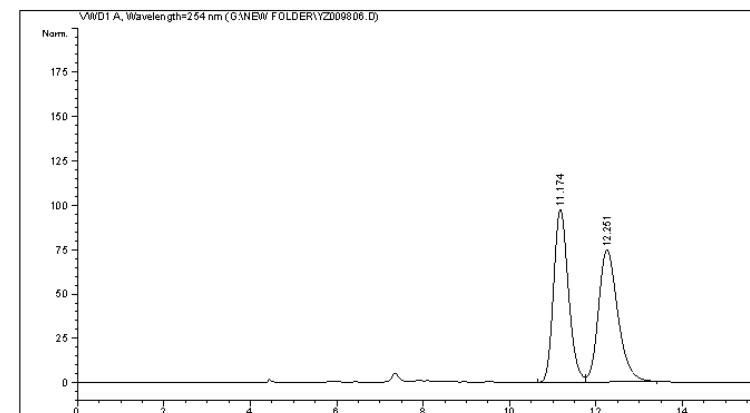
```
=====
*** End of Report ***
=====
```

Instrument 1 3/7/2016 10:25:03 PM

Page 1 of 1

Data File G:\NEW FOLDER\YZ009806.D
Sample Name: XG-6-58C+

```
=====
Acq. Operator : i
Acq. Instrument : Instrument 1 Location : Vial 1
Injection Date : 1/24/2016 3:17:38 AM
Acq. Method : C:\HPCHEM\1\METHODS\DEF_LC.M
Last changed : 1/24/2016 2:37:16 AM by j
(modified after loading)
Analysis Method : C:\CHEM32\1\METHODS\DEF_LC.M
Last changed : 3/7/2016 10:23:49 PM
(modified after loading)
Sample Info : AS-H, Hexane/iPrOH = 95/05, 0.7 mL/min, 30 oC, 254
nm
```



```
=====
Area Percent Report
=====
```

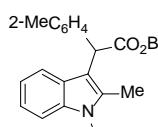
Sorted By : Signal

Multiplier: : 1.0000

Dilution: : 1.0000

Sample Amount: : 1.00000 [ng/uL] (not used in calc.)

Use Multiplier & Dilution Factor with ISTDs

2-MeC₆H₄ 

Signal 1: VWD1 A, Wavelength=254 nm

Peak #	RetTime [min]	Type	Width [min]	Area [mAU]	Height *s	[mAU]	Area %
1	11.174	BV	0.3678	2320.38379	97.53590	50.0227	
2	12.251	VB	0.4780	2318.27417	74.50746	49.9773	

Totals : 4638.65796 172.04336

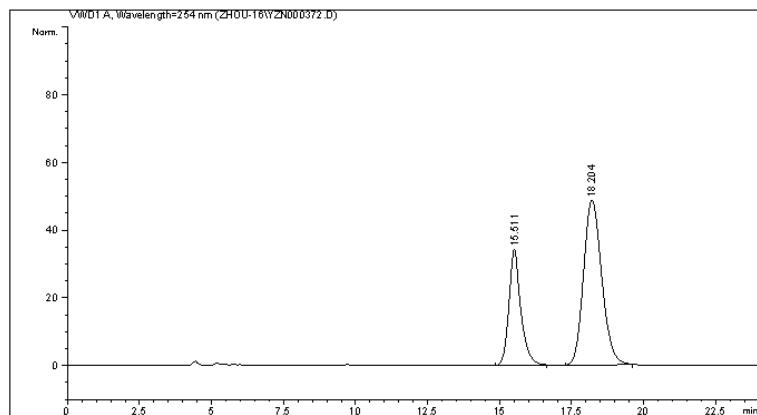
```
=====
*** End of Report ***
=====
```

Instrument 1 3/7/2016 10:23:55 PM

Page 1 of 1

Data File C:\CHEM32\1\DATA\ZHOU-16\YZN000372.D
Sample Name: XG-6-63A

```
=====
Acq. Operator :                               Location : Vial 1
Acq. Instrument : Instrument 1             Location : Vial 1
Injection Date : 2/26/2016 9:26:27 AM
Acq. Method : C:\CHEM32\1\METHODS\DEF_LC.M
Last changed : 2/26/2016 9:24:29 AM
(modified after loading)
Analysis Method : C:\CHEM32\1\METHODS\DEF_LC.M
Last changed : 3/7/2016 9:56:48 PM
(modified after loading)
Sample Info : AS-H, H/i-PrOH = 90/10, 0.7 mL/min, 30 oC, 254 nm
```



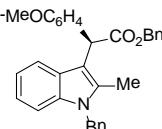
```
=====
Area Percent Report
```

```
Sorted By : Signal
Multiplier: : 1.0000
Dilution: : 1.0000
Use Multiplier & Dilution Factor with ISTDs
```

Signal 1: VWD1 A, Wavelength=254 nm

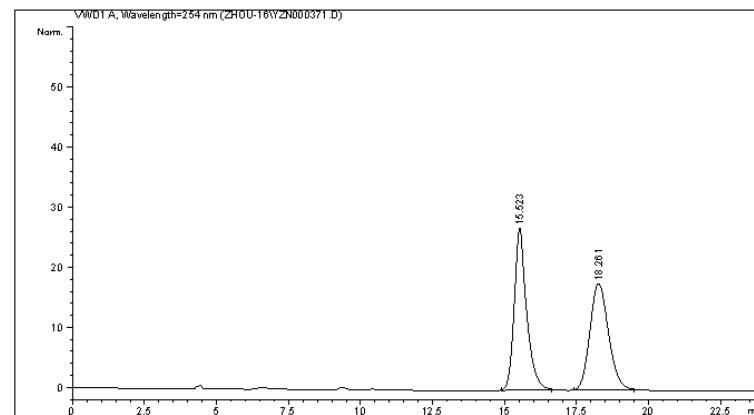
Peak #	RetTime [min]	Type	Width [min]	Area [mAU]	Height *s	Area %
1	15.511	BB	0.4108	977.66168	34.34002	31.3074
2	18.204	BB	0.6824	2145.11816	48.73619	68.6926

Totals : 3122.77985 83.07621



Data File C:\CHEM32\1\DATA\ZHOU-16\YZN000371.D
Sample Name: XG-6-63A+

```
=====
Acq. Operator :                               Location : Vial 1
Acq. Instrument : Instrument 1             Location : Vial 1
Injection Date : 2/26/2016 9:00:28 AM
Acq. Method : C:\CHEM32\1\METHODS\DEF_LC.M
Last changed : 2/26/2016 8:41:26 AM
(modified after loading)
Analysis Method : C:\CHEM32\1\METHODS\DEF_LC.M
Last changed : 3/7/2016 9:54:24 PM
(modified after loading)
Sample Info : AS-H, H/i-PrOH = 90/10, 0.7 mL/min, 30 oC, 254 nm
```



```
=====
Area Percent Report
```

```
Sorted By : Signal
Multiplier: : 1.0000
Dilution: : 1.0000
Use Multiplier & Dilution Factor with ISTDs
```

Signal 1: VWD1 A, Wavelength=254 nm

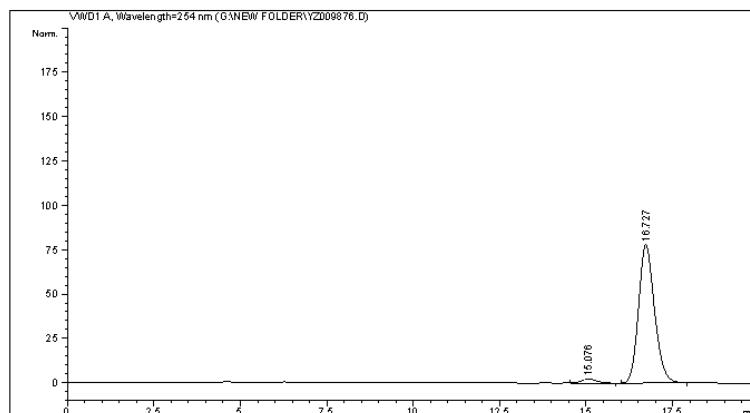
Peak #	RetTime [min]	Type	Width [min]	Area [mAU]	Height *s	Area %
1	15.523	BB	0.4233	800.53156	26.97937	50.2085
2	18.261	BB	0.6928	793.88239	17.72684	49.7915

Totals : 1594.41394 44.70620

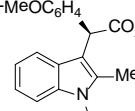


Data File G:\NEW FOLDER\YZ009876.D
Sample Name: XG-6-59H

```
=====
Acq. Operator : i
Acq. Instrument : Instrument 1 Location : Vial 1
Injection Date : 1/28/2016 7:56:55 AM
Acq. Method : C:\HPCHEM\1\METHODS\DEF_LC.M
Last changed : 1/28/2016 7:28:35 AM by j
(modified after loading)
Analysis Method : C:\CHEM32\1\METHODS\DEF_LC.M
Last changed : 3/7/2016 10:31:43 PM
(modified after loading)
Sample Info : AS-H, Hexane/iPrOH = 90/10, 0.7 mL/min, 30 oC, 254
nm
```



```
=====
Area Percent Report
=====
Sorted By : Signal
Multiplier: : 1.0000
Dilution: : 1.0000
Sample Amount: : 1.00000 [ng/uL] (not used in calc.)
Use Multiplier & Dilution Factor with ISTDs
```

3-MeOC₆H₄ 

Signal 1: VWD1 A, Wavelength=254 nm

Peak #	RetTime [min]	Type	Width [min]	Area [mAU]	Height *s	[mAU]	Area %
1	15.076	BB	0.4475	69.41928	2.36383	2.6968	
2	16.727	BB	0.4898	2504.72241	77.97632	97.3032	

Totals : 2574.14169 80.34014

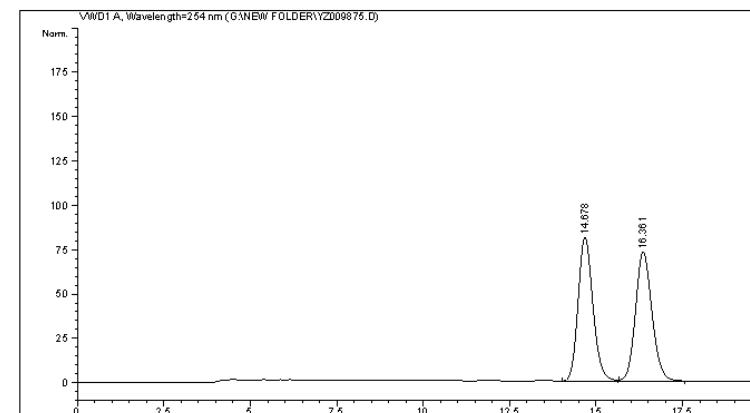
```
=====
*** End of Report ***
=====
```

Instrument 1 3/7/2016 10:32:38 PM

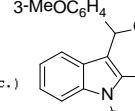
Page 1 of 1

Data File G:\NEW FOLDER\YZ009875.D
Sample Name: XG-6-59H+

```
=====
Acq. Operator : i
Acq. Instrument : Instrument 1 Location : Vial 1
Injection Date : 1/28/2016 7:30:10 AM
Acq. Method : C:\HPCHEM\1\METHODS\DEF_LC.M
Last changed : 1/28/2016 7:28:35 AM by j
(modified after loading)
Analysis Method : C:\CHEM32\1\METHODS\DEF_LC.M
Last changed : 3/7/2016 10:31:43 PM
(modified after loading)
Sample Info : AS-H, Hexane/iPrOH = 90/10, 0.7 mL/min, 30 oC, 254
nm
```



```
=====
Area Percent Report
=====
Sorted By : Signal
Multiplier: : 1.0000
Dilution: : 1.0000
Sample Amount: : 1.00000 [ng/uL] (not used in calc.)
Use Multiplier & Dilution Factor with ISTDs
```

3-MeOC₆H₄ 

Signal 1: VWD1 A, Wavelength=254 nm

Peak #	RetTime [min]	Type	Width [min]	Area [mAU]	Height *s	[mAU]	Area %
1	14.678	BB	0.4606	2406.94482	80.92484	49.8976	
2	16.361	BB	0.5064	2416.62178	72.85381	50.1024	

Totals : 4823.76660 153.77866

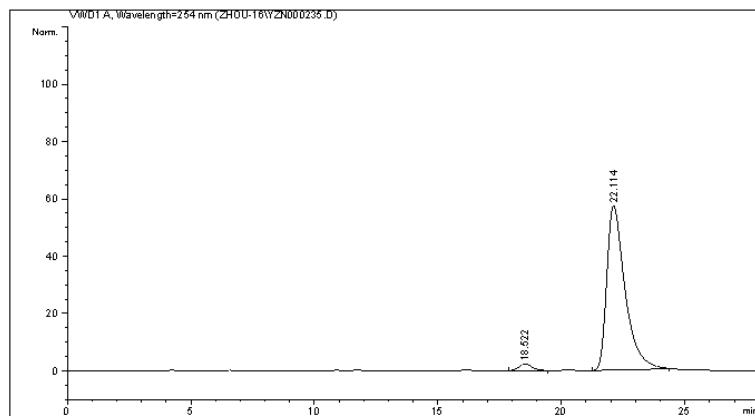
```
=====
*** End of Report ***
=====
```

Instrument 1 3/7/2016 10:31:48 PM

Page 1 of 1

Data File C:\CHEM32\1\DATA\ZHOU-16\YZN000235.D
Sample Name: XG-6-56b

```
=====
Acq. Operator :                               Location : Vial 1
Acq. Instrument : Instrument 1             Location : Vial 1
Injection Date : 1/19/2016 2:39:05 PM
Acq. Method : C:\CHEM32\1\METHODS\DEF_LC.M
Last changed : 1/19/2016 2:36:59 PM
(modified after loading)
Analysis Method : C:\CHEM32\1\METHODS\DEF_LC.M
Last changed : 3/7/2016 9:52:12 PM
(modified after loading)
Sample Info : OD-H, H/i-PrOH = 90/10, 0.7 mL/min, 30 oC, 254 nm
```



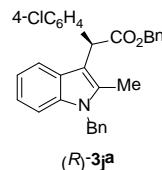
```
=====
Area Percent Report
=====
```

Sorted By : Signal
Multiplier: : 1.0000
Dilution: : 1.0000
Use Multiplier & Dilution Factor with ISTDs

Signal 1: VWD1 A, Wavelength=254 nm

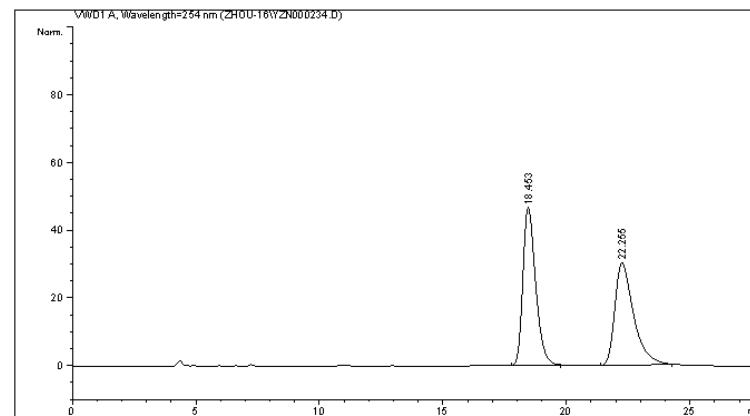
Peak #	RetTime [min]	Type	Width [min]	Area [mAU]	Height *s	[mAU]	Area %
1	18.522	BB	0.5409	85.08411	2.31478	2.8025	
2	22.114	BB	0.7675	2950.97046	57.37182	97.1975	

Totals : 3036.05457 59.68660



Data File C:\CHEM32\1\DATA\ZHOU-16\ZN000234.D
Sample Name: XG-6-56b+-

```
=====
Acq. Operator :                               Location : Vial 1
Acq. Instrument : Instrument 1             Location : Vial 1
Injection Date : 1/19/2016 2:09:08 PM
Acq. Method : C:\CHEM32\1\METHODS\DEF_LC.M
Last changed : 1/19/2016 1:49:42 PM
(modified after loading)
Analysis Method : C:\CHEM32\1\METHODS\DEF_LC.M
Last changed : 3/7/2016 9:50:36 PM
(modified after loading)
Sample Info : OD-H, H/i-PrOH = 90/10, 0.7 mL/min, 30 oC, 254 nm
```



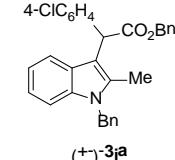
```
=====
Area Percent Report
=====
```

Sorted By : Signal
Multiplier: : 1.0000
Dilution: : 1.0000
Use Multiplier & Dilution Factor with ISTDs

Signal 1: VWD1 A, Wavelength=254 nm

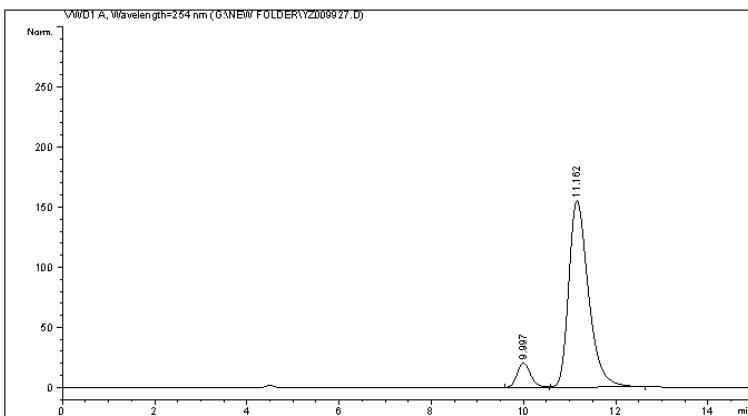
Peak #	RetTime [min]	Type	Width [min]	Area [mAU]	Height *s	[mAU]	Area %
1	18.453	BB	0.5494	1670.15955	46.57877	51.1445	
2	22.255	BB	0.7892	1595.40930	30.21898	48.8555	

Totals : 3265.56885 76.79776



Data File G:\NEW FOLDER\Y2009927.D
Sample Name: XG-6-66A

```
=====
Acq. Operator : i                               Location : Vial 1
Acq. Instrument : Instrument 1
Injection Date : 3/2/2016 1:07:08 PM
Acq. Method : C:\HPCHEM1\METHODS\DEF LC.M
Last changed : 3/2/2016 12:54:08 PM by j
(modified after loading)
Analysis Method : C:\CHEM32\1\METHODS\DEF_LC.M
Last changed : 3/7/2016 10:36:17 PM
(modified after loading)
Sample Info : AS-H, H/iPrOH = 90/10, 0.7 mL/min, 30 oC, 254 nm
```



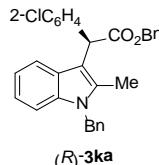
```
=====
Area Percent Report
=====

Sorted By : Signal
Multiplier: : 1.0000
Dilution: : 1.0000
Sample Amount: : 1.00000 [ng/uL] (not used in calc.)
Use Multiplier & Dilution Factor with ISTDs
```

Signal 1: VWD1 A, Wavelength=254 nm

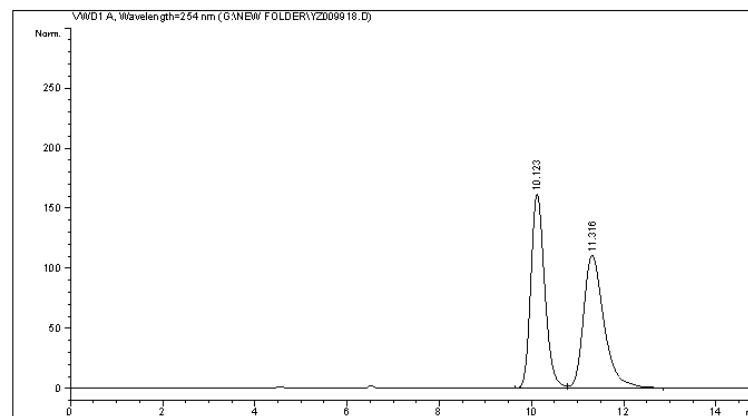
Peak #	RetTime	Type	Width [min]	Area [mAU]	Height *s	[mAU]	Area %
1	9.997	BB	0.3090	404.36596	20.22407	8.0642	
2	11.162	BB	0.4532	4610.19678	155.02699	91.9358	

Totals : 5014.58273 175.25106



Data File G:\NEW FOLDER\Y2009918.D
Sample Name: XG-6-66A+

```
=====
Acq. Operator : i                               Location : Vial 1
Acq. Instrument : Instrument 1
Injection Date : 3/1/2016 2:12:32 PM
Acq. Method : C:\HPCHEM1\METHODS\DEF LC.M
Last changed : 3/1/2016 1:38:33 PM by j
(modified after loading)
Analysis Method : C:\CHEM32\1\METHODS\DEF_LC.M
Last changed : 3/7/2016 10:36:17 PM
(modified after loading)
Sample Info : AS-H, H/iPrOH = 90/10, 0.7 mL/min, 30 oC, 254 nm
```



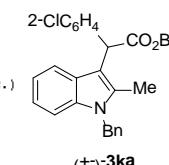
```
=====
Area Percent Report
=====

Sorted By : Signal
Multiplier: : 1.0000
Dilution: : 1.0000
Sample Amount: : 1.00000 [ng/uL] (not used in calc.)
Use Multiplier & Dilution Factor with ISTDs
```

Signal 1: VWD1 A, Wavelength=254 nm

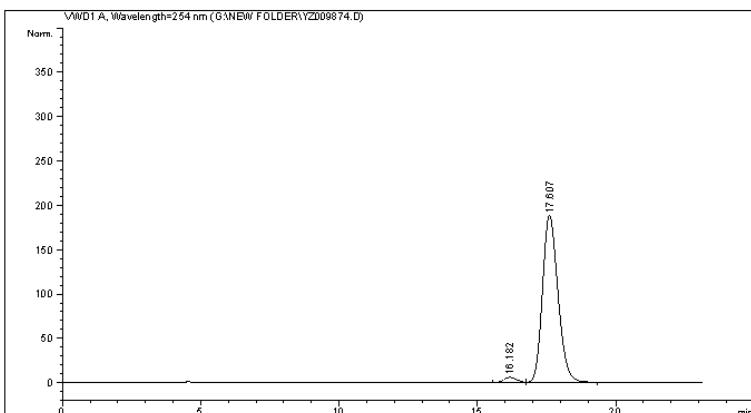
Peak #	RetTime	Type	Width [min]	Area [mAU]	Height *s	[mAU]	Area %
1	10.123	BV	0.3205	3366.87036	161.40986	49.6961	
2	11.316	BV	0.4688	3408.04712	110.56133	50.3039	

Totals : 6774.91748 271.97121



Data File G:\NEW FOLDER\Y2009874.D
Sample Name: XG-6-59G

```
=====
Acq. Operator : i
Acq. Instrument : Instrument 1 Location : Vial 1
Injection Date : 1/28/2016 7:03:48 AM
Acq. Method : C:\HPCHEM1\METHODS\DEF LC.M
Last changed : 1/28/2016 6:35:02 AM bv j
(modified after loading)
Analysis Method : C:\CHEM32\1\METHODS\DEF_LC.M
Last changed : 3/7/2016 10:29:43 PM
(modified after loading)
Sample Info : AS-H, Hexane/iPrOH = 95/05, 0.7 mL/min, 30 oC, 254
nm
```



```
=====
Area Percent Report
=====

Sorted By : Signal
Multiplier: : 1.0000
Dilution: : 1.0000
Sample Amount: : 1.00000 [ng/uL] (not used in calc.)
Use Multiplier & Dilution Factor with ISTDs
```

Signal 1: VWD1 A, Wavelength=254 nm

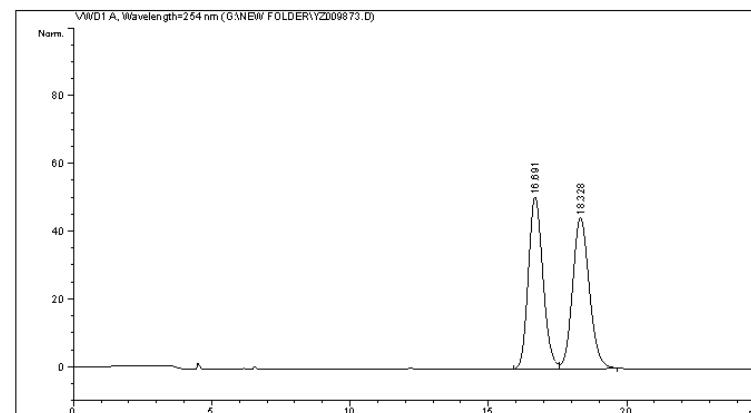
Peak #	RetTime [min]	Type	Width [min]	Area mAU	Height *s	Area [mAU]	Area %
1	16.182	BV	0.5183	195.00739	5.87528	2.5794	
2	17.607	VB	0.6101	7365.26172	187.93428	97.4206	

Totals : 7560.26910 193.80956



Data File G:\NEW FOLDER\Y2009873.D
Sample Name: XG-6-59G+

```
=====
Acq. Operator : i
Acq. Instrument : Instrument 1 Location : Vial 1
Injection Date : 1/28/2016 6:36:46 AM
Acq. Method : C:\HPCHEM1\METHODS\DEF LC.M
Last changed : 1/28/2016 6:35:02 AM bv j
(modified after loading)
Analysis Method : C:\CHEM32\1\METHODS\DEF_LC.M
Last changed : 3/7/2016 10:28:37 PM
(modified after loading)
Sample Info : AS-H, Hexane/iPrOH = 95/05, 0.7 mL/min, 30 oC, 254
nm
```



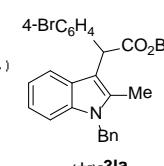
```
=====
Area Percent Report
=====

Sorted By : Signal
Multiplier: : 1.0000
Dilution: : 1.0000
Sample Amount: : 1.00000 [ng/uL] (not used in calc.)
Use Multiplier & Dilution Factor with ISTDs
```

Signal 1: VWD1 A, Wavelength=254 nm

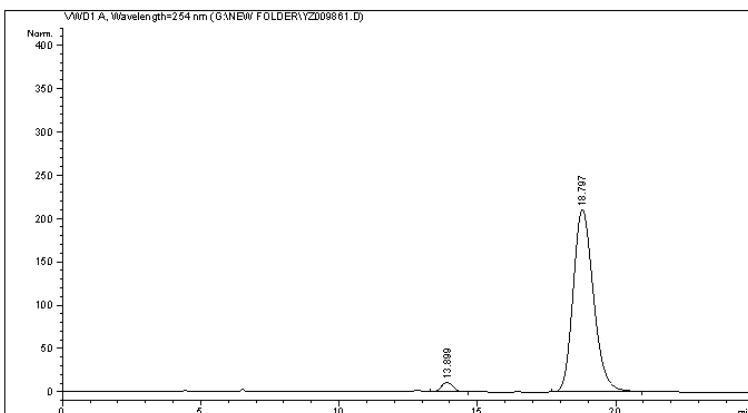
Peak #	RetTime [min]	Type	Width [min]	Area mAU	Height *s	Area [mAU]	Area %
1	16.691	BV	0.5679	1864.41724	50.80787	49.8370	
2	18.328	VB	0.6518	1876.61340	44.53248	50.1630	

Totals : 3741.03064 95.34035



Data File G:\NEW FOLDER\Y2009861.D
Sample Name: XG-6-59E

```
=====
Acq. Operator : i
Acq. Instrument : Instrument 1 Location : Vial 1
Injection Date : 1/27/2016 12:57:33 PM
Acq. Method : C:\HPCHEM\1\METHODS\DEF LC.M
Last changed : 1/27/2016 12:19:08 PM by j
(modified after loading)
Analysis Method : C:\CHEM32\1\METHODS\DEF_LC.M
Last changed : 3/7/2016 10:27:36 PM
(modified after loading)
Sample Info : AS-H, Hexane/iPrOH = 90/10, 0.7 mL/min, 30 oC, 254
nm
```



```
=====
Area Percent Report
=====

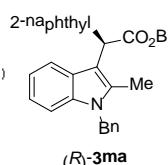
Sorted By : Signal
Multiplier: : 1.0000
Dilution: : 1.0000
Sample Amount: : 1.00000 [ng/uL] (not used in calc.)
Use Multiplier & Dilution Factor with ISTDs
```

Signal 1: VWD1 A, Wavelength=254 nm

Peak #	RetTime [min]	Type	Width [min]	Area mAU	Height *s	Area [mAU]	Area %
1	13.899	VB	0.4622	329.61392	11.12388	2.9809	
2	18.797	BB	0.7887	1.07280e4	210.32315	97.0191	

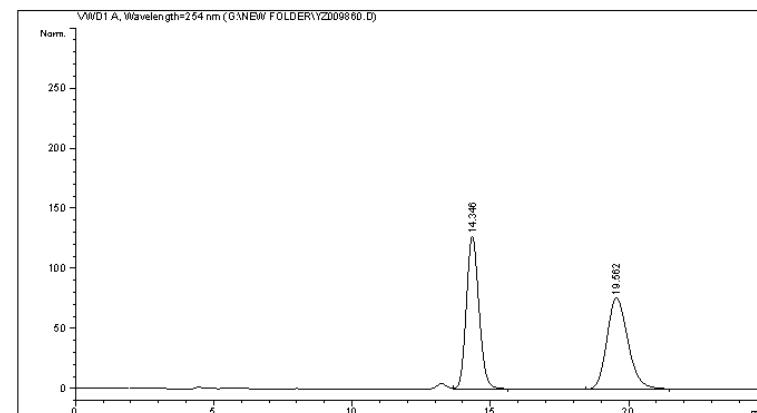
Totals : 1.10576e4 221.44703

```
=====
*** End of Report ***
=====
```



Data File G:\NEW FOLDER\Y2009860.D
Sample Name: XG-6-59E+

```
=====
Acq. Operator : i
Acq. Instrument : Instrument 1 Location : Vial 1
Injection Date : 1/27/2016 12:30:20 PM
Acq. Method : C:\HPCHEM\1\METHODS\DEF LC.M
Last changed : 1/27/2016 12:19:08 PM by j
(modified after loading)
Analysis Method : C:\CHEM32\1\METHODS\DEF_LC.M
Last changed : 3/7/2016 10:26:24 PM
(modified after loading)
Sample Info : AS-H, Hexane/iPrOH = 90/10, 0.7 mL/min, 30 oC, 254
nm
```



```
=====
Area Percent Report
=====

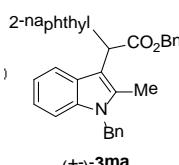
Sorted By : Signal
Multiplier: : 1.0000
Dilution: : 1.0000
Sample Amount: : 1.00000 [ng/uL] (not used in calc.)
Use Multiplier & Dilution Factor with ISTDs
```

Signal 1: VWD1 A, Wavelength=254 nm

Peak #	RetTime [min]	Type	Width [min]	Area mAU	Height *s	Area [mAU]	Area %
1	14.346	VB	0.4907	4008.12207	126.93084	50.0637	
2	19.562	BB	0.8184	3997.92261	75.89039	49.9363	

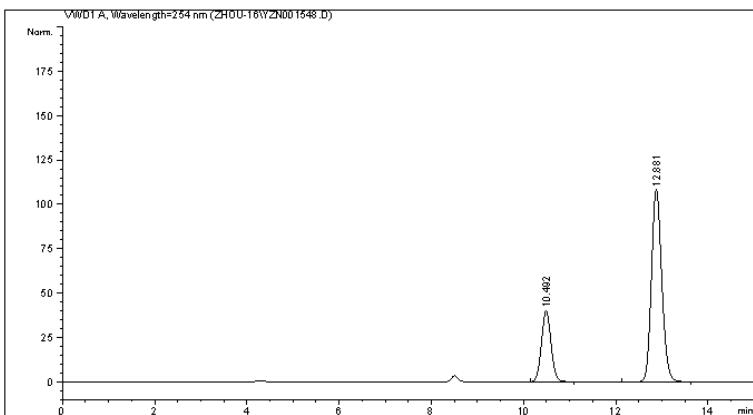
Totals : 8006.04468 202.82123

```
=====
*** End of Report ***
=====
```



Data File C:\CHEM32\1\DATA\ZHOU-16\YZN001548.D
Sample Name: xg-7-24

```
=====
Acq. Operator : Location : Vial 1
Acq. Instrument : Instrument 1
Injection Date : 6/7/2016 10:41:34 PM
Acq. Method : C:\CHEM32\1\METHODS\DEF_LC.M
Last changed : 6/7/2016 10:40:03 PM
(modified after loading)
Analysis Method : C:\CHEM32\1\METHODS\DEF_LC.M
Last changed : 6/13/2016 9:58:34 PM
(modified after loading)
Sample Info : AD-H, Hex/i-PrOH = 90/10, 0.7 mL/min, 30oC, 254 nm
```



```
=====
Area Percent Report
=====
```

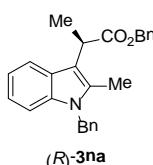
```
Sorted By : Signal
Multiplier: : 1.0000
Dilution: : 1.0000
Use Multiplier & Dilution Factor with ISTDs
```

Signal 1: VWD1 A, Wavelength=254 nm

Peak RetTime	Type	Width	Area	Height	Area
# [min]		[min]	[mAU]	*s	[mAU]
1 10.492	BB	0.2201	575.34381	40.03687	25.4247
2 12.881	BB	0.2401	1687.59009	108.27431	74.5753

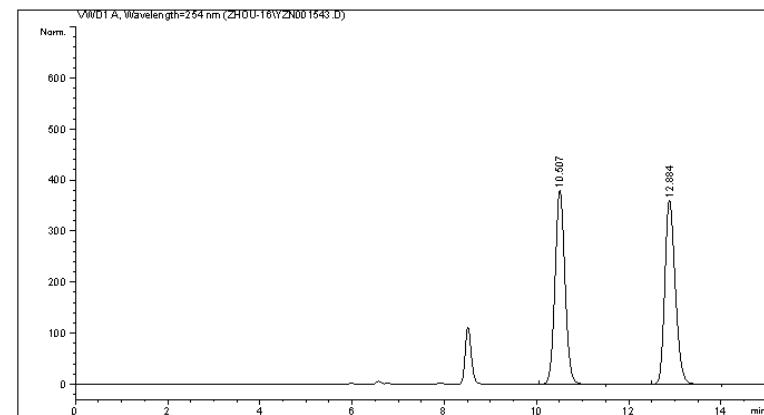
Totals : 2262.93390 148.31118

```
=====
*** End of Report ***
=====
```



Data File C:\CHEM32\1\DATA\ZHOU-16\YZN001543.D
Sample Name: xg-7-24+

```
=====
Acq. Operator : Location : Vial 1
Acq. Instrument : Instrument 1
Injection Date : 6/7/2016 4:09:06 PM
Acq. Method : C:\CHEM32\1\METHODS\DEF_LC.M
Last changed : 6/7/2016 3:59:01 PM
(modified after loading)
Analysis Method : C:\CHEM32\1\METHODS\DEF_LC.M
Last changed : 6/13/2016 9:56:42 PM
(modified after loading)
Sample Info : AD-H, Hex/i-PrOH = 90/10, 0.7 mL/min, 30oC, 254 nm
```



```
=====
Area Percent Report
=====
```

```
Sorted By : Signal
Multiplier: : 1.0000
Dilution: : 1.0000
Use Multiplier & Dilution Factor with ISTDs
```

Signal 1: VWD1 A, Wavelength=254 nm

Peak RetTime	Type	Width	Area	Height	Area
# [min]		[min]	[mAU]	*s	[mAU]
1 10.507	VB	0.2327	5665.62988	378.92914	50.0201
2 12.884	BB	0.2421	5661.08008	359.29172	49.9799

Totals : 1.13267e4 738.22086

```
=====
*** End of Report ***
=====
```

