

# Readily Available Phosphine-Phosphoramidite Ligands for Highly Efficient Rh-Catalyzed Enantioselective Hydrogenations

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## General Information

All reactions were conducted under a nitrogen or argon atmosphere unless otherwise noted. Anhydrous procedures were conducted using oven dried or flame dried glassware and standard syringe and cannula transfer techniques. To eliminate the influence of environmental factors such as air and humidity in the catalytic reaction, hydrogenation reaction was carried out in glove-box by use of a stainless steel autoclave. Solvents were of reagent grade, dried and distilled before use following standard procedures. BINOL-based chlorophosphite **5** was synthesized according to the literature method<sup>1</sup>.  $\alpha$ -Dehydroamino acid esters **6a-e**<sup>2</sup>, and enamides **8a-g**<sup>3</sup> were known compounds, which were synthesized according to the literature procedure. All other chemicals were obtained commercially. Optical rotations were recorded on a polarimeter at ambient temperature ( $c = \text{g}/100 \text{ mL}$ ).  $^1\text{H}$ ,  $^{13}\text{C}$  and  $^{31}\text{P}$  NMR spectra were recorded on a 400 MHz instrument using  $\text{CDCl}_3$  as the solvent. Enantiomeric excesses were determined by capillary GC analysis with a chiral column.

## Synthesis of (S)-1-[2-(diphenylphosphino)phenyl]ethylamine [(S)-DPPNH<sub>2</sub>] **3**

To a solution of (S)- $\alpha$ -phenylethylamine **2** (1.21 g, 10.0 mmol) in 10 mL of ether at  $-35^\circ\text{C}$  was dropwise added 4.0 mL (10.0 mmol) of a 2.5M solution of *n*-BuLi in hexanes. The resulting solution was stirred at  $-35^\circ\text{C}$  for 15 minutes, and then 1.39 mL (11.0 mmol, 1.1equiv) of  $\text{Me}_3\text{SiCl}$  was added slowly at the same temperature. The reaction mixture was stirred for 1 hour and then 12.0 mL (30.0 mmol, 3 equiv) of a 2.5M solution of *n*-BuLi was added dropwise. After the addition was completed, the reaction mixture was stirred at  $-35^\circ\text{C}$  for 3 h. The reaction mixture was slowly warm to room temperature and stirred overnight. The reaction mixture was cooled to  $-35^\circ\text{C}$  again, and a solution of 1.80 mL (10.0 mmol) of chlorodiphenylphosphine in 10 mL of ether was added dropwise during 1 hour. The reaction mixture was stirred for another 3 hours at the same temperature, and then warmed to room temperature. After stirring for another 4 hours, a solution of 1M aqueous HCl was added slowly until the reaction mixture became clear in both phases. The aqueous phase was extracted with ether ( $3 \times 10 \text{ mL}$ ). Combined organic layers were dried over  $\text{Na}_2\text{SO}_4$  and concentrated under reduced pressure. The residue was purified by silica gel column chromatography (hexanes / acetate, 8 / 1) to give 1.22 g (40% yield) of the targeted (S)-DPPNH<sub>2</sub> **3** as a white solid; mp  $80\sim 82^\circ\text{C}$ ;  $[\alpha]_{\text{D}}^{25} = -56.7$  ( $c$  0.53,  $\text{CHCl}_3$ );  $^1\text{H}$  NMR ( $\text{CDCl}_3$ ):  $\delta$  1.23 (d,  $J = 6.8 \text{ Hz}$ , 3H), 1.38 (s, 2H), 4.90 (m, 1H), 6.83-7.59 (m, 14H);  $^{31}\text{P}$  NMR ( $\text{CDCl}_3$ ):  $\delta$  -16.3;  $^{13}\text{C}$  NMR  $\delta$  24.3, 47.5, 124.8, 126.5, 128.1, 128.3, 129.0, 132.8, 133.2, 133.4, 136.1, 136.2, 136.5, 136.6, 151.3, 151.5; HRMS ( $m/z$ ) calcd for  $\text{C}_{20}\text{H}_{20}\text{NP} + \text{H}$ : 306.1412, found: 306.1406.

### Synthesis of (*S*)-*N*-methyl-1-[2-(diphenylphosphino)phenyl]ethylamine[(*S*)-DPPNHMe] **4**

A mixture of (*S*)-DPPNH<sub>2</sub> **3** (1.22 g, 4 mmol) and ethyl formate (1.45 mL) was stirred at 45~50 °C overnight, and then volatile component was removed under reduced pressure to give the crude product, which did not need purification and used directly for next step.

In a 100 ml freshly oven-dried three-necked flask placed 0.27 g of LiAlH<sub>4</sub> and 10 mL of THF was slowly added a solution of above-mentioned crude product in 10 mL of THF under nitrogen atmosphere. The reaction mixture was refluxed for 5 hours, and then cooled to 0 °C by ice-bath. 10% KOH aqueous solution (5 mL) was added slowly. The reaction mixture was filtered and the solid was thoroughly washed with THF. The solvent was removed under reduced pressure and the residue was purified by silica gel column chromatography (hexanes / acetate, 10 / 1) to give 0.66 g (52% yield) of the targeted (*S*)-DPPNHMe **4** as a white solid; mp 81~83 °C;  $[\alpha]_D^{23} = -57.1$  (c 0.48, CHCl<sub>3</sub>); <sup>1</sup>H NMR (CDCl<sub>3</sub>): δ 1.19-1.22 (d, *J* = 12 Hz, 3H), 2.14(s, 3H), 4.46-4.51 (m, 1H), 6.84-7.53 (m, 14H); <sup>31</sup>P NMR (CDCl<sub>3</sub>): δ -16.5; <sup>13</sup>C NMR δ 23.2, 34.2, 56.6, 125.8, 125.9, 126.9, 128.5, 128.6, 128.7, 129.4, 133.4, 133.8, 134.0, 134.2, 135.2, 136.7, 136.8, 137.0, 137.1, 149.8, 150.0; HRMS (*m/z*) calcd for C<sub>21</sub>H<sub>22</sub>NP: 319.1490, found: 319.1492.

### General Procedure for the Synthesis of phosphine-phosphoramidite derivatives PEAPhos **1**

(*R*)-Chlorophosphite **5** (350.5 mg, 1.0 mmol) was dissolved in 4.0 mL of dried toluene, which was cooled to 0 °C. A solution of (*S*)-DPPNH<sub>2</sub> **3** or (*S*)-DPPNHMe **4** (1.0 mmol) and Et<sub>3</sub>N (303 mg, 3.0 mmol) in 4.0 mL of toluene was added to above solution during 30 min. The resulting mixture was left standing at room temperature overnight. The precipitate was filtered, and the solid was washed with toluene (5 mL x 1). The filtrate was collected, and concentrated under reduced pressure. The residue was purified by column chromatography to give the crude product, which can be further purified by crystallizing from hexane/dichloromethane.

### *N*-{(*S*)-1-[2-(diphenylphosphino)phenyl]ethyl}-(*R*)-1,10-bi-2-naphthylphosphoramidite (*S<sub>c</sub>*,*R<sub>a</sub>*)-

**PEAPhos 1a**: white solids; mp 107~109 °C;  $[\alpha]_D^{24} = -87.0$  (c 1.02, CHCl<sub>3</sub>); <sup>1</sup>H NMR (CDCl<sub>3</sub>): δ 1.33-1.35 (d, *J* = 6.8 Hz, 3H), 3.68-3.75 (m, 1H), 5.37-5.45(m, 1H), 6.71-7.92 (m, 26H); <sup>31</sup>P NMR (CDCl<sub>3</sub>): δ -18.0, 152.7; <sup>13</sup>C NMR δ 25.6, 48.4, 122.5, 124.7, 125.9, 126.0, 126.9, 127.0, 128.2, 128.3, 128.5, 128.6, 128.7, 129.6, 133.6, 133.8, 133.9, 134.0, 134.1, 136.8, 147.4, 149.4, 150.8; HRMS (*m/z*) calcd for C<sub>40</sub>H<sub>31</sub>NO<sub>2</sub>P<sub>2</sub>: 619.1830, found: 619.1835.

***N*-methyl-*N*-{(*S*)-1-[2-(diphenylphosphino)phenyl]ethyl}-(*R*)-1,10-bi-2-naphthylphosphoramidite (*S<sub>c</sub>,R<sub>a</sub>*)-PEAPhos **1b**:** white solids; mp 174~176 °C;  $[\alpha]_D^{24} = -122.9$  (c 1.01, CHCl<sub>3</sub>); <sup>1</sup>H NMR (CDCl<sub>3</sub>): δ 1.60-1.62 (d, *J* = 9.88 Hz, 3H), 1.99 (s, 3H), 5.40-5.44 (m, 1H), 7.03-7.94 (m, 26H); <sup>31</sup>P NMR (CDCl<sub>3</sub>): δ -18.4, 148.4; <sup>13</sup>C NMR δ 21.6, 30.5, 56.6, 122.1, 124.4, 125.96, 125.99, 126.9, 127.0, 128.1, 128.3, 128.5, 128.6, 128.7, 129.3, 129.9, 130.1, 133.7, 133.9, 134.0, 136.9, 147.8, 149.8, 150.5; HRMS (m/z) calcd for C<sub>41</sub>H<sub>33</sub>NO<sub>2</sub>P<sub>2</sub>: 633.1987, found: 633.1981.

***N*-{(*S*)-1-[2-(diphenylphosphino)phenyl]ethyl}-(*S*)-1,10-bi-2-naphthylphosphoramidite (*S<sub>c</sub>,S<sub>a</sub>*)-PEAPhos **1c**:** white solids; mp 108~110 °C;  $[\alpha]_D^{24} = 56.5$  (c 0.44, CHCl<sub>3</sub>); <sup>1</sup>H NMR (CDCl<sub>3</sub>): δ 1.22-1.26 (d, *J* = 14 Hz, 3H), 3.46-3.49 (m, 1H), 5.44 (m, 1H), 6.92-7.92 (m, 26 H); <sup>31</sup>P NMR (CDCl<sub>3</sub>): δ -16.9, 153.9; <sup>13</sup>C NMR δ 26.0, 48.5, 122.6, 124.7, 126.0, 126.9, 127.0, 128.2, 128.3, 128.5, 128.6, 128.7, 128.8, 129.6, 133.7, 133.92, 134.0, 134.1, 147.2, 149.4, 150.3; HRMS (m/z) calcd for C<sub>40</sub>H<sub>31</sub>NO<sub>2</sub>P<sub>2</sub>: 619.1830, found: 619.1825.

***N*-methyl-*N*-{(*S*)-1-[2-(diphenylphosphino)phenyl]ethyl}-(*S*)-1,10-bi-2-naphthylphosphoramidite (*S<sub>c</sub>,S<sub>a</sub>*)-PEAPhos **1d**:** white solids; mp 206~208 °C;  $[\alpha]_D^{24} = 195.7$  (c 0.58, CHCl<sub>3</sub>); <sup>1</sup>H NMR (CDCl<sub>3</sub>): δ 1.66-1.69 (d, *J* = 9.8 Hz, 3H), 1.87 (s, 3H), 5.42 (m, 1H), 6.99-7.91 (m, 26H); <sup>31</sup>P NMR (CDCl<sub>3</sub>): δ -17.8, 147.6; <sup>13</sup>C NMR δ 21.6, 30.1, 56.7, 124.4, 125.9, 127.00, 127.06, 127.5, 128.2, 128.3, 128.4, 128.5, 128.6, 128.7, 130.1, 133.7, 133.9, 134.0, 147.4, 149.7, 150.7; HRMS (m/z) calcd for C<sub>41</sub>H<sub>33</sub>NO<sub>2</sub>P<sub>2</sub>: 633.1987, found: 633.1992.

### General procedure for asymmetric hydrogenation

In a nitrogen-filled glovebox, a stainless steel autoclave was charged with Rh(COD)<sub>2</sub>BF<sub>4</sub> (2.0 mg, 0.5 x 10<sup>-2</sup> mmol) and PEAPhos **1** (0.55 x 10<sup>-2</sup> mmol) in 1.5 mL of a degassed CH<sub>2</sub>Cl<sub>2</sub>. After stirring for 10 min at room temperature. A substrate (0.5 mmol) in 1.5 mL of the same solvents was added to the reaction mixture, and then the hydrogenation was performed at room temperature under an H<sub>2</sub> pressure of 10 bar for 12 hours. The reaction mixture was passed through a short silica gel column to remove the catalyst. After evaporating the solvent, the crude reaction mixture was subjected to GC to determine the enantiomeric excesses and yields of hydrogenation products.

### Determination of Enantiomeric Excesses for α-amino acid esters **7a-e**:

Chiral Capillary GC Column. CP-Chiralsil-L-Val column (25m x 0.25mm x 0.12  $\mu$  m). Carrier gas: N<sub>2</sub>. The racemic products were obtained by hydrogenation of substrates with an achiral catalyst prepared from PPh<sub>3</sub> and Rh(COD)<sub>2</sub>BF<sub>4</sub>. The following are the retention times for the racemic products.

**Methyl 2-Acetamido-3-phenylpropanoate (7a):** (capillary GC, CP-Chiralsil-L-Val column, 160 °C, 20 psi) t(R) = 8.59, t(S) = 9.45.

**Methyl 2-Acetamido-3-(2-chlorophenyl)propanoate (7b):** (capillary GC, CP-Chiralsil-L-Val column, 160 °C, 20 psi) t(R) = 16.45, t(S) = 18.32.

**Methyl 2-Acetamido-3-(4-chlorophenyl)propanoate (7c):** (capillary GC, CP-Chiralsil-L-Val column, 160 °C, 20 psi) t(R) = 22.67, t(S) = 25.95.

**Methyl 2-Acetamido-3-(2-methoxyphenyl)propanoate (7d):** (capillary GC, CP-Chiralsil-L-Val column, 160 °C, 20 psi) t(R) = 16.79, t(S) = 18.54.

**Methyl 2-Acetamido-3-(4-methoxyphenyl)propanoate (7e):** (capillary GC, CP-Chiralsil-L-Val column, 160 °C, 20 psi) t(R) = 23.19, t(S) = 25.81.

**Determination of Enantiomeric Excesses for *N*-Acetyl-1-Arylethylamine 9a-g:**

Chiral Capillary GC Column. Chiral Select-1000 column (dimensions 30 m x 0.25 mm(i.d.)). Carrier gas: N<sub>2</sub>. The racemic products were obtained by hydrogenation of substrates with an achiral catalyst prepared from PPh<sub>3</sub> and Rh(COD)<sub>2</sub>BF<sub>4</sub>. The following are the retention times for the racemic products.

***N*-Acetyl-1-phenylethylamine (9a):** (capillary GC, Chiral Select-1000 column, 130 °C, 10psi) t(S) = 21.44, t(R) = 23.38.

***N*-Acetyl-1-(4-methylphenyl)ethylamine (9b):** (capillary GC, Chiral Select-1000 column, 130 °C, 15 psi) t(S) = 25.12, t(R) = 26.97.

***N*-Acetyl-1-(4-trifluoromethyl)ethylamine (9c):** (capillary GC, Chiral Select-1000 column, 130 °C, 15 psi) t(S) = 22.70, t(R) = 25.06.

***N*-Acetyl-1-(4-bromophenyl)ethylamine (9d):** (capillary GC, Chiral Select-1000 column, 140 °C, 15 psi) t(S) = 62.43, t(R) = 66.18.

***N*-Acetyl-1-(4-chlorophenyl)ethylamine (9e):** (capillary GC, Chiral Select-1000 column, 140 °C, 10 psi) t(S) = 51.15, t(R) = 54.35.

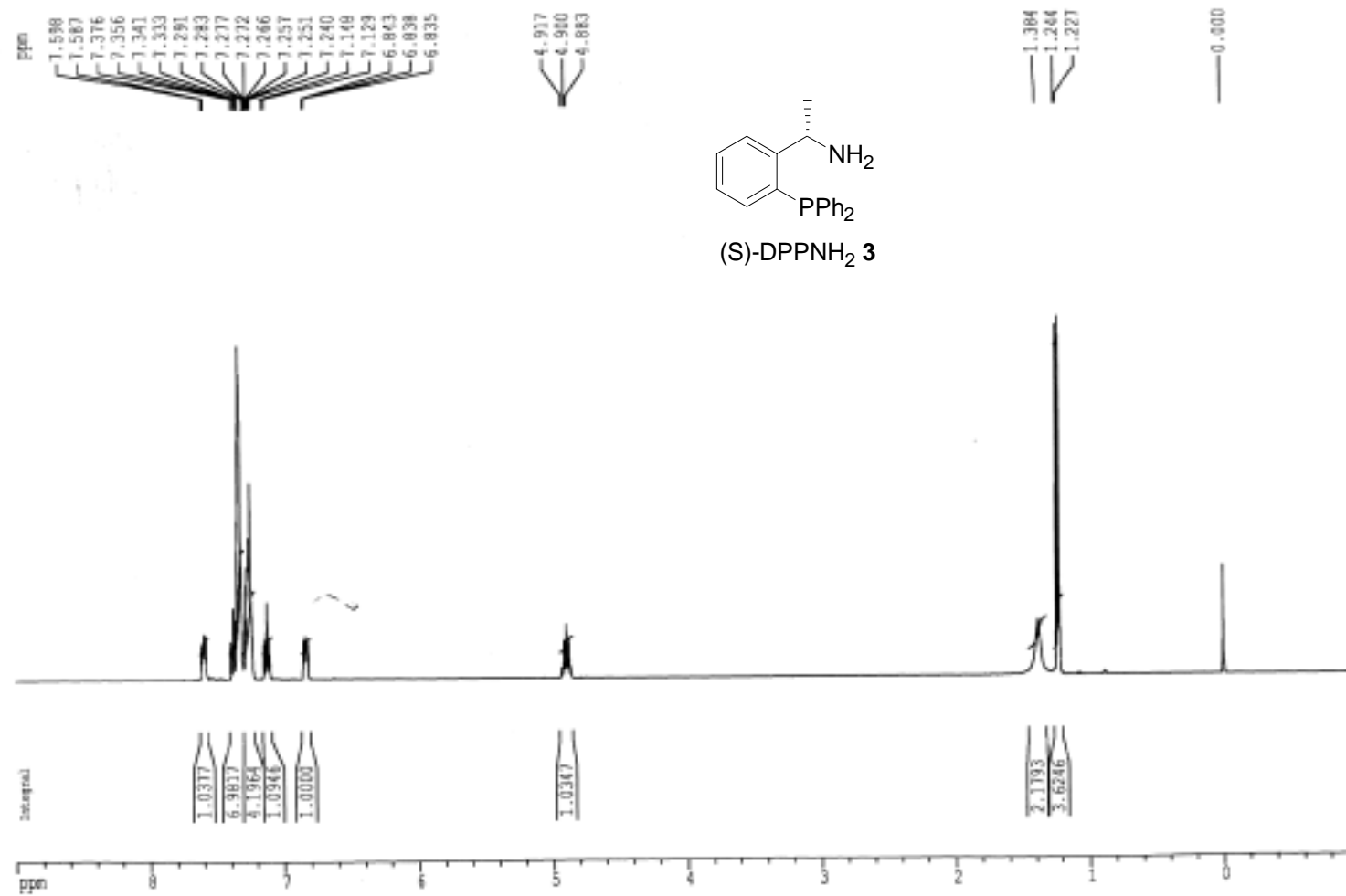
***N*-Acetyl-1-(4-methoxyphenyl)ethylamine (9f):** (capillary GC, Chiral Select-1000 column, 140 °C, 10 psi) t(S) = 58.02, t(R) = 60.98.

***N*-Acetyl-1-(3-methoxyphenyl)ethylamine (9g):** (capillary GC, Chiral Select-1000 column, 130 °C, 10psi) t(S) = 78.30, t(R) = 83.16.

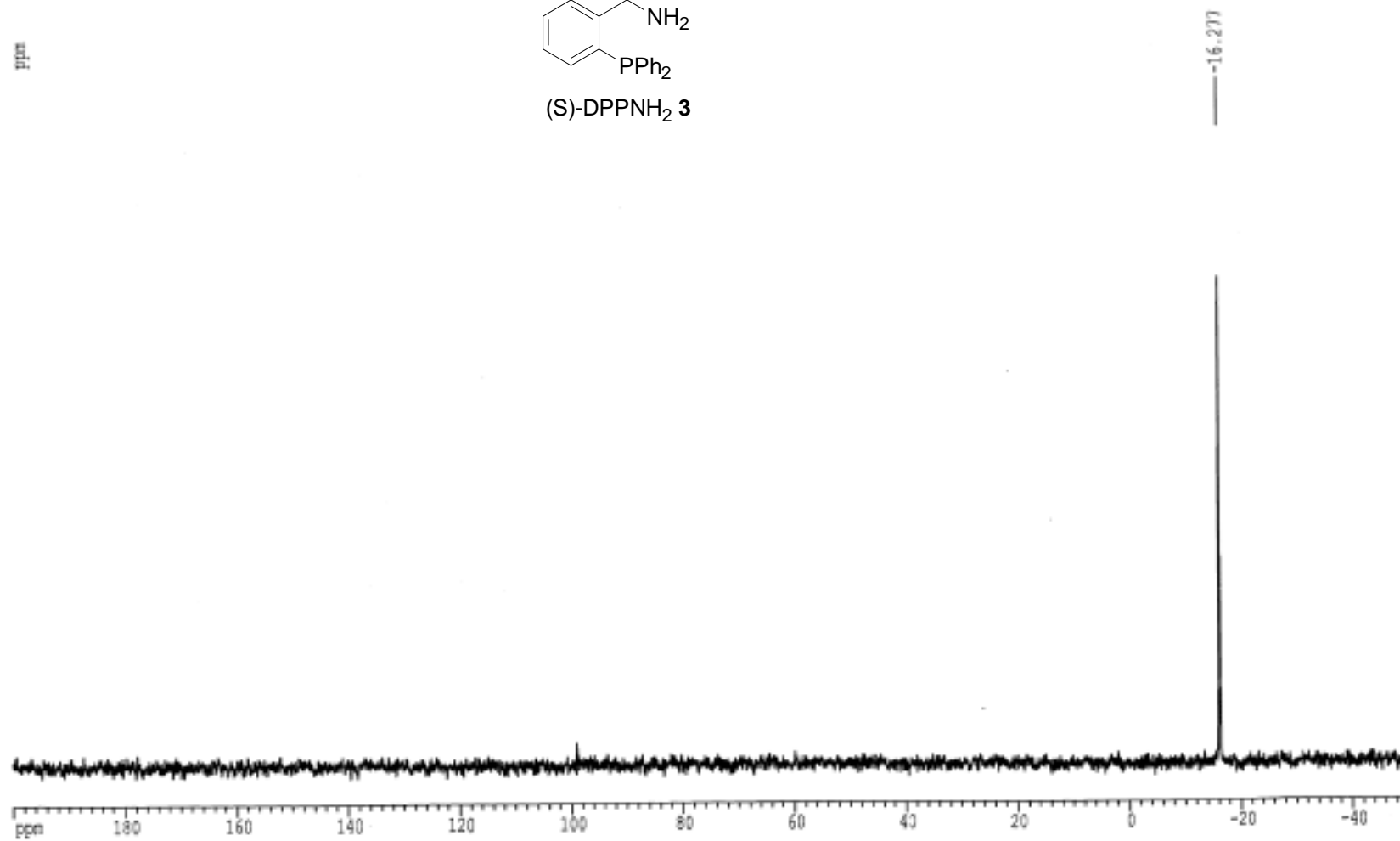
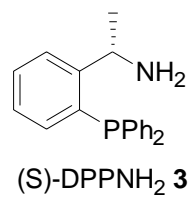
## References and Notes

1. Franciò, G.; Arena, C. G.; Faraone, F.; Graiff, C.; Lanfranchi, M.; Tiripicchio, A. *Eur.J. Inorg. Chem.* **1999**, 1219.
2. Blott, A. H. *Org. Syn., Coll. Vol.* **1950**, p1
3. (a) van den Berg, M.; Minnaard, A. J.; Schudde, E. P.; van Esch, J.; de Vries, J. G.; Feringa, B. L. *J. Am. Chem. Soc.* **2000**, *122*, 11539. (b) Burk, M. J.; Casy, G.; Johnson, N. B. *J. Org. Chem.* **1998**, *63*, 6084.

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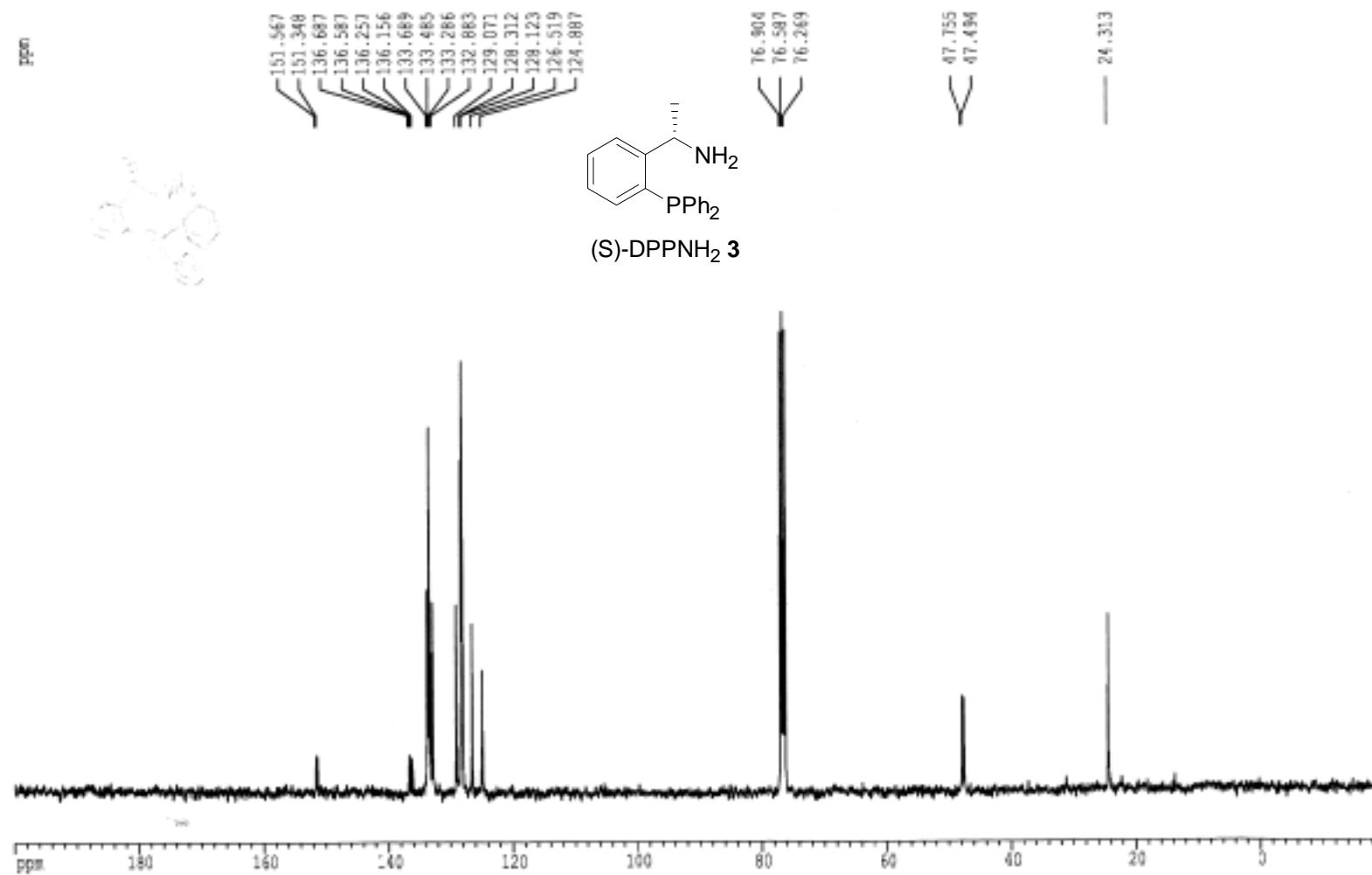


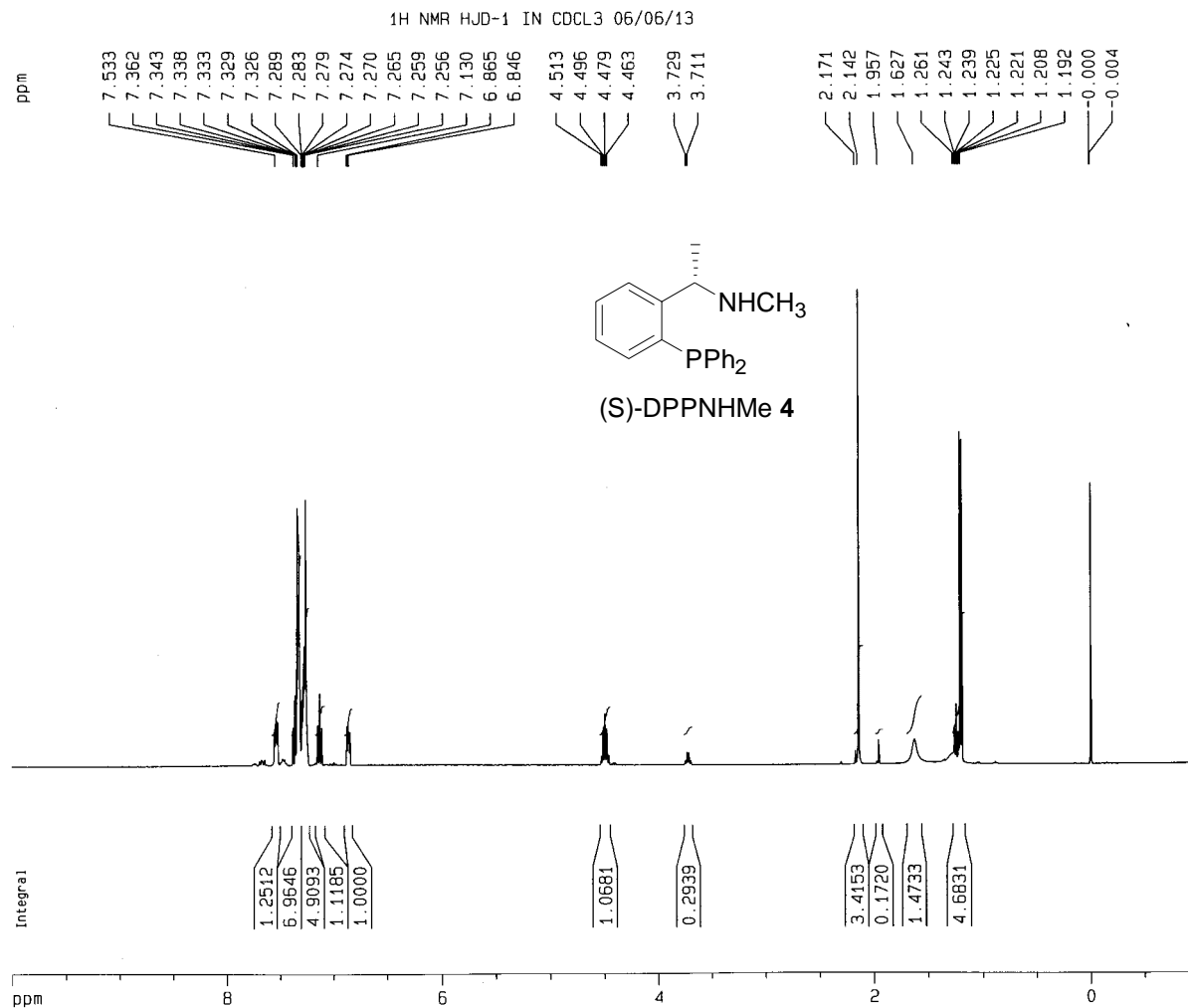
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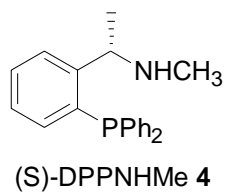
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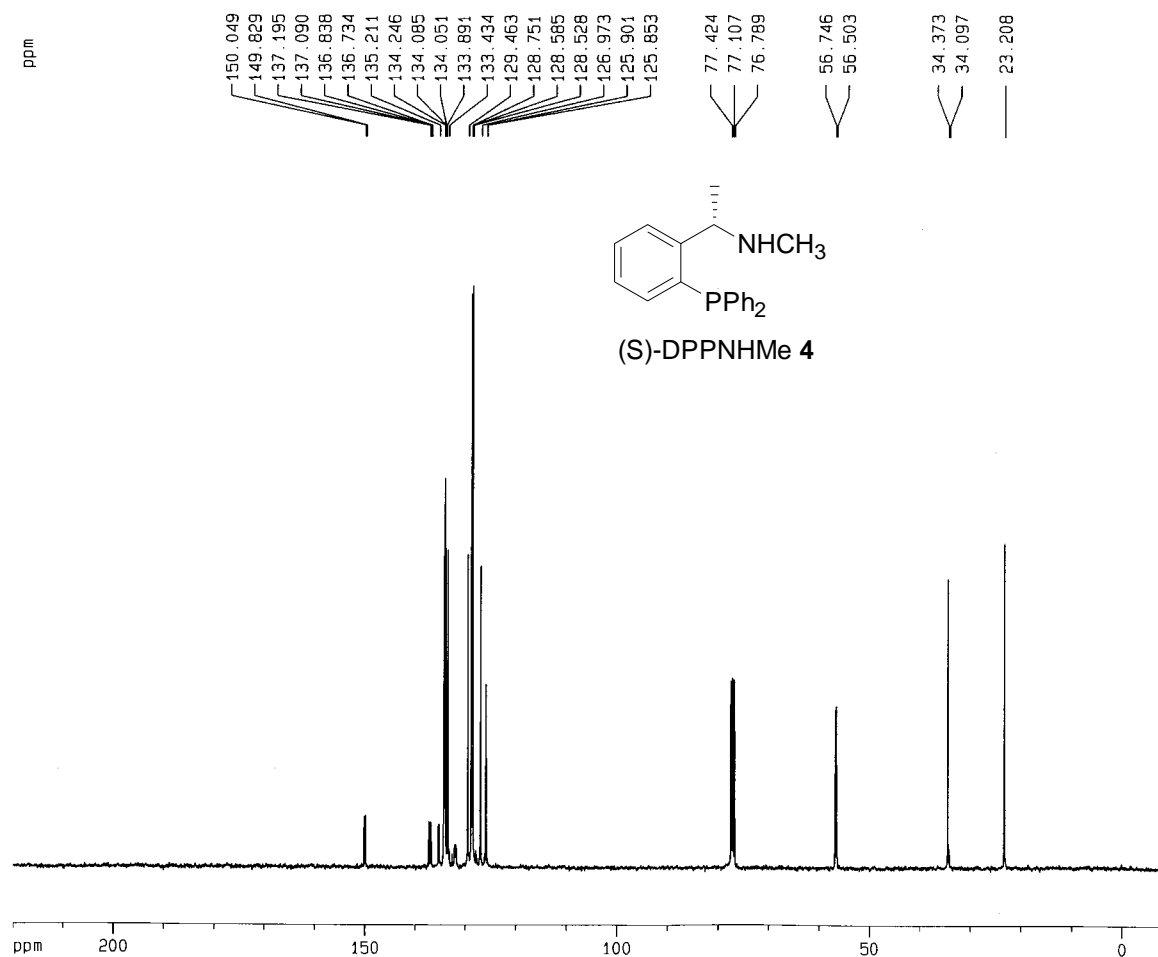
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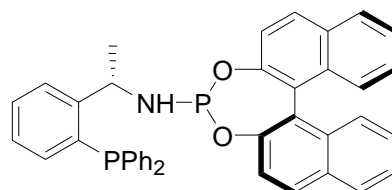
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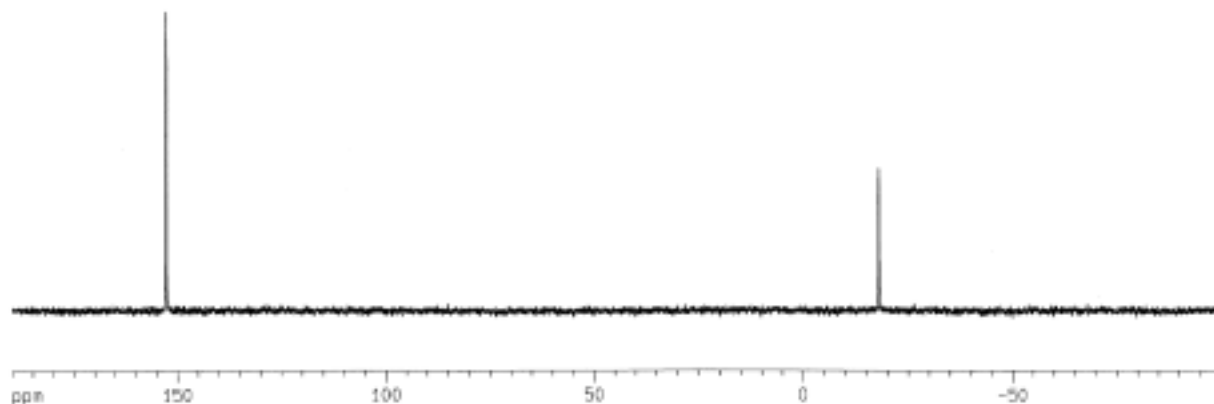
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Ligand 1a

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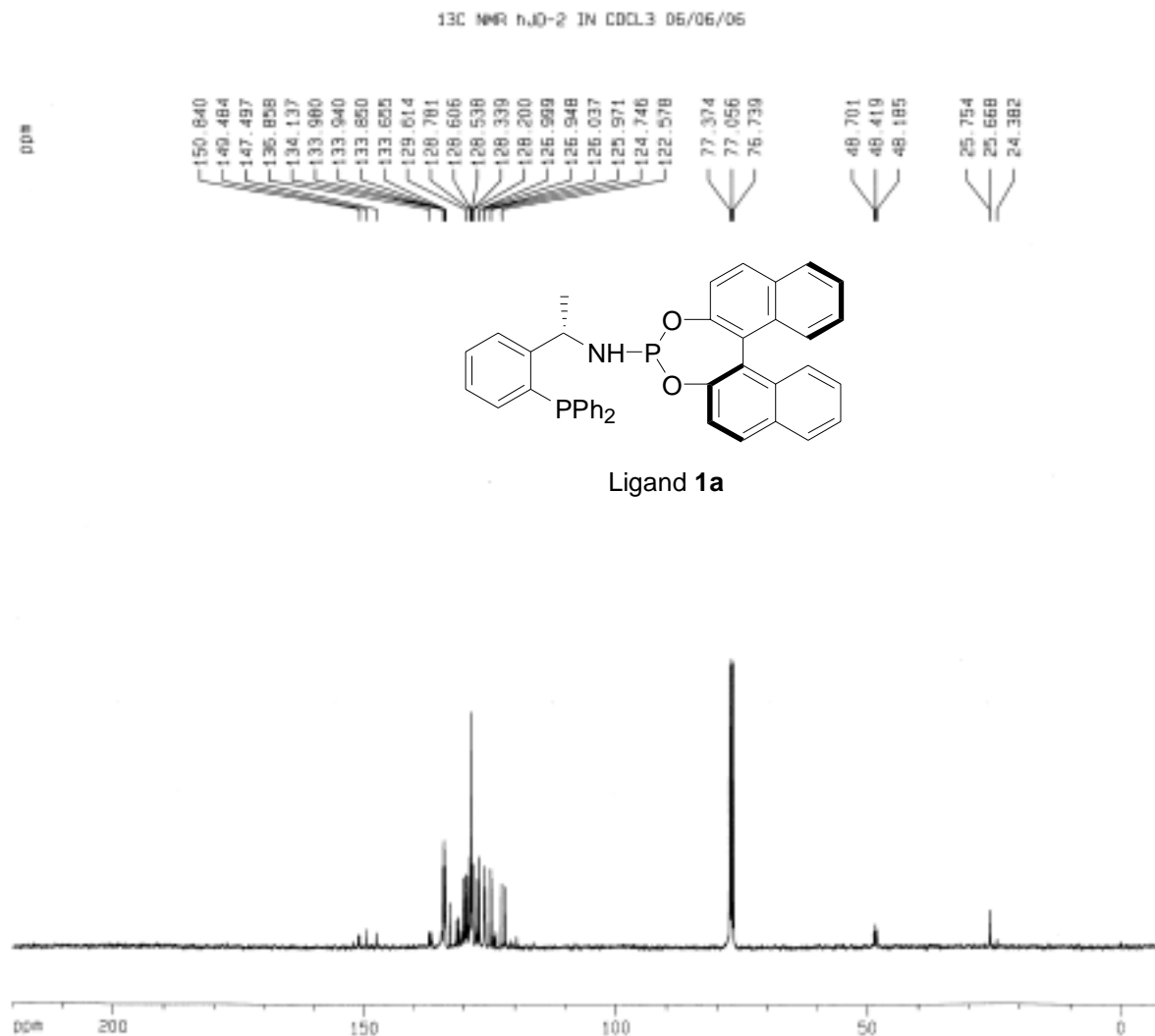
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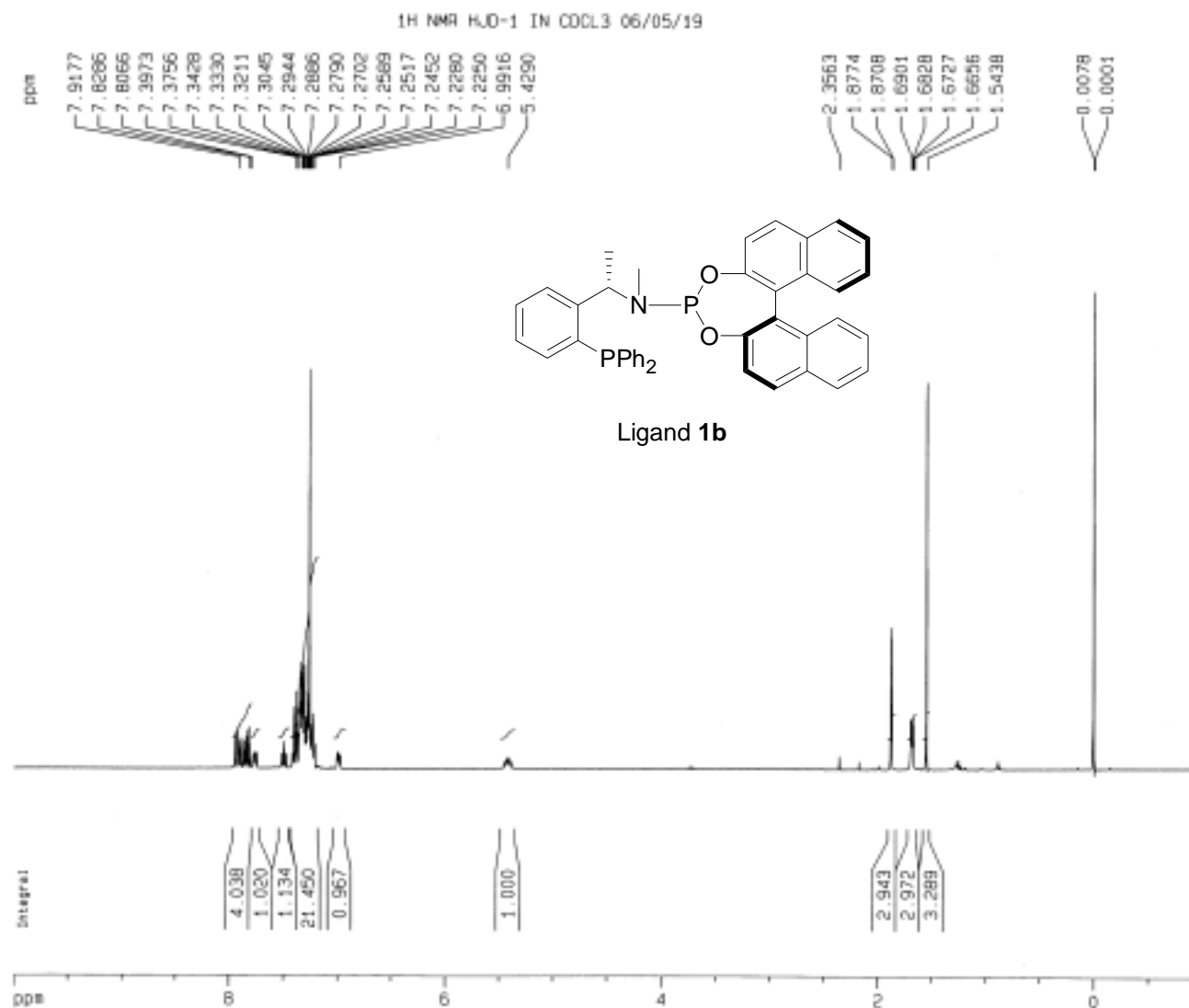
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SF01 100.6234215 MHz

\*\*\*\*\* CHANNEL f2 \*\*\*\*\*  
CPDPRG2 waltz16  
NUC2 1H  
PCPD2 66.00 usec  
PL2 5.00 dB  
PL12 23.00 dB  
SF02 400.1326907 MHz

F2 - Processing parameters  
SI 32768  
SF 100.6127690 MHz  
WDW EM  
SSB 0  
LB 4.00 Hz  
GB 0  
PC 1.40

1D NMR (13C) parameters  
CX 20.00 cm  
CY 5.00 cm  
F1P 220.800 ppm  
F1 22134.81 Hz  
F2P -10.800 ppm  
F2 -1006.13 Hz  
PRGM 11.50000 ppm/cm  
H2CH 1157.04889 Hz/cm



Current Data Parameters  
 NAME C hjd  
 EXPNO 160  
 PROCNO 1

F2 - Acquisition Parameters  
 Date\_ 20060519  
 Time 10.34  
 INSTRUM drx400  
 PROBHD 5 mm PABBO BB-  
 PULPROG zg  
 TD 32768  
 SOLVENT CDCl<sub>3</sub>  
 NS 8  
 DS 0  
 SNH 8012.820 Hz  
 FIDRES 0.244532 Hz  
 AQ 2.0447731 sec  
 RG 181  
 CW 62.400 usec  
 DE 6.00 usec  
 TE 296.2 K  
 DI 1.00000000 sec  
 MCREST 0.00000000 sec  
 MCWPK 0.01500000 sec

----- CHANNEL f1 -----  
 NUC1 1H  
 P1 8.20 usec  
 PL1 5.00 dB  
 SF01 400.1332521 MHz

F2 - Processing parameters  
 SI 32768  
 SF 400.1300177 MHz  
 WDW GM  
 SSB 0  
 LB -0.50 Hz  
 GB 0.1  
 PC 1.40

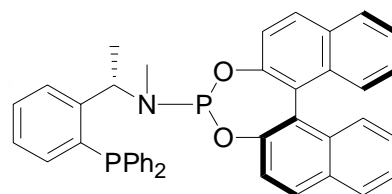
1D NMR plot parameters  
 CX 20.00 cm  
 CY 8.00 cm  
 F1P 10.000 ppm  
 F1 4001.30 Hz  
 F2P -1.000 ppm  
 F2 -400.13 Hz  
 PPMCM 0.55000 ppm/cm  
 HZCM 220.07150 Hz/cm



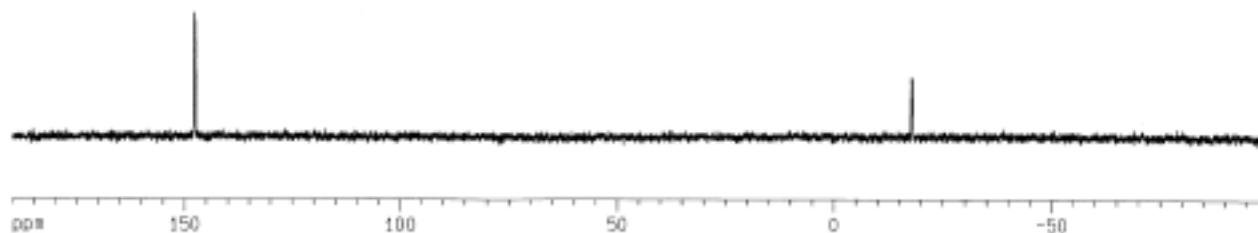
31P NMR HJD-1 IN CDCl3 06/05/19

147.743  
147.511

17.768  
17.981



Ligand 1b



Current Data Parameters  
NAME hjd  
EXPNO 161  
PROCNO 1

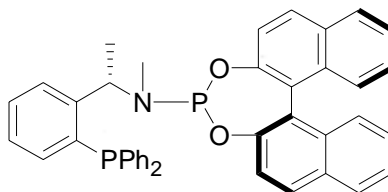
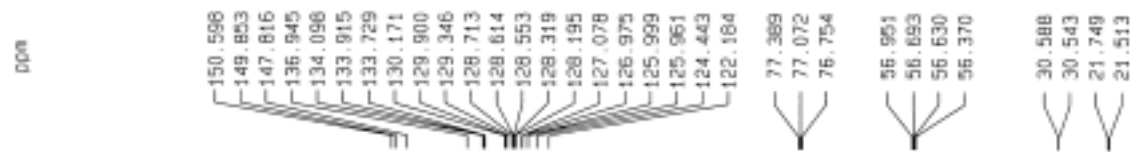
F2 - Acquisition Parameters  
Date\_ 20080519  
Time 10.41  
INSTRUM drs400  
PROBHD 5 mm PABBO BB-  
PULPROG zg  
TD 32768  
SOLVENT CDCl3  
NS 105  
DS 0  
SWH 48543.688 Hz  
FIDRES 1.481436 Hz  
AQ 0.3375604 sec  
RG 13004  
DM 10.300 usec  
DE 6.00 usec  
TE 296.2 K  
D1 2.00000000 sec  
MCREST 0.00000000 sec  
MCWRR 0.01500000 sec

\*\*\*\*\* CHANNEL f1 \*\*\*\*\*  
NUC1 31P  
P1 8.00 usec  
PL1 0.00 dB  
SF01 161.9820520 MHz

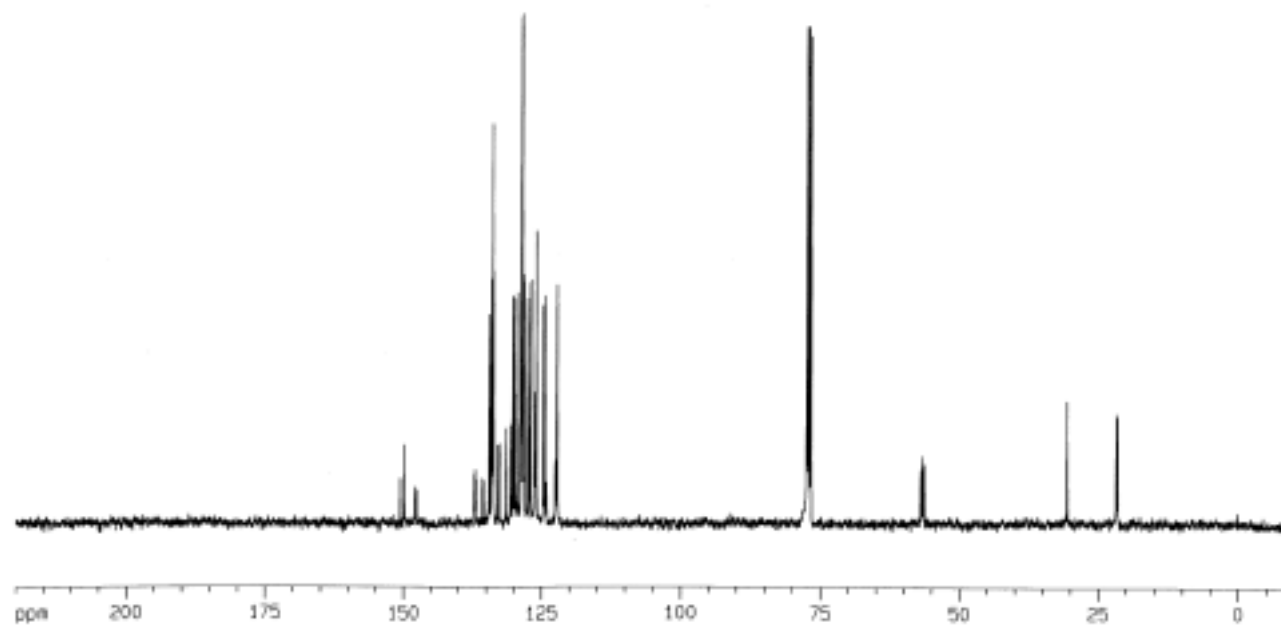
F2 - Processing parameters  
SI 16384  
SF 161.9795337 MHz  
WDW EM  
SSB 0  
LB 5.00 Hz  
GB 0  
PC 1.40

1D NMR plot parameters  
CX 20.00 cm  
CY 2.00 cm  
F1P 190.000 ppm  
F1 30775.35 Hz  
F2P -100.000 ppm  
F2 -16197.55 Hz  
PPMCM 14.50000 ppm/cm  
HZCM 2340.64526 Hz/cm

<sup>13</sup>C NMR HJ0-3 IN CDCl<sub>3</sub> 06/05/30



Ligand 1b



Current Data Parameters  
NAME hjd  
EXPNO 177  
PROCNO 1

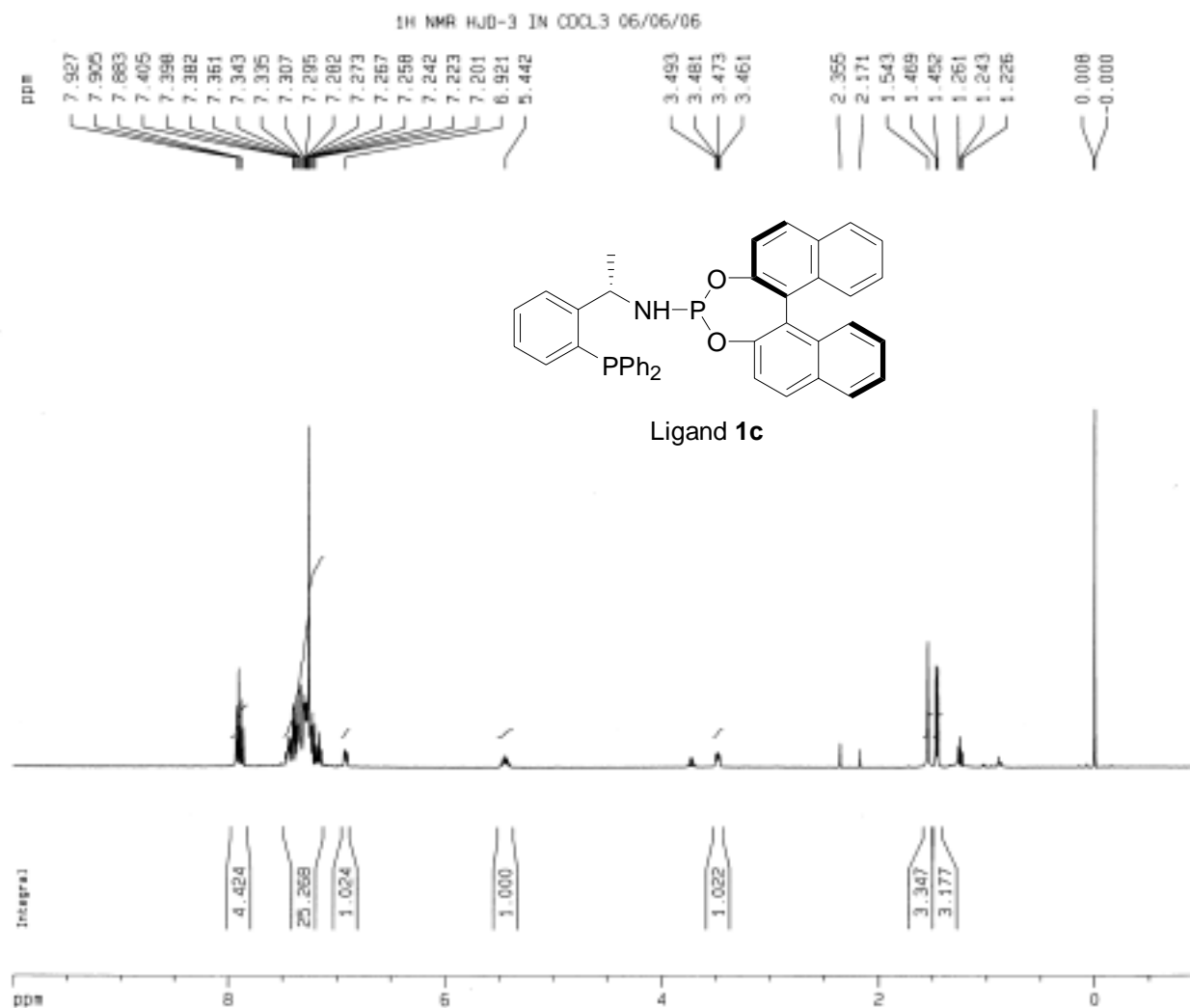
F2 - Acquisition Parameters  
Date\_ 20060530  
Time 14.52  
INSTRUM drx400  
PROBHD 5 mm PA680 BB-  
PULPROG zgpg  
TD 65536  
SOLVENT CDCl<sub>3</sub>  
NS 842  
DS 16  
SWH 23149.148 Hz  
FIDRES 0.353213 Hz  
AQ 1.4156276 sec  
RG 16384  
DM 21.600 usec  
DE 6.00 usec  
TE 298.2 K  
D1 1.0000000 sec  
D11 0.0300000 sec  
MORST 0.0000000 sec  
MCRR 0.0150000 sec

\*\*\*\*\* CHANNEL f1 \*\*\*\*\*  
NUC1 <sup>13</sup>C  
P1 8.20 usec  
PL1 1.50 dB  
SF01 100.6234215 MHz

\*\*\*\*\* CHANNEL f2 \*\*\*\*\*  
CPDPRG2 waltz16  
NUC2 <sup>1</sup>H  
PCPD2 88.00 usec  
PL2 5.00 dB  
PLS2 23.00 dB  
SF02 400.1320997 MHz

F2 - Processing parameters  
SI 32768  
SF 100.6127690 MHz  
WDW EM  
SSB 0  
LB 4.00 Hz  
GB 0  
PC 1.40

SF NMR plot parameters  
CX 20.00 cm  
CY 8.00 cm  
F1P 220.000 ppm  
F1 22134.81 Hz  
F2P -10.000 ppm  
F2 -1006.13 Hz  
PRACH 11.50000 ppm/cm  
HZCM 1157.04688 Hz/cm



Current Data Parameters  
NAME hjd  
EXPNO 189  
PROCNO 1

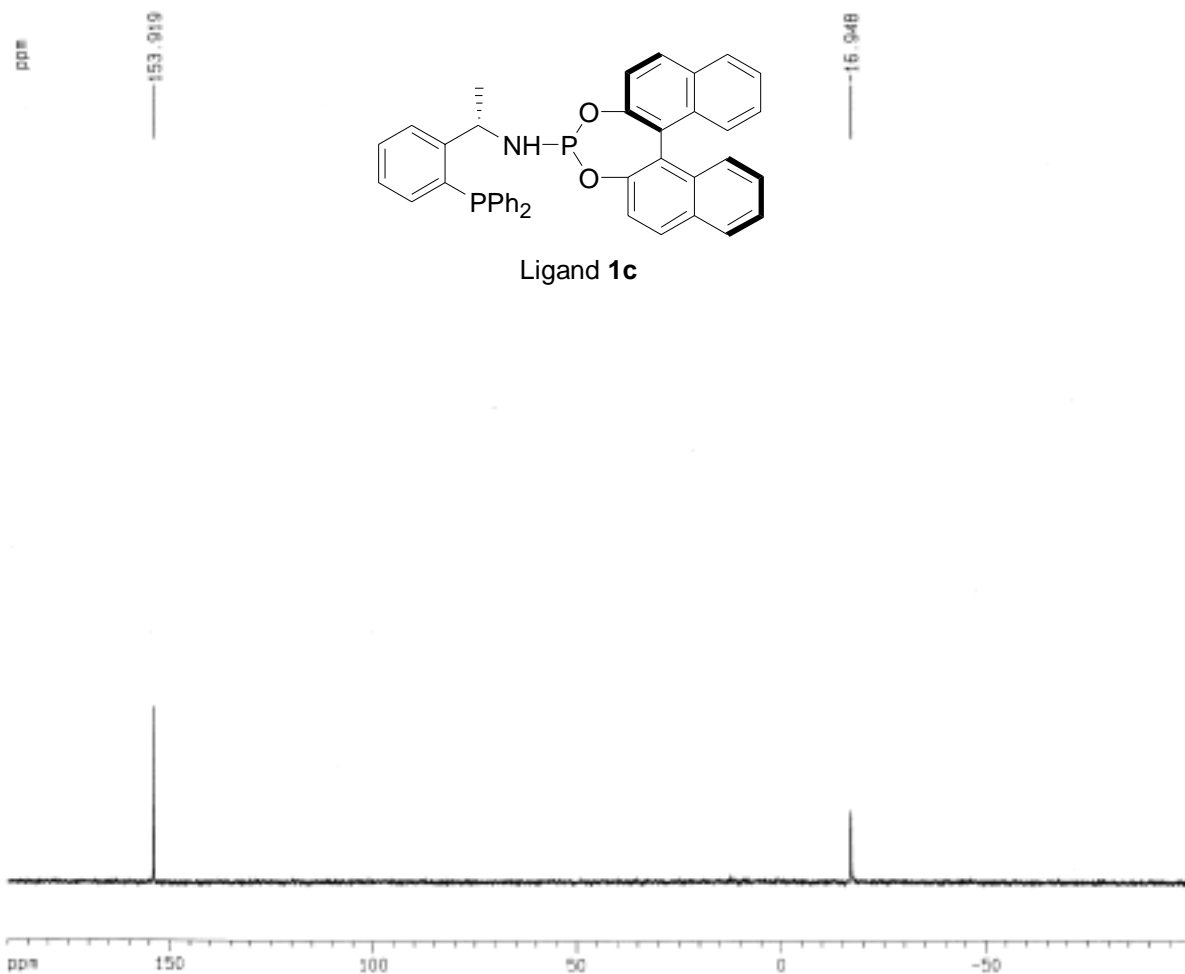
F2 - Acquisition Parameters  
Date\_ 20060606  
Time 14.19  
INSTRUM grs400  
PROBHD 5 mm PABBO BB-  
PULPROG zg  
TD 32768  
SOLVENT CDCl3  
NS 8  
DS 0  
SWH 8012.820 Hz  
FIDRES 0.244532 Hz  
AQ 2.0447731 sec  
RG 256  
DW 62.400 usec  
DE 6.00 usec  
TE 297.2 K  
D1 1.0000000 sec  
MCREST 0.0000000 sec  
MCWRR 0.0150000 sec

\*\*\*\*\* CHANNEL f1 \*\*\*\*\*  
NUC1 1H  
P1 8.20 usec  
PL1 5.00 dB  
SFO1 400.1332521 MHz

F2 - Processing parameters  
SI 32768  
SF 400.1300182 MHz  
WDW GM  
SSB 0  
LB -0.50 Hz  
GB 0.1  
PC 1.40

1D NMR plot parameters  
Cx 20.00 cm  
Cy 6.00 cm  
F1P 10.000 ppm  
F1 4001.30 Hz  
F2P -1.000 ppm  
F2 -400.13 Hz  
PPMCM 0.55000 ppm/cm  
HZCM 220.07150 Hz/cm

31P NMR HJD-3 IN CDCL3 05/06/06



Ligand 1c

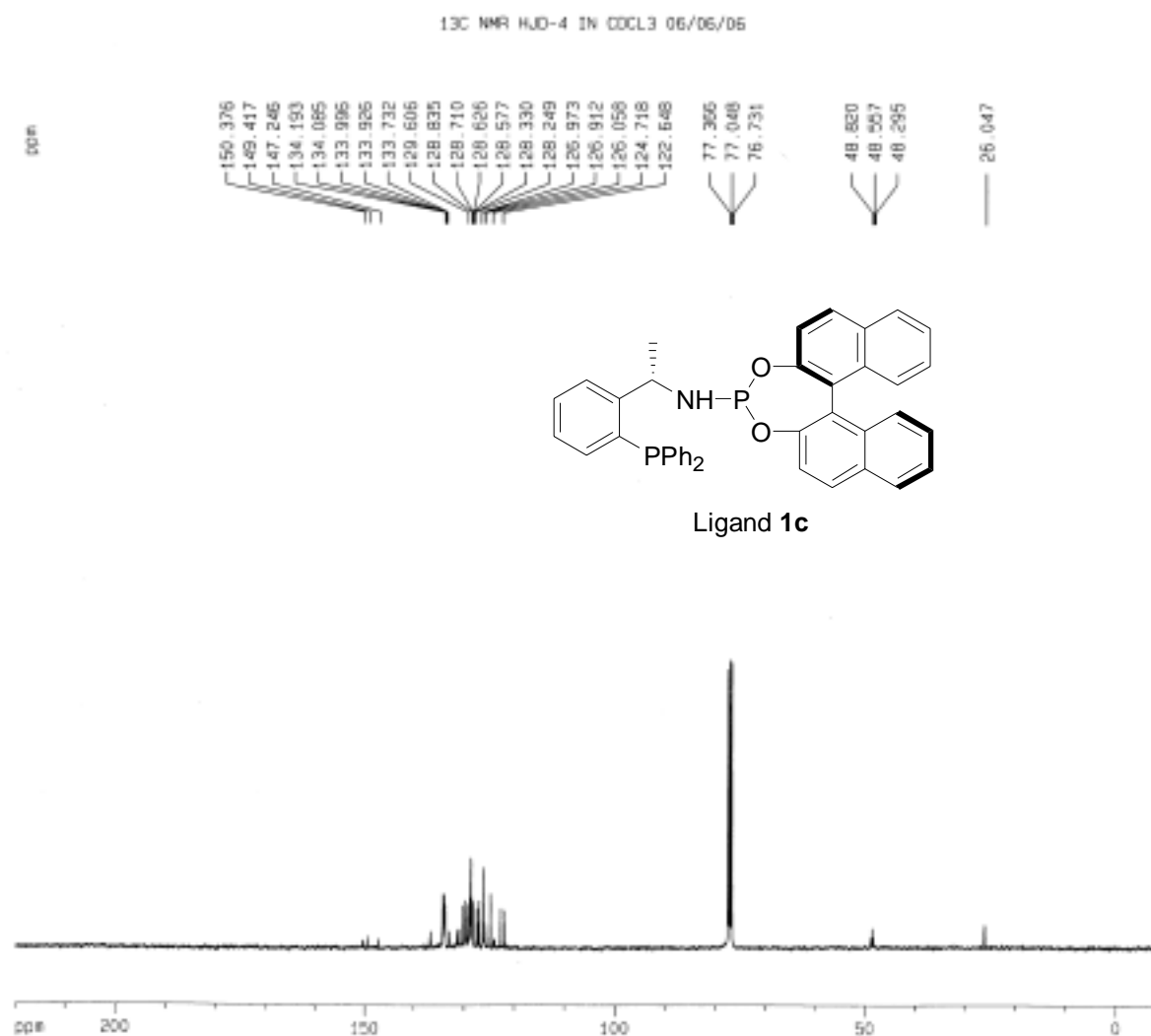
Current Data Parameters  
NAME hjd  
EXPNO 190  
PROCNO 1

F2 - Acquisition Parameters  
Date\_ 20060606  
Time 14.20  
INSTRUM drx400  
PROBHD 5 mm PABBO BB-  
PULPROG zg  
TD 32768  
SOLVENT CDCL3  
NS 200  
DS 0  
SWH 40543.688 Hz  
FIDRES 1.481436 Hz  
AQ 0.3375684 sec  
RG 3251  
DM 10.300 usec  
DE 8.00 usec  
TE 297.2 K  
D1 2.0000000 sec  
NCREST 0.0000000 sec  
NEWK 0.0150000 sec

\*\*\*\*\* CHANNEL f1 \*\*\*\*\*  
NUC1 31P  
P1 8.00 usec  
PL1 0.00 dB  
SFO1 161.9820520 MHz

F2 - Processing parameters  
SI 16384  
SF 161.9755337 MHz  
WDW EM  
SSB 0  
LB 5.00 Hz  
GB 0  
PC 1.40

1D NMR plot parameters  
CX 20.00 cm  
CY 3.00 cm  
F1P 190.000 ppm  
F1 30775.25 Hz  
F2P -100.000 ppm  
F2 -10507.55 Hz  
PPHCH 14.50000 ppm/cm  
H1CH 2348.64526 Hz/cm



Current Sols Parameters

NAME	hjd
EXPNO	182
PROCNO	1

F2 - Acquisition Parameters

Date_	20060606
Time	16.30
INSTRUM	drx400
PROBHD	5 mm R6680 BB-
PULPROG	zgpg
TD	65536
SOLVENT	CDCl3
HQ	1646
OS	16
SMH	23148.140 Hz
F2FRES	0.253213 Hz
AS	1.4956276 sec
RG	16384
DW	21.600 usec
DE	6.00 usec
TE	298.2 K
D1	1.0000000 sec
d11	0.0300000 sec
MDPRST	0.0000000 sec
MDPR	0.0150000 sec

----- (NAME), f1 -----

MU1	13C
PL1	0.20 usec
PL1	1.50 dB
SFO1	100.6234215 MHz

----- (NAME), f2 -----

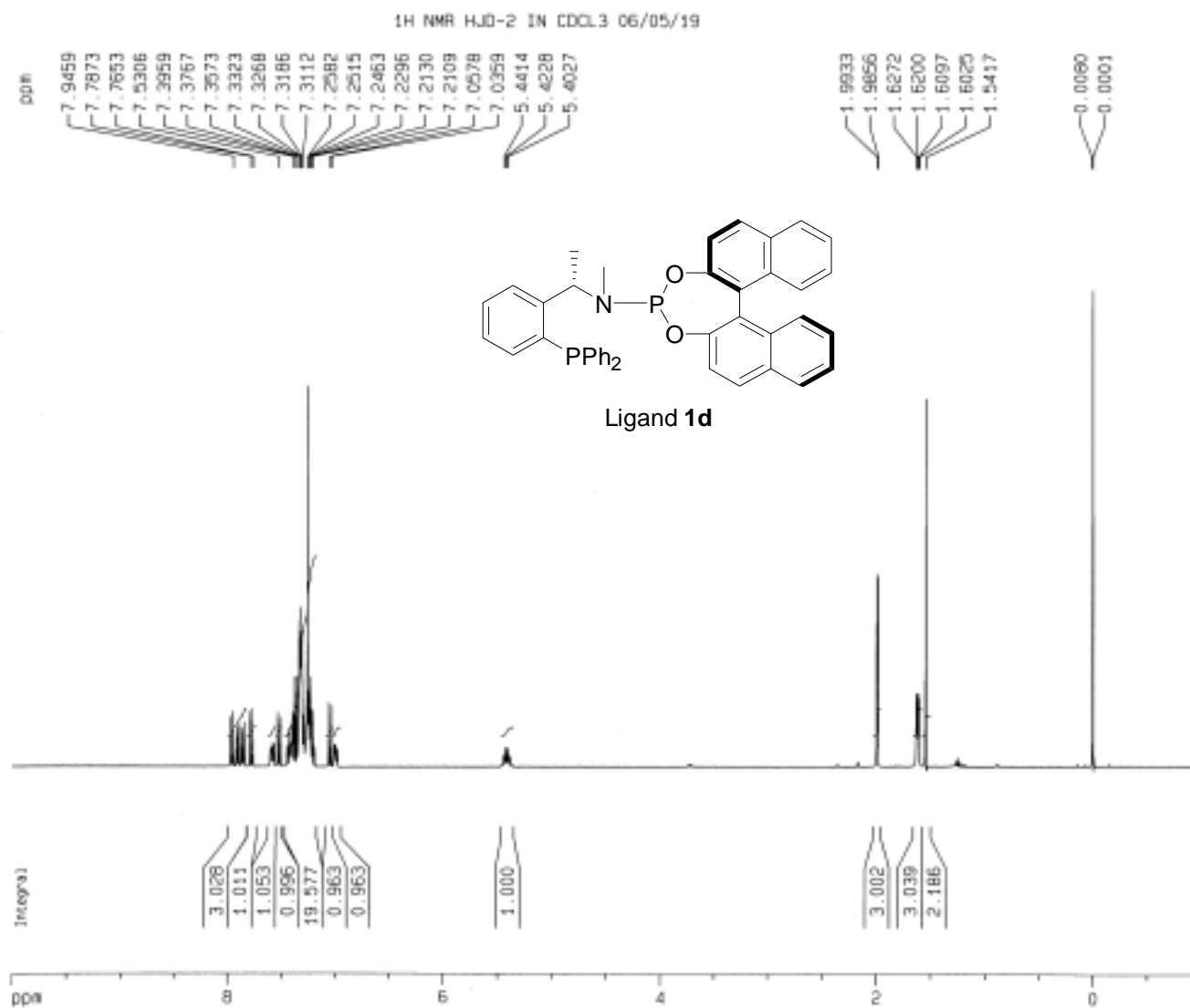
OPPROG2	waltz16
MU2	1H
PL2	80.00 usec
PL2	5.00 dB
PL12	23.00 dB
SFO2	400.1320907 MHz

F2 - Processing parameters

SI	32768
SF	100.6127690 MHz
WDW	EM
SGB	0
LB	4.00 Hz
GB	0
PC	1.48

3D NMR list parameters

EX	20.00 cm
EY	5.00 cm
F1P	220.000 ppm
F1	22134.80 Hz
F2P	-10.000 ppm
F2	-1005.13 Hz
PPMCM	51.50000 ppm/cm
HZCM	1197.84088 Hz/cm



Current Data Parameters  
 NAME **P** hjd  
 EXPNO 162  
 PROCNO 1

F2 - Acquisition Parameters  
 Date\_ 20060519  
 Time 10.47  
 INSTRUM grx400  
 PROBHD 5 mm PABBO BB-  
 PULPROG zg  
 TD 32768  
 SOLVENT CDCl3  
 NS 8  
 DS 0  
 SWH 8012.820 Hz  
 FIDRES 0.244532 Hz  
 AQ 2.0447731 sec  
 RG 181  
 CW 62.400 usec  
 CE 6.00 usec  
 TE 296.2 K  
 D1 1.00000000 sec  
 MDCREST 0.00000000 sec  
 MDCWK 0.01500000 sec

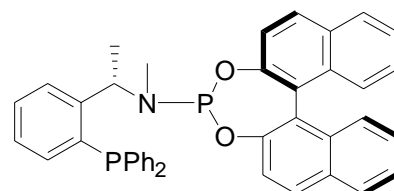
\*\*\*\*\* CHANNEL f1 \*\*\*\*\*  
 NUC1 1H  
 P1 8.20 usec  
 PL1 5.00 dB  
 SFO1 400.1332521 MHz

F2 - Processing parameters  
 SI 32768  
 SF 400.1300179 MHz  
 WDW GM  
 SSB 0  
 LB -0.50 Hz  
 GB 0.1  
 PC 1.40

1D NMR plot parameters  
 CX 20.00 cm  
 CY 8.00 cm  
 F1P 10.000 ppm  
 F1 4001.30 Hz  
 F2P -1.000 ppm  
 F2 -400.13 Hz  
 PRMCM 0.55000 ppm/cm  
 HZCM 220.07150 Hz/cm

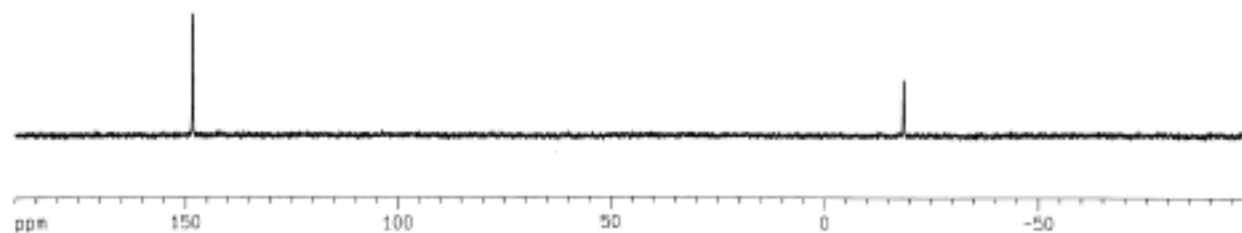
31P NMR H2O-2 IN CDCL3 06/05/19

148.469  
148.308



Ligand 1d

18.470



#### Current Data Parameters

NAME h1d  
EXPNO 163  
PROCNO 1

#### F2 - Acquisition Parameters

Date\_ 20060519  
Time 10.53  
INSTRUM drx400  
PROBHD 5 mm PABBO BB-  
PULPROG zg  
TD 32768  
SOLVENT CDCl3  
NS 101  
DS 0  
SWH 40543.688 Hz  
FIDRES 1.481436 Hz  
AQ 0.3375604 sec  
RG 10221.3  
DW 10.300 usec  
DE 6.00 usec  
TE 296.2 K  
D1 2.0000000 sec  
HCREST 0.0000000 sec  
HCHW 0.0150000 sec

#### \*\*\*\*\* CHANNEL f1 \*\*\*\*\*

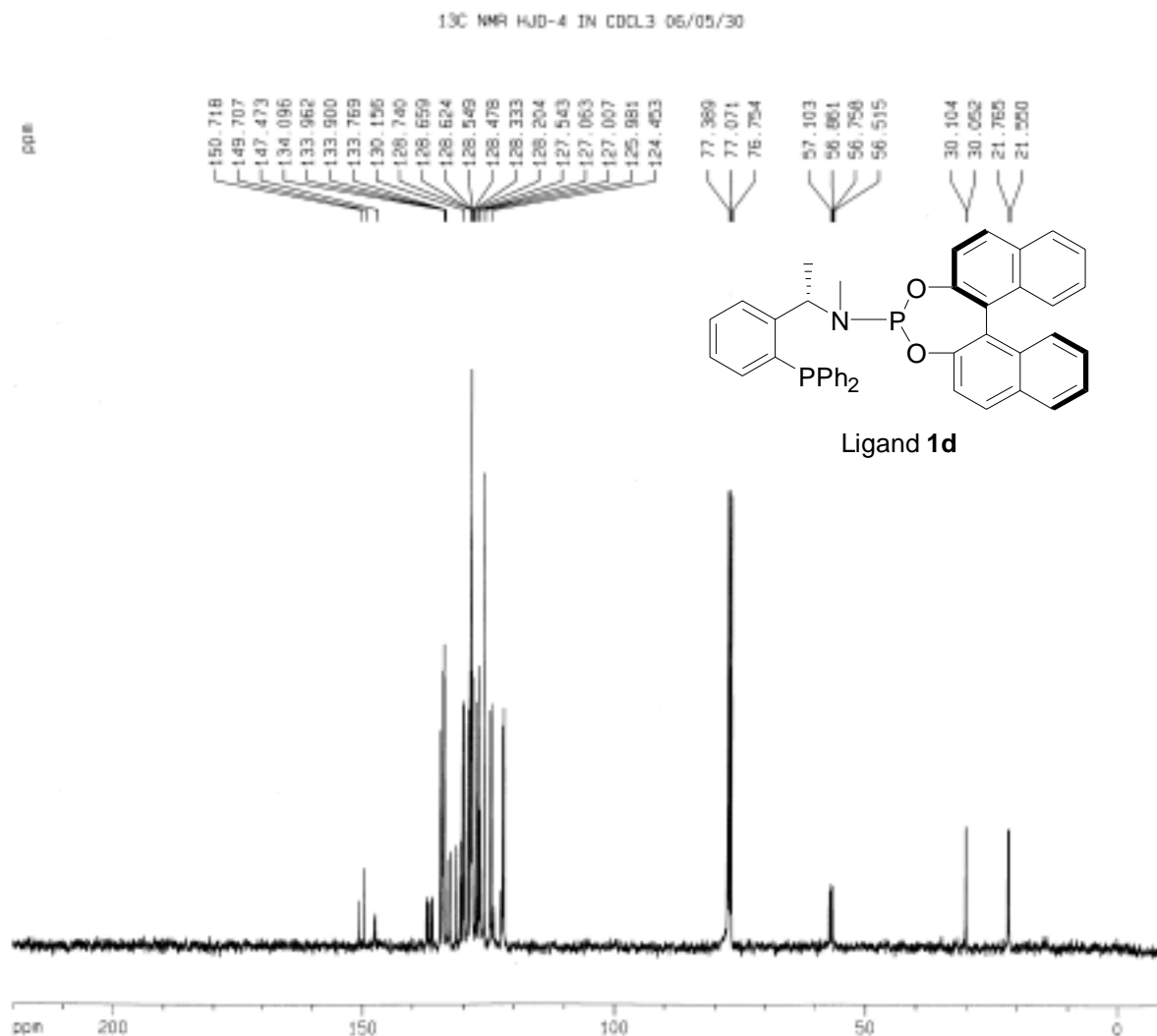
NUC1 31P  
P1 8.00 usec  
PL1 0.00 dB  
SFO1 161.9820520 MHz

#### F2 - Processing parameters

SI 16384  
SF 161.9755337 MHz  
WDW EM  
SSB 0  
LB 5.00 Hz  
GB 0  
PC 1.40

#### 1D NMR plot parameters

C1 20.00 cm  
C2 2.00 cm  
F1P 190.000 ppm  
F1 30775.35 Hz  
F2P -100.000 ppm  
F2 -16197.55 Hz  
PPMCM 14.50000 ppm/cm  
HZCM 2348.64526 Hz/cm



Current Data Parameters

NAME hjd  
EXPNO 179  
PROCNO 1

F2 - Acquisition Parameters

Date\_ 20060530  
Time 15.41  
INSTRUM dr400  
PROBHD 5 mm PABBO 80-  
PULPROG zgpg  
TD 65536  
SOLVENT cdcl3  
NS 726  
DS 16  
SWH 23040.140 Hz  
FIDRES 0.253213 Hz  
AQ 1.4156276 sec  
RG 16394  
DW 21.600 usec  
DE 6.00 usec  
TE 298.2 K  
D1 1.0000000 sec  
D11 0.0000000 sec  
HOREST 0.0000000 sec  
HOREF 0.0000000 sec

\*\*\*\*\* CHANNEL f1 \*\*\*\*\*

NUC1 13C  
P1 8.20 usec  
PL1 1.50 dB  
SFO1 500.6234215 MHz

\*\*\*\*\* CHANNEL f2 \*\*\*\*\*

PROG2 waltz16  
NUC2 1H  
PCPD2 68.00 usec  
PL2 5.00 dB  
PL12 23.00 dB  
SFO2 400.1326307 MHz

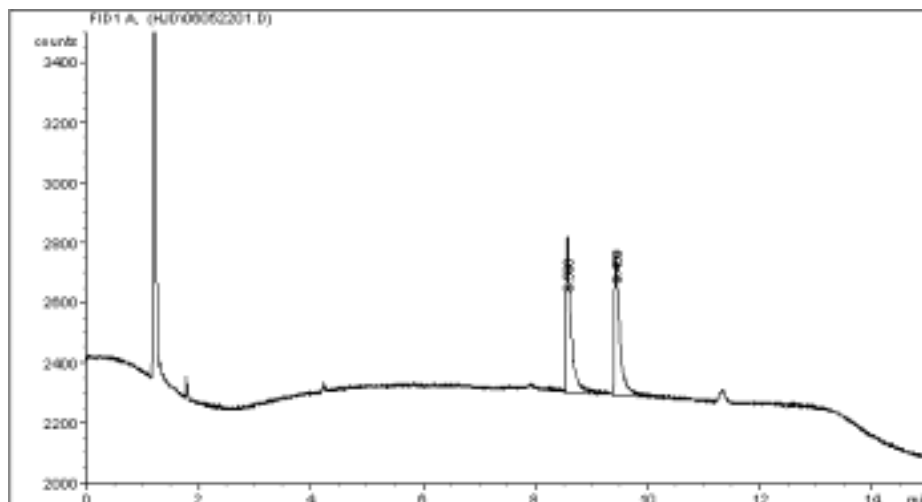
F2 - Processing parameters

SI 32768  
SF 500.5127590 MHz  
WDW EM  
SSB 0  
LB 4.00 Hz  
GB 0  
PC 1.40

1D NMR plot parameters

CS 29.00 cm  
CF 19.00 cm  
F1P 226.000 ppm  
F1 22134.81 Hz  
F2P -10.000 ppm  
F2 -1006.13 Hz  
RAMEX 11.58000 ppm/cm  
RDCM 1157.04688 Hz/cm





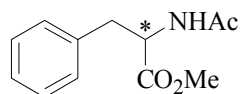
=====  
 Area Percent Report  
 =====

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

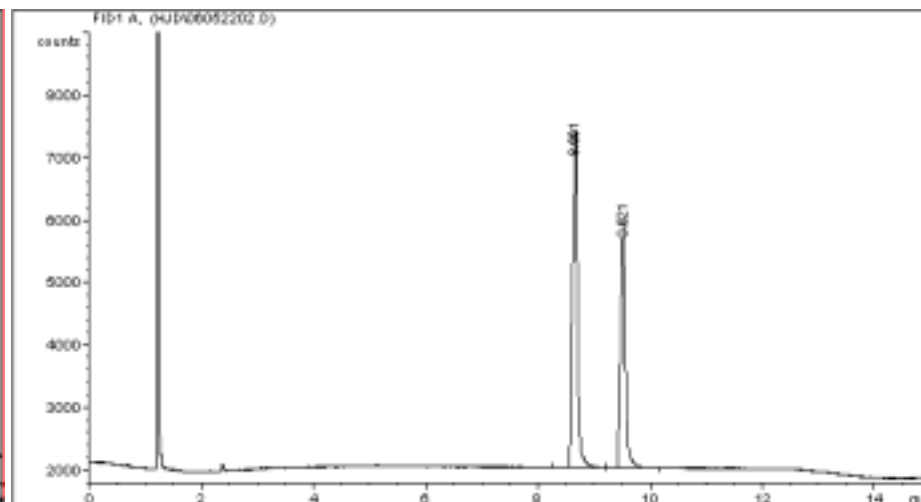
Signal 1: FID1 A,

Peak #	RetTime [min]	Type	Width [min]	Area counts*s	Height [counts]	Area %
1	8.596	BB	0.1876	3389.45410	319.85999	50.42877
2	9.459	BB	0.1738	3331.81665	354.00717	49.57123

Totals : 6721.27075 673.86716



(racemic product)



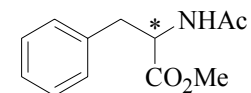
=====  
 Area Percent Report  
 =====

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

Signal 1: FID1 A,

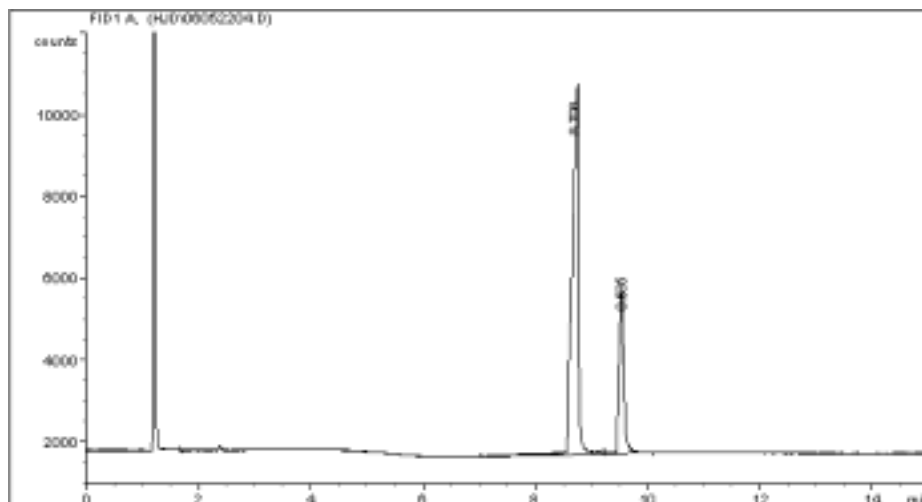
Peak #	RetTime [min]	Type	Width [min]	Area counts*s	Height [counts]	Area %
1	8.661	PV	0.1598	3.35320e4	4908.20166	58.62712
2	9.521	VB	0.1408	2.36775e4	3597.78711	41.37288

Totals : 5.72295e4 8505.98877



(hydrogenation product  
 with PEPhos 1a)

Entry 1, Table 1



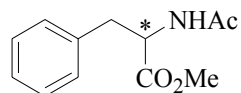
=====  
 Area Percent Report  
 =====

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

Signal 1: FID1 A,

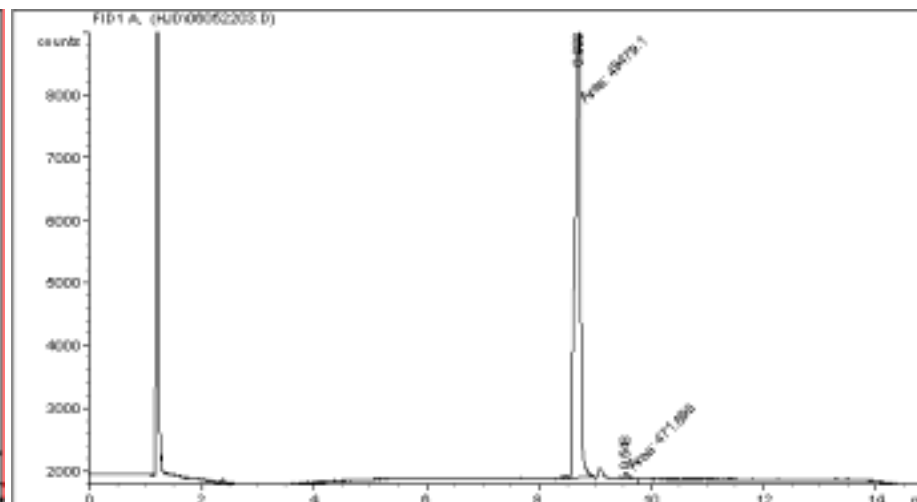
Peak #	RetTime [min]	Type	Width [min]	Area counts*s	Height [counts]	Area %
1	8.708	PV	0.1734	7.20917e4	7686.57275	74.21119
2	9.535	VB	0.1500	2.50523e4	3400.37598	25.78881

Totals : 9.71439e4 1.10869e4



(hydrogenation product  
 with PEApHos **1b**)

Entry 2, Table 1



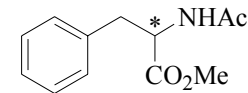
=====  
 Area Percent Report  
 =====

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

Signal 1: FID1 A,

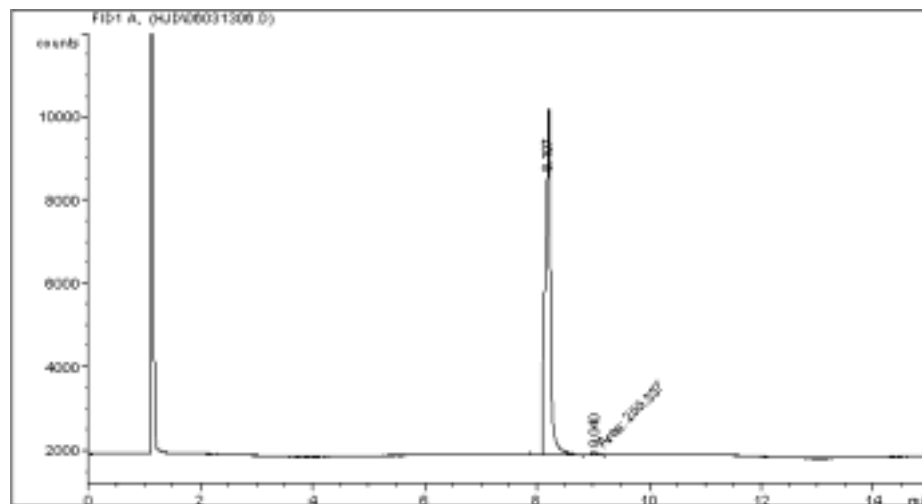
Peak #	RetTime [min]	Type	Width [min]	Area counts*s	Height [counts]	Area %
1	8.688	NM	0.1258	4.94791e4	6553.36230	99.05568
2	9.548	NM	0.1046	471.69522	75.15848	0.94432

Totals : 4.99508e4 6628.52078



(hydrogenation product  
 with PEApHos **1c**)

Entry 3, Table 1



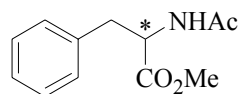
=====  
 Area Percent Report  
 =====

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

Signal 1: FID1 A,

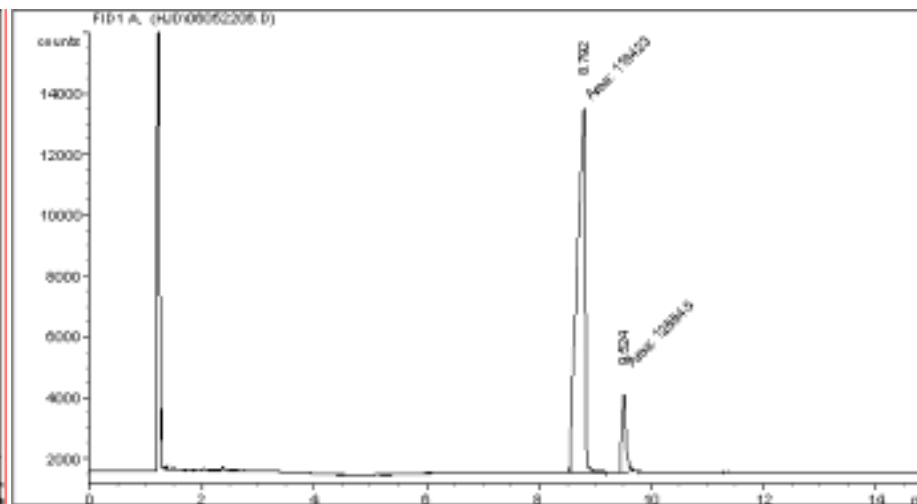
Peak #	RetTime [min]	Type	Width [min]	Area counts*s	Height [counts]	Area %
1	8.197	FB	0.1577	5.35981e4	6675.22510	99.52587
2	9.040	NM	0.0613	255.33720	69.37847	0.47413

Totals : 5.38535e4 6744.60357



(hydrogenation product  
 with PEAphos **1d**)

Entry 4, Table 1



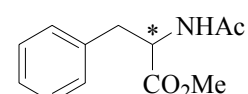
=====  
 Area Percent Report  
 =====

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

Signal 1: FID1 A,

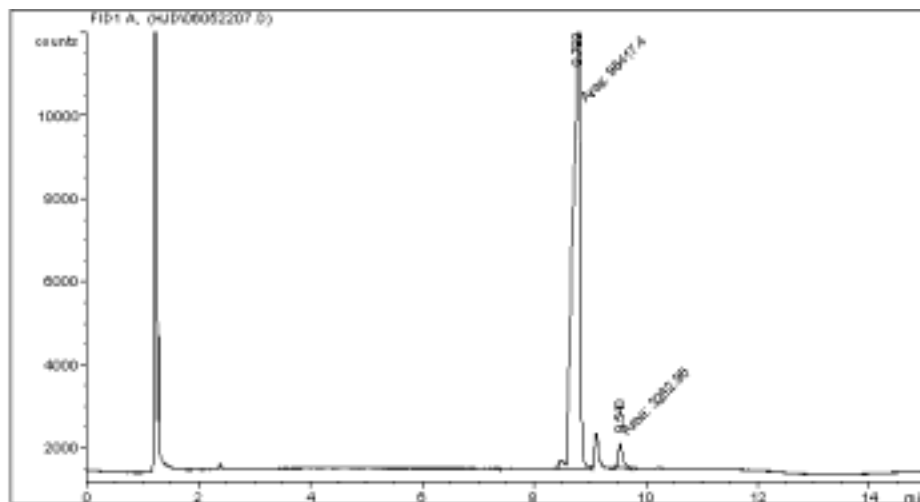
Peak #	RetTime [min]	Type	Width [min]	Area counts*s	Height [counts]	Area %
1	8.792	NM	0.1504	1.16423e5	1.28979e4	90.03578
2	9.524	NM	0.0641	1.28845e4	3350.86572	9.96422

Totals : 1.29308e5 1.62487e4



(hydrogenation in PhMe)

Entry 5, Table 1



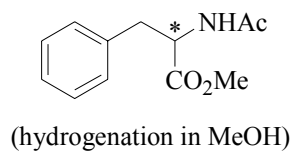
=====  
 Area Percent Report  
 =====

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

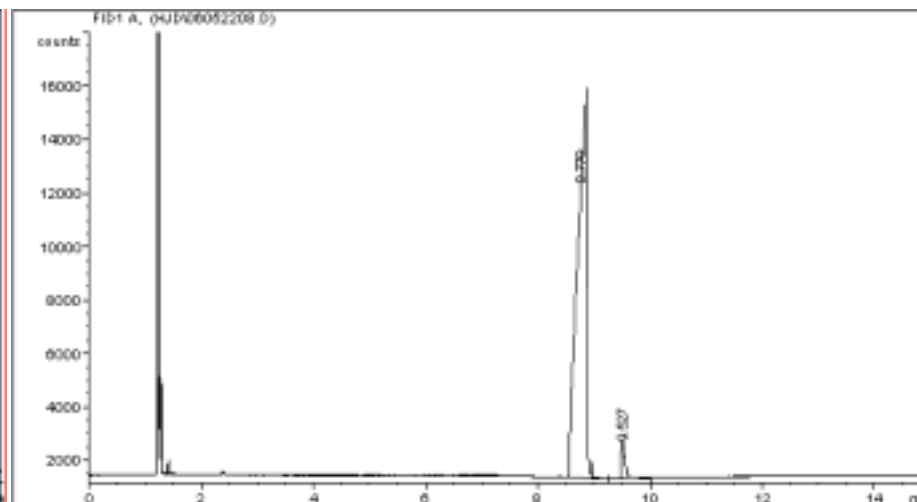
Signal 1: FID1 A,

Peak #	RetTime [min]	Type	Width [min]	Area counts*s	Height [counts]	Area %
1	0.783	PF	0.1411	9.64174e4	1.16281e4	96.79097
2	9.540	VF	0.0751	3262.95728	723.89581	3.20903

Totals : 1.01680e5 1.23520e4



Entry 6, Table 1



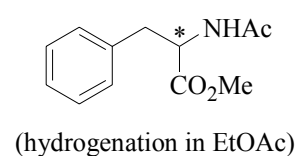
=====  
 Area Percent Report  
 =====

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

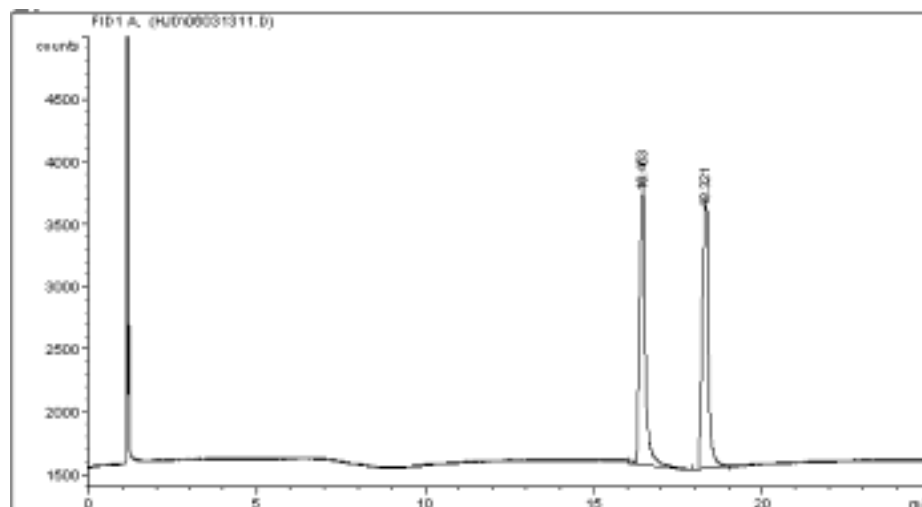
Signal 1: FID1 A,

Peak #	RetTime [min]	Type	Width [min]	Area counts*s	Height [counts]	Area %
1	0.779	PF	0.2619	1.68590e5	1.08125e4	96.18279
2	9.527	VF	0.1297	6690.83252	1187.96643	3.81721

Totals : 1.75281e5 1.20005e4



Entry 7, Table 1



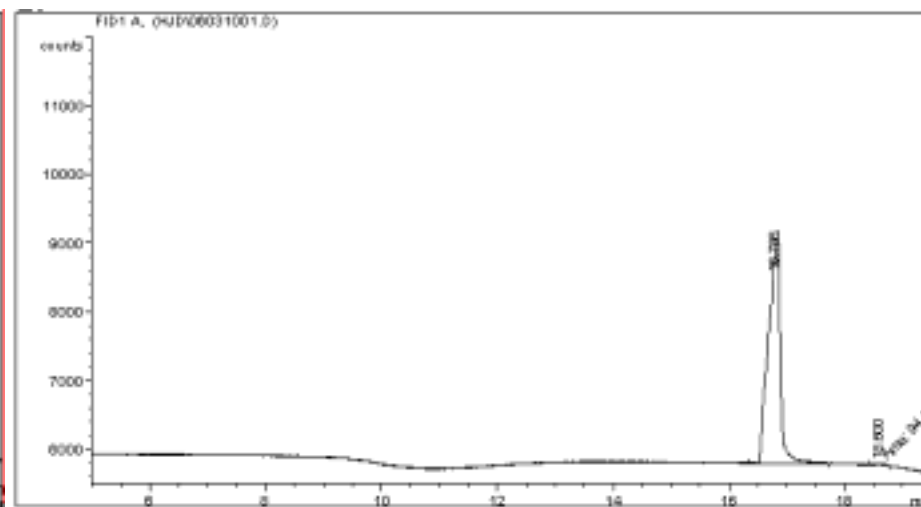
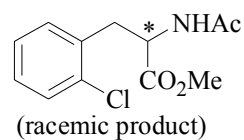
=====  
 Area Percent Report  
 =====

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

Signal 1: FID1 A,

Peak #	RetTime [min]	Type	Width [min]	Area counts*s	Height [counts]	Area %
1	16.453	BB	0.2297	2.77695e4	2163.49583	51.68750
2	18.321	BB	0.2281	2.59564e4	2044.85168	48.31250

Totals : 5.37260e4 4208.34851



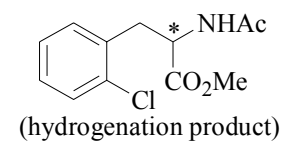
=====  
 Area Percent Report  
 =====

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

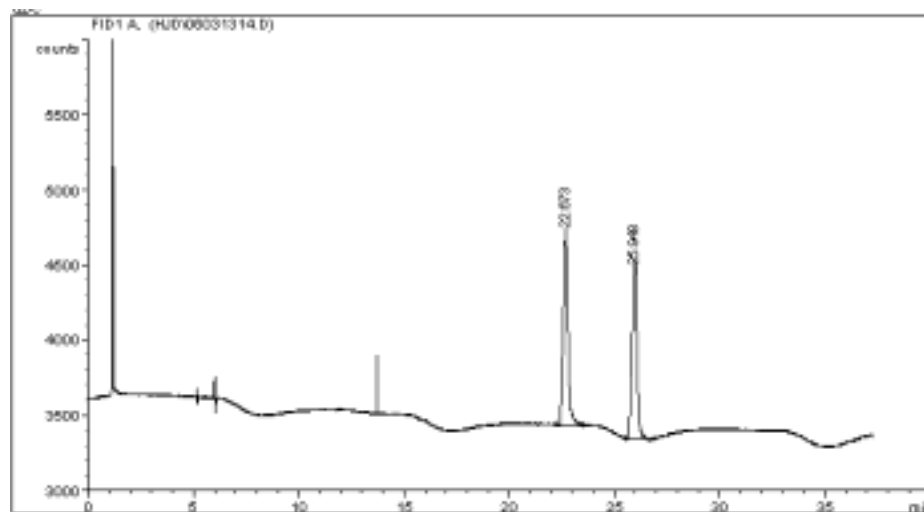
Signal 1: FID1 A,

Peak #	RetTime [min]	Type	Width [min]	Area counts*s	Height [counts]	Area %
1	16.786	BB	0.2851	4.77787e4	2718.36255	99.80195
2	18.600	BB	0.1062	94.81235	14.88543	0.19805

Totals : 4.78735e4 2733.24797



Entry 8, Table 1



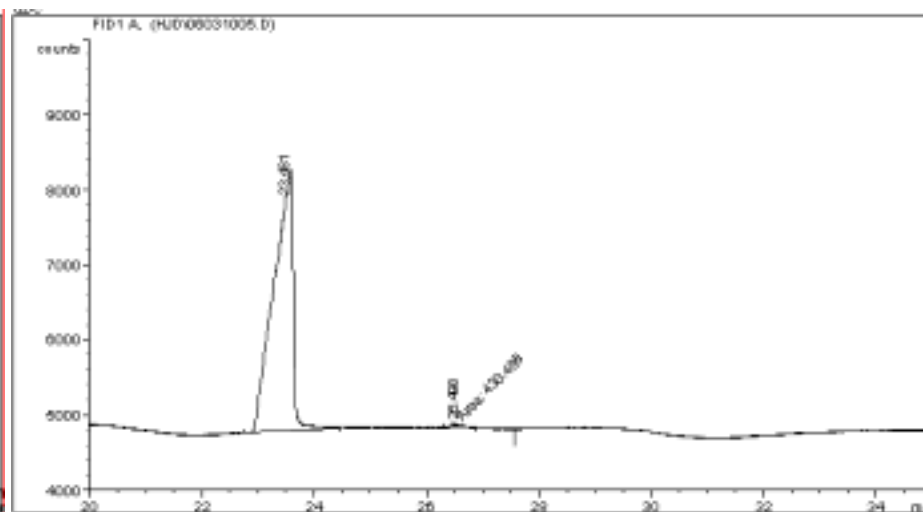
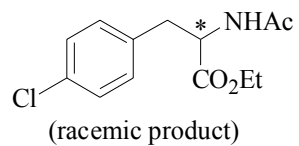
Area Percent Report

Sorted By : Signal  
Multiplier : 1.0000  
Dilution : 1.0000  
Sample Amount : 1.00000 [nmul] (not used in calc.)  
Use Multiplier \* Dilution Factor with ISTDs

Signal 1: FID1 A,

Peak #	RetTime [min]	Type	Width [min]	Area counts*s	Height [counts]	Area %
1	22.673	BB	0.2600	2.01745e4	1278.88563	51.38540
2	25.948	PP	0.2781	1.90866e4	1124.01807	48.61460

Totals : 3.92611e4 2402.90369



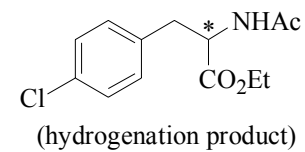
Area Percent Report

Sorted By : Signal  
Multiplier : 1.0000  
Dilution : 1.0000  
Sample Amount : 1.00000 [nmul] (not used in calc.)  
Use Multiplier \* Dilution Factor with ISTDs

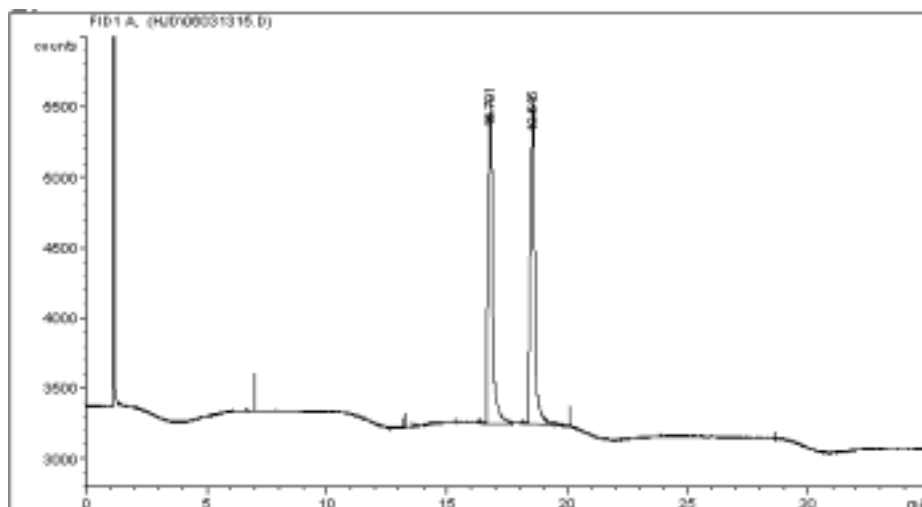
Signal 1: FID1 A,

Peak #	RetTime [min]	Type	Width [min]	Area counts*s	Height [counts]	Area %
1	23.481	BB	0.4594	8.32573e4	3079.26369	99.48563
2	26.498	HH	0.1641	430.46838	43.72455	0.51437

Totals : 8.36878e4 3123.00824



Entry 9, Table 1



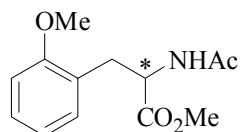
Area Percent Report

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

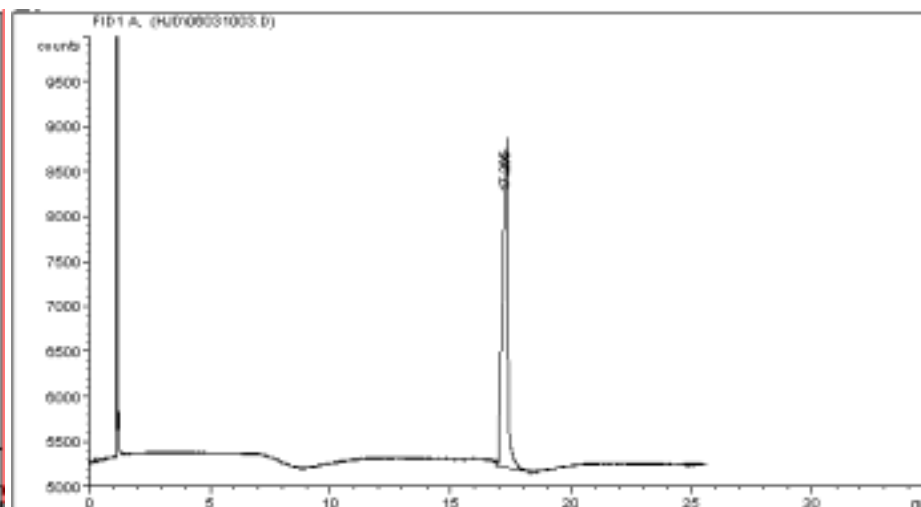
Signal 1: FID1 A,

Peak #	RetTime [min]	Type	Width [min]	Area counts*s	Height [counts]	Area %
1	16.791	BB	0.2488	3.00675e4	2077.65161	50.41713
2	18.545	BB	0.2482	2.95700e4	2051.21704	49.58283

Totals : 5.96375e4 4128.86863



(racemic product)



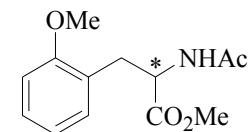
Area Percent Report

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

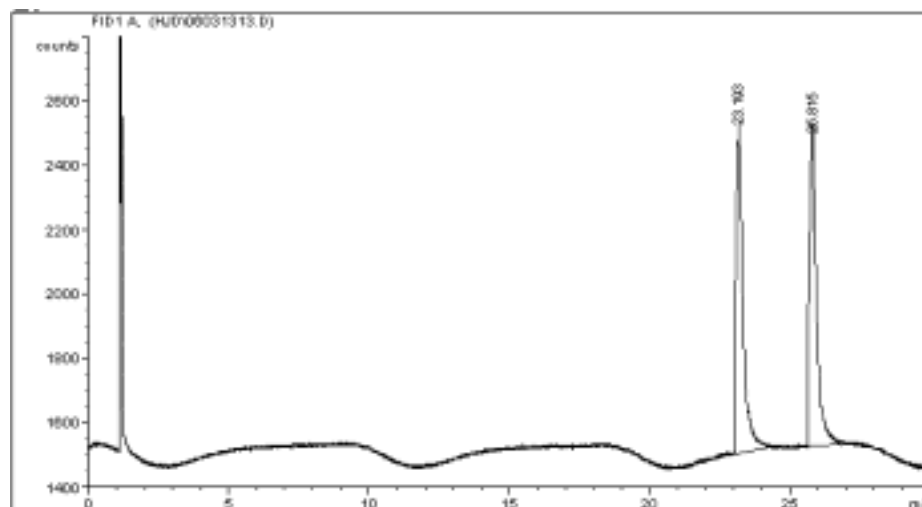
Signal 1: FID1 A,

Peak #	RetTime [min]	Type	Width [min]	Area counts*s	Height [counts]	Area %
1	17.265	BP	0.3030	5.74159e4	3003.61401	1.000e2

Totals : 5.74159e4 3003.61401



(hydrogenation product)



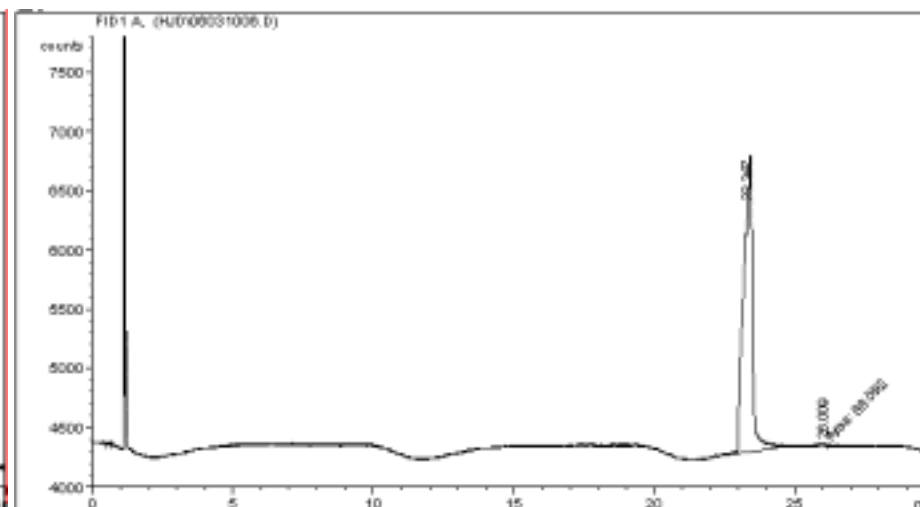
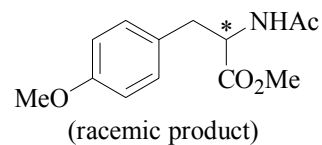
=====  
 Area Percent Report  
 =====

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

Signal 1: FID1 A,

Peak #	RetTime [min]	Type	Width [min]	Area counts*s	Height [counts]	Area %
1	23.193	BB	0.2865	1.76113e4	1006.04791	50.52843
2	25.615	BB	0.3091	1.74388e4	954.64014	49.47157

Totals : 3.52501e4 1960.68805



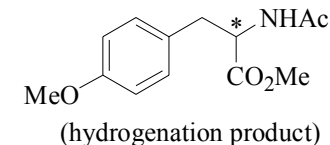
=====  
 Area Percent Report  
 =====

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

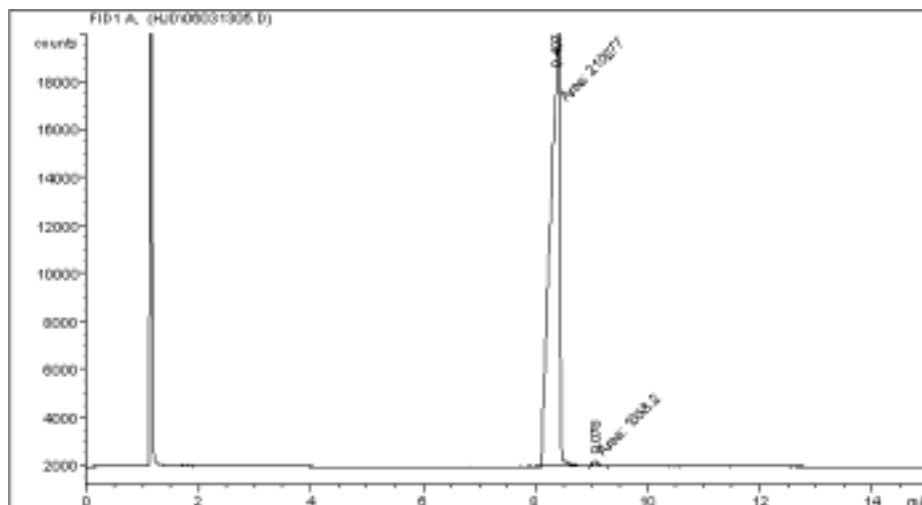
Signal 1: FID1 A,

Peak #	RetTime [min]	Type	Width [min]	Area counts*s	Height [counts]	Area %
1	23.347	BB	0.4312	5.41679e4	2085.38916	99.87818
2	26.009	BB	0.1343	66.09198	8.20503	0.12182

Totals : 5.42540e4 2093.59421







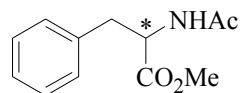
Area Percent Report

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

Signal 1: FID1 A,

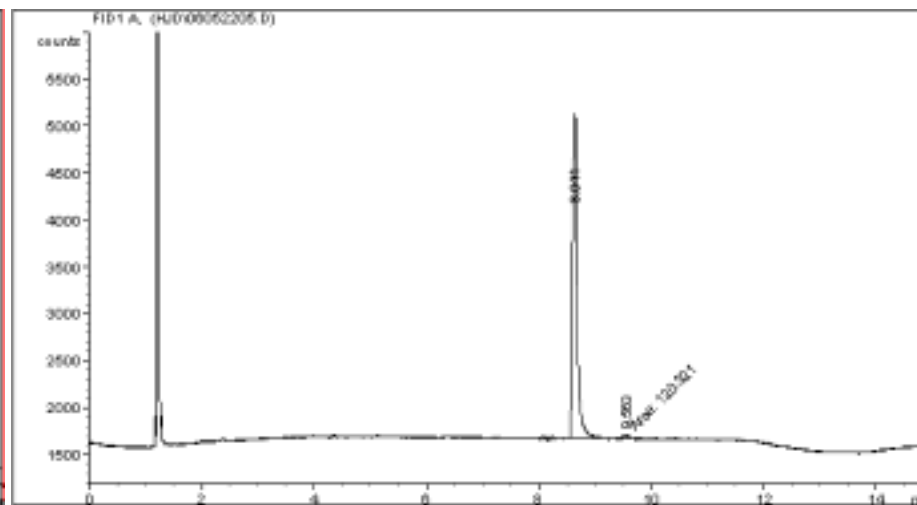
Peak #	RetTime [min]	Type	Width [min]	Area counts*s	Height [counts]	Area %
1	8.407	NM	0.1672	2.10277e5	2.09613e4	99.49928
2	9.078	NM	0.0628	1058.20142	281.04776	0.50072

Totals : 2.11335e5 2.12424e4



(hydrogenation with  
0.02mol% Rh)

Entry 12, Table 1



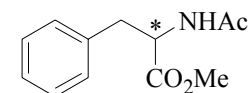
Area Percent Report

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

Signal 1: FID1 A,

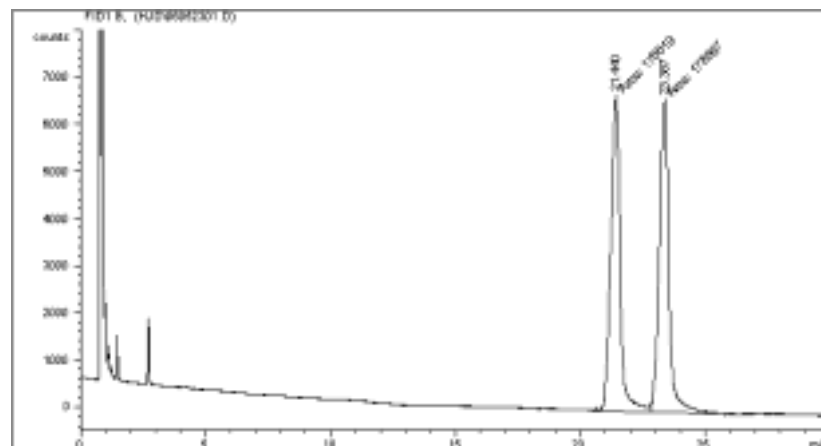
Peak #	RetTime [min]	Type	Width [min]	Area counts*s	Height [counts]	Area %
1	8.644	PM	0.1742	1.98322e4	2455.12134	99.39696
2	9.563	NM	0.0901	120.32088	40.32061	0.60304

Totals : 1.99525e4 2495.44194



(hydrogenation with  
0.01mol% Rh)

Entry 13, Table 1



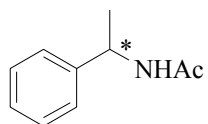
=====  
Area Percent Report  
=====

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

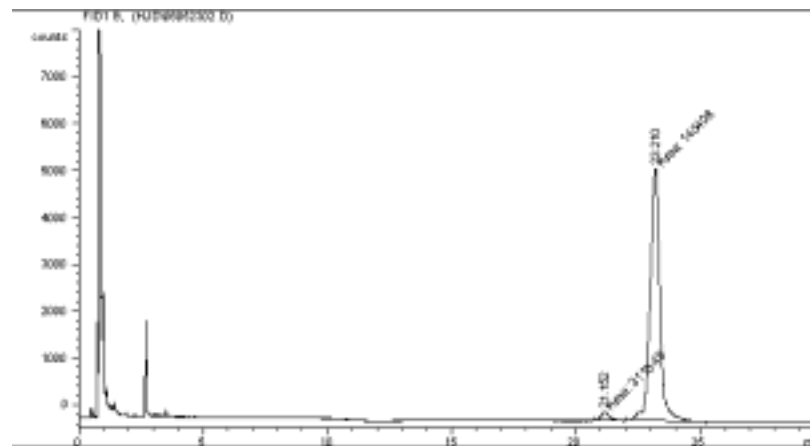
Signal 1: FID1 B,

Peak #	RetTime (min)	Type	Width (min)	Area (counts*s)	Height (counts)	Area %
1	21.440	HF	0.4387	1.76619e5	6710.41211	49.71179
2	23.387	FM	0.4481	1.78667e5	6630.01660	50.28821

Totals : 3.55286e5 1.33404e4



(racemic sample)



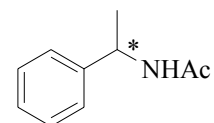
=====  
Area Percent Report  
=====

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

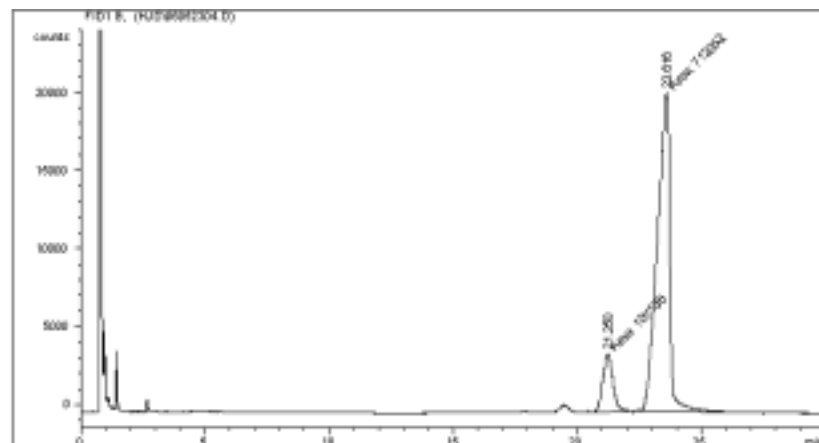
Signal 1: FID1 B,

Peak #	RetTime (min)	Type	Width (min)	Area (counts*s)	Height (counts)	Area %
1	21.152	NH	0.3466	3116.48853	149.85065	2.09030
2	23.210	NH	0.4514	1.45409e5	5368.97510	97.90970

Totals : 1.46525e5 5518.82574



(hydrogenation product  
using PEAPhos-1a)  
Entry 1, Table 2



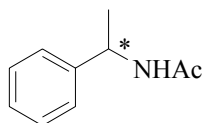
=====  
 Area Percent Report  
 =====

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

Signal 1: FID1 B,

Peak #	RetTime [min]	Type	Width [min]	Area counts*s	Height [counts]	Area %
1	21.250	HM	0.4702	1.07136e5	3733.60718	13.07627
2	23.616	HM	0.5819	7.12852e5	2.03959e4	86.92173

Totals : 8.19189e5 2.41295e4



(hydrogenation product  
 using PEAPhos-**1b**)  
 Entry 2, Table 2



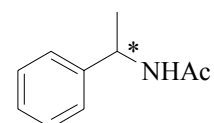
=====  
 Area Percent Report  
 =====

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

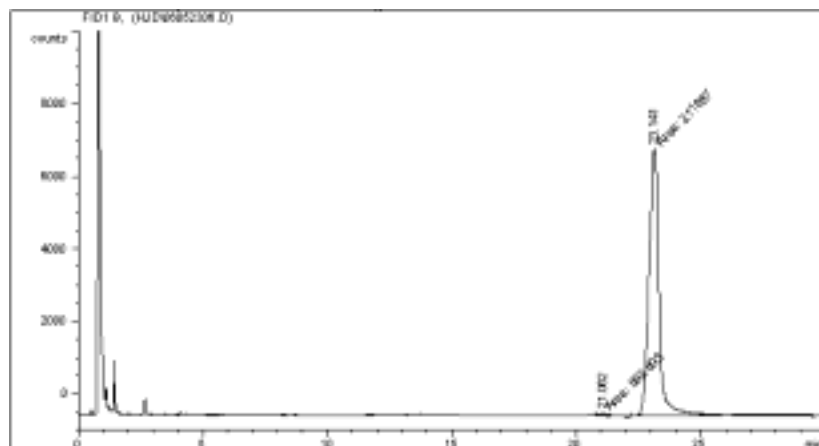
Signal 1: FID1 B,

Peak #	RetTime [min]	Type	Width [min]	Area counts*s	Height [counts]	Area %
1	21.098	HM	0.3190	639.24005	33.39722	0.75934
2	23.062	HM	0.4652	8.94787e4	3205.45142	99.24066

Totals : 9.01179e4 3238.84863



(hydrogenation product  
 using PEAPhos-**1c**)  
 Entry 3, Table 2



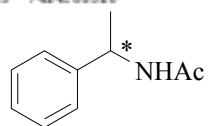
=====  
 Area Percent Report  
 =====

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

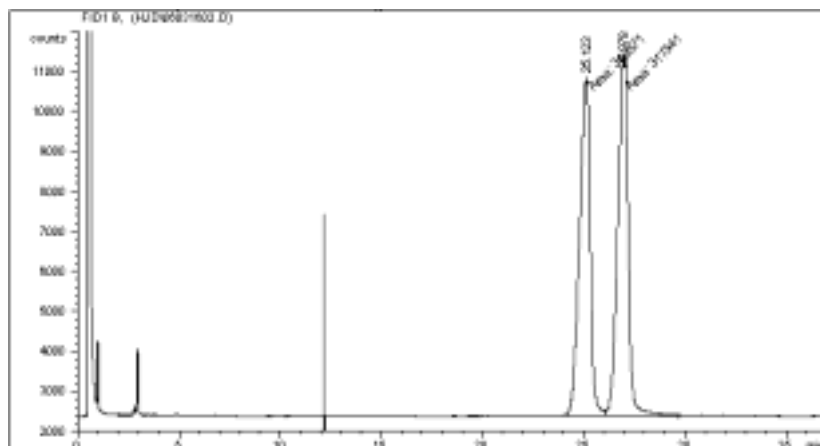
Signal 1: FID1 B,

Peak #	RetTime (min)	Type	Width (min)	Area (counts*s)	Height (counts)	Area %
1	21.062	SH	0.2620	591.89273	37.71442	0.27926
2	23.141	SH	0.4783	2.11687e5	7376.95068	99.72074

Totals : 2.12289e5 7414.66510



(hydrogenation product  
 using PEAPhos-**1d**)  
 Entry 4, Table 2



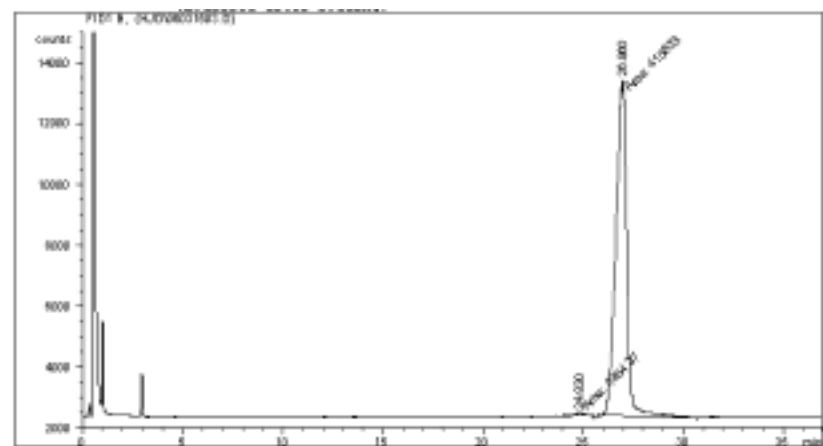
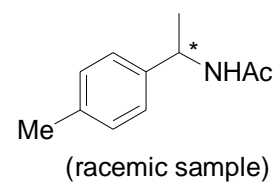
=====  
 Area Percent Report  
 =====

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

Signal is FID1 B,

Peak #	RetTime [min]	Type	Width [min]	Area counts*s	Height [counts]	Area %
1	25.123	MF	0.6123	3.10571e5	8453.23242	49.44512
2	26.978	FM	0.5882	3.17541e5	8998.06348	50.55488

Totals : 6.28112e5 1.74513e4



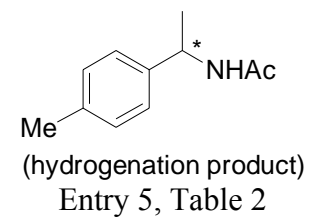
=====  
 Area Percent Report  
 =====

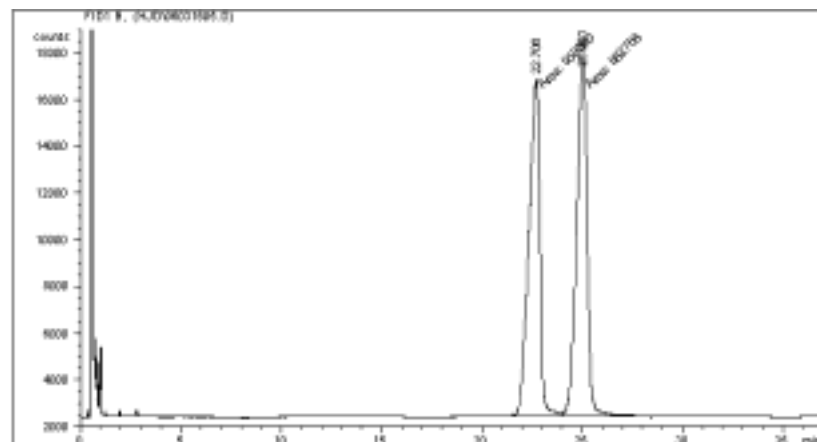
Sorted By : Signal  
 Multiplier : 1.0000  
 Dilution : 1.0000  
 Use Multiplier & Dilution Factor with ISTDs

Signal is FID1 B,

Peak #	RetTime [min]	Type	Width [min]	Area counts*s	Height [counts]	Area %
1	24.830	MM	0.4289	1954.37329	77.39775	0.46802
2	26.960	MM	0.6296	4.15633e5	1.10000e4	99.53198

Totals : 4.17597e5 1.10804e4





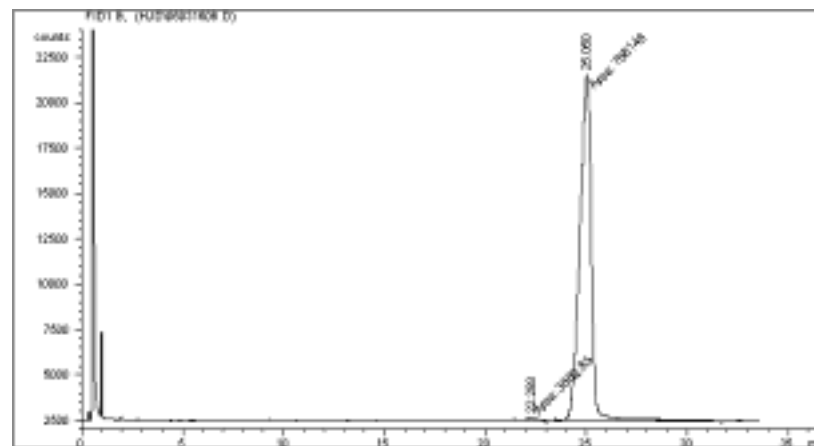
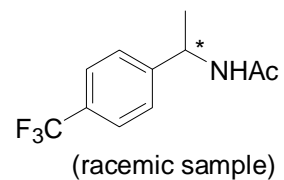
Area Percent Report

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

Signal 1: FID1 B,

Peak #	RetTime [min]	Type	Width [min]	Area counts*s	Height [counts]	Area %
1	22.706	HF	0.6452	5.59338e5	1.44481e4	49.94692
2	25.061	FM	0.6135	5.62768e5	1.52879e4	50.15318

Totals : 1.12218e6 2.97360e4



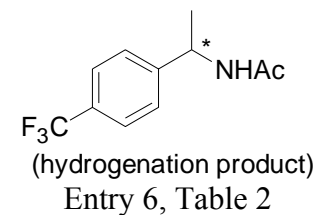
Area Percent Report

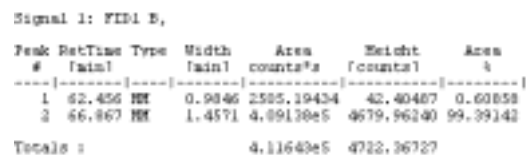
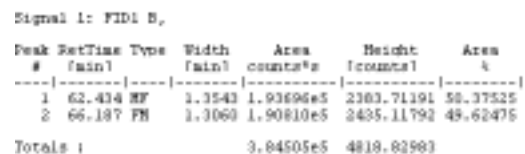
Sorted By : Signal  
Multiplier : 1.0000  
Dilution : 1.0000  
Use Multiplier & Dilution Factor with ISTDs

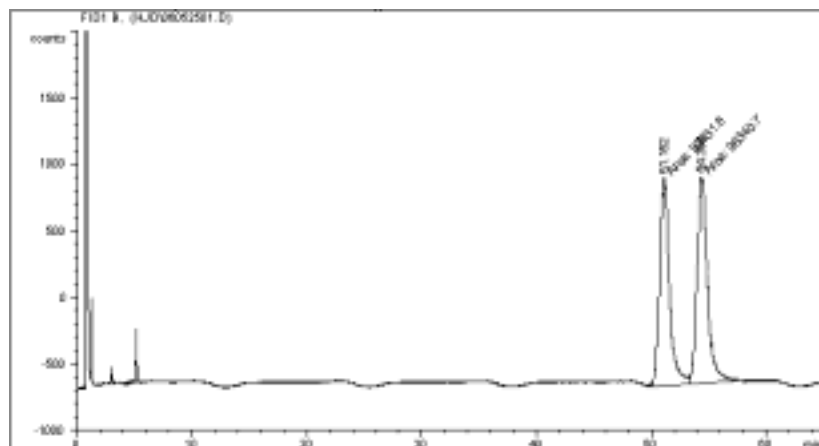
Signal 1: FID1 B,

Peak #	RetTime [min]	Type	Width [min]	Area counts*s	Height [counts]	Area %
1	22.293	HM	0.4469	3882.84692	144.81602	0.58294
2	25.050	HM	0.6723	7.69146e5	1.90441e4	99.41706

Totals : 7.72628e5 1.91890e4







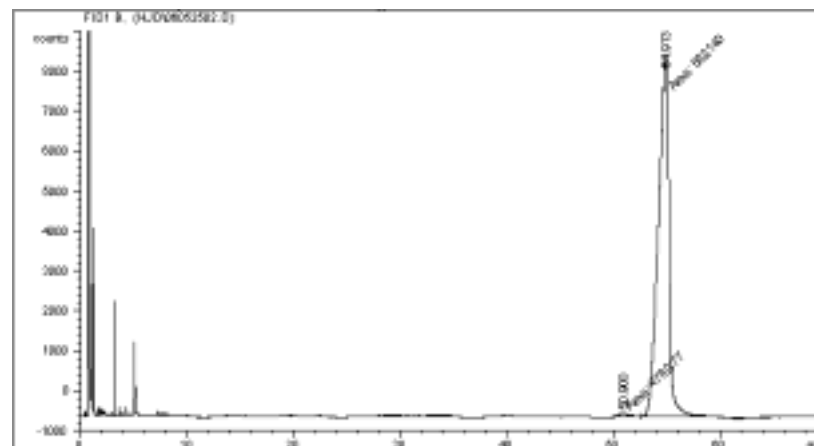
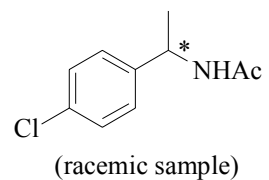
=====  
 Area Percent Report  
 =====

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

Signal 1: FID1 E,

Peak #	RetTime (min)	Type	Width (min)	Area (counts*s)	Height (counts)	Area %
1	51.152	HF	1.0019	9.35316e4	1555.84949	49.24026
2	54.354	HF	1.0343	9.63407e4	1552.45227	50.73974

Totals : 1.89872e5 3108.30176



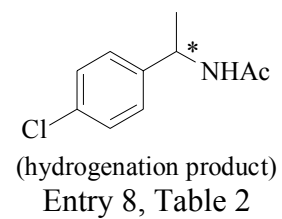
=====  
 Area Percent Report  
 =====

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

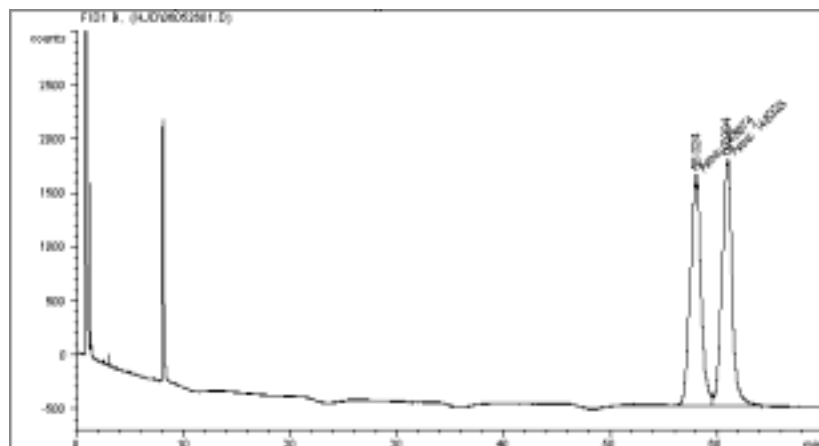
Signal 1: FID1 E,

Peak #	RetTime (min)	Type	Width (min)	Area (counts*s)	Height (counts)	Area %
1	50.900	HF	0.9785	4762.77197	81.12357	0.74780
2	54.913	HF	1.1627	6.32140e5	9061.55664	99.25220

Totals : 6.36903e5 9142.68021







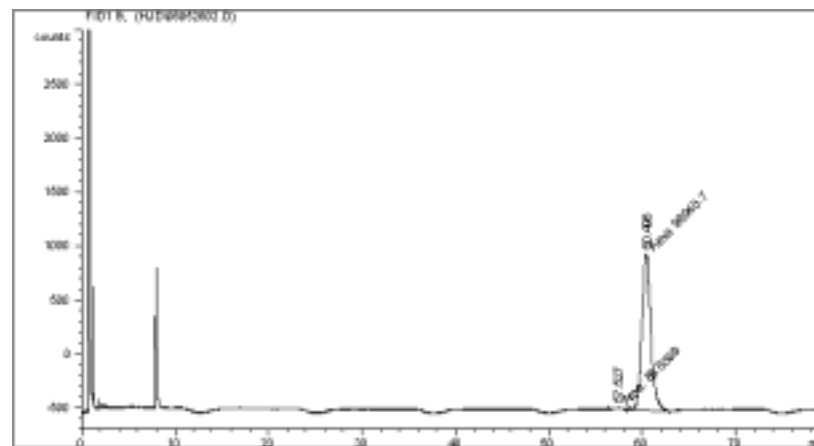
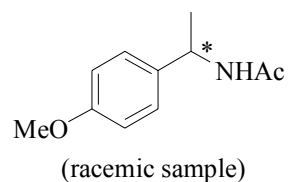
=====  
 Area Percent Report  
 =====

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

Signal 1: FID1 B,

Peak #	RetTime (min)	Type	Width (min)	Area (counts*s)	Height (counts)	Area %
1	58.024	HF	1.1580	1.48674e5	2139.82520	50.05874
2	60.984	HF	1.0803	1.46325e5	2288.38159	49.94126

Totals : 2.96999e5 4428.20679



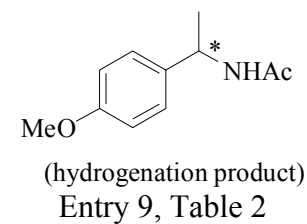
=====  
 Area Percent Report  
 =====

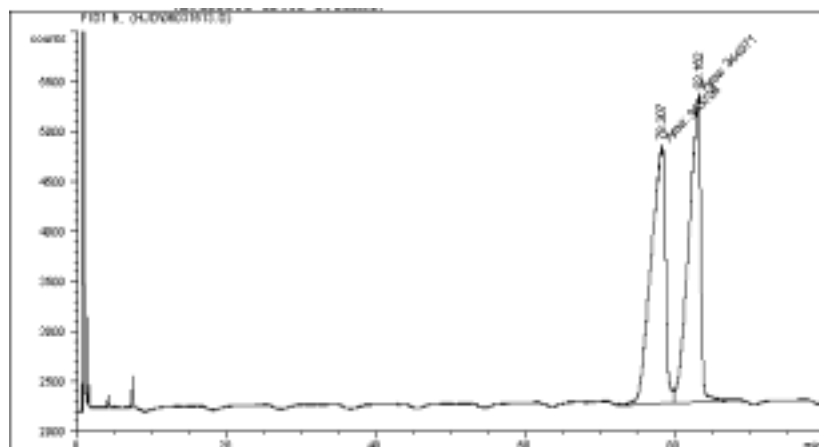
Sorted By : Signal  
 Multiplier : 1.0000  
 Dilution : 1.0000  
 Use Multiplier & Dilution Factor with ISTDs

Signal 1: FID1 B,

Peak #	RetTime (min)	Type	Width (min)	Area (counts*s)	Height (counts)	Area %
1	57.527	HF	0.2202	88.65588	6.71115	0.09137
2	60.496	HF	1.1163	9.69407e4	1447.39429	99.90863

Totals : 9.70293e4 1454.10544





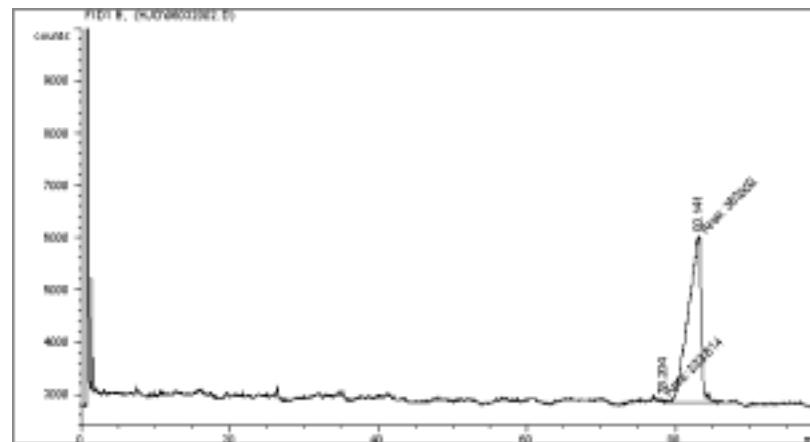
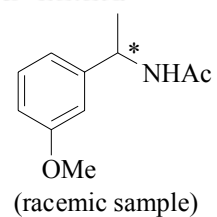
=====  
 Area Percent Report  
 =====

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

Signal 1: FID1 B,

Peak #	RetTime [min]	Type	Width [min]	Area counts*s	Height [counts]	Area %
1	78.307	HF	2.2194	3.45708e5	2596.86763	50.06231
2	83.162	FM	1.8572	3.44571e5	3092.26880	49.91769

Totals : 6.90279e5 5688.33643



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

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

Signal 1: FID1 B,

Peak #	RetTime [min]	Type	Width [min]	Area counts*s	Height [counts]	Area %
1	78.204	HM	0.0948	233.91410	41.18606	0.06093
2	83.141	HM	2.0140	3.83582e5	3173.59717	99.93907

Totals : 3.83796e5 3214.78322

