

Supplementary Material

Studies on the Synthesis of *cis*-4-Hydroxy-L-proline

Jessica A. Smith,^A Paul G. Savage,^A and Oliver E. Hutt^{A,B}

^AIan Wark Laboratory, CSIRO Materials Science and Engineering,
Bayview Avenue, Clayton, VIC 3168, Australia.

^BCorresponding author. Email: oliver.hutt@csiro.au

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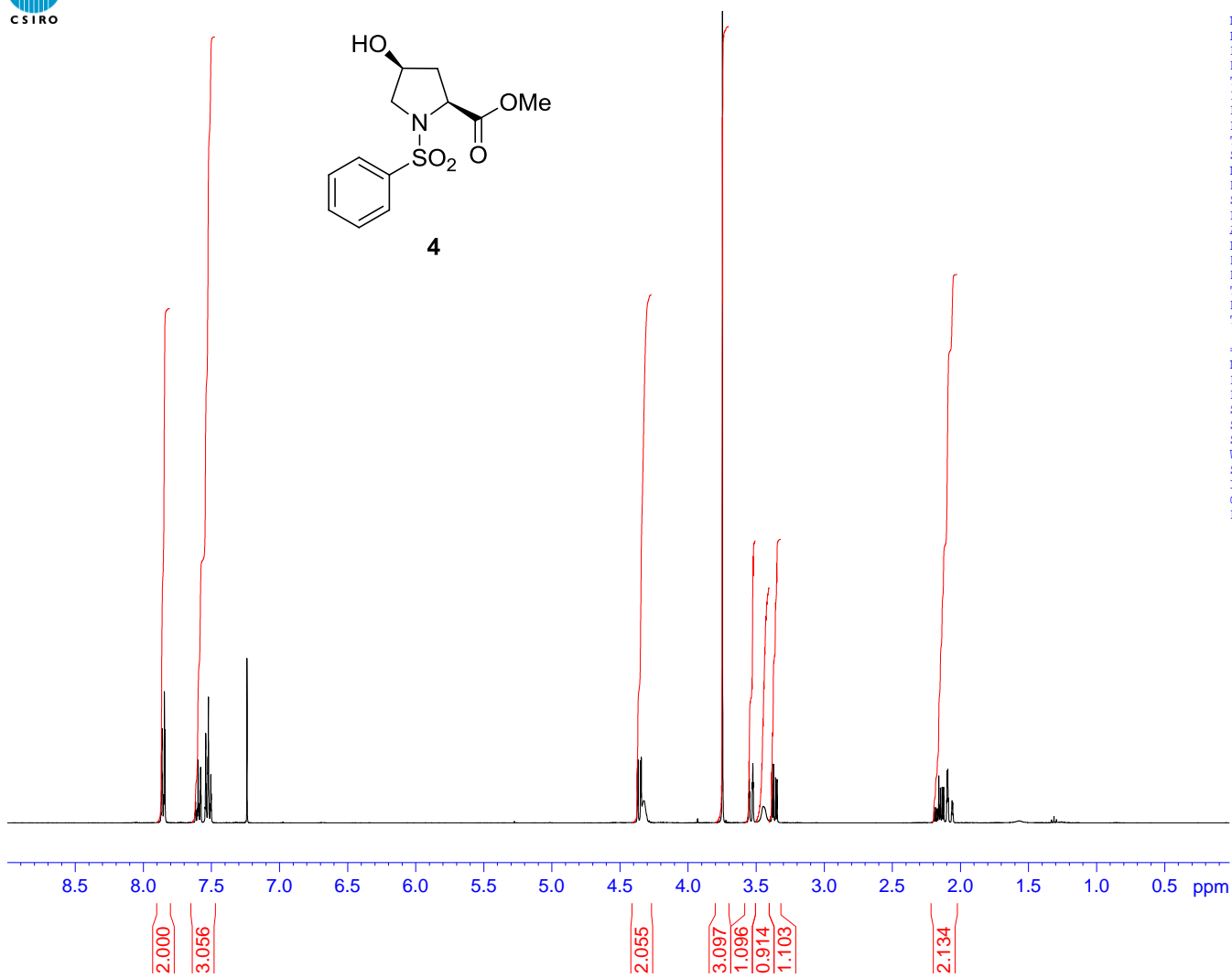
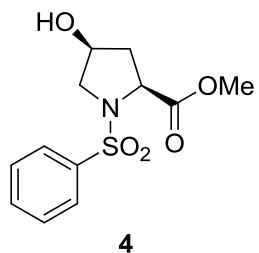
[¹H]
[¹³C]

14

15



Figure S1: ¹H NMR (400 MHz, CDCl₃) spectrum of Compound 4

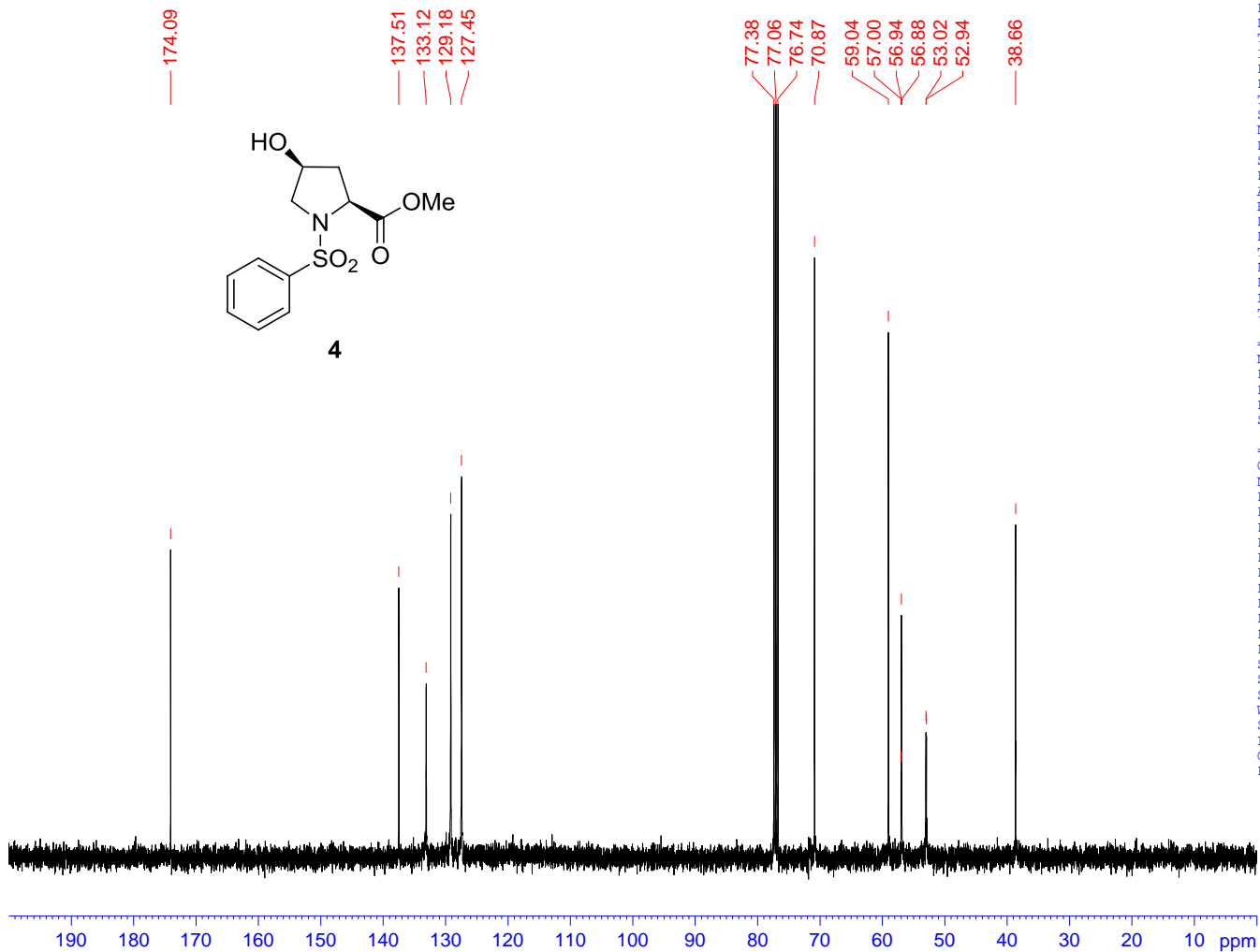


```
NAME      hutt40372
EXPNO     10
PROCNO    1
Date_     20110616
Time      16.13
INSTRUM   Av400
PROBHD    5 mm PABBI 1H/
PULPROG   zg30
TD         32768
SOLVENT   CDCl3
NS         32
DS         2
SWH        5995.204 Hz
FIDRES     0.182959 Hz
AQ         2.7329011 sec
RG         256
DW         83.400 usec
DE         12.00 usec
TE         298.0 K
D1         1.00000000 sec
TD0        1
```

```
===== CHANNEL f1 =====
NUC1      1H
P1         7.70 usec
PL1        -1.00 dB
SFO1      400.1326104 MHz
SI         65536
SF         400.1300175 MHz
WDW        EM
SSB         0
LB         0.10 Hz
GB         0
PC         1.00
```



Figure S2: ¹³C NMR (100 MHz, CDCl₃) spectrum of Compound 4



```
NAME      hutt40373
EXPNO     1
PROCNO    1
Date_     20110617
Time      10.43
INSTRUM   Av400
PROBHD    5 mm PABBI 1H/
PULPROG   zgpg30_CSIRO
TD         65536
SOLVENT   CDCl3
NS         320
DS         2
SWH        25125.629 Hz
FIDRES     0.383387 Hz
AQ         1.3042164 sec
RG         20642.5
DW         19.900 usec
DE         12.00 usec
TE         298.0 K
D1         1.0000000 sec
D11        0.0300000 sec
L31        1
TD0        1
```

```
===== CHANNEL f1 =====
NUC1      13C
P1         13.00 usec
PL1        -6.00 dB
PL1W      163.0000000 W
SFO1      100.6243395 MHz
```

```
===== CHANNEL f2 =====
CPDPRG2   bi_waltz16_32pl
NUC2       1H
PCPD2     100.00 usec
PL2        -1.00 dB
PL12       21.27 dB
PL13       27.27 dB
PL30       21.27 dB
PL31       15.27 dB
PL2W      28.77672577 W
PL12W     0.17062448 W
PL13W     0.04285893 W
PL30W     0.17062448 W
PL31W     0.67926830 W
SFO2      400.1320007 MHz
SI         65536
SF         100.6127719 MHz
WDW        EM
SSB         0
LB         1.00 Hz
GB         0
PC         1.40
```

Figure S3: ¹H NMR (400 MHz, d₄-MeOH) spectrum of Compound 6

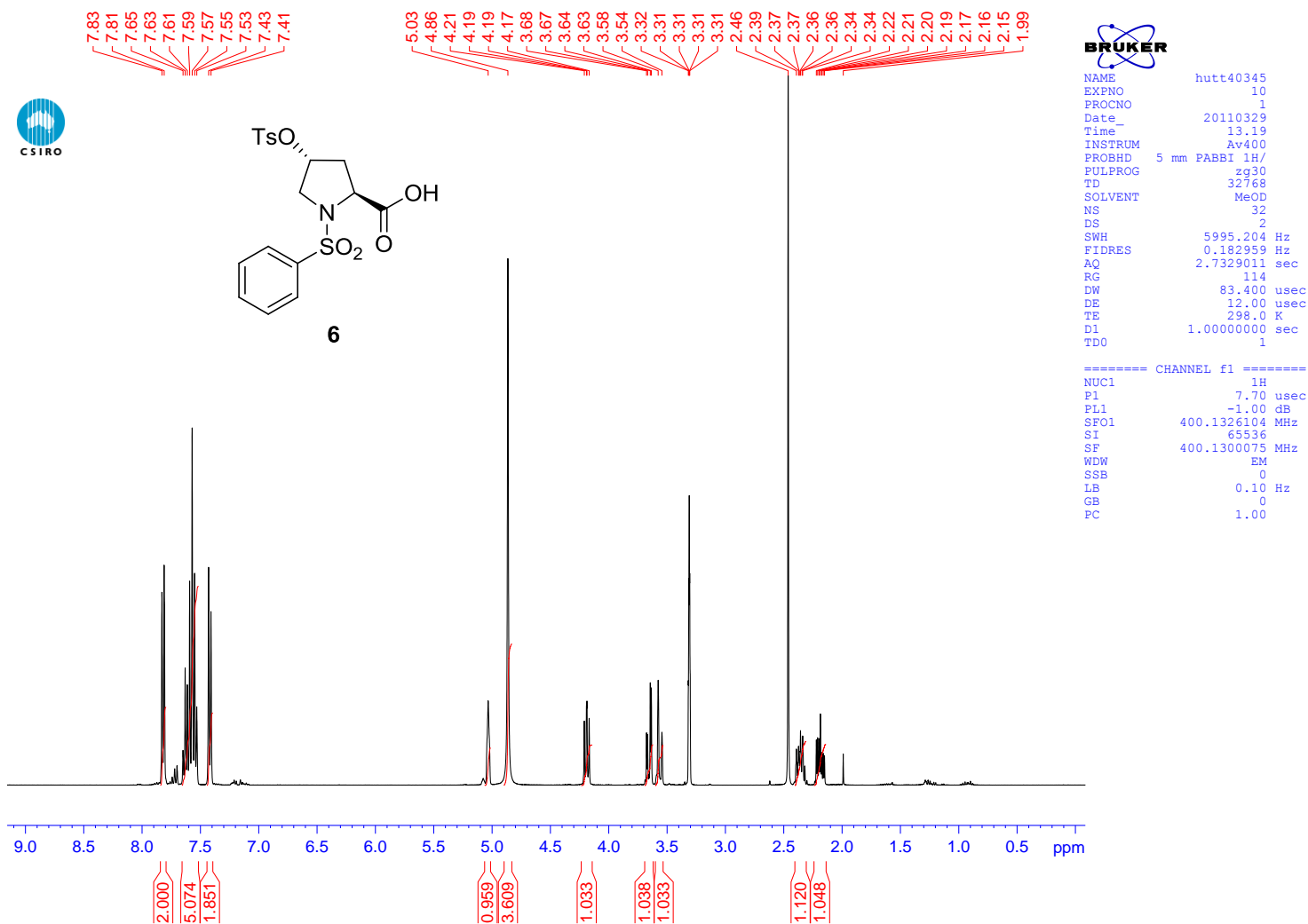


Figure S4: ^{13}C NMR (100 MHz, d_4 -MeOH) spectrum of Compound 6

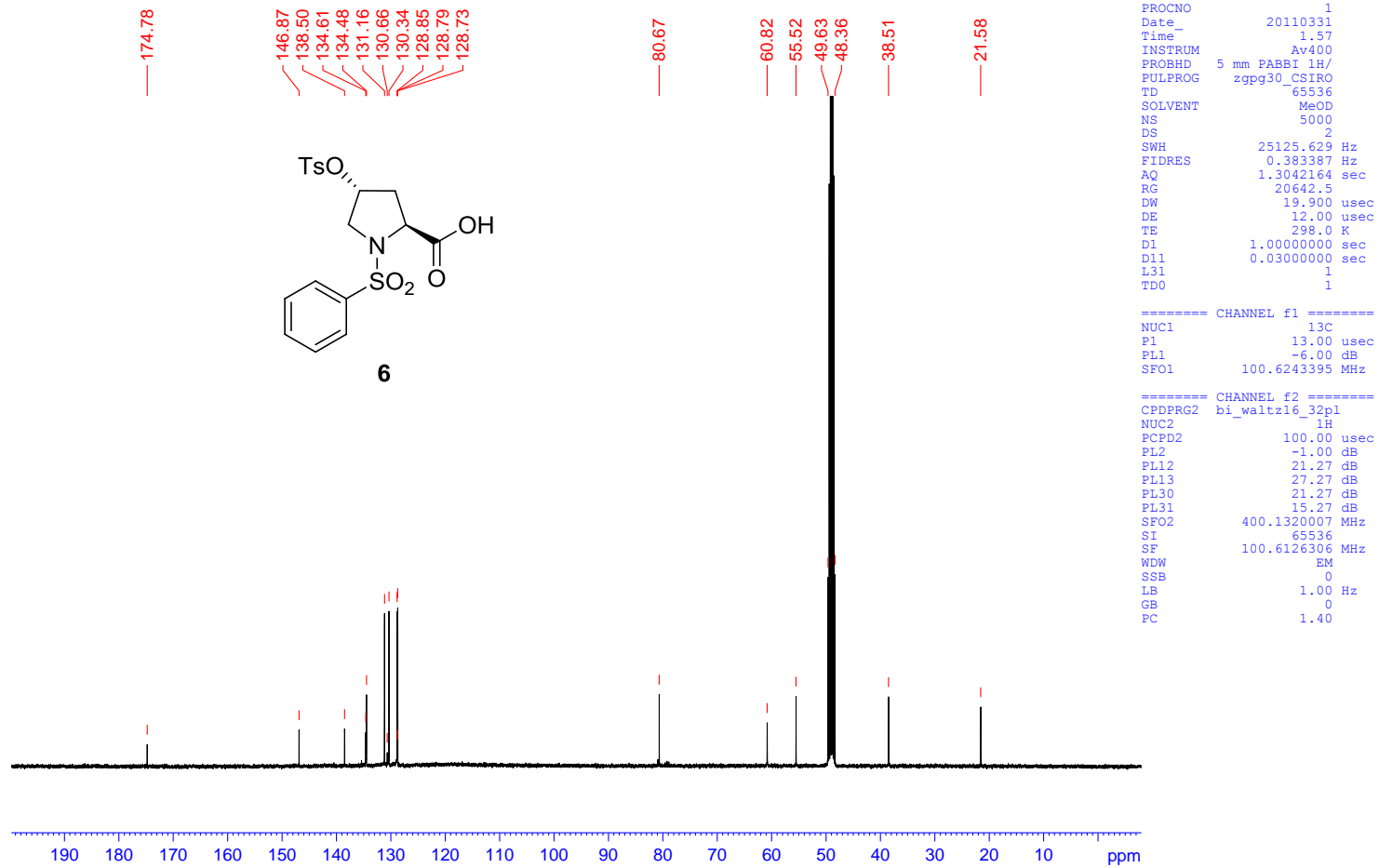


Figure S5: ¹H NMR (200 MHz, CDCl₃) spectrum of Compound 7

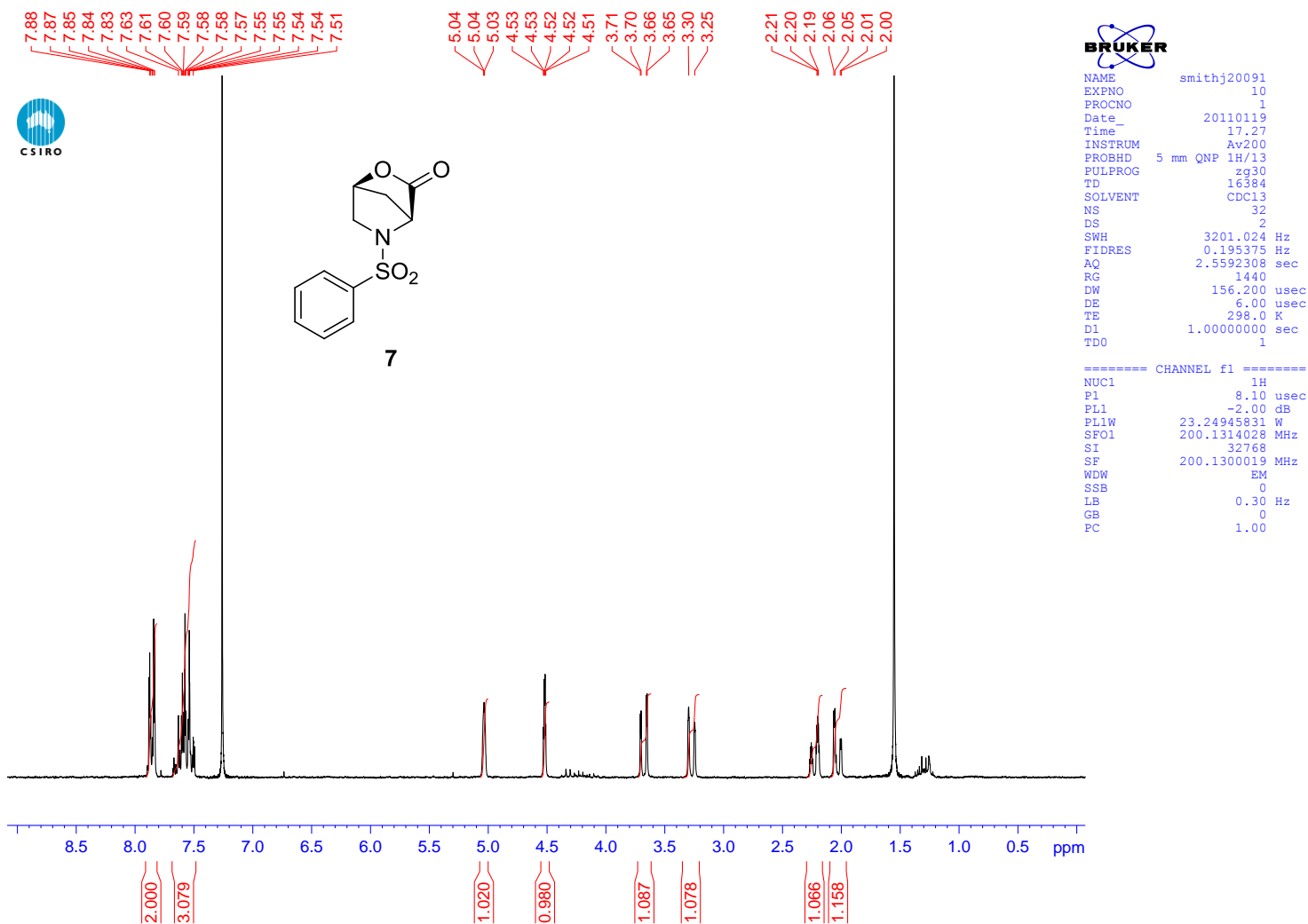


Figure S6: ^{13}C NMR (100 MHz, CDCl_3) spectrum of Compound 7

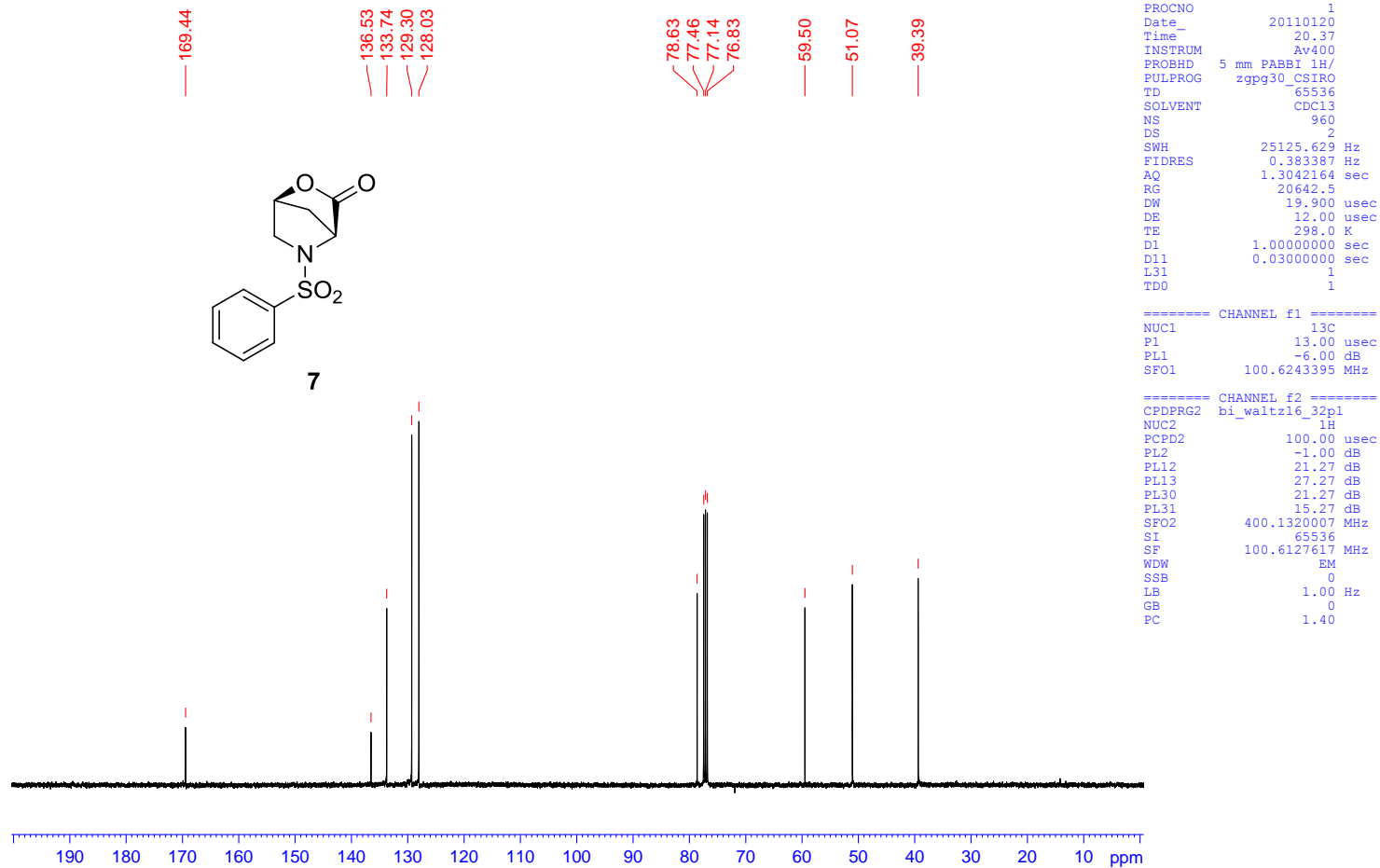


Figure S7: ¹H NMR (400 MHz, CDCl₃) spectrum of Compound 10

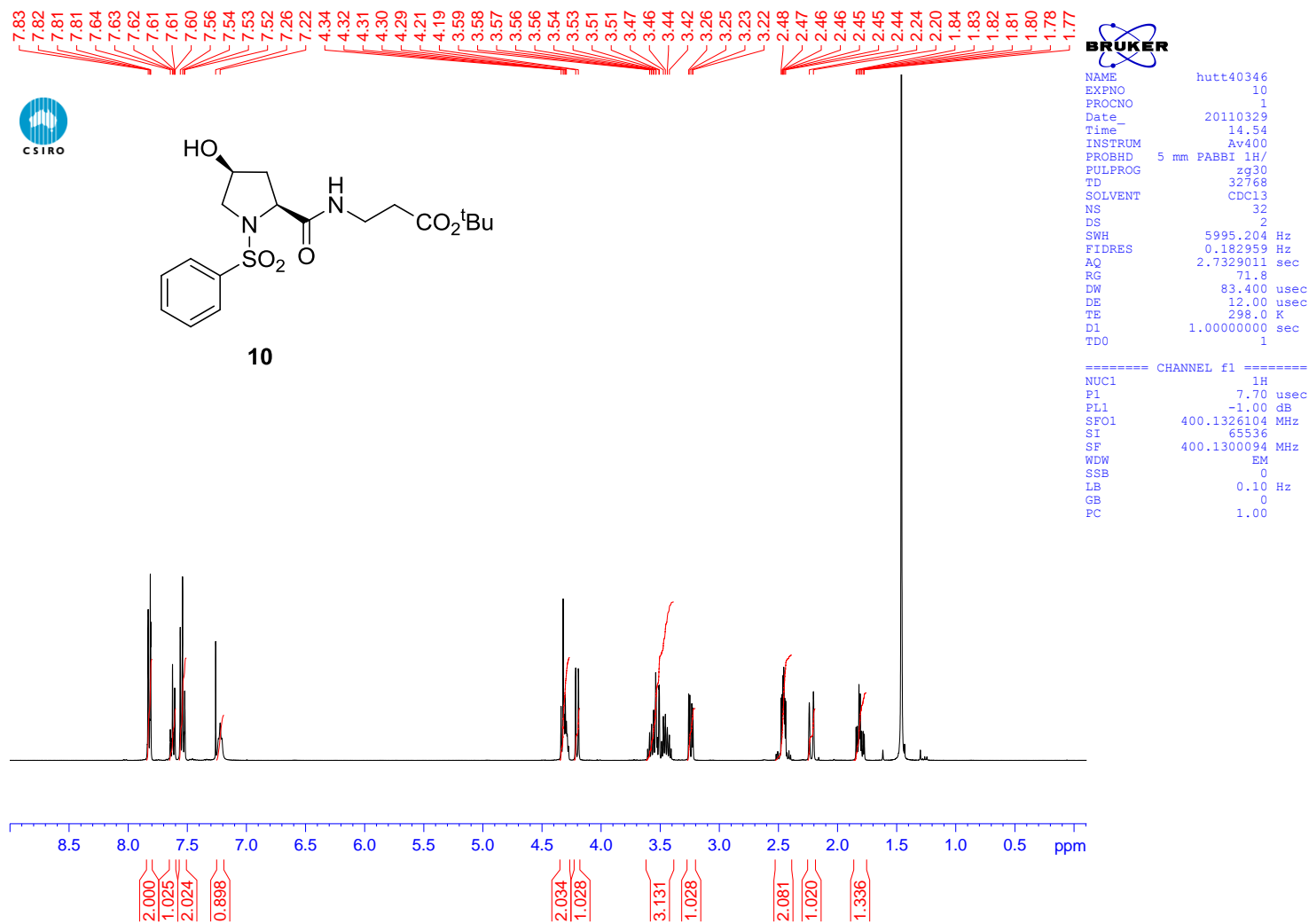
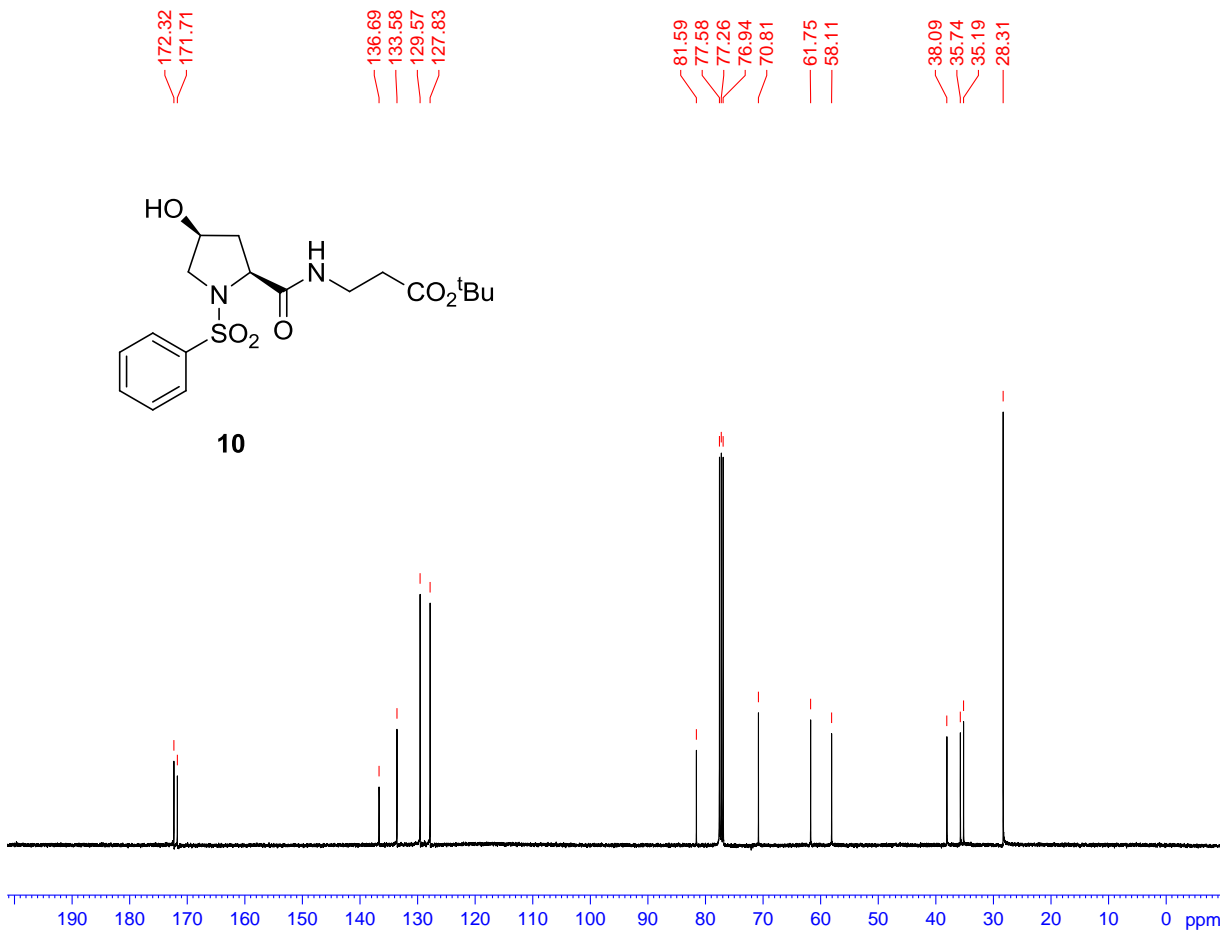
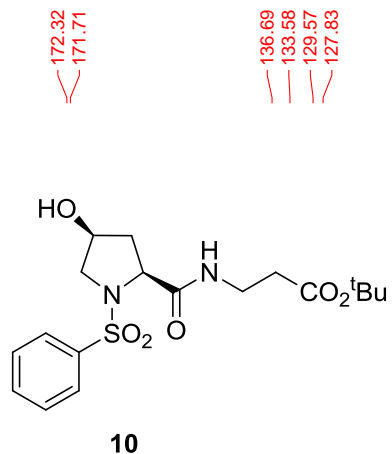


Figure S8: ^{13}C NMR (100 MHz, CDCl_3) spectrum of Compound 10



```

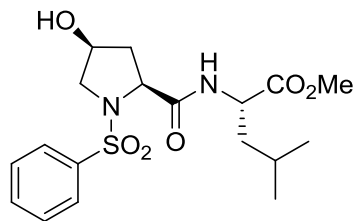
NAME      hutt40347
EXPNO     10
PROCNO    1
Date_     20110330
Time      22.34
INSTRUM   Av400
PROBHD    5 mm PABBI 1H/
PULPROG   zgpg30_CSIRO
TD         65536
SOLVENT   CDCl3
NS         5000
DS         2
SWH        25125.629 Hz
FIDRES     0.383387 Hz
AQ         1.3042164 sec
RG         20642.5
DW         19.900 usec
DE         12.00 usec
TE         298.0 K
D1         1.00000000 sec
D11        0.03000000 sec
L31        1
TD0        1

===== CHANNEL f1 =====
NUC1       13C
P1         13.00 usec
PL1        -6.00 dB
SFO1       100.6243395 MHz

===== CHANNEL f2 =====
CPDPRG2    bi_waltz16_32pl
NUC2       1H
PCPD2      100.00 usec
PL2        -1.00 dB
PL12       21.27 dB
PL13       27.27 dB
PL30       21.27 dB
PL31       15.27 dB
SFO2       400.1320007 MHz
SI         65536
SF         100.6127469 MHz
WDW        EM
SSB        0
LB         1.00 Hz
GB         0
PC         1.40
    
```



Figure S9: ^1H NMR (400 MHz, d_6 -Acetone/0.3% D_2O) spectrum of Compound 12



12



```
NAME      hutt40399
EXPNO     10
PROCNO    1
Date_     20110705
Time_     9.59
INSTRUM   Av400
PROBHD    5 mm QNP 1H/13
PULPROG   zg30
TD        32768
SOLVENT   Acetone
NS        32
DS        2
SWH       5995.204 Hz
FIDRES    0.182959 Hz
AQ        2.7329011 sec
RG        574.7
DW        83.400 usec
DE        12.00 usec
TE        298.0 K
D1        1.00000000 sec
TD0       1
```

```
===== CHANNEL f1 =====
NUC1      1H
P1        11.20 usec
PL1       -3.00 dB
PL1W      45.60803986 W
SF01      400.1326104 MHz
SI        65536
SF        400.1300175 MHz
WDW       EM
SSB       0
LB        0.10 Hz
GB        0
PC        1.00
```

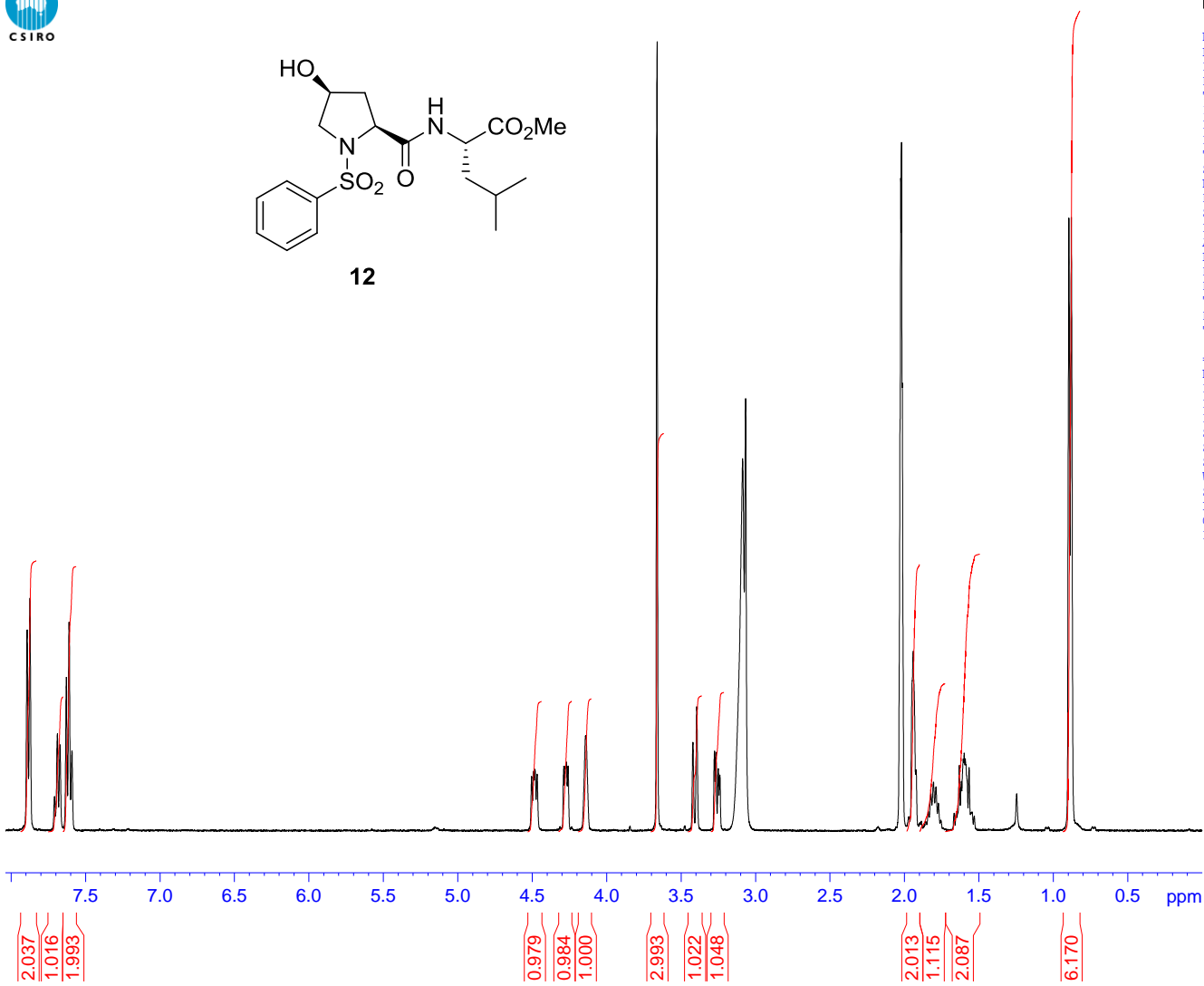
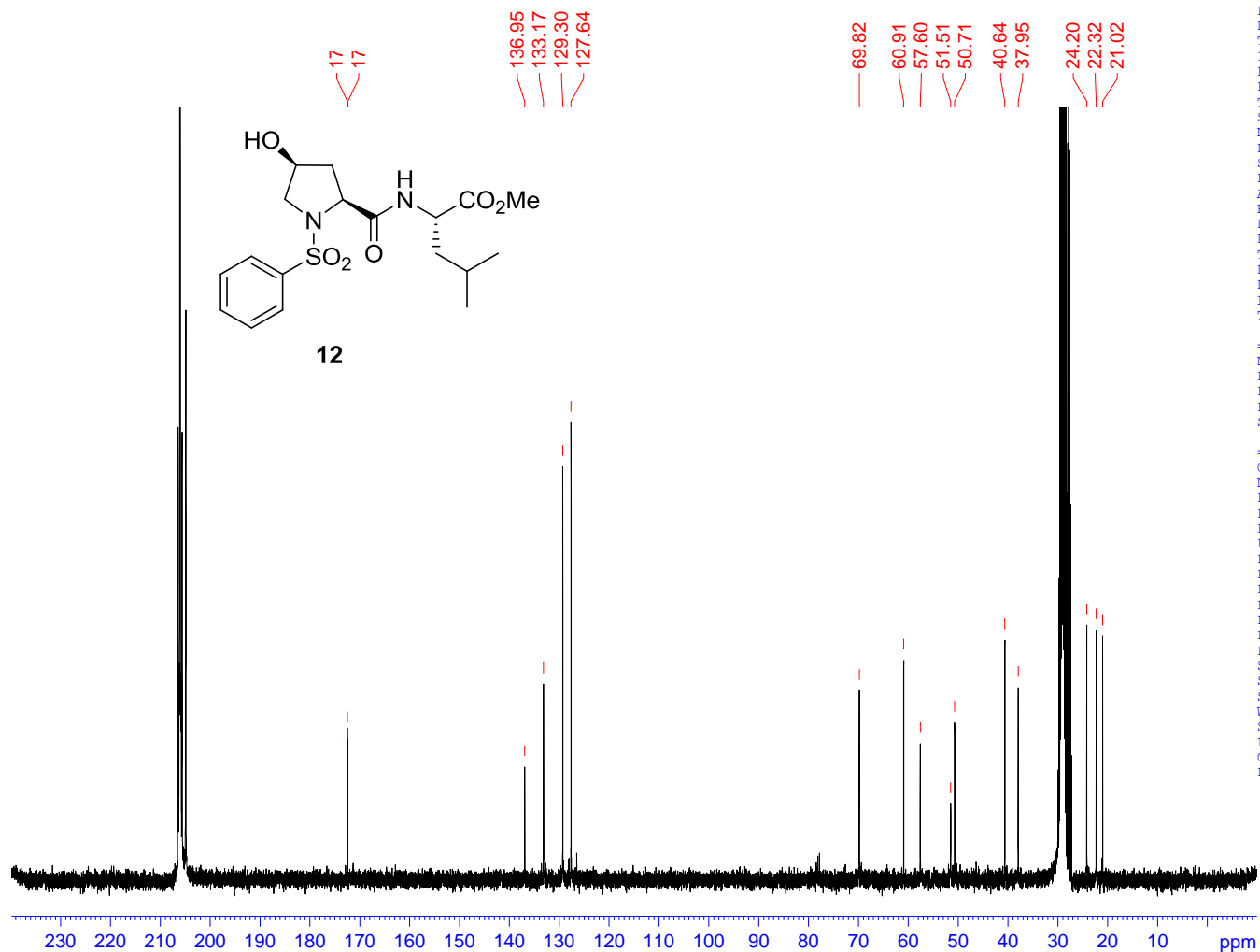


Figure S10: ^{13}C NMR (100 MHz, d_6 -Acetone/0.3% D_2O) spectrum of Compound 12



```

NAME      hutt40400
EXPNO     1
PROCNO    1
Date_     20110706
Time      4.55
INSTRUM   Av400
PROBHD    5 mm QNP 1H/13
PULPROG   zgpg30_CSIRO
TD         65536
SOLVENT   Acetone
NS         15000
DS         2
SWH        25125.629 Hz
FIDRES     0.383387 Hz
AQ         1.3042164 sec
RG         20642.5
DW         19.900 usec
DE         12.00 usec
TE         298.0 K
D1         1.00000000 sec
D11        0.03000000 sec
L31        1
TD0        1
    
```

```

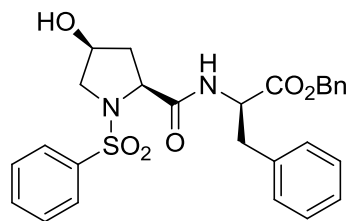
===== CHANNEL f1 =====
NUC1       13C
P1         7.30 usec
PL1        0.00 dB
PL1W       40.94374847 W
SFO1       100.6243395 MHz
    
```

```

===== CHANNEL f2 =====
CPDPRG2    bi_waltz16_32pl
NUC2       1H
PCPD2      100.00 usec
PL2        -3.00 dB
PL12       16.02 dB
PL13       22.00 dB
PL30       16.02 dB
PL31       10.02 dB
PL2W       45.60803986 W
PL12W      0.57153302 W
PL13W      0.14422528 W
PL30W      0.57153302 W
PL31W      2.27531409 W
SFO2       400.1320007 MHz
SI         65536
SF         100.6127719 MHz
WDW         EM
SSB         0
LB         1.00 Hz
GB         0
PC         1.40
    
```



Figure S11: ¹H NMR (400 MHz, CDCl₃) spectrum of Compound 14



14



NAME hutt40394
EXPNO 10
PROCNO 1
Date_ 20110701
Time_ 13.49
INSTRUM Av400
PROBHD 5 mm QNP 1H/13
PULPROG zg30
TD 32768
SOLVENT CDCl3
NS 32
DS 2
SWH 5995.204 Hz
FIDRES 0.182959 Hz
AQ 2.7329011 sec
RG 512
DW 83.400 usec
DE 12.00 usec
TE 298.0 K
D1 1.0000000 sec
TD0 1

===== CHANNEL f1 =====
NUC1 1H
P1 11.20 usec
PL1 -3.00 dB
PL1W 45.60803986 W
SF01 400.1326104 MHz
SI 65536
SF 400.1300175 MHz
WDW EM
SSB 0
LB 0.10 Hz
GB 0
PC 1.00

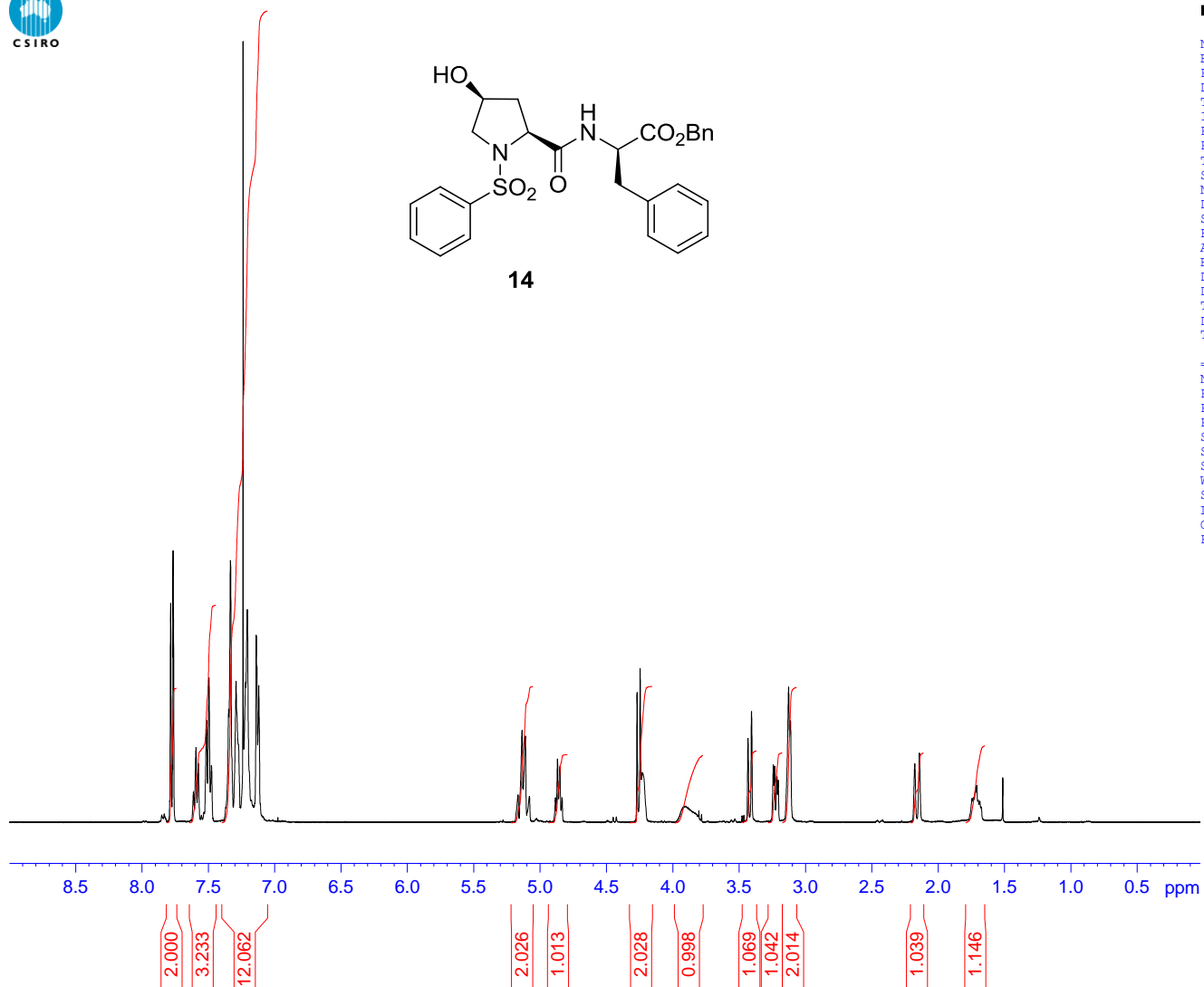
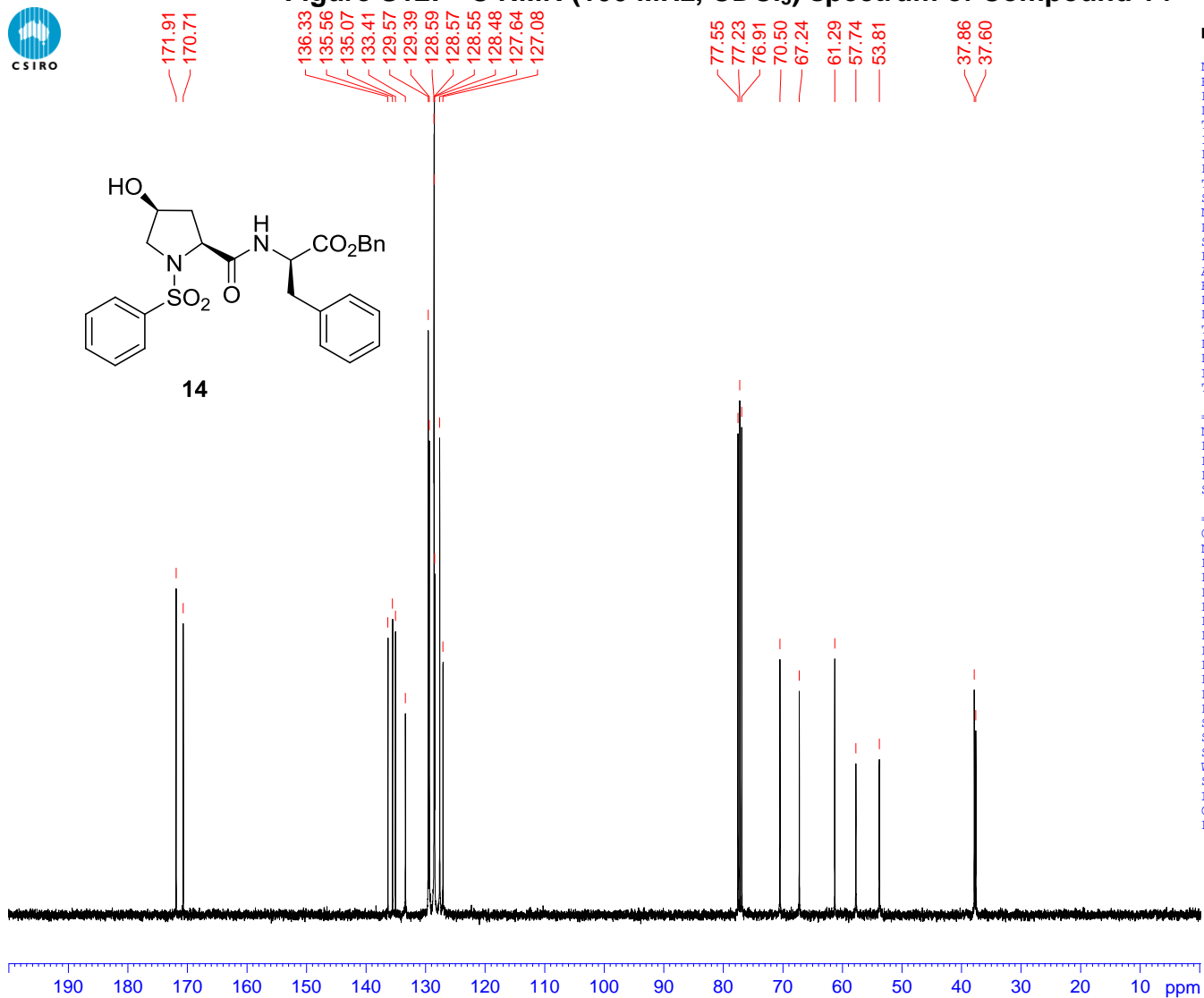




Figure S12: ¹³C NMR (100 MHz, CDCl₃) spectrum of Compound 14



```
NAME      hutt40396
EXPNO     10
PROCNO    1
Date_     20110701
Time      14.42
INSTRUM   Av400
PROBHD    5 mm QNP 1H/13
PULPROG   zgpg30_CSIRO
TD         65536
SOLVENT   CDCl3
NS         320
DS         2
SWH        25125.629 Hz
FIDRES     0.383387 Hz
AQ         1.3042164 sec
RG         20642.5
DW         19.900 usec
DE         12.00 usec
TE         298.0 K
D1         1.0000000 sec
D11        0.0300000 sec
L31        1
TD0        1
```

```
===== CHANNEL f1 =====
NUC1      13C
P1         7.30 usec
PL1        0.00 dB
PL1W      40.94374847 W
SFO1      100.6243395 MHz
```

```
===== CHANNEL f2 =====
CPDPRG2   bi_waltz16_32pl
NUC2       1H
PCPD2     100.00 usec
PL2        -3.00 dB
PL12       16.02 dB
PL13       22.00 dB
PL30       16.02 dB
PL31       10.02 dB
PL2W      45.60803986 W
PL12W     0.57153302 W
PL13W     0.14422528 W
PL30W     0.57153302 W
PL31W     2.27531409 W
SFO2      400.1320007 MHz
SI         65536
SF         100.6127719 MHz
WDM        EM
SSB        0
LB         1.00 Hz
GB         0
PC         1.40
```

Figure S13: ¹H NMR (400 MHz, CDCl₃) spectrum of Compound 15

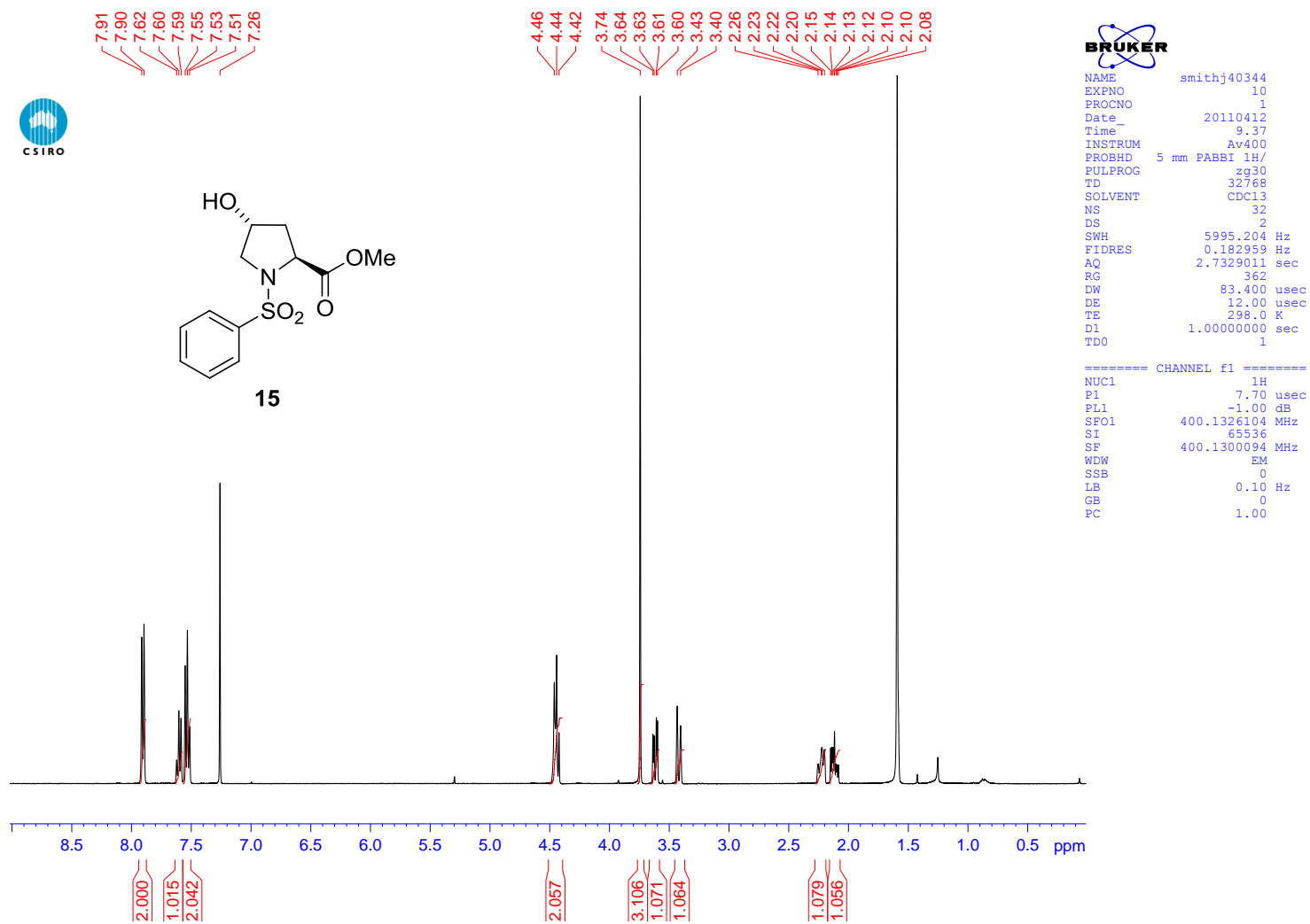


Figure S14: ^{13}C NMR (100 MHz, CDCl_3) spectrum of Compound 15

