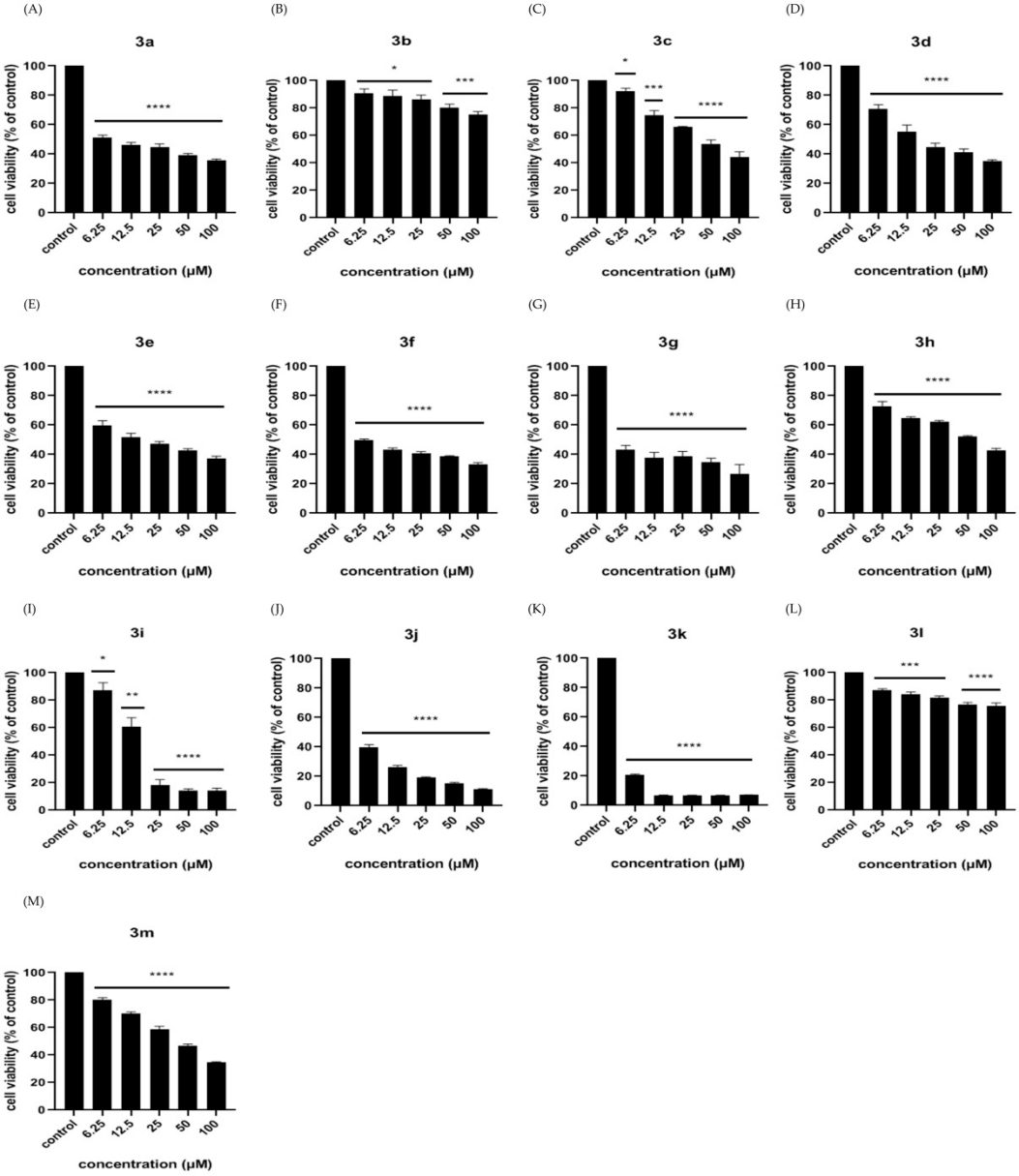
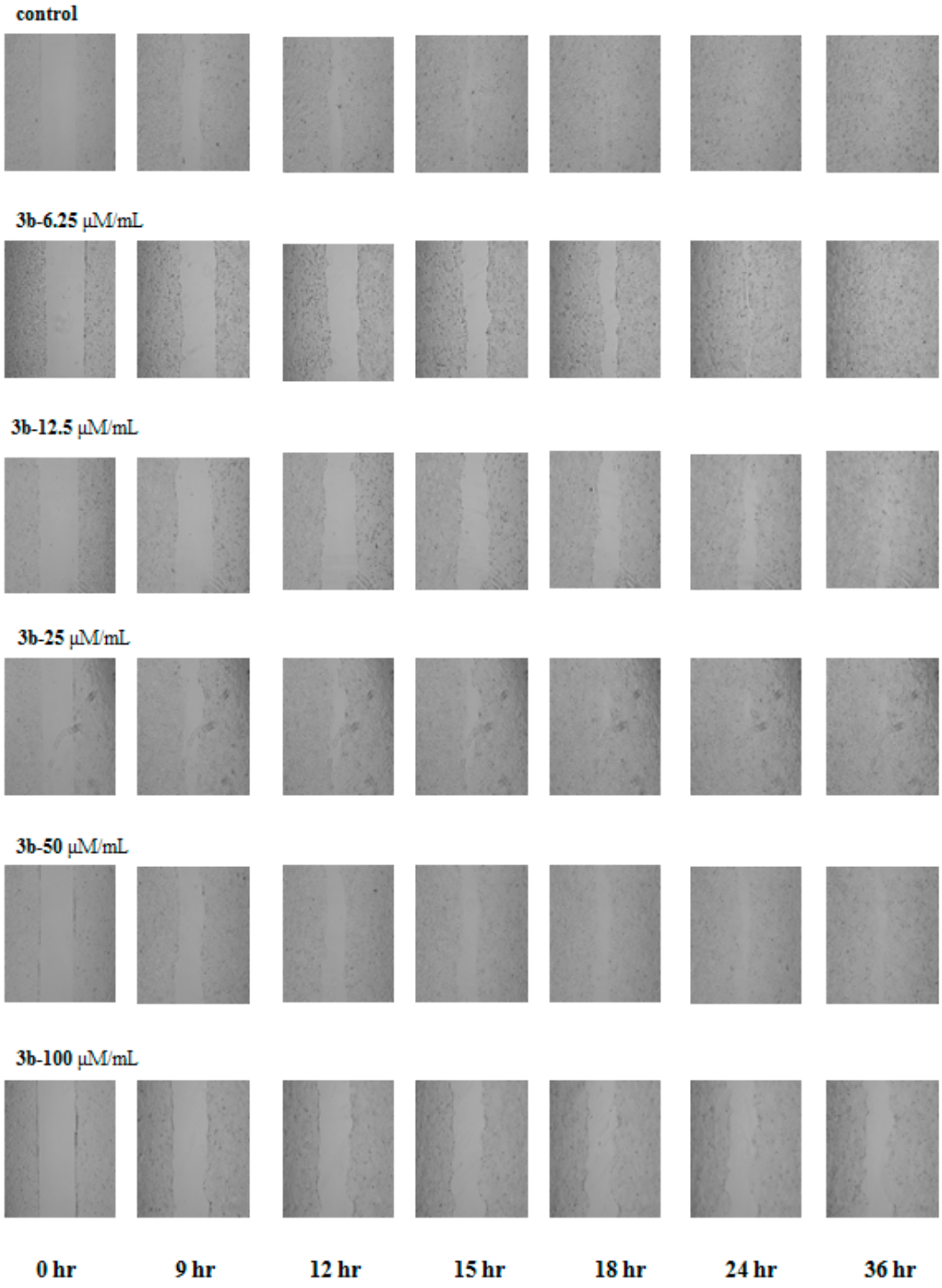
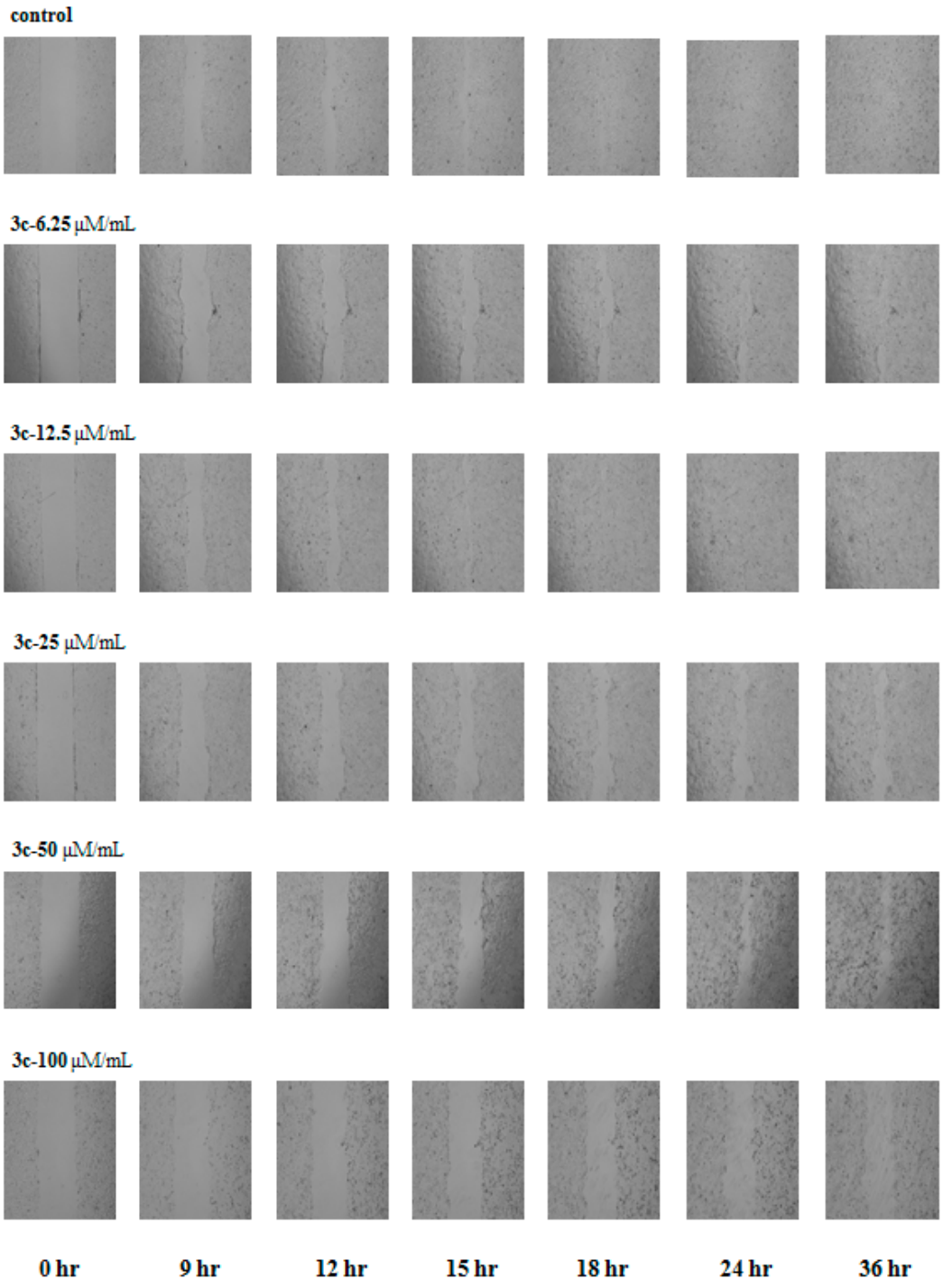


Figure S1. Effects of (A) **3a,** (B) **3b,** (C) **3c,** (D) **3d,** (E) **3e,** (F) **3f,** (G) **3g,** (H) **3h,** (I) **3i,** (J) **3j,** (K) **3k,** (L) **3l and** (M) **3m** on cell viability in HaCaT cell. The cells were treated with different concentrations of compounds for 24 h. The cell viabilities were measured by MTT assay as Table 3. Values are expressed as mean ± SD for triplicate samples and expressed as a percentage of control (set as 100 %). * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$, **** $p < 0.0001$.

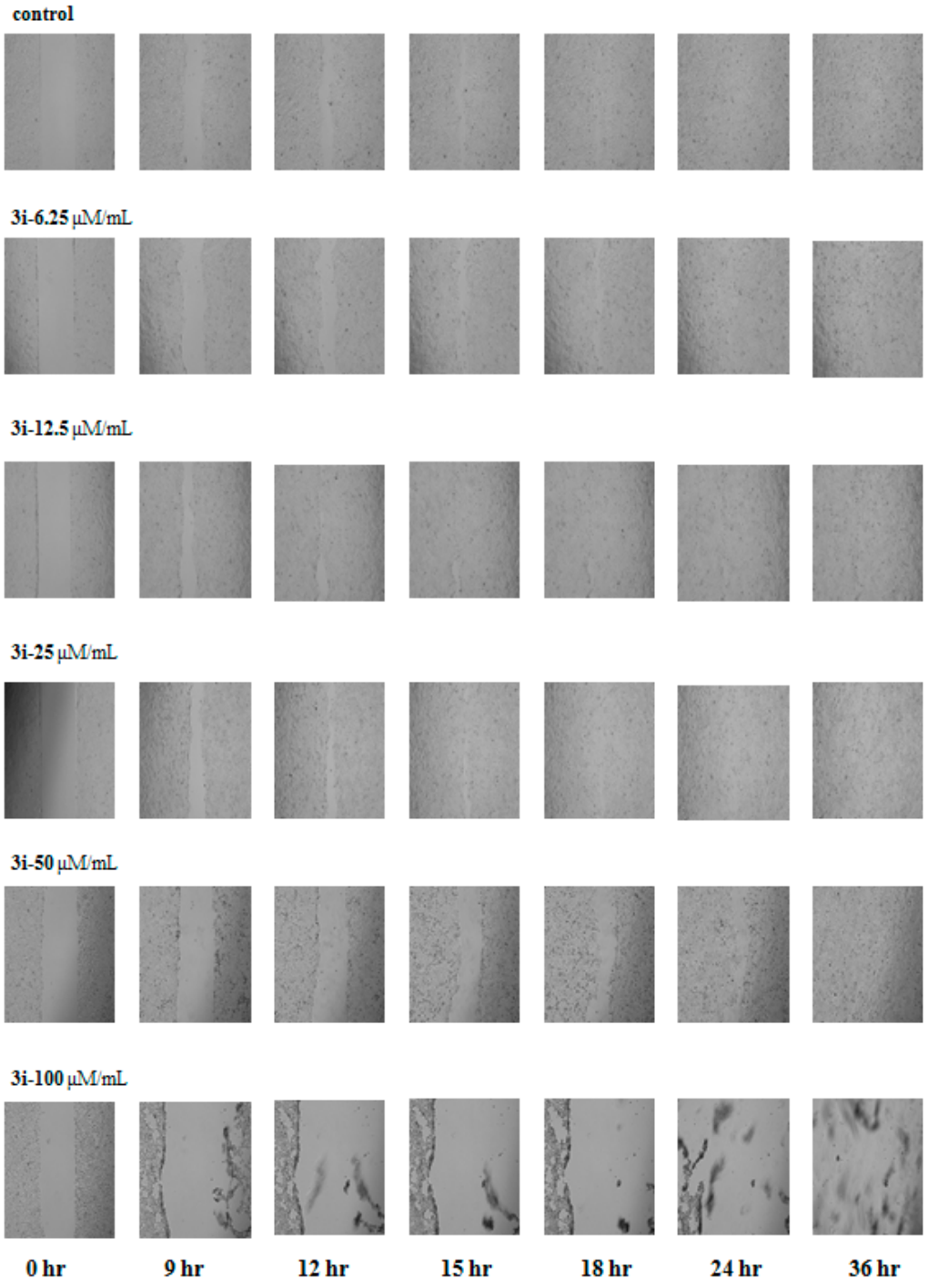
(A)


control
3b-6.25 μM/mL
3b-12.5 μM/mL
3b-25 μM/mL
3b-50 μM/mL
3b-100 μM/mL
0 hr
9 hr
12 hr
15 hr
18 hr
24 hr
36 hr

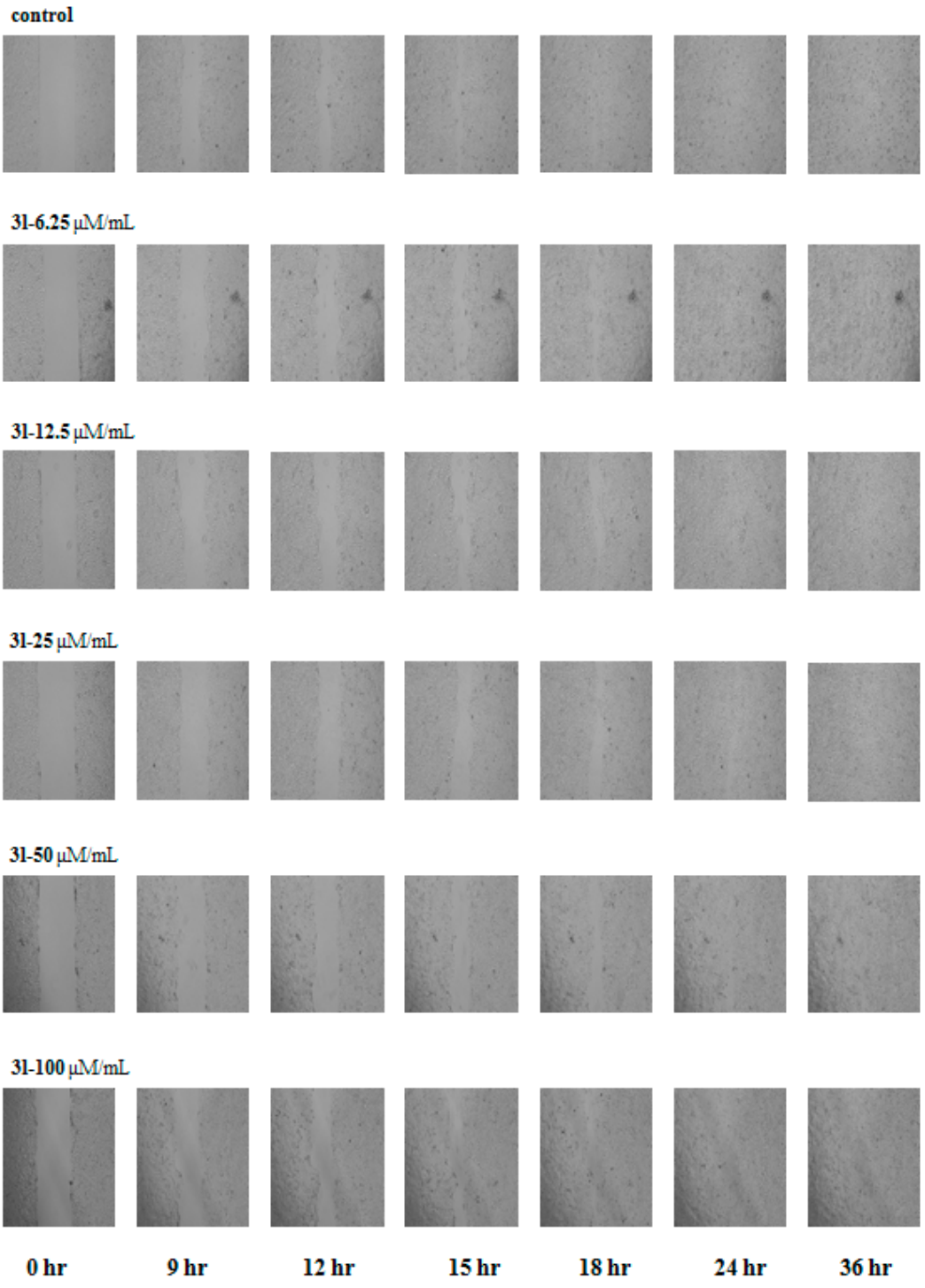
(B)


control
3c-6.25 μM/mL
3c-12.5 μM/mL
3c-25 μM/mL
3c-50 μM/mL
3c-100 μM/mL
0 hr
9 hr
12 hr
15 hr
18 hr
24 hr
36 hr

(C)


control
3i-6.25 μM/mL
3i-12.5 μM/mL
3i-25 μM/mL
3i-50 μM/mL
3i-100 μM/mL
0 hr
9 hr
12 hr
15 hr
18 hr
24 hr
36 hr

(D)


control
3l-6.25 μM/mL
3l-12.5 μM/mL
3l-25 μM/mL
3l-50 μM/mL
3l-100 μM/mL
0 hr
9 hr
12 hr
15 hr
18 hr
24 hr
36 hr

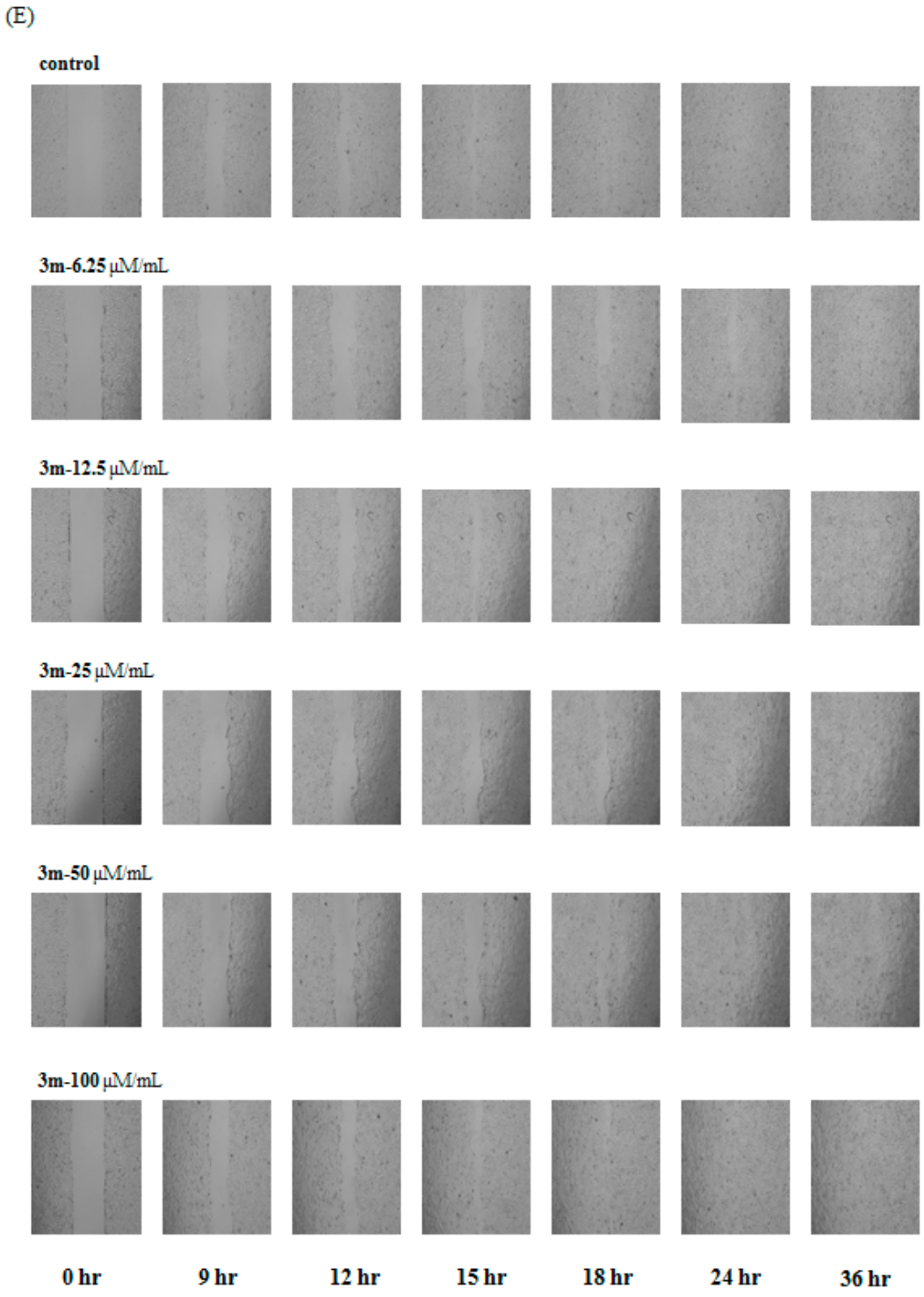


Figure S2. Scratch analysis rate of HaCaT cells. (**A**) Cell migration photos of **3b** (**B**) Cell migration photosof **3c**, (**C**) Cell migration photos of **3i**, (**D**) Cell migration photos of **3l**, (**E**) Cell migration photos of **3m**.

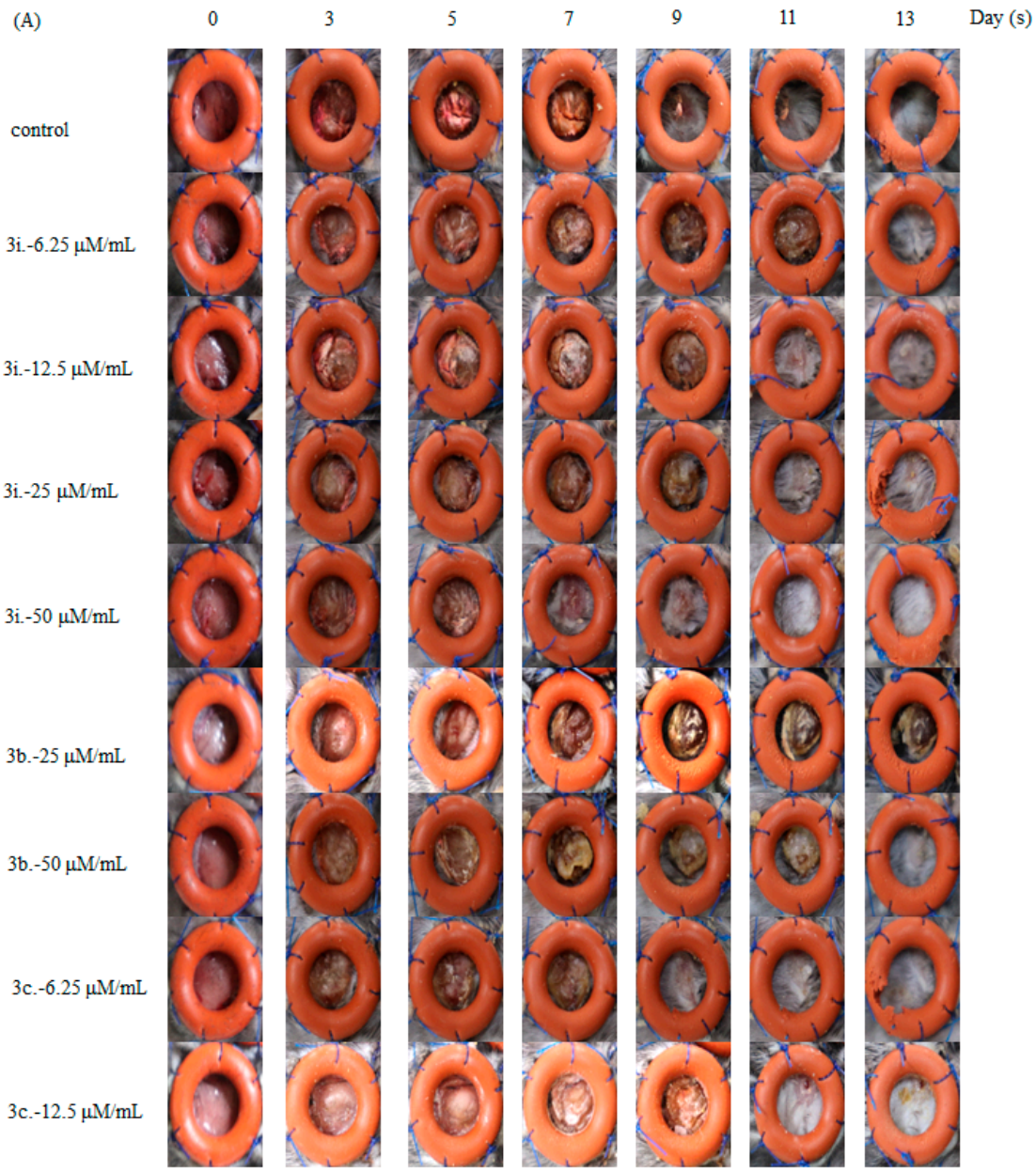
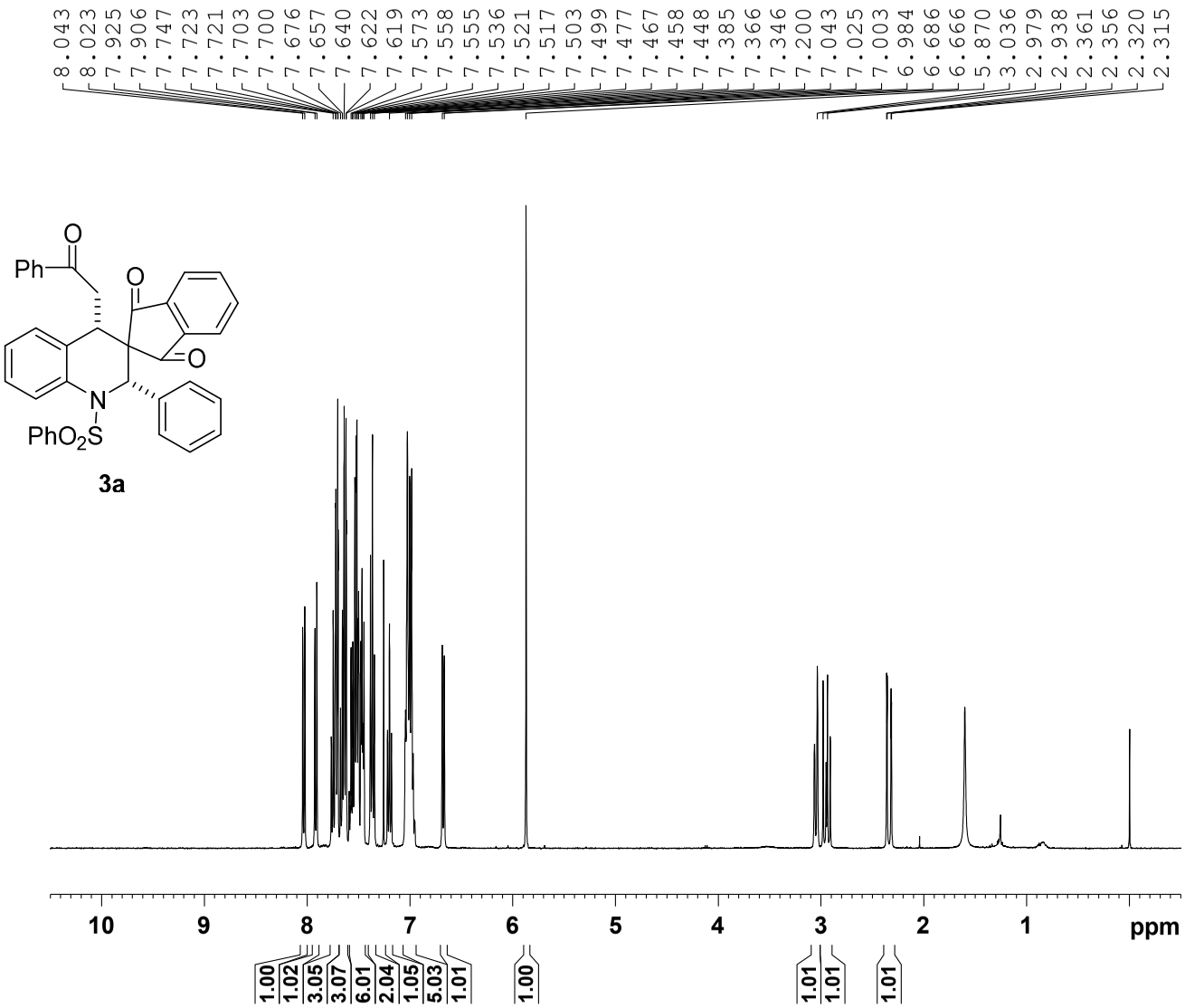


Figure S3. C57BL/6 mouse simulated wound trauma animal model. Photographs of mouse wounds were observed at 0, 3, 5, 7, 9, 11 and 13 days.

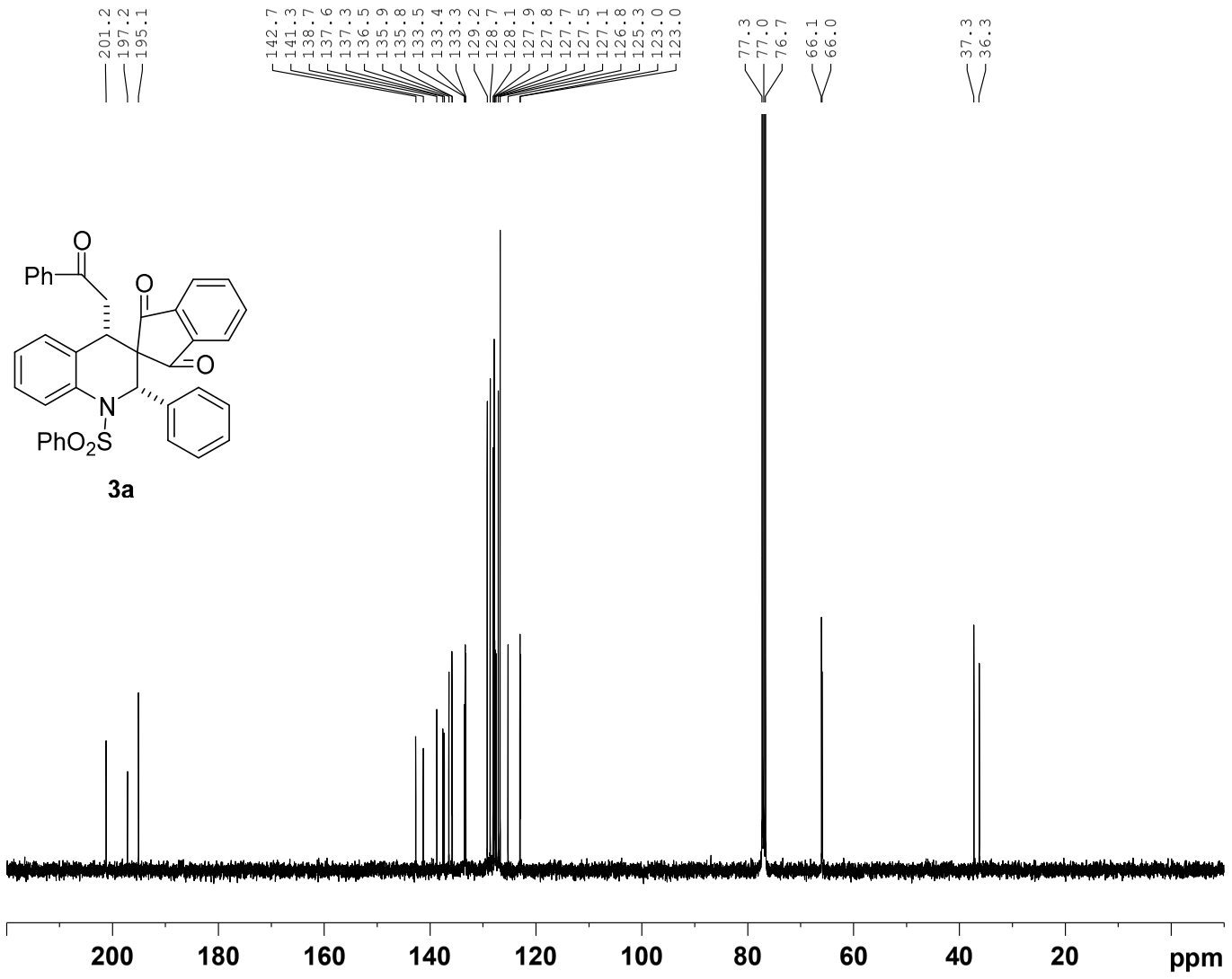



```
Current Data Parameters
NAME         no substitu
EXPNO                  1
PROCNO                 1

F2 - Acquisition Parameters
Date_           20180811
Time               14.40
INSTRUM            spect
PROBHD   5 mm BBO BB-1H
PULPROG             zg30
TD                 32768
SOLVENT            CDCl3
NS                    16
DS                     0
SWH             7246.377 Hz
FIDRES          0.221142 Hz
AQ             2.2609921 sec
RG                   114
DW                69.000 usec
DE                 6.50 usec
TE                296.3 K
D1           2.00000000 sec
TD0                    1

======== CHANNEL f1 ========
NUC1                  1H
P1                15.00 usec
PL1                2.20 dB
SFO1         400.1324008 MHz

F2 - Processing parameters
SI                 16384
SF           400.1300110 MHz
WDW                   EM
SSB       0
LB        0 Hz
GB        0
PC                 1.00
```



3a

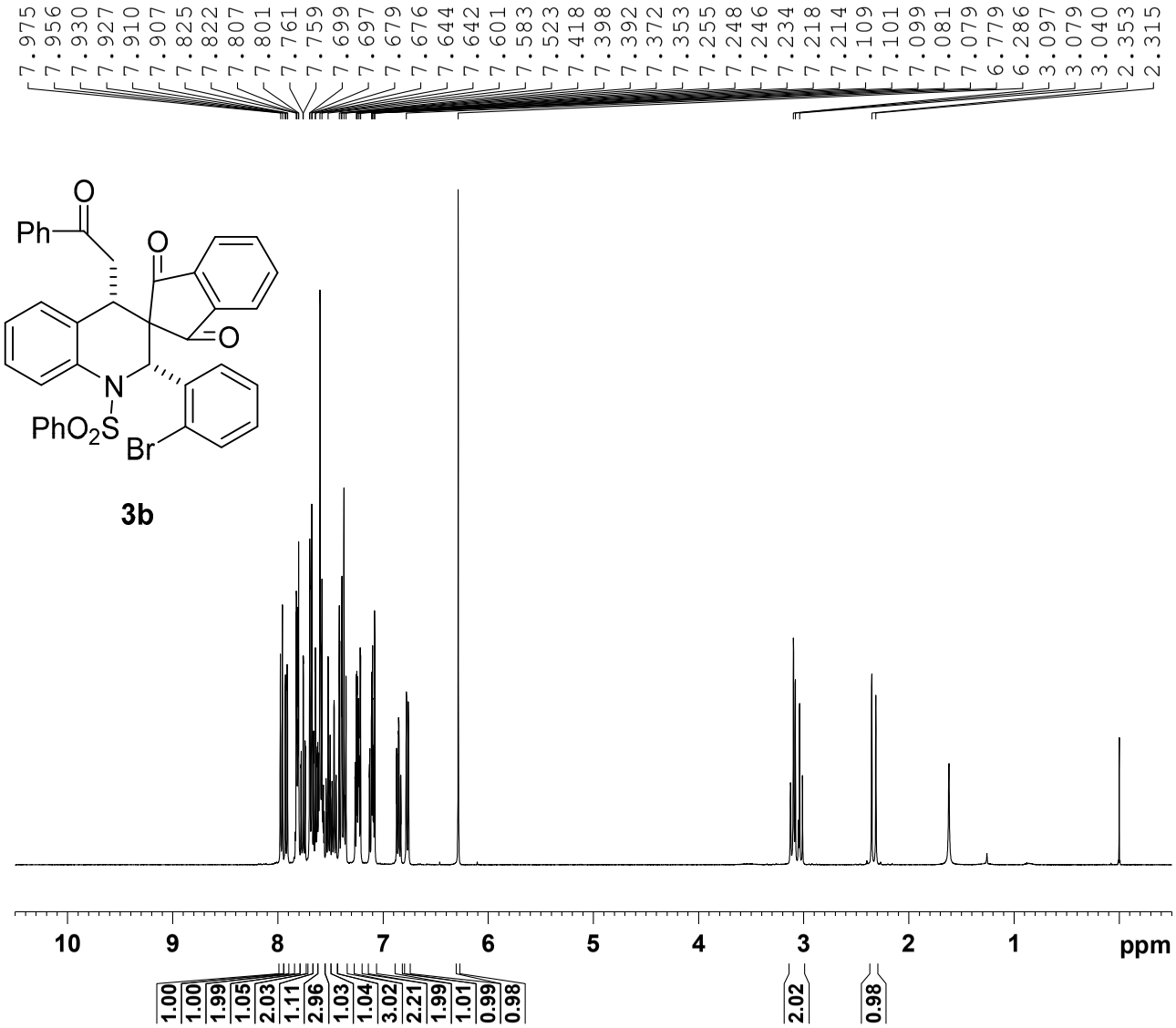
```
Current Data Parameters
NAME         no substitu
EXPNO                 13
PROCNO                 1

F2 - Acquisition Parameters
Date_           20180811
Time               14.42
INSTRUM            spect
PROBHD   5 mm BBO BB-1H
PULPROG          zgpg30
TD                 32768
SOLVENT            CDCl3
NS                   763
DS                     0
SWH            24038.461 Hz
FIDRES          0.733596 Hz
AQ              0.6815744 sec
RG                  1024
DW                20.800 usec
DE                 6.50 usec
TE                296.2 K
D1             2.00000000 sec
D11            0.03000000 sec
TD0                    1

======== CHANNEL f1 ========
NUC1                 13C
P1                 10.00 usec
PL1                 7.50 dB
SFO1         100.6233325 MHz

======== CHANNEL f2 ========
CPDPRG[2         waltz16
NUC2                 1H
PCPD2              90.00 usec
PL2                 1.40 dB
PL12               17.50 dB
PL13               20.50 dB
SFO2         400.1316005 MHz

F2 - Processing parameters
SI                 32768
SF           100.6127741 MHz
WDW                  EM
SSB       0
LB                  1.00 Hz
GB        0
PC                  1.00
```

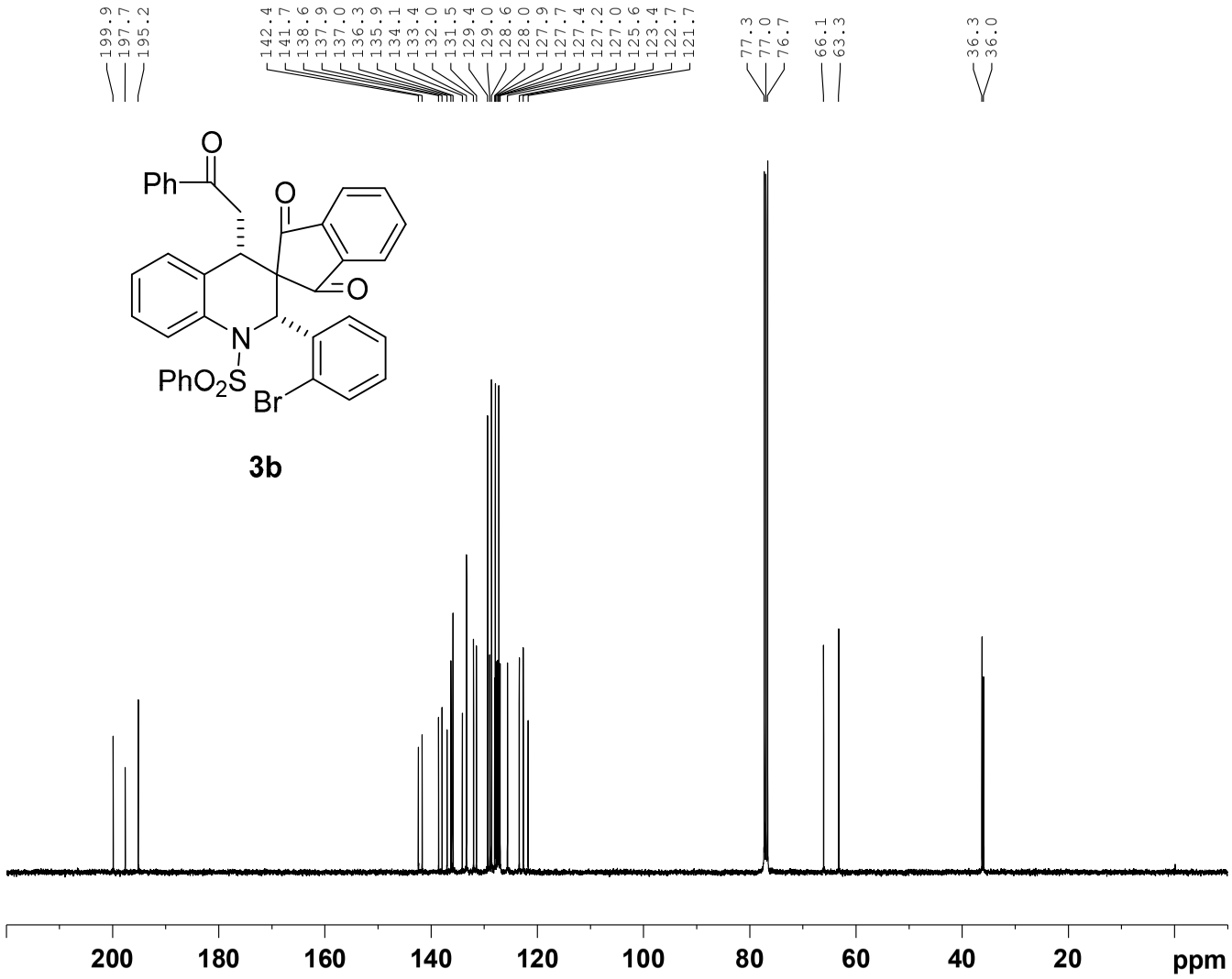



```
Current Data Parameters
NAME                  2-Br
EXPNO                    1
PROCNO                   1

F2 - Acquisition Parameters
Date_              20180731
Time                  7.32
INSTRUM              spect
PROBHD   5 mm BBO BB-1H
PULPROG               zg30
TD                   32768
SOLVENT              CDCl3
NS                      16
DS                       0
SWH              7246.377 Hz
FIDRES           0.221142 Hz
AQ               2.2609921 sec
RG                     114
DW                69.000 usec
DE                 6.50 usec
TE                 297.2 K
D1             2.00000000 sec
TD0                      1

======== CHANNEL f1 ========
NUC1                    1H
P1                  15.00 usec
PL1                  2.20 dB
SFO1          400.1324008 MHz

F2 - Processing parameters
SI                   16384
SF            400.1300115 MHz
WDW                     EM
SSB       0
LB        0 Hz
GB        0
PC                    1.00
```



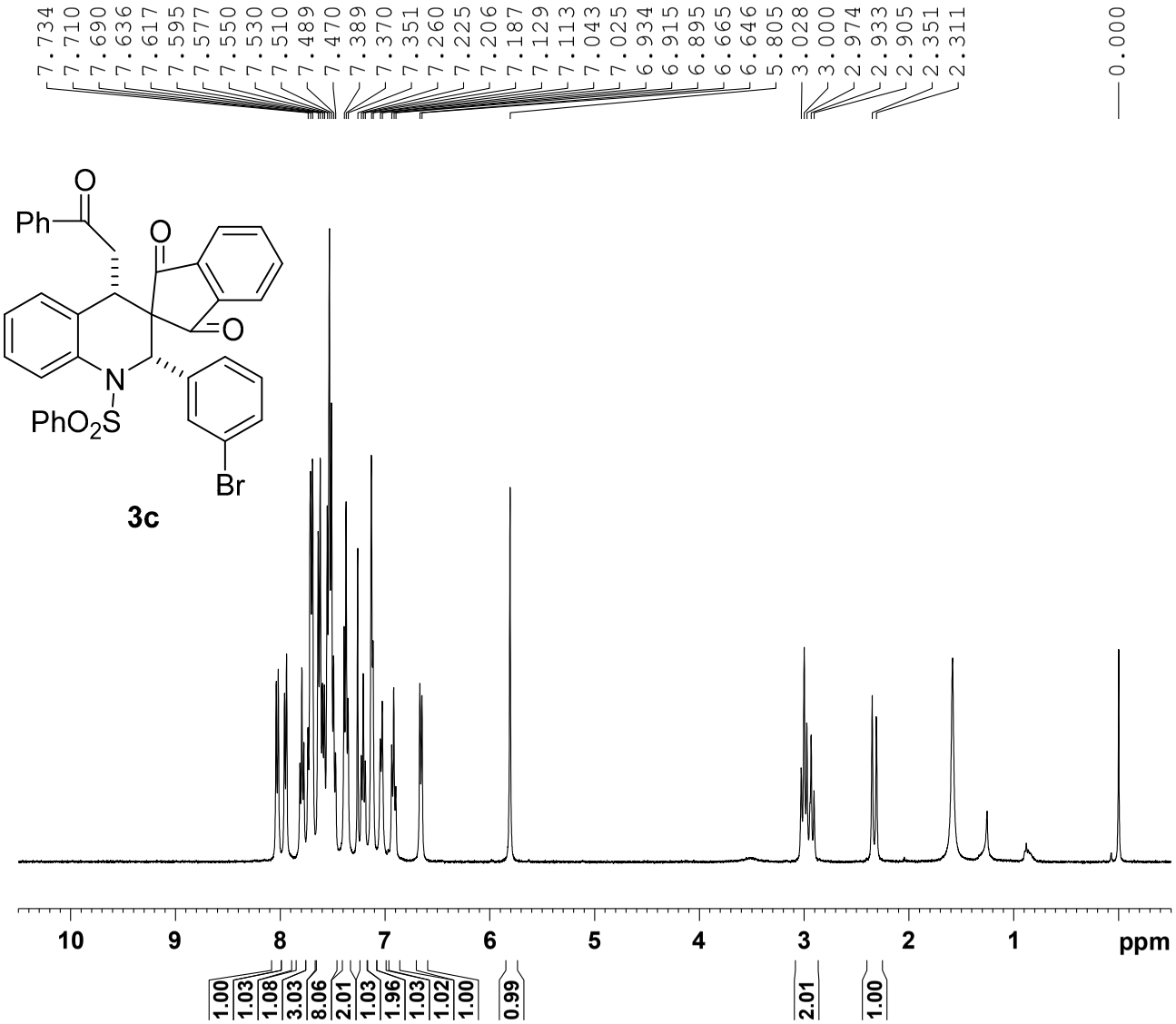

```
Current Data Parameters
NAME                  2-Br
EXPNO                   13
PROCNO                   1

F2 - Acquisition Parameters
Date_              20180731
Time                  7.34
INSTRUM              spect
PROBHD    5 mm BBO BB-1H
PULPROG             zgpg30
TD                   32768
SOLVENT              CDCl3
NS                    2491
DS                       0
SWH             24038.461 Hz
FIDRES           0.733596 Hz
AQ               0.6815744 sec
RG                    2048
DW                  20.800 usec
DE                   6.50 usec
TE                  297.2 K
D1             2.00000000 sec
D11            0.03000000 sec
TD0                      1

======== CHANNEL f1 ========
NUC1                   13C
P1                   10.00 usec
PL1                   7.50 dB
SFO1          100.6233325 MHz

======== CHANNEL f2 ========
CPDPRG[2           waltz16
NUC2                   1H
PCPD2                90.00 usec
PL2                   1.40 dB
PL12                 17.50 dB
PL13                 20.50 dB
SFO2          400.1316005 MHz

F2 - Processing parameters
SI                   32768
SF            100.6127759 MHz
WDW                     EM
SSB       0
LB                    1.00 Hz
GB        0
PC                    1.00
```

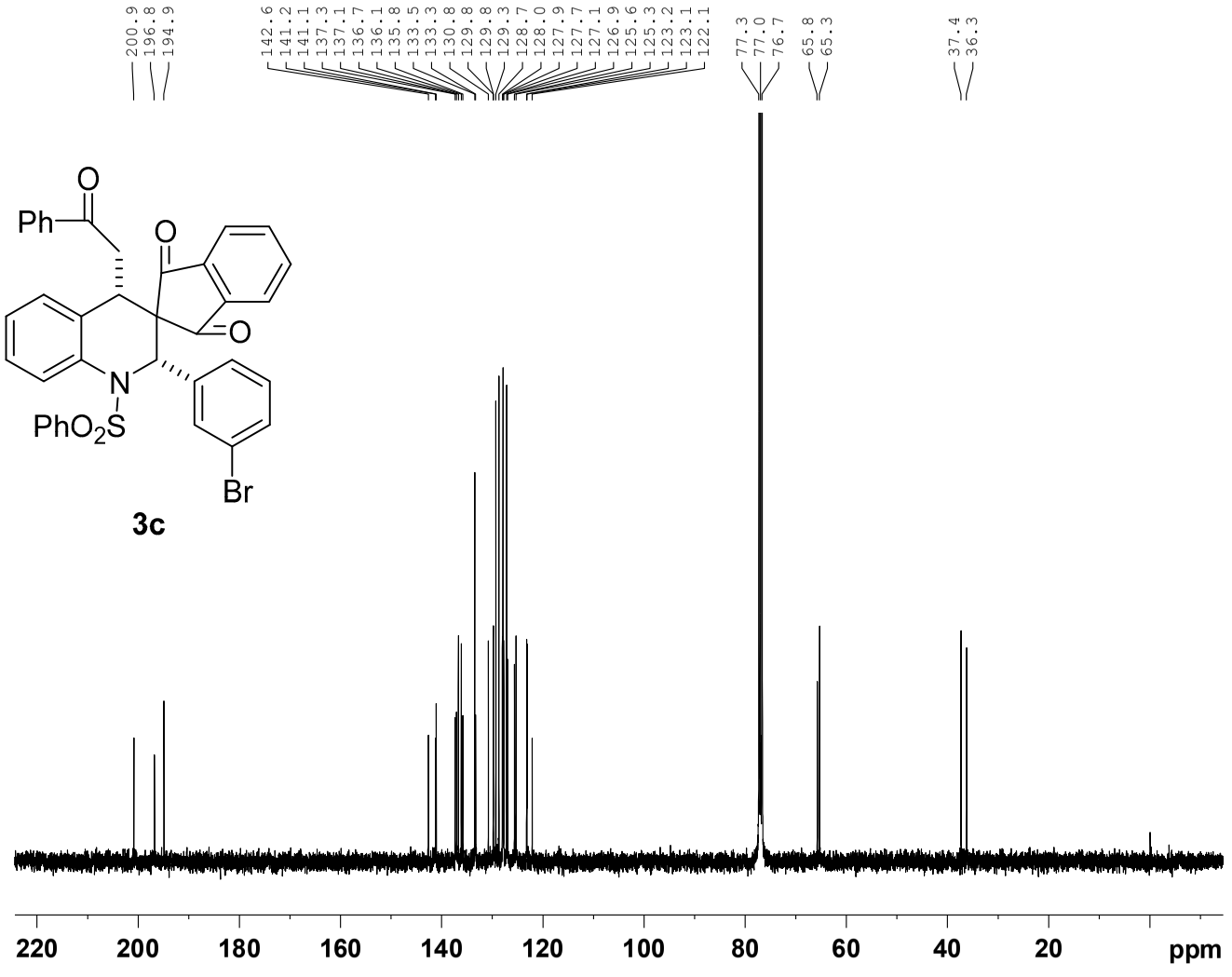



```
Current Data Parameters
NAME                  3-Br
EXPNO                    1
PROCNO                   1

F2 - Acquisition Parameters
Date_            20180731
Time                21.23
INSTRUM             spect
PROBHD   5 mm BBO BB-1H
PULPROG              zg30
TD                  32768
SOLVENT             CDCl3
NS                     16
DS                      0
SWH              7246.377 Hz
FIDRES           0.221142 Hz
AQ               2.2609921 sec
RG                    114
DW                 69.000 usec
DE                  6.50 usec
TE                 296.8 K
D1            2.00000000 sec
TD0                     1

======== CHANNEL f1 ========
NUC1                   1H
P1                 15.00 usec
PL1                 2.20 dB
SFO1         400.1324008 MHz

F2 - Processing parameters
SI                  16384
SF           400.1300098 MHz
WDW                    EM
SSB       0
LB        0 Hz
GB        0
PC                  1.00
```



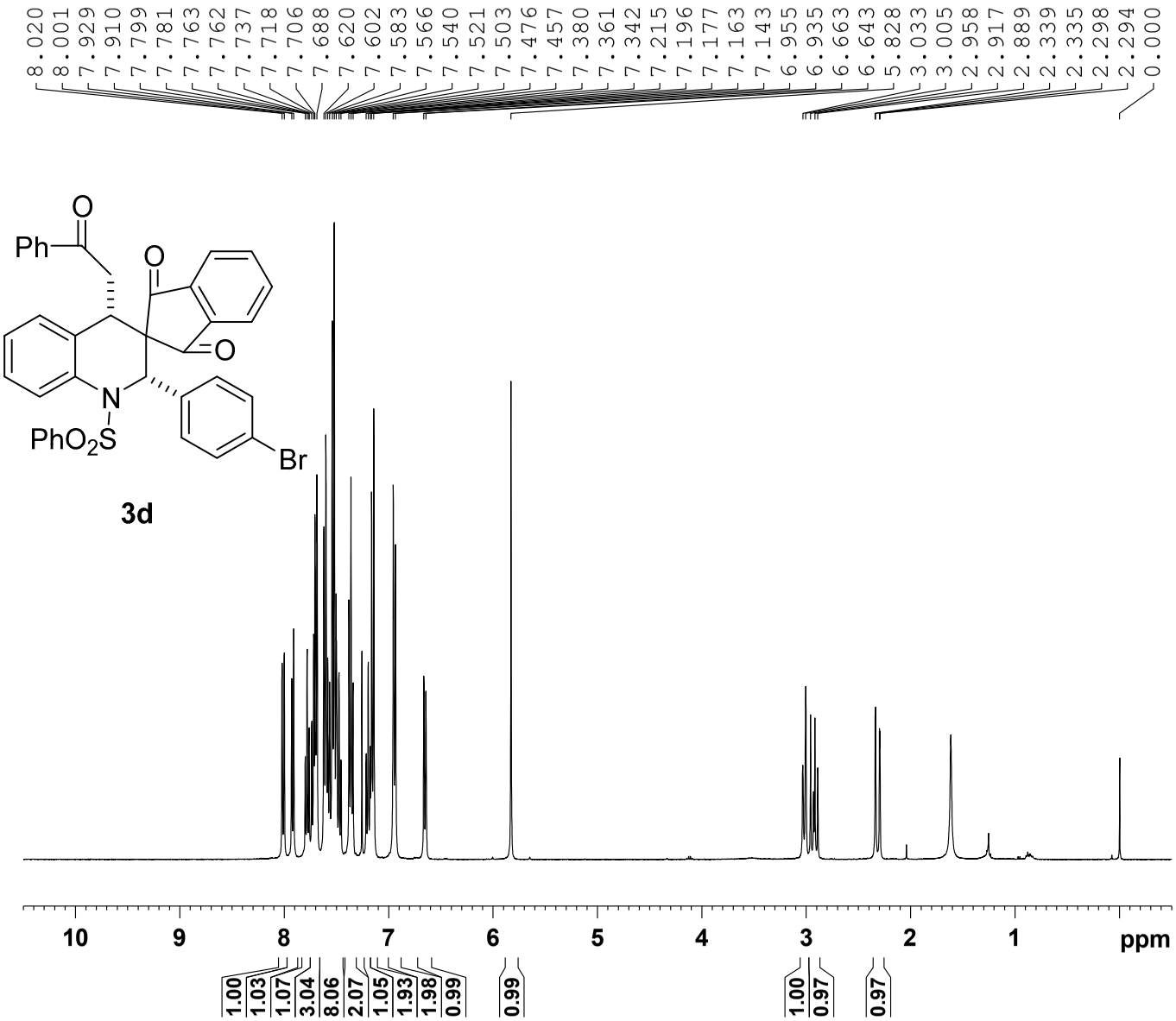

```
Current Data Parameters
NAME                  3-Br
EXPNO                   13
PROCNO                   1

F2 - Acquisition Parameters
Date_              20180801
Time                  8.08
INSTRUM              spect
PROBHD   5 mm BBO BB-1H
PULPROG             zgpg30
TD                   32768
SOLVENT              CDCl3
NS                    2856
DS                       0
SWH              24038.461 Hz
FIDRES            0.733596 Hz
AQ                0.6815744 sec
RG                    4096
DW                  20.800 usec
DE                   6.50 usec
TE                  297.0 K
D1             2.00000000 sec
D11            0.03000000 sec
TD0                      1

======== CHANNEL f1 ========
NUC1                   13C
P1                   10.00 usec
PL1                   7.50 dB
SFO1          100.6233325 MHz

======== CHANNEL f2 ========
CPDPRG[2           waltz16
NUC2                   1H
PCPD2                90.00 usec
PL2                   1.40 dB
PL12                 17.50 dB
PL13                 20.50 dB
SFO2          400.1316005 MHz

F2 - Processing parameters
SI                   32768
SF            100.6127715 MHz
WDW                     EM
SSB       0
LB                    1.00 Hz
GB        0
PC                    1.00
```

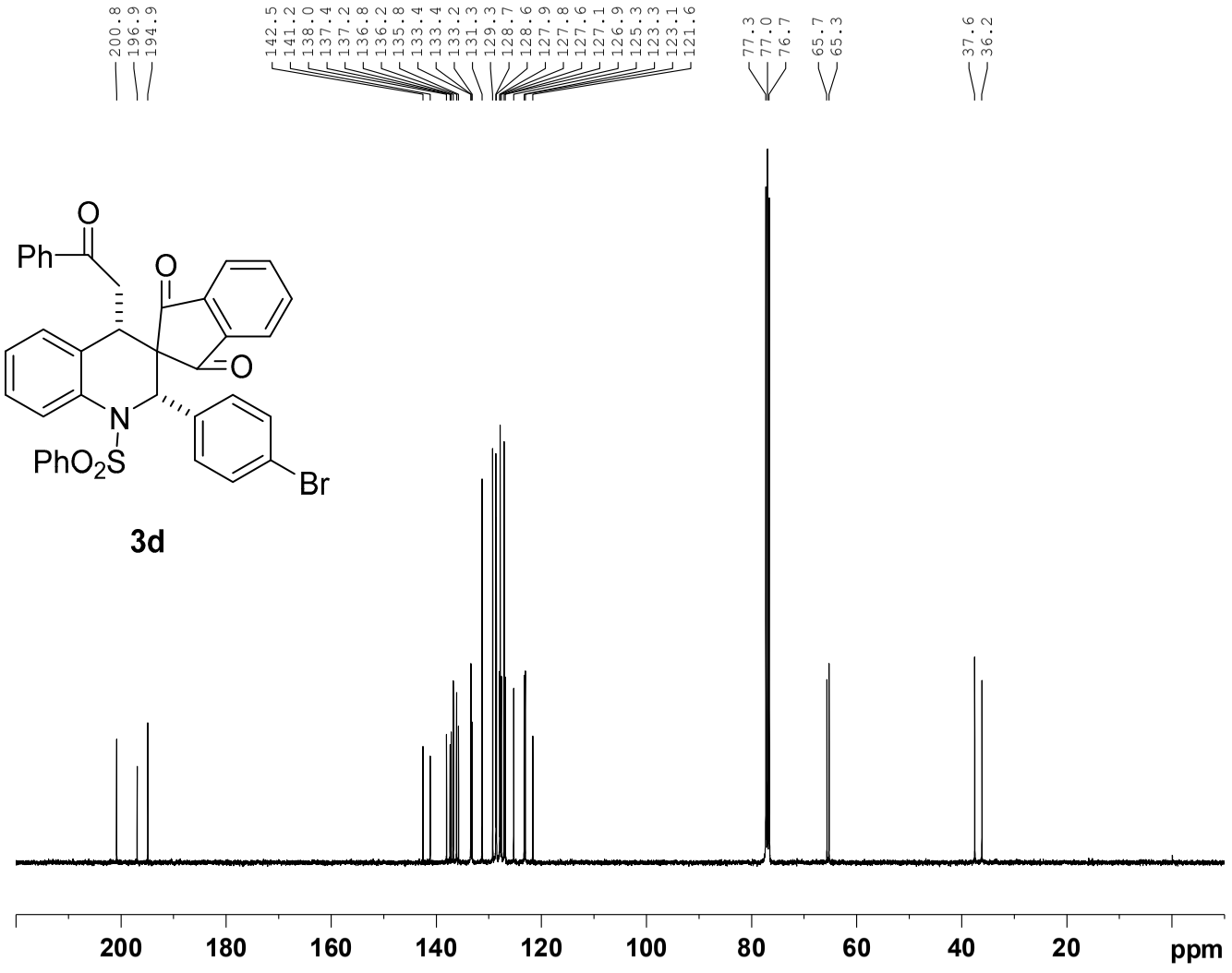



```
Current Data Parameters
NAME                  4-Br
EXPNO                    1
PROCNO                   1

F2 - Acquisition Parameters
Date_              20180804
Time                 21.32
INSTRUM              spect
PROBHD   5 mm BBO BB-1H
PULPROG               zg30
TD                   32768
SOLVENT              CDCl3
NS                      16
DS                       0
SWH               7246.377 Hz
FIDRES            0.221142 Hz
AQ                2.2609921 sec
RG                     114
DW                  69.000 usec
DE                   6.50 usec
TE                  296.4 K
D1             2.00000000 sec
TD0                      1

======== CHANNEL f1 ========
NUC1                    1H
P1                   15.00 usec
PL1                   2.20 dB
SFO1          400.1324008 MHz

F2 - Processing parameters
SI                   16384
SF            400.1300110 MHz
WDW                     EM
SSB       0
LB        0 Hz
GB        0
PC                    1.00
```



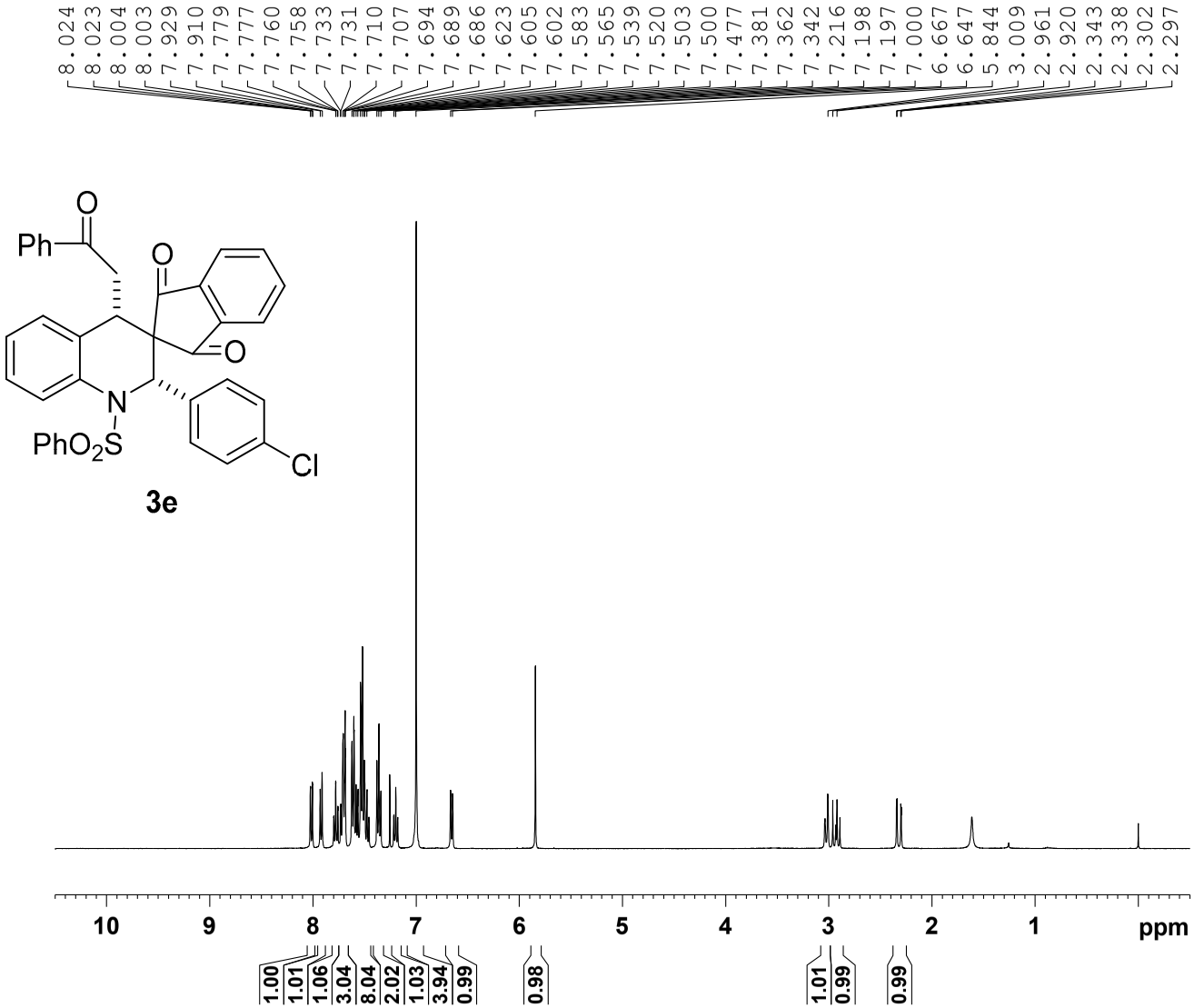

```
Current Data Parameters
NAME                   4-Br
EXPNO                    13
PROCNO                    1

F2 - Acquisition Parameters
Date_             20180804
Time                 21.35
INSTRUM              spect
PROBHD   5 mm BBO BB-1H
PULPROG             zgpg30
TD                   32768
SOLVENT              CDCl3
NS                    5000
DS                       0
SWH              24038.461 Hz
FIDRES            0.733596 Hz
AQ                0.6815744 sec
RG                    1024
DW                  20.800 usec
DE                   6.50 usec
TE                  296.5 K
D1             2.00000000 sec
D11            0.03000000 sec
TD0                      1

======== CHANNEL f1 ========
NUC1                   13C
P1                   10.00 usec
PL1                   7.50 dB
SFO1          100.6233325 MHz

======== CHANNEL f2 ========
CPDPRG[2           waltz16
NUC2                   1H
PCPD2                90.00 usec
PL2                   1.40 dB
PL12                 17.50 dB
PL13                 20.50 dB
SFO2          400.1316005 MHz

F2 - Processing parameters
SI                   32768
SF            100.6127738 MHz
WDW                     EM
SSB       0
LB                    1.00 Hz
GB        0
PC                    1.00
```

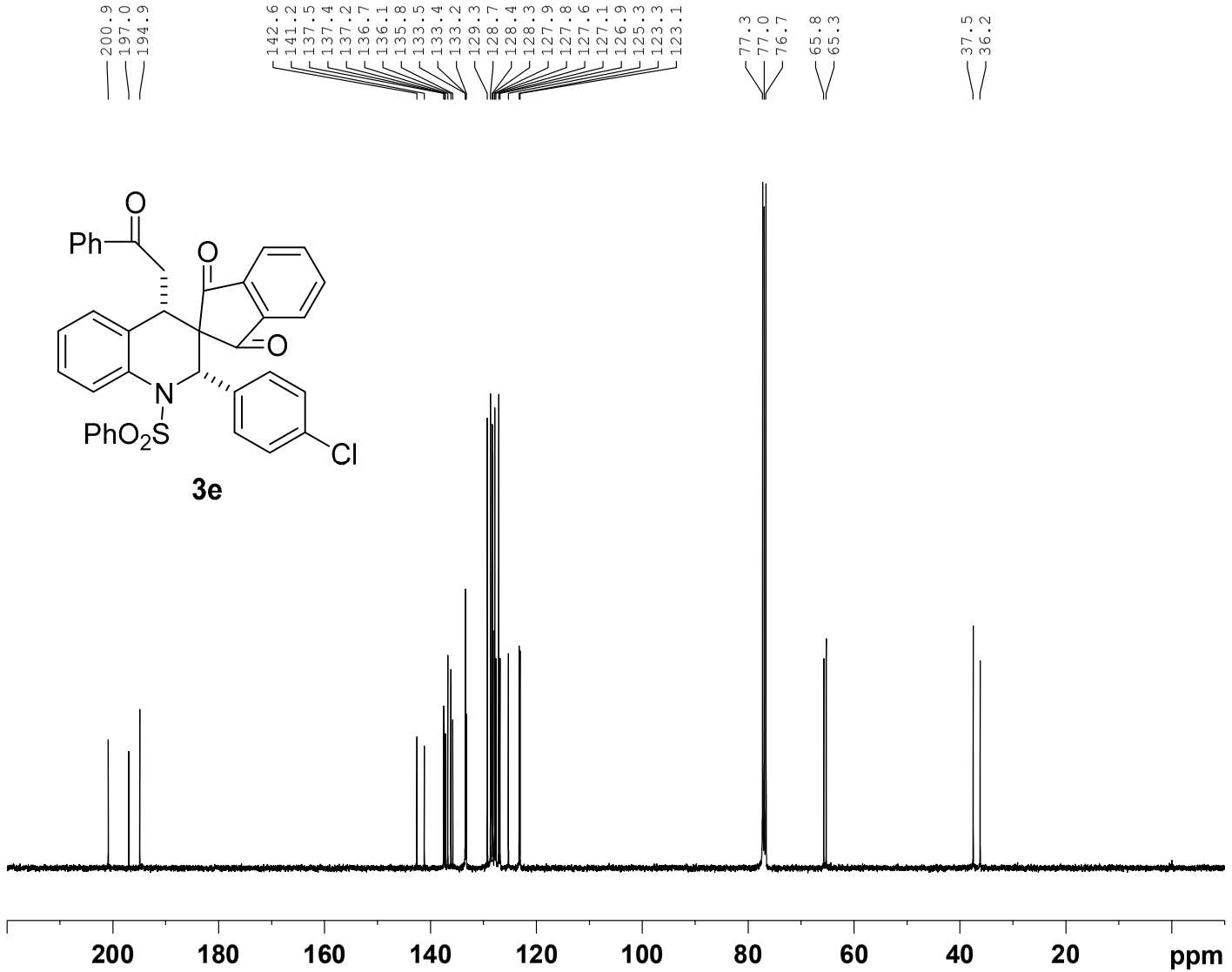



```
Current Data Parameters
NAME                  4-Cl
EXPNO                    1
PROCNO                   1

F2 - Acquisition Parameters
Date_              20180805
Time                 14.10
INSTRUM              spect
PROBHD   5 mm BBO BB-1H
PULPROG              zg30
TD                  32768
SOLVENT             CDCl3
NS                     16
DS                      0
SWH              7246.377 Hz
FIDRES           0.221142 Hz
AQ               2.2609921 sec
RG                    114
DW                 69.000 usec
DE                   6.50 usec
TE                  297.3 K
D1              2.00000000 sec
TD0                     1

======== CHANNEL f1 ========
NUC1                   1H
P1                  15.00 usec
PL1                  2.20 dB
SFO1          400.1324008 MHz

F2 - Processing parameters
SI                  16384
SF            400.1300111 MHz
WDW                    EM
SSB       0
LB        0 Hz
GB        0
PC                   1.00
```



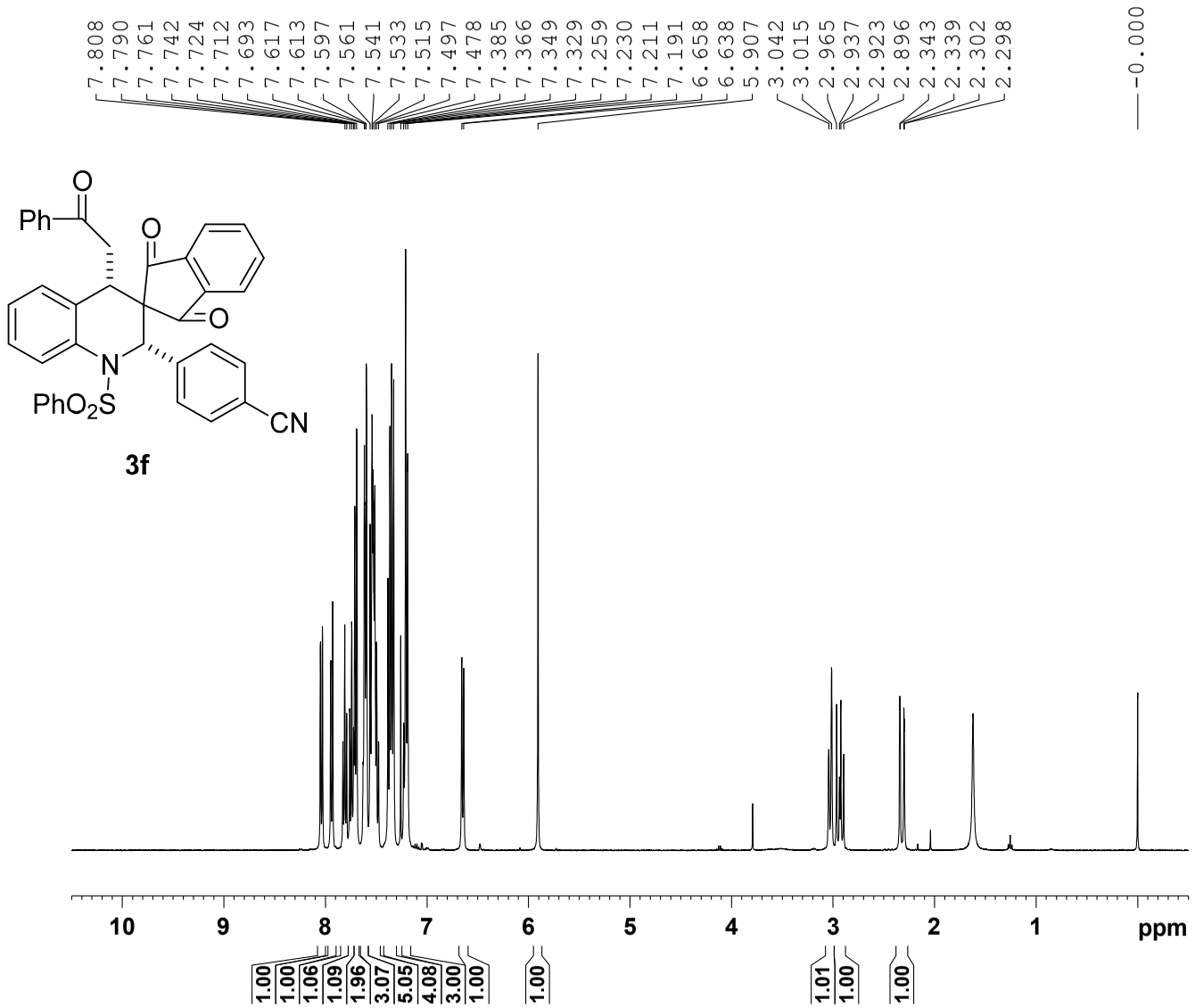

```
Current Data Parameters
NAME                  4-Cl
EXPNO                   13
PROCNO                   1

F2 - Acquisition Parameters
Date_              20180805
Time                 14.14
INSTRUM              spect
PROBHD   5 mm BBO BB-1H
PULPROG             zgpg30
TD                   32768
SOLVENT              CDCl3
NS                    5000
DS                       0
SWH             24038.461 Hz
FIDRES           0.733596 Hz
AQ               0.6815744 sec
RG                    2048
DW                  20.800 usec
DE                   6.50 usec
TE                  297.2 K
D1              2.00000000 sec
D11             0.03000000 sec
TD0                      1

======== CHANNEL f1 ========
NUC1                   13C
P1                   10.00 usec
PL1                   7.50 dB
SFO1          100.6233325 MHz

======== CHANNEL f2 ========
CPDPRG[2           waltz16
NUC2                   1H
PCPD2                90.00 usec
PL2                   1.40 dB
PL12                 17.50 dB
PL13                 20.50 dB
SFO2          400.1316005 MHz

F2 - Processing parameters
SI                   32768
SF            100.6127734 MHz
WDW                     EM
SSB       0
LB                    1.00 Hz
GB        0
PC                    1.00
```

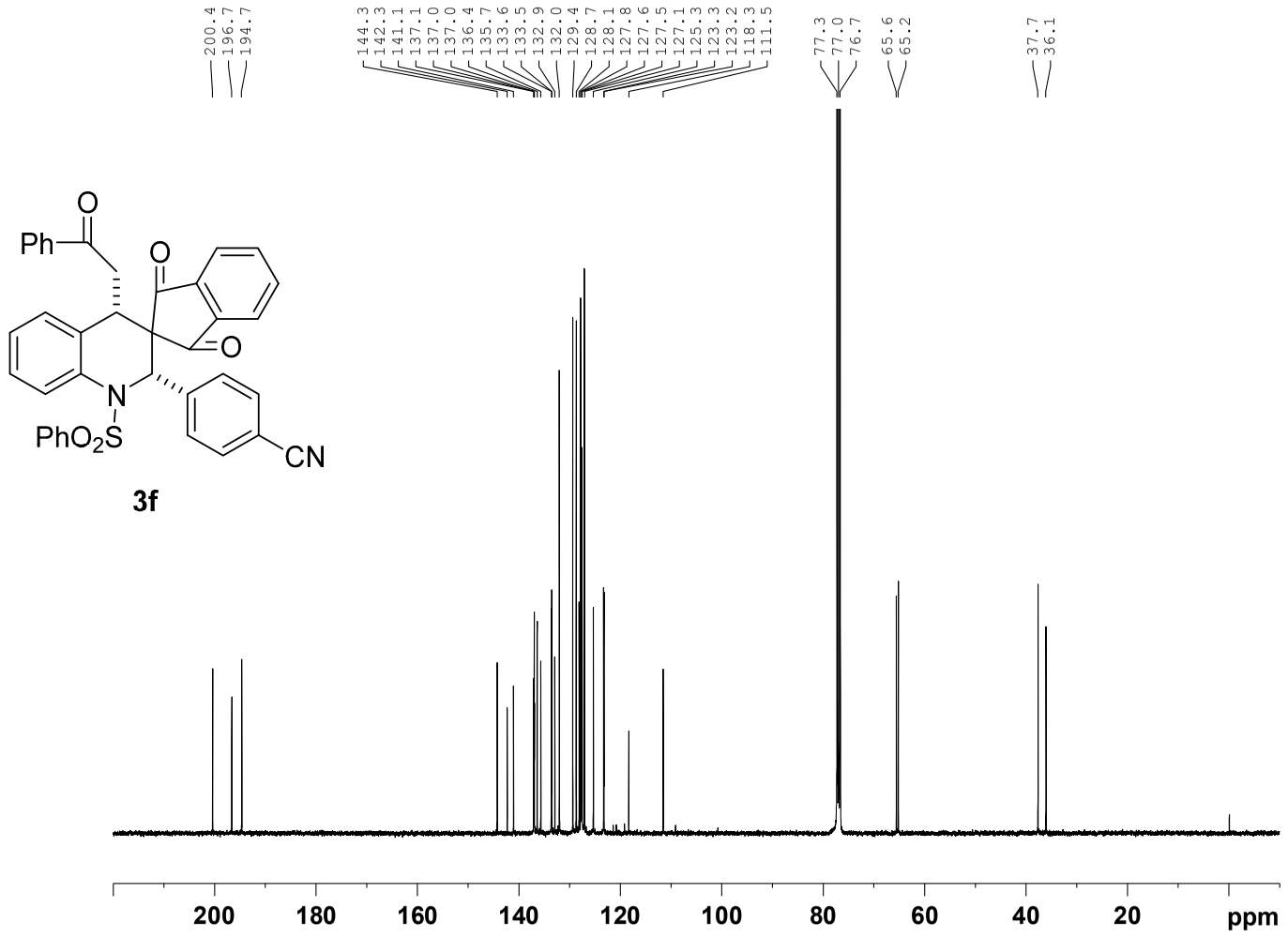


Current Data Parameters
NAME 4-CN
EXPNO 1
PROCNO 1

F2 - Acquisition Parameters
Date_ 20180803
Time 23.32
INSTRUM spect
PROBHD 5 mm BBO BB-1H
PULPROG zg30
TD 32768
SOLVENT CDCl3
NS 16
DS 0
SWH 7246.377 Hz
FIDRES 0.221142 Hz
AQ 2.2609921 sec
RG 114
DW 69.000 usec
DE 6.50 usec
TE 296.5 K
D1 2.00000000 sec
TD0 1

======== CHANNEL f1 ========
NUC1 1H
P1 15.00 usec
PL1 2.20 dB
SFO1 400.1324008 MHz

F2 - Processing parameters
SI 16384
SF 400.1300098 MHz
WDW EM
SSB 0
LB 0 Hz
GB 0
PC 1.00



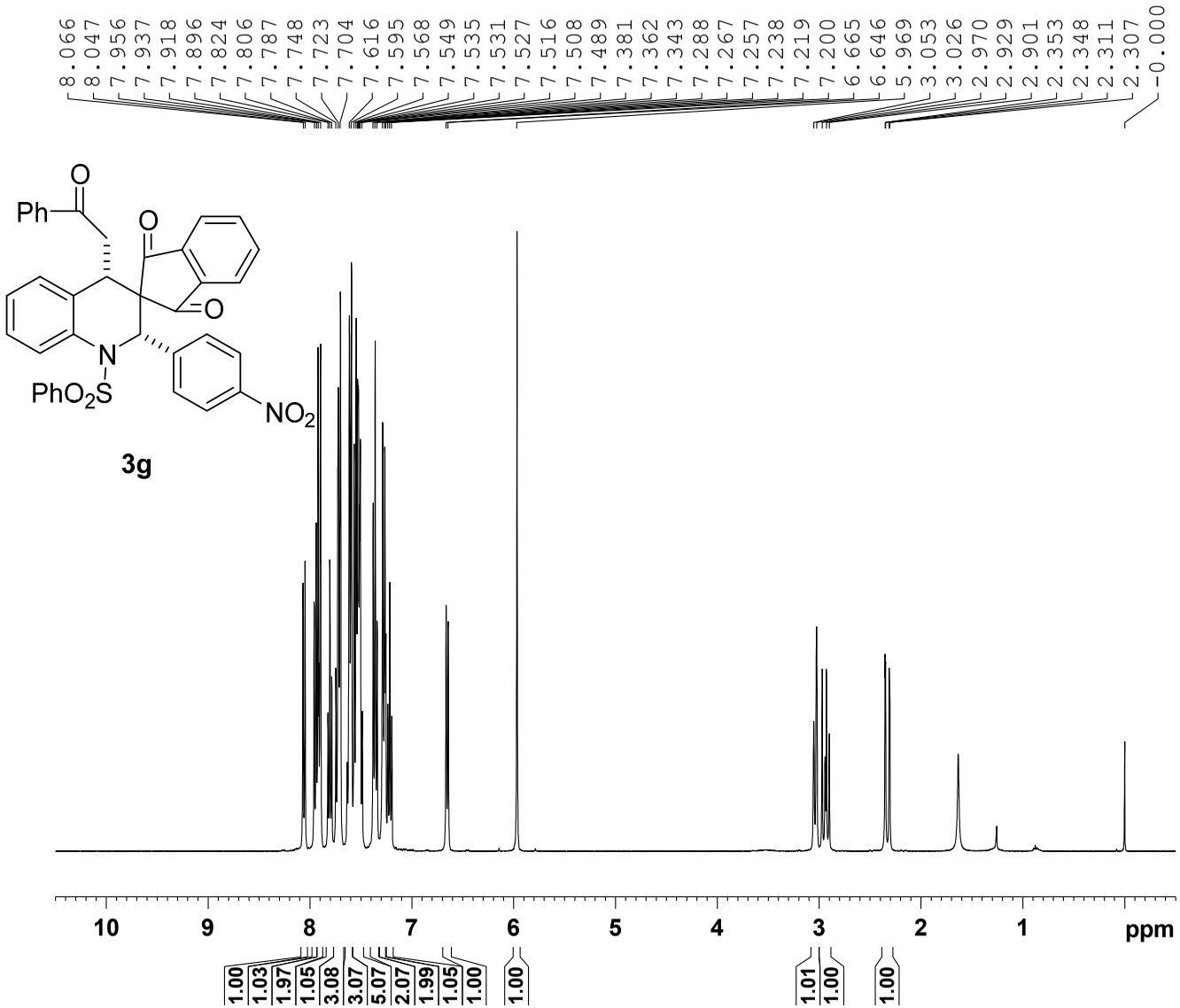

```
Current Data Parameters
NAME                  4-CN
EXPNO                   13
PROCNO                   1

F2 - Acquisition Parameters
Date_           20180803
Time                23.35
INSTRUM             spect
PROBHD   5 mm BBO BB-1H
PULPROG           zgpg30
TD                 32768
SOLVENT            CDCl3
NS                 12781
DS                     0
SWH           24038.461 Hz
FIDRES         0.733596 Hz
AQ             0.6815744 sec
RG                  1024
DW                20.800 usec
DE                 6.50 usec
TE                296.4 K
D1            2.00000000 sec
D11           0.03000000 sec
TD0                    1

======== CHANNEL f1 ========
NUC1                  13C
P1                 10.00 usec
PL1                 7.50 dB
SFO1         100.6233325 MHz

======== CHANNEL f2 ========
CPDPRG[2         waltz16
NUC2                  1H
PCPD2              90.00 usec
PL2                 1.40 dB
PL12               17.50 dB
PL13               20.50 dB
SFO2         400.1316005 MHz

F2 - Processing parameters
SI                 32768
SF           100.6127738 MHz
WDW                   EM
SSB       0
LB                  1.00 Hz
GB        0
PC                  1.00
```

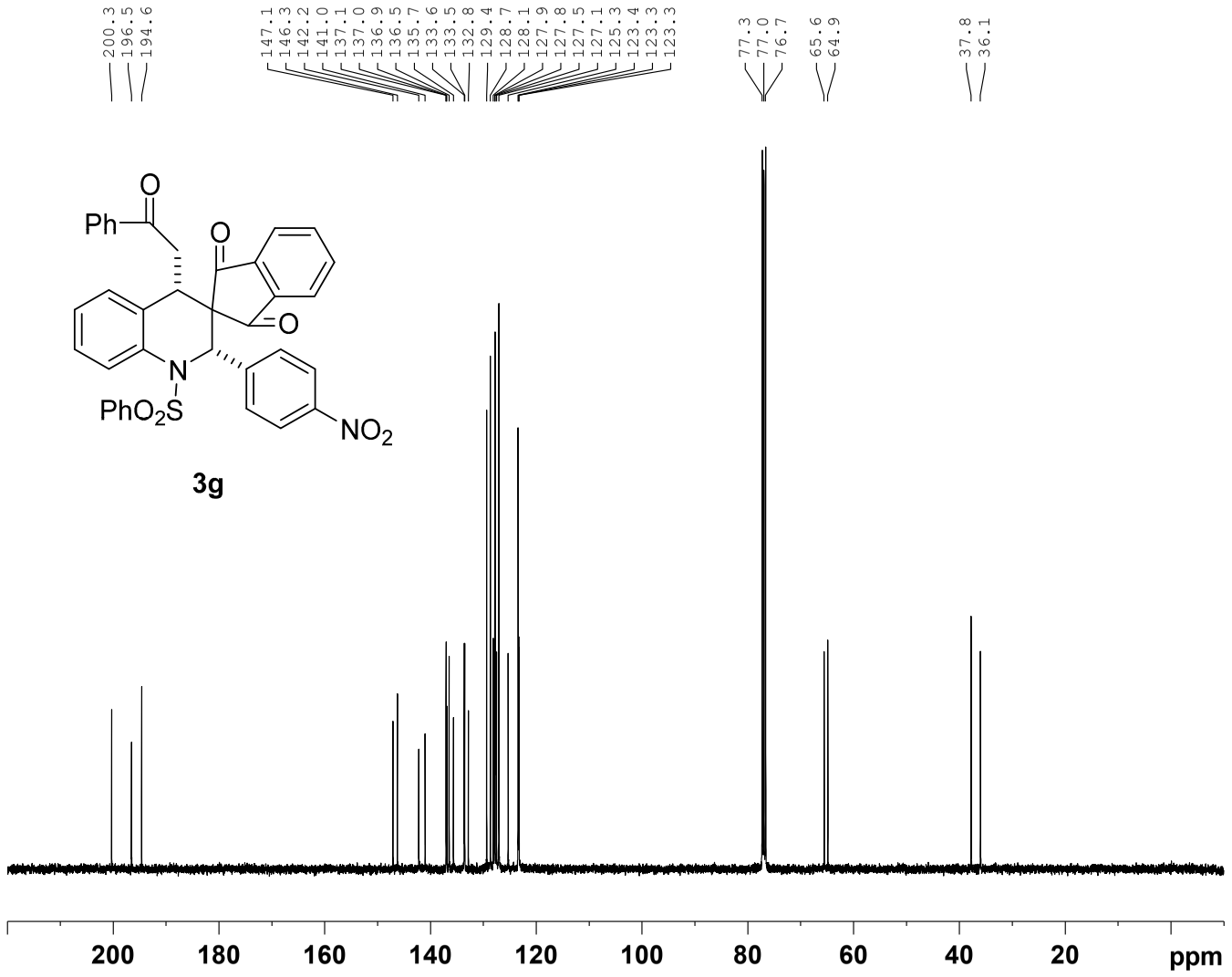



```
Current Data Parameters
NAME                  4-NO2
EXPNO                     1
PROCNO                    1

F2 - Acquisition Parameters
Date_              20180730
Time                  9.01
INSTRUM              spect
PROBHD   5 mm BBO BB-1H
PULPROG               zg30
TD                   32768
SOLVENT              CDC13
NS                      16
DS                       0
SWH               7246.377 Hz
FIDRES           0.221142 Hz
AQ               2.2609921 sec
RG                    71.8
DW                  69.000 usec
DE                   6.50 usec
TE                  296.5 K
D1             2.00000000 sec
TD0                       1

======== CHANNEL f1 ========
NUC1                    1H
P1                  15.00 usec
PL1                  2.20 dB
SFO1         400.1324008 MHz

F2 - Processing parameters
SI                    16384
SF           400.1300105 MHz
WDW                      EM
SSB       0
LB        0 Hz
GB        0
PC                    1.00
```



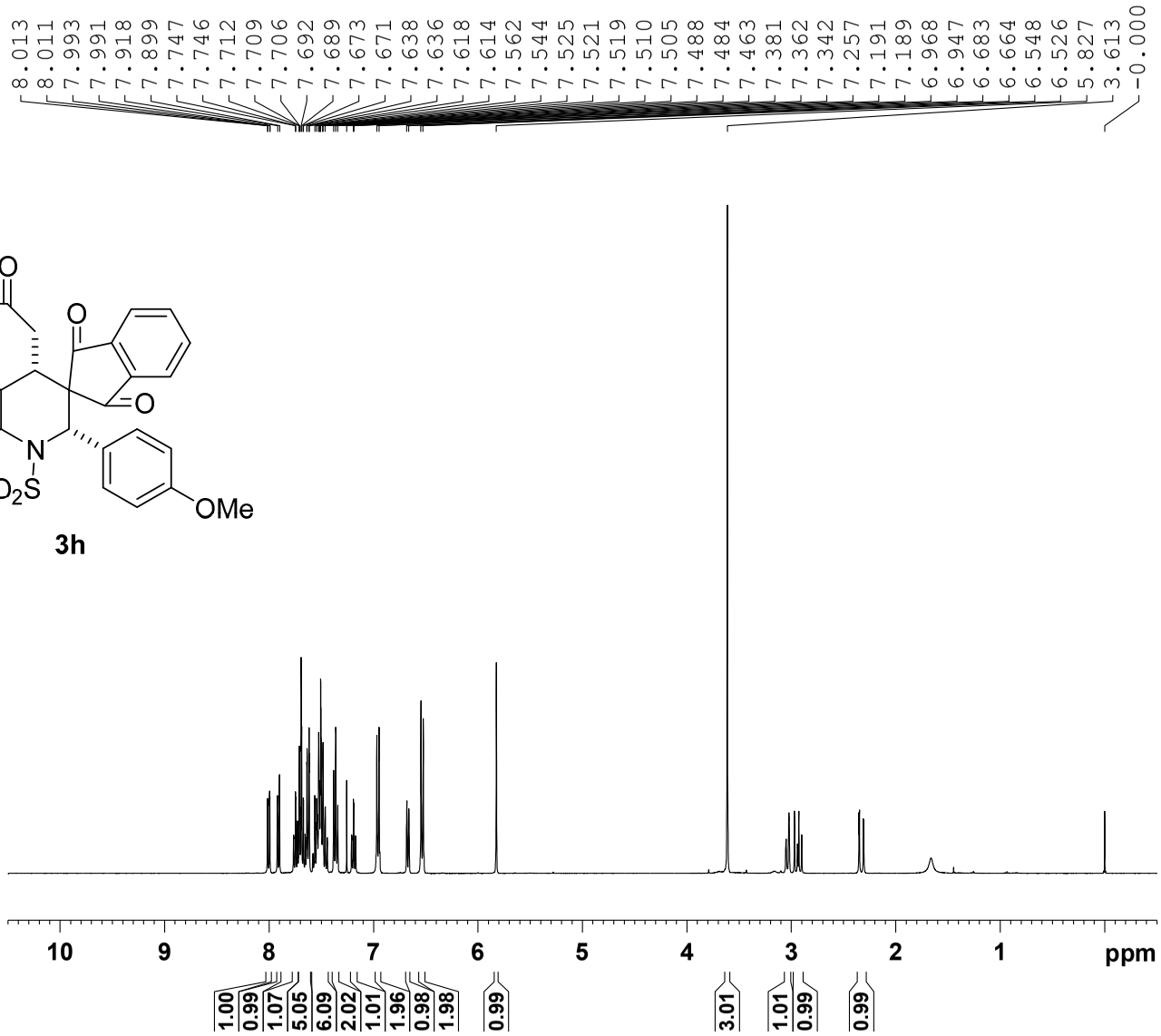

```
Current Data Parameters
NAME                  4-NO2
EXPNO                    13
PROCNO                    1

F2 - Acquisition Parameters
Date_              20180730
Time                   9.03
INSTRUM               spect
PROBHD    5 mm BBO BB-1H
PULPROG             zgpg30
TD                    32768
SOLVENT               CDCl3
NS                     1129
DS                        0
SWH              24038.461 Hz
FIDRES            0.733596 Hz
AQ                0.6815744 sec
RG                     2048
DW                  20.800 usec
DE                   6.50 usec
TE                   296.5 K
D1              2.00000000 sec
D11             0.03000000 sec
TD0                       1

======== CHANNEL f1 ========
NUC1                    13C
P1                   10.00 usec
PL1                   7.50 dB
SFO1          100.6233325 MHz

======== CHANNEL f2 ========
CPDPRG[2           waltz16
NUC2                    1H
PCPD2                90.00 usec
PL2                   1.40 dB
PL12                 17.50 dB
PL13                 20.50 dB
SFO2          400.1316005 MHz

F2 - Processing parameters
SI                    32768
SF            100.6127764 MHz
WDW                      EM
SSB       0
LB                    1.00 Hz
GB        0
PC                    1.00
```




```
Current Data Parameters
NAME                  4-OMe
EXPNO                     1
PROCNO                    1

F2 - Acquisition Parameters
Date_              20180729
Time                  22.29
INSTRUM               spect
PROBHD   5 mm BBO BB-1H
PULPROG                zg30
TD                    32768
SOLVENT               CDC13
NS                       16
DS                        0
SWH                7246.377 Hz
FIDRES            0.221142 Hz
AQ                2.2609921 sec
RG                      114
DW                   69.000 usec
DE                    6.50 usec
TE                   297.2 K
D1              2.00000000 sec
TD0                       1

======== CHANNEL f1 ========
NUC1                     1H
P1                   15.00 usec
PL1                   2.20 dB
SFO1          400.1324008 MHz

F2 - Processing parameters
SI                    16384
SF            400.1300108 MHz
WDW                      EM
SSB       0
LB        0 Hz
GB        0
PC                    1.00
```