Supporting information for:

# Cobalt-Catalyzed Asymmetric Hydroboration of Aryl Ketones

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## I. General Information

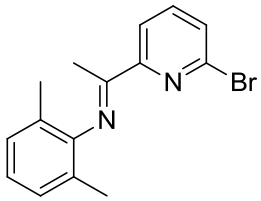
Ether, THF, and Toluene were distilled from sodium benzophenone ketyl prior to use. Pinacolborane (HBPin) (97%) was purchased from TCI and used as received. $NaHBEt_3$ (1.0 M in THF) and $CoCl_2$ (99.7%) were purchased from Aldrich and used as received. 4,5-Bis(diphenylphosphino)-9,9-dimethylxanthene (98%), $Pd(OAc)_2$ (98%) were purchased from energy and used as received. The other commercial available chemicals were used as received. NMR spectra were recorded on a Bruker-400 instrument. $^1H$ NMR chemical shifts were referenced to tetramethylsilane signal (0 ppm), $^{13}C$ NMR chemical shifts were referenced to the solvent resonance (77.00 ppm, $CDCl_3$). The following abbreviations (or combinations) were used to explain multiplicities: s = singlet, d = doublet, t = triplet, m= multiplet, br = broad, q = quadruplet. HPLC analyses were performed on a Shimadzu SPD-20A or Agilent 1100 series. High-resolution mass spectra (HRMS) were recorded on EI-TOF (electrospray ionization-time of flight).

## II. Procedures for Synthesis of Starting Material

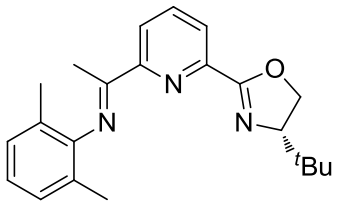
Without note, ketones were purchased and used as received, otherwise, 1-(3-((triisopropylsilyl)oxy)phenyl)ethanone[1a], 1-(4-(dimethylamino)phenyl)ethanone[1b], 1-(3-bromo-4-methoxyphenyl)ethanone[1c], ethyl 4-oxo-4-phenylbutanoate[1d] and *N*,*N*-diethyl-4-oxo-4-phenylbutanamide[1e] were prepared according to previously reported procedures.

## III. Procedures for Preparation of Metal complexes

**1a-1f** were prepared according to the literature.

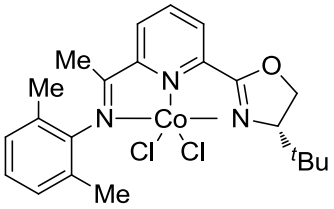



**(*E*)-*N*-(1-(6-bromopyridin-2-yl)ethylidene)-2,6-dimethylaniline (S1).** Prepared according to a previously reported procedure[2] using 1-(6-bromopyridin-2-yl)ethanone as starting material, 88% yield. $^1$H NMR ($CDCl_3$, 400 MHz): $\delta$ 8.30-8.37 (m, 1H), 7.60-7.68 (m, 1H), 7.53-7.59 (m, 1H), 7.02-7.12 (m, 2H), 6.90-6.98 (m, 1H), 2.15 (s, 3H), 2.01 (s, 6H); $^{13}$C NMR ($CDCl_3$, 100 MHz): $\delta$ 166.1, 157.4, 148.4, 140.9, 138.7, 129.2, 127.9, 125.2, 123.2, 120.0, 17.8, 16.6.

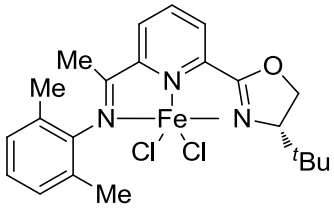



**(*S*,*E*)-*N*-(1-(6-(4-(tert-butyl)-4,5-dihydrooxazol-2-yl)pyridin-2-yl)ethylidene)-2,6-dimethylaniline) (S2).** A 100 mL Schlenk flask was charged with 3.6384 g (12 mmol) of **S1**, 1.8288 g (14.4 mmol) of (*S*)-4-(tert-butyl)-4,5-dihydrooxazole, 0.0673 g (0.30 mmol) of $Pd(OAc)_2$, 0.1944 g (0.336 mmol) of 4,5-bis(diphenylphosphino)-9,9-dimethylxanthene, 1.9224 g (24 mmol) of *t*BuOLi and 50 mL of 1,4-dioxane in nitrogen atmosphere, the mixture was placed in an oil bath and stirring at 100 $^o$C for 18 h. Then the mixture was cooled to room temperature, flitered, and concentrated, the residue was purified by flash column chromatography using 10:1 PE/EtOAc as the eluent to give 1.5001 g (4.3 mmol) of the title compound as a yellow solid. $^1$H NMR ($CDCl_3$,

400 MHz): $\delta$ 8.49 (d, J = 7.8 Hz, 1H), 8.22 (d, J = 7.8 Hz, 1H), 7.88 (t, J = 7.8 Hz, 1H), 7.03-7.10 (m, 2H), 6.90-6.97 (m, 1H), 4.45-4.53 (m, 1H), 4.35 (t, J = 8.4 Hz, 1H), 4.11-4.19 (m, 1H), 2.25 (s, 3H), 2.02 (s, 6H), 1.02 (s, 9H); $^{13}$C NMR: ($CDCl_3$, 100 MHz): $\delta$ 167.1, 162.6, 156.2, 148.7, 146.2, 136.9, 127.9, 125.5, 125.4, 125.3, 123.1, 76.4, 69.5, 34.1, 26.0, 17.9, 16.6; HRMS (EI) calculated for $[C_{29}H_{33}N_3O]^+$ requires m/z 349.2154, found m/z 349.2155.




**1g.** Prepared according to a previously reported procedure[2], A 100 mL Schlenk flask was charged with 0.3225 g (2.48 mmol) of $CoCl_2$, 24 mL of THF and 0.9650 g (2.8 mmol) of **S2** in nitrogen atmosphere, then the mixture was stirred at room temperature for 3 h, then 11 mL of ether was injected to precipitate the complex. The resulting mixture was filtered under air, washed with ether and dried in vacuo to yield 1.1275 g (2.36 mmol, 95% yield) of green powder; Anal. Calcd for $C_{29}H_{33}Cl_2CoN_3O$: C, 55.13; H, 5.68; N, 8.77. Found: C, 55.02; H, 5.76; N, 8.64.

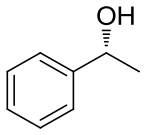



**1h.** Prepared according to a previously reported procedure[2], A 100 mL Schlenk flask was charged with 0.3803 g (3.0 mmol) of $FeCl_2$, 24 mL of THF and 0.9650 g (3.3 mmol) of **S2** in nitrogen atmosphere, then the mixture was stirred at room temperature for 3 h, then 11 mL of ether was injected to precipitate the complex. The resulting mixture was filtered under air, washed with ether and dried in vacuo to yield 1.3970 g (2.85 mmol, 95% yield) of blue powder; Anal. Calcd for $C_{29}H_{33}Cl_2FeN_3O$: C, 56.23; H, 6.16; N, 8.55. Found: C, 56.07; H, 6.23; N, 8.43.

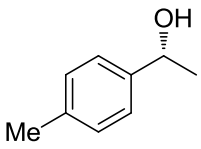
## IV. Hydroboration of ketones

**General Procedure for Asymmetric Hydroboration of Ketones:** To a 25 mL flame-dried Schlenk flask cooled under $N_2$, **1g** complex (0.025 mmol), ether or THF (1 mL), HBPin (180 μL,

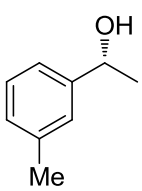
97%, 1.2 mmol) were added insequencely. The mixture was injected with $NaBHEt_3$ (1 M) (25μL, 0.025 mmol) by dropwise and then stirred at r.t. for 10 min. Then the ketone was injected in. Two hours later, the resulting solution was purified by flash column chromatography using 20:1 PE/EtOAc (150 ml) and 5:1 PE/EtOAc as the eluent to give the corresponding product.




**(*R*)-(+)-1-phenylethanol (3a).** Prepared according to the general procedure using 118 μL (1.02 g/mL, 1.0 mmol) of acetophenone, 180 μL (0.89 g/mL, 97%, 1.2 mmol) of HBPin, 0.0128 g (0.027 mmol) of **1g**, 25 μL (1 M in THF, 0.025 mmol) of $NaBHEt_3$, and 1 mL (1.0 M) of ether. After 2 h, the crude reaction mixture was purified by flash column chromatography using 20:1 PE/EtOAc (150 ml) and 5:1 PE/EtOAc as the eluent to give 0.1111 g (0.92 mmol, 92% yield) of the title compound as a colorless oil. Optical Rotation: $[\alpha]^{20}_D$ = +59.5 (c 1.0, $CHCl_3$) (lit.[3]: $[\alpha]^{20}_D$ = -55.3 (c 0.88, $CHCl_3$), 97% ee), 98.1% ee determined by HPLC, HPLC conditions: Chiralcel AS-H, *n*-hexane/*i*-PrOH = 98/2, 1.0 mL/min, *n* = 220 nm, $t_r$ 11.9 (major), 13.1 (minor); $^1$H NMR ($CDCl_3$, 400 MHz): $\delta$ 7.27-7.40 (m, 4H), 7.24-7.30 (m, 1H), 4.84-4.93 (m, 1H), 1.93 (br, 1H), 1.49 (d, J = 6.2 Hz, 3H).

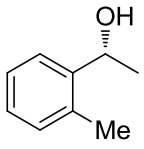



**(*R*)-(+)-1-(p-tolyl)ethanol (3b).** Prepared according to the general procedure using 134 μL (0.98 g/mL, 1.0 mmol) of 4'-methyl-acetophenone, 180 μL (0.89 g/mL, 97%, 1.2 mmol) of HBPin, 0.0134 g (0.028 mmol) of **1g**, 25 μL (1 M in THF, 0.025 mmol) of $NaBHEt_3$, and 1 mL (1.0 M) of THF. After 2 h, the crude reaction mixture was purified by flash column chromatography using 20:1 PE/EtOAc (150 ml) and 5:1 PE/EtOAc as the eluent to give 0.1262 g (0.93 mmol, 93% yield) of the title compound as a colorless oil. Optical Rotation: $[\alpha]^{20}_D$ = +55.4 (c 1.01, $CHCl_3$) (lit.[3]: $[\alpha]^{20}_D$ = -53.4 (c 0.85, $CHCl_3$), 97% ee), 98.7% ee determined by HPLC, HPLC conditions: Chiralcel AD-H, *n*-hexane/*i*-PrOH = 98/2, 1.0 mL/min, *n* = 220 nm, $t_r$ 15.2 (major), 16.5 (minor); $^1$H NMR ($CDCl_3$, 400 MHz): $\delta$ 7.27 (d, J = 7.8 Hz, 2H), 7.16 (d, J = 7.8 Hz, 2H), 4.82-4.92 (m, 1H), 2.34 (s, 3H), 1.79 (br, 1H), 1.48 (d, J = 6.4 Hz, 3H).

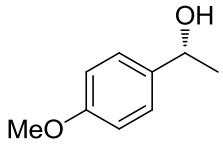



**(*R*)-(+)-1-(m-tolyl)ethanol (3c).** Prepared according to the general procedure

using 136 μL (0.98 g/mL, 1.0 mmol) of 3'-methyl-acetophenone, 180 μL (0.89 g/mL, 97%, 1.2 mmol) of HBPin, 0.0125 g (0.026 mmol) of **1g**, 25 μL (1 M in THF, 0.025 mmol) of $NaBHEt_3$, and 1 mL (1.0 M) of ether. After 2 h, the crude reaction mixture was purified by flash column chromatography using 20:1 PE/EtOAc (150 ml) and 5:1 PE/EtOAc as the eluent to give 0.1302 g (0.96 mmol, 96% yield) of the title compound as a colorless oil. Optical Rotation: $[\alpha]^{20}_D$ = +44.0 (c 0.95, $CHCl_3$) ( lit.[3]: $[\alpha]^{20}_D$ = -54.5 (c 1.65, $CHCl_3$), 95% ee), 96.0% ee determined by HPLC, HPLC conditions: Chiralcel OD-H, *n*-hexane/*i*-PrOH = 98/2, 1.0 mL/min, *n* = 220 nm, $t_r$ 13.4 (major), 18.2 (minor); $^1$H NMR ($CDCl_3$, 400 MHz): $\delta$ 7.21-7.30 (m, 1H), 7.14-7.20 (m, 2H), 7.06-7.12 (m, 1H), 4.81-4.90 (m, 1H), 2.36 (s, 3H), 1.87 (br, 1H), 1.48 (d, J = 6.6 Hz, 3H).

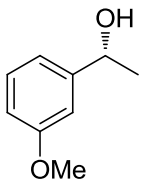



**(*R*)-(+)-1-(o-tolyl)ethanol (3d).** Prepared according to the general procedure using 136 μL (0.98 g/mL, 1.0 mmol) of 2'-methyl-acetophenone, 180 μL (0.89 g/mL, 97%, 1.2 mmol) of HBPin, 0.0123 g (0.026 mmol) of **1g**, 25 μL (1 M in THF, 0.025 mmol) of $NaBHEt_3$, and 1 mL (1.0 M) of ether. After 2 h, the crude reaction mixture was purified by flash column chromatography using 20:1 PE/EtOAc (150 ml) and 5:1 PE/EtOAc as the eluent to give 0.1340 g (0.98 mmol, 98% yield) of the title compound as a colorless oil. Optical Rotation: $[\alpha]^{20}_D$ = +86.3 (c 0.55, $CHCl_3$) ( lit.[3]: $[\alpha]^{20}_D$ = -73.8 (c 0.90, $CHCl_3$), 99% ee), 93.5.0% ee determined by HPLC, HPLC conditions: Chiralcel AD-H, *n*-hexane/*i*-PrOH = 98/2, 1.0 mL/min, *n* = 220 nm, $t_r$ 13.1 (major), 15.0 (minor); $^1$H NMR ($CDCl_3$, 400 MHz): $\delta$ 7.50 (d, J = 7.6 Hz, 1H), 7.20-7.26 (m, 1H), 7.10-7.20 (m, 2H), 5.08-5.15 (m, 1H), 2.34 (s, 3H), 1.83 (br, 1H), 1.46 (d, J = 6.0 Hz, 3H).

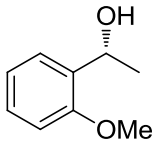



**(*R*)-(+)-1-(4-methoxyphenyl)ethanol (3e).** Prepared according to the general procedure using 0.1500 g of 4'-methoxy-acetophenon (98%), 180 μL (0.89 g/mL, 97%, 1.2 mmol) of HBPin, 0.0127 g (0.027 mmol) of **1g**, 25 μL (1 M in THF, 0.025 mmol) of $NaBHEt_3$, and 1 mL (1.0 M) of ether. After 2 h, the crude reaction mixture was purified by flash column chromatography using 20:1 PE/EtOAc (150 ml) and 5:1 PE/EtOAc as the eluent to give 0.1137 g (0.76 mmol, 76% yield) of the title compound as a colorless oil. Optical Rotation: $[\alpha]^{20}_D$ = +16.5 (c 1.1, $CHCl_3$) (lit.[3]: $[\alpha]^{20}_D$ = -49.1 (c 1.29,

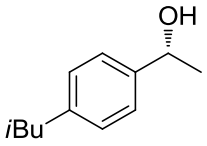
$CHCl_3$), 96% ee), 95.5% ee determined by HPLC, HPLC conditions: Chiralcel AS-H, *n*-hexane/*i*-PrOH = 90/10, 1.0 mL/min, *n* = 220 nm, $t_r$ 11.2 (major), 15.0 (minor); $^1$H NMR ($CDCl_3$, 400 MHz): $\delta$ 7.30 (d, J = 7.8 Hz, 2H), 6.88 (d, J = 7.8 Hz, 2H), 4.82-4.91 (m, 1H), 3.81 (s, 3H), 1.73 (br, 1H), 1.48 (d, J = 6.2 Hz, 3H).



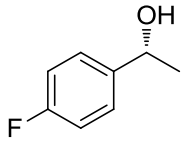

**(*R*)-(+)-1-(3-methoxyphenyl)ethanol (3f).** Prepared according to the general procedure using 138 μL (1.10 g/mL, 1.0 mmol) of 3'-methoxy -acetophenone, 180 μL (0.89 g/mL, 97%, 1.2 mmol) of HBPin, 0.0120 g (0.025 mmol) of **1g**, 25 μL (1 M in THF, 0.025 mmol) of $NaBHEt_3$, and 1 mL (1.0 M) of ether. After 2 h, the crude reaction mixture was purified by flash column chromatography using 20:1 PE/EtOAc (150 ml) and 5:1 PE/EtOAc as the eluent to give 0.1435 g (0.94 mmol, 94% yield) of the title compound as a colorless oil. Optical Rotation: $[\alpha]^{20}_D$ = +42.4 (c 0.91, $CHCl_3$) (lit.[3]: $[\alpha]^{20}_D$ = -38.9 (c 1.27, $CHCl_3$), 91% ee), 98.3% ee determined by HPLC, HPLC conditions: Chiralcel AS-H, *n*-hexane/*i*-PrOH = 98/2, 1.0 mL/min, *n* = 220 nm, $t_r$ 21.6 (major), 23.5 (minor); $^1$H NMR ($CDCl_3$, 400 MHz): $\delta$ 7.30 (d, J = 7.8 Hz, 2H), 6.88 (d, J = 7.8 Hz, 2H), 4.82-4.91 (m, 1H), 3.81 (s, 3H), 1.73 (br, 1H), 1.48 (d, J = 6.2 Hz, 3H).



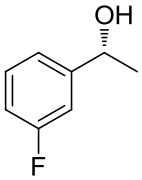

**(*R*)-(+)-1-(2-methoxyphenyl)ethanol (3g).** Prepared according to the general procedure using 142 μL (1.10 g/mL, 1.0 mmol) of 2'-methoxy –acetophenone (97%), 180 μL (0.89 g/mL, 97%, 1.2 mmol) of HBPin, 0.0128 g (0.027 mmol) of **1g**, 25 μL (1 M in THF, 0.025 mmol) of $NaBHEt_3$, and 1 mL (1.0 M) of ether. After 2 h, the crude reaction mixture was purified by flash column chromatography using 20:1 PE/EtOAc (150 ml) and 5:1 PE/EtOAc as the eluent to give 0.0971 g (0.64 mmol, 64% yield) of the title compound as a colorless oil. Optical Rotation: $[\alpha]^{20}_D$ = +22.8 (c 0.93, $CHCl_3$) (lit.[3]: $[\alpha]^{20}_D$ = -15.5 (c 0.8, $CHCl_3$), 60% ee), 91.0% ee determined by HPLC, HPLC conditions: Chiralcel OD-H, *n*-hexane/*i*-PrOH = 98/2, 1.0 mL/min, *n* = 220 nm, $t_r$ 17.9 (minor), 19.3 (major); $^1$H NMR ($CDCl_3$, 400 MHz): $\delta$ 7.31-7.37 (m, 1H), 7.21-7.28 (m, 1H), 6.93-7.00 (m, 1H), 6.88 (d, J = 8.0 Hz, 1H), 5.05-5.14 (m, 1H), 3.87 (s, 3H), 2.66 (br, 1H), 1.51 (d, J = 6.2 Hz, 3H).




**(*R*)-(+)-1-(4-isobutylphenyl)ethanol (3h).** Prepared according to the general procedure using 176 μL (1.0 g/mL, 1.0 mmol) of 4'-(2-methylpropyl)–acetophenone, 180 μL (0.89 g/mL, 97%, 1.2 mmol) of HBPin, 0.0123 g (0.026 mmol) of **1g**, 25 μL (1 M in THF, 0.025 mmol) of $NaBHEt_3$, and 1 mL (1.0 M) of ether. After 2 h, the crude reaction mixture was purified by flash column chromatography using 20:1 PE/EtOAc (150 ml) and 5:1 PE/EtOAc as the eluent to give 0.1558 g (0.87 mmol, 87% yield) of the title compound as a white solid. Optical Rotation: $[\alpha]^{20}_D$ = +38.5 (c 1.03, $CHCl_3$) (lit.[4] $[\alpha]^{22}_D$ = +27.8 (c 1.0, MeOH)), 97.6% ee determined by HPLC, HPLC conditions: Chiralcel AS-H, *n*-hexane/*i*-PrOH = 98/2, 1.0 mL/min, *n* = 220 nm, $t_r$ 7.9 (major), 9.0 (minor); $^1$H NMR ($CDCl_3$, 400 MHz): $\delta$ 7.27 (d, J = 7.6 Hz, 2H), 7.12 (d, J = 7.0 Hz, 2H), 4.80-4.90 (m, 1H), 2.46 (d, J = 6.8 Hz, 2H), 1.78-1.97 (m, 2H), 1.44-1.53 (m, 3H), 0.85-0.96 (m, 6H).

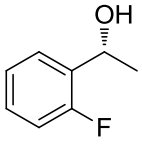



**(*R*)-(+)-1-(4-fluorophenyl)ethanol (3i).** Prepared according to the general procedure using 122 μL (1.09 g/mL, 1.0 mmol) of *p*-fluoroacetophenone, 180 μL (0.89 g/mL, 97%, 1.2 mmol) of HBPin, 0.0128 g (0.027 mmol) of **1g**, 25 μL (1 M in THF, 0.025 mmol) of $NaBHEt_3$, and 1 mL (1.0 M) of THF. After 2 h, the crude reaction mixture was purified by flash column chromatography using 20:1 PE/EtOAc (150 ml) and 5:1 PE/EtOAc as the eluent to give 0.1213 g (0.87 mmol, 87% yield) of the title compound as a colorless oil. Optical Rotation: $[\alpha]^{20}_D$ = +45.8 (c 0.97, $CHCl_3$) (lit.[3]: $[\alpha]^{20}_D$ = -81.5 (c 1.58, $CHCl_3$), 96% ee), 96.7% ee determined by HPLC, HPLC conditions: Chiralcel AS-H, *n*-hexane/*i*-PrOH = 98/2, 1.0 mL/min, *n* = 220 nm, $t_r$ 15.8 (major), 18.1 (minor); $^1$H NMR ($CDCl_3$, 400 MHz): $\delta$ 7.30-7.41 (m, 2H), 7.03 (t, J = 8.6 Hz, 2H), 4.81-4.92 (m, 1H), 1.95 (br, 1H), 1.47 (d, J = 6.4 Hz, 3H).

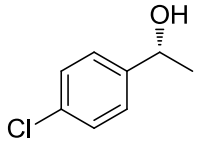



**(*R*)-(+)-1-(3-fluorophenyl)ethanol (3j).** Prepared according to the general procedure using 125 μL (1.09 g/mL, 1.0 mmol) of 3'-fluoroacetophenone ( 98% ), 180 μL (0.89 g/mL, 97%, 1.2 mmol) of HBPin, 0.0124 g (0.026 mmol) of **1g**, 25 μL (1 M in THF, 0.025 mmol) of $NaBHEt_3$, and 1 mL (1.0 M) of THF. After 2 h, the

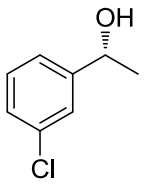
crude reaction mixture was purified by flash column chromatography using 20:1 PE/EtOAc (150 ml) and 5:1 PE/EtOAc as the eluent to give 0.1271 g (0.91 mmol, 91% yield) of the title compound as a colorless oil. Optical Rotation: $[\alpha]^{20}_{D}$ = +39.7 (c 1.18, $CHCl_3$), 95.0% ee determined by HPLC, HPLC conditions: Chiralcel OJ-H, *n*-hexane/*i*-PrOH = 98/2, 1.0 mL/min, *n* = 220 nm, $t_r$ 16.9 (minor), 18.2 (major); $^1$H NMR ($CDCl_3$, 400 MHz): $\delta$ 7.27-7.35 (m, 1H), 7.07-7.17 (m, 2H), 6.92-7.00 (m, 1H), 4.86-4.95 (m, 1H), 1.86 (br, 1H), 1.49 (d, J = 5.8 Hz, 3H).



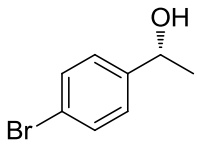

**(*R*)-(+)-1-(2-fluorophenyl)ethanol (3k).** Prepared according to the general procedure using 126 μL (1.09 g/mL, 1.0 mmol) of 2'-fluoroacetophenone, 180 μL (0.89 g/mL, 97%, 1.2 mmol) of HBPin, 0.0130 g (0.027 mmol) of **1g**, 25 μL (1 M in THF, 0.025 mmol) of $NaBHEt_3$, and 1 mL (1.0 M) of ether. After 2 h, the crude reaction mixture was purified by flash column chromatography using 20:1 PE/EtOAc (150 ml) and 5:1 PE/EtOAc as the eluent to give 0.1138 g (0.81 mmol, 81% yield) of the title compound as a colorless oil. Optical Rotation: $[\alpha]^{20}_{D}$ = +44.0 (c 1.03, $CHCl_3$) (lit.[5]: $[\alpha]^{28}_{D}$ = +35.0 (c 0.6, $CHCl_3$), 85% ee), 95.1% ee determined by HPLC, HPLC conditions: Chiralcel OD-H, *n*-hexane/*i*-PrOH = 98/2, 1.0 mL/min, *n* = 220 nm, $t_r$ 10.9 (major), 11.9 (minor); $^1$H NMR ($CDCl_3$, 400 MHz): $\delta$ 7.45-7.53 (m, 1H), 7.21-7.28 (m, 1H), 7.12-7.19 (m, 1H), 6.98-7.06 (m, 1H), 5.16-5.25 (m, 1H), 1.93 (br, 1H), 1.52 (d, J = 6.4 Hz, 3H).



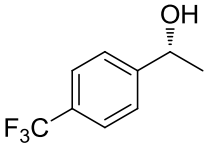

**(*R*)-(+)-1-(4-chlorophenyl)ethanol (3l).** Prepared according to the general procedure using 130 μL (1.19 g/mL, 1.0 mmol) of *p*-chloroacetophenone, 180 μL (0.89 g/mL, 97%, 1.2 mmol) of HBPin, 0.0123 g (0.026 mmol) of **1g**, 25 μL (1 M in THF, 0.025 mmol) of $NaBHEt_3$, and 1 mL (1.0 M) of ether. After 2 h, the crude reaction mixture was purified by flash column chromatography using 20:1 PE/EtOAc (150 ml) and 5:1 PE/EtOAc as the eluent to give 0.1292 g (0.83 mmol, 83% yield) of the title compound as a colorless oil. Optical Rotation: $[\alpha]^{20}_{D}$ = +44.2 (c 0.93, $CHCl_3$) (lit.[3]: $[\alpha]^{20}_{D}$ = -46.0 (c 1.37, $CHCl_3$), 95% ee), 96.1% ee determined by HPLC, HPLC conditions: Chiralcel AS-H, *n*-hexane/*i*-PrOH = 98/2, 1.0 mL/min, *n* = 220 nm, $t_r$ 13.8 (major), 14.7 (minor); $^1$H NMR ($CDCl_3$, 400 MHz): $\delta$ 7.23-7.34 (m, 4H), 4.79-4.87 (m, 1H), 2.30 (br, 1H), 1.44 (d, J = 6.4 Hz, 3H).



**(*R*)-(+)-1-(3-chlorophenyl)ethanol (3m).** Prepared according to the general procedure using 130 μL (1.19 g/mL, 1.0 mmol) of 3'-chloroacetophenone, 180 μL (0.89 g/mL, 97%, 1.2 mmol) of HBPin, 0.0123 g (0.026 mmol) of **1g**, 25 μL (1 M in THF, 0.025 mmol) of $NaBHEt_3$, and 1 mL (1.0 M) of ether. After 2 h, the crude reaction mixture was purified by flash column chromatography using 20:1 PE/EtOAc (150 ml) and 5:1 PE/EtOAc as the eluent to give 0.1400 g (0.89 mmol, 89% yield) of the title compound as a colorless oil. Optical Rotation: $[\alpha]^{20}_D$ = +39.8 (c 0.92, $CHCl_3$) (lit.[3]: $[\alpha]^{20}_D$ = -39.8 (c 1.17, $CHCl_3$), 94% ee), 97.7% ee determined by HPLC, HPLC conditions: Chiralcel AS-H, *n*-hexane/*i*-PrOH = 99/1, 1.0 mL/min, *n* = 220 nm, $t_r$ 34.9 (major), 40.8 (minor); $^1$H NMR ($CDCl_3$, 400 MHz): $\delta$ 7.37 (s, 1H), 7.20-7.30 (m, 3H), 4.82-4.90 (m, 1H), 2.03 (br, 1H), 1.47 (d, J = 6.2 Hz, 3H).

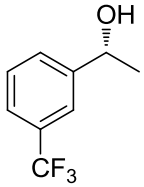


**(*R*)-(+)-1-(4-bromophenyl)ethanol (3n).** Prepared according to the general procedure using 0.2051 g of *p*-bromoacetophenones, 180 μL (0.89 g/mL, 97%, 1.2 mmol) of HBPin, 0.0123 g (0.026 mmol) of **1g**, 25 μL (1 M in THF, 0.025 mmol) of $NaBHEt_3$, and 1 mL (1.0 M) of ether. After 2 h, the crude reaction mixture was purified by flash column chromatography using 20:1 PE/EtOAc (150 ml) and 5:1 PE/EtOAc as the eluent to give 0.1712 g (0.84 mmol, 84% yield) of the title compound as a colorless oil. Optical Rotation: $[\alpha]^{20}_D$ = +35.7 (c 0.98, $CHCl_3$) (lit.[3]: $[\alpha]^{20}_D$ = -72.1 (c 1.66, $CHCl_3$), 96% ee), 96.0% ee determined by HPLC, HPLC conditions: Chiralcel AS-H, *n*-hexane/*i*-PrOH = 98/2, 1.0 mL/min, *n* = 220 nm, $t_r$ 16.0 (major), 17.2 (minor); $^1$H NMR ($CDCl_3$, 400 MHz): $\delta$ 7.47 (d, J = 8.0 Hz, 2H), 7.25 (d, J = 8.0 Hz, 2H), 4.82-4.92 (m, 1H), 1.84 (br, 1H), 1.47 (d, J = 6.4 Hz, 3H).

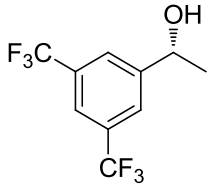


**(*R*)-(+)-1-(4-(trifluoromethyl)phenyl)ethanol (3o).** Prepared according to the general procedure using 205 μL (0.92 g/mL, 1.0 mmol) of 4'-(trifluoromethyl)acetophenone, 180 μL (0.89 g/mL, 97%, 1.2 mmol) of HBPin, 0.0127 g (0.027 mmol) of **1g**, 25 μL (1 M in THF, 0.025 mmol) of $NaBHEt_3$, and 1 mL (1.0 M) of ether. After 2 h, the crude reaction mixture was purified by flash column

chromatography using 20:1 PE/EtOAc (150 ml) and 5:1 PE/EtOAc as the eluent to give 0.1746 g (0.92 mmol, 92% yield) of the title compound as a colorless oil. Optical Rotation: $[\alpha]^{20}_{D}$ = +30.6 (c 1.01, $CHCl_3$) (lit.[3]: $[\alpha]^{20}_{D}$ = -32.0 (c 0.86, $CHCl_3$), 91% ee), 96.5% ee determined by HPLC, HPLC conditions: Chiralcel OJ-H, *n*-hexane/*i*-PrOH = 99/1, 0.5 mL/min, *n* = 220 nm, $t_r$ 30.3 (minor), 32.0 (major); $^1$H NMR ($CDCl_3$, 400 MHz): $\delta$ 7.58 (d, J = 7.6 Hz, 2H), 7.45 (d, J = 8.0 Hz, 2H), 4.87-4.96 (m, 1H), 2.43 (br, 1H), 1.47 (d, J = 6.6 Hz, 3H).

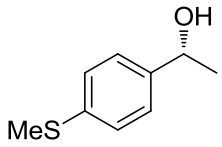



**(*R*)-(+)-1-(3-(trifluoromethyl)phenyl)ethanol (3p).** Prepared according to the general procedure using 210 μL (0.92 g/mL, 1.0 mmol) of 3'-(trifluoromethyl)acetophenone (98%), 180 μL (0.89 g/mL, 97%, 1.2 mmol) of HBPin, 0.0131 g (0.027 mmol) of **1g**, 25 μL (1 M in THF, 0.025 mmol) of $NaBHEt_3$, and 1 mL (1.0 M) of ether. After 2 h, the crude reaction mixture was purified by flash column chromatography using 20:1 PE/EtOAc (150 ml) and 5:1 PE/EtOAc as the eluent to give 0.1672 g (0.88 mmol, 88% yield) of the title compound as a colorless oil. Optical Rotation: $[\alpha]^{20}_{D}$ = +28.7 (c 1.1, $CHCl_3$) (lit.[3]: $[\alpha]^{20}_{D}$ = -27.6 (c 1.05, $CHCl_3$), 91% ee), 92.0% ee determined by HPLC, HPLC conditions: Chiralcel AD-H, *n*-hexane/*i*-PrOH = 98/2, 1.0 mL/min, *n* = 220 nm, $t_r$ 9.2 (major), 10.5 (minor); $^1$H NMR ($CDCl_3$, 400 MHz): $\delta$ 7.65 (s, 1H), 7.51-7.61 (m, 2H), 7.43-7.51 (m, 1H), 4.93-5.02 (m, 1H), 1.90 (br, 1H), 1.52 (d, J = 6.6 Hz, 3H).

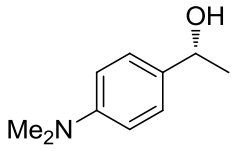



**(*R*)-(+)-1-(3,5-bis(trifluoromethyl)phenyl)ethanol (3q).** Prepared according to the general procedure using 184 μL (1.42, 1.0 mmol) of 3',5'-bis(trifluoromethyl)acetophenone, 180 μL (0.89 g/mL, 97%, 1.2 mmol) of HBPin, 0.0129 g (0.027 mmol) of **1g**, 25 μL (1 M in THF, 0.025 mmol) of $NaBHEt_3$, and 1 mL (1.0 M) of THF. After 2 h, the crude reaction mixture was purified by flash column chromatography using 20:1 PE/EtOAc (150 ml) and 10:1 PE/EtOAc as the eluent to give 0.2320 g (0.90 mmol, 90% yield) of the title compound as a colorless oil. Optical Rotation: $[\alpha]^{20}_{D}$ = +22.6 (c 1.04, $CHCl_3$) (lit.[9]: $[\alpha]^{20}_{D}$ = +15 (c 1.4, $CH_2Cl_2$), 99% ee), 93.6% ee determined by HPLC, HPLC conditions: Chiralcel AS-H, *n*-hexane/*i*-PrOH = 98/2, 1.0 mL/min, *n* = 220 nm, $t_r$ 5.6 (minor), 6.2 (major);$^1$H NMR ($CDCl_3$, 400 MHz): $\delta$ 7.84 (s, 2H), 7.79 (s, 1H), 5.00-5.10 (m,

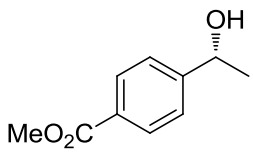
1H), 2.00 (d, J = 3.6 Hz, 1H), 1.55 (d, J = 6.8 Hz, 3H).



**(*R*)-(+)-1-(4-(methylthio)phenyl)ethanol (3r).** Prepared according to the general procedure using 0.1730 g of 4'-(methylthio)acetophenone (0.98, 1.0 mmol), 180 μL (0.89 g/mL, 97%, 1.2 mmol) of HBPin, 0.0121 g (0.025 mmol) of **1g**, 25 μL (1 M in THF, 0.025 mmol) of $NaBHEt_3$, and 1 mL (1.0 M) of ether. After 2 h, the crude reaction mixture was purified by flash column chromatography using 20:1 PE/EtOAc (150 ml) and 5:1 PE/EtOAc as the eluent to give 0.1440 g (0.95 mmol, 95% yield) of the title compound as a colorless oil. Optical Rotation: $[\alpha]^{20}_D$ = +50.3 (c 0.60, $CHCl_3$) (lit.[6]: $[\alpha]^{20}_D$ = +46.4 (c 1.7, $CHCl_3$), 99% ee), 97.3% ee determined by HPLC, HPLC conditions: Chiralcel OJ-H, *n*-hexane/*i*-PrOH = 85/15, 1.0 mL/min, *n* = 220 nm, $t_r$ 11.1 (minor), 11.5 (major); $^1$H NMR ($CDCl_3$,4 00 MHz): $\delta$ 7.20-7.31 (m, 4H), 4.80-4.89 (m, 1H), 2.47 (s, 3H), 1.98 (br, 1H), 1.46 (d, J = 6.4 Hz, 3H).

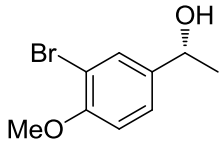


**(*R*)-(+)-1-(4-(dimethylamino)phenyl)ethanol (3s).** Prepared according to the general procedure using 0.1696 g of 4'-dimethylaminoacetophenone (1.0 mmol), 180 μL (0.89 g/mL, 97%, 1.2 mmol) of HBPin, 0.0130 g (0.027 mmol) of **1g**, 25 μL (1 M in THF, 0.025 mmol) of $NaBHEt_3$, and 1 mL (1.0 M) of ether. After 2 h, the crude reaction mixture was purified by flash column chromatography using 20:1 PE/EtOAc (150 ml) and 5:1 PE/EtOAc as the eluent to give 0.1687 g (0.98 mmol, 98% yield) of the title compound as a white solid. Optical Rotation: $[\alpha]^{20}_D$ = +55.8 (c 0.90, $CHCl_3$) (lit.[7]: $[\alpha]^{20}_D$ = +54.8 (c 0.74, $CHCl_3$), 96% ee), 95.8% ee determined by HPLC, HPLC conditions: Chiralcel OJ-H, *n*-hexane/*i*-PrOH = 90/10, 1.0 mL/min, *n* = 220 nm, $t_r$ 19.6 (minor), 22.3 (major); $^1$H NMR ($CDCl_3$, 400 MHz): $\delta$ 7.23-7.28 (m, 2H), 6.72 (d, J = 8.6 Hz, 2H), 4.78-4.84 (m, 1H), 2.94 (s, 6H), 1.72 (br, 1H), 1.48 (d, J = 6.4 Hz, 3H).

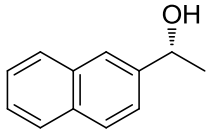


**(*R*)-(+)-methyl 4-(1-hydroxyethyl)benzoate (3t).** Prepared according to the general procedure using 0.1818 g of methyl 4-acetylbenzoate ( 0.98, 1.0 mmol ), 180 μL (0.89 g/mL, 97%, 1.2 mmol) of HBPin, 0.0129 g

(0.027 mmol) of **1g**, 25 μL (1 M in THF, 0.025 mmol) of $NaBHEt_3$, and 1 mL (1.0 M) of ether. After 2 h, the crude reaction mixture was purified by flash column chromatography using 20:1 PE/EtOAc (150 ml) and 5:1 PE/EtOAc as the eluent to give 0.1580 g (0.88 mmol, 88% yield) of the title compound as a thick oil. Optical Rotation: $[\alpha]^{20}_D$ = +33.0 (c 1.2, $CHCl_3$) (lit.[8]: $[\alpha]^{25}_D$ = +41.0 (c 1.0, $CHCl_3$), 93% ee), 96.1% ee determined by HPLC, HPLC conditions: Chiralcel AS-H, *n*-hexane/*i*-PrOH = 80/20, 1.0 mL/min, *n* = 220 nm, $t_r$ 31.2 (major), 51.2 (minor); $^1$H NMR ($CDCl_3$, 400 MHz): $\delta$ 7 .99 (d, J = 8.0 Hz, 2H), 7.42 (d, J = 7.8 Hz, 2H), 4.90-4.97 (m, 1H), 3.90 (s, 3H), 2.40 (br, 1H), 1.49 (d, J = 6.2 Hz, 3H).

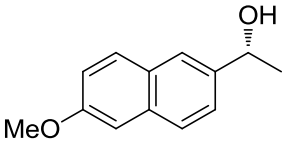



**(*R*)-(+)-1-(3-bromo-4-methoxyphenyl)ethanol (3u).** Prepared according to the general procedure using 0.2246 g of 3-bromo-4-methoxyacetophenone (1.0 mmol), 180 μL (0.89 g/mL, 97%, 1.2 mmol) of HBPin, 0.0125 g (0.026 mmol) of **1g**, 25 μL (1 M in THF, 0.025 mmol) of $NaBHEt_3$, and 1 mL (1.0 M) of ether. After 2 h, the crude reaction mixture was purified by flash column chromatography using 20:1 PE/EtOAc (150 ml) and 5:1 PE/EtOAc as the eluent to give 0.1626 g (0.72 mmol, 72% yield) of the title compound as a yellow oil. IR (neat): 3344, 2970, 1604, 1497, 1254, 1052 $cm^{-1}$; Optical Rotation: $[\alpha]^{20}_D$ = +29.6 (c 0.93, $CHCl_3$), 96.0% ee determined by HPLC, HPLC conditions: Chiralcel AD-H, *n*-hexane/*i*-PrOH = 98/2, 1.0 mL/min, *n* = 220 nm, $t_r$ 31.6 (major), 33.5 (minor); $^1$H NMR ($CDCl_3$, 400 MHz): $\delta$ 7.55-7.59 (m, 1H), 7.25-7.30 (m, 1H), 6.87 (d, J = 8.4 Hz, 1H), 4.80-4.87 (m, 1H), 3.89 (s, 3H), 1.79 (br, 1H), 1.47 (d, J = 6.4 Hz, 3H); $^{13}$C NMR: ($CDCl_3$, 100 MHz): $\delta$ 155.1, 139.6, 130.6, 125.6, 111.9, 111.6, 69.3, 56.3, 25.1; HRMS (EI) calculated for $[C_9H_{11}BrO_2]^+$ requires m/z 229.9942, found m/z 229.9945.

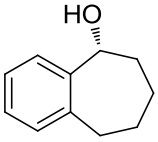



**(*R*)-(+)-1-(naphthalen-2-yl)ethanol (3v).** Prepared according to the general procedure using 0.1700 g of 2'-acetonaphthone ( 1.0 mmol ), 180 μL (0.89 g/mL, 97%, 1.2 mmol) of HBPin, 0.0120 g (0.025 mmol) of **1g**, 25 μL (1 M in THF, 0.025 mmol) of $NaBHEt_3$, and 1 mL (1.0 M) of ether. After 2 h, the crude reaction mixture was purified by flash column chromatography using 20:1 PE/EtOAc (150 ml) and 5:1 PE/EtOAc as the eluent to give 0.1603 g (0.95 mmol, 95% yield) of the title compound as a white

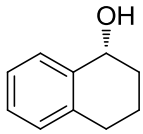
solid. Optical Rotation: $[\alpha]^{20}_D$ = +40.9 (c 1.02, $CHCl_3$) (lit.[3]: $[\alpha]^{20}_D$ = -46.4 (c 1.61, $CHCl_3$), 96% ee), >99% ee determined by HPLC, HPLC conditions: Chiralcel AS-H, *n*-hexane/*i*-PrOH = 98/2, 1.0 mL/min, *n* = 220 nm, $t_r$ 16.2 (minor), 17.5 (major); $^1$H NMR ($CDCl_3$, 400 MHz): $\delta$ 7.76-7.87 (m, 4H), 7.42-7.53 (m, 3H), 5.00-5.10 (m, 1H), 2.01 (br, 1H), 1.56 (d, J = 6.0 Hz, 3H).



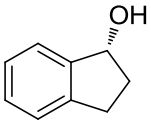

**(*R*)-(+)-1-(6-methoxynaphthalen-2-yl)ethanol (3w).** Prepared according to the general procedure using 0.2035 g of 2-acetyl-6-methoxynaphthalene ( 0.98, 1.0 mmol ), 180 μL (0.89 g/mL, 97%, 1.2 mmol) of HBPin, 0.0122 g (0.025 mmol) of **1g**, 25 μL (1 M in THF, 0.025 mmol) of $NaBHEt_3$, and 1 mL (1.0 M) of ether. After 2 h, the crude reaction mixture was purified by flash column chromatography using 20:1 PE/EtOAc (150 ml) and 5:1 PE/EtOAc as the eluent to give 0.1603 g (0.84 mmol, 84% yield) of the title compound as a white solid. Optical Rotation: $[\alpha]^{20}_D$ = +24.8 (c 0.98, $CHCl_3$) (lit.[8]: $[\alpha]^{25}_D$ =+34.3 (c 1.0, $CHCl_3$), 91% ee), 96.0% ee determined by HPLC, HPLC conditions: Chiralcel OJ-H, *n*-hexane/*i*-PrOH = 80/20, 1.0 mL/min, *n* = 220 nm, $t_r$ 19.8 (minor), 28.6 (major); $^1$H NMR ($CDCl_3$, 400 MHz): $\delta$ 7.67-7.77 (m, 3H), 7.43-7.50 (m, 1H), 7.09-7.17 (m, 2H), 4.98-5.06 (m, 1H), 3.91 (s, 3H), 1.98 (br, 1H), 1.56 (d, J = 6.2 Hz, 3H).



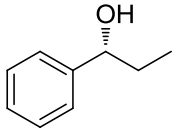

**(*R*)-(+)-6,7,8,9-tetrahydro-5H-benzo[7]annulen-5-ol (3x).** Prepared according to the general procedure using 154 μL (1.08 g/mL, 1.0 mmol) of 6,7,8,9-tetrahydro-5H-benzocyclohepten-5-one, 180 μL (0.89 g/mL, 97%, 1.2 mmol) of HBPin, 0.0128 g (0.027 mmol) of **1g**, 25 μL (1 M in THF, 0.025 mmol) of $NaBHEt_3$, and 1 mL (1.0 M) of THF. After 2 h, the crude reaction mixture was purified by flash column chromatography using 20:1 PE/EtOAc (150 ml) and 5:1 PE/EtOAc as the eluent to give 0.1700 g (0.99 mmol, 99% yield) of the title compound as a white solid. Optical Rotation: $[\alpha]^{20}_D$ = +32.7 (c 1.18, $CHCl_3$) (lit.[7]: $[\alpha]^{19}_D$ = +27.0 (c 1.88, $CHCl_3$), 88% ee), 98.9% ee determined by HPLC, HPLC conditions: Chiralcel AS-H, *n*-hexane/*i*-PrOH = 98/2, 1.0 mL/min, *n* = 220 nm, $t_r$ 14.2 (minor), 14.9 (major); $^1$H NMR ($CDCl_3$, 400 MHz): $\delta$ 7.43 (d, J = 7.8 Hz, 1H), 7.05-7.30 (m, 3H), 4.88-4.97 (m, 1H), 2.86-2.97 (m, 1H), 2.65-2.77 (m, 1H), 1.70-2.11 (m, 6H), 1.40-1.55 (m, 1H).



**(*R*)-(-)-1,2,3,4-tetrahydronaphthalen-1-ol (3y).** Prepared according to the general procedure using 134 μL (1.09 g/mL, 1.0 mmol) of 1,2,3,4-tetrahydro-1-naphthalenone, 180 μL (0.89 g/mL, 97%, 1.2 mmol) of HBPin, 0.0127 g (0.027 mmol) of **1g**, 25 μL (1 M in THF, 0.025 mmol) of $NaBHEt_3$, and 1 mL (1.0 M) of ether. After 2 h, the crude reaction mixture was purified by flash column chromatography using 20:1 PE/EtOAc (150 ml) and 5:1 PE/EtOAc as the eluent to give 0.1283 g (0.87 mmol, 87% yield) of the title compound as a colorless oil. Optical Rotation: $[\alpha]^{20}_D$ = -32.2 (c 1.15, $CHCl_3$) (lit.[7]: $[\alpha]^{19}_D$ = -26.1 (c 1.01, $CHCl_3$), 82% ee), 99.8% ee determined by HPLC, HPLC conditions: Chiralcel AD-H, *n*-hexane/*i*-PrOH = 90/10, 1.0 mL/min, *n* = 220 nm, $t_r$ 19.0 (major), 20.0 (minor); $^1$H NMR ($CDCl_3$, 400 MHz): $\delta$ 7.38-7.46 (m, 1H), 7.15-7.23 (m, 2H), 7.06-7.14 (m, 1H), 4.77 (s, 1H), 2.66-2.88 (m, 2H), 1.68-2.04 (m, 5H).

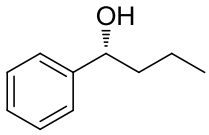


**(*R*)-(-)-2,3-dihydro-1H-inden-1-ol (3z).** Prepared according to the general procedure using 0.1360 g of 1-indanone ( 0.99, 1.01 mmol ), 180 μL (0.89 g/mL, 97%, 1.2 mmol) of HBPin, 0.0126 g (0.027 mmol) of **1g**, 25 μL (1 M in THF, 0.025 mmol) of $NaBHEt_3$, and 1 mL (1.0 M) of THF. After 2 h, the crude reaction mixture was purified by flash column chromatography using 20:1 PE/EtOAc (150 ml) and 5:1 PE/EtOAc as the eluent to give 0.1271 g (0.99 mmol, 99% yield) of the title compound as a white solid. Optical Rotation: $[\alpha]^{20}_D$ = -30.7 (c 0.88, $CHCl_3$) (lit.[7]: $[\alpha]^{20}_D$ = -20.9 (c 1.00, $CHCl_3$), 67% ee), 98.9% ee determined by HPLC, HPLC conditions: Chiralcel AS-H, *n*-hexane/*i*-PrOH = 98/2, 1.0 mL/min, *n* = 220 nm, $t_r$ 13.5 (minor), 15.8 (major); $^1$H NMR ($CDCl_3$, 400 MHz): $\delta$ 7.38-7.46 (m, 1H), 7.20-7.30 (m, 3H), 5.20-5.29 (m, 1H), 3.00-3.11 (m, 1H), 2.76-2.86 (m, 1H), 2.43-2.54 (m, 1H), 1.88-2.00 (m, 1H), 1.82 (br, 1H).

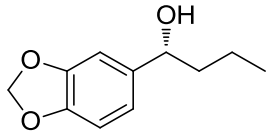


**(*R*)-(+)-1-phenylpropan-1-ol (3aa).** Prepared according to the general procedure using 133 μL (1.01 g/mL, 1.0 mmol) of propiophenone, 180 μL (0.89 g/mL, 97%, 1.2 mmol) of HBPin, 0.0120 g (0.025 mmol) of **1g**, 25 μL (1 M in THF, 0.025 mmol) of $NaBHEt_3$, and 1 mL (1.0 M) of ether. After 2 h, the crude reaction mixture was purified by flash column chromatography using 20:1 PE/EtOAc (150 ml) and 5:1 PE/EtOAc

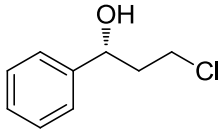
as the eluent to give 0.1254 g (0.92 mmol, 92% yield) of the title compound as a colorless oil. Optical Rotation: $[\alpha]^{20}_D$ = +45.1 (c 0.99, $CHCl_3$) (lit.[3]: $[\alpha]^{20}_D$ = -47.2 (c 0.72, $CHCl_3$), 98% ee), 97.5% ee determined by HPLC, HPLC conditions: Chiralcel AS-H, *n*-hexane/*i*-PrOH = 98/2, 1.0 mL/min, *n* = 220 nm, $t_r$ 9.4 (major), 10.9 (minor); $^1$H NMR ($CDCl_3$, 400 MHz): $\delta$ 7.32-7.40 (m, 4H), 7.23-7.31 (m, 1H), 4.56-4.64 (m, ), 1.69-1.90 (m, 3H), 0.92 (t, J = 7.0 Hz, 3H).



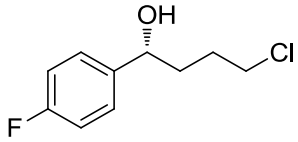
**(*R*)-(+)-1-phenylbutan-1-ol (3ab).** Prepared according to the general procedure using 145 μL (1.02 g/mL, 1.0 mmol) of butyrophenone, 180 μL (0.89 g/mL, 97%, 1.2 mmol) of HBPin, 0.0123 g (0.026 mmol) of **1g**, 25 μL (1 M in THF, 0.025 mmol) of $NaBHEt_3$, and 1 mL (1.0 M) of ether. After 2 h, the crude reaction mixture was purified by flash column chromatography using 20:1 PE/EtOAc (150 ml) and 5:1 PE/EtOAc as the eluent to give 0.1219 g (0.81 mmol, 81% yield) of the title compound as a colorless oil. Optical Rotation: $[\alpha]^{20}_D$ = +43.0 (c 0.90, $CHCl_3$), 96.7% ee determined by HPLC, HPLC conditions: Chiralcel AS-H, *n*-hexane/*i*-PrOH = 98/2, 1.0 mL/min, *n* = 220 nm, $t_r$ 8.3 (major), 9.5 (minor); $^1$H NMR ($CDCl_3$, 400 MHz): $\delta$ 7.23-7.38 (m, 5H), 4.63-4.70 (m, 1H), 1.90 (br, 1H), 1.73-1.84 (m, 1H), 1.61-1.73 (m, 1H), 1.36-1.50 (m, 1H), 1.24-1.36 (m, 1H), 0.93 (t, J = 7.0 Hz, 3H).



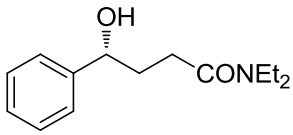
**(*R*)-(+)-1-(benzo[d][1,3]dioxol-5-yl)butan-1-ol (3ac).** Prepared according to the general procedure using 0.1961 g (1.0 mmol) of 3,4-(methylenedioxy)butyrophenone, 180 μL (0.89 g/mL, 97%, 1.2 mmol) of HBPin, 0.0132 g (0.028 mmol) of **1g**, 25 μL (1 M in THF, 0.025 mmol) of $NaBHEt_3$, and 1 mL (1.0 M) of THF. After 2 h, the crude reaction mixture was purified by flash column chromatography using 20:1 PE/EtOAc (150 ml) and 5:1 PE/EtOAc as the eluent to give 0.2168 g (0.99 mmol, 99% yield) of the title compound as a colorless oil. Optical Rotation: $[\alpha]^{20}_D$ = +34.7 (c 0.90, $CHCl_3$), 98.3% ee determined by HPLC, HPLC conditions: Chiralcel OD-H, *n*-hexane/*i*-PrOH = 98/2, 0.7 mL/min, *n* = 220 nm, $t_r$ 36.5 (major), 42.2 (minor);$^1$H NMR ($CDCl_3$, 400 MHz): $\delta$ 6.83 (s, 1H), 6.72-6.77 (m, 2H), 5.91 (s, 2H), 4.51-4.57 (m, 1H), 2.16 (s, 1H), 1.68-1.79 (m, 1H), 1.55-1.65 (m, 1H), 1.20-1.45 (m, 2H), 0.91 (t, J = 7.4 Hz, 3H).




**(*R*)-(+)-3-chloro-1-phenylpropan-1-ol (3ad).** Prepared according to the general procedure using 0.1746 g ( 0.95, 1.0 mmol) of 3-chloropropiophenone, 180 μL (0.89 g/mL, 97%, 1.2 mmol) of HBPin, 0.0123 g (0.026 mmol) of **1g**, 25 μL (1 M in THF, 0.025 mmol) of $NaBHEt_3$, and 1 mL (1.0 M) of ether. After 2 h, the crude reaction mixture was purified by flash column chromatography using 20:1 PE/EtOAc (150 ml) and 5:1 PE/EtOAc as the eluent to give 0.1629 g (0.97 mmol, 97% yield) of the title compound as a colorless oil. Optical Rotation: $[\alpha]^{20}_D$ = +23.8 (c 1.0, $CHCl_3$) (lit.[13]: $[\alpha]^{20}_D$ =-24 (c 1.0, $CHCl_3$), 99% ee), 96.9% ee determined by HPLC, HPLC conditions: Chiralcel AS-H, *n*-hexane/*i*-PrOH = 98/2, 1.0 mL/min, *n* = 220 nm, $t_r$ 18.5 (major), 20.3 (minor); $^1$H NMR ($CDCl_3$, 400 MHz): $\delta$ 7.26-7.39 (m, 5H), 4.88-4.95 (m, 1H), 3.68-3.76 (m, 1H), 3.50-3.58 (m, 1H), 2.17-2.27 (m, 1H), 2.03-2.15 (m, 2H).

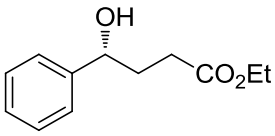



**(*R*)-(+)-4-chloro-1-(4-fluorophenyl)butan-1-ol (3ae).** Prepared according to the general procedure using 174 μL (1.22, 1.0 mmol) of 4-chloro-4'-fluorobutyrophenone, 180 μL (0.89 g/mL, 97%, 1.2 mmol) of HBPin, 0.0120 g (0.025 mmol) of **1g**, 25 μL (1 M in THF, 0.025 mmol) of $NaBHEt_3$, and 1 mL (1.0 M) of THF. After 2 h, the crude reaction mixture was purified by flash column chromatography using 20:1 PE/EtOAc (150 ml) and 10:1 PE/EtOAc as the eluent to give 0.1770 g (0.87 mmol, 87% yield) of the title compound as a colorless oil. Optical Rotation: $[\alpha]^{20}_D$ = +40.6 (c 1.00, $CHCl_3$) (lit.[11]: $[\alpha]^{20}_D$ = -39.8 (c 1.0, $CHCl_3$), 94% ee), 98.1% ee determined by HPLC, HPLC conditions: Chiralcel OD-H, *n*-hexane/*i*-PrOH = 98/2, 1.0 mL/min, *n* = 220 nm, $t_r$ 20.4 (minor), 22.0 (major); $^1$H NMR ($CDCl_3$, 400 MHz): $\delta$ 7.28-7.39 (m, 2H), 6.97-7.10 (m, 2H), 4.65-4.75 (m, 1H), 3.49-3.64 (m, 2H), 1.72-2.00 (m, 5H).

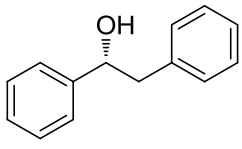



**(*R*)-(+)-*N*,*N*-diethyl-4-hydroxy-4-phenylbutanamide (3af).** Prepared according to the general procedure using 0.2472 g (1.0 mmol) of *N*,*N*-diethyl-4-oxo-4-phenylbutanamide, 180 μL (0.89 g/mL, 97%, 1.2 mmol) of HBPin, 0.0128 g (0.027 mmol) of **1g**, 25 μL (1 M in THF, 0.025 mmol) of

$NaBHEt_3$, and 1 mL (1.0 M) of THF. After 23.5 h, the crude reaction mixture was purified by flash column chromatography using 4:1 PE/EtOAc (150 ml) and 1:1 PE/EtOAc as the eluent to give 0.2014 g (0.81 mmol, 81% yield) of the title compound as a colorless oil. Optical Rotation: $[\alpha]^{20}_D$ = +35.7 (c 0.93, $CHCl_3$) (lit.[1e] $[\alpha]^{25}_D$ = +30.0 (c 1.02, $CH_2Cl_2$, 96% ee), 90.5% ee determined by HPLC, HPLC conditions: Chiralcel AD-H, *n*-hexane/*i*-PrOH = 85/15, 0.8 mL/min, *n* = 210 nm, $t_r$ 9.5 (minor), 10.5 (major); $^1$H NMR ($CDCl_3$, 400 MHz): $\delta$ 7.19-7.30 (m, 4H), 7.12-7.18 (m, 1H), 4.69 (s, 1H), 4.61 (s, 1H), 3.24-3.34 (m, 2H), 3.13-3.21 (m, 2H), 2.36 (t, J = 6.4 Hz, 2H), 1.93-2.09 (m, 2H), 1.03 (t, J = 7.0 Hz, 6H).

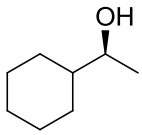



**(*R*)-(+)-ethyl-4-hydroxy-4-phenylbutanoate (3ag).** Prepared according to the general procedure using 0.2062 g (1.0 mmol) of ethyl-4-oxo-4-phenylbutanoate, 180 μL (0.89 g/mL, 97%, 1.2 mmol) of HBPin, 0.0130 g (0.027 mmol) of **1g**, 25 μL (1 M in THF, 0.025 mmol) of $NaBHEt_3$, and 1 mL (1.0 M) of THF. After 24 h, the crude reaction mixture was purified by flash column chromatography using 10:1 PE/EtOAc (150 ml) and 4:1 PE/EtOAc as the eluent to give 0.1826 g (0.88 mmol, 88% yield) of the title compound as a colorless oil. Optical Rotation: $[\alpha]^{20}_D$ = +33.3 (c 1.00, $CHCl_3$) (lit.[1d]: $[\alpha]^{20}_D$ = -35.6 (c 1.0, $CHCl_3$), 96.3% ee), 98.0% ee determined by HPLC, HPLC conditions: Chiralcel OJ-H, *n*-hexane/*i*-PrOH = 95/5, 1.0 mL/min, *n* = 220 nm, $t_r$ 26.0 (major), 27.8 (minor); $^1$H NMR ($CDCl_3$, 400 MHz): $\delta$ 7.20-7.35 (m, 5H), 4.63-4.70 (m, 1H), 4.03-4.11 (q, 2H), 3.00 (br, 1H), 2.36 (t, J = 7.2 Hz, 2H), 1.97-2.05 (m, 2H), 1.22 (t, J = 7.2 Hz, 3H).

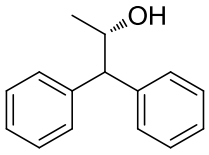



**(*R*)-(+)-1,2-diphenylethanol (3ah).** Prepared according to the general procedure using 0.2010 g (0.98, 1.0 mmol) of benzylphenylketone, 180 μL (0.89 g/mL, 97%, 1.2 mmol) of HBPin, 0.0130 g (0.027 mmol) of **1g**, 25 μL (1 M in THF, 0.025 mmol) of $NaBHEt_3$, and 1 mL (1.0 M) of ether. After 2 h, the crude reaction mixture was purified by flash column chromatography using 20:1 PE/EtOAc (150 ml) and 5:1 PE/EtOAc as the eluent to give 0.1685 g (0.86 mmol, 86% yield) of the title compound as a colorless solid. Optical Rotation: $[\alpha]^{20}_D$ = +12.5 (c 1.01, $CHCl_3$) (lit.[3]: $[\alpha]^{20}_D$ = -15.0 (c 0.77,

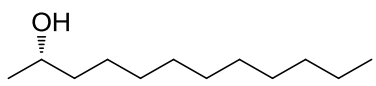
$CHCl_3$), 98% ee), 92.0% ee determined by HPLC, HPLC conditions: Chiralcel AS-H, *n*-hexane/*i*-PrOH = 98/2, 1.0 mL/min, *n* = 220 nm, $t_r$ 15.4 (major), 17.3 (minor); $^1$H NMR ($CDCl_3$, 400 MHz): $\delta$ 7.14-7.44 (m, 10H), 4.87-4.94 (m, 1H), 2.95-3.09 (m, 2H), 1.94 (br, 1H).




**(*S*)-(+)-1-cyclohexylethanol (3ai).** Prepared according to the general procedure using 0.1263 g (1.0 mmol) of 1-cyclohexylethan-1-one, 180 μL (0.89 g/mL, 97%, 1.2 mmol) of HBPin, 0.0128 g (0.027 mmol) of **1g**, 25 μL (1 M in THF, 0.025 mmol) of $NaBHEt_3$, and 1 mL (1.0 M) of ether. After 2 h, the crude reaction mixture was purified by flash column chromatography using 20:1 PE/EtOAc (150 ml) and 5:1 PE/EtOAc as the eluent to give 0.0856 g (0.67 mmol, 67% yield) of the title compound as a colorless oil. $^1$H NMR ($CDCl_3$, 400 MHz): $\delta$ 3.50-3.59 (m, 1H), 1.62-1.89 (m, 5H), 1.38 (br, 1H), 0.90-1.32 (m, 9H). The product was treated with 2-naphthoyl chloride (1.35 mmol, 2 equiv) to afford the corresponding ester, optical Rotation: $[\alpha]^{20}_D$ = +20.0 (c 1.14, $CHCl_3$), 45.0% ee determined by HPLC, HPLC conditions: Chiralcel OJ-H, *n*-hexane/*i*-PrOH = 98/2, 1.0 mL/min, *n* = 220 nm, $t_r$ 5.2 (minor), 6.3 (major).

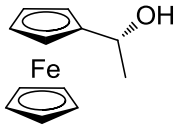



**(*S*)-(-)-1,1-diphenylpropan-2-ol (3aj).** Prepared according to the general procedure using 0.2124 g (0.99, 1.0 mmol) of 1,1-diphenylacetone, 180 μL (0.89 g/mL, 97%, 1.2 mmol) of HBPin, 0.0123 g (0.026 mmol) of **1g**, 25 μL (1 M in THF, 0.025 mmol) of $NaBHEt_3$, and 1 mL (1.0 M) of ether. After 2 h, the crude reaction mixture was purified by flash column chromatography using 20:1 PE/EtOAc (150 ml) and 5:1 PE/EtOAc as the eluent to give 0.1985 g (0.94 mmol, 94% yield) of the title compound as a white solid. Optical Rotation: $[\alpha]^{20}_D$ = -4.9 (c 1.14, $CHCl_3$) (lit.[3]: $[\alpha]^{20}_D$ = +14.5 (c 1.94, $CHCl_3$), 99% ee), 64.5% ee determined by HPLC, HPLC conditions: Chiralcel AS-H, *n*-hexane/*i*-PrOH = 98/2, 1.0 mL/min, *n* = 220 nm, $t_r$ 12.4 (major), 14.1 (minor); $^1$H NMR ($CDCl_3$, 400 MHz): $\delta$ 7.14-7.43 (m, 10H), 4.49-4.59 (m, 1H), 3.80 (d, J = 8.8 Hz, 1H), 1.70 (br, 1H), 1.19 (d, J = 6.2 Hz, 3H).

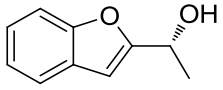



**(*S*)-(+)-tridecan-2-ol (3ak).** Prepared according to the general procedure using 0.2090 g ( 1.0 mmol) of 2-tridecanone, 180

μL (0.89 g/mL, 97%, 1.2 mmol) of HBPin, 0.0120 g (0.025 mmol) of **1g**, 25 μL (1 M in THF, 0.025 mmol) of $NaBHEt_3$, and 1 mL (1.0 M) of ether. After 2 h, the crude reaction mixture was purified by flash column chromatography using 20:1 PE/EtOAc (150 ml) and 10:1 PE/EtOAc as the eluent to give 0.1753 g (0.85 mmol, 85% yield) of the title compound as a colorless oil. $^1$H NMR ($CDCl_3$, 400 MHz): $\delta$ 3.86-3.73 (m, 1H), 1.53-1.37 (m, 3H), 1.36-1.21 (m, 18H), 1.18 (d, J = 6.0 Hz, 3H), 0.88 (t, J = 6.0 Hz, 3H). The product was treated with 2-naphthoyl chloride ( 2 equiv) to afforded the corresponding ester. Optical Rotation for the corresponding ester: $[\alpha]^{20}_D$ = +5.8 (c 0.92, $CHCl_3$), 17.7% ee determined by HPLC, HPLC conditions: Chiralcel AD-H, n-hexane/i-PrOH = 99/1, 0.5 mL/min, n = 220 nm, tr 9.5 (major), 9.0 (minor);

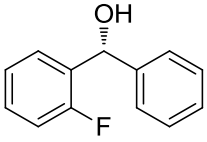



**(*R*)-(-)-1-ferrocenylethanol (3al).** Prepared according to the general procedure using 0.2326 g of acetylferrocene (0.98, 1.0 mmol), 180 μL (0.89 g/mL, 97%, 1.2 mmol) of HBPin, 0.0122 g (0.025 mmol) of **1g**, 25 μL (1 M in THF, 0.025 mmol) of $NaBHEt_3$, and 1 mL (1.0 M) of ether. After 2 h, the crude reaction mixture was purified by flash column chromatography using 20:1 PE/EtOAc (150 ml) and 5:1 PE/EtOAc as the eluent to give 0.1603 g (0.71 mmol, 71% yield) of the title compound as a yellow solid. Optical Rotation: $[\alpha]^{20}_D$ = -26.6 (c 2.06, $CHCl_3$) (lit.[10]: $[\alpha]^{23}_D$ = -28.9 (c 1.21, benzene), 98% ee), 95.1% ee determined by HPLC, HPLC conditions: Chiralcel OJ-H, *n*-hexane/*i*-PrOH = 98/2, 1.0 mL/min, *n* = 220 nm, $t_r$ 14.9 (major), 16.4 (minor); $^1$H NMR ($CDCl_3$, 400 MHz): $\delta$ 4.50-4.60 (m, 1H), 4.13-4.27 (m, 9H), 1.84 (br, 1H), 1.44 (d, J = 6.o Hz, 3H).

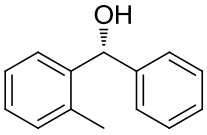



**(*R*)-(+)-1-(benzofuran-2-yl)ethanol (3am).** Prepared according to the general procedure using 0.3236 g (0.99, 2.0 mmol) of 2-acetylbenzofuran, 360 μL (0.89 g/mL, 97%, 2.4 mmol) of HBPin, 0.0258 g (0.054 mmol) of **1g**, 50 μL (1 M in THF, 0.050 mmol) of $NaBHEt_3$, and 2 mL (1.0 M) of THF. After 24 h, the crude reaction mixture was purified by flash column chromatography using 20:1 PE/EtOAc (150 ml) and 10:1 PE/EtOAc as the eluent to give 0.2912 g (0.90 mmol, 90% yield) of the title compound as a yellow oil. Optical Rotation: $[\alpha]^{20}_D$ = +9.9, 62.7% ee determined by HPLC, HPLC conditions: Chiralcel AS-H, *n*-hexane/*i*-PrOH = 98/2, 1.0 mL/min, *n* = 254 nm, $t_r$ 19.4 (major), 21.3 (minor);$^1$H NMR ($CDCl_3$,

400 MHz): $\delta$ 7.46-7.52 (m, 1H), 7.39-7.45 (m, 1H), 7.15-7.27 (m, 1H), 6.53 (s, 1H), 4.99-4.90 (m, 1H), 2.84 (br, 1H), 1.57 (d, J = 6.6 Hz, 3H).

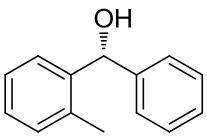



**(*R*)-(+)-(2-fluorophenyl)(phenyl)methanol (3an).** Prepared according to the general procedure using 174 uL (1.18, 1.0 mmol) of 2-fluorobenzophenone, 180 μL (0.89 g/mL, 97%, 1.2 mmol) of HBPin, 0.0127 g (0.027 mmol) of **1g**, 25 μL (1 M in THF, 0.025 mmol) of $NaBHEt_3$, and 1 mL (1.0 M) of THF. After 2 h, the crude reaction mixture was purified by flash column chromatography using 20:1 PE/EtOAc (150 ml) and 10:1 PE/EtOAc as the eluent to give 0.1948 g (0.96 mmol, 96% yield) of the title compound as a white solid. Optical Rotation: $[\alpha]^{20}_D$ = +5.2 (c 0.81, $CHCl_3$) (lit.[17]: $[\alpha]^{20}_D$ = -4.64 (c 0.84, $CHCl_3$), 97% ee), 90.3% ee determined by HPLC, HPLC conditions: Chiralcel OD-H, *n*-hexane/*i*-PrOH = 96/4, 0.9 mL/min, *n* = 254 nm, $t_r$ 15.6 (minor), 17.3 (major); $^1$H NMR ($CDCl_3$, 400 MHz): $\delta$ 7.43-7.52 (m, 1H), 7.17-7.41 (m, 6H), 7.06-7.15 (m, 1H), 6.93-7.03 (m, 1H), 6.07 (s, 1H), 2.58 (br, 1H).




**(*R*)-(+)-phenyl(o-tolyl)methanol (3ao).** Prepared according to the general procedure using 185 uL (1.08, 1.0 mmol) of 2-methylbenzophenone, 180 μL (0.89 g/mL, 97%, 1.2 mmol) of HBPin, 0.0120 g (0.025 mmol) of **1g**, 25 μL (1 M in THF, 0.025 mmol) of $NaBHEt_3$, and 1 mL (1.0 M) of THF. After 13 h, the crude reaction mixture was purified by flash column chromatography using 20:1 PE/EtOAc (150 ml) and 10:1 PE/EtOAc as the eluent to give 0.1990 g (0.99 mmol, 99% yield) of the title compound as a white solid. Optical Rotation: $[\alpha]^{20}_D$ =+5.4 (c 0.94, $CHCl_3$) (lit.[16]: $[\alpha]^{23}_D$ = +11 (c 1.33, $CHCl_3$), 81% ee), 86.0% ee determined by HPLC, HPLC conditions: Chiralcel OD-H, *n*-hexane/*i*-PrOH = 90/10, 1.0 mL/min, *n* = 220 nm, $t_r$ 13.8 (minor), 14.9 (major);$^1$H NMR ($CDCl_3$, 400 MHz): $\delta$ 7.44 (d, J = 7.0 Hz, 1H), 7.00-7.30 (m, 8H), 5.85 (s, 1H), 2.53 (br, 1H), 2.16 (s, 3H).

**Gram-Scale reaction**




**(*R*)-(+)-phenyl(o-tolyl)methanol (3ao).** Prepared according to the general procedure using 185 mL (1.08, 10 mmol) of 2-methylbenzophenone, 1.8 mL (0.89 g/mL, 97%, 12 mmol) of HBPin, 0.1200 g (0.25 mmol) of **1g**, 250 μL

(1 M in THF, 0.25 mmol) of $NaBHEt_3$, and 10 mL (1.0 M) of THF. After 11 h, the crude reaction mixture was purified by flash column chromatography using 20:1 PE/EtOAc and 10:1 PE/EtOAc as the eluent to give 1.9351 g (9.8 mmol, 98% yield) of the title compound as a white solid. Optical Rotation: $[\alpha]^{20}_{D}$ = +5.4 (c 0.94, $CHCl_3$), 86.0% ee determined by HPLC.

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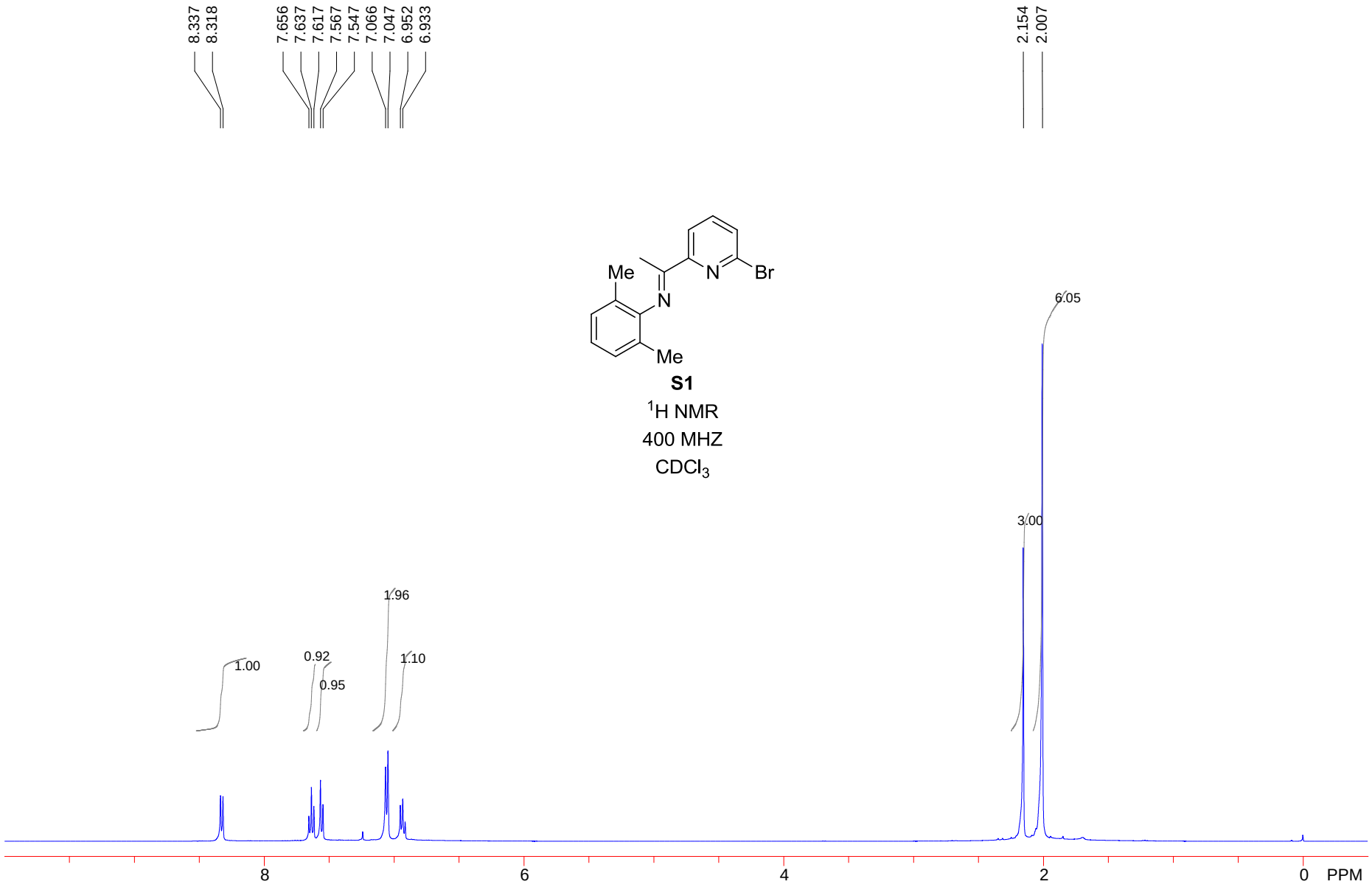
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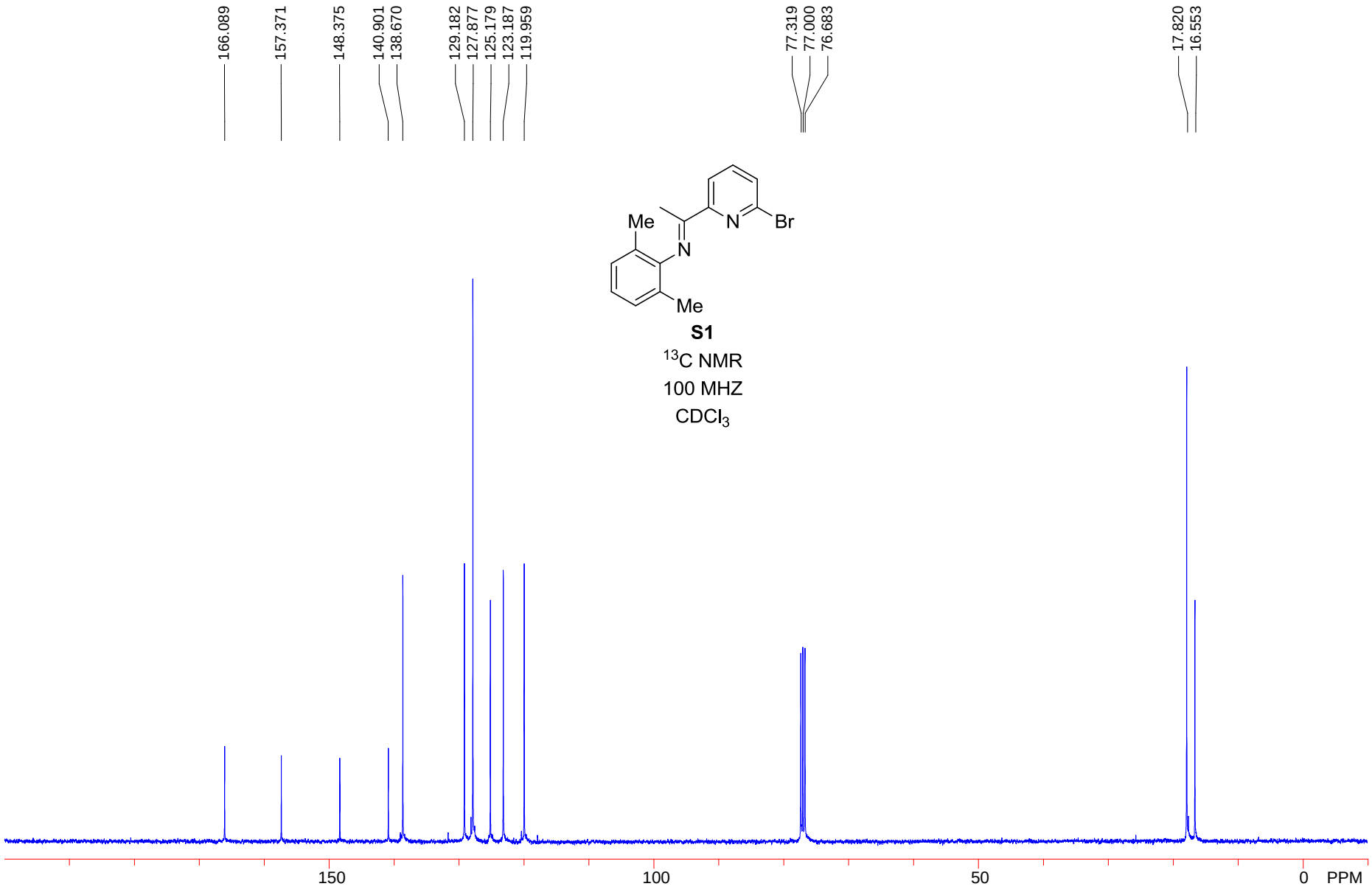
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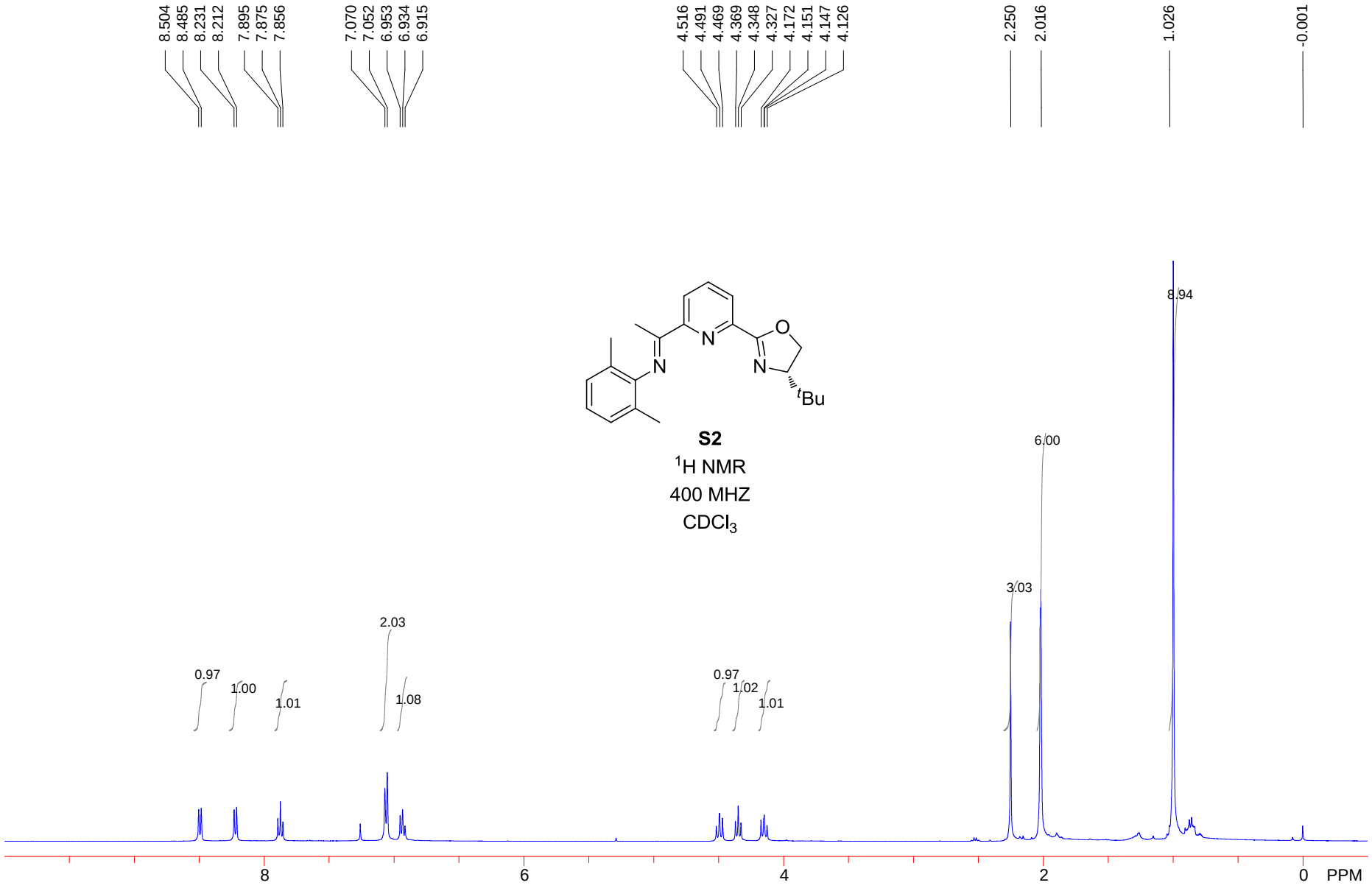
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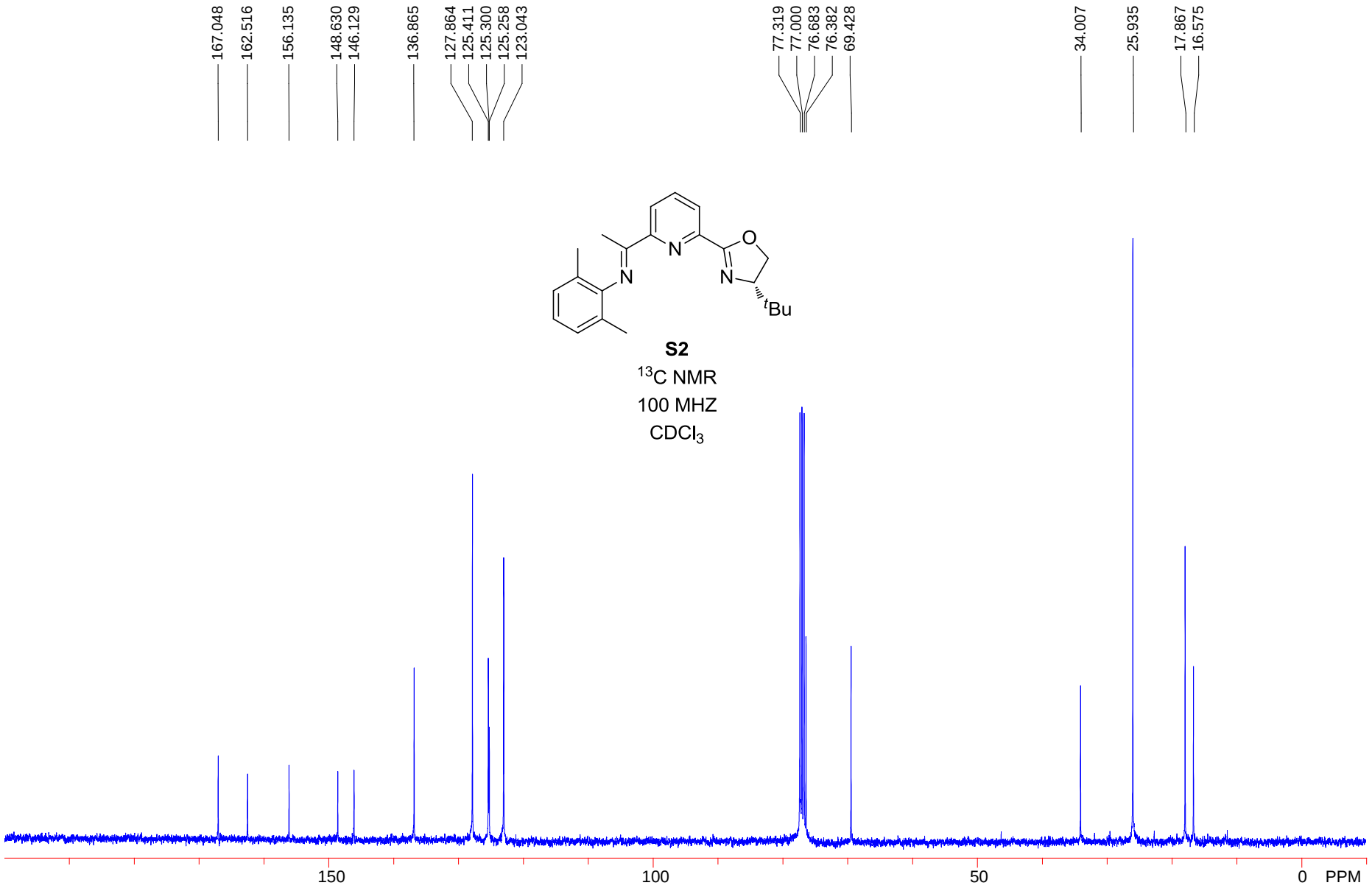


**S2**

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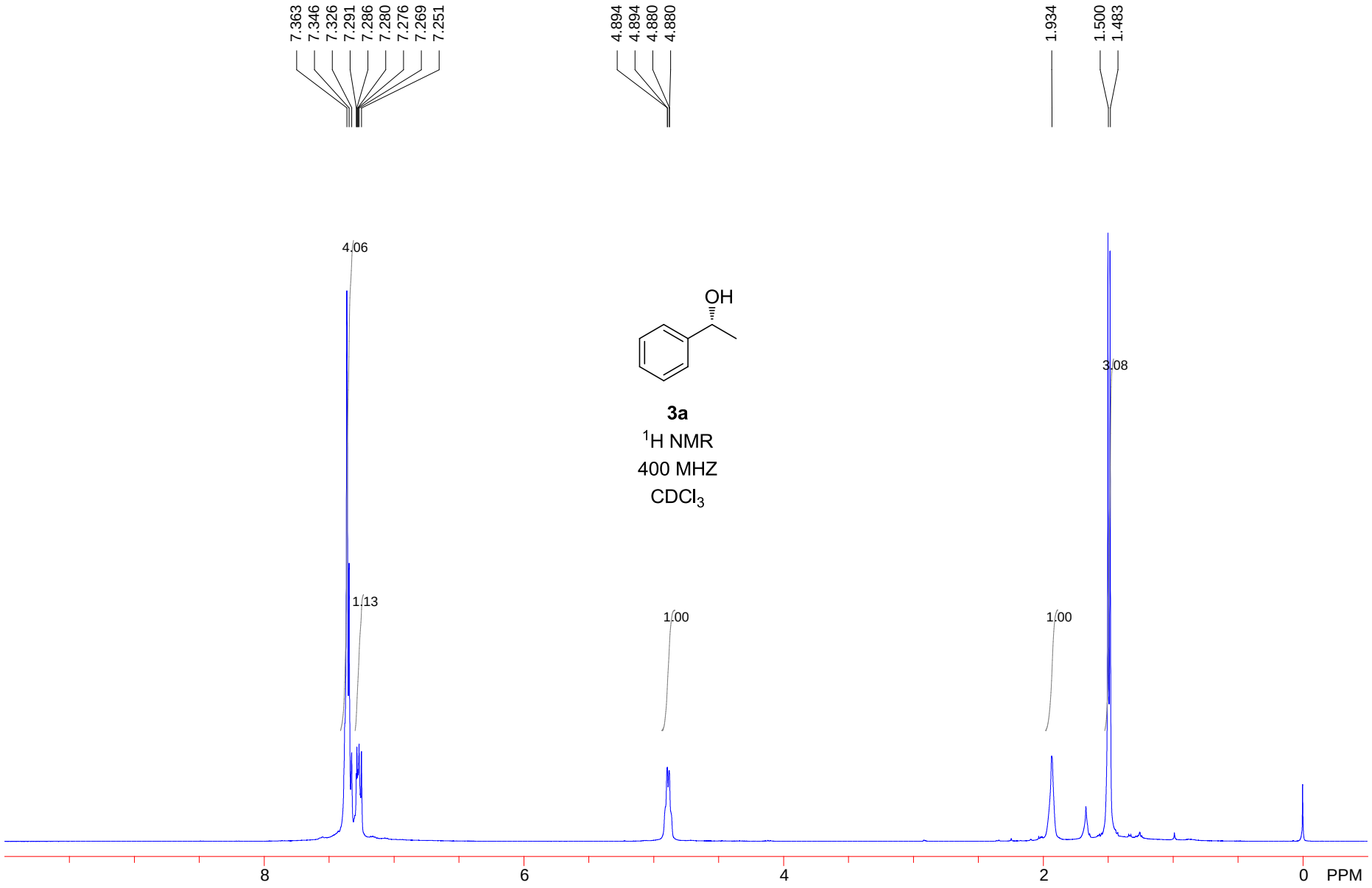
100 MHZ

$CDCl_3$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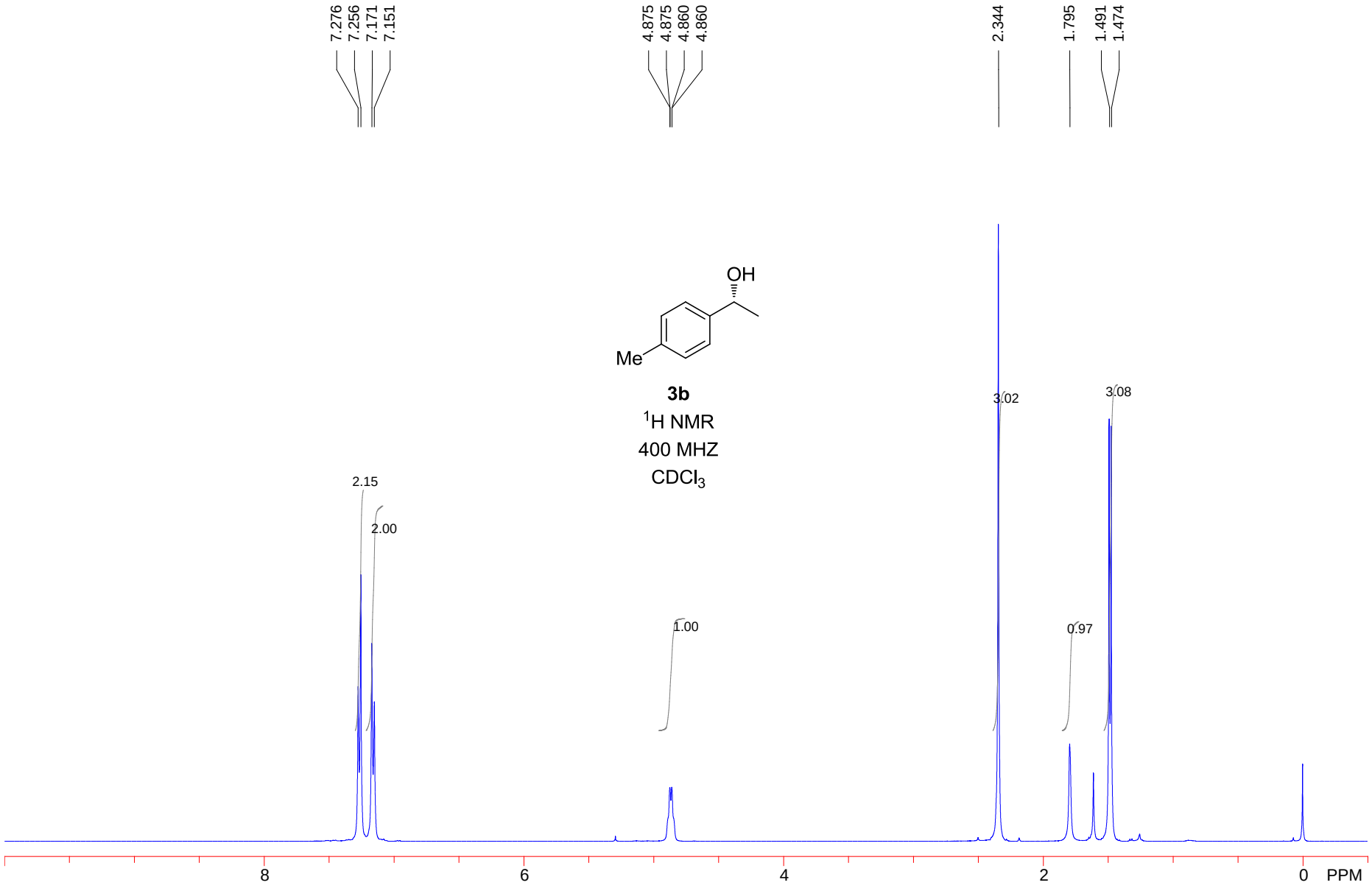
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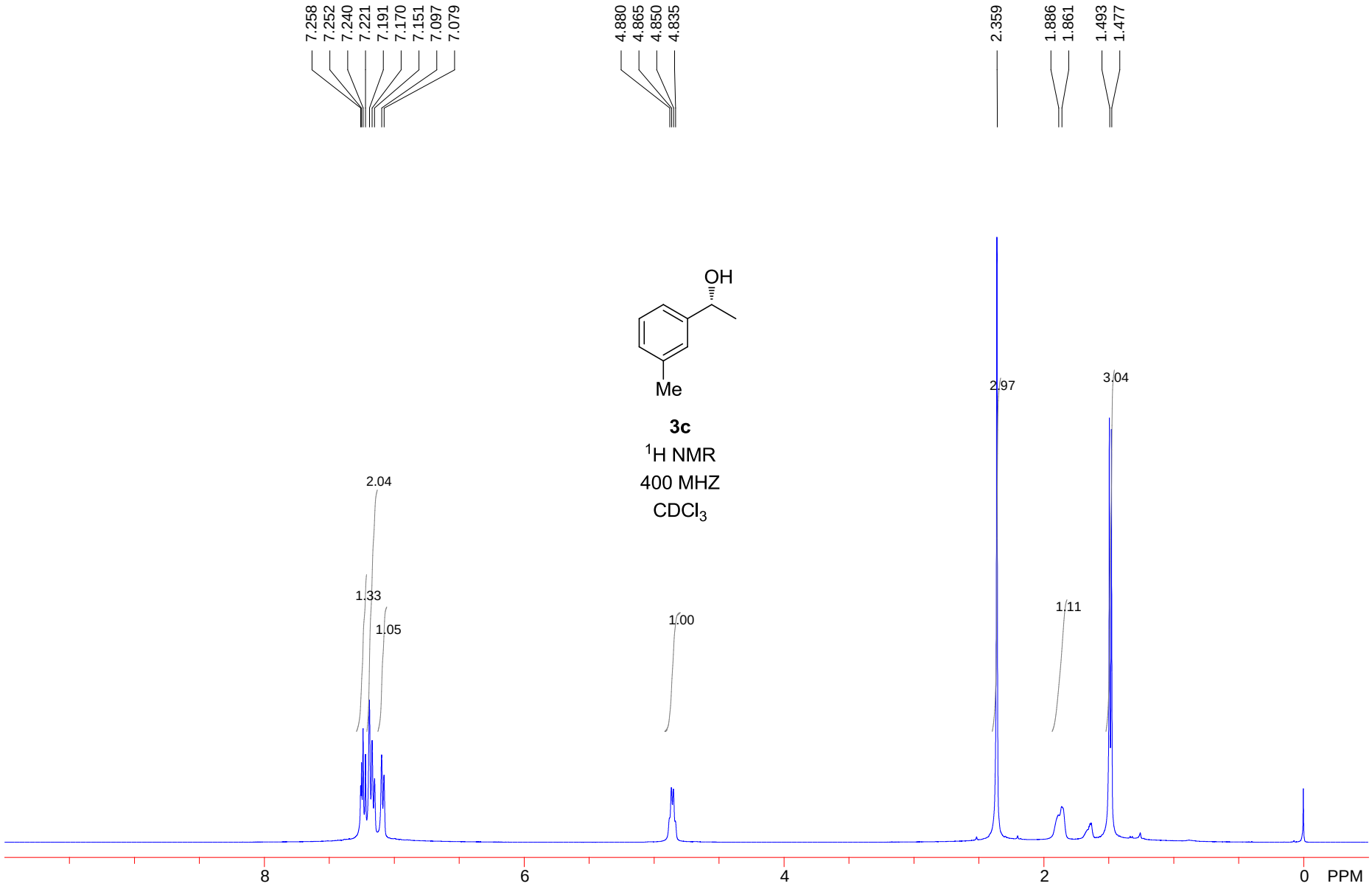
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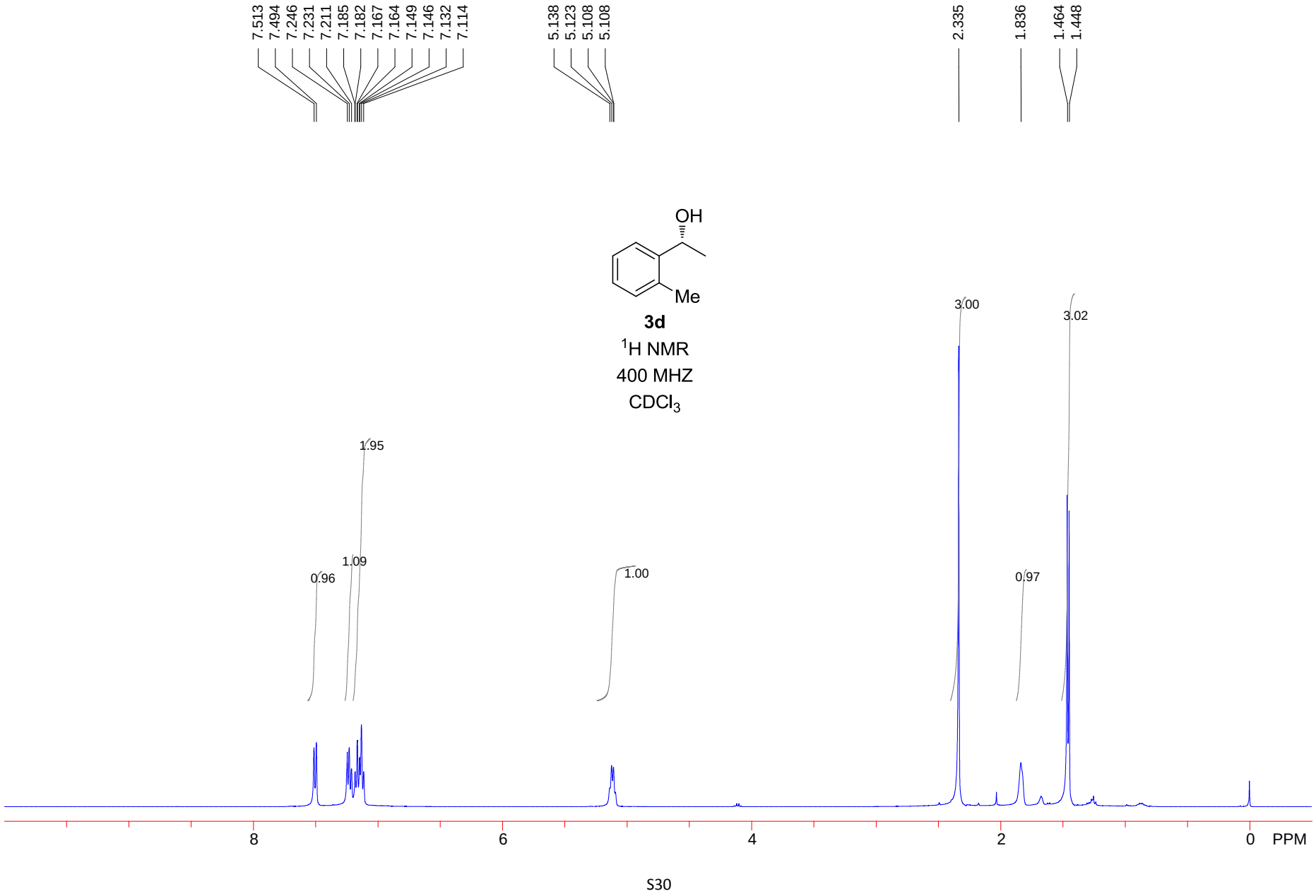
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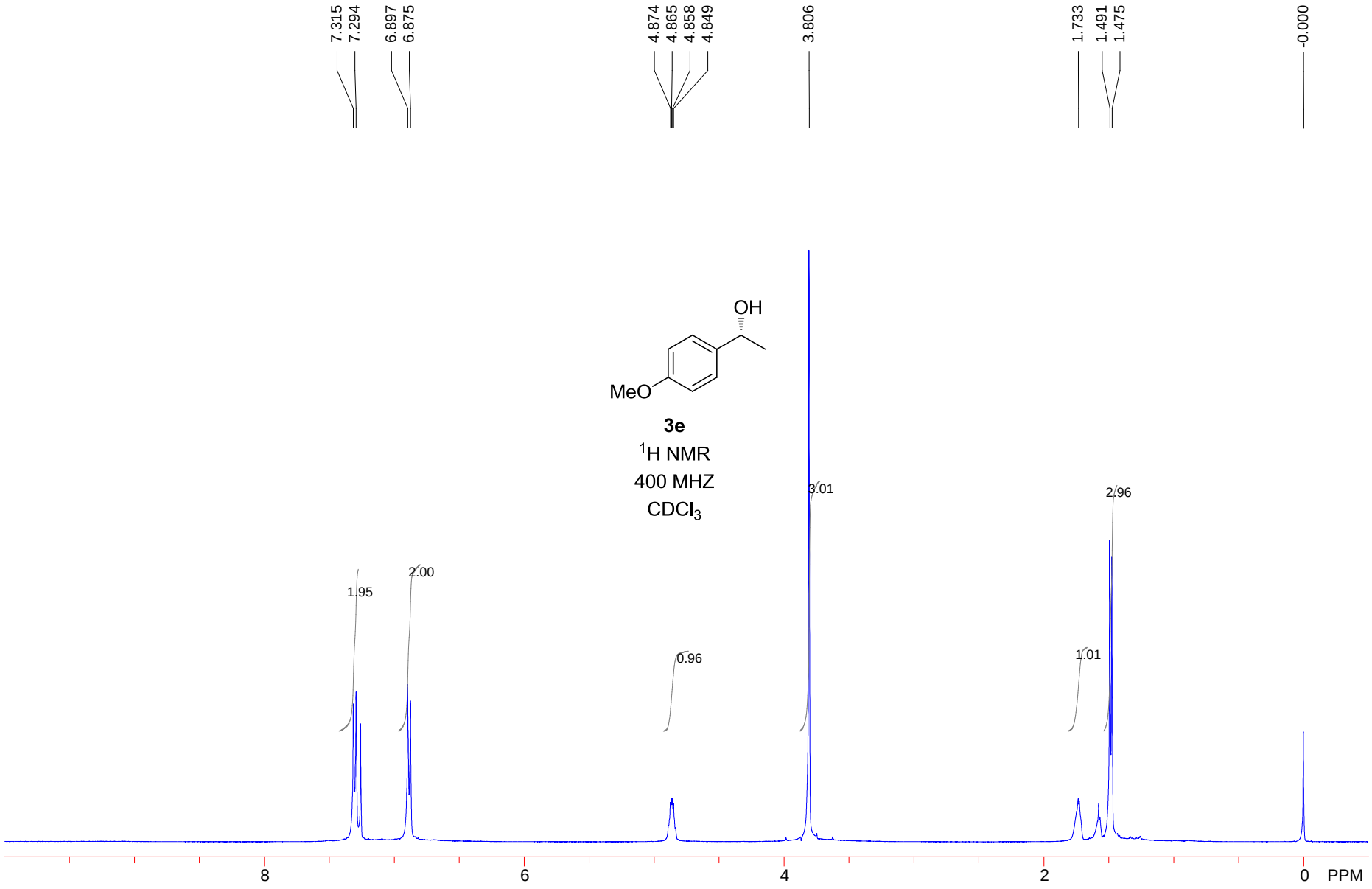
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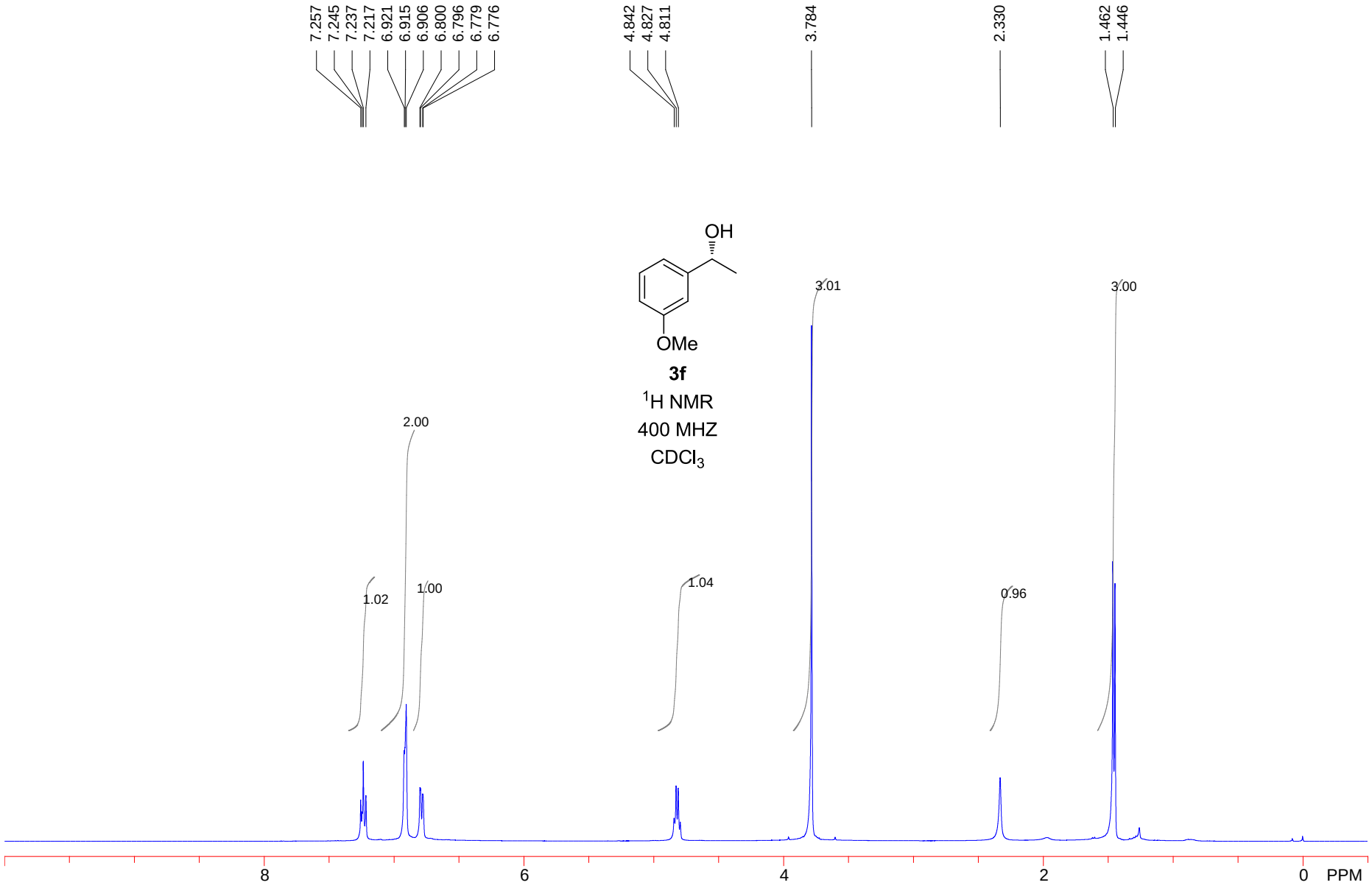
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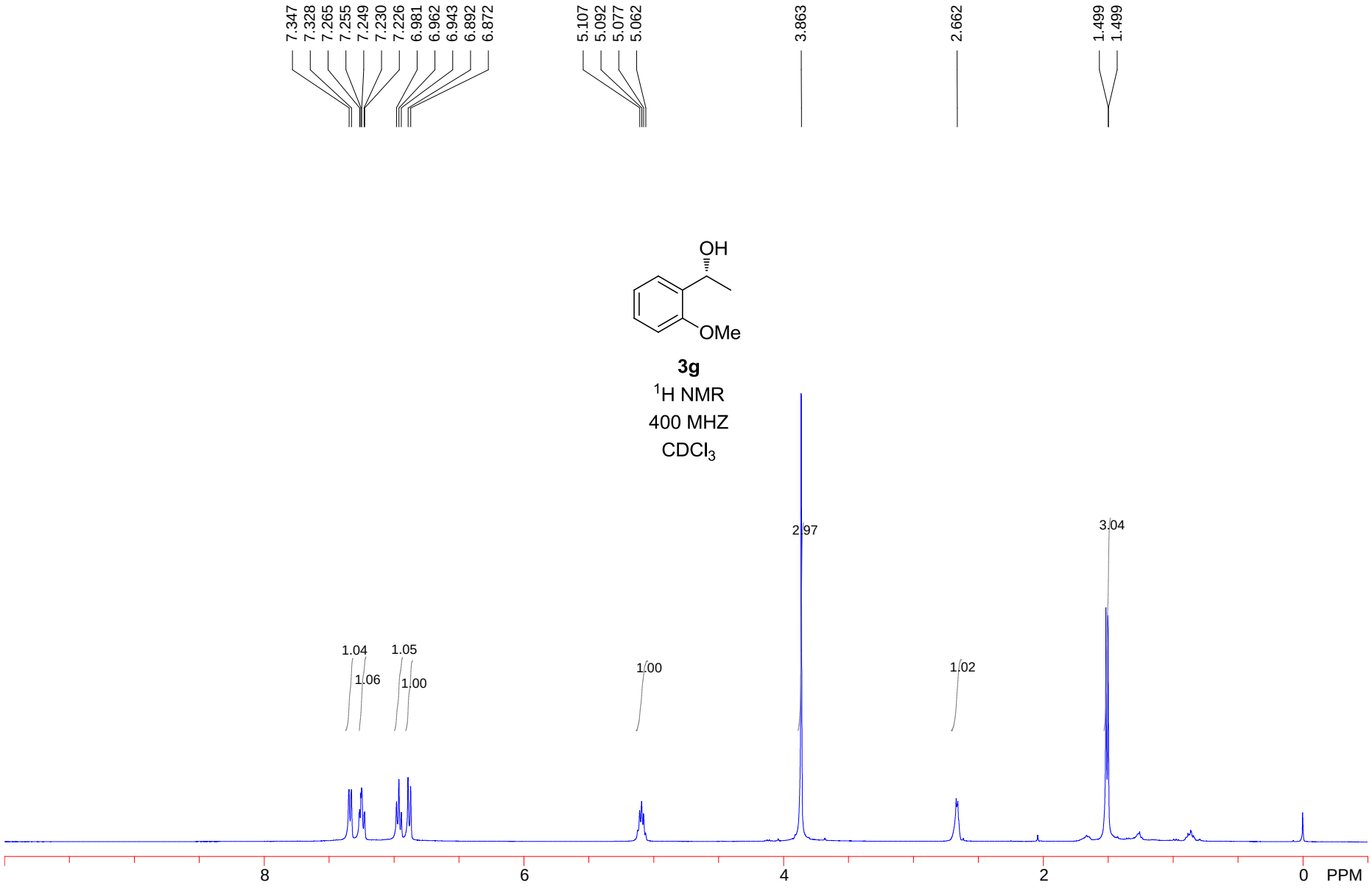
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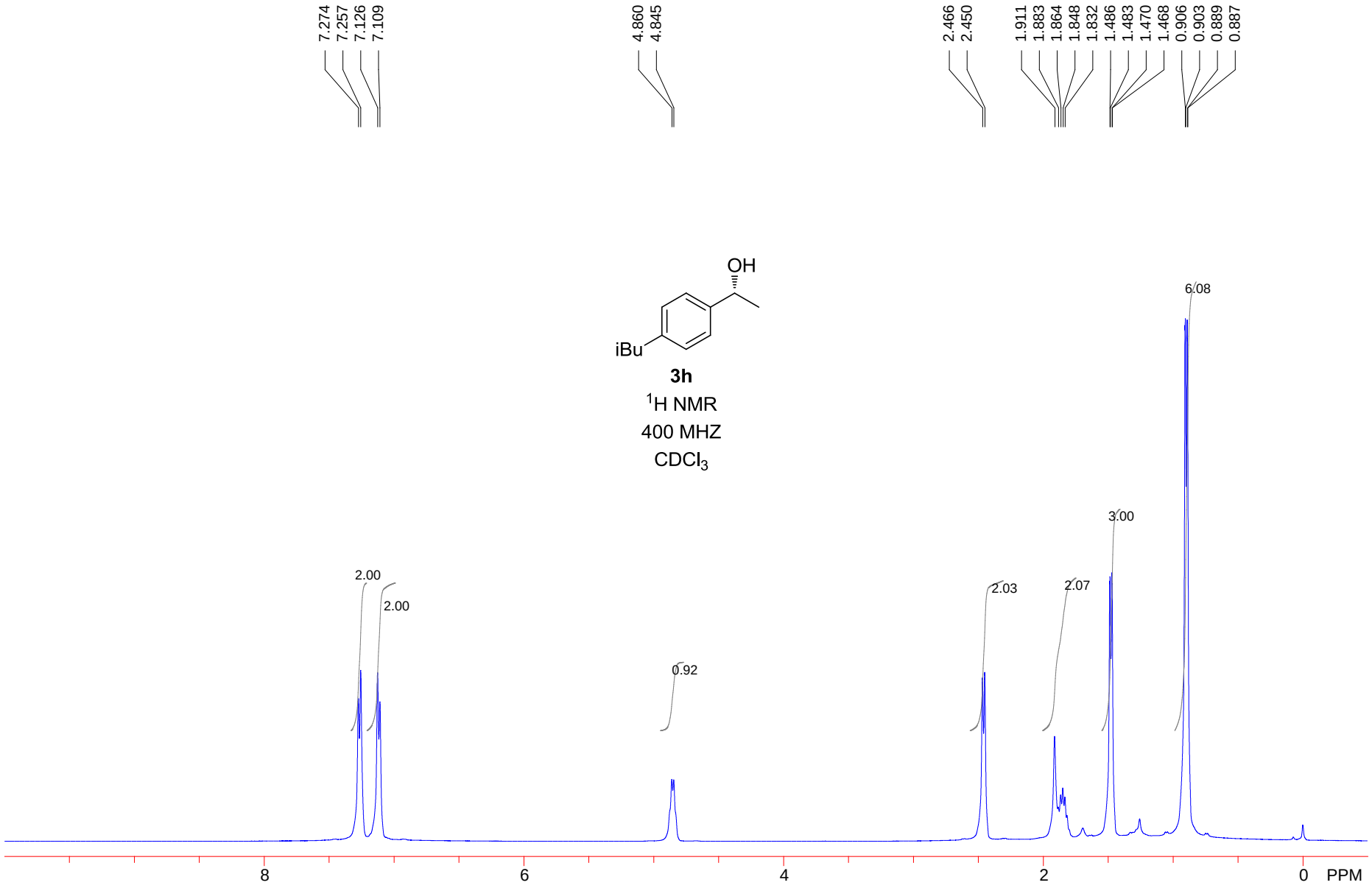
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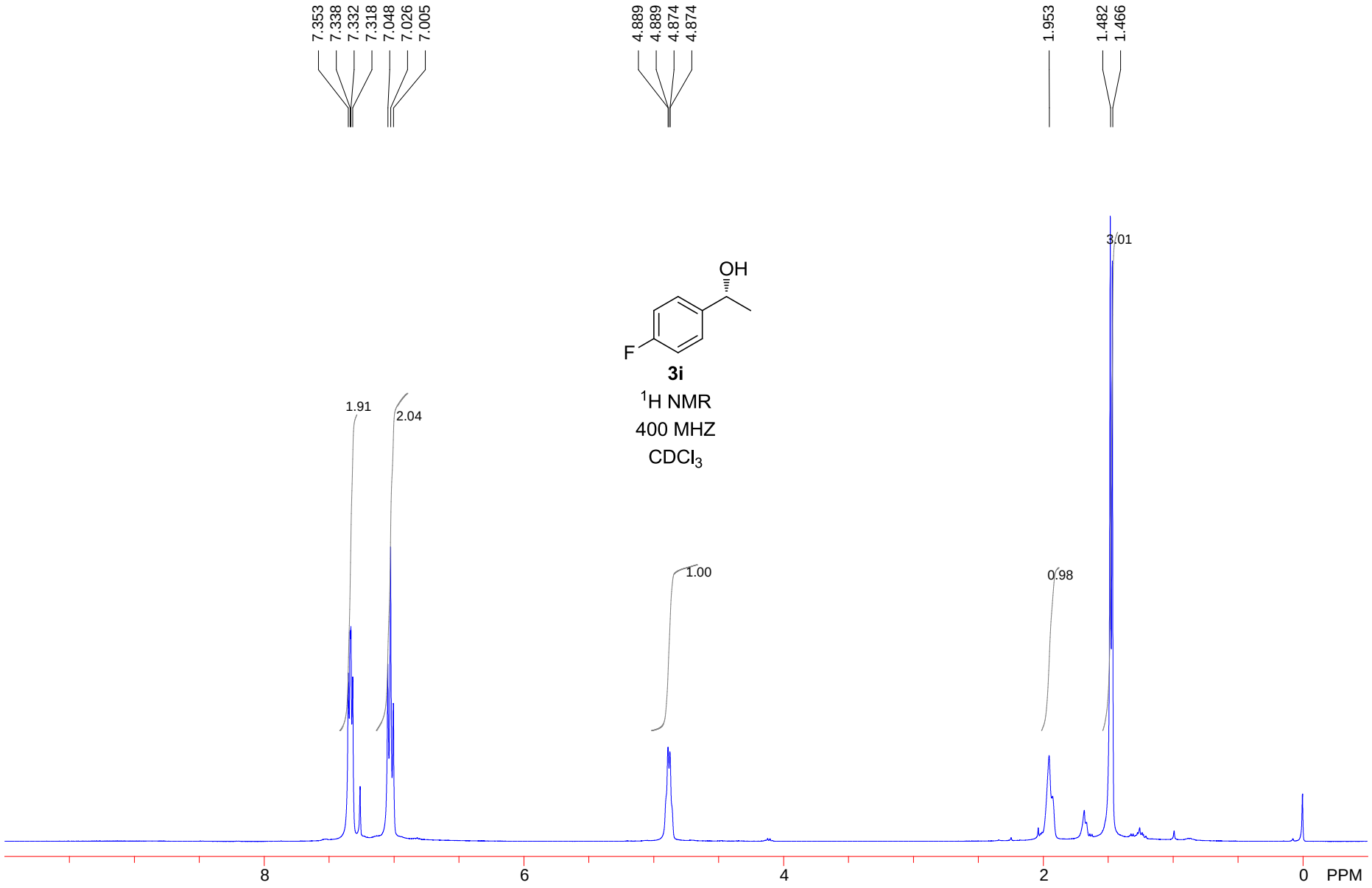
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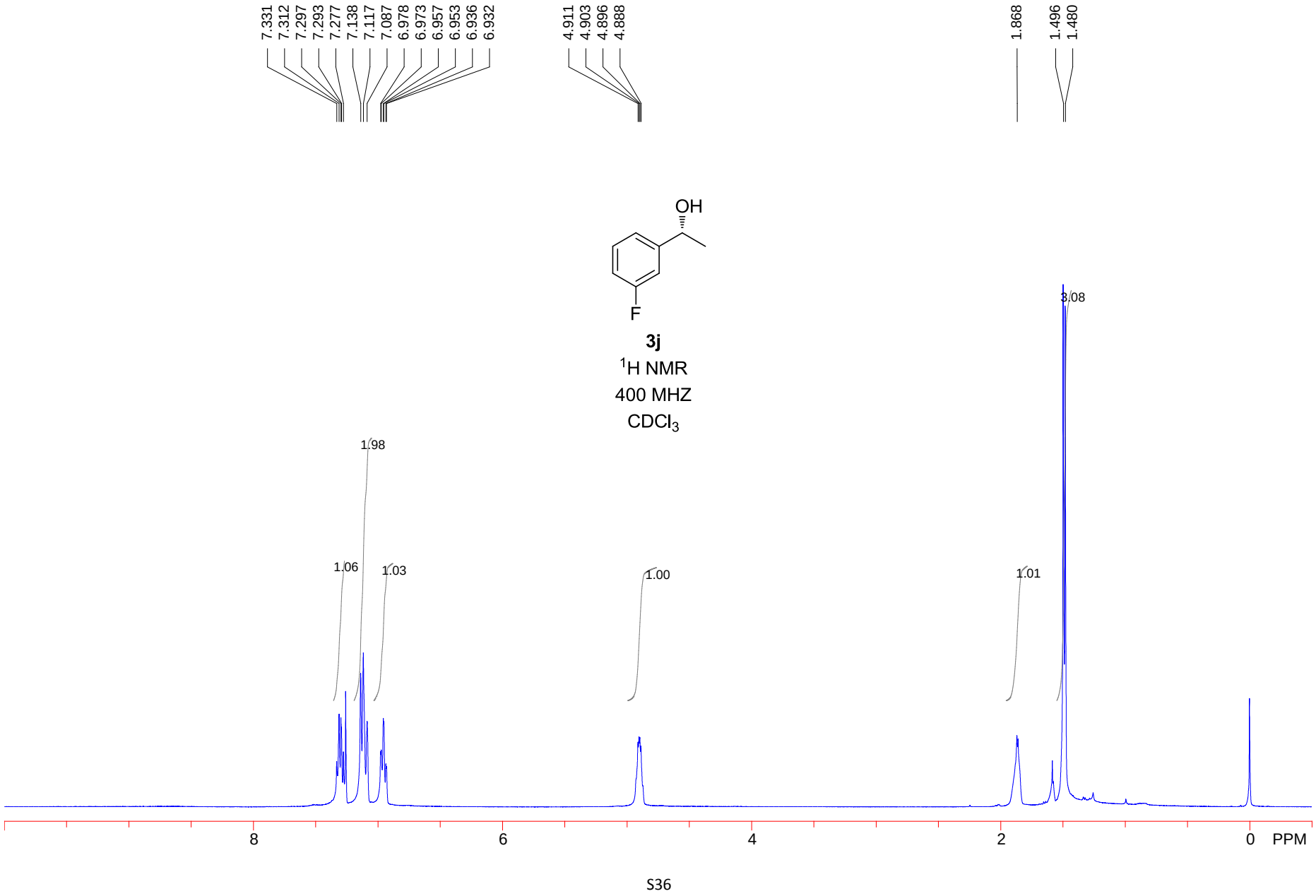
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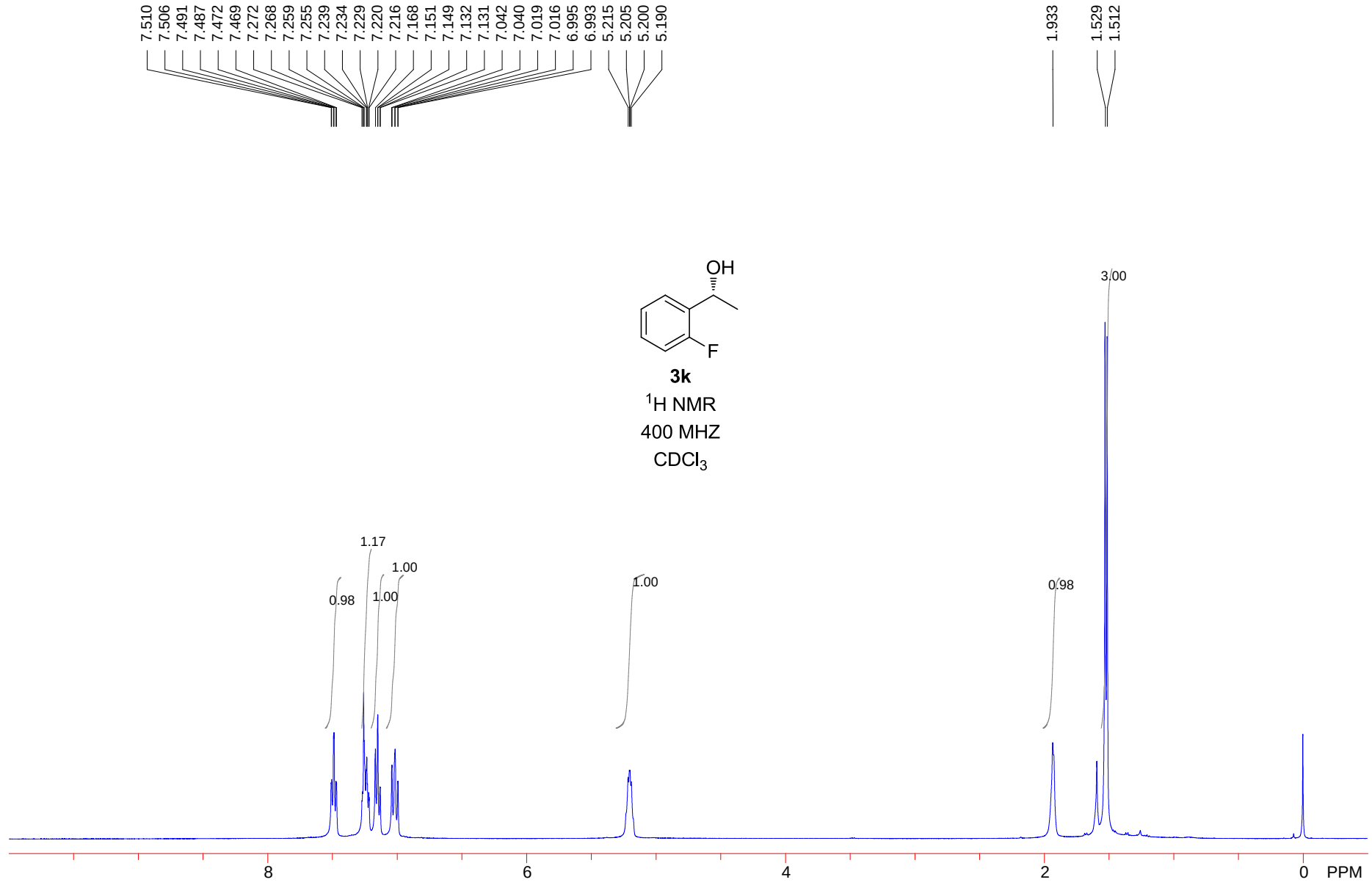
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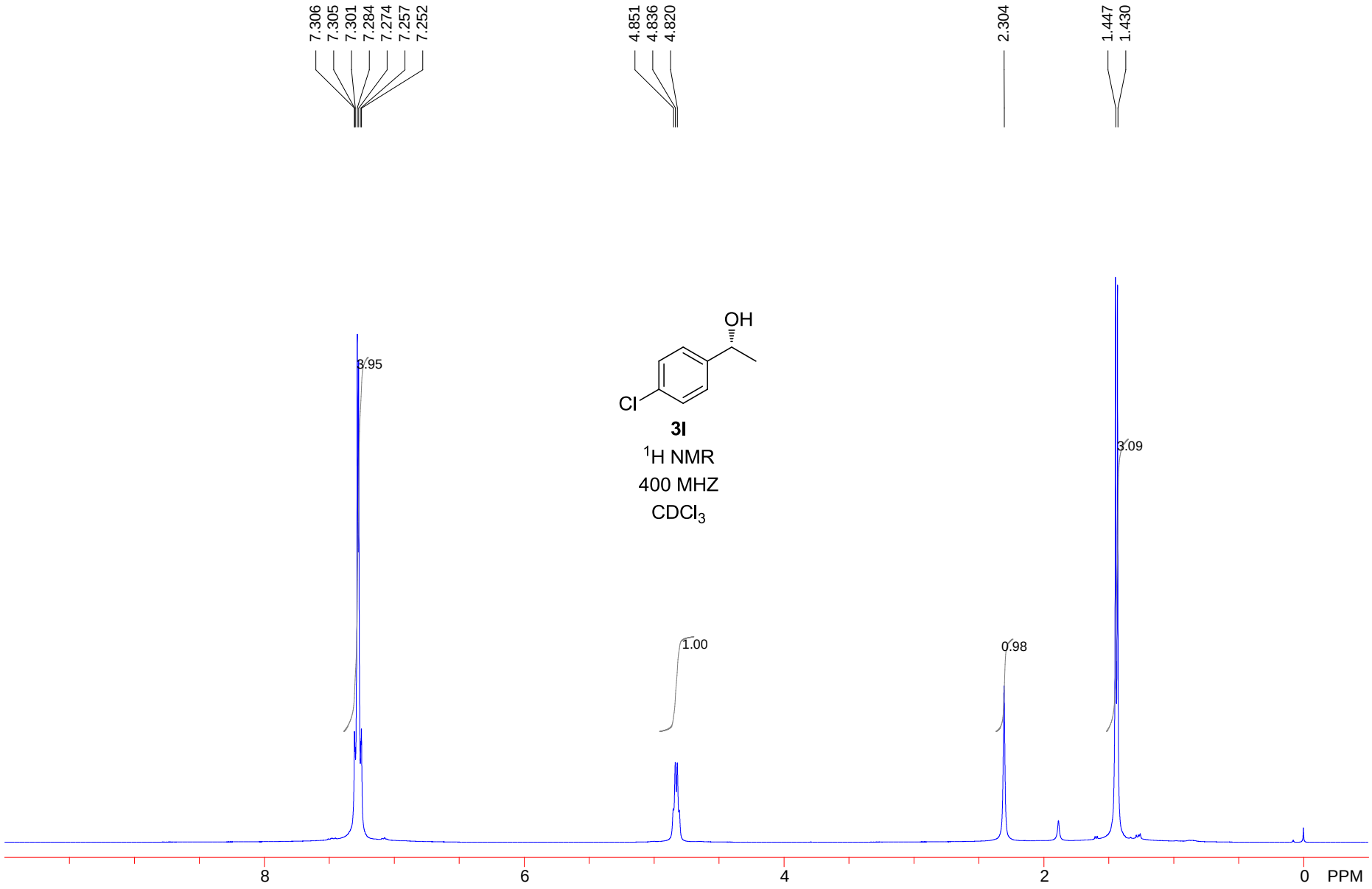
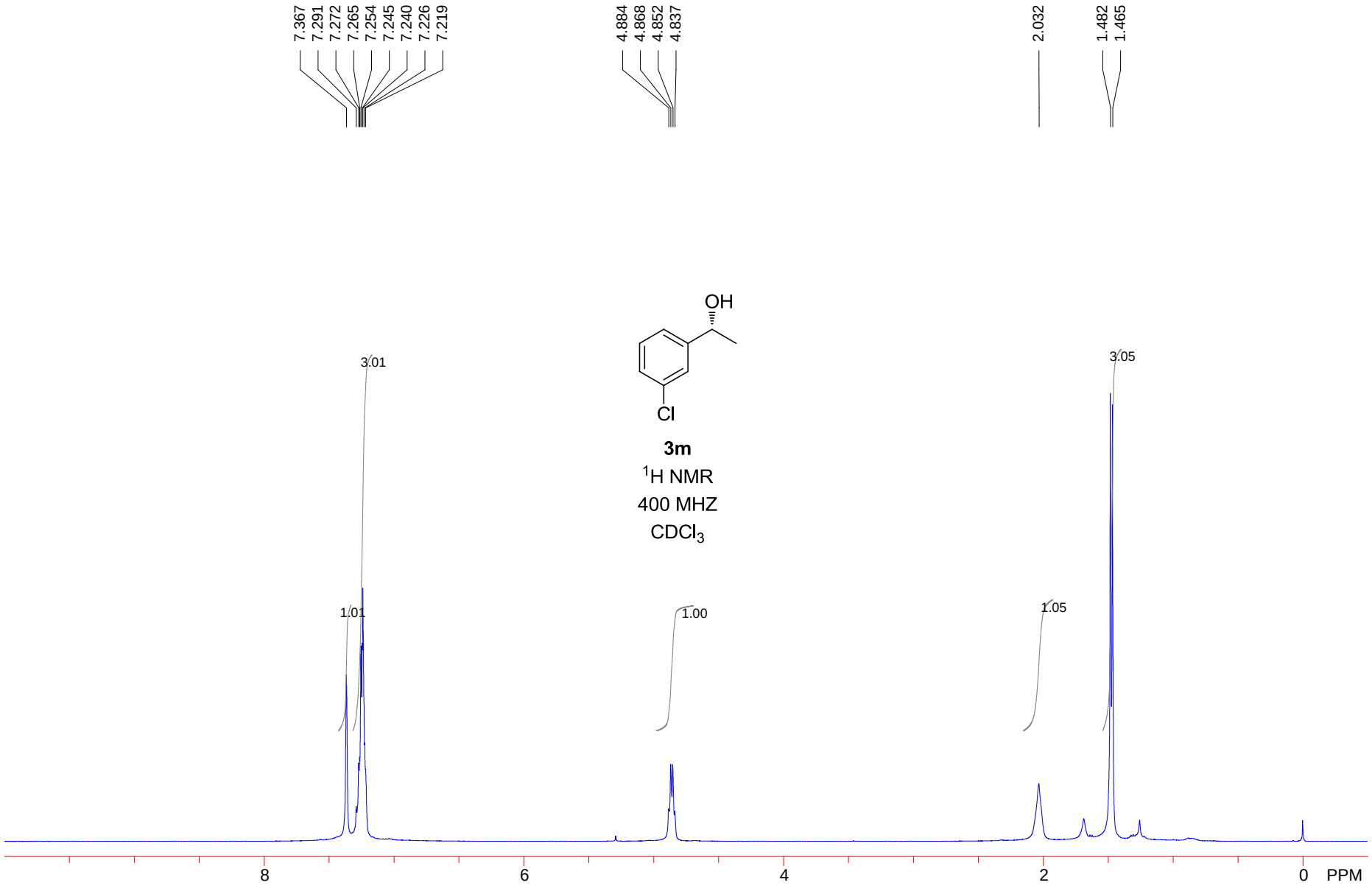



**3l**

$^1$H NMR

400 MHZ

$CDCl_3$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1.465
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Cl
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3.05
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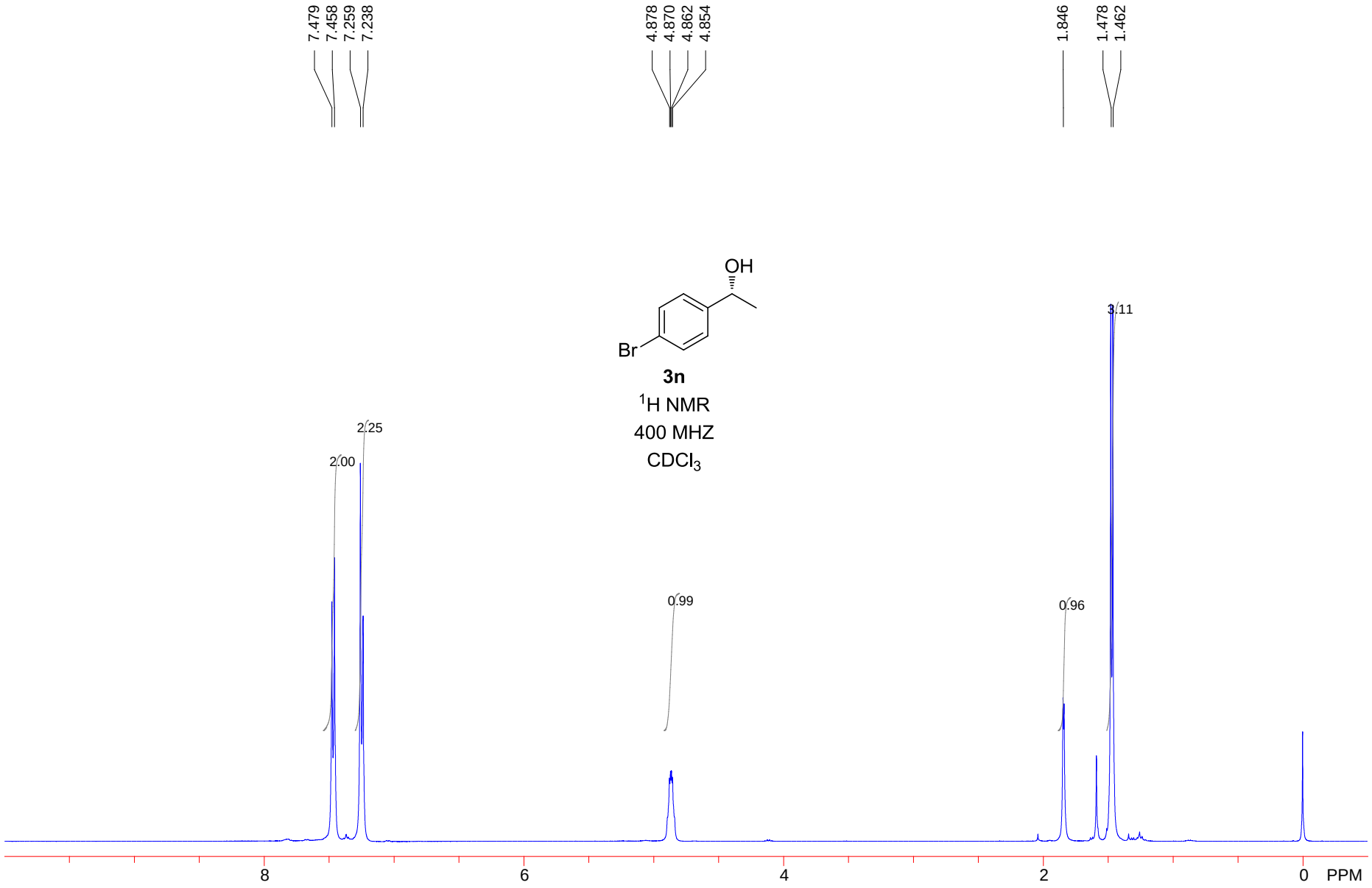
PPM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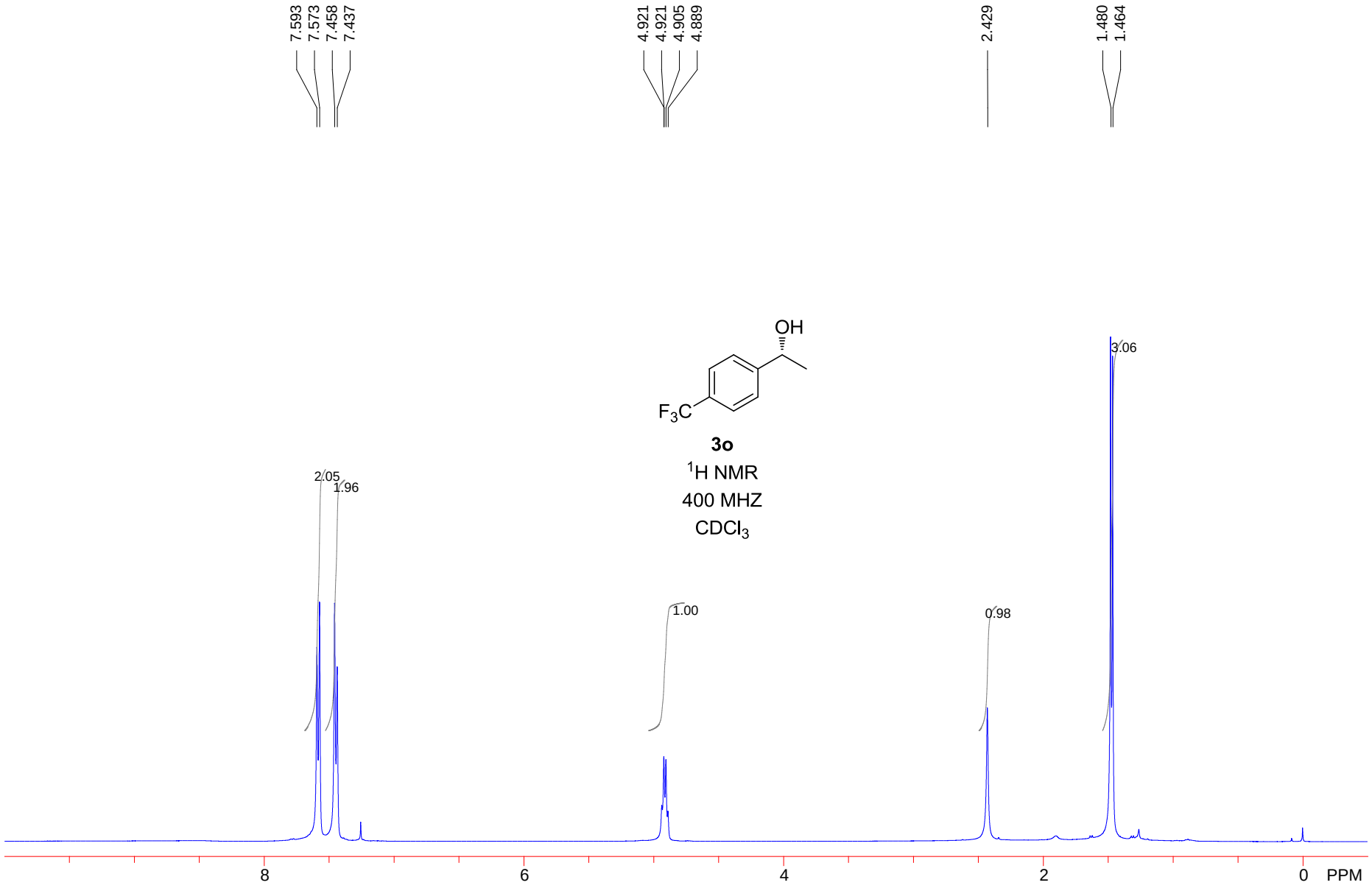
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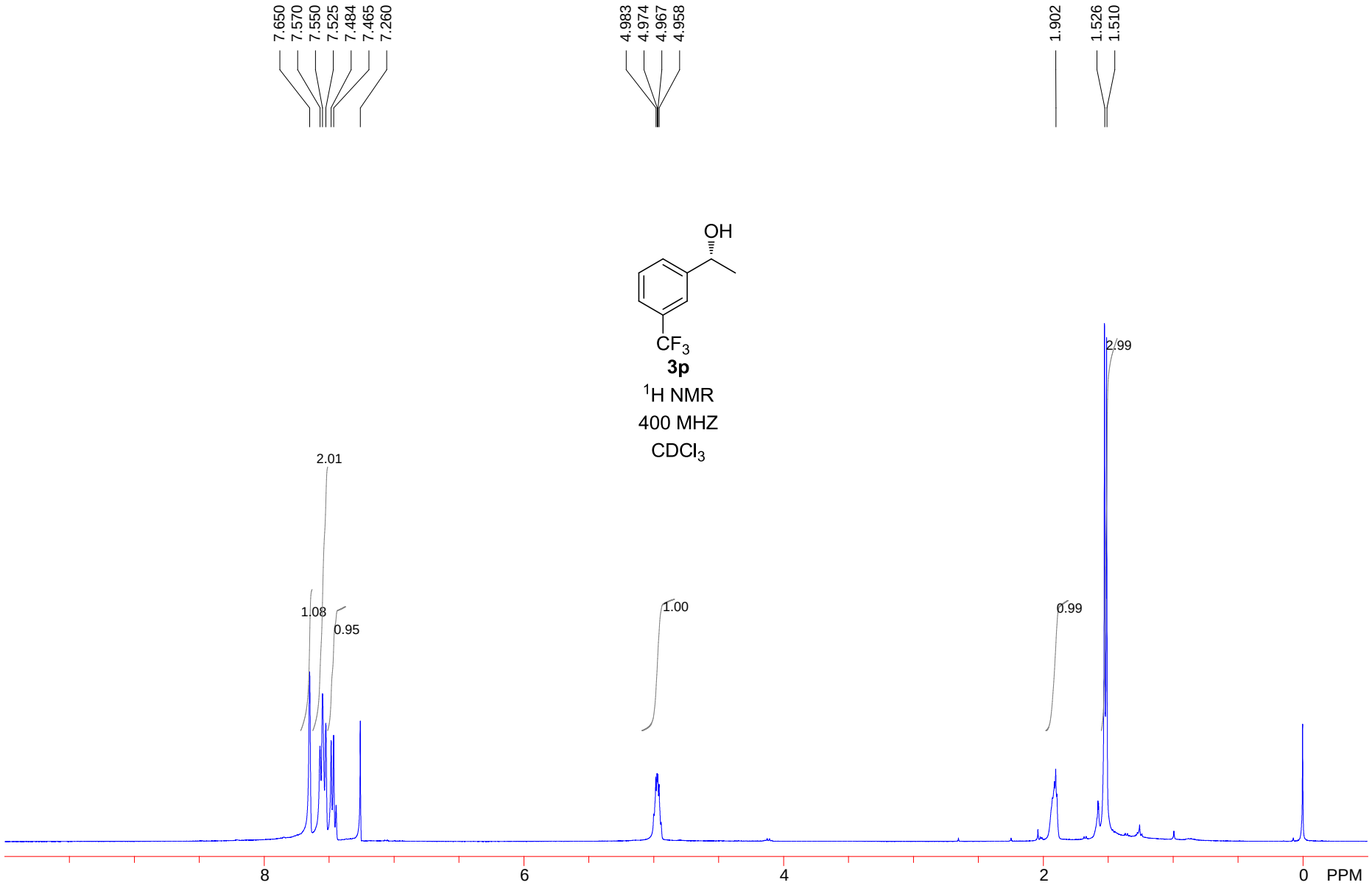
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CF3
3p
1H NMR
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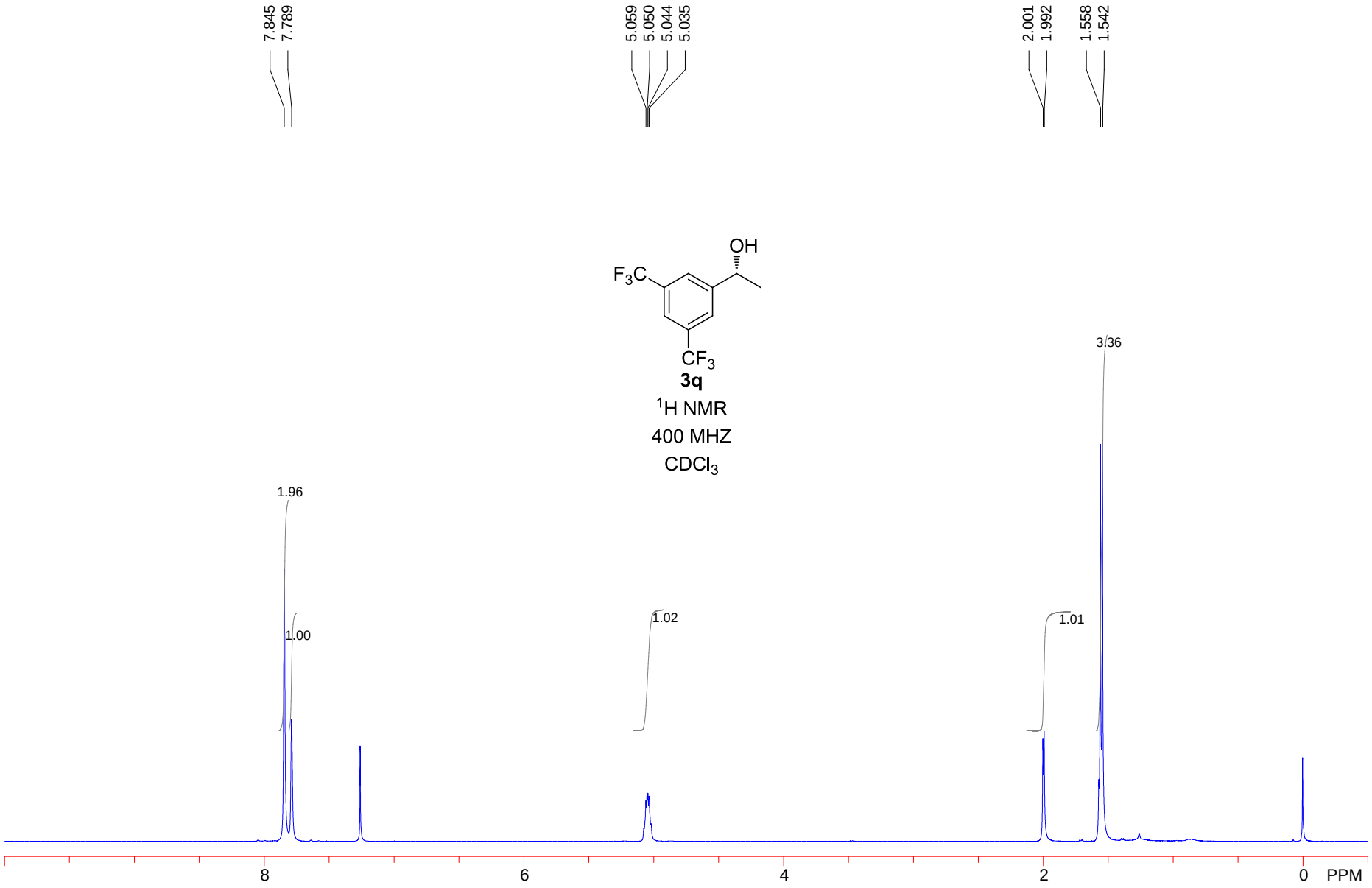
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CF3
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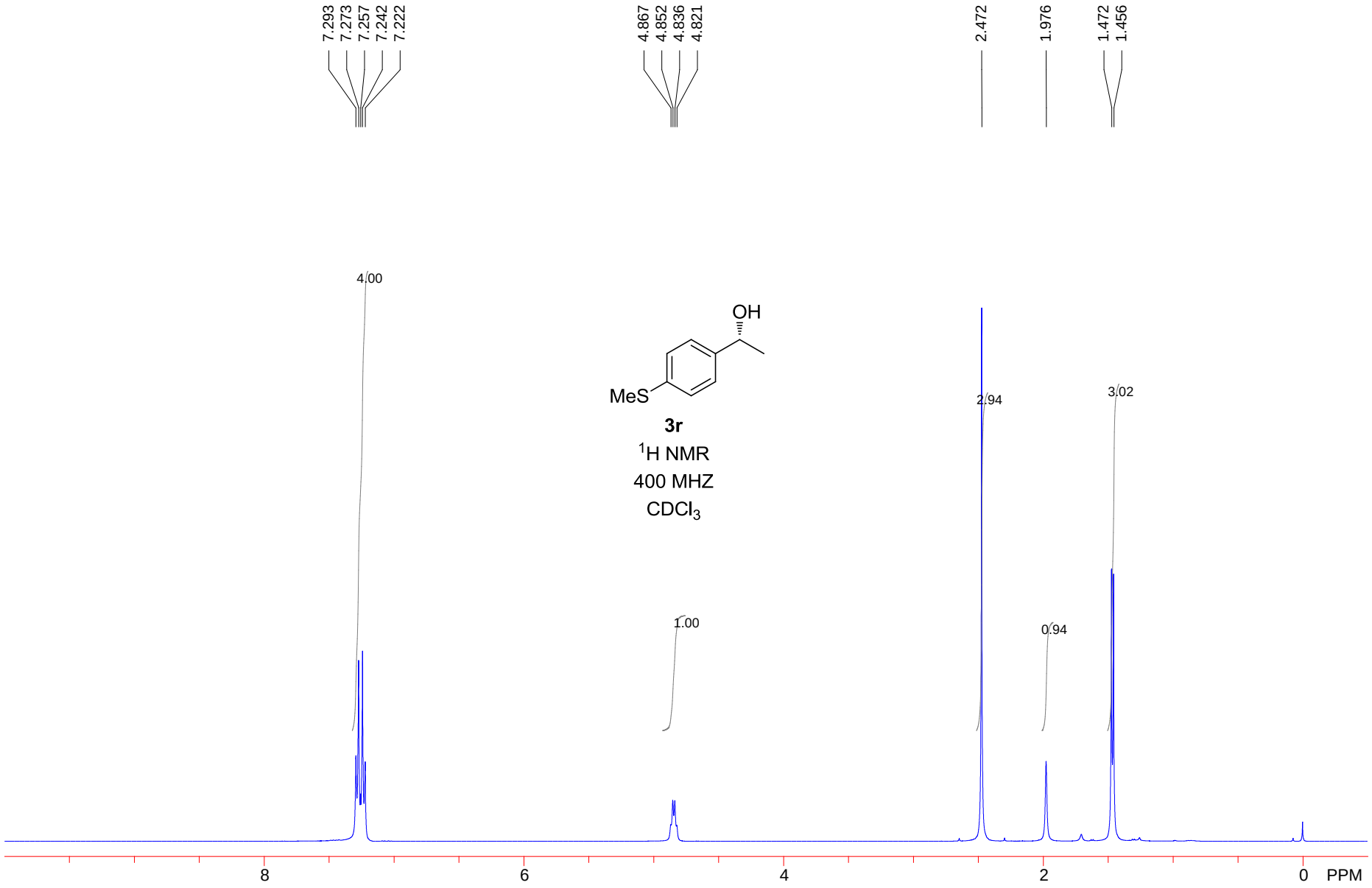
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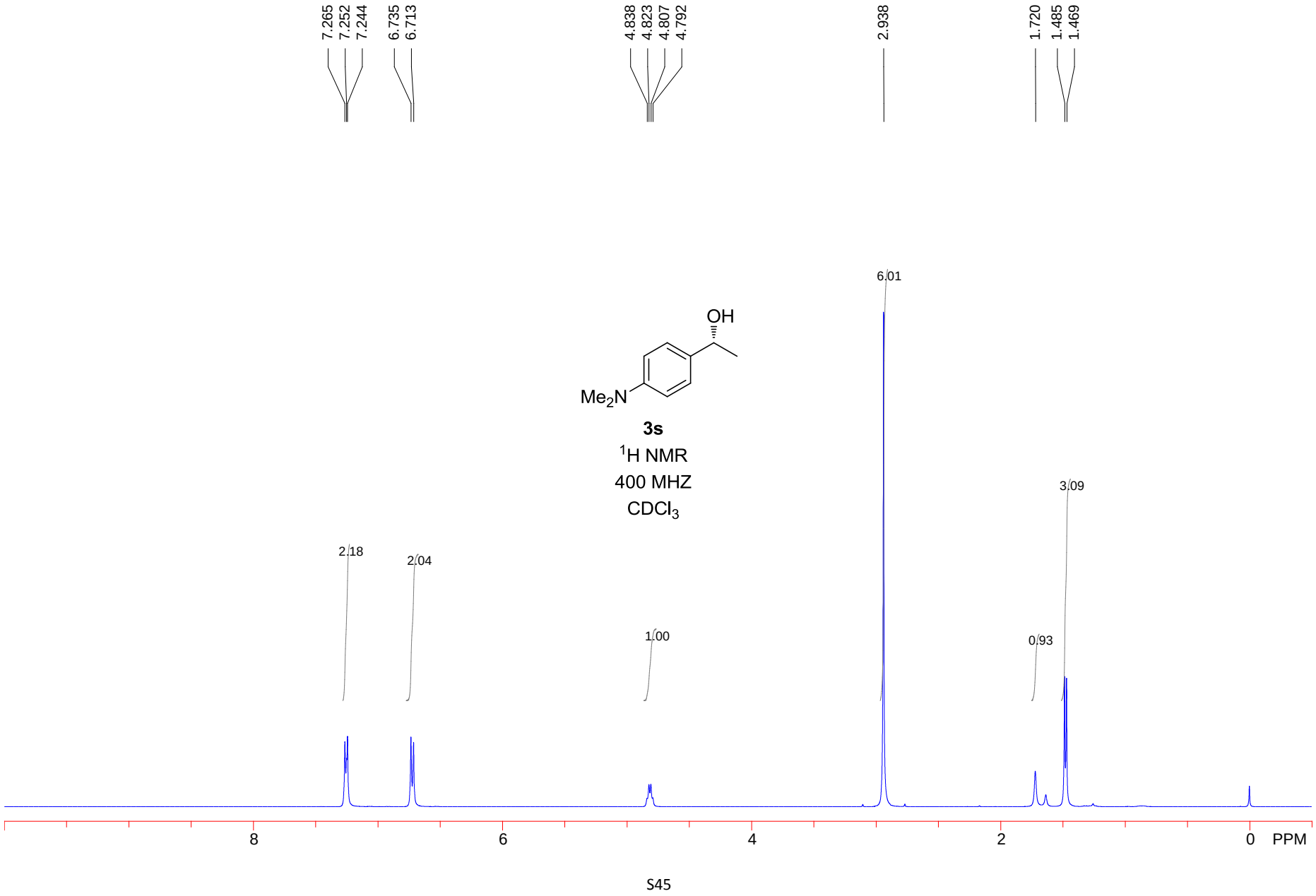
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1H NMR
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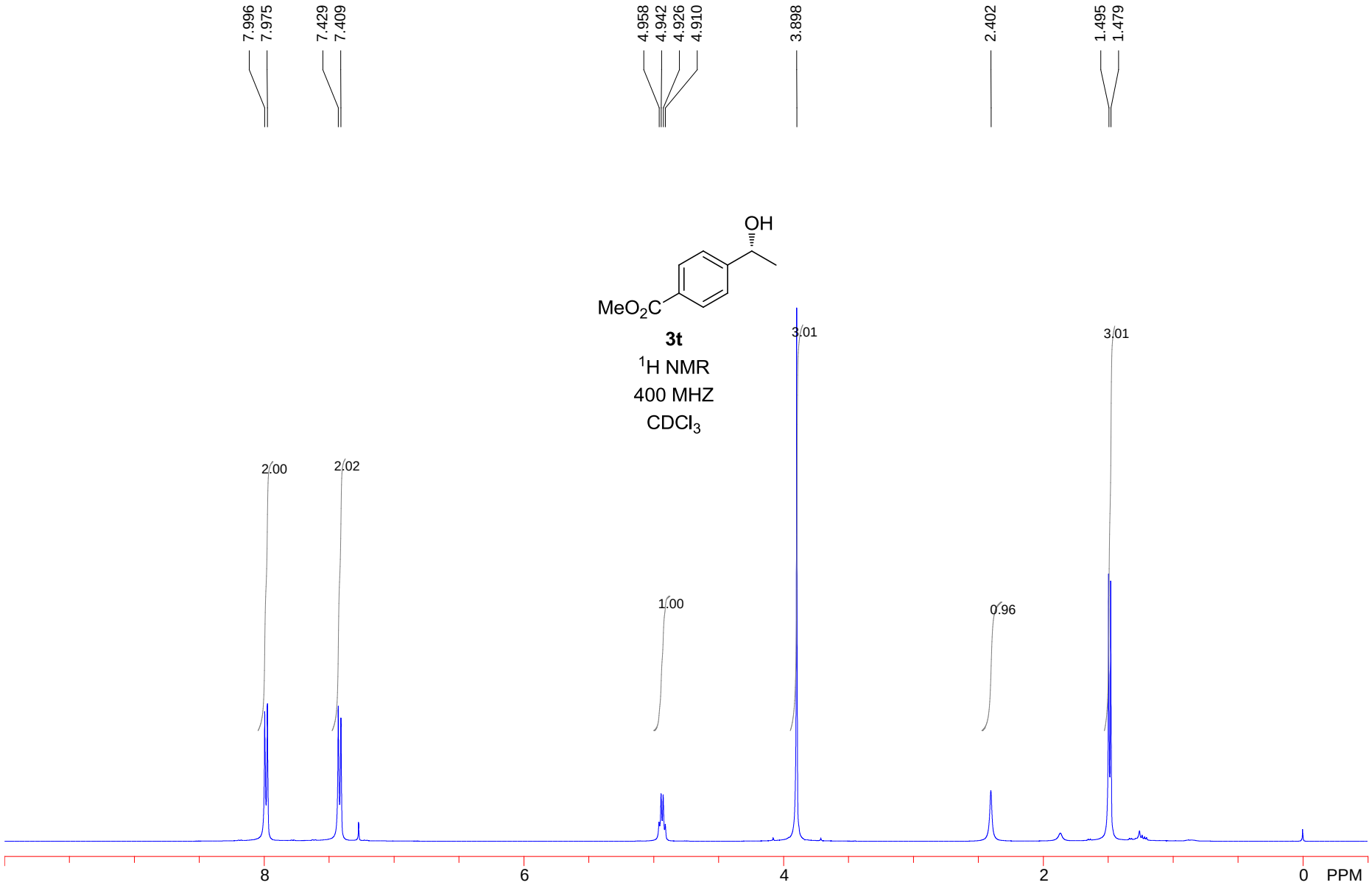
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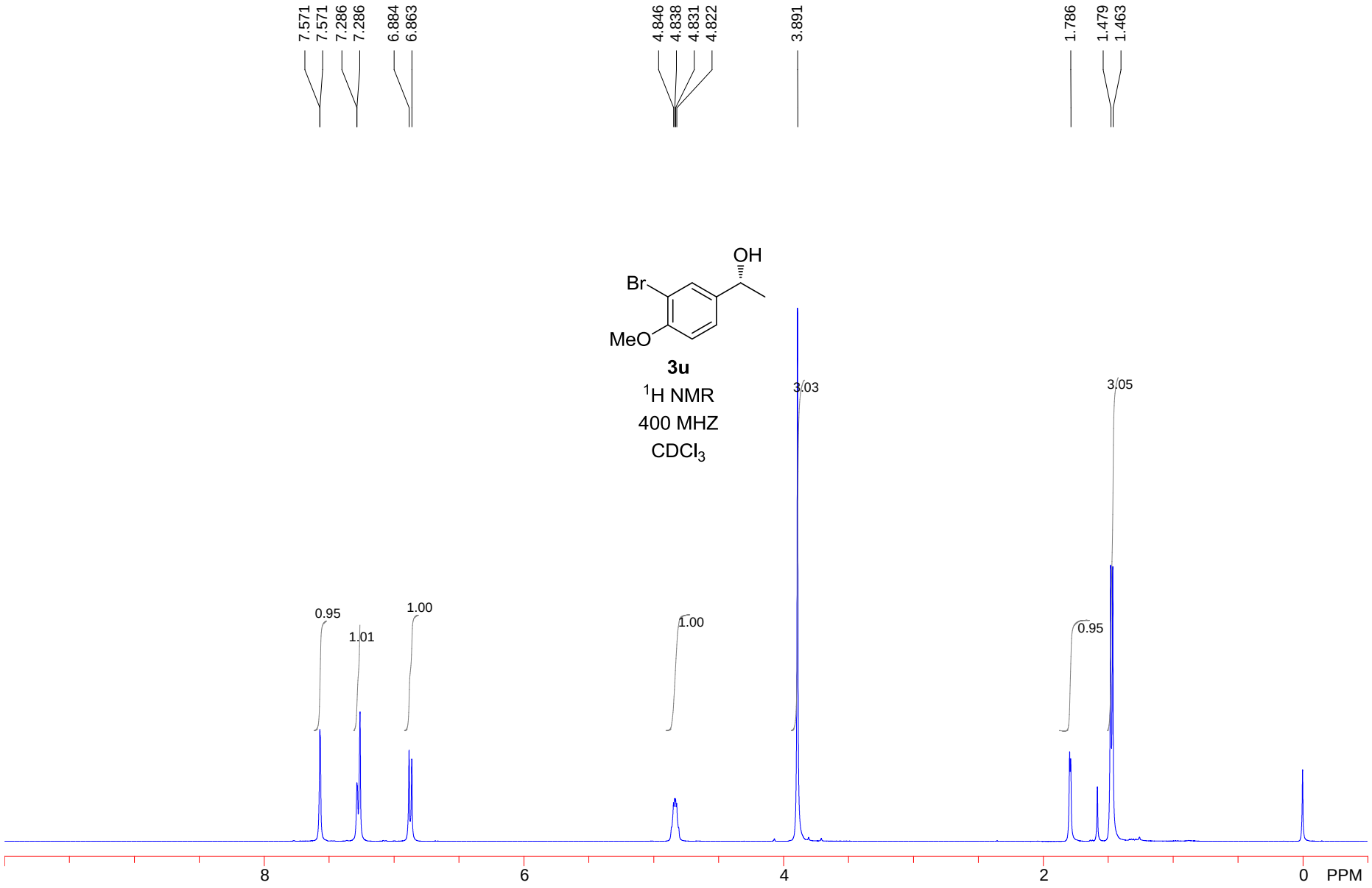
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1.479
1.463
OH
Br
MeO
3u
1H NMR
400 MHZ
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1.00
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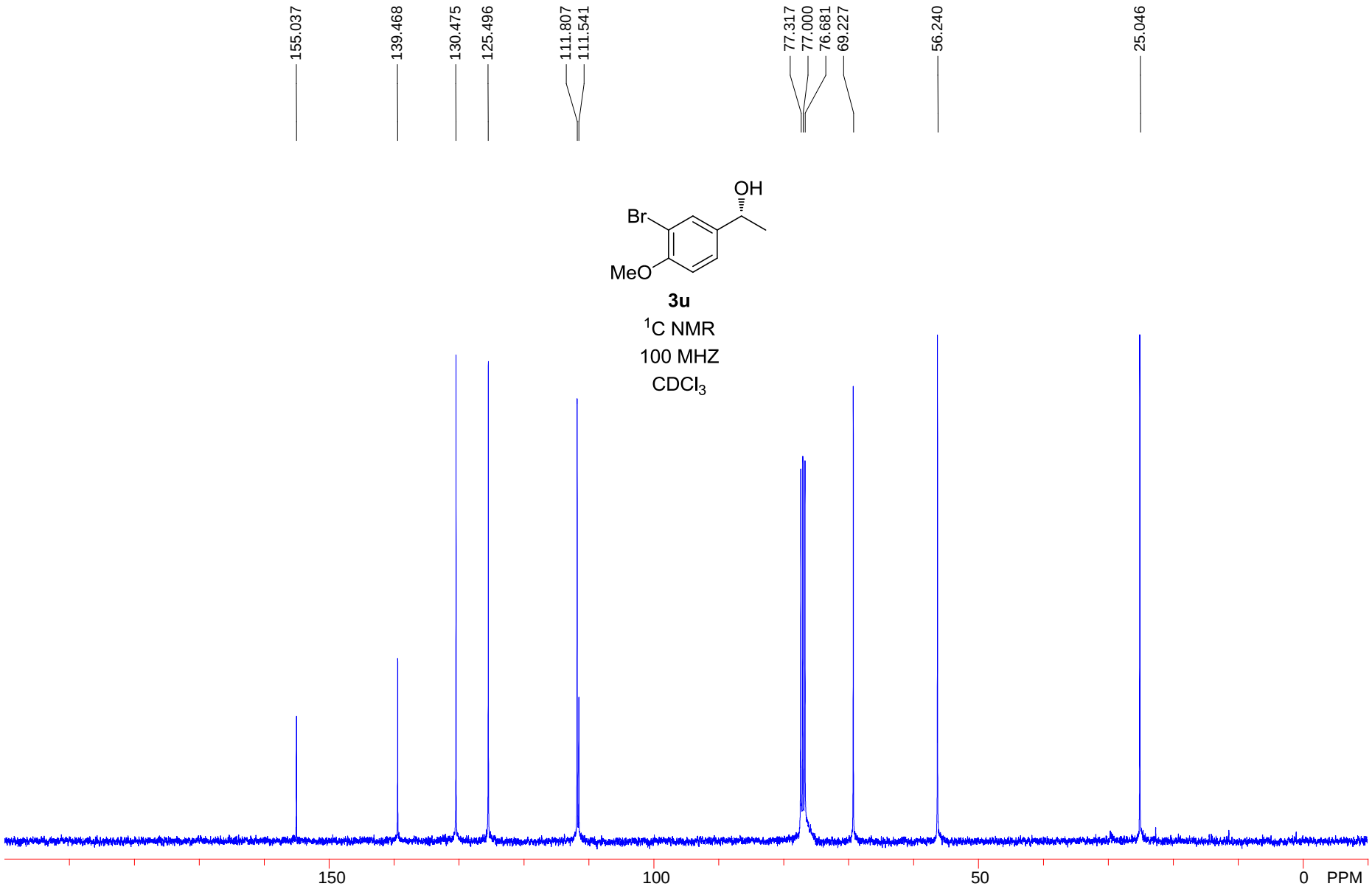
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MeO
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100 MHZ
CDCl3
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100
50
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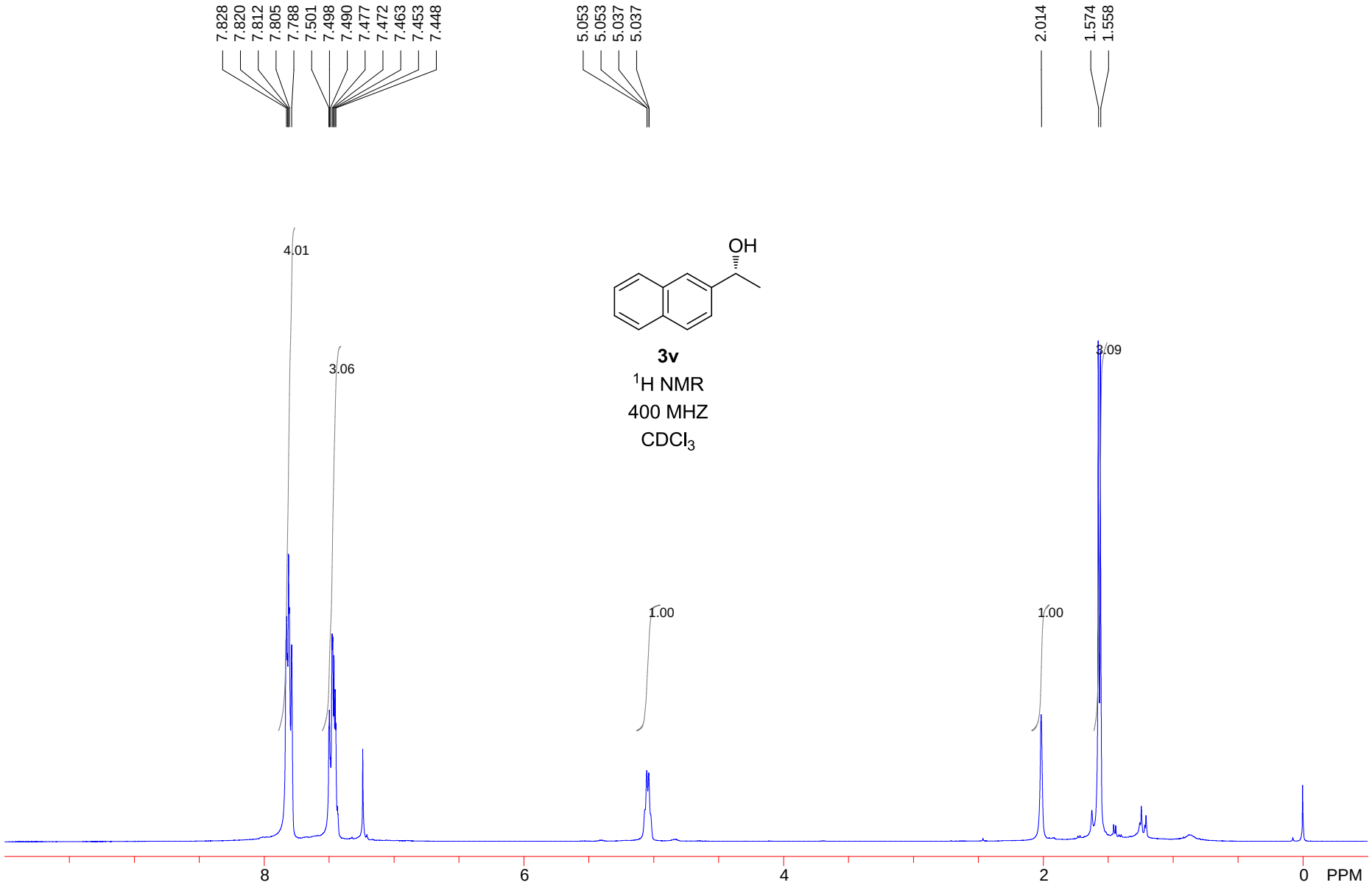
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7.448
5.053
5.053
5.037
5.037
2.014
1.574
1.558
OH
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CDCl3
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1.00
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3.09
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4
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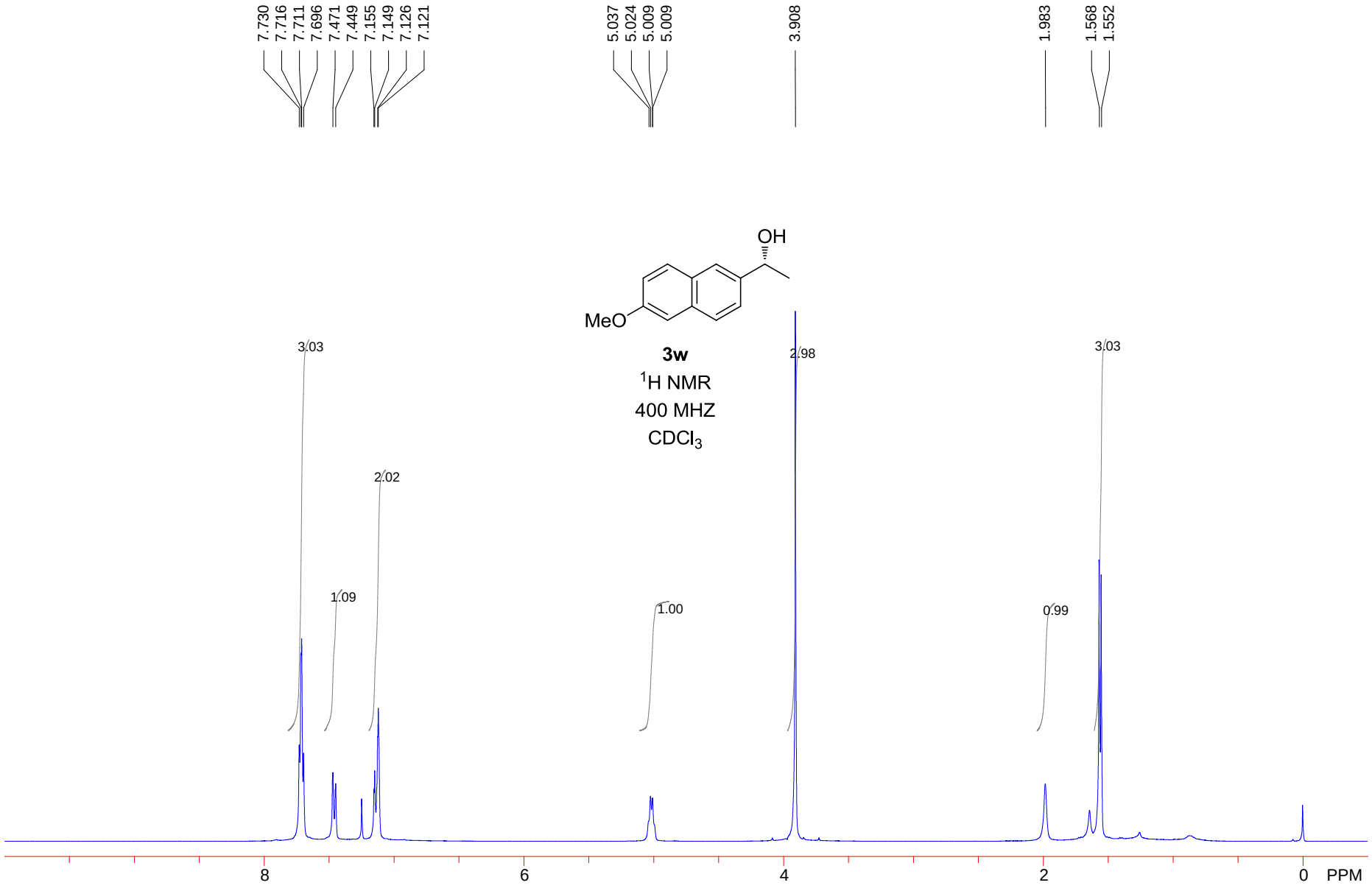
0
PPM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5.009
3.908
1.983
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1.552
OH
MeO
3w
1H NMR
400 MHZ
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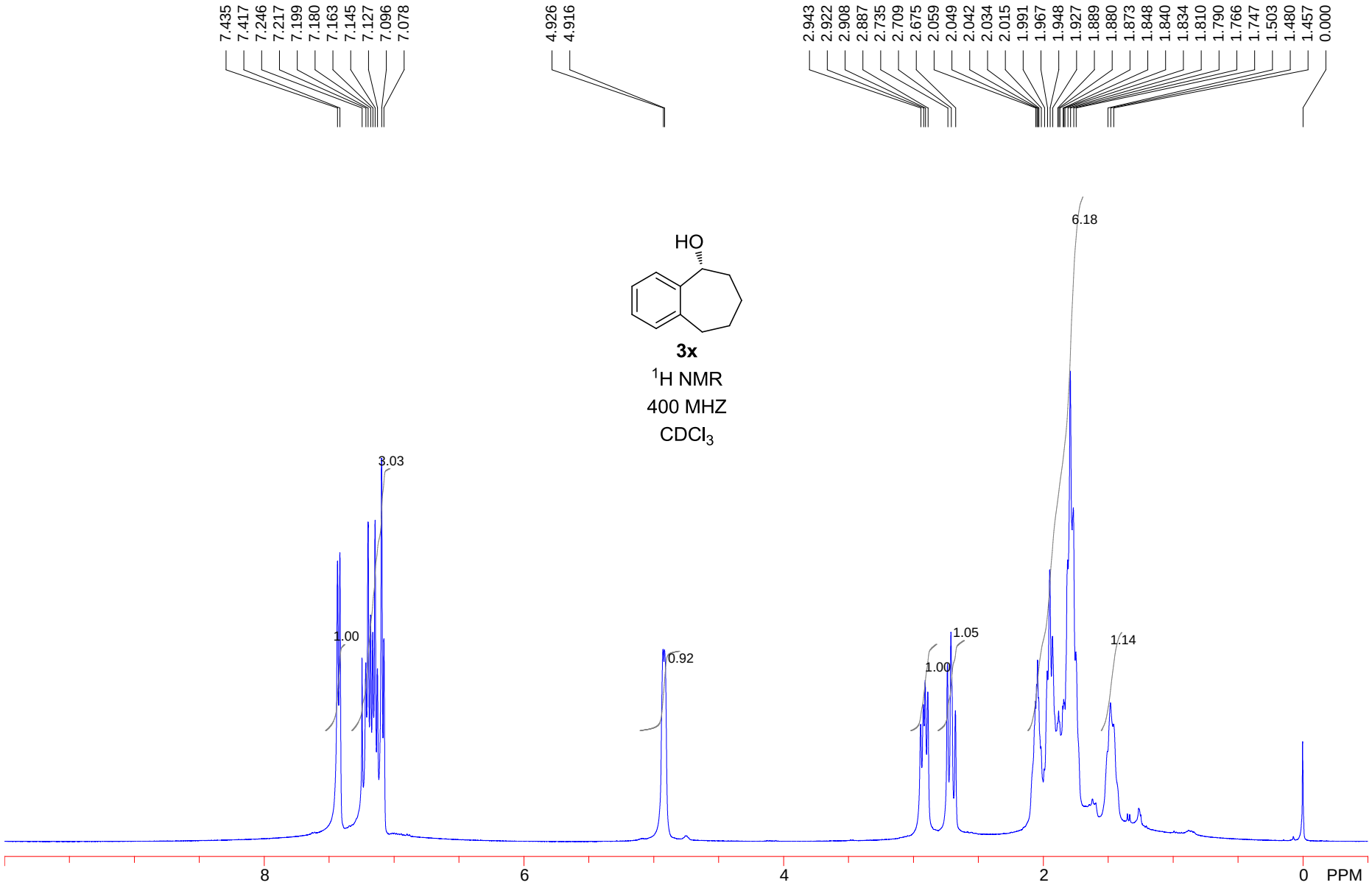
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2.709
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2.042
2.034
2.015
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1.967
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3x
1H NMR
400 MHZ
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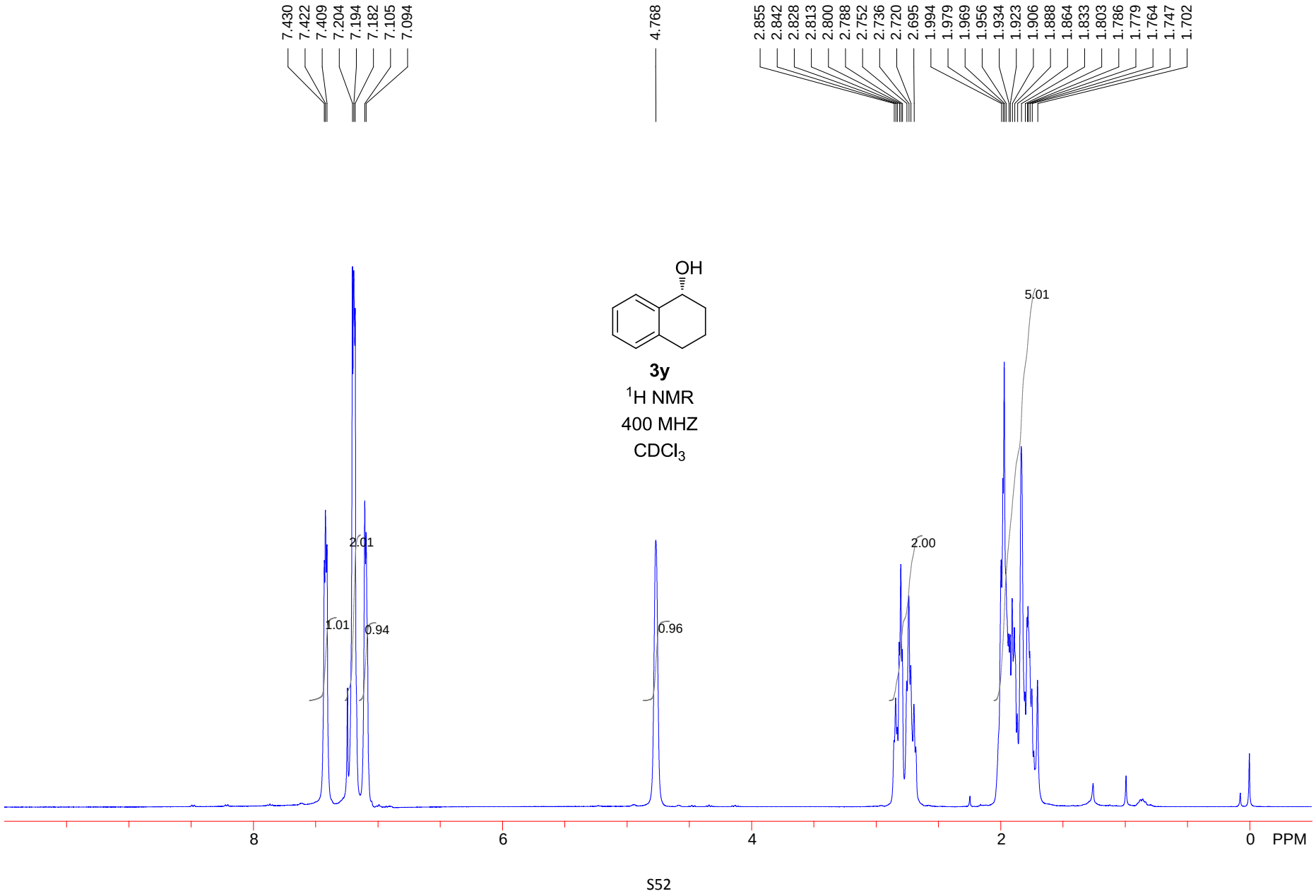
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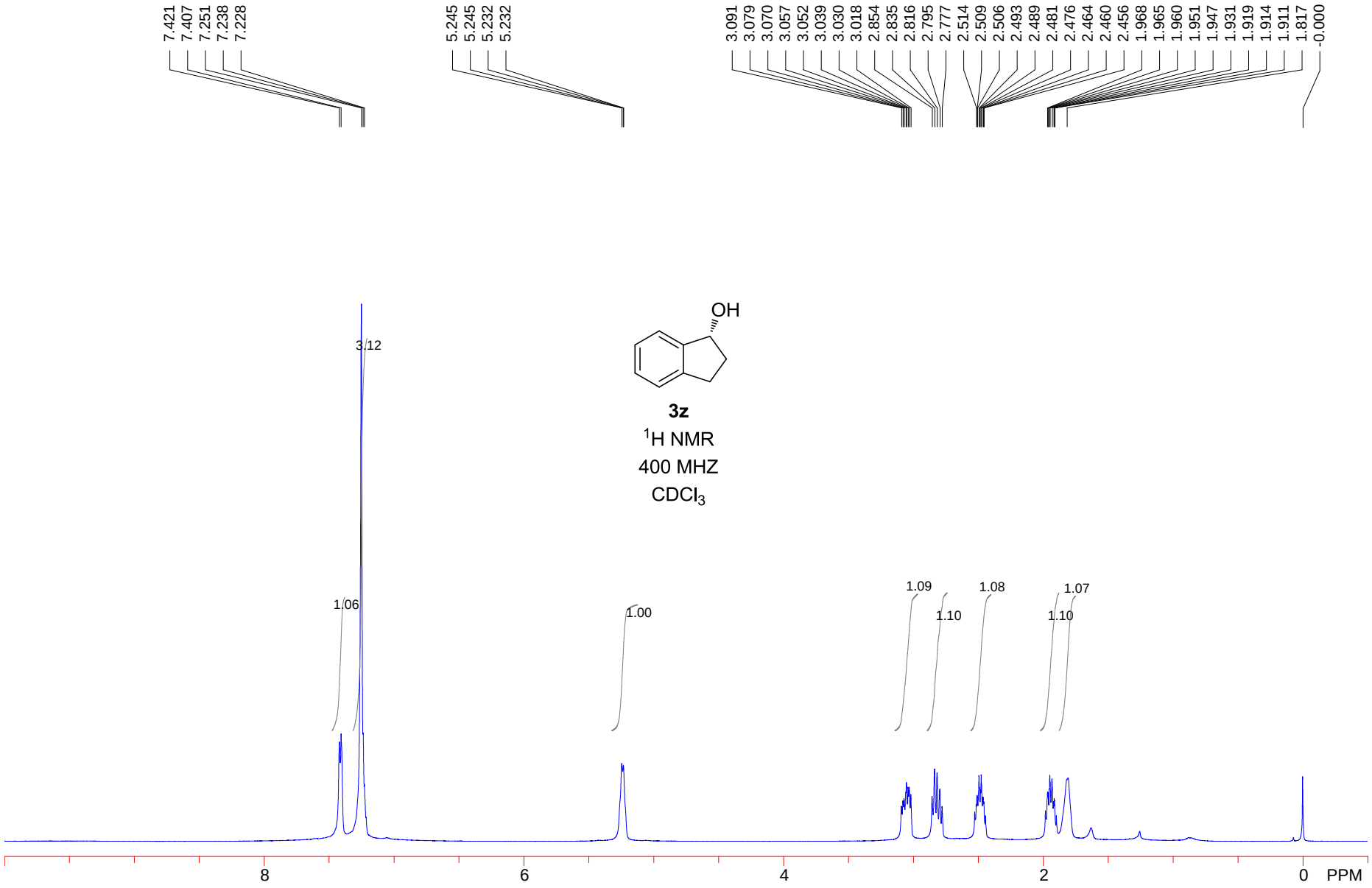
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-0.000
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1.00
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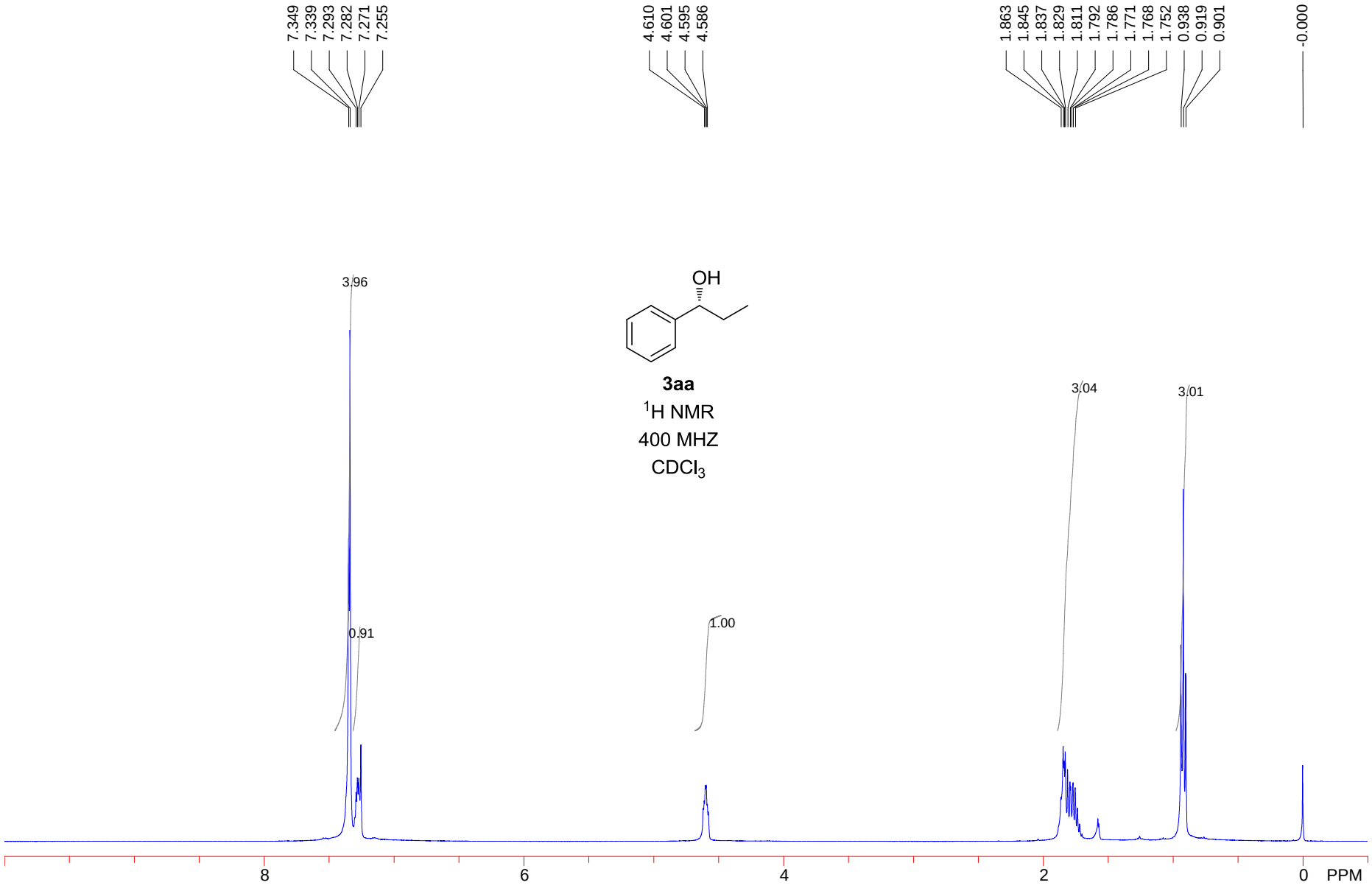
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1.829
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0.919
0.901
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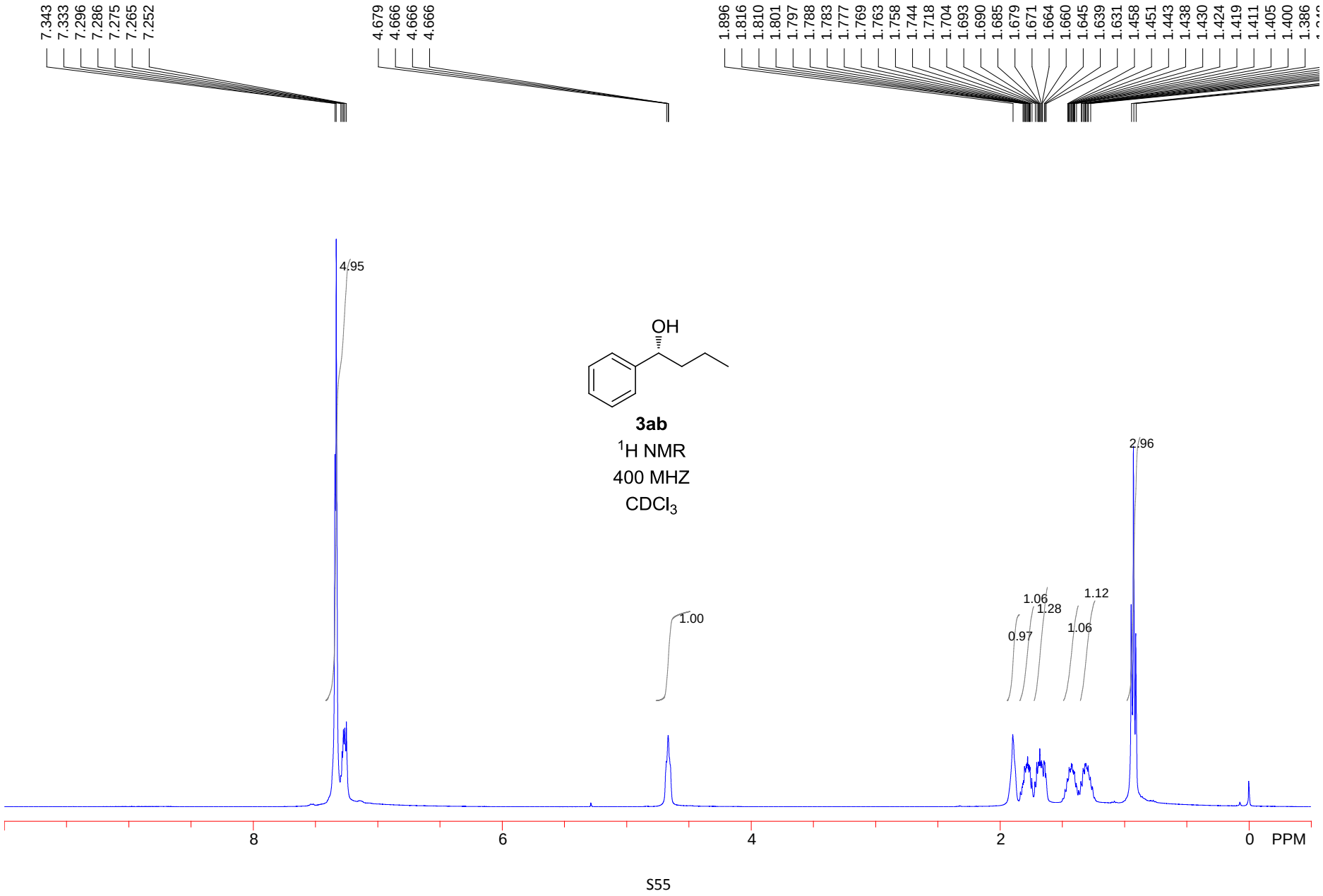
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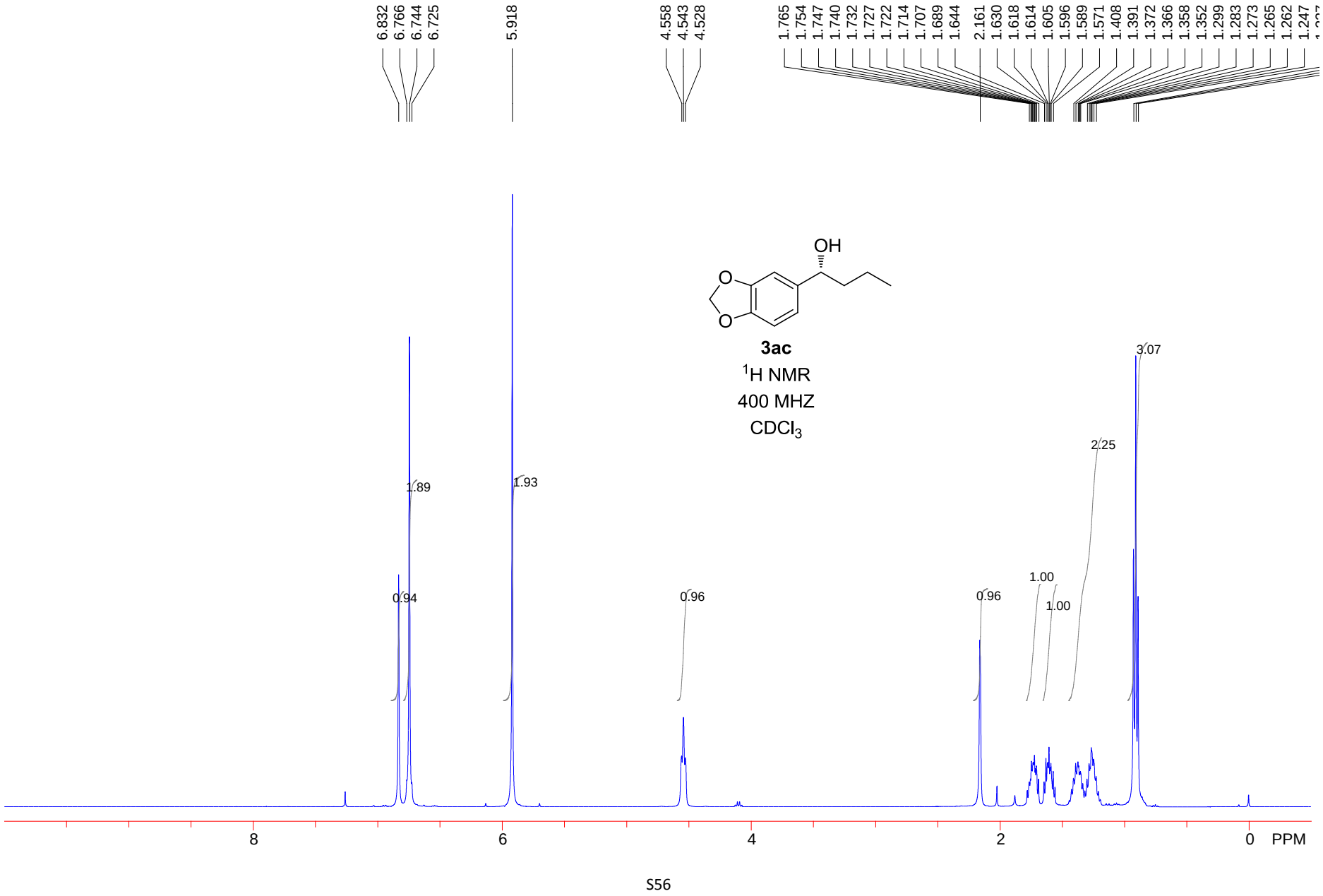
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1.596
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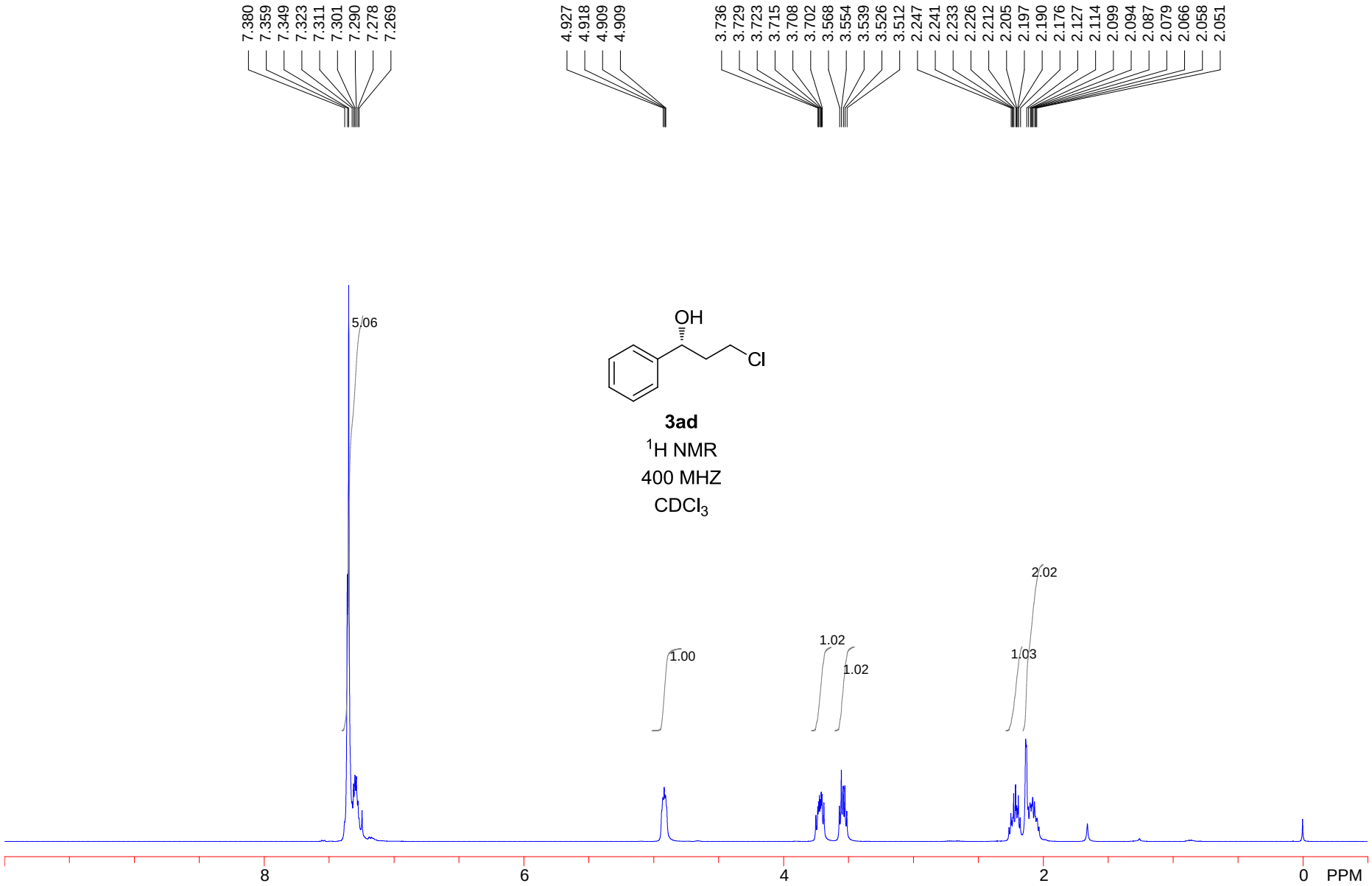
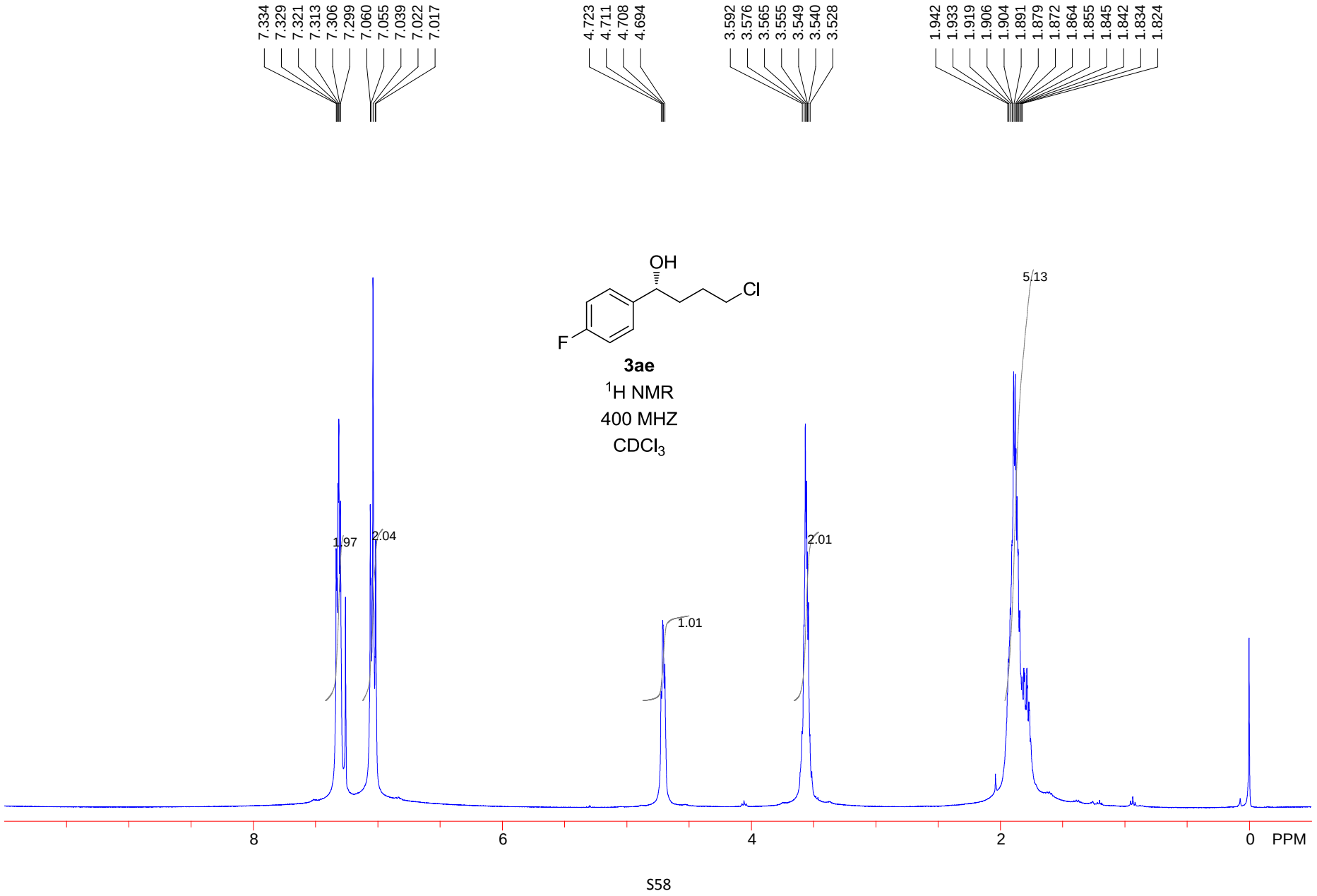



**3ad**

$^1$H NMR

400 MHZ

$CDCl_3$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1.824
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Cl
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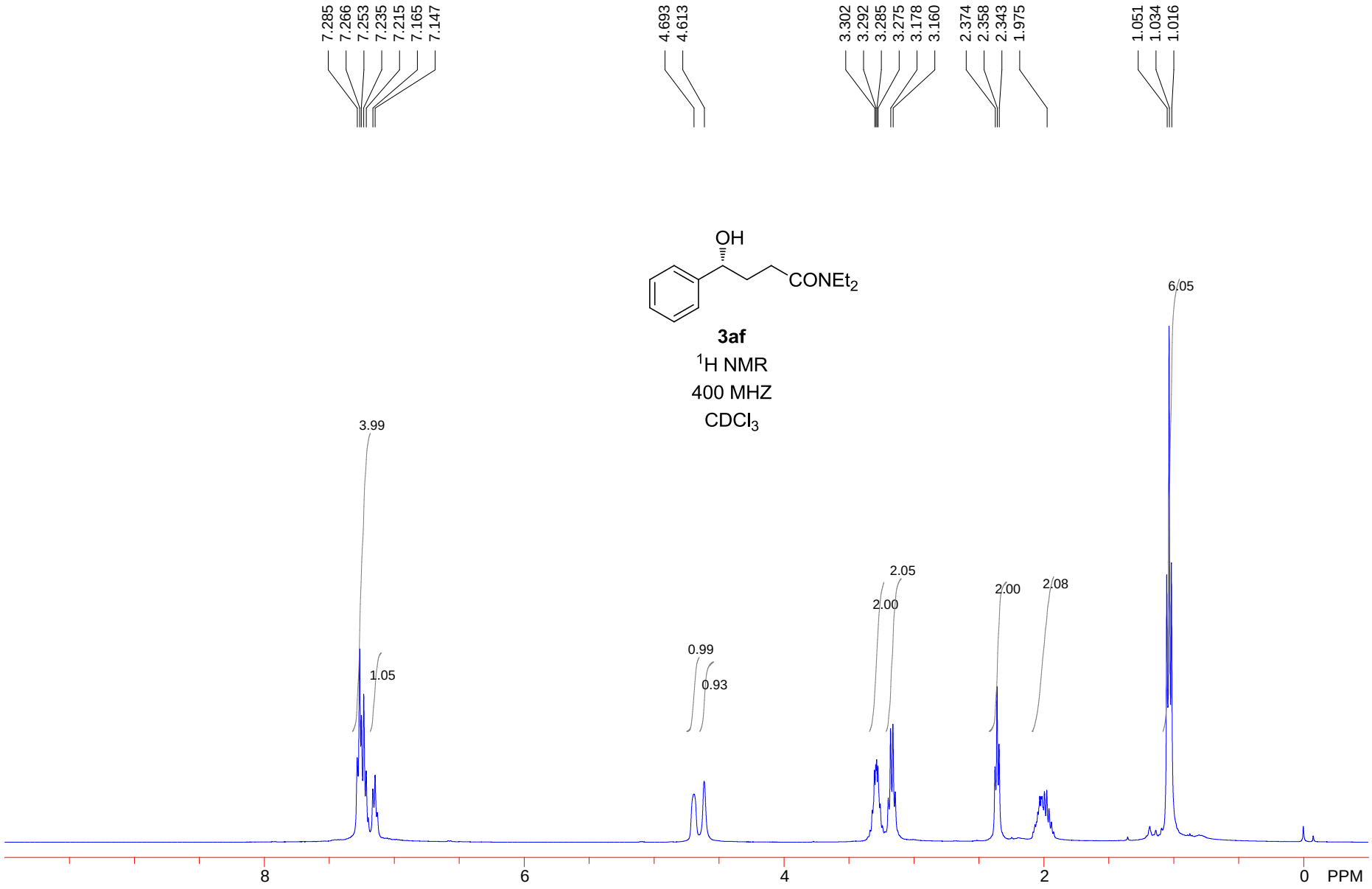
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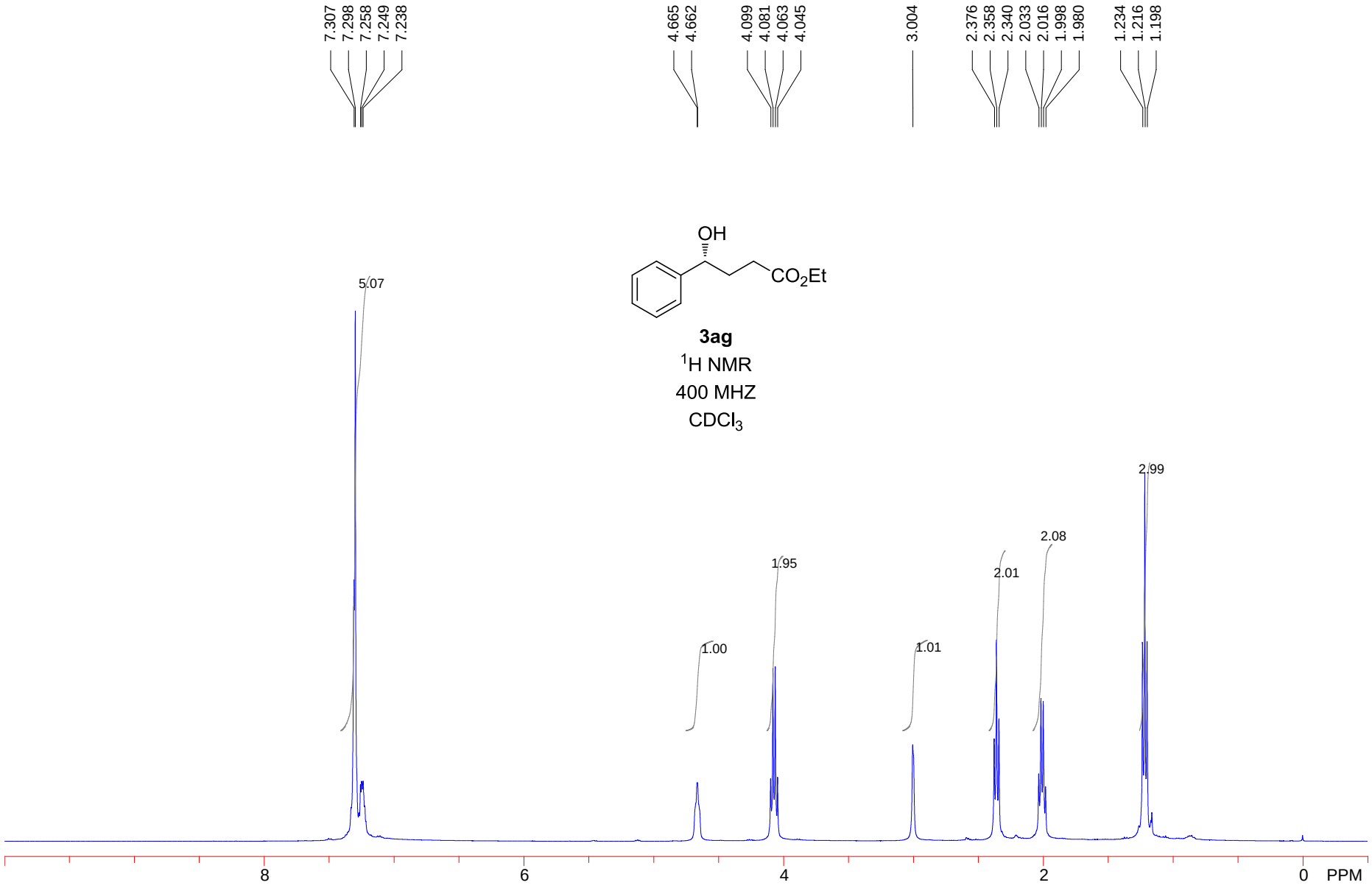
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CO2Et
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1H NMR
400 MHZ
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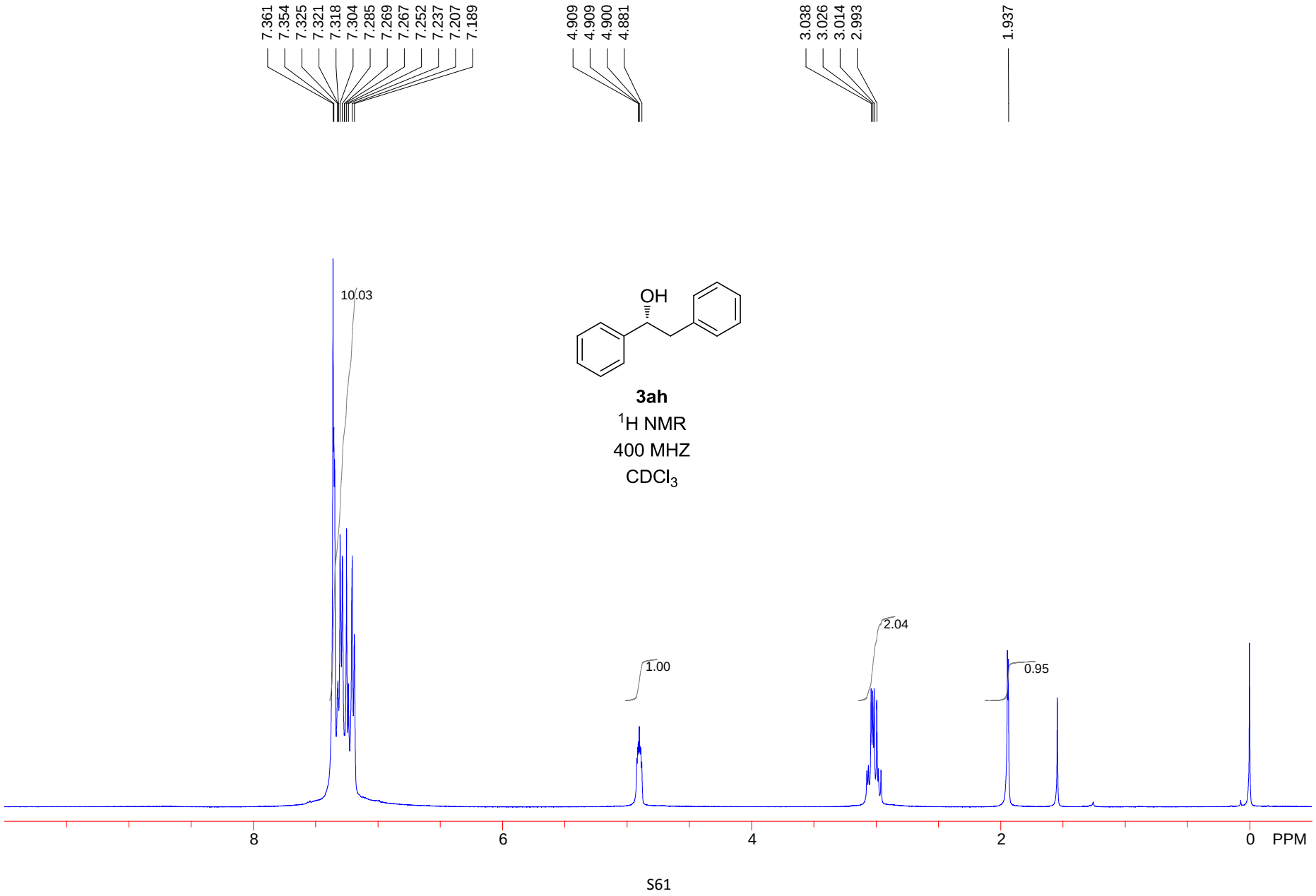
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4.909
4.900
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3.026
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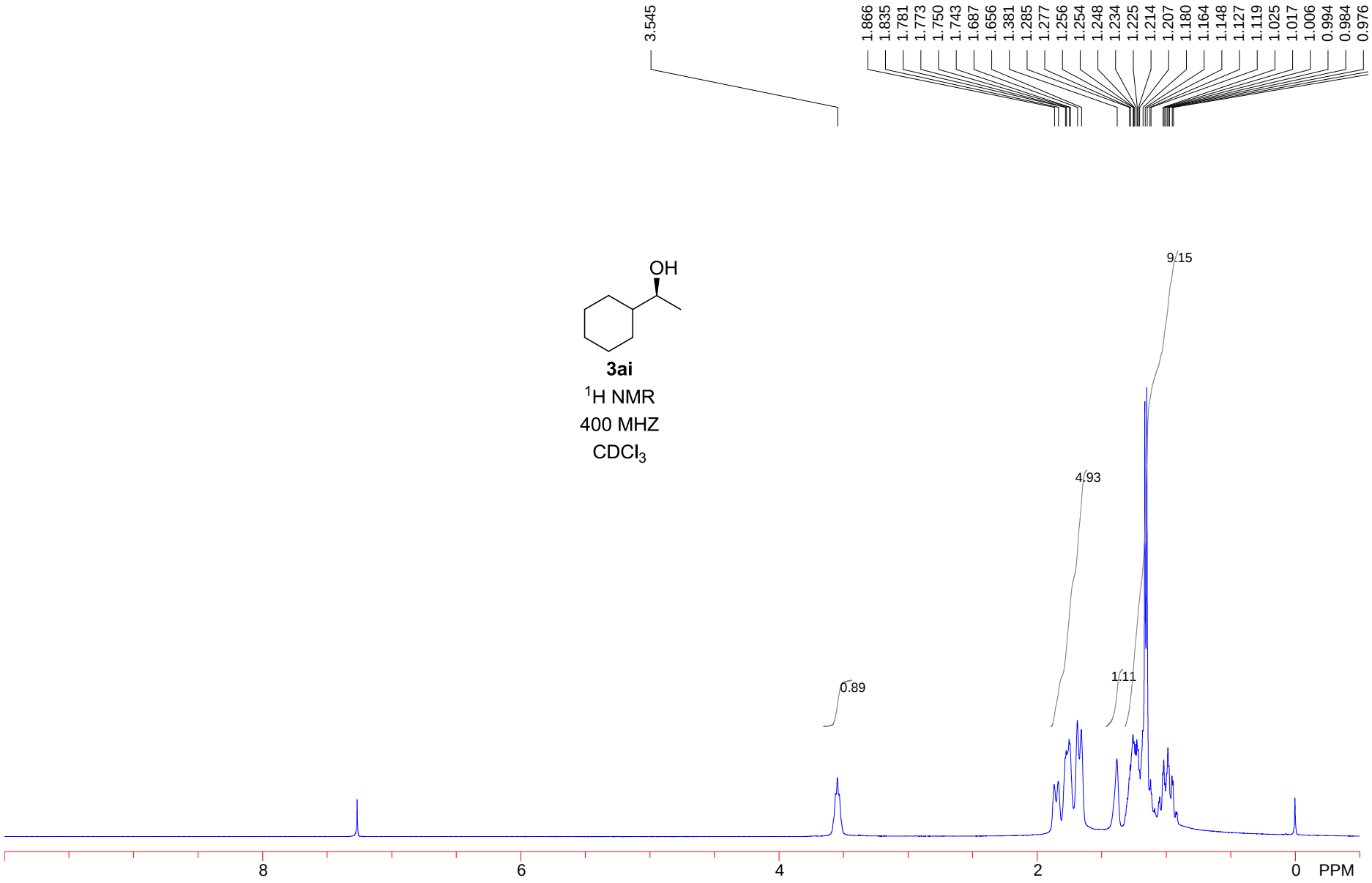
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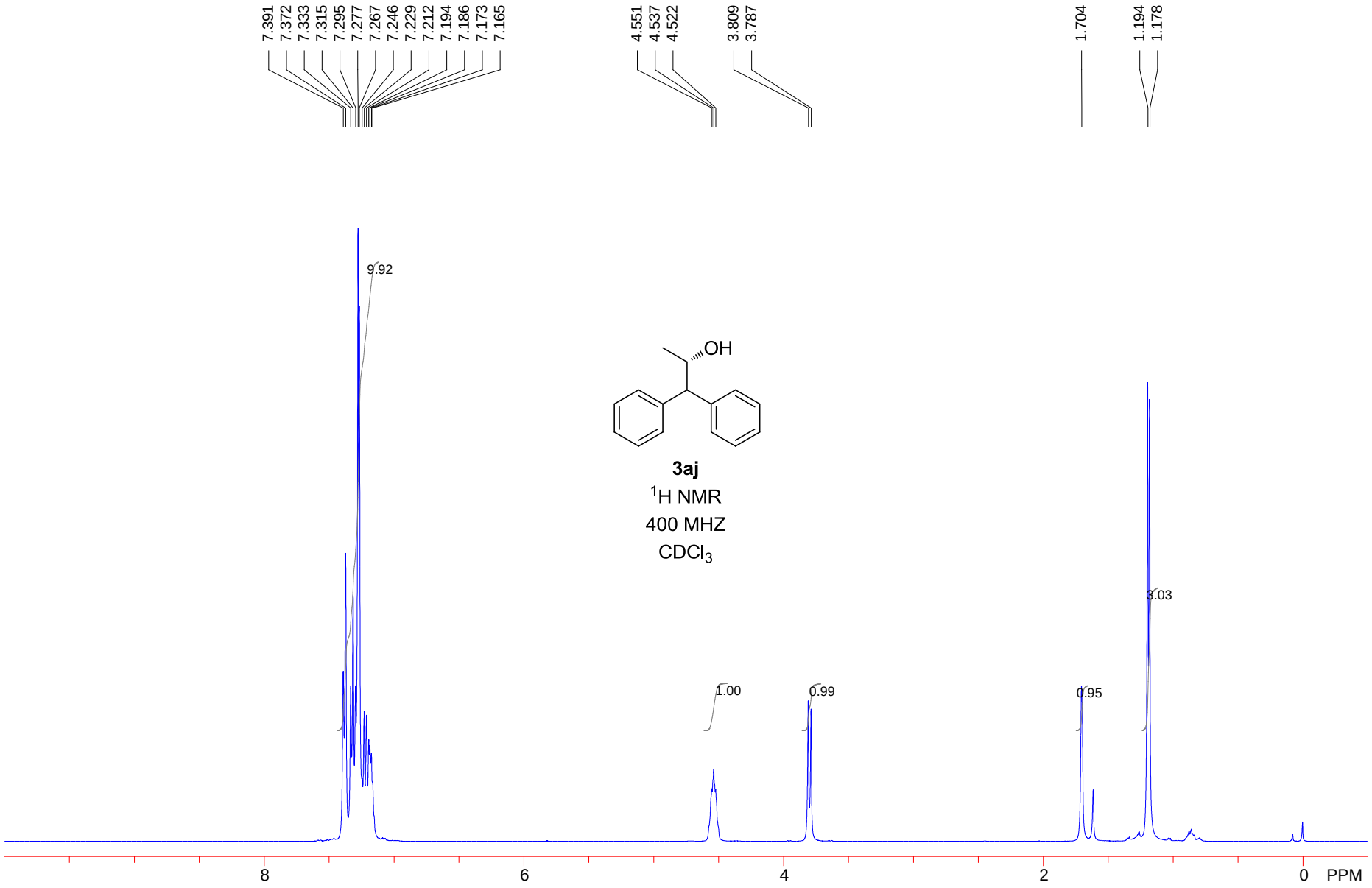
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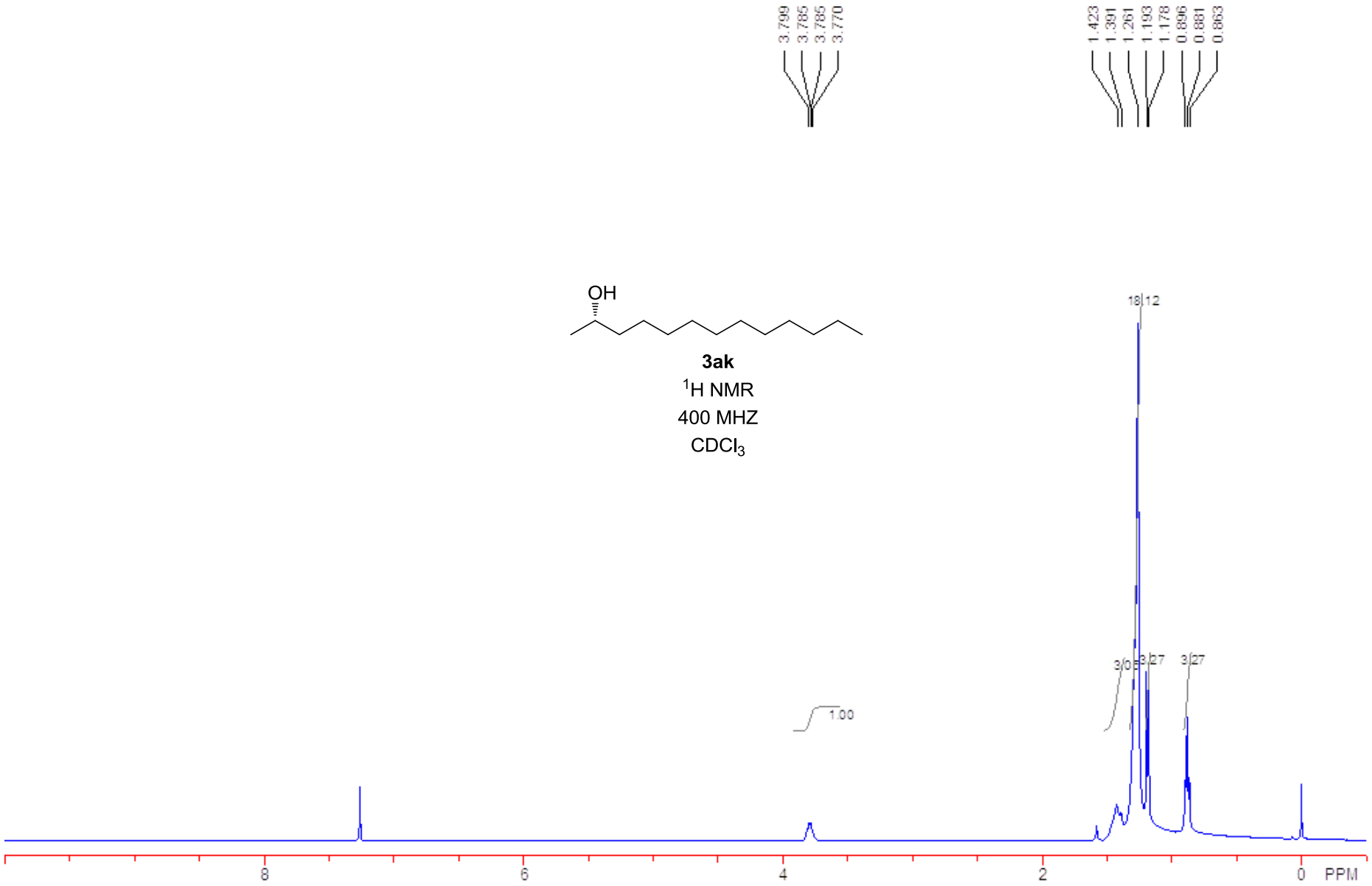
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3ak
1H NMR
400 MHZ
CDCl3
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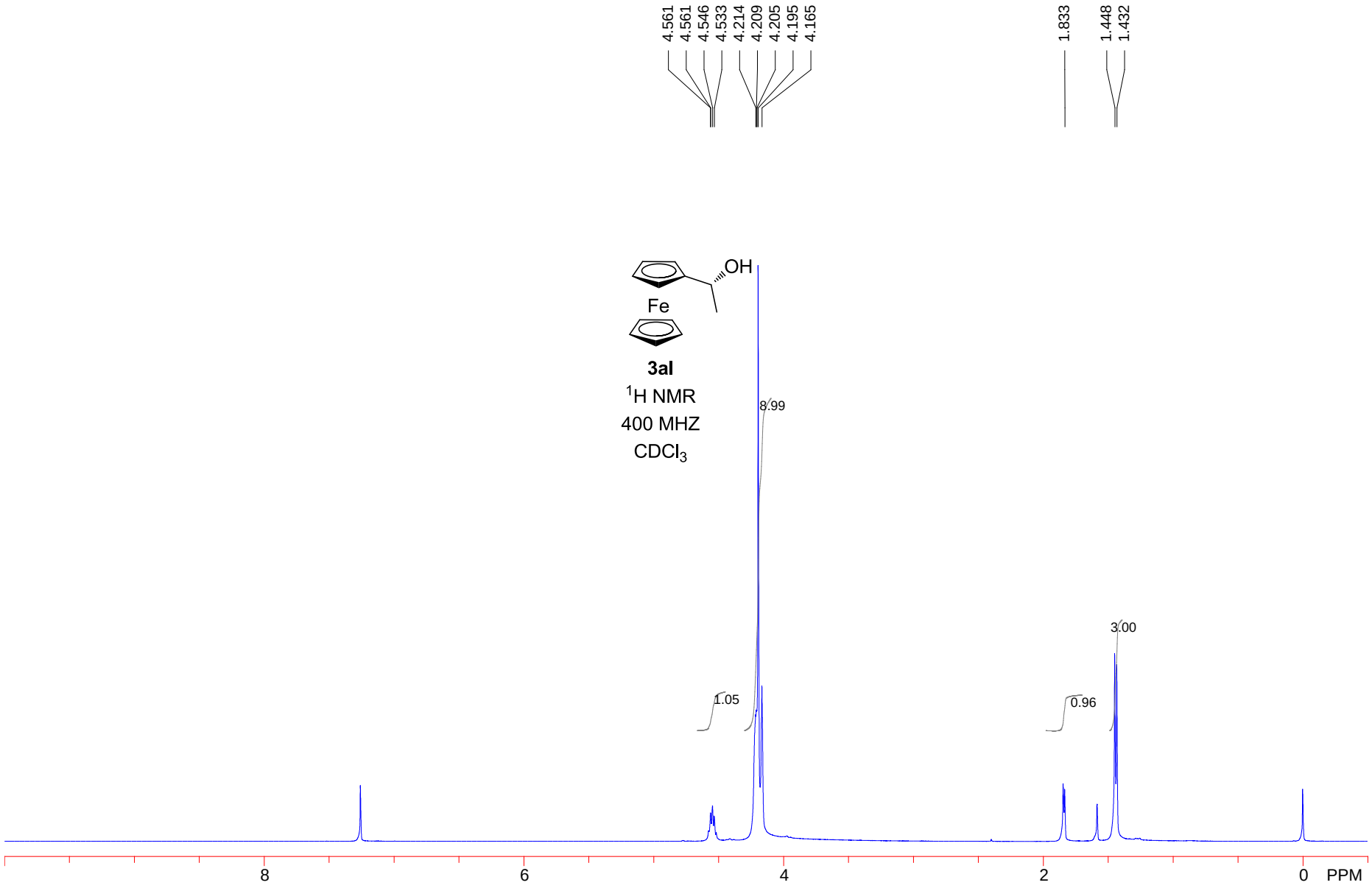
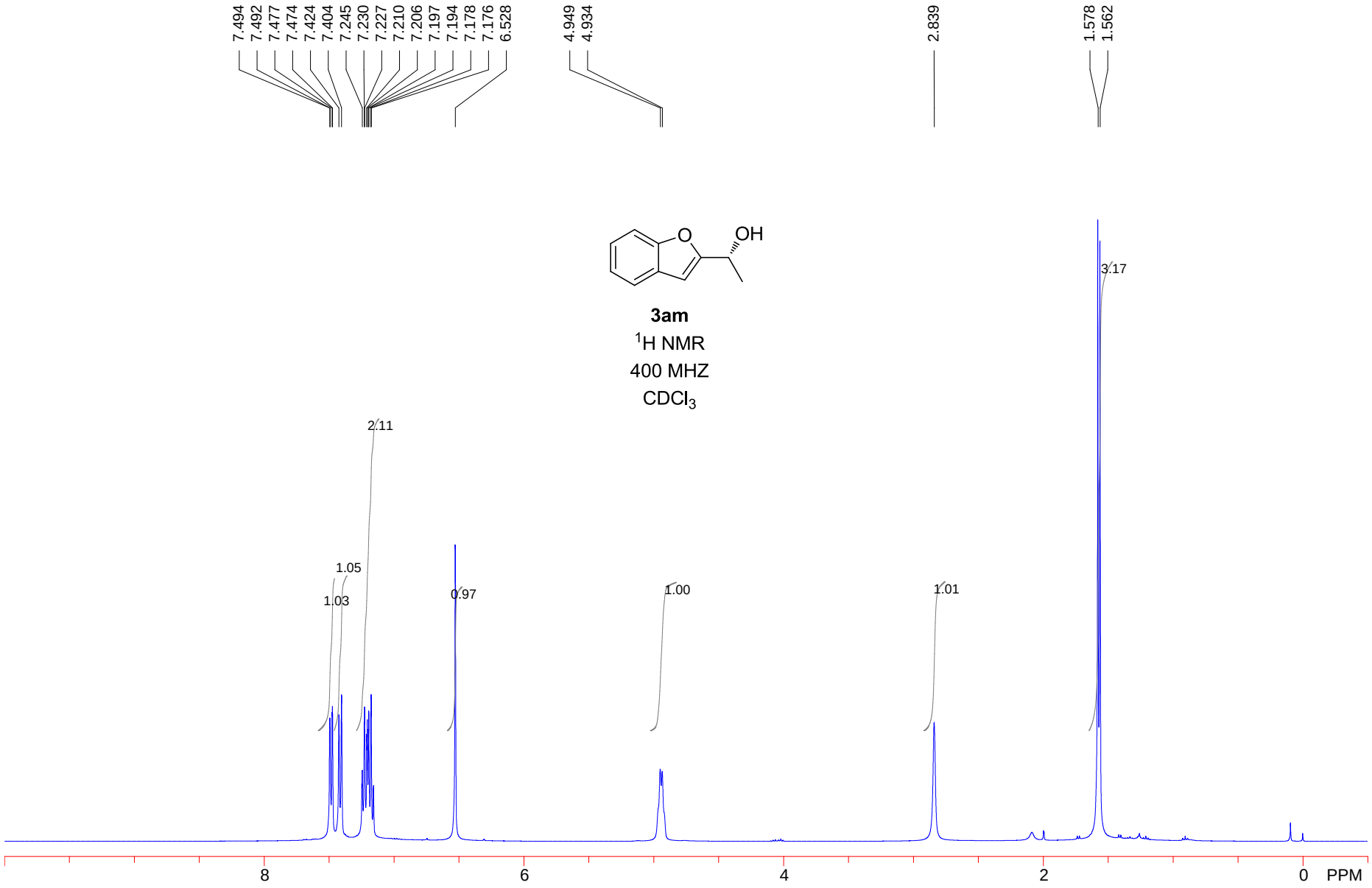
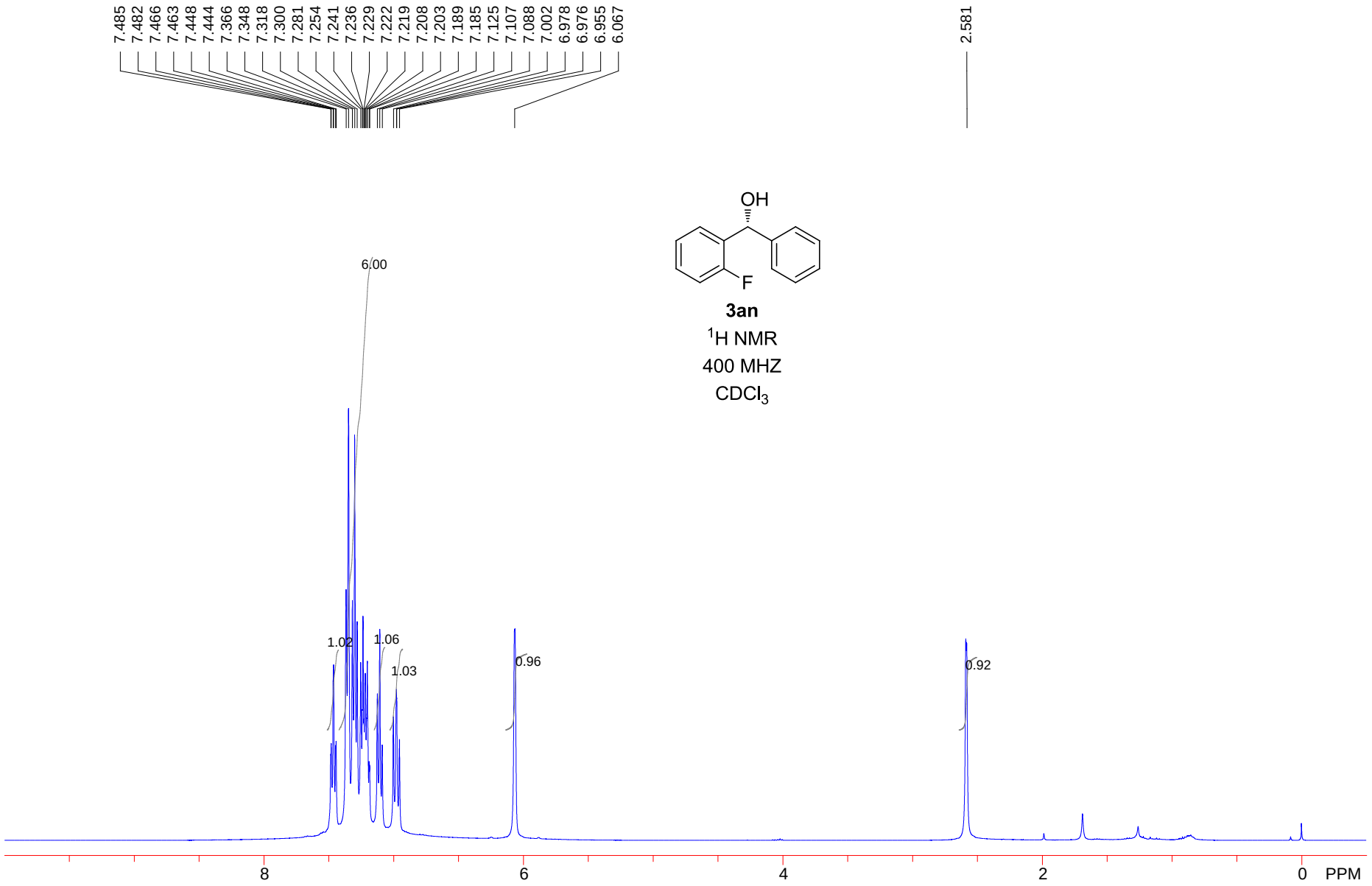
3.27
1.00
8
6
4
2
0
PPM


4.561
4.561
4.546
4.533
4.214
4.209
4.205
4.195
4.165
1.833
1.448
1.432
OH
Fe
3al
1H NMR
400 MHZ
CDCl3
8.99
1.05
0.96
3.00
8
6
4
2
0
PPM


7.494
7.492
7.477
7.474
7.424
7.404
7.245
7.230
7.227
7.210
7.206
7.197
7.194
7.178
7.176
6.528
4.949
4.934
2.839
1.578
1.562
O
OH
3am
1H NMR
400 MHZ
CDCl3
2.11
1.05
1.03
0.97
1.00
1.01
3.17
8
6
4
2
0
PPM


7.485
7.482
7.466
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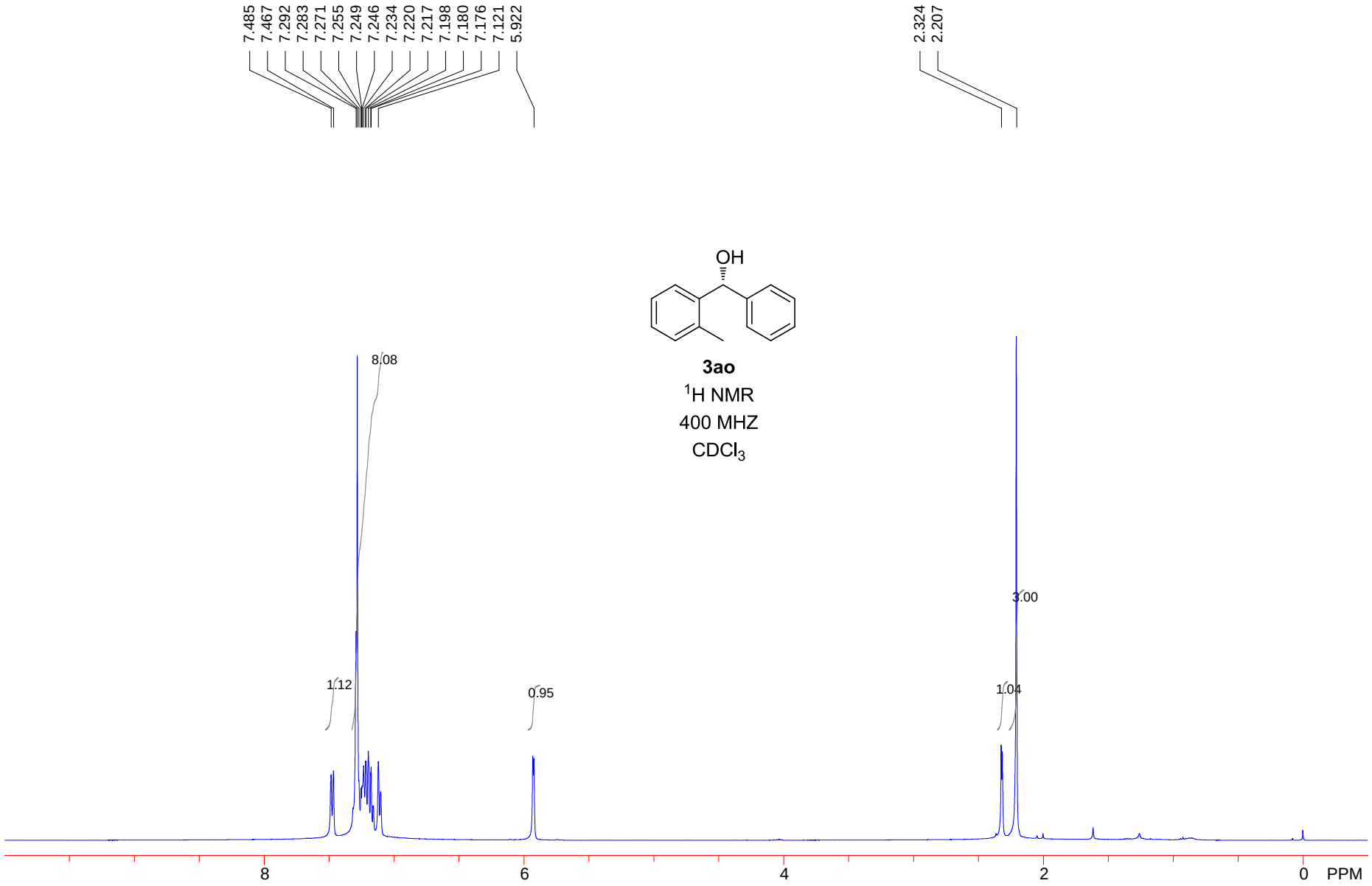
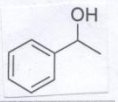
7.448
7.444
7.366
7.348
7.318
7.300
7.281
7.254
7.241
7.236
7.229
7.222
7.219
7.208
7.203
7.189
7.185
7.125
7.107
7.088
7.002
6.978
6.976
6.955
6.067
2.581
OH
F
3an
1H NMR
400 MHZ
CDCl3
6.00
1.02
1.06
1.03
0.96
0.92
8
6
4
2
0
PPM


7.485
7.467
7.292
7.283
7.271
7.255
7.249
7.246
7.234
7.220
7.217
7.198
7.180
7.176
7.121
5.922
2.324
2.207
OH
3ao
1H NMR
400 MHZ
CDCl3
8.08
1.12
0.95
3.00
1.04
8
6
4
2
0
PPM

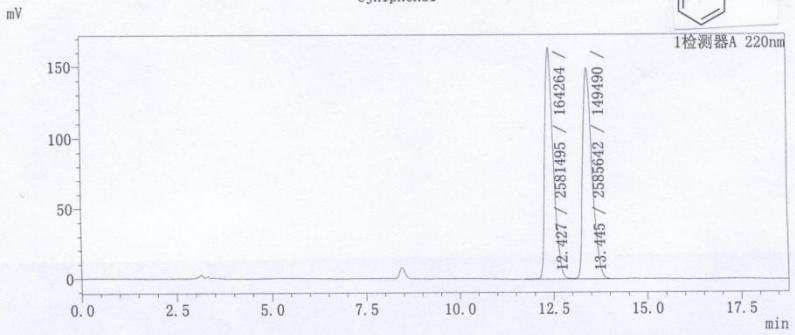
Translation of Chinese characters in HPLC spectra to English

| Chinese characters | English |
|---|---|
| 下午 | Afternoon |
| 上午 | Morning |
| 描述 | HPLC Condition |
| 色谱图 | HPLC Spectra |
| 检测器 | Detector |
| 峰表 | Area Percent Report |
| 峰号 | Peak |
| 保留时间 | Remiaining Time |
| 面积 | Area |
| 高度 | Height |
| 标记 | Note |
| 总计 | Total |

描述 : hex : iPrOH = 98 : 2, 1.0 mL/min, AS-H, 220




色谱图
cjh1phenol

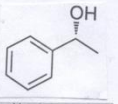



峰表

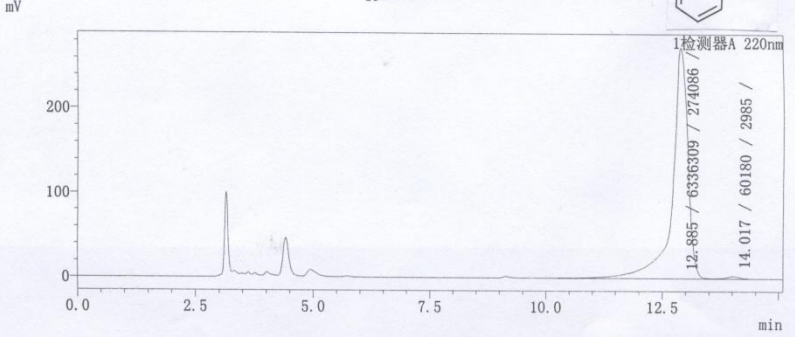
检测器A 220nm

| 峰号 | 保留时间 | 面积 | 高度 | 标记 | 面积% |
|---|---|---|---|---|---|
| 1 | 12.427 | 2581495 | 164264 | | 49.960 |
| 2 | 13.445 | 2585642 | 149490 | V | 50.040 |
| 总计 | | 5167137 | 313753 | | 100.000 |

描述 : hex : iPrOH =98/2, 1.0 mL/min, AS-H, 220 nm




色谱图
gj2024-d

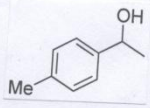



峰表

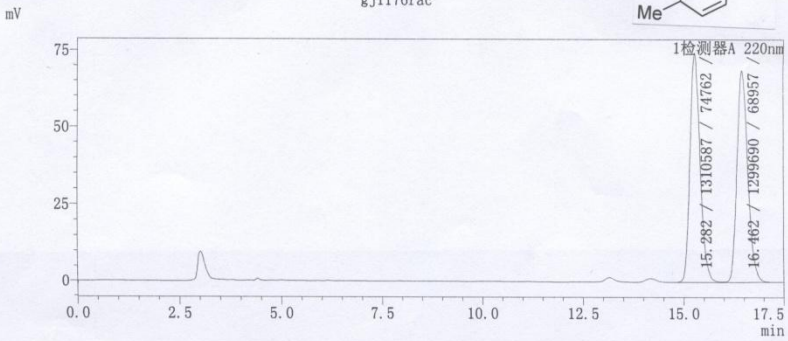
检测器A 220nm

| 峰号 | 保留时间 | 面积 | 高度 | 标记 | 面积% |
|---|---|---|---|---|---|
| 1 | 12.885 | 6336309 | 274086 | | 99.059 |
| 2 | 14.017 | 60180 | 2985 | V | 0.941 |
| 总计 | | 6396489 | 277071 | | 100.000 |

描述 : hex : iPrOH = 98/2, 1.0 mL/min, AD-H , 220 nm




色谱图
gj1176rac

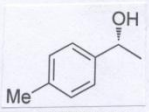



峰表

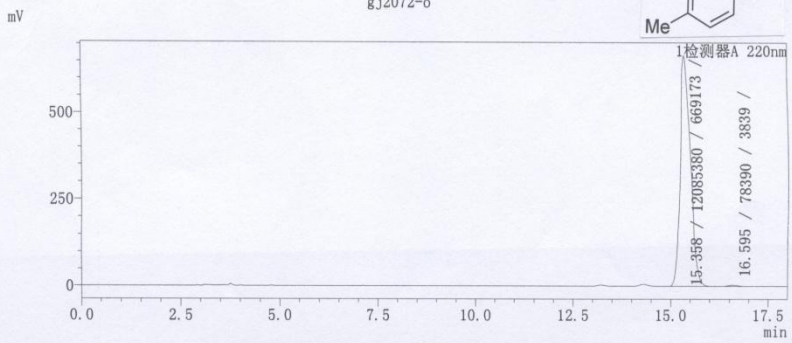
检测器A 220nm

| 峰号 | 保留时间 | 面积 | 高度 | 标记 | 面积% |
|---|---|---|---|---|---|
| 1 | 15.282 | 1310587 | 74762 | | 50.209 |
| 2 | 16.462 | 1299690 | 68957 | V | 49.791 |
| 总计 | | 2610278 | 143719 | | 100.000 |

描述 : hex : iPrOH = 98/2, 1.0 mL/min, AD-H , 220 nm




色谱图
gj2072-o



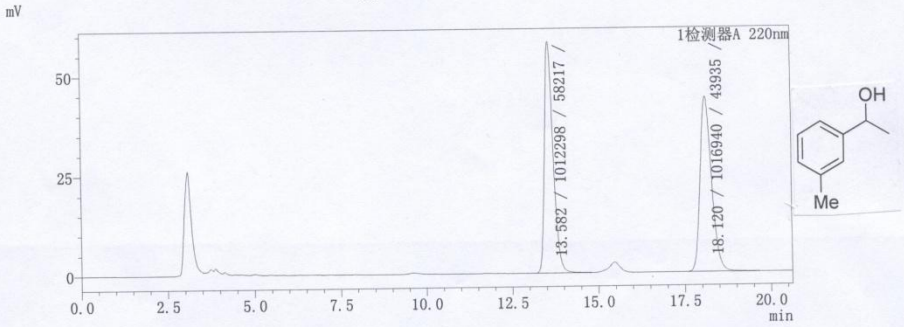

峰表

检测器A 220nm

| 峰号 | 保留时间 | 面积 | 高度 | 标记 | 面积% |
|---|---|---|---|---|---|
| 1 | 15.358 | 12085380 | 669173 | | 99.356 |
| 2 | 16.595 | 78390 | 3839 | V | 0.644 |
| 总计 | | 12163770 | 673013 | | 100.000 |

描述 : hex : iPrOH = 98/2,1.0 mL/min,OD-H , 220 nm

色谱图
gj1175rac



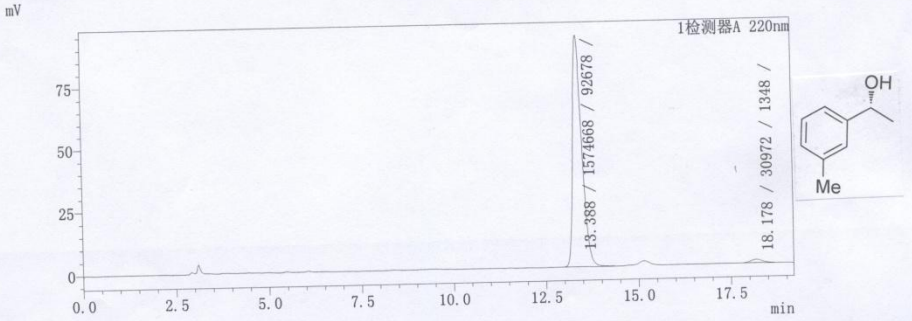

峰表

检测器A 220nm

| 峰号 | 保留时间 | 面积 | 高度 | 标记 | 面积% |
|---|---|---|---|---|---|
| 1 | 13.582 | 1012298 | 58217 | | 49.886 |
| 2 | 18.120 | 1016940 | 43935 | | 50.114 |
| 总计 | | 2029238 | 102152 | | 100.000 |

描述 : hex : iPrOH = 98/2,1.0 mL/min,OD-H , 220 nm

色谱图
gj1175-o



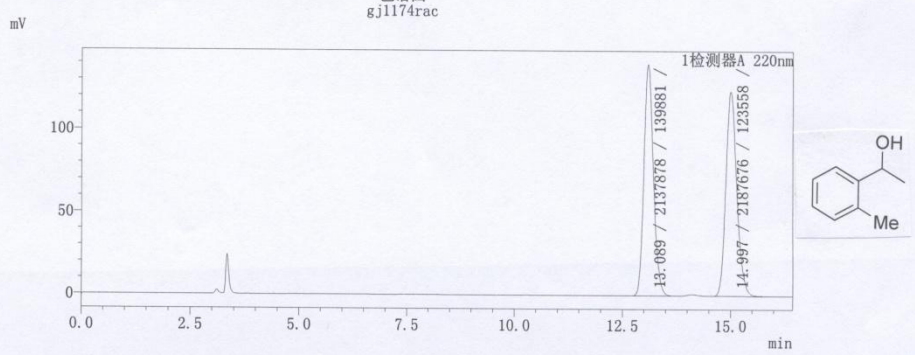

峰表

检测器A 220nm

| 峰号 | 保留时间 | 面积 | 高度 | 标记 | 面积% |
|---|---|---|---|---|---|
| 1 | 13.388 | 1574668 | 92678 | | 98.071 |
| 2 | 18.178 | 30972 | 1348 | | 1.929 |
| 总计 | | 1605640 | 94025 | | 100.000 |

描述 : hex : iPrOH = 98/2, 1.0 mL/min, AD-H , 220 nm

色谱图
gj1174rac







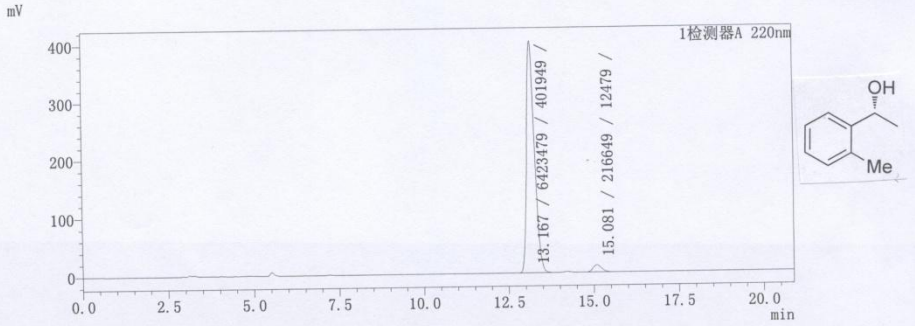
峰表

检测器A 220nm

| 峰号 | 保留时间 | 面积 | 高度 | 标记 | 面积% |
|---|---|---|---|---|---|
| 1 | 13.089 | 2137878 | 139881 | | 49.424 |
| 2 | 14.997 | 2187676 | 123558 | | 50.576 |
| 总计 | | 4325554 | 263439 | | 100.000 |

描述 : hex : iPrOH = 98/2, 1.0 mL/min, AD-H , 220 nm

色谱图
gj1174-o







峰表

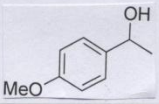
检测器A 220nm

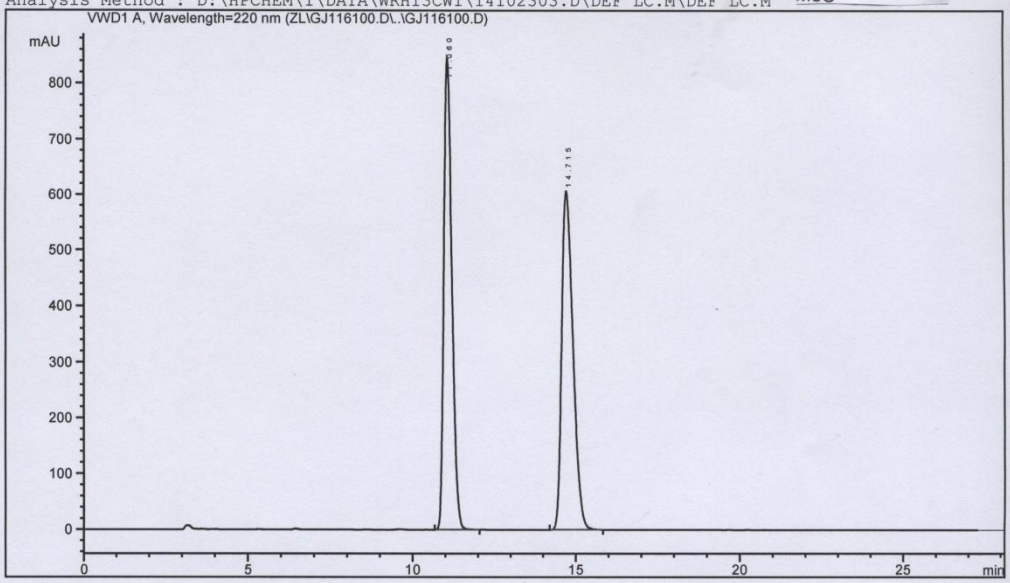
| 峰号 | 保留时间 | 面积 | 高度 | 标记 | 面积% |
|---|---|---|---|---|---|
| 1 | 13.167 | 6423479 | 401949 | | 96.737 |
| 2 | 15.081 | 216649 | 12479 | | 3.263 |
| 总计 | | 6640128 | 414427 | | 100.000 |

Data File D:\HPCHEM\1\DATA\ZL\GJ116100.D\..\GJ116100.D Sample Name: gj1161-o

AS-H, hex/iPrOH = 90/10, 1.0 mL/min, 220 nm

```
Injection Date  : 2014-10-24 08:21:47 下午
Sample Name     : gj1161-o                          Location : Vial 1
Acq. Operator   : gj
Acq. Instrument : Instrument 1
Acq. Method     : D:\HPCHEM\1\DATA\WRH13CW1\14102303.D\DEF_LC.M\DEF_LC.M
Last changed    : 2014-10-24 08:09:11 下午 by gj
                  (modified after loading)
Analysis Method : D:\HPCHEM\1\DATA\WRH13CW1\14102303.D\DEF LC.M\DEF LC.M
```



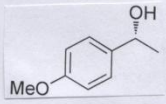

```
=====================================================================
                      Area Percent Report
=====================================================================

Sorted By             :      Signal
Multiplier            :      1.0000
Dilution              :      1.0000
Sample Amount         :      2.50000  [ng/ul]   (not used in calc.)
Use Multiplier & Dilution Factor with ISTDs


Signal 1: VWD1 A, Wavelength=220 nm

Peak RetTime Type  Width     Area      Height     Area
  #   [min]       [min]  mAU   *s   [mAU   ]      %
----|-------|----|-------|----------|----------|--------|
   1  11.060 PB    0.2677 1.45479e4   845.63483  49.8339
   2  14.715 BB    0.3775 1.46449e4   607.09448  50.1661

Totals :                 2.91928e4  1452.72931

 Results obtained with enhanced integrator!
=====================================================================
                      *** End of Report ***
```

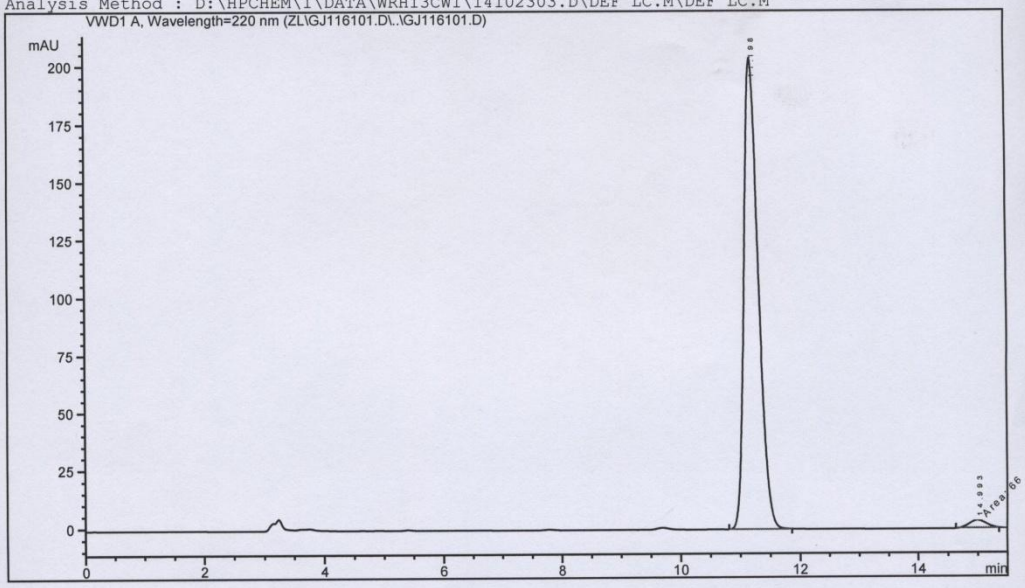
Instrument 1 2014-10-24 08:52:14 下午 wrh Page 1 of 1

Data File D:\HPCHEM\1\DATA\ZL\GJ116101.D\..\GJ116101.D  Sample Name: gj1161-o

AS-H, hex/iPrOH = 90/10, 1.0 mL/min, 220 nm

```
Injection Date  : 2014-10-24 08:51:11 下午
Sample Name     : gj1161-o                      Location : Vial 1
Acq. Operator   : gj
Acq. Instrument : Instrument 1
Acq. Method     : D:\HPCHEM\1\DATA\WRH13CW1\14102303.D\DEF_LC.M\DEF_LC.M
Last changed    : 2014-10-24 08:09:11 下午 by gj
                  (modified after loading)
Analysis Method : D:\HPCHEM\1\DATA\WRH13CW1\14102303.D\DEF LC.M\DEF LC.M
```




Area Percent Report

```
Sorted By             :      Signal
Multiplier            :      1.0000
Dilution              :      1.0000
Sample Amount         :      2.50000  [ng/ul]   (not used in calc.)
Use Multiplier & Dilution Factor with ISTDs
```

Signal 1: VWD1 A, Wavelength=220 nm

| Peak # | RetTime [min] | Type | Width [min] | Area mAU *s | Height [mAU ] | Area % |
|---|---|---|---|---|---|---|
| 1 | 11.198 | PB | 0.2580 | 3394.86963 | 204.21149 | 98.0835 |
| 2 | 14.993 | MM | 0.3360 | 66.33274 | 3.29074 | 1.9165 |
| Totals : | | | | 3461.20237 | 207.50223 | |

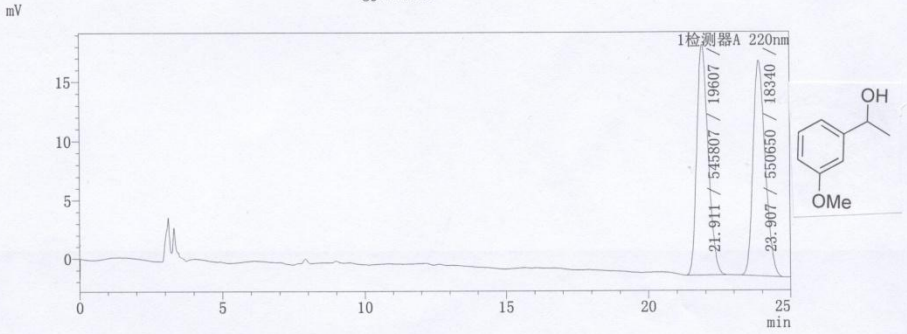
Results obtained with enhanced integrator!

*** End of Report ***

Instrument 1 2014-11-4 10:33:41 上午 gj  Page 1 of 1

描述 : hex : iPrOH = 98/1, 1.0 mL/min, AS-H , 220 nm

色谱图
gjl141rac



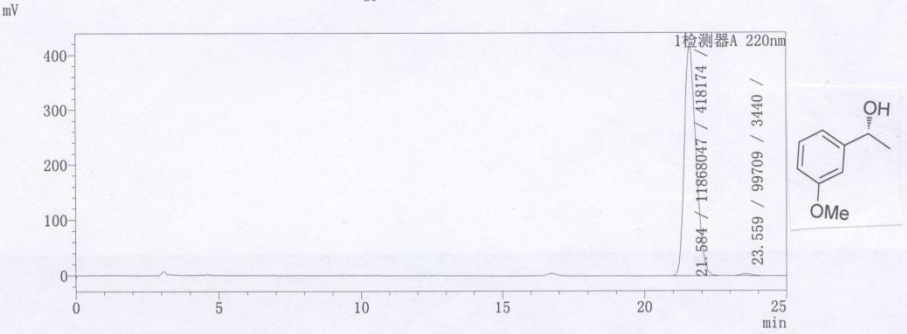

峰表

检测器A 220nm

| 峰号 | 保留时间 | 面积 | 高度 | 标记 | 面积% |
|---|---|---|---|---|---|
| 1 | 21.911 | 545807 | 19607 | | 49.779 |
| 2 | 23.907 | 550650 | 18340 | | 50.221 |
| 总计 | | 1096457 | 37947 | | 100.000 |

描述 : hex : iPrOH = 98/2, 1.0 mL/min, AS-H , 220 nm

色谱图
gjl141-o



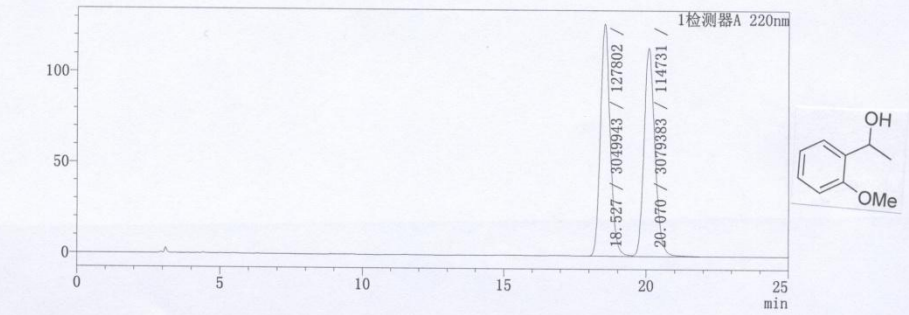

峰表

检测器A 220nm

| 峰号 | 保留时间 | 面积 | 高度 | 标记 | 面积% |
|---|---|---|---|---|---|
| 1 | 21.584 | 11868047 | 418174 | | 99.167 |
| 2 | 23.559 | 99709 | 3440 | | 0.833 |
| 总计 | | 11967756 | 421614 | | 100.000 |

描述 : hex : iPrOH = 98/2, 1.0 mL/min, OD-H , 220 nm

色谱图
gj1182rac



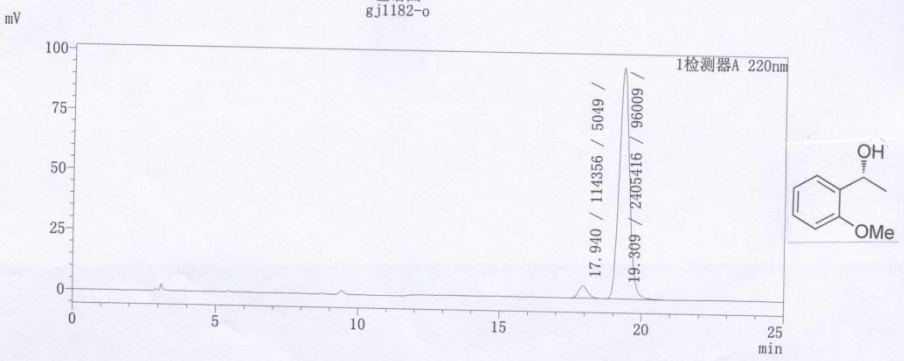

峰表

检测器A 220nm

| 峰号 | 保留时间 | 面积 | 高度 | 标记 | 面积% |
|---|---|---|---|---|---|
| 1 | 18.527 | 3049943 | 127802 | | 49.760 |
| 2 | 20.070 | 3079383 | 114731 | V | 50.240 |
| 总计 | | 6129325 | 242533 | | 100.000 |

描述 : hex : iPrOH = 98/2, 1.0 mL/min, OD-H , 220 nm

色谱图
gj1182-o



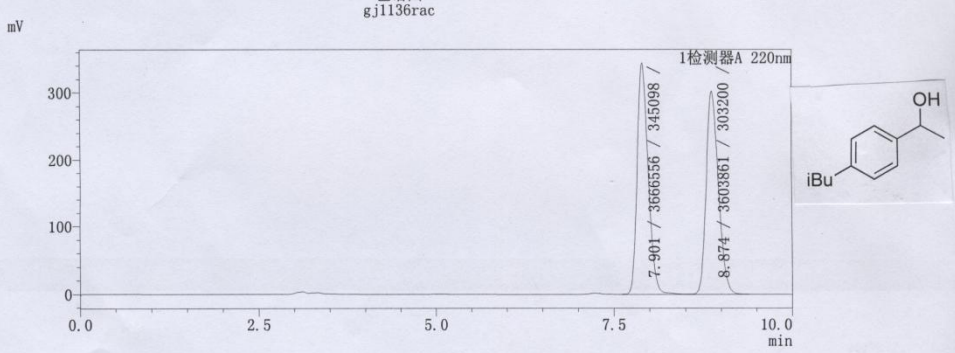

峰表

检测器A 220nm

| 峰号 | 保留时间 | 面积 | 高度 | 标记 | 面积% |
|---|---|---|---|---|---|
| 1 | 17.940 | 114356 | 5049 | | 4.538 |
| 2 | 19.309 | 2405416 | 96009 | | 95.462 |
| 总计 | | 2519772 | 101058 | | 100.000 |

描述 : hex : iPrOH = 98/1, 1.0 mL/min, AS-H , 220 nm

色谱图
gj1136rac



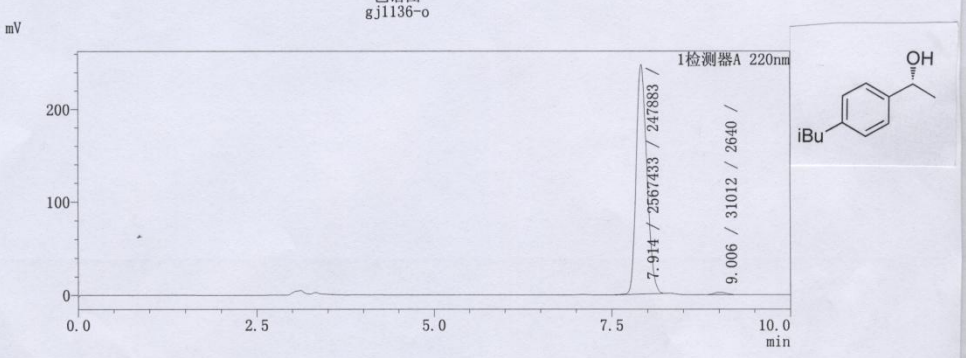

峰表

检测器A 220nm

| 峰号 | 保留时间 | 面积 | 高度 | 标记 | 面积% |
|---|---|---|---|---|---|
| 1 | 7.901 | 3666556 | 345098 | | 50.431 |
| 2 | 8.874 | 3603861 | 303200 | SV | 49.569 |
| 总计 | | 7270416 | 648298 | | 100.000 |

描述 : hex : iPrOH = 98/1, 1.0 mL/min, AS-H , 220 nm

色谱图
gj1136-o

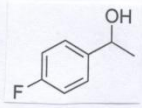



峰表

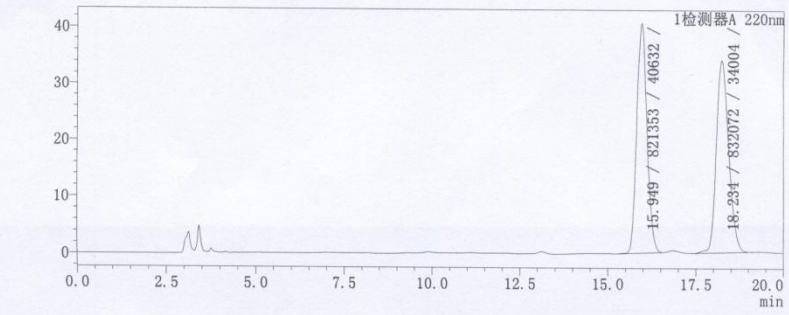
检测器A 220nm

| 峰号 | 保留时间 | 面积 | 高度 | 标记 | 面积% |
|---|---|---|---|---|---|
| 1 | 7.914 | 2567433 | 247883 | | 98.806 |
| 2 | 9.006 | 31012 | 2640 | V | 1.194 |
| 总计 | | 2598445 | 250522 | | 100.000 |

描述 : hex : iPrOH = 98/2,1.0 mL/min,AS-H ,220 nm




色谱图
gj1179rac

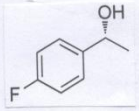



峰表

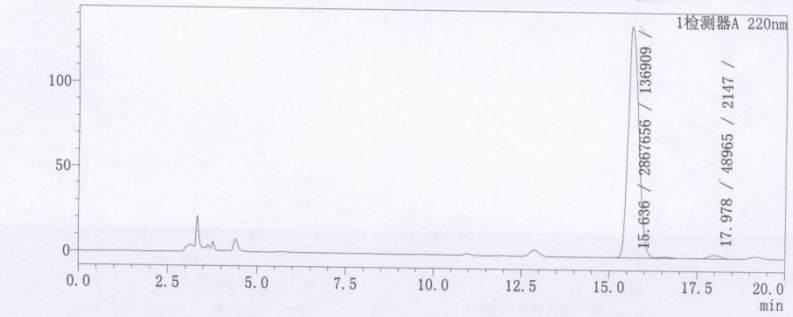
检测器A 220nm

| 峰号 | 保留时间 | 面积 | 高度 | 标记 | 面积% |
|---|---|---|---|---|---|
| 1 | 15.949 | 821353 | 40632 | | 49.676 |
| 2 | 18.234 | 832072 | 34004 | | 50.324 |
| 总计 | | 1653425 | 74636 | | 100.000 |

描述 : hex : iPrOH = 98/2, 1.0 mL/min, AS-H , 220 nm




色谱图
gj2074-o

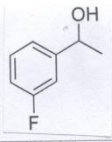



峰表

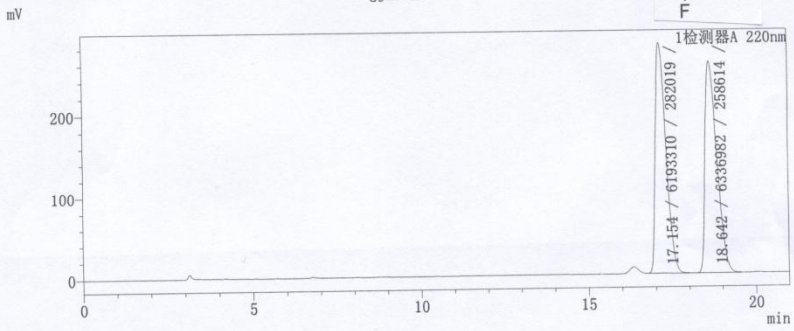
检测器A 220nm

| 峰号 | 保留时间 | 面积 | 高度 | 标记 | 面积% |
|---|---|---|---|---|---|
| 1 | 15.636 | 2867656 | 136909 | M | 98.321 |
| 2 | 17.978 | 48965 | 2147 | M | 1.679 |
| 总计 | | 2916621 | 139055 | | 100.000 |

描述 : hex : iPrOH = 98/2, 1.0 mL/min, OJ-H , 220 nm




色谱图
gj2075r

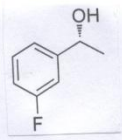



峰表

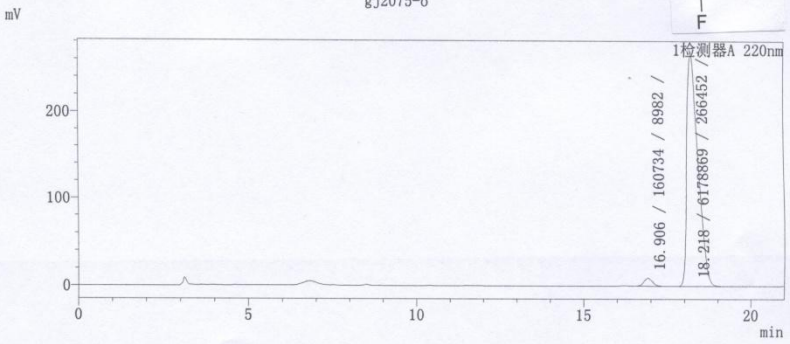
检测器A 220nm

| 峰号 | 保留时间 | 面积 | 高度 | 标记 | 面积% |
|---|---|---|---|---|---|
| 1 | 17.154 | 6193310 | 282019 | | 49.427 |
| 2 | 18.642 | 6336982 | 258614 | | 50.573 |
| 总计 | | 12530293 | 540633 | | 100.000 |

描述 : hex : iPrOH = 98/2, 1.0 mL/min, OJ-H , 220 nm




色谱图
gj2075-o



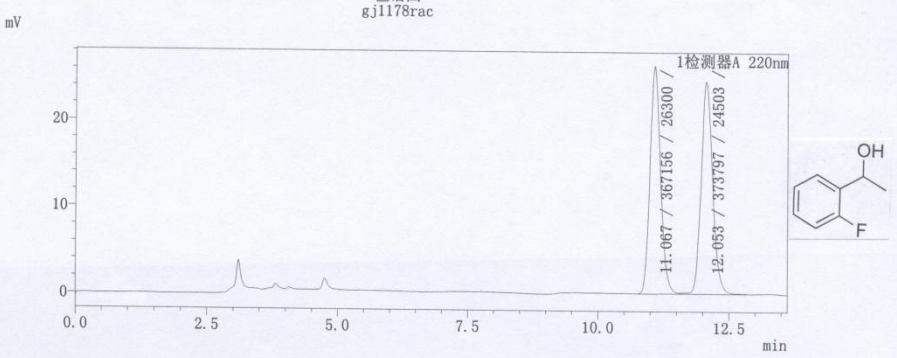

峰表

检测器A 220nm

| 峰号 | 保留时间 | 面积 | 高度 | 标记 | 面积% |
|---|---|---|---|---|---|
| 1 | 16.906 | 160734 | 8982 | | 2.535 |
| 2 | 18.218 | 6178869 | 266452 | | 97.465 |
| 总计 | | 6339602 | 275434 | | 100.000 |

描述 : hex : iPrOH = 98/2, 1.0 mL/min, OD-H , 220 nm

色谱图
gj1178rac



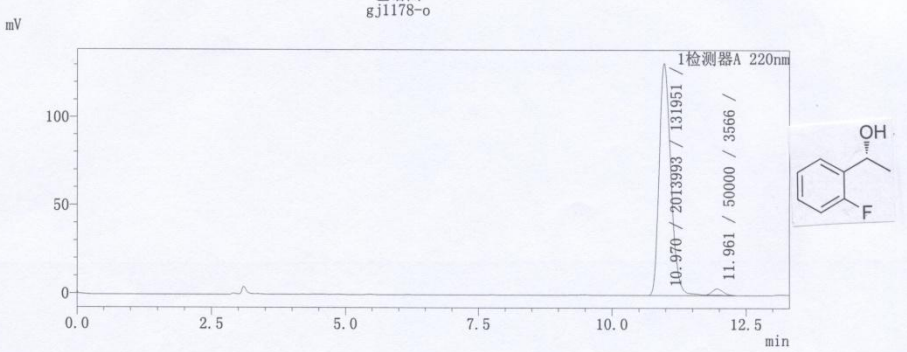

峰表

检测器A 220nm

| 峰号 | 保留时间 | 面积 | 高度 | 标记 | 面积% |
|---|---|---|---|---|---|
| 1 | 11.067 | 367156 | 26300 | | 49.552 |
| 2 | 12.053 | 373797 | 24503 | V | 50.448 |
| 总计 | | 740953 | 50803 | | 100.000 |

描述 : hex : iPrOH = 98/2, 1.0 mL/min, OD-H , 220 nm

色谱图
gj1178-o




峰表

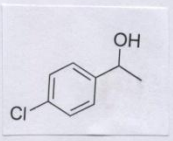
检测器A 220nm

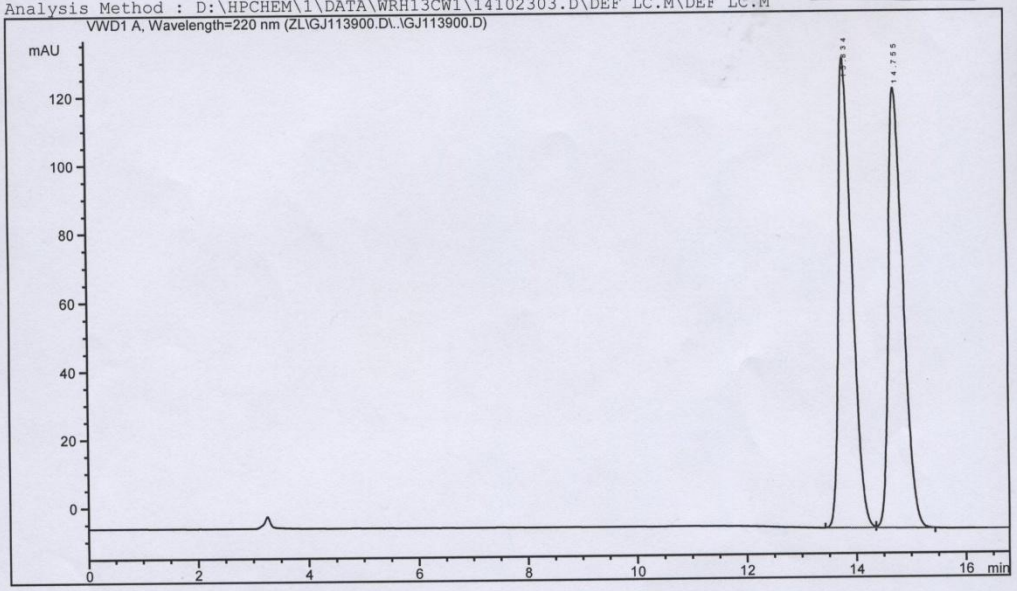
| 峰号 | 保留时间 | 面积 | 高度 | 标记 | 面积% |
|---|---|---|---|---|---|
| 1 | 10.970 | 2013993 | 131951 | S | 97.578 |
| 2 | 11.961 | 50000 | 3566 | T | 2.422 |
| 总计 | | 2063993 | 135517 | | 100.000 |

Data File D:\HPCHEM\1\DATA\ZL\GJ113900.D\..\GJ113900.D  Sample Name: gj1139rac

AS-H, hex/iPrOH = 98/2, 1.0 mL/min, 220 nm

Injection Date : 2014-10-24 01:24:52 下午
Sample Name : gj1139rac  Location : Vial 1
Acq. Operator : gj
Acq. Instrument : Instrument 1
Acq. Method : D:\HPCHEM\1\DATA\WRH13CW1\14102303.D\DEF_LC.M\DEF_LC.M
Last changed : 2014-10-24 10:45:19 上午 by wrh
(modified after loading)
Analysis Method : D:\HPCHEM\1\DATA\WRH13CW1\14102303.D\DEF_LC.M\DEF_LC.M




Area Percent Report

Sorted By : Signal
Multiplier : 1.0000
Dilution : 1.0000
Sample Amount : 2.50000 [ng/ul] (not used in calc.)
Use Multiplier & Dilution Factor with ISTDs

Signal 1: VWD1 A, Wavelength=220 nm

| Peak # | RetTime [min] | Type | Width [min] | Area mAU *s | Height [mAU ] | Area % |
|---|---|---|---|---|---|---|
| 1 | 13.834 | BV | 0.2706 | 2396.34985 | 137.33264 | 49.9557 |
| 2 | 14.755 | VB | 0.2892 | 2400.60425 | 128.56506 | 50.0443 |

Totals : 4796.95410 265.89771

Results obtained with enhanced integrator!

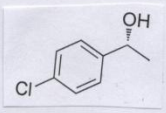
*** End of Report ***

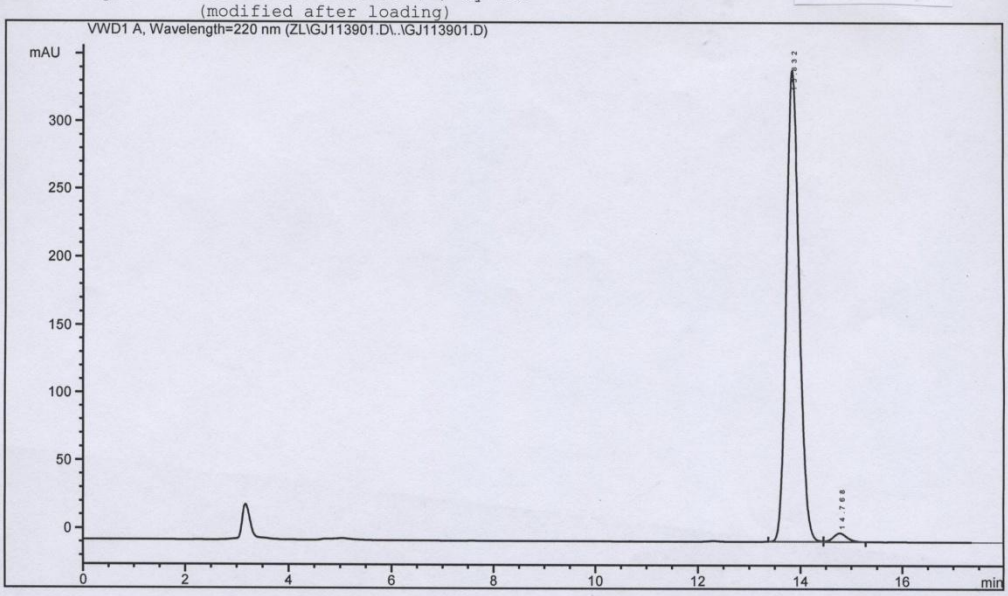
Instrument 1 2014-10-24 01:45:25 下午 wrh  Page 1 of 1

Data File D:\HPCHEM\1\DATA\ZL\GJ113901.D\..\GJ113901.D Sample Name: gj1139-o

AS-H, hex/iPrOH = 98/2, 1.0 mL/min, 220 nm

```
Injection Date  : 2014-10-24 01:43:33 下午
Sample Name     : gj1139-o                          Location : Vial 1
Acq. Operator   : gj
Acq. Instrument : Instrument 1
Acq. Method     : D:\HPCHEM\1\DATA\WRH13CW1\14102303.D\DEF_LC.M\DEF_LC.M
Last changed    : 2014-10-24 10:45:19 上午 by wrh
                  (modified after loading)
Analysis Method : D:\HPCHEM\1\DATA\WRH13CW1\14102303.D\DEF_LC.M\DEF_LC.M
Last changed    : 2014-10-24 02:05:33 下午 by wrh
                  (modified after loading)
```



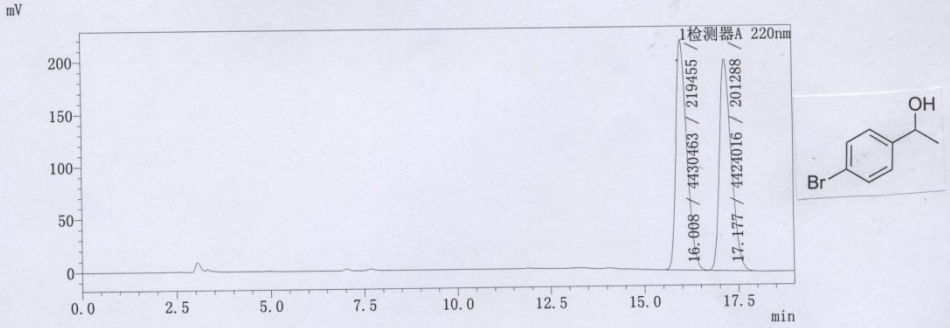




```
=====================================================================
                        Area Percent Report
=====================================================================

Sorted By             :      Signal
Multiplier            :      1.0000
Dilution              :      1.0000
Sample Amount         :      2.50000  [ng/ul]   (not used in calc.)
Use Multiplier & Dilution Factor with ISTDs


Signal 1: VWD1 A, Wavelength=220 nm

Peak RetTime Type  Width     Area      Height     Area
  #   [min]        [min]  mAU   *s   [mAU   ]      %
----|-------|----|-------|----------|----------|--------|
   1  13.832 BV    0.2702 6100.52783  347.74100  98.0514
   2  14.768 VB    0.2905  121.23466    6.41055   1.9486

Totals :                  6221.76249  354.15155

 Results obtained with enhanced integrator!
=====================================================================
                        *** End of Report ***
```

Instrument 1 2014-10-24 02:06:04 下午 wrh Page 1 of 1

描述 : hex : iPrOH = 98/2, 1.0 mL/min,AS-H , 220 nm

色谱图
gj1148-o



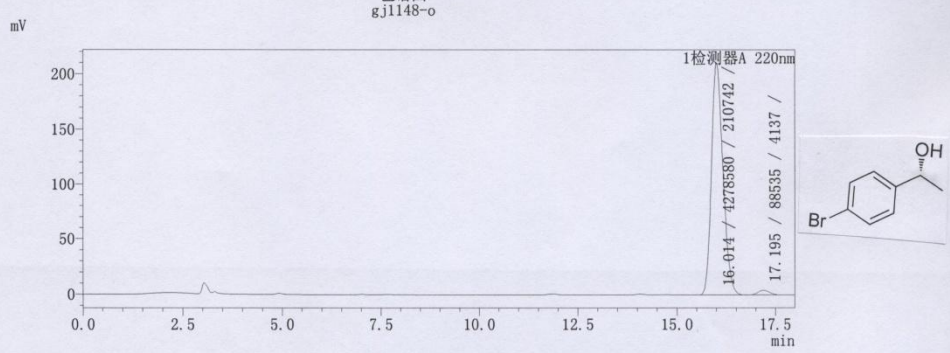

峰表

检测器A 220nm

| 峰号 | 保留时间 | 面积 | 高度 | 标记 | 面积% |
|---|---|---|---|---|---|
| 1 | 16.008 | 4430463 | 219455 | | 50.036 |
| 2 | 17.177 | 4424016 | 201288 | | 49.964 |
| 总计 | | 8854479 | 420743 | | 100.000 |

描述 : hex : iPrOH = 98/2, 1.0 mL/min,AS-H , 220 nm

色谱图
gj1148-o




峰表

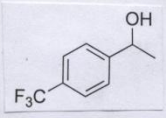
检测器A 220nm

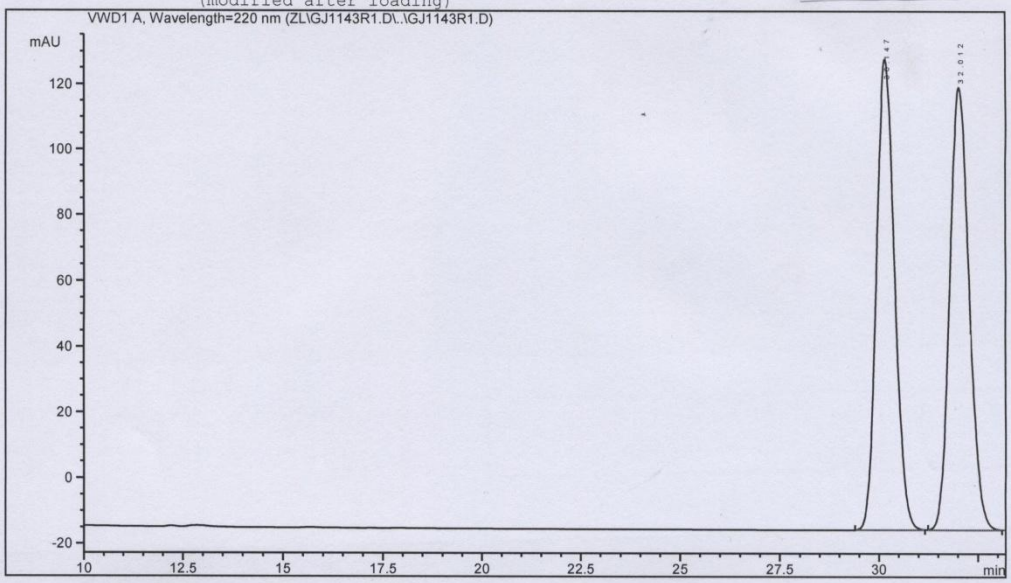
| 峰号 | 保留时间 | 面积 | 高度 | 标记 | 面积% |
|---|---|---|---|---|---|
| 1 | 16.014 | 4278580 | 210742 | | 97.973 |
| 2 | 17.195 | 88535 | 4137 | V | 2.027 |
| 总计 | | 4367116 | 214879 | | 100.000 |

Data File D:\HPCHEM\1\DATA\ZL\GJ1143R1.D\..\GJ1143R1.D  Sample Name: gj1143r

OJ-H, hex/iPrOH = 99/1, 0.5 mL/min, 220 nm

```
Injection Date  : 2014-10-26 03:53:09 下午
Sample Name     : gj1143r                          Location : Vial 1
Acq. Operator   : gj
Acq. Instrument : Instrument 1
Acq. Method     : D:\HPCHEM\1\DATA\WRH13CW1\14102303.D\DEF_LC.M\DEF_LC.M
Last changed    : 2014-10-26 03:46:05 下午 by gj
                  (modified after loading)
Analysis Method : D:\HPCHEM\1\DATA\WRH13CW1\14102303.D\DEF_LC.M\DEF_LC.M
Last changed    : 2014-11-13 09:32:20 下午 by gj
                  (modified after loading)
```




Area Percent Report

```
Sorted By             :      Signal
Multiplier            :      1.0000
Dilution              :      1.0000
Sample Amount         :      2.50000  [ng/ul]   (not used in calc.)
Use Multiplier & Dilution Factor with ISTDs


Signal 1: VWD1 A, Wavelength=220 nm

Peak RetTime Type  Width     Area      Height     Area
  #   [min]        [min]  mAU   *s   [mAU   ]      %
----|-------|----|-------|----------|----------|--------|
   1  30.147 BB    0.4983 4588.52246  143.50304  49.9960
   2  32.012 BB    0.5279 4589.26318  134.91661  50.0040

Totals :                  9177.78564  278.41965

 Results obtained with enhanced integrator!
```

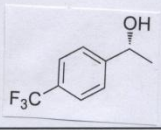
*** End of Report ***

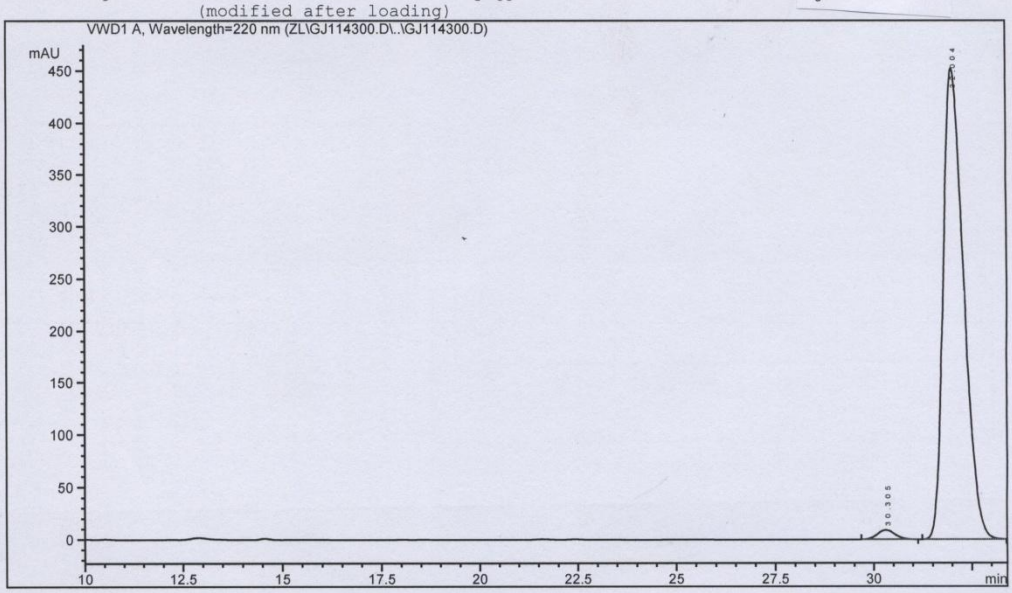
Instrument 1 2014-11-13 09:32:44 下午 gj  Page 1 of 1

Data File D:\HPCHEM\1\DATA\ZL\GJ114300.D\..\GJ114300.D  Sample Name: gj1143-o

OJ-H, hex/iPrOH = 99/1, 0.5 mL/min, 220 nm

```
Injection Date  : 2014-10-26 04:28:06 下午
Sample Name     : gj1143-o                          Location : Vial 1
Acq. Operator   : gj
Acq. Instrument : Instrument 1
Acq. Method     : D:\HPCHEM\1\DATA\WRH13CW1\14102303.D\DEF_LC.M\DEF_LC.M
Last changed    : 2014-10-26 03:46:05 下午 by gj
                  (modified after loading)
Analysis Method : D:\HPCHEM\1\DATA\WRH13CW1\14102303.D\DEF_LC.M\DEF_LC.M
Last changed    : 2014-11-13 09:34:52 下午 by gj
                  (modified after loading)
```



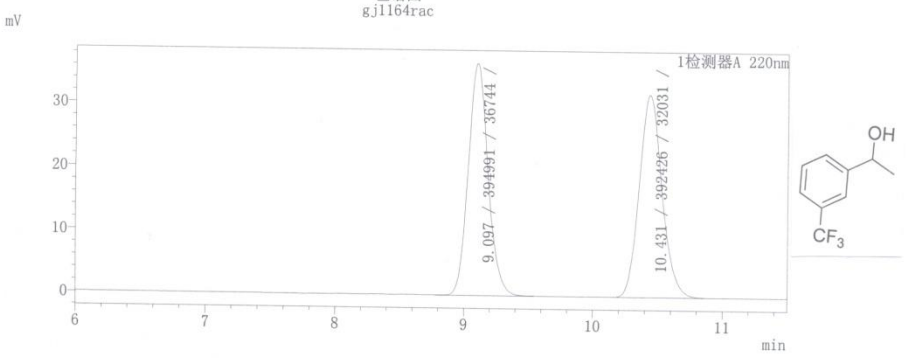




```
=====================================================================
                        Area Percent Report
=====================================================================

Sorted By             :      Signal
Multiplier            :      1.0000
Dilution              :      1.0000
Sample Amount         :      2.50000  [ng/ul]   (not used in calc.)
Use Multiplier & Dilution Factor with ISTDs


Signal 1: VWD1 A, Wavelength=220 nm

Peak RetTime Type  Width     Area      Height     Area
  #   [min]        [min]  mAU   *s   [mAU   ]      %
----|-------|----|-------|----------|----------|--------|
   1  30.305 BP    0.4859  285.88004    9.13533   1.7231
   2  32.004 BB    0.5601 1.63051e4   452.57944  98.2769

Totals :                  1.65910e4   461.71477

 Results obtained with enhanced integrator!
=====================================================================
                        *** End of Report ***
```

Instrument 1 2014-11-13 09:35:09 下午 gj  Page 1 of 1

描述 : hex : iPrOH = 98/2, 1.0 mL/min, AD-H , 220 nm

色谱图
gj1164rac



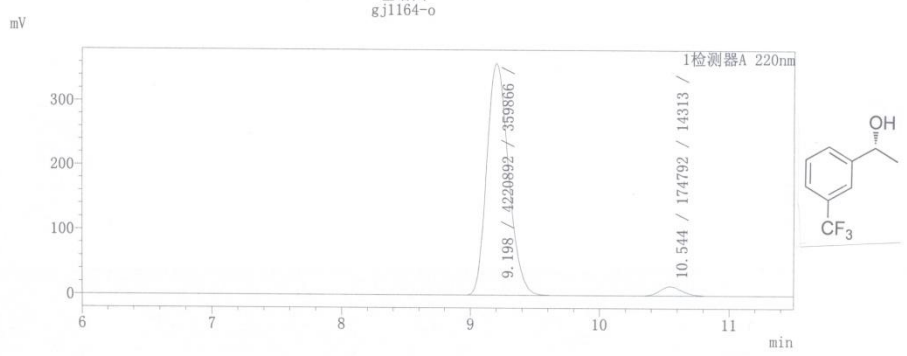

峰表

检测器A 220nm

| 峰号 | 保留时间 | 面积 | 高度 | 标记 | 面积% |
|---|---|---|---|---|---|
| 1 | 9.097 | 394991 | 36744 | V | 50.163 |
| 2 | 10.431 | 392426 | 32031 | | 49.837 |
| 总计 | | 787417 | 68775 | | 100.000 |

描述 : hex : iPrOH = 98/2, 1.0 mL/min, AD-H , 220 nm

色谱图
gj1164-o

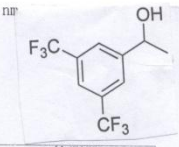



峰表

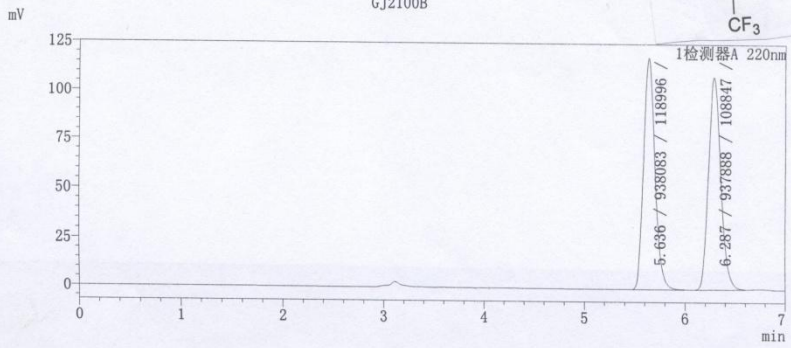
检测器A 220nm

| 峰号 | 保留时间 | 面积 | 高度 | 标记 | 面积% |
|---|---|---|---|---|---|
| 1 | 9.198 | 4220892 | 359866 | | 96.024 |
| 2 | 10.544 | 174792 | 14313 | V | 3.976 |
| 总计 | | 4395684 | 374179 | | 100.000 |

描述 : hex : iPrOH = 98/2, 1.0 mL/min, AS-H , 220 nm




色谱图
GJ2100B

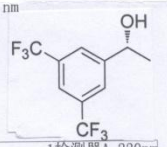



峰表

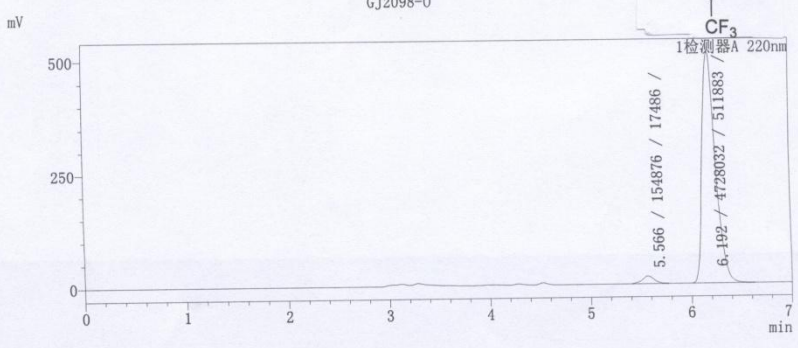
检测器A 220nm

| 峰号 | 保留时间 | 面积 | 高度 | 标记 | 面积% |
|---|---|---|---|---|---|
| 1 | 5.636 | 938083 | 118996 | | 50.005 |
| 2 | 6.287 | 937888 | 108847 | | 49.995 |
| 总计 | | 1875971 | 227844 | | 100.000 |

描述 : hex : iPrOH = 98/2, 1.0 mL/min, AS-H , 220 nm




色谱图
GJ2098-O

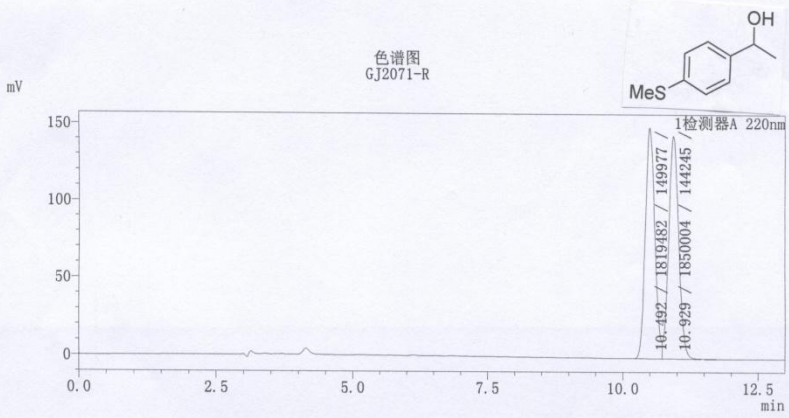



峰表

检测器A 220nm

| 峰号 | 保留时间 | 面积 | 高度 | 标记 | 面积% |
|---|---|---|---|---|---|
| 1 | 5.566 | 154876 | 17486 | | 3.172 |
| 2 | 6.192 | 4728032 | 511883 | | 96.828 |
| 总计 | | 4882908 | 529369 | | 100.000 |

描述 : hex : iPrOH = 85/15, 1.0 mL/min, OJ-H , 220 nm

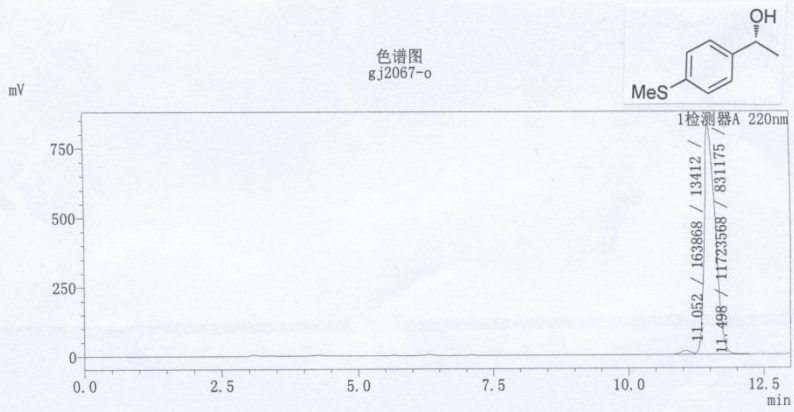



峰表

检测器A 220nm

| 峰号 | 保留时间 | 面积 | 高度 | 标记 | 面积% |
|---|---|---|---|---|---|
| 1 | 10.492 | 1819482 | 149977 | | 49.584 |
| 2 | 10.929 | 1850004 | 144245 | V | 50.416 |
| 总计 | | 3669486 | 294223 | | 100.000 |

描述 : hex : iPrOH = 85/15, 1.0 mL/min, OJ-H , 220 nm



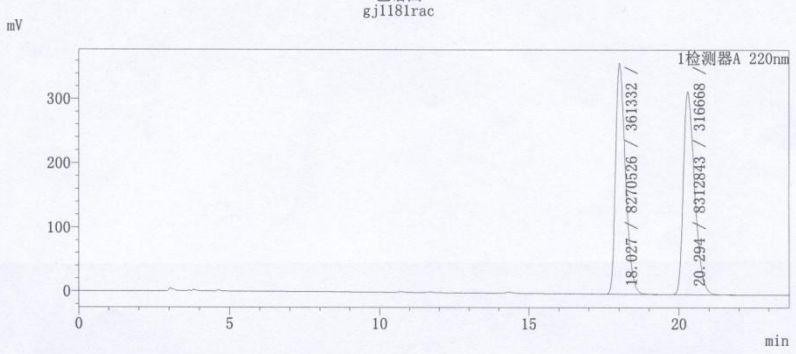

峰表

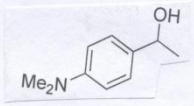
检测器A 220nm

| 峰号 | 保留时间 | 面积 | 高度 | 标记 | 面积% |
|---|---|---|---|---|---|
| 1 | 11.052 | 163868 | 13412 | | 1.378 |
| 2 | 11.498 | 11723568 | 831175 | V | 98.622 |
| 总计 | | 11887436 | 844587 | | 100.000 |

描述 : hex : iPrOH = 90/10, 1.0 mL/min, OJ-H , 220 nm

色谱图
gj1181rac



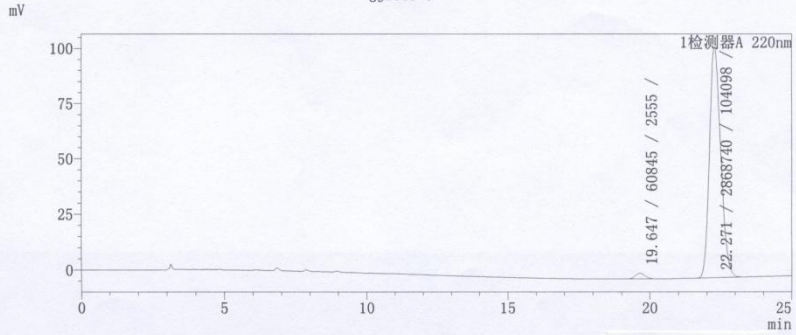

峰表

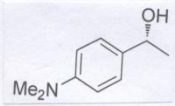
检测器A 220nm

| 峰号 | 保留时间 | 面积 | 高度 | 标记 | 面积% |
|---|---|---|---|---|---|
| 1 | 18.027 | 8270526 | 361332 | | 49.872 |
| 2 | 20.294 | 8312843 | 316668 | | 50.128 |
| 总计 | | 16583369 | 678001 | | 100.000 |

描述 : hex : iPrOH =90/10, 1.0 mL/min, OJ-H, 220 nm

色谱图
gj2006-o



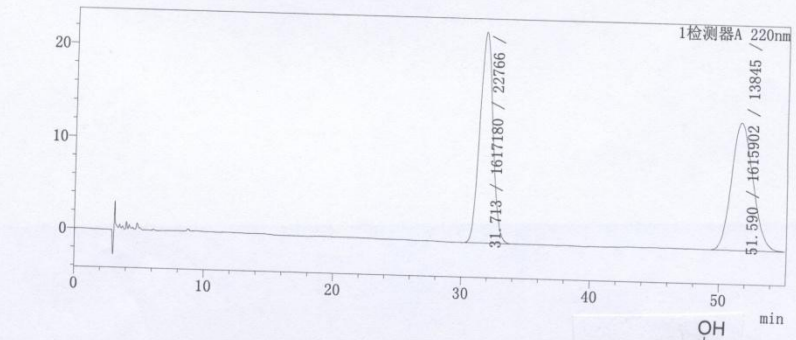

峰表

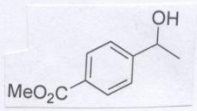
检测器A 220nm

| 峰号 | 保留时间 | 面积 | 高度 | 标记 | 面积% |
|---|---|---|---|---|---|
| 1 | 19.647 | 60845 | 2555 | | 2.077 |
| 2 | 22.271 | 2868740 | 104098 | | 97.923 |
| 总计 | | 2929585 | 106653 | | 100.000 |

描述 : hex : iPrOH = 80/20, 1.0 mL/min, AS-H , 220 nm

色谱图
gjl186rac



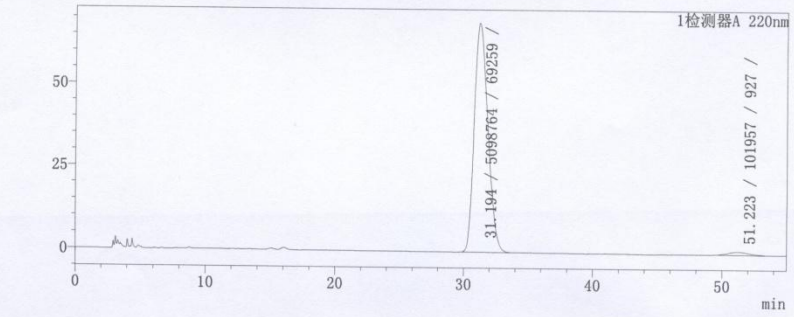

峰表

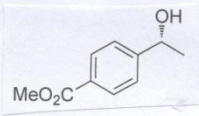
检测器A 220nm

| 峰号 | 保留时间 | 面积 | 高度 | 标记 | 面积% |
|---|---|---|---|---|---|
| 1 | 31.713 | 1617180 | 22766 | | 50.020 |
| 2 | 51.590 | 1615902 | 13845 | | 49.980 |
| 总计 | | 3233083 | 36612 | | 100.000 |

描述 : hex : iPrOH = 80/20, 1.0 mL/min, AS-H , 220 nm

色谱图
gjl186-o



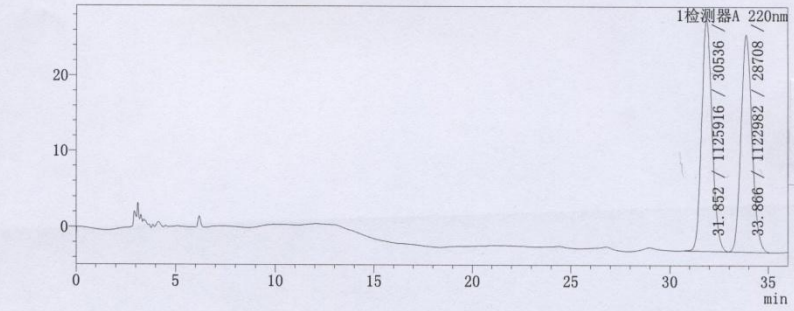

峰表

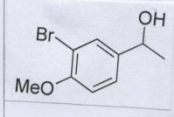
检测器A 220nm

| 峰号 | 保留时间 | 面积 | 高度 | 标记 | 面积% |
|---|---|---|---|---|---|
| 1 | 31.194 | 5098764 | 69259 | | 98.040 |
| 2 | 51.223 | 101957 | 927 | | 1.960 |
| 总计 | | 5200721 | 70187 | | 100.000 |

描述 : hex : iPrOH = 98/2, 1.0 mL/min, AD-H , 220 nm

色谱图
gj1156rac



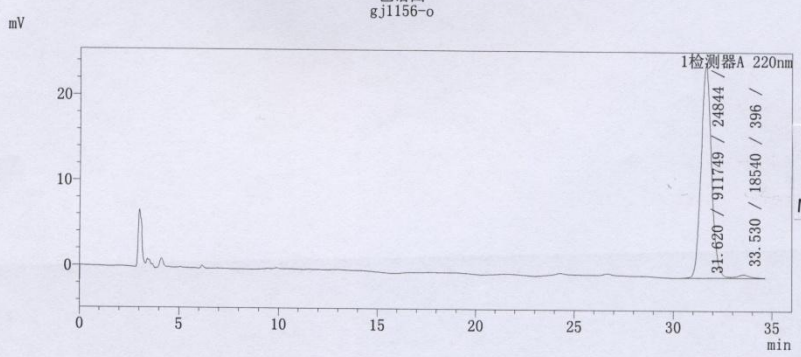

峰表

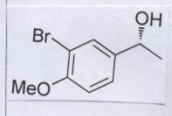
检测器A 220nm

| 峰号 | 保留时间 | 面积 | 高度 | 标记 | 面积% |
|---|---|---|---|---|---|
| 1 | 31.852 | 1125916 | 30536 | | 50.065 |
| 2 | 33.866 | 1122982 | 28708 | | 49.935 |
| 总计 | | 2248898 | 59243 | | 100.000 |

描述 : hex : iPrOH = 98/2, 1.0 mL/min, AD-H , 220 nm

色谱图
gj1156-o




峰表

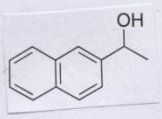
检测器A 220nm

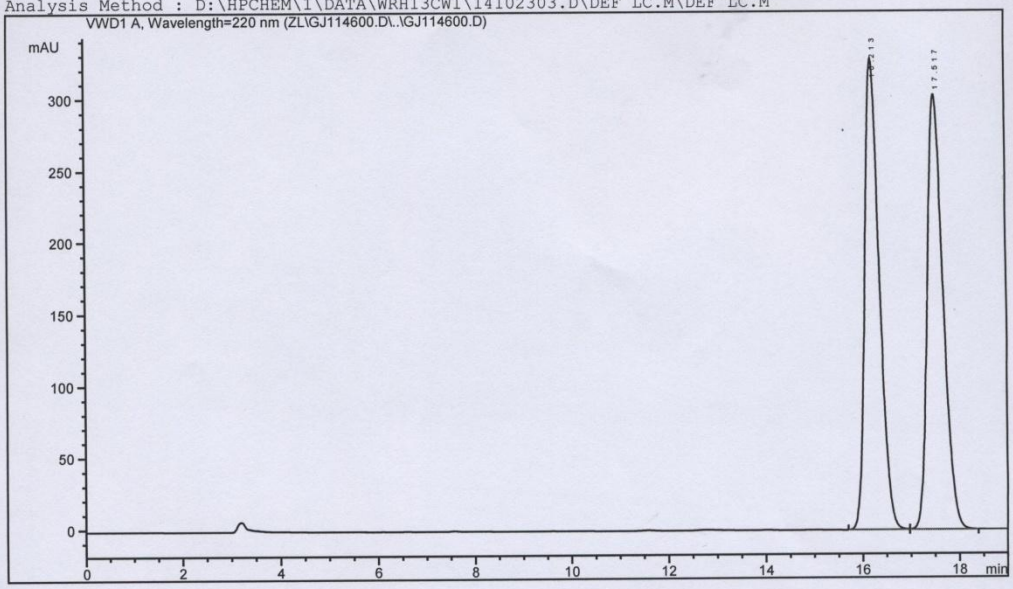
| 峰号 | 保留时间 | 面积 | 高度 | 标记 | 面积% |
|---|---|---|---|---|---|
| 1 | 31.620 | 911749 | 24844 | | 98.007 |
| 2 | 33.530 | 18540 | 396 | V | 1.993 |
| 总计 | | 930288 | 25240 | | 100.000 |

Data File D:\HPCHEM\1\DATA\ZL\GJ114600.D\..\GJ114600.D Sample Name: gj1146rac

AS-H, hex/iPrOH = 98/2, 1.0 mL/min, 220 nm

Injection Date : 2014-10-24 12:05:46 下午
Sample Name : gj1146rac Location : Vial 1
Acq. Operator : gj
Acq. Instrument : Instrument 1
Acq. Method : D:\HPCHEM\1\DATA\WRH13CW1\14102303.D\DEF_LC.M\DEF_LC.M
Last changed : 2014-10-24 10:45:19 上午 by wrh
(modified after loading)
Analysis Method : D:\HPCHEM\1\DATA\WRH13CW1\14102303.D\DEF_LC.M\DEF_LC.M




Area Percent Report

Sorted By : Signal
Multiplier : 1.0000
Dilution : 1.0000
Sample Amount : 2.50000 [ng/ul] (not used in calc.)
Use Multiplier & Dilution Factor with ISTDs

Signal 1: VWD1 A, Wavelength=220 nm

| Peak # | RetTime [min] | Type | Width [min] | Area mAU *s | Height [mAU ] | Area % |
|---|---|---|---|---|---|---|
| 1 | 16.213 | BV | 0.3249 | 6904.95850 | 329.01633 | 50.0203 |
| 2 | 17.517 | VB | 0.3520 | 6899.36279 | 304.10742 | 49.9797 |
| Totals : | | | | 1.38043e4 | 633.12375 | |

Results obtained with enhanced integrator!

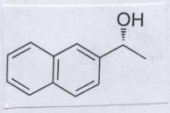
*** End of Report ***

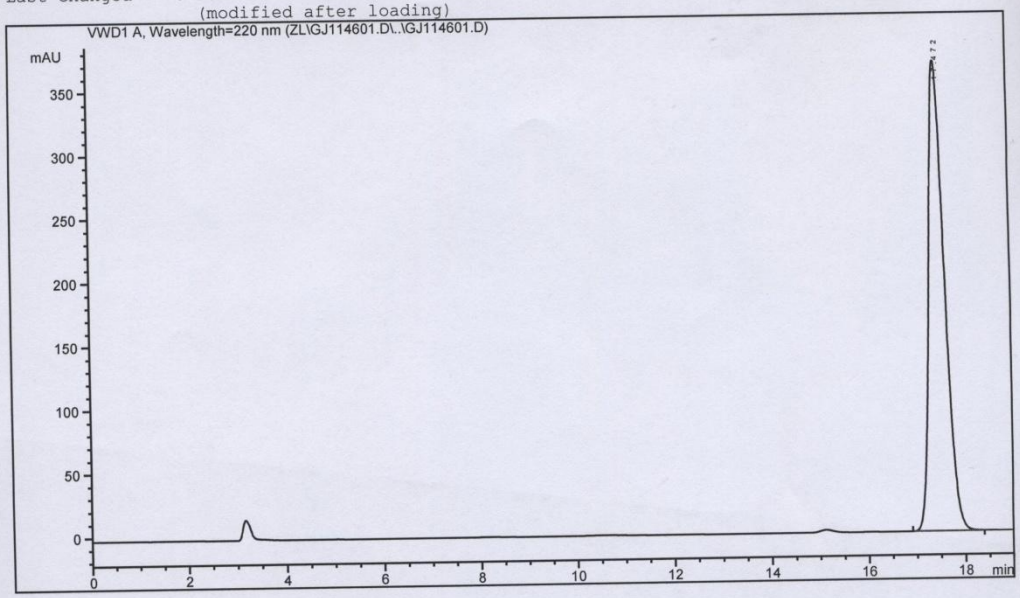
Instrument 1 2014-11-4 10:11:49 上午 gj Page 1 of 1

Data File D:\HPCHEM\1\DATA\ZL\GJ114601.D\..\GJ114601.D  Sample Name: gj1146-O

AS-H, hex/iPrOH = 98/2, 1.0 mL/min, 220 nm

Injection Date : 2014-10-24 12:28:05 下午
Sample Name : gj1146-O  Location : Vial 1
Acq. Operator : gj
Acq. Instrument : Instrument 1
Acq. Method : D:\HPCHEM\1\DATA\WRH13CW1\14102303.D\DEF_LC.M\DEF_LC.M
Last changed : 2014-10-24 10:45:19 上午 by wrh
(modified after loading)
Analysis Method : D:\HPCHEM\1\DATA\WRH13CW1\14102303.D\DEF_LC.M\DEF_LC.M
Last changed : 2014-11-4 10:13:10 上午 by gj
(modified after loading)




Area Percent Report

Sorted By : Signal
Multiplier : 1.0000
Dilution : 1.0000
Sample Amount : 2.50000 [ng/ul] (not used in calc.)
Use Multiplier & Dilution Factor with ISTDs

Signal 1: VWD1 A, Wavelength=220 nm

| Peak # | RetTime [min] | Type | Width [min] | Area mAU *s | Height [mAU] | Area % |
|---|---|---|---|---|---|---|
| 1 | 17.472 | BB | 0.3490 | 8365.23145 | 370.95340 | 100.0000 |
| Totals : | | | | 8365.23145 | 370.95340 | |

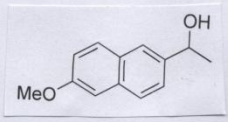
Results obtained with enhanced integrator!

*** End of Report ***

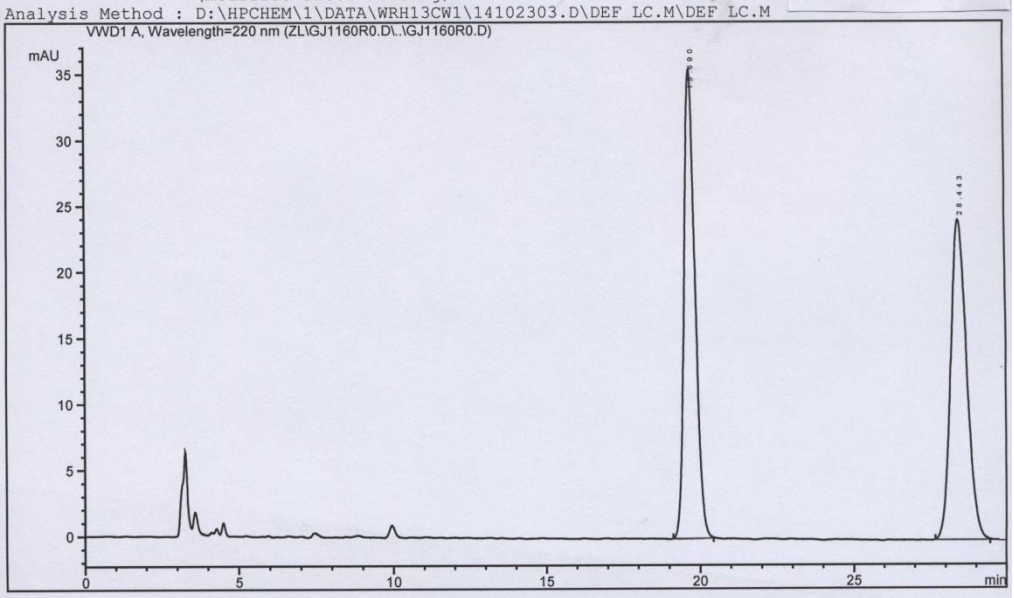
Instrument 1 2014-11-4 10:13:25 上午 gj  Page 1 of 1

Data File D:\HPCHEM\1\DATA\ZL\GJ1160R0.D\..\GJ1160R0.D  Sample Name: gj1160rac

OJ-H, hex/iPrOH = 80/20, 1.0 mL/min, 220 nm




```
Injection Date  : 2014-10-26 09:32:57 下午
Sample Name     : gj1160rac                    Location : Vial 1
Acq. Operator   : gj
Acq. Instrument : Instrument 1
Acq. Method     : D:\HPCHEM\1\DATA\WRH13CW1\14102303.D\DEF_LC.M\DEF_LC.M
Last changed    : 2014-10-26 09:16:12 下午 by gj
                  (modified after loading)
Analysis Method : D:\HPCHEM\1\DATA\WRH13CW1\14102303.D\DEF LC.M\DEF LC.M
```



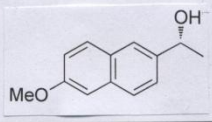

```
                          Area Percent Report

Sorted By             :      Signal
Multiplier            :      1.0000
Dilution              :      1.0000
Sample Amount         :      2.50000  [ng/ul]   (not used in calc.)
Use Multiplier & Dilution Factor with ISTDs


Signal 1: VWD1 A, Wavelength=220 nm

Peak RetTime Type  Width     Area      Height     Area
  #   [min]        [min]  mAU   *s   [mAU   ]      %
----|-------|----|-------|----------|----------|--------|
   1  19.690 BB    0.3840  882.30786   35.57243  50.0621
   2  28.443 BB    0.5643  880.11981   24.27322  49.9379

Totals :                  1762.42767   59.84565

 Results obtained with enhanced integrator!

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

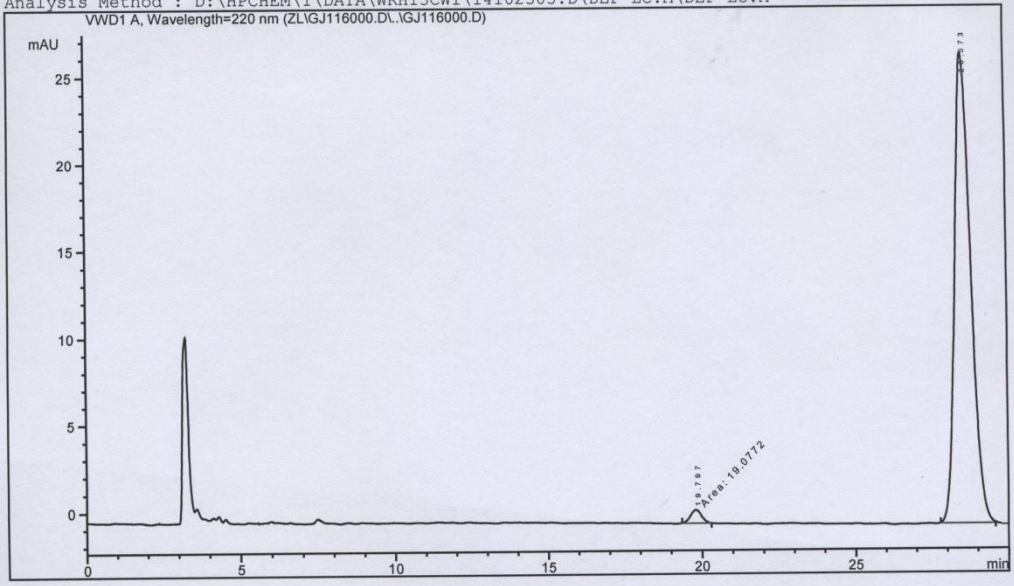
Instrument 1 2014-11-4 10:48:33 上午 gj  Page 1 of 1

Data File D:\HPCHEM\1\DATA\ZL\GJ116000.D\..\GJ116000.D  Sample Name: gj1160-o

OJ-H, hex/iPrOH = 80/20, 1.0 mL/min, 220 nm

Injection Date : 2014-10-26 10:05:43 下午
Sample Name : gj1160-o  Location : Vial 1
Acq. Operator : gj
Acq. Instrument : Instrument 1
Acq. Method : D:\HPCHEM\1\DATA\WRH13CW1\14102303.D\DEF_LC.M\DEF_LC.M
Last changed : 2014-10-26 09:16:12 下午 by gj
(modified after loading)
Analysis Method : D:\HPCHEM\1\DATA\WRH13CW1\14102303.D\DEF_LC.M\DEF_LC.M




Area Percent Report

Sorted By : Signal
Multiplier : 1.0000
Dilution : 1.0000
Sample Amount : 2.50000 [ng/ul] (not used in calc.)
Use Multiplier & Dilution Factor with ISTDs

Signal 1: VWD1 A, Wavelength=220 nm

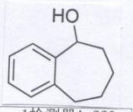
| Peak # | RetTime [min] | Type | Width [min] | Area mAU *s | Height [mAU ] | Area % |
|---|---|---|---|---|---|---|
| 1 | 19.797 | MM | 0.4173 | 19.07721 | 7.62011e-1 | 1.9069 |
| 2 | 28.573 | BB | 0.5635 | 981.32715 | 27.02267 | 98.0931 |
| Totals : | | | | 1000.40436 | 27.78468 | |

Results obtained with enhanced integrator!

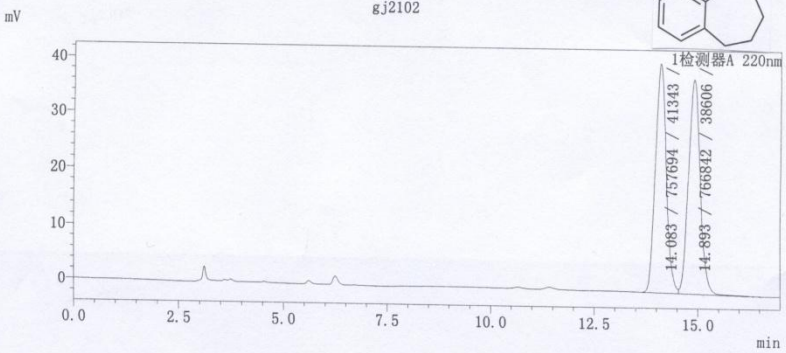
*** End of Report ***

Instrument 1 2014-11-4 10:49:48 上午 gj  Page 1 of 1

描述 : hex : iPrOH = 98/2, 1.0 mL/min, AS-H , 220 nm




色谱图
gj2102

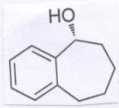



峰表

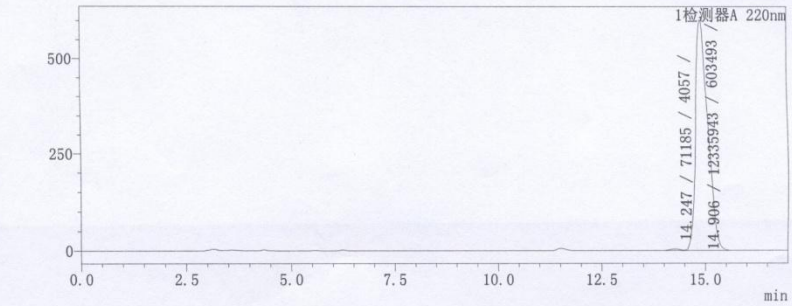
检测器A 220nm

| 峰号 | 保留时间 | 面积 | 高度 | 标记 | 面积% |
|---|---|---|---|---|---|
| 1 | 14.083 | 757694 | 41343 | | 49.700 |
| 2 | 14.893 | 766842 | 38606 | V | 50.300 |
| 总计 | | 1524536 | 79949 | | 100.000 |

描述 : hex : iPrOH = 98/2, 1.0 mL/min, AS-H , 220 nm




色谱图
gj2106-o



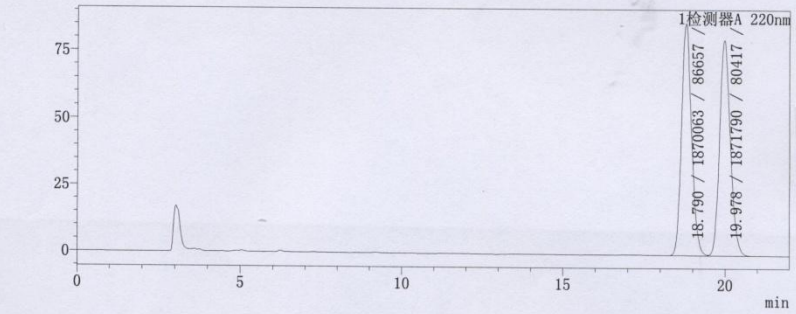

峰表

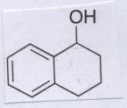
检测器A 220nm

| 峰号 | 保留时间 | 面积 | 高度 | 标记 | 面积% |
|---|---|---|---|---|---|
| 1 | 14.247 | 71185 | 4057 | | 0.574 |
| 2 | 14.906 | 12335943 | 603493 | V | 99.426 |
| 总计 | | 12407128 | 607551 | | 100.000 |

描述 : hex : iPrOH = 90/10,1.0 mL/min,AD-H , 220 nm

色谱图
gj1183rac



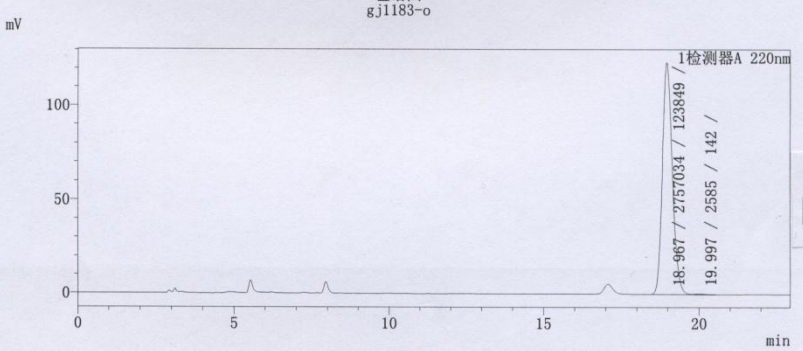

峰表

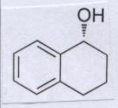
检测器A 220nm

| 峰号 | 保留时间 | 面积 | 高度 | 标记 | 面积% |
|---|---|---|---|---|---|
| 1 | 18.790 | 1870063 | 86657 | | 49.977 |
| 2 | 19.978 | 1871790 | 80417 | V | 50.023 |
| 总计 | | 3741853 | 167074 | | 100.000 |

描述 : hex : iPrOH = 90/10,1.0 mL/min,AD-H , 220 nm

色谱图
gj1183-o



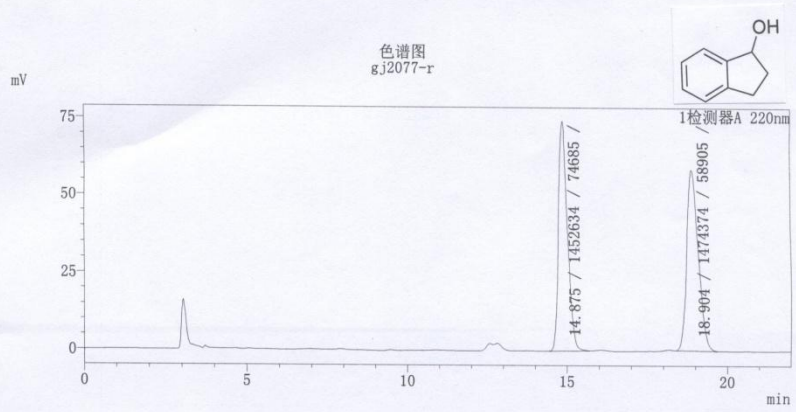




峰表

检测器A 220nm

| 峰号 | 保留时间 | 面积 | 高度 | 标记 | 面积% |
|---|---|---|---|---|---|
| 1 | 18.967 | 2757034 | 123849 | S | 99.906 |
| 2 | 19.997 | 2585 | 142 | T | 0.094 |
| 总计 | | 2759620 | 123991 | | 100.000 |

描述 : hex : iPrOH = 98/2, 1.0 mL/min, AS-H , 220 nm

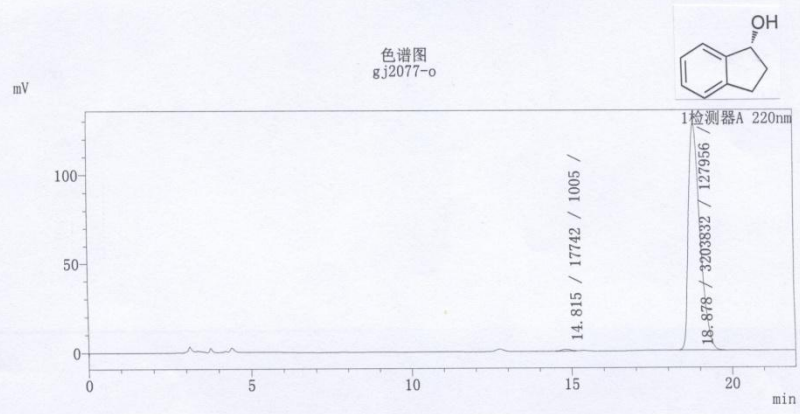



峰表

检测器A 220nm

| 峰号 | 保留时间 | 面积 | 高度 | 标记 | 面积% |
|---|---|---|---|---|---|
| 1 | 14.875 | 1452634 | 74685 | | 49.629 |
| 2 | 18.904 | 1474374 | 58905 | | 50.371 |
| 总计 | | 2927008 | 133590 | | 100.000 |

描述 : hex : iPrOH = 98/2, 1.0 mL/min, AS-H , 220 nm




峰表

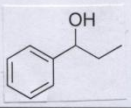
检测器A 220nm

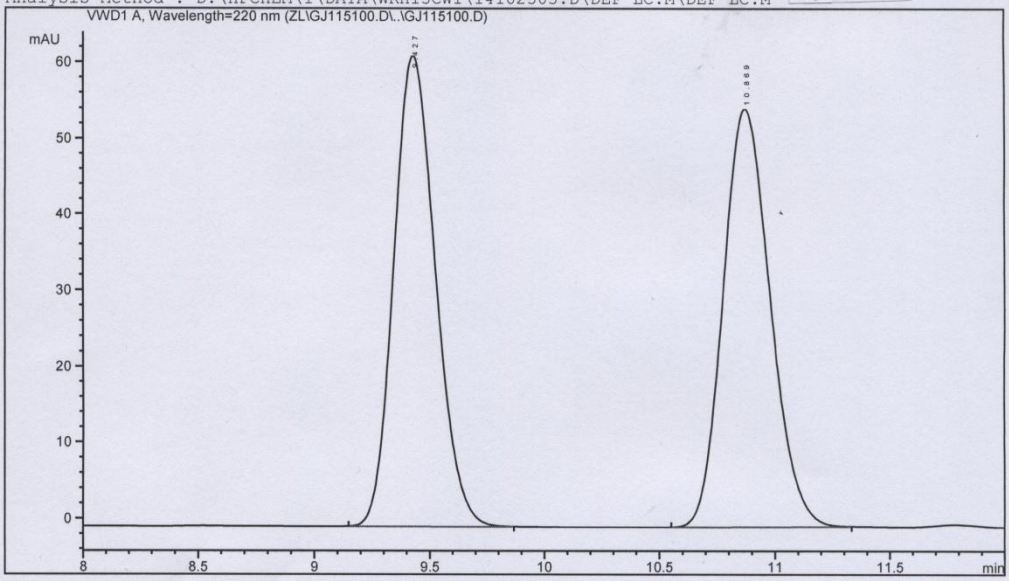
| 峰号 | 保留时间 | 面积 | 高度 | 标记 | 面积% |
|---|---|---|---|---|---|
| 1 | 14.815 | 17742 | 1005 | | 0.551 |
| 2 | 18.878 | 3203832 | 127956 | | 99.449 |
| 总计 | | 3221574 | 128961 | | 100.000 |

Data File D:\HPCHEM\1\DATA\ZL\GJ115100.D\..\GJ115100.D Sample Name: gj1151rac

AS-H, hex/iPrOH = 98/2, 1.0 mL/min, 220 nm

```
Injection Date  : 2014-10-24 02:51:40 下午
Sample Name     : gj1151rac                    Location : Vial 1
Acq. Operator   : gj
Acq. Instrument : Instrument 1
Acq. Method     : D:\HPCHEM\1\DATA\WRH13CW1\14102303.D\DEF_LC.M\DEF_LC.M
Last changed    : 2014-10-24 10:45:19 上午 by wrh
                  (modified after loading)
Analysis Method : D:\HPCHEM\1\DATA\WRH13CW1\14102303.D\DEF_LC.M\DEF_LC.M
```



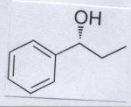

```
=====================================================================
                        Area Percent Report
=====================================================================

Sorted By             :      Signal
Multiplier            :      1.0000
Dilution              :      1.0000
Sample Amount         :      2.50000  [ng/ul]   (not used in calc.)
Use Multiplier & Dilution Factor with ISTDs


Signal 1: VWD1 A, Wavelength=220 nm

Peak RetTime Type  Width     Area      Height     Area
  #   [min]        [min]  mAU   *s   [mAU   ]      %
----|-------|----|-------|----------|----------|--------|
   1   9.427 BB    0.1965  780.51953   61.93050  50.0232
   2  10.869 BB    0.2206  779.79663   55.05898  49.9768

Totals :                  1560.31616  116.98948

 Results obtained with enhanced integrator!
=====================================================================
                        *** End of Report ***
```

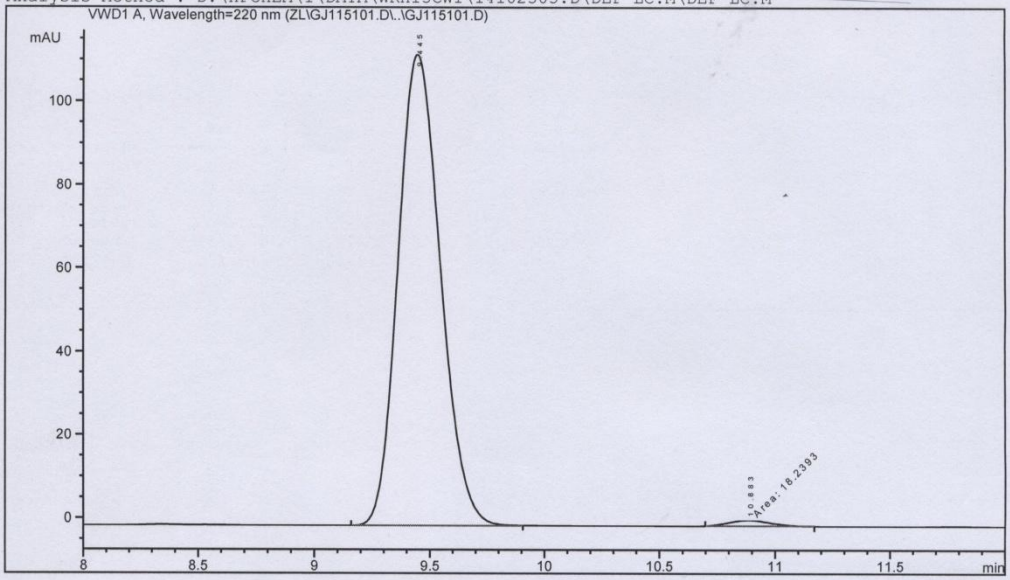
Instrument 1 2014-11-13 09:39:17 下午 gj Page 1 of 1

Data File D:\HPCHEM\1\DATA\ZL\GJ115101.D\..\GJ115101.D Sample Name: gj1151-o

AS-H, hex/iPrOH = 98/2, 1.0 mL/min, 220 nm

```
Injection Date  : 2014-10-24 03:13:12 下午
Sample Name     : gj1151-o                    Location : Vial 1
Acq. Operator   : gj
Acq. Instrument : Instrument 1
Acq. Method     : D:\HPCHEM\1\DATA\WRH13CW1\14102303.D\DEF_LC.M\DEF_LC.M
Last changed    : 2014-10-24 10:45:19 上午 by wrh
                  (modified after loading)
Analysis Method : D:\HPCHEM\1\DATA\WRH13CW1\14102303.D\DEF_LC.M\DEF_LC.M
```




Area Percent Report

```
Sorted By             :      Signal
Multiplier            :      1.0000
Dilution              :      1.0000
Sample Amount         :      2.50000  [ng/ul]   (not used in calc.)
Use Multiplier & Dilution Factor with ISTDs
```

Signal 1: VWD1 A, Wavelength=220 nm

| Peak # | RetTime [min] | Type | Width [min] | Area mAU *s | Height [mAU] | Area % |
|---|---|---|---|---|---|---|
| 1 | 9.445 | BB | 0.2004 | 1448.60315 | 113.05382 | 98.7566 |
| 2 | 10.883 | MM | 0.2106 | 18.23930 | 1.44322 | 1.2434 |
| Totals : | | | | 1466.84245 | 114.49704 | |

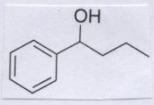
Results obtained with enhanced integrator!

*** End of Report ***

Data File D:\HPCHEM\1\DATA\ZL\GJ115000.D\..\GJ115000.D  Sample Name: gj1150rac

AS-H, hex/iPrOH = 98/2, 1.0 mL/min, 220 nm

```
Injection Date  : 2014-10-24 07:36:13 下午
Sample Name     : gj1150rac                    Location : Vial 1
Acq. Operator   : gj
Acq. Instrument : Instrument 1
Acq. Method     : D:\HPCHEM\1\DATA\WRH13CW1\14102303.D\DEF_LC.M\DEF_LC.M
Last changed    : 2014-10-24 06:09:18 下午 by gj
                  (modified after loading)
Analysis Method : D:\HPCHEM\1\DATA\WRH13CW1\14102303.D\DEF_LC.M\DEF_LC.M
```





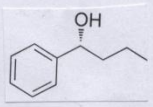
```
                        Area Percent Report

Sorted By             :      Signal
Multiplier            :      1.0000
Dilution              :      1.0000
Sample Amount         :      2.50000  [ng/ul]   (not used in calc.)
Use Multiplier & Dilution Factor with ISTDs


Signal 1: VWD1 A, Wavelength=220 nm

Peak RetTime Type  Width     Area       Height      Area
  #   [min]        [min]  mAU   *s   [mAU   ]       %
----|-------|----|-------|----------|----------|--------|
   1   8.269 BB    0.1787  690.87274   60.36485  49.8396
   2   9.551 BB    0.2017  695.32062   53.81673  50.1604

Totals :                  1386.19336  114.18158

 Results obtained with enhanced integrator!

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

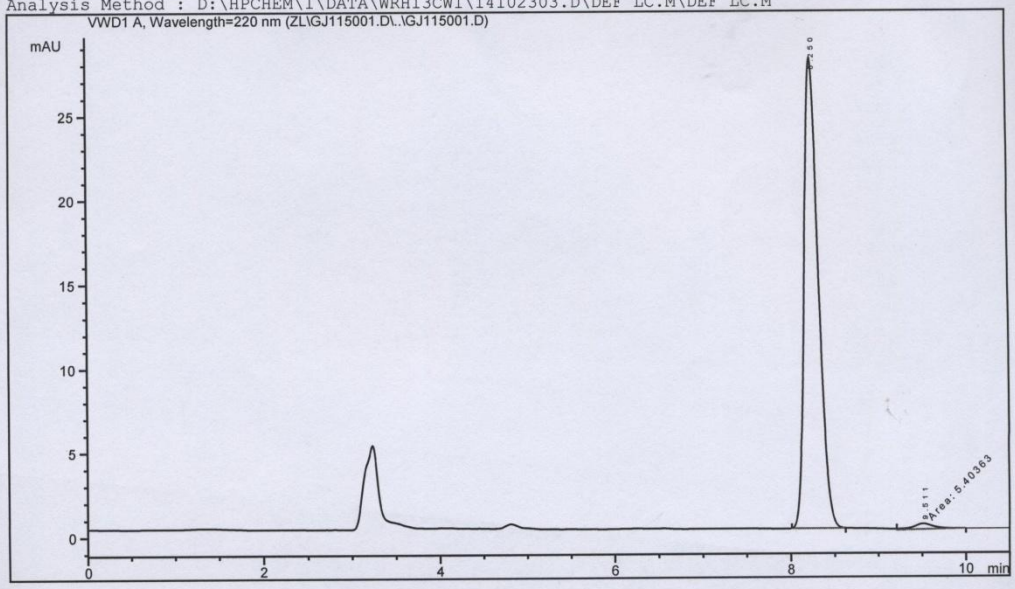
Instrument 1 2014-11-4 10:15:21 上午 gj  Page 1 of 1

Data File D:\HPCHEM\1\DATA\ZL\GJ115001.D\..\GJ115001.D Sample Name: gj1150-o

AS-H, hex/iPrOH = 98/2, 1.0 mL/min, 220 nm

```
Injection Date  : 2014-10-24 07:55:52 下午
Sample Name     : gj1150-o                          Location : Vial 1
Acq. Operator   : gj
Acq. Instrument : Instrument 1
Acq. Method     : D:\HPCHEM\1\DATA\WRH13CW1\14102303.D\DEF_LC.M\DEF_LC.M
Last changed    : 2014-10-24 06:09:18 下午 by gj
                  (modified after loading)
Analysis Method : D:\HPCHEM\1\DATA\WRH13CW1\14102303.D\DEF LC.M\DEF LC.M
```




Area Percent Report

```
Sorted By             :      Signal
Multiplier            :      1.0000
Dilution              :      1.0000
Sample Amount         :      2.50000  [ng/ul]   (not used in calc.)
Use Multiplier & Dilution Factor with ISTDs
```

Signal 1: VWD1 A, Wavelength=220 nm

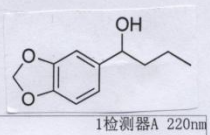
| Peak # | RetTime [min] | Type | Width [min] | Area mAU *s | Height [mAU ] | Area % |
|---|---|---|---|---|---|---|
| 1 | 8.250 | BB | 0.1747 | 313.98462 | 27.96078 | 98.3081 |
| 2 | 9.511 | MM | 0.2683 | 5.40363 | 3.35640e-1 | 1.6919 |
| Totals : | | | | 319.38825 | 28.29642 | |

Results obtained with enhanced integrator!

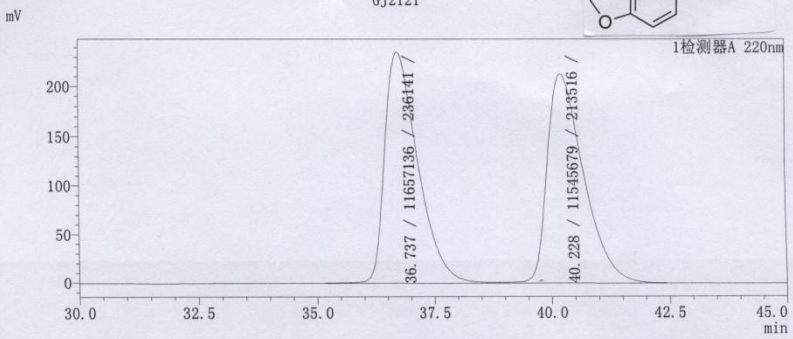
*** End of Report ***

Instrument 1 2014-11-4 10:17:42 上午 gj Page 1 of 1

描述 : hex : iPrOH = 98/2, 0.7 mL/min, OD-H , 220 nm




色谱图
GJ2121

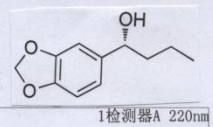



峰表

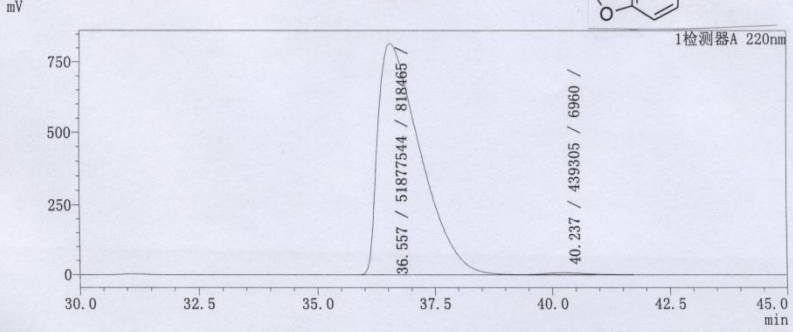
检测器A 220nm

| 峰号 | 保留时间 | 面积 | 高度 | 标记 | 面积% |
|---|---|---|---|---|---|
| 1 | 36.737 | 11657136 | 236141 | | 50.240 |
| 2 | 40.228 | 11545679 | 213516 | V | 49.760 |
| 总计 | | 23202815 | 449657 | | 100.000 |

描述 : hex : iPrOH = 98/2, 0.7 mL/min, OD-H , 220 nm




色谱图
GJ2120



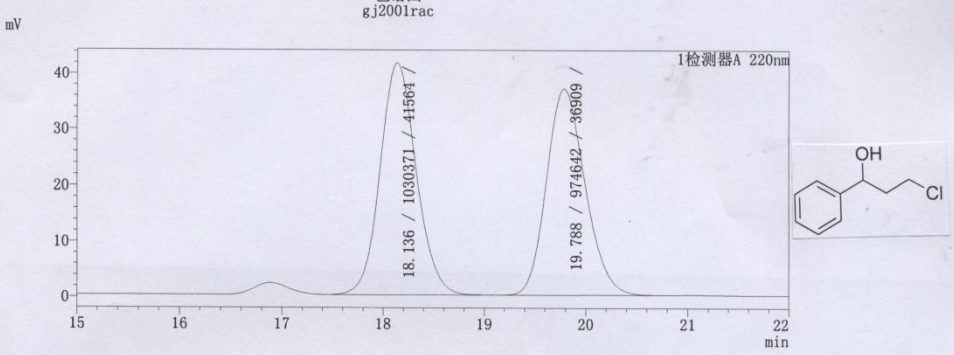

峰表

检测器A 220nm

| 峰号 | 保留时间 | 面积 | 高度 | 标记 | 面积% |
|---|---|---|---|---|---|
| 1 | 36.557 | 51877544 | 818465 | S | 99.160 |
| 2 | 40.237 | 439305 | 6960 | T | 0.840 |
| 总计 | | 52316849 | 825425 | | 100.000 |

描述 : hex : iPrOH、=98/2, 1.0 mL/min, AS-H, 220 nm

色谱图
gj2001rac



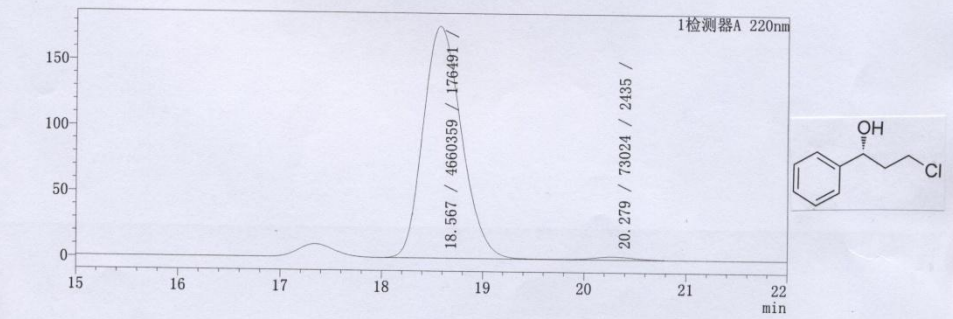

峰表

检测器A 220nm

| 峰号 | 保留时间 | 面积 | 高度 | 标记 | 面积% |
|---|---|---|---|---|---|
| 1 | 18.136 | 1030371 | 41564 | | 51.390 |
| 2 | 19.788 | 974642 | 36909 | | 48.610 |
| 总计 | | 2005013 | 78473 | | 100.000 |

描述 : hex : iPrOH =98/2, 1.0 mL/min, AS-H, 220 nm

色谱图
gj2005-o

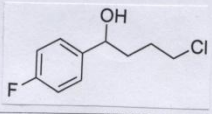



峰表

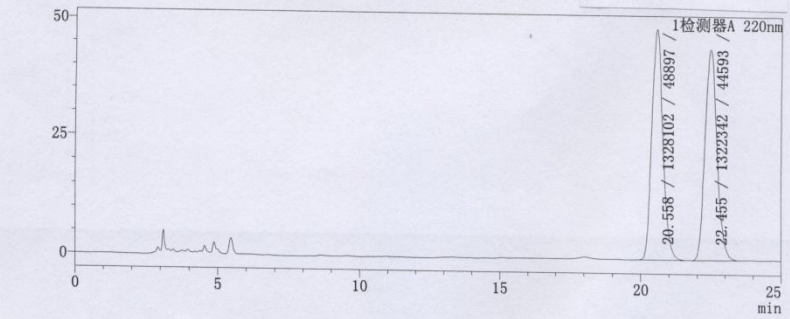
检测器A 220nm

| 峰号 | 保留时间 | 面积 | 高度 | 标记 | 面积% |
|---|---|---|---|---|---|
| 1 | 18.567 | 4660359 | 176491 | | 98.457 |
| 2 | 20.279 | 73024 | 2435 | V | 1.543 |
| 总计 | | 4733383 | 178926 | | 100.000 |

描述 : hex : iPrOH = 98/2, 1.0 mL/min, OD-H , 220 nm




色谱图
gj2092-r

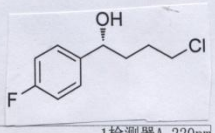



峰表

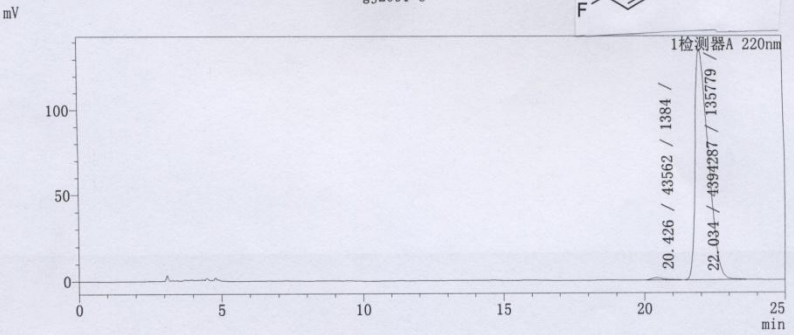
检测器A 220nm

| 峰号 | 保留时间 | 面积 | 高度 | 标记 | 面积% |
|---|---|---|---|---|---|
| 1 | 20.558 | 1328102 | 48897 | | 50.109 |
| 2 | 22.455 | 1322342 | 44593 | | 49.891 |
| 总计 | | 2650444 | 93490 | | 100.000 |

描述 : hex : iPrOH = 98/2, 1.0 mL/min, OD-H , 220 nm




色谱图
gj2091-o

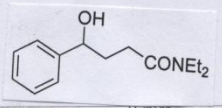



峰表

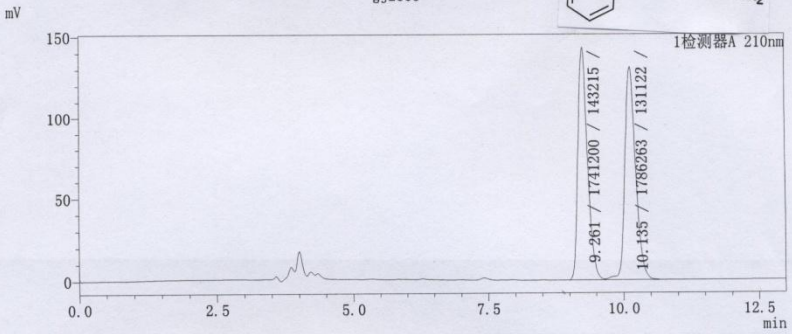
检测器A 220nm

| 峰号 | 保留时间 | 面积 | 高度 | 标记 | 面积% |
|---|---|---|---|---|---|
| 1 | 20.426 | 43562 | 1384 | | 0.982 |
| 2 | 22.034 | 4394287 | 135779 | V | 99.018 |
| 总计 | | 4437850 | 137162 | | 100.000 |

描述 : hex : iPrOH = 85/15, 0.8 mL/min, AD-H , 220 nm




色谱图
gj2111

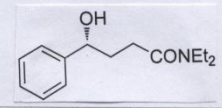



峰表

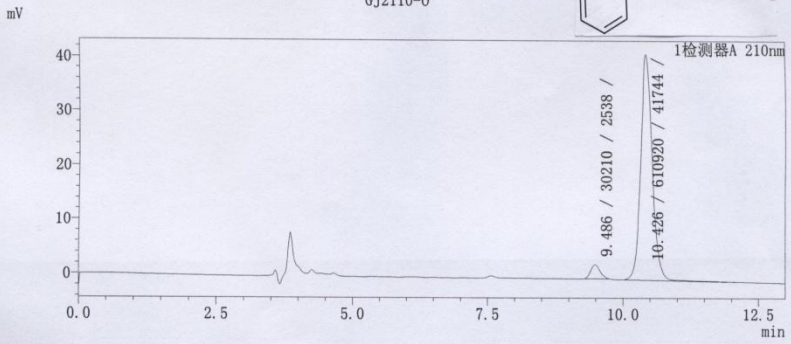
检测器A 210nm

| 峰号 | 保留时间 | 面积 | 高度 | 标记 | 面积% |
|---|---|---|---|---|---|
| 1 | 9.261 | 1741200 | 143215 | | 49.361 |
| 2 | 10.135 | 1786263 | 131122 | V | 50.639 |
| 总计 | | 3527463 | 274337 | | 100.000 |

描述 : hex : iPrOH = 85/15, 0.8 mL/min, AD-H , 210 nm




色谱图
GJ2110-O



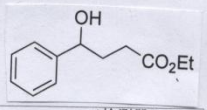

峰表

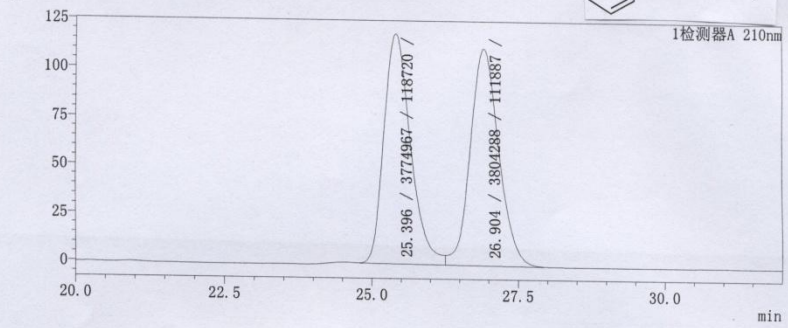
检测器A 210nm

| 峰号 | 保留时间 | 面积 | 高度 | 标记 | 面积% |
|---|---|---|---|---|---|
| 1 | 9.486 | 30210 | 2538 | M | 4.712 |
| 2 | 10.426 | 610920 | 41744 | | 95.288 |
| 总计 | | 641130 | 44282 | | 100.000 |

描述 : hex : iPrOH = 95/5, 1.0 mL/min, OJ-H , 210 nm

色谱图
GJ2118



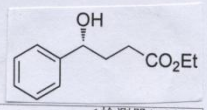

峰表

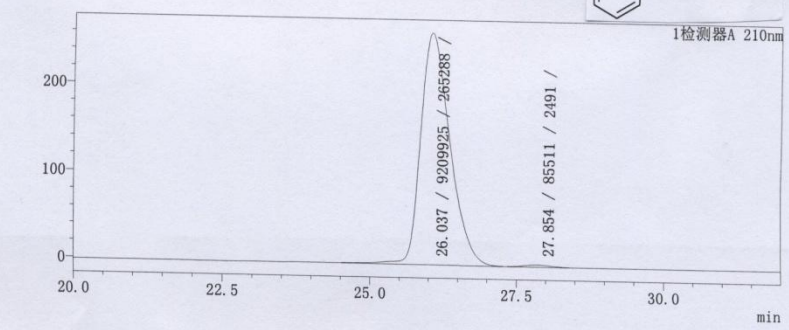
检测器A 210nm

| 峰号 | 保留时间 | 面积 | 高度 | 标记 | 面积% |
|---|---|---|---|---|---|
| 1 | 25.396 | 3774967 | 118720 | | 49.807 |
| 2 | 26.904 | 3804288 | 111887 | V | 50.193 |
| 总计 | | 7579255 | 230607 | | 100.000 |

描述 : hex : iPrOH = 95/5, 1.0 mL/min, OJ-H , 210 nm

色谱图
GJ2112



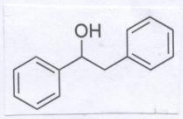




峰表

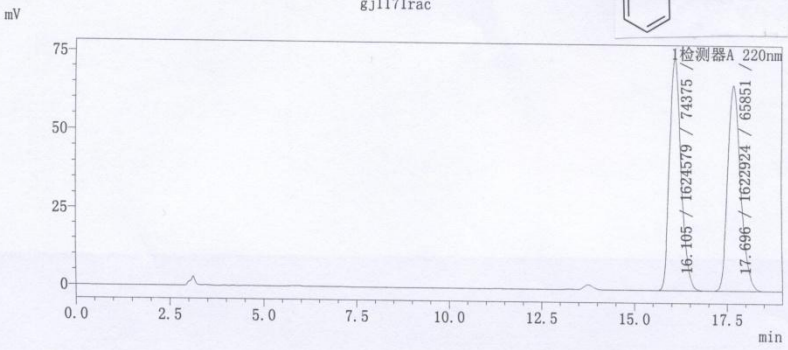
检测器A 210nm

| 峰号 | 保留时间 | 面积 | 高度 | 标记 | 面积% |
|---|---|---|---|---|---|
| 1 | 26.037 | 9209925 | 265288 | | 99.080 |
| 2 | 27.854 | 85511 | 2491 | V | 0.920 |
| 总计 | | 9295436 | 267779 | | 100.000 |

描述 : hex : iPrOH = 98/2,1.0 mL/min,AS-H ,220 nm




色谱图
gj1171rac

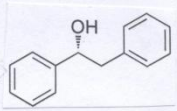



峰表

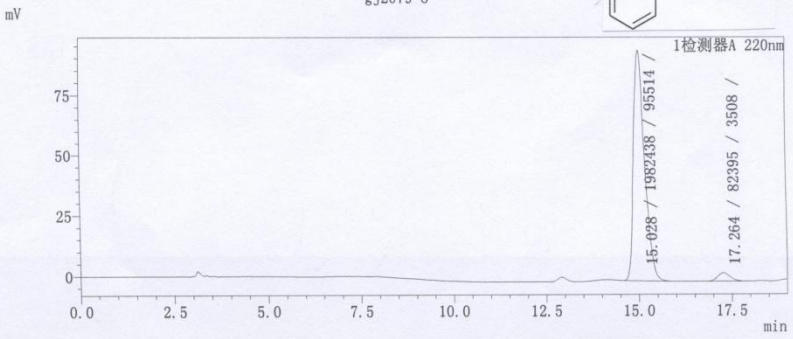
检测器A 220nm

| 峰号 | 保留时间 | 面积 | 高度 | 标记 | 面积% |
|---|---|---|---|---|---|
| 1 | 16.105 | 1624579 | 74375 | | 50.025 |
| 2 | 17.696 | 1622924 | 65851 | V | 49.975 |
| 总计 | | 3247504 | 140226 | | 100.000 |

描述 : hex : iPrOH = 98/2, 1.0 mL/min, AS-H , 220 nm




色谱图
gj2079-o



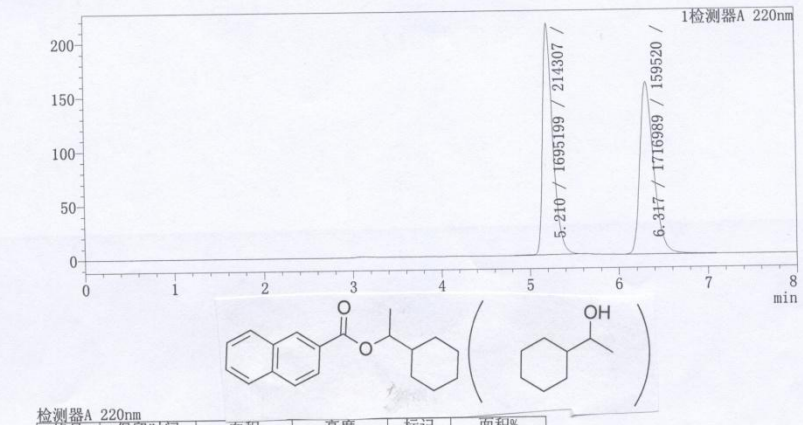

峰表

检测器A 220nm

| 峰号 | 保留时间 | 面积 | 高度 | 标记 | 面积% |
|---|---|---|---|---|---|
| 1 | 15.028 | 1982438 | 95514 | | 96.010 |
| 2 | 17.264 | 82395 | 3508 | | 3.990 |
| 总计 | | 2064833 | 99022 | | 100.000 |

描述 : hex : iPrOH =98/2, 1.0 mL/min, OJ-H , 220 nm

色谱图
gj1187rac





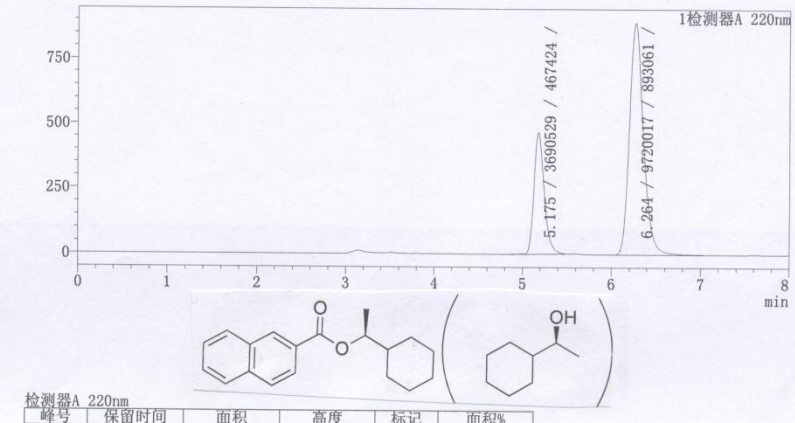


检测器A 220nm

| 峰号 | 保留时间 | 面积 | 高度 | 标记 | 面积% |
|---|---|---|---|---|---|
| 1 | 5.210 | 1695199 | 214307 | | 49.681 |
| 2 | 6.317 | 1716989 | 159520 | S | 50.319 |
| 总计 | | 3412188 | 373827 | | 100.000 |

描述 : hex : iPrOH =98/2, 1.0 mL/min, OJ-H , 220 nm

色谱图
gj1187-o





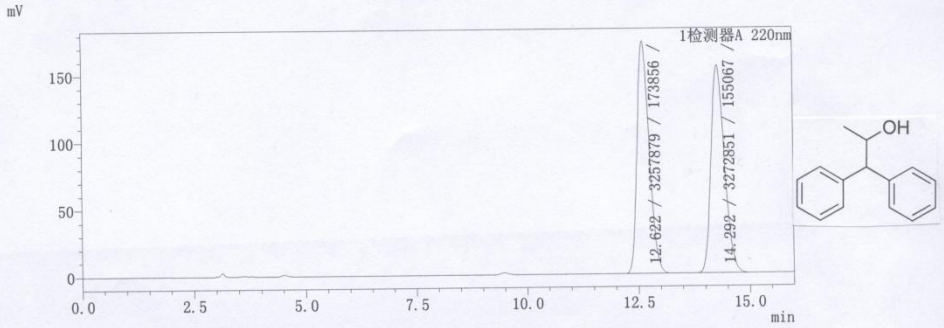


检测器A 220nm

| 峰号 | 保留时间 | 面积 | 高度 | 标记 | 面积% |
|---|---|---|---|---|---|
| 1 | 5.175 | 3690529 | 467424 | | 27.520 |
| 2 | 6.264 | 9720017 | 893061 | S | 72.480 |
| 总计 | | 13410546 | 1360485 | | 100.000 |

描述 : hex : iPrOH = 90/10, 1.0 mL/min, AS-H , 220 nm

色谱图
gj1196rac



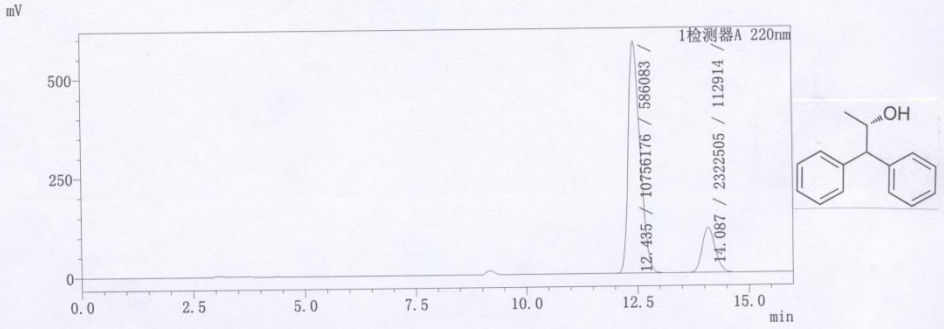

峰表

检测器A 220nm

| 峰号 | 保留时间 | 面积 | 高度 | 标记 | 面积% |
|---|---|---|---|---|---|
| 1 | 12.622 | 3257879 | 173856 | | 49.885 |
| 2 | 14.292 | 3272851 | 155067 | | 50.115 |
| 总计 | | 6530731 | 328923 | | 100.000 |

描述 : hex : iPrOH = 98/2, 1.0 mL/min, AS-H , 220 nm

色谱图
gj1196rac




峰表

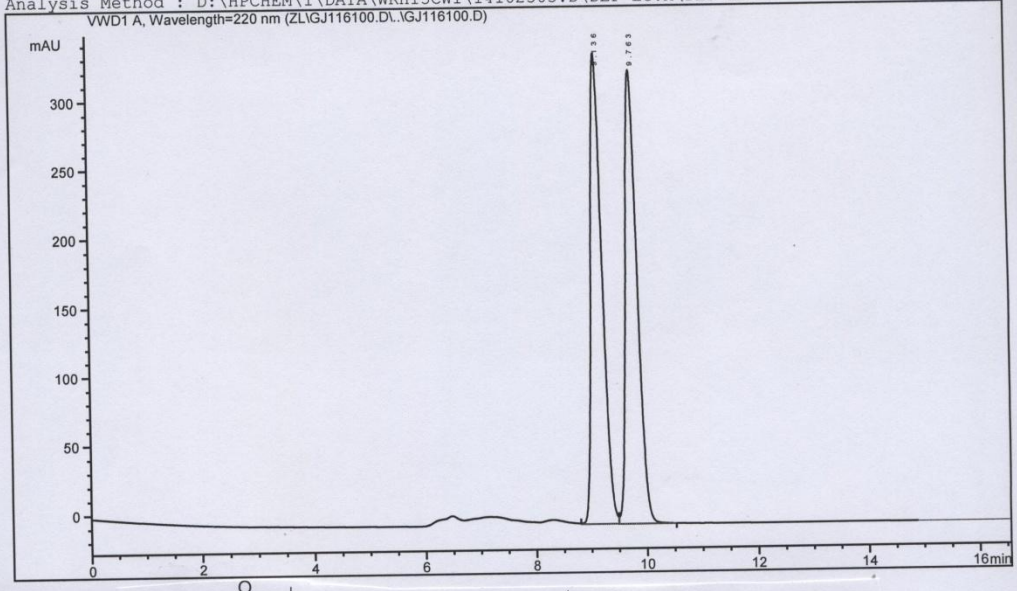
检测器A 220nm

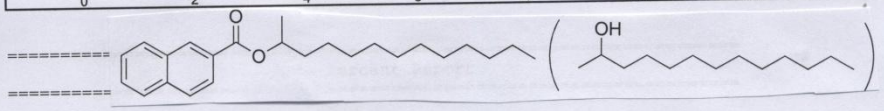
| 峰号 | 保留时间 | 面积 | 高度 | 标记 | 面积% |
|---|---|---|---|---|---|
| 1 | 12.435 | 10756176 | 586083 | | 82.242 |
| 2 | 14.087 | 2322505 | 112914 | V | 17.758 |
| 总计 | | 13078681 | 698997 | | 100.000 |

Data File D:\HPCHEM\1\DATA\ZL\GJ116100.D\..\GJ116100.D  Sample Name: gj1161rac

AD-H, hex/iPrOH = 99/1, 0.5 mL/min, 220 nm

Injection Date : 2014-10-24 10:03:53 下午
Sample Name : gj1161rac  Location : Vial 1
Acq. Operator : gj
Acq. Instrument : Instrument 1
Acq. Method : D:\HPCHEM\1\DATA\WRH13CW1\14102303.D\DEF_LC.M\DEF_LC.M
Last changed : 2014-10-24 09:53:13 下午 by gj
(modified after loading)
Analysis Method : D:\HPCHEM\1\DATA\WRH13CW1\14102303.D\DEF_LC.M\DEF_LC.M




Sorted By : Signal
Multiplier : 1.0000
Dilution : 1.0000
Sample Amount : 2.50000 [ng/ul] (not used in calc.)
Use Multiplier & Dilution Factor with ISTDs

Signal 1: VWD1 A, Wavelength=220 nm

| Peak # | RetTime [min] | Type | Width [min] | Area mAU *s | Height [mAU ] | Area % |
|---|---|---|---|---|---|---|
| 1 | 9.136 | VV | 0.2226 | 4857.01514 | 341.70300 | 49.9867 |
| 2 | 9.763 | VB | 0.2304 | 4859.60010 | 329.39841 | 50.0133 |
| Totals : | | | | 9716.61523 | 671.10141 | |

Results obtained with enhanced integrator!

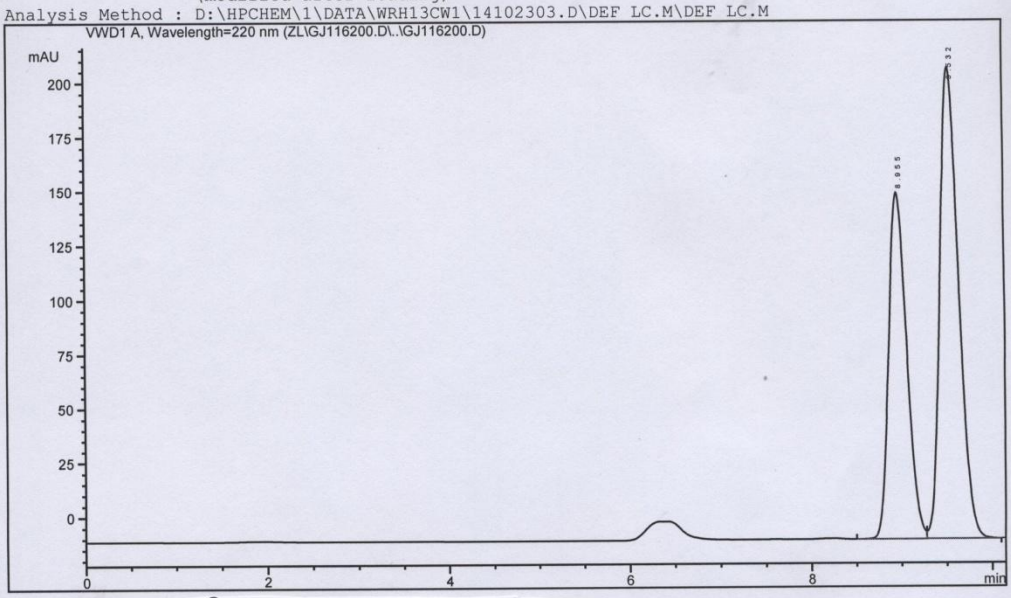
*** End of Report ***

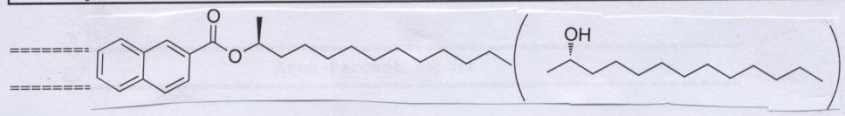
Instrument 1 2014-10-24 10:25:00 下午 wrh  Page 1 of 1

Data File D:\HPCHEM\1\DATA\ZL\GJ116200.D\..\GJ116200.D  Sample Name: gj1162-O

AD-H, hex/iPrOH = 99/1, 0.5 mL/min, 220 nm

Injection Date : 2014-10-24 10:22:12 下午
Sample Name : gj1162-O  Location : Vial 1
Acq. Operator : gj
Acq. Instrument : Instrument 1
Acq. Method : D:\HPCHEM\1\DATA\WRH13CW1\14102303.D\DEF_LC.M\DEF_LC.M
Last changed : 2014-10-24 09:53:13 下午 by gj
(modified after loading)
Analysis Method : D:\HPCHEM\1\DATA\WRH13CW1\14102303.D\DEF_LC.M\DEF_LC.M




Sorted By : Signal
Multiplier : 1.0000
Dilution : 1.0000
Sample Amount : 2.50000 [ng/ul] (not used in calc.)
Use Multiplier & Dilution Factor with ISTDs

Signal 1: VWD1 A, Wavelength=220 nm

| Peak # | RetTime [min] | Type | Width [min] | Area mAU *s | Height [mAU ] | Area % |
|---|---|---|---|---|---|---|
| 1 | 8.955 | VV | 0.2172 | 2210.36279 | 159.34013 | 41.5265 |
| 2 | 9.532 | VB | 0.2242 | 3112.41333 | 216.92252 | 58.4735 |
| Totals : | | | | 5322.77612 | 376.26265 | |

Results obtained with enhanced integrator!

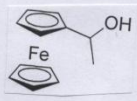
*** End of Report ***

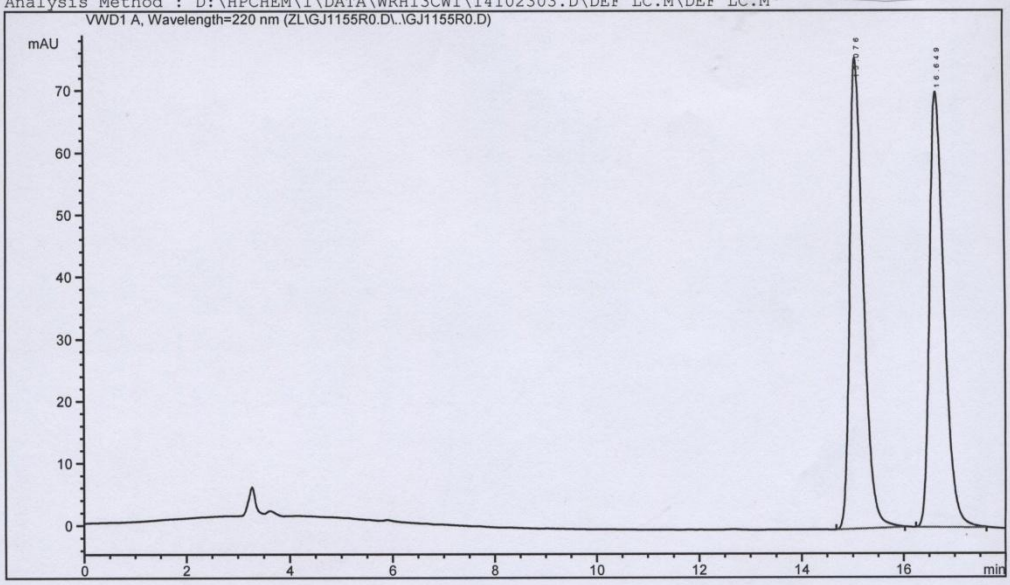
Instrument 1 2014-11-4 10:36:43 上午 gj  Page 1 of 1

Data File D:\HPCHEM\1\DATA\ZL\GJ1155R0.D\..\GJ1155R0.D Sample Name: gj1155rac

OJ-H, hex/iPrOH = 98/2, 1.0 mL/min, 220 nm

Injection Date : 2014-10-26 12:47:40 下午
Sample Name : gj1155rac Location : Vial 1
Acq. Operator : gj
Acq. Instrument : Instrument 1
Acq. Method : D:\HPCHEM\1\DATA\WRH13CW1\14102303.D\DEF_LC.M\DEF_LC.M
Last changed : 2014-10-26 12:37:58 下午 by gj
(modified after loading)
Analysis Method : D:\HPCHEM\1\DATA\WRH13CW1\14102303.D\DEF LC.M\DEF LC.M




Area Percent Report

Sorted By : Signal
Multiplier : 1.0000
Dilution : 1.0000
Sample Amount : 2.50000 [ng/ul] (not used in calc.)
Use Multiplier & Dilution Factor with ISTDs

Signal 1: VWD1 A, Wavelength=220 nm

| Peak # | RetTime [min] | Type | Width [min] | Area mAU *s | Height [mAU ] | Area % |
|---|---|---|---|---|---|---|
| 1 | 15.076 | PB | 0.2840 | 1409.68762 | 75.79465 | 50.3104 |
| 2 | 16.649 | PB | 0.3046 | 1392.29041 | 70.06665 | 49.6896 |
| Totals : | | | | 2801.97803 | 145.86130 | |

Results obtained with enhanced integrator!

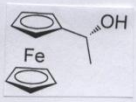
*** End of Report ***

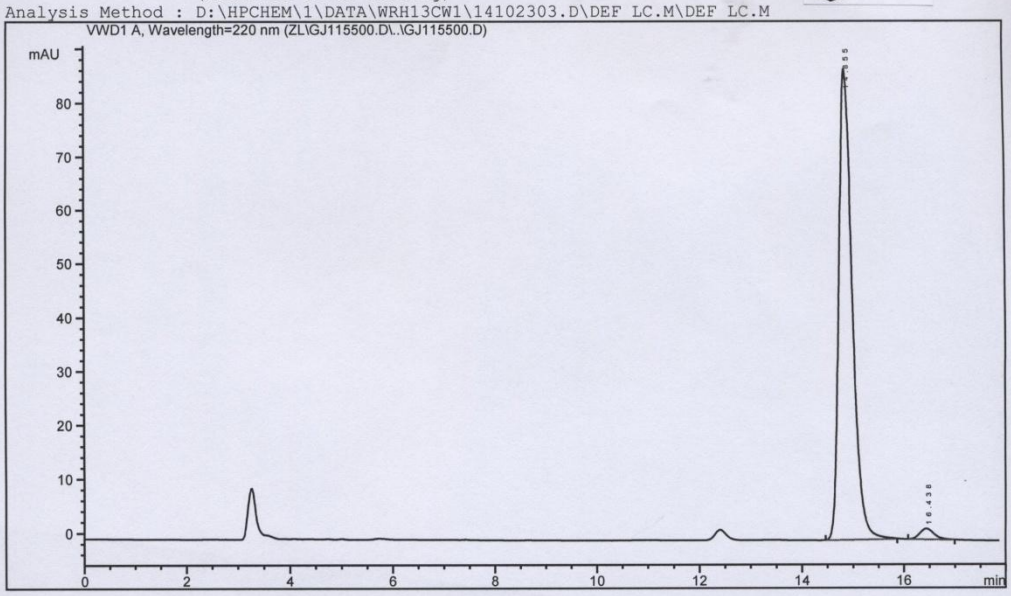
Instrument 1 2014-11-4 10:40:39 上午 gj Page 1 of 1

Data File D:\HPCHEM\1\DATA\ZL\GJ115500.D\..\GJ115500.D  Sample Name: gj1155-o

OJ-H, hex/iPrOH = 98/2, 1.0 mL/min, 220 nm

```
Injection Date  : 2014-10-26 01:08:51 下午
Sample Name     : gj1155-o                      Location : Vial 1
Acq. Operator   : gj
Acq. Instrument : Instrument 1
Acq. Method     : D:\HPCHEM\1\DATA\WRH13CW1\14102303.D\DEF_LC.M\DEF_LC.M
Last changed    : 2014-10-26 12:37:58 下午 by gj
                  (modified after loading)
Analysis Method : D:\HPCHEM\1\DATA\WRH13CW1\14102303.D\DEF LC.M\DEF LC.M
```




Area Percent Report

```
Sorted By             :      Signal
Multiplier            :      1.0000
Dilution              :      1.0000
Sample Amount         :      2.50000  [ng/ul]   (not used in calc.)
Use Multiplier & Dilution Factor with ISTDs
```

Signal 1: VWD1 A, Wavelength=220 nm

| Peak # | RetTime [min] | Type | Width [min] | Area mAU *s | Height [mAU ] | Area % |
|---|---|---|---|---|---|---|
| 1 | 14.855 | BB | 0.2803 | 1601.78406 | 87.60040 | 97.5719 |
| 2 | 16.438 | PB | 0.3066 | 39.86035 | 1.98881 | 2.4281 |
| Totals : | | | | 1641.64441 | 89.58920 | |

Results obtained with enhanced integrator!

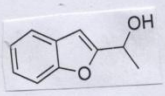
*** End of Report ***

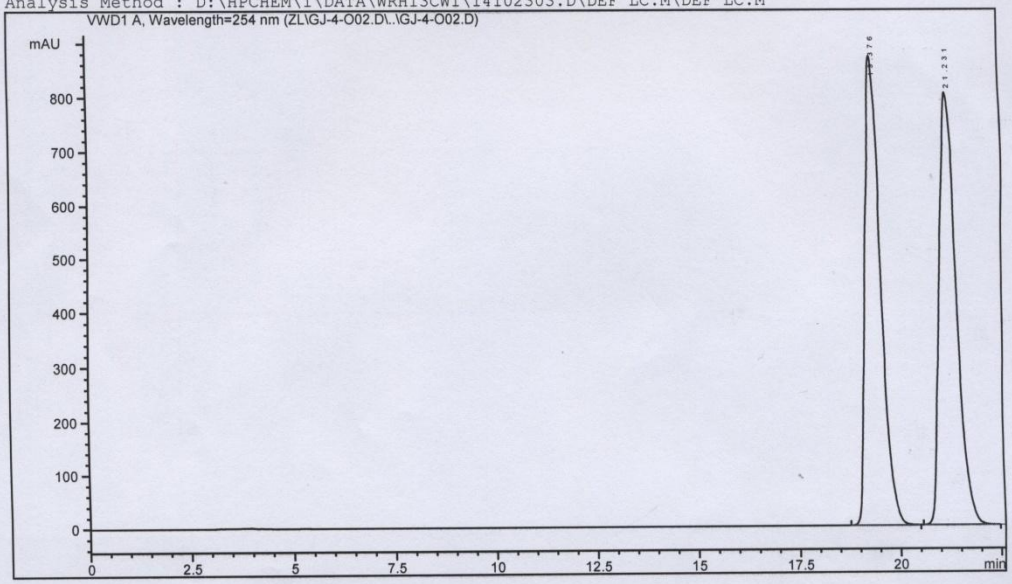
Instrument 1 2014-11-4 10:41:53 上午 gj  Page 1 of 1

Data File D:\HPCHEM\1\DATA\ZL\GJ-4-O02.D\..\GJ-4-O02.D  Sample Name: gj2048

AS-H, hex/iPrOH = 98/2, 1.0 mL/min, 254 nm

```
Injection Date  : 2014-11-28 08:51:35 下午
Sample Name     : gj2048                          Location : Vial 1
Acq. Operator   : gj
Acq. Instrument : Instrument 1
Acq. Method     : D:\HPCHEM\1\DATA\WRH13CW1\14102303.D\DEF_LC.M\DEF_LC.M
Last changed    : 2014-11-28 07:53:19 下午 by gj
                  (modified after loading)
Analysis Method : D:\HPCHEM\1\DATA\WRH13CW1\14102303.D\DEF LC.M\DEF LC.M
```




Area Percent Report

```
Sorted By             :      Signal
Multiplier            :      1.0000
Dilution              :      1.0000
Sample Amount         :      2.50000  [ng/ul]   (not used in calc.)
Use Multiplier & Dilution Factor with ISTDs
```

Signal 1: VWD1 A, Wavelength=254 nm

| Peak # | RetTime [min] | Type | Width [min] | Area mAU *s | Height [mAU] | Area % |
|---|---|---|---|---|---|---|
| 1 | 19.376 | BB | 0.4196 | 2.34454e4 | 873.06750 | 49.8606 |
| 2 | 21.231 | BB | 0.4579 | 2.35765e4 | 805.73145 | 50.1394 |
| Totals : | | | | 4.70219e4 | 1678.79895 | |

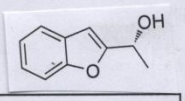
Results obtained with enhanced integrator!

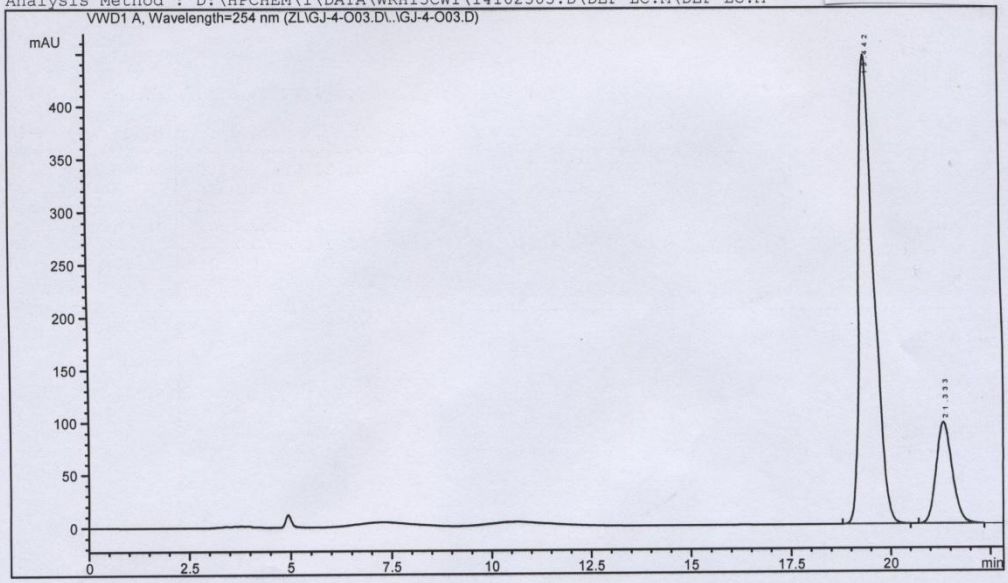
*** End of Report ***

Data File D:\HPCHEM\1\DATA\ZL\GJ-4-003.D\..\GJ-4-003.D  Sample Name: gj2042-o

AS-H, hex/iPrOH = 98/2, 1.0 mL/min, 254 nm

```
Injection Date  : 2014-11-28 09:15:54 下午
Sample Name     : gj2042-o                      Location : Vial 1
Acq. Operator   : gj
Acq. Instrument : Instrument 1
Acq. Method     : D:\HPCHEM\1\DATA\WRH13CW1\14102303.D\DEF_LC.M\DEF_LC.M
Last changed    : 2014-11-28 07:53:19 下午 by gj
                  (modified after loading)
Analysis Method : D:\HPCHEM\1\DATA\WRH13CW1\14102303.D\DEF_LC.M\DEF_LC.M
```




Area Percent Report

```
Sorted By             :      Signal
Multiplier            :      1.0000
Dilution              :      1.0000
Sample Amount         :      2.50000  [ng/ul]   (not used in calc.)
Use Multiplier & Dilution Factor with ISTDs
```

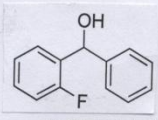
Signal 1: VWD1 A, Wavelength=254 nm

| Peak # | RetTime [min] | Type | Width [min] | Area mAU *s | Height [mAU ] | Area % |
|---|---|---|---|---|---|---|
| 1 | 19.442 | BB | 0.4085 | 1.17509e4 | 447.11285 | 81.3773 |
| 2 | 21.333 | BB | 0.4314 | 2689.12842 | 96.07845 | 18.6227 |
| Totals : | | | | 1.44400e4 | 543.19130 | |

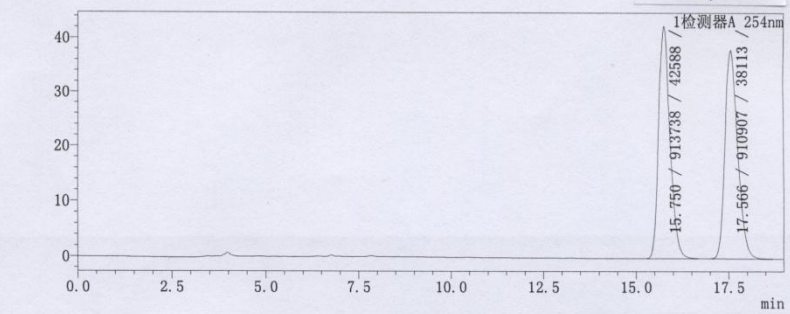
Results obtained with enhanced integrator!

*** End of Report ***

描述 : hex : iPrOH = 96/4, 0.9 mL/min, OD-H , 254 nm




色谱图
GJ2117A

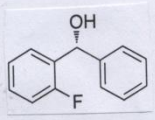



峰表

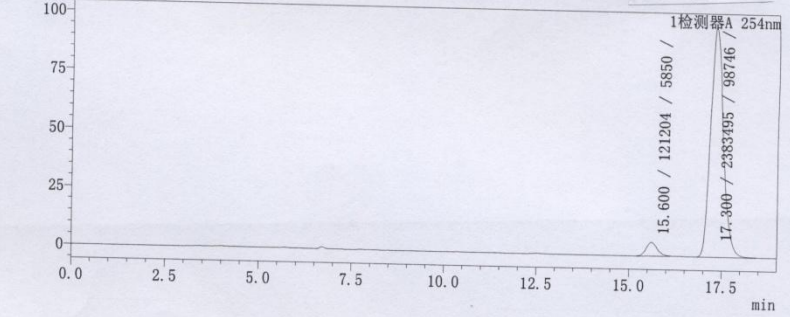
检测器A 254nm

| 峰号 | 保留时间 | 面积 | 高度 | 标记 | 面积% |
|---|---|---|---|---|---|
| 1 | 15.750 | 913738 | 42588 | | 50.078 |
| 2 | 17.566 | 910907 | 38113 | | 49.922 |
| 总计 | | 1824644 | 80701 | | 100.000 |

描述 : hex : iPrOH = 96/4, 0.9 mL/min, OD-H , 254 nm




色谱图
GJ2115-O

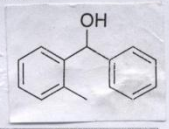



峰表

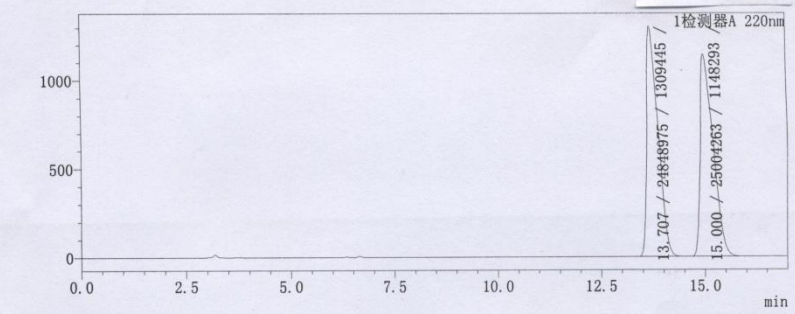
检测器A 254nm

| 峰号 | 保留时间 | 面积 | 高度 | 标记 | 面积% |
|---|---|---|---|---|---|
| 1 | 15.600 | 121204 | 5850 | | 4.839 |
| 2 | 17.300 | 2383495 | 98746 | | 95.161 |
| 总计 | | 2504699 | 104596 | | 100.000 |

描述 : hex : iPrOH = 90/10, 1.0 mL/min, OJ-H , 220 nm




色谱图
gj2117b

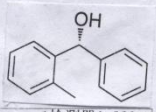



峰表

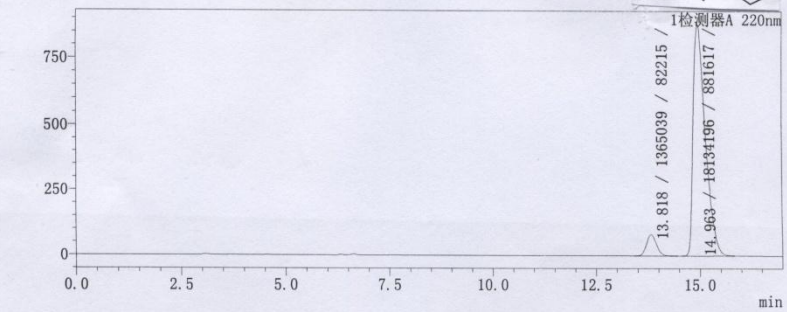
检测器A 220nm

| 峰号 | 保留时间 | 面积 | 高度 | 标记 | 面积% |
|---|---|---|---|---|---|
| 1 | 13.707 | 24848975 | 1309445 | | 49.844 |
| 2 | 15.000 | 25004263 | 1148293 | V | 50.156 |
| 总计 | | 49853238 | 2457738 | | 100.000 |

描述 : hex : iPrOH = 90/10, 1.0 mL/min, OJ-H , 220 nm




色谱图
gj2116-o




峰表

检测器A 220nm

| 峰号 | 保留时间 | 面积 | 高度 | 标记 | 面积% |
|---|---|---|---|---|---|
| 1 | 13.818 | 1365039 | 82215 | | 7.000 |
| 2 | 14.963 | 18134196 | 881617 | | 93.000 |
| 总计 | | 19499235 | 963832 | | 100.000 |