

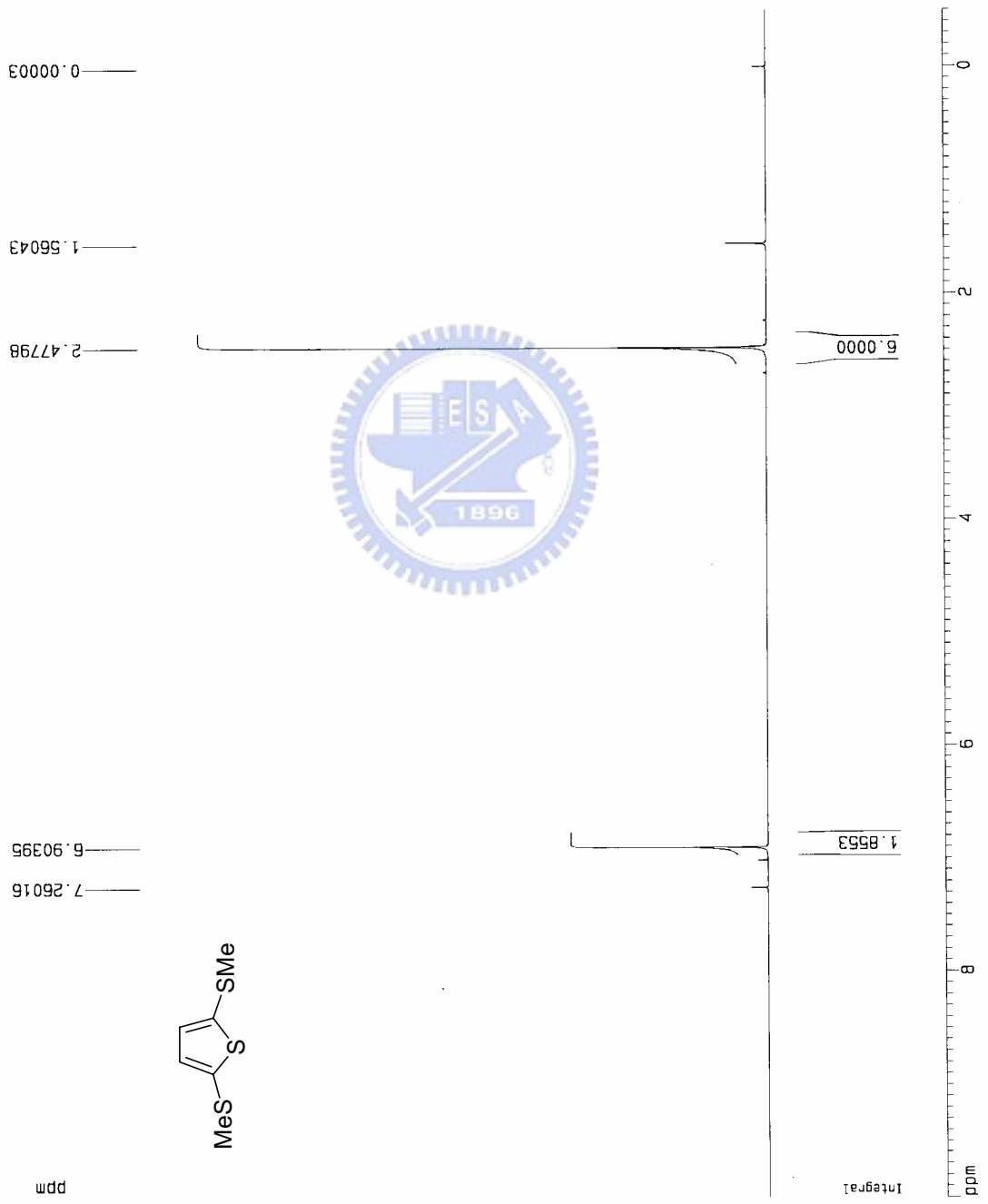
Current Data Parameters
 NAME CH100101
 EXPNO 1
 PROCNO 1

F2 - Acquisition Parameters
 Date_ 20011004
 Time 11.05
 INSTRUM spect
 PROBHD 5 mm BBO

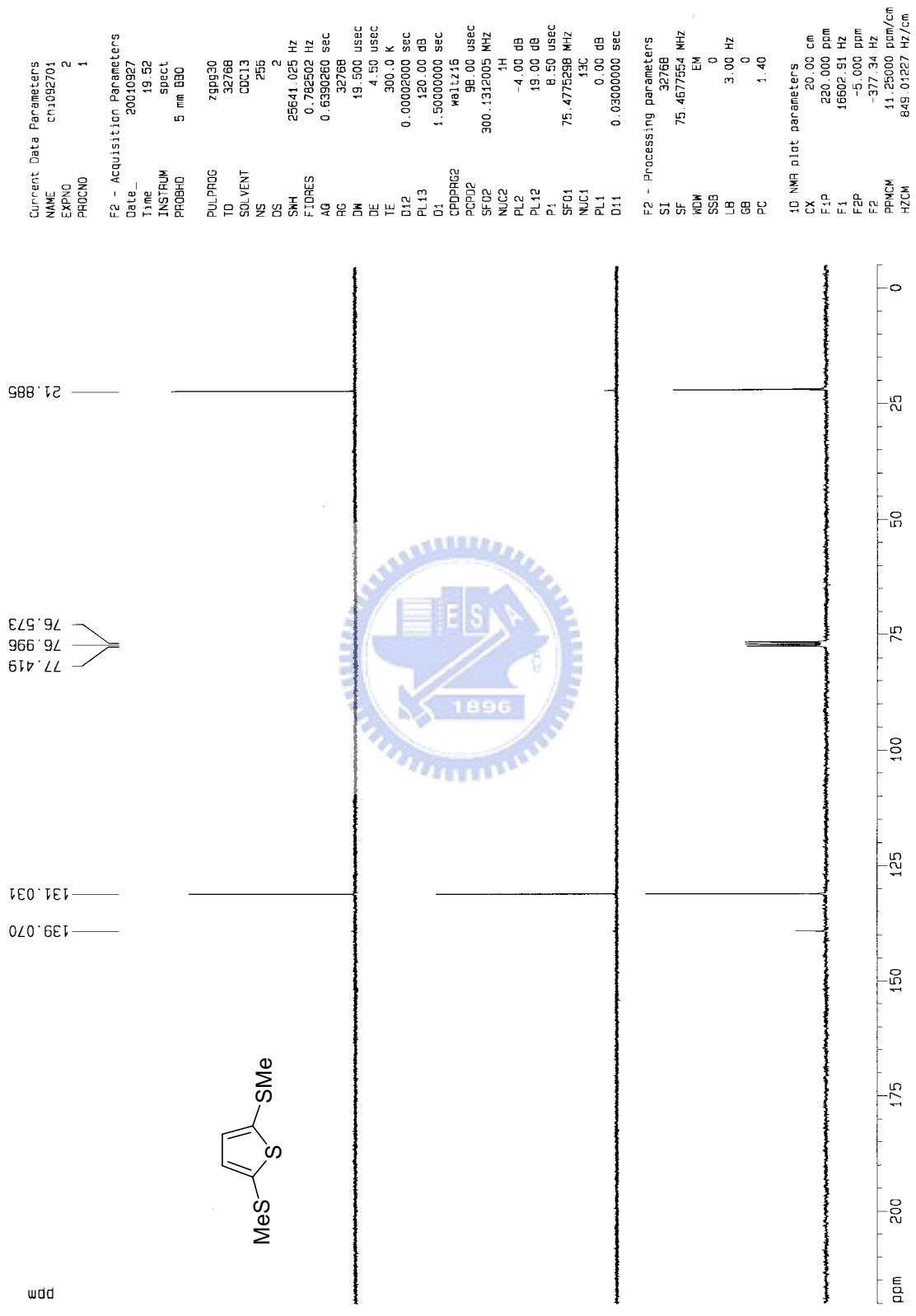
PULPROG zg30
 TD 32768
 SOLVENT CDC13
 NS 16
 DS 0
 SWH 7812.500 Hz
 FIDRES 0.238419 Hz
 AQ 2.0972021 sec
 RG 456.1
 DM 64.000 usec
 DE 4.50 usec
 TE 300.0 K
 D1 1.00000000 sec
 P1 9.10 usec
 SF01 300.1321122 MHz
 NUC1 1H
 PL1 -4.00 dB

F2 - Processing parameters
 SI 32768
 SF 300.1300060 MHz
 WDW EM
 SSB 0
 LB 0.30 Hz
 GB 0
 PC 1.00

1D NMR plot parameters
 CX 20.00 cm
 F1P 10.000 ppm
 F1 3001.30 Hz
 F2P -0.500 ppm
 F2 -150.07 Hz
 PPMCM 0.52500 ppm/cm
 HZCM 157.56825 Hz/cm



附圖 1 化合物 53e 的 ¹H NMR 光譜圖



Current Data Parameters
 NAME ch1092701
 EXPNO 2
 PROCNO 1

F2 - Acquisition Parameters
 Date_ 20010927
 Time 19 52
 INSTRUM spect
 PROBHD 5 mm BBO

PULPROG zgpg30
 TD 32768
 SOLVENT CDCl3
 NS 256
 DS 2
 SNH 25641.025 Hz
 FIDRES 0.762502 Hz
 AQ 0.6390260 sec
 RG 32768
 DM 19.500 usec
 DE 4.50 usec
 TE 300.0 K
 D12 0.00002000 sec
 PL13 120.00 dB
 O1 1.50000000 sec
 CPDPRG2 waitz15
 PCPD2 98.00 usec
 SF02 300.1312005 MHz
 NUC2 1H
 PL2 -4.00 dB
 PL12 19.00 dB
 P1 8.50 usec
 SF01 75.4775298 MHz
 NUC1 13C
 PL1 0.00 dB
 D11 0.03000000 sec

F2 - Processing parameters
 SI 32768
 SF 75.4677654 MHz
 WDM EM
 SSB 0
 LB 3.00 Hz
 GB 0
 PC 1.40

1D NMR plot parameters
 CX 20.00 cm
 F1P 220.000 pcm
 F1 16602.91 Hz
 F2P -5.000 ppm
 F2 -377.34 Hz
 PPMCM 11.25000 ppm/cm
 HZCM 849.01227 Hz/cm

附圖 2 化合物 53e 之 ¹³C NMR 光譜圖

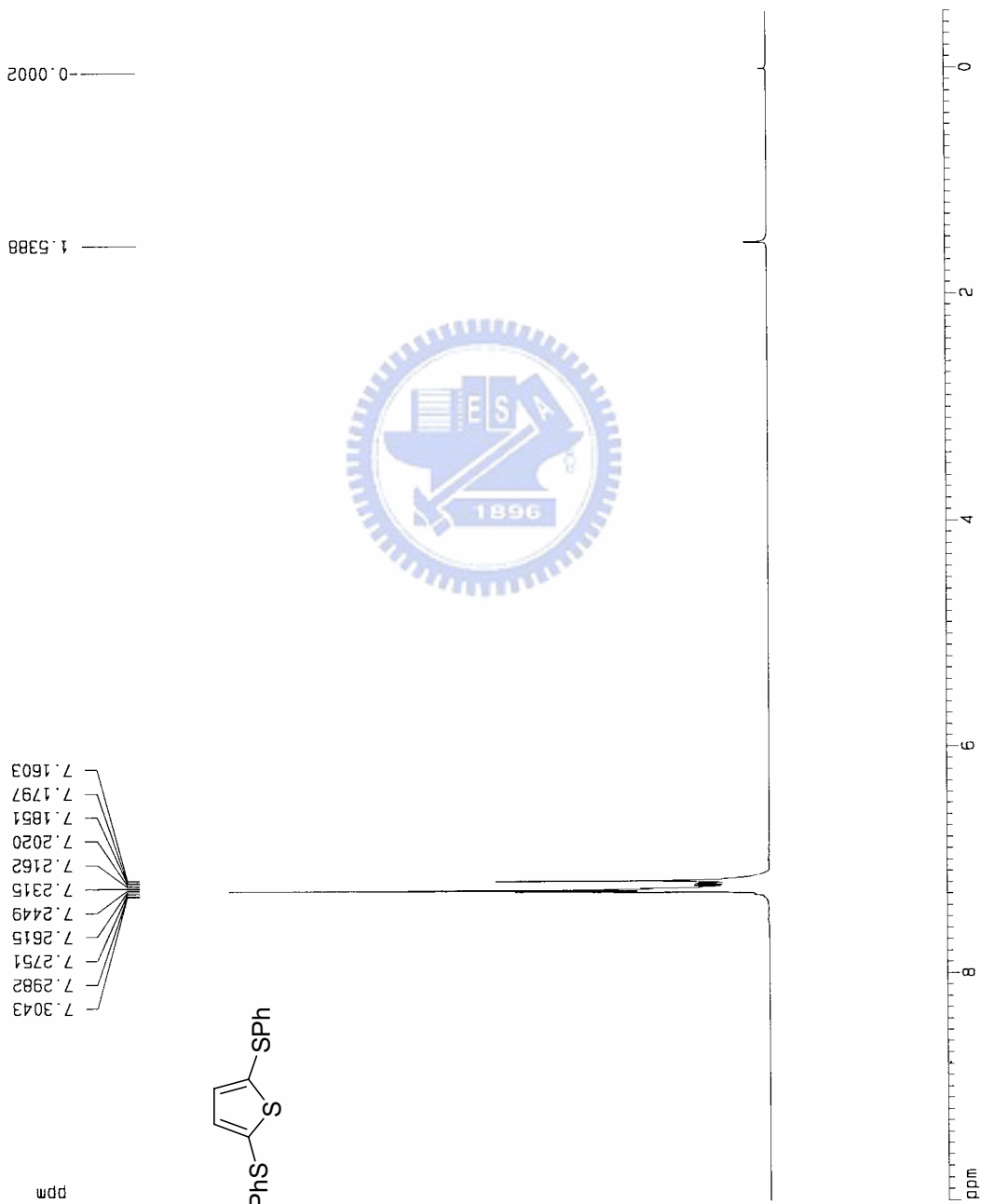
Current Data Parameters
 NAME chi011802
 EXPNO 1
 PROCNO 1

F2 - Acquisition Parameters
 Date_ 20020122
 Time 19.56
 INSTRUM spect
 PROBHD 5 mm BBO

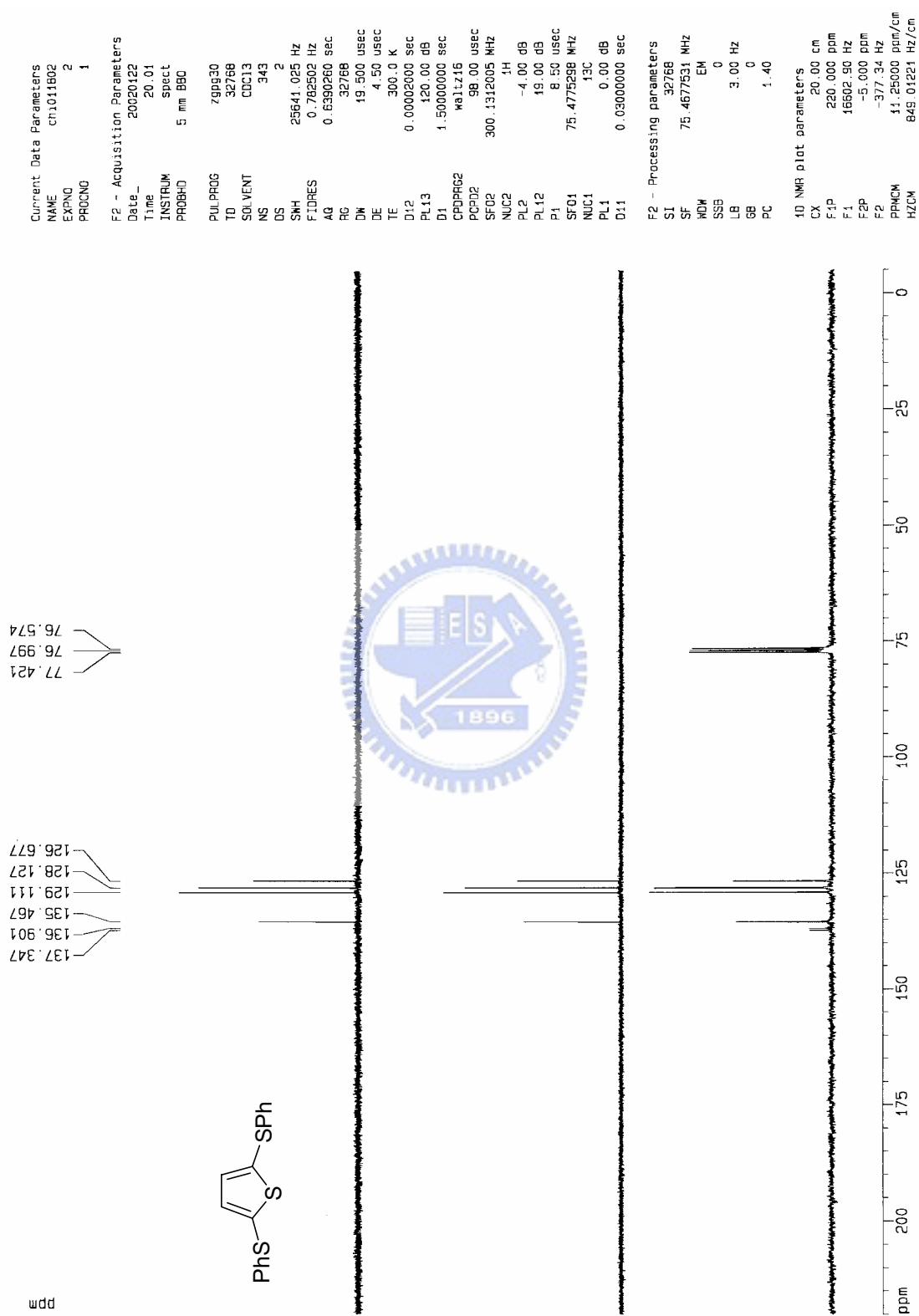
PULPROG zg30
 TD 32768
 SOLVENT CDCl3
 NS 16
 DS 0
 SWH 7812.500 Hz
 FIDRES 0.238419 Hz
 AQ 2.0972021 sec
 RG 362
 DW 64.000 usec
 DE 4.50 usec
 TE 300.0 K
 D1 1.00000000 sec
 P1 9.10 usec
 SF01 300.132122 MHz
 NUC1 1H
 PL1 -4.00 dB

F2 - Processing parameters
 SI 32768
 SF 300.1300110 MHz
 WDW EM
 SSB 0
 LB 0.30 Hz
 GB 0
 PC 1.00

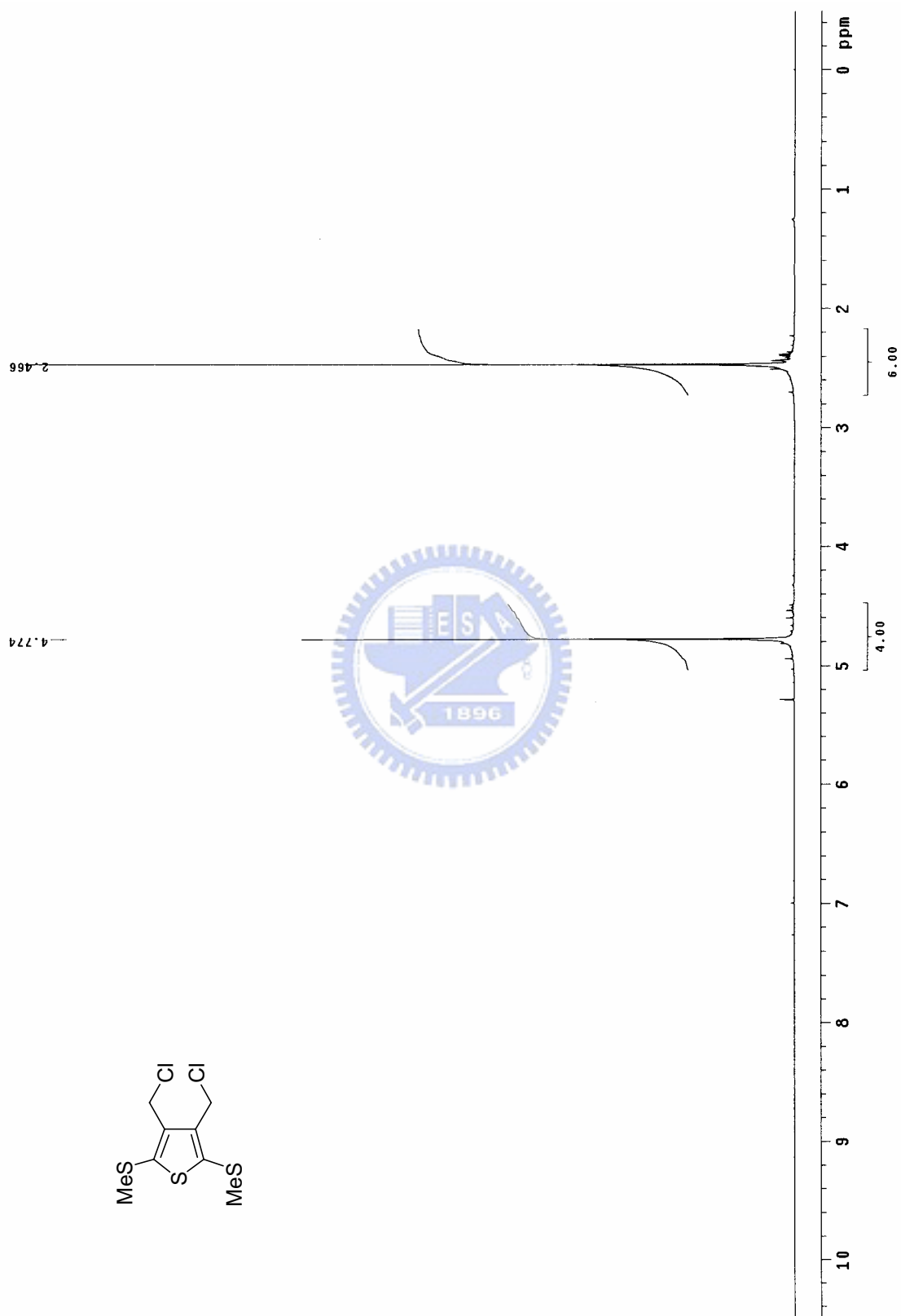
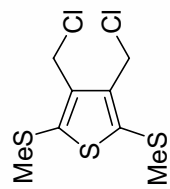
1D NMR plot parameters
 CX 20.00 cm
 F1P 10.000 ppm
 F1 3001.30 Hz
 F2P -0.500 ppm
 F2 -150.07 Hz
 PPMCM 0.52500 ppm/cm
 HZCM 157.56825 Hz/cm



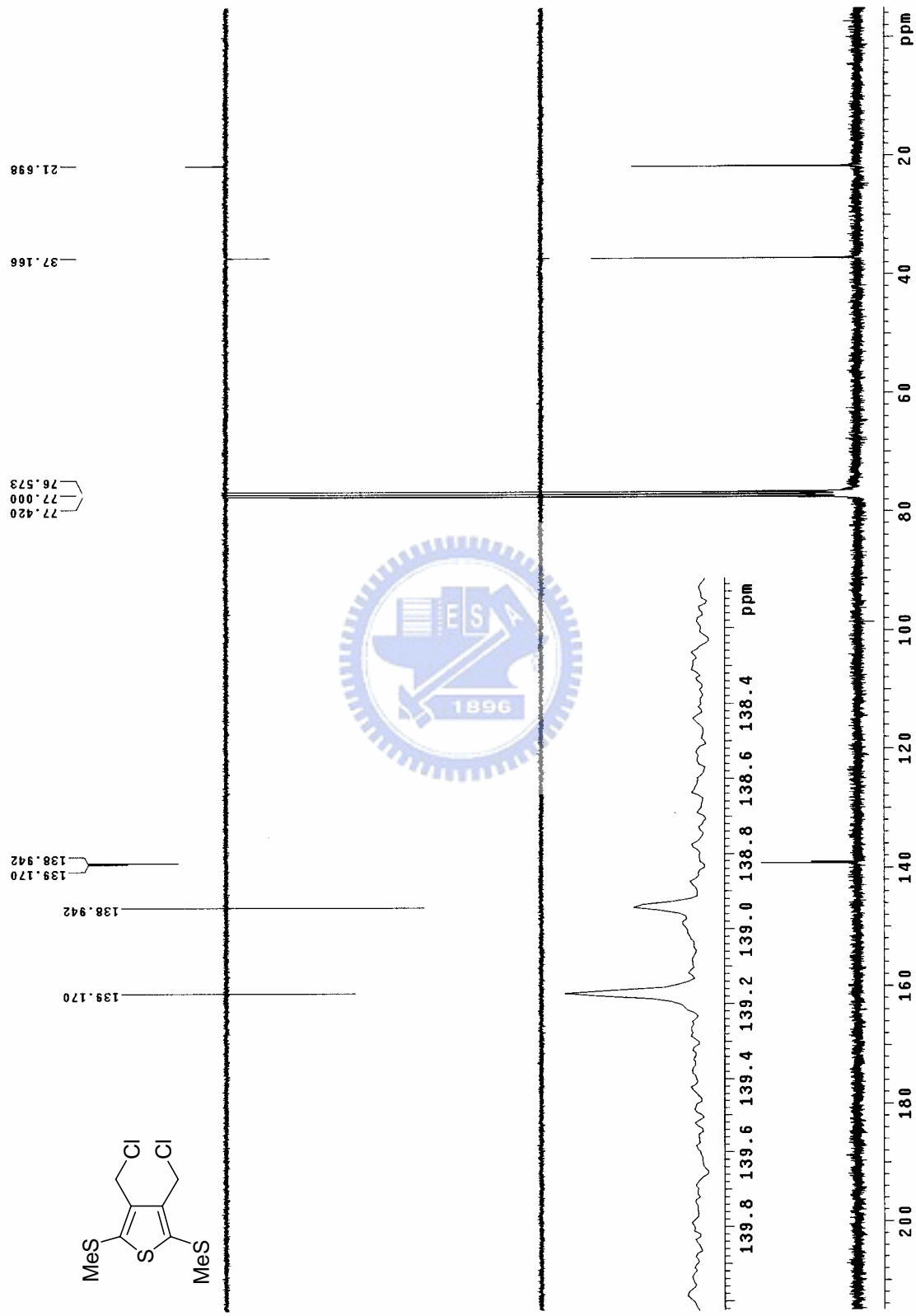
附圖 3 化合物 53f 之 ¹H NMR 光譜圖



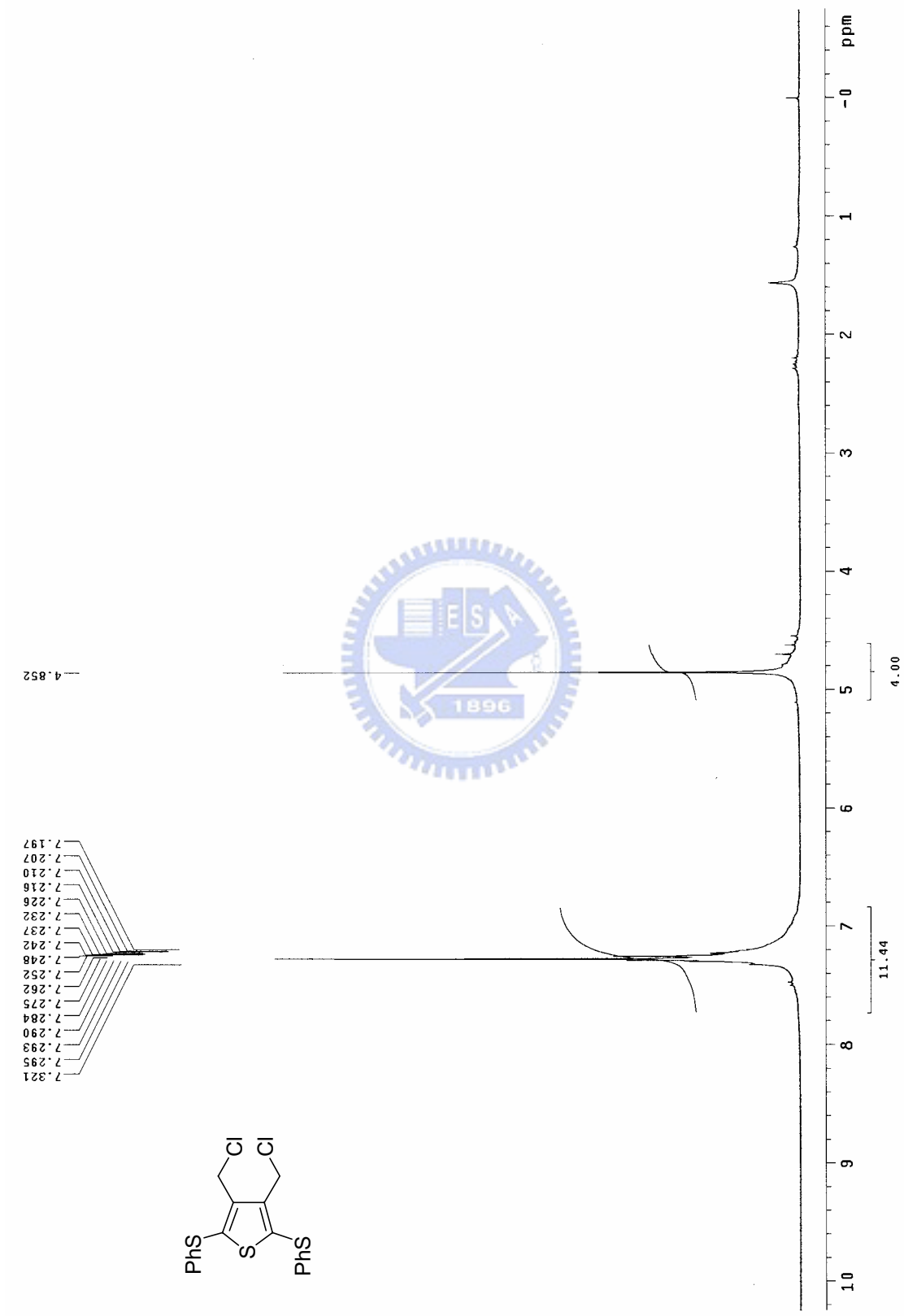
附圖 4 化合物 53f 之 ¹³C NMR 光譜圖



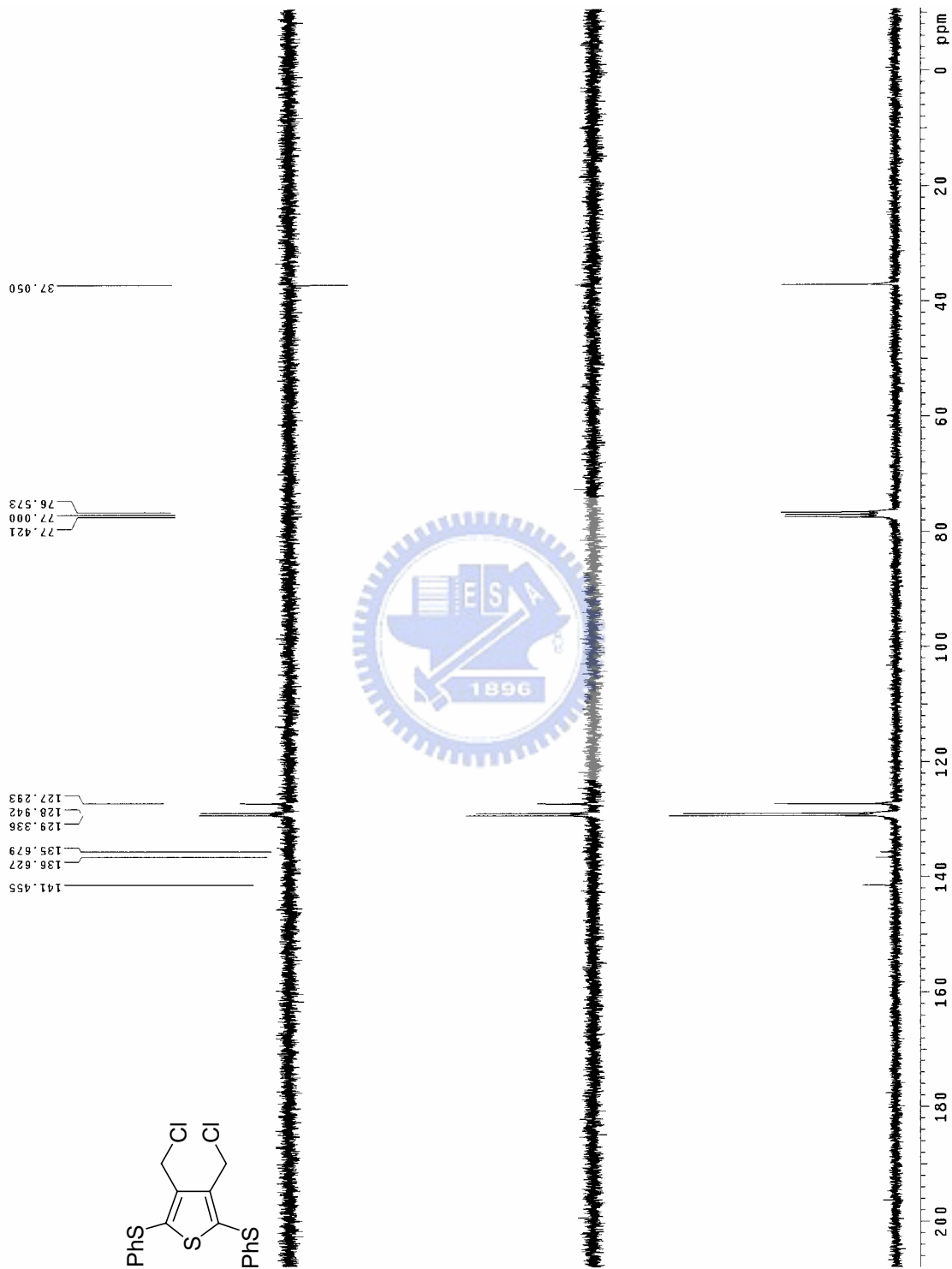
附圖 5 化合物 54e 之 ¹H NMR 光譜圖



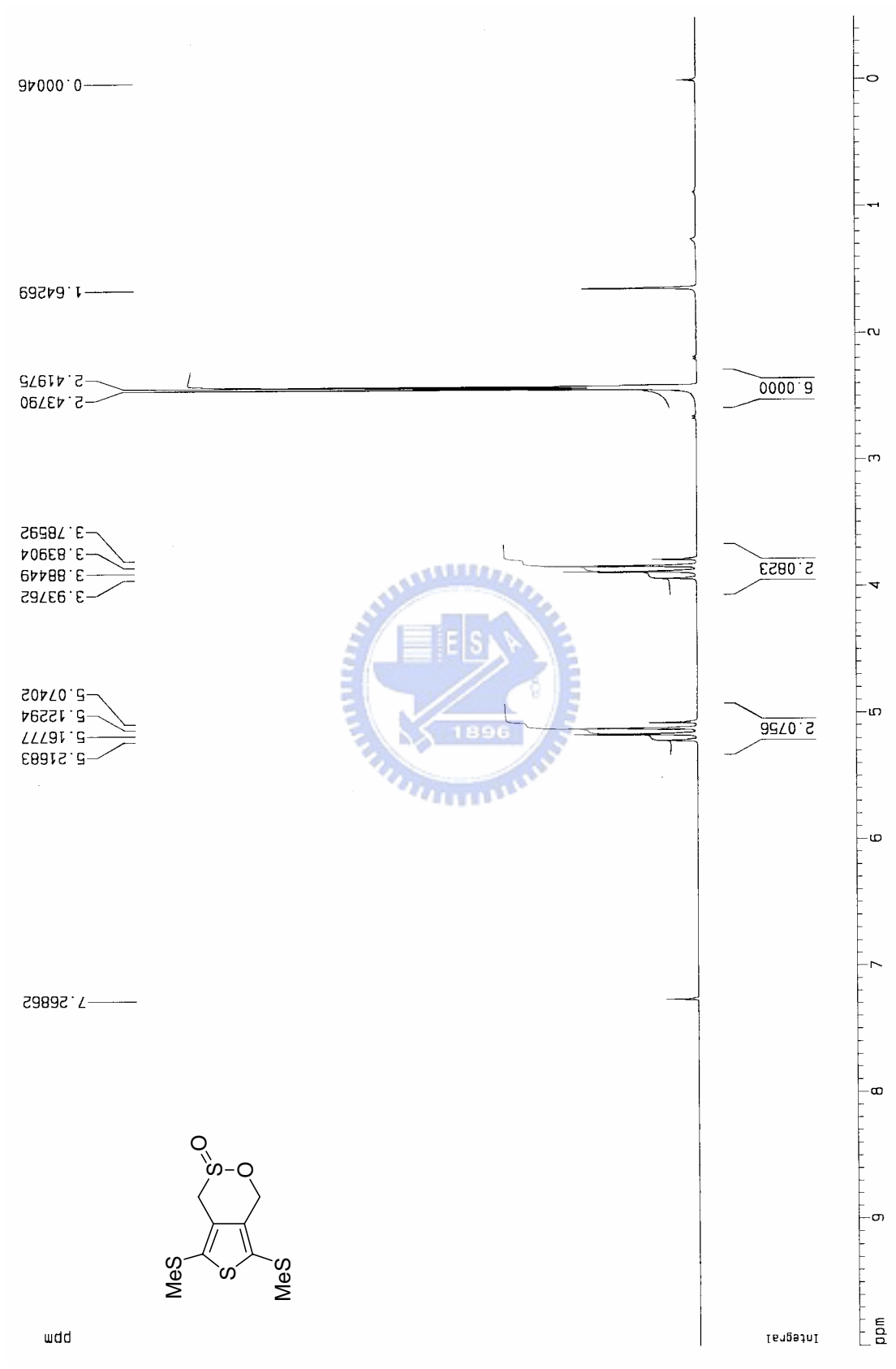
附圖 6 化合物 54e 之 ¹³C NMR 光譜圖



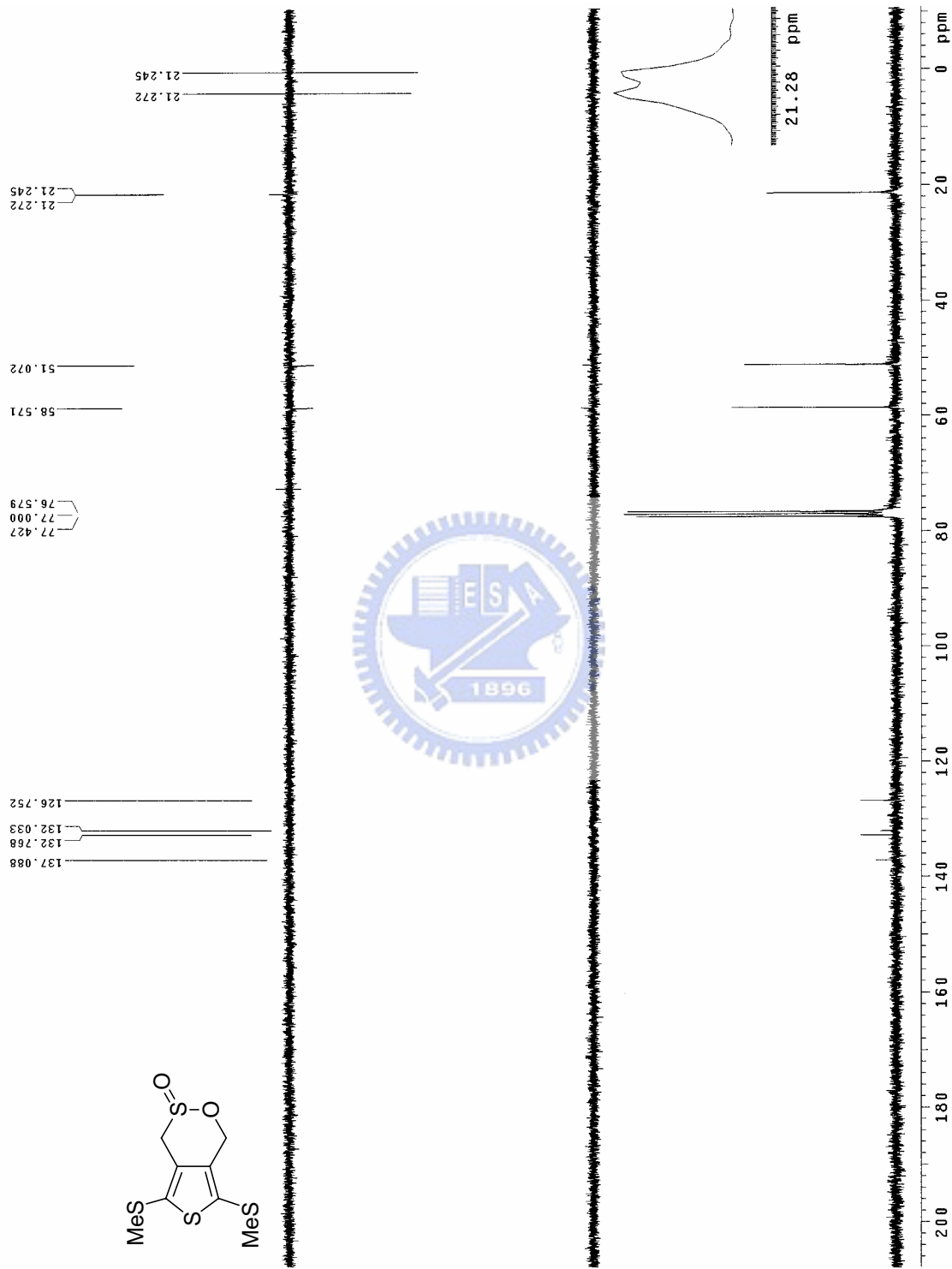
附圖 7 化合物 54f 之 ^1H NMR 光譜圖



附圖 8 化合物 54f 之 ¹³C NMR 光譜圖



附圖 9 化合物 33e 之 ¹H NMR 光譜圖



附圖 10 化合物 33e 之 ¹³C NMR 光譜圖

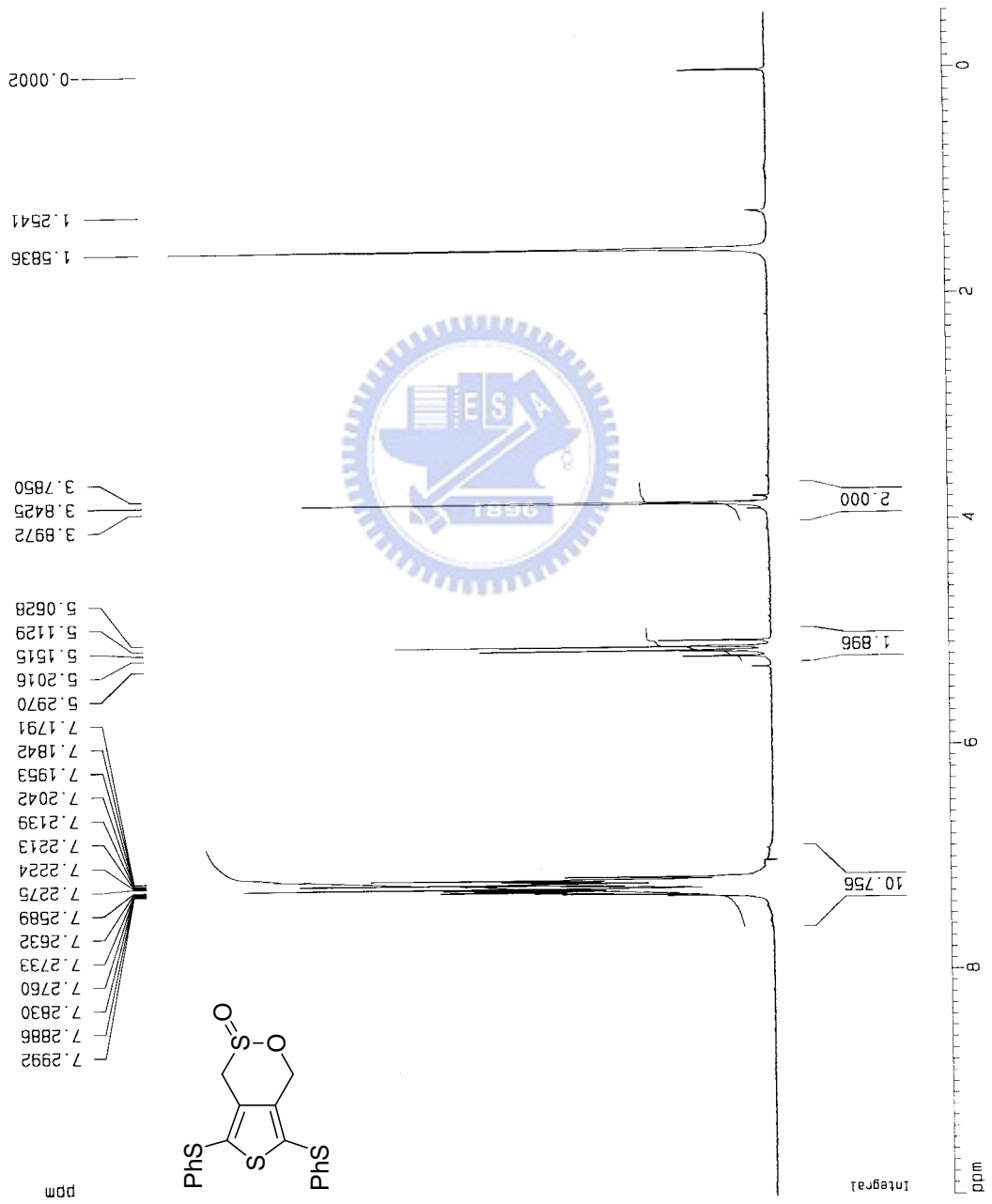
Current Data Parameters
 NAME ch1070702
 EXPNO 1
 PROCNO 1

F2 - Acquisition Parameters
 Date_ 20020722
 Time_ 23.52
 INSTRUM spect
 PROBHD 5 mm BBO

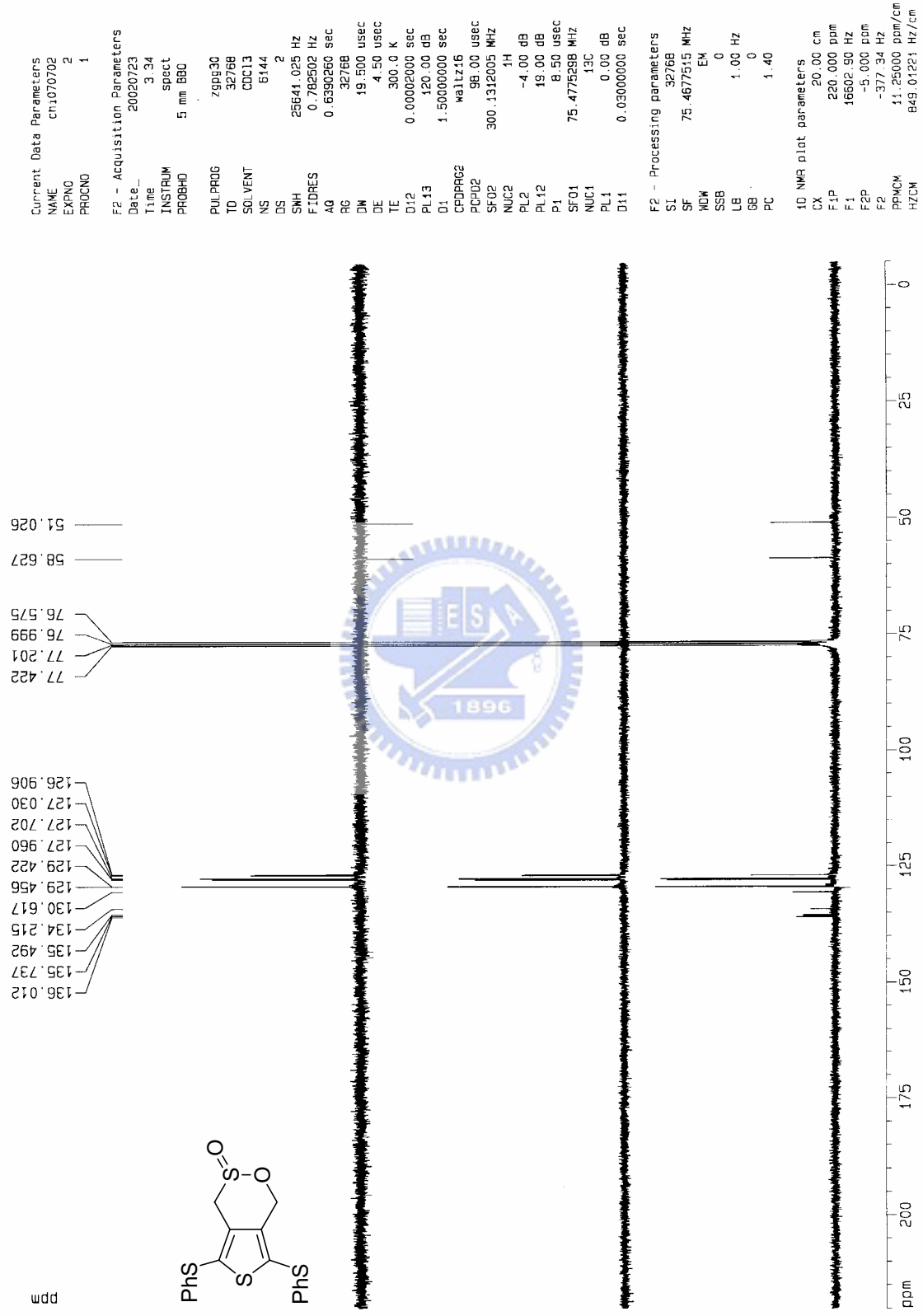
PULPROG zg30
 TD 32768
 SOLVENT CDCl3
 NS 16
 DS 0
 SWH 7812.500 Hz
 FIDRES 0.238419 Hz
 AQ 2.0972021 sec
 RG 512
 DW 64.000 usec
 DE 4.50 usec
 TE 300.0 K
 D1 1.00000000 sec
 P1 9.10 usec
 SFO1 300.1321122 MHz
 NUC1 ¹H
 PL1 -4.00 dB

F2 - Processing parameters
 SI 32768
 SF 300.1300070 MHz
 WDW EM
 SSB 0
 LB 0.30 Hz
 GB 0
 PC 1.00

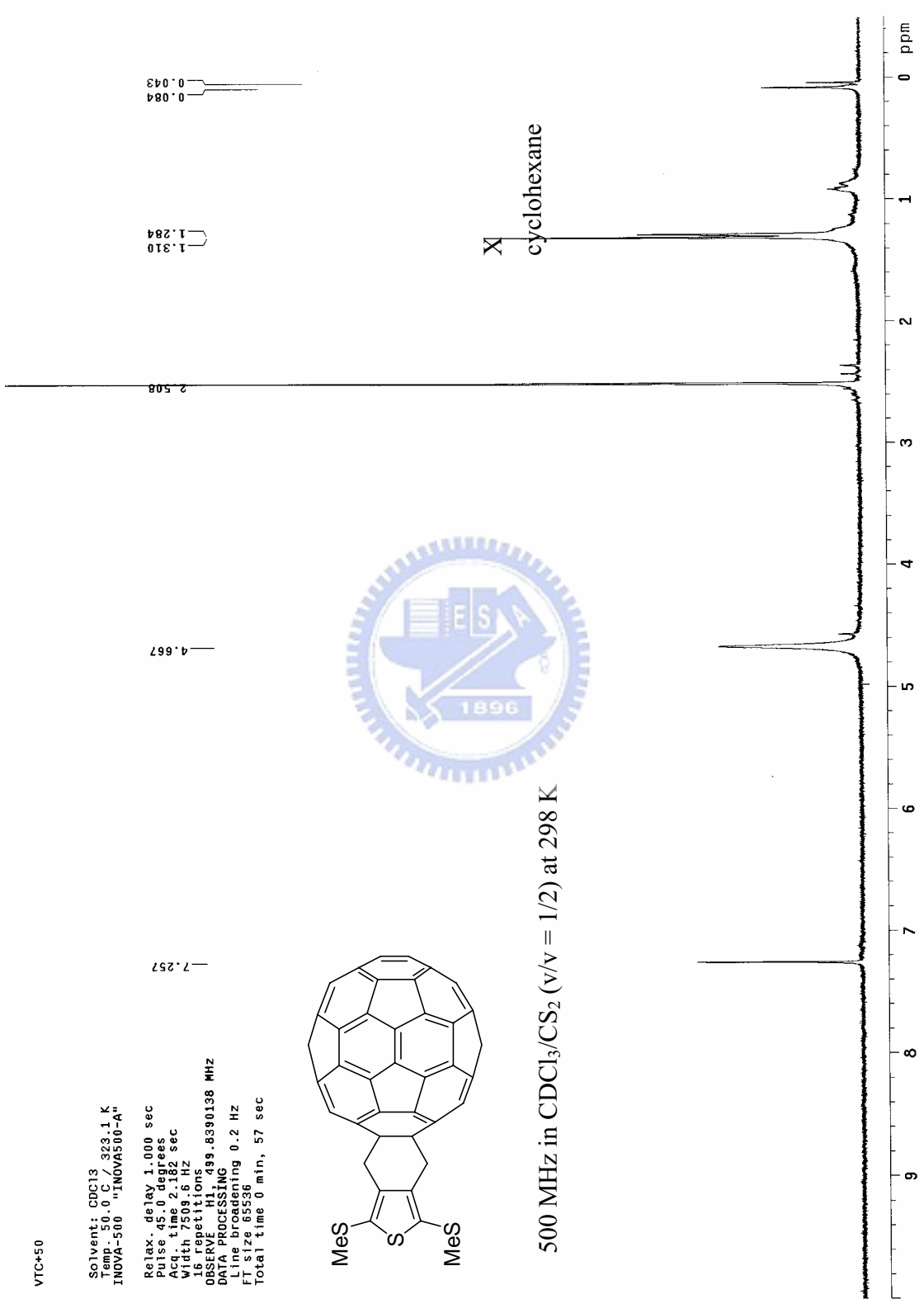
1D NMR plot parameters
 CX 20.00 cm
 F1P 10.000 ppm
 F1 3001.30 Hz
 F2P -0.500 ppm
 F2 -150.07 Hz
 PPMCM 0.52500 ppm/cm
 HZCM 157.56825 Hz/cm



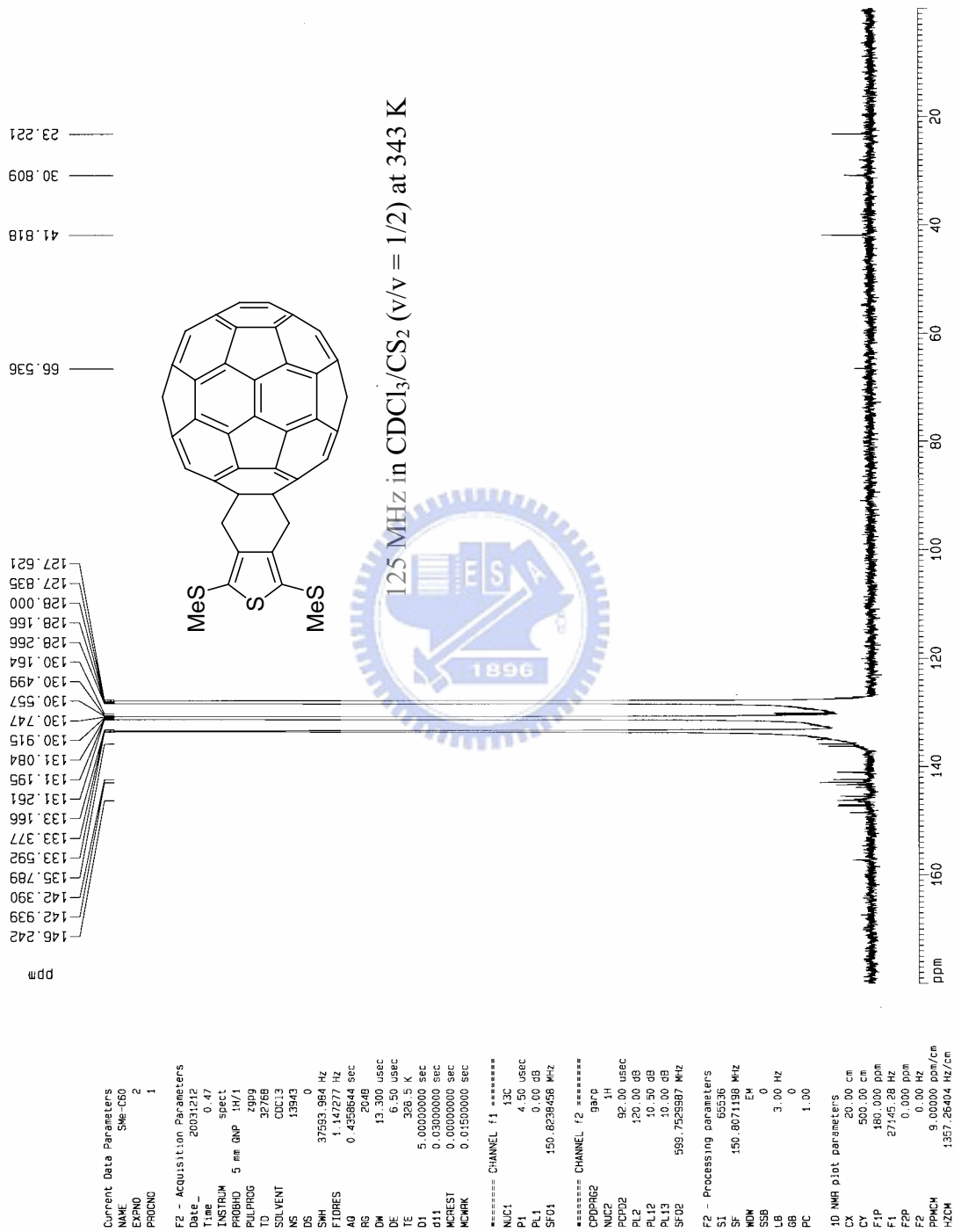
附圖 11 化合物 33f 之 ¹H NMR 光譜圖



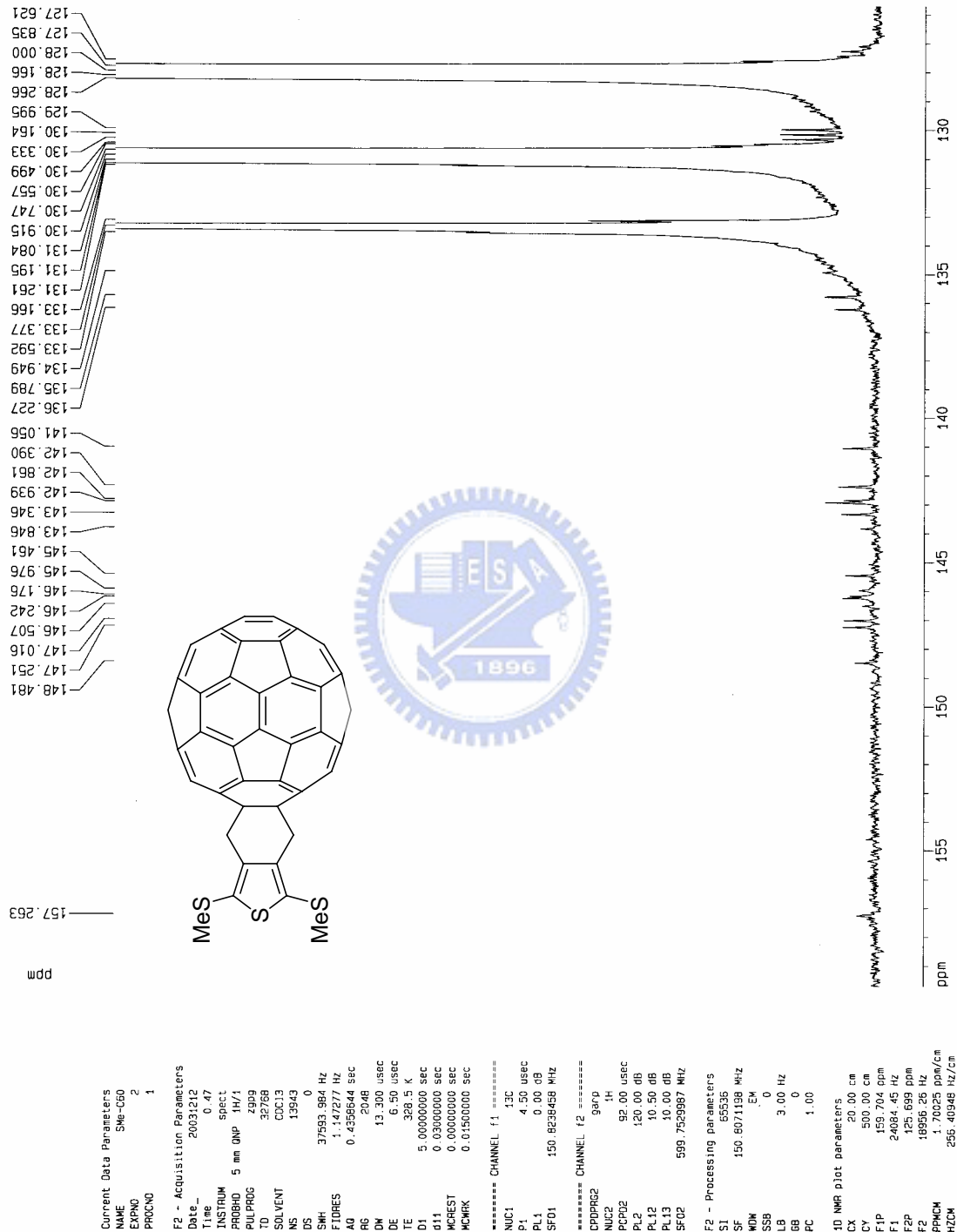
附圖 12 化合物 33f 之 ¹³C NMR 光譜圖



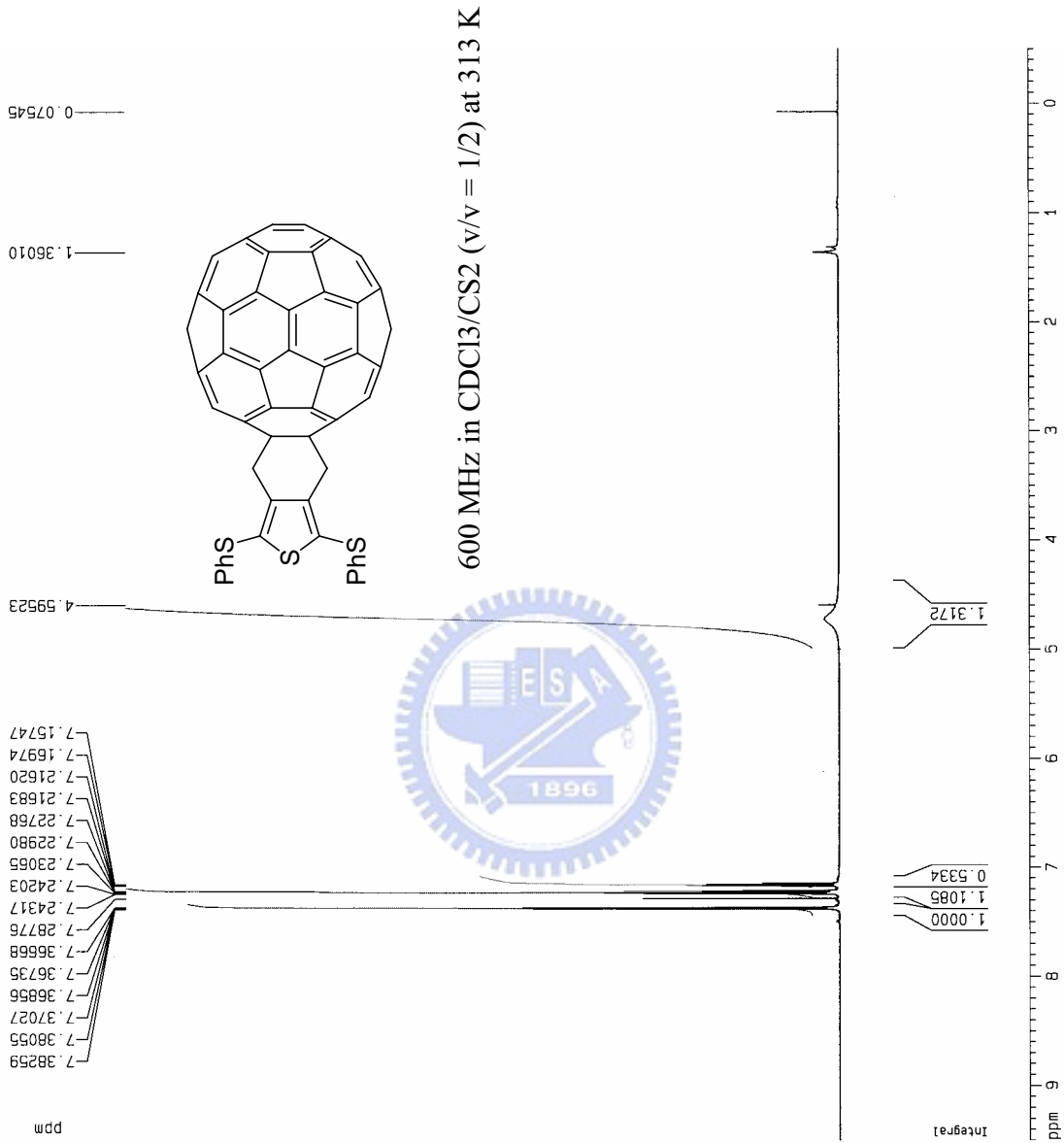
附圖 13 化合物 57e 之 ¹H NMR 光譜圖



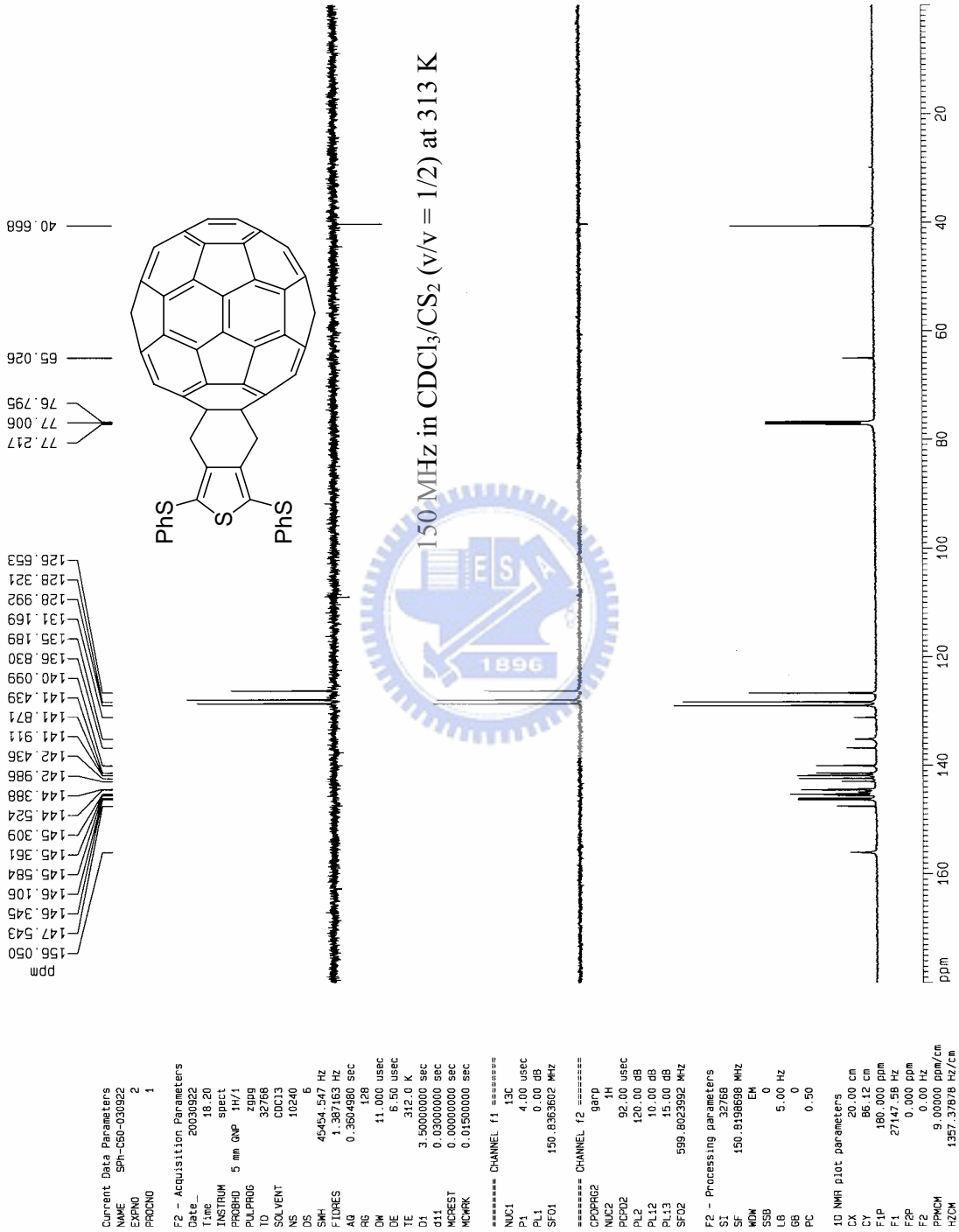
附圖 14 化合物 57e 之 ¹³C NMR 光譜圖



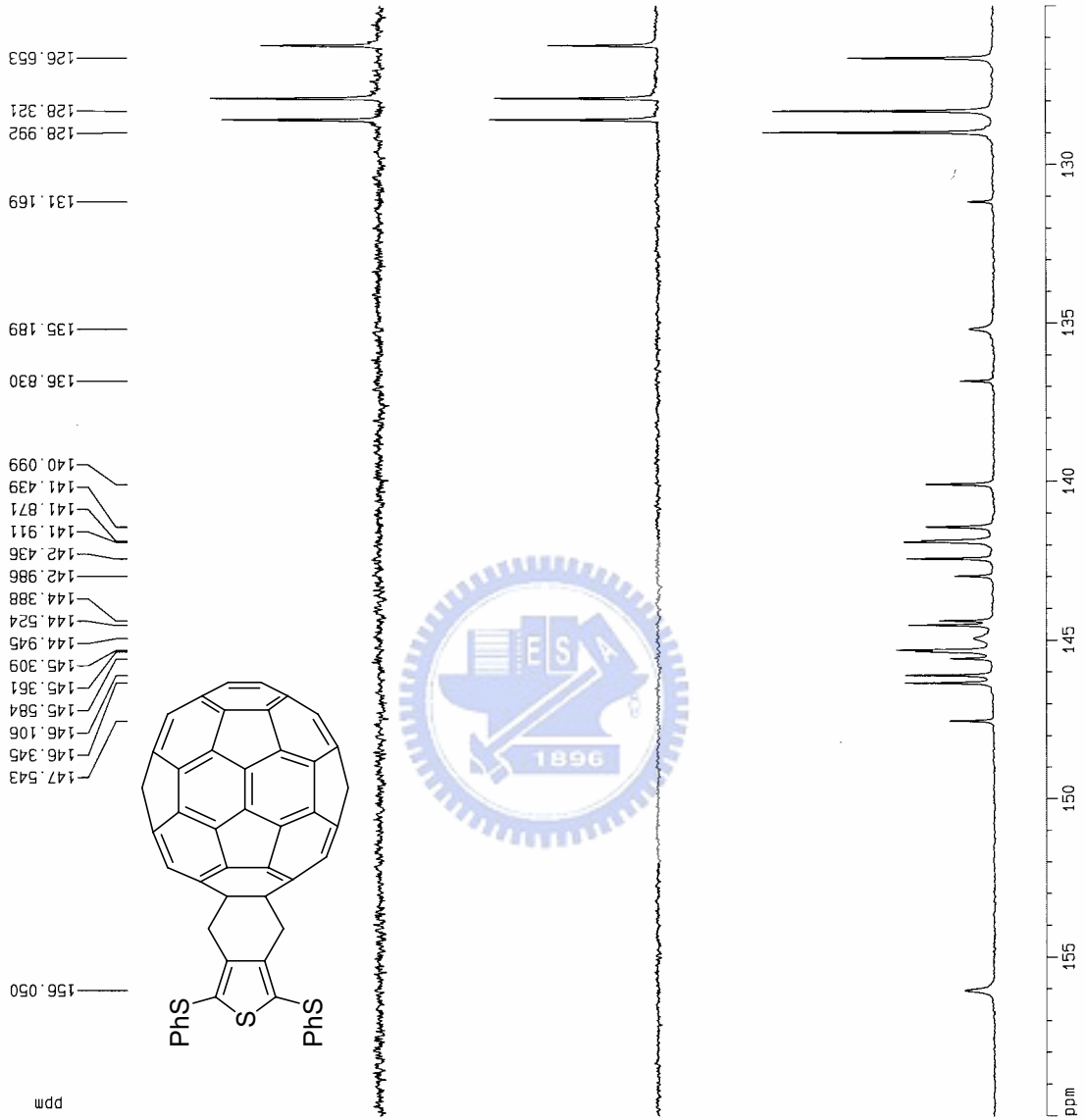
附圖 15 化合物 57e 之 ¹³C NMR 光譜放大圖



附圖 16 化合物 57f 之 ¹H NMR 光譜圖



附圖 17 化合物 57f 之 ¹³C NMR 光譜圖



附圖 18 化合物 57f 之 ¹³C NMR 光譜放大圖

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Current Data Parameters
NAME      SPh-C60-030922
EXPNO    2
PROCNO   1

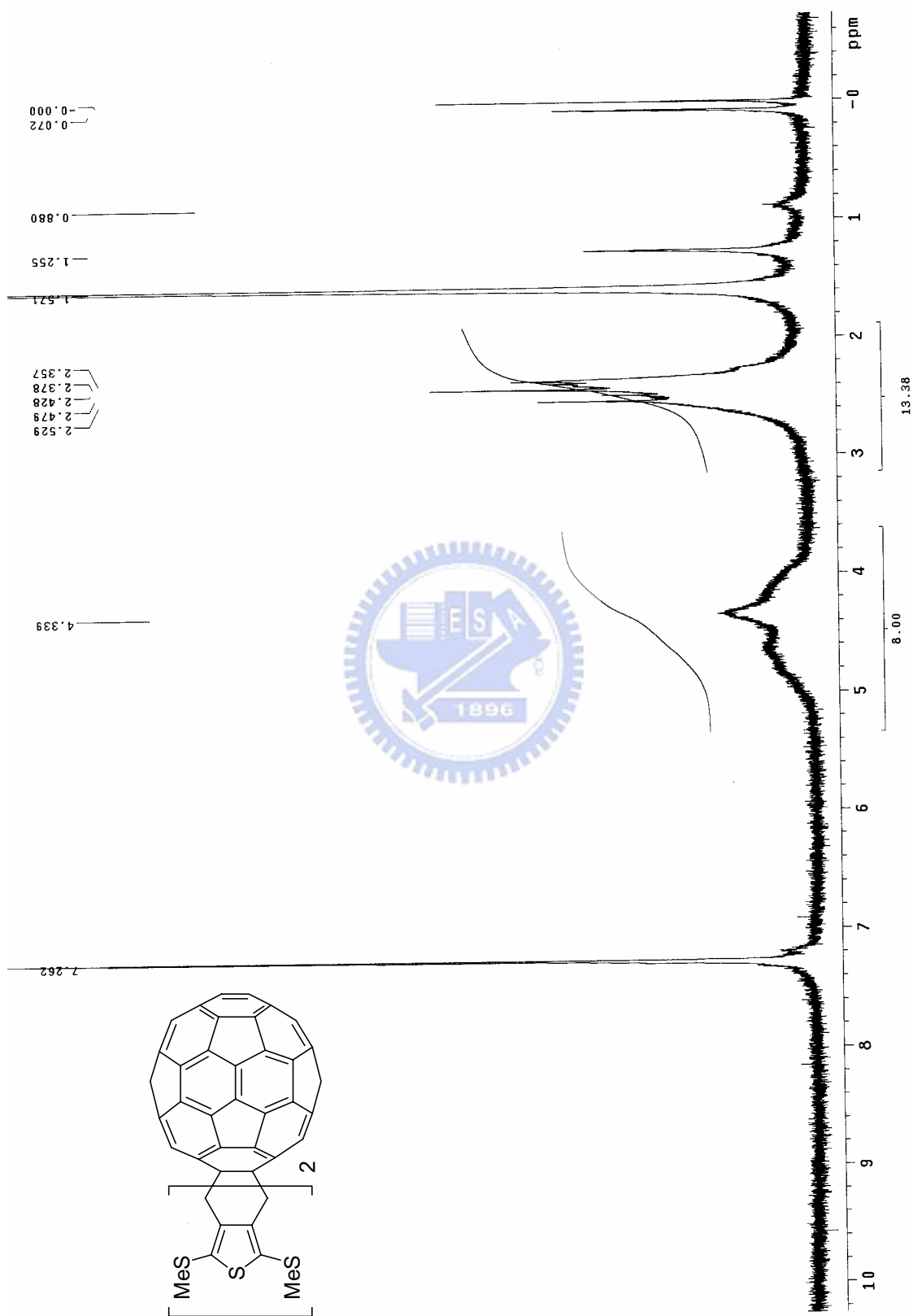
F2 - Acquisition Parameters
Date_    20030922
Time     18.20
INSTRUM  spect
PROBHD   5 mm GNP 1H/1
PULPROG  zgpg30
TD       32768
SOLVENT  CDCl3
NS       10240
DS       5
SWH      45454.547 Hz
FIDRES   1.387163 Hz
AQ       0.3604980 sec
RG        128
DM       11.000 usec
DE       6.50 usec
TE       312.0 K
D1       3.50000000 sec
d11      0.03000000 sec
MCREST   0.00000000 sec
MCWRK    0.01500000 sec

===== CHANNEL f1 =====
NUC1     13C
P1       4.00 usec
PL1      0.00 dB
SFO1     150.8363602 MHz

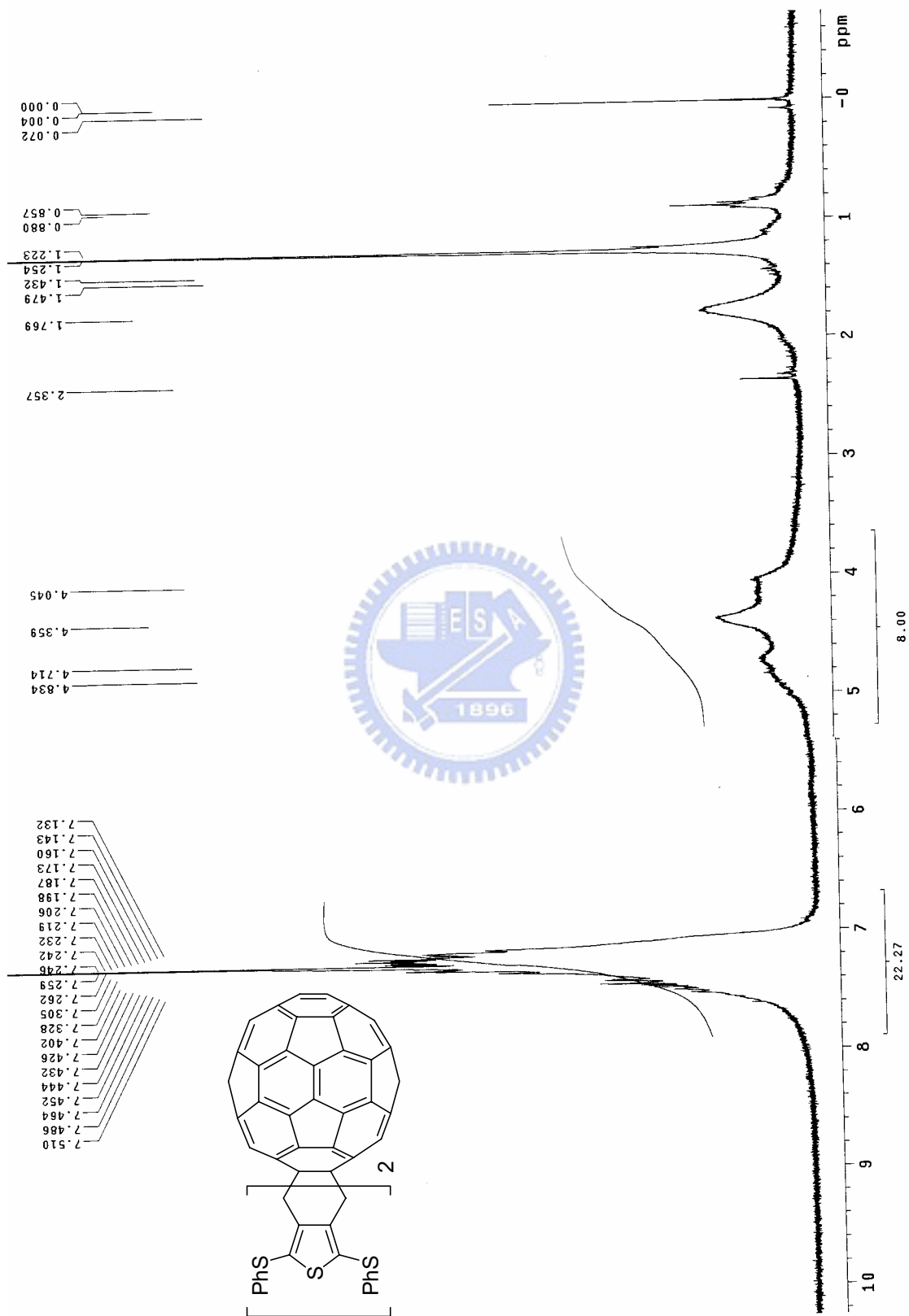
===== CHANNEL f2 =====
CPDPRG2  gprp
NUC2     1H
PCPD2    92.00 usec
PL2      120.00 dB
PL12     10.00 dB
PL13     15.00 dB
SFD2     599.8023992 MHz

F2 - Processing parameters
SI       32768
SF       150.8196698 MHz
WDW      EM
SSB      0
LB       5.00 Hz
GB       0
PC       0.50

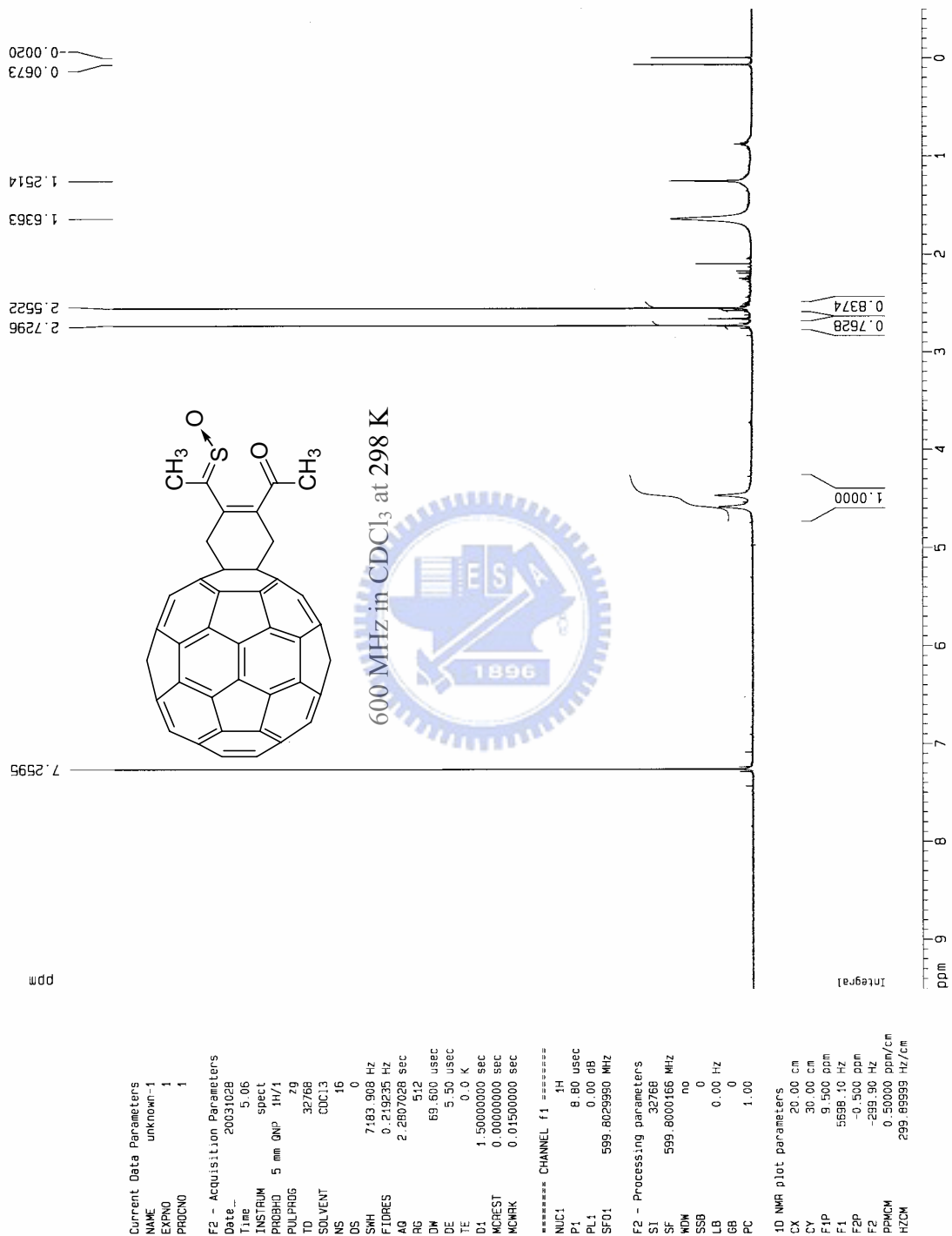
1D NMR plot parameters
CX       20.00 cm
CY       86.12 cm
F1       160.000 ppm
F2       24131.18 Hz
F3       125.000 ppm
F4       18862.48 Hz
PRACH    1.75000 ppm/cm
HZCR     263.93478 Hz/cm
  
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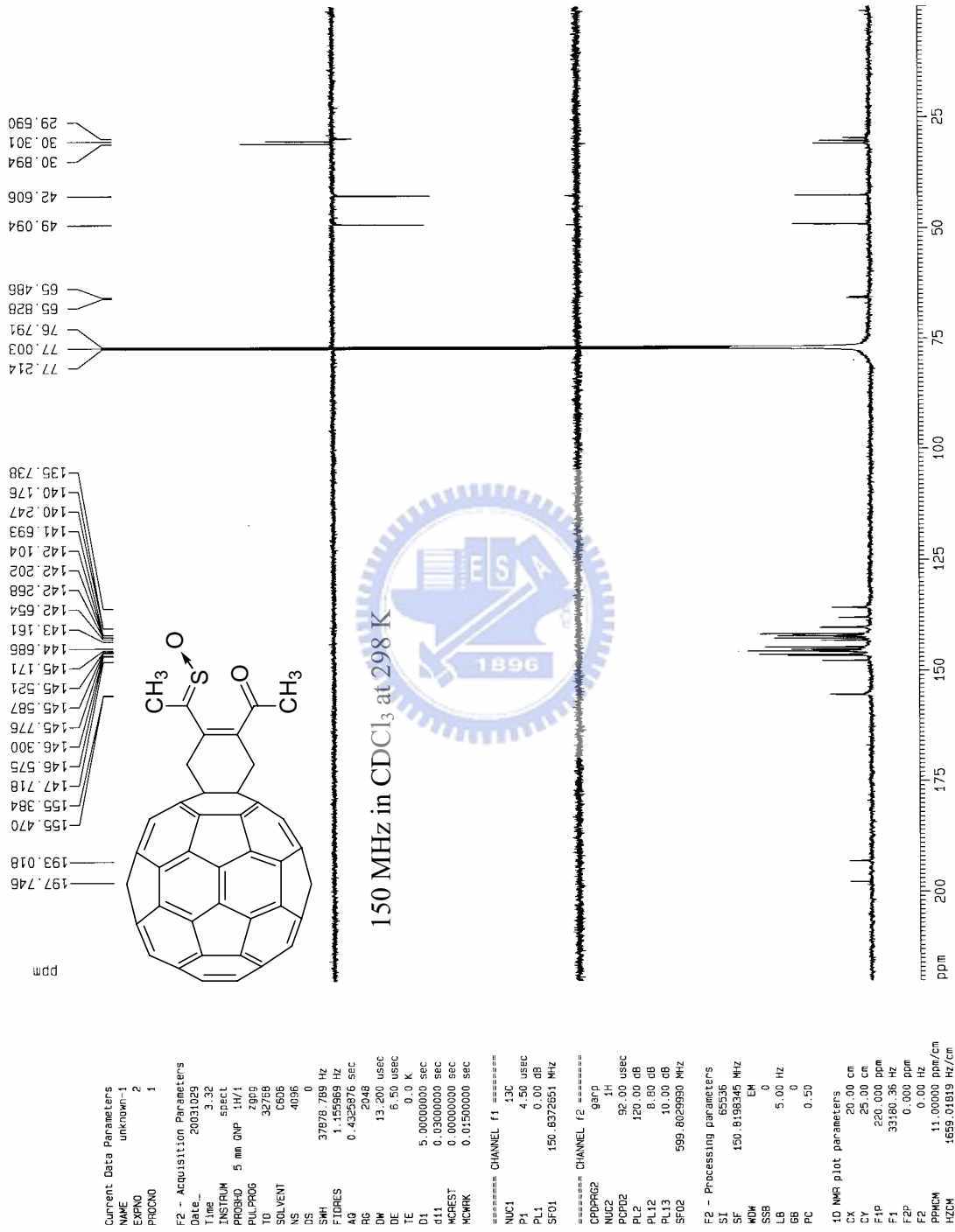
附圖 19 化合物 58e 之 ¹H NMR 光譜圖



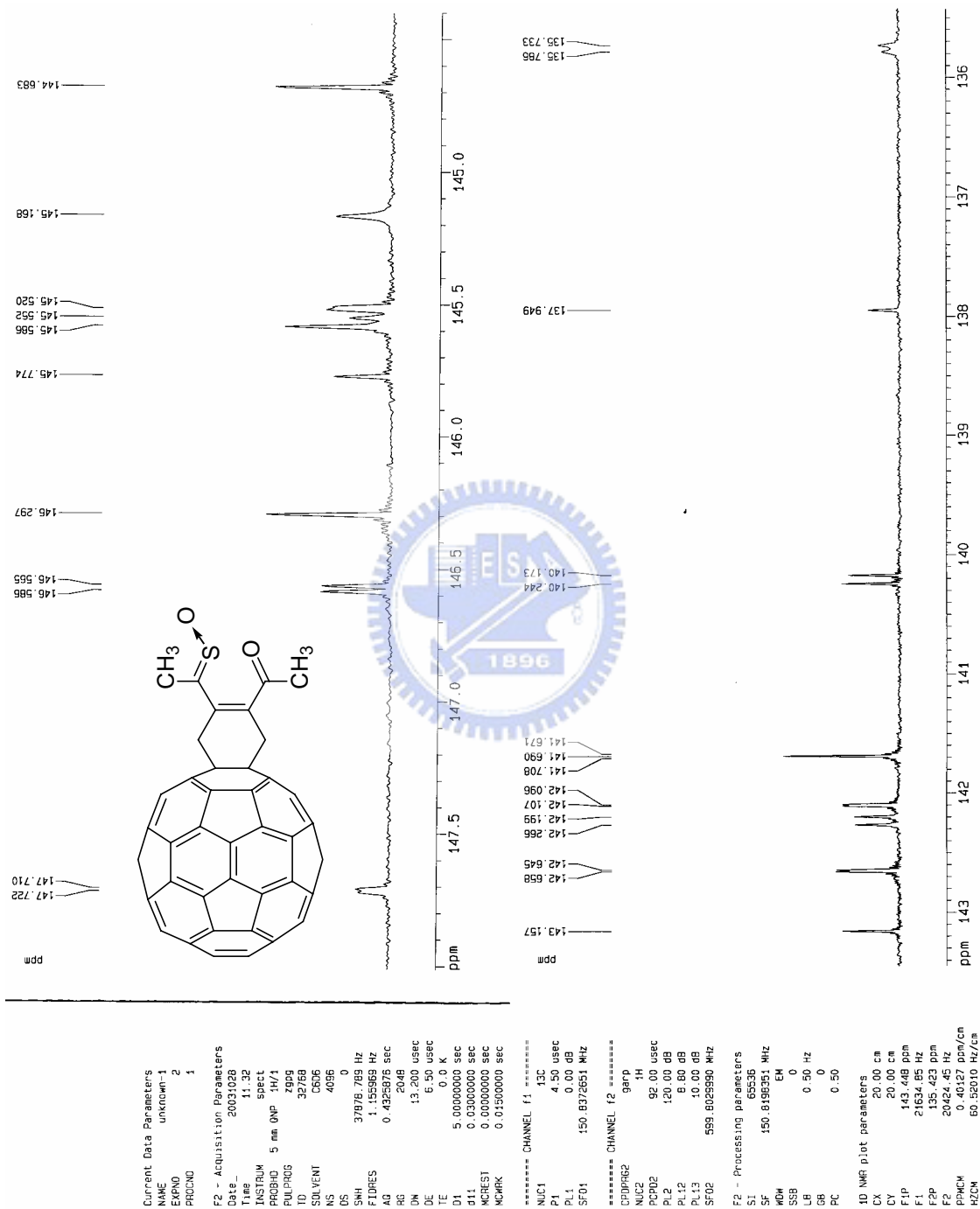
附圖 20 化合物 58f 之 ¹H NMR 光譜圖



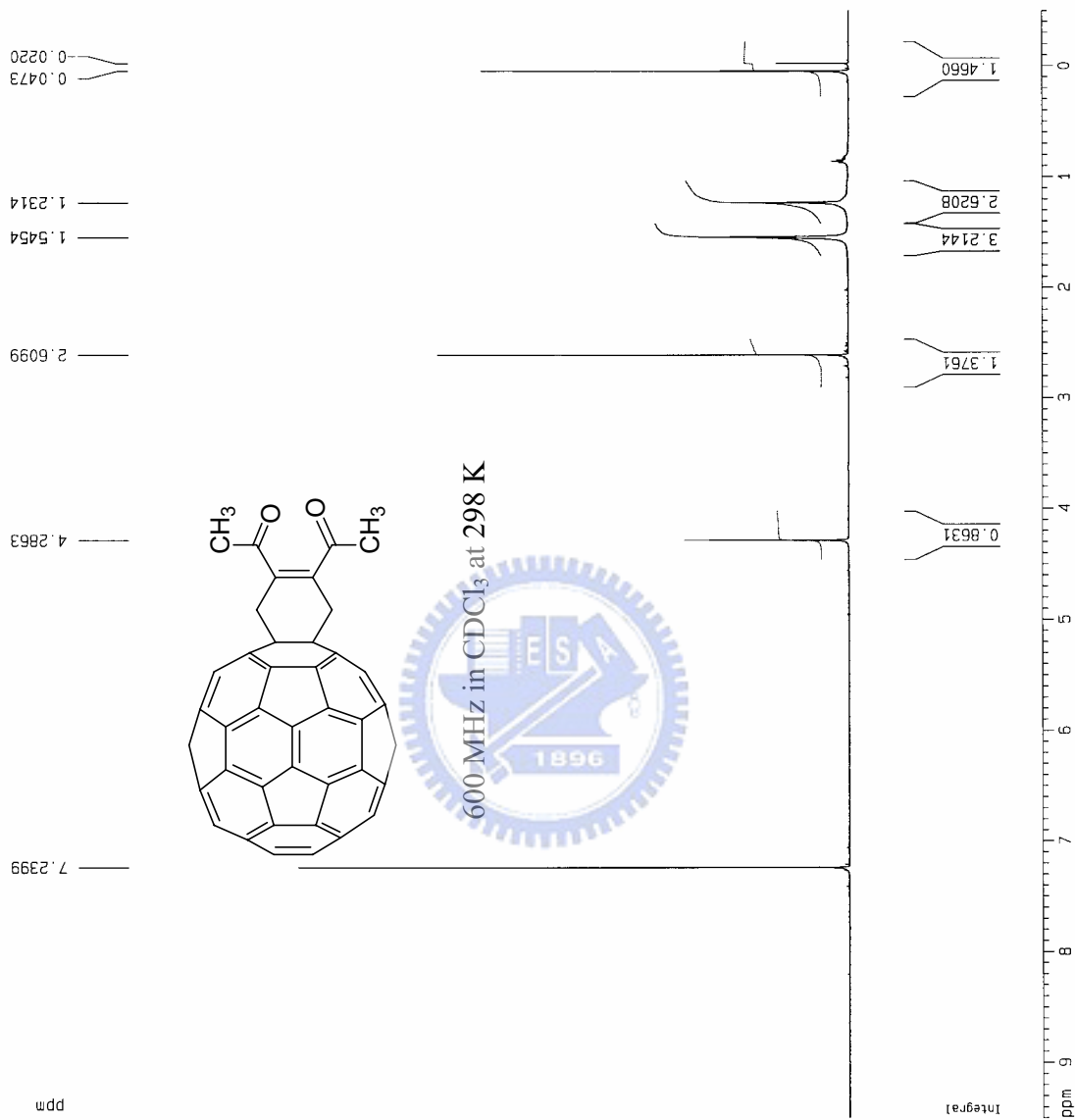
附圖 21 化合物 62 之 ¹H NMR 光譜圖



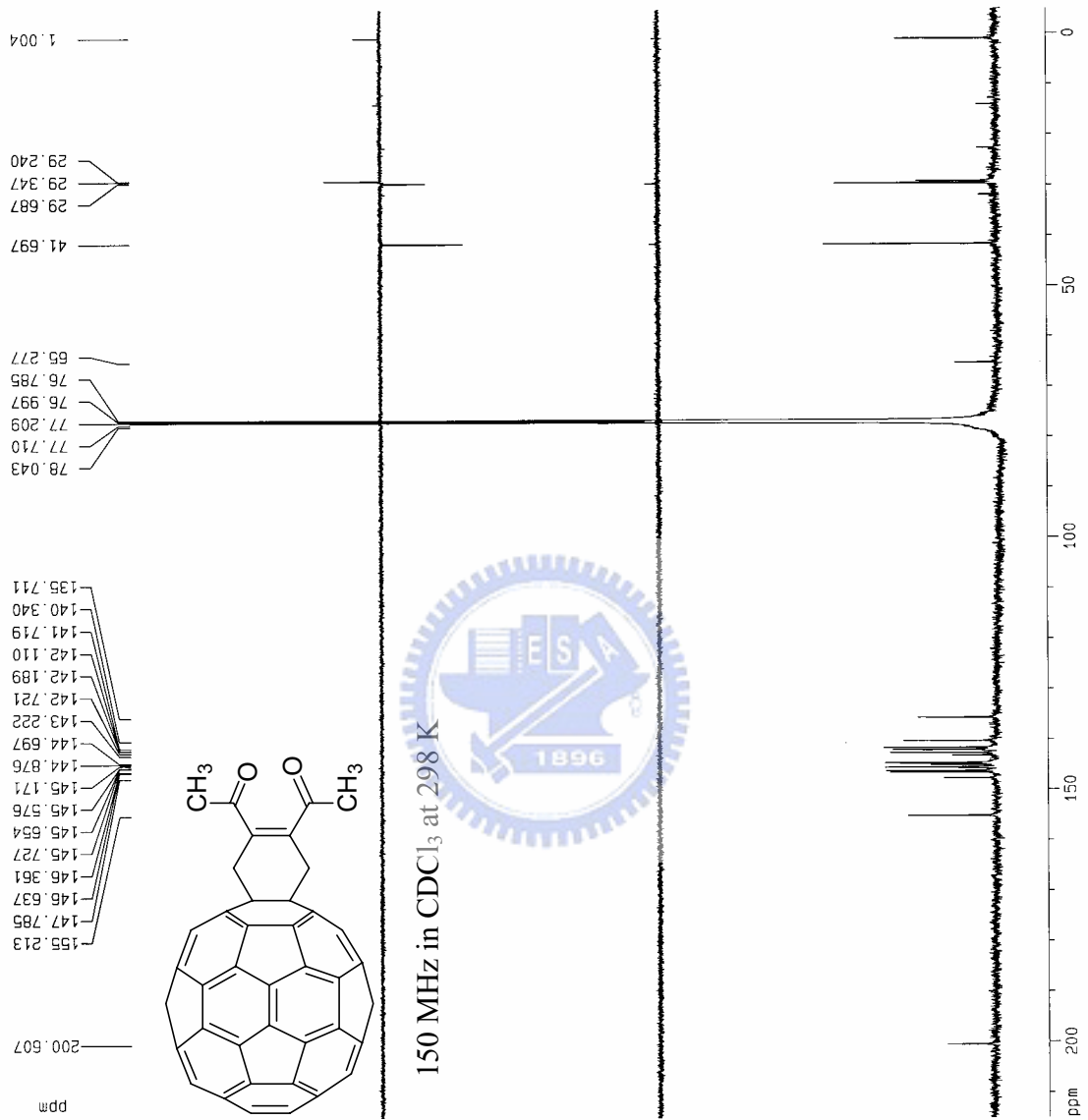
附圖 22 化合物 62 之 ¹³C NMR 光譜圖



附圖 23 化合物 62 之 ¹³C NMR 光譜放大圖



附圖 24 化合物 63 之 ¹H NMR 光譜圖



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Current Data Parameters
NAME          unknown-2
EXPNO        2
PROCNO       1

F2 - Acquisition Parameters
Date_        20031024
Time         21.07
INSTRUM      spect
PROBHD       5 mm gnp 1H/1
PULPROG      zgpg
TD            32768
SOLVENT      CDCl3
NS            8160
DS            0
SWH           37875.789 Hz
FIDRES       1.159589 Hz
AQ            0.4325876 sec
RG            2048
DE            13.200 usec
TE            300.4 K
D1            5.0000000 sec
d11           0.0300000 sec
WREST        0.0000000 sec
RGMARK       0.01500000 sec

===== CHANNEL f1 =====
NUC1          13C
P1            4.50 usec
PL1           0.00 dB
SFO1          150.8372651 MHz

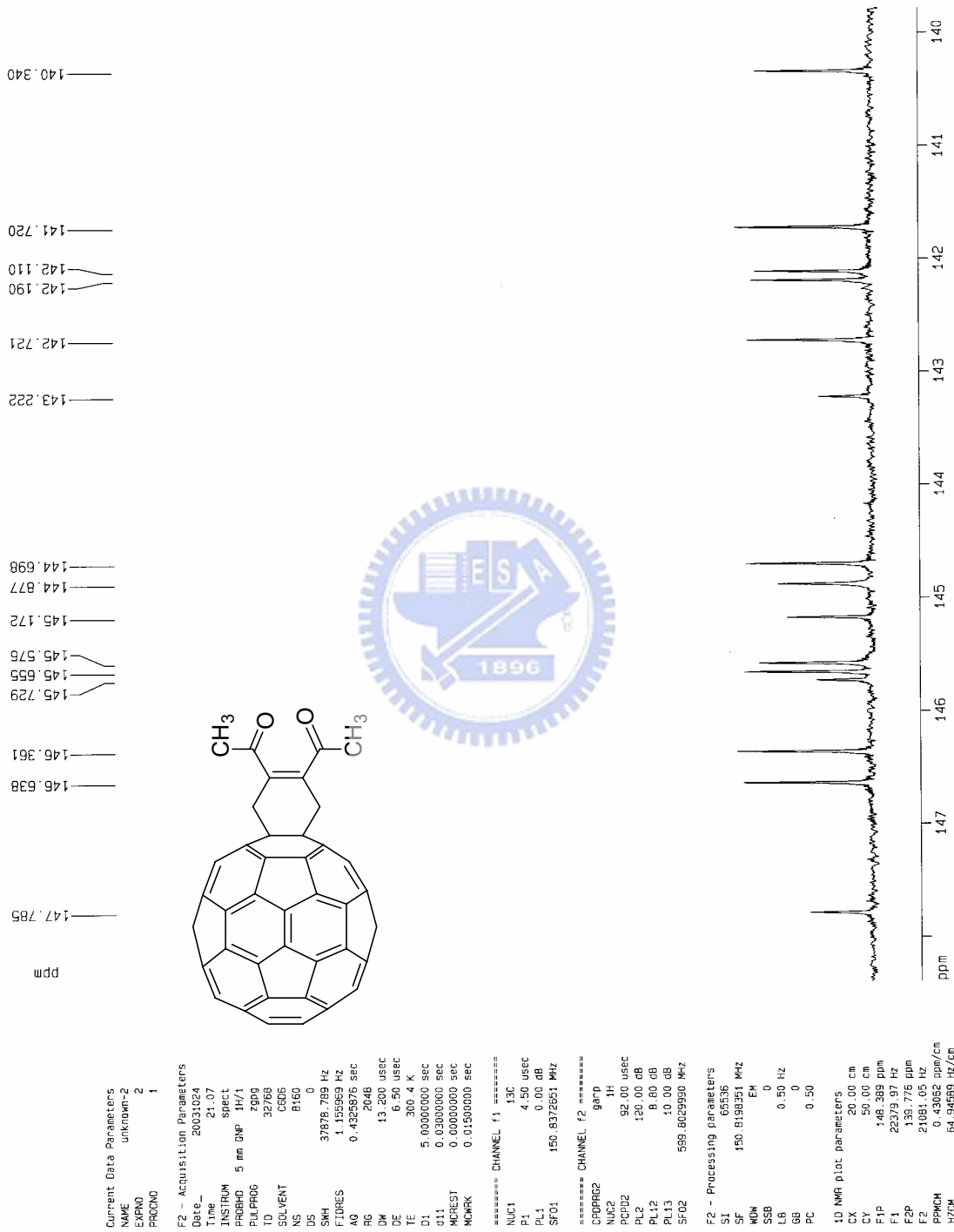
===== CHANNEL f2 =====
CPDPRG2      garp
NUC2          1H
PCPD2        92.00 usec
PL2           120.00 dB
PL12         8.80 dB
PL13         10.00 dB
SFO2          599.8029590 MHz

F2 - Processing parameters
SI            65536
SF            150.8198351 MHz
WDW           EM
SSB           0
LB            5.00 Hz
GB            0
PC            0.50

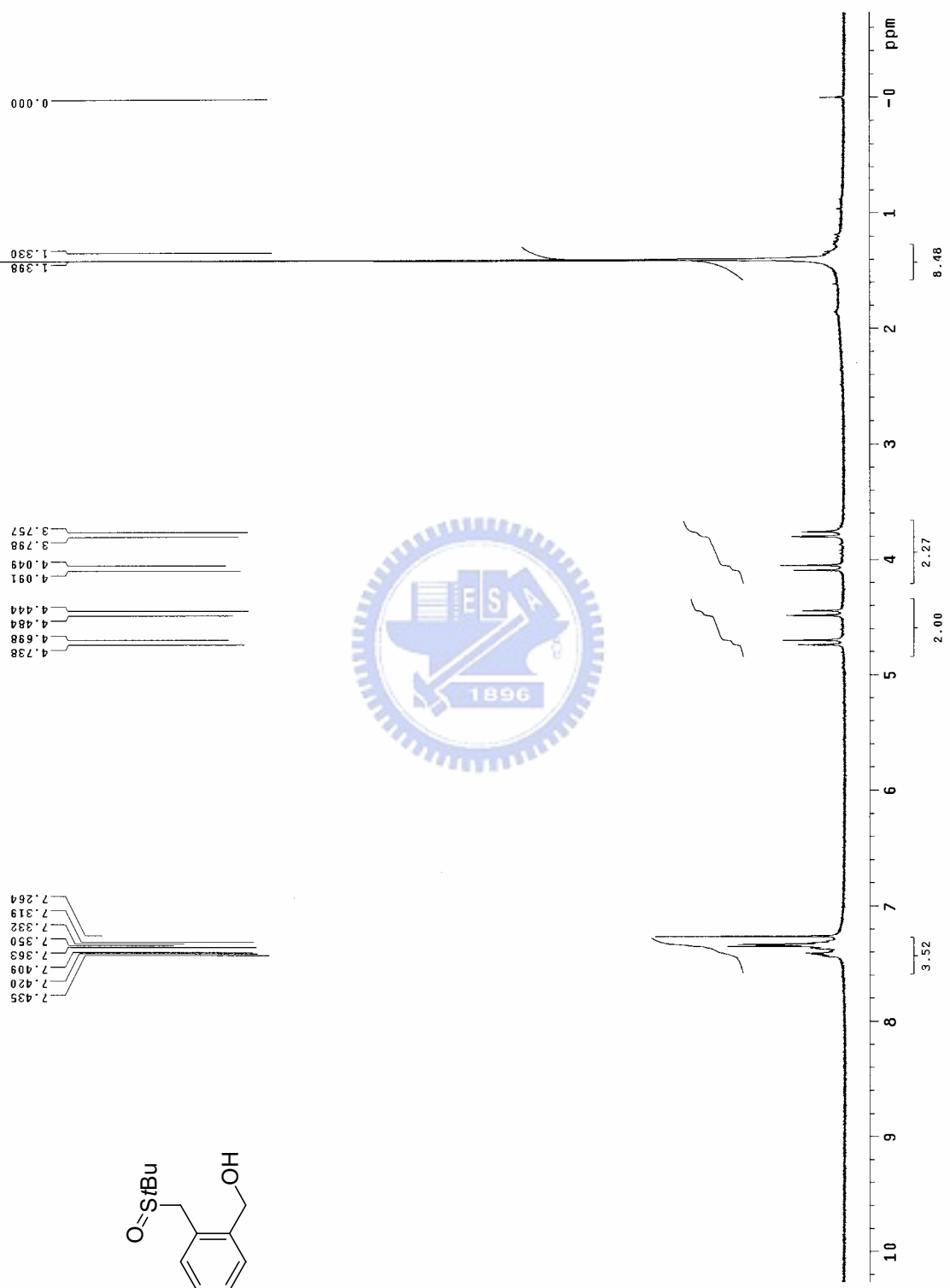
1D NMR plot parameters
CX            20.00 cm
CY            50.00 cm
F1P           215.0000000 ppm
F1            32426.25 Hz
F2P           5.0000000 ppm
F2            -754.10 Hz
PPM0M         11.00000 ppm/cm
HZCM          1659.01519 Hz/cm

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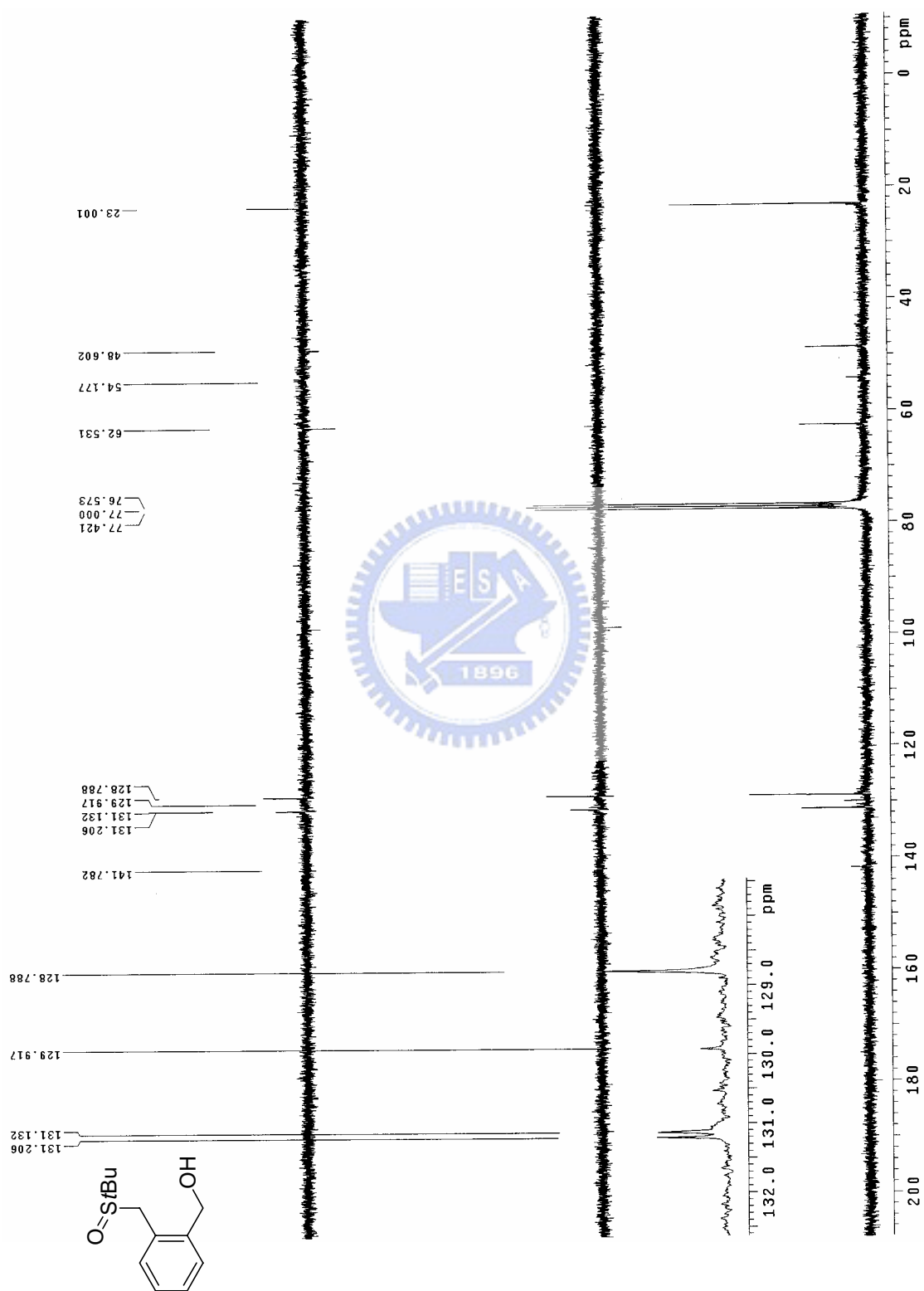
附圖 25 化合物 63 之 ¹³C NMR 光譜圖



附圖 26 化合物 63 之 ¹³C NMR 光譜放大圖



附圖 27 化合物 81 之 ^1H NMR 光譜圖



附圖 28 化合物 81 之 ¹³C NMR 光譜圖

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Current Data Parameters
NAME      chi1022204
EXPNO     1
PROCNO    1

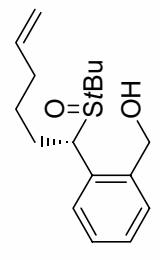
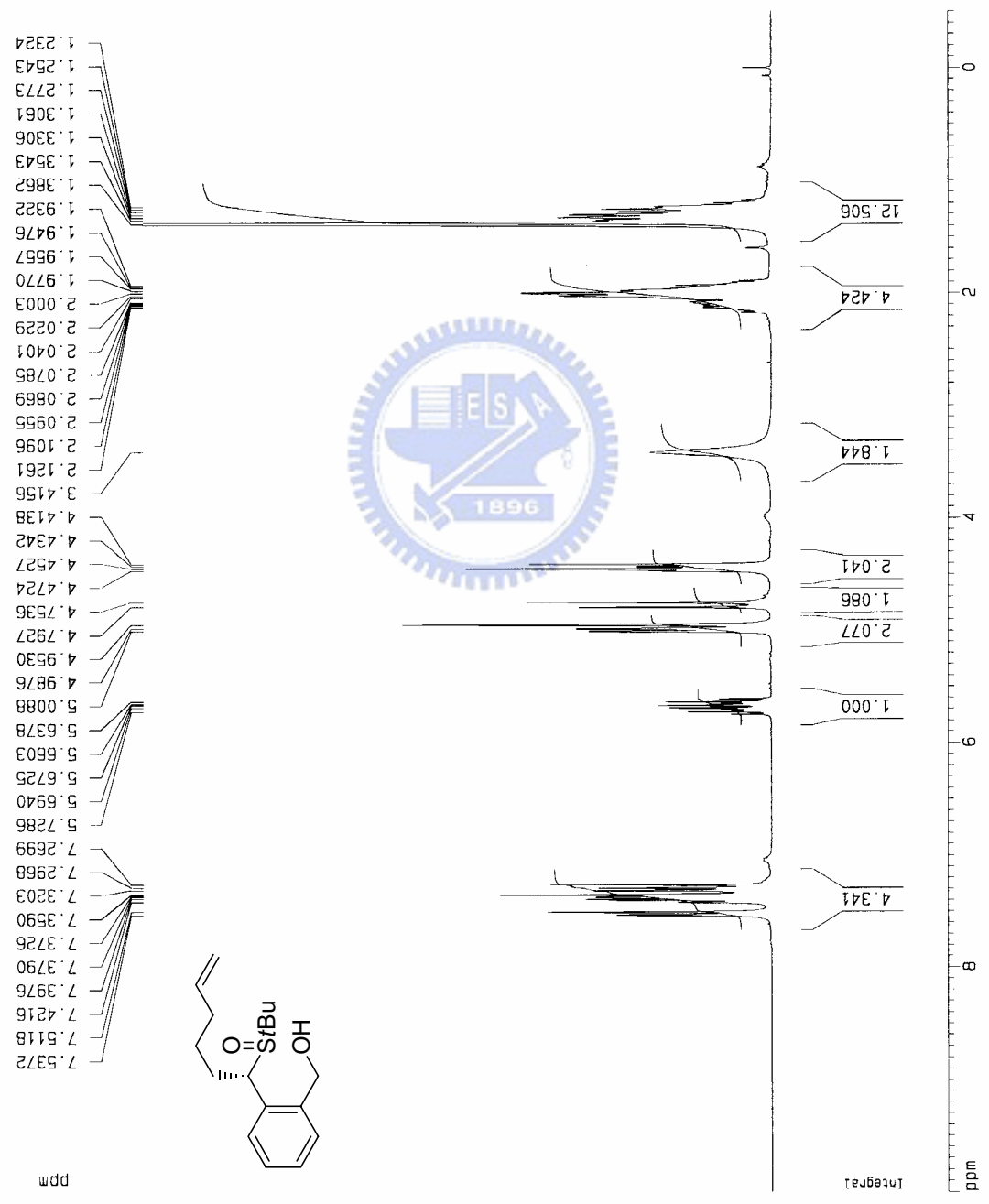
F2 - Acquisition Parameters
Date_     20040222
Time      13.39
INSTRUM   spect
PROBHD    5 mm SEI Z-
PULPROG   zg30
TD         32768
SOLVENT   CDCl3
NS         16
DS         0
SMH       7812.500 Hz
FIDRES    0.238419 Hz
AQ         2.0972021 sec
RG         90.5
DK         64.000 usec
DE         4.50 usec
TE         300.0 K
D1         1.00000000 sec

===== CHANNEL f1 =====
NUC1      1H
P1        9.10 usec
PL1       -4.00 dB
SFO1      300.1321122 MHz

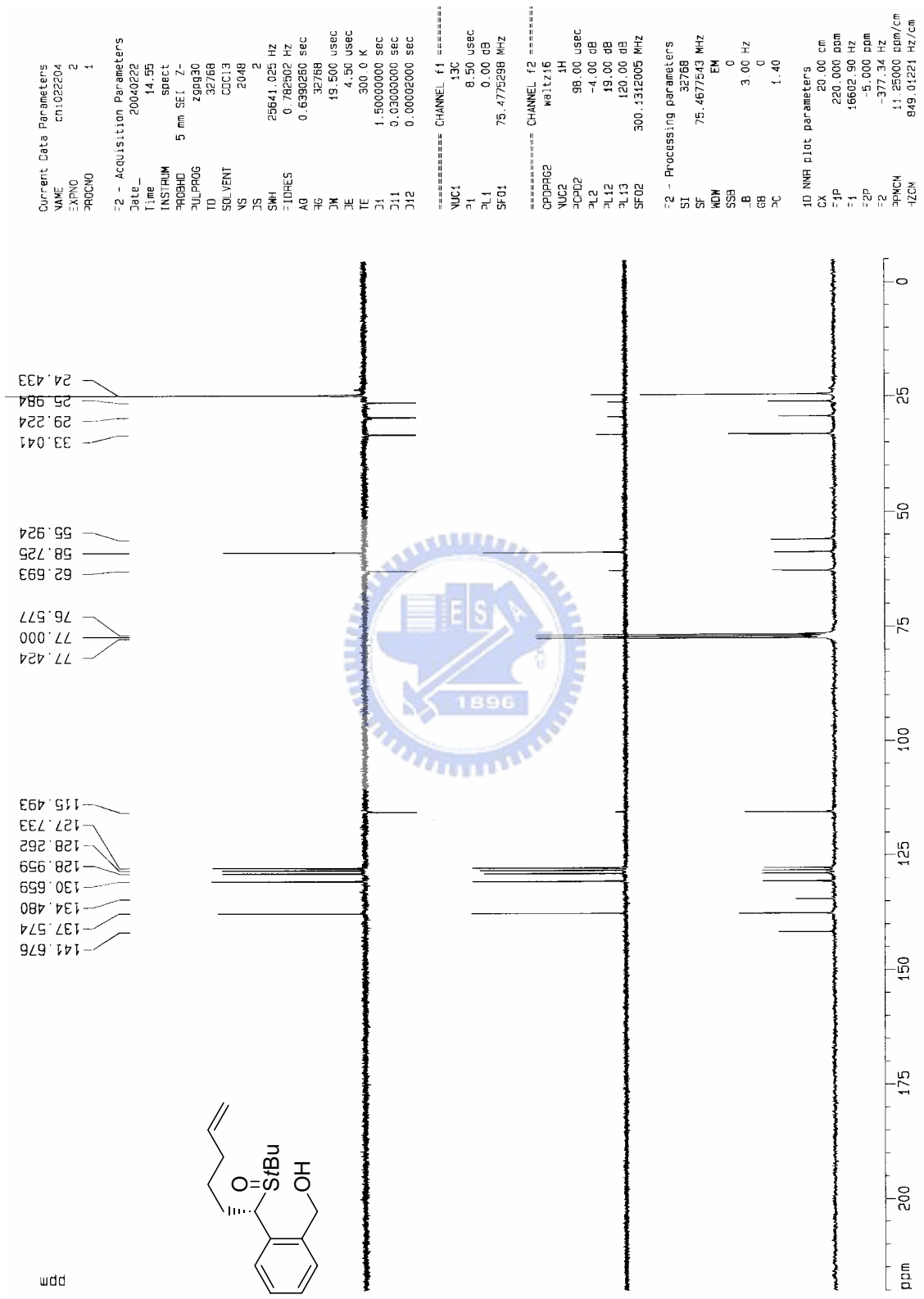
F2 - Processing parameters
SI        32768
SF        300.1300029 MHz
RG        EM
SSB       0
LB        0.30 Hz
GB        0
PC        1.00

1D NMR Plot parameters
CX        20.00 cm
F1P       10.000 ppm
F1        3001.30 Hz
F2P       -0.500 ppm
F2        -150.07 Hz
PPMCM     0.52500 ppm/cm
HZCM      157.56825 Hz/cm

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附圖 29 化合物 86a 之 ¹H NMR 光譜圖



附圖 30 化合物 86a 之 ¹³C NMR 光譜圖

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Current Data Parameters
NAME      ch1022204
EXPNO    2
PROCNO   1

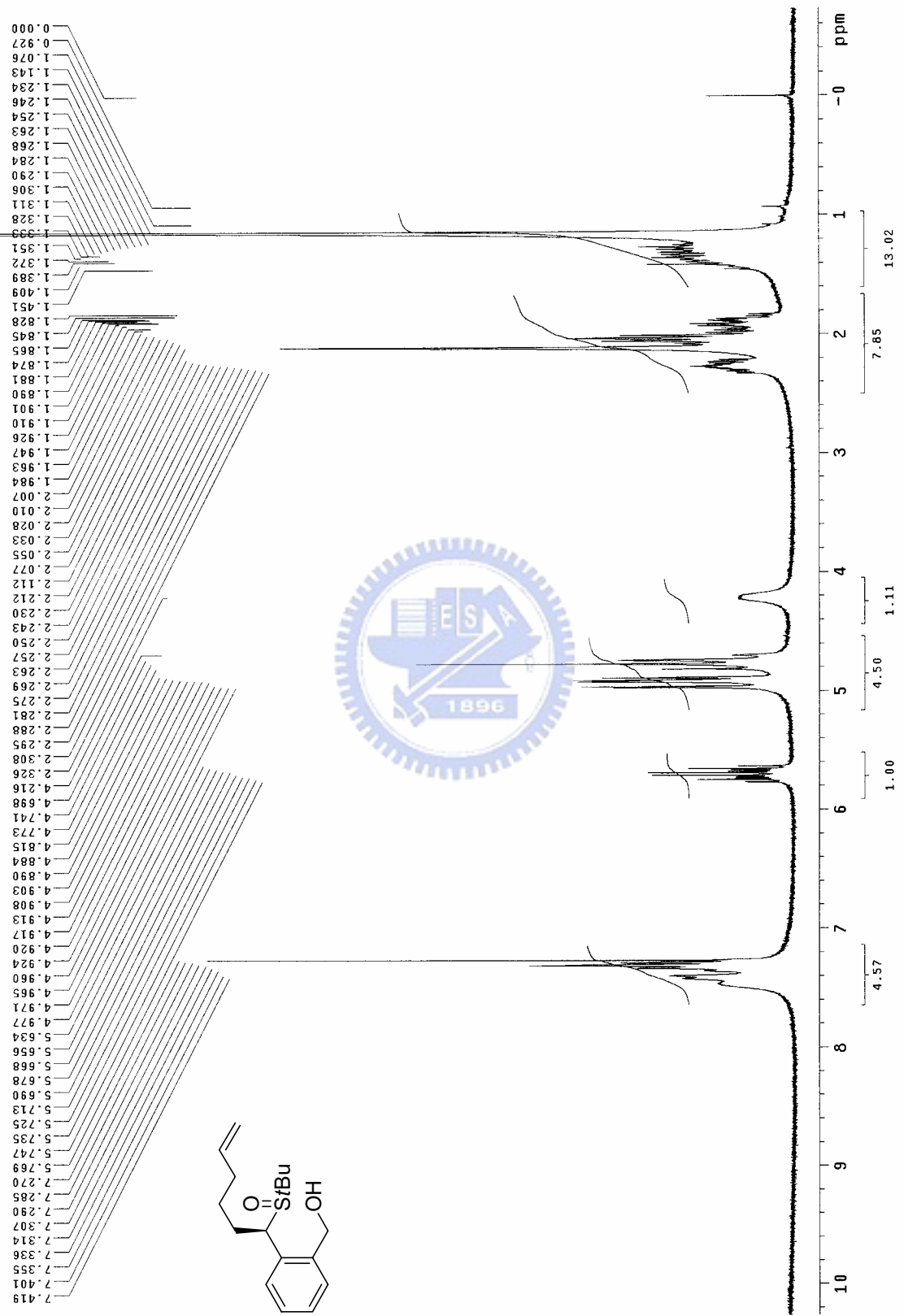
F2 - Acquisition Parameters
Date_    20040222
Time     14.35
INSTRUM  spect
PROBHD   5 mm SEL Z-
PULPROG  zgpg30
TD        32768
SOLVENT  CDCl3
NS        2048
DS        2
SWH       25641.025 Hz
FIDRES    0.782302 Hz
AQ         0.6398260 sec
RG         32768
DM         19.500 usec
DE         4.50 usec
TE         300.0 K
PC         1.50000000 sec
D11        0.03000000 sec
D12        0.00002000 sec

===== CHANNEL f1 =====
NUC1       13C
P1         8.50 usec
PL1        0.00 dB
SFO1       75.4775298 MHz

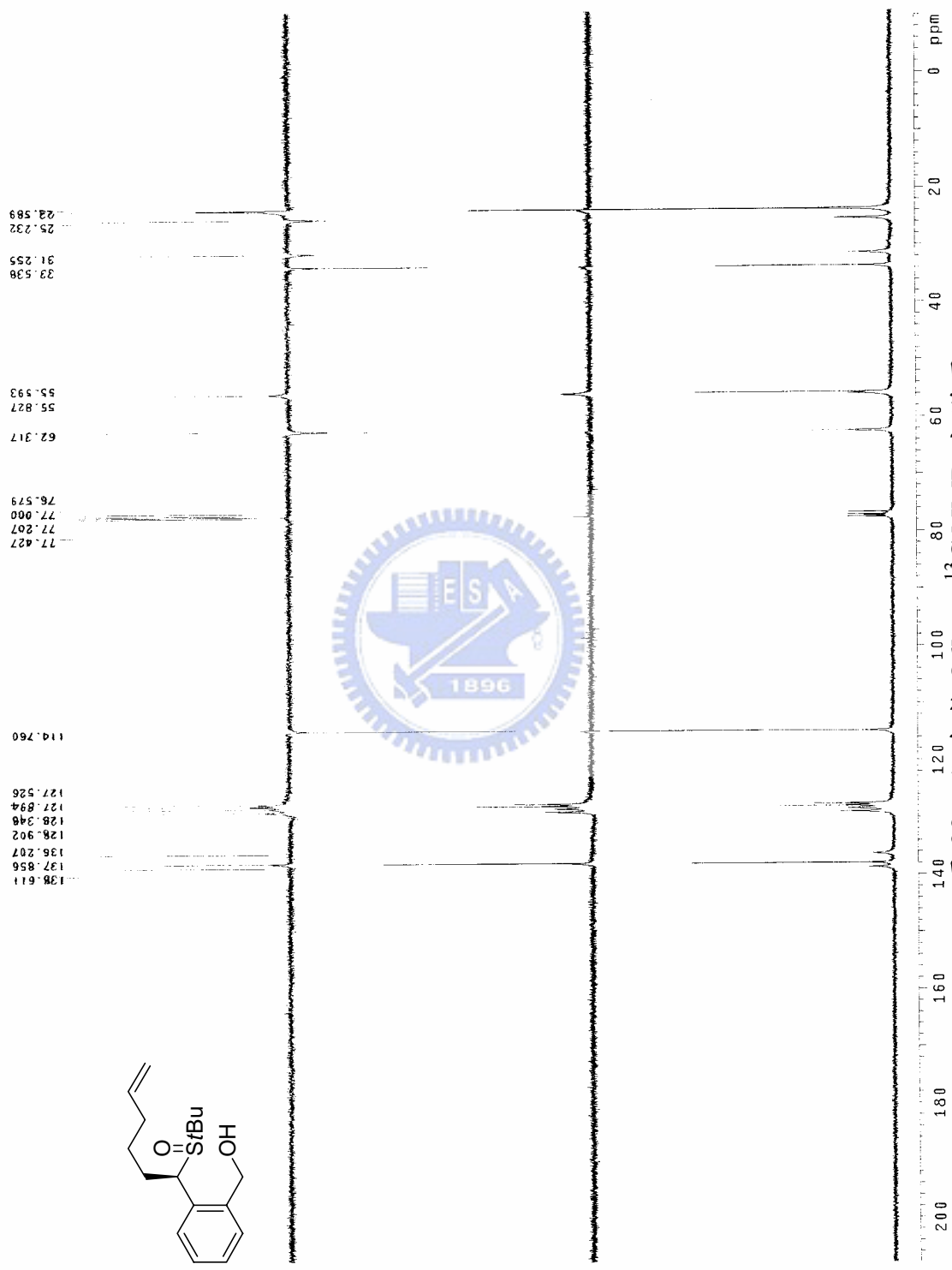
===== CHANNEL f2 =====
CPDPRG2   waltz16
NUC2       1H
PCPD2     98.00 usec
PL2        -4.00 dB
PL12       19.00 dB
PL13       120.00 dB
SFO2       300.1312005 MHz

F2 - Processing parameters
SI         32768
SF         75.4677543 MHz
RG         EM
SSB        0
LB         3.00 Hz
GB         0
PC         1.40

F2 - Processing parameters
ID NMR plot parameters
CA         20.00 cm
F1P        220.000 ppm
F1         16602.50 Hz
F2P        -5.000 ppm
F2         -377.34 Hz
FREQNCH    11.25000 ppm/cm
FZCN       849.01221 Hz/cm
  
```



附圖 31 化合物 86b 之 ¹H NMR 光譜圖



附圖 32 化合物 86b 之 ¹³C NMR 光譜圖

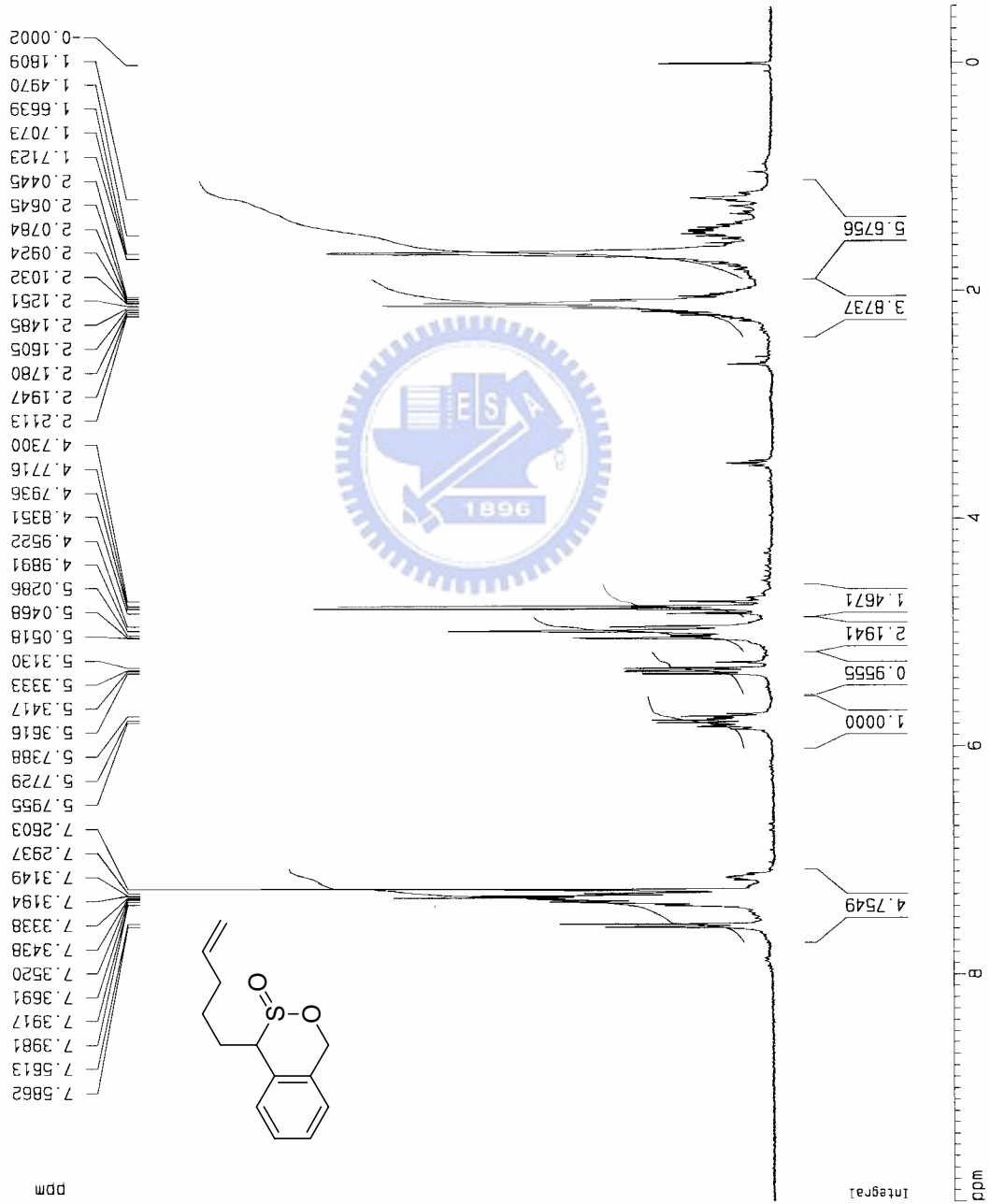
Current Data Parameters
 NAME chi022304
 EXPNO 1
 PROCNO 1

F2 - Acquisition Parameters
 Date_ 20040223
 Time 15.46
 INSTRUM spect
 PROBHD 5 mm SEI Z-
 PULPROG zg30
 TD 32768
 SOLVENT CDCl3
 NS 16
 DS 0
 SWH 7812.500 Hz
 FIDRES 0.238419 Hz
 AQ 2.0972021 sec
 RG 456.1
 DM 64.000 usec
 DE 4.50 usec
 TE 300.0 K
 D1 1.00000000 sec

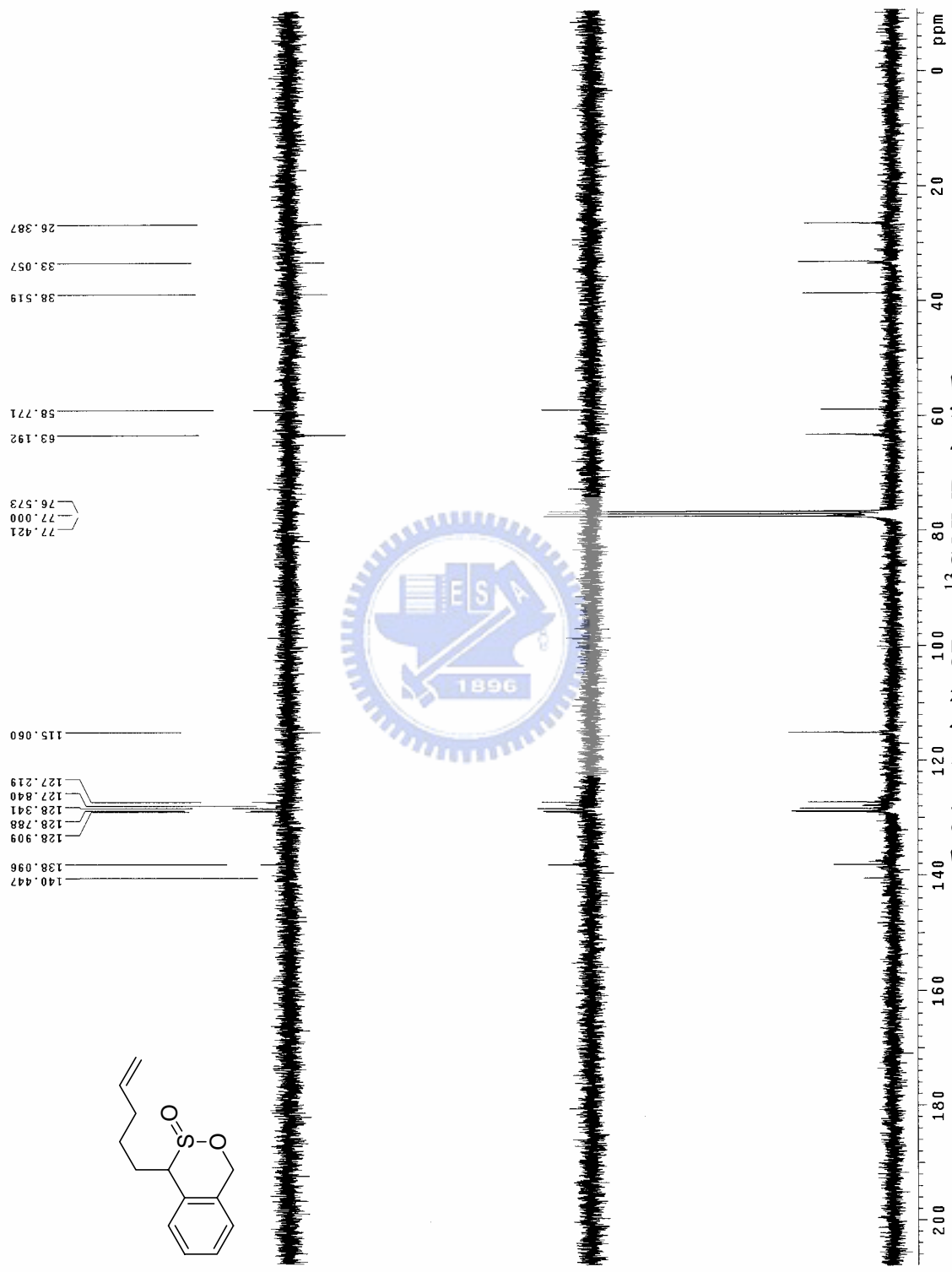
===== CHANNEL f1 =====
 NUC1 ¹H
 P1 9.10 usec
 PL1 -4.00 dB
 SF01 300.1321122 MHz

F2 - Processing parameters
 SI 32768
 SF 300.1300058 MHz
 WDW EM
 SSB 0
 LB 0.30 Hz
 GB 0
 PC 1.00

1D NMR plot parameters
 CX 20.00 cm
 F1P 10.000 ppm
 F1 3001.30 Hz
 F2P -0.500 ppm
 F2 -150.07 Hz
 PPMCM 0.52500 ppm/cm
 HZCM 157.56825 Hz/cm



附圖 33 化合物 87 之 ¹H NMR 光譜圖



附圖 34 化合物 87 之 ¹³C NMR 光譜圖

Current Data Parameters
 NAME chi010604
 EXPNO 1
 PROCNO 1

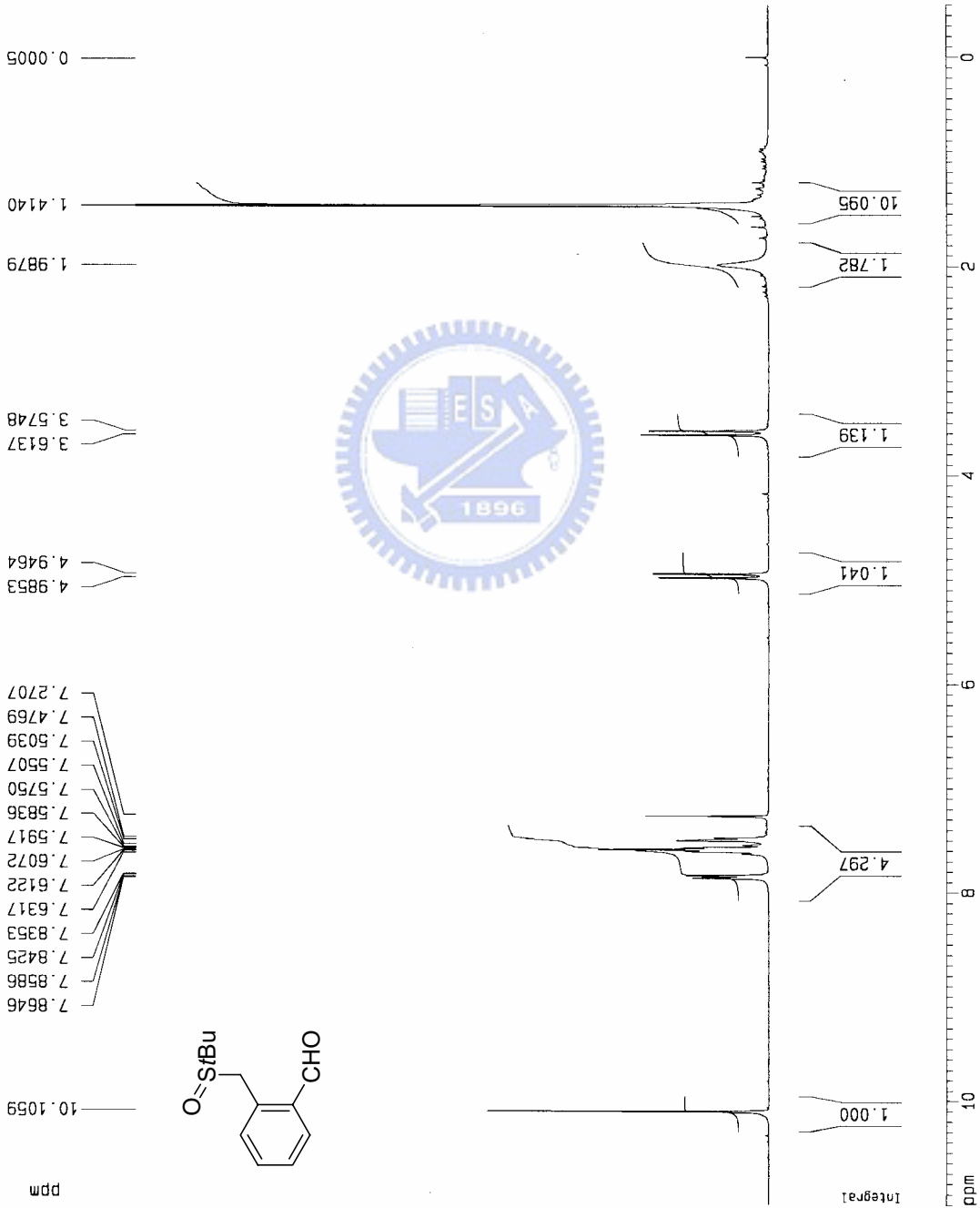
F2 - Acquisition Parameters
 Date_ 20040106
 Time_ 22.27
 INSTRUM spect
 PROBHO 5 mm BBO

PULPROG zg30
 TD 32768
 SOLVENT CDCl3
 NS 16
 DS 0
 SWH 7812.500 Hz
 FIDRES 0.238419 Hz
 AQ 2.0972021 sec
 RG 287.4
 DM 64.000 usec
 DE 4.50 usec
 TE 300.0 K
 D1 1.00000000 sec

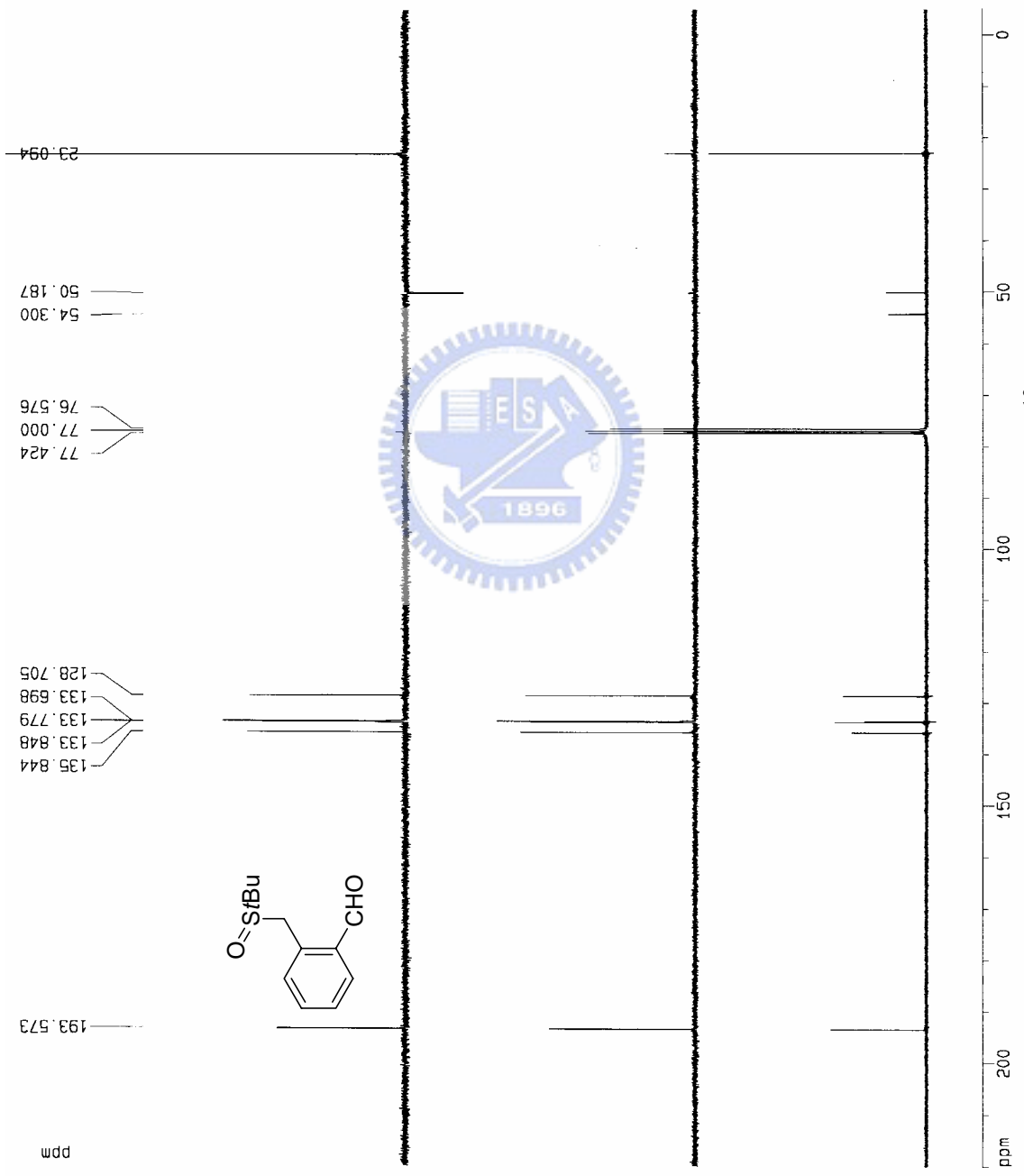
===== CHANNEL f1 =====
 NUC1 1H
 P1 9.10 usec
 PL1 -4.00 dB
 SF01 300.1321122 MHz

F2 - Processing parameters
 SI 32768
 SF 300.1300031 MHz
 WDM EM
 SSB 0
 LB 0.30 Hz
 GB 0
 PC 1.00

ID NMR plot parameters
 CX 20.00 cm
 F1P 11.000 ppm
 F1 3301.43 Hz
 F2P -0.500 ppm
 F2 -150.07 Hz
 PPMCM 0.57500 ppm/cm
 HZCM 172.57475 Hz/cm



附圖 35 化合物 93 之 ¹H NMR 光譜圖



附圖 36 化合物 93 之 ¹³C NMR 光譜圖

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Current Data Parameters
NAME      chi010604
EXPNO    2
PROCNO   1

F2 - Acquisition Parameters
Date_    20040107
Time     4.35
INSTRUM spect
PROBHD   5 mm BBO

PULPROG  zgpg30
TD        32768
SOLVENT  CDCl3
NS        10240
DS        2
SWH       25641.025 Hz
FIDRES    0.782502 Hz
AQ        0.6390260 sec
RG        32768
DQ        19.500 usec
CJ        4.50 usec
TE        300.0 K
D1        1.50000000 sec
D11       0.03000000 sec
D12       0.00002000 sec

===== CHANNEL f1 =====
NUC1      13C
P1        8.50 usec
PL1       0.00 dB
SFO1     75.4775298 MHz

===== CHANNEL f2 =====
CPDPRG2  waltz16
NUC2      1H
PCPD2     98.00 usec
PL2       -4.00 dB
PL12     19.00 dB
PL13     120.00 dB
SFO2     300.1312005 MHz

F2 - Processing parameters
SI        32768
SF       75.4677524 MHz
WDW       EM
SSB       0
RB        0.00 Hz
GB        0
PC        1.40

1D NMR plot parameters
CX        20.00 cm
F1P       220.000 ppm
F1        16602.90 Hz
F2P       -5.000 ppm
F2        -377.34 Hz
P1MCH     11.25000 ppm/cm
FZCM      849.01221 Hz/cm
  
```

Current Data Parameters
 NAME ch1111404
 EXPNO 1
 PROCNO 1

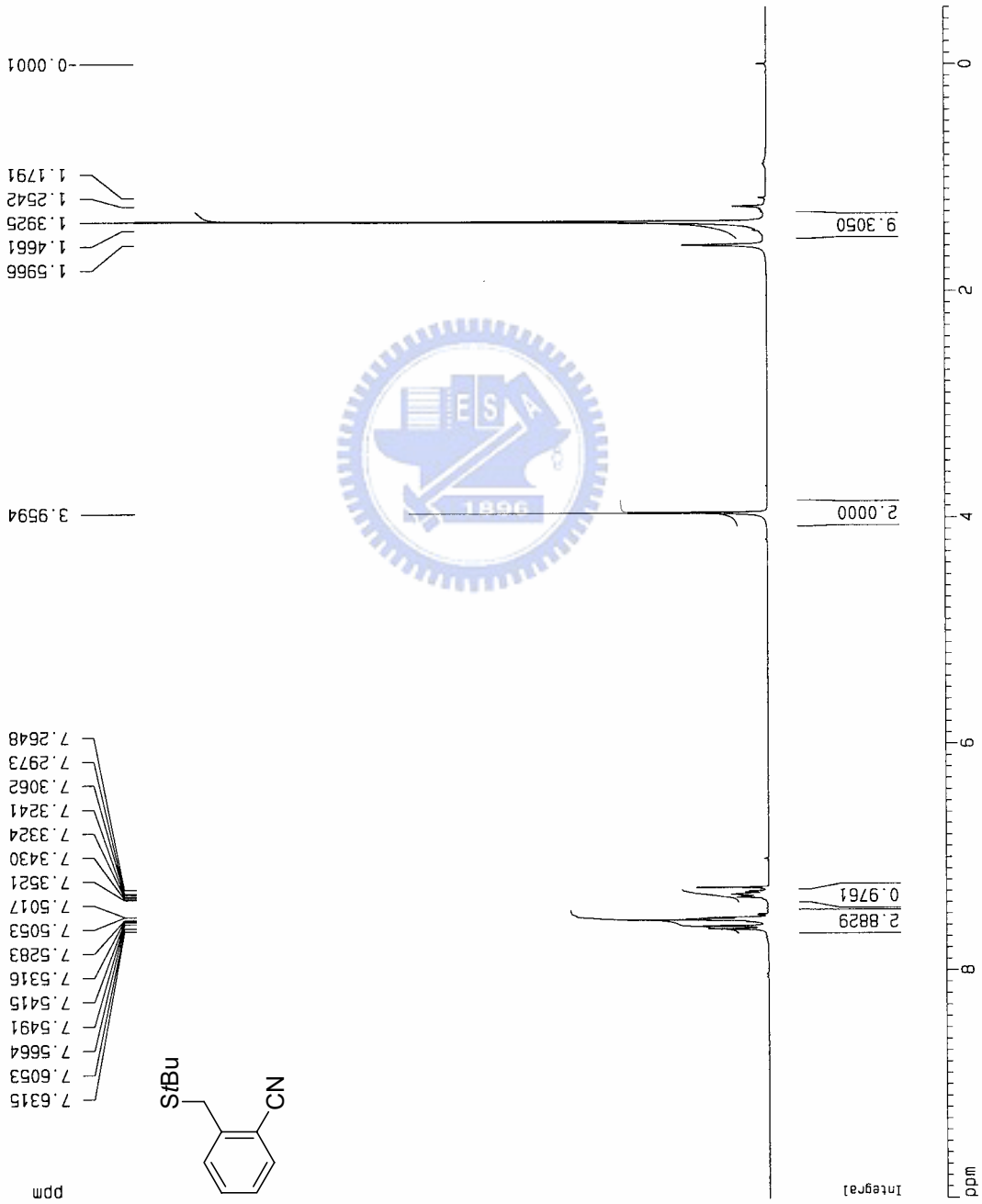
F2 - Acquisition Parameters
 Date_ 20041114
 Time 11.14
 INSTRUM spect
 PROBHD 5 mm BBD

PULPROG zg30
 TD 32768
 SOLVENT CDCl3
 NS 16
 DS 0
 SWH 7812.500 Hz
 FIDRES 0.238419 Hz
 AQ 2.0572021 sec
 RG 362
 DW 64.000 usec
 DE 4.50 usec
 TE 300.0 K
 D1 1.00000000 sec

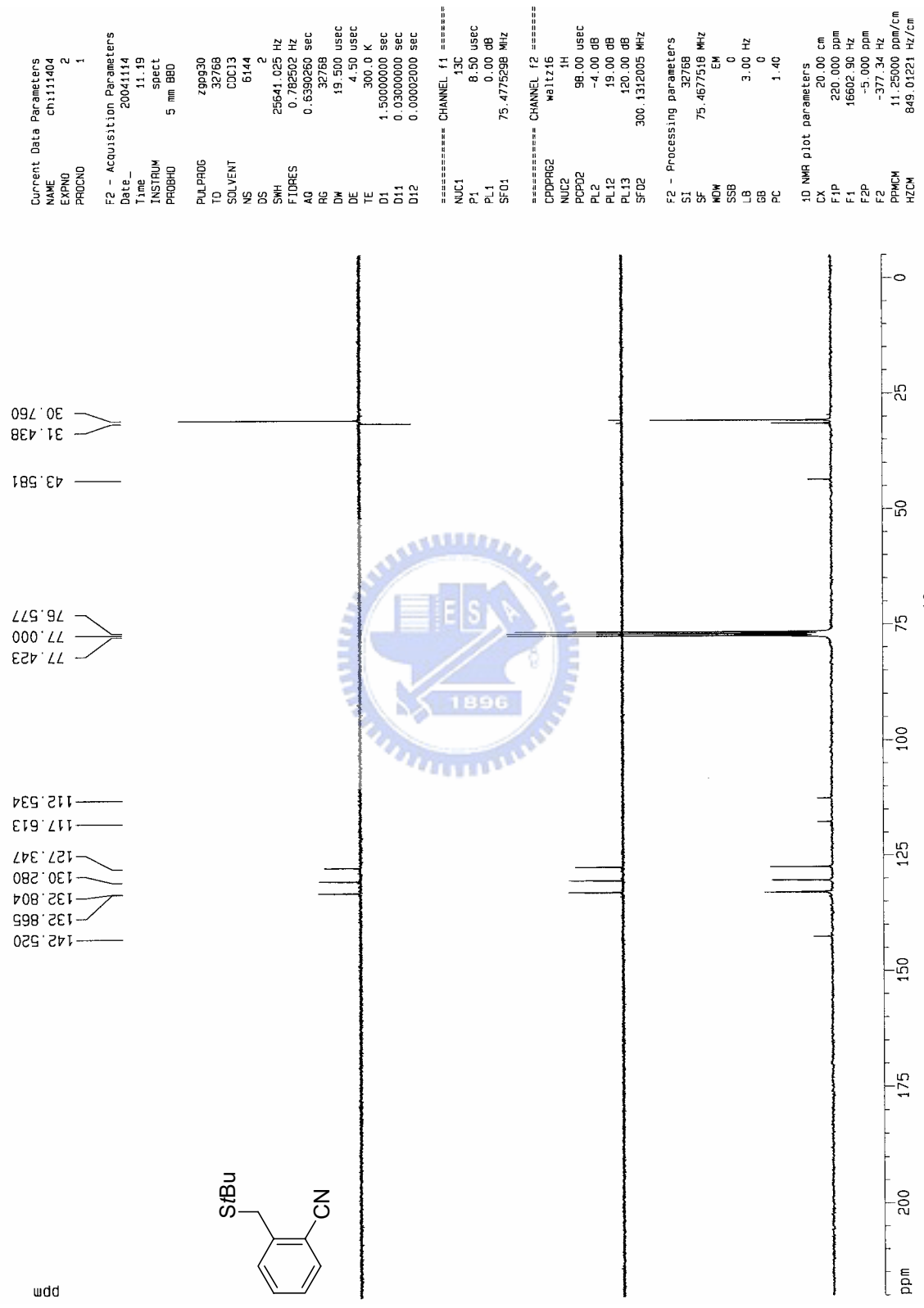
===== CHANNEL f1 =====
 NUC1 1H
 P1 9.10 usec
 PL1 -4.00 dB
 SF01 300.132122 MHz

F2 - Processing parameters
 SI 32768
 SF 300.1300048 MHz
 WDW EM
 SSB 0
 LB 0.30 Hz
 GB 0
 PC 1.00

1D NMR plot parameters
 CX 20.00 cm
 F1P 10.000 ppm
 F1 3001.30 Hz
 F2P -0.500 ppm
 F2 -150.07 Hz
 PPMCM 0.52500 ppm/cm
 HZCM 157.56825 Hz/cm



附圖 37 化合物 94 之 ¹H NMR 光譜圖



附圖 38 化合物 94 之 ¹³C NMR 光譜圖

Current Data Parameters
 NAME Chi112304
 EXPNO 1
 PROCNO 1

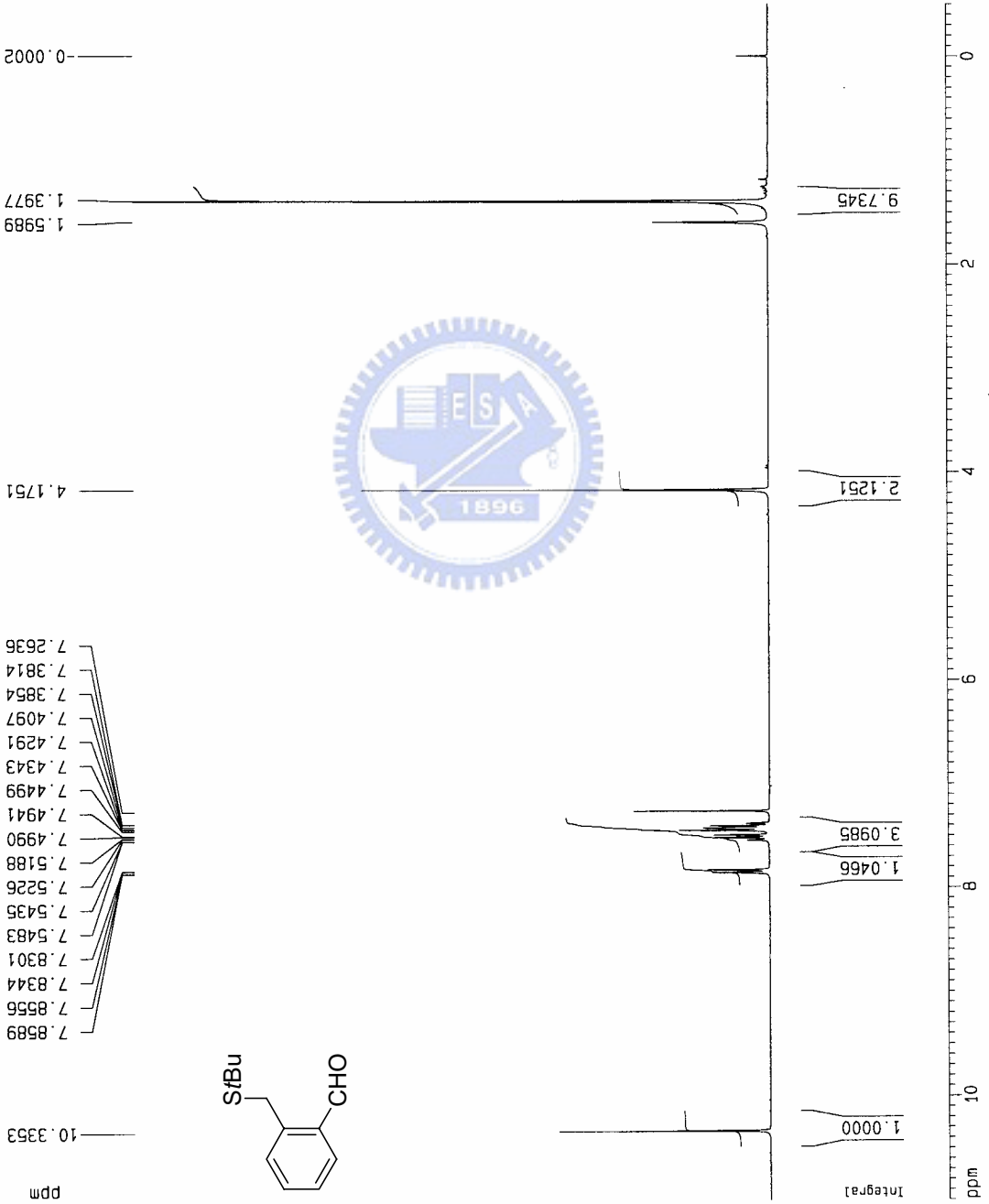
F2 - Acquisition Parameters
 Date_ 20041123
 Time_ 10.55
 INSTRUM spect
 PROBHD 5 mm BBO

PULPROG zg30
 TD 32768
 SOLVENT CDC13
 NS 16
 DS 0
 SWH 7812.500 Hz
 FIDRES 0.238419 Hz
 AQ 2.0972021 sec
 RG 456.1
 DM 64.000 usec
 DE 4.50 usec
 TE 300.0 K
 D1 1.00000000 sec

===== CHANNEL f1 =====
 NUC1 1H
 P1 9.10 usec
 PL1 -4.00 dB
 SFO1 300.1321122 MHz

F2 - Processing parameters
 SI 32768
 SF 300.1300050 MHz
 WDW EM
 SSB 0
 LB 0.30 Hz
 GB 0
 PC 1.00

1D NMR plot parameters
 CX 20.00 cm
 F1P 11.000 ppm
 F1 3301.43 Hz
 F2P -0.500 ppm
 F2 -150.07 Hz
 PPMCM 0.57500 ppm/cm
 HZCM 172.57475 Hz/cm



附圖 39 化合物 95 之 ¹H NMR 光譜圖

```

Current Data Parameters
NAME      ch112304
EXPNO    2
PROCNO   1

F2 - Acquisition Parameters
Date_    20041123
Time     12.05
INSTRUM spect
PROBHD   5 mm BBO

PULPROG  zgpg30
TD        32768
SOLVENT  CDCl3
NS        4096
DS        2
SWH       25641.025 Hz
FIDRES    0.782502 Hz
AQ        0.6350260 sec
RG        32768
DW        19.500 usec
DE        4.50 usec
TE        300.0 K
D1        1.50000000 sec
D11       0.03000000 sec
D12       0.00020000 sec

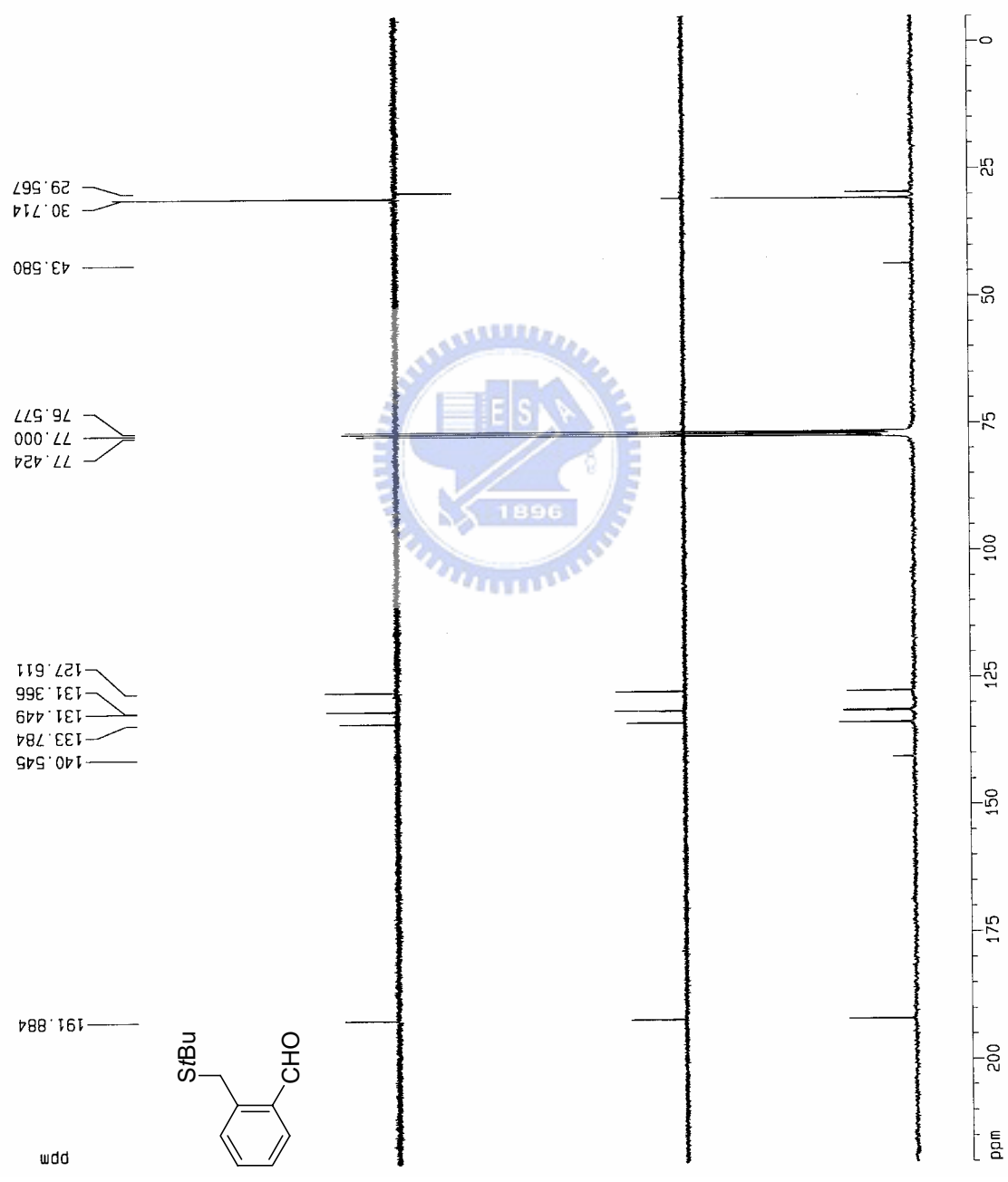
===== CHANNEL f1 =====
NUC1      13C
P1        8.50 usec
PL1       0.00 dB
SF01      75.4775298 MHz

===== CHANNEL f2 =====
CPDPRG2  waitz16
NUC2      1H
PCPD2     98.00 usec
PL2       -4.00 dB
PL12      19.00 dB
PL13      120.00 dB
SF02      300.1312005 MHz

F2 - Processing parameters
SI        32768
SF        75.4677514 MHz
RG        0
WDW       EM
SSB       0
LB        3.00 Hz
GB        0
PC        1.40

1D NMR plot parameters
CX        20.00 cm
FIP       220.000 ppm
F1        16602.90 Hz
F2        -5.000 ppm
PPMCM     11.25000 ppm/cm
HZCM      849.01221 Hz/cm

```



附圖 40 化合物 95 之 ¹³C NMR 光譜圖

Current Data Parameters
 NAME chi061705
 EXPNO 2
 PROCNO 1

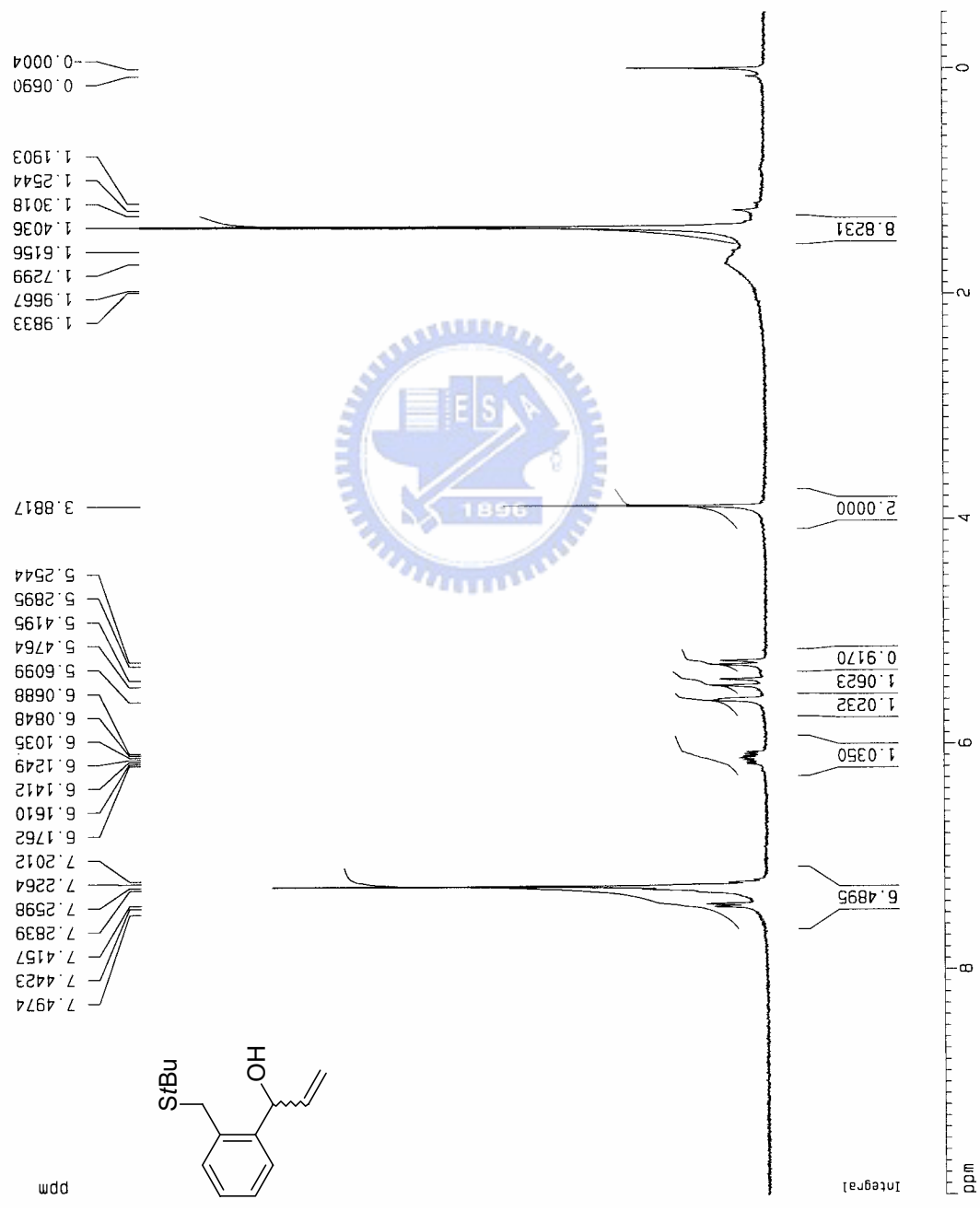
F2 - Acquisition Parameters
 Date_ 20050618
 Time 17.39
 INSTRUM spect
 PROBHD 5 mm BBO

PULPROG zg30
 TD 32768
 SOLVENT CDC13
 NS 16
 DS 0
 SWH 7812.500 Hz
 FIDRES 0.238419 Hz
 AQ 2.0972021 sec
 RG 1024
 DW 64.000 usec
 DE 4.50 usec
 TE 300.0 K
 D1 1.0000000 sec

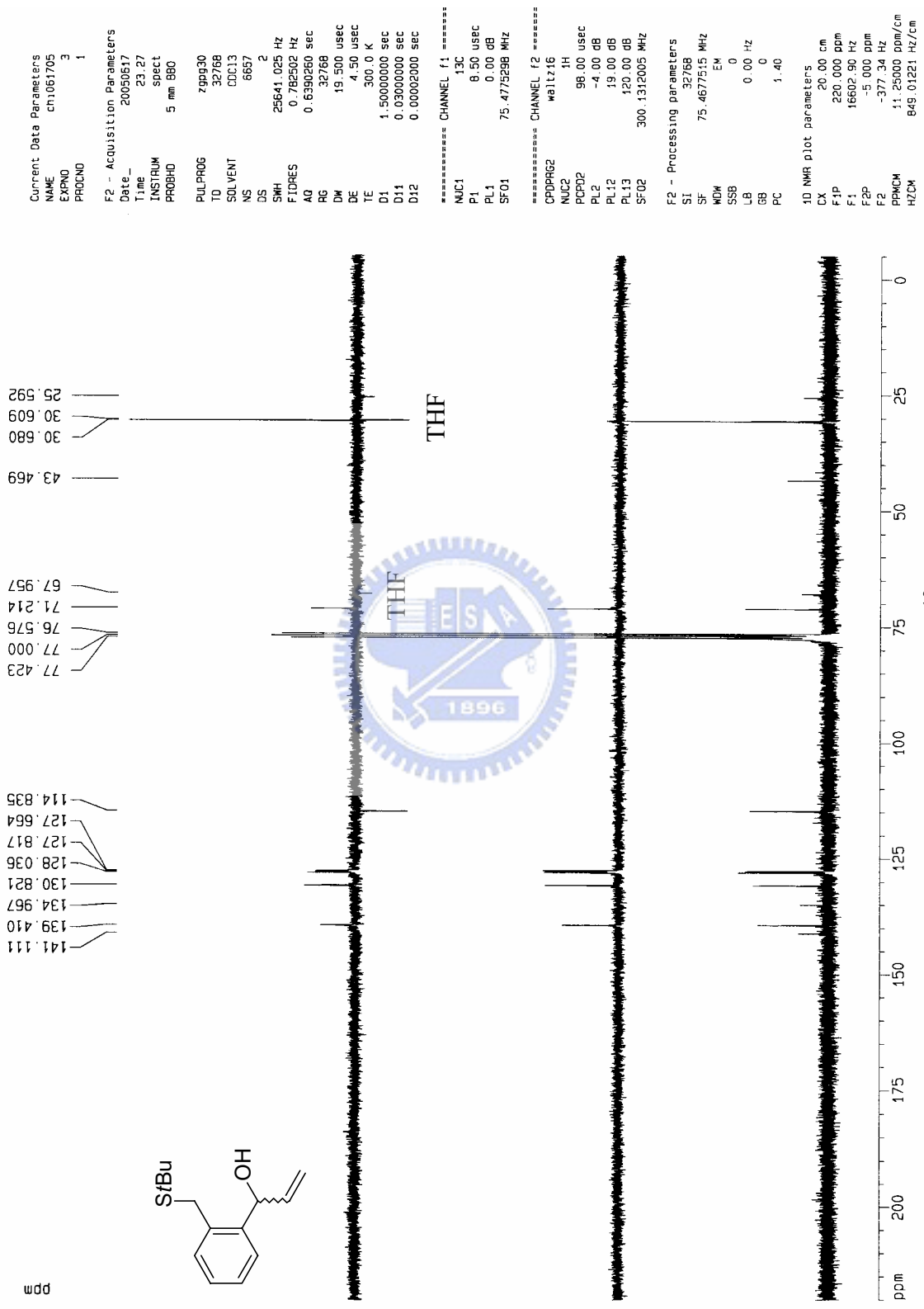
===== CHANNEL f1 =====
 NUC1 1H
 P1 9.10 usec
 PL1 -4.00 dB
 SF01 300.1321122 MHz

F2 - Processing parameters
 SI 32768
 SF 300.1300060 MHz
 MDW EM
 SSB 0
 LB 0.30 Hz
 GB 0
 PC 1.00

1D NMR plot parameters
 CX 20.00 cm
 FJP 10.000 ppm
 F1 3001.30 Hz
 F2 -0.500 ppm
 F2 -150.07 Hz
 PPMCM 0.52500 ppm/cm
 HZCM 157.56825 Hz/cm



附圖 41 化合物 96a 之 ¹H NMR 光譜圖



附圖 42 化合物 96a 之 ¹³C NMR 光譜圖

```

Current Data Parameters
NAME      Chi112504
EXPNO    3
PROCNO   1

F2 - Acquisition Parameters
Date_    20041125
Time     10.13
INSTRUM spect
PROBHD   5 mm BBO

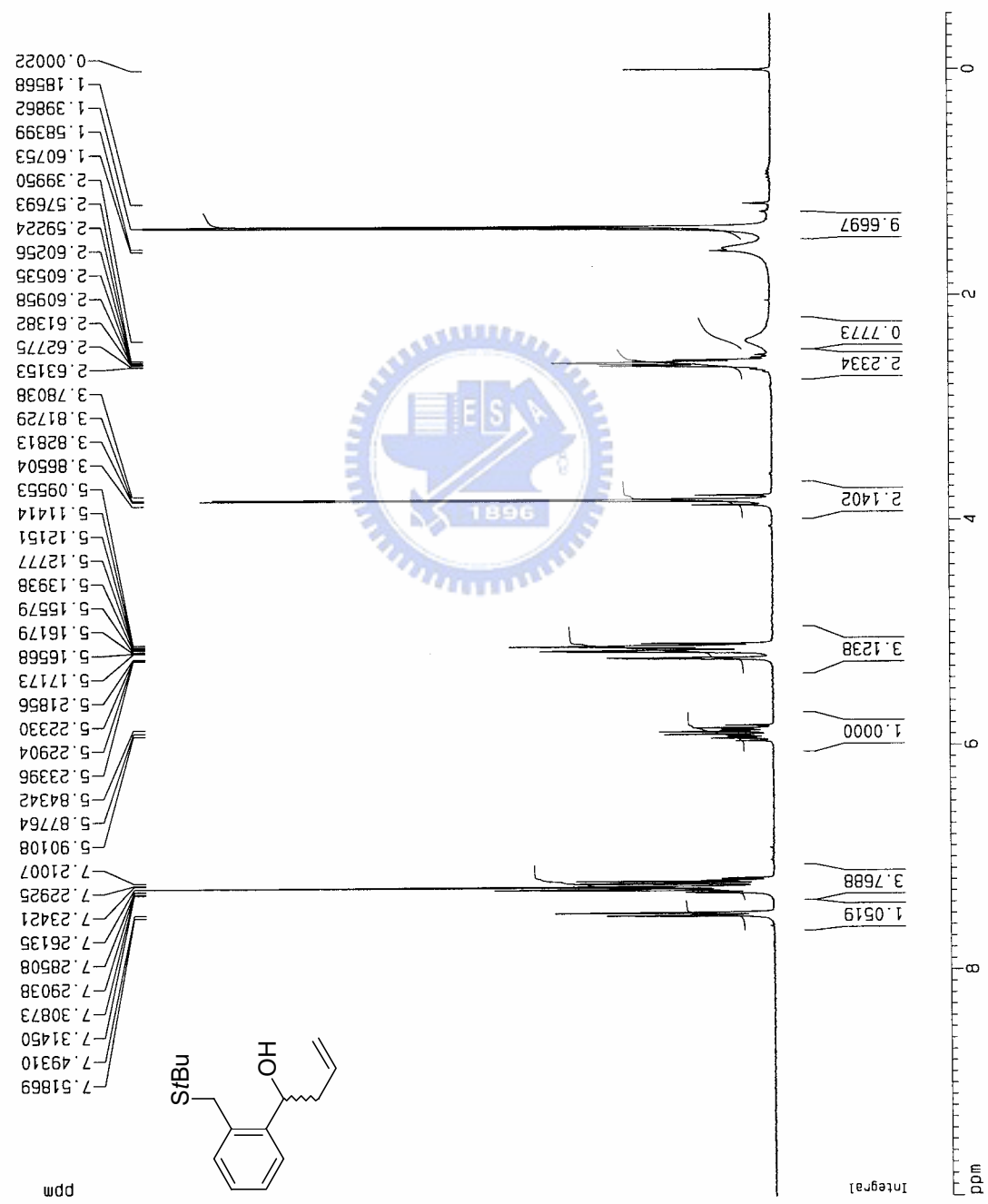
PULPROG  zg30
TD        32768
SOLVENT   CDC13
NS        16
DS        0
SWH       7812.500 Hz
FIDRES    0.238419 Hz
AQ        2.0972021 sec
RG        512
DM        64.000 usec
DE        4.50 usec
TE        300.0 K
D1        1.00000000 sec

===== CHANNEL f1 =====
NUC1      1H
P1        9.10 usec
PL1       -4.00 dB
SF01      300.1321122 MHz

F2 - Processing parameters
SI        32768
SF        300.1300060 MHz
WDW       EM
SSB       0
LB        0.30 Hz
GB        0
PC        1.00

1D NMR plot parameters
CX        20.00 cm
F1P       10.000 ppm
F1        3001.30 Hz
F2P       -0.500 ppm
F2        -150.07 Hz
PPMCM     0.52500 ppm/cm
HZCM      157.56825 Hz/cm

```



附圖 43 化合物 96b 之 ¹H NMR 光譜圖

```

Current Data Parameters
NAME      CH112504
EXPNO    7
PROCNO   1

F2 - Acquisition Parameters
Date_    20041125
Time     10.45
INSTRUM  spect
PROBHD   5 mm BBO

PULPROG  zgpg30
TD        32768
SOLVENT  CDCl3
NS        4096
DS        2
SWH       25641.025 Hz
FIDRES    0.782502 Hz
AQ        0.6390260 sec
RG        32768
DM        19.500 usec
DE        4.50 usec
TE        300.0 K
D1        1.5000000 sec
D11       0.0300000 sec
D12       0.0000200 sec

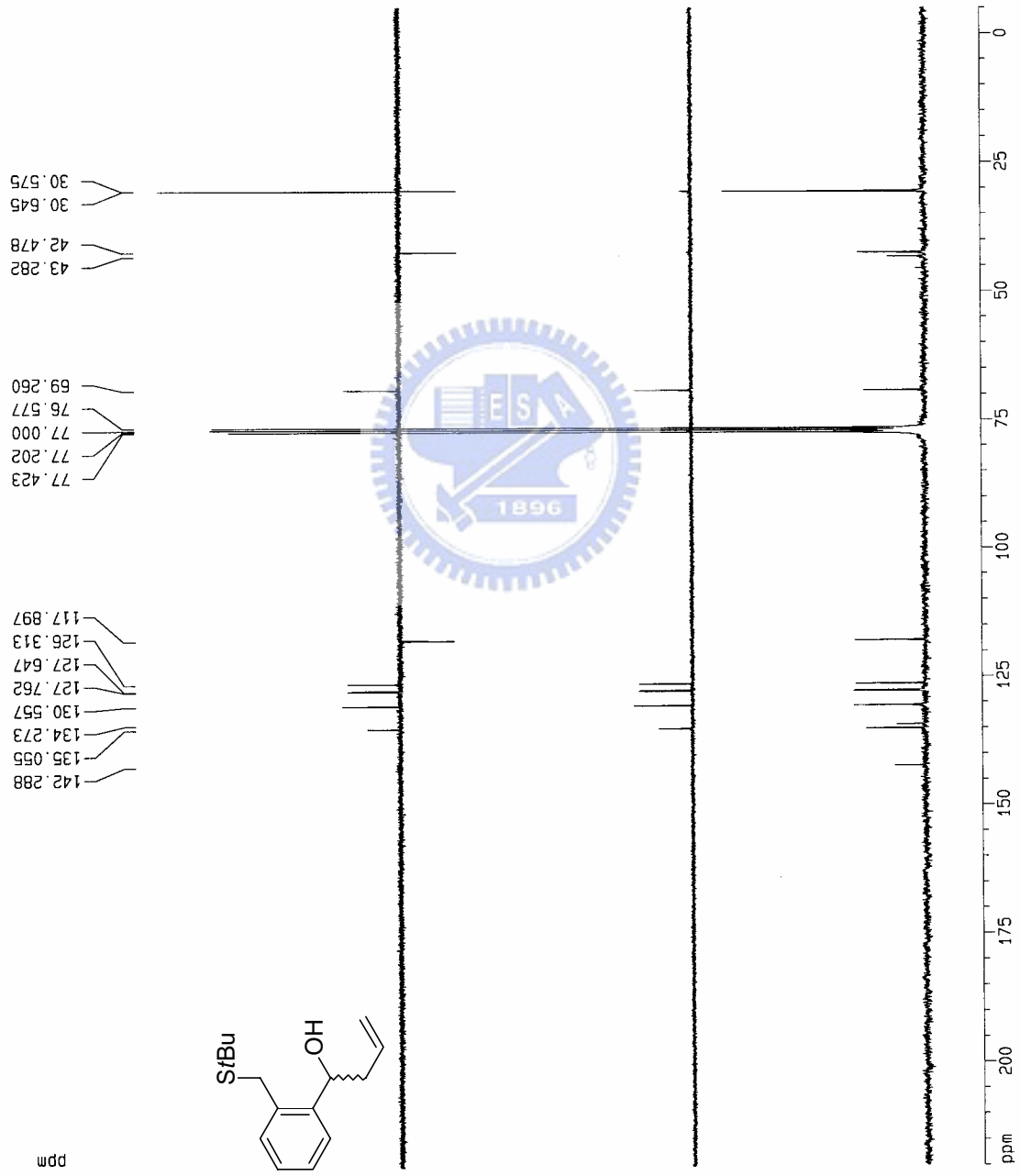
===== CHANNEL f1 =====
NUC1      13C
P1        8.50 usec
PL1       0.00 dB
SF01      75.4775298 MHz

===== CHANNEL f2 =====
COPROG2  waltz16
NUC2      1H
PCPD2     96.00 usec
PL2       -4.00 dB
PL12      19.00 dB
PL13      120.00 dB
SF02      300.1312005 MHz

F2 - Processing parameters
SI        32768
SF        75.4677512 MHz
MDM       EM
SSS       0
LB        3.00 Hz
GB        0
PC        1.40

1D NMR plot parameters
CX        20.00 cm
F1P       220.000 ppm
F1        16602.90 Hz
F2P       -5.000 ppm
F2        -377.34 Hz
PPMCM    11.25000 ppm/cm
HZCM      849.01221 Hz/cm

```



附圖 44 化合物 96b 之 ¹³C NMR 光譜圖

```

Current Data Parameters
NAME      ch1012405
EXPNO     1
PROCNO    1

F2 - Acquisition Parameters
Date_     20050124
Time      13.12
INSTRUM   spect
PROBHD    5 mm BBO

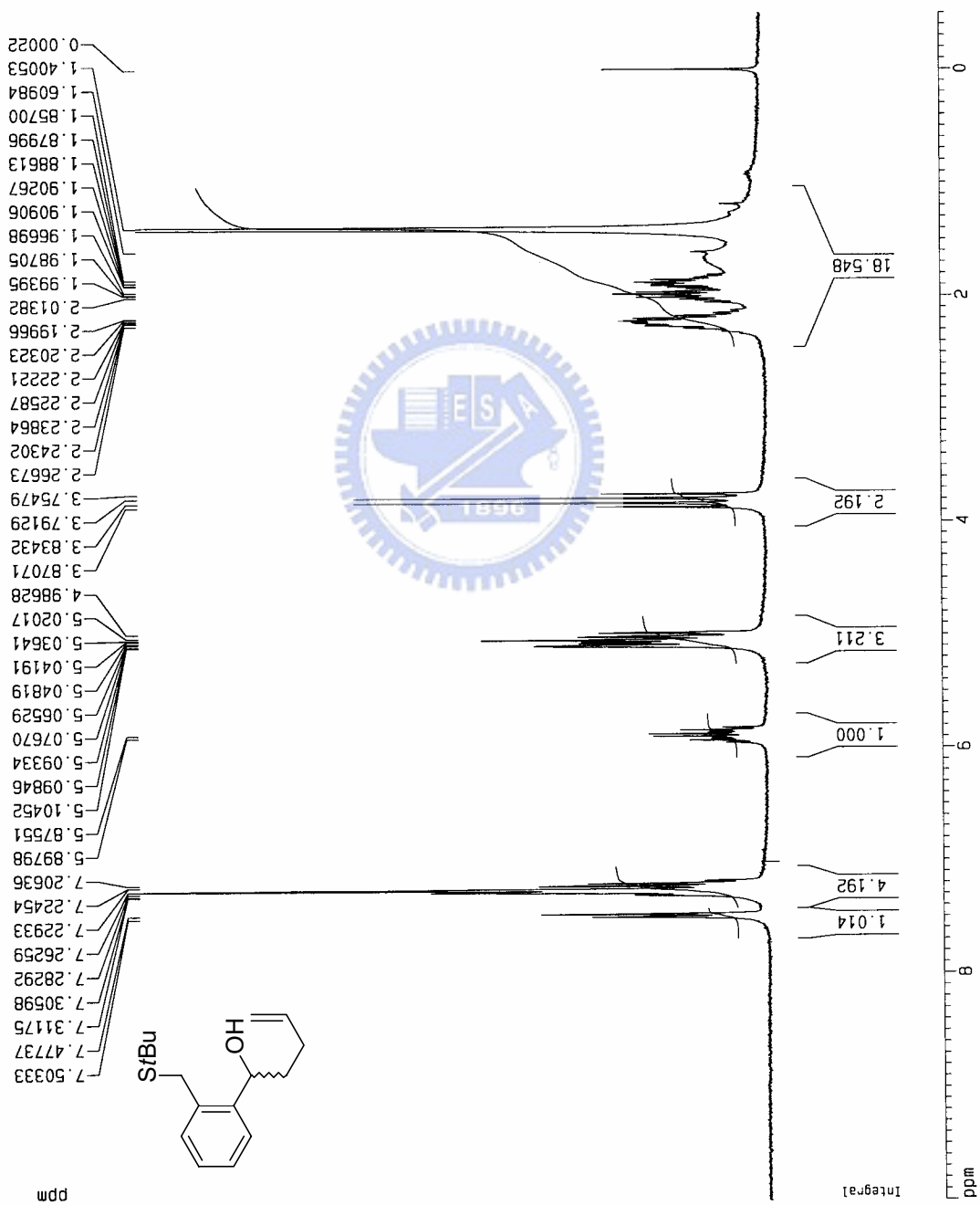
PULPROG   zg30
TO         32768
SOLVENT    CDCl3
NS         16
DS         0
SWH        7612.500 Hz
FIDRES     0.236419 Hz
AQ         2.0972021 sec
RG         512
DW         64.000 usec
DE         4.50 usec
TE         300.0 K
D1         1.00000000 sec

===== CHANNEL f1 =====
NUC1       1H
P1         9.10 usec
PL1        -4.00 dB
SFO1       300.1321122 MHz

F2 - Processing parameters
SI         32768
SF         300.1300038 MHz
WDW        EM
SSB        0
LB         0.30 Hz
GB         0
PC         1.00

1D NMR plot parameters
CX         20.00 cm
F1P        10.000 ppm
F1         3001.30 Hz
F2P        -0.500 ppm
F2         -150.07 Hz
PPMCH      0.52500 ppm/cm
HZCM       157.56825 Hz/cm

```



附圖 45 化合物 96c 之 ^1H NMR 光譜圖

```

Current Data Parameters
NAME      chi012405
EXPNO    2
PROCNO    1

F2 - Acquisition Parameters
Date_     20050124
Time      15.45
INSTRUM   spect
PROBHD    5 mm BBO

PULPROG   zgpg30
TD         32768
SOLVENT    COC13
NS         3117
DS         2
SMH        25641.025 Hz
FIDRES     0.782502 Hz
AQ         0.6390260 sec
RG         32768
DM         19.500 usec
DE         4.50 usec
TE         300.0 K
D1         1.50000000 sec
D11        0.03000000 sec
D12        0.00002000 sec

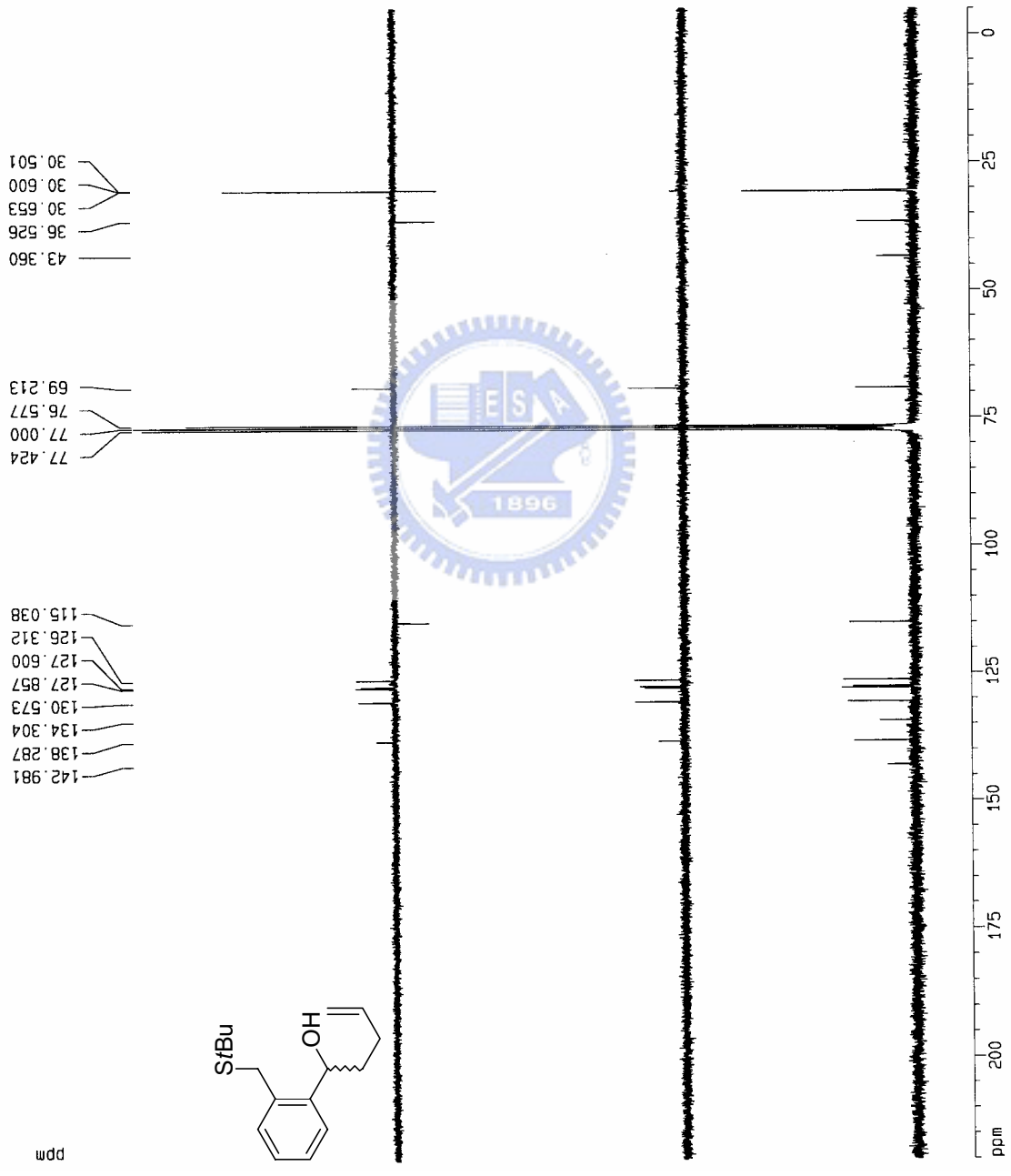
===== CHANNEL f1 =====
NUC1       13C
P1         8.50 usec
PL1        0.00 dB
SF01       75.4775298 MHz

===== CHANNEL f2 =====
CPDPRG2    waltz16
NUC2        1H
PCPD02     98.00 usec
PL2        -4.00 dB
PL12       19.00 dB
PL13       120.00 dB
SF02       300.1312005 MHz

F2 - Processing parameters
SI         32768
SF         75.4677517 MHz
WDW        EM
SSB        0
LB         1.00 Hz
GB         0
PC         1.40

1D NMR plot parameters
CX         20.00 cm
F1P        220.000 ppm
F1         16602.90 Hz
F2P        -5.000 ppm
F2         -377.34 Hz
PPHCH      11.25000 ppm/cm
HZDM       849.01621 Hz/cm

```



附圖 46 化合物 96c 之 ¹³C NMR 光譜圖

Current Data Parameters
 NAME ch1120504
 EXPNO 1
 PROCNO 1

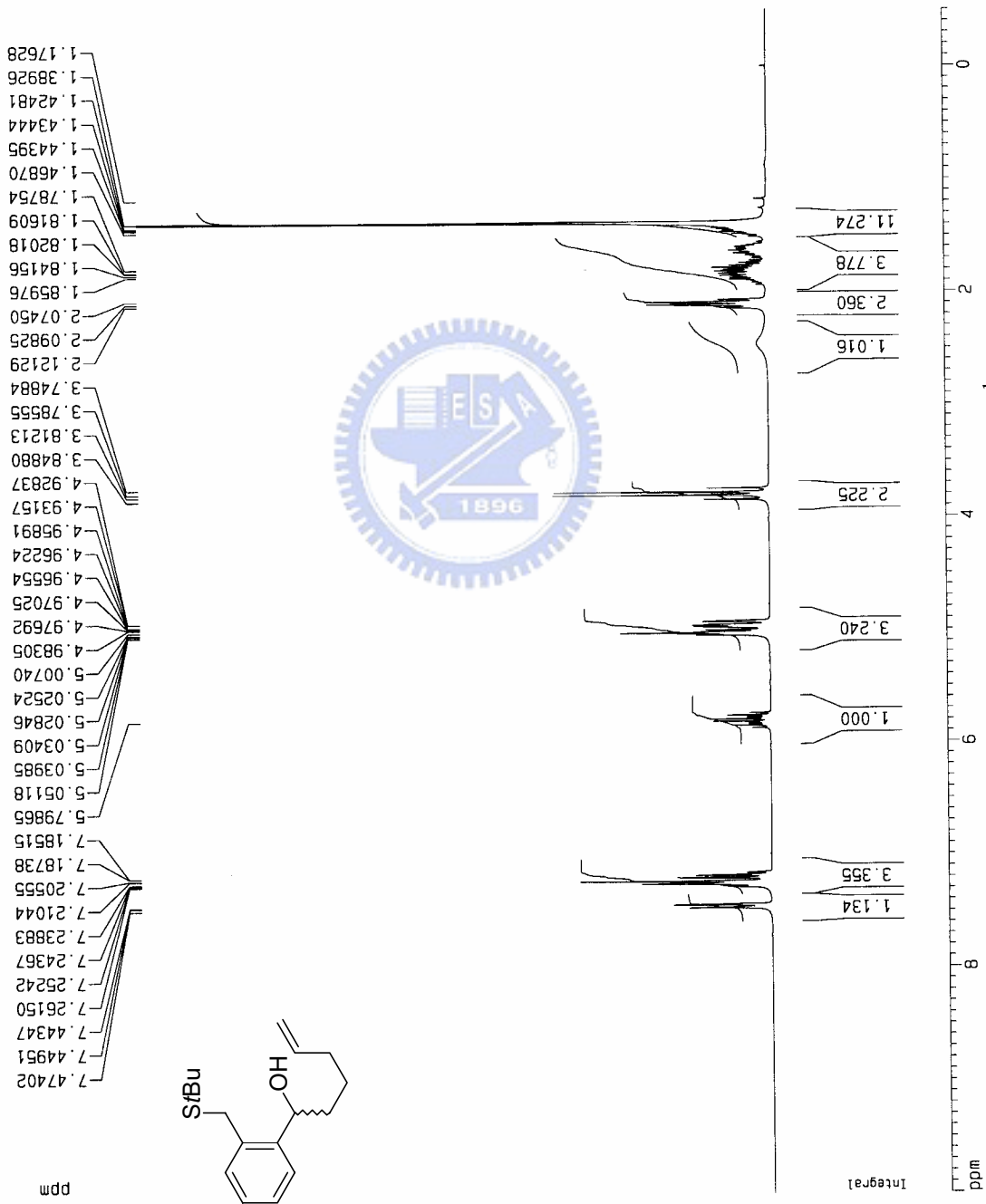
F2 - Acquisition Parameters
 Date_ 20041204
 Time_ 22.43
 INSTRUM spect
 PROBHD 5 mm BBO

PULPROG zg30
 TD 32768
 SOLVENT CDCl3
 NS 16
 DS 0
 SWH 7612.500 Hz
 FIDRES 0.238419 Hz
 AQ 2.0972021 sec
 RG 64
 DM 64.000 usec
 DE 4.50 usec
 TE 300.0 K
 D1 1.00000000 sec

===== CHANNEL f1 =====
 NUC1 1H
 P1 9.10 usec
 PL1 -4.00 dB
 SF01 300.1321122 MHz

F2 - Processing parameters
 SI 32768
 SF 300.1300089 MHz
 WDW EM
 SSB 0
 LB 0.30 Hz
 GB 0
 PC 1.00

1D NMR plot parameters
 CX 20.00 cm
 F1P 10.000 ppm
 F1 3001.30 Hz
 F2P -0.500 ppm
 F2 -150.07 Hz
 PPMCM 0.52500 ppm/cm
 HZCM 157.56825 Hz/cm



附圖 47 化合物 96d 之 ¹H NMR 光譜圖

```

Current Data Parameters
NAME      ch1120504
EXPNO    2
PROCNO   1

F2 - Acquisition Parameters
Date_    20041205
Time     3.38
INSTRUM spect
PROBHD   5 mm BBO

PULPROG  zgpg30
TD        32768
SOLVENT  CDCl3
NS        8192
DS        2
SMH       25641.025 Hz
FIDRES    0.782502 Hz
AQ         0.6390260 sec
RG         32768
DM         19.500 usec
DE         4.50 usec
TE         300.0 K
D1         1.50000000 sec
D11        0.03000000 sec
D12        0.00002000 sec

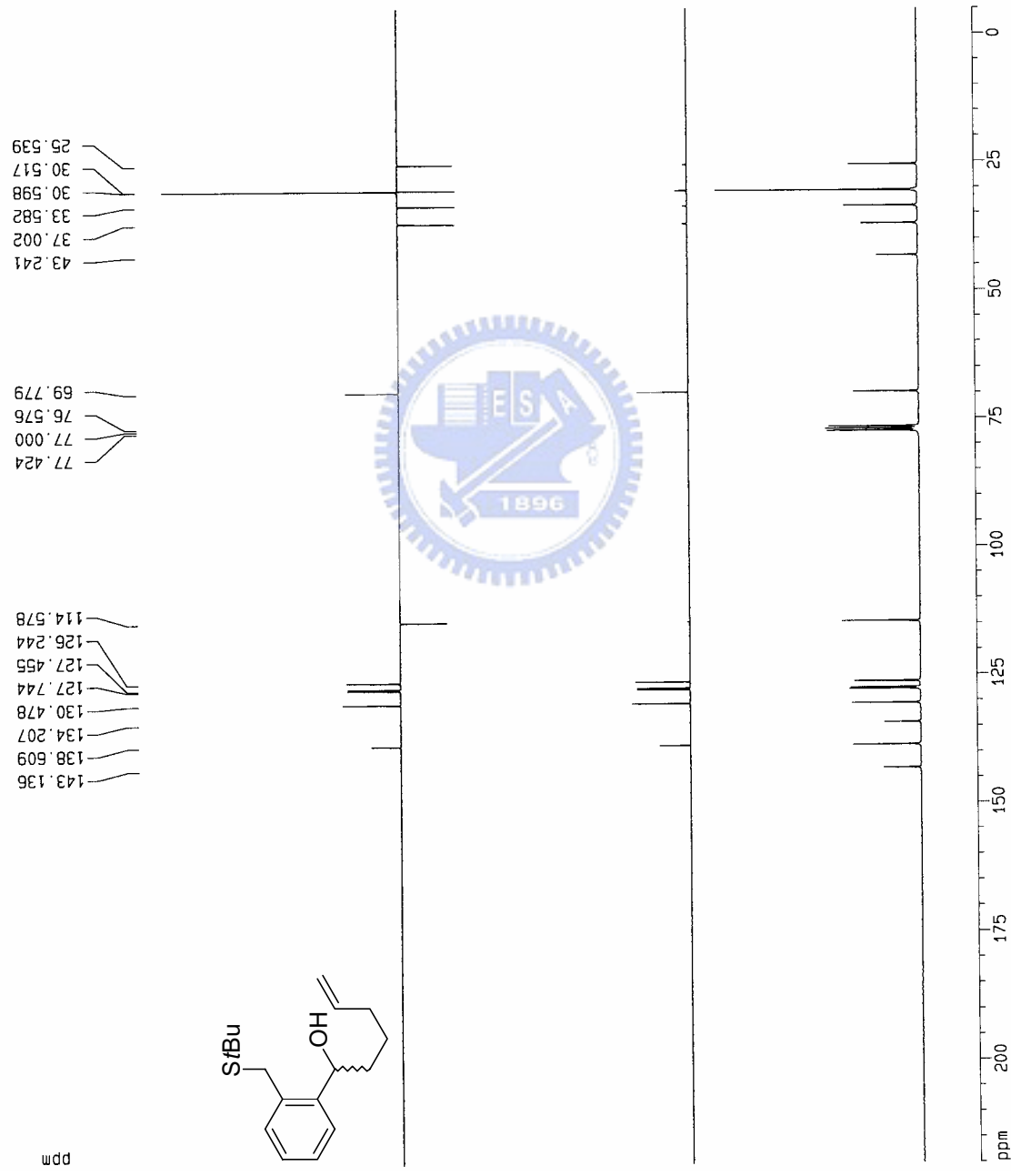
***** CHANNEL f1 *****
NUC1      13C
P1         8.50 usec
PL1        0.00 dB
SF01      75.4775298 MHz

***** CHANNEL f2 *****
CPDPRG2   waltz16
NUC2       1H
PCPD2     98.00 usec
PL2       -4.00 dB
PL12      19.00 dB
PL13      120.00 dB
SF02      300.1312005 MHz

F2 - Processing parameters
SI         32768
SF         75.4677563 MHz
WDW        EM
SSB        0
LB         3.00 Hz
GB         0
PC         1.40

1D NMR plot parameters
CX         20.00 cm
F1         220.000 ppm
F2         16602.91 Hz
PPMCM      -5.000 ppm
HZCM       -377.34 Hz
            11.25000 ppm/cm
            649.01227 Hz/cm

```



附圖 48 化合物 96d 之 ¹³C NMR 光譜圖


```

Current Data Parameters
NAME      chi120804
EXPNO    1
PROCNO   1

F2 - Acquisition Parameters
Date_    20041207
Time    22.56
INSTRUM spect
PROBHD  5 mm BBO

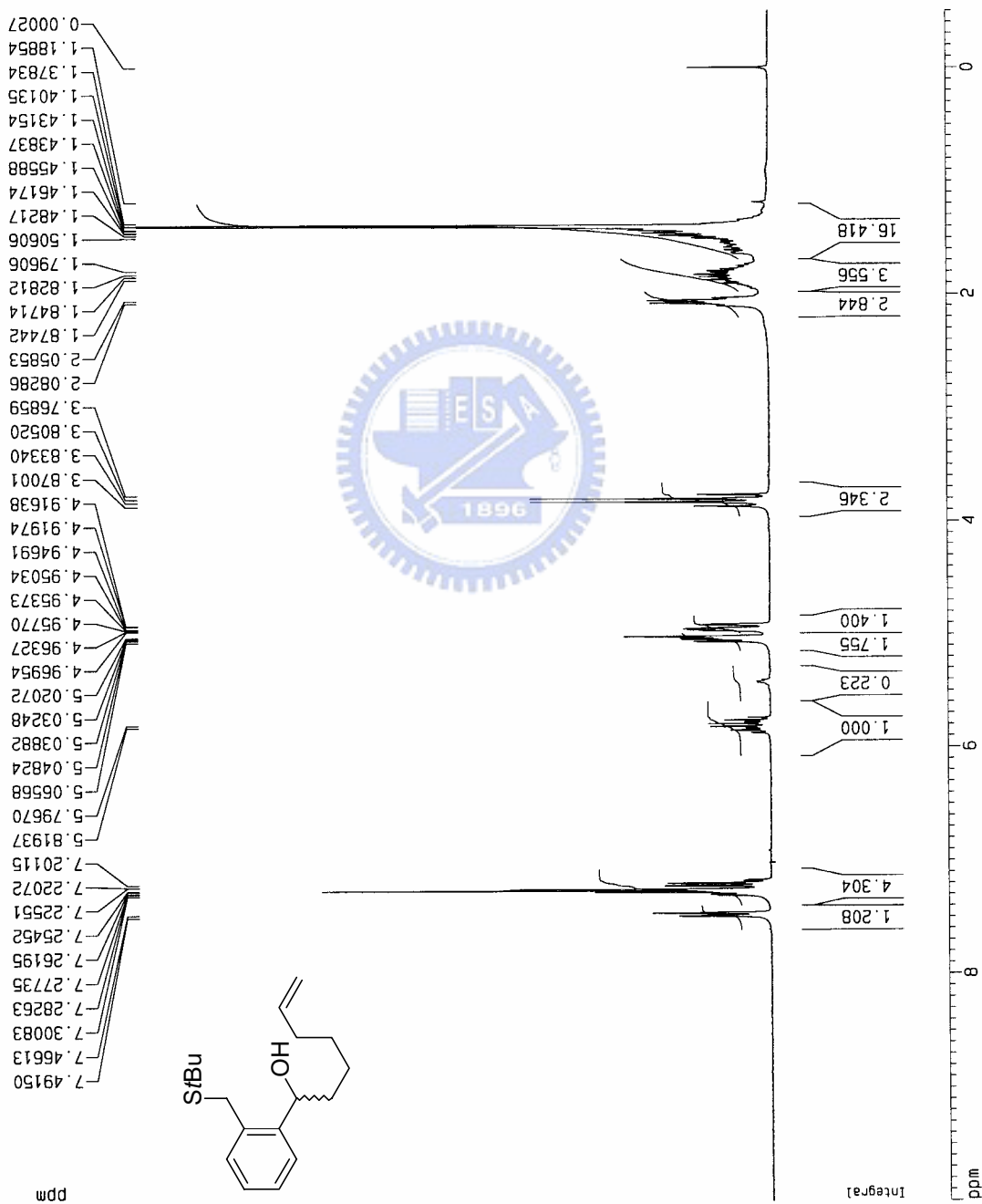
PULPROG  zg30
TD       32768
SOLVENT  CDCl3
NS       16
DS       0
SWH      7812.500 Hz
FIDRES   0.238419 Hz
AQ       2.0972021 sec
RG       456.1
DM       64.000 usec
DE       4.50 usec
TE       300.0 K
D1       1.00000000 sec

===== CHANNEL f1 =====
NUC1     1H
P1       9.10 usec
PL1     -4.00 dB
SF01    300.1321122 MHz

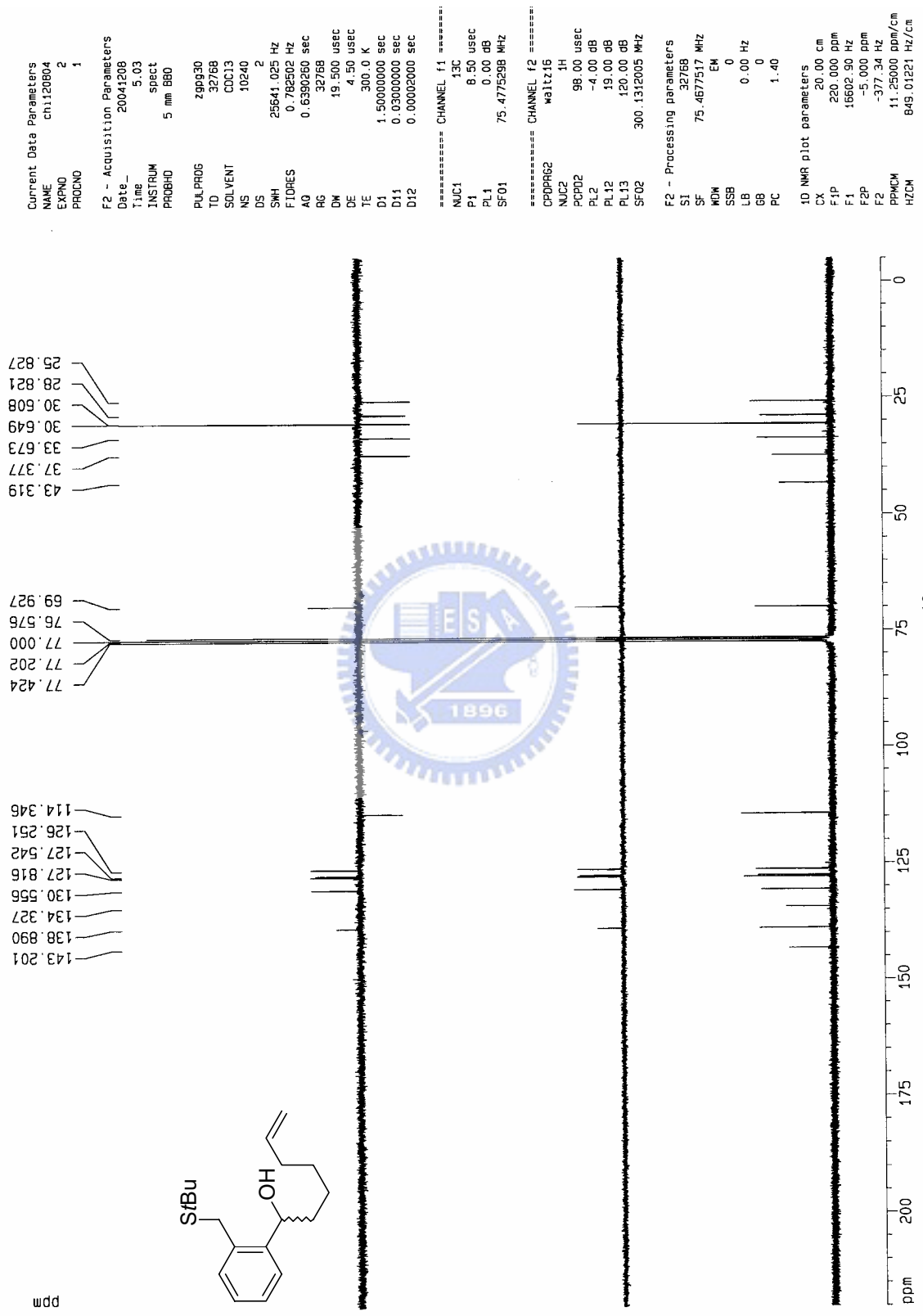
F2 - Processing parameters
SI       32768
SF       300.1300058 MHz
WDW      EM
SSB      0
LB       0.30 Hz
GB       0
PC       1.00

1D NMR plot parameters
CX       20.00 cm
F1P     10.000 ppm
F1       3001.30 Hz
F2P     -0.500 ppm
F2       -150.07 Hz
PPMCM   0.52500 ppm/cm
HZCM    157.56825 Hz/cm

```



附圖 49 化合物 96e 之 ¹H NMR 光譜圖



附圖 50 化合物 96e 之 ¹³C NMR 光譜圖

```

Current Data Parameters
NAME      Chi121204
EXPNO    5
PROCNO   1

F2 - Acquisition Parameters
Date_    20041212
Time     15.55
INSTRUM  spect
PROBHD   5 mm BBO

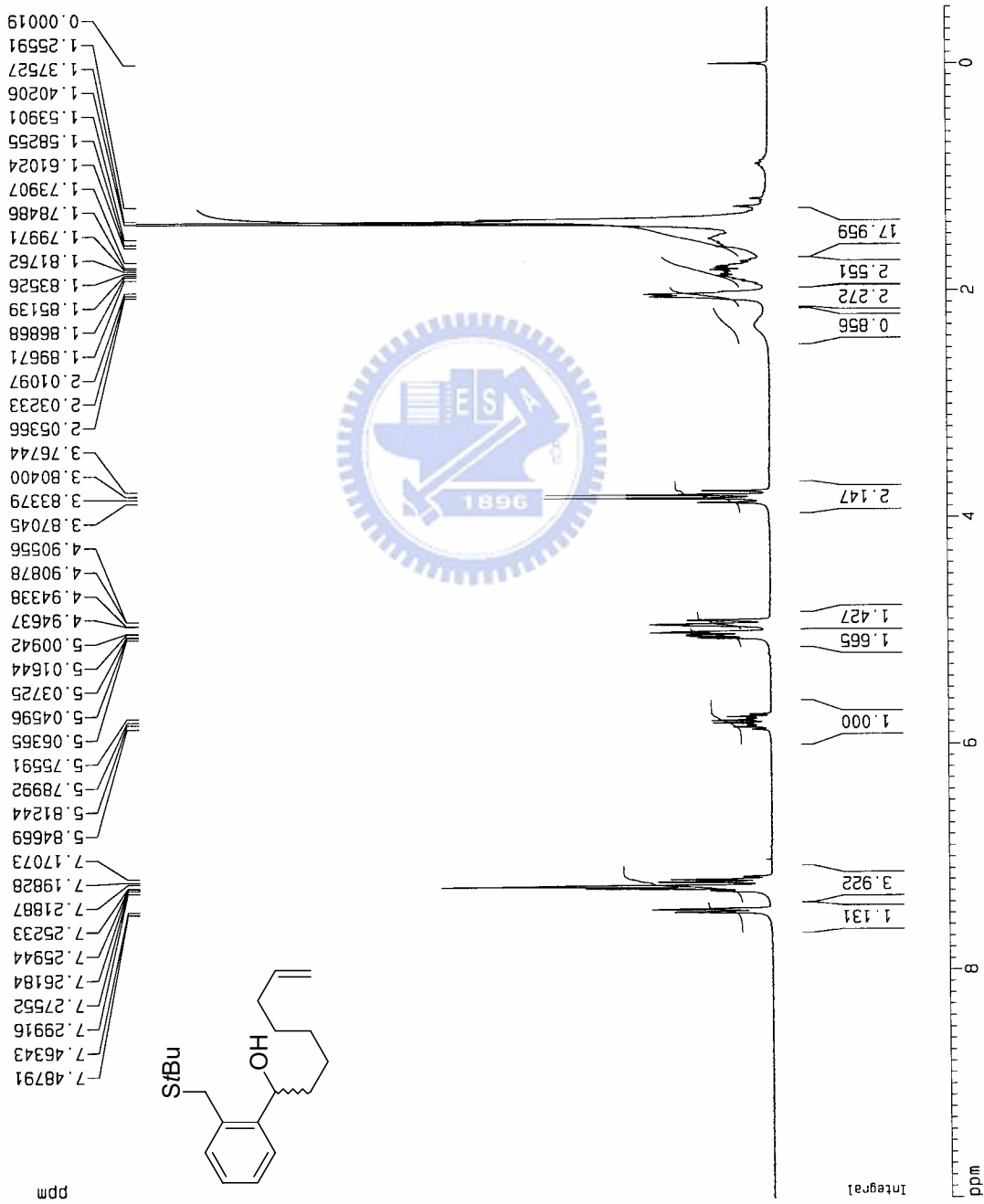
PULPROG  zg30
TD        32768
SOLVENT  CDCl3
NS        16
DS        0
SWH       7812.500 Hz
FIDRES    0.236419 Hz
AQ        2.0972021 sec
RG         362
DM        64.000 usec
DE        4.50 usec
TE        300.0 K
D1        1.00000000 sec

===== CHANNEL f1 =====
NUC1      1H
P1        9.10 usec
PL1       -4.00 dB
SF01      300.1321122 MHz

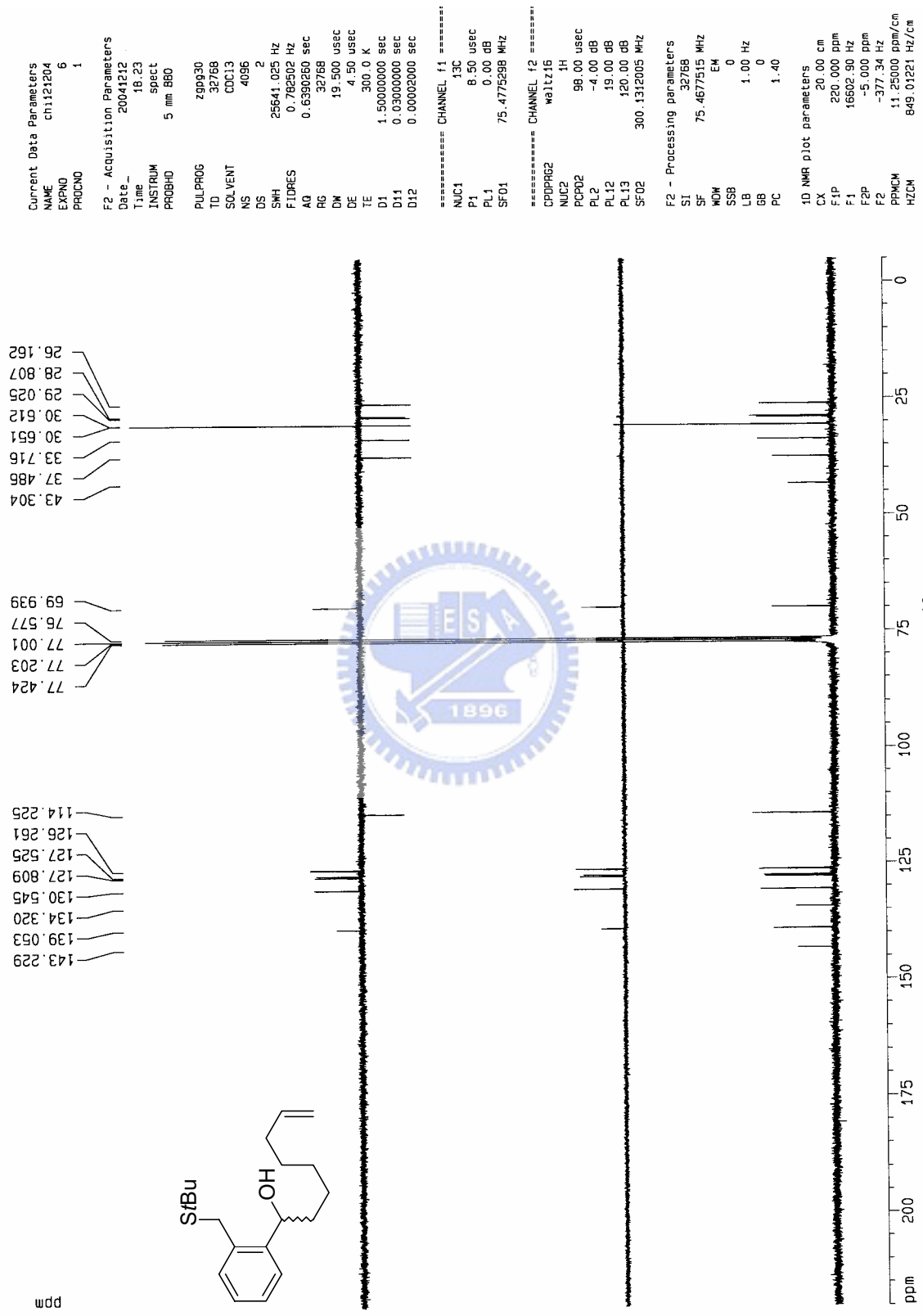
F2 - Processing parameters
SI        32768
SF        300.1300058 MHz
WDW       EM
SSB       0
LB        0.30 Hz
GB        0
PC        1.00

1D NMR plot parameters
CX        20.00 cm
F1P       10.000 ppm
F1        3001.30 Hz
F2P       -0.500 ppm
F2        -150.07 Hz
PPMCM     0.52500 ppm/cm
HZCM      157.56825 Hz/cm

```



附圖 51 化合物 96f 之 ¹H NMR 光譜圖



附圖 52 化合物 96f 之 ¹³C NMR 光譜圖

Current Data Parameters
 NAME ch120404
 EXPNO 5
 PROCNO 1

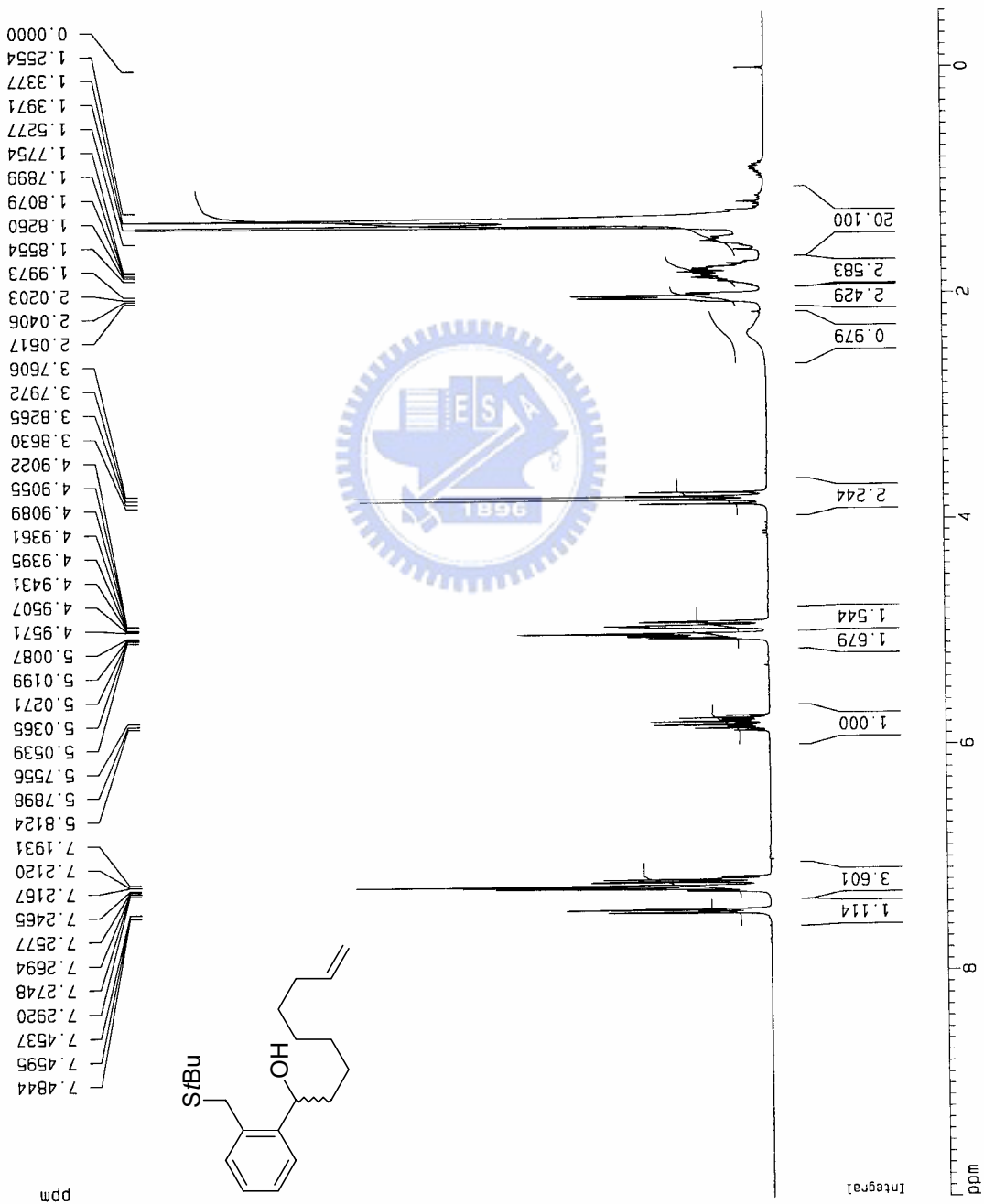
F2 - Acquisition Parameters
 Date_ 20041204
 Time_ 15.39
 INSTRUM spect
 PROBHD 5 mm BBO

PULPROG zg30
 TD 32768
 SOLVENT CDCl3
 NS 16
 DS 0
 SWH 7812.500 Hz
 FIDRES 0.238419 Hz
 AQ 2.0972021 sec
 RG 90.5
 DW 64.000 usec
 DE 4.50 usec
 TE 300.0 K
 D1 1.00000000 sec

===== CHANNEL f1 =====
 NUC1 1H
 P1 9.10 usec
 PL1 -4.00 dB
 SF01 300.1321122 MHz

F2 - Processing parameters
 SI 32768
 SF 300.1300070 MHz
 MCM EM
 SSB 0
 LB 0.30 Hz
 GB 0
 PC 1.00

1D NMR plot parameters
 CX 20.00 cm
 F1P 10.000 ppm
 F1 3001.30 Hz
 F2P -0.500 ppm
 F2 -150.07 Hz
 PPMCM 0.52500 ppm/cm
 HZCM 157.56825 Hz/cm



附圖 53 化合物 96g 之 ¹H NMR 光譜圖

```

Current Data Parameters
NAME      ch120404
EXPNO    6
PROCNO   1

F2 - Acquisition Parameters
Date_    20041204
Time     19:20
INSTRUM  spect
PROBHD   5 mm BBO

PULPROG  zgpg30
TD        32768
SOLVENT  CDCl3
NS        6144
DS        2
SWH       25641.025 Hz
FIDRES    0.782502 Hz
AQ        0.6390260 sec
RG        32768
DM        19.500 usec
DE        4.50 usec
TE        300.0 K
D1        1.50000000 sec
D11       0.03000000 sec
D12       0.00002000 sec

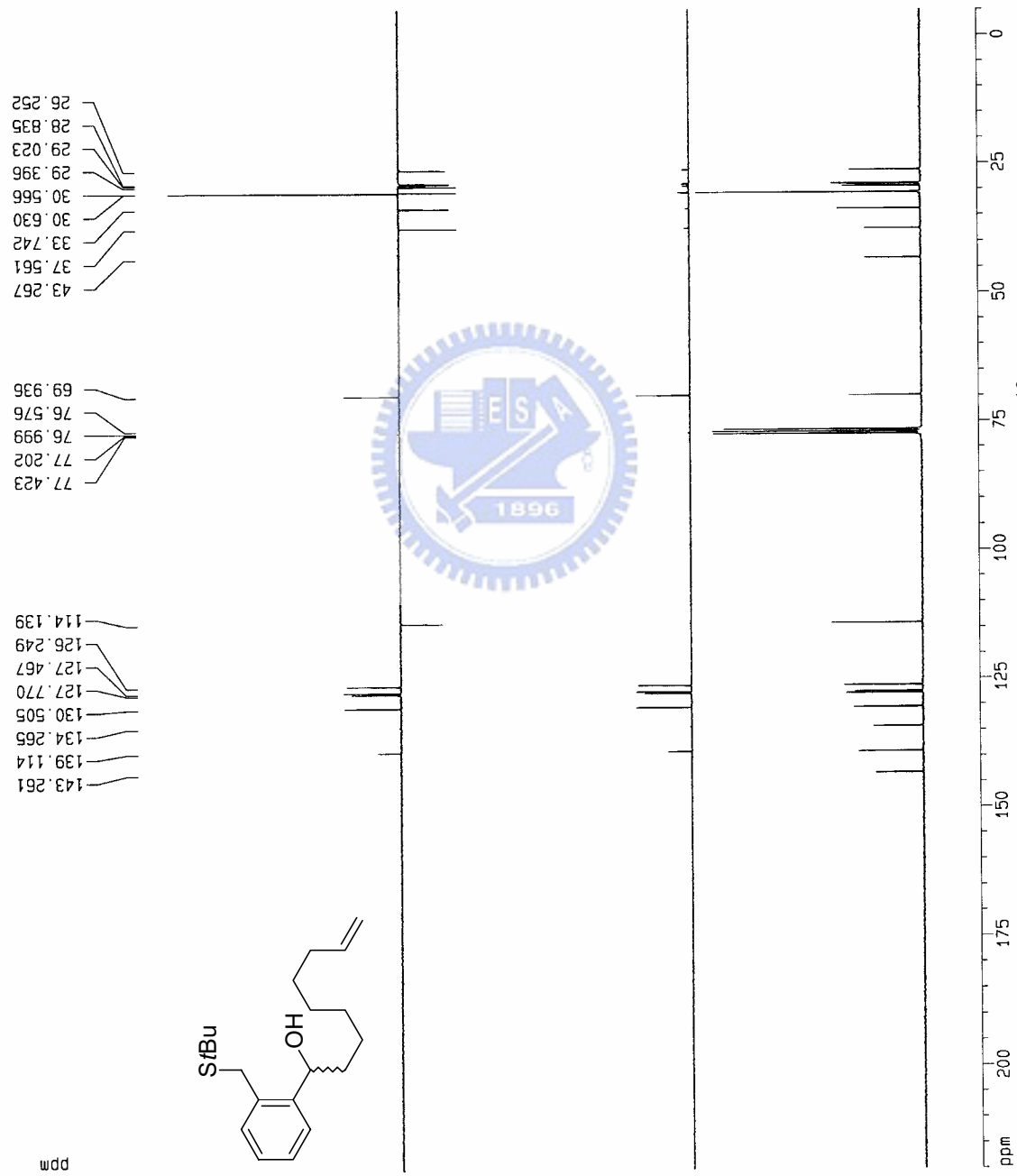
===== CHANNEL f1 =====
NUC1      13C
P1        8.50 usec
PL1       0.00 dB
SFO1     75.4775298 MHz

===== CHANNEL f2 =====
CPDPRG2  waltz16
NUC2      1H
PCPD2    98.00 usec
PL2      -4.00 dB
PL12     19.00 dB
PL13     120.00 dB
SFO2     300.1312005 MHz

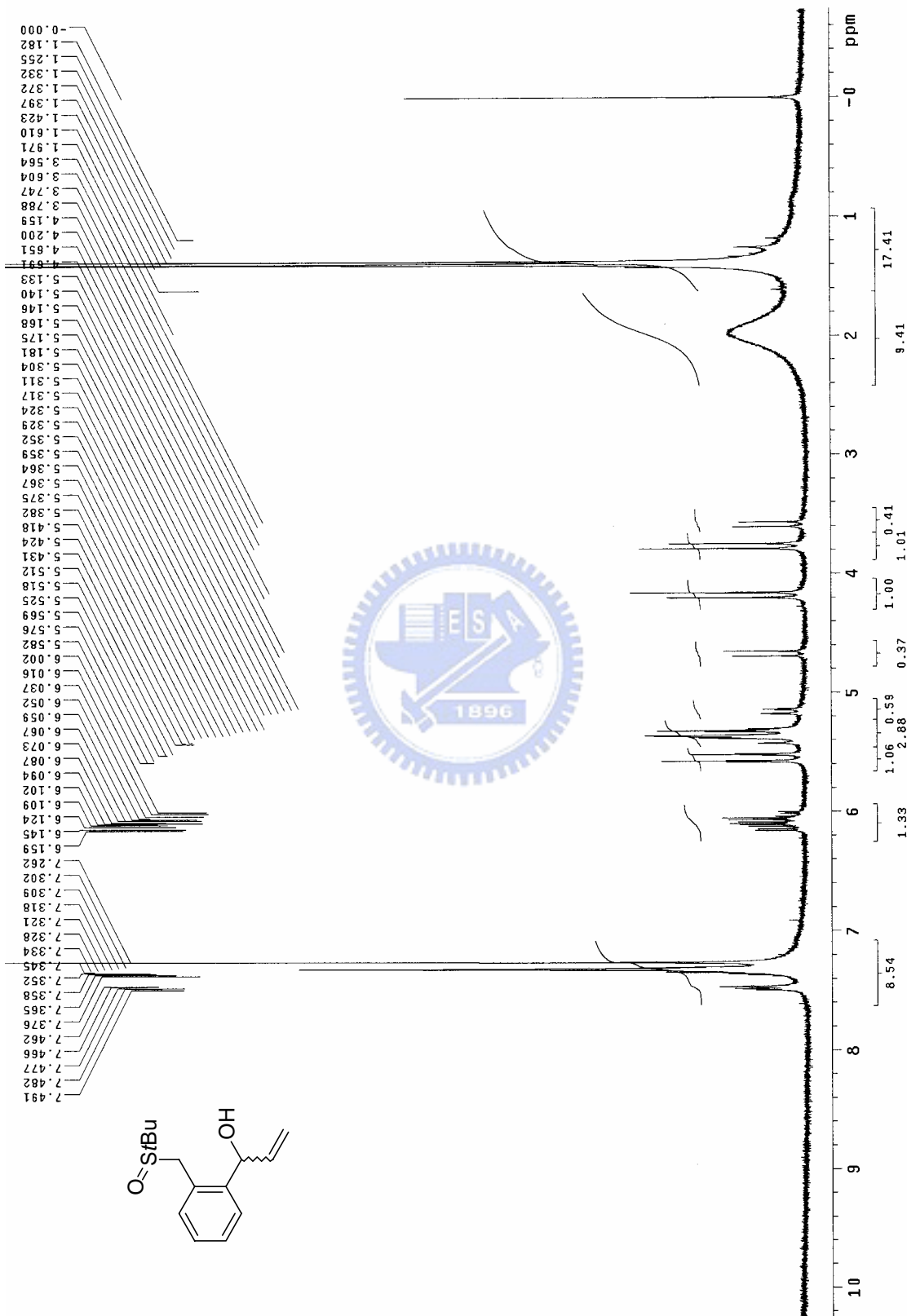
F2 - Processing parameters
SI        32768
SF        75.4677533 MHz
WDW       EM
SSB       0
LB        1.00 Hz
GB        0
PC        1.40

ID NMR plot parameters
CX        20.00 cm
FJP       220.000 ppm
F1        16602.90 Hz
F2P       -5.000 ppm
F2        -377.34 Hz
PPMCM     11.25000 ppm/cm
HZCM      849.01221 Hz/cm

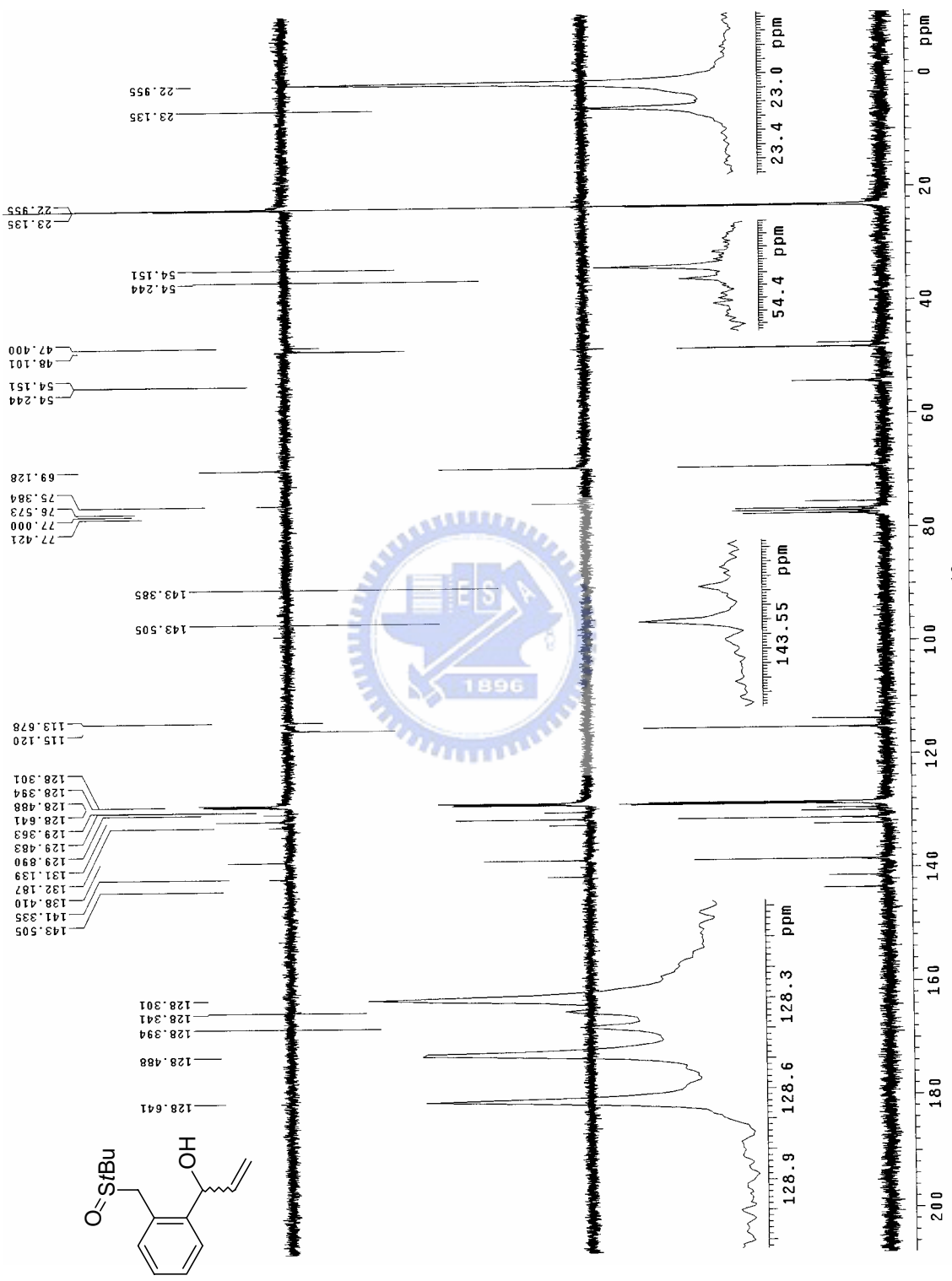
```



附圖 54 化合物 96g 之 ¹³C NMR 光譜圖



附圖 55 化合物 97a 之 ¹H NMR 光譜圖



附圖 56 化合物 97a 之 ^{13}C NMR 光譜圖

Current Data Parameters
 NAME ch112804
 EXPNO 2
 PROCNO 1

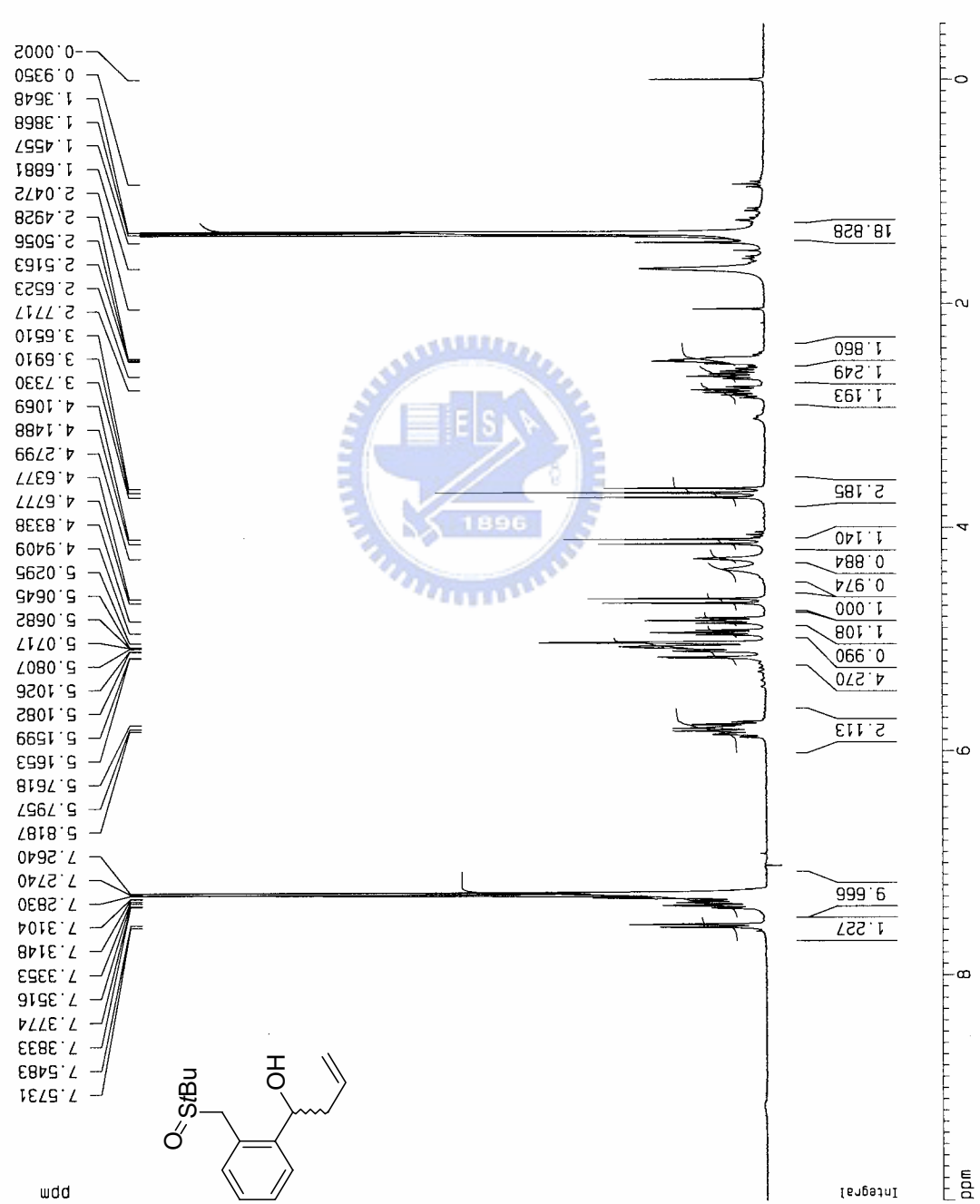
F2 - Acquisition Parameters
 Date_ 20041128
 Time 14.43
 INSTRUM spect
 PROBHD 5 mm BBO

PULPROG zg30
 TD 32768
 SOLVENT CDC13
 NS 16
 DS 0
 SWH 7812.500 Hz
 FIDRES 0.238419 Hz
 AQ 2.0972021 sec
 RG 362
 DM 64.000 usec
 DE 4.50 usec
 TE 300.0 K
 D1 1.00000000 sec

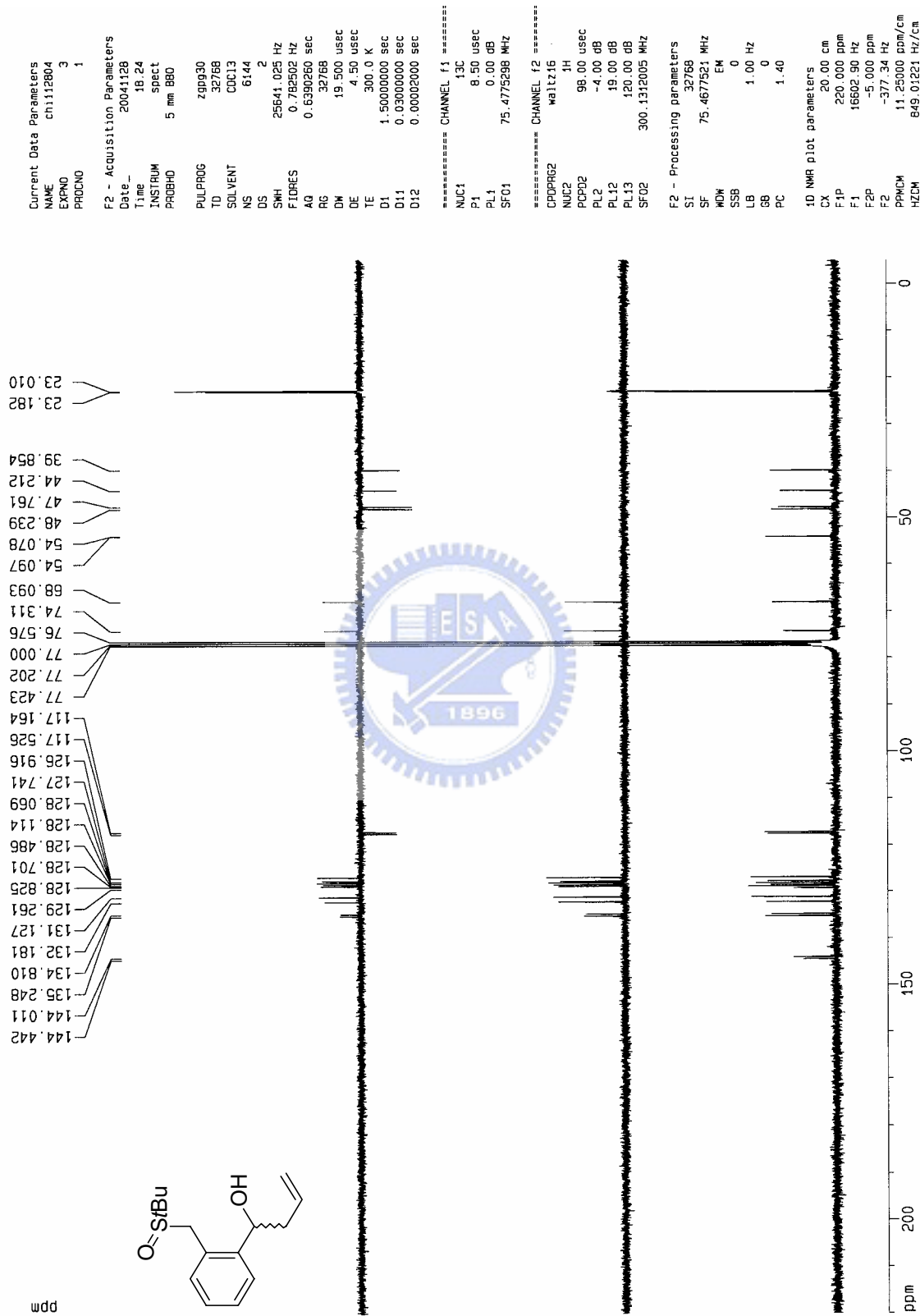
===== CHANNEL f1 =====
 NUC1 ¹H
 P1 9.10 usec
 PL1 -4.00 dB
 SFO1 300.1321122 MHz

F2 - Processing parameters
 SI 32768
 SF 300.1300053 MHz
 EM
 SSB 0
 LB 0.30 Hz
 GB 0
 PC 1.00

1D NMR plot parameters
 CX 20.00 cm
 F1P 10.000 ppm
 F1 3001.30 Hz
 F2P -0.500 ppm
 F2 -150.07 Hz
 PPMCM 0.52500 ppm/cm
 HZCM 157.56825 Hz/cm



附圖 57 化合物 97b 之 ¹H NMR 光譜圖



附圖 58 化合物 97b 之 ¹³C NMR 光譜圖

```

Current Data Parameters
NAME      chi1012705
EXPNO    1
PROCNO   1

F2 - Acquisition Parameters
Date_    20050127
Time     22.00
INSTRUM  spect
PROBHD   5 mm BBO

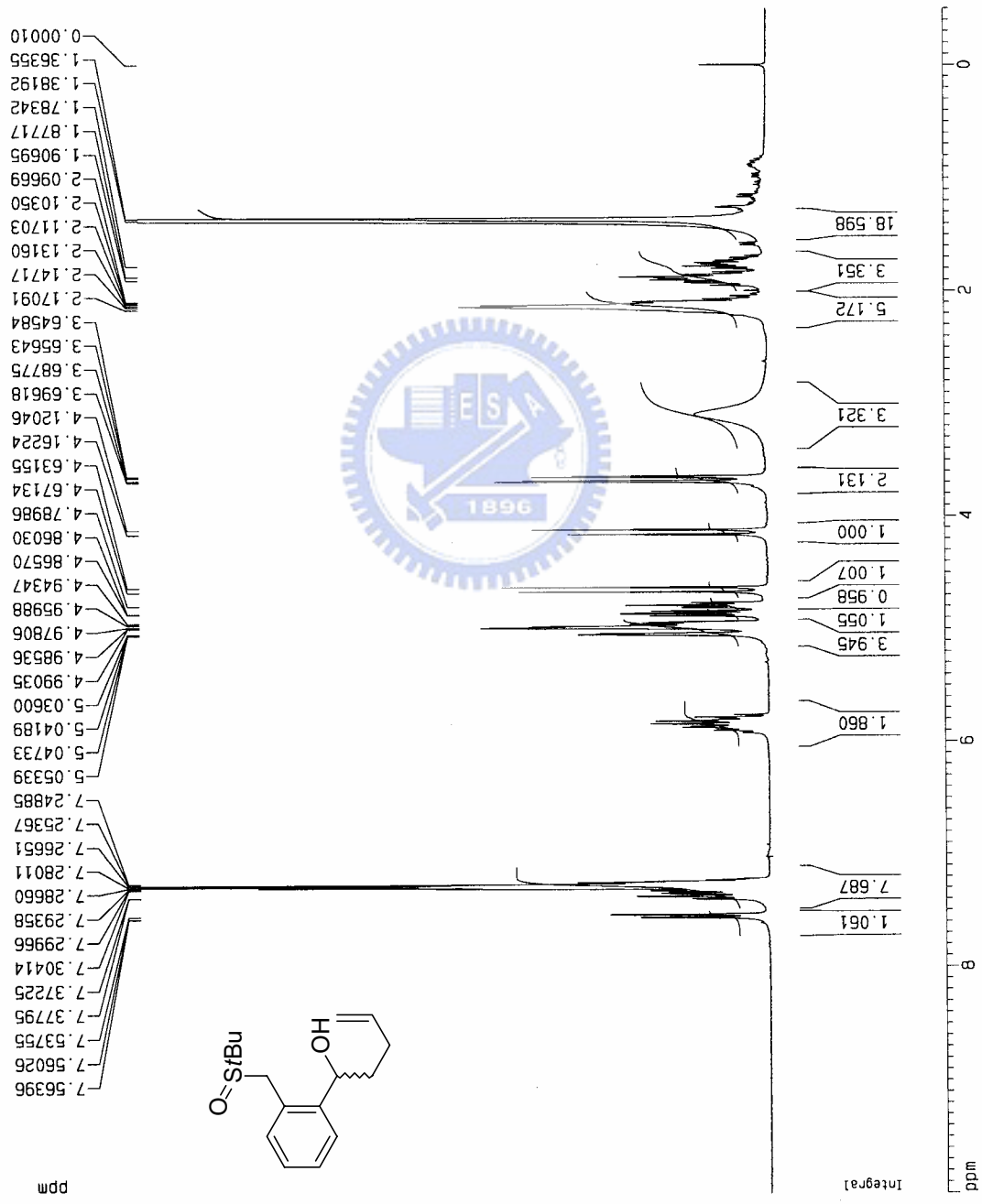
PULPROG  zg30
TD        32768
SOLVENT  CDCl3
NS        16
DS        0
SWH       7812.500 Hz
FIDRES    0.298419 Hz
AQ        2.0972021 sec
RG        181
DW        64.000 usec
DE        4.50 usec
TE        300.0 K
D1        1.00000000 sec

===== CHANNEL f1 =====
NUC1      1H
P1        9.10 usec
PL1       -4.00 dB
SF01      300.1321122 MHz

F2 - Processing parameters
SI        32768
SF        300.1300043 MHz
WDW       EM
SSB       0
LB        0.30 Hz
GB        0
PC        1.00

1D NMR plot parameters
CX        20.00 cm
F1P       10.000 ppm
F1        3001.30 Hz
F2P       -0.500 ppm
F2        -150.07 Hz
PPMCM     0.52500 ppm/cm
HZCM      157.56825 Hz/cm

```



附圖 59 化合物 97c 之 ¹H NMR 光譜圖

```

Current Data Parameters
NAME      ch1012705
EXPNO    2
PROCNO   1

F2 - Acquisition Parameters
Date_    20050128
Time     7.12
INSTRUM spect
PROBHD   5 mm BBO

PULPROG  zgpg30
TD       32768
SOLVENT  CDCl3
NS       15360
DS       2
SWH      25641.025 Hz
FIDRES   0.782502 Hz
AQ       0.6390260 sec
RG       32768
DM       19.500 usec
DE       4.50 usec
TE       300.0 K
D1       1.50000000 sec
D11      0.03000000 sec
D12      0.00002000 sec

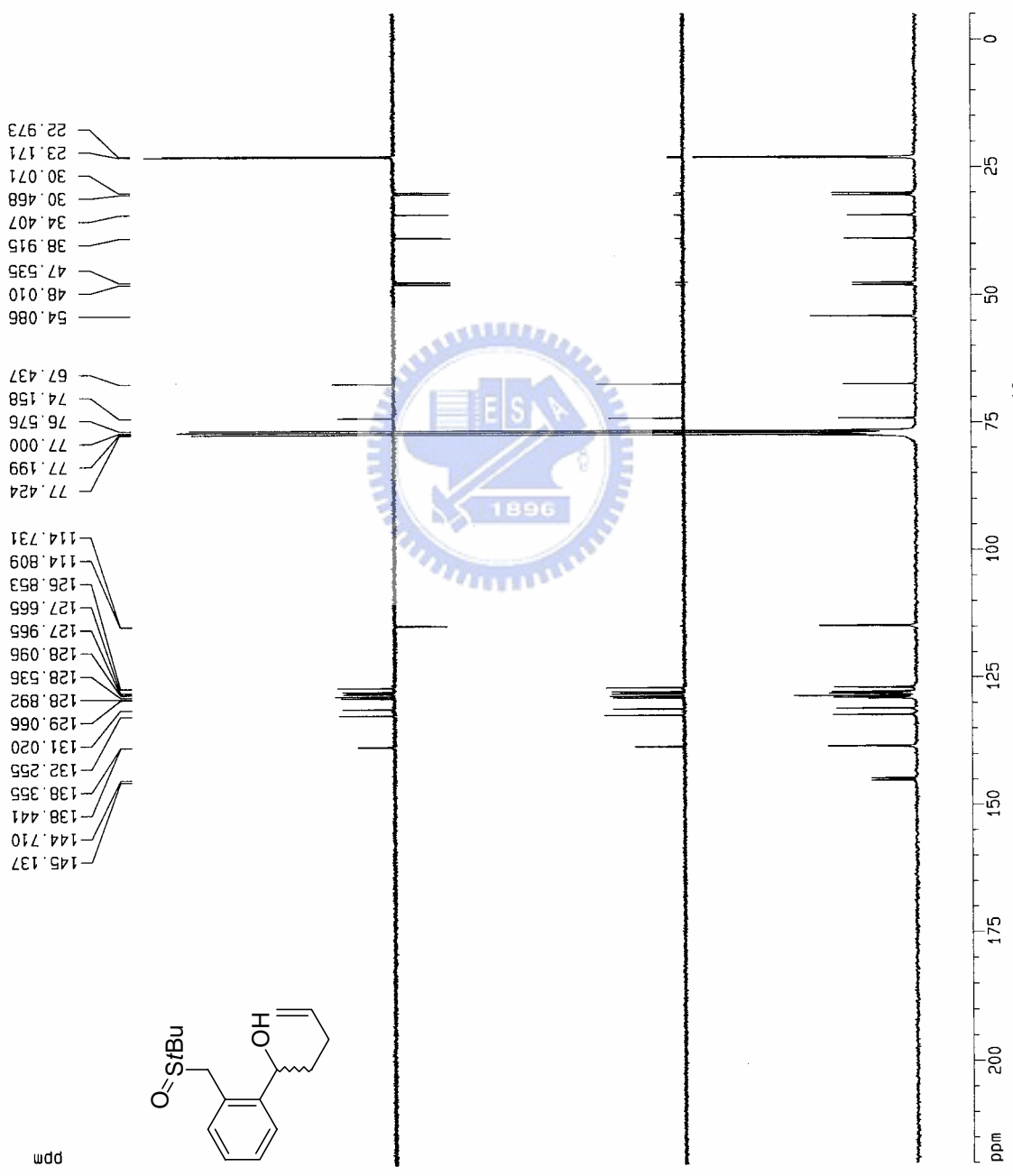
===== CHANNEL f1 =====
NUC1     13C
P1       8.50 usec
PL1      0.00 dB
SF01     75.4775298 MHz

===== CHANNEL f2 =====
CPDPRG2  waltz16
NUC2     1H
PCPD2    98.00 usec
PL2      -4.00 dB
PL12     19.00 dB
PL13     120.00 dB
SF02     300.1312005 MHz

F2 - Processing parameters
SI       32768
SF       75.4677538 MHz
WDW      EM
SSB      0
LB       3.00 Hz
GB       0
PC       1.40

1D NMR plot parameters
CX       20.00 cm
F1P      220.000 ppm
F1       16602.90 Hz
F2P      -5.000 ppm
F2       -377.34 Hz
PPMCH   11.25000 ppm/cm
HZCM     849.01221 Hz/cm

```



附圖 60 化合物 97c 之 ¹³C NMR 光譜圖

Current Data Parameters
 NAME ch1012005
 EXPNO 5
 PROCNO 1

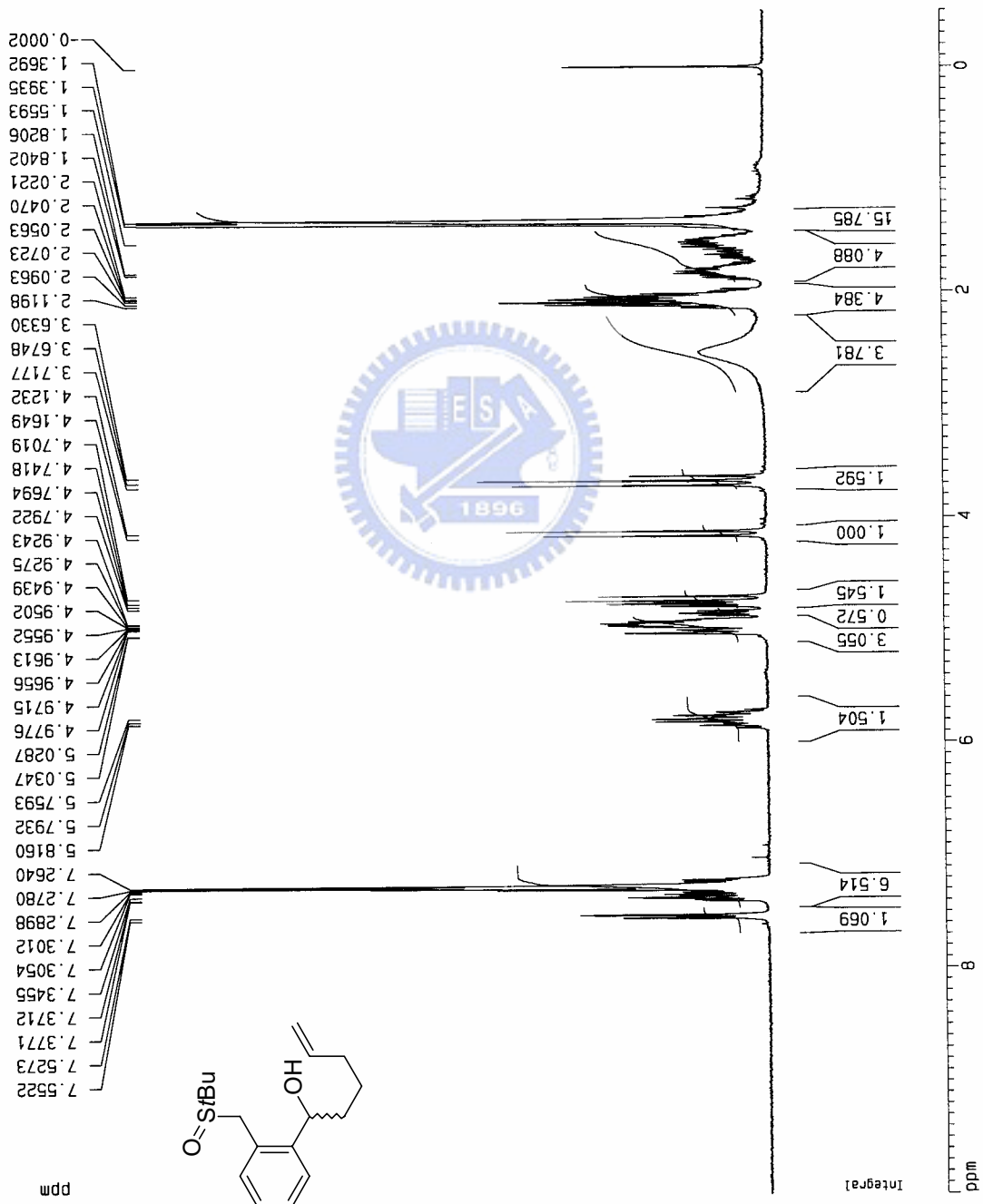
F2 - Acquisition Parameters
 Date_ 20050120
 Time 19.20
 INSTRUM spect
 PROBHD 5 mm BBO

PULPROG zg30
 TD 32768
 SOLVENT CDCl3
 NS 16
 DS 0
 SWH 7812.500 Hz
 FIDRES 0.238419 Hz
 AQ 2.0972021 sec
 RG 406.4
 DM 64.000 usec
 DE 4.50 usec
 TE 300.0 K
 D1 1.00000000 sec

===== CHANNEL f1 =====
 NUC1 1H
 P1 9.10 usec
 PL1 -4.00 dB
 SF01 300.1321122 MHz

F2 - Processing parameters
 SI 32768
 SF 300.1300048 MHz
 WDM EM
 SSB 0
 LB 0.30 Hz
 GB 0
 PC 1.00

1D NMR plot parameters
 CX 20.00 cm
 F1P 10.000 ppm
 F1 3001.30 Hz
 F2P -0.500 ppm
 F2 -150.07 Hz
 PPMCM 0.52500 ppm/cm
 HZCM 157.56825 Hz/cm



附圖 61 化合物 97d 之 ¹H NMR 光譜圖

```

Current Data Parameters
NAME      chi012005
EXPNO    2
PROCNO   1

F2 - Acquisition Parameters
Date_    20050120
Time     7.08
INSTRUM  spect
PROBHD   5 mm BBO

PULPROG  zgpg30
TD        32768
SOLVENT  CDCl3
NS        12288
DS        2
SMH       25641.025 Hz
FIDRES    0.782502 Hz
AQ        0.6390260 sec
RG        32768
DM        19.500 usec
DE        4.50 usec
TE        300.0 K
D1        1.5000000 sec
D11       0.0300000 sec
D12       0.0002000 sec

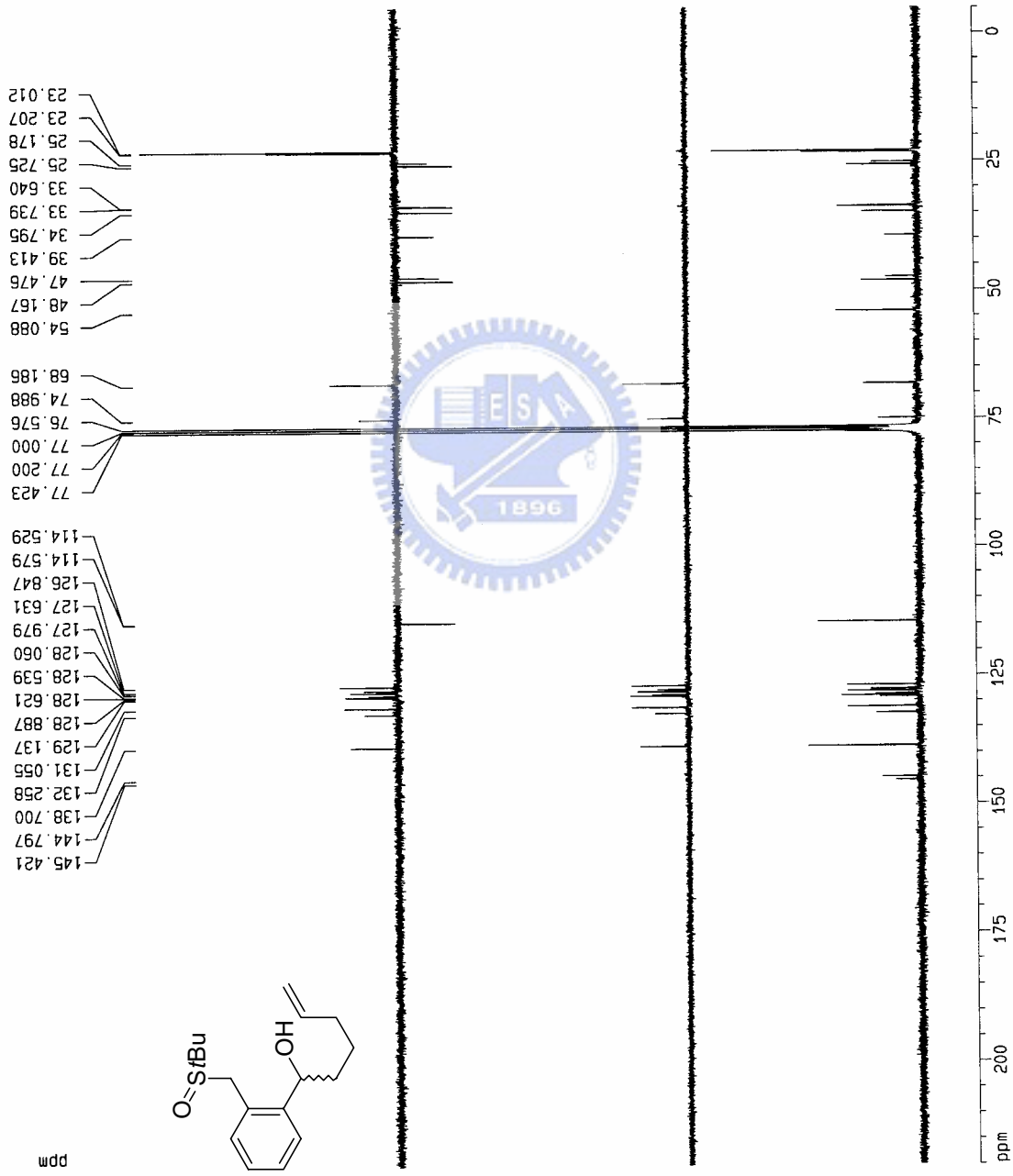
===== CHANNEL f1 =====
NUC1      13C
P1        8.50 usec
PL1       0.00 dB
SF01      75.4775298 MHz

===== CHANNEL f2 =====
CPDPRG2   waltz16
NUC2      1H
PCPD2     98.00 usec
PL2       -4.00 dB
PL12      19.00 dB
PL13      120.00 dB
SF02      300.1312005 MHz

F2 - Processing parameters
SI         32768
SF         75.4677521 MHz
RG         0
WDW        EM
SSB        0
LB         1.00 Hz
GB         0
PC         1.40

1D NMR plot parameters
CX         20.00 cm
F1P        220.000 ppm
F1         16602.90 Hz
F2P        -5.000 ppm
F2         -377.34 Hz
PPMCK      11.25000 ppm/cm
HZCM       849.01221 Hz/cm

```



附圖 62 化合物 97d 之 ¹³C NMR 光譜圖

Current Data Parameters
 NAME ch1021505
 EXPNO 1
 PROCNO 1

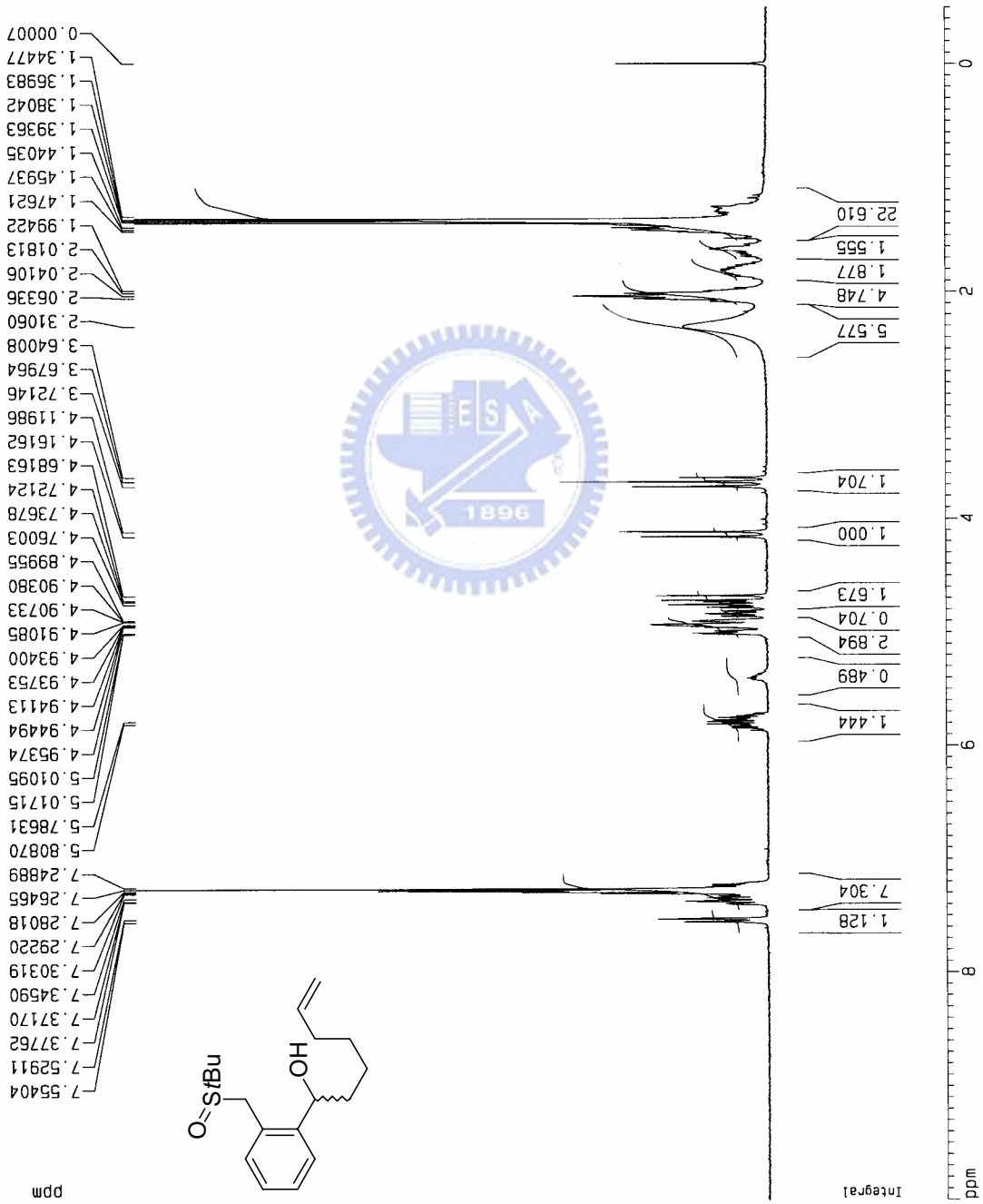
F2 - Acquisition Parameters
 Date_ 20050214
 Time 21.43
 INSTRUM spect
 PROBHD 5 mm BBO

PULPROG zg30
 TD 32768
 SOLVENT CDC13
 NS 16
 DS 0
 SWH 7812.500 Hz
 FIDRES 0.238419 Hz
 AQ 2.0972021 sec
 RG 456.1
 DW 64.000 usec
 DE 4.50 usec
 TE 300.0 K
 D1 1.00000000 sec

===== CHANNEL f1 =====
 NUC1 ¹H
 P1 9.10 usec
 PL1 -4.00 dB
 SFO1 300.1321122 MHz

F2 - Processing parameters
 SI 32768
 SF 300.1300050 MHz
 MDW EM
 SSB 0
 LB 0.30 Hz
 GB 0
 PC 1.00

1D NMR plot parameters
 CX 20.00 cm
 F1P 10.000 ppm
 F1 3001.30 Hz
 F2P -0.500 ppm
 F2 -150.07 Hz
 PPMCM 0.52500 ppm/cm
 HZCM 157.56825 Hz/cm



附圖 63 化合物 97e 之 ¹H NMR 光譜圖

```

Current Data Parameters
NAME      ch1021905
EXPNO    2
PROCNO   1

F2 - Acquisition Parameters
Date_    20050214
Time     21.50
INSTRUM  spect
PROBHD   5 mm BBO

PULPROG  zgpg30
TD        32768
SOLVENT  CDCl3
NS        15360
DS        2
SWH       25641.025 Hz
FIDRES    0.782502 Hz
AQ        0.63390260 sec
RG        32768
DW        19.500 usec
DE        4.50 usec
TE        300.0 K
D1        1.50000000 sec
D11       0.30000000 sec
D12       0.00020000 sec

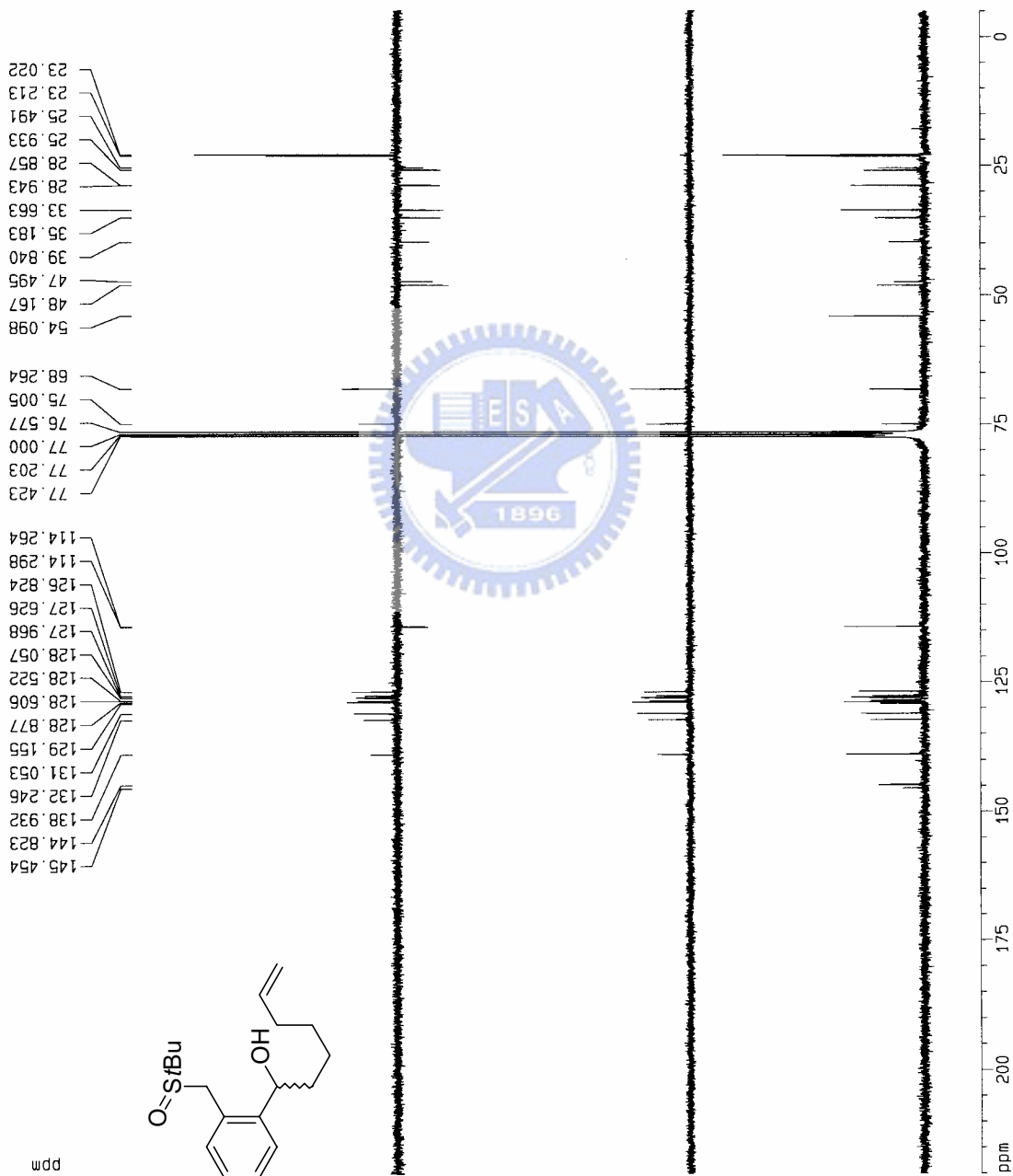
===== CHANNEL f1 =====
NUC1      13C
P1        8.30 usec
PL1       0.00 dB
SF01      75.4775298 MHz

===== CHANNEL f2 =====
waitz15
NUC2      1H
PCPD2     98.00 usec
PL2       -4.00 dB
PL12      19.00 dB
PL13      120.00 dB
SF02      300.1312005 MHz

F2 - Processing parameters
SI        32768
SF        75.4677521 MHz
WDW       EM
SSB       0
LB        1.00 Hz
GB        0
PC        1.40

1D NMR plot parameters
CX        20.00 cm
F1P       220.000 ppm
F1        16602.90 Hz
F2P       -5.000 ppm
F2        -377.34 Hz
PPMCH    11.25000 ppm/cm
HZCM      849.01221 Hz/cm

```



附圖 64 化合物 97e 之 ^{13}C NMR 光譜圖


```

Current Data Parameters
NAME      chi121104
EXPNO     1
PROCNO    1

F2 - Acquisition Parameters
Date_     20041210
Time      21.35
INSTRUM   spect
PROBHD    5 mm BBO

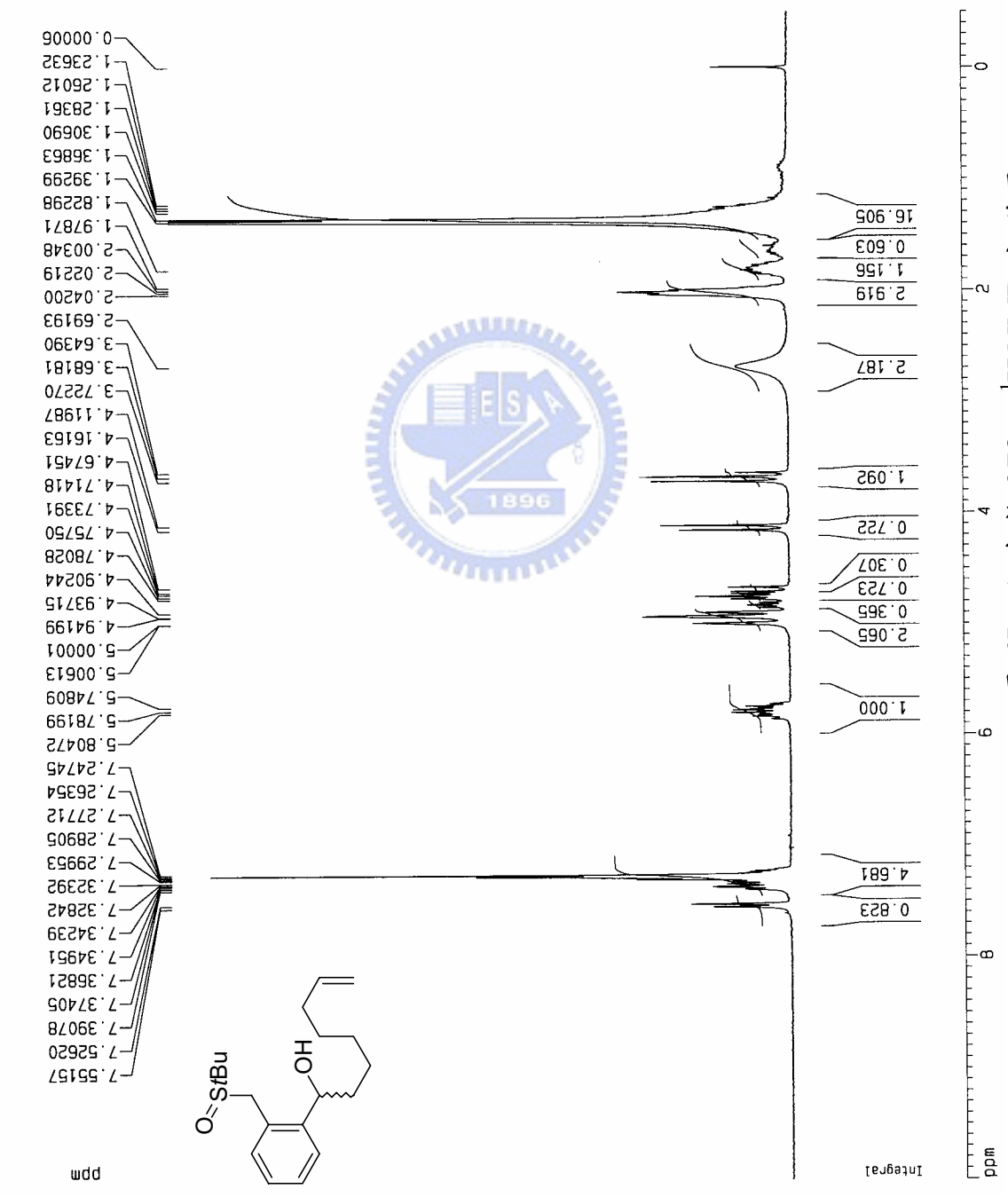
PULPROG   zg30
TD         32768
SOLVENT   CDCl3
NS         16
DS         0
SWH        7812.500 Hz
FIDRES     0.238419 Hz
AQ         2.0972021 sec
RG         362
DM         64.000 usec
DE         4.50 usec
TE         300.0 K
D1         1.00000000 sec

===== CHANNEL f1 =====
NUC1      1H
P1        9.10 usec
PL1       -4.00 dB
SF01      300.1321122 MHz

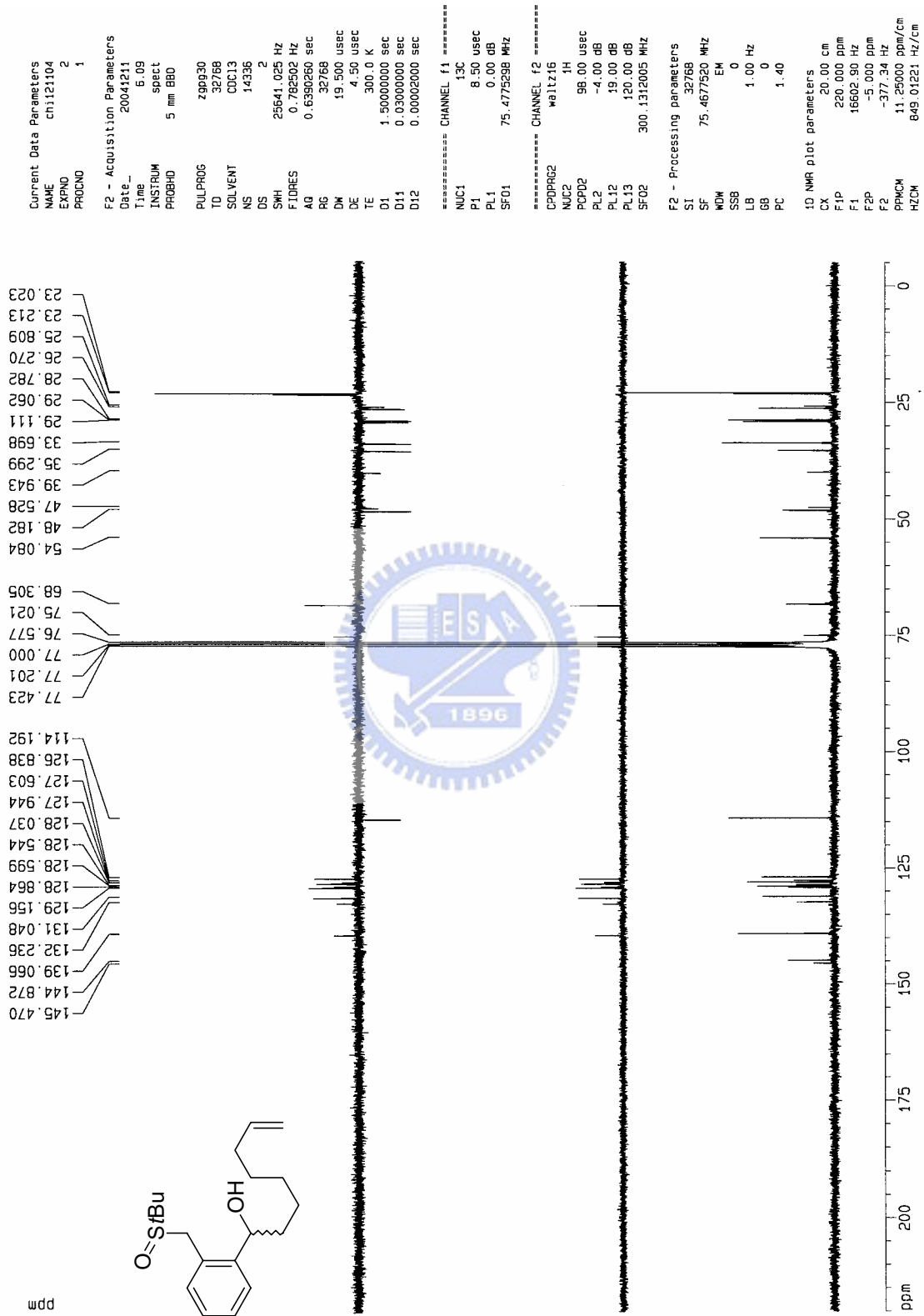
F2 - Processing parameters
SI        32768
SF        300.1300053 MHz
WDW       EM
SSB       0
LB        0.30 Hz
GB         0
PC        1.00

1D NMR plot parameters
CX        20.00 cm
F1P       10.000 ppm
F1        3001.30 Hz
F2P       -0.500 ppm
F2        -150.07 Hz
PPMCM     0.52500 ppm/cm
HZCM      157.56825 Hz/cm

```



附圖 65 化合物 97f 之 ¹H NMR 光譜圖



Current Data Parameters
 NAME ch1031205
 EXPNO 1
 PROCNO 1

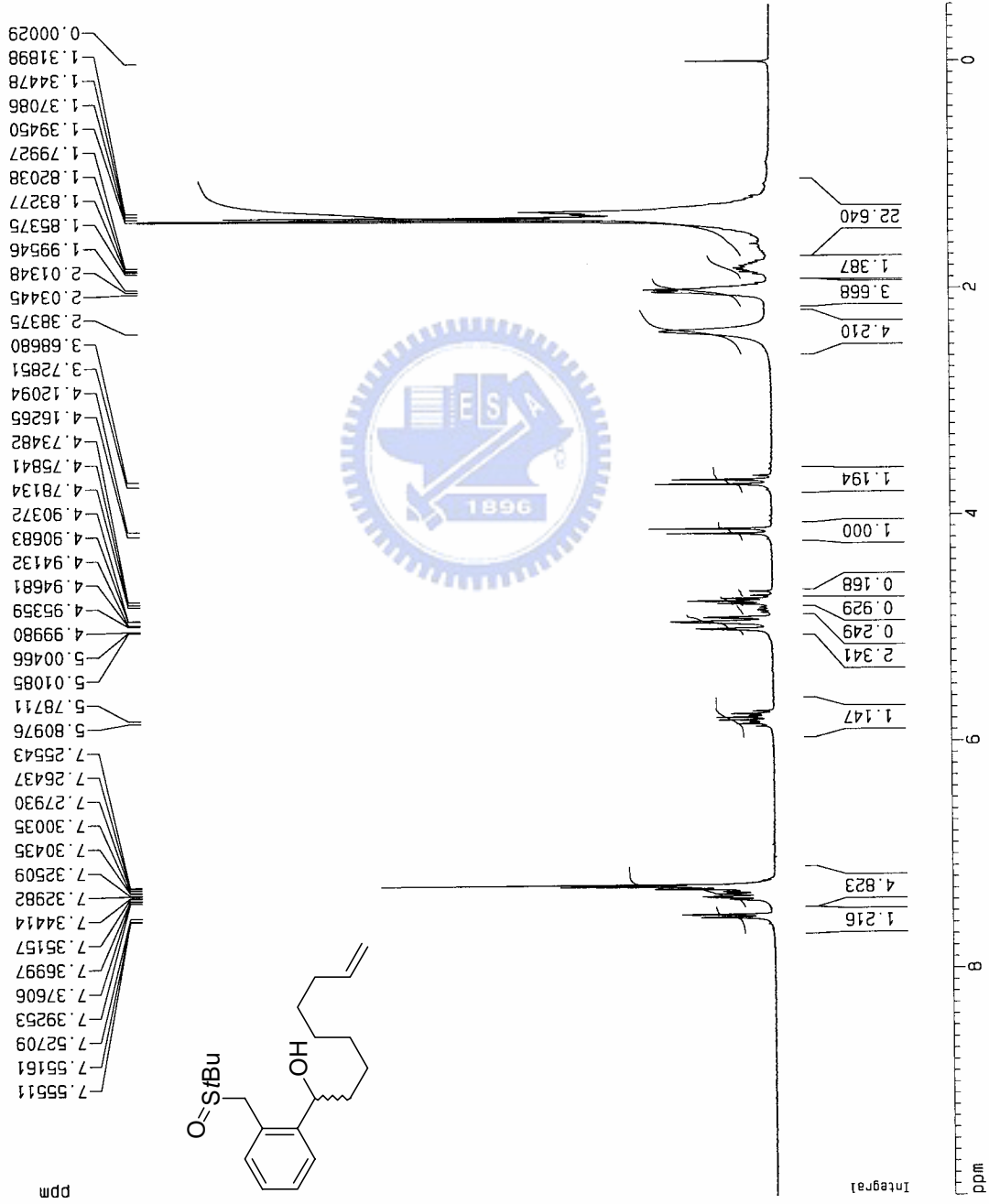
F2 - Acquisition Parameters
 Date_ 20050312
 Time 1.15
 INSTRUM spect
 PROBHD 5 mm BBO

PULPROG zg30
 TD 32768
 SOLVENT CDCl3
 NS 16
 DS 0
 SWH 7812.500 Hz
 FIDRES 0.238419 Hz
 AQ 2.0972021 sec
 RG 456.1
 DW 64.000 usec
 DE 4.50 usec
 TE 300.0 K
 D1 1.00000000 sec

===== CHANNEL f1 =====
 NUC1 1H
 P1 9.10 usec
 PL1 -4.00 dB
 SF01 300.1321122 MHz

F2 - Processing parameters
 SI 32768
 SF 300.1300053 MHz
 WDW EM
 SSB 0
 LB 0.30 Hz
 GB 0
 PC 1.00

1D NMR plot parameters
 CX 20.00 cm
 F1P 10.000 ppm
 F1 3001.30 Hz
 F2P -0.500 ppm
 F2 -150.07 Hz
 PPMCM 0.52500 ppm/cm
 HZCM 157.56825 Hz/cm



附圖 67 化合物 97g 之 ¹H NMR 光譜圖

```

Current Data Parameters
NAME ch1031205
EXPNO 2
PROCNO 1

F2 - Acquisition Parameters
Date_ 20050312
Time 6.36
INSTRUM spect
PROBHD 5 mm BBO

PULPROG zgpg30
TD 32768
SOLVENT CDC13
NS 12288
DS 2
SWH 25641.025 Hz
FIDRES 0.782502 Hz
AQ 0.6390260 sec
RG 32768
DM 19.500 usec
DE 4.50 usec
TE 300.0 K
D1 1.50000000 sec
D11 0.03000000 sec
D12 0.00002000 sec

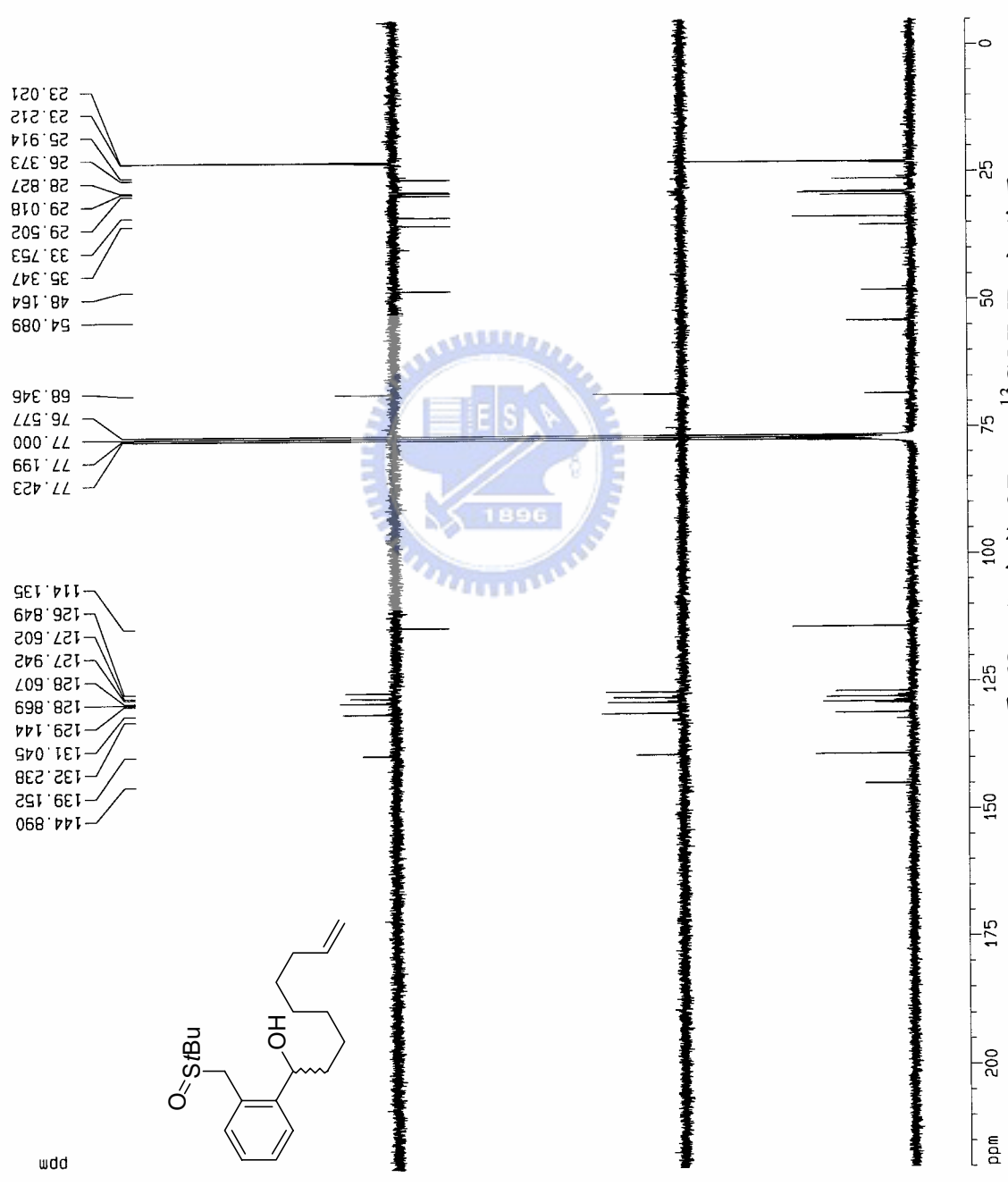
***** CHANNEL f1 *****
NUC1 13C
P1 8.50 usec
PL1 0.00 dB
SF01 75.4775298 MHz

***** CHANNEL f2 *****
CPDPRG2 waltz16
NUC2 1H
PCPD2 98.00 usec
PL2 -4.00 dB
PL12 19.00 dB
PL13 120.00 dB
SF02 300.1312005 MHz

F2 - Processing parameters
SI 32768
SF 75.4677521 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40

1D NMR plot parameters
CX 20.00 cm
F1P 220.000 ppm
F1 16602.90 Hz
F2P -5.000 ppm
F2 -377.34 Hz
PP4CM 11.25000 ppm/cm
HZCM 849.01221 Hz/cm

```



附圖 68 化合物 97g 之 ¹³C NMR 光譜圖

Current Data Parameters
 NAME chi120404
 EXPNO 1
 PROCNO 1

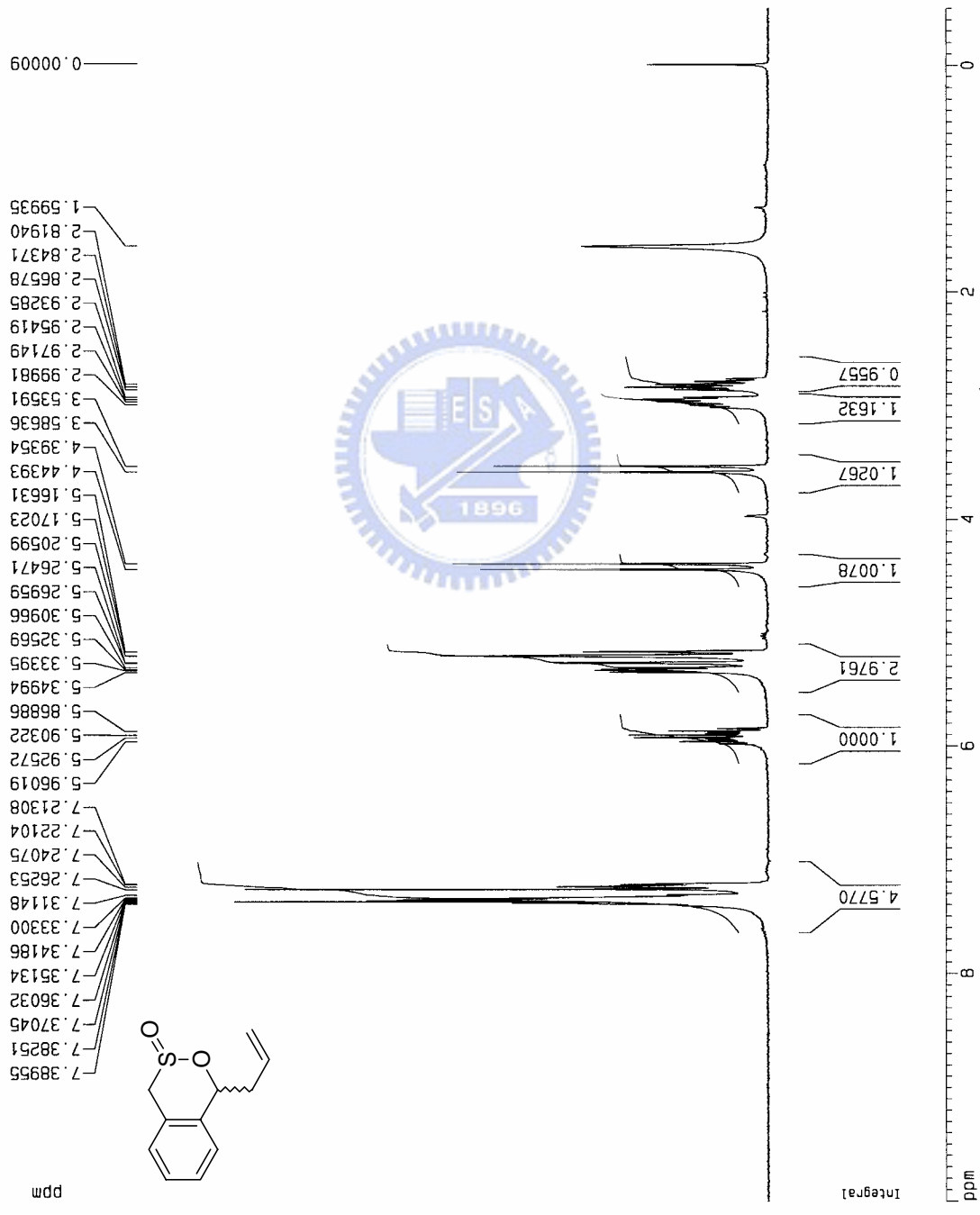
F2 - Acquisition Parameters
 Date_ 20041204
 Time 9.51
 INSTRUM spect
 PROBHD 5 mm BBO

PULPROG zg30
 TD 32768
 SOLVENT CDCl3
 NS 16
 DS 0
 SWH 7812.500 Hz
 FIDRES 0.238419 Hz
 AQ 2.0972021 sec
 RG 645.1
 DW 64.000 usec
 DE 4.50 usec
 TE 300.0 K
 D1 1.00000000 sec

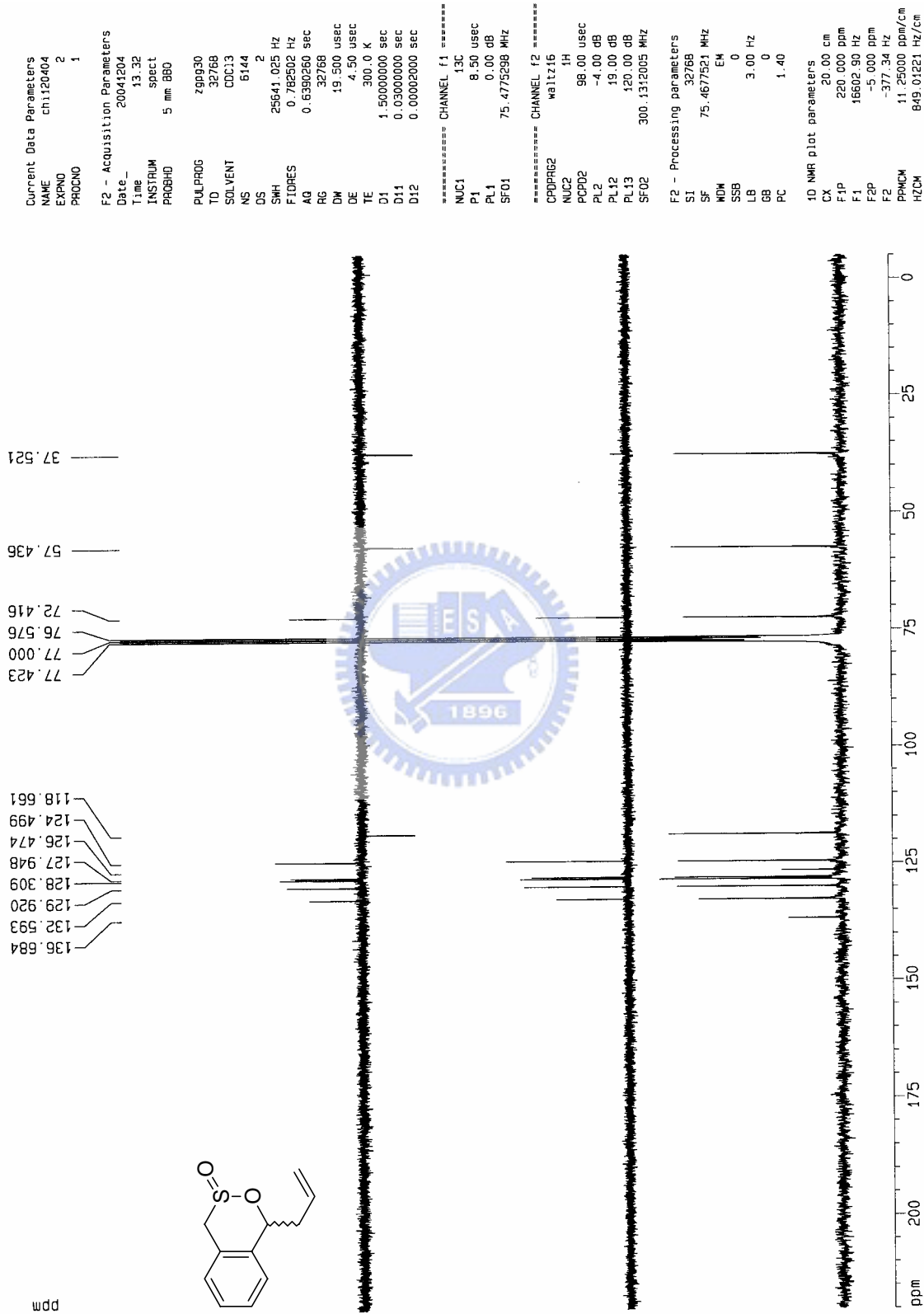
===== CHANNEL f1 =====
 NUC1 1H
 P1 9.10 usec
 PL1 -4.00 dB
 SF01 300.1321122 MHz

F2 - Processing parameters
 SI 32768
 SF 300.1300055 MHz
 MDW EM
 SSB 0
 LB 0.30 Hz
 GB 0
 PC 1.00

1D NMR plot parameters
 CX 20.00 cm
 F1P 10.000 ppm
 F1 3001.30 Hz
 F2P -0.500 ppm
 F2 -150.07 Hz
 PPMCM 0.52500 ppm/cm
 HZCM 157.56825 Hz/cm



附圖 69 化合物 98b 之 ¹H NMR 光譜圖



附圖 70 化合物 98b 之 ^{13}C NMR 光譜圖

Current Data Parameters
 NAME ch1020305
 EXPNO 2
 PROCNO 1

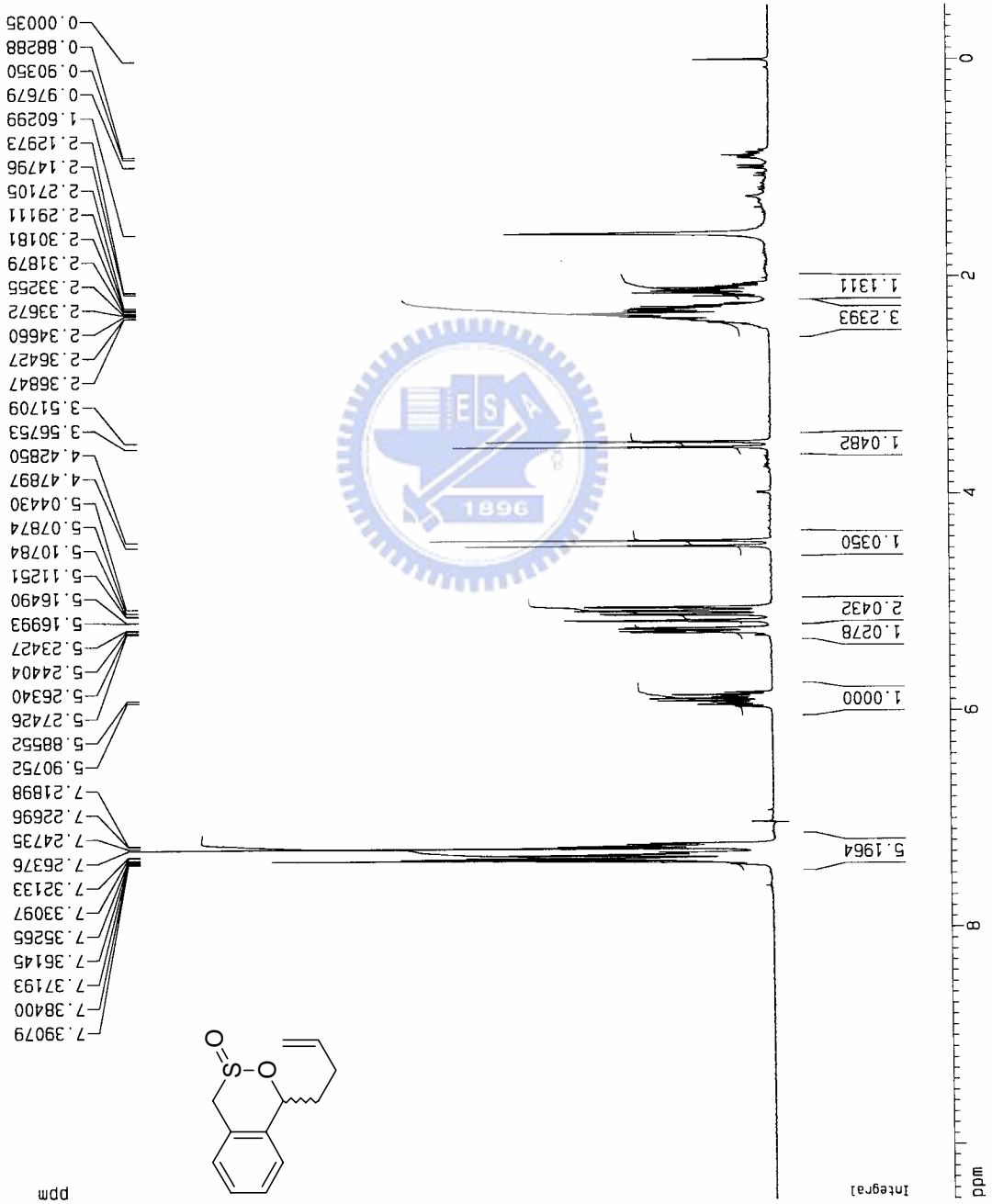
F2 - Acquisition Parameters
 Date_ 20050203
 Time_ 18.37
 INSTRUM spect
 PROBHD 5 mm BBO

PULPROG zg30
 TD 32768
 SOLVENT CDCl3
 NS 16
 DS 0
 SWH 7612.500 Hz
 FIDRES 0.236419 Hz
 AQ 2.0972021 sec
 RG 256
 DW 64.000 usec
 DE 4.50 usec
 TE 300.0 K
 D1 1.00000000 sec

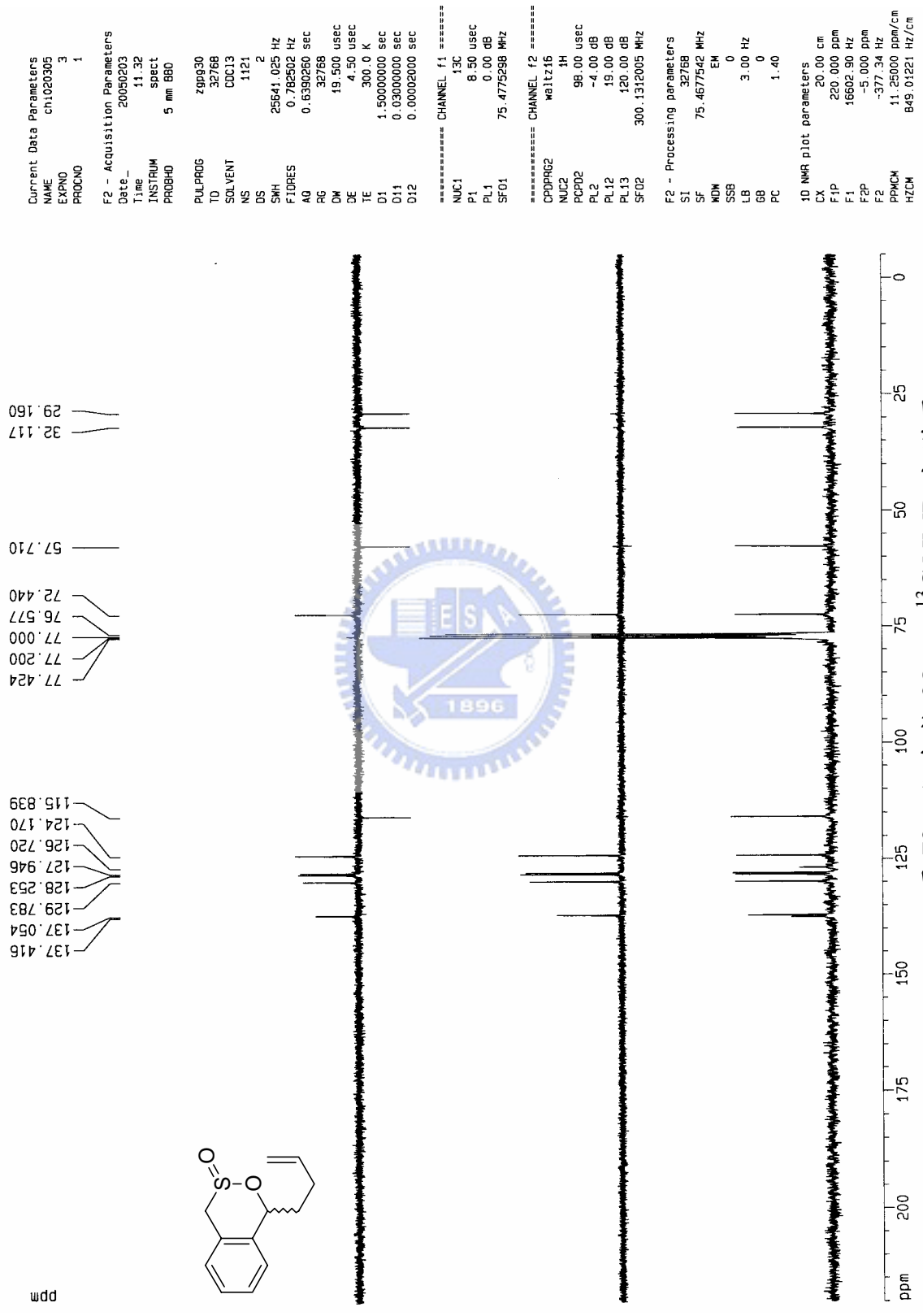
===== CHANNEL f1 =====
 NUC1 ¹H
 P1 9.10 usec
 PL1 -4.00 dB
 SF01 300.1321122 MHz

F2 - Processing parameters
 SI 32768
 SF 300.1300053 MHz
 WDW EM
 SSB 0
 LB 0.30 Hz
 GB 0
 PC 1.00

1D NMR plot parameters
 CX 20.00 cm
 F1P 10.500 ppm
 F1 3151.36 Hz
 F2P -0.500 ppm
 F2 -150.07 Hz
 PPMCM 0.55000 ppm/cm
 HZCM 165.07150 Hz/cm



附圖 71 化合物 98c 之 ¹H NMR 光譜圖



Current Data Parameters
 NAME ch1020305
 EXPNO 3
 PROCNO 1

F2 - Acquisition Parameters
 Date_ 20050203
 Time 11.32
 INSTRUM spect
 PROBHD 5 mm BBO

PULPROG zgpg30
 TD 32768
 SOLVENT CDCl3
 NS 1121
 DS 2
 SWH 25641.025 Hz
 FIDRES 0.782502 Hz
 AQ 0.6390260 sec
 RG 32768
 DM 19.500 usec
 DE 4.50 usec
 TE 300.0 K
 D1 1.5000000 sec
 D11 0.0300000 sec
 D12 0.0000200 sec

===== CHANNEL f1 =====
 NUC1 13C
 P1 8.50 usec
 PL1 0.00 dB
 SF01 75.4775298 MHz

===== CHANNEL f2 =====
 CPDPRG2 waltz16
 NUC2 1H
 PCPD2 98.00 usec
 PL2 -4.00 dB
 PL12 19.00 dB
 PL13 120.00 dB
 SF02 300.1312005 MHz

F2 - Processing parameters
 S1 32768
 SF 75.4677542 MHz
 WDW EM
 SSB 0
 LB 3.00 Hz
 GB 0
 PC 1.40

1D NMR plot parameters
 CX 20.00 cm
 F1P 220.000 ppm
 F1 16602.90 Hz
 F2P -5.000 ppm
 F2 -377.34 Hz
 PPMCM 11.25000 ppm/cm
 HZCM 849.01221 Hz/cm

附圖 72 化合物 98c 之 ¹³C NMR 光譜圖

Current Data Parameters
 NAME chi020405
 EXPNO 10
 PROCNO 1

F2 - Acquisition Parameters
 Date_ 20050204
 Time_ 19.01
 INSTRUM spect
 PROBHD 5 mm BBO

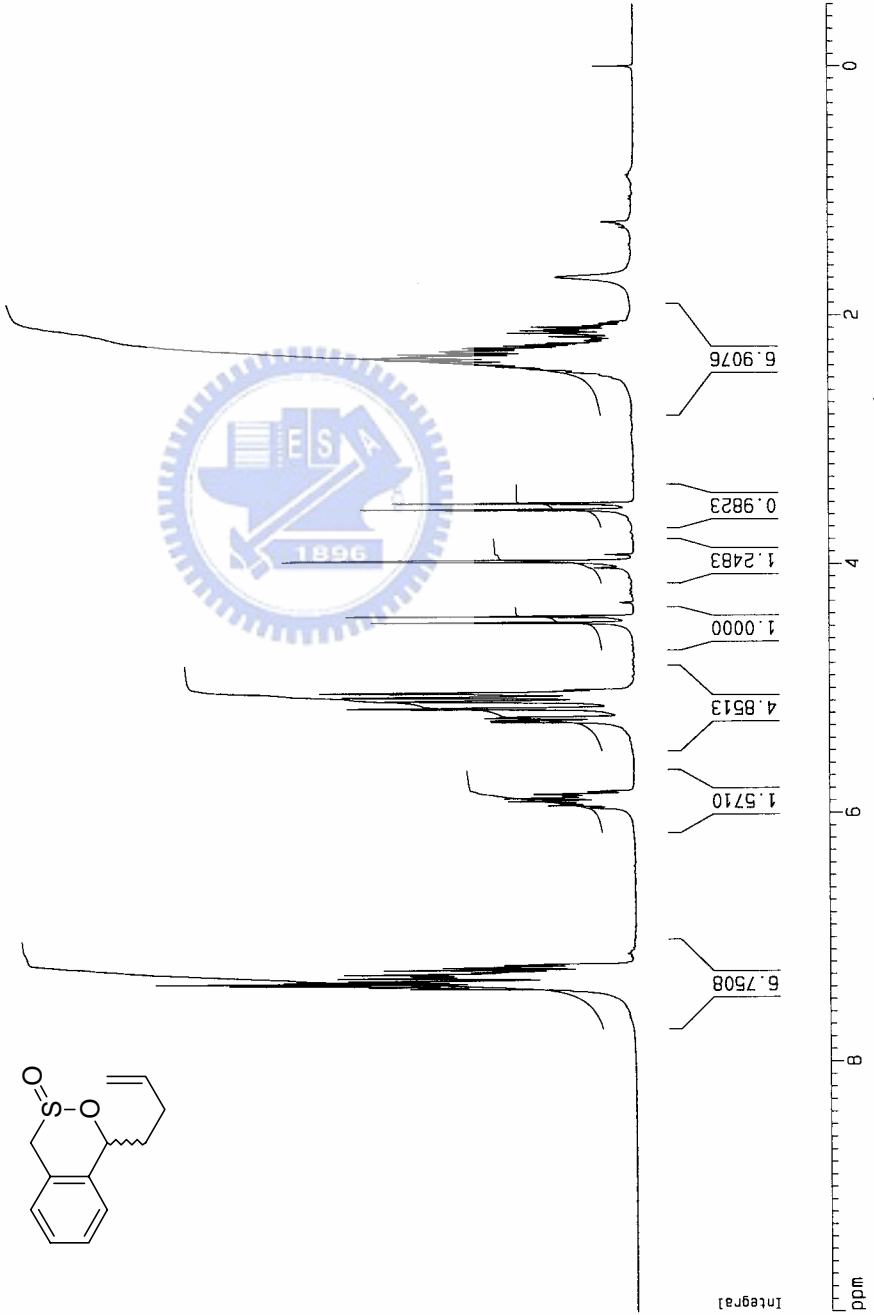
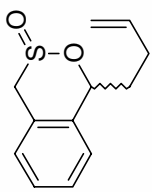
PULPROG zg30
 TD 32768
 SOLVENT CDC13
 NS 16
 DS 0
 SWH 7812.500 Hz
 FIDRES 0.238419 Hz
 AQ 2.0972021 sec
 RG 181
 DM 64,000 usec
 DE 4.50 usec
 TE 300.0 K
 D1 1.00000000 sec

===== CHANNEL f1 =====
 NUC1 ¹H
 P1 9.10 usec
 PL1 -4.00 dB
 SFO1 300.1321122 MHz

F2 - Processing parameters
 SI 32768
 SF 300.1300065 MHz
 WDW EM
 SSB 0
 LB 0.30 Hz
 GB 0
 PC 1.00

1D NMR plot parameters
 CX 20.00 cm
 F1P 10.000 ppm
 F1 3001.30 Hz
 F2P -0.500 ppm
 F2 -150.07 Hz
 PPMCM 0.52500 ppm/cm
 HZCM 157.56825 Hz/cm

7.4129
7.4057
7.3977
7.3817
7.3675
7.3570
7.3482
7.3263
7.3164
7.3097
7.2955
7.2786
7.2606
7.2421
5.2699
5.2590
5.2397
5.1671
5.1619
5.1573
5.1095
5.1048
5.0737
5.0393
4.4727
4.4222
3.9812
3.9724
3.5618
3.5114
2.3854
2.3650
2.3431
2.3324
2.3150
2.2975
2.2906
2.2774
2.2661
2.0957
1.6960
1.2534
-0.0005



附圖 73 化合物 98c 和 98c 之 ¹H NMR 混合光譜圖

```

Current Data Parameters
NAME      ch1020405
EXPNO    11
PROCNO    1

F2 - Acquisition Parameters
Date_     20050204
Time      19.08
INSTRUM   spect
PROBHD    5 mm BBO

PULPROG   zgpg30
TD         32768
SOLVENT   CDCl3
NS         1456
DS         2
SWH        25641.025 Hz
FIDRES     0.782502 Hz
AQ         0.6390260 sec
RG         32768
DM         19.500 usec
DE         4.50 usec
TE         300.0 K
D1         1.50000000 sec
D11        0.03000000 sec
D12        0.00002000 sec

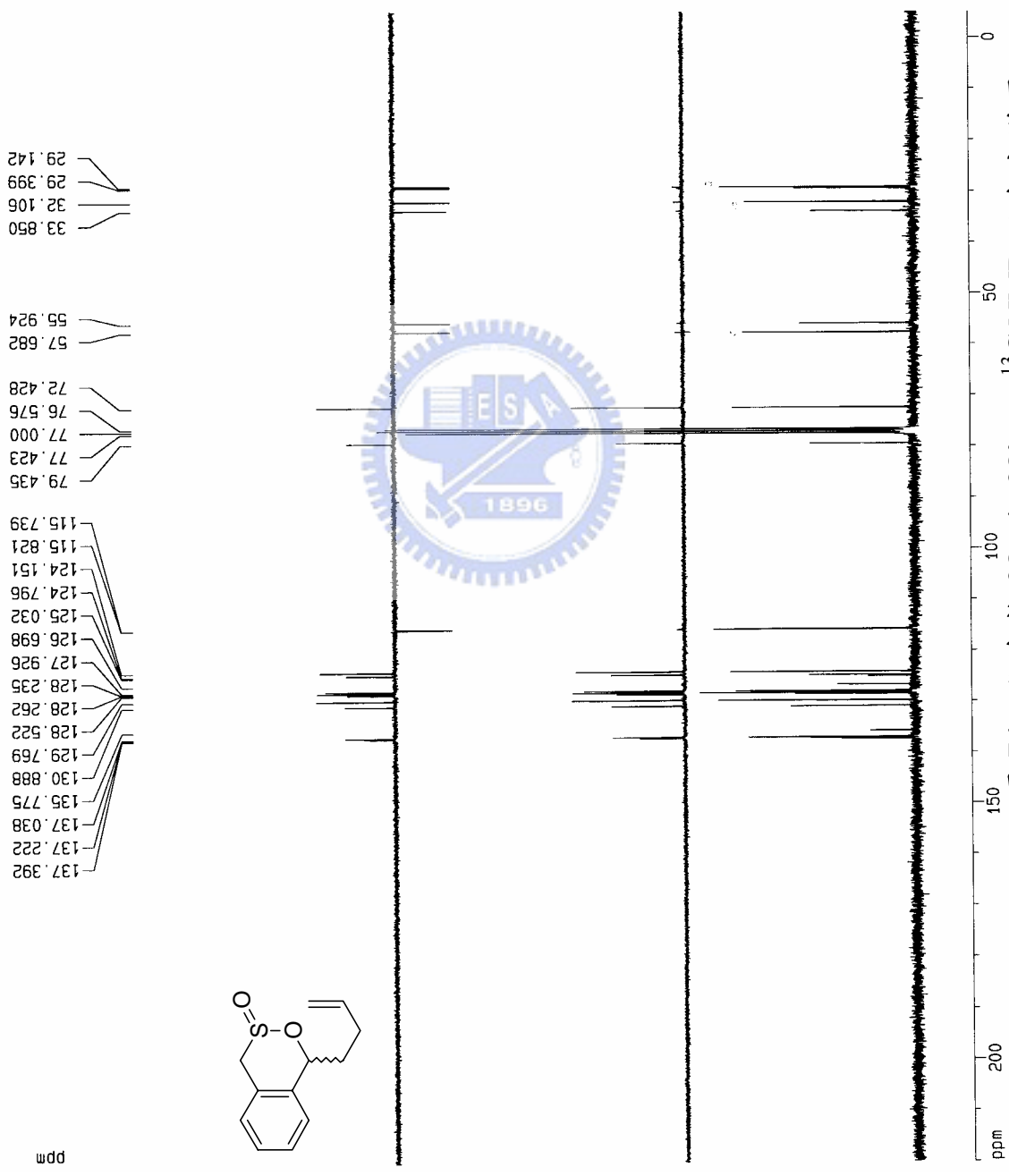
***** CHANNEL f1 *****
NUC1       13C
P1         8.50 usec
PL1        0.00 dB
SFO1       75.4775298 MHz

***** CHANNEL f2 *****
CPDPRG2   waltz16
NUC2       1H
PCPD2     98.00 usec
PL2       -4.00 dB
PL12      19.00 dB
PL13      120.00 dB
SFO2      300.1312005 MHz

F2 - Processing parameters
SI         32768
SF         75.4677553 MHz
WDW        EM
SSB        0
LB         1.00 Hz
GB         0
PC         1.40

1D NMR plot parameters
CX         20.00 cm
F1P        220.000 ppm
F1         16602.91 Hz
F2P        -5.000 ppm
F2         -377.34 Hz
PPMCH      11.25000 ppm/cm
HZCM       849.01227 Hz/cm

```



附圖 74 化合物 98c 和 98'c 之 ¹³C NMR 混合光譜圖

```

Current Data Parameters
NAME      ch1011505
EXPNO    1
PROCNO   1

F2 - Acquisition Parameters
Date_    20050115
Time     11.32
INSTRUM spect
PROBHD   5 mm BBO

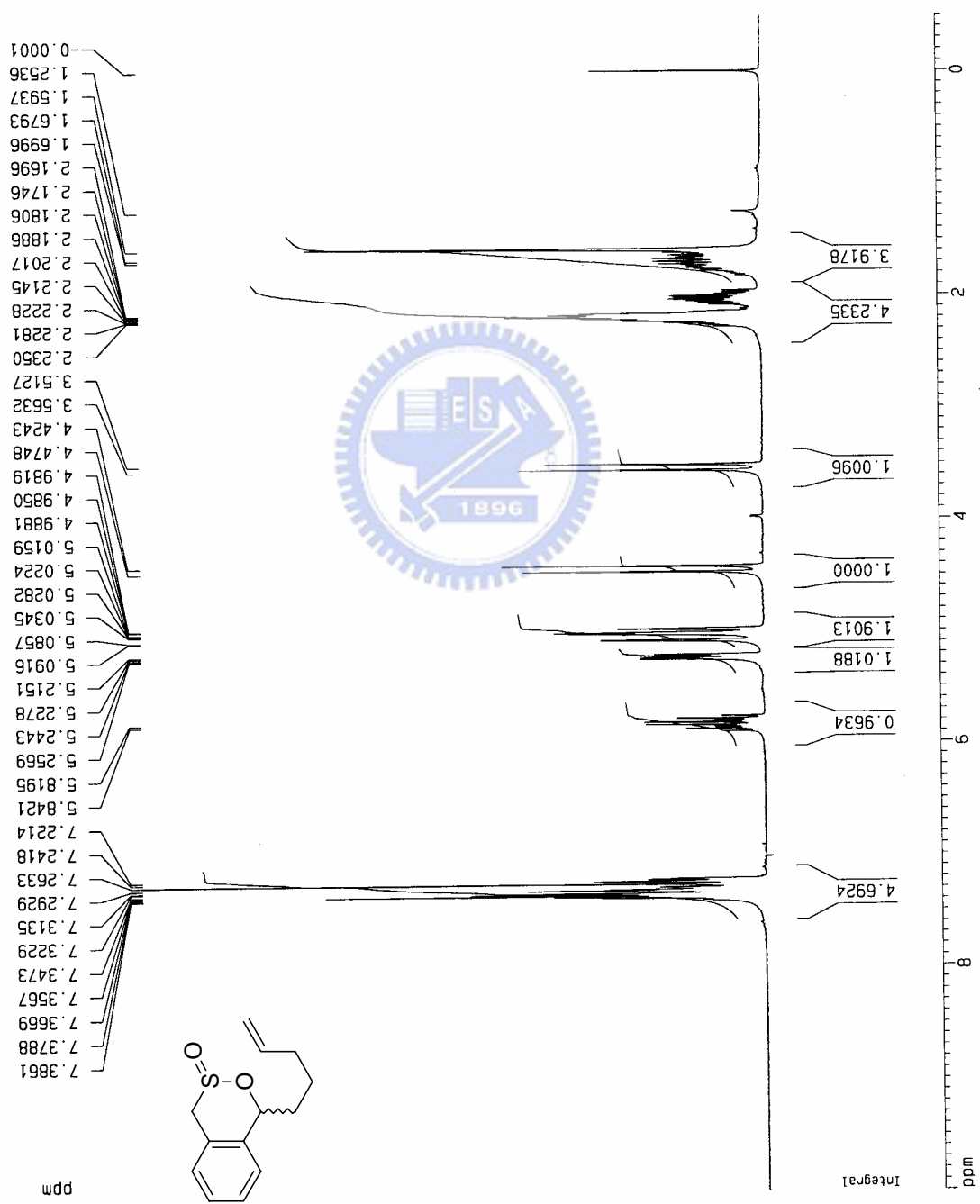
PULPROG  zg30
TD        32768
SOLVENT  CDCl3
NS        64
DS        0
SWH       7812.500 Hz
FIDRES    0.238419 Hz
AQ        2.0972021 sec
RG        512
DM        64.000 usec
DE        4.50 usec
TE        300.0 K
D1        1.00000000 sec

===== CHANNEL f1 =====
NUC1      1H
P1        9.10 usec
PL1       -4.00 dB
SF01      300.1321122 MHz

F2 - Processing parameters
SI        32768
SF        300.1300055 MHz
WDW       EM
SSB       0
LB        0.30 Hz
GB        0
PC        1.00

1D NMR plot parameters
CX        20.00 cm
F1P       10.000 ppm
F1        3001.30 Hz
F2P       -0.500 ppm
F2        -150.07 Hz
PPMCM     0.52500 ppm/cm
HZCM      157.56825 Hz/cm

```



附圖 75 化合物 98d 之 ¹H NMR 光譜圖

```

Current Data Parameters
NAME      chi011505
EXPNO    6
PROCNO   1

F2 - Acquisition Parameters
Date_    20050115
Time     18.15
INSTRUM spect
PROBHD   5 mm BBO

PULPROG  zgpg30
TD        32768
SOLVENT  CDCl3
NS        6144
DS        2
SWH       25641.025 Hz
FIDRES    0.782502 Hz
AQ        0.6350260 sec
RG        32768
DM        19.500 usec
DE        4.50 usec
TE        300.0 K
D1        1.5000000 sec
D11       0.0300000 sec
D12       0.0000200 sec

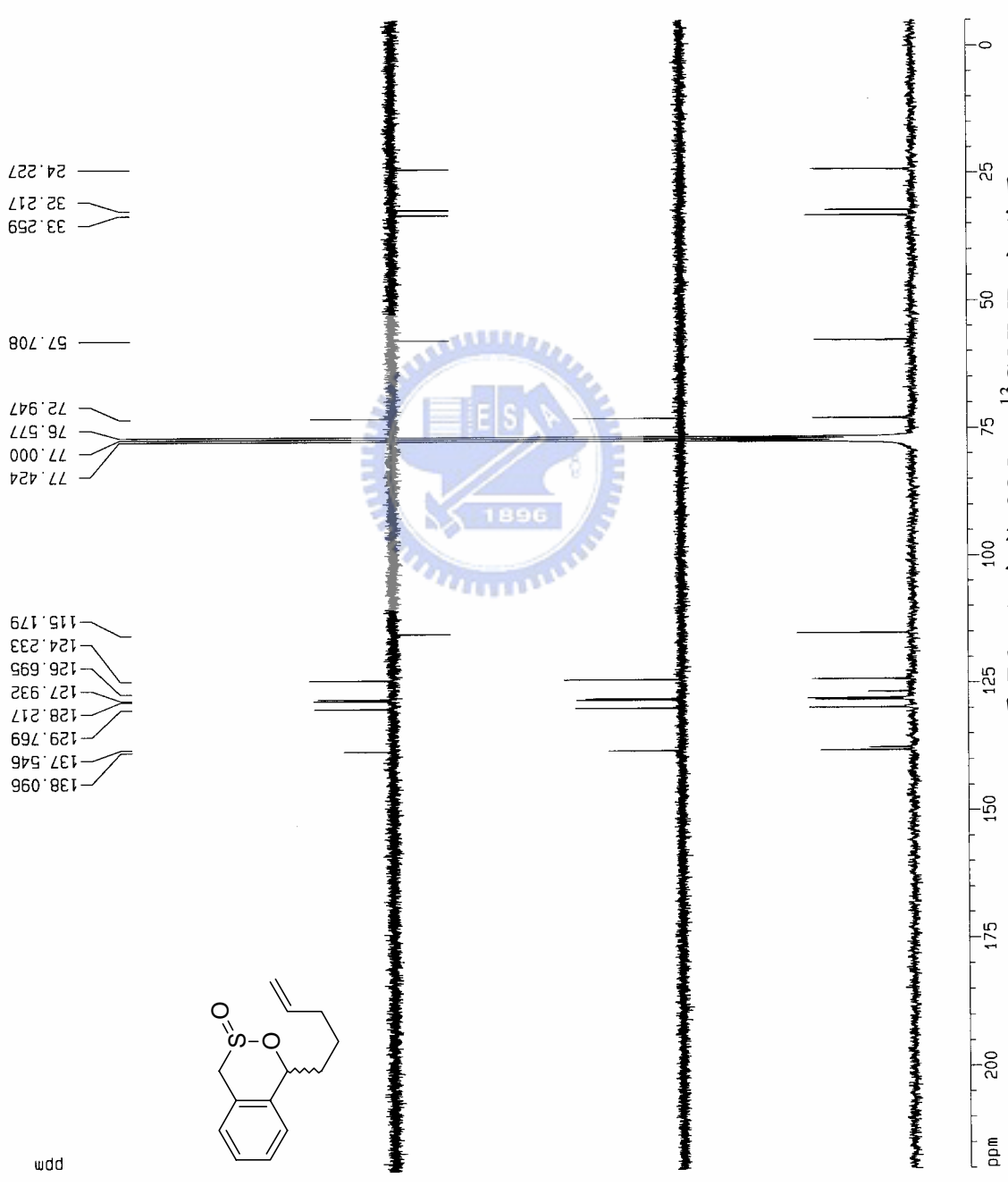
***** CHANNEL f1 *****
NUC1      13C
P1        8.50 usec
PL1       0.00 dB
SF01      75.4775298 MHz

***** CHANNEL f2 *****
CPDPRG2  waitz16
NUC2      1H
PCPD02   98.00 usec
PL2       -4.00 dB
PL12     19.00 dB
PL13     120.00 dB
SF02     300.1312005 MHz

F2 - Processing parameters
SI        32768
SF        75.4677523 MHz
AQ        0
LB        3.00 Hz
GB        0
PC        1.40

1D NMR plot parameters
CX        20.00 cm
F1P       220.000 ppm
F1        16602.90 Hz
F2P       -5.000 ppm
F2        -377.34 Hz
PPMCH     11.25000 ppm/cm
HZCM      849.01221 Hz/cm

```



附圖 76 化合物 98d 之 ¹³C NMR 光譜圖

Current Data Parameters
 NAME chi010405
 EXPNO 1
 PROCNO 1

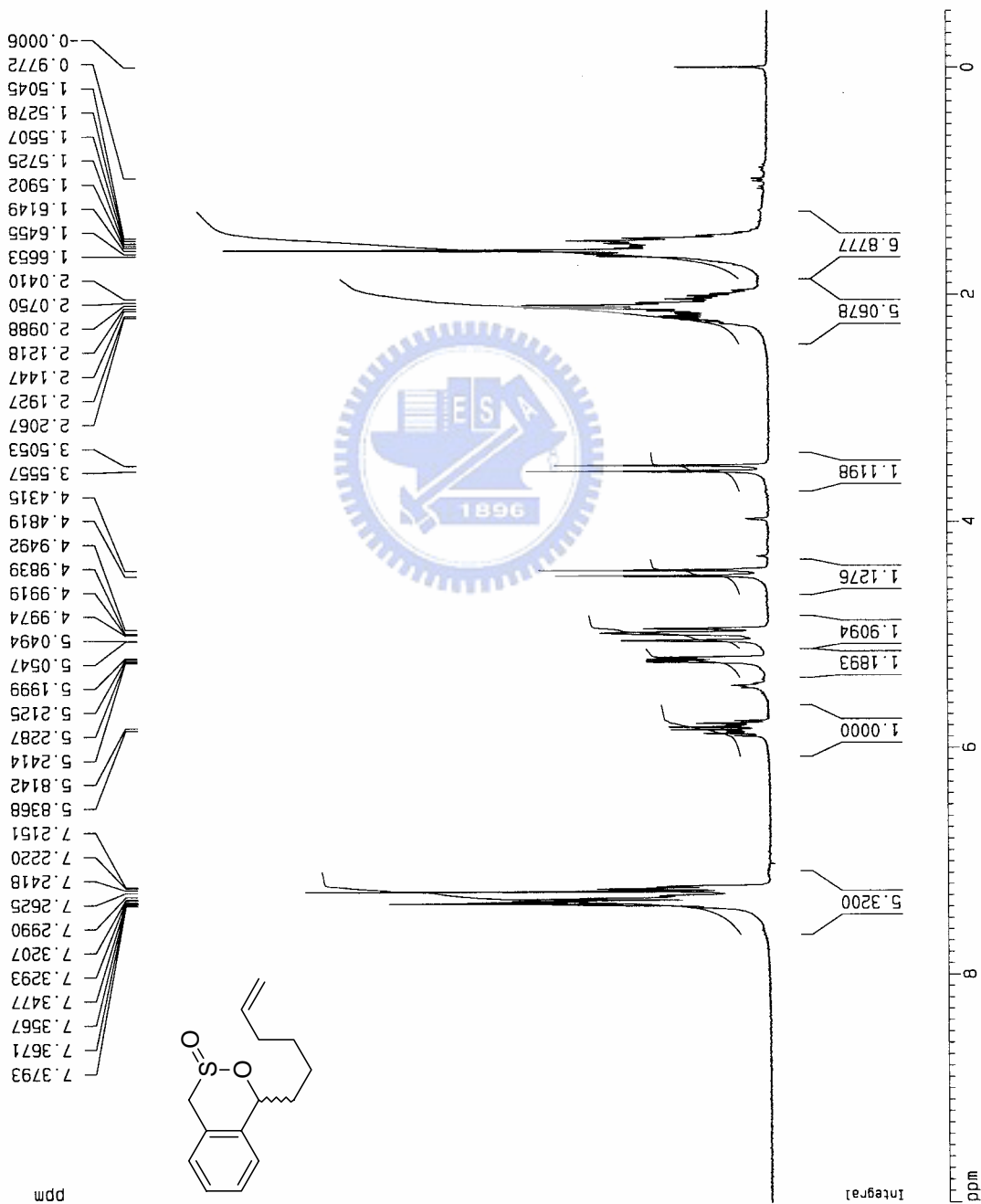
F2 - Acquisition Parameters
 Date_ 20050103
 Time 22.38
 INSTRUM spect
 PROBHD 5 mm BBO

PULPROG zg30
 TD 32768
 SOLVENT CDCl3
 NS 16
 DS 0
 SWH 7812.500 Hz
 FIDRES 0.238419 Hz
 AQ 2.0972021 sec
 RG 456.1
 DW 64.000 usec
 DE 4.50 usec
 TE 300.0 K
 D1 1.00000000 sec

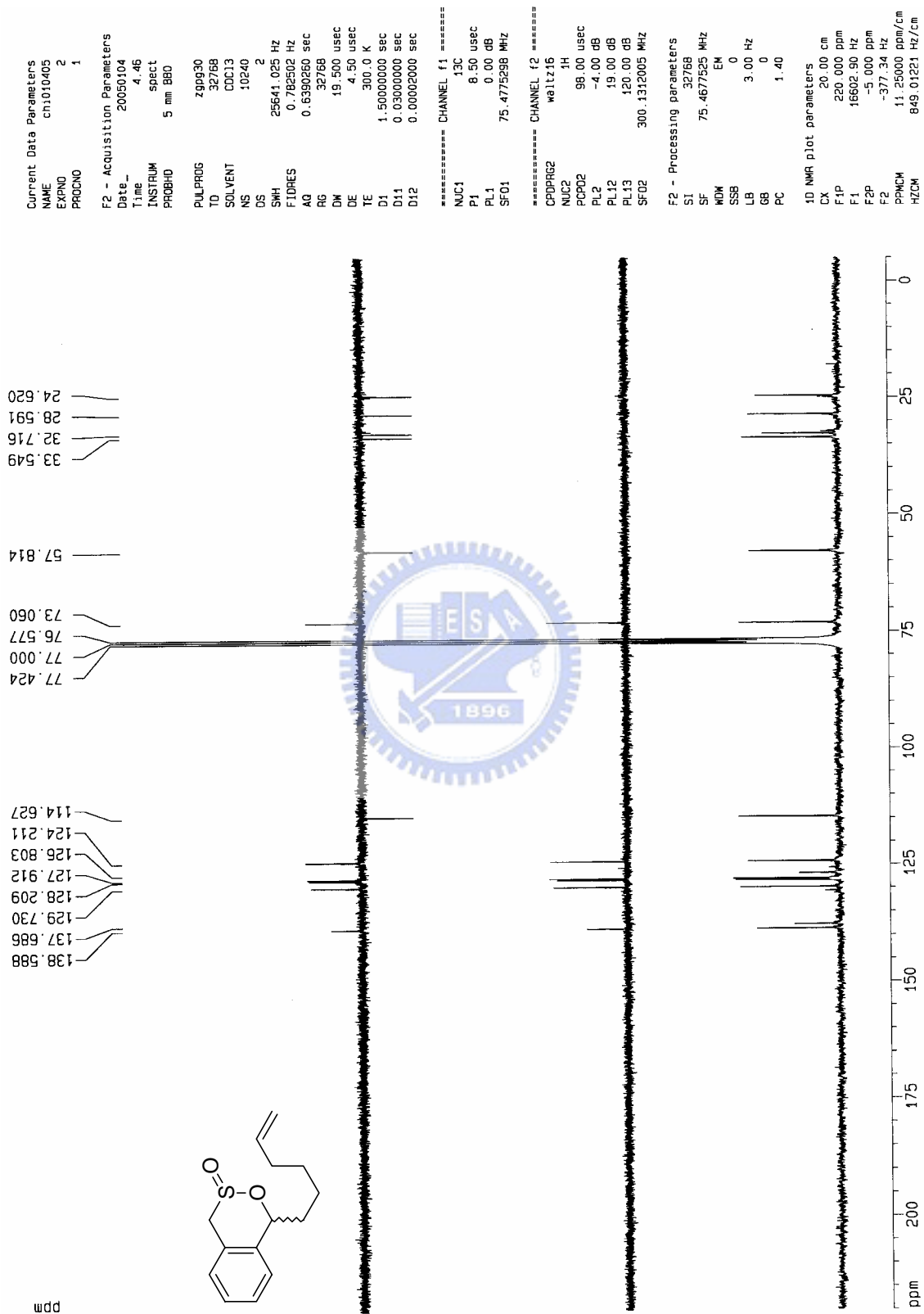
===== CHANNEL f1 =====
 NUC1 1H
 P1 9.10 usec
 PL1 -4.00 dB
 SF01 300.1321122 MHz

F2 - Processing parameters
 SI 32768
 SF 300.1300058 MHz
 WDW EM
 SSB 0
 LB 0.30 Hz
 GB 0
 PC 1.00

1D NMR plot parameters
 CX 20.00 cm
 F1P 10.000 ppm
 F1 3001.30 Hz
 F2P -0.500 ppm
 F2 -150.07 Hz
 PPMCM 0.52500 ppm/cm
 HZCM 157.56625 Hz/cm



附圖 77 化合物 98e 之 ¹H NMR 光譜圖



附圖 78 化合物 98e 之 ¹³C NMR 光譜圖

Current Data Parameters
 NAME chi122404
 EXPNO 1
 PROCNO 1

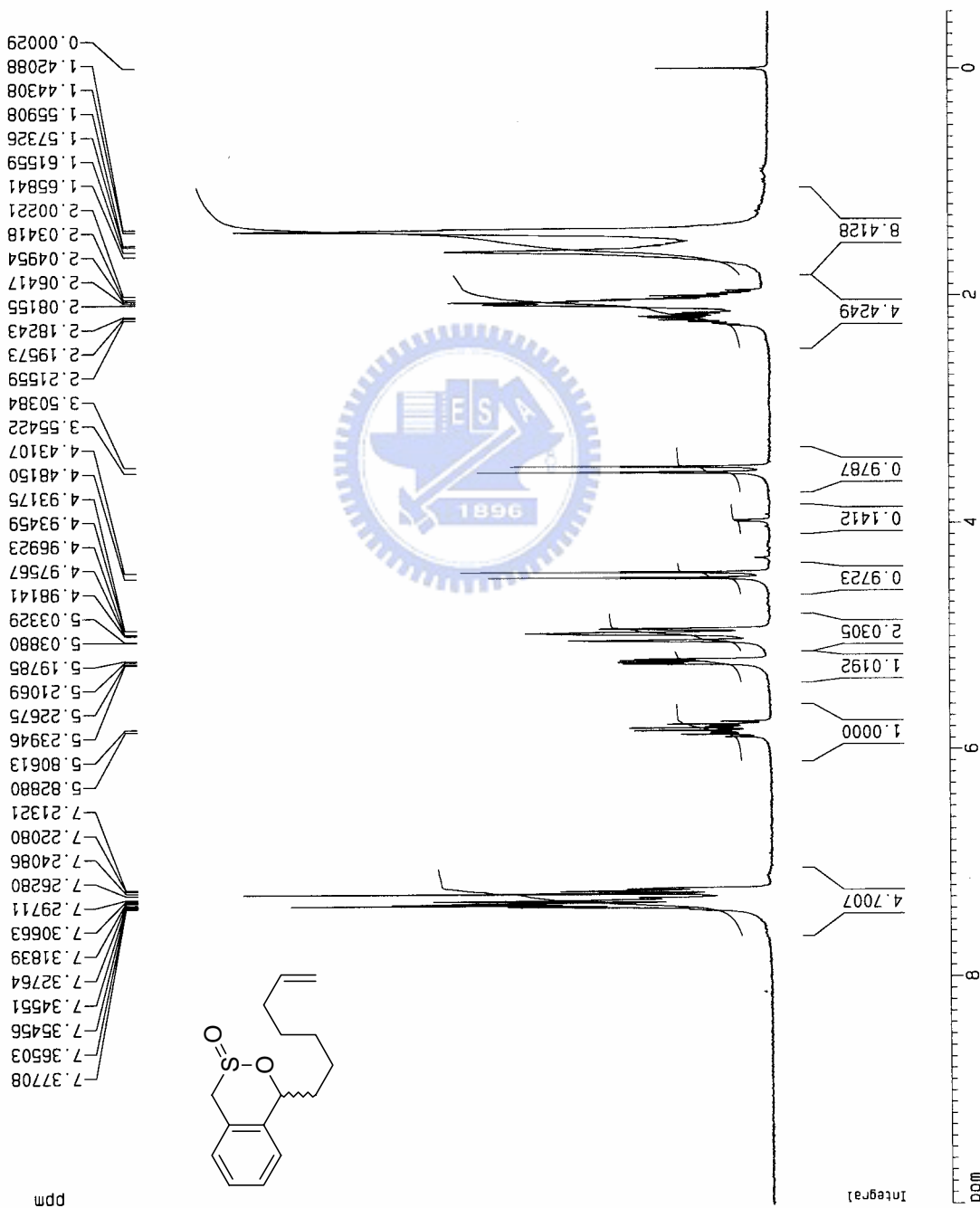
F2 - Acquisition Parameters
 Date_ 20041224
 Time_ 23.14
 INSTRUM spect
 PROBHD 5 mm BBO

PULPROG zg30
 TD 32768
 SOLVENT CDCl3
 NS 16
 DS 0
 SWH 7812.500 Hz
 FIDRES 0.236419 Hz
 AQ 2.0972021 sec
 RG 456.1
 DW 64.000 usec
 DE 4.50 usec
 TE 300.0 K
 D1 1.00000000 sec

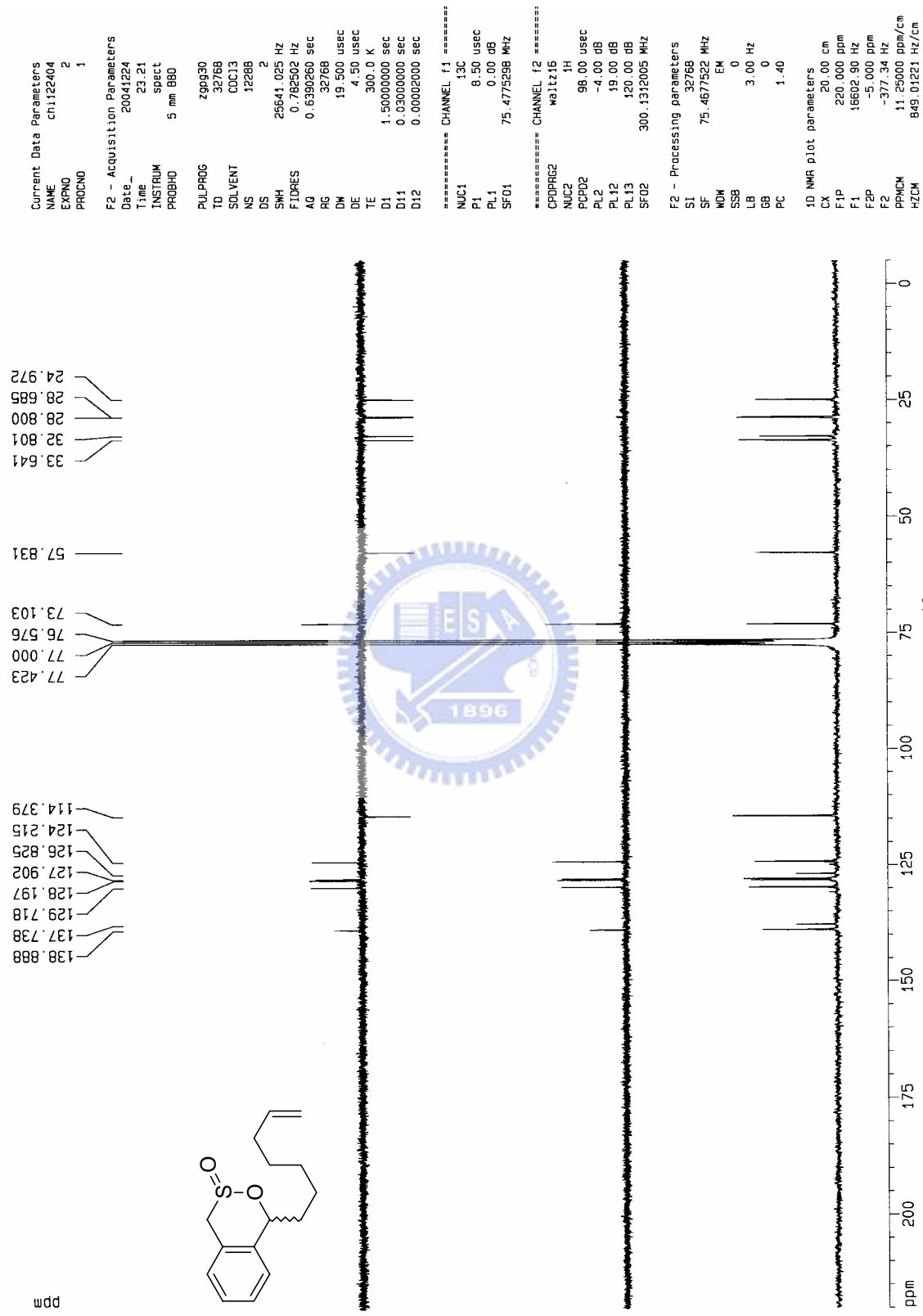
===== CHANNEL f1 =====
 NUC1 1H
 P1 9.10 usec
 PL1 -4.00 dB
 SF01 300.1321122 MHz

F2 - Processing parameters
 SI 32768
 SF 300.1300058 MHz
 WDM EM
 SSB 0
 LB 0.30 Hz
 GB 0
 PC 1.00

1D NMR plot parameters
 CX 20.00 cm
 F1P 10.000 ppm
 F1 3001.30 Hz
 F2P -0.500 ppm
 F2 -150.07 Hz
 PPMCM 0.52500 ppm/cm
 HZCM 157.56825 Hz/cm



附圖 79 化合物 98f 之 ¹H NMR 光譜圖



附圖 80 化合物 98f 之 ¹³C NMR 光譜圖

Current Data Parameters
 NAME ch121604
 EXPNO 1
 PROCNO 1

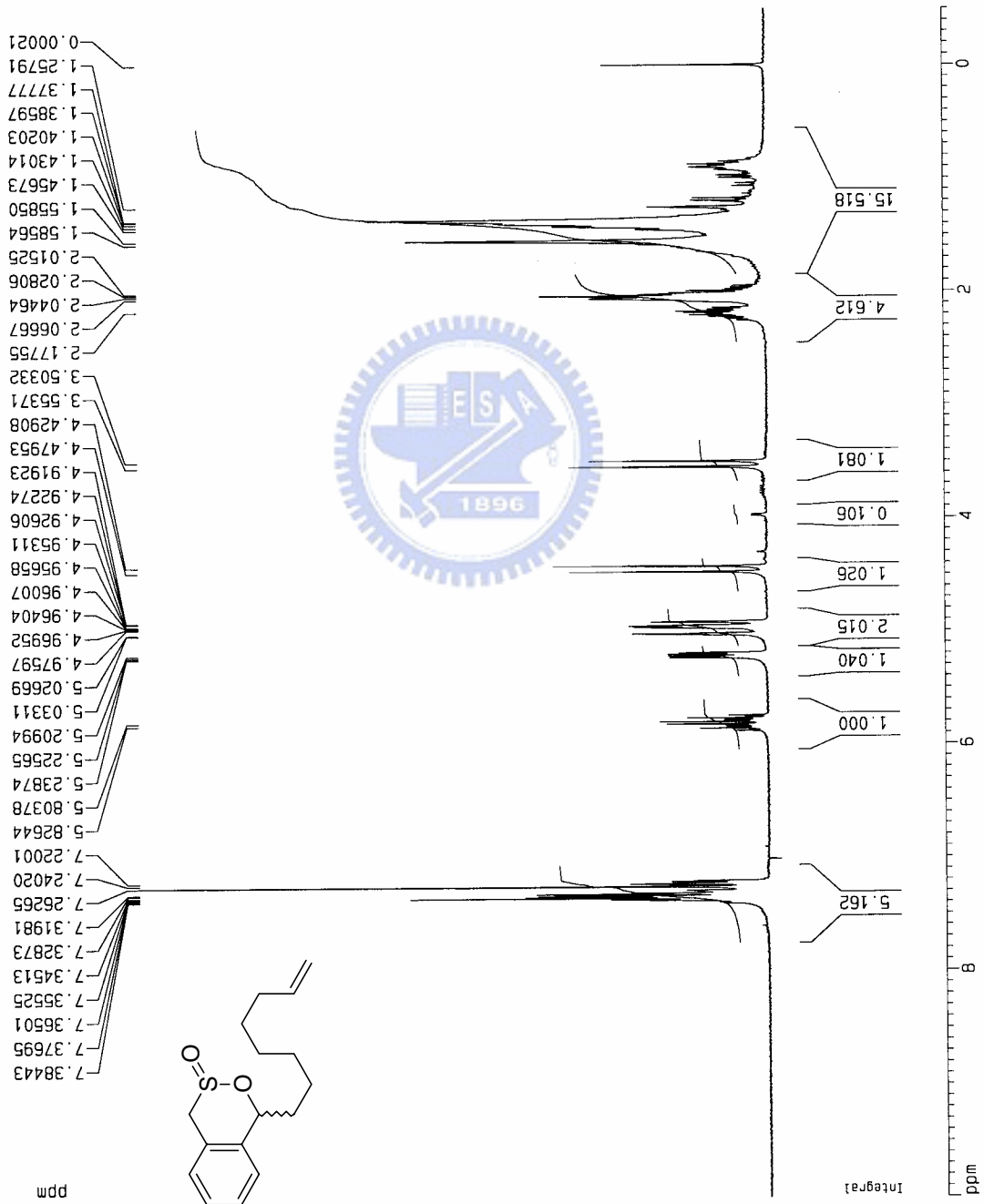
F2 - Acquisition Parameters
 Date_ 20041216
 Time 10.46
 INSTRUM spect
 PROBHD 5 mm BBO

PULPROG zg30
 TD 32768
 SOLVENT CDCl3
 NS 16
 DS 0
 SWH 7812.500 Hz
 FIDRES 0.238419 Hz
 AQ 2.0972021 sec
 RG 574.7
 DW 64.000 usec
 DE 4.50 usec
 TE 300.0 K
 D1 1.00000000 sec

===== CHANNEL f1 =====
 NUC1 1H
 P1 9.10 usec
 PL1 -4.00 dB
 SF01 300.132122 MHz

F2 - Processing parameters
 SI 32768
 SF 300.1300058 MHz
 MVM EM
 SSB 0
 LB 0.30 Hz
 GB 0
 PC 1.00

1D NMR plot parameters
 CX 20.00 cm
 F1P 10.000 ppm
 F1 3004.30 Hz
 F2P -0.500 ppm
 F2 -150.07 Hz
 PPMCM 0.52500 ppm/cm
 HZCM 157.56825 Hz/cm



附圖 81 化合物 98g 之 ¹H NMR 光譜圖

```

Current Data Parameters
NAME      ch1121604
EXPNO    2
PROCNO   1

F2 - Acquisition Parameters
Date_    20041216
Time     14.27
INSTRUM  spect
PROBHD   5 mm BBO

PULPROG  zgpg30
TD        32768
SOLVENT  CDCl3
NS        6144
DS        2
SWH       25641.025 Hz
FIDRES    0.782502 Hz
AQ        0.6390260 sec
RG        32768
DM        19.500 usec
DE        4.50 usec
TE        300.0 K
D1        1.5000000 sec
D11       0.0300000 sec
D12       0.0000200 sec

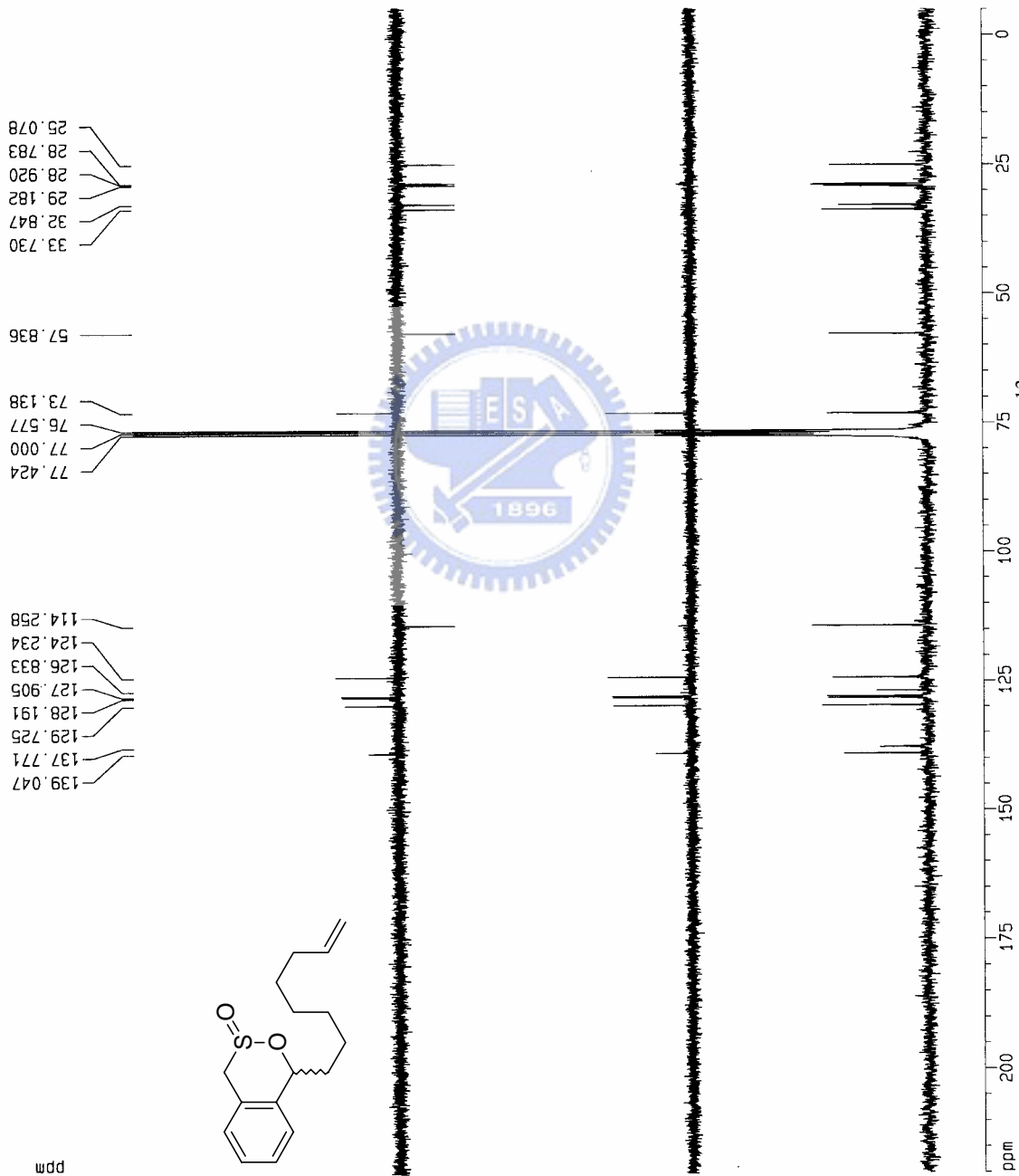
===== CHANNEL f1 =====
NUC1      13C
P1        8.50 usec
PL1       0.00 dB
SFO1      75.4775298 MHz

===== CHANNEL f2 =====
CPDPRG2  waltz16
NUC2      1H
PCPD2     98.00 usec
PL2       -4.00 dB
PL12      19.00 dB
PL13      120.00 dB
SFO2      300.1312005 MHz

F2 - Processing parameters
SI        32768
SF        75.4677515 MHz
WDW       EM
SSB       0
LB        3.00 Hz
GB        0
PC        1.40

ID NMR plot parameters
CX        20.00 cm
F1P       220.000 ppm
F1        16602.90 Hz
F2P       -5.000 ppm
F2        -377.34 Hz
PPMCM     11.25000 ppm/cm
HZCM      849.01221 Hz/cm

```



附圖 82 化合物 98g 之 ^{13}C NMR 光譜圖

```

Current Data Parameters
NAME      chi1062904
EXPNO    1
PROCNO   1

F2 - Acquisition Parameters
Date_    20040629
Time     9.24
INSTRUM spect
PROBHD   5 mm BBO

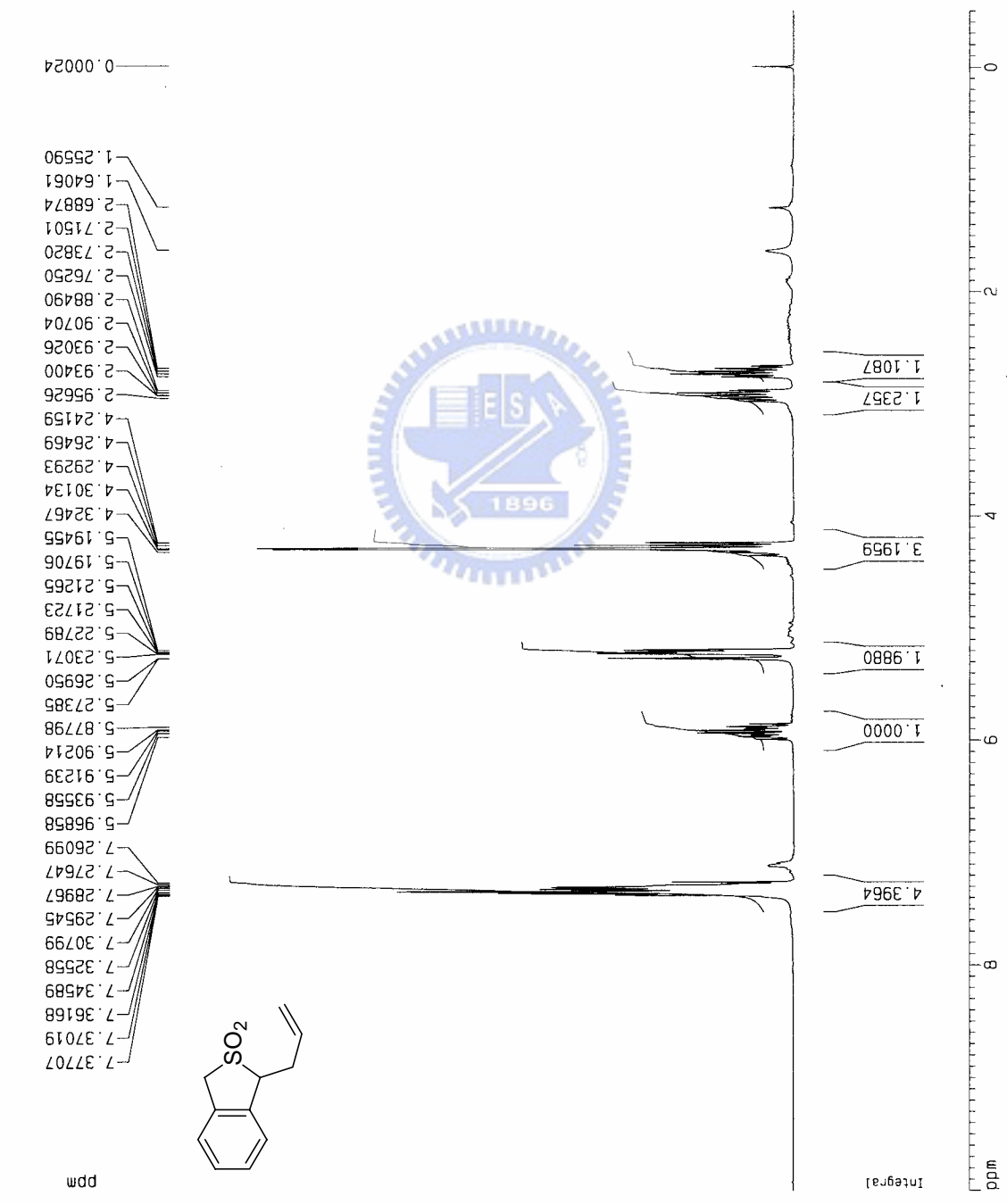
PULPROG  zg30
TD        32768
SOLVENT  CDCl3
NS        16
DS        0
SWH       7612.500 Hz
FIDRES    0.238419 Hz
AQ        2.0972021 sec
RG        228.1
DM        64.000 usec
DE        4.50 usec
TE        300.0 K
D1        1.00000000 sec

===== CHANNEL f1 =====
NUC1      1H
P1        9.10 usec
PL1       -4.00 dB
SFO1      300.1321122 MHz

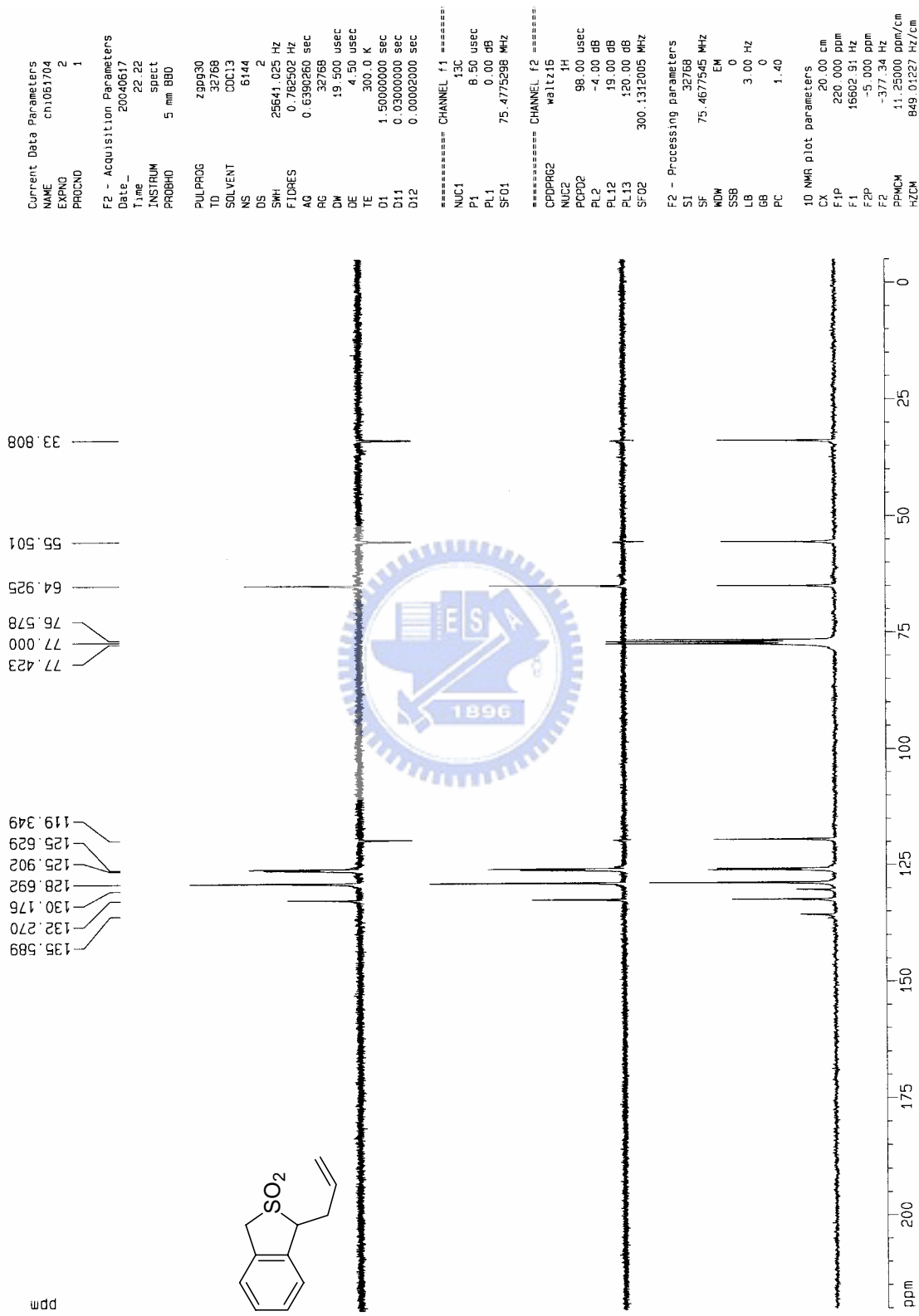
F2 - Processing parameters
SI        32768
SF        300.1300050 MHz
WDW       EM
SSB       0
LB        0.30 Hz
GB        0
PC        1.00

1D NMR plot parameters
CX        20.00 cm
F1P       10.000 ppm
F1        3001.30 Hz
F2P       -0.500 ppm
F2        -150.07 Hz
PPMCM     0.52500 ppm/cm
HZCM      157.56825 Hz/cm

```



附圖 83 化合物 105b 之 ¹H NMR 光譜圖



附圖 84 化合物 105b 之 ¹³C NMR 光譜圖

Current Data Parameters
 NAME Ch1060904
 EXPNO 1
 PROCNO 1

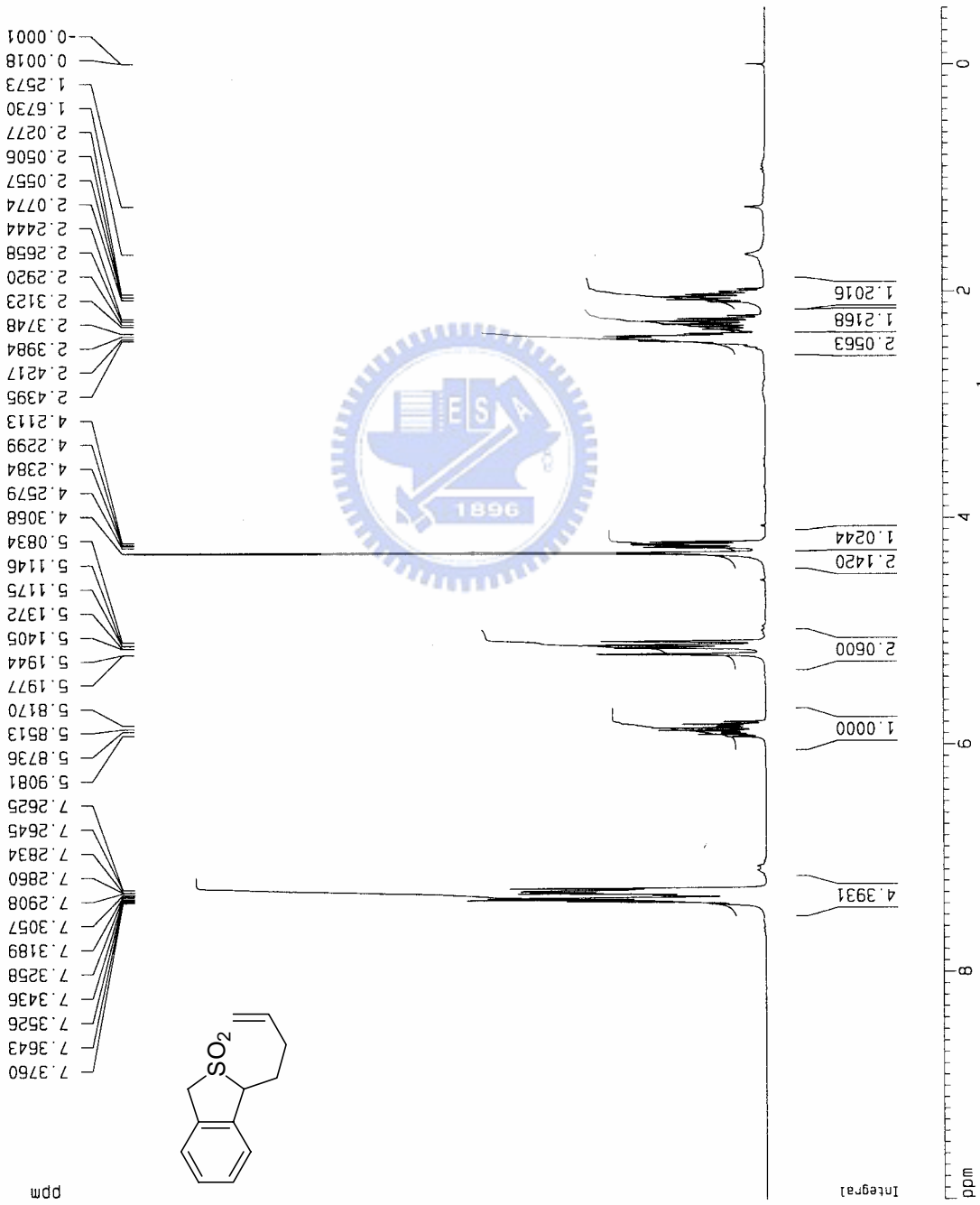
F2 - Acquisition Parameters
 Date_ 20040609
 Time 23.26
 INSTRUM spect
 PROBHD 5 mm BBO

PULPROG zg30
 TO 32768
 SOLVENT CDCl3
 NS 16
 DS 0
 SWH 7612.500 Hz
 FIDRES 0.238419 Hz
 AQ 2.0972021 sec
 RG 90.5
 DW 64.000 usec
 DE 4.50 usec
 TE 300.0 K
 D1 1.0000000 sec

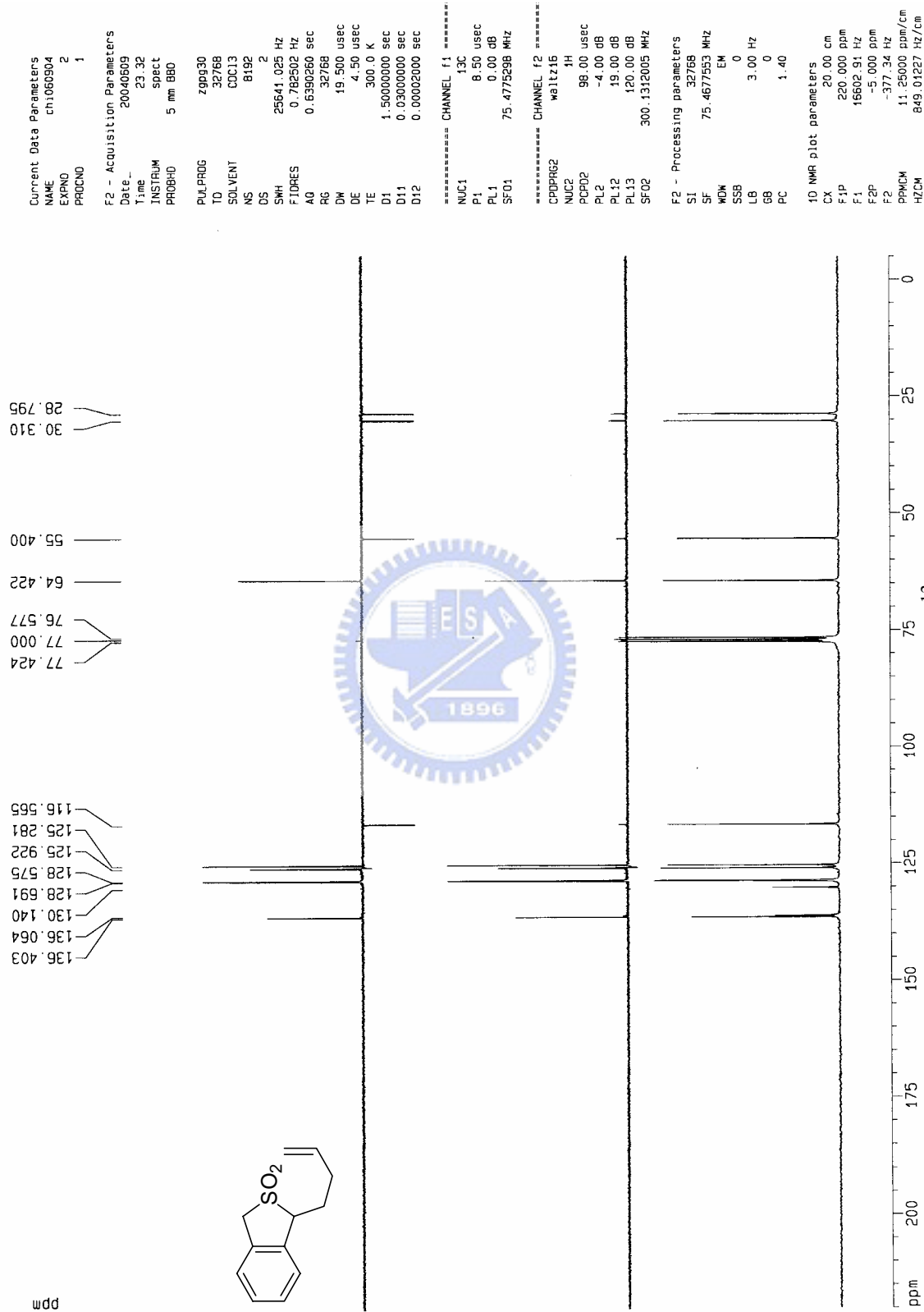
===== CHANNEL f1 =====
 NUC1 1H
 P1 9.10 usec
 PL1 -4.00 dB
 SF01 300.132122 MHz

F2 - Processing parameters
 SI 32768
 SF 300.1300053 MHz
 WDW EM
 SSB 0
 LB 0.30 Hz
 GB 0
 PC 1.00

1D NMR plot parameters
 CX 20.00 cm
 F1P 10.000 ppm
 F1 3001.30 Hz
 F2P -0.500 ppm
 F2 -150.07 Hz
 PPMCM 0.52500 ppm/cm
 HZCM 157.56825 Hz/cm



附圖 85 化合物 105c 之 ¹H NMR 光譜圖



```

Current Data Parameters
NAME      Ch1020505
EXPNO    1
PROCNO   1

F2 - Acquisition Parameters
Date_    20050204
Time     21.14
INSTRUM  spect
PROBHD   5 mm BBO

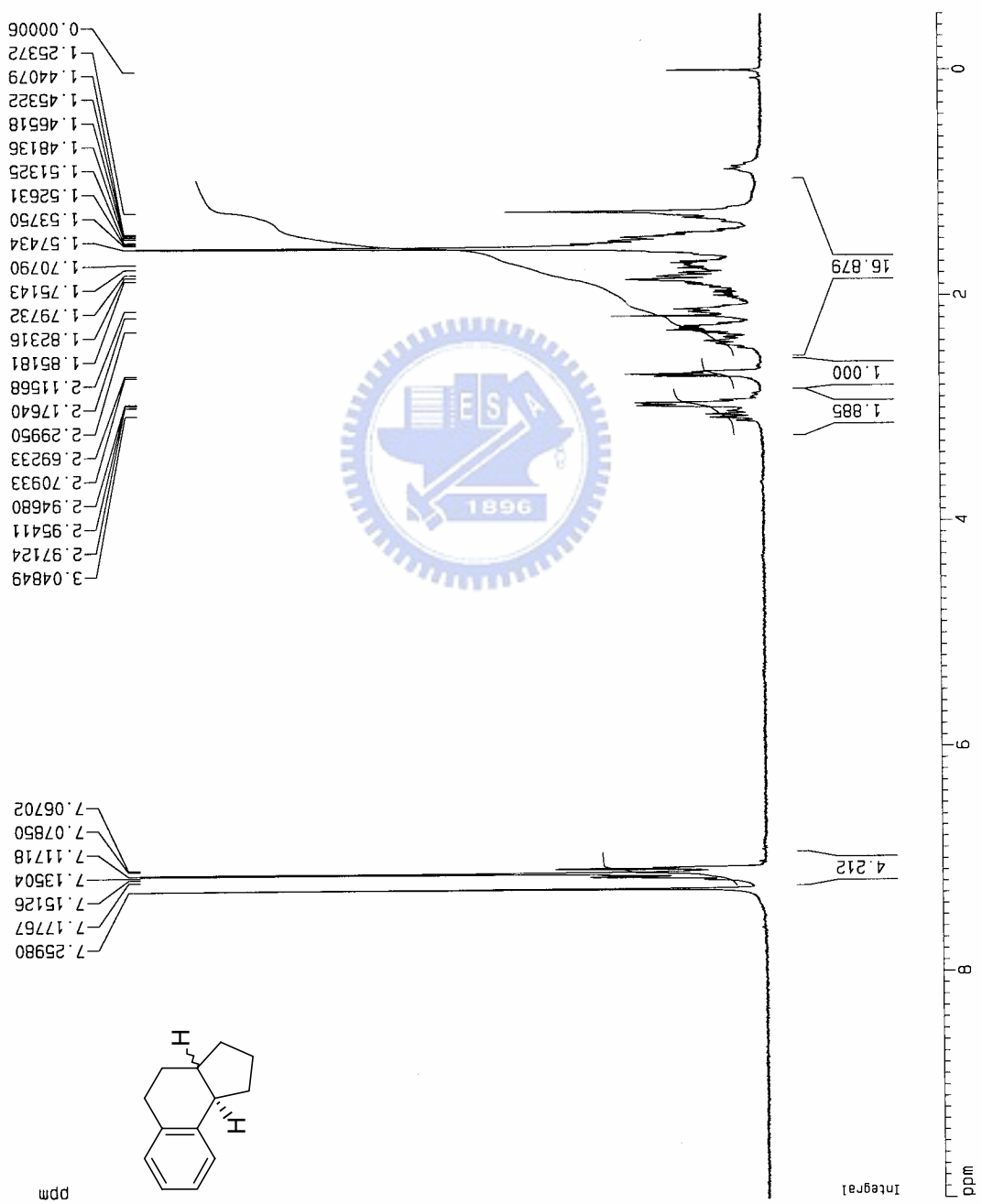
PULPROG  zg30
TD        32768
SOLVENT  CDCl3
NS        16
DS        0
SWH       7812.500 Hz
FIDRES    0.238419 Hz
AQ        2.0972021 sec
RG        645.1
DM        64.000 usec
DE        4.50 usec
TE        300.0 K
D1        1.00000000 sec

===== CHANNEL f1 =====
NUC1      1H
P1        9.10 usec
PL1       -4.00 dB
SFO1      300.1321122 MHz

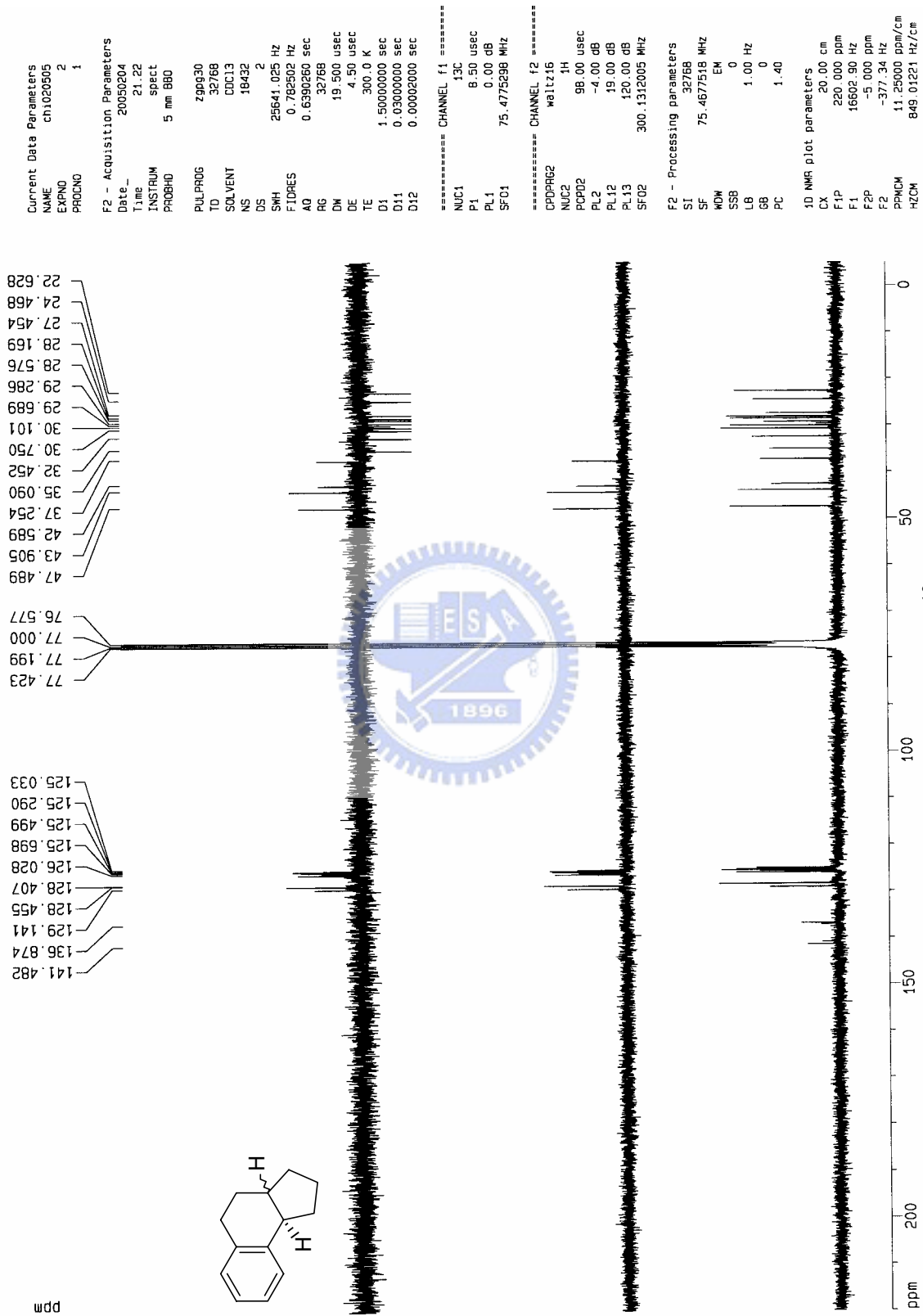
F2 - Processing parameters
SI        32768
SF        300.1300065 MHz
WDW       EM
SSB       0
LB        0.30 Hz
GB        0
PC        1.00

ID NMR plot parameters
CX        20.00 cm
F1P       10.000 ppm
F1        3001.30 Hz
F2P       -0.500 ppm
F2        -150.07 Hz
PPMCM     0.52500 ppm/cm
HZCM      157.56825 Hz/cm

```



附圖 87 化合物 103d 之 ¹H NMR 光譜圖



附圖 88 化合物 103d 之 ¹³C NMR 光譜圖

Current Data Parameters
 NAME ch1020405
 EXPNO 9
 PROCNO 1

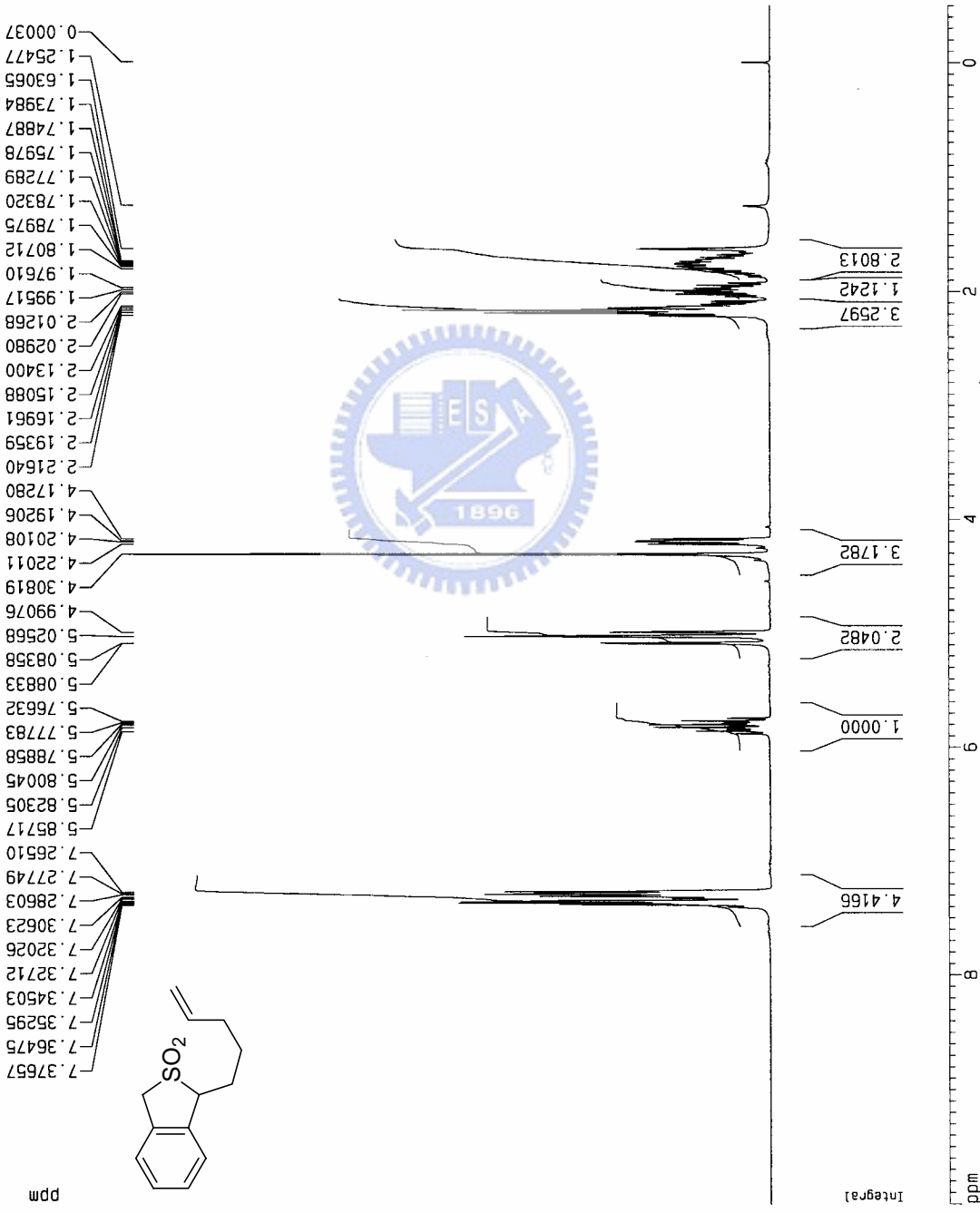
F2 - Acquisition Parameters
 Date_ 20050204
 Time 18.50
 INSTRUM spect
 PROBHD 5 mm BBO

PULPROG zg30
 TD 32768
 SOLVENT CDCl3
 NS 16
 DS 0
 SWH 7612.500 Hz
 FIDRES 0.238419 Hz
 AQ 2.0972021 sec
 RG 228.1
 DW 64.000 usec
 DE 4.50 usec
 TE 300.0 K
 D1 1.00000000 sec

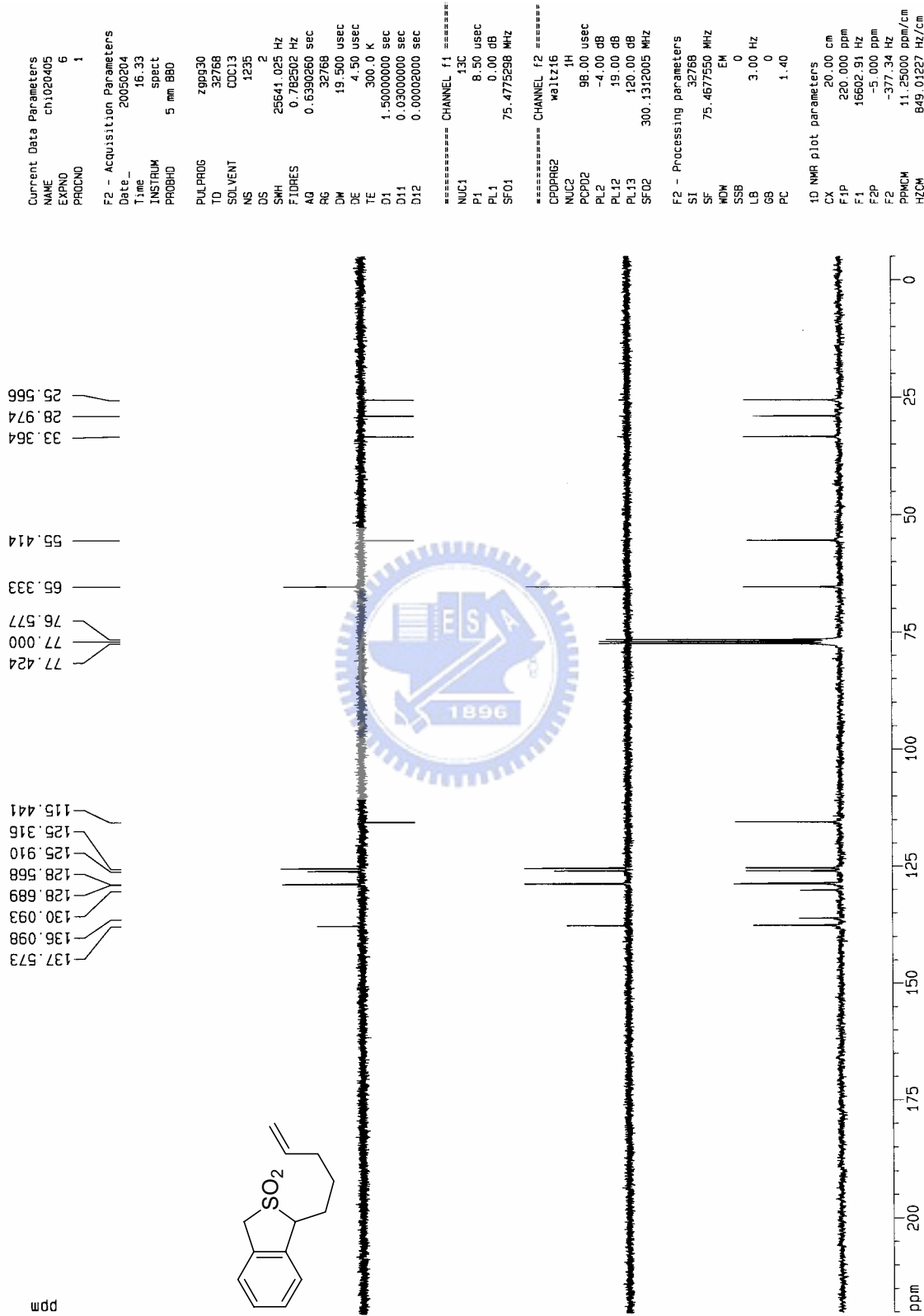
===== CHANNEL f1 =====
 NUC1 1H
 P1 9.10 usec
 PL1 -4.00 dB
 SF01 300.1321122 MHz

F2 - Processing parameters
 SI 32768
 SF 300.1300048 MHz
 MDW EM
 SSB 0
 LB 0.30 Hz
 GB 0
 PC 1.00

1D NMR plot parameters
 CX 20.00 cm
 F1P 10.000 ppm
 F1 3001.30 Hz
 F2P -0.500 ppm
 F2 -150.07 Hz
 PPMCM 0.52500 ppm/cm
 HZCM 157.56825 Hz/cm



附圖 89 化合物 105d 之 ¹H NMR 光譜圖



附圖 90 化合物 105d 之 ¹³C NMR 光譜圖

```

Current Data Parameters
NAME      chi1012305
EXPNO     3
PROCNO    1

F2 - Acquisition Parameters
Date_     20050124
Time      0.20
INSTRUM   spect
PROBHD    5 mm BBO

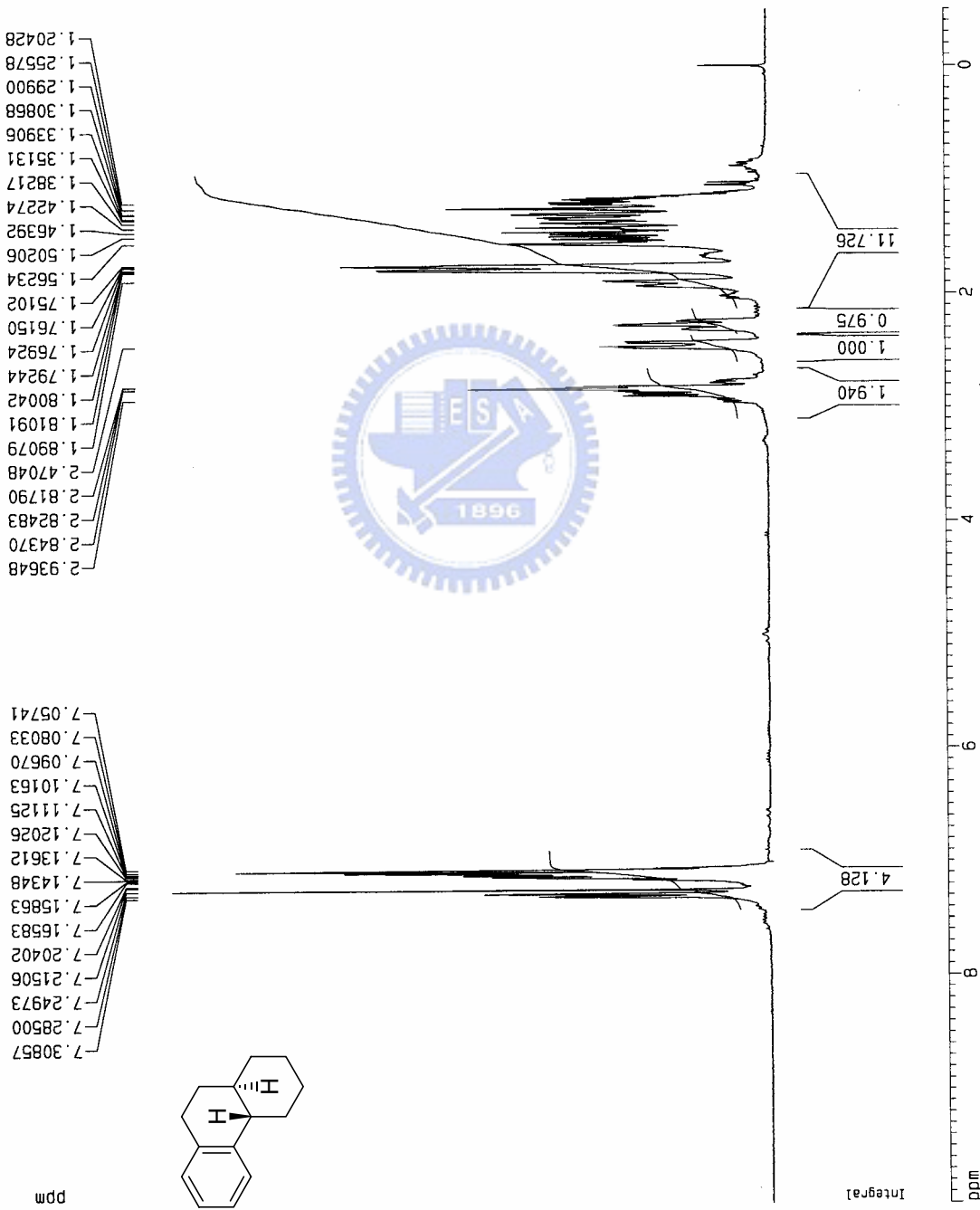
PULPROG   zg30
TD         32768
SOLVENT   CDCl3
NS         16
DS         0
SWH        7812.500 Hz
FIDRES     0.238419 Hz
AQ         2.0972021 sec
RG         256
DM         64.000 usec
DE         4.50 usec
TE         300.0 K
D1         1.00000000 sec

===== CHANNEL f1 =====
NUC1       1H
P1         9.10 usec
PL1        -4.00 dB
SF01       300.1321122 MHz

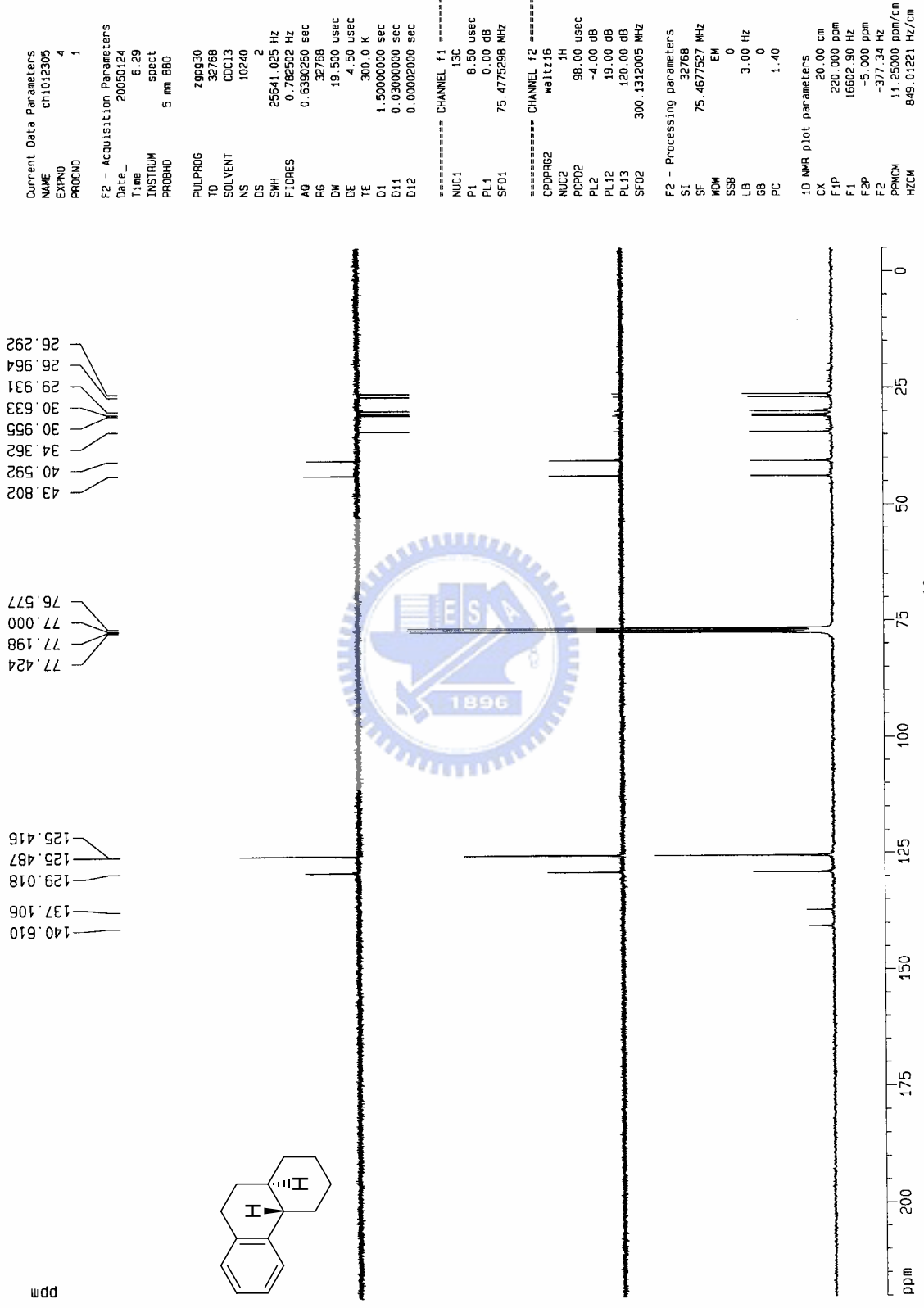
F2 - Processing parameters
SI         32768
SF         300.1300096 MHz
WDW        EM
SSB        0
LB         0.30 Hz
GB         0
PC         1.00

1D NMR plot parameters
CX         20.00 cm
F1P        10.000 ppm
F1         3001.30 Hz
F2P        -0.500 ppm
F2         -150.07 Hz
PPMCM      0.52500 ppm/cm
HZCM       157.56625 Hz/cm

```



附圖 91 化合物 103e 之 ¹H NMR 光譜圖



```

Current Data Parameters
NAME      chi012305
EXPNO    4
PROCNO   1

F2 - Acquisition Parameters
Date_    20050124
Time     6.29
INSTRUM spect
PROBHD   5 mm BBO

PULPROG  zgpg30
TD        32768
SOLVENT  CDCl3
NS        10240
DS        2
SWH       25641.025 Hz
FIDRES    0.782502 Hz
AQ        0.6390260 sec
RG         32768
DM        19.500 usec
DE        4.50 usec
TE        300.0 K
D1        1.50000000 sec
D11       0.03000000 sec
D12       0.00002000 sec

===== CHANNEL f1 =====
NUC1      13C
P1        8.50 usec
PL1       0.00 dB
SFO1     75.4775298 MHz

===== CHANNEL f2 =====
CPDPRG2  waltz16
NUC2      1H
PCPD2    98.00 usec
PL2      -4.00 dB
PL12     19.00 dB
PL13     120.00 dB
SFO2     300.1312005 MHz

F2 - Processing parameters
SI        32768
SF        75.4677527 MHz
WDW       EM
SSB       0
LB        3.00 Hz
GB        0
PC        1.40

1D NMR plot parameters
CX        20.00 cm
F1P       220.000 ppm
F1        16602.90 Hz
F2P       -5.000 ppm
F2        -377.34 Hz
PPMCM     11.25000 ppm/cm
HZCM      849.01221 Hz/cm

```

附圖 92 化合物 103e 之 ¹³C NMR 光譜圖

```

Current Data Parameters
NAME      ch1020105
EXPNO    1
PROCNO   1

F2 - Acquisition Parameters
Date_    20050201
Time     19.47
INSTRUM  spect
PROBHD   5 mm BBO

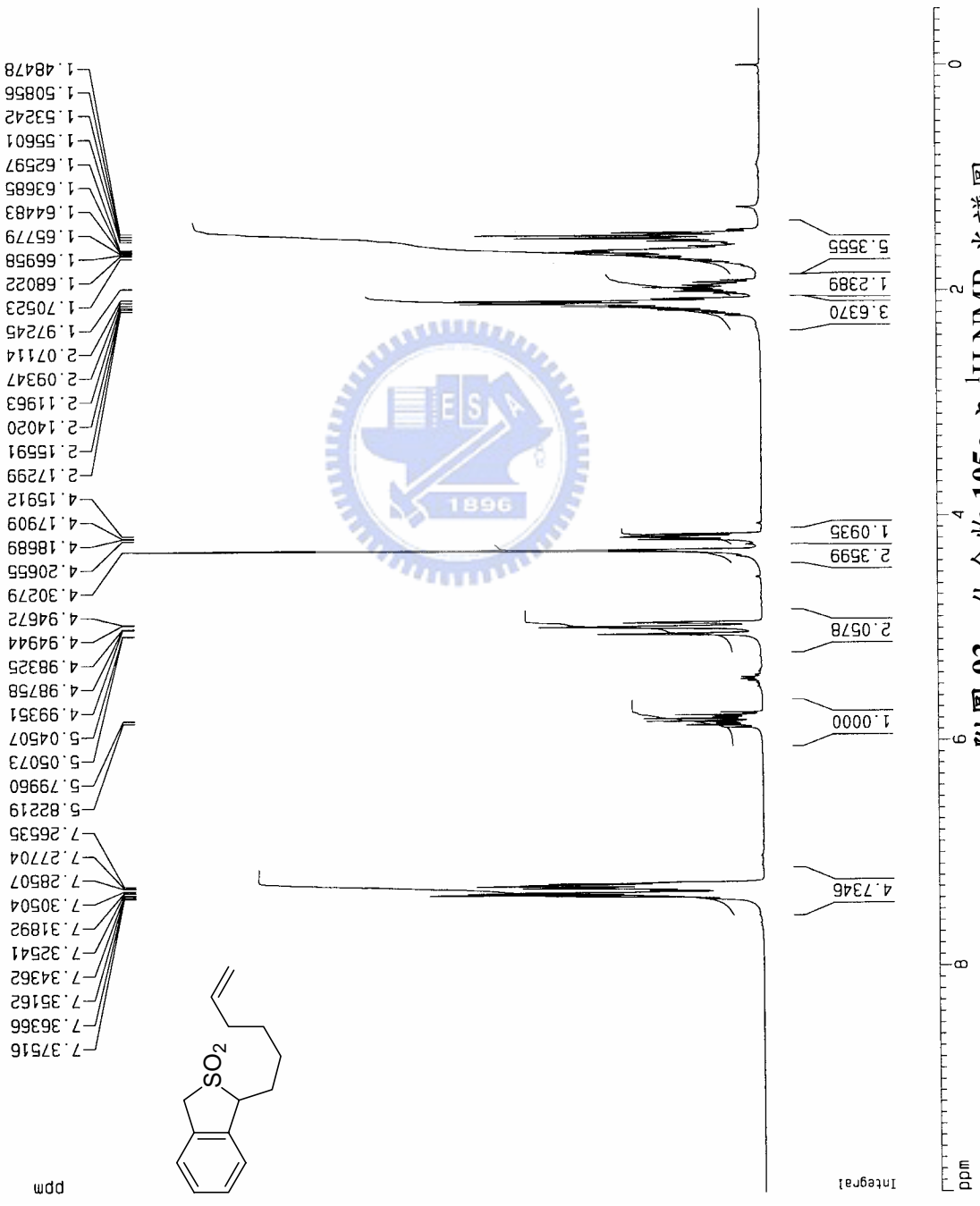
PULPROG  zg30
TD        32768
SOLVENT  CDCl3
NS        16
DS        0
SWH       7812.500 Hz
FIDRES    0.238419 Hz
AQ        2.0972021 sec
RG        143.7
DM        64.000 usec
DE        4.50 usec
TE        300.0 K
D1        1.00000000 sec

===== CHANNEL f1 =====
NUC1      1H
P1        9.10 usec
PL1       -4.00 dB
SF01      300.1321122 MHz

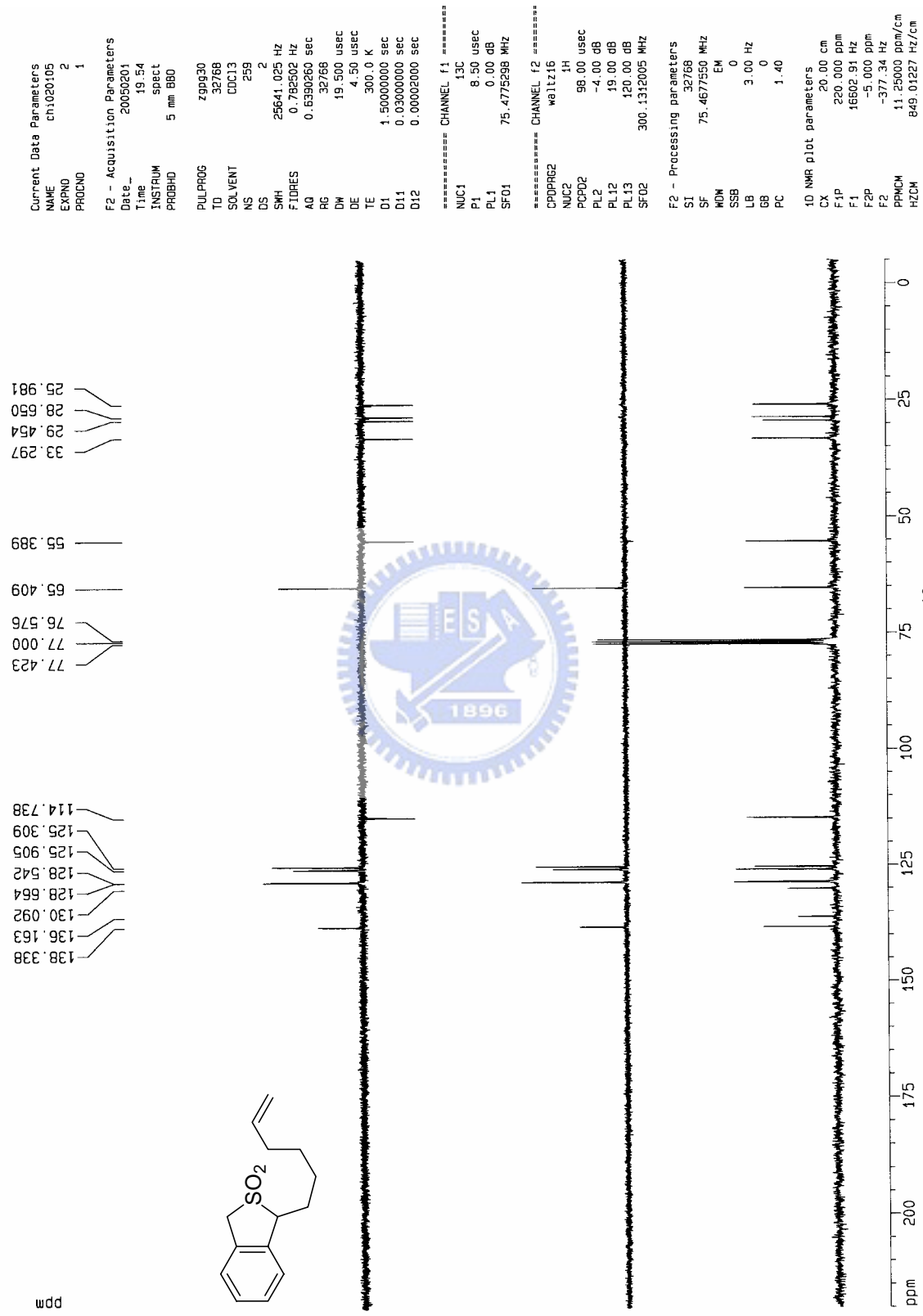
F2 - Processing parameters
SI        32768
SF        300.1300046 MHz
WDW       EM
SSB       0
LB        0.30 Hz
GB        0
PC        1.00

1D NMR plot parameters
CX        20.00 cm
F1P       10.000 ppm
F1        3001.30 Hz
F2P       -0.500 ppm
F2        -150.07 Hz
PPMCM     0.52500 ppm/cm
HZCM      157.56825 Hz/cm

```



附圖 93 化合物 105e 之 ¹H NMR 光譜圖



附圖 94 化合物 105e 之 ¹³C NMR 光譜圖

Current Data Parameters
 NAME chi011805
 EXPNO 2
 PROCNO 1

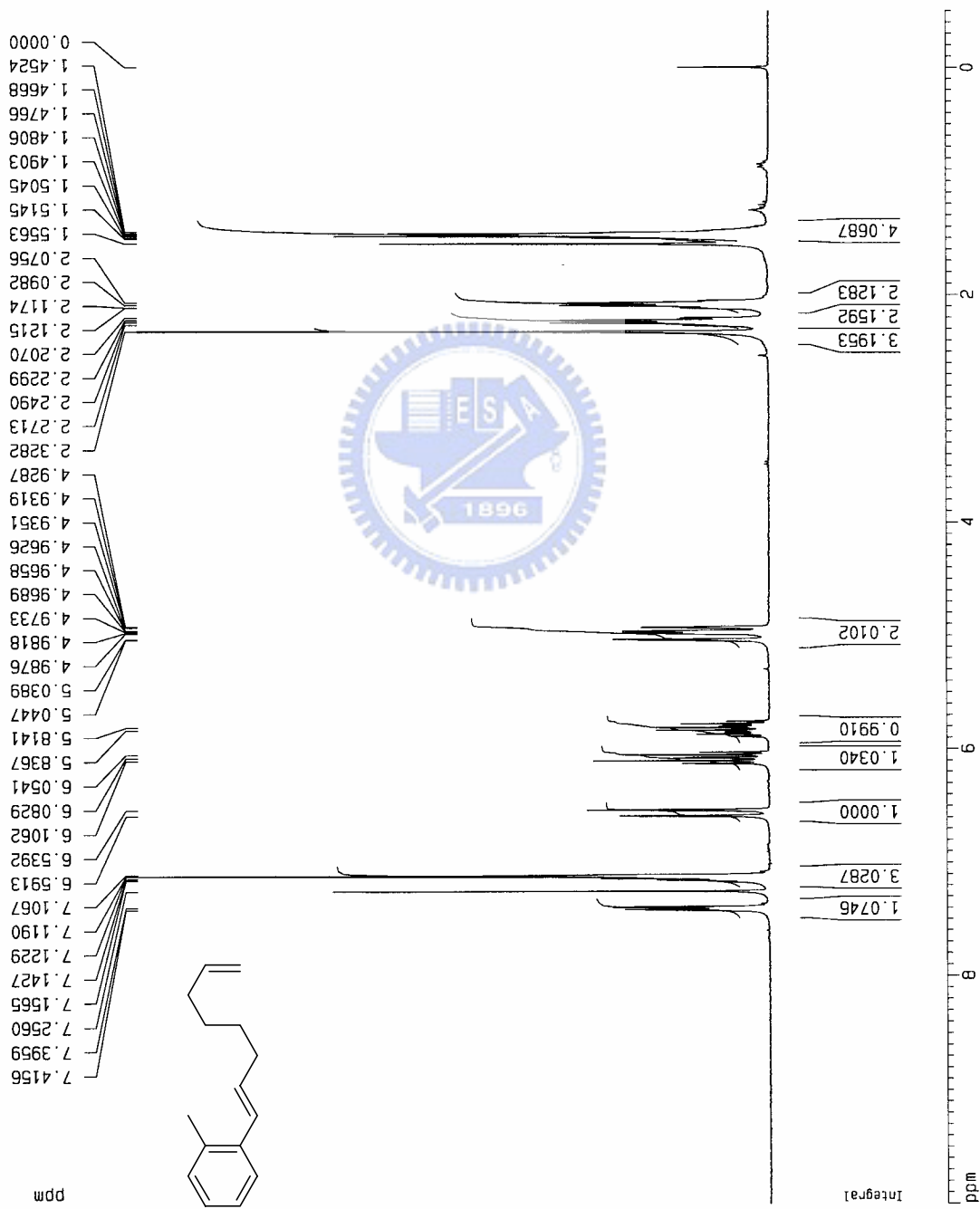
F2 - Acquisition Parameters
 Date_ 20050118
 Time 23.50
 INSTRUM Spect
 PROBHD 5 mm BBO

PULPROG zg30
 TD 32768
 SOLVENT CDC13
 NS 16
 DS 0
 SWH 7812.500 Hz
 FIDRES 0.238419 Hz
 AQ 2.0972021 sec
 RG 406.4
 DM 64.000 usec
 DE 4.50 usec
 TE 300.0 K
 D1 1.00000000 sec

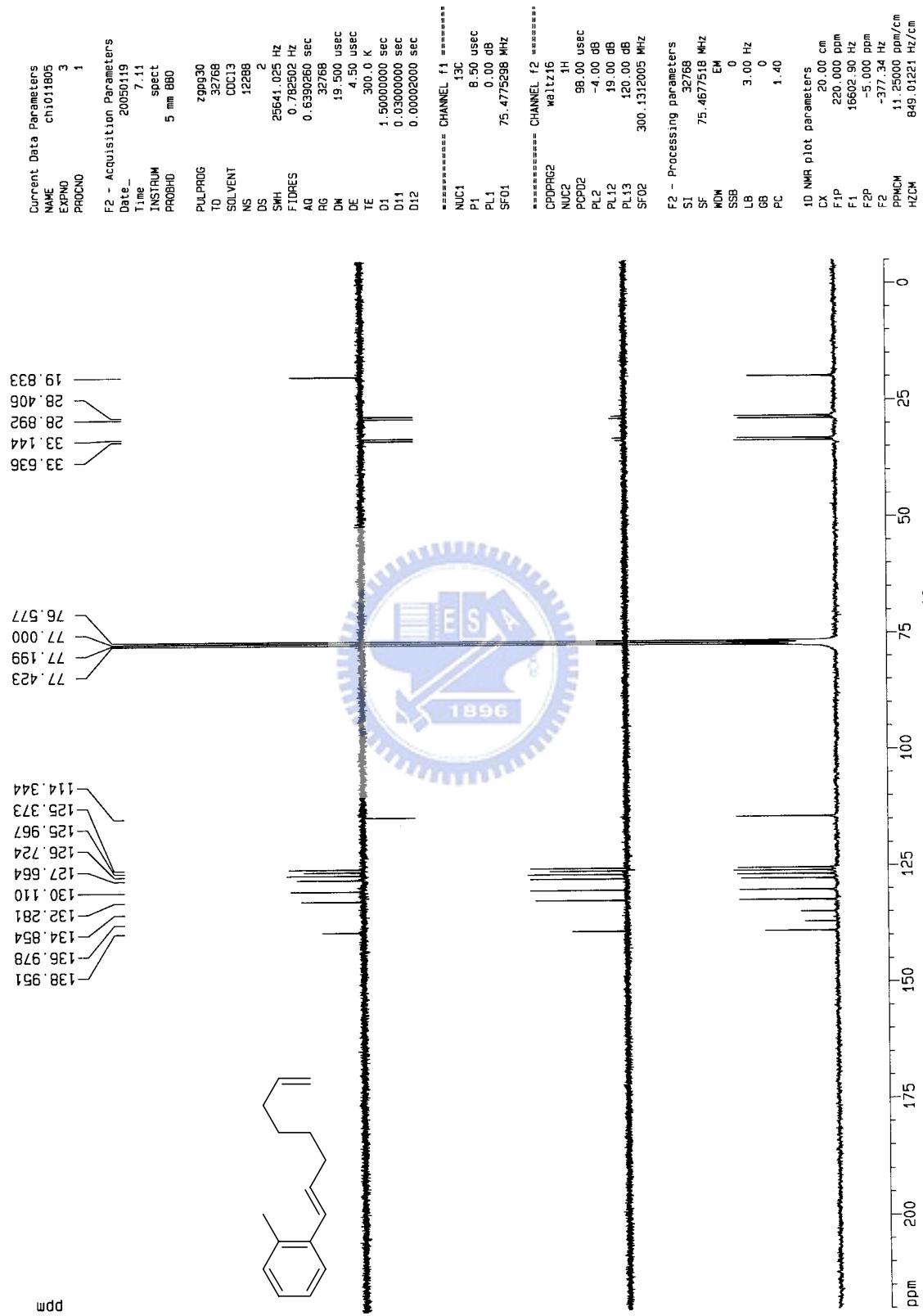
===== CHANNEL f1 =====
 NUC1 1H
 P1 9.10 usec
 PL1 -4.00 dB
 SF01 300.1321122 MHz

F2 - Processing parameters
 SI 32768
 SF 300.1300074 MHz
 WDW EM
 SSB 0
 LB 0.30 Hz
 GB 0
 PC 1.00

1D NMR plot parameters
 CX 20.00 cm
 F1P 10.000 ppm
 F1 3001.30 Hz
 F2P -0.500 ppm
 F2 -150.07 Hz
 PPMCM 0.52500 ppm/cm
 HZCM 157.56825 Hz/cm



附圖 95 化合物 104f 之 ¹H NMR 光譜圖



附圖 96 化合物 104f 之 ¹³C NMR 光譜圖


```

Current Data Parameters
NAME          chi011905
EXPNO         1
PROCNO        1

F2 - Acquisition Parameters
Date_         20050119
Time          19.39
INSTRUM       spect
PROBHD        5 mm BBO

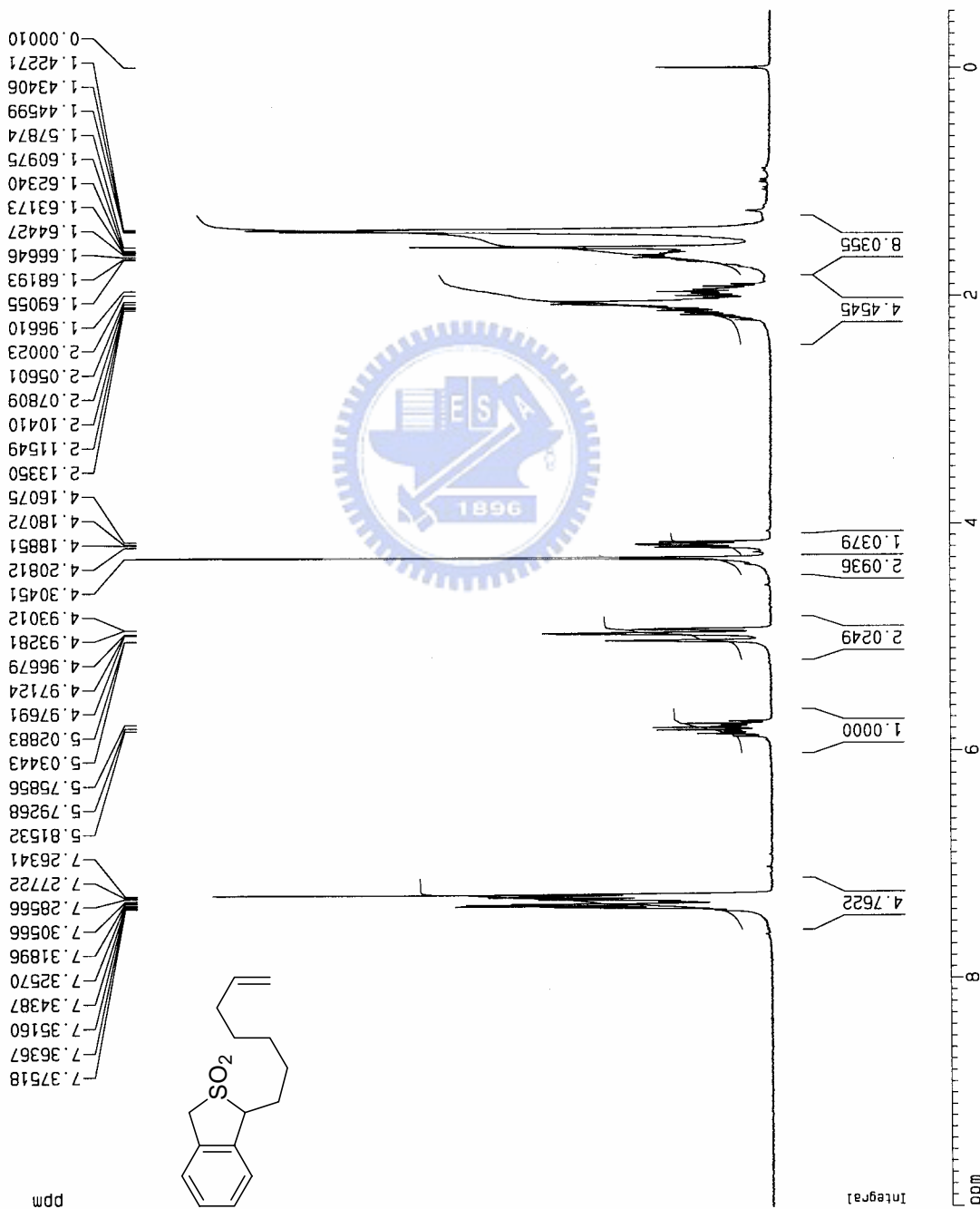
PULPROG       zg30
TD             32768
SOLVENT       CDC13
NS             16
DS             0
SWH           7612.500 Hz
FIDRES        0.238419 Hz
AQ            2.0972021 sec
RG            456.1
DM            64.000 usec
DE            4.50 usec
TE            300.0 K
D1            1.00000000 sec

===== CHANNEL f1 =====
NUC1          1H
P1            9.10 usec
PL1           -4.00 dB
SFO1          300.1321122 MHz

F2 - Processing parameters
SI            32768
SF            300.1300053 MHz
WDW           EM
SSB           0
LB            0.30 Hz
GB            0
PC            1.00

1D NMR plot parameters
CX            20.00 cm
F1P           10.000 ppm
F1            3001.30 Hz
F2P           -0.500 ppm
F2            -150.07 Hz
PPMCM         0.52500 ppm/cm
HZCM          157.56825 Hz/cm

```



附圖 97 化合物 105f 之 ¹H NMR 光譜圖

```

Current Data Parameters
NAME      CH1011905
EXPNO    2
PROCNO   1

F2 - Acquisition Parameters
Date_    20060119
Time     19.50
INSTRUM spect
PROBHD   5 mm BBO

PULPROG  zgpg30
TD        32768
SOLVENT  CDCl3
NS        4333
DS        2
SWH       25541.025 Hz
FIDRES    0.782502 Hz
AQ        0.6390260 sec
RG        32768
DM        19.500 usec
DE        4.50 usec
TE        300.0 K
D1        1.50000000 sec
D11       0.03000000 sec
D12       0.00002000 sec

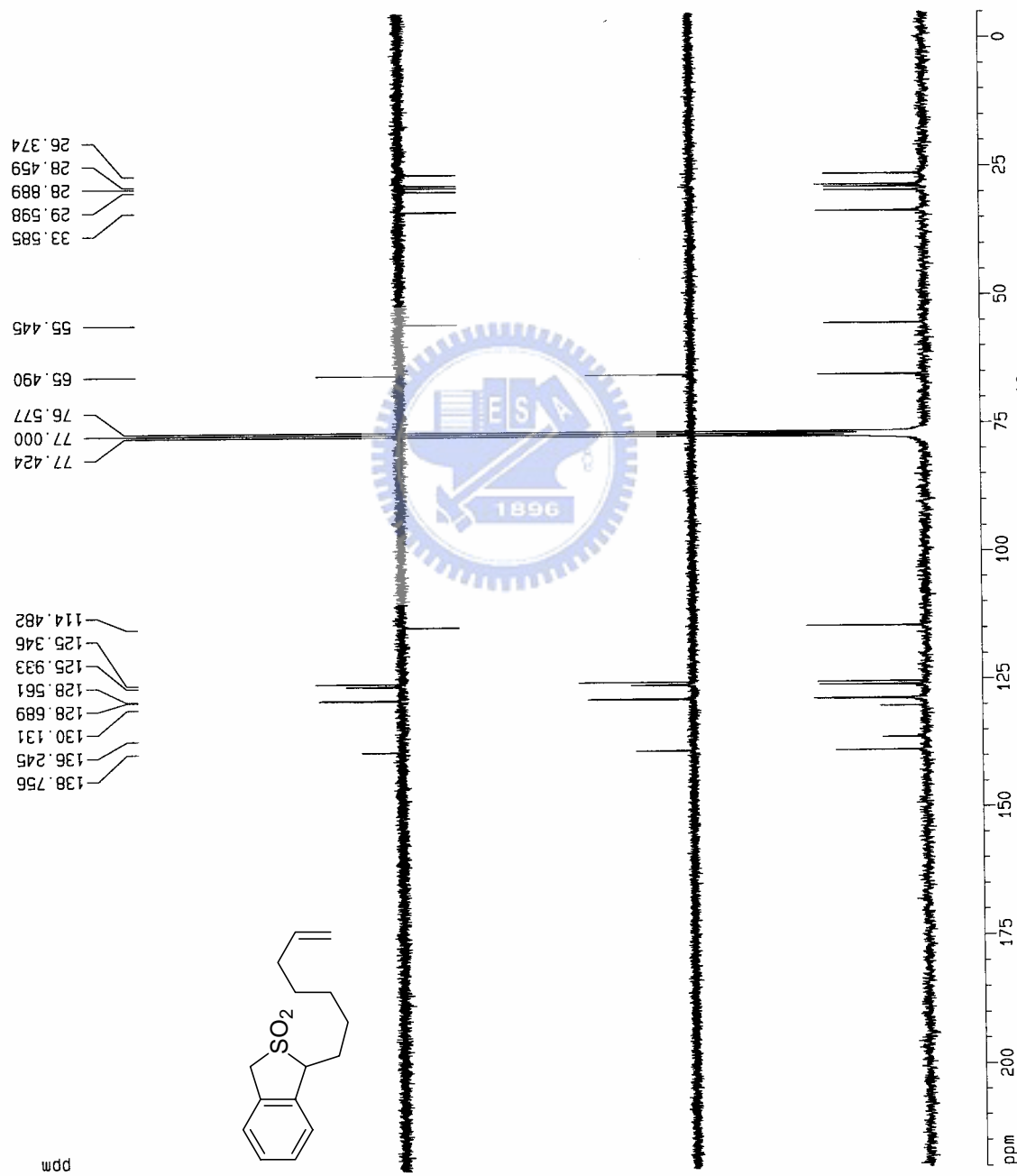
===== CHANNEL f1 =====
NUC1      13C
P1        8.50 usec
PL1       0.00 dB
SF01      75.4775298 MHz

===== CHANNEL f2 =====
CPCPRG2  waltz16
NUC2      1H
PCPD2     98.00 usec
PL2       -4.00 dB
PL12      19.00 dB
PL13      120.00 dB
SF02      300.1312005 MHz

F2 - Processing parameters
SI        32768
SF        75.4677519 MHz
WDW       EM
SSB       0
LB        3.00 Hz
GB        0
PC        1.40

1D NMR plot parameters
CX        20.00 cm
F1P       220.000 ppm
F1        16502.50 Hz
F2P       -5.000 ppm
F2        -377.34 Hz
PPMCH     11.25000 ppm/cm
HZCM      849.01221 Hz/cm

```



附圖 98 化合物 105f 之 ¹³C NMR 光譜圖

```

Current Data Parameters
NAME      chi012605
EXPNO     1
PROCNO    1

F2 - Acquisition Parameters
Date_     20050127
Time      11.07
INSTRUM   spect
PROBHD    5 mm BBO

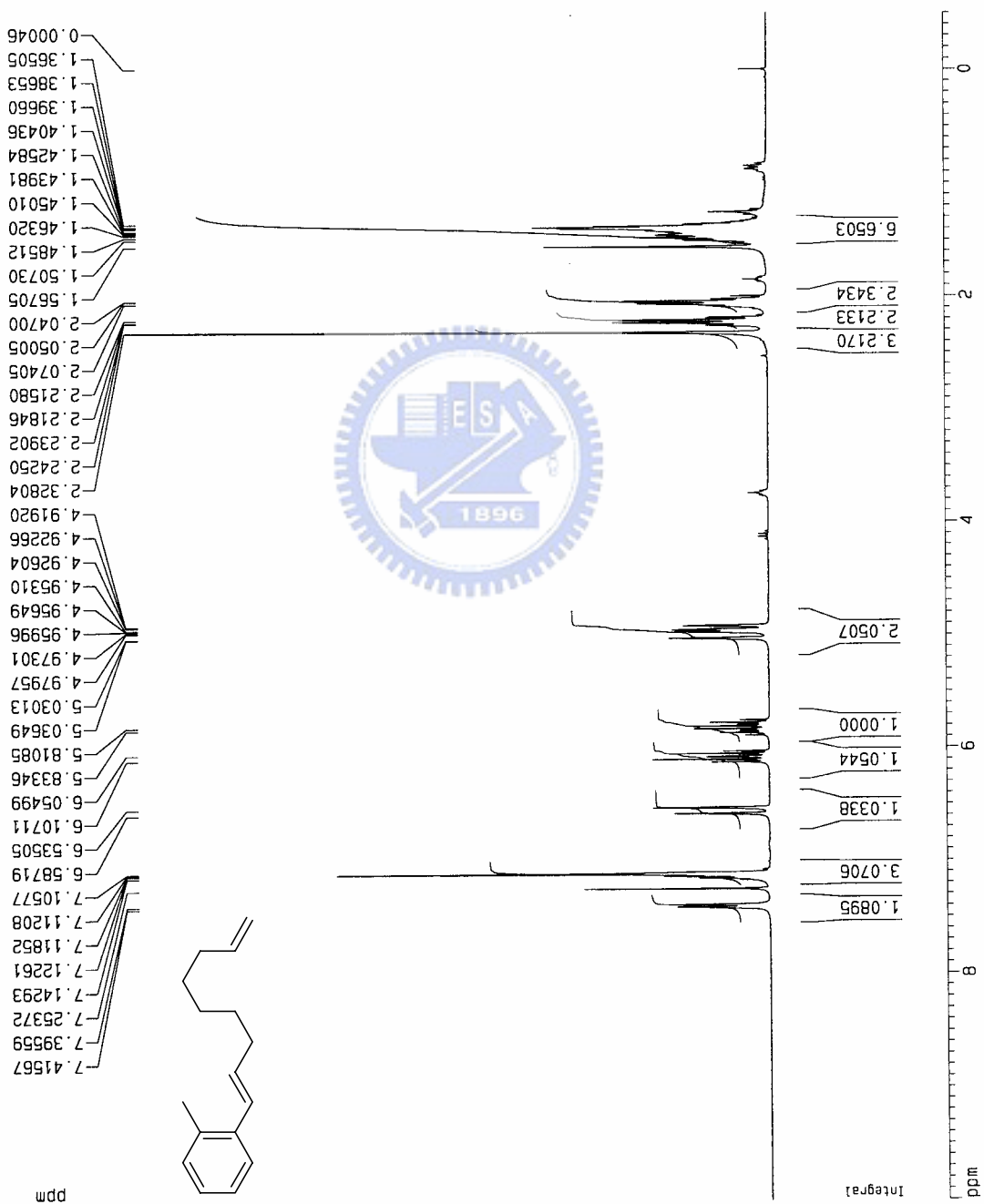
PULPROG   zg30
TD         32768
SOLVENT   CDCl3
NS         16
DS         0
SWH       7812.500 Hz
FIDRES    0.238419 Hz
AQ         2.0972021 sec
RG         256
DM         64.000 usec
DE         4.50 usec
TE         300.0 K
D1         1.00000000 sec

===== CHANNEL f1 =====
NUC1       1H
P1         9.10 usec
PL1        -4.00 dB
SFO1       300.1321122 MHz

F2 - Processing parameters
SI         32768
SF         300.1300081 MHz
WDW        EM
SSB        0
LB         0.30 Hz
GB         0
PC         1.00

1D NMR plot parameters
CX         20.00 cm
F1P        10.000 ppm
F1         30001.30 Hz
F2P        -0.500 ppm
F2         -150.07 Hz
PPMCM      0.52500 ppm/cm
HZCM       157.56825 Hz/cm

```



附圖 99 化合物 104g 之 ¹H NMR 光譜圖

```

Current Data Parameters
NAME      chi012605
EXPNO    2
PROCNO   1

F2 - Acquisition Parameters
Date_    20050126
Time     13 51
INSTRUM spect
PROBHD   5 mm BBO

PULPROG  zgpg30
TD        32768
SOLVENT  CDCl3
NS        5087
DS        2
SWH       25641.025 Hz
FIDRES    0.782502 Hz
AQ        0.6390260 sec
RG        32768
DM        19.500 usec
DE        4.50 usec
TE        300.0 K
D1        1.5000000 sec
D11       0.03000000 sec
D12       0.00002000 sec

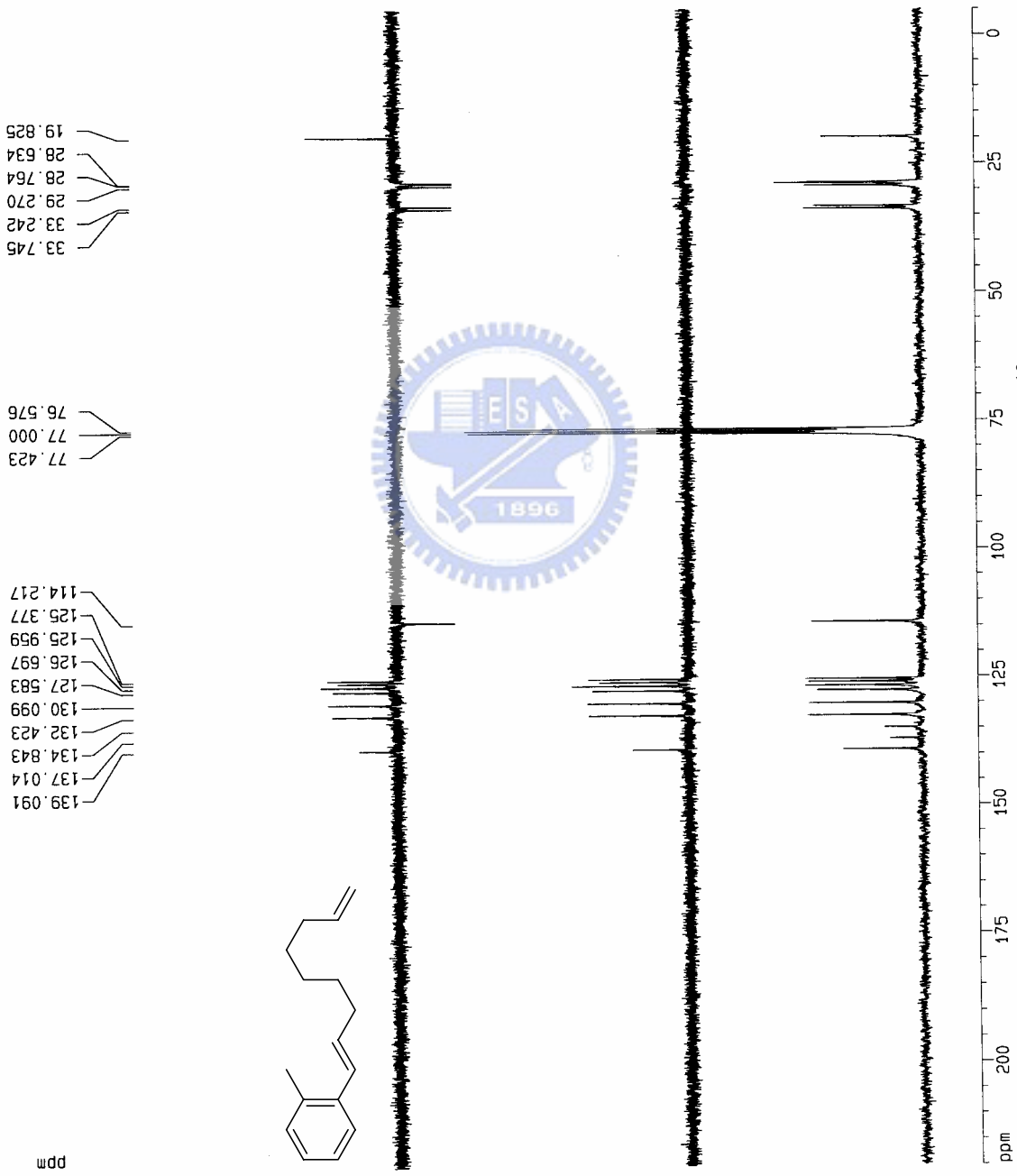
===== CHANNEL f1 =====
NUC1      13C
P1        8.50 usec
PL1       0.00 dB
SFO1      75.4775298 MHz

===== CHANNEL f2 =====
CPDPRG2  waltz16
NUC2      1H
PCPD02   98.00 usec
PL2       -4.00 dB
PL12     19.00 dB
PL13     120.00 dB
SFO2     300.1312005 MHz

F2 - Processing parameters
SI        32768
SF        75.4677531 MHz
MDM       EM
SSB       0
LB        3.00 Hz
GB        0
PC        1.40

1D NMR plot parameters
CX        20.00 cm
F1P       220.000 ppm
F1        16602.90 Hz
F2P       -5.000 ppm
F2        -377.34 Hz
PPMCM     11.25000 ppm/cm
HZCM      849.01221 Hz/cm

```



附圖 100 化合物 104g 之 ¹³C NMR 光譜圖

Current Data Parameters
 NAME CN1012605
 PROCNO 1

F2 - Acquisition Parameters
 Date_ 20050727
 Time 10:05
 INSTRUM spect
 PROBHD 5 mm BBO

ACQPROG hncp
 IN 1
 SD VENT CQ13
 NS 24
 DS 32
 SWH 1204.259 Hz
 FIDRES 0.4252148 sec
 AQ 15.984
 RG 415.200 usec
 DE 6.50 usec
 TE 300.2
 O1 0.0000000 sec
 O2 1.500000000 sec
 O3 0.003450000 sec
 O4 0.002000000 sec
 O5 0.000000000 sec
 O6 0.000000000 sec
 O7 0.000000000 sec
 O8 0.001100000 sec
 O9 0.001100000 sec

***** CHANNEL f1 *****
 NUC1 13C
 P1 18.00 usec
 PL1 1.00 dB
 SF01 75.4697908 MHz

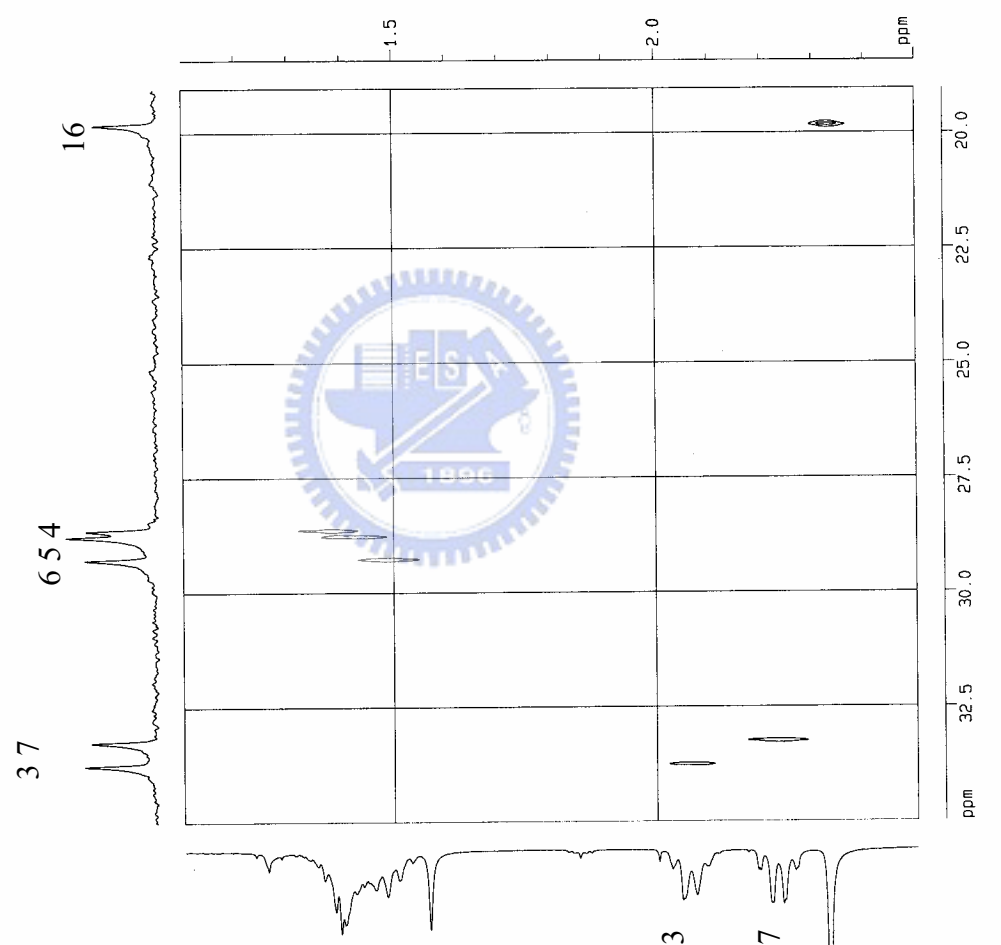
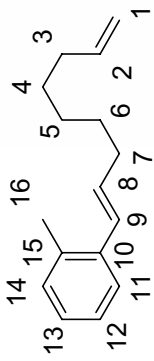
***** CHANNEL f2 *****
 NUC2 1H
 P2 9.80 usec
 PL2 0.00 dB
 SF02 300.1305484 MHz

F1 - Acquisition parameters
 MD 53
 TD 53
 SF01 300.1305 MHz
 FIDRES 7.959035 Hz
 SN 1.389 dB

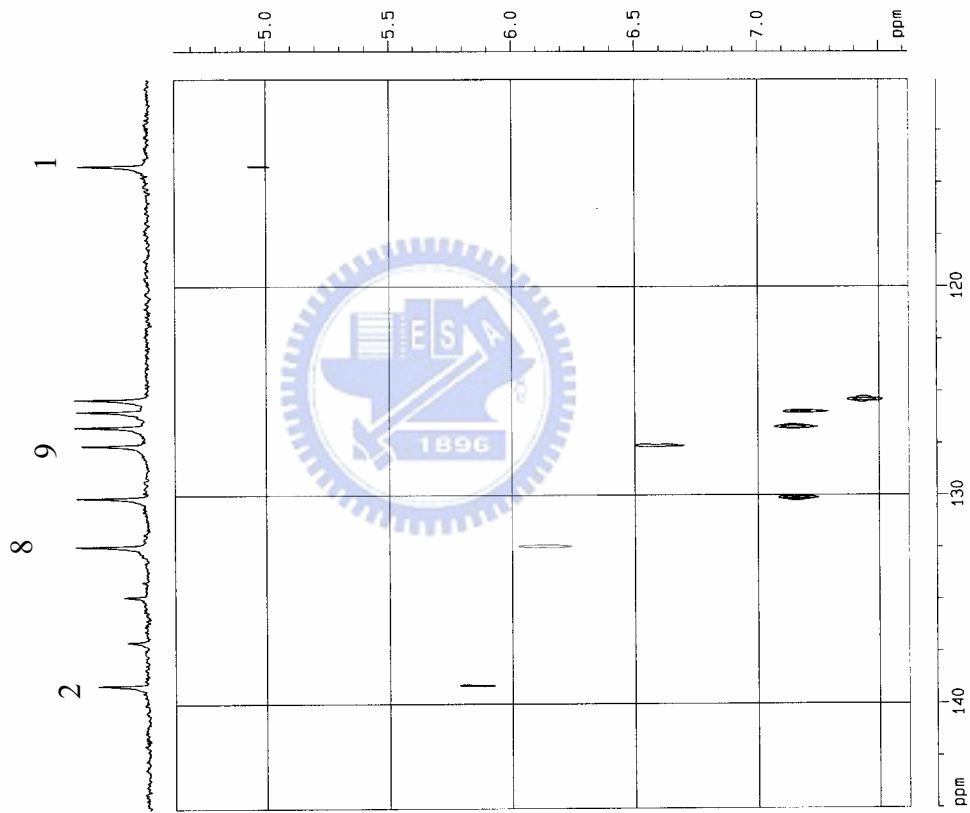
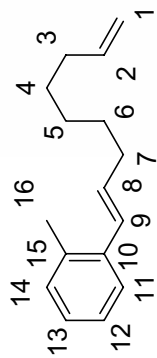
F2 - Processing parameters
 SI 1024
 SF 75.4677518 MHz
 EQ 0
 LB 3.00 Hz
 GB 0
 PC 1.40

F1 - Processing parameters
 SI 32768
 SF 300.1300079 MHz
 SINE
 EQ 2
 LB 0.00 Hz
 GB 0

2D NMR PLOT PARAMETERS
 CK2 13.00 cm
 CK1 13.00 cm
 F2L0 34.936 dB
 F2L1 2641.07 Hz
 F2PH1 19.039 dB
 F2L2 14.958 Hz
 F2PH2 26.500 dB
 F2L3 750.51 Hz
 F2PH3 1.101 dB
 F2V1 330.48 Hz
 F2PH4 227.66 dB/cm
 F2V2 92.00 Hz
 F2PH5 0.10785 dB/cm
 F2V3 32.30576 Hz/cm



附圖 102 化合物 104g 之 H,C-COSY 光譜圖之一



Current Data Parameters
 NAME ch1012605
 PROCNO 0
 1

F2 - Acquisition Parameters
 Date_ 20050127
 Time 13:05:33
 INSTRUM spect
 PROCNO 5
 MH 880

PCPRG0
 TO 1619
 SOLVENT CDCl3
 NS 24
 DS 32
 AQ 0.1942004 Hz
 FIDRES 2.5747323 Hz
 AD 0.1942004 SEC
 RG 16384
 DN 189.600 USEC
 DE 6.50 USEC
 TE 300.2 K
 D0 0.0000000 SEC
 D1 1.5000000 SEC
 D2 0.00345000 SEC
 D3 0.00200000 SEC
 D4 0.00200000 SEC
 D5 0.00200000 SEC
 D6 0.0000000 SEC
 D7 0.0000000 SEC
 D8 0.0000000 SEC
 D9 0.0000000 SEC
 D10 0.0000000 SEC
 D11 0.0000000 SEC
 D12 0.0000000 SEC
 INVD 0.0000000 SEC

***** CHANNEL f1 *****
 NU0 300
 TD 46
 F2 18.00 USEC
 P1 18.00 USEC
 PL1 1.00 dB
 SFO1 75.477253 MHz

***** CHANNEL f2 *****
 CPDPRG2 WALTZ16
 NU0 300
 TD 46
 F2 18.00 USEC
 P1 18.00 USEC
 PL1 1.00 dB
 SFO1 75.477253 MHz
 SFO2 300.1319368 MHz

F1 - Acquisition parameters
 NU0 300
 TD 46
 F1 300.1319 MHz
 FIDRES 18.346296 Hz
 SW 2.5952 ppm

F2 - Processing parameters
 SI 3024
 SF 75.4677508 MHz
 EM
 NQM 3.00 Hz
 SB 0
 GB 0
 PC 1.00

F1 - Processing parameters
 SI 3024
 SF 75.4677508 MHz
 EM
 NQM 3.00 Hz
 SB 0
 GB 0
 PC 1.00

2D NMR plot parameters
 DZ 13.00 cm
 F2 18.00 USEC
 F2R0 145.000 ppm
 F2L0 109.44 04 Hz
 F2PHI 110.058 ppm
 F2R1 8392.51 Hz
 F2L1 2287.54 Hz
 F2PHI 4.631 ppm
 F2R1 1396.95 Hz
 F2L1 202.84258 ppm/cm
 F2PHI 0.23015 ppm/cm
 F1R0 69.07603 Hz/cm

附圖 103 化合物 104g 之 H,C-COSY 光譜圖之二

```

Current Data Parameters
NAME      chi1012505
EXPNO     6
PROCNO    1

F2 - Acquisition Parameters
Date_     20050126
Time      15.27
INSTRUM   spect
PROBHD    5 mm BBO

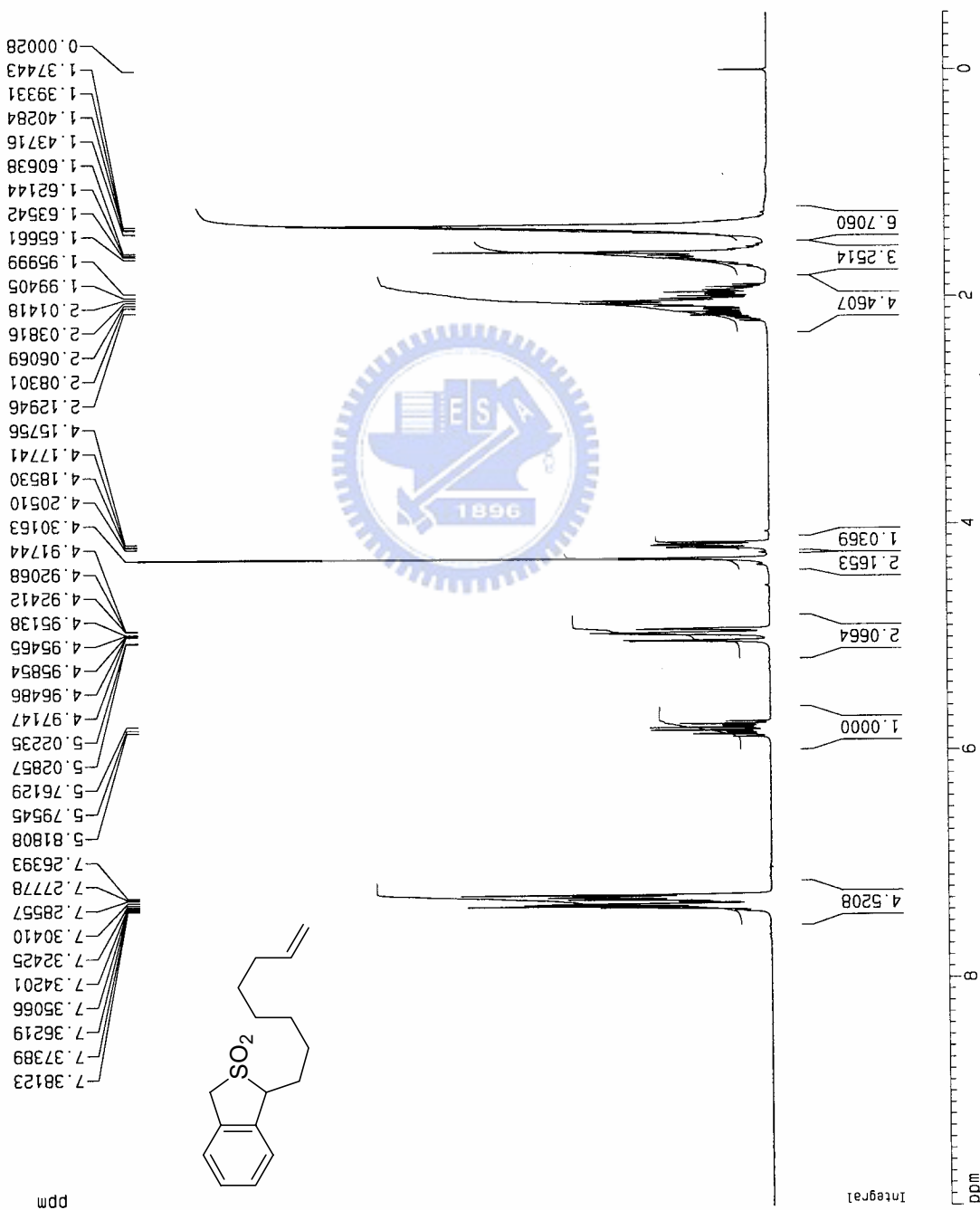
PULPROG   zg30
TD         32768
SOLVENT   CDCl3
NS         16
DS         0
SMH        7812.500 Hz
FIDRES     0.238419 Hz
AQ         2.0972021 sec
RG         228.1
DM         64.000 usec
DE         4.50 usec
TE         300.0 K
D1         1.0000000 sec

===== CHANNEL f1 =====
NUC1       1H
P1         9.10 usec
PL1        -4.00 dB
SF01       300.1321122 MHz

F2 - Processing parameters
SI         32768
SF         300.1300050 MHz
WDW        EM
SSB        0
LB         0.30 Hz
GB         0
PC         1.00

1D NMR plot parameters
CX         20.00 cm
F1P        10.000 ppm
F1         3001.30 Hz
F2P        -0.500 ppm
F2         -150.07 Hz
PPMCM      0.52500 ppm/cm
HZCM       157.56825 Hz/cm

```



附圖 104 化合物 105g 之 ¹H NMR 光譜圖


```

Current Data Parameters
NAME      ch1012505
EXPNO    3
PROCNO   1

F2 - Acquisition Parameters
Date_    20050125
Time     13.45
INSTRUM  spect
PROBHD   5 mm BBD

PULPROG  zgpg30
TD        32768
SOLVENT  COCl3
NS        1505
DS        2
SWH       25641.025 Hz
FIDRES    0.789502 Hz
AQ        0.6390260 sec
RG        32768
DM        19.500 usec
DE        4.50 usec
TE        300.0 K
D1        1.5000000 sec
D11       0.0300000 sec
D12       0.0000200 sec

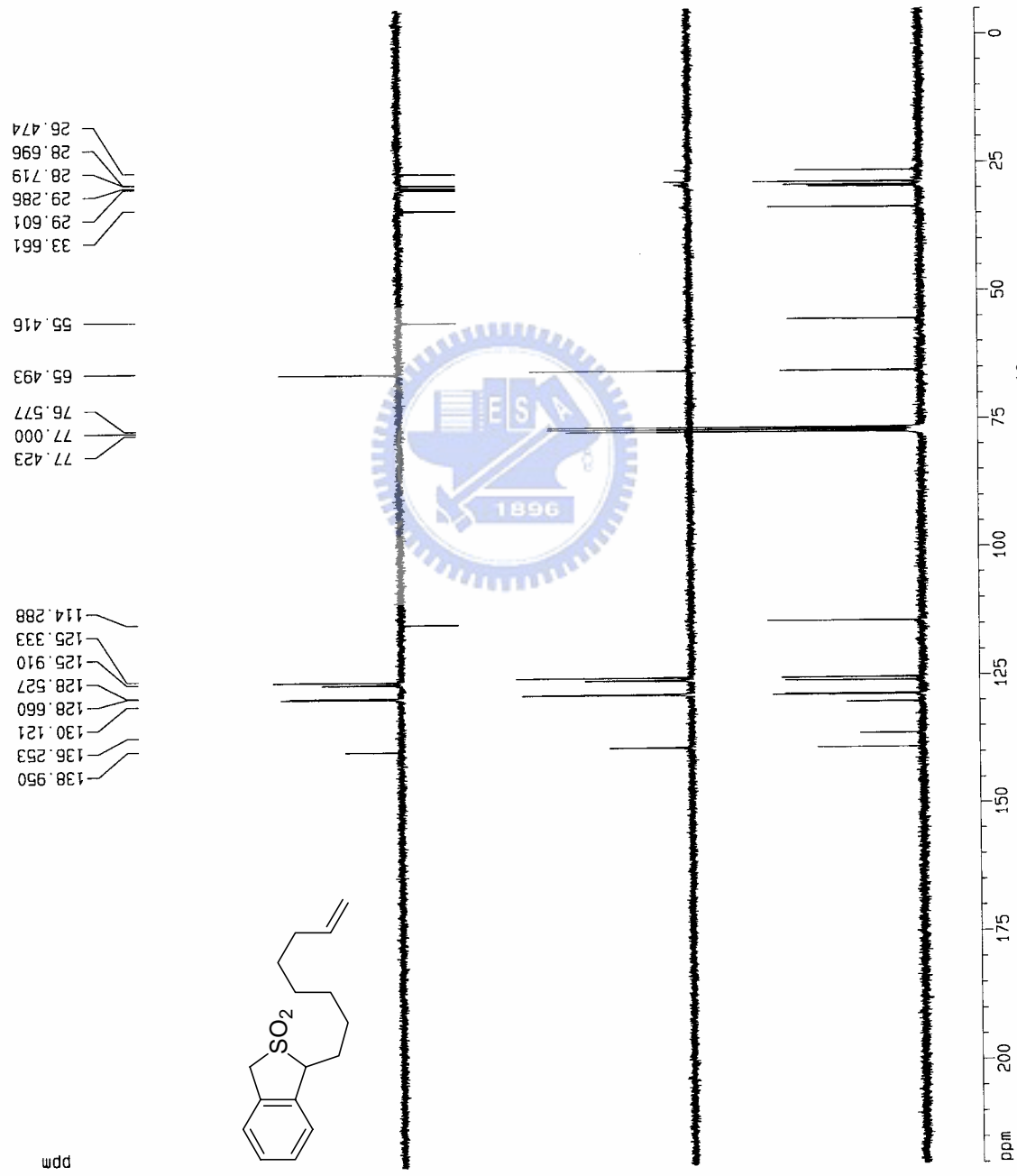
***** CHANNEL f1 *****
NUC1      13C
P1        6.50 usec
PL1       0.00 dB
SFO1      75.4775298 MHz

***** CHANNEL f2 *****
CPDPRG2  waltz16
NUC2      1H
PCPD2     98.00 usec
PL2       -4.00 dB
PL12      19.00 dB
PL13      120.00 dB
SFO2      300.1312005 MHz

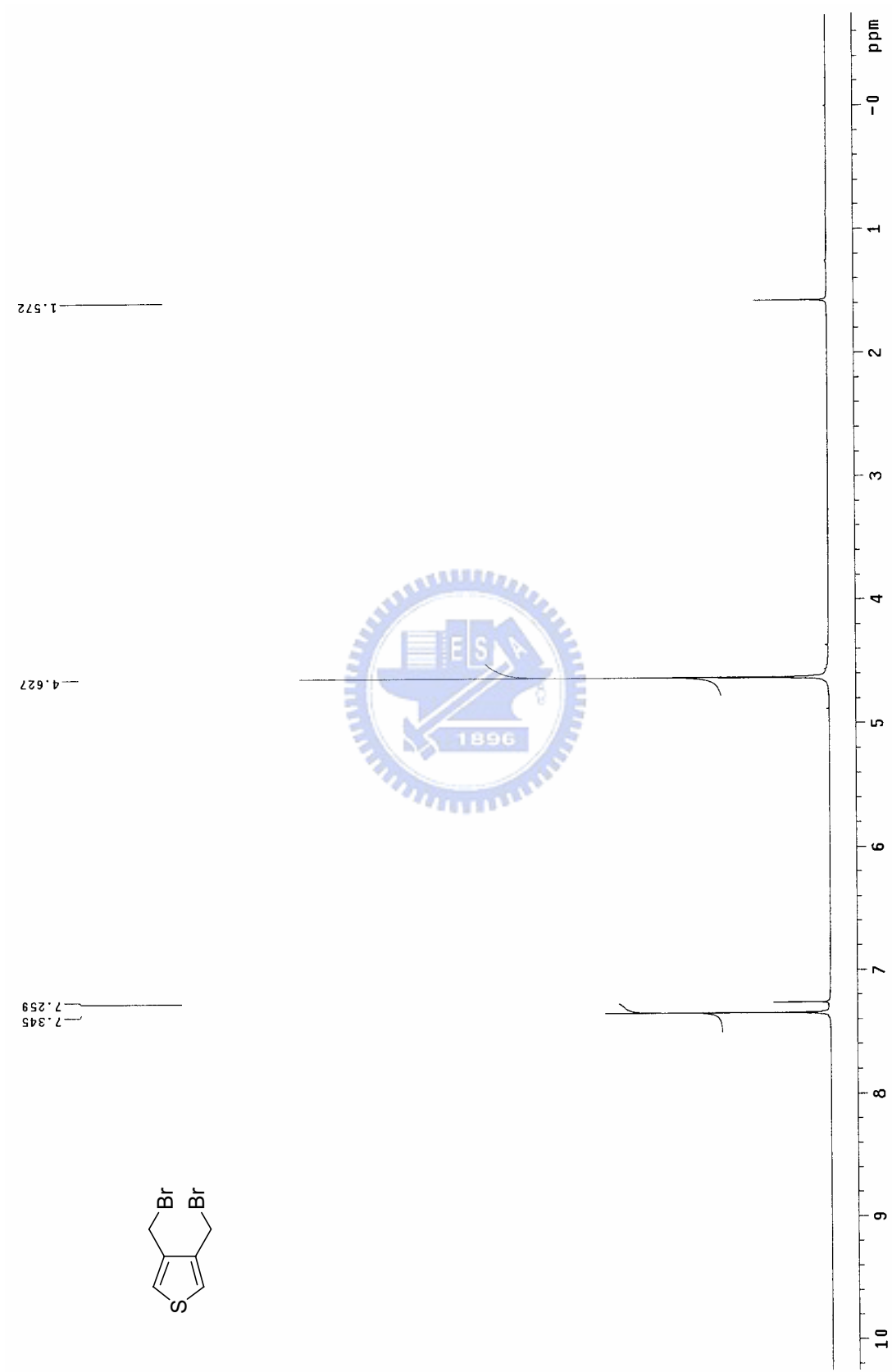
F2 - Processing parameters
SI        32768
SF        75.4677535 MHz
WDW       EM
SSB       0
LB        1.00 Hz
GB        0
PC        1.40

1D NMR plot parameters
CX        20.00 cm
F1P       220.000 ppm
F1        16502.90 Hz
F2P       -5.000 ppm
F2        -377.34 Hz
PPMCM     11.25000 ppm/cm
HZCM      849.01221 Hz/cm

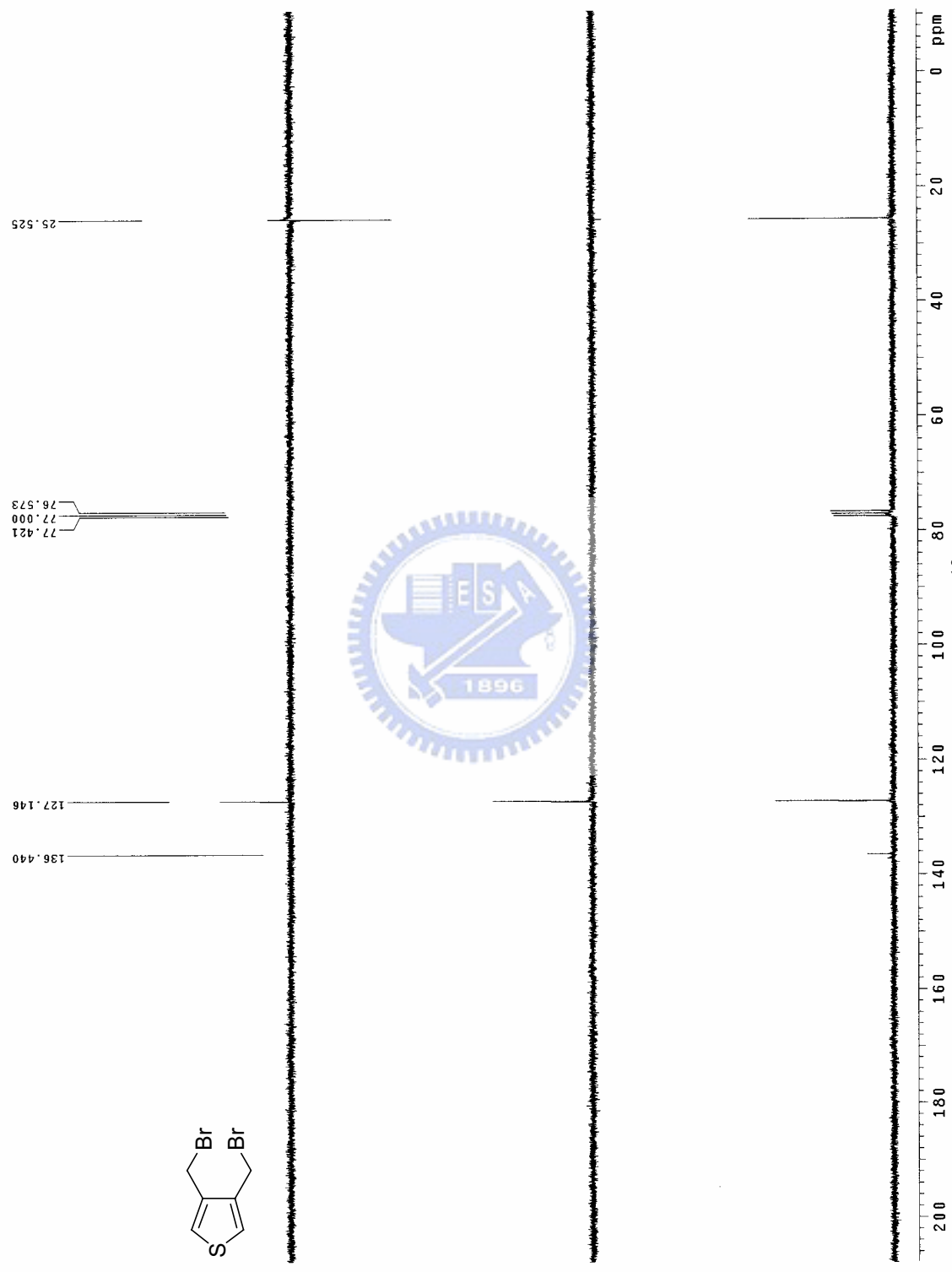
```



附圖 105 化合物 105g 之 ¹³C NMR 光譜圖



附圖 106 化合物 115 之 ^1H NMR 光譜圖



附圖 107 化合物 115 之 ¹³C NMR 光譜圖

```

Current Data Parameters
NAME      chi060305
EXPNO     1
PROCNO    1

F2 - Acquisition Parameters
Date_     20050603
Time      3.49
INSTRUM   spect
PROBHD    5 mm BBO

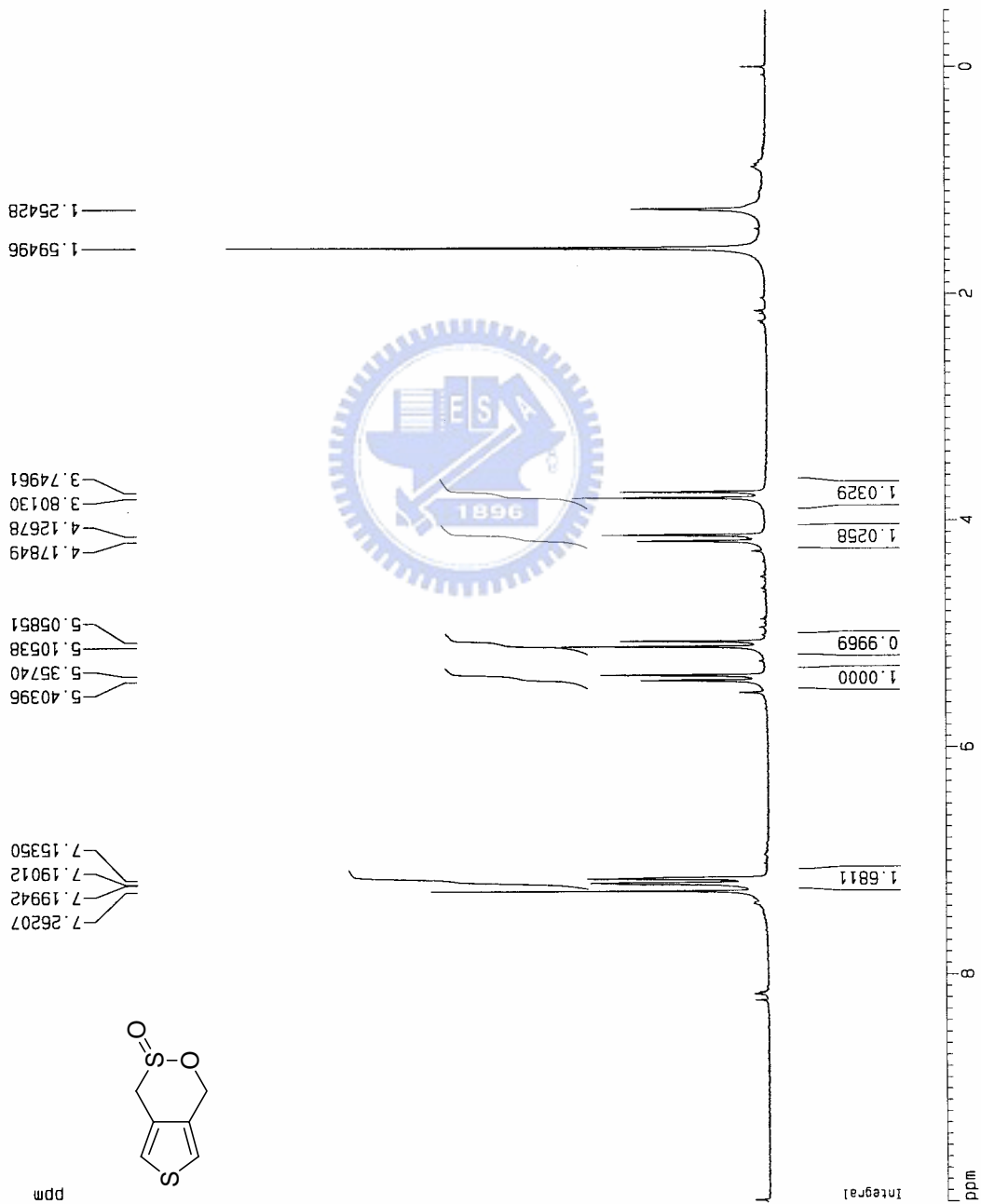
PULPROG   zg30
TD         32768
SOLVENT   CDC13
NS         16
DS         0
SWH        7812.500 Hz
FIDRES     0.238419 Hz
AQ         2.0972021 sec
RG         812.7
DM         64.000 usec
DE         4.50 usec
TE         300.0 K
D1         1.00000000 sec

===== CHANNEL f1 =====
NUC1       1H
P1         9.10 usec
PL1        -4.00 dB
SF01       300.1321122 MHz

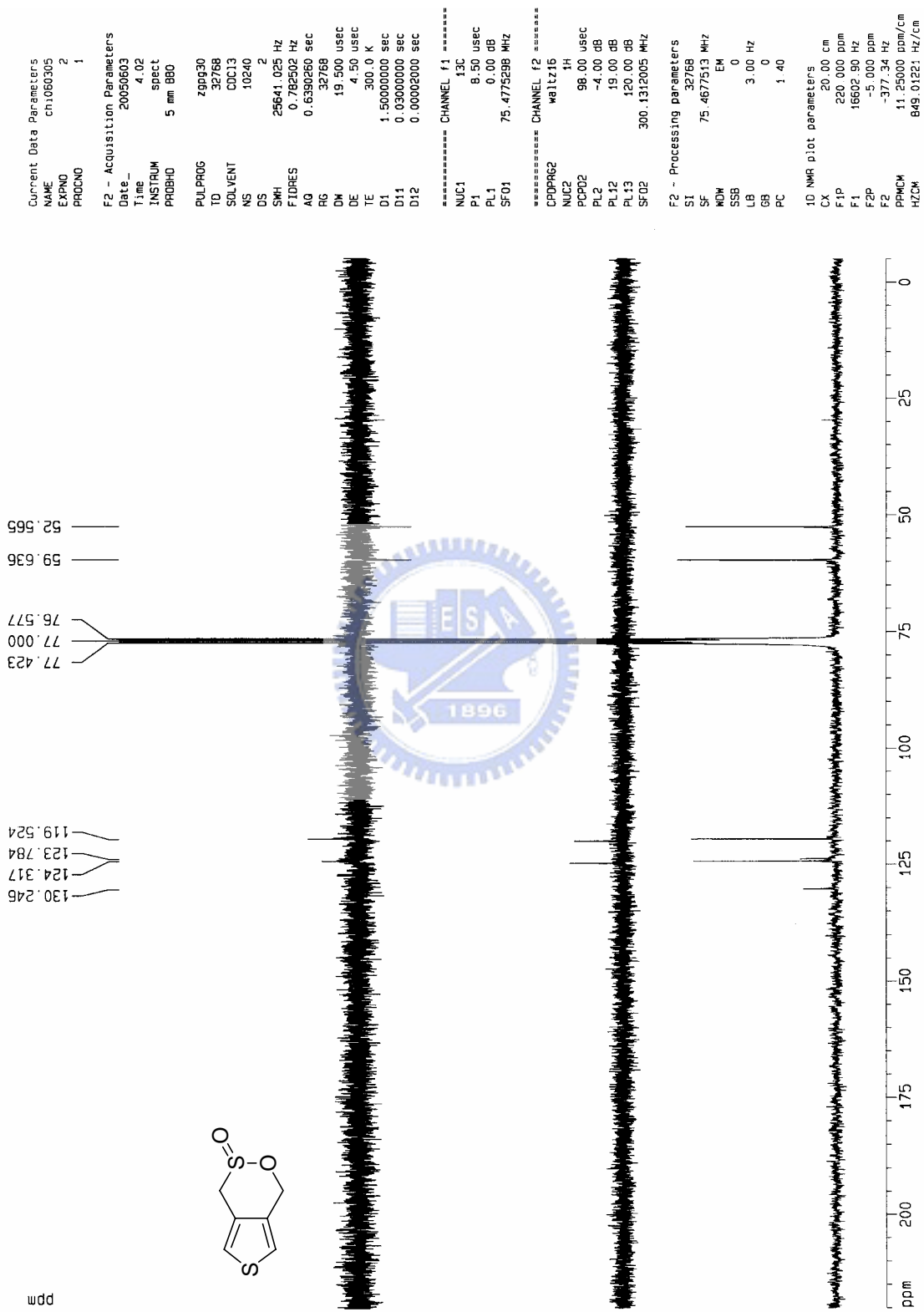
F2 - Processing parameters
SI         32768
SF         300.1300058 MHz
WDW        EM
SSB        0
LB         0.30 Hz
GB         0
PC         1.00

1D NMR plot parameters
CX         20.00 cm
F1P        10.000 ppm
F1         3001.30 Hz
F2P        -0.500 ppm
F2         -150.07 Hz
PPMCM      0.52500 ppm/cm
HZCM       157.56825 Hz/cm

```



附圖 108 化合物 116 之 ¹H NMR 光譜圖



附圖 109 化合物 116 之 ¹³C NMR 光譜圖

```

Current Data Parameters
NAME      chi060205
EXPNO     5
PROCNO    1

F2 - Acquisition Parameters
Date_     20050603
Time      0.45
INSTRUM   spect
PROBHD    5 mm BBO

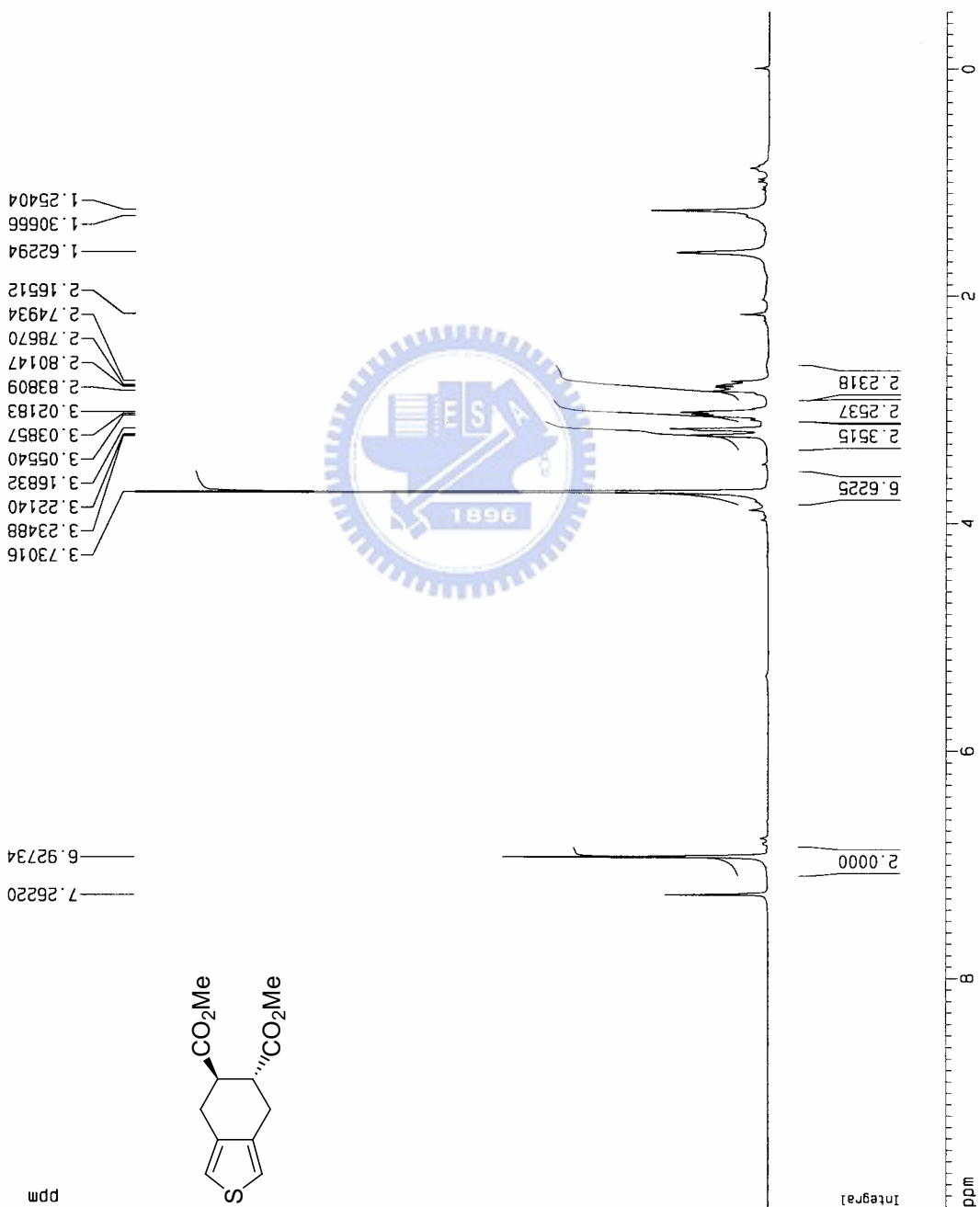
PULPROG   zg30
TD         32768
SOLVENT   CDCl3
NS         16
DS         0
SWH       7812.500 Hz
FIDRES    0.238419 Hz
AQ         2.0972021 sec
RG         406.4
DM         64.000 usec
DE         4.50 usec
TE         300.0 K
D1         1.00000000 sec

===== CHANNEL f1 =====
NUC1       1H
P1         9.10 usec
PL1        -4.00 dB
SF01       300.1321122 MHz

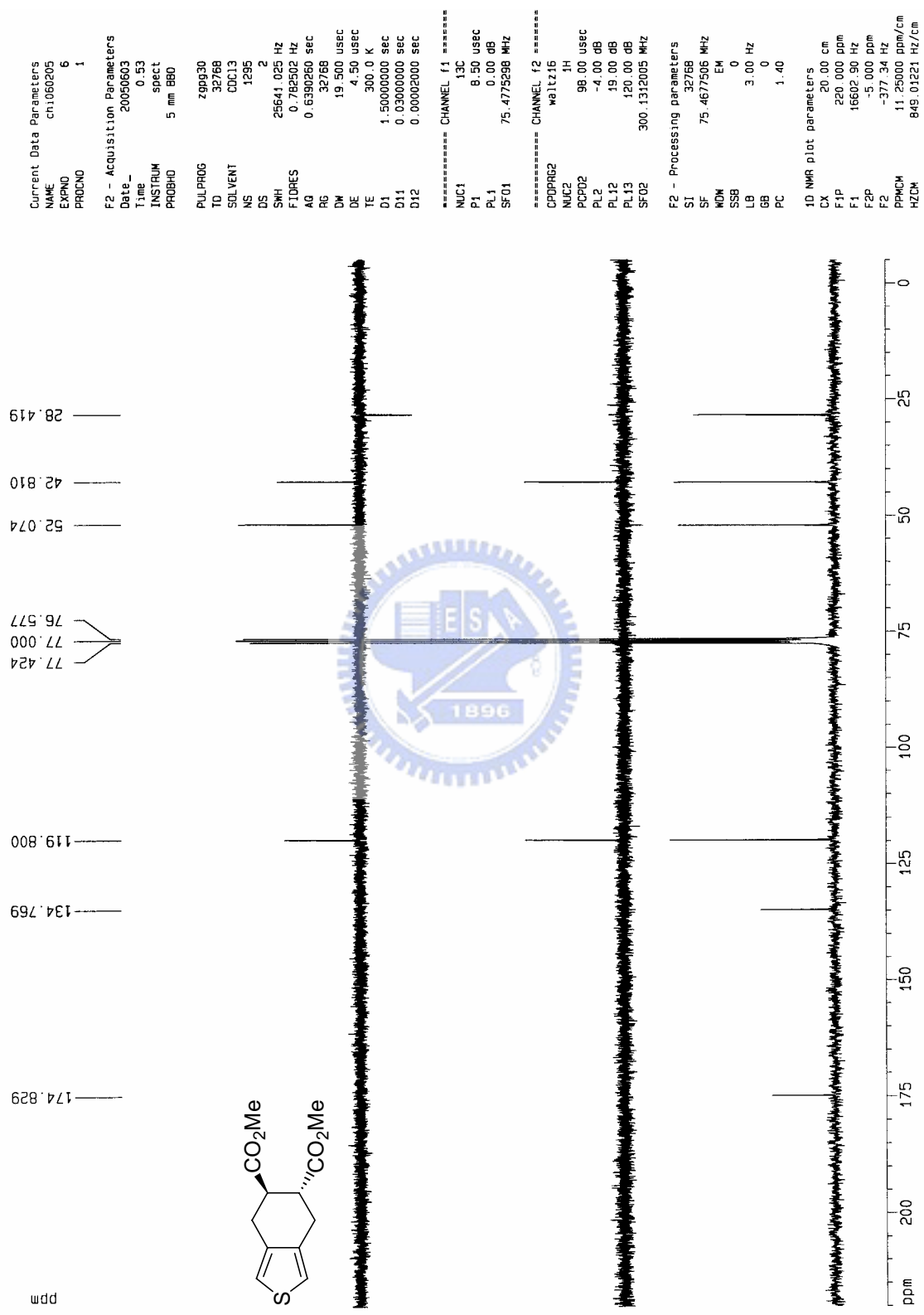
F2 - Processing parameters
SI         32768
SF         300.1300058 MHz
WDW        EM
SSB        0
LB         0.30 Hz
GB         0
PC         1.00

1D NMR plot parameters
CX         20.00 cm
F1P        10.000 ppm
F1         3001.30 Hz
F2P        -0.500 ppm
F2         -150.07 Hz
PPMCM      0.52500 ppm/cm
HZCM       157.56825 Hz/cm

```



附圖 110 化合物 117 之 ¹H NMR 光譜圖



附圖 111 化合物 117 之 ¹³C NMR 光譜圖

```

Current Data Parameters
NAME      chi1060205
EXPNO    10
PROCNO    1

F2 - Acquisition Parameters
Date_     20050603
Time      23.44
INSTRUM   spect
PROBHD    5 mm BBO

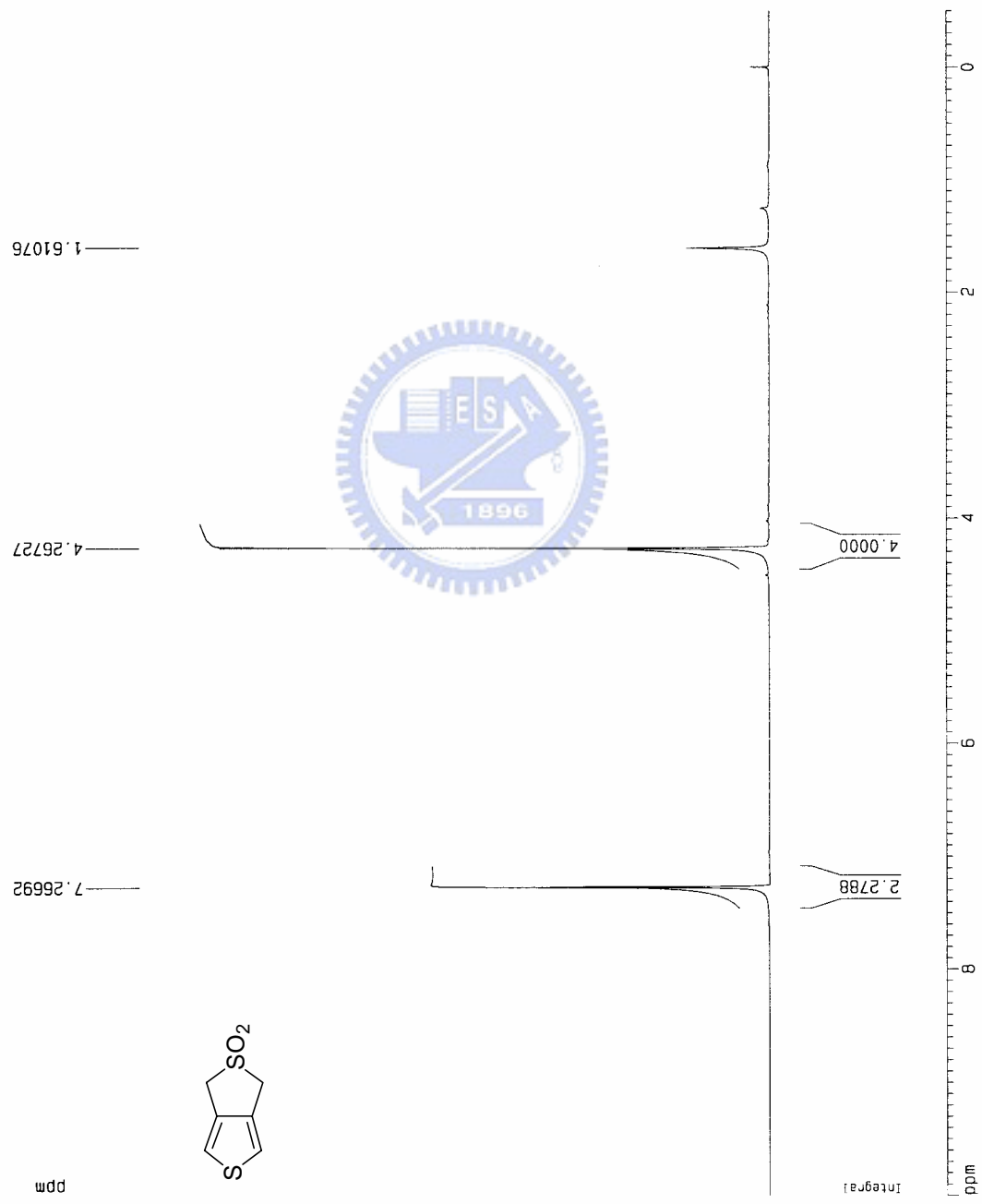
PULPROG   zg30
TD         32768
SOLVENT   CDCl3
NS         16
DS         0
SWH        7812.500 Hz
FIDRES     0.238419 Hz
AQ         2.0972021 sec
RG         812.7
DM         64.000 usec
DE         4.50 usec
TE         300.0 K
D1         1.00000000 sec

===== CHANNEL f1 =====
NUC1       1H
P1         9.10 usec
PL1        -4.00 dB
SF01       300.1321122 MHz

F2 - Processing parameters
SI         32768
SF         300.1300053 MHz
WDW        EM
SSB        0
LB         0.30 Hz
GB         0
PC         1.00

1D NMR pilot parameters
CX         20.00 cm
F1P        10.000 ppm
F1         3001.30 Hz
F2P        -0.500 ppm
F2         -150.07 Hz
PPM1CM     0.52500 ppm/cm
HZCM       157.56825 Hz/cm

```



附圖 112 化合物 118 之 ¹H NMR 光譜圖


```

Current Data Parameters
NAME      CH1060205
EXPNO    2
PROCNO   1

F2 - Acquisition Parameters
Date_    20050602
Time     23.08
INSTRUM  spect
PROBHD   5 mm BBO

PULPROG  zgpg30
TD        32768
SOLVENT  CDCl3
NS        1431
DS        2
SWH       25641.025 Hz
FIDRES    0.782502 Hz
AQ        0.6390260 sec
RG        32768
DM        19.500 usec
DE        4.50 usec
TE        300.0 K
D1        1.5000000 sec
D11       0.0300000 sec
D12       0.0002000 sec

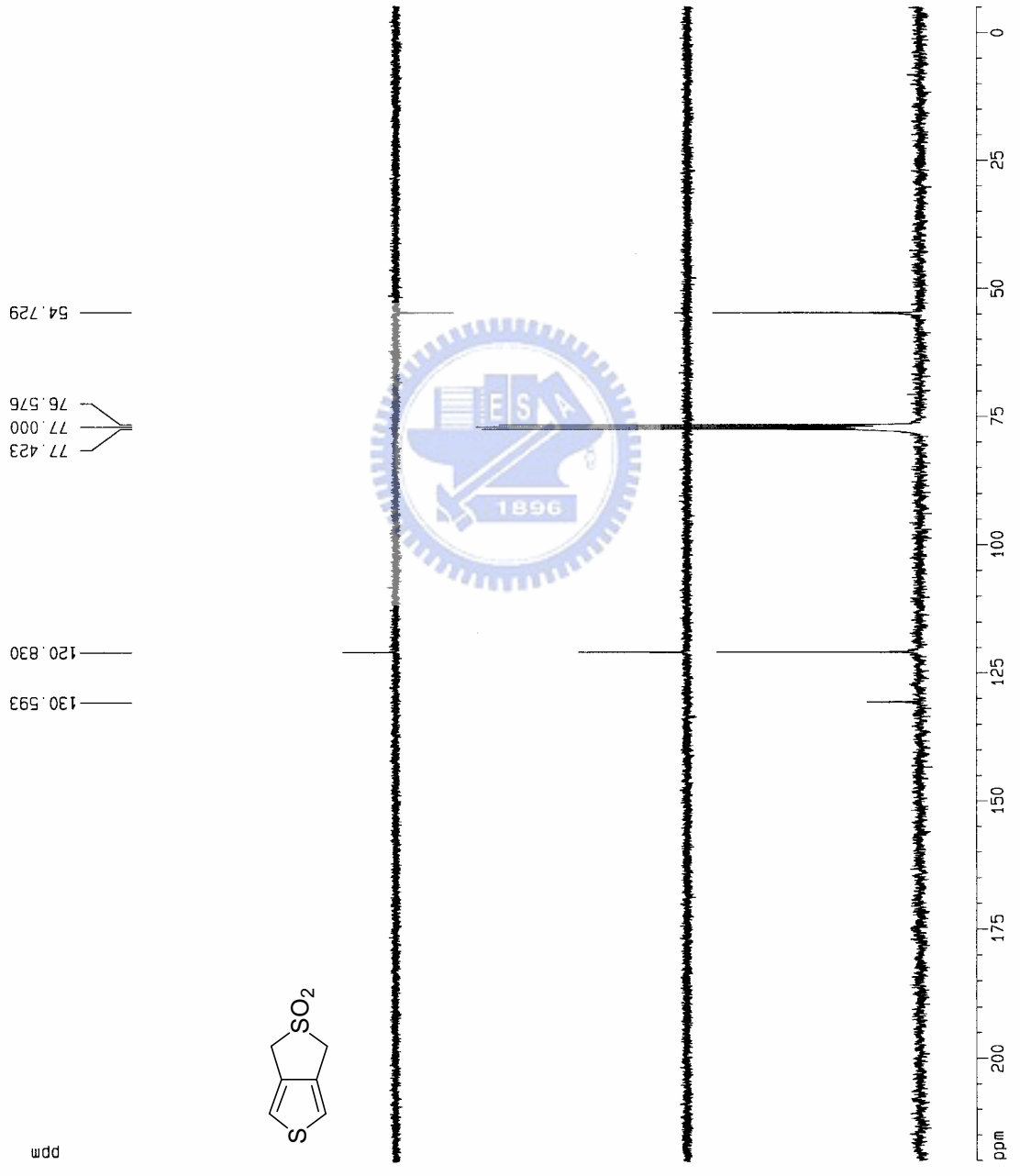
===== CHANNEL f1 =====
NUC1      13C
P1        8.50 usec
PL1       0.00 dB
SF01      75.4775298 MHz

===== CHANNEL f2 =====
CPDPRG2   waltz16
NUC2      1H
P2        98.00 usec
PL2       -4.00 dB
PL12      19.00 dB
PL13      120.00 dB
SF02      300.1312005 MHz

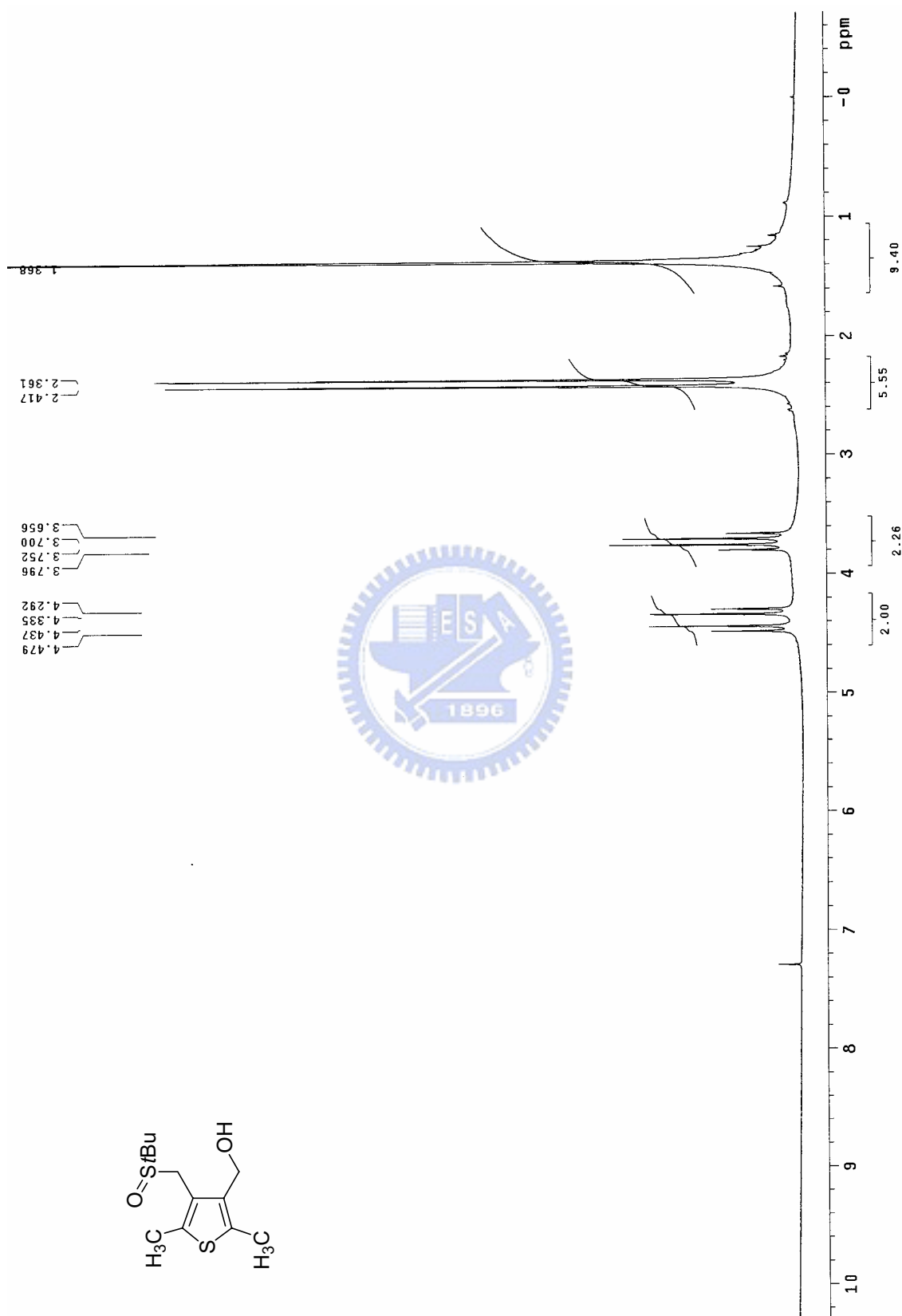
F2 - Processing parameters
SI        32768
SF        75.4677524 MHz
WDW       EM
SSB       0
LB        3.00 Hz
GB        0
PC        1.40

1D NMR plot parameters
CX        20.00 cm
F1P       220.000 ppm
F1        16602.90 Hz
F2P       -5.000 ppm
F2        -377.34 Hz
PPMCH     11.25000 ppm/cm
HZCM      849.01221 Hz/cm

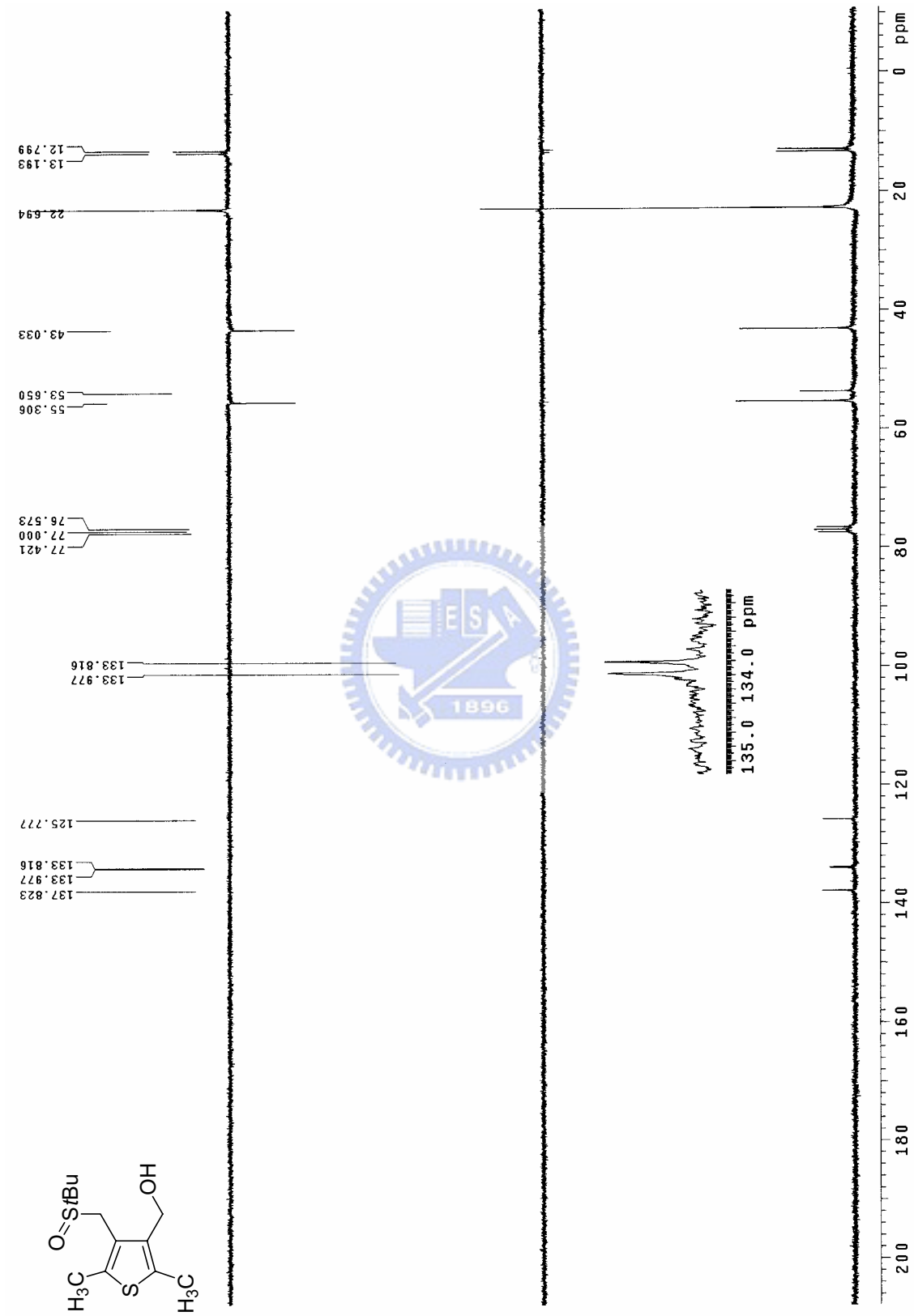
```



附圖 113 化合物 118 之 ¹³C NMR 光譜圖



附圖 114 化合物 128 之 ¹H NMR 光譜圖



附圖 115 化合物 128 之 ^{13}C NMR 光譜圖

Current Data Parameters
 NAME Chi110104
 EXPNO 1
 PROCNO 1

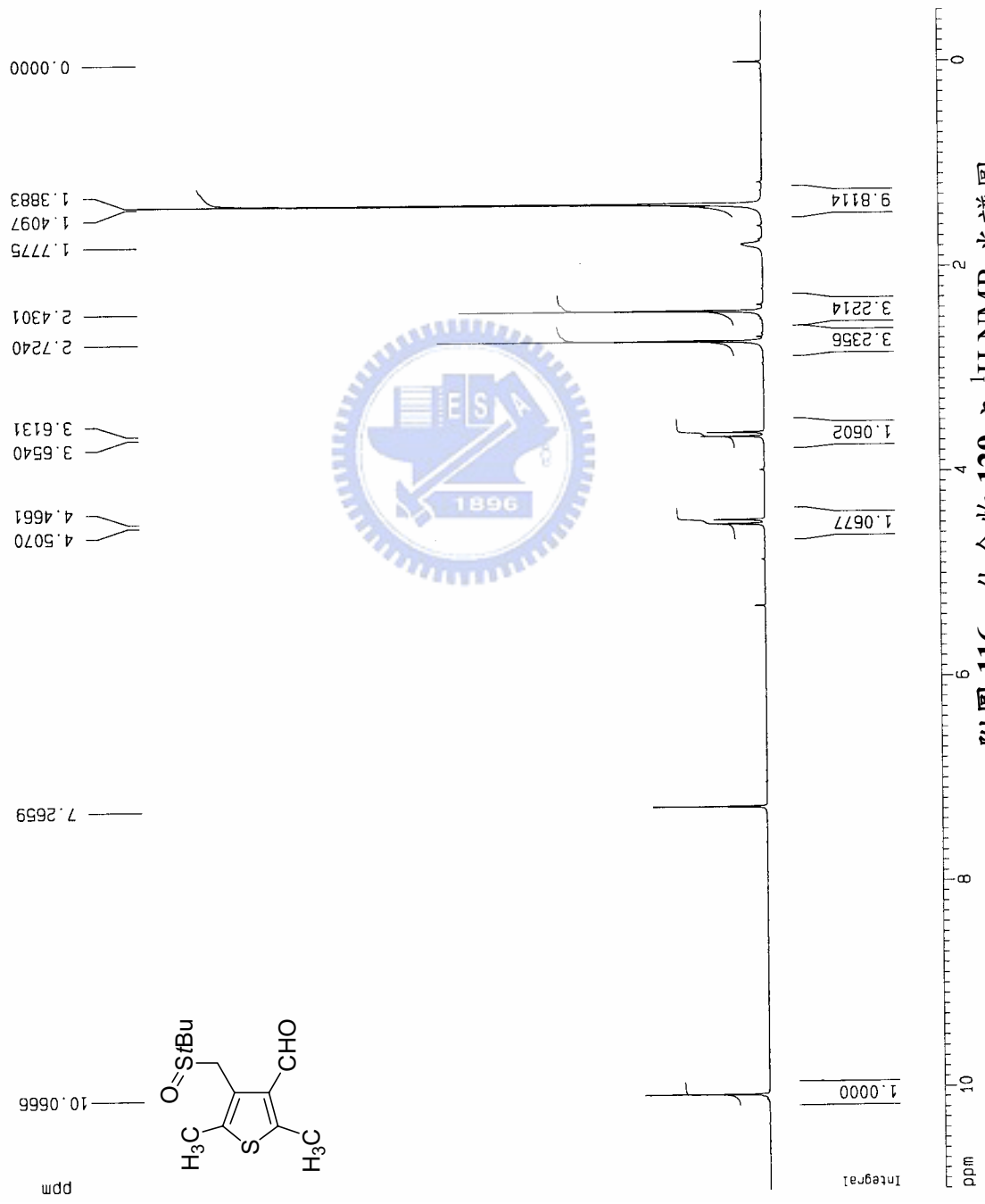
F2 - Acquisition Parameters
 Date_ 20041031
 Time_ 23.50
 INSTRUM spect
 PROBHD 5 mm BBO

PULPROG zg30
 TD 32768
 SOLVENT CDCl3
 NS 16
 DS 0
 SWH 7812.500 Hz
 FIDRES 0.238419 Hz
 AQ 2.0972021 sec
 RG 645.1
 DW 64.000 usec
 DE 4.50 usec
 TE 300.0 K
 D1 1.0000000 sec

===== CHANNEL f1 =====
 NUC1 1H
 P1 9.10 usec
 PL1 -4.00 dB
 SF01 300.1321122 MHz

F2 - Processing parameters
 SI 32768
 SF 300.1300046 MHz
 WDW EM
 SSB 0
 LB 0.30 Hz
 GB 0
 PC 1.00

1D NMR plot parameters
 CX 20.00 cm
 F1P 11.000 ppm
 F1 3301.43 Hz
 F2P -0.500 ppm
 F2 -150.07 Hz
 PPMCM 0.57500 ppm/cm
 HZCM 172.57475 Hz/cm



附圖 116 化合物 129 之 ¹H NMR 光譜圖

```

Current Data Parameters
NAME      ch1110104
EXPNO    2
PROCNO   1

F2 - Acquisition Parameters
Date_    20041101
Time     5:59
INSTRUM spect
PROBHD   5 mm BBO

PULPROG  zgpg30
TD        32768
SOLVENT  CDCl3
NS        10240
DS        2
SWH       256641.025 Hz
FIDRES    0.782502 Hz
AQ         0.6390260 sec
RG         32768
DM         19.500 usec
DE         4.50 usec
TE         300.0 K
D1         1.50000000 sec
D11        0.03000000 sec
D12        0.00002000 sec

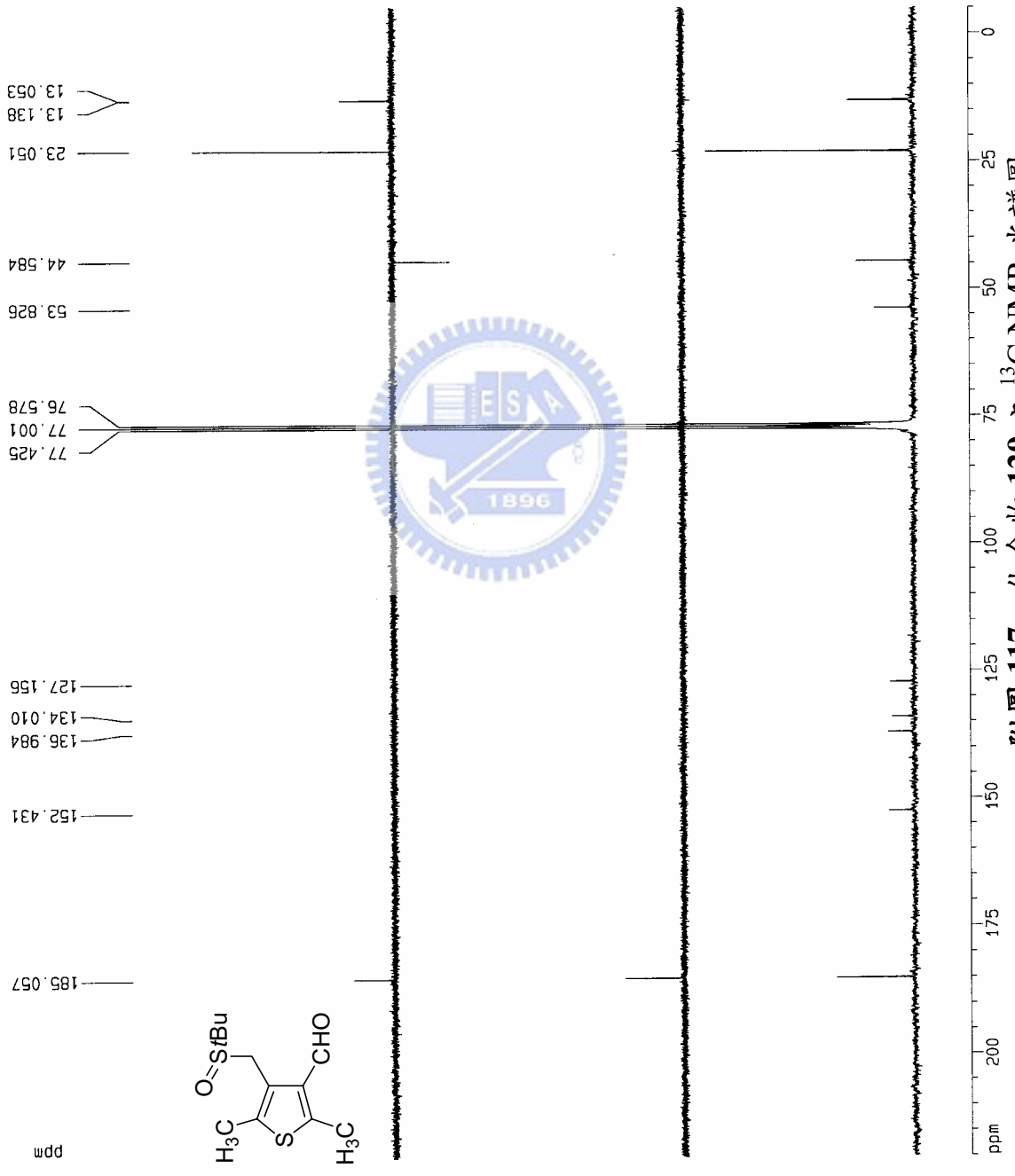
===== CHANNEL f1 =====
NUC1       13C
P1         8.50 usec
PL1        0.00 dB
SF01       75.4775298 MHz

===== CHANNEL f2 =====
CPOPRG2   waltz16
NUC2       1H
PCPD2     98.00 usec
PL2        -4.00 dB
PL12       19.00 dB
PL13       120.00 dB
SF02       300.1312005 MHz

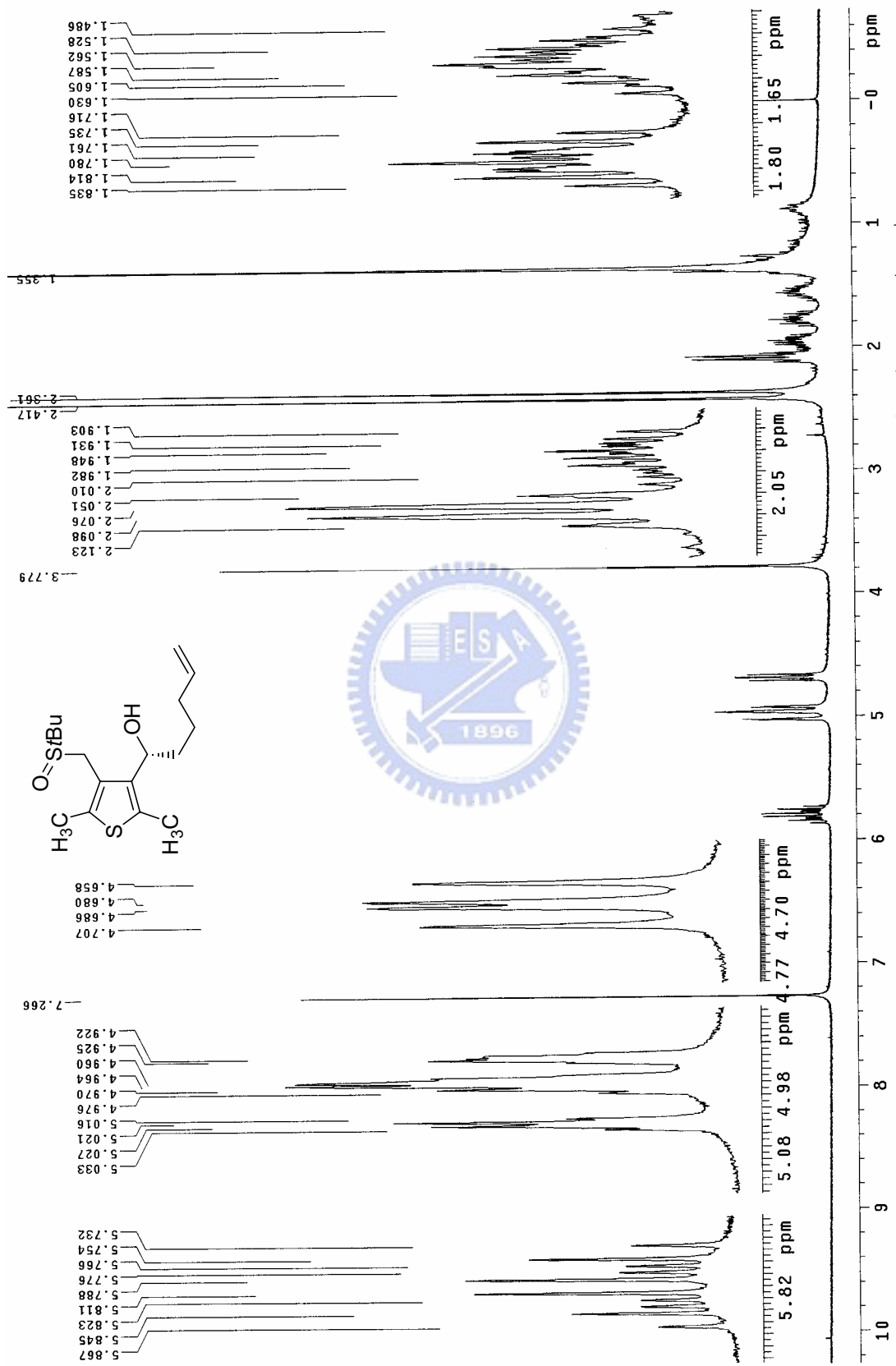
F2 - Processing parameters
SI         32768
SF         75.4677515 MHz
WDW        EM
SSB        0
LB         3.00 Hz
GB         0
PC         1.40

1D NMR plot parameters
CX         20.00 cm
F1P        220.000 ppm
F1         16602.90 Hz
F2P        -5.000 ppm
F2         -377.34 Hz
PPMCM      11.25000 ppm/cm
HZCM       849.01221 Hz/cm

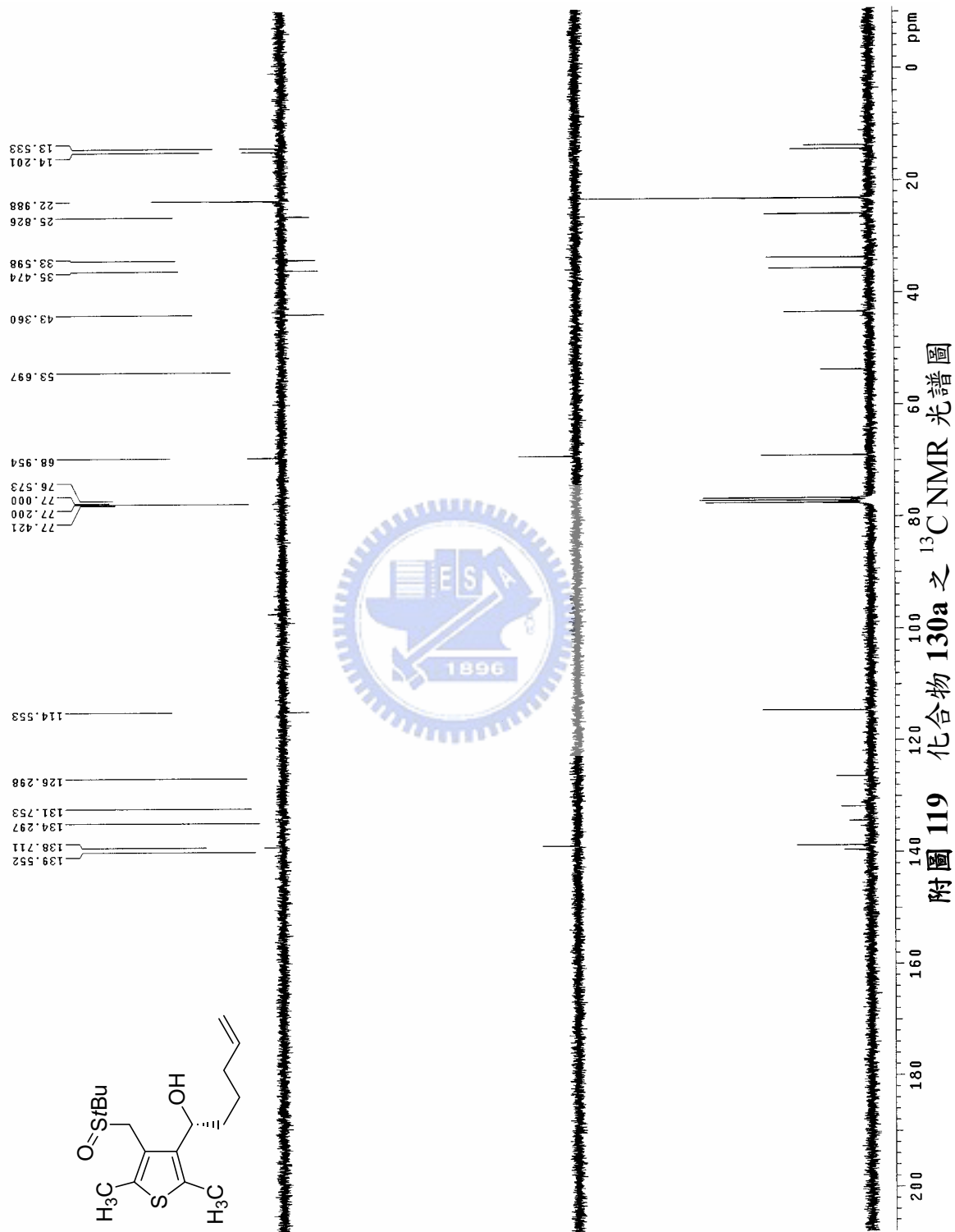
```



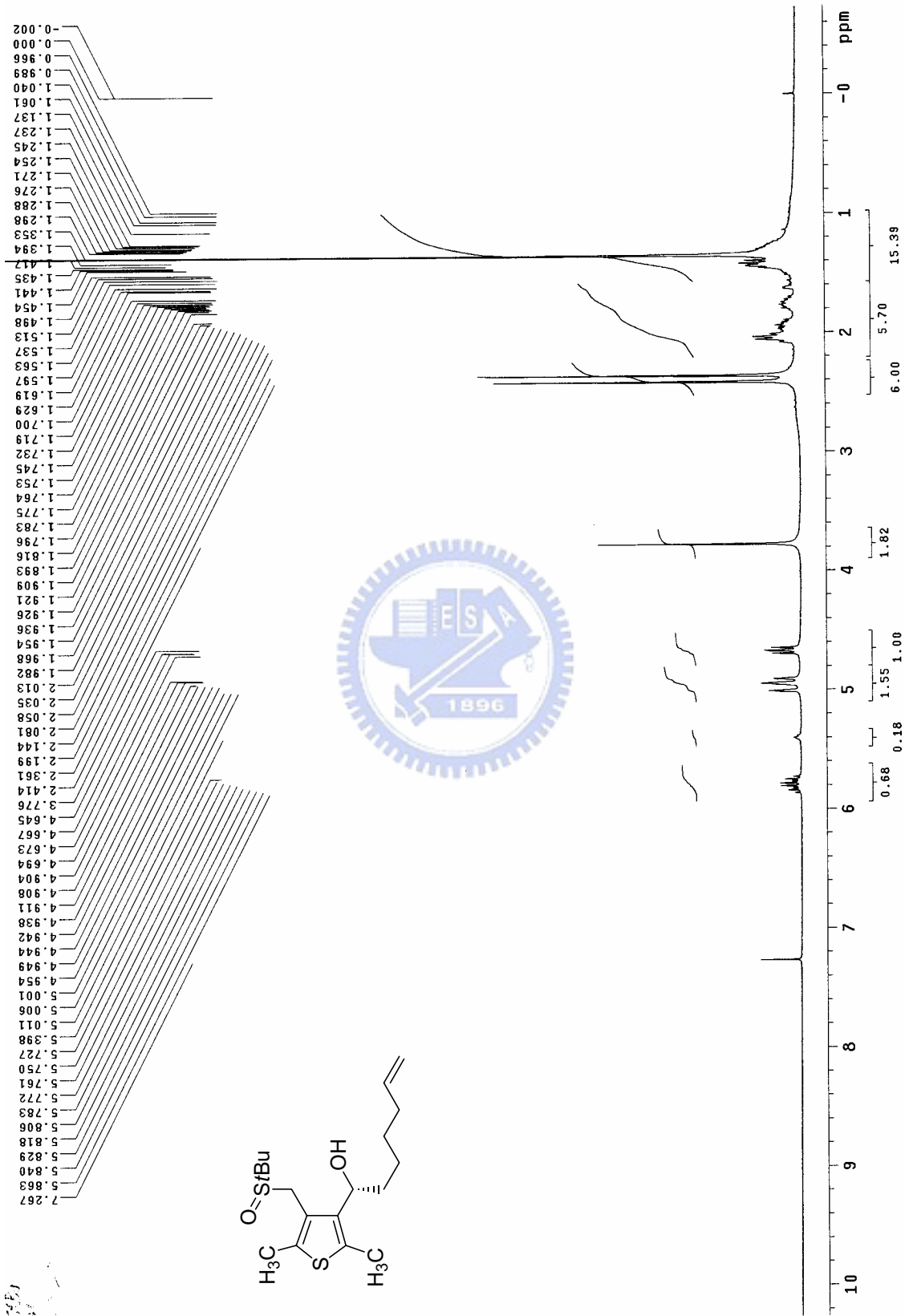
附圖 117 化合物 129 之 ¹³C NMR 光譜圖



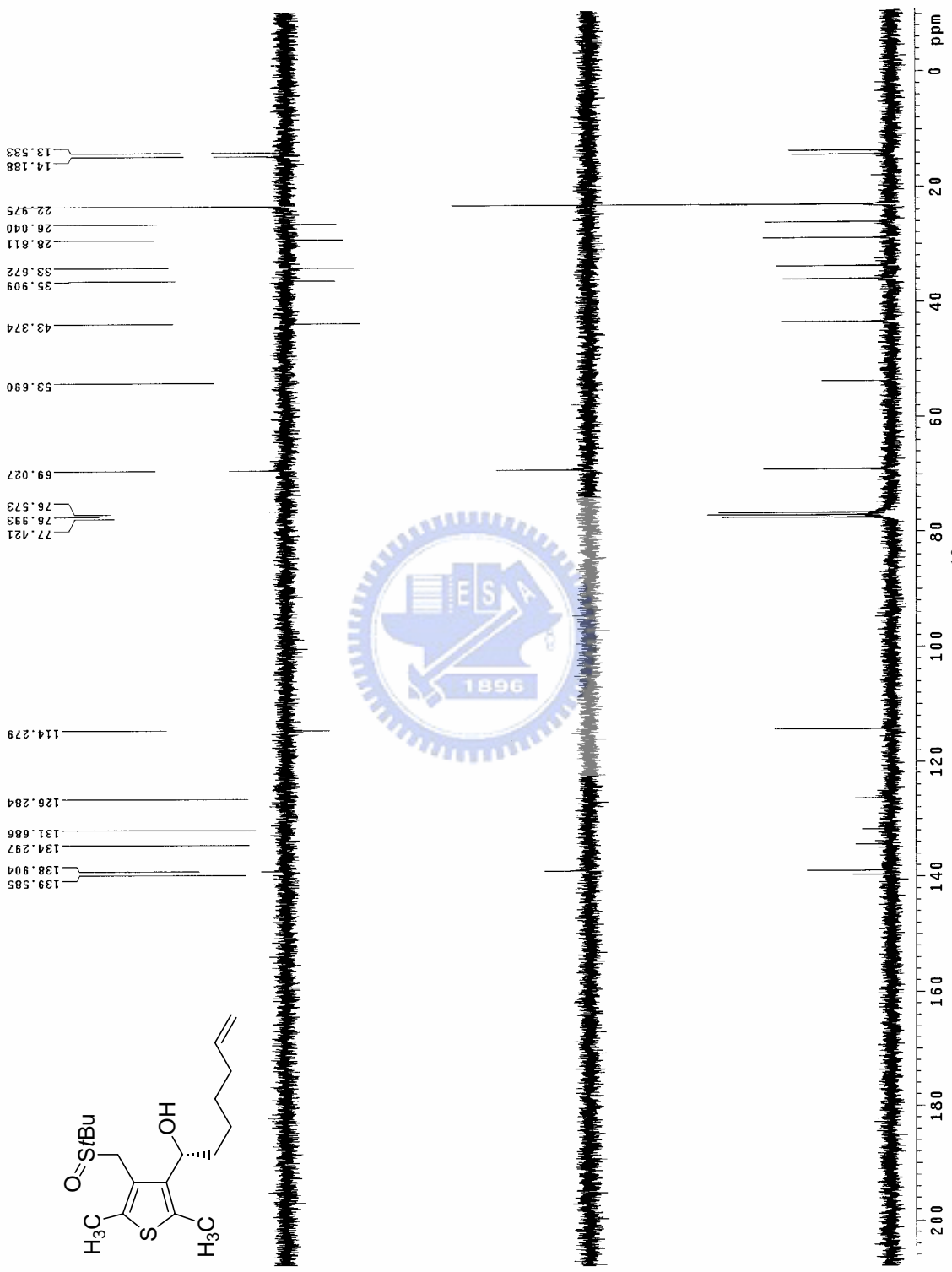
附圖 118 化合物 130a 之 ¹H NMR 光譜圖



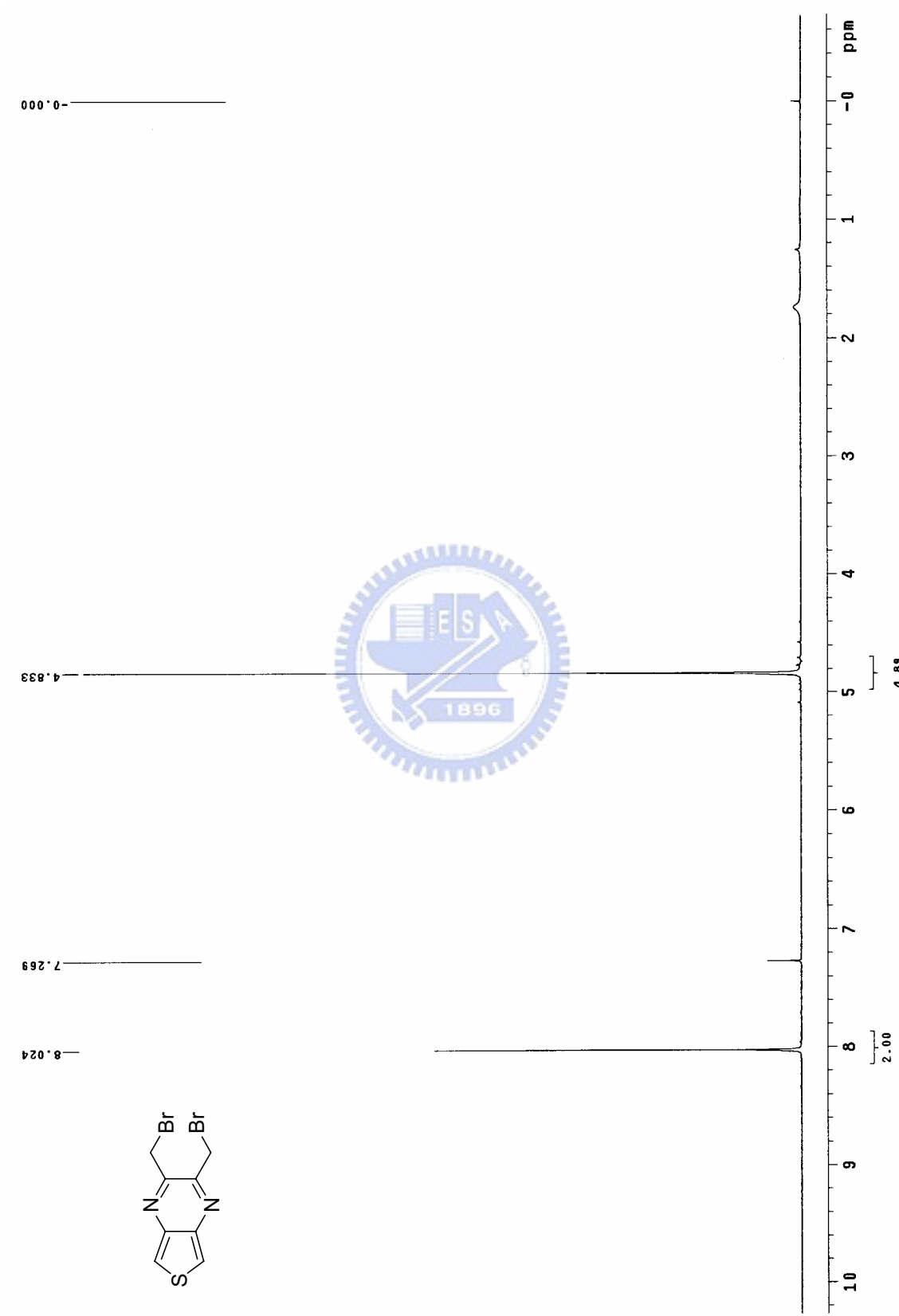
附圖 119 化合物 130a 之 ¹³C NMR 光譜圖



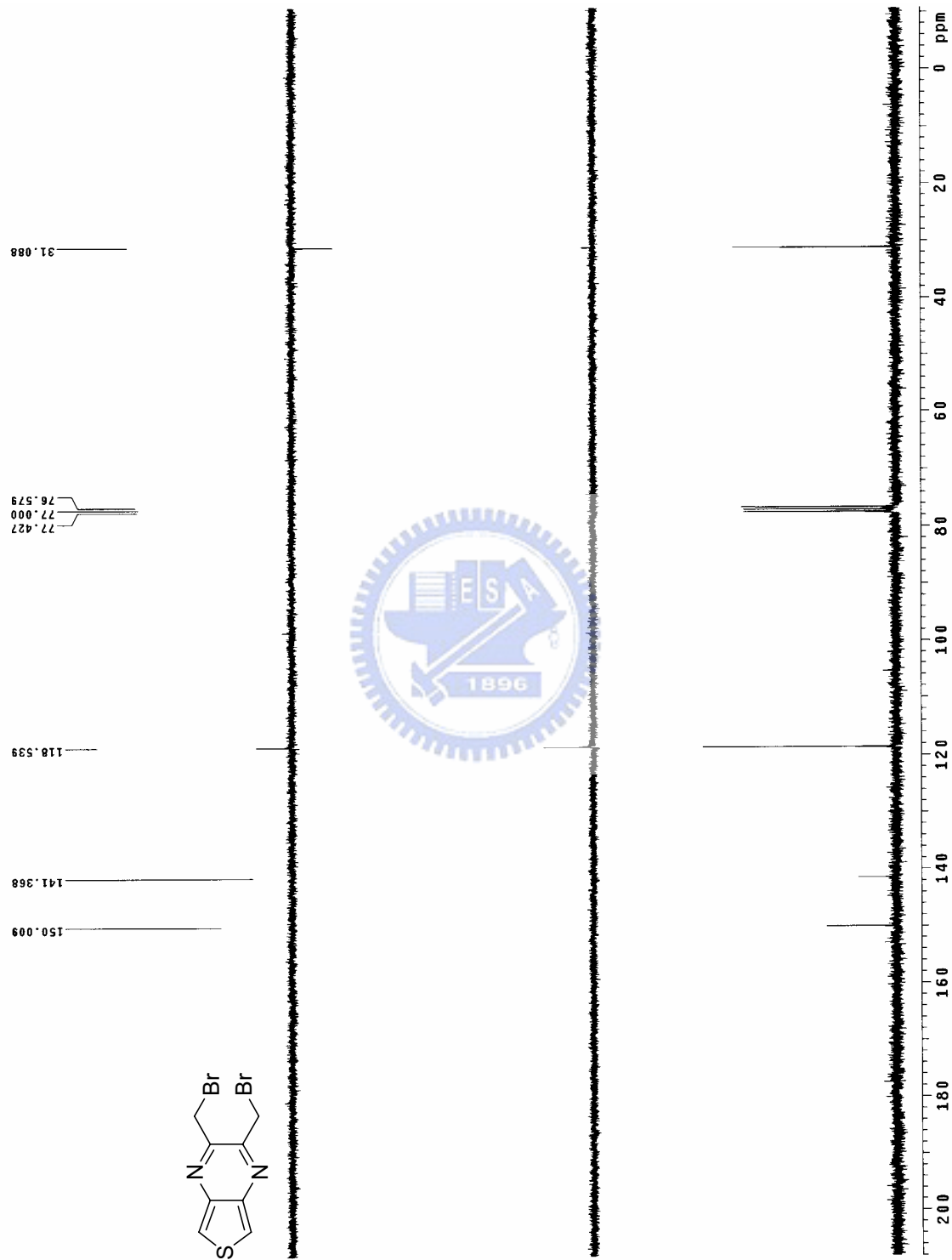
附圖 120 化合物 130b 之 ¹H NMR 光譜圖



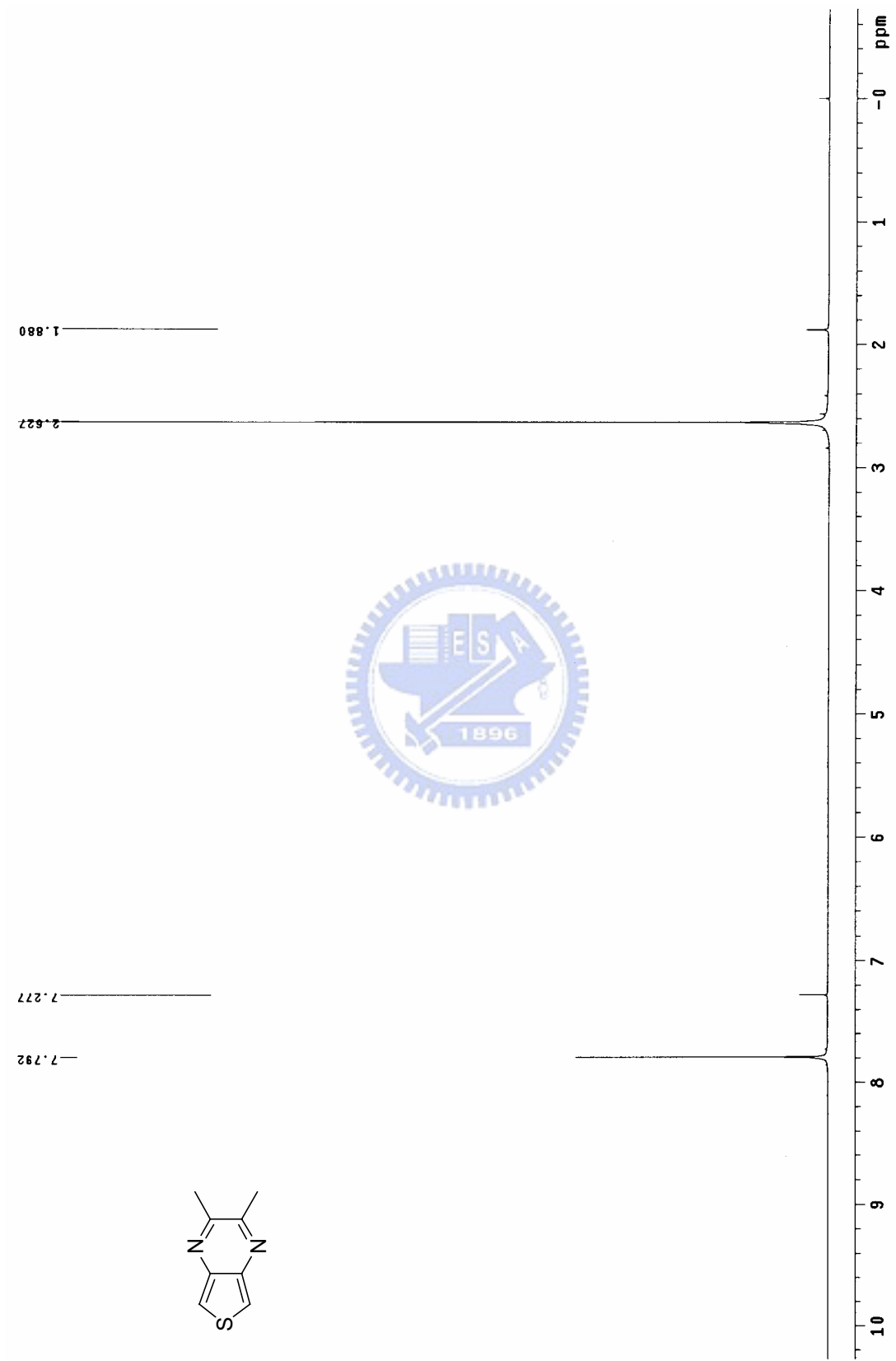
附圖 121 化合物 130b 之 ¹³C NMR 光譜圖



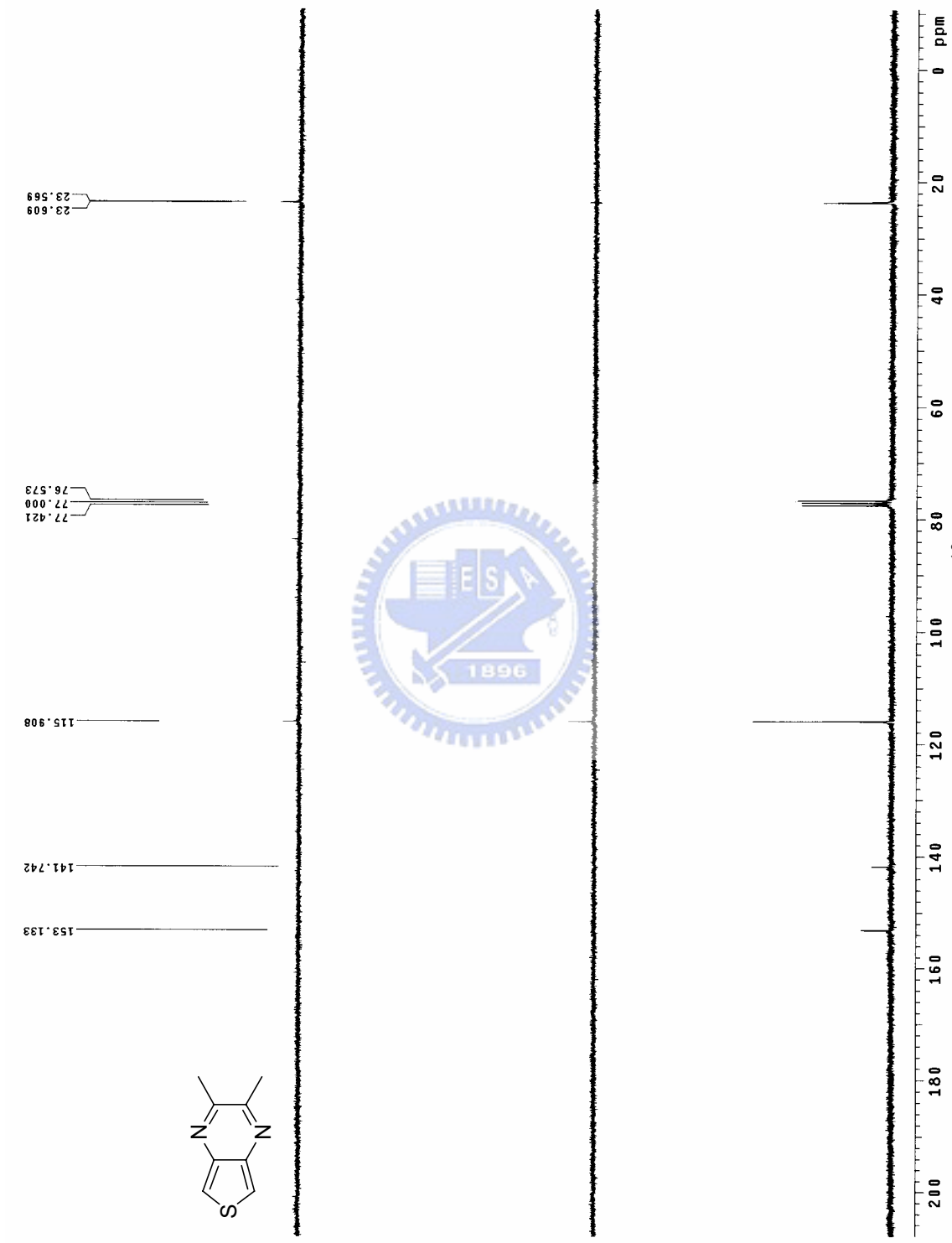
附圖 122 化合物 138 之 ^1H NMR 光譜圖



附圖 123 化合物 138 之 ¹³C NMR 光譜圖



附圖 124 化合物 139 之 ^1H NMR 光譜圖



附圖 125 化合物 139 之 ^{13}C NMR 光譜圖

Current Data Parameters
 NAME chi022605
 EXPNO 1
 PROCNO 1

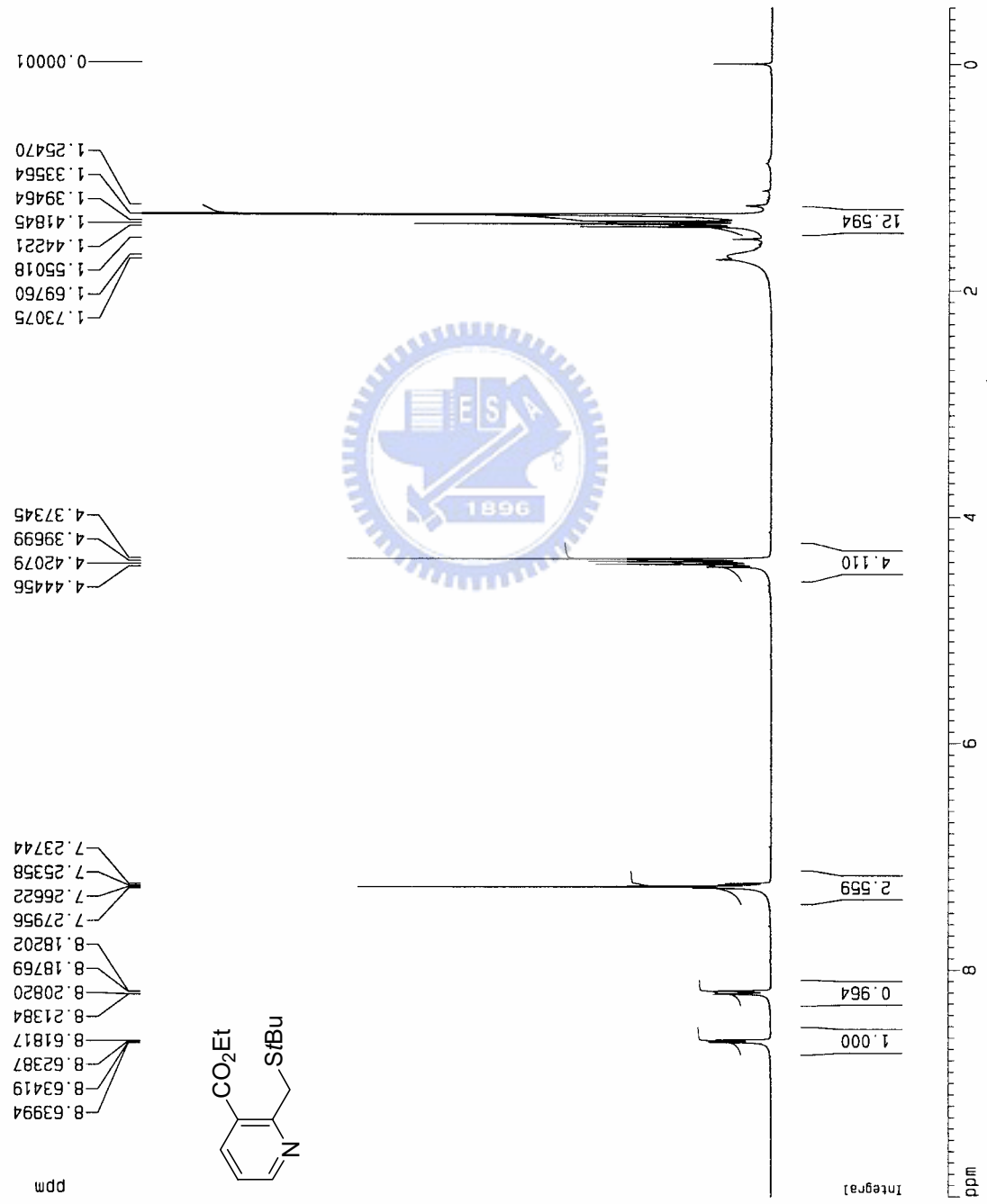
F2 - Acquisition Parameters
 Date_ 20050225
 Time 22.52
 INSTRUM spect
 PROBHD 5 mm BBO

PULPROG zg30
 TD 32768
 SOLVENT CDCl3
 NS 16
 DS 0
 SWH 7812.500 Hz
 FIDRES 0.238419 Hz
 AQ 2.0972021 sec
 RG 724.1
 DW 64.000 usec
 DE 4.50 usec
 TE 300.0 K
 D1 1.00000000 sec

===== CHANNEL f1 =====
 NUC1 1H
 P1 9.10 usec
 PL1 -4.00 dB
 SF01 300.1321122 MHz

F2 - Processing parameters
 SI 32768
 SF 300.1300046 MHz
 WDW EM
 SSB 0
 LB 0.30 Hz
 GB 0
 PC 1.00

1D NMR plot parameters
 CX 20.00 cm
 F1P 10.000 ppm
 F1 3001.30 Hz
 F2P -0.500 ppm
 F2 -150.07 Hz
 PPMCM 0.52500 ppm/cm
 HZCM 157.56625 Hz/cm



附圖 126 化合物 158 之 ¹H NMR 光譜圖

```

Current Data Parameters
NAME      ch1022605
EXPNO    2
PROCNO    1

F2 - Acquisition Parameters
Date_     20050226
Time      6.13
INSTRUM   spect
PROBHD    5 mm BBO

PULPROG   zgpg30
TD         32768
SOLVENT   CDCl3
NS         12288
DS         2
SWH        25641.025 Hz
FIDRES     0.782502 Hz
AQ         0.6390260 sec
RG         32768
DM         19.500 usec
DE         4.50 usec
TE         300.0 K
D1         1.50000000 sec
D11        0.03000000 sec
D12        0.00002000 sec

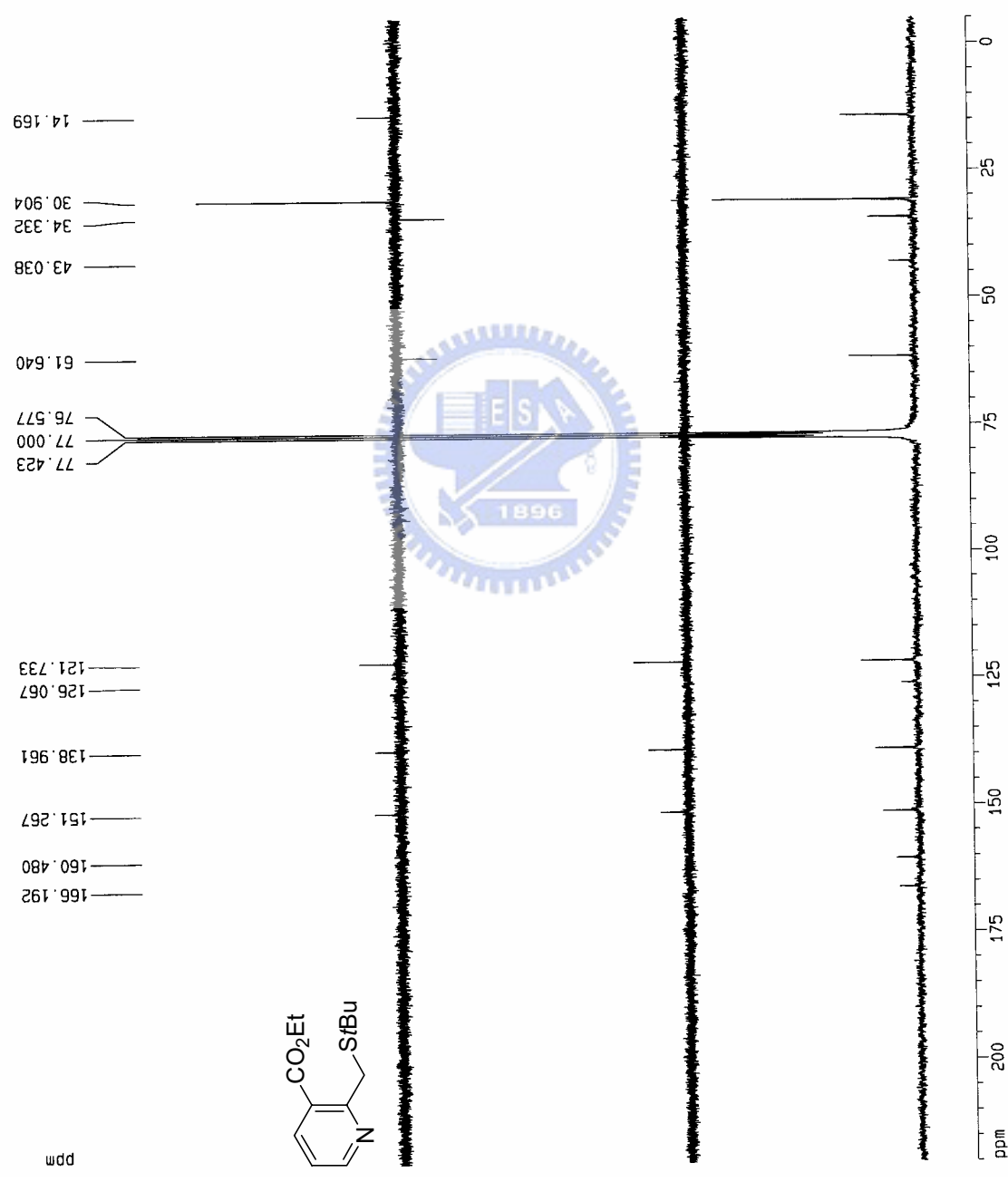
===== CHANNEL f1 =====
NUC1       13C
P1         8.50 usec
PL1        0.00 dB
SF01       75.4775298 MHz

===== CHANNEL f2 =====
CPDPRG2    waltz16
NUC2       1H
PCPD2      98.00 usec
PL2        -4.00 dB
PL12       19.00 dB
PL13       120.00 dB
SF02       300.1312005 MHz

F2 - Processing parameters
SI         32768
SF         75.4677521 MHz
MVM        EM
SSB        0
LB         3.00 Hz
GB         0
PC         1.40

1D NMR plot parameters
CX         20.00 cm
F1P        220.000 ppm
F1         16602.90 Hz
F2P        -5.000 ppm
F2         -377.34 Hz
PPMCH      11.25000 ppm/cm
HZCH       849.01221 Hz/cm

```



附圖 127 化合物 158 之 ¹³C NMR 光譜圖

```

Current Data Parameters
NAME      chi030405
EXPNO    1
PROCNO   1

F2 - Acquisition Parameters
Date_    20050304
Time     21.00
INSTRUM  spect
PROBHD   5 mm BBO

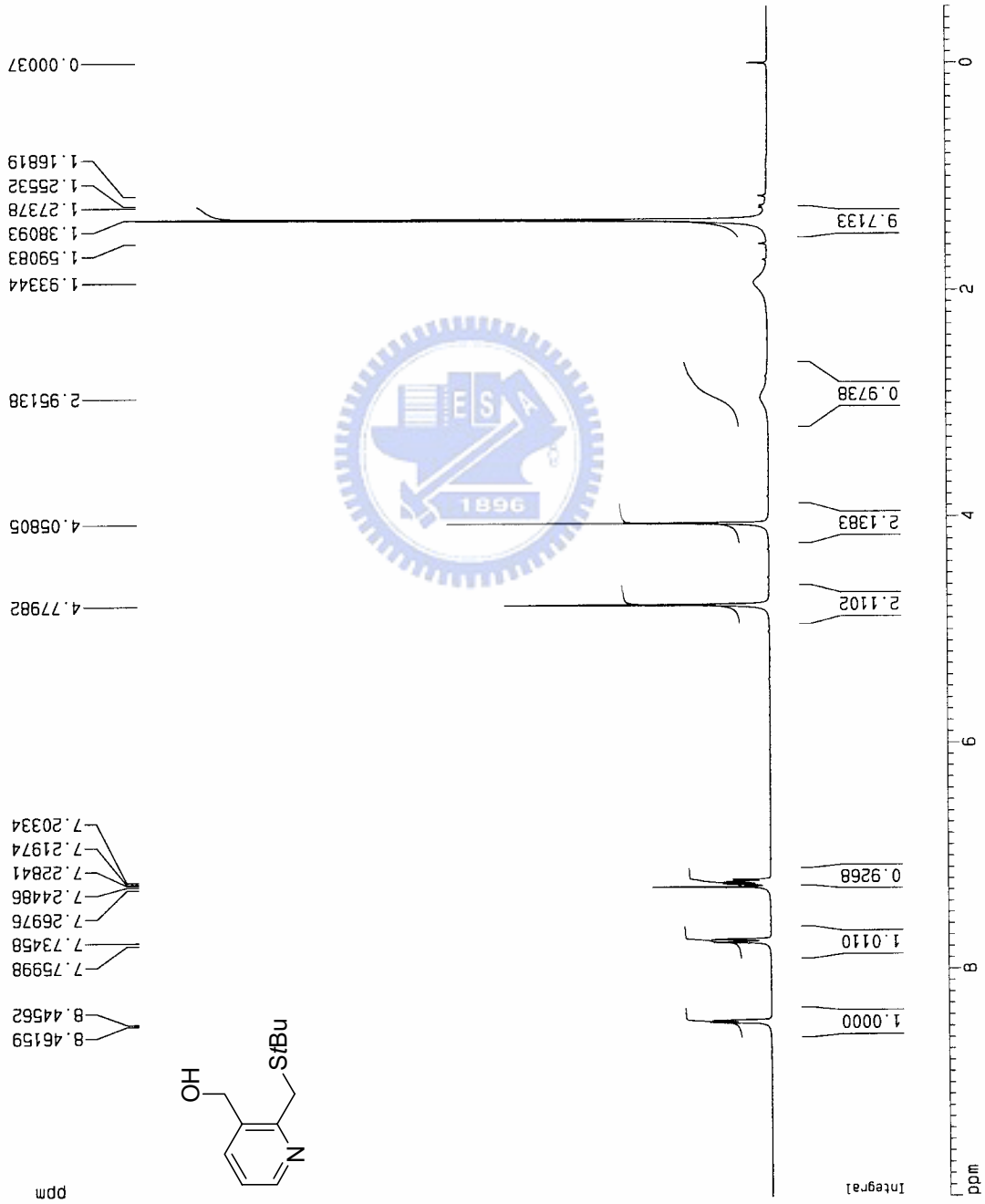
PULPROG  zg30
TD        32768
SOLVENT  CDCl3
NS        16
DS        0
SWH       7812.500 Hz
FIDRES    0.238419 Hz
AQ        2.0972021 sec
RG        456.1
DM        64.000 usec
DE        4.50 usec
TE        300.0 K
D1        1.00000000 sec

===== CHANNEL f1 =====
NUC1      1H
P1        9.10 usec
PL1       -4.00 dB
SF01      300.1321122 MHz

F2 - Processing parameters
SI        32768
SF        300.1300034 MHz
WDW       EM
SSB       0
LB        0.30 Hz
GB        0
PC        1.00

1D NMR plot parameters
CX        20.00 cm
F1P       10.000 ppm
F1        3001.30 Hz
F2P       -0.500 ppm
F2        -150.07 Hz
PPMCM     0.52500 ppm/cm
HZCM      157.56825 Hz/cm

```



附圖 128 化合物 159 之 ¹H NMR 光譜圖


```

Current Data Parameters
NAME      ch1030405
EXPNO    2
PROCNO    1

F2 - Acquisition Parameters
Date_    20050304
Time     21.07
INSTRUM  spect
PROBHD   5 mm BBO

PULPROG  zgpg30
TD        32768
SOLVENT  COCl3
NS        10240
DS        2
SWH       25641.025 Hz
FIDRES    0.782502 Hz
AQ        0.6390260 sec
RG         32768
DM        19.500 usec
DE        4.50 usec
TE        300.0 K
D1        1.5000000 sec
D11       0.0300000 sec
D12       0.0000200 sec

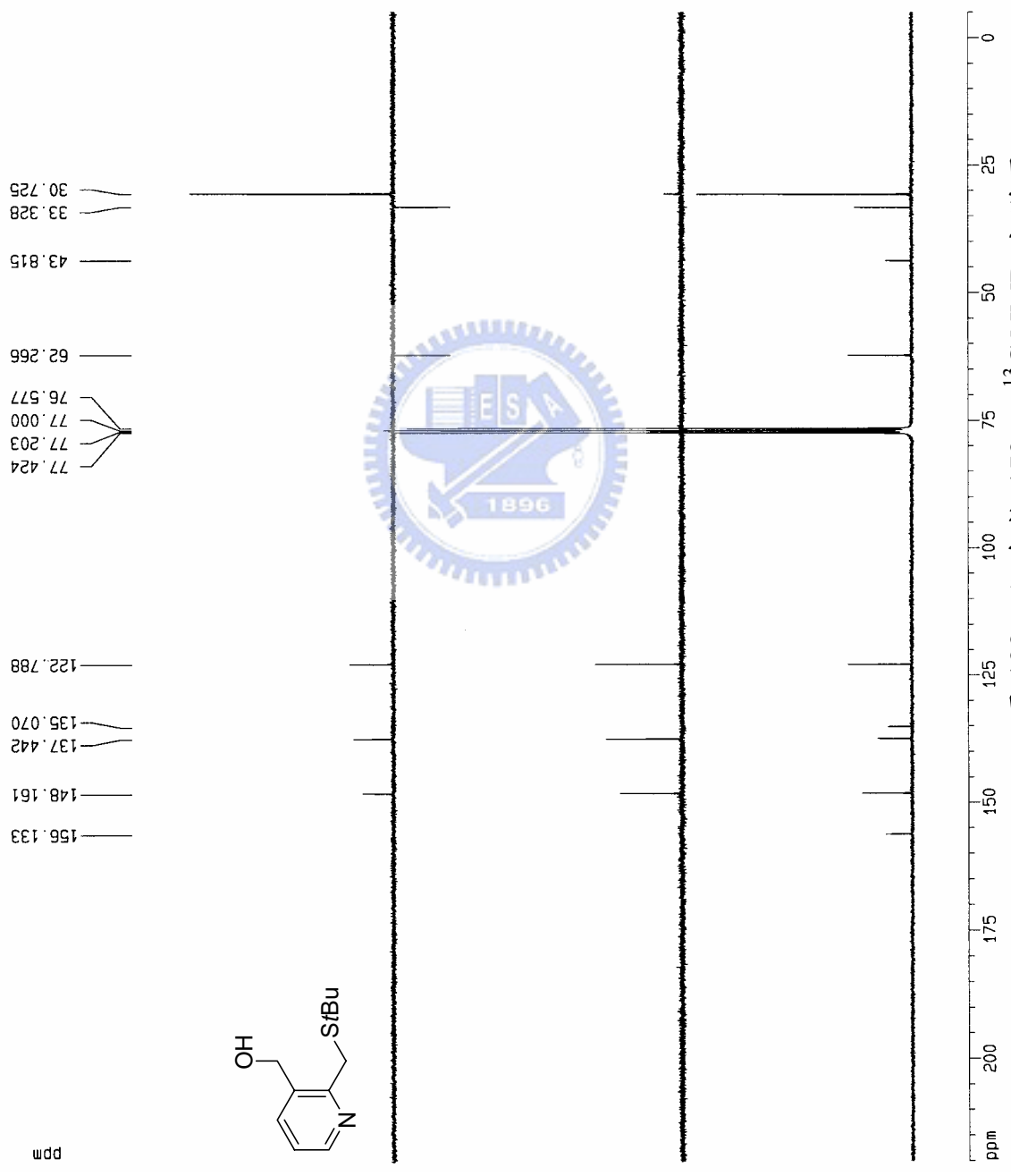
===== CHANNEL f1 =====
NUC1      13C
P1        8.50 usec
PL1       0.00 dB
SF01      75.4775298 MHz

===== CHANNEL f2 =====
CPDPRG2  waltz16
NUC2      1H
PCPD2     98.00 usec
PL2       -4.00 dB
PL12      19.00 dB
PL13      120.00 dB
SF02      300.1312005 MHz

F2 - Processing parameters
SI        32768
SF        75.4677524 MHz
WDW       EM
SSB       0
LB        1.00 Hz
GB        0
PC        1.40

ID NMR plot parameters
CX        20.00 cm
F1P       220.000 ppm
F1        16602.90 Hz
F2P       -5.000 ppm
F2        -377.34 Hz
PPMCM     11.25000 ppm/cm
HZCM      849.01221 Hz/cm

```



附圖 129 化合物 159 之 ¹³C NMR 光譜圖

Current Data Parameters
 NAME chi030505
 EXPNO 1
 PROCNO 1

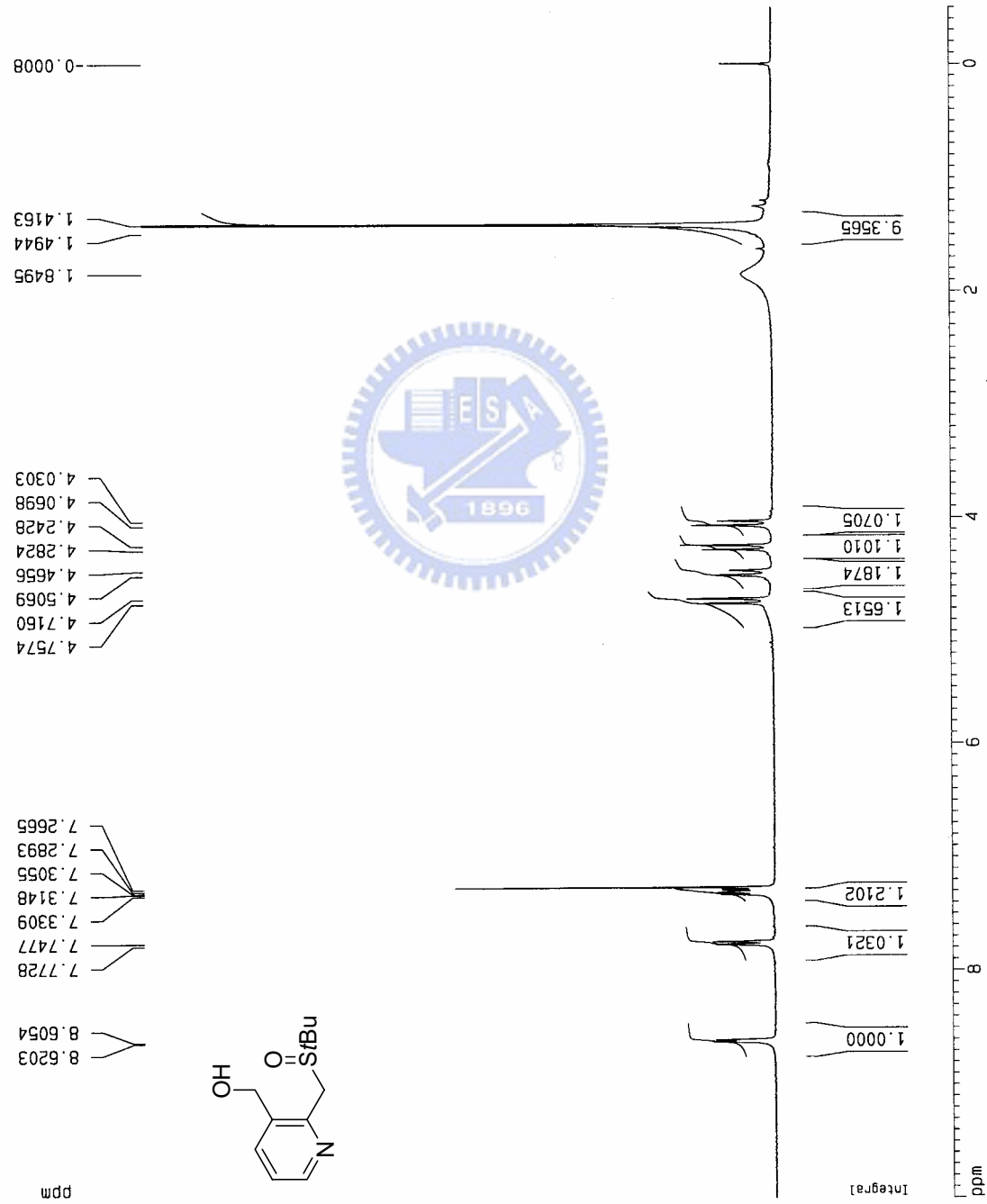
F2 - Acquisition Parameters
 Date_ 20050305
 Time 4.29
 INSTRUM spect
 PROBH0 5 mm BBO

PULPROG zg30
 TD 32768
 SOLVENT CDCl3
 NS 16
 DS 0
 SMH 7812.500 Hz
 FIDRES 0.238419 Hz
 AQ 2.0972021 sec
 RG 724.1
 DW 64.000 usec
 DE 4.50 usec
 TE 300.0 K
 D1 1.00000000 sec

==== CHANNEL f1 =====
 NUC1 1H
 P1 9.10 usec
 PL1 -4.00 dB
 SF01 300.1321122 MHz

F2 - Processing parameters
 SI 32768
 SF 300.1300046 MHz
 WDW EM
 SSB 0
 LB 0.30 Hz
 GB 0
 PC 1.00

1D NMR plot parameters
 CX 20.00 cm
 F1P 10.000 ppm
 F1 3001.30 Hz
 F2P -0.500 ppm
 F2 -150.07 Hz
 PPMCM 0.52500 ppm/cm
 HZCM 157.56825 Hz/cm



附圖 130 化合物 160 之 ¹H NMR 光譜圖


```

Current Data Parameters
NAME      chi031105
EXPNO    9
PROCNO   1

F2 - Acquisition Parameters
Date_    20050312
Time     13.10
INSTRUM spect
PROBHD   5 mm BBO

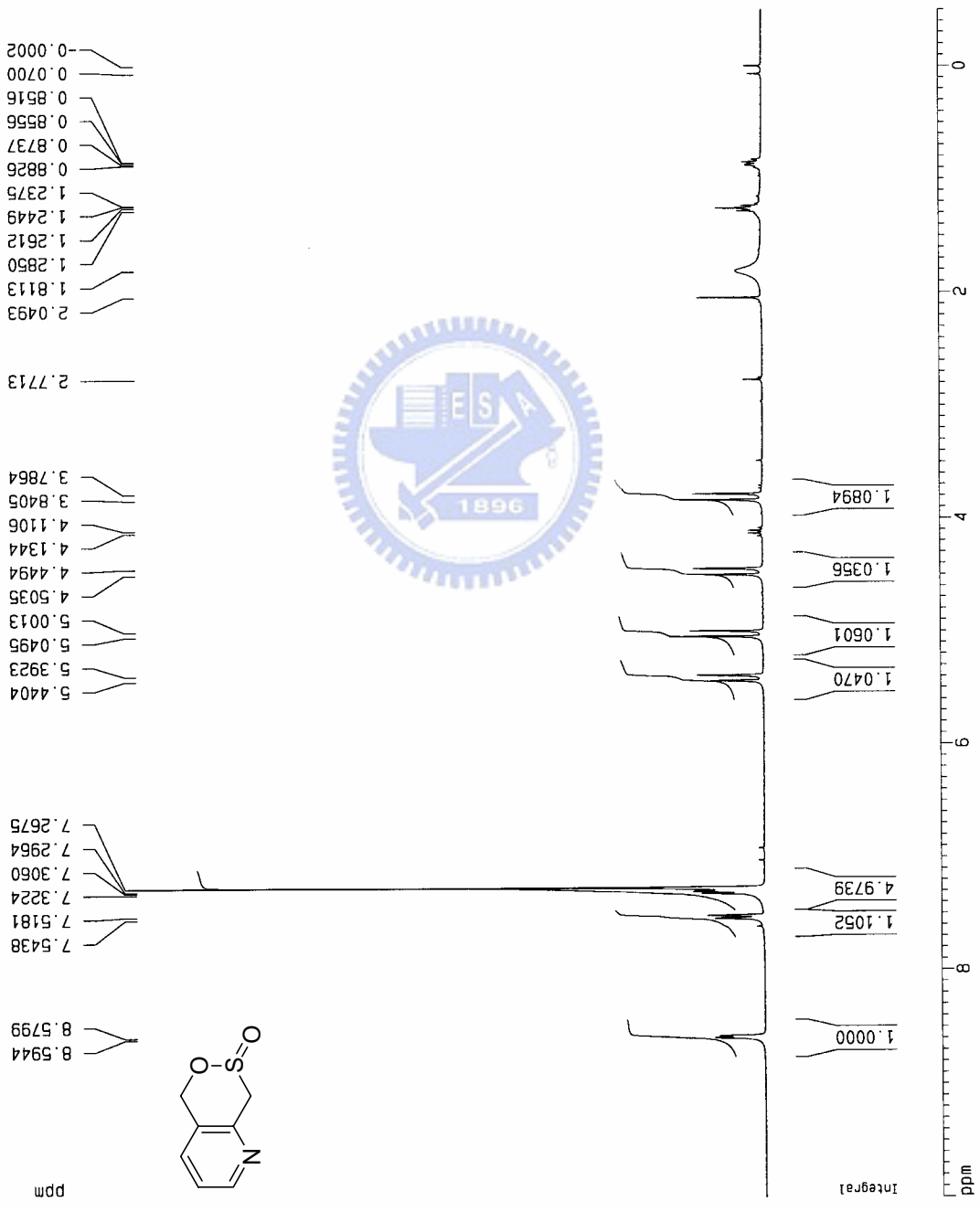
PULPROG  zg30
TD        32768
SOLVENT  CDCl3
NS        16
DS        0
SWH       7812.500 Hz
FIDRES    0.236419 Hz
AQ         2.0972021 sec
RG         574.7
DW         64.000 usec
DE         4.50 usec
TE         300.0 K
D1         1.00000000 sec

===== CHANNEL f1 =====
NUC1      1H
P1         9.10 usec
PL1        -4.00 dB
SFO1      300.1321122 MHz

F2 - Processing parameters
SI         32768
SF        300.1300041 MHz
WDW        EM
SSB        0
LB         0.30 Hz
GB         0
PC         1.00

1D NMR plot parameters
CX         20.00 cm
F1P        10.000 ppm
F1         3001.30 Hz
F2P        -0.500 ppm
F2         -150.07 Hz
PPMCH      0.52500 ppm/cm
HZCM       157.56825 Hz/cm

```



附圖 132 化合物 155 之 ¹H NMR 光譜圖

Current Data Parameters
 NAME ch1031305
 EXPNO 1
 PROCNO 1

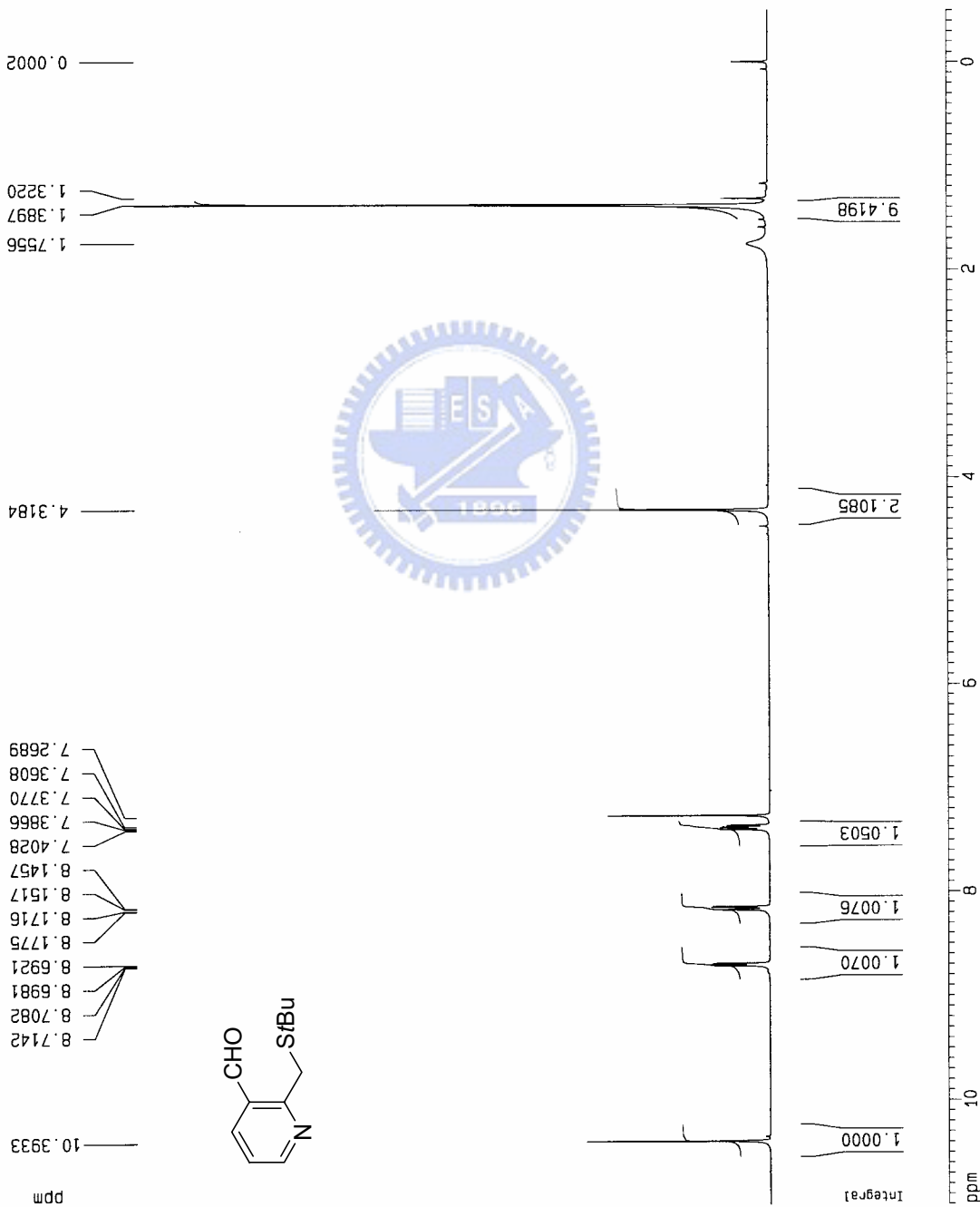
F2 - Acquisition Parameters
 Date_ 20050313
 Time_ 22.18
 INSTRUM spect
 PROBHD 5 mm BBO

PULPROG zg30
 TD 32768
 SOLVENT CDCl3
 NS 16
 DS 0
 SWH 7812.500 Hz
 FIDRES 0.238419 Hz
 AQ 2.0972021 sec
 RG 512
 DW 64.000 usec
 DE 4.50 usec
 TE 300.0 K
 D1 1.0000000 sec

===== CHANNEL f1 =====
 NUC1 1H
 P1 9.10 usec
 PL1 -4.00 dB
 SF01 300.1321122 MHz

F2 - Processing parameters
 SI 32768
 SF 300.1300039 MHz
 WDW EM
 SSB 0
 LB 0.30 Hz
 GB 0
 PC 1.00

3D NMR plot parameters
 CX 20.00 cm
 F1P 11.000 ppm
 F1 3301.43 Hz
 F2P -0.500 ppm
 F2 -150.07 Hz
 PPMCM 0.57500 ppm/cm
 HZCM 172.57475 Hz/cm



附圖 134 化合物 161 之 ¹H NMR 光譜圖

```

Current Data Parameters
NAME      ch1031305
EXPNO    2
PROCNO   1

F2 - Acquisition Parameters
Date_    20050313
Time     22.24
INSTRUM spect
PROBHD   5 mm BBO

PULPROG  zgpg30
TD        32768
SOLVENT  CDCl3
NS        12288
DS        2
SMH       25641.025 Hz
FIDRES    0.782502 Hz
AQ        0.6380260 sec
RG        32768
DM        19.500 usec
DE        4.50 usec
TE        300.0 K
D1        1.5000000 sec
D11       0.0300000 sec
D12       0.0002000 sec

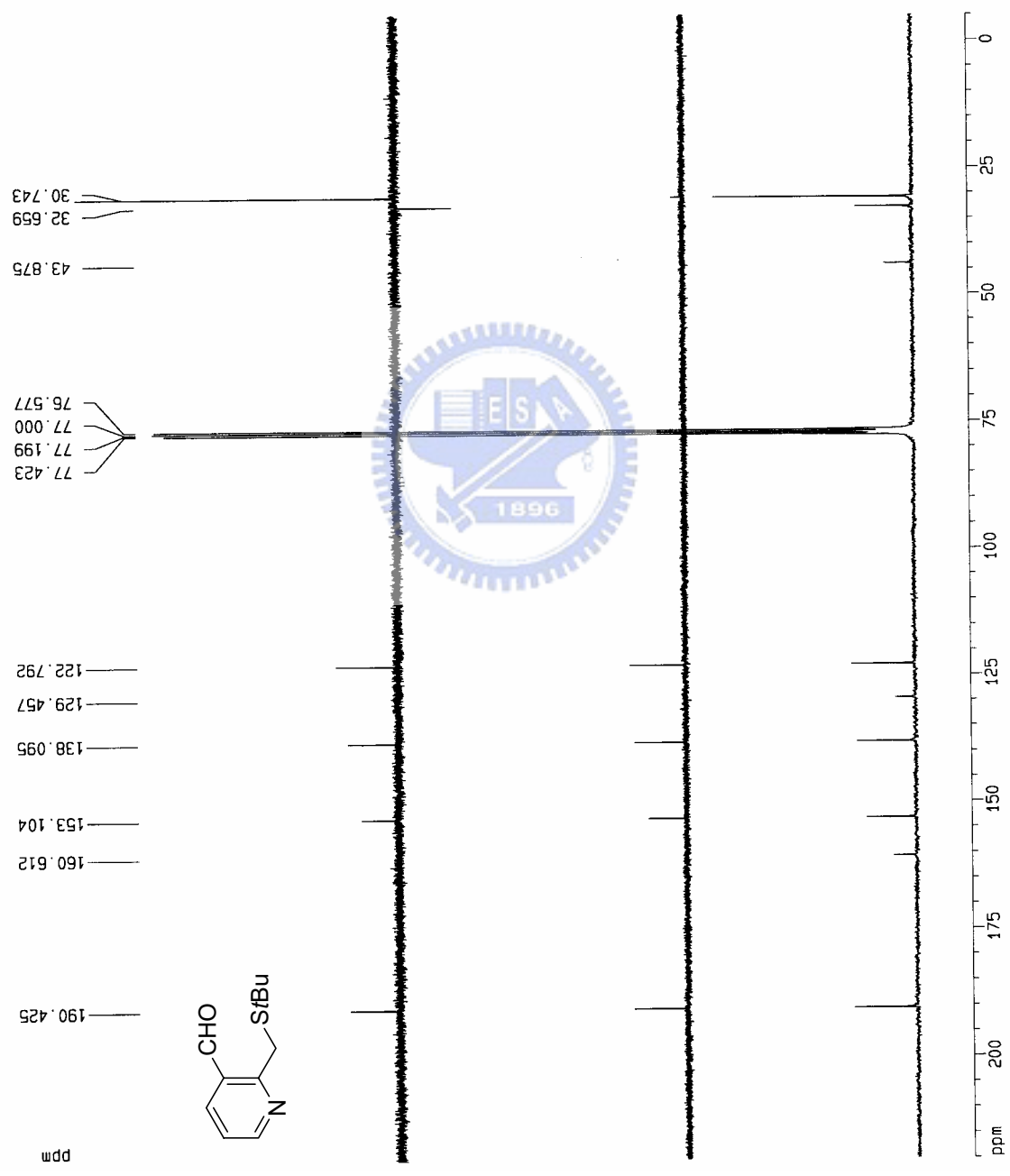
===== CHANNEL f1 =====
NUC1      13C
P1        8.50 usec
PL1       0.00 dB
SF01      75.4775298 MHz

===== CHANNEL f2 =====
CPDPRG2   waltz16
NUC2      1H
P2        98.00 usec
PL2       -4.00 dB
PL12      19.00 dB
PL13      120.00 dB
SF02      300.1312005 MHz

F2 - Processing parameters
SI        32768
SF        75.4677528 MHz
WDW       EM
SSB       0
LB        3.00 Hz
GB        0
PC        1.40

ID NMR plot parameters
CX        20.00 cm
F1P       220 000 ppm
F1        16602.90 Hz
F2P       -5 000 ppm
F2        -377.34 Hz
PPMCM     11.25000 ppm/cm
HZCM      849.01221 Hz/cm

```



附圖 135 化合物 161 之 ¹³C NMR 光譜圖

Current Data Parameters
 NAME chi032805
 EXPNO 2
 PROCNO 1

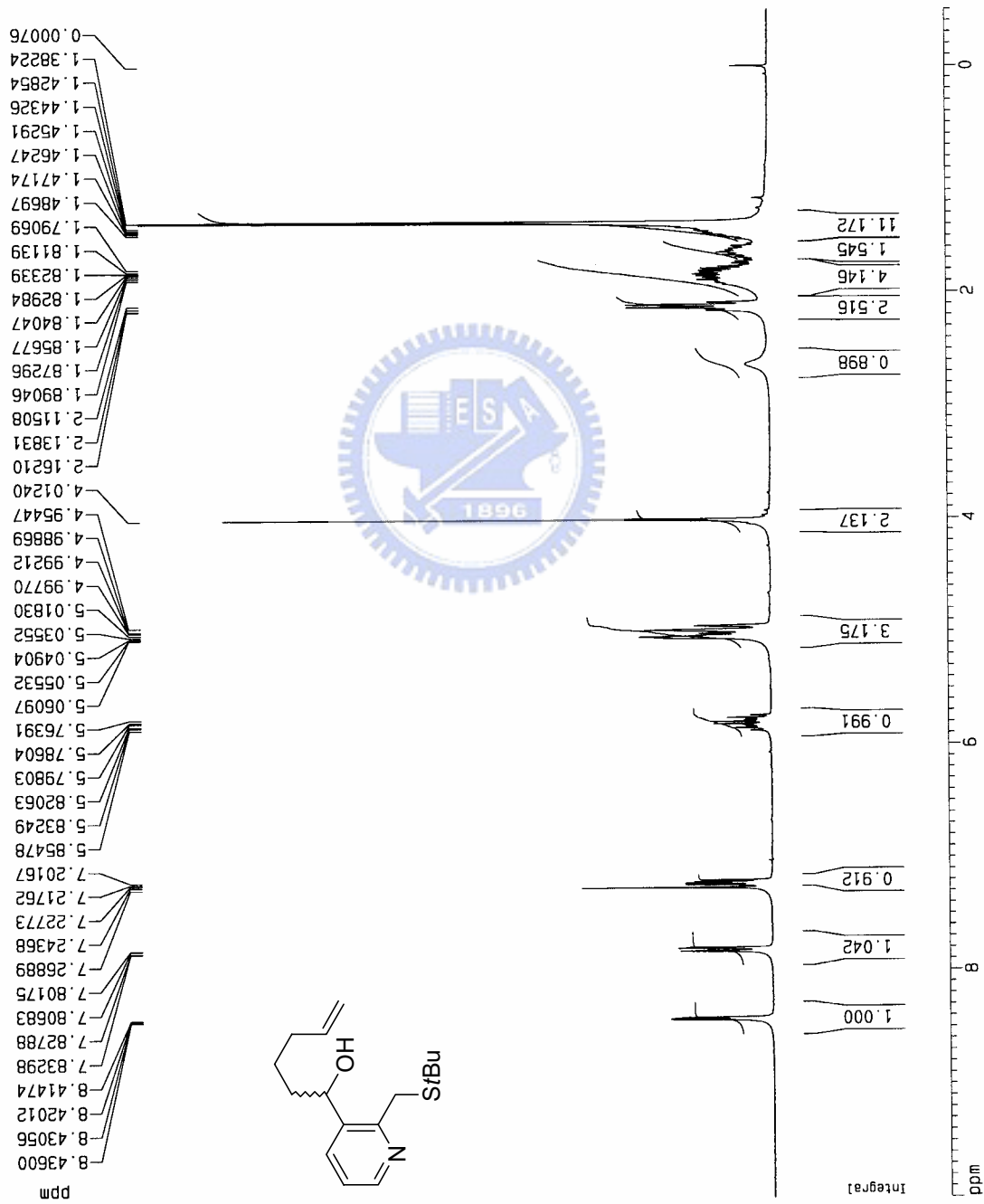
F2 - Acquisition Parameters
 Date_ 20050328
 Time 3.19
 INSTRUM spect
 PROBHD 5 mm BBO

PULPROG zg30
 TD 32768
 SOLVENT CDCl3
 NS 16
 DS 0
 SWH 7612.500 Hz
 FIDRES 0.238419 Hz
 AQ 2.0972021 sec
 RG 362
 DW 64.000 usec
 DE 4.50 usec
 TE 300.0 K
 D1 1.00000000 sec

===== CHANNEL f1 =====
 NUC1 1H
 P1 9.10 usec
 PL1 -4.00 dB
 SF01 300.1321122 MHz

F2 - Processing parameters
 SI 32768
 SF 300.1300036 MHz
 WDW EM
 SSB 0
 LB 0.30 Hz
 GB 0
 PC 1.00

1D NMR plot parameters
 CX 20.00 cm
 F1P 10.000 ppm
 F1 3001.30 Hz
 F2P -0.500 ppm
 F2 -150.07 Hz
 PPMCM 0.52500 ppm/cm
 HZCM 157.56825 Hz/cm



附圖 136 化合物 162a 之 ¹H NMR 光譜圖


```

Current Data Parameters
NAME      chi032805
EXPNO    3
PROCNO   1

F2 - Acquisition Parameters
Date_    20050328
Time     8.14
INSTRUM  spect
PROBHD   5 mm BBO

PULPROG  zgpg30
TD        32768
SOLVENT  CDCl3
NS        8192
DS        2
SWH       25641.025 Hz
FIDRES    0.782502 Hz
AQ        0.6390260 sec
RG        32768
DM        19.500 usec
DE        4.50 usec
TE        300.0 K
D1        1.50000000 sec
D11       0.03000000 sec
D12       0.00002000 sec

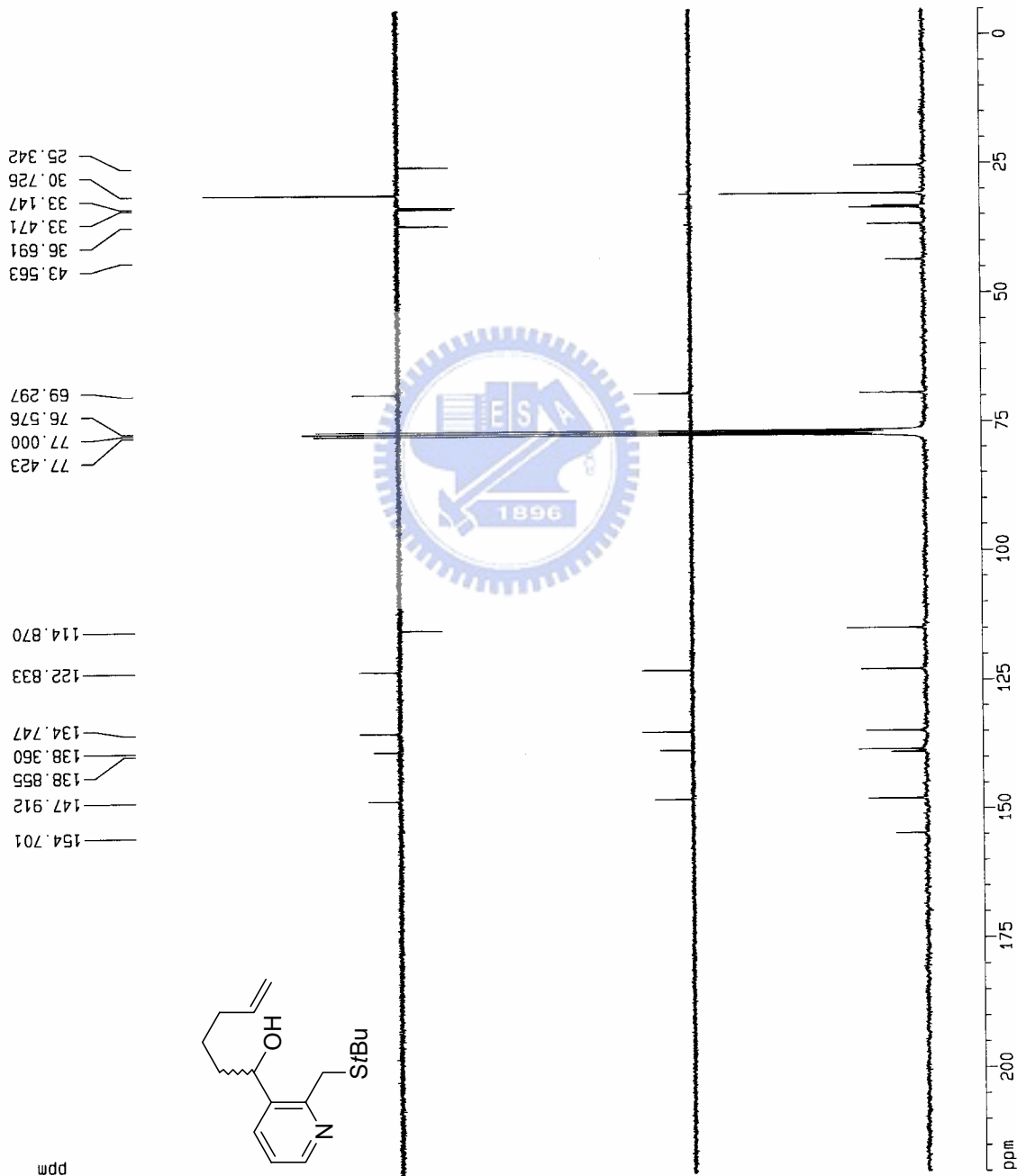
===== CHANNEL f1 =====
NUC1      13C
P1        8.50 usec
PL1       0.00 dB
SF01      75.4775298 MHz

===== CHANNEL f2 =====
CPDPRG2  waltz16
NUC2      1H
PCPD2     98.00 usec
PL2       -4.00 dB
PL12      19.00 dB
PL13      120.00 dB
SF02      300.1312005 MHz

F2 - Processing parameters
SI        32768
SF        75.4677523 MHz
MVM       EM
SSB       0
LB        3.00 Hz
GB        0
PC        1.40

1D NMR plot parameters
CX        20.00 cm
F1P       220.000 ppm
F1        16602.90 Hz
F2P       -5.000 ppm
F2        -377.34 Hz
PPMCM     11.25000 ppm/cm
HZCM      849.01221 Hz/cm

```



附圖 137 化合物 162a 之 ¹³C NMR 光譜圖

Current Data Parameters
 NAME chi03105
 EXPNO 2
 PROCNO 1

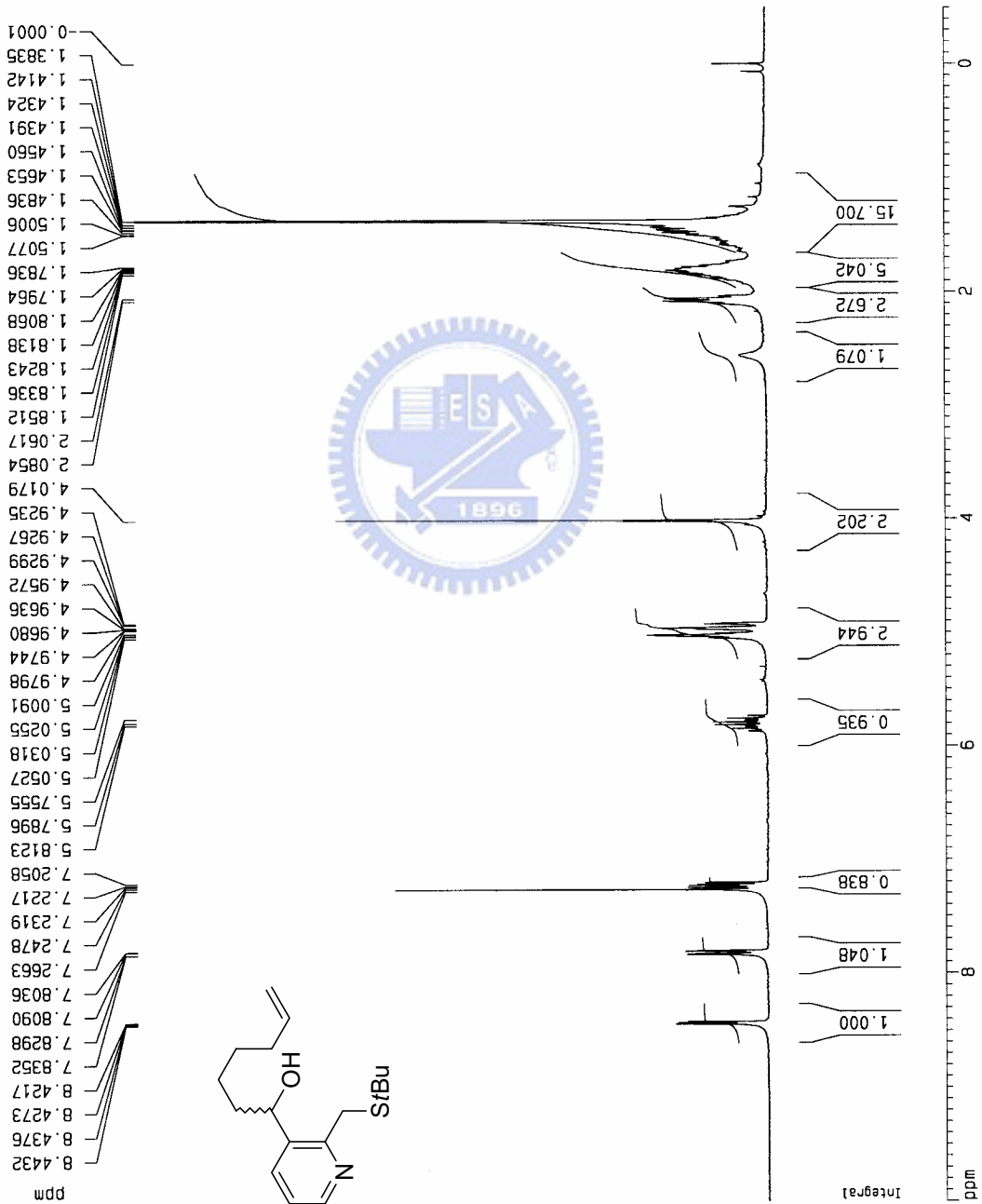
F2 - Acquisition Parameters
 Date_ 20050331
 Time 17.19
 INSTRUM spect
 PROBHD 5 mm BBO

PULPROG zg30
 TD 32768
 SOLVENT CDCl3
 NS 16
 DS 0
 SWH 7812.500 Hz
 FIDRES 0.238419 Hz
 AQ 2.0972021 sec
 RG 456.1
 DM 64.000 usec
 DE 4.50 usec
 TE 300.0 K
 D1 1.00000000 sec

===== CHANNEL f1 =====
 NUC1 1H
 P1 9.10 usec
 PL1 -4.00 dB
 SF01 300.1321122 MHz

F2 - Processing parameters
 SI 32768
 SF 300.1300046 MHz
 WDW EM
 SSB 0
 LB 0.30 Hz
 GB 0
 PC 1.00

1D NMR plot parameters
 CX 20.00 cm
 F1P 10.000 ppm
 F1 3001.30 Hz
 F2P -0.500 ppm
 F2 -150.07 Hz
 PPMCM 0.52500 ppm/cm
 HZCM 157.56825 Hz/cm



附圖 138 化合物 162b 之 ¹H NMR 光譜圖

```

Current Data Parameters
NAME      ch1033105
EXPNO     3
PROCNO    1

F2 - Acquisition Parameters
Date_     20050331
Time      17.25
INSTRUM   spect
PROBHD    5 mm BBO

PULPROG   zgpg30
TD         32768
SOLVENT   CDCl3
NS         2064
DS         2
SWH        25641.025 Hz
FIDRES     0.782502 Hz
AQ         0.6390260 sec
RG         32768
DM         19.500 usec
DE         4.50 usec
TE         300.0 K
D1         1.50000000 sec
D11        0.03000000 sec
D12        0.00002000 sec

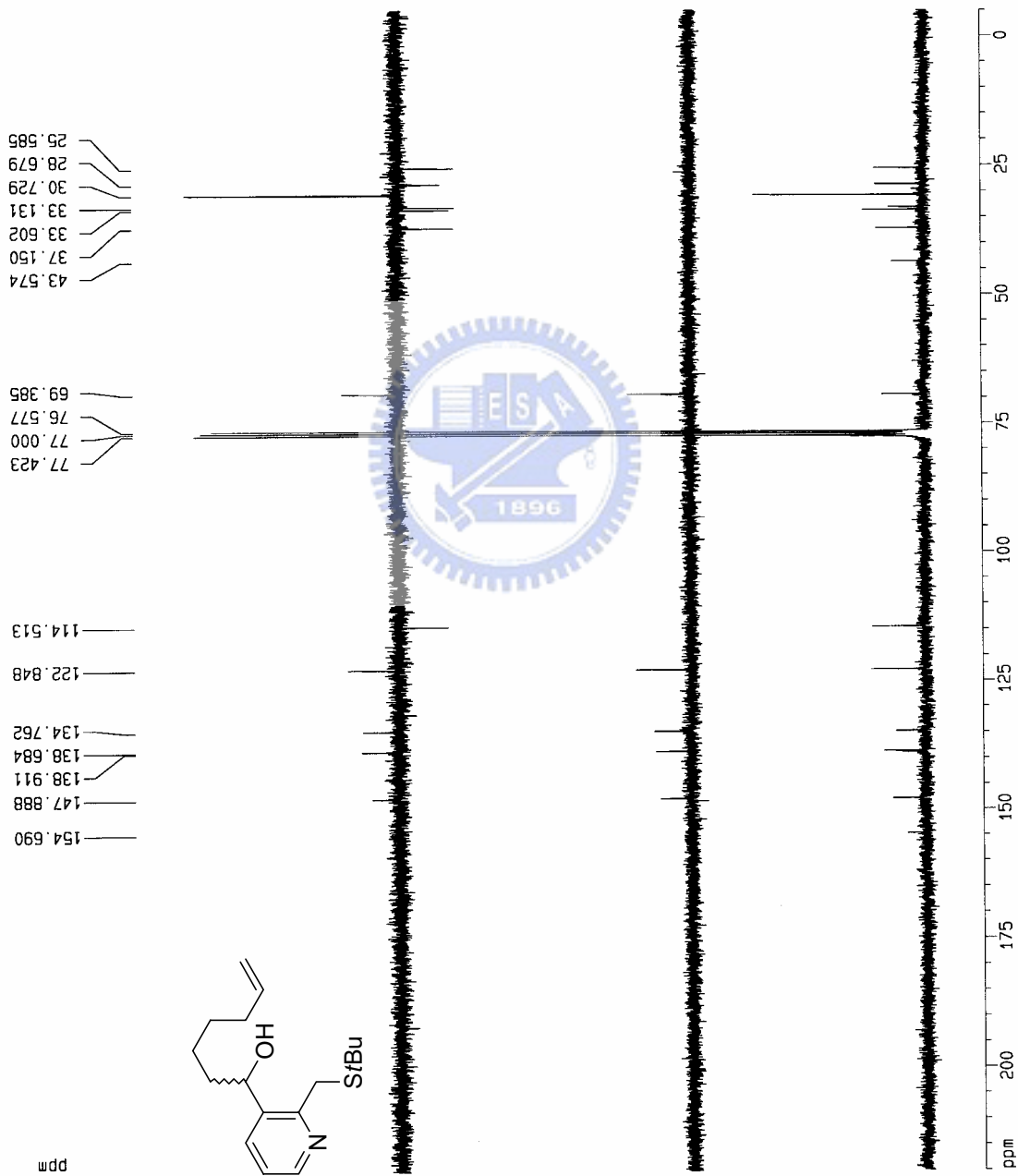
***** CHANNEL f1 *****
NUC1       13C
P1         8.50 usec
PL1        0.00 dB
SFO1       75.4775298 MHz

***** CHANNEL f2 *****
CPDPRG2    waltz16
NUC2        1H
PCPD2      98.00 usec
PL2        -4.00 dB
PL12       19.00 dB
PL13       120.00 dB
SFO2       300.1312005 MHz

F2 - Processing parameters
SI         32768
SF         75.4677519 MHz
WDW        EM
SSB        0
LB         1.00 Hz
GB         0
PC         1.40

1D NMR plot parameters
CX         20.00 cm
F1P        220.000 ppm
F1         16602.90 Hz
F2P        -5.000 ppm
F2         -377.34 Hz
PPMCH      11.25000 ppm/cm
HZCM       849.01221 Hz/cm

```



附圖 139 化合物 162b 之 ¹³C NMR 光譜圖

```

Current Data Parameters
NAME      ch1032705
EXPNO     1
PROCNO    1

F2 - Acquisition Parameters
Date_     20050327
Time      23.13
INSTRUM   spect
PROBHD    5 mm BBO

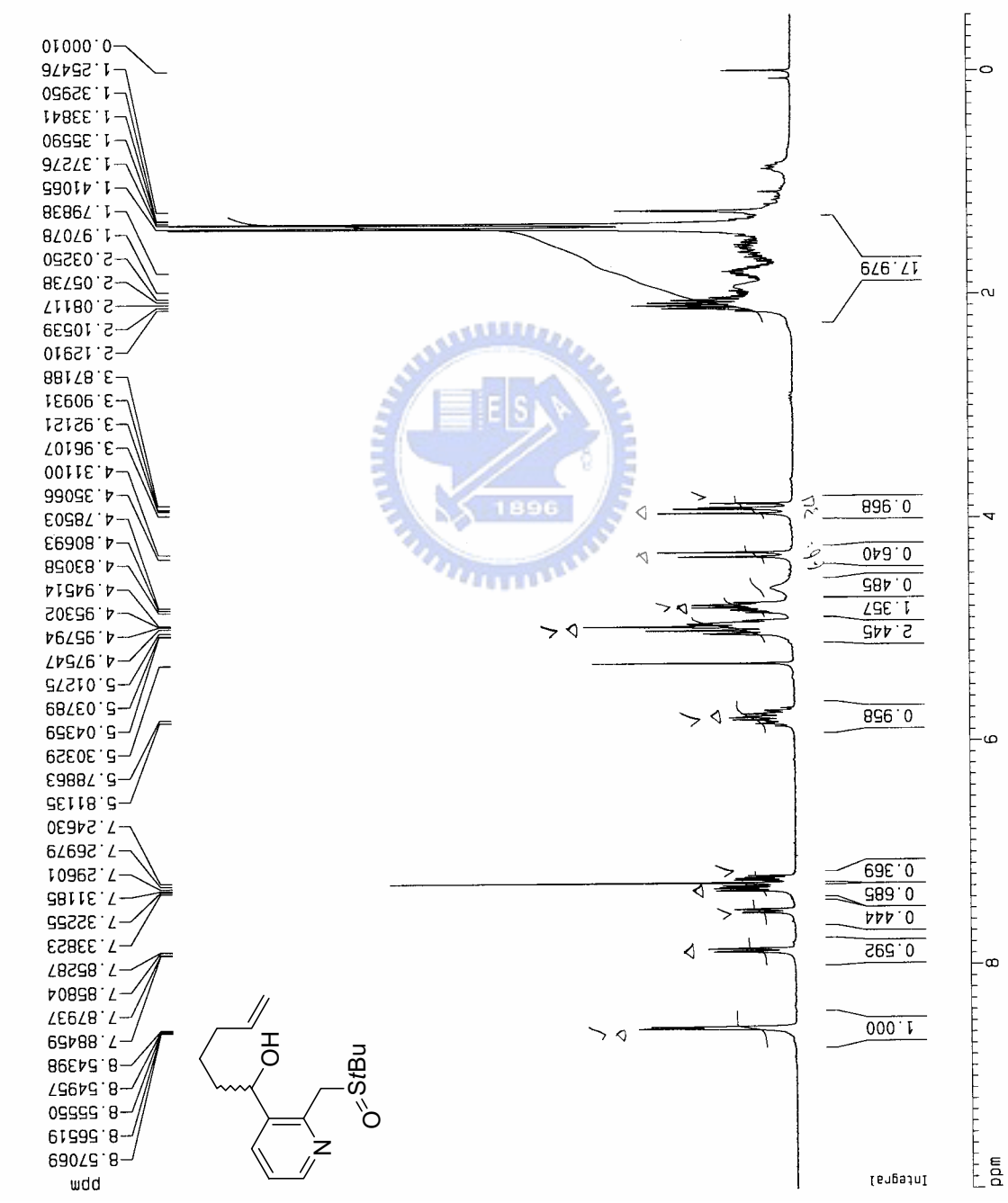
PULPROG   zg30
TD         32768
SOLVENT   CDCl3
NS         16
DS         0
SWH        7812.500 Hz
FIDRES     0.238419 Hz
AQ         2.0972021 sec
RG         322.5
DM         64.000 usec
DE         4.50 usec
TE         300.0 K
D1         1.00000000 sec

===== CHANNEL f1 =====
NUC1      1H
P1        9.10 usec
PL1       -4.00 dB
SF01      300.1321122 MHz

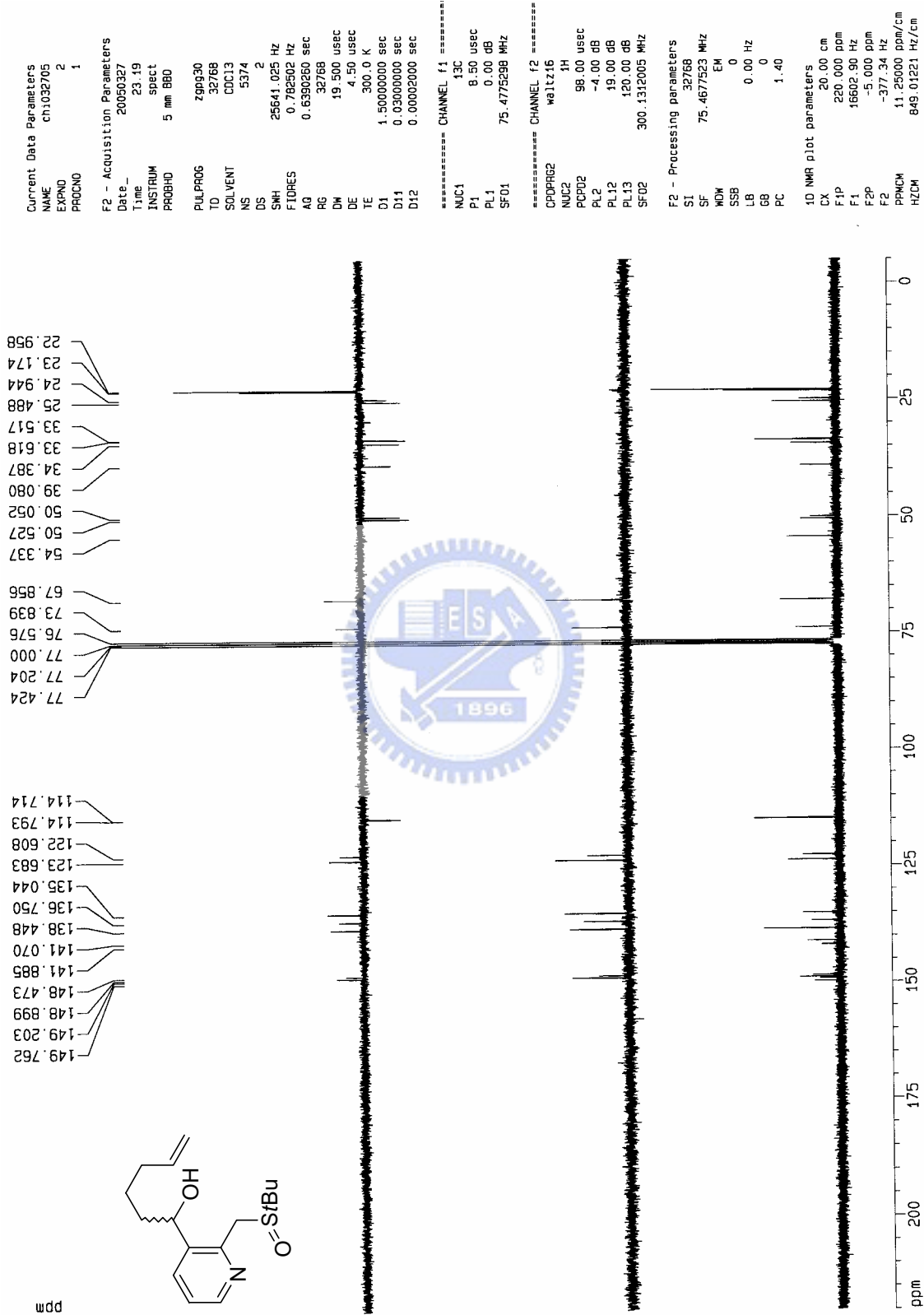
F2 - Processing parameters
SI        32768
SF        300.1300036 MHz
WDW       EM
SSB       0
LB        0.30 Hz
GB        0
PC        1.00

1D NMR plot parameters
CX        20.00 cm
F1P       10.000 ppm
F1        3001.30 Hz
F2P       -0.500 ppm
F2        -150.07 Hz
PPMCM     0.52500 ppm/cm
HZCM      157.56825 Hz/cm

```



附圖 140 化合物 163a 之 ¹H NMR 光譜圖



附圖 141 化合物 163a 之 ¹³C NMR 光譜圖

```

Current Data Parameters
NAME      chi061905
EXPNO    5
PROCNO   1

F2 - Acquisition Parameters
Date_    20050619
Time     12.20
INSTRUM  spect
PROBHD   5 mm BBO

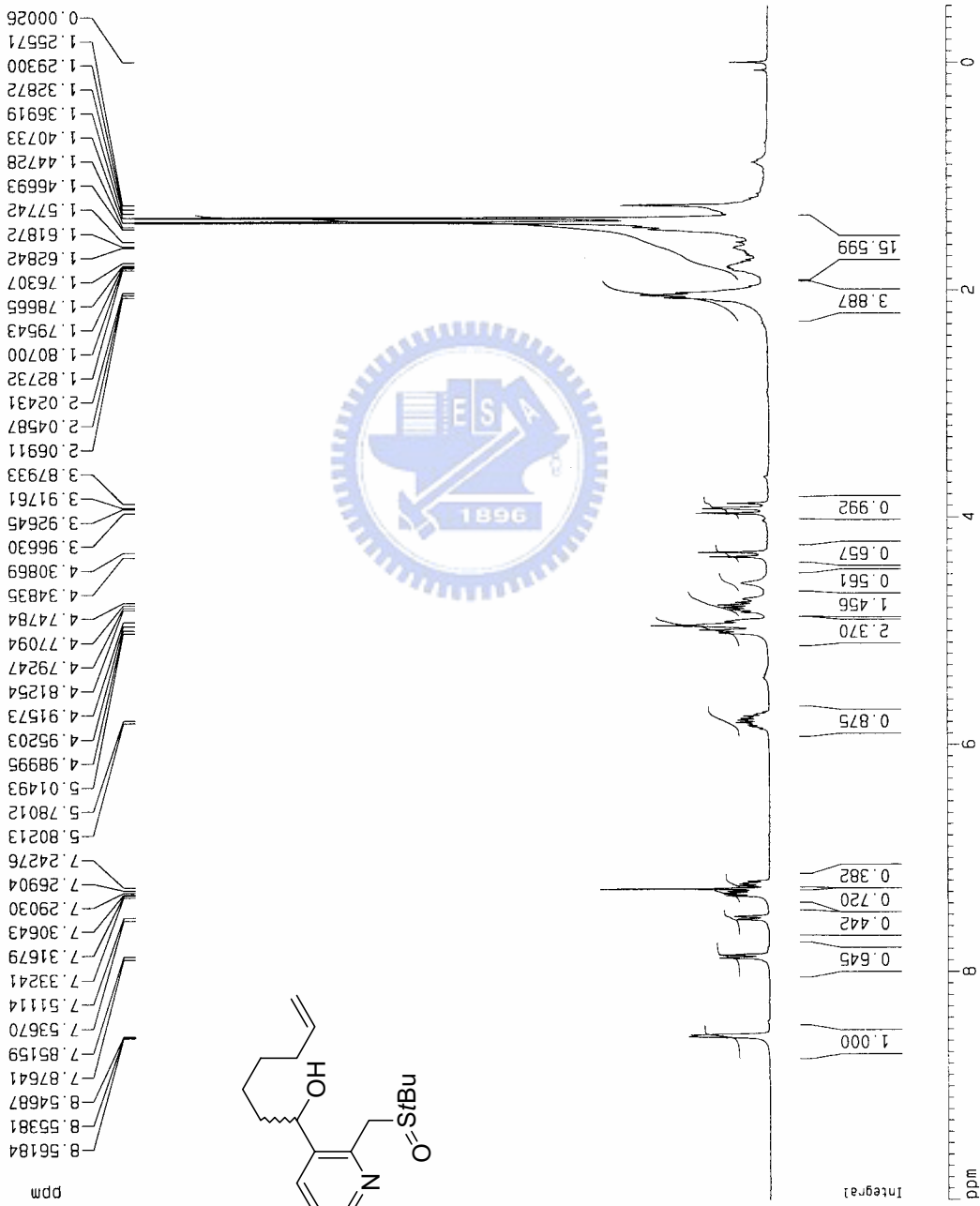
PULPROG  zg30
TD        32768
SOLVENT  CDCl3
NS        16
DS        0
SWH       7812.500 Hz
FIDRES    0.238419 Hz
AQ         2.0972021 sec
RG         256
DW         64.000 usec
DE         4.50 usec
TE         300.0 K
D1         1.00000000 sec

===== CHANNEL f1 =====
NUC1      1H
P1        9.10 usec
PL1       -4.00 dB
SF01      300.1321122 MHz

F2 - Processing parameters
SI        32768
SF        300.1300039 MHz
WDW       EM
SSB       0
LB        0.30 Hz
GB        0
PC        1.00

1D NMR plot parameters
CX        20.00 cm
F1P       10.000 ppm
F1        3001.30 Hz
F2P       -0.500 ppm
F2        -150.07 Hz
PPMCH    0.52500 ppm/cm
HZCM     157.56825 Hz/cm

```



附圖 142 化合物 163b 之 ¹H NMR 光譜圖

```

Current Data Parameters
NAME      ch1051905
EXPNO    6
PROCNO   1

F2 - Acquisition Parameters
Date_    20050619
Time     12.28
INSTRUM  spect
PROBHD   5 mm QNP

PULPROG  zgpg30
TD        32768
SOLVENT  CDCl3
NS        6255
DS        2
SMH       25641.025 Hz
FIDRES    0.782502 Hz
AQ        0.6390260 sec
RG        32768
DM        19.500 usec
DE        4.50 usec
TE        300.0 K
D1        1.50000000 sec
D11       0.03000000 sec
D12       0.00002000 sec

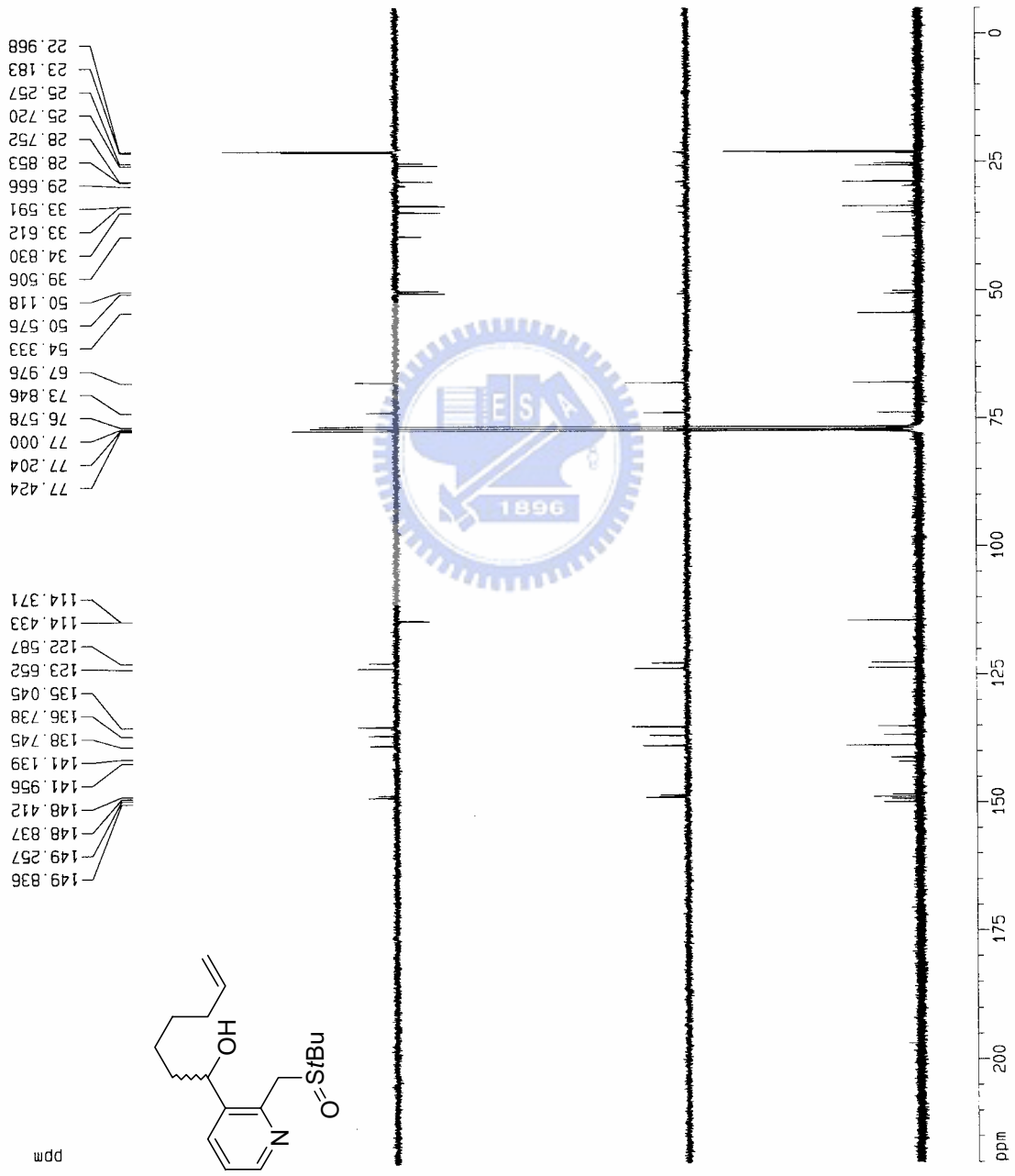
===== CHANNEL f1 =====
NUC1      13C
P1        8.50 usec
PL1       0.00 dB
SF01      75.4775298 MHz

===== CHANNEL f2 =====
CPDPRG2   waitz15
NUC2      1H
PCPD2     98.00 usec
PL2       -4.00 dB
PL12      19.00 dB
PL13      120.00 dB
SF02      300.1312005 MHz

F2 - Processing parameters
SI        32768
SF        75.4677510 MHz
WDW       EM
SSB       0
LB        0.00 Hz
GB        0
PC        1.40

ID: NMR plot parameters
CX        20.00 cm
F1P       220.000 ppm
F1        16602.90 Hz
F2P       -5.000 ppm
F2        -377.34 Hz
PPMCM     11.25000 ppm/cm
HZCM      649.01221 Hz/cm

```



附圖 143 化合物 163b 之 ¹³C NMR 光譜圖

```

Current Data Parameters
NAME      ch1031905
EXPNO     5
PROCNO    1

F2 - Acquisition Parameters
Date_     20050328
Time      21.18
INSTRUM   spect
PROBHD    5 mm BBO

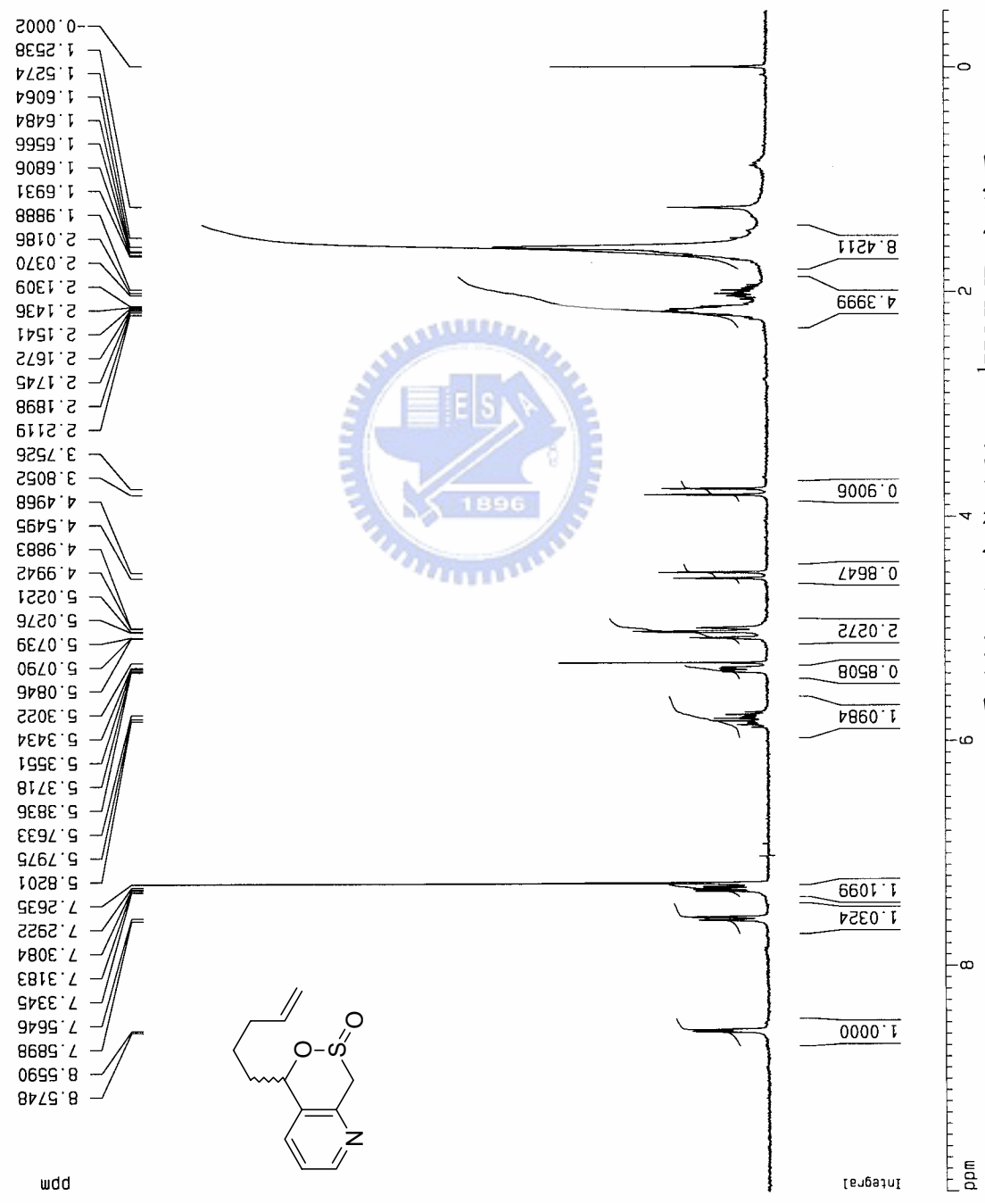
PULPROG   zg30
TD         32768
SOLVENT   CDCl3
NS         16
DS         0
SWH        7612.500 Hz
FIDRES     0.236419 Hz
AQ         2.0972021 sec
RG         1149.4
DM         64.000 usec
DE         4.50 usec
TE         300.0 K
D1         1.00000000 sec

===== CHANNEL f1 =====
NUC1       1H
P1         9.10 usec
PL1        -4.00 dB
SFO1       300.1321122 MHz

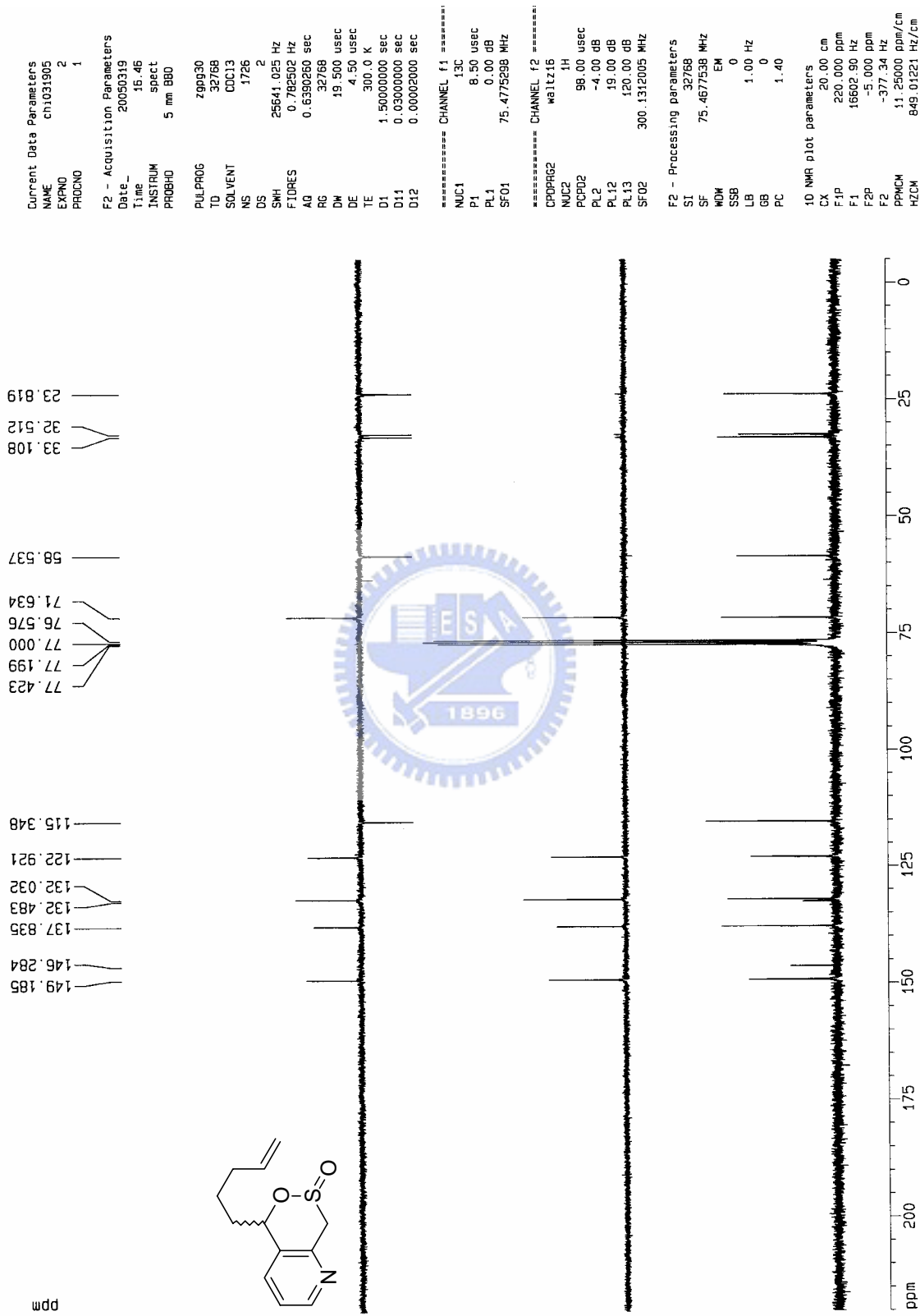
F2 - Processing parameters
SI         32768
SF         300.1300053 MHz
WDW        EM
SSB        0
LB         0.30 Hz
GB         0
PC         1.00

1D NMR plot parameters
CX         20.00 cm
F1P        10.000 ppm
F1         3001.30 Hz
F2P        -0.500 ppm
F2         -150.07 Hz
PPMCM      0.52500 ppm/cm
HZCM       157.56825 Hz/cm

```



附圖 144 化合物 164a 之 ¹H NMR 光譜圖



附圖 145 化合物 164a 之 ^{13}C NMR 光譜圖

Current Data Parameters
 NAME chi032005
 EXPNO 1
 PROCNO 1

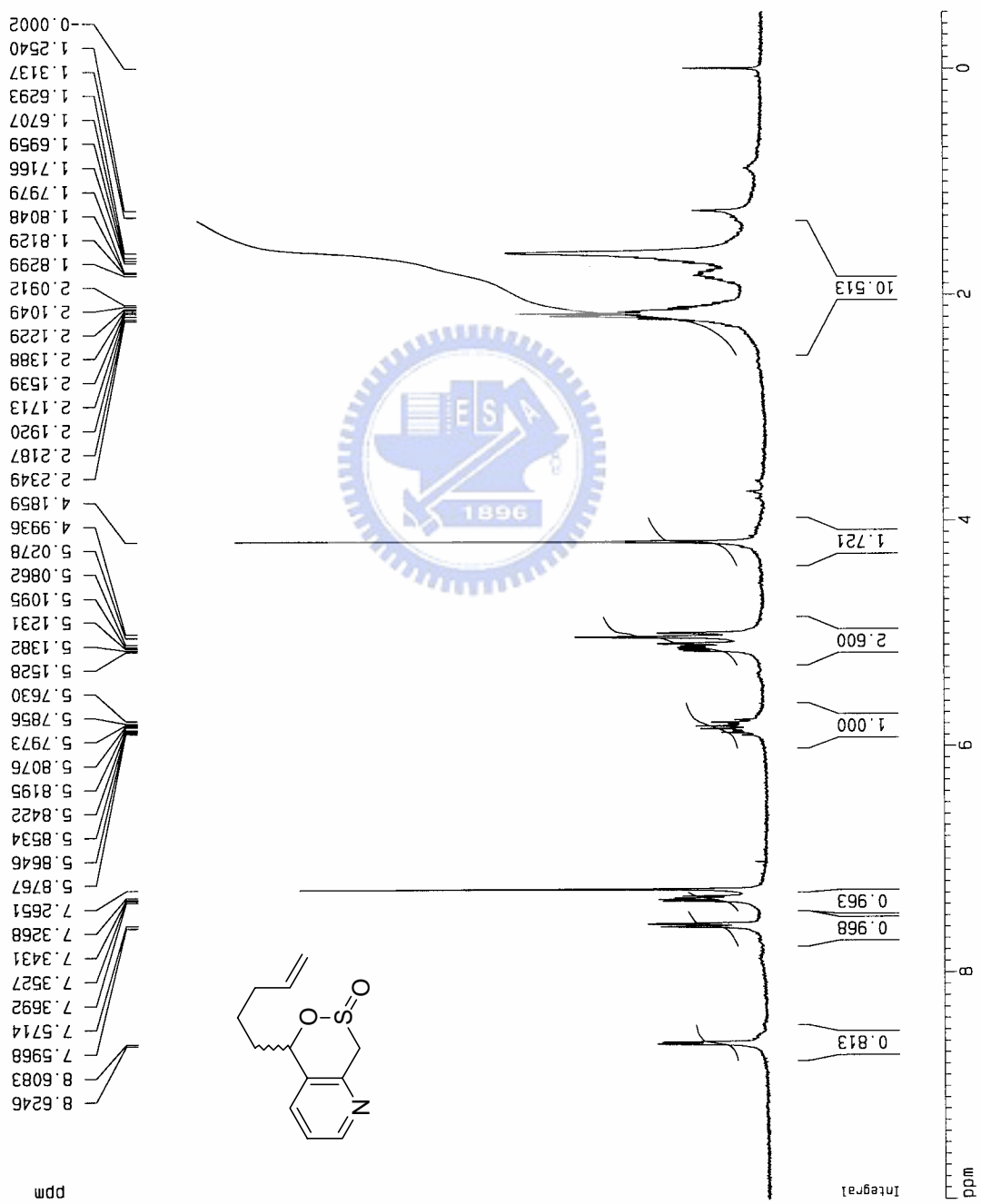
F2 - Acquisition Parameters
 Date_ 20050319
 Time_ 19.49
 INSTRUM spect
 PROBH0 5 mm BBO

PULPROG zg30
 TD 32768
 SOLVENT CDCl3
 NS 16
 DS 0
 SWH 7812.500 Hz
 FIDRES 0.238419 Hz
 AQ 2.0972021 sec
 RG 812.7
 DW 64.000 usec
 DE 4.50 usec
 TE 300.0 K
 D1 1.00000000 sec

===== CHANNEL f1 =====
 NUC1 1H
 P1 9.10 usec
 PL1 -4.00 dB
 SF01 300.1321122 MHz

F2 - Processing parameters
 SI 32768
 SF 300.1300048 MHz
 WDW EM
 SSB 0
 LB 0.30 Hz
 GB 0
 PC 1.00

1D NMR plot parameters
 CX 20.00 cm
 F1P 10.000 ppm
 F1 3001.30 Hz
 F2P -0.500 ppm
 F2 -150.07 Hz
 PPMCM 0.52500 ppm/cm
 HZCM 157.56825 Hz/cm



附圖 146 化合物 164'a 之 ¹H NMR 光譜圖

```

Current Data Parameters
NAME      ch1032005
EXPNO    2
PROCNO   1

F2 - Acquisition Parameters
Date_    20050320
Time     6.50
INSTRUM spect
PROBHD   5 mm BBO

PULPROG  zgpg30
TD        32768
SOLVENT  CDCl3
NS        18432
DS        2
SWH       25641.025 Hz
FIDRES    0.782502 Hz
AQ        0.6390260 sec
RG        32768
DM        19.500 usec
DE        4.50 usec
TE        300.0 K
D1        1.50000000 sec
D11       0.03000000 sec
D12       0.00002000 sec

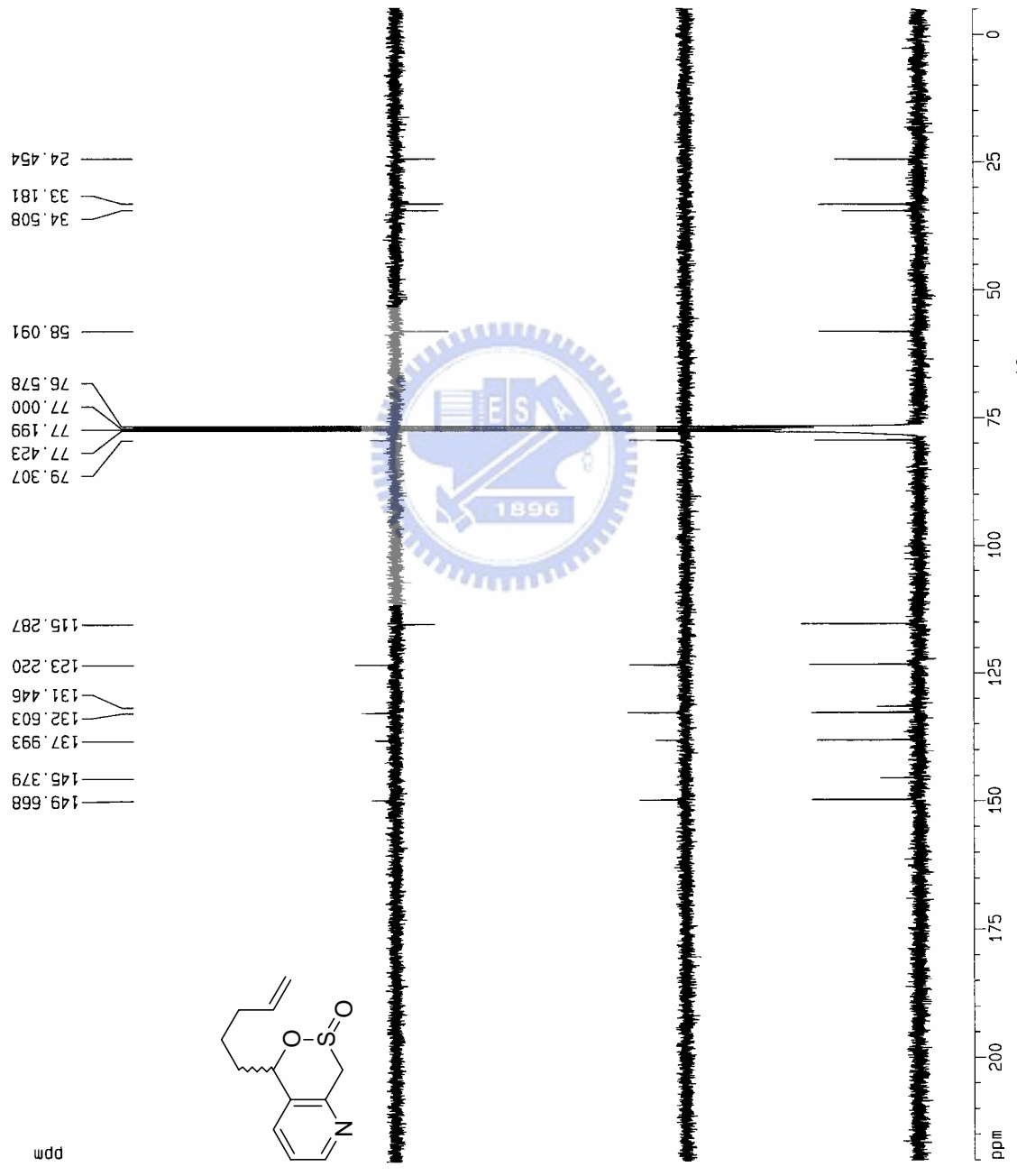
===== CHANNEL f1 =====
NUC1      13C
P1        8.50 usec
PL1       0.00 dB
SFO1     75.4775298 MHz

===== CHANNEL f2 =====
CPOPRG2  waltz16
NUC2      1H
PCPD2    98.00 usec
PL2      -4.00 dB
PL12     19.00 dB
PL13     120.00 dB
SFO2     300.1312005 MHz

F2 - Processing parameters
SI        32768
SF        75.4677519 MHz
WDW       EM
SSB       0
LB        1.00 Hz
GB        0
PC        1.40

1D NMR plot parameters
CX        20.00 cm
F1P       220.000 ppm
F1        16602.90 Hz
F2P       -5.000 ppm
F2        -377.34 Hz
PPMCM     11.25000 ppm/cm
HZCM      849.01221 Hz/cm

```



附圖 147 化合物 164'a 之 ¹³C NMR 光譜圖

```

Current Data Parameters
NAME      chi062005
EXPNO     B
PROCNO    1

F2 - Acquisition Parameters
Date_     20050620
Time      23.12
INSTRUM   spect
PROBHD    5 mm BBO

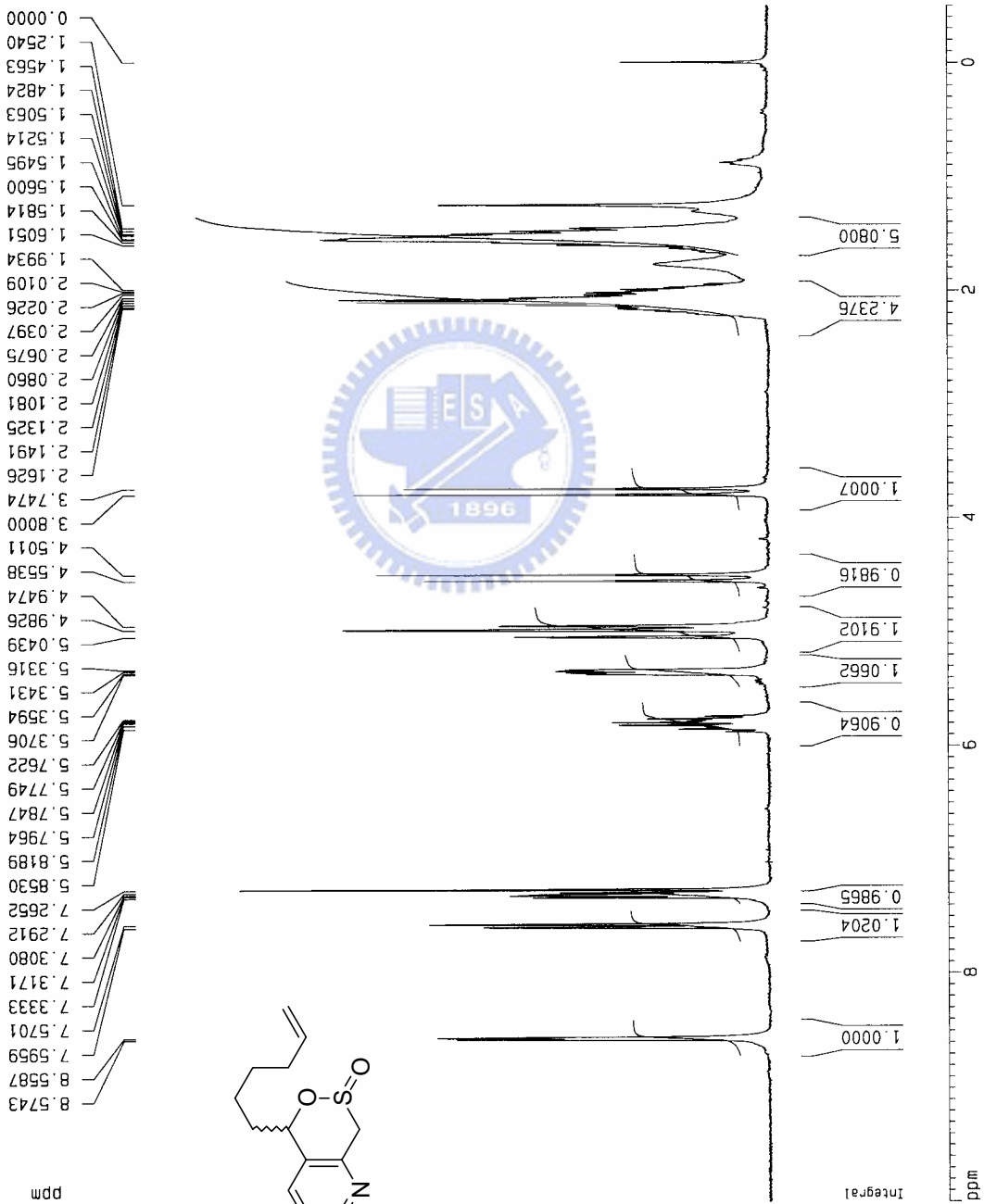
PULPROG   zg30
TD         32768
SOLVENT    CDCl3
NS         16
DS         0
SWH        7812.500 Hz
FIDRES     0.238419 Hz
AQ         2.0972021 sec
RG         362
DE         64.000 usec
TE         300.0 K
D1         1.00000000 sec

===== CHANNEL f1 =====
NUC1       1H
P1         9.10 usec
PL1        -4.00 dB
SF01       300.132122 MHz

F2 - Processing parameters
SI         32768
SF         300.1300046 MHz
WDW        EM
SSB        0
LB         0.30 Hz
GB         0
PC         1.00

1D NMR plot parameters
CX         20.00 cm
F1P        10.000 ppm
F1         3001.30 Hz
F2P        -0.500 ppm
F2         -150.07 Hz
PPMCK      0.52500 ppm/cm
HZCM       157.56825 Hz/cm

```



附圖 148 化合物 164b 之 ¹H NMR 光譜圖

```

Current Data Parameters
NAME      ch1062005
EXPNO     5
PROCNO    1

F2 - Acquisition Parameters
Date_     20050620
Time      20.39
INSTRUM   spect
PROBHD    5 mm BBO

PULPROG   zgpg30
TD         32768
SOLVENT   CDCl3
NS         1856
DS         2
SWH        25641.025 Hz
FIDRES     0.782502 Hz
AQ         0.6390260 sec
RG         32768
DM         19.500 usec
DE         4.50 usec
TE         300.0 K
D1         1.5000000 sec
D11        0.0300000 sec
D12        0.0000200 sec

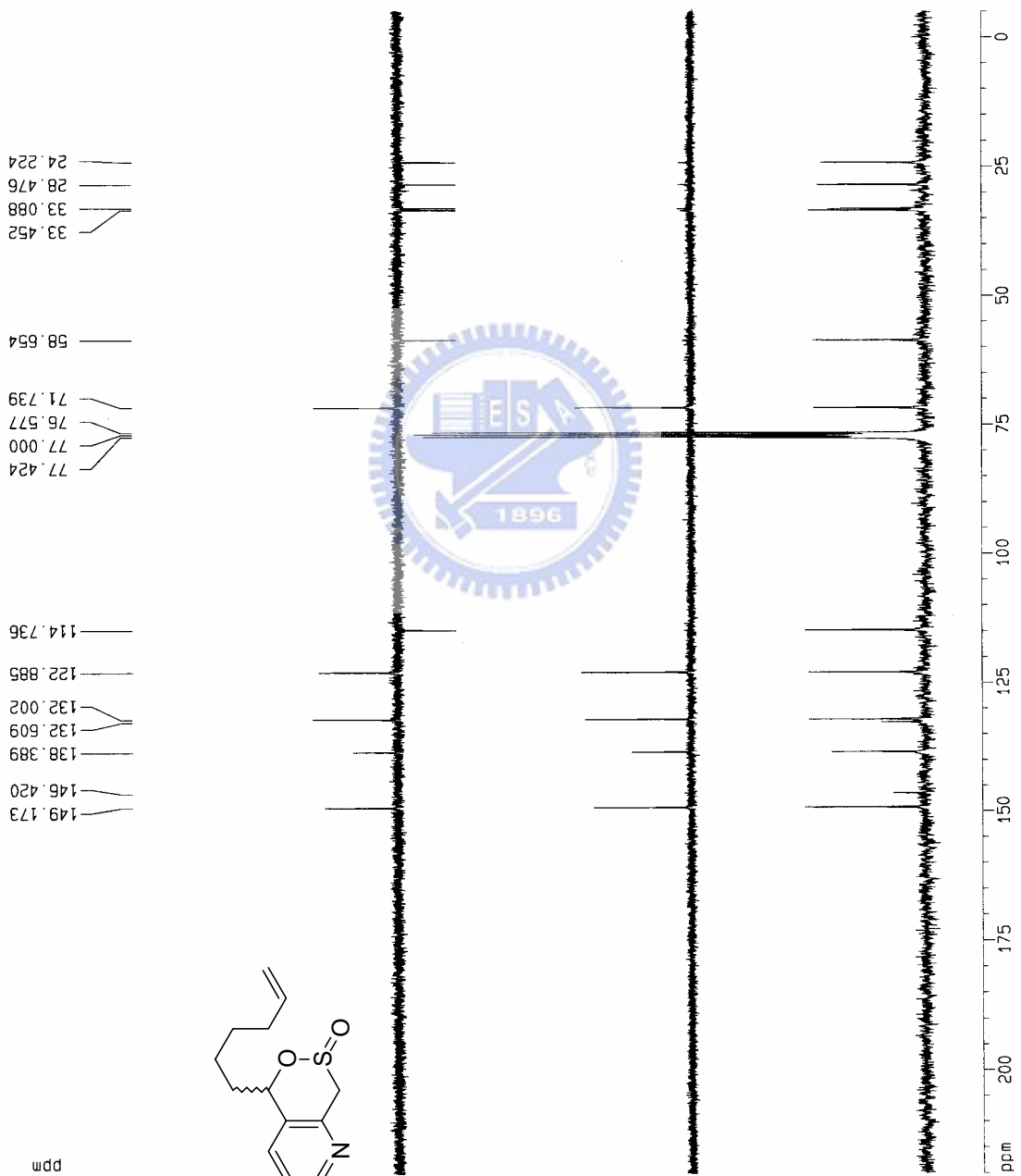
===== CHANNEL f1 =====
NUC1       13C
P1         8.50 usec
PL1        0.00 dB
SFO1       75.4775296 MHz

===== CHANNEL f2 =====
CPOPRG2    waltz16
NUC2        1H
PCPD2      98.00 usec
PL2        -4.00 dB
PL12       19.00 dB
PL13       120.00 dB
SF02       300.1312005 MHz

F2 - Processing parameters
S1         32768
SF         75.4677521 MHz
WDW        EM
SSB        0
LB         3.00 Hz
GB         0
PC         1.40

1D NMR plot parameters
CX         20.00 cm
F1P        220.000 ppm
F1         16602.90 Hz
F2P        -5.000 ppm
F2         -37.34 Hz
PPHCH      11.25000 ppm/cm
HZCM       849.01221 Hz/cm

```



附圖 149 化合物 164b 之 ¹³C NMR 光譜圖

Current Data Parameters
 NAME ch1062105
 EXPNO 1
 PROCNO 1

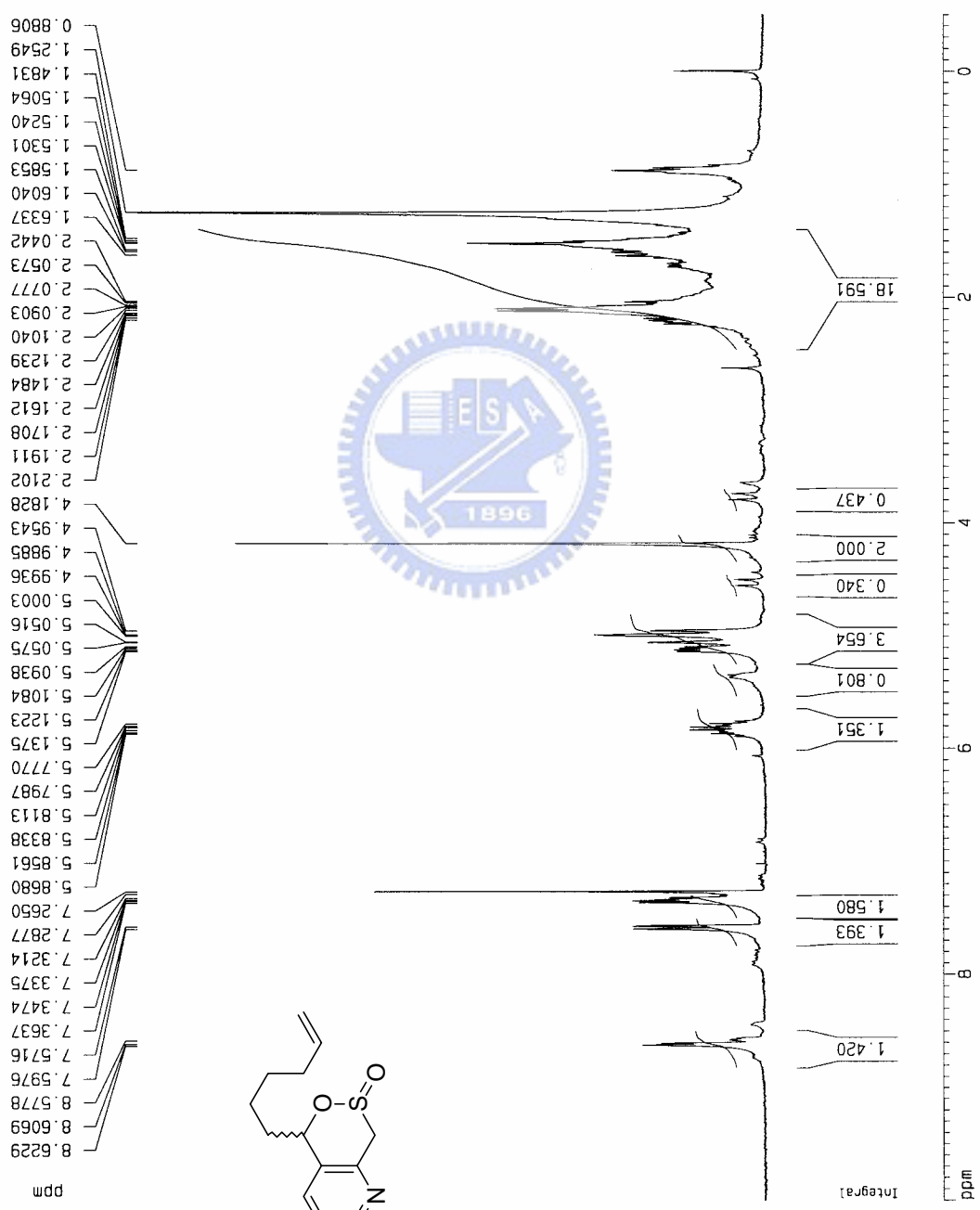
F2 - Acquisition Parameters
 Date_ 20050621
 Time 23.04
 INSTRUM spect
 PROBHD 5 mm BBO

PULPROG zg30
 TD 32768
 SOLVENT CDCl3
 NS 16
 DS 0
 SWH 7812.500 Hz
 FIDRES 0.238419 Hz
 AQ 2.0972021 sec
 RG 362
 DM 64.000 usec
 DE 4.50 usec
 TE 300.0 K
 D1 1.00000000 sec

===== CHANNEL f1 =====
 NUC1 1H
 P1 9.10 usec
 PL1 -4.00 dB
 SFO1 300.1321122 MHz

F2 - Processing parameters
 SI 32768
 SF 300.1300048 MHz
 WDW EM
 SSB 0
 LB 0.30 Hz
 GB 0
 PC 1.00

1D NMR plot parameters
 CX 20.00 cm
 F1P 10.000 ppm
 F1 3001.30 Hz
 F2P -0.500 ppm
 F2 -150.07 Hz
 PPMCM 0.52500 ppm/cm
 HZCM 157.56825 Hz/cm



附圖 150 化合物 164'b 之 ¹H NMR 光譜圖

```

Current Data Parameters
NAME      CHI062105
EXPNO    2
PROCNO   1

F2 - Acquisition Parameters
Date_    20050621
Time     13.14
INSTRUM  spect
PROBHD   5 mm BBO

PULPROG  zgpg30
TD        32768
SOLVENT  CDCl3
NS        5758
DS        2
SWH       25641.025 Hz
FIDRES    0.782502 Hz
AQ        0.6390260 sec
RG        32768
DM        19.500 usec
DE        4.50 usec
TE        300.0 K
D1        1.50000000 sec
D11       0.03000000 sec
D12       0.00002000 sec

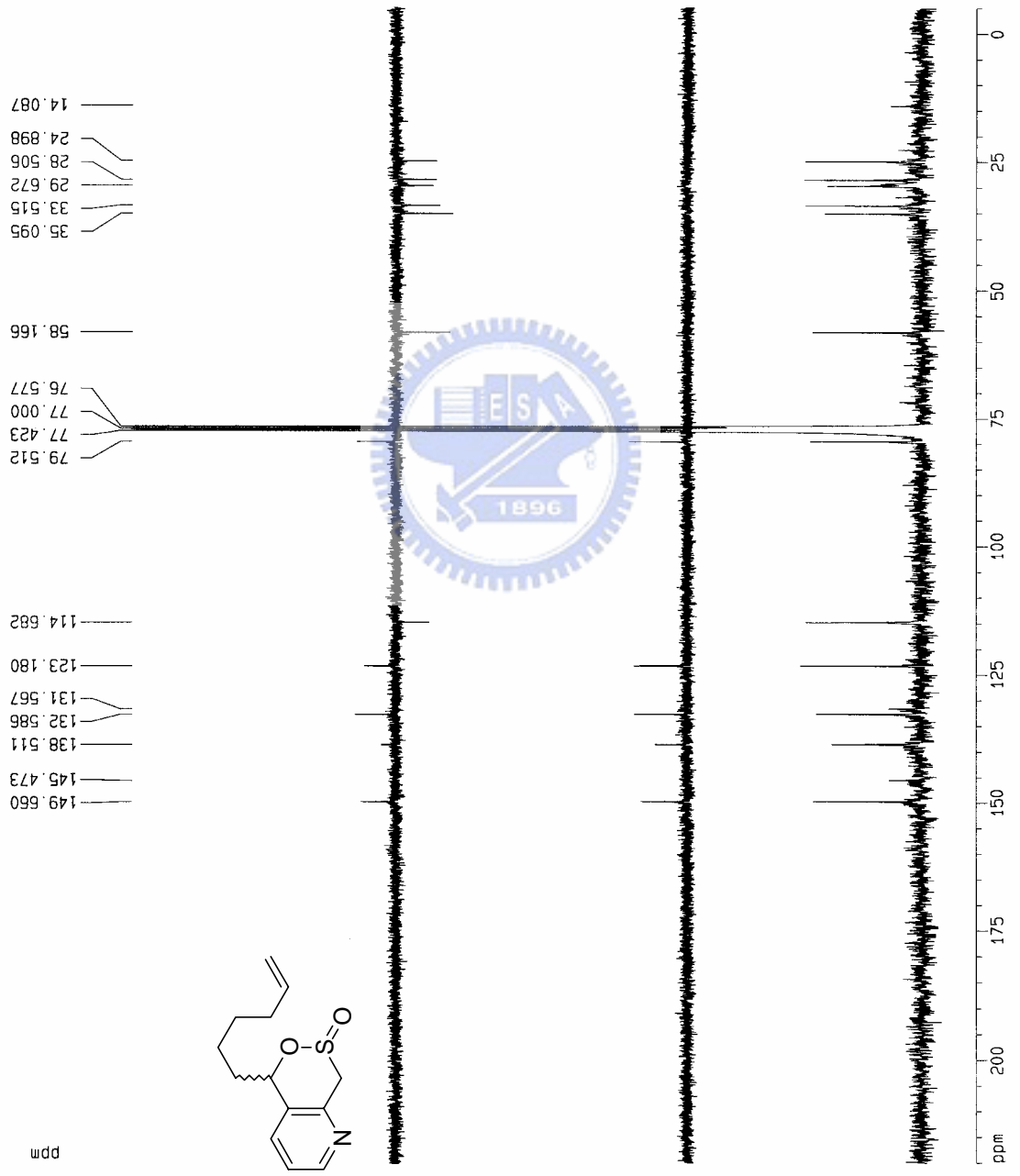
===== CHANNEL f1 =====
NUC1      13C
P1        8.50 usec
PL1       0.00 dB
SF01      75.4775298 MHz

===== CHANNEL f2 =====
CPDPRG2  waltz16
NUC2      1H
NUC3      13C
PCPD2     98.00 usec
PL2       -4.00 dB
PL12      19.00 dB
PL13      120.00 dB
SF02      300.1312005 MHz

F2 - Processing parameters
S1        32768
SF        75.4677522 MHz
NDW       EM
SSB       0
LB        3.00 Hz
GB        0
PC        1.40

1D NMR plot parameters
CX        20.00 cm
F1P       220.000 ppm
F1        16602.90 Hz
F2P       -5.000 ppm
F2        -377.34 Hz
PPMCM     11.25000 ppm/cm
HZCM      849.01221 Hz/cm

```



附圖 151 化合物 164'b 之 ¹³C NMR 光譜圖

Current Data Parameters
 NAME ch1033105
 EXPNO 1
 PROCNO 1

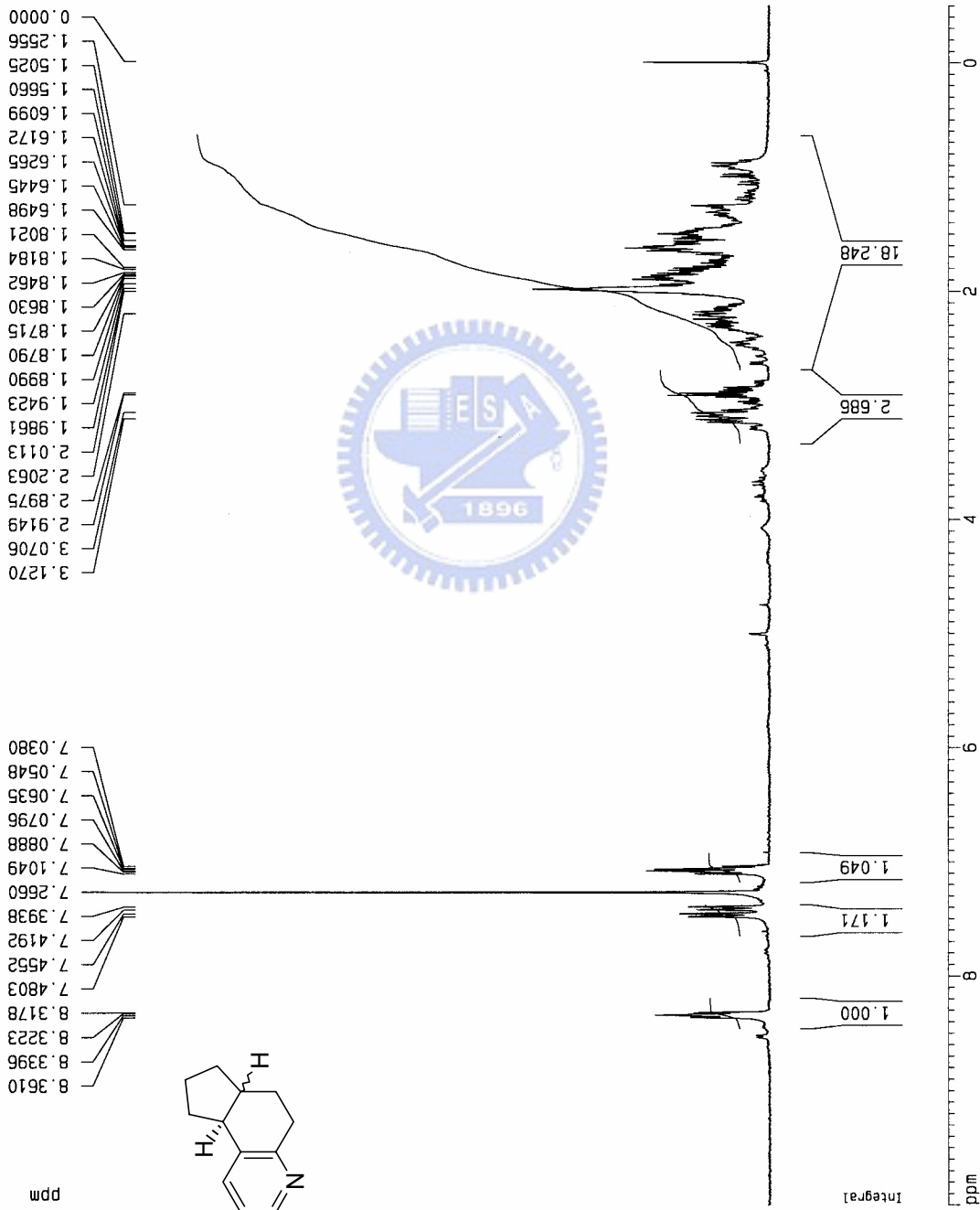
F2 - Acquisition Parameters
 Date_ 20050331
 Time 15.53
 INSTRUM spect
 PROBHD 5 mm BBO

PULPROG zg30
 TD 32768
 SOLVENT CDCl3
 NS 16
 DS 0
 SWH 7812.500 Hz
 FIDRES 0.238419 Hz
 AQ 2.0972021 sec
 RG 645.1
 DM 64.000 usec
 DE 4.50 usec
 TE 300.0 K
 D1 1.0000000 sec

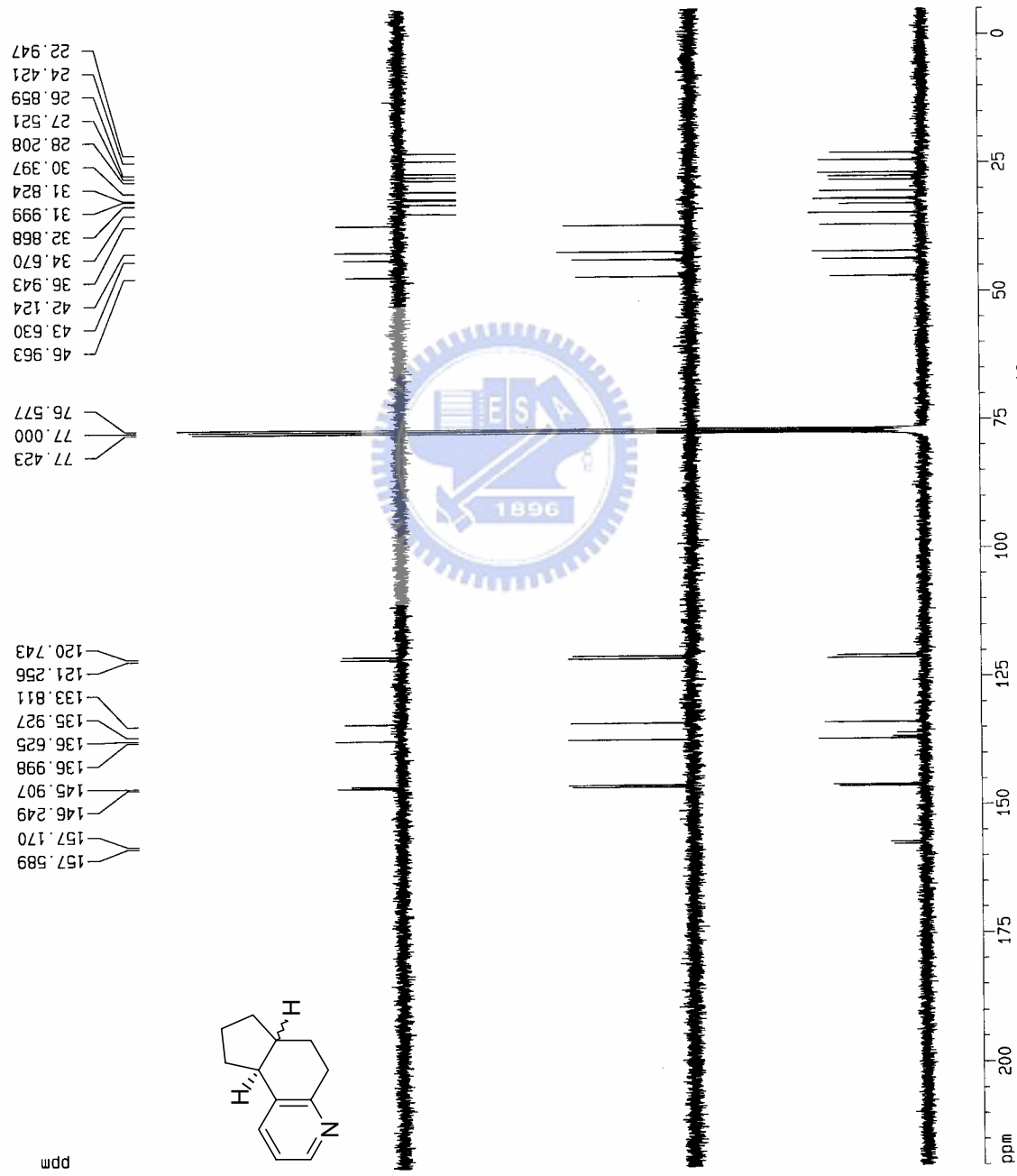
===== CHANNEL f1 =====
 NUC1 1H
 P1 9.10 usec
 PL1 -4.00 dB
 SFO1 300.1321122 MHz

F2 - Processing parameters
 SI 32768
 SF 300.1300048 MHz
 WDW EM
 SSB 0
 LB 0.30 Hz
 GB 0
 PC 1.00

1D NMR plot parameters
 CX 20.00 cm
 F1P 10.000 ppm
 F1 3001.30 Hz
 F2P -0.500 ppm
 F2 -150.07 Hz
 PPMCM 0.52500 ppm/cm
 HZCM 157.56625 Hz/cm



附圖 152 化合物 166a 之 ¹H NMR 光譜圖



```

Current Data Parameters
NAME      ch1040105
EXPNO    2
PROCNO   1

F2 - Acquisition Parameters
Date_    20050331
Time     22.44
INSTRUM  spect
PROBHD   5 mm BBO

PULPROG  zgpg30
TD        32768
SOLVENT  CDCl3
NS        2887
DS        2
SWH       25641.025 Hz
FIDRES    0.782502 Hz
AQ        0.6390260 sec
RG        32768
DM        19.500 usec
DE        4.50 usec
TE        300.0 K
D1        1.50000000 sec
D11       0.03000000 sec
D12       0.00002000 sec

===== CHANNEL f1 =====
NUC1      13C
P1        8.50 usec
PL1       0.00 dB
SFO1     75.4775298 MHz

===== CHANNEL f2 =====
CPOPRG2  waltz16
NUC2      1H
PCPD2     98.00 usec
PL2       -4.00 dB
PL12      19.00 dB
PL13      120.00 dB
SFO2     300.1312005 MHz

F2 - Processing parameters
SI        32768
SF        75.467528 MHz
WDW       EM
SSB       0
LB        1.00 Hz
GB        0
PC        1.40

1D NMR plot parameters
CX        20.00 cm
F1P       220.000 ppm
F1        16602.50 Hz
F2P       -5.000 ppm
F2        -377.34 Hz
PPMCM     11.25000 ppm/cm
HZCM      848.01221 Hz/cm

```

附圖 153 化合物 166a 之 ¹³C NMR 光譜圖

Current Data Parameters
 NAME chi051805
 EXPNO 1
 PROCNO 1

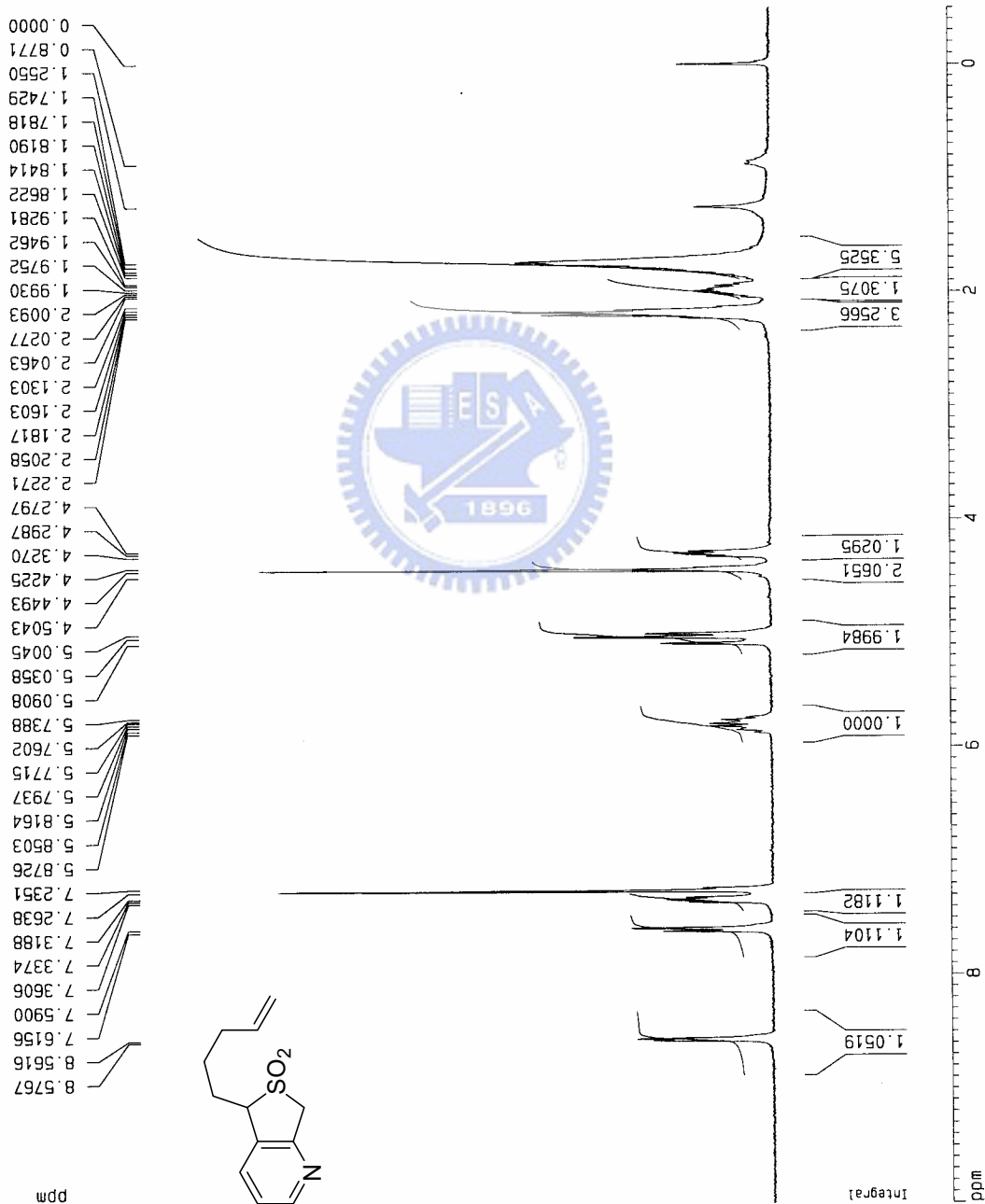
F2 - Acquisition Parameters
 Date_ 20050618
 Time 17.49
 INSTRUM spect
 PROBHD 5 mm BBO

PULPROG zg30
 TD 32768
 SOLVENT CDCl3
 NS 16
 DS 0
 SWH 7812.500 Hz
 FIDRES 0.238419 Hz
 AQ 2.0972021 sec
 RG 512
 DM 64.000 usec
 DE 4.50 usec
 TE 300.0 K
 D1 1.00000000 sec

===== CHANNEL f1 =====
 NUC1 ¹H
 P1 9.10 usec
 PL1 -4.00 dB
 SF01 300.1321122 MHz

F2 - Processing parameters
 SI 32768
 SF 300.1300046 MHz
 WDW EM
 SSB 0
 LB 0.30 Hz
 GB 0
 PC 1.00

1D NMR plot parameters
 CX 20.00 cm
 F1P 10.000 ppm
 F1 3001.30 Hz
 F2P -0.500 ppm
 F2 -150.07 Hz
 PPMCM 0.52500 ppm/cm
 HZCM 157.56825 Hz/cm



附圖 154 化合物 167a 之 ¹H NMR 光譜圖

```

Current Data Parameters
NAME      chi051805
EXPNO    2
PROCNO   1

F2 - Acquisition Parameters
Date_    20050618
Time    10.42
INSTRUM spect
PROBHD   5 mm BBO

PULPROG  zgpg30
TD       32768
SOLVENT  CDCl3
NS       10240
DS       2
SWH      25641.025 Hz
FIDRES   0.782502 Hz
AQ       0.6390260 sec
RG       32768
DM       19.500 usec
DE       4.50 usec
TE       300.0 K
D1       1.50000000 sec
D11      0.03000000 sec
D12      0.00002000 sec

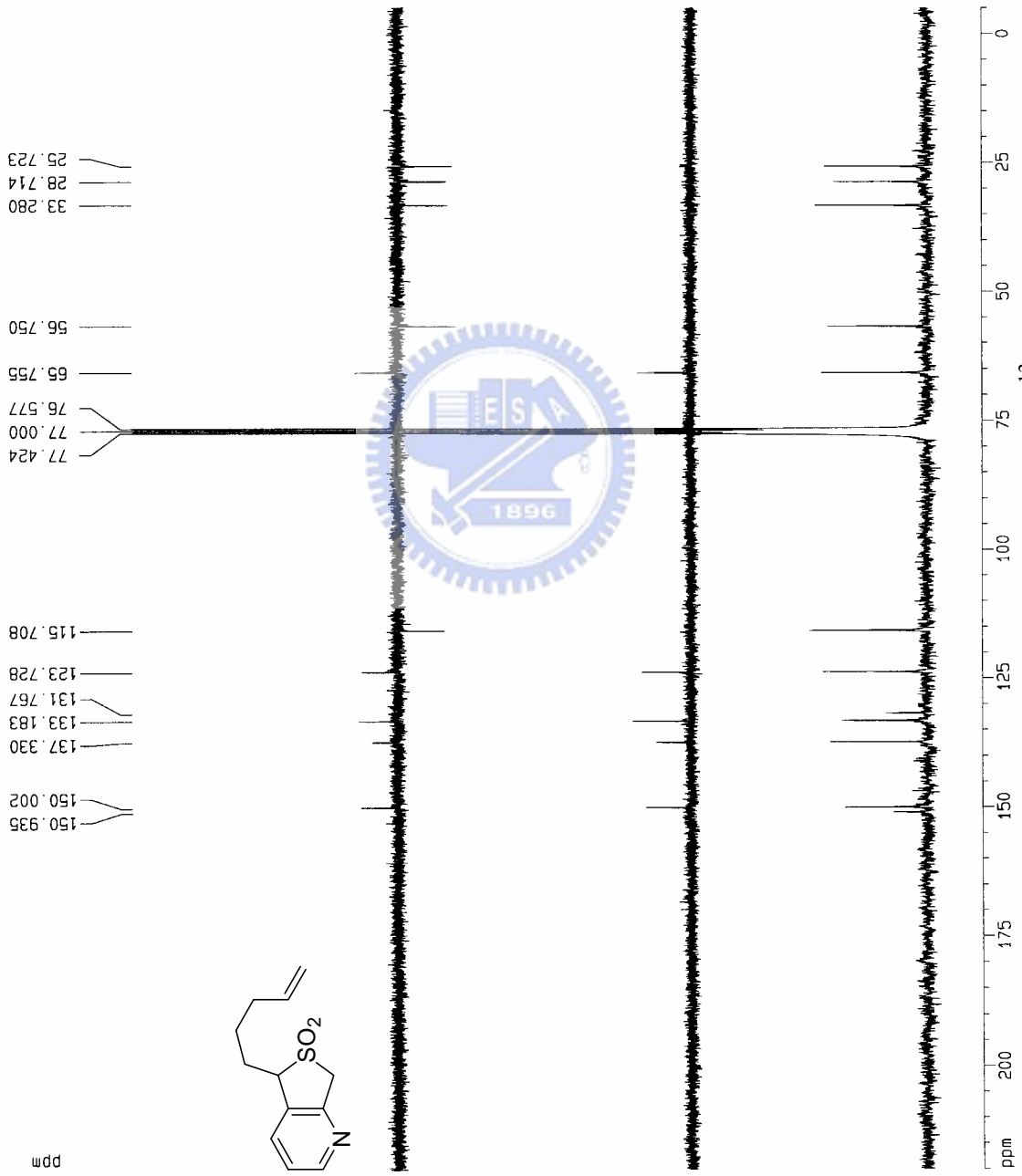
***** CHANNEL f1 *****
NUC1     13C
P1       8.50 usec
PL1      0.00 dB
SFO1     75.4775298 MHz

***** CHANNEL f2 *****
CPDPRG2  waltz16
NUC2     1H
PCPD2    98.00 usec
PL2      -4.00 dB
PL12     19.00 dB
PL13     120.00 dB
SFO2     300.1312005 MHz

F2 - Processing parameters
SI       32768
SF       75.4677517 MHz
WDW      EM
SSB      0
LB       3.00 Hz
GB       0
PC       1.40

1D NMR plot parameters
CX       20.00 cm
F1P      220.000 ppm
F1       16602.90 Hz
F2P      -5.000 ppm
F2       -377.34 Hz
PRMCH    11.250000 ppm/cm
HZCM     849.01221 Hz/cm

```



附圖 155 化合物 167a 之 ¹³C NMR 光譜圖

```

Current Data Parameters
NAME      chi062205
EXPNO    1
PROCNO   1

F2 - Acquisition Parameters
Date_    20050822
Time     2.58
INSTRUM spect
PROBHD   5 mm BBO

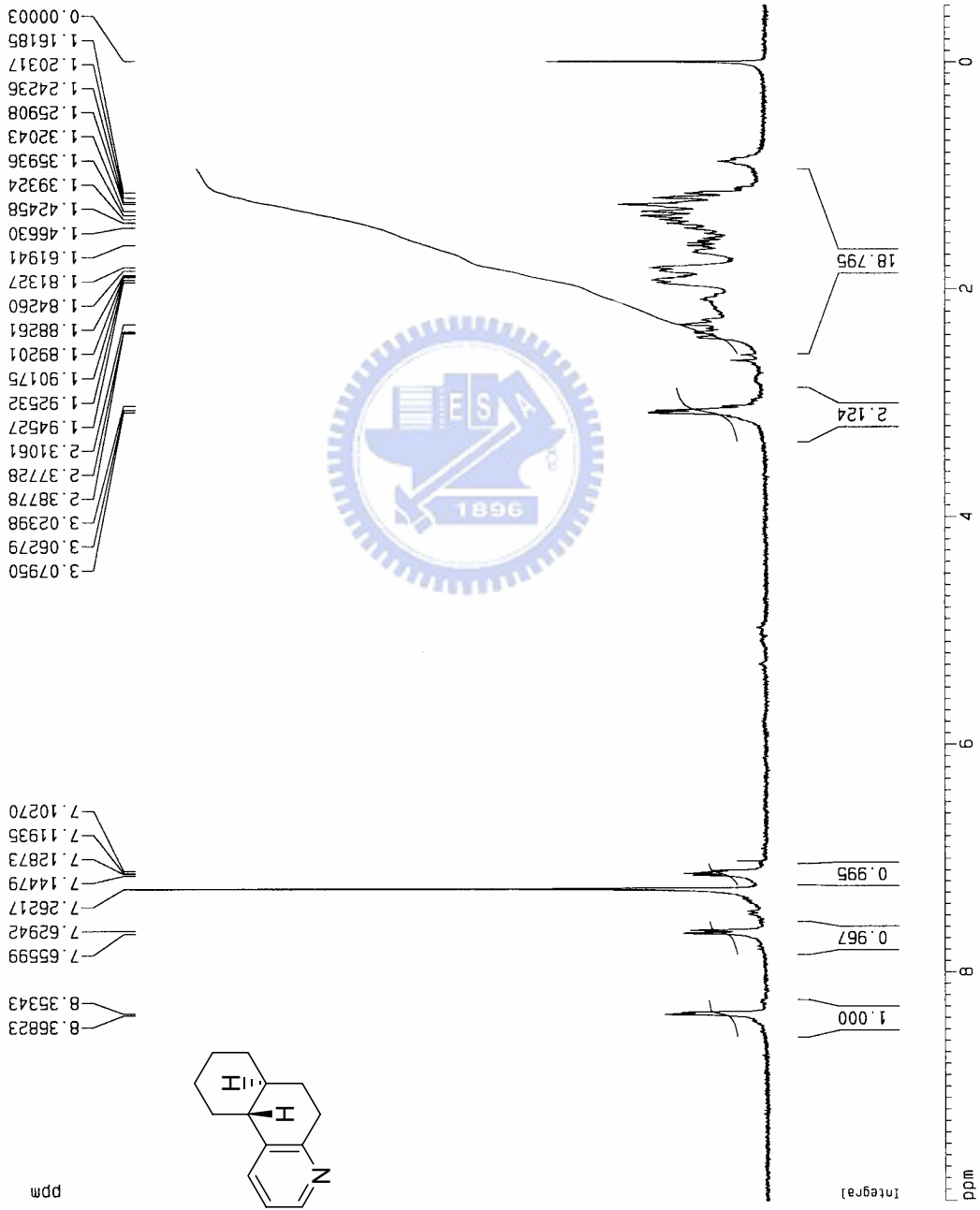
PULPROG  zg30
TD        32768
SOLVENT   CDCl3
NS        16
DS        0
SWH       7812.500 Hz
FIDRES    0.238419 Hz
AQ        2.0972021 sec
RG        812.7
DM        64.000 usec
DE        4.50 usec
TE        300.0 K
D1        1.00000000 sec

===== CHANNEL f1 =====
NUC1      1H
P1        9.10 usec
PL1       -4.00 dB
SFO1     300.1321122 MHz

F2 - Processing parameters
SI        32768
SF        300.1300055 MHz
WDW       EM
SSB       0
LB        0.30 Hz
GB        0
PC        1.00

ID NMR plot parameters
CX        20.00 cm
F1P       10.000 ppm
F1        3001.30 Hz
F2P       -0.500 ppm
F2        -150.07 Hz
PPMCM     0.52500 ppm/cm
HZCM      157.56825 Hz/cm

```



附圖 156 化合物 166b 之 ¹H NMR 光譜圖

```

Current Data Parameters
NAME      chi061805
EXPNO    2
PROCNO   1

F2 - Acquisition Parameters
Date_    20050618
Time     10.42
INSTRUM spect
PROBHD   5 mm BBO

PULPROG  zgpg30
TD        32768
SOLVENT  CDCl3
NS        10240
DS        2
SWH       25541.025 Hz
FIDRES   0.782502 Hz
AQ        0.6390260 sec
RG        32768
DM        19.500 usec
DE        4.50 usec
TE        300.0 K
D1        1.50000000 sec
D11       0.03000000 sec
D12       0.00002000 sec

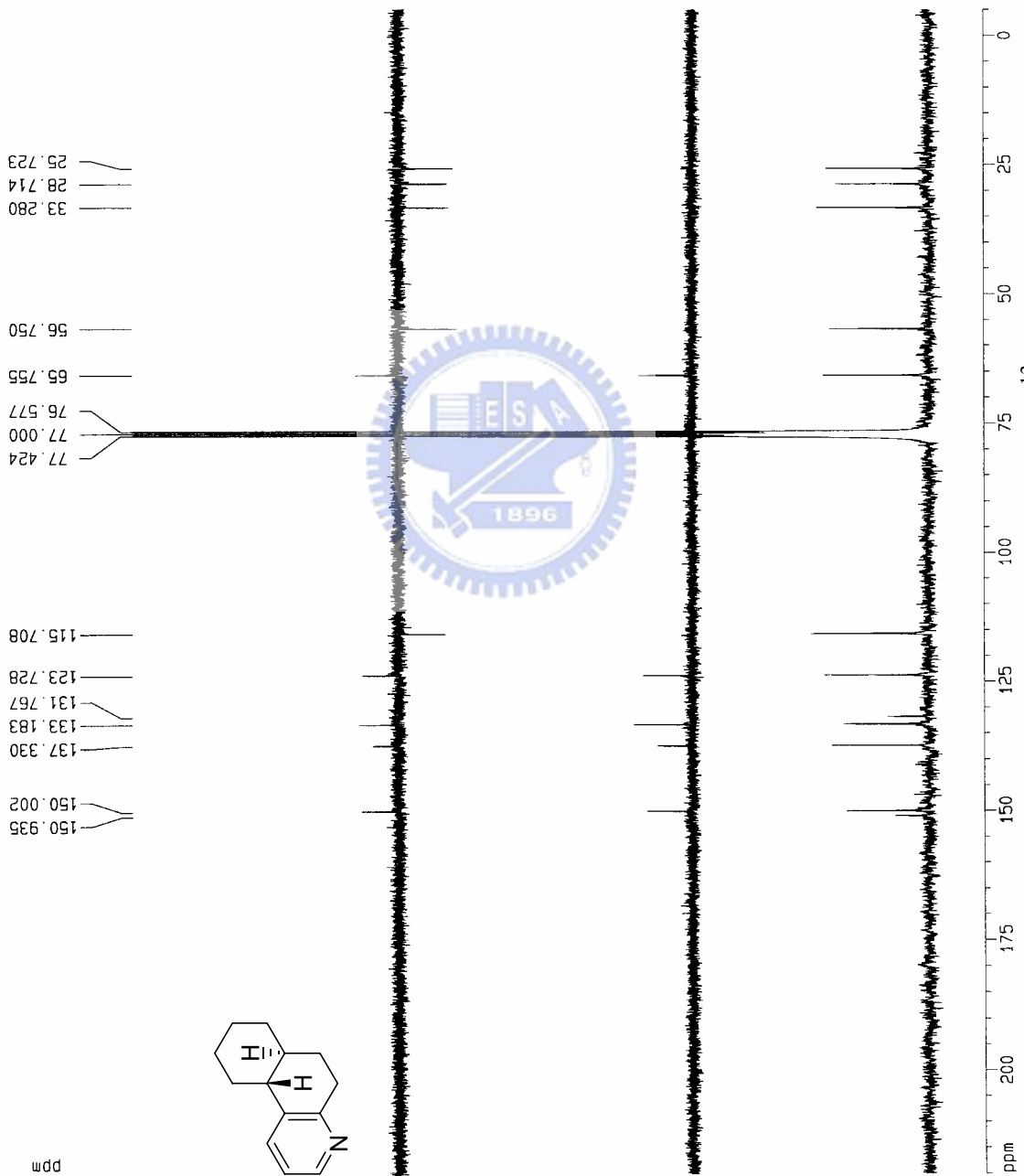
***** CHANNEL f1 *****
NUC1      13C
P1        8.50 usec
PL1       0.00 dB
SFO1     75.4775298 MHz

***** CHANNEL f2 *****
CPDPRG2  waltz16
NUC2      1H
PCPD2    98.00 usec
PL2      -4.00 dB
PL12     19.00 dB
PL13     120.00 dB
SFO2     300.1312005 MHz

F2 - Processing parameters
SI        32768
SF        75.4677517 MHz
WDW       EM
SSB       0
LB        3.00 Hz
GB        0
PC        1.40

1D NMR plot parameters
CX        20.00 cm
F1P       220.000 ppm
F1        16602.90 Hz
F2P       -5.000 ppm
F2        -377.34 Hz
PRMCH    11.25000 ppm/cm
HZCM     849.01221 Hz/cm

```



附圖 157 化合物 166b 之 ^{13}C NMR 光譜圖

```

Current Data Parameters
NAME      ch1052205
EXPNO    5
PROCNO   1

F2 - Acquisition Parameters
Date_    20050622
Time     3.03
INSTRUM spect
PROBHD   5 mm BBO

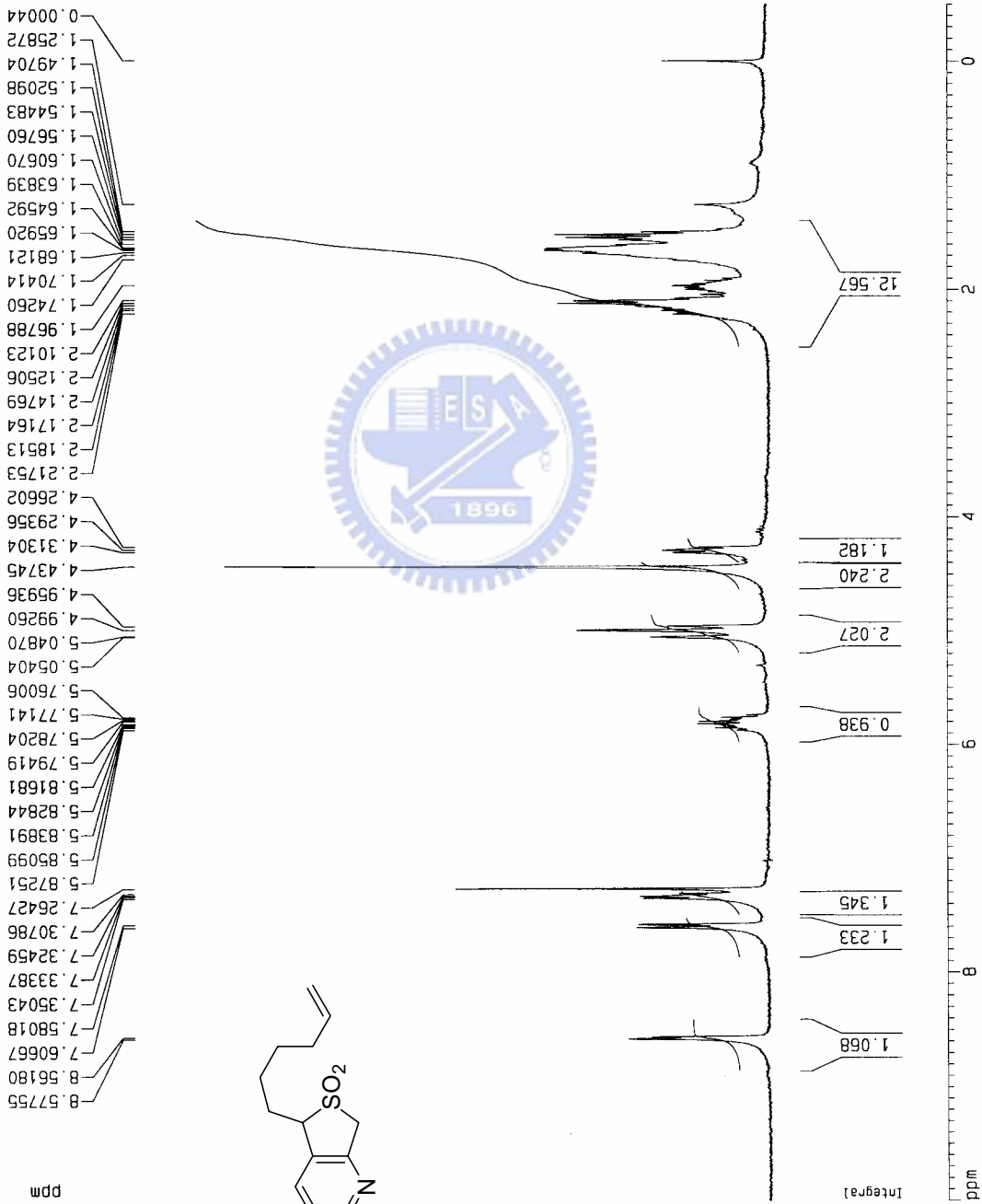
PULPROG  zg30
TD        32768
SOLVENT  CDCl3
NS        16
DS        0
SWH       7812.500 Hz
FIDRES    0.238419 Hz
AQ        2.0972021 sec
RG        724.1
DM        64.000 usec
DE        4.50 usec
TE        300.0 K
D1        1.00000000 sec

===== CHANNEL f1 =====
NUC1      1H
P1        9.10 usec
PL1       -4.00 dB
SF01      300.1321122 MHz

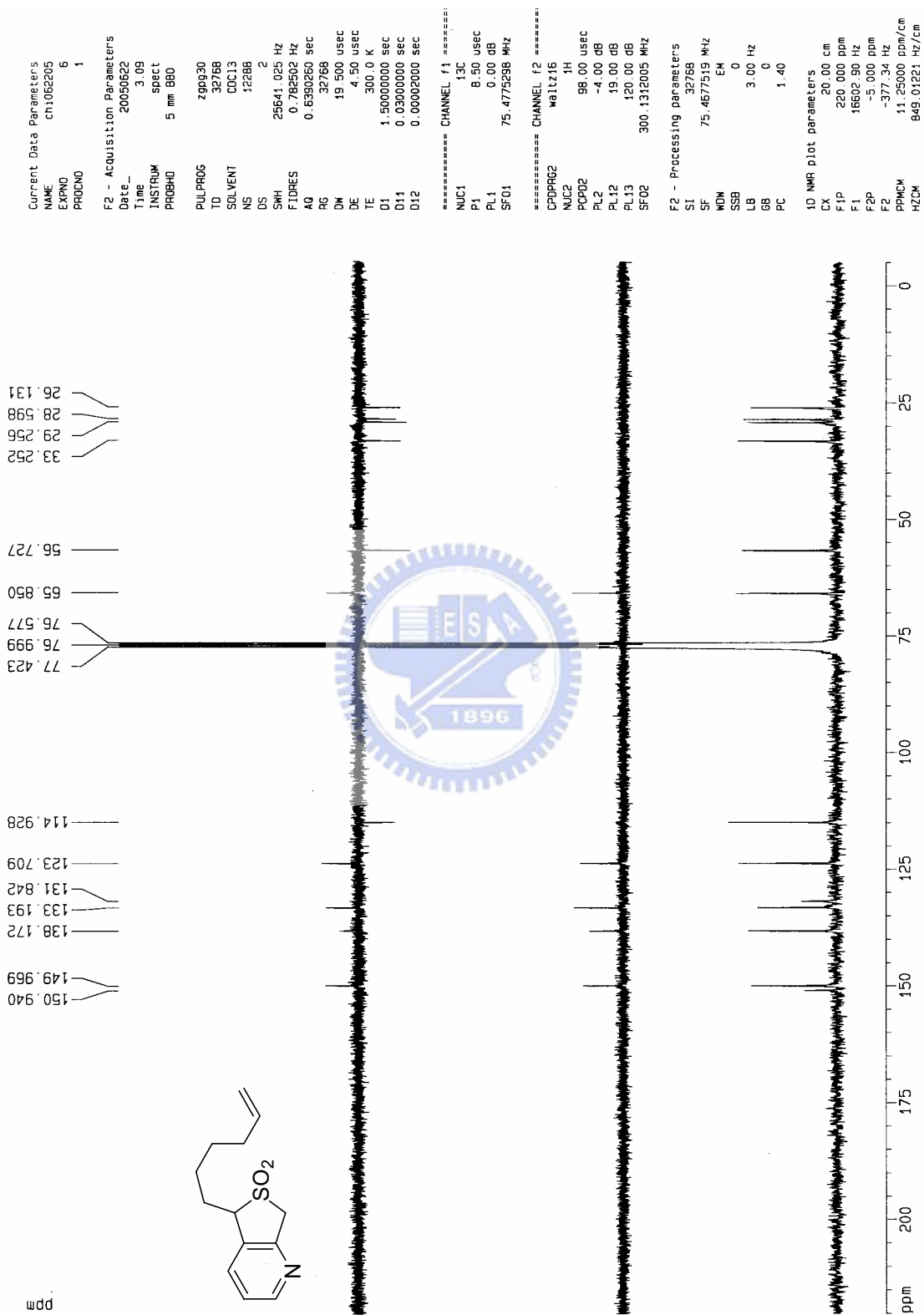
F2 - Processing parameters
SI        32768
SF        300.1300055 MHz
WDW       EM
SSB       0
LB        0.30 Hz
GB        0
PC        1.00

1D NMR plot parameters
CX        20.00 cm
F1P       10.000 ppm
F1        3001.30 Hz
F2P       -0.500 ppm
F2        -150.07 Hz
PPMCM     0.52500 ppm/cm
HZCM      157.56825 Hz/cm

```



附圖 158 化合物 167b 之 ¹H NMR 光譜圖



附圖 159 化合物 167b 之 ¹³C NMR 光譜圖

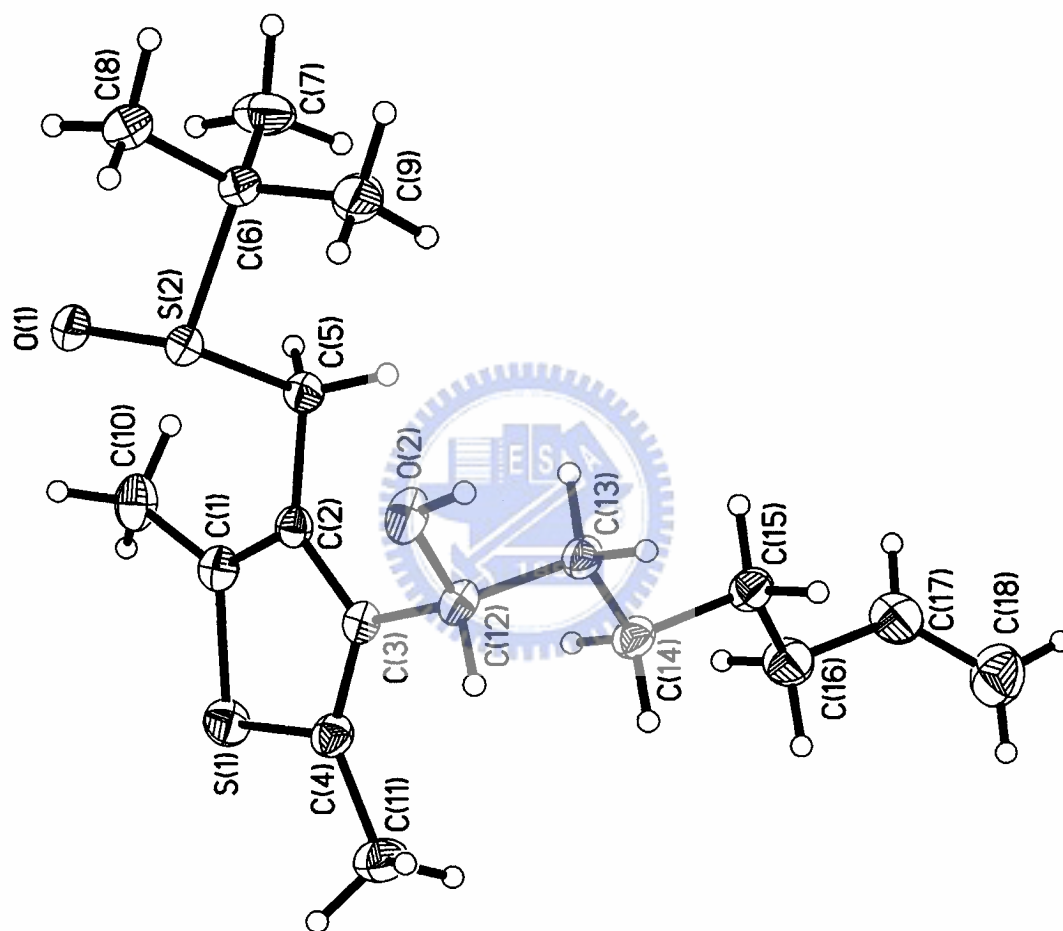


Fig. : The molecular structure of IC11027, thermal ellipsoids drawn at the 50% probability.

Table 1. Crystal data and structure refinement for ic11027.

| | |
|--|--|
| Identification code | ic11027 |
| Empirical formula | $C_{18}H_{30}O_2S_2$ |
| Formula weight | 342.54 |
| Diffractometer used | BRUKER SMART APEXCCD |
| Temperature | 150(1) K |
| Wavelength | 0.71073 Å |
| Crystal system | Triclinic |
| Space group | $P\bar{1}$ |
| Unit cell dimensions | $a = 11.6083(5)$ Å $\alpha = 93.345(1)^\circ$ $b = 11.8322(5)$ Å $\beta = 105.290(1)^\circ$ $c = 15.5154(6)$ Å $\gamma = 109.547(1)^\circ$ |
| Volume, Z | 1911.81(14) Å ³ , 4 |
| Density (calculated) | 1.190 Mg/m ³ |
| Absorption coefficient | 0.283 mm ⁻¹ |
| F(000) | 744 |
| Crystal size | 0.37 x 0.37 x 0.25 mm |
| θ range for data collection | 1.38 to 27.50° |
| Limiting indices | $-15 \leq h \leq 15$, $-15 \leq k \leq 15$, $-20 \leq l \leq 20$ |
| Reflections collected | 25522 |
| Independent reflections | 8769 ($R_{int} = 0.0379$) |
| Completeness to $\theta = 27.50^\circ$ | 99.9 % |
| Absorption correction | Semi-empirical from equivalents |
| Max. and min. transmission | 0.9325 and 0.9024 |
| Refinement method | Full-matrix least-squares on F^2 |
| Data / restraints / parameters | 8769 / 0 / 407 |
| Goodness-of-fit on F^2 | 1.020 |
| Final R indices [$I > 2\sigma(I)$] | $R1 = 0.0449$, $wR2 = 0.1063$ |
| R indices (all data) | $R1 = 0.0598$, $wR2 = 0.1141$ |
| Largest diff. peak and hole | 0.438 and -0.208 eÅ ⁻³ |

Table 2. Bond lengths [Å] and angles [°] for ic11027.

| | | | |
|-------------------|------------|-------------------|------------|
| S(1)-C(1) | 1.7228(18) | S(1)-C(4) | 1.7239(18) |
| S(2)-O(1) | 1.5066(13) | S(2)-C(5) | 1.8200(18) |
| S(2)-C(6) | 1.8483(18) | O(2)-C(12) | 1.426(2) |
| C(1)-C(2) | 1.362(2) | C(1)-C(10) | 1.497(2) |
| C(2)-C(3) | 1.442(2) | C(2)-C(5) | 1.499(2) |
| C(3)-C(4) | 1.362(2) | C(3)-C(12) | 1.510(2) |
| C(4)-C(11) | 1.502(3) | C(6)-C(7) | 1.518(3) |
| C(6)-C(9) | 1.526(3) | C(6)-C(8) | 1.529(3) |
| C(12)-C(13) | 1.531(2) | C(13)-C(14) | 1.523(2) |
| C(14)-C(15) | 1.523(2) | C(15)-C(16) | 1.531(3) |
| C(16)-C(17) | 1.481(3) | C(17)-C(18) | 1.311(3) |
| S(3)-C(19) | 1.7224(18) | S(3)-C(22) | 1.7263(19) |
| S(4)-O(3) | 1.5089(13) | S(4)-C(23) | 1.8160(17) |
| S(4)-C(24) | 1.8461(17) | O(4)-C(30) | 1.427(2) |
| C(19)-C(20) | 1.363(2) | C(19)-C(28) | 1.500(3) |
| C(20)-C(21) | 1.445(2) | C(20)-C(23) | 1.506(2) |
| C(21)-C(22) | 1.363(2) | C(21)-C(30) | 1.510(2) |
| C(22)-C(29) | 1.502(3) | C(24)-C(25) | 1.515(3) |
| C(24)-C(26) | 1.522(3) | C(24)-C(27) | 1.524(3) |
| C(30)-C(31) | 1.533(2) | C(31)-C(32) | 1.516(3) |
| C(32)-C(33) | 1.516(3) | C(33)-C(34) | 1.530(3) |
| C(34)-C(35) | 1.484(3) | C(35)-C(36) | 1.318(3) |
| <hr/> | | | |
| C(1)-S(1)-C(4) | 92.90(8) | O(1)-S(2)-C(5) | 104.36(8) |
| O(1)-S(2)-C(6) | 105.89(8) | C(5)-S(2)-C(6) | 100.56(8) |
| C(2)-C(1)-C(10) | 129.94(17) | C(2)-C(1)-S(1) | 110.58(13) |
| C(10)-C(1)-S(1) | 119.47(13) | C(1)-C(2)-C(3) | 113.10(15) |
| C(1)-C(2)-C(5) | 122.44(16) | C(3)-C(2)-C(5) | 124.44(15) |
| C(4)-C(3)-C(2) | 112.50(15) | C(4)-C(3)-C(12) | 122.91(16) |
| C(2)-C(3)-C(12) | 124.57(15) | C(3)-C(4)-C(11) | 129.85(17) |
| C(3)-C(4)-S(1) | 110.91(13) | C(11)-C(4)-S(1) | 119.23(13) |
| C(2)-C(5)-S(2) | 110.39(12) | C(7)-C(6)-C(9) | 112.95(17) |
| C(7)-C(6)-C(8) | 110.68(16) | C(9)-C(6)-C(8) | 110.25(17) |
| C(7)-C(6)-S(2) | 111.33(14) | C(9)-C(6)-S(2) | 107.64(13) |
| C(8)-C(6)-S(2) | 103.54(12) | O(2)-C(12)-C(3) | 106.95(13) |
| O(2)-C(12)-C(13) | 112.02(14) | C(3)-C(12)-C(13) | 112.71(14) |
| C(14)-C(13)-C(12) | 114.79(14) | C(15)-C(14)-C(13) | 113.36(14) |
| C(14)-C(15)-C(16) | 111.97(15) | C(17)-C(16)-C(15) | 114.27(16) |
| C(18)-C(17)-C(16) | 125.4(2) | C(19)-S(3)-C(22) | 92.70(9) |
| O(3)-S(4)-C(23) | 104.40(8) | O(3)-S(4)-C(24) | 105.52(8) |
| C(23)-S(4)-C(24) | 101.43(8) | C(20)-C(19)-C(28) | 129.79(17) |
| C(20)-C(19)-S(3) | 110.75(13) | C(28)-C(19)-S(3) | 119.46(13) |
| C(19)-C(20)-C(21) | 113.16(16) | C(19)-C(20)-C(23) | 122.87(16) |
| C(21)-C(20)-C(23) | 123.94(15) | C(22)-C(21)-C(20) | 112.17(16) |
| C(22)-C(21)-C(30) | 123.18(16) | C(20)-C(21)-C(30) | 124.64(15) |
| C(21)-C(22)-C(29) | 129.78(17) | C(21)-C(22)-S(3) | 111.21(14) |
| C(29)-C(22)-S(3) | 119.00(14) | C(20)-C(23)-S(4) | 109.36(11) |
| C(25)-C(24)-C(26) | 113.25(17) | C(25)-C(24)-C(27) | 110.38(16) |
| C(26)-C(24)-C(27) | 110.21(17) | C(25)-C(24)-S(4) | 111.39(13) |
| C(26)-C(24)-S(4) | 107.83(12) | C(27)-C(24)-S(4) | 103.29(12) |
| O(4)-C(30)-C(21) | 107.35(14) | O(4)-C(30)-C(31) | 111.63(14) |
| C(21)-C(30)-C(31) | 113.58(15) | C(32)-C(31)-C(30) | 115.13(15) |
| C(33)-C(32)-C(31) | 112.72(16) | C(32)-C(33)-C(34) | 113.19(17) |
| C(35)-C(34)-C(33) | 113.04(18) | C(36)-C(35)-C(34) | 125.0(2) |