Supporting Information

Catalytic Atroposelective Electrophilic Amination of Diaryl Anilines and Diaryl Phenols for the Synthesis of Axially Chiral Diaryl Compounds

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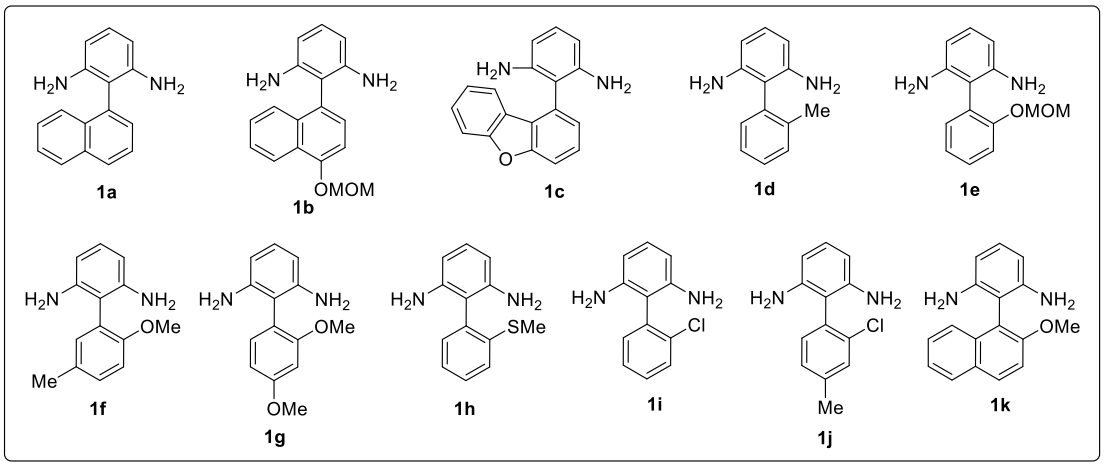
I. General Information

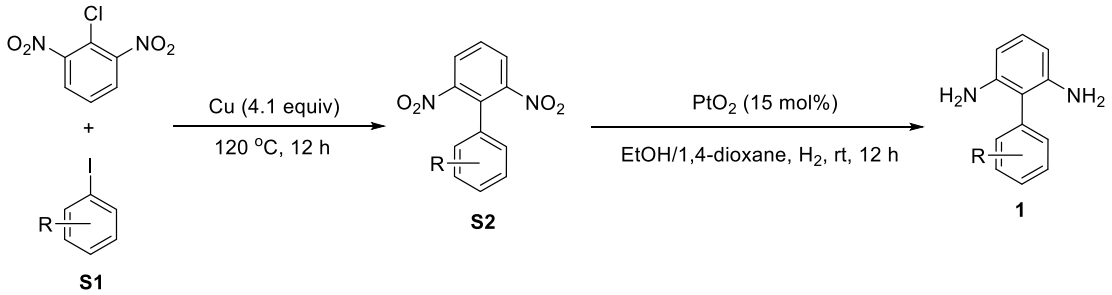
Flash column chromatography was performed over silica gel (200-300 mesh) purchased from Qindao Puke Co. Lit., China. All air or moisture sensitive reactions were conducted in oven-dried glassware under nitrogen atmosphere using anhydrous solvents. Anhydrous toluene, acetonitrile, dichloromethane, chloroform, methanol, and tetrahydrofuran were purified by the Innovative® solvent purification system. Other anhydrous solvents were purchased from J&K Scientific. ^{1}H, ^{13}C, and ^{19}F NMR spectra were collected on a Bruker AV 400 or AV 300 MHz NMR spectrometer using residue solvent peaks as an internal standard (^{1}H NMR: $CDCl_3$ at 7.26 ppm, DMSO-d_6 at 2.50 ppm, Acetone-d_6 at 2.05 ppm; ^{13}C NMR: $CDCl_3$ at 77.0 ppm, DMSO-d_6 at 39.5 ppm, Acetone-d_6 at 206.26 ppm). HRMS spectra were performed on a Waters mass spectrometer.

II. Preparation of Substrates

The structures of substrates **1a-1k** were synthesized according to the following procedure, in which **1b, 1d, 1f, 1g, 1j, 1k** are unknown compounds.



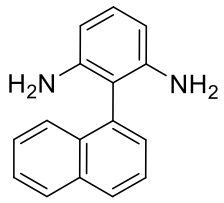
General Procedure A: Preparation of the diaryl anilines 1.[1]



To a 50 mL round-bottomed flask equipped with a stir, **S1** (6.0 mmol, 1.2 equiv), 2-chloro-1,3-dinitrobenzene (1.19 g, 5.0 mmol, 1.0 equiv.) and Cu (1.30 g, 16.4 mmol, 4.1 equiv.) were added, and the mixture was stirred at 120 °C (oil bath) overnight. Then mixture was filtered over celite with DCM. The residue was purified by silica gel column chromatography to afford **S2**.

[1] Zhang, X. Y.; Zhu, D.; Huo, Y. X.; Chen, L. L.; Chen, Z. M. Atroposelective Sulfenylation of Biaryl Anilines Catalyzed by Chiral SPINOL-Derived Selenide. *Org. Lett.* **2023**, *25*, 3445-3450.

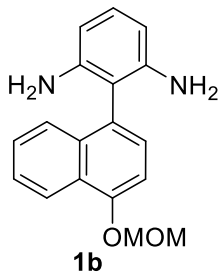
Under N_2 atmosphere at room temperature, to solution of **S2** (1.0 equiv) and PtO_2 (0.15 equiv) in 2:1 mixture of EtOH and 1,4-dioxane (15 mL). Then the reaction mixture was stirred at room temperature for 12 h. The catalyst was removed by filtration over Celite and the residue was purified by silica gel column chromatography to afford **1**.



1a

2-(Naphthalen-1-yl)benzene-1,3-diamine (1a) was prepared according to the General Procedure A as a brownish solid (chromatography eluent: petroleum ether/dichloromethane/acetone = 15:4:1) in 98% yield (196.2 mg).

^{1}H NMR (400 MHz, $CDCl_3$) δ 7.93 (m, 2H), 7.68 (d, J = 8.4 Hz, 1H), 7.60 (t, J = 7.0 Hz, 1H), 7.54-7.50 (m, 2H), 7.40-7.42 (m, 1H), 7.07 (t, J = 8.0 Hz, 1H), 6.31 (d, J = 8.0 Hz, 2H), 3.07 (brs, 4H) ppm.



1b

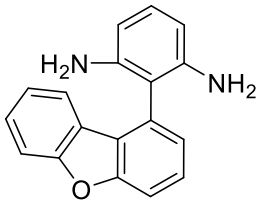
2-(4-(Methoxymethoxy)naphthalen-1-yl)benzene-1,3-diamine (1b) was prepared according to the General Procedure A as a brownish solid (chromatography eluent: petroleum ether/dichloromethane/acetone = 15:4:1) in

99% yield (201.2 mg).

^{1}H NMR (400 MHz, $CDCl_3$) δ 8.37 (d, J = 8.2 Hz, 1H), 7.63 (d, J = 8.3 Hz, 1H), 7.55-7.51 (m, 1H), 7.48-7.44 (m, 1H), 7.41 (d, J = 7.8 Hz, 1H), 7.21 (d, J = 7.8 Hz, 1H), 7.06 (t, J = 7.9 Hz, 1H), 6.29 (d, J = 8.0 Hz, 2H), 5.46 (s, 2H), 3.60 (s, 3H), 3.34 (brs, 4H) ppm.

^{13}C NMR (100 MHz, $CDCl_3$) δ 152.9, 145.7 (2C), 132.8, 129.0, 128.8, 127.0, 126.6, 125.8, 125.2, 122.3, 111.4, 108.4, 105.5, 94.5, 56.3 ppm.

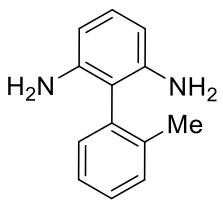
HRMS (ES+) Calcd for $C_{18}H_{19}N_2O_2$ $[M+H]^+$: 295. 1447, Found: 295.1444.



1c

2-(Dibenzo[*b*,*d*]furan-1-yl)benzene-1,3-diamine (1c) was prepared according to the General Procedure A as a brownish solid (chromatography eluent: petroleum ether/dichloromethane/acetone = 15:4:1) in 92% yield (348.1 mg).

^{1}H NMR (400 MHz, $CDCl_3$) δ 7.62-7.54 (m, 3H), 7.42-7.38 (m, 1H), 7.32-7.30 (m, 1H), 7.27-7.24 (m, 1H), 7.18-7.14 (m, 1H), 7.09 (t, J = 8.0 Hz, 1H), 6.31 (d, J = 8.0 Hz, 2H), 3.32 (brs, 4H) ppm.



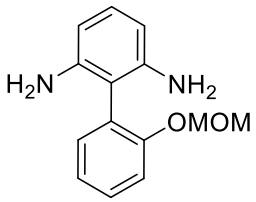
1d

2'-Methyl-[1,1'-biphenyl]-2,6-diamine (1d) was prepared according to the General Procedure A as a brownish solid (chromatography eluent: petroleum ether/dichloromethane = 1:1) in 85% yield (593.3 mg).

^{1}H NMR (400 MHz, $CDCl_3$) δ 7.36-7.20 (m, 4H), 6.97 (t, J = 7.9 Hz, 1H), 6.22 (d, J = 7.9 Hz, 2H), 3.25 (s, 4H), 2.16 (s, 3H) ppm.

^{13}C NMR (100 MHz, $CDCl_3$) δ 144.5, 138.4, 134.5, 130.9, 130.7, 128.7, 128.2, 127.0, 113.2, 105.4, 19.1 ppm.

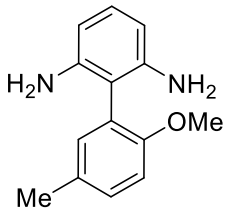
HRMS (ES+) Calcd for $C_{13}H_{15}N_2$ $[M+H]^+$: 199.1235, Found: 199.1232.



1e

2'-(Methoxymethoxy)-[1,1'-biphenyl]-2,6-diamine (1e) was prepared according to the General Procedure A as a brownish solid (chromatography eluent: petroleum ether/ethyl acetate = 5:1) in 85% yield (995.5 mg).

^{1}H NMR (400 MHz, $CDCl_3$) δ 7.34-7.30 (m, 1H), 7.23-7.19 (m, 2H), 7.10 (t, J = 7.4 Hz, 1H), 6.90 (t, J = 7.9 Hz, 1H), 6.14 (d, J = 7.9 Hz, 2H), 5.03 (s, 2H), 3.36 (s, 4H), 3.31 (s, 3H) ppm.



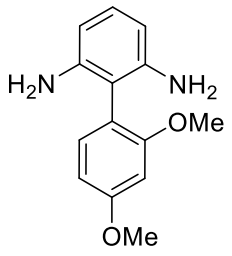
1f

2'-Methoxy-5'-methyl-[1,1'-biphenyl]-2,6-diamine (1f) was prepared according to the General Procedure A as a brownish solid (chromatography eluent: petroleum ether/ethyl acetate = 3:1) in 95% yield (500.1 mg).

^{1}H NMR (400 MHz, $CDCl_3$) δ 7.19-7.17 (m, 1H), 7.08 (d, J = 1.4 Hz, 1H), 6.99-6.94 (m, 2H), 6.25 (d, J = 7.9 Hz, 2H), 3.77 (s, 3H), 3.37 (brs, 4H), 2.30 (s, 3H) ppm.

^{13}C NMR (100 MHz, $CDCl_3$) δ 155.3, 144.9, 132.8, 130.9, 129.9, 128.7, 123.3, 111.9, 110.9, 105.8, 55.9, 20.4 ppm.

HRMS (ES+) Calcd for $C_{14}H_{17}N_2O$ $[M+H]^+$: 229.1341, Found: 229.1331.



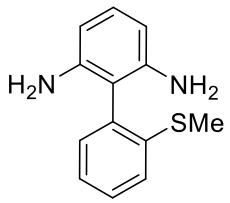
1g

2',4'-Dimethoxy-[1,1'-biphenyl]-2,6-diamine (1g) was prepared according to the General Procedure A as a brownish solid (chromatography eluent: petroleum ether/ethyl acetate = 2:1) in 83% yield (530.2 mg).

^{1}H NMR (400 MHz, $CDCl_3$) δ 7.18 (m, 1H), 6.96 (t, J = 7.9 Hz, 1H), 6.65-6.62 (m, 2H), 6.23 (t, J = 7.9 Hz, 2H), 3.87 (s, 3H), 3.77 (s, 3H), 3.40 (brs, 4H) ppm.

^{13}C NMR (100 MHz, $CDCl_3$) δ 160.8, 158.5, 145.3, 132.7, 128.6, 115.7, 110.2, 105.6, 105.4, 99.4, 55.6, 55.3 ppm.

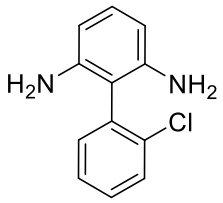
HRMS (ES+) Calcd for $C_{14}H_{17}N_2O_2$ $[M+H]^+$: 245.1290, Found: 245.1285.



1h

2'-(Methylthio)-[1,1'-biphenyl]-2,6-diamine (1h) was prepared according to the General Procedure A as a brownish solid (chromatography eluent: petroleum ether/dichloromethane = 1:1) in 88% yield (627.4 mg).

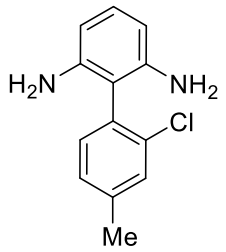
^{1}H NMR (400 MHz, $CDCl_3$) δ 7.41-7.38 (m, 1H), 7.30-7.22 (m, 3H), 7.02 (t, J = 7.9 Hz, 1H), 6.26 (d, J = 8.0 Hz, 2H), 3.26 (brs, 4H), 2.39 (s, 3H) ppm.



1i

2'-Chloro-[1,1'-biphenyl]-2,6-diamine (1i) was prepared according to the General Procedure A as a brownish solid (chromatography eluent: petroleum ether/ethyl acetate = 4:1) in 88% yield (156 mg).

^{1}H NMR (400 MHz, $CDCl_3$) δ 7.59-7.57 (m, 1H), 7.43-7.34 (m, 3H), 7.02 (t, J = 8.0 Hz, 1H), 6.29 (d, J = 7.9 Hz, 2H), 3.36 (brs, 4H) ppm.



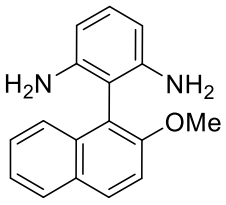
1j

2'-Chloro-4'-methyl-[1,1'-biphenyl]-2,6-diamine (1j) was prepared according to the General Procedure A as a brownish solid (chromatography eluent: petroleum ether/ethyl acetate = 4:1) in 90% yield (501.1 mg).

^{1}H NMR (400 MHz, $CDCl_3$) δ 7.39 (s, 1H), 7.25-7.18 (m, 2H), 6.99 (t, J = 7.9 Hz, 1H), 6.24 (t, J = 7.9 Hz, 2H), 3.31 (brs, 4H), 2.39 (s, 3H) ppm.

^{13}C NMR (100 MHz, $CDCl_3$) δ 144.8, 139.9, 134.8, 132.4, 130.9, 130.8, 129.4, 129.0, 111.5, 105.6, 20.9 ppm.

HRMS (ES+) Calcd for $C_{13}H_{14}ClN_2$ $[M + H]^+$: 233.0846, Found: 233.0843.



1k

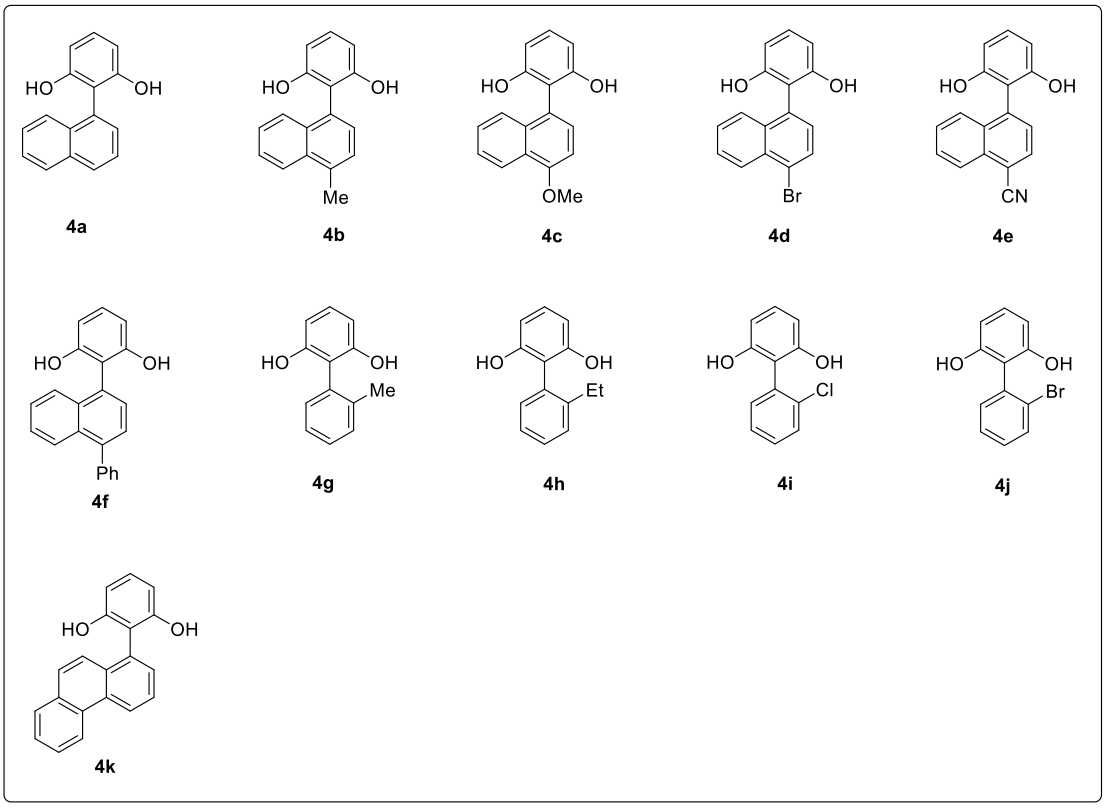
2-(2-Methoxynaphthalen-1-yl)benzene-1,3-diamine (1k) was prepared according to the General Procedure A as a brownish solid (chromatography eluent: petroleum ether/ethyl acetate/acetone = 15:4:1) in 81% yield (119.5 mg).

^{1}H NMR (400 MHz, $CDCl_3$) δ 7.94 (d, J = 9.0 Hz, 1H), 7.86-7.84 (m, 1H), 7.52-7.49 (m, 1H), 7.44-7.35 (m, 3H), 7.08 (t, J = 7.9 Hz, 1H), 6.32 (d, J = 7.9 Hz, 2H), 3.91 (s, 3H), 3.15 (brs, 4H) ppm.

^{13}C NMR (100 MHz, $CDCl_3$) δ 155.3, 145.5, 133.0, 130.2, 129.6, 129.2, 128.1, 127.2, 124.4, 124.1, 116.9, 114.1, 107.8, 105.7, 56.8 ppm.

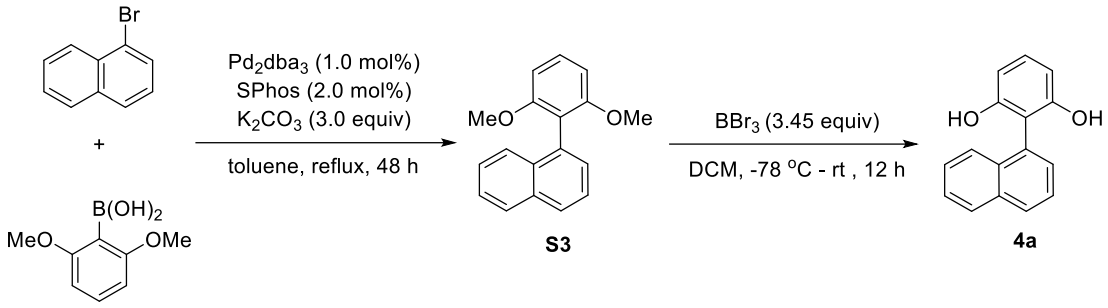
HRMS (ES+) Calcd for $C_{17}H_{17}N_2O$ $[M+H]^+$: 265.1341, Found: 265.1332.

The structures of substrates **4a-4k** were synthesized according to the following procedure and they are all known compounds.



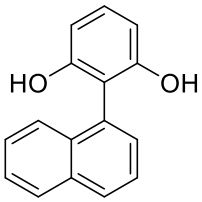
General Procedure B: Preparation of the diaryl phenols 4a[2].

[2] (a) Munday, E. S.; Grove, M. A.; Feoktistova, T.; Brueckner, A. C.; Walden, D. M.; Young, C. M.; Smith, A. D. Isothiourea-Catalyzed Atropselective Acylation of Biaryl Phenols via Sequential Desymmetrization/Kinetic Resolution. *Angew. Chem. Int. Ed.* **2020**, *59*, 7897-7905. (b) Luo, H. Y.; Li, Z. H.; Zhu, D.; Yang, Q.; Cao, R. F.; Ding, T. M.; Chen, Z. M. Chiral Selenide/Achiral Sulfonic Acid Cocatalyzed Atroposelective Sulfenylation of Biaryl Phenols *via* a Desymmetrization/Kinetic Resolution Sequence. *J. Am. Chem. Soc.* **2022**, *144*, 2943-2952.



Under N_2 atmosphere at room temperature, to solution of 2,6-dimethoxyphenyl)boronic acid (1.85 g, 12.0 mmol, 2.0 equiv), 1-bromonaphthalene (1.24 g, 6.0 mmol, 1.0 equiv) and K_2CO_3 (2.49 g, 18.0 mmol, 3.0 equiv) in degassed toluene (100 mL) was added $Pd_2(dba)_3$ (54.9 mg, 1.0 mol%), and SPhos (49.3 mg, 2.0 mol%). The reaction mixture was stirred at reflux for 48 h, then the reaction mixture was filtered through celite, diluted with EA (100 mL) and washed with brine. The combined organic layers dried over anhydrous Na_2SO_4, and concentrated under reduced pressure. The residue was purified by silica gel column chromatography (petroleum ether/ethyl acetate = 100:1) to afford **S3.**

To solution of **S3** (897.6 mg, 3.4 mmol, 1.0 equiv) in DCM (20 mL) was added dropwise Boron tribromide (3.45 equiv, 1.0 M in DCM, 11.7 mL) at -78 ^oC. Then the reaction mixture was stirred at room temperature for 12 h. The reaction mixture was quenched with H_2O (20 mL) and extracted with EA (30 mL × 3). The combined organic layers were washed with water, brine, dried over anhydrous Na_2SO_4, and concentrated under reduced pressure. The residue was purified by silica gel column chromatography (petroleum ether/ethyl acetate = 10:1) to afford **4a**.

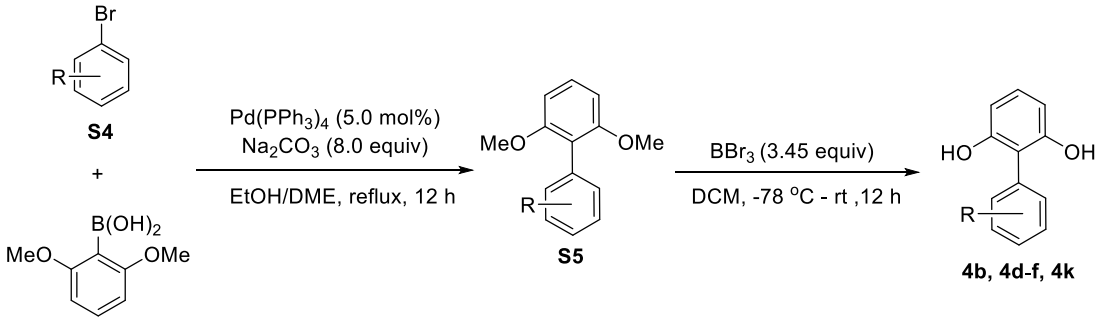


4a

2-(Naphthalen-1-yl)benzene-1,3-diol (4a) was prepared according to the General Procedure B as a white solid (chromatography eluent: petroleum ether/ethyl acetate = 10:1) in 91% yield (720.1 mg).

^{1}H NMR (400 MHz, $CDCl_3$) δ 7.91 (t, J = 8.5 Hz, 2H), 7.60-7.43 (m, 5H), 7.24-7.20 (m, 1H), 6.62 (d, J = 8.2 Hz, 2H), 4.72 (s, 2H) ppm.

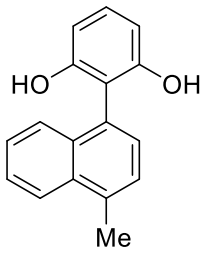
General Procedure C: Preparation of the diaryl phenols 4b, 4d-f, 4k



Under N_2 atmosphere at room temperature, to solution of 2,6-dimethoxyphenyl)boronic acid (1.85 g, 12.0 mmol, 2.0 equiv), aryl bromides **S4** (6.0 mmol, 1.0 equiv) and Na_2CO_3 (5.1 g, 48.0 mmol, 8.0 equiv) in EtOH/DME (35 mL, v/v = 4/3) was added $Pd(PPh_3)_4$ (346.7 mg, 5.0 mol%). The reaction mixture was stirred at reflux for 12 hours, then the reaction mixture was filtered through celite, diluted with EA (50 mL) and washed with brine. The combined organic layers dried over anhydrous Na_2SO_4, and concentrated under reduced pressure. The residue was purified by silica gel column chromatography

(petroleum ether/ethyl acetate = 100:1) to afford **S5.**

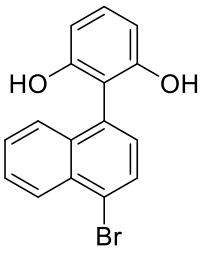
To solution of **S5** (1.0 equiv) in DCM (20 mL) was added dropwise Boron tribromide (3.45 equiv, 1.0 M in DCM) at -78 °C. Then the reaction mixture was stirred at room temperature for 12 h. The reaction mixture was quenched with H_2O (20 mL) and extracted with EA (30 mL × 3). The combined organic layers were washed with water, brine, dried over anhydrous Na_2SO_4, and concentrated under reduced pressure. The residue was purified by silica gel column chromatography (petroleum ether/ethyl acetate = 25:1) to afford **4b, 4d-f** and **4k**.



4b

2-(4-Methylnaphthalen-1-yl)benzene-1,3-diol (4b) was prepared according to the General Procedure C as a white solid (chromatography eluent: petroleum ether/ethyl acetate = 20:1) in 72% yield (580.3 mg).

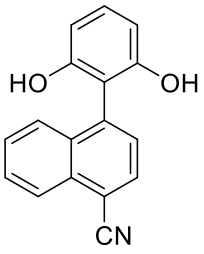
^{1}H NMR (300 MHz, $CDCl_3$) δ 8.11 (d, J = 8.4 Hz, 1H), 7.65-7.58 (m, 2H), 7.52-7.44 (m, 3H), 7.26 (t, J = 7.4 Hz, 1H), 6.66 (d, J = 8.2 Hz, 2H), 2.79 (s, 3H) ppm.



4d

2-(4-Bromonaphthalen-1-yl)benzene-1,3-diol (4d) was prepared according to the General Procedure C as a white solid (chromatography eluent: petroleum ether/ethyl acetate = 20:1) in 52% yield (288.1 mg).

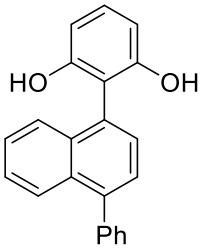
^{1}H NMR (400 MHz, $CDCl_3$) δ 8.37 (d, J = 8.4 Hz, 1H), 7.94 (d, J = 7.6 Hz, 1H), 7.70-7.62 (m, 2H), 7.56-7.52 (m, 1H), 7.40 (d, J = 7.5 Hz, 1H), 7.28-7.24 (m, 1H), 6.65 (d, J = 8.2 Hz, 2H), 4.61 (s, 2H) ppm.



4e

4-(2,6-Dihydroxyphenyl)-1-naphthonitrile (4e) was prepared according to the General Procedure C as a white solid (chromatography eluent: petroleum ether/ethyl acetate = 20:1) in 42% yield (121.5 mg).

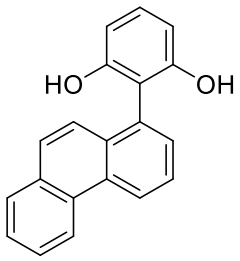
^{1}H NMR (400 MHz, CH_3OD) δ 8.10 (d, J = 8.3 Hz, 1H), 7.92 (d, J = 7.4 Hz, 1H), 7.61-7.57 (m, 2H), 7.44-7.37 (m, 2H), 7.01 (t, J = 8.2 Hz, 1H), 6.38 (d, J = 8.2 Hz, 2H) ppm.



4f

2-(4-Phenylnaphthalen-1-yl)benzene-1,3-diol (4f) was prepared according to the General Procedure C as a white solid (chromatography eluent: petroleum ether/ethyl acetate = 10:1) in 85% yield (721.3 mg).

^{1}H NMR (300 MHz, $CHCl_3$) δ 8.00-7.97 (m, 1H), 7.70-7.65 (m, 1H), 7.58-7.44 (m, 9H), 7.28-7.22 (m, 1H), 6.66 (d, J = 10.9 Hz, 2H), 4.87 (s, 2H) ppm.

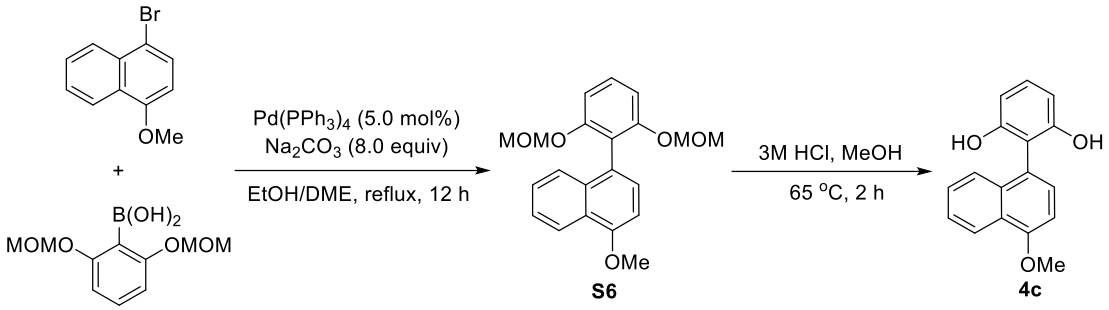


4k

2-(Phenanthren-1-yl)benzene-1,3-diol (4k) was prepared according to the General Procedure C as a white solid (chromatography eluent: petroleum ether/ethyl acetate = 20:1) in 84% yield (276.8 mg).

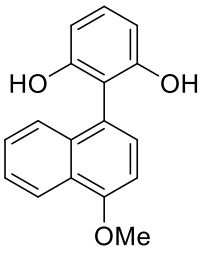
^{1}H NMR (400 MHz, $CHCl_3$) δ 8.81-8.75 (m, 1H), 7.93-7.86 (m, 2H), 7.78-7.65 (m, 4H), 7.60-7.56 (m, 1H), 6.69 (d, J = 8.2 Hz, 2H), 4.80 (s, 2H) ppm.

General Procedure D: Preparation of the diaryl phenols 4c



Under N_2 atmosphere at room temperature, to solution of (2,6-bis(methoxymethoxy)phenyl)boronic acid (2.91 g, 12.0 mmol, 2.0 equiv), 1-bromo-4-methoxynaphthalene (1.42 g, 6.0 mmol, 1.0 equiv) and Na_2CO_3 (5.09 g, 48.0 mmol, 8.0 equiv) in EtOH/DME (35 mL, *v*/*v* = 4/3) was added $Pd(PPh_3)_4$ (346.7 mg, 5.0 mol%). The reaction mixture was stirred at reflux for 12 h, then the reaction mixture was filtered through celite, diluted with EA (50 mL) and washed with brine. The combined organic layers dried over anhydrous Na_2SO_4, and concentrated under reduced pressure. The residue was purified by silica gel column chromatography (petroleum ether/ethyl acetate = 100:1) to afford **S6.**

To solution of **S6** (1.27 g, 3.6 mmol) in MeOH (20 mL) was added dropwise 3M HCl (1.0 mL) at room temperature. Then the reaction mixture was stirred at 65 °C for 2 h. The reaction mixture was quenched with $NaHCO_3$ solution (20 mL) and extracted with EA (30 mL × 3). The combined organic layers were washed with water, brine, dried over anhydrous Na_2SO_4, and concentrated under reduced pressure. The residue was purified by silica gel column chromatography (petroleum ether/ethyl acetate = 20:1) to afford **4c.**

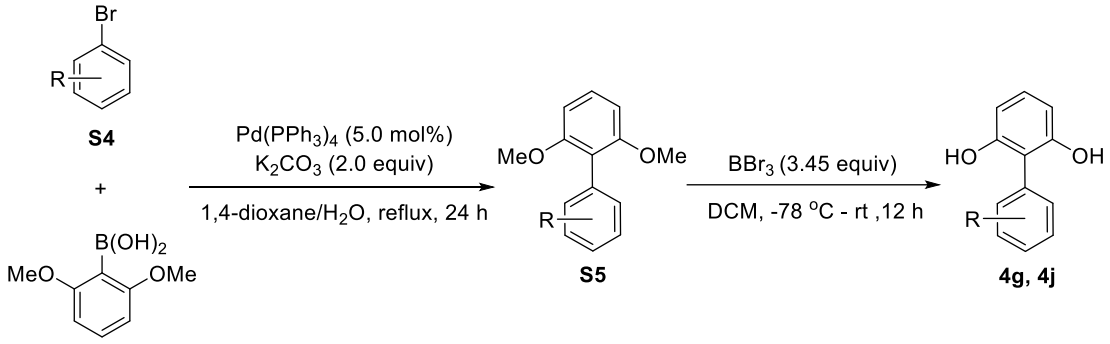


4c

2-(4-Methoxynaphthalen-1-yl)benzene-1,3-diol (4c) was prepared according to the General Procedure D as a white solid (chromatography eluent: petroleum ether/ethyl acetate = 20:1) in 92% yield (880.3 mg).

^{1}H NMR (400 MHz, $CDCl_3$) δ 8.36-8.34 (m 1H), 7.56-7.45 (m, 4H), 7.26-7.22 (m, 1H), 6.94 (d, J = 7.8 Hz, 1H), 6.65 (d, J = 8.2 Hz, 2H), 4.79 (s, 2H), 4.06 (s, 3H) ppm.

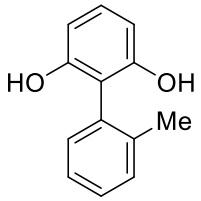
General Procedure E: Preparation of the diaryl phenols 4g and **4j**



Under N_2 atmosphere at room temperature, to solution of 2,6-dimethoxyphenyl)boronic acid (1.85 g, 12.0 mmol, 2.0 equiv), aryl bromides **S4** (6.0 mmol, 1.0 equiv) and K_2CO_3 (1.66 g, 12.0 mmol, 2.0 equiv) in 1,4-dioxane/H_2O (45 mL, v/v = 8/1) was added $Pd(PPh_3)_4$ (346.7 mg, 5.0 mol%). The reaction mixture was stirred at reflux for 24 h, then the reaction mixture was filtered through celite, diluted with EA (50 mL) and washed with brine. The combined organic layers dried over anhydrous Na_2SO_4, and concentrated

under reduced pressure. The residue was purified by silica gel column chromatography (petroleum ether/ethyl acetate = 100:1) to afford **S5.**

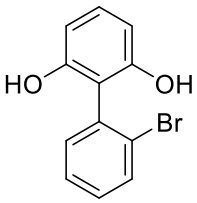
To solution of **S5** (1.0 equiv) in DCM (20 mL) was added dropwise Boron tribromide (3.45 equiv, 1.0 M in DCM) at -78 °C. Then the reaction mixture was stirred at room temperature for 12 h. The reaction mixture was quenched with H_2O (20 mL) and extracted with EA (30 mL × 3). The combined organic layers were washed with water, brine, dried over anhydrous Na_2SO_4, and concentrated under reduced pressure. The residue was purified by silica gel column chromatography (petroleum ether/ethyl acetate = 10:1) to afford **4g** and **4j.**



4g

2'-Methyl-[1,1'-biphenyl]-2,6-diol (4g) was prepared according to the General Procedure E as a white solid (chromatography eluent: petroleum ether/ethyl acetate = 20:1) in 66% yield (239.5 mg).

^{1}H NMR (400 MHz, $CHCl_3$) δ 7.43-7.34 (m, 3H), 7.29-7.26 (m, 1H), 7.17 (t, J = 8.2 Hz, 1H), 6.59 (d, J = 8.2 Hz, 2H), 4.62 (s, 2H), 2.16 (s, 3H) ppm.

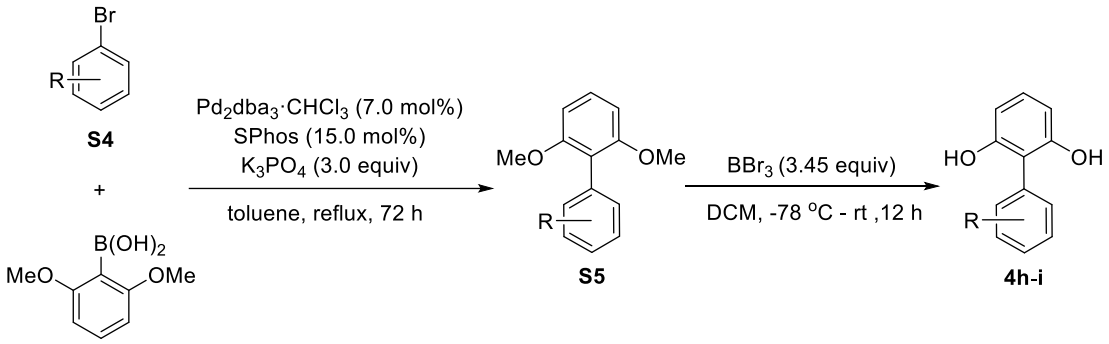


4j

2'-Bromo-[1,1'-biphenyl]-2,6-diol (4j) was prepared according to the General Procedure E as a white solid (chromatography eluent: petroleum ether/ethyl acetate = 20:1) in 42% yield (274.2 mg).

^{1}H NMR (300 MHz, $CHCl_3$) δ 7.80 (d, J = 10.8 Hz, 1H), 7.51-7.46 (m, 1H), 7.39-7.33 (m, 2H), 7.26-7.17 (m, 1H), 6.59 (d, J = 10.9 Hz, 2H), 4.62 (s, 2H) ppm.

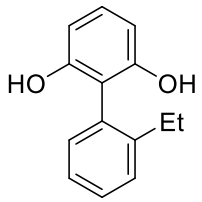
General Procedure F: Preparation of the diaryl phenols 4h-i



Under N_2 atmosphere at room temperature, to solution of 2,6-dimethoxyphenyl)boronic acid (1.85 g, 12.0 mmol, 2.0 equiv), **S4** (6.0 mmol, 1.0 equiv) and K_3PO_4 (3.82 g, 18.0 mmol, 3.0 equiv) in anhydrous toluene (85 mL) was added Pd_2dba_3•$CHCl_3$ (429.7 mg, 7.0 mol%) and SPhos (369.5 mg, 15.0 mol%). The reaction mixture was stirred at reflux for 72 h, then the reaction mixture was filtered through celite, diluted with EA (50 mL) then washed with brine. The combined organic layers dried over anhydrous Na_2SO_4, and

concentrated under reduced pressure. The residue was purified by silica gel column chromatography (petroleum ether/ethyl acetate = 100:1) to afford **S4.**

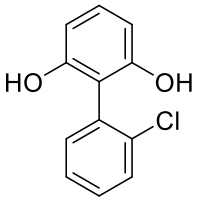
To solution of **S4** (1.0 equiv) in DCM (20 mL) was added dropwise Boron tribromide (3.45 equiv, 1.0 M in DCM) at -78 °C. Then the reaction mixture was stirred at room temperature for 12 h. The reaction mixture was quenched with H_2O (20 mL) and extracted with EA (30 mL × 3). The combined organic layers were washed with water, brine, dried over anhydrous Na_2SO_4, and concentrated under reduced pressure. The residue was purified by silica gel column chromatography (petroleum ether/ethyl acetate = 10:1) to afford **4h-i.**



4h

2'-Ethyl-[1,1'-biphenyl]-2,6-diol (4h) was prepared according to the General Procedure F as a white solid (chromatography eluent: petroleum ether/ethyl acetate = 20:1) in 83% yield (454.5 mg).

^{1}H NMR (400 MHz, $CHCl_3$) δ 7.45-7.40 (m, 2H), 7.37-7.33 (m, 1H), 7.25-7.23 (m, 1H), 7.17 (t, J = 8.2 Hz, 1H), 6.58 (d, J = 8.2 Hz, 2H), 4.62 (s, 2H), 2.46 (7.17 (q, J = 7.6 Hz, 2H), 1.07 (t, J = 7.6 Hz, 3H) ppm.



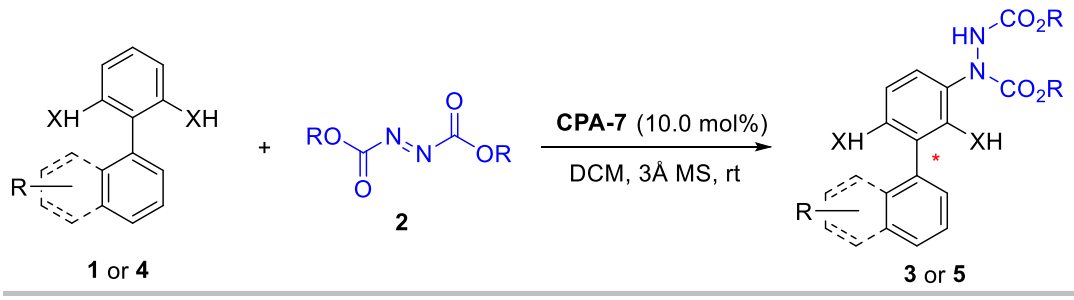
4i

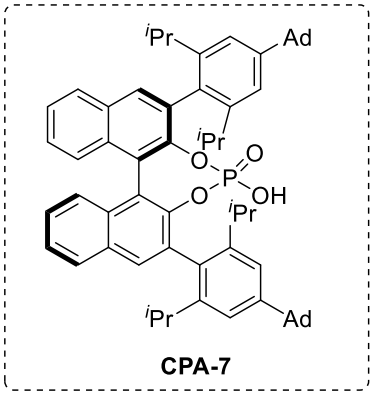
2'-Chloro-[1,1'-biphenyl]-2,6-diol (4i) was prepared according to the General Procedure F as a yellow solid (chromatography eluent: petroleum ether/ethyl acetate = 20:1) in 82% yield (523.5 mg).

^{1}H NMR (400 MHz, $CHCl_3$) δ 7.62-7.58 (m, 1H), 7.45-7.37 (m, 3H), 7.19 (t, J = 8.2 Hz, 1H), 6.59 (d, J = 8.2 Hz, 2H), 4.79 (s, 2H) ppm.

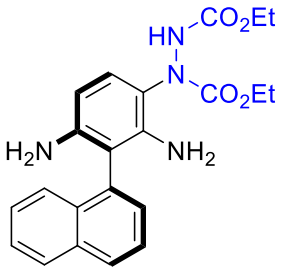
III. **Synthesis of Axially Chiral Diaryl Anilines and Diaryl Phenols**

General Procedure G: The Synthesis of Axially Chiral diaryl Anilines 3 and Diaryl Phenols 5





To a solution of **1** or **4** (0.2 mmol, 1.0 equiv), **2** (0.24 mmol, 1.2 equiv) and 3Å MS (60.0 mg) in anhydrous DCM (4.0 mL) was added **CPA-7** (18.7 mg, 10.0 mol%). Then the reaction mixture was stirred at room temperature for 3h. The reaction mixture was directly concentrated and purified by silica gel column chromatography (petroleum ether/ethyl acetate = 8:1 to 2:1) to afford the desired products **3** or **5**.



3a

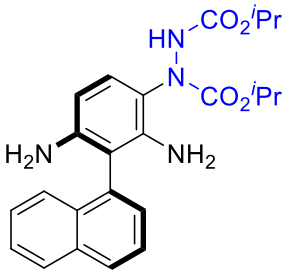
(*R*)-Diethyl 1-(2,4-diamino-3-(naphthalen-1-yl)phenyl)hydrazine-1,2-dicarboxylate (3a) was prepared according to the General Procedure G as yellow solid (chromatography eluent: petroleum ether/ethyl acetate = 8:1 to 2:1) in 95% yield (77.5 mg, 88% ee).

$[\alpha]_D^{25}$: -65.30 (*c* = 0.22, $CHCl_3$). HPLC (OD, *i*-PrOH/*n*-hexane = 20/80, flow rate = 1.0 mL/min, l = 210 nm) t_R = 17.4 min (minor), 21.9 min (major).

^{1}H NMR (400 MHz, $CDCl_3$) δ 7.91 (d, *J* = 8.1 Hz, 2H), 7.66 (d, *J* = 8.0 Hz, 1H), 7.58 (t, *J* = 7.2 Hz, 1H), 7.55-7.49 (m, 2H), 7.44-7.40 (m, 1H), 7.00 (s, 1H), 6.18 (d, *J* = 8.4 Hz, 1H), 4.24-4.16 (m, 4H), 1.28-1.23 (m, 6H) ppm.

^{13}C NMR (100 MHz, CDCl) δ 157.5, 156.7, 145.4, 143.6, 134.3, 134.0, 132.8, 132.4, 131.7, 128.6, 128.4, 126.6, 126.4, 126.3, 125.3, 118.4, 111.1, 104.2, 63.0, 62.2, 14.4, 14.3 ppm.

HRMS (ES+) Calcd for $C_{22}H_{25}N_4O_4$ $[M+H]^+$: 409.1876, Found: 409.1867.



3b

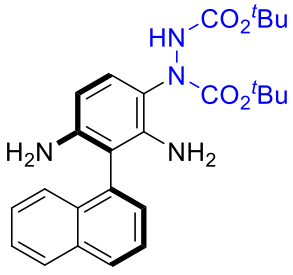
(*R*)-Diisopropyl 1-(2,4-diamino-3-(naphthalen-1-yl)phenyl)hydrazine-1,2-dicarboxylate (3b) was prepared according to the General Procedure G as yellow solid (chromatography eluent: petroleum ether/ethyl acetate = 8:1 to 2:1) in 96% yield (83.8 mg, 90% ee).

$[\alpha]_D^{25}$: -54.30 (*c* = 0.23, $CHCl_3$). HPLC (IC, *i*-PrOH/*n*-hexane = 20/80, flow rate = 1.0 mL/min, l = 210 nm) t_R = 16.5 min (minor), 20.0 min (major).

^{1}H NMR (400 MHz, $CDCl_3$) δ 7.90 (d, *J* = 8.1 Hz, 2H), 7.66 (s, 1H), 7.58 (t, *J* = 7.3 Hz, 1H), 7.52-7.49 (m, 2H), 7.43-7.39 (m, 1H), 7.06-6.97 (m, 2H), 6.17 (d, *J* = 8.3 Hz, 1H), 4.96-4.95 (m, 2H), 1.26-1.25 (m, 12H) ppm.

^{13}C NMR (100 MHz, $CDCl_3$) δ 157.2, 155.9, 145.3, 143.6, 134.3, 134.0, 132.8, 132.6, 131.7, 131.1, 128.6, 128.3, 126.3 (2C), 125.3, 118.6, 110.9, 104.1, 70.6, 70.0, 21.9 ppm.

HRMS (ES+) Calcd for $C_{24}H_{29}N_4O_4$ $[M+H]^+$: 437.2189, Found: 437.2186.



3c

(*R*)-Di-*tert*-butyl 1-(2,4-diamino-3-(naphthalen-1-yl)phenyl)hydrazine-1,2-dicarboxylate (3c) was prepared according to the General Procedure G as yellow solid (chromatography eluent: petroleum ether/ethyl acetate = 10:1 to 2:1) in 94% yield (87.3 mg, 93% ee).

$[\alpha]_D^{25}$: -57.20 (*c* = 0.25, $CHCl_3$). HPLC (IC, *i*-PrOH/*n*-hexane = 5/95, flow rate = 1.0 mL/min, l = 210 nm) t_R = 35.7 min (minor), 43.8 min (major).

^{1}H NMR (400 MHz, $CDCl_3$, **298K**) δ 7.91 (d, *J* = 7.9 Hz, 2H), 7.69-7.56 (m, 2H), 7.55-7.49 (m, 2H), 7.41 (s, 1H), 7.02-6.88 (m, 2H), 6.18 (d, *J* = 8.2 Hz, 1H), 1.46 (s, 18H) ppm.

^{13}C NMR (100 MHz, $CDCl_3$, **298K**) δ 156.5, 155.1, 145.0, 143.6, 134.3, 132.8, 131.8, 128.8, 128.5, 128.3, 127.9, 127.7, 126.3 (2C), 125.4, 119.5, 110.9, 104.1, 81.5 (2C), 28.2, 28.1 ppm.

HRMS (ES+) Calcd for $C_{26}H_{33}N_4O_4$ $[M+H]^+$: 465.2502, Found: 465.2495

Due to the presence of rotamers of the amide groups, the ^{1}H NMR and ^{13}C NMR spectra of the products exhibited a relatively complex pattern at room temperature. To confirm the purity of the product, high-temperature experiment was conducted on the typical product **3c** at 100 °C. The result indicated that the ^{1}H NMR and ^{13}C NMR spectrum appeared cleaner at high temperature, suggesting the elimination of rotamers and the presence of a highly pure product.

^{1}H NMR (400 MHz, DMSO-*d*6, **364.1K**) δ 9.02 (br, 1H), 7.97 (s, 2H), 7.63 (s, 1H), 7.54 (s, 1H), 7.40 (d, *J* = 5.6 Hz, 1H), 6.98 (d, *J* = 7.6 Hz, 2H), 6.14 (d, *J* = 8.0 Hz,

2H), 1.44 (s, 9H), 1.42 (s, 9H) ppm.

^{13}C NMR (100 MHz, DMSO-*d6*, **373.2K**) δ 155.3, 153.8, 145.0, 142.3, 133.7, 132.9, 131.2, 128.1, 127.7 (2C), 127.4, 125.8, 125.5, 125.4, 124.7, 118.4, 109.2, 103.1, 79.3, 79.3, 27.6, 27.4 ppm.

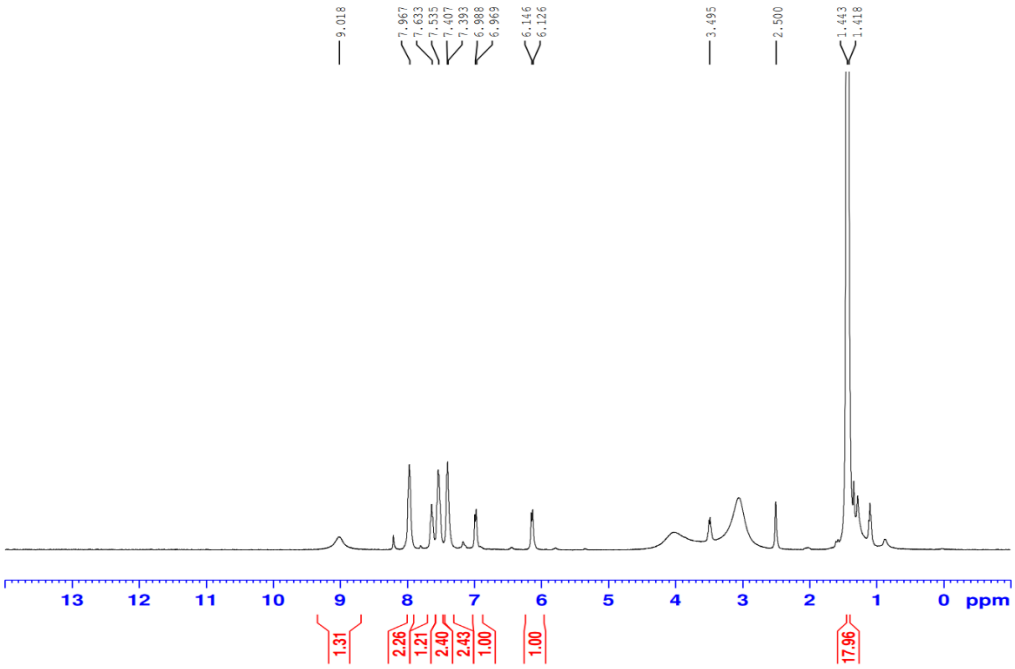


Figure S1. ^{1}H NMR spectrum of **3c** at 364.1 K

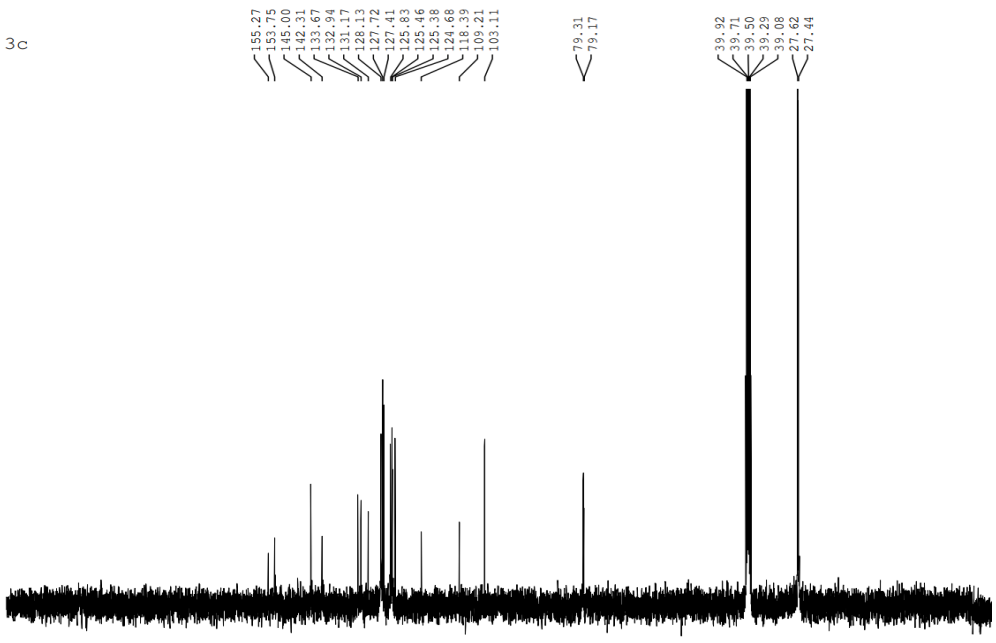
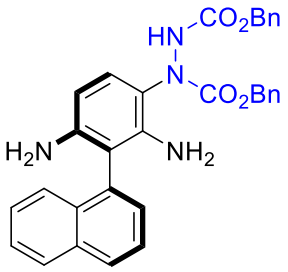


Figure S2. ^{13}C NMR spectrum of **3c** at 373.2 K



3d

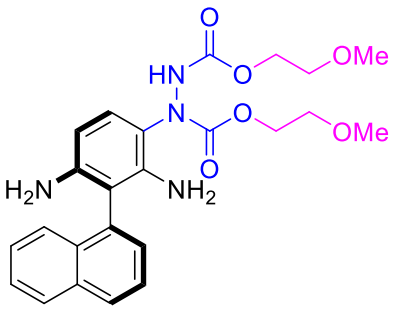
(*R*)-Dibenzyl 1-(2,4-diamino-3-(naphthalen-1-yl)phenyl)hydrazine-1,2-dicarboxylate (3d) was prepared according to the General Procedure G as yellow solid (chromatography eluent: petroleum ether/ethyl acetate = 8:1 to 3:1) in 75% yield (79.8 mg, 70% ee).

$[\alpha]_D^{25}$: -43.40 (*c* = 0.20, $CHCl_3$). HPLC (IC, *i*-PrOH/*n*-hexane = 20/80, flow rate = 1.0 mL/min, l = 210 nm) t_R = 46.3 min (minor), 64.8 min (major).

^{1}H NMR (400 MHz, $CDCl_3$) δ 7.93 (d, *J* = 8.2 Hz, 2H), 7.67-7.48 (m, 5H), 7.43-7.26 (m, 11H), 7.02-7.00 (m, 1H), 6.16 (d, *J* = 8.4 Hz, 1H), 5.25-5.08 (m, 4H) ppm.

^{13}C NMR (100 MHz, $CDCl_3$) δ 157.2, 156.4, 145.6, 143.5, 135.9, 135.3, 134.3, 132.4, 131.7, 128.6 (2C), 128.4 (2C), 128.3 (2C), 128.2 (2C), 128.1 (2C), 127.7, 127.0, 126.3, 125.2, 118.2, 111.0, 104.3, 68.2, 67.8 ppm.

HRMS (ES+) Calcd for $C_{32}H_{29}N_4O_4$ $[M+H]^+$: 533.2189, Found: 533.2182.



3e

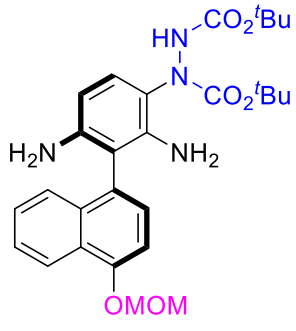
(*R*)-Bis(methoxymethyl) 1-(2,4-diamino-3-(naphthalen-1-yl)phenyl)hydrazine-1,2-dicarboxylate (3e) was prepared according to the General Procedure G as yellow solid (chromatography eluent: petroleum ether/ethyl acetate = 1:1 to 1:3) in 88% yield (82.4 mg, 70% ee).

$[\alpha]_D^{25}$: -37.10 (*c* = 0.30, $CHCl_3$). HPLC (AD, *i*-PrOH/*n*-hexane = 30/70, flow rate = 1.0 mL/min, l = 210 nm) t_R = 46.7 min (minor), 51.3 min (major).

^{1}H NMR (400 MHz, $CDCl_3$) δ 7.90 (d, *J* = 8.2 Hz, 2H), 7.65 (d, *J* = 8.1 Hz, 1H), 7.57 (t, *J* = 7.3 Hz, 2H), 7.52-7.47 (m, 2H), 7.41 (t, *J* = 7.8 Hz, 1H), 7.08-7.00 (m, 1H), 6.17 (d, *J* = 8.4 Hz, 1H), 4.31-4.25 (m, 4H), 3.57-3.56 (m, 4H), 3.34-3.31 (m, 6H) ppm.

^{13}C NMR (100 MHz, $CDCl_3$) δ 156.9, 156.3, 145.4, 143.4, 134.3, 132.5, 131.7, 129.2, 128.9, 128.6, 128.4, 126.6, 126.4, 126.3, 125.3, 118.4, 111.1, 104.5, 70.4 (2C), 65.9, 65.0, 58.9, 58.8 ppm.

HRMS (ES+) Calcd for $C_{24}H_{29}N_4O_6$ $[M+H]^+$: 469.2087, Found: 469.2083.



3f

(*R*)-Di-*tert*-butyl 1-(2,4-diamino-3-(4-(methoxymethoxy)naphthalen-1-yl)phenyl)hydrazine-1,2-dicarboxylate (3f) was prepared according to the

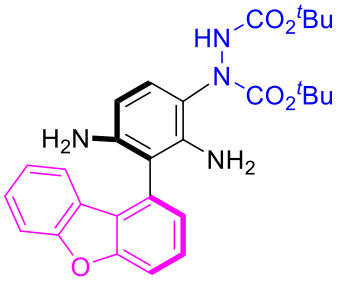
General Procedure G as yellow solid (chromatography eluent: petroleum ether/ethyl acetate = 8:1 to 2:1) in 97% yield (101.7 mg, 90% ee).

$[\alpha]_D^{25}$: -31.00 (*c* = 0.14, $CHCl_3$). HPLC (IC, *i*-PrOH/*n*-hexane = 10/90, flow rate = 1.0 mL/min, l = 210 nm) t_R = 21.5 min (minor), 26.3 min (major).

^{1}H NMR (400 MHz, $CDCl_3$) δ 8.33 (d, *J* = 8.0 Hz, 1H), 7.62-7.48 (m, 2H), 7.40-7.38 (m, 2H), 7.19-6.93 (m, 4H), 5.42 (s, 2H), 3.56 (s, 3H), 1.43 (s, 18H) ppm.

^{13}C NMR (100 MHz, $CDCl_3$) δ 156.4, 154.9, 154.2, 152.9, 144.0, 132.9, 129.3, 128.8, 127.3, 126.7, 125.7 (2C), 125.4, 122.1, 117.6, 109.7, 108.1 (2C), 94.5, 81.3 (2C), 56.2, 28.1, 28.0 ppm.

HRMS (ES+) Calcd for $C_{28}H_{37}N_4O_6$ $[M+H]^+$: 525.2713, Found: 525.2720.



3g

(*R*)-Di-*tert*-butyl 1-(2,4-diamino-3-(dibenzo[*b*,*d*]furan-1-yl)phenyl)hydrazine-1,2-dicarboxylate (3g) was prepared according to the General Procedure G as yellow solid (chromatography eluent: petroleum ether/ethyl acetate = 10:1 to 5:1) in 93% yield (93.8 mg, 92% ee).

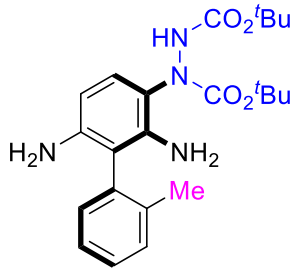
$[\alpha]_D^{25}$: -82.90 (*c* = 0.29, $CHCl_3$). HPLC (IC, *i*-PrOH/*n*-hexane = 5/95, flow rate = 1.0 mL/min, l = 210 nm) t_R = 33.1 min (minor), 53.2 min (major).

^{1}H NMR (400 MHz, $CDCl_3$) δ 7.61-7.52 (m, 4H), 7.42-7.38 (m, 1H), 7.32-7.31 (m,

2H), 7.00-6.92 (m, 2H), 6.19 (d, J = 8.3 Hz, 1H), 1.45 (s, 18H) ppm.

^{13}C NMR (100 MHz, $CDCl_3$) δ 156.9, 156.6, 156.1, 155.2, 144.7, 143.2, 129.6, 128.9, 128.1, 127.2 (2C), 125.1, 123.5, 122.9, 122.2, 119.2, 111.2 (2C), 110.0, 104.0, 81.6 (2C), 28.1 (2C) ppm.

HRMS (ES+) Calcd for $C_{28}H_{33}N_4O_5$ [M + H]$^+$: 505.2451, Found: 505.2448.



3h

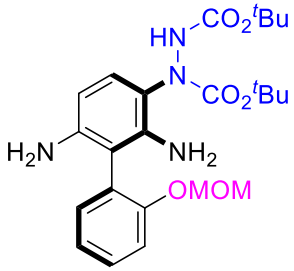
(*R*)-Di-*tert*-butyl 1-(2,6-diamino-2'-methyl-[1,1'-biphenyl]-3-yl)hydrazine-1,2-dicarboxylate (3h) was prepared according to the General Procedure G as yellow solid (chromatography eluent: petroleum ether/ethyl acetate = 8:1 to 3:1) in 98% yield (83.9 mg, 90% ee).

$[\alpha]_D^{25}$: -18.80 (c = 0.28, $CHCl_3$). HPLC (IC, *i*-PrOH/*n*-hexane = 3/90, flow rate = 1.0 mL/min, l = 210 nm) t_R = 37.9 min (minor), 45.9 min (major).

^{1}H NMR (400 MHz, $CDCl_3$) δ 7.36-7.34 (m, 1H), 7.30-7.28 (m, 2H), 7.22-7.20 (m, 1H), 6.85-6.82 (m, 2H), 6.10 (d, J = 8.0 Hz, 1H), 2.14 (s, 3H), 1.45 (s, 18H) ppm.

^{13}C NMR (100 MHz, $CDCl_3$) δ 156.6, 155.2, 144.2, 138.6, 134.4, 130.9, 128.3, 127.7, 127.4, 127.0, 119.3, 112.7, 105.5, 103.8, 81.4 (2C), 28.2, 28.1, 19.2 ppm.

HRMS (ES+) Calcd for $C_{23}H_{33}N_4O_4$ [M + H]$^+$: 429.2502, Found: 429.2498.



3i

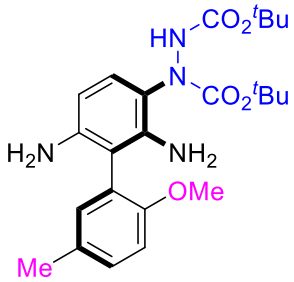
(*R*)-Di-*tert*-butyl 1-(2,6-diamino-2'-(methoxymethoxy)-[1,1'-biphenyl]-3-yl)hydrazine-1,2-dicarboxylate (3i) was prepared according to the General Procedure G as yellow solid (chromatography eluent: petroleum ether/ethyl acetate = 8:1 to 2:1) in 98% yield (92.9 mg, 89% ee).

$[\alpha]_D^{25}$: -16.30 (*c* = 0.24, $CHCl_3$). HPLC (IC, *i*-PrOH/*n*-hexane = 5/95, flow rate = 1.0 mL/min, l = 210 nm) t_R = 60.8 min (minor), 82.9 min (major).

^{1}H NMR (400 MHz, $CDCl_3$) δ 7.36 (t, *J* = 7.3 Hz, 1H), 7.27-7.23 (m, 2H), 7.16-7.13 (m, 1H), 6.90-6.80 (m, 2H), 6.11 (d, *J* = 7.8 Hz, 1H), 5.05 (s, 2H), 3.35 (s, 3H), 1.45 (s, 18H) ppm.

^{13}C NMR (100 MHz, $CDCl_3$) δ 156.5, 155.3, 154.1, 144.7, 143.4, 132.7, 131.1, 129.7, 128.8, 128.0, 125.1, 123.4, 116.5, 110.2, 104.1, 94.7, 81.5, 56.1, 28.2, 28.1 ppm.

HRMS (ES+) Calcd for $C_{24}H_{35}N_4O_6$ $[M+H]^+$: 475.2557, Found: 475.2549.



3j

(*R*)-Di-*tert*-butyl 1-(2,6-diamino-2'-methoxy-5'-methyl-[1,1'-biphenyl]-3-

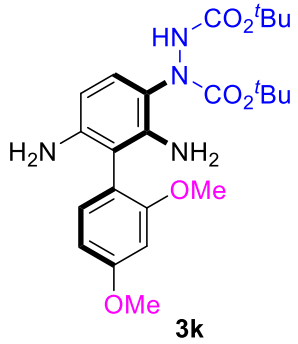
yl)hydrazine-1,2-dicarboxylate (3j) was prepared according to the General Procedure G as yellow solid (chromatography eluent: petroleum ether/ethyl acetate = 8:1 to 2:1) in 98% yield (89.8 mg, 91% ee).

$[\alpha]_D^{25}$: +7.50 (*c* = 0.39, $CHCl_3$). HPLC (OD, *i*-PrOH/*n*-hexane = 5/95, flow rate = 0.7 mL/min, l = 210 nm) t_R = 30.1 min (minor), 33.2 min (major).

^{1}H NMR (400 MHz, $CDCl_3$) δ 7.15 (d, *J* = 7.7 Hz, 1H), 7.05 (s, 1H), 6.93-6.80 (m, 3H), 6.11 (d, *J* = 7.7 Hz, 1H), 3.72 (s, 3H), 2.30 (s, 3H), 1.45 (s, 18H) ppm.

^{13}C NMR (100 MHz, $CDCl_3$) δ 156.4, 155.3, 144.7, 143.2, 133.0, 131.0, 129.9, 127.6, 123.1, 119.6, 111.8, 110.5, 104.7, 104.2, 81.4, 81.2, 55.8, 28.2, 28.1, 20.4 ppm.

HRMS (ES+) Calcd for $C_{24}H_{35}N_4O_5$ $[M+H]^+$: 459.2607, Found: 459.2598.



3k

(*R*)-Di-*tert*-butyl 1-(2,6-diamino-2',4'-dimethoxy-[1,1'-biphenyl]-3-yl)hydrazine-1,2-dicarboxylate (3k) was prepared according to the General Procedure G as yellow solid (chromatography eluent: petroleum ether/ethyl acetate = 6:1 to 2:1) in 95% yield (90.1 mg, 81% ee).

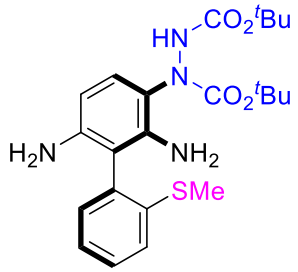
$[\alpha]_D^{25}$: -3.20 (*c* = 0.23, $CHCl_3$). HPLC (IC, *i*-PrOH/*n*-hexane = 10/90, flow rate = 1.0 mL/min, l = 210 nm) t_R = 51.5 min (minor), 66.3 min (major).

^{1}H NMR (400 MHz, $CDCl_3$) δ 7.15-7.13 (m, 1H), 6.96-6.83 (m, 2H), 6.61-6.59 (m,

2H), 6.09 (d, J = 7.8 Hz, 1H), 3.84 (s, 3H), 3.73 (s, 3H), 1.45 (s, 18H) ppm.

^{13}C NMR (100 MHz, $CDCl_3$) δ 160.9, 158.5, 156.4, 155.2, 144.9, 143.6, 133.1, 127.5, 119.5, 115.6, 110.0, 105.5, 104.1, 99.4, 81.4 (2C), 55.6, 55.3, 28.1, 28.0 ppm.

HRMS (ES+) Calcd for $C_{24}H_{35}N_4O_6$ [M + H]$^+$: 475.2557, Found: 475.2548.



3l

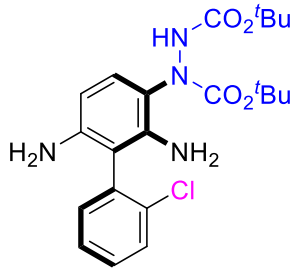
(*R*)-Di-*tert*-butyl 1-(2,6-diamino-2'-(methylthio)-[1,1'-biphenyl]-3-yl)hydrazine-1,2-dicarboxylate (3l) was prepared according to the General Procedure G as yellow solid (chromatography eluent: petroleum ether/ethyl acetate = 8:1 to 2:1) in 88% yield (90.0 mg, 91% ee).

$[\alpha]_D^{25}$: -15.70 (c = 0.39, $CHCl_3$). HPLC (IC, *i*-PrOH/*n*-hexane = 5/95, flow rate = 1.0 mL/min, l = 210 nm) t_R = 67.3 min (minor), 99.4 min (major).

^{1}H NMR (400 MHz, $CDCl_3$) δ 7.41-7.36 (m, 1H), 7.29-7.27 (m, 1H), 7.24-7.22 (m, 2H), 7.03-6.82 (m, 2H), 6.12 (d, J = 7.9 Hz, 1H), 2.35 (s, 3H), 1.45 (s, 18H) ppm.

^{13}C NMR (100 MHz, $CDCl_3$) δ 156.4, 155.2, 144.4, 143.3, 140.4, 132.6, 131.1, 128.9, 125.5, 124.6, 119.6, 111.4, 105.8, 104.0, 81.5 (2C), 28.2, 28.0, 14.7 ppm.

HRMS (ES+) Calcd for $C_{24}H_{35}N_4O_5$ [M + H]$^+$: 459.2607, Found: 459.2598.



3m

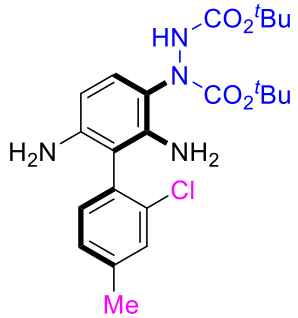
(*R*)-Di-*tert*-butyl 1-(2,6-diamino-2'-chloro-[1,1'-biphenyl]-3-yl)hydrazine-1,2-dicarboxylate (3m) was prepared according to the General Procedure G as yellow solid (chromatography eluent: petroleum ether/ethyl acetate = 8:1 to 2:1) in 96% yield (86.1 mg, 92% ee).

$[\alpha]_D^{25}$: -9.50 (*c* = 0.33, $CHCl_3$). HPLC (IC, *i*-PrOH/*n*-hexane = 10/90, flow rate = 1.0 mL/min, l = 210 nm) t_R = 15.0 min (minor), 18.3 min (major).

^{1}H NMR (400 MHz, $CDCl_3$) δ 7.56 (d, *J* = 7.1 Hz, 1H), 7.40-7.34 (m, 3H), 7.07-6.69 (m, 2H), 6.11 (d, *J* = 8.2 Hz, 1H), 1.45 (s, 18H) ppm.

^{13}C NMR (100 MHz, $CDCl_3$) δ 156.5, 155.1, 144.3, 143.0, 135.5, 134.0, 133.1, 130.5, 129.6, 128.4, 128.1, 119.6, 110.0, 104.0, 81.5 (2C), 28.2, 28.0 ppm.

HRMS (ES+) Calcd for $C_{22}H_{30}ClN_4O_4$ $[M+H]^+$: 449.1956, Found: 449.1947.



3n

(*R*)-Di-*tert*-butyl 1-(2,6-diamino-2'-chloro-4'-methyl-[1,1'-biphenyl]-3-yl)hydrazine-1,2-dicarboxylate (3n) was prepared according to the General

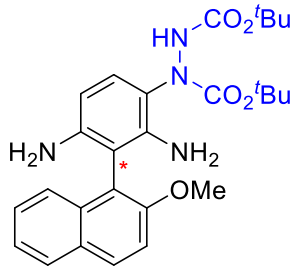
Procedure G as yellow solid (chromatography eluent: petroleum ether/ethyl acetate = 8:1 to 2:1) in 98% yield (90.6 mg, 92% ee).

$[\alpha]_D^{25}$: -12.90 (*c* = 0.23, $CHCl_3$). HPLC (IC, *i*-PrOH/*n*-hexane = 10/90, flow rate = 1.0 mL/min, l = 210 nm) t_R = 40.2 min (minor), 58.5 min (major).

^{1}H NMR (400 MHz, $CDCl_3$) δ 7.38 (s, 1H), 7.24-7.17 (m, 2H), 6.99-6.81 (m, 2H), 6.11 (d, *J* = 8.0 Hz, 1H), 2.38 (s, 3H), 1.45 (s, 18H) ppm.

^{13}C NMR (100 MHz, $CDCl_3$) δ 156.5, 155.1, 144.4, 143.2, 139.9, 132.7, 130.9, 130.7, 128.9, 128.2, 119.5, 110.9, 105.7, 103.9, 81.5 (2C), 28.2, 28.0, 21.0 ppm.

HRMS (ES+) Calcd for $C_{23}H_{32}ClN_4O_4$ $[M+H]^+$: 463.2112, Found: 463.2110.



3k

Di-*tert*-butyl 1-(2,4-diamino-3-(2-methoxynaphthalen-1-yl)phenyl)hydrazine-1,2-dicarboxylate (3k) was prepared according to the General Procedure G as yellow solid (chromatography eluent: petroleum ether/ethyl acetate = 8:1 to 2:1) in 90% yield (89.0 mg, 24% ee).

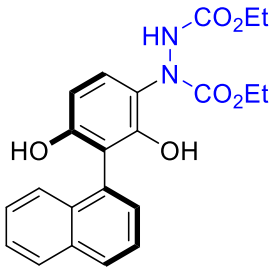
$[\alpha]_D^{25}$: -0.20 (*c* = 0.23, $CHCl_3$). HPLC (OJ, *i*-PrOH/*n*-hexane = 5/95, flow rate = 1.0 mL/min, l = 210 nm) t_R = 16.9 min (major), 29.9 min (minor).

^{1}H NMR (400 MHz, $CDCl_3$) δ 7.92 (d, *J* = 9.0 Hz, 1H), 7.83 (d, *J* = 8.7 Hz, 1H), 7.55-7.36 (m, 4H), 7.00-6.87 (m, 2H), 6.19 (d, *J* = 7.9 Hz, 1H), 3.88 (s, 3H), 1.46 (s,

18H) ppm.

^{13}C NMR (100 MHz, $CDCl_3$) δ 156.4, 155.2, 145.2, 143.8, 133.0, 130.2 (2C), 129.6, 128.0 (2C), 127.0, 124.6, 124.0, 119.6, 116.7, 114.1, 107.2, 110.9, 104.1, 81.3 (2C), 28.2, 28.1 ppm.

HRMS (ES+) Calcd for $C_{27}H_{35}N_4O_5$ $[M+H]^+$: 495.2607, Found: 495.2616.



5a

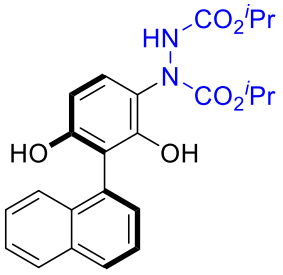
(*R*)-Diethyl 1-(2,4-dihydroxy-3-(naphthalen-1-yl)phenyl)hydrazine-1,2-dicarboxylate (5a) was prepared according to the General Procedure G as yellow solid (chromatography eluent: petroleum ether/ethyl acetate = 6:1 to 2:1) in 98% yield (80.4 mg, 99% ee).

$[\alpha]_D^{25}$: -97.40 (*c* = 0.25, Acetone). HPLC (AD, *i*-PrOH/*n*-hexane = 10/90, flow rate = 1.0 mL/min, l = 210 nm) t_R = 55.5 min (major).

^{1}H NMR (400 MHz, $CDCl_3$) δ 8.94 (s, 1H), 7.92 (t, *J* = 8.3 Hz, 2H), 7.62-7.57 (m, 2H), 7.53-7.41 (m, 4H), 7.12 (d, *J* = 8.0 Hz, 1H), 6.60 (d, *J* = 8.7 Hz, 1H), 5.08 (s, 1H), 4.25-4.16 (m, 4H), 1.28-1.24 (m, 6H) ppm.

^{13}C NMR (100 MHz, $CDCl_3$) δ 159.4, 156.8, 155.0, 152.6, 134.1, 132.2, 129.4, 129.2 (2C), 128.4, 126.5, 126.3, 125.8 (2C), 125.5, 121.1, 115.0, 107.0, 63.3, 62.2, 14.4, 14.2 ppm.

HRMS (ES+) Calcd for $C_{22}H_{23}N_2O_6$ [M + H]$^+$: 411.1556, Found: 411.1566.



5b

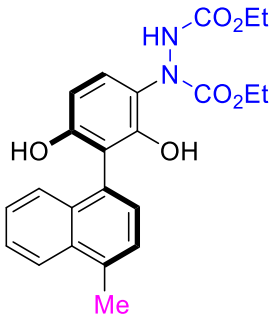
(*R*)-Diisopropyl 1-(2,4-dihydroxy-3-(naphthalen-1-yl)phenyl)hydrazine-1,2-dicarboxylate (5b) was prepared according to the General Procedure G as yellow solid (chromatography eluent: petroleum ether/ethyl acetate = 6:1 to 2:1) in 93% yield (81.5 mg, 90% ee).

$[\alpha]_D^{25}$: -104.80 (*c* = 0.26, $CDCl_3$). HPLC (AD, *i*-PrOH/*n*-hexane = 7/93, flow rate = 1.0 mL/min, l = 210 nm) t_R = 55.5 min (major), 94.4 min (minor).

^{1}H NMR (400 MHz, $CDCl_3$) δ 9.06 (s, 1H), 7.93 (t, *J* = 8.8 Hz, 2H), 7.61-7.57 (m, 2H), 7.53-7.49 (m, 2H), 7.44-7.40 (m, 1H), 7.24-7.09 (m, 2H), 6.60 (d, *J* = 8.7 Hz, 1H), 6.42 (s, 1H), 5.02-4.94 (m, 2H), 1.26 (d, *J* = 6.2 Hz, 12H) ppm.

^{13}C NMR (100 MHz, $CDCl_3$) δ 159.2, 156.4, 154.9, 152.7, 134.1, 132.2, 129.5, 129.2 (2C), 128.4, 126.4, 126.3, 125.8 (2C), 125.6, 121.3, 114.9, 106.8, 71.6, 70.1, 21.9, 21.8 ppm.

HRMS (ES+) Calcd for $C_{24}H_{27}N_2O_6$ [M + H]$^+$: 439.1869, Found: 439.1862.



5d

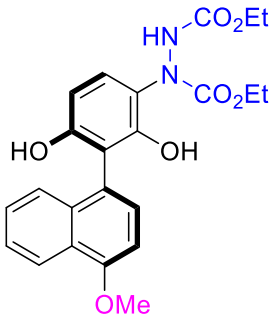
(*R*)-Diethyl 1-(2,4-dihydroxy-3-(4-methylnaphthalen-1-yl)phenyl)hydrazine-1,2-dicarboxylate (5d) was prepared according to the General Procedure G as yellow solid (chromatography eluent: petroleum ether/ethyl acetate = 6:1 to 2:1) in 94% yield (79.7 mg, 94% ee).

$[\alpha]_D^{25}$: -104.50 (*c* = 0.32, $CDCl_3$). HPLC (AD, *i*-PrOH/*n*-hexane = 10/90, flow rate = 1.0 mL/min, l = 210 nm) t_R = 44.8 min (minor), 49.2 min (major).

^{1}H NMR (400 MHz, $CDCl_3$) δ 8.88 (s, 1H), 8.08 (d, *J* = 8.4 Hz, 1H), 7.63 (d, *J* = 8.2 Hz, 1H), 7.56 (t, *J* = 6.9 Hz, 2H), 7.46-7.41 (m, 3H), 7.11 (d, *J* = 8.0 Hz, 1H), 6.60 (d, *J* = 8.7 Hz, 1H), 5.15 (s, 1H), 4.27-4.16 (m, 4H), 2.76 (s, 3H), 1.28-1.24 (m, 6H) ppm.

^{13}C NMR (100 MHz, $CDCl_3$) δ 159.3, 156.1, 155.1, 152.6, 135.6, 133.2, 132.1, 129.0, 128.5, 127.5, 126.6 (2C), 126.1 (2C), 124.5, 121.1, 115.2, 106.8, 63.2, 62.2, 19.5, 14.3, 14.2 ppm.

HRMS (ES+) Calcd for $C_{23}H_{24}N_2O_6$ [M + H]$^+$: 425.1713, Found: 425.1716.



5e

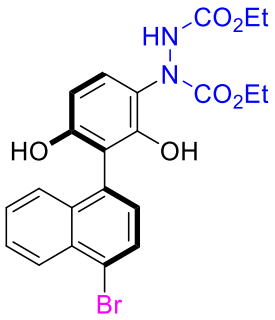
(*R*)-Diethyl 1-(2,4-dihydroxy-3-(4-methoxynaphthalen-1-yl)phenyl)hydrazine-1,2-dicarboxylate (5e) was prepared according to the General Procedure G as yellow solid (chromatography eluent: petroleum ether/ethyl acetate = 6:1 to 2:1) in 78% yield (68.7 mg, 80% ee).

$[\alpha]_D^{25}$: -71.70 (*c* = 0.25, $CDCl_3$). HPLC (AD, *i*-PrOH/*n*-hexane = 10/90, flow rate = 1.0 mL/min, l = 210 nm) t_R = 46.4 min (major), 61.2 min (minor).

^{1}H NMR (400 MHz, $CDCl_3$) δ 8.88 (s, 1H), 8.35 (d, *J* = 8.2 Hz, 1H), 7.55-7.43 (m, 5H), 7.10 (d, *J* = 7.8 Hz, 1H), 6.93 (d, *J* = 7.9 Hz, 1H), 6.60 (d, *J* = 8.7 Hz, 1H), 5.15 (s, 1H), 4.25-4.17 (m, 4H), 4.04 (s, 3H), 1.27-1.23 (m, 6H) ppm.

^{13}C NMR (100 MHz, $CDCl_3$) δ 159.3, 156.1, 155.3, 152.8, 133.1, 128.9, 127.0, 126.2, 125.6 (2C), 125.2, 122.4 (2C), 121.0, 120.8, 114.9, 106.7, 103.8, 63.4, 63.3, 55.5, 14.4, 14.2 ppm.

HRMS (ES+) Calcd for $C_{23}H_{25}N_2O_7$ $[M+H]^+$: 441.1662, Found: 441.1663.



5f

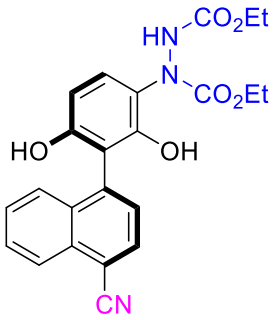
(*R*)-Diethyl 1-(3-(4-bromonaphthalen-1-yl)-2,4-dihydroxyphenyl)hydrazine-1,2-dicarboxylate (5f) was prepared according to the General Procedure G as yellow solid (chromatography eluent: petroleum ether/ethyl acetate = 6:1 to 2:1) in 98% yield (95.7 mg, 99% ee).

$[\alpha]_D^{25}$: -87.50 (*c* = 0.40, $CDCl_3$). HPLC (AD, *i*-PrOH/*n*-hexane = 10/90, flow rate = 1.0 mL/min, l = 210 nm) t_R = 41.8 min (major).

^{1}H NMR (400 MHz, $CDCl_3$) δ 9.05 (s, 1H), 8.33 (d, *J* = 8.4 Hz, 1H), 7.89 (d, *J* = 7.6 Hz, 1H), 7.62 (t, *J* = 7.6 Hz, 2H), 7.50-7.35 (m, 3H), 7.10 (d, *J* = 8.4 Hz, 1H), 6.57 (d, *J* = 8.7 Hz, 1H), 5.17 (s, 1H), 4.24-4.16 (m, 4H), 1.26-1.23 (m, 6H) ppm.

^{13}C NMR (100 MHz, $CDCl_3$) δ 159.5, 156.1, 154.9, 152.6, 133.4, 132.5, 129.9, 129.8, 129.4, 129.1, 127.7 (2C), 127.3, 126.1, 124.0, 121.1, 114.4, 107.1, 63.5, 63.4, 14.3, 14.2 ppm.

HRMS (ES+) Calcd for $C_{22}H_{22}BrN_2O_6$ $[M+H]^+$: 489.0661, Found: 489.0658.



5g

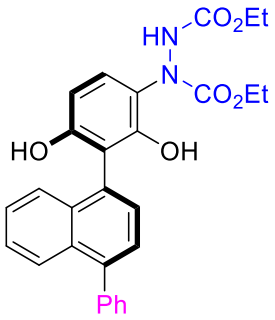
(*R*)-Diethyl 1-(3-(4-cyanonaphthalen-1-yl)-2,4-dihydroxyphenyl)hydrazine-1,2-dicarboxylate (5g) was prepared according to the General Procedure G as yellow solid (chromatography eluent: petroleum ether/ethyl acetate = 6:1 to 2:1) in 92% yield (80.1 mg, 99% ee).

$[\alpha]_D^{25}$: -72.00 (*c* = 0.20, Acetone). HPLC (AD, *i*-PrOH/*n*-hexane = 10/90, flow rate = 1.0 mL/min, l = 210 nm) t_R = 69.1 min (major).

^{1}H NMR (400 MHz, d_6-Acetone) δ 9.42 (s, 1H), 9.22 (s, 1H), 8.54 (s, 1H), 8.23 (d, *J* = 8.3 Hz, 1H), 8.13 (d, *J* = 7.4 Hz, 1H), 7.79-7.74 (m, 2H), 7.60 (t, *J* = 7.8 Hz, 2H), 7.23 (d, *J* = 8.6 Hz, 1H), 6.63 (d, *J* = 8.6 Hz, 1H), 4.21-4.16 (m, 4H), 1.28-1.19 (m, 6H) ppm.

^{13}C NMR (100 MHz, d_6-Acetone) δ 160.8, 157.0, 156.0, 153.7, 139.9, 133.3, 133.2, 133.1, 130.7, 129.1, 128.9, 128.04, 127.96, 125.5, 122.3, 118.4, 114.9, 109.8, 107.9, 63.4, 63.3, 14.7, 14.5 ppm.

HRMS (ES+) Calcd for $C_{23}H_{22}N_3O_6$ [M + H]$^+$: 436.1509, Found: 436.1508.



5h

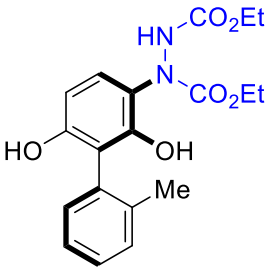
(*R*)-Diethyl 1-(2,4-dihydroxy-3-(4-phenylnaphthalen-1-yl)phenyl)hydrazine-1,2-dicarboxylate (5h) was prepared according to the General Procedure G as yellow solid (chromatography eluent: petroleum ether/ethyl acetate = 6:1 to 2:1) in 84% yield (81.7 mg, 90% ee).

$[\alpha]_D^{25}$: -74.40 (*c* = 0.32, $CDCl_3$). HPLC (AD, *i*-PrOH/*n*-hexane = 10/90, flow rate = 1.0 mL/min, l = 230 nm) t_R = 37.2 min (major), 55.5 min (minor).

^{1}H NMR (400 MHz, $CDCl_3$) δ 9.07 (s, 1H), 7.98-7.96 (m, 1H), 7.69-7.67 (m, 1H), 7.58-7.50 (m, 6H), 7.47-7.38 (m, 4H), 7.13 (d, *J* = 7.8 Hz, 1H), 6.63 (d, *J* = 8.7 Hz, 1H), 5.10 (s, 1H), 4.32-4.19 (m, 4H), 1.35-1.25 (m, 6H) ppm.

^{13}C NMR (100 MHz, $CDCl_3$) δ 159.5, 156.1, 155.1, 152.7, 141.3, 140.5, 132.4, 132.3, 130.1 (2C), 129.2, 128.8, 128.3 (2C), 127.4, 126.9, 126.6, 126.4, 125.8, 121.1, 115.1, 107.0, 63.5, 63.4, 14.4, 14.3 ppm.

HRMS (ES+) Calcd for $C_{28}H_{27}N_2O_6$ $[M+H]^+$: 487.1869, Found: 487.1868.



5i

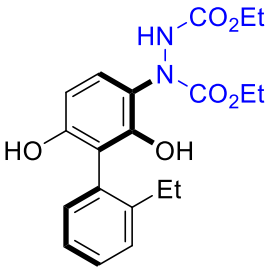
(*R*)-Diethyl 1-(2,6-dihydroxy-2'-methyl-[1,1'-biphenyl]-3-yl)hydrazine-1,2-dicarboxylate (5i) was prepared according to the General Procedure C as yellow solid (chromatography eluent: petroleum ether/ethyl acetate = 6:1 to 2:1) in 99% yield (74.1 mg, 97% ee).

$[\alpha]_D^{25}$: -40.80 (*c* = 0.27, $CDCl_3$). HPLC (OD, *i*-PrOH/*n*-hexane = 10/90, flow rate = 1.0 mL/min, l = 210 nm) t_R = 21.4 min (major), 27.4 min (minor).

^{1}H NMR (400 MHz, $CDCl_3$) δ 8.96 (s, 1H), 7.53 (s, 1H), 7.36-7.28 (m, 3H), 7.25-7.23 (m, 1H), 7.02 (d, *J* = 8.4 Hz, 1H), 6.53 (d, *J* = 8.7 Hz, 1H), 5.11 (s, 1H), 4.25-4.20 (m, 4H), 2.17 (s, 3H), 1.28-1.20 (m, 6H) ppm.

^{13}C NMR (100 MHz, $CDCl_3$) δ 159.4, 156.2, 154.3, 151.9, 138.7, 131.1, 130.7, 130.6, 128.8, 128.6, 126.4, 120.9, 116.4, 106.7, 63.4, 63.3, 19.4, 14.3, 14.2 ppm.

HRMS (ES+) Calcd for $C_{19}H_{23}N_2O_6$ $[M+H]^+$: 375.1556, Found: 375.1550.



5j

(*R*)-Diethyl 1-(2'-ethyl-2,6-dihydroxy-[1,1'-biphenyl]-3-yl)hydrazine-1,2-

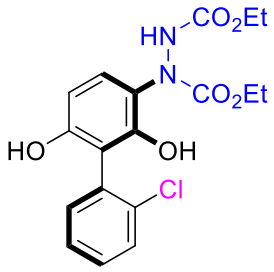
dicarboxylate (5j) was prepared according to the General Procedure G as yellow solid (chromatography eluent: petroleum ether/ethyl acetate = 6:1 to 2:1) in 88% yield (68.3 mg, 78% ee).

$[\alpha]_D^{25}$: -29.80 (c = 0.30, $CDCl_3$). HPLC (AD, *i*-PrOH/*n*-hexane = 10/90, flow rate = 1.0 mL/min, l = 210 nm) t_R = 19.5 min (major), 22.2 min (minor).

^{1}H NMR (400 MHz, $CDCl_3$) δ 8.94 (s, 1H), 7.41-7.36 (m, 3H), 7.35-7.29 (m, 1H), 7.22 (d, J = 7.2 Hz, 1H), 7.03 (d, J = 8.2 Hz, 1H), 6.53 (d, J = 8.6 Hz, 1H), 4.95 (s, 1H), 4.32-4.15 (m, 4H), 2.48 (q, J = 7.6 Hz, 2H), 1.35-1.19 (m, 6H), 1.07 (t, J = 7.6 Hz, 3H) ppm.

^{13}C NMR (100 MHz, $CDCl_3$) δ 159.4, 156.1, 154.4, 152.0, 144.7, 130.9, 130.3, 129.2, 129.1, 128.6, 126.6, 121.0, 116.4, 106.6, 64.2, 63.3, 62.3, 26.3, 14.8, 14.3 ppm.

HRMS (ES+) Calcd for $C_{20}H_{25}N_2O_6$ $[M+H]^+$: 389.1713, Found: 389.1718.



5k

(*R*)-Diethyl 1-(2'-chloro-2,6-dihydroxy-[1,1'-biphenyl]-3-yl)hydrazine-1,2-dicarboxylate (5k) was prepared according to the General Procedure G as yellow solid (chromatography eluent: petroleum ether/ethyl acetate = 6:1 to 2:1) in 95% yield (74.9 mg, 99% ee).

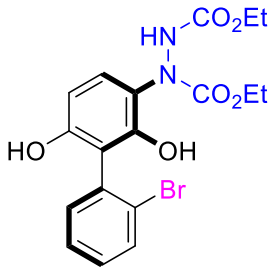
$[\alpha]_D^{25}$: -35.10 (c = 0.26, Acetone). HPLC (IC, *i*-PrOH/*n*-hexane = 7/93, flow rate =

1.0 mL/min, l = 210 nm) t_R = 74.9 min (major).

^{1}H NMR (400 MHz, d_6-Acetone) δ 9.35 (s, 1H), 9.10 (s, 1H), 8.42 (s, 1H), 7.48-7.45 (m, 1H), 7.35-7.29 (m, 3H), 7.09 (d, J = 8.6 Hz, 1H), 6.50 (d, J = 8.6 Hz, 1H), 4.23-4.10 (m, 4H), 1.29-1.15 (m, 6H) ppm.

^{13}C NMR (100 MHz, d_6-Acetone) δ 160.6, 156.7, 156.1, 153.5, 135.4, 134.7, 133.6, 129.9, 129.7, 129.3, 127.0, 121.9, 115.9, 107.4, 63.3, 63.1, 14.6, 14.5 ppm.

HRMS (ES+) Calcd for $C_{18}H_{20}ClN_2O_6$ $[M+H]^+$: 395.1010, Found: 395.1018.



5l

(*R*)-Diethyl 1-(2'-bromo-2,6-dihydroxy-[1,1'-biphenyl]-3-yl)hydrazine-1,2-dicarboxylate (5l) was prepared according to the General Procedure G as yellow solid (chromatography eluent: petroleum ether/ethyl acetate = 6:1 to 2:1) in 95% yield (83.2 mg, 94% ee).

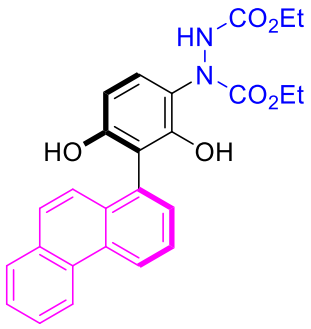
$[\alpha]_D^{25}$: -52.80 (c = 0.25, $CDCl_3$). HPLC (IC, *i*-PrOH/*n*-hexane = 10/90, flow rate = 1.0 mL/min, l = 230 nm) t_R = 49.4 min (major), 70.5 min (minor).

^{1}H NMR (400 MHz, $CDCl_3$) δ 9.08 (s, 1H), 7.72 (d, J = 7.9 Hz, 1H), 7.61 (s, 1H), 7.41 (t, J = 7.2 Hz, 1H), 7.34 (d, J = 6.8 Hz, 1H), 7.28-7.24 (m, 1H), 7.03 (d, J = 8.4 Hz, 1H), 6.49 (d, J = 8.6 Hz, 1H), 5.44 (s, 1H), 4.24-4.15 (m, 4H), 1.34-1.20 (m, 6H) ppm.

^{13}C NMR (100 MHz, $CDCl_3$) δ 159.5, 156.2, 154.4, 152.2, 133.7, 133.1, 132.5, 129.9,

129.2, 127.8, 125.5, 121.0, 116.9, 106.9, 63.5, 63.3, 14.3, 14.2 ppm.

HRMS (ES+) Calcd for $C_{18}H_{20}BrN_2O_6$ [M + H]$^+$: 439.0505, Found: 439.0510.



5m

(*R*)-Diethyl 1-(2,4-dihydroxy-3-(phenanthren-1-yl)phenyl)hydrazine-1,2-dicarboxylate (5m) was prepared according to the General Procedure B as yellow solid (chromatography eluent: petroleum ether/ethyl acetate = 6:1 to 2:1) in 92% yield (84.7 mg, 99% ee).

$[\alpha]_D^{25}$: -43.50 (*c* = 0.22, $CDCl_3$). HPLC (IC, *i*-PrOH/*n*-hexane = 5/95, flow rate = 1.0 mL/min, l = 210 nm) t_R = 103.0 min (major).

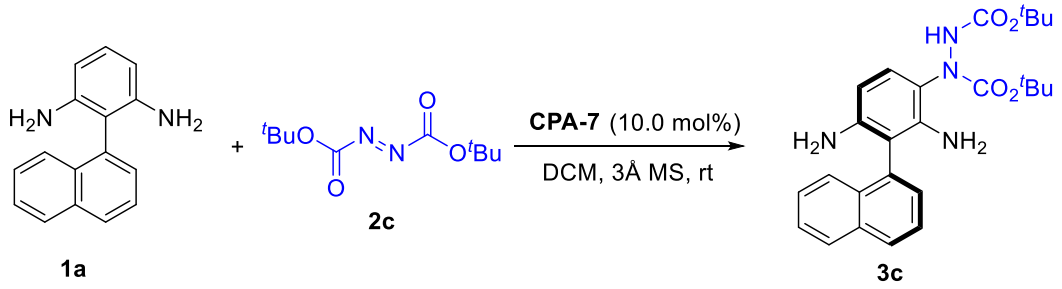
^{1}H NMR (400 MHz, $CDCl_3$) δ 9.01 (s, 1H), 8.79-8.74 (m, 2H), 7.90 (d, *J* = 7.7 Hz, 1H), 7.82 (s, 1H), 7.73-7.61 (m, 4H), 7.54 (t, *J* = 7.5 Hz, 1H), 7.49-7.38 (m, 1H), 7.17-7.11 (m, 1H), 6.63 (d, *J* = 8.7 Hz, 1H), 5.35 (s, 1H), 4.24-4.16 (m, 4H), 1.29-1.22 (m, 6H) ppm.

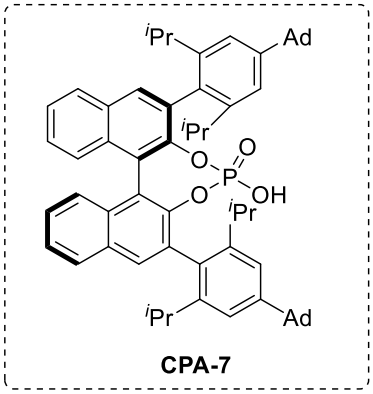
^{13}C NMR (100 MHz, $CDCl_3$) δ 159.4, 156.1, 155.2, 152.8, 131.4, 130.9, 130.8, 130.6, 129.8, 129.2, 128.8, 128.3, 127.2, 127.0, 126.9, 126.8, 126.3, 122.9, 122.6, 121.0, 115.0, 107.1, 63.4, 63.3, 14.3, 14.2 ppm.

HRMS (ES+) Calcd for $C_{26}H_{25}N_2O_6$ [M + H]$^+$: 461.1713, Found: 461.1707.

IV. Gram-scale Synthesis and Derivation of Product

Gram-scale synthesis:





To a solution of **1a** (351.2 mg, 1.5 mmol, 1.0 equiv), **2c** (414.2 mg, 1.8 mmol, 1.2 equiv) and 3Å MS (450.0 mg) in anhydrous DCM (60.0 mL) was added **CPA-7** (140.6 mg, 10.0 mol%). Then the reaction mixture was stirred at room temperature for 5 hours. The reaction mixture was directly concentrated and purified by silica gel column chromatography (petroleum ether/ethyl acetate = 8:1 to 2:1) to afford the desired products **3c** in 96% yield (668.5 mg, 92% ee).

Synthetic applications:

3a, 0.1 mmol, 92% ee

6, 52%, 99% ee

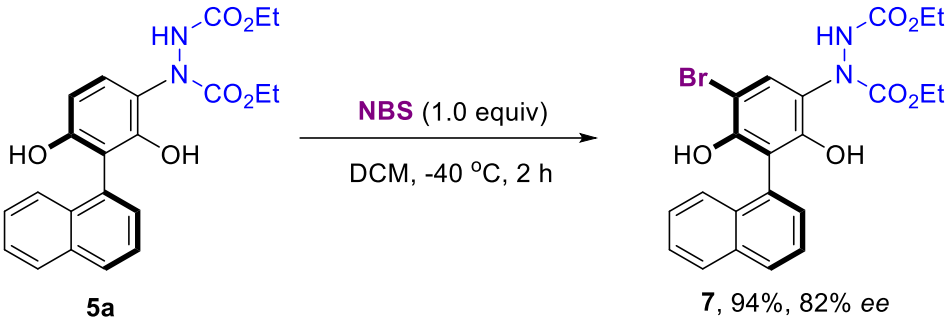
(*S*)-Di-*tert*-butyl 1-(2-amino-4-(3-(3,5-dimethylphenyl)ureido)-3-(naphthalen-1-yl)phenyl)hydrazine-1,2-dicarboxylate (6): To a solution of **3a** (46.4 mg, 0.1 mmol, 1.0 equiv) in anhydrous DCM (3.0 mL) was added Et_3N (20.2 mg, 0.2 mmol, 2.0 equiv) and 1-isocyanato-3,5-dimethylbenzene (14.7 mg, 0.1 mmol, 1.0 equiv). Then the reaction mixture was stirred at room temperature for 5 h. The reaction mixture was directly concentrated and purified by silica gel column chromatography (petroleum ether/ethyl acetate = 6:1 to 2:1) to afford the desired products **6**, which was provided in 52% yield after recrystallization (31.8 mg, 99% ee).

$[\alpha]_D^{25}$: -12.40 (*c* = 0.23, $CDCl_3$). HPLC (IC, *i*-PrOH/*n*-hexane = 15/85, flow rate = 1.0 mL/min, l = 210 nm) t_R = 23.9 min (major), 35.3 min (minor).

^{1}H NMR (400 MHz, $CDCl_3$) δ 7.83 (t, *J* = 9.6 Hz, 2H), 7.49-7.43 (m, 4H), 7.36-7.32 (m, 2H), 7.09 (s, 1H), 6.85 (s, 1H), 6.57 (s, 1H), 6.46 (s, 2H), 6.34 (s, 1H), 6.06 (s, 1H), 2.07 (s, 6H), 7.14 (s, 18H) ppm.

^{13}C NMR (100 MHz, $CDCl_3$) δ 156.5, 153.2, 143.5, 138.7 (2C), 137.1, 136.8, 134.1 (2C), 131.6, 131.3, 129.0, 128.4 (2C), 128.1, 126.5, 126.0 (2C), 125.1, 123.4, 120.1, 115.5, 109.1, 81.9, 81.6, 28.14, 28.07, 21.1 ppm.

HRMS (ES+) Calcd for $C_{35}H_{42}N_5O_5$ $[M+H]^+$: 612.3186, Found: 612.3187.



5a **7**, 94%, 82% *ee*

(*S*)-Diethyl 1-(5-bromo-2,4-dihydroxy-3-(naphthalen-1-yl)phenyl)hydrazine-1,2-dicarboxylate (7): To a solution of **5a** (20.5 mg, 0.05 mmol, 1.0 equiv) in anhydrous DCM (1.0 mL) was added NBS (17.8 mg, 0.05 mmol, 1.0 equiv). Then the reaction mixture was stirred at -40 °C for 2 h. The reaction mixture was directly concentrated and purified by silica gel column chromatography (petroleum ether/ethyl acetate = 6:1 to 2:1) to afford the desired products **7** in 94% yield (22.9 mg, 82% ee).

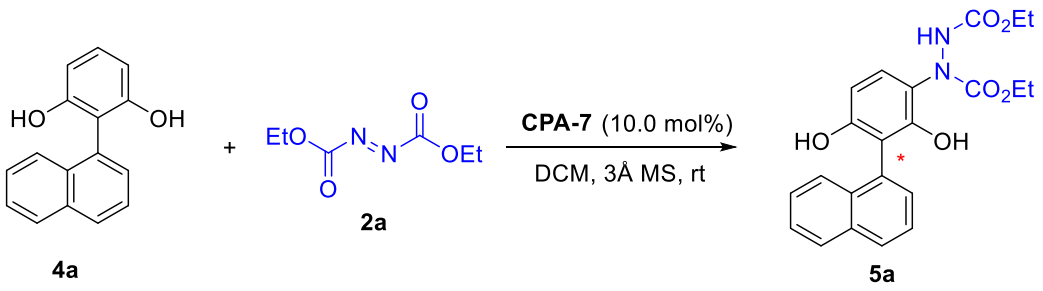
$[\alpha]_D^{25}$: -30.80 (*c* = 0.13, $CDCl_3$). HPLC (IC, *i*-PrOH/*n*-hexane = 10/90, flow rate = 1.0 mL/min, l = 210 nm) t_R = 29.5 min (minor), 50.1 min (major).

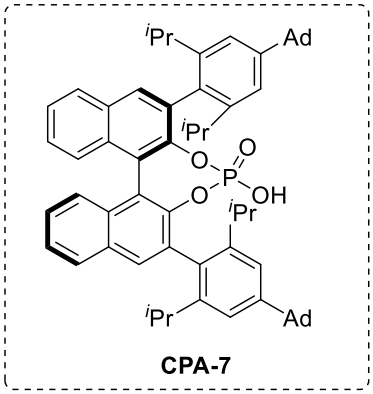
^{1}H NMR (400 MHz, $CDCl_3$) δ 9.01(s, 1H), 7.94 (t, *J* = 9.0 Hz, 2H), 7.61-7.56 (m, 2H), 7.54-7.49 (m, 2H), 7.46-7.42 (m, 2H), 5.50 (s, 1H), 4.26-4.19 (m, 4H), 1.30-1.25 (m, 6H) ppm.

^{13}C NMR (100 MHz, $CDCl_3$) δ 159.4, 155.6, 152.5, 151.7, 133.9, 131.9, 131.6, 129.7, 129.2, 128.5, 126.5, 126.2, 125.6 (2C), 125.3, 122.0, 116.2, 98.9, 63.7, 63.5, 14.4, 14.2 ppm.

HRMS (ES+) Calcd for $C_{22}H_{22}BrN_2O_6$ $[M+H]^+$: 489.0661, Found: 489.0670.

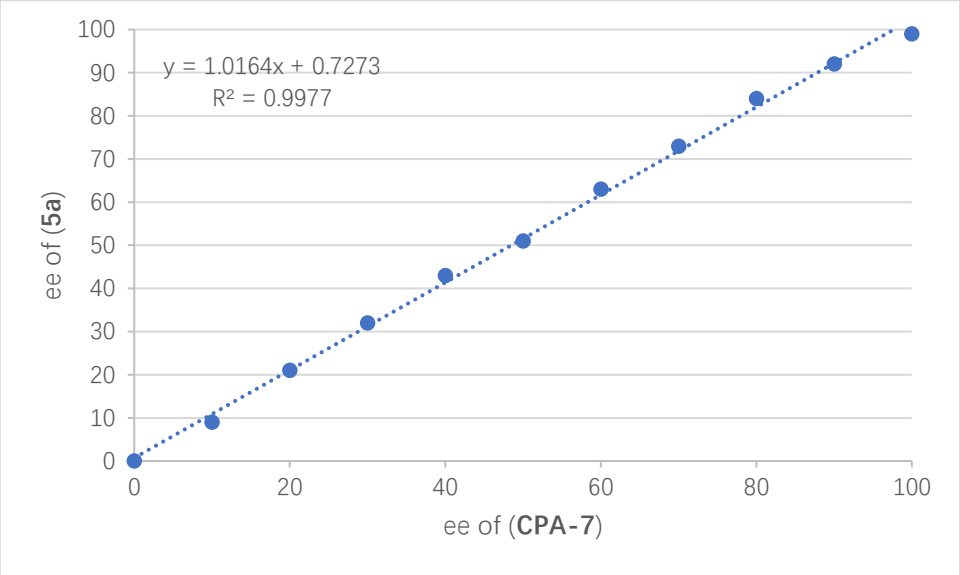
V. Nonliner Relationship Experiments





To a solution of **4a** (5.9 mg, 0.025 mmol, 1.0 equiv), **CPA-7** (2.3 mg, 10.0 mol%) with different enantiopurity (1st run: 0% ee, 2nd run: 10% ee; 3rd run: 20% ee; 4th run: 30% ee; 5th run: 40% ee; 6th run: 50% ee; 7th run: 60% ee, 8th run: 70% ee; 9th run: 80% ee; 10th run: 90% ee; 11th run: 100% ee) and 3Å MS (15.0 mg) in anhydrous DCM (1.0 mL) was added **2a** (5.2 mg, 0.03 mmol, 1.2 equiv). The resulting mixture was stirred at room temperature for 24 hours. The mixture was filtered through a short pad of silica gel and then concentrated under reduced pressure. The *ee* values of the product **5a** were determined by HPLC.

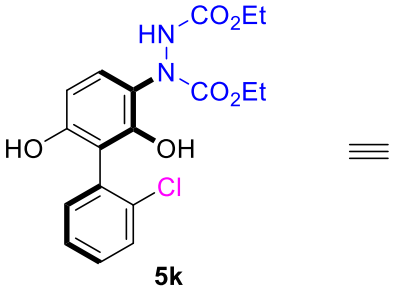
ee (**CPA-7**)	0	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
ee (**5a**)	0	9%	21%	32%	43%	51%	63%	73%	84%	92%	99%


y = 1.0164x + 0.7273
R² = 0.9977
ee of (5a)
ee of (CPA-7)
0
10
20
30
40
50
60
70
80
90
100
0
20
40
60
80
100

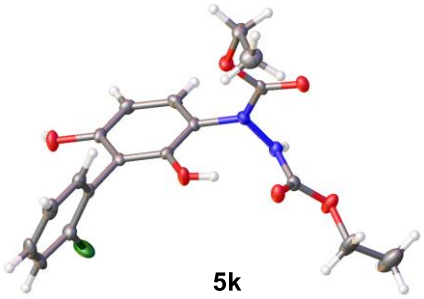
VI. Determination of Product Structure

The absolute stereochemistry of product **5k** was determined by X-ray diffraction. The X-ray data have been deposited at the Cambridge Crystallographic Data Center (CCDC 2368440). The data can be obtained free of charge via the internet at https://www.ccdc.cam.ac.uk/structures/. The measurements were taken in a Bruker D8 Venture CCD diffractometer. The data were integrated by Bruker D8 Venture with \f and \w scans absorption corrections. The structure solution and refinement were processed by ShelXL (Sheldrick, 2015). The stereochemistry of other products was assumed by analogy.

Method of crystallization: A solution of **5k** in CH_2Cl_2 and petroleum ether was evaporated the solvent slowly at room temperature.



5k



5k
CCDC 2368440
ORTEP at 50% probability

Table 1 Crystal data and structure refinement for 5k.

Identification code	**5k**
Empirical formula	$C_{18}H_{19}ClN_2O_6$
Formula weight	394.80
Temperature/K	100.00
Crystal system	monoclinic
Space group	$P2_1$
a/Å	8.8928(3)
b/Å	20.9134(8)
c/Å	10.5213(4)
α/°	90

β/°	101.4580(10)
γ/°	90
Volume/Å^3	1917.74(12)
Z	4
ϱ_{calc}g/cm^3	1.367
μ/mm^{-1}	1.373
F(000)	824.0
Crystal size/mm^3	0.065 × 0.065 × 0.06
Radiation	GaKα (λ = 1.34139)
2Θ range for data collection/°	7.354 to 118.61
Index ranges	-10 ≤ h ≤ 11, -26 ≤ k ≤ 26, -13 ≤ l ≤ 13
Reflections collected	30014
Independent reflections	8402 [R_{int} = 0.0532, R_{sigma} = 0.0490]
Data/restraints/parameters	8402/85/495
Goodness-of-fit on F^2	1.077
Final R indexes [I>=2σ (I)]	R_1 = 0.0537, wR_2 = 0.1255
Final R indexes [all data]	R_1 = 0.0575, wR_2 = 0.1277
Largest diff. peak/hole / e Å^{-3}	0.46/-0.37
Flack parameter	0.014(8)

Table 2 Fractional Atomic Coordinates (×10^4) and Equivalent Isotropic Displacement Parameters (Å^2×10^3) for 5k. U_{eq} is defined as 1/3 of the trace of the orthogonalised U_{IJ} tensor.

Atom	*x*	*y*	*z*	U(eq)
Cl1	11780.9(14)	4516.4(5)	13050.9(11)	33.7(3)
O1	7345(3)	3674.6(15)	11124(3)	22.0(6)
O2	12538(3)	3618.9(15)	10807(3)	23.9(6)
O3	6060(3)	3227.0(14)	7961(3)	21.0(6)
O4	4094(3)	3935.9(14)	7565(3)	18.8(6)
O5	4339(4)	5439.1(16)	9656(3)	29.4(7)
O6	4839(3)	4448.8(15)	10480(3)	22.9(6)
N1	6487(4)	4234.7(16)	8612(3)	17.2(7)
N2	5930(4)	4834.1(16)	8853(3)	17.6(7)
C1	8056(4)	4084.5(19)	9181(4)	16.3(8)
C2	8413(4)	3810.5(19)	10414(4)	16.0(8)
C3	9945(4)	3669.1(18)	10961(4)	16.0(7)
C4	11081(4)	3796.8(19)	10246(4)	17.6(8)
C5	10724(4)	4074(2)	9028(4)	20.1(8)
C6	9210(4)	4219(2)	8502(4)	18.3(8)
C7	10358(4)	3391.7(19)	12292(4)	15.8(7)

Table 2 Fractional Atomic Coordinates (×10⁴) and Equivalent Isotropic Displacement Parameters (Å²×10³) for 5k. U_{eq} is defined as 1/3 of the trace of the orthogonalised U_{IJ} tensor.

Atom	*x*	*y*	*z*	U(eq)
C8	11248(5)	3729(2)	13313(4)	21.9(8)
C9	11708(5)	3465(2)	14537(4)	27.6(10)
C10	11225(5)	2855(2)	14762(4)	28.7(10)
C11	10286(5)	2514(2)	13784(4)	27.4(9)
C12	9867(4)	2779(2)	12561(4)	20.5(8)
C20	5421(4)	3798(2)	7998(4)	16.5(8)
C21	5034(5)	2712(2)	7393(5)	25.7(9)
C22	4024(6)	2497(3)	8301(5)	37.6(11)
C30	5009(4)	4874(2)	9724(4)	19.2(8)
C31	3446(7)	5588(3)	10641(6)	42.8(14)
C32	2770(9)	6230(3)	10337(7)	59.4(19)
Cl1A	895.3(17)	7500.3(6)	3001.3(14)	44.9(3)
O1A	2530(3)	6132.4(14)	3590(3)	21.3(6)
O2A	-2710(3)	6155.5(19)	3733(4)	43.6(10)
O3A	3653(3)	6621.7(14)	6915(3)	22.3(6)
O4A	5677(3)	5941.5(14)	7260(3)	19.8(6)
O5A	5522(3)	4414.0(15)	5158(3)	25.1(7)
O6A	5046(3)	5412.8(14)	4337(3)	19.9(6)
N1A	3325(3)	5630.3(16)	6155(3)	16.9(7)
N2A	3928(3)	5034.0(16)	5946(3)	15.1(6)
C1A	1755(4)	5768.2(18)	5546(4)	18.0(8)
C2A	1434(4)	6014.3(19)	4289(4)	17.9(8)
C3A	-84(4)	6141(2)	3683(4)	21.8(8)
C4A	-1251(5)	6018(2)	4364(5)	26.3(10)
C5A	-932(5)	5771(2)	5616(5)	27.8(10)
C6A	578(5)	5648(2)	6197(4)	21.0(8)
C7A	-464(5)	6356(2)	2304(5)	26.1(9)
C8A	-94(5)	6957(2)	1888(5)	28.0(9)
C9A	-489(5)	7143(3)	605(5)	38.1(10)
C10A	-1250(7)	6726(3)	-298(6)	51.5(13)
C11A	-1610(7)	6126(4)	75(6)	60.4(16)
C12A	-1225(7)	5941(3)	1371(5)	48.2(13)
C20A	4340(4)	6068(2)	6827(4)	16.4(7)
C21A	4642(5)	7132(2)	7605(5)	27.3(10)
C22A	5608(6)	7429(3)	6750(6)	38.9(12)
C30A	4854(4)	4983(2)	5084(4)	17.6(8)

Table 2 Fractional Atomic Coordinates (×10⁴) and Equivalent Isotropic Displacement Parameters (Å²×10³) for 5k. U_{eq} is defined as 1/3 of the trace of the orthogonalised U_{IJ} tensor.

Atom	*x*	*y*	*z*	U(eq)
C31A	6361(6)	4251(3)	4131(5)	38.7(12)
C32A	7483(7)	3749(3)	4636(6)	50.8(16)

Table 3 Anisotropic Displacement Parameters (Å²×10³) for 5k. The Anisotropic displacement factor exponent takes the form: $-2\pi^2[h^2a^{*2}U_{11}+2hka^*b^*U_{12}+\ldots]$.

Atom	U_{11}	U_{22}	U_{33}	U_{23}	U_{13}	U_{12}
Cl1	43.5(6)	22.9(5)	28.0(6)	-3.2(4)	-8.8(4)	-9.5(4)
O1	14.2(13)	32.0(17)	20.2(14)	9.3(12)	4.2(10)	5.3(12)
O2	10.8(12)	28.8(16)	31.8(17)	9.6(13)	3.5(11)	0.2(11)
O3	15.3(13)	20.0(15)	26.7(16)	-3.9(12)	1.6(11)	-1.6(11)
O4	14.4(13)	23.2(15)	18.1(14)	4.2(11)	1.1(10)	-0.7(11)
O5	33.7(17)	27.4(17)	32.3(17)	8.0(14)	18.8(14)	12.8(13)
O6	17.7(14)	27.9(16)	23.7(15)	7.4(13)	5.6(11)	2.5(12)
N1	16.3(15)	19.8(17)	14.4(16)	0.6(13)	0.4(12)	1.1(13)
N2	17.2(15)	17.0(17)	18.7(17)	3.5(13)	3.4(12)	1.2(12)
C1	11.8(17)	16.6(18)	19.2(19)	-2.9(15)	0.2(14)	-1.1(14)
C2	13.9(17)	16.4(19)	18.2(19)	-4.2(15)	4.3(14)	-1.0(14)
C3	17.4(18)	12.0(18)	17.0(19)	-1.4(14)	0.0(14)	-0.5(14)
C4	11.8(17)	16.3(19)	24(2)	-3.6(16)	2.9(14)	-0.7(14)
C5	18.2(19)	23(2)	22(2)	-0.9(16)	9.3(15)	-3.0(15)
C6	20.3(19)	21(2)	13.3(18)	1.9(16)	1.9(14)	-2.2(15)
C7	11.9(16)	17.0(19)	18.6(19)	1.5(15)	3.1(14)	2.8(14)
C8	20.1(19)	19(2)	26(2)	-0.1(17)	2.3(16)	1.4(15)
C9	16.9(19)	45(3)	18(2)	0.3(19)	-3.5(15)	1.4(18)
C10	20.0(19)	44(3)	22(2)	16(2)	3.9(16)	7.1(18)
C11	21(2)	30(2)	33(2)	12(2)	12.2(17)	4.4(18)
C12	15.1(17)	23(2)	24(2)	0.8(17)	6.7(15)	0.9(15)
C20	14.1(17)	23(2)	11.5(17)	5.2(15)	1.7(13)	-0.7(14)
C21	19.5(19)	21(2)	35(3)	-8.2(18)	2.1(17)	-1.4(16)
C22	37(3)	32(3)	47(3)	-3(2)	14(2)	-10(2)
C30	15.3(17)	22(2)	20(2)	1.8(16)	3.1(15)	0.2(15)
C31	50(3)	46(3)	42(3)	10(3)	32(3)	21(3)
C32	78(5)	54(4)	56(4)	6(3)	37(4)	28(3)
Cl1A	63.3(8)	19.6(5)	64.5(9)	-4.0(6)	44.0(7)	-7.0(5)
O1A	13.2(12)	27.9(16)	22.2(14)	8.0(12)	2.2(11)	3.5(11)
O2A	10.5(13)	55(2)	63(2)	40(2)	0.2(14)	-1.9(14)
O3A	17.9(13)	22.0(15)	25.5(16)	-5.1(12)	0.6(11)	-3.2(11)

Table 3 Anisotropic Displacement Parameters ($Å^2×10^3$) for 5k. The Anisotropic displacement factor exponent takes the form: $-2π^2[h^2a^{*2}U_{11}+2hka^*b^*U_{12}+…]$.

Atom	U_{11}	U_{22}	U_{33}	U_{23}	U_{13}	U_{12}
O4A	16.4(13)	23.6(15)	17.1(14)	3.4(12)	-2.0(10)	-3.5(11)
O5A	28.2(15)	24.5(16)	25.5(15)	5.4(13)	12.4(12)	9.3(12)
O6A	13.8(13)	23.3(15)	22.5(15)	5.8(12)	3.7(10)	1.6(11)
N1A	15.8(15)	16.8(16)	17.2(16)	-2.0(13)	1.2(12)	1.5(12)
N2A	14.9(14)	14.1(16)	16.2(16)	3.0(13)	2.4(12)	1.9(12)
C1A	14.9(18)	15.4(19)	22(2)	-1.5(15)	0.1(14)	0.3(14)
C2A	16.2(18)	13.9(18)	22.4(19)	0.2(16)	1.4(15)	-3.2(13)
C3A	16.8(18)	18(2)	29(2)	8.1(17)	-1.7(16)	-2.7(15)
C4A	15.4(19)	23(2)	38(2)	10(2)	1.7(17)	-2.6(15)
C5A	17(2)	27(2)	41(3)	8(2)	9.9(18)	-3.8(16)
C6A	20.4(19)	21(2)	21(2)	3.9(17)	2.6(15)	-1.2(16)
C7A	13.6(16)	27.6(18)	33.7(19)	12.4(15)	-3.4(14)	-2.2(14)
C8A	20.7(18)	26.2(17)	40.6(18)	10.0(16)	14.8(15)	4.7(14)
C9A	29(2)	41(2)	48(2)	23.7(16)	15.9(16)	8.8(17)
C10A	38(2)	67(3)	45(2)	27.3(19)	-1.4(19)	-5(2)
C11A	57(3)	72(3)	42(2)	18(2)	-15(2)	-27(2)
C12A	48(3)	47(2)	41(2)	14.7(18)	-12.4(19)	-26(2)
C20A	15.8(17)	21.7(19)	12.0(17)	4.8(15)	3.5(13)	-1.2(14)
C21A	25(2)	22(2)	32(2)	-9.0(19)	-0.7(17)	-6.0(17)
C22A	36(3)	27(3)	52(3)	3(2)	5(2)	-11(2)
C30A	12.7(17)	20.8(19)	16.8(19)	0.2(16)	-2.8(14)	1.2(14)
C31A	50(3)	40(3)	32(3)	8(2)	24(2)	21(2)
C32A	42(3)	66(4)	45(3)	-5(3)	11(2)	26(3)

Table 4 Bond Lengths for 5k.

Atom	Atom	Length/Å	Atom	Atom	Length/Å
Cl1	C8	1.750(4)	Cl1A	C8A	1.740(5)
O1	C2	1.349(5)	O1A	C2A	1.356(5)
O2	C4	1.365(5)	O2A	C4A	1.365(5)
O3	C20	1.326(5)	O3A	C20A	1.321(5)
O3	C21	1.460(5)	O3A	C21A	1.479(5)
O4	C20	1.212(5)	O4A	C20A	1.215(5)
O5	C30	1.318(5)	O5A	C30A	1.326(5)
O5	C31	1.459(5)	O5A	C31A	1.469(5)
O6	C30	1.223(5)	O6A	C30A	1.228(5)
N1	N2	1.389(5)	N1A	N2A	1.392(5)
N1	C1	1.439(5)	N1A	C1A	1.445(5)

Table 4 Bond Lengths for 5k.

Atom	Atom	Length/Å	Atom	Atom	Length/Å
N1	C20	1.381(5)	N1A	C20A	1.378(5)
N2	C30	1.348(5)	N2A	C30A	1.345(5)
C1	C2	1.396(6)	C1A	C2A	1.394(6)
C1	C6	1.391(5)	C1A	C6A	1.384(6)
C2	C3	1.401(5)	C2A	C3A	1.398(5)
C3	C4	1.400(5)	C3A	C4A	1.397(6)
C3	C7	1.493(5)	C3A	C7A	1.493(6)
C4	C5	1.385(6)	C4A	C5A	1.391(6)
C5	C6	1.385(6)	C5A	C6A	1.384(6)
C7	C8	1.393(6)	C7A	C8A	1.393(6)
C7	C12	1.400(6)	C7A	C12A	1.382(7)
C8	C9	1.386(6)	C8A	C9A	1.381(7)
C9	C10	1.383(7)	C9A	C10A	1.366(9)
C10	C11	1.387(7)	C10A	C11A	1.372(9)
C11	C12	1.382(6)	C11A	C12A	1.392(8)
C21	C22	1.504(7)	C21A	C22A	1.497(7)
C31	C32	1.480(8)	C31A	C32A	1.474(7)

Table 5 Bond Angles for 5k.

Atom	Atom	Atom	Angle/°	Atom	Atom	Atom	Angle/°
C20	O3	C21	116.0(3)	C20A	O3A	C21A	115.4(3)
C30	O5	C31	117.1(4)	C30A	O5A	C31A	116.9(3)
N2	N1	C1	118.2(3)	N2A	N1A	C1A	118.5(3)
C20	N1	N2	116.5(3)	C20A	N1A	N2A	116.3(3)
C20	N1	C1	124.7(3)	C20A	N1A	C1A	124.9(3)
C30	N2	N1	117.8(3)	C30A	N2A	N1A	118.9(3)
C2	C1	N1	119.9(3)	C2A	C1A	N1A	119.5(4)
C6	C1	N1	119.7(3)	C6A	C1A	N1A	120.2(4)
C6	C1	C2	120.4(3)	C6A	C1A	C2A	120.2(4)
O1	C2	C1	123.0(3)	O1A	C2A	C1A	123.2(3)
O1	C2	C3	117.5(4)	O1A	C2A	C3A	116.9(4)
C1	C2	C3	119.4(4)	C1A	C2A	C3A	120.0(4)
C2	C3	C7	120.4(3)	C2A	C3A	C7A	120.8(4)
C4	C3	C2	119.0(4)	C4A	C3A	C2A	118.7(4)
C4	C3	C7	120.6(3)	C4A	C3A	C7A	120.4(4)
O2	C4	C3	116.1(4)	O2A	C4A	C3A	116.3(4)
O2	C4	C5	122.5(4)	O2A	C4A	C5A	122.3(4)
C5	C4	C3	121.3(3)	C5A	C4A	C3A	121.4(4)

Table 5 Bond Angles for 5k.

Atom	Atom	Atom	Angle/°	Atom	Atom	Atom	Angle/°
C6	C5	C4	119.2(4)	C6A	C5A	C4A	119.0(4)
C5	C6	C1	120.6(4)	C1A	C6A	C5A	120.7(4)
C8	C7	C3	121.5(4)	C8A	C7A	C3A	123.8(4)
C8	C7	C12	117.4(4)	C12A	C7A	C3A	119.1(4)
C12	C7	C3	121.1(4)	C12A	C7A	C8A	117.1(4)
C7	C8	Cl1	119.0(3)	C7A	C8A	Cl1A	119.8(4)
C9	C8	Cl1	118.8(3)	C9A	C8A	Cl1A	118.1(4)
C9	C8	C7	122.1(4)	C9A	C8A	C7A	122.1(5)
C10	C9	C8	118.9(4)	C10A	C9A	C8A	119.7(5)
C9	C10	C11	120.6(4)	C9A	C10A	C11A	119.7(5)
C12	C11	C10	119.8(4)	C10A	C11A	C12A	120.5(6)
C11	C12	C7	121.2(4)	C7A	C12A	C11A	120.8(5)
O3	C20	N1	110.5(3)	O3A	C20A	N1A	110.7(3)
O4	C20	O3	126.5(4)	O4A	C20A	O3A	126.6(4)
O4	C20	N1	123.0(4)	O4A	C20A	N1A	122.7(4)
O3	C21	C22	111.4(4)	O3A	C21A	C22A	111.1(4)
O5	C30	N2	110.4(3)	O5A	C30A	N2A	111.0(3)
O6	C30	O5	125.1(4)	O6A	C30A	O5A	125.2(4)
O6	C30	N2	124.5(4)	O6A	C30A	N2A	123.8(4)
O5	C31	C32	107.1(4)	O5A	C31A	C32A	107.8(4)

Table 6 Hydrogen Bonds for 5k.

D	H	A	d(D-H)/Å	d(H-A)/Å	d(D-A)/Å	D-H-A/°
O1	H1	O6	0.84	1.91	2.729(4)	165.1
O2	H2	O6[1]	0.84	1.95	2.756(4)	159.4
O1A	H1A	O6A	0.84	1.85	2.681(4)	170.7
O2A	H2AA	O6A[2]	0.84	1.89	2.703(4)	161.9

[1]1+X,+Y,+Z; [2]-1+X,+Y,+Z

Table 7 Torsion Angles for 5k.

A	B	C	D	Angle/°	A	B	C	D	Angle/°
Cl1	C8	C9	C10	176.8(3)	Cl1A	C8A	C9A	C10A	179.2(4)
O1	C2	C3	C4	179.2(3)	O1A	C2A	C3A	C4A	179.2(4)
O1	C2	C3	C7	-1.3(6)	O1A	C2A	C3A	C7A	3.8(6)
O2	C4	C5	C6	177.6(4)	O2A	C4A	C5A	C6A	-179.6(5)
N1	N2	C30	O5	-167.5(3)	N1A	N2A	C30A	O5A	169.7(3)
N1	N2	C30	O6	13.4(6)	N1A	N2A	C30A	O6A	-10.1(6)
N1	C1	C2	O1	0.0(6)	N1A	C1A	C2A	O1A	0.2(6)

Table 7 Torsion Angles for 5k.

A	B	C	D	Angle/°	A	B	C	D	Angle/°
N1	C1	C2	C3	-179.7(3)	N1A	C1A	C2A	C3A	179.1(4)
N1	C1	C6	C5	-179.5(4)	N1A	C1A	C6A	C5A	-179.3(4)
N2	N1	C1	C2	89.2(4)	N2A	N1A	C1A	C2A	-86.9(4)
N2	N1	C1	C6	-90.2(4)	N2A	N1A	C1A	C6A	92.1(5)
N2	N1	C20	O3	-172.7(3)	N2A	N1A	C20A	O3A	177.3(3)
N2	N1	C20	O4	7.3(5)	N2A	N1A	C20A	O4A	-2.5(5)
C1	N1	N2	C30	-103.4(4)	C1A	N1A	N2A	C30A	101.5(4)
C1	N1	C20	O3	-2.4(5)	C1A	N1A	C20A	O3A	4.2(5)
C1	N1	C20	O4	177.6(4)	C1A	N1A	C20A	O4A	-175.5(4)
C1	C2	C3	C4	-1.0(6)	C1A	C2A	C3A	C4A	0.3(6)
C1	C2	C3	C7	178.4(4)	C1A	C2A	C3A	C7A	-175.2(4)
C2	C1	C6	C5	1.2(6)	C2A	C1A	C6A	C5A	-0.3(6)
C2	C3	C4	O2	-176.9(3)	C2A	C3A	C4A	O2A	179.4(4)
C2	C3	C4	C5	1.6(6)	C2A	C3A	C4A	C5A	-0.4(7)
C2	C3	C7	C8	-114.3(4)	C2A	C3A	C7A	C8A	-70.6(6)
C2	C3	C7	C12	65.9(5)	C2A	C3A	C7A	C12A	109.3(5)
C3	C4	C5	C6	-0.8(6)	C3A	C4A	C5A	C6A	0.2(7)
C3	C7	C8	Cl1	4.4(5)	C3A	C7A	C8A	Cl1A	1.1(6)
C3	C7	C8	C9	-176.5(4)	C3A	C7A	C8A	C9A	-178.9(4)
C3	C7	C12	C11	178.1(4)	C3A	C7A	C12A	C11A	179.5(6)
C4	C3	C7	C8	65.2(5)	C4A	C3A	C7A	C8A	114.0(5)
C4	C3	C7	C12	-114.7(4)	C4A	C3A	C7A	C12A	-66.1(7)
C4	C5	C6	C1	-0.6(6)	C4A	C5A	C6A	C1A	0.1(7)
C6	C1	C2	O1	179.4(4)	C6A	C1A	C2A	O1A	-178.8(4)
C6	C1	C2	C3	-0.3(6)	C6A	C1A	C2A	C3A	0.1(6)
C7	C3	C4	O2	3.7(6)	C7A	C3A	C4A	O2A	-5.1(7)
C7	C3	C4	C5	-177.8(4)	C7A	C3A	C4A	C5A	175.1(4)
C7	C8	C9	C10	-2.3(6)	C7A	C8A	C9A	C10A	-0.9(7)
C8	C7	C12	C11	-1.7(6)	C8A	C7A	C12A	C11A	-0.6(9)
C8	C9	C10	C11	-0.5(7)	C8A	C9A	C10A	C11A	-0.2(9)
C9	C10	C11	C12	2.0(7)	C9A	C10A	C11A	C12A	0.9(10)
C10	C11	C12	C7	-0.9(6)	C10A	C11A	C12A	C7A	-0.4(11)
C12	C7	C8	Cl1	-175.8(3)	C12A	C7A	C8A	Cl1A	-178.8(4)
C12	C7	C8	C9	3.3(6)	C12A	C7A	C8A	C9A	1.3(7)
C20	O3	C21	C22	-74.6(5)	C20A	O3A	C21A	C22A	78.9(5)
C20	N1	N2	C30	67.6(4)	C20A	N1A	N2A	C30A	-72.0(4)
C20	N1	C1	C2	-81.0(5)	C20A	N1A	C1A	C2A	86.0(5)
C20	N1	C1	C6	99.6(5)	C20A	N1A	C1A	C6A	-95.0(5)

Table 7 Torsion Angles for 5k.

A	B	C	D	Angle/°	A	B	C	D	Angle/°
C21	O3	C20	O4	-3.0(6)	C21A	O3A	C20A	O4A	0.5(6)
C21	O3	C20	N1	177.0(3)	C21A	O3A	C20A	N1A	-179.2(3)
C30	O5	C31	C32	-178.0(5)	C30A	O5A	C31A	C32A	157.9(5)
C31	O5	C30	O6	6.2(7)	C31A	O5A	C30A	O6A	-10.2(6)
C31	O5	C30	N2	-172.8(4)	C31A	O5A	C30A	N2A	170.0(4)

Table 8 Hydrogen Atom Coordinates (Å×10⁴) and Isotropic Displacement Parameters (Å²×10³) for 5k.

Atom	*x*	*y*	*z*	U(eq)
H1	6526.38	3867.48	10811.66	33
H2	13169.91	3844.84	10510.98	36
H2A	6171.57	5176.32	8449.67	21
H5	11509.07	4162.45	8558.28	24
H6	8956.4	4413.01	7670.08	22
H9	12345.56	3699.76	15208.95	33
H10	11538.93	2666.96	15595.03	34
H11	9931.11	2100.67	13953.06	33
H12	9235.32	2541.57	11891.31	25
H21A	5649.65	2346.1	7189.16	31
H21B	4384.52	2863.02	6572.35	31
H22A	3464.97	2110.83	7954.08	56
H22B	3291.55	2836.27	8387.22	56
H22C	4659.36	2402.94	9153.38	56
H31A	4115.03	5586.62	11514.13	51
H31B	2625.87	5266.3	10626.25	51
H32A	2061.43	6217.88	9495.19	89
H32B	3589.86	6538.83	10302.77	89
H32C	2212.42	6357.79	11010.7	89
H1A	3327.31	5925.77	3906	32
H2AA	-3339.3	5956.48	4084.14	65
H2AB	3705.83	4695.67	6371.22	18
H5A	-1738.02	5688.91	6066.8	33
H6A	807.47	5478.24	7051.15	25
H9A	-233.42	7558.7	352.64	46
H10A	-1528.98	6851.38	-1181.72	62
H11A	-2126.8	5833.88	-554.89	72
H12A	-1487.64	5525.21	1616.05	58
H21C	5314.47	6950.64	8385.1	33

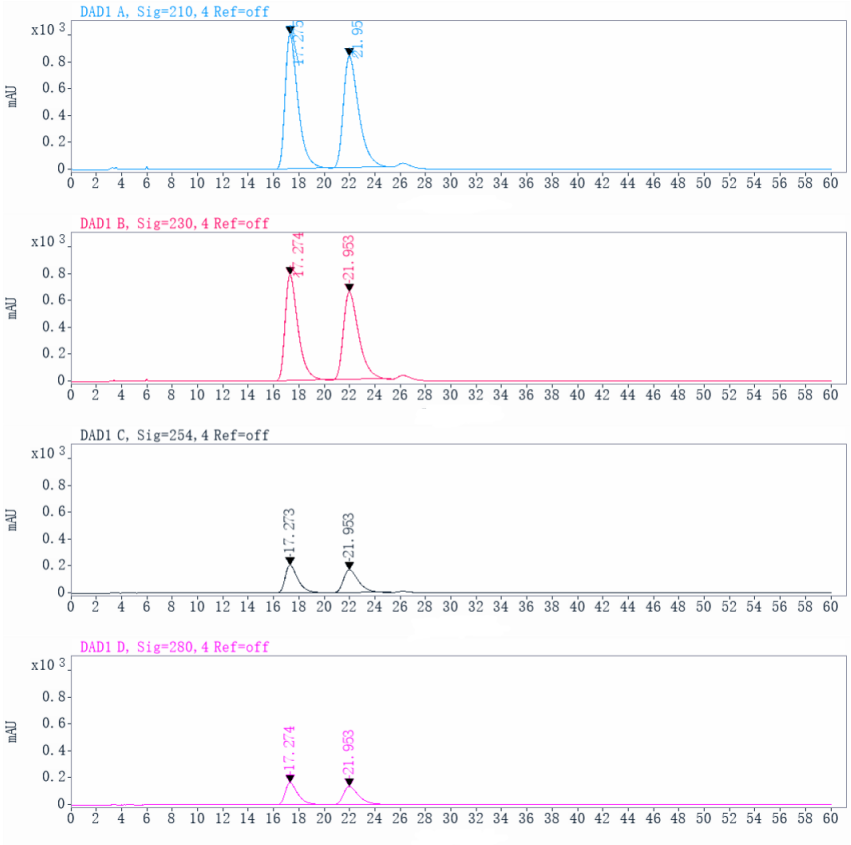
Table 8 Hydrogen Atom Coordinates (Å×10⁴) and Isotropic Displacement Parameters (Å²×10³) for 5k.

Atom	*x*	*y*	*z*	U(eq)
H21D	3992.61	7465.39	7893.57	33
H22D	4943.86	7603.69	5972.72	58
H22E	6284.99	7103.04	6496.26	58
H22F	6229.56	7772.8	7221.18	58
H31C	6894.79	4633.79	3886.51	46
H31D	5638.92	4095.51	3352.92	46
H32D	7970.37	3594.42	3936.86	76
H32E	6956.81	3393.23	4970.3	76
H32F	8266.68	3924.39	5336.85	76

Agilent Technologies

File of data: D:\ChemStation\2\Data\2023-10-16S 2023-10-16 09-06-31\ZHH-6-1-RAC.D
Sample name: ZHH-6-1-RAC
Remarks: ZHH-6-1-RAC
Acq. instrument: LC1260
Injection date: 2023/10/16 18:13:18
Acq.Method 0D-20-60.M
Analysis Method: 0D-20-60.M
Last changed 2024/4/19 15:14:44

Location: P2-D1
Inj: 1 of 1
Inj Volume 5.000
Acq. Operator: system



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Signal: DAD1 A, Sig=210,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
17.275	BB	1.0384	71097.0859	1006.1107	50.1827	
21.950	BB	1.2683	70579.2734	833.1794	49.8173	
		total	141676.3594			

Signal: DAD1 B, Sig=230,4 Ref=off

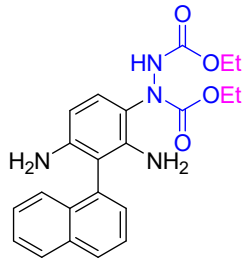
RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
17.274	BB	1.0756	56263.6680	791.2463	50.1212	
21.953	BB	1.2847	55991.6602	656.7013	49.8788	
		total	112255.3281			

Signal: DAD1 C, Sig=254,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
17.273	BB	1.0490	14531.9512	208.0298	50.3023	
21.953	BB	1.2548	14357.2930	171.1317	49.6977	
		total	28889.2441			

Signal: DAD1 D, Sig=280,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
17.274	BB	1.0525	11446.4023	163.9557	50.1609	
21.953	BB	1.2592	11372.9775	134.9555	49.8391	
		total	22819.3799			

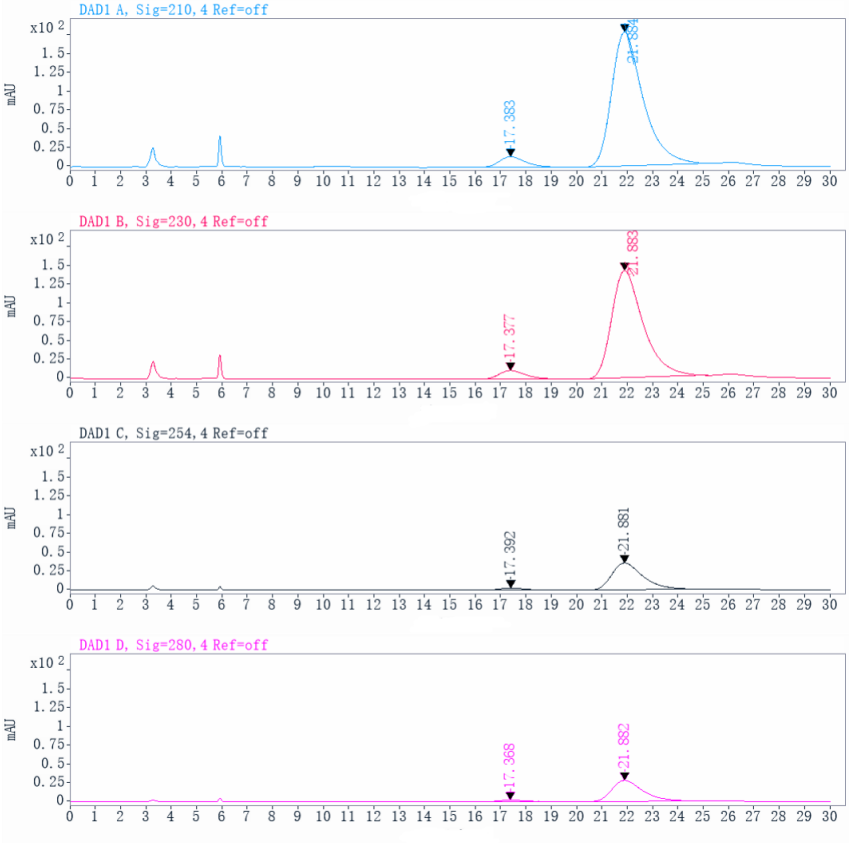


3a-rac

Agilent Technologies

File of data: D:\ChemStation\2\Data\2023-11-2S.2S 2023-11-02 16-56-46\zhh-6-27-2.D
Sample name: zhh-6-27-2
Remarks: zhh-6-27-2
Acq. instrument: LC1260
Injection date: 2023/11/2 17:09:41
Acq.Method 0D-20-30.M
Analysis Method: 0D-20-30.M
Last changed 2024/4/19 15:16:39

Location: P2-D4
Inj: 1 of 1
Inj Volume 5.000
Acq. Operator: system



Agilent Technologies

Signal: DAD1 A, Sig=210,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
17.383	BB	0.8664	1020.8027	14.1367	6.1295	
21.884	BB	1.2553	15633.1240	178.9350	93.8705	
		total	16653.9267			

Signal: DAD1 B, Sig=230,4 Ref=off

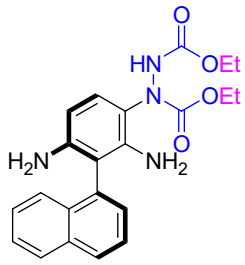
RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
17.377	BB	0.9301	865.6924	11.6339	6.4815	
21.883	BB	1.2862	12490.7100	143.4053	93.5185	
		total	13356.4024			

Signal: DAD1 C, Sig=254,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
17.392	MM	1.1974	203.8153	2.8370	6.1475	
21.881	BB	1.2433	3111.5896	35.9664	93.8525	
		total	3315.4049			

Signal: DAD1 D, Sig=280,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
17.368	MM	1.1522	158.3492	2.2905	6.0059	
21.882	BB	1.2466	2478.2173	28.3286	93.9941	
		total	2636.5665			

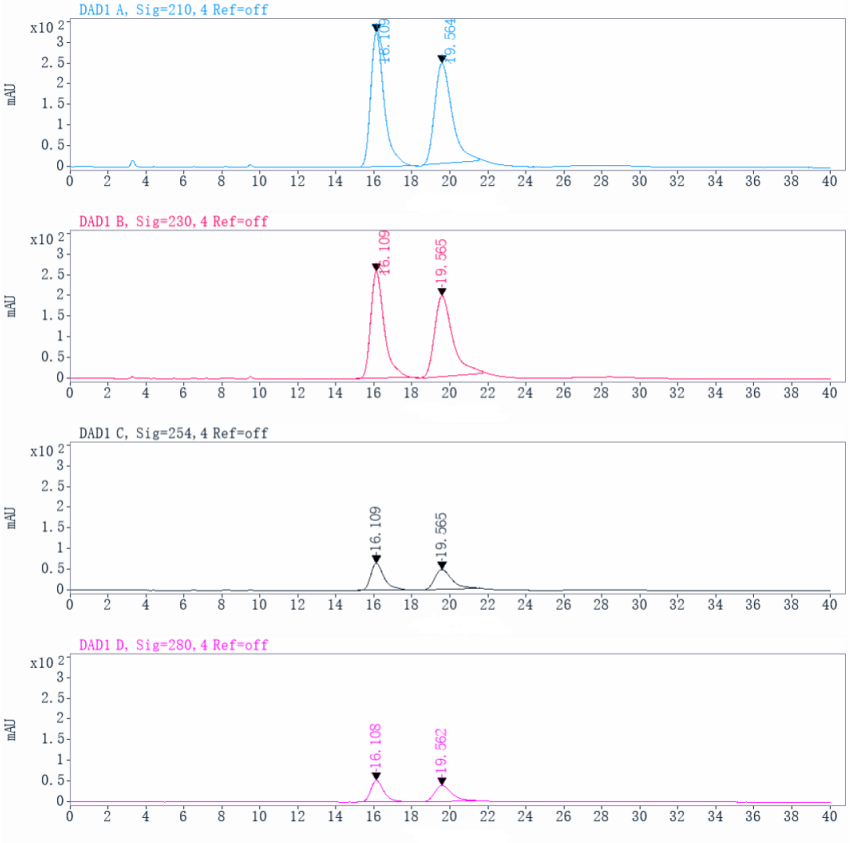


3a

Agilent Technologies

File of data: D:\ChemStation\2\Data\2023-11-14-2.S 2023-11-13 23-48-31\zhh-6-43-1.D
Sample name: zhh-6-43-1
Remarks: zhh-6-43-1
Acq. instrument: LC1260
Injection date: 2023/11/15 1:58:32
Acq.Method IC-20-40.M
Analysis Method: IC-20-40.M
Last changed 2024/4/19 15:22:03

Location: P2-D1
Inj: 1 of 1
Inj Volume 5.000
Acq. Operator: system



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Signal: DAD1 A, Sig=210,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
16.109	BB	0.7486	16169.5479	326.0485	50.9369	
19.564	MM	1.0686	15574.7021	242.9219	49.0631	
		total	31744.2500			

Signal: DAD1 B, Sig=230,4 Ref=off

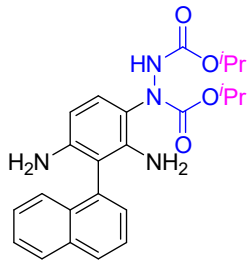
RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
16.109	BB	0.7560	12968.2334	259.0559	49.5445	
19.565	MM	1.1221	13206.6777	196.1589	50.4555	
		total	26174.9111			

Signal: DAD1 C, Sig=254,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
16.109	BB	0.7561	3274.5256	65.4082	50.5928	
19.565	MM	1.0919	3197.7881	48.8092	49.4072	
		total	6472.3137			

Signal: DAD1 D, Sig=280,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
16.108	BB	0.7236	2537.4795	52.1547	49.3440	
19.562	MM	1.0975	2604.9473	39.5597	50.6560	
		total	5142.4268			

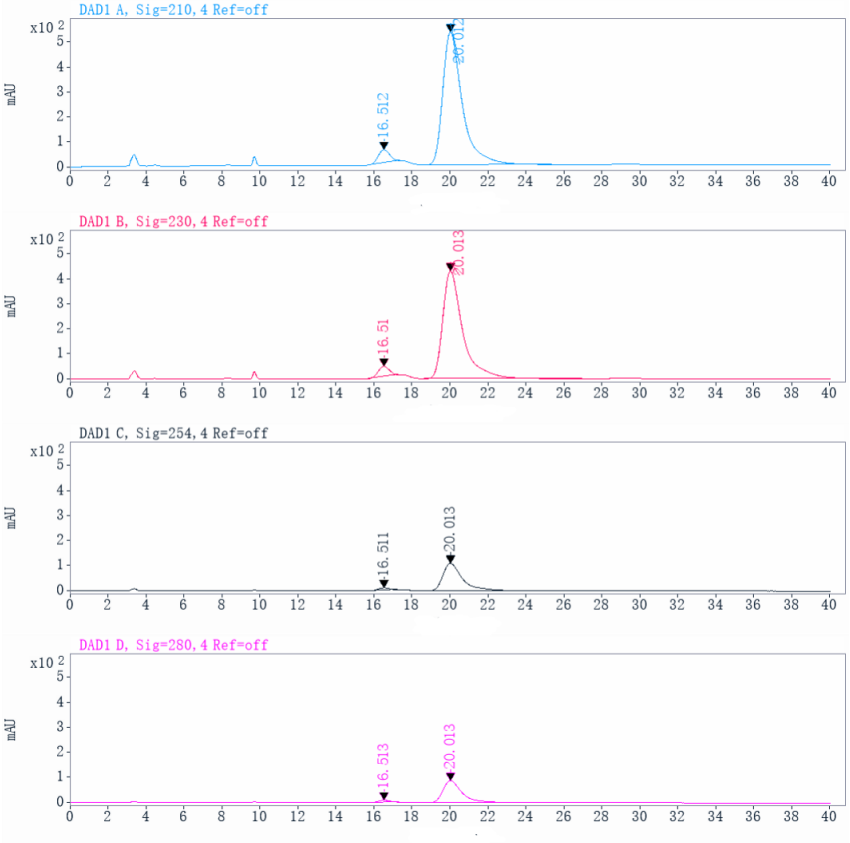


3b-rac

Agilent Technologies

File of data: D:\ChemStation\2\Data\2023-11-18S 2023-11-18 11-05-50\zhh-6-42.D
Sample name: zhh-6-42
Remarks: zhh-6-42
Acq. instrument: LC1260
Injection date: 2023/11/18 11:18:56
Acq.Method IC-20-40.M
Analysis Method: IC-20-40.M
Last changed 2024/4/19 15:19:17

Location: P2-D1
Inj: 1 of 1
Inj Volume 10.000
Acq. Operator: system



Agilent Technologies

Signal: DAD1 A, Sig=210,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
16.512	BB	0.6317	2217.5964	52.4071	5.4778	
20.012	BB	1.0662	38265.5039	531.3139	94.5222	
		total	40483.1003			

Signal: DAD1 B, Sig=230,4 Ref=off

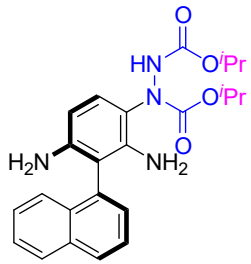
RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
16.510	BB	0.6512	1703.9152	41.3087	5.0973	
20.013	BB	1.0902	31723.9961	431.2607	94.9027	
		total	33427.9113			

Signal: DAD1 C, Sig=254,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
16.511	BB	0.6321	407.2042	10.0625	4.7729	
20.013	BB	1.0766	8124.3760	110.6577	95.2271	
		total	8531.5801			

Signal: DAD1 D, Sig=280,4 Ref=off

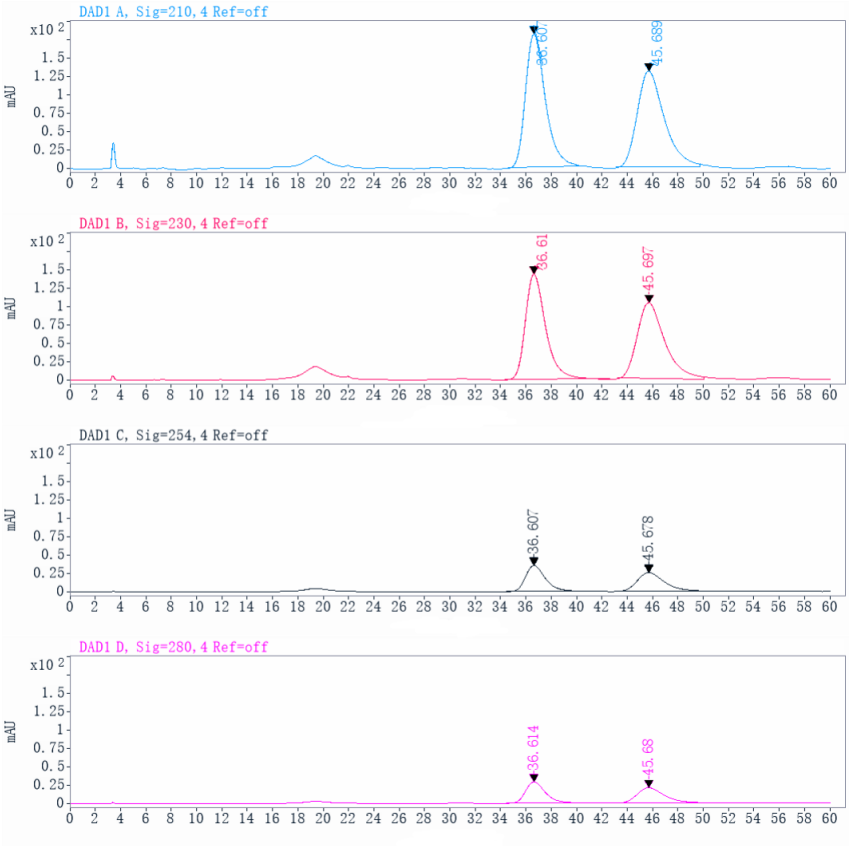
RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
16.513	MM	0.7053	362.4068	8.5642	5.4678	
20.013	BB	1.0553	6265.5884	88.1408	94.5322	
		total	6627.9952			



3b

Agilent Technologies

File of data:	D:\ChemStation\2\Data\2023-11-14-2.S 2023-11-13 23-48-31\zhh-6-43-2,.D		
Sample name:	zhh-6-43-2,		
Remarks:	zhh-6-43-2,		
Acq. instrument:	LC1260	Location:	P2-D2
Injection date:	2023/11/16 2:52:48	Inj:	1 of 1
Acq.Method	IC-05-60.M	Inj Volume	10.000
Analysis Method:	IC-05-60.M	Acq. Operator:	system
Last changed	2024/4/19 15:23:48		



Agilent Technologies

Signal: DAD1 A, Sig=210,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
36.607	BB	1.5153	19891.8223	181.4096	50.5083	
45.689	MM	2.4916	19491.4258	130.3813	49.4917	
		total	39383.2480			

Signal: DAD1 B, Sig=230,4 Ref=off

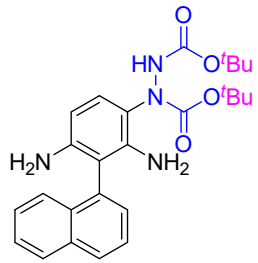
RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
36.610	BB	1.7093	16097.1338	143.4327	50.5146	
45.697	MM	2.5462	15769.1514	103.2184	49.4854	
		total	31866.2852			

Signal: DAD1 C, Sig=254,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
36.607	BB	1.4090	3931.1877	35.4703	50.1681	
45.678	BB	1.7994	3904.8423	25.5166	49.8319	
		total	7836.0300			

Signal: DAD1 D, Sig=280,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
36.614	BB	1.3748	3154.5386	28.8247	50.0763	
45.680	BB	1.7800	3144.9287	20.7997	49.9237	
		total	6299.4673			

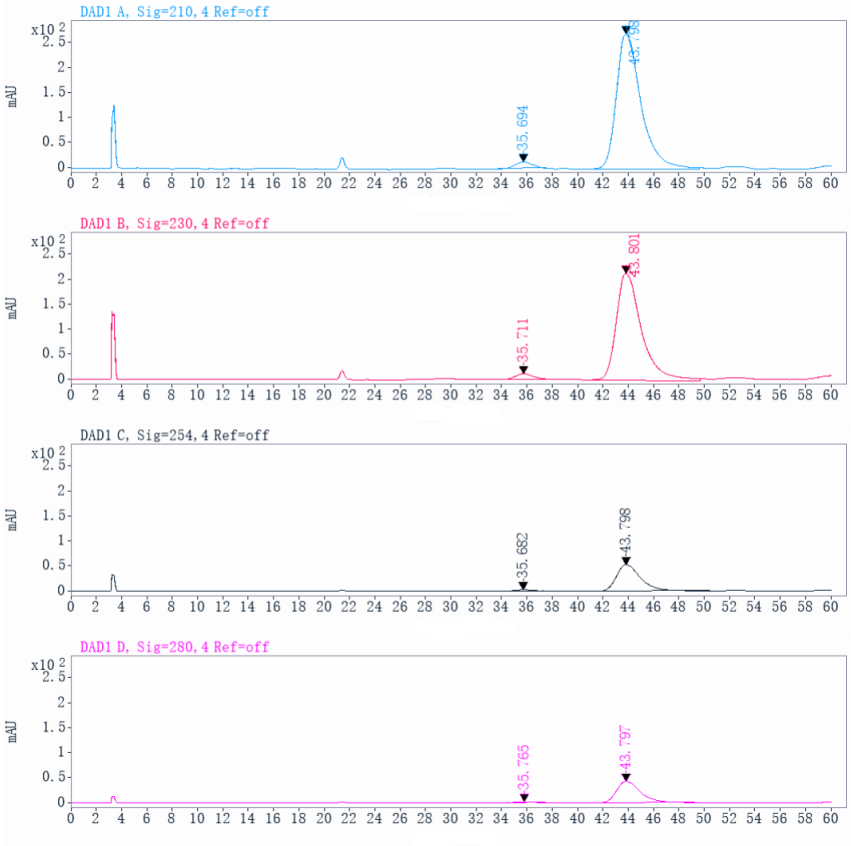


3c-rac

Agilent Technologies

File of data: D:\ChemStation\2\Data\2023-11-18S 2023-11-18 11-05-50\zhh-6-52.D
Sample name: zhh-6-52
Remarks: zhh-6-52
Acq. instrument: LC1260
Injection date: 2023/11/18 12:22:49
Acq.Method IC-05-60.M
Analysis Method: IC-05-60.M
Last changed 2024/4/19 15:25:51

Location: P2-D2
Inj: 1 of 1
Inj Volume 10.000
Acq. Operator: system



Agilent Technologies

Signal: DAD1 A, Sig=210,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
35.694	BB	1.1824	1362.8904	13.5625	3.5071	
43.798	MM	2.3015	37498.3438	271.5456	96.4929	
		total	38861.2341			

Signal: DAD1 B, Sig=230,4 Ref=off

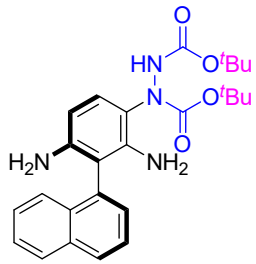
RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
35.711	BB	1.2113	1181.1959	11.4908	3.7772	
43.801	MM	2.3382	30090.7129	214.4841	96.2228	
		total	31271.9088			

Signal: DAD1 C, Sig=254,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
35.682	MM	1.6008	265.5793	2.7651	3.6060	
43.798	BB	1.6575	7099.2896	52.7702	96.3940	
		total	7364.8689			

Signal: DAD1 D, Sig=280,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
35.765	MM	1.6282	230.0093	2.3544	3.8799	
43.797	BB	1.5950	5698.2881	42.8074	96.1201	
		total	5928.2974			

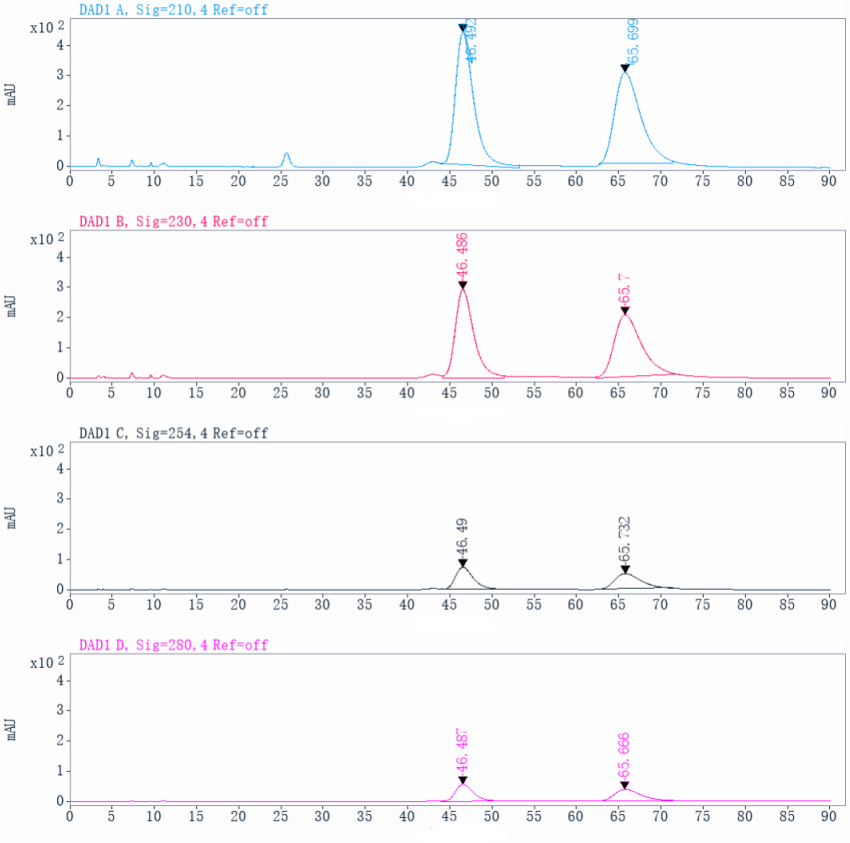


3c

Agilent Technologies

File of data: D:\ChemStation\2\Data\2023-11-16.S 2023-11-16 09-41-22\zhh-6-43-4.D
Sample name: zhh-6-43-4
Remarks: zhh-6-43-4
Acq. instrument: LC1260
Injection date: 2023/11/16 12:16:02
Acq.Method IC-20-90.M
Analysis Method: IC-20-90.M
Last changed 2024/4/19 15:30:41

Location: P2-D4
Inj: 1 of 1
Inj Volume 10.000
Acq. Operator: system



Agilent Technologies

Signal: DAD1 A, Sig=210,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
46.492	MM	2.5277	66984.1016	441.6737	50.2851	
65.699	MM	3.6330	66224.4219	303.8106	49.7149	
		total	133208.5234			

Signal: DAD1 B, Sig=230,4 Ref=off

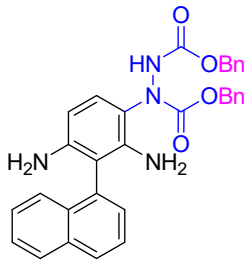
RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
46.486	MM	2.5774	45740.6250	295.7771	49.6512	
65.700	MM	3.7425	46383.3086	206.5603	50.3488	
		total	92123.9336			

Signal: DAD1 C, Sig=254,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
46.490	MM	2.5506	11441.3740	74.7620	50.8441	
65.732	MM	3.6053	11061.4590	51.1352	49.1559	
		total	22502.8330			

Signal: DAD1 D, Sig=280,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
46.487	MM	2.5775	8907.2354	57.5966	50.5721	
65.666	MM	3.7064	8705.7109	39.1471	49.4279	
		total	17612.9463			

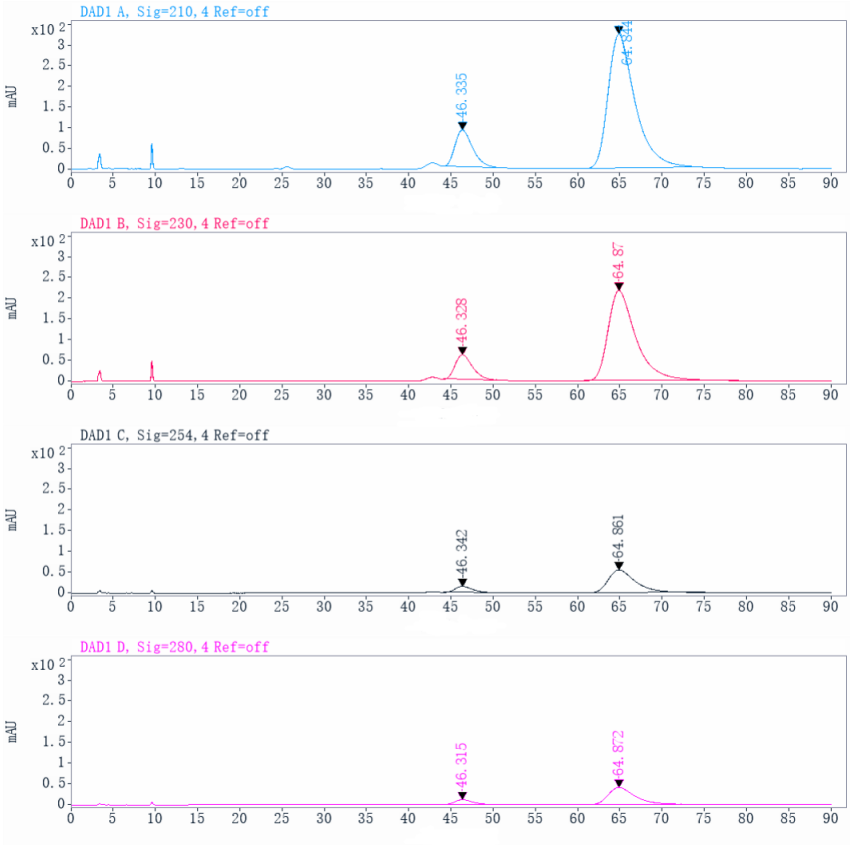


3d-rac

Agilent Technologies

File of data: D:\ChemStation\2\Data\2023-11-21S 2023-11-21 21-19-07\zhh-6-56.D
Sample name: zhh-6-56
Remarks: zhh-6-56
Acq. instrument: LC1260
Injection date: 2023/11/21 21:32:10
Acq.Method IC-20-90.M
Analysis Method: IC-20-90.M
Last changed 2024/4/19 15:32:41

Location: P2-D9
Inj: 1 of 1
Inj Volume 10.000
Acq. Operator: system



Agilent Technologies

Signal: DAD1 A, Sig=210,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
46.335	MM	2.4190	12823.2695	88.3522	15.0567	
64.844	BB	2.6181	72343.0156	323.3576	84.9433	
		total	85166.2852			

Signal: DAD1 B, Sig=230,4 Ref=off

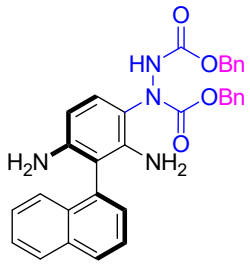
RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
46.328	MM	2.3987	8498.8535	59.0520	14.4172	
64.870	BB	2.9644	50450.6211	217.9615	85.5828	
		total	58949.4746			

Signal: DAD1 C, Sig=254,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
46.342	BB	1.7064	2150.7839	14.8440	14.6717	
64.861	BB	2.6806	12508.6699	54.9740	85.3283	
		total	14659.4539			

Signal: DAD1 D, Sig=280,4 Ref=off

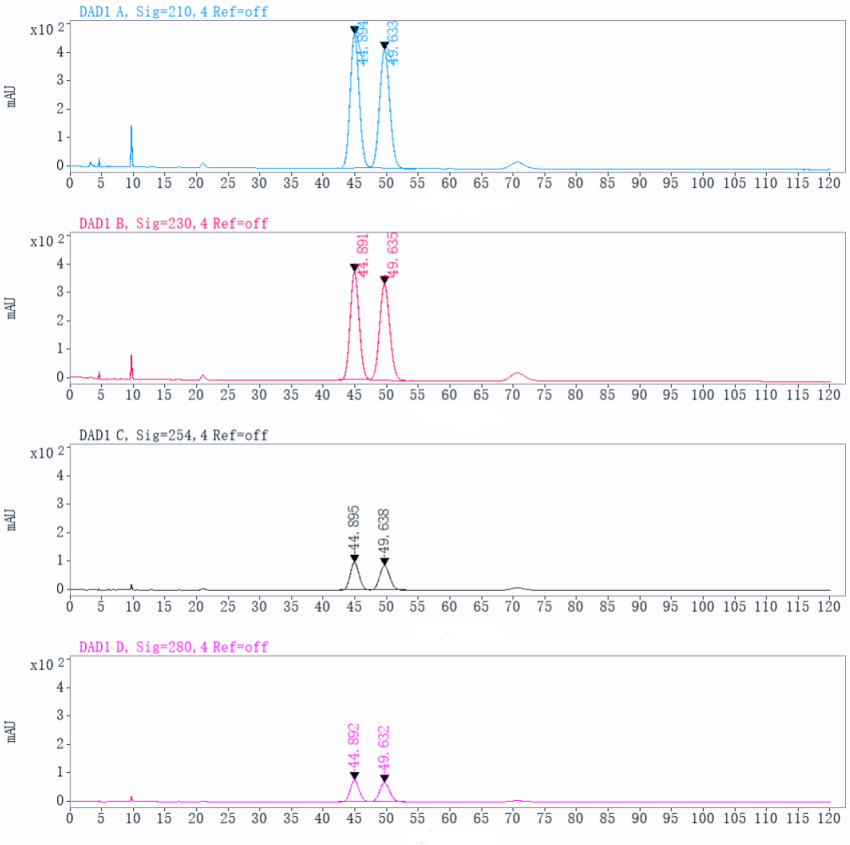
RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
46.315	BB	1.7417	1724.2247	11.5898	15.6909	
64.872	MM	3.7249	9264.4541	41.4531	84.3091	
		total	10988.6788			



3d

Agilent Technologies

File of data:	D:\ChemStation\2\Data\2023-11-19S 2023-11-19 19-50-37\zhh-6-43-5rac-ad.D		
Sample name:	zhh-6-43-5rac-ad		
Remarks:	zhh-6-43-5rac-ad		
Acq. instrument:	LC1260	Location:	P2-D8
Injection date:	2023/11/19 22:27:31	Inj:	1 of 1
Acq.Method	AD-30-120.M	Inj Volume	10.000
Analysis Method:	AD-30-120.M	Acq. Operator:	system
Last changed	2024/4/19 15:39:42		



Agilent Technologies

Signal: DAD1 A, Sig=210,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
44.894	MM	1.6612	47183.8242	473.3937	49.7960	
49.633	MM	1.8914	47570.5117	419.1913	50.2040	
		total	94754.3359			

Signal: DAD1 B, Sig=230,4 Ref=off

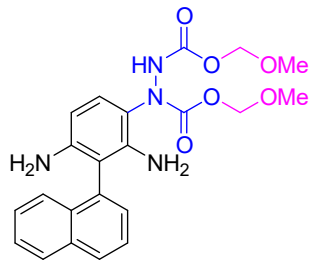
RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
44.891	MM	1.6574	37961.5625	381.7308	49.2867	
49.635	MM	1.9077	39060.3320	341.2440	50.7133	
		total	77021.8945			

Signal: DAD1 C, Sig=254,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
44.895	BB	1.4735	9614.8584	97.7563	50.1260	
49.638	BB	1.6718	9566.5176	86.2654	49.8740	
		total	19181.3760			

Signal: DAD1 D, Sig=280,4 Ref=off

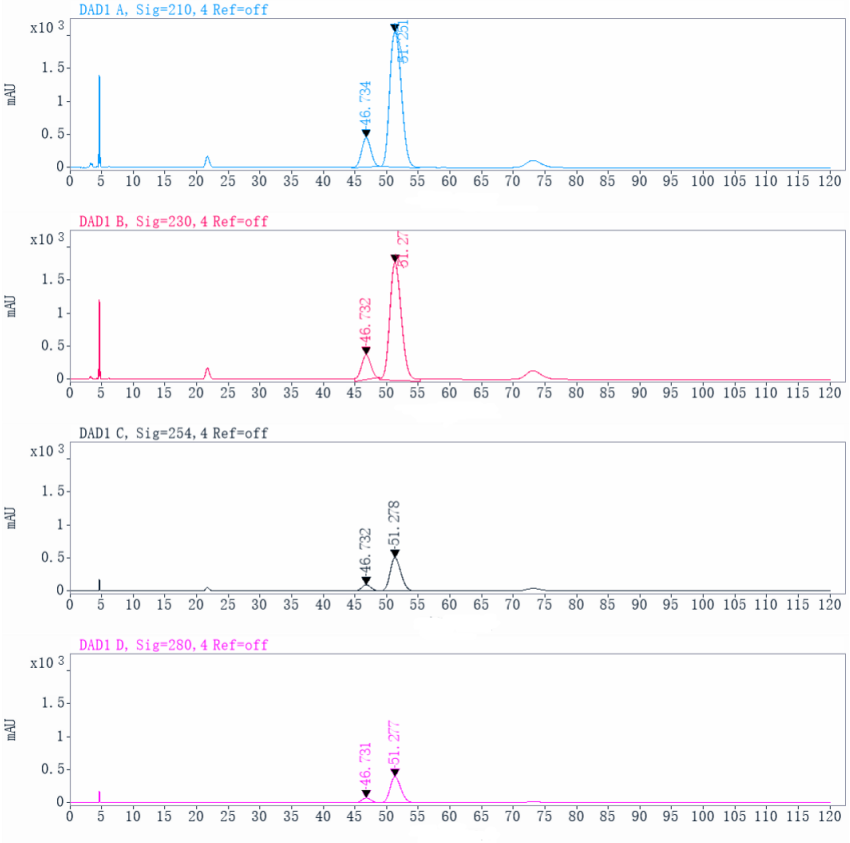
RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
44.892	BB	1.4753	7497.2266	76.2390	50.1637	
49.632	BB	1.6429	7448.3071	67.2094	49.8363	
		total	14945.5337			



3e-rac

Agilent Technologies

File of data:	D:\ChemStation\2\Data\2023-11-21S 2023-11-21 21-19-07\zhh-6-58.D		
Sample name:	zhh-6-58		
Remarks:	zhh-6-58		
Acq. instrument:	LC1260	Location:	P2-D11
Injection date:	2023/11/22 0:57:39	Inj:	1 of 1
Acq.Method	AD-30-120.M	Inj Volume	10.000
Analysis Method:	AD-30-120.M	Acq. Operator:	system
Last changed	2024/4/19 15:38:45		



Agilent Technologies

Signal: DAD1 A, Sig=210,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
46.734	MM	1.7482	47888.5000	456.5598	15.1311	
51.251	MM	2.1766	268602.7500	2056.7227	84.8689	
		total	316491.2500			

Signal: DAD1 B, Sig=230,4 Ref=off

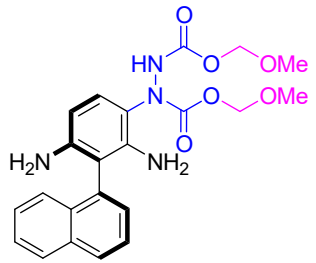
RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
46.732	MM	1.7781	40706.1875	381.5614	15.0184	
51.270	MM	2.1414	230335.1250	1792.7108	84.9816	
		total	271041.3125			

Signal: DAD1 C, Sig=254,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
46.732	BB	1.5260	9449.6914	93.2737	13.3109	
51.278	MM	2.0110	61542.1719	510.0447	86.6891	
		total	70991.8633			

Signal: DAD1 D, Sig=280,4 Ref=off

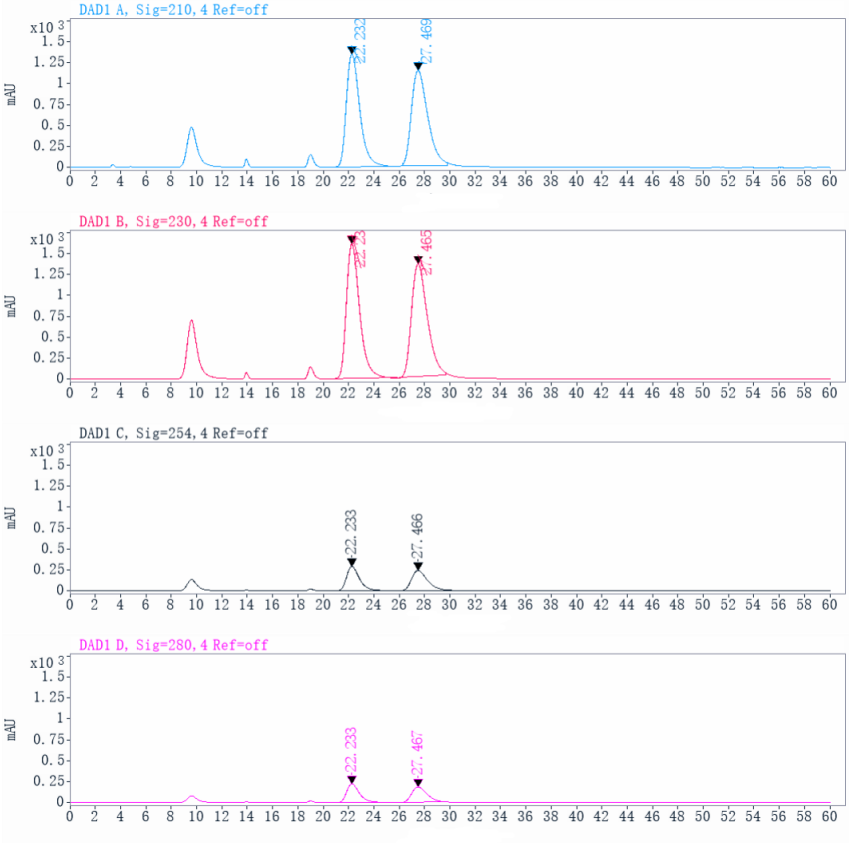
RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
46.731	BB	1.4771	7353.0654	72.6351	13.2601	
51.277	MM	2.0114	48099.5313	398.5588	86.7399	
		total	55452.5967			



3e

Agilent Technologies

File of data:	D:\ChemStation\2\Data\20231203.1S 2023-12-04 09-32-08\ZHH-6-72RAC.D		
Sample name:	ZHH-6-72RAC		
Remarks:	ZHH-6-72RAC		
Acq. instrument:	LC1260	Location:	P2-D5
Injection date:	2023/12/7 12:17:19	Inj:	1 of 1
Acq.Method	IC-10-60.M	Inj Volume	10.000
Analysis Method:	IC-10-60.M	Acq. Operator:	system
Last changed	2024/4/19 15:49:23		



Agilent Technologies

Signal: DAD1 A, Sig=210,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
22.232	BB	1.1337	100843.1797	1352.7079	49.2473	
27.469	MM	1.5042	103925.9531	1151.5234	50.7527	
		total	204769.1328			

Signal: DAD1 B, Sig=230,4 Ref=off

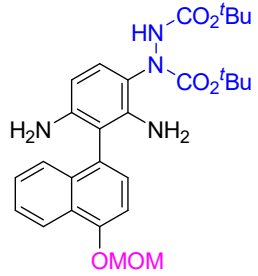
RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
22.230	BB	1.1241	118510.6172	1618.7372	50.0738	
27.465	MM	1.4529	118161.4063	1355.4799	49.9262	
		total	236672.0234			

Signal: DAD1 C, Sig=254,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
22.233	BB	1.0923	20956.1309	293.0591	49.0423	
27.466	BB	1.3312	21774.5527	244.4473	50.9577	
		total	42730.6836			

Signal: DAD1 D, Sig=280,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
22.233	BB	1.0908	15952.1621	224.0188	50.6324	
27.467	MM	1.4101	15553.6592	183.8388	49.3676	
		total	31505.8213			

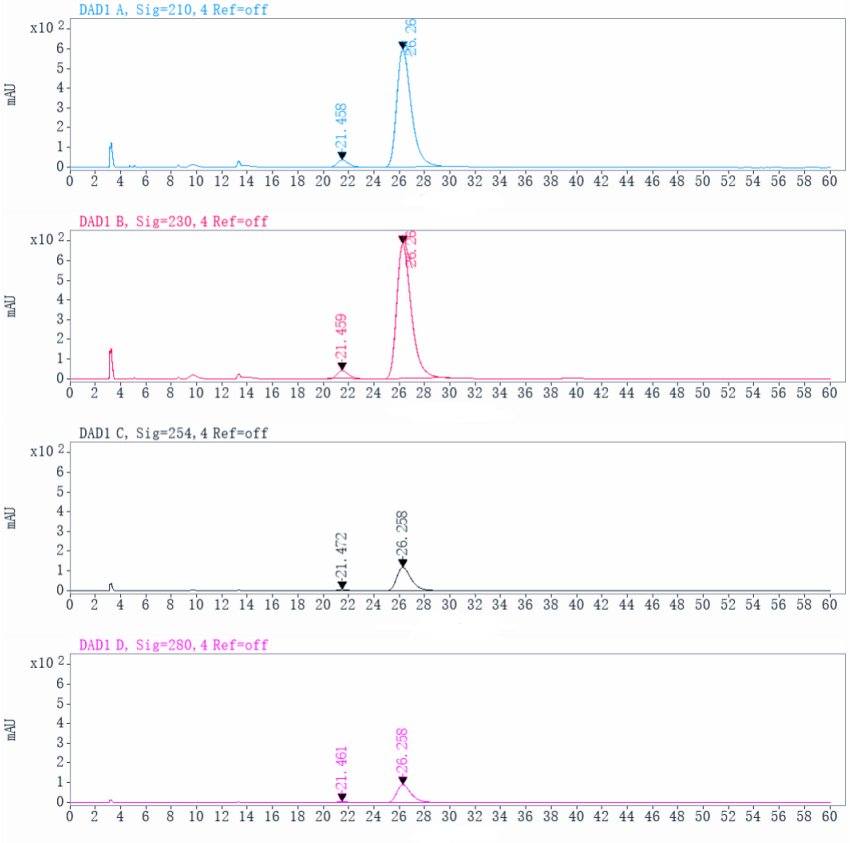


3f-rac

Agilent Technologies

File of data: D:\ChemStation\2\Data\2023-11-30S 2023-11-30 10-06-33\ZHH-6-72.D
Sample name: ZHH-6-72
Remarks: ZHH-6-72
Acq. instrument: LC1260
Injection date: 2023/12/1 22:50:41
Acq.Method IC-10-60.M
Analysis Method: IC-10-60.M
Last changed 2024/4/19 15:51:24

Location: P2-D6
Inj: 1 of 1
Inj Volume 5.000
Acq. Operator: system



Agilent Technologies

Signal: DAD1 A, Sig=210,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
21.458	BB	0.8734	2369.5669	36.9863	4.6842	
26.260	BB	1.2244	48216.4648	596.8870	95.3158	
		total	50586.0317			

Signal: DAD1 B, Sig=230,4 Ref=off

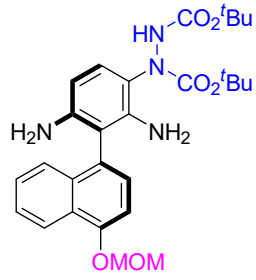
RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
21.459	BB	0.9529	2775.1357	43.0010	4.7965	
26.260	BB	1.2211	55082.0586	684.3180	95.2035	
		total	57857.1943			

Signal: DAD1 C, Sig=254,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
21.472	BB	0.7602	470.2677	7.3529	4.7083	
26.258	BB	1.2111	9517.8760	118.7430	95.2917	
		total	9988.1436			

Signal: DAD1 D, Sig=280,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
21.461	BB	0.7664	363.2419	5.6625	4.7684	
26.258	BB	1.2071	7254.4521	90.5080	95.2316	
		total	7617.6941			

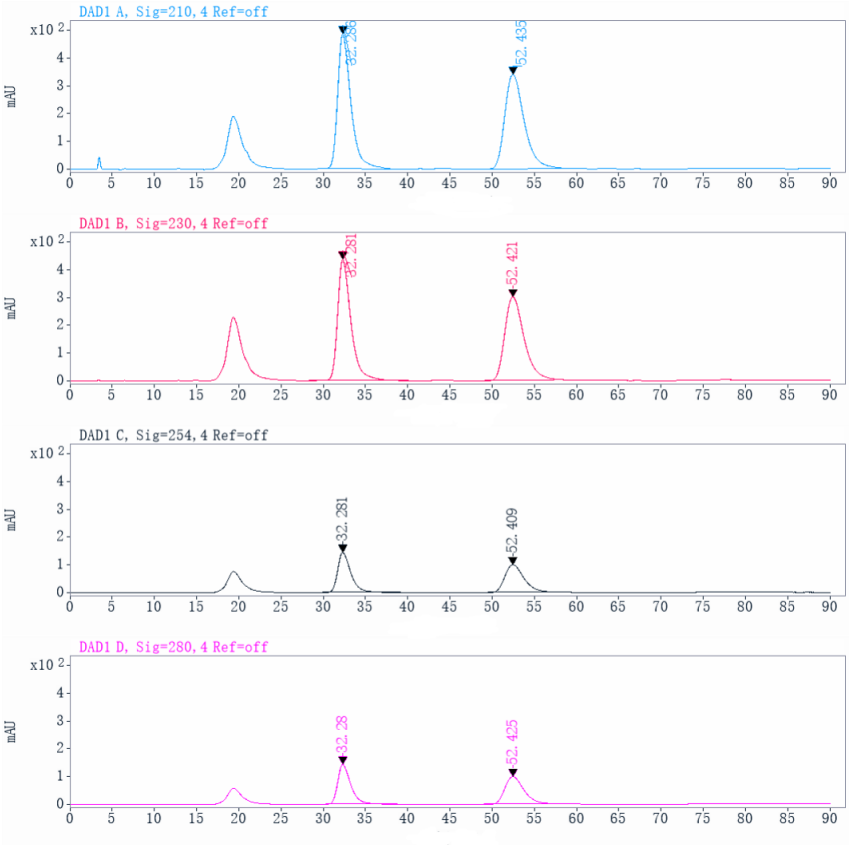


3f

Agilent Technologies

File of data: D:\ChemStation\2\Data\2023-11-30S 2023-11-30 10-06-33\zhh-6-68rac..D
Sample name: zhh-6-68rac.
Remarks: zhh-6-68rac.
Acq. instrument: LC1260
Injection date: 2023/11/30 14:30:40
Acq.Method IC-05-90.M
Analysis Method: IC-05-90.M
Last changed 2024/4/19 15:41:15

Location: P2-D3
Inj: 1 of 1
Inj Volume 10.000
Acq. Operator: system



Agilent Technologies

Signal: DAD1 A, Sig=210,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
32.286	BB	1.5530	53400.2852	485.5673	49.3394	
52.435	BB	1.9417	54830.1797	340.6822	50.6606	
		total	108230.4648			

Signal: DAD1 B, Sig=230,4 Ref=off

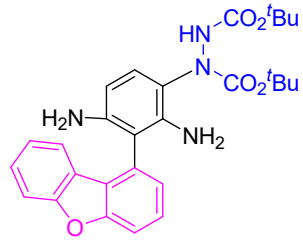
RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
32.281	BB	1.6783	48268.4141	437.1052	50.2198	
52.421	MM	2.6561	47845.8008	300.2206	49.7802	
		total	96114.2148			

Signal: DAD1 C, Sig=254,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
32.281	BB	1.6068	15749.6768	144.5959	49.9959	
52.409	MM	2.6387	15752.2314	99.4958	50.0041	
		total	31501.9082			

Signal: DAD1 D, Sig=280,4 Ref=off

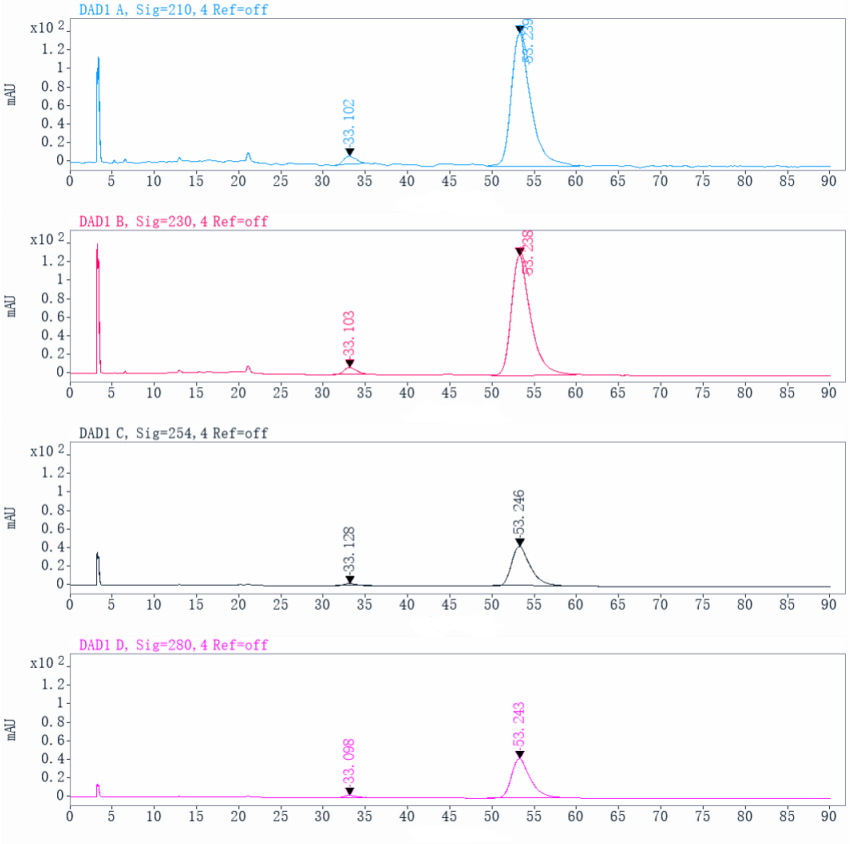
RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
32.280	BB	1.6258	15602.7217	143.8046	49.5539	
52.425	MM	2.6696	15883.6201	99.1636	50.4461	
		total	31486.3418			



3g-rac

Agilent Technologies

File of data:	D:\ChemStation\2\Data\2023-11-30S 2023-11-30 10-06-33\zhh-6-68..D		
Sample name:	zhh-6-68.		
Remarks:	zhh-6-68.		
Acq. instrument:	LC1260	Location:	P2-D1
Injection date:	2023/11/30 16:02:17	Inj:	1 of 1
Acq.Method	IC-05-90.M	Inj Volume	10.000
Analysis Method:	IC-05-90.M	Acq. Operator:	system
Last changed	2024/4/19 15:41:15		



Agilent Technologies

Signal: DAD1 A, Sig=210,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
33.102	BB	1.2587	979.1064	9.1772	4.0039	
53.239	MM	2.7150	23474.8379	144.1081	95.9961	
		total	24453.9443			

Signal: DAD1 B, Sig=230,4 Ref=off

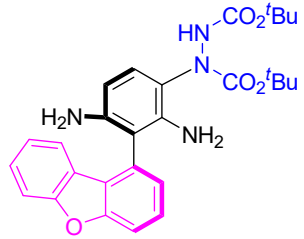
RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
33.103	BB	1.2654	827.0163	7.6732	3.8441	
53.238	MM	2.6591	20687.1563	129.6647	96.1559	
		total	21514.1725			

Signal: DAD1 C, Sig=254,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
33.128	MM	1.6427	234.7435	2.3816	3.4456	
53.246	MM	2.5760	6578.1484	42.5611	96.5544	
		total	6812.8920			

Signal: DAD1 D, Sig=280,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
33.098	MM	1.8160	283.7657	2.6043	4.0680	
53.243	MM	2.6250	6691.7490	42.4865	95.9320	
		total	6975.5147			

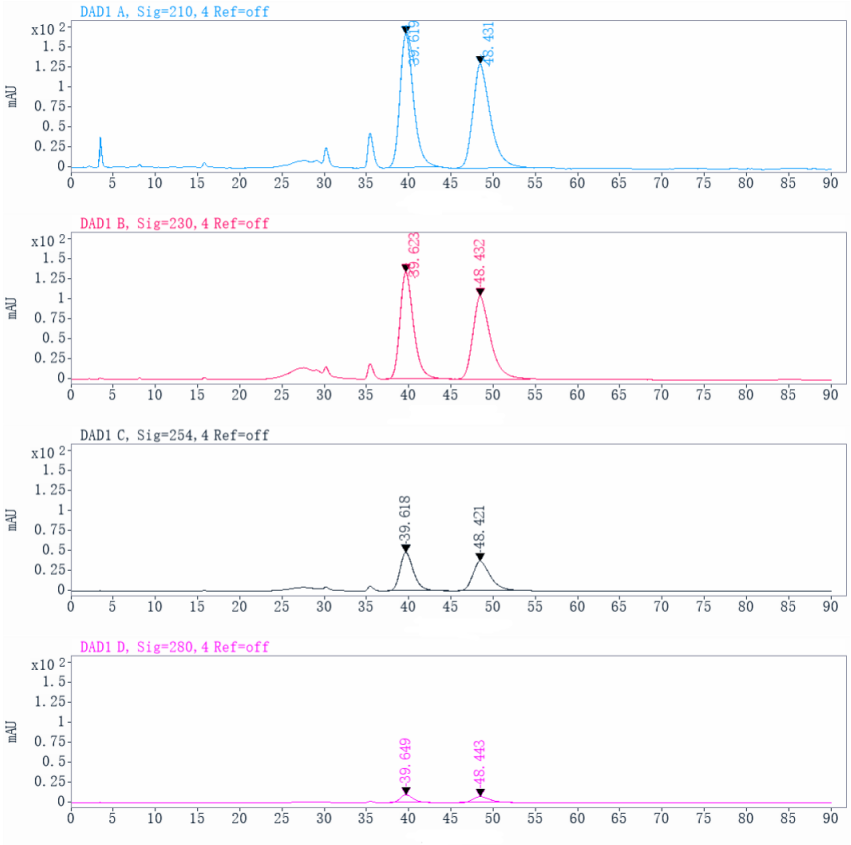


3g

Agilent Technologies

File of data: D:\ChemStation\2\Data\2023-12-20-2S 2023-12-20 16-43-00\ZHH-6-92RAC.D
Sample name: ZHH-6-92RAC
Remarks: ZHH-6-92RAC
Acq. instrument: LC1260
Injection date: 2023/12/20 20:22:59
Acq.Method IC-03-90.M
Analysis Method: IC-03-90.M
Last changed 2024/4/19 15:57:32

Location: P2-D2
Inj: 1 of 1
Inj Volume 10.000
Acq. Operator: system



Agilent Technologies

Signal: DAD1 A, Sig=210,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
39.619	BB	1.4160	18733.3926	166.5855	49.7115	
48.431	MM	2.4158	18950.8535	130.7437	50.2885	
		total	37684.2461			

Signal: DAD1 B, Sig=230,4 Ref=off

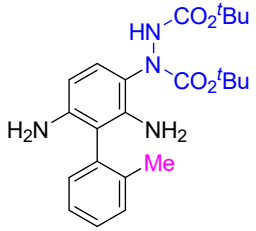
RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
39.623	BB	1.6504	15030.0527	133.6060	49.1343	
48.432	MM	2.4740	15559.6572	104.8193	50.8657	
		total	30589.7100			

Signal: DAD1 C, Sig=254,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
39.618	BB	1.4311	5364.0117	47.9502	50.2156	
48.421	BB	1.7320	5317.9546	37.1970	49.7844	
		total	10681.9663			

Signal: DAD1 D, Sig=280,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
39.649	BB	1.2676	1043.5813	9.6969	49.2300	
48.443	MM	2.3523	1076.2256	7.6252	50.7700	
		total	2119.8069			

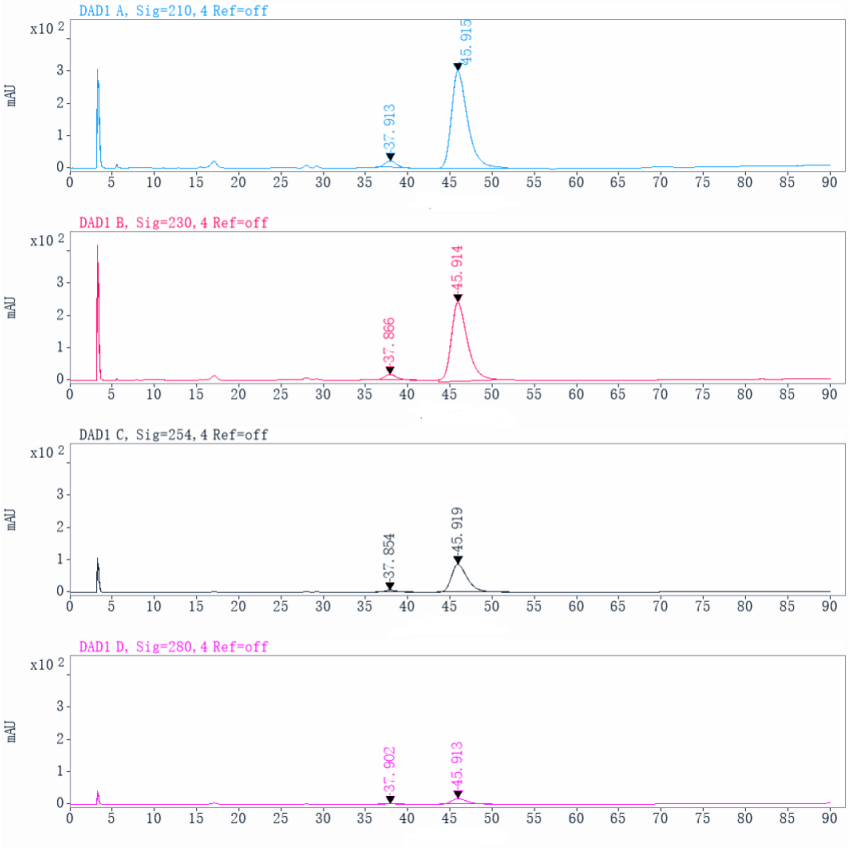


3h-rac

Agilent Technologies

File of data: D:\ChemStation\2\Data\2023-12-20-2S 2023-12-20 16-43-00\ZHH-6-92.D
Sample name: ZHH-6-92
Remarks: ZHH-6-92
Acq. instrument: LC1260
Injection date: 2023/12/20 21:54:41
Acq.Method IC-03-90.M
Analysis Method: IC-03-90.M
Last changed 2024/4/19 15:57:32

Location: P2-D1
Inj: 1 of 1
Inj Volume 10.000
Acq. Operator: system



Agilent Technologies

Signal: DAD1 A, Sig=210,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
37.913	BB	1.1712	2140.3418	21.5415	4.9617	
45.915	MM	2.2565	40996.6875	302.8064	95.0383	
		total	43137.0293			

Signal: DAD1 B, Sig=230,4 Ref=off

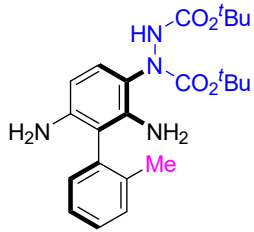
RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
37.866	BB	1.2209	1761.7686	17.0582	5.0357	
45.914	MM	2.2576	33223.8047	245.2700	94.9643	
		total	34985.5732			

Signal: DAD1 C, Sig=254,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
37.854	BB	1.1864	610.9688	6.0385	5.0831	
45.919	BB	1.7650	11408.7354	86.8248	94.9169	
		total	12019.7042			

Signal: DAD1 D, Sig=280,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
37.902	MM	1.6449	129.1686	1.3088	5.3935	
45.913	BB	1.5091	2265.7273	17.6802	94.6065	
		total	2394.8959			

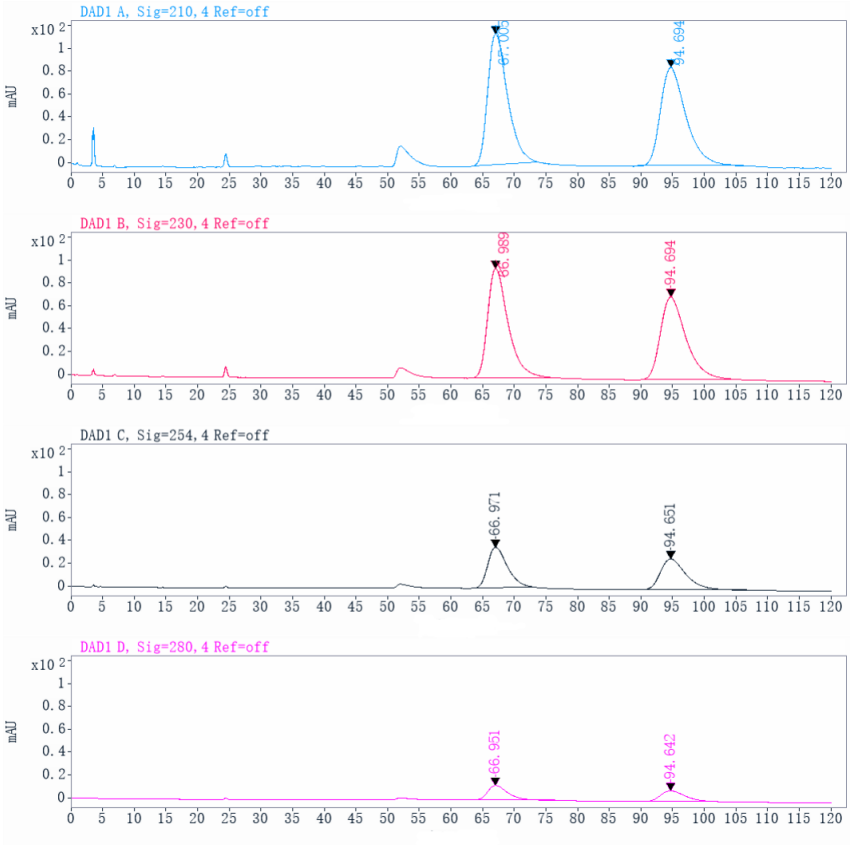


3h

Agilent Technologies

File of data: D:\ChemStation\2\Data\2023-12-13S 2023-12-13 09-01-46\ZHH-6-78RAC.D
Sample name: ZHH-6-78RAC
Remarks: ZHH-6-78RAC
Acq. instrument: LC1260
Injection date: 2023/12/13 9:14:44
Acq.Method IC-05-120.M
Analysis Method: IC-05-120.M
Last changed 2024/4/19 15:54:57

Location: P2-C11
Inj: 1 of 1
Inj Volume 15.000
Acq. Operator: system



Agilent Technologies

Signal: DAD1 A, Sig=210,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
67.005	BB	2.5735	25161.0684	114.6007	50.7621	
94.694	MM	4.7034	24405.5703	86.4818	49.2379	
		total	49566.6387			

Signal: DAD1 B, Sig=230,4 Ref=off

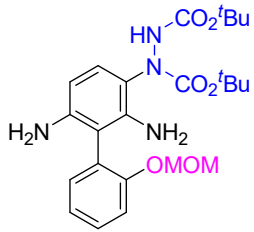
RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
66.989	BB	2.6690	21737.7090	95.8802	51.5321	
94.694	BB	3.3022	20445.1563	72.5847	48.4679	
		total	42182.8652			

Signal: DAD1 C, Sig=254,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
66.971	MM	3.5822	7590.5161	35.3158	50.2294	
94.651	MM	4.6364	7521.1953	27.0371	49.7706	
		total	15111.7114			

Signal: DAD1 D, Sig=280,4 Ref=off

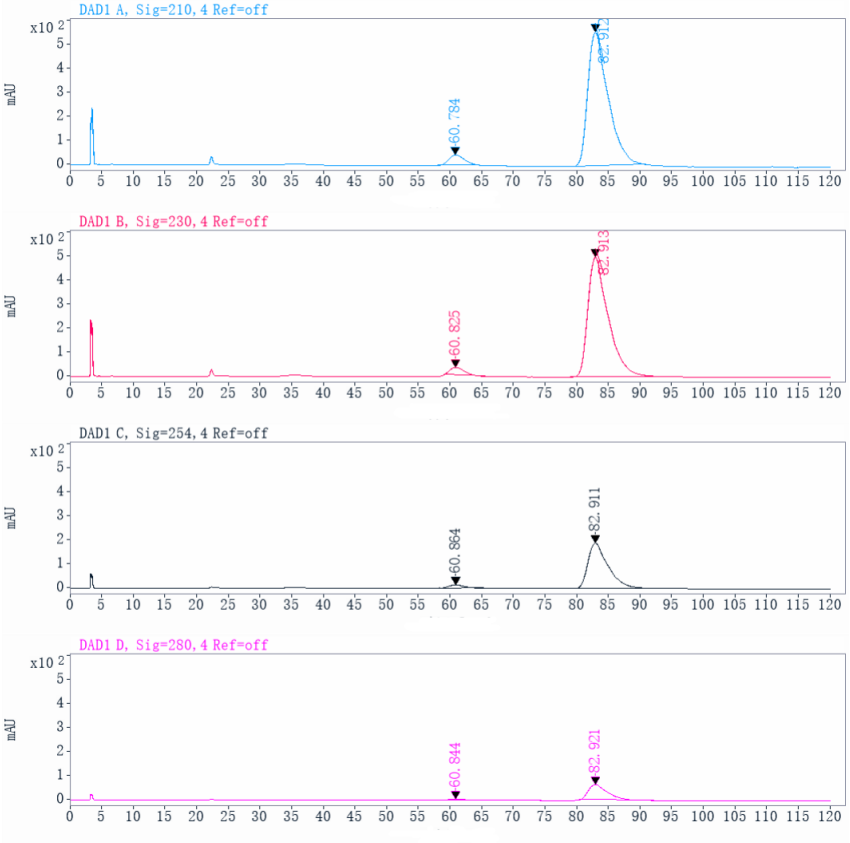
RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
66.951	MM	3.6444	2741.9766	12.5397	50.6316	
94.642	MM	4.6347	2673.5674	9.6143	49.3684	
		total	5415.5439			



3i-rac

Agilent Technologies

File of data:	D:\ChemStation\2\Data\2023-12-13S 2023-12-13 09-01-46\ZHH-6-78.D		
Sample name:	ZHH-6-78		
Remarks:	ZHH-6-78		
Acq. instrument:	LC1260	Location:	P2-D2
Injection date:	2023/12/13 11:16:22	Inj:	1 of 1
Acq.Method	IC-05-120.M	Inj Volume	15.000
Analysis Method:	IC-05-120.M	Acq. Operator:	system
Last changed	2024/4/19 15:54:57		



Agilent Technologies

Signal: DAD1 A, Sig=210,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
60.784	MM	2.8175	7199.7046	42.5896	5.4609	
82.912	BB	2.6508	124641.1875	558.2474	94.5391	
		total	131840.8921			

Signal: DAD1 B, Sig=230,4 Ref=off

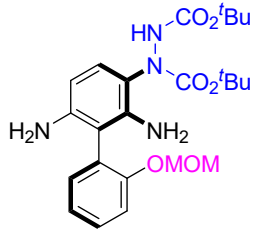
RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
60.825	BB	1.8894	5167.9224	32.1488	4.4065	
82.913	BB	3.1099	112110.6953	500.3811	95.5935	
		total	117278.6177			

Signal: DAD1 C, Sig=254,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
60.864	MM	2.8179	2304.9470	13.6325	5.1930	
82.911	BB	2.6808	42080.5469	190.0834	94.8070	
		total	44385.4939			

Signal: DAD1 D, Sig=280,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
60.844	MM	2.4801	617.9988	4.1531	4.3068	
82.921	BB	2.5530	13731.2588	64.4132	95.6932	
		total	14349.2576			

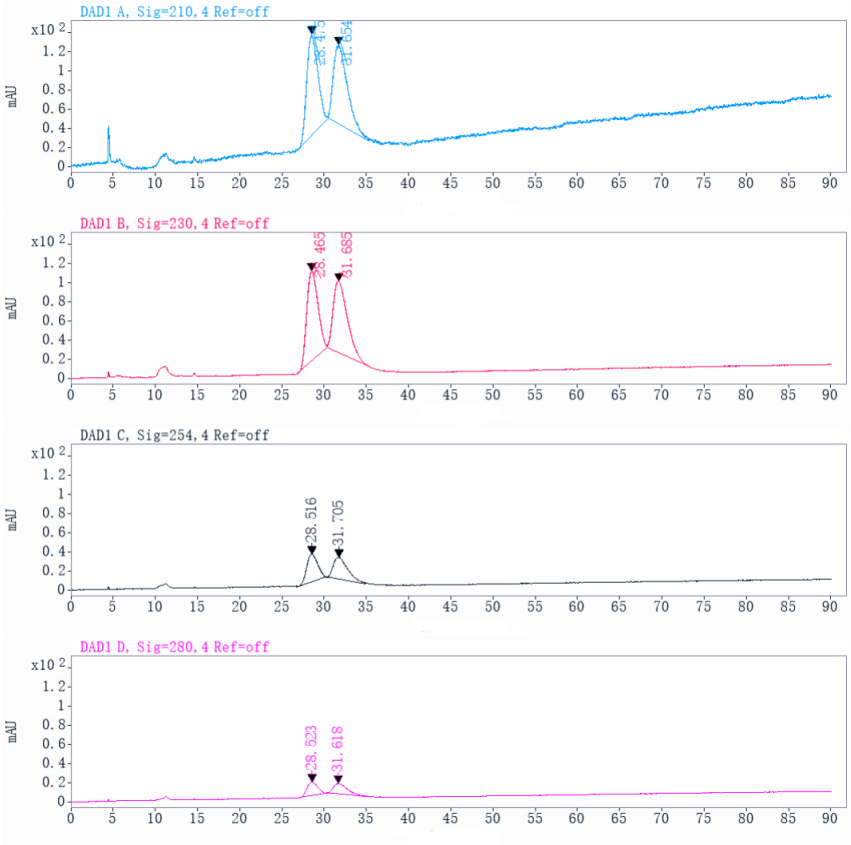


3i

Agilent Technologies

File of data: D:\ChemStation\2\Data\2024-4-21.S 2024-04-21 15-11-13\ZHH-7-12RAC.D
Sample name: ZHH-7-12RAC
Remarks: ZHH-7-12RAC
Acq. instrument: LC1260
Injection date: 2024/4/21 21:31:00
Acq.Method 0D-5-90-0.7.M
Analysis Method: 0D-5-90-0.7.M
Last changed 2024/5/23 10:12:54

Location: P2-D3
Inj: 1 of 1
Inj Volume 5.000
Acq. Operator: system



Agilent Technologies

Signal: DAD1 A, Sig=210,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
28.475	MM	1.5273	9731.0488	106.1928	50.0281	
31.654	MM	1.9600	9720.0996	82.6529	49.9719	
		total	19451.1484			

Signal: DAD1 B, Sig=230,4 Ref=off

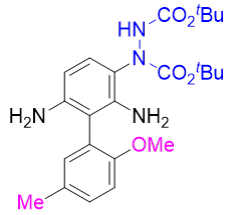
RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
28.465	MM	1.5447	8741.8789	94.3233	49.5226	
31.685	MM	1.9732	8910.4336	75.2624	50.4774	
		total	17652.3125			

Signal: DAD1 C, Sig=254,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
28.516	MM	1.5451	2711.8325	29.2517	49.8743	
31.705	MM	1.9865	2725.5056	22.8670	50.1257	
		total	5437.3381			

Signal: DAD1 D, Sig=280,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
28.523	VB R	1.0757	1311.5461	14.4124	49.6466	
31.618	MM	1.9547	1330.2175	11.3420	50.3534	
		total	2641.7637			

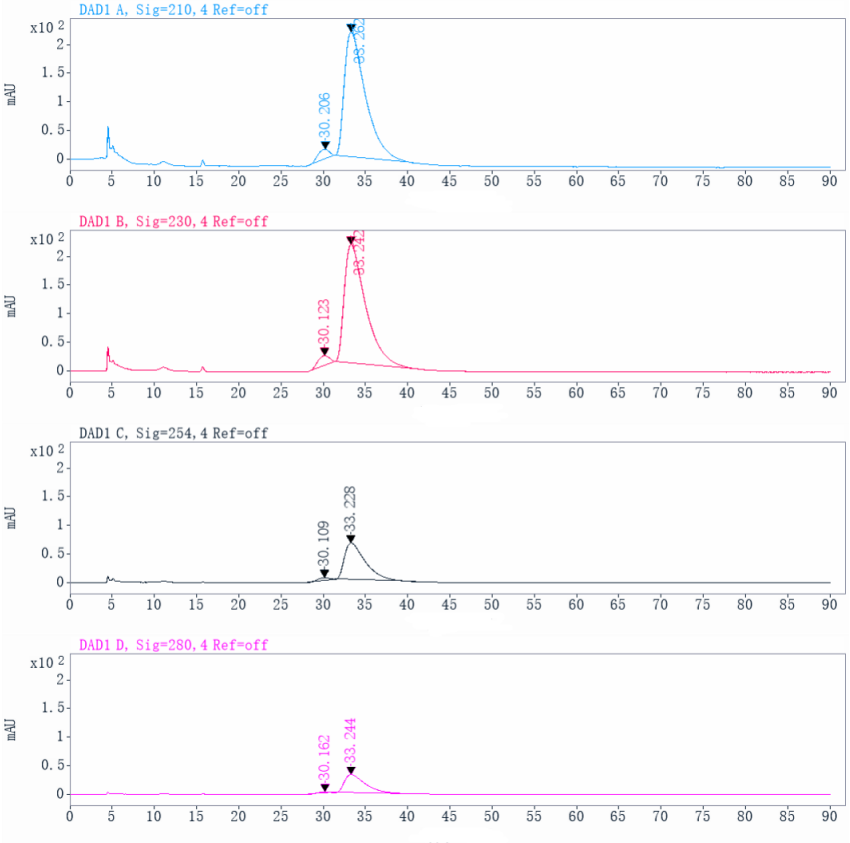


3j-rac

Agilent Technologies

File of data: D:\ChemStation\2\Data\2024-1-7.S 2024-01-07 19-46-32\ZHH-7-12.D
Sample name: ZHH-7-12
Remarks: ZHH-7-12
Acq. instrument: LC1260
Injection date: 2024/1/7 21:23:23
Acq.Method 0D-5-90-0.7.M
Analysis Method: 0D-5-90-0.7.M
Last changed 2024/5/23 10:17:12

Location: P2-D5
Inj: 1 of 1
Inj Volume 5.000
Acq. Operator: system



Agilent Technologies

Signal: DAD1 A, Sig=210,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
30.206	BB	1.1836	1733.7325	17.2644	4.3151	
33.262	BB	2.0705	38444.7031	218.7361	95.6849	
		total	40178.4357			

Signal: DAD1 B, Sig=230,4 Ref=off

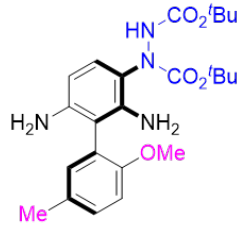
RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
30.123	BB	1.1416	1638.8213	16.8960	4.2939	
33.242	BB	2.0867	36527.6172	207.2081	95.7061	
		total	38166.4385			

Signal: DAD1 C, Sig=254,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
30.109	MM	1.1072	483.1847	5.1676	4.0875	
33.228	BB	2.0596	11337.8730	64.5380	95.9125	
		total	11821.0578			

Signal: DAD1 D, Sig=280,4 Ref=off

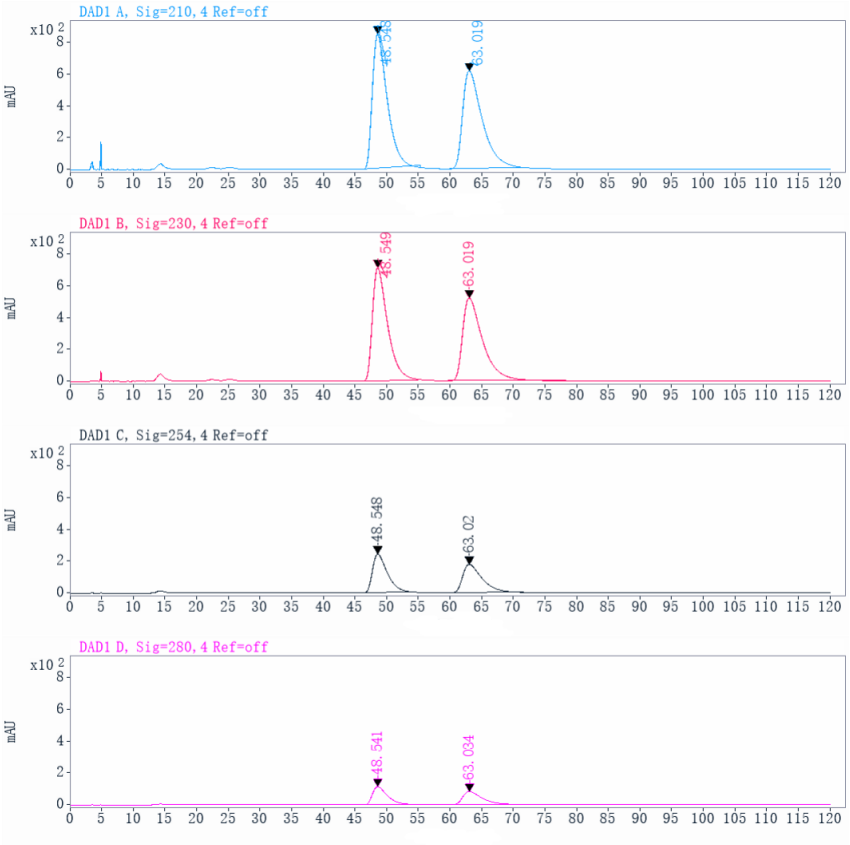
RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
30.162	MM	1.6597	261.1615	2.6226	4.4402	
33.244	BB	2.0621	5620.6123	32.1428	95.5598	
		total	5881.7738			



3j

Agilent Technologies

File of data:	D:\ChemStation\2\Data\2023-12-28-1.S 2023-12-28 10-08-18\zhh-7-11rac..D		
Sample name:	zhh-7-11rac.		
Remarks:	zhh-7-11rac.		
Acq. instrument:	LC1260	Location:	P2-D2
Injection date:	2023/12/30 1:17:59	Inj:	1 of 1
Acq.Method	IC-10-120.M	Inj Volume	10.000
Analysis Method:	IC-10-120.M	Acq. Operator:	system
Last changed	2024/4/19 16:01:58		



Agilent Technologies

Signal: DAD1 A, Sig=210,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
48.548	MM	2.7177	138186.7969	847.4438	50.8303	
63.019	BB	2.5497	133672.5625	615.0128	49.1697	
		total	271859.3594			

Signal: DAD1 B, Sig=230,4 Ref=off

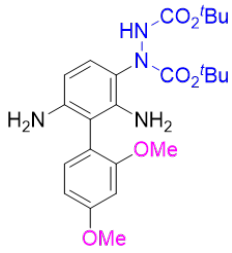
RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
48.549	MM	2.7883	119779.3125	715.9684	50.8092	
63.019	BB	2.6224	115964.2109	521.4774	49.1908	
		total	235743.5234			

Signal: DAD1 C, Sig=254,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
48.548	MM	2.7405	40368.5352	245.5076	50.2344	
63.020	MM	3.6839	39991.7734	180.9320	49.7656	
		total	80360.3086			

Signal: DAD1 D, Sig=280,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
48.541	BB	2.2035	18924.1387	113.5999	49.2983	
63.034	MM	3.8583	19462.8984	84.0733	50.7017	
		total	38387.0371			

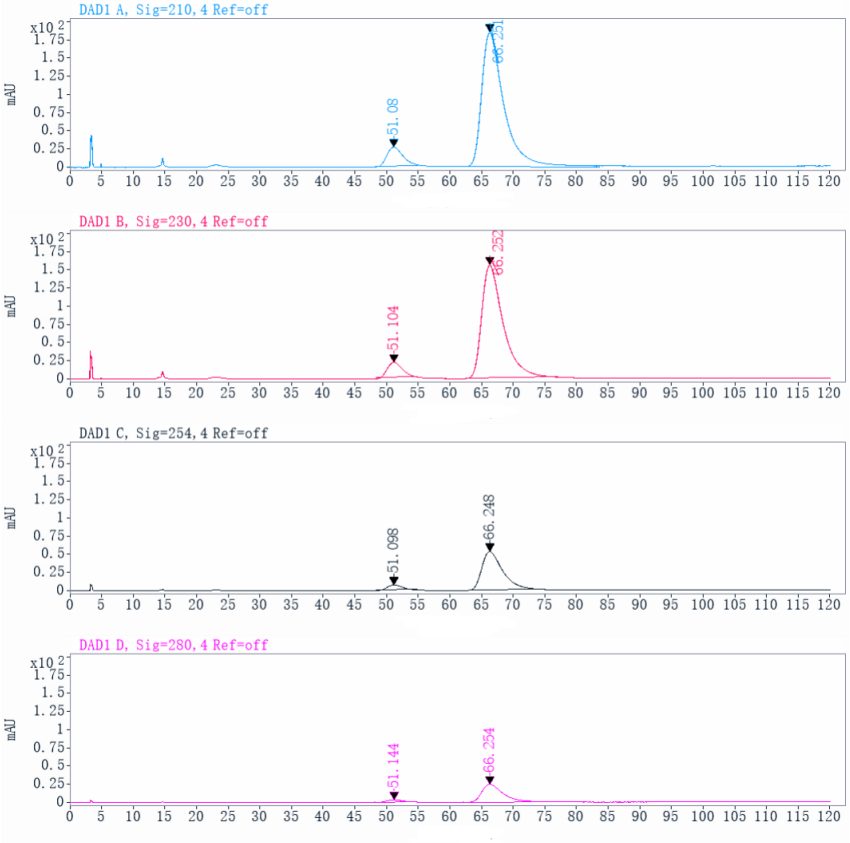


3k-rac

Agilent Technologies

File of data: D:\ChemStation\2\Data\2023-12-28-1.S 2023-12-28 10-08-18\zhh-7-11..D
Sample name: zhh-7-11.
Remarks: zhh-7-11.
Acq. instrument: LC1260
Injection date: 2023/12/30 3:19:33
Acq.Method IC-10-120.M
Analysis Method: IC-10-120.M
Last changed 2024/4/19 16:01:58

Location: P2-D3
Inj: 1 of 1
Inj Volume 10.000
Acq. Operator: system



Agilent Technologies

Signal: DAD1 A, Sig=210,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
51.080	MM	2.9593	4702.9771	26.4866	9.2729	
66.251	MM	4.1393	46014.3672	185.2763	90.7271	
		total	50717.3442			

Signal: DAD1 B, Sig=230,4 Ref=off

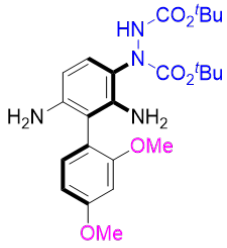
RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
51.104	MM	2.7539	3441.0315	20.8252	8.5888	
66.252	BB	2.7709	36622.9492	155.6611	91.4112	
		total	40063.9807			

Signal: DAD1 C, Sig=254,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
51.098	MM	2.6802	1130.6929	7.0312	8.5615	
66.248	BB	2.6824	12076.0508	52.7991	91.4385	
		total	13206.7437			

Signal: DAD1 D, Sig=280,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
51.144	MM	2.9909	639.7615	3.5650	9.4610	
66.254	MM	4.0824	6122.3140	24.9949	90.5390	
		total	6762.0755			

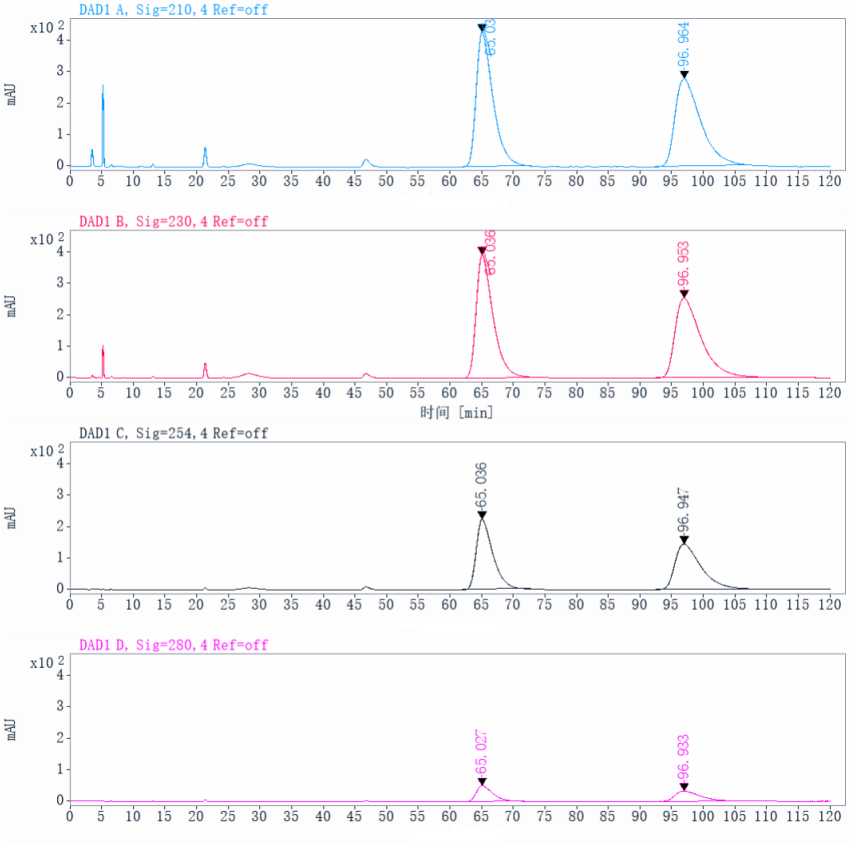


3k

Agilent Technologies

File of data: D:\ChemStation\2\Data\2023-12-12S 2023-12-12 08-47-15\ZHH-6-76RAC.D
Sample name: ZHH-6-76RAC
Remarks: ZHH-6-76RAC
Acq. instrument: LC1260
Injection date: 2023/12/12 9:00:19
Acq.Method IC-05-120.M
Analysis Method: IC-05-120.M
Last changed 2024/4/19 15:52:39

Location: P2-D3
Inj: 1 of 1
Inj Volume 15.000
Acq. Operator: system



Agilent Technologies

Signal: DAD1 A, Sig=210,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
65.030	BB	2.3013	79754.5781	430.9198	50.0276	
96.964	BB	3.3442	79666.4531	281.1212	49.9724	
		total	159421.0313			

Signal: DAD1 B, Sig=230,4 Ref=off

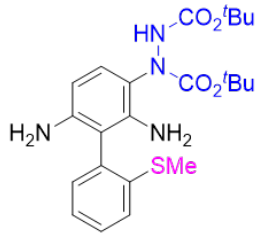
RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
65.036	BB	2.4190	73270.0859	394.4712	49.8965	
96.953	BB	3.4350	73574.1484	255.6950	50.1035	
		total	146844.2344			

Signal: DAD1 C, Sig=254,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
65.036	MM	3.0012	40333.7031	223.9860	49.0284	
96.947	BB	3.3831	41932.3320	145.9836	50.9716	
		total	82266.0352			

Signal: DAD1 D, Sig=280,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
65.027	MM	3.0933	9443.1641	50.8791	49.6613	
96.933	MM	4.7486	9571.9697	33.5955	50.3387	
		total	19015.1338			

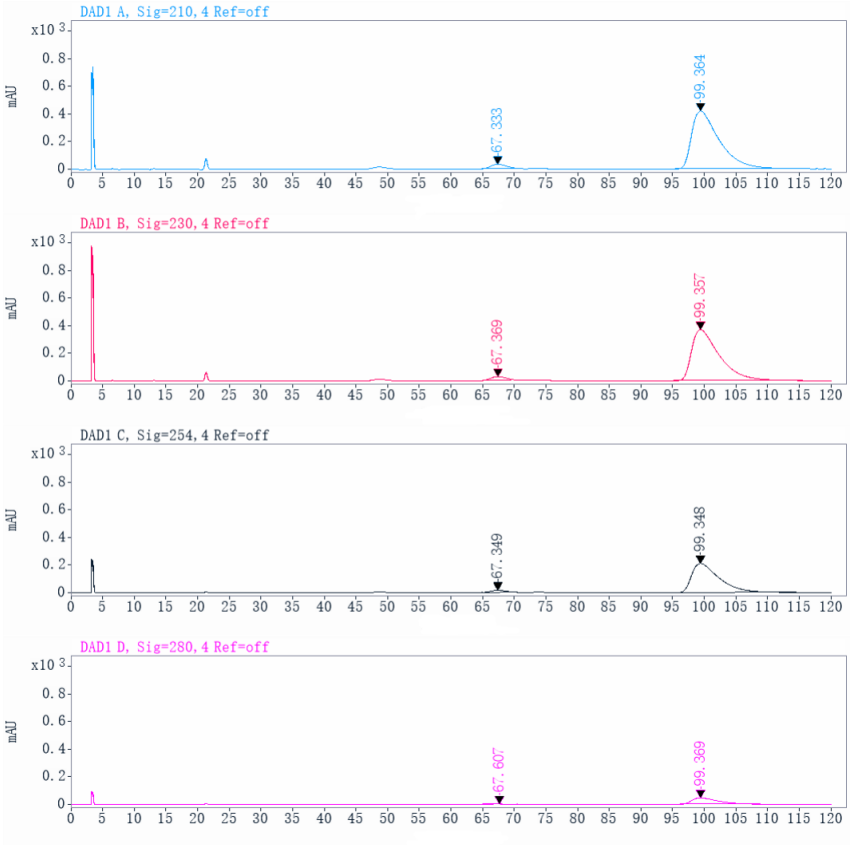


3l-rac

Agilent Technologies

File of data: D:\ChemStation\2\Data\2023-12-12S 2023-12-12 08-47-15\ZHH-6-76.D
Sample name: ZHH-6-76
Remarks: ZHH-6-76
Acq. instrument: LC1260
Injection date: 2023/12/12 11:01:55
Acq.Method IC-05-120.M
Analysis Method: IC-05-120.M
Last changed 2024/4/19 15:52:39

Location: P2-D2
Inj: 1 of 1
Inj Volume 15.000
Acq. Operator: system



Agilent Technologies

Signal: DAD1 A, Sig=210,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
67.333	BB	2.1151	5989.8066	33.1965	4.4825	
99.364	BB	3.5592	127635.8047	420.9734	95.5175	
		total	133625.6113			

Signal: DAD1 B, Sig=230,4 Ref=off

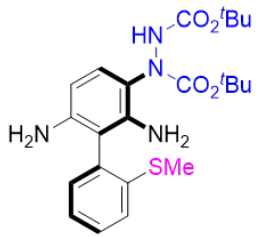
RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
67.369	MM	2.7092	4540.6270	27.9334	3.8210	
99.357	BB	3.6584	114292.3203	371.5873	96.1790	
		total	118832.9473			

Signal: DAD1 C, Sig=254,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
67.349	MM	3.0054	3098.4922	17.1831	4.5519	
99.348	BB	3.6578	64972.5000	211.9848	95.4481	
		total	68070.9922			

Signal: DAD1 D, Sig=280,4 Ref=off

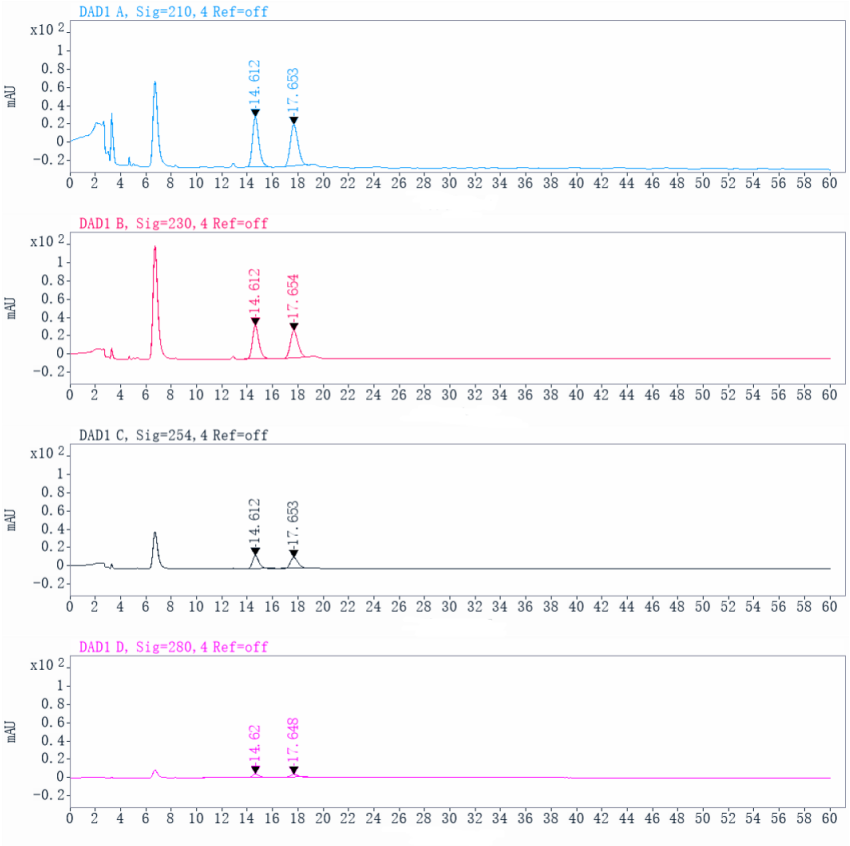
RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
67.607	MM	3.1580	653.8228	3.4506	4.4022	
99.369	MM	5.0181	14198.3584	47.1576	95.5978	
		total	14852.1812			



3l

Agilent Technologies

File of data:	D:\ChemStation\2\Data\2023-11-30S 2023-11-30 10-06-33\ZHH-6-71...D		
Sample name:	ZHH-6-71..		
Remarks:	ZHH-6-71..		
Acq. instrument:	LC1260	Location:	P2-D2
Injection date:	2023/12/2 17:38:42	Inj:	1 of 1
Acq.Method	IC-10-60.M	Inj Volume	5.000
Analysis Method:	IC-10-60.M	Acq. Operator:	system
Last changed	2024/4/19 15:44:50		



Agilent Technologies

Signal: DAD1 A, Sig=210,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
14.612	BB	0.5339	1986.5267	55.1966	50.4878	
17.653	BB	0.6507	1948.1393	45.5780	49.5122	
		total	3934.6660			

Signal: DAD1 B, Sig=230,4 Ref=off

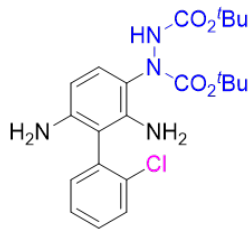
RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
14.612	BB	0.5467	1326.5468	36.7872	50.9944	
17.654	BB	0.6425	1274.8115	29.9531	49.0056	
		total	2601.3583			

Signal: DAD1 C, Sig=254,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
14.612	BB	0.5427	519.8206	14.4146	50.9012	
17.653	BB	0.6385	501.4132	11.7349	49.0988	
		total	1021.2338			

Signal: DAD1 D, Sig=280,4 Ref=off

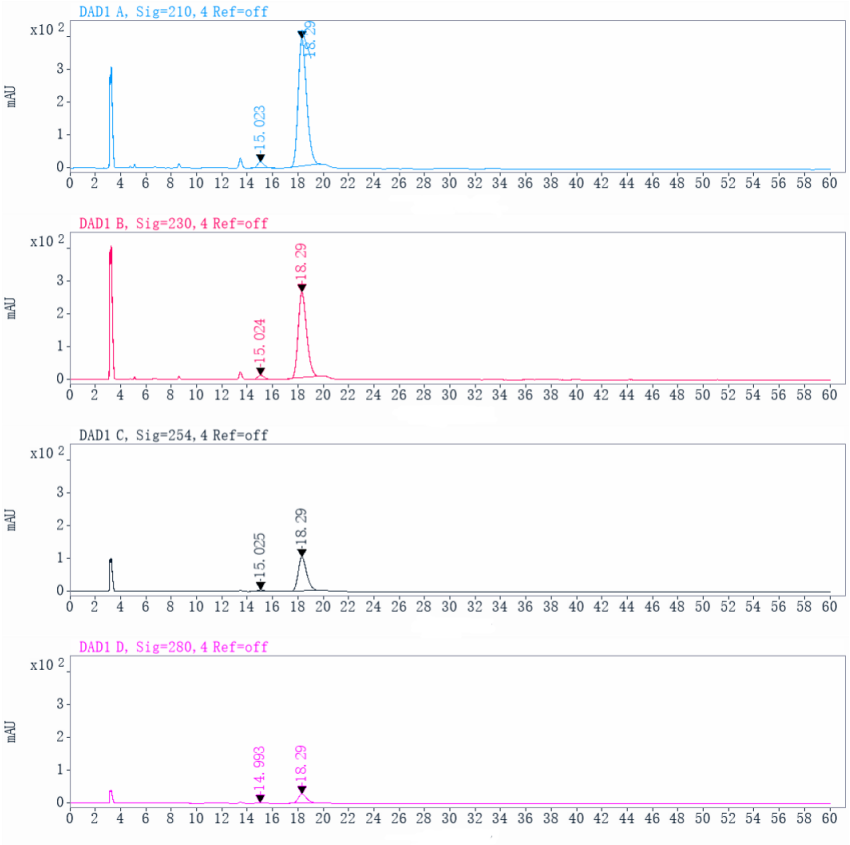
RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
14.620	BB	0.4546	134.6392	3.8445	49.7416	
17.648	BB	0.5316	136.0380	3.1769	50.2584	
		total	270.6772			



3m-rac

Agilent Technologies

File of data:	D:\ChemStation\2\Data\2023-11-30S 2023-11-30 10-06-33\ZHH-6-71.D		
Sample name:	ZHH-6-71		
Remarks:	ZHH-6-71		
Acq. instrument:	LC1260	Location:	P2-D4
Injection date:	2023/12/1 20:47:37	Inj:	1 of 1
Acq.Method	IC-10-60.M	Inj Volume	5.000
Analysis Method:	IC-10-60.M	Acq. Operator:	system
Last changed	2024/4/19 15:44:50		



Agilent Technologies

Signal: DAD1 A, Sig=210,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
15.023	BB	0.5455	703.5992	18.4249	3.6862	
18.290	BB	0.7347	18383.8438	389.4431	96.3138	
		total	19087.4429			

Signal: DAD1 B, Sig=230,4 Ref=off

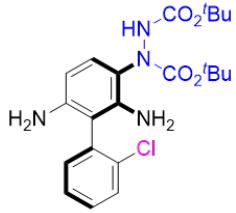
RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
15.024	BB	0.5957	507.1133	12.8138	3.9649	
18.290	BB	0.7221	12283.0508	262.4113	96.0351	
		total	12790.1640			

Signal: DAD1 C, Sig=254,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
15.025	BB	0.5151	198.9117	5.0331	3.9313	
18.290	BB	0.7229	4860.7236	103.6833	96.0687	
		total	5059.6353			

Signal: DAD1 D, Sig=280,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
14.993	MM	0.5777	43.7121	1.2612	3.2181	
18.290	BB	0.7132	1314.5948	27.9265	96.7819	
		total	1358.3069			

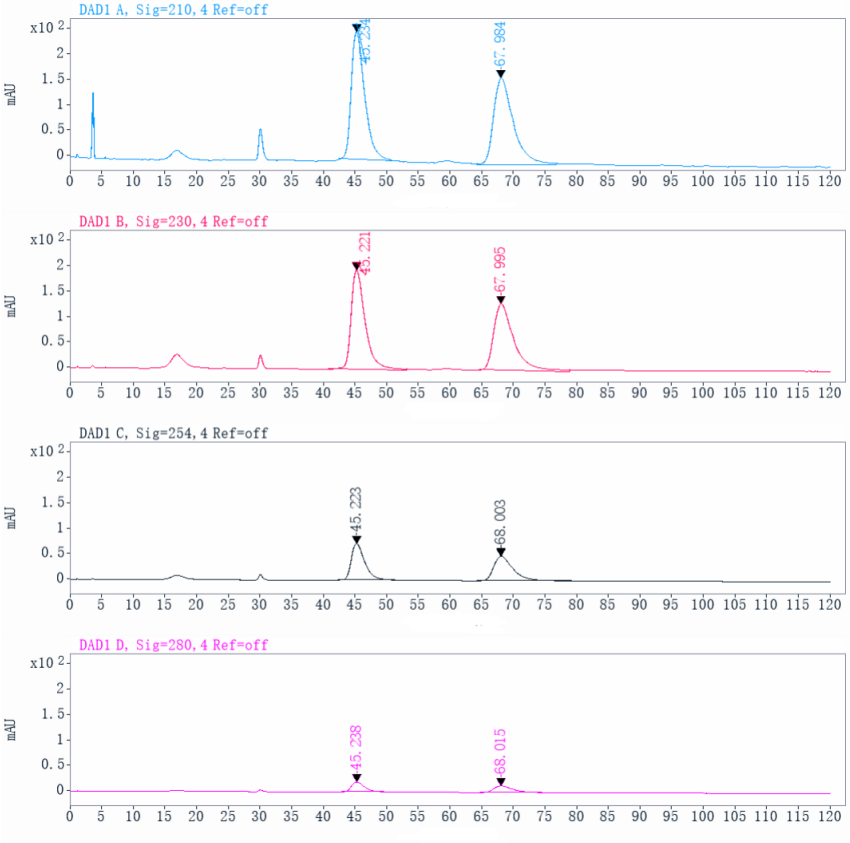


3m

Agilent Technologies

File of data: D:\ChemStation\2\Data\2023-12-22-1S 2023-12-24 18-31-00\ZHH-6-99RAC.D
Sample name: ZHH-6-99RAC
Remarks: ZHH-6-99RAC
Acq. instrument: LC1260
Injection date: 2023/12/24 18:44:11
Acq.Method IC-05-120.M
Analysis Method: IC-05-120.M
Last changed 2024/4/19 15:59:23

Location: P2-D4
Inj: 1 of 1
Inj Volume 10.000
Acq. Operator: system



Agilent Technologies

Signal: DAD1 A, Sig=210,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
45.234	BB	1.7581	37590.5664	251.4481	49.9021	
67.984	MM	3.6642	37737.9883	171.6540	50.0979	
		total	75328.5547			

Signal: DAD1 B, Sig=230,4 Ref=off

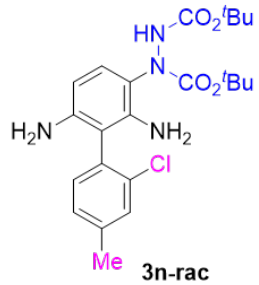
RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
45.221	MM	2.6107	30645.0078	195.6375	50.8412	
67.995	MM	3.7555	29630.8730	131.4988	49.1588	
		total	60275.8809			

Signal: DAD1 C, Sig=254,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
45.223	BB	1.8497	10611.7314	71.5756	49.9205	
68.003	MM	3.6409	10645.5166	48.7317	50.0795	
		total	21257.2480			

Signal: DAD1 D, Sig=280,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
45.238	BB	1.6845	2767.2354	19.3260	50.5411	
68.015	MM	3.4356	2707.9875	13.1370	49.4589	
		total	5475.2229			



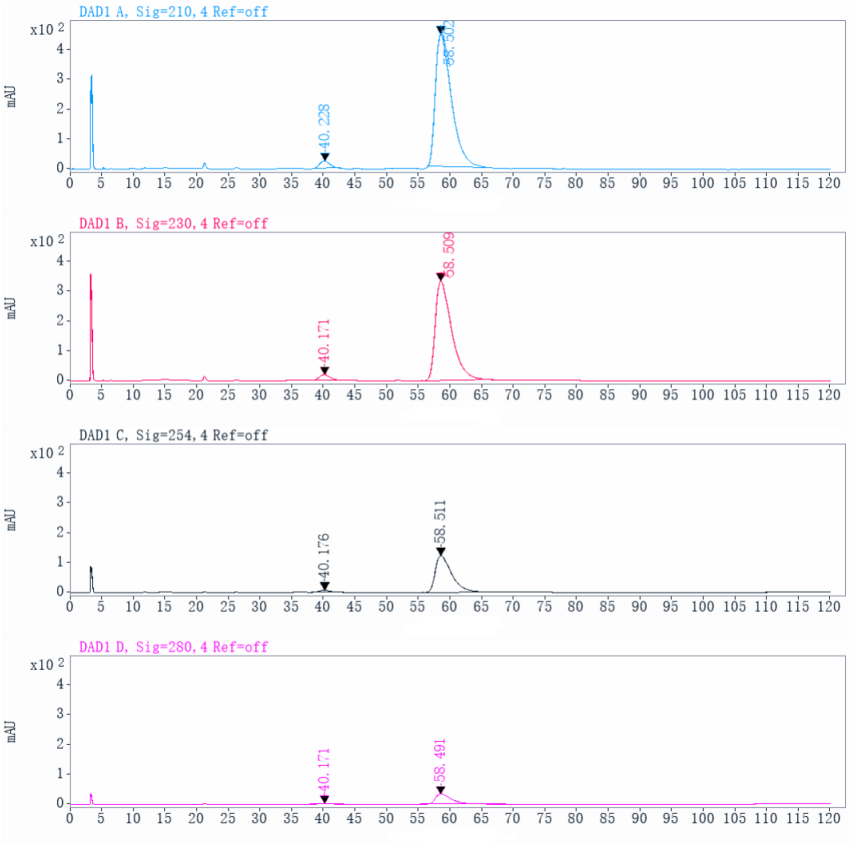
3n-rac

Agilent Technologies

File of data: D:\ChemStation\2\Data\2023-12-22-1S 2023-12-24 18-31-00\ZHH-6-99.D
Sample name: ZHH-6-99
Remarks: ZHH-6-99
Acq. instrument: LC1260
Injection date: 2023/12/24 20:45:49
Acq.Method IC-05-120.M
Analysis Method: IC-05-120.M
Last changed 2024/4/19 15:59:23

Location: P2-D1
Inj: 1 of 1
Inj Volume 10.000
Acq. Operator: system

(Uḱ)



Agilent Technologies

Signal: DAD1 A, Sig=210,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
40.228	BB	1.3407	2931.8337	25.6655	3.6049	
58.502	BB	2.1359	78396.2344	444.0052	96.3951	
		total	81328.0681			

Signal: DAD1 B, Sig=230,4 Ref=off

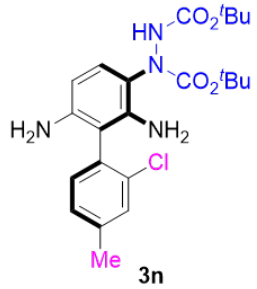
RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
40.171	BB	1.4029	2286.4575	19.1788	3.6092	
58.509	MM	3.0389	61064.3320	334.9087	96.3908	
		total	63350.7896			

Signal: DAD1 C, Sig=254,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
40.176	BB	1.3930	830.4508	7.0155	3.5194	
58.511	MM	3.0539	22766.2168	124.2479	96.4806	
		total	23596.6676			

Signal: DAD1 D, Sig=280,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
40.171	MM	1.9639	228.4438	1.9387	3.4109	
58.491	MM	3.1648	6469.0840	34.0675	96.5891	
		total	6697.5278			

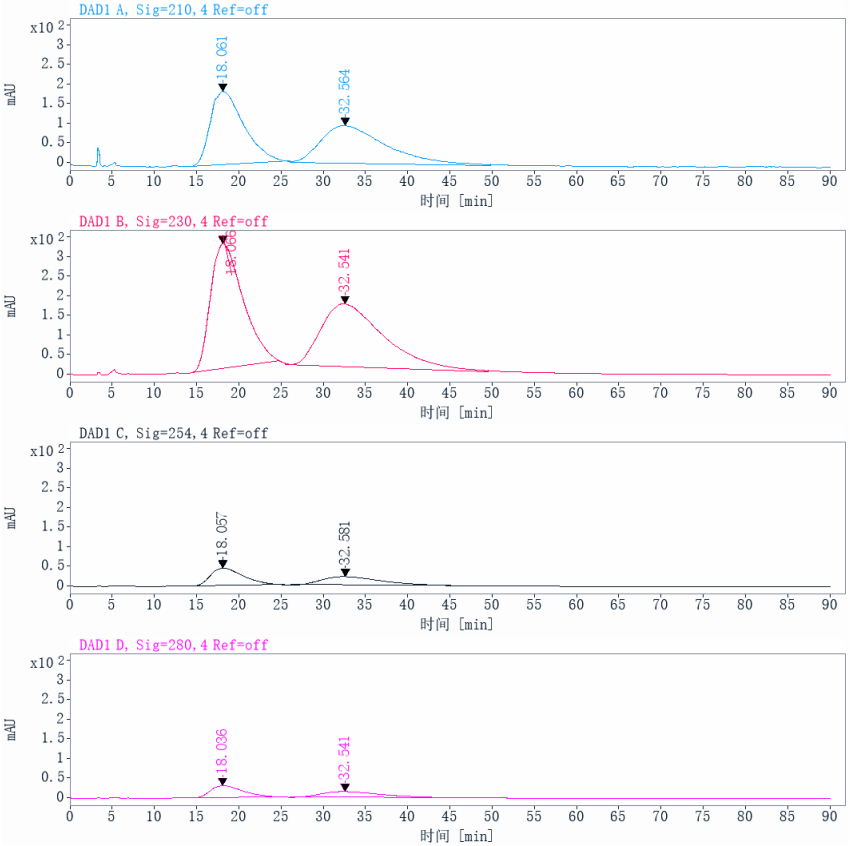


3n

Agilent Technologies

File of data: D:\ChemStation\2\Data\2023-12-10S 2023-12-10 19-23-54\ZHH-6-61-1.D
Sample name: ZHH-6-61-1
Remarks: ZHH-6-61-1
Acq. instrument: LC1260
Injection date: 2023/12/10 19:36:55
Acq.Method 0J-05-90.M
Analysis Method: 0J-05-90.M
Last changed 2024/6/18 16:32:29

Location: P2-D9
Inj: 1 of 1
Inj Volume 20.000
Acq. Operator: system



Agilent Technologies

Signal: DAD1 A, Sig=210,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
18.061	BB	3.257	52084.4492	187.2104	49.4376	
32.564	MM	9.117	53269.4141	97.3764	50.5624	
		total	105353.8633			

Signal: DAD1 B, Sig=230,4 Ref=off

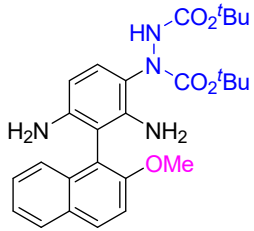
RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
18.066	MM	4.4803	85608.0547	318.4602	50.5253	
32.541	MM	8.6989	83827.9375	160.6094	49.4747	
		total	169435.9922			

Signal: DAD1 C, Sig=254,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
18.057	MM	4.5261	12068.7402	44.4413	50.9698	
32.581	MM	8.7217	11609.4600	22.1849	49.0302	
		total	23678.2002			

Signal: DAD1 D, Sig=280,4 Ref=off

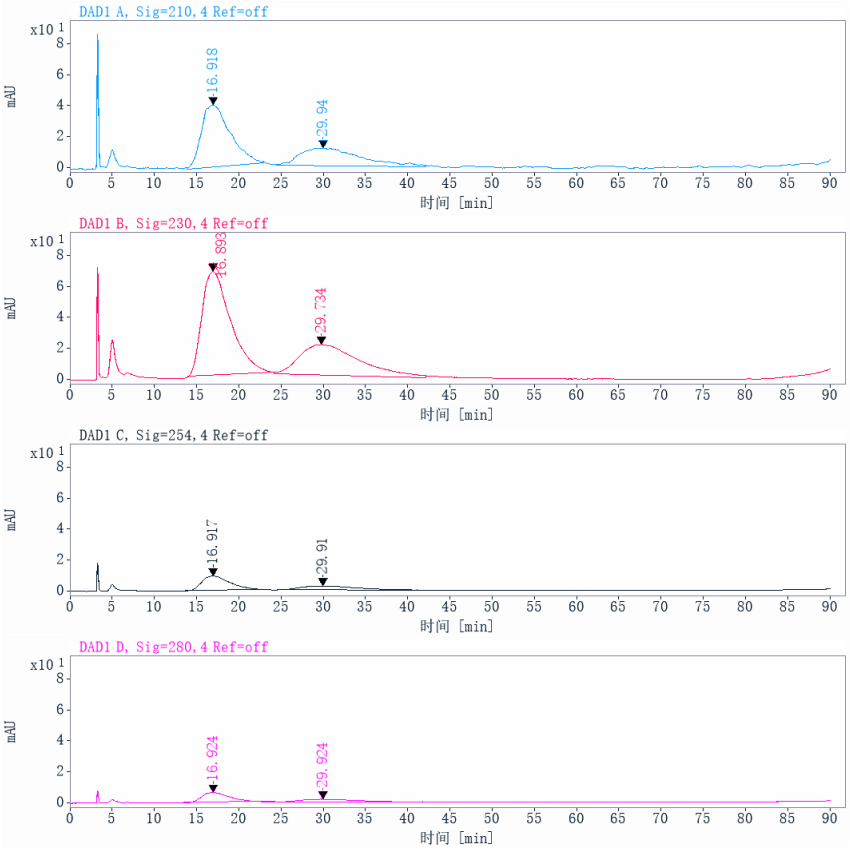
RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
18.036	MM	4.5268	8223.4658	30.2772	51.5540	
32.541	MM	8.4749	7727.7104	15.1973	48.4460	
		total	15951.1763			



3o-rac

Agilent Technologies

File of data:	D:\ChemStation\2\Data\2023-12-10S 2023-12-10 19-23-54\ZHH-6-66.D		
Sample name:	ZHH-6-66		
Remarks:	ZHH-6-66		
Acq. instrument:	LC1260	Location:	P2-D1
Injection date:	2023/12/10 22:40:15	Inj:	1 of 1
Acq.Method	OJ-05-90.M	Inj Volume	10.000
Analysis Method:	OJ-05-90.M	Acq. Operator:	system
Last changed	2024/6/18 16:32:29		



Agilent Technologies

Signal: DAD1 A, Sig=210,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
16.918	MM	4.014	9731.4873	40.4030	61.7921	
29.940	MM	8.633	6017.2603	11.6159	38.2079	
		total	15748.7476			

Signal: DAD1 B, Sig=230,4 Ref=off

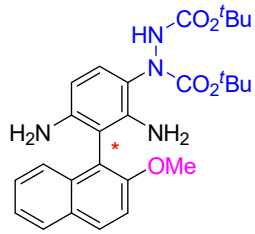
RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
16.893	BB	2.7760	15950.6836	67.1802	61.2776	
29.734	MM	8.4510	10079.5264	19.8784	38.7224	
		total	26030.2100			

Signal: DAD1 C, Sig=254,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
16.917	MM	3.9490	2227.1345	9.3995	62.5254	
29.910	MM	8.1370	1334.8340	2.7341	37.4746	
		total	3561.9685			

Signal: DAD1 D, Sig=280,4 Ref=off

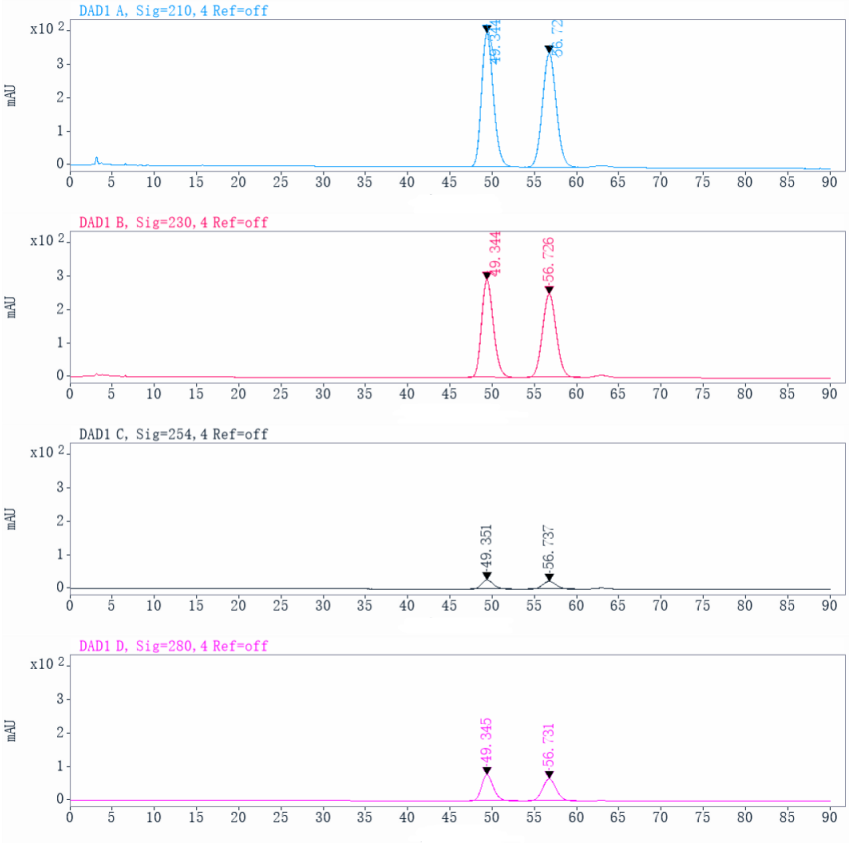
RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
16.924	MM	3.9577	1521.5559	6.4075	61.2721	
29.924	MM	8.2520	961.7224	1.9424	38.7279	
		total	2483.2783			



3o

Agilent Technologies

File of data:	D:\ChemStation\2\Data\2023-12-21-1S 2023-12-21 09-35-47\zhh-6-90-2rac-ad..D
Sample name:	zhh-6-90-2rac-ad.
Remarks:	zhh-6-90-2rac-ad.
Acq. instrument:	LC1260
Injection date:	2023/12/22 11:17:14
Acq.Method	AD-10-90.M
Analysis Method:	AD-10-90.M
Last changed	2024/4/19 19:40:22
Location:	P2-D3
Inj:	1 of 1
Inj Volume	10.000
Acq. Operator:	system



Agilent Technologies

Signal: DAD1 A, Sig=210,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
49.344	BB	1.4458	39063.1602	399.1439	49.7018	
56.720	MM	1.9312	39531.8945	341.1658	50.2982	
		total	78595.0547			

Signal: DAD1 B, Sig=230,4 Ref=off

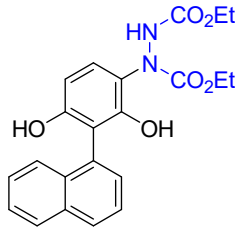
RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
49.344	BB	1.4912	28651.5469	291.8799	50.2036	
56.726	MM	1.9026	28419.1719	248.9500	49.7964	
		total	57070.7188			

Signal: DAD1 C, Sig=254,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
49.351	BB	1.1635	2631.6499	27.1834	50.1176	
56.737	BB	1.3349	2619.3032	23.1345	49.8824	
		total	5250.9531			

Signal: DAD1 D, Sig=280,4 Ref=off

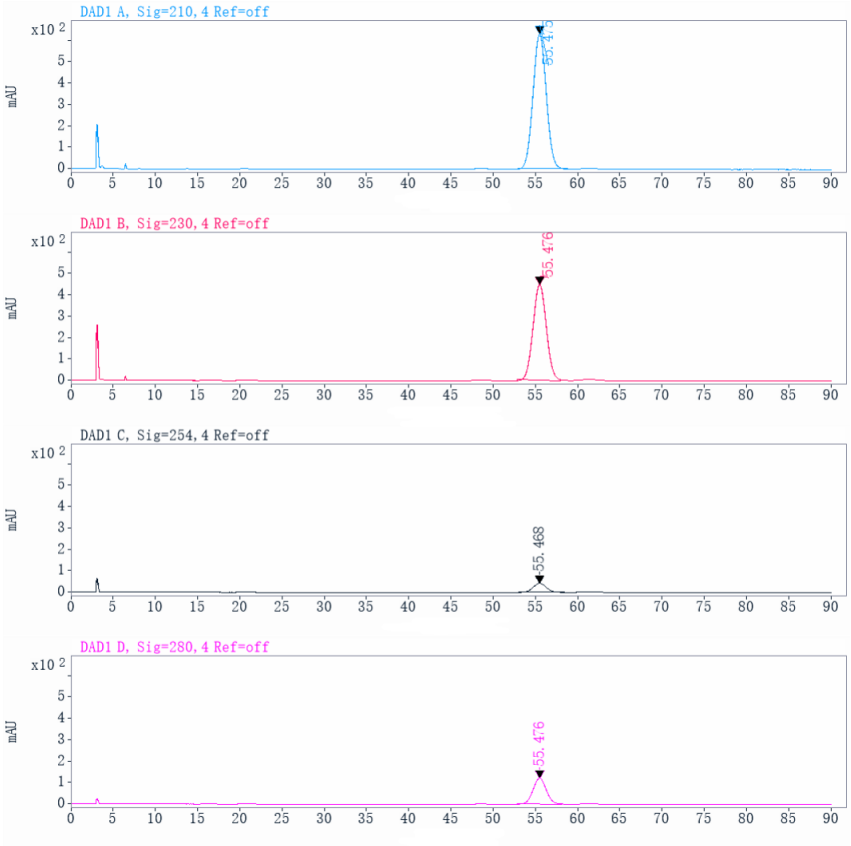
RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
49.345	BB	1.3857	7538.1050	77.5699	50.2782	
56.731	BB	1.5641	7454.6816	65.8802	49.7218	
		total	14992.7866			



5a-rac

Agilent Technologies

File of data:	D:\ChemStation\2\Data\2024-1-5.S 2024-01-05 09-16-48\zhh-7-16.D		
Sample name:	zhh-7-16		
Remarks:	zhh-7-16		
Acq. instrument:	LC1260	Location:	P2-D1
Injection date:	2024/1/5 10:01:07	Inj:	1 of 1
Acq.Method	AD-10-90.M	Inj Volume	10.000
Analysis Method:	AD-10-90.M	Acq. Operator:	system
Last changed	2024/4/19 19:42:30		



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Signal: DAD1 A, Sig=210,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
55.475	BB	1.3435	69490.4844	632.6445	100.0000	
	total		69490.4844			

Signal: DAD1 B, Sig=230,4 Ref=off

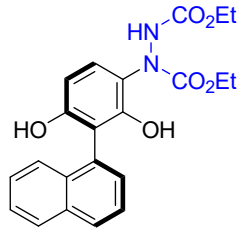
RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
55.476	MM	1.8327	49337.4492	448.6786	100.0000	
	total		49337.4492			

Signal: DAD1 C, Sig=254,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
55.468	BB	1.3242	4605.5723	42.3021	100.0000	
	total		4605.5723			

Signal: DAD1 D, Sig=280,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
55.476	MM	1.8423	13506.1318	122.1831	100.0000	
	total		13506.1318			

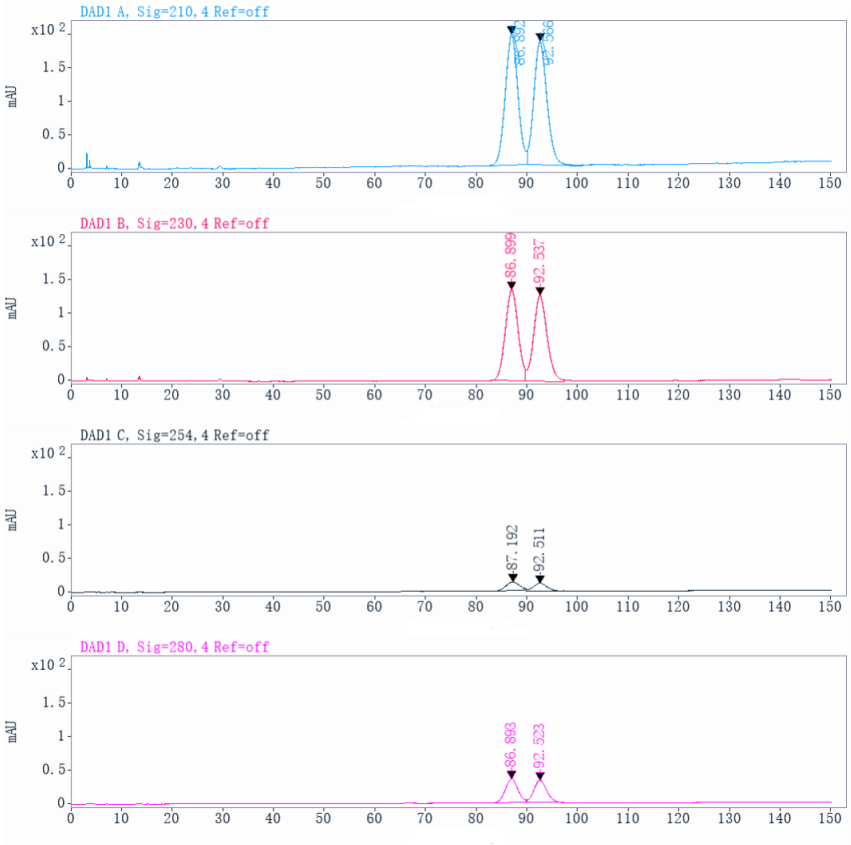


5a

Agilent Technologies

File of data: D:\ChemStation\2\Data\2024-1-13.S 2024-01-13 08-51-23\ZHH-7-22RAC.D
Sample name: ZHH-7-22RAC
Remarks: ZHH-7-22RAC
Acq. instrument: LC1260
Injection date: 2024/1/13 23:02:44
Acq.Method AD-07-150.M
Analysis Method: AD-07-150.M
Last changed 2024/4/19 19:46:10

Location: P2-D1
Inj: 1 of 1
Inj Volume 5.000
Acq. Operator: system



Agilent Technologies

Signal: DAD1 A, Sig=210,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
86.892	MM	2.9237	34117.5039	194.4860	50.4049	
92.566	MM	3.0388	33569.3633	184.1159	49.5951	
		total	67686.8672			

Signal: DAD1 B, Sig=230,4 Ref=off

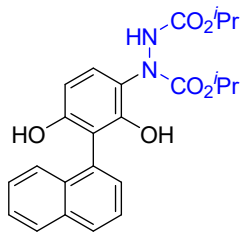
RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
86.899	MF	2.9260	23779.7871	135.4492	50.0681	
92.537	FM	3.0890	23715.1406	127.9568	49.9319	
		total	47494.9277			

Signal: DAD1 C, Sig=254,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
87.192	MM	3.1688	2600.8237	13.6794	49.8496	
92.511	MM	3.4417	2616.5205	12.6706	50.1504	
		total	5217.3442			

Signal: DAD1 D, Sig=280,4 Ref=off

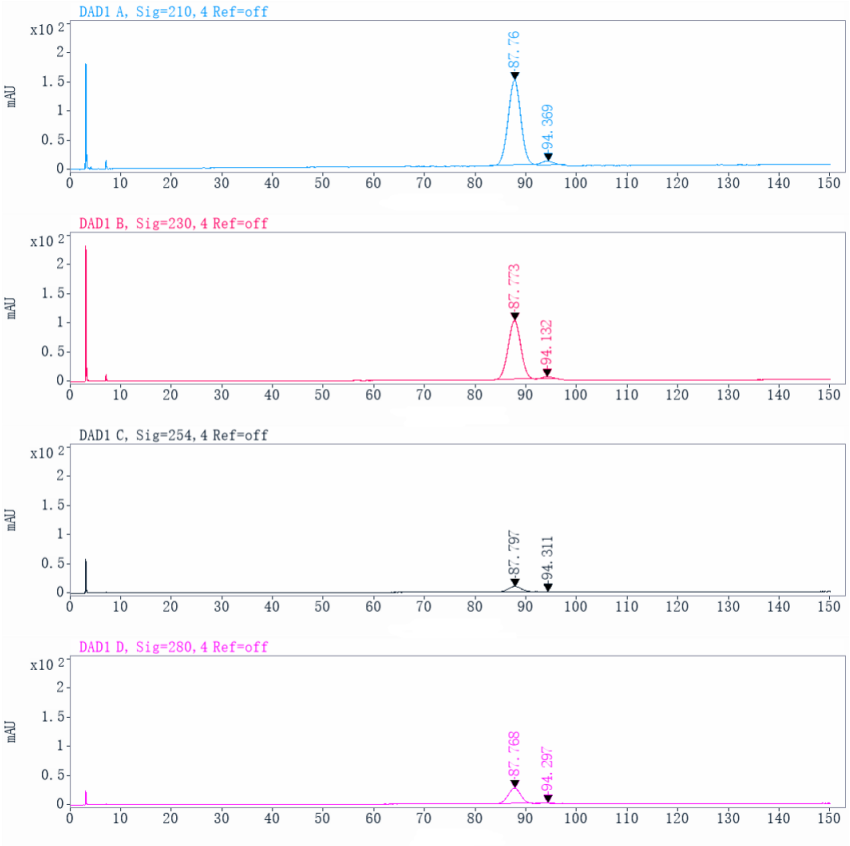
RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
86.893	MM	2.9240	6266.1274	35.7164	50.9164	
92.523	MM	3.0019	6040.5762	33.5377	49.0836	
		total	12306.7036			



5b-rac

Agilent Technologies

File of data:	D:\ChemStation\2\Data\2024-1-13.S 2024-01-13 08-51-23\ZHH-7-22.D		
Sample name:	ZHH-7-22		
Remarks:	ZHH-7-22		
Acq. instrument:	LC1260	Location:	P2-D2
Injection date:	2024/1/14 1:34:21	Inj:	1 of 1
Acq.Method	AD-07-150.M	Inj Volume	5.000
Analysis Method:	AD-07-150.M	Acq. Operator:	system
Last changed	2024/4/19 19:46:10		



Agilent Technologies

Signal: DAD1 A, Sig=210,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
87.760	MM	2.9357	25894.0469	147.0064	95.0376	
94.369	MM	2.9668	1352.0702	7.5955	4.9624	
		total	27246.1171			

Signal: DAD1 B, Sig=230,4 Ref=off

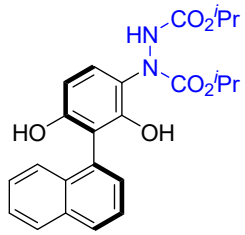
RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
87.773	MM	2.9078	17618.0098	100.9800	96.4403	
94.132	MM	2.5765	650.2895	4.2065	3.5597	
		total	18268.2993			

Signal: DAD1 C, Sig=254,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
87.797	MM	3.2838	1959.5110	9.9453	95.0971	
94.311	MM	3.0713	101.0259	0.5482	4.9029	
		total	2060.5369			

Signal: DAD1 D, Sig=280,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
87.768	MM	2.9189	4691.8330	26.7899	94.7966	
94.297	MM	3.0744	257.5377	1.3961	5.2034	
		total	4949.3707			

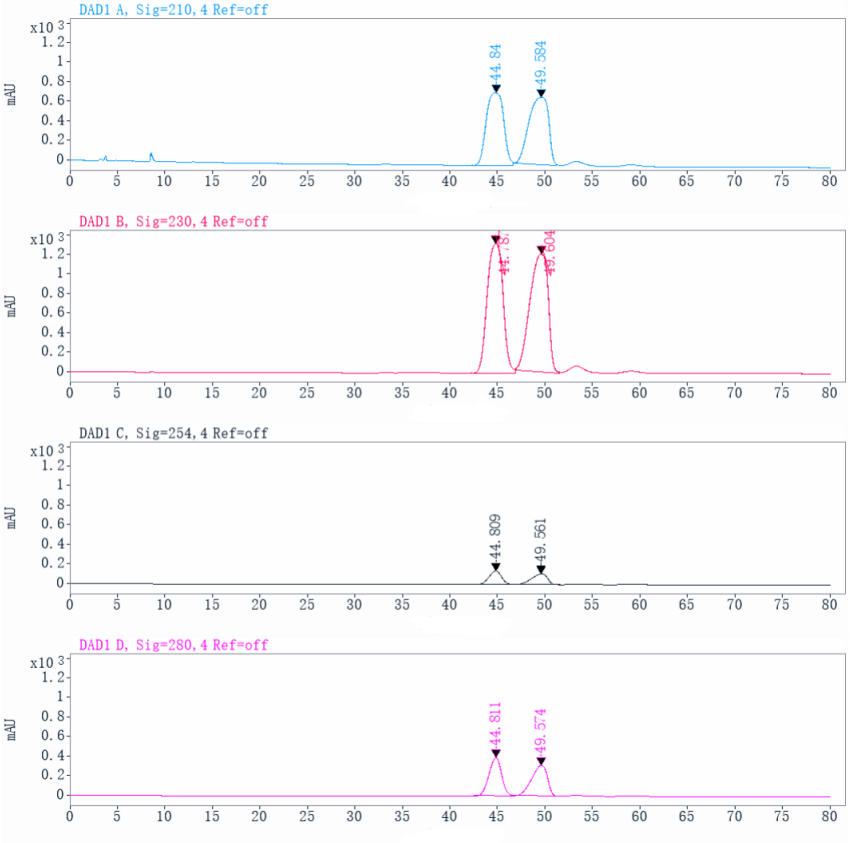


5b

Agilent Technologies

File of data: D:\ChemStation\2\Data\2024-3-6.S 2024-03-06 09-22-01\ZHH-7-45.D
Sample name: ZHH-7-45
Remarks: ZHH-7-45
Acq. instrument: LC1260
Injection date: 2024/3/6 9:35:41
Acq.Method AD-10-80.M
Analysis Method: AD-10-80.M
Last changed 2024/4/19 20:17:36

Location: P2-D1
Inj: 1 of 1
Inj Volume 10.000
Acq. Operator: system



Agilent Technologies

Signal: DAD1 A, Sig=210,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
44.840	MM	2.1428	97033.4922	754.7181	49.2429	
49.584	MM	2.4105	100017.3125	691.5530	50.7571	
		total	197050.8047			

Signal: DAD1 B, Sig=230,4 Ref=off

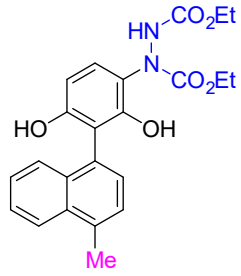
RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
44.787	MM	1.9557	156492.1719	1333.6127	49.0435	
49.604	MM	2.2328	162596.4531	1213.7189	50.9565	
		total	319088.6250			

Signal: DAD1 C, Sig=254,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
44.809	BB	1.2356	12803.7275	139.1301	50.3978	
49.561	BB	1.3774	12601.5908	110.2591	49.6022	
		total	25405.3184			

Signal: DAD1 D, Sig=280,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
44.811	MM	1.5604	37397.7461	399.4380	50.8110	
49.574	BB	1.3632	36203.8672	314.4516	49.1890	
		total	73601.6133			

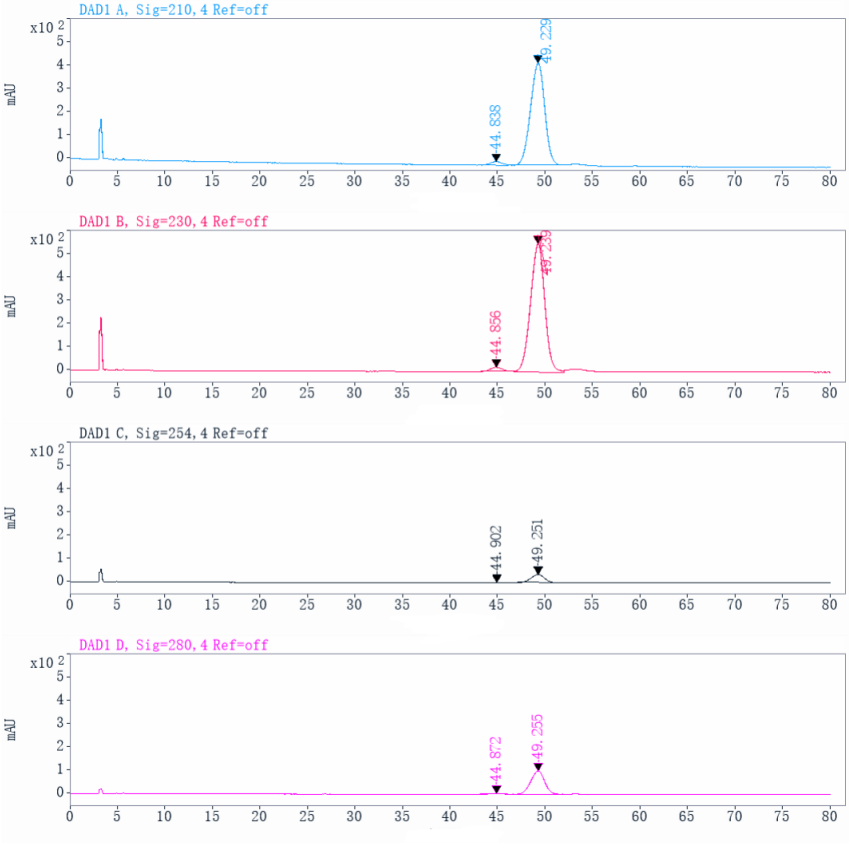


5c-rac

Agilent Technologies

File of data: D:\ChemStation\2\Data\2024-3-11.S 2024-03-11 09-20-04\ZHH-7-45.D
Sample name: ZHH-7-45
Remarks: ZHH-7-45
Acq. instrument: LC1260
Injection date: 2024/3/11 9:33:12
Acq.Method AD-10-80.M
Analysis Method: AD-10-80.M
Last changed 2024/4/19 20:18:48

Location: P2-D1
Inj: 1 of 1
Inj Volume 10.000
Acq. Operator: system



Agilent Technologies

Signal: DAD1 A, Sig=210,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
44.838	MM	1.4706	1396.8158	15.8302	2.9444	
49.229	VV R	1.2337	46042.1367	441.0091	97.0556	
		total	47438.9525			

Signal: DAD1 B, Sig=230,4 Ref=off

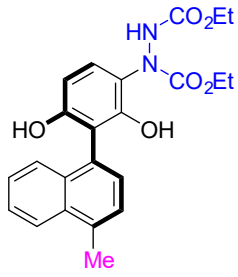
RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
44.856	BB	1.0353	1566.5199	17.9303	2.5932	
49.239	MM	1.7626	58842.7383	556.4053	97.4068	
		total	60409.2582			

Signal: DAD1 C, Sig=254,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
44.902	MM	1.4479	112.5444	1.2954	3.0835	
49.251	BB	1.1814	3537.3013	35.1698	96.9165	
		total	3649.8456			

Signal: DAD1 D, Sig=280,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
44.872	MM	1.4817	304.0199	3.4197	2.7076	
49.255	MM	1.7714	10924.4961	102.7865	97.2924	
		total	11228.5160			

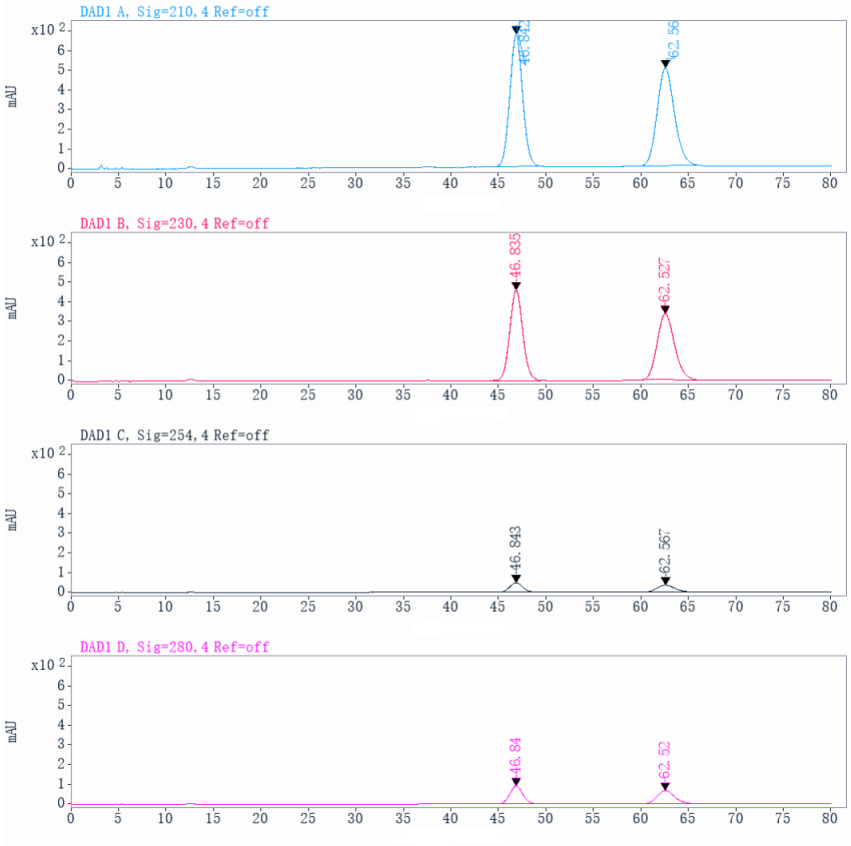


5c

Agilent Technologies

File of data: D:\ChemStation\2\Data\2024-2-1.S 2024-02-01 21-42-16\ZHH-7-47RAC.D
Sample name: ZHH-7-47RAC
Remarks: ZHH-7-47RAC
Acq. instrument: LC1260
Injection date: 2024/2/3 2:56:11
Acq.Method AD-10-80.M
Analysis Method: AD-10-80.M
Last changed 2024/4/19 20:24:52

Location: P2-D1
Inj: 1 of 1
Inj Volume 10.000
Acq. Operator: system



Agilent Technologies

Signal: DAD1 A, Sig=210,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
46.842	VV R	1.1096	63531.1250	675.1975	49.9594	
62.560	VV R	1.5040	63634.3047	498.2023	50.0406	
		total	127165.4297			

Signal: DAD1 B, Sig=230,4 Ref=off

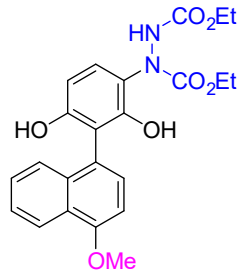
RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
46.835	MM	1.6143	44944.1563	464.0257	50.9598	
62.527	BB	1.5228	43251.1953	337.5643	49.0402	
		total	88195.3516			

Signal: DAD1 C, Sig=254,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
46.843	BB	1.1173	4513.7104	47.6433	49.0840	
62.567	MM	2.1954	4682.1733	35.5450	50.9160	
		total	9195.8838			

Signal: DAD1 D, Sig=280,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
46.840	BB	1.2268	8651.3516	91.1915	49.5239	
62.520	MM	2.1697	8817.6904	67.7327	50.4761	
		total	17469.0420			

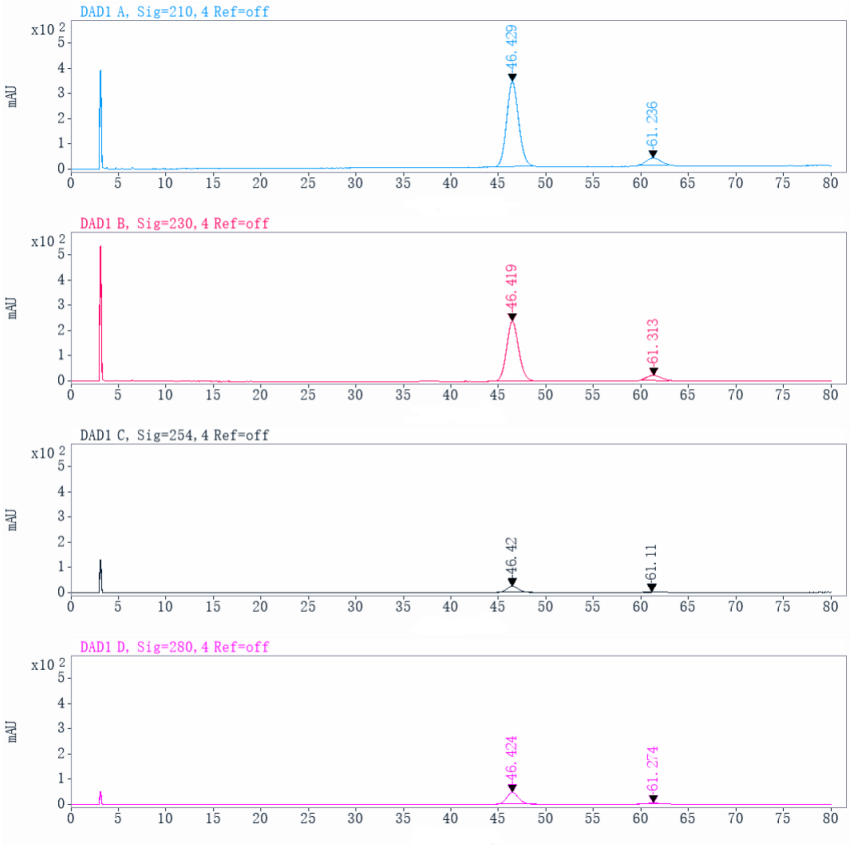


5d-rac

Agilent Technologies

File of data: D:\ChemStation\2\Data\2024-2-29.S 2024-02-29 13-48-57\ZHH-7-47.D
Sample name: ZHH-7-47
Remarks: ZHH-7-47
Acq. instrument: LC1260
Injection date: 2024/3/2 4:45:26
Acq.Method AD-10-80.M
Analysis Method: AD-10-80.M
Last changed 2024/4/19 20:26:28

Location: P2-D4
Inj: 1 of 1
Inj Volume 5.000
Acq. Operator: system



Agilent Technologies

Signal: DAD1 A, Sig=210,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
46.429	VV R	1.0398	29817.6211	338.3798	89.8253	
61.236	MM	1.8296	3377.4924	30.7670	10.1747	
		total	33195.1135			

Signal: DAD1 B, Sig=230,4 Ref=off

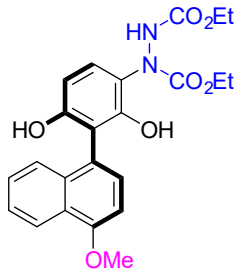
RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
46.419	BB	1.1731	21047.4199	237.6933	89.6399	
61.313	MM	1.8720	2432.5396	21.6569	10.3601	
		total	23479.9595			

Signal: DAD1 C, Sig=254,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
46.420	BB	1.0238	2123.7124	24.4880	89.1252	
61.110	MM	1.4418	259.1294	2.9955	10.8748	
		total	2382.8418			

Signal: DAD1 D, Sig=280,4 Ref=off

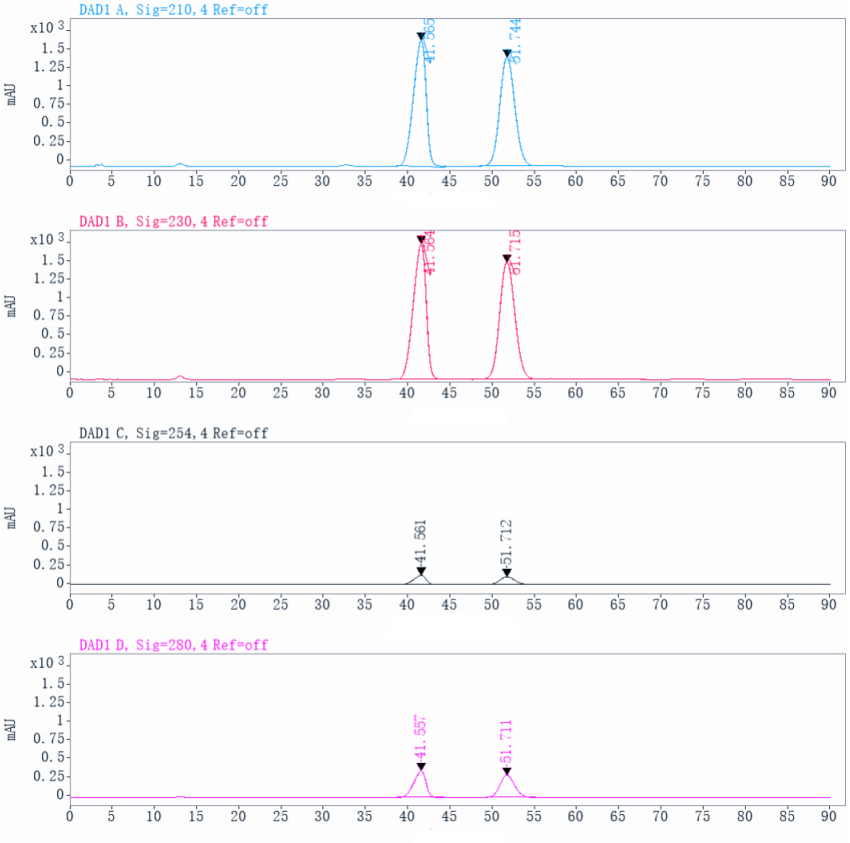
RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
46.424	BB	1.1003	4113.0078	46.9387	90.8795	
61.274	MM	1.7198	412.7733	4.0001	9.1205	
		total	4525.7811			



5d

Agilent Technologies

File of data:	D:\ChemStation\2\Data\2024-1-20.S 2024-01-20 16-14-10\ZHH-7-34RAC.D		
Sample name:	ZHH-7-34RAC		
Remarks:	ZHH-7-34RAC		
Acq. instrument:	LC1260	Location:	P2-D4
Injection date:	2024/1/21 7:57:38	Inj:	1 of 1
Acq.Method	AD-10-90.M	Inj Volume	15.000
Analysis Method:	AD-10-90.M	Acq. Operator:	system
Last changed	2024/4/19 20:06:12		



Agilent Technologies

Signal: DAD1 A, Sig=210,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
41.565	MM	1.7706	182073.1094	1713.8578	49.7324	
51.744	BB	1.4687	184032.6563	1473.9001	50.2676	
		total	366105.7656			

Signal: DAD1 B, Sig=230,4 Ref=off

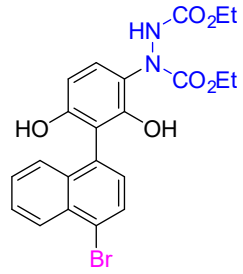
RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
41.564	BB	1.2575	194746.4375	1835.9313	49.4130	
51.715	BB	1.4957	199373.0156	1582.6094	50.5870	
		total	394119.4531			

Signal: DAD1 C, Sig=254,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
41.561	MM	1.8031	14093.4492	130.2720	50.8654	
51.712	MM	2.1022	13613.8887	107.9358	49.1346	
		total	27707.3379			

Signal: DAD1 D, Sig=280,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
41.557	BB	1.4994	36490.6758	362.1837	50.2190	
51.711	BB	1.6928	36172.3984	299.1236	49.7810	
		total	72663.0742			

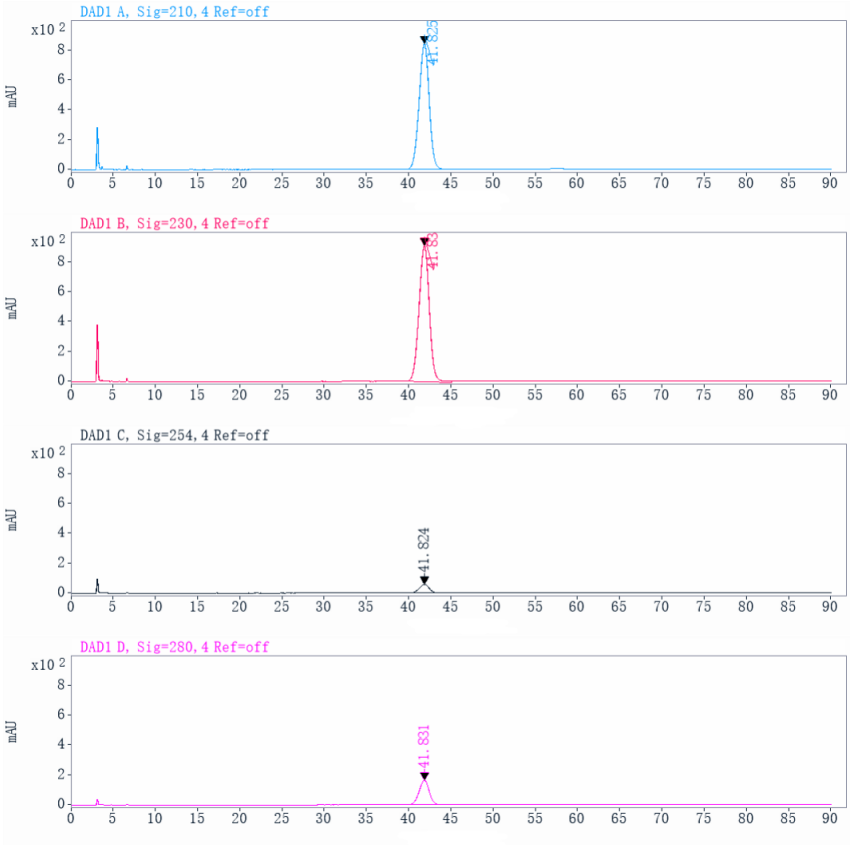


5e-rac

Agilent Technologies

File of data: D:\ChemStation\2\Data\2024-1-22.S 2024-01-22 09-19-40\ZHH-7-34.D
Sample name: ZHH-7-34
Remarks: ZHH-7-34
Acq. instrument: LC1260
Injection date: 2024/1/23 2:11:50
Acq.Method AD-10-90.M
Analysis Method: AD-10-90.M
Last changed 2024/4/19 20:08:41

Location: P2-D5
Inj: 1 of 1
Inj Volume 5.000
Acq. Operator: system



Agilent Technologies

Signal: DAD1 A, Sig=210,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
41.825	MM	1.4031	70930.0859	842.5616	100.0000	
		total	70930.0859			

Signal: DAD1 B, Sig=230,4 Ref=off

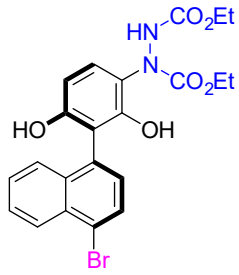
RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
41.830	MM	1.4388	78825.1094	913.1198	100.0000	
		total	78825.1094			

Signal: DAD1 C, Sig=254,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
41.824	BB	1.1283	4823.1133	57.9894	100.0000	
		total	4823.1133			

Signal: DAD1 D, Sig=280,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
41.831	BB	1.2589	13639.6572	163.9008	100.0000	
		total	13639.6572			

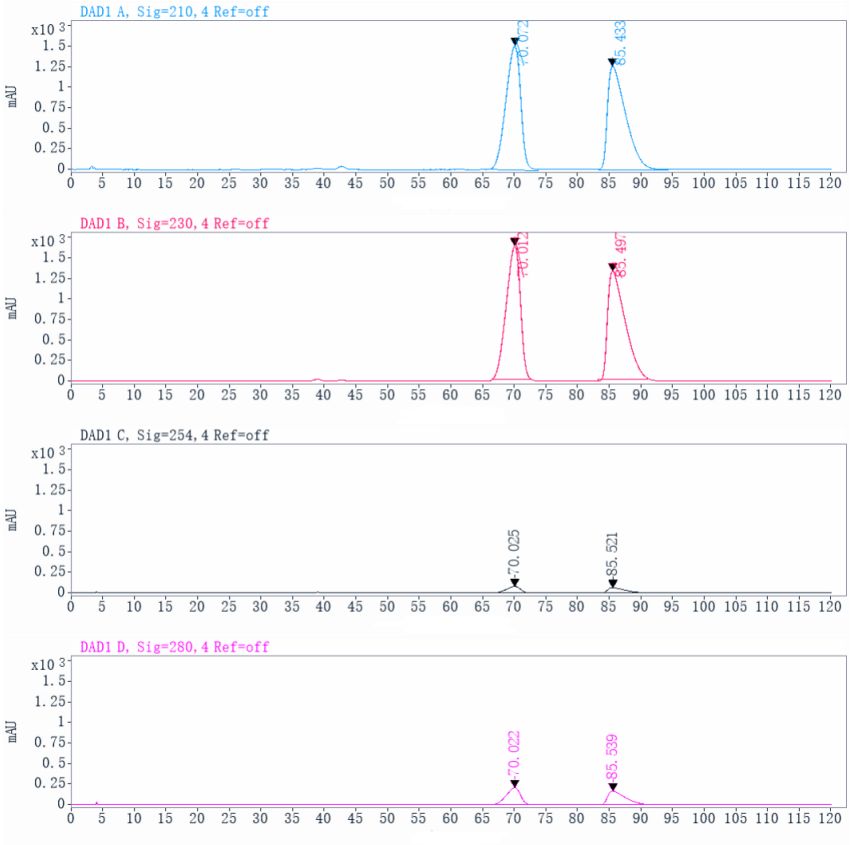


5e

Agilent Technologies

File of data: D:\ChemStation\2\Data\2024-1-24.S 2024-01-24 08-39-15\ZHH-7-33RAC,..D
Sample name: ZHH-7-33RAC,.
Remarks: ZHH-7-33RAC,.
Acq. instrument: LC1260
Injection date: 2024/1/26 1:56:26
Acq.Method AD-10-120.M
Analysis Method: AD-10-120.M
Last changed 2024/4/19 20:03:58

Location: P2-D8
Inj: 1 of 1
Inj Volume 10.000
Acq. Operator: system



Agilent Technologies

Signal: DAD1 A, Sig=210,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
70.072	MM	2.7350	250042.4531	1523.7386	49.2712	
85.433	MM	3.3805	257439.1563	1269.2396	50.7288	
		total	507481.6094			

Signal: DAD1 B, Sig=230,4 Ref=off

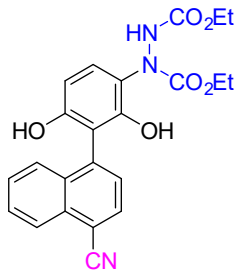
RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
70.012	MM	2.6006	254556.0781	1631.4081	50.0825	
85.497	MM	3.1957	253717.2031	1323.2365	49.9175	
		total	508273.2813			

Signal: DAD1 C, Sig=254,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
70.025	BB	1.8447	12394.4063	79.4199	50.1632	
85.521	BB	2.2722	12313.7568	63.5056	49.8368	
		total	24708.1631			

Signal: DAD1 D, Sig=280,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
70.022	BB	1.8832	32274.7090	207.2068	50.1402	
85.539	BB	2.2728	32094.2168	165.3278	49.8598	
		total	64368.9258			

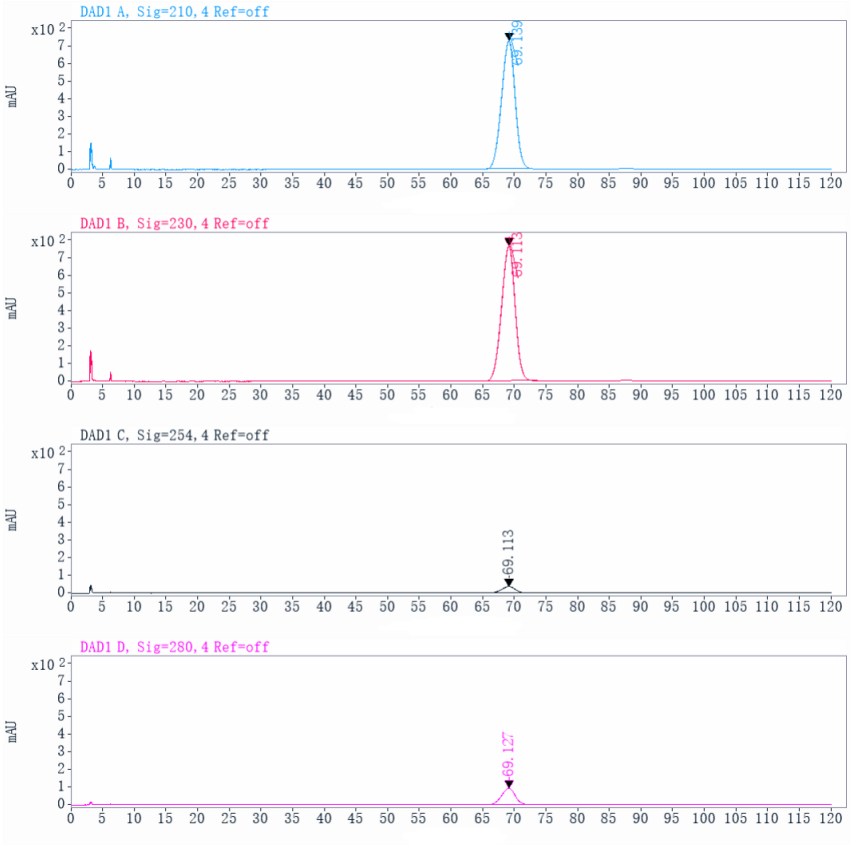


5f-rac

Agilent Technologies

File of data: D:\ChemStation\2\Data\2024-1-24.S 2024-01-24 08-39-15\ZHH-7-33.D
Sample name: ZHH-7-33
Remarks: ZHH-7-33
Acq. instrument: LC1260
Injection date: 2024/1/26 3:58:08
Acq.Method AD-10-120.M
Analysis Method: AD-10-120.M
Last changed 2024/4/19 20:03:58

Location: P2-D9
Inj: 1 of 1
Inj Volume 10.000
Acq. Operator: system



Agilent Technologies

Signal: DAD1 A, Sig=210,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
69.139	BV R	1.7522	108369.4297	727.3796	100.0000	
		total	108369.4297			

Signal: DAD1 B, Sig=230,4 Ref=off

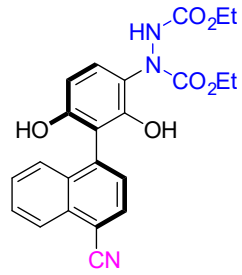
RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
69.113	BB	1.7984	114652.2031	766.7967	100.0000	
		total	114652.2031			

Signal: DAD1 C, Sig=254,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
69.113	BB	1.6990	5109.2251	35.3750	100.0000	
		total	5109.2251			

Signal: DAD1 D, Sig=280,4 Ref=off

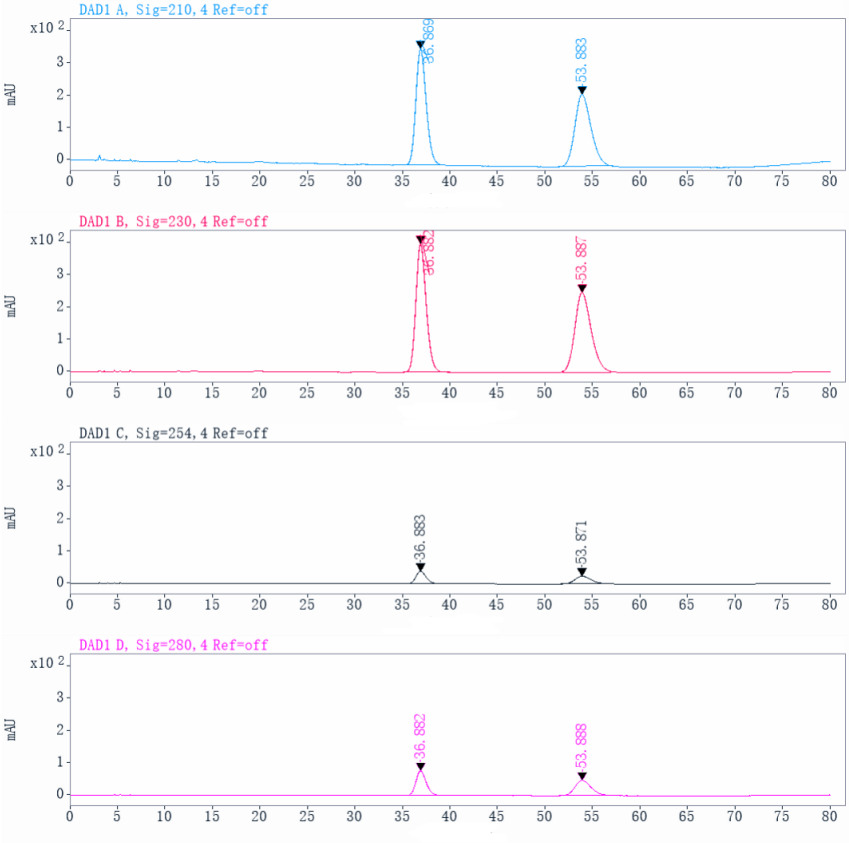
RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
69.127	BB	1.7639	13905.3926	93.4541	100.0000	
		total	13905.3926			



5f

Agilent Technologies

File of data:	D:\ChemStation\2\Data\2024-1-31.S 2024-01-31 14-08-45\ZHH-7-46RAC.D		
Sample name:	ZHH-7-46RAC		
Remarks:	ZHH-7-46RAC		
Acq. instrument:	LC1260	Location:	P2-D11
Injection date:	2024/2/1 14:30:10	Inj:	1 of 1
Acq.Method	AD-10-80.M	Inj Volume	5.000
Analysis Method:	AD-10-80.M	Acq. Operator:	system
Last changed	2024/4/19 20:22:19		



Agilent Technologies

Signal: DAD1 A, Sig=210,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
36.869	VV R	0.9030	27569.0820	362.0419	50.5793	
53.883	VV R	1.4104	26937.5820	224.6849	49.4207	
		total	54506.6641			

Signal: DAD1 B, Sig=230,4 Ref=off

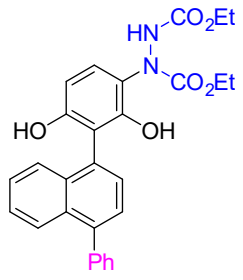
RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
36.882	BB	1.1108	30206.6582	399.2059	49.7015	
53.887	MM	2.0280	30569.4375	251.2301	50.2985	
		total	60776.0957			

Signal: DAD1 C, Sig=254,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
36.883	BB	0.9015	2921.4373	38.9290	50.5336	
53.871	BB	1.3997	2859.7358	24.1810	49.4664	
		total	5781.1731			

Signal: DAD1 D, Sig=280,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
36.882	BB	1.0610	5769.7715	76.7584	50.3131	
53.888	BB	1.4093	5697.9702	47.7098	49.6869	
		total	11467.7417			

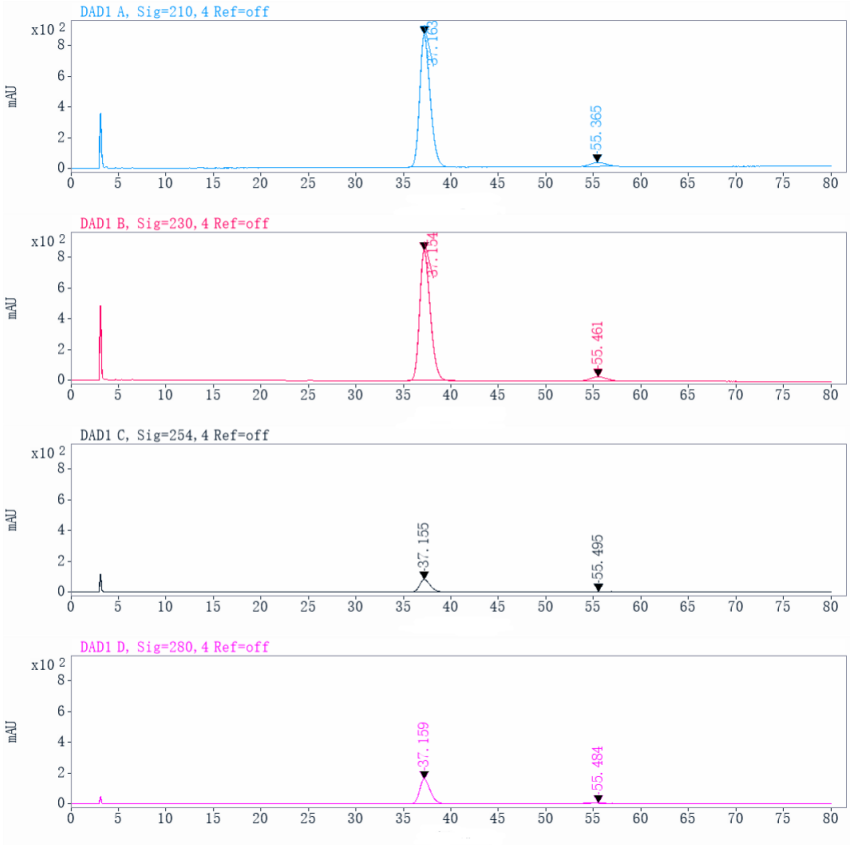


5g-rac

Agilent Technologies

File of data: D:\ChemStation\2\Data\2024-2-29.S 2024-02-29 13-48-57\ZHH-7-46.D
Sample name: ZHH-7-46
Remarks: ZHH-7-46
Acq. instrument: LC1260
Injection date: 2024/3/2 3:23:52
Acq.Method AD-10-80.M
Analysis Method: AD-10-80.M
Last changed 2024/4/19 20:23:28

Location: P2-D3
Inj: 1 of 1
Inj Volume 5.000
Acq. Operator: system



Agilent Technologies

Signal: DAD1 A, Sig=210,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
37.163	BV R	0.9074	66593.8125	867.2626	94.6737	
55.365	MM	2.0490	3746.5022	30.4743	5.3263	
		total	70340.3147			

Signal: DAD1 B, Sig=230,4 Ref=off

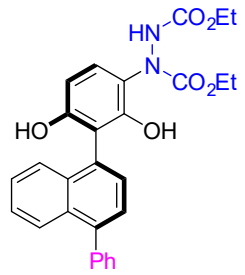
RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
37.154	BB	1.0998	66369.2109	851.0490	95.1015	
55.461	BB	1.4417	3418.5569	27.7789	4.8985	
		total	69787.7678			

Signal: DAD1 C, Sig=254,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
37.155	BB	1.0695	6388.1533	82.1218	95.2145	
55.495	MM	1.8807	321.0669	2.8453	4.7855	
		total	6709.2202			

Signal: DAD1 D, Sig=280,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
37.159	BB	1.1067	12560.5410	161.6252	95.6694	
55.484	MM	1.8617	568.5690	5.0901	4.3306	
		total	13129.1100			

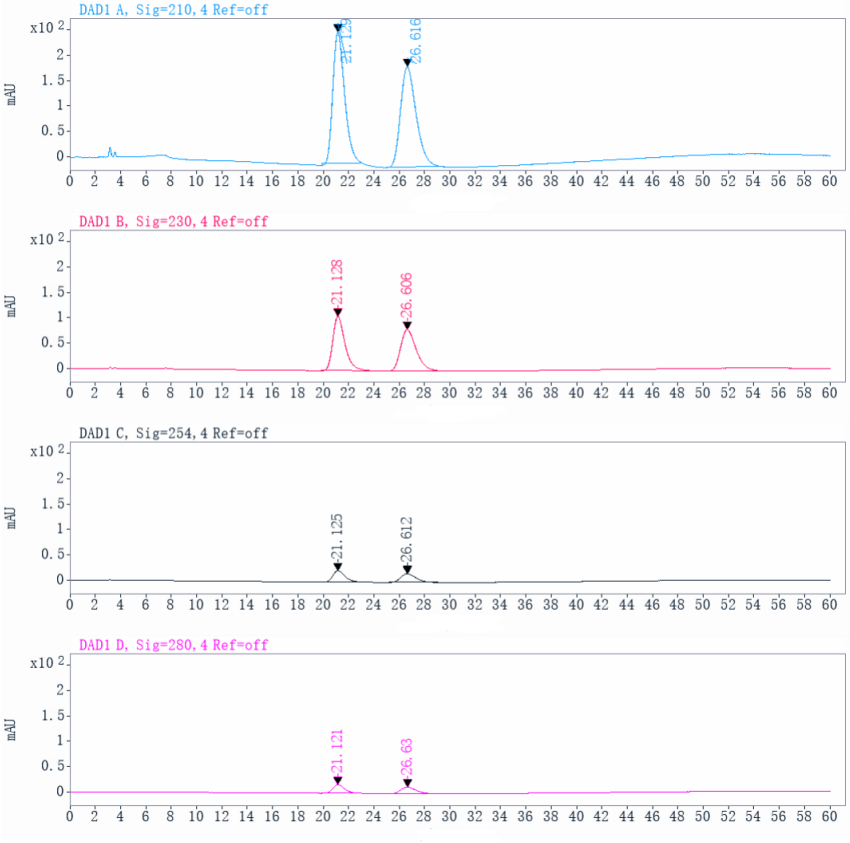


5g

Agilent Technologies

File of data: D:\ChemStation\2\Data\2024-1-24.S 2024-01-24 08-39-15\ZHH-7-32RAC.D
Sample name: ZHH-7-32RAC
Remarks: ZHH-7-32RAC
Acq. instrument: LC1260
Injection date: 2024/1/24 17:11:07
Acq.Method 0D-10-60.M
Analysis Method: 0D-10-60.M
Last changed 2024/4/19 20:01:23

Location: P2-D3
Inj: 1 of 1
Inj Volume 5.000
Acq. Operator: system



Agilent Technologies

Signal: DAD1 A, Sig=210,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
21.129	MM	1.0869	16971.7891	260.2426	49.6962	
26.616	BV R	1.0335	17179.2656	198.9378	50.3038	
		total	34151.0547			

Signal: DAD1 B, Sig=230,4 Ref=off

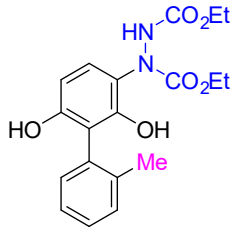
RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
21.128	BB	1.0103	7302.5254	107.5354	50.8167	
26.606	BB	1.1574	7067.7944	82.1797	49.1833	
		total	14370.3198			

Signal: DAD1 C, Sig=254,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
21.125	BB	0.8001	1503.8503	22.3745	50.8648	
26.612	BB	0.9942	1452.7145	17.1502	49.1352	
		total	2956.5648			

Signal: DAD1 D, Sig=280,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
21.121	MM	1.0775	1099.9727	17.0149	50.5117	
26.630	BB	0.9835	1077.6870	12.9413	49.4883	
		total	2177.6597			

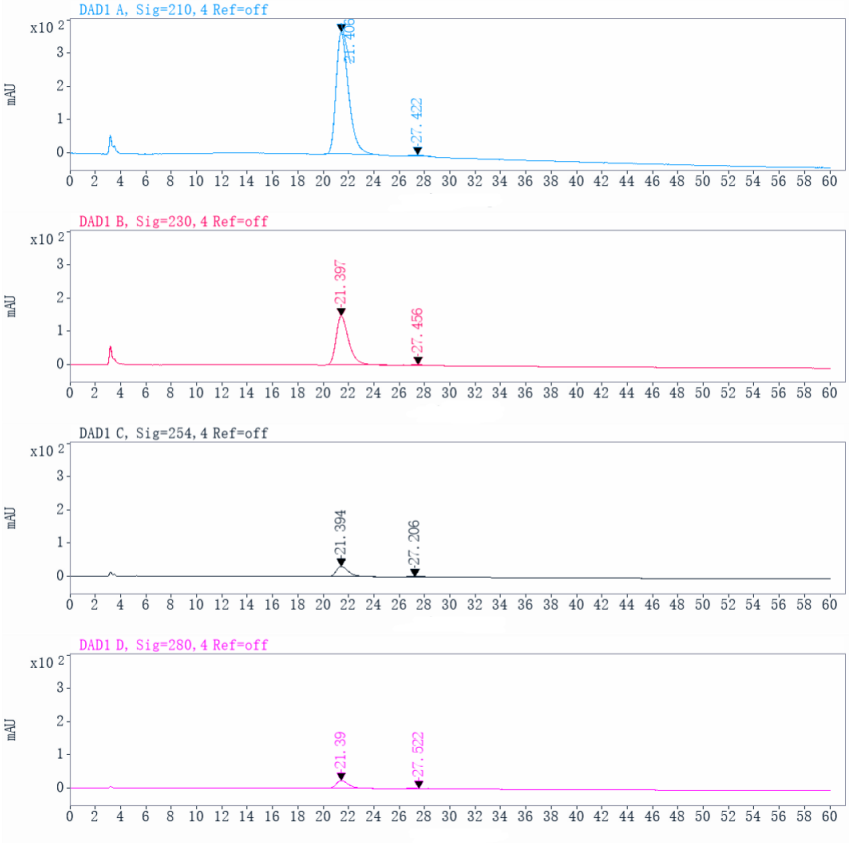


5h-rac

Agilent Technologies

File of data: D:\ChemStation\2\Data\2024-1-24.S 2024-01-24 08-39-15\ZHH-7-32.D
Sample name: ZHH-7-32
Remarks: ZHH-7-32
Acq. instrument: LC1260
Injection date: 2024/1/24 18:12:43
Acq.Method 0D-10-60.M
Analysis Method: 0D-10-60.M
Last changed 2024/4/19 20:01:23

Location: P2-D7
Inj: 1 of 1
Inj Volume 5.000
Acq. Operator: system



Agilent Technologies

Signal: DAD1 A, Sig=210,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
21.406	BB	0.8366	25676.6504	369.5409	98.5492	
27.422	MM	1.2682	377.9973	4.9676	1.4508	
		total	26054.6477			

Signal: DAD1 B, Sig=230,4 Ref=off

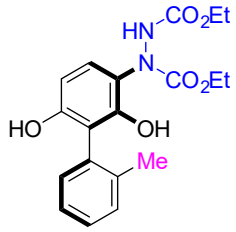
RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
21.397	BB	1.0288	10248.1465	147.8205	97.9630	
27.456	MM	1.4060	213.0960	2.5260	2.0370	
		total	10461.2424			

Signal: DAD1 C, Sig=254,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
21.394	BB	0.8797	2119.7351	30.8477	98.4345	
27.206	MM	1.0712	33.7115	0.5245	1.5655	
		total	2153.4466			

Signal: DAD1 D, Sig=280,4 Ref=off

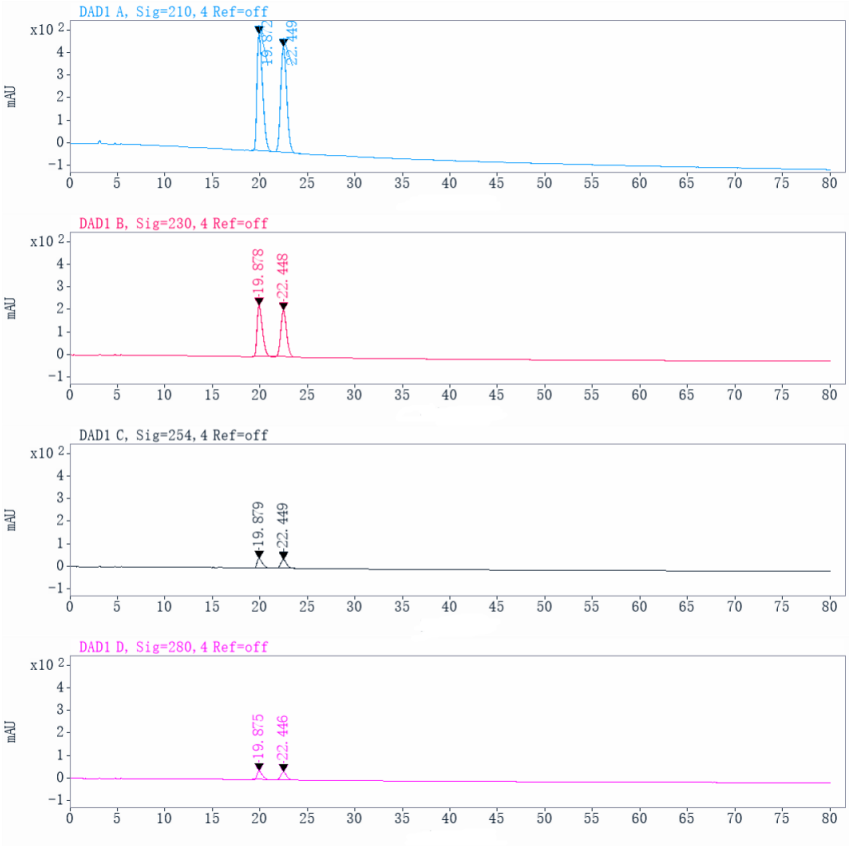
RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
21.390	BB	0.8617	1600.7189	23.5887	97.4300	
27.522	MM	1.2741	42.2243	0.5523	2.5700	
		total	1642.9431			



5h

Agilent Technologies

File of data:	D:\ChemStation\2\Data\2024-1-31.S 2024-01-31 14-08-45\ZHH-7-44RAC.D		
Sample name:	ZHH-7-44RAC		
Remarks:	ZHH-7-44RAC		
Acq. instrument:	LC1260	Location:	P2-D9
Injection date:	2024/2/1 11:47:02	Inj:	1 of 1
Acq.Method	AD-10-80.M	Inj Volume	5.000
Analysis Method:	AD-10-80.M	Acq. Operator:	system
Last changed	2024/4/19 20:14:15		



Agilent Technologies

Signal: DAD1 A, Sig=210,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
19.872	VV R	0.6075	21484.0801	518.3514	50.4388	
22.449	VV R	0.6780	21110.2578	468.2545	49.5612	
		total	42594.3379			

Signal: DAD1 B, Sig=230,4 Ref=off

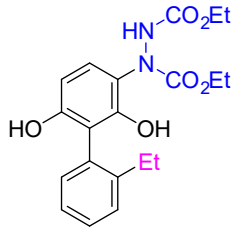
RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
19.878	BB	0.6059	8975.9629	226.7272	50.2374	
22.448	BB	0.6653	8891.1309	206.9201	49.7626	
		total	17867.0938			

Signal: DAD1 C, Sig=254,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
19.879	BB	0.5911	1648.9574	41.7194	50.3431	
22.449	BB	0.6346	1626.4794	38.0568	49.6569	
		total	3275.4368			

Signal: DAD1 D, Sig=280,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
19.875	BB	0.5960	1510.5035	38.3092	50.1862	
22.446	BB	0.6350	1499.2974	35.0511	49.8138	
		total	3009.8009			

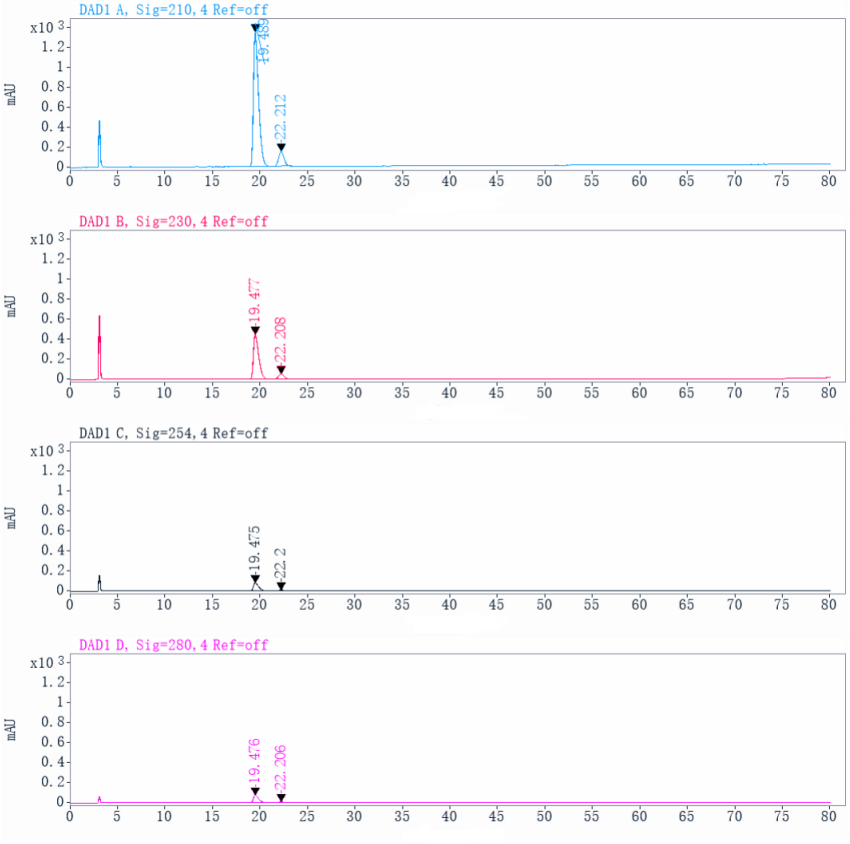


5i-rac

Agilent Technologies

File of data: D:\ChemStation\2\Data\2024-2-29.S 2024-02-29 13-48-57\ZHH-7-44.D
Sample name: ZHH-7-44
Remarks: ZHH-7-44
Acq. instrument: LC1260
Injection date: 2024/3/2 2:02:17
Acq.Method AD-10-80.M
Analysis Method: AD-10-80.M
Last changed 2024/4/19 20:16:20

Location: P2-D2
Inj: 1 of 1
Inj Volume 5.000
Acq. Operator: system



Agilent Technologies

Signal: DAD1 A, Sig=210,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
19.489	VV R	0.4639	50461.3047	1344.4425	89.2739	
22.212	VV R	0.5064	6062.8325	149.0950	10.7261	
		total	56524.1372			

Signal: DAD1 B, Sig=230,4 Ref=off

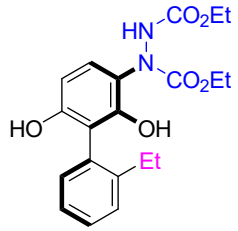
RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
19.477	BB	0.5901	17195.1758	445.6794	89.1669	
22.208	BB	0.5851	2089.0830	51.5129	10.8331	
		total	19284.2588			

Signal: DAD1 C, Sig=254,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
19.475	BB	0.5742	3114.1436	80.7043	89.1889	
22.200	BB	0.5201	377.4850	9.3684	10.8111	
		total	3491.6285			

Signal: DAD1 D, Sig=280,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
19.476	BB	0.5538	2865.8479	74.3337	89.4814	
22.206	BB	0.4809	336.8833	8.4540	10.5186	
		total	3202.7312			

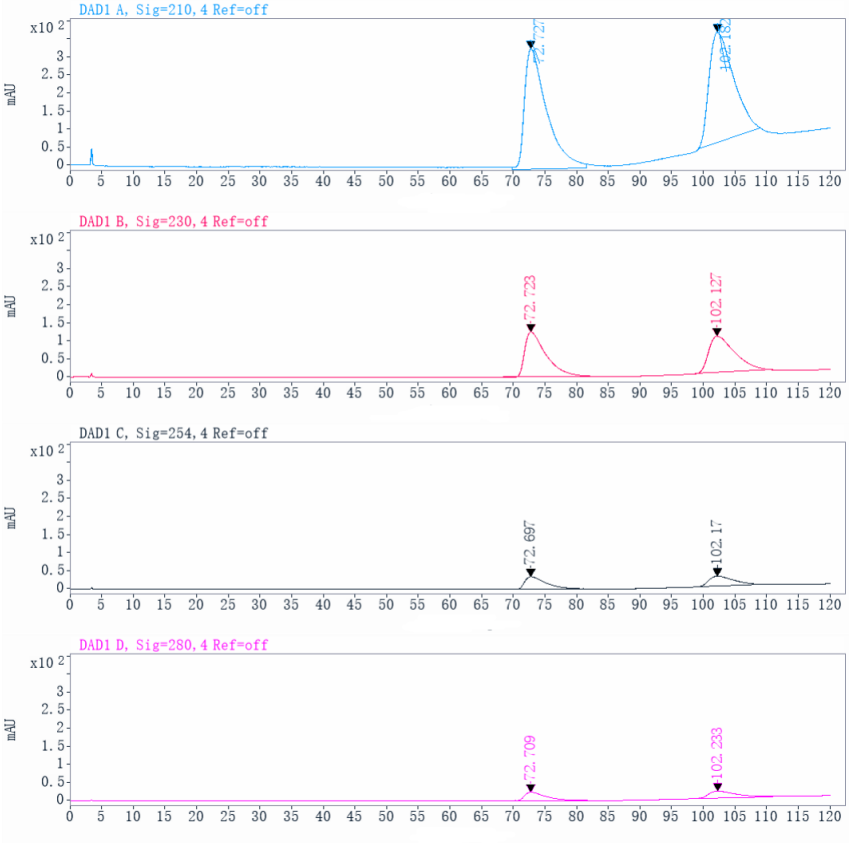


5i

Agilent Technologies

File of data: D:\ChemStation\2\Data\2024-1-26.S 2024-01-26 13-50-38\ZHH-7-31RAC.D
Sample name: ZHH-7-31RAC
Remarks: ZHH-7-31RAC
Acq. instrument: LC1260
Injection date: 2024/1/27 23:56:24
Acq.Method IC-07-120.M
Analysis Method: IC-07-120.M
Last changed 2024/4/19 19:56:20

Location: P2-D2
Inj: 1 of 1
Inj Volume 10.000
Acq. Operator: system



Agilent Technologies

Signal: DAD1 A, Sig=210,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
72.727	MM	4.0974	82373.8281	335.0617	49.9428	
102.182	MM	4.4782	82562.4453	307.2777	50.0572	
		total	164936.2734			

Signal: DAD1 B, Sig=230,4 Ref=off

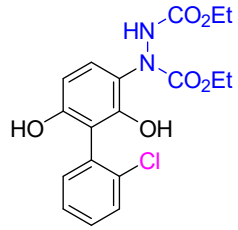
RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
72.723	MM	3.9967	30065.1719	125.3763	50.4738	
102.127	BB	3.4016	29500.7539	101.6595	49.5262	
		total	59565.9258			

Signal: DAD1 C, Sig=254,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
72.697	MM	3.9678	8281.8291	34.7880	50.9977	
102.170	MM	4.7380	7957.7881	27.9929	49.0023	
		total	16239.6172			

Signal: DAD1 D, Sig=280,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
72.709	MM	4.1443	5989.0015	24.0851	49.0832	
102.233	MM	5.2728	6212.7344	19.6376	50.9168	
		total	12201.7358			

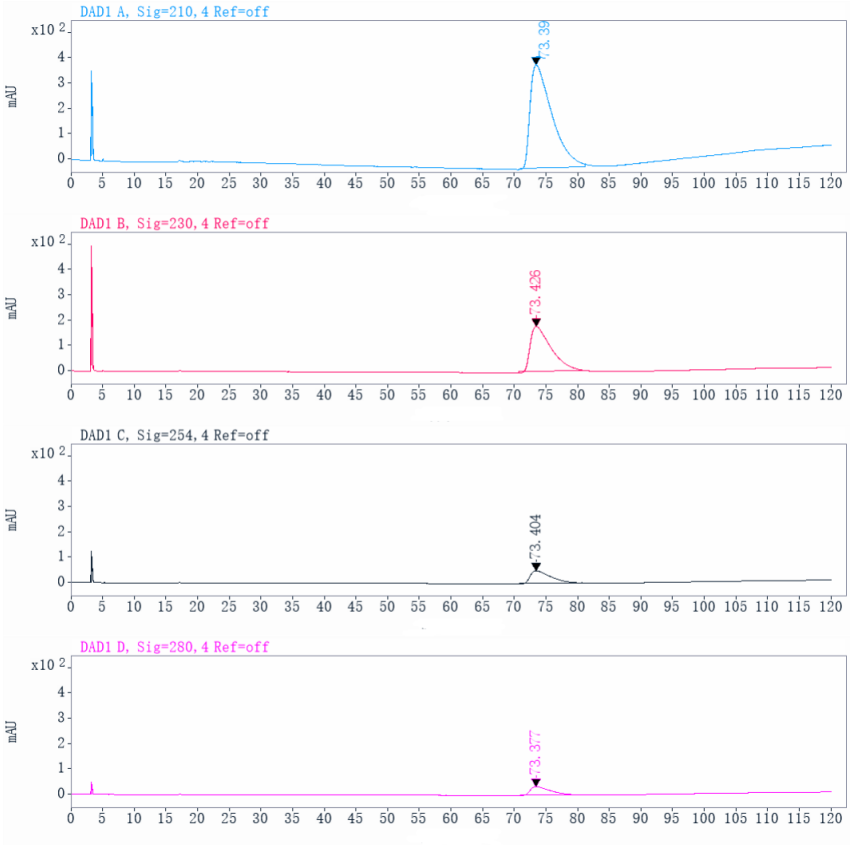


5j-rac

Agilent Technologies

File of data: D:\ChemStation\2\Data\2024-1-29.S 2024-01-29 13-49-53\ZHH-7-31.D
Sample name: ZHH-7-31
Remarks: ZHH-7-31
Acq. instrument: LC1260
Injection date: 2024/1/30 12:17:11
Acq.Method IC-07-120.M
Analysis Method: IC-07-120.M
Last changed 2024/6/3 21:11:53

Location: P2-D4
Inj: 1 of 1
Inj Volume 5.000
Acq. Operator: system



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Signal: DAD1 A, Sig=210,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
73.390	MM	4.0288	99177.3203	410.2839	100.0000	
		total	99177.3203			

Signal: DAD1 B, Sig=230,4 Ref=off

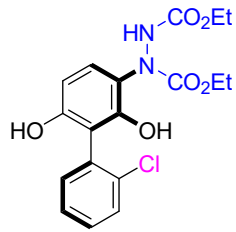
RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
73.426	MM	3.8487	41372.6563	179.1648	100.0000	
		total	41372.6563			

Signal: DAD1 C, Sig=254,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
73.404	MM	4.0449	12549.5195	51.7092	100.0000	
		total	12549.5195			

Signal: DAD1 D, Sig=280,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
73.377	MM	3.9111	8129.9907	34.6448	100.0000	
		total	8129.9907			

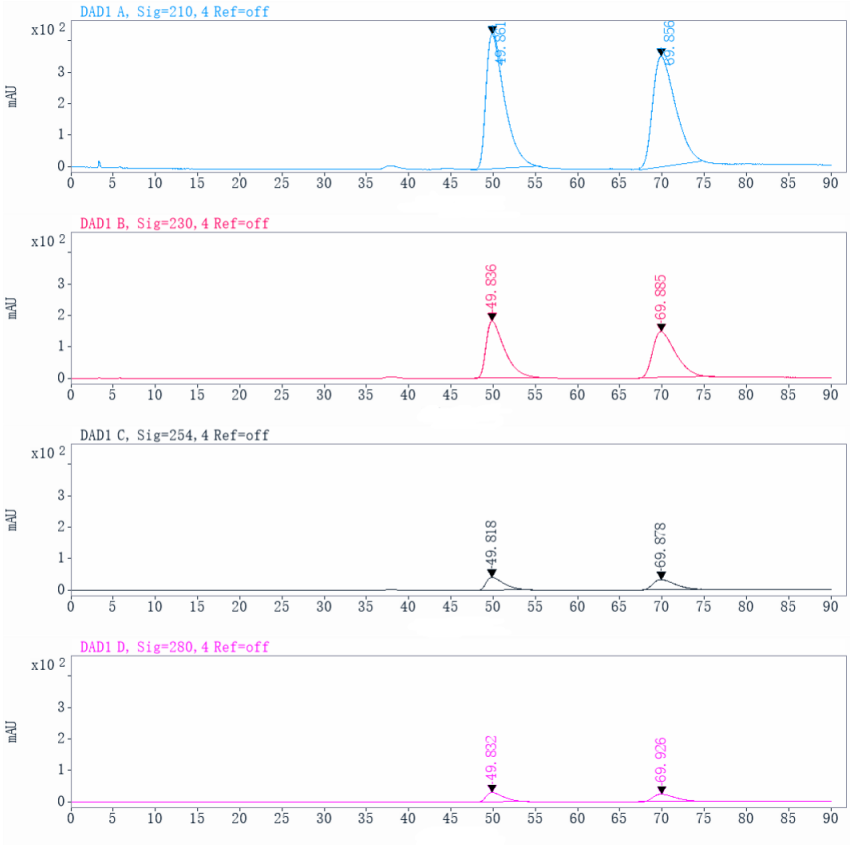


5j

Agilent Technologies

File of data: D:\ChemStation\2\Data\2024-1-31.S 2024-01-31 14-08-45\ZHH-7-43RAC,.D
Sample name: ZHH-7-43RAC,
Remarks: ZHH-7-43RAC,
Acq. instrument: LC1260
Injection date: 2024/2/1 16:14:04
Acq.Method IC-10-90.M
Analysis Method: IC-10-90.M
Last changed 2024/4/19 20:11:21

Location: P2-D8
Inj: 1 of 1
Inj Volume 5.000
Acq. Operator: system



Agilent Technologies

Signal: DAD1 A, Sig=210,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
49.861	MM	2.5549	65819.1406	429.3586	49.7631	
69.856	MM	3.1362	66445.9141	353.1157	50.2369	
		total	132265.0547			

Signal: DAD1 B, Sig=230,4 Ref=off

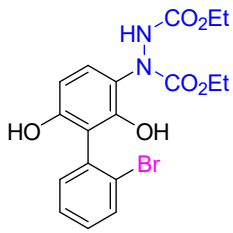
RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
49.836	BB	1.7971	27997.6992	182.5729	49.9579	
69.885	BB	2.2398	28044.9121	147.1326	50.0421	
		total	56042.6113			

Signal: DAD1 C, Sig=254,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
49.818	BB	1.7392	6099.4116	41.2471	49.9406	
69.878	MM	3.0899	6113.9233	32.9779	50.0594	
		total	12213.3350			

Signal: DAD1 D, Sig=280,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
49.832	BB	1.7245	4405.7729	30.1912	49.6372	
69.926	MM	3.0863	4470.1758	24.1400	50.3628	
		total	8875.9487			

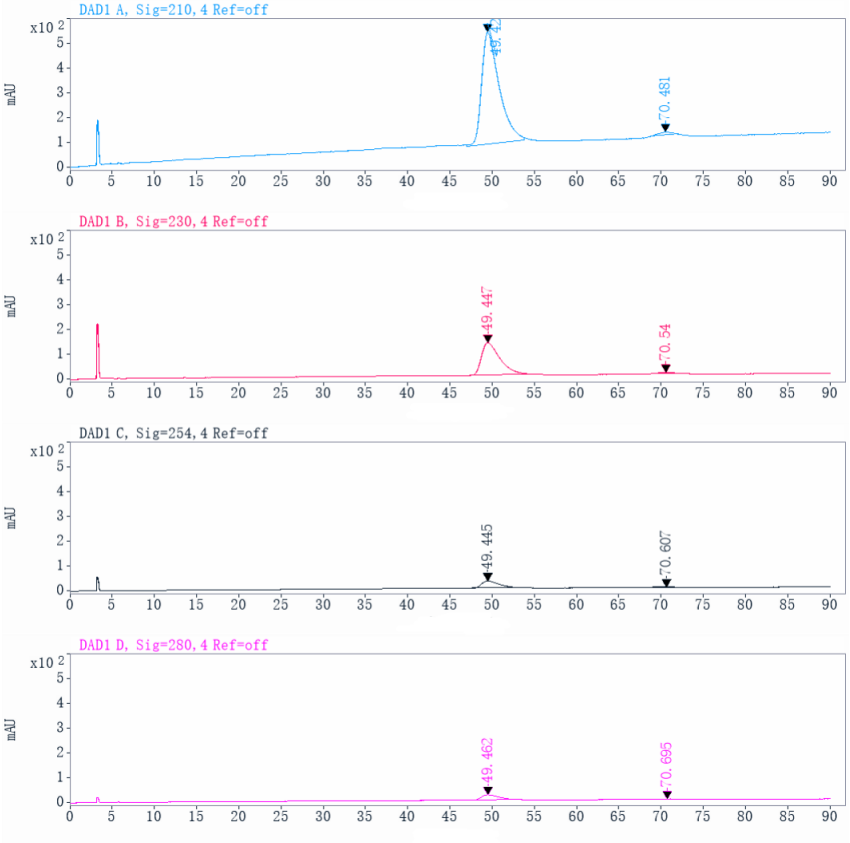


5k-rac

Agilent Technologies

File of data: D:\ChemStation\2\Data\2024-2-29.S 2024-02-29 13-48-57\ZHH-7-43.D
Sample name: ZHH-7-43
Remarks: ZHH-7-43
Acq. instrument: LC1260
Injection date: 2024/3/2 0:08:18
Acq.Method IC-10-90.M
Analysis Method: IC-10-90.M
Last changed 2024/4/19 20:12:58

Location: P2-D1
Inj: 1 of 1
Inj Volume 5.000
Acq. Operator: system



Agilent Technologies

Signal: DAD1 A, Sig=210,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
49.420	MM	2.4239	65892.2656	453.0790	98.1463	
70.481	MM	1.7069	1244.4900	12.1517	1.8537	
		total	67136.7556			

Signal: DAD1 B, Sig=230,4 Ref=off

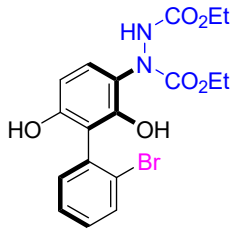
RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
49.447	BB	1.8156	19924.7813	130.1843	97.3011	
70.540	MM	1.9346	552.6743	4.7612	2.6989	
		total	20477.4555			

Signal: DAD1 C, Sig=254,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
49.445	BB	1.7482	4275.4980	28.7635	97.1121	
70.607	MM	1.9182	127.1426	1.1047	2.8879	
		total	4402.6406			

Signal: DAD1 D, Sig=280,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
49.462	BB	1.6979	3031.7393	20.9060	98.0931	
70.695	MM	1.4204	58.9355	0.6915	1.9069	
		total	3090.6748			

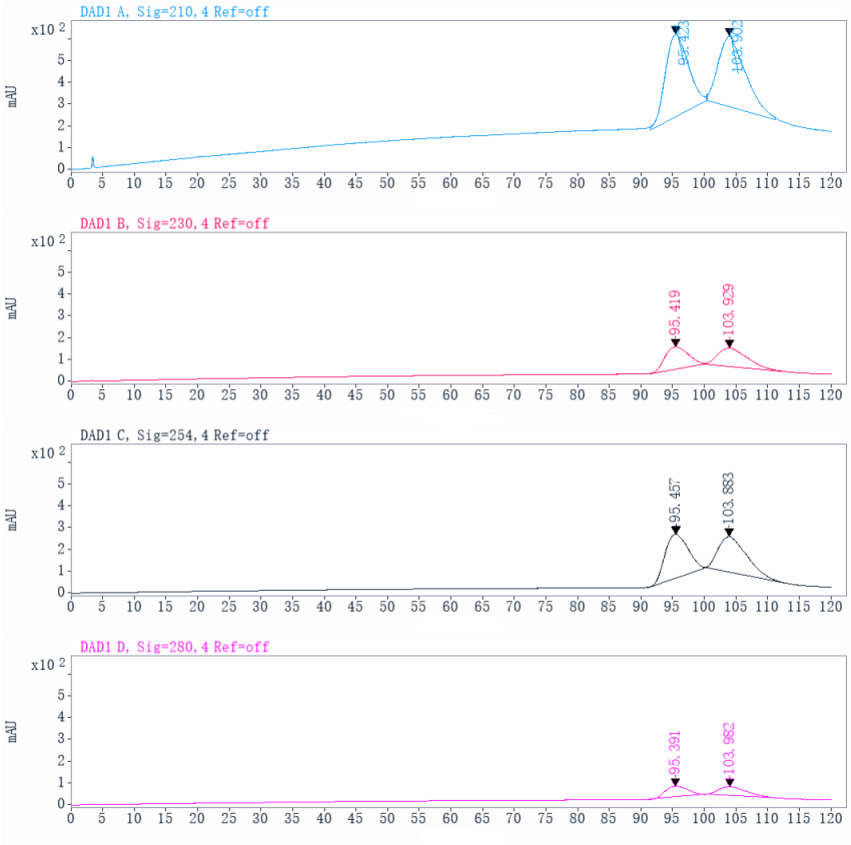


5k

Agilent Technologies

File of data: D:\ChemStation\2\Data\2024-1-26.S 2024-01-26 13-50-38\ZHH-7-30RAC.D
Sample name: ZHH-7-30RAC
Remarks: ZHH-7-30RAC
Acq. instrument: LC1260
Injection date: 2024/1/27 19:41:53
Acq.Method IC-05-120.M
Analysis Method: IC-05-120.M
Last changed 2024/4/19 19:51:56

Location: P2-D1
Inj: 1 of 1
Inj Volume 10.000
Acq. Operator: system



Agilent Technologies

Signal: DAD1 A, Sig=210,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
95.423	MM	4.2051	96348.5703	381.8711	49.9590	
103.902	MM	4.9402	96506.6875	325.5850	50.0410	
		total	192855.2578			

Signal: DAD1 B, Sig=230,4 Ref=off

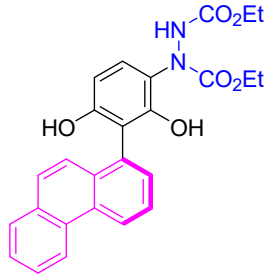
RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
95.419	MM	3.0324	26955.1250	104.0133	48.2339	
103.929	MM	5.5076	28929.0273	87.5433	51.7661	
		total	55884.1523			

Signal: DAD1 C, Sig=254,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
95.457	MM	2.9901	51500.2695	201.8541	49.7380	
103.883	BB	3.6808	52042.8945	165.4931	50.2620	
		total	103543.1641			

Signal: DAD1 D, Sig=280,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
95.391	BB	2.9357	12481.2207	49.7360	49.3907	
103.982	MM	5.1587	12789.1738	41.3190	50.6093	
		total	25270.3945			

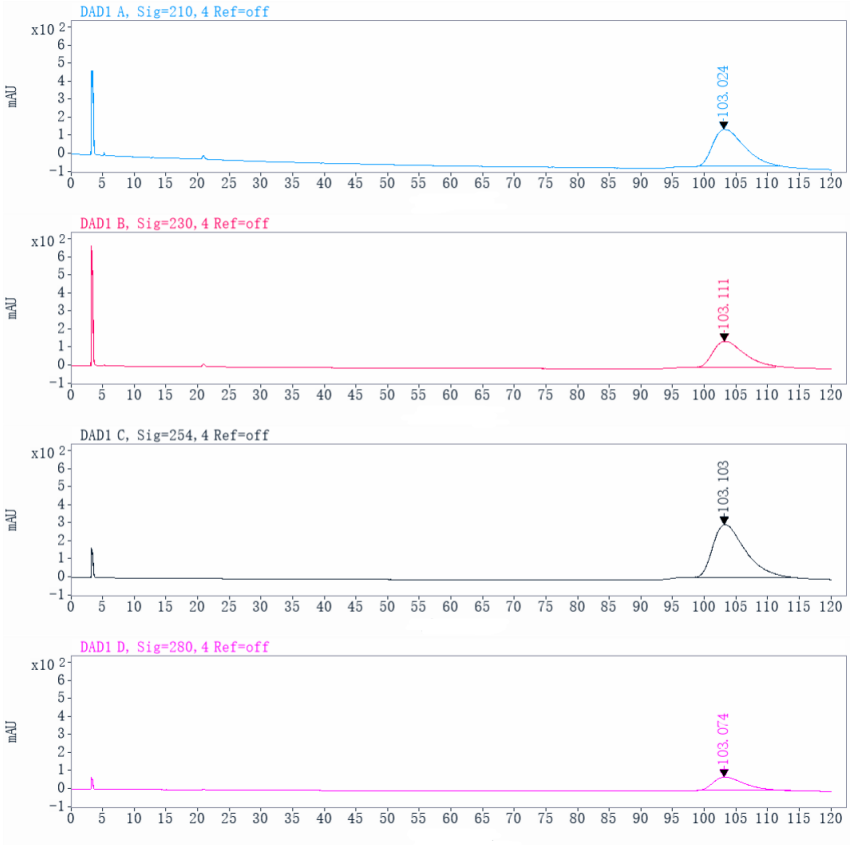


5l-rac

Agilent Technologies

File of data: D:\ChemStation\2\Data\2024-1-26.S 2024-01-26 13-50-38\ZHH-7-30.D
Sample name: ZHH-7-30
Remarks: ZHH-7-30
Acq. instrument: LC1260
Injection date: 2024/1/27 21:43:28
Acq.Method IC-05-120.M
Analysis Method: IC-05-120.M
Last changed 2024/4/19 19:51:56

Location: P2-D3
Inj: 1 of 1
Inj Volume 10.000
Acq. Operator: system



Agilent Technologies

Signal: DAD1 A, Sig=210,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
103.024	MM	5.8346	72034.7266	205.7687	100.0000	
		total	72034.7266			

Signal: DAD1 B, Sig=230,4 Ref=off

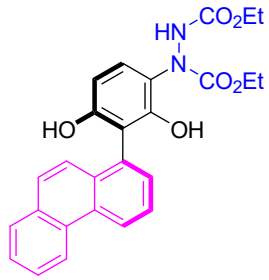
RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
103.111	MM	5.9391	52716.0781	147.9344	100.0000	
		total	52716.0781			

Signal: DAD1 C, Sig=254,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
103.103	MM	5.9566	104869.2891	293.4257	100.0000	
		total	104869.2891			

Signal: DAD1 D, Sig=280,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
103.074	MM	5.8204	26183.5000	74.9757	100.0000	
		total	26183.5000			

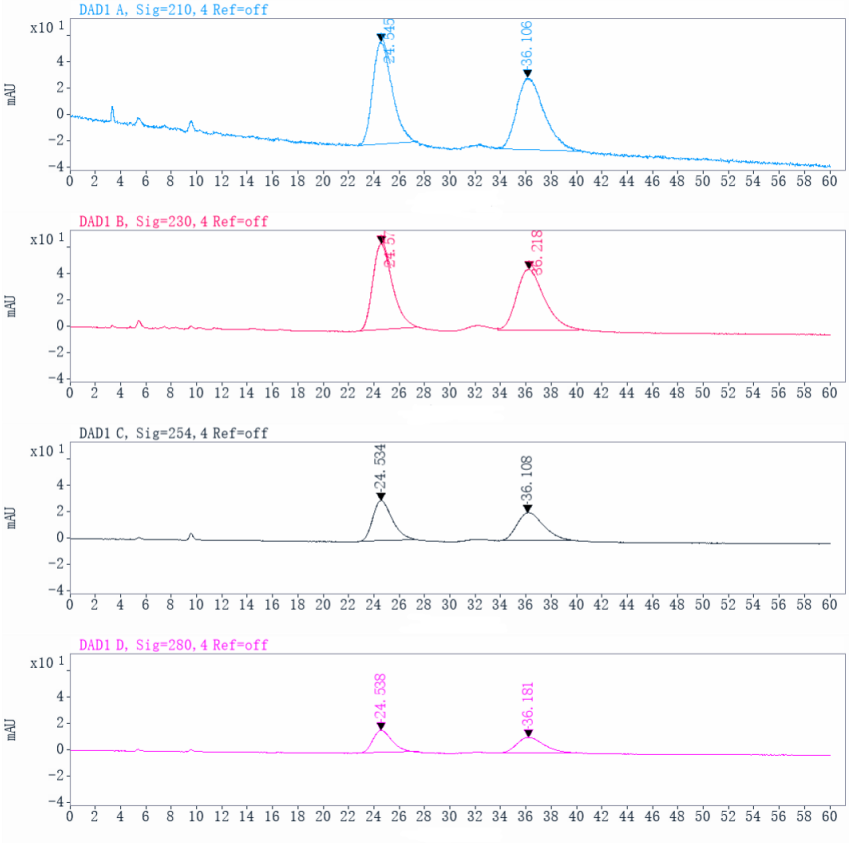


5l

Agilent Technologies

File of data: D:\ChemStation\2\Data\2024-4-2.S1 2024-04-02 08-45-44\ZHH-7-70-1.D
Sample name: ZHH-7-70-1
Remarks: ZHH-7-70-1
Acq. instrument: LC1260
Injection date: 2024/4/2 10:11:39
Acq.Method IC-15-60.M
Analysis Method: IC-15-60.M
Last changed 2024/4/19 20:43:58

Location: P2-D2
Inj: 1 of 1
Inj Volume 5.000
Acq. Operator: system



Agilent Technologies

Signal: DAD1 A, Sig=210,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
24.545	MM	1.7848	8331.5801	77.8025	49.9987	
36.106	MM	2.5324	8332.0020	54.8352	50.0013	
		total	16663.5820			

Signal: DAD1 B, Sig=230,4 Ref=off

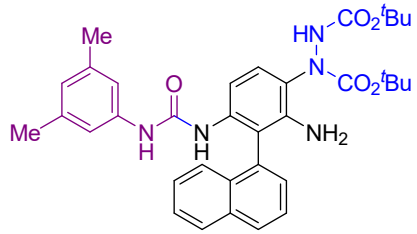
RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
24.570	BV R	1.2892	7091.3740	65.0805	49.5912	
36.218	MM	2.5899	7208.2852	46.3877	50.4088	
		total	14299.6592			

Signal: DAD1 C, Sig=254,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
24.534	BB	1.2612	3234.2627	30.2547	50.8319	
36.108	MM	2.4585	3128.4014	21.2077	49.1681	
		total	6362.6641			

Signal: DAD1 D, Sig=280,4 Ref=off

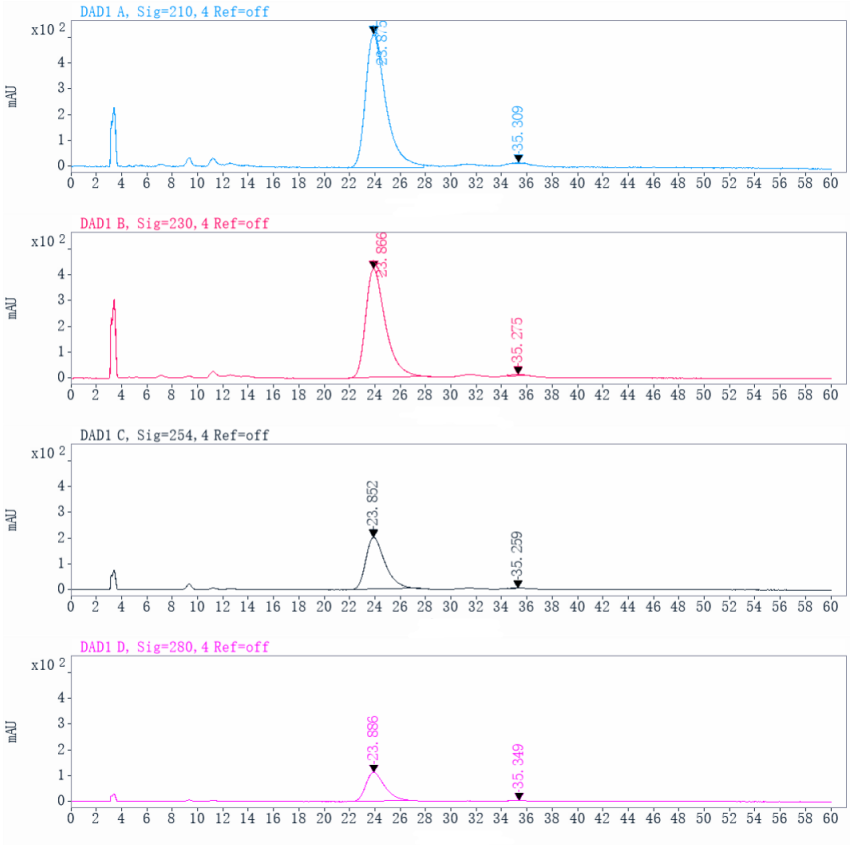
RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
24.538	MM	1.7621	1781.0049	16.8453	49.5991	
36.181	MM	2.5337	1809.7972	11.9049	50.4009	
		total	3590.8021			



6-rac

Agilent Technologies

File of data:	D:\ChemStation\2\Data\2024-4-17.S 2024-04-17 17-02-13\ZHH-7-85-1-SHOU.D		
Sample name:	ZHH-7-85-1-SHOU		
Remarks:	ZHH-7-85-1-SHOU		
Acq. instrument:	LC1260	Location:	P2-D5
Injection date:	2024/4/18 12:49:42	Inj:	1 of 1
Acq.Method	IC-15-60.M	Inj Volume	15.000
Analysis Method:	IC-15-60.M	Acq. Operator:	system
Last changed	2024/5/23 14:02:18		



Agilent Technologies

Signal: DAD1 A, Sig=210,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
23.875	MM	1.8715	58516.7539	521.1080	99.3502	
35.309	MM	0.8950	382.7494	7.1273	0.6498	
		total	58899.5033			

Signal: DAD1 B, Sig=230,4 Ref=off

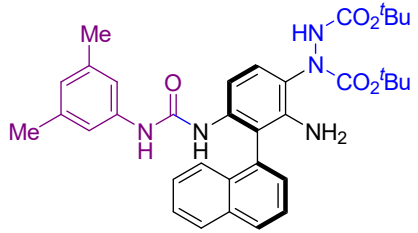
RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
23.866	BV R	1.2898	46366.2578	424.0020	99.2290	
35.275	MM	1.1240	360.2405	5.3418	0.7710	
		total	46726.4984			

Signal: DAD1 C, Sig=254,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
23.852	BB	1.2630	21601.6016	202.1027	99.2157	
35.259	MM	1.0691	170.7684	2.6622	0.7843	
		total	21772.3700			

Signal: DAD1 D, Sig=280,4 Ref=off

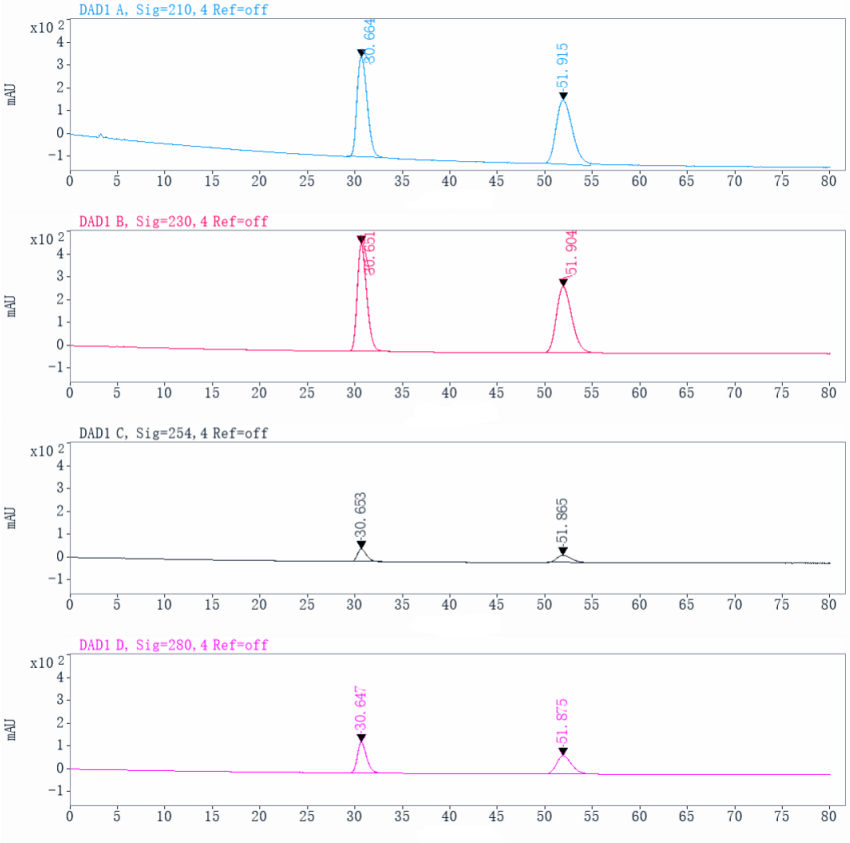
RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
23.886	BB	1.2466	11819.7793	111.8782	99.4194	
35.349	MM	0.9312	69.0218	1.2354	0.5806	
		total	11888.8011			



6

Agilent Technologies

File of data:	D:\ChemStation\2\Data\2024-3-26.S1 2024-03-26 19-46-06\ZHH-7-62-2.D		
Sample name:	ZHH-7-62-2		
Remarks:	ZHH-7-62-2		
Acq. instrument:	LC1260	Location:	P2-D1
Injection date:	2024/3/26 19:59:01	Inj:	1 of 1
Acq.Method	AD-10-80.M	Inj Volume	10.000
Analysis Method:	AD-10-80.M	Acq. Operator:	system
Last changed	2024/4/19 20:28:39		



Agilent Technologies

Signal: DAD1 A, Sig=210,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
30.664	VV R	0.9001	32993.8477	438.3806	49.1417	
51.915	MM	2.0133	34146.4414	282.6729	50.8583	
		total	67140.2891			

Signal: DAD1 B, Sig=230,4 Ref=off

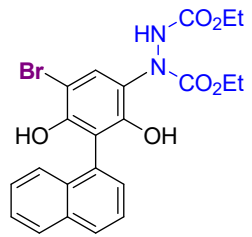
RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
30.651	BB	0.9754	32716.4668	471.5587	49.9414	
51.904	BB	1.3342	32793.2500	290.2356	50.0586	
		total	65509.7168			

Signal: DAD1 C, Sig=254,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
30.653	BB	0.8279	3654.8110	54.9575	51.0064	
51.865	BB	1.2734	3510.5894	32.4180	48.9936	
		total	7165.4004			

Signal: DAD1 D, Sig=280,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
30.647	BB	0.9496	9037.8936	135.2459	50.4589	
51.875	BB	1.3030	8873.5146	80.4396	49.5411	
		total	17911.4082			

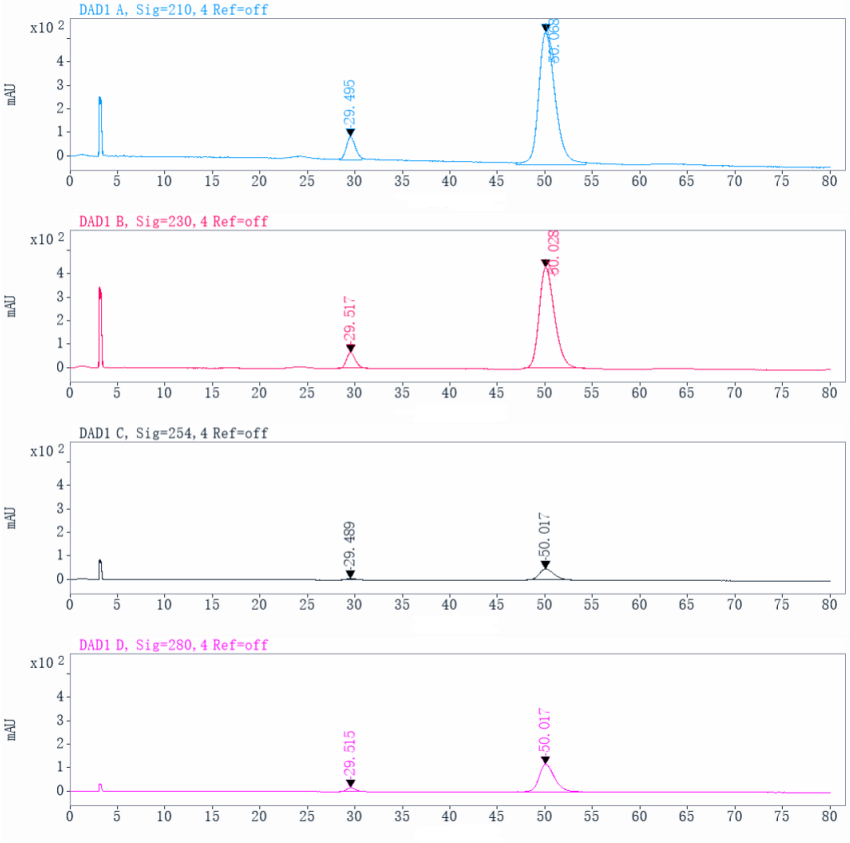


7-rac

Agilent Technologies

File of data: D:\ChemStation\2\Data\2024-4-10-1.S 2024-04-10 11-32-15\ZHH-7-78-2.D
Sample name: ZHH-7-78-2
Remarks: ZHH-7-78-2
Acq. instrument: LC1260
Injection date: 2024/4/10 13:28:17
Acq.Method AD-10-80.M
Analysis Method: AD-10-80.M
Last changed 2024/4/19 20:32:15

Location: P2-D2
Inj: 1 of 1
Inj Volume 10.000
Acq. Operator: system



Agilent Technologies

Signal: DAD1 A, Sig=210,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
29.495	MM	1.1140	6713.6284	100.4452	8.7850	
50.068	MM	2.0447	69707.6250	568.1929	91.2150	
		total	76421.2534			

Signal: DAD1 B, Sig=230,4 Ref=off

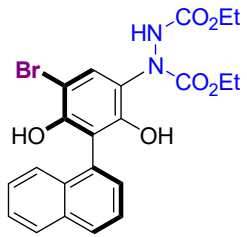
RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
29.517	BB	0.7886	4452.8062	67.5866	8.3976	
50.028	BV R	1.3480	48571.8125	431.2643	91.6024	
		total	53024.6187			

Signal: DAD1 C, Sig=254,4 Ref=off

RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
29.489	BB	0.7313	415.1362	6.7142	7.5220	
50.017	BB	1.2749	5103.7974	47.1491	92.4780	
		total	5518.9336			

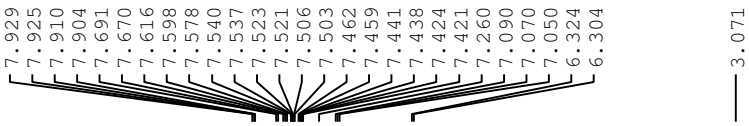
Signal: DAD1 D, Sig=280,4 Ref=off

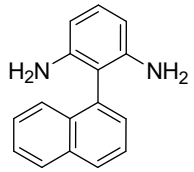
RetTime [min]	Type	Width[min]	Area[mAu*s]	Height [mAu\U]	Area%	Name
29.515	BB	0.7615	1098.0494	17.0922	7.3360	
50.017	MM	1.9401	13869.9727	119.1509	92.6640	
		total	14968.0221			



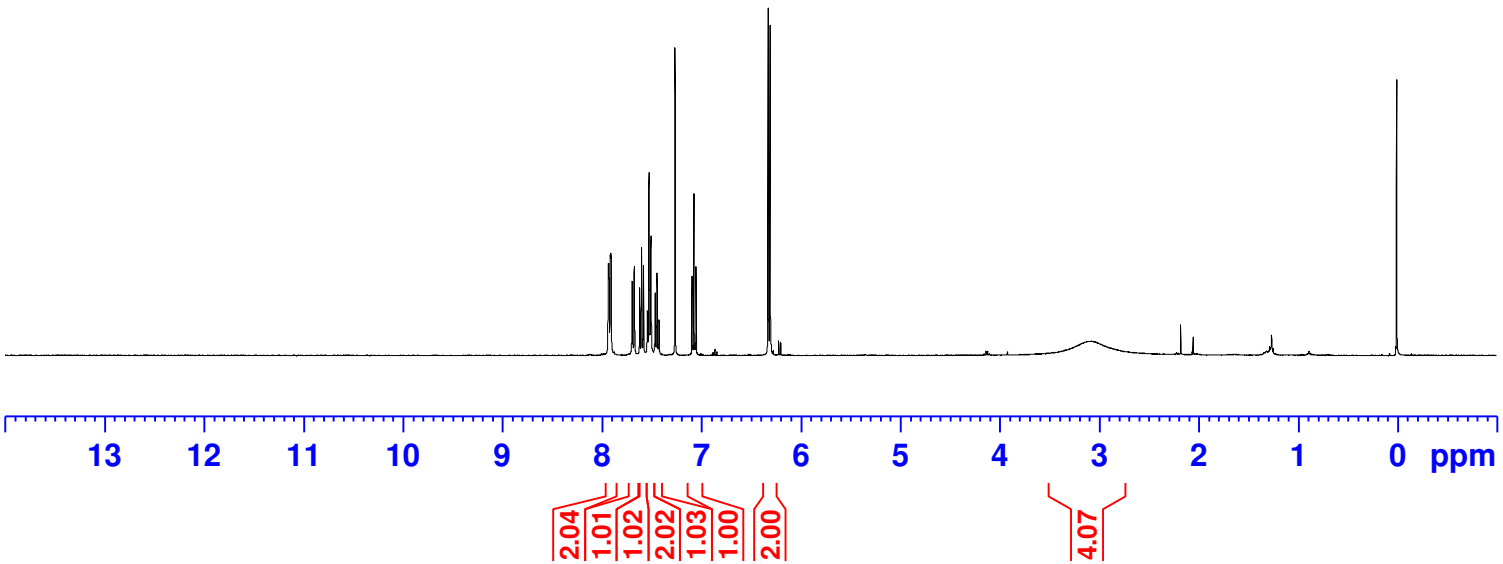
7

1a





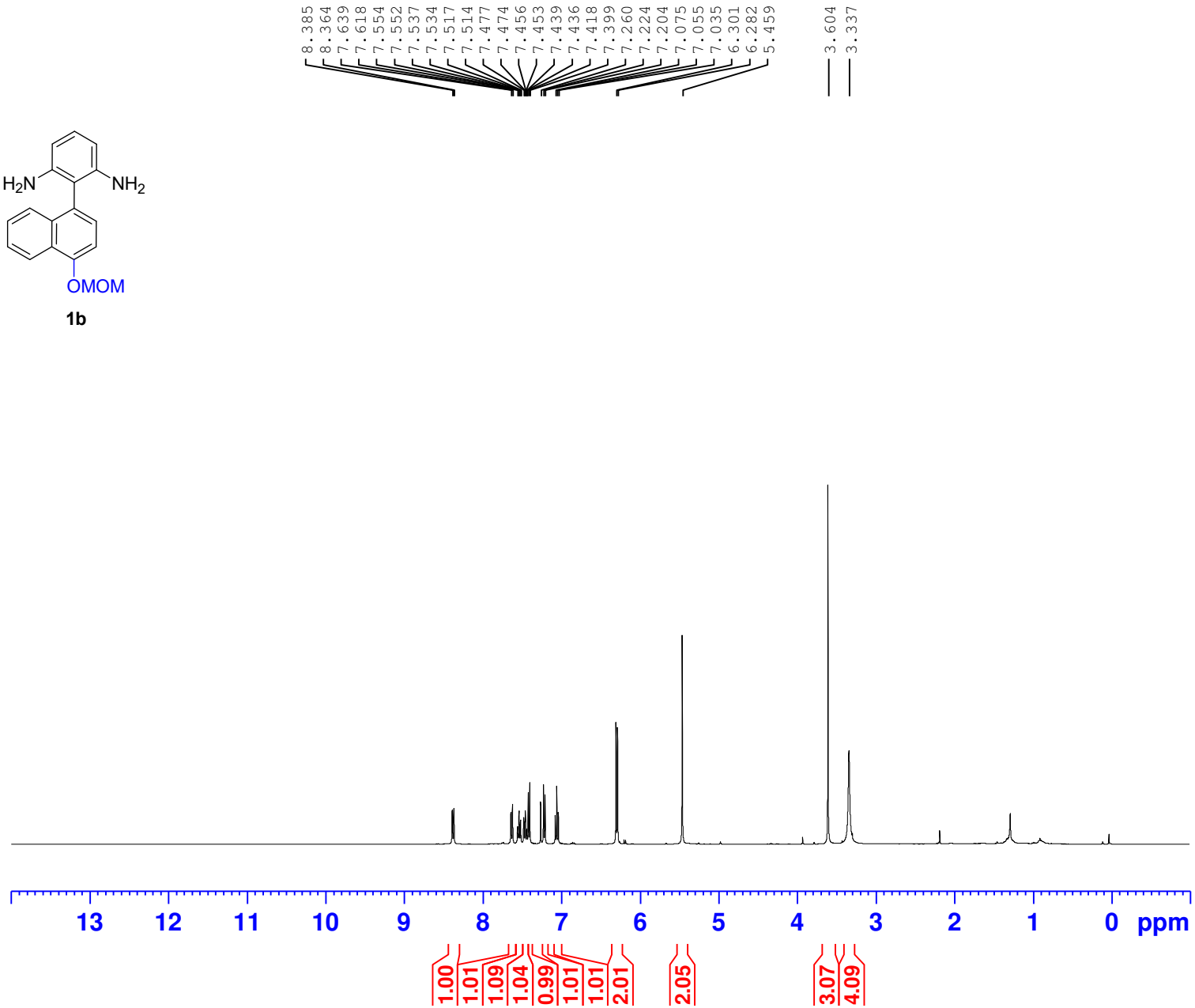
1a




```
Current Data Parameters
NAME       20231021-400M
EXPNO                 34
PROCNO                 1

F2 - Acquisition Parameters
Date_           20231021
Time                1.07
INSTRUM            spect
PROBHD   5 mm PADUL 13C
PULPROG             zg30
TD                 65536
SOLVENT            CDCl3
NS                     6
DS                     2
SWH             8223.685 Hz
FIDRES          0.125483 Hz
AQ             3.9845889 sec
RG                193.13
DW                60.800 usec
DE                 6.50 usec
TE                294.0 K
D1           1.00000000 sec
TD0                    1

======== CHANNEL f1 ========
NUC1                  1H
P1                 9.90 usec
PLW1        23.00000000 W
SFO1        400.1924713 MHz

F2 - Processing parameters
SI                 65536
SF          400.1900140 MHz
WDW                   EM
SSB                    0
LB                 0.30 Hz
GB                     0
PC                 1.00
```

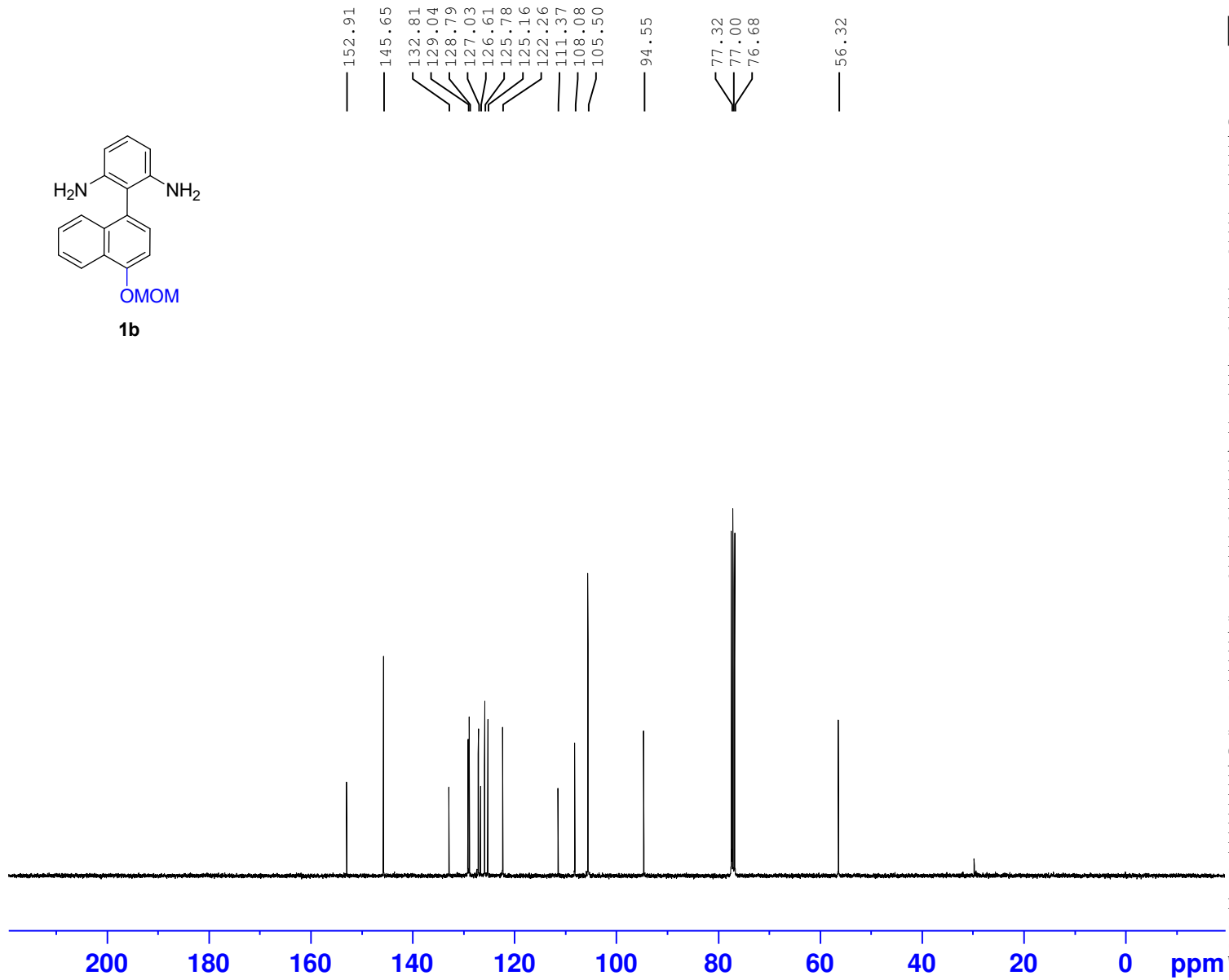
1b

1b




```
Current Data Parameters
NAME       20231124-400M
EXPNO                 25
PROCNO                 1

F2 - Acquisition Parameters
Date_           20231124
Time                0.46
INSTRUM            spect
PROBHD   5 mm PADUL 13C
PULPROG             zg30
TD                 65536
SOLVENT            CDCl3
NS                     8
DS                     2
SWH             8223.685 Hz
FIDRES          0.125483 Hz
AQ             3.9845889 sec
RG                  53.3
DW                60.800 usec
DE                 6.50 usec
TE                292.2 K
D1           1.00000000 sec
TD0                    1

======== CHANNEL f1 ========
NUC1                  1H
P1                 9.90 usec
PLW1        23.00000000 W
SFO1       400.1924713 MHz

F2 - Processing parameters
SI                 65536
SF          400.1900138 MHz
WDW                   EM
SSB                    0
LB                  0.30 Hz
GB                     0
PC                  1.00
```

1b



Current Data Parameters
NAME 20231124-400M
EXPNO 26
PROCNO 1

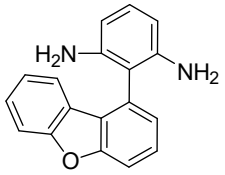
F2 - Acquisition Parameters
Date_ 20231124
Time 1.10
INSTRUM spect
PROBHD 5 mm PADUL 13C
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 400
DS 4
SWH 24038.461 Hz
FIDRES 0.366798 Hz
AQ 1.3631488 sec
RG 37.77
DW 20.800 usec
DE 6.50 usec
TE 292.7 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1

======== CHANNEL f1 ========
NUC1 13C
P1 9.80 usec
PLW1 47.40000153 W
SFO1 100.6379178 MHz

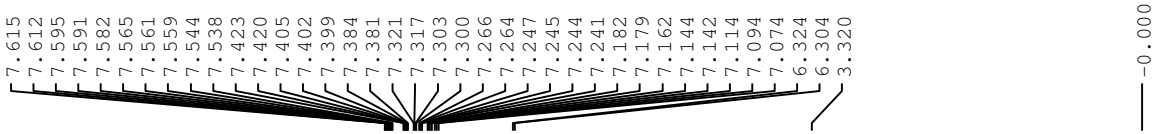
======== CHANNEL f2 ========
CPDPRG[2 waltz16
NUC2 1H
PCPD2 90.00 usec
PLW2 23.00000000 W
PLW12 0.30712000 W
PLW13 0.24877000 W
SFO2 400.1916008 MHz

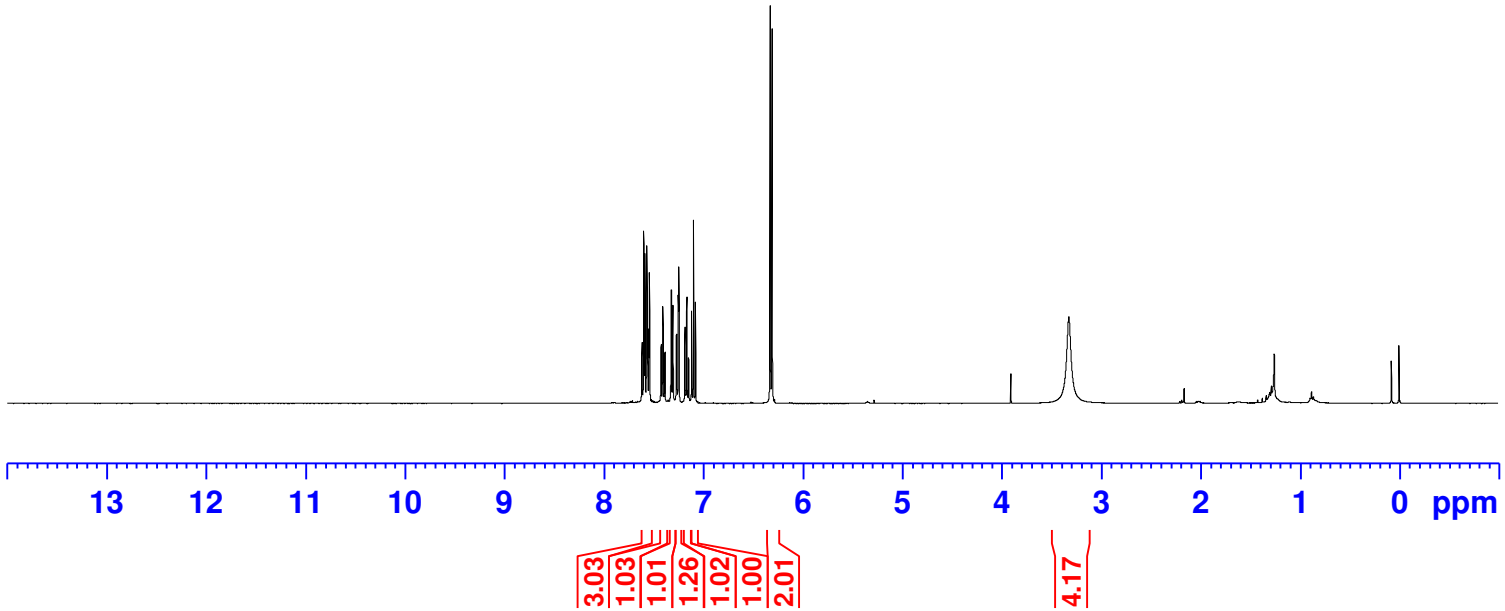
F2 - Processing parameters
SI 32768
SF 100.6278693 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40

1c



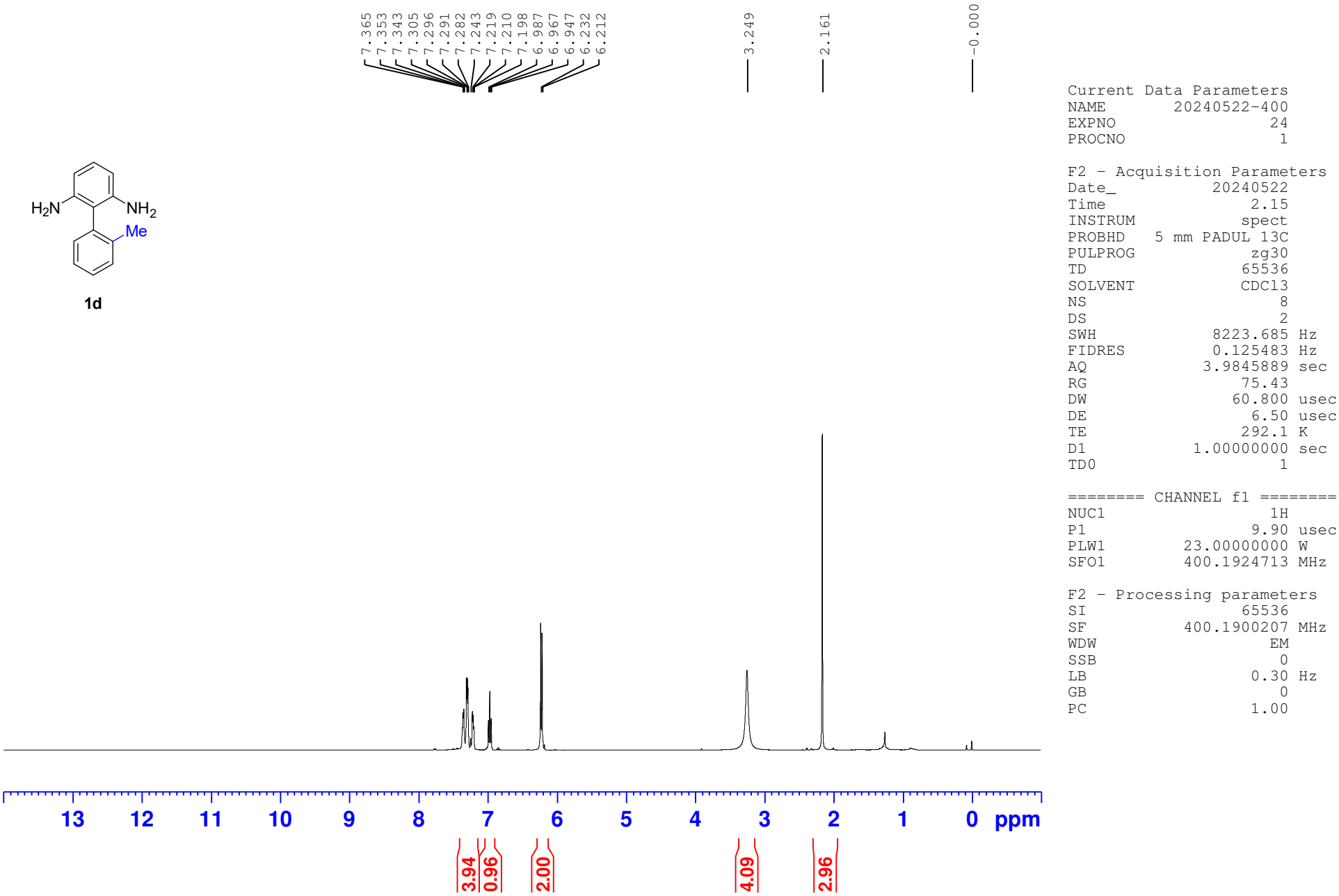
1c






```
Current Data Parameters
NAME        20231111-400
EXPNO                 16
PROCNO                 1

F2 - Acquisition Parameters
Date_           20231111
Time                1.19
INSTRUM            spect
PROBHD   5 mm PADUL 13C
PULPROG             zg30
TD                 65536
SOLVENT            CDCl3
NS                     6
DS                     2
SWH             8223.685 Hz
FIDRES          0.125483 Hz
AQ             3.9845889 sec
RG                100.49
DW                60.800 usec
DE                 6.50 usec
TE                292.5 K
D1           1.00000000 sec
TD0                    1

======== CHANNEL f1 ========
NUC1                  1H
P1                 9.90 usec
PLW1        23.00000000 W
SFO1        400.1924713 MHz

F2 - Processing parameters
SI                 65536
SF          400.1900216 MHz
WDW                   EM
SSB                    0
LB                 0.30 Hz
GB                     0
PC                 1.00
```

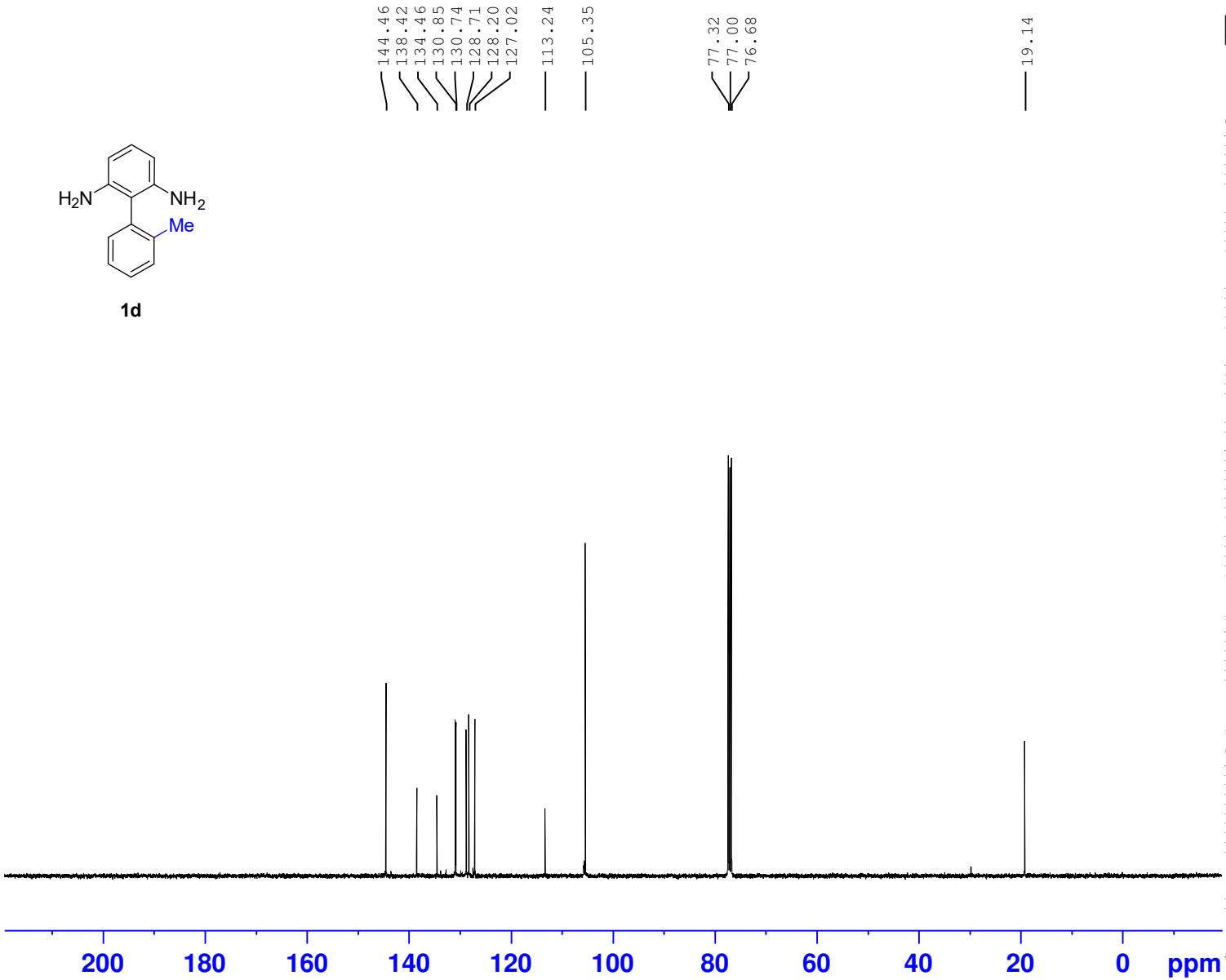
1d




```
Current Data Parameters
NAME        20240522-400
EXPNO                 24
PROCNO                 1

F2 - Acquisition Parameters
Date_           20240522
Time                2.15
INSTRUM            spect
PROBHD   5 mm PADUL 13C
PULPROG             zg30
TD                 65536
SOLVENT            CDCl3
NS                     8
DS                     2
SWH             8223.685 Hz
FIDRES          0.125483 Hz
AQ             3.9845889 sec
RG                 75.43
DW                60.800 usec
DE                 6.50 usec
TE                292.1 K
D1           1.00000000 sec
TD0                    1

======== CHANNEL f1 ========
NUC1                  1H
P1                 9.90 usec
PLW1        23.00000000 W
SFO1        400.1924713 MHz

F2 - Processing parameters
SI                 65536
SF          400.1900207 MHz
WDW                   EM
SSB                    0
LB                 0.30 Hz
GB                     0
PC                 1.00
```

1d

1d



Current Data Parameters
NAME 20240522-400
EXPNO 25
PROCNO 1

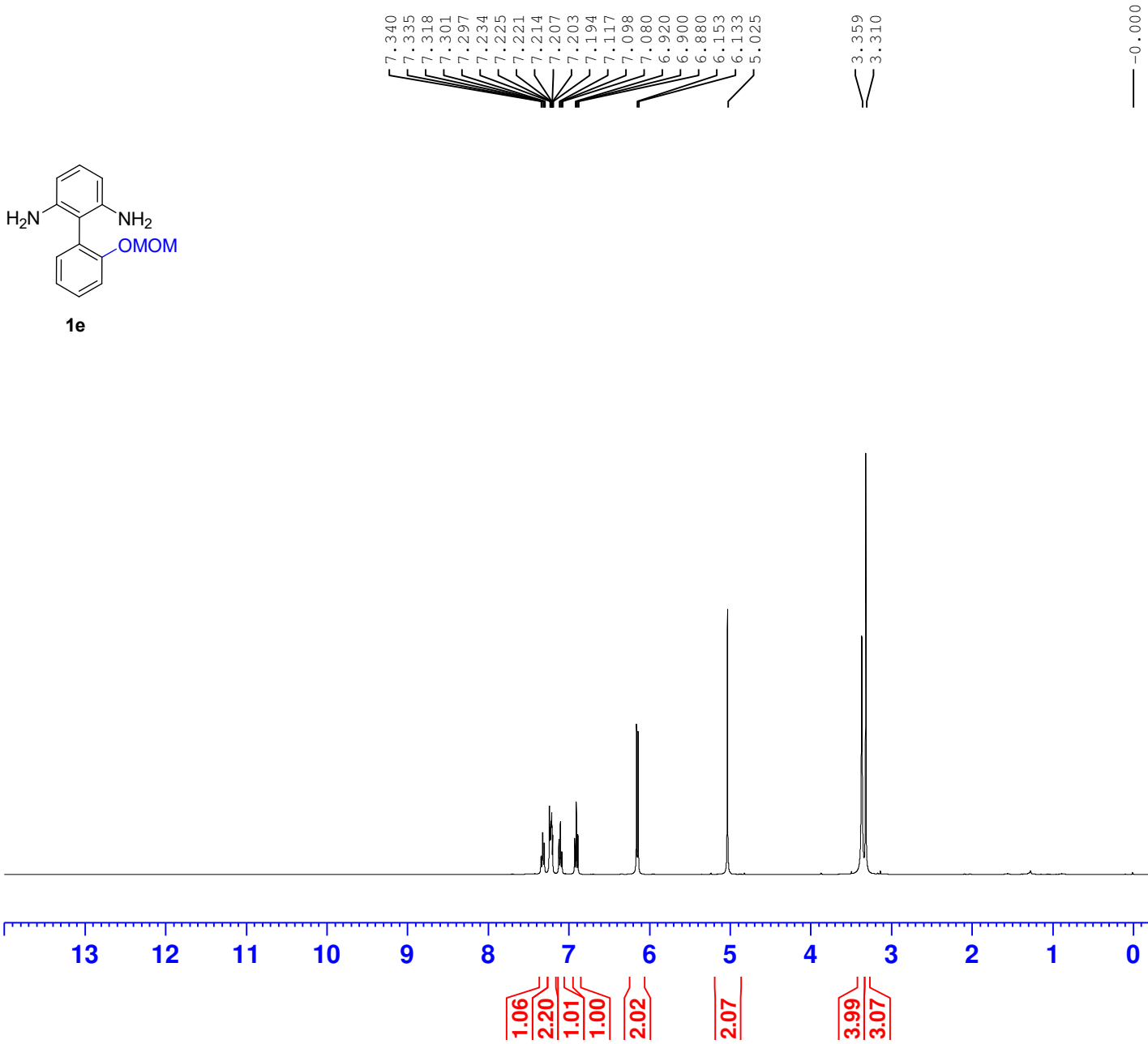
F2 - Acquisition Parameters
Date_ 20240522
Time 2.45
INSTRUM spect
PROBHD 5 mm PADUL 13C
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 500
DS 4
SWH 24038.461 Hz
FIDRES 0.366798 Hz
AQ 1.3631488 sec
RG 35.06
DW 20.800 usec
DE 6.50 usec
TE 292.5 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1

======== CHANNEL f1 ========
NUC1 13C
P1 9.80 usec
PLW1 47.40000153 W
SFO1 100.6379178 MHz

======== CHANNEL f2 ========
CPDPRG[2 waltz16
NUC2 1H
PCPD2 90.00 usec
PLW2 23.00000000 W
PLW12 0.30712000 W
PLW13 0.24877000 W
SFO2 400.1916008 MHz

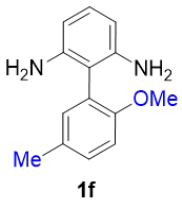
F2 - Processing parameters
SI 32768
SF 100.6278667 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40

1e

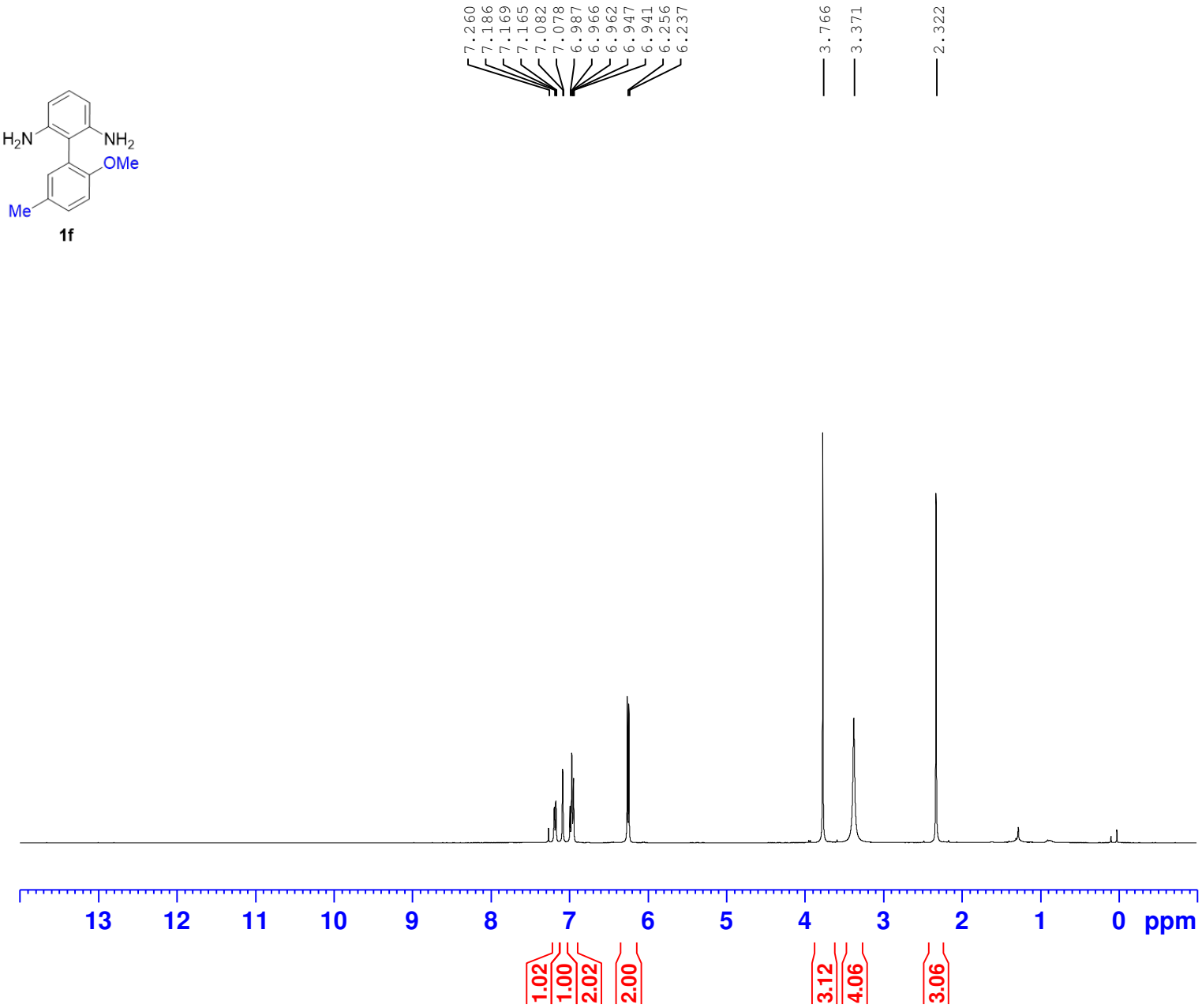



```
Current Data Parameters
NAME        20231129-400
EXPNO                 17
PROCNO                 1

F2 - Acquisition Parameters
Date_           20231129
Time                0.31
INSTRUM            spect
PROBHD   5 mm PADUL 13C
PULPROG             zg30
TD                 65536
SOLVENT            CDCl3
NS                     8
DS                     2
SWH             8223.685 Hz
FIDRES          0.125483 Hz
AQ             3.9845889 sec
RG                 17.43
DW                60.800 usec
DE                 6.50 usec
TE                292.5 K
D1           1.00000000 sec
TD0                    1

======== CHANNEL f1 ========
NUC1                  1H
P1                 9.90 usec
PLW1         23.00000000 W
SFO1         400.1924713 MHz

F2 - Processing parameters
SI                 65536
SF           400.1900402 MHz
WDW                   EM
SSB                    0
LB                 0.30 Hz
GB                     0
PC                  1.00
```

1i

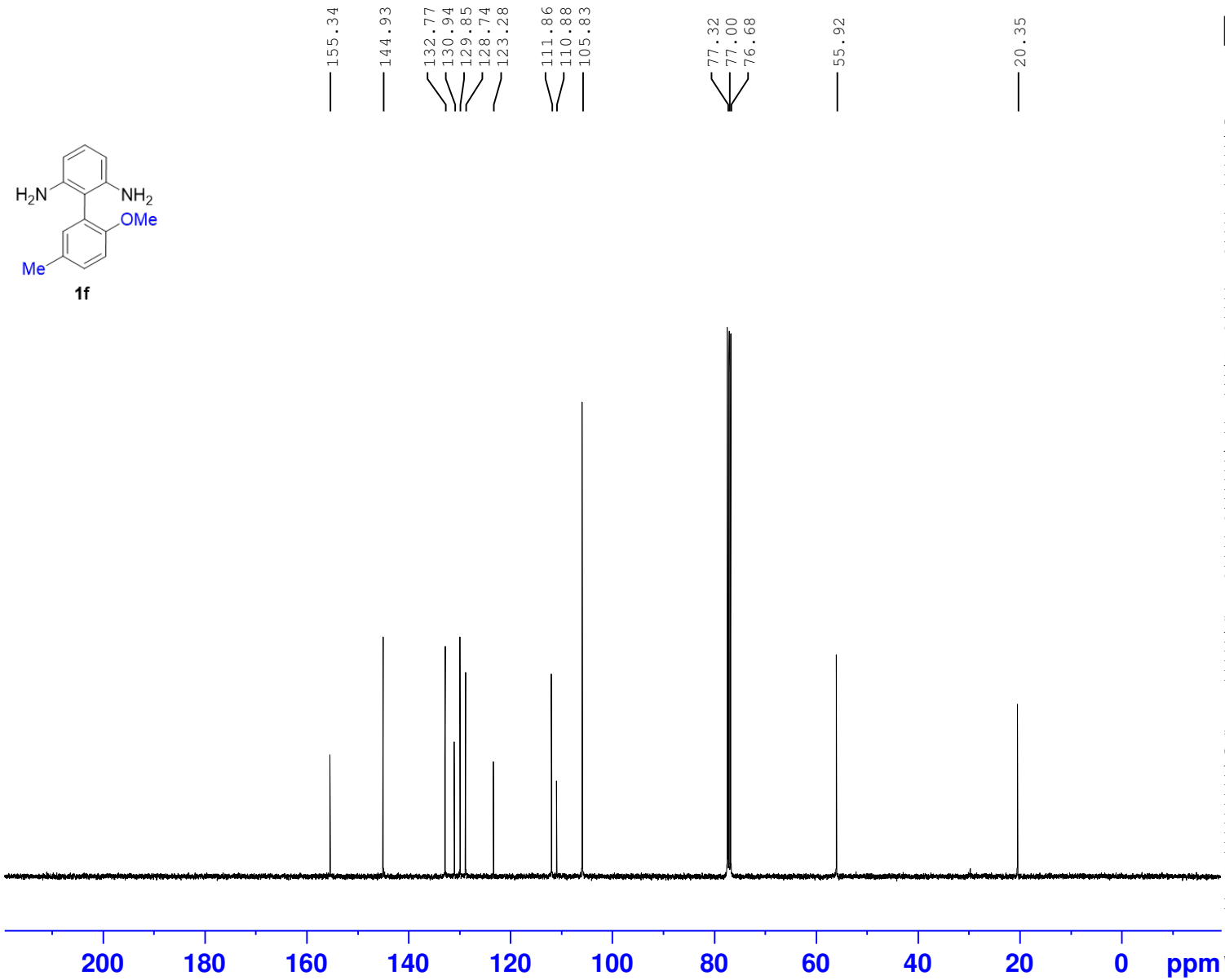


1f




```
Current Data Parameters
NAME        20231228-400
EXPNO                 27
PROCNO                 1

F2 - Acquisition Parameters
Date_           20231227
Time               23.58
INSTRUM            spect
PROBHD   5 mm PADUL 13C
PULPROG             zg30
TD                 65536
SOLVENT            CDCl3
NS                     6
DS                     2
SWH             8223.685 Hz
FIDRES          0.125483 Hz
AQ             3.9845889 sec
RG                 68.24
DW                60.800 usec
DE                 6.50 usec
TE                293.1 K
D1           1.00000000 sec
TD0                    1

======== CHANNEL f1 ========
NUC1                  1H
P1                 9.90 usec
PLW1        23.00000000 W
SFO1        400.1924713 MHz

F2 - Processing parameters
SI                 65536
SF          400.1900139 MHz
WDW                   EM
SSB                    0
LB                 0.30 Hz
GB                     0
PC                 1.00
```

1i



Current Data Parameters
NAME 20231228-400
EXPNO 28
PROCNO 1

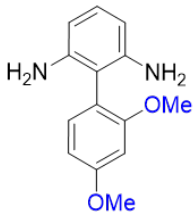
F2 - Acquisition Parameters
Date_ 20231228
Time 0.28
INSTRUM spect
PROBHD 5 mm PADUL 13C
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 500
DS 4
SWH 24038.461 Hz
FIDRES 0.366798 Hz
AQ 1.3631488 sec
RG 61.19
DW 20.800 usec
DE 6.50 usec
TE 293.7 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1

======== CHANNEL f1 ========
NUC1 13C
P1 9.80 usec
PLW1 47.40000153 W
SFO1 100.6379178 MHz

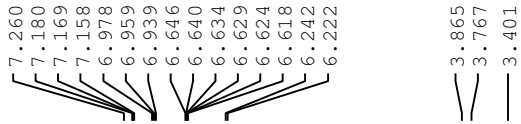
======== CHANNEL f2 ========
CPDPRG[2 waltz16
NUC2 1H
PCPD2 90.00 usec
PLW2 23.00000000 W
PLW12 0.30712000 W
PLW13 0.24877000 W
SFO2 400.1916008 MHz

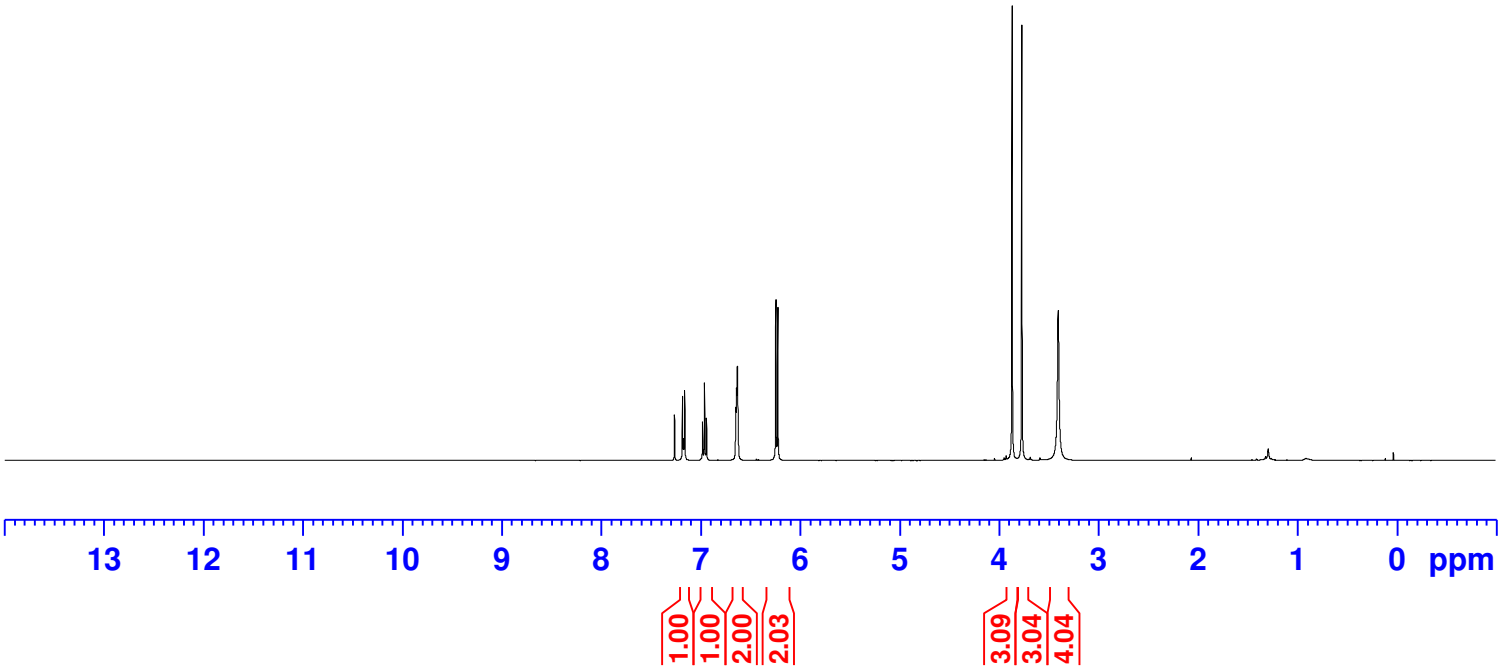
F2 - Processing parameters
SI 32768
SF 100.6278688 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40

1j



1g

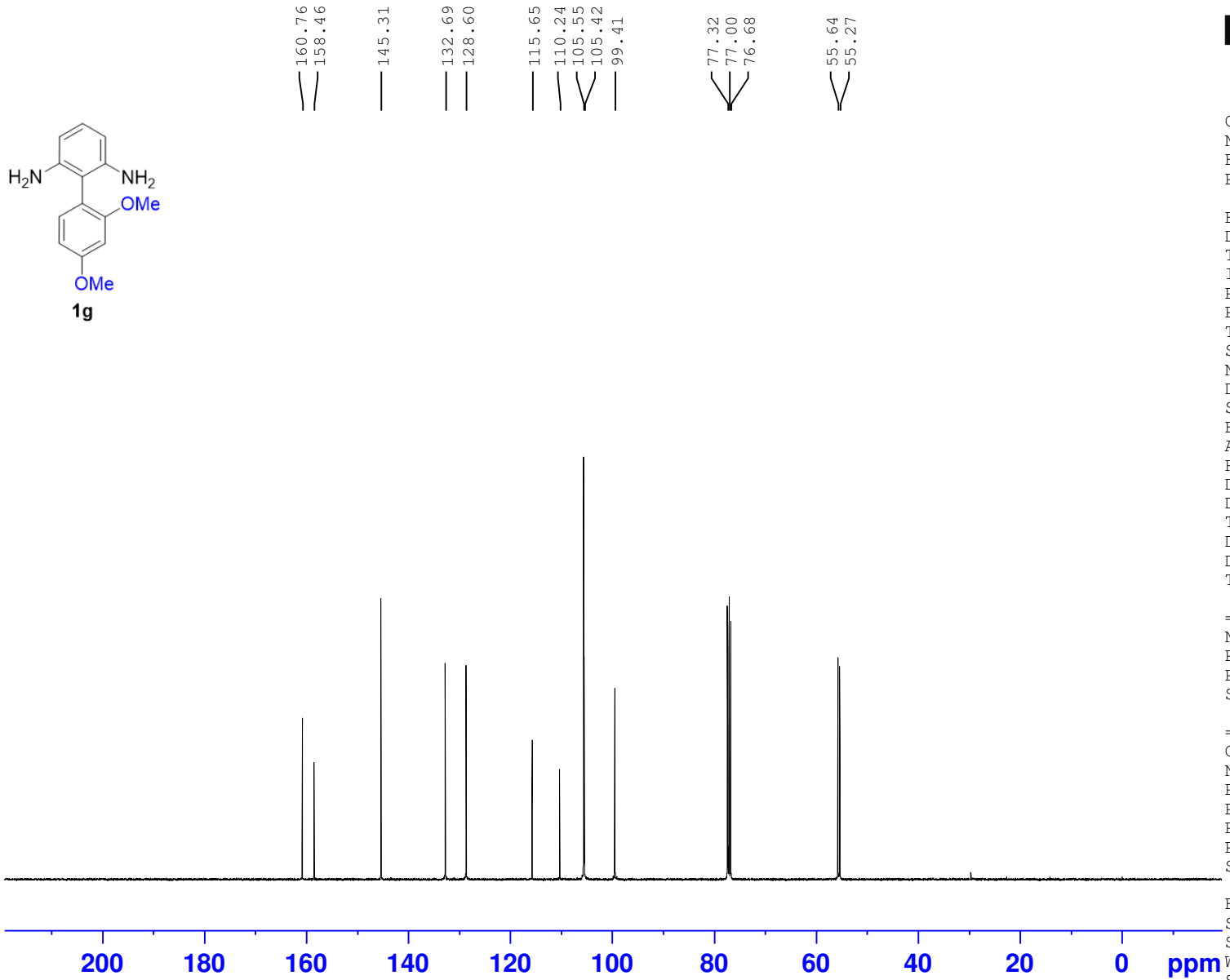





```
Current Data Parameters
NAME        20231227-400
EXPNO                 28
PROCNO                 1

F2 - Acquisition Parameters
Date_           20231227
Time                0.12
INSTRUM            spect
PROBHD   5 mm PADUL 13C
PULPROG             zg30
TD                 65536
SOLVENT            CDCl3
NS                    10
DS                     2
SWH             8223.685 Hz
FIDRES          0.125483 Hz
AQ             3.9845889 sec
RG                 29.75
DW                60.800 usec
DE                 6.50 usec
TE                291.7 K
D1           1.00000000 sec
TD0                    1

======== CHANNEL f1 ========
NUC1                  1H
P1                 9.90 usec
PLW1        23.00000000 W
SFO1        400.1924713 MHz

F2 - Processing parameters
SI                 65536
SF          400.1900136 MHz
WDW                   EM
SSB                    0
LB                  0.30 Hz
GB                     0
PC                  1.00
```

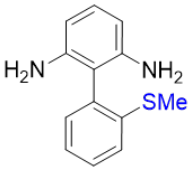
1j

1g

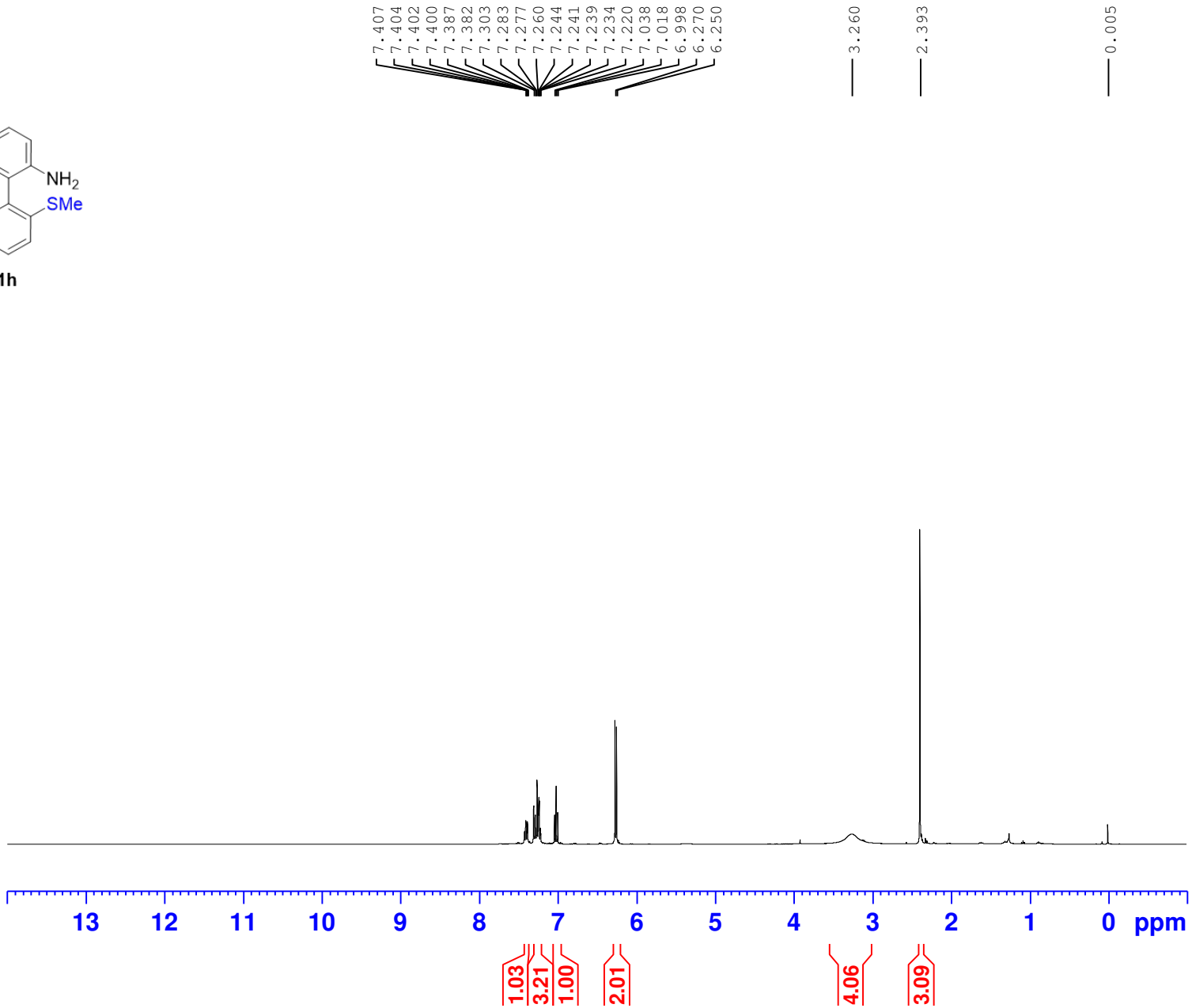



```
Current Data Parameters
NAME        20231227-400
EXPNO                 29
PROCNO                 1

F2 - Acquisition Parameters
Date_           20231227
Time                0.59
INSTRUM            spect
PROBHD   5 mm PADUL 13C
PULPROG          zgpg30
TD                65536
SOLVENT           CDCl3
NS                  800
DS                    4
SWH           24038.461 Hz
FIDRES         0.366798 Hz
AQ            1.3631488 sec
RG                37.77
DW               20.800 usec
DE                6.50 usec
TE               292.3 K
D1           2.00000000 sec
D11          0.03000000 sec
TD0                   1

======== CHANNEL f1 ========
NUC1                 13C
P1                 9.80 usec
PLW1        47.40000153 W
SFO1       100.6379178 MHz

======== CHANNEL f2 ========
CPDPRG[2         waltz16
NUC2                 1H
PCPD2             90.00 usec
PLW2        23.00000000 W
PLW12        0.30712000 W
PLW13        0.24877000 W
SFO2       400.1916008 MHz

F2 - Processing parameters
SI                 32768
SF         100.6278789 MHz
WDW                   EM
SSB                    0
LB                  1.00 Hz
GB                     0
PC                  1.40
```

1f

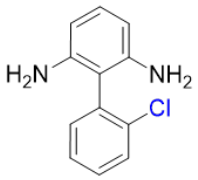


1h

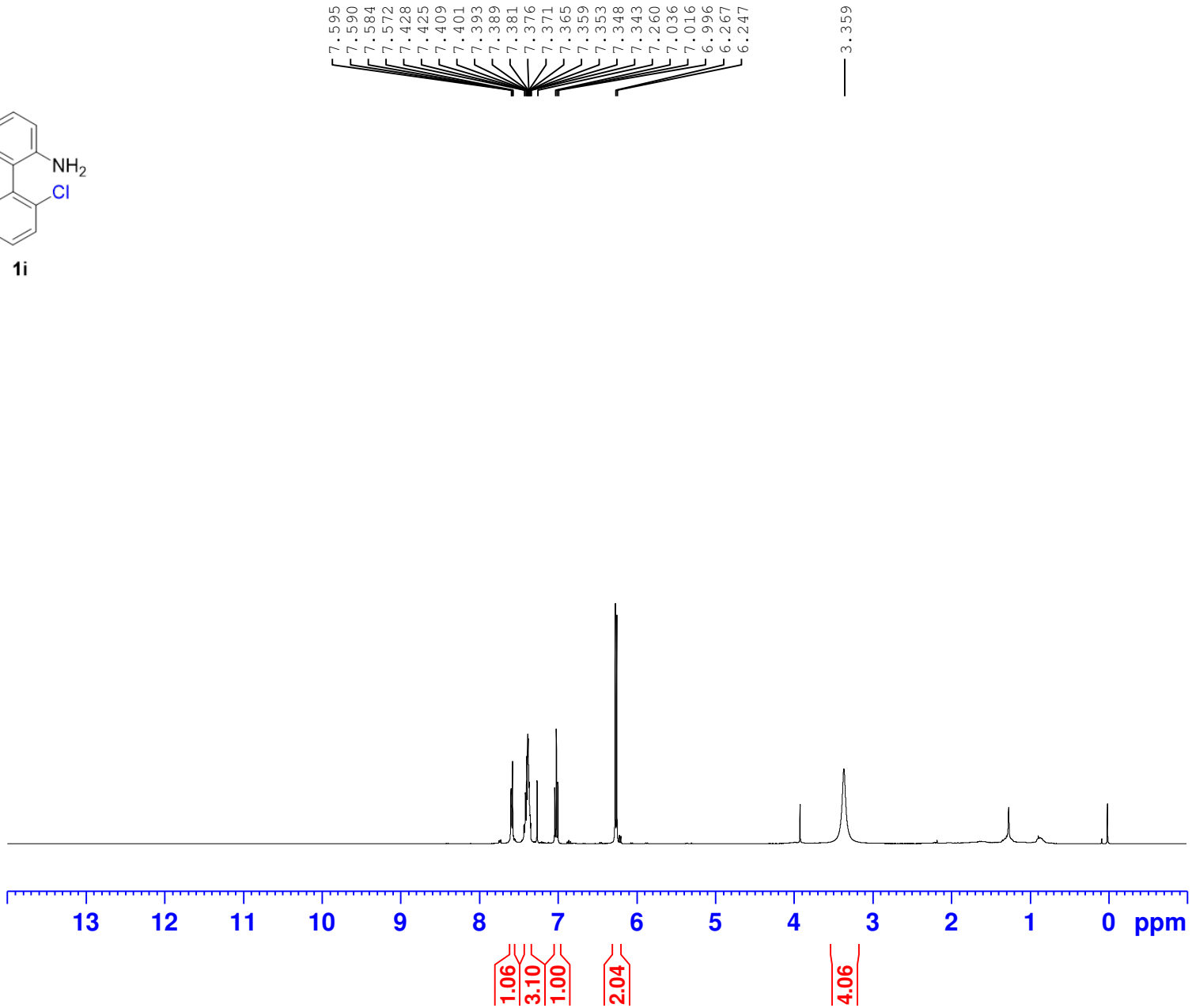



```
Current Data Parameters
NAME        20231128-400
EXPNO                 10
PROCNO                 1

F2 - Acquisition Parameters
Date_           20231127
Time               22.43
INSTRUM            spect
PROBHD   5 mm PADUL 13C
PULPROG             zg30
TD                 65536
SOLVENT            CDCl3
NS                     8
DS                     2
SWH             8223.685 Hz
FIDRES          0.125483 Hz
AQ             3.9845889 sec
RG                100.49
DW                60.800 usec
DE                 6.50 usec
TE                291.8 K
D1           1.00000000 sec
TD0                    1

======== CHANNEL f1 ========
NUC1                  1H
P1                 9.90 usec
PLW1        23.00000000 W
SFO1        400.1924713 MHz

F2 - Processing parameters
SI                 65536
SF          400.1900139 MHz
WDW                   EM
SSB                    0
LB                 0.30 Hz
GB                     0
PC                 1.00
```

1g

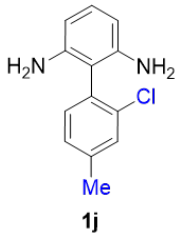


1i

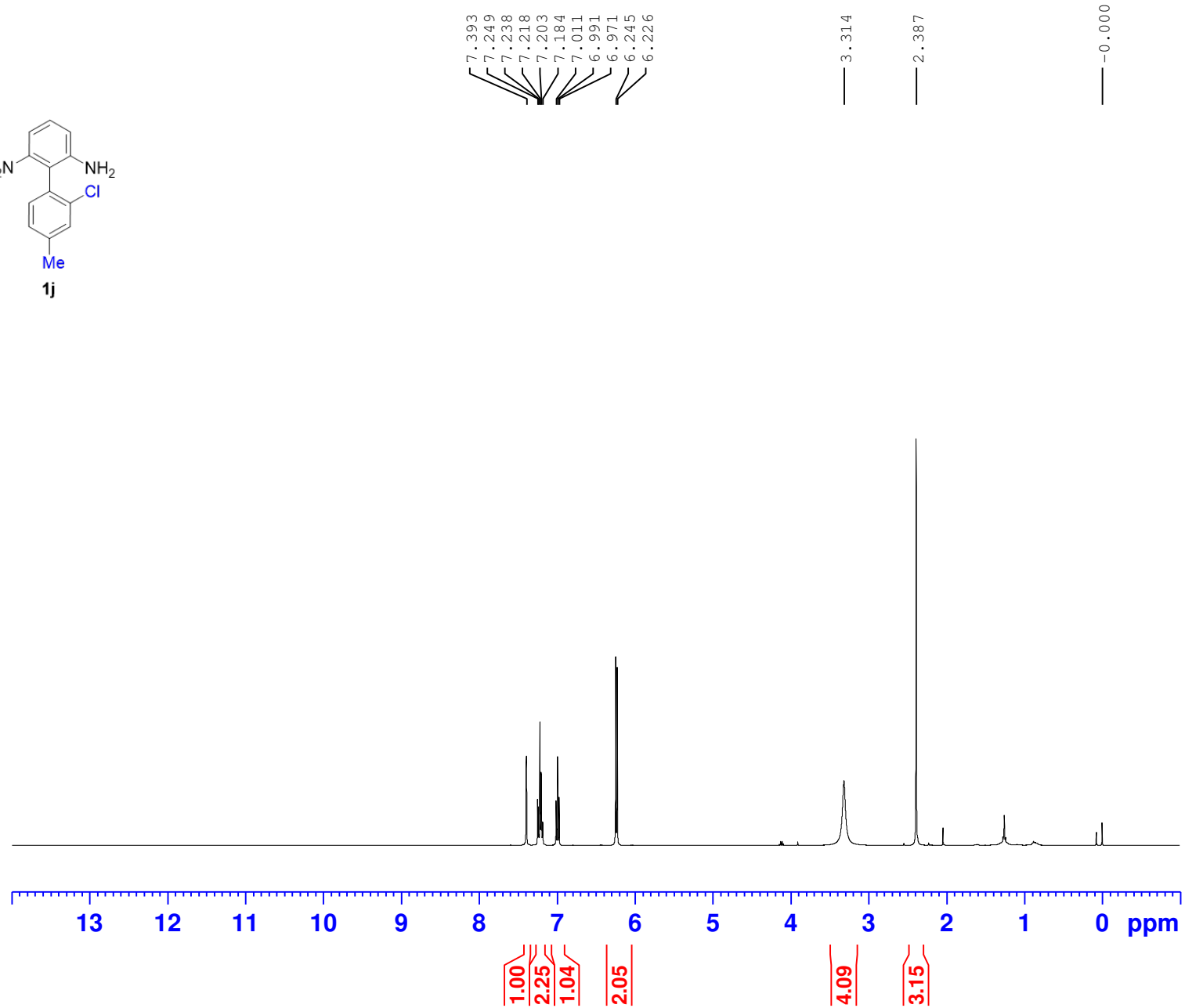



```
Current Data Parameters
NAME       20231118-400M
EXPNO                 33
PROCNO                 1

F2 - Acquisition Parameters
Date_           20231118
Time                3.52
INSTRUM            spect
PROBHD   5 mm PADUL 13C
PULPROG             zg30
TD                 65536
SOLVENT            CDCl3
NS                     6
DS                     2
SWH             8223.685 Hz
FIDRES          0.125483 Hz
AQ             3.9845889 sec
RG                 113.67
DW                 60.800 usec
DE                  6.50 usec
TE                 294.5 K
D1            1.00000000 sec
TD0                    1

======== CHANNEL f1 ========
NUC1                  1H
P1                  9.90 usec
PLW1         23.00000000 W
SFO1         400.1924713 MHz

F2 - Processing parameters
SI                 65536
SF           400.1900139 MHz
WDW                   EM
SSB                    0
LB                  0.30 Hz
GB                     0
PC                  1.00
```

1h

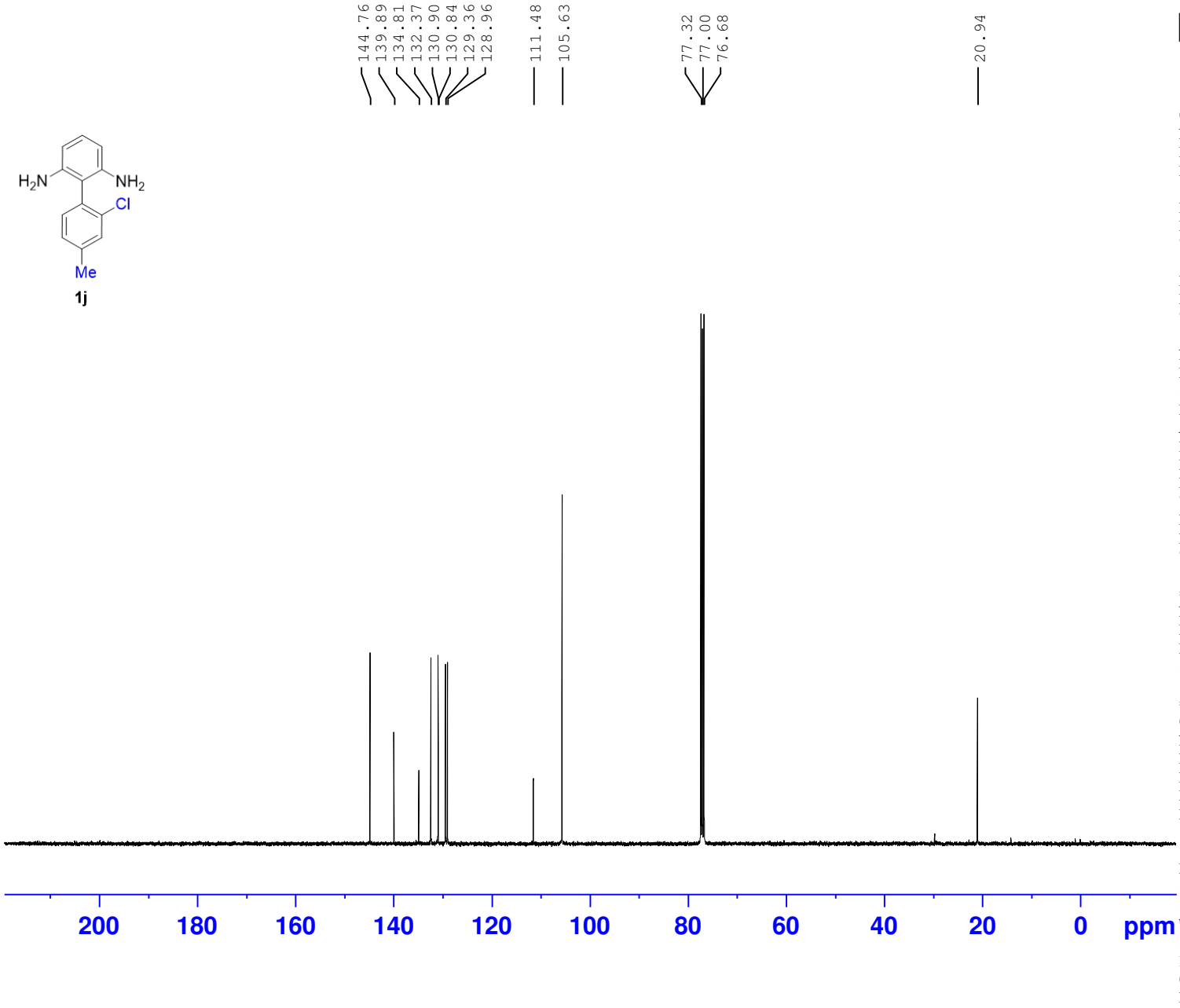


1j



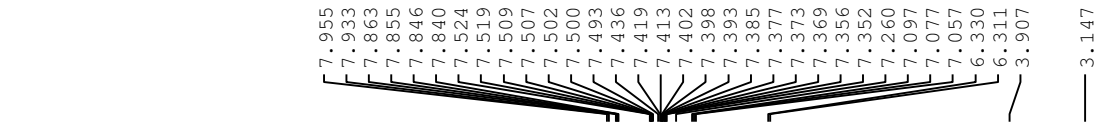

```
Current Data Parameters
NAME        20231221-400
EXPNO                 10
PROCNO                 1

F2 - Acquisition Parameters
Date_           20231220
Time               23.12
INSTRUM            spect
PROBHD   5 mm PADUL 13C
PULPROG             zg30
TD                 65536
SOLVENT            CDCl3
NS                     8
DS                     2
SWH             8223.685 Hz
FIDRES          0.125483 Hz
AQ             3.9845889 sec
RG                 90.23
DW                60.800 usec
DE                 6.50 usec
TE                292.9 K
D1           1.00000000 sec
TD0                    1

======== CHANNEL f1 ========
NUC1                  1H
P1                 9.90 usec
PLW1        23.00000000 W
SFO1        400.1924713 MHz

F2 - Processing parameters
SI                 65536
SF          400.1900182 MHz
WDW                   EM
SSB                    0
LB                 0.30 Hz
GB                     0
PC                 1.00
```

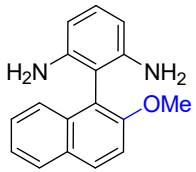
1h



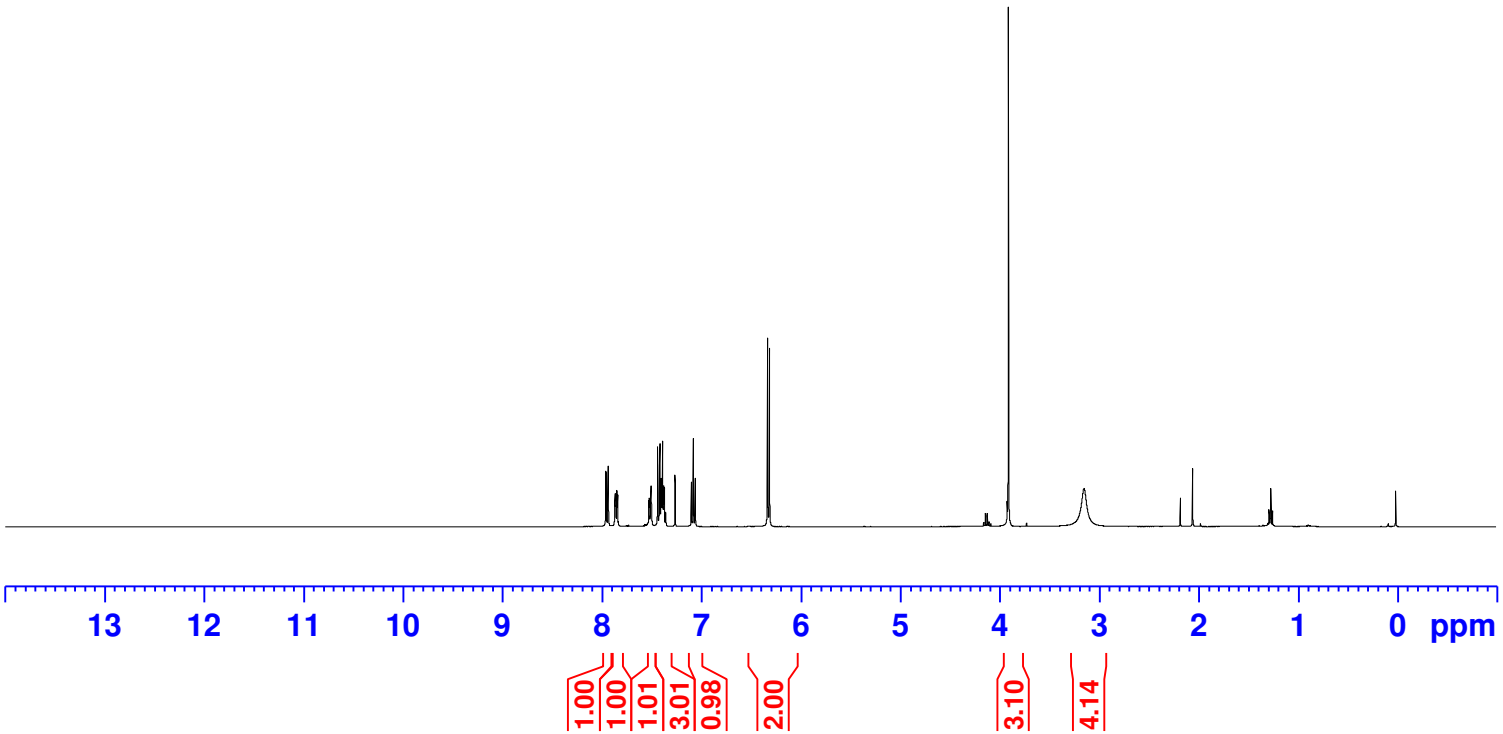

```
Current Data Parameters
NAME        20231221-400
EXPNO                 11
PROCNO                 1

F2 - Acquisition Parameters
Date_           20231220
Time               23.58
INSTRUM            spect
PROBHD   5 mm PADUL 13C
PULPROG          zgpg30
TD                65536
SOLVENT           CDCl3
NS                  800
DS                    4
SWH           24038.461 Hz
FIDRES         0.366798 Hz
AQ            1.3631488 sec
RG                35.06
DW               20.800 usec
DE                6.50 usec
TE               293.6 K
D1           2.00000000 sec
D11          0.03000000 sec
TD0                   1

======== CHANNEL f1 ========
NUC1                 13C
P1                 9.80 usec
PLW1        47.40000153 W
SFO1       100.6379178 MHz

======== CHANNEL f2 ========
CPDPRG[2         waltz16
NUC2                 1H
PCPD2             90.00 usec
PLW2        23.00000000 W
PLW12        0.30712000 W
PLW13        0.24877000 W
SFO2       400.1916008 MHz

F2 - Processing parameters
SI                 32768
SF         100.6278659 MHz
WDW                   EM
SSB                   0
LB                 1.00 Hz
GB                    0
PC                 1.40
```

1k





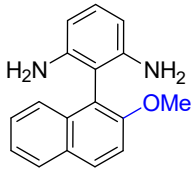
1k



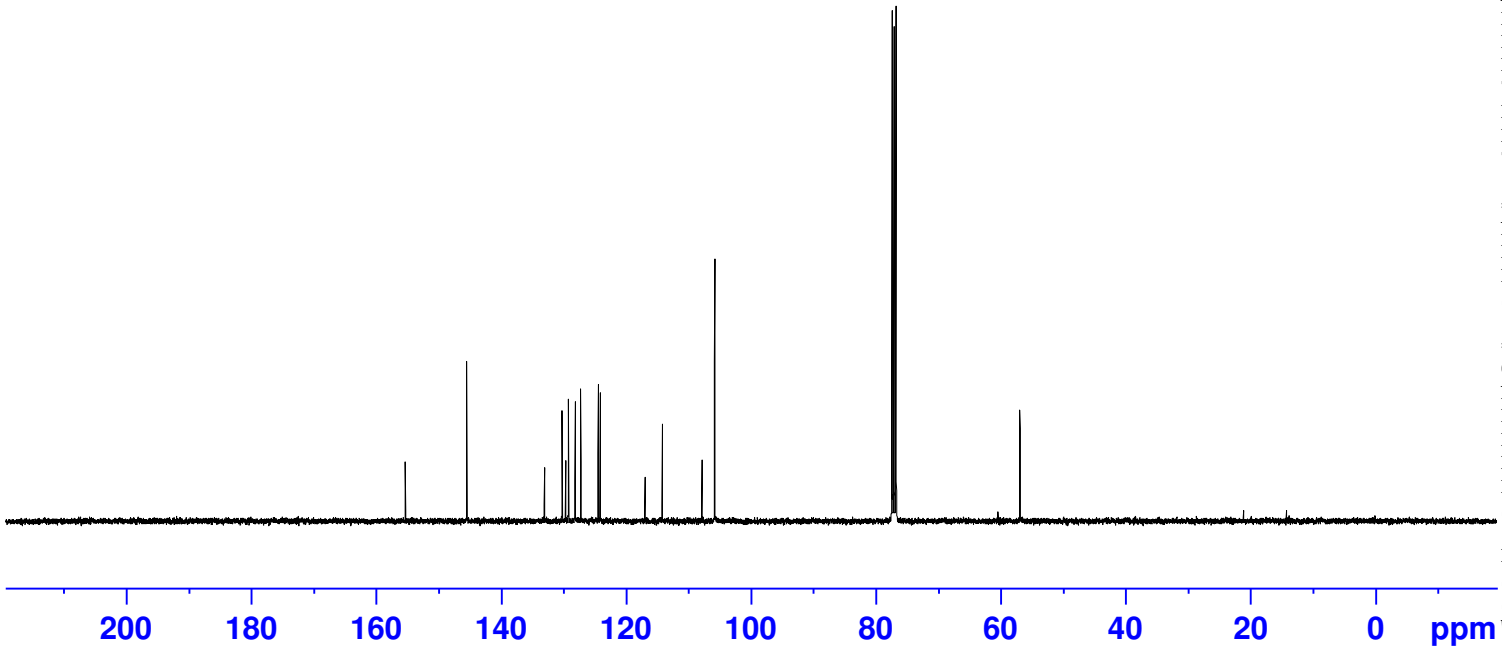

```
Current Data Parameters
NAME       20231102-400m
EXPNO                24
PROCNO                1

F2 - Acquisition Parameters
Date_           20231102
Time                6.02
INSTRUM            spect
PROBHD   5 mm PADUL 13C
PULPROG             zg30
TD                 65536
SOLVENT            CDCl3
NS                     8
DS                     2
SWH             8223.685 Hz
FIDRES          0.125483 Hz
AQ             3.9845889 sec
RG                 113.67
DW                 60.800 usec
DE                  6.50 usec
TE                 291.9 K
D1            1.00000000 sec
TD0                    1

======== CHANNEL f1 ========
NUC1                  1H
P1                  9.90 usec
PLW1         23.00000000 W
SFO1         400.1924713 MHz

F2 - Processing parameters
SI                 65536
SF           400.1900140 MHz
WDW                   EM
SSB                    0
LB                  0.30 Hz
GB                     0
PC                  1.00
```

1k

155.27
145.46
133.01
130.20
129.59
129.17
128.08
127.18
124.40
124.06
116.88
114.13
107.75
105.74
77.32
77.00
76.68
56.84



1k



Current Data Parameters
NAME 20231102-400m
EXPNO 25
PROCNO 1

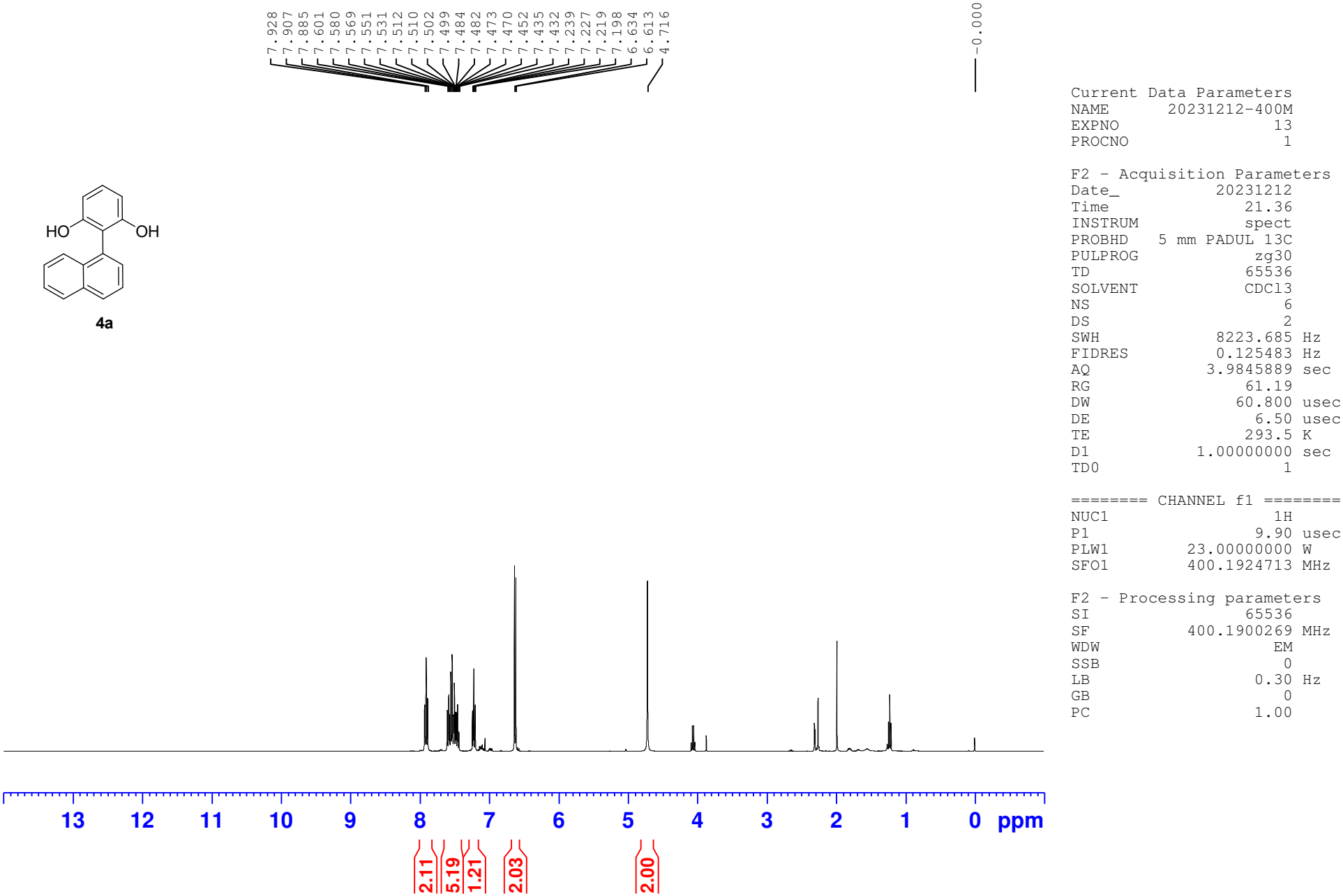
F2 - Acquisition Parameters
Date_ 20231102
Time 6.26
INSTRUM spect
PROBHD 5 mm PADUL 13C
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 400
DS 4
SWH 24038.461 Hz
FIDRES 0.366798 Hz
AQ 1.3631488 sec
RG 44.2
DW 20.800 usec
DE 6.50 usec
TE 293.0 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1

======== CHANNEL f1 ========
NUC1 13C
P1 9.80 usec
PLW1 47.40000153 W
SFO1 100.6379178 MHz

======== CHANNEL f2 ========
CPDPRG[2 waltz16
NUC2 1H
PCPD2 90.00 usec
PLW2 23.00000000 W
PLW12 0.30712000 W
PLW13 0.24877000 W
SFO2 400.1916008 MHz

F2 - Processing parameters
SI 32768
SF 100.6278653 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40

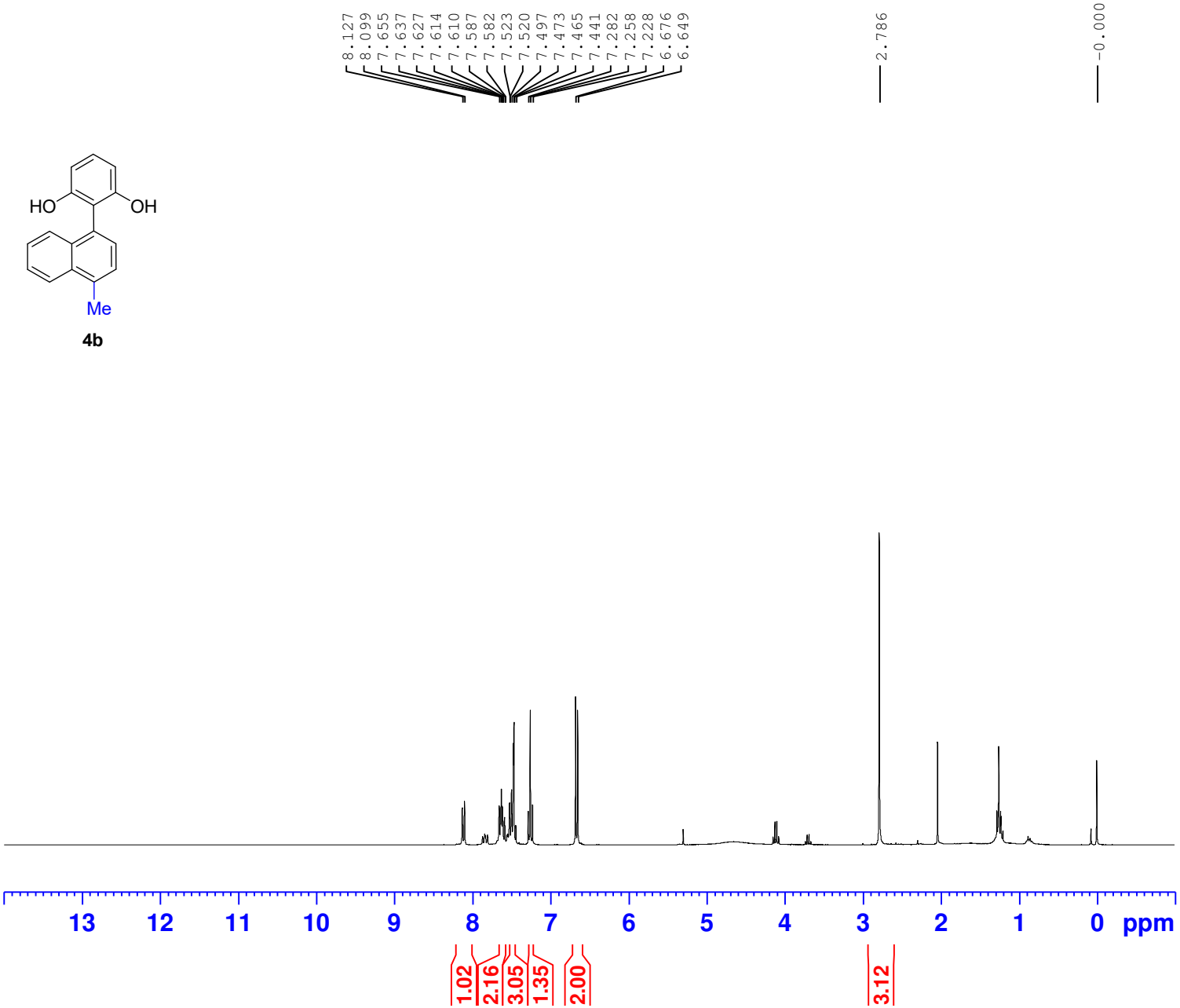
4a




```
Current Data Parameters
NAME       20231212-400M
EXPNO                13
PROCNO                1

F2 - Acquisition Parameters
Date_          20231212
Time               21.36
INSTRUM            spect
PROBHD   5 mm PADUL 13C
PULPROG             zg30
TD                 65536
SOLVENT            CDCl3
NS                     6
DS                     2
SWH             8223.685 Hz
FIDRES          0.125483 Hz
AQ             3.9845889 sec
RG                 61.19
DW                60.800 usec
DE                 6.50 usec
TE                293.5 K
D1           1.00000000 sec
TD0                    1

======== CHANNEL f1 ========
NUC1                  1H
P1                 9.90 usec
PLW1        23.00000000 W
SFO1        400.1924713 MHz

F2 - Processing parameters
SI                 65536
SF          400.1900269 MHz
WDW                   EM
SSB                    0
LB                 0.30 Hz
GB                     0
PC                 1.00
```

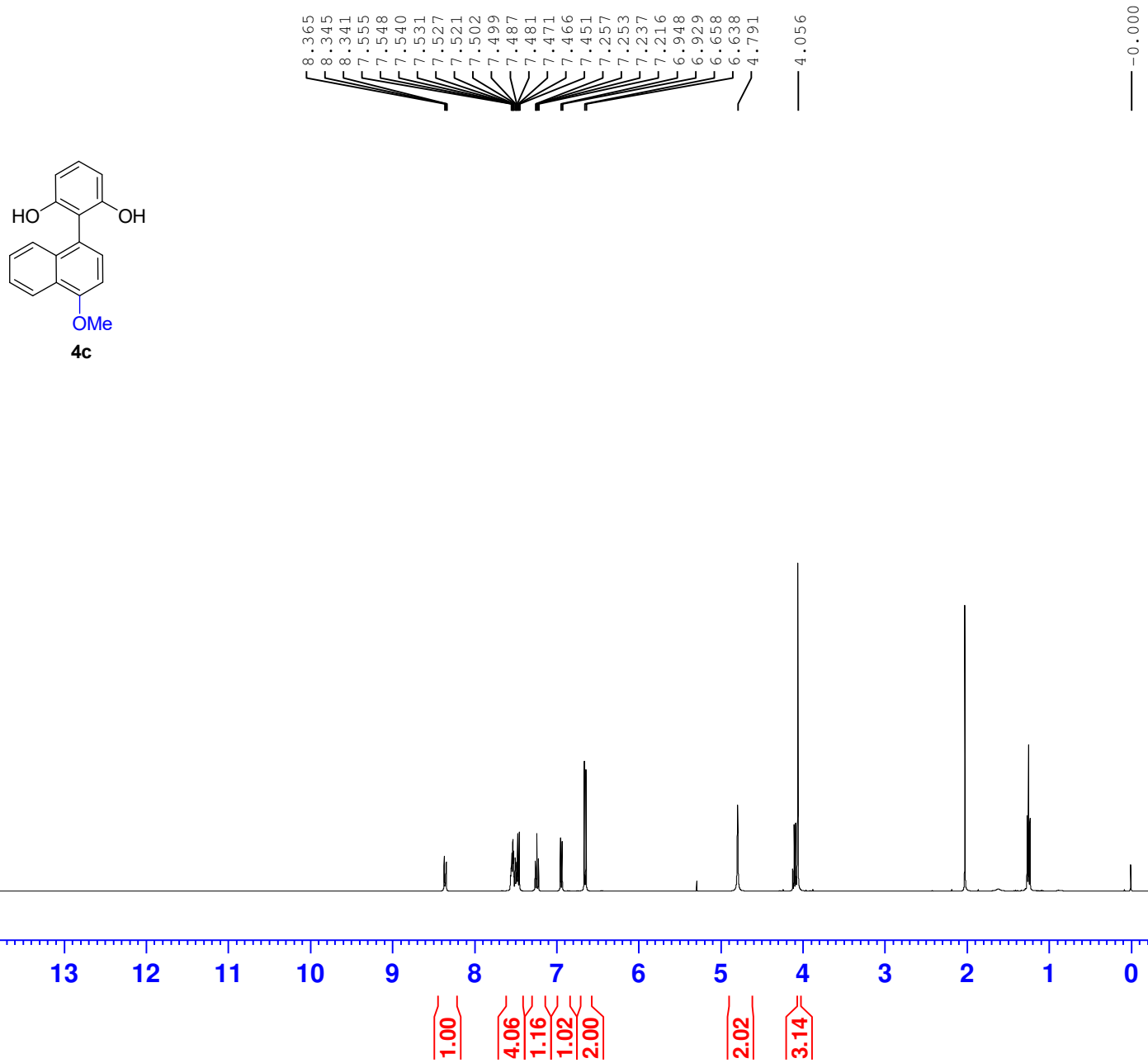
4b

4b



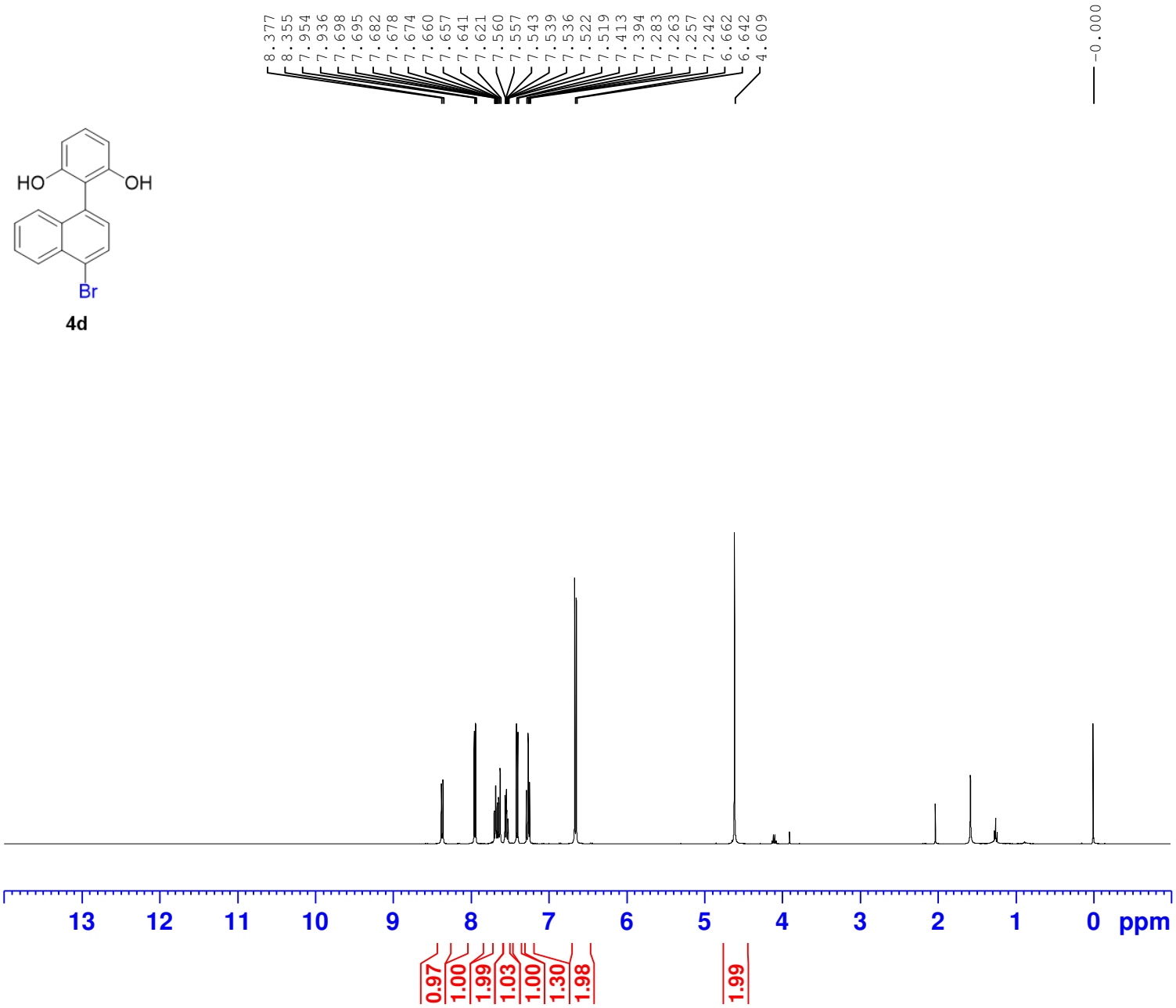

```
Current Data Parameters
NAME        20240229-300
EXPNO               1052
PROCNO                 1

F2 - Acquisition Parameters
Date_           20240229
Time               11.17 h
INSTRUM            spect
PROBHD   Z104275_0225 (
PULPROG             zg30
TD                 65536
SOLVENT            CDCl3
NS                    16
DS                     2
SWH             6009.615 Hz
FIDRES          0.183399 Hz
AQ             5.4525952 sec
RG                   203
DW                83.200 usec
DE                 6.50 usec
TE                288.1 K
D1           1.00000000 sec
TD0                    1
SFO1        300.1318533 MHz
NUC1                1H
P1                10.00 usec
PLW1        14.00000000 W

F2 - Processing parameters
SI                 65536
SF          300.1300080 MHz
WDW                   EM
SSB                    0
LB                  0.30 Hz
GB                     0
PC                  1.00
```

4c



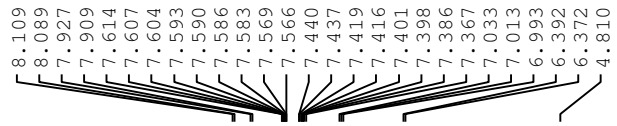

```
Current Data Parameters
NAME            20240131
EXPNO                 13
PROCNO                 1

F2 - Acquisition Parameters
Date_           20240130
Time               22.18
INSTRUM            spect
PROBHD   5 mm PADUL 13C
PULPROG             zg30
TD                 65536
SOLVENT            CDCl3
NS                     6
DS                     2
SWH             8223.685 Hz
FIDRES          0.125483 Hz
AQ             3.9845889 sec
RG                 90.23
DW                60.800 usec
DE                 6.50 usec
TE                290.1 K
D1           1.00000000 sec
TD0                    1

======== CHANNEL f1 ========
NUC1                  1H
P1                 9.90 usec
PLW1        23.00000000 W
SFO1        400.1924713 MHz

F2 - Processing parameters
SI                 65536
SF          400.1900165 MHz
WDW                   EM
SSB                    0
LB                 0.30 Hz
GB                     0
PC                 1.00
```

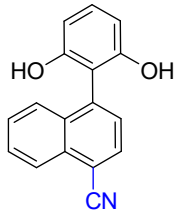
4d



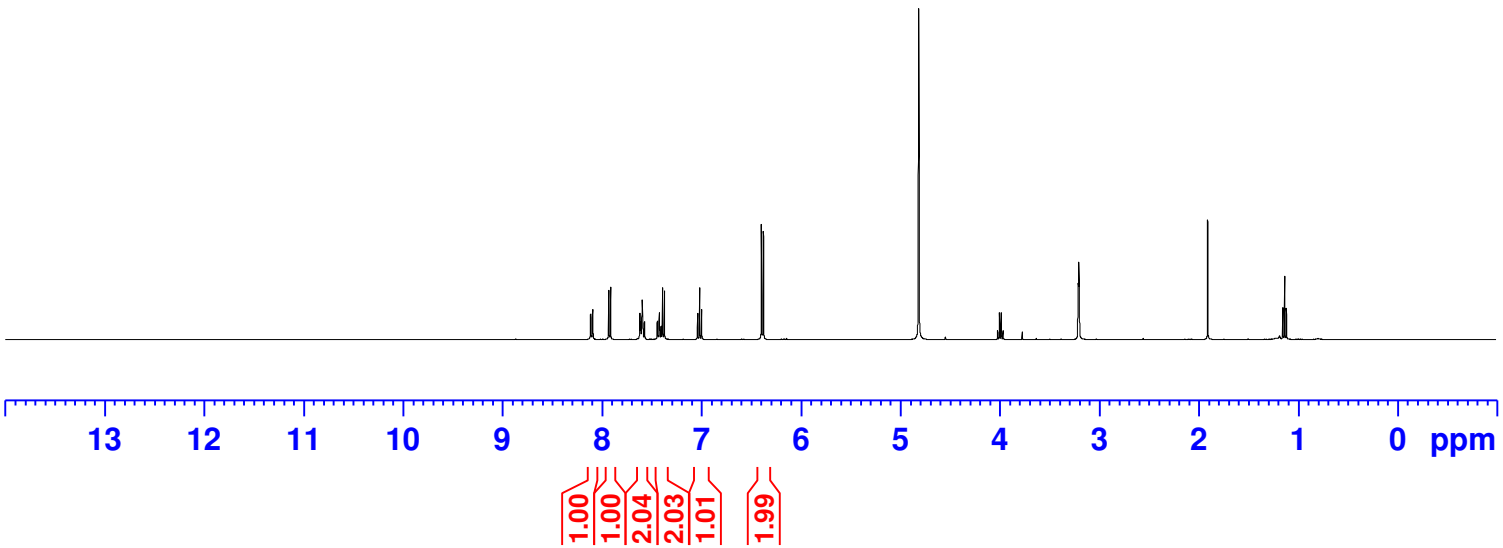

```
Current Data Parameters
NAME        20240110-400
EXPNO                  4
PROCNO                 1

F2 - Acquisition Parameters
Date_           20240109
Time               21.38
INSTRUM            spect
PROBHD   5 mm PADUL 13C
PULPROG             zg30
TD                 65536
SOLVENT            CDCl3
NS                     8
DS                     2
SWH             8223.685 Hz
FIDRES          0.125483 Hz
AQ             3.9845889 sec
RG                193.13
DW                60.800 usec
DE                 6.50 usec
TE                292.0 K
D1           1.00000000 sec
TD0                    1

======== CHANNEL f1 ========
NUC1                  1H
P1                 9.90 usec
PLW1        23.00000000 W
SFO1        400.1924713 MHz

F2 - Processing parameters
SI                 65536
SF          400.1900150 MHz
WDW                   EM
SSB                    0
LB                 0.30 Hz
GB                     0
PC                 1.00
```

4e



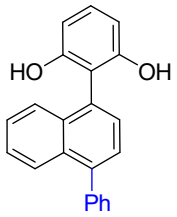


4e

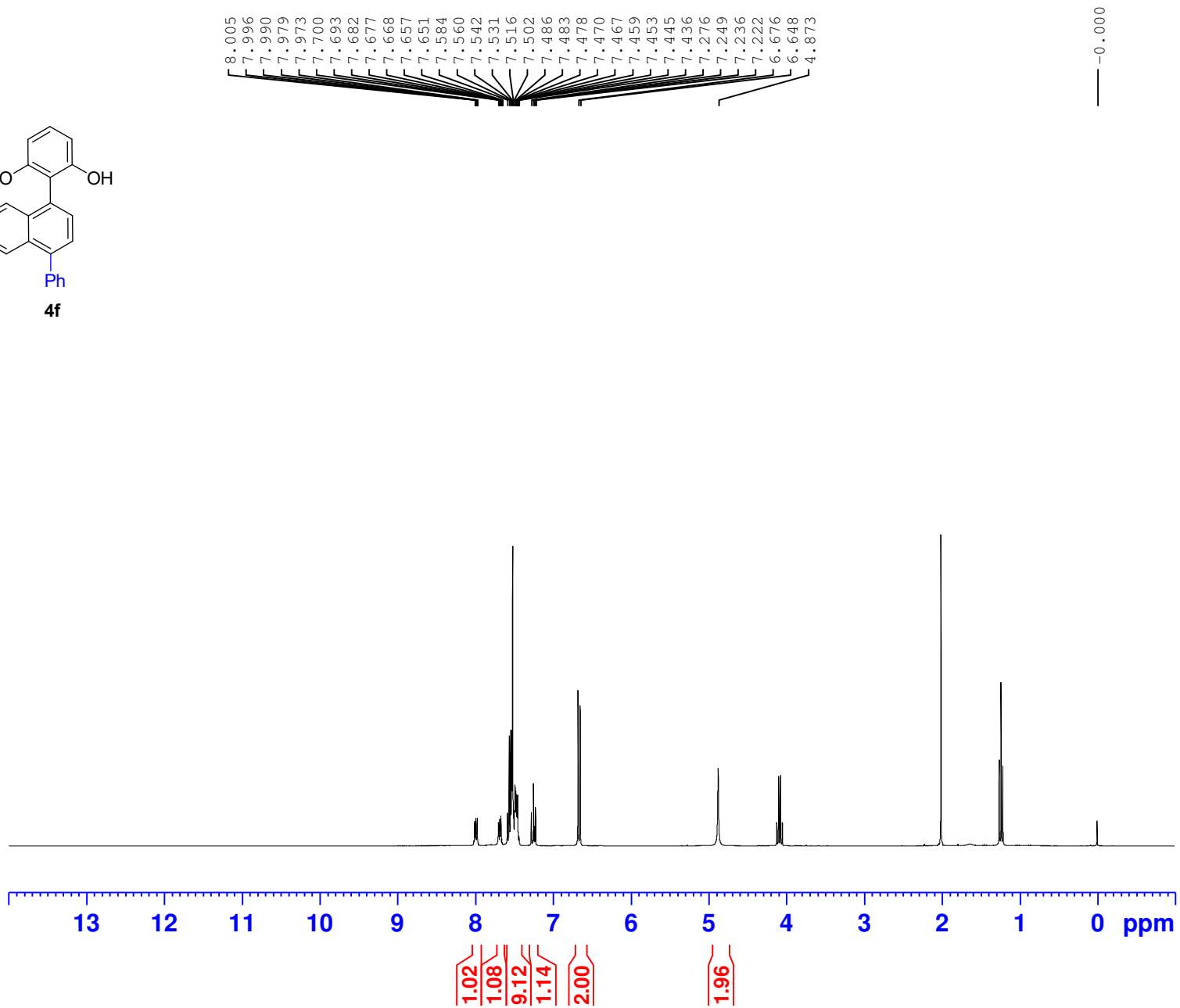



```
Current Data Parameters
NAME        20240117-400
EXPNO                  7
PROCNO                 1

F2 - Acquisition Parameters
Date_           20240116
Time               21.59
INSTRUM            spect
PROBHD   5 mm PADUL 13C
PULPROG             zg30
TD                 65536
SOLVENT             MeOD
NS                     8
DS                     2
SWH             8223.685 Hz
FIDRES          0.125483 Hz
AQ             3.9845889 sec
RG                181.41
DW                60.800 usec
DE                 6.50 usec
TE                291.0 K
D1           1.00000000 sec
TD0                    1

======== CHANNEL f1 ========
NUC1                  1H
P1                 9.90 usec
PLW1        23.00000000 W
SFO1        400.1924713 MHz

F2 - Processing parameters
SI                 65536
SF          400.1900555 MHz
WDW                   EM
SSB                    0
LB                 0.30 Hz
GB                     0
PC                 1.00
```

4f



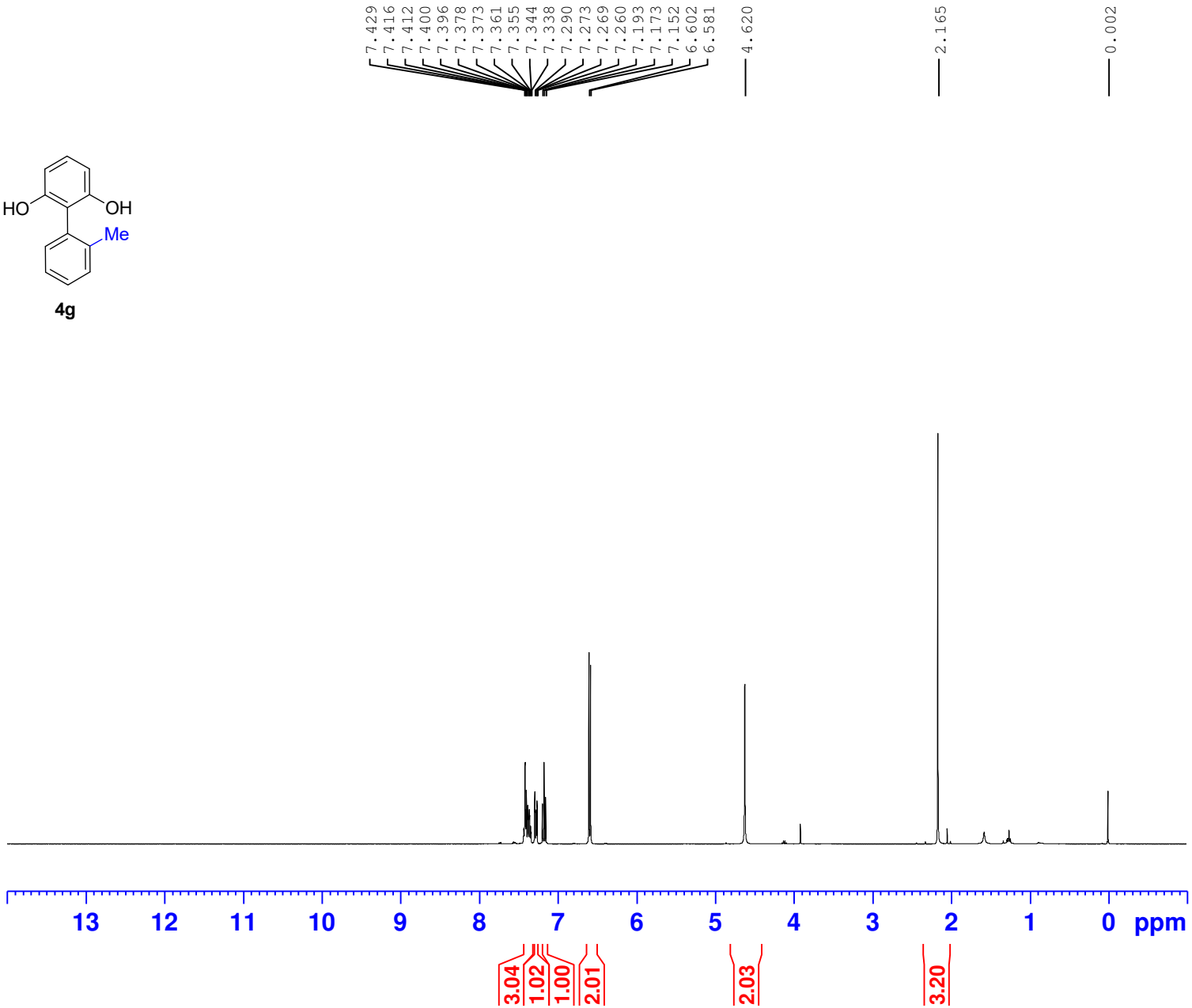
4f




```
Current Data Parameters
NAME       20240129-300M
EXPNO                992
PROCNO                 1

F2 - Acquisition Parameters
Date_           20240129
Time               11.34 h
INSTRUM            spect
PROBHD   Z104275_0225 (
PULPROG             zg30
TD                 65536
SOLVENT            CDCl3
NS                    16
DS                     2
SWH             6009.615 Hz
FIDRES          0.183399 Hz
AQ             5.4525952 sec
RG                   101
DW                83.200 usec
DE                 6.50 usec
TE                293.6 K
D1           1.00000000 sec
TD0                    1
SFO1         300.1318533 MHz
NUC1                1H
P1                10.00 usec
PLW1         14.00000000 W

F2 - Processing parameters
SI                 65536
SF           300.1300144 MHz
WDW                   EM
SSB                    0
LB                  0.30 Hz
GB                     0
PC                  1.00
```

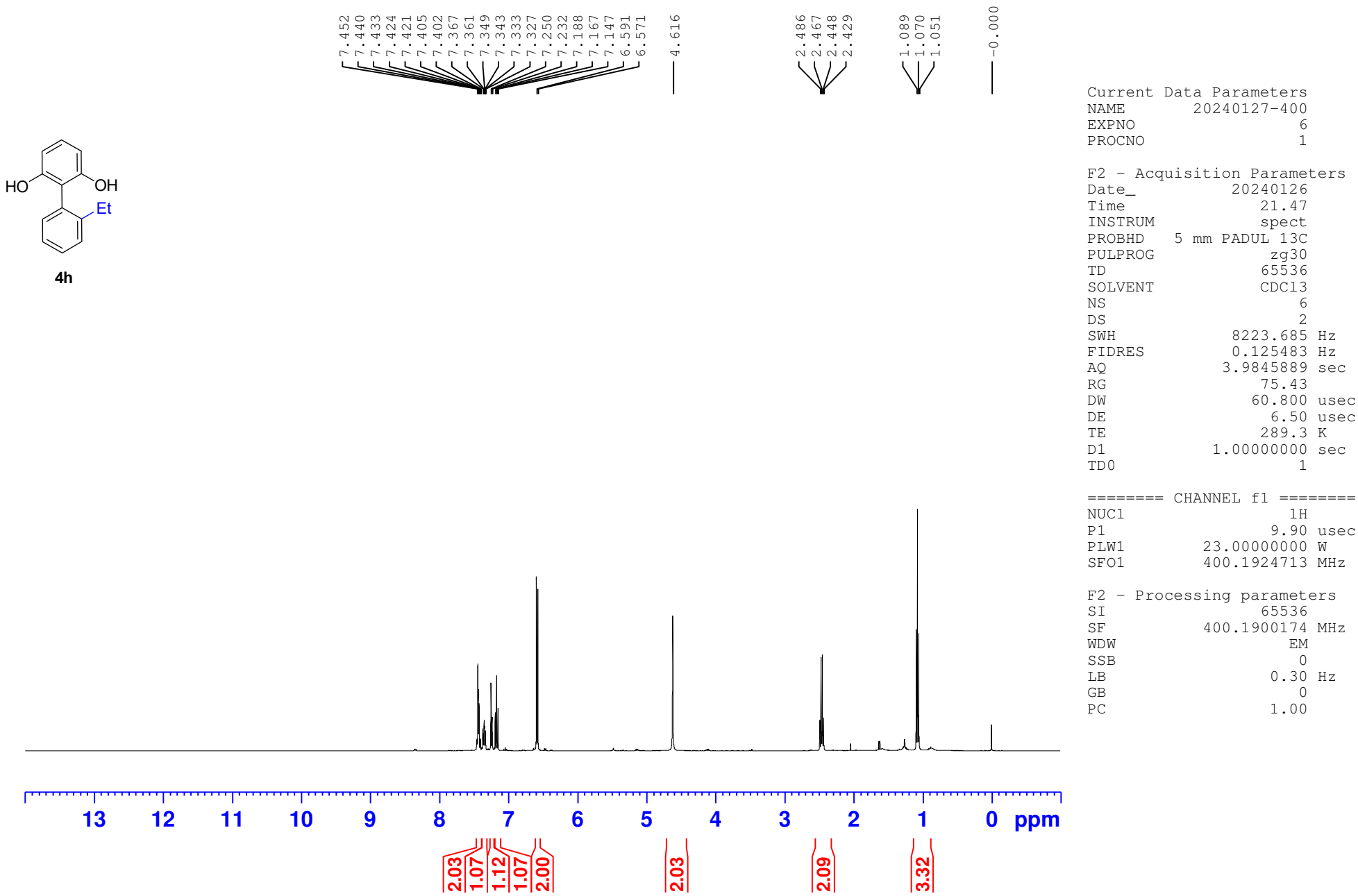
4g

4g




```
Current Data Parameters
NAME        20240105-400
EXPNO                  4
PROCNO                 1

F2 - Acquisition Parameters
Date_           20240104
Time               21.55
INSTRUM            spect
PROBHD   5 mm PADUL 13C
PULPROG             zg30
TD                 65536
SOLVENT            CDCl3
NS                     6
DS                     0
SWH             8223.685 Hz
FIDRES          0.125483 Hz
AQ             3.9845889 sec
RG                140.02
DW                60.800 usec
DE                 6.50 usec
TE                291.0 K
D1           1.00000000 sec
TD0                    1

======== CHANNEL f1 ========
NUC1                  1H
P1                 9.90 usec
PLW1        23.00000000 W
SFO1        400.1924713 MHz

F2 - Processing parameters
SI                 65536
SF          400.1900139 MHz
WDW                   EM
SSB                    0
LB                0.30 Hz
GB                     0
PC                1.00
```

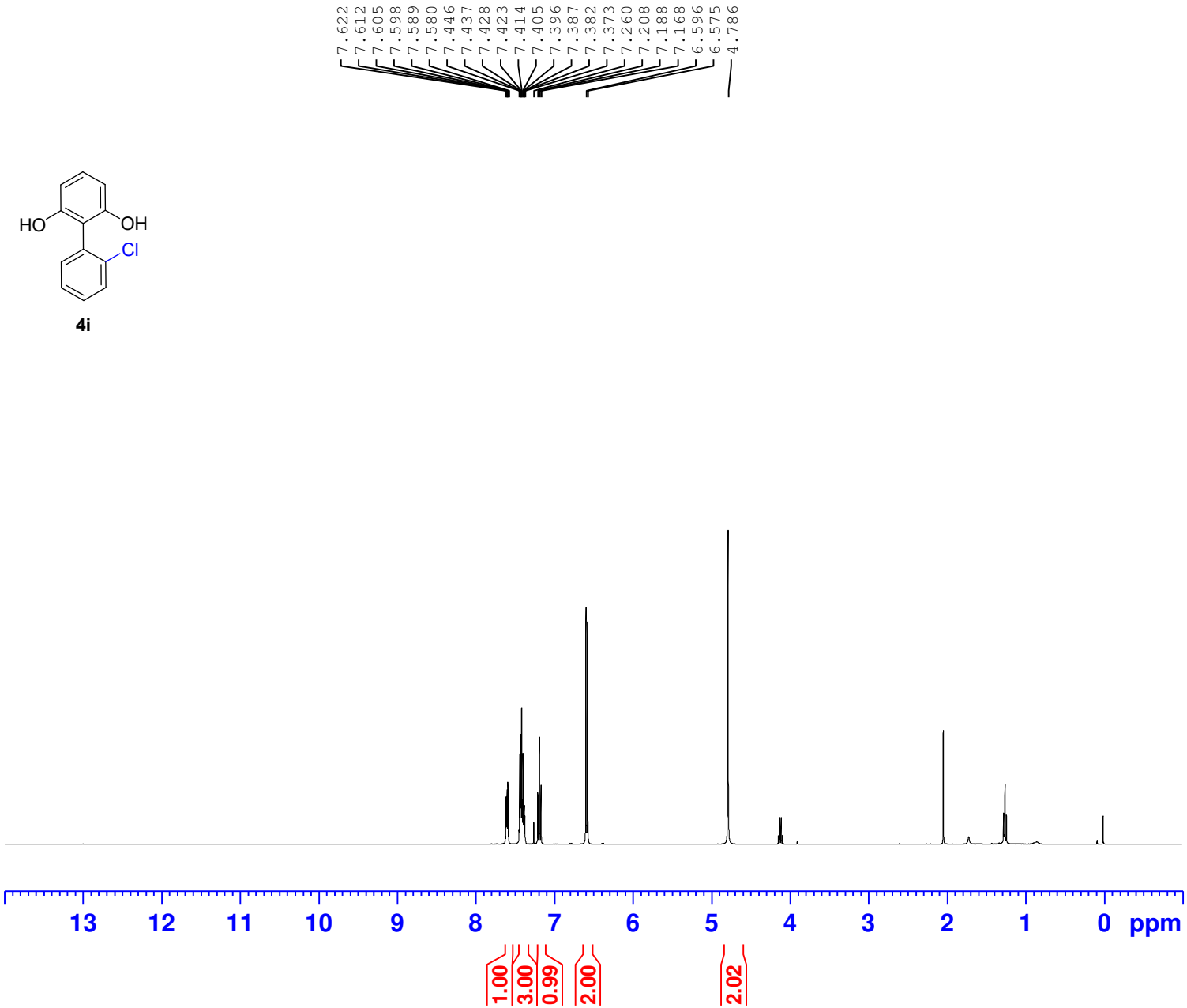
4h




```
Current Data Parameters
NAME        20240127-400
EXPNO                  6
PROCNO                 1

F2 - Acquisition Parameters
Date_           20240126
Time               21.47
INSTRUM            spect
PROBHD   5 mm PADUL 13C
PULPROG             zg30
TD                 65536
SOLVENT            CDCl3
NS                     6
DS                     2
SWH             8223.685 Hz
FIDRES          0.125483 Hz
AQ             3.9845889 sec
RG                 75.43
DW                60.800 usec
DE                 6.50 usec
TE                289.3 K
D1           1.00000000 sec
TD0                    1

======== CHANNEL f1 ========
NUC1                  1H
P1                 9.90 usec
PLW1        23.00000000 W
SFO1        400.1924713 MHz

F2 - Processing parameters
SI                 65536
SF          400.1900174 MHz
WDW                   EM
SSB                    0
LB                 0.30 Hz
GB                     0
PC                 1.00
```

4i

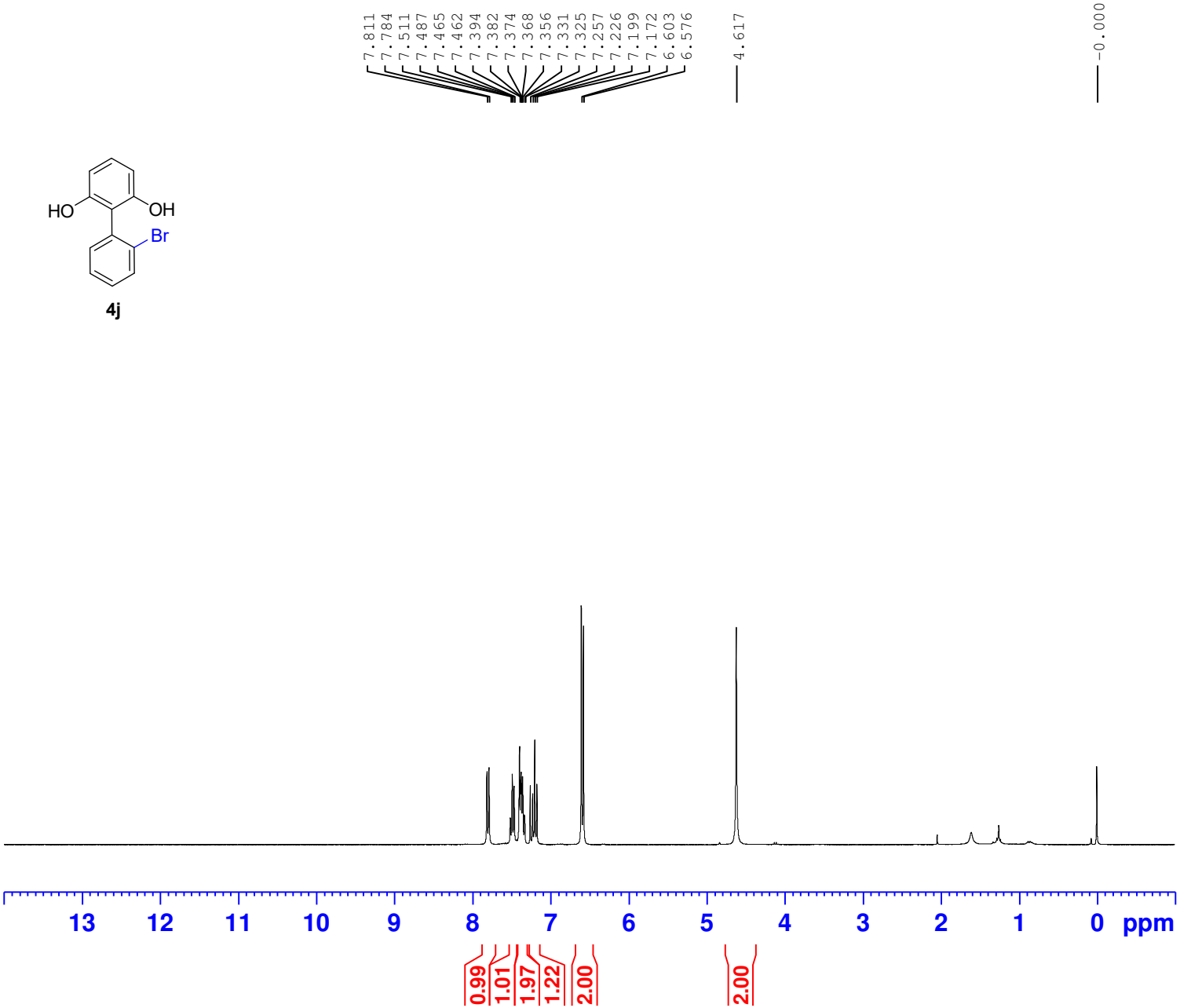
4i




```
Current Data Parameters
NAME       20240109-400m
EXPNO                 10
PROCNO                 1

F2 - Acquisition Parameters
Date_           20240108
Time               22.08
INSTRUM            spect
PROBHD   5 mm PADUL 13C
PULPROG             zg30
TD                 65536
SOLVENT            CDCl3
NS                     6
DS                     2
SWH             8223.685 Hz
FIDRES          0.125483 Hz
AQ             3.9845889 sec
RG                113.67
DW                60.800 usec
DE                 6.50 usec
TE                291.9 K
D1           1.00000000 sec
TD0                    1

======== CHANNEL f1 ========
NUC1                  1H
P1                 9.90 usec
PLW1        23.00000000 W
SFO1        400.1924713 MHz

F2 - Processing parameters
SI                 65536
SF          400.1900138 MHz
WDW                   EM
SSB                    0
LB                 0.30 Hz
GB                     0
PC                 1.00
```

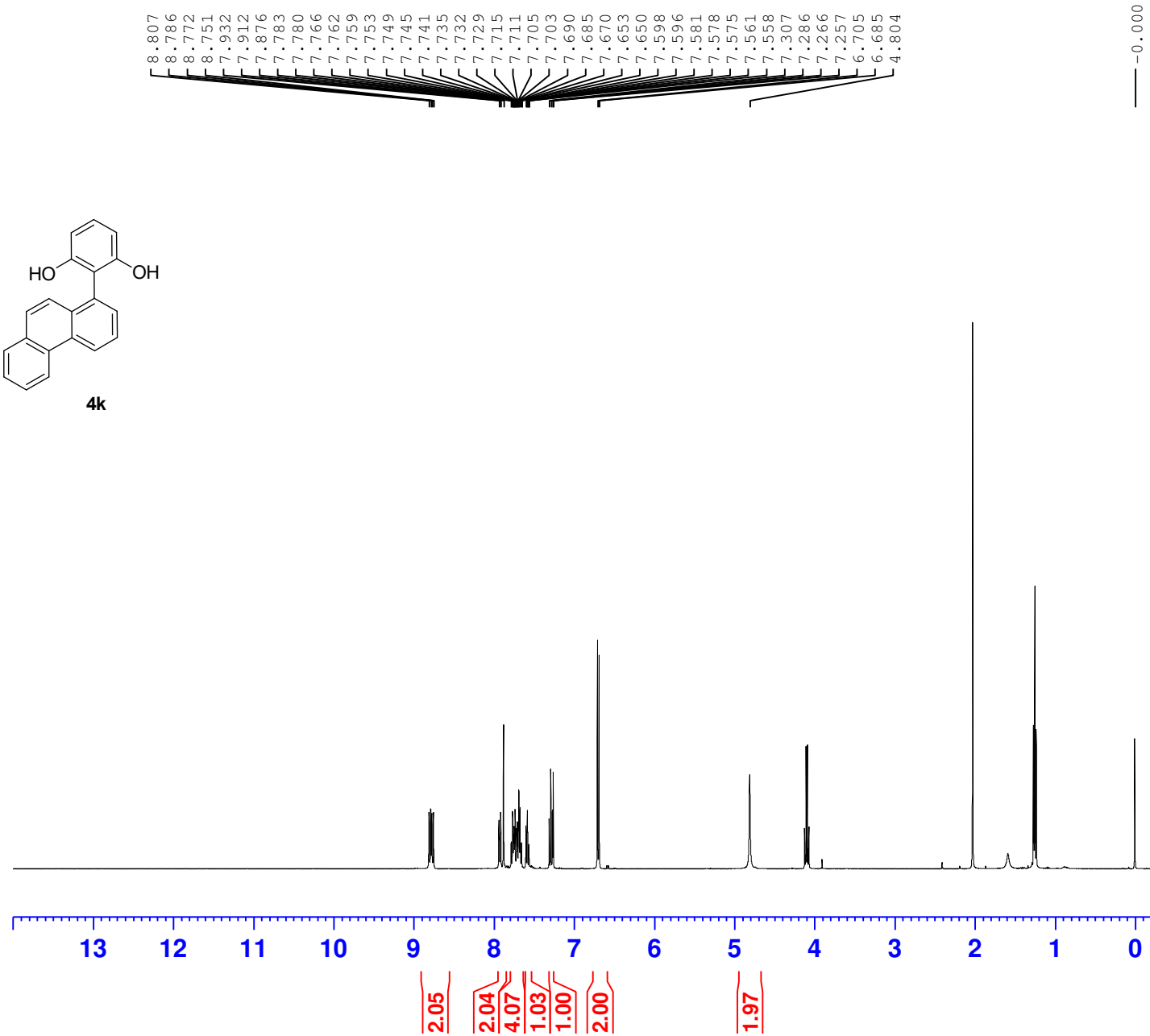
4j

4j



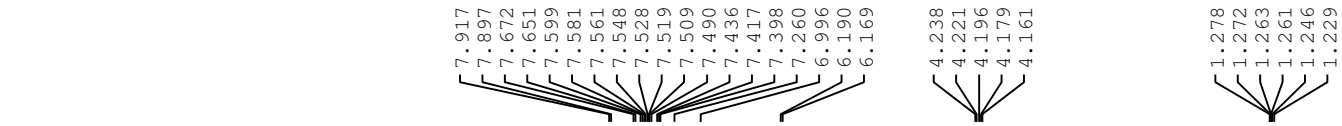

```
Current Data Parameters
NAME        20240125-300
EXPNO                951
PROCNO                 1

F2 - Acquisition Parameters
Date_           20240125
Time               11.25 h
INSTRUM             spect
PROBHD   Z104275_0225 (
PULPROG             zg30
TD                 65536
SOLVENT            CDCl3
NS                    16
DS                     2
SWH             6009.615 Hz
FIDRES          0.183399 Hz
AQ             5.4525952 sec
RG                   203
DW                83.200 usec
DE                 6.50 usec
TE                292.5 K
D1           1.00000000 sec
TD0                    1
SFO1        300.1318533 MHz
NUC1                1H
P1                10.00 usec
PLW1        14.00000000 W

F2 - Processing parameters
SI                 65536
SF          300.1300083 MHz
WDW                   EM
SSB                    0
LB                  0.30 Hz
GB                     0
PC                  1.00
```

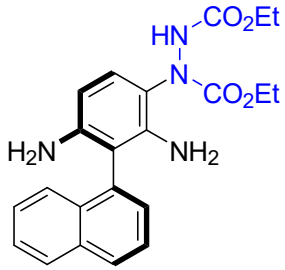
4k



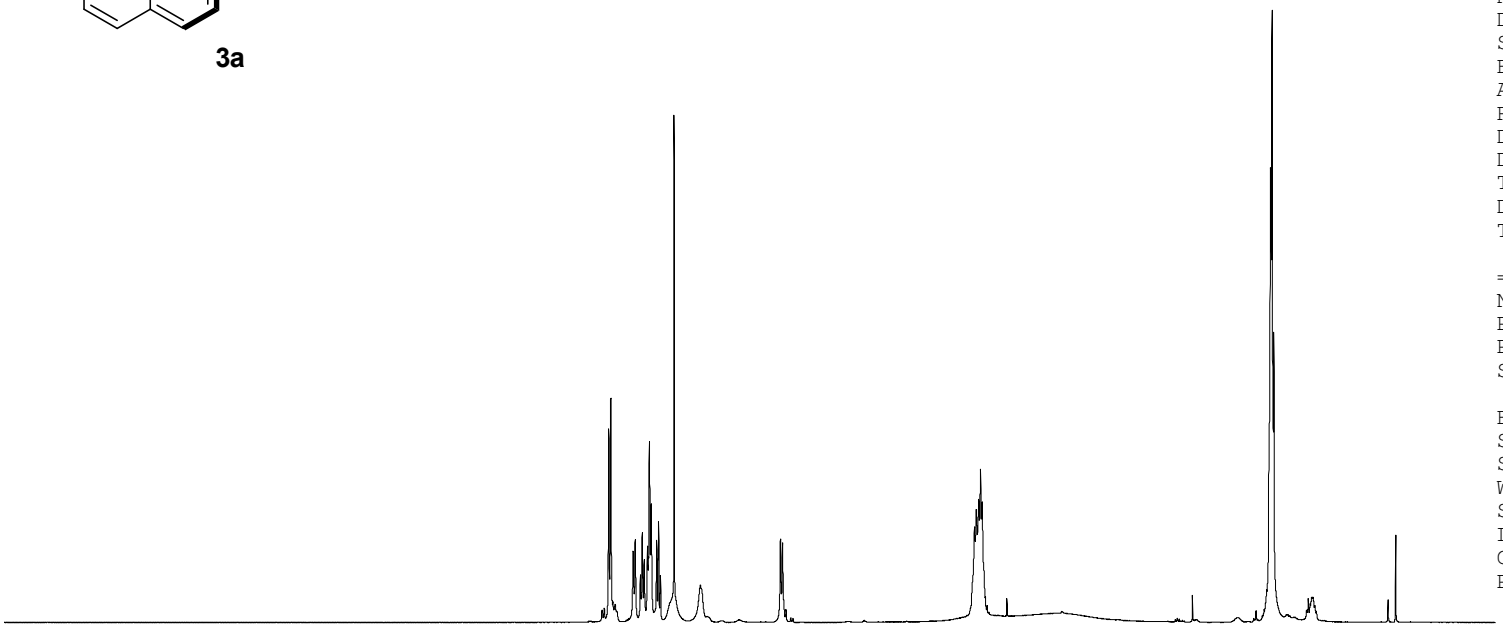

```
Current Data Parameters
NAME        20240105-400
EXPNO                  5
PROCNO                 1

F2 - Acquisition Parameters
Date_           20240104
Time               21.59
INSTRUM            spect
PROBHD   5 mm PADUL 13C
PULPROG             zg30
TD                 65536
SOLVENT            CDCl3
NS                     6
DS                     0
SWH             8223.685 Hz
FIDRES          0.125483 Hz
AQ             3.9845889 sec
RG                154.68
DW                60.800 usec
DE                 6.50 usec
TE                291.0 K
D1           1.00000000 sec
TD0                    1

======== CHANNEL f1 ========
NUC1                  1H
P1                 9.90 usec
PLW1        23.00000000 W
SFO1        400.1924713 MHz

F2 - Processing parameters
SI                 65536
SF          400.1900153 MHz
WDW                   EM
SSB                    0
LB                 0.30 Hz
GB                     0
PC                 1.00
```

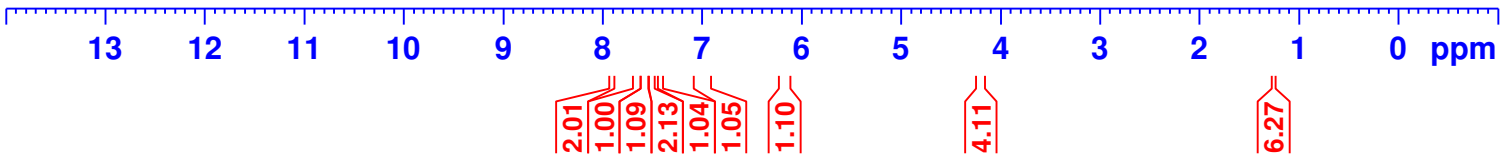
3a





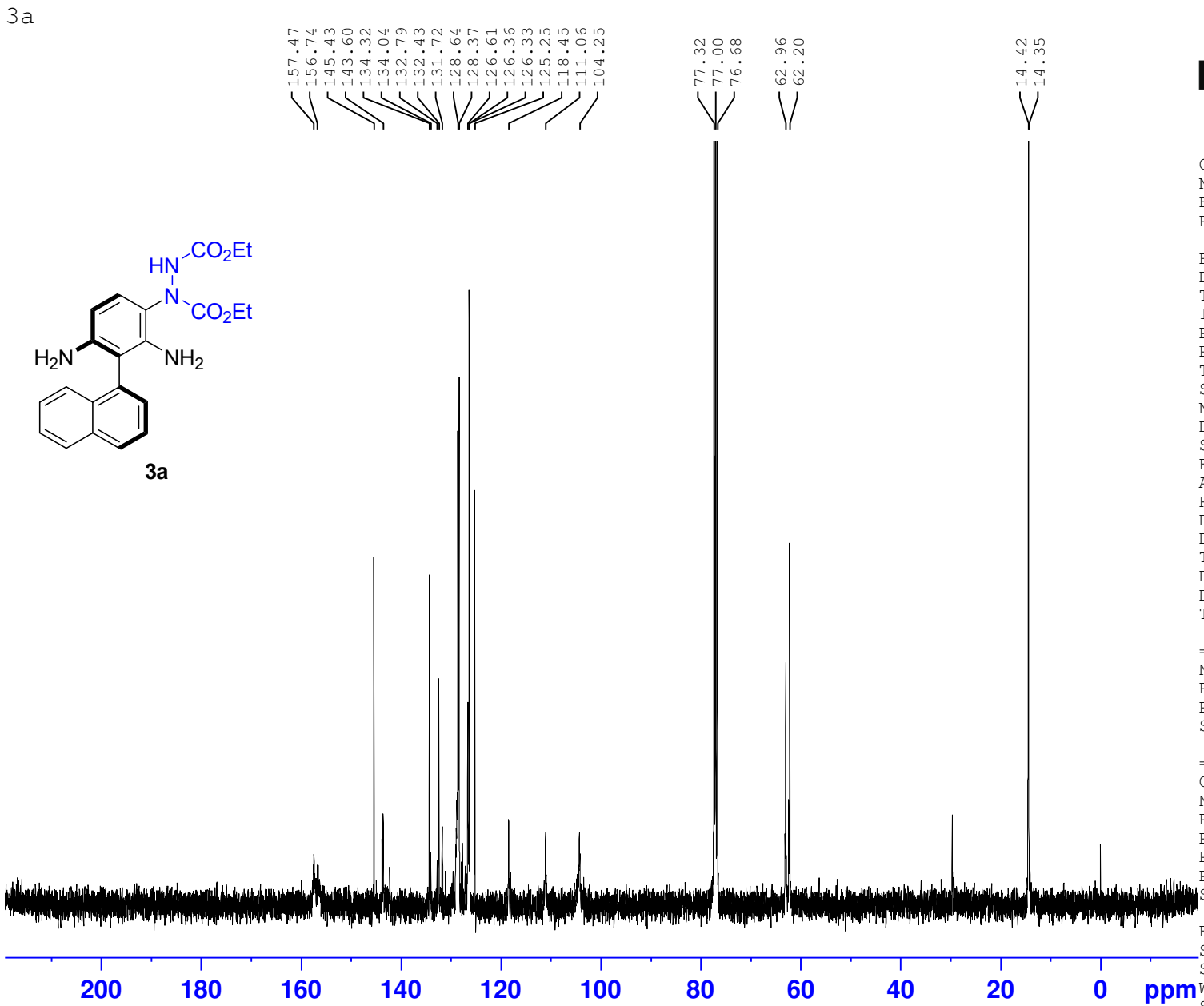
3a






```
Current Data Parameters
NAME       20231013-400M
EXPNO                 18
PROCNO                 1

F2 - Acquisition Parameters
Date_           20231012
Time               23.13
INSTRUM            spect
PROBHD   5 mm PADUL 13C
PULPROG             zg30
TD                 65536
SOLVENT            CDCl3
NS                     5
DS                     2
SWH             8223.685 Hz
FIDRES          0.125483 Hz
AQ             3.9845889 sec
RG                 75.43
DW                60.800 usec
DE                 6.50 usec
TE                290.8 K
D1           1.00000000 sec
TD0                    1

======== CHANNEL f1 ========
NUC1                  1H
P1                 9.90 usec
PLW1        23.00000000 W
SFO1        400.1924713 MHz

F2 - Processing parameters
SI                 65536
SF          400.1900138 MHz
WDW                   EM
SSB                    0
LB                  0.30 Hz
GB                     0
PC                  1.00
```

3a



Current Data Parameters
NAME 20231024-400
EXPNO 23
PROCNO 1

F2 - Acquisition Parameters
Date_ 20231024
Time 3.41
INSTRUM spect
PROBHD 5 mm PADUL 13C
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 1024
DS 4
SWH 24038.461 Hz
FIDRES 0.366798 Hz
AQ 1.3631488 sec
RG 37.77
DW 20.800 usec
DE 6.50 usec
TE 292.4 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1

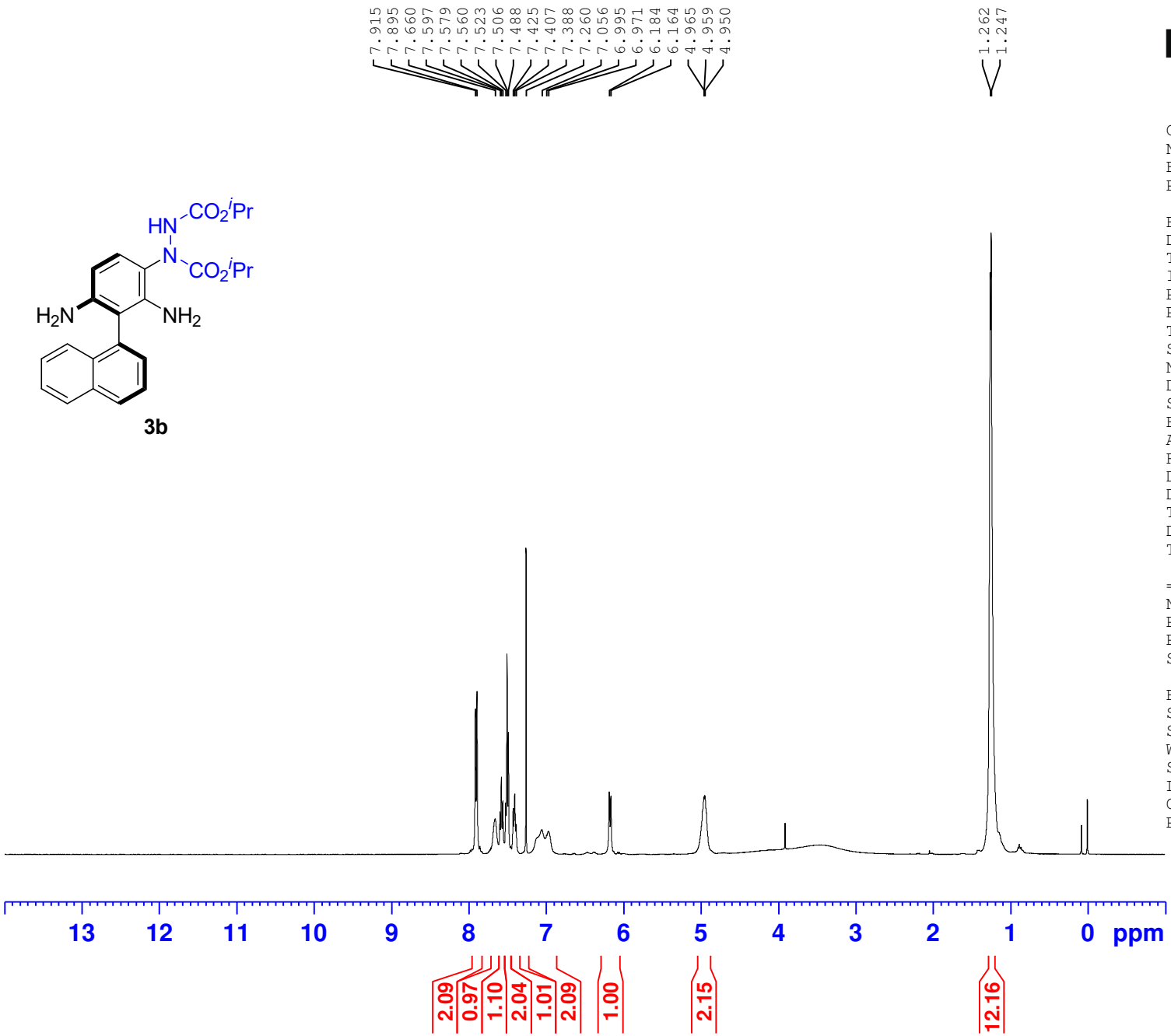
======== CHANNEL f1 ========
NUC1 13C
P1 9.80 usec
PLW1 47.40000153 W
SFO1 100.6379178 MHz

======== CHANNEL f2 ========
CPDPRG[2 waltz16
NUC2 1H
PCPD2 90.00 usec
PLW2 23.00000000 W
PLW12 0.30712000 W
PLW13 0.24877000 W
SFO2 400.1916008 MHz

F2 - Processing parameters
SI 32768
SF 100.6278662 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40

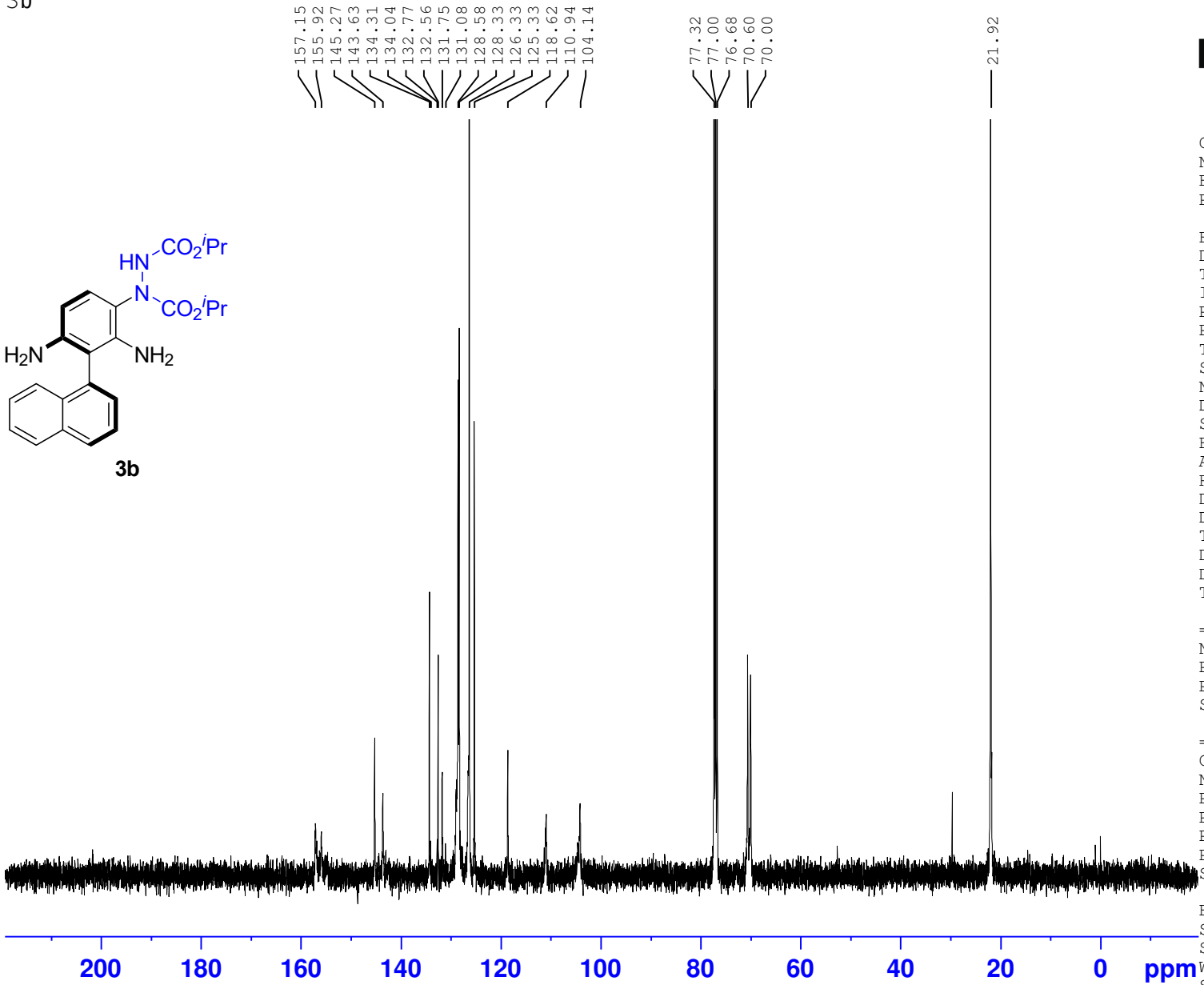
3b

3b




```
Current Data Parameters
NAME       20231109-400M
EXPNO                 26
PROCNO                 1

F2 - Acquisition Parameters
Date_           20231108
Time               23.45
INSTRUM            spect
PROBHD   5 mm PADUL 13C
PULPROG             zg30
TD                 65536
SOLVENT            CDCl3
NS                     6
DS                     0
SWH             8223.685 Hz
FIDRES          0.125483 Hz
AQ             3.9845889 sec
RG                  53.3
DW                60.800 usec
DE                 6.50 usec
TE                294.2 K
D1           1.00000000 sec
TD0                    1

======== CHANNEL f1 ========
NUC1                  1H
P1                 9.90 usec
PLW1        23.00000000 W
SFO1        400.1924713 MHz

F2 - Processing parameters
SI                 65536
SF          400.1900139 MHz
WDW                   EM
SSB                    0
LB                 0.30 Hz
GB                     0
PC                 1.00
```

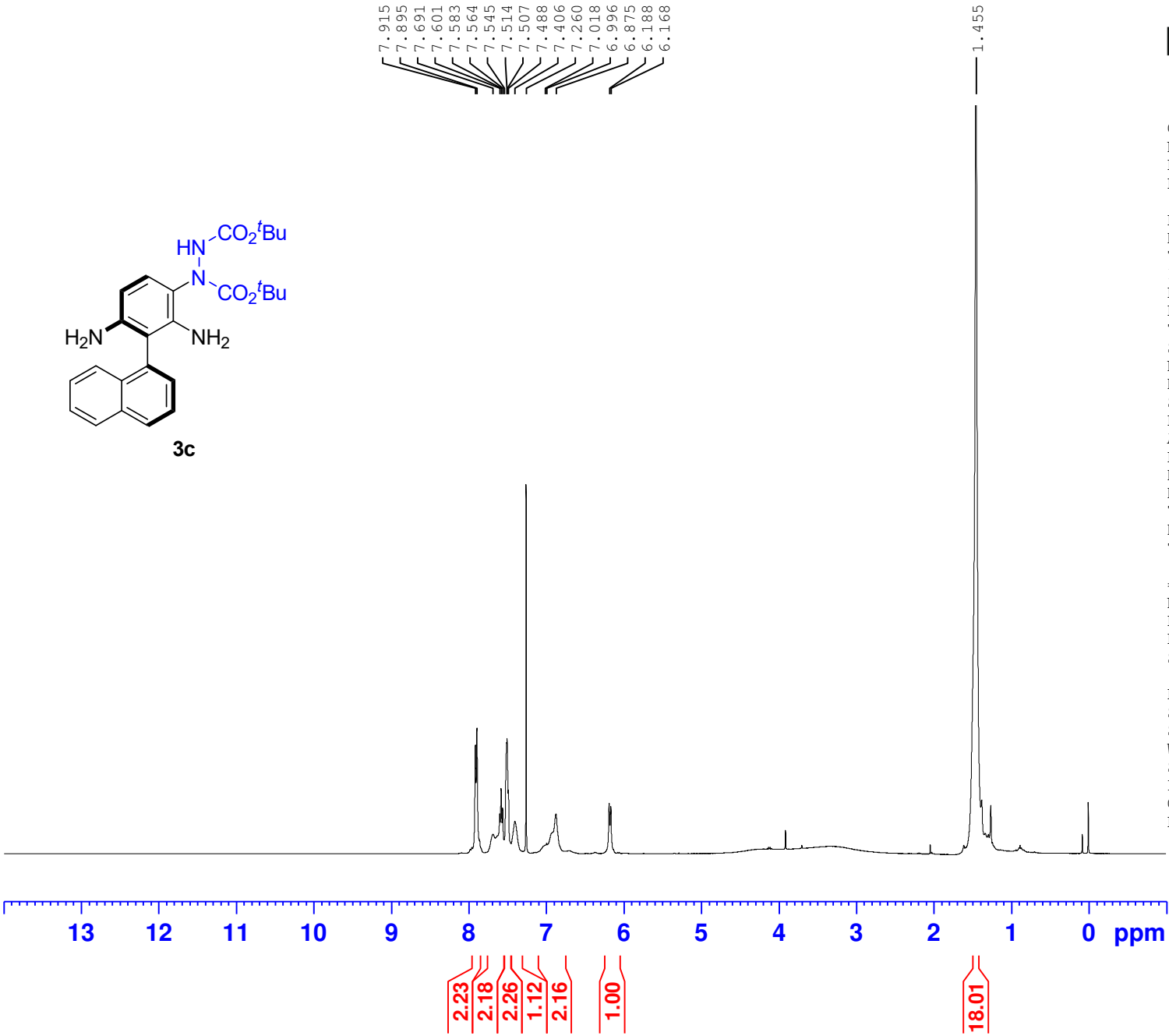
3b



3b

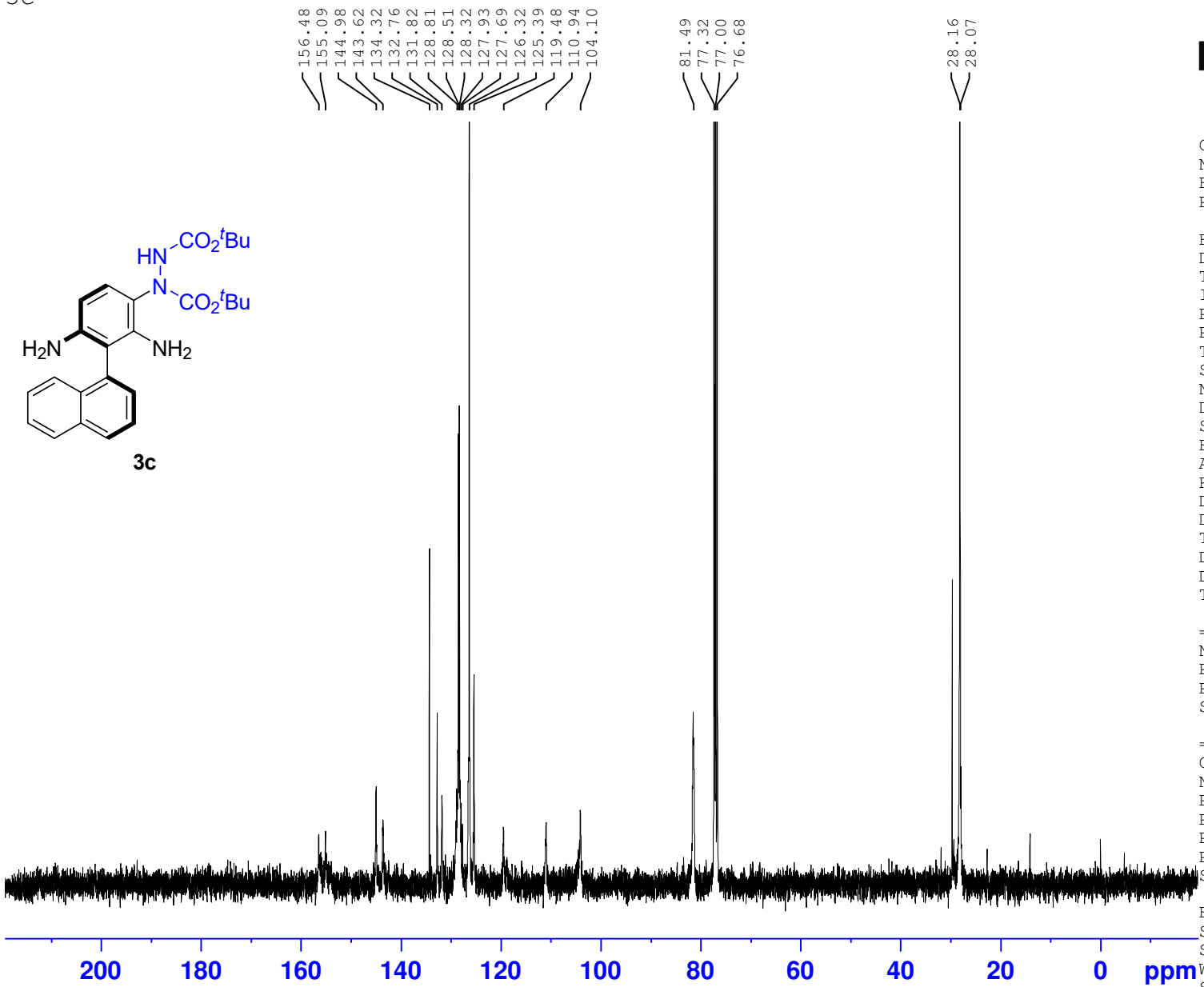
```
Current Data Parameters
NAME        20231112-400
EXPNO                 17
PROCNO                 1

F2 - Acquisition Parameters
Date_           20231112
Time                0.55
INSTRUM            spect
PROBHD   5 mm PADUL 13C
PULPROG          zgpg30
TD                65536
SOLVENT           CDCl3
NS                 1024
DS                    4
SWH           24038.461 Hz
FIDRES         0.366798 Hz
AQ            1.3631488 sec
RG                37.77
DW               20.800 usec
DE                6.50 usec
TE                294.2 K
D1           2.00000000 sec
D11          0.03000000 sec
TD0                   1

======== CHANNEL f1 ========
NUC1                 13C
P1                 9.80 usec
PLW1        47.40000153 W
SFO1        100.6379178 MHz

======== CHANNEL f2 ========
CPDPRG[2         waltz16
NUC2                 1H
PCPD2             90.00 usec
PLW2        23.00000000 W
PLW12        0.30712000 W
PLW13        0.24877000 W
SFO2        400.1916008 MHz

F2 - Processing parameters
SI                 32768
SF          100.6278669 MHz
WDW                   EM
SSB                   0
LB                 1.00 Hz
GB                    0
PC                 1.40
```

3c




```
Current Data Parameters
NAME        20231110-400
EXPNO                24
PROCNO                1

F2 - Acquisition Parameters
Date_          20231110
Time               0.08
INSTRUM           spect
PROBHD   5 mm PADUL 13C
PULPROG            zg30
TD                65536
SOLVENT           CDCl3
NS                    8
DS                    2
SWH            8223.685 Hz
FIDRES        0.125483 Hz
AQ            3.9845889 sec
RG                 53.3
DW               60.800 usec
DE                6.50 usec
TE                294.3 K
D1           1.00000000 sec
TD0                   1

======== CHANNEL f1 ========
NUC1                  1H
P1                 9.90 usec
PLW1        23.00000000 W
SFO1        400.1924713 MHz

F2 - Processing parameters
SI                65536
SF          400.1900139 MHz
WDW                  EM
SSB                   0
LB                 0.30 Hz
GB                    0
PC                 1.00
```

3c



Current Data Parameters
NAME 20231112-400
EXPNO 24
PROCNO 1

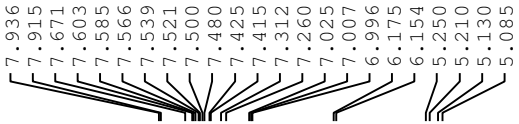
F2 - Acquisition Parameters
Date_ 20231112
Time 5.10
INSTRUM spect
PROBHD 5 mm PADUL 13C
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 1024
DS 4
SWH 24038.461 Hz
FIDRES 0.366798 Hz
AQ 1.3631488 sec
RG 37.77
DW 20.800 usec
DE 6.50 usec
TE 294.5 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1

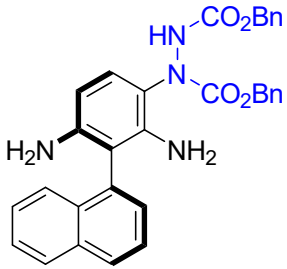
======== CHANNEL f1 ========
NUC1 13C
P1 9.80 usec
PLW1 47.40000153 W
SFO1 100.6379178 MHz

======== CHANNEL f2 ========
CPDPRG[2 waltz16
NUC2 1H
PCPD2 90.00 usec
PLW2 23.00000000 W
PLW12 0.30712000 W
PLW13 0.24877000 W
SFO2 400.1916008 MHz

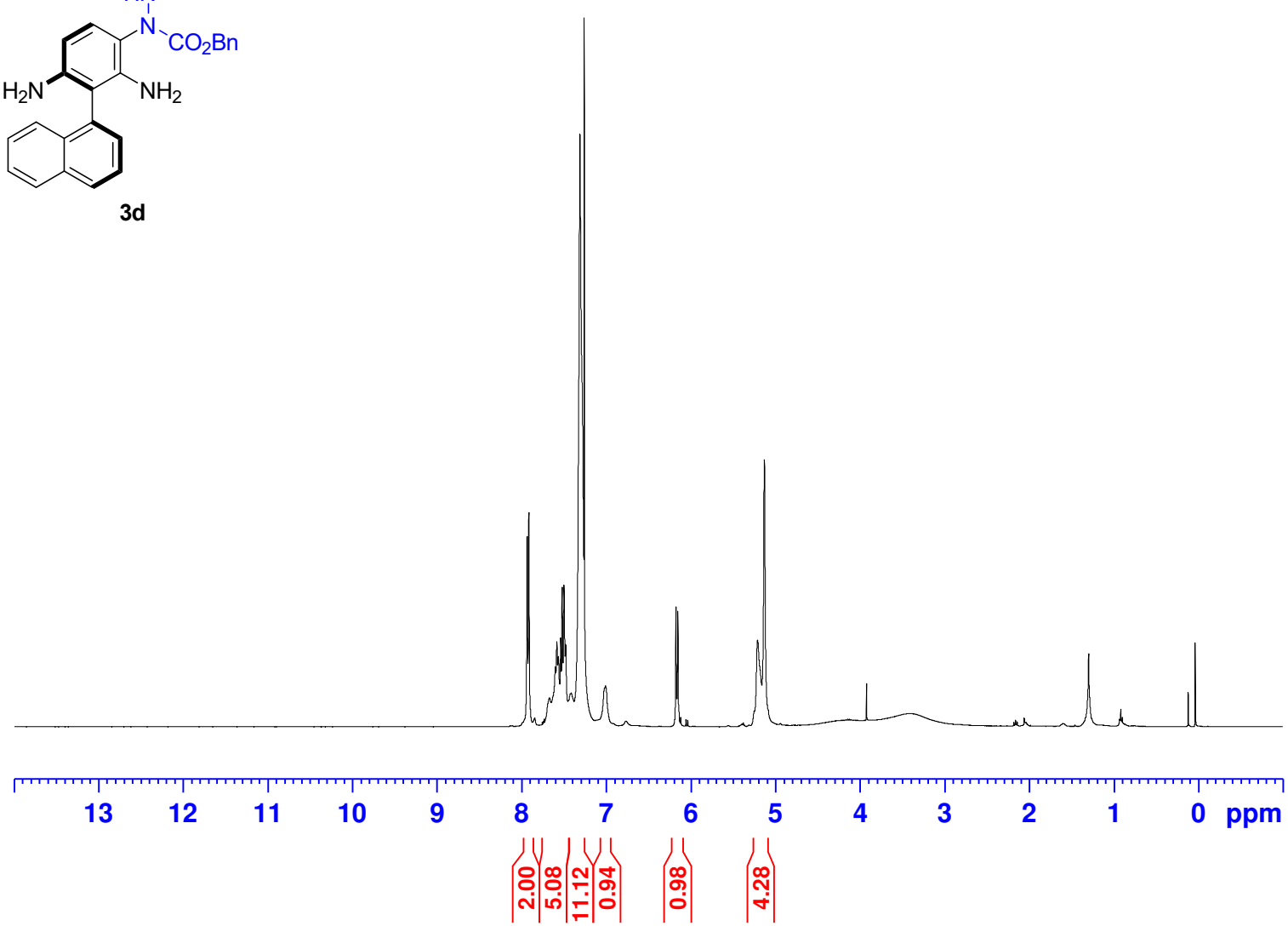
F2 - Processing parameters
SI 32768
SF 100.6278662 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40

3d



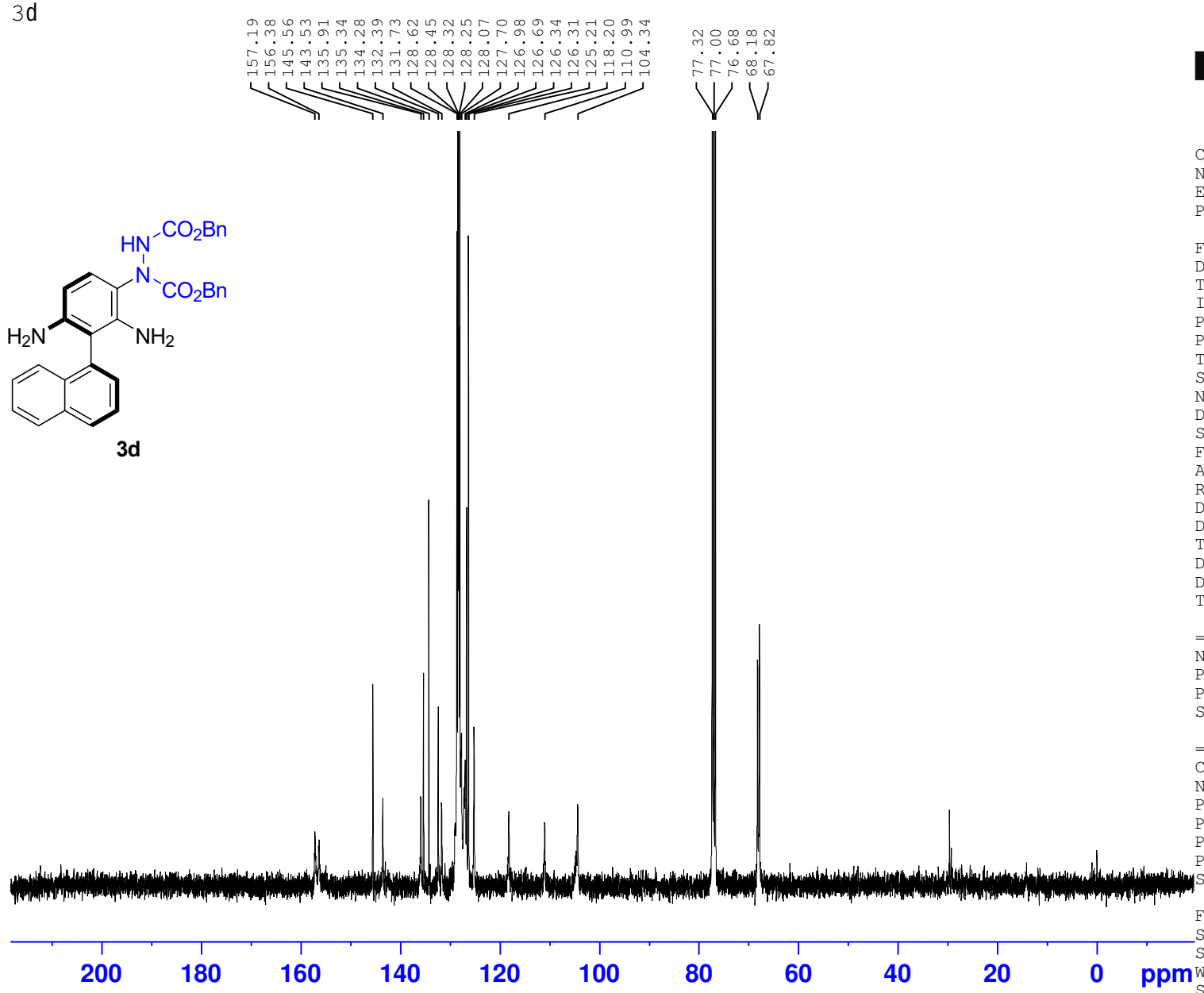


3d




```
Current Data Parameters
NAME        20231111-400
EXPNO                 14
PROCNO                 1

F2 - Acquisition Parameters
Date_           20231111
Time                0.40
INSTRUM            spect
PROBHD   5 mm PADUL 13C
PULPROG             zg30
TD                 65536
SOLVENT            CDCl3
NS                     8
DS                     2
SWH             8223.685 Hz
FIDRES          0.125483 Hz
AQ             3.9845889 sec
RG                 50.16
DW                60.800 usec
DE                 6.50 usec
TE                292.6 K
D1           1.00000000 sec
TD0                    1

======== CHANNEL f1 ========
NUC1                  1H
P1                 9.90 usec
PLW1        23.00000000 W
SFO1        400.1924713 MHz

F2 - Processing parameters
SI                 65536
SF          400.1900138 MHz
WDW                   EM
SSB                    0
LB                 0.30 Hz
GB                     0
PC                  1.00
```

3d



Current Data Parameters
NAME 20231112-400
EXPNO 22
PROCNO 1

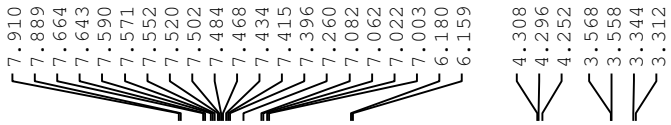
F2 - Acquisition Parameters
Date_ 20231112
Time 3.05
INSTRUM spect
PROBHD 5 mm PADUL 13C
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 1024
DS 4
SWH 24038.461 Hz
FIDRES 0.366798 Hz
AQ 1.3631488 sec
RG 44.2
DW 20.800 usec
DE 6.50 usec
TE 294.4 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1

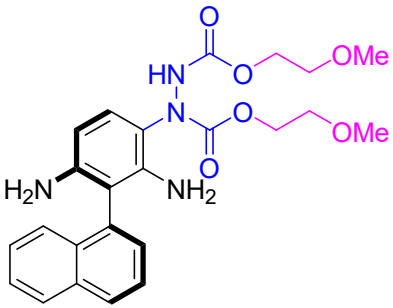
======== CHANNEL f1 ========
NUC1 13C
P1 9.80 usec
PLW1 47.40000153 W
SFO1 100.6379178 MHz

======== CHANNEL f2 ========
CPDPRG[2 waltz16
NUC2 1H
PCPD2 90.00 usec
PLW2 23.00000000 W
PLW12 0.30712000 W
PLW13 0.24877000 W
SFO2 400.1916008 MHz

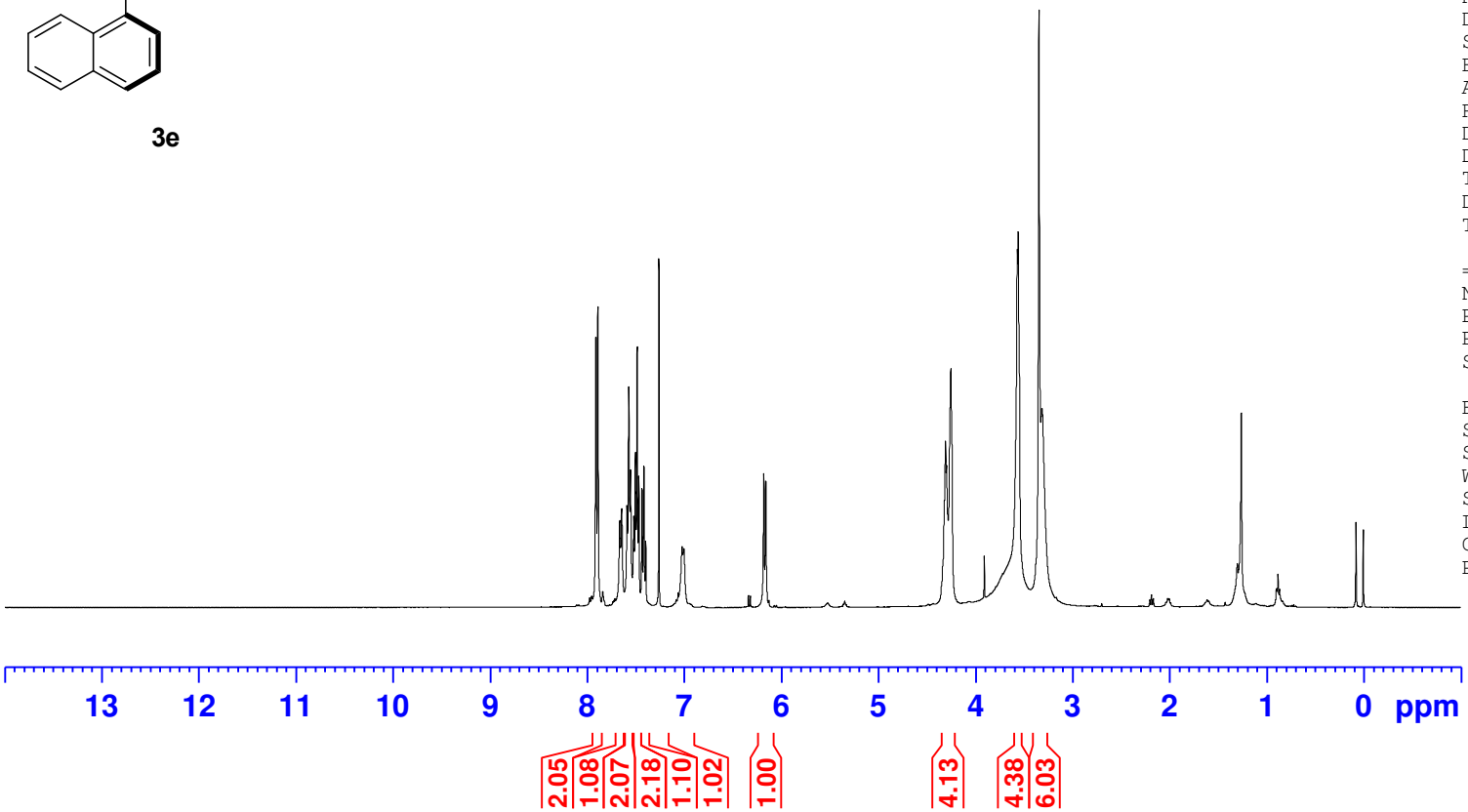
F2 - Processing parameters
SI 32768
SF 100.6278713 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40

3e



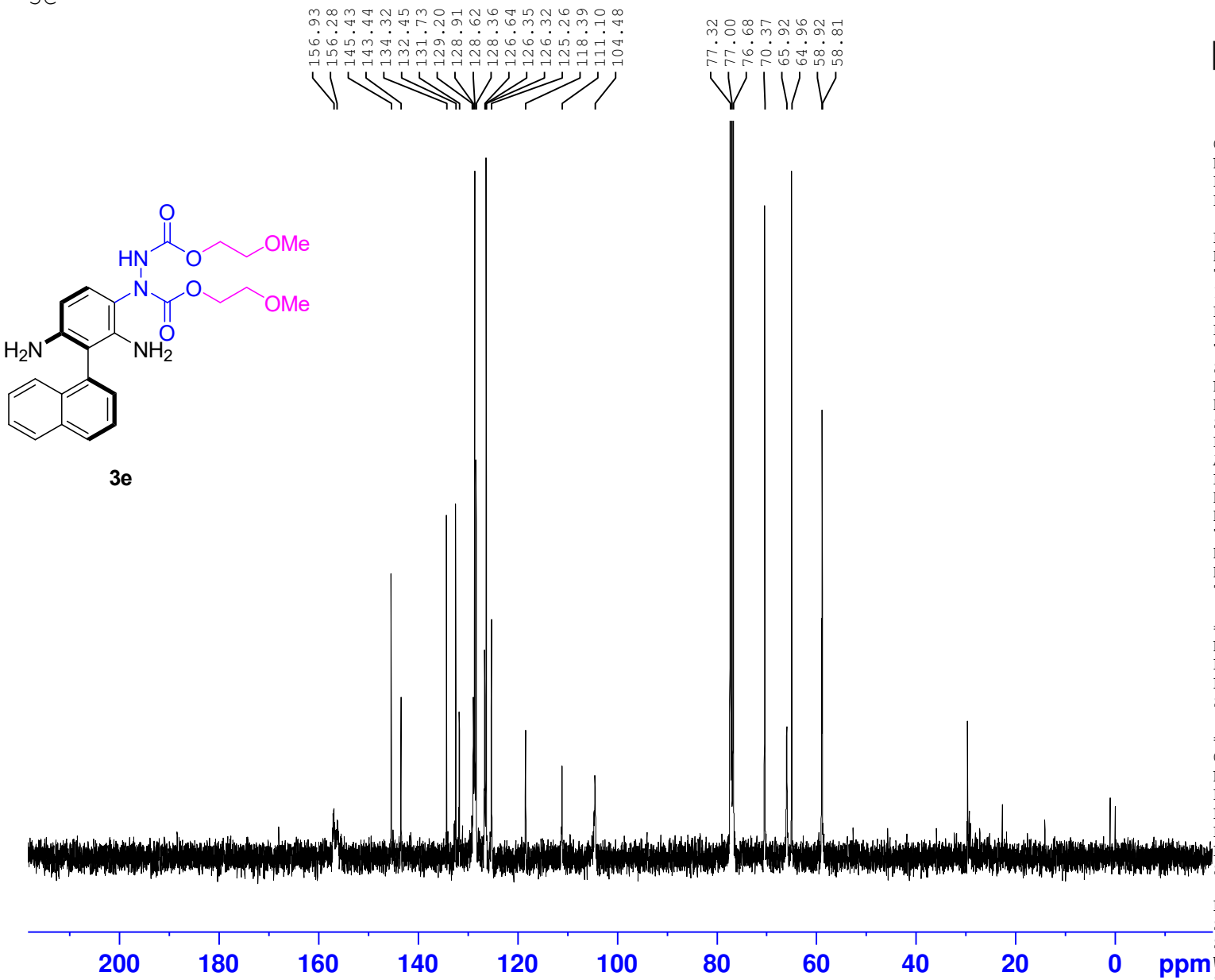


3e




```
Current Data Parameters
NAME       20231115-400M
EXPNO                 22
PROCNO                 1

F2 - Acquisition Parameters
Date_           20231115
Time                1.24
INSTRUM            spect
PROBHD   5 mm PADUL 13C
PULPROG             zg30
TD                 65536
SOLVENT            CDCl3
NS                    14
DS                     2
SWH             8223.685 Hz
FIDRES          0.125483 Hz
AQ             3.9845889 sec
RG                 61.19
DW                60.800 usec
DE                 6.50 usec
TE                295.7 K
D1           1.00000000 sec
TD0                    1

======== CHANNEL f1 ========
NUC1                  1H
P1                 9.90 usec
PLW1        23.00000000 W
SFO1        400.1924713 MHz

F2 - Processing parameters
SI                 65536
SF          400.1900139 MHz
WDW                   EM
SSB                    0
LB                  0.30 Hz
GB                     0
PC                  1.00
```

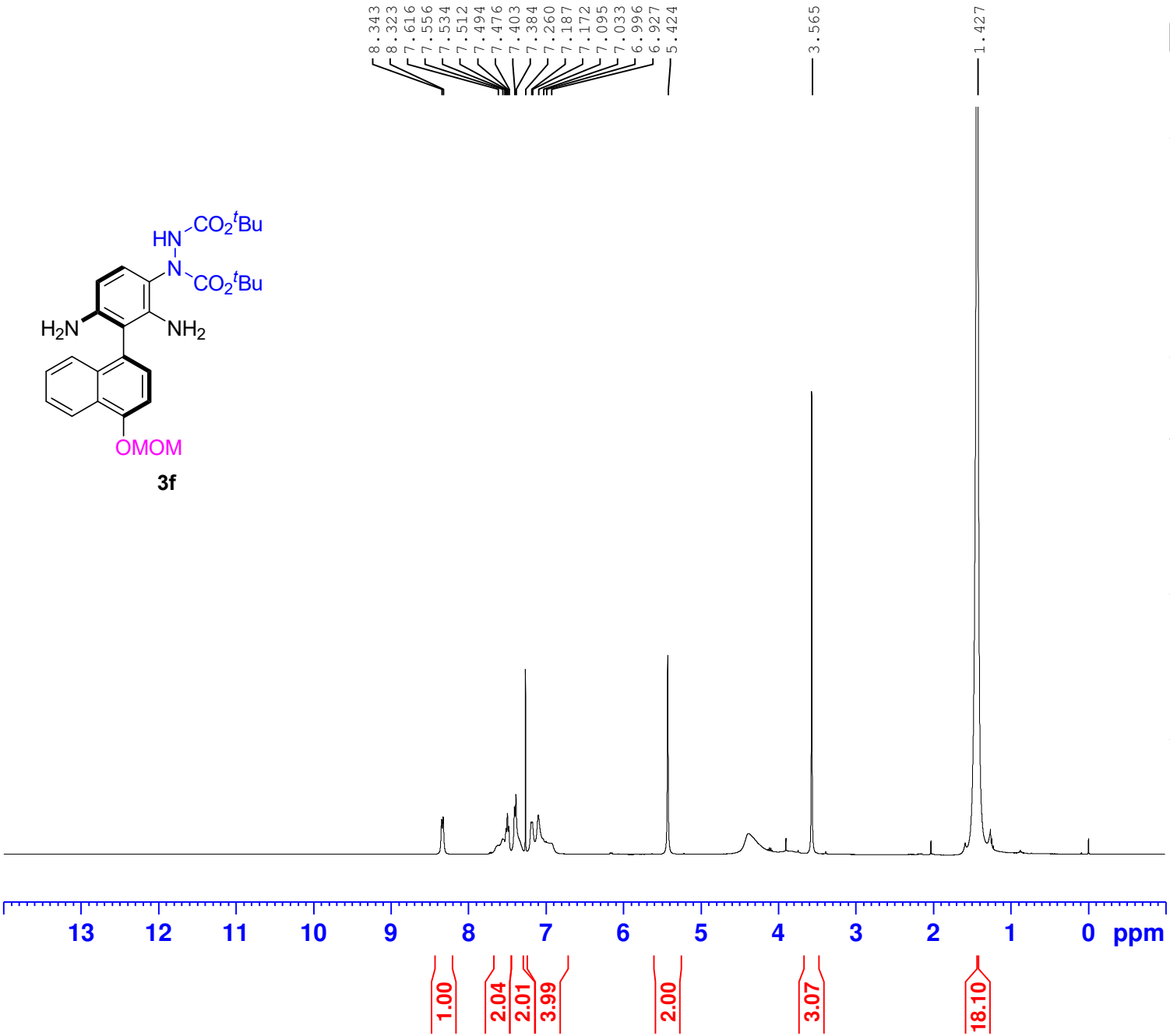
3e



3e

```
Current Data Parameters
NAME       20231115-400M
EXPNO                 23
PROCNO                 1

F2 - Acquisition Parameters
Date_           20231115
Time                2.14
INSTRUM            spect
PROBHD   5 mm PADUL 13C
PULPROG           zgpg30
TD                 65536
SOLVENT            CDCl3
NS                   850
DS                     4
SWH           24038.461 Hz
FIDRES         0.366798 Hz
AQ            1.3631488 sec
RG                37.77
DW               20.800 usec
DE                6.50 usec
TE                296.6 K
D1           2.00000000 sec
D11          0.03000000 sec
TD0                    1

======== CHANNEL f1 ========
NUC1                  13C
P1                   9.80 usec
PLW1        47.40000153 W
SFO1        100.6379178 MHz

======== CHANNEL f2 ========
CPDPRG[2         waltz16
NUC2                  1H
PCPD2              90.00 usec
PLW2        23.00000000 W
PLW12        0.30712000 W
PLW13        0.24877000 W
SFO2        400.1916008 MHz

F2 - Processing parameters
SI                 32768
SF          100.6278660 MHz
WDW                   EM
SSB                    0
LB                  1.00 Hz
GB                     0
PC                  1.40
```

3f



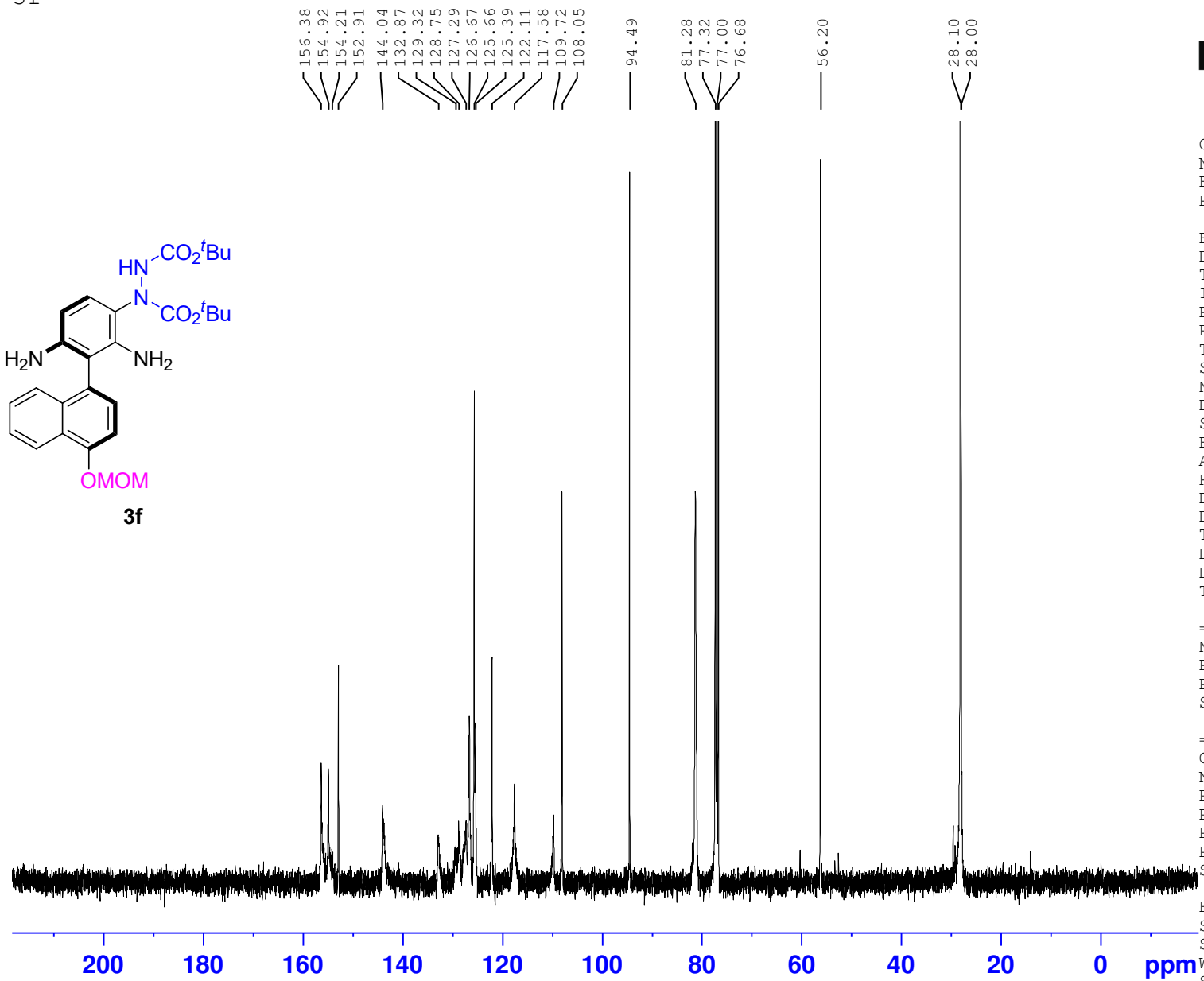
Current Data Parameters
NAME 20231201-400M
EXPNO 28
PROCNO 1

F2 - Acquisition Parameters
Date_ 20231201
Time 0.39
INSTRUM spect
PROBHD 5 mm PADUL 13C
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 8
DS 2
SWH 8223.685 Hz
FIDRES 0.125483 Hz
AQ 3.9845889 sec
RG 18.94
DW 60.800 usec
DE 6.50 usec
TE 295.1 K
D1 1.00000000 sec
TD0 1

======== CHANNEL f1 ========
NUC1 1H
P1 9.90 usec
PLW1 23.00000000 W
SFO1 400.1924713 MHz

F2 - Processing parameters
SI 65536
SF 400.1900135 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

3f



Current Data Parameters
NAME 20231201-400M
EXPNO 29
PROCNO 1

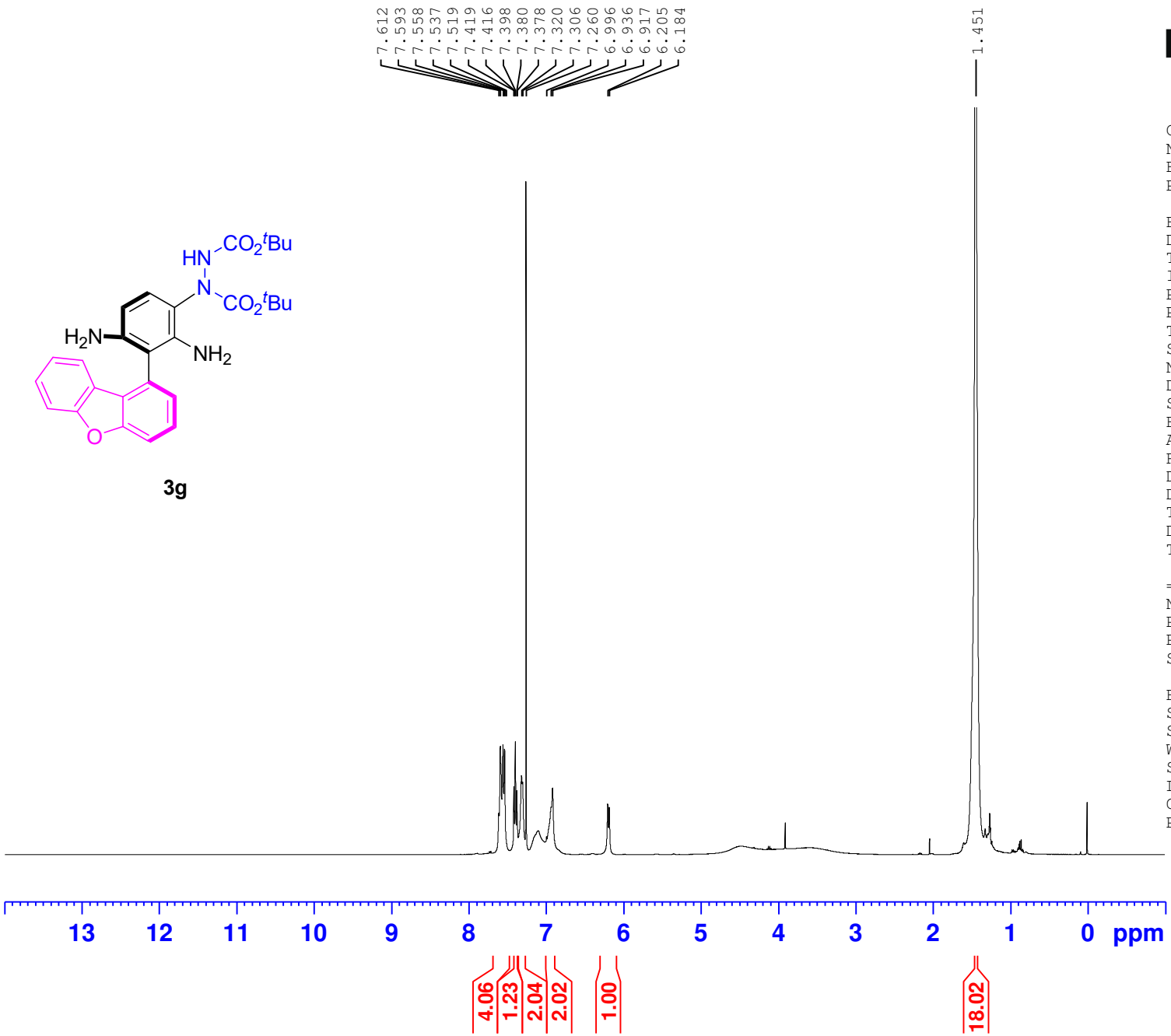
F2 - Acquisition Parameters
Date_ 20231201
Time 1.39
INSTRUM spect
PROBHD 5 mm PADUL 13C
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 1024
DS 4
SWH 24038.461 Hz
FIDRES 0.366798 Hz
AQ 1.3631488 sec
RG 90.23
DW 20.800 usec
DE 6.50 usec
TE 295.8 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1

======== CHANNEL f1 ========
NUC1 13C
P1 9.80 usec
PLW1 47.40000153 W
SFO1 100.6379178 MHz

======== CHANNEL f2 ========
CPDPRG[2 waltz16
NUC2 1H
PCPD2 90.00 usec
PLW2 23.00000000 W
PLW12 0.30712000 W
PLW13 0.24877000 W
SFO2 400.1916008 MHz

F2 - Processing parameters
SI 32768
SF 100.6278714 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40

3g



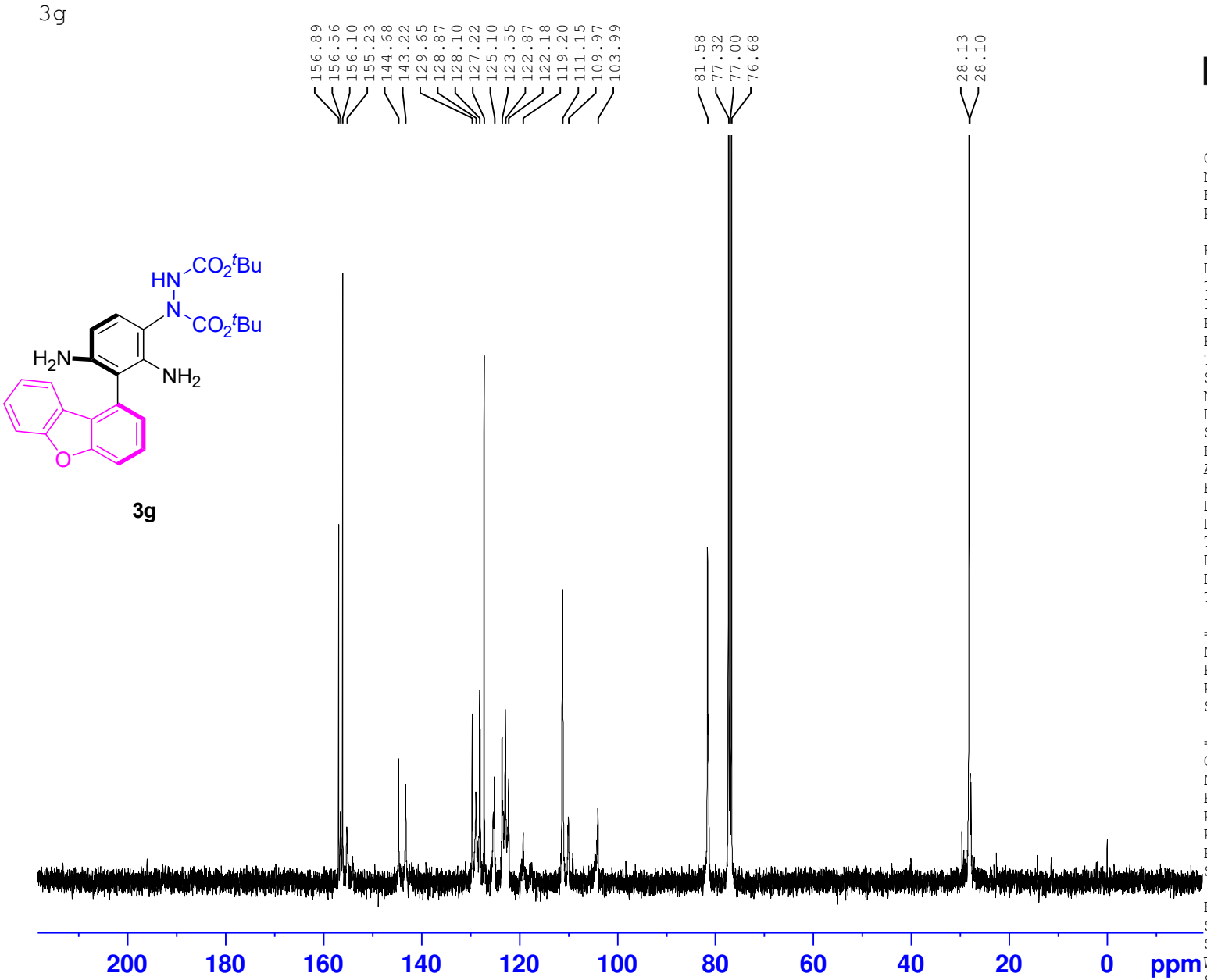
Current Data Parameters
NAME 20231124-400M
EXPNO 249
PROCNO 1

F2 - Acquisition Parameters
Date_ 20231123
Time 23.42
INSTRUM spect
PROBHD 5 mm PADUL 13C
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 8
DS 2
SWH 8223.685 Hz
FIDRES 0.125483 Hz
AQ 3.9845889 sec
RG 29.75
DW 60.800 usec
DE 6.50 usec
TE 292.3 K
D1 1.00000000 sec
TD0 1

======== CHANNEL f1 ========
NUC1 1H
P1 9.90 usec
PLW1 23.00000000 W
SFO1 400.1924713 MHz

F2 - Processing parameters
SI 65536
SF 400.1900137 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

3g



Current Data Parameters
NAME 20231124-400M
EXPNO 24
PROCNO 1

F2 - Acquisition Parameters
Date_ 20231124
Time 0.42
INSTRUM spect
PROBHD 5 mm PADUL 13C
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 1024
DS 4
SWH 24038.461 Hz
FIDRES 0.366798 Hz
AQ 1.3631488 sec
RG 68.24
DW 20.800 usec
DE 6.50 usec
TE 292.7 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1

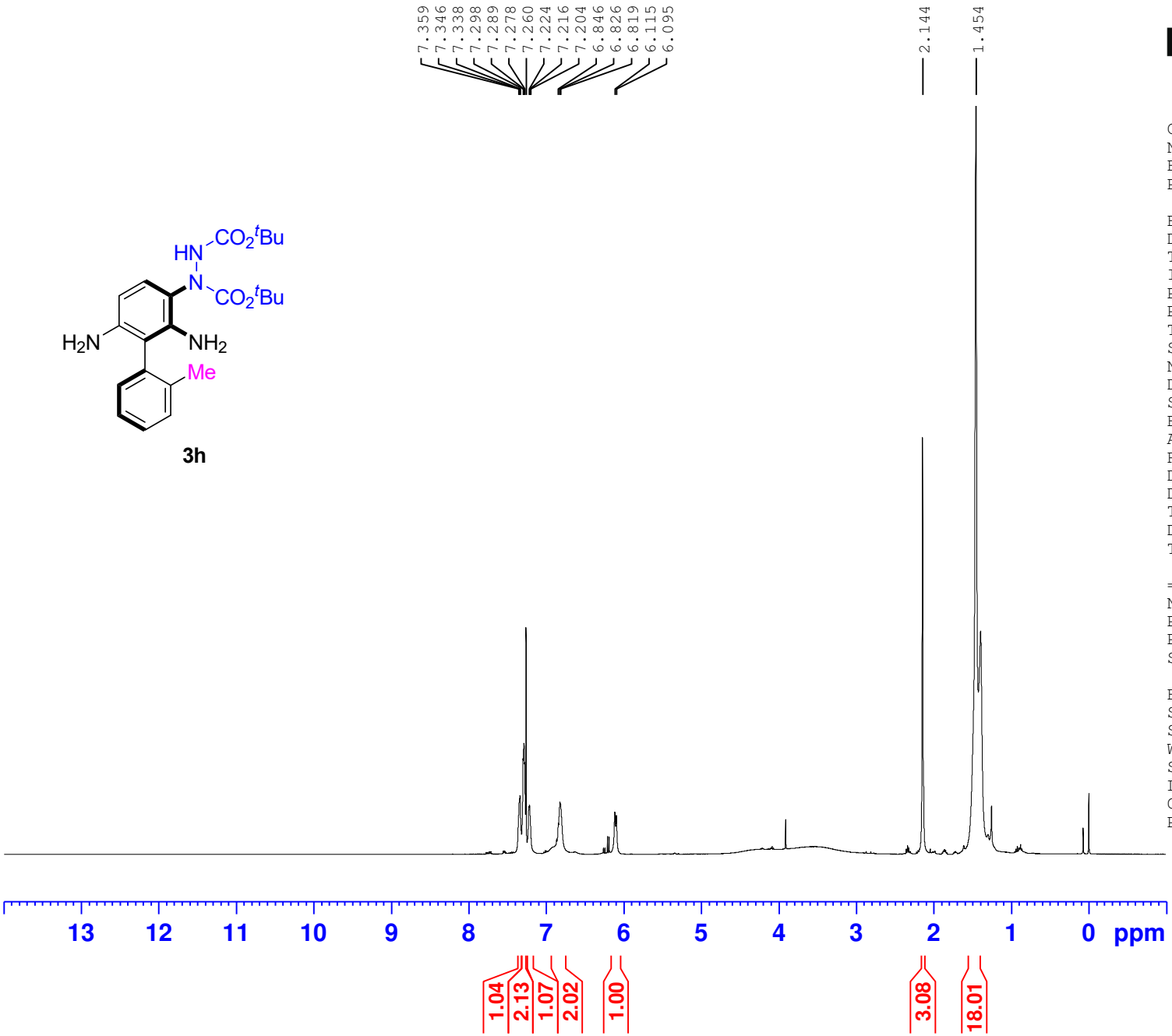
======== CHANNEL f1 ========
NUC1 13C
P1 9.80 usec
PLW1 47.40000153 W
SFO1 100.6379178 MHz

======== CHANNEL f2 ========
CPDPRG[2 waltz16
NUC2 1H
PCPD2 90.00 usec
PLW2 23.00000000 W
PLW12 0.30712000 W
PLW13 0.24877000 W
SFO2 400.1916008 MHz

F2 - Processing parameters
SI 32768
SF 100.6278684 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40

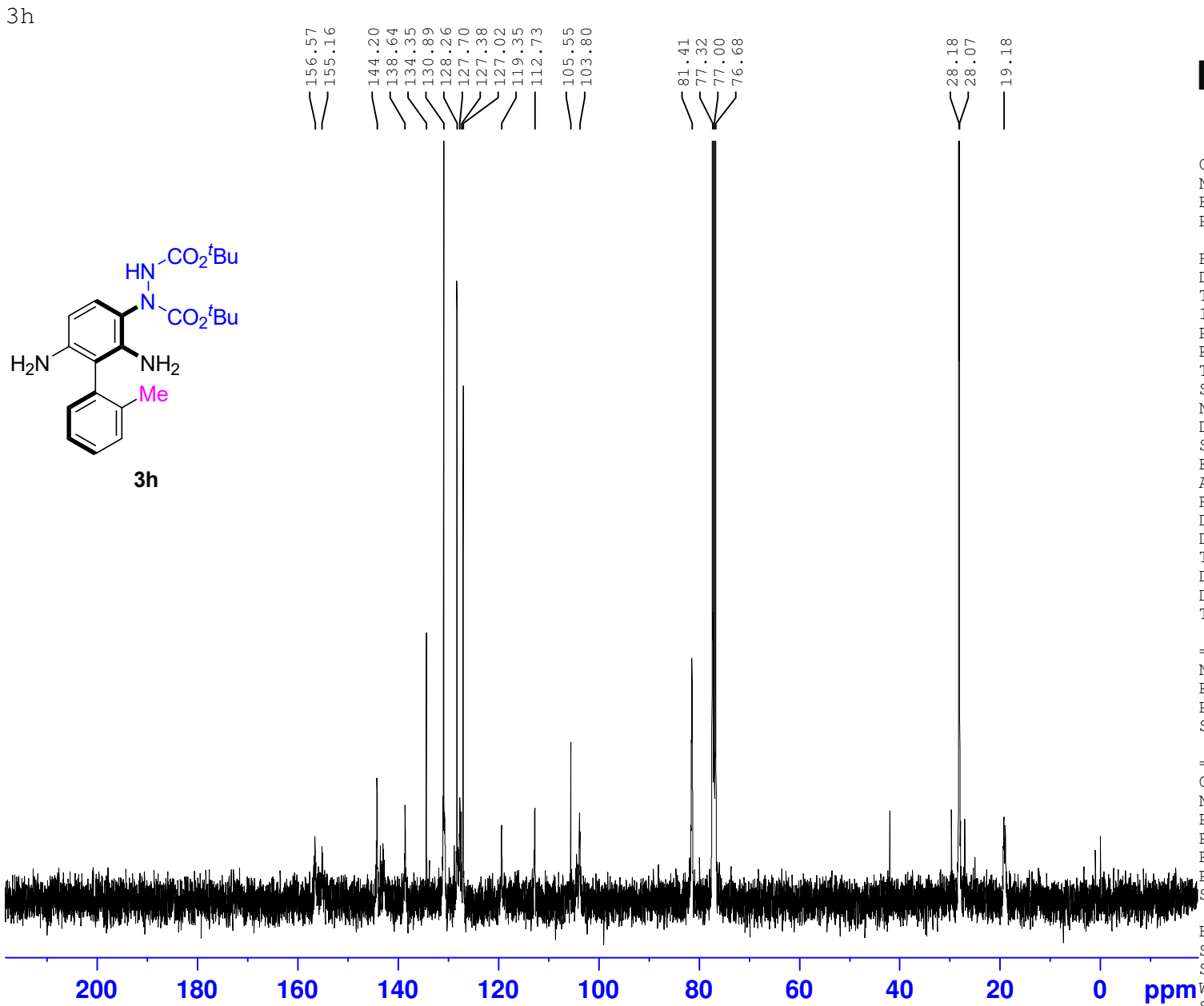
3h

3h




```
Current Data Parameters
NAME        20231219-400
EXPNO                 13
PROCNO                 1

F2 - Acquisition Parameters
Date_           20231218
Time                22.30
INSTRUM             spect
PROBHD    5 mm PADUL 13C
PULPROG              zg30
TD                  65536
SOLVENT             CDCl3
NS                      8
DS                      2
SWH              8223.685 Hz
FIDRES           0.125483 Hz
AQ               3.9845889 sec
RG                  61.19
DW                 60.800 usec
DE                  6.50 usec
TE                 293.4 K
D1            1.00000000 sec
TD0                     1

======== CHANNEL f1 ========
NUC1                   1H
P1                  9.90 usec
PLW1         23.00000000 W
SFO1         400.1924713 MHz

F2 - Processing parameters
SI                  65536
SF           400.1900138 MHz
WDW                    EM
SSB                     0
LB                   0.30 Hz
GB                      0
PC                   1.00
```

3h



3h

Current Data Parameters
NAME 20231219-400
EXPNO 14
PROCNO 1

F2 - Acquisition Parameters
Date_ 20231218
Time 23.29
INSTRUM spect
PROBHD 5 mm PADUL 13C
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 1024
DS 4
SWH 24038.461 Hz
FIDRES 0.366798 Hz
AQ 1.3631488 sec
RG 35.06
DW 20.800 usec
DE 6.50 usec
TE 294.3 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1

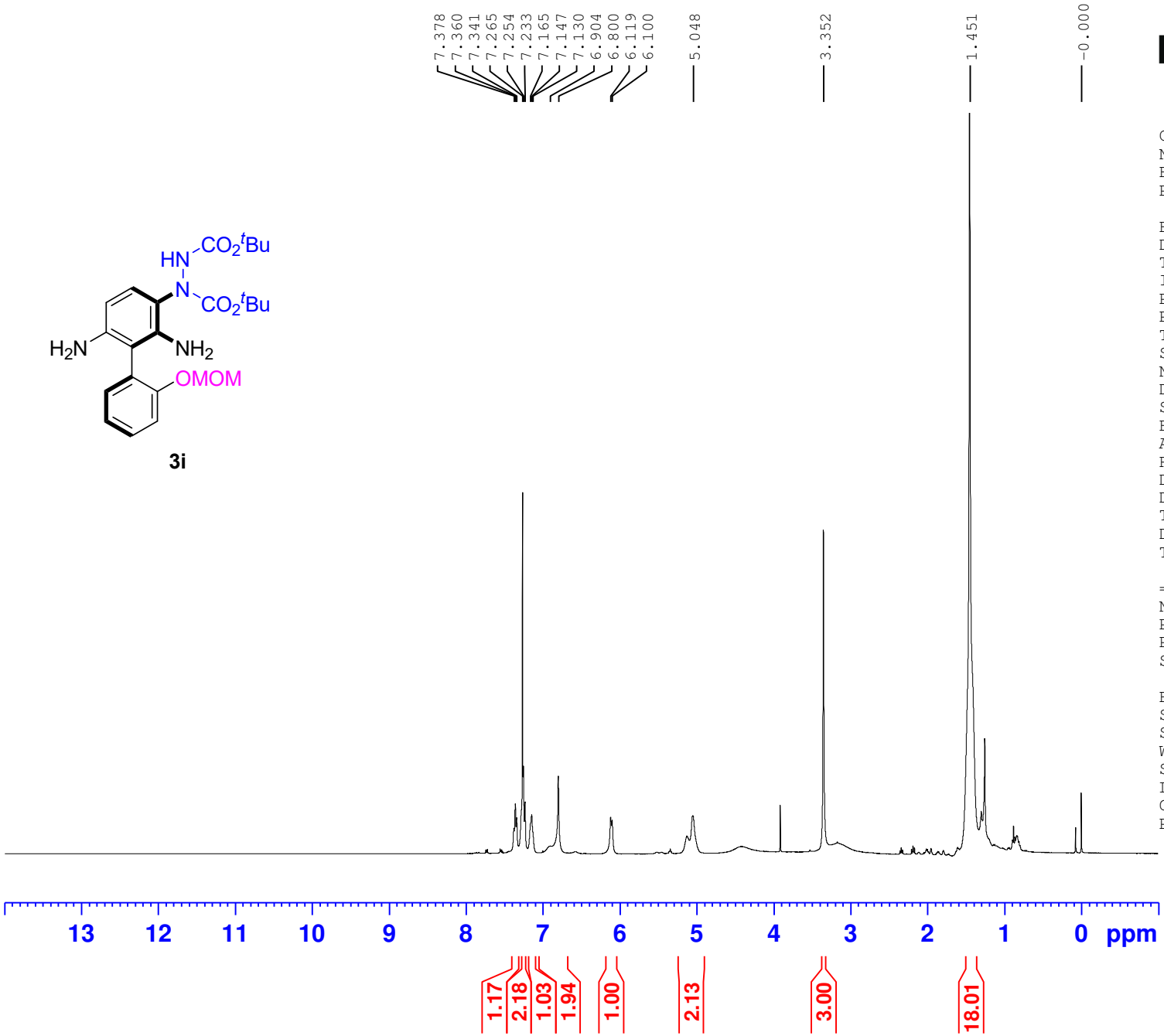
======== CHANNEL f1 ========
NUC1 13C
P1 9.80 usec
PLW1 47.40000153 W
SFO1 100.6379178 MHz

======== CHANNEL f2 ========
CPDPRG[2 waltz16
NUC2 1H
PCPD2 90.00 usec
PLW2 23.00000000 W
PLW12 0.30712000 W
PLW13 0.24877000 W
SFO2 400.1916008 MHz

F2 - Processing parameters
SI 32768
SF 100.6278634 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40

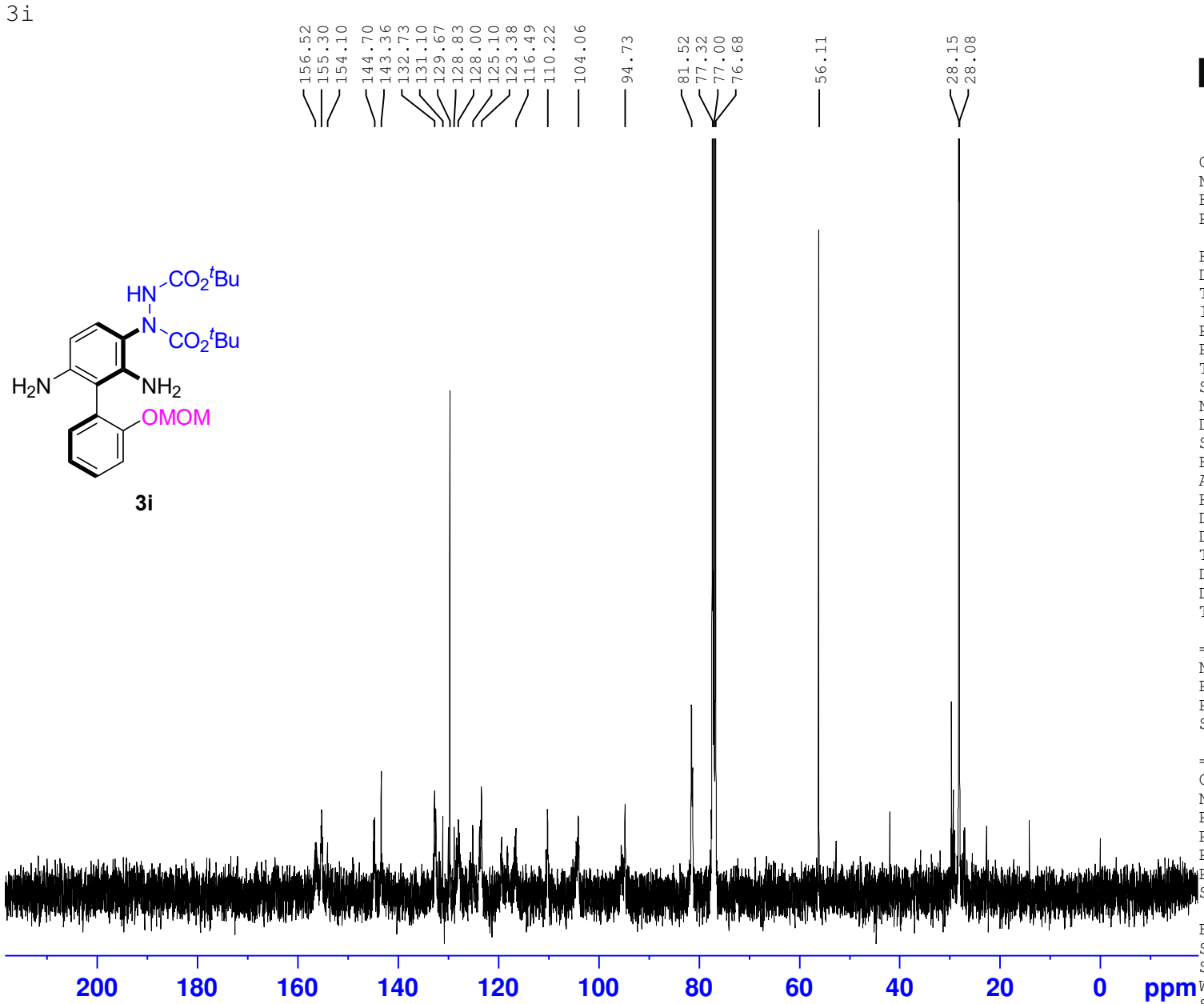
3i

3i




```
Current Data Parameters
NAME       20231214-400M
EXPNO                  9
PROCNO                 1

F2 - Acquisition Parameters
Date_           20231213
Time               22.42
INSTRUM            spect
PROBHD   5 mm PADUL 13C
PULPROG             zg30
TD                 65536
SOLVENT            CDCl3
NS                     8
DS                     2
SWH             8223.685 Hz
FIDRES          0.125483 Hz
AQ             3.9845889 sec
RG                 68.24
DW                60.800 usec
DE                 6.50 usec
TE                291.8 K
D1           1.00000000 sec
TD0                    1

======== CHANNEL f1 ========
NUC1                  1H
P1                 9.90 usec
PLW1        23.00000000 W
SFO1        400.1924713 MHz

F2 - Processing parameters
SI                 65536
SF          400.1900117 MHz
WDW                   EM
SSB                    0
LB                0.30 Hz
GB                     0
PC                 1.00
```

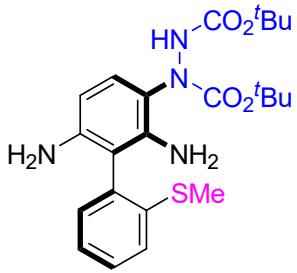
3i



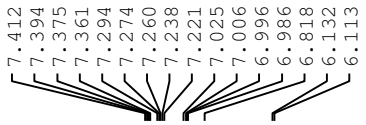
3i

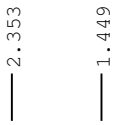
```
Current Data Parameters
NAME       20231214-400M
EXPNO                 10
PROCNO                 1

F2 - Acquisition Parameters
Date_           20231213
Time               23.42
INSTRUM            spect
PROBHD   5 mm PADUL 13C
PULPROG          zgpg30
TD                65536
SOLVENT           CDCl3
NS                 1024
DS                    4
SWH           24038.461 Hz
FIDRES         0.366798 Hz
AQ            1.3631488 sec
RG                61.19
DW               20.800 usec
DE                6.50 usec
TE                292.3 K
D1           2.00000000 sec
D11          0.03000000 sec
TD0                   1

======== CHANNEL f1 ========
NUC1                 13C
P1                 9.80 usec
PLW1        47.40000153 W
SFO1       100.6379178 MHz

======== CHANNEL f2 ========
CPDPRG[2         waltz16
NUC2                 1H
PCPD2             90.00 usec
PLW2        23.00000000 W
PLW12        0.30712000 W
PLW13        0.24877000 W
SFO2       400.1916008 MHz

F2 - Processing parameters
SI                32768
SF         100.6278636 MHz
WDW                  EM
SSB                   0
LB                 1.00 Hz
GB                    0
PC                 1.40
```

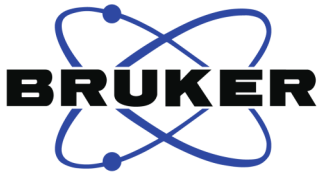
3j



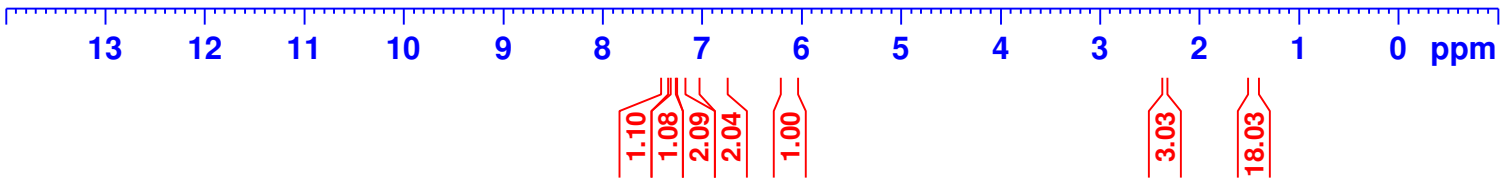
3j



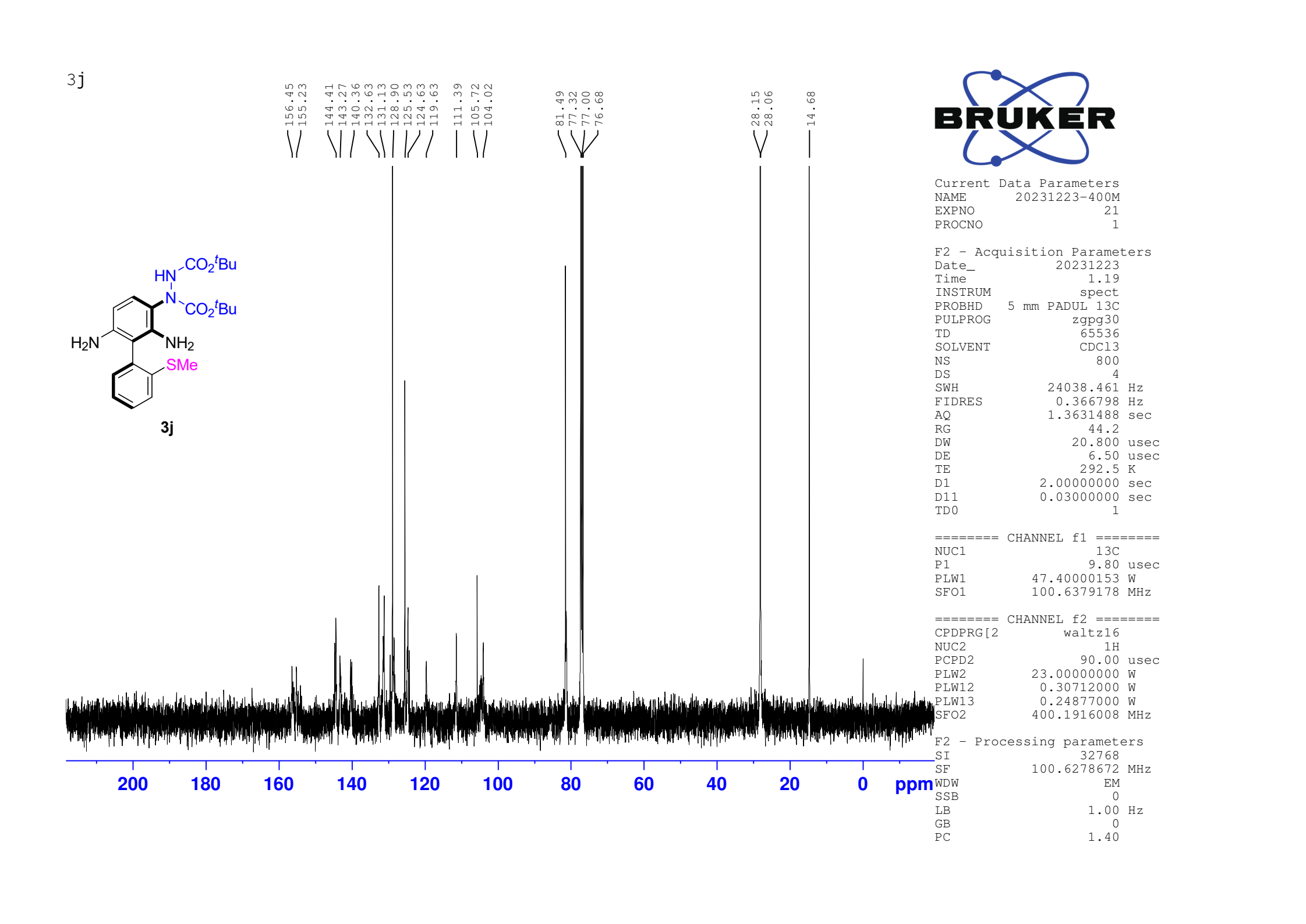





```
Current Data Parameters
NAME       20231223-400M
EXPNO                 20
PROCNO                 1

F2 - Acquisition Parameters
Date_           20231223
Time                0.32
INSTRUM            spect
PROBHD   5 mm PADUL 13C
PULPROG             zg30
TD                 65536
SOLVENT            CDCl3
NS                     8
DS                     2
SWH             8223.685 Hz
FIDRES          0.125483 Hz
AQ             3.9845889 sec
RG                  53.3
DW                60.800 usec
DE                 6.50 usec
TE                292.1 K
D1           1.00000000 sec
TD0                    1

======== CHANNEL f1 ========
NUC1                  1H
P1                 9.90 usec
PLW1        23.00000000 W
SFO1        400.1924713 MHz

F2 - Processing parameters
SI                 65536
SF          400.1900137 MHz
WDW                   EM
SSB                    0
LB                  0.30 Hz
GB                     0
PC                  1.00
```



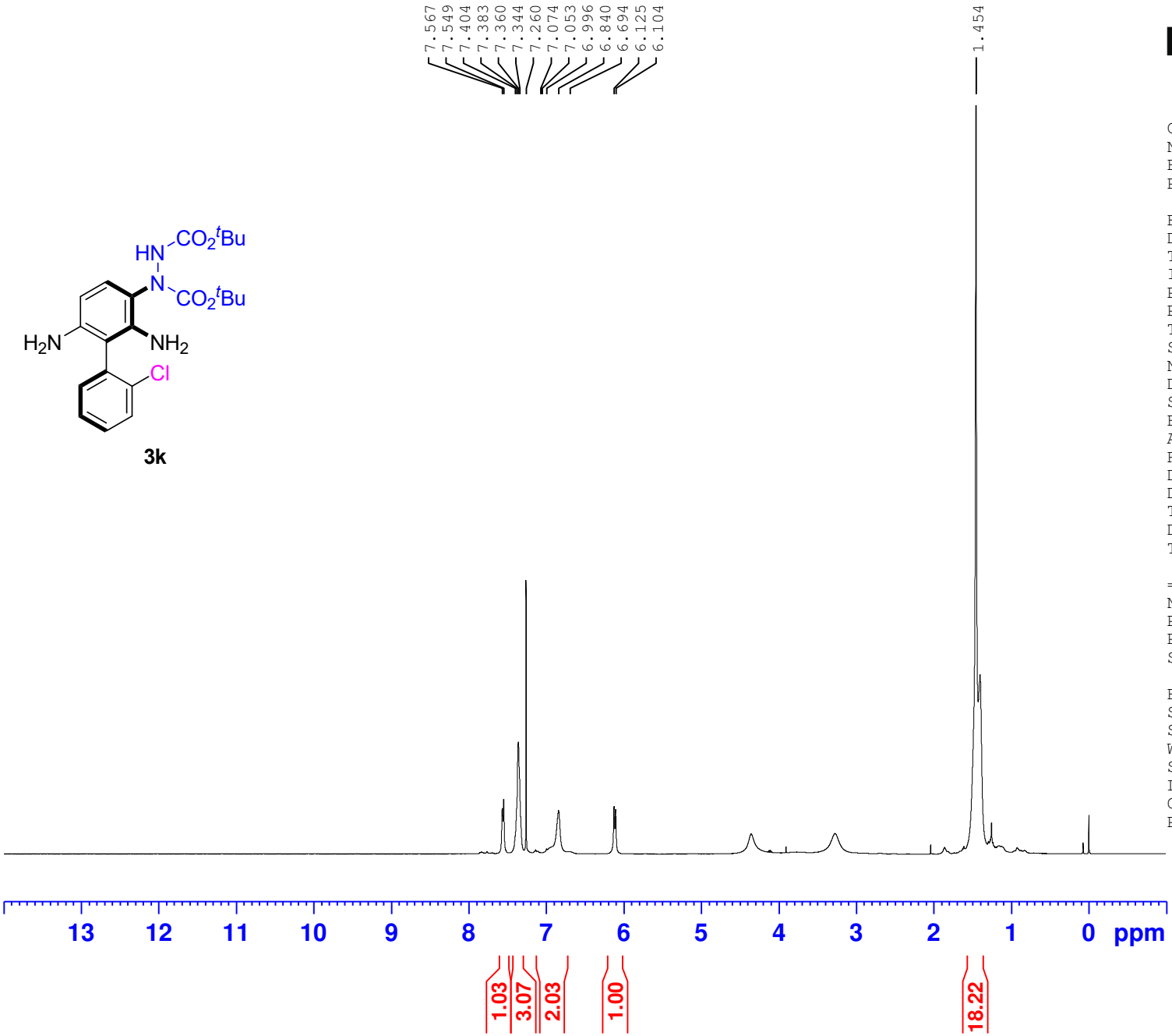
3j




```
Current Data Parameters
NAME       20231223-400M
EXPNO                 21
PROCNO                 1

F2 - Acquisition Parameters
Date_           20231223
Time                1.19
INSTRUM            spect
PROBHD   5 mm PADUL 13C
PULPROG          zgpg30
TD                65536
SOLVENT           CDCl3
NS                  800
DS                    4
SWH           24038.461 Hz
FIDRES         0.366798 Hz
AQ            1.3631488 sec
RG                 44.2
DW               20.800 usec
DE                6.50 usec
TE                292.5 K
D1           2.00000000 sec
D11          0.03000000 sec
TD0                   1

======== CHANNEL f1 ========
NUC1                 13C
P1                 9.80 usec
PLW1        47.40000153 W
SFO1       100.6379178 MHz

======== CHANNEL f2 ========
CPDPRG[2         waltz16
NUC2                 1H
PCPD2             90.00 usec
PLW2        23.00000000 W
PLW12        0.30712000 W
PLW13        0.24877000 W
SFO2       400.1916008 MHz

F2 - Processing parameters
SI                 32768
SF         100.6278672 MHz
WDW                   EM
SSB                    0
LB                  1.00 Hz
GB                     0
PC                  1.40
```

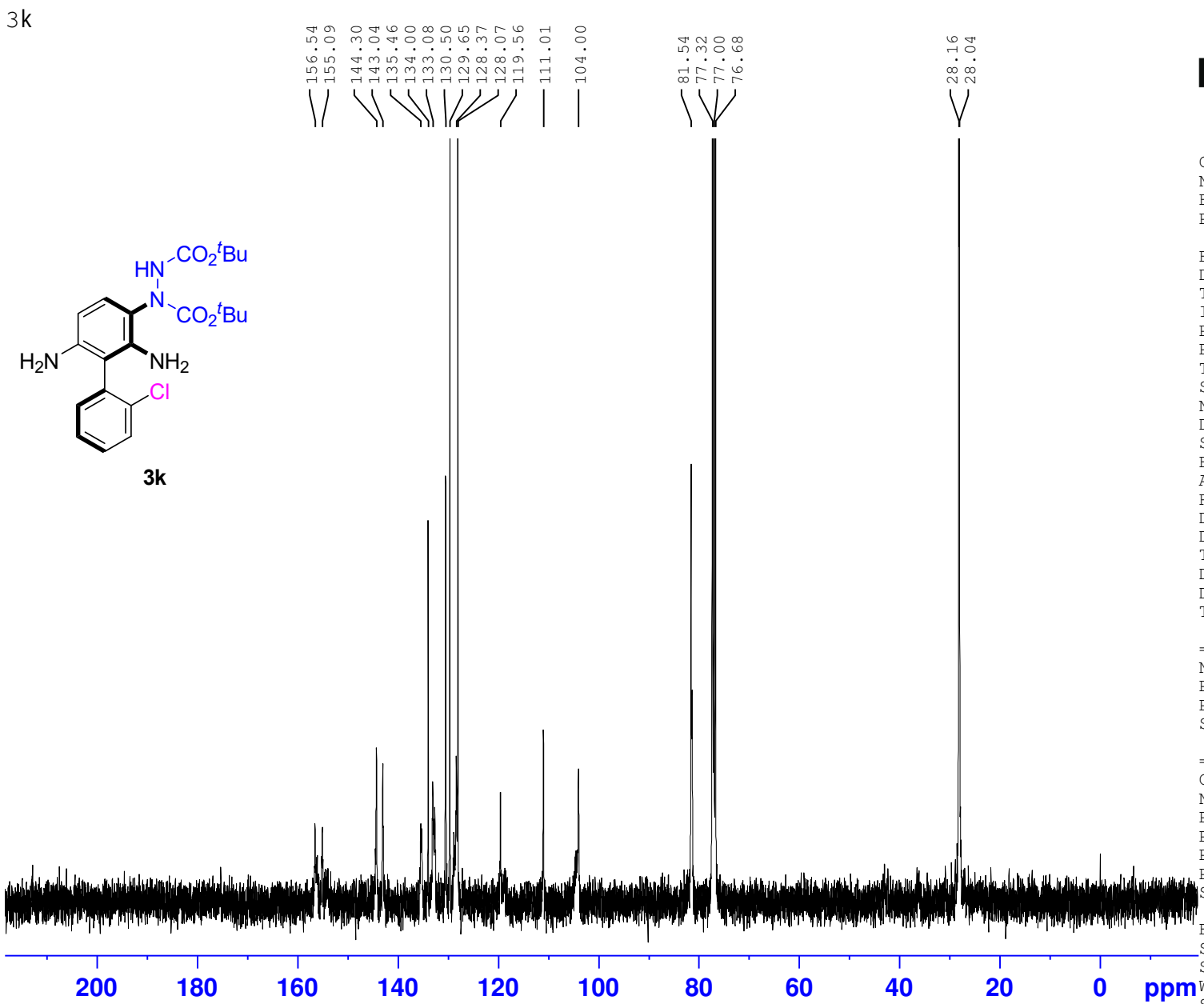
3k

3k

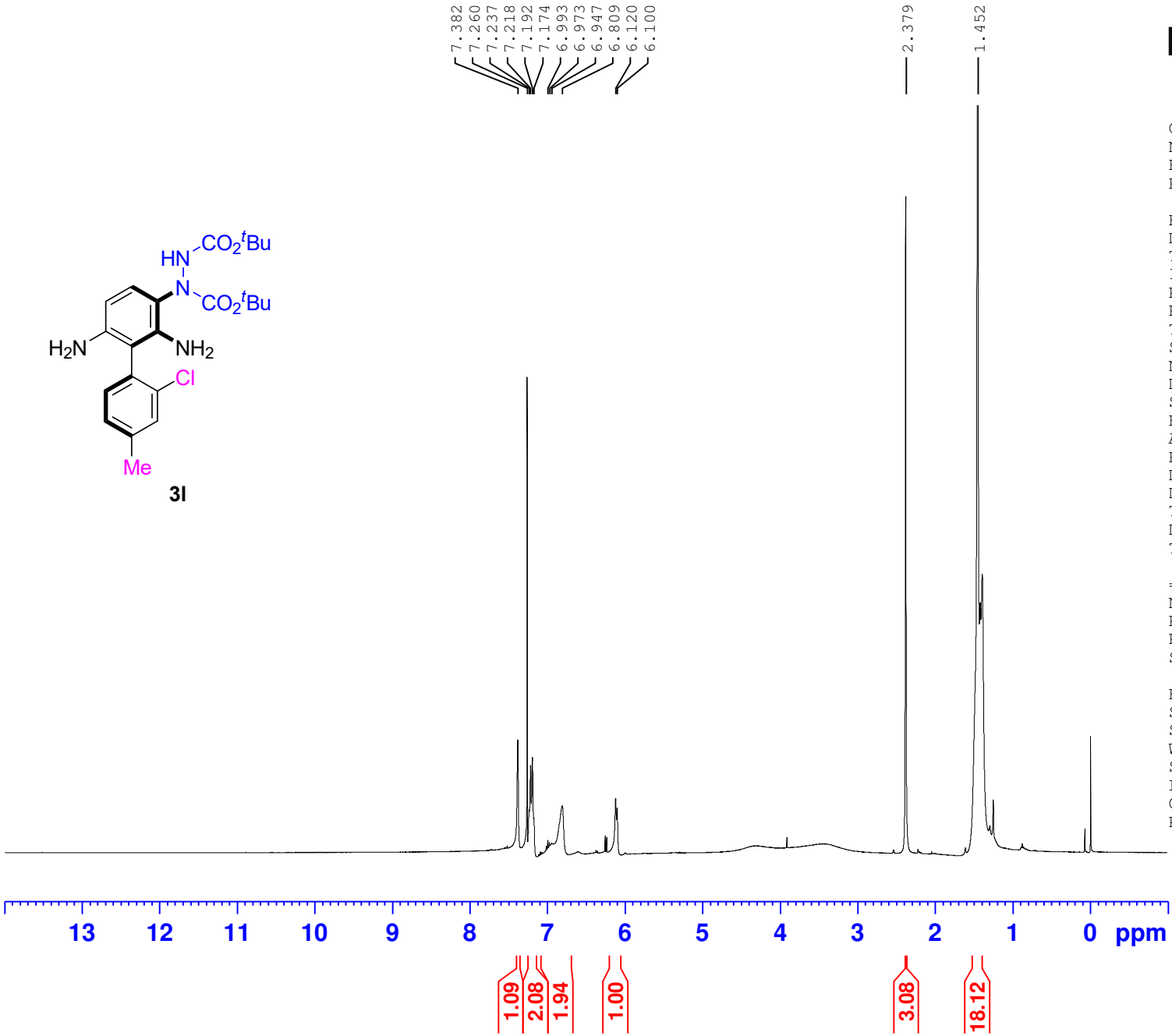



```
Current Data Parameters
NAME        20231221-400
EXPNO                 12
PROCNO                 1

F2 - Acquisition Parameters
Date_           20231221
Time                0.02
INSTRUM            spect
PROBHD   5 mm PADUL 13C
PULPROG             zg30
TD                 65536
SOLVENT            CDCl3
NS                     8
DS                     2
SWH             8223.685 Hz
FIDRES          0.125483 Hz
AQ             3.9845889 sec
RG                 29.75
DW                60.800 usec
DE                 6.50 usec
TE                293.1 K
D1           1.00000000 sec
TD0                    1

======== CHANNEL f1 ========
NUC1                  1H
P1                 9.90 usec
PLW1        23.00000000 W
SFO1        400.1924713 MHz

F2 - Processing parameters
SI                 65536
SF          400.1900137 MHz
WDW                   EM
SSB                    0
LB                 0.30 Hz
GB                     0
PC                  1.00
```

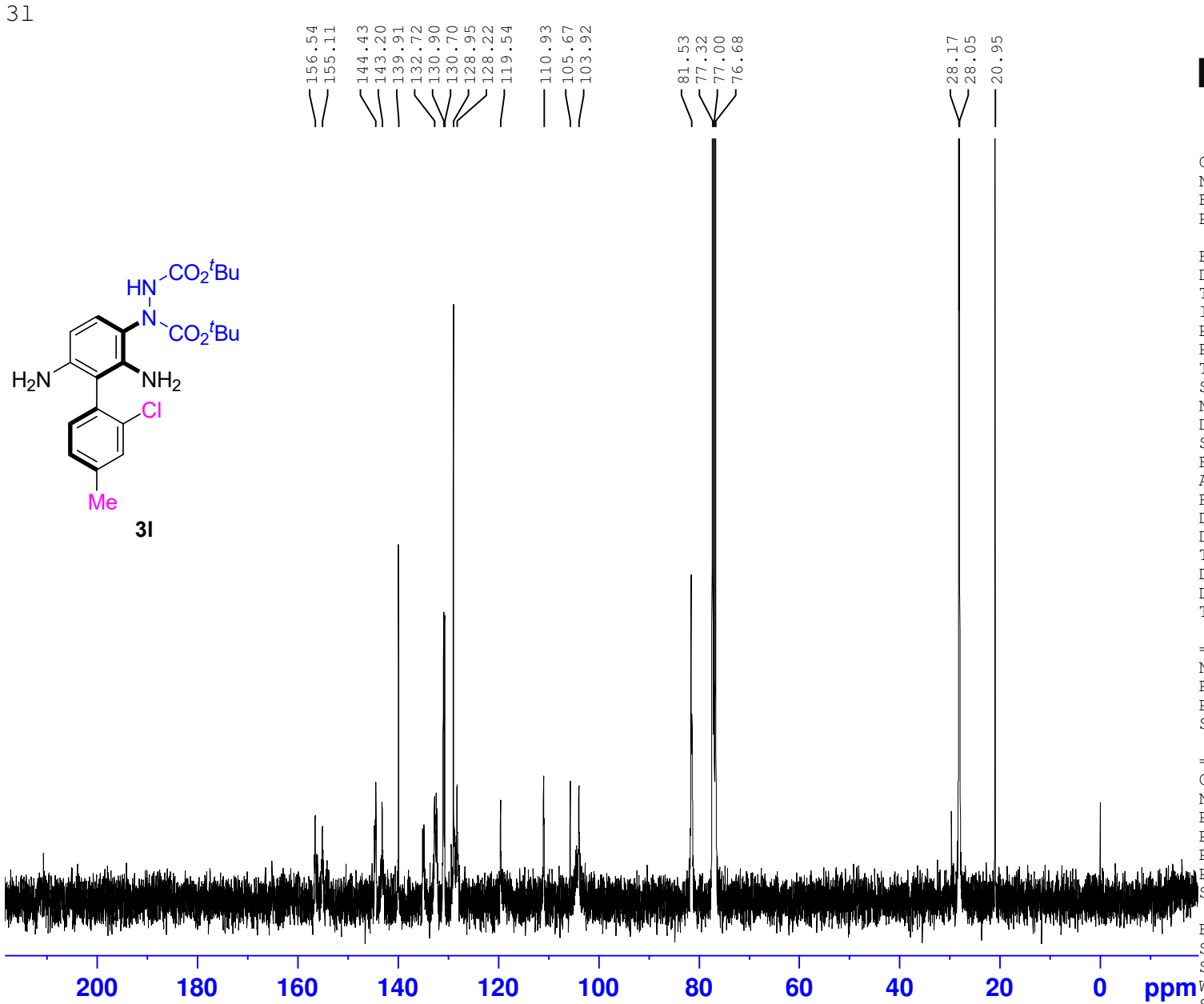
3k




```
Current Data Parameters
NAME        20231221-400
EXPNO                 13
PROCNO                 1

F2 - Acquisition Parameters
Date_           20231221
Time                1.00
INSTRUM            spect
PROBHD   5 mm PADUL 13C
PULPROG           zgpg30
TD                 65536
SOLVENT            CDCl3
NS                  1000
DS                     4
SWH           24038.461 Hz
FIDRES         0.366798 Hz
AQ            1.3631488 sec
RG                 35.06
DW               20.800 usec
DE                6.50 usec
TE                293.8 K
D1           2.00000000 sec
D11          0.03000000 sec
TD0                    1

======== CHANNEL f1 ========
NUC1                 13C
P1                  9.80 usec
PLW1        47.40000153 W
SFO1       100.6379178 MHz

======== CHANNEL f2 ========
CPDPRG[2         waltz16
NUC2                 1H
PCPD2              90.00 usec
PLW2        23.00000000 W
PLW12        0.30712000 W
PLW13        0.24877000 W
SFO2       400.1916008 MHz

F2 - Processing parameters
SI                 32768
SF         100.6278663 MHz
WDW                   EM
SSB                    0
LB                  1.00 Hz
GB                     0
PC                  1.40
```




```
Current Data Parameters
NAME        20231222-400
EXPNO                 20
PROCNO                 1

F2 - Acquisition Parameters
Date_           20231222
Time                1.30
INSTRUM            spect
PROBHD   5 mm PADUL 13C
PULPROG             zg30
TD                 65536
SOLVENT            CDCl3
NS                     8
DS                     2
SWH             8223.685 Hz
FIDRES          0.125483 Hz
AQ             3.9845889 sec
RG                 68.24
DW                60.800 usec
DE                 6.50 usec
TE                290.4 K
D1           1.00000000 sec
TD0                    1

======== CHANNEL f1 ========
NUC1                  1H
P1                 9.90 usec
PLW1        23.00000000 W
SFO1        400.1924713 MHz

F2 - Processing parameters
SI                 65536
SF          400.1900137 MHz
WDW                   EM
SSB                    0
LB                0.30 Hz
GB                     0
PC                 1.00
```

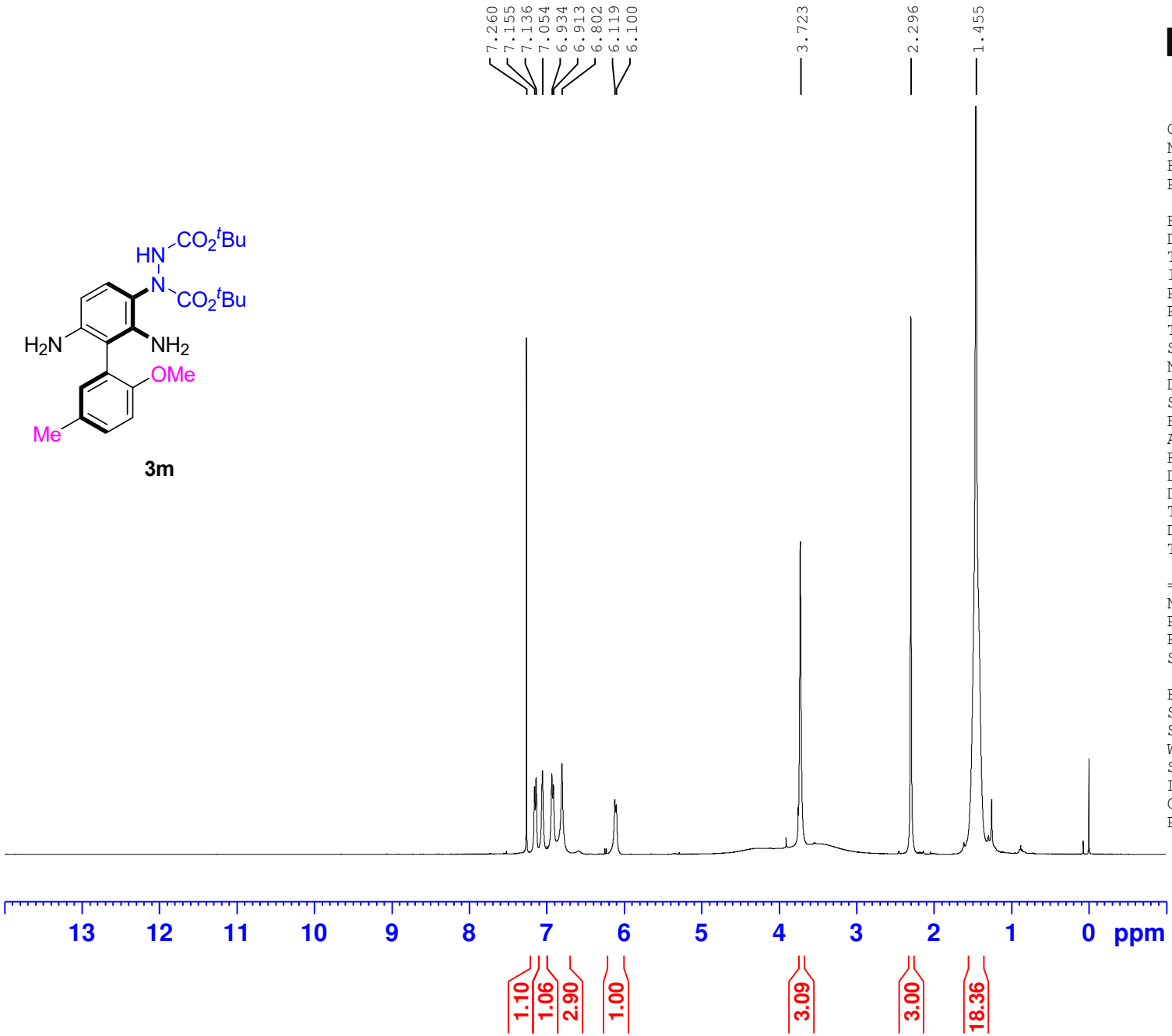


3l

```
Current Data Parameters
NAME        20231222-400
EXPNO                 19
PROCNO                 1

F2 - Acquisition Parameters
Date_           20231222
Time                1.28
INSTRUM            spect
PROBHD   5 mm PADUL 13C
PULPROG          zgpg30
TD                65536
SOLVENT           CDCl3
NS                 1300
DS                    4
SWH           24038.461 Hz
FIDRES         0.366798 Hz
AQ            1.3631488 sec
RG                35.06
DW               20.800 usec
DE                6.50 usec
TE                290.9 K
D1           2.00000000 sec
D11          0.03000000 sec
TD0                   1

======== CHANNEL f1 ========
NUC1                 13C
P1                 9.80 usec
PLW1        47.40000153 W
SFO1       100.6379178 MHz

======== CHANNEL f2 ========
CPDPRG[2         waltz16
NUC2                 1H
PCPD2             90.00 usec
PLW2        23.00000000 W
PLW12        0.30712000 W
PLW13        0.24877000 W
SFO2       400.1916008 MHz

F2 - Processing parameters
SI                 32768
SF          100.6278647 MHz
WDW                   EM
SSB                    0
LB                  1.00 Hz
GB                     0
PC                  1.40
```

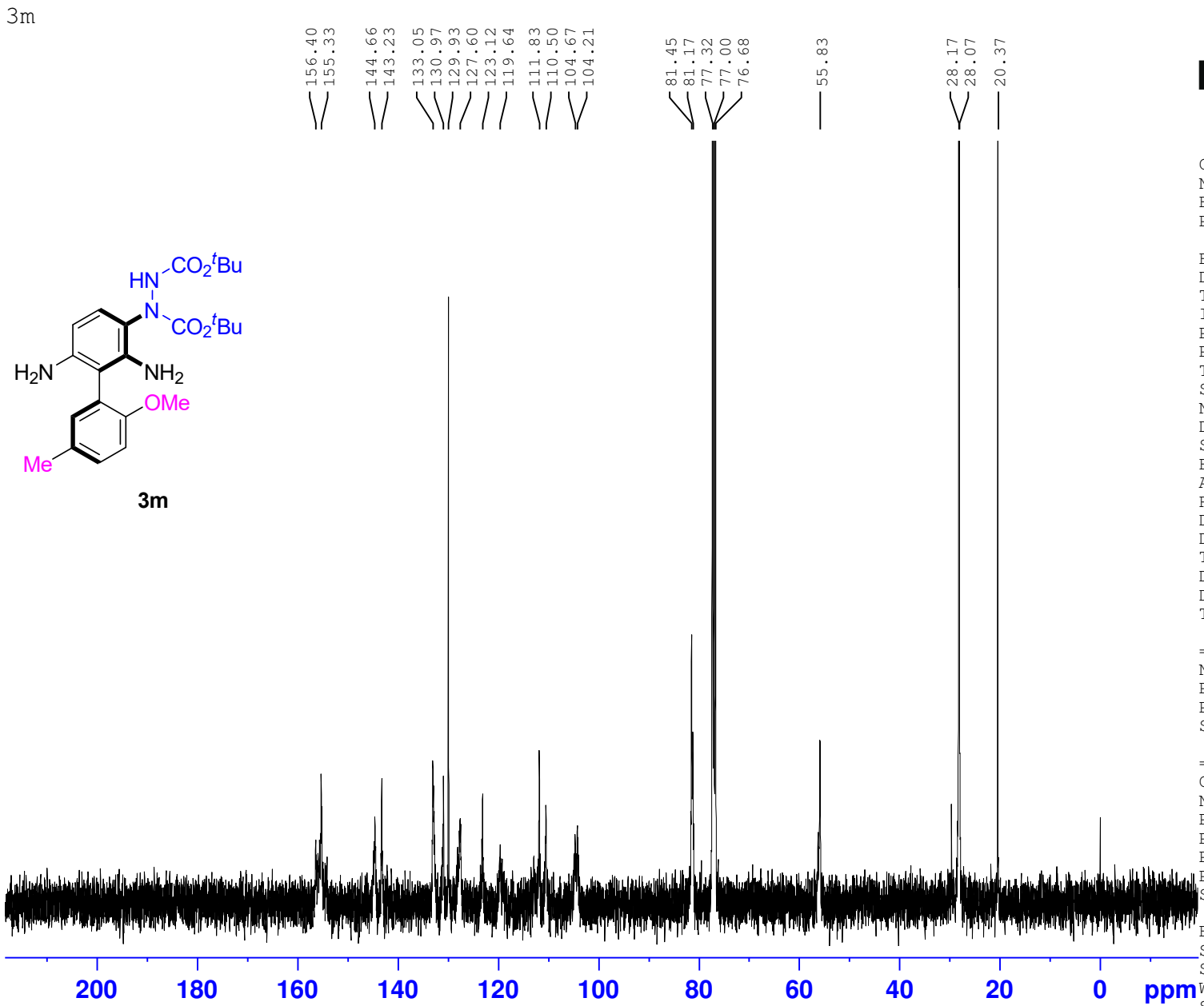
3m

3m




```
Current Data Parameters
NAME        20231229-400
EXPNO                 29
PROCNO                 1

F2 - Acquisition Parameters
Date_           20231229
Time                2.20
INSTRUM            spect
PROBHD   5 mm PADUL 13C
PULPROG             zg30
TD                 65536
SOLVENT            CDCl3
NS                     8
DS                     2
SWH             8223.685 Hz
FIDRES          0.125483 Hz
AQ             3.9845889 sec
RG                  53.3
DW                60.800 usec
DE                 6.50 usec
TE                291.9 K
D1           1.00000000 sec
TD0                    1

======== CHANNEL f1 ========
NUC1                  1H
P1                 9.90 usec
PLW1        23.00000000 W
SFO1        400.1924713 MHz

F2 - Processing parameters
SI                 65536
SF          400.1900138 MHz
WDW                   EM
SSB                    0
LB                  0.30 Hz
GB                     0
PC                  1.00
```

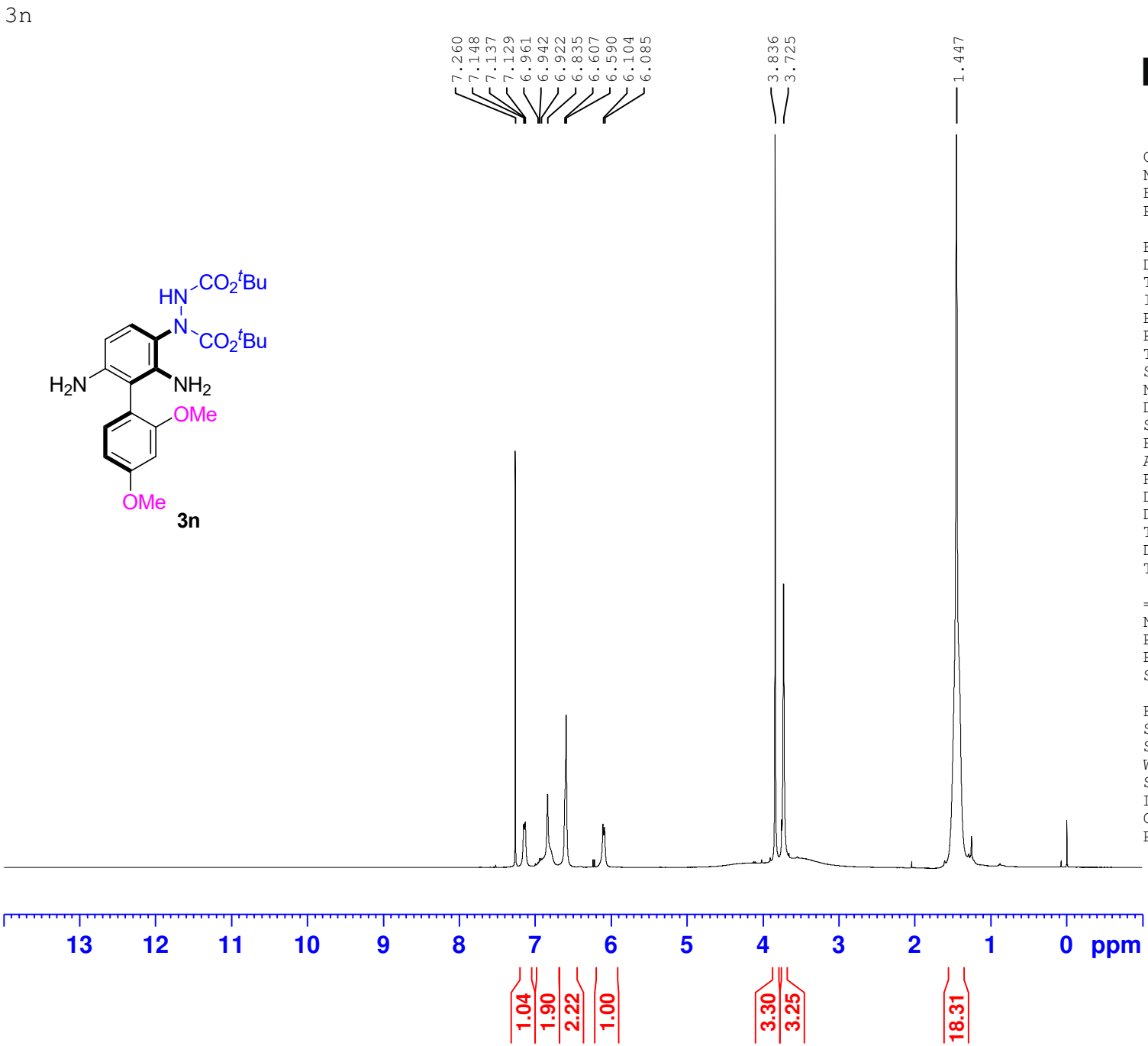
3m



BRUKER

```
Current Data Parameters
NAME        20231229-400
EXPNO                 28
PROCNO                 1

F2 - Acquisition Parameters
Date_           20231229
Time                2.18
INSTRUM            spect
PROBHD   5 mm PADUL 13C
PULPROG           zgpg30
TD                 65536
SOLVENT            CDCl3
NS                  1024
DS                     4
SWH           24038.461 Hz
FIDRES         0.366798 Hz
AQ            1.3631488 sec
RG                37.77
DW               20.800 usec
DE                6.50 usec
TE                292.3 K
D1           2.00000000 sec
D11          0.03000000 sec
TD0                    1

======== CHANNEL f1 ========
NUC1                  13C
P1                   9.80 usec
PLW1        47.40000153 W
SFO1       100.6379178 MHz

======== CHANNEL f2 ========
CPDPRG[2         waltz16
NUC2                  1H
PCPD2              90.00 usec
PLW2        23.00000000 W
PLW12        0.30712000 W
PLW13        0.24877000 W
SFO2       400.1916008 MHz

F2 - Processing parameters
SI                 32768
SF          100.6278656 MHz
WDW                   EM
SSB                    0
LB                  1.00 Hz
GB                     0
PC                  1.40
```

3n



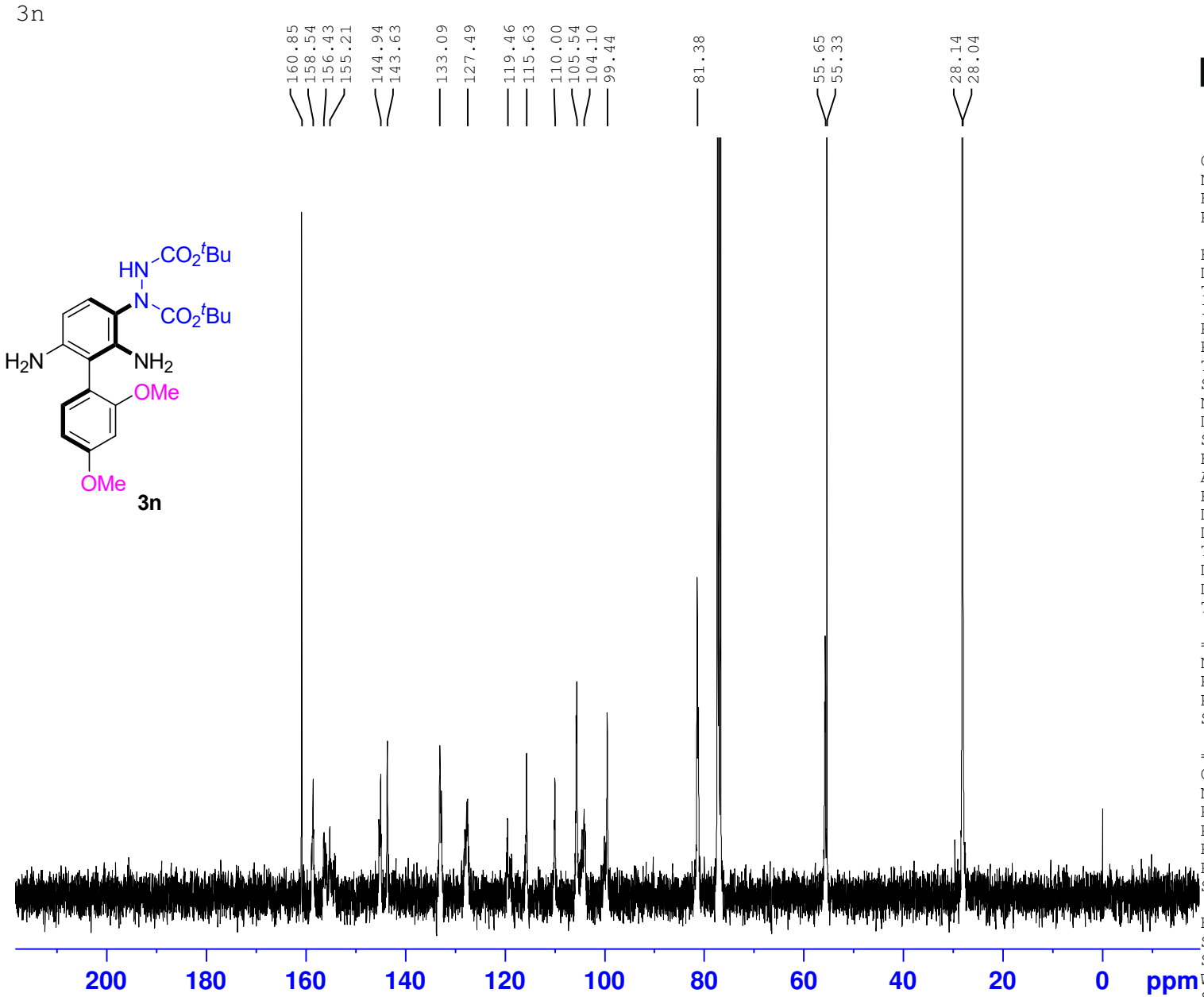
Current Data Parameters
NAME 20231229-400
EXPNO 31
PROCNO 1

F2 - Acquisition Parameters
Date_ 20231229
Time 3.23
INSTRUM spect
PROBHD 5 mm PADUL 13C
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 8
DS 2
SWH 8223.685 Hz
FIDRES 0.125483 Hz
AQ 3.9845889 sec
RG 29.75
DW 60.800 usec
DE 6.50 usec
TE 291.8 K
D1 1.00000000 sec
TD0 1

======== CHANNEL f1 ========
NUC1 1H
P1 9.90 usec
PLW1 23.00000000 W
SFO1 400.1924713 MHz

F2 - Processing parameters
SI 65536
SF 400.1900137 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

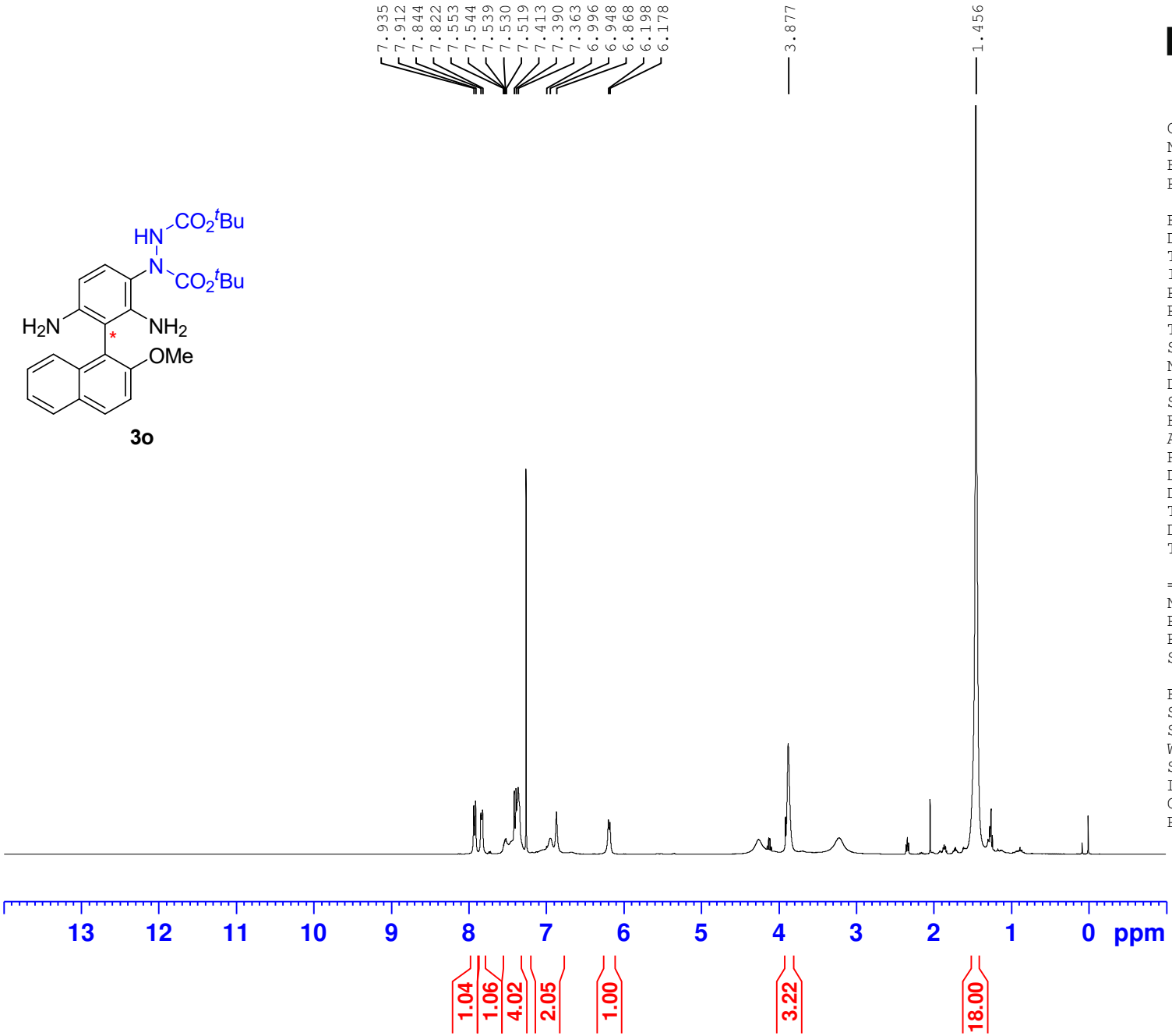
3n




```
Current Data Parameters
NAME        20231229-400
EXPNO                30
PROCNO                1

F2 - Acquisition Parameters
Date_          20231229
Time               3.22
INSTRUM           spect
PROBHD   5 mm PADUL 13C
PULPROG          zgpg30
TD                65536
SOLVENT           CDCl3
NS                 1024
DS                    4
SWH           24038.461 Hz
FIDRES         0.366798 Hz
AQ            1.3631488 sec
RG                35.06
DW               20.800 usec
DE                6.50 usec
TE                292.2 K
D1           2.00000000 sec
D11          0.03000000 sec
TD0                   1

======== CHANNEL f1 ========
NUC1                 13C
P1                 9.80 usec
PLW1        47.40000153 W
SFO1       100.6379178 MHz

======== CHANNEL f2 ========
CPDPRG[2         waltz16
NUC2                 1H
PCPD2             90.00 usec
PLW2        23.00000000 W
PLW12        0.30712000 W
PLW13        0.24877000 W
SFO2       400.1916008 MHz

F2 - Processing parameters
SI                32768
SF         100.6278678 MHz
WDW                  EM
SSB                   0
LB                 1.00 Hz
GB                    0
PC                 1.40
```

3o

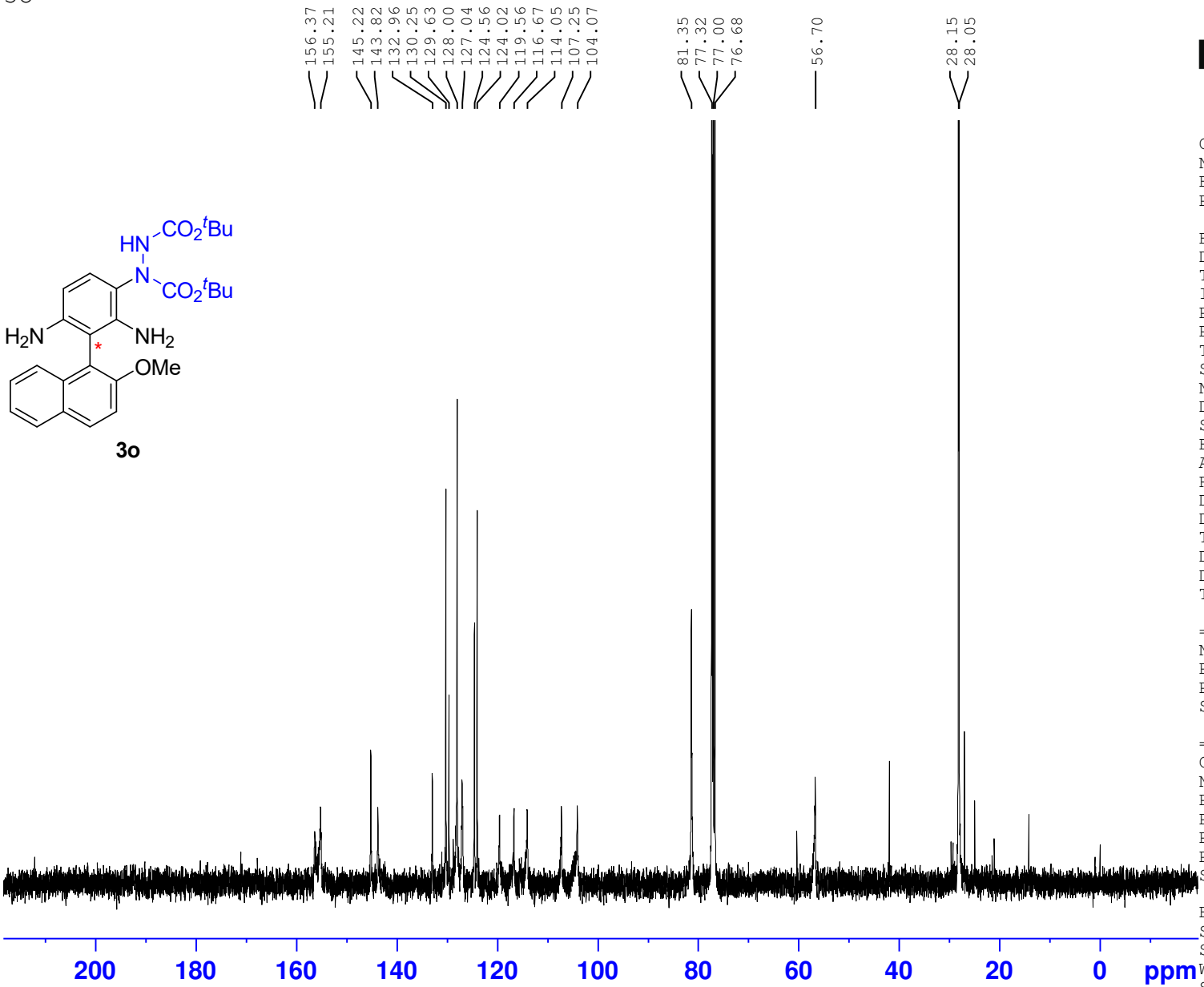
3o




```
Current Data Parameters
NAME       20231207-400M
EXPNO                 29
PROCNO                 1

F2 - Acquisition Parameters
Date_           20231207
Time                0.16
INSTRUM            spect
PROBHD   5 mm PADUL 13C
PULPROG             zg30
TD                 65536
SOLVENT            CDCl3
NS                     6
DS                     0
SWH             8223.685 Hz
FIDRES          0.125483 Hz
AQ             3.9845889 sec
RG                 29.75
DW                60.800 usec
DE                 6.50 usec
TE                293.1 K
D1           1.00000000 sec
TD0                    1

======== CHANNEL f1 ========
NUC1                  1H
P1                 9.90 usec
PLW1        23.00000000 W
SFO1        400.1924713 MHz

F2 - Processing parameters
SI                 65536
SF          400.1900138 MHz
WDW                   EM
SSB                    0
LB                0.30 Hz
GB                     0
PC                 1.00
```

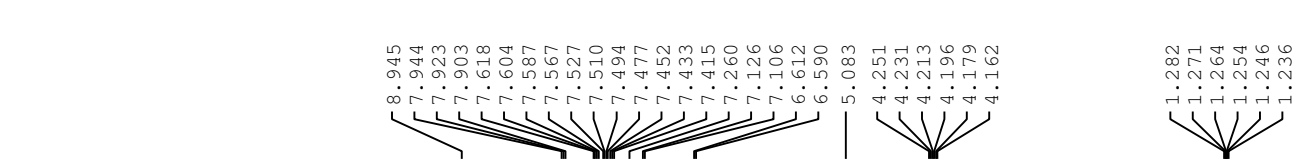
3o

3o

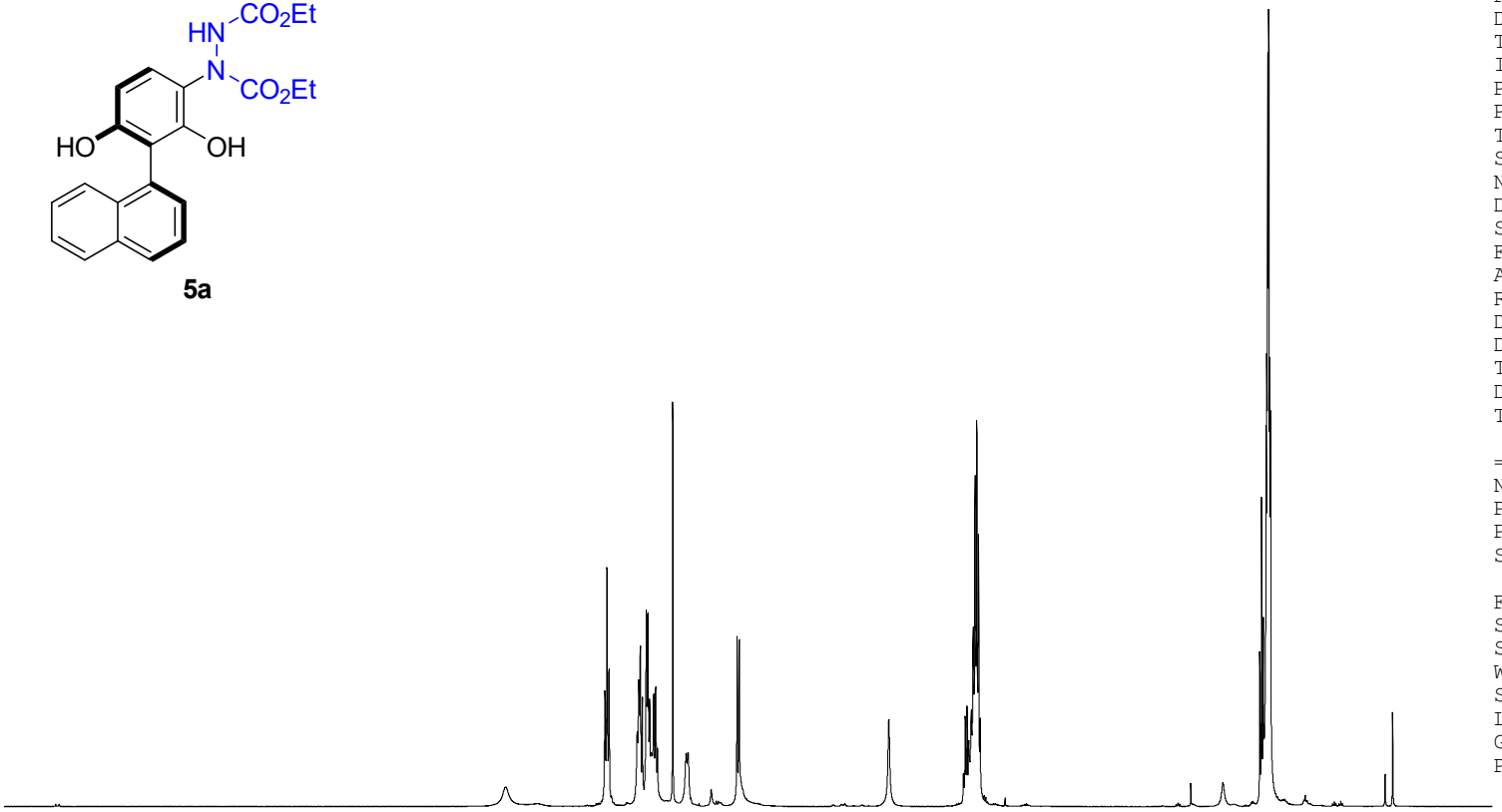



```
Current Data Parameters
NAME       20231207-400M
EXPNO                 30
PROCNO                 1

F2 - Acquisition Parameters
Date_           20231207
Time                1.16
INSTRUM            spect
PROBHD   5 mm PADUL 13C
PULPROG          zgpg30
TD                65536
SOLVENT           CDCl3
NS                 1024
DS                    4
SWH           24038.461 Hz
FIDRES         0.366798 Hz
AQ            1.3631488 sec
RG                37.77
DW               20.800 usec
DE                6.50 usec
TE                293.9 K
D1           2.00000000 sec
D11          0.03000000 sec
TD0                   1

======== CHANNEL f1 ========
NUC1                 13C
P1                 9.80 usec
PLW1        47.40000153 W
SFO1       100.6379178 MHz

======== CHANNEL f2 ========
CPDPRG[2         waltz16
NUC2                 1H
PCPD2             90.00 usec
PLW2        23.00000000 W
PLW12        0.30712000 W
PLW13        0.24877000 W
SFO2       400.1916008 MHz

F2 - Processing parameters
SI                 32768
SF         100.6278668 MHz
WDW                   EM
SSB                    0
LB                  1.00 Hz
GB                     0
PC                  1.40
```

5a



5a



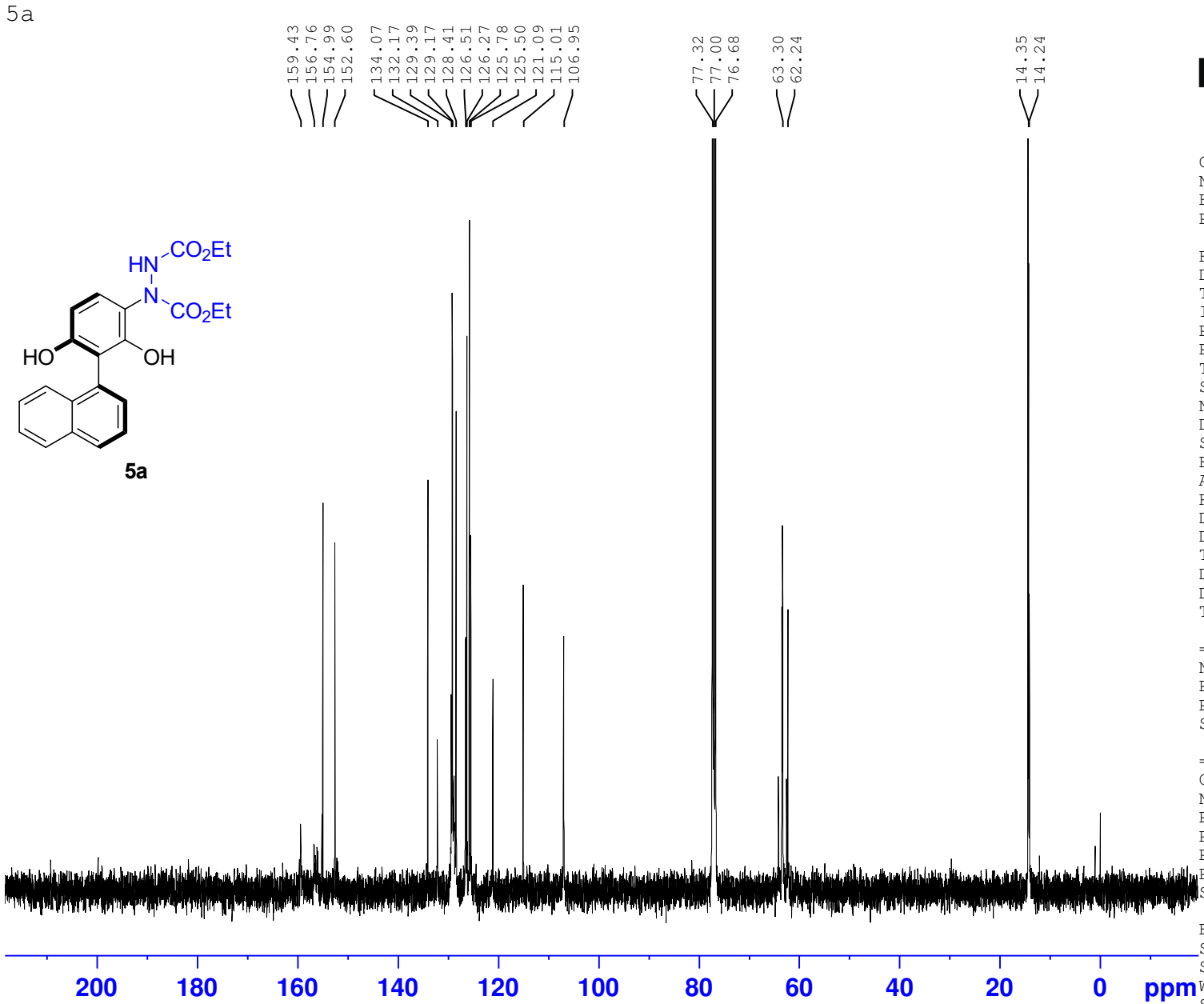
Current Data Parameters
NAME 20240103-400
EXPNO 23
PROCNO 1

F2 - Acquisition Parameters
Date_ 20240103
Time 1.17
INSTRUM spect
PROBHD 5 mm PADUL 13C
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 8
DS 2
SWH 8223.685 Hz
FIDRES 0.125483 Hz
AQ 3.9845889 sec
RG 68.24
DW 60.800 usec
DE 6.50 usec
TE 292.6 K
D1 1.00000000 sec
TD0 1

======== CHANNEL f1 ========
NUC1 1H
P1 9.90 usec
PLW1 23.00000000 W
SFO1 400.1924713 MHz

F2 - Processing parameters
SI 65536
SF 400.1900138 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

5a



Current Data Parameters
NAME 20240103-400
EXPNO 24
PROCNO 1

F2 - Acquisition Parameters
Date_ 20240103
Time 2.17
INSTRUM spect
PROBHD 5 mm PADUL 13C
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 1024
DS 4
SWH 24038.461 Hz
FIDRES 0.366798 Hz
AQ 1.3631488 sec
RG 44.2
DW 20.800 usec
DE 6.50 usec
TE 293.3 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1

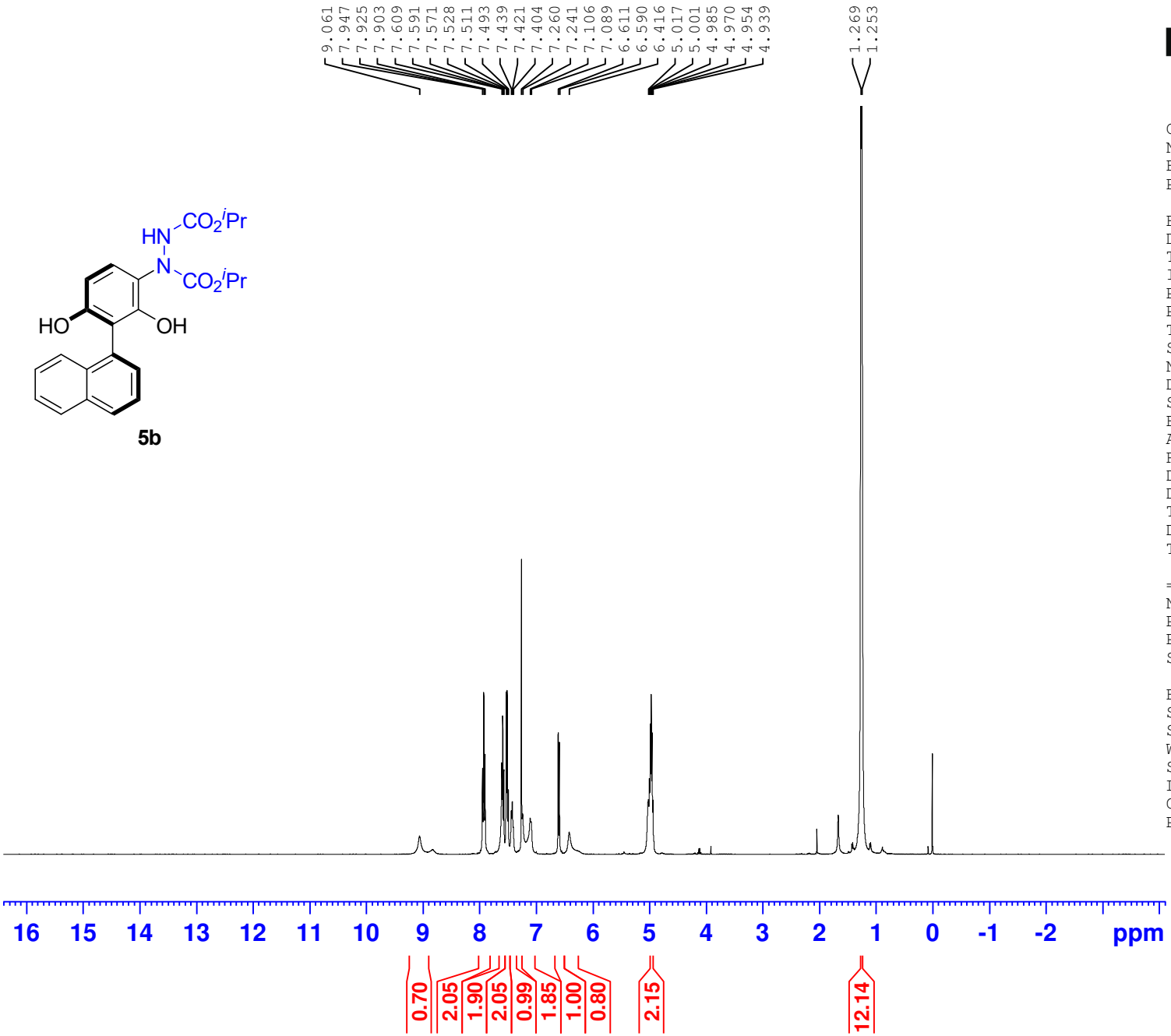
======== CHANNEL f1 ========
NUC1 13C
P1 9.80 usec
PLW1 47.40000153 W
SFO1 100.6379178 MHz

======== CHANNEL f2 ========
CPDPRG[2 waltz16
NUC2 1H
PCPD2 90.00 usec
PLW2 23.00000000 W
PLW12 0.30712000 W
PLW13 0.24877000 W
SFO2 400.1916008 MHz

F2 - Processing parameters
SI 32768
SF 100.6278649 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40

5b

5b

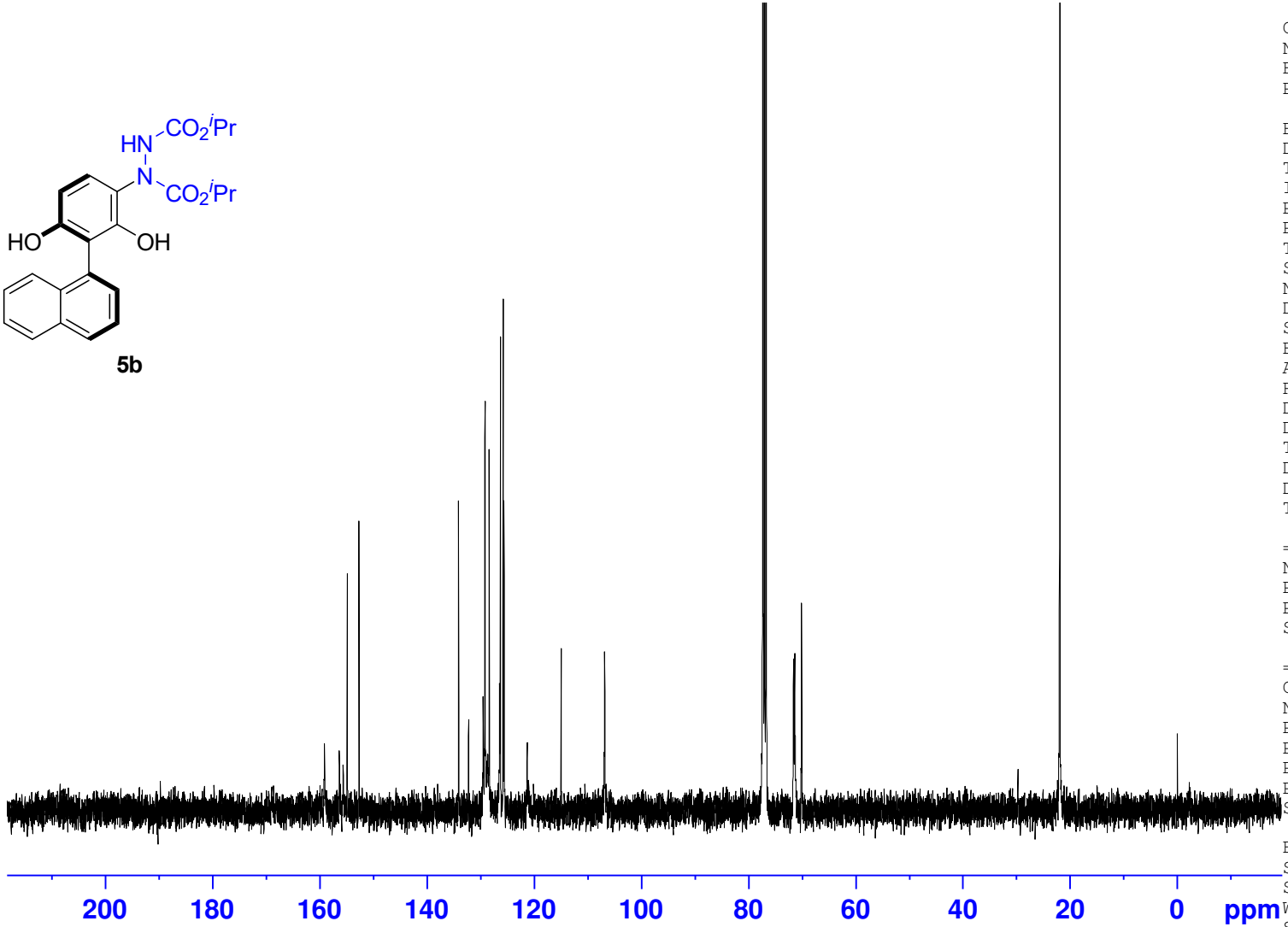



```
Current Data Parameters
NAME        20240103-400
EXPNO                 19
PROCNO                 1

F2 - Acquisition Parameters
Date_           20240102
Time               23.09
INSTRUM            spect
PROBHD   5 mm PADUL 13C
PULPROG             zg30
TD                 65536
SOLVENT            CDCl3
NS                     8
DS                     2
SWH             8223.685 Hz
FIDRES          0.125483 Hz
AQ              3.9845889 sec
RG                 90.23
DW                60.800 usec
DE                 6.50 usec
TE                292.3 K
D1             1.00000000 sec
TD0                    1

======== CHANNEL f1 ========
NUC1                  1H
P1                 9.90 usec
PLW1         23.00000000 W
SFO1         400.1924713 MHz

F2 - Processing parameters
SI                 65536
SF           400.1900139 MHz
WDW                   EM
SSB                    0
LB                0.30 Hz
GB                     0
PC                 1.00
```

5b

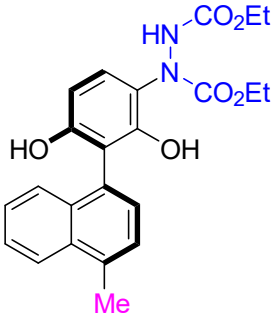
5b

159.16
156.37
154.87
152.71
134.09
132.23
129.53
129.18
128.39
126.42
126.27
125.79
125.61
121.28
114.93
106.83
77.32
77.00
76.68
71.56
70.08
21.91
21.81




```
Current Data Parameters
NAME        20240103-400
EXPNO                 20
PROCNO                 1

F2 - Acquisition Parameters
Date_           20240103
Time                0.09
INSTRUM            spect
PROBHD   5 mm PADUL 13C
PULPROG           zgpg30
TD                 65536
SOLVENT            CDCl3
NS                  1024
DS                     4
SWH           24038.461 Hz
FIDRES         0.366798 Hz
AQ            1.3631488 sec
RG                 61.19
DW                20.800 usec
DE                 6.50 usec
TE                293.1 K
D1           2.00000000 sec
D11          0.03000000 sec
TD0                    1

======== CHANNEL f1 ========
NUC1                  13C
P1                   9.80 usec
PLW1        47.40000153 W
SFO1        100.6379178 MHz

======== CHANNEL f2 ========
CPDPRG[2         waltz16
NUC2                  1H
PCPD2              90.00 usec
PLW2        23.00000000 W
PLW12        0.30712000 W
PLW13        0.24877000 W
SFO2        400.1916008 MHz

F2 - Processing parameters
SI                 32768
SF          100.6278634 MHz
WDW                   EM
SSB                    0
LB                  1.00 Hz
GB                     0
PC                  1.40
```

5d



5d

8.885 8.088 8.067 7.639 7.619 7.577 7.559 7.540 7.462 7.453 7.435 7.425 7.407 7.260 7.123 7.103 6.607 6.586 5.147 4.270 4.253 4.235 4.228 4.210 4.197 4.193 4.179 4.162 2.759 1.284 1.278 1.271 1.267 1.253 1.249 1.236

13 12 11 10 9 8 7 6 5 4 3 2 1 0 ppm

0.80 1.05 1.11 1.86 3.27 1.00 1.35 1.01 4.21 3.15 6.29

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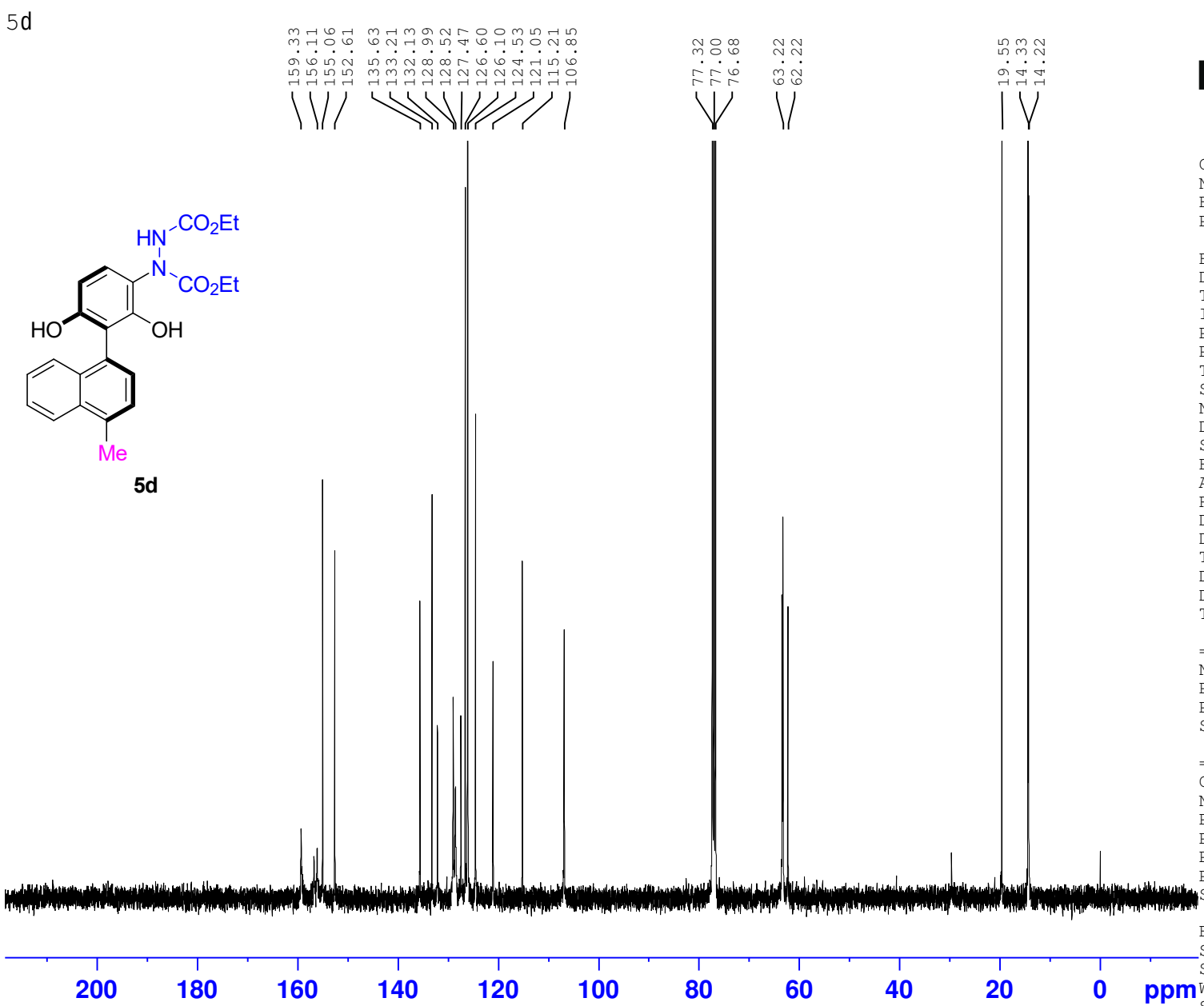
```
Current Data Parameters
NAME        20240306-400
EXPNO                 13
PROCNO                 1

F2 - Acquisition Parameters
Date_           20240305
Time               23.20
INSTRUM            spect
PROBHD   5 mm PADUL 13C
PULPROG             zg30
TD                 65536
SOLVENT            CDCl3
NS                     6
DS                     2
SWH             8223.685 Hz
FIDRES          0.125483 Hz
AQ             3.9845889 sec
RG                  53.3
DW                60.800 usec
DE                 6.50 usec
TE                294.4 K
D1           1.00000000 sec
TD0                    1

======== CHANNEL f1 ========
NUC1                  1H
P1                  9.90 usec
PLW1        23.00000000 W
SFO1        400.1924713 MHz

F2 - Processing parameters
SI                 65536
SF          400.1900138 MHz
WDW                   EM
SSB                    0
LB                  0.30 Hz
GB                     0
PC                  1.00
```

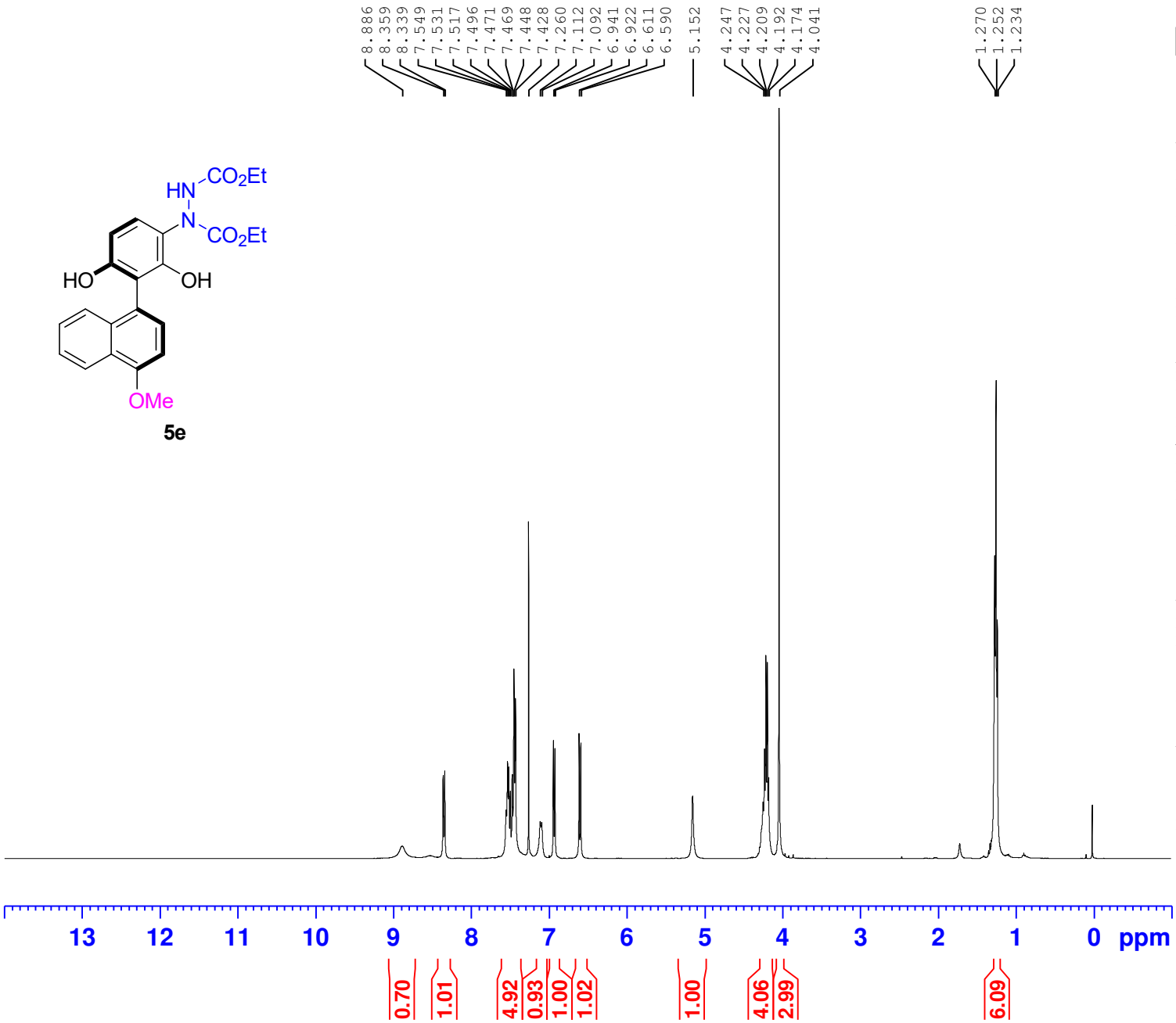
5d




```
Current Data Parameters
NAME        20240306-400
EXPNO                 14
PROCNO                 1

F2 - Acquisition Parameters
Date_           20240306
Time                0.20
INSTRUM            spect
PROBHD   5 mm PADUL 13C
PULPROG           zgpg30
TD                 65536
SOLVENT            CDCl3
NS                  1024
DS                     4
SWH           24038.461 Hz
FIDRES         0.366798 Hz
AQ            1.3631488 sec
RG                 61.19
DW                20.800 usec
DE                 6.50 usec
TE                294.6 K
D1           2.00000000 sec
D11          0.03000000 sec
TD0                    1

======== CHANNEL f1 ========
NUC1                13C
P1                 9.80 usec
PLW1        47.40000153 W
SFO1       100.6379178 MHz

======== CHANNEL f2 ========
CPDPRG[2         waltz16
NUC2                1H
PCPD2              90.00 usec
PLW2        23.00000000 W
PLW12        0.30712000 W
PLW13        0.24877000 W
SFO2       400.1916008 MHz

F2 - Processing parameters
SI                 32768
SF         100.6278670 MHz
WDW                   EM
SSB                    0
LB                  1.00 Hz
GB                     0
PC                  1.40
```

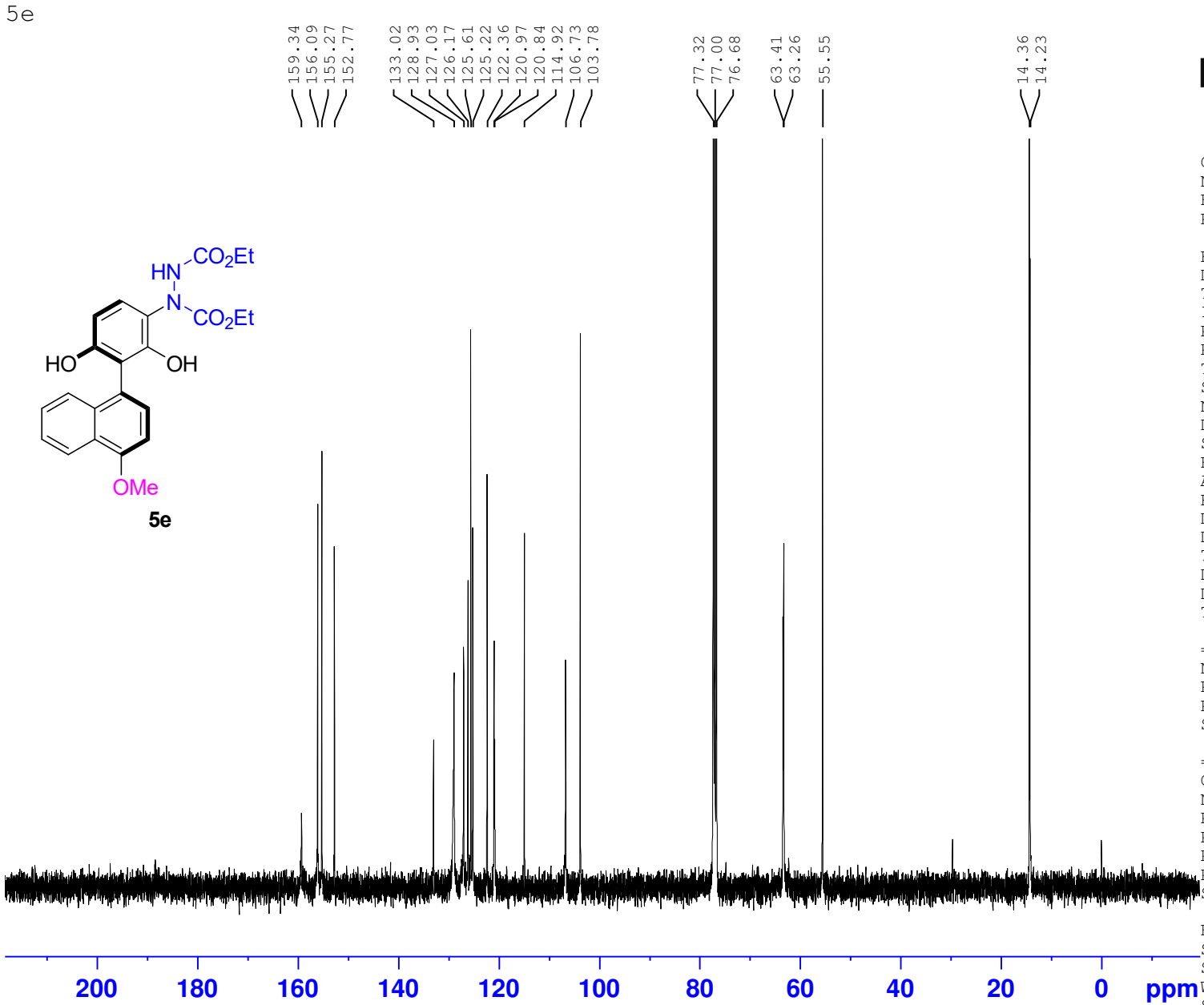
5e

5e




```
Current Data Parameters
NAME        20240203-400
EXPNO                265
PROCNO                 1

F2 - Acquisition Parameters
Date_           20240202
Time               22.24
INSTRUM            spect
PROBHD   5 mm PADUL 13C
PULPROG             zg30
TD                 65536
SOLVENT            CDCl3
NS                     8
DS                     2
SWH             8223.685 Hz
FIDRES          0.125483 Hz
AQ             3.9845889 sec
RG                  53.3
DW                60.800 usec
DE                 6.50 usec
TE                289.5 K
D1            1.00000000 sec
TD0                    1

======== CHANNEL f1 ========
NUC1                  1H
P1                 9.90 usec
PLW1         23.00000000 W
SFO1         400.1924713 MHz

F2 - Processing parameters
SI                 65536
SF           400.1900136 MHz
WDW                   EM
SSB                    0
LB                  0.30 Hz
GB                     0
PC                  1.00
```

5e



Current Data Parameters
NAME 20240203-400
EXPNO 21
PROCNO 1

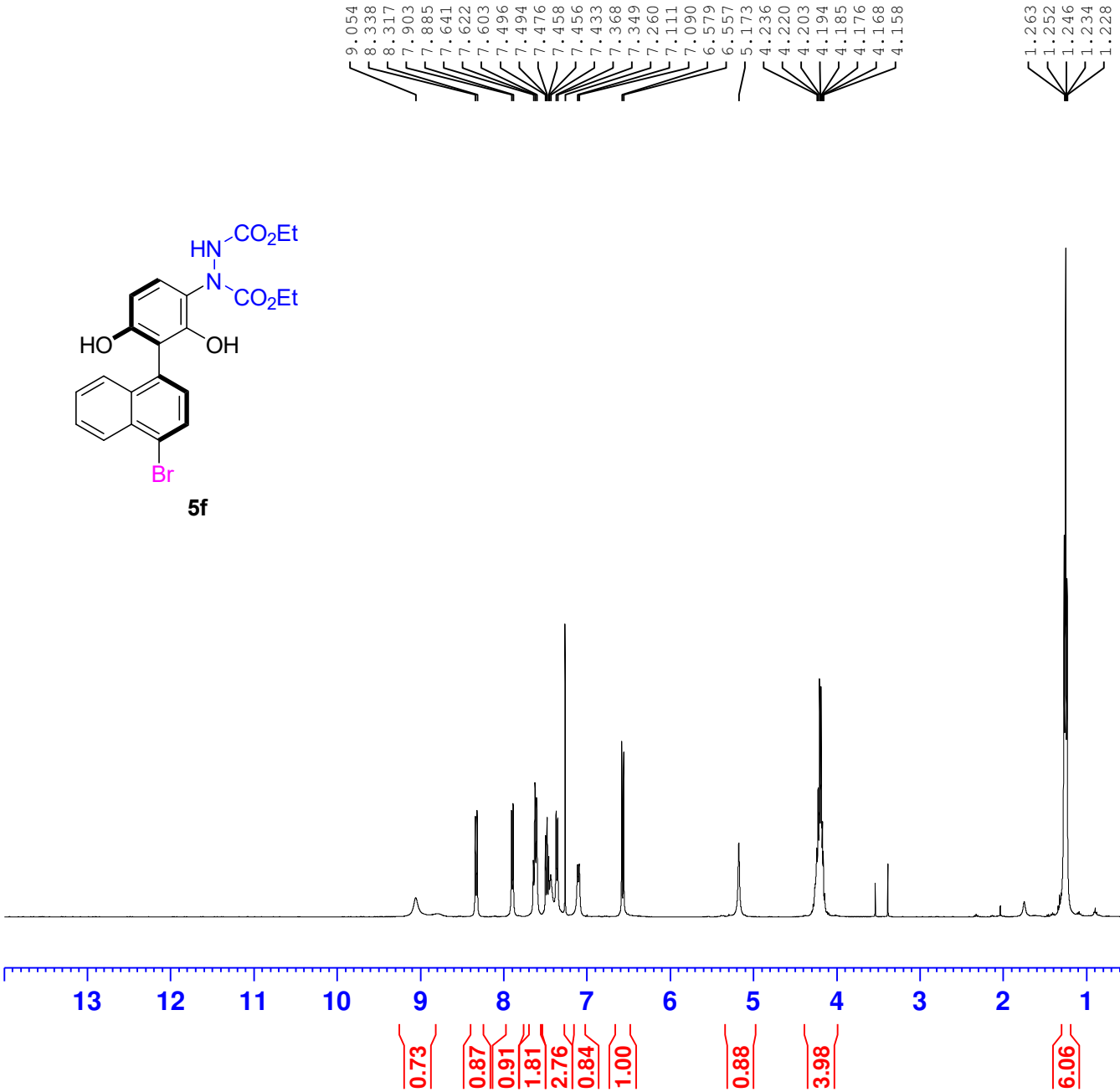
F2 - Acquisition Parameters
Date_ 20240202
Time 23.24
INSTRUM spect
PROBHD 5 mm PADUL 13C
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 1024
DS 4
SWH 24038.461 Hz
FIDRES 0.366798 Hz
AQ 1.3631488 sec
RG 35.06
DW 20.800 usec
DE 6.50 usec
TE 290.1 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1

======== CHANNEL f1 ========
NUC1 13C
P1 9.80 usec
PLW1 47.40000153 W
SFO1 100.6379178 MHz

======== CHANNEL f2 ========
CPDPRG[2 waltz16
NUC2 1H
PCPD2 90.00 usec
PLW2 23.00000000 W
PLW12 0.30712000 W
PLW13 0.24877000 W
SFO2 400.1916008 MHz

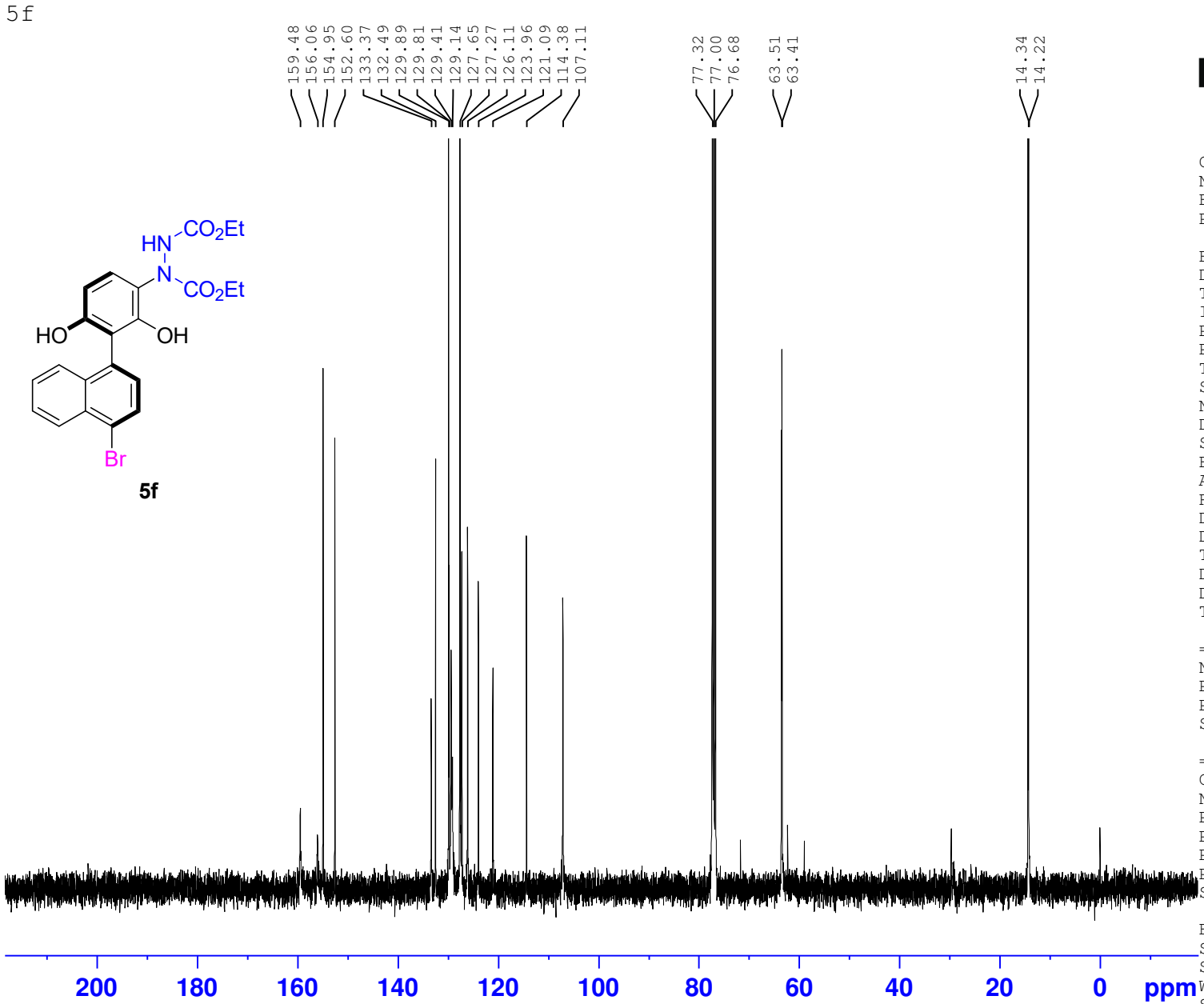
F2 - Processing parameters
SI 32768
SF 100.6278669 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40

5f




```
Current Data Parameters
NAME        20240119-400
EXPNO                 12
PROCNO                 1

F2 - Acquisition Parameters
Date_           20240119
Time                2.37
INSTRUM            spect
PROBHD   5 mm PADUL 13C
PULPROG             zg30
TD                 65536
SOLVENT            CDCl3
NS                     6
DS                     2
SWH             8223.685 Hz
FIDRES          0.125483 Hz
AQ             3.9845889 sec
RG                 68.24
DW                60.800 usec
DE                 6.50 usec
TE                291.2 K
D1           1.00000000 sec
TD0                    1

======== CHANNEL f1 ========
NUC1                  1H
P1                 9.90 usec
PLW1        23.00000000 W
SFO1        400.1924713 MHz

F2 - Processing parameters
SI                 65536
SF          400.1900137 MHz
WDW                   EM
SSB                    0
LB                0.30 Hz
GB                     0
PC                 1.00
```

5f



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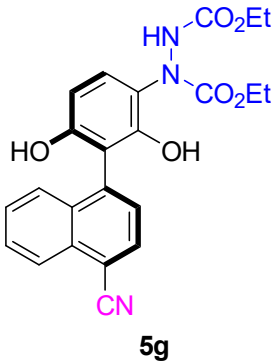
```
Current Data Parameters
NAME        20240119-400
EXPNO                 13
PROCNO                 1

F2 - Acquisition Parameters
Date_           20240119
Time                3.37
INSTRUM            spect
PROBHD   5 mm PADUL 13C
PULPROG          zgpg30
TD                65536
SOLVENT           CDCl3
NS                 1024
DS                    4
SWH           24038.461 Hz
FIDRES         0.366798 Hz
AQ            1.3631488 sec
RG                37.77
DW               20.800 usec
DE                6.50 usec
TE                291.6 K
D1           2.00000000 sec
D11          0.03000000 sec
TD0                   1

======== CHANNEL f1 ========
NUC1                 13C
P1                 9.80 usec
PLW1        47.40000153 W
SFO1       100.6379178 MHz

======== CHANNEL f2 ========
CPDPRG[2         waltz16
NUC2                 1H
PCPD2             90.00 usec
PLW2        23.00000000 W
PLW12        0.30712000 W
PLW13        0.24877000 W
SFO2       400.1916008 MHz

F2 - Processing parameters
SI                32768
SF         100.6278661 MHz
WDW                  EM
SSB                   0
LB                 1.00 Hz
GB                    0
PC                 1.40
```

5g

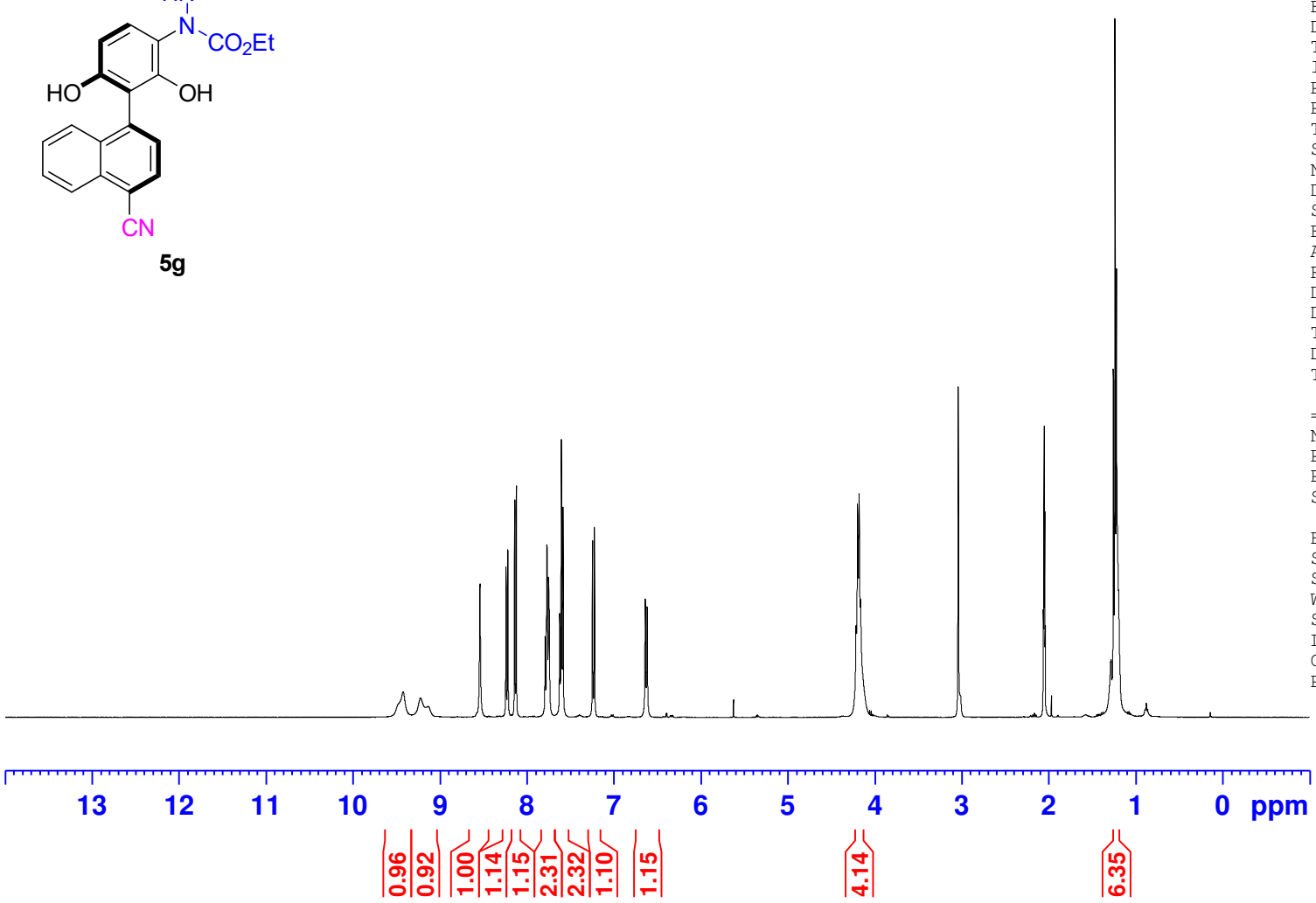


5g

9.423 9.224 8.540 8.240 8.219 8.140 8.122 7.788 7.770 7.768 7.750 7.745 7.623 7.603 7.585 7.245 7.223 6.638 6.616

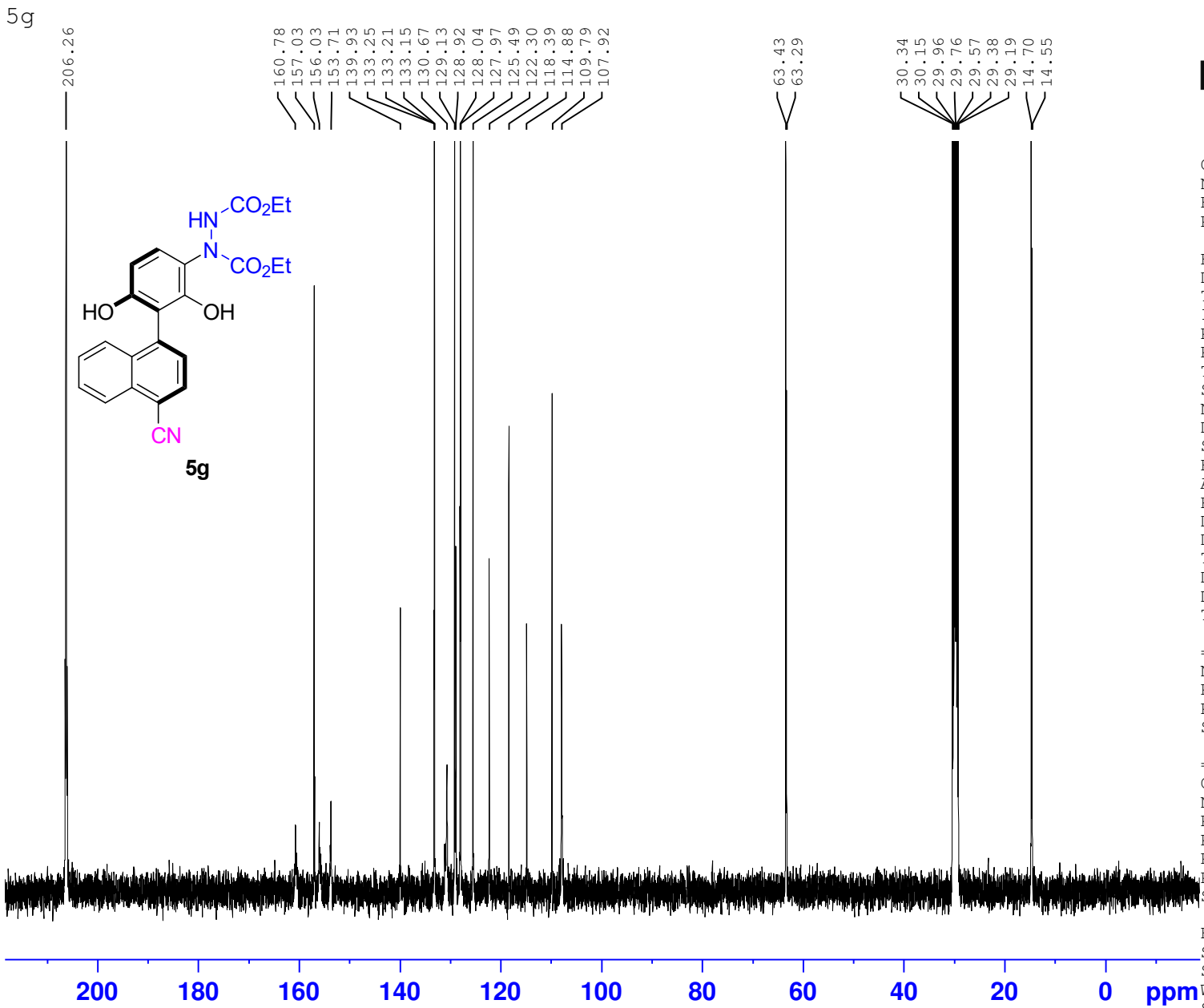
4.214 4.196 4.179 4.162

2.061 2.055 2.050 2.045 2.039 1.285 1.280 1.269 1.253 1.236 1.218 1.194




```
Current Data Parameters
NAME        20240125-400
EXPNO                 20
PROCNO                 1

F2 - Acquisition Parameters
Date_           20240125
Time                2.40
INSTRUM            spect
PROBHD   5 mm PADUL 13C
PULPROG             zg30
TD                 65536
SOLVENT          Acetone
NS                     8
DS                     2
SWH             8223.685 Hz
FIDRES          0.125483 Hz
AQ             3.9845889 sec
RG                 75.43
DW                60.800 usec
DE                 6.50 usec
TE                289.1 K
D1           1.00000000 sec
TD0                    1

======== CHANNEL f1 ========
NUC1                  1H
P1                 9.90 usec
PLW1        23.00000000 W
SFO1        400.1924713 MHz

F2 - Processing parameters
SI                 65536
SF          400.1900109 MHz
WDW                   EM
SSB                    0
LB                0.30 Hz
GB                     0
PC                 1.00
```

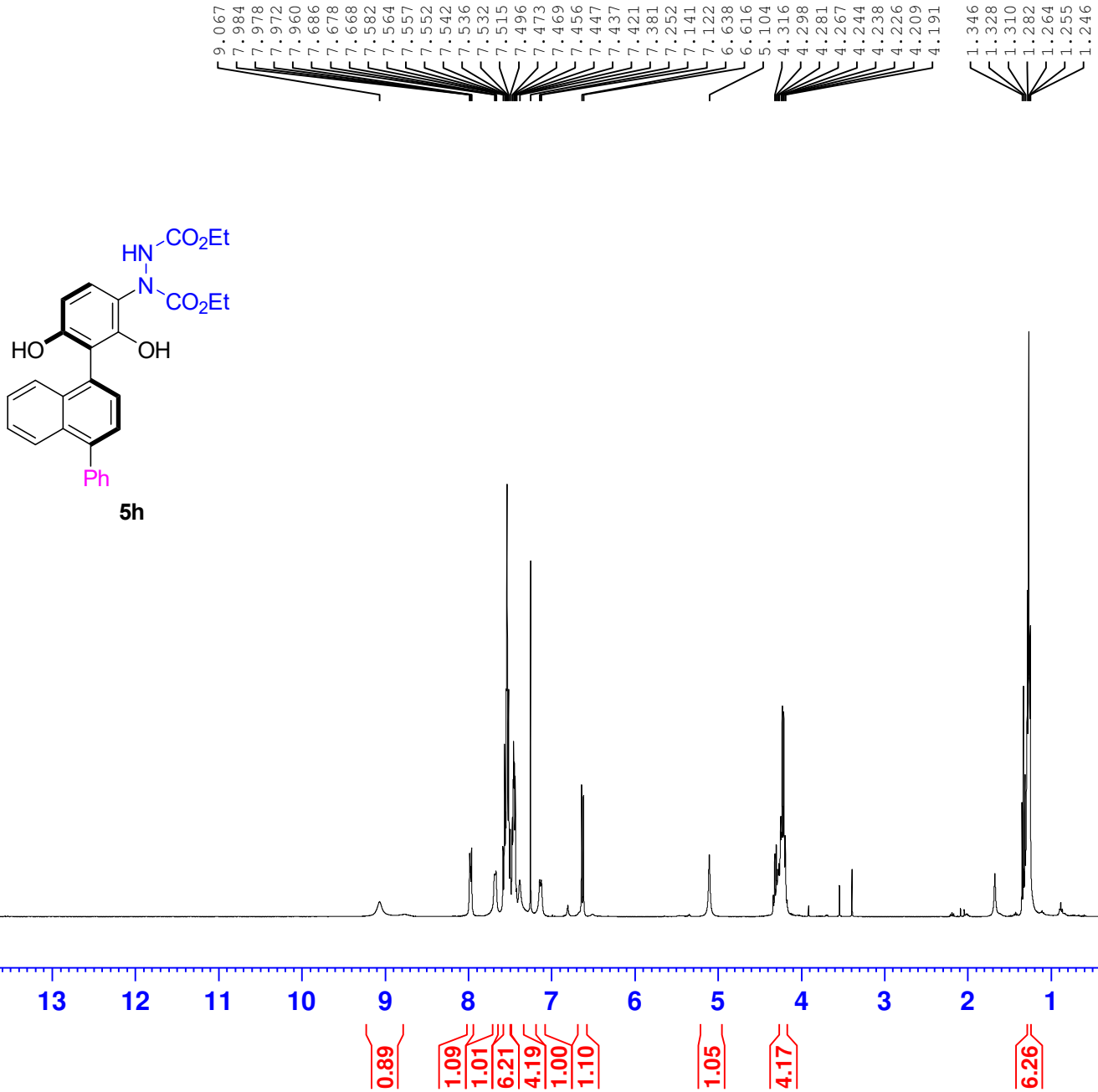
5g



BRUKER

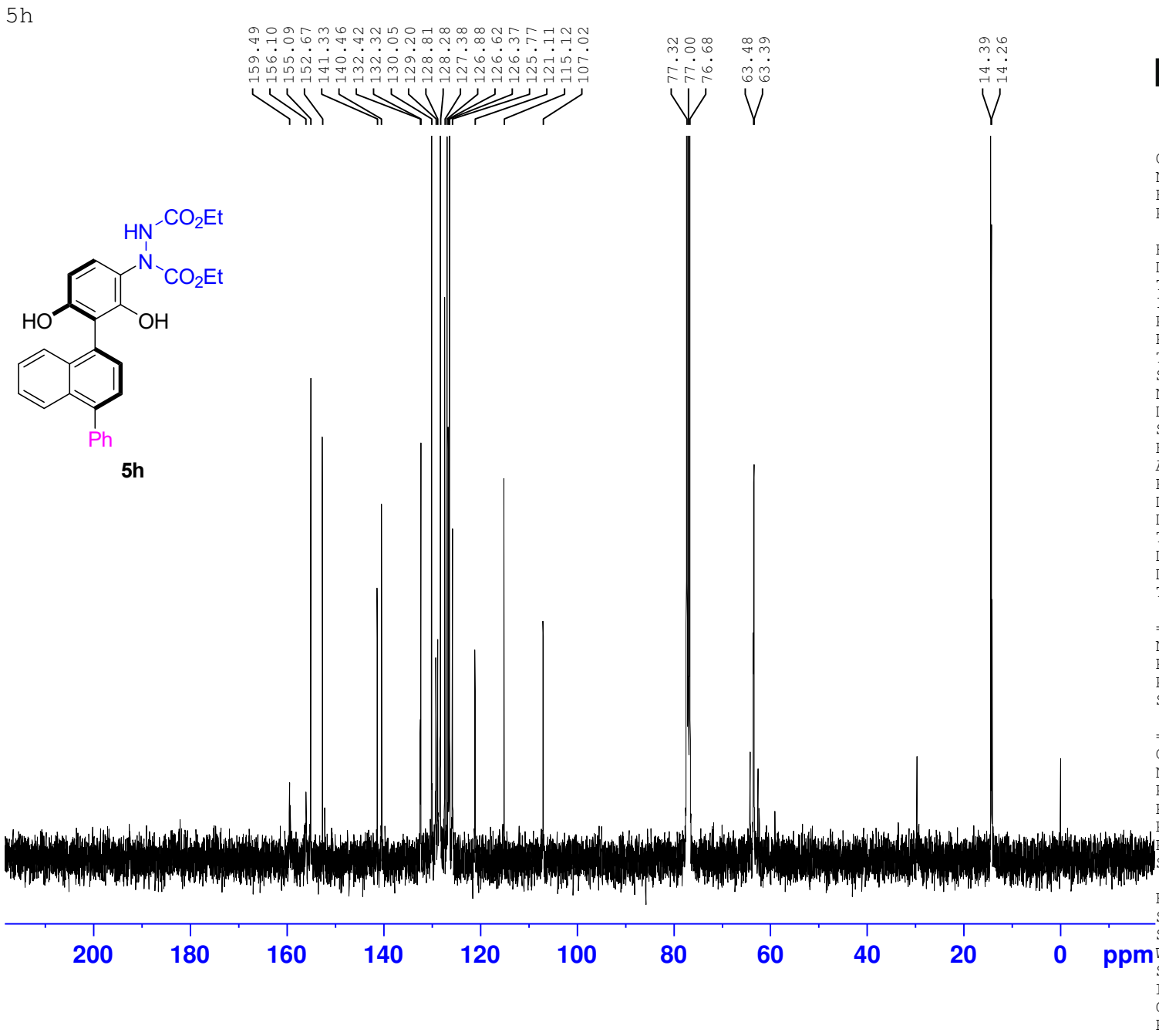
```
Current Data Parameters
NAME        20240125-400
EXPNO                 21
PROCNO                 1

F2 - Acquisition Parameters
Date_           20240125
Time                3.40
INSTRUM            spect
PROBHD   5 mm PADUL 13C
PULPROG           zgpg30
TD                 65536
SOLVENT          Acetone
NS                  1024
DS                     4
SWH           24038.461 Hz
FIDRES         0.366798 Hz
AQ            1.3631488 sec
RG                 28.08
DW               20.800 usec
DE                6.50 usec
TE                289.6 K
D1           2.00000000 sec
D11          0.03000000 sec
TD0                    1

======== CHANNEL f1 ========
NUC1                 13C
P1                 9.80 usec
PLW1        47.40000153 W
SFO1       100.6379178 MHz

======== CHANNEL f2 ========
CPDPRG[2         waltz16
NUC2                 1H
PCPD2             90.00 usec
PLW2        23.00000000 W
PLW12        0.30712000 W
PLW13        0.24877000 W
SFO2       400.1916008 MHz

F2 - Processing parameters
SI                 32768
SF          100.6277815 MHz
WDW                   EM
SSB                    0
LB                  1.00 Hz
GB                     0
PC                  1.40
```

5h




```
Current Data Parameters
NAME            20240131
EXPNO                 20
PROCNO                 1

F2 - Acquisition Parameters
Date_           20240131
Time                1.02
INSTRUM            spect
PROBHD   5 mm PADUL 13C
PULPROG             zg30
TD                 65536
SOLVENT            CDCl3
NS                     8
DS                     2
SWH             8223.685 Hz
FIDRES          0.125483 Hz
AQ             3.9845889 sec
RG                 90.23
DW                60.800 usec
DE                 6.50 usec
TE                290.2 K
D1           1.00000000 sec
TD0                    1

======== CHANNEL f1 ========
NUC1                  1H
P1                 9.90 usec
PLW1        23.00000000 W
SFO1        400.1924713 MHz

F2 - Processing parameters
SI                 65536
SF          400.1900170 MHz
WDW                   EM
SSB                    0
LB                0.30 Hz
GB                     0
PC                 1.00
```

5h



Current Data Parameters
NAME 20240131
EXPNO 21
PROCNO 1

F2 - Acquisition Parameters
Date_ 20240131
Time 2.02
INSTRUM spect
PROBHD 5 mm PADUL 13C
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 1024
DS 4
SWH 24038.461 Hz
FIDRES 0.366798 Hz
AQ 1.3631488 sec
RG 35.06
DW 20.800 usec
DE 6.50 usec
TE 290.8 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1

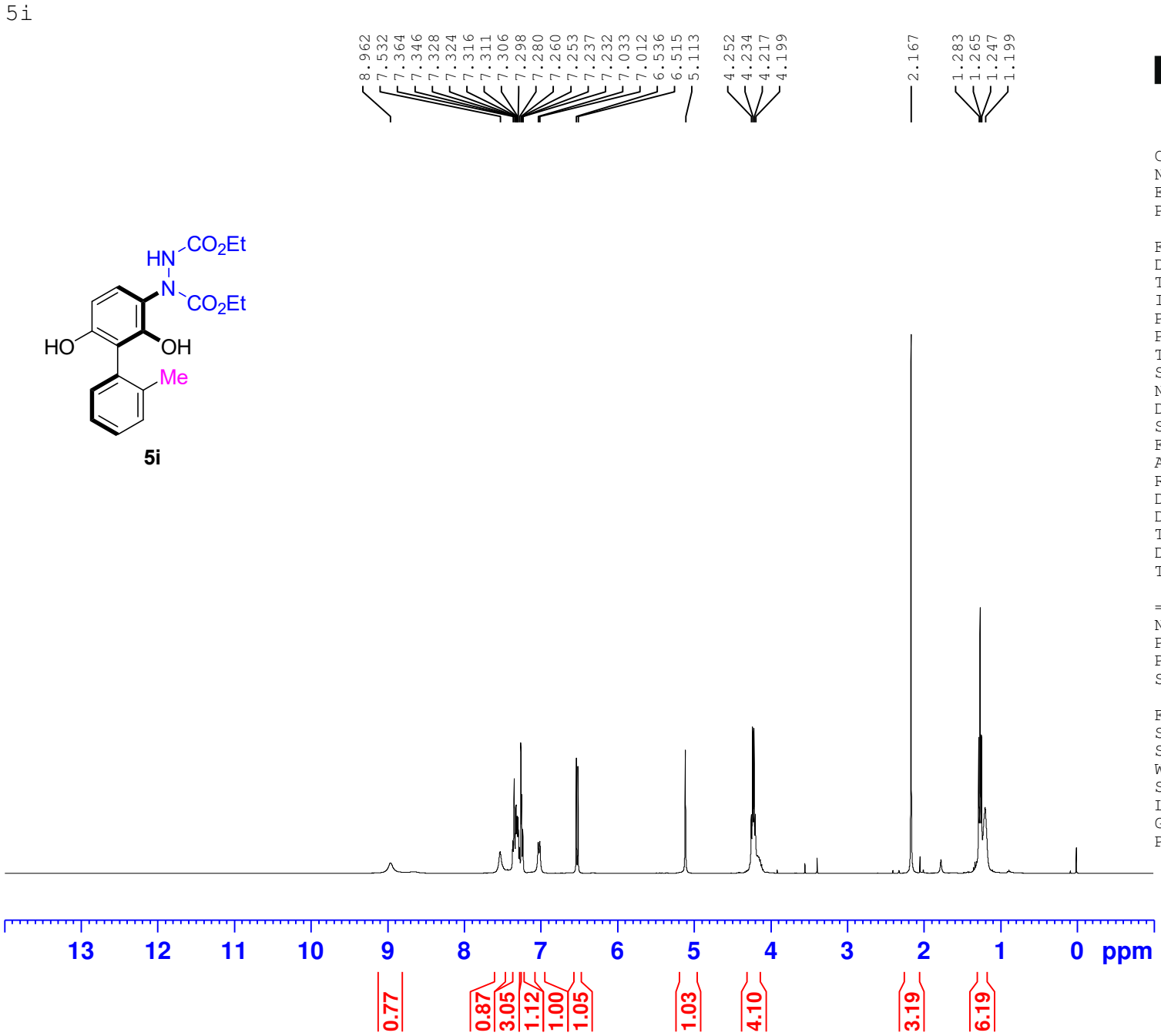
======== CHANNEL f1 ========
NUC1 13C
P1 9.80 usec
PLW1 47.40000153 W
SFO1 100.6379178 MHz

======== CHANNEL f2 ========
CPDPRG[2 waltz16
NUC2 1H
PCPD2 90.00 usec
PLW2 23.00000000 W
PLW12 0.30712000 W
PLW13 0.24877000 W
SFO2 400.1916008 MHz

F2 - Processing parameters
SI 32768
SF 100.6278648 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40

5i

5i



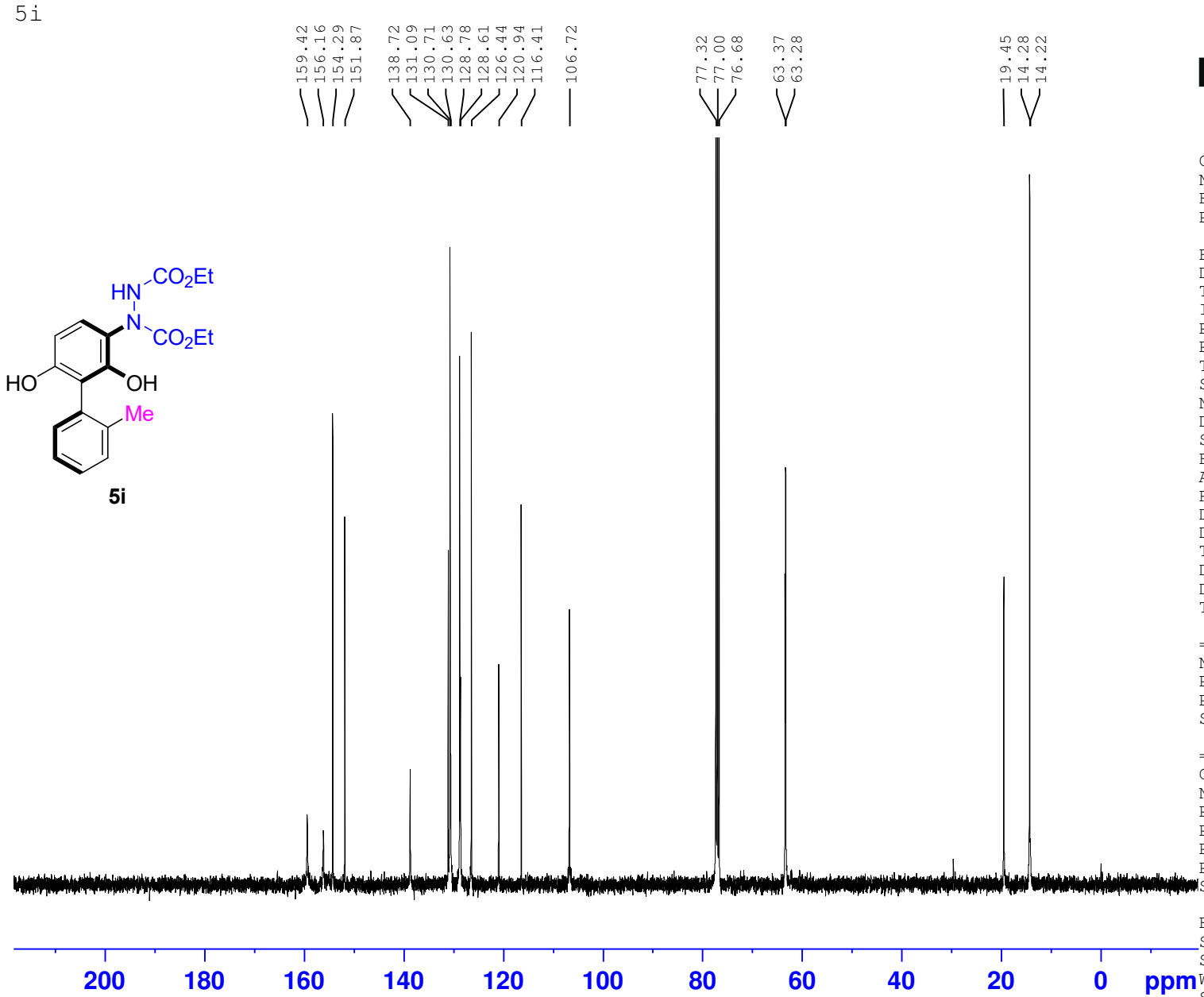
Current Data Parameters
NAME 20240118-400
EXPNO 30
PROCNO 1

F2 - Acquisition Parameters
Date_ 20240118
Time 4.07
INSTRUM spect
PROBHD 5 mm PADUL 13C
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 8
DS 2
SWH 8223.685 Hz
FIDRES 0.125483 Hz
AQ 3.9845889 sec
RG 29.75
DW 60.800 usec
DE 6.50 usec
TE 291.6 K
D1 1.00000000 sec
TD0 1

======== CHANNEL f1 ========
NUC1 1H
P1 9.90 usec
PLW1 23.00000000 W
SFO1 400.1924713 MHz

F2 - Processing parameters
SI 65536
SF 400.1900138 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

5i



Current Data Parameters
NAME 20240118-400
EXPNO 29
PROCNO 1

F2 - Acquisition Parameters
Date_ 20240118
Time 4.06
INSTRUM spect
PROBHD 5 mm PADUL 13C
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 1024
DS 4
SWH 24038.461 Hz
FIDRES 0.366798 Hz
AQ 1.3631488 sec
RG 37.77
DW 20.800 usec
DE 6.50 usec
TE 292.0 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1

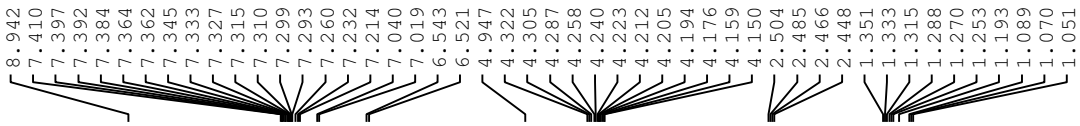
======== CHANNEL f1 ========
NUC1 13C
P1 9.80 usec
PLW1 47.40000153 W
SFO1 100.6379178 MHz

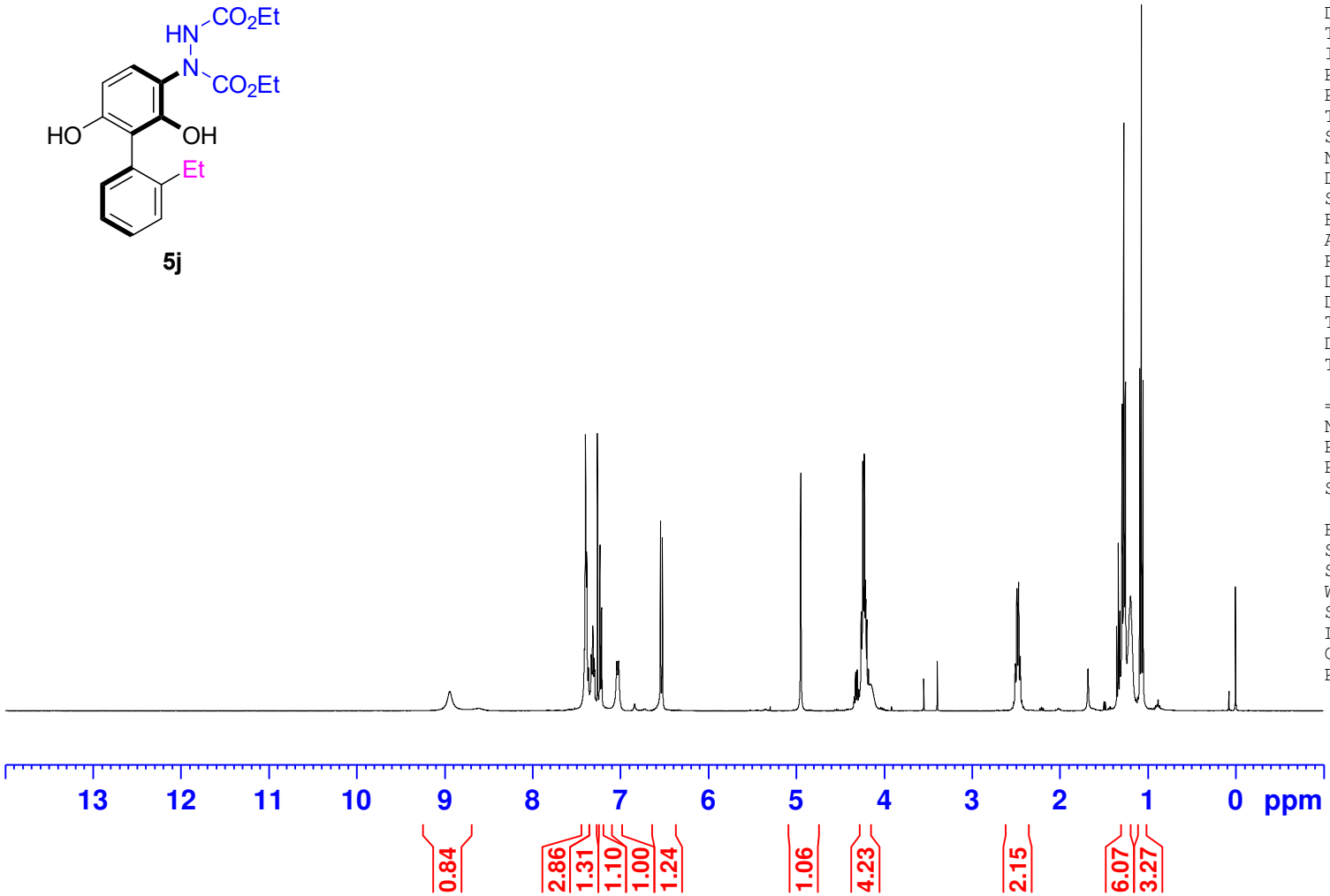
======== CHANNEL f2 ========
CPDPRG[2 waltz16
NUC2 1H
PCPD2 90.00 usec
PLW2 23.00000000 W
PLW12 0.30712000 W
PLW13 0.24877000 W
SFO2 400.1916008 MHz

F2 - Processing parameters
SI 32768
SF 100.6278678 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40

5j

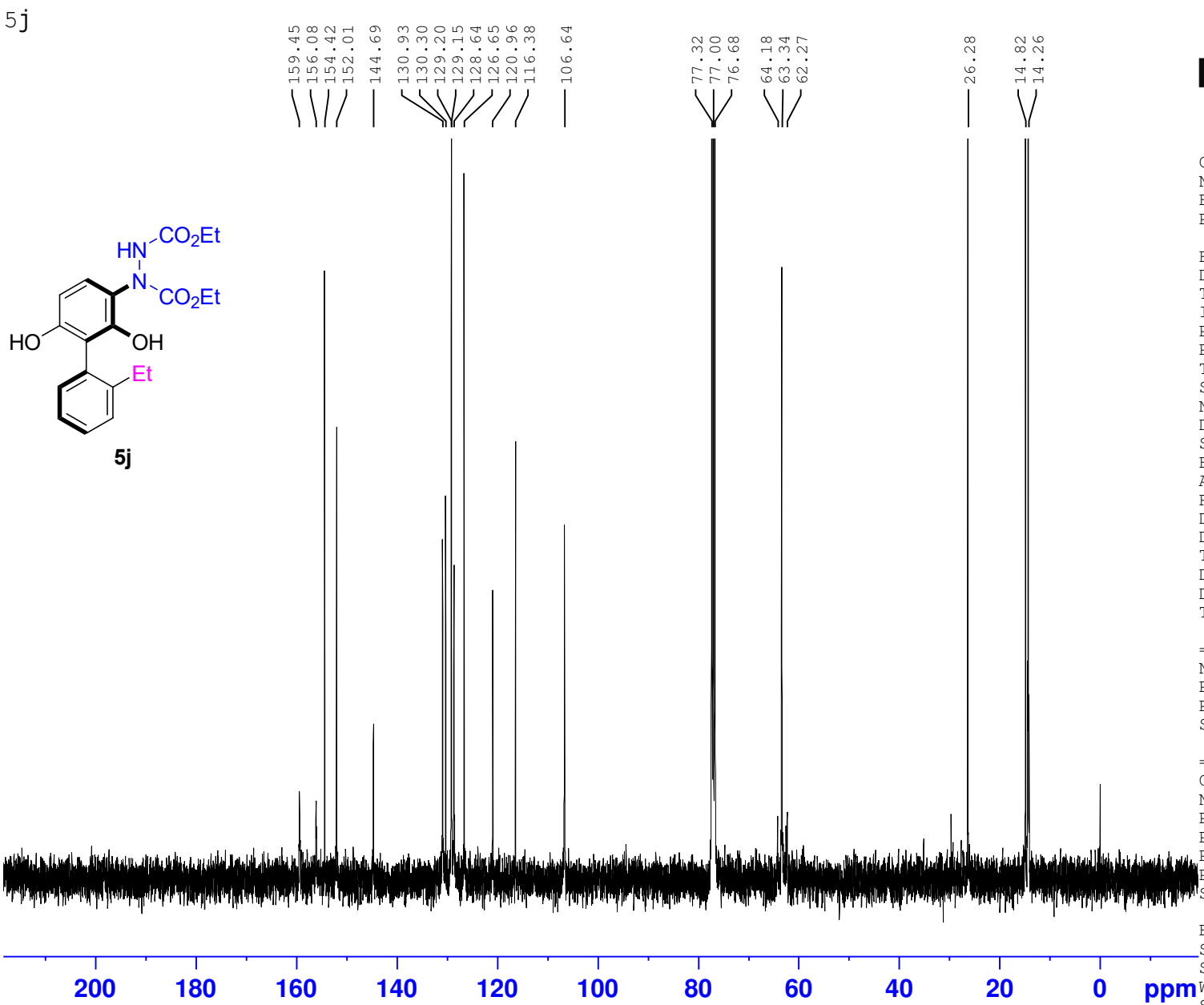
5j






```
Current Data Parameters
NAME            20240131
EXPNO                 27
PROCNO                 1

F2 - Acquisition Parameters
Date_           20240130
Time                3.38
INSTRUM            spect
PROBHD   5 mm PADUL 13C
PULPROG             zg30
TD                 65536
SOLVENT            CDCl3
NS                     6
DS                     2
SWH             8223.685 Hz
FIDRES          0.125483 Hz
AQ              3.9845889 sec
RG                 90.23
DW                60.800 usec
DE                 6.50 usec
TE                 290.5 K
D1            1.00000000 sec
TD0                    1

======== CHANNEL f1 ========
NUC1                  1H
P1                 9.90 usec
PLW1         23.00000000 W
SFO1         400.1924713 MHz

F2 - Processing parameters
SI                 65536
SF           400.1900137 MHz
WDW                   EM
SSB                    0
LB                 0.30 Hz
GB                     0
PC                  1.00
```

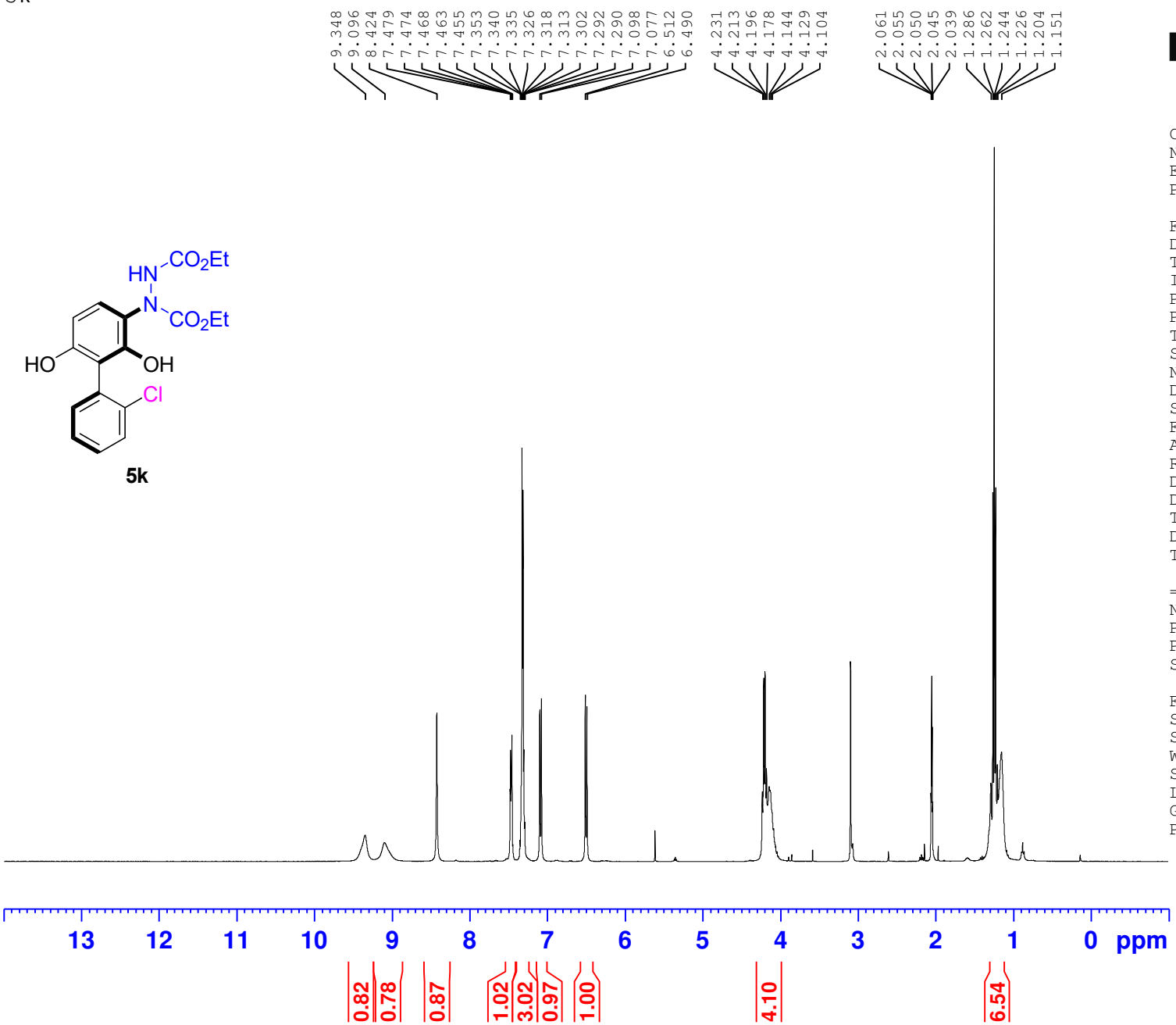
5j




```
Current Data Parameters
NAME            20240131
EXPNO                 28
PROCNO                 1

F2 - Acquisition Parameters
Date_           20240130
Time                4.38
INSTRUM            spect
PROBHD   5 mm PADUL 13C
PULPROG           zgpg30
TD                 65536
SOLVENT            CDCl3
NS                  1024
DS                     4
SWH           24038.461 Hz
FIDRES         0.366798 Hz
AQ            1.3631488 sec
RG                 35.06
DW                20.800 usec
DE                 6.50 usec
TE                291.0 K
D1           2.00000000 sec
D11          0.03000000 sec
TD0                    1

======== CHANNEL f1 ========
NUC1                13C
P1                 9.80 usec
PLW1        47.40000153 W
SFO1       100.6379178 MHz

======== CHANNEL f2 ========
CPDPRG[2         waltz16
NUC2                1H
PCPD2              90.00 usec
PLW2        23.00000000 W
PLW12        0.30712000 W
PLW13        0.24877000 W
SFO2       400.1916008 MHz

F2 - Processing parameters
SI                 32768
SF         100.6278642 MHz
WDW                   EM
SSB                    0
LB                  1.00 Hz
GB                     0
PC                  1.40
```

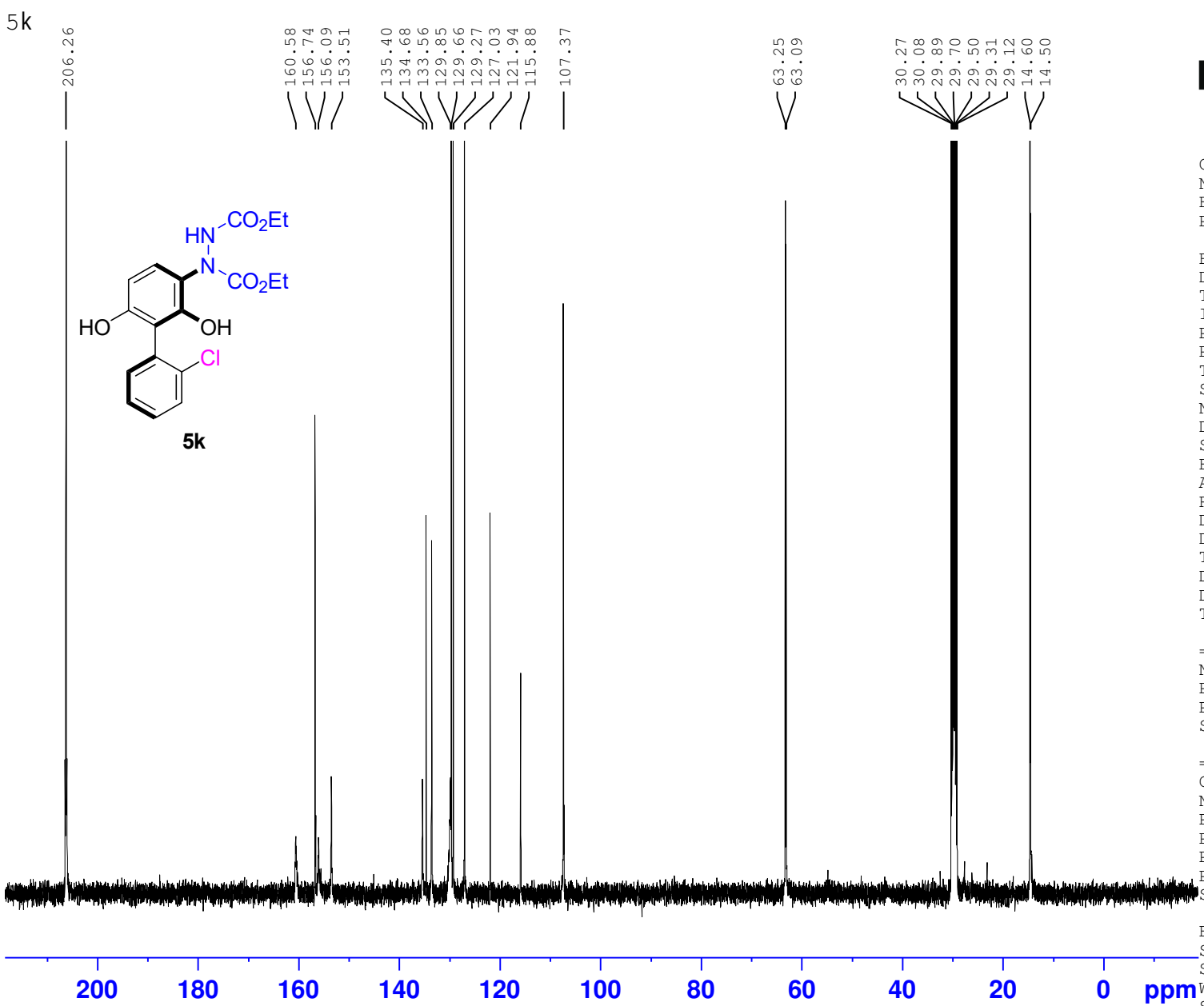
5k

5k



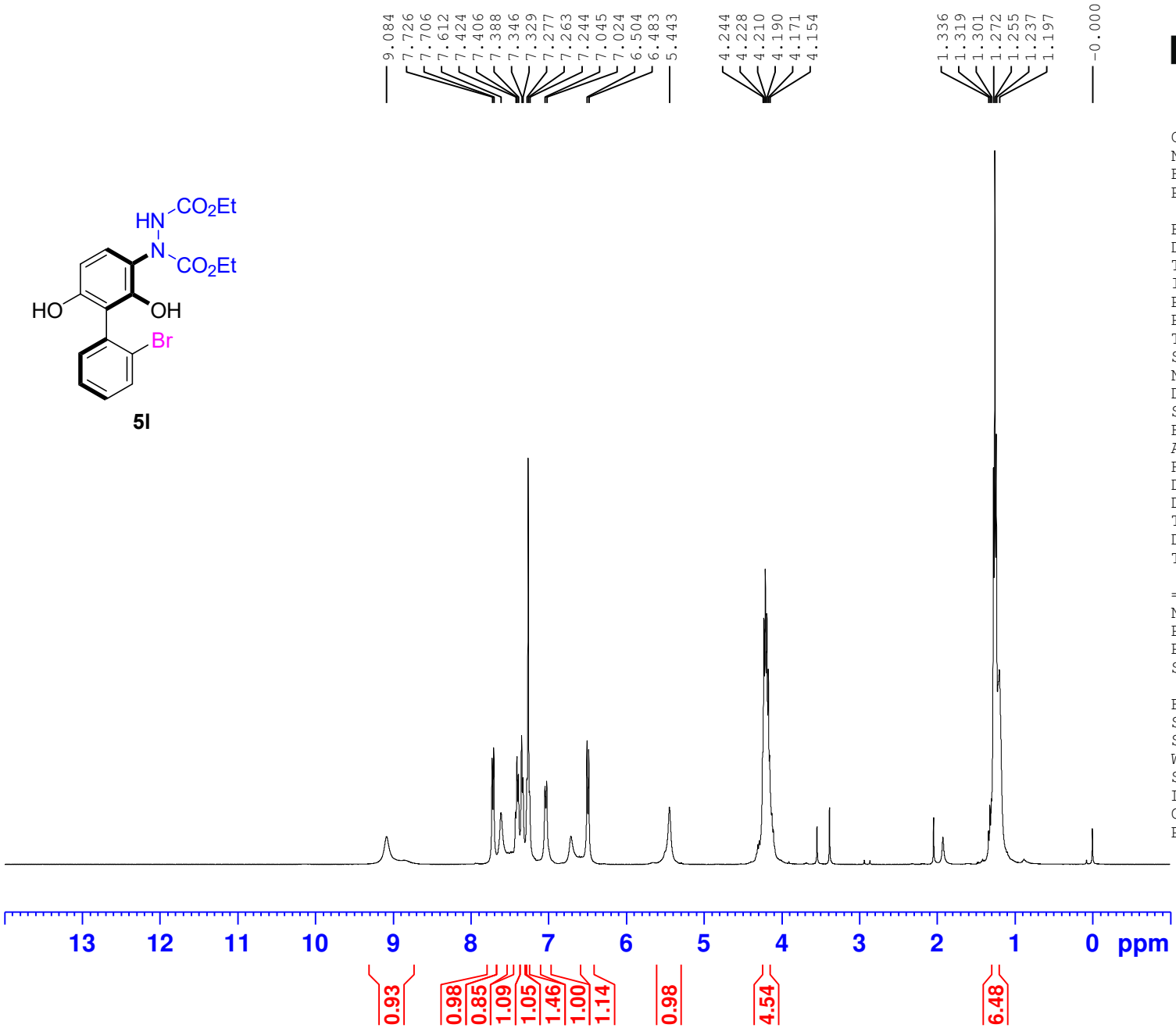

```
Current Data Parameters
NAME        20240125-400
EXPNO                 19
PROCNO                 1

F2 - Acquisition Parameters
Date_           20240125
Time                2.37
INSTRUM            spect
PROBHD   5 mm PADUL 13C
PULPROG             zg30
TD                 65536
SOLVENT          Acetone
NS                     8
DS                     2
SWH             8223.685 Hz
FIDRES          0.125483 Hz
AQ             3.9845889 sec
RG                  53.3
DW                60.800 usec
DE                 6.50 usec
TE                289.3 K
D1            1.00000000 sec
TD0                    1

======== CHANNEL f1 ========
NUC1                  1H
P1                  9.90 usec
PLW1         23.00000000 W
SFO1         400.1924713 MHz

F2 - Processing parameters
SI                 65536
SF           400.1900109 MHz
WDW                   EM
SSB                    0
LB                  0.30 Hz
GB                     0
PC                  1.00
```

5k




```
Current Data Parameters
NAME        20240125-400
EXPNO                 18
PROCNO                 1

F2 - Acquisition Parameters
Date_           20240125
Time                2.35
INSTRUM            spect
PROBHD   5 mm PADUL 13C
PULPROG          zgpg30
TD                65536
SOLVENT         Acetone
NS                 1024
DS                    4
SWH           24038.461 Hz
FIDRES         0.366798 Hz
AQ            1.3631488 sec
RG                28.08
DW               20.800 usec
DE                6.50 usec
TE                289.8 K
D1           2.00000000 sec
D11          0.03000000 sec
TD0                   1

======== CHANNEL f1 ========
NUC1                 13C
P1                 9.80 usec
PLW1        47.40000153 W
SFO1       100.6379178 MHz

======== CHANNEL f2 ========
CPDPRG[2         waltz16
NUC2                 1H
PCPD2             90.00 usec
PLW2        23.00000000 W
PLW12        0.30712000 W
PLW13        0.24877000 W
SFO2       400.1916008 MHz

F2 - Processing parameters
SI                32768
SF         100.6277903 MHz
WDW                  EM
SSB                   0
LB                 1.00 Hz
GB                    0
PC                 1.40
```

5l

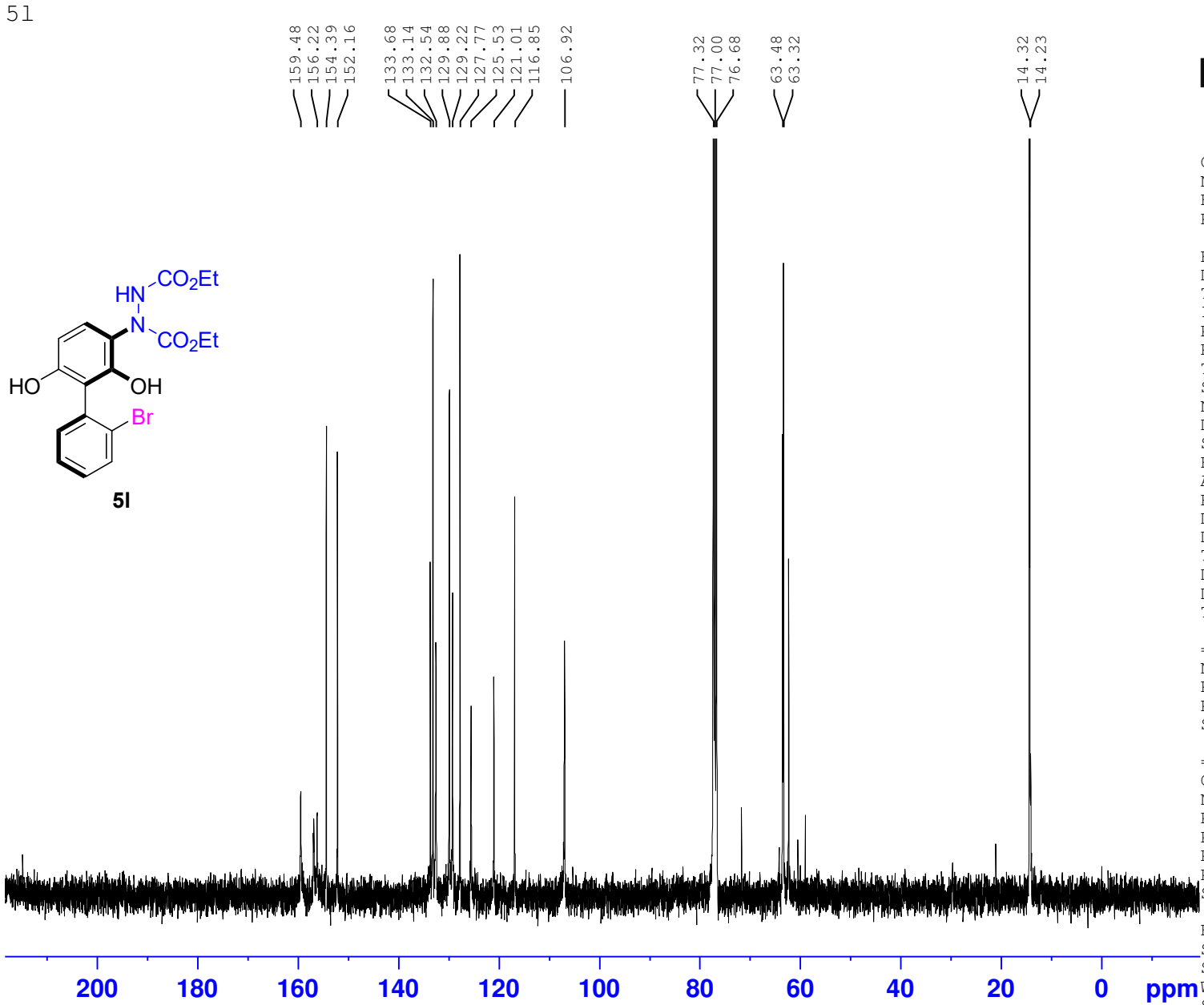


Current Data Parameters
NAME 20240131
EXPNO 25
PROCNO 1

F2 - Acquisition Parameters
Date_ 20240130
Time 2.35
INSTRUM spect
PROBHD 5 mm PADUL 13C
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 6
DS 2
SWH 8223.685 Hz
FIDRES 0.125483 Hz
AQ 3.9845889 sec
RG 29.75
DW 60.800 usec
DE 6.50 usec
TE 290.6 K
D1 1.00000000 sec
TD0 1

======== CHANNEL f1 ========
NUC1 1H
P1 9.90 usec
PLW1 23.00000000 W
SFO1 400.1924713 MHz

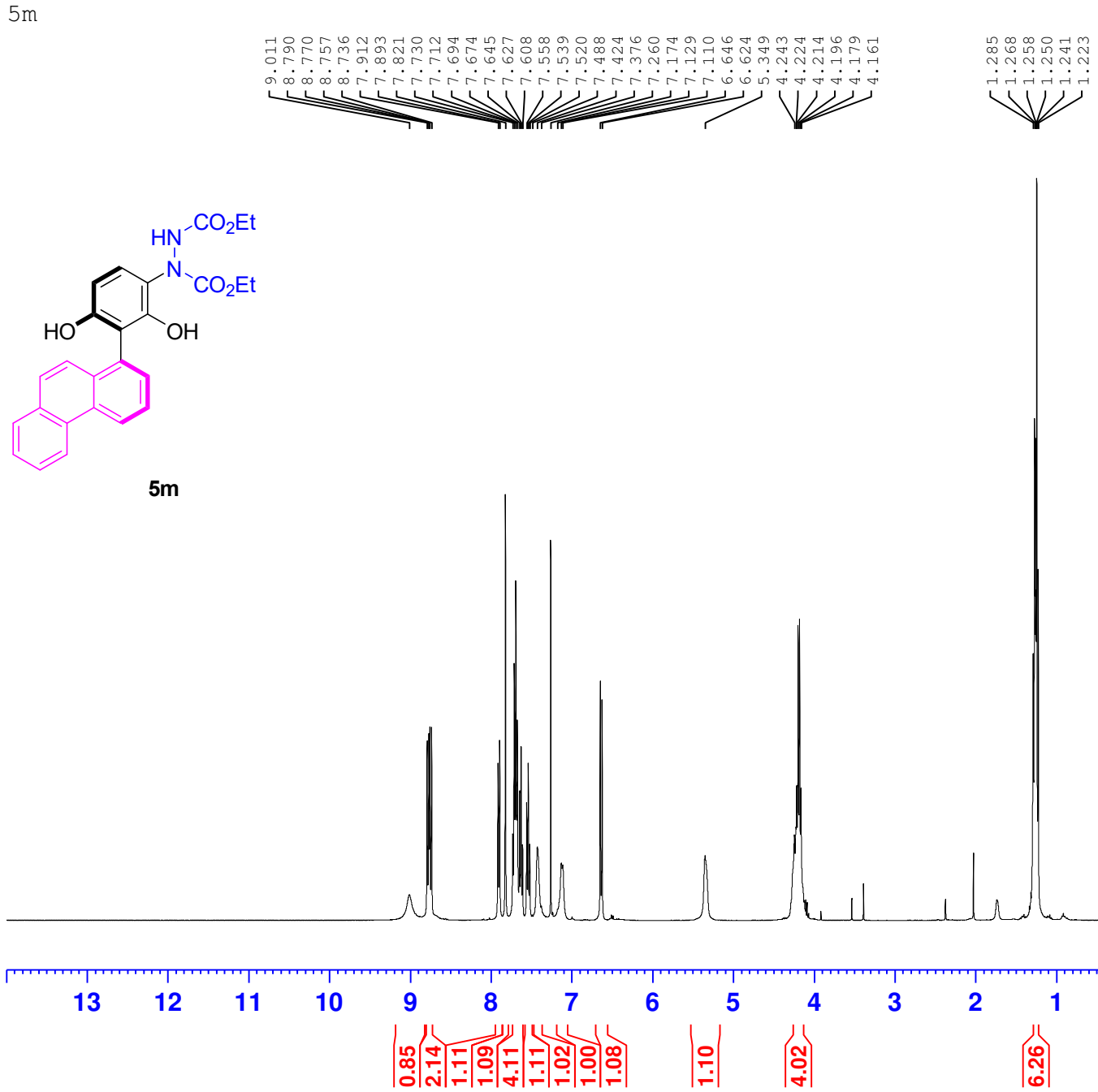
F2 - Processing parameters
SI 65536
SF 400.1900126 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00



5l

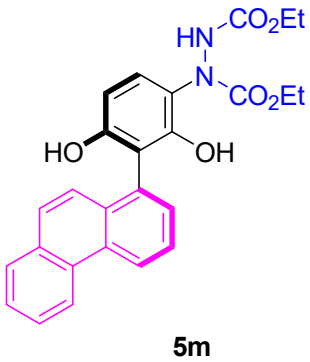
```
Current Data Parameters
NAME            20240131
EXPNO                 26
PROCNO                 1

F2 - Acquisition Parameters
Date_           20240130
Time                3.34
INSTRUM            spect
PROBHD   5 mm PADUL 13C
PULPROG           zgpg30
TD                 65536
SOLVENT            CDCl3
NS                  1024
DS                     4
SWH           24038.461 Hz
FIDRES         0.366798 Hz
AQ            1.3631488 sec
RG                 35.06
DW                20.800 usec
DE                 6.50 usec
TE                291.0 K
D1           2.00000000 sec
D11          0.03000000 sec
TD0                    1

======== CHANNEL f1 ========
NUC1                13C
P1                 9.80 usec
PLW1        47.40000153 W
SFO1       100.6379178 MHz

======== CHANNEL f2 ========
CPDPRG[2         waltz16
NUC2                1H
PCPD2              90.00 usec
PLW2        23.00000000 W
PLW12        0.30712000 W
PLW13        0.24877000 W
SFO2       400.1916008 MHz

F2 - Processing parameters
SI                 32768
SF         100.6278675 MHz
WDW                   EM
SSB                    0
LB                 1.00 Hz
GB                     0
PC                 1.40
```

5m




```
Current Data Parameters
NAME        20240118-400
EXPNO                 28
PROCNO                 1

F2 - Acquisition Parameters
Date_           20240118
Time                3.04
INSTRUM            spect
PROBHD   5 mm PADUL 13C
PULPROG             zg30
TD                 65536
SOLVENT            CDCl3
NS                     8
DS                     2
SWH             8223.685 Hz
FIDRES          0.125483 Hz
AQ             3.9845889 sec
RG                  53.3
DW                60.800 usec
DE                 6.50 usec
TE                291.6 K
D1           1.00000000 sec
TD0                    1

======== CHANNEL f1 ========
NUC1                  1H
P1                 9.90 usec
PLW1        23.00000000 W
SFO1        400.1924713 MHz

F2 - Processing parameters
SI                 65536
SF          400.1900138 MHz
WDW                   EM
SSB                    0
LB                0.30 Hz
GB                     0
PC                 1.00
```

5m



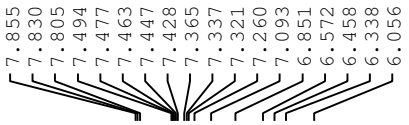
5m

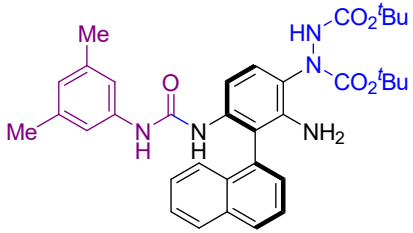
159.40
156.07
155.18
152.76
131.42
130.90
130.80
130.65
129.83
129.19
128.82
128.33
127.21
126.98
126.85
126.79
126.29
122.91
122.57
121.02
114.97
107.06
77.32
77.00
76.68
63.44
63.29
14.34
14.20

200 180 160 140 120 100 80 60 40 20 0 ppm

```
Current Data Parameters
NAME        20240118-400
EXPNO                 27
PROCNO                 1

F2 - Acquisition Parameters
Date_           20240118
Time                3.02
INSTRUM            spect
PROBHD   5 mm PADUL 13C
PULPROG           zgpg30
TD                 65536
SOLVENT            CDCl3
NS                  1024
DS                     4
SWH           24038.461 Hz
FIDRES         0.366798 Hz
AQ            1.3631488 sec
RG                 37.77
DW               20.800 usec
DE                6.50 usec
TE                292.1 K
D1           2.00000000 sec
D11          0.03000000 sec
TD0                    1

======== CHANNEL f1 ========
NUC1                13C
P1                9.80 usec
PLW1        47.40000153 W
SFO1       100.6379178 MHz

======== CHANNEL f2 ========
CPDPRG[2         waltz16
NUC2                1H
PCPD2            90.00 usec
PLW2        23.00000000 W
PLW12        0.30712000 W
PLW13        0.24877000 W
SFO2       400.1916008 MHz

F2 - Processing parameters
SI                 32768
SF          100.6278690 MHz
WDW                   EM
SSB                    0
LB                 1.00 Hz
GB                     0
PC                 1.40
```

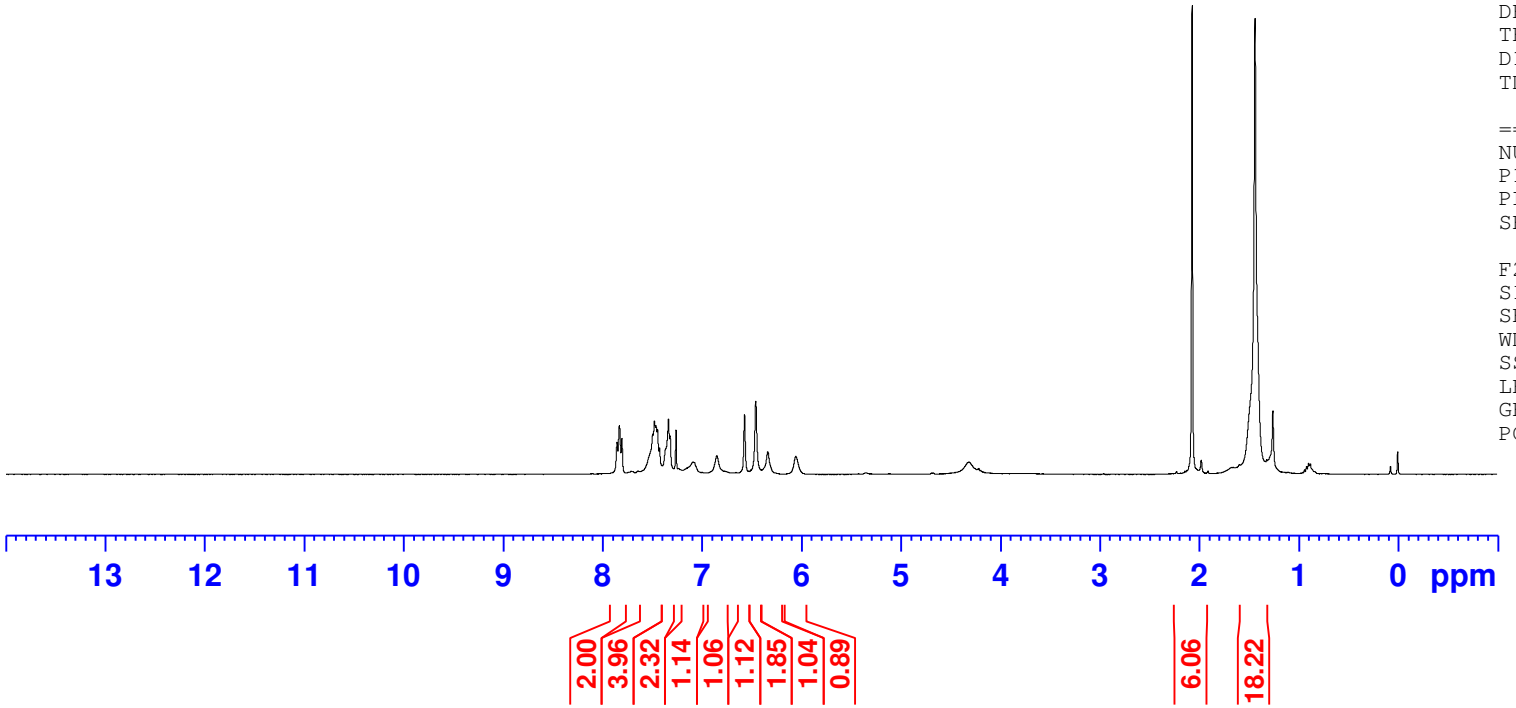
zhh-7-70-1

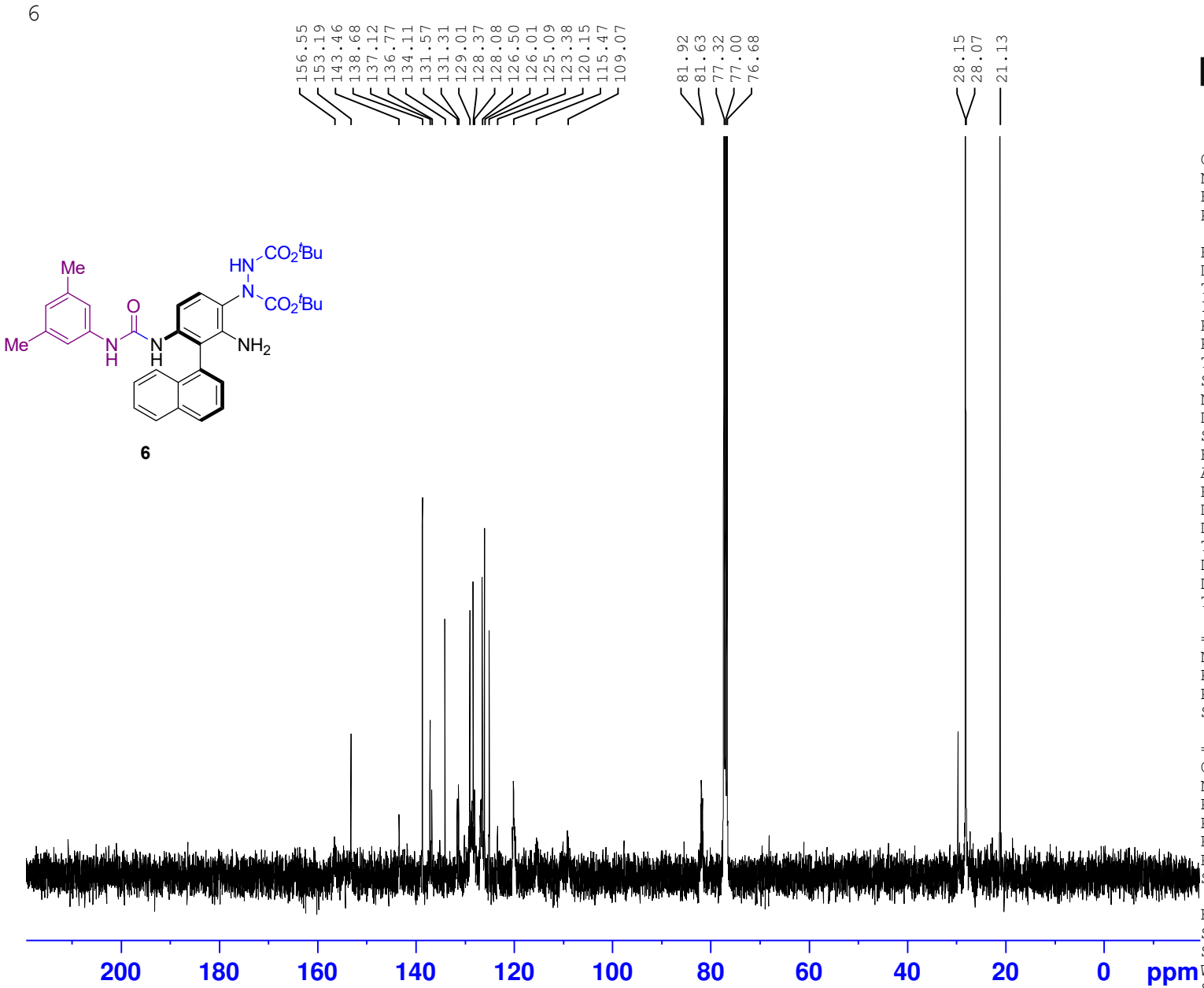




6

```
Current Data Parameters
NAME        20240530-400
EXPNO                 17
PROCNO                 1

F2 - Acquisition Parameters
Date_           20240530
Time                5.11
INSTRUM            spect
PROBHD   5 mm PADUL 13C
PULPROG             zg30
TD                 65536
SOLVENT            CDCl3
NS                     6
DS                     2
SWH             8223.685 Hz
FIDRES          0.125483 Hz
AQ             3.9845889 sec
RG                 90.23
DW                60.800 usec
DE                 6.50 usec
TE                294.2 K
D1           1.00000000 sec
TD0                    1

======== CHANNEL f1 ========
NUC1                  1H
P1                 9.90 usec
PLW1        23.00000000 W
SFO1        400.1924713 MHz

F2 - Processing parameters
SI                 65536
SF          400.1900140 MHz
WDW                   EM
SSB                    0
LB                 0.30 Hz
GB                     0
PC                  1.00
```

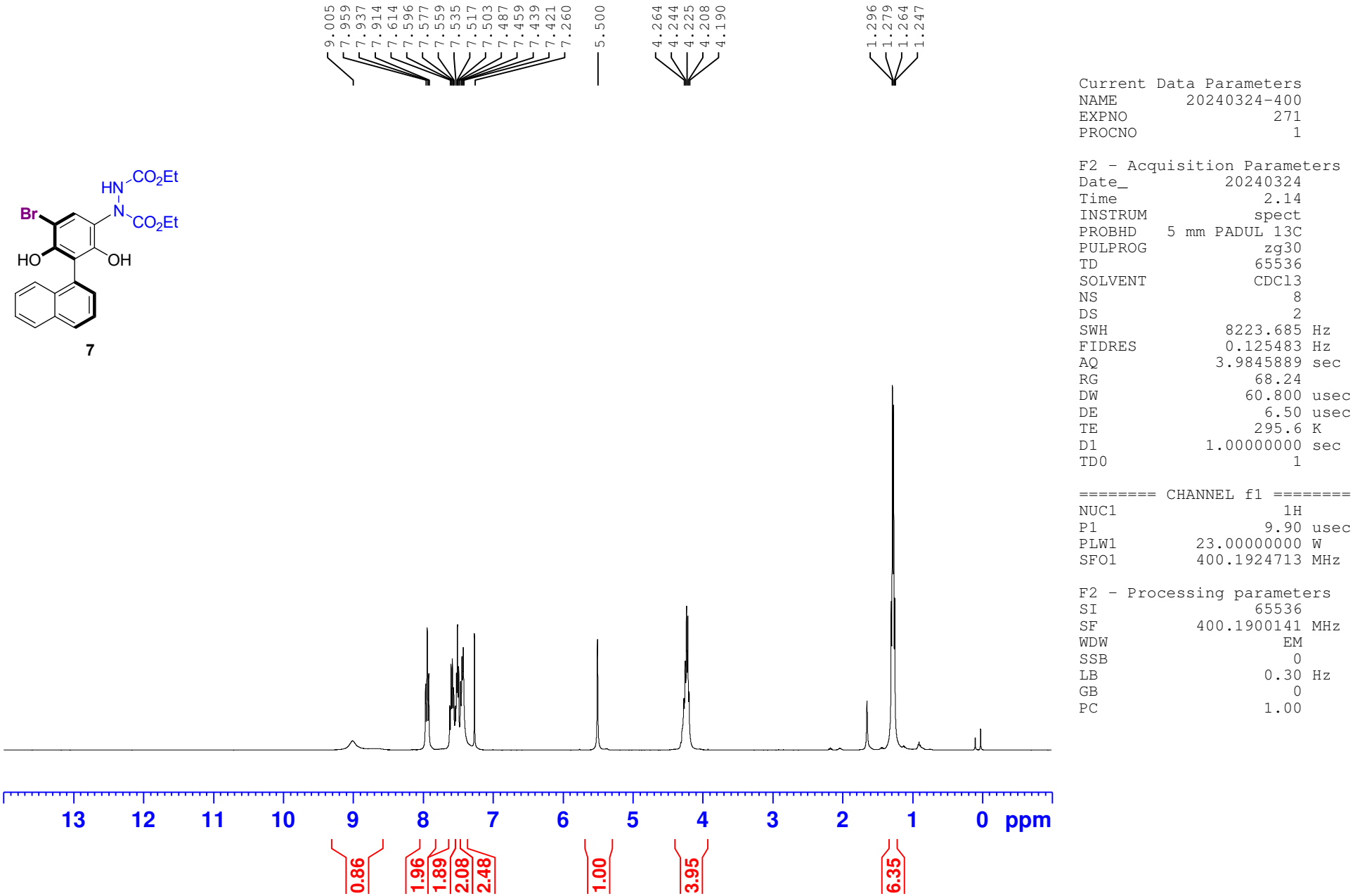




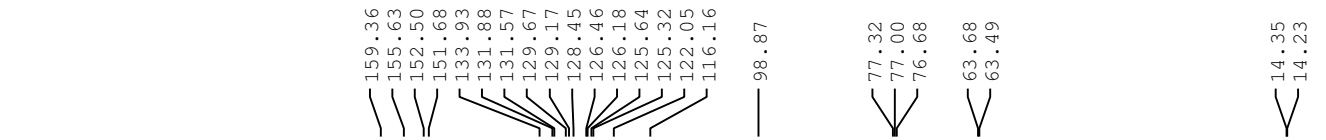
BRUKER

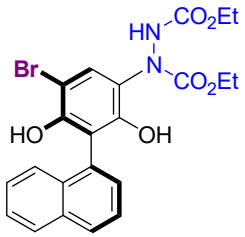
```
Current Data Parameters
NAME        20240530-400
EXPNO                 18
PROCNO                 1

F2 - Acquisition Parameters
Date_           20240530
Time                6.11
INSTRUM            spect
PROBHD   5 mm PADUL 13C
PULPROG          zgpg30
TD                65536
SOLVENT           CDCl3
NS                 1024
DS                    4
SWH           24038.461 Hz
FIDRES         0.366798 Hz
AQ            1.3631488 sec
RG                 53.3
DW               20.800 usec
DE                6.50 usec
TE                295.3 K
D1           2.00000000 sec
D11          0.03000000 sec
TD0                   1

======== CHANNEL f1 ========
NUC1                 13C
P1                 9.80 usec
PLW1        47.40000153 W
SFO1       100.6379178 MHz

======== CHANNEL f2 ========
CPDPRG[2         waltz16
NUC2                 1H
PCPD2             90.00 usec
PLW2        23.00000000 W
PLW12        0.30712000 W
PLW13        0.24877000 W
SFO2       400.1916008 MHz

F2 - Processing parameters
SI                 32768
SF          100.6278626 MHz
WDW                   EM
SSB                    0
LB                  1.00 Hz
GB                     0
PC                  1.40
```

7

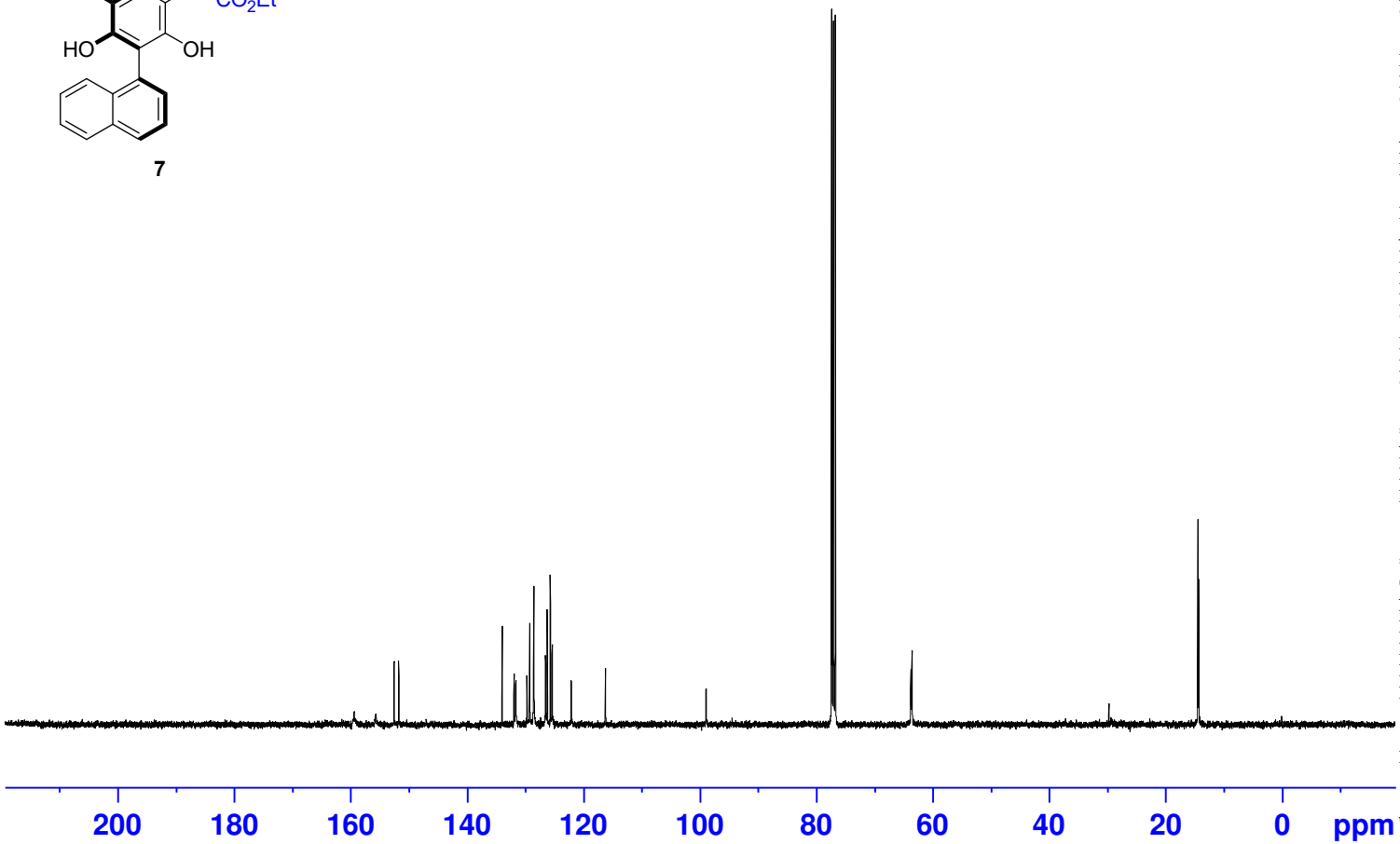



```
Current Data Parameters
NAME        20240324-400
EXPNO                271
PROCNO                 1

F2 - Acquisition Parameters
Date_           20240324
Time                2.14
INSTRUM            spect
PROBHD   5 mm PADUL 13C
PULPROG             zg30
TD                 65536
SOLVENT            CDCl3
NS                     8
DS                     2
SWH             8223.685 Hz
FIDRES          0.125483 Hz
AQ             3.9845889 sec
RG                 68.24
DW                60.800 usec
DE                 6.50 usec
TE                295.6 K
D1           1.00000000 sec
TD0                    1

======== CHANNEL f1 ========
NUC1                  1H
P1                 9.90 usec
PLW1        23.00000000 W
SFO1        400.1924713 MHz

F2 - Processing parameters
SI                 65536
SF          400.1900141 MHz
WDW                   EM
SSB                    0
LB                  0.30 Hz
GB                     0
PC                  1.00
```





7



Current Data Parameters
NAME 20240324-400
EXPNO 272
PROCNO 1

F2 - Acquisition Parameters
Date_ 20240324
Time 3.01
INSTRUM spect
PROBHD 5 mm PADUL 13C
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 800
DS 4
SWH 24038.461 Hz
FIDRES 0.366798 Hz
AQ 1.3631488 sec
RG 61.19
DW 20.800 usec
DE 6.50 usec
TE 296.1 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1

======== CHANNEL f1 ========
NUC1 13C
P1 9.80 usec
PLW1 47.40000153 W
SFO1 100.6379178 MHz

======== CHANNEL f2 ========
CPDPRG[2 waltz16
NUC2 1H
PCPD2 90.00 usec
PLW2 23.00000000 W
PLW12 0.30712000 W
PLW13 0.24877000 W
SFO2 400.1916008 MHz

F2 - Processing parameters
SI 32768
SF 100.6278652 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40