Chiral 3,3′-diaroyl BINOL phosphoric acids: Syntheses and evaluation in asymmetric transfer hydrogenation, photophysical, and electrochemical studies

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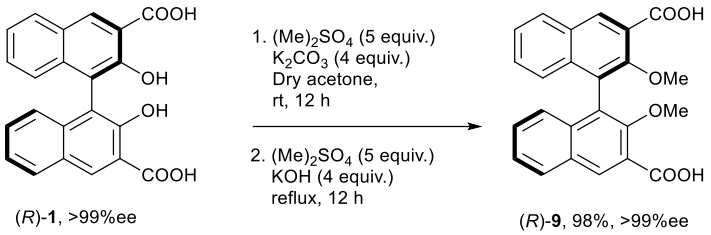
SUPPORTING INFORMATION

1. Synthesis of (*R*)-2,2′-dimethoxy-[1,1′-binaphthalene]-3,3′-dicarboxylic acid, (*R*)-9



(*R*)-**1**, >99%ee

(*R*)-**9**, 98%, >99%ee

2. UV-Vis Absorption for compounds (*R*)-4a, 4g-4k, (*R*)-8a, 8g-8k

Spectroscopic measurements: UV-visible absorption spectra were recorded on Shimadzu UV-visible spectrophotometer in 1 cm optical length quartz cuvettes. Dichloromethane is used as a solvent for absorption measurements.

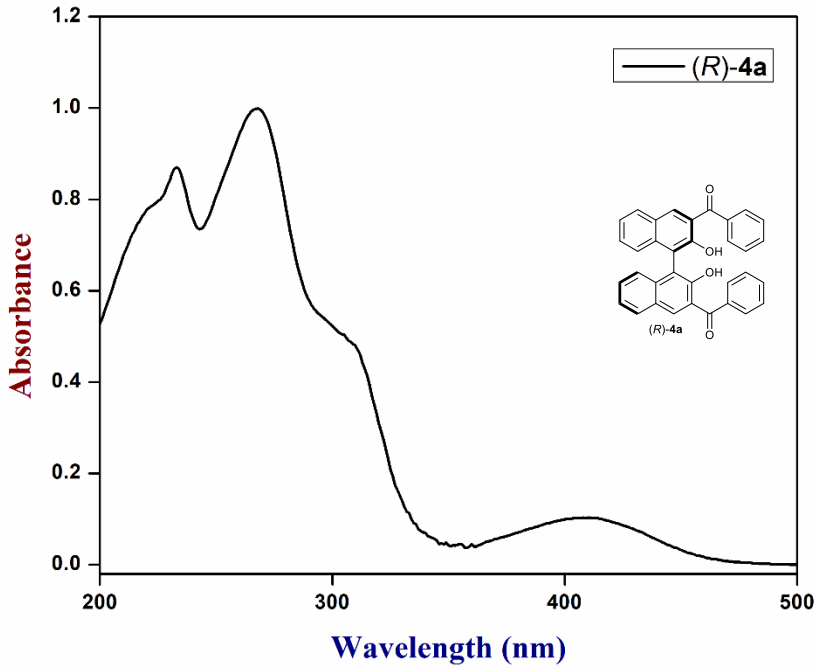


Figure S1. UV-vis absorption spectrum of (*R*)-**4a**

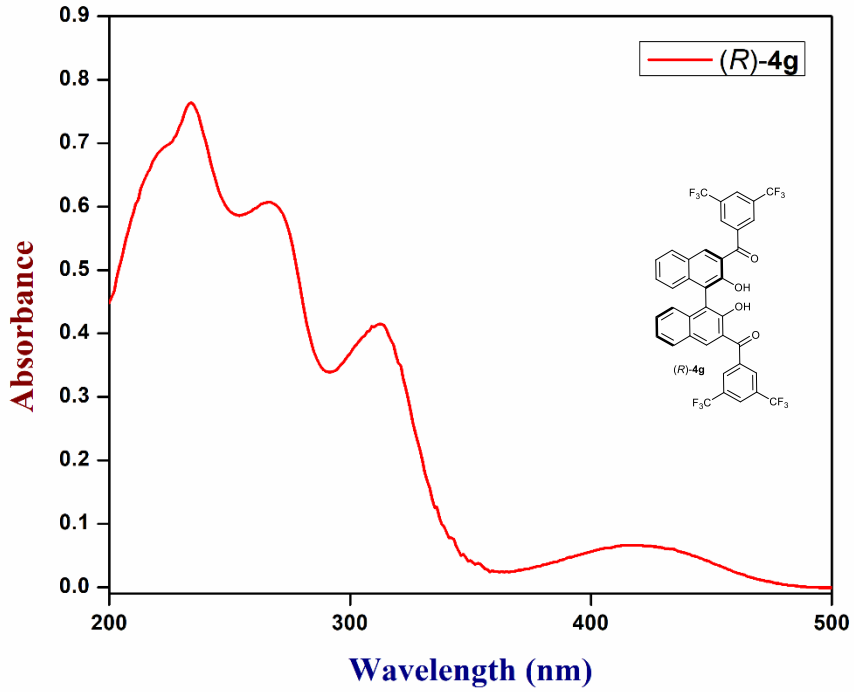


Figure S2. UV-vis absorption spectrum of (*R*)-**4g**

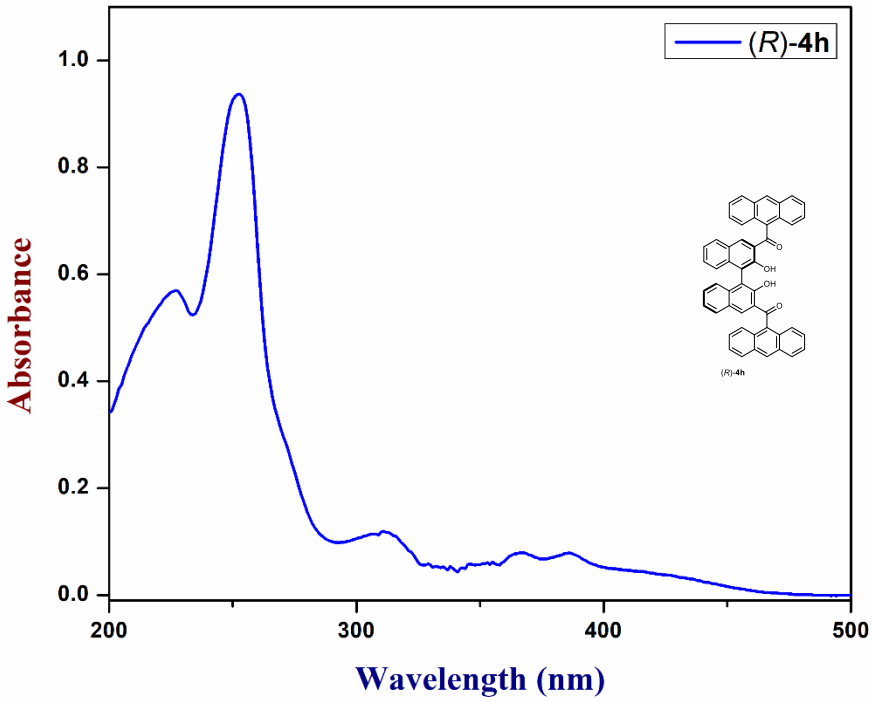


Figure S3. UV-vis absorption spectrum of (*R*)-**4h**

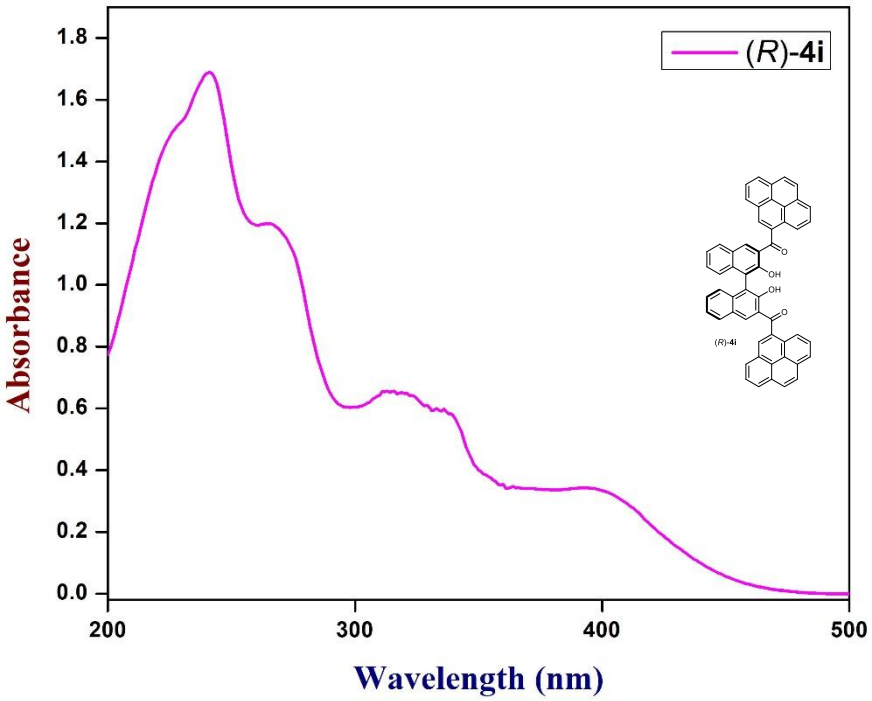


Figure S4. UV-vis absorption spectrum of (*R*)-**4i**

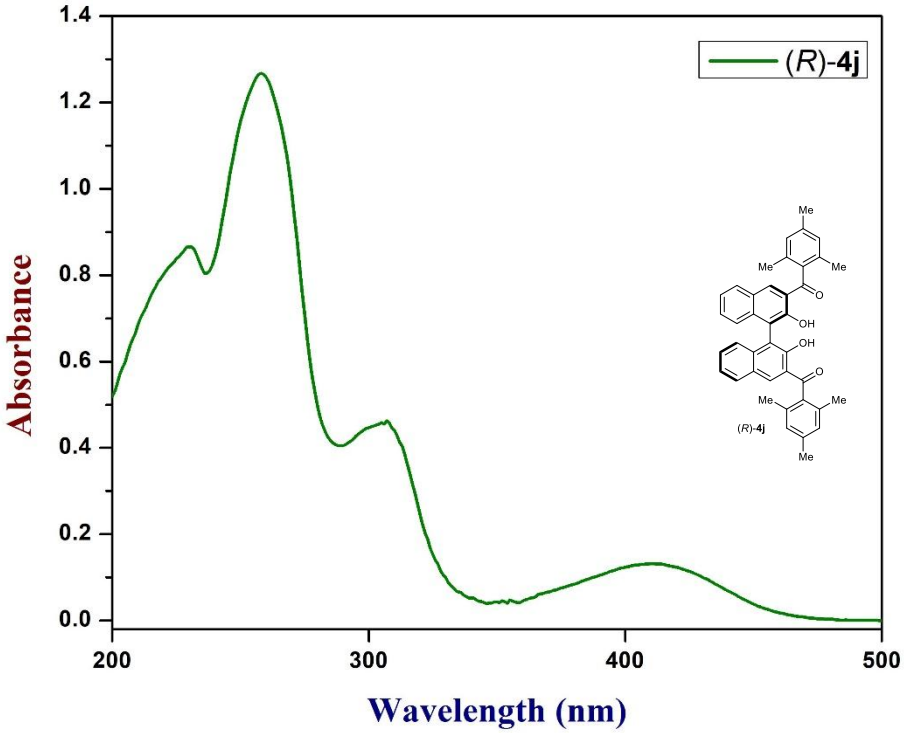


Figure S5. UV-vis absorption spectrum of (*R*)-**4j**

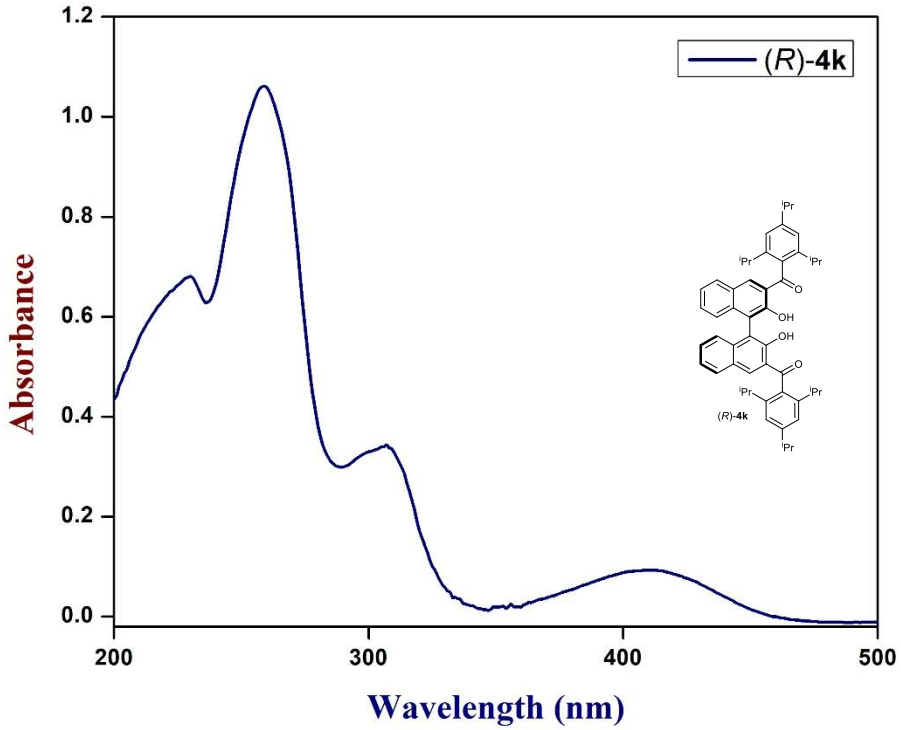


Figure S6. UV-vis absorption spectrum of (*R*)-**4k**

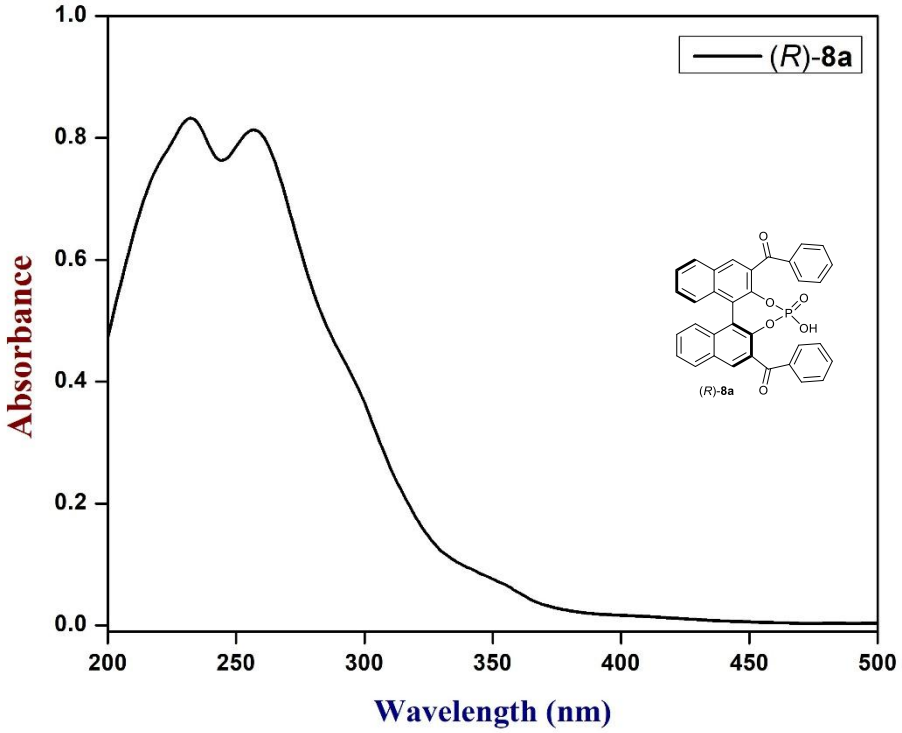


Figure S7. UV-vis absorption spectrum of (*R*)-**8a**

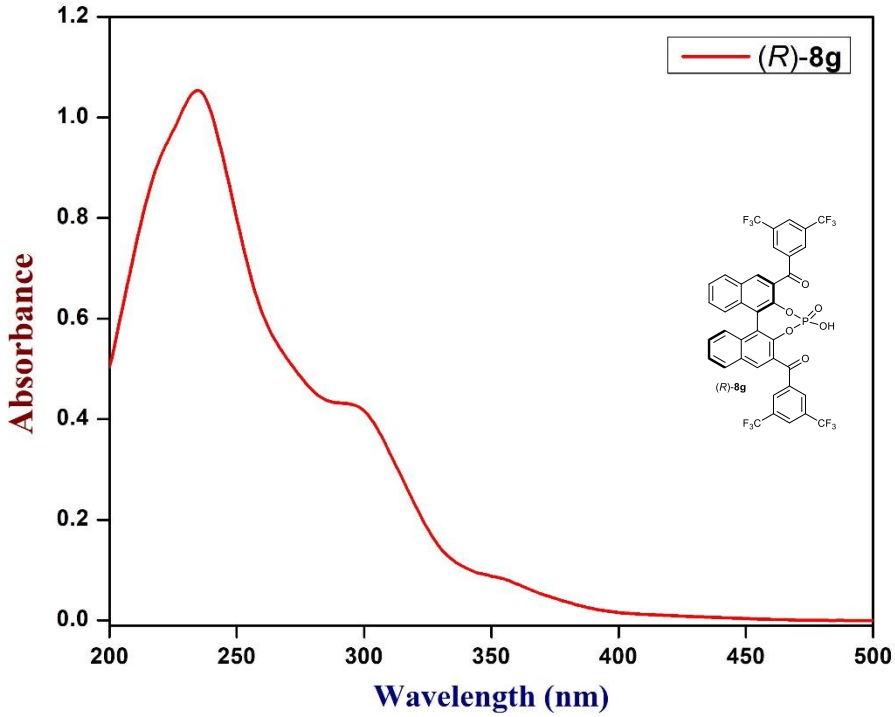


Figure S8. UV-vis absorption spectrum of (*R*)-**8g**

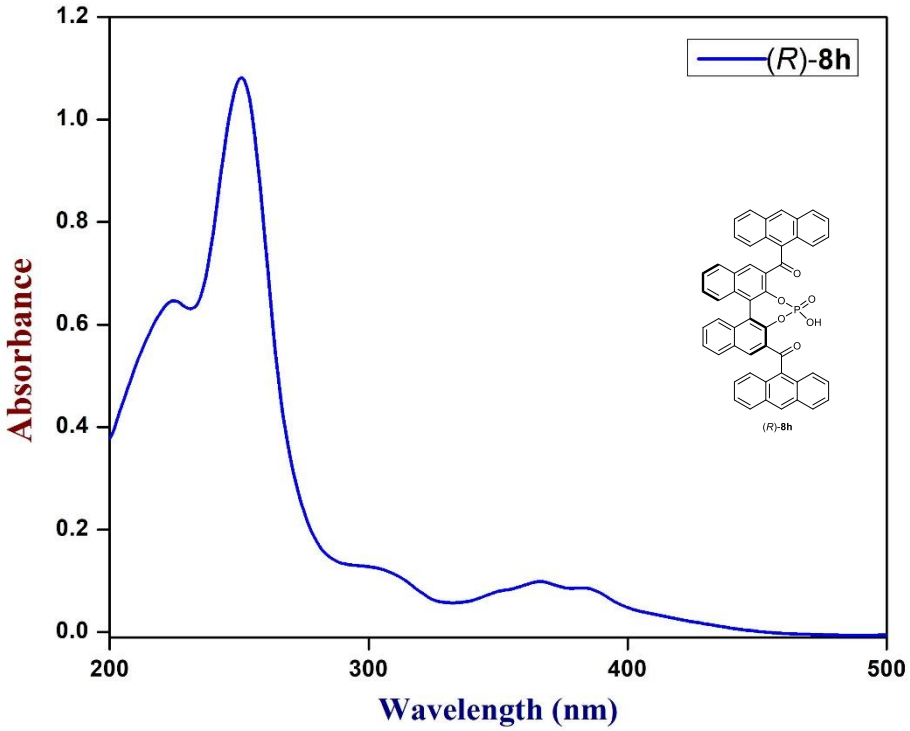


Figure S9. UV-vis absorption spectrum of (*R*)-**8h**

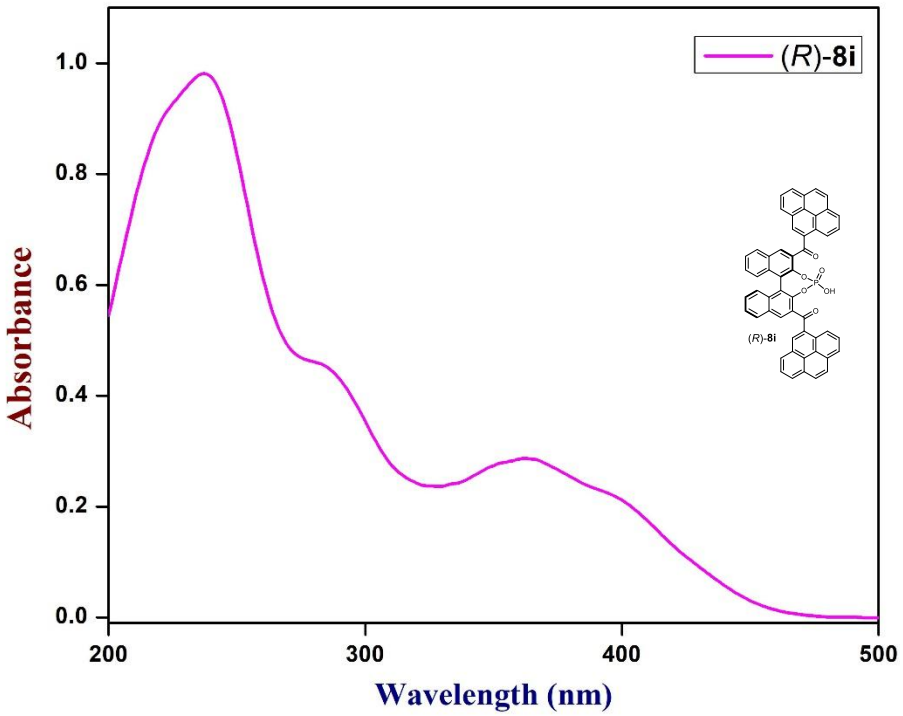


Figure S10. UV-vis absorption spectrum of (*R*)-**8i**

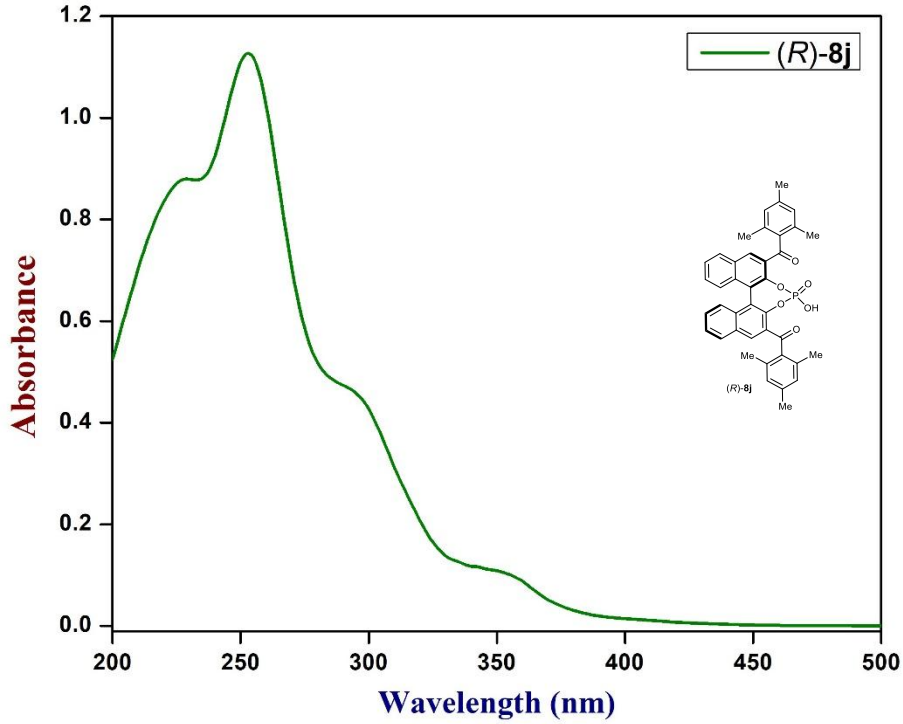


Figure S11. UV-vis absorption spectrum of (*R*)-**8j**

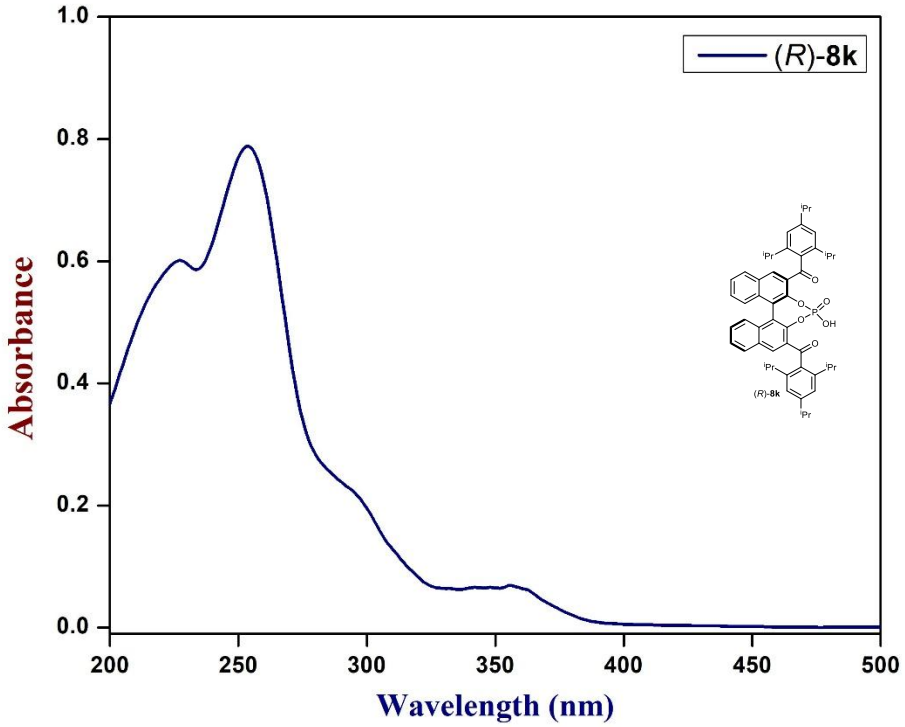


Figure S12. UV-vis absorption spectrum of (*R*)-**8k**

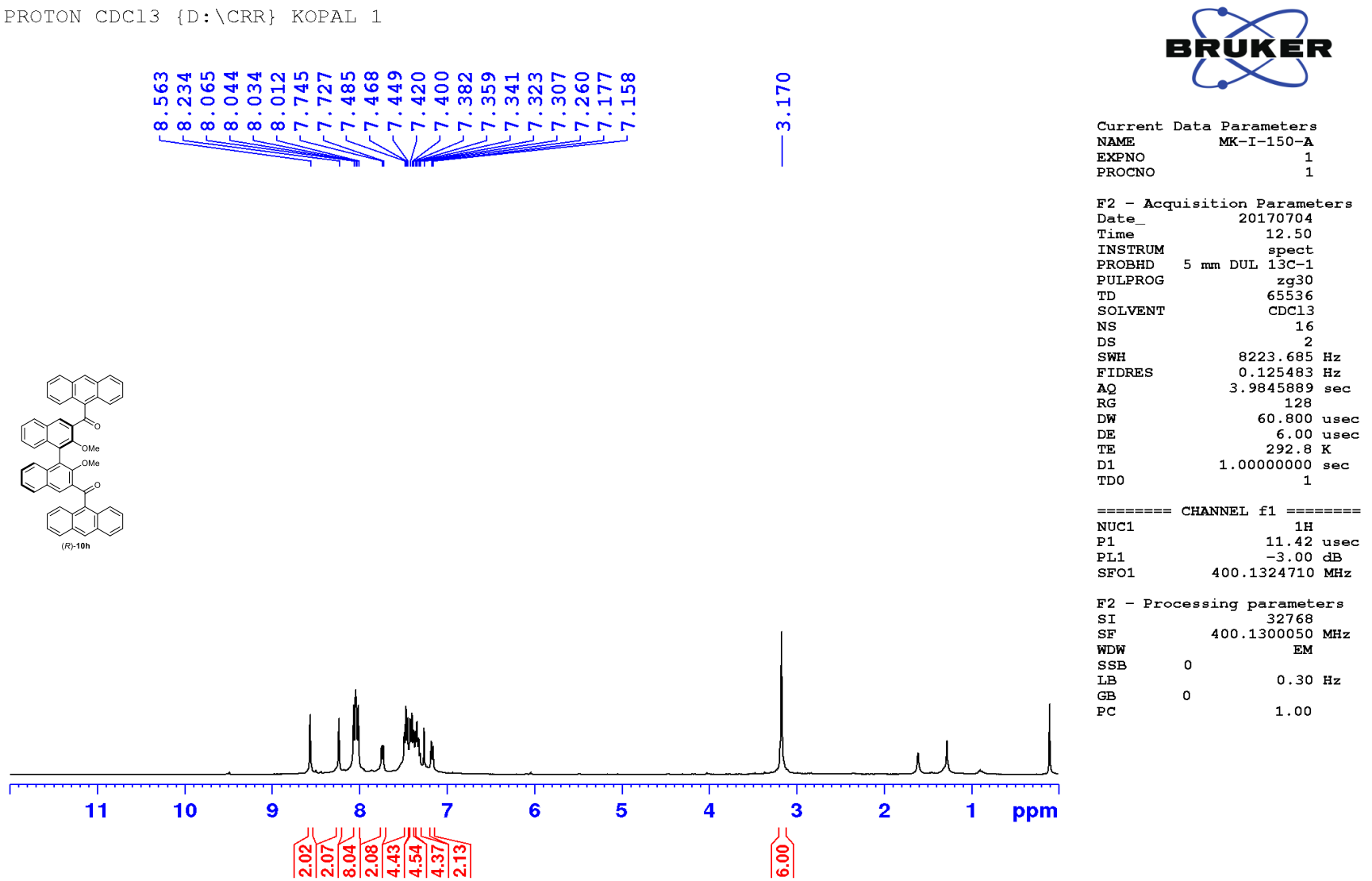
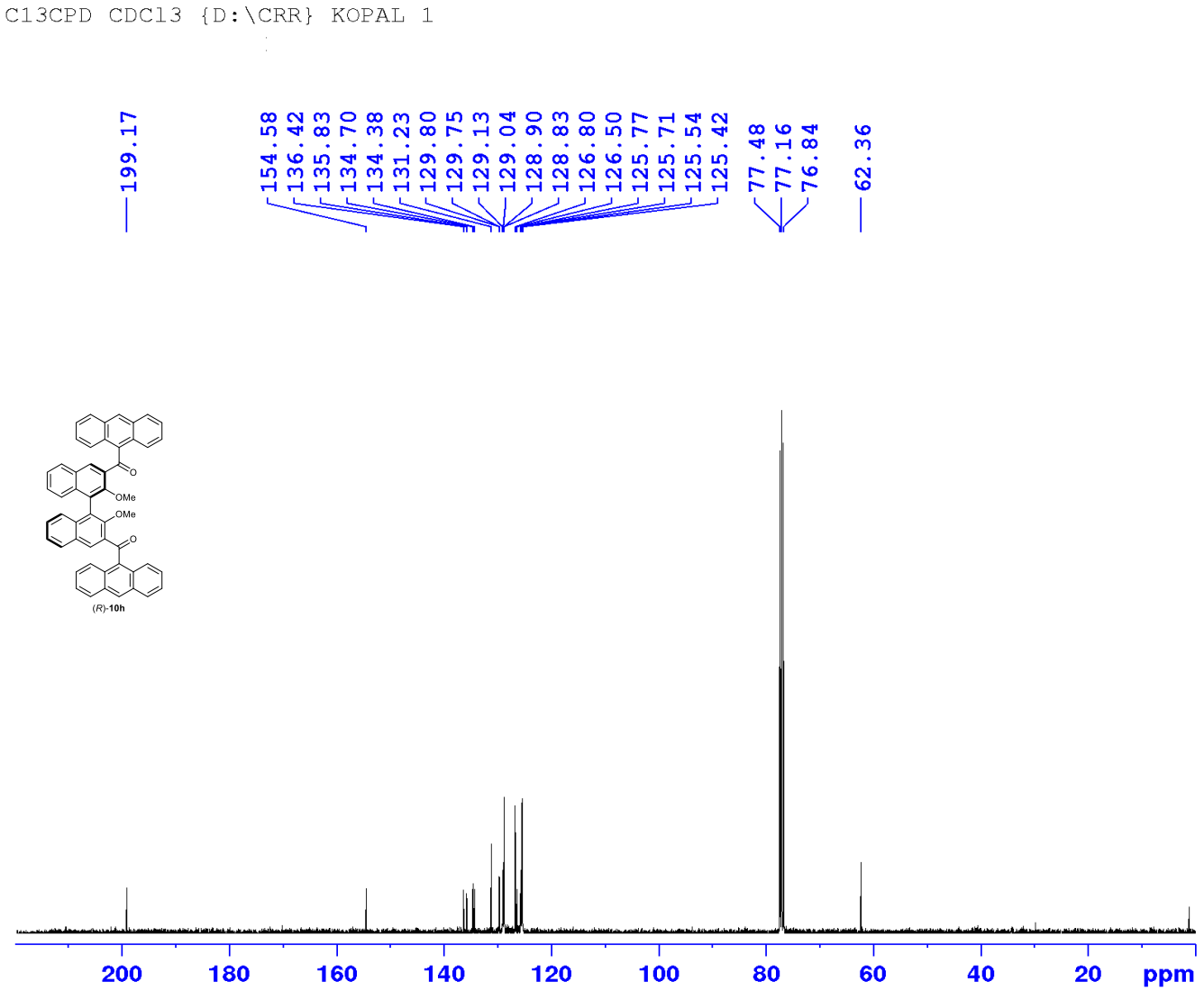


Figure S13: ^{1}H-NMR spectra for compound (*R*)-**10h**

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PROCNO                         1

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INSTRUM                    spect
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PULPROG                 zgpg30
TD                         65536
SOLVENT                    CDCl3
NS                           256
DS                             4
SWH                    24038.461 Hz
FIDRES                 0.366798 Hz
AQ                     1.3631488 sec
RG                            36
DW                        20.800 usec
DE                         6.00 usec
TE                        293.3 K
D1                     2.00000000 sec
d11                    0.03000000 sec
DELTA                  1.89999998 sec
TD0                            1

======== CHANNEL f1 ========
NUC1                         13C
P1                         9.15 usec
PL1          0 dB
SFO1               100.6228298 MHz

======== CHANNEL f2 ========
CPDPRG[2                waltz16
NUC2                         1H
PCPD2                     90.00 usec
PL12                      14.90 dB
PL13                      14.90 dB
PL2                       -3.00 dB
SFO2               400.1316005 MHz

F2 - Processing parameters
SI                           32768
SF                 100.6127583 MHz
WDW                             EM
SSB          0
LB                         1.00 Hz
GB           0
PC                         1.40
```

Figure S14: $^{13}C\{^{1}H\}$-NMR spectra for compound (*R*)-**10h**

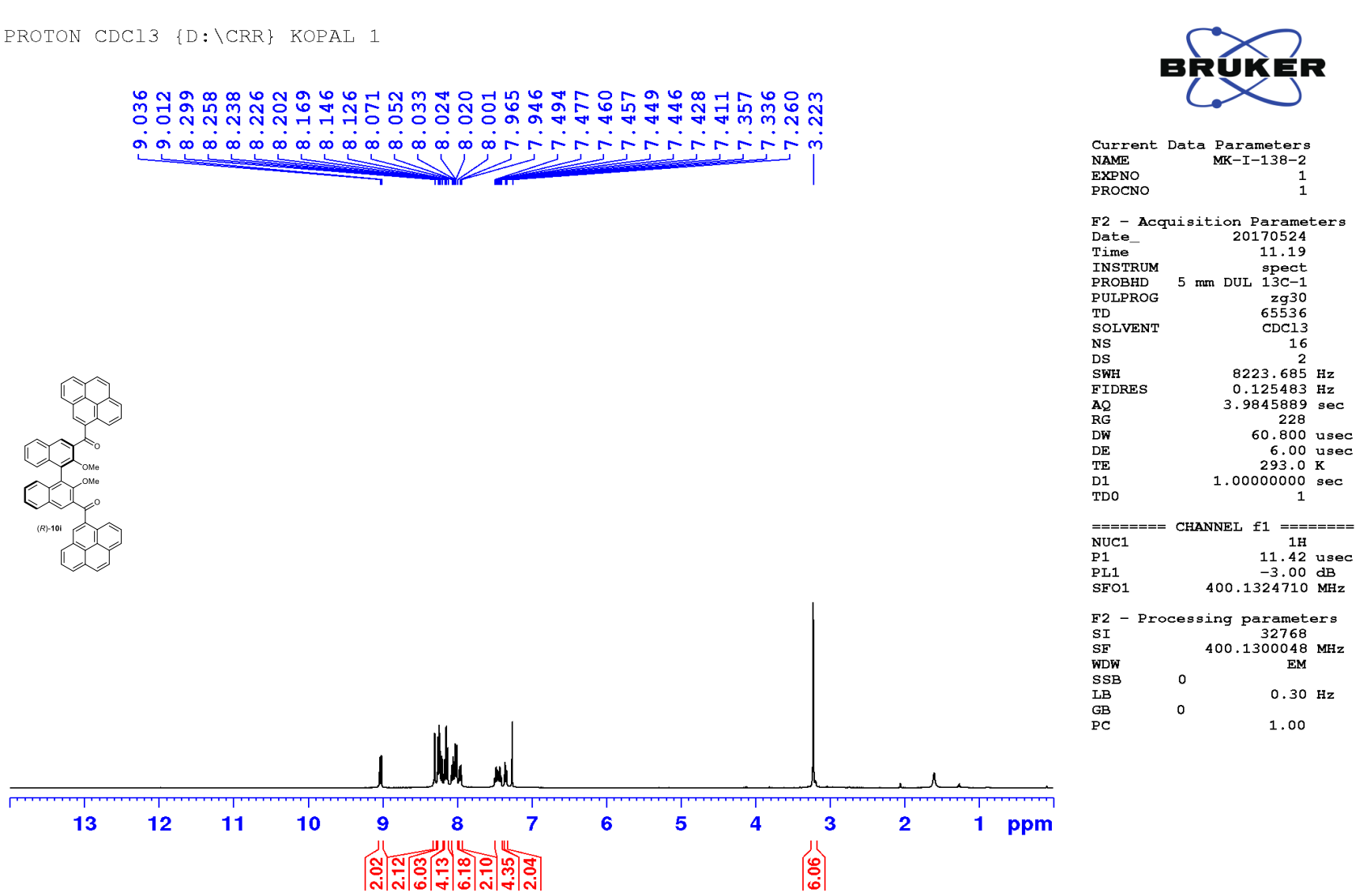


Figure S15: ^{1}H-NMR spectra for compound (*R*)-**10i**

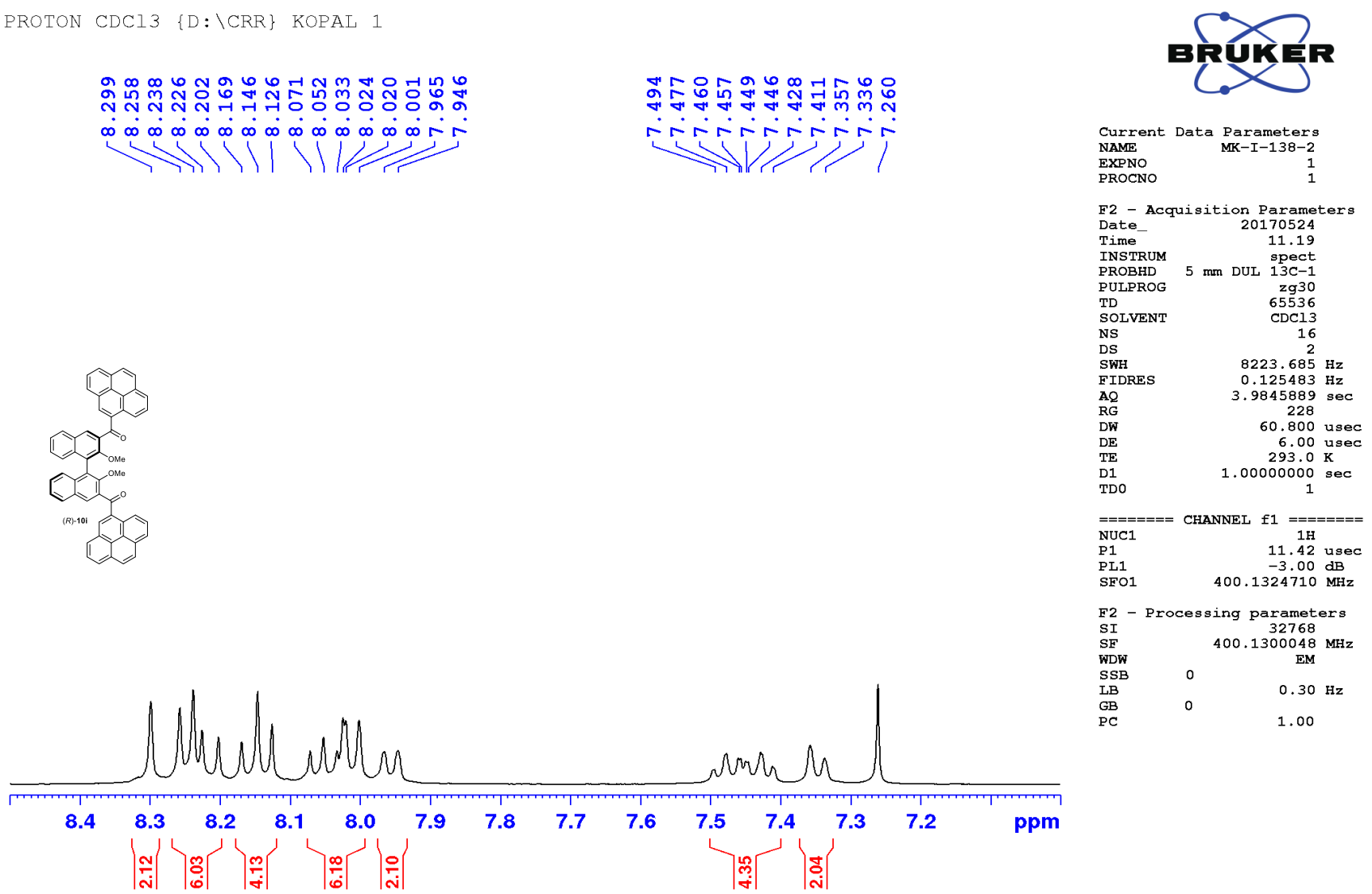
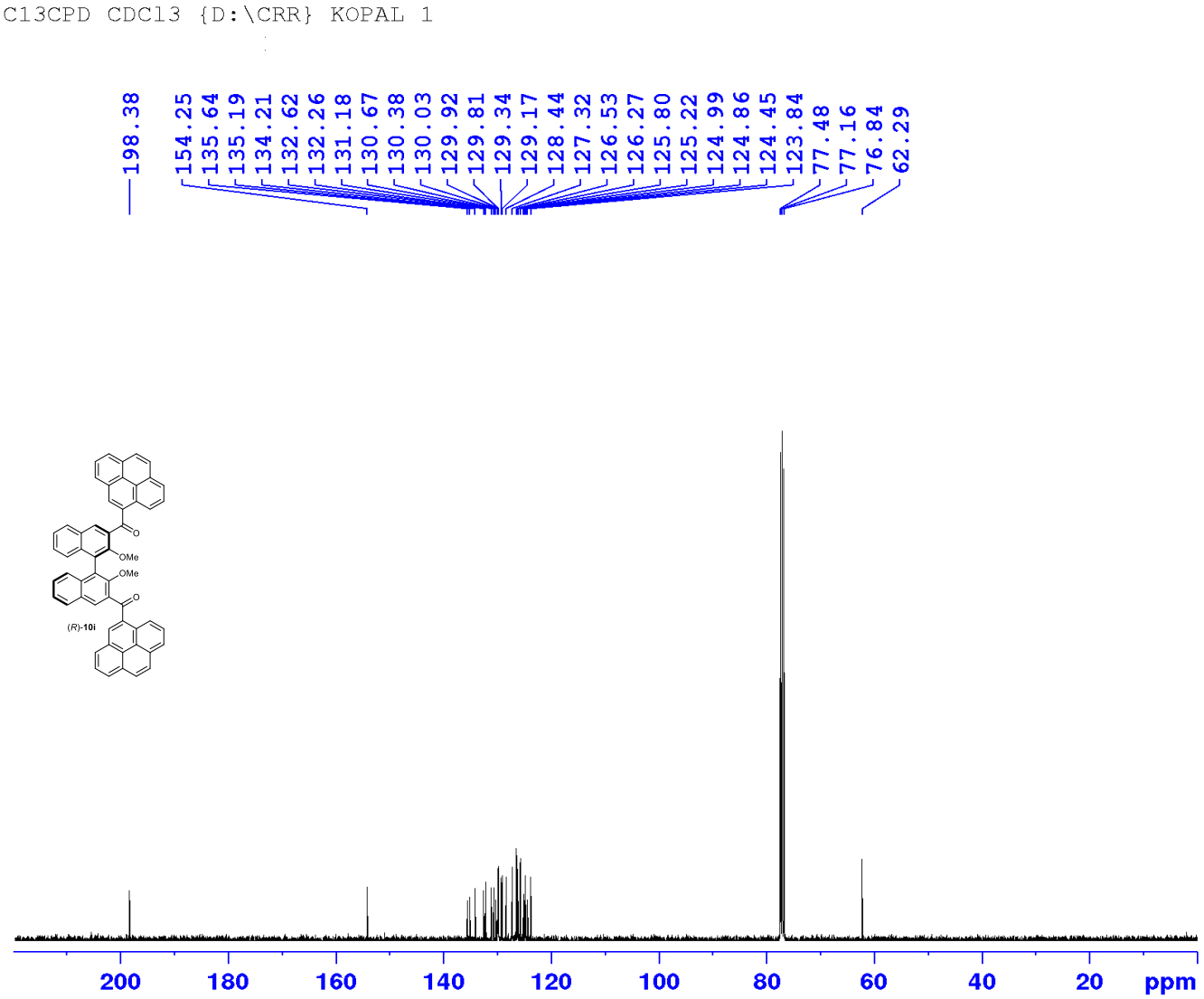


Figure S16: ^{1}H-NMR spectra for compound (*R*)-**10i**

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EXPNO                  2
PROCNO                 1

F2 - Acquisition Parameters
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Time               12.18
INSTRUM            spect
PROBHD   5 mm DUL 13C-1
PULPROG          zgpg30
TD                65536
SOLVENT           CDCl3
NS                  256
DS                    4
SWH           24038.461 Hz
FIDRES         0.366798 Hz
AQ             1.3631488 sec
RG                   32
DW                20.800 usec
DE                 6.00 usec
TE                294.0 K
D1             2.00000000 sec
d11            0.03000000 sec
DELTA          1.89999998 sec
TD0                   1

======== CHANNEL f1 ========
NUC1                 13C
P1                 9.15 usec
PL1       0 dB
SFO1         100.6228298 MHz

======== CHANNEL f2 ========
CPDPRG[2          waltz16
NUC2                 1H
PCPD2             90.00 usec
PL12              14.90 dB
PL13              14.90 dB
PL2               -3.00 dB
SFO2         400.1316005 MHz

F2 - Processing parameters
SI                  32768
SF           100.6127583 MHz
WDW                  EM
SSB       0
LB                 1.00 Hz
GB        0
PC                 1.40
```

Figure S17: $^{13}C\{^{1}H\}$-NMR spectra for compound (*R*)-**10i**

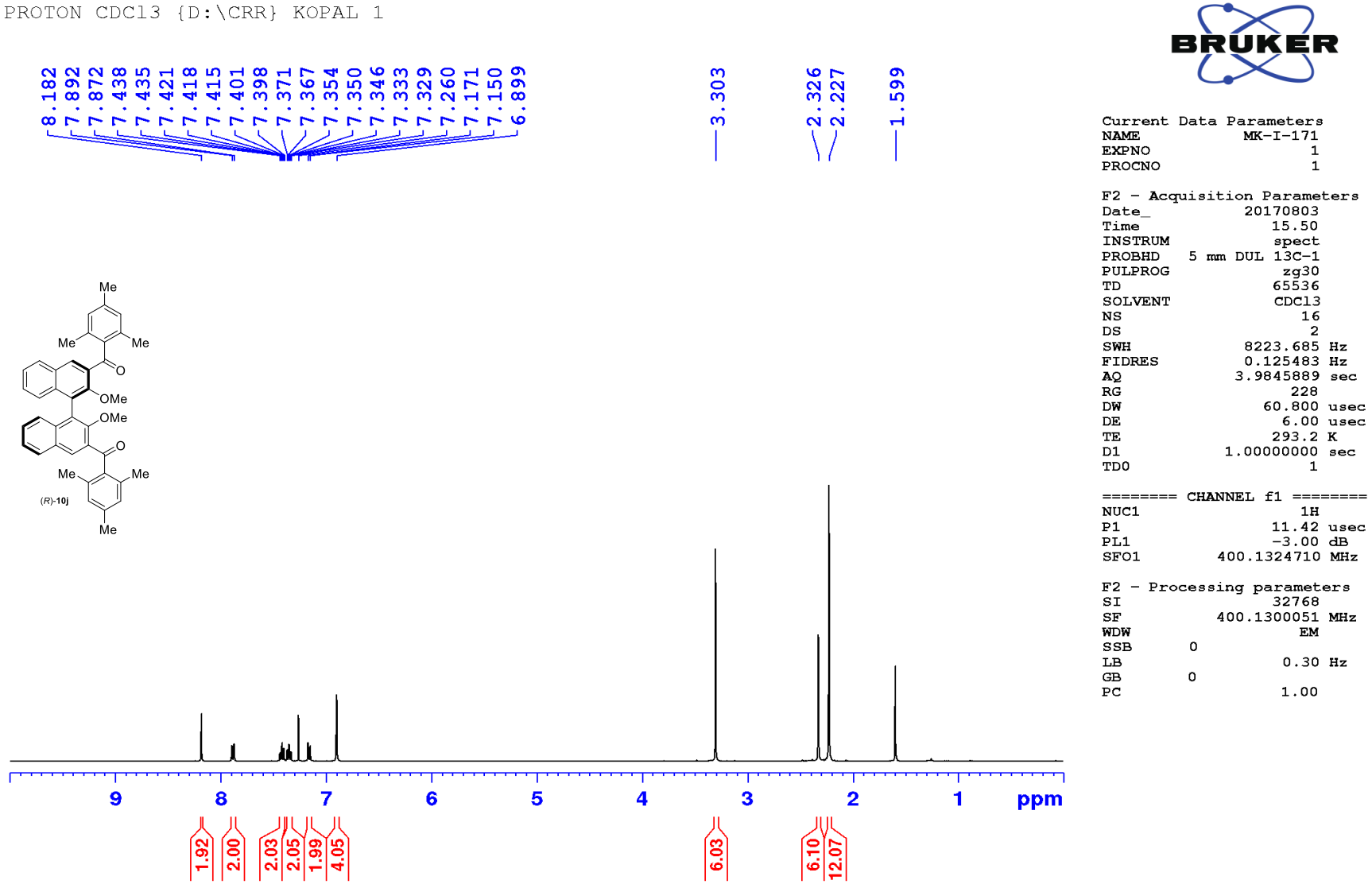
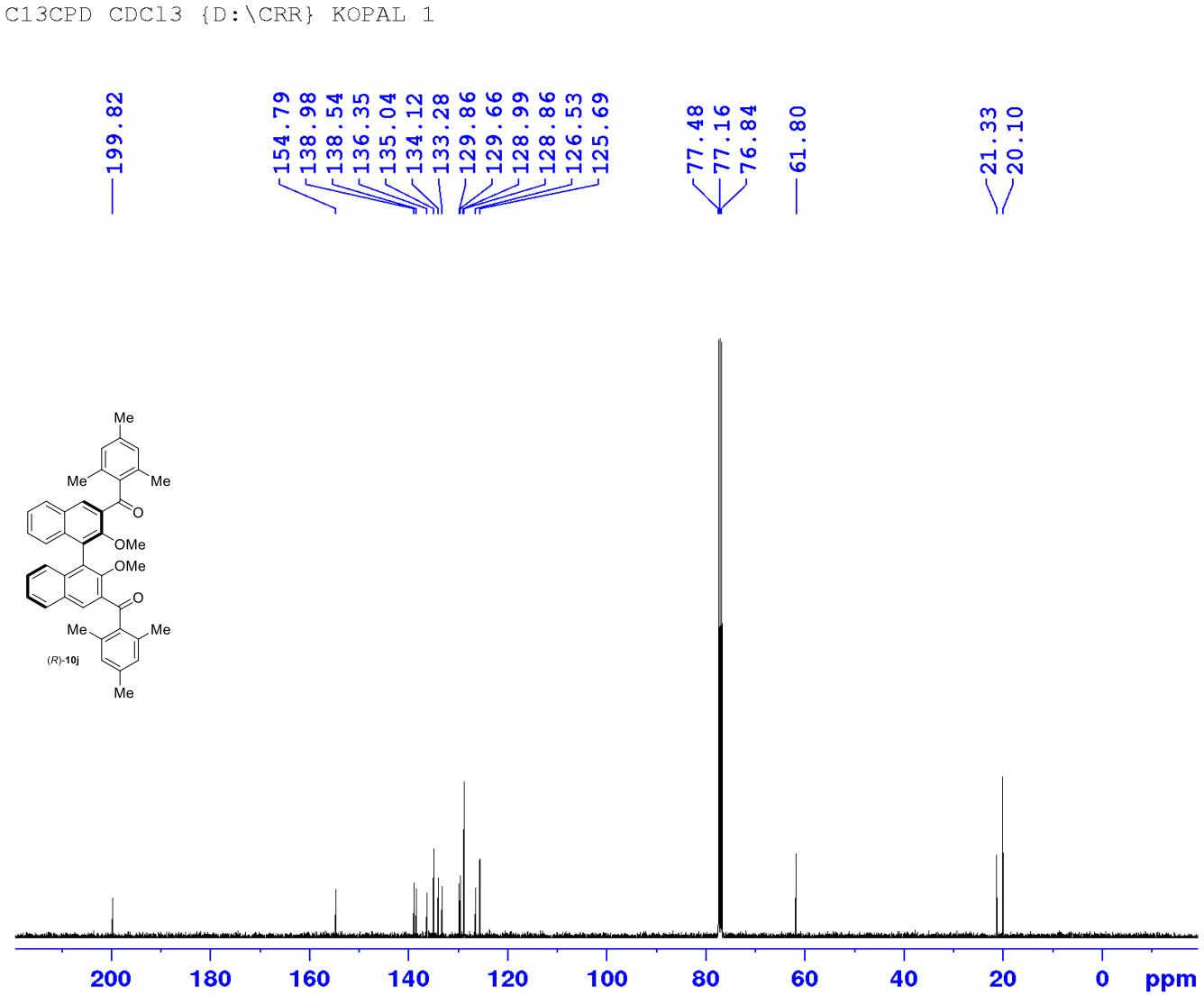


Figure S18: ^{1}H-NMR spectra for compound (*R*)-**10j**

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Current Data Parameters
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EXPNO                        2
PROCNO                       1

F2 - Acquisition Parameters
Date_                 20170803
Time                     16.50
INSTRUM                  spect
PROBHD    5 mm DUL 13C-1
PULPROG                 zgpg30
TD                       65536
SOLVENT                  CDCl3
NS                         256
DS                           4
SWH                  24038.461 Hz
FIDRES                0.366798 Hz
AQ                    1.3631488 sec
RG                          64
DW                       20.800 usec
DE                        6.00 usec
TE                       294.7 K
D1                   2.00000000 sec
d11                  0.03000000 sec
DELTA                1.89999998 sec
TD0                          1

======== CHANNEL f1 ========
NUC1                        13C
P1                         9.15 usec
PL1            0 dB
SFO1              100.6228298 MHz

======== CHANNEL f2 ========
CPDPRG[2                waltz16
NUC2                        1H
PCPD2                    90.00 usec
PL12                     14.90 dB
PL13                     14.90 dB
PL2                      -3.00 dB
SFO2               400.1316005 MHz

F2 - Processing parameters
SI                       32768
SF                 100.6127548 MHz
WDW                         EM
SSB            0
LB                        1.00 Hz
GB             0
PC                        1.40
```

Figure S19: $^{13}C\{^{1}H\}$-NMR spectra for compound (*R*)-**10j**

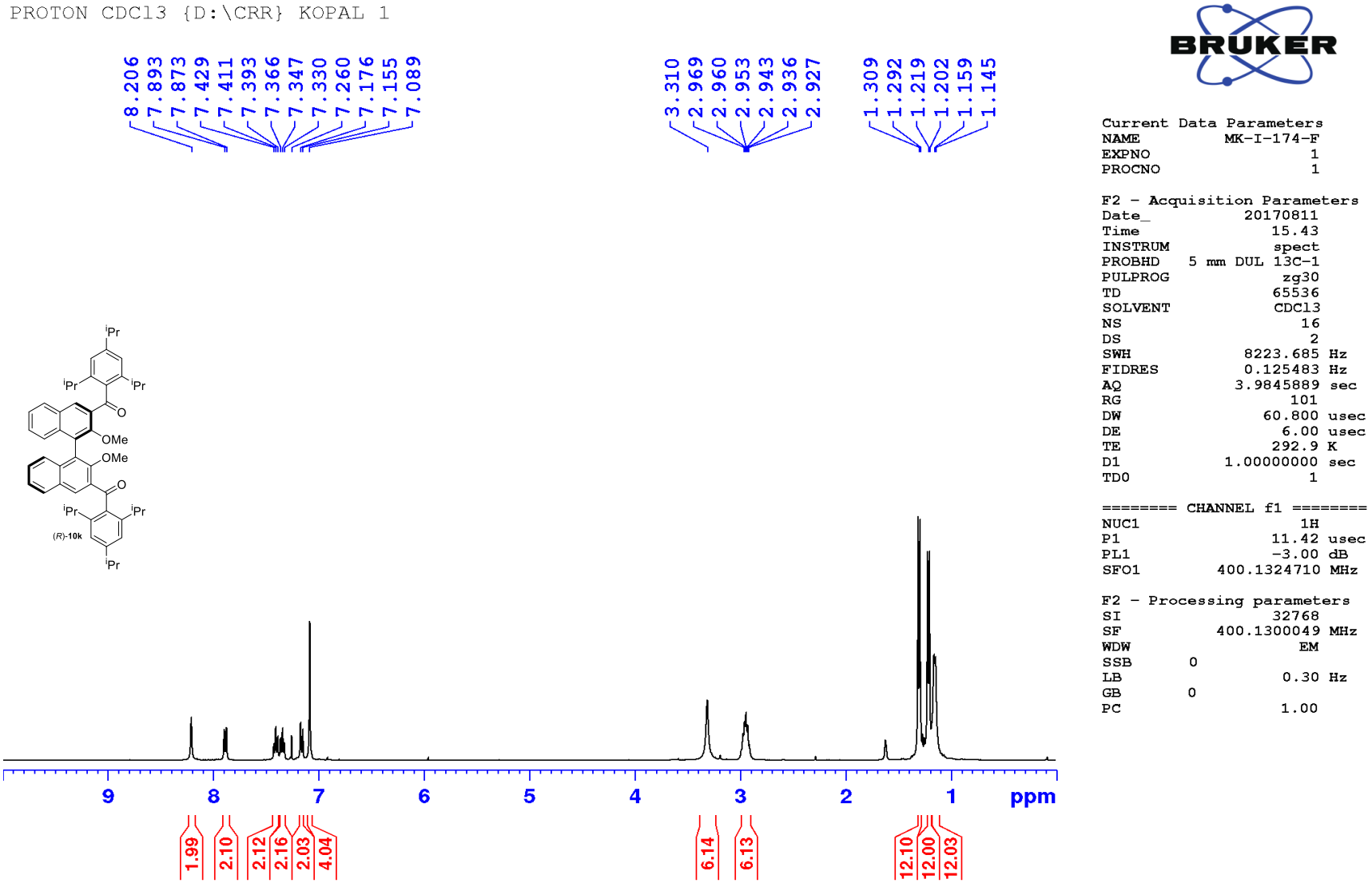
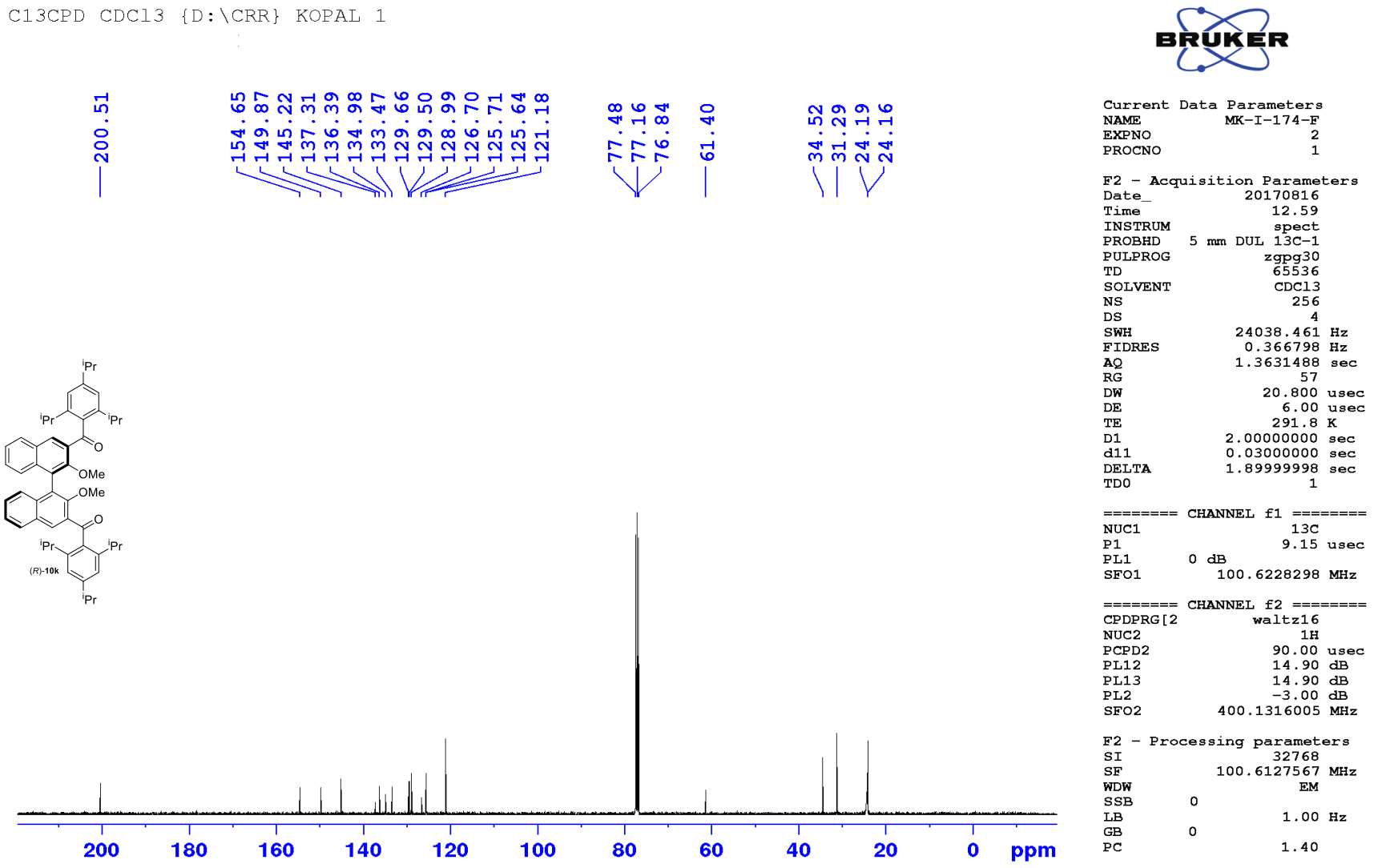


Figure S20: ^{1}H-NMR spectra for compound (*R*)-**10k**

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Current Data Parameters
NAME          MK-I-174-F
EXPNO                  2
PROCNO                 1

F2 - Acquisition Parameters
Date_           20170816
Time               12.59
INSTRUM            spect
PROBHD   5 mm DUL 13C-1
PULPROG          zgpg30
TD                65536
SOLVENT           CDCl3
NS                  256
DS                    4
SWH           24038.461 Hz
FIDRES         0.366798 Hz
AQ             1.3631488 sec
RG                   57
DW                20.800 usec
DE                 6.00 usec
TE                291.8 K
D1             2.00000000 sec
d11            0.03000000 sec
DELTA          1.89999998 sec
TD0                   1

======== CHANNEL f1 ========
NUC1                 13C
P1                  9.15 usec
PL1       0 dB
SFO1         100.6228298 MHz

======== CHANNEL f2 ========
CPDPRG[2          waltz16
NUC2                 1H
PCPD2              90.00 usec
PL12               14.90 dB
PL13               14.90 dB
PL2                -3.00 dB
SFO2         400.1316005 MHz

F2 - Processing parameters
SI                  32768
SF           100.6127567 MHz
WDW                  EM
SSB       0
LB                  1.00 Hz
GB        0
PC                  1.40
```
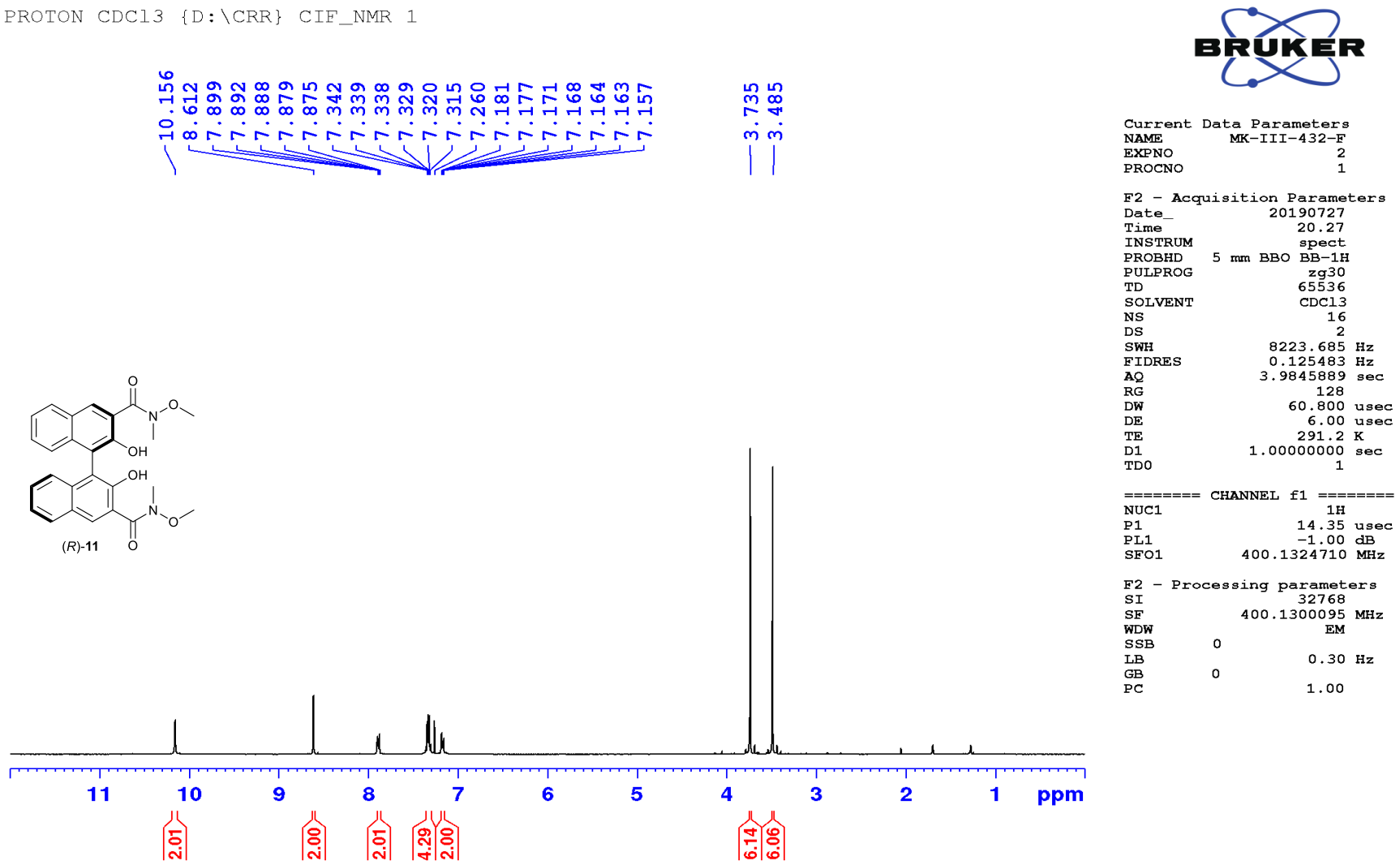

Figure S21: $^{13}C\{^{1}H\}$-NMR spectra for compound (*R*)-**10k**

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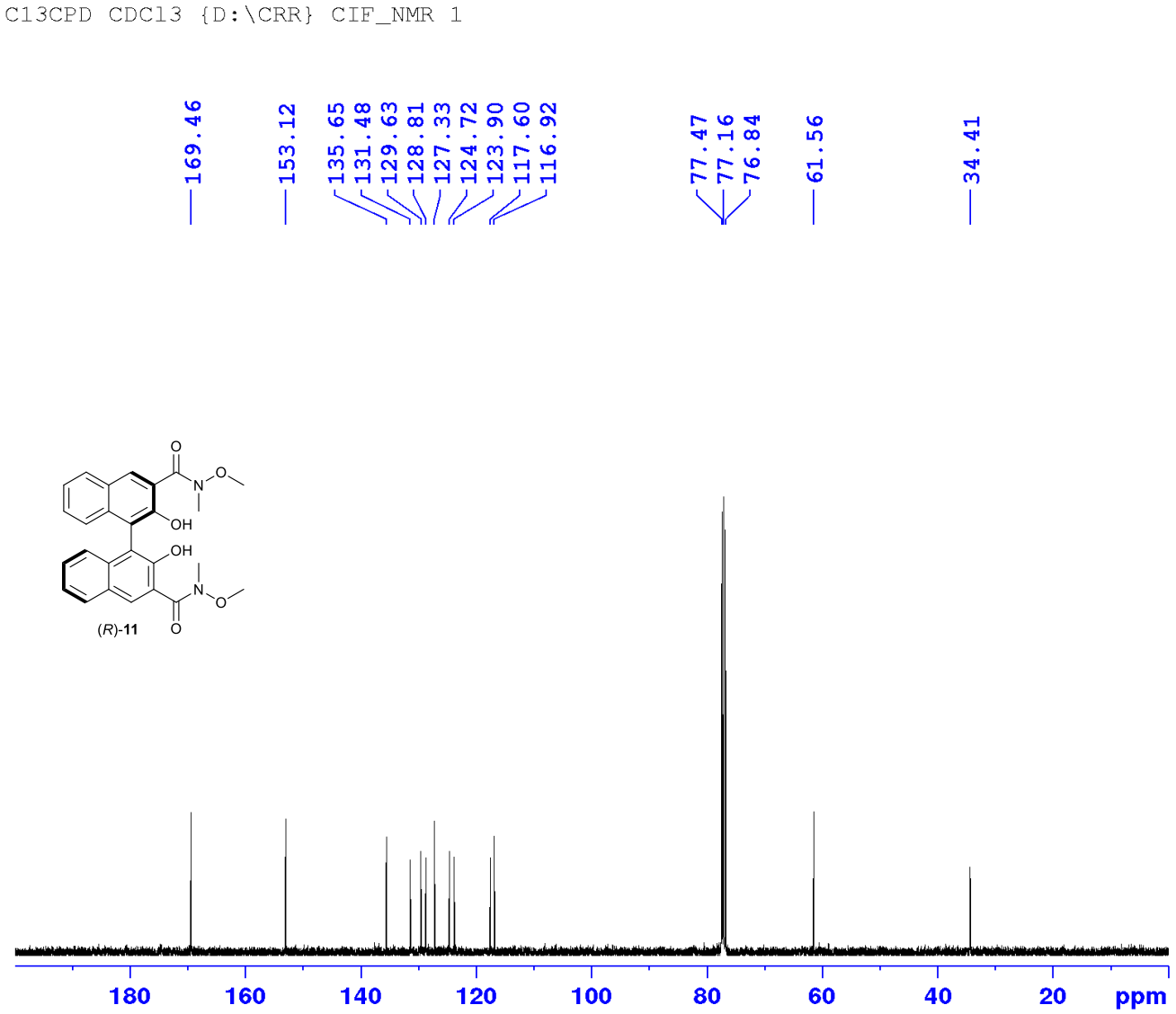
Current Data Parameters
NAME        MK-III-432-F
EXPNO                  2
PROCNO                 1

F2 - Acquisition Parameters
Date_           20190727
Time               20.27
INSTRUM            spect
PROBHD   5 mm BBO BB-1H
PULPROG             zg30
TD                 65536
SOLVENT            CDCl3
NS                    16
DS                     2
SWH             8223.685 Hz
FIDRES          0.125483 Hz
AQ              3.9845889 sec
RG                   128
DW                60.800 usec
DE                 6.00 usec
TE                291.2 K
D1             1.00000000 sec
TD0                    1

======== CHANNEL f1 ========
NUC1                  1H
P1                 14.35 usec
PL1                -1.00 dB
SFO1         400.1324710 MHz

F2 - Processing parameters
SI                 32768
SF           400.1300095 MHz
WDW                   EM
SSB       0
LB                 0.30 Hz
GB        0
PC                 1.00
```

Figure S22: ^{1}H-NMR spectra for compound (*R*)-**11**



Current Data Parameters
NAME MK-III-432-F
EXPNO 1
PROCNO 1

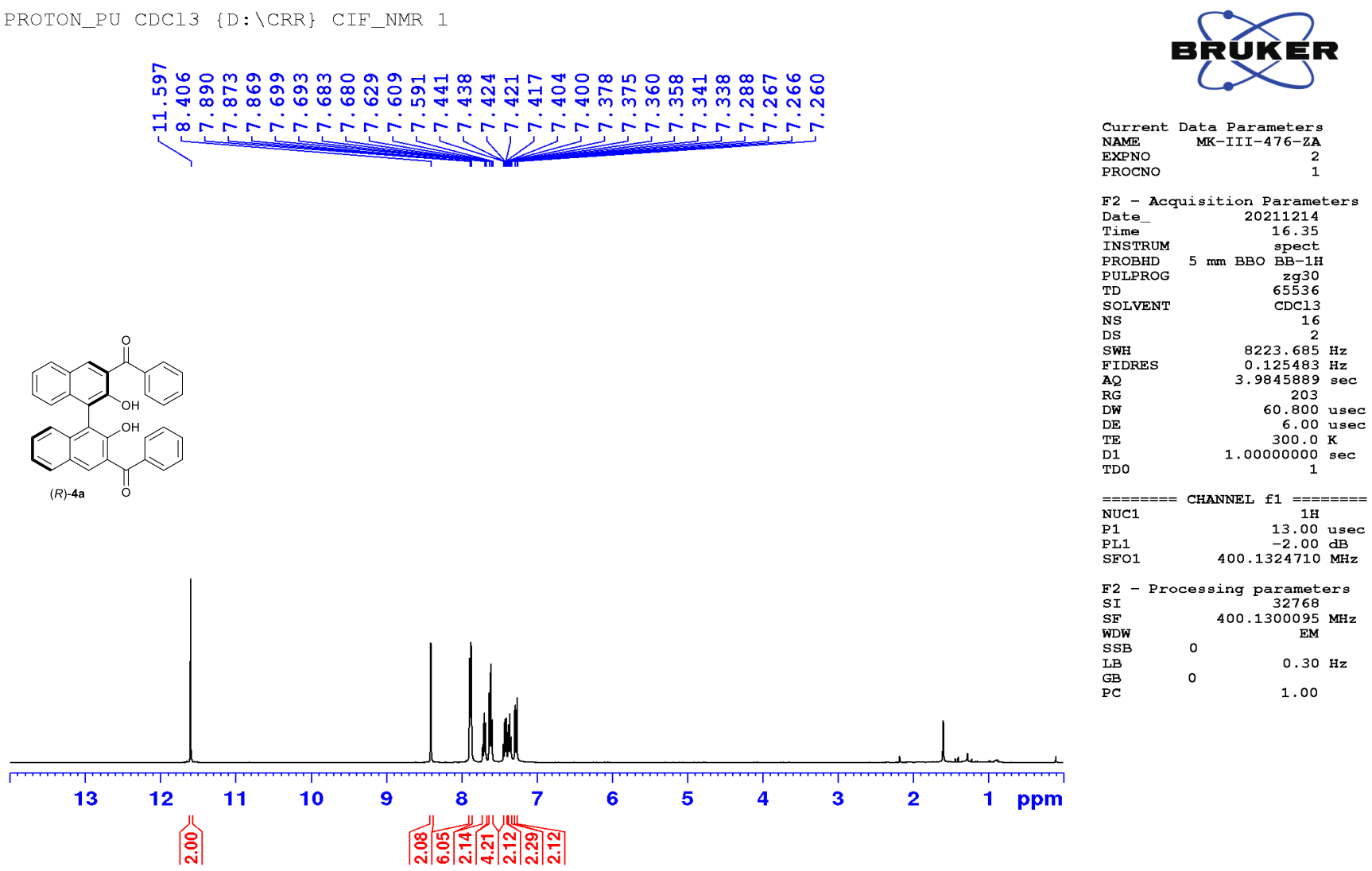
F2 - Acquisition Parameters
Date_ 20190727
Time 13.17
INSTRUM spect
PROBHD 5 mm BBO BB-1H
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 188
DS 4
SWH 24038.461 Hz
FIDRES 0.366798 Hz
AQ 1.3631488 sec
RG 40.3
DW 20.800 usec
DE 6.00 usec
TE 291.6 K
D1 2.00000000 sec
d11 0.03000000 sec
DELTA 1.89999998 sec
TD0 1

======== CHANNEL f1 ========
NUC1 13C
P1 9.95 usec
PL1 -1.00 dB
SFO1 100.6228298 MHz

======== CHANNEL f2 ========
CPDPRG[2 waltz16
NUC2 1H
PCPD2 90.00 usec
PL12 14.95 dB
PL13 120.00 dB
PL2 -1.00 dB
SFO2 400.1316005 MHz

F2 - Processing parameters
SI 32768
SF 100.6127638 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40

Figure S23: $^{13}C\{^{1}H\}$-NMR spectra for compound (*R*)-**11**

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Current Data Parameters
NAME       MK-III-476-ZA
EXPNO                  2
PROCNO                 1

F2 - Acquisition Parameters
Date_           20211214
Time               16.35
INSTRUM            spect
PROBHD   5 mm BBO BB-1H
PULPROG             zg30
TD                 65536
SOLVENT            CDCl3
NS                    16
DS                     2
SWH             8223.685 Hz
FIDRES          0.125483 Hz
AQ              3.9845889 sec
RG                   203
DW                60.800 usec
DE                 6.00 usec
TE                300.0 K
D1           1.00000000 sec
TD0                    1

======== CHANNEL f1 ========
NUC1                  1H
P1                13.00 usec
PL1               -2.00 dB
SFO1         400.1324710 MHz

F2 - Processing parameters
SI                 32768
SF           400.1300095 MHz
WDW                   EM
SSB       0
LB                 0.30 Hz
GB        0
PC                 1.00
```
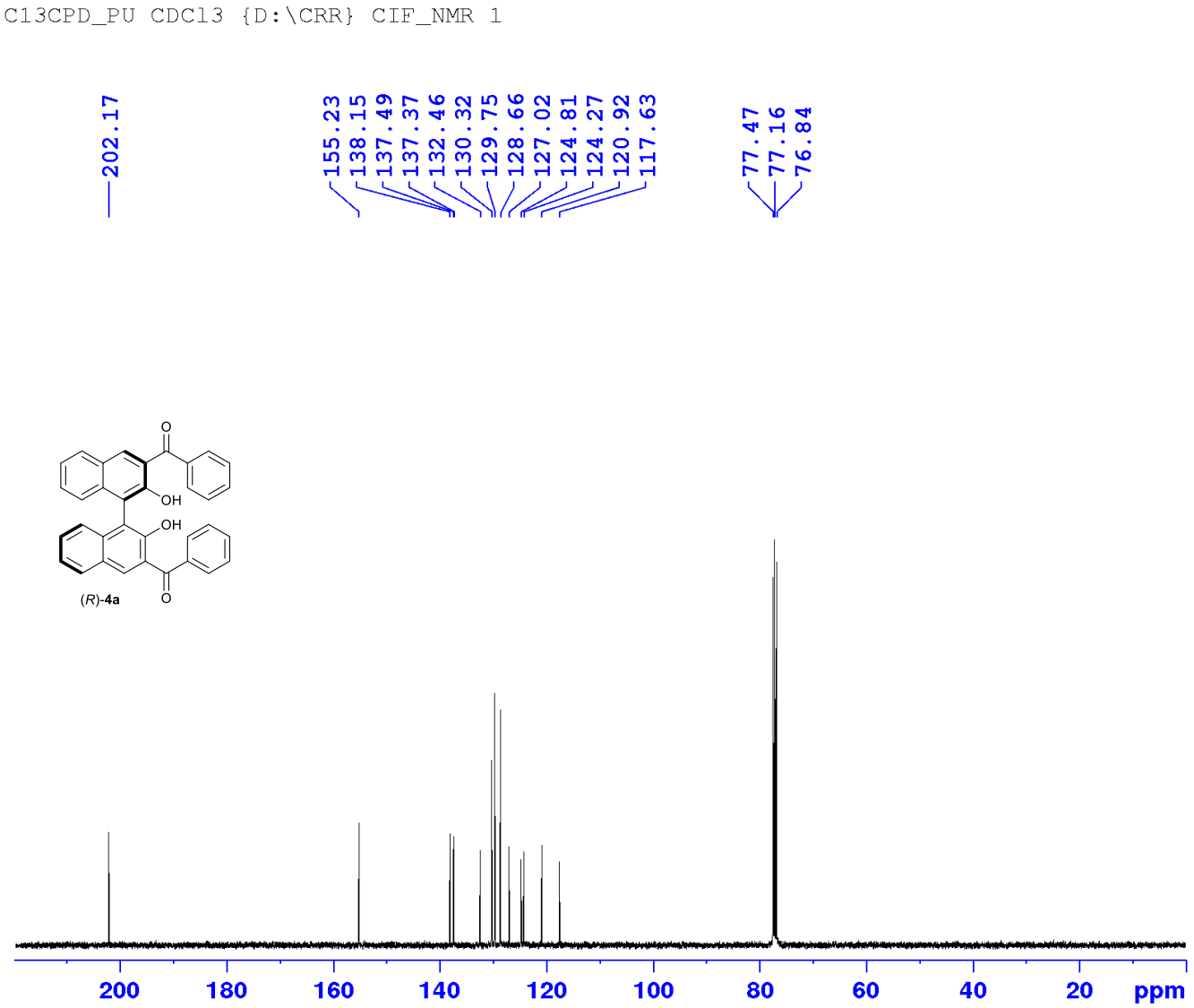

Figure S24: ^{1}H-NMR spectra for compound (*R*)-**4a**

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Current Data Parameters
NAME       MK-III-476-ZA
EXPNO                  3
PROCNO                 1

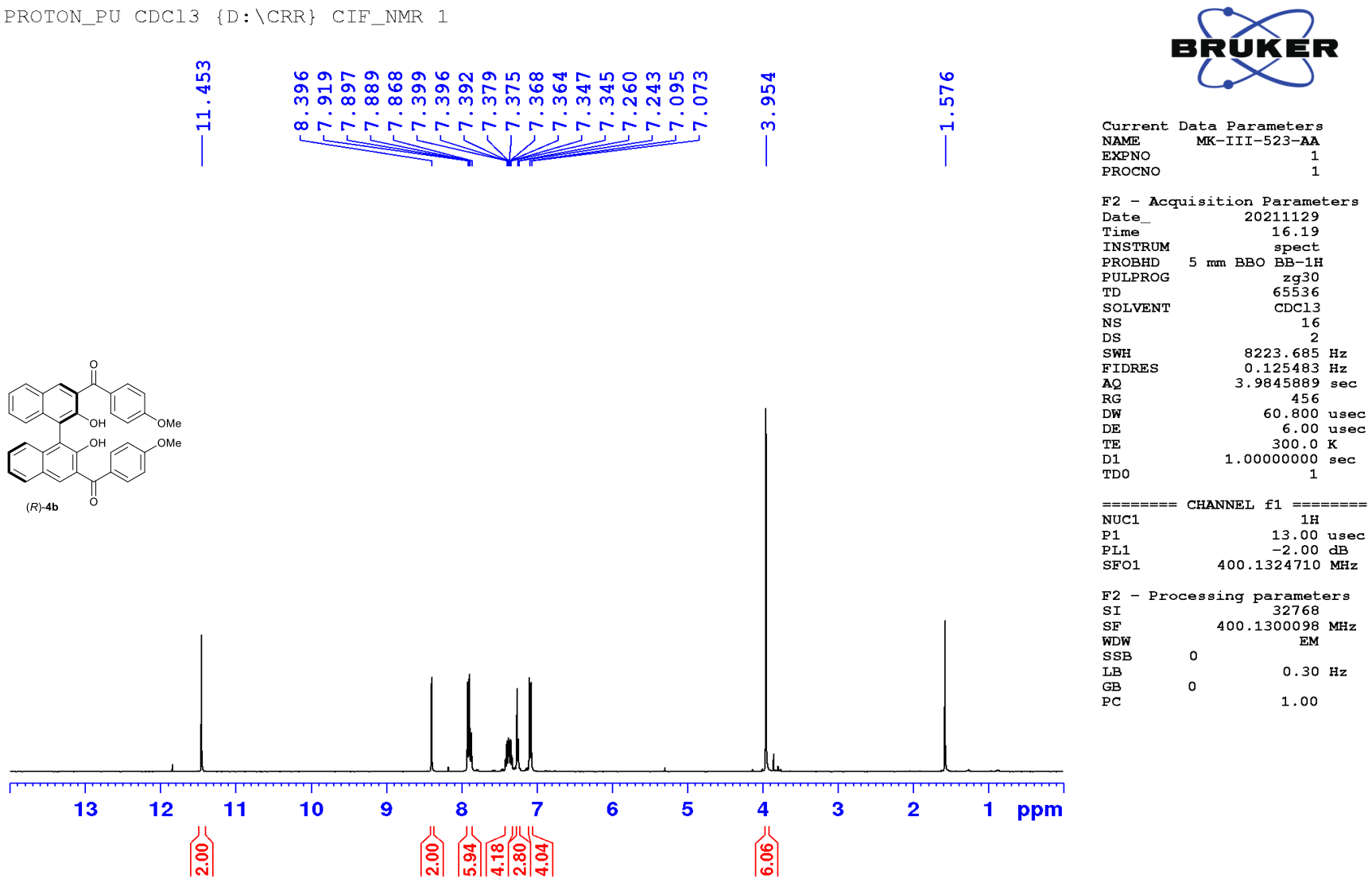
F2 - Acquisition Parameters
Date_           20211214
Time               16.37
INSTRUM            spect
PROBHD   5 mm BBO BB-1H
PULPROG          zgpg30
TD                65536
SOLVENT           CDCl3
NS                  512
DS                    4
SWH           24038.461 Hz
FIDRES         0.366798 Hz
AQ            1.3631488 sec
RG                  322
DW               20.800 usec
DE                6.00 usec
TE               300.0 K
D1           2.00000000 sec
d11          0.03000000 sec
DELTA        1.89999998 sec
TD0                   1

======== CHANNEL f1 ========
NUC1                 13C
P1                12.00 usec
PL1               -2.00 dB
SFO1        100.6228298 MHz

======== CHANNEL f2 ========
CPDPRG[2         waltz16
NUC2                 1H
PCPD2             90.00 usec
PL12              14.81 dB
PL13             120.00 dB
PL2               -2.00 dB
SFO2        400.1316005 MHz

F2 - Processing parameters
SI                32768
SF          100.6127615 MHz
WDW                  EM
SSB       0
LB                1.00 Hz
GB        0
PC                1.40
```

Figure S25: $^{13}C\{^{1}H\}$-NMR spectra for compound (*R*)-**4a**



Current Data Parameters
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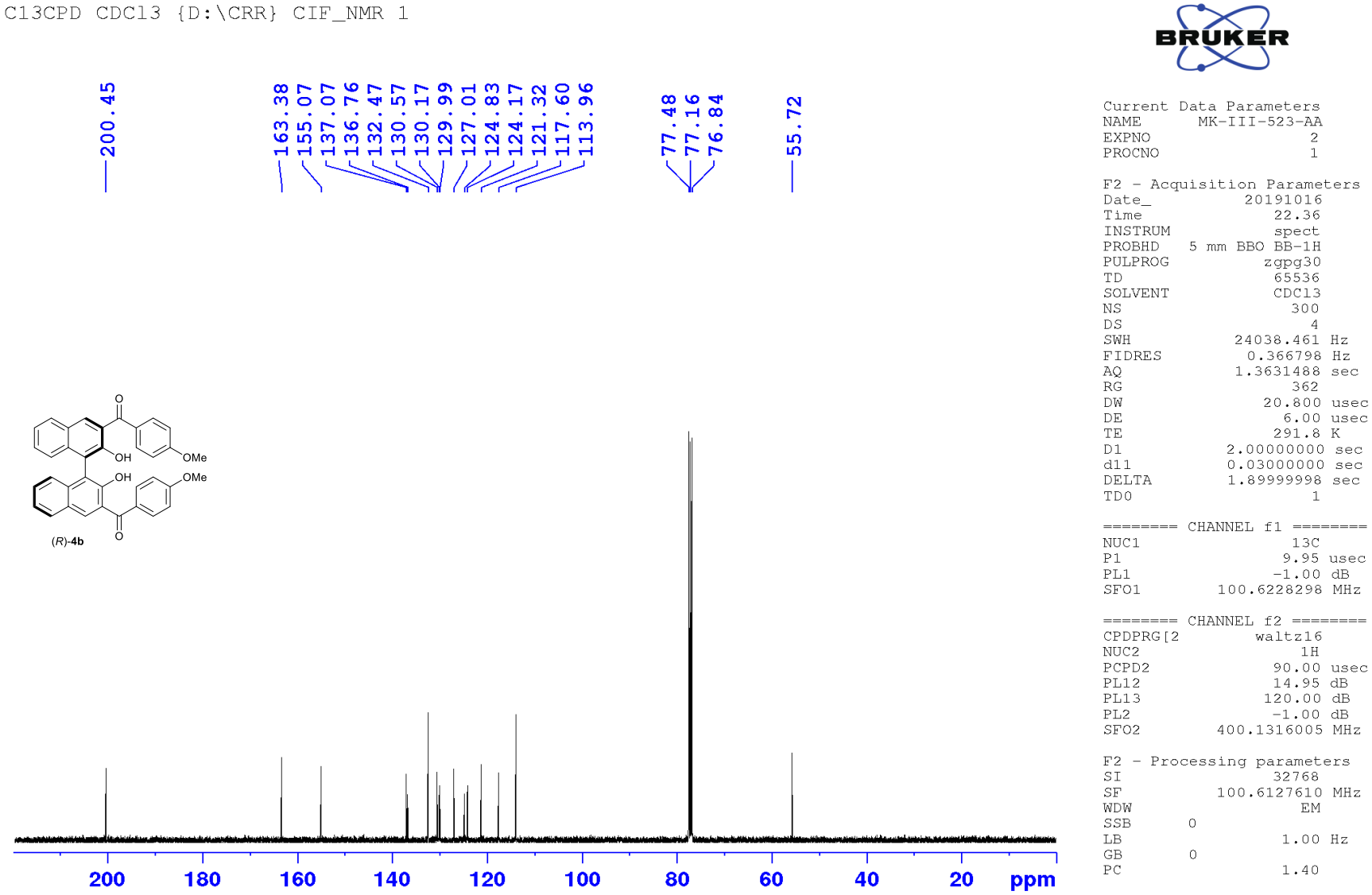
EXPNO 1
PROCNO 1

F2 - Acquisition Parameters
Date_ 20211129
Time 16.19
INSTRUM spect
PROBHD 5 mm BBO BB-1H
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 8223.685 Hz
FIDRES 0.125483 Hz
AQ 3.9845889 sec
RG 456
DW 60.800 usec
DE 6.00 usec
TE 300.0 K
D1 1.00000000 sec
TD0 1

======== CHANNEL f1 ========
NUC1 1H
P1 13.00 usec
PL1 -2.00 dB
SFO1 400.1324710 MHz

F2 - Processing parameters
SI 32768
SF 400.1300098 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

Figure S26: ^{1}H-NMR spectra for compound (*R*)-**4b**

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Current Data Parameters
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EXPNO                  2
PROCNO                 1

F2 - Acquisition Parameters
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Time               22.36
INSTRUM            spect
PROBHD   5 mm BBO BB-1H
PULPROG          zgpg30
TD                65536
SOLVENT            CDCl3
NS                   300
DS                     4
SWH            24038.461 Hz
FIDRES          0.366798 Hz
AQ              1.3631488 sec
RG                   362
DW                20.800 usec
DE                 6.00 usec
TE                291.8 K
D1             2.00000000 sec
d11            0.03000000 sec
DELTA          1.89999998 sec
TD0                    1

======== CHANNEL f1 ========
NUC1                  13C
P1                  9.95 usec
PL1                -1.00 dB
SFO1         100.6228298 MHz

======== CHANNEL f2 ========
CPDPRG[2          waltz16
NUC2                  1H
PCPD2              90.00 usec
PL12               14.95 dB
PL13              120.00 dB
PL2                -1.00 dB
SFO2         400.1316005 MHz

F2 - Processing parameters
SI                 32768
SF           100.6127610 MHz
WDW                   EM
SSB       0
LB                 1.00 Hz
GB        0
PC                 1.40
```

Figure S27: $^{13}C\{^{1}H\}$-NMR spectra for compound (*R*)-**4b**

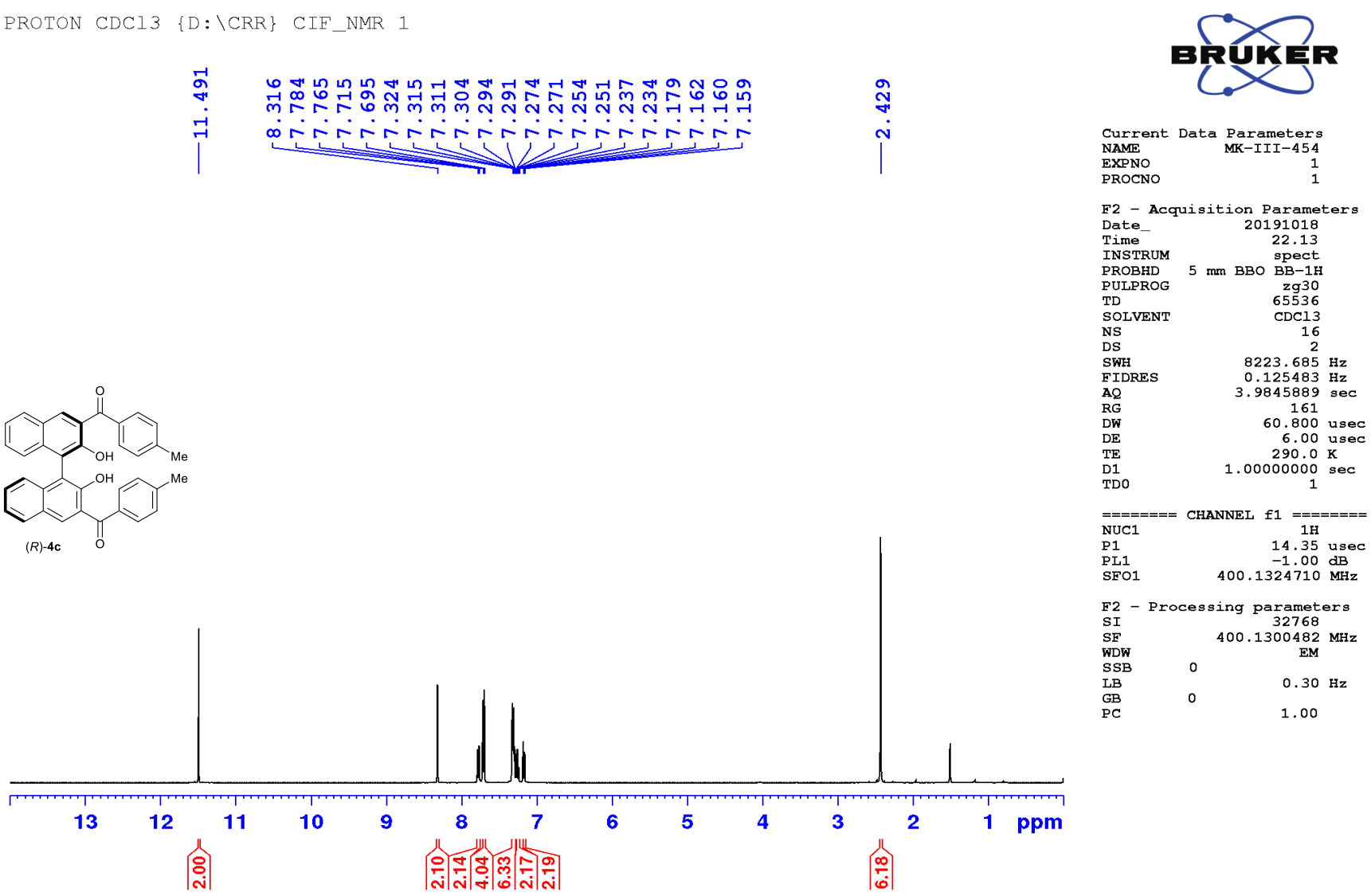
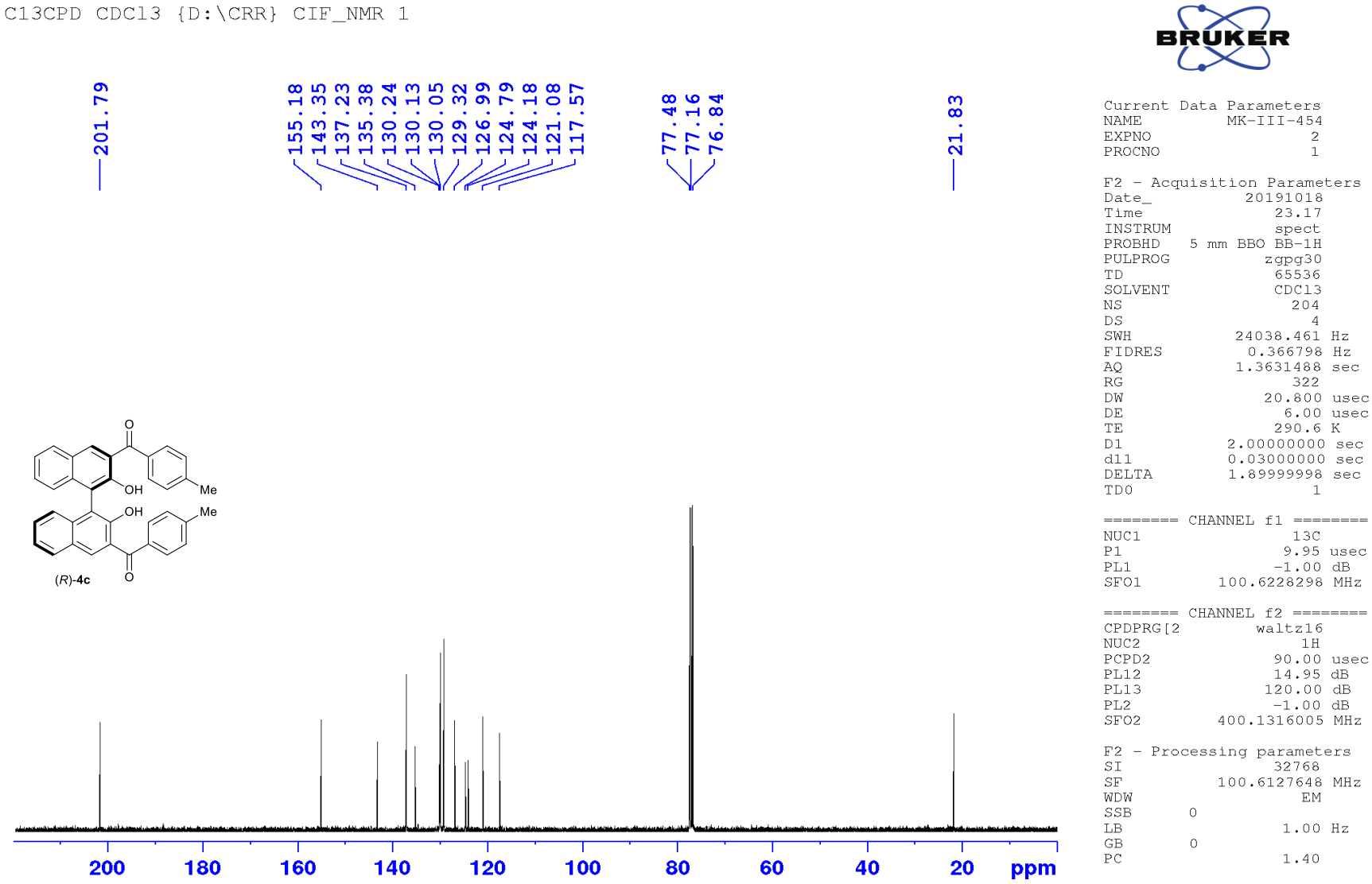


Figure S28: ^{1}H-NMR spectra for compound (*R*)-**4c**



Current Data Parameters
NAME MK-III-454
EXPNO 2
PROCNO 1

F2 - Acquisition Parameters
Date_ 20191018
Time 23.17
INSTRUM spect
PROBHD 5 mm BBO BB-1H
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 204
DS 4
SWH 24038.461 Hz
FIDRES 0.366798 Hz
AQ 1.3631488 sec
RG 322
DW 20.800 usec
DE 6.00 usec
TE 290.6 K
D1 2.00000000 sec
d11 0.03000000 sec
DELTA 1.89999998 sec
TD0 1

======== CHANNEL f1 ========
NUC1 13C
P1 9.95 usec
PL1 -1.00 dB
SFO1 100.6228298 MHz

======== CHANNEL f2 ========
CPDPRG[2 waltz16
NUC2 1H
PCPD2 90.00 usec
PL12 14.95 dB
PL13 120.00 dB
PL2 -1.00 dB
SFO2 400.1316005 MHz

F2 - Processing parameters
SI 32768
SF 100.6127648 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40

Figure S29: $^{13}C\{^{1}H\}$-NMR spectra for compound (*R*)-**4c**

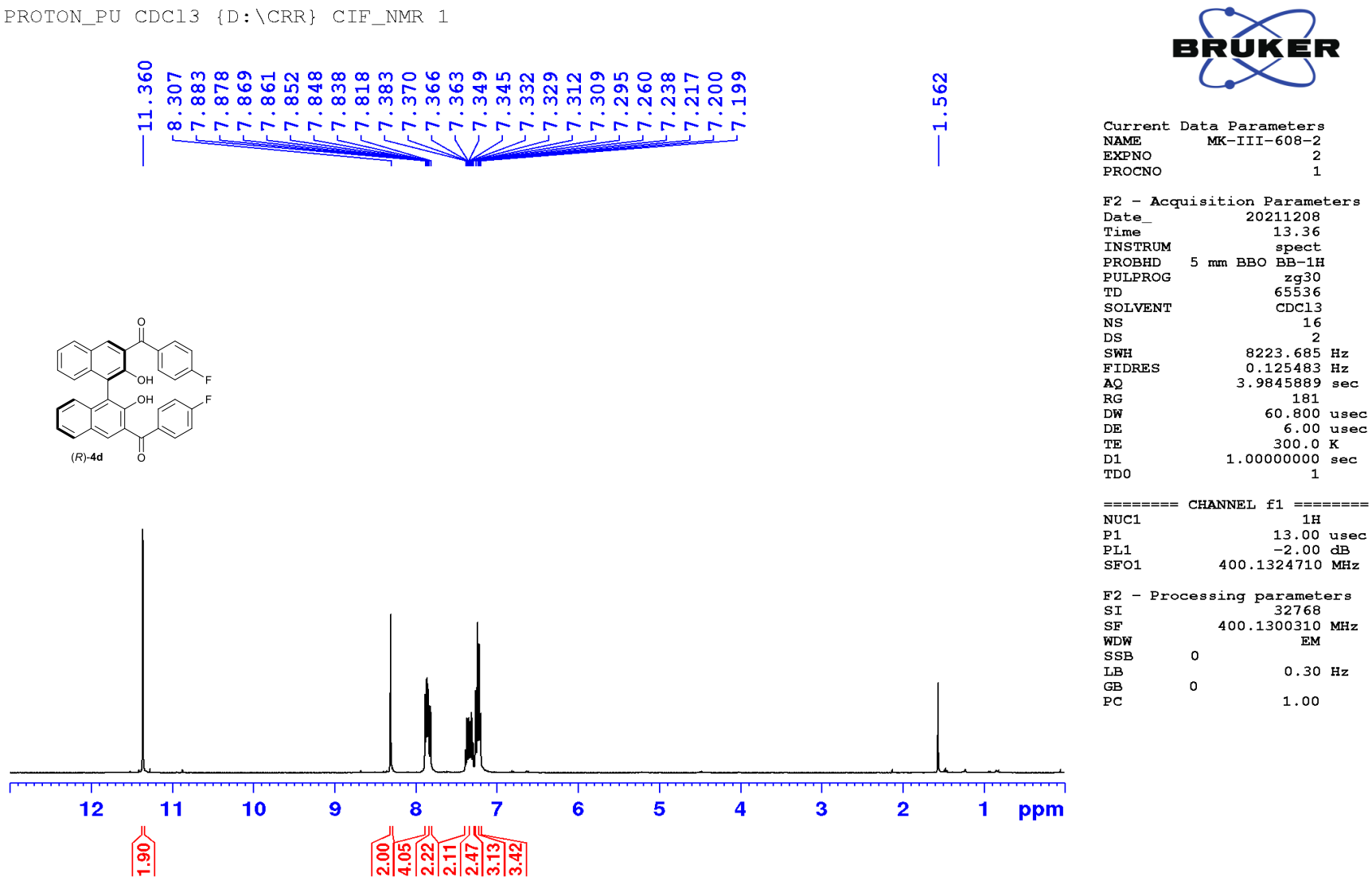
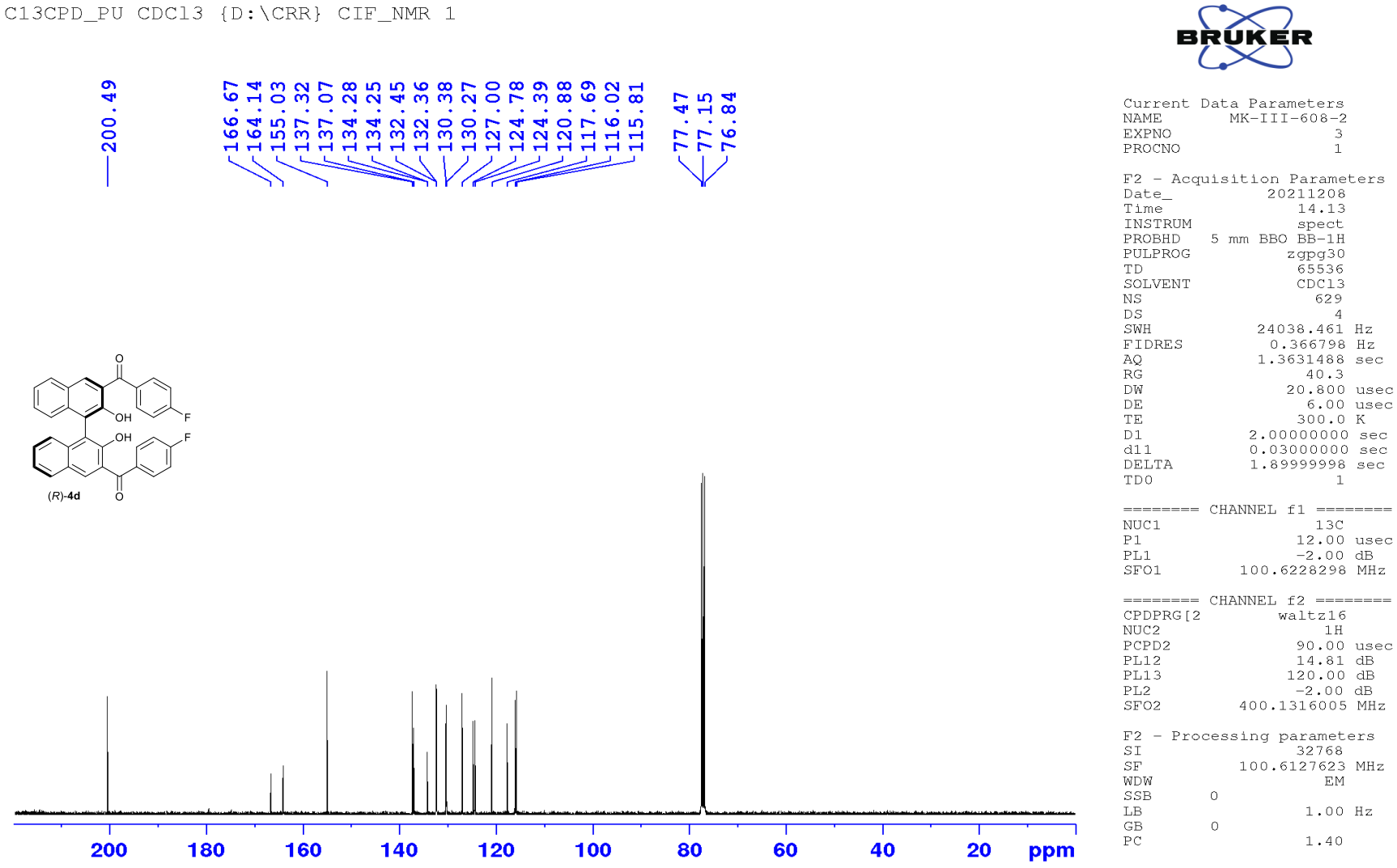


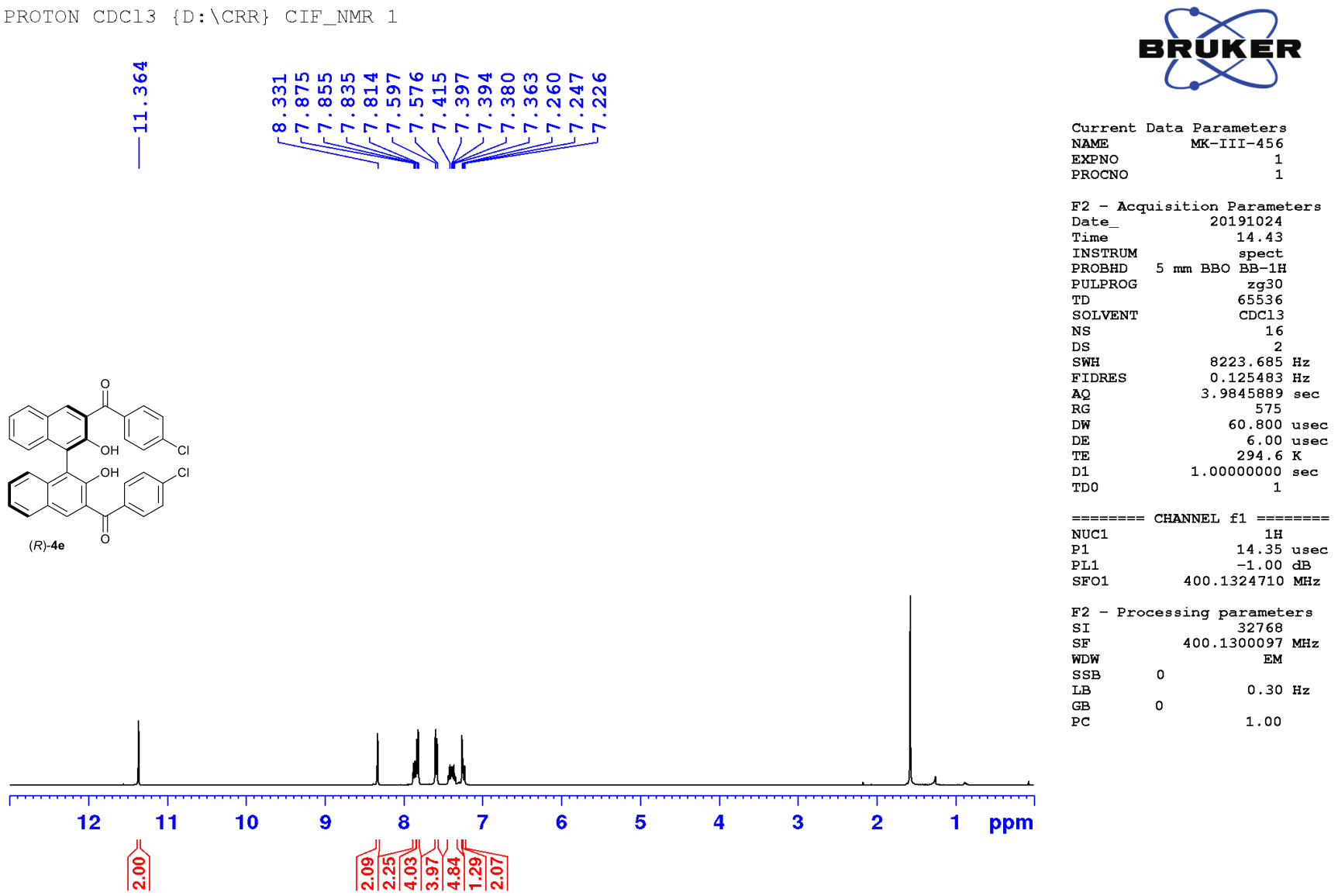
Figure S30: ^{1}H-NMR spectra for compound (*R*)-**4d**



BRUKER

```
Current Data Parameters
NAME        MK-III-608-2
EXPNO                  3
PROCNO                 1

F2 - Acquisition Parameters
Date_           20211208
Time               14.13
INSTRUM            spect
PROBHD   5 mm BBO BB-1H
PULPROG          zgpg30
TD                65536
SOLVENT           CDCl3
NS                  629
DS                    4
SWH           24038.461 Hz
FIDRES         0.366798 Hz
AQ             1.3631488 sec
RG                 40.3
DW                20.800 usec
DE                 6.00 usec
TE                300.0 K
D1            2.00000000 sec
d11           0.03000000 sec
DELTA         1.89999998 sec
TD0                   1

======== CHANNEL f1 ========
NUC1                 13C
P1                12.00 usec
PL1               -2.00 dB
SFO1        100.6228298 MHz

======== CHANNEL f2 ========
CPDPRG[2         waltz16
NUC2                 1H
PCPD2             90.00 usec
PL12              14.81 dB
PL13             120.00 dB
PL2               -2.00 dB
SFO2        400.1316005 MHz

F2 - Processing parameters
SI                32768
SF          100.6127623 MHz
WDW                  EM
SSB       0
LB                1.00 Hz
GB        0
PC                1.40
```

Figure S31: $^{13}C\{^{1}H\}$-NMR spectra for compound (*R*)-**4d**



Current Data Parameters
NAME MK-III-456
EXPNO 1
PROCNO 1

F2 - Acquisition Parameters
Date_ 20191024
Time 14.43
INSTRUM spect
PROBHD 5 mm BBO BB-1H
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 8223.685 Hz
FIDRES 0.125483 Hz
AQ 3.9845889 sec
RG 575
DW 60.800 usec
DE 6.00 usec
TE 294.6 K
D1 1.00000000 sec
TD0 1

======== CHANNEL f1 ========
NUC1 1H
P1 14.35 usec
PL1 -1.00 dB
SFO1 400.1324710 MHz

F2 - Processing parameters
SI 32768
SF 400.1300097 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

Figure S32: ^{1}H-NMR spectra for compound (*R*)-**4e**

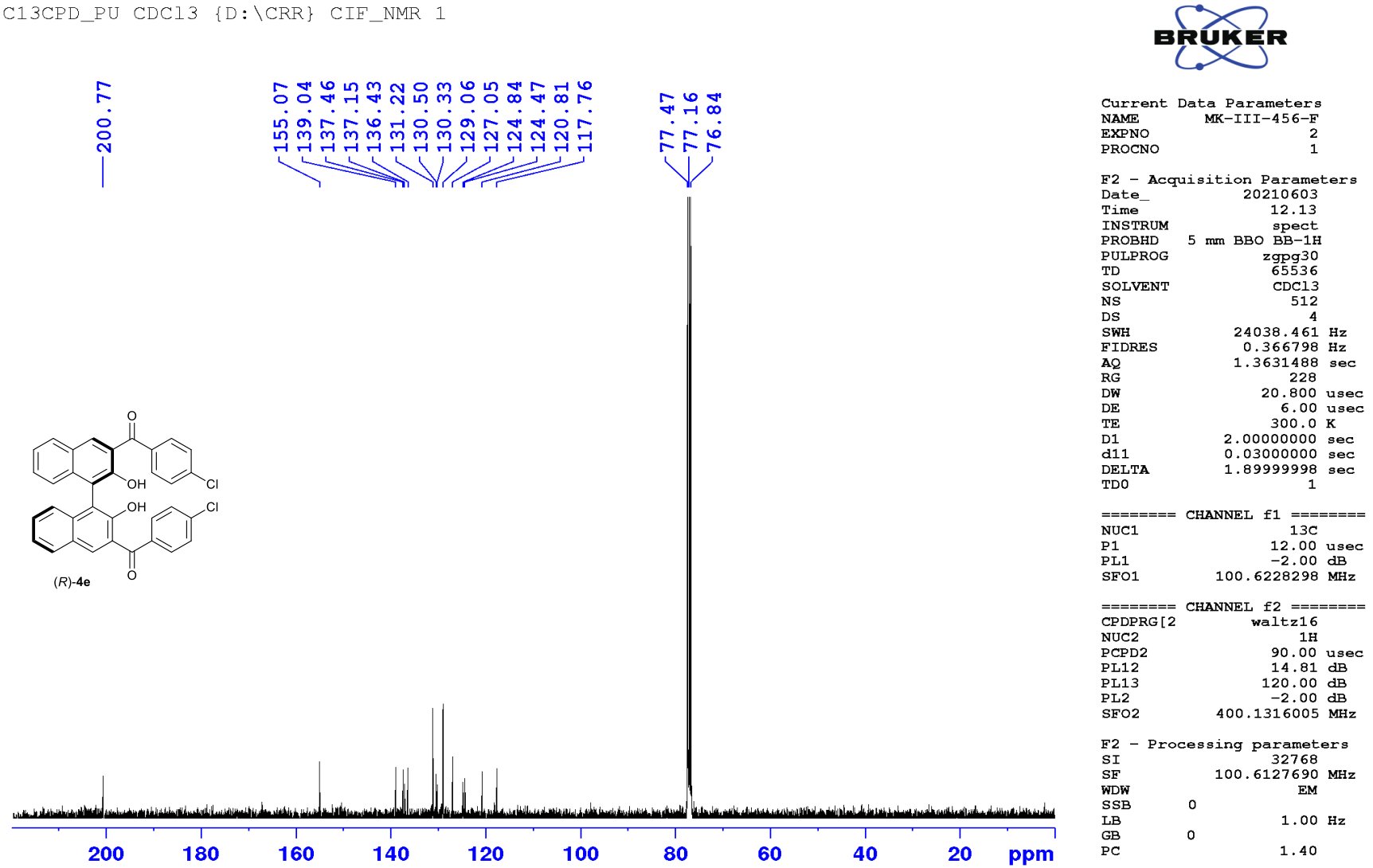


Figure S33: $^{13}C\{^{1}H\}$-NMR spectra for compound (*R*)-**4e**

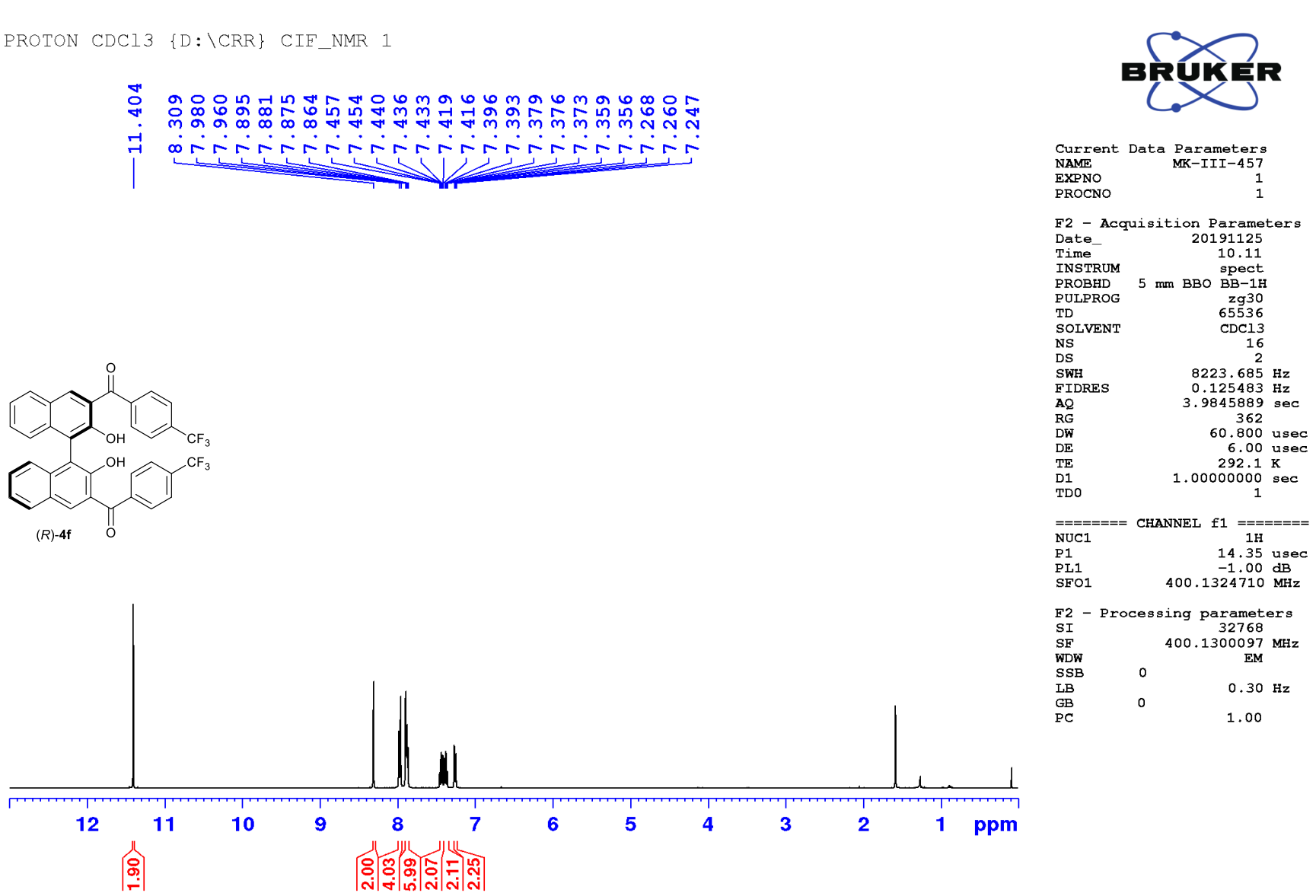
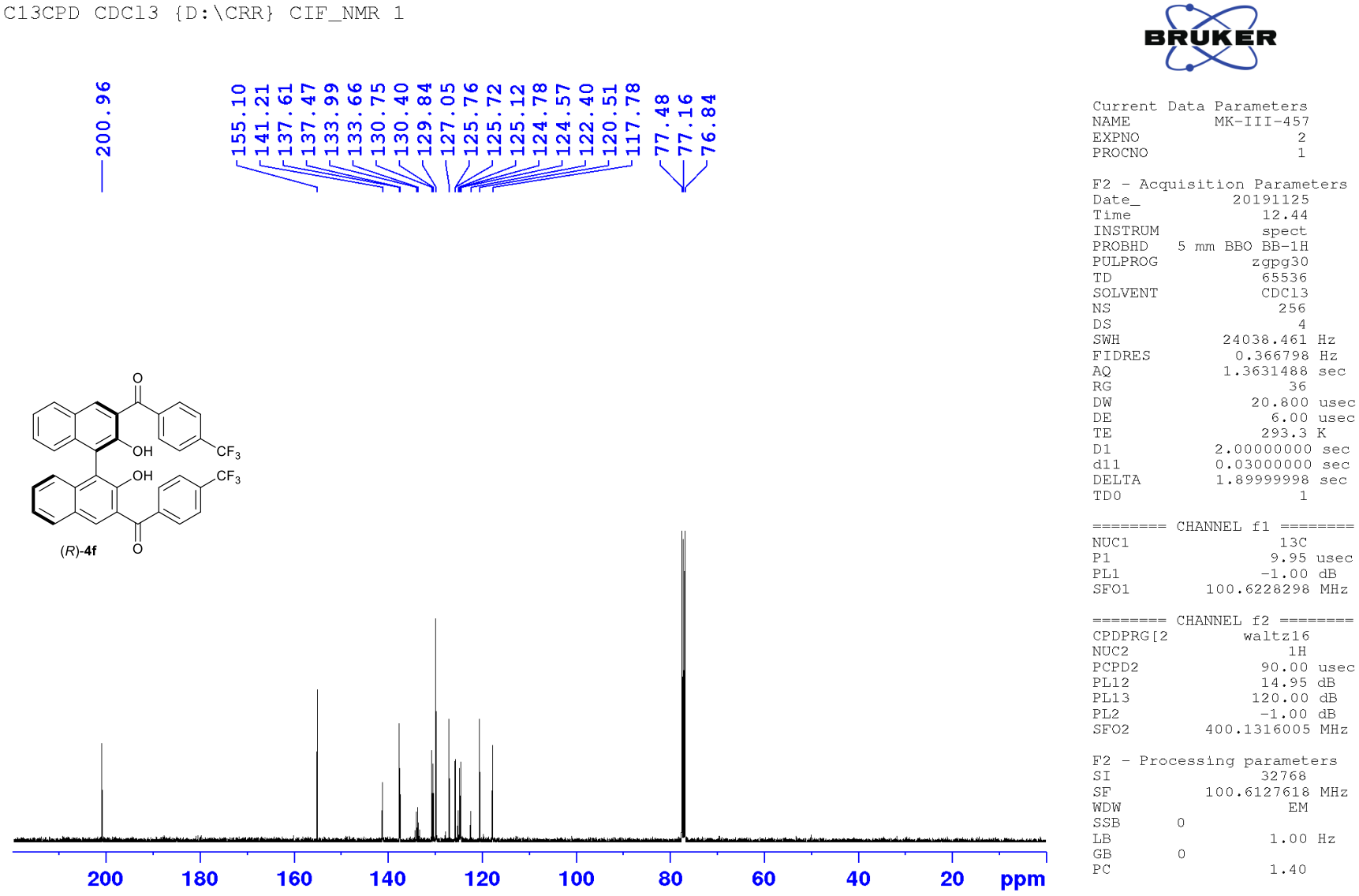
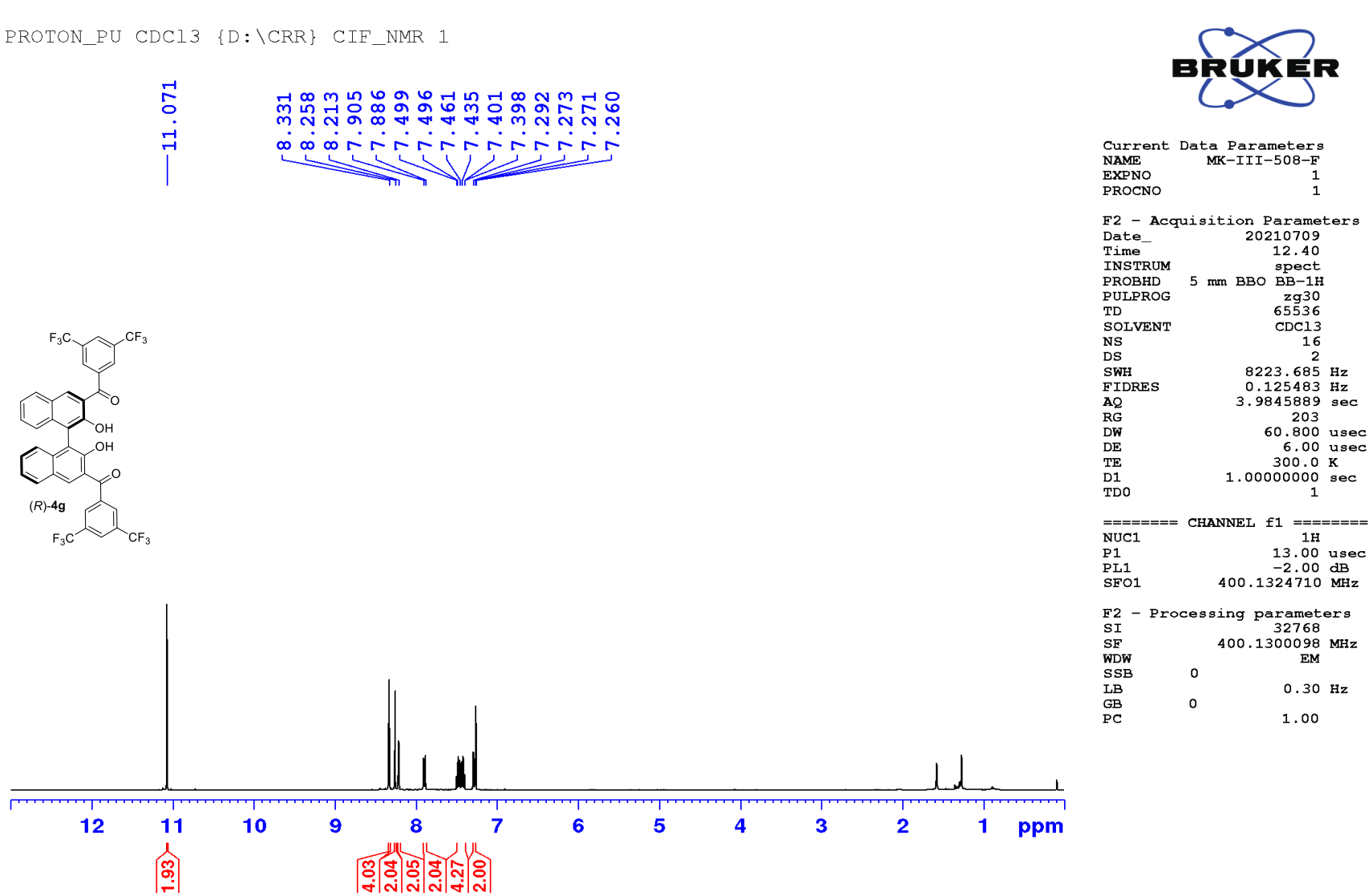


Figure S34: ^{1}H-NMR spectra for compound (*R*)-**4f**



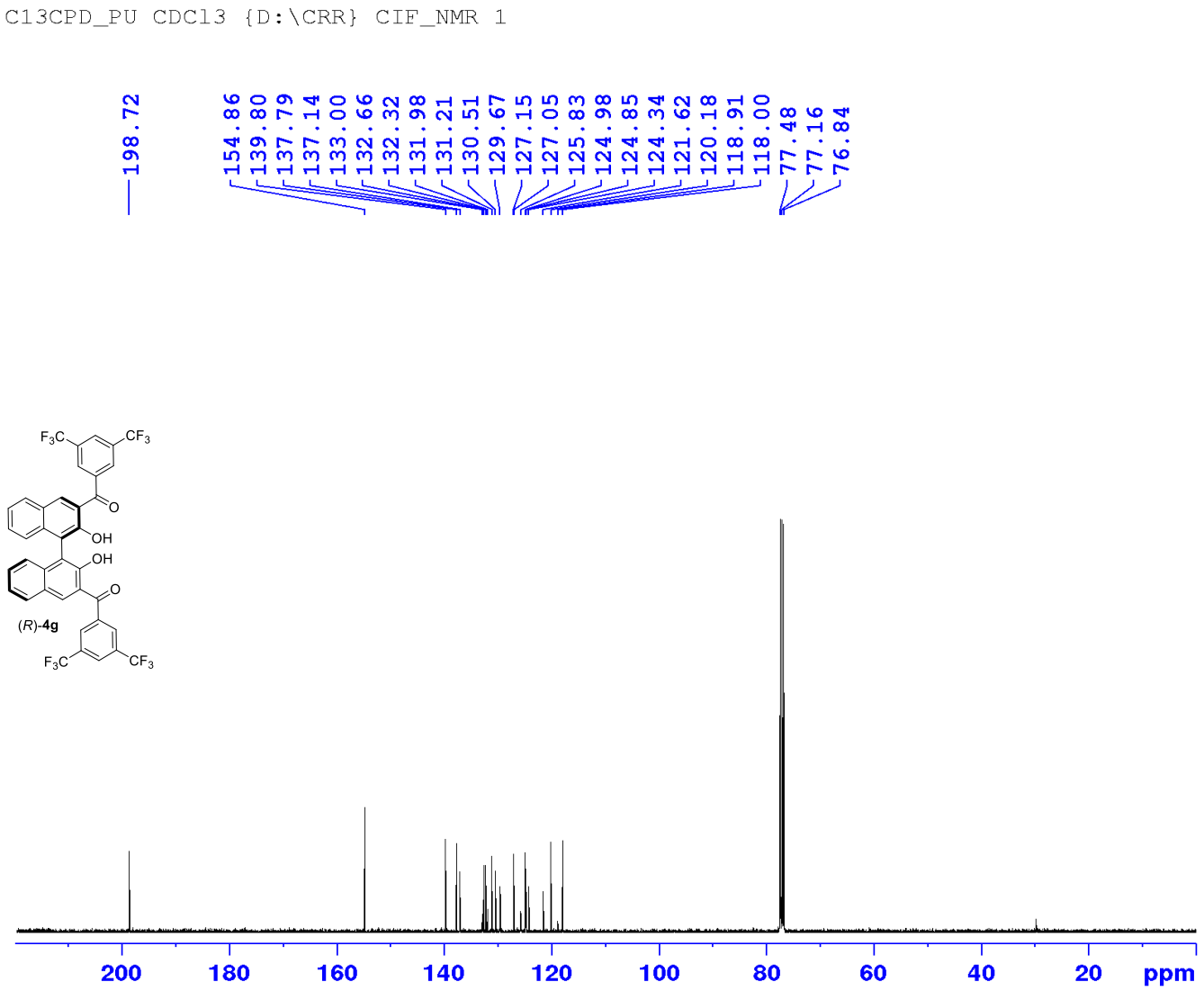

```
Current Data Parameters
NAME          MK-III-457
EXPNO                  2
PROCNO                 1

F2 - Acquisition Parameters
Date_           20191125
Time               12.44
INSTRUM            spect
PROBHD   5 mm BBO BB-1H
PULPROG          zgpg30
TD                65536
SOLVENT           CDCl3
NS                  256
DS                    4
SWH           24038.461 Hz
FIDRES         0.366798 Hz
AQ             1.3631488 sec
RG                   36
DW                20.800 usec
DE                 6.00 usec
TE                293.3 K
D1            2.00000000 sec
d11           0.03000000 sec
DELTA         1.89999998 sec
TD0                   1

======== CHANNEL f1 ========
NUC1                 13C
P1                 9.95 usec
PL1               -1.00 dB
SFO1         100.6228298 MHz

======== CHANNEL f2 ========
CPDPRG[2         waltz16
NUC2                 1H
PCPD2             90.00 usec
PL12              14.95 dB
PL13             120.00 dB
PL2               -1.00 dB
SFO2         400.1316005 MHz

F2 - Processing parameters
SI                32768
SF           100.6127618 MHz
WDW                  EM
SSB       0
LB                1.00 Hz
GB        0
PC                1.40
```

Figure S35: $^{13}C\{^{1}H\}$-NMR spectra for compound (*R*)-**4f**




```
Current Data Parameters
NAME        MK-III-508-F
EXPNO                  1
PROCNO                 1

F2 - Acquisition Parameters
Date_           20210709
Time               12.40
INSTRUM            spect
PROBHD   5 mm BBO BB-1H
PULPROG             zg30
TD                 65536
SOLVENT            CDCl3
NS                    16
DS                     2
SWH             8223.685 Hz
FIDRES          0.125483 Hz
AQ              3.9845889 sec
RG                   203
DW                60.800 usec
DE                 6.00 usec
TE                300.0 K
D1             1.00000000 sec
TD0                    1

======== CHANNEL f1 ========
NUC1                  1H
P1                13.00 usec
PL1               -2.00 dB
SFO1         400.1324710 MHz

F2 - Processing parameters
SI                 32768
SF           400.1300098 MHz
WDW                   EM
SSB       0
LB                 0.30 Hz
GB        0
PC                 1.00
```

Figure S36: ^{1}H-NMR spectra for compound (*R*)-**4g**



Current Data Parameters
NAME MK-III-508-F
EXPNO 2
PROCNO 1

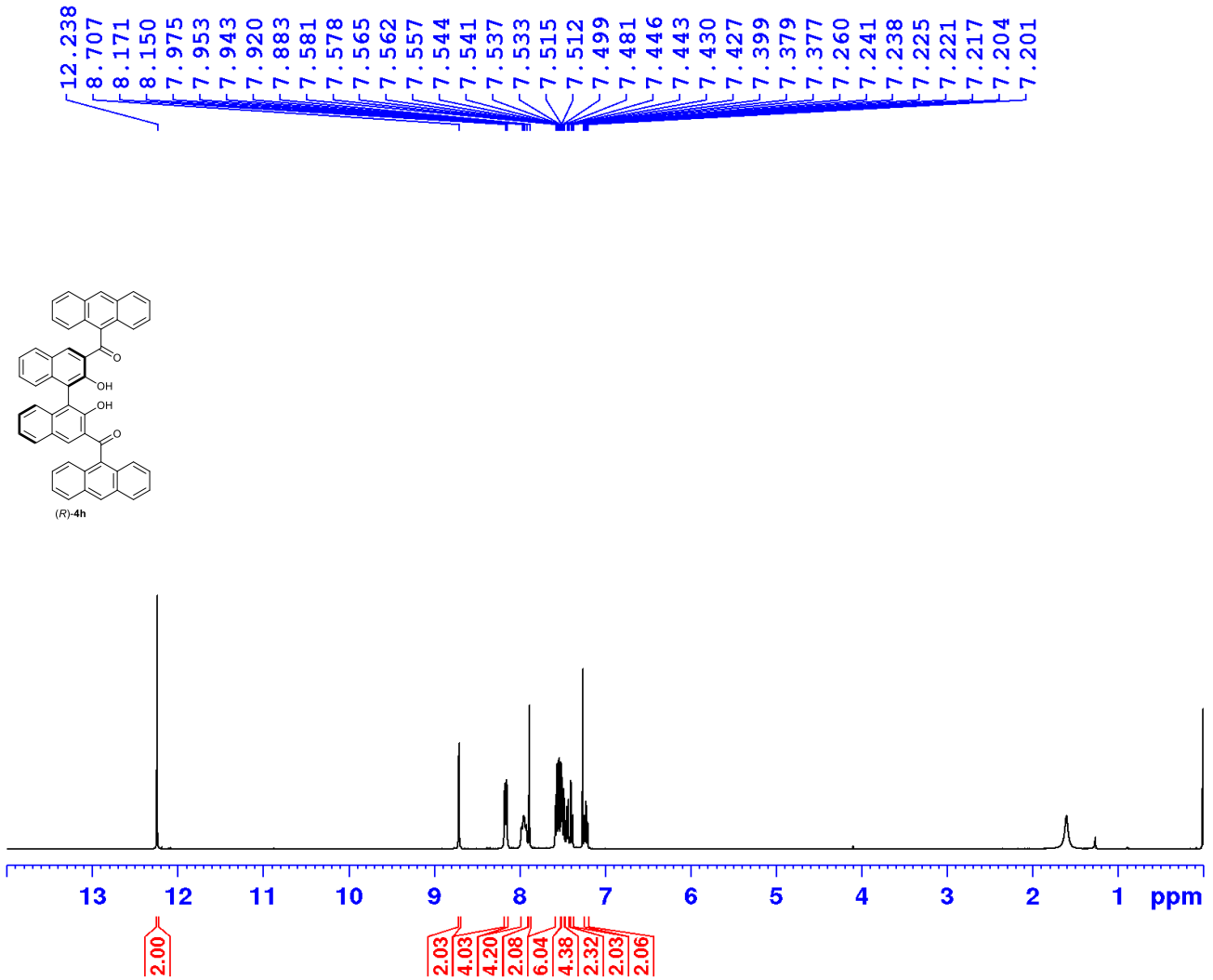
F2 - Acquisition Parameters
Date_ 20210709
Time 12.43
INSTRUM spect
PROBHD 5 mm BBO BB-1H
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 512
DS 4
SWH 24038.461 Hz
FIDRES 0.366798 Hz
AQ 1.3631488 sec
RG 287
DW 20.800 usec
DE 6.00 usec
TE 300.0 K
D1 2.00000000 sec
d11 0.03000000 sec
DELTA 1.89999998 sec
TD0 1

======== CHANNEL f1 ========
NUC1 13C
P1 12.00 usec
PL1 -2.00 dB
SFO1 100.6228298 MHz

======== CHANNEL f2 ========
CPDPRG[2 waltz16
NUC2 1H
PCPD2 90.00 usec
PL12 14.81 dB
PL13 120.00 dB
PL2 -2.00 dB
SFO2 400.1316005 MHz

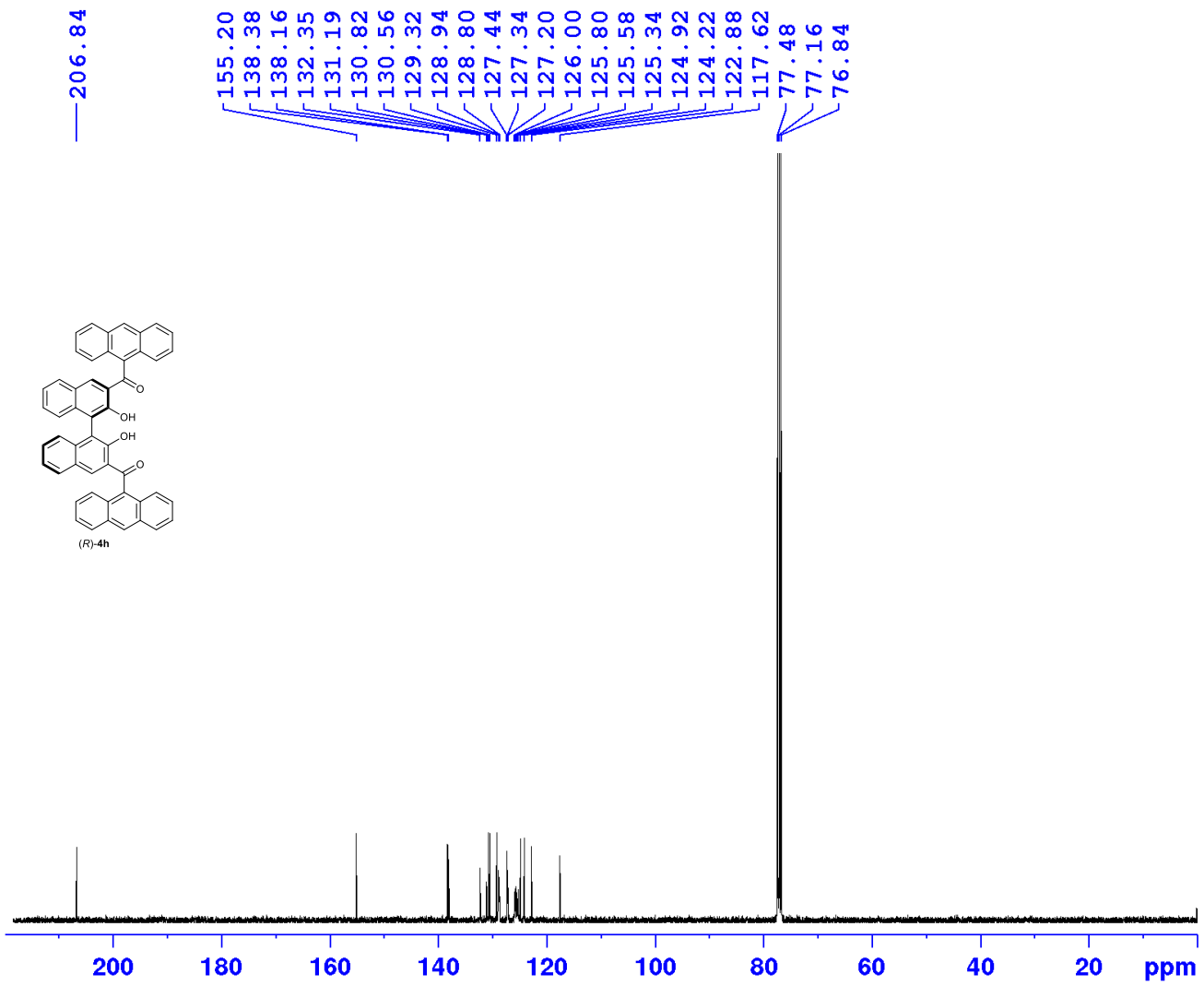
F2 - Processing parameters
SI 32768
SF 100.6127564 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40

Figure S37: $^{13}C\{^{1}H\}$-NMR spectra for compound (*R*)-**4g**




```
Current Data Parameters
NAME                  MK-IV-802
EXPNO                         1
PROCNO                        1

F2 - Acquisition Parameters
Date_                  20240103
Time                      13.41 h
INSTRUM  AVNeo400NB-5059676-
Pondicherry Univ
PROBHD    Z163739_0809 (
PULPROG                    zg30
TD                        65536
SOLVENT                   CDCl3
NS                           16
DS                            2
SWH                    8196.721 Hz
FIDRES                 0.250144 Hz
AQ                     3.9976959 sec
RG                          101
DW                       61.000 usec
DE                       13.89 usec
TE                       296.7 K
D1                    1.00000000 sec
TD0                           1
SFO1                400.1324708 MHz
NUC1                        1H
P0                       2.67 usec
P1                       8.00 usec
PLW1                24.18499947 W

F2 - Processing parameters
SI                        65536
SF                  400.1300098 MHz
WDW                          EM
SSB          0
LB                       0.30 Hz
GB           0
PC                       1.00
```

Figure S38: ^{1}H-NMR spectra for compound (*R*)-**4h**




```
Current Data Parameters
NAME                  MK-IV-802
EXPNO                         2
PROCNO                        1

F2 - Acquisition Parameters
Date_                  20240103
Time                      14.39 h
INSTRUM  AVNeo400NB-5059676
-Pondicherry Univ
PROBHD    Z163739_0809 (
PULPROG                 zgpg30
TD                       65536
SOLVENT                  CDCl3
NS                        1008
DS                           4
SWH                  23809.524 Hz
FIDRES                0.726609 Hz
AQ                    1.3762560 sec
RG                         101
DW                      21.000 usec
DE                       6.50 usec
TE                      297.2 K
D1                    2.00000000 sec
D11                   0.03000000 sec
TD0                          1
SFO1                100.6228298 MHz
NUC1                        13C
P0                       2.67 usec
P1                       8.00 usec
PLW1                91.39299774 W
SFO2                400.1316005 MHz
NUC2                        1H
CPDPRG[2                waltz65
PCPD2                   90.00 usec
PLW2                24.18499947 W
PLW12                0.18788880 W
PLW13                0.09416986 W

F2 - Processing parameters
SI                       32768
SF                  100.6127566 MHz
WDW                         EM
SSB       0
LB                       1.00 Hz
GB        0
PC                       1.40
```

Figure S39: $^{13}C\{^{1}H\}$-NMR spectra for compound (*R*)-**4h**

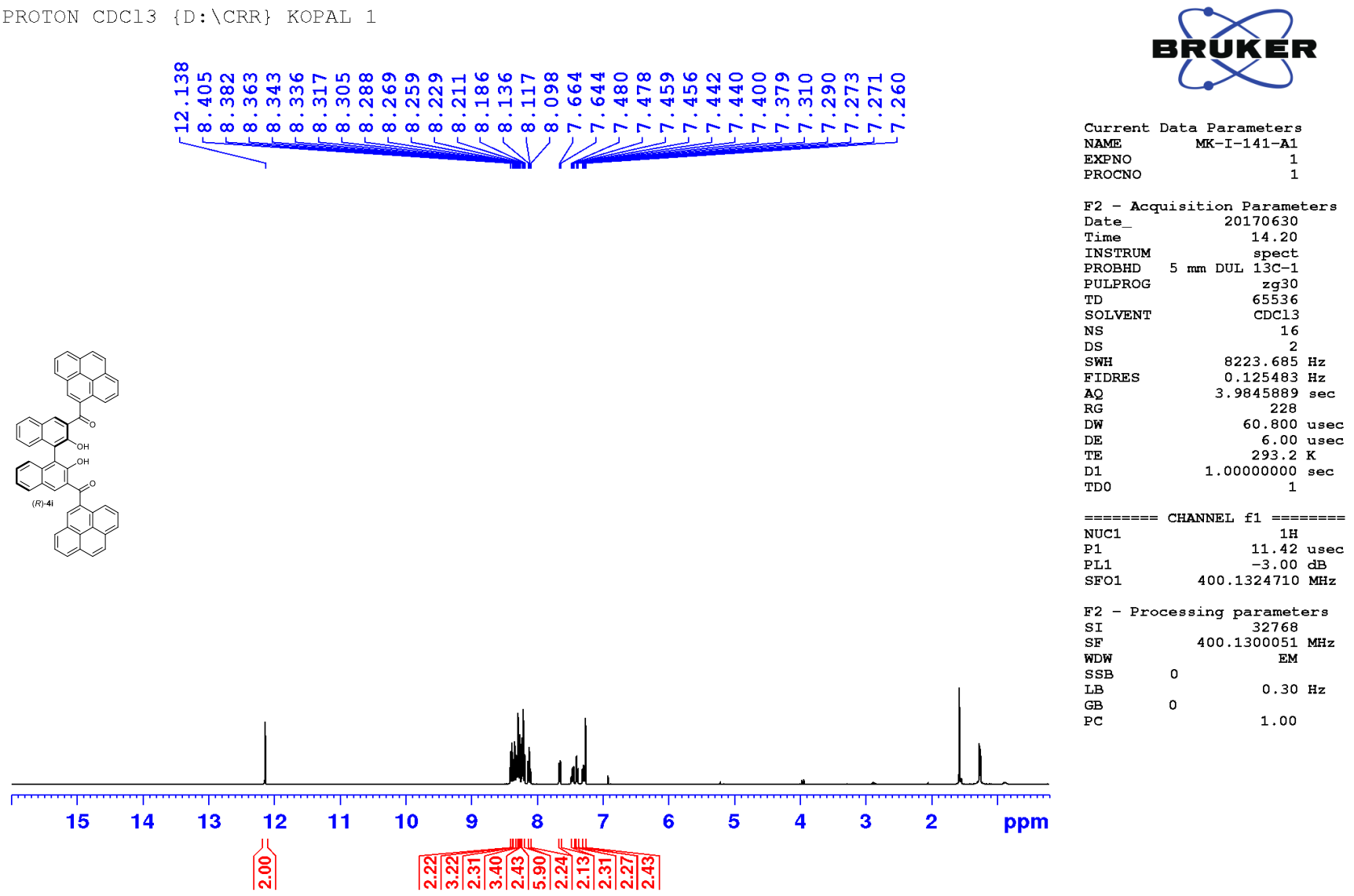


Figure S40: ^{1}H-NMR spectra for compound (*R*)-**4i**

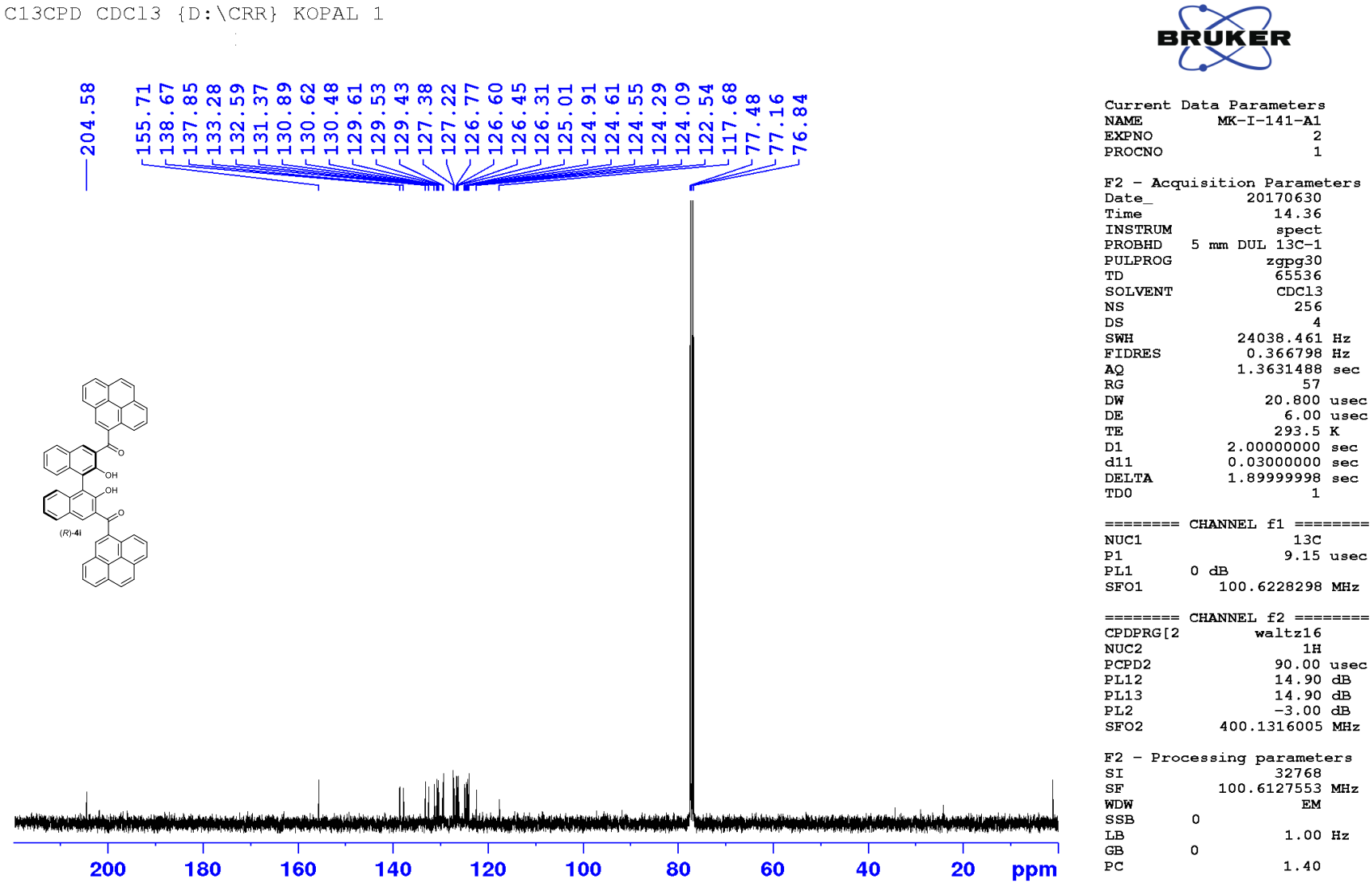
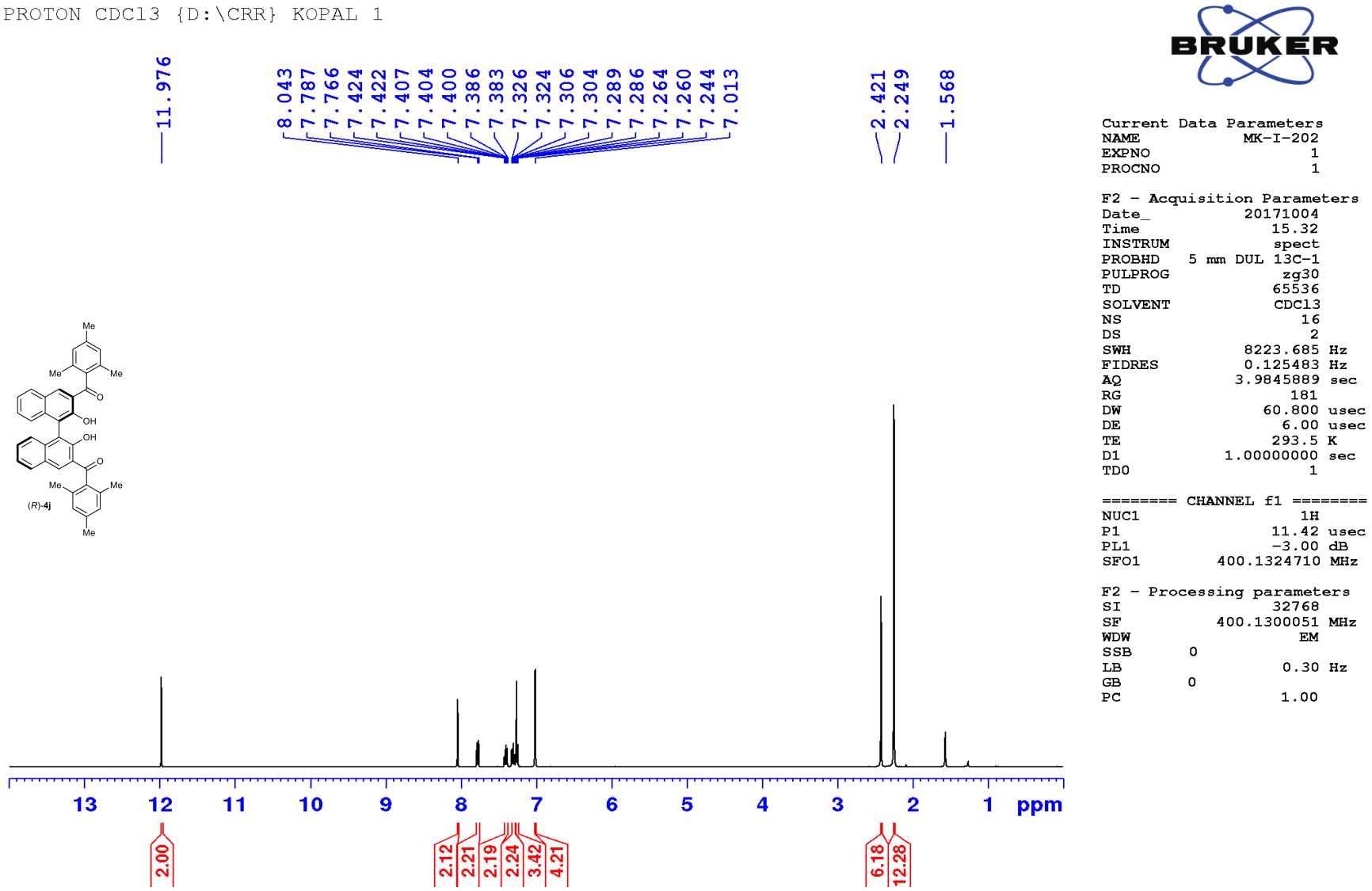


Figure S41: $^{13}C\{^{1}H\}$-NMR spectra for compound (*R*)-**4i**




```
Current Data Parameters
NAME                  MK-I-202
EXPNO                        1
PROCNO                       1

F2 - Acquisition Parameters
Date_              20171004
Time                   15.32
INSTRUM                spect
PROBHD    5 mm DUL 13C-1
PULPROG                zg30
TD                    65536
SOLVENT               CDCl3
NS                       16
DS                        2
SWH                8223.685 Hz
FIDRES             0.125483 Hz
AQ                 3.9845889 sec
RG                       181
DW                  60.800 usec
DE                   6.00 usec
TE                   293.5 K
D1                1.00000000 sec
TD0                          1

======== CHANNEL f1 ========
NUC1                        1H
P1                      11.42 usec
PL1                     -3.00 dB
SFO1           400.1324710 MHz

F2 - Processing parameters
SI                       32768
SF             400.1300051 MHz
WDW                         EM
SSB          0
LB                       0.30 Hz
GB           0
PC                       1.00
```

Figure S42: ^{1}H-NMR spectra for compound (*R*)-**4j**

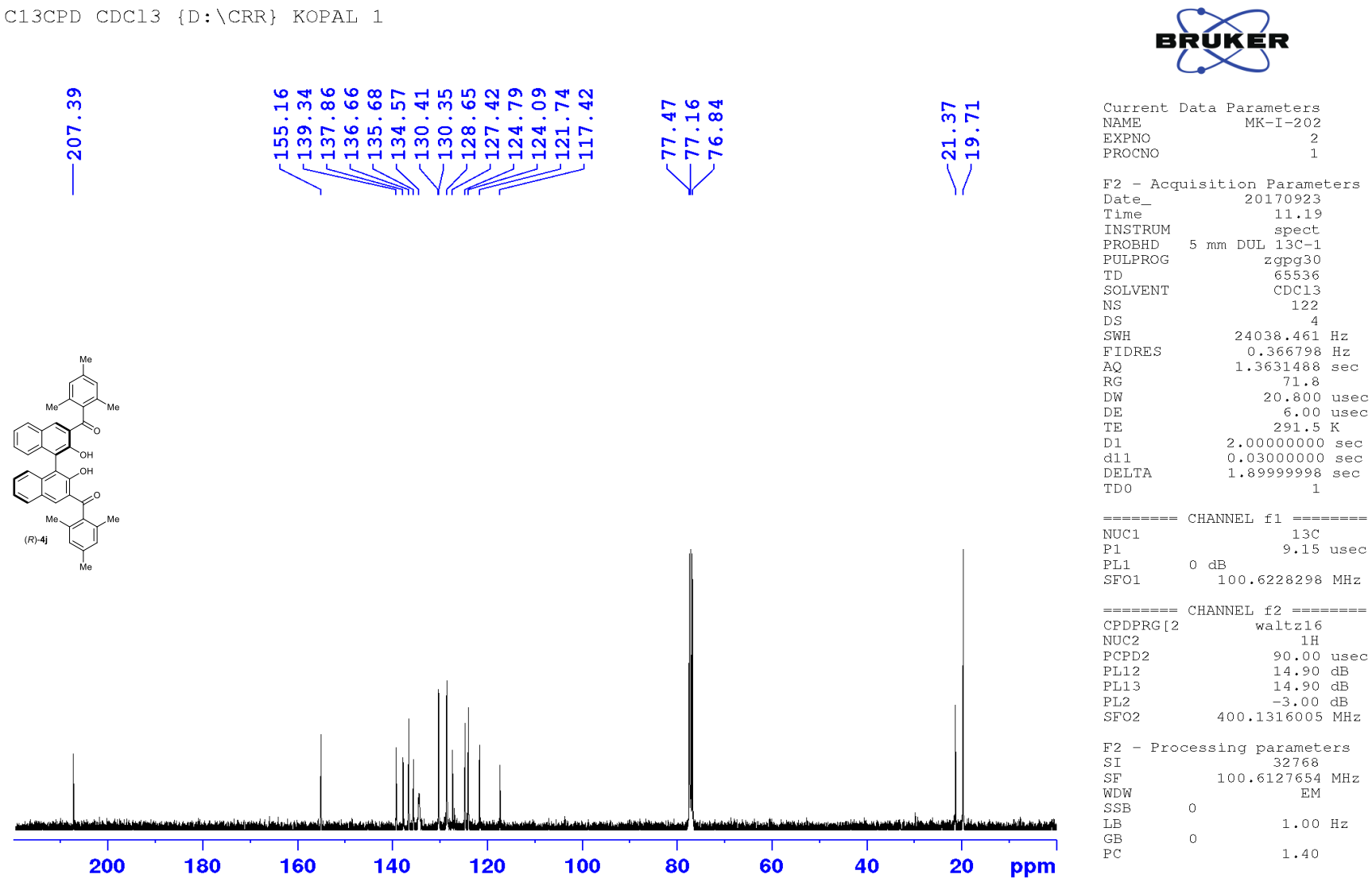
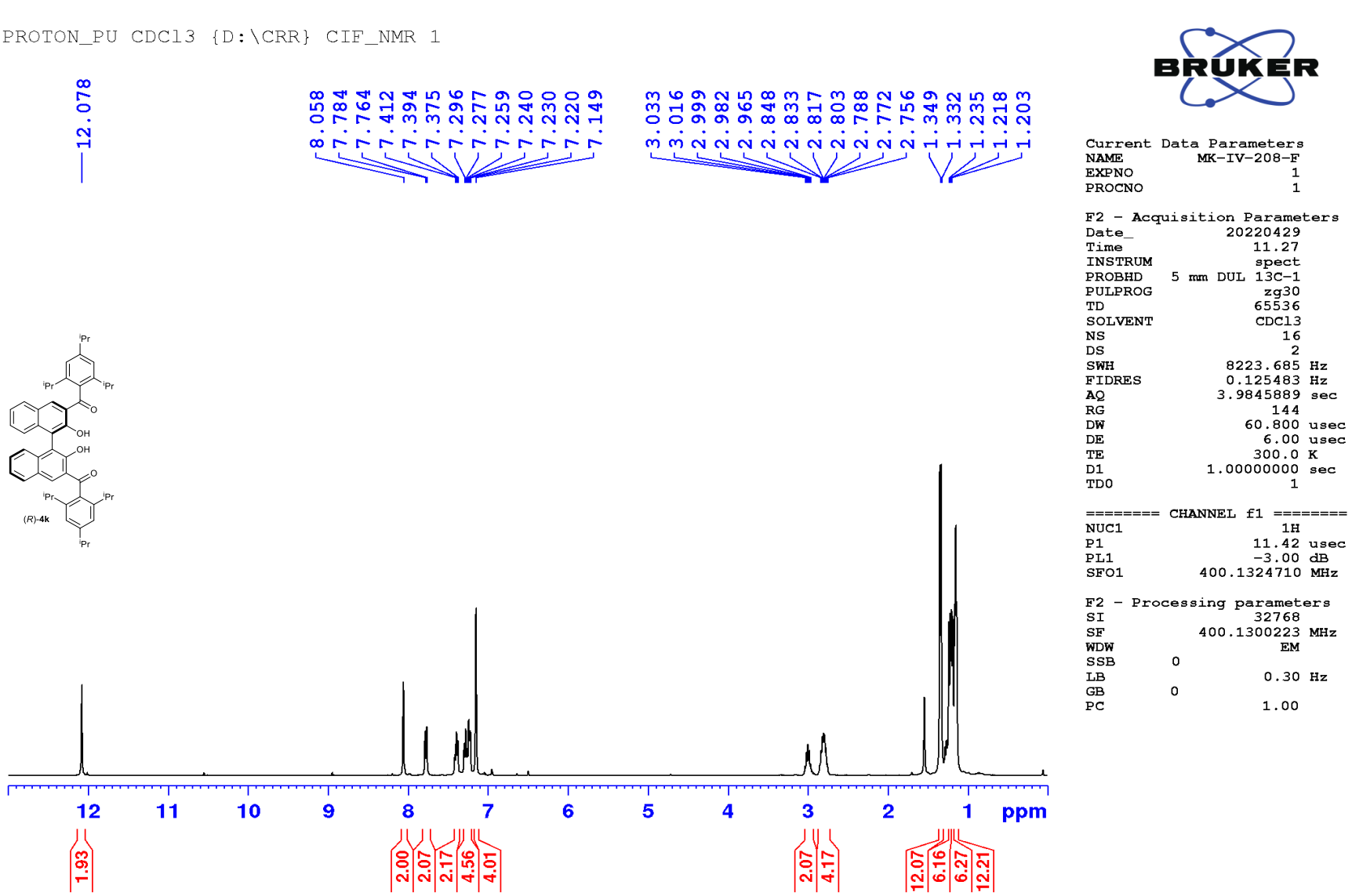


Figure S43: $^{13}C\{^{1}H\}$-NMR spectra for compound (*R*)-**4j**




```
Current Data Parameters
NAME          MK-IV-208-F
EXPNO                   1
PROCNO                  1

F2 - Acquisition Parameters
Date_            20220429
Time                11.27
INSTRUM             spect
PROBHD    5 mm DUL 13C-1
PULPROG              zg30
TD                  65536
SOLVENT             CDCl3
NS                     16
DS                      2
SWH              8223.685 Hz
FIDRES           0.125483 Hz
AQ               3.9845889 sec
RG                    144
DW                 60.800 usec
DE                  6.00 usec
TE                 300.0 K
D1            1.00000000 sec
TD0                     1

======== CHANNEL f1 ========
NUC1                   1H
P1                 11.42 usec
PL1                -3.00 dB
SFO1         400.1324710 MHz

F2 - Processing parameters
SI                  32768
SF           400.1300223 MHz
WDW                    EM
SSB       0
LB                  0.30 Hz
GB        0
PC                  1.00
```

Figure S44: ^{1}H-NMR spectra for compound (*R*)-**4k**

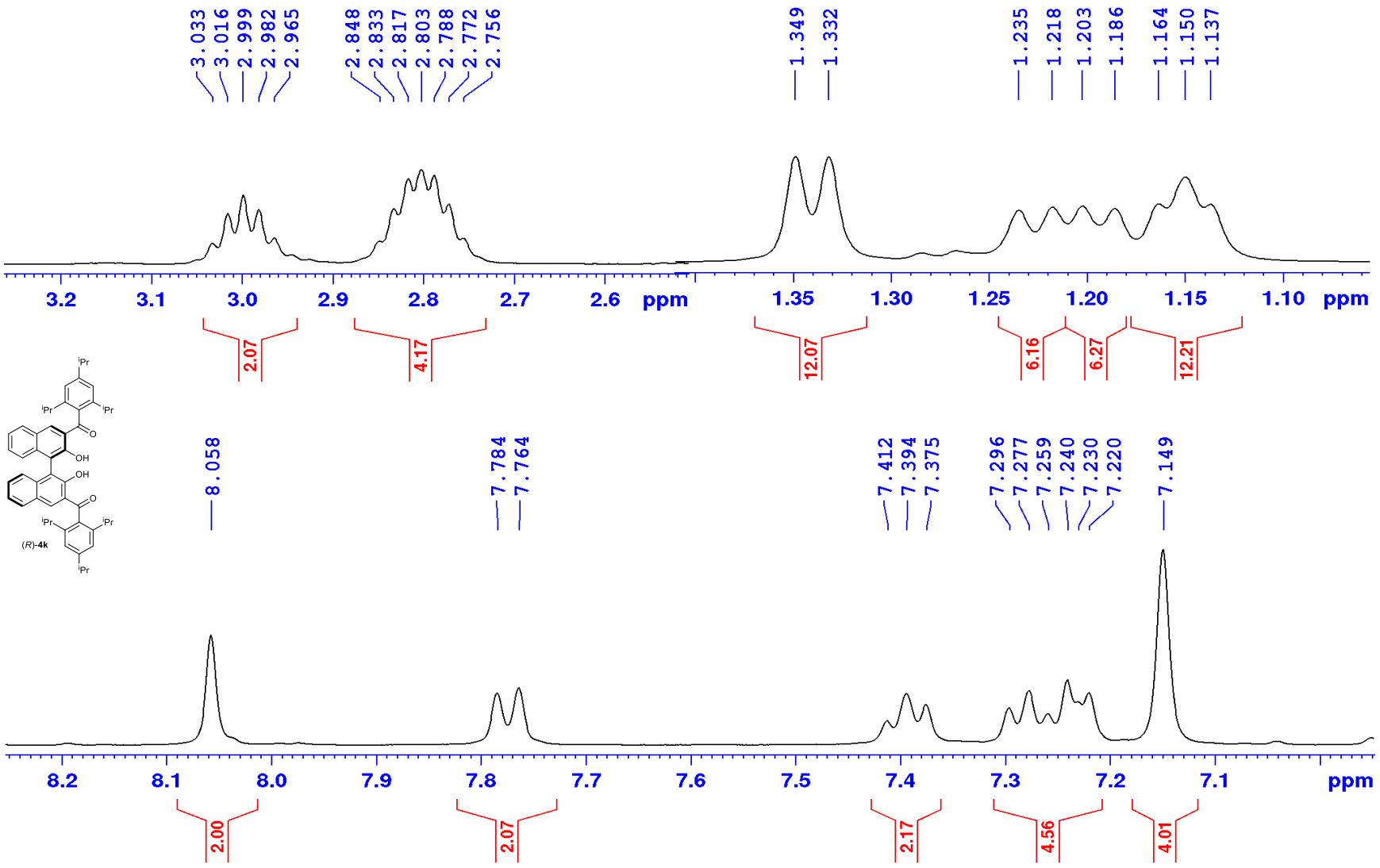
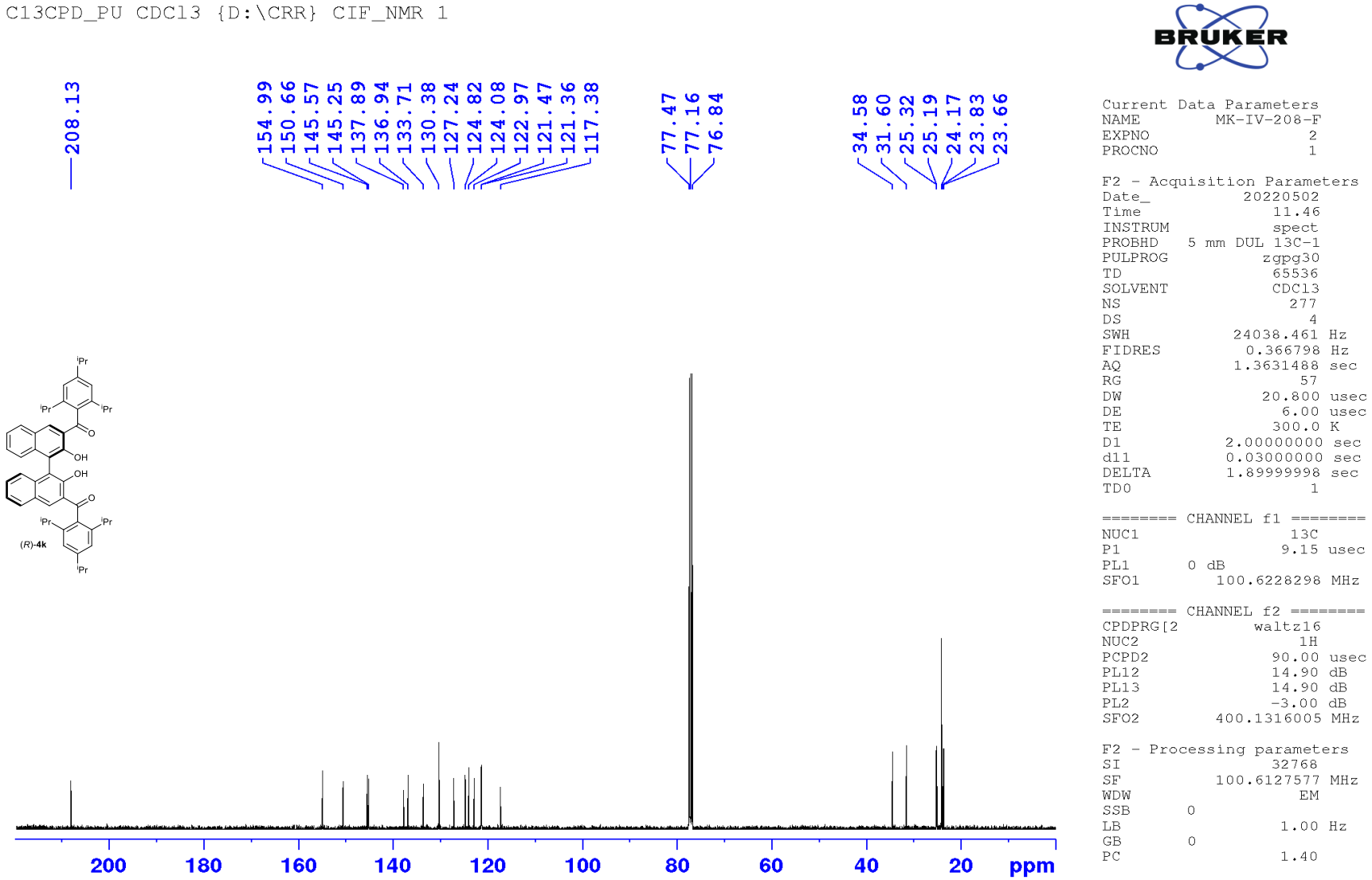


Figure S45: ^{1}H-NMR spectra for compound (*R*)-**4k**




```
Current Data Parameters
NAME         MK-IV-208-F
EXPNO                  2
PROCNO                 1

F2 - Acquisition Parameters
Date_           20220502
Time               11.46
INSTRUM            spect
PROBHD   5 mm DUL 13C-1
PULPROG          zgpg30
TD                65536
SOLVENT           CDCl3
NS                  277
DS                    4
SWH           24038.461 Hz
FIDRES         0.366798 Hz
AQ             1.3631488 sec
RG                   57
DW                20.800 usec
DE                 6.00 usec
TE                300.0 K
D1            2.00000000 sec
d11           0.03000000 sec
DELTA         1.89999998 sec
TD0                   1

======== CHANNEL f1 ========
NUC1                 13C
P1                  9.15 usec
PL1       0 dB
SFO1         100.6228298 MHz

======== CHANNEL f2 ========
CPDPRG[2          waltz16
NUC2                 1H
PCPD2              90.00 usec
PL12               14.90 dB
PL13               14.90 dB
PL2                -3.00 dB
SFO2         400.1316005 MHz

F2 - Processing parameters
SI                  32768
SF           100.6127577 MHz
WDW                  EM
SSB       0
LB                  1.00 Hz
GB        0
PC                  1.40
```

Figure S46: $^{13}C\{^{1}H\}$-NMR spectra for compound (*R*)-**4k**

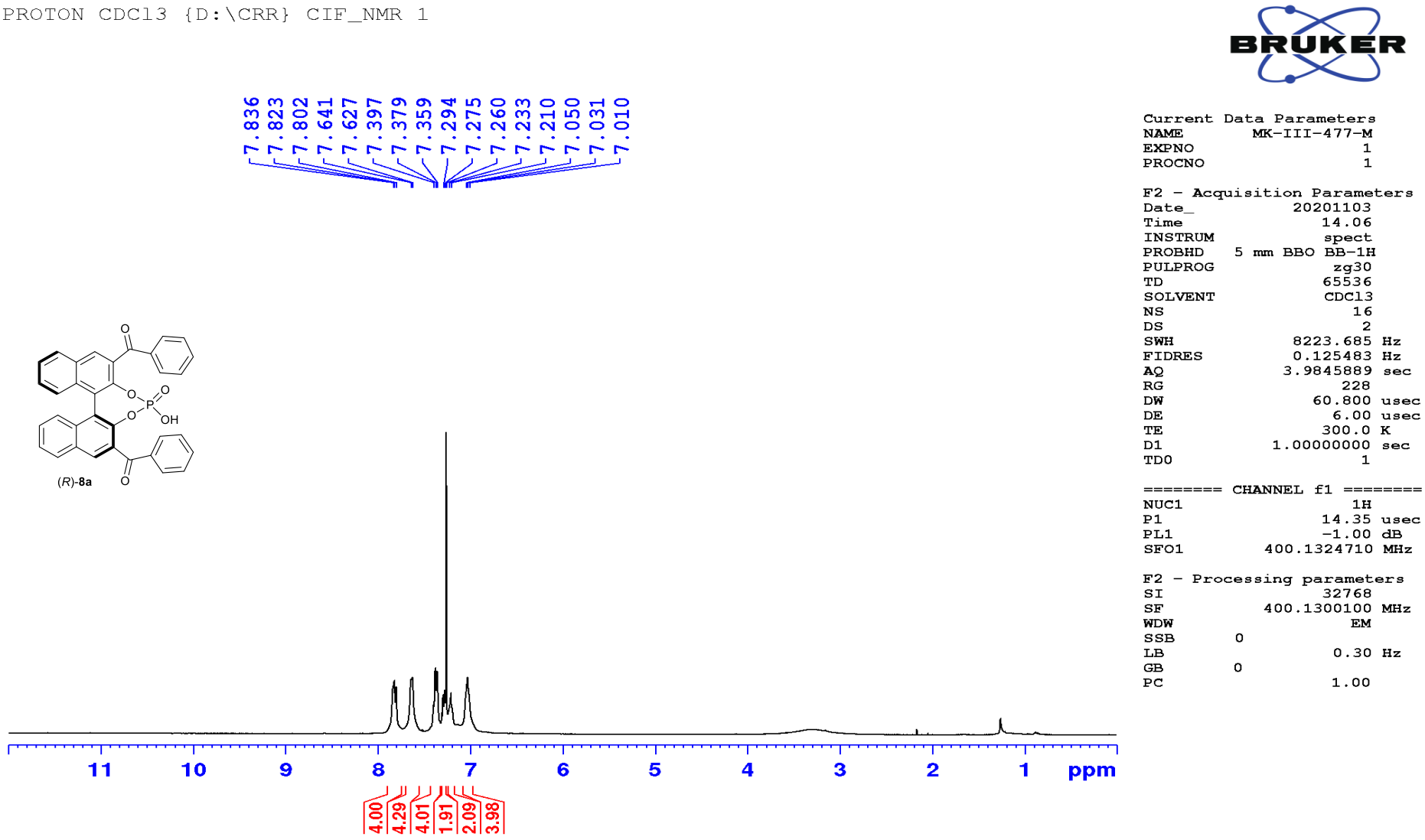
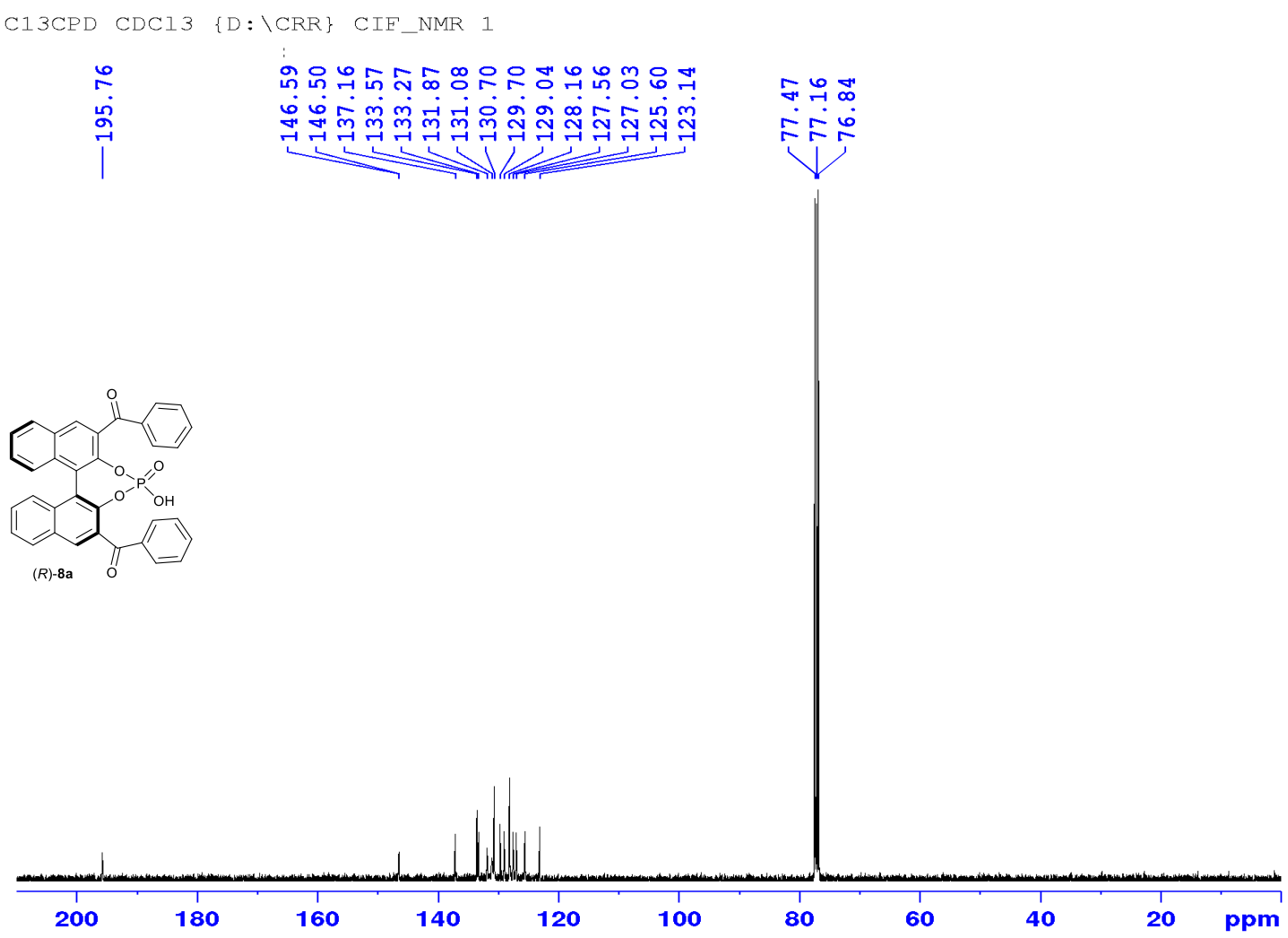


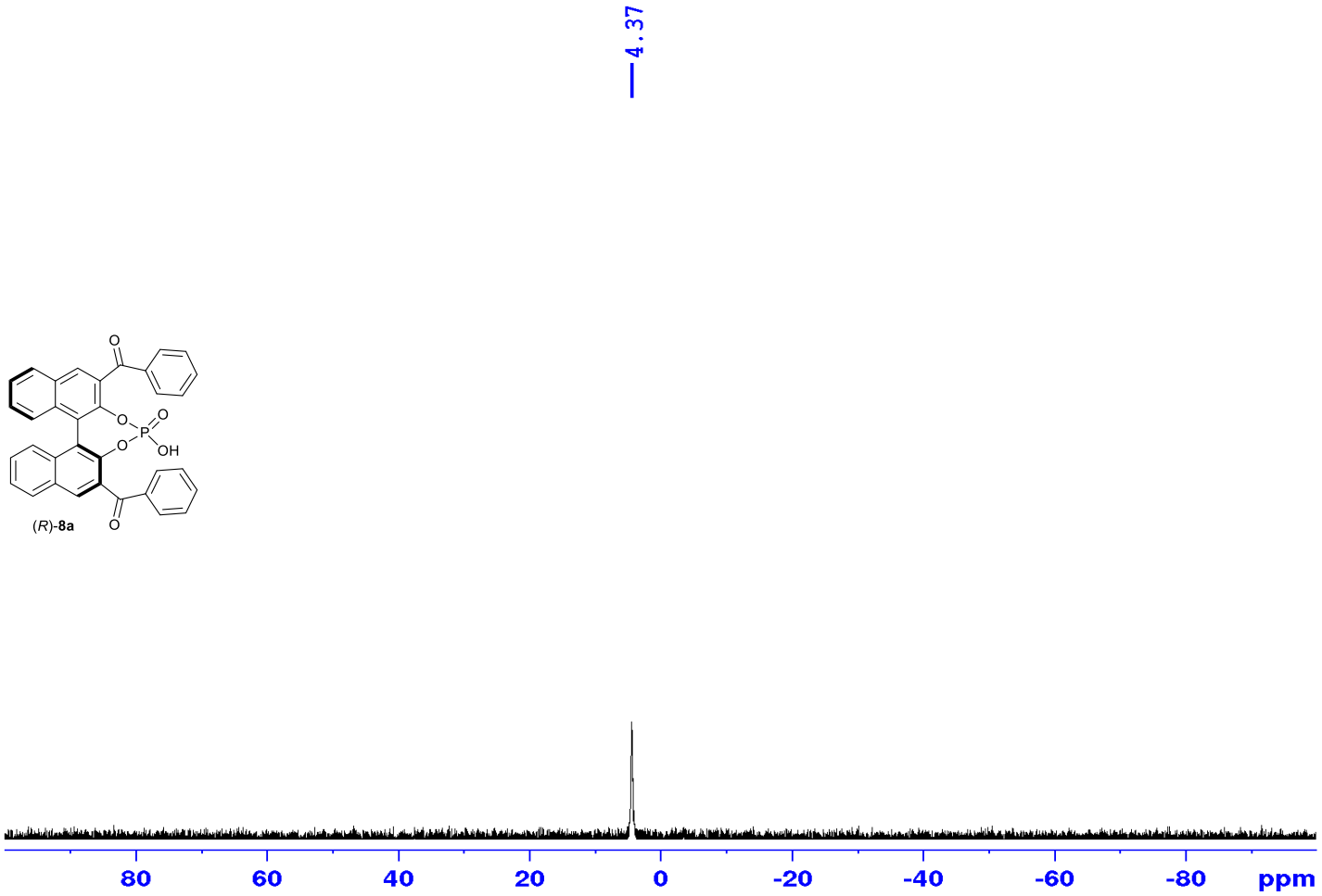
Figure S47: ^{1}H-NMR spectra for compound (*R*)-**8a**




```
Current Data Parameters
NAME                  MK-III-477-M
EXPNO                            4
PROCNO                           1

F2 - Acquisition Parameters
Date_                     20201106
Time                         12.03
INSTRUM                      spect
PROBHD    5 mm BBO BB-1H
PULPROG                     zgpg30
TD                           65536
SOLVENT                      CDCl3
NS                             300
DS                               4
SWH                    24038.461 Hz
FIDRES                  0.366798 Hz
AQ                      1.3631488 sec
RG                            40.3
DW                          20.800 usec
DE                           6.00 usec
TE                          300.0 K
D1                     2.00000000 sec
d11                    0.03000000 sec
DELTA                  1.89999998 sec
TD0                              1

======== CHANNEL f1 ========
NUC1                           13C
P1                            9.95 usec
PL1                          -1.00 dB
SFO1                100.6228298 MHz

======== CHANNEL f2 ========
CPDPRG[2                 waltz16
NUC2                           1H
PCPD2                       90.00 usec
PL12                        14.95 dB
PL13                       120.00 dB
PL2                          -1.00 dB
SFO2                400.1316005 MHz

F2 - Processing parameters
SI                           32768
SF                  100.6127665 MHz
WDW                             EM
SSB                0
LB                            1.00 Hz
GB                 0
PC                            1.40
```

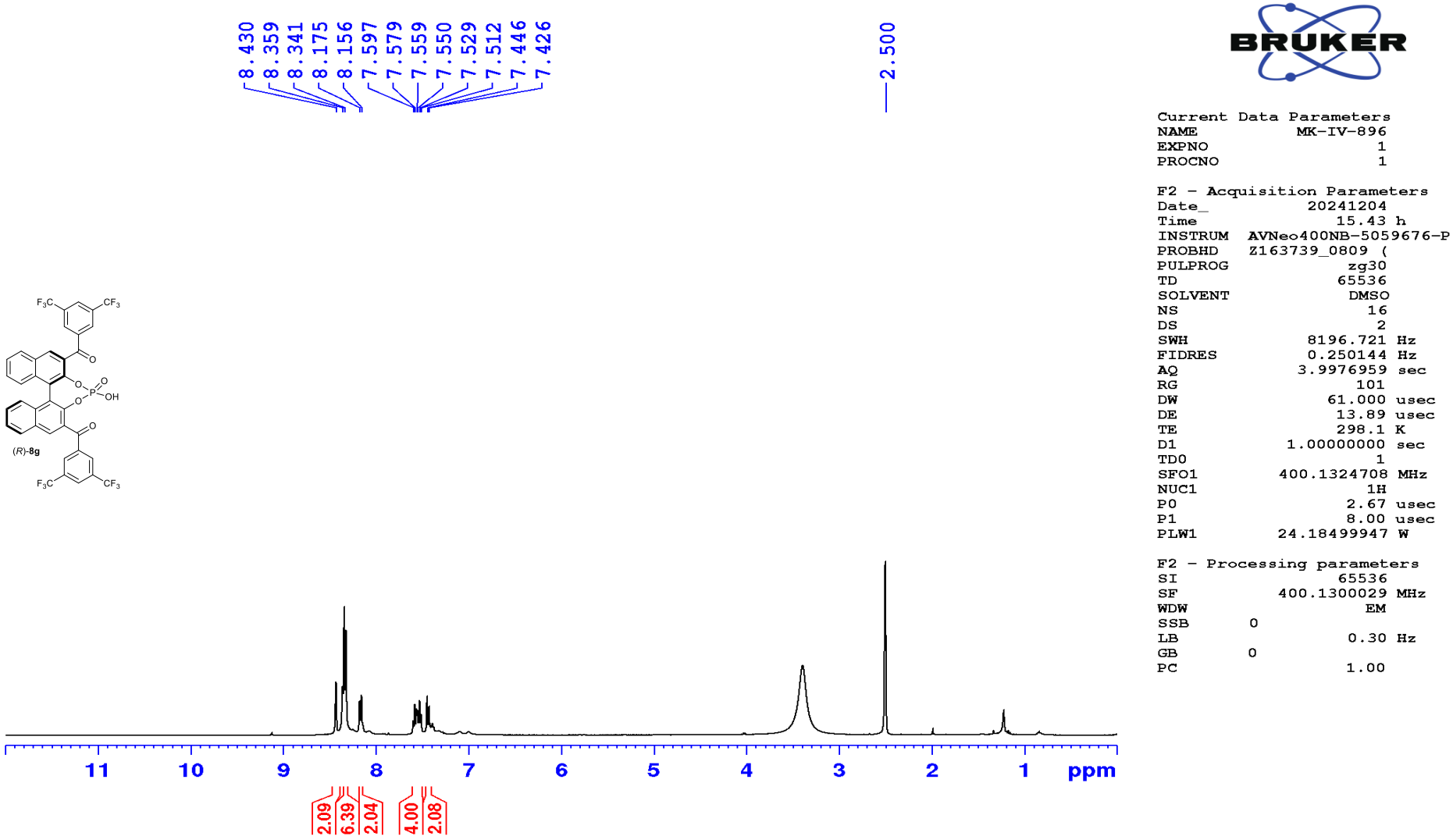
Figure S48: $^{13}C\{^{1}H\}$-NMR spectra for compound (*R*)-**8a**

P31CPD CDCl3 {D:\CRR} CIF_NMR 1



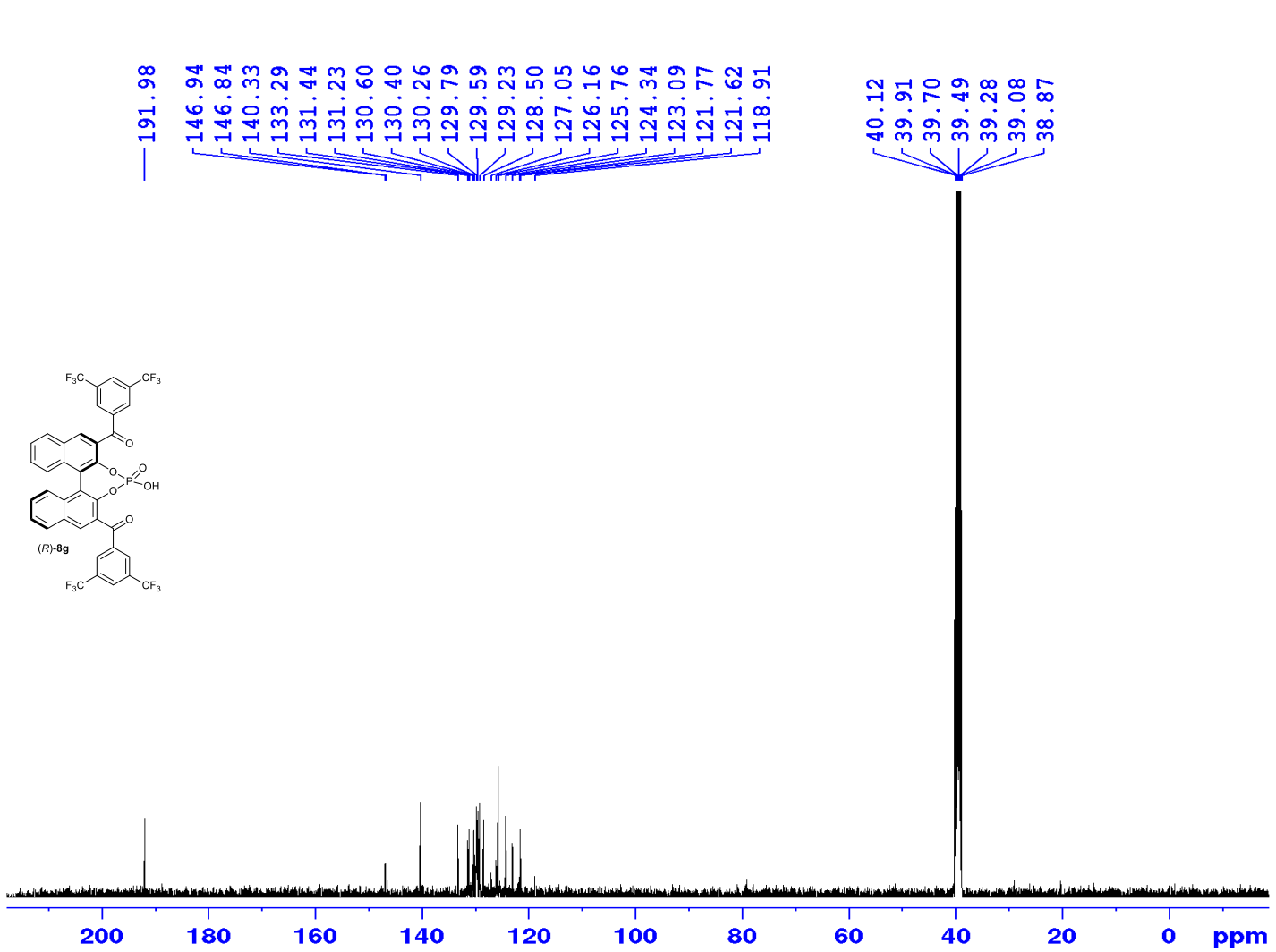

```
Current Data Parameters
NAME        MK-III-477-M
EXPNO                  2
PROCNO                 1

F2 - Acquisition Parameters
Date_           20201104
Time               16.38
INSTRUM            spect
PROBHD   5 mm BBO BB-1H
PULPROG          zgpg30
TD                65536
SOLVENT           CDCl3
NS                   16
DS                    4
SWH           64102.563 Hz
FIDRES         0.978127 Hz
AQ             0.5111808 sec
RG                 2050
DW                7.800 usec
DE                6.00 usec
TE                300.0 K
D1            2.00000000 sec
d11           0.03000000 sec
DELTA         1.89999998 sec
TD0                   1

======== CHANNEL f1 ========
NUC1                 31P
P1                10.80 usec
PL1       0 dB
SFO1        161.9674942 MHz

======== CHANNEL f2 ========
CPDPRG[2          waltz16
NUC2                 1H
PCPD2             90.00 usec
PL12              14.95 dB
PL13             120.00 dB
PL2               -1.00 dB
SFO2         400.1316005 MHz

F2 - Processing parameters
SI                  32768
SF           161.9755930 MHz
WDW                    EM
SSB       0
LB                 1.00 Hz
GB        0
PC                 1.40
```

Figure S49: ^{31}P-NMR spectra for compound (*R*)-**8a**



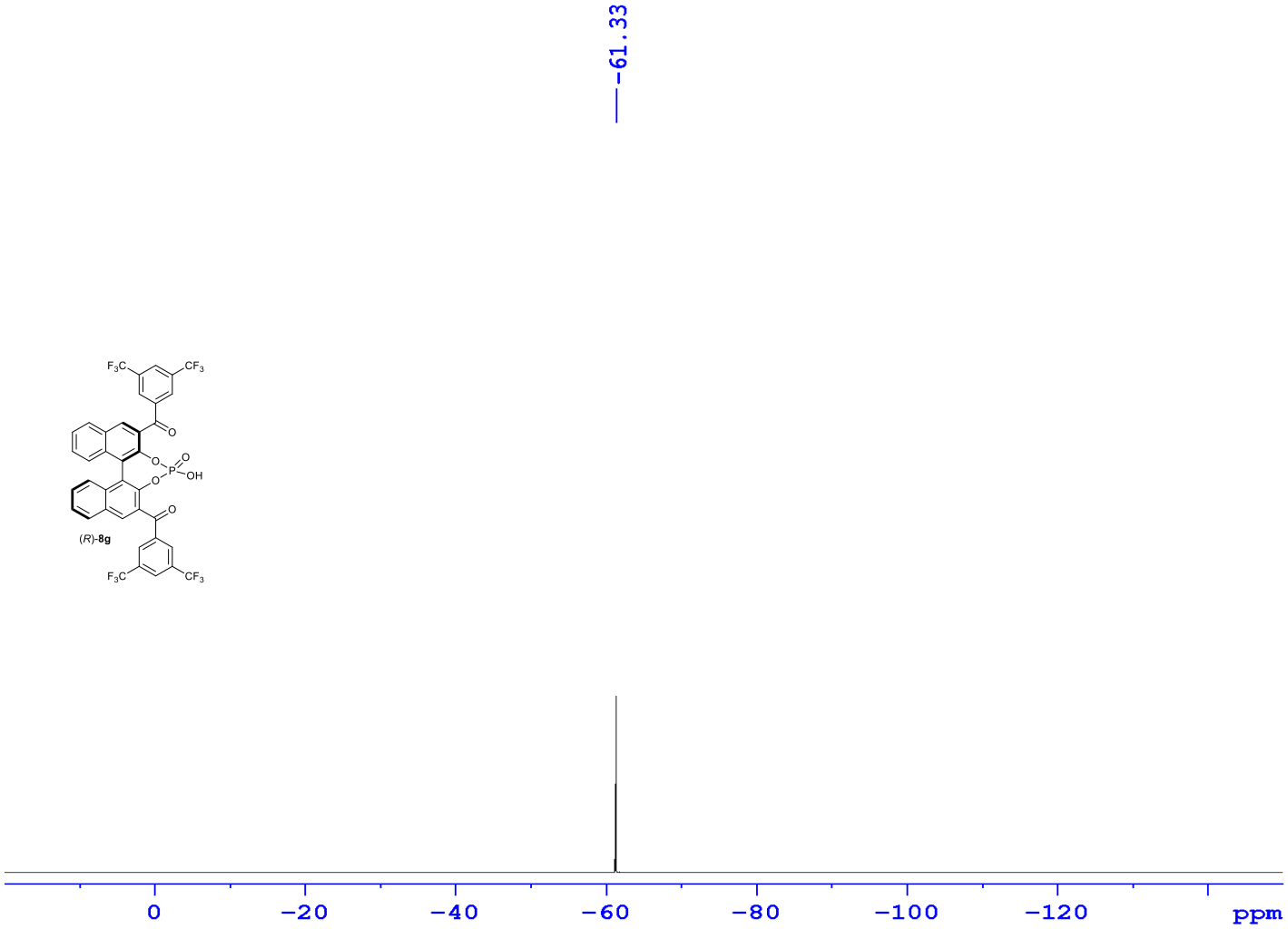

```
Current Data Parameters
NAME                  MK-IV-896
EXPNO                         1
PROCNO                        1

F2 - Acquisition Parameters
Date_                  20241204
Time                     15.43 h
INSTRUM  AVNeo400NB-5059676-P
PROBHD   Z163739_0809 (
PULPROG                   zg30
TD                       65536
SOLVENT                   DMSO
NS                          16
DS                           2
SWH                   8196.721 Hz
FIDRES                0.250144 Hz
AQ                    3.9976959 sec
RG                          101
DW                     61.000 usec
DE                     13.89 usec
TE                     298.1 K
D1                  1.00000000 sec
TD0                          1
SFO1               400.1324708 MHz
NUC1                        1H
P0                     2.67 usec
P1                     8.00 usec
PLW1               24.18499947 W

F2 - Processing parameters
SI                       65536
SF                 400.1300029 MHz
WDW                         EM
SSB                  0
LB                     0.30 Hz
GB                   0
PC                     1.00
```

Figure S50: ^{1}H-NMR spectra for compound (*R*)-**8g**




```
Current Data Parameters
NAME                  MK-IV-896
EXPNO                         2
PROCNO                        1

F2 - Acquisition Parameters
Date_                  20241204
Time                      16.05 h
INSTRUM  AVNeo400NB-5059676-P
PROBHD   Z163739_0809 (
PULPROG                  zgpg30
TD                        65536
SOLVENT                     DMSO
NS                           512
DS                             4
SWH                    23809.524 Hz
FIDRES                 0.726609 Hz
AQ                     1.3762560 sec
RG                           101
DW                        21.000 usec
DE                         6.50 usec
TE                        298.9 K
D1                     1.00000000 sec
D11                    0.03000000 sec
TD0                            1
SFO1                 100.6228298 MHz
NUC1                         13C
P0                         2.67 usec
P1                         8.00 usec
PLW1                91.39299774 W
SFO2                400.1316005 MHz
NUC2                         1H
CPDPRG[2                waltz65
PCPD2                     90.00 usec
PLW2                24.18499947 W
PLW12                0.18788880 W
PLW13                0.09416986 W

F2 - Processing parameters
SI                           32768
SF                  100.6128155 MHz
WDW                             EM
SSB                  0
LB                            1.00 Hz
GB                   0
PC                            1.40
```

Figure S51: $^{13}C\{^{1}H\}$-NMR spectra for compound (*R*)-**8g**

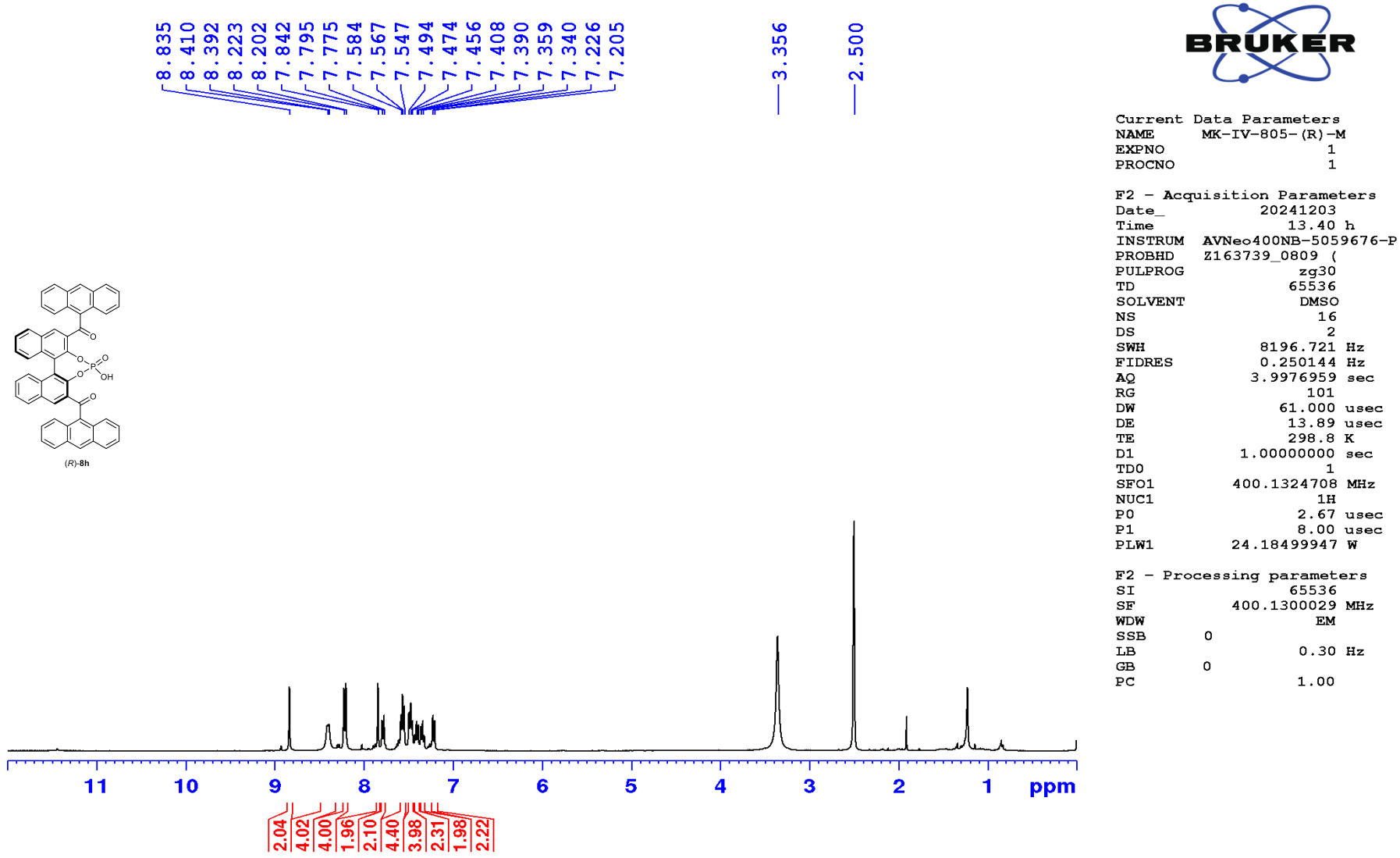


Current Data Parameters
NAME MK-IV-896-F
EXPNO 1
PROCNO 1

F2 - Acquisition Parameters
Date_ 20241205
Time 12.19 h
INSTRUM AVNeo400NB-5059676-F
PROBHD Z163739_0809 (
PULPROG zg
TD 131072
SOLVENT DMSO
NS 16
DS 4
SWH 90909.091 Hz
FIDRES 1.387163 Hz
AQ 0.7208960 sec
RG 101
DW 5.500 usec
DE 6.50 usec
TE 299.1 K
D1 1.00000000 sec
TD0 1
SFO1 376.4607164 MHz
NUC1 19F
P1 12.00 usec
PLW1 34.48500061 W

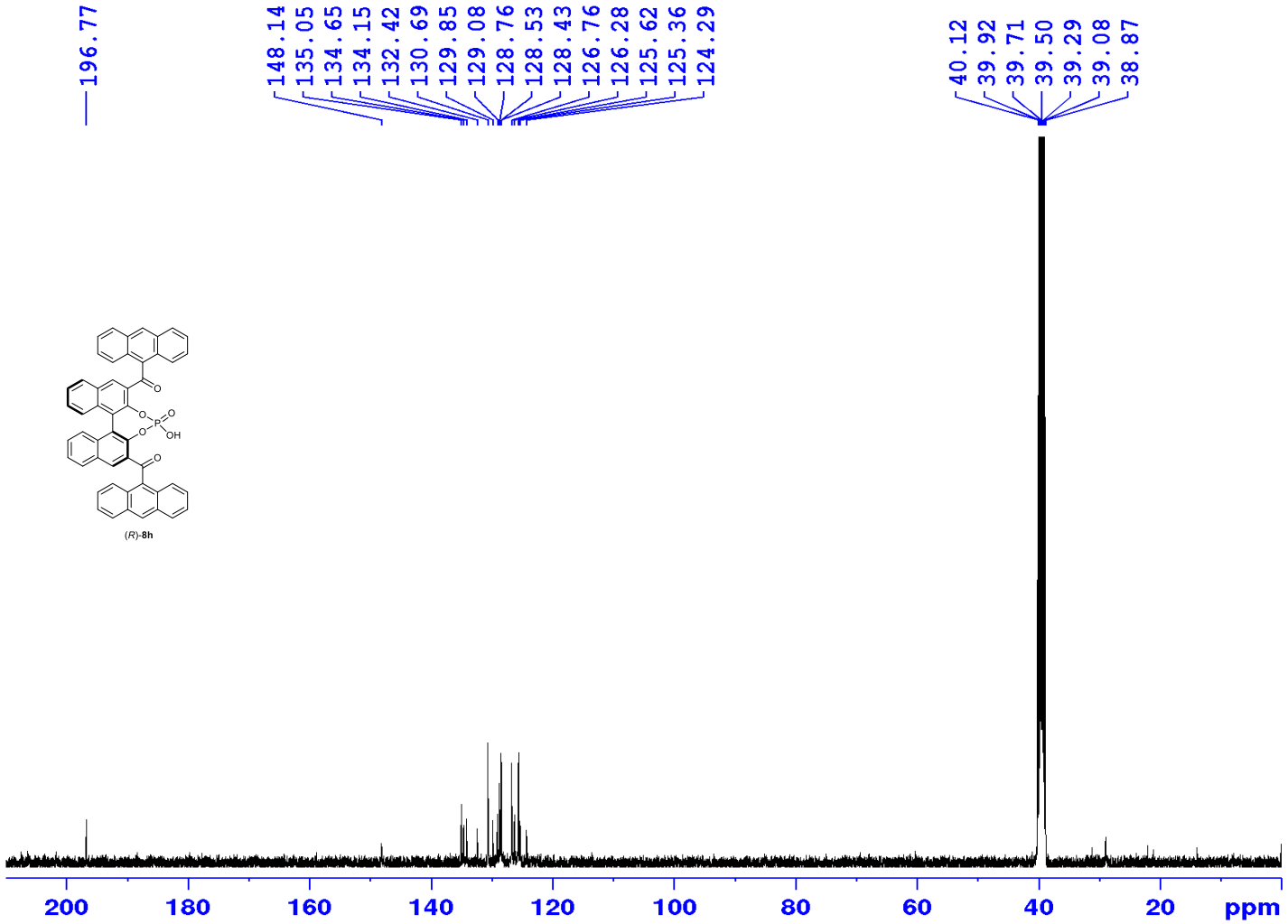
F2 - Processing parameters
SI 65536
SF 376.4983662 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

Figure S52: ^{19}F-NMR spectra for compound (*R*)-**8g**




```
Current Data Parameters
NAME      MK-IV-805-(R)-M
EXPNO                   1
PROCNO                  1

F2 - Acquisition Parameters
Date_           20241203
Time               13.40 h
INSTRUM  AVNeo400NB-5059676-P
PROBHD   Z163739_0809 (
PULPROG             zg30
TD                 65536
SOLVENT             DMSO
NS                    16
DS                     2
SWH             8196.721 Hz
FIDRES          0.250144 Hz
AQ              3.9976959 sec
RG                   101
DW                61.000 usec
DE                13.89 usec
TE                298.8 K
D1             1.00000000 sec
TD0                    1
SFO1          400.1324708 MHz
NUC1                  1H
P0                 2.67 usec
P1                 8.00 usec
PLW1          24.18499947 W

F2 - Processing parameters
SI                 65536
SF            400.1300029 MHz
WDW                   EM
SSB       0
LB                 0.30 Hz
GB        0
PC                 1.00
```

Figure S53: ^{1}H-NMR spectra for compound (*R*)-**8h**



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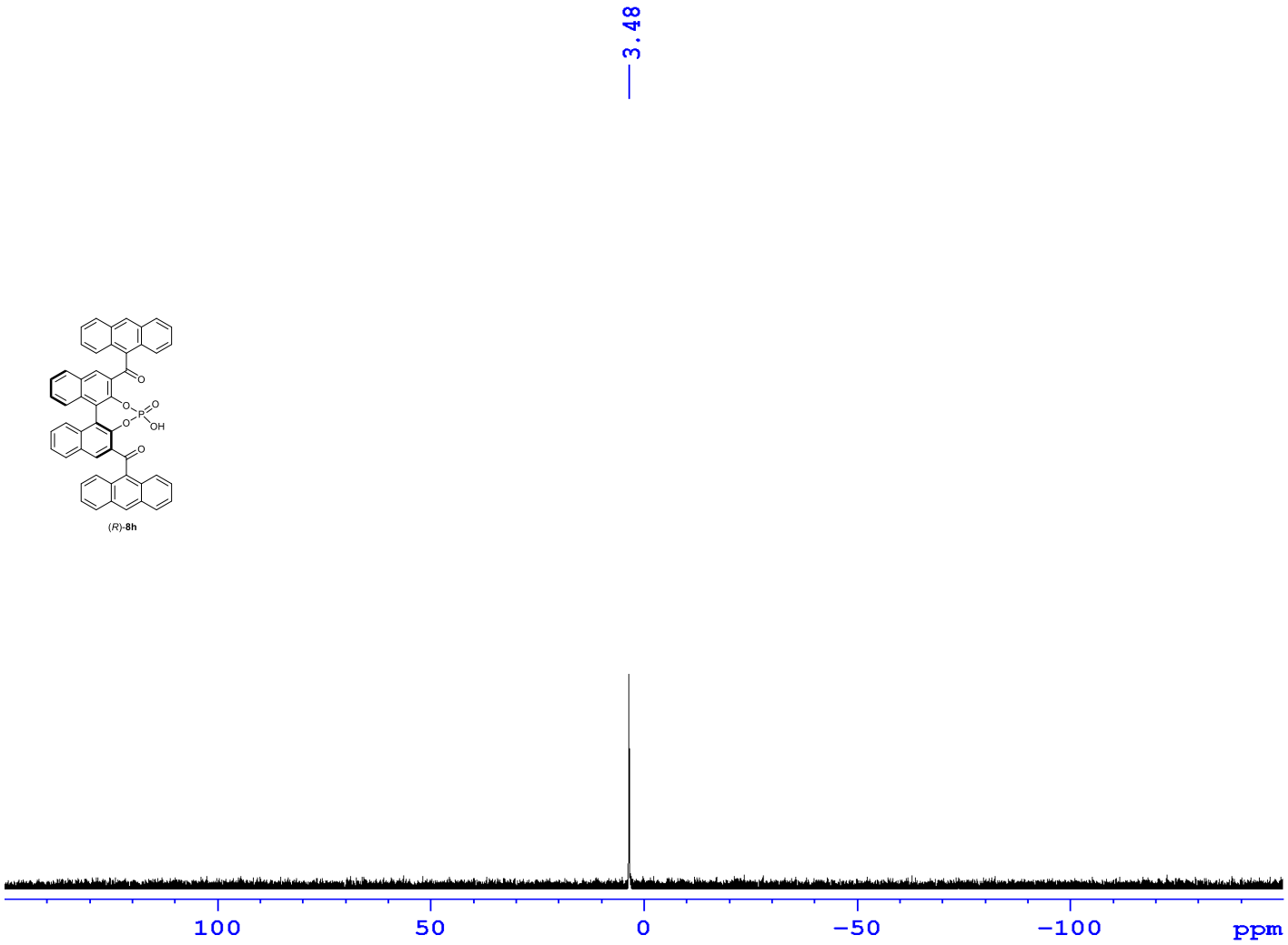
```
Current Data Parameters
NAME      MK-IV-805-(R)-M
EXPNO                   4
PROCNO                  1

F2 - Acquisition Parameters
Date_            20241203
Time               14.22 h
INSTRUM  AVNeo400NB-5059676-P
PROBHD   Z163739_0809 (
PULPROG           zgpg30
TD                65536
SOLVENT            DMSO
NS                   667
DS                     4
SWH          23809.524 Hz
FIDRES        0.726609 Hz
AQ            1.3762560 sec
RG                   101
DW              21.000 usec
DE               6.50 usec
TE              300.0 K
D1           2.00000000 sec
D11          0.03000000 sec
TD0                    1
SFO1        100.6228298 MHz
NUC1                13C
P0               2.67 usec
P1               8.00 usec
PLW1        91.39299774 W
SFO2        400.1316005 MHz
NUC2                1H
CPDPRG[2         waltz65
PCPD2            90.00 usec
PLW2        24.18499947 W
PLW12        0.18788880 W
PLW13        0.09416986 W

F2 - Processing parameters
SI                 32768
SF          100.6128188 MHz
WDW                   EM
SSB       0
LB                1.00 Hz
GB        0
PC                1.40
```

Figure S54: $^{1}H\{^{13}C\}$-NMR spectra for compound (*R*)-**8h**

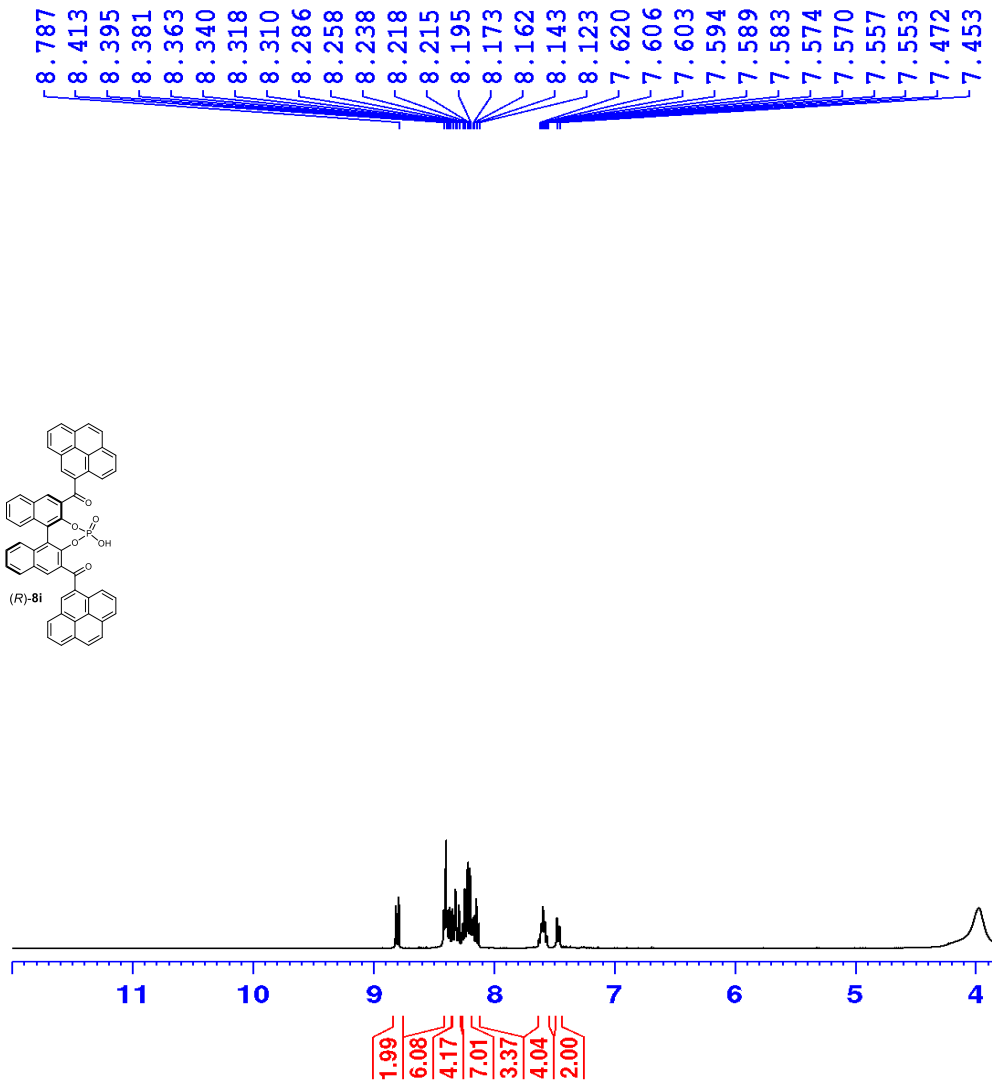



```
Current Data Parameters
NAME      MK-IV-805-(R)-M
EXPNO                   3
PROCNO                  1

F2 - Acquisition Parameters
Date_           20241203
Time                13.42 h
INSTRUM  AVNeo400NB-5059676-P
PROBHD   Z163739_0809 (
PULPROG             zg30
TD                 65536
SOLVENT             DMSO
NS                    16
DS                     4
SWH            65789.474 Hz
FIDRES          2.007735 Hz
AQ             0.4980736 sec
RG                   101
DW                 7.600 usec
DE                 6.50 usec
TE                298.8 K
D1             2.00000000 sec
TD0                    1
SFO1         161.9674942 MHz
NUC1                31P
P0                 2.67 usec
P1                 8.00 usec
PLW1         43.69699860 W

F2 - Processing parameters
SI                 32768
SF           161.9755930 MHz
WDW                EM
SSB       0
LB                 1.00 Hz
GB        0
PC                 1.40
```

Figure S55: ^{31}P-NMR spectra for compound (*R*)-**8h**

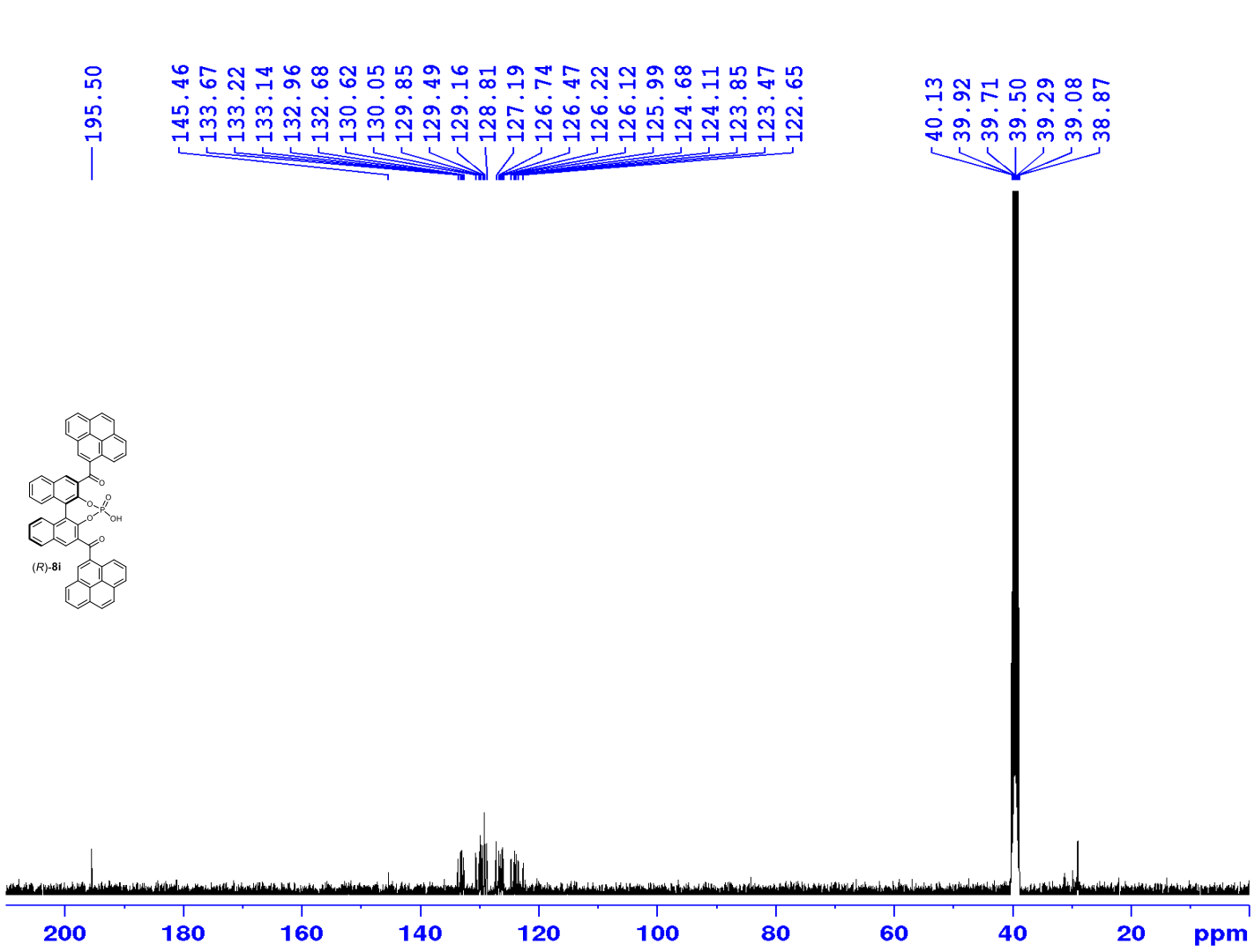


Current Data Parameters
NAME MK-IV-808(RAC)
EXPNO 1
PROCNO 1

F2 - Acquisition Parameters
Date_ 20241104
Time 9.48 h
INSTRUM AVNeo400NB-5059676-P
PROBHD Z163739_0809 (
PULPROG zg30
TD 65536
SOLVENT DMSO
NS 16
DS 2
SWH 8196.721 Hz
FIDRES 0.250144 Hz
AQ 3.9976959 sec
RG 101
DW 61.000 usec
DE 13.89 usec
TE 294.8 K
D1 1.00000000 sec
TD0 1
SFO1 400.1324708 MHz
NUC1 1H
P0 2.67 usec
P1 8.00 usec
PLW1 24.18499947 W

F2 - Processing parameters
SI 65536
SF 400.1300034 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

Figure S56: ^{1}H-NMR spectra for compound (*R*)-**8i**

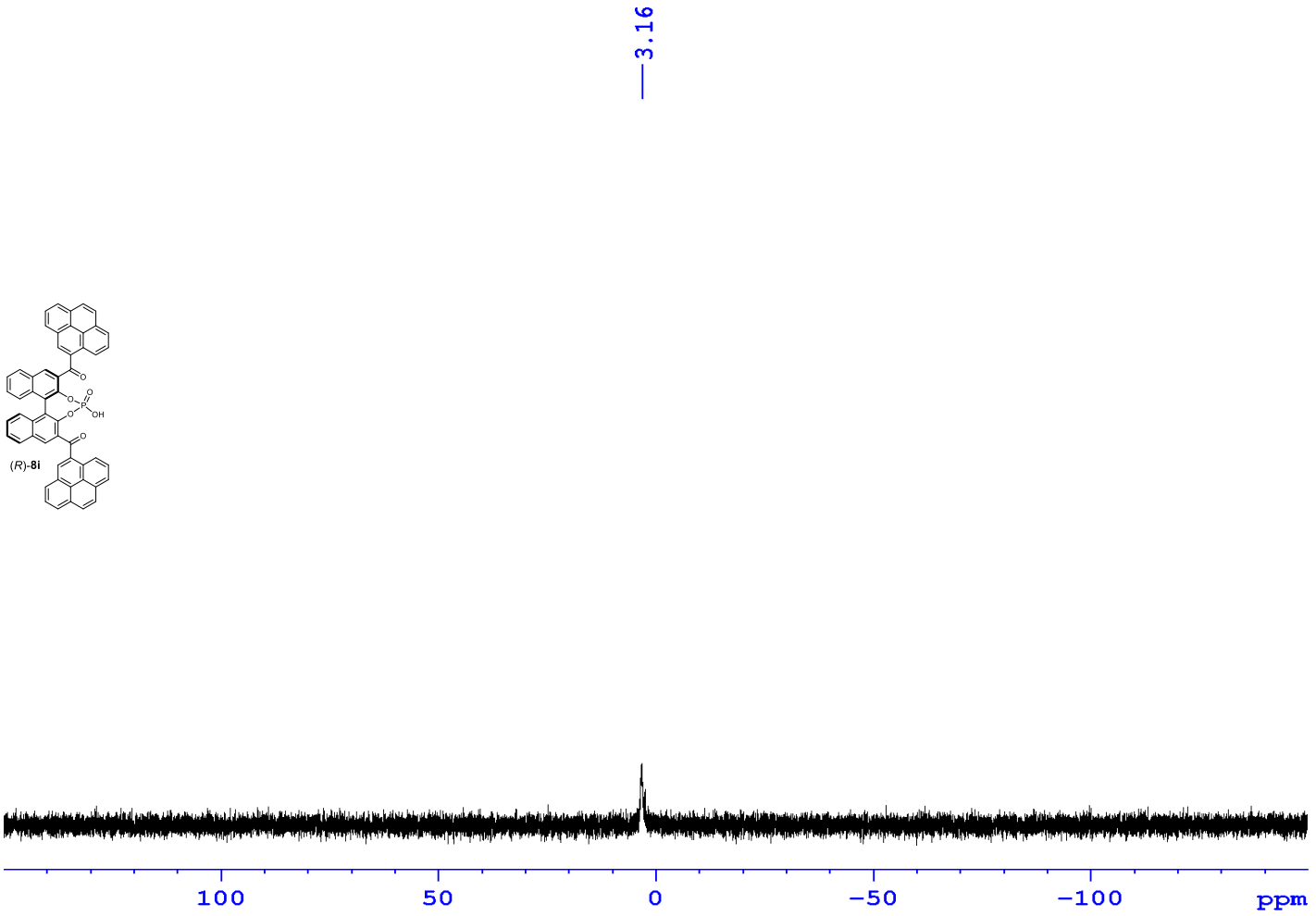



```
Current Data Parameters
NAME      MK-IV-808 (RAC)
EXPNO                1
PROCNO               1

F2 - Acquisition Parameters
Date_          20241104
Time             16.03 h
INSTRUM  AVNeo400NB-5059676-P
PROBHD   Z163739_0809 (
PULPROG          zgpg30
TD                65536
SOLVENT            DMSO
NS                   512
DS                     4
SWH          23809.524 Hz
FIDRES        0.726609 Hz
AQ            1.3762560 sec
RG                 101
DW              21.000 usec
DE               6.50 usec
TE              300.1 K
D1           1.00000000 sec
D11          0.03000000 sec
TD0                  1
SFO1        100.6228298 MHz
NUC1               13C
P0              2.67 usec
P1              8.00 usec
PLW1        91.39299774 W
SFO2        400.1316005 MHz
NUC2               1H
CPDPRG[2        waltz65
PCPD2           90.00 usec
PLW2        24.18499947 W
PLW12        0.18788880 W
PLW13        0.09416986 W

F2 - Processing parameters
SI                 32768
SF          100.6127685 MHz
WDW                EM
SSB       0
LB              1.00 Hz
GB        0
PC              1.40
```

Figure S57: $^{1}H\{^{13}C\}$-NMR spectra for compound (*R*)-**8i**

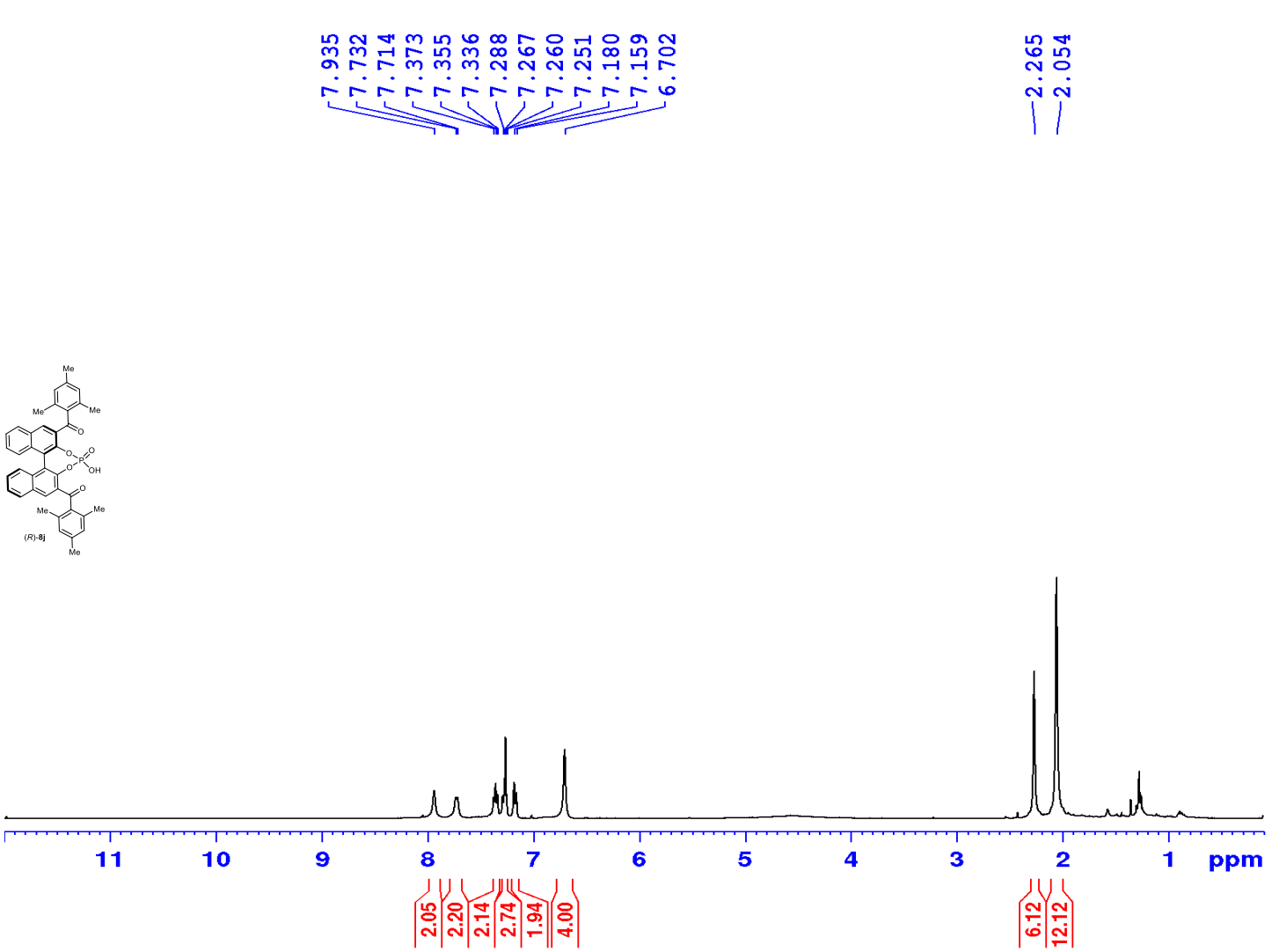



```
Current Data Parameters
NAME            MK-IV-895
EXPNO                   1
PROCNO                  1

F2 - Acquisition Parameters
Date_            20241204
Time                15.33 h
INSTRUM  AVNeo400NB-5059676-P
PROBHD   Z163739_0809 (
PULPROG              zg30
TD                  65536
SOLVENT              DMSO
NS                     16
DS                      4
SWH             65789.474 Hz
FIDRES           2.007735 Hz
AQ              0.4980736 sec
RG                    101
DW                  7.600 usec
DE                  6.50 usec
TE                 298.0 K
D1            1.00000000 sec
TD0                     1
SFO1          161.9674942 MHz
NUC1                  31P
P0                  2.67 usec
P1                  8.00 usec
PLW1          43.69699860 W

F2 - Processing parameters
SI                    32768
SF            161.9755930 MHz
WDW                     EM
SSB       0
LB                  1.00 Hz
GB        0
PC                  1.40
```

Figure S58: ^{31}P-NMR spectra for compound (*R*)-**8i**



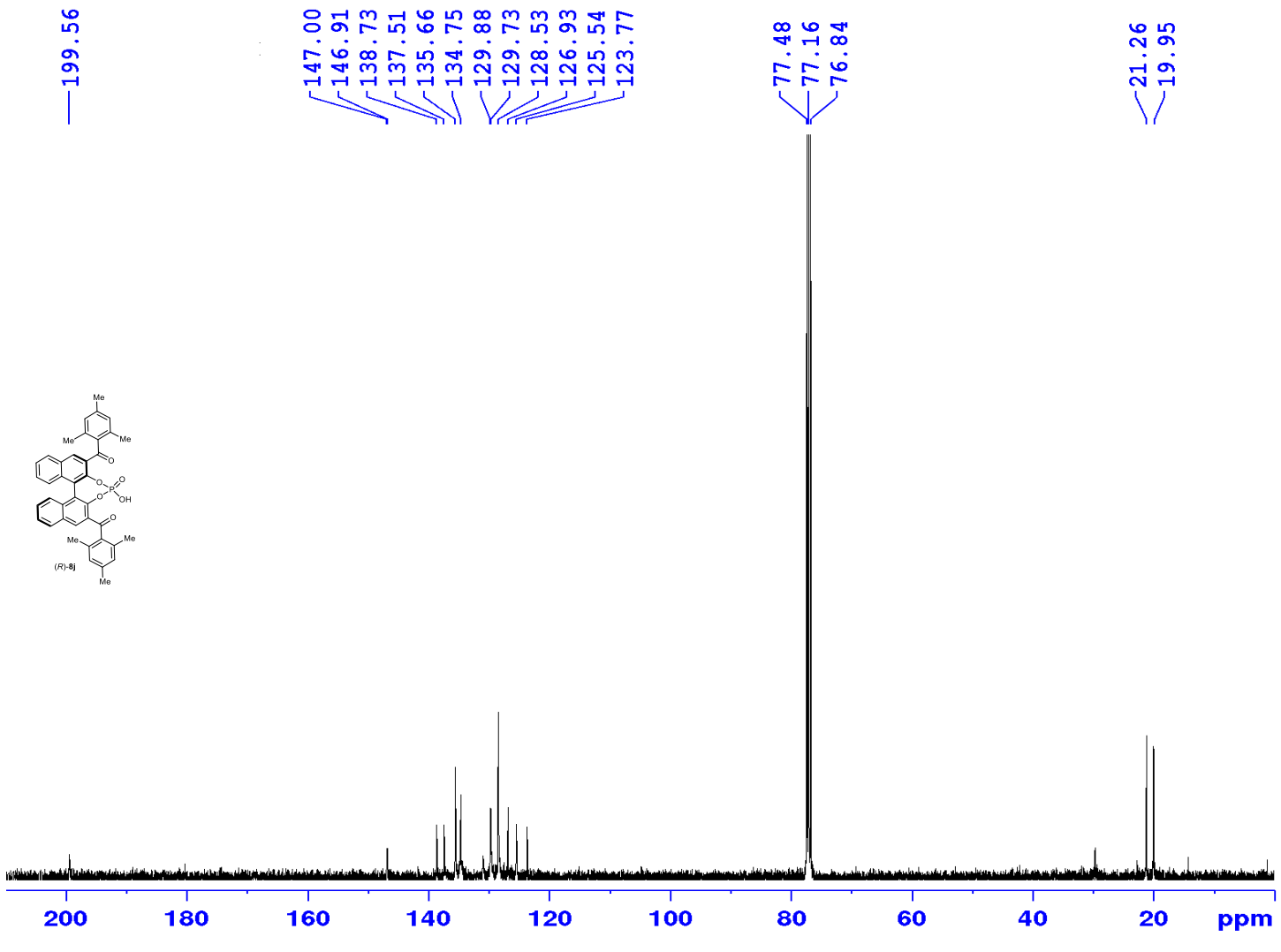

```
Current Data Parameters
NAME          MK-II-300-M
EXPNO                   1
PROCNO                  1

F2 - Acquisition Parameters
Date_            20180801
Time                15.46
INSTRUM             spect
PROBHD   5 mm BBO BB-1H
PULPROG              zg30
TD                  65536
SOLVENT             CDCl3
NS                     16
DS                      2
SWH              8223.685 Hz
FIDRES           0.125483 Hz
AQ               3.9845889 sec
RG                    144
DW                 60.800 usec
DE                  6.00 usec
TE                 295.6 K
D1            1.00000000 sec
TD0                     1

======== CHANNEL f1 ========
NUC1                   1H
P1                 14.35 usec
PL1                -1.00 dB
SFO1         400.1324710 MHz

F2 - Processing parameters
SI                  32768
SF           400.1300046 MHz
WDW                    EM
SSB       0
LB                  0.30 Hz
GB        0
PC                  1.00
```

Figure S59: ^{1}H-NMR spectra for compound (*R*)-**8j**



(*R*)-8j

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```
Current Data Parameters
NAME          MK-II-300-M
EXPNO                   4
PROCNO                  1

F2 - Acquisition Parameters
Date_            20180803
Time                11.07
INSTRUM             spect
PROBHD    5 mm BBO BB-1H
PULPROG           zgpg30
TD                 65536
SOLVENT            CDCl3
NS                   512
DS                     4
SWH            24038.461 Hz
FIDRES          0.366798 Hz
AQ              1.3631488 sec
RG                  40.3
DW                20.800 usec
DE                 6.00 usec
TE                293.0 K
D1             2.00000000 sec
d11            0.03000000 sec
DELTA          1.89999998 sec
TD0                    1

======== CHANNEL f1 ========
NUC1                  13C
P1                   9.95 usec
PL1                 -1.00 dB
SFO1          100.6228298 MHz

======== CHANNEL f2 ========
CPDPRG[2          waltz16
NUC2                  1H
PCPD2              90.00 usec
PL12               14.95 dB
PL13              120.00 dB
PL2                -1.00 dB
SFO2          400.1316005 MHz

F2 - Processing parameters
SI                 32768
SF            100.6127642 MHz
WDW                   EM
SSB       0
LB                 1.00 Hz
GB        0
PC                 1.40
```

Figure S60: $^{13}C\{^{1}H\}$-NMR spectra for compound (*R*)-**8j**

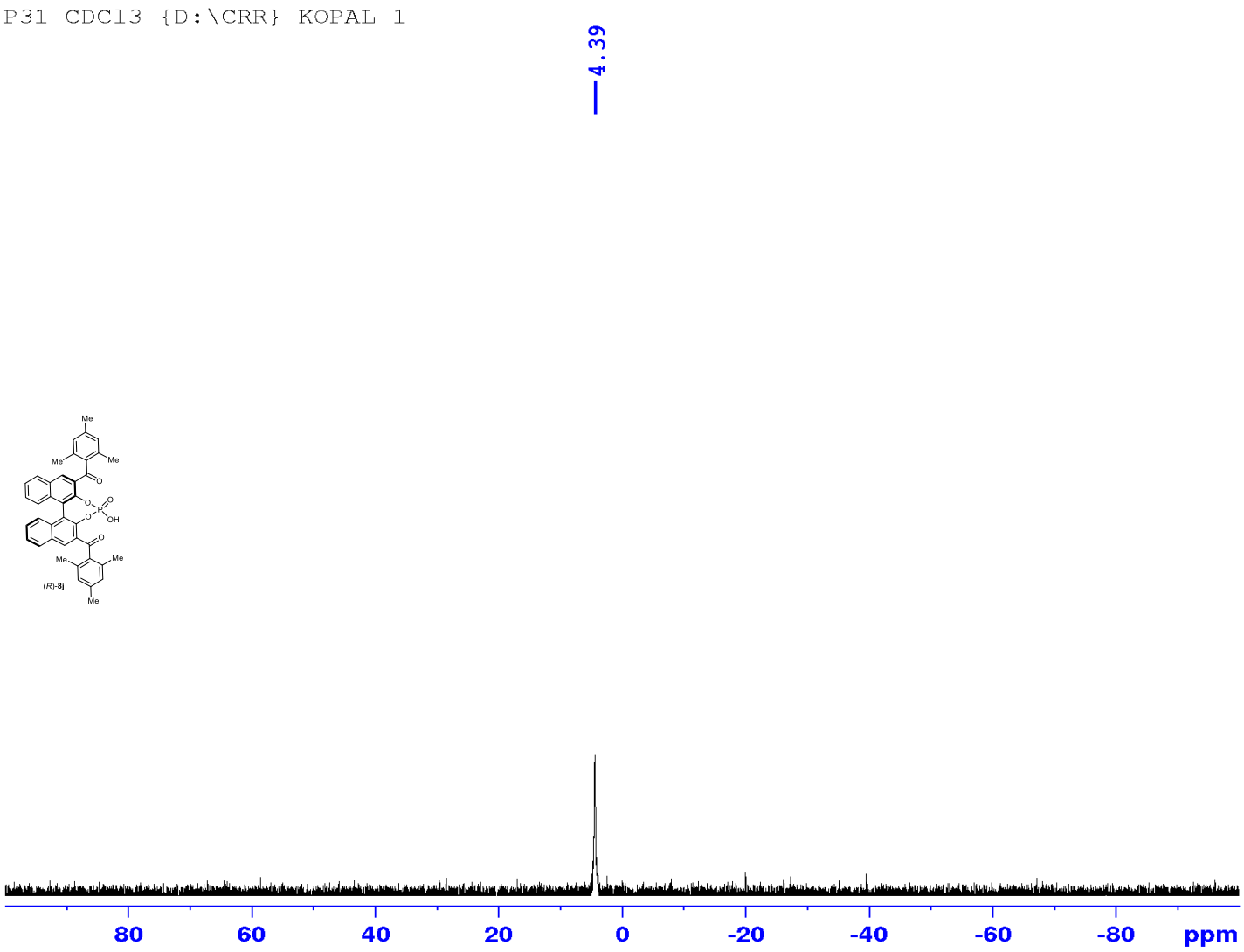
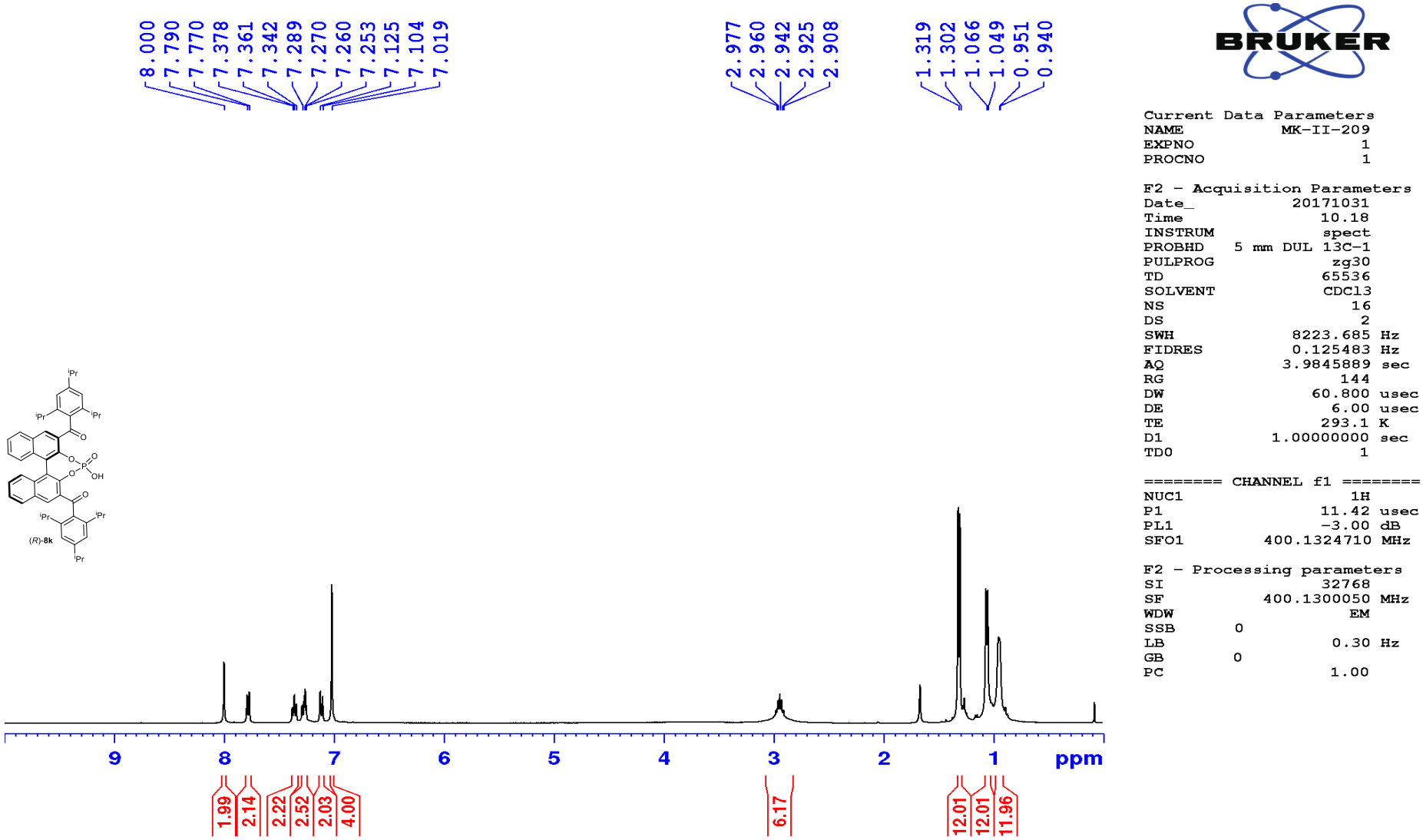


Figure S61: ^{31}P-NMR spectra for compound (*R*)-**8j**



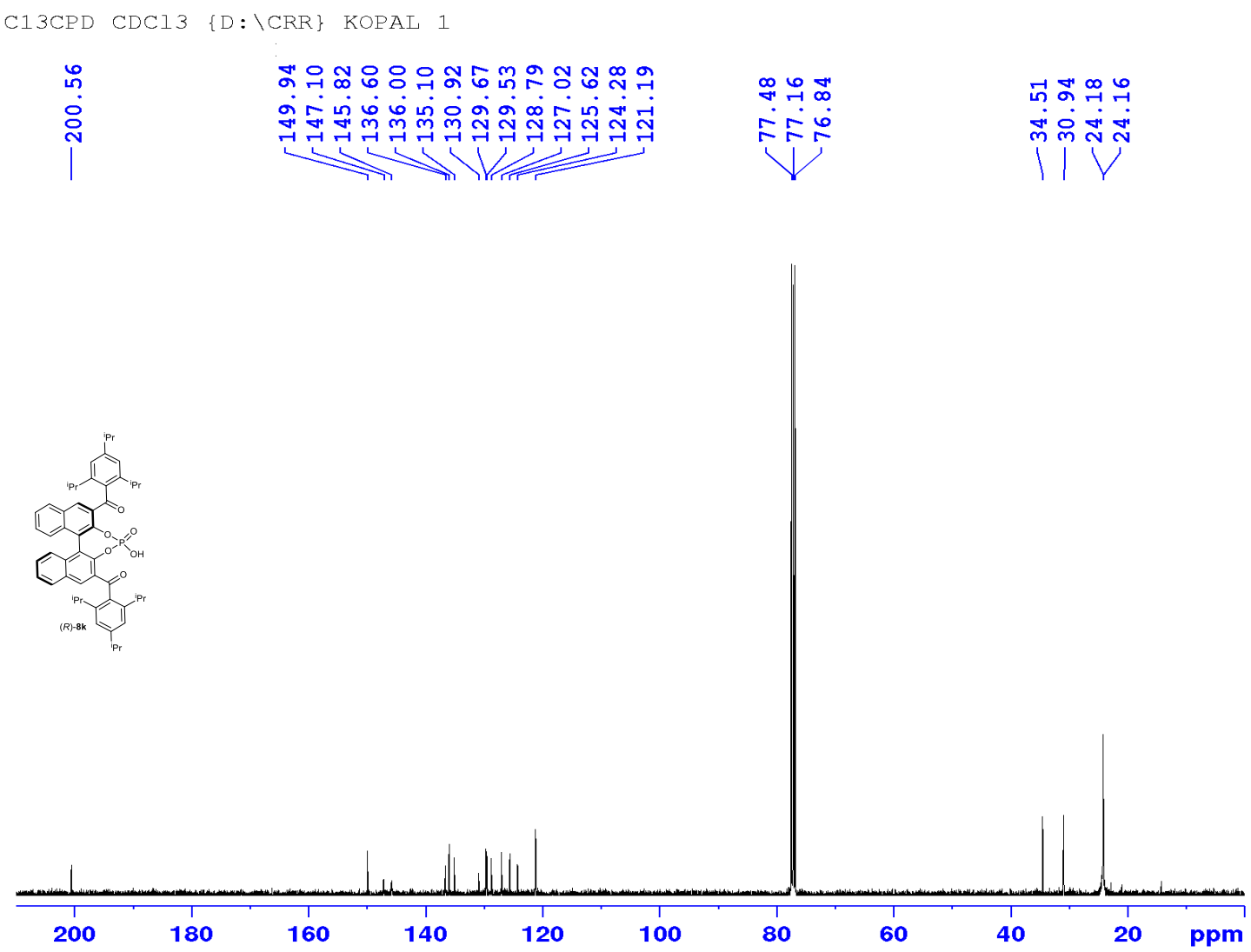

```
Current Data Parameters
NAME                  MK-II-209
EXPNO                         1
PROCNO                        1

F2 - Acquisition Parameters
Date_                  20171031
Time                      10.18
INSTRUM                   spect
PROBHD    5 mm DUL 13C-1
PULPROG                    zg30
TD                        65536
SOLVENT                   CDCl3
NS                           16
DS                            2
SWH                    8223.685 Hz
FIDRES                 0.125483 Hz
AQ                     3.9845889 sec
RG                          144
DW                       60.800 usec
DE                        6.00 usec
TE                        293.1 K
D1                     1.00000000 sec
TD0                           1

======== CHANNEL f1 ========
NUC1                         1H
P1                       11.42 usec
PL1                      -3.00 dB
SFO1                400.1324710 MHz

F2 - Processing parameters
SI                        32768
SF                 400.1300050 MHz
WDW                          EM
SSB                0
LB                        0.30 Hz
GB                 0
PC                        1.00
```

Figure S62: ^{1}H-NMR spectra for compound (*R*)-**8k**



Current Data Parameters

NAME	MK-II-209
EXPNO	2
PROCNO	1

F2 - Acquisition Parameters

Date_	20171031
Time	12.48
INSTRUM	spect
PROBHD	5 mm DUL 13C-1
PULPROG	zgpg30
TD	65536
SOLVENT	CDCl3
NS	256
DS	4
SWH	24038.461 Hz
FIDRES	0.366798 Hz
AQ	1.3631488 sec
RG	80.6
DW	20.800 usec
DE	6.00 usec
TE	294.5 K
D1	2.00000000 sec
d11	0.03000000 sec
DELTA	1.89999998 sec
TD0	1

======== CHANNEL f1 ========

NUC1	13C
P1	9.15 usec
PL1	0 dB
SFO1	100.6228298 MHz

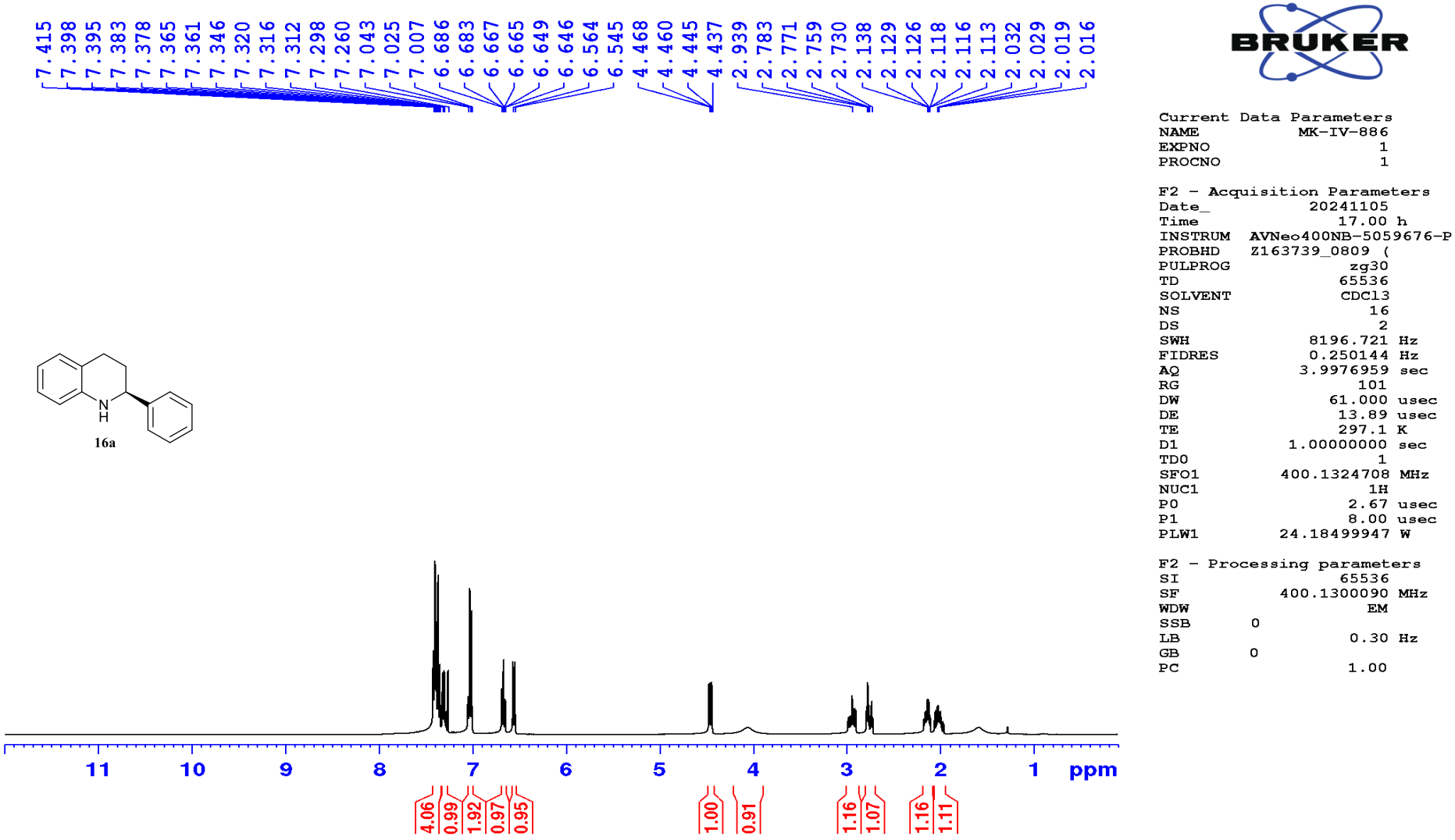
======== CHANNEL f2 ========

CPDPRG[2	waltz16
NUC2	1H
PCPD2	90.00 usec
PL12	14.90 dB
PL13	14.90 dB
PL2	-3.00 dB
SFO2	400.1316005 MHz

F2 - Processing parameters

SI	32768
SF	100.6127565 MHz
WDW	EM
SSB	0
LB	1.00 Hz
GB	0
PC	1.40

Figure S63: $^{1}H\{^{13}C\}$-NMR spectra for compound (*R*)-**8k**

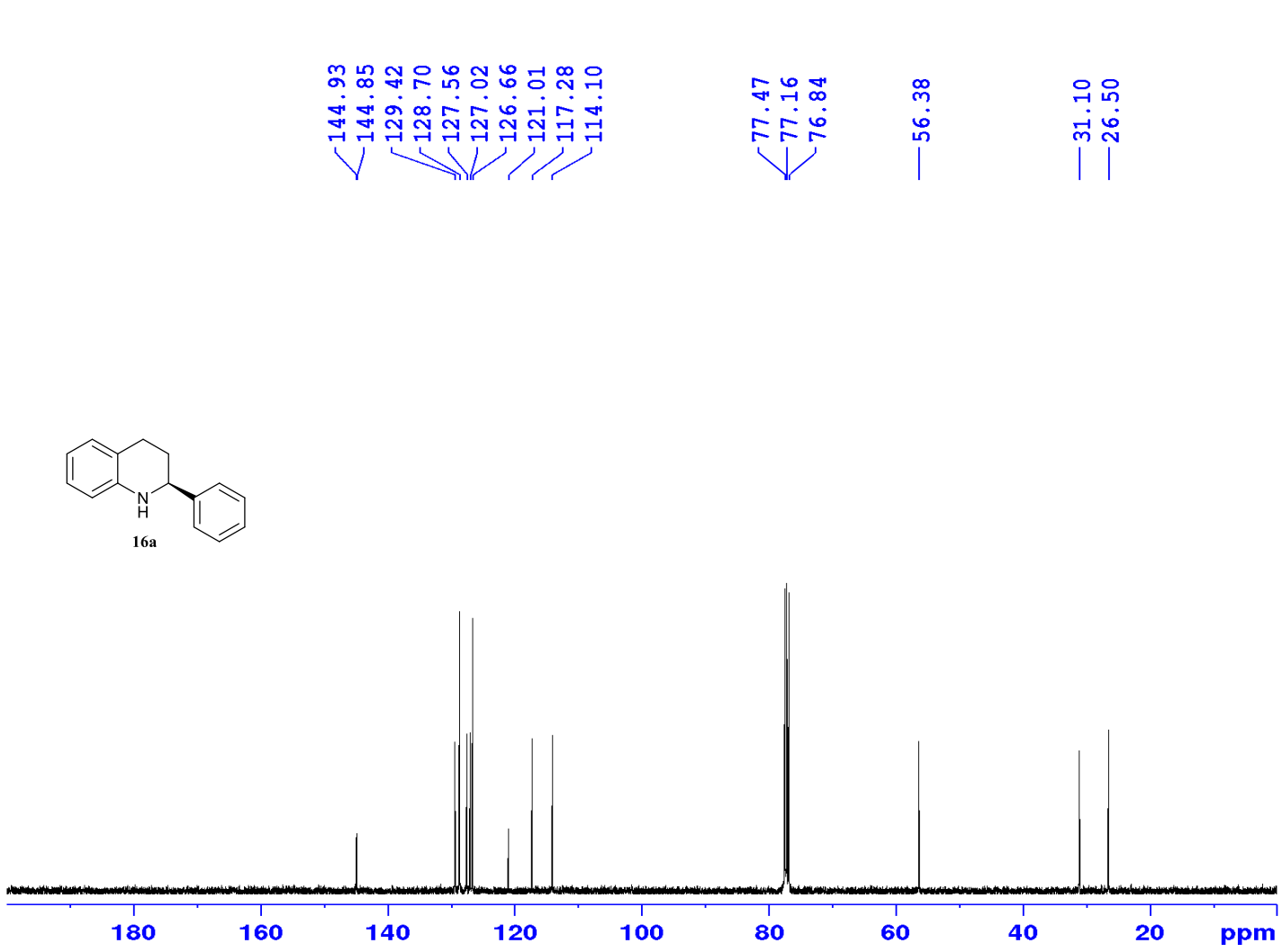



```
Current Data Parameters
NAME                  MK-IV-886
EXPNO                         1
PROCNO                        1

F2 - Acquisition Parameters
Date_                  20241105
Time                      17.00 h
INSTRUM        AVNeo400NB-5059676-P
PROBHD         Z163739_0809 (
PULPROG                    zg30
TD                        65536
SOLVENT                   CDCl3
NS                           16
DS                            2
SWH                    8196.721 Hz
FIDRES                 0.250144 Hz
AQ                     3.9976959 sec
RG                          101
DW                       61.000 usec
DE                       13.89 usec
TE                       297.1 K
D1                     1.00000000 sec
TD0                           1
SFO1                 400.1324708 MHz
NUC1                         1H
P0                        2.67 usec
P1                        8.00 usec
PLW1                24.18499947 W

F2 - Processing parameters
SI                        65536
SF                   400.1300090 MHz
WDW                          EM
SSB                0
LB                        0.30 Hz
GB                 0
PC                        1.00
```

Figure S64: ^{1}H-NMR spectra for compound **16a**

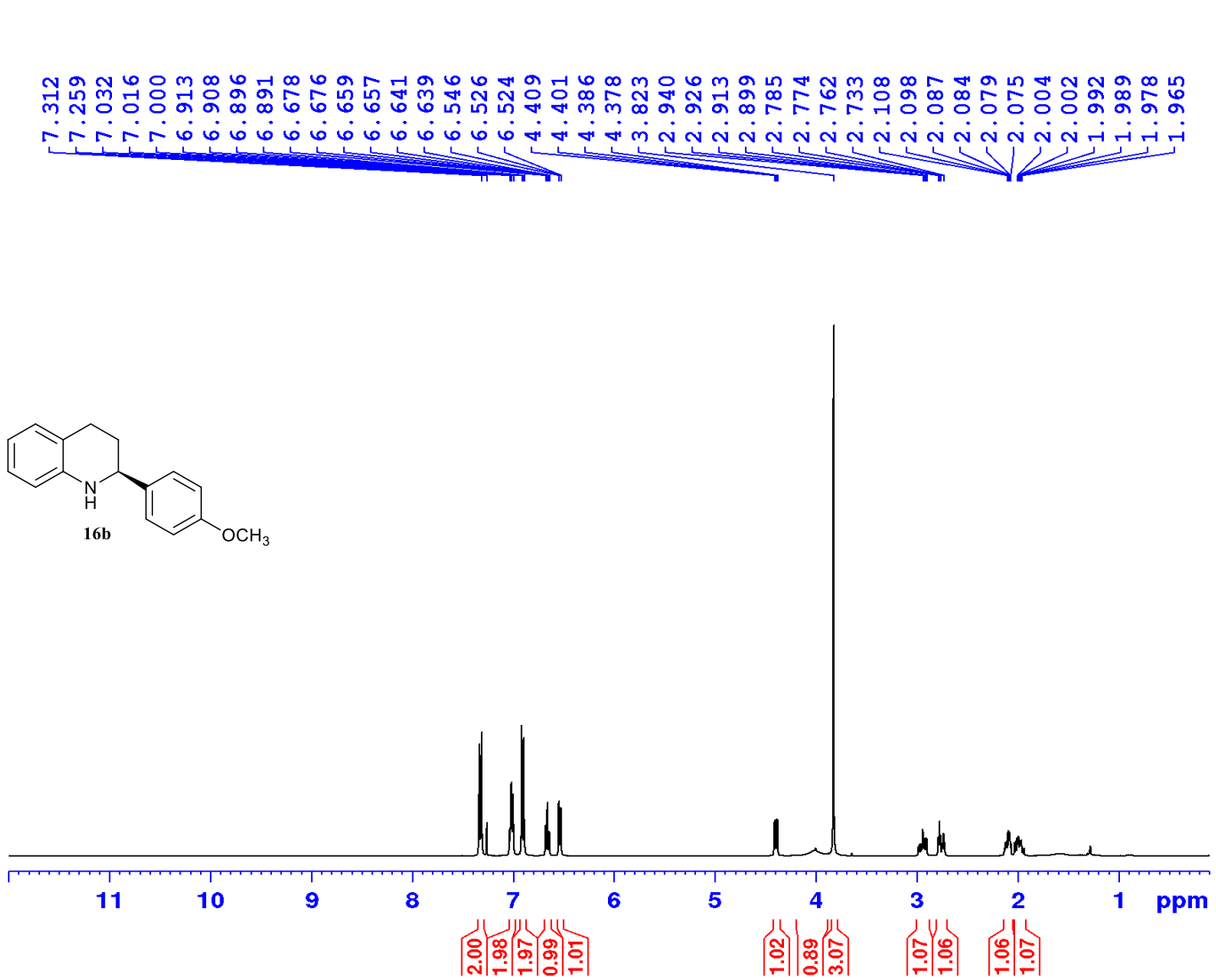



```
Current Data Parameters
NAME                  MK-IV-886
EXPNO                         2
PROCNO                        1

F2 - Acquisition Parameters
Date_                  20241105
Time                      17.11 h
INSTRUM  AVNeo400NB-5059676-P
PROBHD   Z163739_0809 (
PULPROG                 zgpg30
TD                       65536
SOLVENT                  CDCl3
NS                         256
DS                           4
SWH                  23809.524 Hz
FIDRES                0.726609 Hz
AQ                    1.3762560 sec
RG                         101
DW                      21.000 usec
DE                       6.50 usec
TE                      298.2 K
D1                    1.00000000 sec
D11                   0.03000000 sec
TD0                          1
SFO1                100.6228298 MHz
NUC1                       13C
P0                       2.67 usec
P1                       8.00 usec
PLW1                91.39299774 W
SFO2                400.1316005 MHz
NUC2                       1H
CPDPRG[2                waltz65
PCPD2                   90.00 usec
PLW2                24.18499947 W
PLW12                0.18788880 W
PLW13                0.09416986 W

F2 - Processing parameters
SI                         32768
SF                  100.6127581 MHz
WDW                           EM
SSB                  0
LB                        1.00 Hz
GB                   0
PC                        1.40
```

Figure S65: $^{13}C\{^{1}H\}$-NMR spectra for compound **16a**



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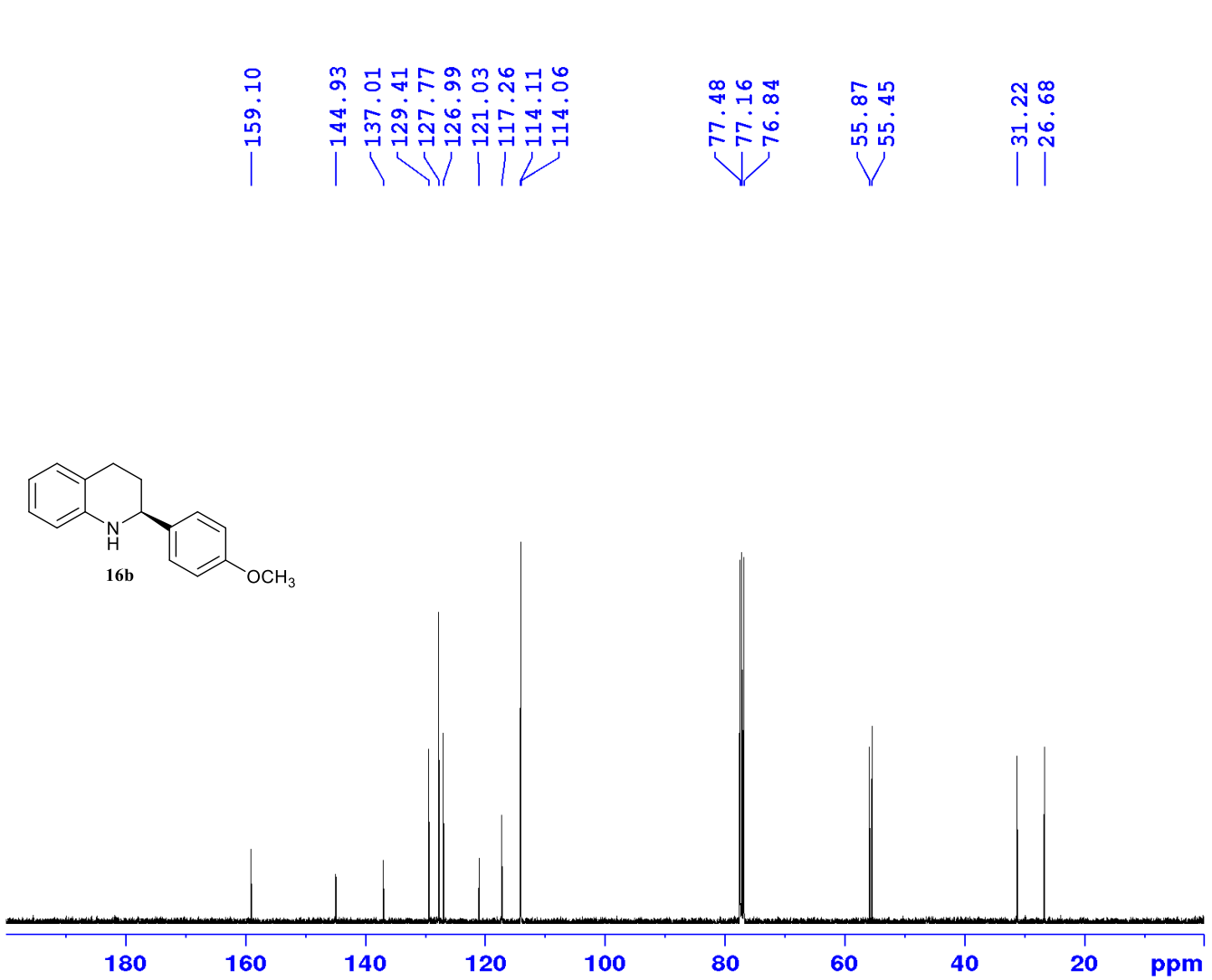
```
Current Data Parameters
NAME                  MK-IV-873
EXPNO                         1
PROCNO                        1

F2 - Acquisition Parameters
Date_                  20240918
Time                      15.01 h
INSTRUM        AVNeo400NB-5059676-P
PROBHD         Z163739_0809 (
PULPROG                    zg30
TD                        65536
SOLVENT                   CDCl3
NS                           16
DS                            2
SWH                    8196.721 Hz
FIDRES                 0.250144 Hz
AQ                     3.9976959 sec
RG                         71.8
DW                        61.000 usec
DE                        13.89 usec
TE                        300.0 K
D1                   1.00000000 sec
TD0                           1
SFO1                400.1324708 MHz
NUC1                        1H
P0                        2.67 usec
P1                        8.00 usec
PLW1                24.18499947 W

F2 - Processing parameters
SI                        65536
SF                  400.1300099 MHz
WDW                          EM
SSB                 0
LB                        0.30 Hz
GB                  0
PC                        1.00
```

Figure S66: ^{1}H-NMR spectra for compound **16b**

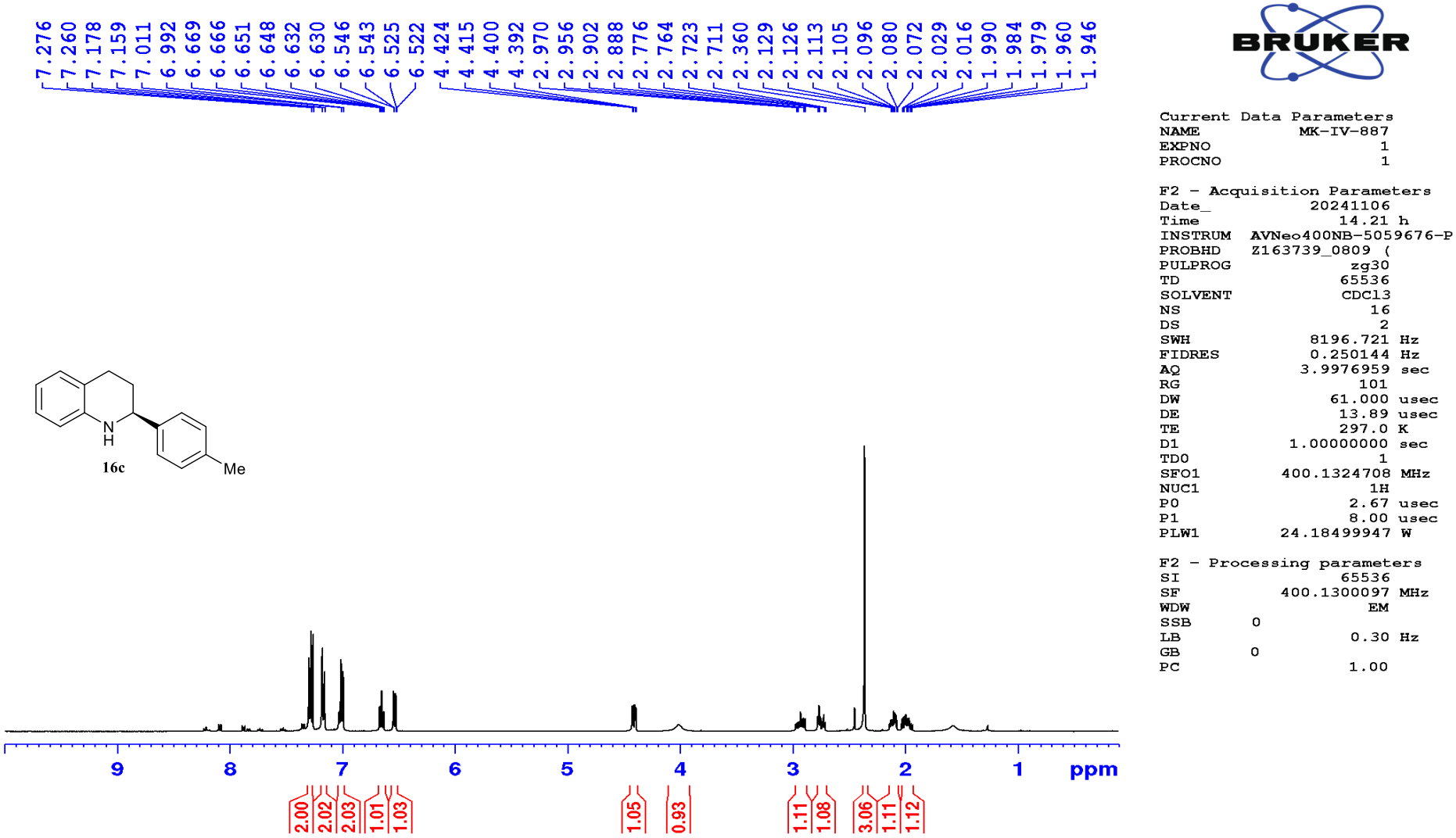



```
Current Data Parameters
NAME                  MK-IV-873
EXPNO                         2
PROCNO                        1

F2 - Acquisition Parameters
Date_                  20240918
Time                      15.11 h
INSTRUM  AVNeo400NB-5059676-P
PROBHD   Z163739_0809 (
PULPROG                  zgpg30
TD                        65536
SOLVENT                   CDCl3
NS                          146
DS                            4
SWH                   23809.524 Hz
FIDRES                 0.726609 Hz
AQ                     1.3762560 sec
RG                          101
DW                       21.000 usec
DE                        6.50 usec
TE                       300.7 K
D1                    2.00000000 sec
D11                   0.03000000 sec
TD0                           1
SFO1                100.6228298 MHz
NUC1                        13C
P0                        2.67 usec
P1                        8.00 usec
PLW1                91.39299774 W
SFO2                400.1316005 MHz
NUC2                        1H
CPDPRG[2                waltz65
PCPD2                    90.00 usec
PLW2                24.18499947 W
PLW12                0.18788880 W
PLW13                0.09416986 W

F2 - Processing parameters
SI                        32768
SF                  100.6127572 MHz
WDW                          EM
SSB                   0
LB                        1.00 Hz
GB                    0
PC                        1.40
```

Figure S67: $^{13}C\{^{1}H\}$-NMR spectra for compound **16b**

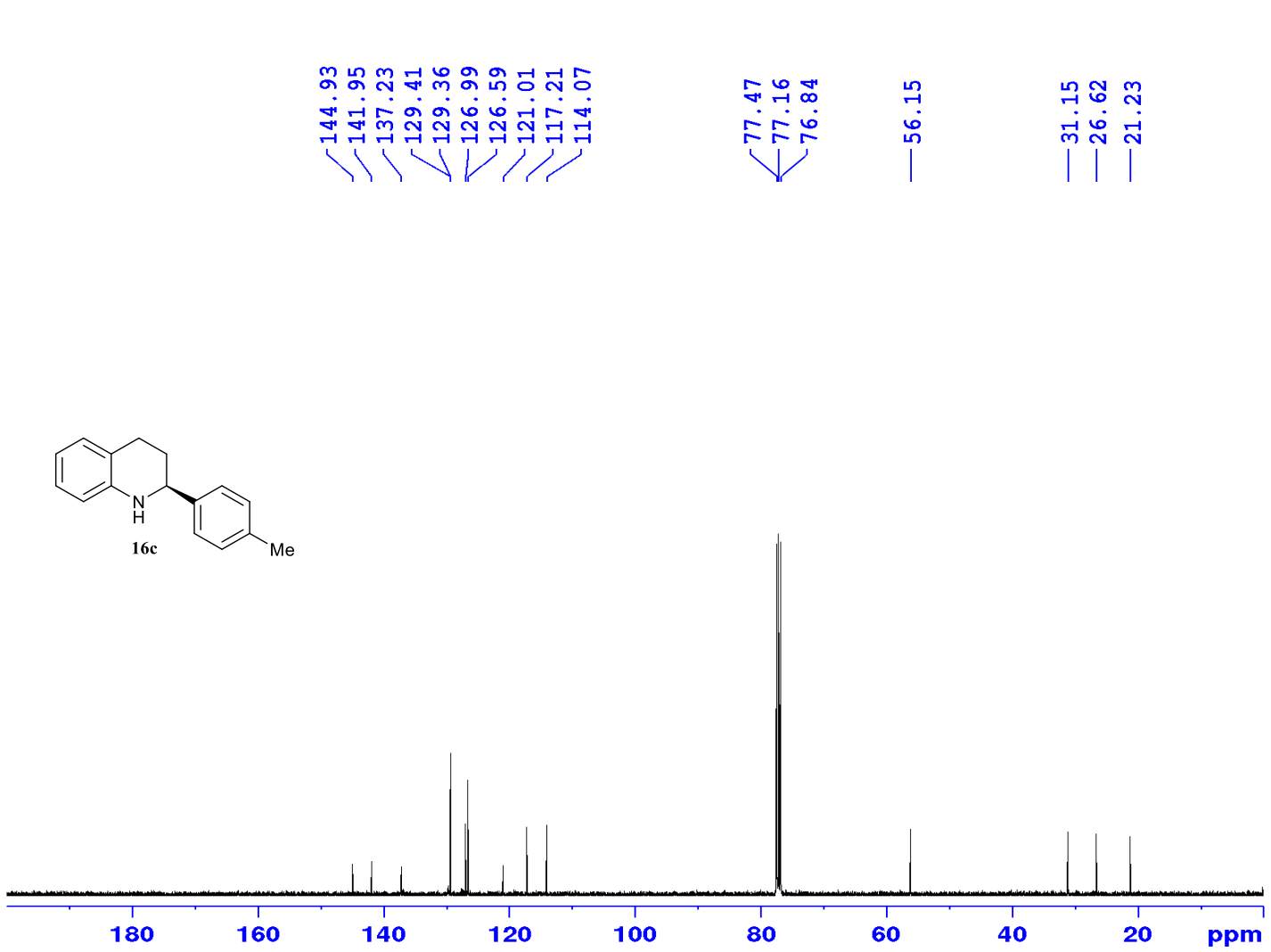



```
Current Data Parameters
NAME            MK-IV-887
EXPNO                   1
PROCNO                  1

F2 - Acquisition Parameters
Date_            20241106
Time               14.21 h
INSTRUM  AVNeo400NB-5059676-P
PROBHD   Z163739_0809 (
PULPROG              zg30
TD                  65536
SOLVENT             CDCl3
NS                     16
DS                      2
SWH             8196.721 Hz
FIDRES          0.250144 Hz
AQ              3.9976959 sec
RG                    101
DW                 61.000 usec
DE                 13.89 usec
TE                 297.0 K
D1             1.00000000 sec
TD0                     1
SFO1          400.1324708 MHz
NUC1                   1H
P0                 2.67 usec
P1                 8.00 usec
PLW1          24.18499947 W

F2 - Processing parameters
SI                  65536
SF            400.1300097 MHz
WDW                    EM
SSB       0
LB                 0.30 Hz
GB        0
PC                 1.00
```

Figure S68: ^{1}H-NMR spectra for compound **16c**

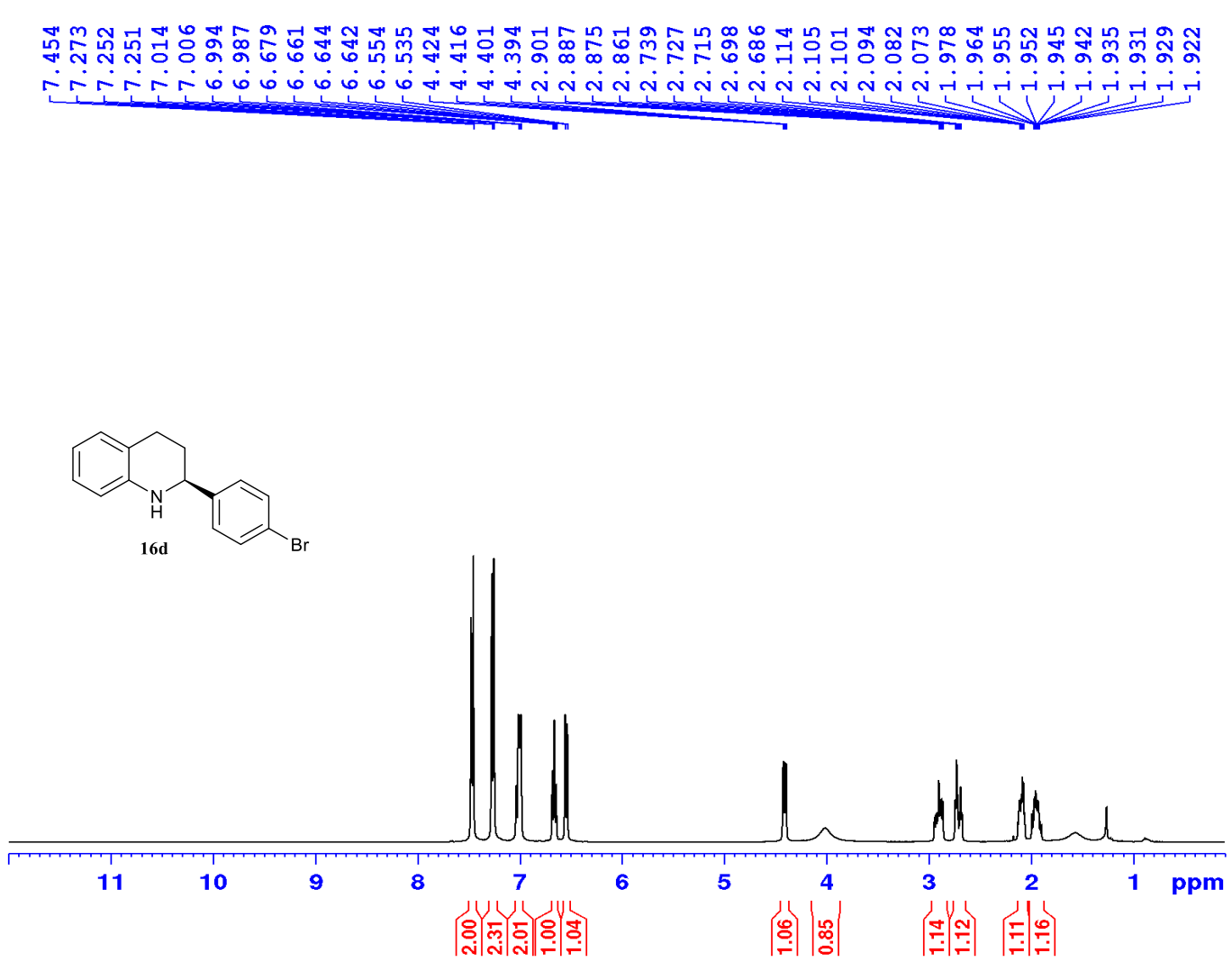



```
Current Data Parameters
NAME                  MK-IV-887
EXPNO                         2
PROCNO                        1

F2 - Acquisition Parameters
Date_               20241106
Time                    14.37 h
INSTRUM  AVNeo400NB-5059676-P
PROBHD   Z163739_0809 (
PULPROG                 zgpg30
TD                       65536
SOLVENT                  CDCl3
NS                         256
DS                           4
SWH                 23809.524 Hz
FIDRES               0.726609 Hz
AQ                  1.3762560 sec
RG                         101
DW                      21.000 usec
DE                       6.50 usec
TE                      297.8 K
D1                  2.00000000 sec
D11                 0.03000000 sec
TD0                          1
SFO1               100.6228298 MHz
NUC1                        13C
P0                       2.67 usec
P1                       8.00 usec
PLW1               91.39299774 W
SFO2               400.1316005 MHz
NUC2                        1H
CPDPRG[2                waltz65
PCPD2                   90.00 usec
PLW2               24.18499947 W
PLW12               0.18788880 W
PLW13               0.09416986 W

F2 - Processing parameters
SI                       32768
SF                 100.6127566 MHz
WDW                         EM
SSB                  0
LB                       1.00 Hz
GB                   0
PC                       1.40
```

Figure S69: $^{13}C\{^{1}H\}$-NMR spectra for compound **16c**

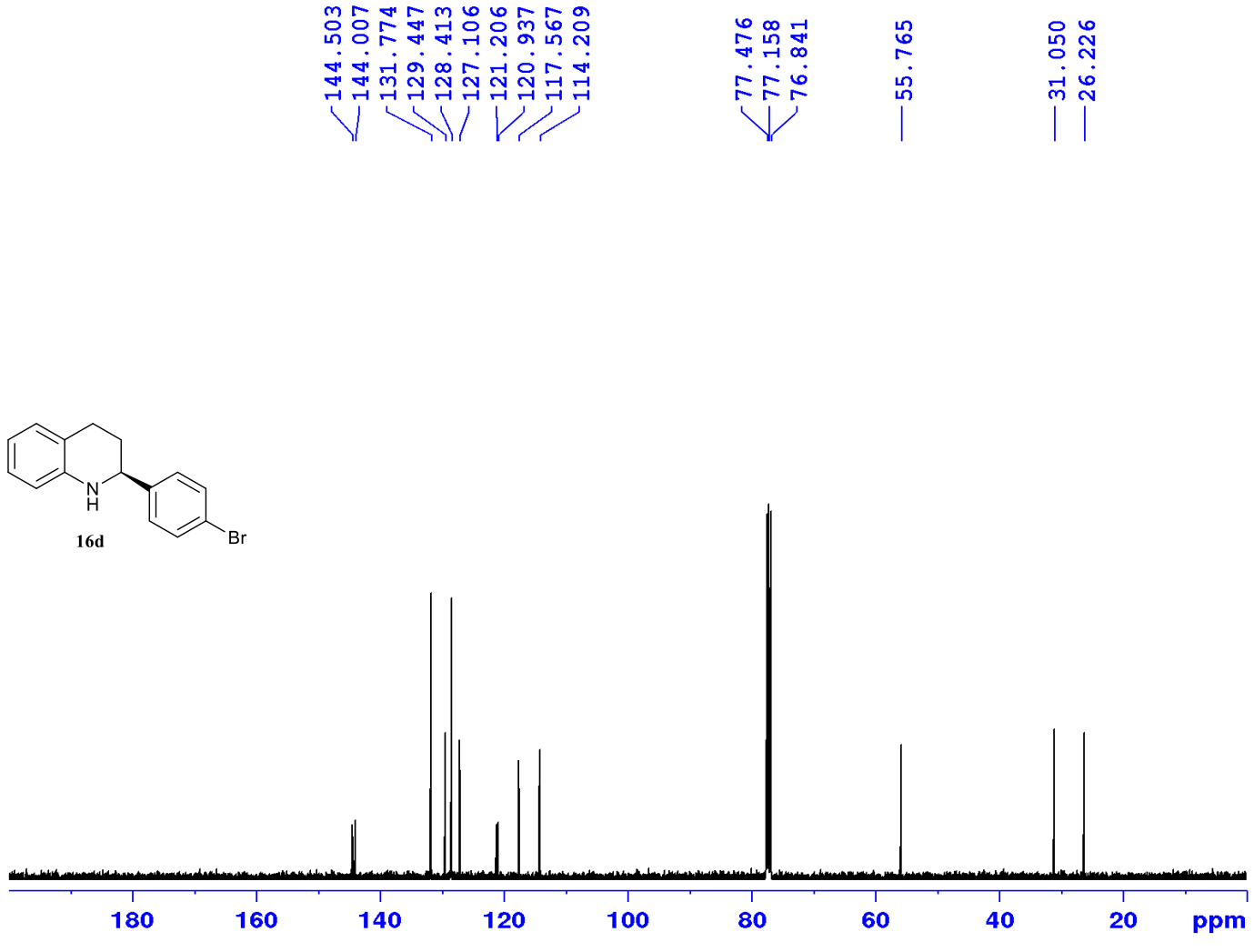



```
Current Data Parameters
NAME          MK-IV-866-CH
EXPNO                    1
PROCNO                   1

F2 - Acquisition Parameters
Date_             20240913
Time                15.32 h
INSTRUM   AVNeo400NB-5059676-P
PROBHD    Z163739_0809 (
PULPROG                zg30
TD                    65536
SOLVENT               CDCl3
NS                       16
DS                        2
SWH                8196.721 Hz
FIDRES             0.250144 Hz
AQ                 3.9976959 sec
RG                       101
DW                  61.000 usec
DE                  13.89 usec
TE                  298.6 K
D1              1.00000000 sec
TD0                       1
SFO1           400.1324708 MHz
NUC1                     1H
P0                  2.67 usec
P1                  8.00 usec
PLW1           24.18499947 W

F2 - Processing parameters
SI                    65536
SF             400.1300138 MHz
WDW                      EM
SSB       0
LB                  0.30 Hz
GB        0
PC                  1.00
```

Figure S70: ^{1}H-NMR spectra for compound **16d**



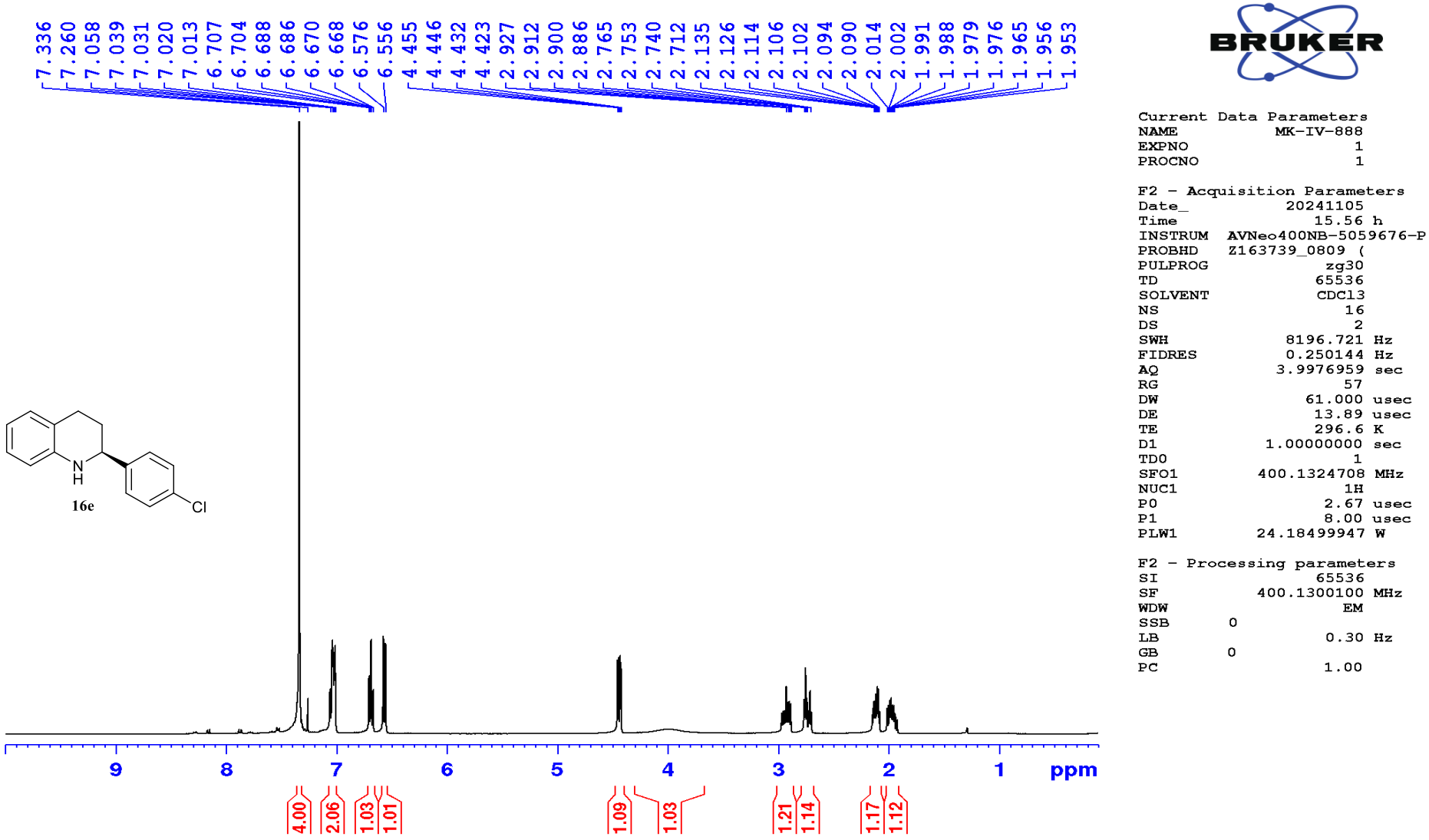
BRUKER

```
Current Data Parameters
NAME        MK-IV-866-CH
EXPNO                  2
PROCNO                 1

F2 - Acquisition Parameters
Date_           20240913
Time              15.38 h
INSTRUM  AVNeo400NB-5059676-P
PROBHD   Z163739_0809 (
PULPROG          zgpg30
TD                65536
SOLVENT           CDCl3
NS                   96
DS                    4
SWH           23809.524 Hz
FIDRES         0.726609 Hz
AQ             1.3762560 sec
RG                  101
DW               21.000 usec
DE                6.50 usec
TE                298.7 K
D1           2.00000000 sec
D11          0.03000000 sec
TD0                   1
SFO1        100.6228298 MHz
NUC1                13C
P0               2.67 usec
P1               8.00 usec
PLW1        91.39299774 W
SFO2        400.1316005 MHz
NUC2                1H
CPDPRG[2        waltz65
PCPD2            90.00 usec
PLW2        24.18499947 W
PLW12        0.18788880 W
PLW13        0.09416986 W

F2 - Processing parameters
SI                32768
SF          100.6127569 MHz
WDW                EM
SSB       0
LB                1.00 Hz
GB        0
PC                1.40
```

Figure S71: $^{13}C\{^{1}H\}$-NMR spectra for compound **16d**

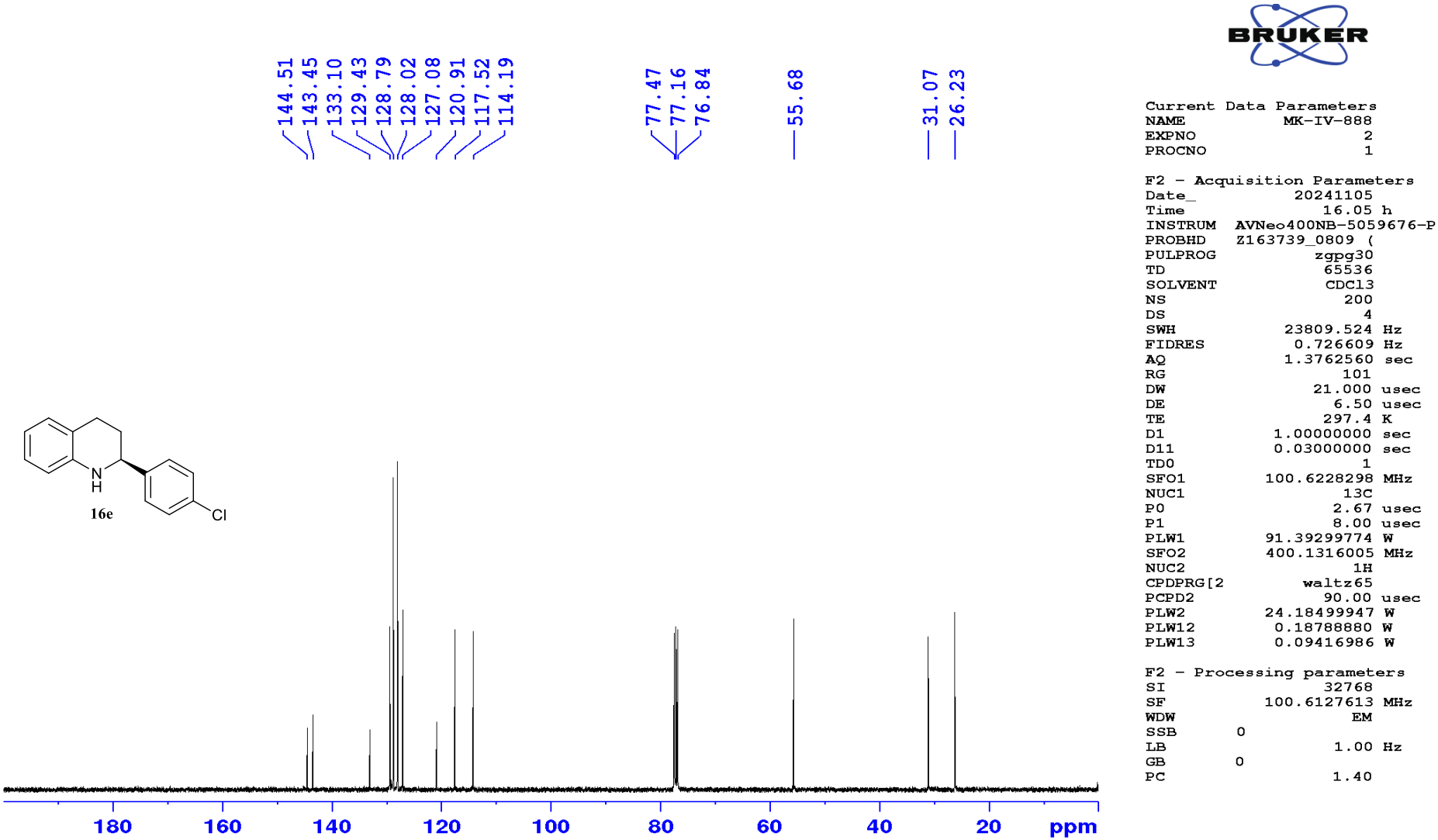



```
Current Data Parameters
NAME                  MK-IV-888
EXPNO                         1
PROCNO                        1

F2 - Acquisition Parameters
Date_                  20241105
Time                      15.56 h
INSTRUM  AVNeo400NB-5059676-P
PROBHD   Z163739_0809 (
PULPROG                    zg30
TD                        65536
SOLVENT                   CDCl3
NS                           16
DS                            2
SWH                    8196.721 Hz
FIDRES                 0.250144 Hz
AQ                     3.9976959 sec
RG                           57
DW                        61.000 usec
DE                        13.89 usec
TE                        296.6 K
D1                     1.00000000 sec
TD0                           1
SFO1                 400.1324708 MHz
NUC1                         1H
P0                        2.67 usec
P1                        8.00 usec
PLW1                24.18499947 W

F2 - Processing parameters
SI                        65536
SF                   400.1300100 MHz
WDW                          EM
SSB                 0
LB                        0.30 Hz
GB                  0
PC                        1.00
```

Figure S72: ^{1}H-NMR spectra for compound **16e**

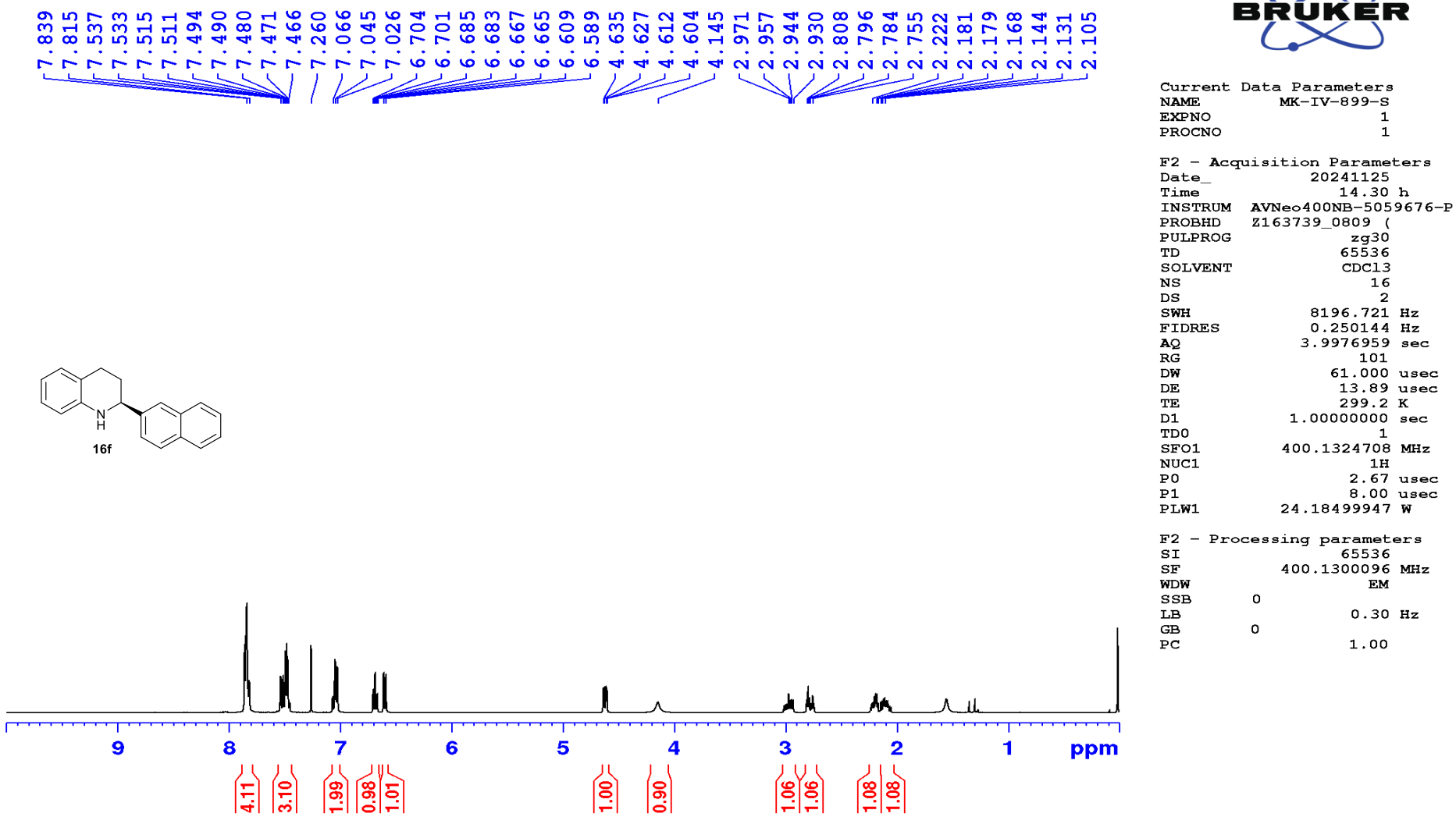


Current Data Parameters
NAME MK-IV-888
EXPNO 2
PROCNO 1

F2 - Acquisition Parameters
Date_ 20241105
Time 16.05 h
INSTRUM AVNeo400NB-5059676-P
PROBHD Z163739_0809 (
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 200
DS 4
SWH 23809.524 Hz
FIDRES 0.726609 Hz
AQ 1.3762560 sec
RG 101
DW 21.000 usec
DE 6.50 usec
TE 297.4 K
D1 1.00000000 sec
D11 0.03000000 sec
TD0 1
SFO1 100.6228298 MHz
NUC1 13C
P0 2.67 usec
P1 8.00 usec
PLW1 91.39299774 W
SFO2 400.1316005 MHz
NUC2 1H
CPDPRG[2 waltz65
PCPD2 90.00 usec
PLW2 24.18499947 W
PLW12 0.18788880 W
PLW13 0.09416986 W

F2 - Processing parameters
SI 32768
SF 100.6127613 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40

Figure S73: $^{13}C\{^{1}H\}$-NMR spectra for compound **16e**

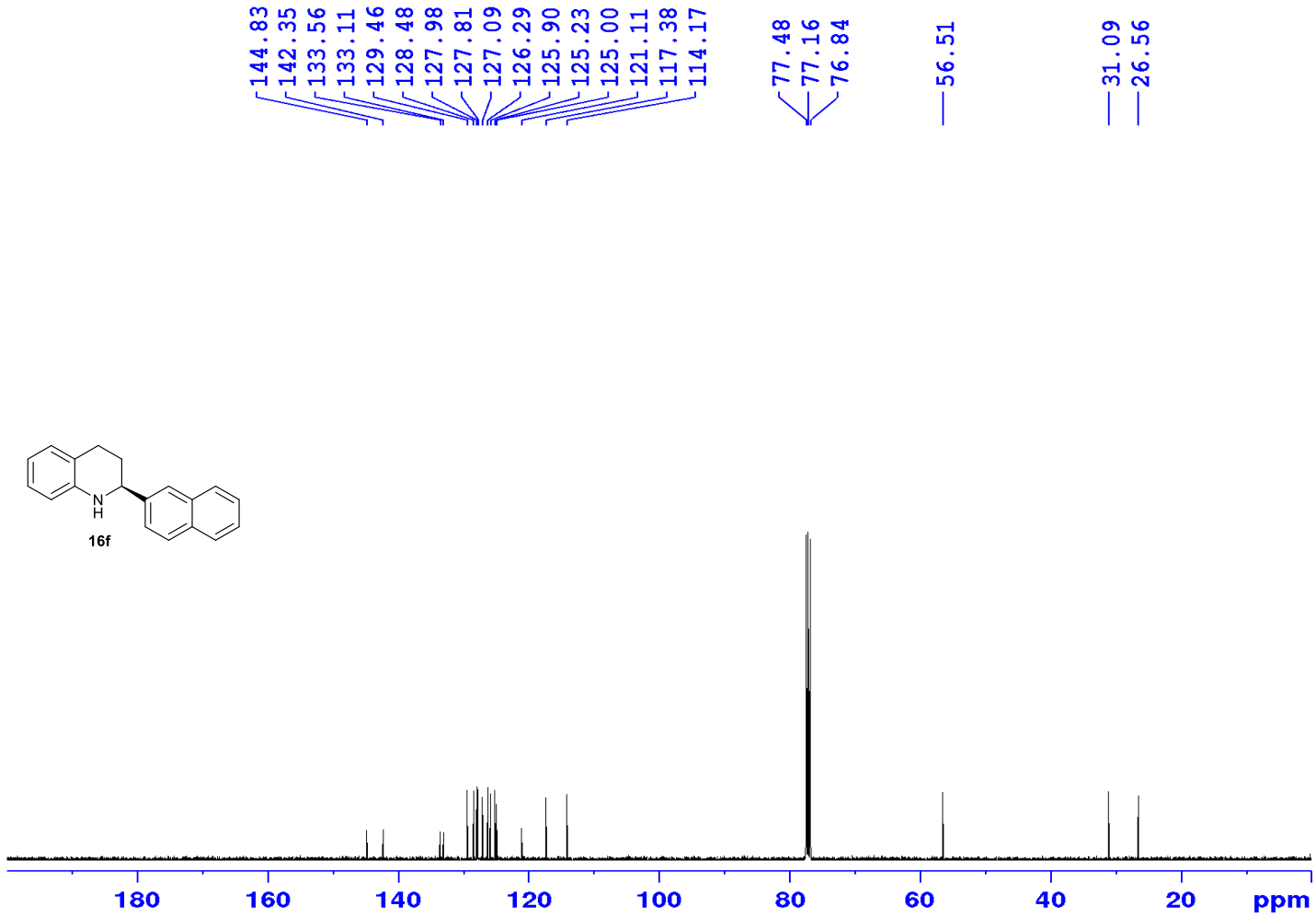



```
Current Data Parameters
NAME          MK-IV-899-S
EXPNO                   1
PROCNO                  1

F2 - Acquisition Parameters
Date_            20241125
Time                14.30 h
INSTRUM  AVNeo400NB-5059676-P
PROBHD   Z163739_0809 (
PULPROG              zg30
TD                  65536
SOLVENT             CDCl3
NS                     16
DS                      2
SWH              8196.721 Hz
FIDRES           0.250144 Hz
AQ               3.9976959 sec
RG                    101
DW                 61.000 usec
DE                 13.89 usec
TE                 299.2 K
D1              1.00000000 sec
TD0                     1
SFO1          400.1324708 MHz
NUC1                   1H
P0                  2.67 usec
P1                  8.00 usec
PLW1          24.18499947 W

F2 - Processing parameters
SI                  65536
SF            400.1300096 MHz
WDW                    EM
SSB       0
LB                  0.30 Hz
GB        0
PC                  1.00
```

Figure S74: ^{1}H-NMR spectra for compound **16f**

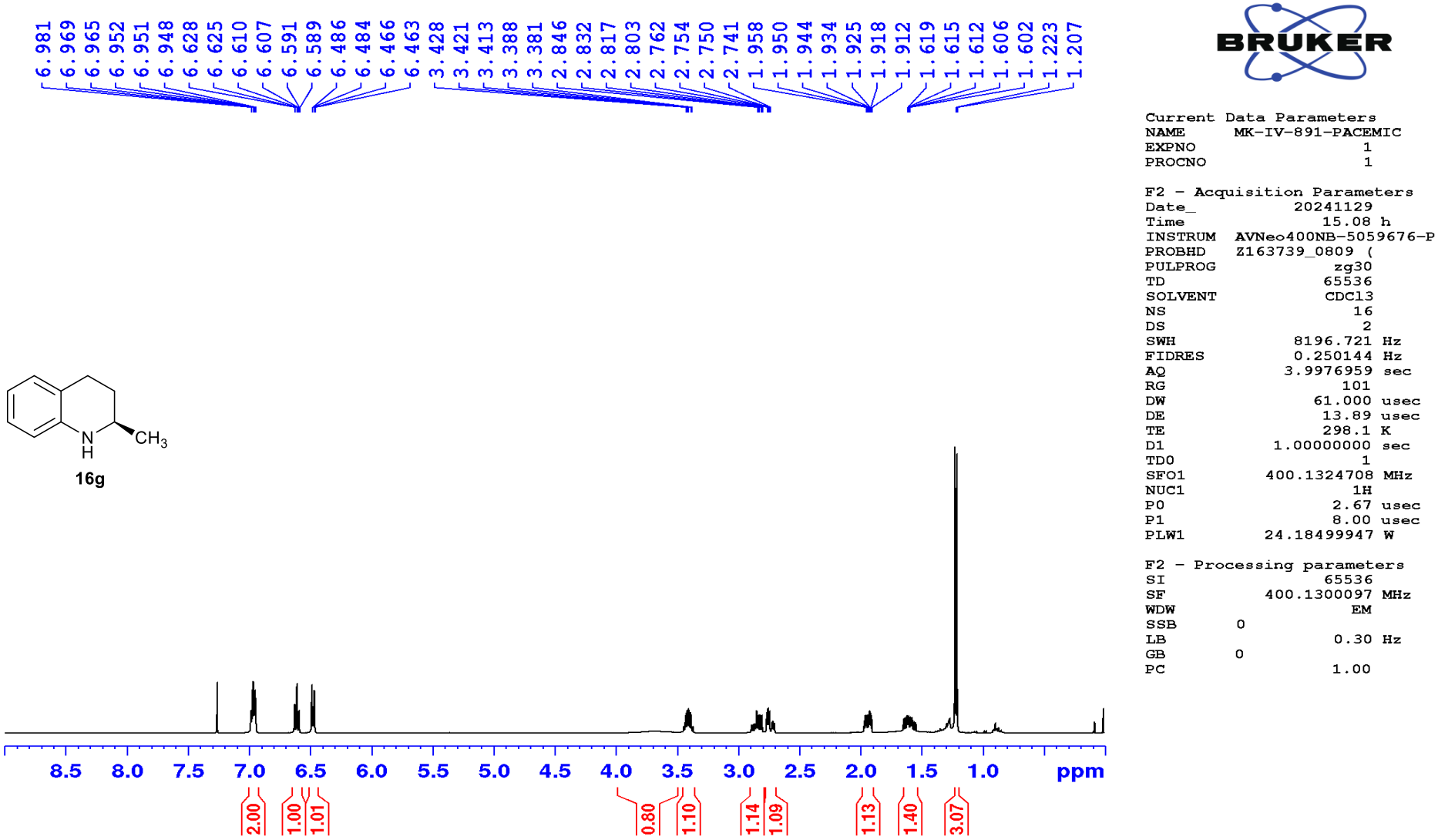



```
Current Data Parameters
NAME          MK-IV-899-S
EXPNO                   2
PROCNO                  1

F2 - Acquisition Parameters
Date_           20241125
Time               14.46 h
INSTRUM  AVNeo400NB-5059676-P
PROBHD   Z163739_0809 (
PULPROG           zgpg30
TD                65536
SOLVENT           CDCl3
NS                  256
DS                    4
SWH           23809.524 Hz
FIDRES         0.726609 Hz
AQ            1.3762560 sec
RG                  101
DW               21.000 usec
DE                6.50 usec
TE               300.1 K
D1            2.00000000 sec
D11           0.03000000 sec
TD0                   1
SFO1         100.6228298 MHz
NUC1                13C
P0                2.67 usec
P1                8.00 usec
PLW1         91.39299774 W
SFO2         400.1316005 MHz
NUC2                1H
CPDPRG[2         waltz65
PCPD2            90.00 usec
PLW2         24.18499947 W
PLW12         0.18788880 W
PLW13         0.09416986 W

F2 - Processing parameters
SI                  32768
SF           100.6127559 MHz
WDW                  EM
SSB       0
LB                1.00 Hz
GB        0
PC                1.40
```

Figure S75: $^{13}C\{^{1}H\}$-NMR spectra for compound **16f**

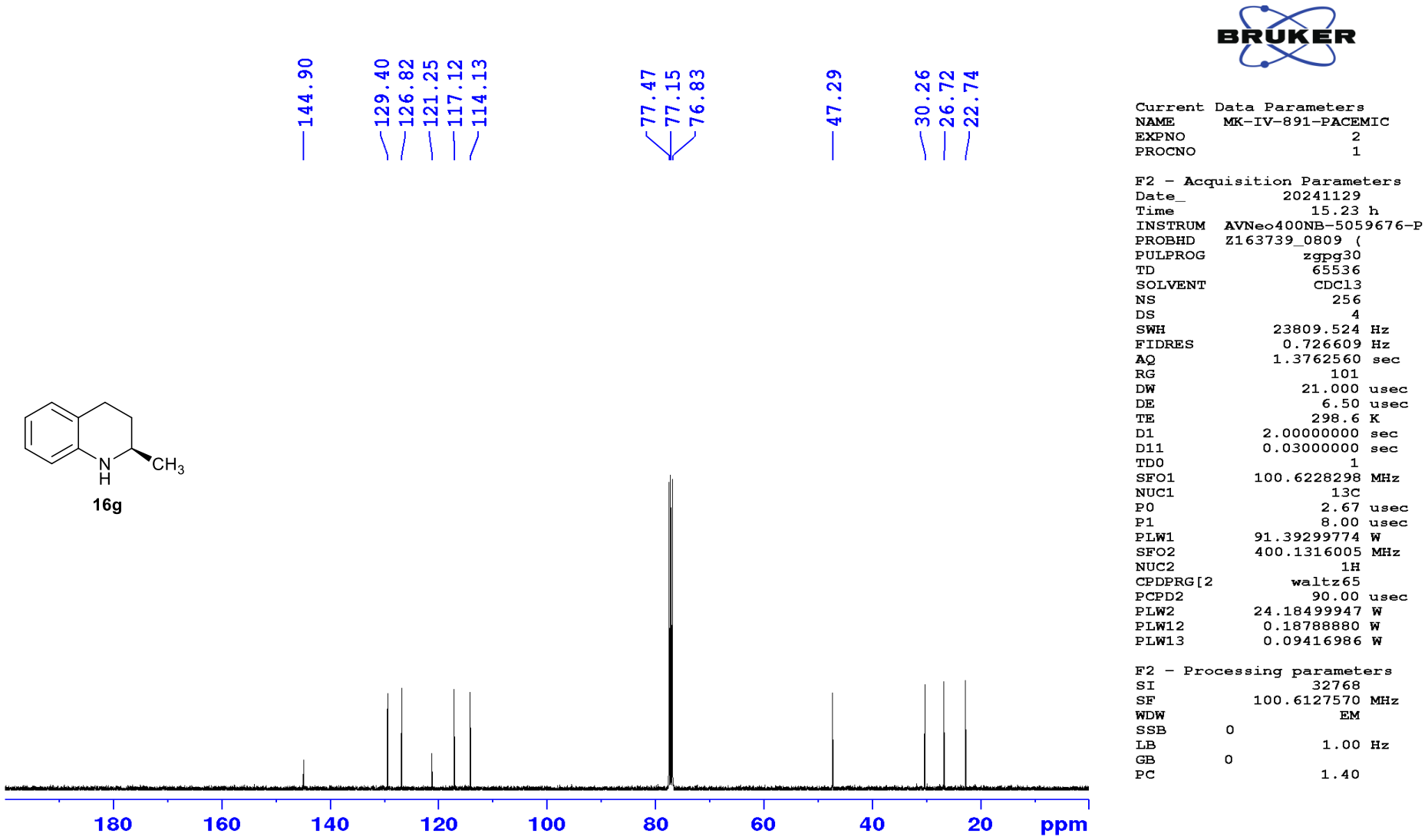



```
Current Data Parameters
NAME      MK-IV-891-PACEMIC
EXPNO                     1
PROCNO                    1

F2 - Acquisition Parameters
Date_              20241129
Time                 15.08 h
INSTRUM  AVNeo400NB-5059676-P
PROBHD   Z163739_0809 (
PULPROG                zg30
TD                    65536
SOLVENT               CDCl3
NS                       16
DS                        2
SWH                8196.721 Hz
FIDRES             0.250144 Hz
AQ                3.9976959 sec
RG                      101
DW                   61.000 usec
DE                   13.89 usec
TE                   298.1 K
D1                1.00000000 sec
TD0                       1
SFO1           400.1324708 MHz
NUC1                     1H
P0                    2.67 usec
P1                    8.00 usec
PLW1           24.18499947 W

F2 - Processing parameters
SI                    65536
SF             400.1300097 MHz
WDW                      EM
SSB       0
LB                    0.30 Hz
GB        0
PC                    1.00
```

Figure S76: ^{1}H-NMR spectra for compound **16g**

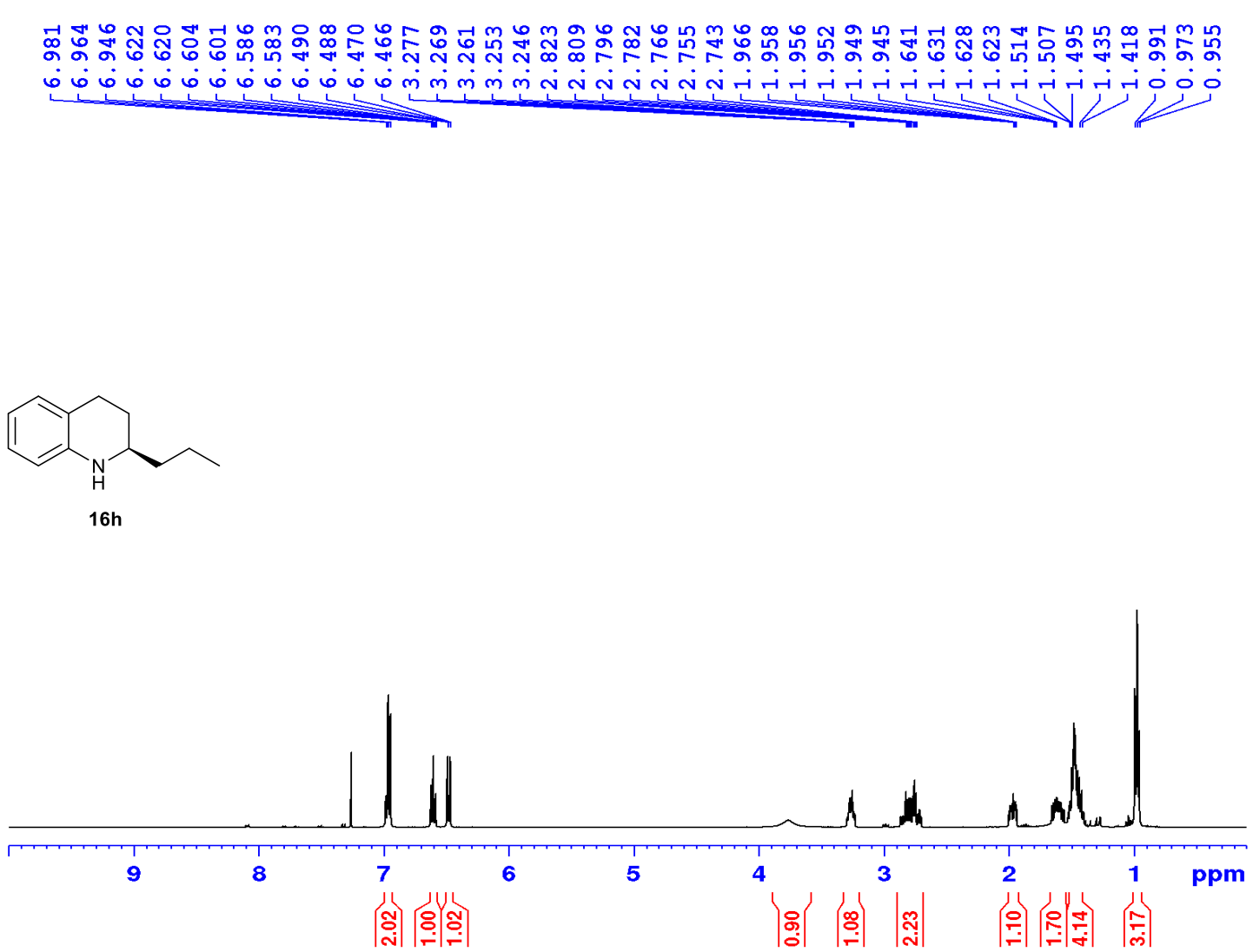



```
Current Data Parameters
NAME      MK-IV-891-PACEMIC
EXPNO                    2
PROCNO                   1

F2 - Acquisition Parameters
Date_             20241129
Time                15.23 h
INSTRUM  AVNeo400NB-5059676-P
PROBHD   Z163739_0809 (
PULPROG            zgpg30
TD                  65536
SOLVENT             CDCl3
NS                    256
DS                      4
SWH             23809.524 Hz
FIDRES           0.726609 Hz
AQ               1.3762560 sec
RG                    101
DW                 21.000 usec
DE                  6.50 usec
TE                 298.6 K
D1              2.00000000 sec
D11             0.03000000 sec
TD0                     1
SFO1          100.6228298 MHz
NUC1                  13C
P0                  2.67 usec
P1                  8.00 usec
PLW1          91.39299774 W
SFO2          400.1316005 MHz
NUC2                  1H
CPDPRG[2          waltz65
PCPD2              90.00 usec
PLW2          24.18499947 W
PLW12          0.18788880 W
PLW13          0.09416986 W

F2 - Processing parameters
SI                  32768
SF            100.6127570 MHz
WDW                    EM
SSB       0
LB                  1.00 Hz
GB        0
PC                  1.40
```

Figure S77: $^{13}C\{^{1}H\}$-NMR spectra for compound **16g**

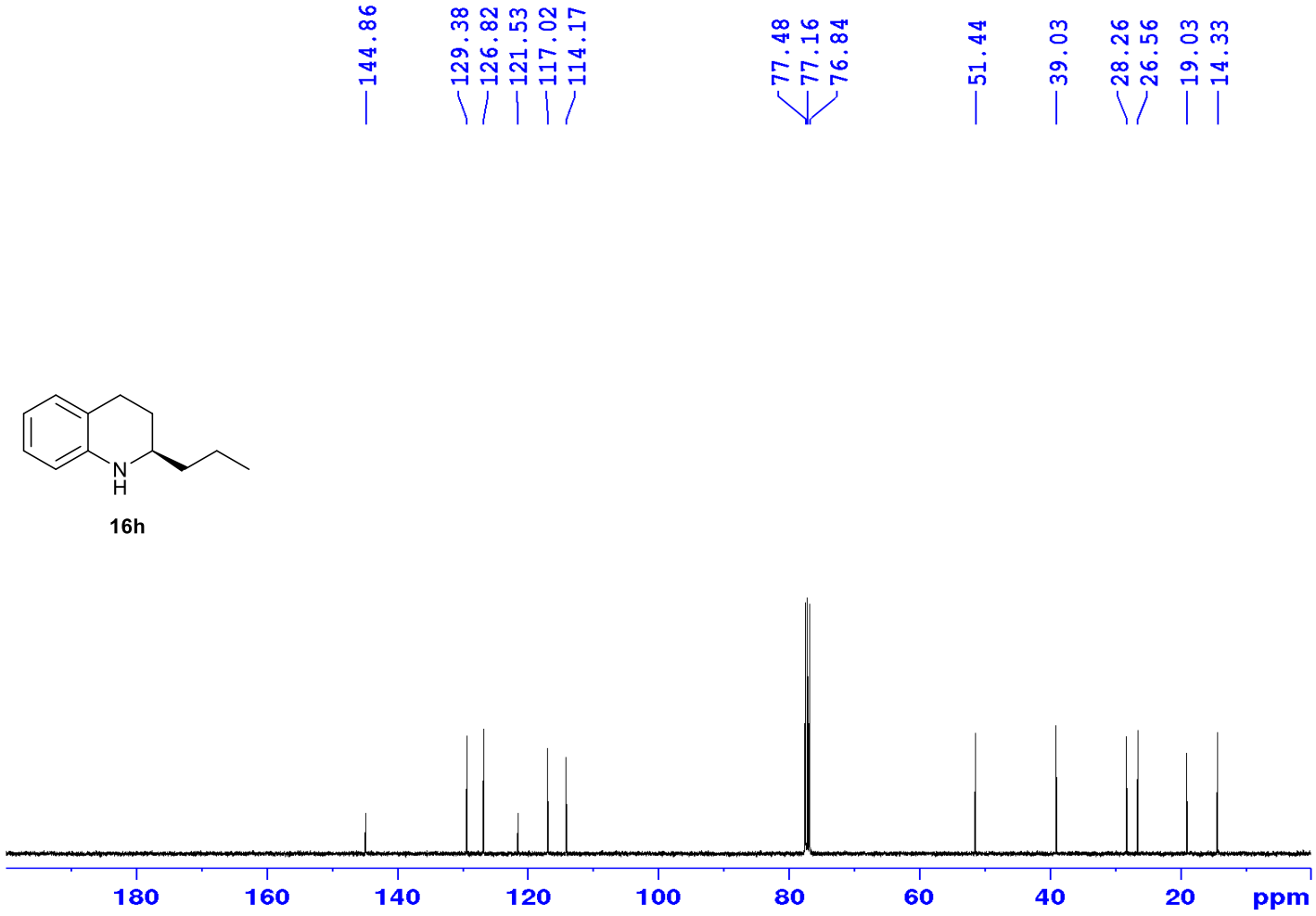


Current Data Parameters
NAME MK-IV-892-RACMK
EXPNO 1
PROCNO 1

F2 - Acquisition Parameters
Date_ 20241203
Time 12.42 h
INSTRUM AVNeo400NB-5059676-P
PROBHD Z163739_0809 (
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 8196.721 Hz
FIDRES 0.250144 Hz
AQ 3.9976959 sec
RG 90.5
DW 61.000 usec
DE 13.89 usec
TE 299.0 K
D1 1.00000000 sec
TD0 1
SFO1 400.1324708 MHz
NUC1 1H
P0 2.67 usec
P1 8.00 usec
PLW1 24.18499947 W

F2 - Processing parameters
SI 65536
SF 400.1300096 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

Figure S78: ^{1}H-NMR spectra for compound **16h**




```
Current Data Parameters
NAME      MK-IV-892-RACMK
EXPNO                   2
PROCNO                  1

F2 - Acquisition Parameters
Date_            20241203
Time                12.58 h
INSTRUM  AVNeo400NB-5059676-P
PROBHD   Z163739_0809 (
PULPROG            zgpg30
TD                  65536
SOLVENT             CDCl3
NS                    256
DS                      4
SWH             23809.524 Hz
FIDRES          0.726609 Hz
AQ              1.3762560 sec
RG                    101
DW                21.000 usec
DE                 6.50 usec
TE                299.8 K
D1           2.00000000 sec
D11          0.03000000 sec
TD0                     1
SFO1         100.6228298 MHz
NUC1                  13C
P0                 2.67 usec
P1                 8.00 usec
PLW1         91.39299774 W
SFO2         400.1316005 MHz
NUC2                  1H
CPDPRG[2          waltz65
PCPD2              90.00 usec
PLW2         24.18499947 W
PLW12         0.18788880 W
PLW13         0.09416986 W

F2 - Processing parameters
SI                    32768
SF           100.6127564 MHz
WDW                     EM
SSB       0
LB                 1.00 Hz
GB        0
PC                 1.40
```

Figure S79: $^{13}C\{^{1}H\}$-NMR spectra for compound **16h**

SHIMADZU LabSolutions

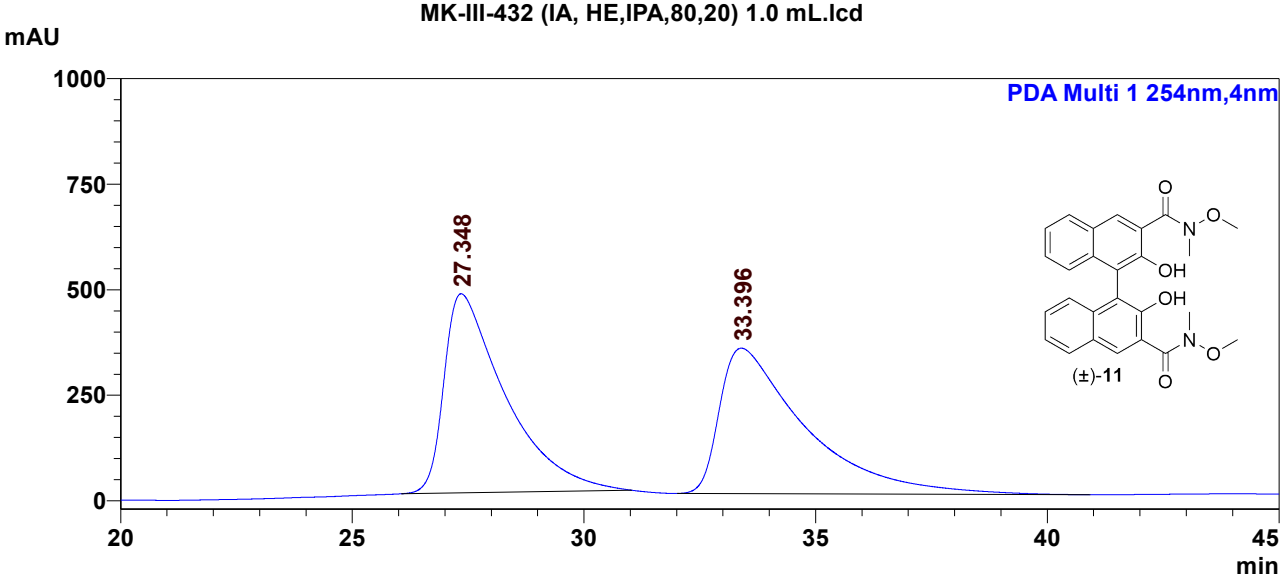
HPLC analysis report

Department of Chemistry
Pondicherry University

<Chromatogram>

(±)-3,3'-Bis(N,N'-dimethyl dimethoxy carbamate)BINOL, (±)-11

MK-III-432 (IA, HE,IPA,80,20) 1.0 mL.lcd



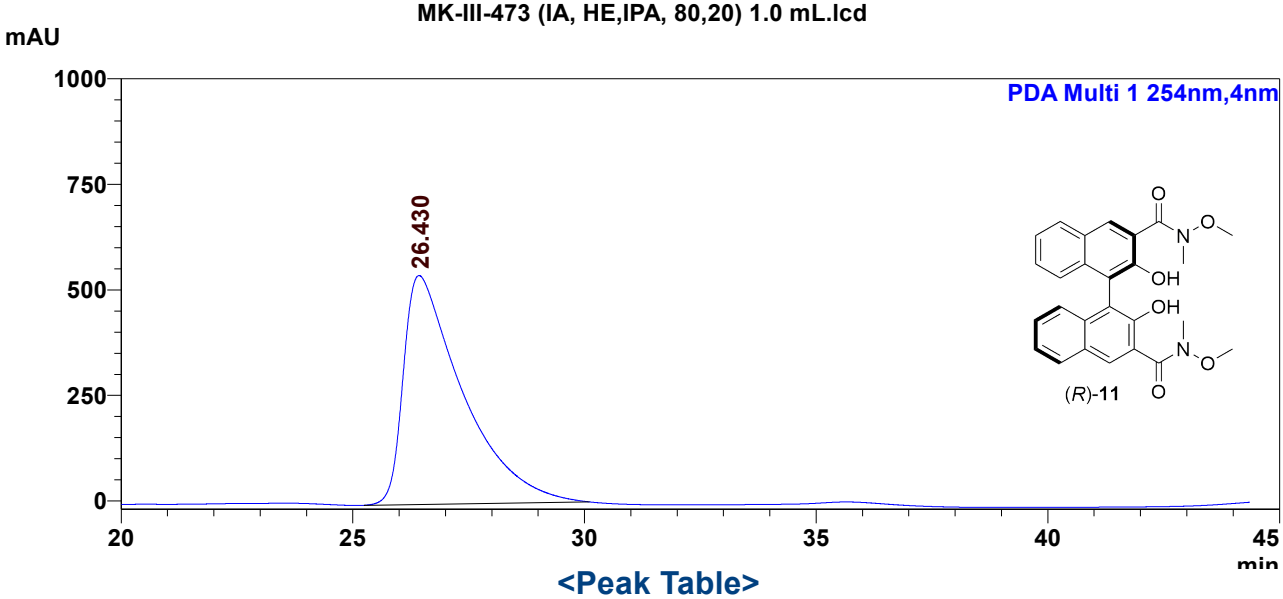
<Peak Table>

PDA Ch1 254nm

Peak#	Ret. Time	Area%
1	27.348	49.601
2	33.396	50.399
Total		100.000

(R)-3,3'-Bis(N,N'-dimethyl dimethoxy carbamate)BINOL, (R)-11

MK-III-473 (IA, HE,IPA, 80,20) 1.0 mL.lcd



<Peak Table>

PDA Ch1 254nm

Peak#	Ret. Time	Area%
1	26.430	100.000
Total		100.000

D:\Data\KARTHICK\3,3'-DIACYL BINOLS\432\MK-III-432 (IA, HE,IPA,80,20) 1.0 mL.lcd

SHIMADZU LabSolutions

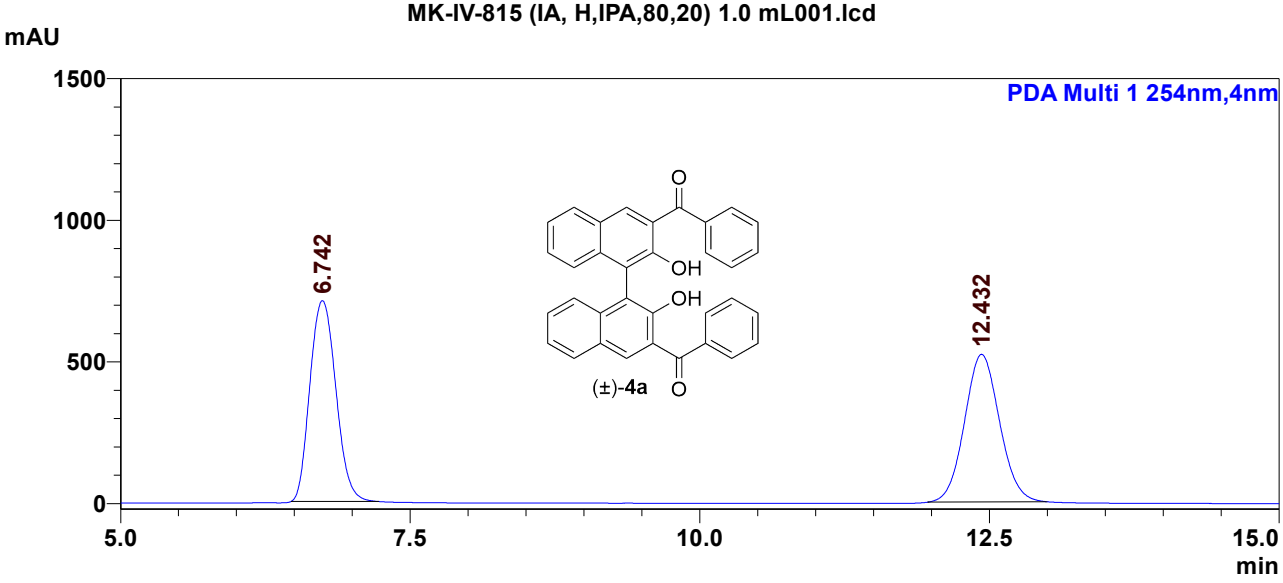
HPLC analysis report

Department of Chemistry
Pondicherry University

<Chromatogram>

(±)-3,3'-Bis(phenyl methanone)BINOL, (±)-4a

MK-IV-815 (IA, H,IPA,80,20) 1.0 mL001.lcd



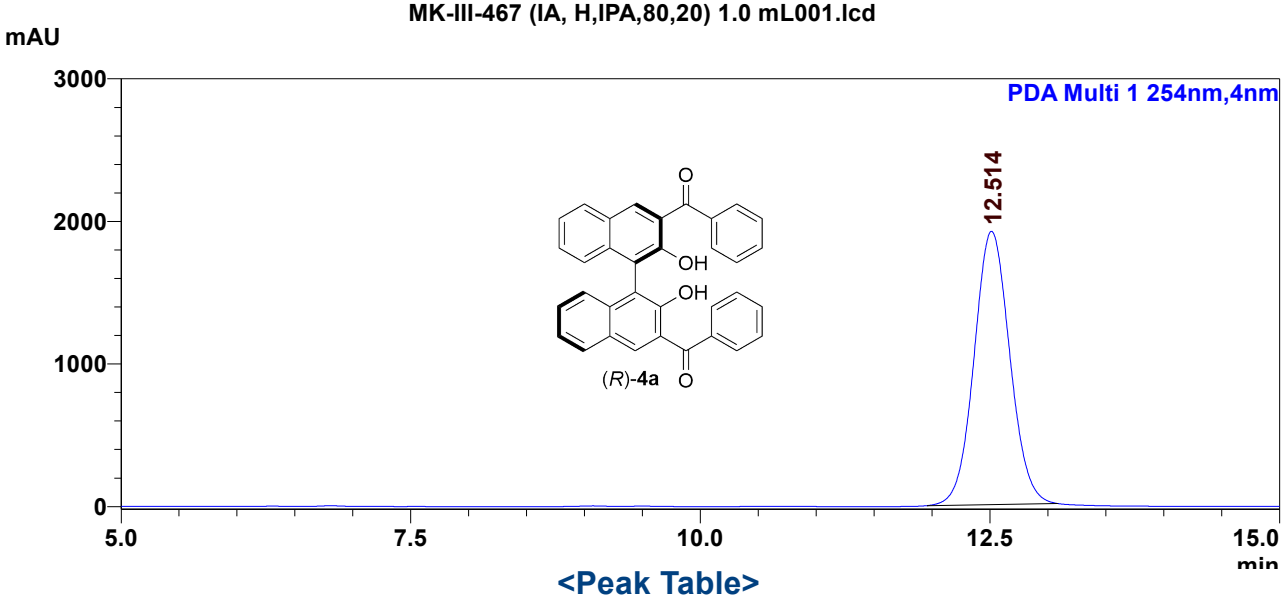
<Peak Table>

PDA Ch1 254nm

Peak#	Ret. Time	Area%
1	6.742	50.291
2	12.432	49.709
Total		100.000

(*R*)-3,3'-Bis(phenyl methanone)BINOL, (*R*)-4a

MK-III-467 (IA, H,IPA,80,20) 1.0 mL001.lcd



<Peak Table>

PDA Ch1 254nm

Peak#	Ret. Time	Area%
1	12.514	100.000
Total		100.000

D:\Data\KARTHICK\3,3'-DIACYL BINOLS\467\MK-IV-815 (IA, H,IPA,80,20) 1.0 mL001.lcd

SHIMADZU LabSolutions

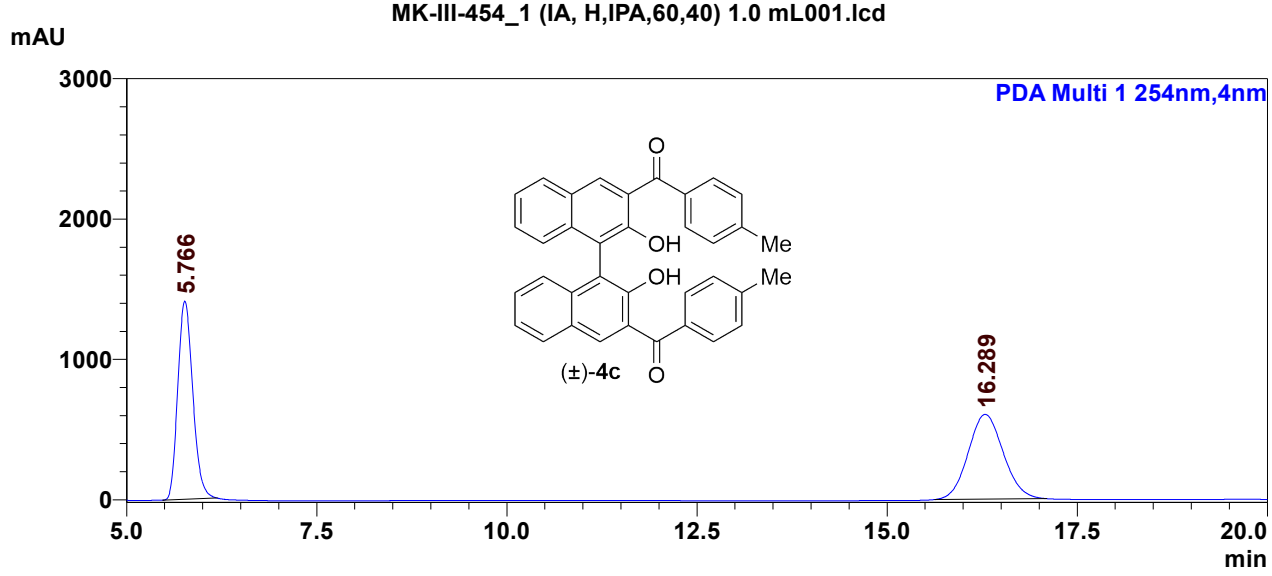
HPLC analysis report

Department of Chemistry
Pondicherry University

<Chromatogram>

(±)-3,3'-Bis(p-tolyl methanone)BINOL, (±)-4c

MK-III-454_1 (IA, H,IPA,60,40) 1.0 mL001.lcd



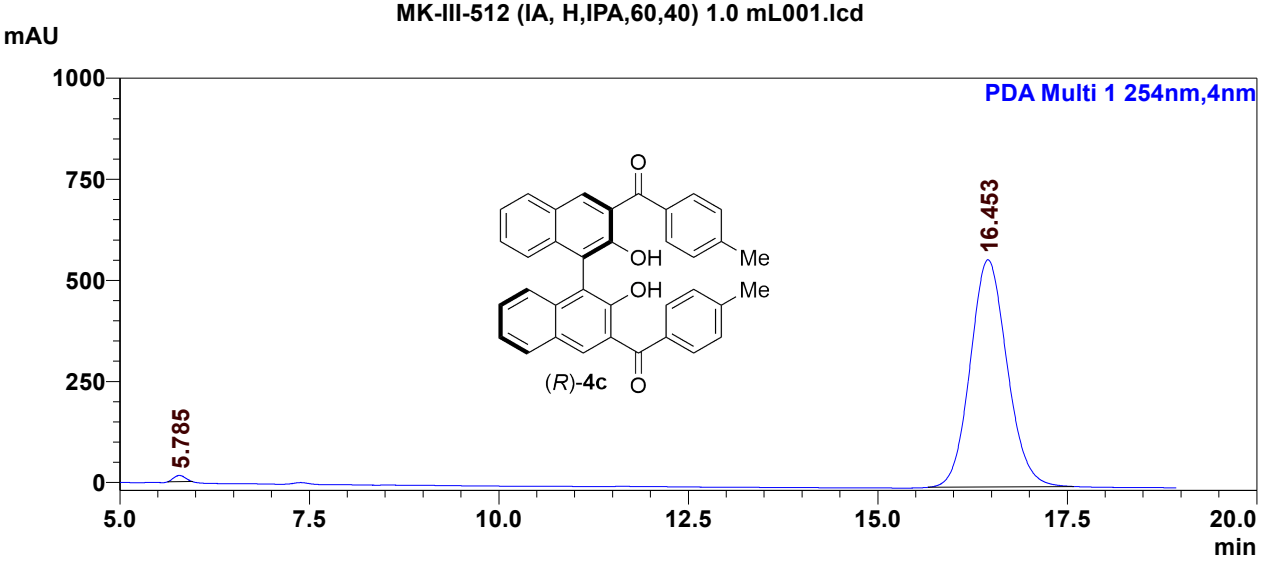
<Peak Table>

PDA Ch1 254nm

Peak#	Ret. Time	Area%
1	5.766	50.040
2	16.289	49.960
Total		100.000

(*R*)-3,3'-Bis(p-tolyl methanone)BINOL, (*R*)-4c

MK-III-512 (IA, H,IPA,60,40) 1.0 mL001.lcd



<Peak Table>

PDA Ch1 254nm

Peak#	Ret. Time	Area%
1	5.785	0.843
2	16.453	99.157
Total		100.000

D:\Data\KARTHICK\3,3'-DIACYL BINOLS\454\MK-III-454_1 (IA, H,IPA,60,40) 1.0 mL001.lcd

SHIMADZU LabSolutions

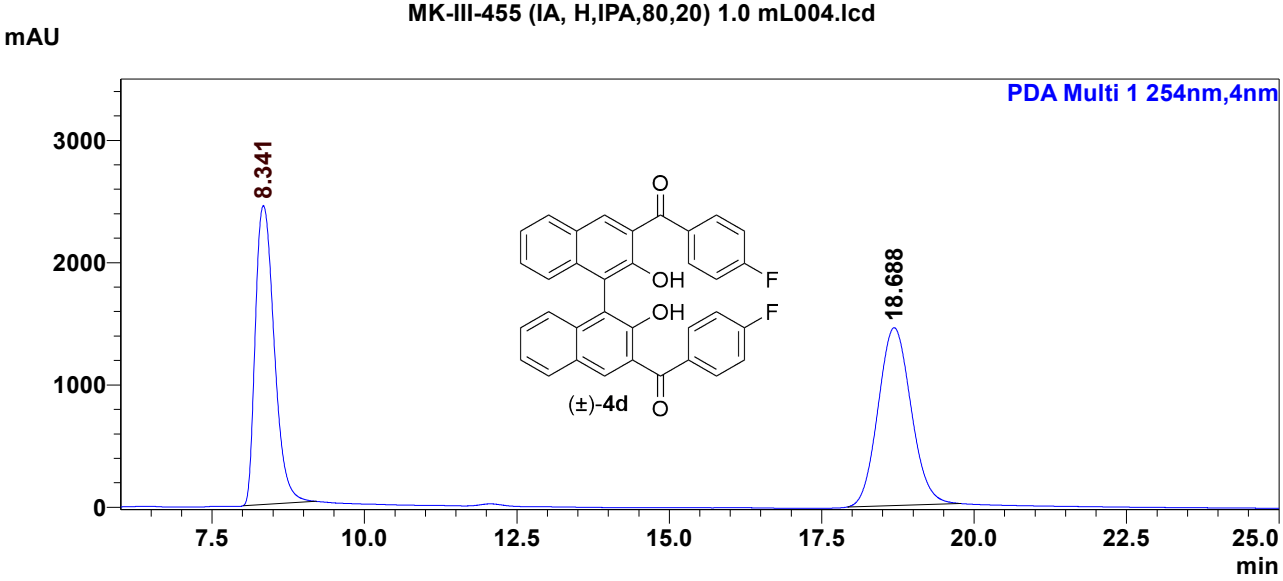
HPLC analysis report

Department of Chemistry
Pondicherry University

<Chromatogram>

(±)-3,3'-Bis(4-Fluoro phenyl methanone)BINOL, (±)-4d

MK-III-455 (IA, H,IPA,80,20) 1.0 mL004.lcd



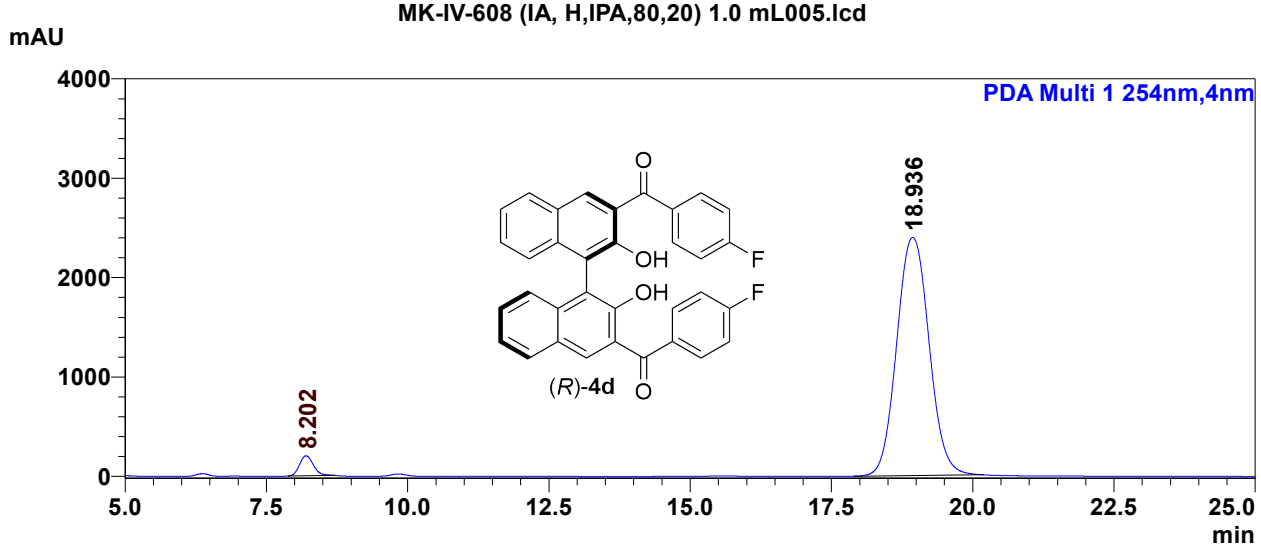
<Peak Table>

PDA Ch1 254nm

Peak#	Ret. Time	Area%
1	8.341	49.085
2	18.688	50.915
Total		100.000

(*R*)-3,3'-Bis(4-fluoro phenyl methanone)BINOL, (*R*)-4d

MK-IV-608 (IA, H,IPA,80,20) 1.0 mL005.lcd



<Peak Table>

PDA Ch1 254nm

Peak#	Ret. Time	Area%
1	8.202	3.440
2	18.936	96.560
Total		100.000

D:\Data\KARTHICK\3,3'-DIACYL BINOLS\455\MK-III-455 (IA, H,IPA,80,20) 1.0 mL004.lcd

SHIMADZU LabSolutions

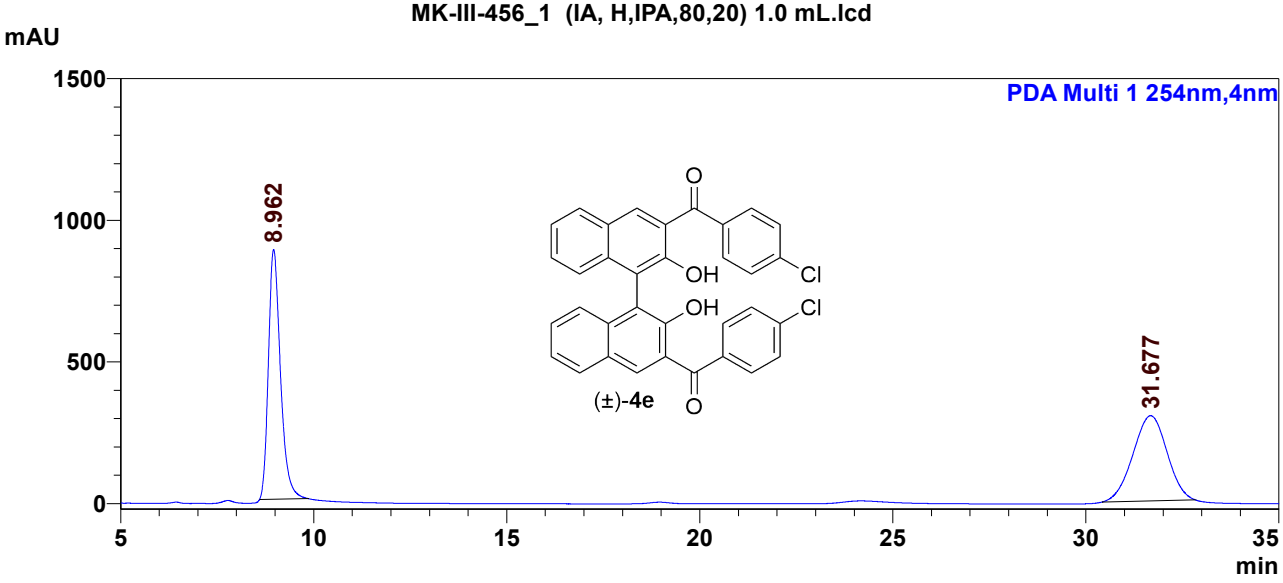
HPLC analysis report

Department of Chemistry
Pondicherry University

<Chromatogram>

(±)-3,3'-Bis(4-chlorophenyl methanone)BINOL, (±)-4e

MK-III-456_1 (IA, H,IPA,80,20) 1.0 mL.lcd



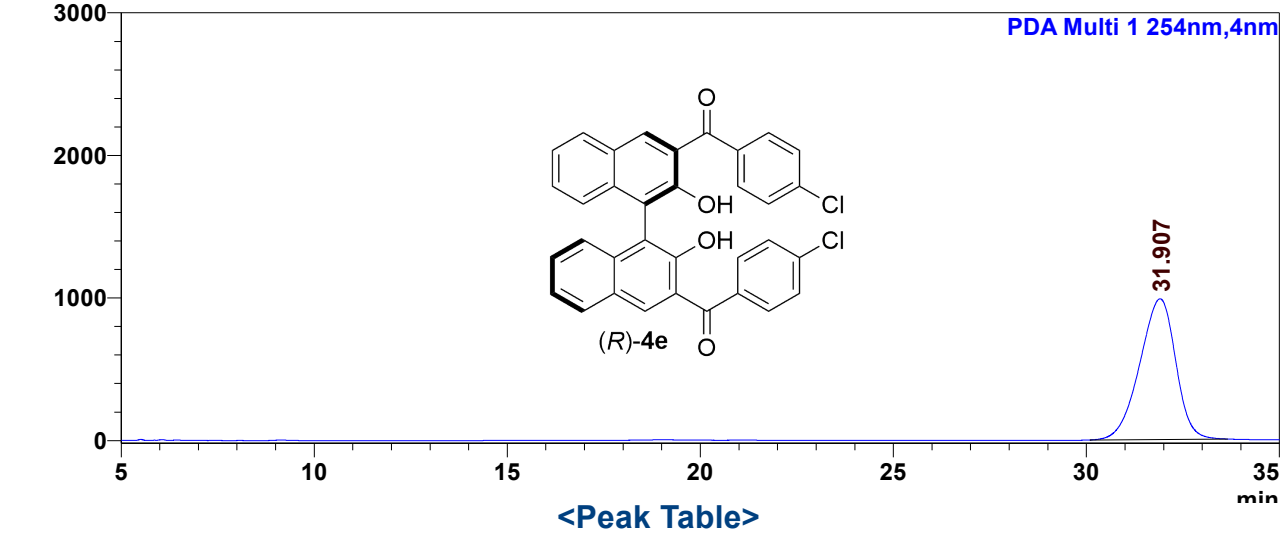
<Peak Table>

PDA Ch1 254nm

Peak#	Ret. Time	Area%
1	8.962	50.849
2	31.677	49.151
Total		100.000

(*R*)-3,3'-Bis(4-chlorophenyl methanone)BINOL, (*R*)-4e

MK-III-547_1 (IA, H,IPA,80,20) 1.0 mL.lcd



<Peak Table>

PDA Ch1 254nm

Peak#	Ret. Time	Area%
1	31.907	100.000
Total		100.000

D:\Data\KARTHICK\3,3'-DIACYL BINOLS\456\MK-III-456_1 (IA, H,IPA,80,20) 1.0 mL.lcd

SHIMADZU LabSolutions

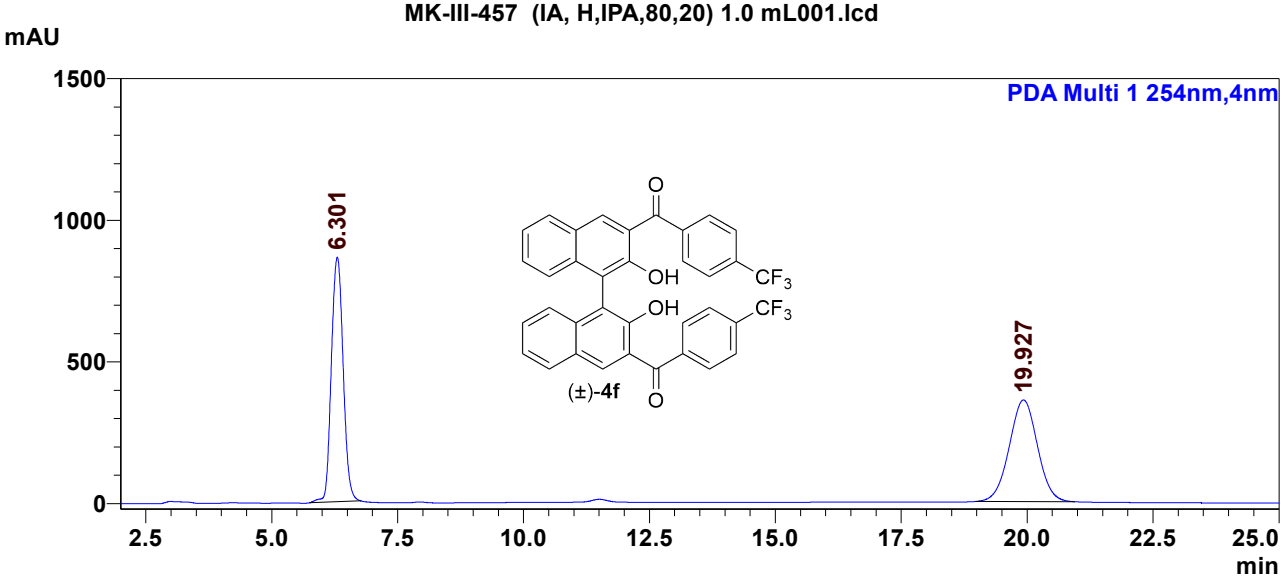
HPLC analysis report

Department of Chemistry
Pondicherry University

<Chromatogram>

(±)-3,3'-Bis(4-CF3 phenyl methanone)BINOL, (±)-4f

MK-III-457 (IA, H,IPA,80,20) 1.0 mL001.lcd



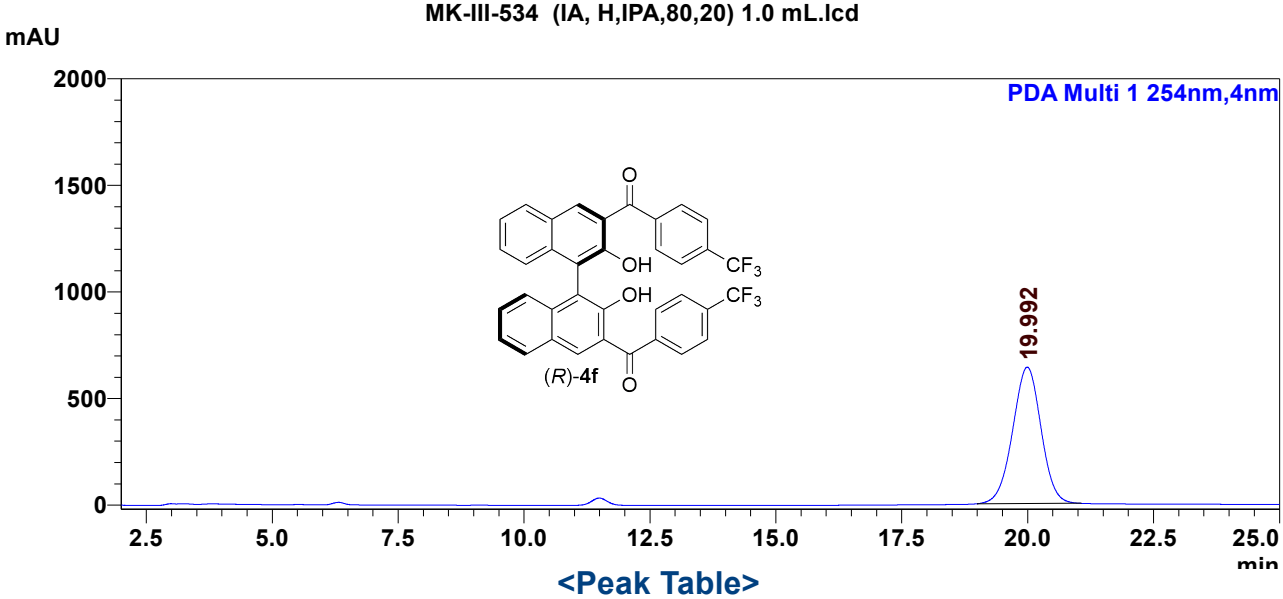
<Peak Table>

PDA Ch1 254nm

Peak#	Ret. Time	Area%
1	6.301	50.248
2	19.927	49.752
Total		100.000

(*R*)-3,3'-Bis(4-CF3 phenyl methanone)BINOL, (*R*)-4f

MK-III-534 (IA, H,IPA,80,20) 1.0 mL.lcd



<Peak Table>

PDA Ch1 254nm

Peak#	Ret. Time	Area%
1	19.992	100.000
Total		100.000

SHIMADZU LabSolutions

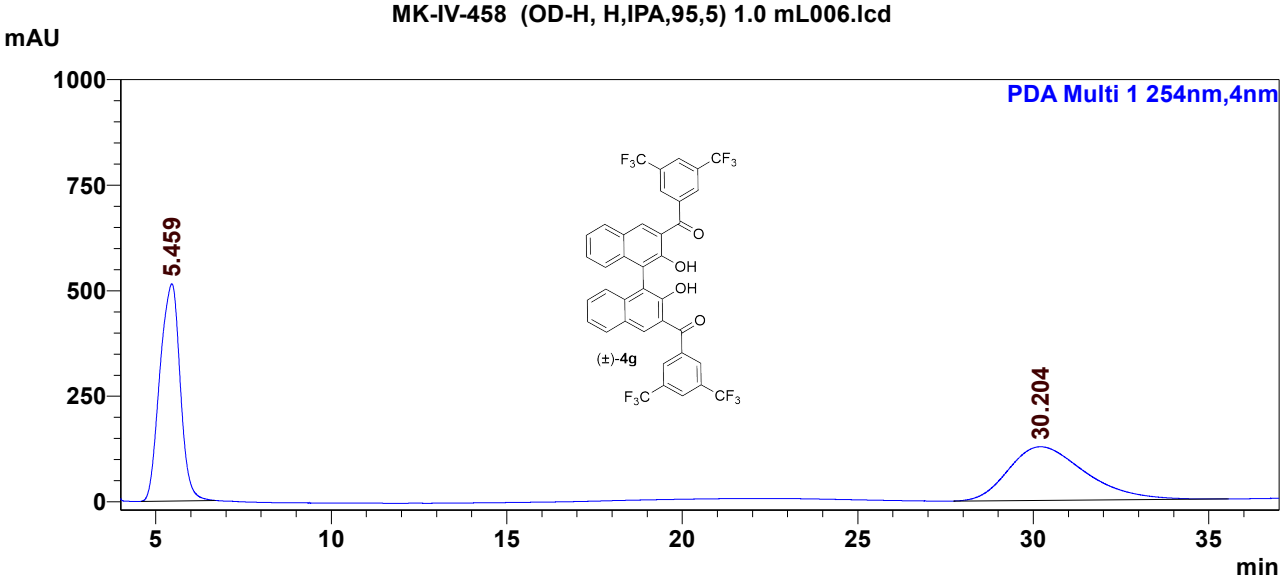
HPLC analysis report

Department of Chemistry
Pondicherry University

<Chromatogram>

(±)-3,3'-Bis(bis 3,5-CF_3 phenyl methanone)BINOL, (±)-4g

MK-IV-458 (OD-H, H,IPA,95,5) 1.0 mL006.lcd



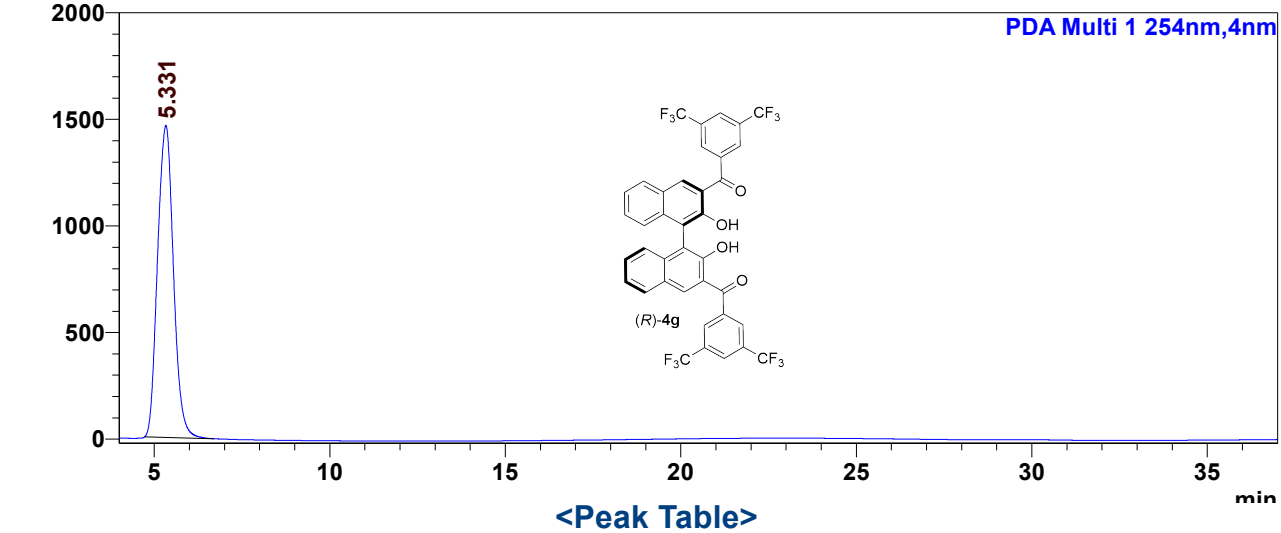
<Peak Table>

PDA Ch1 254nm

Peak#	Ret. Time	Area%
1	5.459	51.636
2	30.204	48.364
Total		100.000

(*R*)-3,3'-Bis(bis 3,5-CF_3 phenyl methanone)BINOL, (*R*)-4g

MK-IV-508_1 (OD-H, H,IPA,95,5) 1.0 mL008.lcd



<Peak Table>

PDA Ch1 254nm

Peak#	Ret. Time	Area%
1	5.331	100.000
Total		100.000

D:\Data\KARTHICK\3,3'-DIACYL BINOLS\458\MK-IV-458 (OD-H, H,IPA,95,5) 1.0 mL006.lcd

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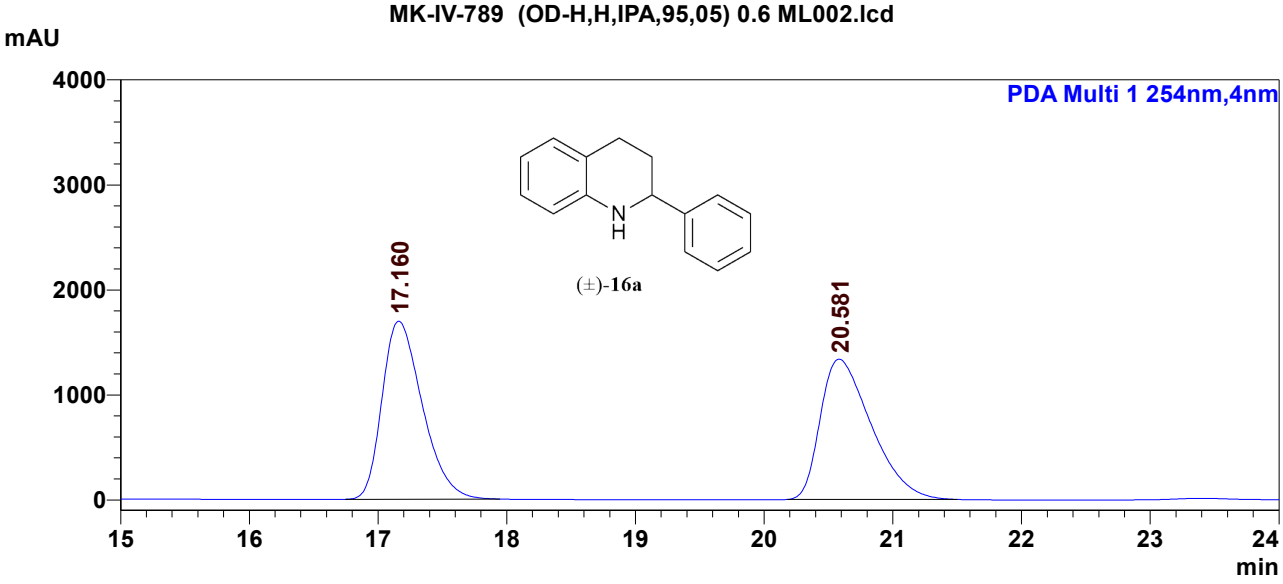
HPLC analysis report

Department of Chemistry
Pondicherry University

<Chromatogram>

(±)-(phenyl) 1,2,3,4-tetrahydroquinoline, (±)-16a

MK-IV-789 (OD-H,H,IPA,95,05) 0.6 ML002.lcd



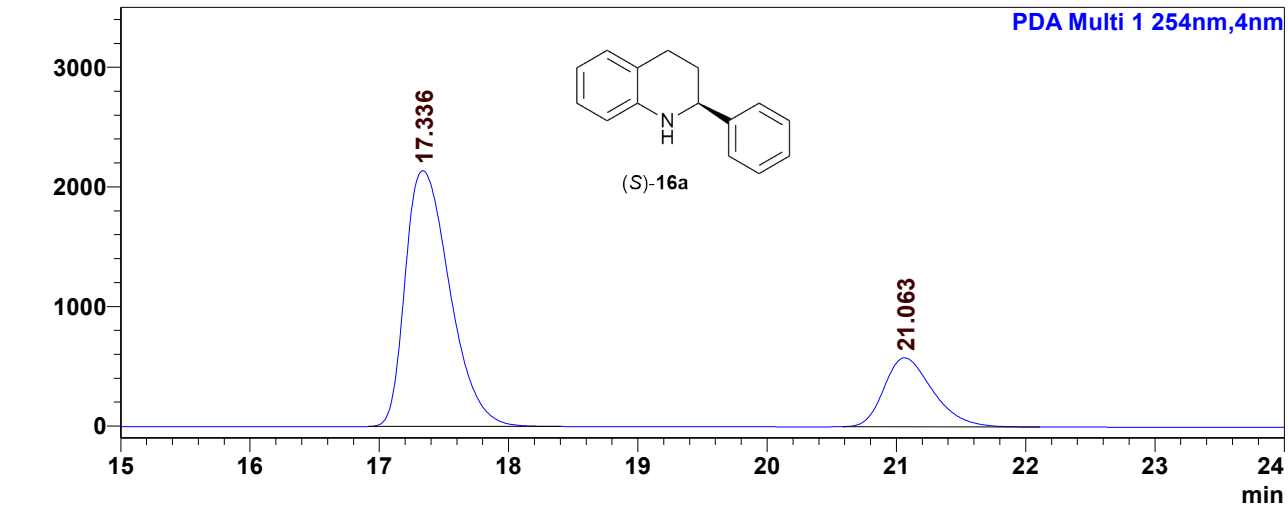
<Peak Table>

PDA Ch1 254nm

Peak#	Ret. Time	Area%
1	17.160	50.086
2	20.581	49.914
Total		100.000

(*S*)-(phenyl) 1,2,3,4-tetrahydroquinoline, (*S*)-16a

MK-IV-881 (chiral)_1 (OD-H,H,IPA,95,05) 0.6 ML003.lcd



<Peak Table>

PDA Ch1 254nm

Peak#	Ret. Time	Area%
1	17.336	77.258
2	21.063	22.742
Total		100.000

SHIMADZU LabSolutions

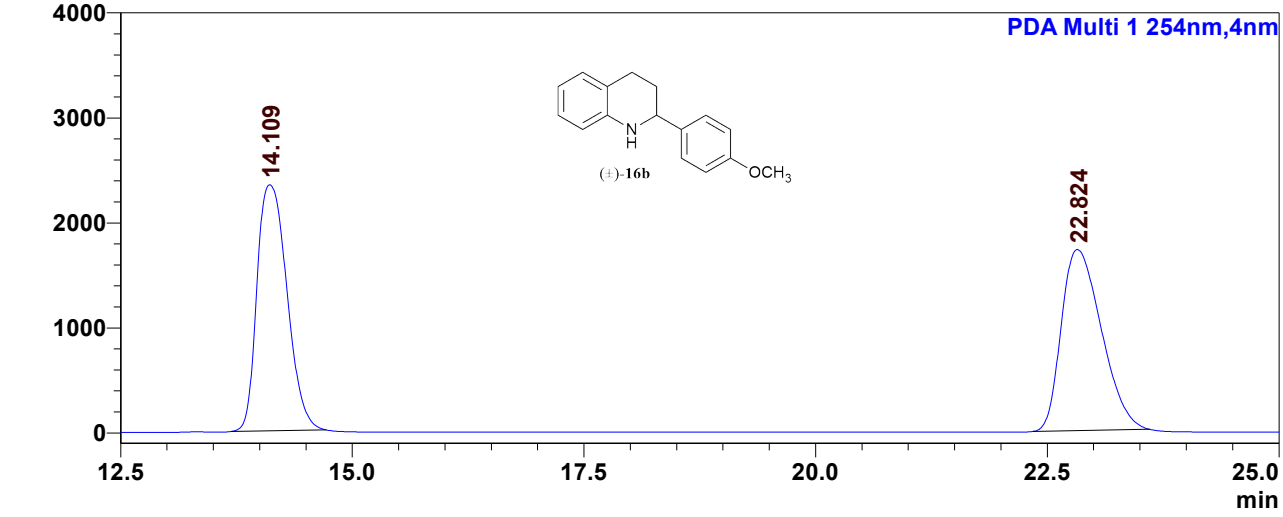
HPLC analysis report

Department of Chemistry
Pondicherry University

<Chromatogram>

(±)-(4-Methoxyphenyl)-1,2,3,4-tetrahydroquinoline, (±)-16b

MK-IV-873_1 (OD-H,H,IPA,90,10) 0.6 ML003.lcd



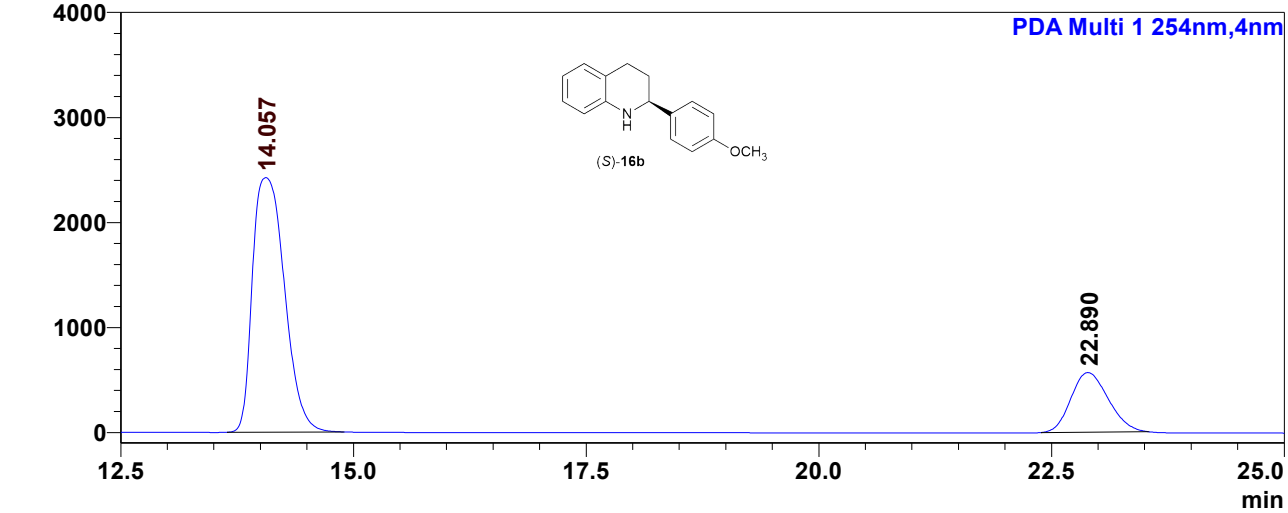
<Peak Table>

PDA Ch1 254nm

Peak#	Ret. Time	Area%
1	14.109	50.422
2	22.824	49.578
Total		100.000

(*S*)-(4-Methoxyphenyl)-1,2,3,4-tetrahydroquinoline, (*S*)-16b

MK-IV-873_1 (OD-H,H,IPA,90,10) 0.6 ML006.lcd



<Peak Table>

PDA Ch1 254nm

Peak#	Ret. Time	Area%
1	14.057	78.549
2	22.890	21.451
Total		100.000

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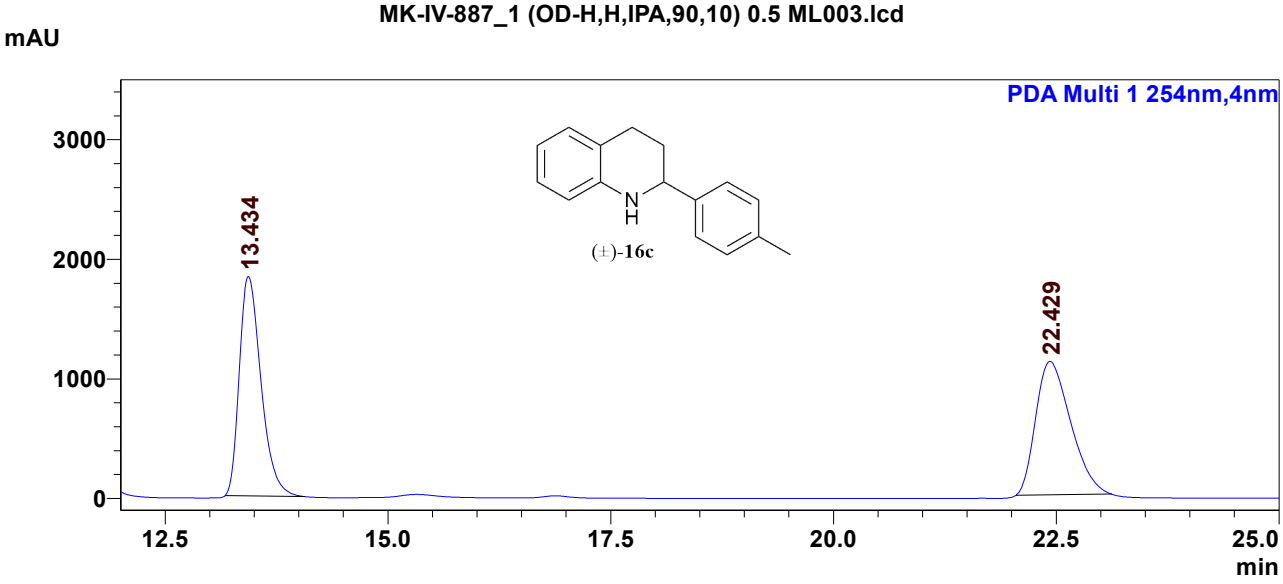
HPLC analysis report

Department of Chemistry
Pondicherry University

<Chromatogram>

(±)-(4-Methyphenyl)-1,2,3,4-tetrahydroquinoline, (±)-16c

MK-IV-887_1 (OD-H,H,IPA,90,10) 0.5 ML003.lcd



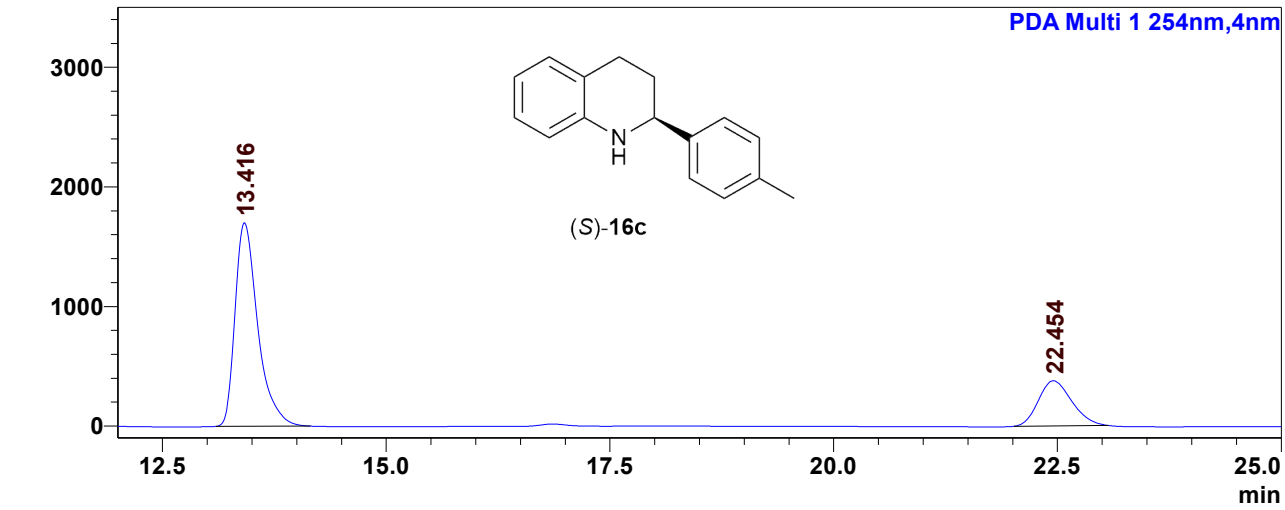
<Peak Table>

PDA Ch1 254nm

Peak#	Ret. Time	Area%
1	13.434	50.678
2	22.429	49.322
Total		100.000

(*S*)-(4-Methylphenyl)-1,2,3,4-tetrahydroquinoline, (*S*)-16c

MK-IV-887(chiral)_1 (OD-H,H,IPA,90,10) 0.5 ML005.lcd



<Peak Table>

PDA Ch1 254nm

Peak#	Ret. Time	Area%
1	13.416	75.323
2	22.454	24.677
Total		100.000

D:\Data\KARTHICK\2-PHENYL QUINOLINE\MK-IV-887\MK-IV-887_1 (OD-H,H,IPA,90,10) 0.5 ML003.lcd

SHIMADZU LabSolutions

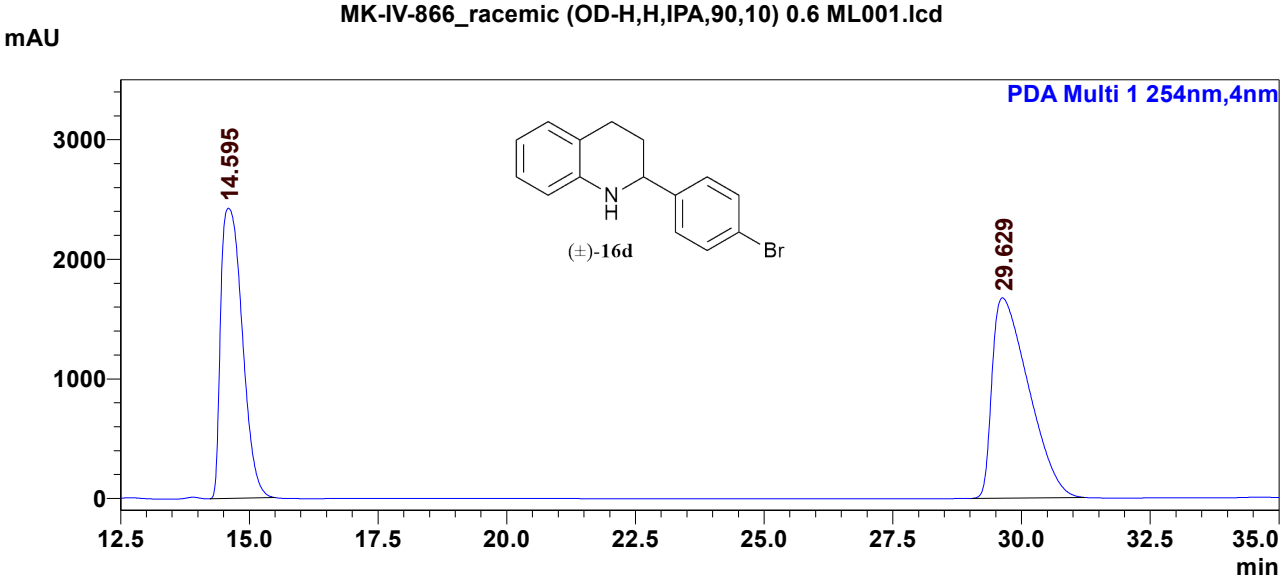
HPLC analysis report

Department of Chemistry
Pondicherry University

<Chromatogram>

(±)-(4-Bromophenyl)-1,2,3,4-tetrahydroquinoline, (±)-16d

MK-IV-866_racemic (OD-H,H,IPA,90,10) 0.6 ML001.lcd



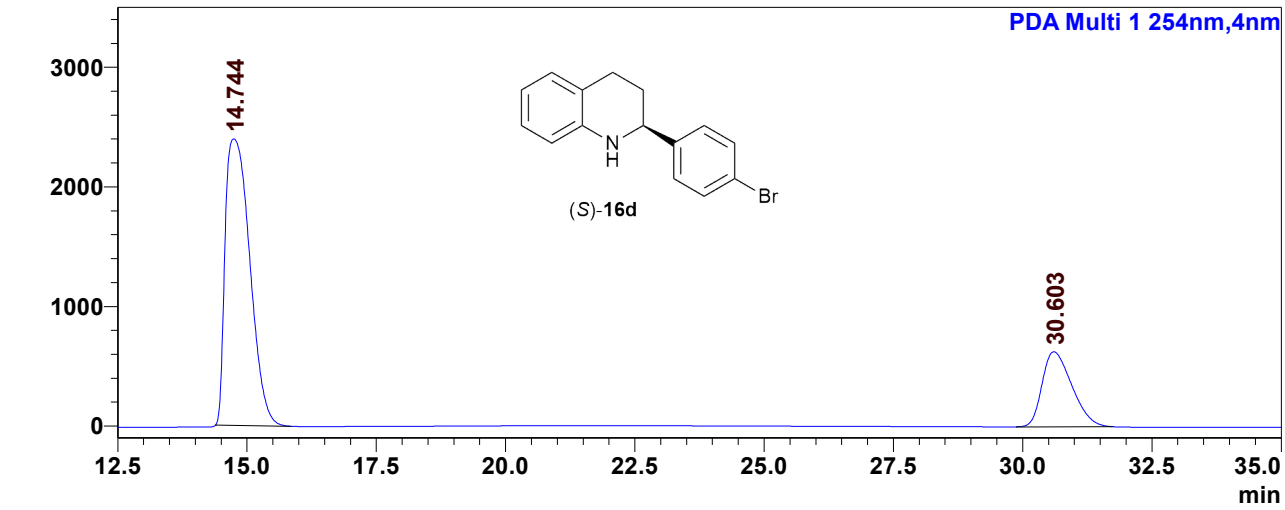
<Peak Table>

PDA Ch1 254nm

Peak#	Ret. Time	Area%
1	14.595	46.191
2	29.629	53.809
Total		100.000

(*S*)-(4-Bromophenyl)-1,2,3,4-tetrahydroquinoline, (*S*)-16d

MK-IV-866 (OD-H,H,IPA,90,10) 0.6 ML.lcd



<Peak Table>

PDA Ch1 254nm

Peak#	Ret. Time	Area%
1	14.744	76.029
2	30.603	23.971
Total		100.000

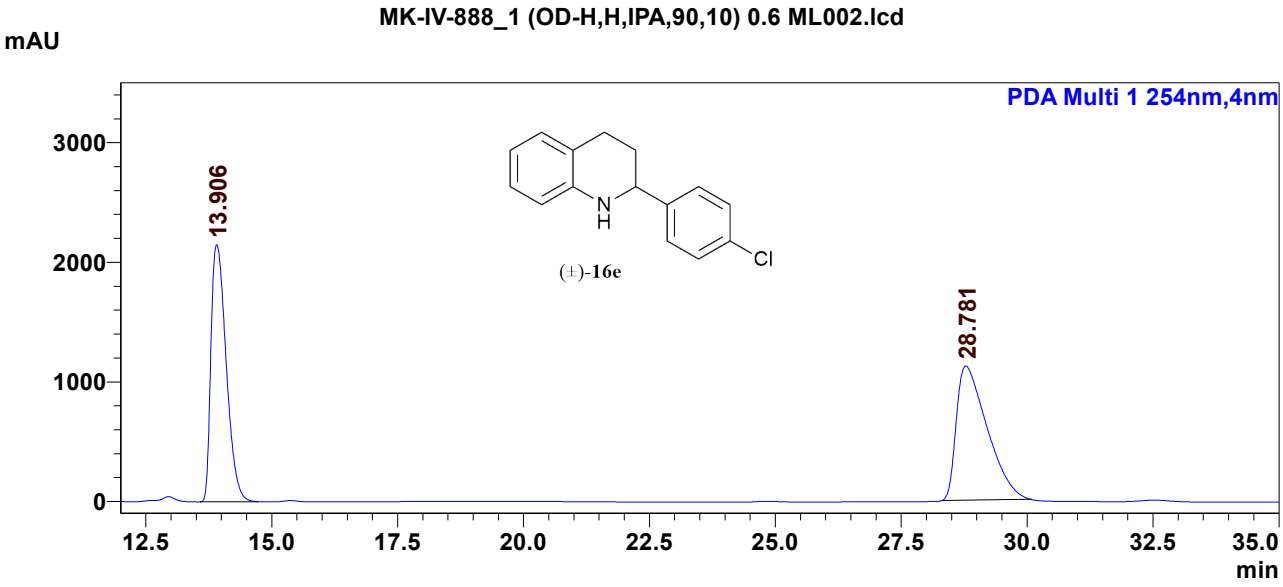
SHIMADZU LabSolutions

HPLC analysis report

Department of Chemistry
Pondicherry University

<Chromatogram>

(±)-(4-Chlorophenyl)-1,2,3,4-tetrahydroquinoline, (±)-16e

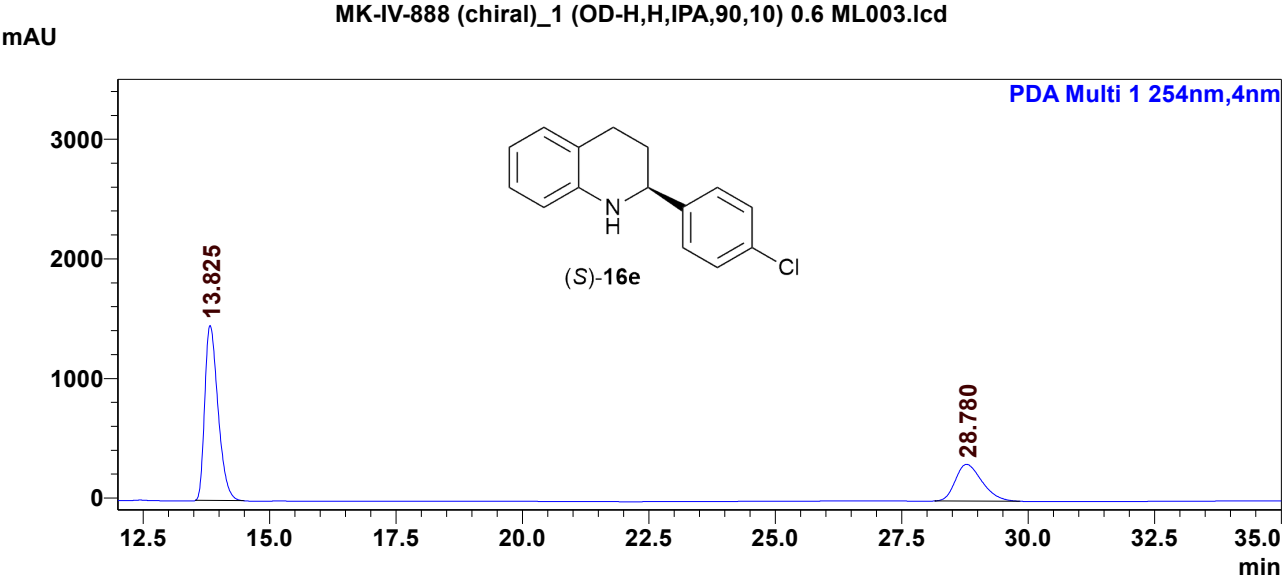


<Peak Table>

PDA Ch1 254nm

Peak#	Ret. Time	Area%
1	13.906	48.705
2	28.781	51.295
Total		100.000

(*S*)-(4-Chlorophenyl)-1,2,3,4-tetrahydroquinoline, (*S*)-16e



<Peak Table>

PDA Ch1 254nm

Peak#	Ret. Time	Area%
1	13.825	70.348
2	28.780	29.652
Total		100.000

D:\Data\KARTHICK\2-PHENYL QUINOLINE\MK-IV-888\MK-IV-888 (chiral)_1 (OD-H,H,IPA,90,10) 0.6 ML003.lcd

SHIMADZU LabSolutions

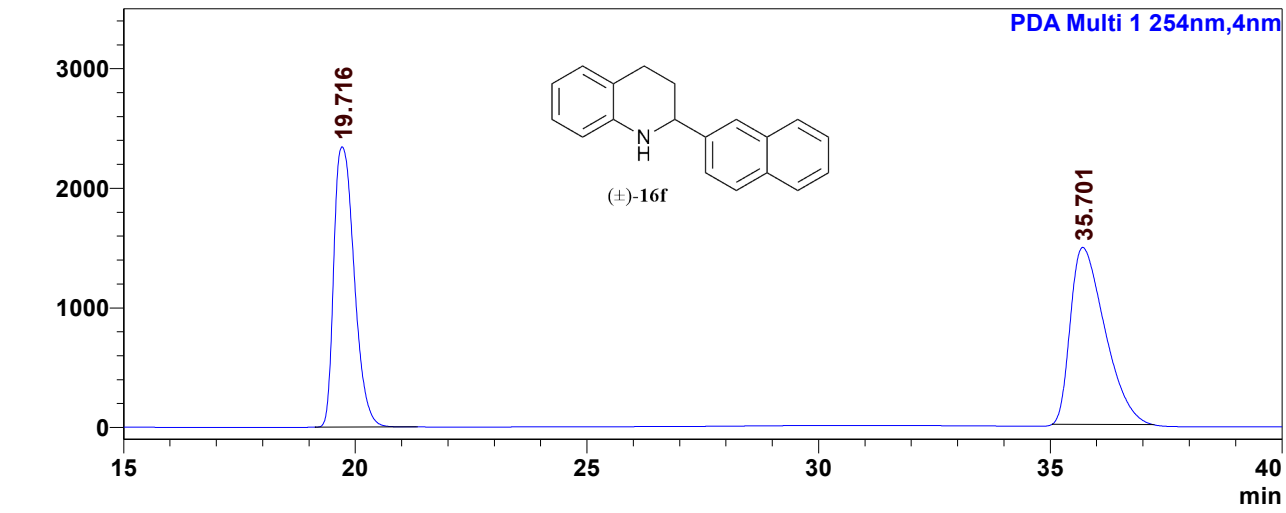
HPLC analysis report

Department of Chemistry
Pondicherry University

<Chromatogram>

(±)-(2-Naphthyl)-1,2,3,4-tetrahydroquinoline, (±)-16f

MK-IV-889 (racemic)_1 (OD-H,H,IPA,10,10) 0.6 ML003.lcd



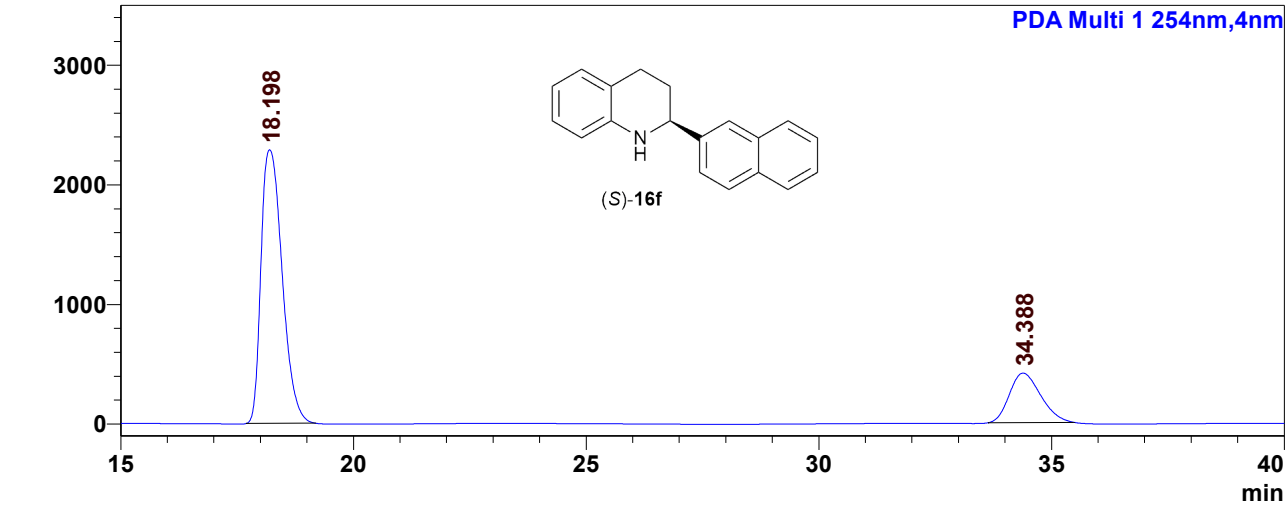
<Peak Table>

PDA Ch1 254nm

Peak#	Ret. Time	Area%
1	19.716	48.313
2	35.701	51.687
Total		100.000

(*S*)-(2-Naphthyl)-1,2,3,4-tetrahydroquinoline, (*S*)-16f

MK-IV-889 (chiral)_1 (OD-H,H,IPA,10,10) 0.6 ML004.lcd



<Peak Table>

PDA Ch1 254nm

Peak#	Ret. Time	Area%
1	18.198	78.872
2	34.388	21.128
Total		100.000

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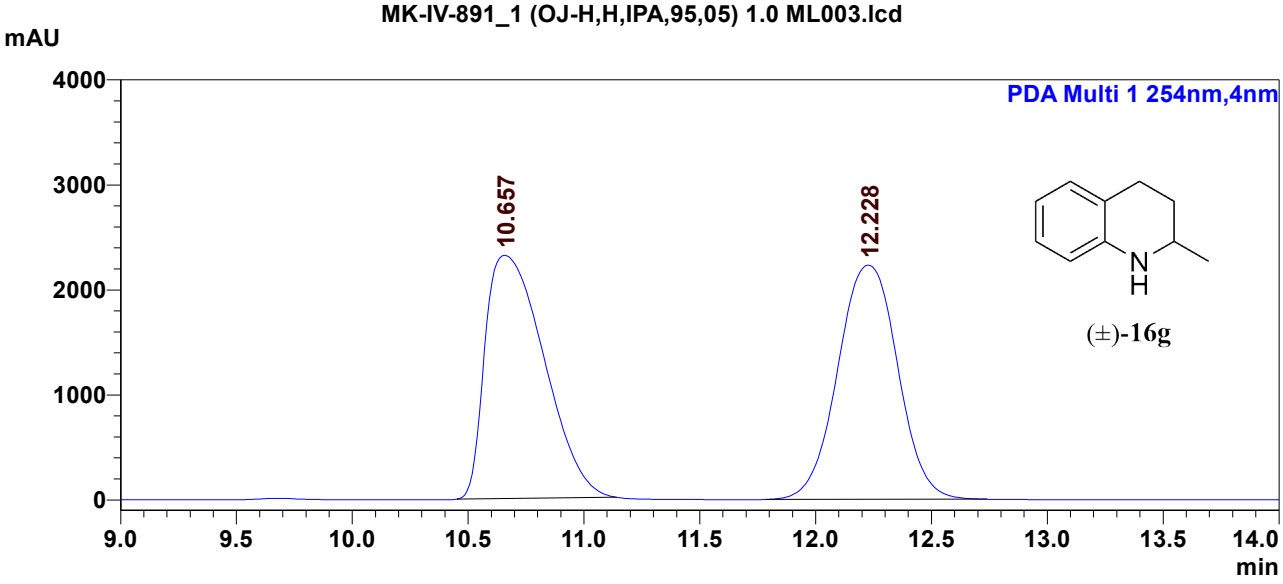
HPLC analysis report

Department of Chemistry
Pondicherry University

<Chromatogram>

(±)-(2-Methyl)-1,2,3,4-tetrahydroquinoline, (±)-16g

MK-IV-891_1 (OJ-H,H,IPA,95,05) 1.0 ML003.lcd



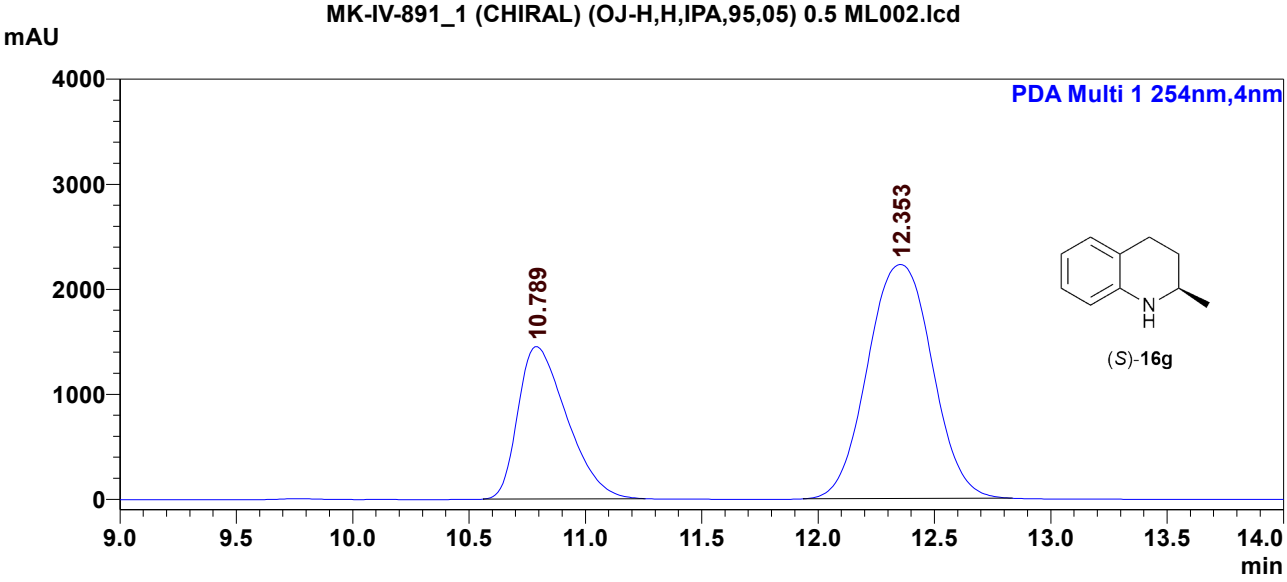
<Peak Table>

PDA Ch1 254nm

Peak#	Ret. Time	Area%
1	10.657	50.555
2	12.228	49.445
Total		100.000

(*S*)-(2-Methyl)-1,2,3,4-tetrahydroquinoline, (*S*)-16g

MK-IV-891_1 (CHIRAL) (OJ-H,H,IPA,95,05) 0.5 ML002.lcd



<Peak Table>

PDA Ch1 254nm

Peak#	Ret. Time	Area%
1	10.789	32.899
2	12.353	67.101
Total		100.000

D:\Data\KARTHICK\2-PHENYL QUINOLINE\MK-IV-891\MK-IV-891_1 (OJ-H,H,IPA,95,05) 1.0 ML003.lcd

SHIMADZU LabSolutions

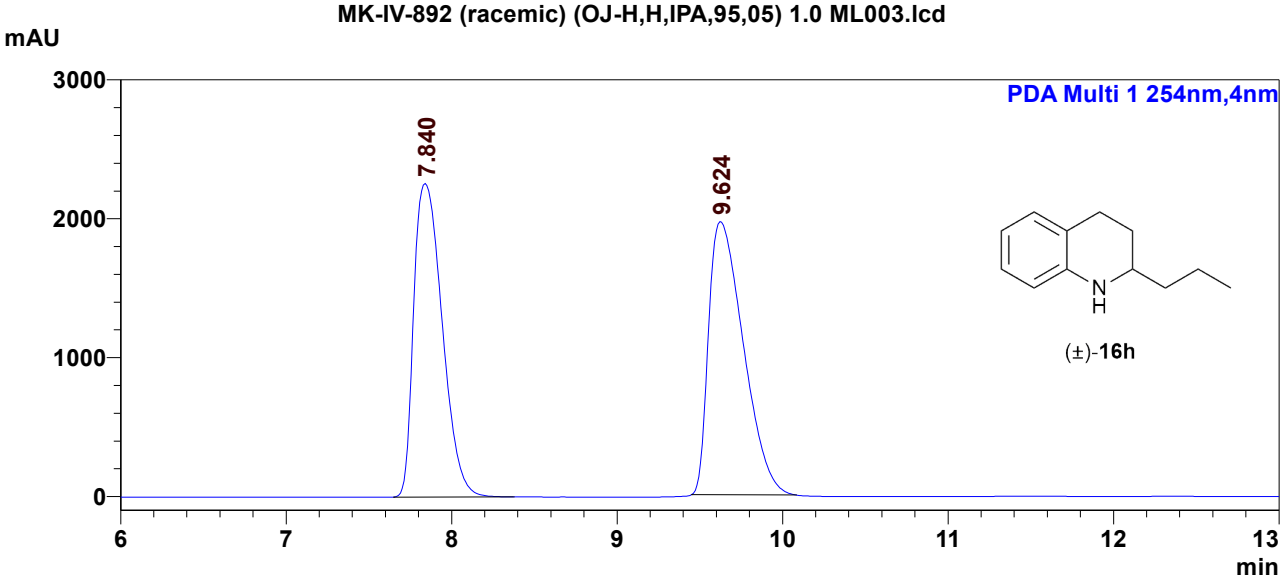
HPLC analysis report

Department of Chemistry
Pondicherry University

<Chromatogram>

(±)-(2-Propyl)-1,2,3,4-tetrahydroquinoline, (±)-16h

MK-IV-892 (racemic) (OJ-H,H,IPA,95,05) 1.0 ML003.lcd



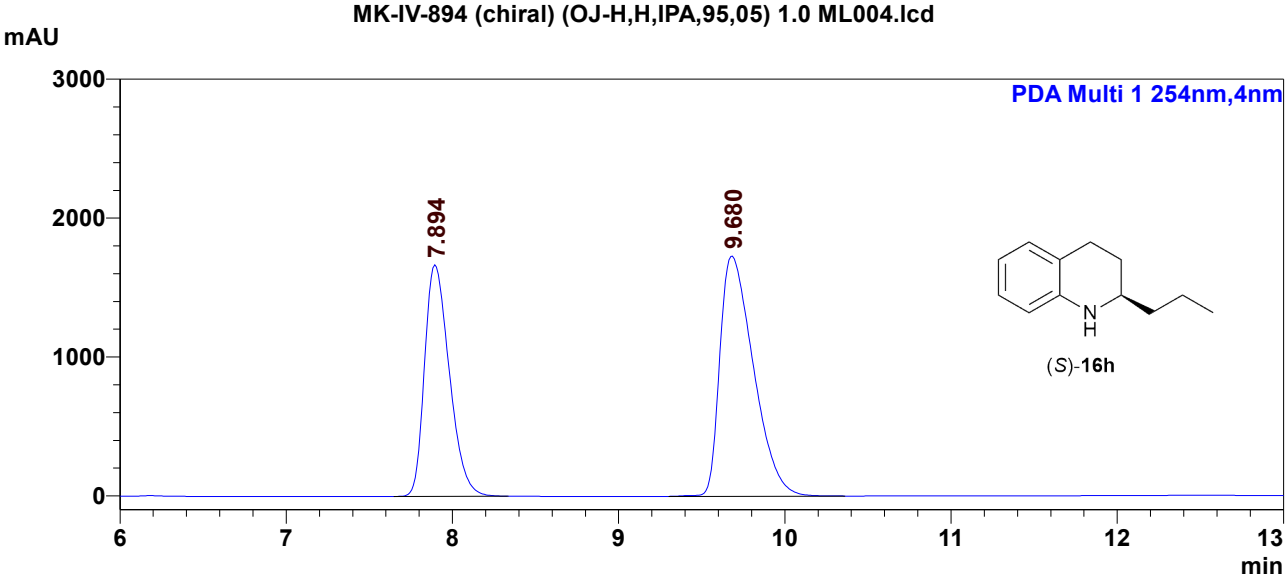
<Peak Table>

PDA Ch1 254nm

Peak#	Ret. Time	Area%
1	7.840	48.476
2	9.624	51.524
Total		100.000

(*S*)-(2-Propyl)-1,2,3,4-tetrahydroquinoline, (*S*)-16h

MK-IV-894 (chiral) (OJ-H,H,IPA,95,05) 1.0 ML004.lcd



<Peak Table>

PDA Ch1 254nm

Peak#	Ret. Time	Area%
1	7.894	41.636
2	9.680	58.364
Total		100.000

D:\Data\KARTHICK\2-PHENYL QUINOLINE\MK-IV-892\MK-IV-892 (racemic) (OJ-H,H,IPA,95,05) 1.0 ML003.lcd