

Copper(I)-Catalyzed Intramolecular Asymmetric C-Arylation of Acyclic β -ester amides: Enantioselective Formation of Chiral Oxindoles

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Supporting Information

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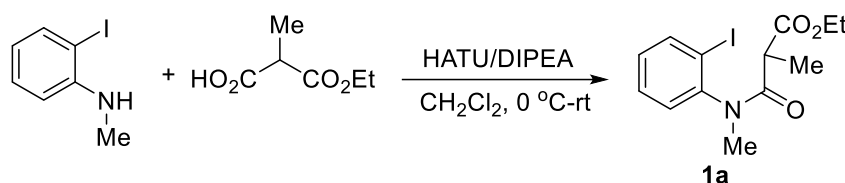
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I. General Remarks

¹H NMR and ¹³C NMR spectra were recorded on a Bruker AV-400 or 500 MHz spectrometer. Chemical shifts (δ) are given in relative to tetramethylsilane (δ 0.00 ppm) in CDCl₃. Coupling constants, *J*, were reported in hertz unit (Hz). High resolution mass spectra (HRMS) were obtained on a Q-STAR Elite ESI-LC-MS/MS Spectrometer. Chemical names were generated using Cambridge Soft. ChemDraw Ultra 10.0. Optical rotations were measured on a Perkin Elmer 341 polarimeter. Enantiomeric ratios were determined by chiral HPLC using a chiralpak AD-H (Amylose tris (3,5-dimethylphenylcarbamate)coated on 5 μ m silica-gel), chiralpak AS-H (Amylose tris-[(S)- α -methylbenzylcarbamate] coated on 5 μ m silica-gel) or chiralcel OD-H column (Cellulose tris (3,5-dimethylphenylcarbamate) coated on 5 μ m silica-gel) with hexane and *i*-PrOH as solvents. Commercially obtained reagents were used without further purification.

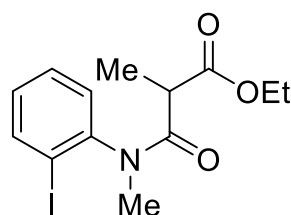
II. Synthesis of Substrates

General Procedure for the synthesis of **1a**:



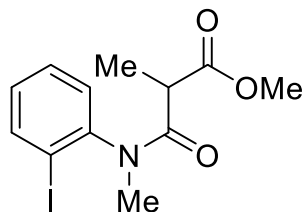
To a solution of 2-iodo-*N*-methylaniline (2.3 g, 10 mmol) in DCM (50 mL) was added 3-ethoxy-2-methyl-3-oxopropanoic acid (1.75 g, 12 mmol), HATU (5.7 g, 15 mmol) and DIPEA (5.1 ml, 30 mmol). The reaction mixture was stirred at room temperature for 24 hours. Then the solvent was evaporated, extracted by DCM, dried over anhydrous NaSO₄, filtered, and concentrated in vacuo. The resulting residue was purified through column to afford the corresponding products **1a** (2.1 g, 58%). Other substrates were synthesized similarly to that of **1a**.

Ethyl 3-((2-iodophenyl)(methyl)amino)-2-methyl-3-oxopropanoate (1a)



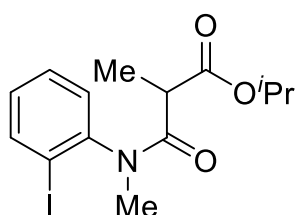
¹H NMR (400 MHz, CDCl₃, two rotamers) δ 7.90-7.96 (m, 1H), 7.33-7.43 & 7.21-7.24 (m, 2H), 7.04-7.10 (m, 1H), 3.99-4.14 (m, 2H), 3.19 (s, 3H), 3.06-3.12 (m, 1H), 1.37 & 1.26 (2d, *J* = 6.8 Hz, 3H), 1.22 & 1.19 (2t, *J* = 6.8 Hz, 3H); ¹³C NMR (100 MHz, CDCl₃, two rotamers) δ 170.5, 170.3, 170.1, 169.5, 145.5, 140.7, 140.1, 130.1, 129.9, 129.8, 129.1, 99.7, 99.2, 61.2, 44.2, 44.1, 36.4, 36.3, 14.5, 14.2, 14.1; ESI-MS *m/z* 384.0 (M + Na)⁺; HRMS calcd for C₁₃H₁₆INNaO₃⁺ (M + Na)⁺ 384.0067, found 384.0065.

Methyl 3-((2-iodophenyl)(methyl)amino)-2-methyl-3-oxopropanoate (1b)



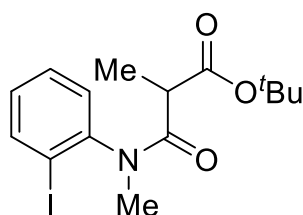
^1H NMR (400 MHz, CDCl_3 , two rotamers) δ 7.90-7.96 (m, 1H), 7.33-7.44 & 7.21-7.24 (m, 2H), 7.06-7.11 (m, 1H), 3.58-3.68 (m, 3H), 3.10-3.21 (m, 4H), 1.26-1.41 (m, 3H); ^{13}C NMR (100 MHz, CDCl_3 , two rotamers) δ 171.0, 170.5, 170.1, 169.5, 145.5, 140.8, 140.2, 130.2, 129.9, 129.8, 129.7, 129.2, 99.6, 99.2, 52.3, 52.2, 44.0, 36.5, 36.4, 14.5; ESI-MS m/z 370.0 ($\text{M} + \text{Na}$) $^+$; HRMS calcd for $\text{C}_{12}\text{H}_{14}\text{INNaO}_3^+$ ($\text{M} + \text{Na}$) $^+$ 369.9911, found 369.9910.

Isopropyl 3-((2-iodophenyl)(methyl)amino)-2-methyl-3-oxopropanoate (1c)



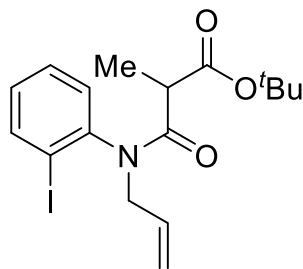
^1H NMR (400 MHz, CDCl_3 , two rotamers) δ 7.86-7.92 (m, 1H), 7.22-7.38 (m, 2H), 7.02-7.06 (m, 1H), 4.81-4.96 (m, 1H), 3.14 (s, 3H), 2.99-3.05 (m, 1H), 1.10-1.35 (m, 9H); ^{13}C NMR (100 MHz, CDCl_3 , two rotamers) δ 170.4, 170.0, 169.6, 169.5, 145.5, 140.7, 140.1, 130.1, 129.9, 129.8, 129.7, 129.0, 99.7, 99.2, 68.6, 44.3, 36.3, 21.8, 21.7, 21.6, 21.5, 14.5, 14.4; ESI-MS m/z 398.0 ($\text{M} + \text{Na}$) $^+$; HRMS calcd for $\text{C}_{14}\text{H}_{18}\text{INaNO}_3^+$ ($\text{M} + \text{Na}$) $^+$ 398.0224, found 398.0224.

tert-Butyl 3-((2-iodophenyl)(methyl)amino)-2-methyl-3-oxopropanoate (1d)



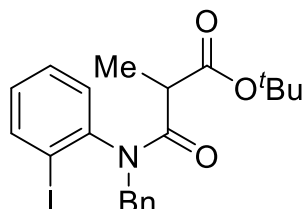
^1H NMR (400 MHz, CDCl_3 , two rotamers) δ 7.92-7.98 (m, 1H), 7.37-7.44 & 7.23-7.24 (m, 2H), 7.06-7.11 (m, 1H), 3.20 (s, 3H), 2.97-3.04 (m, 1H), 1.44 & 1.40 (2s, 9H), 1.36 & 1.22 (2d, $J = 7.2$ Hz, 3H); ^{13}C NMR (100 MHz, CDCl_3 , two rotamers) δ 170.9, 169.9, 169.8, 169.3, 145.8, 145.7, 140.7, 140.1, 130.1, 130.0, 129.9, 129.7, 129.1, 99.8, 99.5, 81.4, 81.3, 45.0, 36.4, 36.3, 28.1, 27.9, 14.6; ESI-MS m/z 412.0 ($\text{M} + \text{Na}$) $^+$; HRMS calcd for $\text{C}_{15}\text{H}_{20}\text{INNaO}_3^+$ ($\text{M} + \text{Na}$) $^+$ 412.0380, found 412.0379.

tert-Butyl 3-(allyl(2-iodophenyl)amino)-2-methyl-3-oxopropanoate (1e)



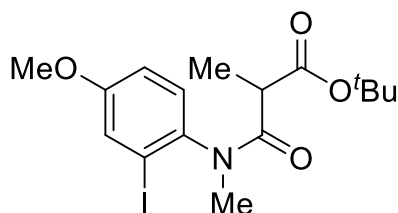
^1H NMR (400 MHz, CDCl_3 , two rotamers) δ 7.91-7.98 (m, 1H), 7.28-7.35 (m, 2H), 7.05-7.11 (m, 1H), 5.87-5.91 (m, 1H), 5.07-5.12 (m, 2H), 4.86-4.92 (m, 1H), 3.46-3.57 (m, 1H), 2.93-3.00 (m, 1H), 1.43 & 1.39 (2s, 9H), 1.34 & 1.19 (2d, $J = 6.8$ Hz, 3H); ^{13}C NMR (100 MHz, CDCl_3 , two rotamers) δ 170.6, 169.7, 169.5, 169.3, 143.9, 143.6, 140.6, 140.1, 132.3, 132.2, 131.3, 130.8, 130.1, 129.2, 129.1, 118.9, 118.5, 100.9, 100.5, 81.5, 81.3, 51.5, 51.3, 45.3, 45.1, 28.1, 27.9, 14.6, 14.4; ESI-MS m/z 438.0 ($\text{M} + \text{Na}$) $^+$; HRMS calcd for $\text{C}_{17}\text{H}_{22}\text{INNaO}_3^+$ ($\text{M} + \text{Na}$) $^+$ 438.0537, found 438.0538.

tert-Butyl 3-(benzyl(2-iodophenyl)amino)-2-methyl-3-oxopropanoate (1f)



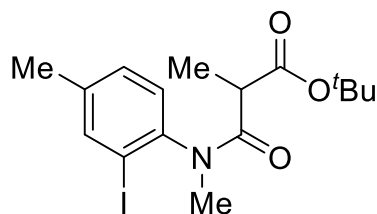
^1H NMR (400 MHz, CDCl_3 , two rotamers) δ 7.93-8.00 (m, 1H), 7.24-7.26 (m, 5H), 7.16-7.20 (m, 1H), 7.03-7.06 (m, 1H), 6.83-6.85 & 6.64-6.67 (m, 1H), 5.71-5.80 (m, 1H), 3.82-3.91 (m, 1H), 2.97-3.03 (m, 1H), 1.19-1.48 (m, 12H); ^{13}C NMR (100 MHz, CDCl_3 , two rotamers) δ 169.9, 169.6, 169.3, 168.5, 143.6, 143.3, 140.7, 140.1, 136.9, 131.5, 131.0, 130.1, 129.4, 129.3, 128.9, 128.5, 128.3, 127.6, 127.5, 100.5, 100.3, 81.5, 81.4, 51.8, 51.6, 45.3, 45.0, 28.2, 27.9, 14.5, 14.4; ESI-MS m/z 488.1 ($\text{M} + \text{Na}$) $^+$; HRMS calcd for $\text{C}_{21}\text{H}_{24}\text{INNaO}_3^+$ ($\text{M} + \text{Na}$) $^+$ 488.0693, found 488.0692.

tert-Butyl 3-((2-iodo-4-methoxyphenyl)(methyl)amino)-2-methyl-3-oxopropanoate (1g)



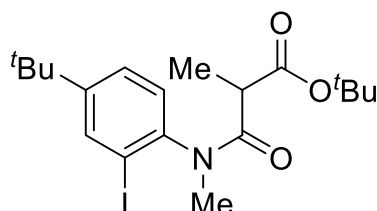
^1H NMR (400 MHz, CDCl_3 , two rotamers) δ 7.45 & 7.41 (2d, $J = 2.4$ Hz, 1H), 7.25 & 7.13 (2d, $J = 8.0$ Hz, 1H), 6.89-6.93 (m, 1H), 3.81 (s, 3H), 3.17 (s, 3H), 3.00-3.09 (m, 1H), 1.44 & 1.40 (2s, 9H), 1.34 & 1.21 (2d, $J = 6.8$ Hz, 3H); ^{13}C NMR (100 MHz, CDCl_3 , two rotamers) δ 171.4, 170.3, 169.9, 169.5, 159.5, 138.6, 129.8, 129.1, 125.2, 124.6, 115.4, 115.3, 100.0, 99.7, 81.3, 81.2, 55.8, 44.9, 44.8, 36.6, 36.5, 28.2, 28.0, 14.5; ESI-MS m/z 442.0 ($\text{M} + \text{Na}$) $^+$; HRMS calcd for $\text{C}_{16}\text{H}_{22}\text{INNaO}_4^+$ ($\text{M} + \text{Na}$) $^+$ 442.0486, found 442.0484.

tert-Butyl 3-((2-iodo-4-methylphenyl)(methyl)amino)-2-methyl-3-oxopropanoate (1h)



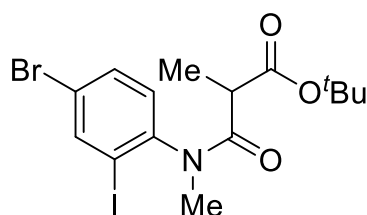
^1H NMR (400 MHz, CDCl_3 , two rotamers) δ 7.79 & 7.75 (2d, $J = 1.2$ Hz, 1H), 7.10-7.26 (m, 2H), 3.18 & 3.17 (2s, 3H), 3.01-3.07 (m, 1H), 2.35 (s, 3H), 1.49 & 1.40 (2s, 9H), 1.35 & 1.21 (2d, $J = 6.8$ Hz, 3H); ^{13}C NMR (100 MHz, CDCl_3 , two rotamers) δ 171.1, 170.1, 169.8, 169.4, 143.2, 143.1, 141.0, 140.4, 130.4, 129.2, 128.5, 99.5, 99.2, 81.3, 81.2, 45.0, 44.8, 36.4, 36.3, 28.2, 28.0, 20.6, 20.5, 14.6, 14.5; ESI-MS m/z 426.0 ($\text{M} + \text{Na}$) $^+$; HRMS calcd for $\text{C}_{16}\text{H}_{22}\text{INNaO}_3^+$ ($\text{M} + \text{Na}$) $^+$ 426.0537, found 426.0537.

tert-Butyl 3-((4-(tert-butyl)-2-iodophenyl)(methyl)amino)-2-methyl-3-oxopropanoate (1i)



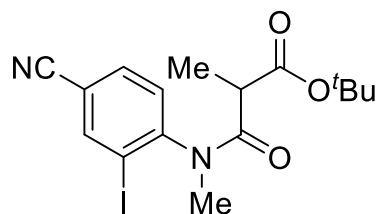
^1H NMR (400 MHz, CDCl_3 , two rotamers) δ 7.93 & 7.89 (2d, $J = 2.0$ Hz, 1H), 7.38-7.42 (m, 1H), 7.28 & 7.15 (2d, $J = 8.0$ Hz, 1H), 3.19 & 3.18 (2s, 3H), 3.01-3.07 (m, 1H), 1.46 & 1.40 (2s, 9H), 1.37 & 1.23 (2d, $J = 7.2$ Hz, 3H), 1.30 (s, 9H); ^{13}C NMR (100 MHz, CDCl_3 , two rotamers) δ 170.0, 169.5, 153.7, 153.6, 143.1, 143.0, 137.7, 137.0, 129.1, 126.9, 99.7, 99.3, 81.3, 81.0, 45.0, 44.9, 36.4, 36.3, 34.7, 31.2, 28.2, 28.0, 14.6, 14.5; ESI-MS m/z 468.1 ($\text{M} + \text{Na}$) $^+$; HRMS calcd for $\text{C}_{19}\text{H}_{28}\text{INNaO}_3^+$ ($\text{M} + \text{Na}$) $^+$ 468.1006, found 468.1008.

tert-Butyl 3-((4-bromo-2-iodophenyl)(methyl)amino)-2-methyl-3-oxopropanoate (1j)



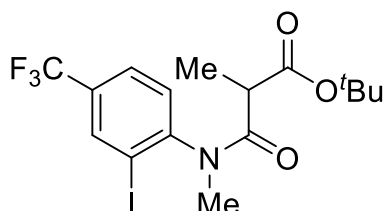
^1H NMR (400 MHz, CDCl_3 , two rotamers) δ 8.10 & 8.06 (2d, $J = 2.0$ Hz, 1H), 7.51-7.55 (m, 1H), 7.25 & 7.11 (2d, $J = 8.4$ Hz, 1H), 3.17 (s, 3H), 2.96-3.02 (m, 1H), 1.44 & 1.40 (2s, 9H), 1.35 & 1.21 (2d, $J = 7.2$ Hz, 3H), 1.30 (s, 9H); ^{13}C NMR (100 MHz, CDCl_3 , two rotamers) δ 170.0, 169.7, 169.5, 169.1, 145.0, 144.9, 142.7, 142.1, 132.9, 130.8, 130.0, 122.9, 122.8, 100.7, 100.4, 81.6, 81.5, 45.1, 45.0, 36.3, 36.2, 28.1, 27.9, 14.6, 14.5; ESI-MS m/z 490.0 ($\text{M} + \text{Na}$) $^+$; HRMS calcd for $\text{C}_{15}\text{H}_{19}\text{BrINNaO}_3^+$ ($\text{M} + \text{Na}$) $^+$ 489.9485, found 489.9489.

tert-Butyl 3-((4-cyano-2-iodophenyl)(methyl)amino)-2-methyl-3-oxopropanoate (1k)



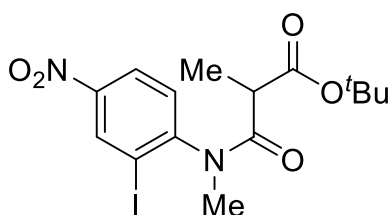
^1H NMR (400 MHz, CDCl_3 , two rotamers) δ 8.26 & 8.22 (2d, $J = 2.0$ Hz, 1H), 7.67-7.75 (m, 1H), 7.51 & 7.36 (2d, $J = 8.0$ Hz, 1H), 3.20 (s, 3H), 2.89-2.95 (m, 1H), 0.88-1.50 (m, 12H); ^{13}C NMR (100 MHz, CDCl_3 , two rotamers) δ 170.3, 170.1, 169.3, 169.2, 150.0, 149.9, 144.0, 143.3, 133.3, 130.6, 129.8, 116.1, 114.1, 100.5, 100.1, 81.9, 81.7, 45.4, 45.3, 36.3, 36.2, 28.1, 27.9, 14.6, 14.5; ESI-MS m/z 437.0 ($\text{M} + \text{Na}$) $^+$; HRMS calcd for $\text{C}_{16}\text{H}_{19}\text{IN}_2\text{NaO}_3^+$ ($\text{M} + \text{Na}$) $^+$ 437.0333, found 437.0334.

tert-Butyl 3-((2-iodo-4-(trifluoromethyl)phenyl)(methyl)amino)-2-methyl-3-oxopropanoate (1l)



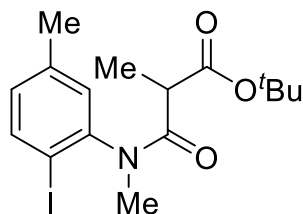
^1H NMR (400 MHz, CDCl_3 , two rotamers) δ 8.20 & 8.16 (2s, 1H), 7.62-7.70 (m, 1H), 7.36-7.62 (m, 1H), 3.19 (s, 3H), 2.91-3.00 (m, 1H), 1.42 & 1.38 (2s, 9H), 1.35 & 1.21 (2d, $J = 6.8$ Hz, 3H); ^{13}C NMR (100 MHz, CDCl_3 , two rotamers) δ 170.4, 169.4, 169.3, 168.8, 149.1, 149.0, 137.7, 137.1 (q, $J = 3.0$ Hz), 132.0 (q, $J = 33.0$ Hz), 130.3, 129.5, 126.8 (q, $J = 3.0$ Hz), 122.4 (q, $J = 271.0$ Hz), 100.1, 99.7, 81.7, 81.5, 45.2, 36.2, 28.1, 27.9, 14.6, 14.5; ESI-MS m/z 480.0 ($\text{M} + \text{Na}$) $^+$; HRMS calcd for $\text{C}_{16}\text{H}_{19}\text{F}_3\text{INNaO}_3^+$ ($\text{M} + \text{Na}$) $^+$ 480.0254, found 480.0254.

tert-Butyl 3-((2-iodo-4-nitrophenyl)(methyl)amino)-2-methyl-3-oxopropanoate (1m)



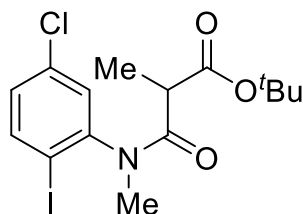
^1H NMR (400 MHz, CDCl_3 , two rotamers) δ 8.80 & 8.76 (2d, $J = 2.4$ Hz, 1H), 8.25-8.30 (m, 1H), 7.57 & 7.43 (2d, $J = 8.4$ Hz, 1H), 3.22 (s, 3H), 2.89-2.95 (m, 1H), 1.44 & 1.40 (2s, 9H), 1.36 & 1.23 (2d, $J = 6.8$ Hz, 3H); ^{13}C NMR (100 MHz, CDCl_3 , two rotamers) δ 170.1, 169.2, 169.1, 168.6, 151.5, 151.4, 147.3, 135.7, 135.1, 130.4, 129.6, 124.8, 124.7, 100.1, 100.0, 82.0, 81.8, 45.5, 45.3, 36.3, 36.2, 28.1, 27.9, 14.6, 14.5; ESI-MS m/z 457.0 ($\text{M} + \text{Na}$) $^+$; HRMS calcd for $\text{C}_{15}\text{H}_{19}\text{IN}_2\text{NaO}_5^+$ ($\text{M} + \text{Na}$) $^+$ 457.0231, found 457.0230.

tert-Butyl 3-((2-iodo-5-methylphenyl)(methyl)amino)-2-methyl-3-oxopropanoate (1n)



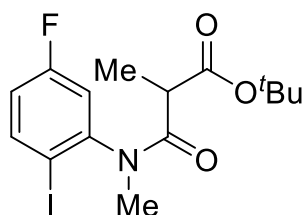
^1H NMR (400 MHz, CDCl_3 , two rotamers) δ 7.81 & 7.77 (2d, J = 8.0 Hz, 1H), 7.20 & 7.05 (2d, J = 1.6 Hz, 1H), 6.89-6.92 (m, 1H), 3.18 & 3.17 (2s, 3H), 3.01-3.07 (m, 1H), 2.33 & 2.31 (2s, 3H), 1.45 & 1.41 (2s, 9H), 1.36 & 1.22 (2d, J = 6.8 Hz, 3H); ^{13}C NMR (100 MHz, CDCl_3 , two rotamers) δ 170.9, 170.0, 169.4, 145.5, 145.4, 140.2, 140.1, 139.7, 131.1, 131.0, 130.5, 129.8, 95.4, 95.0, 81.3, 81.2, 45.0, 44.9, 36.4, 36.3, 28.1, 28.0, 20.9, 20.8, 14.6, 14.5; ESI-MS m/z 426.0 ($\text{M} + \text{Na}$) $^+$; HRMS calcd for $\text{C}_{16}\text{H}_{22}\text{INNaO}_3^+$ ($\text{M} + \text{Na}$) $^+$ 426.0537, found 426.0538.

tert-Butyl 3-((5-chloro-2-iodophenyl)(methylamino)-2-methyl-3-oxopropanoate (1o)



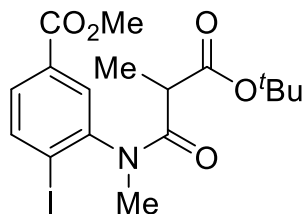
^1H NMR (400 MHz, CDCl_3 , two rotamers) δ 7.88 & 7.84 (2d, J = 8.4 Hz, 1H), 7.40 & 7.25 (2d, J = 2.4 Hz, 1H), 7.10 (dd, J = 8.4 Hz, 2.4 Hz, 1H), 3.18 (s, 3H), 2.96-3.01 (m, 1H), 1.44 & 1.43 (2s, 9H), 1.36 & 1.24 (2d, J = 6.8 Hz, 3H); ^{13}C NMR (100 MHz, CDCl_3 , two rotamers) δ 170.6, 169.6, 169.5, 169.0, 146.9, 146.8, 141.4, 140.7, 135.5, 135.4, 130.4, 130.3, 130.2, 129.4, 97.2, 96.9, 81.8, 81.2, 45.1, 45.0, 36.3, 36.2, 28.1, 28.0, 14.6, 14.5; ESI-MS m/z 446.0 ($\text{M} + \text{Na}$) $^+$; HRMS calcd for $\text{C}_{15}\text{H}_{19}\text{ClINNaO}_3^+$ ($\text{M} + \text{Na}$) $^+$ 445.9990, found 445.9992.

tert-Butyl 3-((5-fluoro-2-iodophenyl)(methylamino)-2-methyl-3-oxopropanoate (1p)



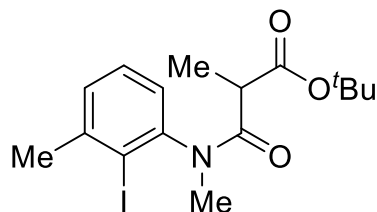
^1H NMR (400 MHz, CDCl_3 , two rotamers) δ 7.85-7.93 (m, 1H), 7.14-7.17 & 7.00-7.03 (m, 1H), 6.87-6.90 (m, 1H), 3.19 (s, 3H), 2.96-3.01 (m, 1H), 1.44 & 1.41 (2s, 9H), 1.36 & 1.24 (2d, J = 7.2 Hz, 3H); ^{13}C NMR (100 MHz, CDCl_3 , two rotamers) δ 170.6, 169.6, 169.5, 169.0, 163.2 (d, J = 250 Hz), 147.1, 147.0, 141.4 (d, J = 9.0 Hz), 140.8 (d, J = 8.0 Hz), 117.9, 117.8, 117.7, 117.6, 116.9, 116.7, 93.1, 81.8, 81.5, 45.1, 36.3, 36.1, 28.1, 27.9, 14.6, 14.5; ESI-MS m/z 430.0 ($\text{M} + \text{Na}$) $^+$; HRMS calcd for $\text{C}_{15}\text{H}_{19}\text{FINNaO}_3^+$ ($\text{M} + \text{Na}$) $^+$ 430.0286, found 430.0288.

Methyl 3-(3-(tert-butoxy)-N,2-dimethyl-3-oxopropanamido)-4-iodobenzoate (1q)



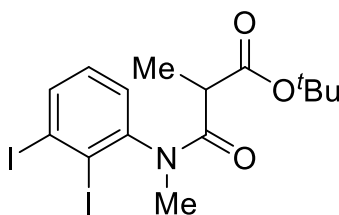
^1H NMR (400 MHz, CDCl_3 , two rotamers) δ 8.00-8.05 (m, 2H), 7.85-7.88 & 7.69-7.73 (m, 1H), 3.88-3.91 (m, 3H), 3.20 & 3.19 (2s, 3H), 2.92-2.98 (m, 1H), 1.42 & 1.40 (2s, 9H), 1.19-1.39 (m, 3H); ^{13}C NMR (100 MHz, CDCl_3 , two rotamers) δ 170.6, 169.7, 169.4, 169.0, 165.4, 165.3, 146.2, 146.1, 141.0, 140.4, 132.2, 132.1, 130.6, 130.5, 130.4, 129.8, 106.4, 106.0, 81.7, 81.4, 52.6, 52.4, 45.1, 44.9, 36.4, 36.3, 28.1, 27.8, 14.5, 14.4; ESI-MS m/z 470.0 ($\text{M} + \text{Na}$) $^+$; HRMS calcd for $\text{C}_{17}\text{H}_{22}\text{INNaO}_5^+$ ($\text{M} + \text{Na}$) $^+$ 470.0435, found 470.0436.

tert-Butyl 3-((2-iodo-3-methylphenyl)(methyl)amino)-2-methyl-3-oxopropanoate (1r)



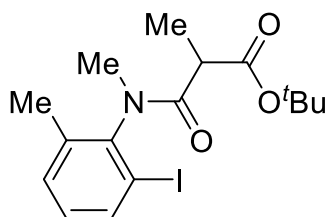
^1H NMR (400 MHz, CDCl_3 , two rotamers) δ 7.20-7.28 (m, 2H), 7.16-7.19 & 7.03-7.05 (m, 1H), 3.19 & 3.18 (2s, 3H), 3.00-3.04 (m, 1H), 2.54 & 2.52 (2s, 3H), 1.50 & 1.44 (2s, 9H), 1.35 & 1.21 (2d, $J = 6.8$ Hz, 3H); ^{13}C NMR (100 MHz, CDCl_3 , two rotamers) δ 169.9, 169.8, 169.4, 146.2, 146.1, 144.9, 144.5, 129.5, 129.0, 126.8, 126.1, 106.9, 106.7, 81.9, 81.2, 45.1, 45.0, 36.3, 36.2, 29.5, 29.4, 28.1, 27.9, 14.6; ESI-MS m/z 426.0 ($\text{M} + \text{Na}$) $^+$; HRMS calcd for $\text{C}_{16}\text{H}_{22}\text{INNaO}_3^+$ ($\text{M} + \text{Na}$) $^+$ 426.0537, found 426.0537.

tert-Butyl 3-((2,3-diiodophenyl)(methyl)amino)-2-methyl-3-oxopropanoate (1s)



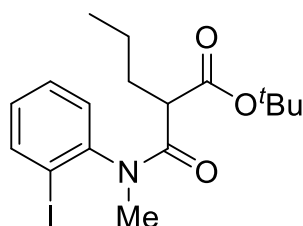
^1H NMR (400 MHz, CDCl_3 , two rotamers) δ 7.85-7.89 (m, 1H), 7.32-7.34 & 7.11-7.21 (m, 2H), 3.17 & 3.16 (2s, 3H), 2.98-3.03 (m, 1H), 1.50 & 1.45 (2s, 9H), 1.36 & 1.21 (2d, $J = 6.8$ Hz, 3H); ^{13}C NMR (100 MHz, CDCl_3 , two rotamers) δ 170.5, 169.6, 169.4, 169.1, 147.1, 139.6, 139.5, 130.7, 128.7, 128.0, 114.8, 114.6, 110.2, 109.7, 81.5, 81.4, 45.2, 36.3, 36.2, 28.2, 27.9, 14.6; ESI-MS m/z 538.0 ($\text{M} + \text{Na}$) $^+$; HRMS calcd for $\text{C}_{15}\text{H}_{19}\text{I}_2\text{NNaO}_3^+$ ($\text{M} + \text{Na}$) $^+$ 537.9347, found 537.9348.

tert-Butyl 3-((2-iodo-6-methylphenyl)(methyl)amino)-2-methyl-3-oxopropanoate (1t)



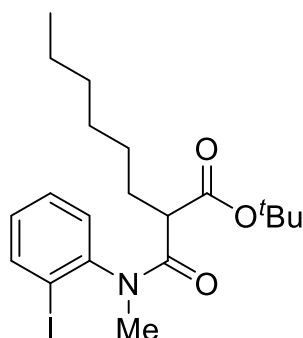
^1H NMR (400 MHz, CDCl_3 , two rotamers) δ 7.75 (d, $J = 8.0$ Hz, 1H), 7.25-7.27 (m, 1H), 6.95-6.99 (m, 1H), 3.16 (s, 3H), 3.01 (q, $J = 6.8$ Hz, 1H), 2.38 (s, 3H), 1.39 (s, 9H), 1.19-1.38 (m, 3H); ^{13}C NMR (100 MHz, CDCl_3 , two rotamers) δ 170.3, 170.2, 169.7, 144.0, 138.9, 137.9, 131.6, 130.0, 100.4, 81.3, 45.8, 45.2, 34.9, 34.8, 28.0, 27.9, 20.1, 19.2, 15.2, 14.4; ESI-MS m/z 426.0 ($\text{M} + \text{Na}$) $^+$; HRMS calcd for $\text{C}_{16}\text{H}_{22}\text{INNaO}_3^+$ ($\text{M} + \text{Na}$) $^+$ 426.0537, found 426.0537.

tert-Butyl 2-((2-iodophenyl)(methyl)carbamoyl)pentanoate (1u)



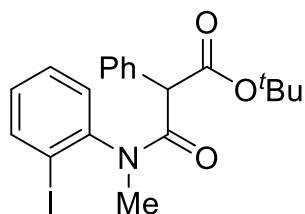
^1H NMR (400 MHz, CDCl_3 , two rotamers) δ 7.91-7.94 (m, 1H), 7.31-7.43 & 7.20-7.23 (m, 2H), 7.05-7.09 (m, 1H), 3.18 (s, 3H), 2.85-2.94 (m, 1H), 1.73-1.90 (m, 2H), 1.49 & 1.43 (2s, 9H), 1.30-1.37 (m, 2H), 0.83 & 0.71 (2t, $J = 7.2$ Hz, 3H); ^{13}C NMR (100 MHz, CDCl_3 , two rotamers) δ 169.5, 168.8, 168.5, 145.6, 145.5, 140.6, 140.2, 130.0, 129.9, 129.7, 129.6, 129.4, 99.7, 99.6, 81.3, 51.1, 50.4, 36.4, 36.3, 32.2, 32.0, 28.1, 27.9, 21.5, 21.0, 14.0, 13.7; ESI-MS m/z 440.1 ($\text{M} + \text{Na}$) $^+$; HRMS calcd for $\text{C}_{17}\text{H}_{24}\text{INNaO}_3^+$ ($\text{M} + \text{Na}$) $^+$ 440.0693, found 440.0692.

tert-Butyl 2-((2-iodophenyl)(methyl)carbamoyl)octanoate (1v)



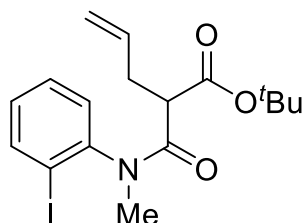
^1H NMR (400 MHz, CDCl_3 , two rotamers) δ 7.88-7.94 (m, 1H), 7.29-7.40 & 7.18-7.23 (m, 2H), 7.03-7.07 (m, 1H), 3.15 (s, 3H), 2.81-2.89 (m, 1H), 1.71-1.90 (m, 2H), 1.47 & 1.40 (2s, 9H), 1.18-1.34 (m, 8H), 0.76-0.81 (m, 3H); ^{13}C NMR (100 MHz, CDCl_3 , two rotamers) δ 169.5, 169.4, 168.8, 168.4, 145.6, 145.5, 140.6, 140.2, 130.0, 129.9, 129.7, 129.6, 129.3, 99.7, 99.6, 81.3, 81.2, 51.3, 50.6, 36.3, 31.5, 31.4, 30.1, 29.9, 29.1, 28.8, 28.2, 28.1, 27.9, 27.7, 22.6, 22.5, 14.1, 14.0; ESI-MS m/z 482.1 ($\text{M} + \text{Na}$) $^+$; HRMS calcd for $\text{C}_{20}\text{H}_{30}\text{INNaO}_3^+$ ($\text{M} + \text{Na}$) $^+$ 482.1163, found 482.1164.

tert-Butyl 3-((2-iodophenyl)(methyl)amino)-3-oxo-2-phenylpropanoate (1w)



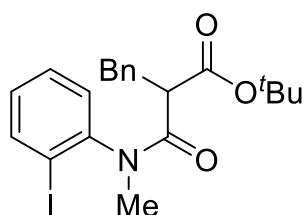
^1H NMR (400 MHz, CDCl_3 , two rotamers) δ 7.91-7.96 (m, 1H), 7.40-7.45 (m, 1H), 7.21-7.24 (m, 4H), 6.97-7.20 & 6.44-6.46 (m, 3H), 4.25 & 4.13 (2s, 1H), 3.18 & 3.15 (2s, 3H), 1.45 & 1.37 (2s, 9H); ^{13}C NMR (100 MHz, CDCl_3 , two rotamers) δ 168.0, 167.9, 167.6, 167.4, 145.6, 144.9, 140.4, 140.1, 133.7, 133.6, 130.5, 130.2, 130.1, 130.0, 129.9, 129.8, 129.4, 129.2, 128.2, 128.1, 127.7, 100.1, 99.5, 82.0, 81.9, 58.0, 57.2, 36.5, 36.4, 28.1, 27.9; ESI-MS m/z 474.0 ($\text{M} + \text{Na}$) $^+$; HRMS calcd for $\text{C}_{20}\text{H}_{22}\text{INNaO}_3^+$ ($\text{M} + \text{Na}$) $^+$ 474.0537, found 474.0535.

tert-Butyl 2-((2-iodophenyl)(methyl)carbamoyl)pent-4-enoate (1x)



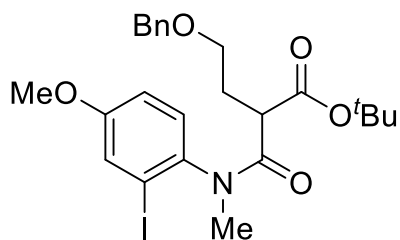
^1H NMR (400 MHz, CDCl_3 , two rotamers) δ 7.92-7.96 (m, 1H), 7.26-7.41 (m, 2H), 7.08-7.13 (m, 1H), 5.62-5.83 (m, 1H), 4.90-5.08 (m, 2H), 3.18-3.22 (m, 3H), 2.93-3.04 (m, 1H), 2.59-2.64 & 2.37-2.42 (m, 2H), 1.38-1.43 (m, 9H); ^{13}C NMR (100 MHz, CDCl_3 , two rotamers) δ 168.9, 168.6, 168.2, 167.8, 145.4, 140.6, 140.2, 135.6, 135.0, 130.1, 130.0, 129.7, 129.6, 129.5, 117.0, 99.6, 81.6, 51.1, 50.4, 36.5, 36.4, 34.1, 28.1, 27.9; ESI-MS m/z 438.1 ($\text{M} + \text{Na}$) $^+$; HRMS calcd for $\text{C}_{17}\text{H}_{22}\text{INNaO}_3^+$ ($\text{M} + \text{Na}$) $^+$ 438.0537, found 438.0538.

tert-Butyl 2-benzyl-3-((2-iodophenyl)(methyl)amino)-3-oxopropanoate (1y)



^1H NMR (400 MHz, CDCl_3 , two rotamers) δ 7.90-7.94 (m, 1H), 6.98-7.40 (m, 8H), 3.09-3.27 (m, 6H), 1.30-1.42 (m, 9H); ^{13}C NMR (100 MHz, CDCl_3 , two rotamers) δ 168.5, 168.4, 168.1, 167.8, 145.4, 140.4, 140.2, 139.1, 138.7, 130.0, 129.9, 129.7, 129.6, 129.5, 129.3, 128.4, 128.2, 126.6, 126.3, 99.6, 99.4, 81.7, 81.6, 53.4, 52.4, 36.5, 36.4, 35.7, 28.1, 27.8; ESI-MS m/z 488.1 ($\text{M} + \text{Na}$) $^+$; HRMS calcd for $\text{C}_{21}\text{H}_{24}\text{INNaO}_3^+$ ($\text{M} + \text{Na}$) $^+$ 488.0693, found 488.0693.

tert-Butyl 4-(benzyloxy)-2-((2-iodo-4-methoxyphenyl)(methyl)carbamoyl)butanoate (3)

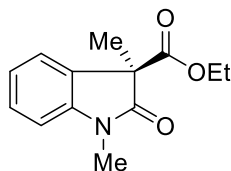


^1H NMR (400 MHz, CDCl_3 , two rotamers) δ 7.08-7.37 (m, 7H), 6.88 & 6.74 (2dd, $J = 8.8$ Hz, 2.8 Hz, 1H), 4.33-4.49 (m, 2H), 3.78 & 3.72 (2s, 3H), 3.48-3.52 & 3.19-3.23 (m, 3H), 3.18 & 3.14 (2s, 3H), 2.09-2.31 (m, 2H), 1.43 & 1.38 (2s, 9H); ^{13}C NMR (100 MHz, CDCl_3 , two rotamers) δ 169.7, 169.3, 169.2, 168.5, 159.5, 159.4, 138.6, 138.3, 129.9, 129.7, 128.3, 128.2, 127.5, 127.4, 127.3, 125.2, 124.7, 115.3, 115.1, 99.9, 99.5, 81.5, 81.4, 72.5, 68.2, 67.9, 55.8, 55.7, 47.5, 47.3, 36.7, 30.1, 29.8, 28.2, 27.9; ESI-MS m/z 562.1 ($\text{M} + \text{Na}$) $^+$; HRMS calcd for $\text{C}_{24}\text{H}_{30}\text{INNaO}_5^+$ ($\text{M} + \text{Na}$) $^+$ 562.1061, found 562.1061.

III. General Procedure for Asymmetric Ullmann-Hurtley Coupling:

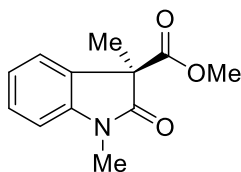
The reaction mixture of substrates (0.2 mmol), CuI (0.02 mmol), (*S, S*)-L2 (0.04 mmol) and *t*-BuOLi (0.3 mmol) in MeCN (2 mL) were stirred at room temperature for 12 hours. Then H_2O (5.0 mL) and ethyl acetate (5.0 mL) were added into the mixture. The organic phase was separated and the aqueous phase was extracted with ethyl acetate (5.0 mL \times 3). The combined organic phase was washed with H_2O and brine, dried over Na_2SO_4 . The solvent was removed under reduced pressure. The residue was purified by flash chromatography (ethyl acetate/petroleum ether = 1/10 to 1/3) to afford the desired products.

Ethyl (*R*)-1,3-dimethyl-2-oxoindoline-3-carboxylate (2a)



30.8 mg, 66% yield, white solid. ^1H NMR (400 MHz, CDCl_3) δ 7.28-7.32 (m, 1H), 7.23-7.25 (m, 1H), 7.03-7.07 (m, 1H), 6.85 (d, $J = 8.0$ Hz, 1H), 4.09-4.13 (m, 2H), 3.24 (s, 3H), 1.64 (s, 3H), 1.14 (t, $J = 6.8$ Hz, 3H); ^{13}C NMR (100 MHz, CDCl_3) δ 175.3, 169.8, 143.6, 130.2, 129.0, 123.0, 122.9, 108.4, 61.9, 55.1, 26.5, 20.2, 13.9; ESI-MS m/z 256.1 ($\text{M} + \text{Na}$) $^+$, HRMS calcd for $\text{C}_{13}\text{H}_{15}\text{NNaO}_3^+$ ($\text{M} + \text{Na}$) $^+$ 256.0944, found 256.0944; HPLC Chiralcel OJ-H (hexane/*i*-PrOH = 99:1, 1.0 ml/min) $\tau_{\text{major}} = 21.5$ min, $\tau_{\text{minor}} = 29.7$ min; $[\alpha]_{\text{D}}^{25} -61.8$ (c 1.0, CHCl_3 , 90% *ee*).

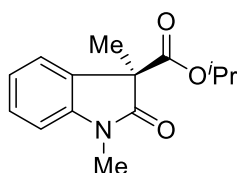
Methyl (*R*)-1,3-dimethyl-2-oxoindoline-3-carboxylate (2b)



19.8 mg, 45% yield, white solid. ^1H NMR (400 MHz, CDCl_3) δ 7.30-7.36 (m, 1H), 7.24-7.26 (m,

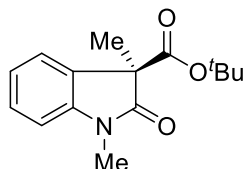
1H), 7.07 (t, $J = 7.6$ Hz, 1H), 6.87 (d, $J = 8.0$ Hz, 1H), 3.65 (s, 3H), 3.25 (s, 3H), 1.67 (s, 3H); ^{13}C NMR (100 MHz, CDCl_3) δ 175.1, 170.3, 143.6, 130.1, 129.0, 123.1, 122.9, 108.4, 54.9, 53.0, 26.6, 20.2; ESI-MS m/z 242.1 ($\text{M} + \text{Na}^+$), HRMS calcd for $\text{C}_{12}\text{H}_{13}\text{NNaO}_3^+$ ($\text{M} + \text{Na}^+$) 242.0788, found 242.0788; HPLC Chiralcel AD-H (hexane/*i*-PrOH = 99:1, 1.0 ml/min) $\tau_{\text{major}} = 25.8$ min, $\tau_{\text{minor}} = 30.1$ min; $[\alpha]_{\text{D}}^{25} -27.7$ (c 1.0, CHCl_3 , 89% *ee*).

Isopropyl (*R*)-1,3-dimethyl-2-oxoindoline-3-carboxylate (2c)



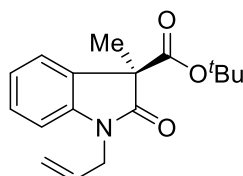
33.6 mg, 68% yield, white solid. ^1H NMR (400 MHz, CDCl_3) δ 7.28-7.32 (m, 1H), 7.23-7.25 (m, 1H), 7.03-7.07 (m, 1H), 6.85 (d, $J = 8.0$ Hz, 1H), 4.94-5.00 (m, 1H), 3.24 (s, 3H), 1.64 (s, 3H), 1.18 (d, $J = 6.0$ Hz, 3H), 1.08 (d, $J = 6.0$ Hz, 3H); ^{13}C NMR (100 MHz, CDCl_3) δ 175.3, 169.2, 143.7, 130.4, 128.9, 122.9, 122.8, 108.4, 69.4, 55.3, 26.5, 21.4, 21.3, 20.2; ESI-MS m/z 270.1 ($\text{M} + \text{Na}^+$), HRMS calcd for $\text{C}_{14}\text{H}_{17}\text{NNaO}_3^+$ ($\text{M} + \text{Na}^+$) 270.1101, found 270.1100; HPLC Chiralpak AS-H (hexane/*i*-PrOH = 99:1, 1.0 ml/min) $\tau_{\text{major}} = 13.6$ min, $\tau_{\text{minor}} = 12.5$ min; $[\alpha]_{\text{D}}^{25} -50.2$ (c 1.0, CHCl_3 , 94% *ee*).

***tert*-Butyl (*R*)-1,3-dimethyl-2-oxoindoline-3-carboxylate (2d)**



45.4 mg, 87% yield, white solid. ^1H NMR (400 MHz, CDCl_3) δ 7.28-7.32 (m, 1H), 7.22-7.25 (m, 1H), 7.05 (t, $J = 7.6$ Hz, 1H), 6.84 (d, $J = 8.0$ Hz, 1H), 3.23 (s, 3H), 1.64 (s, 3H), 1.60 (s, 3H), 1.33 (s, 9H); ^{13}C NMR (100 MHz, CDCl_3) δ 175.5, 168.7, 143.7, 130.7, 128.7, 122.7, 108.3, 82.2, 56.0, 27.7, 26.6, 19.7; ESI-MS m/z 284.1 ($\text{M} + \text{Na}^+$), HRMS calcd for $\text{C}_{15}\text{H}_{19}\text{NNaO}_3^+$ ($\text{M} + \text{Na}^+$) 284.1257, found 284.1256; HPLC Chiralcel OJ-H (hexane/*i*-PrOH = 99:1, 1.0 ml/min) $\tau_{\text{major}} = 11.7$ min, $\tau_{\text{minor}} = 9.7$ min; $[\alpha]_{\text{D}}^{25} -104.9$ (c 1.0, CHCl_3 , 95% *ee*).

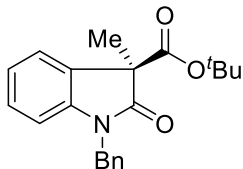
***tert*-Butyl (*R*)-1-allyl-3-methyl-2-oxoindoline-3-carboxylate (2e)**



54.0 mg, 94% yield, white solid. ^1H NMR (400 MHz, CDCl_3) δ 7.21-7.27 (m, 2H), 7.00-7.05 (m, 1H), 6.81 (d, $J = 8.0$ Hz, 1H), 5.78-5.87 (m, 1H), 5.17-5.24 (m, 2H), 4.48-4.53 (m, 1H), 4.14-4.20 (m, 1H), 1.61 (s, 3H), 1.32 (s, 9H); ^{13}C NMR (100 MHz, CDCl_3) δ 175.3, 168.7, 142.8, 131.0, 130.7, 128.6, 122.7, 122.6, 117.2, 109.2, 82.3, 55.9, 42.2, 27.7, 19.6; ESI-MS m/z 310.1 ($\text{M} + \text{Na}^+$), HRMS

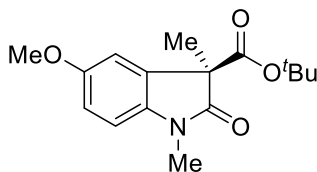
calcd for $C_{17}H_{21}NNaO_3^+$ ($M + Na$)⁺ 310.1414, found 310.1414; HPLC Chiralcel OD-H (hexane/*i*-PrOH = 99:1, 1.0 ml/min) τ_{major} = 8.0 min, τ_{minor} = 10.7 min; $[\alpha]_D^{25}$ -36.8 (*c* 1.0, $CHCl_3$, 95% *ee*).

***tert*-Butyl (*R*)-1-benzyl-3-methyl-2-oxindoline-3-carboxylate (2f)**



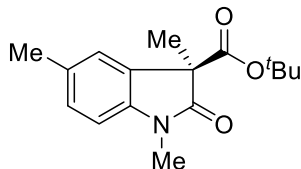
64.7 mg, 96% yield, white solid. 1H NMR (400 MHz, $CDCl_3$) δ 7.22-7.35 (m, 6H), 7.16-7.18 (m, 1H), 6.99-7.02 (m, 1H), 6.69 (d, *J* = 8.0 Hz, 1H), 5.22 (d, *J* = 16.0 Hz, 1H), 4.67 (d, *J* = 16.0 Hz), 1.67 (s, 3H), 1.36 (s, 9H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 175.7, 168.7, 142.7, 135.7, 130.7, 128.7, 127.6, 127.1, 122.8, 122.6, 109.4, 82.4, 55.9, 43.7, 27.8, 19.9; ESI-MS *m/z* 360.1 ($M + Na^+$), HRMS calcd for $C_{21}H_{23}NNaO_3^+$ ($M + Na$)⁺ 360.1570, found 360.1571; HPLC Chiralcel OD-H (hexane/*i*-PrOH = 99:1, 1.0 ml/min) τ_{major} = 13.1 min, τ_{minor} = 17.6 min; $[\alpha]_D^{25}$ -32.5 (*c* 1.0, $CHCl_3$, 94% *ee*).

***tert*-Butyl (*R*)-5-methoxy-1,3-dimethyl-2-oxindoline-3-carboxylate (2g)**



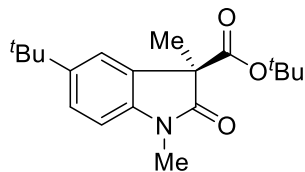
54.1 mg, 93% yield, white solid. 1H NMR (400 MHz, $CDCl_3$) δ 6.85 (d, *J* = 2.4 Hz, 1H), 6.81 (dd, *J* = 8.4 Hz, 2.4 Hz, 1H), 6.73 (d, *J* = 8.4 Hz, 1H), 3.77 (s, 3H), 3.19 (s, 3H), 1.58 (s, 3H), 1.34 (s, 9H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 175.5, 168.7, 143.7, 130.7, 128.7, 122.7, 108.3, 82.2, 56.0, 27.7, 26.6, 19.7; ESI-MS *m/z* 314.1 ($M + Na^+$), HRMS calcd for $C_{16}H_{21}NNaO_4^+$ ($M + Na$)⁺ 314.1363, found 314.1363; HPLC Chiralcel OJ-H (hexane/*i*-PrOH = 99:1, 1.0 ml/min) τ_{major} = 27.5 min, τ_{minor} = 19.1 min; $[\alpha]_D^{25}$ -61.5 (*c* 1.0, $CHCl_3$, 97% *ee*).

***tert*-Butyl (*R*)-1,3,5-trimethyl-2-oxindoline-3-carboxylate (2h)**



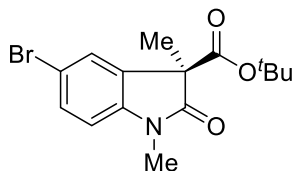
52.8 mg, 96% yield, white solid. 1H NMR (400 MHz, $CDCl_3$) δ 7.08 (d, *J* = 8.0 Hz, 1H), 7.04 (s, 1H), 6.72 (d, *J* = 8.0 Hz, 1H), 3.20 (s, 3H), 2.32 (s, 3H), 1.58 (s, 3H), 1.34 (s, 9H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 175.5, 168.8, 141.3, 132.3, 130.7, 128.9, 123.5, 107.9, 82.1, 56.0, 27.7, 26.4, 21.1, 19.7; ESI-MS *m/z* 298.1 ($M + Na^+$), HRMS calcd for $C_{16}H_{21}NNaO_3^+$ ($M + Na$)⁺ 298.1414, found 298.1413; HPLC Chiralcel OJ-H (hexane/*i*-PrOH = 99:1, 1.0 ml/min) τ_{major} = 9.6 min, τ_{minor} = 8.4 min; $[\alpha]_D^{25}$ -24.8 (*c* 1.0, $CHCl_3$, 96% *ee*).

***tert*-Butyl (*R*)-5-(*tert*-butyl)-1,3-dimethyl-2-oxindoline-3-carboxylate (2i)**



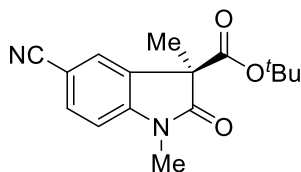
60.2 mg, 95% yield, white solid. $^1\text{H NMR}$ (400 MHz, CDCl_3) δ 7.28-7.32 (m, 2H), 6.76 (d, $J = 8.0$ Hz, 1H), 3.21 (s, 3H), 1.61 (s, 3H), 1.33 (s, 9H), 1.29 (s, 9H); $^{13}\text{C NMR}$ (100 MHz, CDCl_3) δ 175.6, 168.9, 146.0, 141.3, 130.4, 125.1, 120.0, 107.6, 82.0, 56.2, 34.6, 31.5, 27.7, 26.4, 19.7; ESI-MS m/z 340.1 ($\text{M} + \text{Na}^+$), HRMS calcd for $\text{C}_{19}\text{H}_{27}\text{NNaO}_3^+$ ($\text{M} + \text{Na}^+$) 340.1883, found 340.1885; HPLC Chiralcel IC-H (hexane/*i*-PrOH = 95:5, 1.0 ml/min) $\tau_{\text{major}} = 16.2$ min, $\tau_{\text{minor}} = 15.7$ min; $[\alpha]_{\text{D}}^{25} -46.2$ (c 1.0, CHCl_3 , 97% *ee*).

***tert*-Butyl (*R*)-5-bromo-1,3-dimethyl-2-oxindoline-3-carboxylate (2j)**



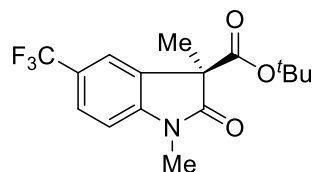
63.0 mg, 93% yield, white solid. $^1\text{H NMR}$ (400 MHz, CDCl_3) δ 7.43 (dd, $J = 8.0$ Hz, 2.0 Hz, 1H), 7.35 (d, $J = 2.0$ Hz, 1H), 6.72 (d, $J = 8.0$ Hz, 1H), 3.21 (s, 3H), 1.59 (s, 3H), 1.36 (s, 9H); $^{13}\text{C NMR}$ (100 MHz, CDCl_3) δ 174.9, 167.8, 142.8, 132.5, 131.6, 126.1, 115.2, 109.7, 82.7, 56.0, 27.7, 26.5, 19.8; ESI-MS m/z 362.0 ($\text{M} + \text{Na}^+$), HRMS calcd for $\text{C}_{15}\text{H}_{18}\text{BrNNaO}_3^+$ ($\text{M} + \text{Na}^+$) 362.0362, found 362.0361; HPLC Chiralcel OD-H (hexane/*i*-PrOH = 99:1, 1.0 ml/min) $\tau_{\text{major}} = 13.7$ min, $\tau_{\text{minor}} = 11.7$ min; $[\alpha]_{\text{D}}^{25} -16.2$ (c 1.0, CHCl_3 , 94% *ee*).

***tert*-Butyl (*R*)-5-cyano-1,3-dimethyl-2-oxindoline-3-carboxylate (2k)**



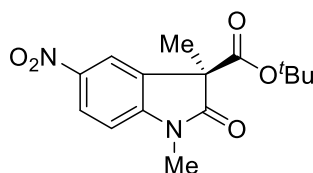
48.6 mg, 85% yield, white solid. $^1\text{H NMR}$ (400 MHz, CDCl_3) δ 7.64 (dd, $J = 8.0$ Hz, 1.6 Hz, 1H), 7.48 (d, $J = 1.6$ Hz, 1H), 6.92 (d, $J = 8.0$ Hz, 1H), 3.25 (s, 3H), 1.61 (s, 3H), 1.35 (s, 9H); $^{13}\text{C NMR}$ (100 MHz, CDCl_3) δ 175.0, 167.3, 147.5, 134.1, 131.6, 126.2, 118.9, 108.7, 105.9, 83.2, 55.6, 27.7, 26.7, 19.7; ESI-MS m/z 309.1 ($\text{M} + \text{Na}^+$), HRMS calcd for $\text{C}_{16}\text{H}_{18}\text{N}_2\text{NaO}_3^+$ ($\text{M} + \text{Na}^+$) 309.1210, found 309.1209; HPLC Chiralcel OJ-H (hexane/*i*-PrOH = 70:30, 1.0 ml/min) $\tau_{\text{major}} = 12.6$ min, $\tau_{\text{minor}} = 7.6$ min; $[\alpha]_{\text{D}}^{25} -30.3$ (c 1.0, CHCl_3 , 93% *ee*).

***tert*-Butyl (*R*)-1,3-dimethyl-2-oxo-5-(trifluoromethyl)indoline-3-carboxylate (2l)**



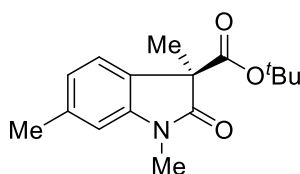
61.9 mg, 94% yield, white solid. $^1\text{H NMR}$ (400 MHz, CDCl_3) δ 7.60 (dd, $J = 8.0$ Hz, 1.2 Hz, 1H), 7.48 (d, $J = 1.2$ Hz, 1H), 6.92 (d, $J = 8.0$ Hz, 1H), 3.26 (s, 3H), 1.64 (s, 3H), 1.35 (s, 9H); $^{13}\text{C NMR}$ (100 MHz, CDCl_3) δ 175.3, 167.7, 146.7, 131.2, 126.5 (q, $J = 4.0$ Hz), 125.0 (q, $J = 32.7$ Hz), 124.3 (q, $J = 270.0$ Hz), 119.9 (q, $J = 3.7$ Hz), 108.0, 82.9, 55.9, 27.6, 26.6, 19.7; ESI-MS m/z 352.1 ($\text{M} + \text{Na}^+$), HRMS calcd for $\text{C}_{16}\text{H}_{18}\text{F}_3\text{NNaO}_3^+$ ($\text{M} + \text{Na}$) $^+$ 352.1131, found 352.1131; HPLC Chiralpak AD-H (hexane/*i*-PrOH = 99:1, 1.0 ml/min) $\tau_{\text{major}} = 8.4$ min, $\tau_{\text{minor}} = 7.0$ min; $[\alpha]_{\text{D}}^{25} -21.3$ (c 1.0, CHCl_3 , 94% *ee*).

***tert*-Butyl (R)-1,3-dimethyl-5-nitro-2-oxindoline-3-carboxylate (2m)**



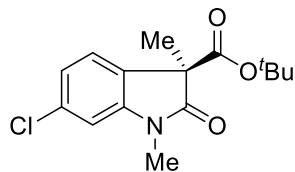
49.0 mg, 80% yield, white solid. $^1\text{H NMR}$ (400 MHz, CDCl_3) δ 8.30 (dd, $J = 8.8$ Hz, 2.4 Hz, 1H), 8.14 (d, $J = 2.4$ Hz, 1H), 6.94 (d, $J = 8.8$ Hz, 1H), 3.30 (s, 3H), 1.66 (s, 3H), 1.37 (s, 9H); $^{13}\text{C NMR}$ (100 MHz, CDCl_3) δ 175.3, 167.1, 149.3, 143.6, 131.3, 126.1, 118.9, 107.8, 83.4, 55.8, 27.7, 26.9, 19.7; ESI-MS m/z 329.1 ($\text{M} + \text{Na}^+$), HRMS calcd for $\text{C}_{15}\text{H}_{18}\text{N}_2\text{NaO}_5^+$ ($\text{M} + \text{Na}$) $^+$ 329.1108, found 329.1108; HPLC Chiralcel OD-H (hexane/*i*-PrOH = 95:5, 1.0 ml/min) $\tau_{\text{major}} = 13.6$ min, $\tau_{\text{minor}} = 12.8$ min; $[\alpha]_{\text{D}}^{25} -7.5$ (c 1.0, CHCl_3 , 89% *ee*).

***tert*-Butyl (R)-1,3,6-trimethyl-2-oxindoline-3-carboxylate (2n)**



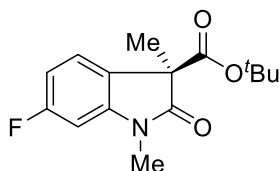
47.9 mg, 87% yield, white solid. $^1\text{H NMR}$ (400 MHz, CDCl_3) δ 7.10 (d, $J = 7.6$ Hz, 1H), 6.84 (dd, $J = 7.6$ Hz, 0.8 Hz, 1H), 6.66 (d, $J = 0.8$ Hz, 1H), 3.20 (s, 3H), 2.37 (s, 3H), 1.57 (s, 3H), 1.33 (s, 9H); $^{13}\text{C NMR}$ (100 MHz, CDCl_3) δ 175.8, 168.9, 143.7, 138.9, 127.8, 123.2, 122.4, 109.2, 82.0, 55.8, 27.7, 26.4, 21.9, 19.7; ESI-MS m/z 298.1 ($\text{M} + \text{Na}^+$), HRMS calcd for $\text{C}_{16}\text{H}_{21}\text{NNaO}_3^+$ ($\text{M} + \text{Na}$) $^+$ 298.1414, found 298.1415; HPLC Chiralcel OD-H (hexane/*i*-PrOH = 99:1, 1.0 ml/min) $\tau_{\text{major}} = 10.1$ min, $\tau_{\text{minor}} = 11.5$ min; $[\alpha]_{\text{D}}^{25} -70.7$ (c 1.0, CHCl_3 , 94% *ee*).

***tert*-Butyl (R)-6-chloro-1,3-dimethyl-2-oxindoline-3-carboxylate (2o)**



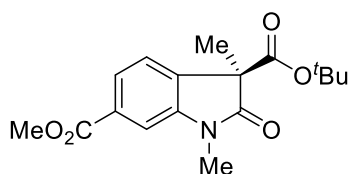
51.3 mg, 87% yield, white solid. $^1\text{H NMR}$ (400 MHz, CDCl_3) δ 7.14 (d, $J = 8.0$ Hz, 1H), 7.02 (dd, $J = 8.0$ Hz, 1.6 Hz, 1H), 6.84 (d, $J = 1.6$ Hz, 1H), 3.21 (s, 3H), 1.58 (s, 3H), 1.34 (s, 9H); $^{13}\text{C NMR}$ (100 MHz, CDCl_3) δ 175.4, 168.1, 144.9, 134.6, 129.0, 123.7, 122.5, 109.0, 82.5, 55.6, 27.7, 26.5, 19.6; ESI-MS m/z 318.1 ($\text{M} + \text{Na}^+$), HRMS calcd for $\text{C}_{15}\text{H}_{18}\text{ClNNaO}_3^+$ ($\text{M} + \text{Na}^+$) $^+$ 318.0867, found 318.0867; HPLC Chiralcel OD-H (hexane/*i*-PrOH = 99:1, 1.0 ml/min) $\tau_{\text{major}} = 10.6$ min, $\tau_{\text{minor}} = 12.3$ min; $[\alpha]_{\text{D}}^{25} -62.4$ (*c* 1.0, CHCl_3 , 94% *ee*).

***tert*-Butyl (R)-6-fluoro-1,3-dimethyl-2-oxoindoline-3-carboxylate (2p)**



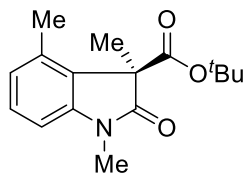
54.1 mg, 97% yield, white solid. $^1\text{H NMR}$ (400 MHz, CDCl_3) δ 7.12-7.16 (m, 1H), 6.69-6.72 (m, 1H), 6.57 (dd, $J = 8.8$ Hz, 2.4 Hz, 1H), 3.19 (s, 3H), 1.56 (s, 3H), 1.32 (s, 9H); $^{13}\text{C NMR}$ (100 MHz, CDCl_3) δ 175.7, 168.4, 163.4 (d, $J = 234.0$ Hz), 145.2 (d, $J = 11.0$ Hz), 125.9 (d, $J = 3.0$ Hz), 123.8 (d, $J = 10.0$ Hz), 108.7 (d, $J = 23.0$ Hz), 97.2 (d, $J = 28.0$ Hz), 82.4, 55.5, 27.7, 26.5, 19.7; ESI-MS m/z 302.1 ($\text{M} + \text{Na}^+$), HRMS calcd for $\text{C}_{15}\text{H}_{18}\text{FNNaO}_3^+$ ($\text{M} + \text{Na}^+$) $^+$ 302.1163, found 302.1160; HPLC Chiralcel OD-H (hexane/*i*-PrOH = 99:1, 1.0 ml/min) $\tau_{\text{major}} = 10.2$ min, $\tau_{\text{minor}} = 11.7$ min; $[\alpha]_{\text{D}}^{25} -61.2$ (*c* 1.0, CHCl_3 , 93% *ee*).

3-(*tert*-Butyl) 6-methyl (R)-1,3-dimethyl-2-oxoindoline-3,6-dicarboxylate (2q)



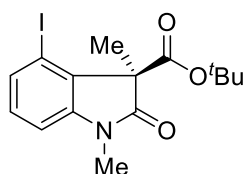
60.0 mg, 94% yield, white solid. $^1\text{H NMR}$ (400 MHz, CDCl_3) δ 7.76 (dd, $J = 7.6$ Hz, 1.2 Hz, 1H), 7.47 (d, $J = 1.2$ Hz, 1H), 7.27 (d, $J = 7.6$ Hz, 1H), 3.91 (s, 3H), 3.25 (s, 3H), 1.59 (s, 3H), 1.30 (s, 9H); $^{13}\text{C NMR}$ (100 MHz, CDCl_3) δ 175.1, 167.9, 166.6, 144.0, 135.6, 130.9, 124.6, 122.5, 108.9, 82.6, 56.1, 52.3, 27.6, 26.6, 19.5; ESI-MS m/z 342.1 ($\text{M} + \text{Na}^+$), HRMS calcd for $\text{C}_{17}\text{H}_{21}\text{NNaO}_5^+$ ($\text{M} + \text{Na}^+$) $^+$ 342.1312, found 342.1313; HPLC Chiralpak AS-H (hexane/*i*-PrOH = 99:1, 1.0 ml/min) $\tau_{\text{major}} = 19.3$ min, $\tau_{\text{minor}} = 16.1$ min; $[\alpha]_{\text{D}}^{25} -80.8$ (*c* 1.0, CHCl_3 , 96% *ee*).

***tert*-Butyl (R)-1,3,4-trimethyl-2-oxoindoline-3-carboxylate (2r)**



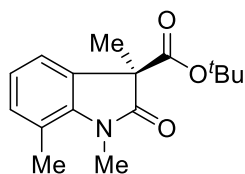
46.2 mg, 84% yield, white solid. ^1H NMR (400 MHz, CDCl_3) δ 7.19 (t, $J = 7.6$ Hz, 1H), 6.83 (d, $J = 7.6$ Hz, 1H), 6.68 (d, $J = 7.6$ Hz, 1H), 3.21 (s, 3H), 2.27 (s, 3H), 1.63 (s, 3H), 1.34 (s, 9H); ^{13}C NMR (100 MHz, CDCl_3) δ 175.6, 168.4, 144.0, 134.1, 128.8, 128.3, 125.0, 105.9, 82.0, 56.3, 27.7, 26.6, 17.9, 17.6; ESI-MS m/z 298.1 ($\text{M} + \text{Na}^+$), HRMS calcd for $\text{C}_{16}\text{H}_{21}\text{NNaO}_3^+$ ($\text{M} + \text{Na}^+$) $^+$ 298.1414, found 298.1414; HPLC Chiralcel IC-H (hexane/*i*-PrOH = 99:1, 1.0 ml/min) $\tau_{\text{major}} = 47.4$ min, $\tau_{\text{minor}} = 45.9$ min; $[\alpha]_{\text{D}}^{25} -20.3$ (c 1.0, CHCl_3 , 94% *ee*).

***tert*-Butyl (R)-4-iodo-1,3-dimethyl-2-oxoindoline-3-carboxylate (2s)**



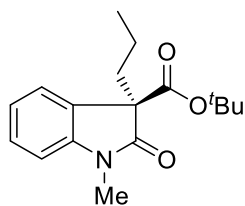
55.7 mg, 72% yield, white solid. ^1H NMR (400 MHz, CDCl_3) δ 7.42 (d, $J = 8.0$ Hz, 1H), 7.00 (t, $J = 8.0$ Hz, 1H), 6.81 (d, $J = 8.0$ Hz, 1H), 3.21 (s, 3H), 1.70 (s, 3H), 1.38 (s, 9H); ^{13}C NMR (100 MHz, CDCl_3) δ 174.5, 166.5, 145.2, 133.9, 133.0, 129.9, 108.0, 90.5, 82.5, 59.0, 27.8, 26.7, 17.6; ESI-MS m/z 410.0 ($\text{M} + \text{Na}^+$), HRMS calcd for $\text{C}_{15}\text{H}_{18}\text{INNaO}_3^+$ ($\text{M} + \text{Na}^+$) $^+$ 410.0224, found 410.0224; HPLC Chiralcel OJ-H (hexane/*i*-PrOH = 99:1, 1.0 ml/min) $\tau_{\text{major}} = 11.1$ min, $\tau_{\text{minor}} = 15.8$ min; $[\alpha]_{\text{D}}^{25} +56.5$ (c 1.0, CHCl_3 , 98% *ee*).

***tert*-Butyl (R)-1,3,7-trimethyl-2-oxoindoline-3-carboxylate (2t)**



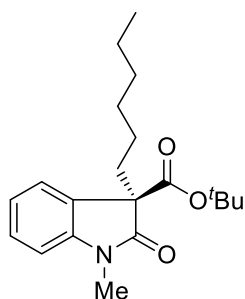
50.1 mg, 91% yield, white solid. ^1H NMR (400 MHz, CDCl_3) δ 7.06 (d, $J = 7.6$ Hz, 1H), 7.02 (d, $J = 7.6$ Hz, 1H), 6.71 (t, $J = 7.6$ Hz, 1H), 3.50 (s, 3H), 2.58 (s, 3H), 1.57 (s, 3H), 1.35 (s, 9H); ^{13}C NMR (100 MHz, CDCl_3) δ 176.3, 168.8, 141.4, 132.5, 131.2, 122.6, 120.6, 119.8, 82.1, 55.5, 29.8, 27.7, 20.1, 19.0; ESI-MS m/z 298.1 ($\text{M} + \text{Na}^+$), HRMS calcd for $\text{C}_{16}\text{H}_{21}\text{NNaO}_3^+$ ($\text{M} + \text{Na}^+$) $^+$ 298.1414, found 298.1412; HPLC Chiralcel OJ-H (hexane/*i*-PrOH = 99:1, 1.0 ml/min) $\tau_{\text{major}} = 11.2$ min, $\tau_{\text{minor}} = 9.4$ min; $[\alpha]_{\text{D}}^{25} -84.9$ (c 1.0, CHCl_3 , 95% *ee*).

***tert*-Butyl (R)-1-methyl-2-oxo-3-propylindoline-3-carboxylate (2u)**



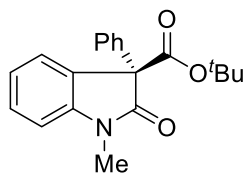
55.5 mg, 96% yield, white solid. $^1\text{H NMR}$ (400 MHz, CDCl_3) δ 7.25-7.28 (m, 1H), 7.22 (dd, $J = 7.6$ Hz, 0.8 Hz, 1H), 7.01-7.05 (m, 1H), 6.81 (d, $J = 7.6$ Hz, 1H), 3.20 (s, 3H), 2.04-2.22 (m, 2H), 1.33 (s, 9H), 0.99-1.05 (m, 1H), 0.90-0.93 (m, 1H), 0.79 (t, $J = 6.8$ Hz, 3H); $^{13}\text{C NMR}$ (100 MHz, CDCl_3) δ 174.6, 168.4, 144.2, 128.8, 128.6, 123.1, 122.6, 108.1, 82.1, 60.6, 36.0, 27.7, 26.3, 17.1, 14.1; ESI-MS m/z 312.1 ($\text{M} + \text{Na}^+$), HRMS calcd for $\text{C}_{17}\text{H}_{23}\text{NNaO}_3^+$ ($\text{M} + \text{Na}$) $^+$ 312.1570, found 312.1569; HPLC Chiralcel OD-H (hexane/*i*-PrOH = 99:1, 1.0 ml/min) $\tau_{\text{major}} = 7.7$ min, $\tau_{\text{minor}} = 11.0$ min; $[\alpha]_{\text{D}}^{25} -31.2$ (c 1.0, CHCl_3 , 96% *ee*).

***tert*-Butyl (*R*)-3-hexyl-1-methyl-2-oxoindoline-3-carboxylate (2v)**



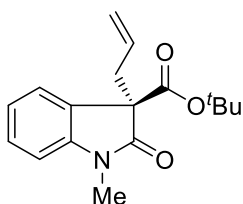
64.2 mg, 97% yield, white solid. $^1\text{H NMR}$ (400 MHz, CDCl_3) δ 7.27-7.31 (m, 1H), 7.23 (d, $J = 7.6$ Hz, 1H), 7.05 (t, $J = 7.6$ Hz, 1H), 6.83 (d, $J = 8.4$ Hz, 1H), 3.22 (s, 3H), 2.07-2.55 (m, 2H), 1.35 (s, 9H), 1.13-1.23 (m, 6H), 0.98-1.02 (m, 1H), 0.86-0.89 (m, 1H), 0.80 (t, $J = 6.8$ Hz, 3H); $^{13}\text{C NMR}$ (100 MHz, CDCl_3) δ 174.6, 168.5, 144.2, 128.8, 128.6, 123.1, 122.6, 108.1, 82.1, 60.5, 33.9, 31.5, 29.3, 27.7, 26.3, 23.6, 22.5, 14.0; ESI-MS m/z 354.0 ($\text{M} + \text{Na}^+$), HRMS calcd for $\text{C}_{20}\text{H}_{29}\text{NNaO}_3^+$ ($\text{M} + \text{Na}$) $^+$ 354.2040, found 354.2040; HPLC Chiralcel OD-H (hexane/*i*-PrOH = 99:1, 1.0 ml/min) $\tau_{\text{major}} = 6.5$ min, $\tau_{\text{minor}} = 10.3$ min; $[\alpha]_{\text{D}}^{25} -65.7$ (c 1.0, CHCl_3 , 97% *ee*).

***tert*-Butyl (*R*)-1-methyl-2-oxo-3-phenylindoline-3-carboxylate (2w)**



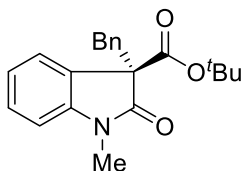
53.6 mg, 83% yield, white solid. $^1\text{H NMR}$ (400 MHz, CDCl_3) δ 7.45 (d, $J = 7.6$ Hz, 1H), 7.37-7.42 (m, 1H), 7.28-7.36 (m, 5H), 7.15 (t, $J = 7.6$ Hz, 1H), 6.91 (d, $J = 8.0$ Hz, 1H), 3.20 (s, 3H), 1.39 (s, 9H); $^{13}\text{C NMR}$ (100 MHz, CDCl_3) δ 173.0, 168.0, 144.5, 136.2, 129.4, 128.4, 127.9, 127.8, 127.4, 125.8, 122.7, 108.5, 82.8, 64.9, 27.7, 26.6; ESI-MS m/z 346.1 ($\text{M} + \text{Na}^+$), HRMS calcd for $\text{C}_{20}\text{H}_{21}\text{NNaO}_3^+$ ($\text{M} + \text{Na}$) $^+$ 346.1414, found : 346.1411; HPLC Chiralcel OJ-H (hexane/*i*-PrOH = 97:3, 1.0 ml/min) $\tau_{\text{major}} = 12.0$ min, $\tau_{\text{minor}} = 16.3$ min; $[\alpha]_{\text{D}}^{25} -177.9$ (c 1.0, CHCl_3 , 87% *ee*).

***tert*-Butyl (*R*)-3-allyl-1-methyl-2-oxoindoline-3-carboxylate (2x)**



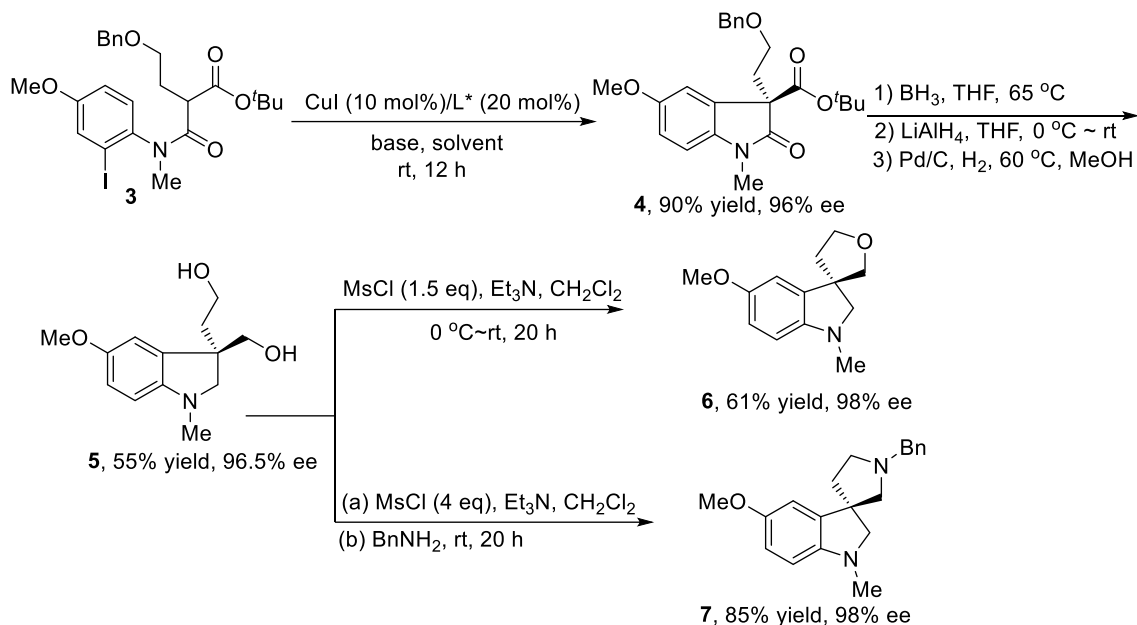
56.3 mg, 98% yield, white solid. $^1\text{H NMR}$ (400 MHz, CDCl_3) δ 7.23-7.31 (m, 2H), 7.03-7.07 (m, 1H), 6.81 (d, $J = 7.6$ Hz, 1H), 5.33-5.43 (m, 1H), 4.99-5.04 (m, 1H), 4.88-4.91 (m, 1H), 3.20 (s, 3H), 2.90-2.92 (m, 2H), 1.35 (s, 9H); $^{13}\text{C NMR}$ (100 MHz, CDCl_3) δ 174.0, 167.9, 144.2, 131.4, 128.8, 128.1, 123.4, 122.6, 119.4, 108.1, 82.4, 60.1, 38.2, 27.7, 26.3; ESI-MS m/z 310.1 ($\text{M} + \text{Na}^+$), HRMS calcd for $\text{C}_{17}\text{H}_{21}\text{NNaO}_3^+$ ($\text{M} + \text{Na}$) $^+$ 310.1414, found 310.1413; HPLC Chiralcel OD-H (hexane/*i*-PrOH = 99:1, 1.0 ml/min) $\tau_{\text{major}} = 8.8$ min, $\tau_{\text{minor}} = 12.6$ min; $[\alpha]_{\text{D}}^{25} -82.2$ (c 1.0, CHCl_3 , 97% *ee*).

***tert*-Butyl (*R*)-3-benzyl-1-methyl-2-oxoindoline-3-carboxylate (2y)**



60.7 mg, 90% yield, white solid. $^1\text{H NMR}$ (400 MHz, CDCl_3) δ 7.31 (dd, $J = 7.2$ Hz, 0.8 Hz, 1H), 7.18-7.21 (m, 1H), 6.97-7.07 (m, 4H), 6.83-6.86 (m, 2H), 6.56 (d, $J = 8.0$ Hz, 1H), 3.52 (d, $J = 13.2$ Hz, 1H), 3.47 (d, $J = 13.2$ Hz, 1H), 2.94 (s, 3H), 1.39 (s, 9H); $^{13}\text{C NMR}$ (100 MHz, CDCl_3) δ 173.8, 168.2, 144.1, 134.8, 129.9, 128.8, 127.9, 127.5, 126.6, 123.6, 122.3, 108.0, 82.5, 61.8, 39.7, 27.8, 26.0; ESI-MS m/z 360.1 ($\text{M} + \text{Na}^+$), HRMS calcd for $\text{C}_{21}\text{H}_{23}\text{NNaO}_3^+$ ($\text{M} + \text{Na}$) $^+$ 360.1570, found 360.1569; HPLC Chiralpak AS-H (hexane/*i*-PrOH = 99:1, 1.0 ml/min) $\tau_{\text{major}} = 10.4$ min, $\tau_{\text{minor}} = 8.4$ min; $[\alpha]_{\text{D}}^{25} -54.2$ (c 1.0, CHCl_3 , 95% *ee*).

IV Synthetic Transformations:



The reaction of compound **3** (4 mmol, 2.16 g) was conducted according to standard procedure, affording compound **4** as a white solid (1.48 g, 90% yield): $^1\text{H NMR}$ (400 MHz, CDCl_3) δ 7.18-7.26 (m, 3H), 7.10-7.12 (m, 2H), 6.80-6.85 (m, 2H), 6.68 (d, $J = 8.4$ Hz, 1H), 4.28 (d, $J = 11.6$ Hz, 1H), 4.16 (d, $J = 11.6$ Hz, 1H), 3.76 (s, 3H), 3.27-3.37 (m, 2H), 3.03 (s, 3H), 2.66-2.71 (m, 1H), 2.41-2.46 (m, 1H), 1.33 (s, 9H); $^{13}\text{C NMR}$ (100 MHz, CDCl_3) δ 174.2, 168.1, 155.8, 138.2, 138.0, 129.2, 128.2, 127.5, 127.4, 113.1, 110.7, 108.5, 82.4, 72.8, 66.2, 59.1, 55.8, 33.0, 27.7, 26.4; ESI-MS m/z 434.1 ($\text{M} + \text{Na}^+$), HRMS calcd for $\text{C}_{24}\text{H}_{29}\text{NNaO}_5^+$ ($\text{M} + \text{Na}^+$) 434.1938, found 434.1939; HPLC Chiralcel OD-H (hexane/*i*-PrOH = 95:5, 1.0 ml/min) $\tau_{\text{major}} = 13.6$ min, $\tau_{\text{minor}} = 16.2$ min; $[\alpha]_{\text{D}}^{25} -98.2$ (c 1.0, CHCl_3 , 96.5% ee).

(R)-2-(3-(hydroxymethyl)-5-methoxy-1-methylindolin-3-yl)ethan-1-ol (5): $\text{BH}_3\text{-Me}_2\text{S}$ (10 mL, 2.0 M in THF) was slowly added into a solution of compound **4** (1.2g, 3.0 mmol) in anhydrous THF (10 mL) at 0°C , and the mixture was stirred at 65°C until the starting materials disappear. MeOH was added to quench the reaction. The solvent was removed under reduced pressure. The residue was dissolved in anhydrous THF (10 mL), and carefully added to the mixture of lithium aluminum hydride (4 eq) in THF (10 mL) at 0°C . The mixture was stirred at 0°C to room temperature for 3 hours before quenched with H_2O . The organic phase was removed in vacuum and the residue was extracted with ethyl acetate (10 mL * 3). The organic phase was combined and washed with brine, dried over Na_2SO_4 , and removed in vacuum.

The residue was dissolved in MeOH (5 mL). Pd/C (10%) was added and the mixture was stirred at 60°C for 2 hours under H_2 . After filtration, the solvent was removed in vacuum and the residue was purified by flash chromatography (DCM / MeOH = 60/1) to obtain the desired product **5** as a colorless oil. (390mg, 55% yield for three steps). $^1\text{H NMR}$ (400 MHz, CDCl_3) δ 6.67-6.70 (m, 2H), 6.46 (d, $J = 8.0$ Hz, 1H), 4.33 (brs, 1H), 3.88 (brs, 1H), 3.72 (s, 3H), 3.61-3.65 (m, 3H), 3.42-3.48 (m, 1H), 3.22 (d, $J = 9.2$ Hz, 1H), 3.11 (d, $J = 9.2$ Hz, 1H), 2.77 (s, 3H), 2.00-2.07 (m, 1H), 1.75-1.81 (m, 1H), 1.33 (s, 9H); $^{13}\text{C NMR}$ (100 MHz, CDCl_3) δ 153.8, 147.0, 135.5, 112.7, 110.5, 109.1,

67.6, 64.5, 59.3, 56.0, 49.2, 39.5, 37.3; ESI-MS m/z 238.1 ($M + H$)⁺, HRMS calcd for C₁₃H₂₀NO₃⁺ ($M + H$)⁺ 238.1438, found 238.1438; HPLC Chiralpak AS-H (hexane/*i*-PrOH = 75:25, 1.0 ml/min) $\tau_{\text{major}} = 7.0$ min, $\tau_{\text{minor}} = 7.7$ min; $[\alpha]_{\text{D}}^{25} -8.2$ (*c* 1.0, CHCl₃, 96% *ee*).

(R)-5'-methoxy-1'-methyl-4,5-dihydro-2H-spiro[furan-3,3'-indoline] (6): To the solution of MsCl (69 mg, 0.6 mmol) in CH₂Cl₂ (4 mL) was added compound **5** (95 mg, 0.4 mmol) and Et₃N (81 mg, 0.8 mmol) at 0 °C. The mixture was stirred at room temperature for 20 h. After completion of the reaction as indicated by TLC analysis, the mixture was concentrated in vacuum and the residue was purified by flash column chromatography (ethyl acetate/petroleum ether = 1:5) to afford the desired product **6** as a white solid (54 mg, 61% yield). ¹H NMR (400 MHz, DMSO-*d*⁶) δ 6.74 (d, *J* = 2.8 Hz, 1H), 6.66 (dd, *J* = 8.4 Hz, 2.8 Hz, 1H), 6.47 (d, *J* = 8.4 Hz, 1H), 3.92-3.97 (m, 1H), 3.81-3.87 (m, 1H), 3.73 (d, *J* = 8.4 Hz, 1H), 3.67 (s, 3H), 3.60 (d, *J* = 8.4 Hz, 1H), 3.18 (d, *J* = 8.8 Hz, 1H), 3.10 (d, *J* = 8.8 Hz, 1H), 2.64 (s, 3H), 2.11-2.20 (m, 1H), 1.99-2.09 (m, 1H); ¹³C NMR (100 MHz, DMSO-*d*⁶) δ 153.3, 147.6, 135.5, 113.0, 109.8, 108.5, 77.4, 68.1, 67.8, 56.0, 51.6, 38.9, 37.1; ESI-MS m/z 220.1 ($M + H$)⁺, HRMS calcd for C₁₃H₁₈NO₂⁺ ($M + H$)⁺ 220.1332, found 220.1332; HPLC Chiralcel OD-H (hexane/*i*-PrOH = 99:1, 1.0 ml/min) $\tau_{\text{major}} = 16.1$ min, $\tau_{\text{minor}} = 17.9$ min; $[\alpha]_{\text{D}}^{25} -5.3$ (*c* 1.0, CHCl₃, 98% *ee*).

(S)-1'-benzyl-5-methoxy-1-methylspiro[indoline-3,3'-pyrrolidine] (7): To the solution of MsCl (183 mg, 1.6 mmol) in CH₂Cl₂ (8 mL) was added compound **5** (95 mg, 0.4 mmol) and triethylamine (162 mg, 0.4 mmol) at 0 °C under Ar. The reaction mixture was stirred at room temperature for 2 h and concentrated in vacuum to give a residue. To the residue was added 2 mL benzylamine and the resulting reaction mixture was stirred at room temperature for another 12 h. After completion of the reaction as indicated by TLC analysis, the mixture was concentrated in vacuum and the residue was purified by flash column chromatography (ethyl acetate/petroleum ether = 1:5) to afford the desired product **7** (105 mg, 85% yield). ¹H NMR (400 MHz, CDCl₃) δ 7.26-7.40 (m, 5H), 6.85 (d, *J* = 2.4 Hz, 1H), 6.69 (dd, *J* = 8.8 Hz, 2.4 Hz, 1H), 6.45 (d, *J* = 8.8 Hz, 1H), 3.79 (s, 3H), 3.74 (d, *J* = 12.8 Hz, 1H), 3.66 (d, *J* = 12.8 Hz, 1H), 3.33 (d, *J* = 8.8 Hz, 1H), 3.12 (d, *J* = 8.8 Hz, 1H), 2.83-2.86 (m, 2H), 2.71-2.75 (m, 4H), 2.62 (d, *J* = 9.2 Hz, 1H), 2.15-2.22 (m, 1H), 2.03-2.10 (m, 1H); ¹³C NMR (100 MHz, CDCl₃) δ 153.4, 147.0, 138.8, 128.8, 128.3, 127.0, 112.3, 109.9, 108.1, 70.7, 65.8, 60.2, 56.1, 54.1, 50.0, 38.4, 37.1; ESI-MS m/z 309.1 ($M + H$)⁺, HRMS calcd for C₂₀H₂₅N₂O⁺ ($M + H$)⁺ 309.1961, found 309.1960; HPLC Chiralcel OD-H (hexane/*i*-PrOH = 90:10, 1.0 ml/min) $\tau_{\text{major}} = 7.9$ min, $\tau_{\text{minor}} = 6.3$ min; $[\alpha]_{\text{D}}^{25} 52.2$ (*c* 1.0, CHCl₃, 98% *ee*).

V. Computational Results

1. Computational methods

All the density functional theory (DFT) computations were performed with Gaussian 09 program package.¹ Calculations were carried out with B3LYP.² The geometry optimization and frequency calculations were conducted with the basis set 6-31G(d)³⁻⁴ for all the atoms except Cu and I atoms, for which the SDD⁵⁻⁶ with effective core potential (ECP) was adopted. Single point energies were calculated with larger basis sets, Def2TZVP⁷. Solvent effect was conducted with self-consistent reaction field (SCRf) method based on SMD⁸ model in acetonitrile. Frequency analysis was performed to obtain thermal corrections at 298.15K and to confirm the transition states with

only one imaginary frequency. Some structures shown in figures were generated with the CYLview⁹.

2. Computational results

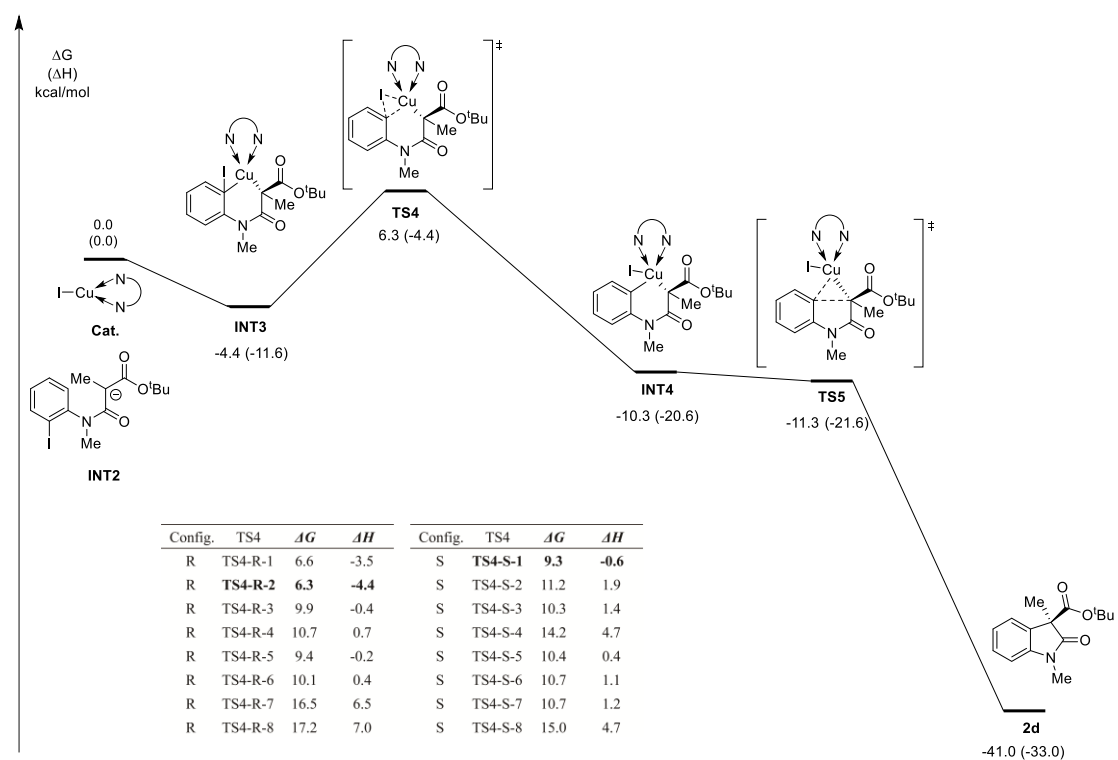


Figure S1. Potential Energy Surface. Free energies and enthalpies (in parenthesis) are given in kcal/mol.

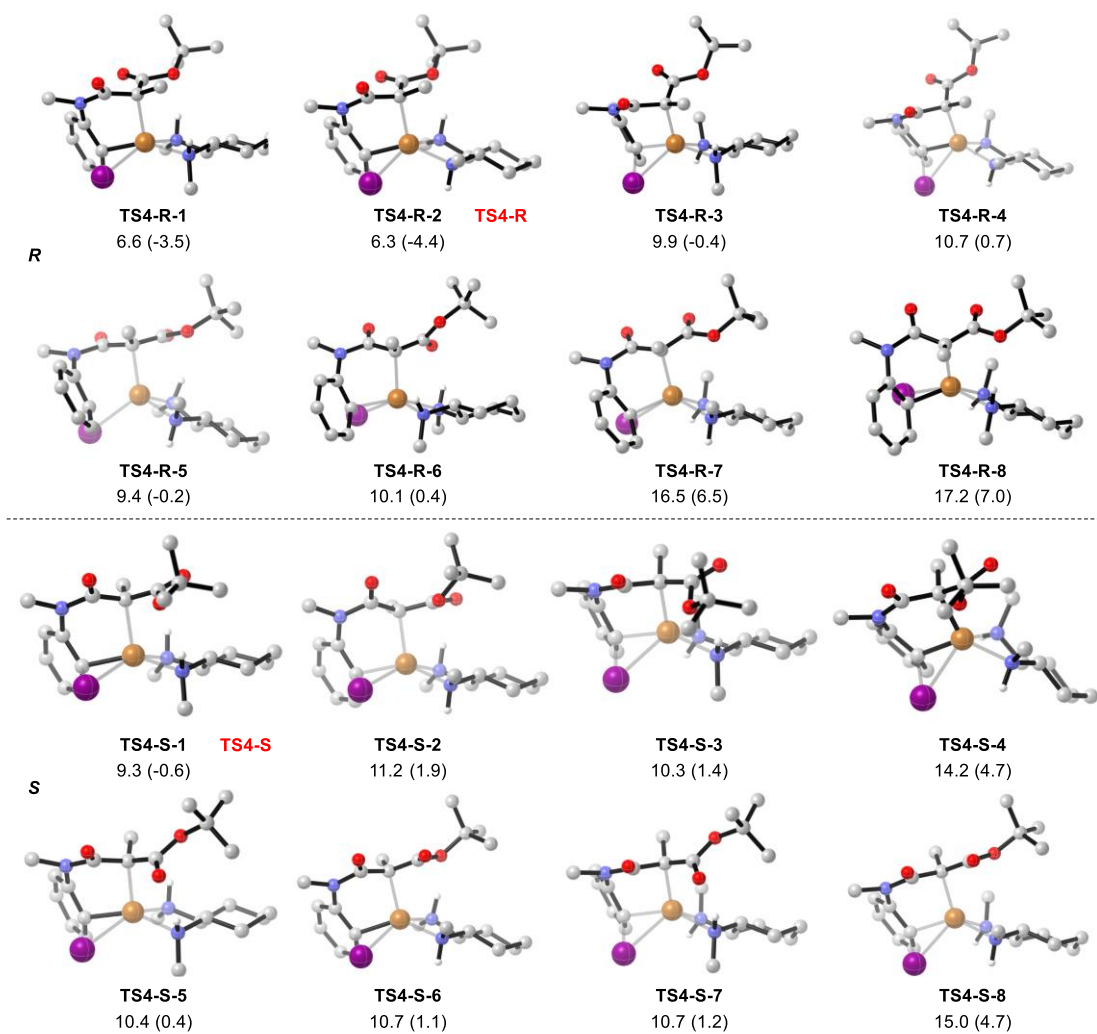


Figure S2. Conformation search of transition states, $\Delta\Delta G, (\Delta\Delta H)$ relative to TS4-R-2. Free energies and enthalpies (in parenthesis) are given in kcal/mol. Some H atoms are hidden for simplicity.

Table S1. Energies of transition states. (units of H and G are Hartree)

	<i>H</i>	<i>G</i>
TS4-R-1	-3227.088742	-3227.188774
TS4-R-2	-3227.090223	-3227.189265
TS4-R-3	-3227.083824	-3227.183598
TS4-R-4	-3227.082098	-3227.182297
TS4-R-5	-3227.083486	-3227.184258
TS4-R-6	-3227.082516	-3227.183171
TS4-R-7	-3227.072833	-3227.173001
TS4-R-8	-3227.072104	-3227.171877
TS4-S-1	-3227.084217	-3227.184520
TS4-S-2	-3227.080122	-3227.181446
TS4-S-3	-3227.081054	-3227.182871
TS4-S-4	-3227.075796	-3227.176611
TS4-S-5	-3227.082511	-3227.182788
TS4-S-6	-3227.081414	-3227.182291
TS4-S-7	-3227.081336	-3227.182295
TS4-S-8	-3227.075692	-3227.175328
Cat	-2363.621847	-2363.682633
INT2	-1161.447990	-1161.522489
INT3	-3227.101760	-3227.206317
INT4	-3227.115979	-3227.215756
TS5	-3227.117620	-3227.217337
2d	-863.514000	-863.582014
I	-297.986618	-298.005826

Cartesian Coordinates

TS4-R-1.log

C	-0.438093	2.003849	-0.585167
C	1.722922	1.387104	-1.666206
C	2.346852	1.286598	0.729796
C	2.397514	1.753273	3.122642
O	2.187548	1.407433	-2.806978
N	2.573720	1.695599	-0.596490
C	1.966224	-0.037560	1.043528
H	2.557300	2.465568	3.927082
C	3.920831	2.145175	-0.959075
C	1.863836	-0.477289	2.370491
H	4.415918	2.546211	-0.072945
H	4.515136	1.315752	-1.362238
H	3.853438	2.918538	-1.726220
H	1.640626	-1.518593	2.573362
C	2.512875	2.175722	1.796586
H	2.717909	3.215042	1.562177
I	2.804126	-1.780756	-0.386750
Cu	0.348235	-0.635530	-0.037133
O	0.010224	2.843697	0.188673
C	2.070815	0.428194	3.413673
H	1.989186	0.088860	4.442644
O	-1.825750	1.827999	-0.717861
C	-2.746391	2.912445	-0.383845
C	-2.848334	3.086210	1.137199
H	-1.878866	3.367946	1.549427
H	-3.584374	3.862182	1.378008
H	-3.179808	2.154359	1.611279
C	-2.319012	4.212939	-1.075602
H	-1.388401	4.596073	-0.655348
H	-2.173516	4.033981	-2.146710
H	-3.102510	4.969814	-0.955692
C	-4.075984	2.421982	-0.966211
H	-4.364935	1.464128	-0.520317
H	-4.872040	3.147619	-0.767350
H	-3.988935	2.282043	-2.048485
C	0.295457	1.052681	-1.405731
C	-0.385737	0.559455	-2.683473
H	0.189189	-0.263678	-3.120767
H	-1.407498	0.226914	-2.489916
H	-0.431358	1.343998	-3.450048
C	-2.451857	-1.446797	0.998167

C	-2.369864	-1.719486	-0.519348
C	-3.439355	-2.715351	-0.997190
C	-4.849084	-2.251163	-0.611477
C	-4.942834	-2.081540	0.909260
C	-3.894392	-1.080046	1.409834
H	-3.350583	-2.844258	-2.084078
H	-2.550824	-0.756082	-1.011264
H	-2.145503	-2.349544	1.545073
H	-5.071553	-1.292763	-1.102456
H	-5.944890	-1.745896	1.202302
H	-4.783504	-3.056184	1.393522
H	-4.121567	-0.087525	0.997018
H	-3.954878	-0.986950	2.499474
H	-3.264032	-3.699631	-0.544125
N	-1.472997	-0.387982	1.318226
N	-0.980141	-2.091445	-0.904721
H	-0.881879	-1.930871	-1.906659
C	-0.589690	-3.485858	-0.620259
H	-1.200968	-4.224985	-1.152444
H	0.454026	-3.614127	-0.909344
H	-0.663158	-3.672027	0.454219
C	-1.316899	-0.088279	2.745280
H	-0.918191	-0.967818	3.260866
H	-0.594315	0.721700	2.849056
H	-2.253846	0.211108	3.235897
H	-1.783613	0.461970	0.841508
H	-5.593714	-2.972232	-0.968880

TS4-R-2.log

C	-0.235949	2.128781	-0.606494
C	1.864372	1.248523	-1.644634
C	2.413932	1.133629	0.768999
C	2.418286	1.681305	3.145911
O	2.351582	1.184593	-2.774432
N	2.725505	1.473513	-0.560522
C	1.866683	-0.121774	1.108433
H	2.627088	2.399630	3.933538
C	4.130261	1.724040	-0.893342
C	1.649977	-0.495093	2.440988
H	4.644169	2.113257	-0.012359
H	4.625640	0.801925	-1.222618
H	4.187415	2.450180	-1.705602
H	1.296706	-1.494551	2.668167

C	2.644178	2.034637	1.814550	H	-1.039261	-0.402175	3.132149
H	2.981177	3.033021	1.556152	H	-0.715054	1.188604	2.430823
I	2.560365	-2.037013	-0.205307	H	-2.374569	0.754995	2.912887
Cu	0.269328	-0.585627	-0.071841	H	-1.917794	0.587291	0.505132
O	0.284604	2.928122	0.164319	H	-5.477681	-3.603985	-0.358558
C	1.915745	0.418811	3.462999	C	-0.775631	-2.686175	-2.106888
H	1.745574	0.131650	4.497027	H	0.302457	-2.721226	-2.277223
O	-1.627411	2.102611	-0.777690	H	-1.201516	-3.678940	-2.298787
C	-2.445184	3.274211	-0.474179	H	-1.210432	-1.972122	-2.807372
C	-2.540933	3.501972	1.039175	H	-0.706678	-2.943950	-0.089137
H	-1.554310	3.706693	1.455121				
H	-3.206152	4.348299	1.247026				
H	-2.959483	2.617984	1.533253				
C	-1.891300	4.505683	-1.199943				
H	-0.923839	4.798067	-0.789184				
H	-1.769682	4.286654	-2.266428				
H	-2.589790	5.343681	-1.095766				
C	-3.812415	2.886543	-1.046189				
H	-4.187392	1.977426	-0.561349				
H	-4.539253	3.689003	-0.879875				
H	-3.736840	2.695982	-2.121477				
C	0.403177	1.090886	-1.405979				
C	-0.329618	0.680936	-2.685404				
H	0.210557	-0.129610	-3.178319				
H	-1.350483	0.355182	-2.471396				
H	-0.388358	1.509123	-3.405204				
C	-2.530268	-1.302447	1.000541				
C	-2.430702	-1.891582	-0.424147				
C	-3.383370	-3.089016	-0.592263				
C	-4.834407	-2.722556	-0.251052				
C	-4.935591	-2.146489	1.165496				
C	-3.993472	-0.947565	1.333734				
H	-3.326931	-3.470340	-1.617229				
H	-2.718935	-1.102052	-1.132487				
H	-2.185047	-2.072071	1.709660				
H	-5.197713	-1.977423	-0.973557				
H	-5.967041	-1.848608	1.388780				
H	-4.667615	-2.924554	1.895334				
H	-4.310201	-0.132884	0.664982				
H	-4.056098	-0.558727	2.355534				
H	-3.043739	-3.901801	0.068841				
N	-1.601541	-0.167511	1.122110				
N	-1.015730	-2.209530	-0.730079				
C	-1.440540	0.374957	2.475695				
				TS4-R-3.log			
				C	-0.563400	2.056992	-0.378417
				C	1.648943	1.627693	-1.440050
				C	2.246447	1.224555	0.931983
				C	2.195382	1.400644	3.366238
				O	2.128333	1.822828	-2.557720
				N	2.466329	1.826832	-0.320594
				C	2.013487	-0.161667	1.066256
				H	2.246004	2.022191	4.255421
				C	3.795818	2.387673	-0.575650
				C	1.961347	-0.769000	2.331854
				H	4.210874	2.769868	0.359229
				H	4.474036	1.629338	-0.988061
				H	3.709790	3.198000	-1.300626
				H	1.876944	-1.847990	2.404388
				C	2.279094	1.990479	2.104967
				H	2.357126	3.066933	1.997408
				I	2.849659	-1.632704	-0.590025
				Cu	0.360569	-0.639048	-0.127647
				O	-0.163506	2.839799	0.477466
				C	2.041072	0.016794	3.482057
				H	1.999220	-0.456873	4.459185
				O	-1.929558	1.876087	-0.600958
				C	-2.882256	2.947686	-0.330872
				C	-3.080188	3.173587	1.174329
				H	-2.133656	3.442230	1.643677
				H	-3.806390	3.979580	1.333501
				H	-3.474463	2.271276	1.655466
				C	-2.425868	4.233280	-1.031820
				H	-1.511740	4.620022	-0.577161
				H	-2.233380	4.032361	-2.091454
				H	-3.207540	4.997932	-0.959662
				C	-4.171556	2.416979	-0.965311

H	-4.456997	1.463936	-0.504027	C	1.422985	-1.065686	1.127569
H	-4.991883	3.129075	-0.823433	H	3.145617	0.455096	4.237748
H	-4.030599	2.251081	-2.038276	C	4.418956	-0.450301	-0.630187
C	0.233966	1.195902	-1.251018	C	0.969492	-1.412481	2.409026
C	-0.393612	0.867584	-2.610729	H	5.004544	-0.464625	0.291244
H	0.199551	0.105574	-3.127965	H	4.392744	-1.460409	-1.058226
H	-1.424657	0.523291	-2.501554	H	4.888946	0.215182	-1.355934
H	-0.409738	1.744623	-3.270385	H	0.174686	-2.143038	2.517896
C	-2.162703	-1.959585	0.991526	C	3.124138	0.325080	2.092312
C	-2.319986	-1.671021	-0.518080	H	3.929616	1.037815	1.950872
C	-3.492848	-2.454471	-1.132117	I	1.171551	-2.931187	-0.409927
C	-4.802296	-2.202882	-0.373328	Cu	-0.106067	-0.508322	-0.169642
C	-4.635711	-2.574023	1.105609	O	1.713155	2.437397	0.572801
C	-3.496281	-1.762614	1.736683	C	1.579570	-0.852925	3.532657
H	-3.593895	-2.179989	-2.190329	H	1.228405	-1.123564	4.524867
H	-2.517174	-0.596542	-0.622468	O	-0.068176	3.068040	-0.695622
H	-1.872889	-3.012762	1.101735	C	-0.051906	4.459572	-0.252580
H	-5.078021	-1.141326	-0.454747	C	-0.261648	4.580264	1.262763
H	-5.566546	-2.395565	1.657161	H	0.552401	4.095778	1.802032
H	-4.420112	-3.649399	1.189669	H	-0.298338	5.639734	1.542911
H	-3.773218	-0.701704	1.709401	H	-1.211673	4.122914	1.559383
H	-3.366505	-2.029485	2.793165	C	1.255143	5.129650	-0.694340
H	-3.275891	-3.530592	-1.102231	H	2.107714	4.710524	-0.157762
N	-1.027222	-1.161758	1.529982	H	1.406186	4.978842	-1.768838
N	-1.021973	-1.887428	-1.210006	H	1.206657	6.207104	-0.499184
H	-1.075515	-1.440032	-2.122475	C	-1.243011	5.060893	-1.004817
C	-0.585441	-3.280111	-1.402631	H	-2.169416	4.546164	-0.725981
H	-1.271536	-3.874067	-2.020389	H	-1.350887	6.124252	-0.764204
H	0.397385	-3.261656	-1.878742	H	-1.104329	4.956298	-2.085580
H	-0.469317	-3.770776	-0.433013	C	0.933578	1.002927	-1.216657
H	-5.617432	-2.778057	-0.828293	C	0.202984	1.191685	-2.549303
H	-0.514745	-1.720997	2.205887	H	0.275350	0.280822	-3.144603
C	-1.363601	0.133454	2.153788	H	-0.849999	1.436860	-2.387967
H	-1.941372	0.030680	3.081943	H	0.644579	2.002042	-3.144533
H	-0.437632	0.668488	2.363926	C	-2.951212	-0.664214	0.983492
H	-1.927459	0.726194	1.439676	C	-3.113645	-0.652046	-0.553716
				C	-4.444705	-1.309494	-0.966745
				C	-5.654126	-0.702807	-0.242750
TS4-R-4.log				C	-5.473636	-0.770404	1.278303
C	0.940866	2.193844	-0.350103	C	-4.177585	-0.060875	1.690250
C	2.280316	0.388119	-1.435334	H	-4.578663	-1.227813	-2.050605
C	2.542059	-0.232278	0.946572	H	-3.099436	0.390381	-0.900453
C	2.662773	0.015010	3.370092	H	-2.878756	-1.722443	1.279148
O	2.731470	0.190104	-2.563882	H	-5.772119	0.347177	-0.547469
N	3.067157	0.029690	-0.332795				

H	-6.329759	-0.315119	1.790102	C	4.200172	1.665059	-0.683581
H	-5.437546	-1.822588	1.596548	H	4.281594	0.786188	-0.033941
H	-4.260916	1.002365	1.430920	H	5.208537	2.075038	-0.815685
H	-4.029335	-0.112030	2.776624	H	3.809541	1.359024	-1.654238
H	-4.383849	-2.384796	-0.735875	C	3.164851	3.965219	-0.931383
N	-1.654047	-0.062409	1.369234	H	2.477143	4.684443	-0.472915
N	-1.924215	-1.304878	-1.144531	H	2.786619	3.699784	-1.919982
H	-6.569522	-1.223107	-0.548559	H	4.143890	4.445585	-1.041531
C	-1.918106	-1.404775	-2.614840	C	3.819110	3.101334	1.343886
H	-0.942478	-1.786775	-2.924402	H	3.165266	3.843621	1.813047
H	-2.701647	-2.067151	-3.004975	H	4.828524	3.520387	1.268169
H	-2.050028	-0.409890	-3.042610	H	3.857729	2.219103	1.993103
H	-1.872140	-2.257346	-0.776350	C	-0.596031	2.635099	1.036917
H	-1.333878	-0.486357	2.235691	H	0.300351	3.171840	1.347992
C	-1.616750	1.400669	1.534212	H	-0.914627	2.018441	1.882653
H	-0.593180	1.679703	1.788457	H	-1.386214	3.374905	0.865698
H	-1.855094	1.882230	0.585201	C	2.091221	-2.016365	-0.407527
H	-2.293750	1.772306	2.315222	C	2.229038	-1.402190	1.006072
				C	3.117673	-2.275760	1.908489
TS4-R-5.log				C	4.496072	-2.537284	1.286921
C	-1.403923	1.757586	-1.250758	C	4.350096	-3.183232	-0.095415
C	-2.968835	1.026855	0.548402	C	3.478680	-2.314028	-1.010698
C	-3.784953	1.169056	2.846405	H	3.228975	-1.803903	2.891188
O	-1.298896	1.816212	-2.472116	H	2.683158	-0.410783	0.890977
N	-2.723604	1.649814	-0.696953	H	1.531705	-2.960045	-0.310022
C	-2.529112	-0.285044	0.831214	H	5.036114	-1.584258	1.189102
H	-4.288924	1.738337	3.621937	H	5.333696	-3.341957	-0.553677
C	-3.851444	1.771574	-1.619442	H	3.889865	-4.176356	0.014397
C	-2.666260	-0.842257	2.108944	H	3.983504	-1.354798	-1.194653
H	-3.587035	2.483624	-2.401359	H	3.356764	-2.796600	-1.986401
H	-4.728926	2.129451	-1.071715	H	2.607047	-3.237961	2.073803
H	-4.096485	0.813269	-2.097034	N	1.272272	-1.127454	-1.247613
H	-2.334327	-1.858590	2.294387	N	0.888340	-1.147892	1.592993
C	-3.614385	1.723940	1.577959	C	0.826216	-1.691804	-2.527665
H	-3.939155	2.739473	1.370965	H	0.212765	-2.578886	-2.341771
I	-2.402874	-1.768559	-0.856160	H	0.213373	-0.937227	-3.026253
Cu	-0.272259	-0.270793	0.041907	H	1.656251	-1.973068	-3.190760
C	-3.277435	-0.102168	3.123343	H	1.783525	-0.267288	-1.467493
H	-3.386615	-0.538030	4.112635	H	5.093691	-3.171758	1.952526
C	-0.307460	1.840087	-0.249637	C	0.903671	-0.211499	2.734367
C	1.055685	1.902954	-0.764564	H	-0.122566	-0.078220	3.084653
O	1.466689	1.658084	-1.899550	H	1.528462	-0.552422	3.572089
O	1.968440	2.183173	0.256842	H	1.270699	0.752127	2.373116
C	3.288881	2.721422	-0.042526	H	0.485811	-2.038185	1.889409

TS4-R-6.log

C	1.049474	2.229670	-0.033337
C	2.675925	0.799751	-1.252211
C	3.537709	-0.480871	-3.143600
O	0.981111	3.089141	0.839646
N	2.302724	2.033093	-0.681150
C	2.524690	-0.419177	-0.544853
H	3.934206	-0.493586	-4.154787
C	3.378478	2.964884	-0.336052
C	2.898288	-1.643099	-1.124017
H	2.955285	3.962446	-0.217108
H	4.123454	2.970122	-1.136306
H	3.865839	2.684656	0.606983
H	2.830211	-2.553080	-0.538597
C	3.177184	0.736035	-2.556662
H	3.254612	1.663589	-3.116975
I	2.718385	-0.369728	1.727649
Cu	0.498252	-0.543844	0.038354
C	3.381165	-1.672815	-2.434946
H	3.665443	-2.622365	-2.880440
C	-0.089784	1.423126	-0.554627
C	-1.329539	1.689405	0.198150
O	-1.491634	1.576724	1.413972
O	-2.364498	2.038904	-0.632439
C	-3.600550	2.629756	-0.124330
C	-4.404115	1.622860	0.704619
H	-4.594263	0.718219	0.116444
H	-5.372666	2.056799	0.979111
H	-3.863704	1.354638	1.612713
C	-3.276255	3.896282	0.676300
H	-2.669519	4.576070	0.068887
H	-2.720879	3.653213	1.583331
H	-4.205058	4.409518	0.950854
C	-4.353234	2.980138	-1.411248
H	-3.764044	3.673191	-2.019941
H	-5.315058	3.448642	-1.175604
H	-4.539613	2.076920	-2.002836
C	-0.253473	1.465383	-2.081706
H	0.619897	1.055980	-2.594517
H	-0.415392	2.484534	-2.460424
H	-1.125795	0.880600	-2.392161
C	-1.972293	-2.149421	0.682770
C	-1.984623	-1.764317	-0.814393
C	-3.041523	-2.566342	-1.594070

C	-4.440057	-2.398691	-0.986618
C	-4.435488	-2.838503	0.483055
C	-3.387729	-2.054793	1.284731
H	-3.030515	-2.248970	-2.645323
H	-2.251516	-0.701177	-0.871958
H	-1.621897	-3.187777	0.764753
H	-4.746399	-1.345225	-1.054217
H	-5.426604	-2.699642	0.931516
H	-4.212974	-3.914525	0.537548
H	-3.672122	-0.996208	1.314087
H	-3.368047	-2.403447	2.323582
H	-2.781624	-3.633329	-1.581081
N	-0.995110	-1.309766	1.412647
N	-0.614282	-1.850300	-1.379978
C	-0.553544	-1.892617	2.688031
H	0.064405	-2.775096	2.493212
H	0.058932	-1.156936	3.212076
H	-1.388654	-2.181682	3.341887
H	-1.412112	-0.391810	1.610446
H	-5.172208	-2.978247	-1.561825
C	-0.106359	-3.197074	-1.674354
H	-0.711850	-3.752702	-2.403712
H	0.907194	-3.097051	-2.066990
H	-0.053474	-3.779683	-0.750183
H	-0.586450	-1.296268	-2.233988

TS4-R-7.log

C	-1.557009	1.930173	-0.943287
C	-2.899755	0.872116	0.852896
C	-3.572356	0.437527	3.156495
O	-1.596690	2.206562	-2.135331
N	-2.797931	1.738072	-0.254239
C	-2.303129	-0.411098	0.824571
H	-4.076842	0.772802	4.058026
C	-4.024055	2.052815	-0.987856
C	-2.332819	-1.249428	1.949206
H	-3.838113	2.917175	-1.625466
H	-4.823187	2.282770	-0.277237
H	-4.342238	1.217313	-1.625208
H	-1.915567	-2.248781	1.883171
C	-3.534917	1.269057	2.034143
H	-3.965299	2.265732	2.072215
I	-2.531900	-1.583686	-1.196007
Cu	-0.329469	-0.303791	0.086109

H	4.213518	1.484460	1.471625	H	3.844868	2.569023	1.842962
C	-0.395915	2.144178	1.669872	H	4.811351	1.077288	1.662091
H	0.573993	2.535679	1.979529	H	4.211305	1.945946	0.223290
H	-0.634116	1.292642	2.318936	H	1.850530	-2.785969	-1.352688
H	-1.147433	2.913296	1.882010	C	3.551153	-1.384165	1.835547
C	2.013838	-2.185177	-0.347265	H	4.009158	-0.985024	2.736224
C	2.481470	-1.167047	0.715132	I	2.047595	0.324462	-2.009211
C	3.647231	-1.708959	1.563116	Cu	0.190243	-0.585986	-0.144945
C	4.804506	-2.227740	0.701251	C	3.018330	-3.263963	0.404702
C	4.300605	-3.319838	-0.250297	H	3.095986	-4.319765	0.160325
C	3.193995	-2.759271	-1.151399	C	0.304372	0.760243	1.547859
H	3.988786	-0.919061	2.244879	C	-2.418605	-2.234415	0.055450
H	2.830637	-0.282642	0.176065	C	-2.728258	-0.803502	-0.434228
H	1.517057	-3.009499	0.183711	C	-4.110555	-0.731238	-1.105170
H	5.232533	-1.401778	0.114368	C	-5.214313	-1.201330	-0.148662
H	5.120211	-3.708085	-0.866675	C	-4.932775	-2.632593	0.326285
H	3.916310	-4.167206	0.336315	C	-3.548114	-2.728411	0.981524
H	3.630300	-1.962246	-1.765888	H	-4.295418	0.299010	-1.434106
H	2.823765	-3.525309	-1.845310	H	-2.752358	-0.159710	0.450531
H	3.294063	-2.536510	2.192568	H	-2.349141	-2.901552	-0.815506
N	0.956360	-1.569303	-1.197518	H	-5.256922	-0.528457	0.719251
N	1.325302	-0.688980	1.508963	H	-5.702776	-2.965221	1.032796
H	5.607627	-2.609852	1.342848	H	-4.977607	-3.316722	-0.534175
C	0.980840	-1.441113	2.719337	H	-3.536223	-2.106500	1.889398
H	1.763503	-1.432845	3.490881	H	-3.349684	-3.758990	1.297963
H	0.067287	-1.014626	3.138987	H	-4.129789	-1.363965	-2.002968
H	0.765183	-2.482317	2.457953	N	-1.091173	-2.261783	0.712112
H	1.495041	0.287298	1.741080	N	-1.612850	-0.278249	-1.264799
H	0.344536	-2.311967	-1.532116	H	-1.648558	0.742278	-1.232013
C	1.400506	-0.797107	-2.380507	C	-1.591822	-0.726532	-2.666847
H	0.517920	-0.335056	-2.827040	H	-2.472111	-0.404559	-3.237943
H	2.058193	0.011985	-2.069042	H	-0.696142	-0.326033	-3.144104
H	1.907335	-1.417495	-3.129893	H	-1.533226	-1.818370	-2.702570
TS4-S-1.log				C	-0.524177	-3.605825	0.876224
C	1.524167	1.575526	1.293061	H	-0.302693	-4.022730	-0.111393
C	2.841370	-0.505651	1.013081	H	0.418256	-3.525386	1.421218
C	3.654566	-2.746815	1.532398	H	-1.186480	-4.303467	1.409330
O	1.566620	2.795562	1.148074	H	-1.189711	-1.839048	1.635646
N	2.749967	0.866825	1.322852	H	-6.191324	-1.145232	-0.643701
C	2.194069	-1.047735	-0.125990	C	-0.969961	1.435624	1.357453
H	4.227695	-3.399283	2.184714	O	-1.984807	1.265180	2.038197
C	3.979907	1.659549	1.257546	O	-0.998618	2.217472	0.219862
C	2.303531	-2.411097	-0.441750	C	-1.782077	3.449894	0.187911
				C	-1.173892	4.198015	-1.000504

H	-1.268591	3.602621	-1.916354	H	2.781466	-0.215367	0.087688
H	-1.684276	5.155270	-1.155280	H	2.053509	-3.163027	0.341363
H	-0.111191	4.378430	-0.815779	H	5.310933	-0.827214	0.036500
C	-1.571167	4.240937	1.483806	H	5.596313	-3.048151	-1.040370
H	-2.053563	3.746232	2.329853	H	4.603056	-3.807035	0.201697
H	-0.498018	4.318090	1.682500	H	3.654041	-1.679298	-1.802175
H	-1.993803	5.246543	1.377854	H	3.252685	-3.398562	-1.847189
C	-3.259503	3.121183	-0.054900	H	3.652967	-2.301719	2.159348
H	-3.653839	2.530174	0.773380	N	1.045373	-1.975843	-1.037769
H	-3.844099	4.043573	-0.153411	N	1.400052	-0.803365	1.518302
H	-3.374621	2.549574	-0.984869	C	0.433213	-3.150433	-1.667973
C	0.363430	-0.090483	2.821419	H	0.109359	-3.846877	-0.887250
H	-0.642630	-0.435327	3.076469	H	-0.455282	-2.835049	-2.217409
H	1.020357	-0.960202	2.719825	H	1.104179	-3.686283	-2.355413
H	0.720480	0.487981	3.685333	H	1.297010	-1.289694	-1.753634
				H	5.939668	-1.972181	1.220384
				C	1.089602	1.334882	-1.232174
TS4-S-2.log				O	2.033294	0.878734	-1.899608
C	-1.368772	1.885180	-0.942131	O	1.320986	2.160053	-0.161836
C	-2.912580	-0.059257	-1.002979	C	2.287735	3.248462	-0.270744
C	-3.881806	-2.031131	-2.061121	C	1.906363	4.153866	0.903013
O	-1.236478	3.059587	-0.606171	H	2.024966	3.623036	1.854448
N	-2.678523	1.330933	-0.976108	H	2.544907	5.044195	0.924046
C	-2.317164	-0.916440	-0.045533	H	0.859915	4.455345	0.805136
H	-4.501075	-2.455106	-2.846281	C	2.081275	3.983738	-1.600000
C	-3.824730	2.206166	-0.744426	H	2.370409	3.353367	-2.445014
C	-2.495713	-2.306151	-0.102012	H	1.024851	4.252058	-1.699523
H	-4.604397	2.031304	-1.494014	H	2.688276	4.895808	-1.622506
H	-4.250462	2.041425	0.253893	C	3.717819	2.713938	-0.125619
H	-3.473933	3.235470	-0.810699	H	3.954096	2.039586	-0.950280
H	-2.066699	-2.933284	0.671748	H	4.432717	3.545586	-0.119898
C	-3.695528	-0.645939	-1.999870	H	3.826619	2.166586	0.818327
H	-4.129835	-0.001455	-2.758692	C	-0.583626	0.263327	-2.752531
I	-2.165819	-0.085524	2.120660	H	0.353454	0.156908	-3.304128
Cu	-0.267556	-0.553098	0.148625	H	-1.037240	-0.727635	-2.656185
C	-3.258430	-2.864224	-1.132576	H	-1.265643	0.859410	-3.371009
H	-3.390495	-3.941603	-1.178603	C	1.580590	0.326471	2.452589
C	-0.300296	0.963946	-1.413554	H	1.807756	1.215307	1.866047
C	2.272369	-2.272001	-0.269436	H	0.639140	0.498281	2.975729
C	2.596771	-1.108773	0.692625	H	2.369528	0.150235	3.194148
C	3.858223	-1.432875	1.513325	H	1.168880	-1.635464	2.065962
C	5.061751	-1.732234	0.608328				
C	4.750164	-2.875161	-0.364418				
C	3.484657	-2.565354	-1.173931	TS4-S-3.log			
H	4.099873	-0.595350	2.175504	C	-1.742650	1.510053	-1.157090

C	-2.778520	-0.738550	-0.927890	O	0.716730	2.439283	-0.183191
C	-3.313018	-3.015836	-1.630315	C	1.354220	3.752572	-0.140570
O	-1.932482	2.709992	-0.972408	C	0.715776	4.390837	1.095158
N	-2.868259	0.653553	-1.138963	H	0.924059	3.787682	1.986515
C	-2.075802	-1.280809	0.175276	H	1.114418	5.398759	1.256471
H	-3.793401	-3.681588	-2.341229	H	-0.368261	4.445523	0.961624
C	-4.180299	1.282840	-0.971651	C	0.996366	4.547064	-1.401356
C	-2.041195	-2.668790	0.394751	H	1.490144	4.129292	-2.281772
H	-4.213556	2.199092	-1.562027	H	-0.086920	4.508641	-1.550070
H	-4.957929	0.593661	-1.309589	H	1.310447	5.590658	-1.285462
H	-4.362919	1.544661	0.078713	C	2.870277	3.597428	0.033467
H	-1.564989	-3.054738	1.289774	H	3.295251	3.072761	-0.823834
C	-3.368526	-1.633262	-1.827876	H	3.343832	4.581835	0.128320
H	-3.862613	-1.220008	-2.702684	H	3.094431	3.029149	0.945822
I	-1.933152	-0.022121	2.082241	C	-0.485672	0.161497	-2.881178
Cu	-0.072346	-0.551981	0.054603	H	0.528385	-0.102053	-3.186077
C	-2.638984	-3.534577	-0.523084	H	-1.094127	-0.746170	-2.876236
H	-2.602457	-4.606939	-0.351251	H	-0.891569	0.826725	-3.657545
C	-0.446215	0.858838	-1.513875	H	0.657816	-3.164690	0.263823
C	2.489683	-2.222073	0.200262	C	0.910502	-2.738684	-1.707898
C	2.826194	-0.713094	0.207951	H	-0.161857	-2.774946	-1.909525
C	4.271696	-0.452835	0.667292	H	1.338252	-1.937164	-2.310701
C	5.288305	-1.260580	-0.148418	H	1.363395	-3.693593	-2.006380
C	4.968797	-2.758304	-0.056950				
C	3.548099	-3.033635	-0.568415				
H	4.474882	0.622997	0.598151	TS4-S-4.log			
H	2.715060	-0.335309	-0.815945	C	-2.578248	-0.704995	-0.616574
H	2.497302	-2.565632	1.243018	C	-1.077299	-2.685598	-0.564529
H	5.255789	-0.943374	-1.200381	C	0.308874	-4.474901	-1.482791
H	5.690440	-3.346512	-0.636531	O	-3.703994	-0.290585	-0.352878
H	5.059245	-3.087814	0.988743	N	-2.332330	-2.074977	-0.413828
H	3.510297	-2.764968	-1.631438	C	0.074041	-2.157366	0.059631
H	3.310130	-4.103252	-0.501640	H	0.387676	-5.372926	-2.088494
H	4.378919	-0.731933	1.724020	C	-3.488255	-2.893399	-0.038292
N	1.089758	-2.421807	-0.278683	C	1.308202	-2.817750	-0.039304
N	1.803655	0.018220	0.993388	H	-4.209934	-2.967652	-0.859883
H	1.821095	1.004578	0.732357	H	-3.141371	-3.890365	0.238228
C	1.891471	-0.068681	2.457637	H	-3.994166	-2.432427	0.813012
H	2.823749	0.343214	2.866865	H	2.156858	-2.445619	0.524191
H	1.050668	0.486930	2.877538	C	-0.925993	-3.835012	-1.351960
H	1.796824	-1.108725	2.783553	H	-1.797519	-4.215453	-1.877264
H	6.304355	-1.059932	0.212134	I	-0.235501	-1.228384	2.281153
C	0.747825	1.679182	-1.339680	Cu	0.330859	-0.150192	-0.254381
O	1.758311	1.641936	-2.042256	C	1.432276	-3.960985	-0.833123
				H	2.393059	-4.463850	-0.903832

C	-1.479390	0.085999	-1.270761	H	2.438146	-1.171069	-1.649225
C	3.266076	0.315930	-0.509803	C	2.055373	0.552220	-2.698214
C	2.813089	1.664800	0.080813	H	2.997195	0.809938	-3.199572
C	3.842838	2.184790	1.100539	H	1.462108	-0.066507	-3.371671
C	5.258479	2.266376	0.512639	H	1.481824	1.463032	-2.507312
C	5.694783	0.904871	-0.045003				
C	4.689241	0.404809	-1.091943				
H	3.527062	3.163753	1.478396	TS4-S-5.log			
H	2.727540	2.389246	-0.739015	C	1.279025	2.209336	0.392696
H	3.286214	-0.404886	0.321708	C	2.773884	0.429926	1.276080
H	5.276416	3.013402	-0.294136	C	3.658519	-1.245313	2.816069
H	6.695966	0.970996	-0.487011	O	1.284007	3.247256	-0.258851
H	5.759948	0.179003	0.778807	N	2.506363	1.774648	0.957875
H	4.698925	1.094613	-1.945295	C	2.445571	-0.621314	0.381668
H	4.983366	-0.580531	-1.476807	H	4.132382	-1.476222	3.765818
H	3.851047	1.499330	1.962412	C	3.649194	2.678301	0.794202
N	2.237838	-0.195630	-1.439604	C	2.754598	-1.955733	0.691773
N	1.458093	1.518746	0.660955	H	3.328037	3.701409	0.993247
H	5.961912	2.613677	1.278649	H	4.438219	2.394832	1.494241
C	-1.615296	1.547039	-1.165076	H	4.043423	2.637929	-0.229177
O	-1.215986	2.358393	-2.002025	H	2.549051	-2.733209	-0.035329
O	-2.164045	1.941912	0.022644	C	3.357163	0.084078	2.498904
C	-3.077951	3.083218	0.074979	H	3.563306	0.879236	3.209950
C	-3.777184	2.881220	1.420854	I	2.557773	-0.174253	-1.896309
H	-3.044474	2.893718	2.235816	Cu	0.446529	-0.512950	-0.105786
H	-4.507717	3.678741	1.597437	C	3.347251	-2.266331	1.919037
H	-4.285750	1.913171	1.428523	H	3.582013	-3.300877	2.154041
C	-4.088466	2.989677	-1.075094	C	0.068335	1.409409	0.749202
H	-3.605754	3.177507	-2.037502	C	-1.938441	-2.400584	0.438426
H	-4.527846	1.988433	-1.086169	C	-2.327004	-1.313887	-0.588826
H	-4.880840	3.733284	-0.932203	C	-3.587025	-1.715266	-1.376200
C	-2.306271	4.407375	0.038995	C	-4.768922	-2.027022	-0.448839
H	-1.746164	4.491296	-0.893811	C	-4.391302	-3.129474	0.547956
H	-3.008486	5.246457	0.113349	C	-3.141844	-2.731614	1.343747
H	-1.609565	4.476357	0.881576	H	-3.841347	-0.909314	-2.075335
C	-1.251226	-0.392752	-2.713088	H	-2.553223	-0.408023	-0.014866
H	-0.687995	0.363758	-3.258736	H	-1.637240	-3.307517	-0.103972
H	-0.710945	-1.344927	-2.758012	H	-5.055346	-1.122197	0.105693
H	-2.205724	-0.531438	-3.242797	H	-5.222116	-3.334275	1.233907
C	0.720992	2.791484	0.780497	H	-4.194934	-4.064297	0.002650
H	0.468439	3.149663	-0.219339	H	-3.368856	-1.838502	1.946793
H	-0.214961	2.590746	1.299481	H	-2.872565	-3.527395	2.047332
H	1.287556	3.564222	1.318743	H	-3.375468	-2.607334	-1.980217
H	1.559460	1.126178	1.598737	N	-0.753902	-1.957581	1.205542
				N	-1.168495	-0.945854	-1.440279

H	-1.324166	-0.000776	-1.803308	H	4.367282	1.672283	-1.197756
C	-0.868716	-1.855636	-2.557757	H	1.913145	-2.676365	1.203635
H	-1.675032	-1.912708	-3.300492	C	3.449873	0.694756	2.341435
H	0.037790	-1.501661	-3.051111	H	3.854548	1.651322	2.660162
H	-0.672867	-2.861669	-2.174596	I	2.522997	-1.218125	-1.555434
C	-0.086212	-3.025666	1.959410	Cu	0.357540	-0.344967	-0.007845
H	0.353950	-3.739214	1.255750	C	2.879286	-1.609917	2.817682
H	0.726907	-2.588098	2.540484	H	2.884881	-2.467628	3.484592
H	-0.756137	-3.572761	2.638549	C	0.332121	1.769984	0.262978
H	-1.055728	-1.241224	1.867031	C	-2.130579	-1.893027	0.843025
H	-5.642825	-2.322537	-1.041742	C	-2.357768	-1.469180	-0.625598
C	-1.112652	1.843095	-0.009802	C	-3.340826	-2.419280	-1.332092
O	-1.176114	2.016376	-1.226338	C	-4.673469	-2.536225	-0.580433
O	-2.227378	1.972493	0.791709	C	-4.441979	-2.988998	0.864816
C	-3.416805	2.688040	0.331243	C	-3.476215	-2.037097	1.581745
C	-4.306002	2.688488	1.578118	H	-3.518974	-2.073436	-2.355522
H	-3.795387	3.182909	2.410493	H	-2.778477	-0.458292	-0.609202
H	-5.245272	3.215246	1.377830	H	-1.619635	-2.869389	0.844267
H	-4.540216	1.661309	1.880323	H	-5.175236	-1.557508	-0.579999
C	-4.119682	1.958520	-0.820493	H	-5.390742	-3.043348	1.412115
H	-3.479956	1.920333	-1.701957	H	-4.019827	-4.004816	0.864143
H	-4.384994	0.939280	-0.522695	H	-3.934296	-1.039640	1.656596
H	-5.047837	2.484435	-1.073247	H	-3.301413	-2.381190	2.607026
C	-3.028232	4.118168	-0.061209	H	-2.875066	-3.414596	-1.408678
H	-2.374145	4.115459	-0.934643	N	-1.209389	-0.933460	1.479729
H	-3.928581	4.700402	-0.288801	N	-1.056348	-1.344164	-1.322402
H	-2.501092	4.602349	0.767707	C	-0.774848	-1.279395	2.836145
C	-0.124665	1.251717	2.263783	H	-0.269674	-2.249931	2.813663
H	-1.052516	0.715098	2.484969	H	-0.047750	-0.535888	3.167454
H	0.702593	0.696324	2.716075	H	-1.593799	-1.326817	3.568142
H	-0.199216	2.219280	2.781530	H	-1.655899	-0.012856	1.481934
TS4-S-6.log				H	-5.340146	-3.231726	-1.104156
C	1.597007	2.148836	-0.430509	C	-0.905100	2.045679	-0.468732
C	2.867021	0.618872	1.071679	O	-1.060072	2.323069	-1.648569
C	3.472886	-0.406896	3.202199	O	-2.030114	1.864506	0.364413
O	1.705598	2.803665	-1.458457	C	-3.259934	2.607996	0.116332
N	2.798965	1.749433	0.233739	C	-4.073650	2.359188	1.390004
C	2.298589	-0.619665	0.684877	H	-3.532704	2.724877	2.269015
H	3.941165	-0.316104	4.178071	H	-5.040452	2.871342	1.334908
C	4.054790	2.256682	-0.322419	H	-4.261094	1.287168	1.522098
C	2.313860	-1.728457	1.545968	C	-4.011237	2.071835	-1.110242
H	3.912138	3.291024	-0.635790	H	-3.404756	2.188070	-2.008298
H	4.836316	2.204478	0.440240	H	-4.257768	1.011706	-0.980175
				H	-4.953205	2.618948	-1.236181

C	-2.944112	4.101636	-0.034263	H	-4.984775	-1.621957	0.531411
H	-2.363749	4.287286	-0.939900	H	-4.808310	-3.966462	1.403233
H	-3.874877	4.677604	-0.086423	H	-3.805720	-4.411487	0.023482
H	-2.368646	4.451297	0.830032	H	-3.136425	-2.317010	2.151049
C	0.311147	2.085695	1.767412	H	-2.388561	-3.908473	2.040364
H	-0.677918	1.910230	2.189346	H	-3.370702	-2.714784	-1.827615
H	1.025360	1.486946	2.335901	N	-0.545834	-1.996306	1.200411
H	0.561444	3.140921	1.953275	N	-1.293360	-0.925664	-1.346333
C	-1.138094	-0.707869	-2.656136	H	-1.529699	0.024383	-1.648023
H	-0.126187	-0.618109	-3.054655	C	-1.006150	-1.738250	-2.534578
H	-1.752356	-1.277387	-3.365380	H	-1.866458	-1.849099	-3.208157
H	-1.535230	0.301004	-2.541647	H	-0.198474	-1.253138	-3.085618
H	-0.662407	-2.280319	-1.439165	H	-0.658243	-2.734119	-2.242201

TS4-S-7.log

C	1.362200	2.226298	-0.218863
C	2.821005	0.684459	1.087394
C	3.555866	-0.446286	3.124342
O	1.369702	3.003605	-1.165318
N	2.613206	1.877789	0.364751
C	2.467610	-0.577800	0.556848
H	3.981019	-0.384439	4.121794
C	3.796192	2.571916	-0.147564
C	2.681054	-1.755870	1.292084
H	3.545450	3.618717	-0.321960
H	4.602361	2.500319	0.587477
H	4.136226	2.139178	-1.097524
H	2.467663	-2.716468	0.835051
C	3.358193	0.718998	2.380758
H	3.593468	1.691583	2.803789
I	2.533229	-0.843039	-1.694668
Cu	0.343859	-0.387131	-0.003298
C	3.199380	-1.684925	2.585547
H	3.356975	-2.599096	3.151518
C	0.149769	1.674604	0.465221
C	-1.752977	-2.521532	0.499283
C	-2.337397	-1.426850	-0.425324
C	-3.619916	-1.905148	-1.129549
C	-4.664674	-2.432418	-0.139771
C	-4.071209	-3.577957	0.690151
C	-2.824760	-3.096244	1.444205
H	-4.023299	-1.080430	-1.729175
H	-2.589059	-0.569811	0.211228
H	-1.389876	-3.334629	-0.142809

H	-4.984775	-1.621957	0.531411
H	-4.808310	-3.966462	1.403233
H	-3.805720	-4.411487	0.023482
H	-3.136425	-2.317010	2.151049
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N	-1.293360	-0.925664	-1.346333
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H	-5.131046	3.512934	1.287834
H	-4.234983	2.195956	2.081053
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H	0.167967	3.043711	2.180821
H	0.125788	-2.750470	1.313790
C	-0.757971	-1.366303	2.516992
H	-1.136317	-2.057724	3.282014
H	0.197718	-0.955030	2.848403
H	-1.457872	-0.536234	2.407276

TS4-S-8.log

C	1.626161	2.119400	-0.454707
C	2.903100	0.589752	1.040126
C	3.558860	-0.413933	3.167822

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C	2.332746	-0.651289	0.672073	H	-4.946203	2.586155	-1.127048
H	4.040839	-0.311909	4.135760	C	-3.016514	4.135450	0.184594
C	4.088006	2.168977	-0.414643	H	-2.415565	4.416766	-0.682328
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H	3.959317	3.193426	-0.764279	H	-2.494113	4.453113	1.093731
H	4.885852	2.129071	0.331914	C	0.435766	2.186636	1.781508
H	4.368563	1.545417	-1.273843	H	-0.560535	2.181349	2.220825
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C	3.504591	0.680248	2.301763	H	0.847040	3.200116	1.898300
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Cu	0.326541	-0.305864	0.040329	H	-1.900725	-0.944054	-3.338093
C	2.983991	-1.630496	2.792264	H	-1.790903	0.555070	-2.367981
H	3.026943	-2.490123	3.455661	H	-0.724938	-2.064009	-1.579942
C	0.374121	1.789597	0.293158	H	-0.257122	-2.287840	1.847911
C	-1.959822	-2.241659	0.695168	C	-1.267423	-0.654475	2.528020
C	-2.351472	-1.394568	-0.536645	H	-1.843229	-1.139068	3.328037
C	-3.485764	-2.063731	-1.333562	H	-0.358170	-0.229938	2.956004
C	-4.694590	-2.414288	-0.457455	H	-1.846551	0.164293	2.099173
C	-4.273648	-3.305824	0.715854				
C	-3.188524	-2.608501	1.546487				
H	-3.795321	-1.406483	-2.153148	Cat.log			
H	-2.677214	-0.409174	-0.185766	I	-3.140850	-0.056405	-0.012762
H	-1.525292	-3.177015	0.309324	Cu	-0.690797	0.204493	0.037936
H	-5.143341	-1.488589	-0.068175	C	2.194091	0.723228	-0.176777
H	-5.134495	-3.544290	1.351943	C	2.103593	-0.783212	0.163247
H	-3.890557	-4.262020	0.330060	C	3.344063	-1.537538	-0.349302
H	-3.615826	-1.694055	1.977589	C	4.653064	-0.928276	0.171370
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N	-1.129863	-1.157484	-1.336473	H	2.058946	-0.871487	1.258897
H	-5.465098	-2.906599	-1.062677	H	2.154757	0.820825	-1.271469
C	-0.879050	2.155943	-0.391569	H	4.698245	-1.042220	1.264131
O	-1.043882	2.541718	-1.536825	H	5.657425	1.003251	0.216461
O	-1.982130	1.933718	0.444214	H	4.794350	0.668210	-1.281648
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C	-4.072335	2.223549	1.444043	H	3.579144	2.380593	0.056151
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H	-4.207350	1.135860	1.480598	N	0.829343	-1.325909	-0.343004
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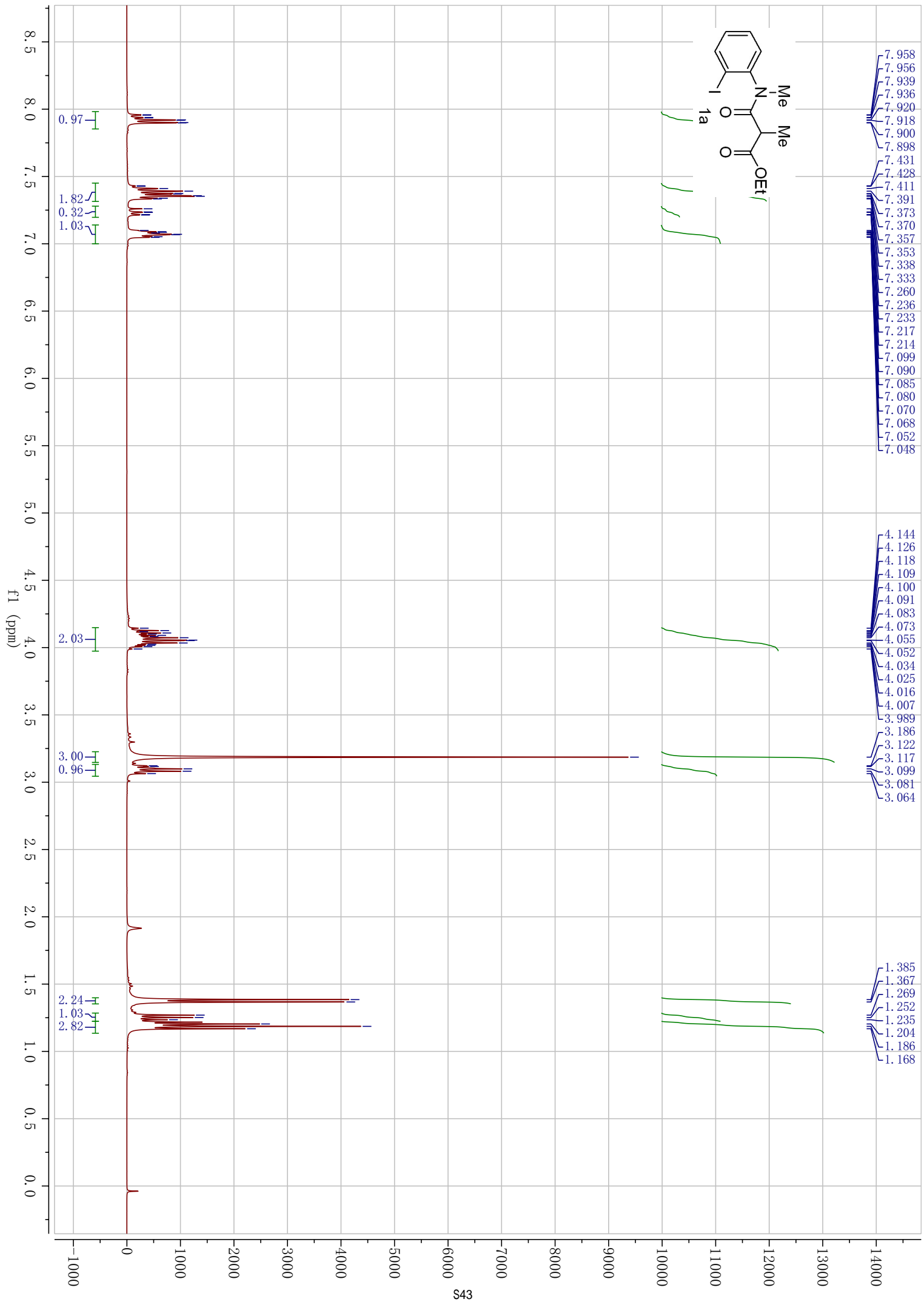
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C	-1.177593	1.139671	2.400308	C	3.167332	-3.266665	-2.081334
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TS5.log				C	-4.517880	-0.827546	1.339748
C	2.641613	-1.051526	0.756213	C	-5.372455	-2.041356	0.950851
C	1.312530	0.329482	2.389939	C	-5.221097	-2.360632	-0.540571
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H	3.753827	3.656156	-1.541782	H	-5.796987	-3.255430	-0.805915
C	1.939932	2.617708	3.040276	H	-5.631612	-1.531568	-1.134082
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H	1.510090	2.263873	3.977277	H	-4.884104	0.065725	0.812753
H	3.017347	2.771444	3.176465	N	-1.455228	-1.492037	-0.878586
H	1.450764	0.085706	-2.223799	N	-2.185815	0.137640	1.336599
C	2.786830	2.834495	0.190544	C	-1.169978	-1.530290	-2.325397
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I	-1.660573	2.238094	-1.353182	H	-0.095204	-1.688636	-2.454211
Cu	-0.370817	0.187542	0.050721	H	-1.707287	-2.325115	-2.860041
O	3.663363	-0.721194	1.321762	H	-1.124036	-2.361003	-0.461734
C	2.656711	1.866399	-2.033818	H	-6.423504	-1.854508	1.201439
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H	4.166437	-0.683813	-2.054875	C	-0.987679	-0.789796	-0.099358
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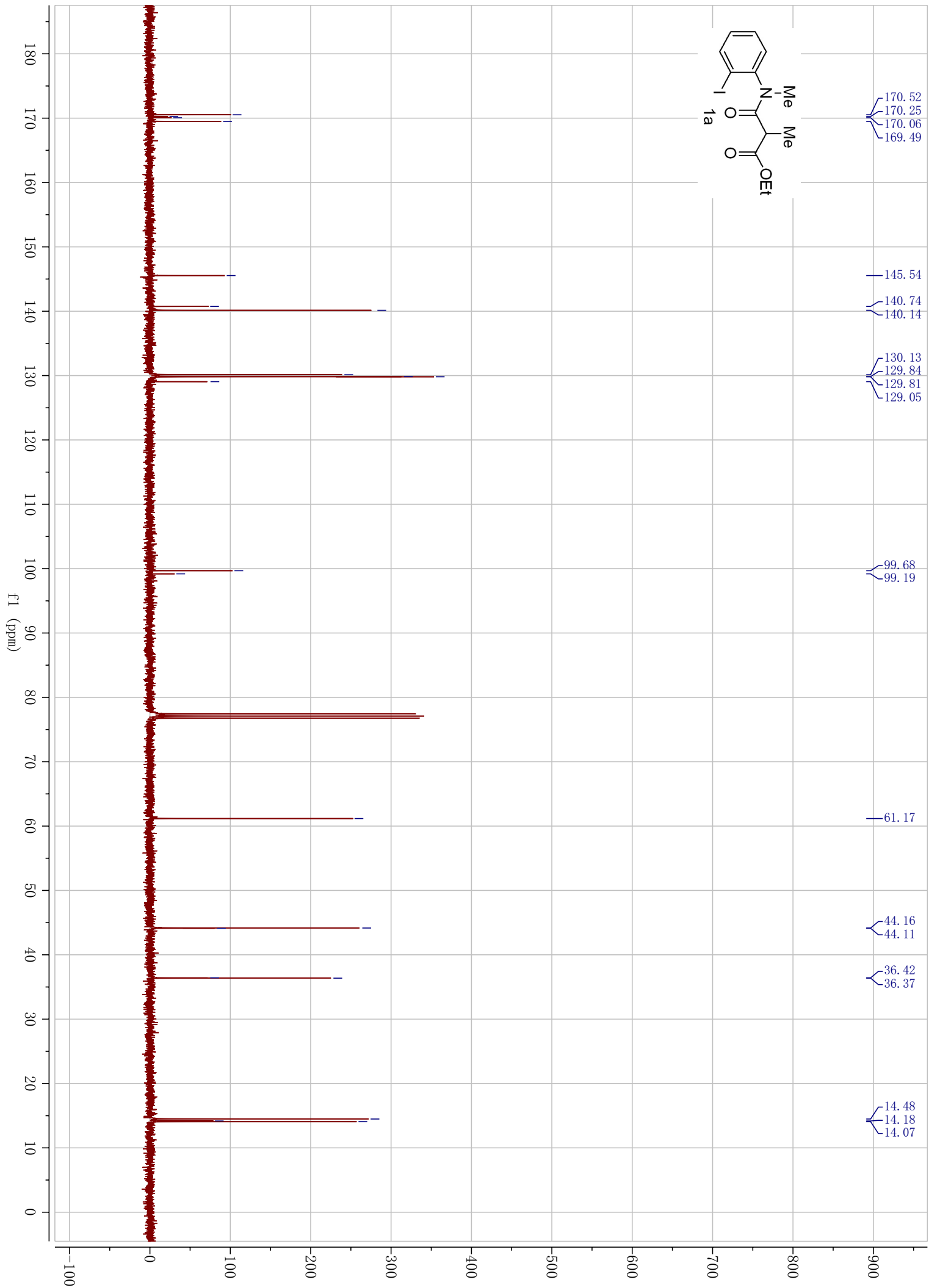
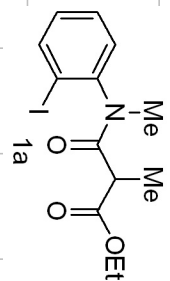
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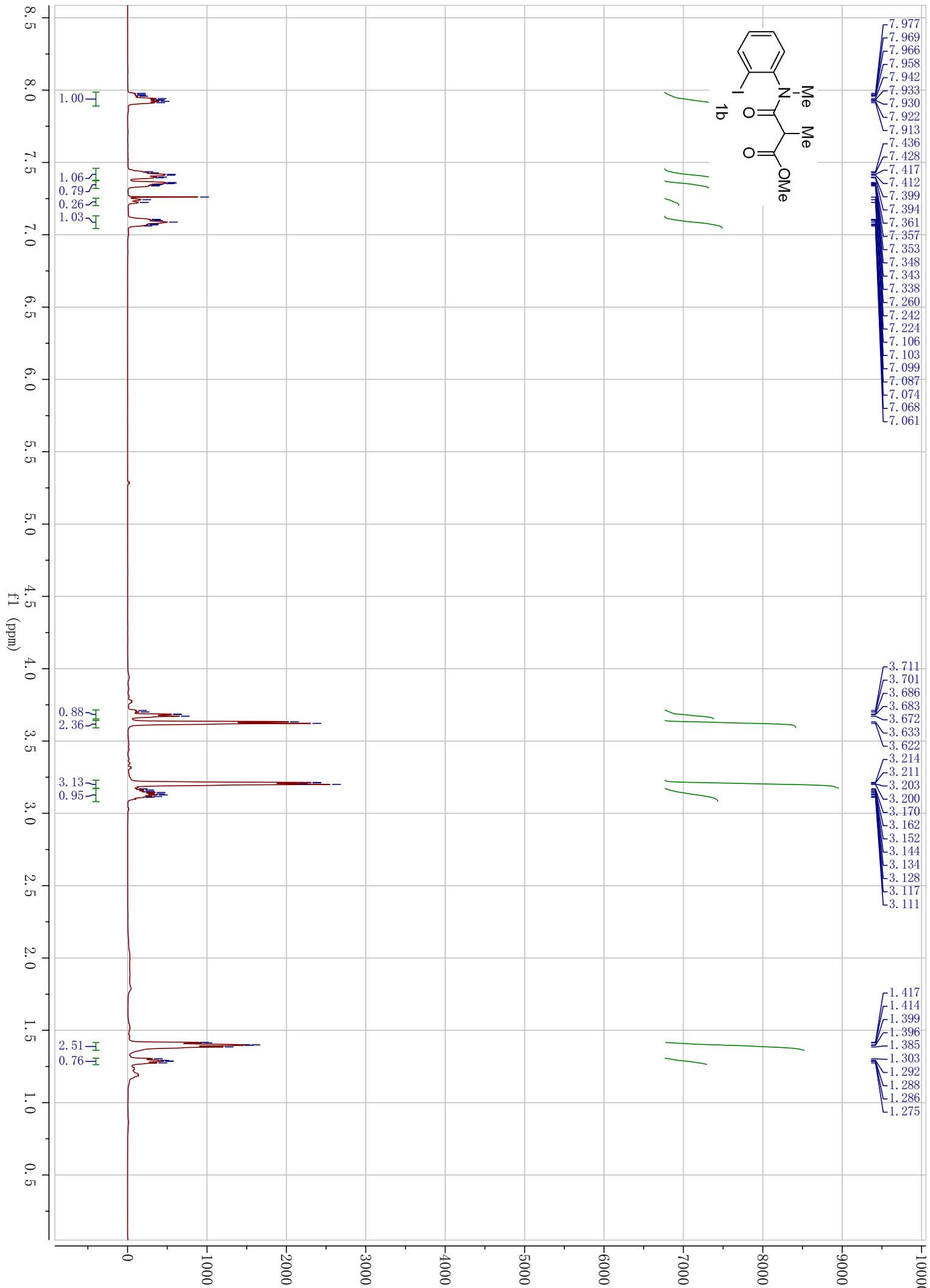
VI References

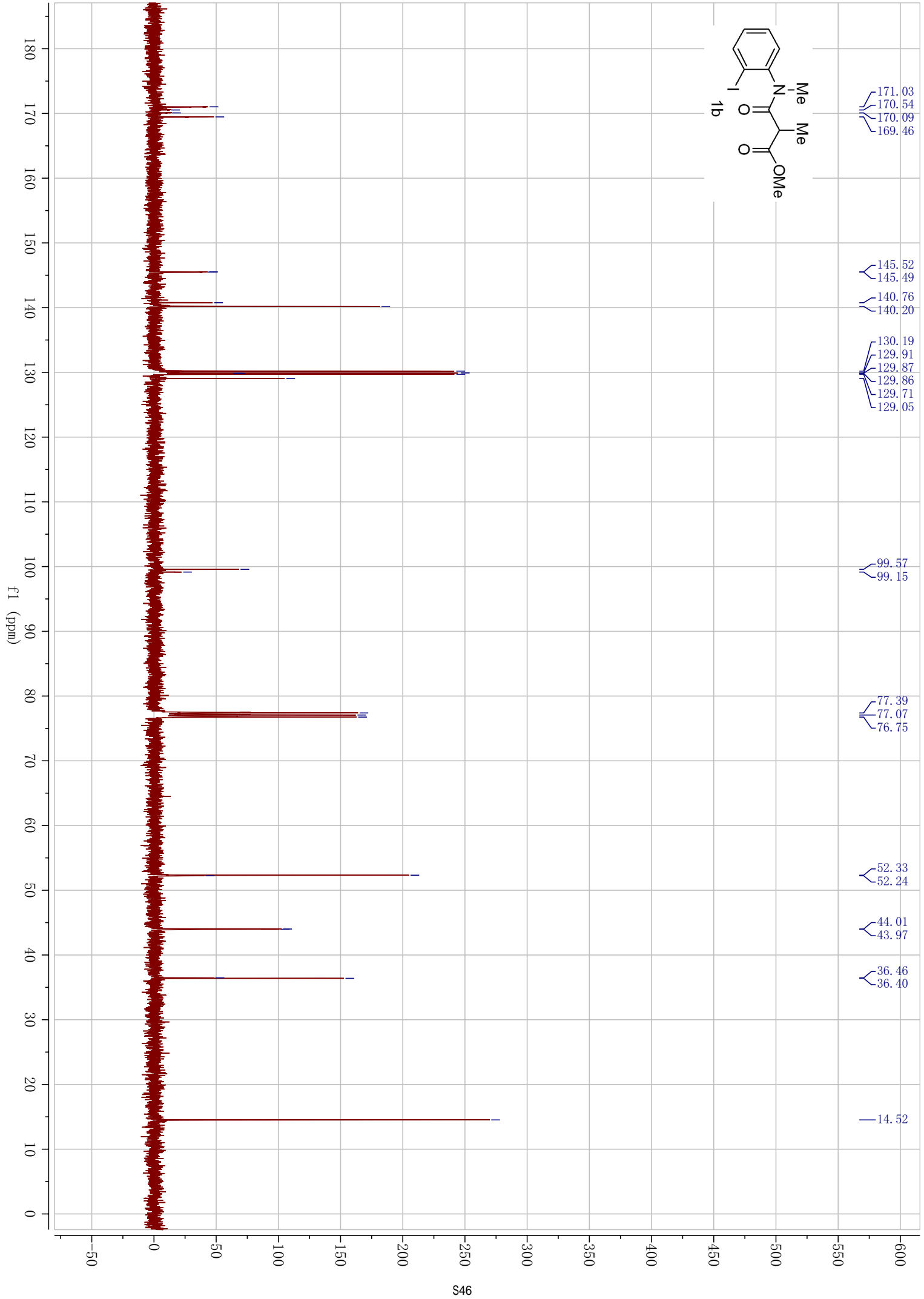
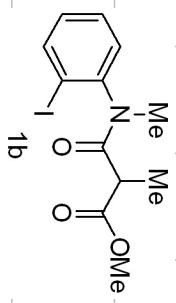
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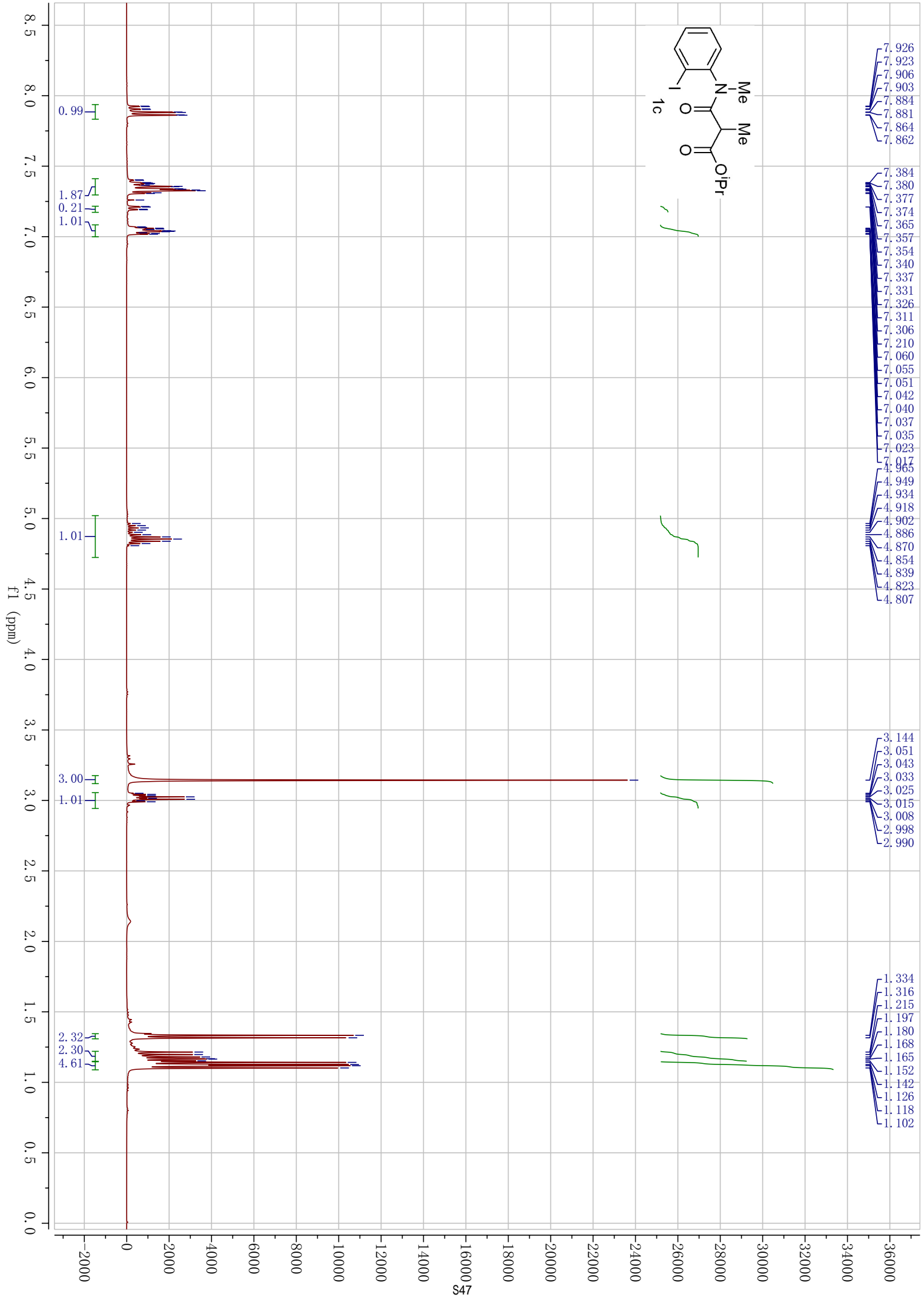
VII. NMR and HPLC Spectra

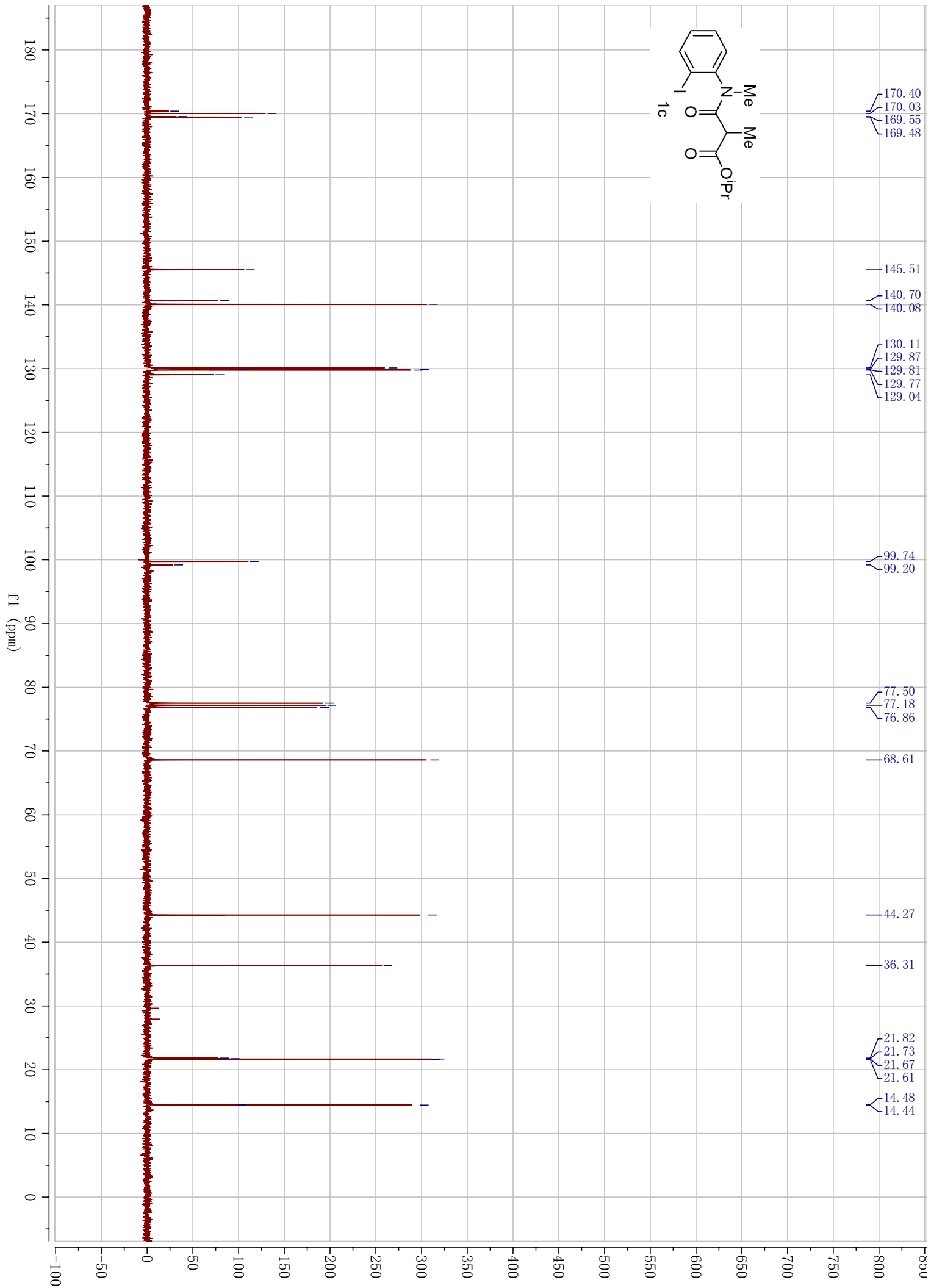


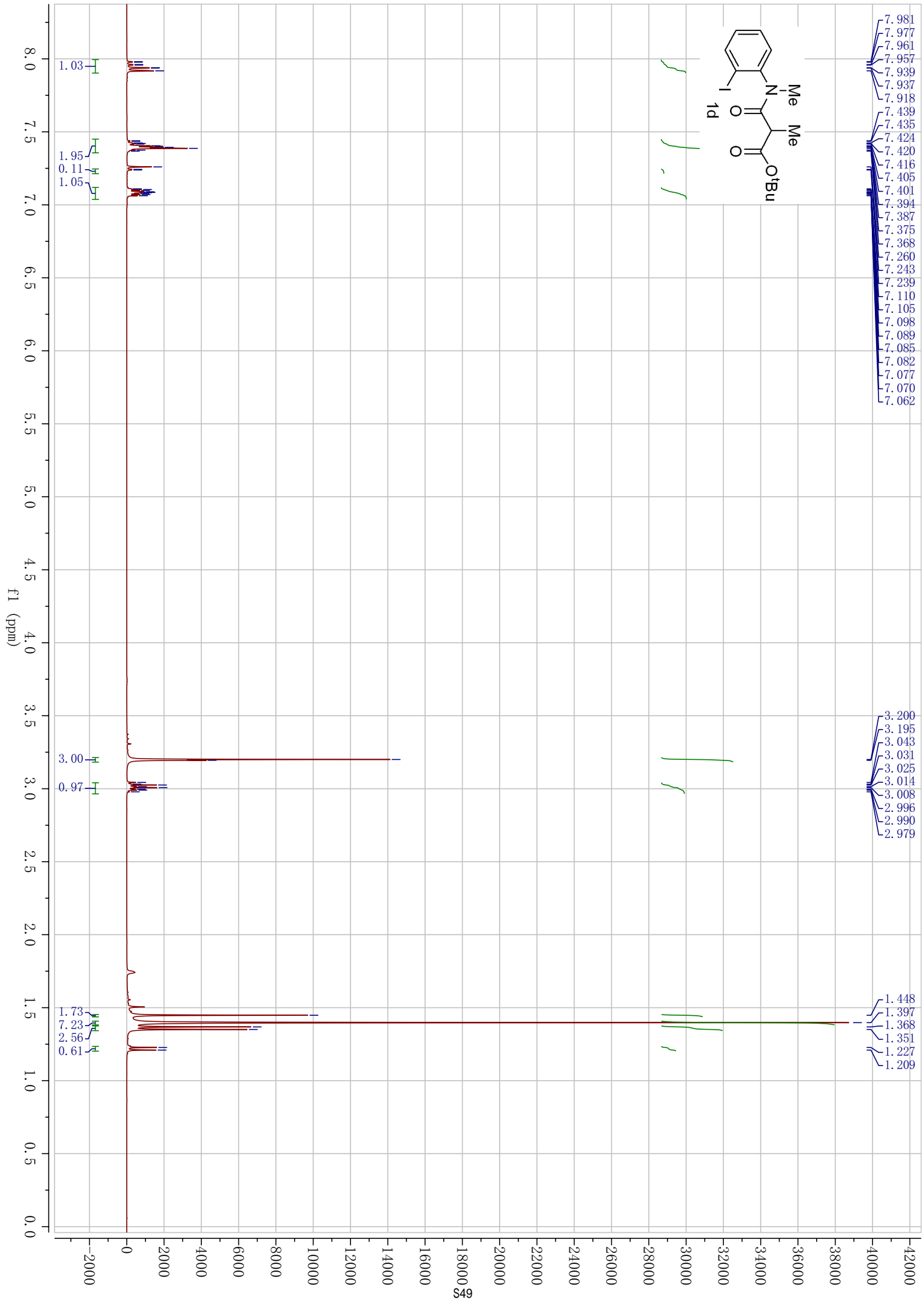


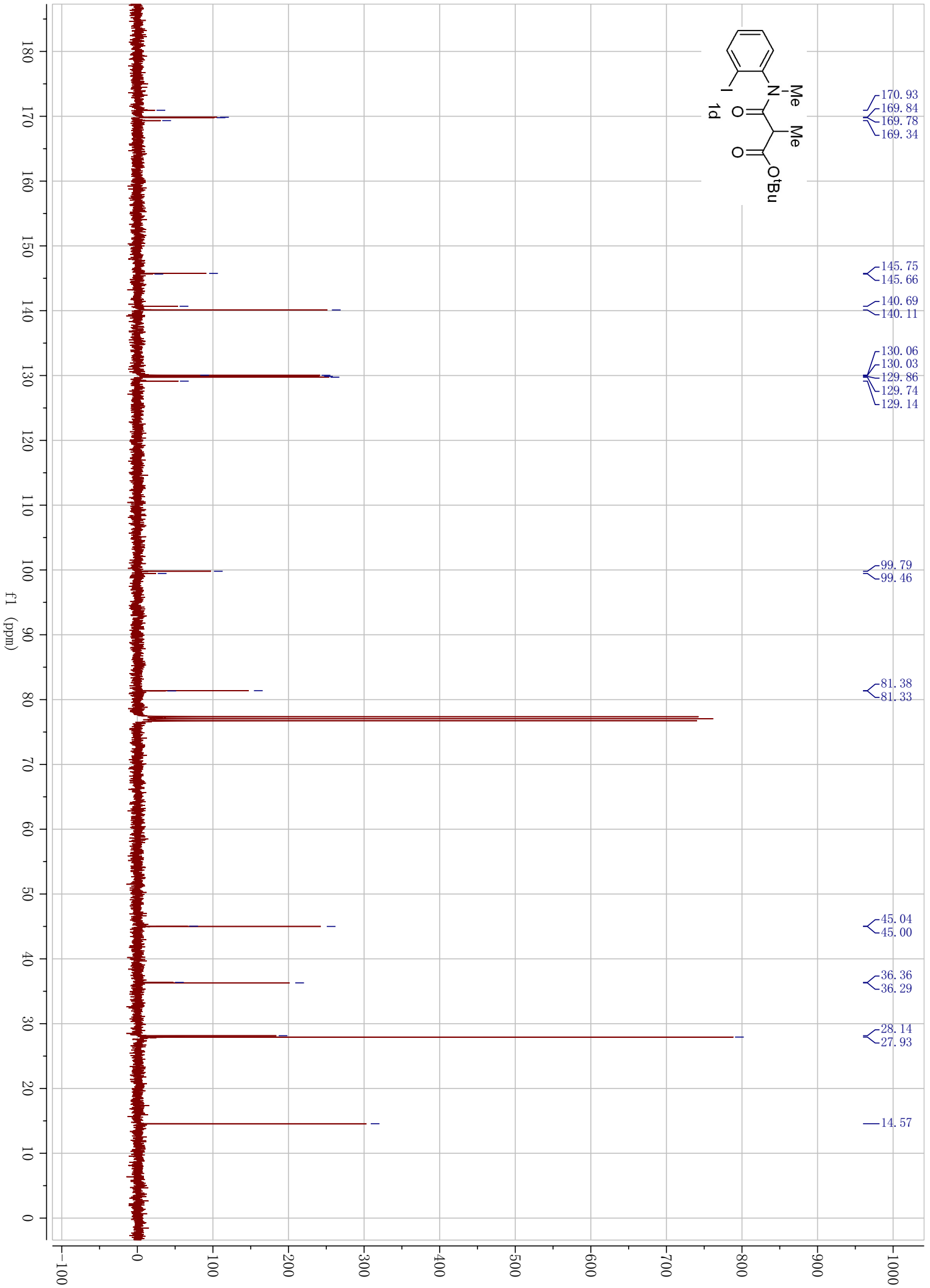
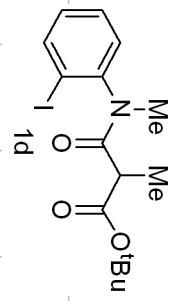


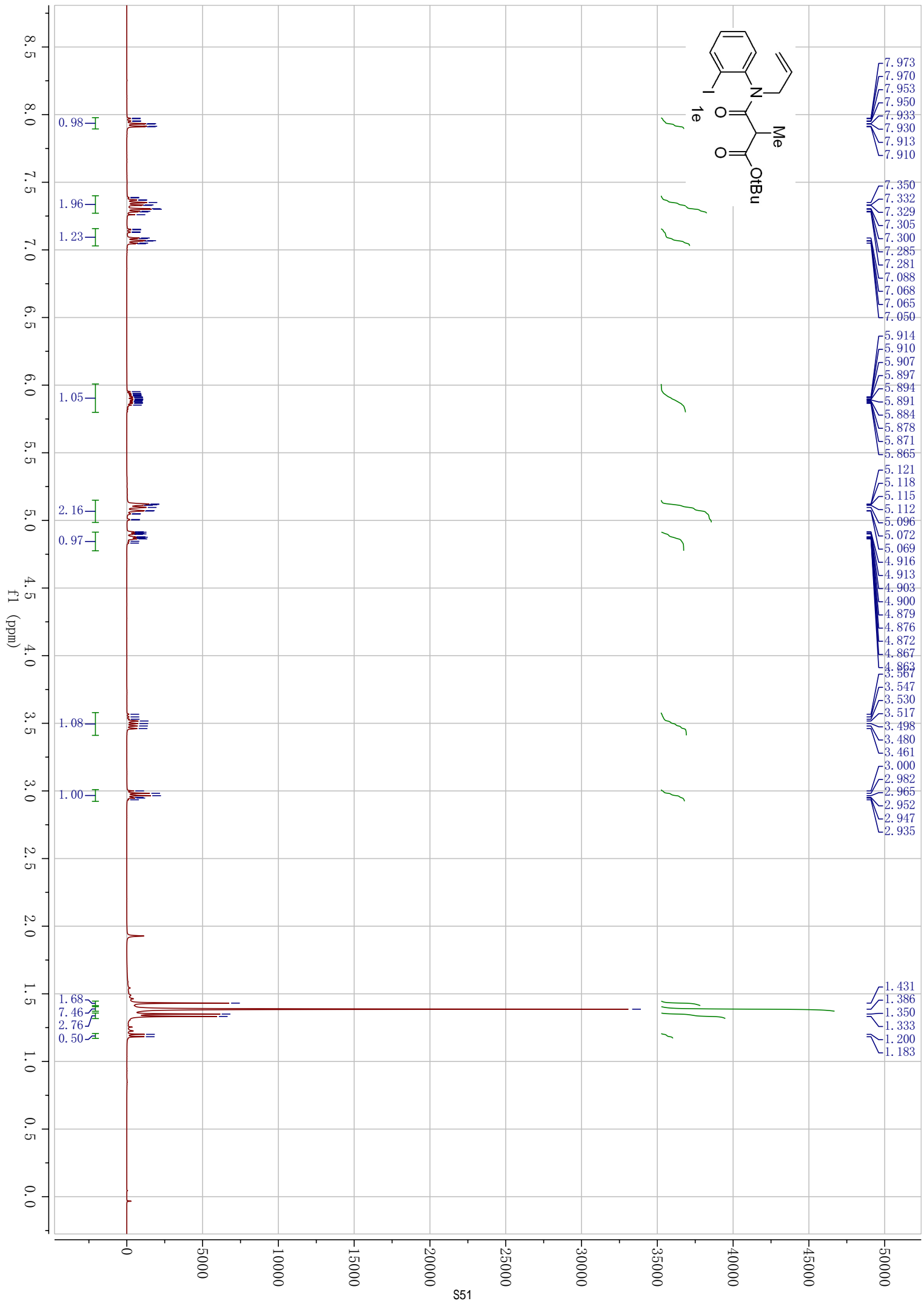


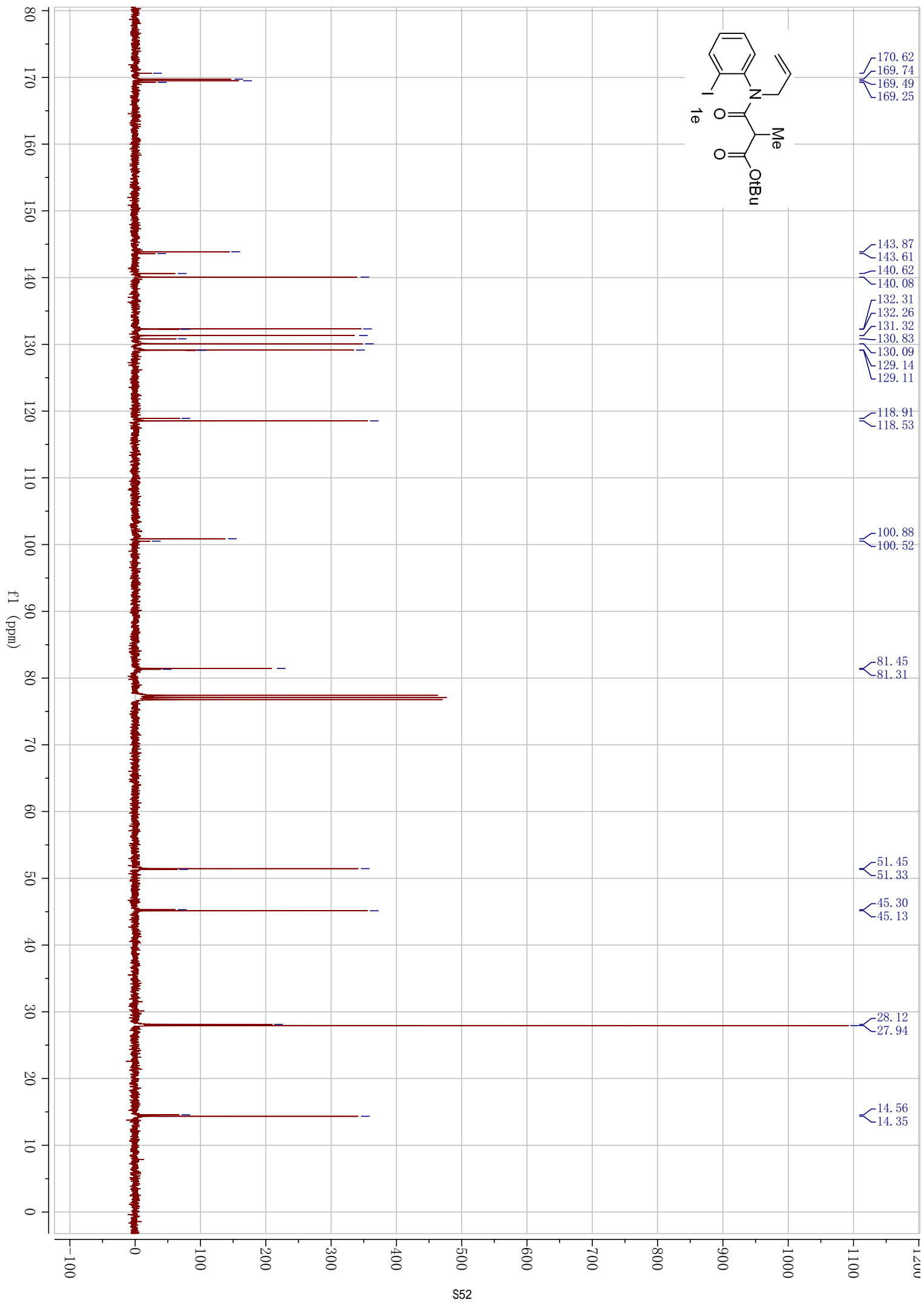


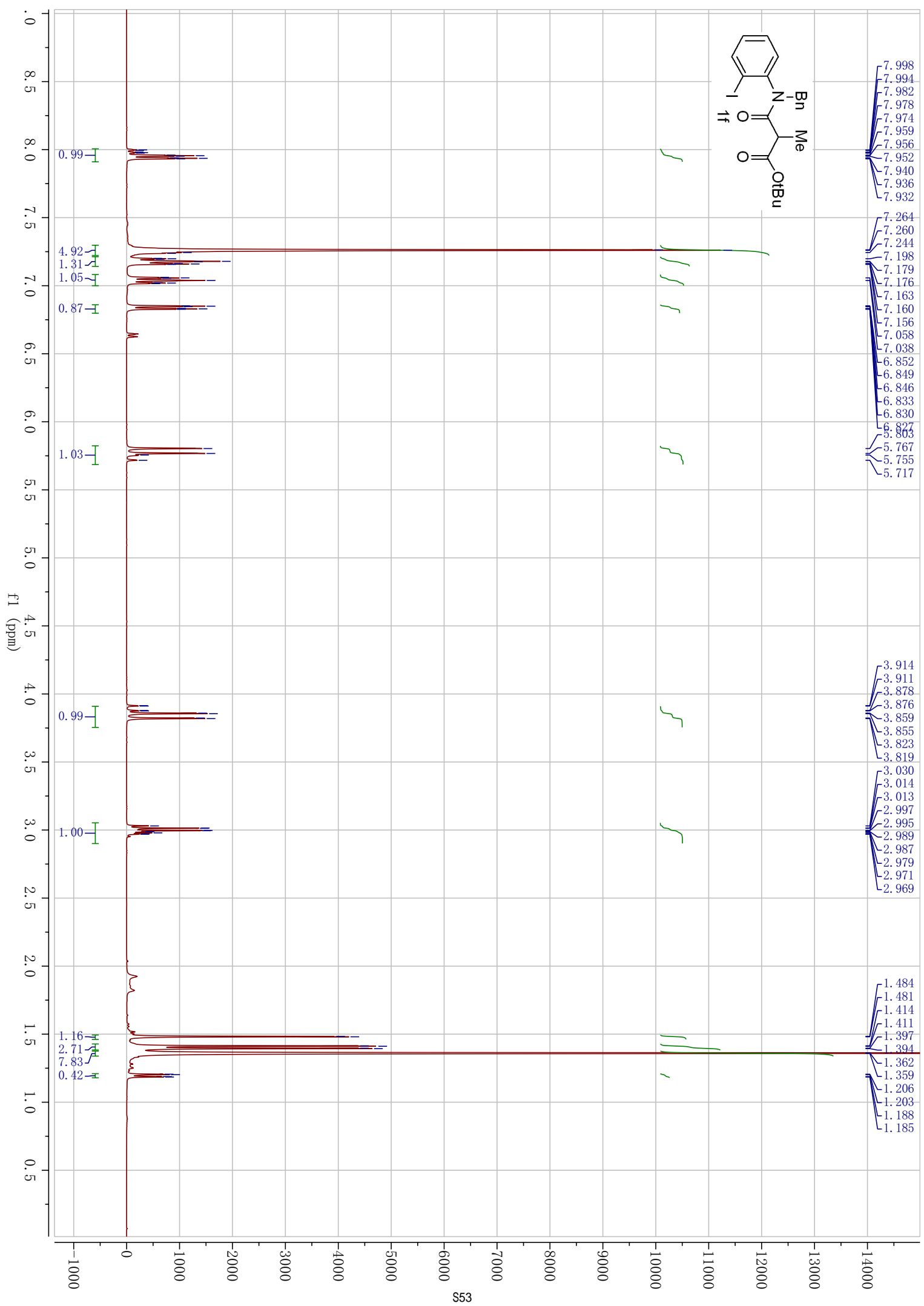
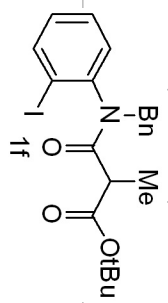


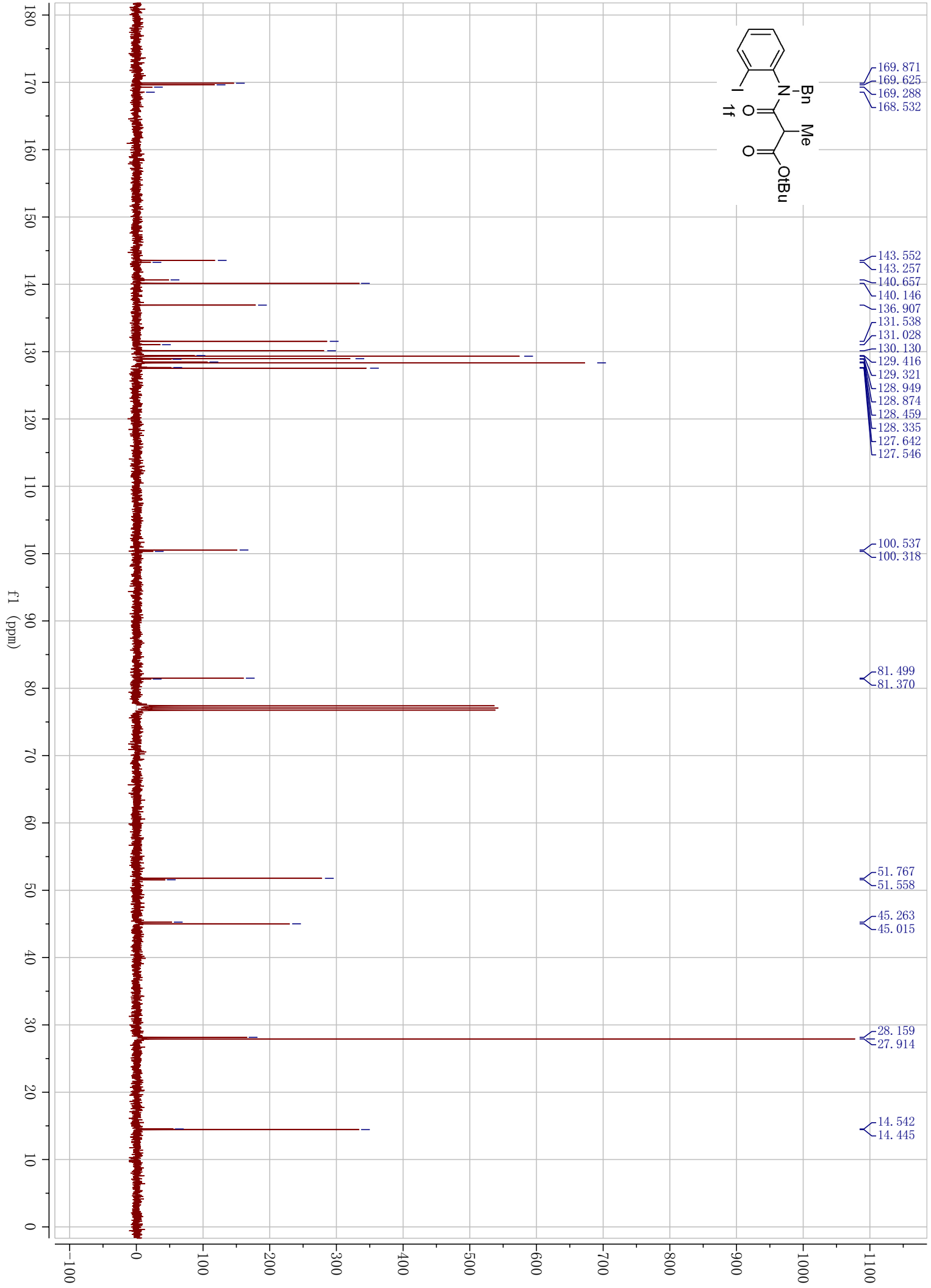
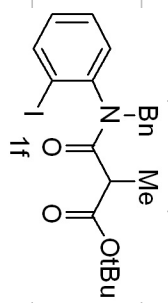


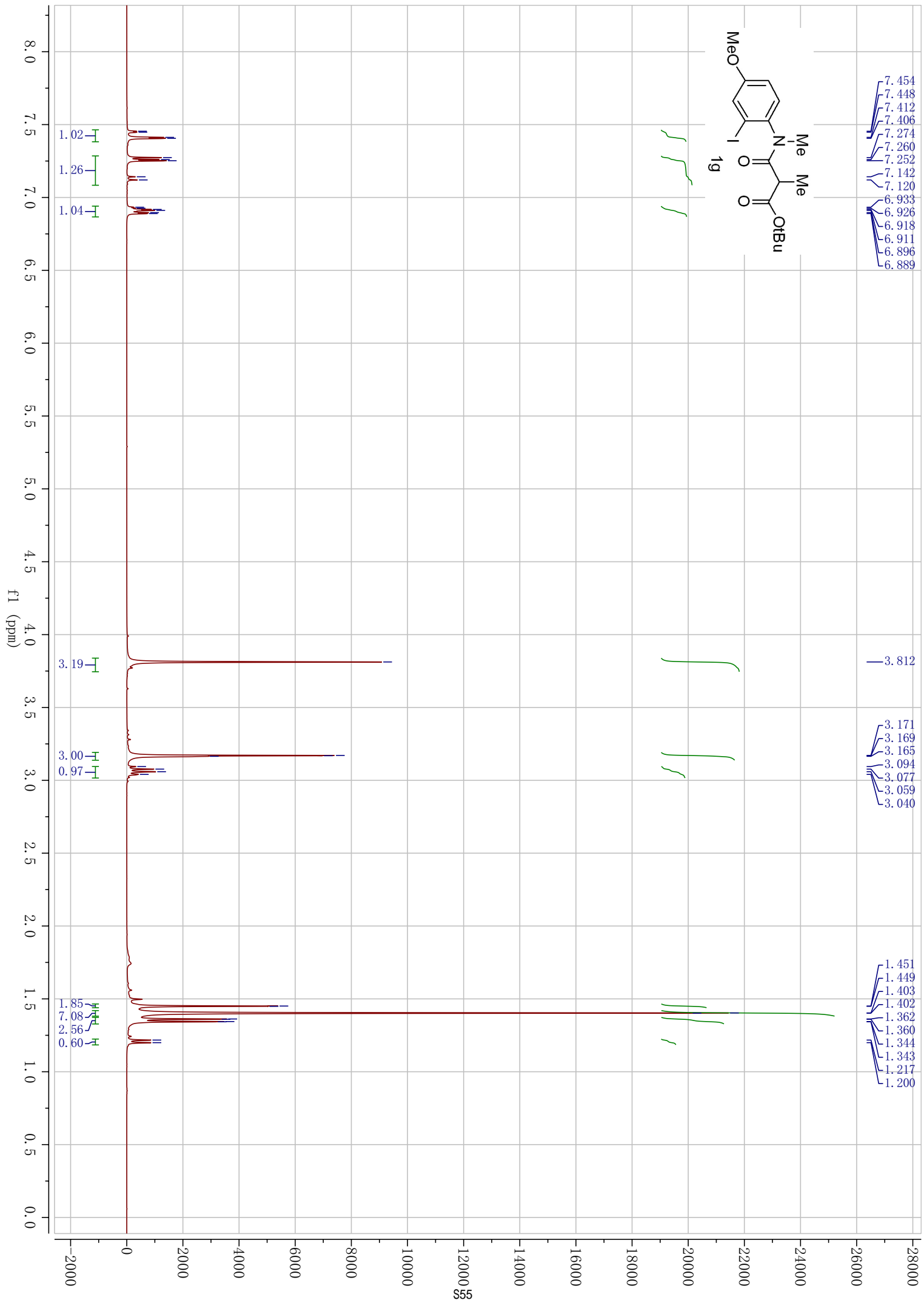


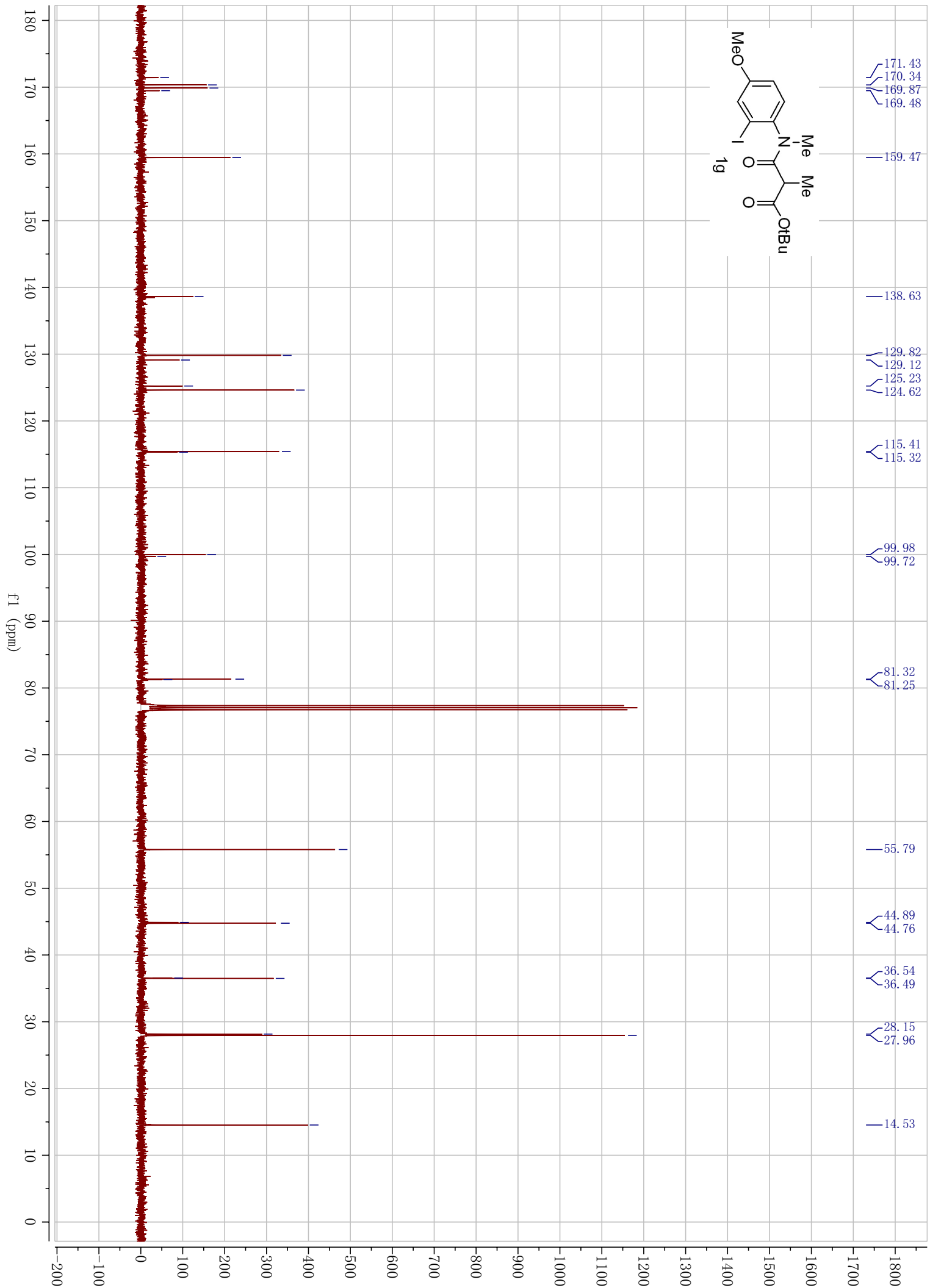


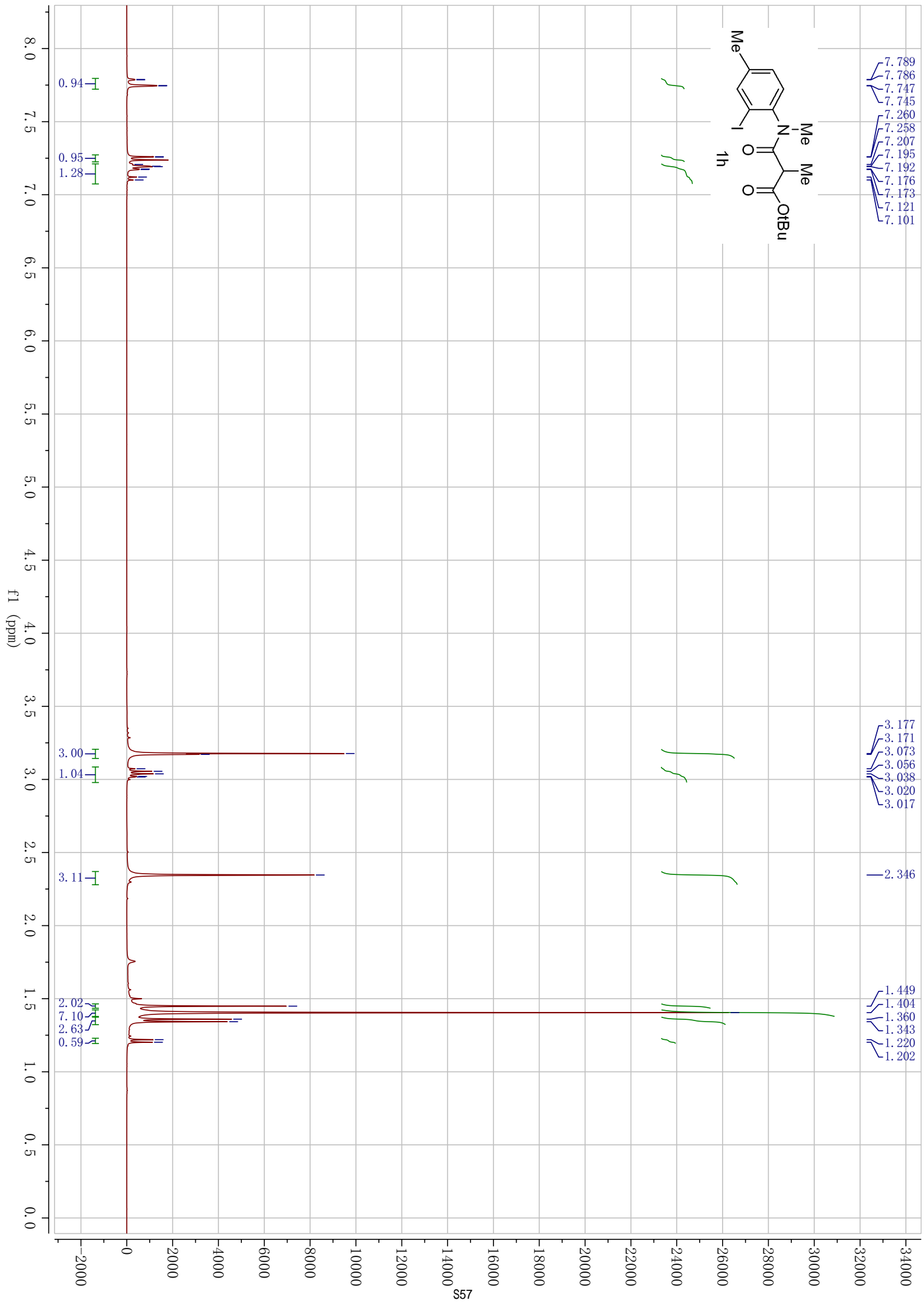


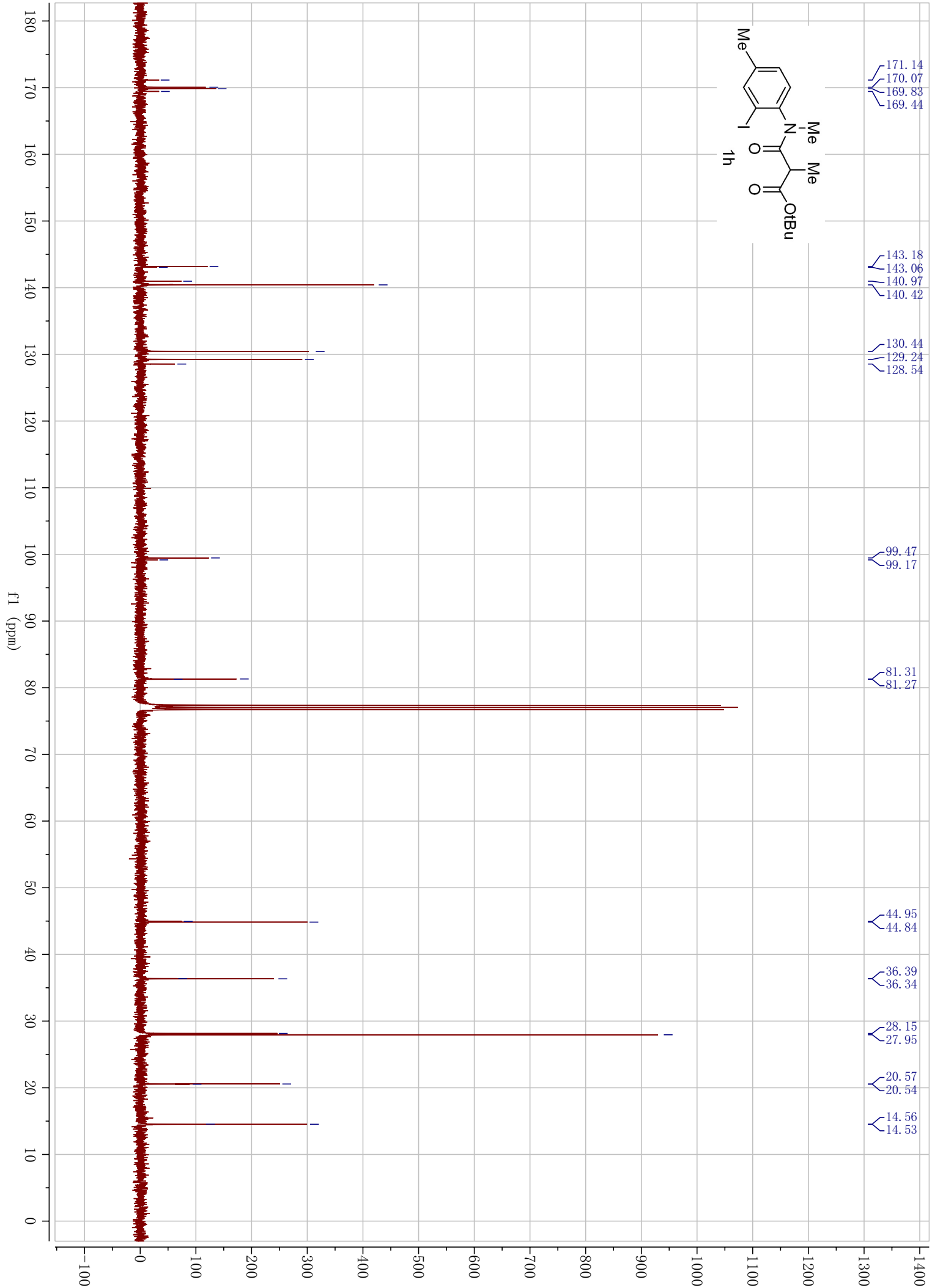


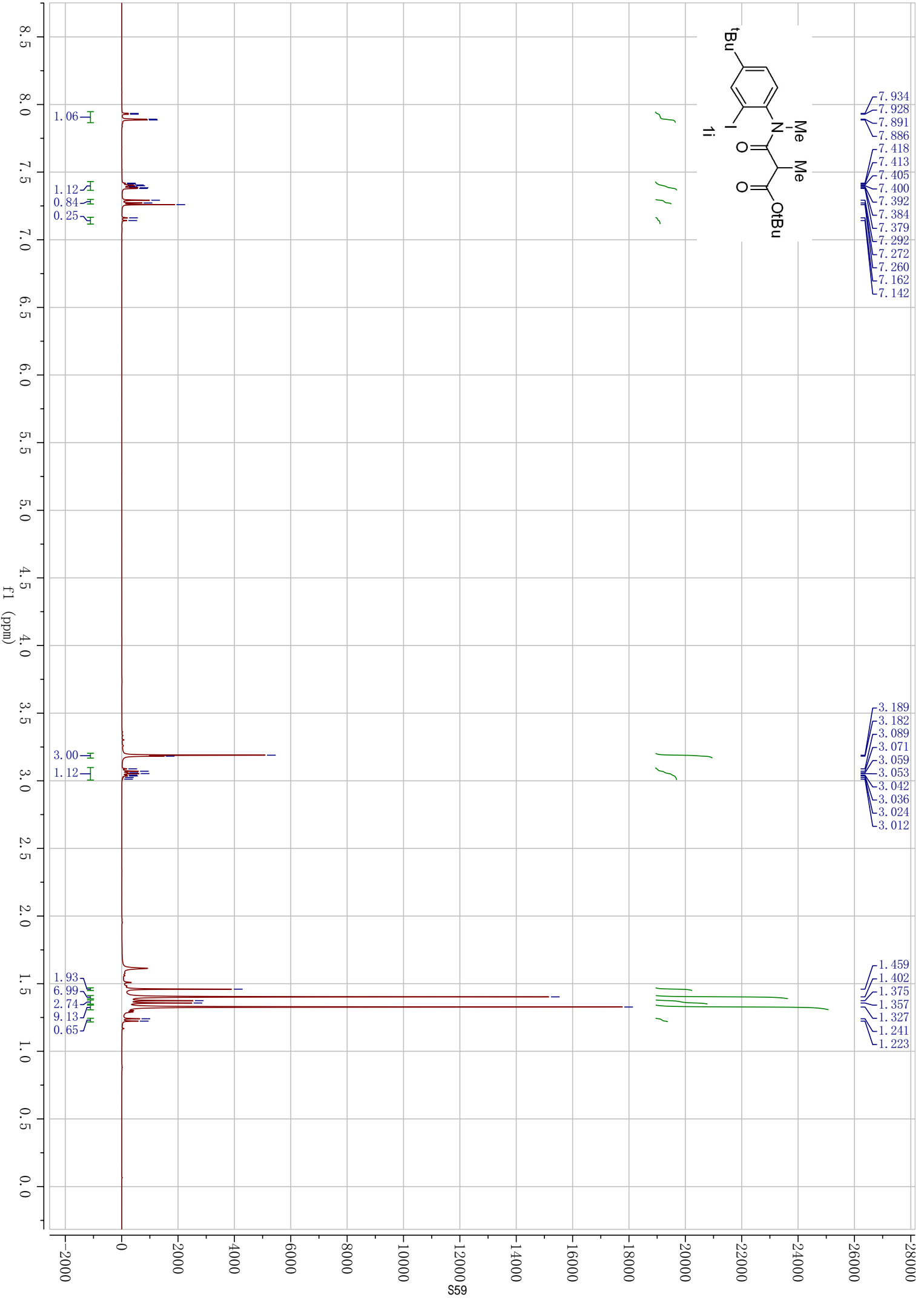
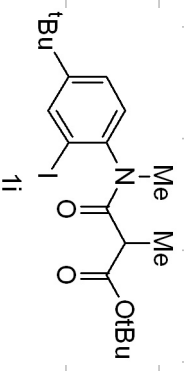


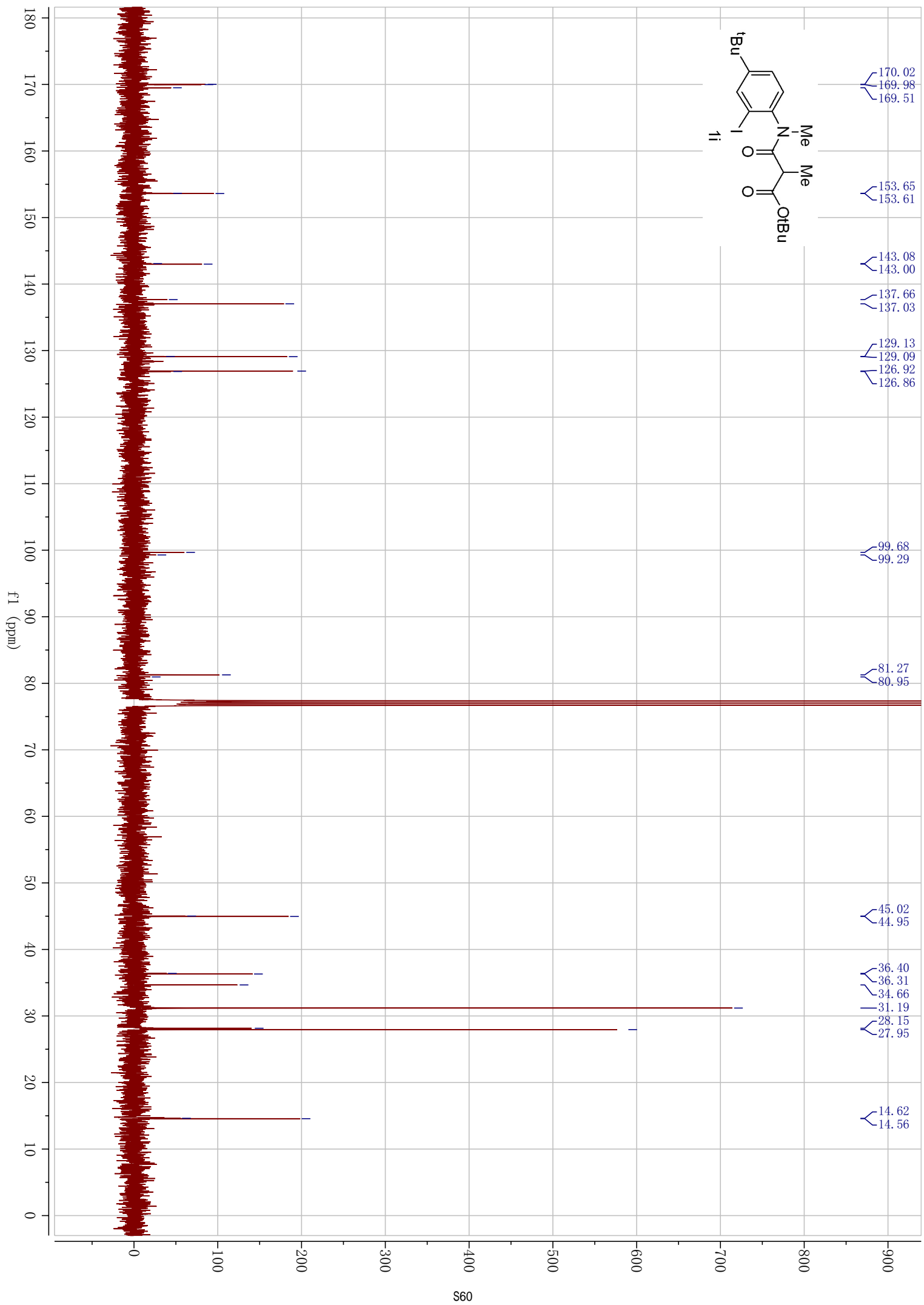


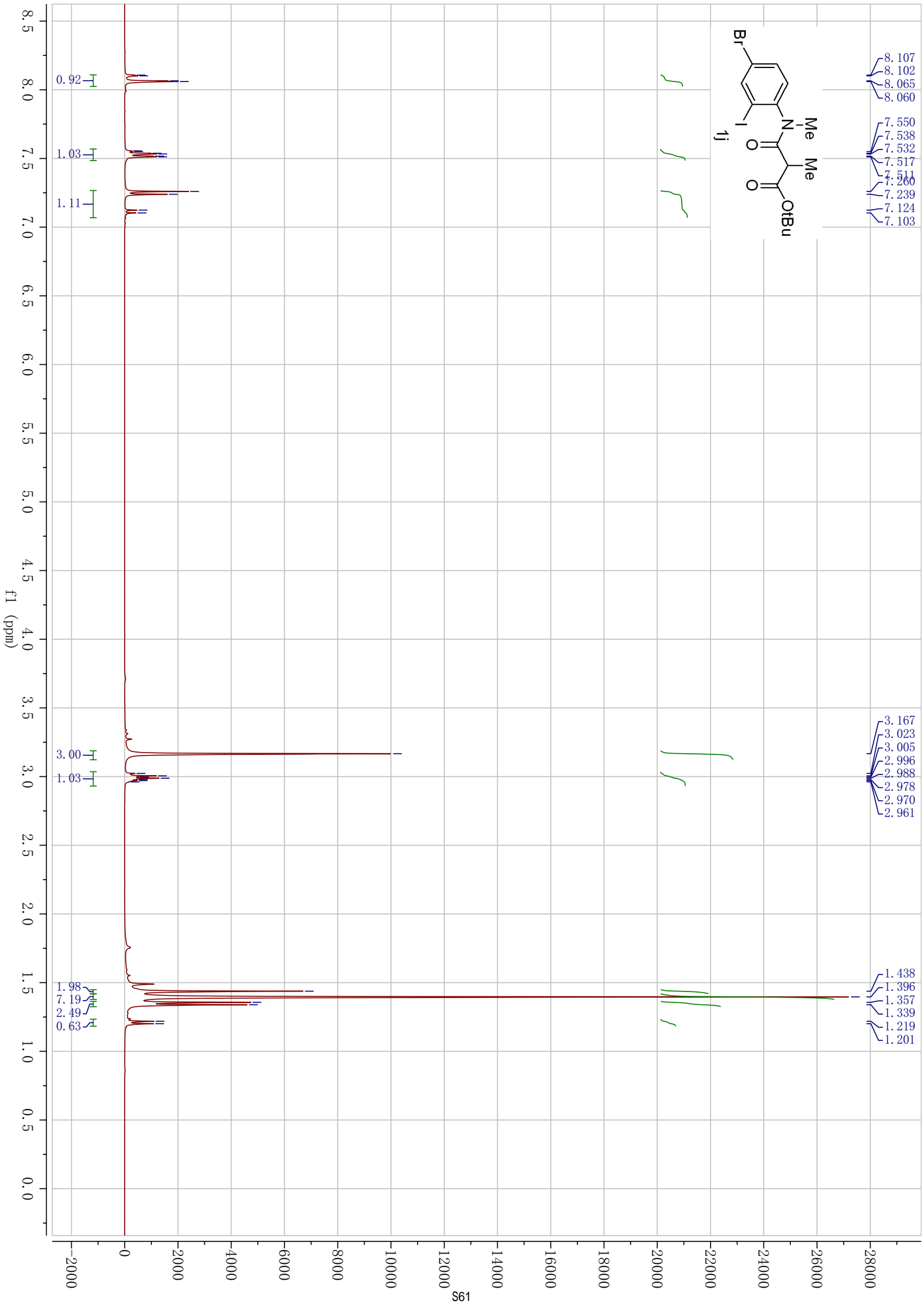
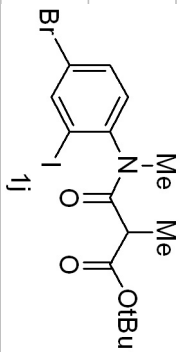


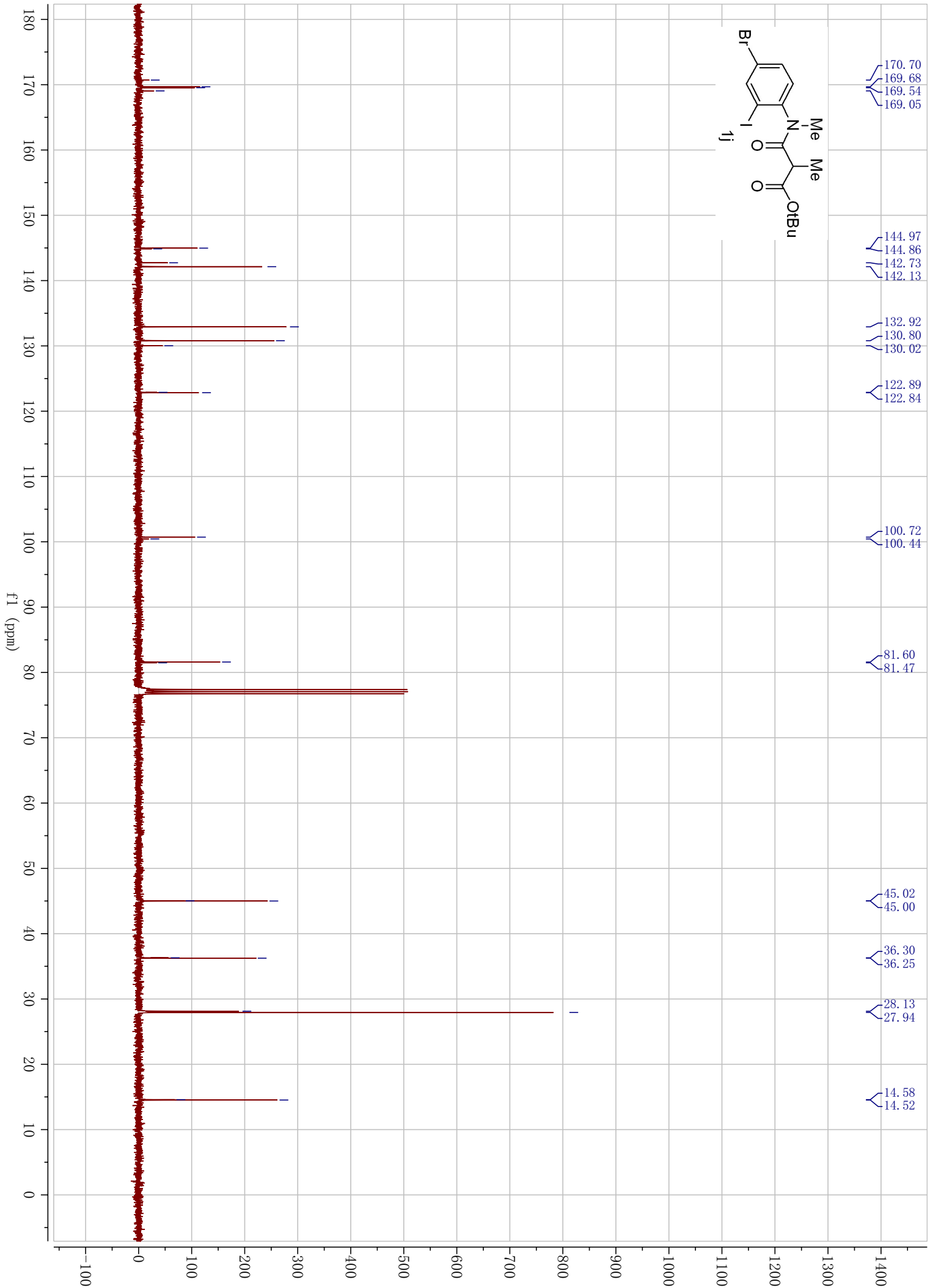
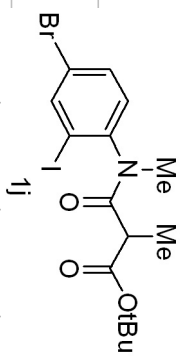


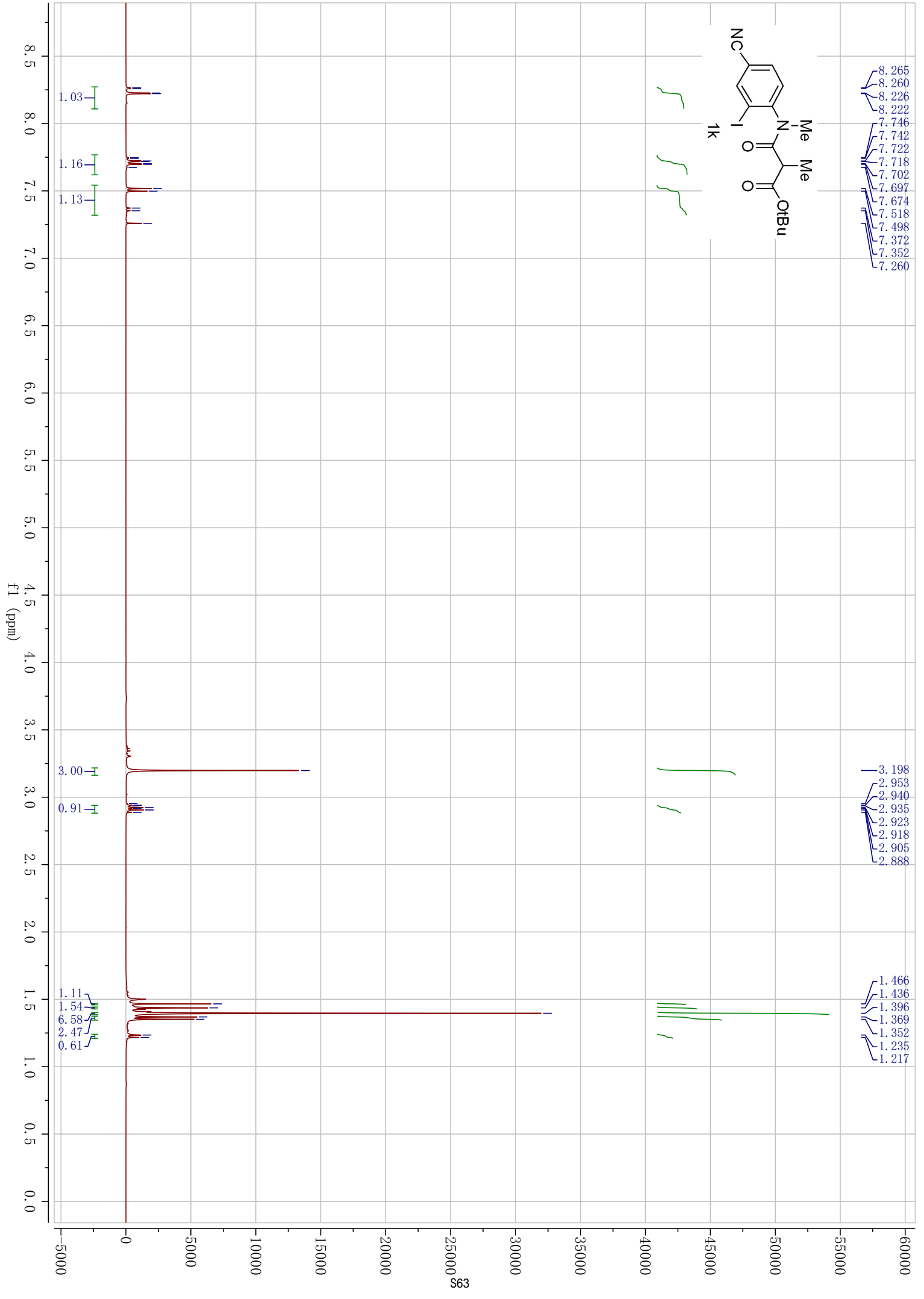


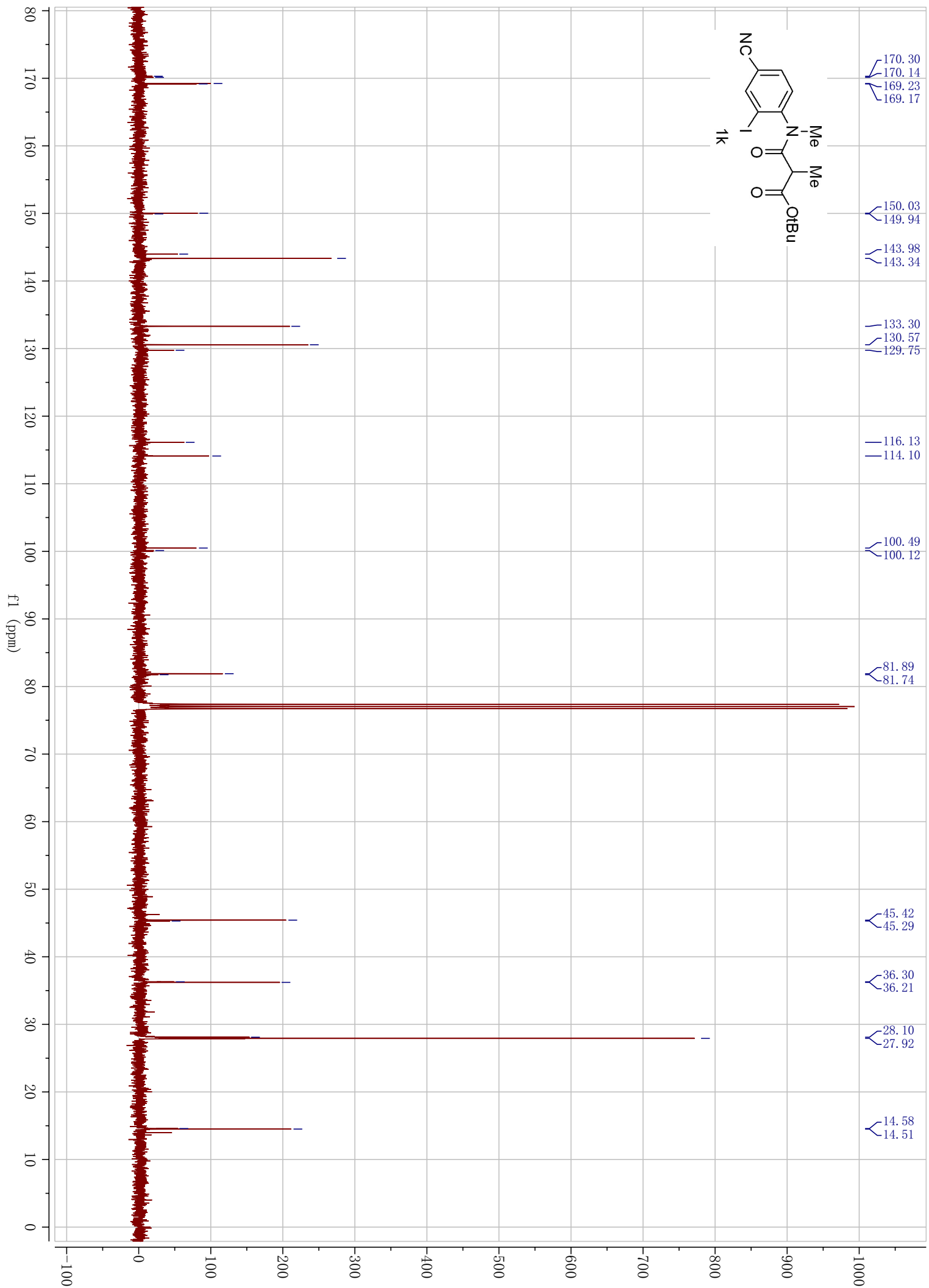


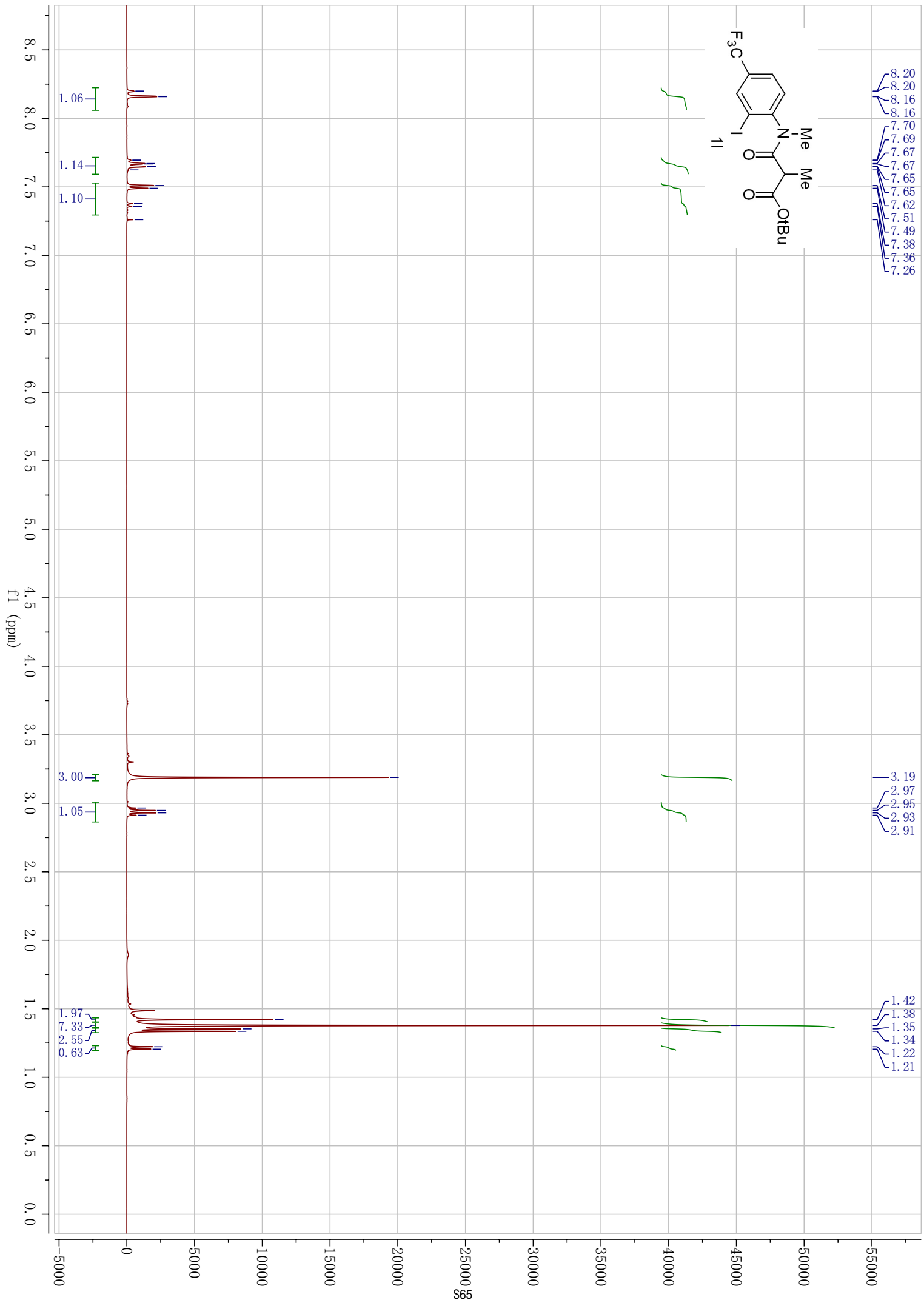


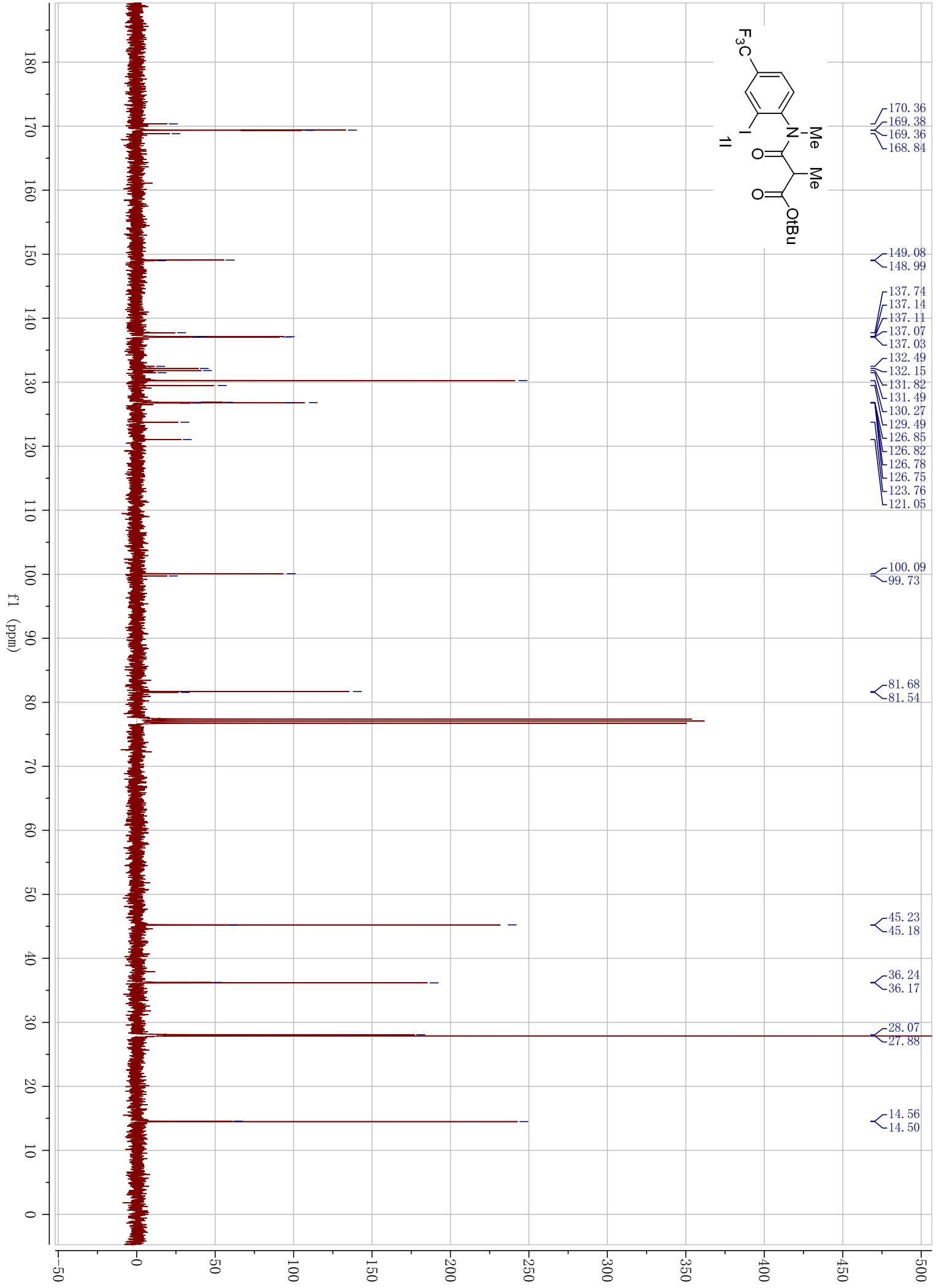
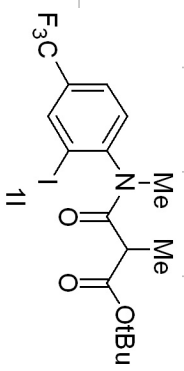


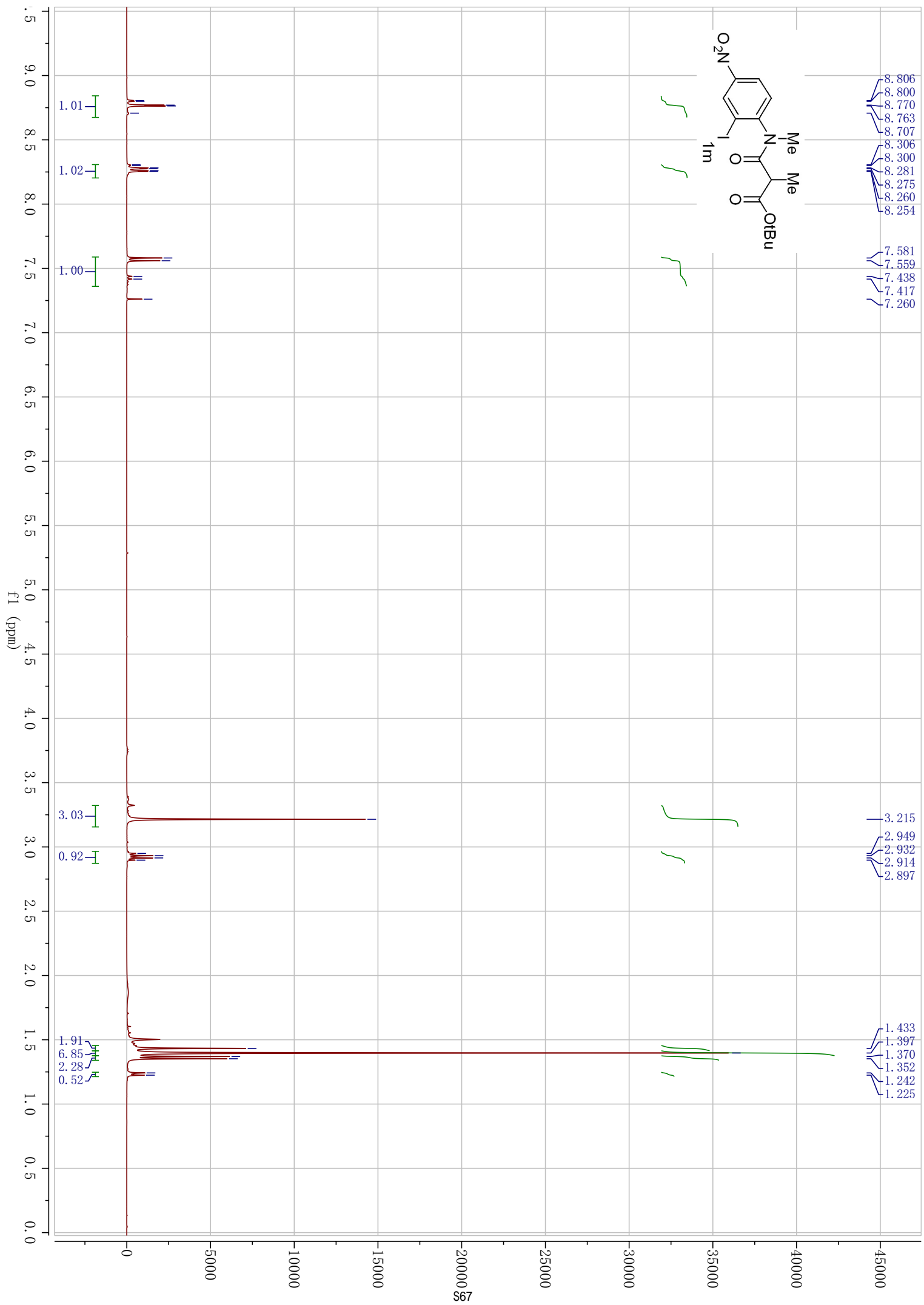


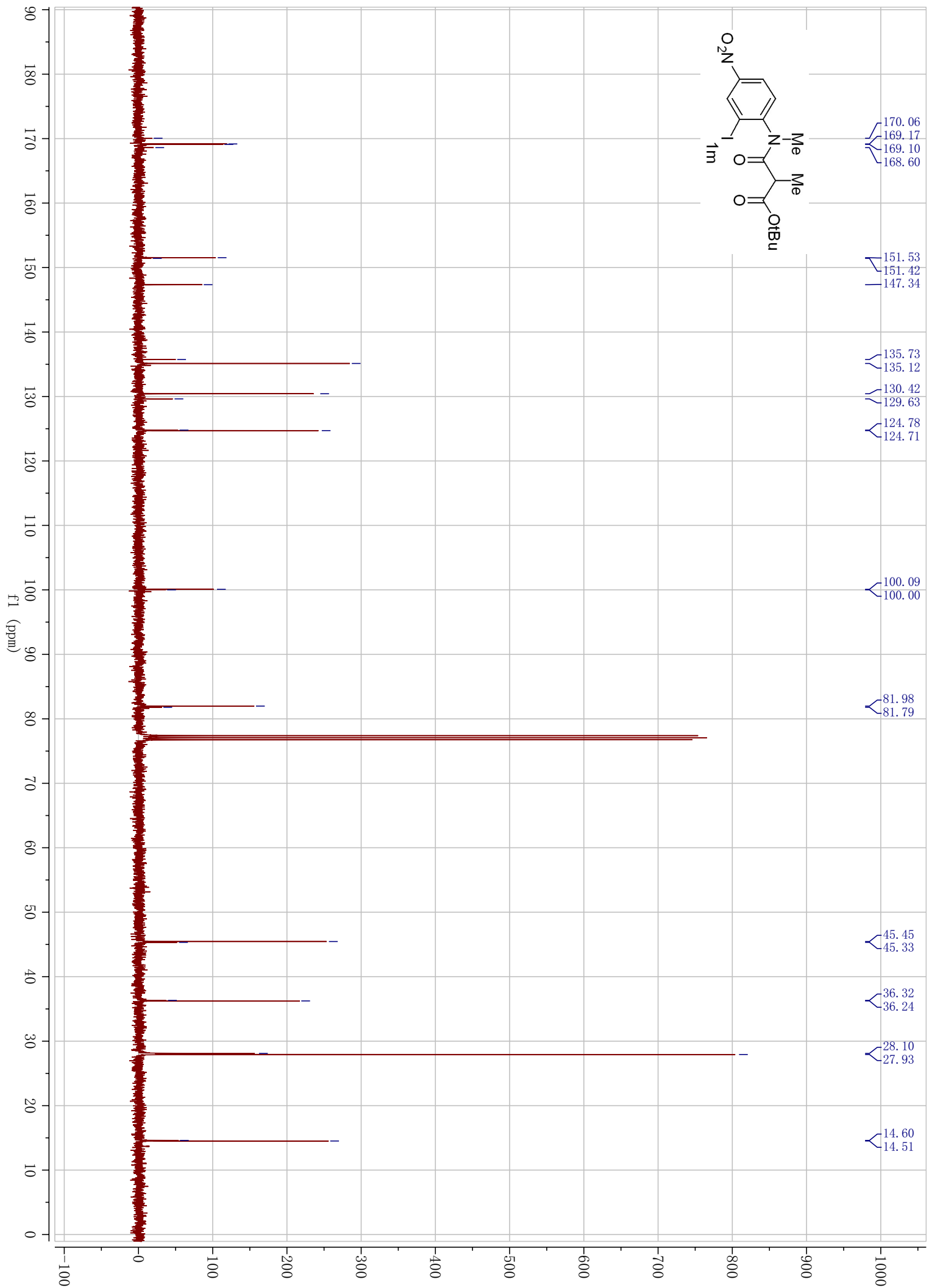


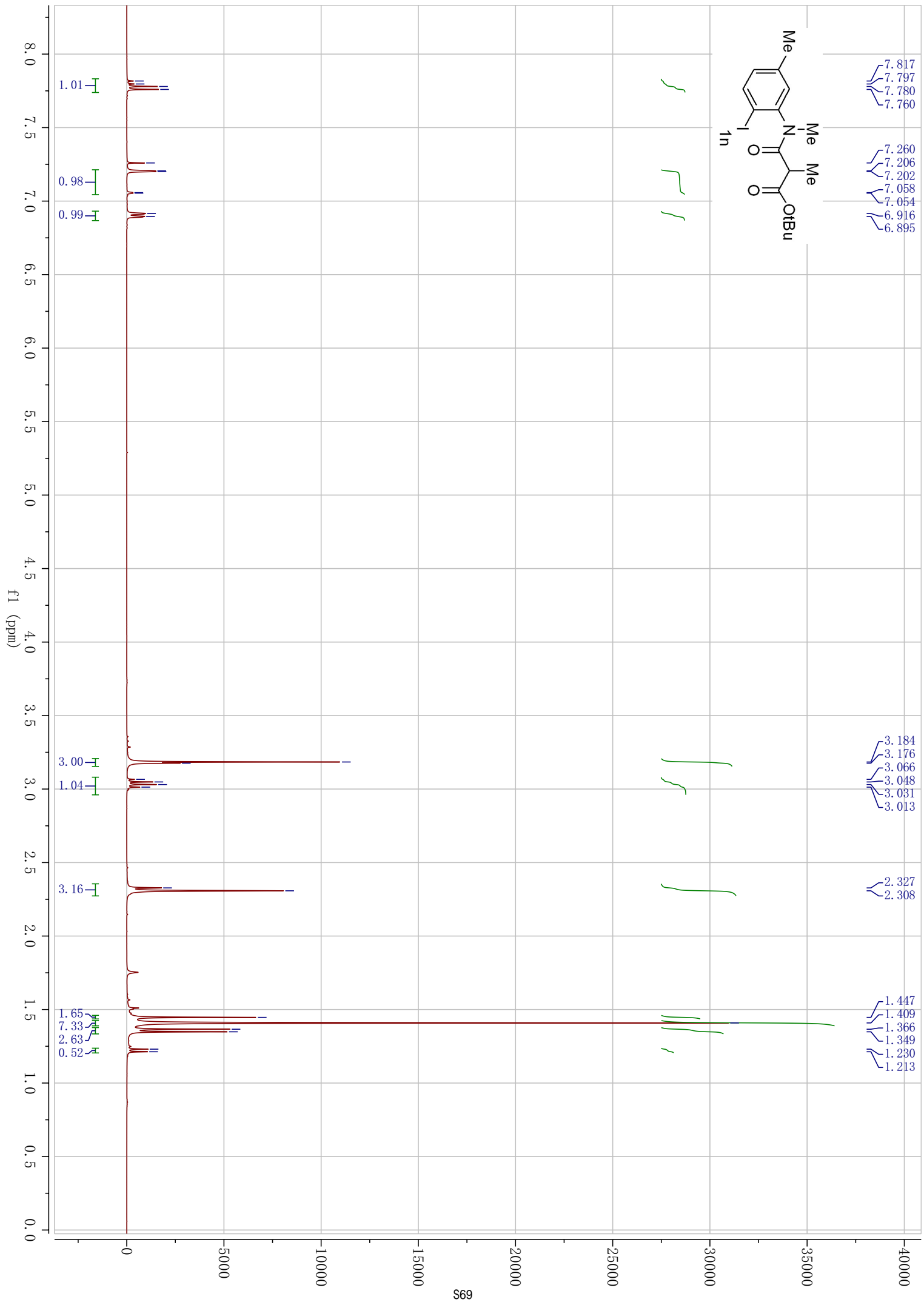


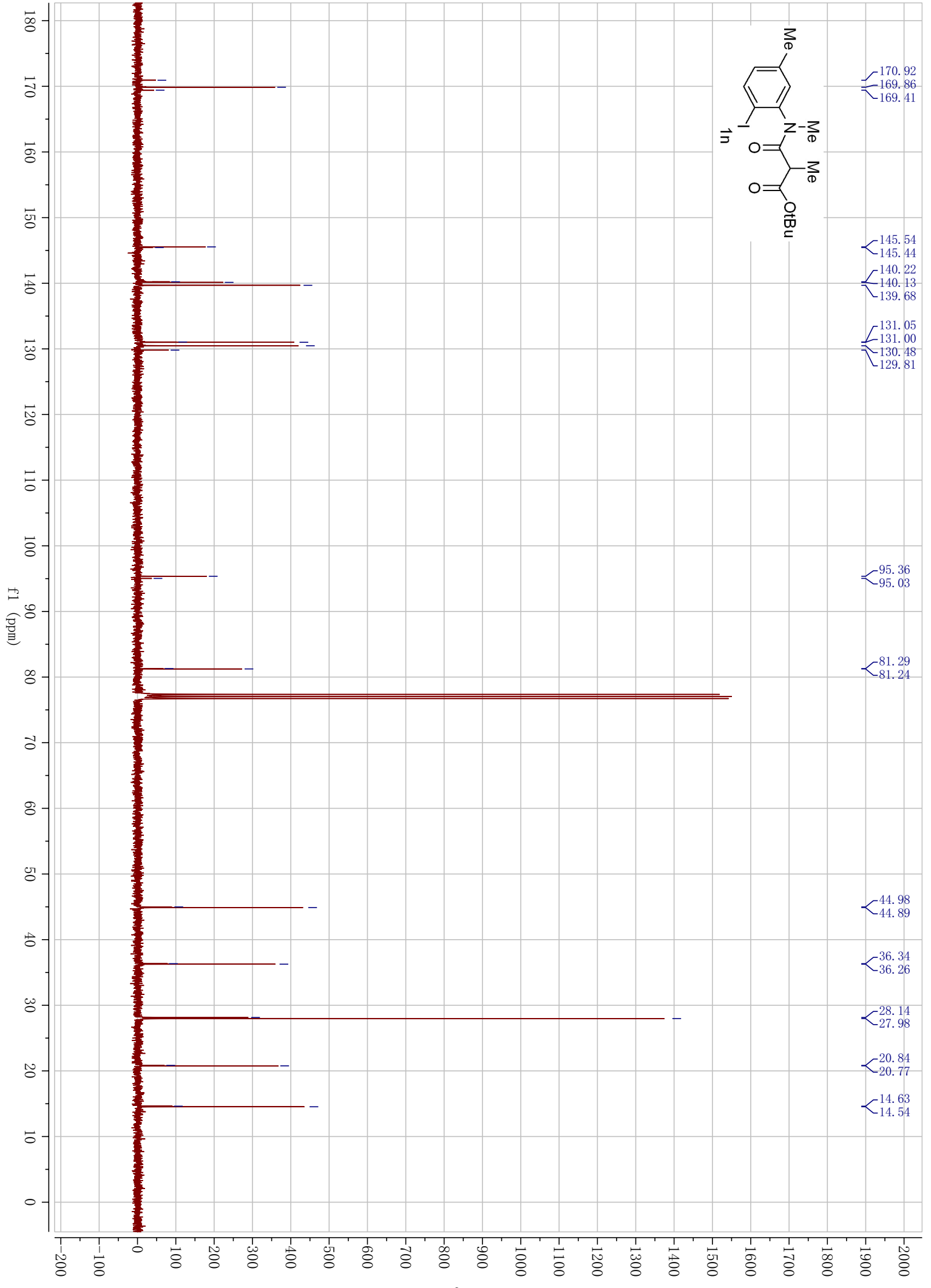
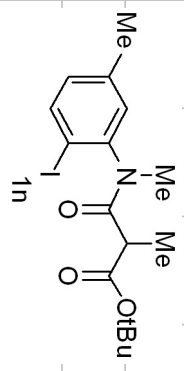


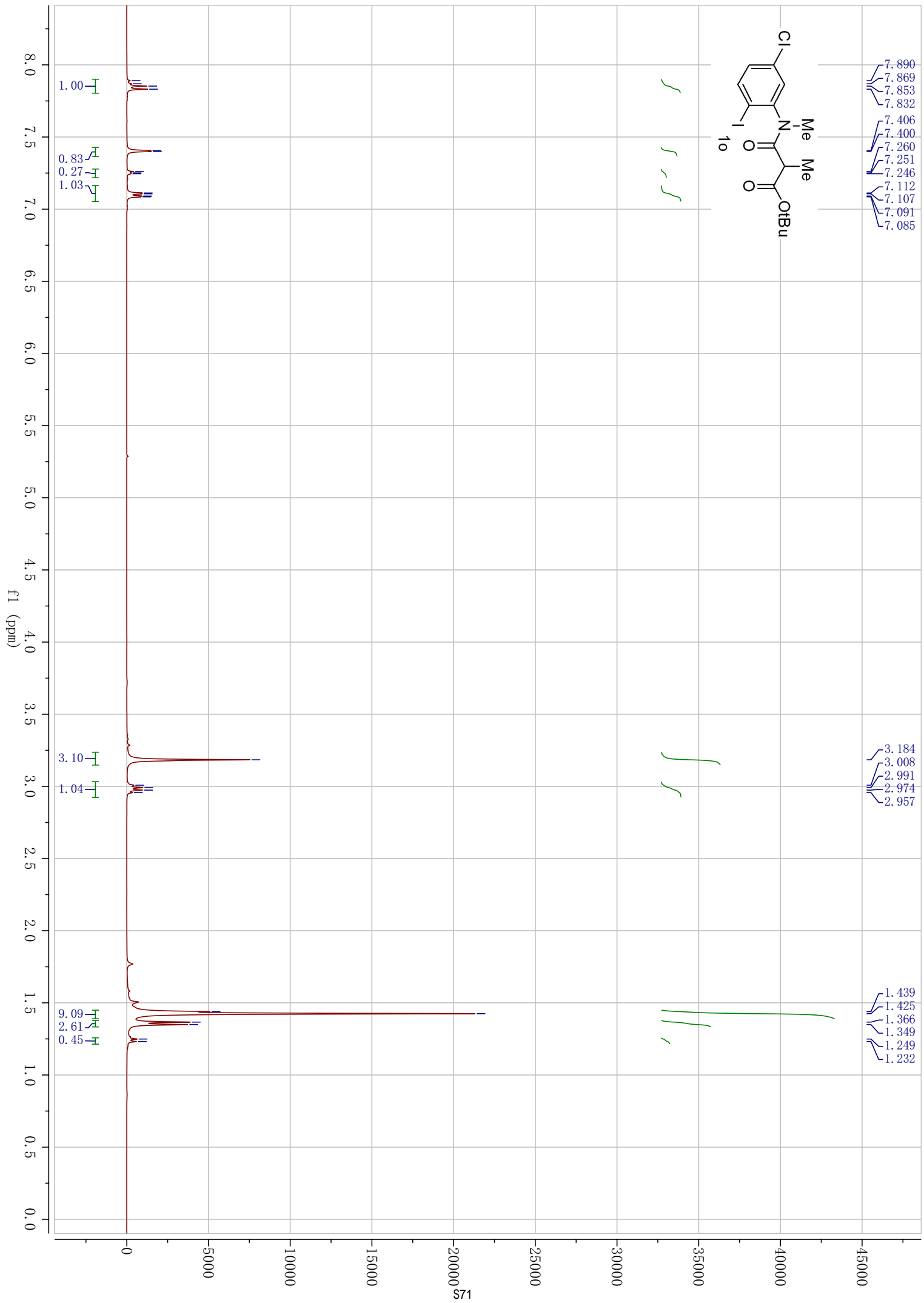


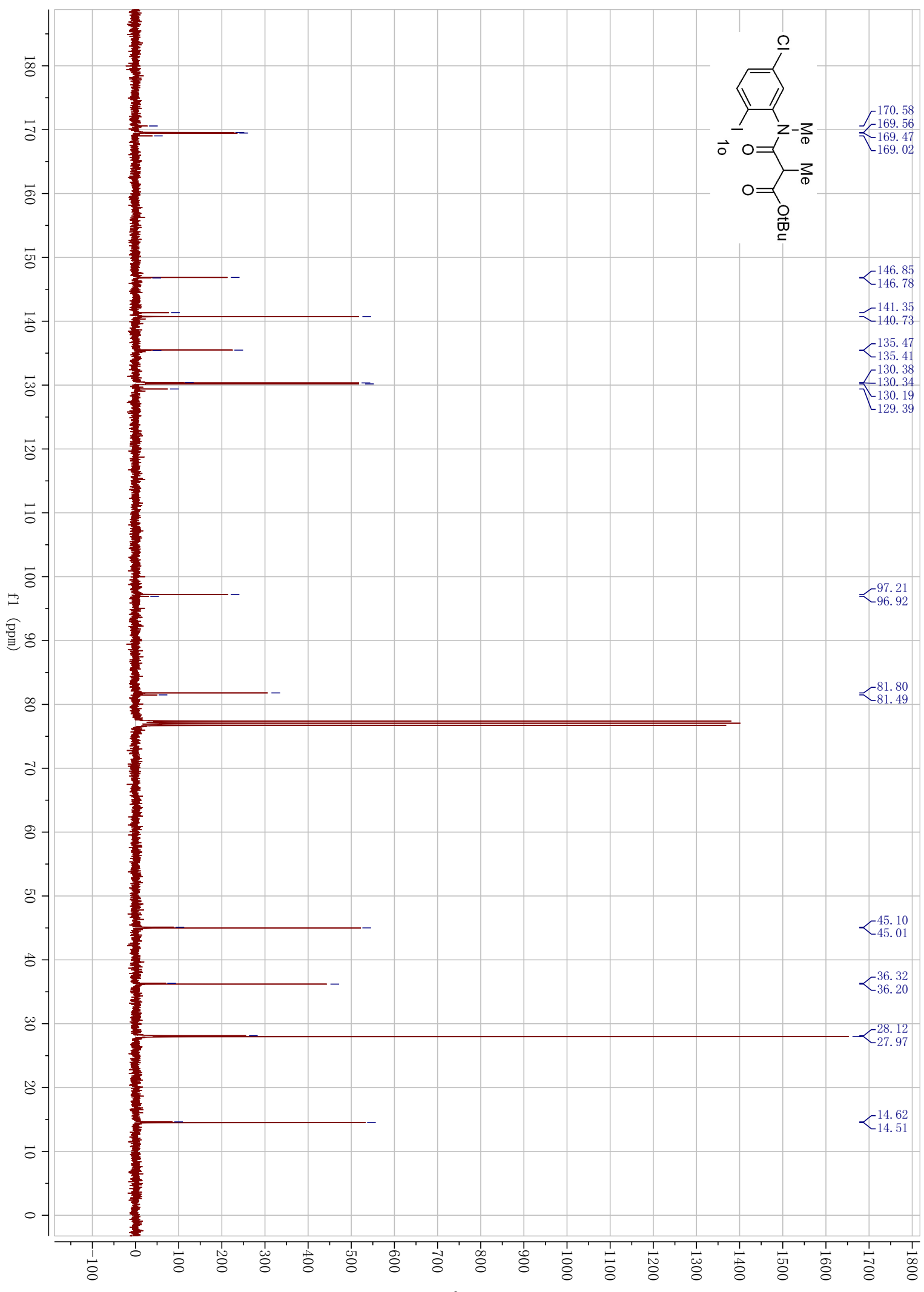
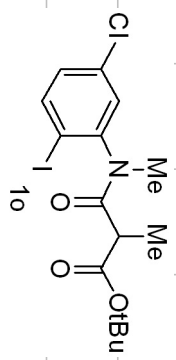


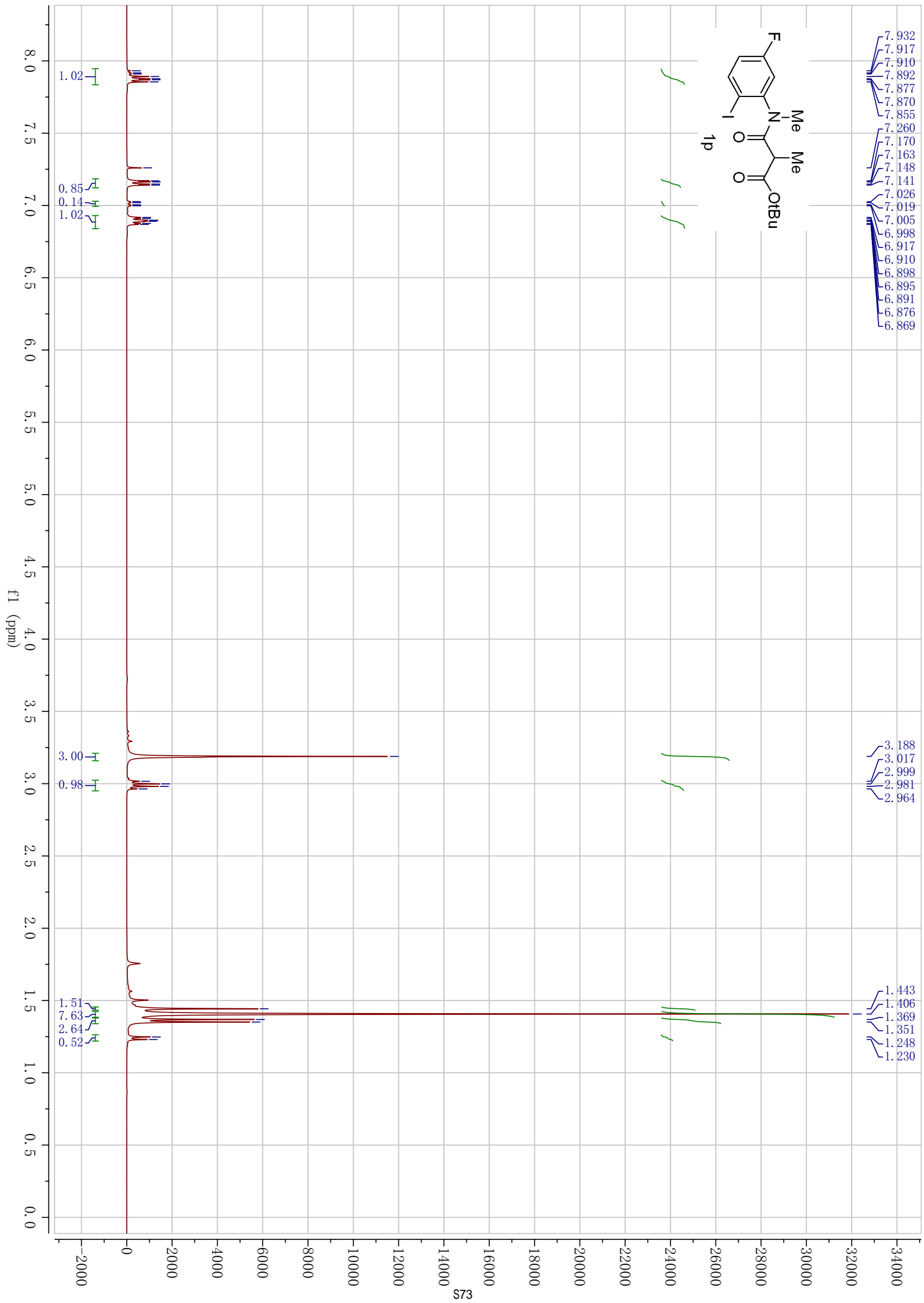


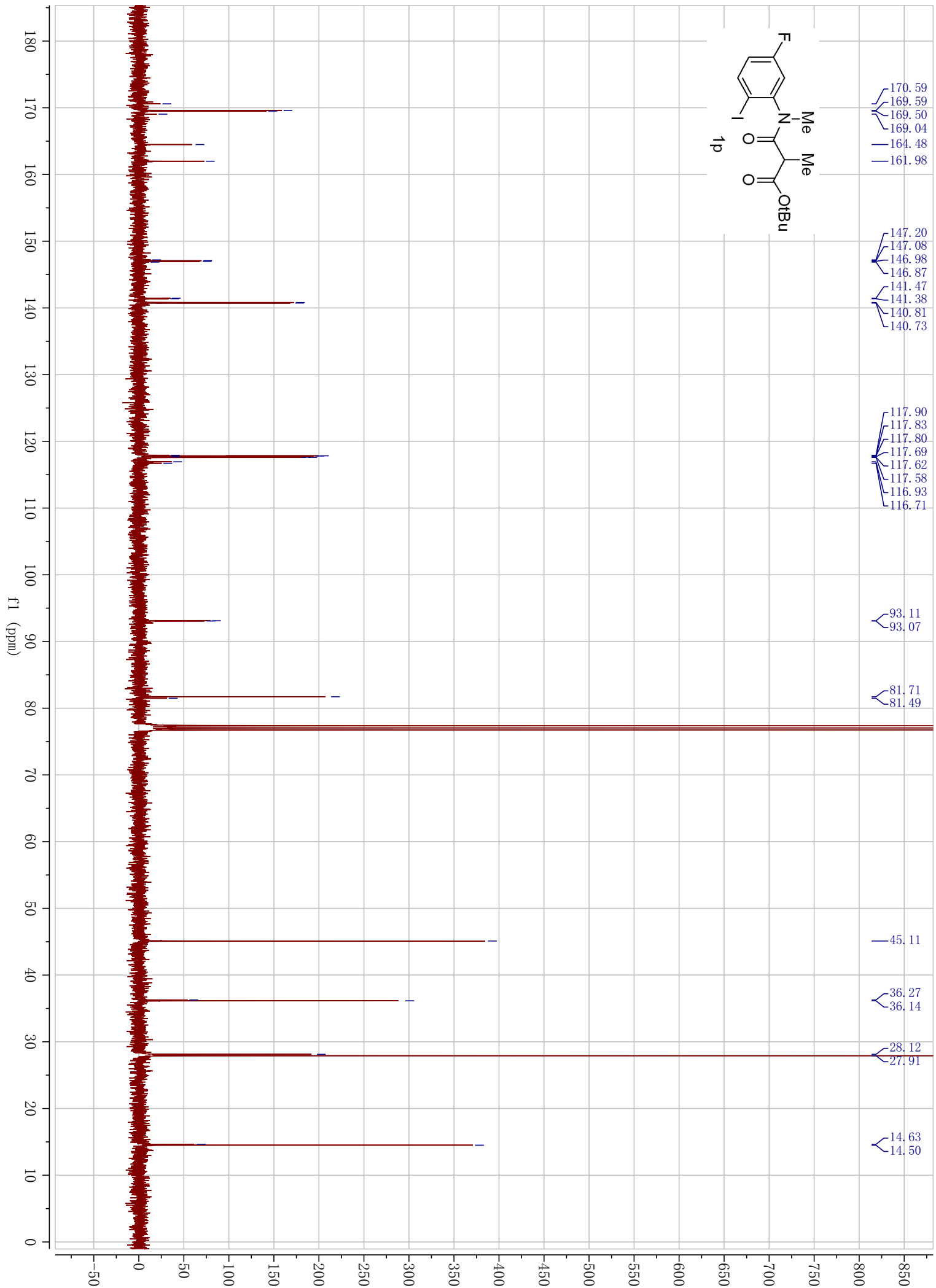


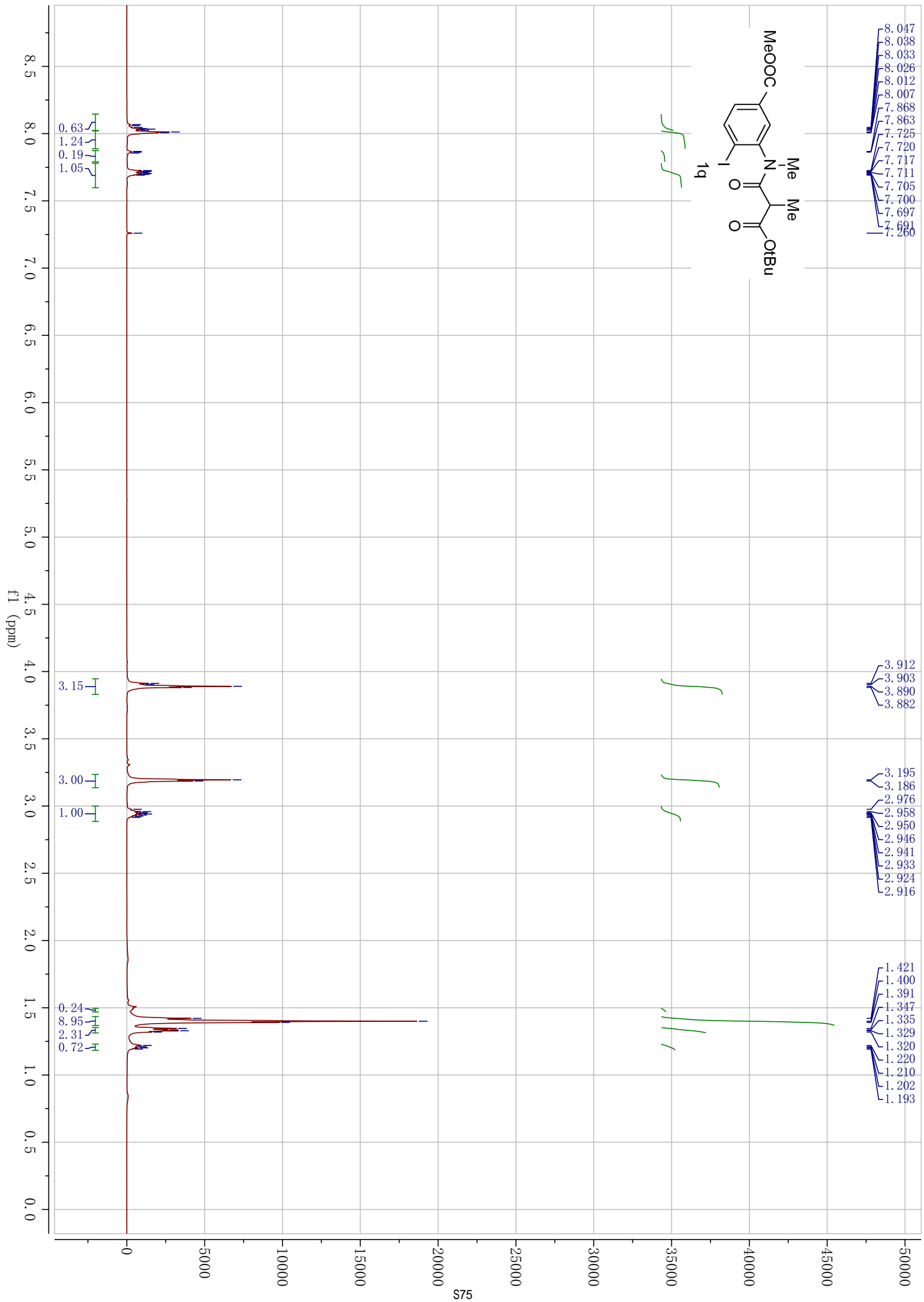


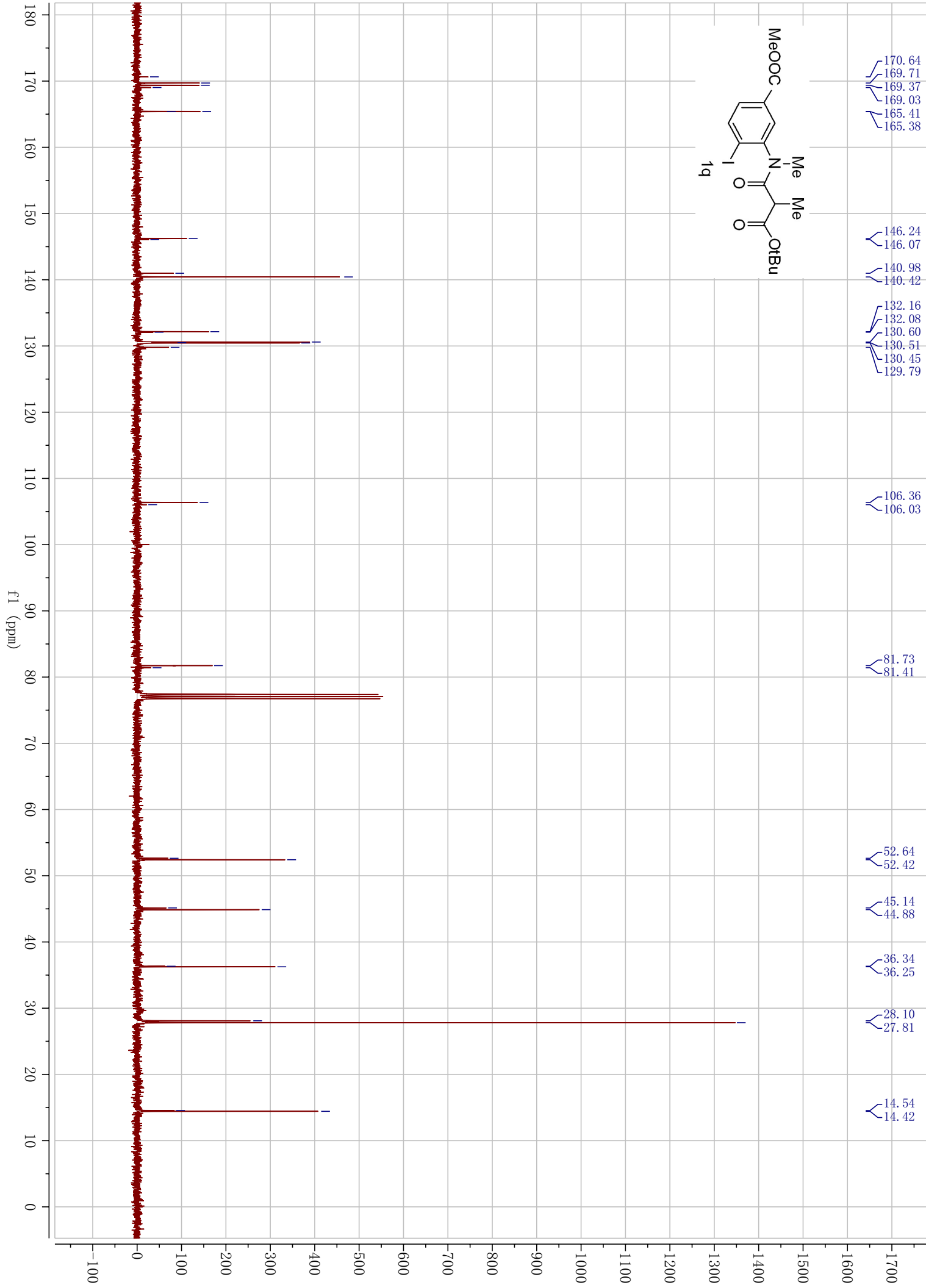
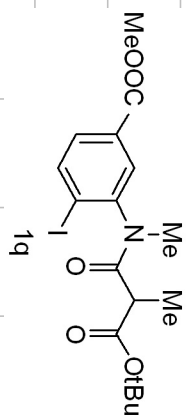


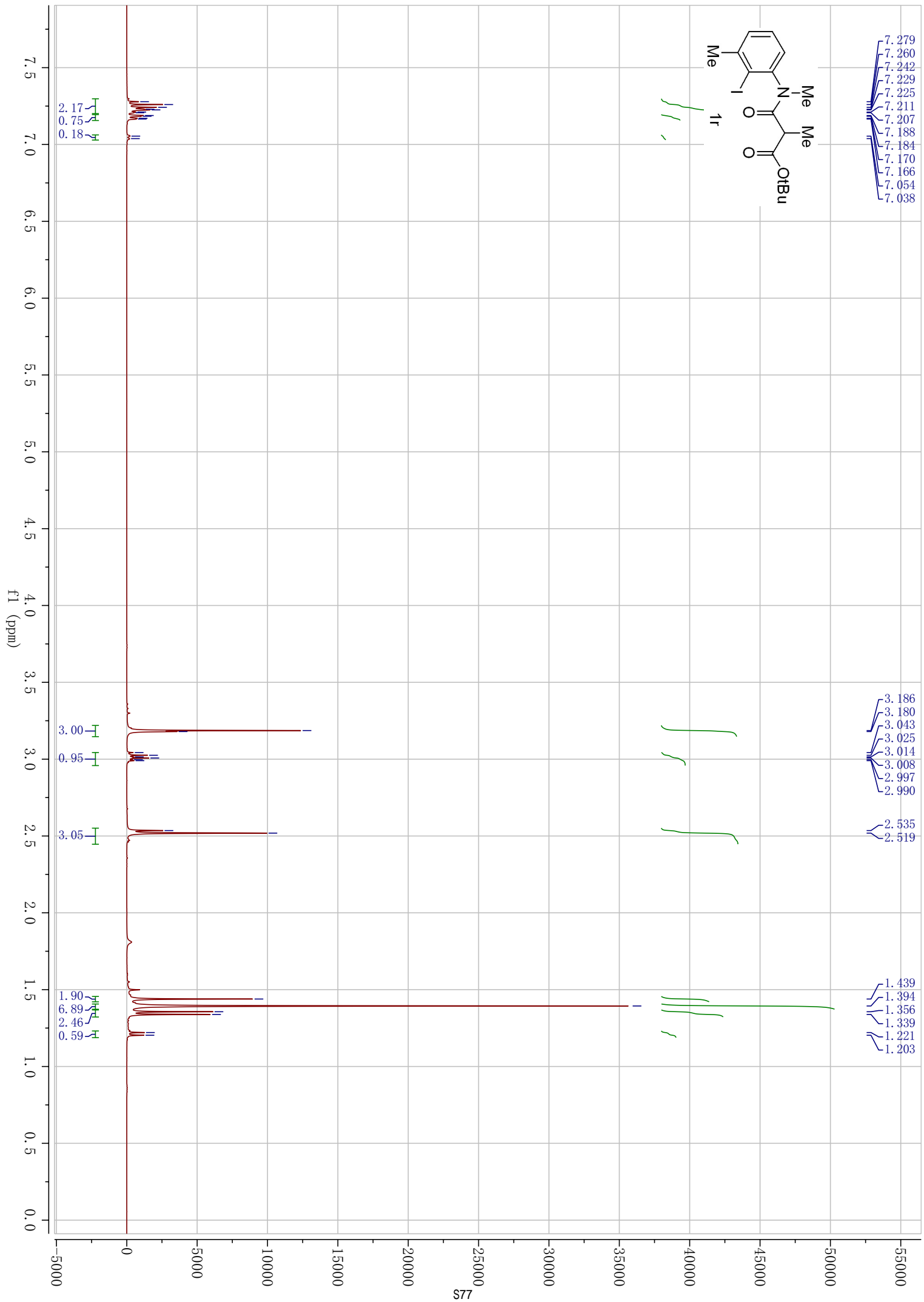


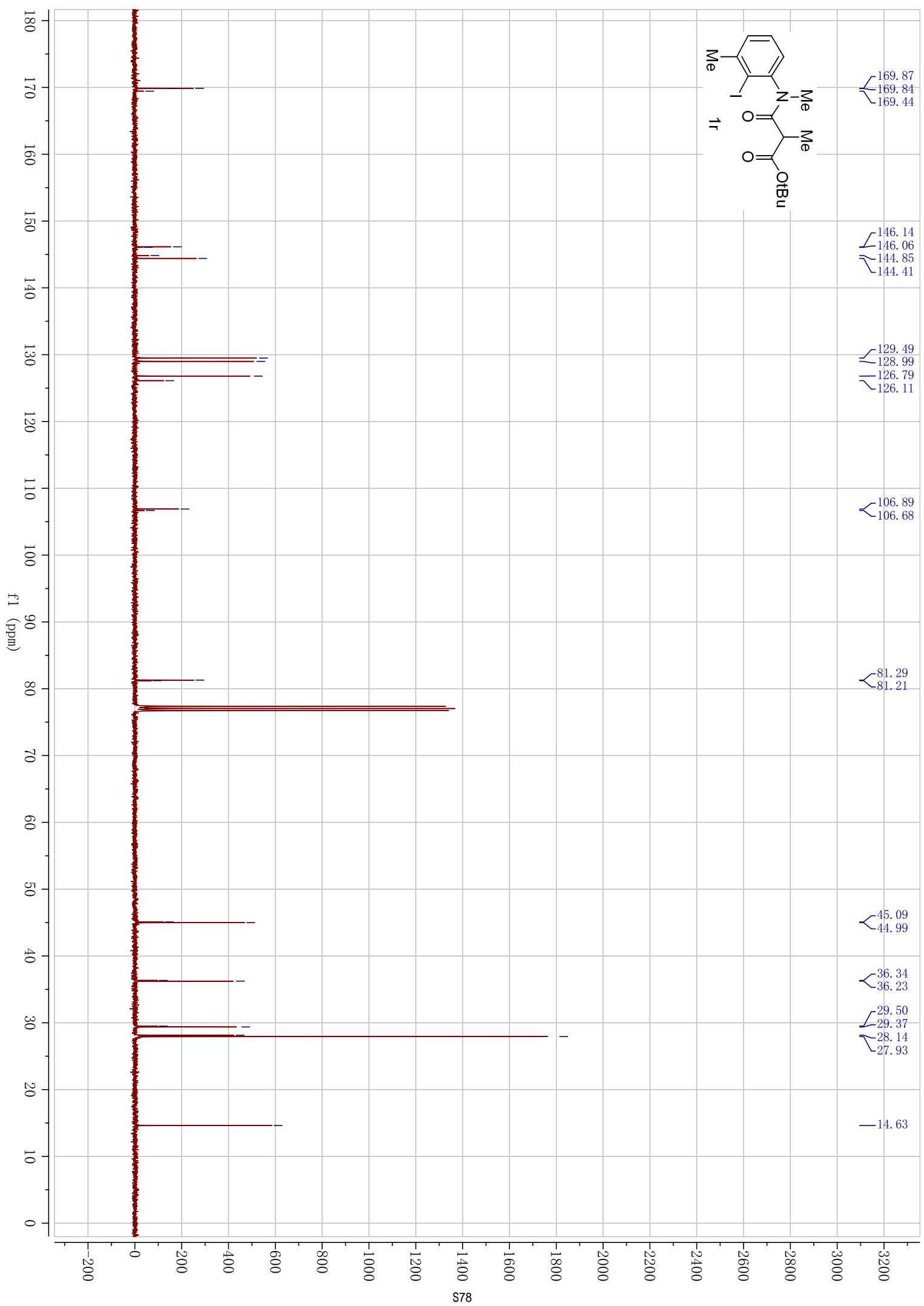
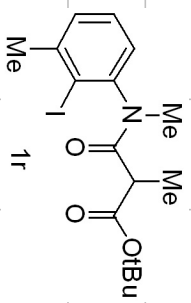


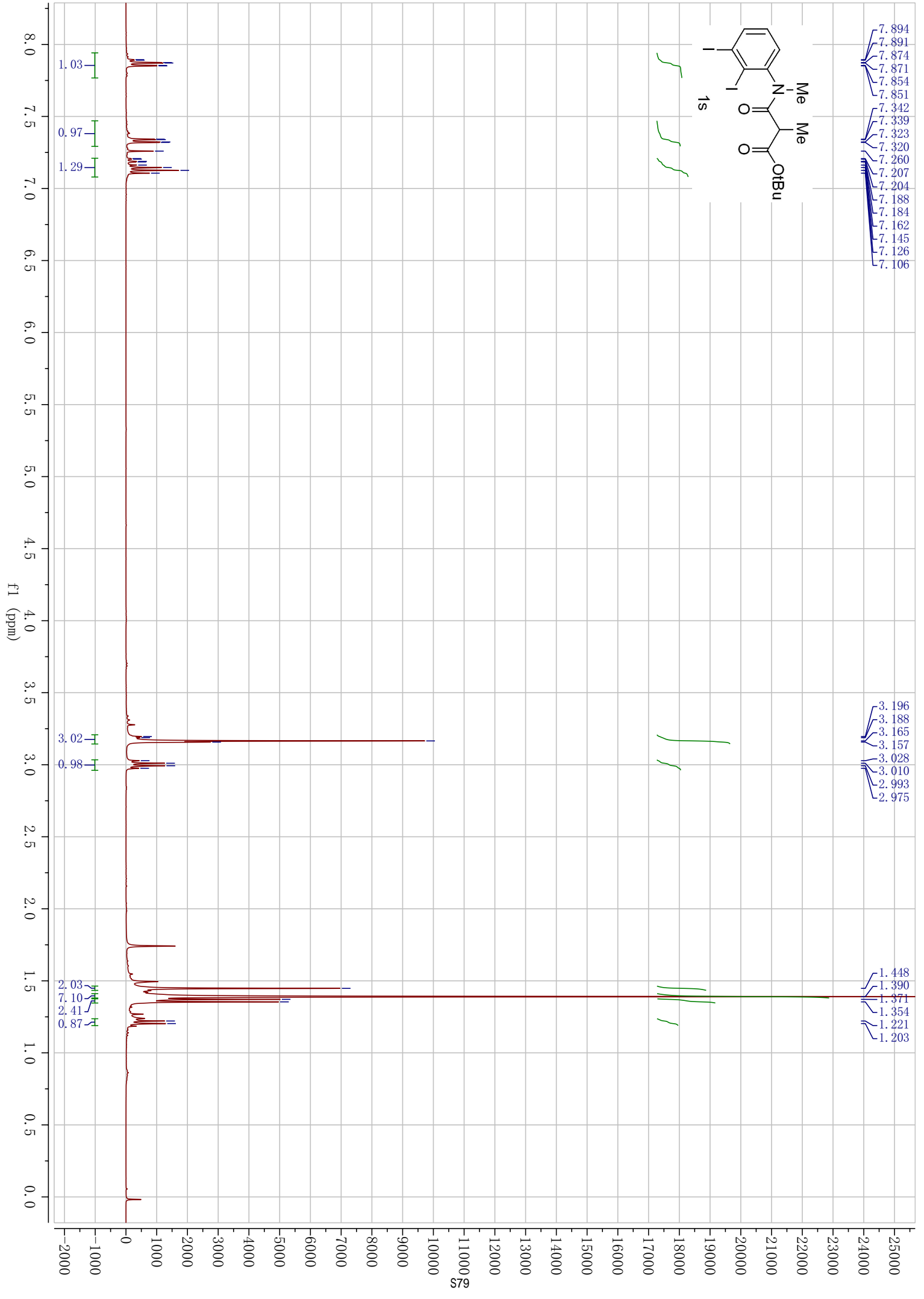


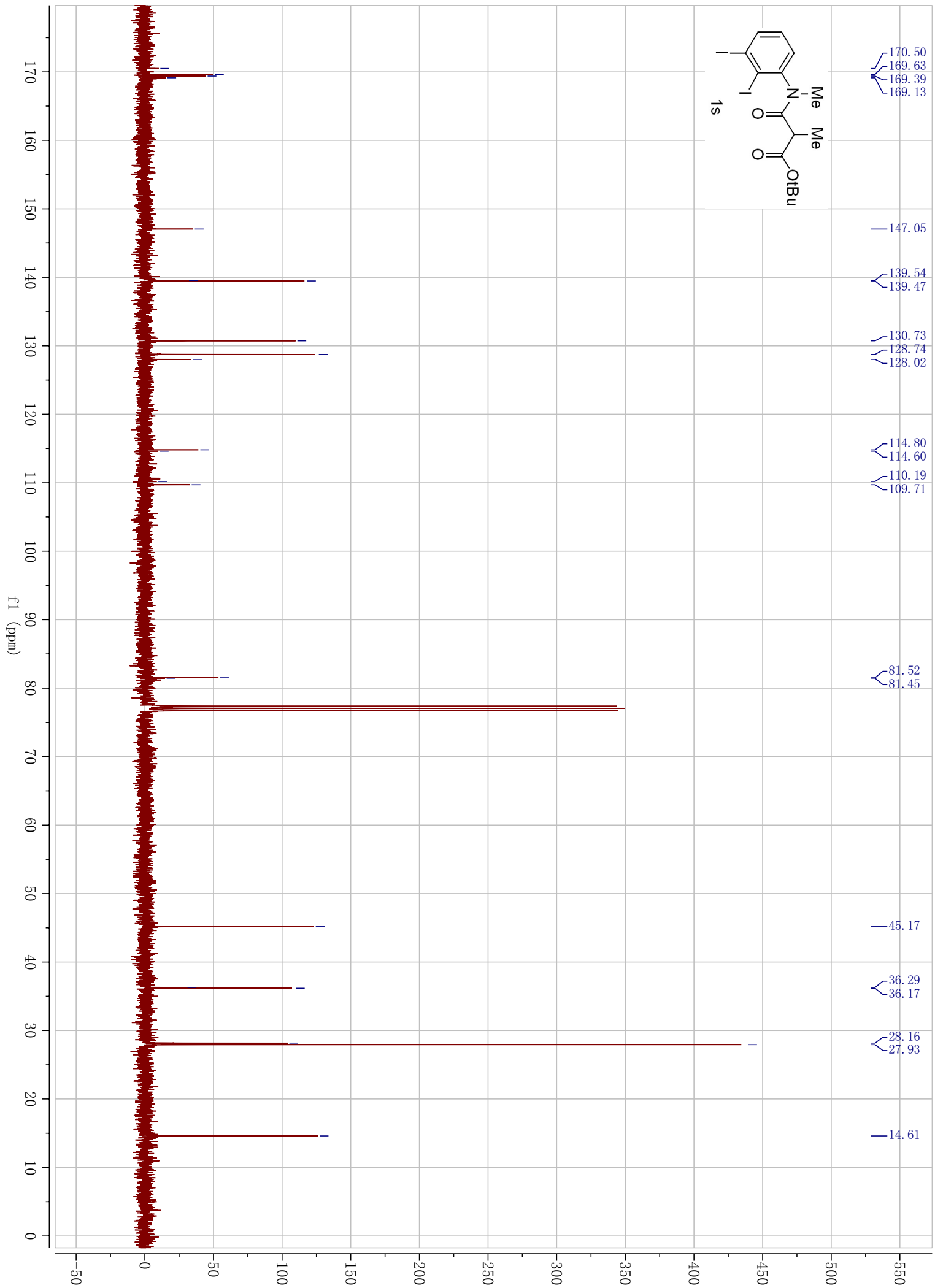


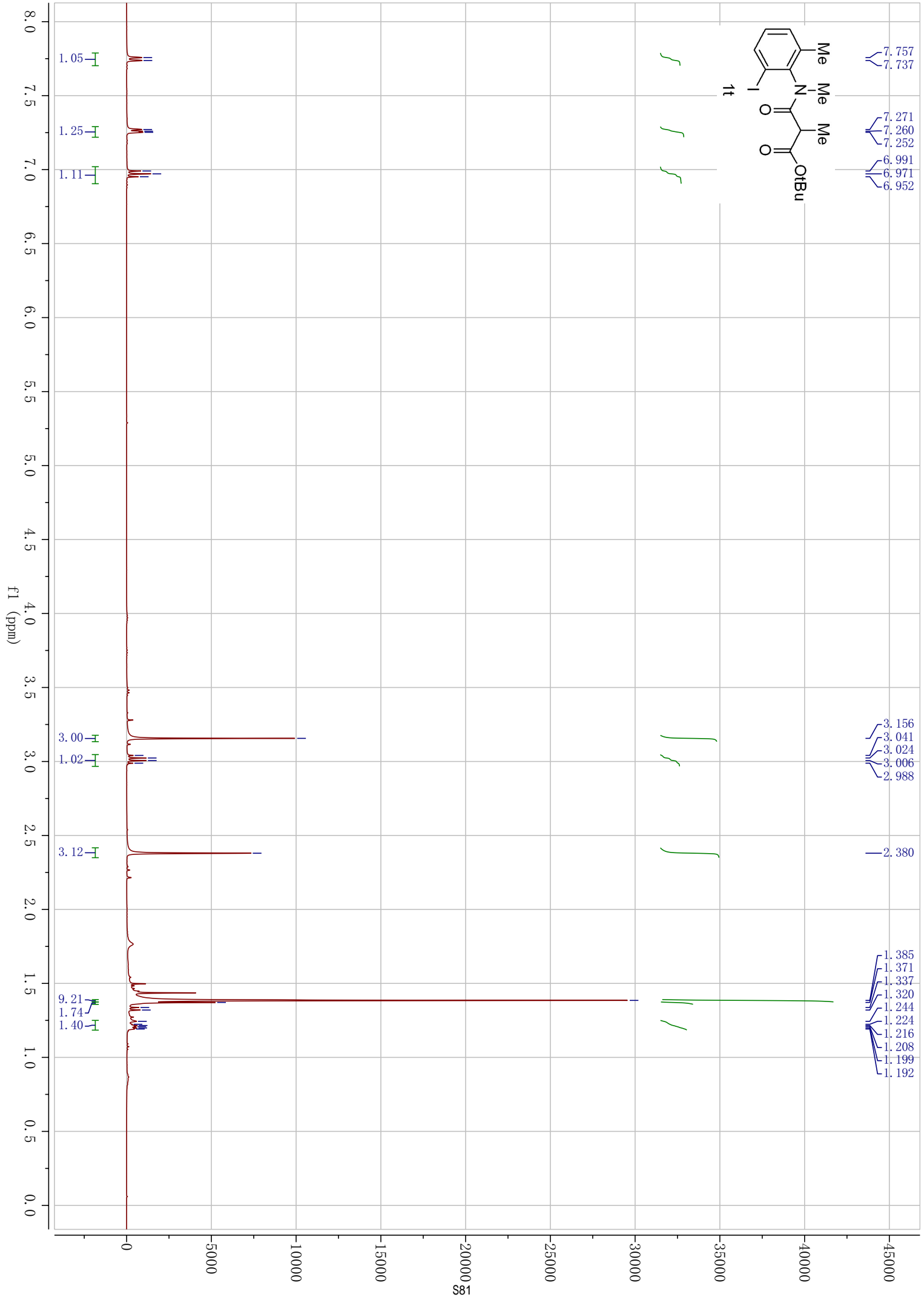


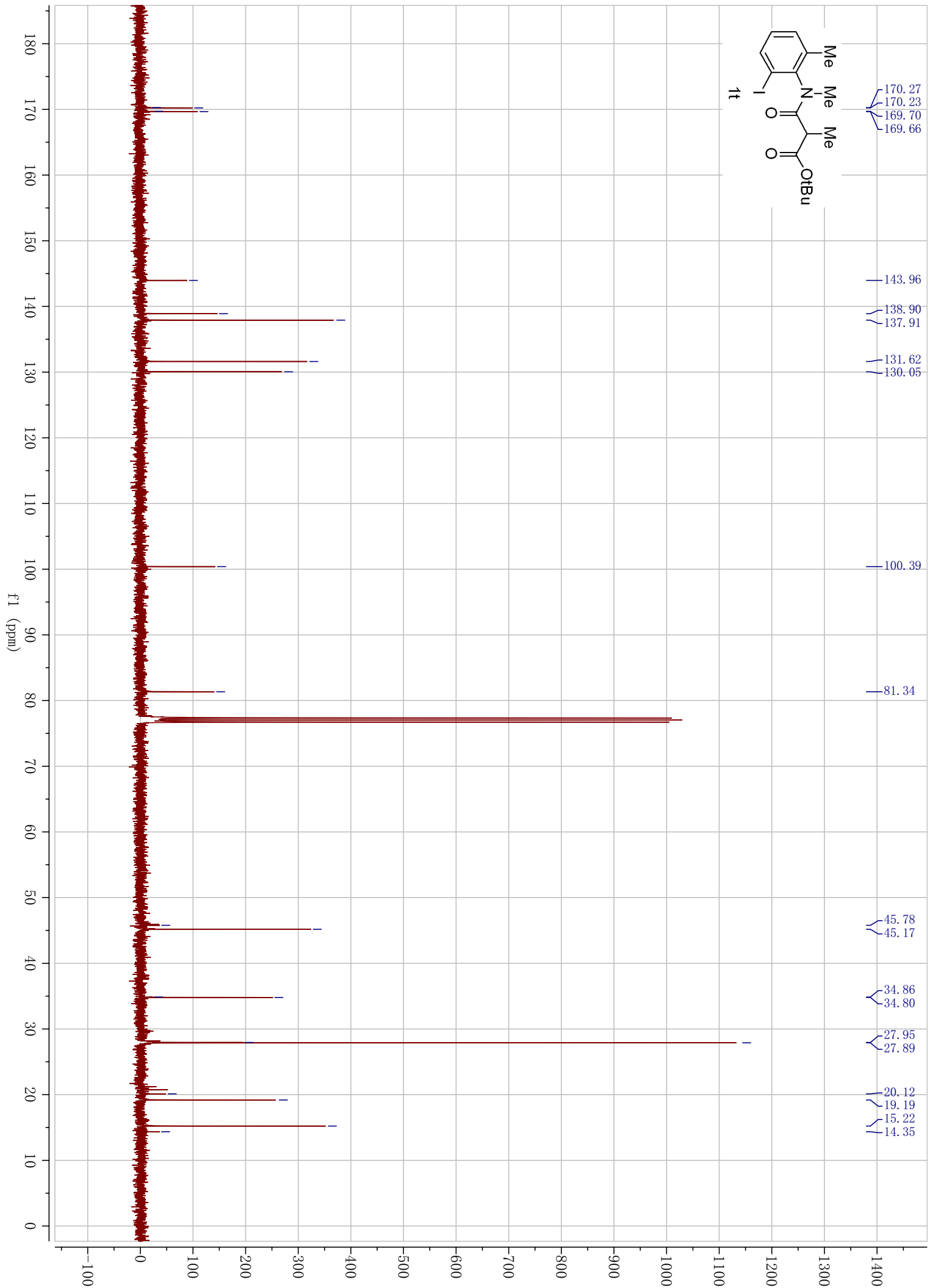


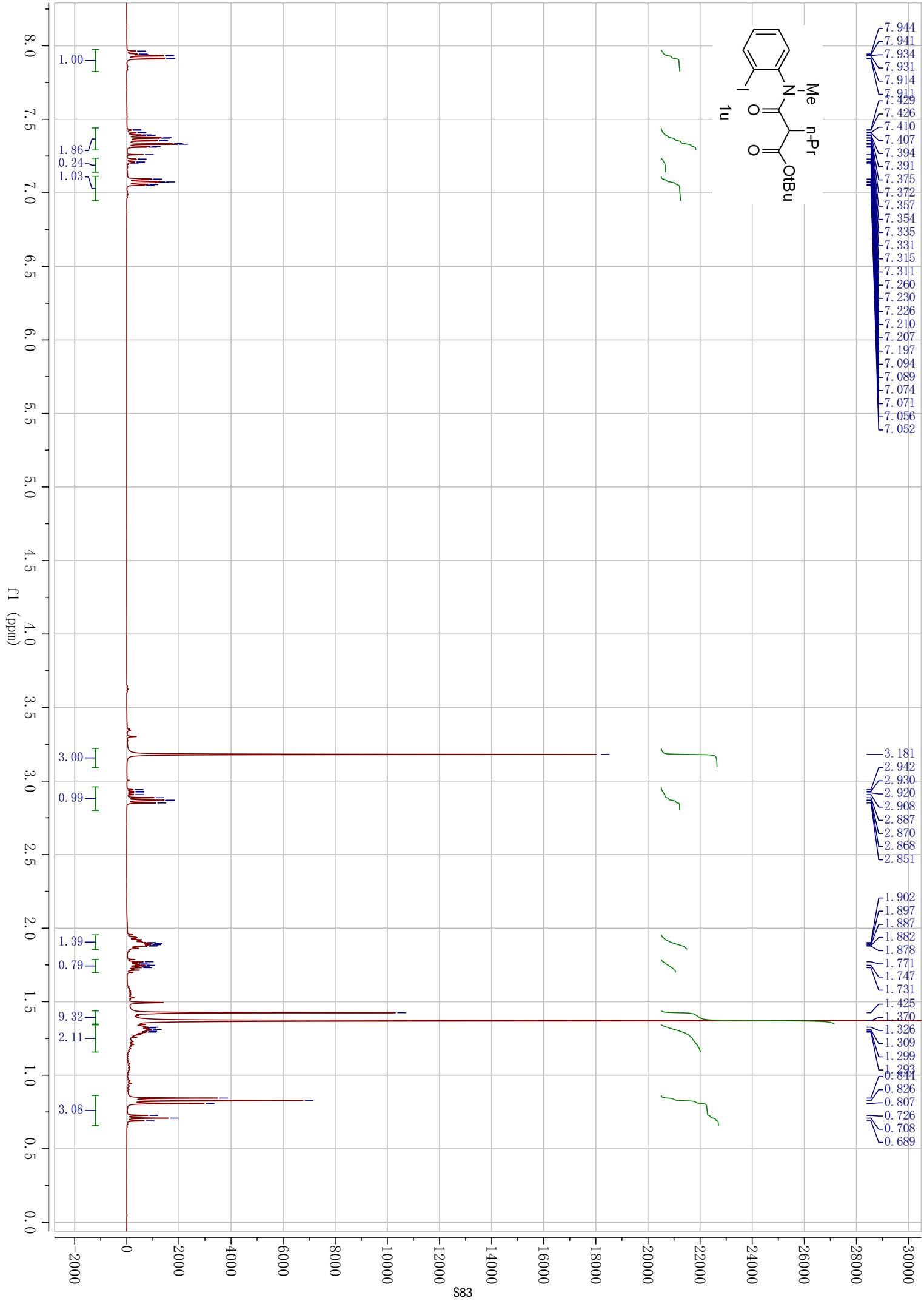


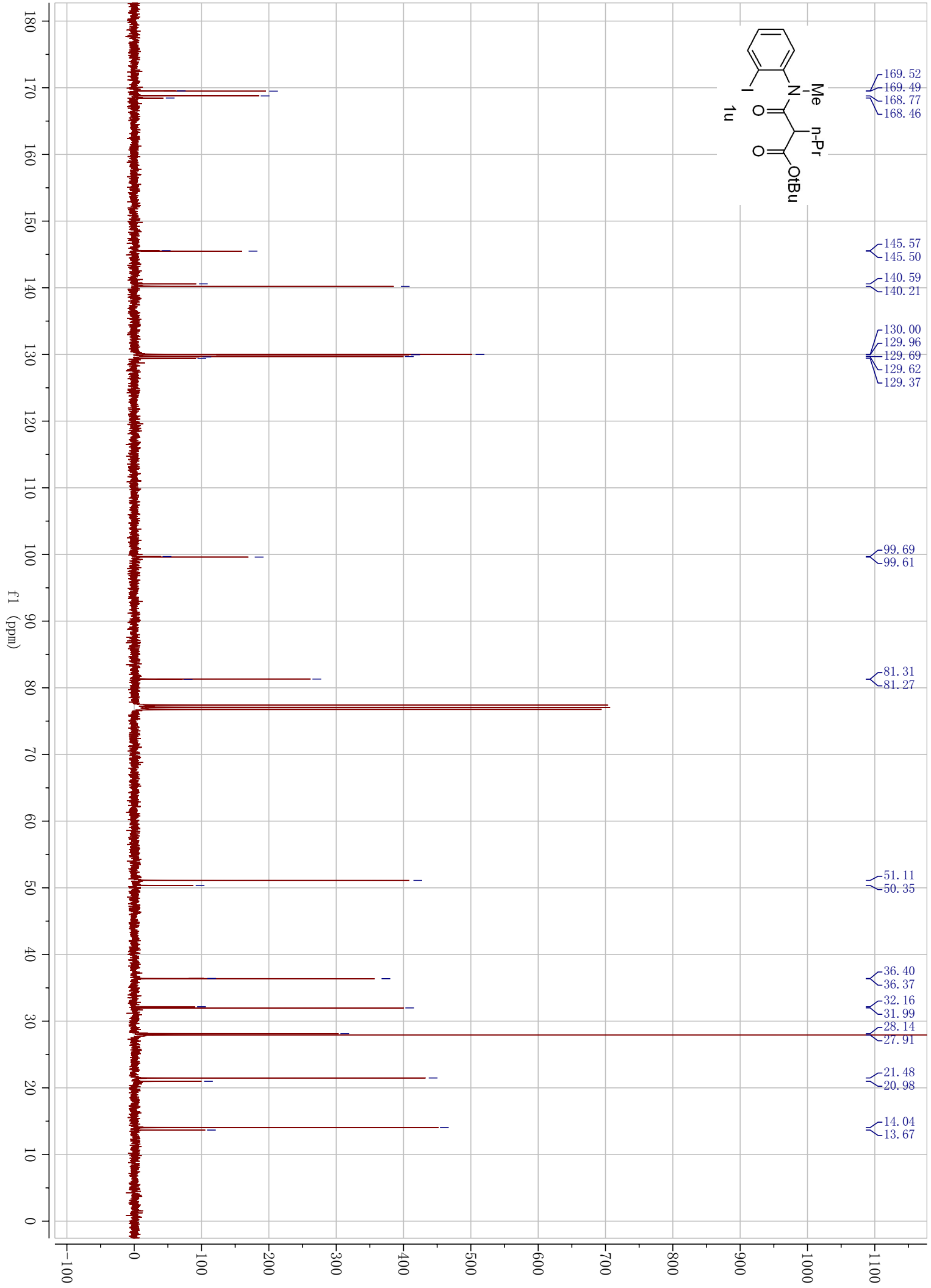
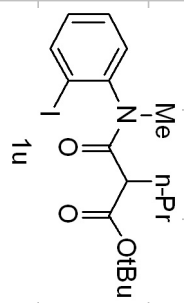


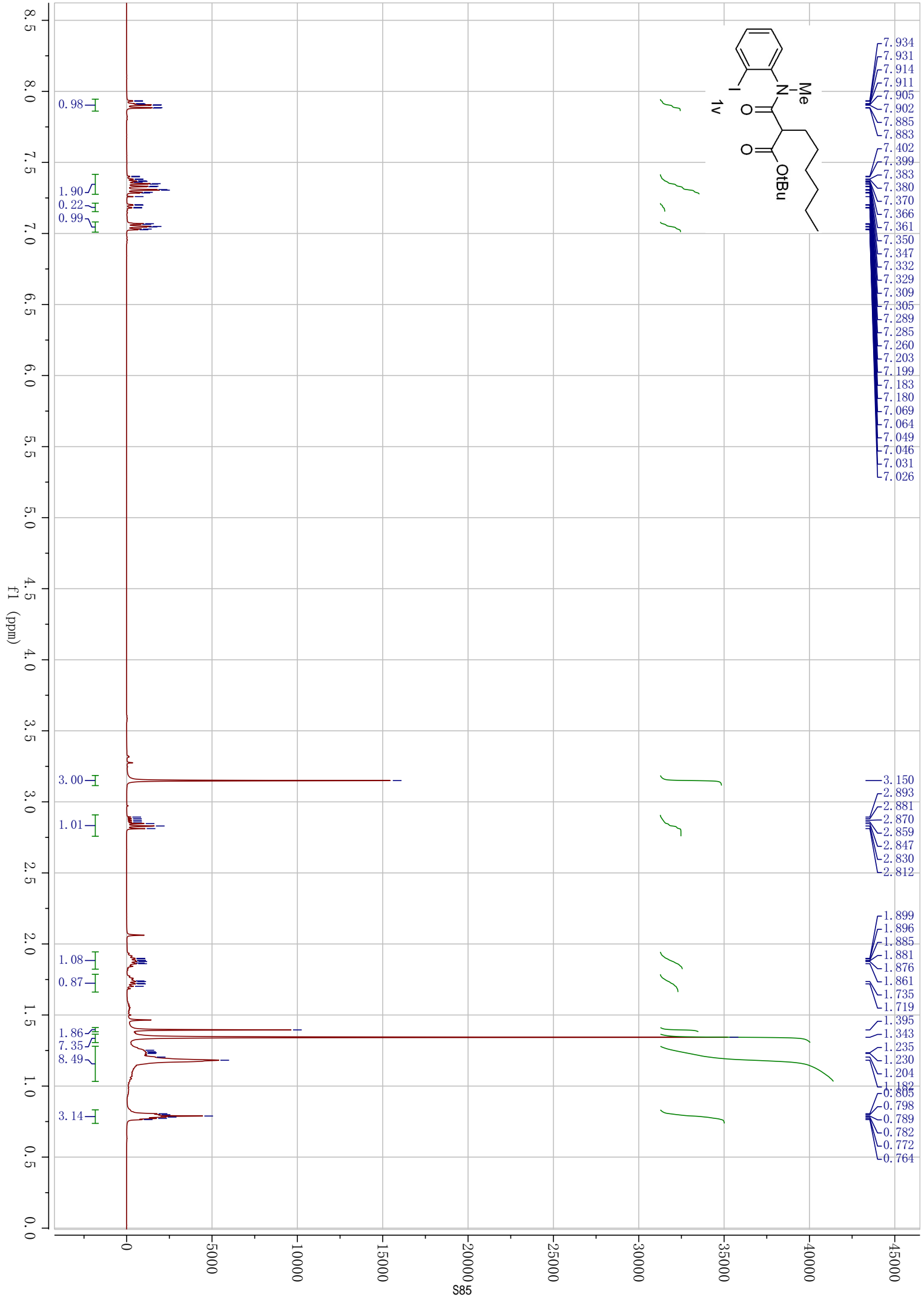


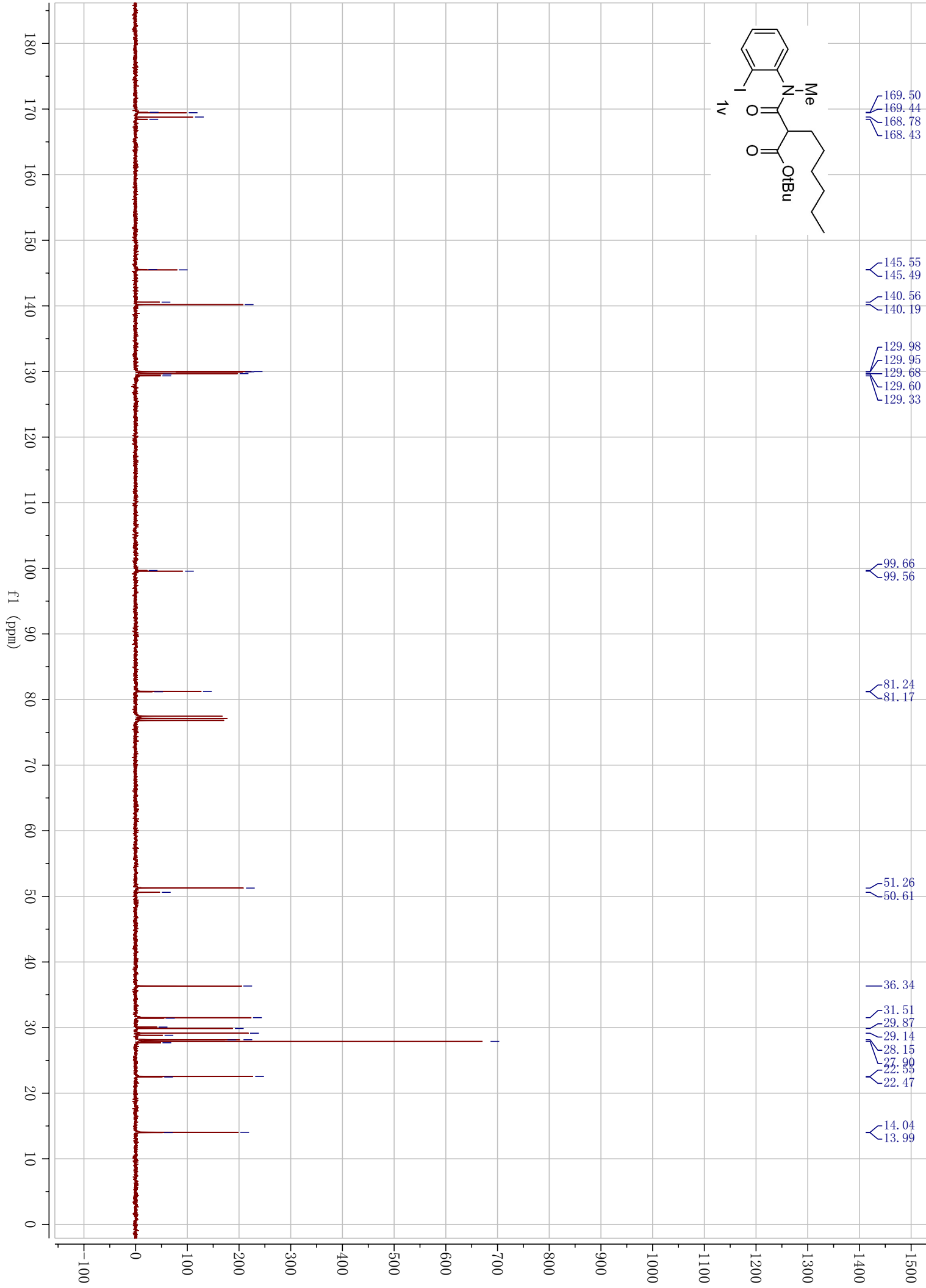
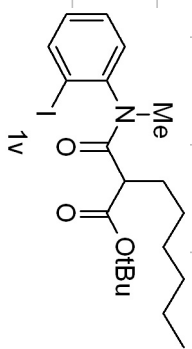


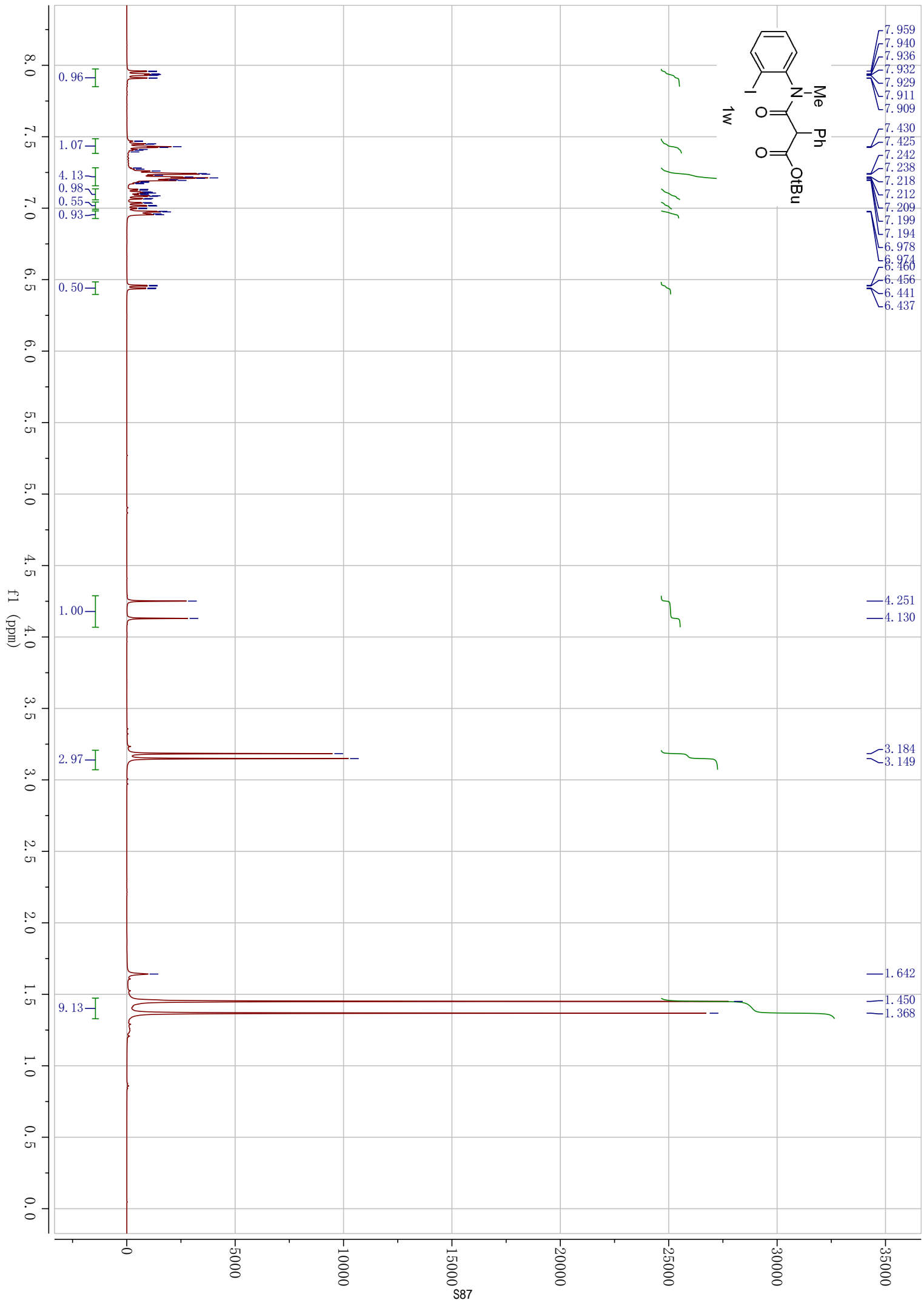


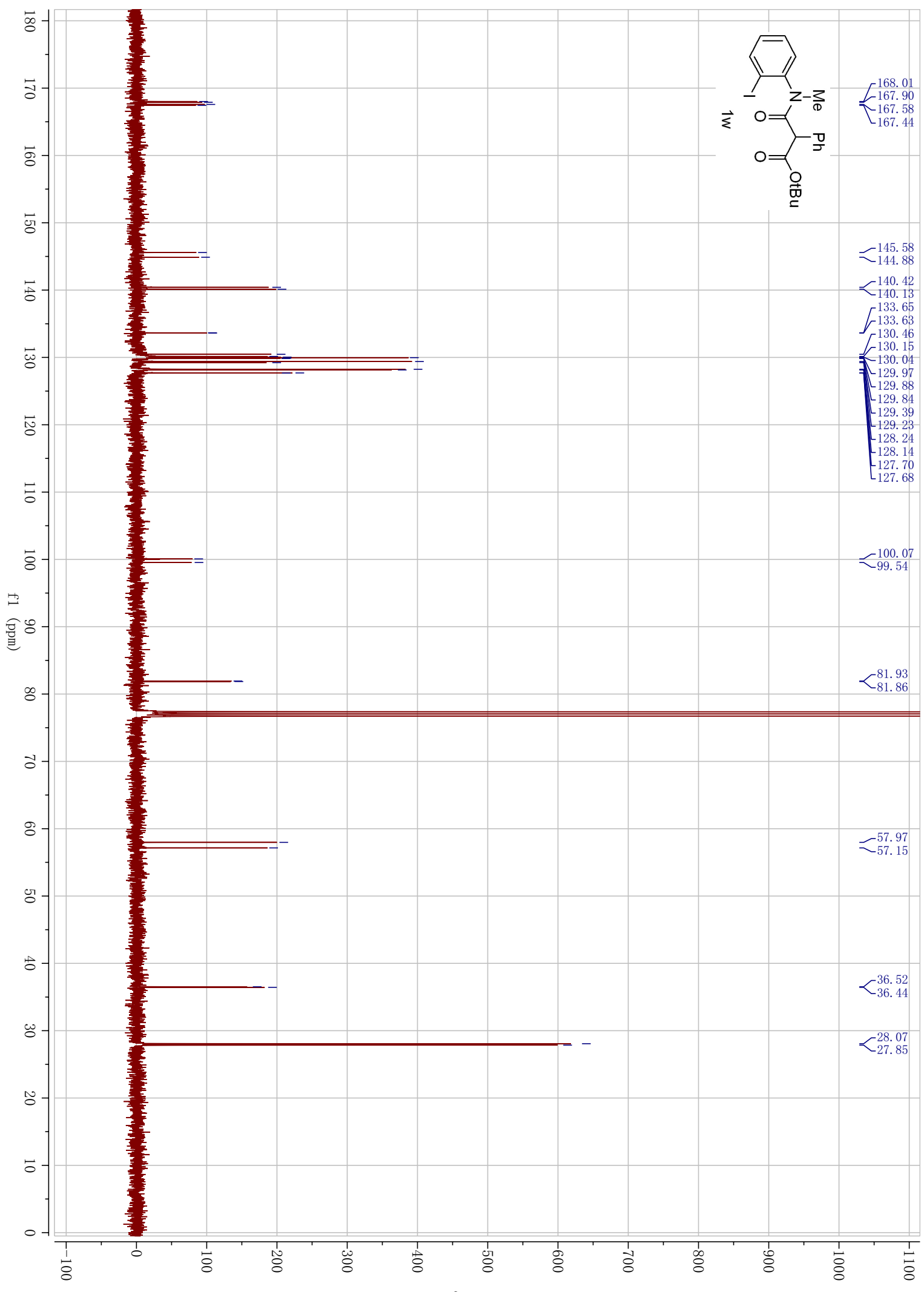
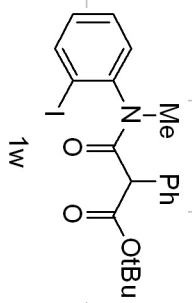


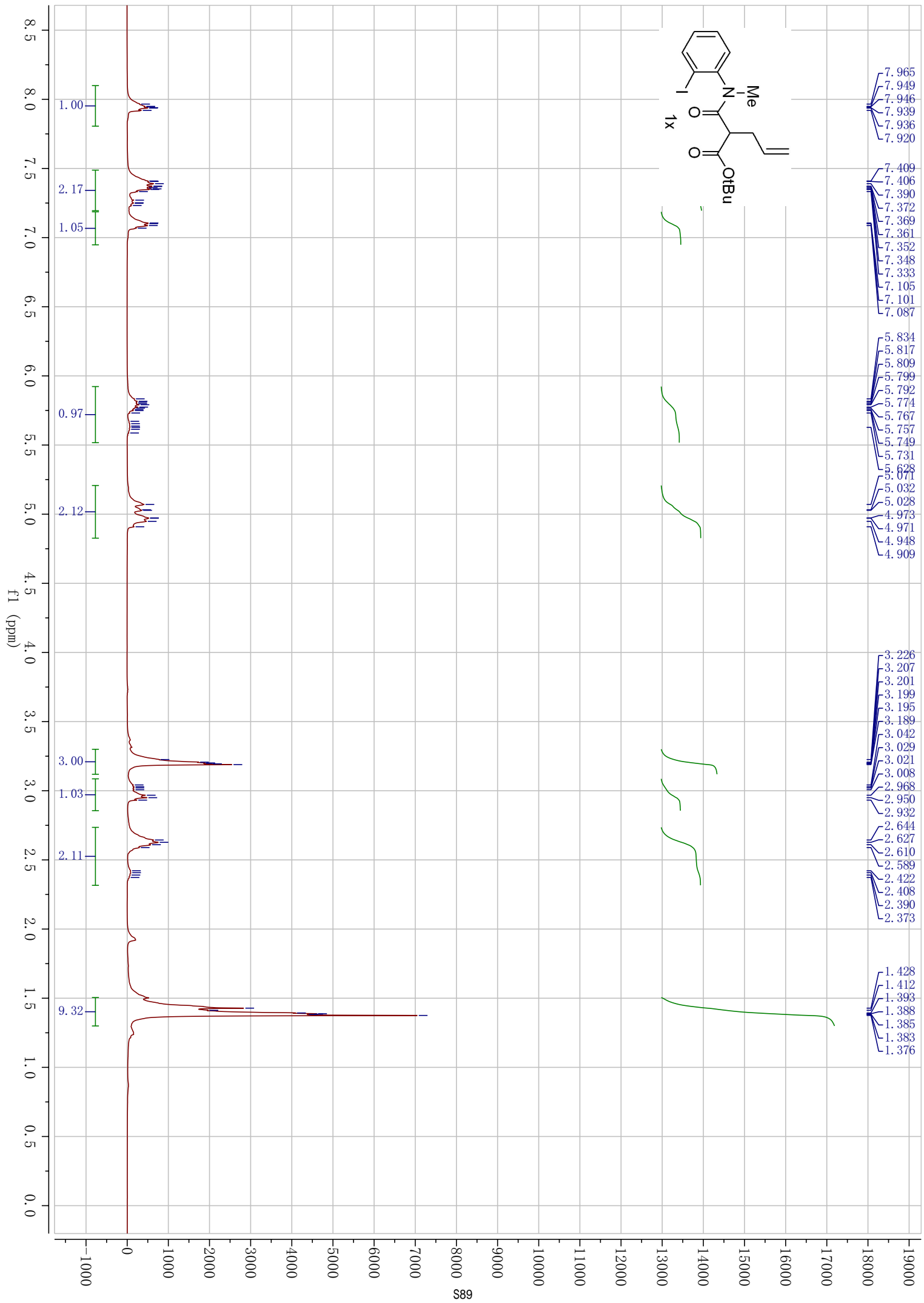


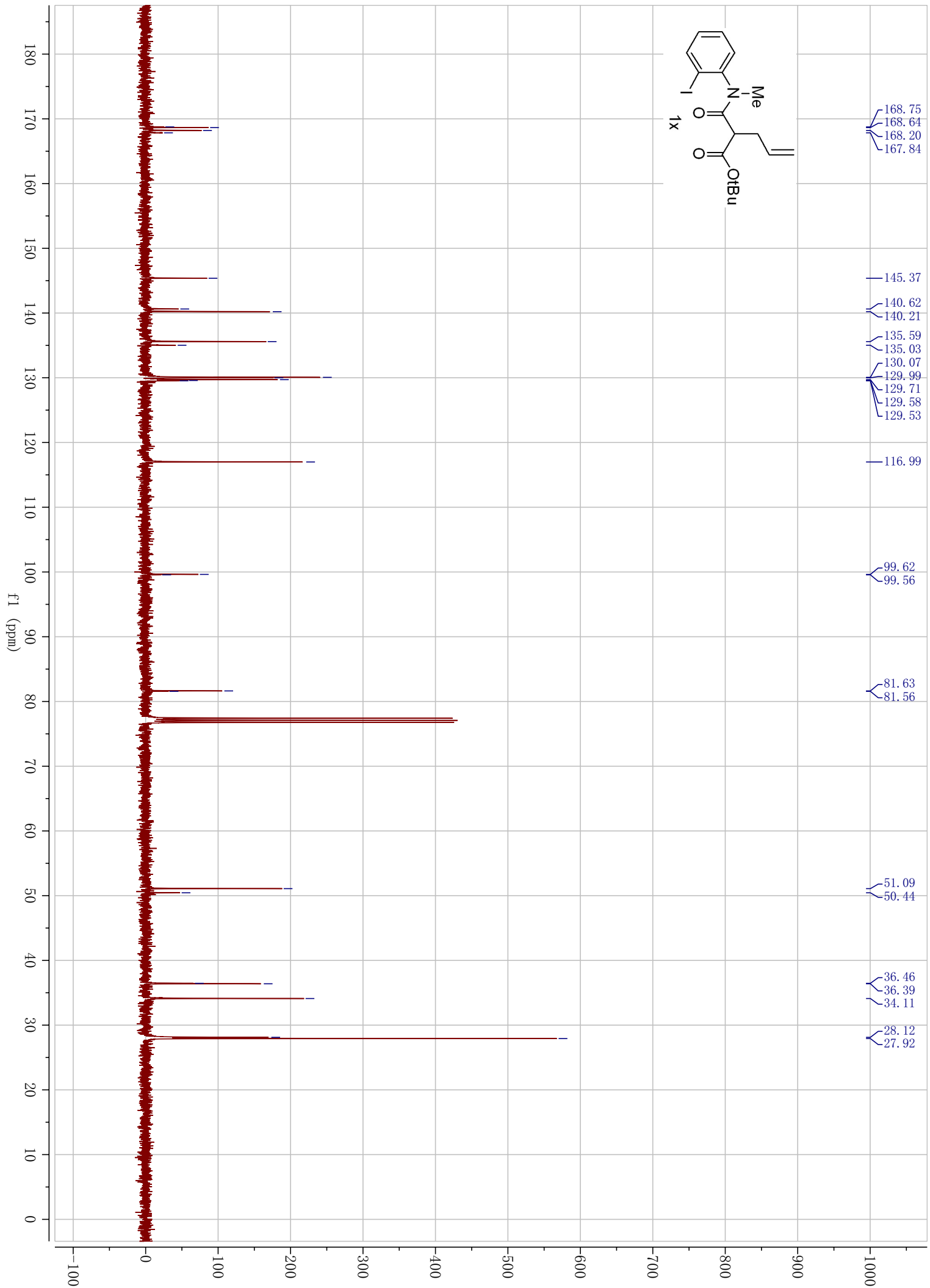


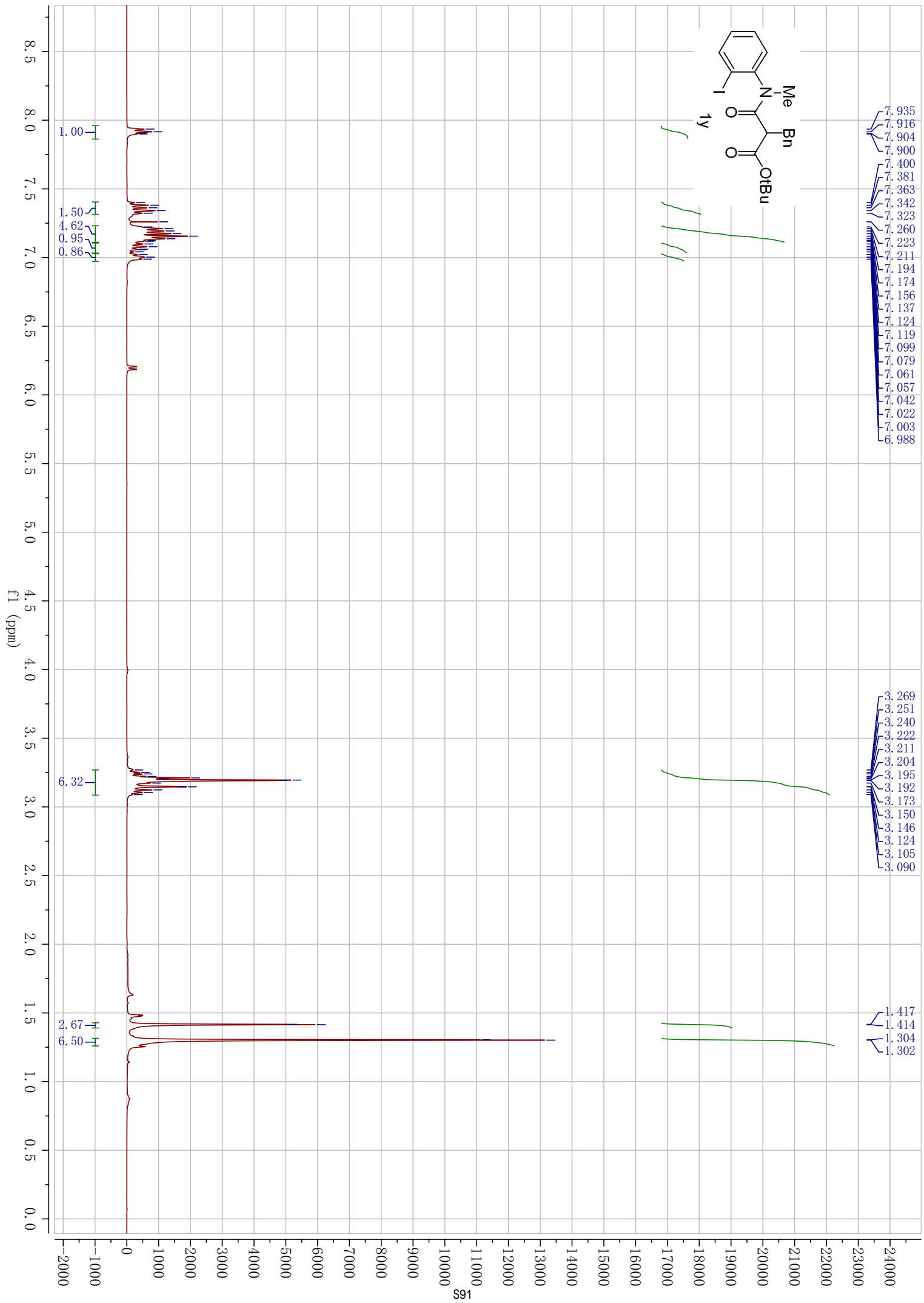


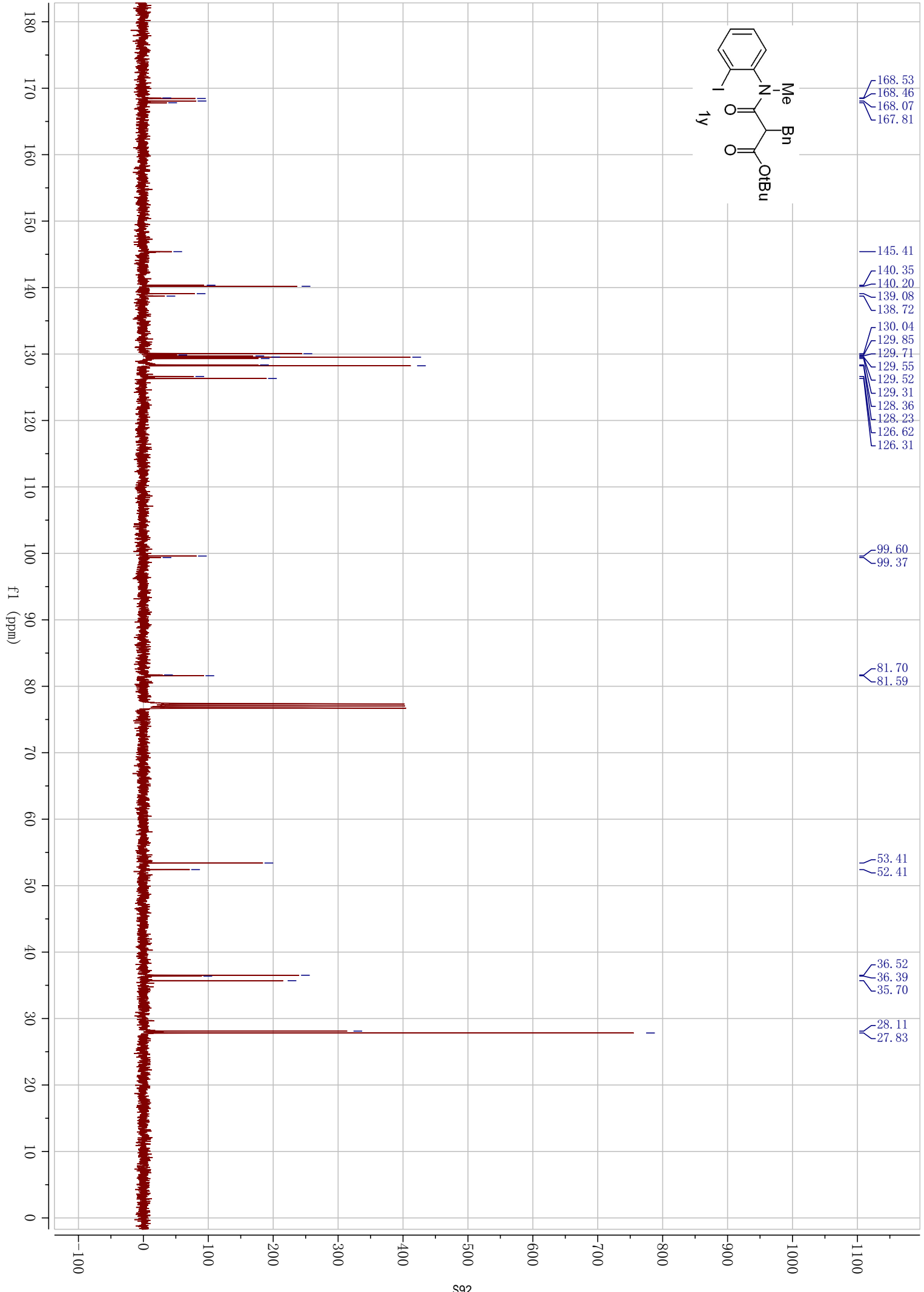
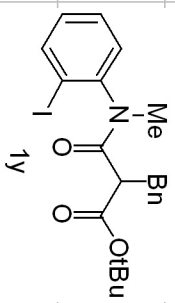


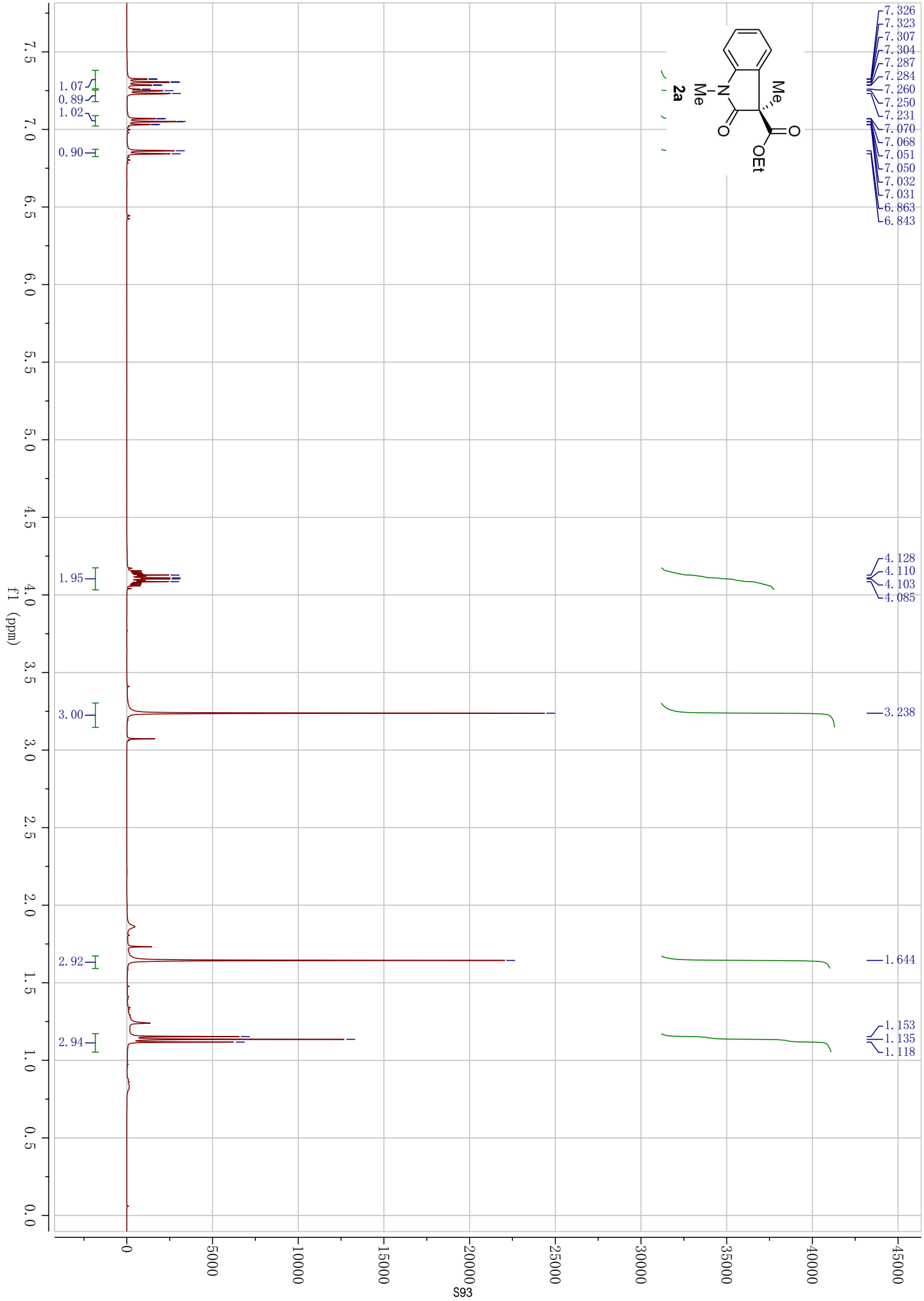


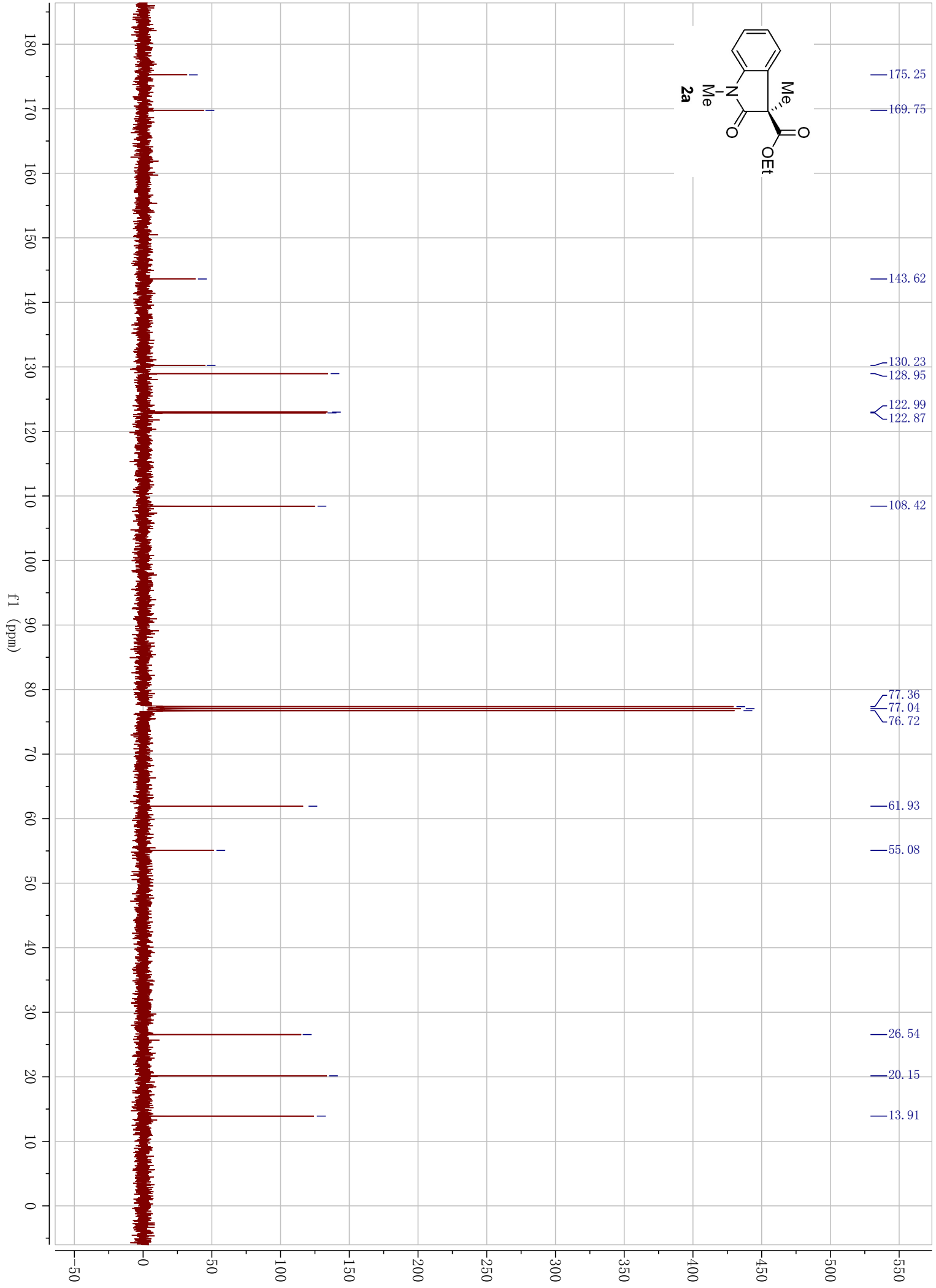
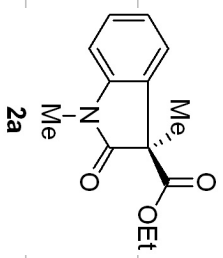


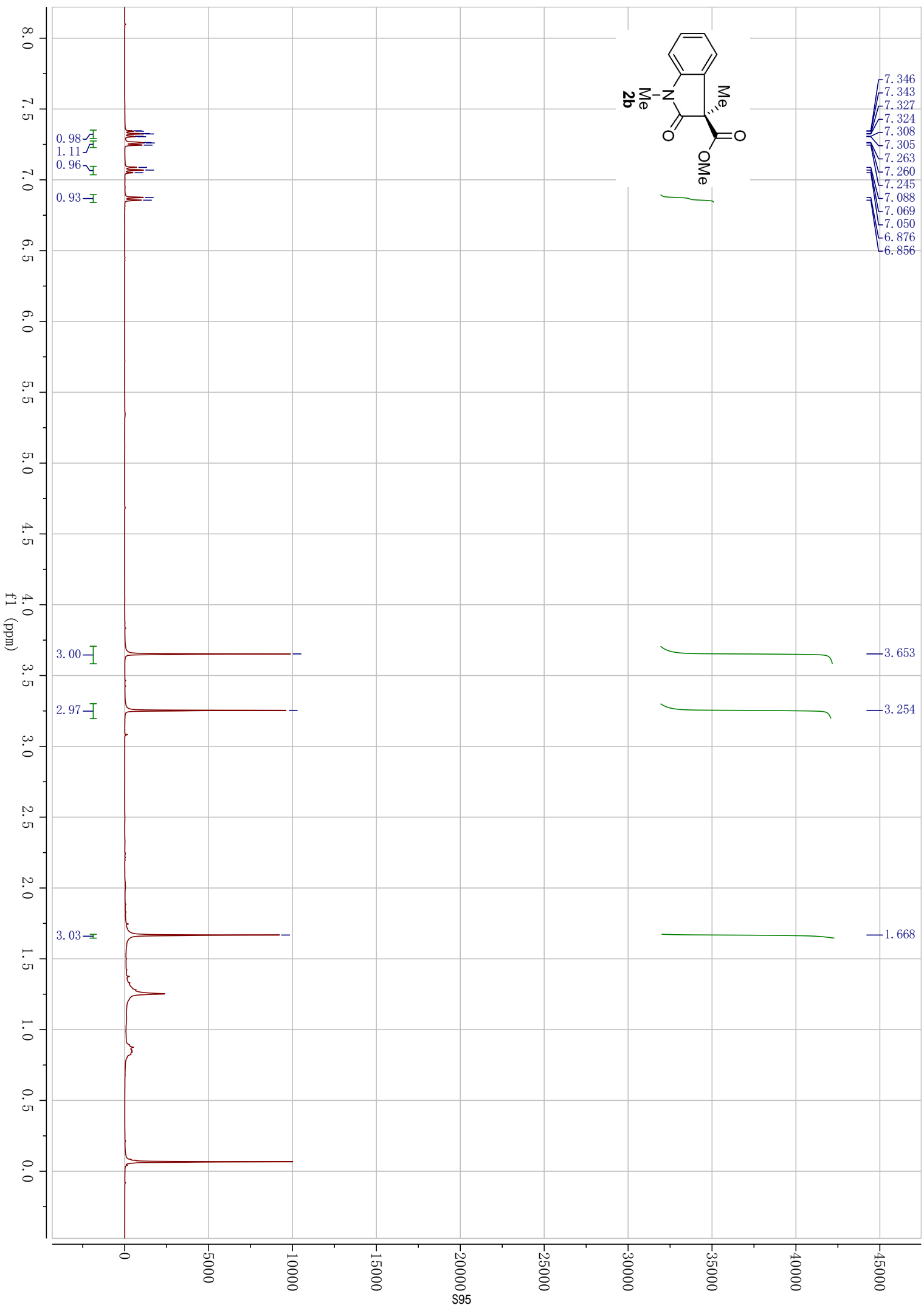
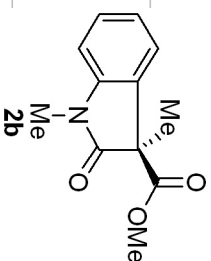


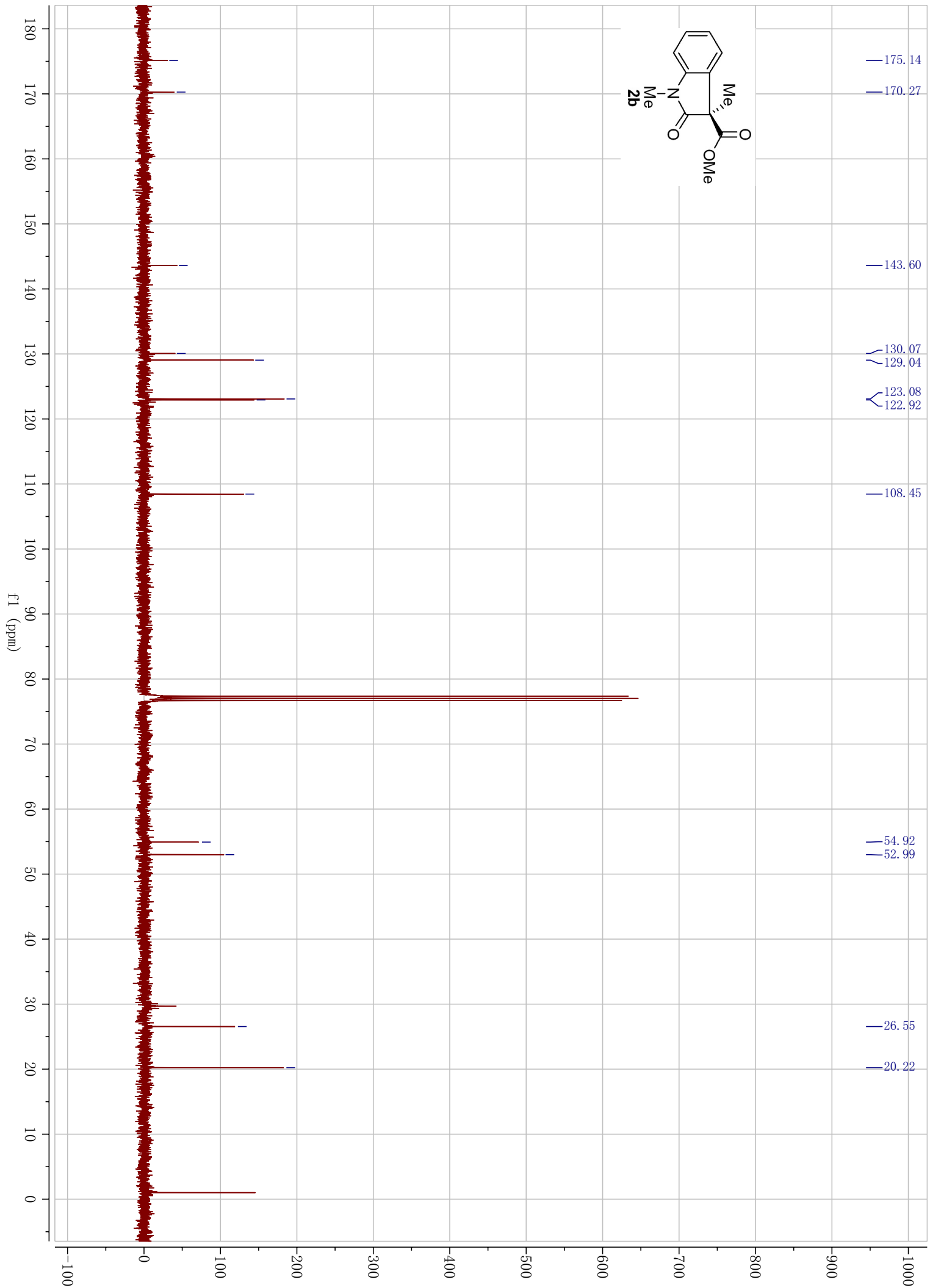
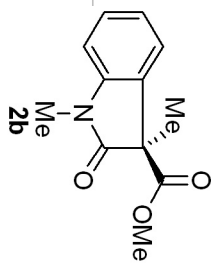


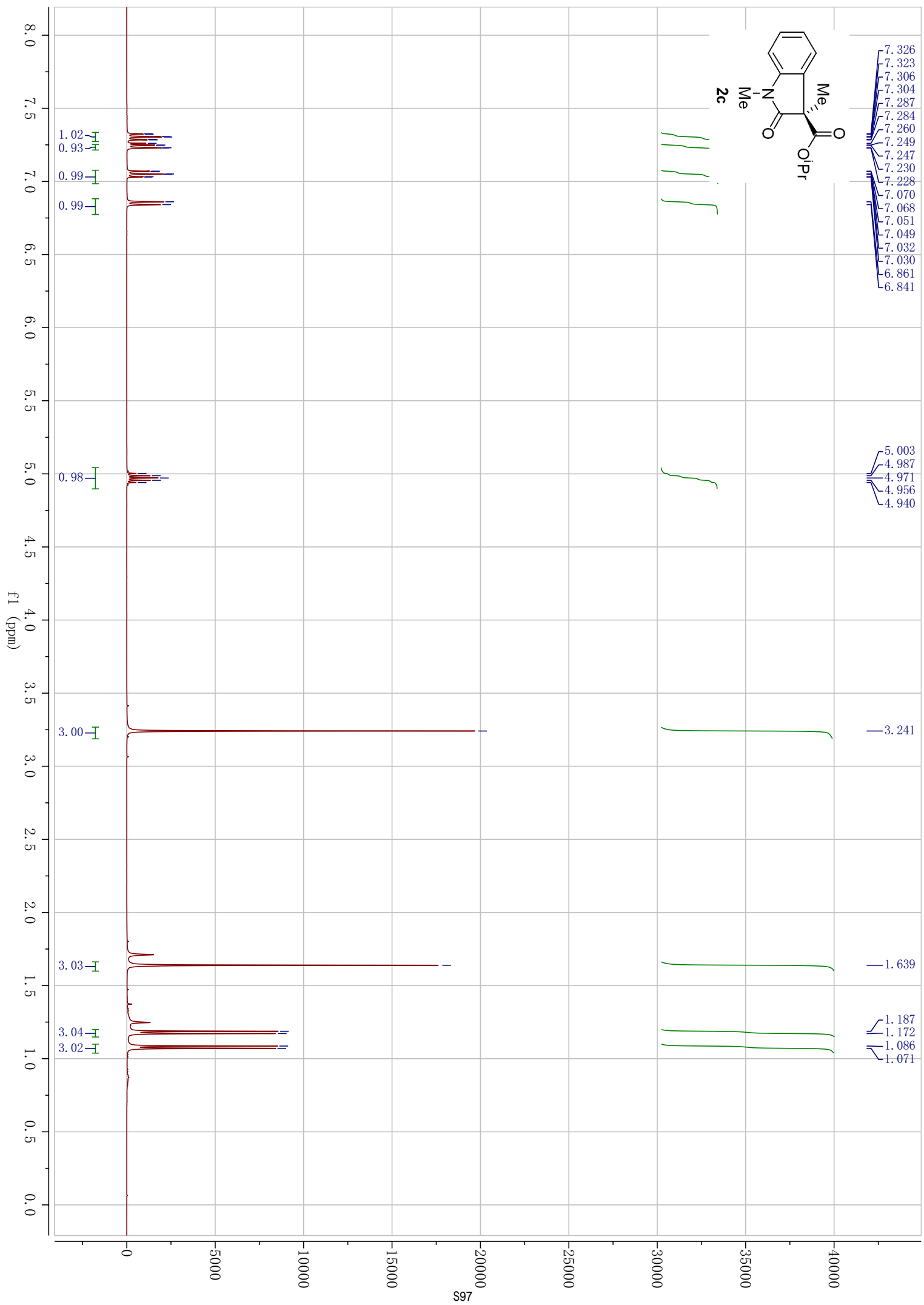


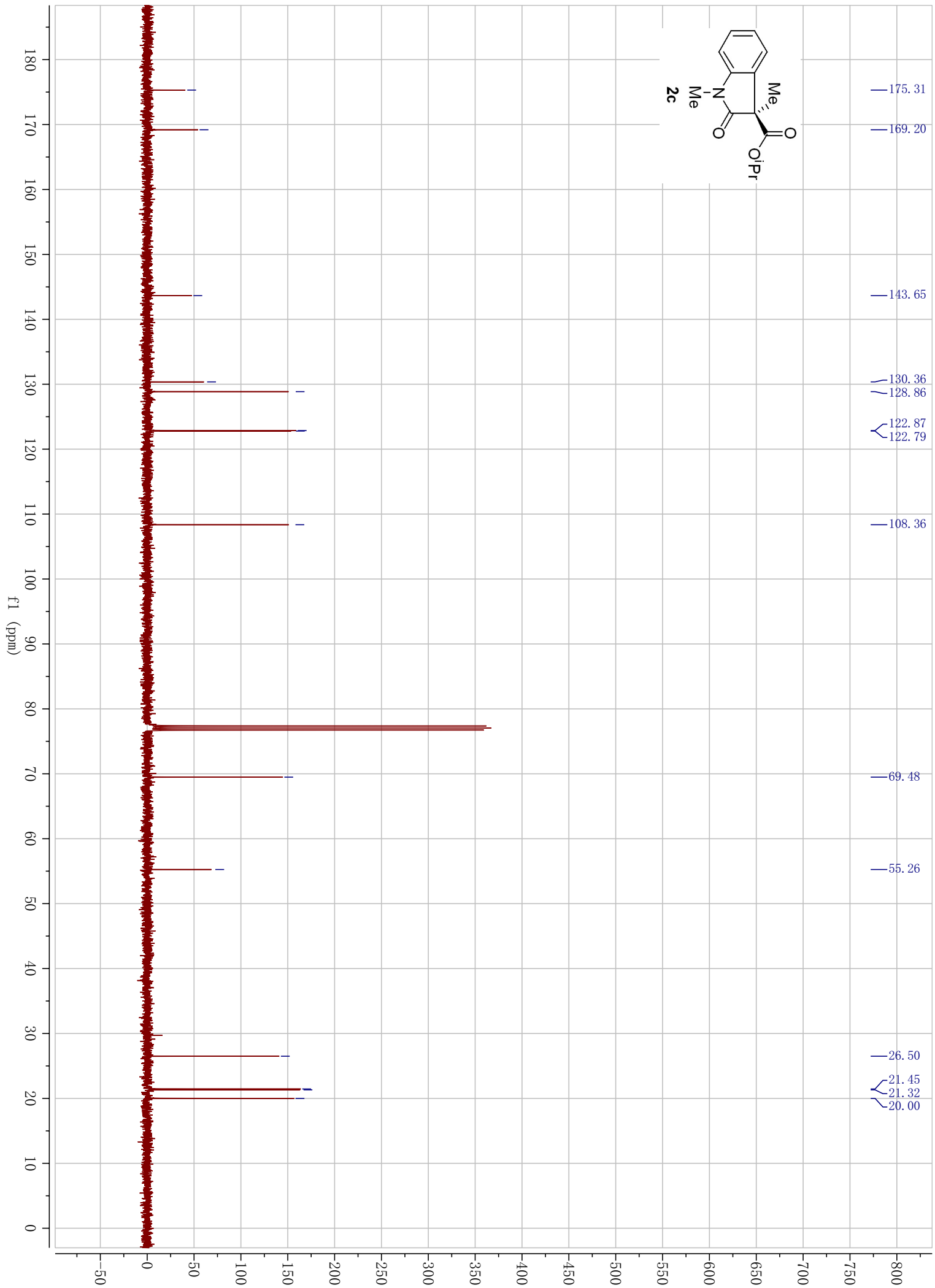


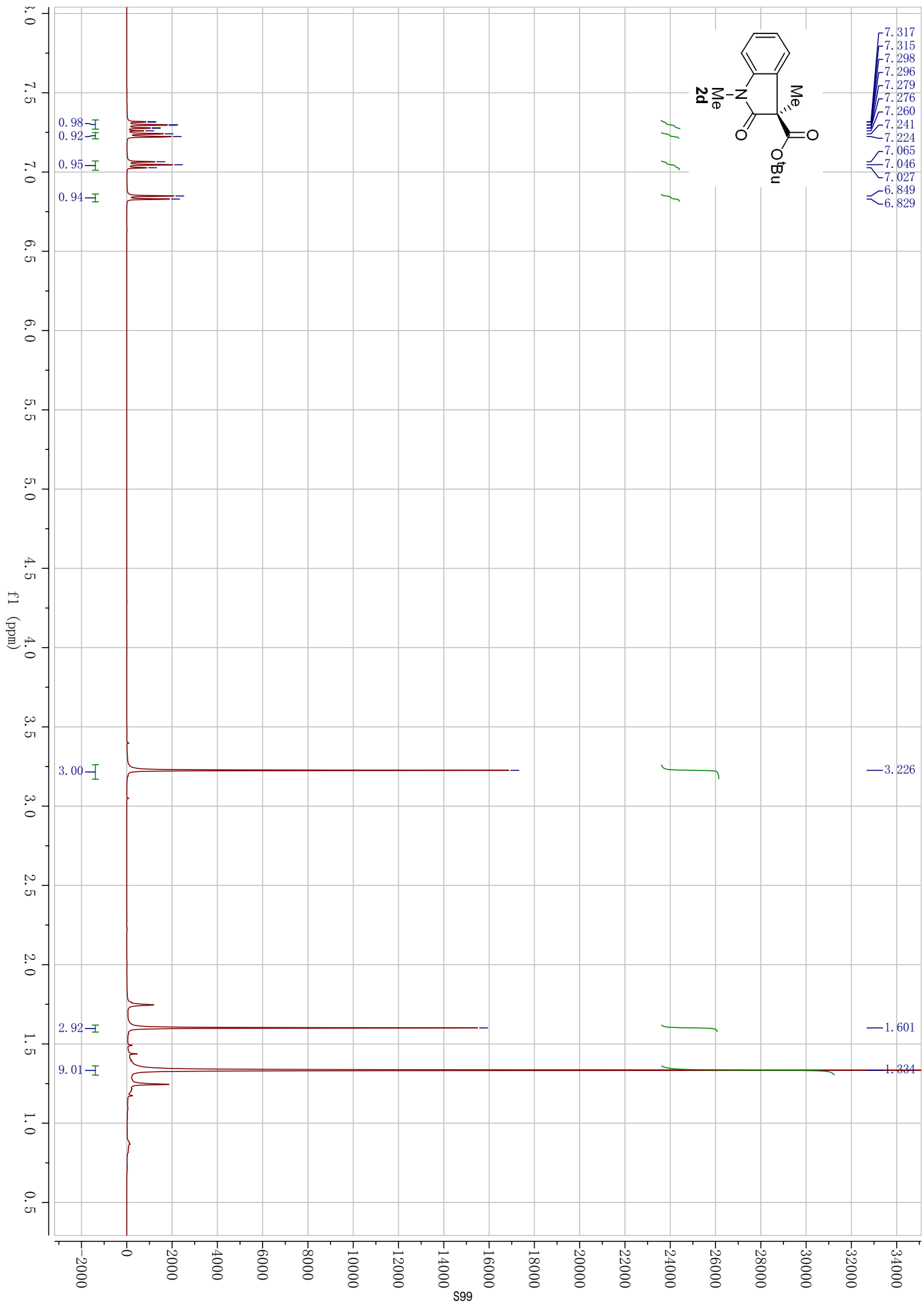


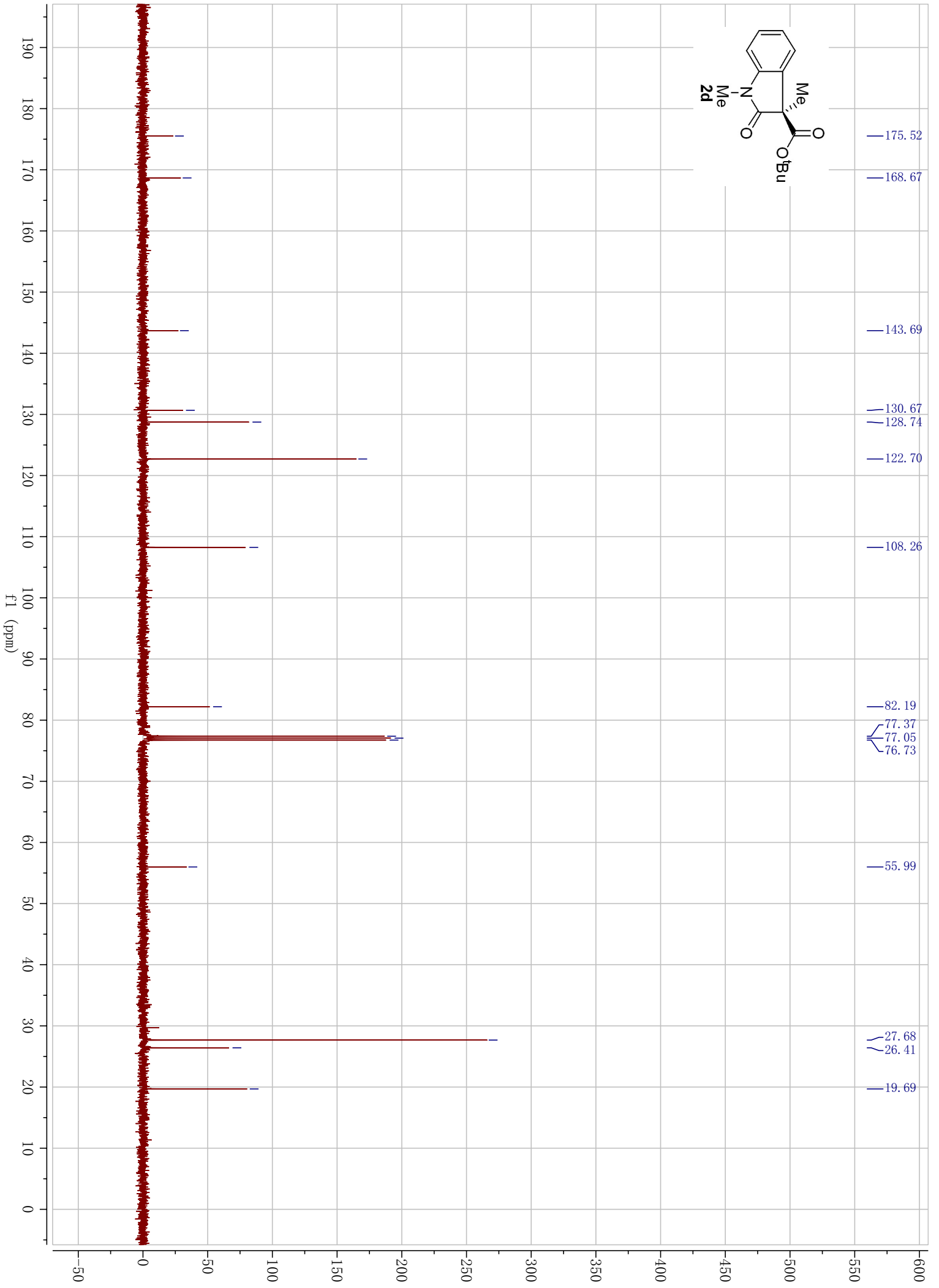
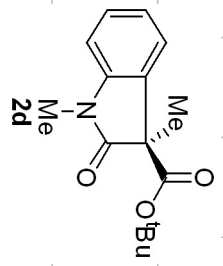


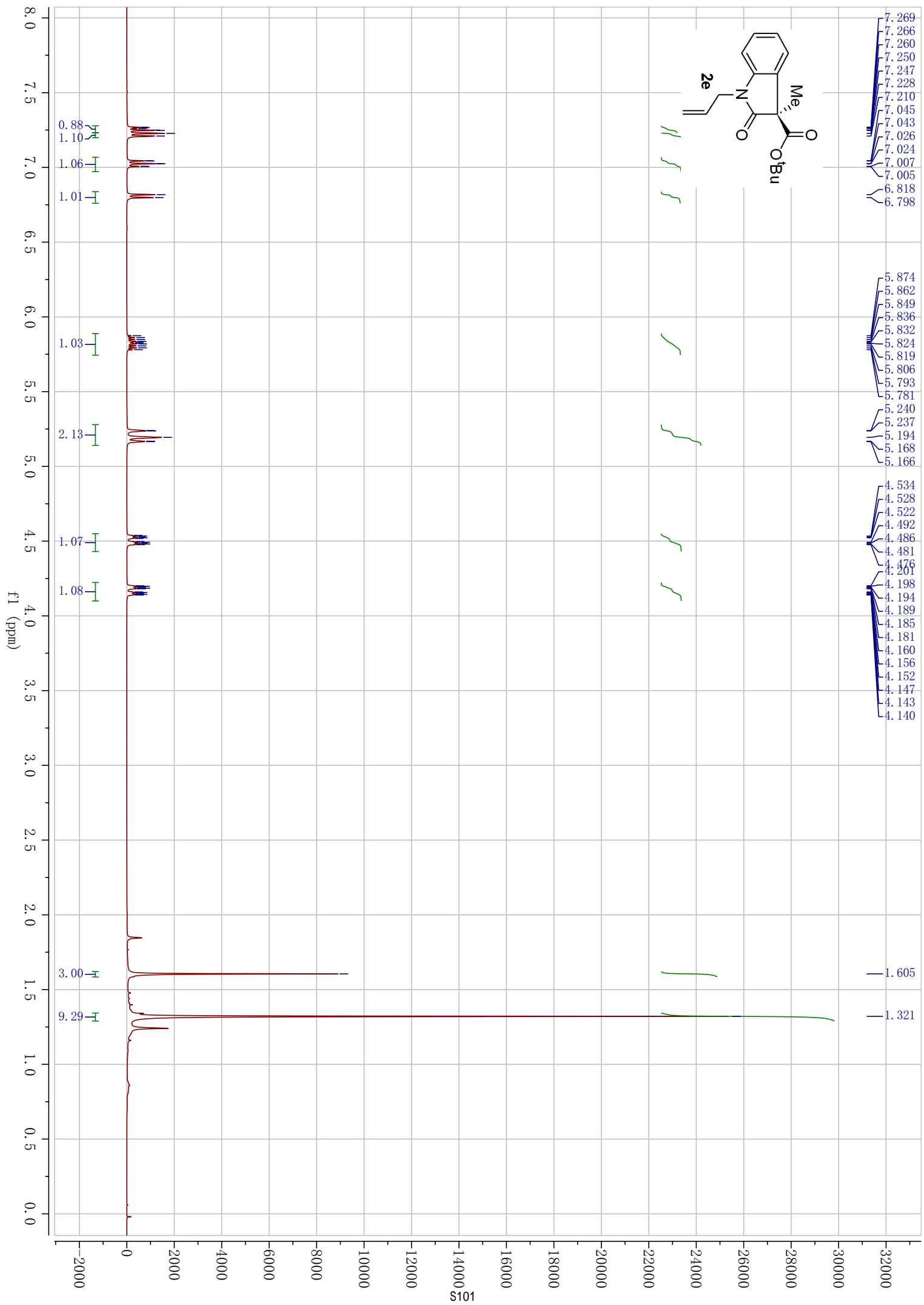


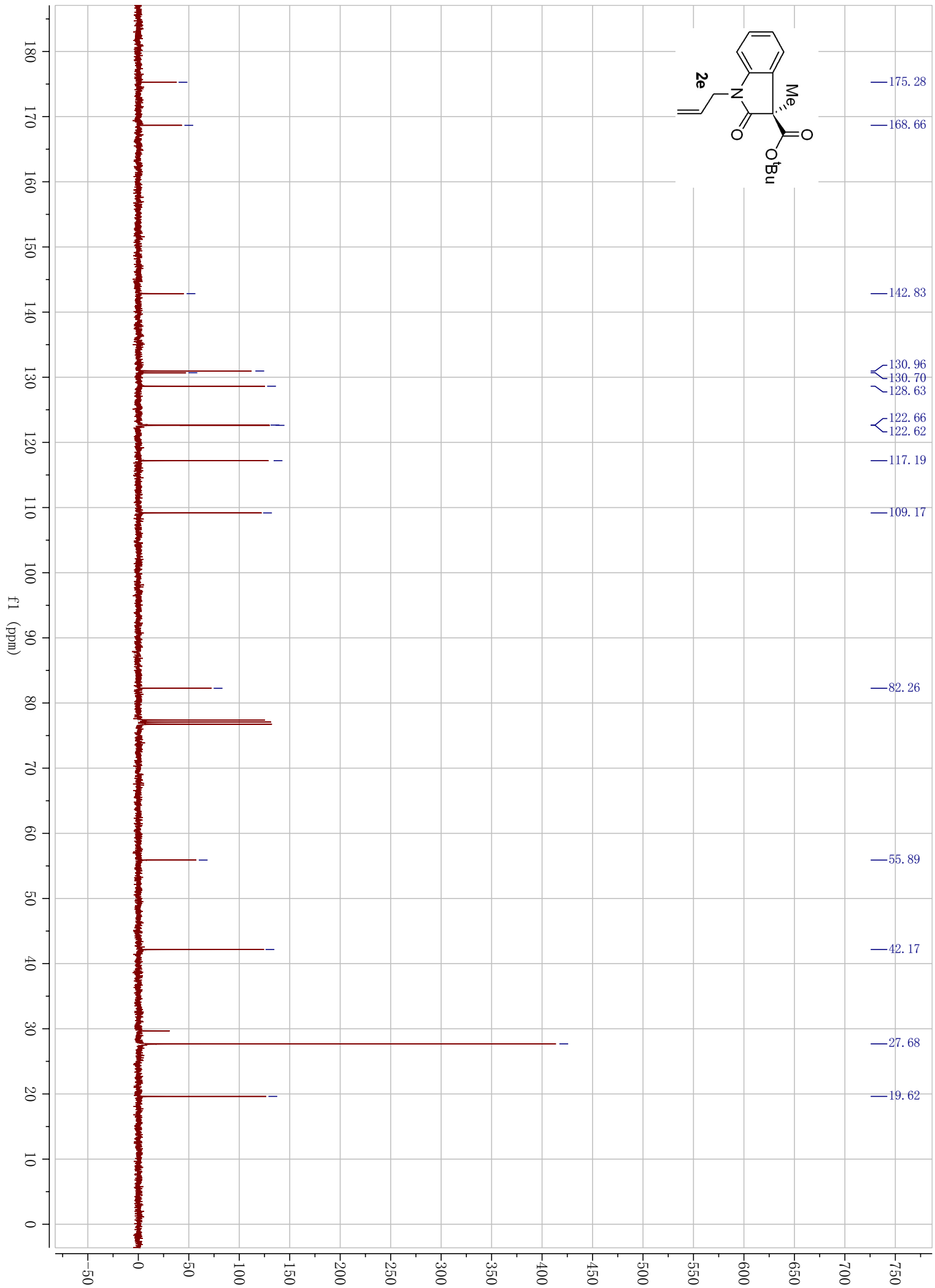
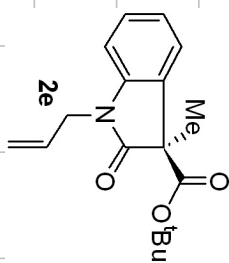


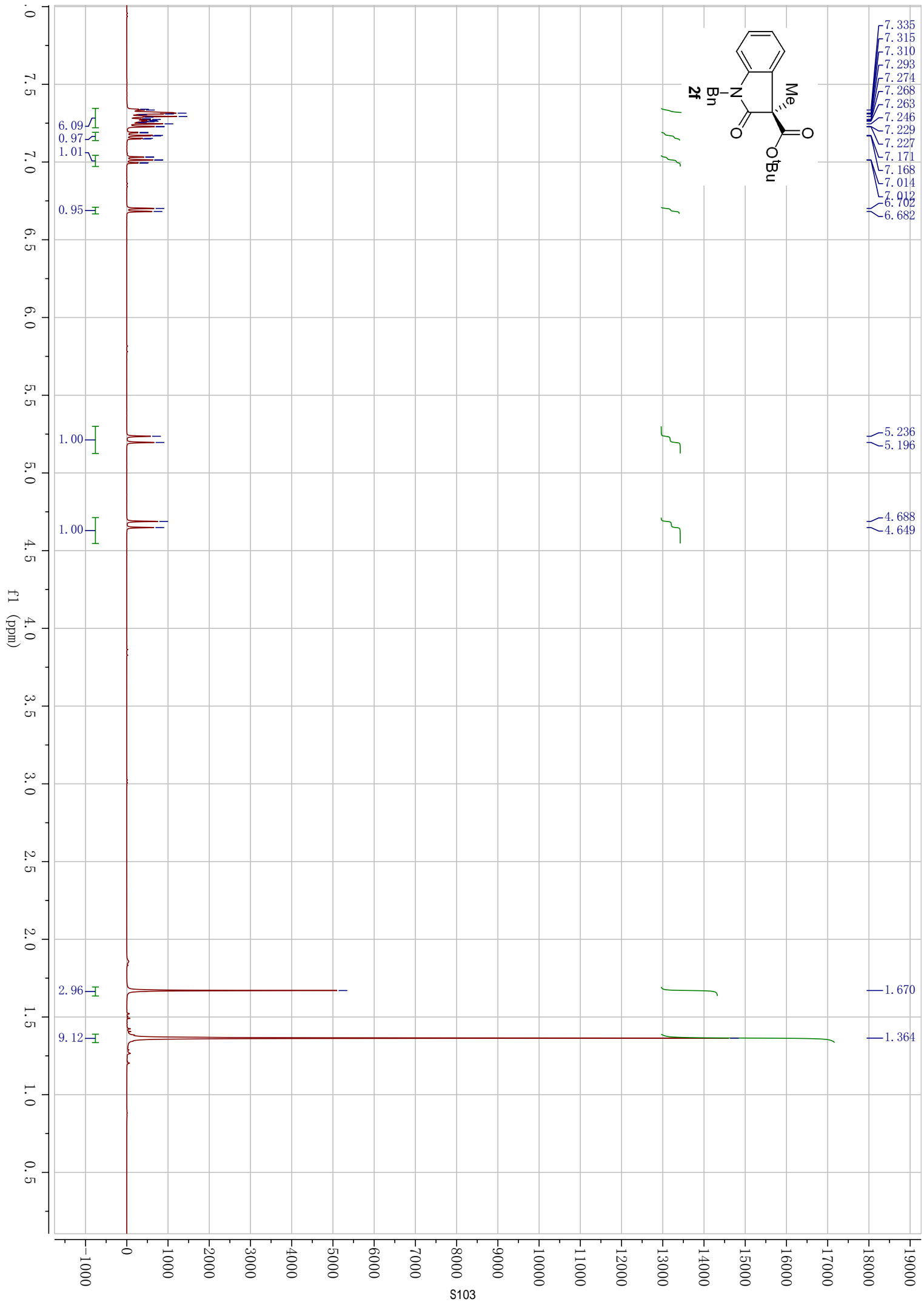


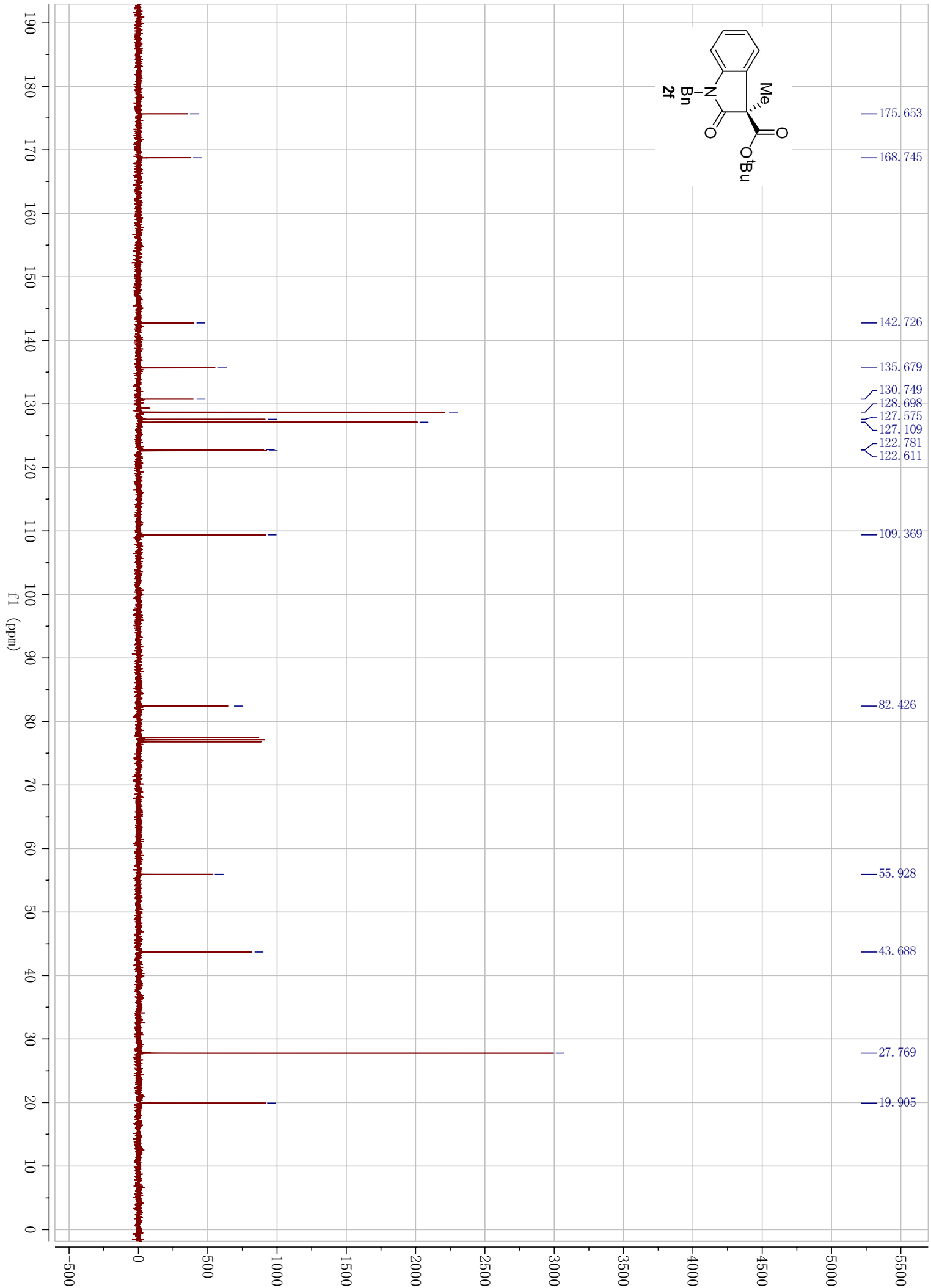


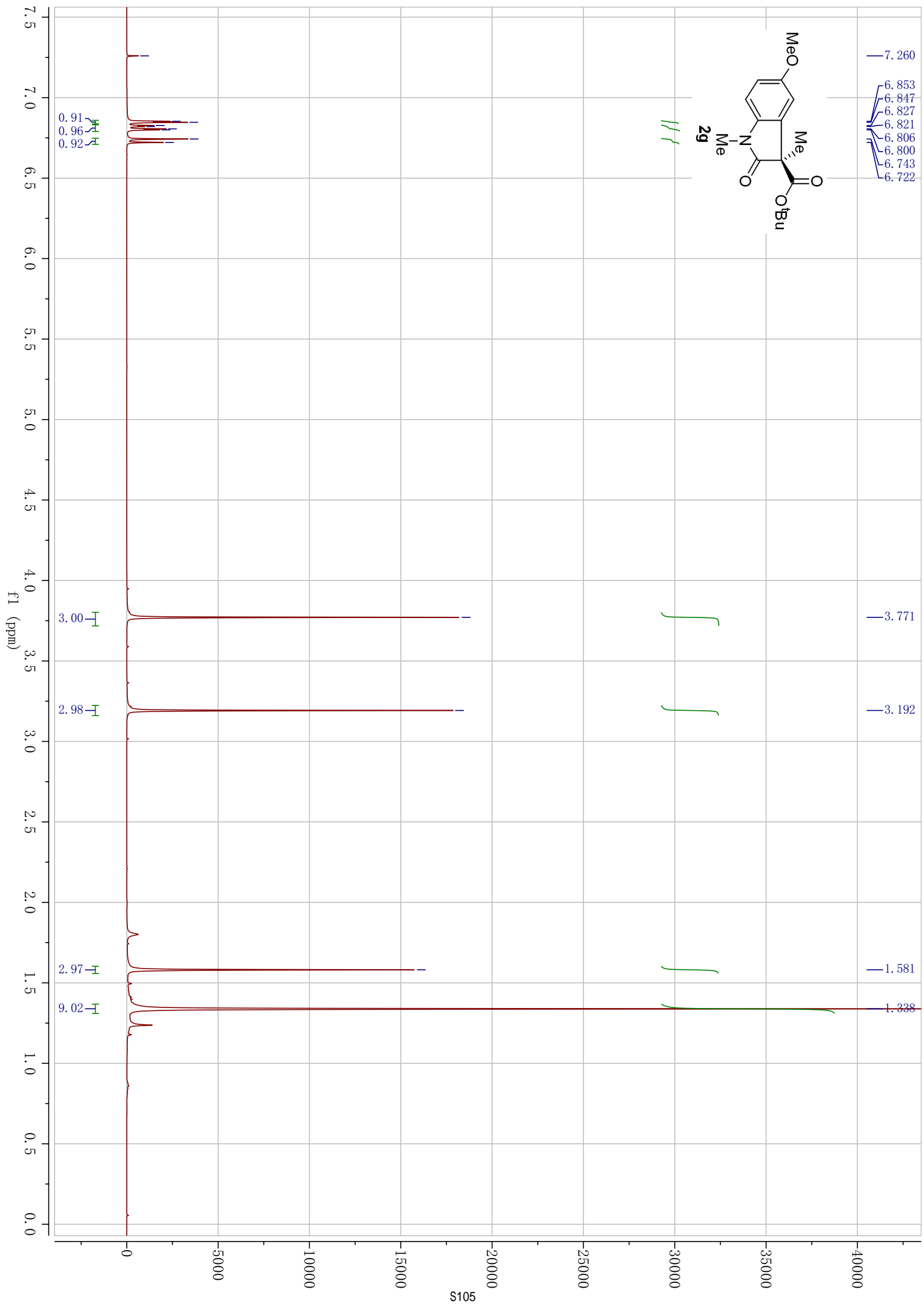


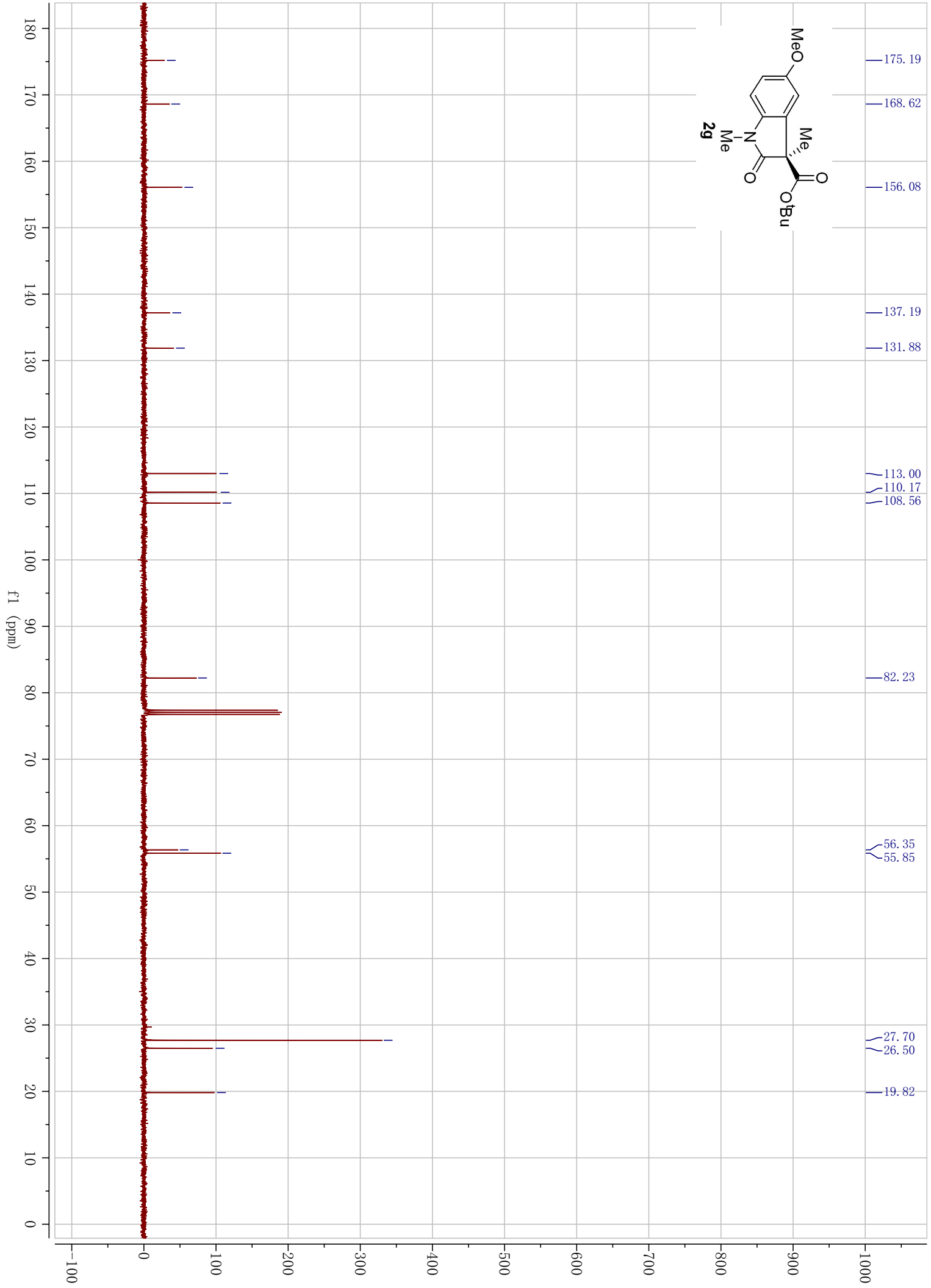
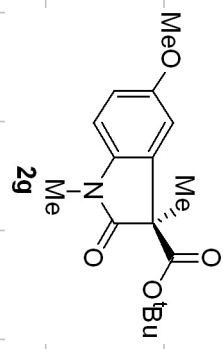


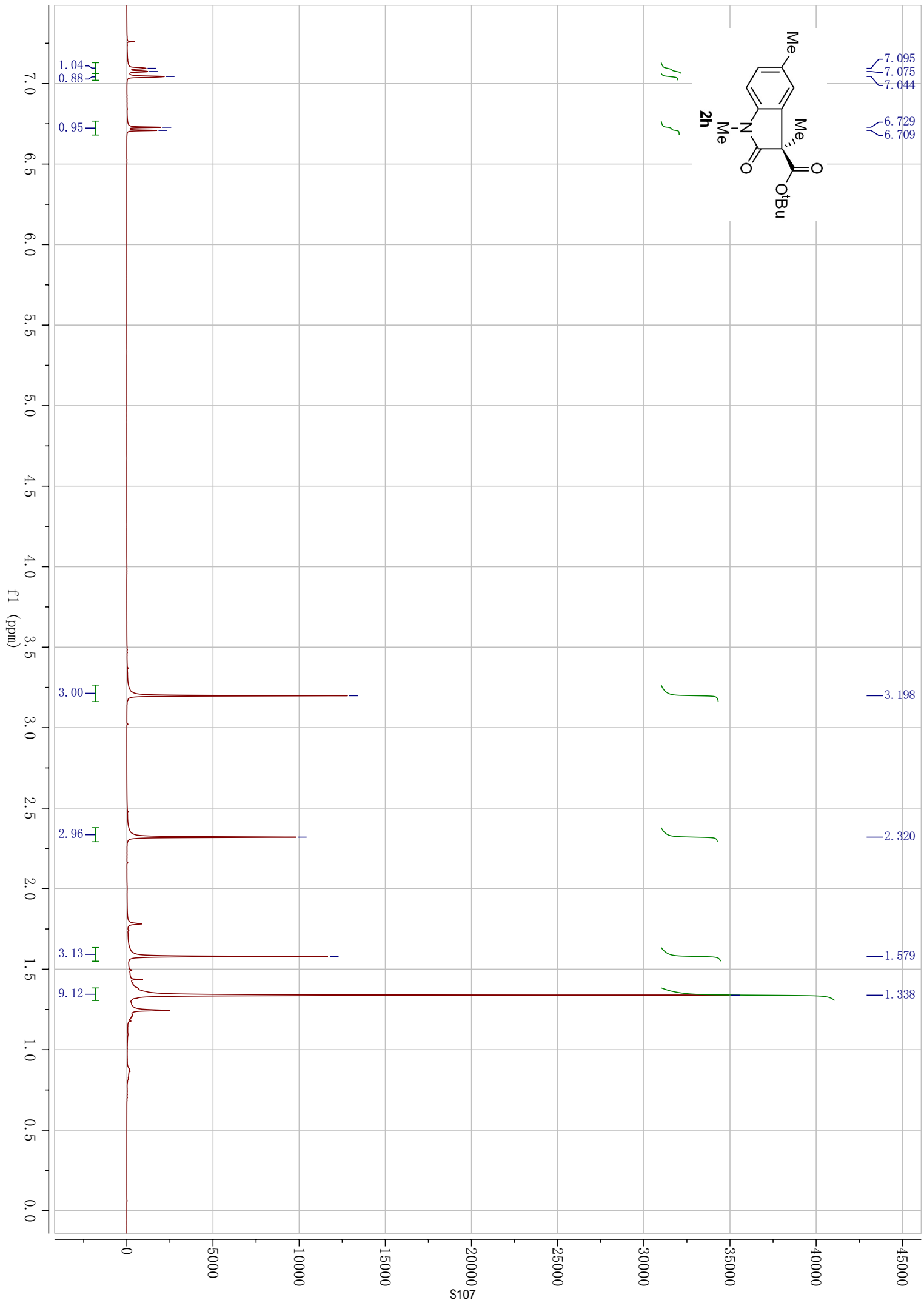


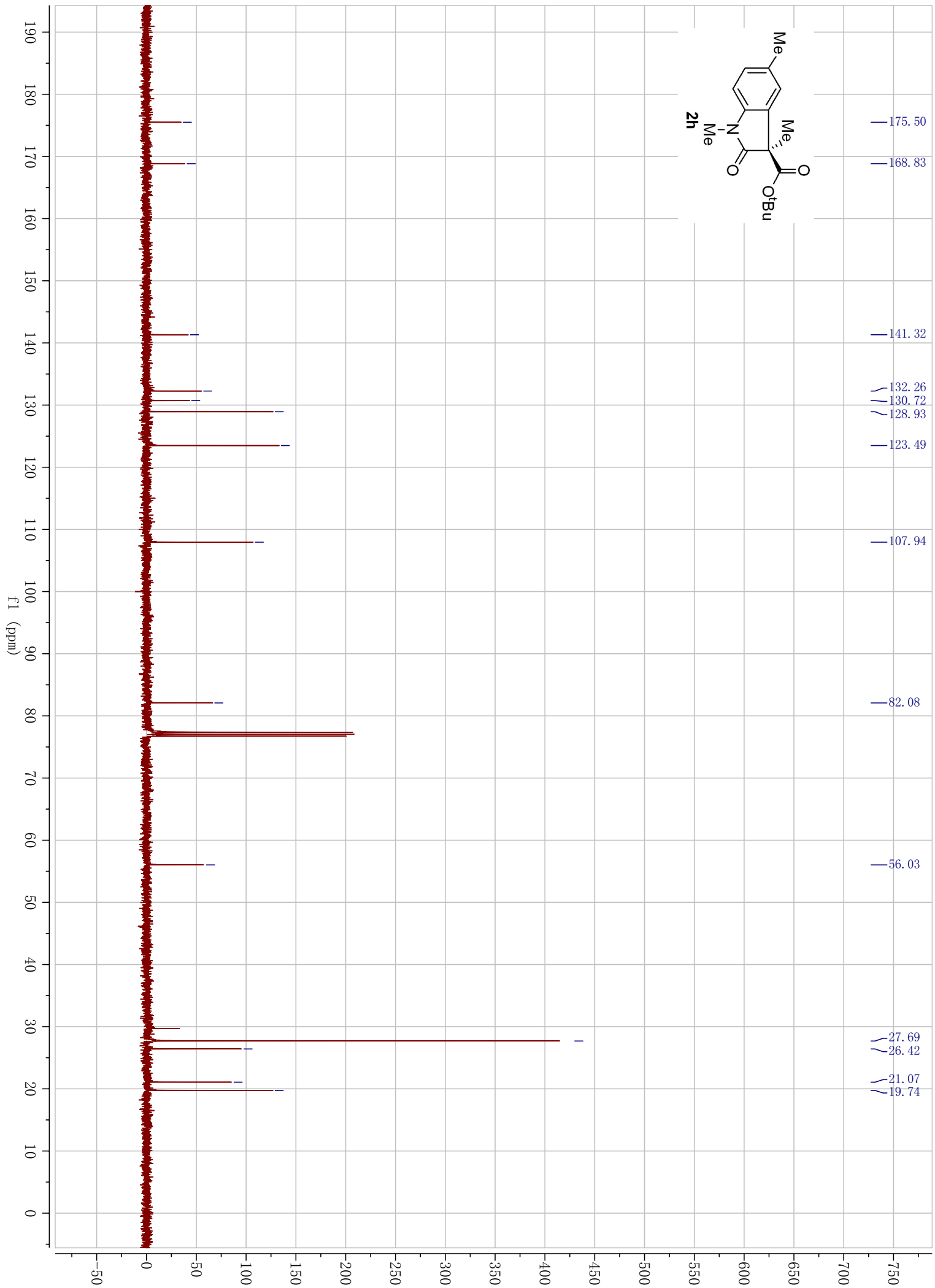
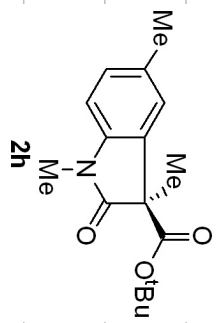


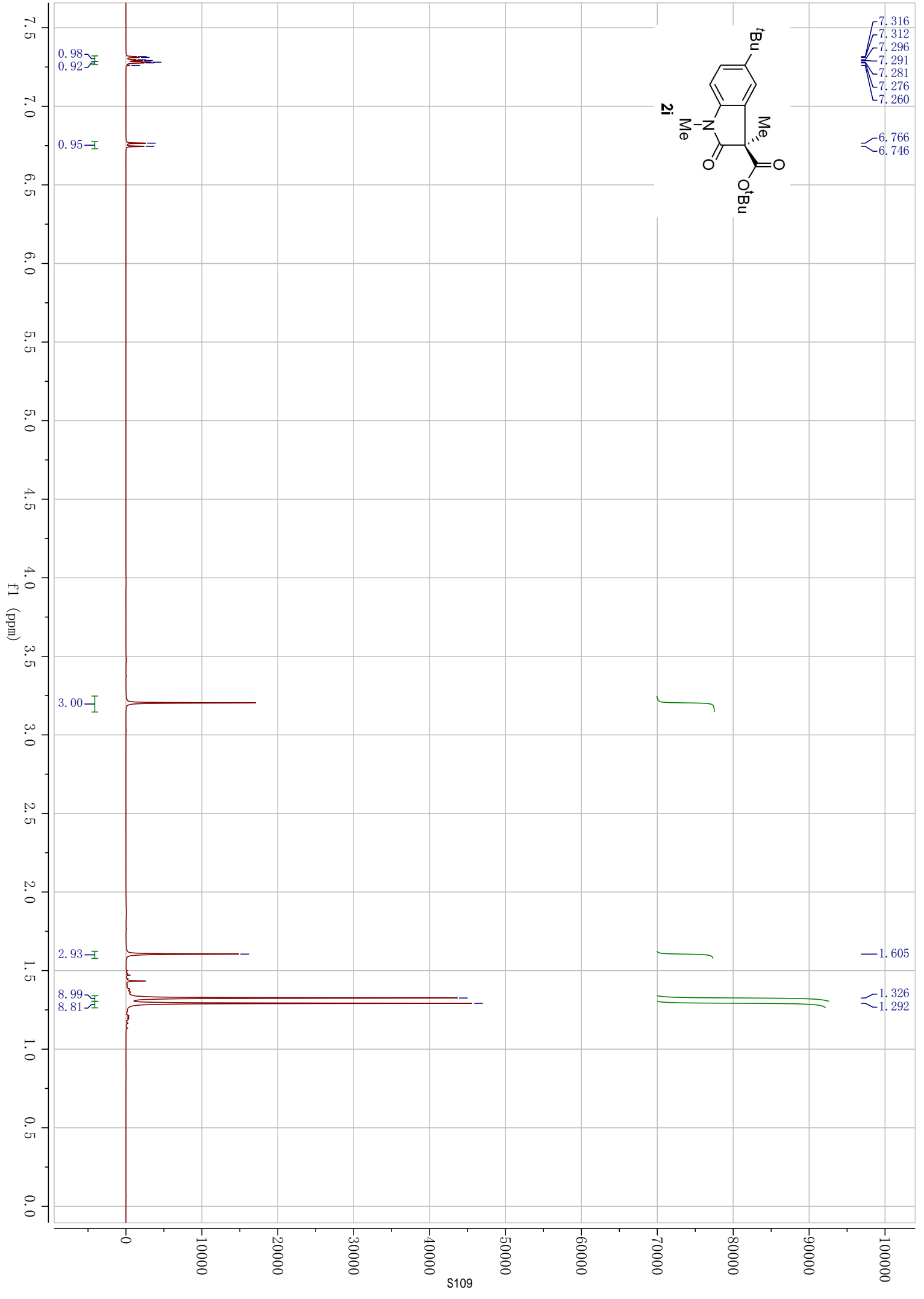


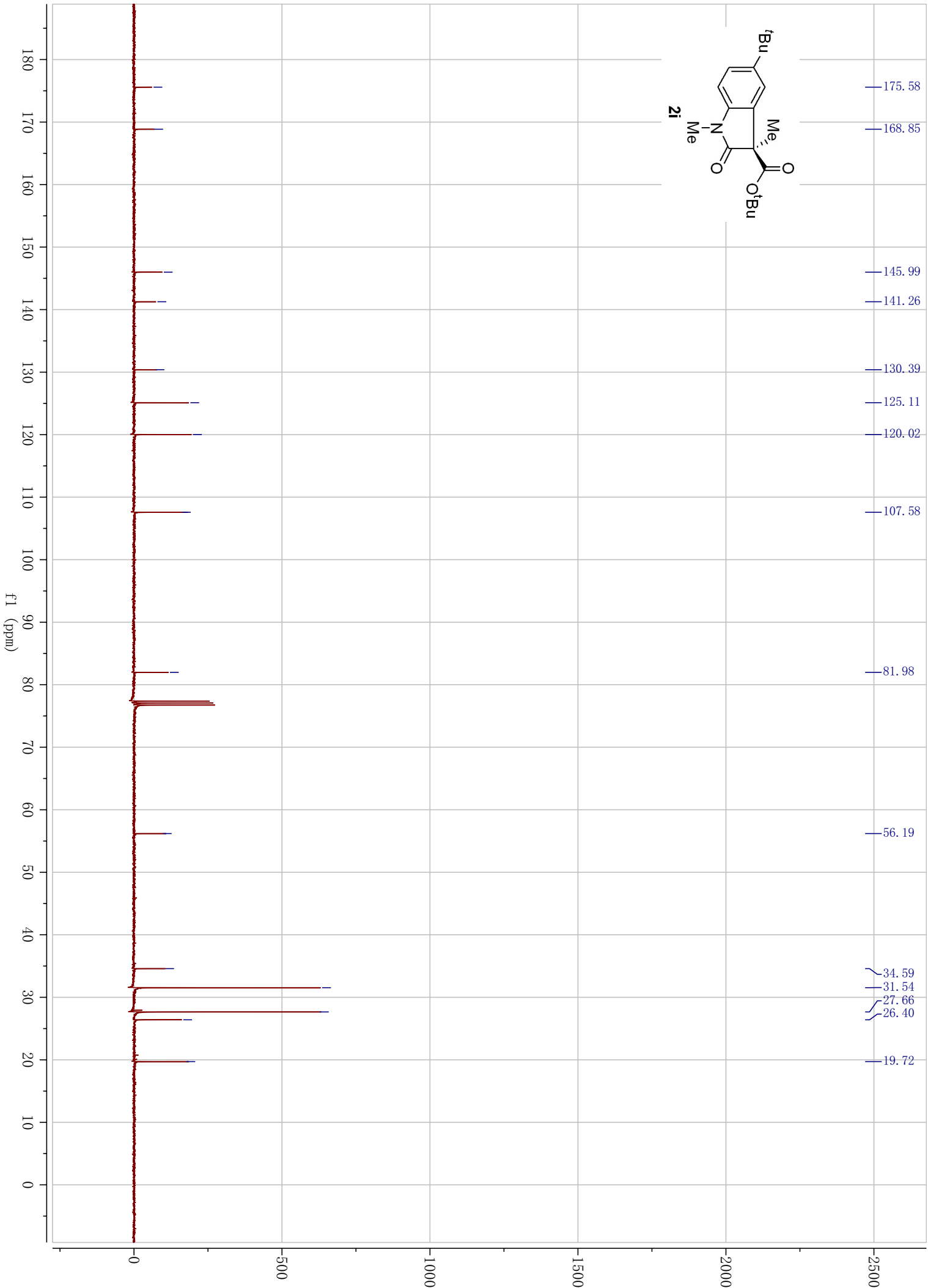
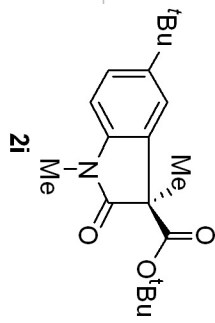


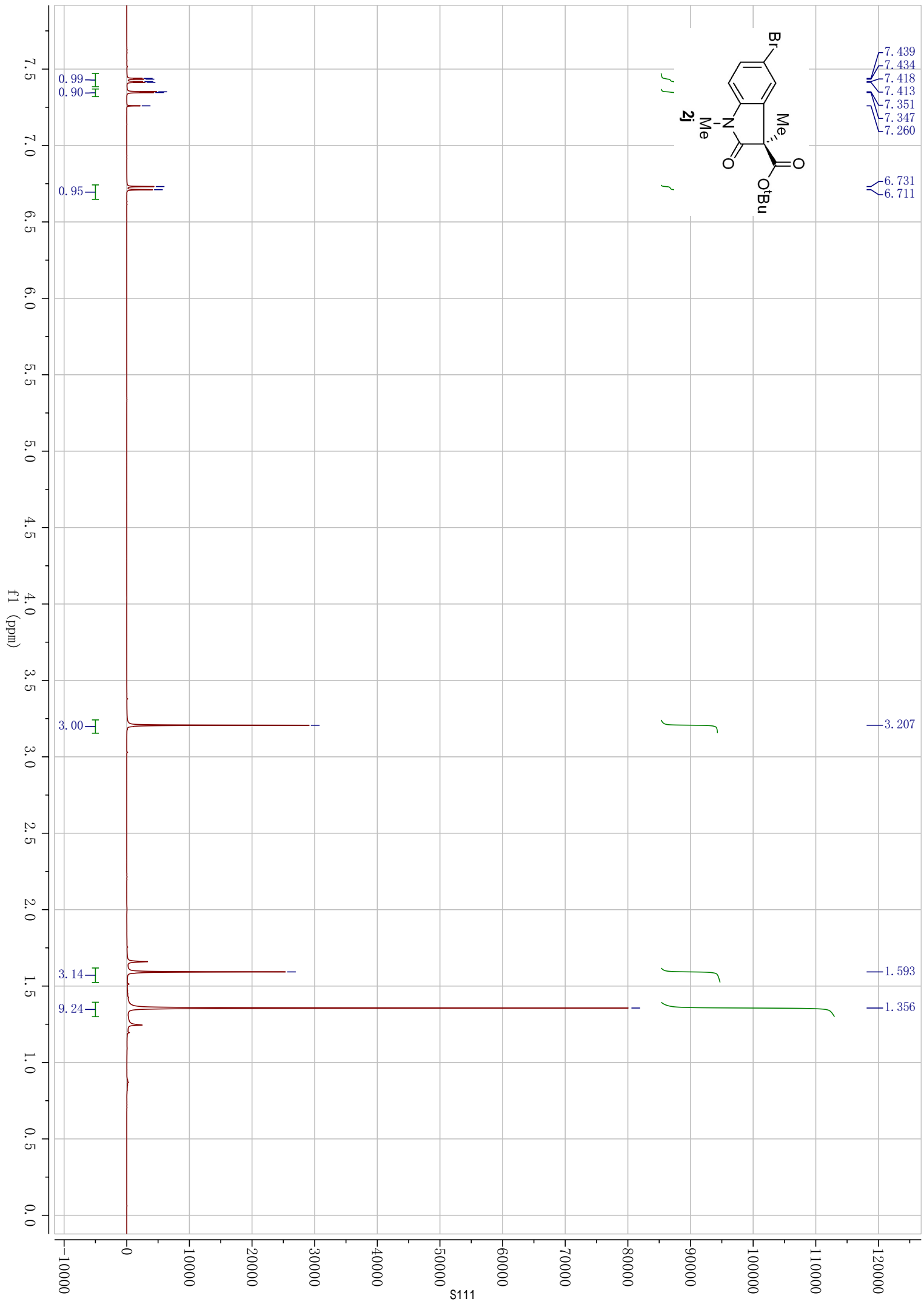


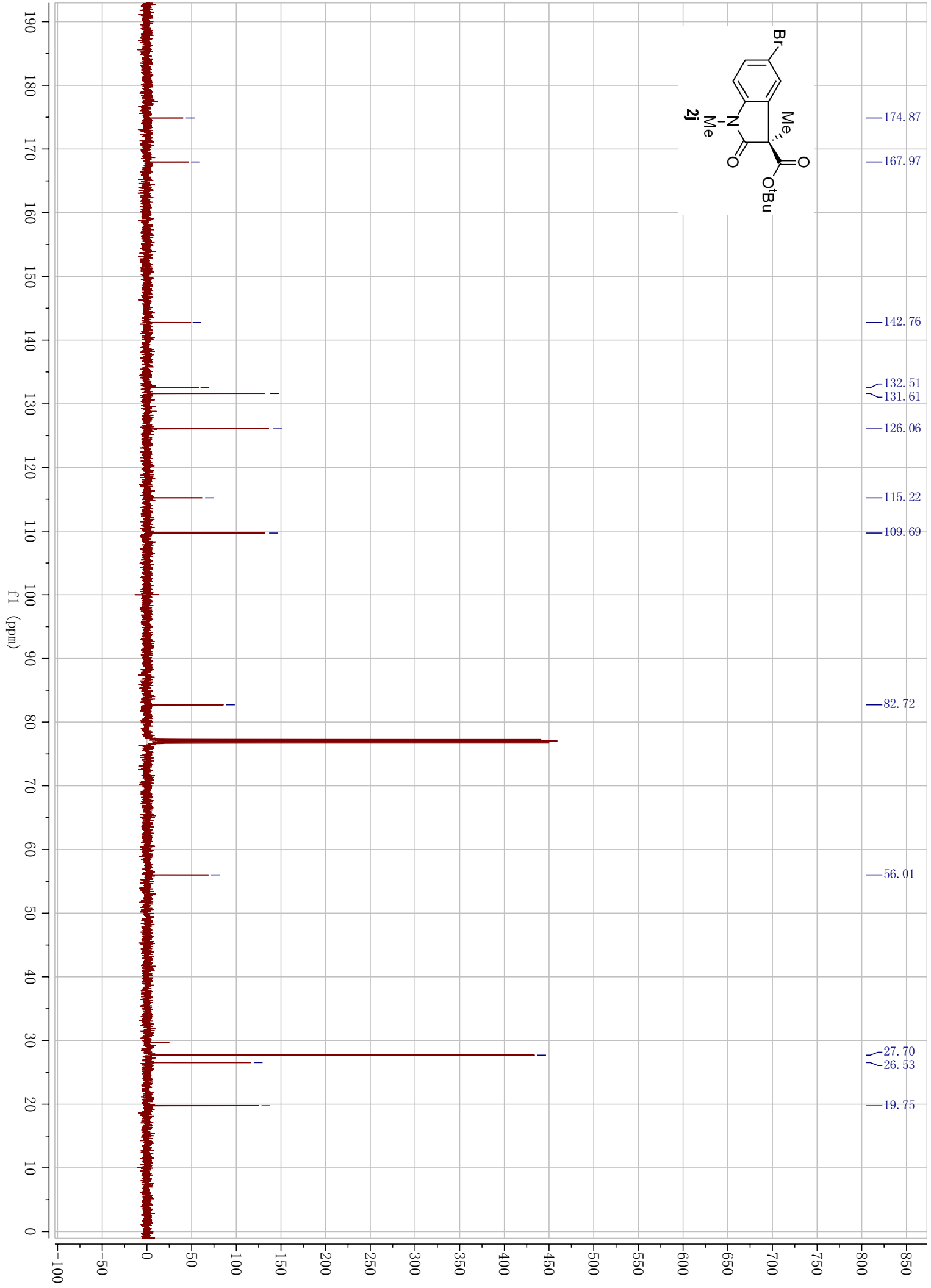
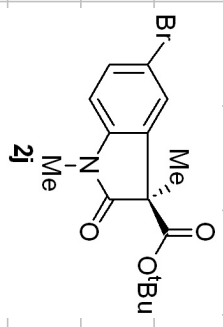


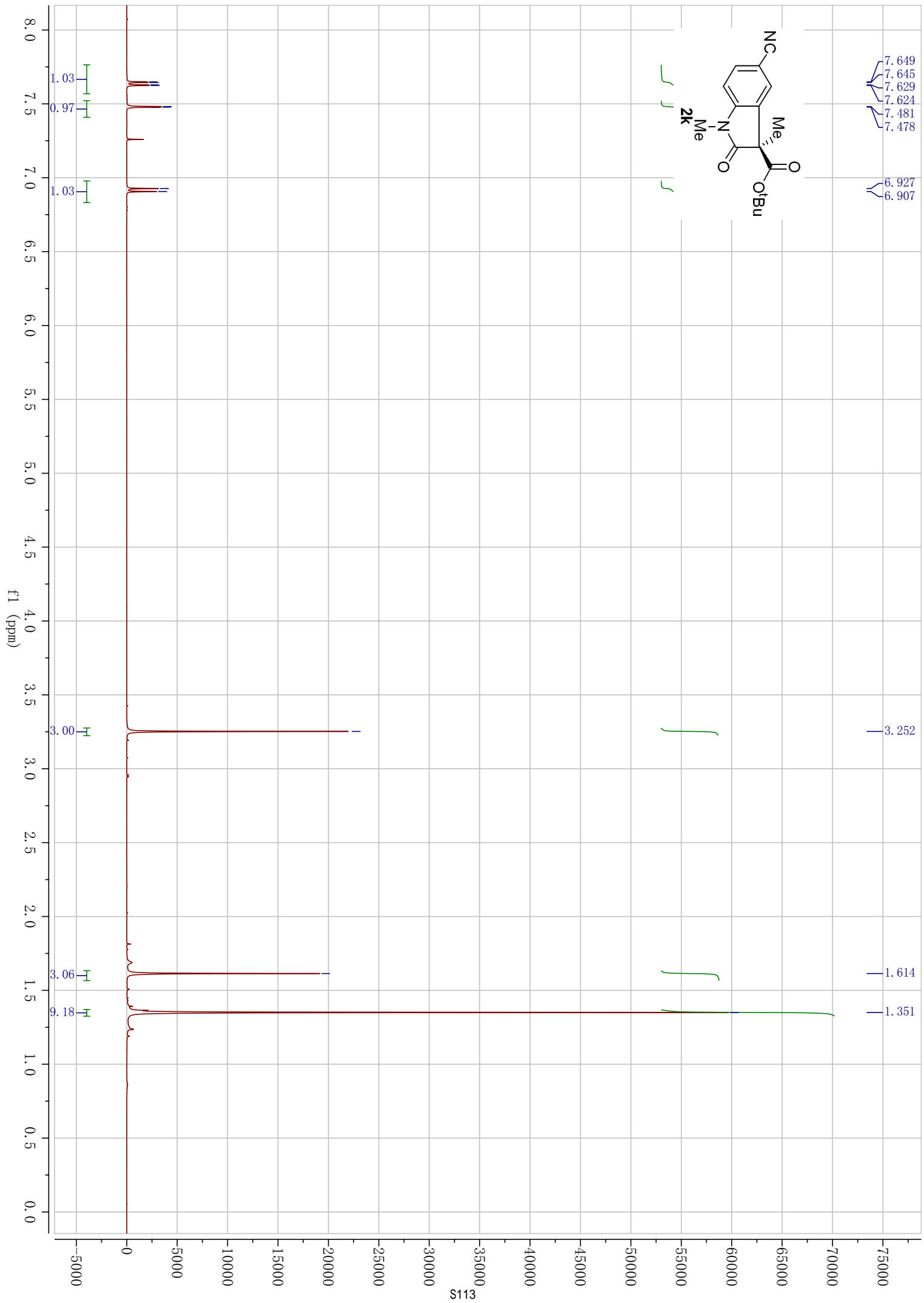


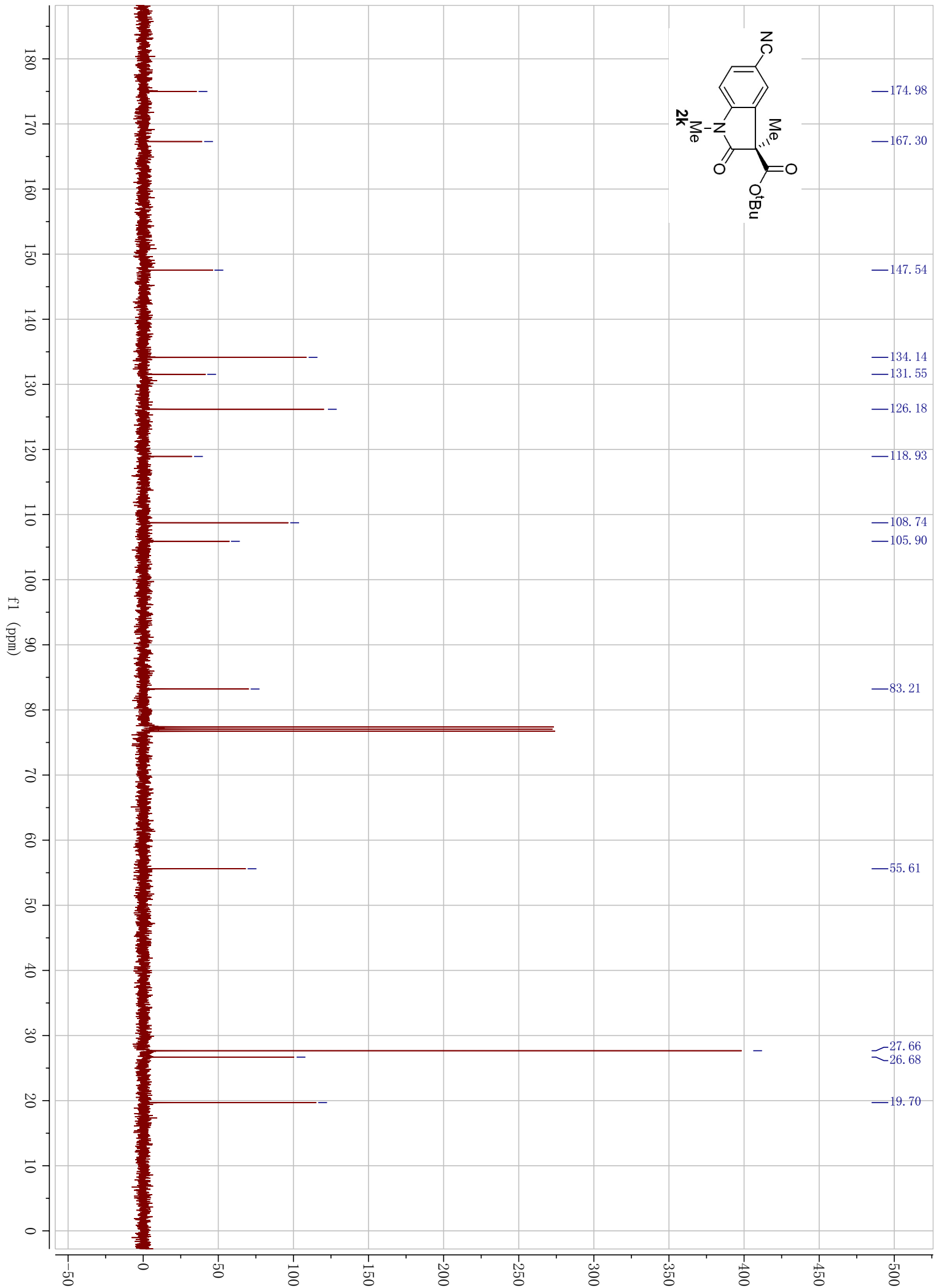


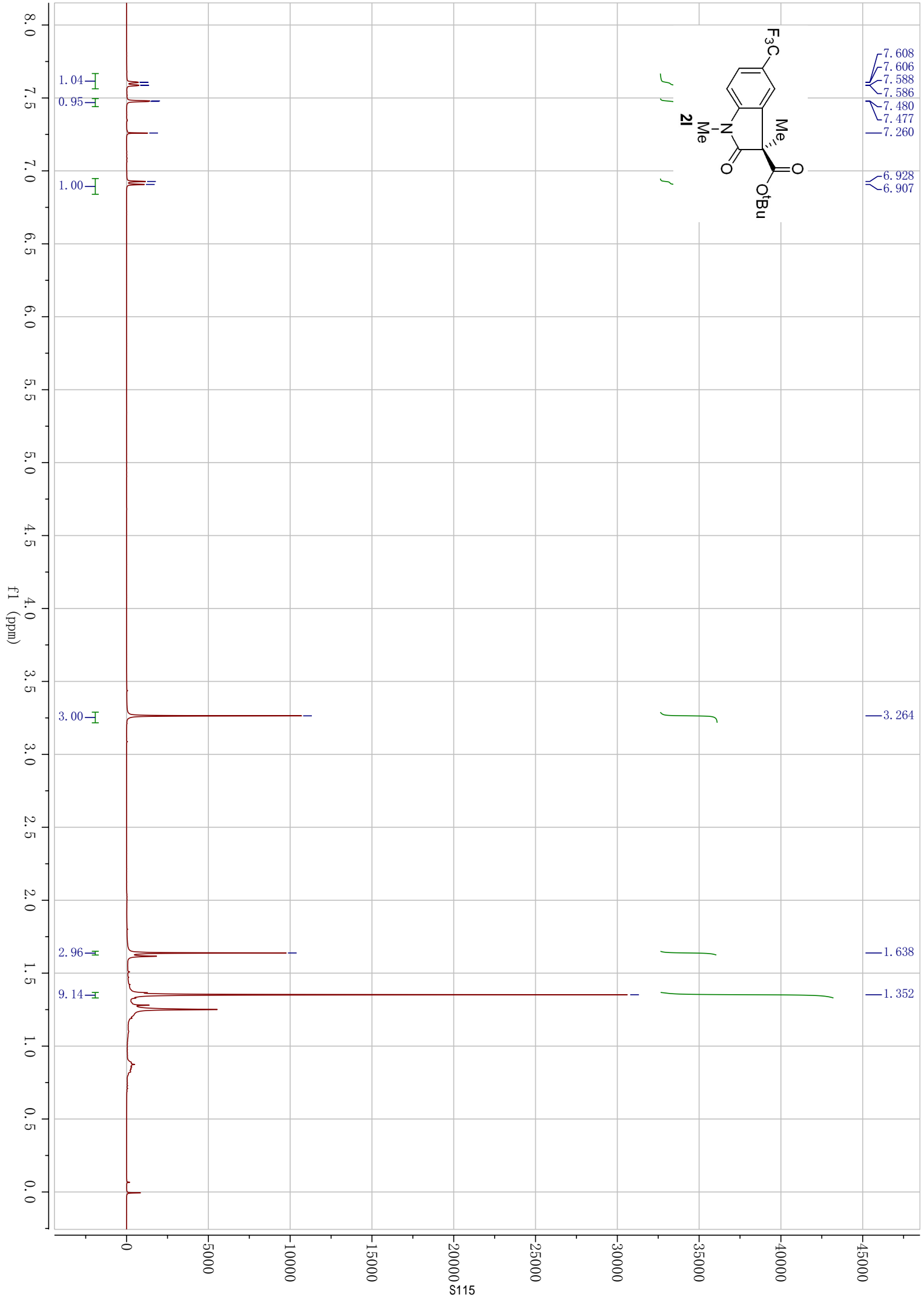


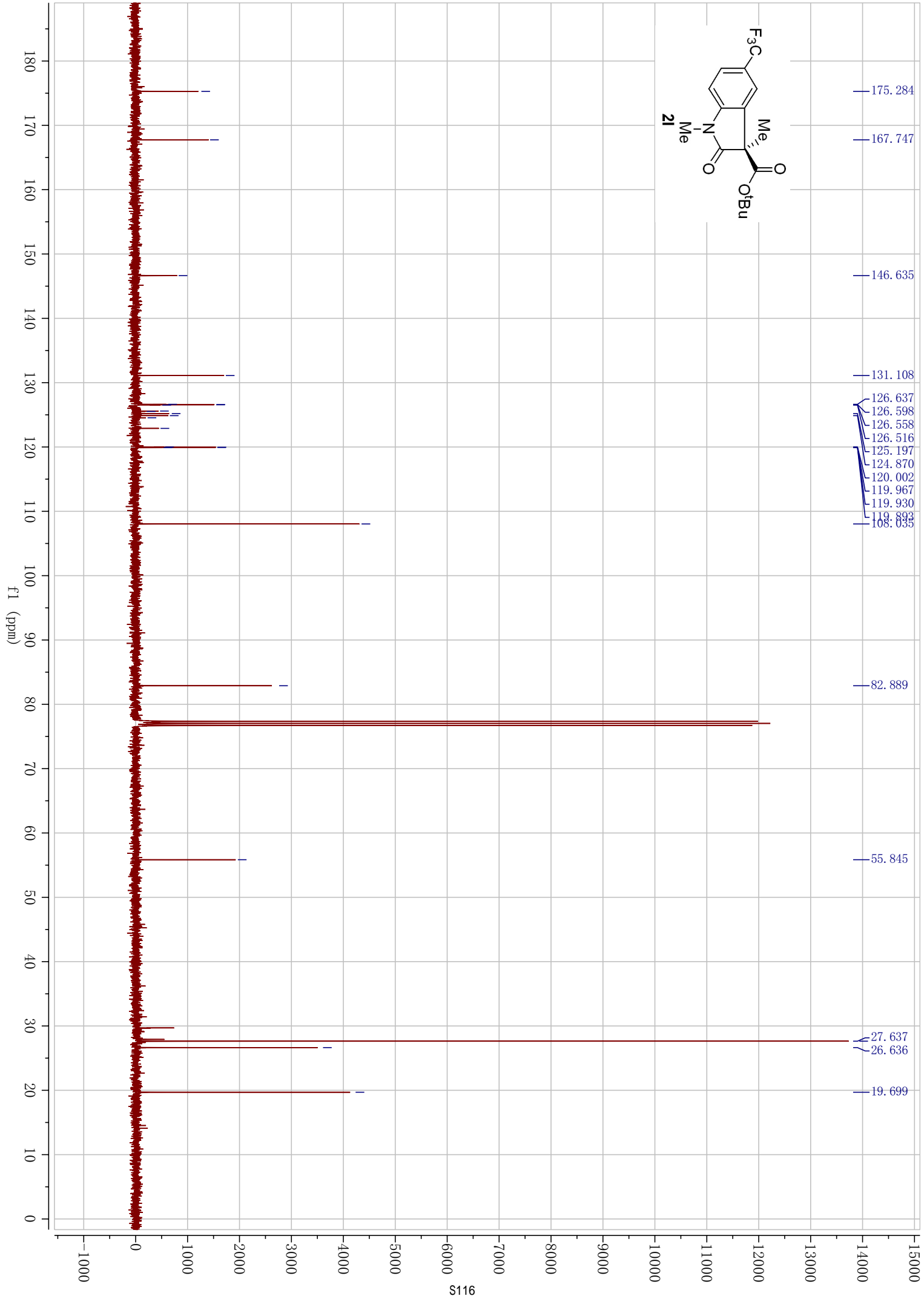
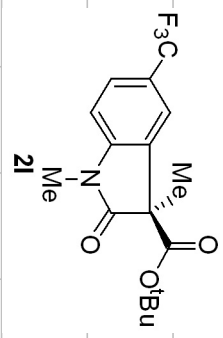


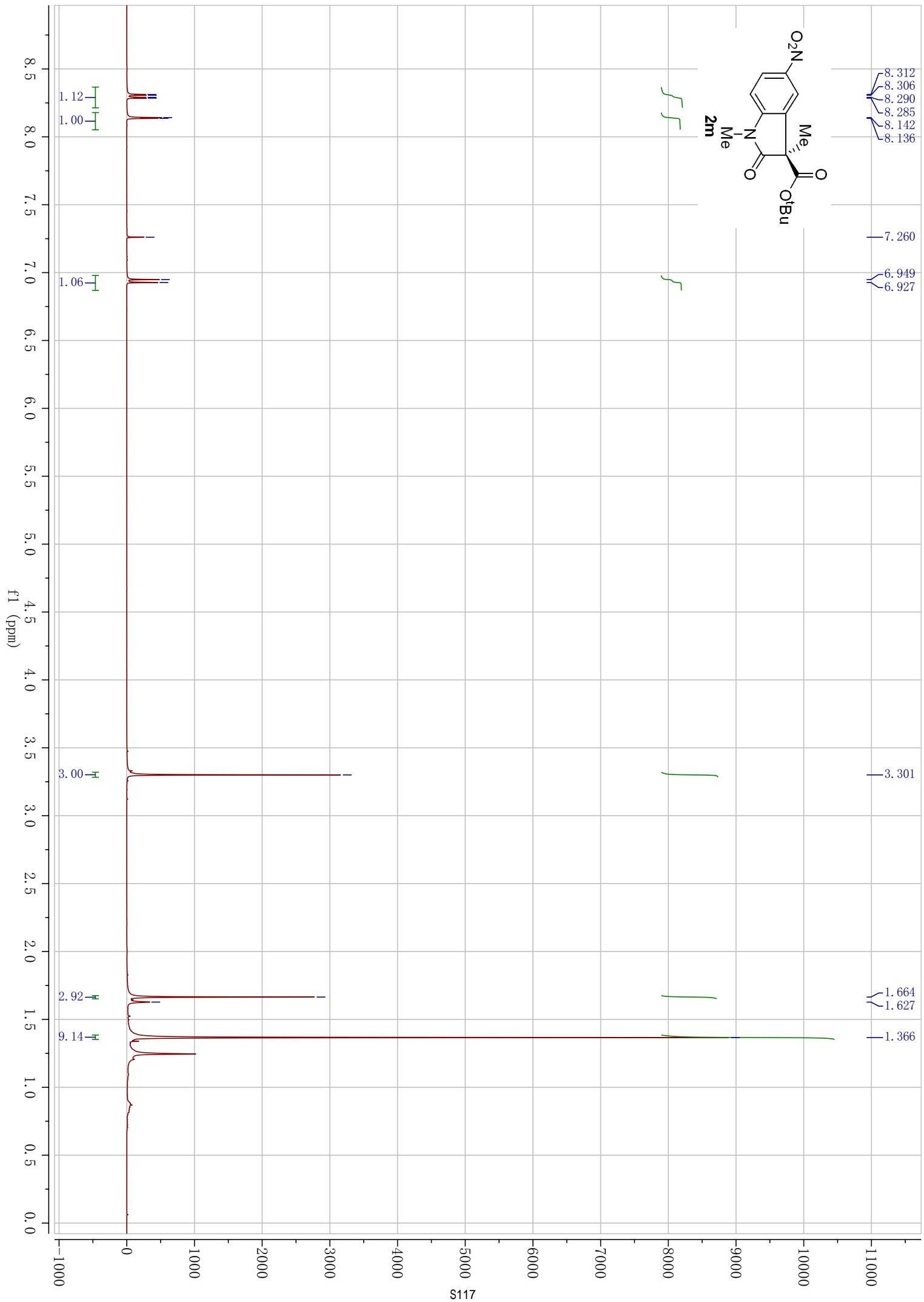


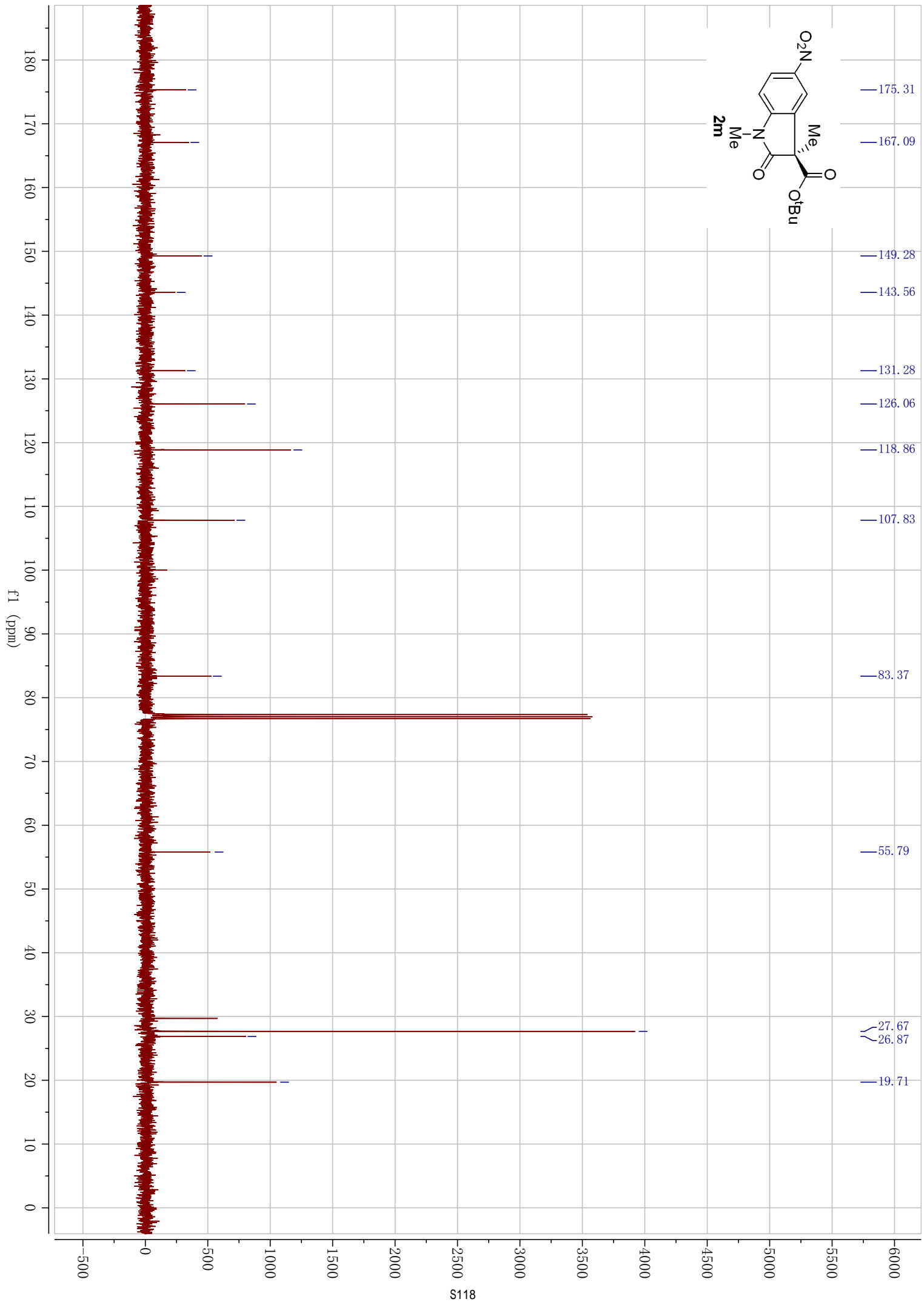


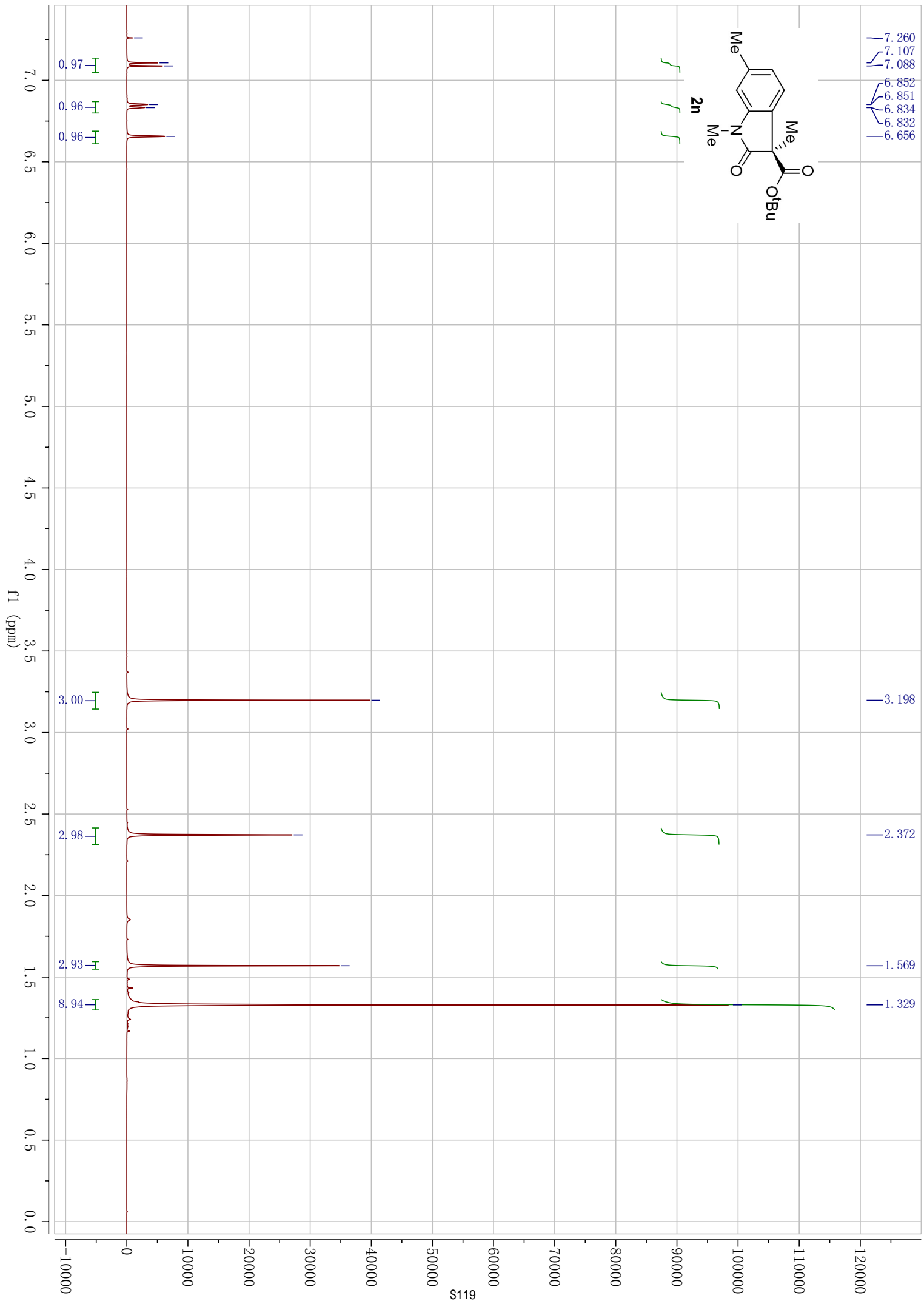


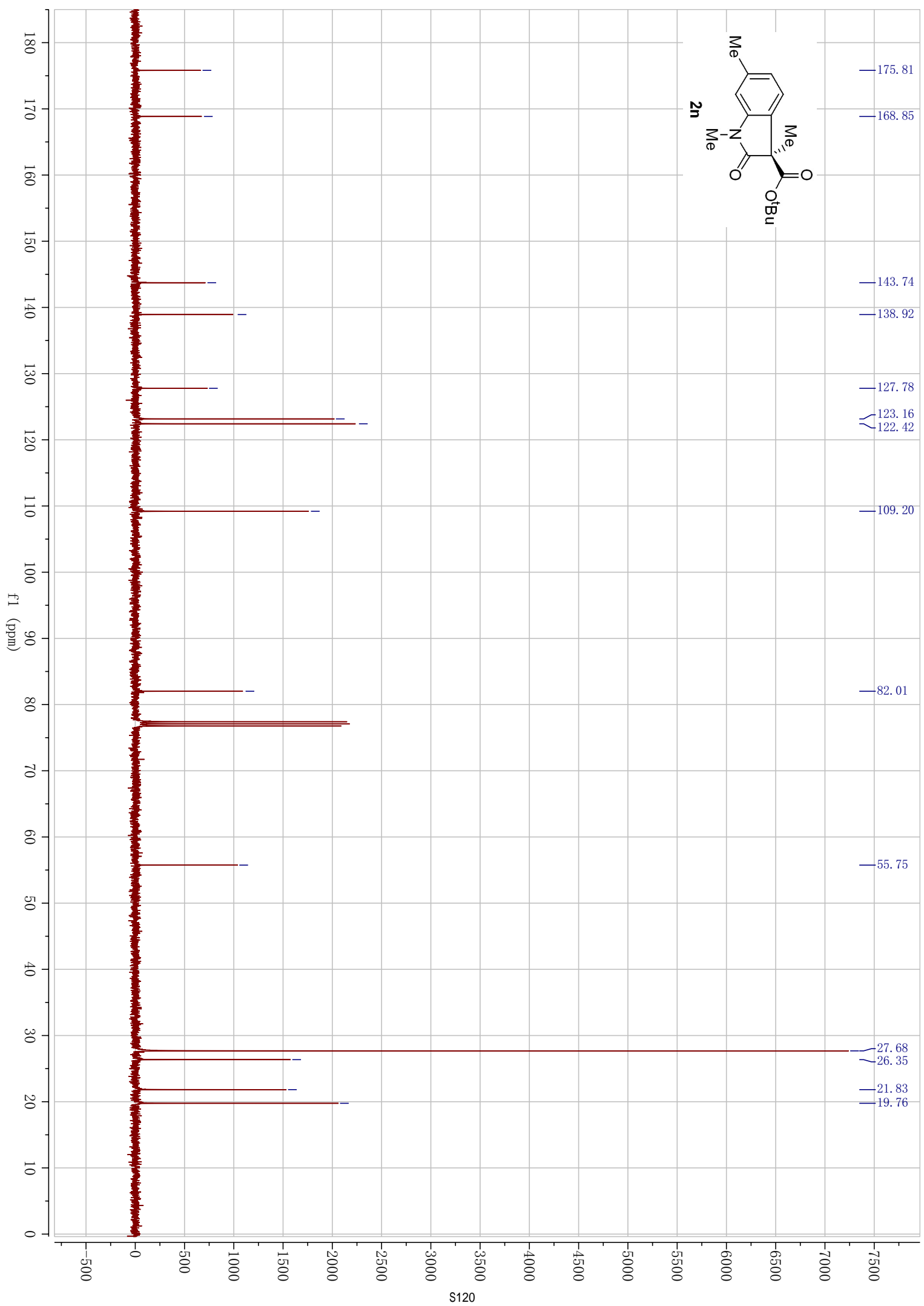
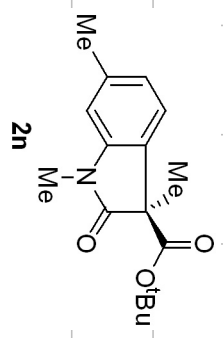


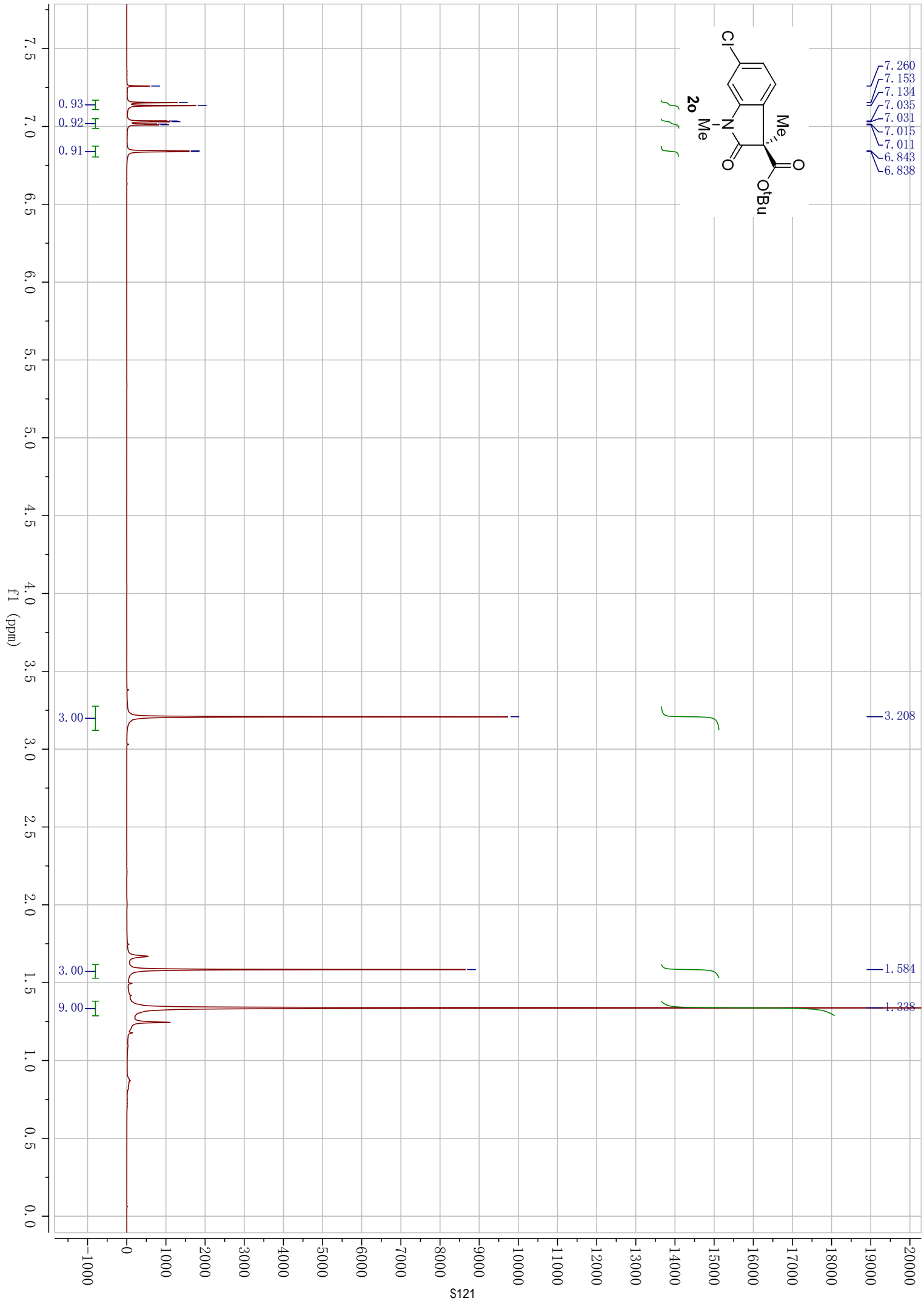


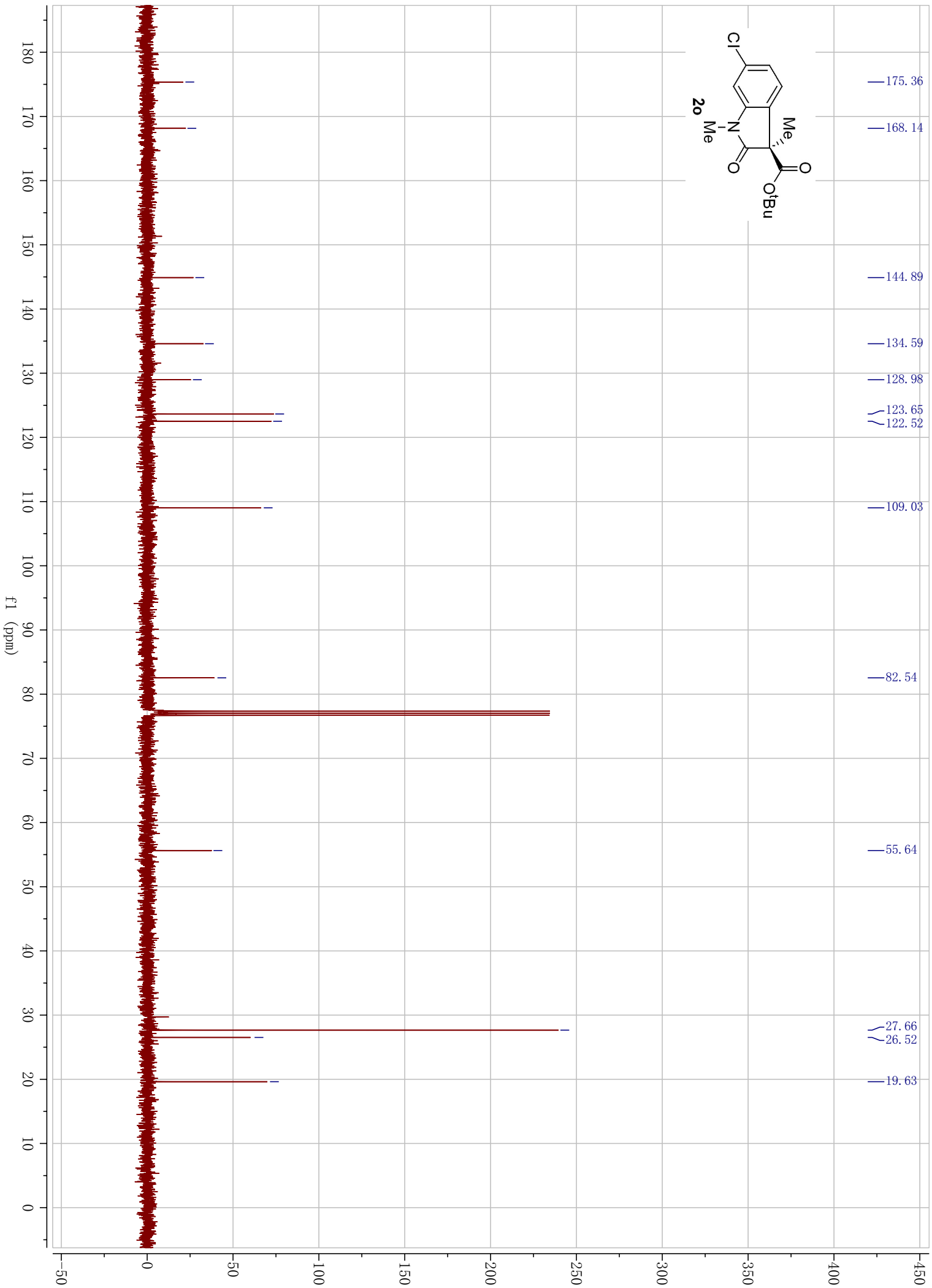
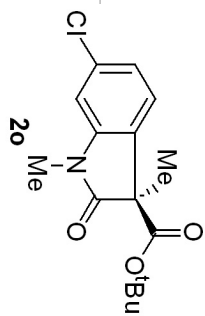


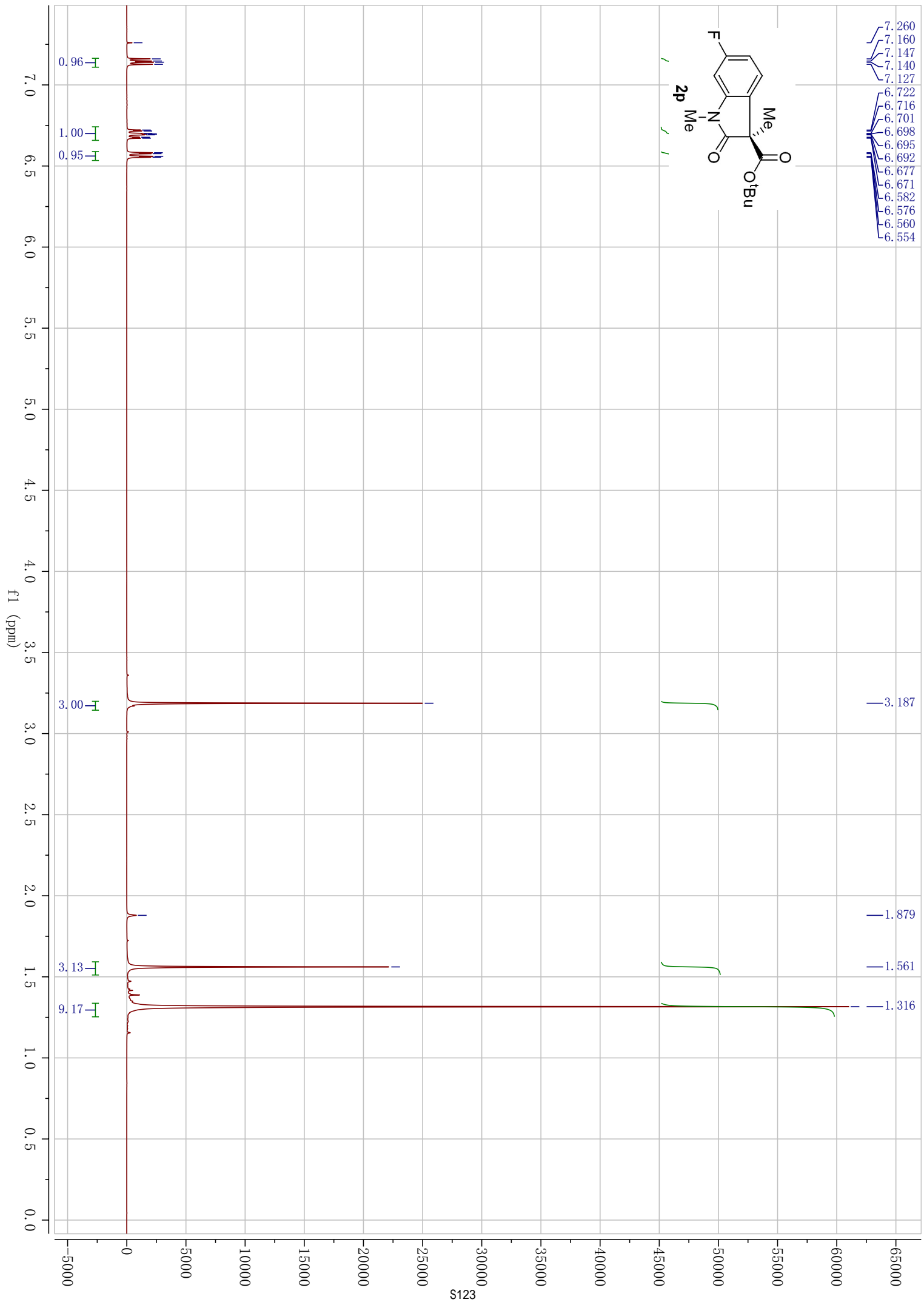


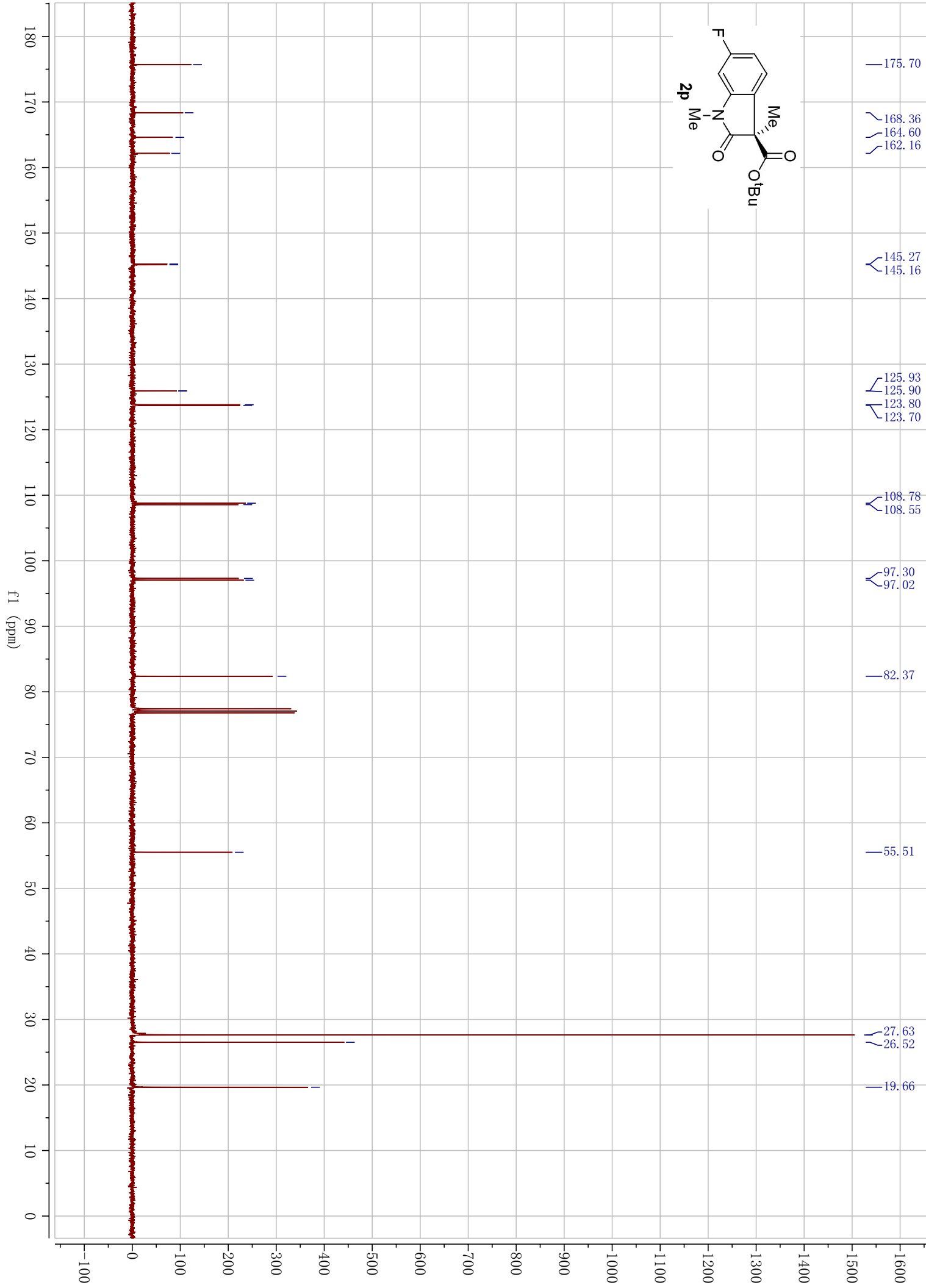
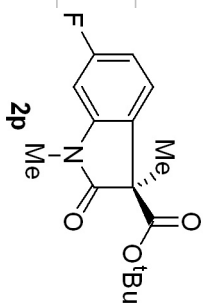


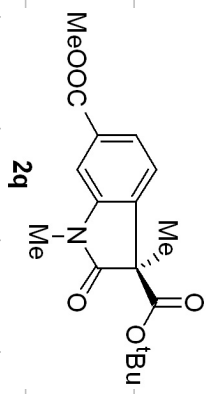




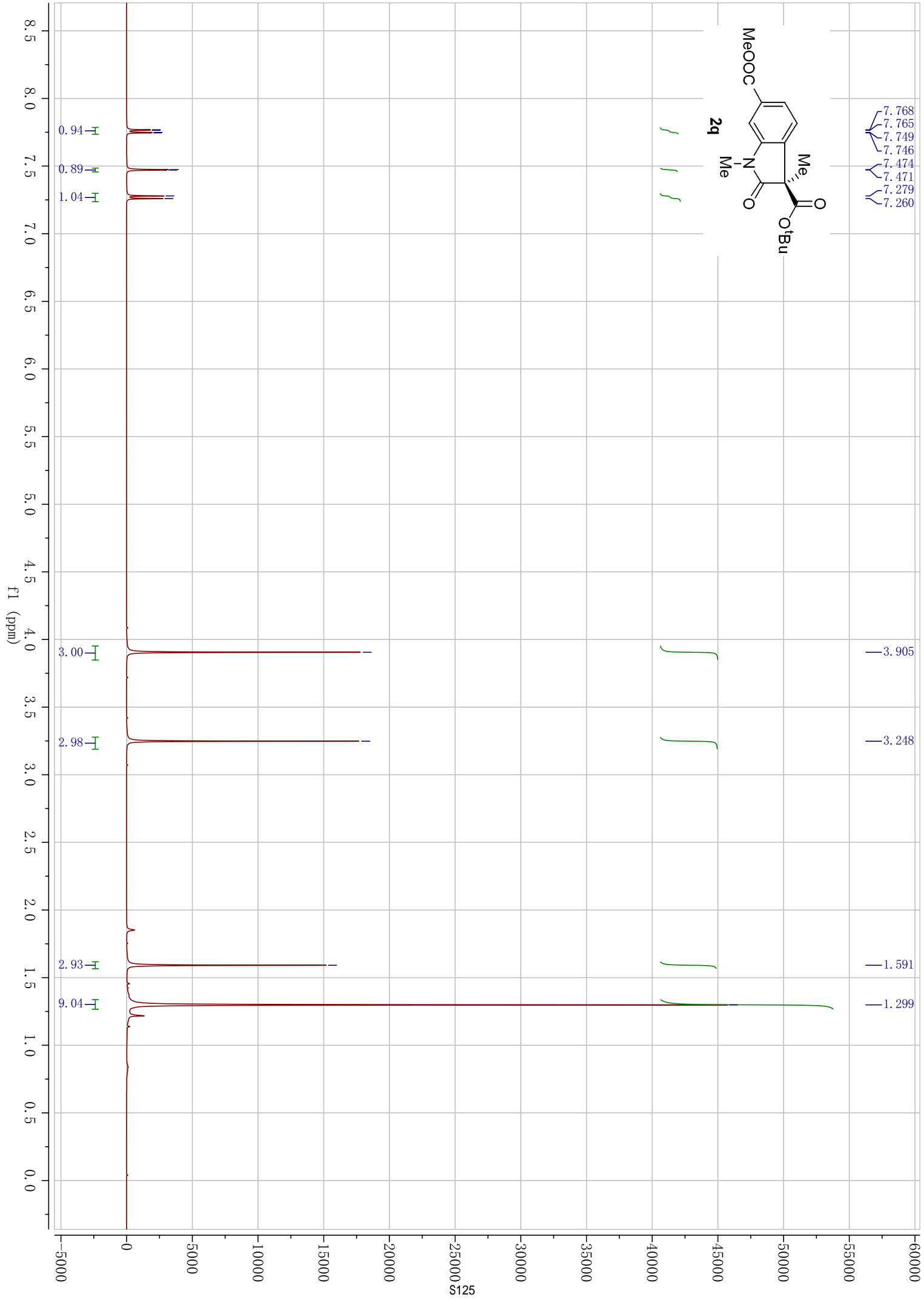


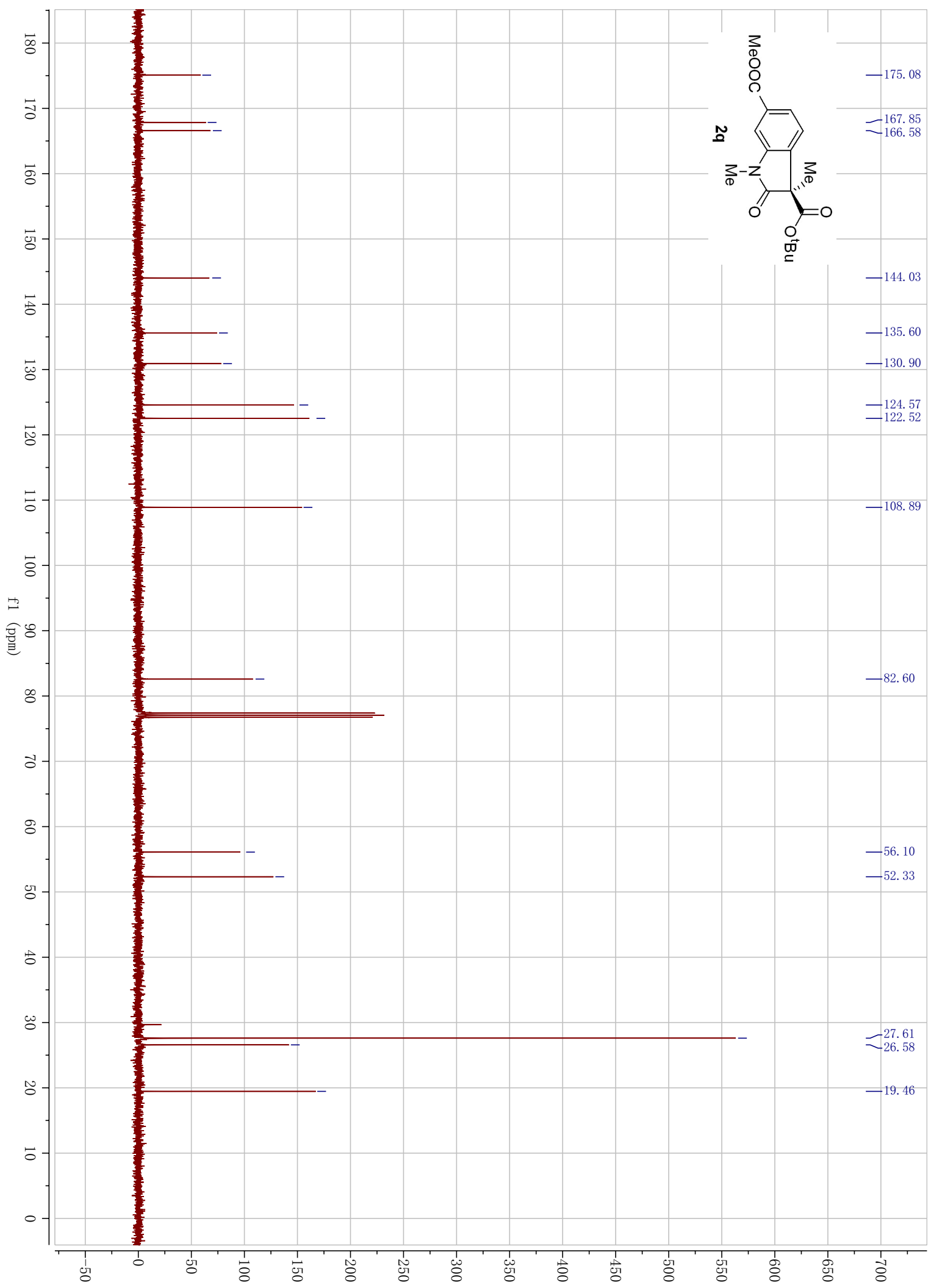
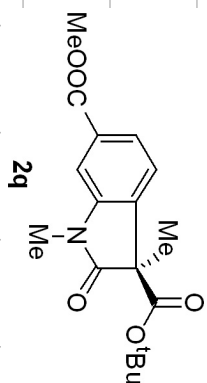


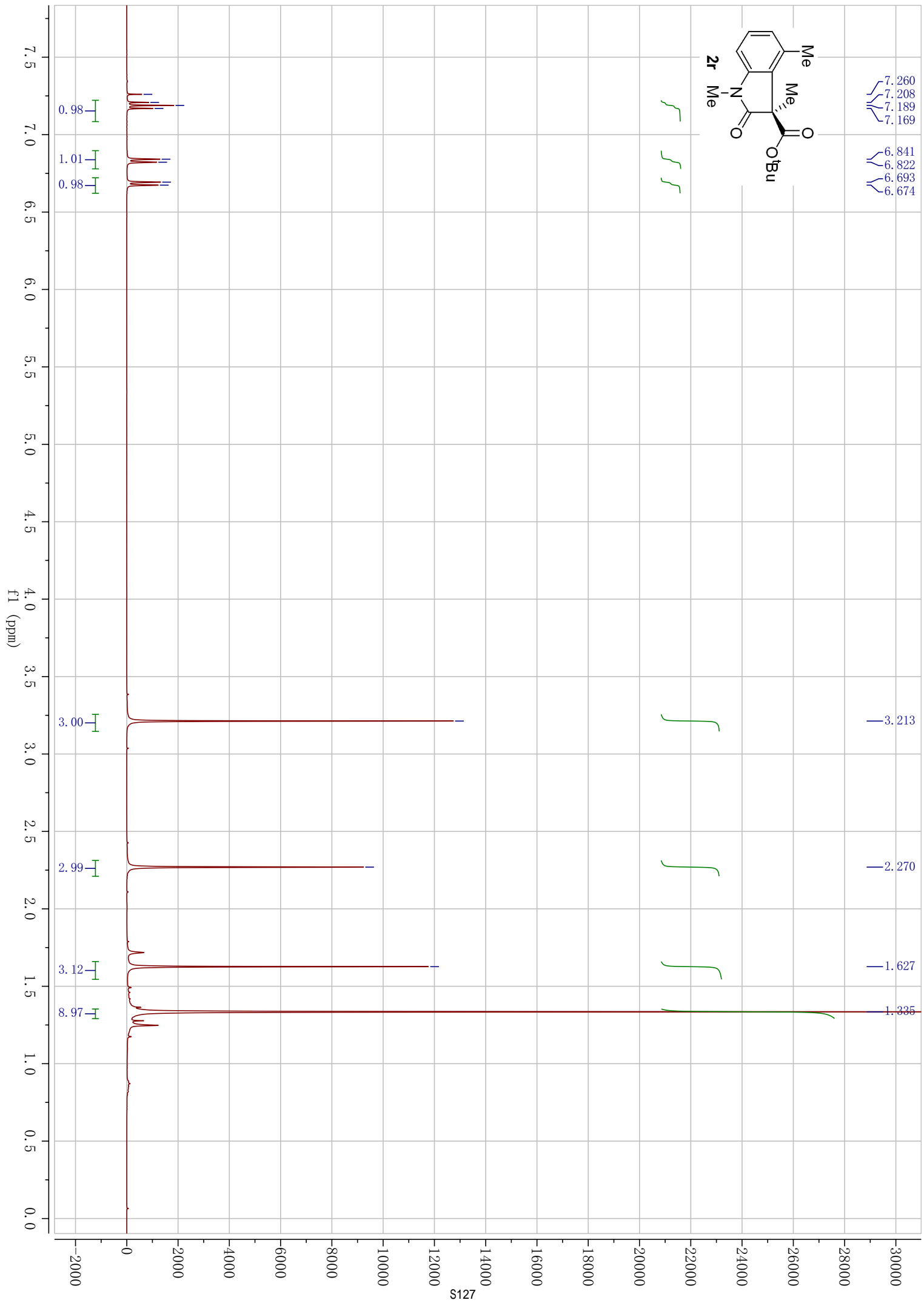


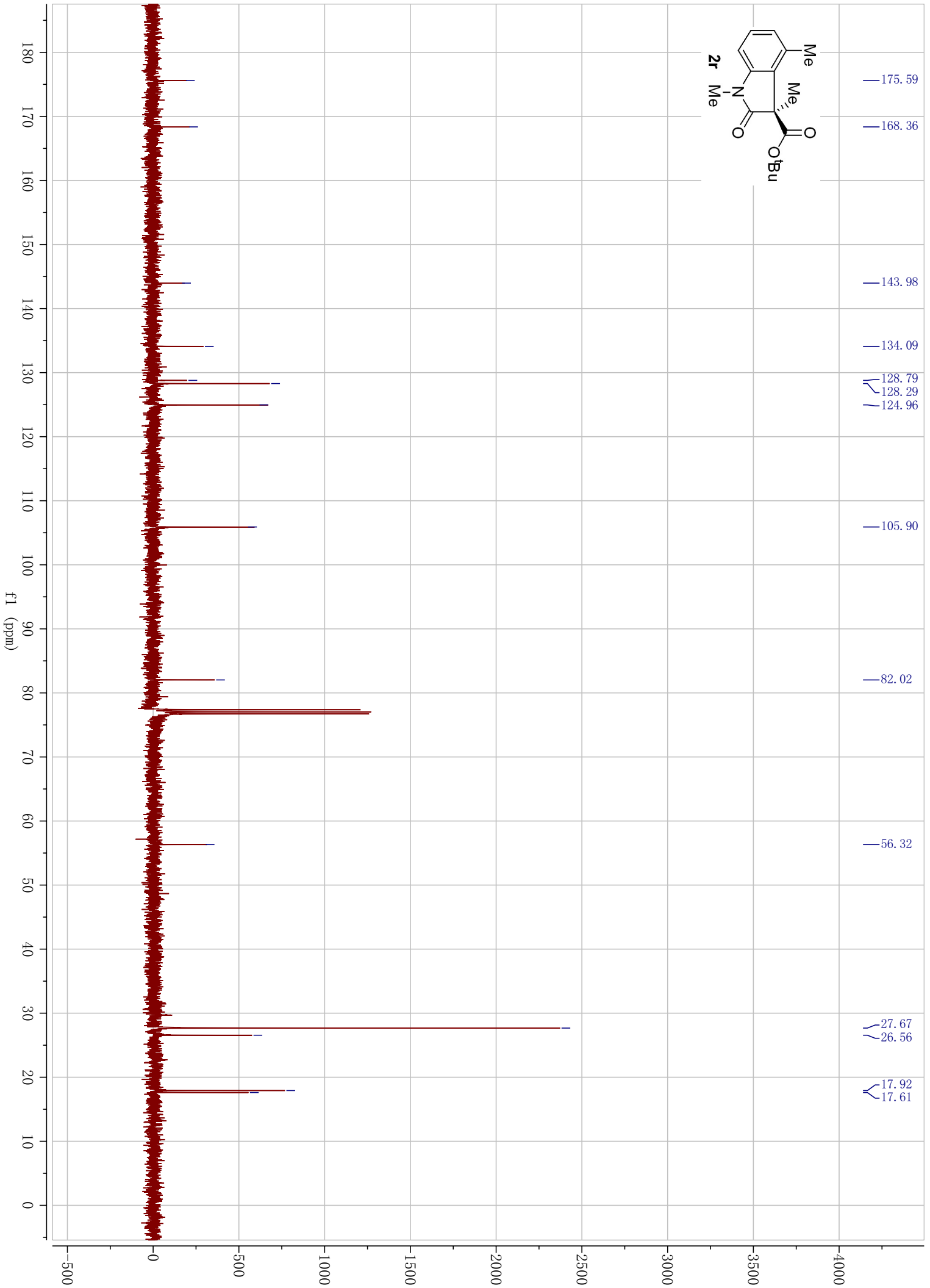
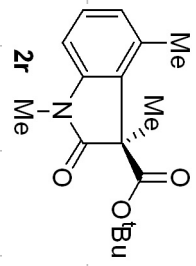


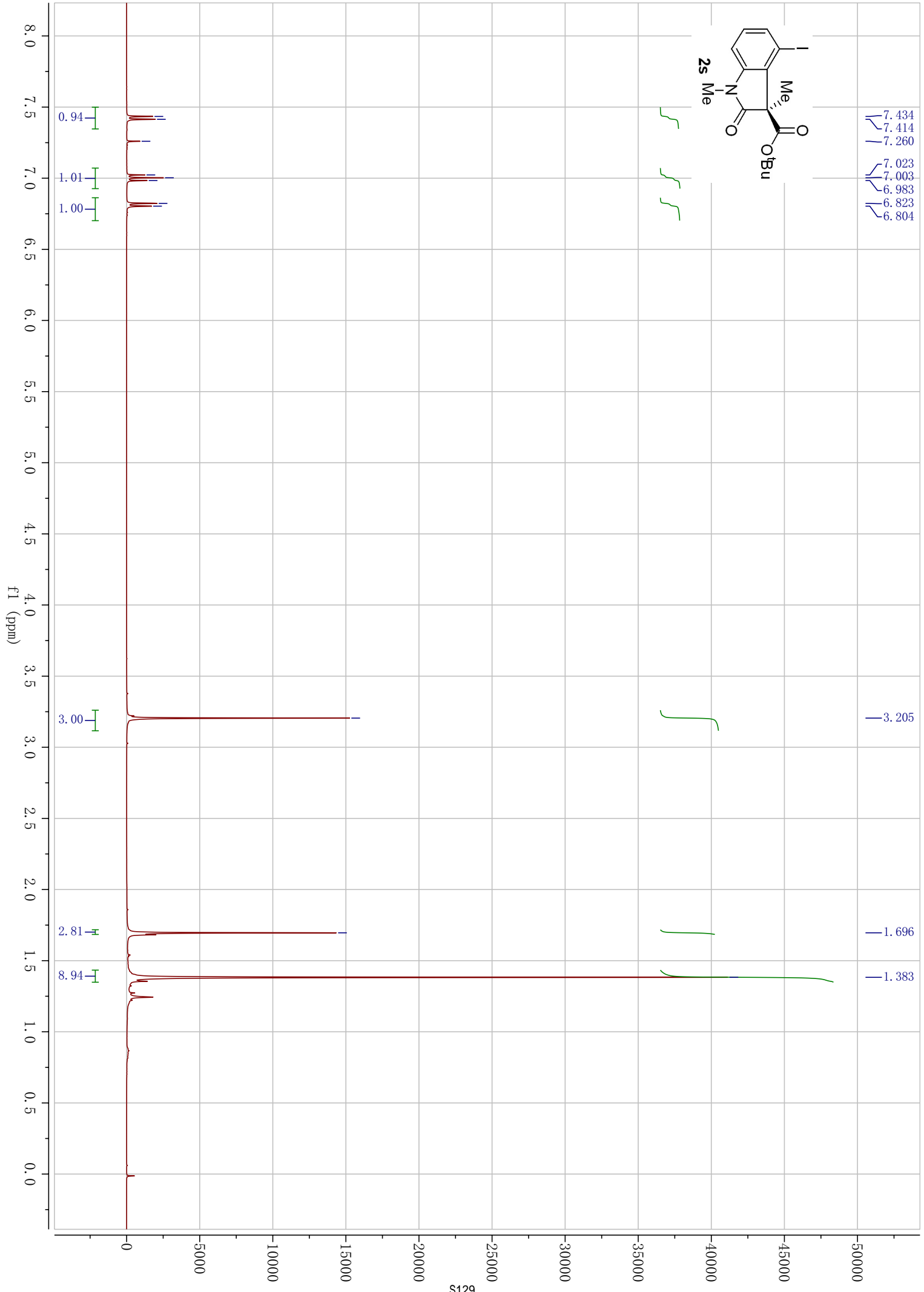
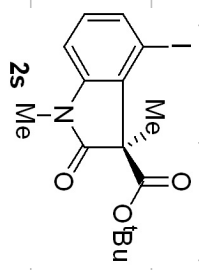
- 7.768
- 7.765
- 7.749
- 7.746
- 7.474
- 7.471
- 7.279
- 7.260



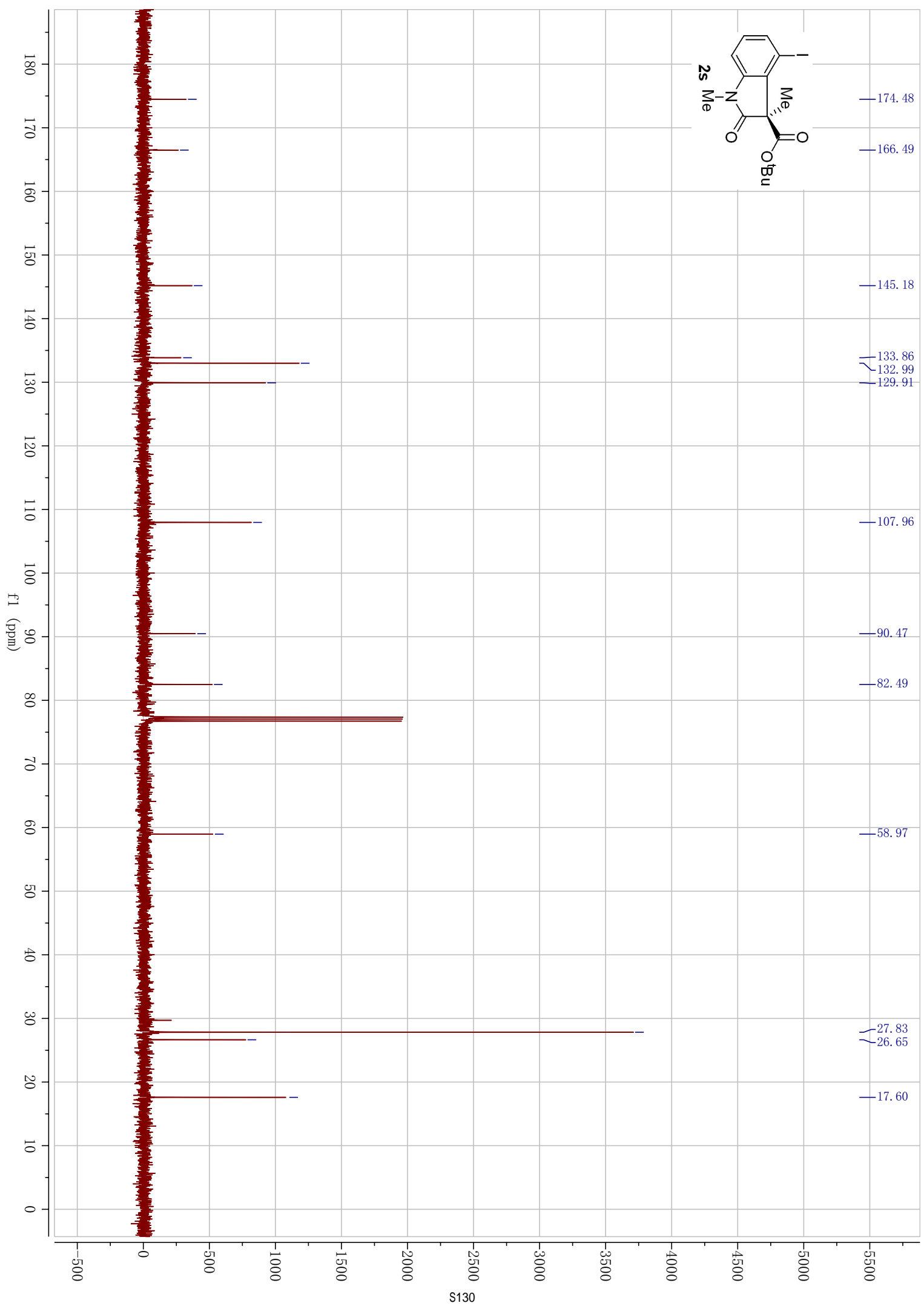
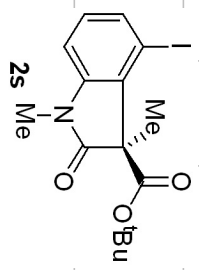


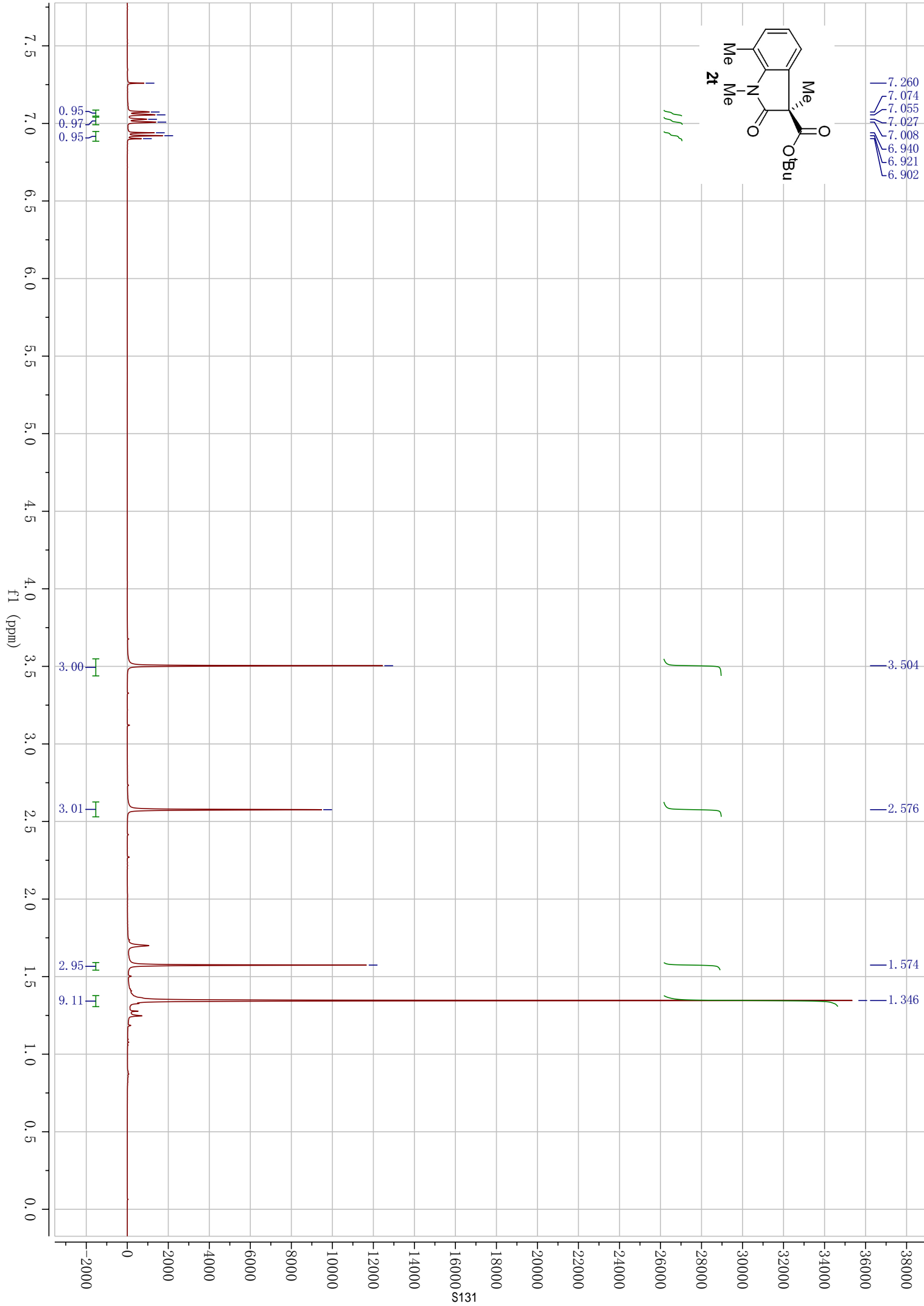
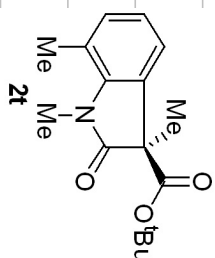


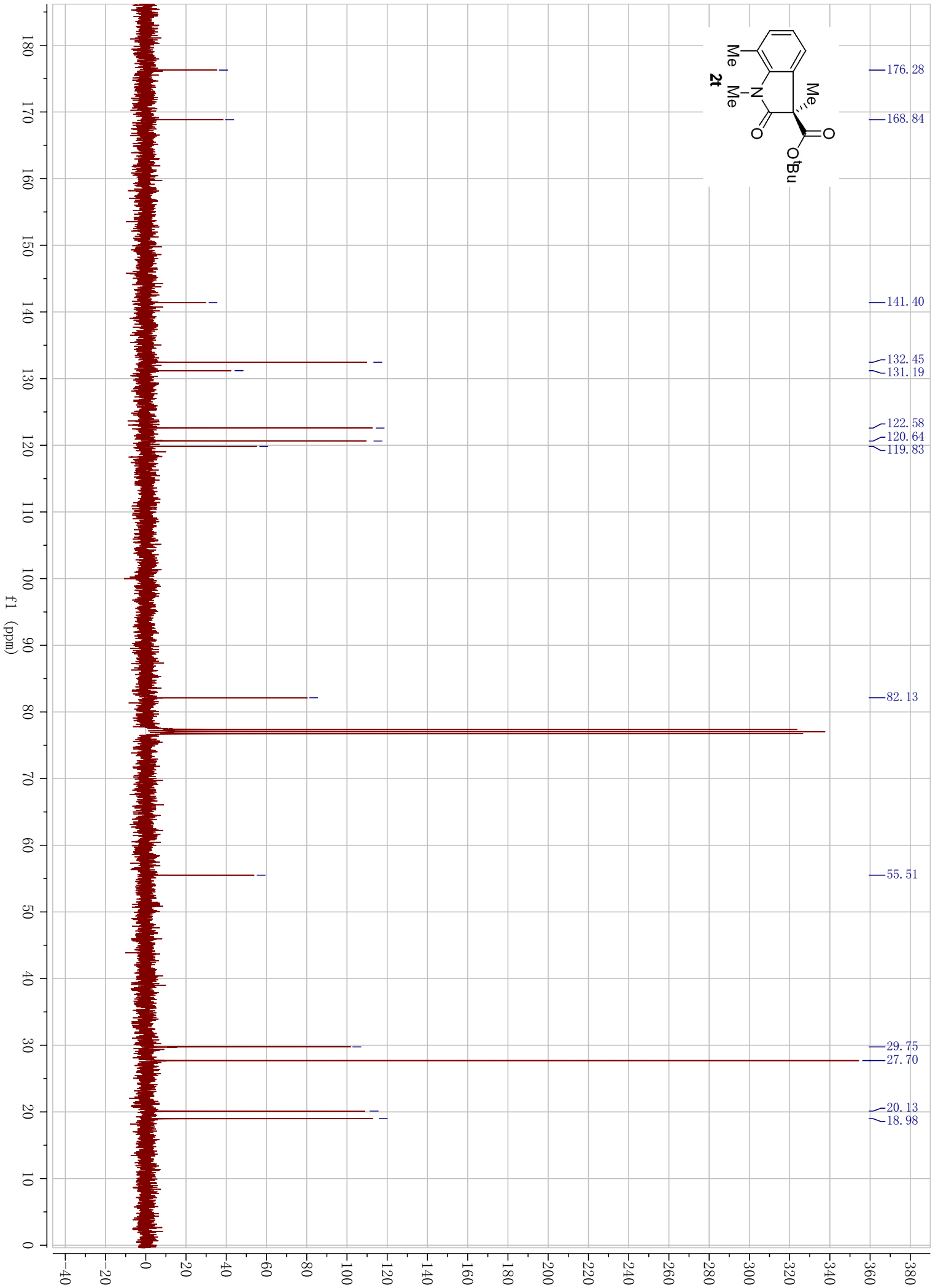
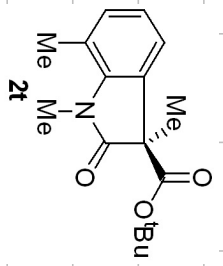


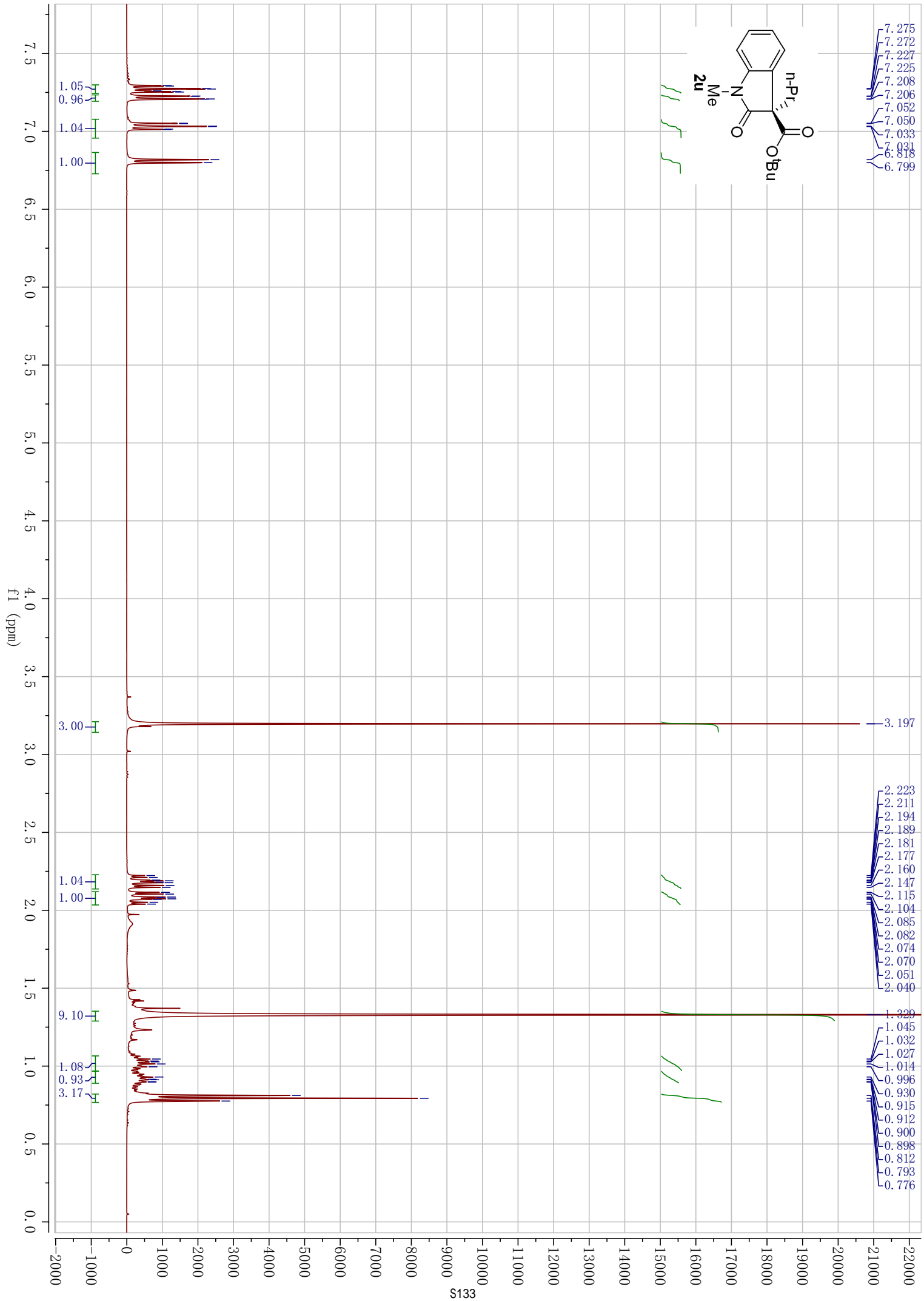


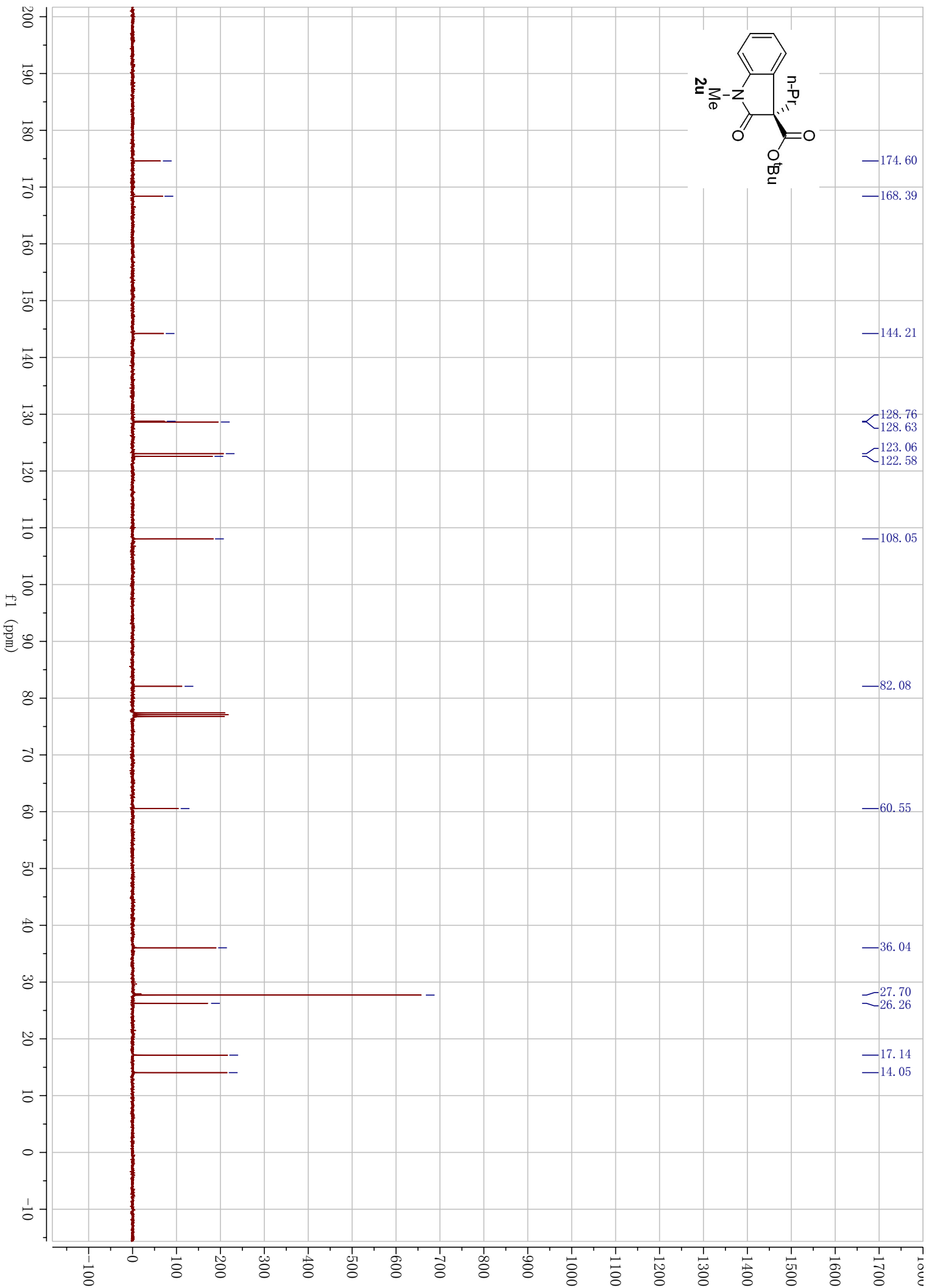
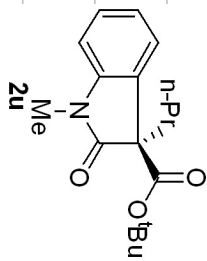
- 7.434
- 7.414
- 7.260
- 7.023
- 7.003
- 6.983
- 6.823
- 6.804

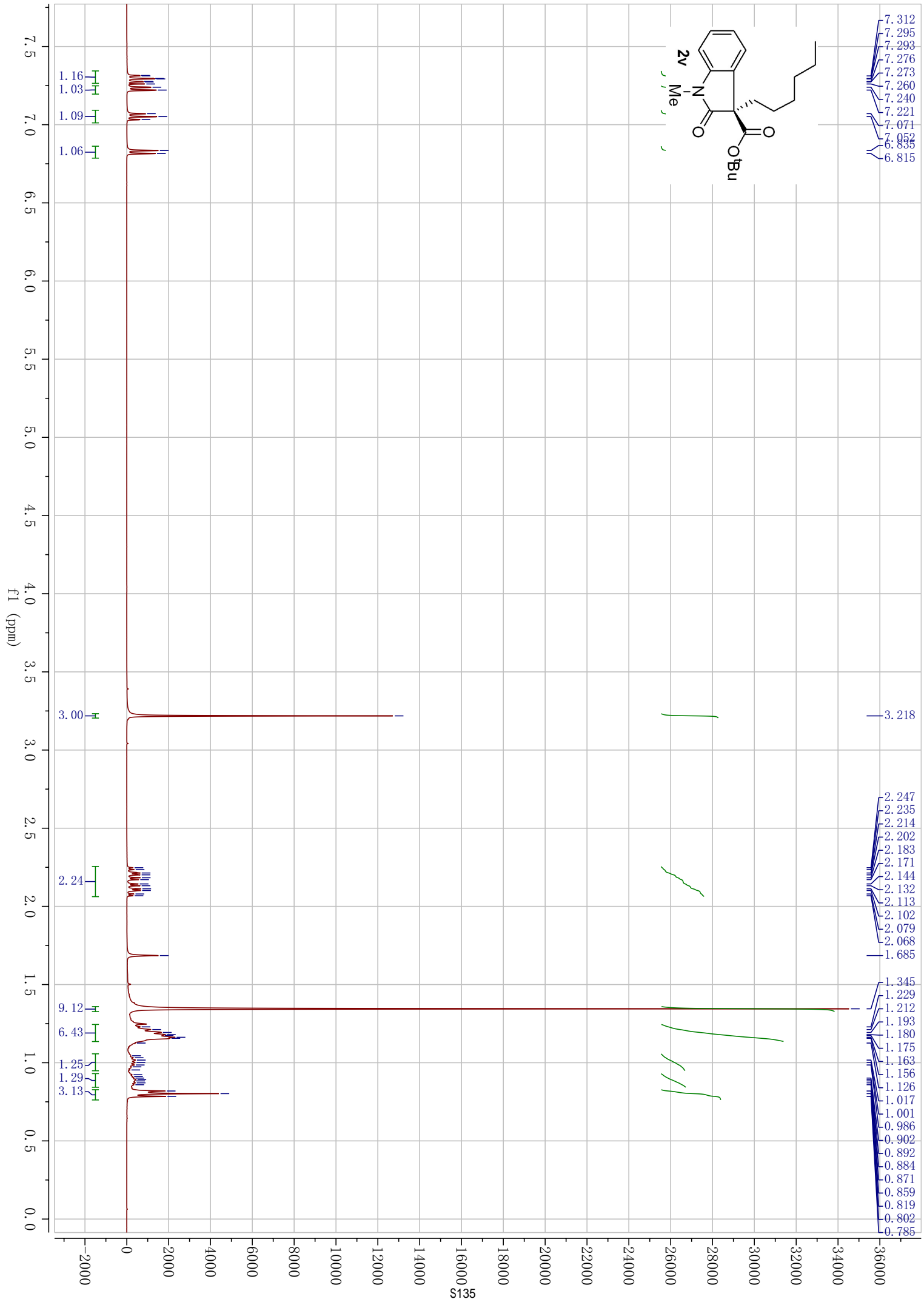


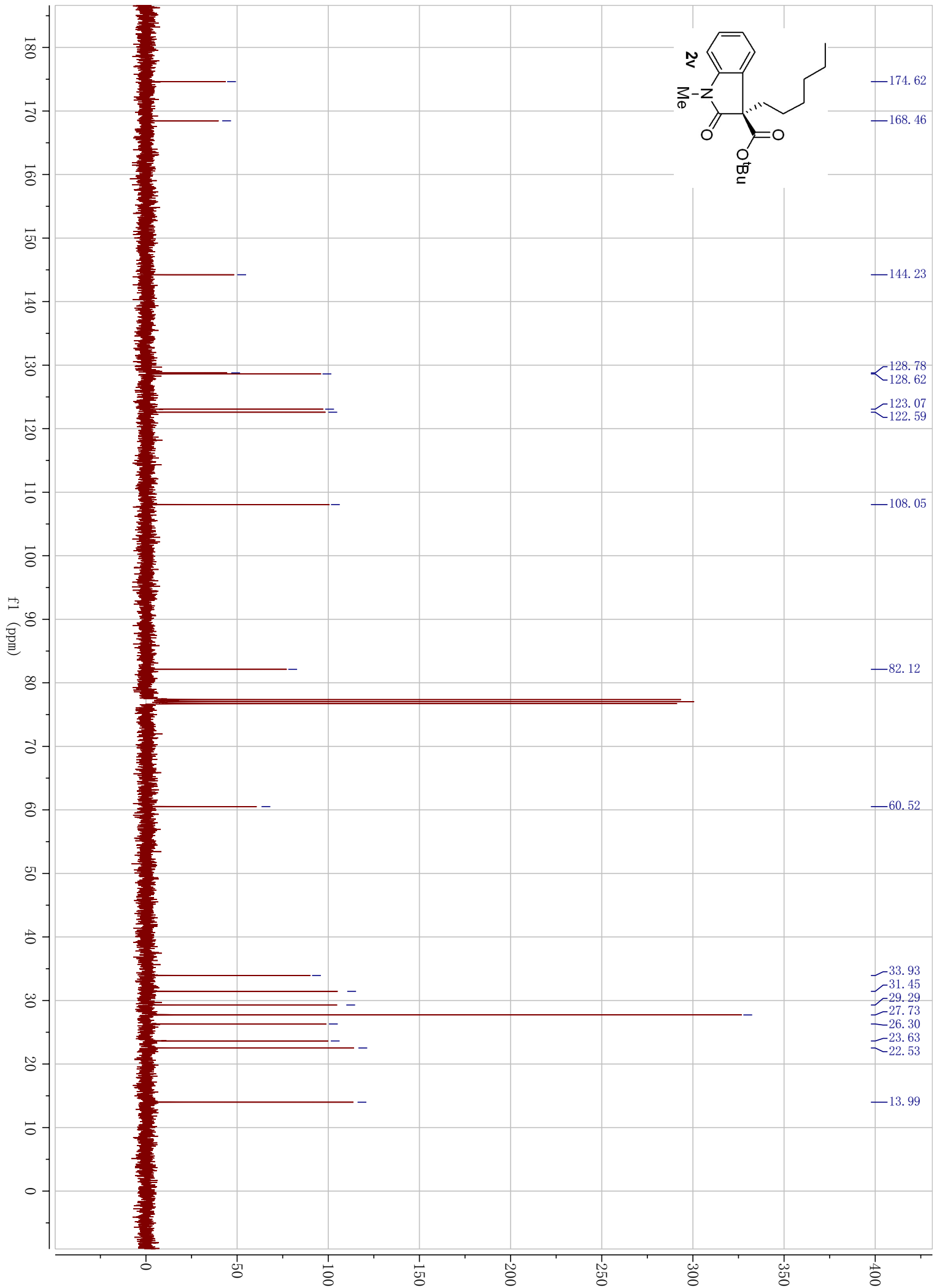


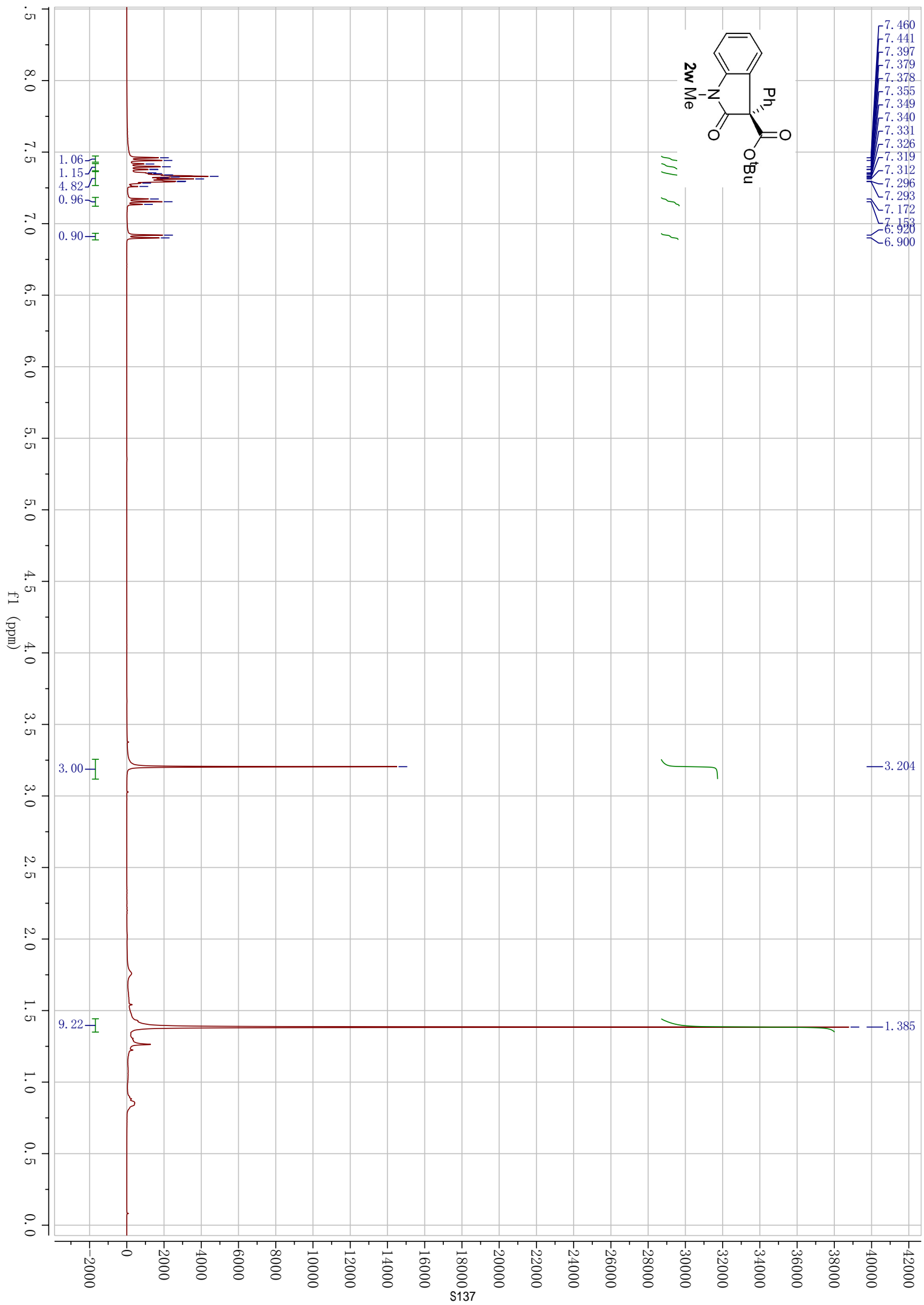


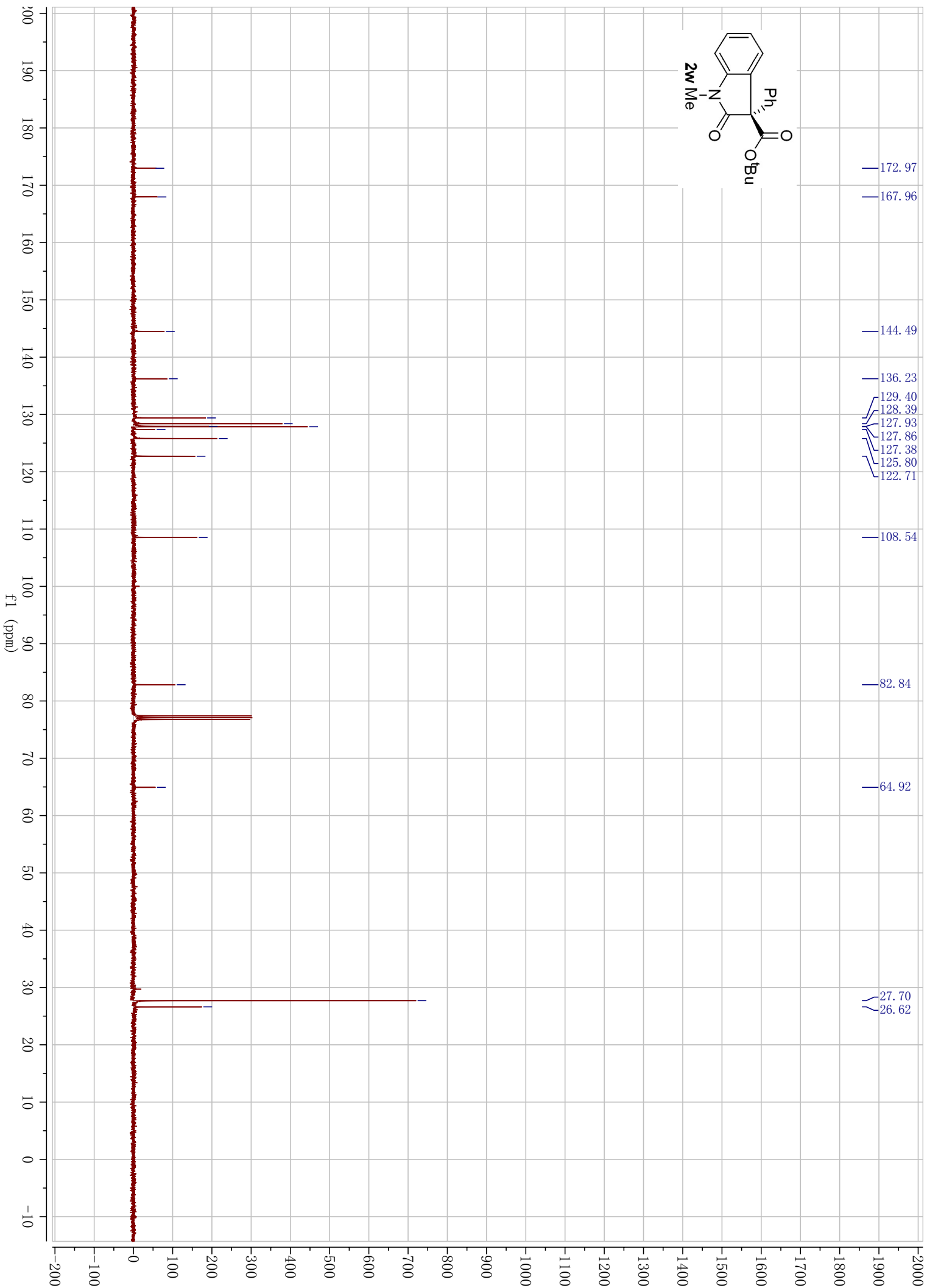
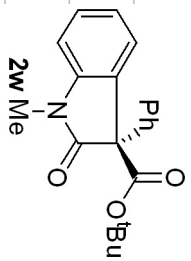


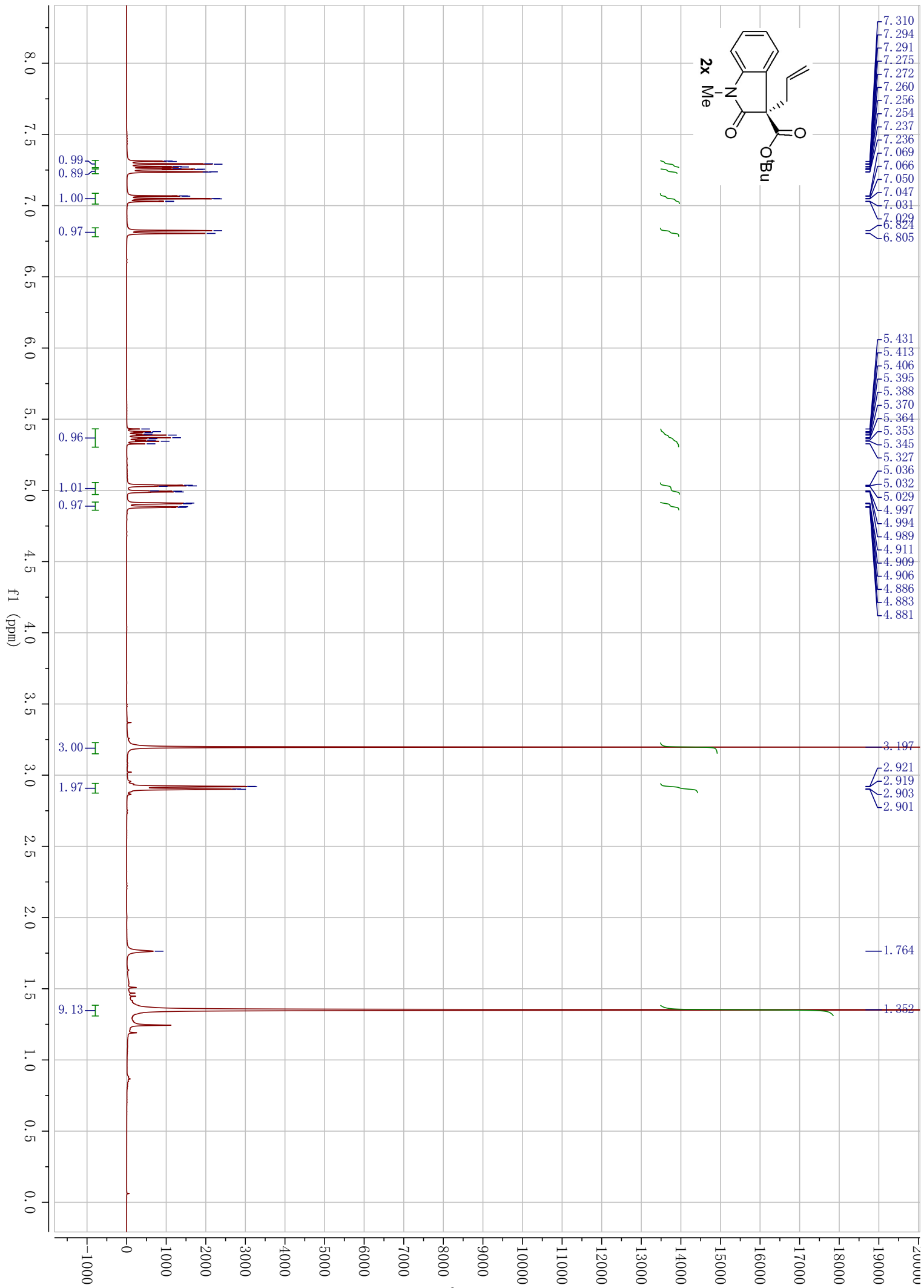


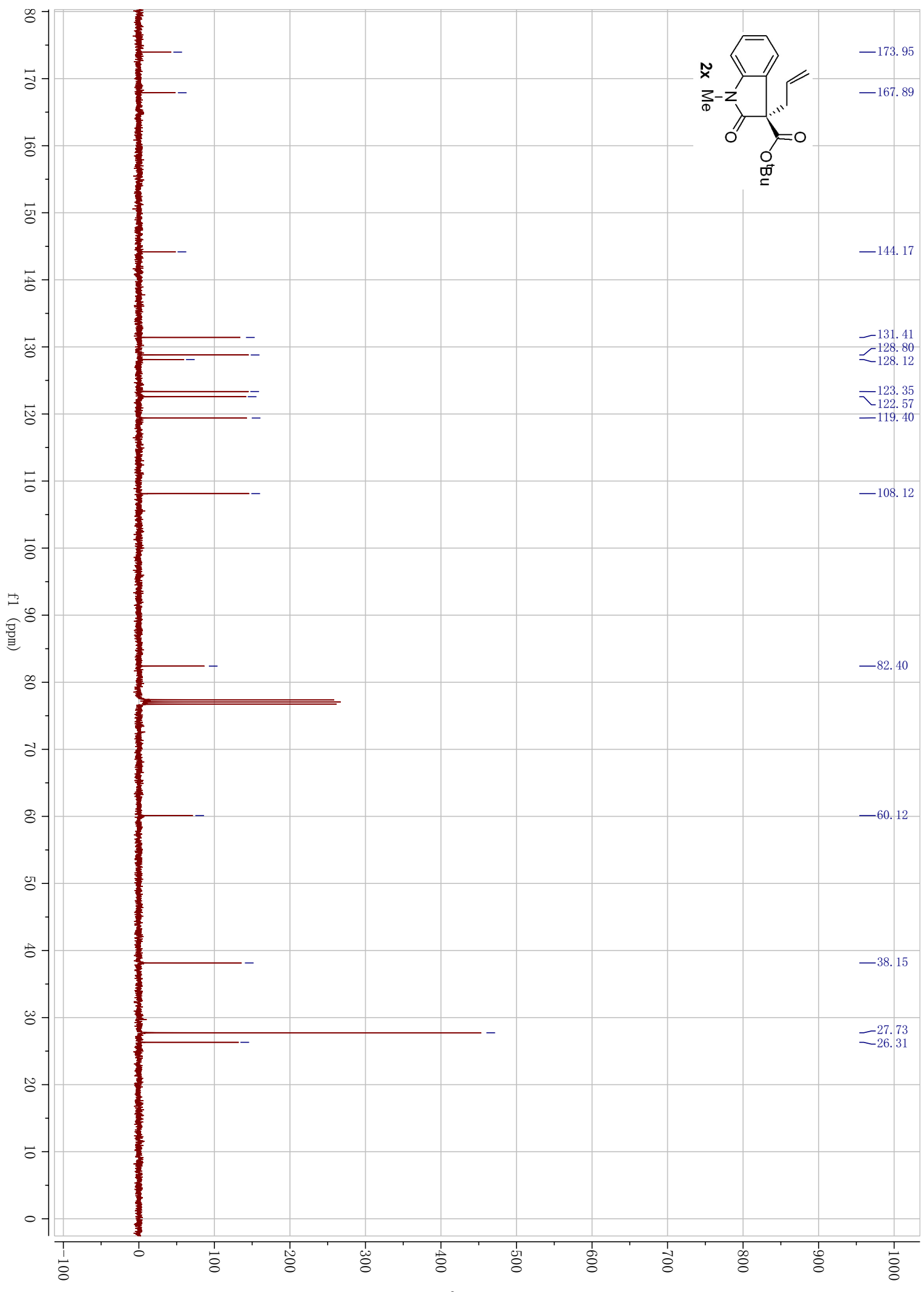
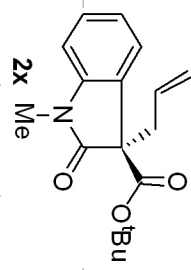


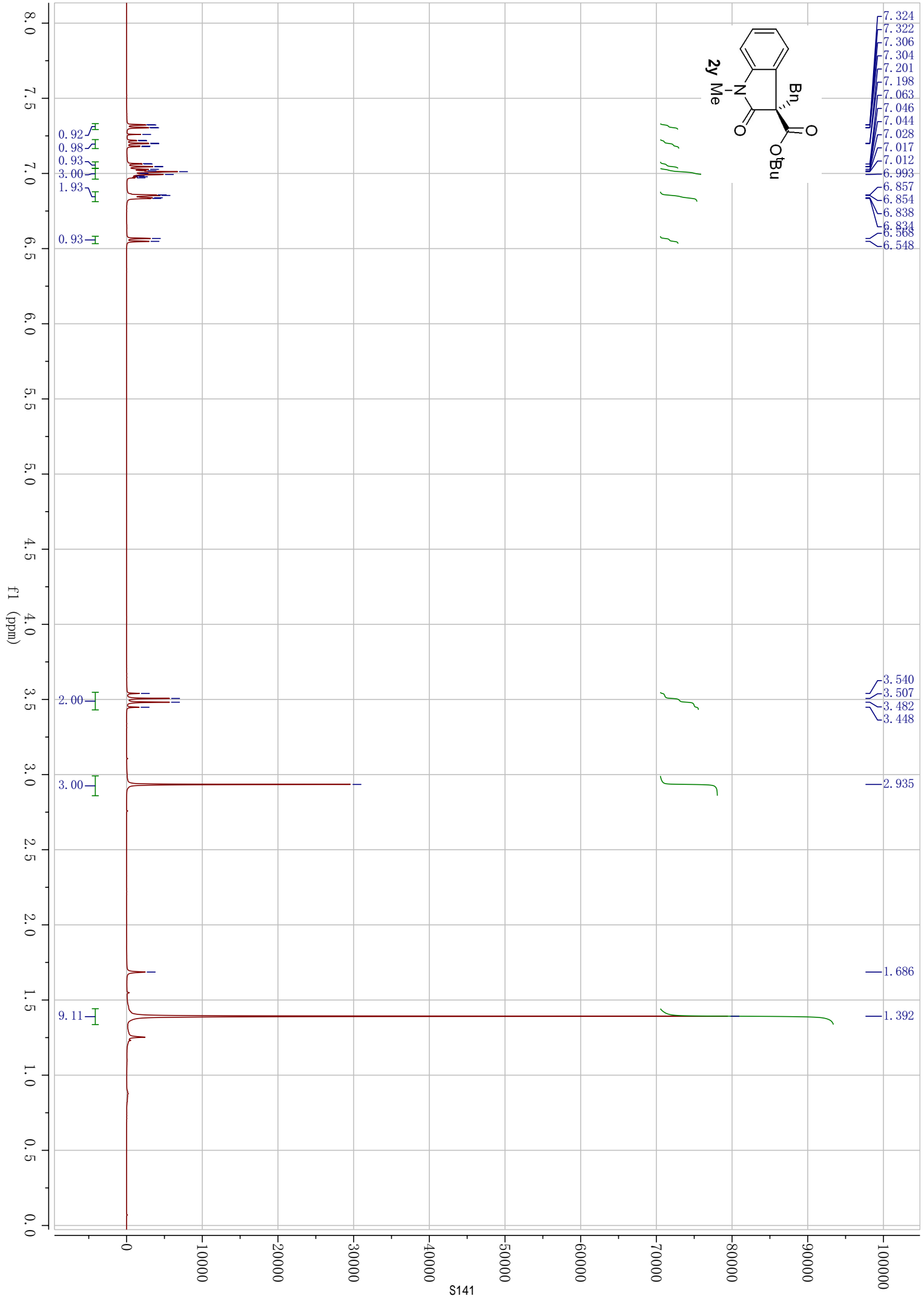


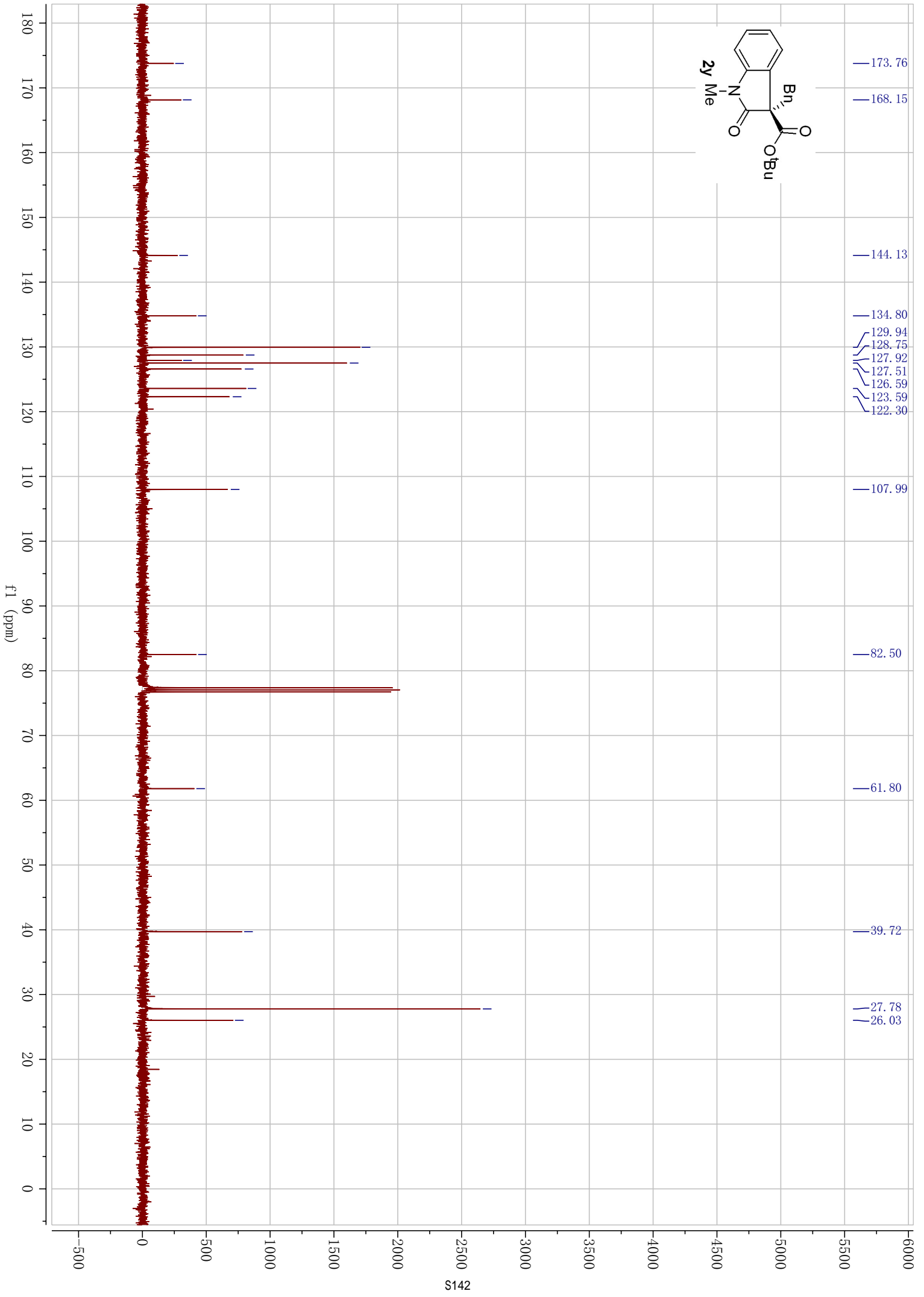
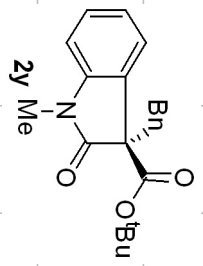


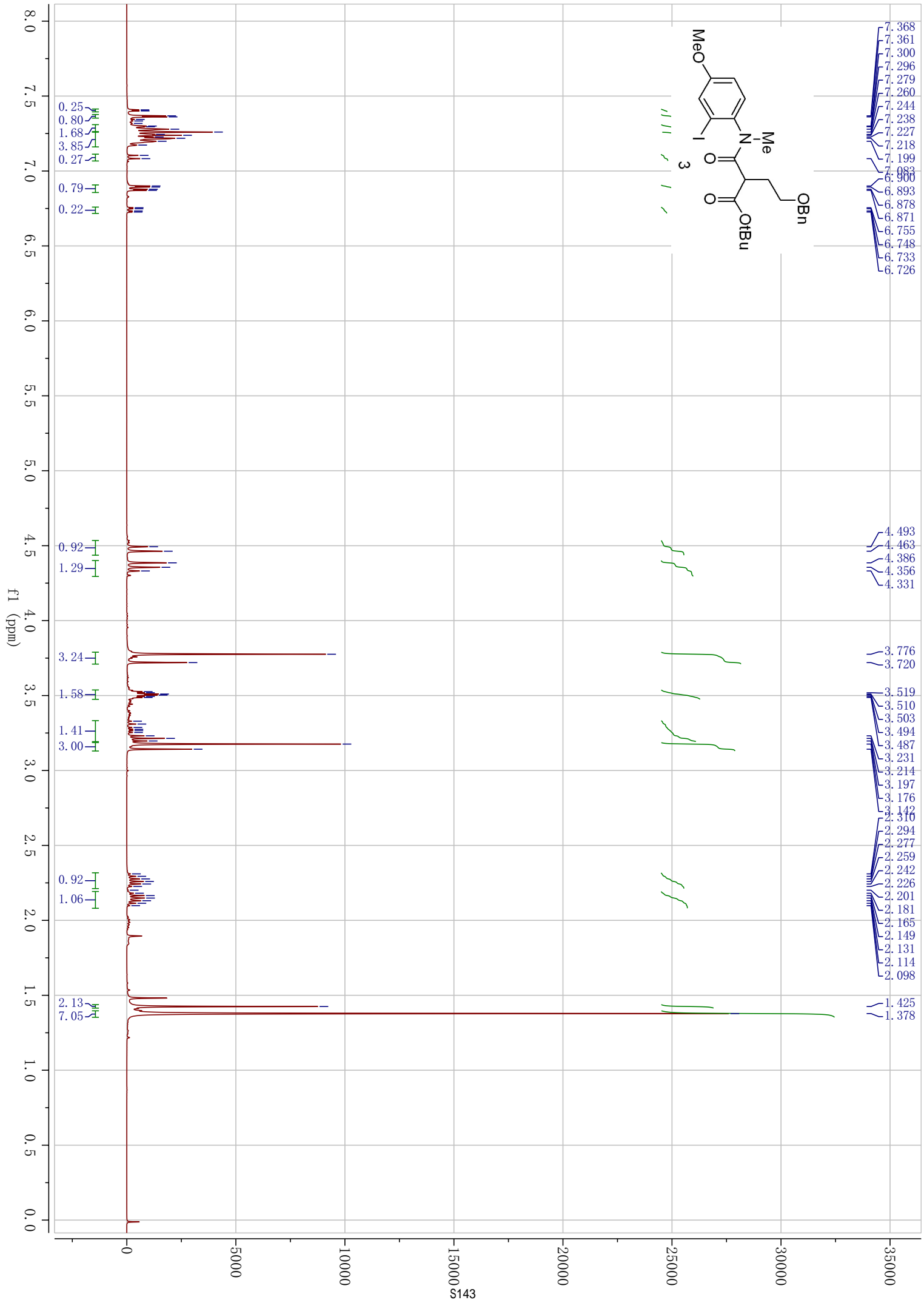


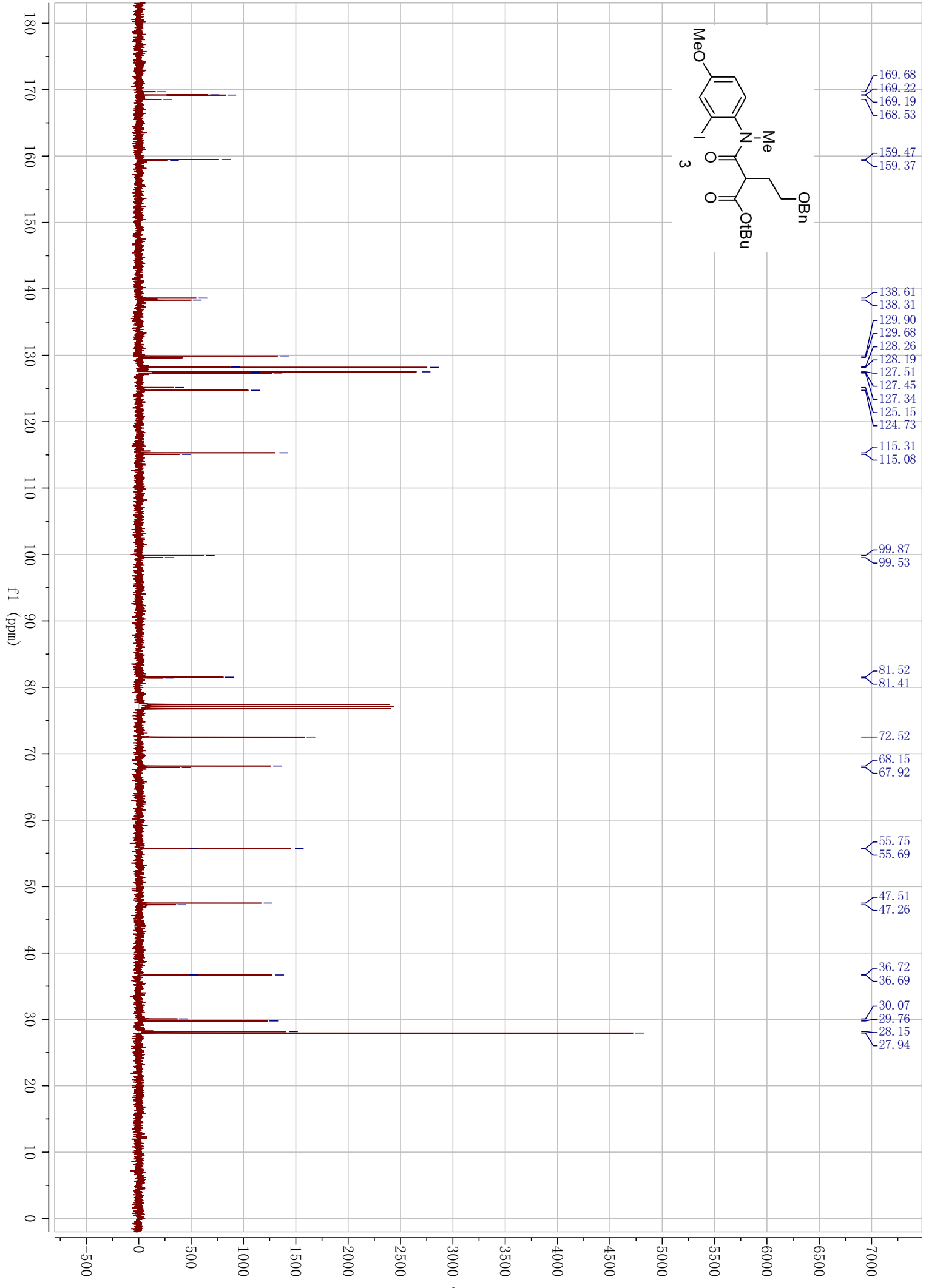
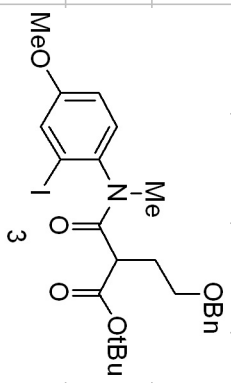


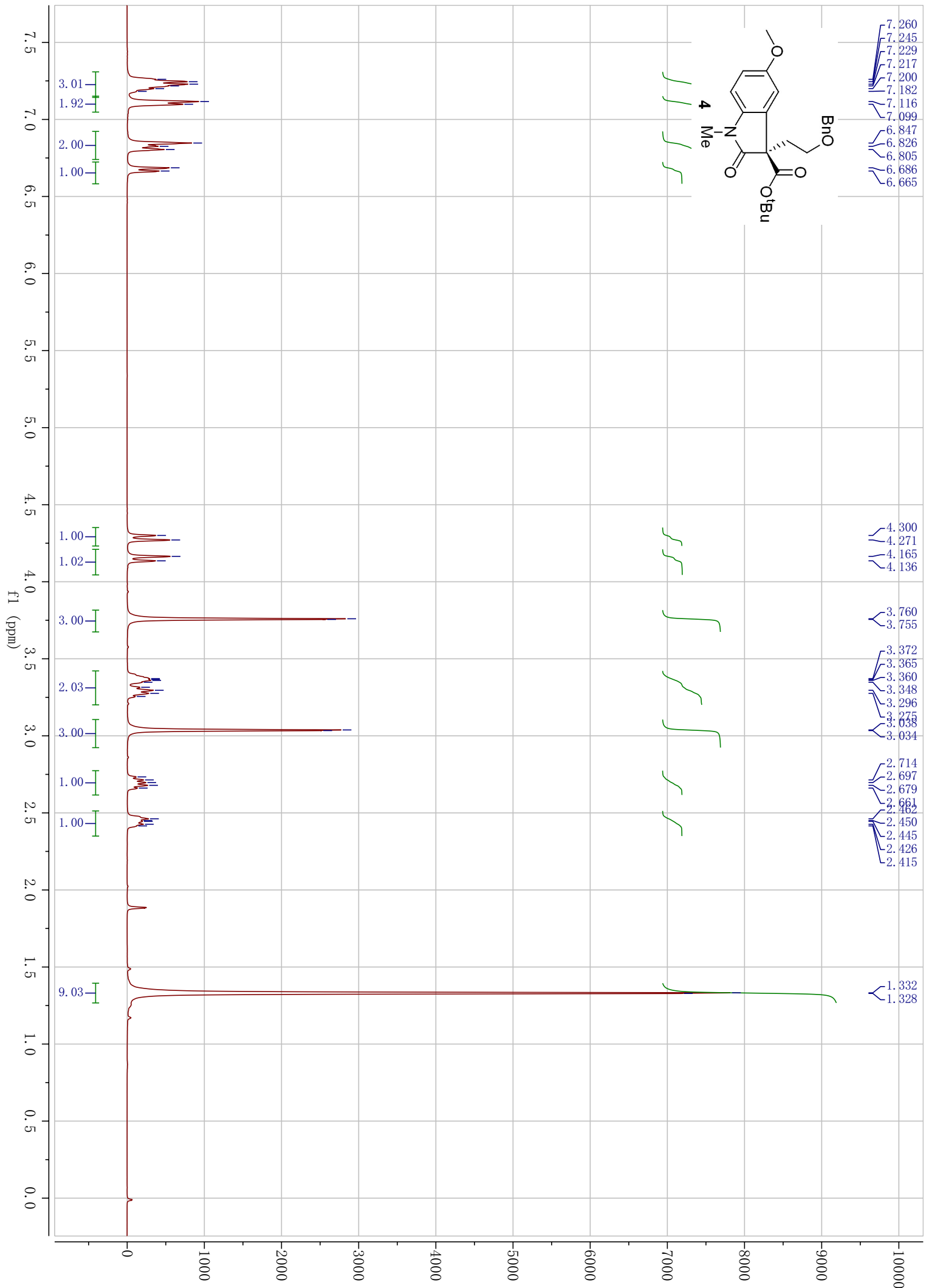


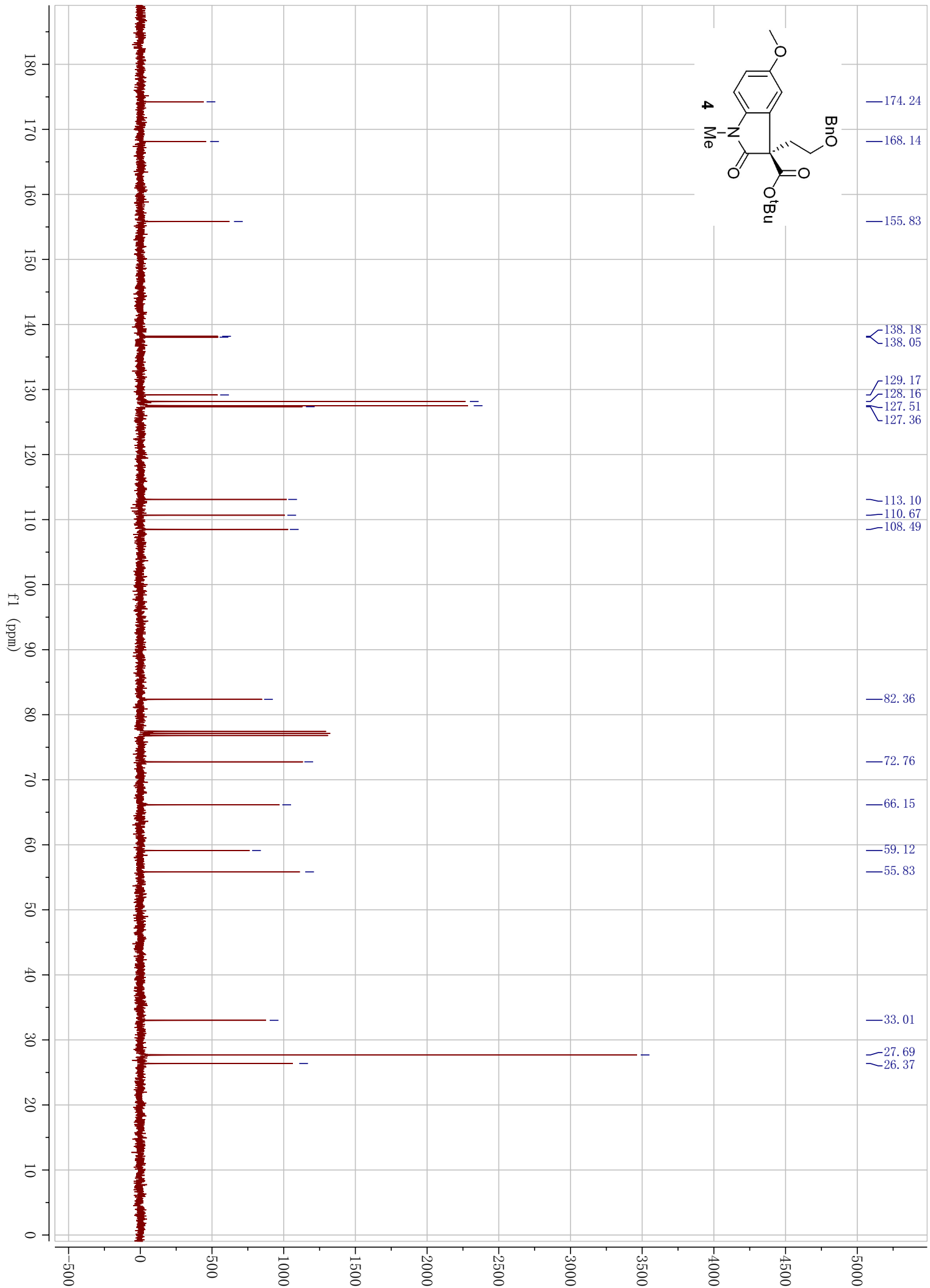
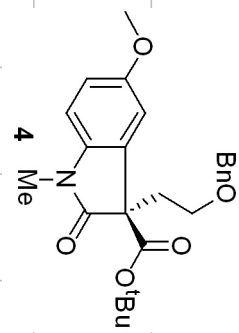


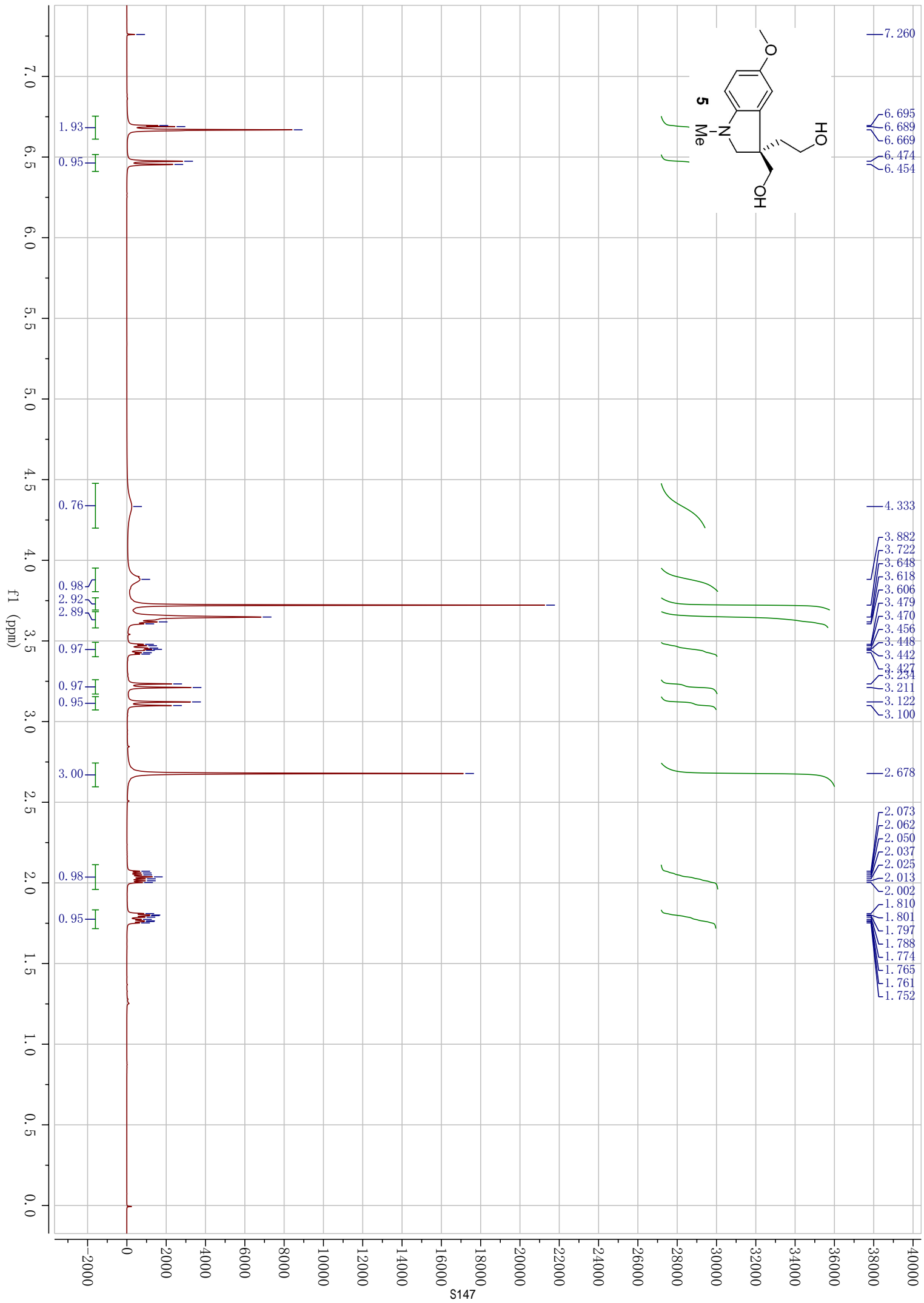


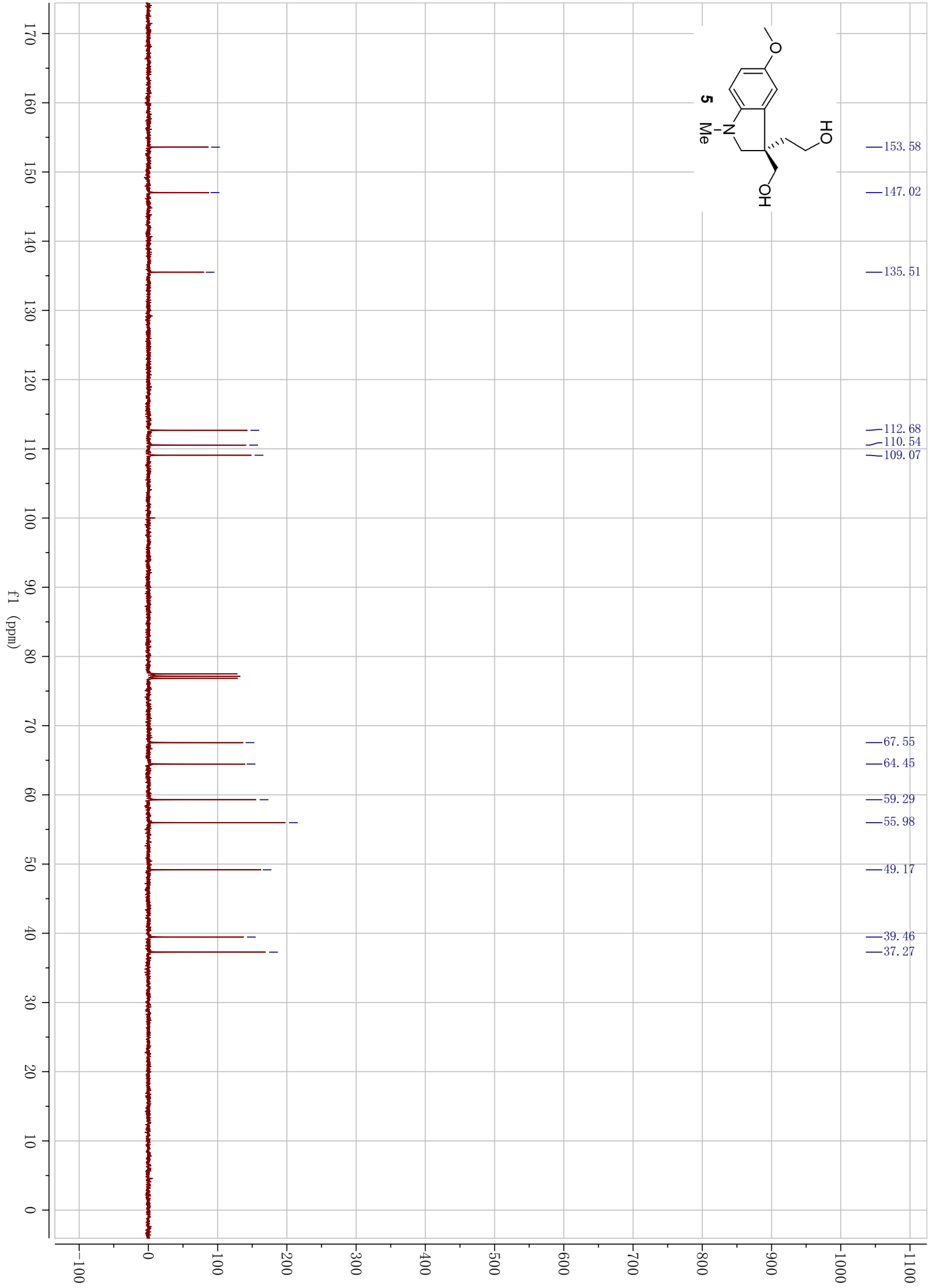
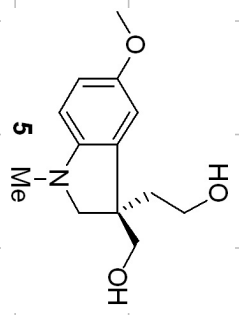


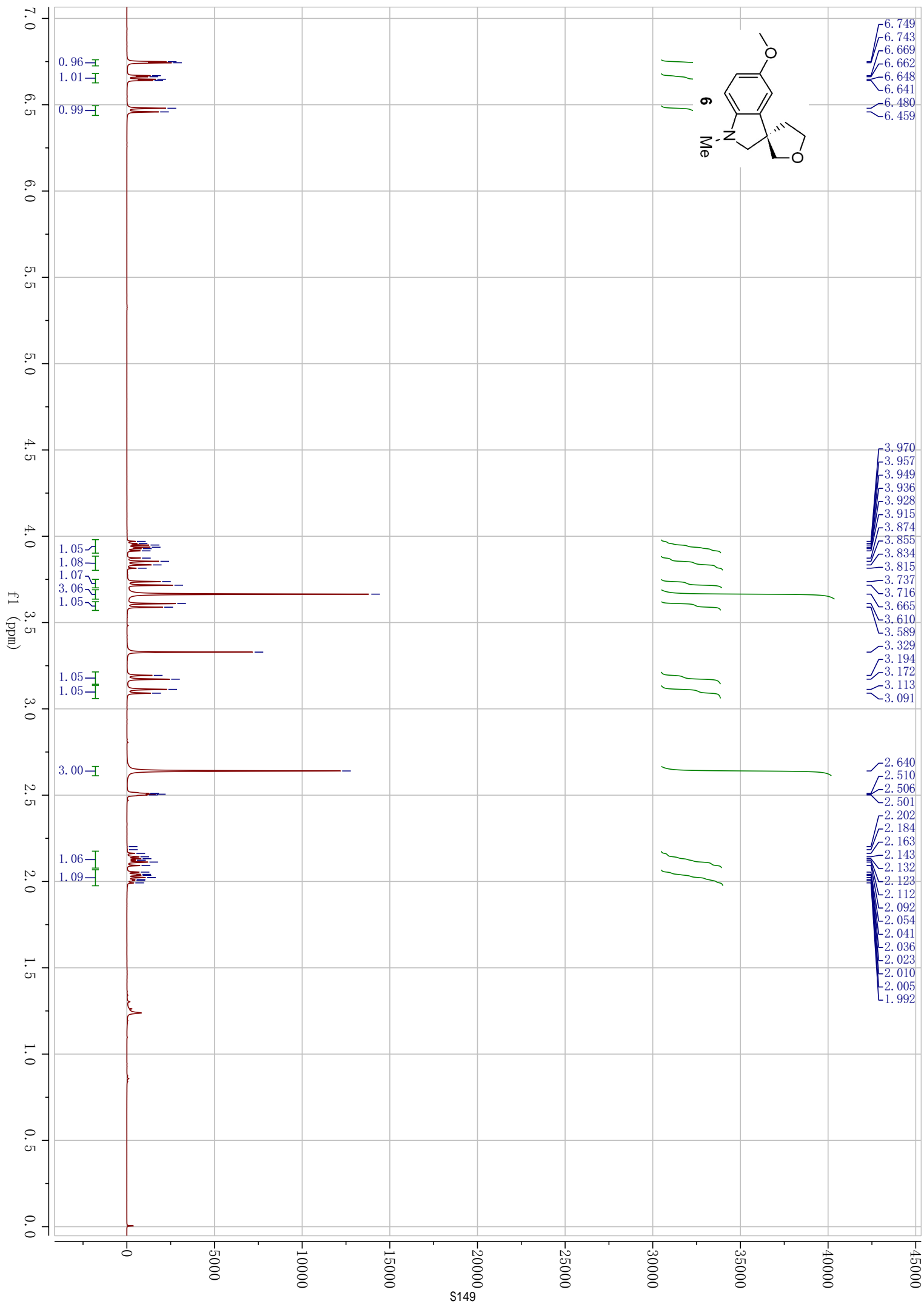


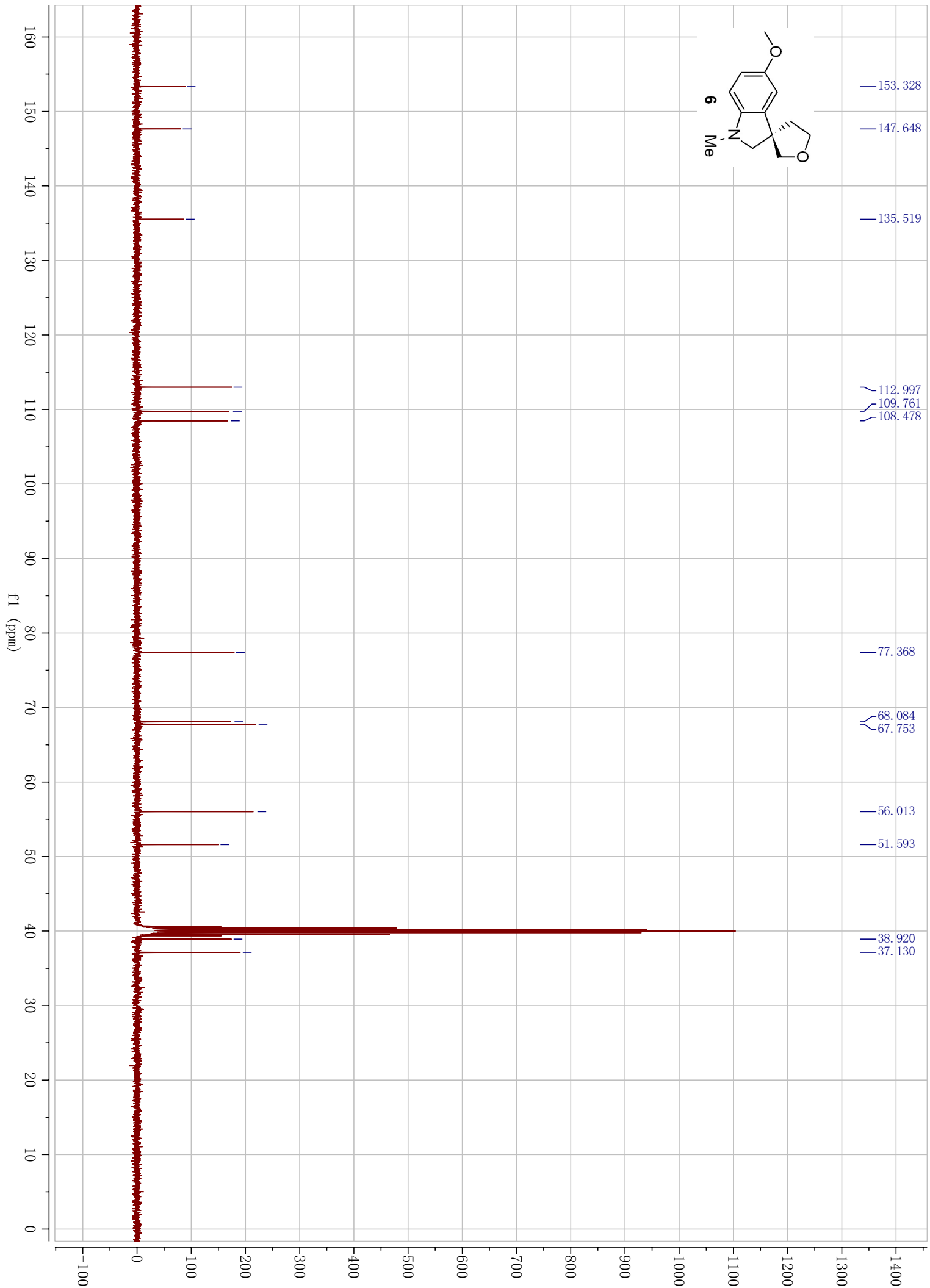


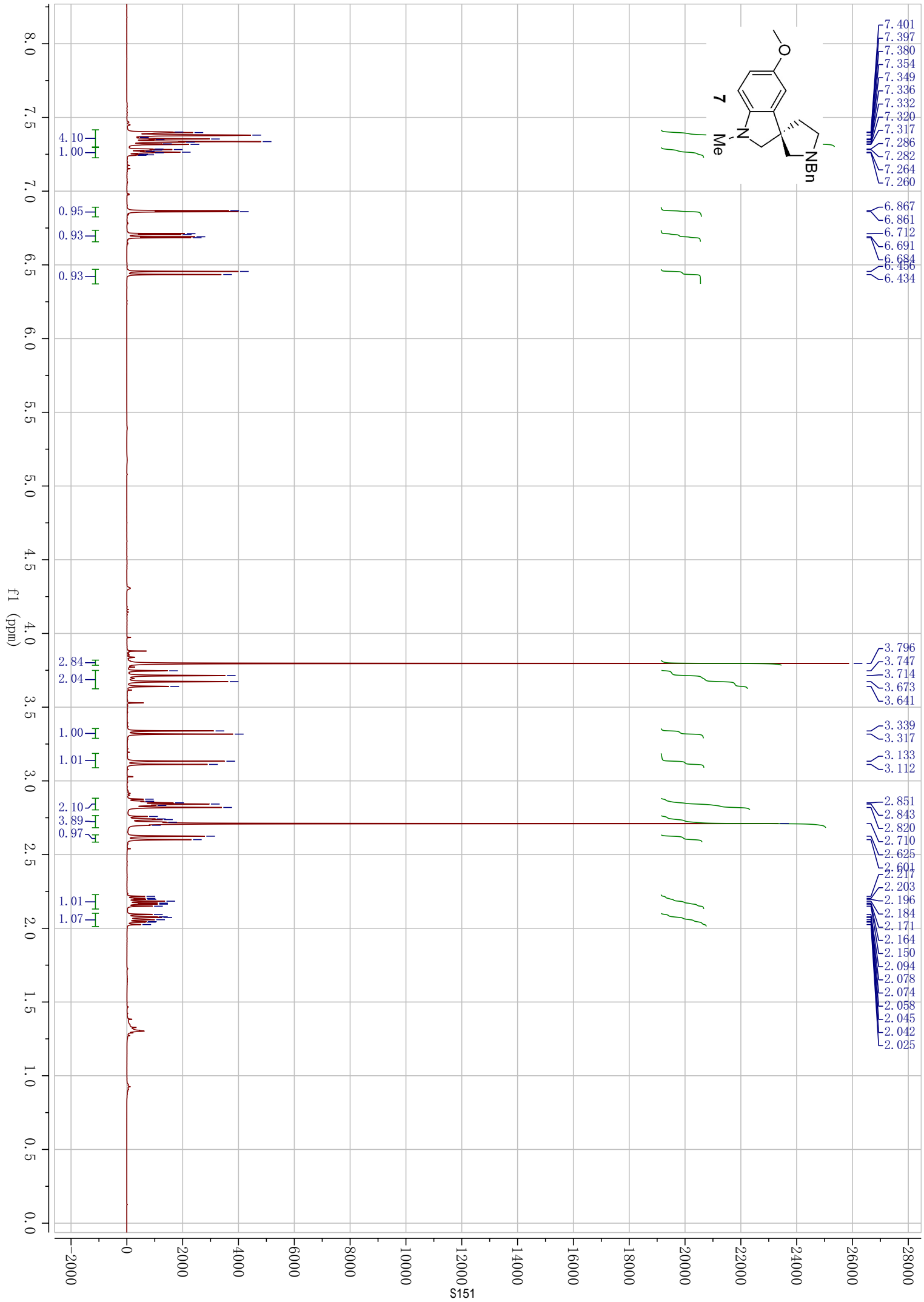


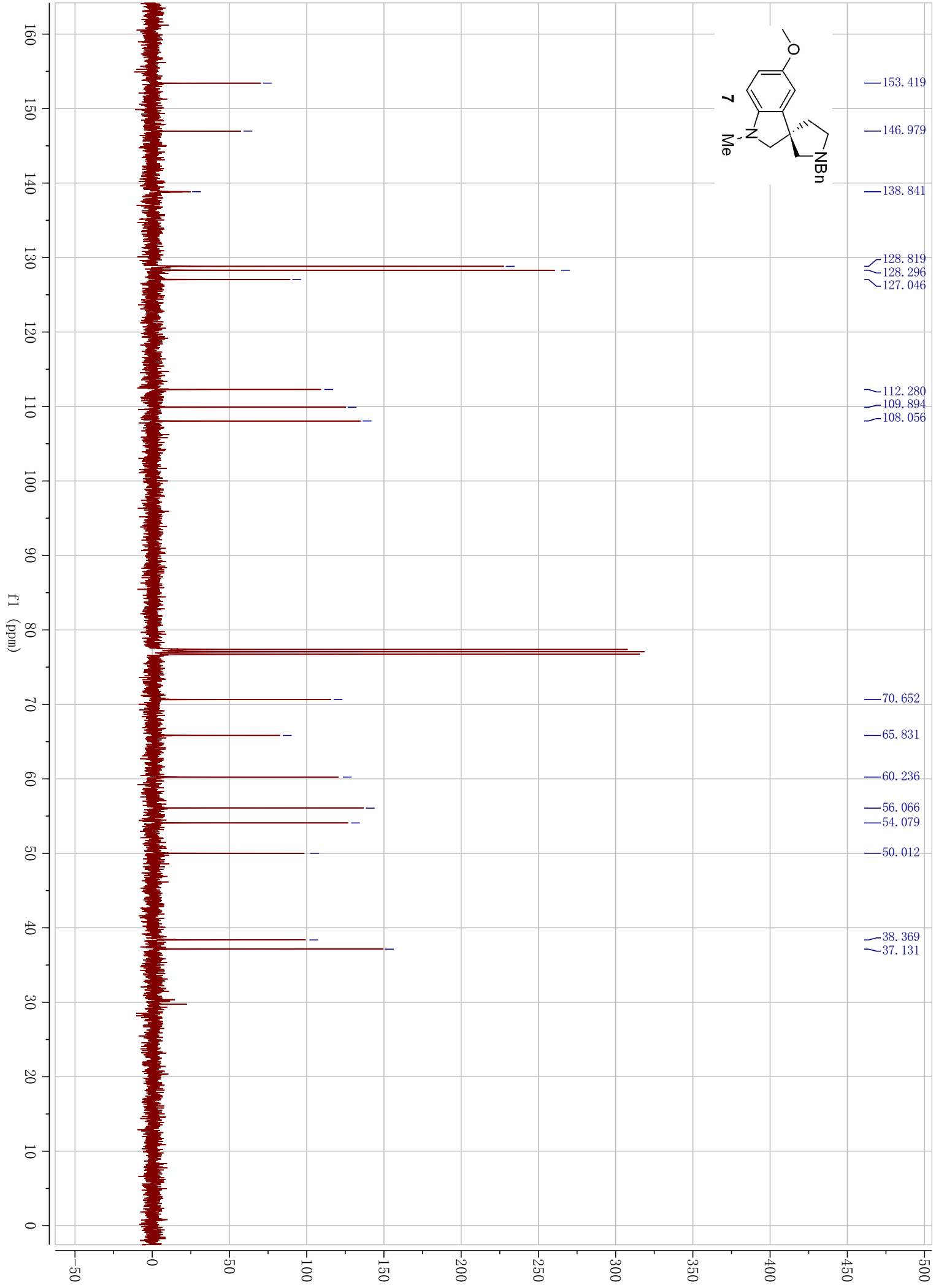
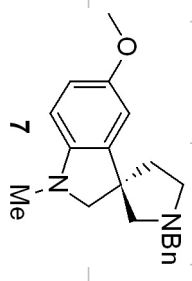








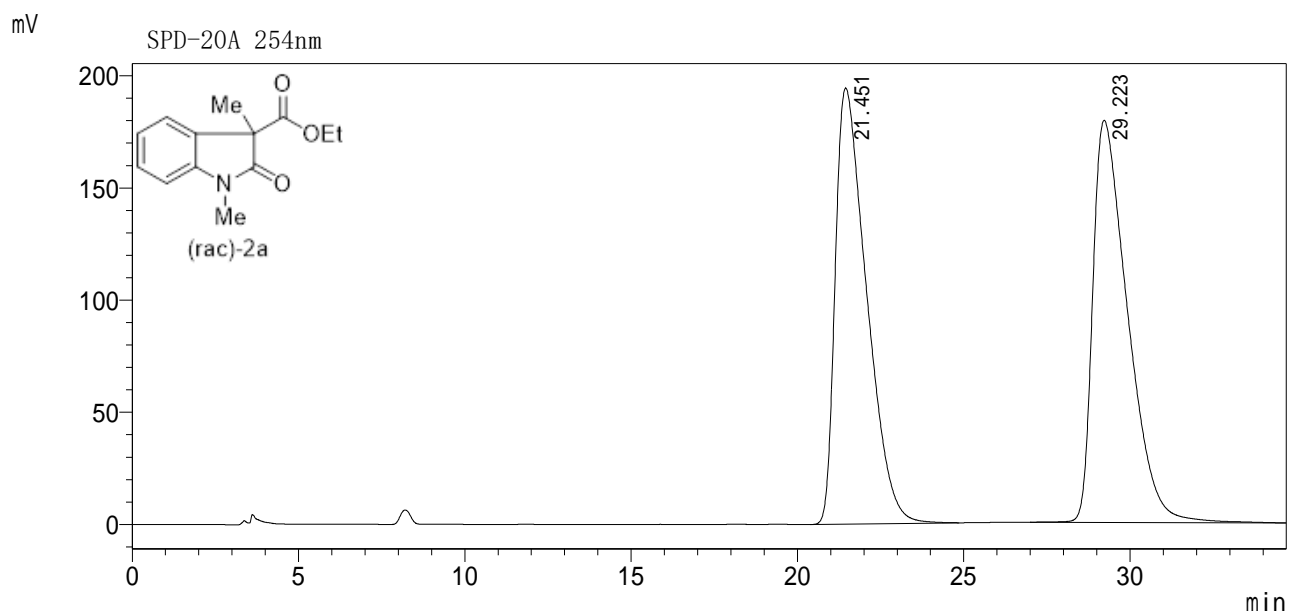




SHIMADZU LabSolutions HPLC Report

< Sample information >

Sample name : DZJC118-2-R-OJ-1%
 Data name : 2a--DZJC118-2-yizhiRAC-OJ-1%.lcd
 Acq. Method : OJ-H-1%.lcm
 Location : 1-1
 : 1 uL
 Ana. Date : 2020/8/6 19:18:18
 Pro. Date : 2020/8/6 22:52:47
 Sample Type : unknown
 Analyst : System Administrator
 Processor : System Administrator



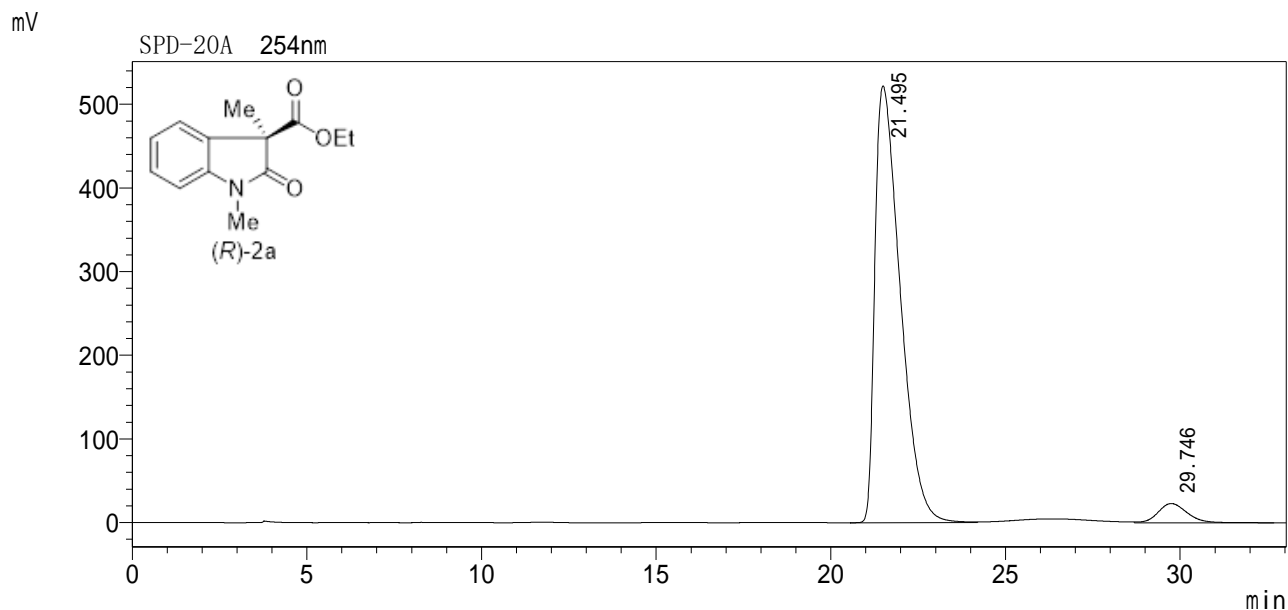
SPD-20A

Entry	RT[min]	Area	Height	Area%
1	21.451	12683267	194390	49.256
2	29.223	13066311	179290	50.744
Sum		25749577	373680	

SHIMADZU LabSolutions HPLC Report

< Sample information >

Sample name : DZJC118-2-C-OJ-1%
 Data name : 2a--DZJC118-2-yizhiCHIRAL-OJ-1%.lcd
 Acq. Method : OJ-H-1%.lcm
 Location : 1-1
 Sample Type : unknown
 : 1 uL
 Ana. Date : 2020/8/6 18:44:24
 Analyst : System Administrator
 Pro. Date : 2020/8/6 22:52:40
 Processor : System Administrator



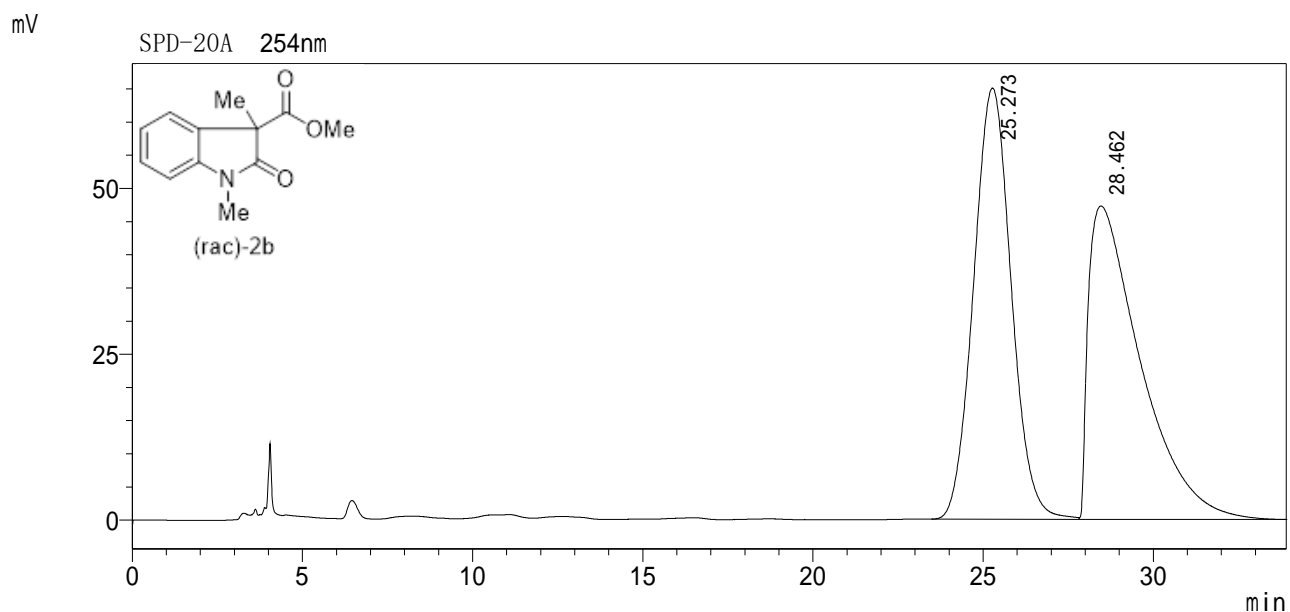
SPD-20A

Entry	RT[min]	Area	Height	Area%
1	21.495	26280004	521999	95.216
2	29.746	1320441	22920	4.784
Sum		27600445	544918	

SHIMADZU
LabSolutions HPLC Report

< Sample information >

Sample name : DZJC105-1-Rac-AD-1%
 Data name : 2b--DZJC124-4-jiazhiRac-AD-1%.lcd
 Acq. Method : AD-H-1%.lcm
 Location : 1-1
 : 1 uL
 Ana. Date : 2020/7/27 11:04:15
 Pro. Date : 2020/7/27 16:53:00
 Sample Type : unknown
 Analyst : System Administrator
 Processor : System Administrator



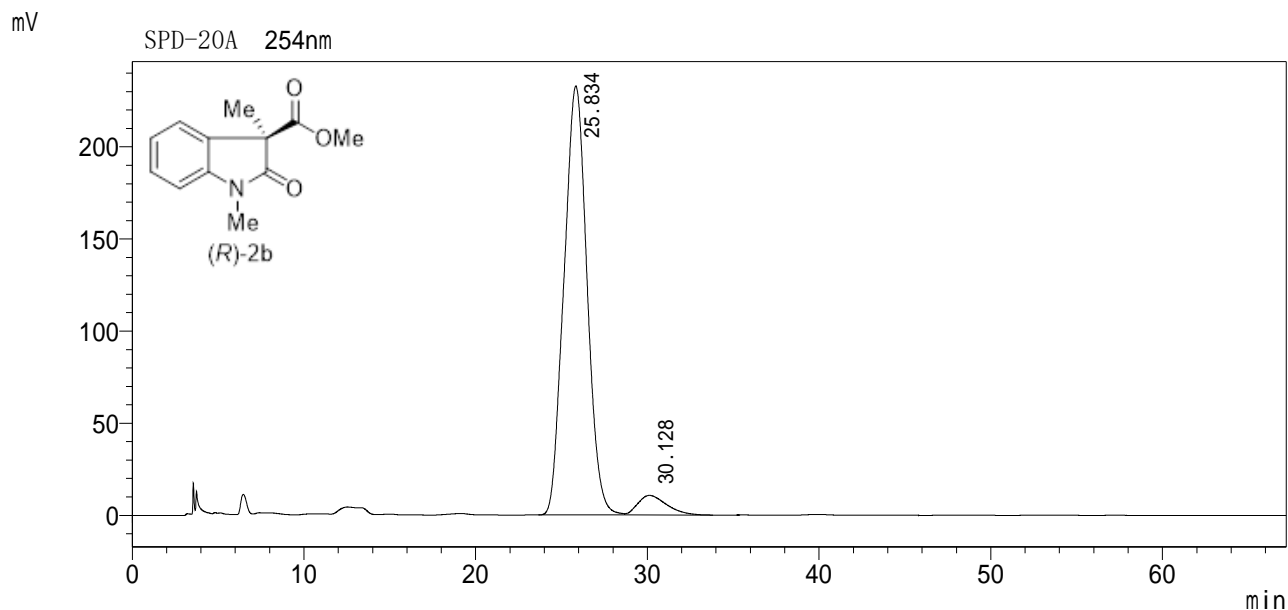
SPD-20A

Entry	RT[min]	Area	Height	Area%
1	25.273	4995010	65000	49.853
2	28.462	5024419	47246	50.147
Sum		10019428	112246	

SHIMADZU LabSolutions HPLC Report

< Sample information >

Sample name : DZJC124-4-C-AD-1%
 Data name : 2b--DZJC124-4-jiazhiCHIRAL-AD-1%.lcd
 Acq. Method : AD-H-1%.lcm
 Location : 1-1
 : 1 uL
 Sample Type : unknown
 Ana. Date : 2020/8/14 15:15:57
 Pro. Date : 2020/8/15 9:29:45
 Analyst : System Administrator
 Processor : System Administrator



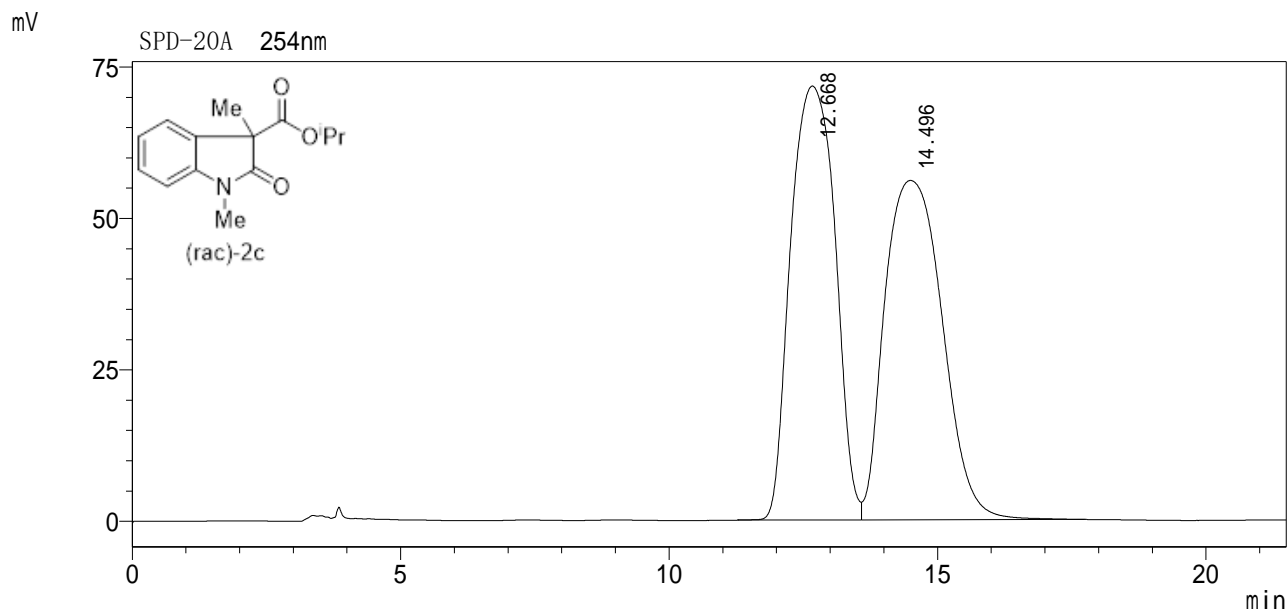
SPD-20A

Entry	RT[min]	Area	Height	Area%
1	25.834	21662858	232827	94.563
2	30.128	1245559	10645	5.437
Sum		22908417	243472	

SHIMADZU LabSolutions HPLC Report

< Sample information >

Sample name : DZJC105-3-rac.1-AS-1%
 Data name : 2c--DZJC118-3-yibingzhiRAC-AS-1%.lcd
 Acq. Method : AS-H-1%.lcm
 Location : 1-1
 Sample Type : unknown
 : 1 uL
 Ana. Date : 2020/7/26 19:45:20
 Analyst : System Administrator
 Pro. Date : 2020/7/26 20:47:58
 Processor : System Administrator



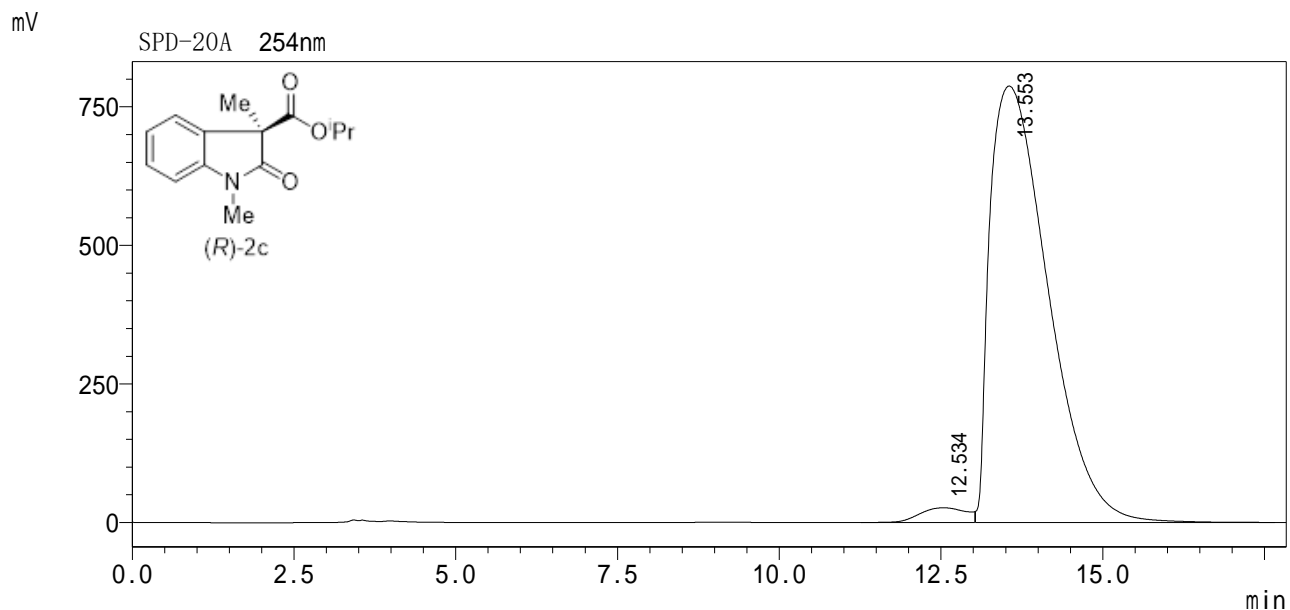
SPD-20A

Entry	RT[min]	Area	Height	Area%			
1	12.668	4146311	71645	49.719			
2	14.496	4193226	56029	50.281			
Sum		8339536	127674				

SHIMADZU LabSolutions HPLC Report

< Sample information >

Sample name : DZJC118-3-C-AS-1%
 Data name : 2c--DZJC118-3-yibingzhiCHIRAL-AS-1%.lcd
 Acq. Method : AS-H-1%.lcm
 Location : 1-1
 : 1 uL
 Ana. Date : 2020/8/8 18:40:03
 Pro. Date : 2020/8/8 19:08:21
 Sample Type : unknown
 Analyst : System Administrator
 Processor : System Administrator



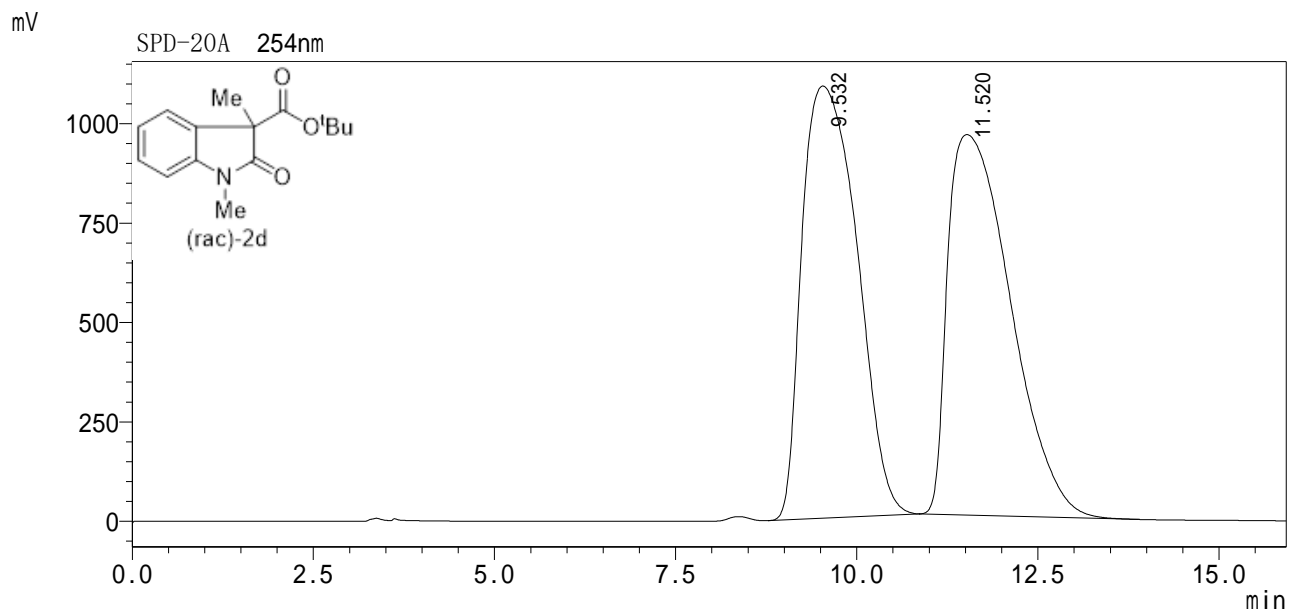
SPD-20A

Entry	RT[min]	Area	Height	Area%
1	12.534	1347582	26749	2.663
2	13.553	49256715	787507	97.337
Sum		50604296	814256	

SHIMADZU LabSolutions HPLC Report

< Sample information >

Sample name : DZJC100-2-RAC-OJ-1%
 Data name : 2d--DZJC116-1-wuqudaiRAC-OJ-1%.lcd
 Acq. Method : OJ-H-1%-50min.lcm
 Location : 1-1
 : 1 uL
 Ana. Date : 2020/7/24 14:38:14
 Pro. Date : 2020/7/24 21:49:21
 Sample Type : unknown
 Analyst : System Administrator
 Processor : System Administrator



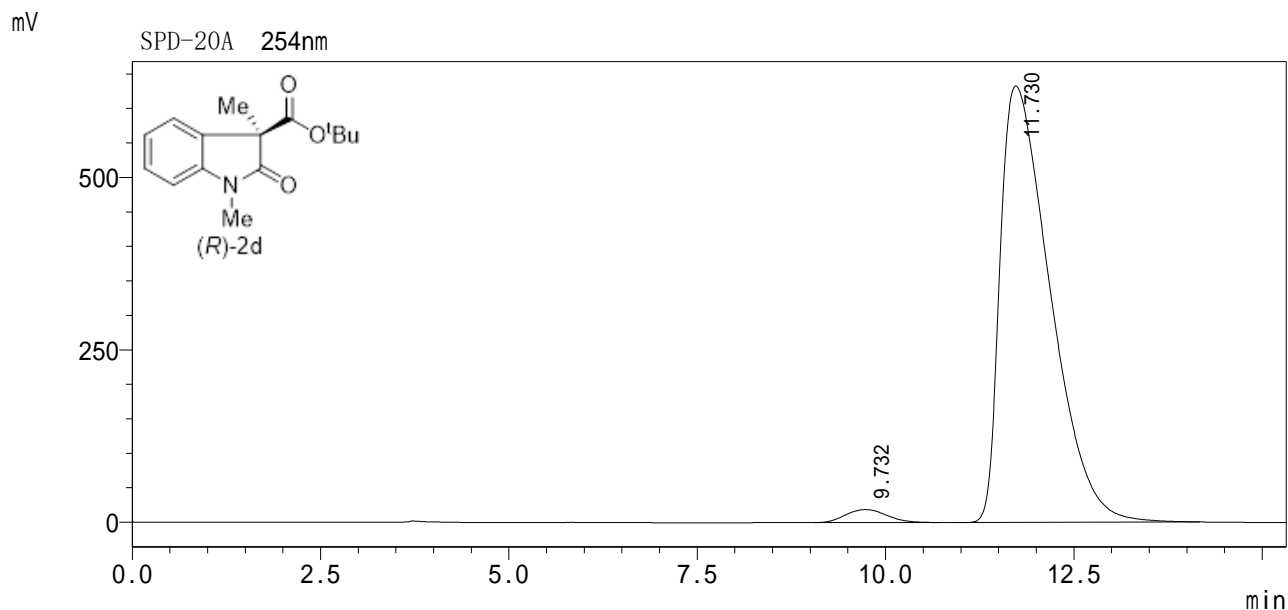
SPD-20A

Entry	RT[min]	Area	Height	Area%
1	9.532	57572502	1087085	49.826
2	11.520	57975508	957081	50.174
Sum		115548010	2044166	

SHIMADZU LabSolutions HPLC Report

< Sample information >

Sample name : DZJC116-1-CHIRAL-OJ-1%
 Data name : 2d--DZJC116-1-wuqudaiCHIRAL-OJ-1%.lcd
 Acq. Method : OJ-H-1%.lcm
 Location : 1-1
 Sample Type : unknown
 : 1 uL
 Ana. Date : 2020/8/5 20:08:13
 Analyst : System Administrator
 Pro. Date : 2020/8/5 20:24:20
 Processor : System Administrator



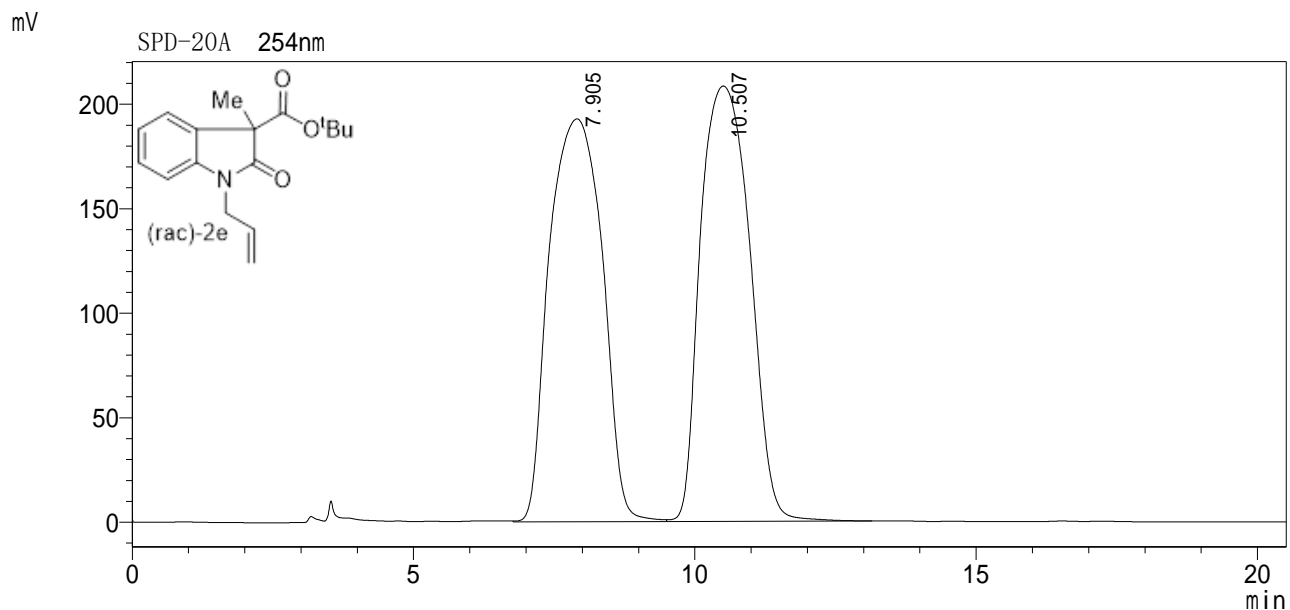
SPD-20A

Entry	RT[min]	Area	Height	Area%			
1	9.732	717767	18843	2.398			
2	11.730	29210062	632775	97.602			
Sum		29927829	651618				

SHIMADZU LabSolutions HPLC Report

< Sample information >

Sample name : dzjd007-r-OD-1%
 Data name : 2e--dzjd007-danshangxibingjiRAC-OD-1%.lcd
 Acq. Method : OD-H-1%.lcm
 Location : 1-1
 Sample Type : unknown
 : 1 uL
 Ana. Date : 2020/9/21 21:28:21
 Analyst : System Administrator
 Pro. Date : 2020/9/21 22:05:42
 Processor : System Administrator



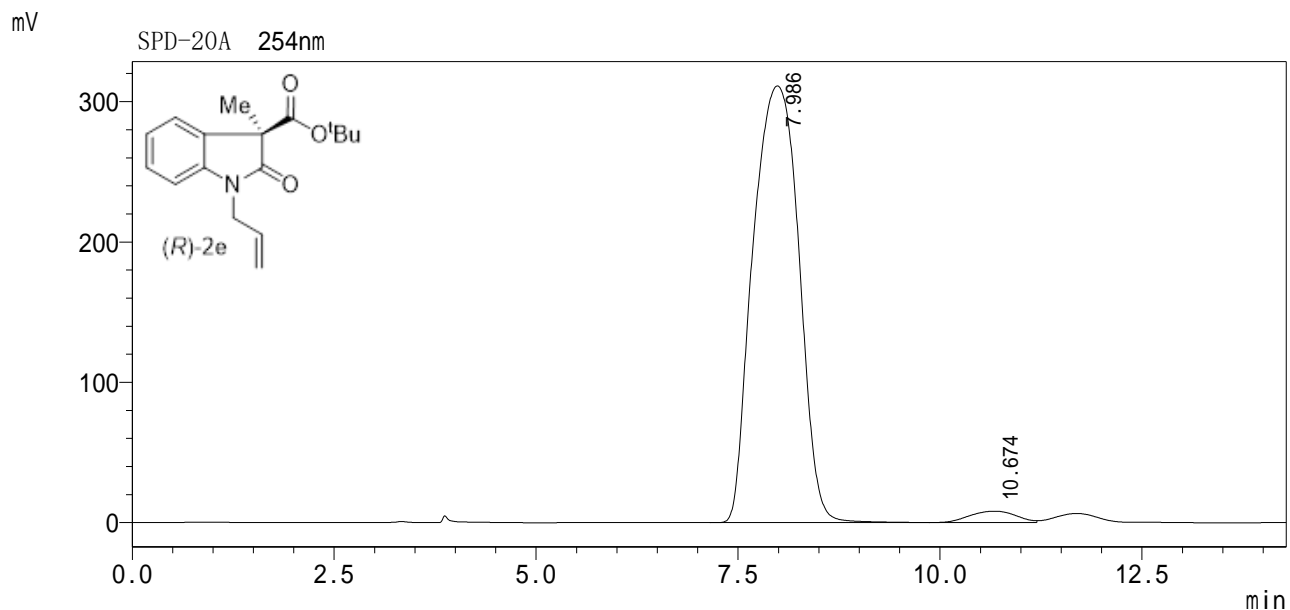
SPD-20A

Entry	RT[min]	Area	Height	Area%
1	7.905	12668693	192791	49.849
2	10.507	12745651	208292	50.151
Sum		25414344	401084	

SHIMADZU LabSolutions HPLC Report

< Sample information >

Sample name : dzjd007-C-OD-1%
 Data name : 2e--dzjd007-danshangxibingjiCHIRAL-OD-1%.lcd
 Acq. Method : OD-H-1%.lcm
 Location : 1-1
 Sample Type : unknown
 : 1 uL
 Ana. Date : 2020/9/21 21:49:57
 Analyst : System Administrator
 Pro. Date : 2020/9/21 22:05:37
 Processor : System Administrator



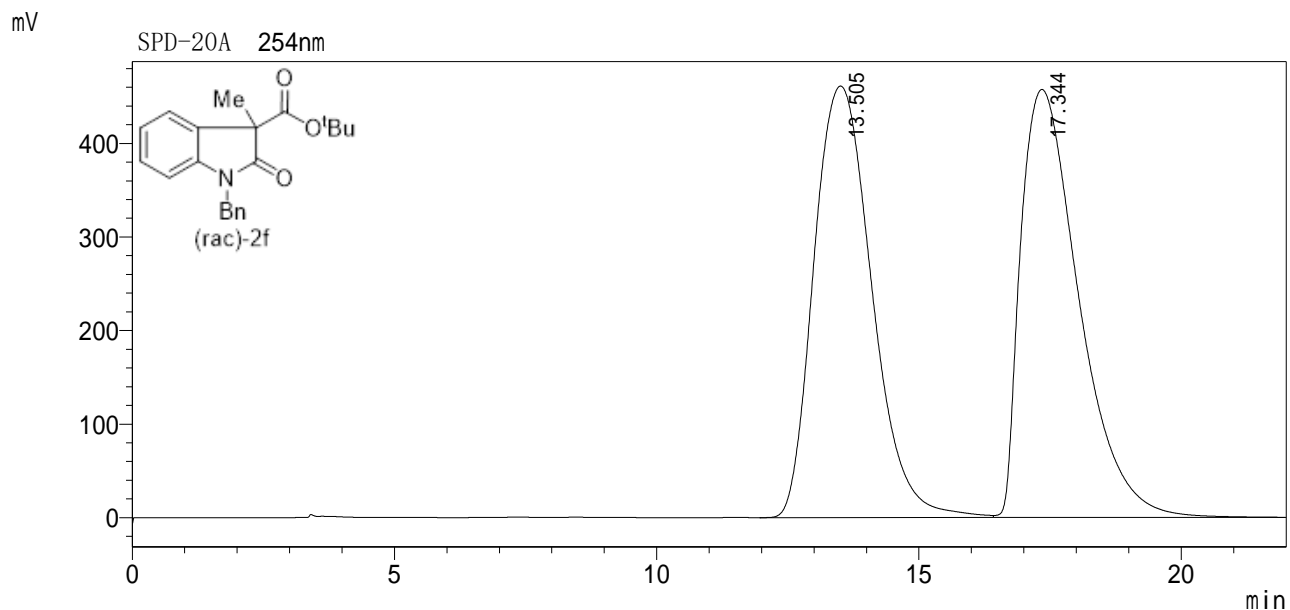
SPD-20A

Entry	RT[min]	Area	Height	Area%
1	7.986	12323709	311114	97.484
2	10.674	318079	8025	2.516
Sum		12641788	319139	

SHIMADZU LabSolutions HPLC Report

< Sample information >

Sample name : dzjd031-r-OD-1%
 Data name : 2f--dzjd031-r-OD-1%.lcd
 Acq. Method : OD-H-1%.lcm
 Location : 1-1
 : 1 uL
 Ana. Date : 2020/11/3 15:24:58 : Analyst : System Administrator
 Pro. Date : 2020/11/3 19:33:22 : Processor : System Administrator



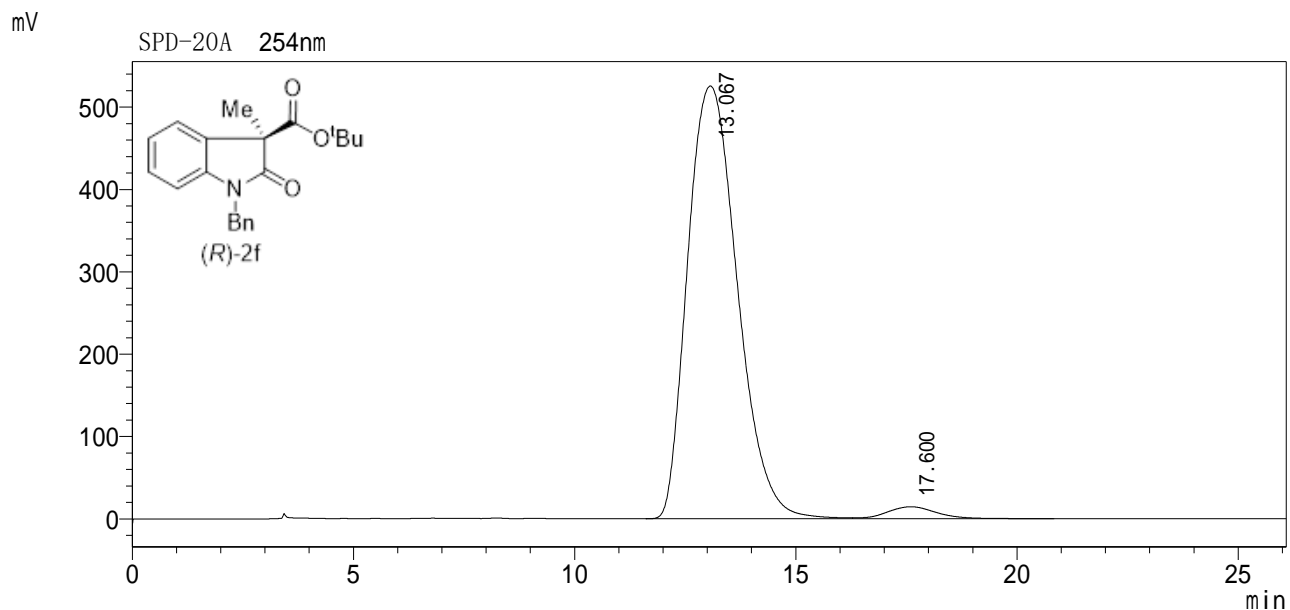
SPD-20A

Entry	RT[min]	Area	Height	Area%			
1	13.505	35437308	461217	50.175			
2	17.344	35189720	457437	49.825			
Sum		70627028	918654				

SHIMADZU LabSolutions HPLC Report

< Sample information >

Sample name : DZJD031-C-2-OD-1%
 Data name : 2f--DZJD031-C-2-OD-1%.lcd
 Acq. Method : OD-H-1%.lcm
 Location : 1-1
 : 1 uL
 Ana. Date : 2020/11/9 19:42:51
 Pro. Date : 2020/11/9 20:10:59
 Sample Type : unknown
 Analyst : System Administrator
 Processor : System Administrator



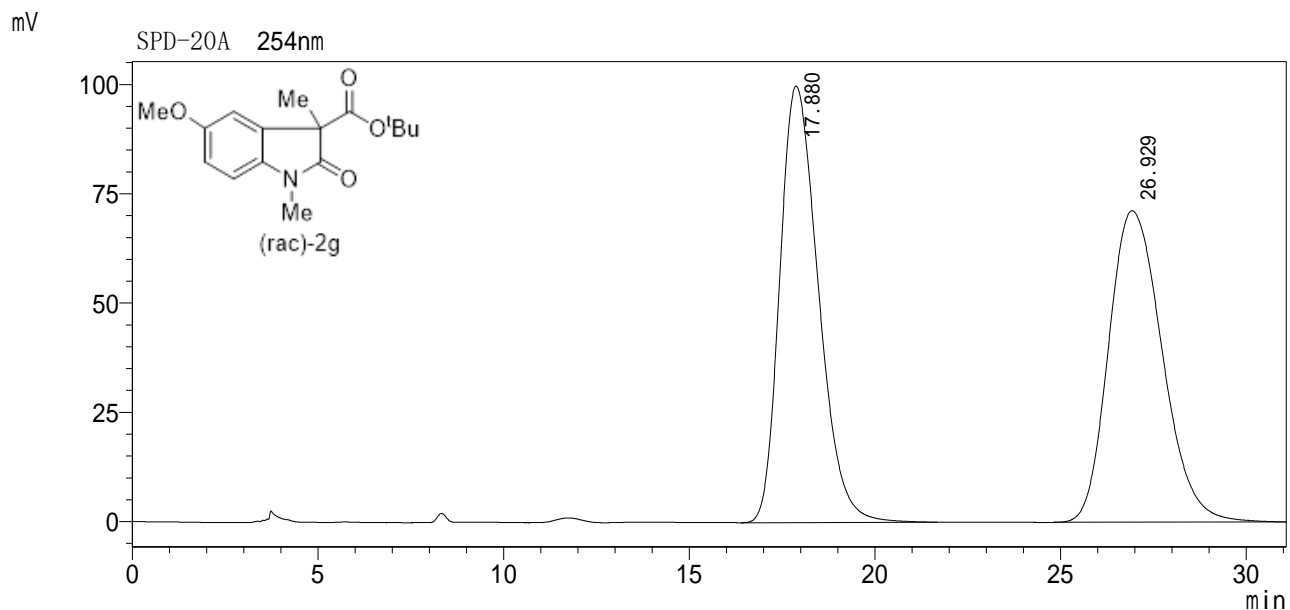
SPD-20A

Entry	RT[min]	Area	Height	Area%
1	13.067	41136533	525403	97.354
2	17.600	1118050	14499	2.646
Sum		42254583	539902	

SHIMADZU LabSolutions HPLC Report

< Sample information >

Sample name : DZJC118-1-RAC-OJ-1%
 Data name : 2g--DZJC118-1-jiayangjiRAC-OJ-1%.lcd
 Acq. Method : OJ-H-1%.lcm
 Location : 1-1
 Sample Type : unknown
 : 1 uL
 Ana. Date : 2020/8/6 18:12:07
 Analyst : System Administrator
 Pro. Date : 2020/8/6 22:53:07
 Processor : System Administrator



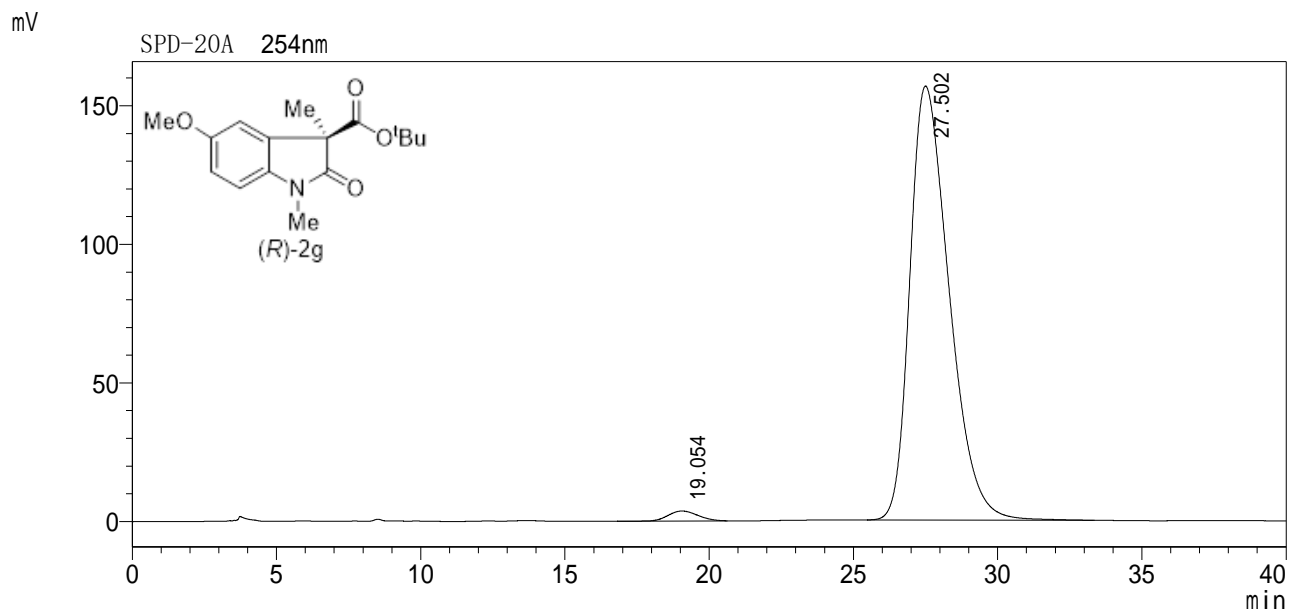
SPD-20A

Entry	RT[min]	Area	Height	Area%
1	17.880	7218263	99889	50.201
2	26.929	7160459	71276	49.799
Sum		14378722	171165	

SHIMADZU LabSolutions HPLC Report

< Sample information >

Sample name : DZJC118-1-C-OJ-1%
 Data name : 2g--DZJC118-1-jiayangjiCHIRAL-OJ-1%.lcd
 Acq. Method : OJ-H-1%.lcm
 Location : 1-1
 Sample Type : unknown
 : 1 uL
 Ana. Date : 2020/8/6 17:05:28
 Analyst : System Administrator
 Pro. Date : 2020/8/6 22:53:13
 Processor : System Administrator



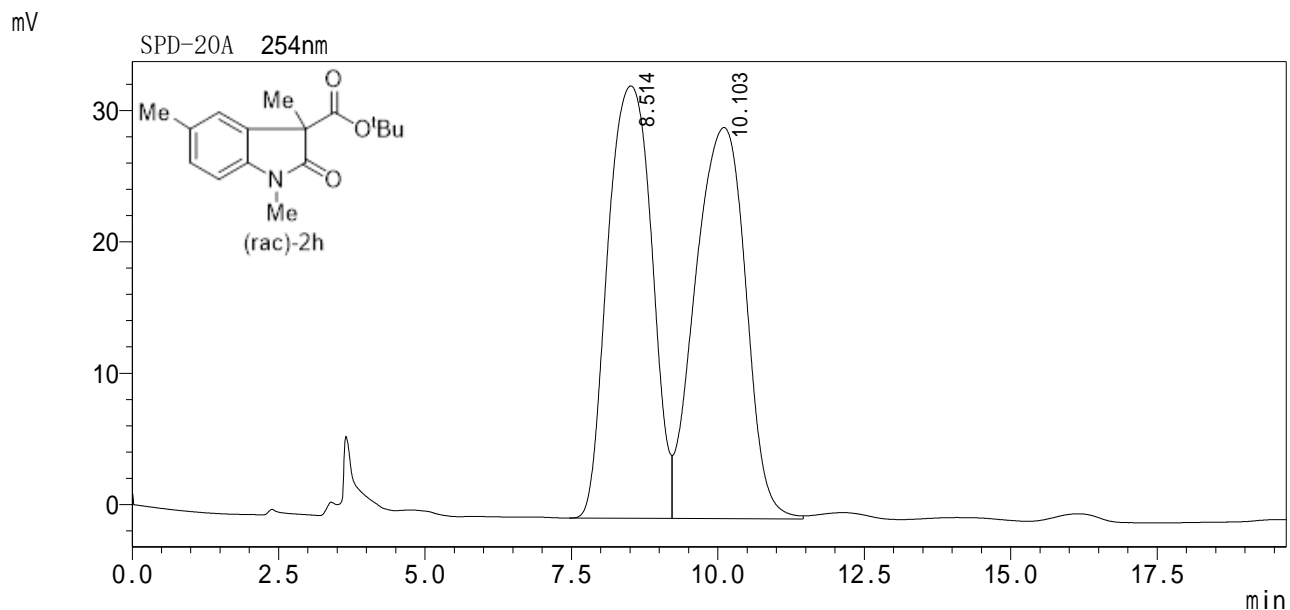
SPD-20A

Entry	RT[min]	Area	Height	Area%
1	19.054	254446	3584	1.689
2	27.502	14810572	156590	98.311
Sum		15065018	160174	

SHIMADZU LabSolutions HPLC Report

< Sample information >

Sample name : DZJC114-1-anduijiajiRAC-OJ-1%
 Data name : 2h--DZJC114-1-anduijiajiRAC-OJ-1%.lcd
 Acq. Method : OJ-H-1%.lcm
 Location : 1-1
 Sample Type : unknown
 : 1 uL
 Ana. Date : 2020/7/21 16:47:34
 Analyst : System Administrator
 Pro. Date : 2020/7/23 9:47:42
 Processor : System Administrator



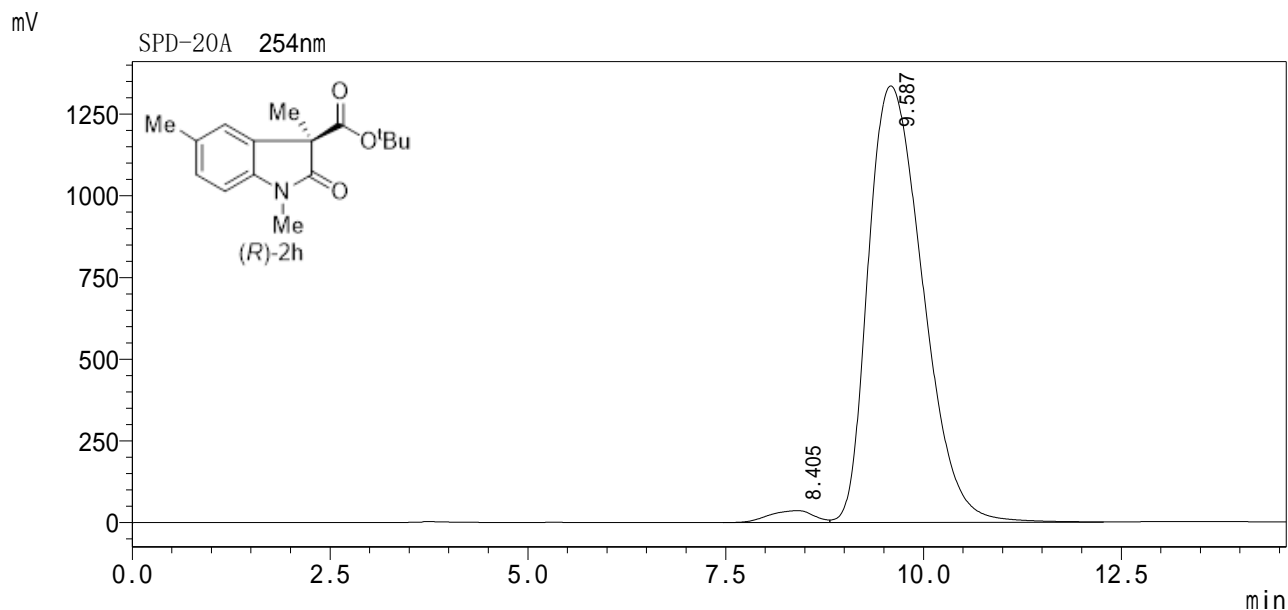
SPD-20A

Entry	RT[min]	Area	Height	Area%			
1	8.514	1728969	32912	49.144			
2	10.103	1789219	29792	50.856			
Sum		3518188	62704				

SHIMADZU LabSolutions HPLC Report

< Sample information >

Sample name : dzjc114-1-chiral-oj-1%
 Data name : 2h--DZJC114-1-anduijiajiCHIRAL-OJ-1%.lcd
 Acq. Method : OJ-H-1%.lcm
 Location : 1-1
 : 1 uL
 Ana. Date : 2020/8/5 9:05:40
 Pro. Date : 2020/8/5 9:22:13
 Sample Type : unknown
 Analyst : System Administrator
 Processor : System Administrator



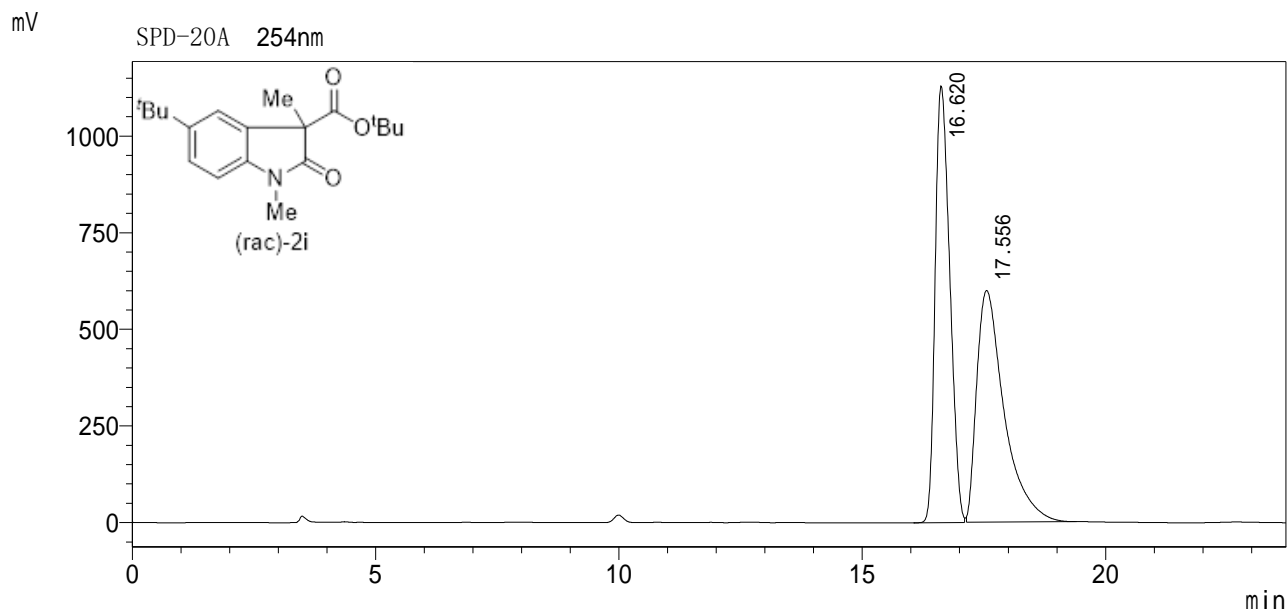
SPD-20A

Entry	RT[min]	Area	Height	Area%			
1	8.405	1406843	36319	2.153			
2	9.587	63931566	1334998	97.847			
Sum		65338408	1371317				

SHIMADZU LabSolutions HPLC Report

< Sample information >

Sample name : DZJC112-2-RAC-IC-5%
 Data name : 2i--DZJC114-3-shudingjiRAC-IC-5%.lcd
 Acq. Method : IC-H-5%.lcm
 Location : 1-1
 Sample Type : unknown
 : 1 uL
 Ana. Date : 2020/8/5 16:48:52
 Analyst : System Administrator
 Pro. Date : 2020/8/5 20:23:08
 Processor : System Administrator



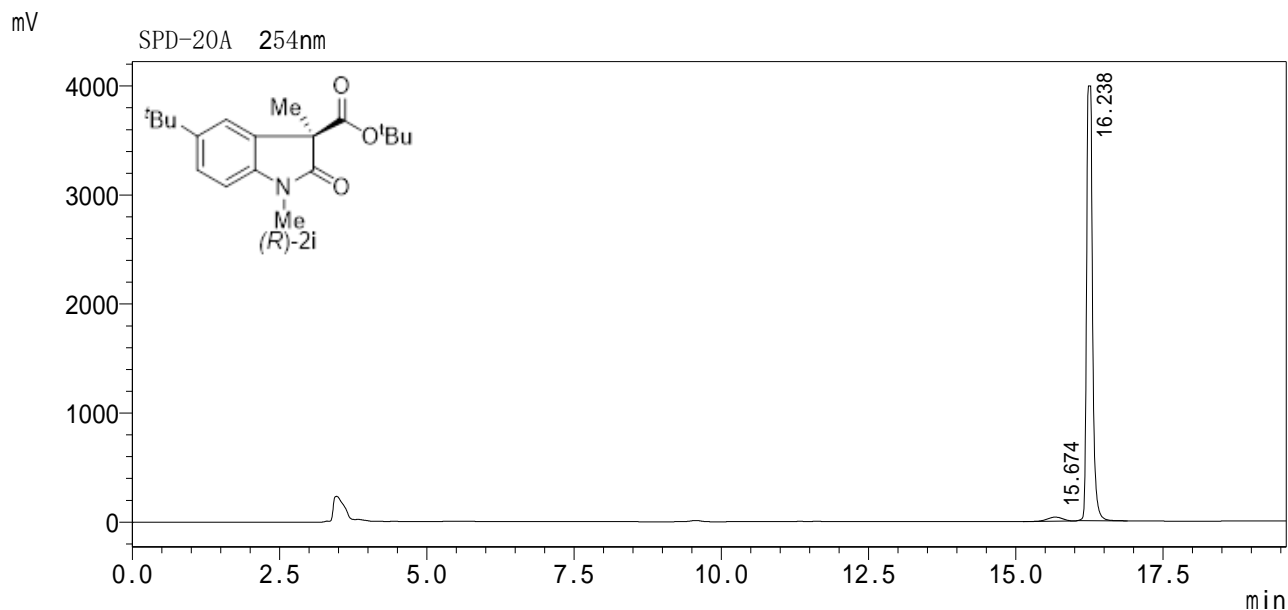
SPD-20A

Entry	RT[min]	Area	Height	Area%
1	16.620	23593159	1129843	50.125
2	17.556	23475774	599311	49.875
Sum		47068933	1729155	

SHIMADZU LabSolutions HPLC Report

< Sample information >

Sample name : DZJ-SHUDINGJI-C-IC-5%
 Data name : 2i--DZJ-SHUDINGJI-C-IC-5%.lcd
 Acq. Method : IC-H-5%.lcm
 Location : 1-1 Sample Type : unknown
 : 1 uL
 Ana. Date : 2020/11/19 20:23:43 Analyst : System Administrator
 Pro. Date : 2020/11/19 21:04:58 Processor : System Administrator



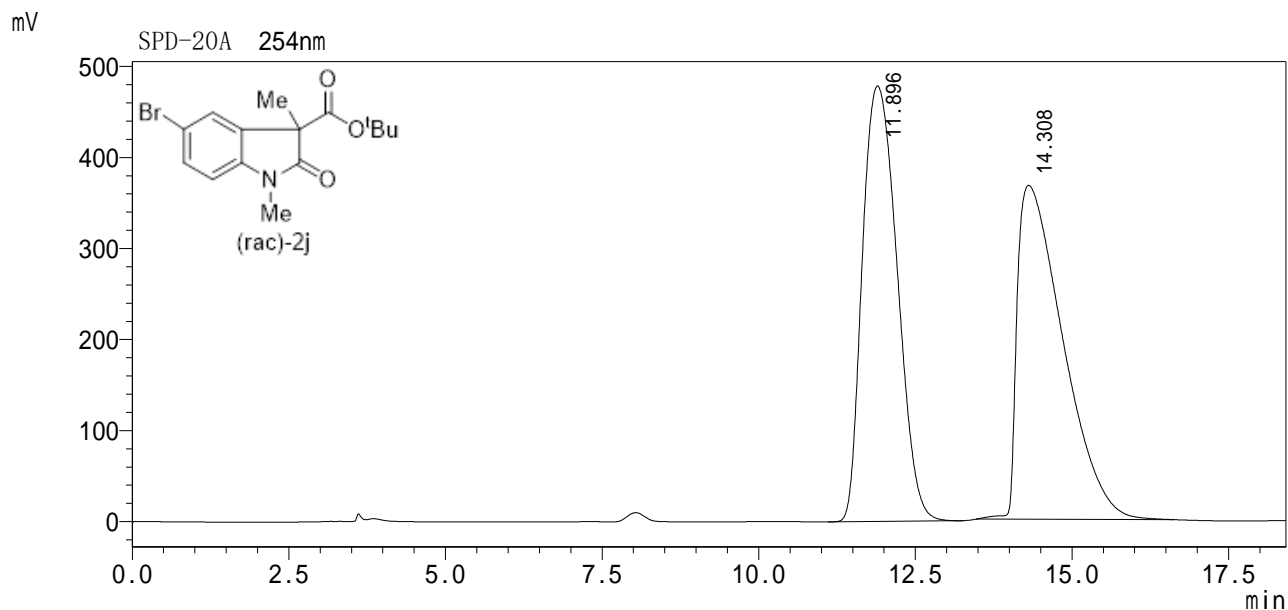
SPD-20A

Entry	RT[min]	Area	Height	Area%
1	15.674	625165	36526	2.201
2	16.238	27772304	3987053	97.799
Sum		28397469	4023579	

SHIMADZU LabSolutions HPLC Report

< Sample information >

Sample name : DZJC120-2.1-RAC-OD-1%
 Data name : 2j--DZJC122-2-anduixiuRAC-OD-1%.lcd
 Acq. Method : OD-H-1%.lcm
 Location : 1-1
 Sample Type : unknown
 : 1 uL
 Ana. Date : 2020/8/9 15:17:14
 Analyst : System Administrator
 Pro. Date : 2020/8/9 17:20:27
 Processor : System Administrator



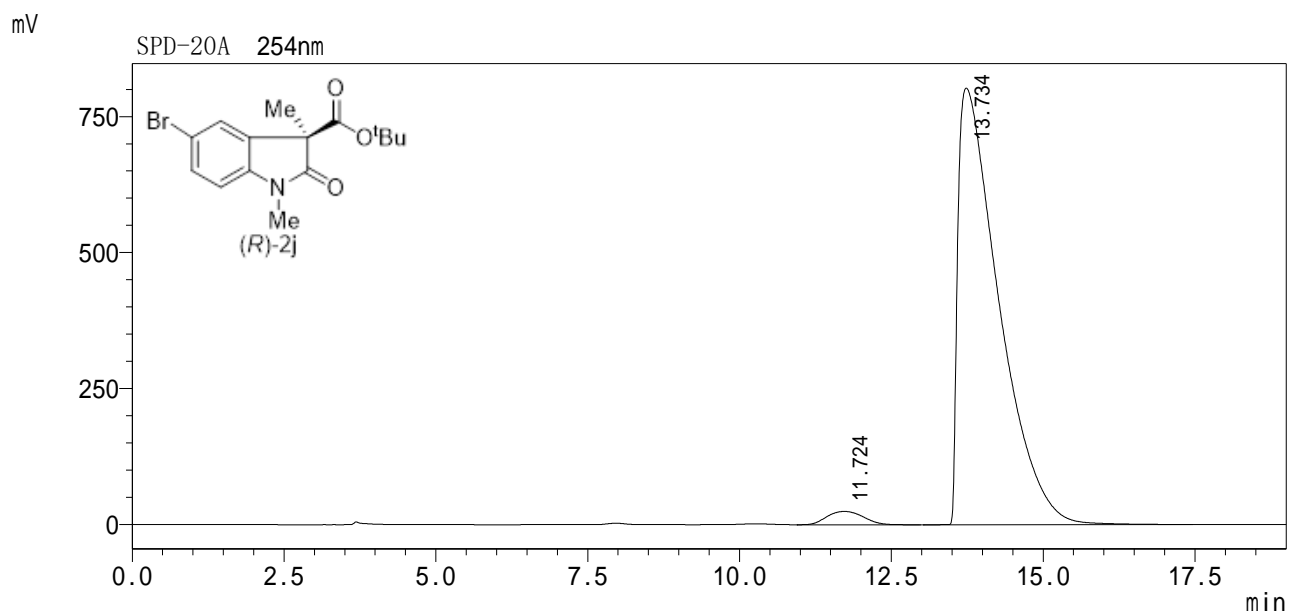
SPD-20A

Entry	RT[min]	Area	Height	Area%
1	11.896	18493582	478310	49.861
2	14.308	18596831	366818	50.139
Sum		37090413	845128	

SHIMADZU LabSolutions HPLC Report

< Sample information >

Sample name : DZJC122-2-C-OD-1%
 Data name : 2j--DZJC122-2-anduixiuCHIRAL-OD-1%.lcd
 Acq. Method : OD-H-1%.lcm
 Location : 1-1
 : 1 uL
 Sample Type : unknown
 Ana. Date : 2020/8/10 19:35:21
 Analyst : System Administrator
 Pro. Date : 2020/8/10 22:26:48
 Processor : System Administrator



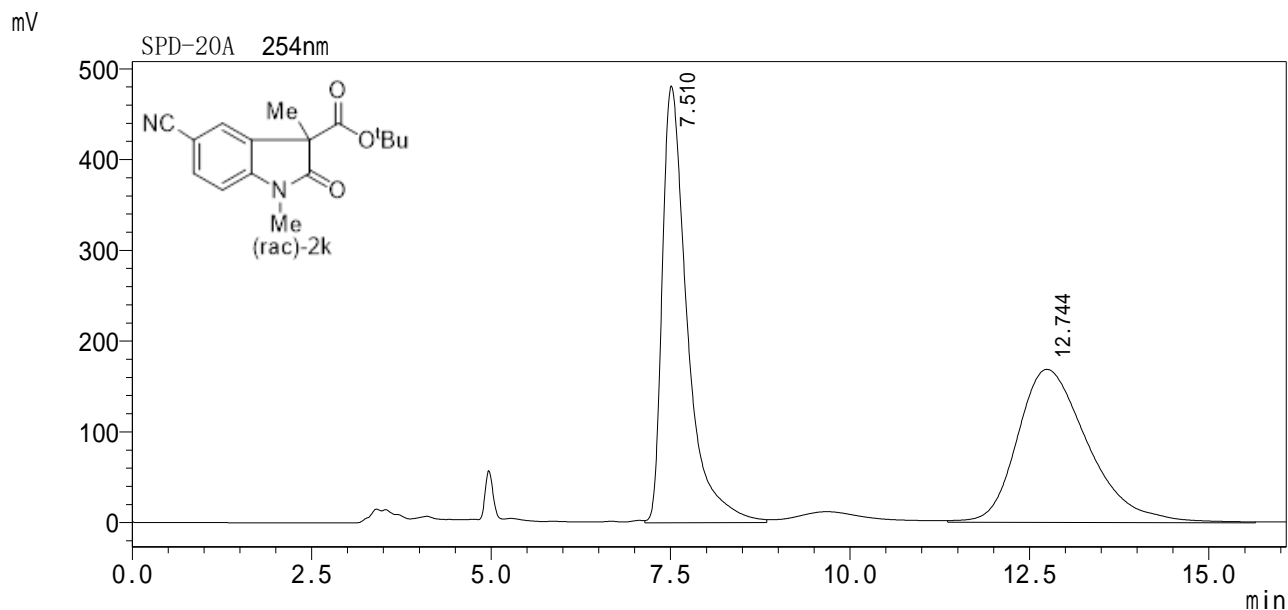
SPD-20A

Entry	RT[min]	Area	Height	Area%
1	11.724	1018956	24442	2.642
2	13.734	37542354	802866	97.358
Sum		38561310	827308	

SHIMADZU LabSolutions HPLC Report

< Sample information >

Sample name : DZJC113-3-RAC-OJ-30%
 Data name : 2k--DZJC113-3-qingjiRAC-OJ-30%.lcd
 Acq. Method : OJ-H-30%.lcm
 Location : 1-1
 Sample Type : unknown
 : 1 uL
 Ana. Date : 2020/8/2 17:24:20
 Analyst : System Administrator
 Pro. Date : 2020/8/2 18:25:29
 Processor : System Administrator



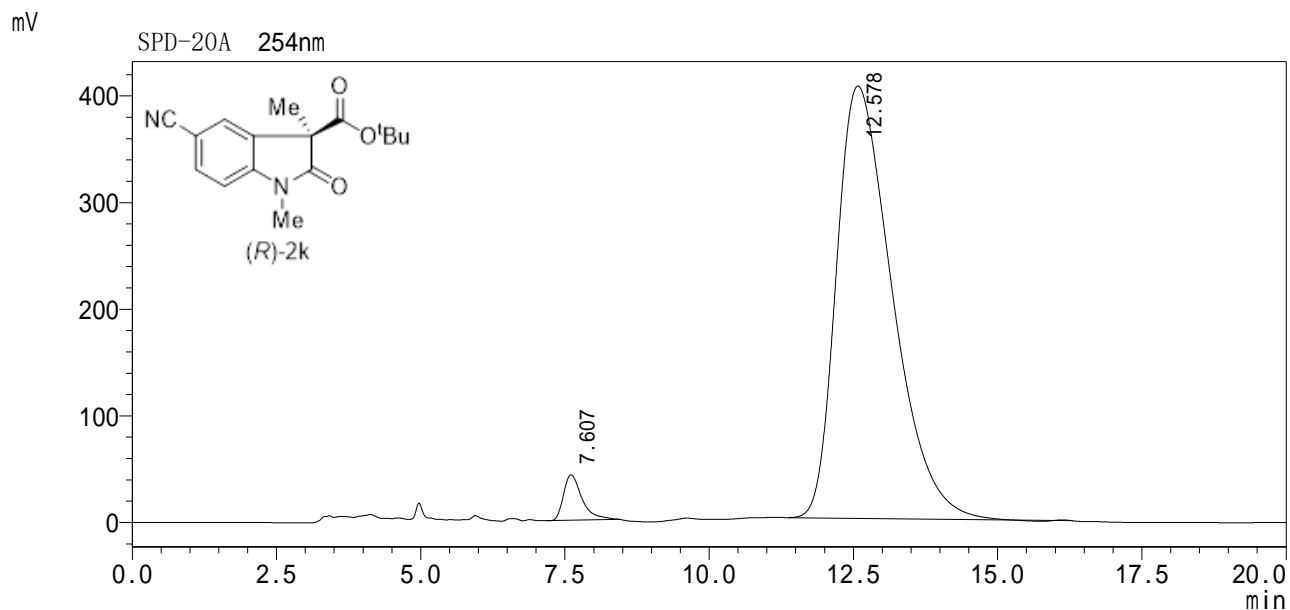
SPD-20A

Entry	RT[min]	Area	Height	Area%
1	7.510	11613557	481045	50.069
2	12.744	11581447	168655	49.931
Sum		23195003	649699	

SHIMADZU LabSolutions HPLC Report

< Sample information >

Sample name : DZJC113-3-C-OJ-30%
 Data name : 2k--DZJC113-3-qingjiCHIRAL-OJ-30%.lcd
 Acq. Method : OJ-H-30%.lcm
 Location : 1-1
 Sample Type : unknown
 : 1 uL
 Ana. Date : 2020/8/2 17:41:21
 Analyst : System Administrator
 Pro. Date : 2020/8/2 18:25:24
 Processor : System Administrator



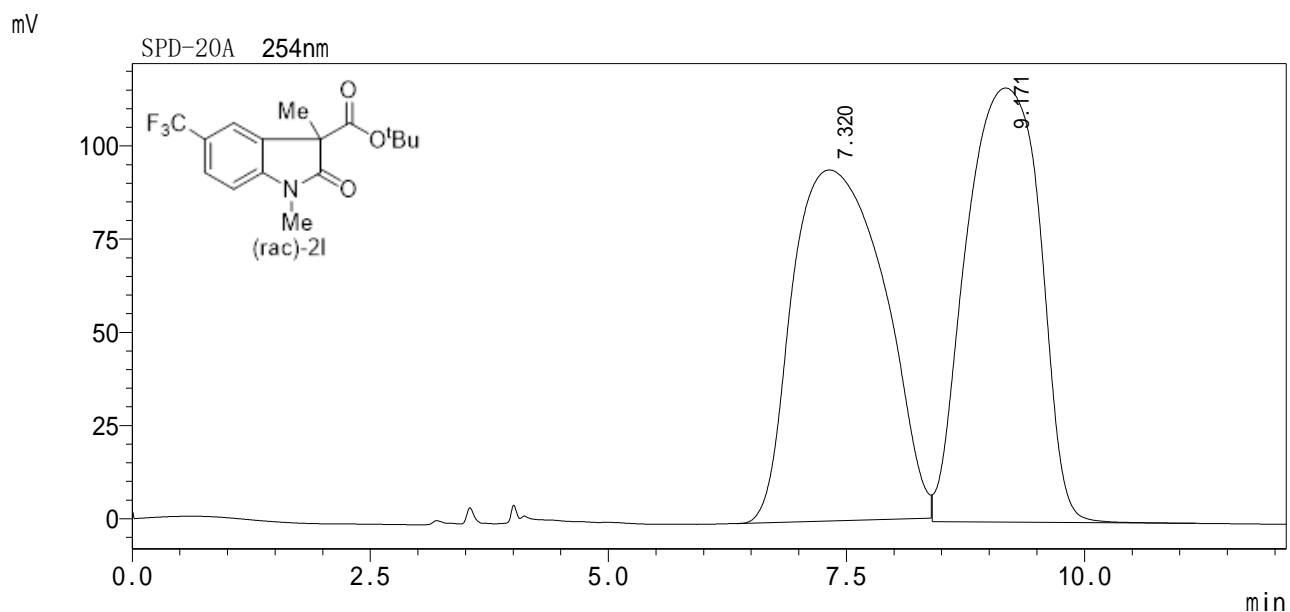
SPD-20A

Entry	RT[min]	Area	Height	Area%
1	7.607	939833	42471	3.337
2	12.578	27220986	405439	96.663
Sum		28160819	447910	

SHIMADZU LabSolutions HPLC Report

< Sample information >

Sample name : DZJC122-3-R-AD-1%
 Data name : 21--DZJC122-3-sanfujiajiRAC-AD-1%.lcd
 Acq. Method : AD-H-1%.lcm
 Location : 1-1
 : 1 uL
 Ana. Date : 2020/8/10 18:59:26
 Pro. Date : 2020/8/10 22:26:55
 Sample Type : unknown
 Analyst : System Administrator
 Processor : System Administrator



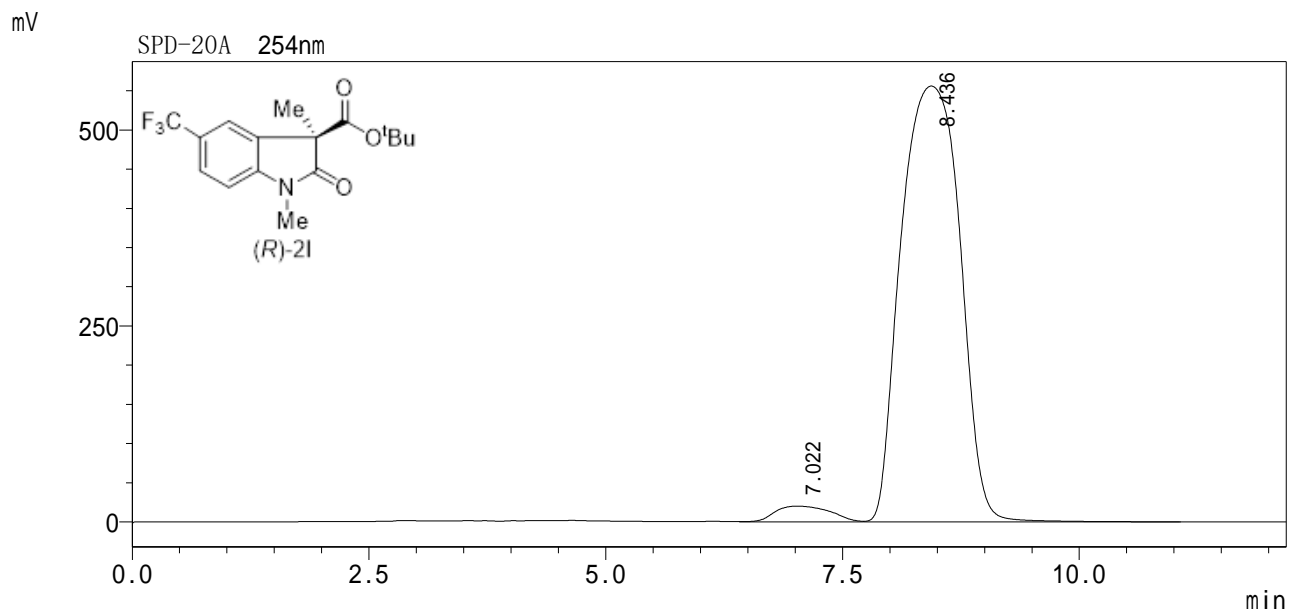
SPD-20A

Entry	RT[min]	Area	Height	Area%
1	7.320	6344586	94156	50.168
2	9.171	6302195	116449	49.832
Sum		12646780	210605	

SHIMADZU LabSolutions HPLC Report

< Sample information >

Sample name : DZJC122-3-C-AD-1%
 Data name : 21--DZJC122-3-sanfujiajiCHIRAL-AD-1%.lcd
 Acq. Method : AD-H-1%.lcm
 Location : 1-1
 Sample Type : unknown
 : 1 uL
 Ana. Date : 2020/8/10 18:45:12
 Analyst : System Administrator
 Pro. Date : 2020/8/10 22:26:59
 Processor : System Administrator



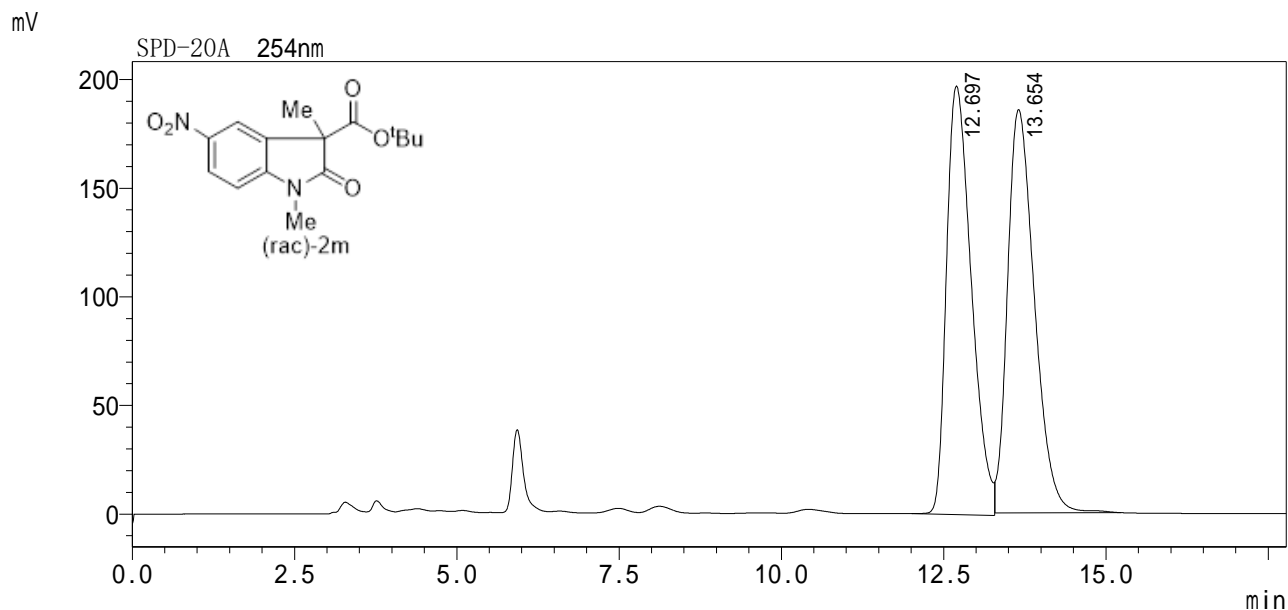
SPD-20A

Entry	RT[min]	Area	Height	Area%			
1	7.022	816526	20097	3.272			
2	8.436	24141443	556019	96.728			
Sum		24957969	576116				

SHIMADZU LabSolutions HPLC Report

< Sample information >

Sample name : DZJC115-4-R-OD-5%
 Data name : 2m--DZJC121-3-xiaojiRAC-OD-5%.lcd
 Acq. Method : OD-H-5%.lcm
 Location : 1-1
 Sample Type : unknown
 : 1 uL
 Ana. Date : 2020/8/8 20:55:38
 Analyst : System Administrator
 Pro. Date : 2020/8/8 21:35:34
 Processor : System Administrator



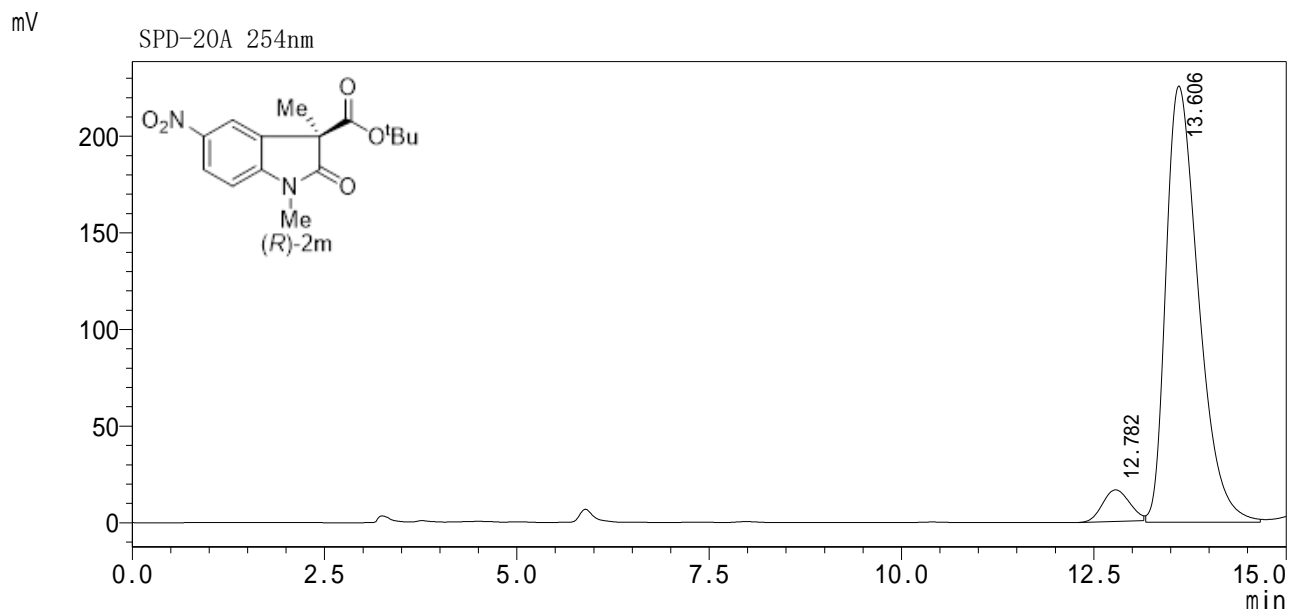
SPD-20A

Entry	RT[min]	Area	Height	Area%
1	12.697	5251948	197296	49.550
2	13.654	5347254	185638	50.450
Sum		10599202	382933	

SHIMADZU LabSolutions HPLC Report

< Sample information >

Sample name : DZJC115-4-C-OD-5%
 Data name : 2m--DZJC121-3-xiaojiCHIRAL-OD-5%.lcd
 Acq. Method : OD-H-5%.lcm
 Location : 1-1
 Sample Type : unknown
 : 1 uL
 Ana. Date : 2020/8/8 21:14:40
 Analyst : System Administrator
 Pro. Date : 2020/8/8 21:34:34
 Processor : System Administrator



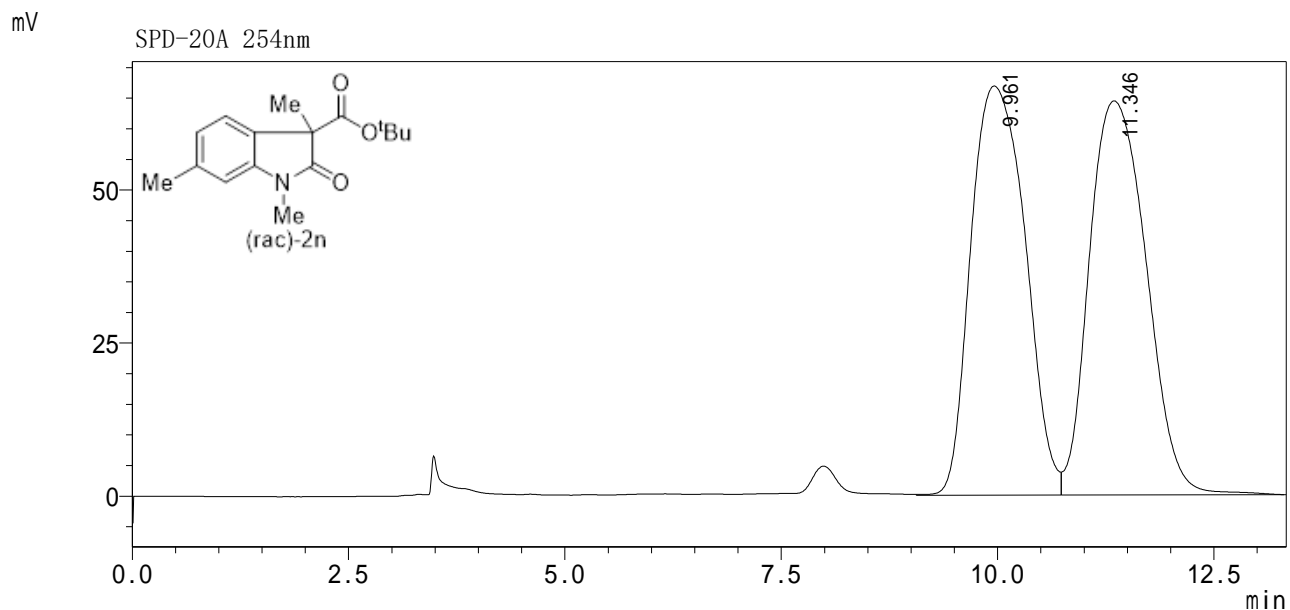
SPD-20A

Entry	RT[min]	Area	Height	Area%
1	12.782	402462	16400	5.708
2	13.606	6647911	225667	94.292
Sum		7050373	242067	

SHIMADZU LabSolutions HPLC Report

< Sample information >

Sample name : DZJC112-1-RAC-OD-1%
 Data name : 2n--DZJC114-2-dianduijiajiRAC-OD-1%.lcd
 Acq. Method : OD-H-1%.lcm
 Location : 1-1
 : 1 uL
 Ana. Date : 2020/8/2 10:36:08
 Pro. Date : 2020/8/2 18:30:39
 Sample Type : unknown
 Analyst : System Administrator
 Processor : System Administrator



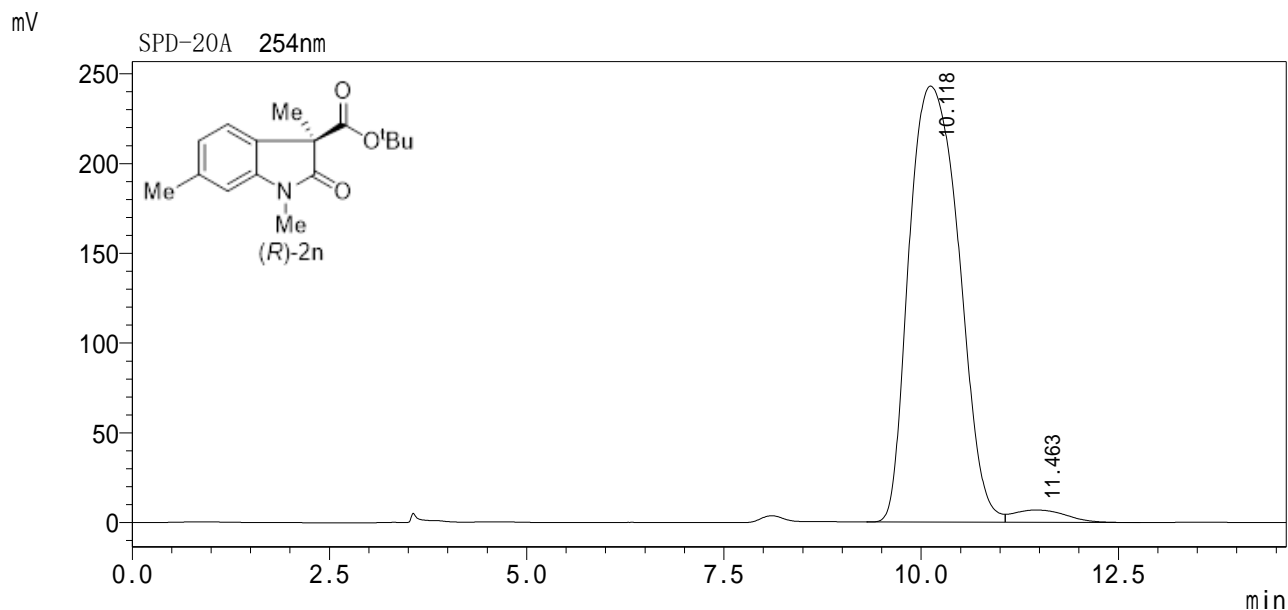
SPD-20A

Entry	RT[min]	Area	Height	Area%
1	9.961	2927504	66817	49.746
2	11.346	2957351	64349	50.254
Sum		5884855	131166	

SHIMADZU LabSolutions HPLC Report

< Sample information >

Sample name : DZJC114-2.1-CHIRAL-OD-1%
 Data name : 2n--DZJC114-2-dianduijiajiCHIRAL-OD-1%.lcd
 Acq. Method : OD-H-1%.lcm
 Location : 1-1
 Sample Type : unknown
 : 1 uL
 Ana. Date : 2020/8/5 19:06:28
 Analyst : System Administrator
 Pro. Date : 2020/8/5 20:22:47
 Processor : System Administrator



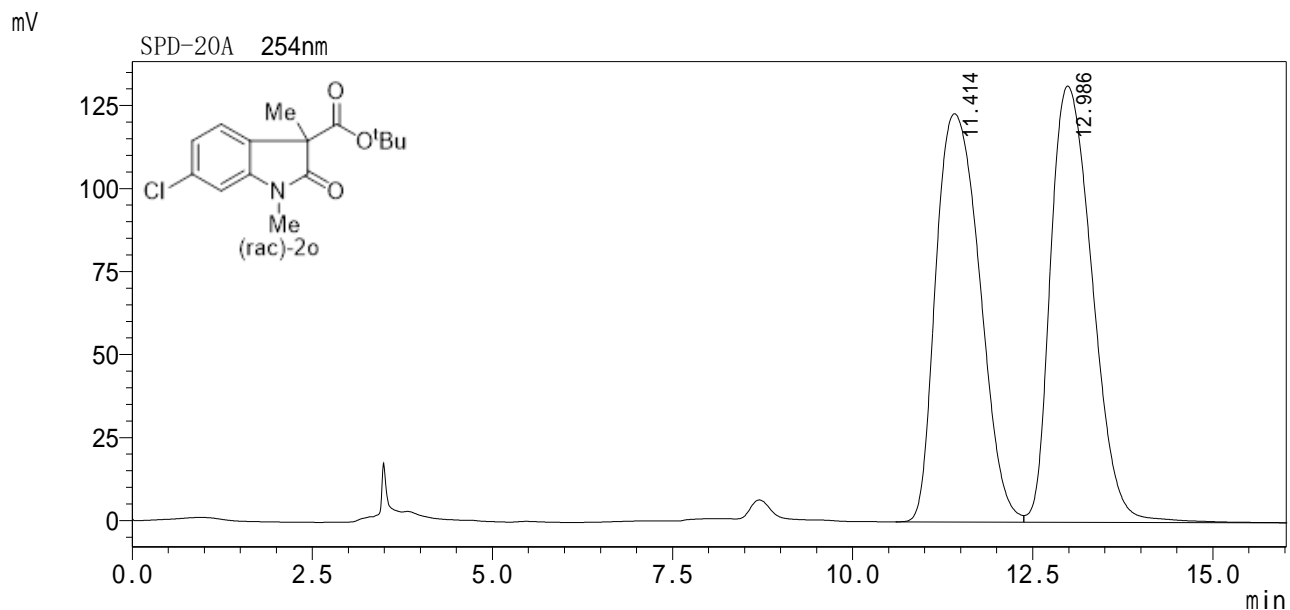
SPD-20A

Entry	RT[min]	Area	Height	Area%
1	10.118	10707239	242924	97.120
2	11.463	317461	6868	2.880
Sum		11024700	249792	

SHIMADZU LabSolutions HPLC Report

< Sample information >

Sample name : DZJC111-rac-OD-1%
 Data name : 2o--DZJC111-diandui lvRAC-OD-1%.lcd
 Acq. Method : OD-H-1%.lcm
 Location : 1-1
 Sample Type : unknown
 : 1 uL
 Ana. Date : 2020/8/1 15:13:37
 Analyst : System Administrator
 Pro. Date : 2020/8/1 15:29:39
 Processor : System Administrator



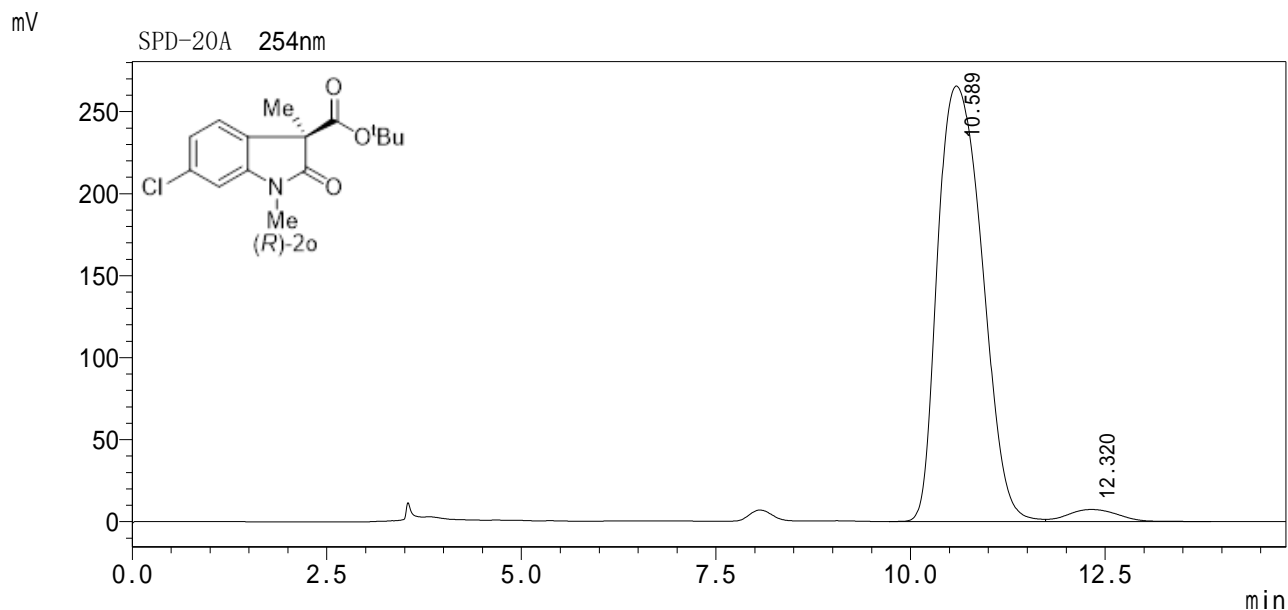
SPD-20A

Entry	RT[min]	Area	Height	Area%
1	11.414	5214049	122972	49.621
2	12.986	5293681	131376	50.379
Sum		10507730	254348	

SHIMADZU LabSolutions HPLC Report

< Sample information >

Sample name : DZJC111-CHIRAL(S,S)-OD-1%
 Data name : 2o--DZJC111-diandui lvCHIRAL(S,S)-OD-1%.lcd
 Acq. Method : OD-H-1%.lcm
 Location : 1-1
 Sample Type : unknown
 : 1 uL
 Ana. Date : 2020/8/1 15:31:50
 Analyst : System Administrator
 Pro. Date : 2020/8/2 20:38:30
 Processor : System Administrator



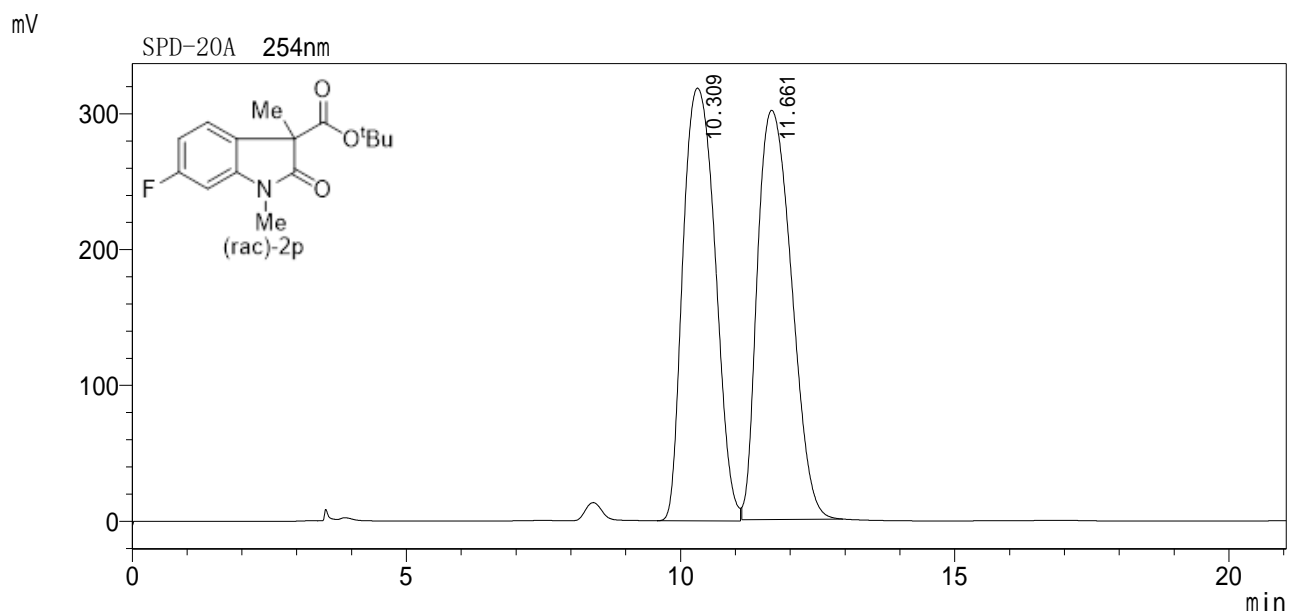
SPD-20A

Entry	RT[min]	Area	Height	Area%
1	10.589	10596970	265534	96.936
2	12.320	334903	7374	3.064
Sum		10931873	272909	

SHIMADZU LabSolutions HPLC Report

< Sample information >

Sample name : DZJC115-3-RAC-OD-1%
 Data name : 2p--DZJC121-2-dianduifuRAC-OD-1%.lcd
 Acq. Method : OD-H-1%.lcm
 Location : 1-1
 : 1 uL
 Ana. Date : 2020/8/7 18:43:39
 Pro. Date : 2020/8/7 23:15:41
 Sample Type : unknown
 Analyst : System Administrator
 Processor : System Administrator



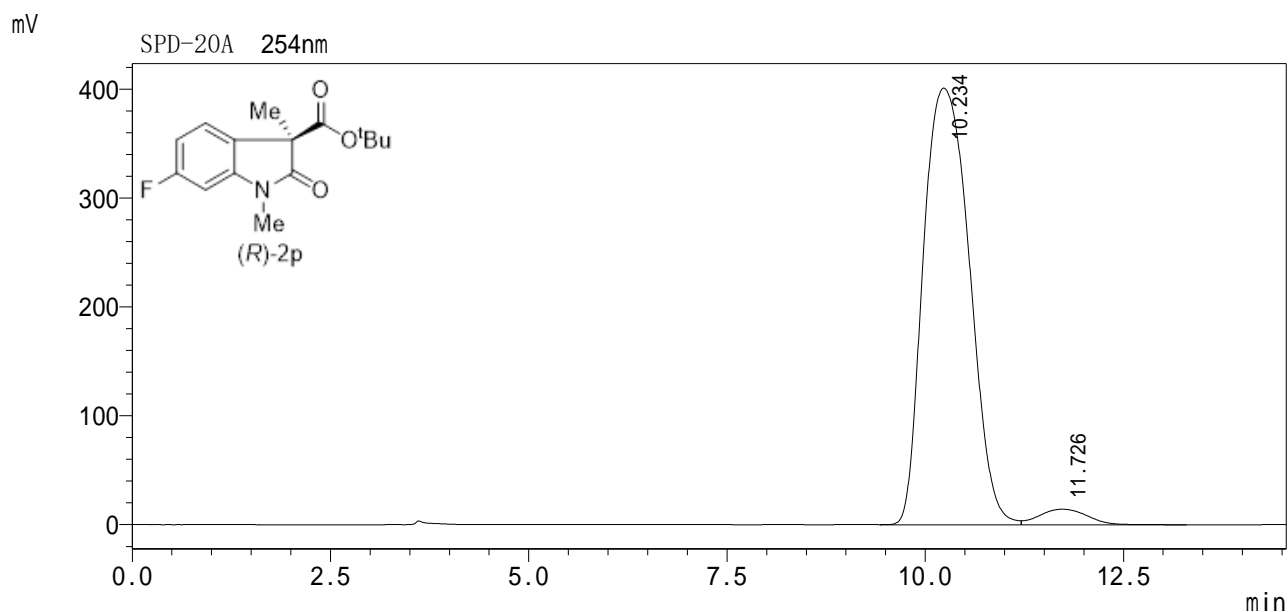
SPD-20A

Entry	RT[min]	Area	Height	Area%
1	10.309	13050188	318794	50.004
2	11.661	13047914	301312	49.996
Sum		26098102	620107	

SHIMADZU LabSolutions HPLC Report

< Sample information >

Sample name : DZJC121-2-C-OD-1%
 Data name : 2p--DZJC121-2-dianduifuCHIRAL-OD-1%.lcd
 Acq. Method : OD-H-1%.lcm
 Location : 1-1
 Sample Type : unknown
 : 1 uL
 Ana. Date : 2020/8/7 19:10:57
 Analyst : System Administrator
 Pro. Date : 2020/8/7 23:15:39
 Processor : System Administrator



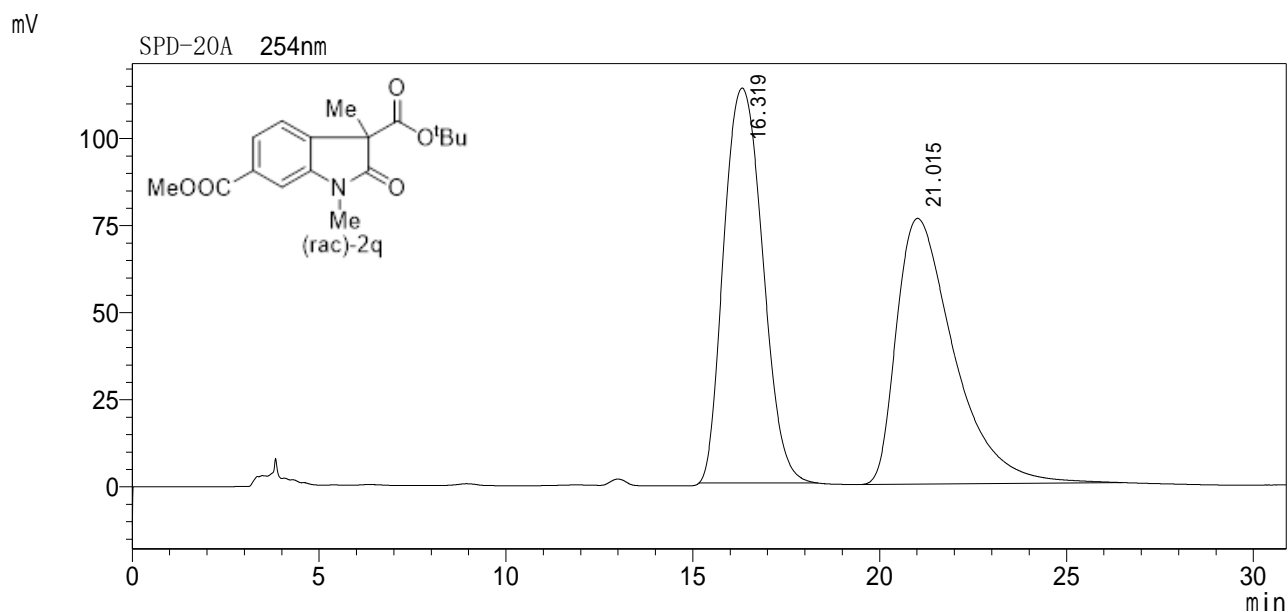
SPD-20A

Entry	RT [min]	Area	Height	Area%
1	10.234	16208320	401003	96.433
2	11.726	599556	14228	3.567
Sum		16807876	415231	

SHIMADZU LabSolutions HPLC Report

< Sample information >

Sample name : DZJC140-r-AS-1%
 Data name : 2q--DZJC140-diandujiiazhiRAC-AS-1%.lcd
 Acq. Method : AS-H-1%.lcm
 Location : 1-1
 : 1 uL
 Ana. Date : 2020/8/26 14:24:54
 Pro. Date : 2020/8/26 15:30:09
 Sample Type : unknown
 Analyst : System Administrator
 Processor : System Administrator



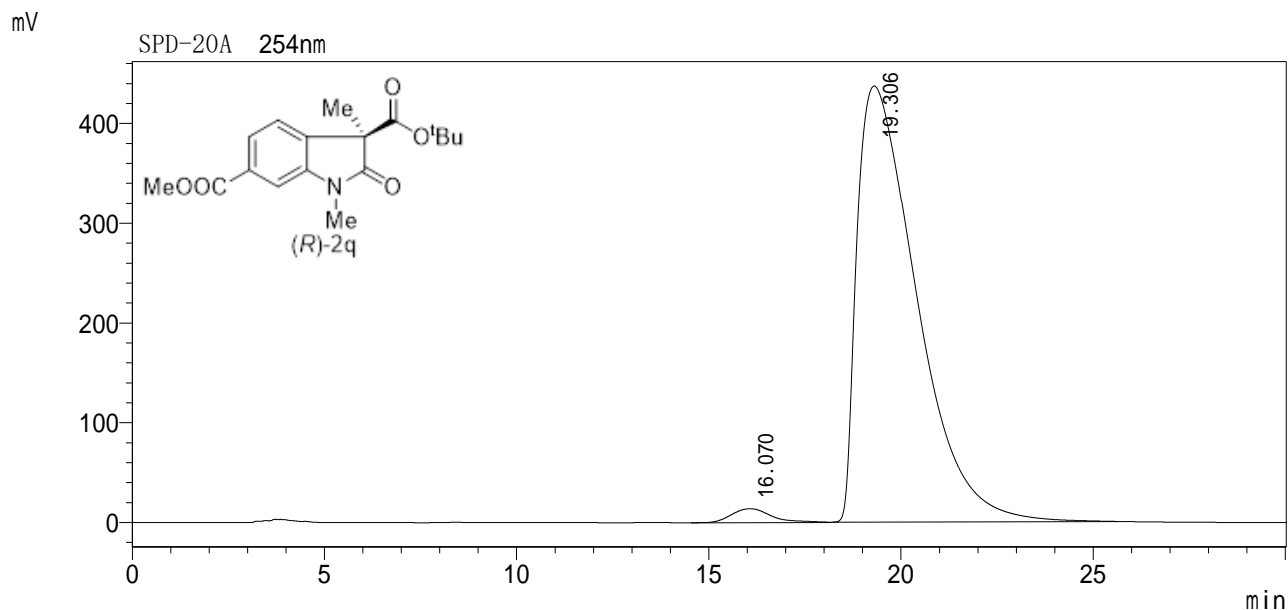
SPD-20A

Entry	RT[min]	Area	Height	Area%			
1	16.319	8230437	113412	50.285			
2	21.015	8137070	76295	49.715			
Sum		16367506	189707				

SHIMADZU LabSolutions HPLC Report

< Sample information >

Sample name : DZJC140-c-AS-1%
 Data name : 2q--DZJC140-dianduijiazhiCHIRAL-AS-1%.lcd
 Acq. Method : AS-H-1%.lcm
 Location : 1-1
 : 1 uL
 Ana. Date : 2020/8/26 14:58:37
 Pro. Date : 2020/8/26 15:30:03
 Sample Type : unknown
 Analyst : System Administrator
 Processor : System Administrator



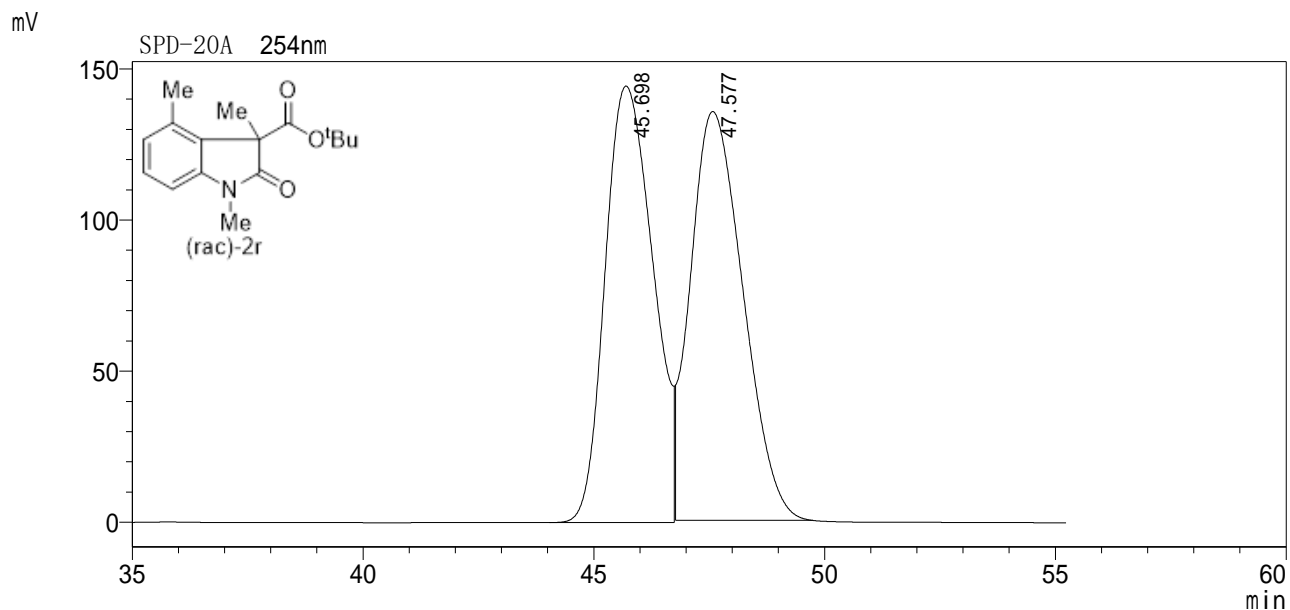
SPD-20A

Entry	RT[min]	Area	Height	Area%			
1	16.070	1035598	14029	2.162			
2	19.306	46871083	437047	97.838			
Sum		47906681	451076				

SHIMADZU LabSolutions HPLC Report

< Sample information >

Sample name : DZJC121-1-R-IC-1%
 Data name : 2r--DZJC121-1-dianlinjiajiRAC-IC-1%.lcd
 Acq. Method : IC-H-1%.lcm
 Location : 1-1
 : 1 uL
 Ana. Date : 2020/8/8 14:33:40
 Pro. Date : 2020/8/8 18:29:59
 Sample Type : unknown
 Analyst : System Administrator
 Processor : System Administrator



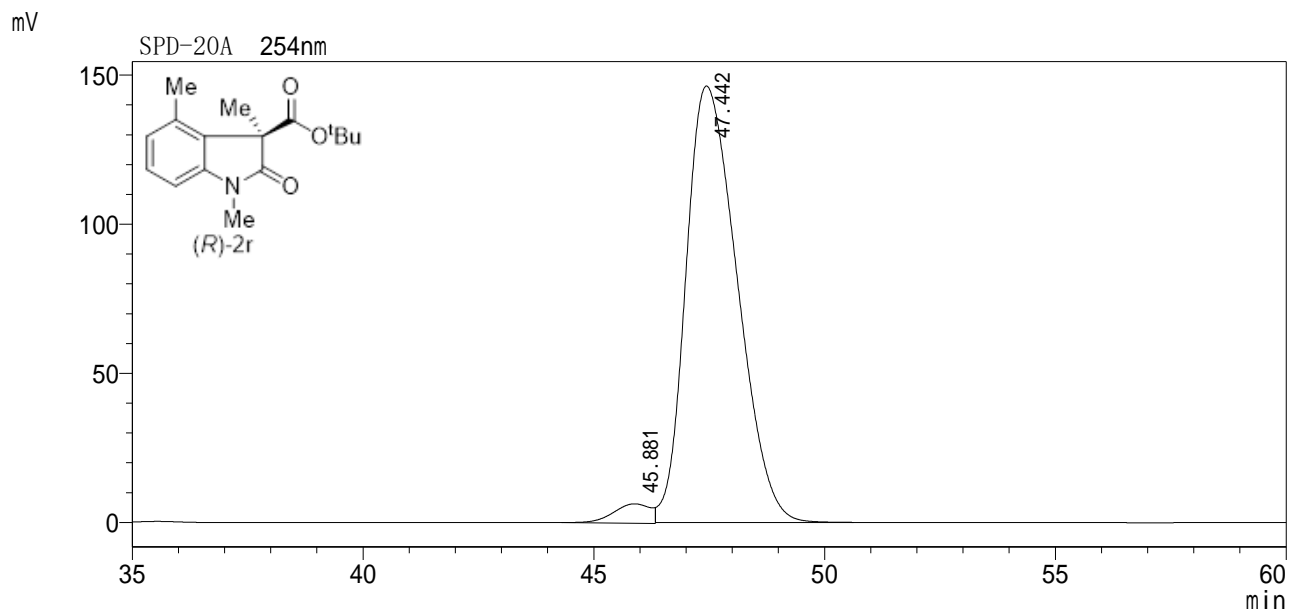
SPD-20A

Entry	RT[min]	Area	Height	Area%			
1	45.698	10437998	144470	49.354			
2	47.577	10711377	135258	50.646			
Sum		21149375	279728				

SHIMADZU LabSolutions HPLC Report

< Sample information >

Sample name : DZJC121-1-C-IC-1%
 Data name : 2r--DZJC121-1-dianlinjiajiCHIRAL-IC-1%.lcd
 Acq. Method : IC-H-1%.lcm
 Location : 1-1
 : 1 uL
 Ana. Date : 2020/8/8 11:21:25
 Pro. Date : 2020/8/8 18:30:17
 Sample Type : unknown
 Analyst : System Administrator
 Processor : System Administrator



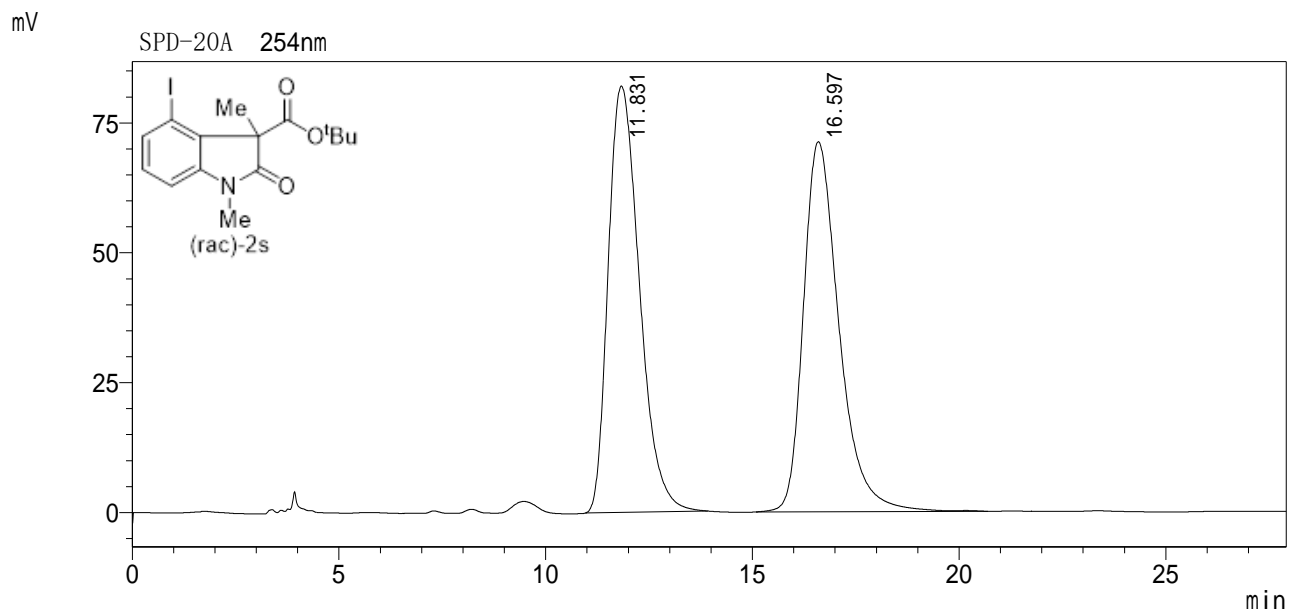
SPD-20A

Entry	RT[min]	Area	Height	Area%		
1	45.881	362833	6510	3.109		
2	47.442	11306058	146407	96.891		
Sum		11668891	152917			

SHIMADZU LabSolutions HPLC Report

< Sample information >

Sample name : dzjc147-r-OJ-1%
 Data name : 2s--dzjc147-dianIindianRAC-OJ-1%.lcd
 Acq. Method : OJ-H-1%.lcm
 Location : 1-1
 Sample Type : unknown
 : 1 uL
 Ana. Date : 2020/9/3 15:03:55
 Analyst : System Administrator
 Pro. Date : 2020/9/3 16:40:55
 Processor : System Administrator



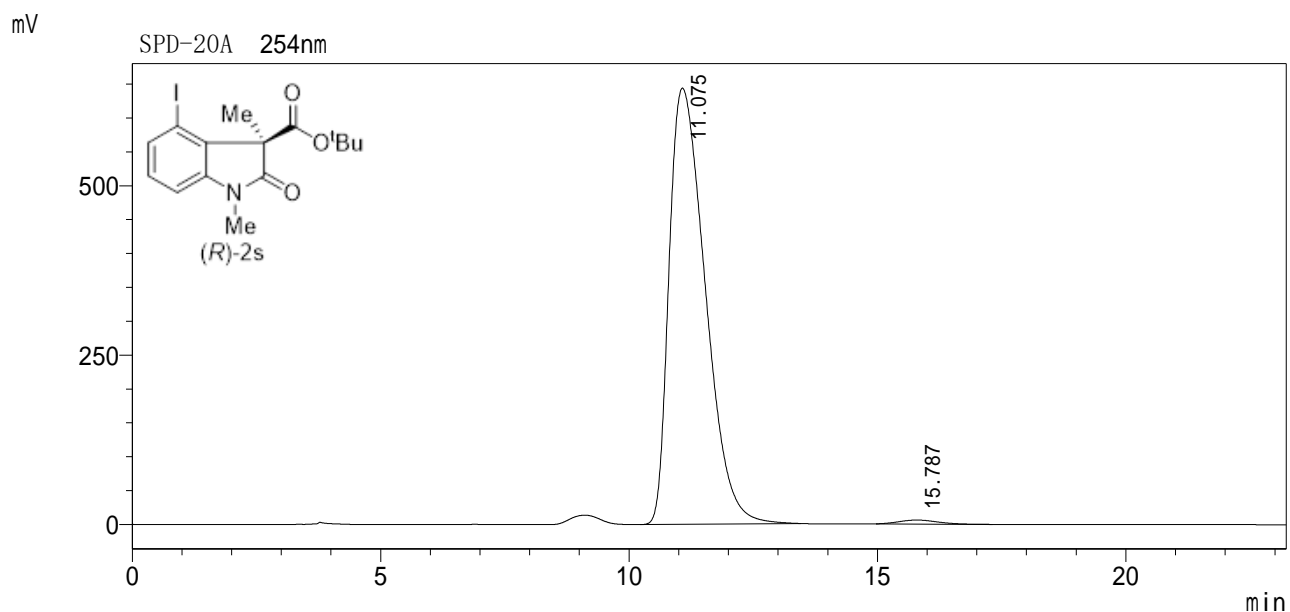
SPD-20A

Entry	RT[min]	Area	Height	Area%
1	11.831	4311218	82073	50.253
2	16.597	4267782	71242	49.747
Sum		8578999	153316	

SHIMADZU LabSolutions HPLC Report

< Sample information >

Sample name : dzjc147-C-0J-1%
 Data name : 2s--dzjc147-dianlindianCHIRAL-0J-1%.lcd
 Acq. Method : 0J-H-1%.lcm
 Location : 1-1
 : 1 uL
 Ana. Date : 2020/9/3 16:15:49
 Pro. Date : 2020/9/3 16:40:49
 Sample Type : unknown
 Analyst : System Administrator
 Processor : System Administrator



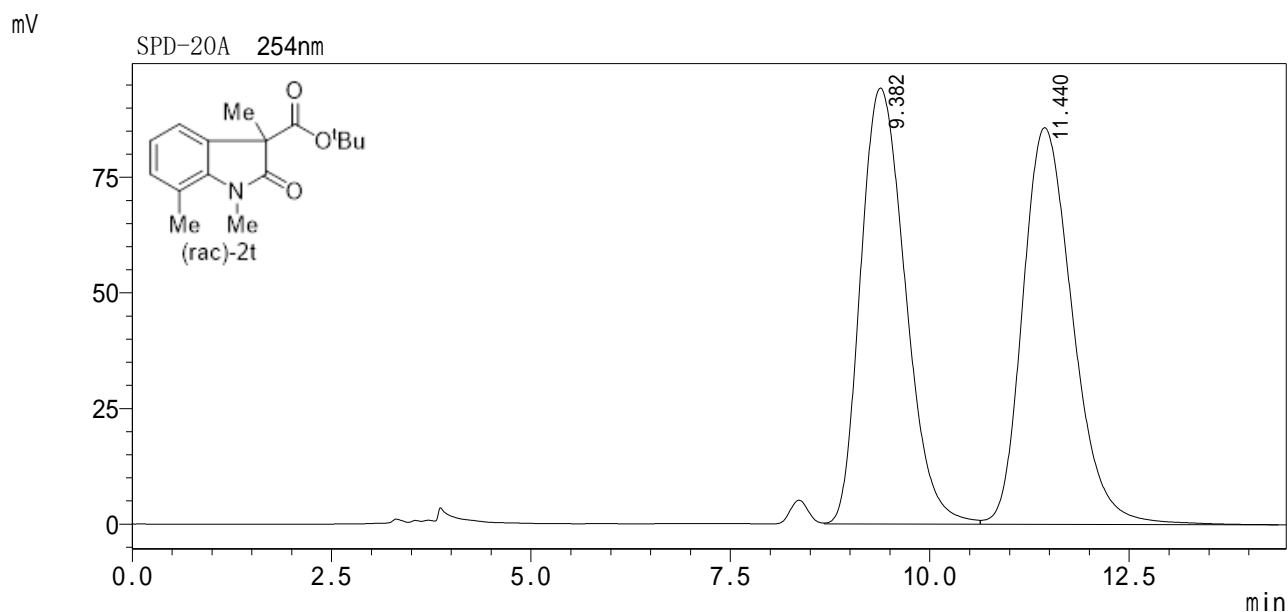
SPD-20A

Entry	RT[min]	Area	Height	Area%
1	11.075	32570814	643846	99.025
2	15.787	320781	5921	0.975
Sum		32891595	649767	

SHIMADZU LabSolutions HPLC Report

< Sample information >

Sample name : DZJC123-1-RAC-OJ-1%
 Data name : 2t--DZJC124-1-anlinjiajiRAC-OJ-1%.lcd
 Acq. Method : OJ-H-1%.lcm
 Location : 1-1
 Sample Type : unknown
 : 1 uL
 Ana. Date : 2020/8/11 21:17:56
 Analyst : System Administrator
 Pro. Date : 2020/8/11 22:46:09
 Processor : System Administrator



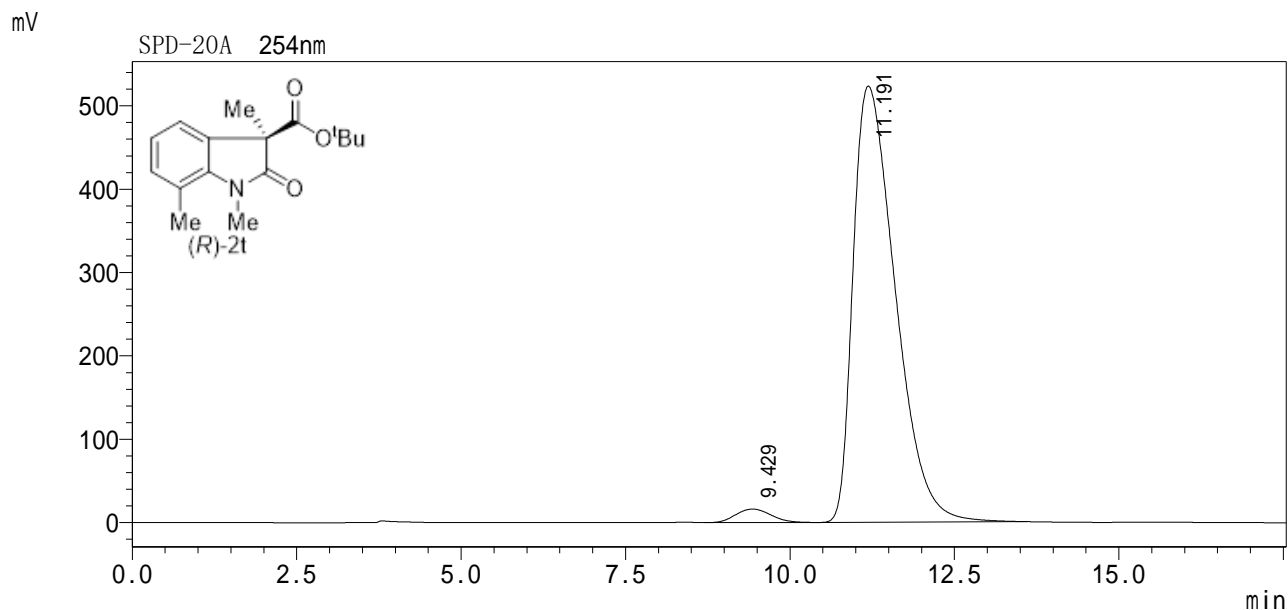
SPD-20A

Entry	RT[min]	Area	Height	Area%
1	9.382	3678416	94329	49.659
2	11.440	3728941	85816	50.341
Sum		7407356	180144	

SHIMADZU LabSolutions HPLC Report

< Sample information >

Sample name : DZJC124-1-C-OJ-1%
 Data name : 2t--DZJC124-1-anlinjiajiCHIRAL-OJ-1%.lcd
 Acq. Method : OJ-H-1%.lcm
 Location : 1-1
 : 1 uL
 Ana. Date : 2020/8/11 21:33:52
 Pro. Date : 2020/8/11 22:46:06
 Sample Type : unknown
 Analyst : System Administrator
 Processor : System Administrator



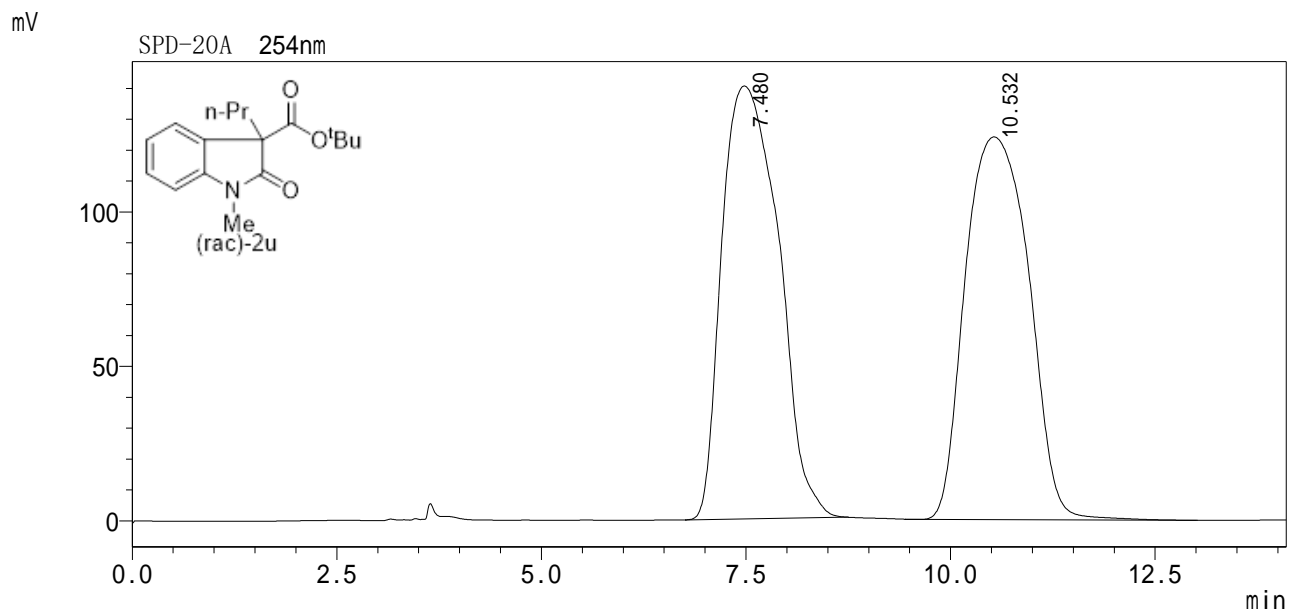
SPD-20A

Entry	RT [min]	Area	Height	Area%
1	9.429	605564	16178	2.534
2	11.191	23288460	523414	97.466
Sum		23894024	539591	

SHIMADZU LabSolutions HPLC Report

< Sample information >

Sample name : DZJC108-2-RAC-OD-1%
 Data name : 2u--DZJC113-2-bingjiRAC-OD-1%.lcd
 Acq. Method : OD-H-1%.lcm
 Location : 1-1
 Sample Type : unknown
 : 1 uL
 Ana. Date : 2020/7/31 14:42:51
 Analyst : System Administrator
 Pro. Date : 2020/7/31 14:58:53
 Processor : System Administrator



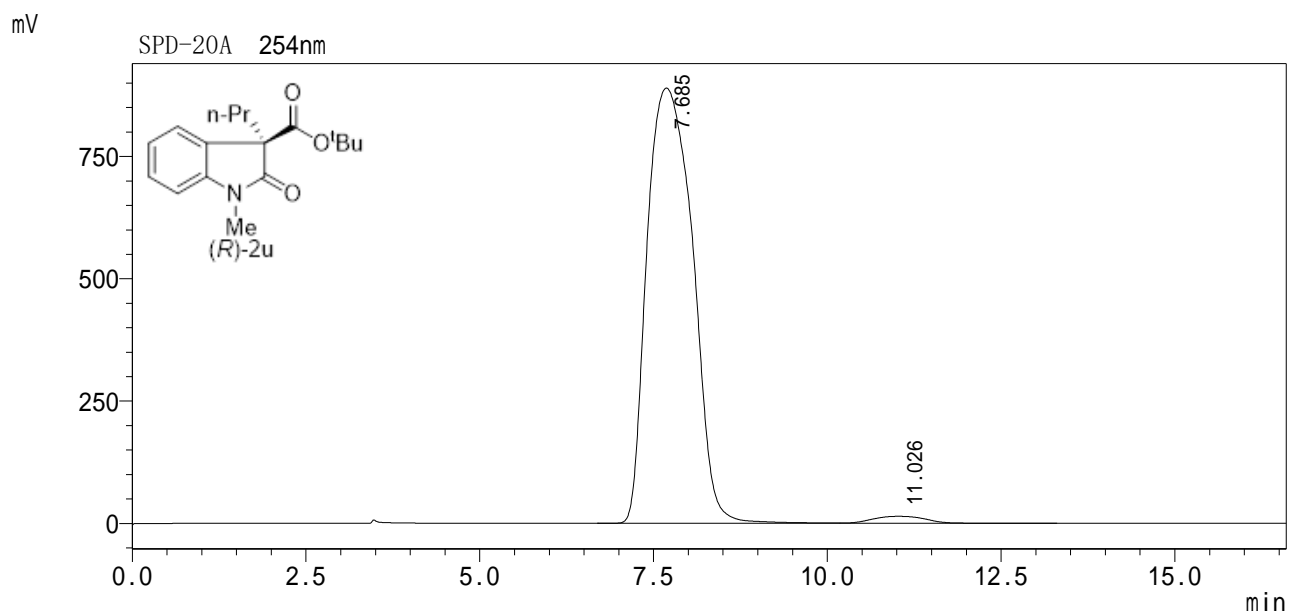
SPD-20A

Entry	RT[min]	Area	Height	Area%
1	7.480	6760991	140146	50.190
2	10.532	6709935	123870	49.810
Sum		13470926	264016	

SHIMADZU LabSolutions HPLC Report

< Sample information >

Sample name : DZJC113-2-C-OD-1%
 Data name : 2u--DZJC113-2-bingjiCHIRAL-OD-1%.lcd
 Acq. Method : OD-H-1%.lcm
 Location : 1-1
 : 1 uL
 Ana. Date : 2020/8/2 20:15:02
 Pro. Date : 2020/8/2 20:32:34
 Sample Type : unknown
 Analyst : System Administrator
 Processor : System Administrator



SPD-20A

Entry	RT[min]	Area	Height	Area%			
1	7.685	40609931	889722	98.145			
2	11.026	767350	14328	1.855			
Sum		41377280	904049				



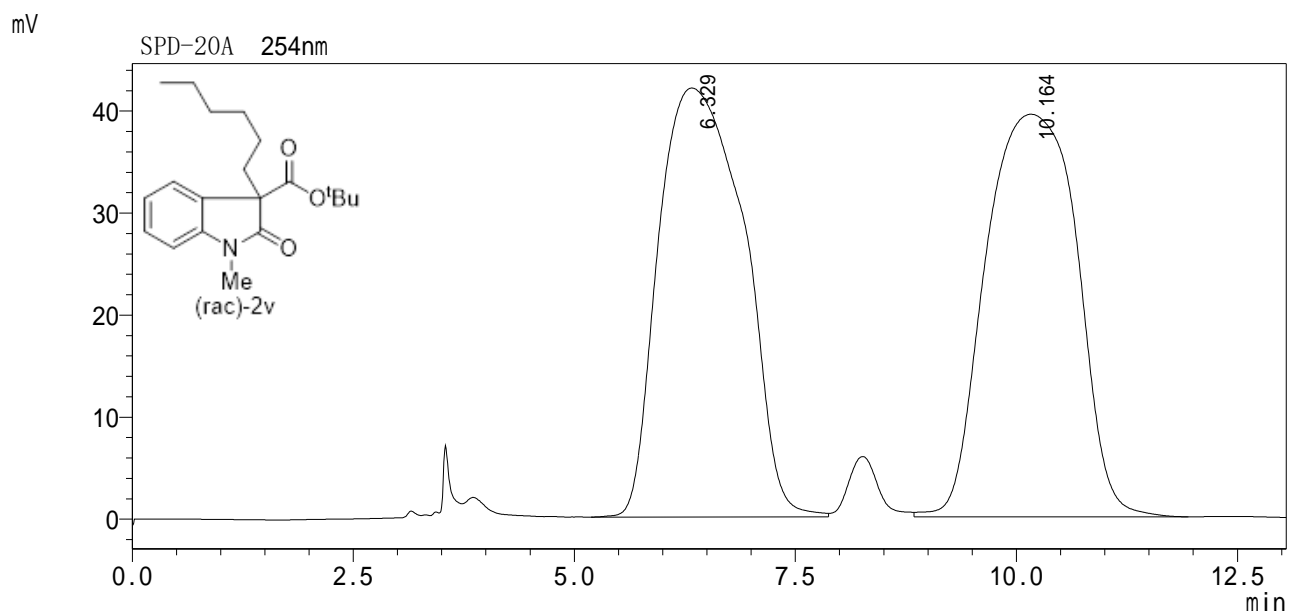
SHIMADZU

LabSolutions

HPLC Report

< Sample information >

Sample name : DZJC123-3-R-OD-1%
Data name : 2v--DZJC124-3-changwanlianRAC-OD-1%.lcd
Acq. Method : OD-H-1%.lcm
Location : 1-1
Sample Type : unknown
Ana. Date : 2020/8/11 22:04:35
Analyst : System Administrator
Pro. Date : 2020/8/11 22:46:04
Processor : System Administrator



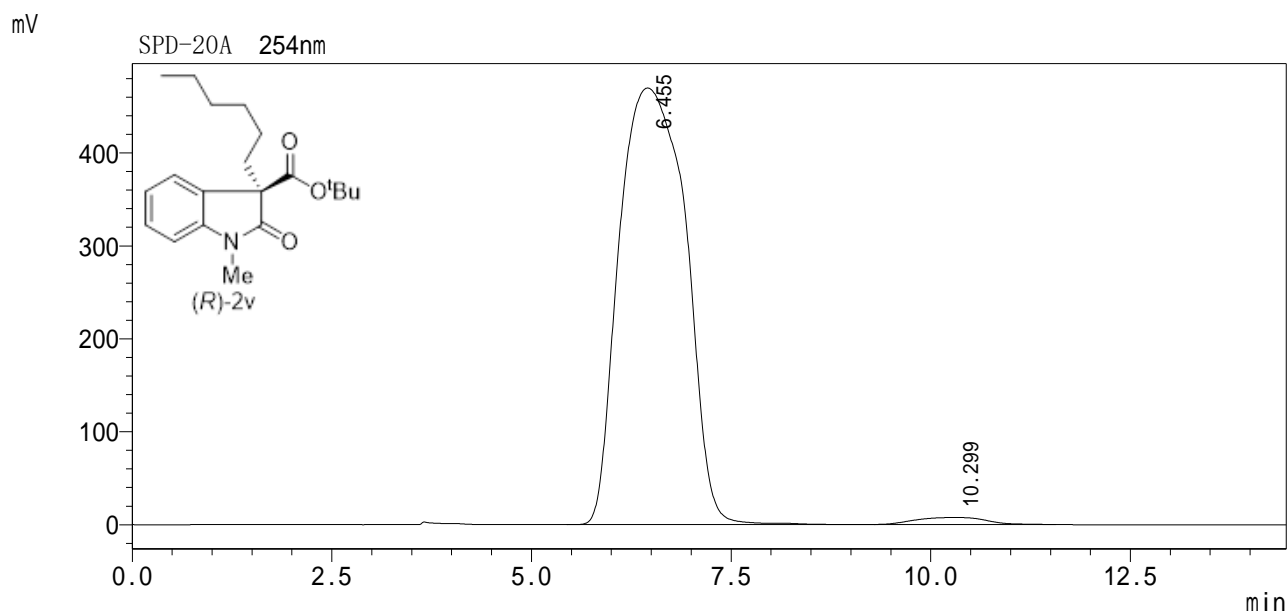
SPD-20A

Entry	RT[min]	Area	Height	Area%			
1	6.329	2824435	42043	49.833			
2	10.164	2843383	39460	50.167			
Sum		5667818	81503				

SHIMADZU LabSolutions HPLC Report

< Sample information >

Sample name : DZJC124-3-C-OD-1%
 Data name : 2v--DZJC124-3-changwanlianCHIRAL-OD-1%.lcd
 Acq. Method : OD-H-1%.lcm
 Location : 1-1
 : 1 uL
 Ana. Date : 2020/8/11 22:18:45
 Pro. Date : 2020/8/11 22:46:01
 Sample Type : unknown
 Analyst : System Administrator
 Processor : System Administrator



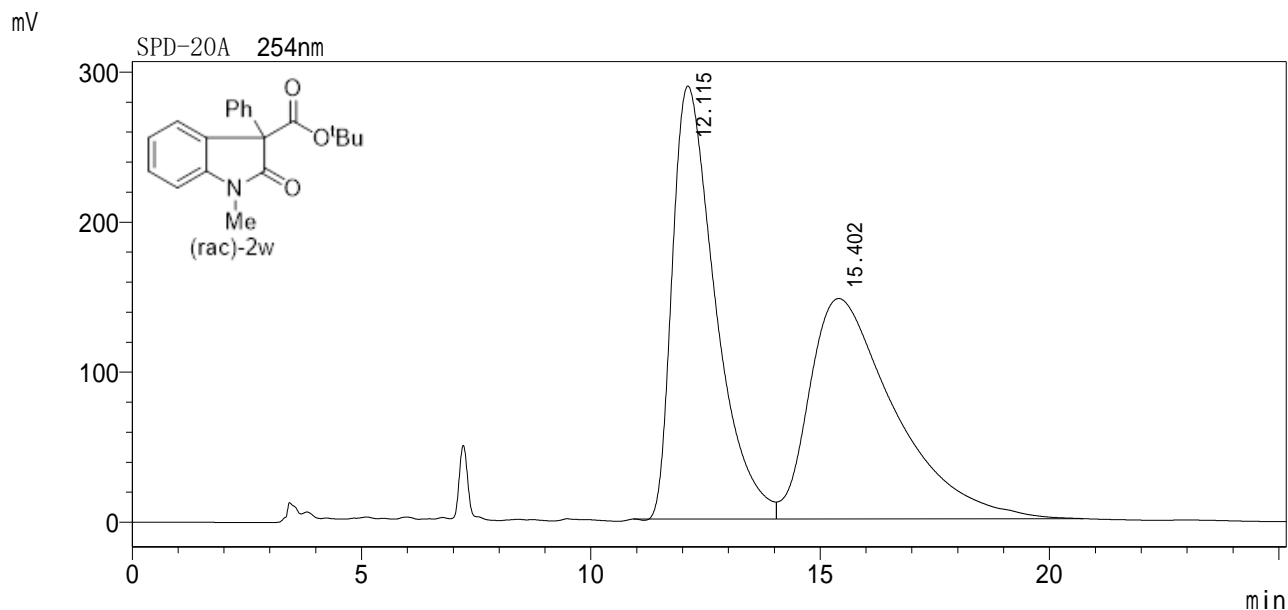
SPD-20A

Entry	RT [min]	Area	Height	Area%
1	6.455	27187059	469683	98.329
2	10.299	462019	7485	1.671
Sum		27649078	477168	

SHIMADZU LabSolutions HPLC Report

< Sample information >

Sample name : DZJC113-1-RAC-OJ-3%
 Data name : 2w-DZJC113-1-benjiRAC-OJ-3%.lcd
 Acq. Method : OJ-H-3%-50min.lcm
 Location : 1-1
 Sample Type : unknown
 : 1 uL
 Ana. Date : 2020/8/2 22:18:41
 Analyst : System Administrator
 Pro. Date : 2020/8/2 22:45:25
 Processor : System Administrator



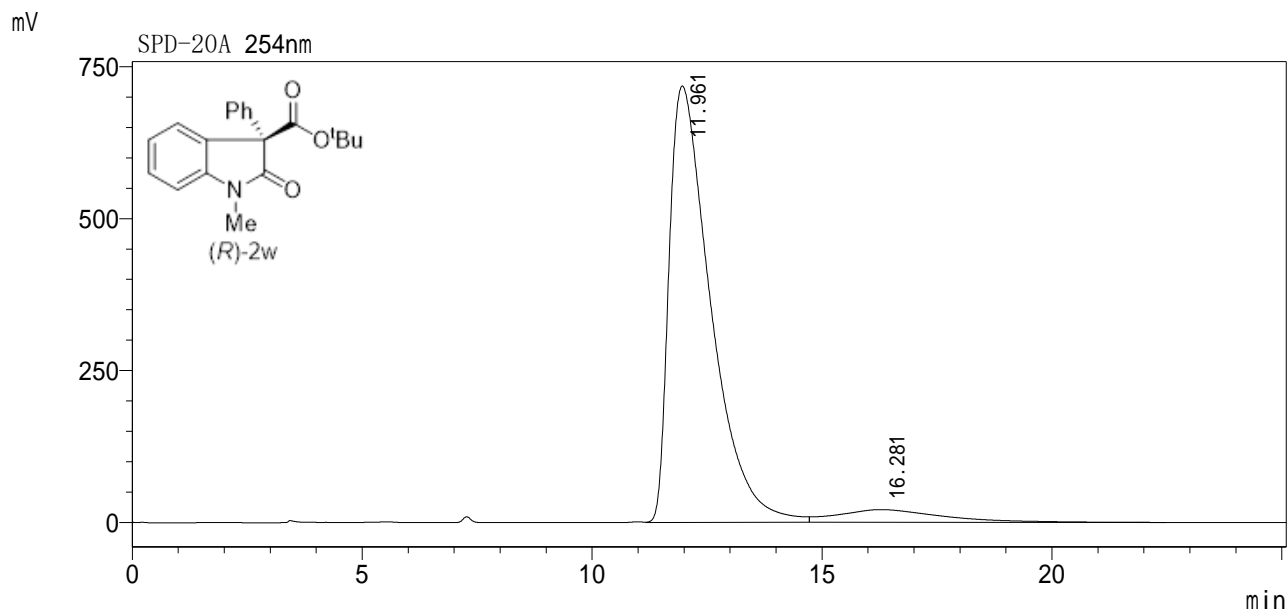
SPD-20A

Entry	RT[min]	Area	Height	Area%
1	12.115	18789490	288519	49.676
2	15.402	19034922	146816	50.324
Sum		37824412	435335	

SHIMADZU LabSolutions HPLC Report

< Sample information >

Sample name : DZJC113-1-CHIRAL-OJ-3%
 Data name : 2w--DZJC113-1-benjiCHIRAL-OJ-3%.lcd
 Acq. Method : OJ-H-3%-50min.lcm
 Location : 1-1
 : 1 uL
 Ana. Date : 2020/8/2 21:52:49
 Pro. Date : 2020/8/2 22:45:52
 Sample Type : unknown
 Analyst : System Administrator
 Processor : System Administrator



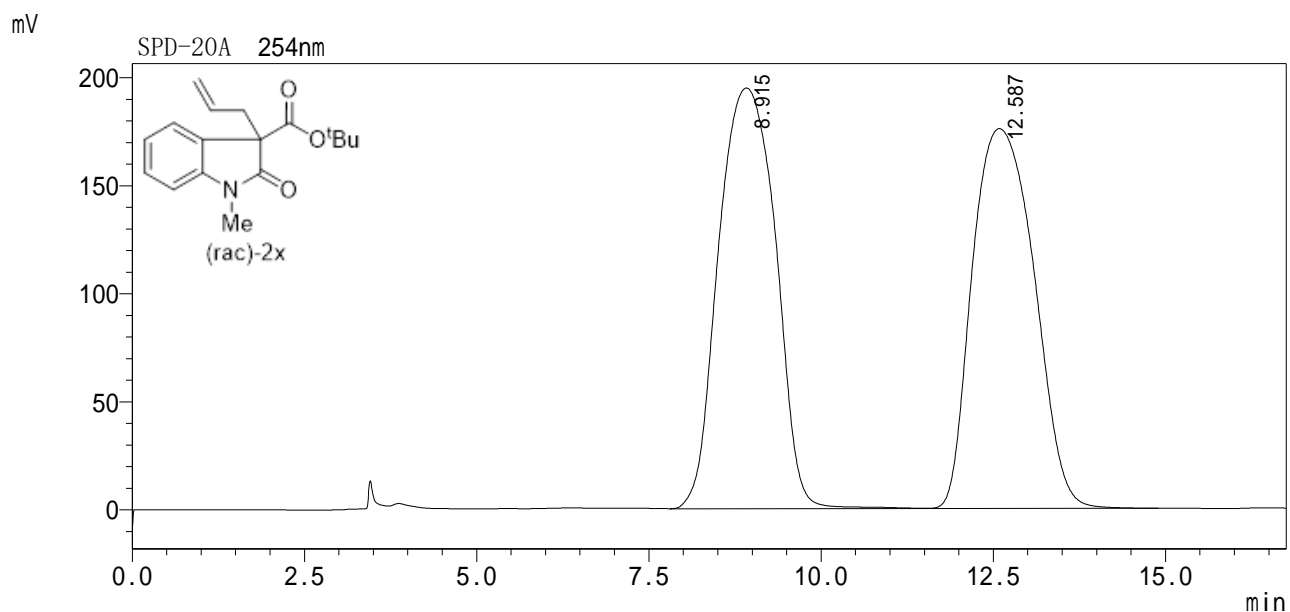
SPD-20A

Entry	RT[min]	Area	Height	Area%
1	11.961	45159860	718465	93.322
2	16.281	3231727	20674	6.678
Sum		48391587	739139	

SHIMADZU LabSolutions HPLC Report

< Sample information >

Sample name : DZJC123-2-RAC-OD-1%
 Data name : 2x--DZJC124-2-xibingjiRAC-OD-1%.lcd
 Acq. Method : OD-H-1%.lcm
 Location : 1-1
 : 1 uL
 Ana. Date : 2020/8/14 10:58:53
 Pro. Date : 2020/8/15 9:37:51
 Sample Type : unknown
 Analyst : System Administrator
 Processor : System Administrator



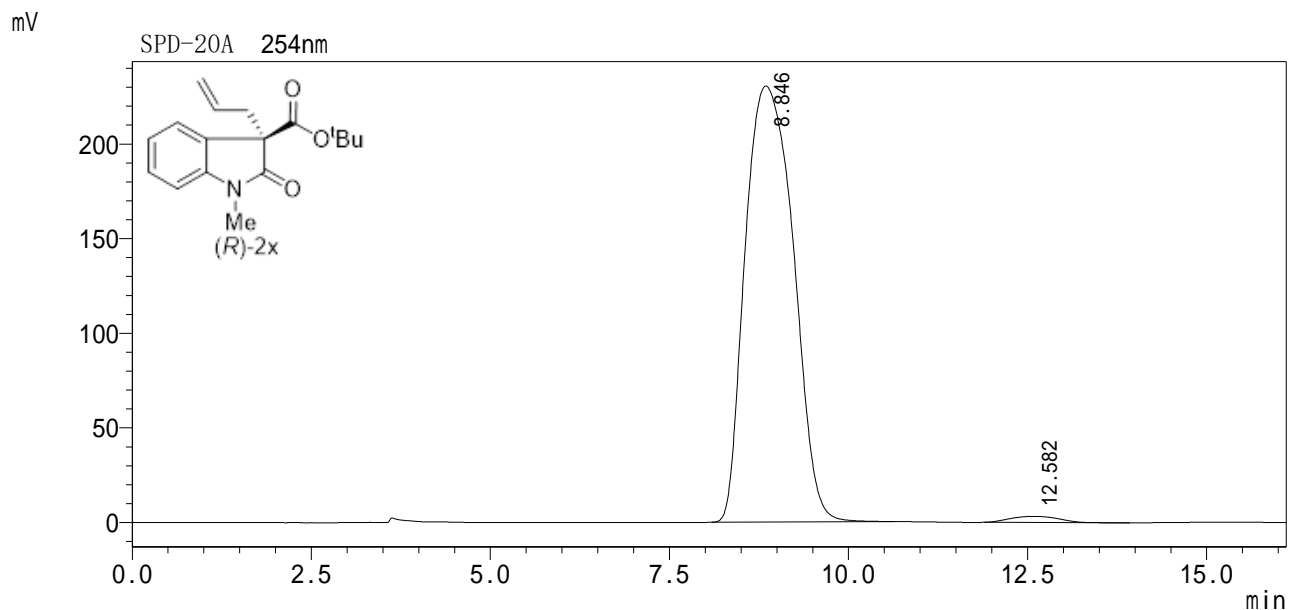
SPD-20A

Entry	RT[min]	Area	Height	Area%
1	8.915	11246211	194663	50.537
2	12.587	11007002	175793	49.463
Sum		22253213	370456	

SHIMADZU LabSolutions HPLC Report

< Sample information >

Sample name : DZJC124-2-C-OD-1%
 Data name : 2x--DZJC124-2-xibingjiCHIRAL-OD-1%.lcd
 Acq. Method : OD-H-1%.lcm
 Location : 1-1
 Sample Type : unknown
 : 1 uL
 Ana. Date : 2020/8/14 11:16:58
 Analyst : System Administrator
 Pro. Date : 2020/8/15 9:36:58
 Processor : System Administrator



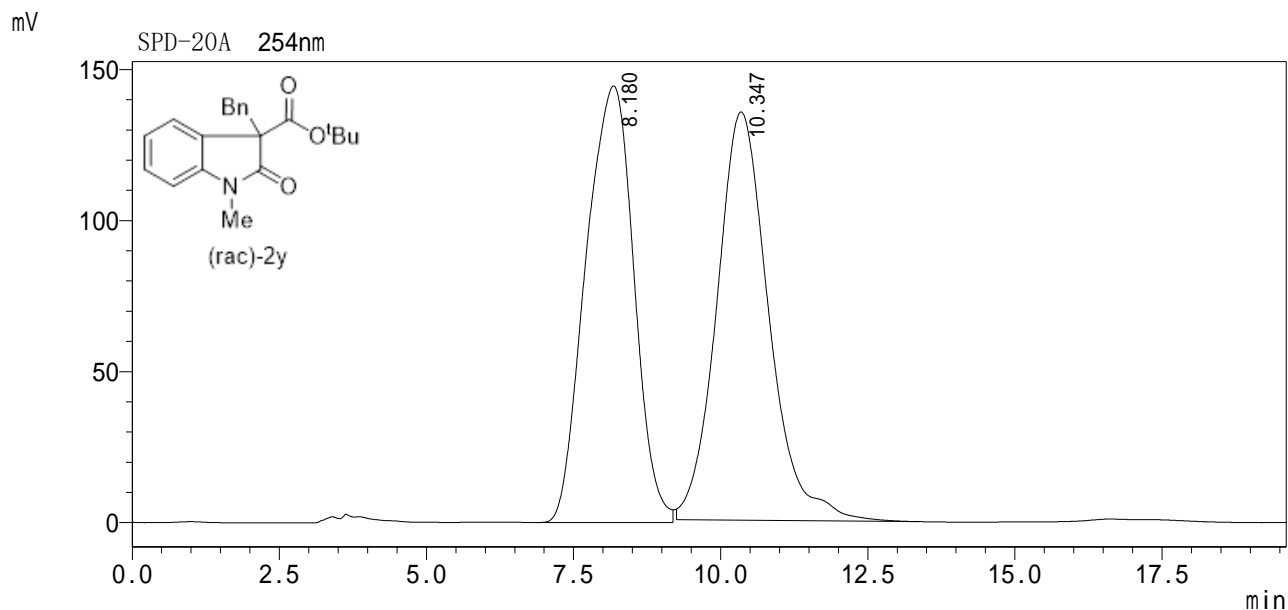
SPD-20A

Entry	RT [min]	Area	Height	Area%
1	8.846	10801281	230385	98.639
2	12.582	149017	3203	1.361
Sum		10950298	233588	

SHIMADZU LabSolutions HPLC Report

< Sample information >

Sample name : DZJC139-r-AS-1%
 Data name : 2y--DZJC139-bianjiRAC-AS-1%.lcd
 Acq. Method : AS-H-1%.lcm
 Location : 1-1
 : 1 uL
 Ana. Date : 2020/8/24 11:06:42
 Pro. Date : 2020/8/24 11:27:49
 Sample Type : unknown
 Analyst : System Administrator
 Processor : System Administrator



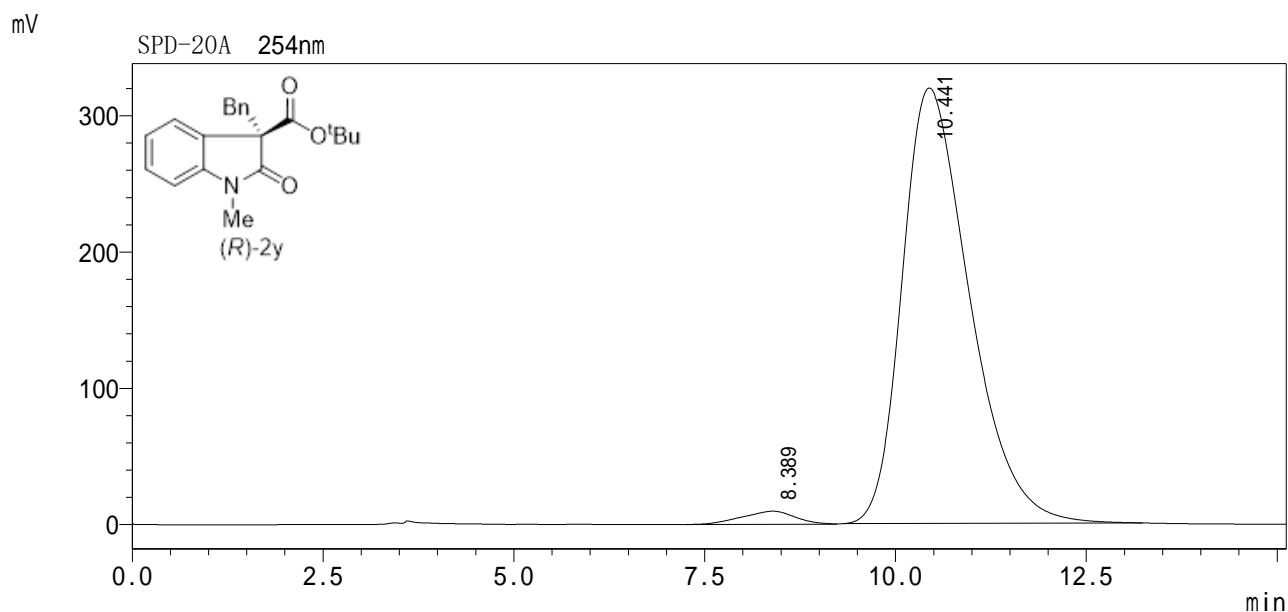
SPD-20A

Entry	RT[min]	Area	Height	Area%
1	8.180	8204306	144486	49.700
2	10.347	8303402	135209	50.300
Sum		16507708	279695	

SHIMADZU LabSolutions HPLC Report

< Sample information >

Sample name : DZJC139-c-AS-1%
 Data name : 2y--DZJC139-bianjiCHIRAL-AS-1%.lcd
 Acq. Method : AS-H-1%.lcm
 Location : 1-1
 : 1 uL
 Ana. Date : 2020/8/24 10:50:53
 Pro. Date : 2020/8/24 11:28:52
 Sample Type : unknown
 Analyst : System Administrator
 Processor : System Administrator



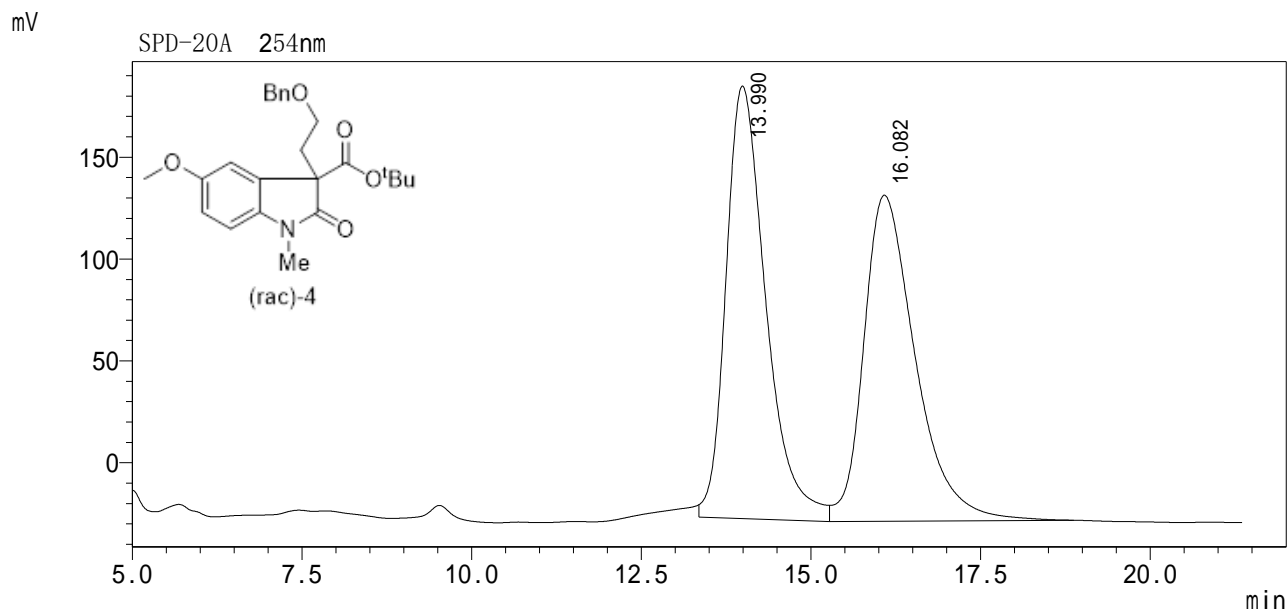
SPD-20A

Entry	RT [min]	Area	Height	Area%
1	8.389	470420	9679	2.341
2	10.441	19620943	319508	97.659
Sum		20091363	329187	

SHIMADZU LabSolutions HPLC Report

< Sample information >

Sample name : dzjd012-bianyanglianRAC-OD-5%
 Data name : 4--dzjd012-bianyanglianRAC-OD-5%.lcd
 Acq. Method : OD-H-5%.lcm
 Location : 1-1
 Sample Type : unknown
 : 1 uL
 Ana. Date : 2020/9/25 10:33:41
 Analyst : System Administrator
 Pro. Date : 2020/9/25 11:28:42
 Processor : System Administrator



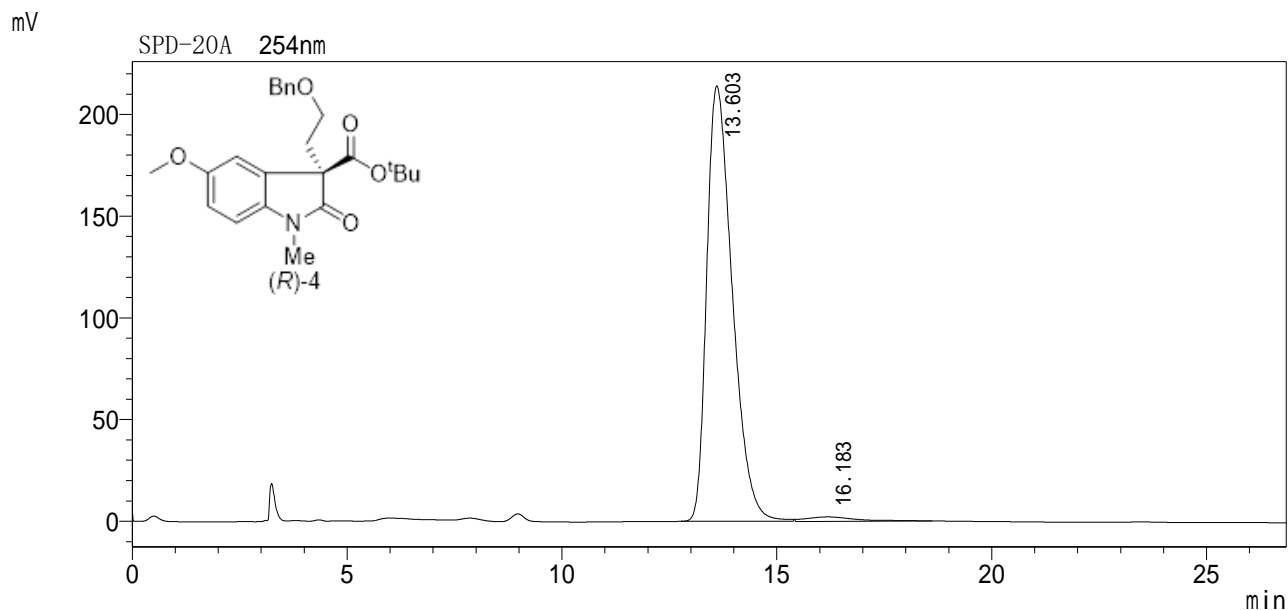
SPD-20A

Entry	RT[min]	Area	Height	Area%			
1	13.990	8703642	212299	50.707			
2	16.082	8460909	160079	49.293			
Sum		17164551	372377				

SHIMADZU LabSolutions HPLC Report

< Sample information >

Sample name : dzjd012-bianyanglianCHIRAL-OD-5%
 Data name : 4--dzjd012-bianyanglianCHIRAL-OD-5%.lcd
 Acq. Method : OD-H-5%.lcm
 Location : 1-1
 Sample Type : unknown
 : 1 uL
 Ana. Date : 2020/9/28 20:28:19
 Analyst : System Administrator
 Pro. Date : 2020/9/28 22:00:13
 Processor : System Administrator



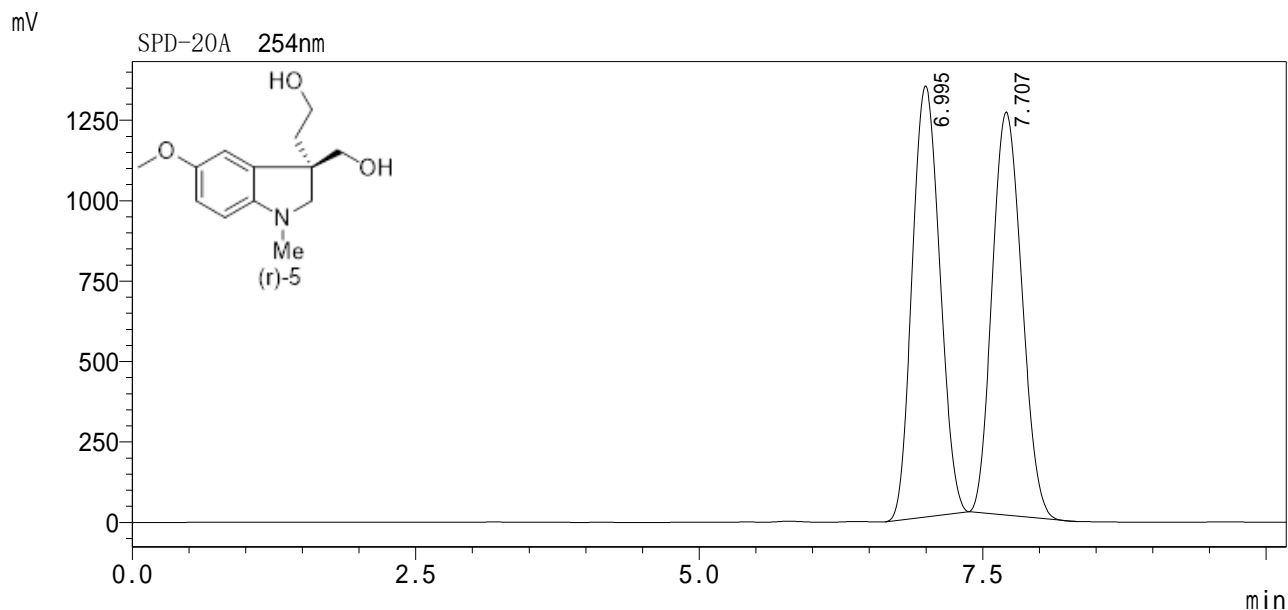
SPD-20A

Entry	RT [min]	Area	Height	Area%
1	13.603	8850808	214016	98.063
2	16.183	174838	2190	1.937
Sum		9025646	216206	

SHIMADZU LabSolutions HPLC Report

< Sample information >

Sample name : dzjd021-3-erchunRAC-AS-25%
 Data name : 5--dzjd021-3-erchunRAC-AS-25%.lcd
 Acq. Method : AS-H-25%.lcm
 Location : 1-1
 Sample Type : unknown
 : 1 uL
 Ana. Date : 2020/10/12 9:21:57
 Analyst : System Administrator
 Pro. Date : 2020/10/12 9:32:55
 Processor : System Administrator



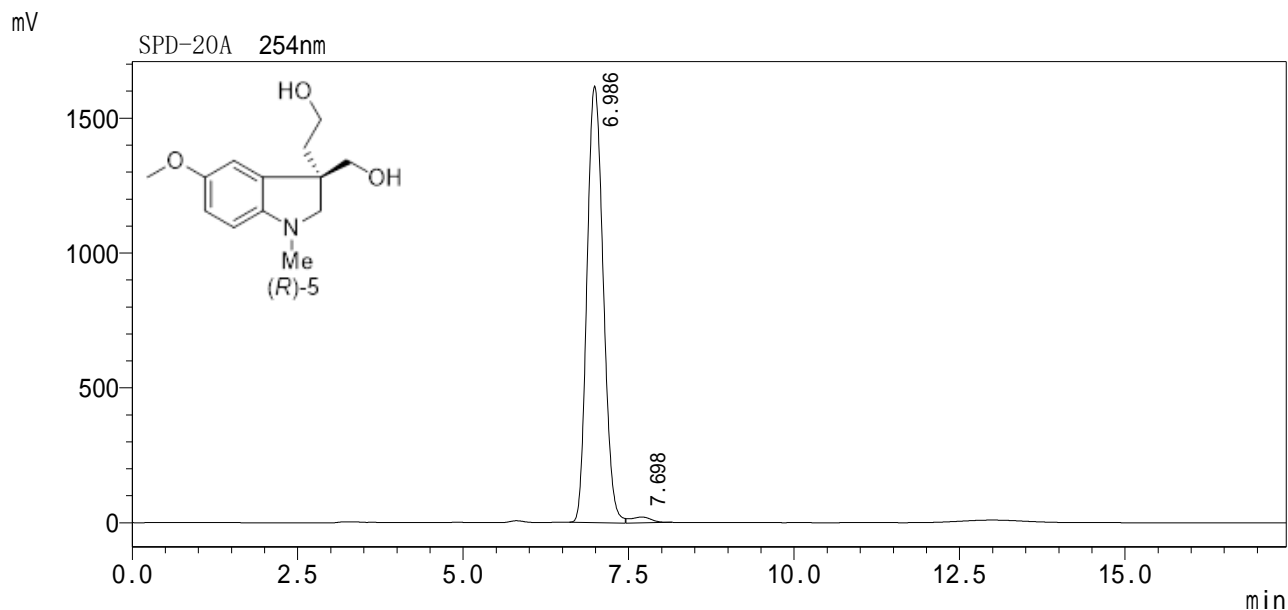
SPD-20A

Entry	RT [min]	Area	Height	Area%
1	6.995	22738055	1339587	49.985
2	7.707	22751624	1252787	50.015
Sum		45489679	2592374	

SHIMADZU LabSolutions HPLC Report

< Sample information >

Sample name : dzjd021-3-erchunCHIRAL-AS-25%
 Data name : 5--dzjd021-3-erchunCHIRAL-AS-25%.lcd
 Acq. Method : AS-H-25%.lcm
 Location : 1-1
 Sample Type : unknown
 : 1 uL
 Ana. Date : 2020/10/12 9:38:19
 Analyst : System Administrator
 Pro. Date : 2020/10/12 9:57:13
 Processor : System Administrator



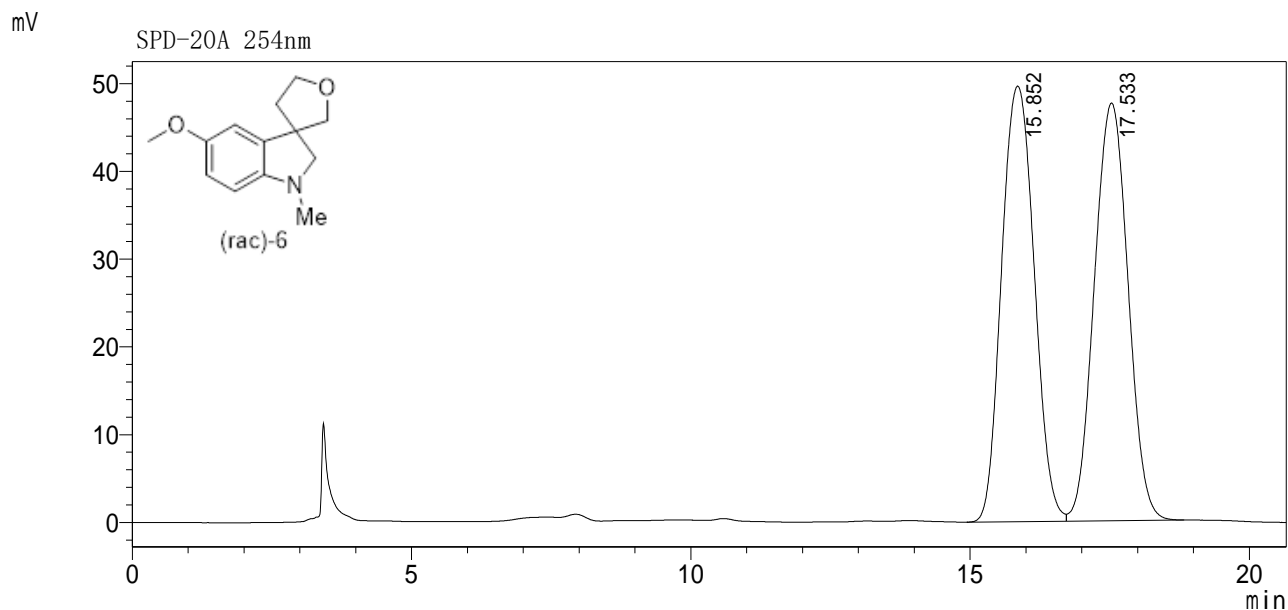
SPD-20A

Entry	RT [min]	Area	Height	Area%
1	6.986	27601443	1618792	98.291
2	7.698	480001	21797	1.709
Sum		28081443	1640589	

SHIMADZU LabSolutions HPLC Report

< Sample information >

Sample name : DZJD-guanyanghuanRAC-OD-1%
 Data name : 6--DZJD-guanyanghuanRAC-OD-1%.lcd
 Acq. Method : OD-H-1%.lcm
 Location : 1-1
 : 1 uL
 Ana. Date : 2020/10/21 11:07:54
 Pro. Date : 2020/10/21 11:30:26
 Sample Type : unknown
 Analyst : System Administrator
 Processor : System Administrator



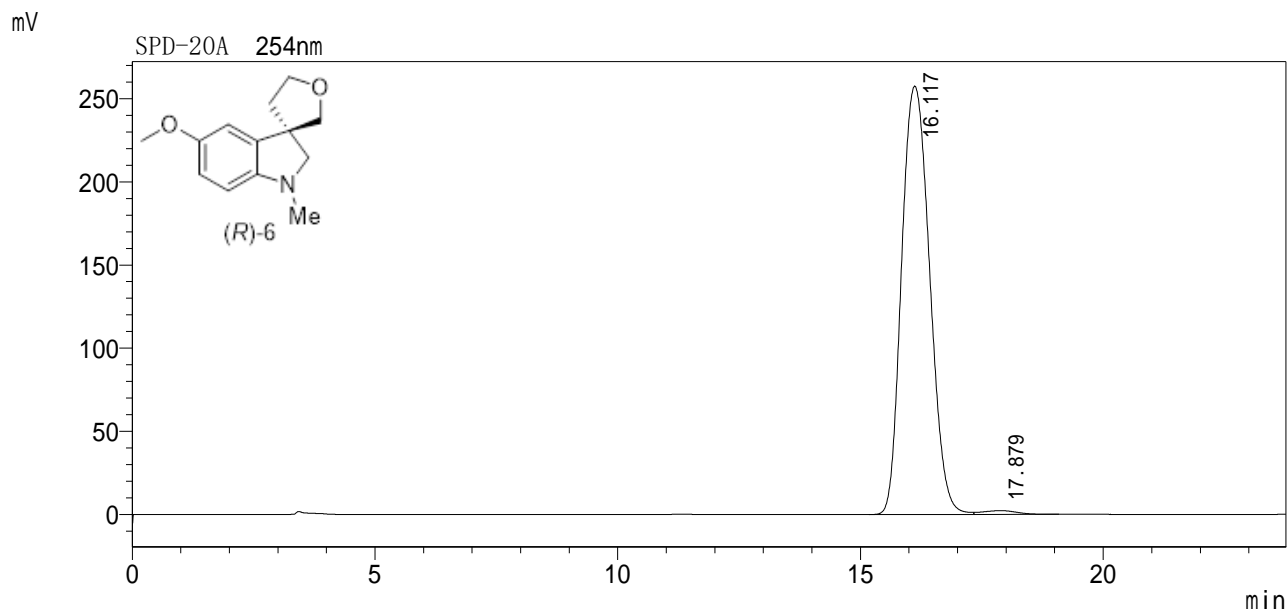
SPD-20A

Entry	RT[min]	Area	Height	Area%
1	15.852	2020462	49637	50.248
2	17.533	2000494	47598	49.752
Sum		4020956	97235	

SHIMADZU LabSolutions HPLC Report

< Sample information >

Sample name : DZJD-guanyanghuanCHIRAL-OD-1%
 Data name : 6--DZJD-guanyanghuanCHIRALOD-1%.lcd
 Acq. Method : OD-H-1%.lcm
 Location : 1-1
 : 1 uL
 Ana. Date : 2020/10/21 10:42:00
 Pro. Date : 2020/10/21 11:29:32
 Sample Type : unknown
 Analyst : System Administrator
 Processor : System Administrator



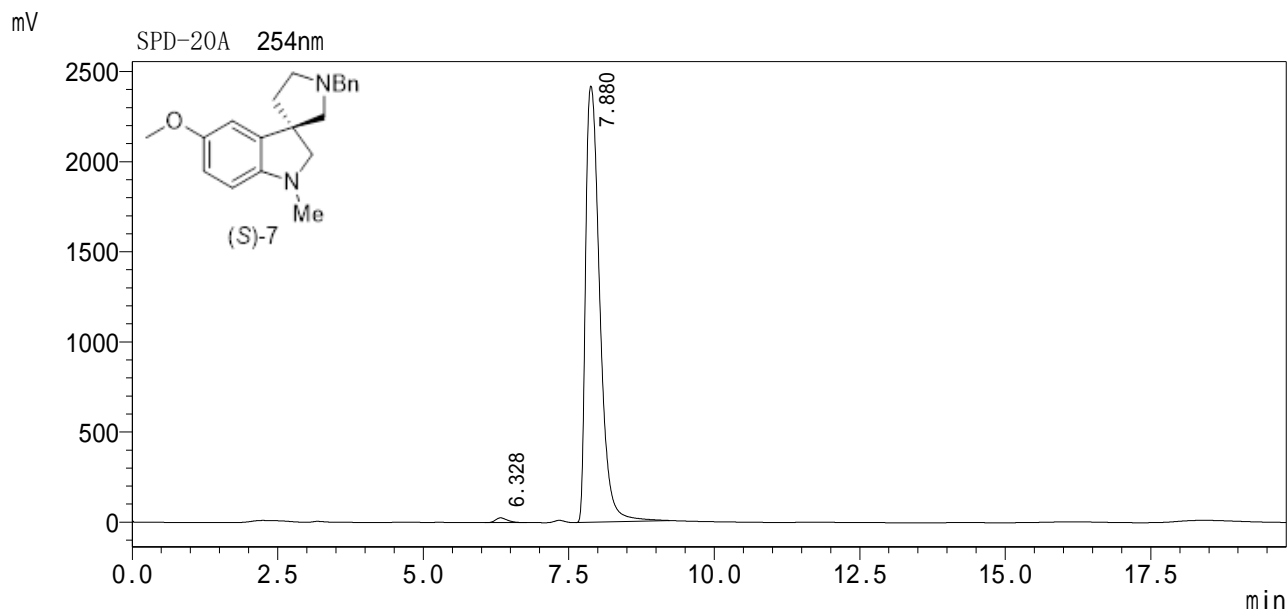
SPD-20A

Entry	RT [min]	Area	Height	Area%
1	16.117	10345239	257634	98.957
2	17.879	109044	2230	1.043
Sum		10454283	259864	

SHIMADZU LabSolutions HPLC Report

< Sample information >

Sample name : DK-1047-2-OD-H-10%
 Data name : DK-1047-2-OD-H-10%.lcd
 Acq. Method : OD-H-10%.lcm
 Location : 1-1
 : 1 uL
 Ana. Date : 2020/11/29 22:28:32
 Pro. Date : 2020/11/29 22:49:21
 Sample Type : unknown
 Analyst : System Administrator
 Processor : System Administrator



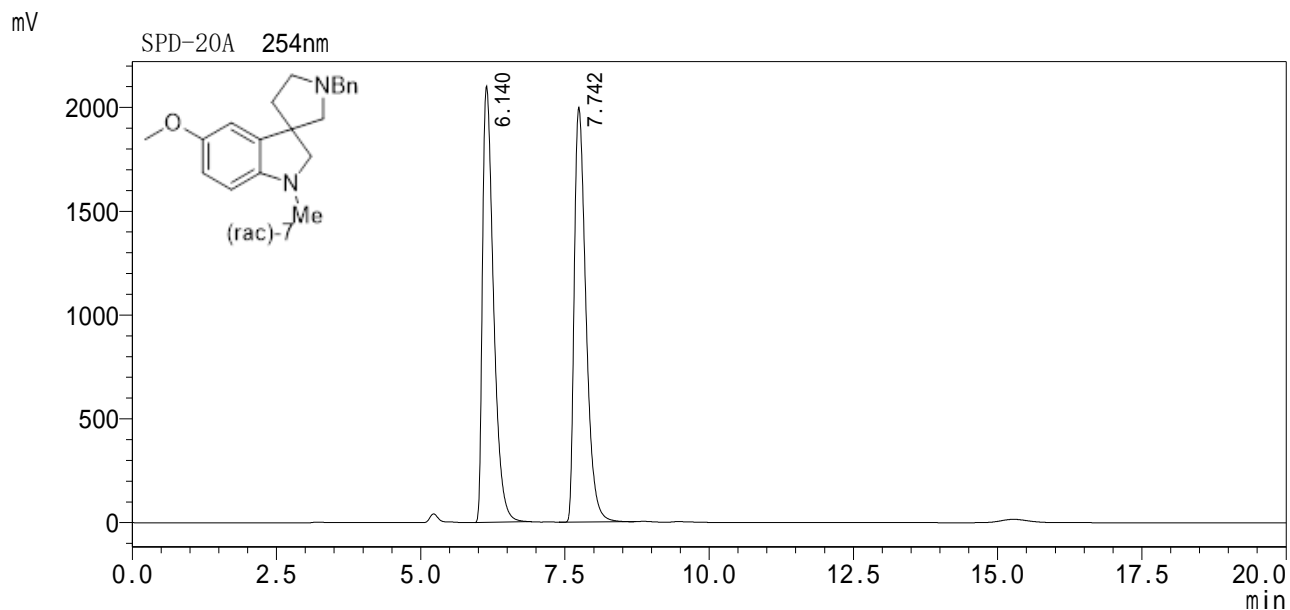
SPD-20A

Entry	RT[min]	Area	Height	Area%			
1	6.328	374354	26468	0.907			
2	7.880	40903836	2420330	99.093			
Sum		41278190	2446798				

SHIMADZU
LabSolutions HPLC Report

<Sample information>

Sample name : DK-1039-OD-H-10%
 Data name : DK-1039-OD-H-10%.lcd
 Acq. method : OD-H-10%.lcm
 Location : 1-1
 : 1 uL
 Ana. Date : 2020/11/29 15:38:58
 Pro. Date : 2020/11/29 16:08:14
 Sample Type : unknown
 Analyst : System Administrator
 Processor : System Administrator



SPD-20A

Entry	RT[min]	Area	Height	Area%
1	6.140	28043430	2101263	49.854
2	7.742	28207640	1996963	50.146
Sum		56251070	4098227	