

Enantioselective Total Synthesis of Lycopodine

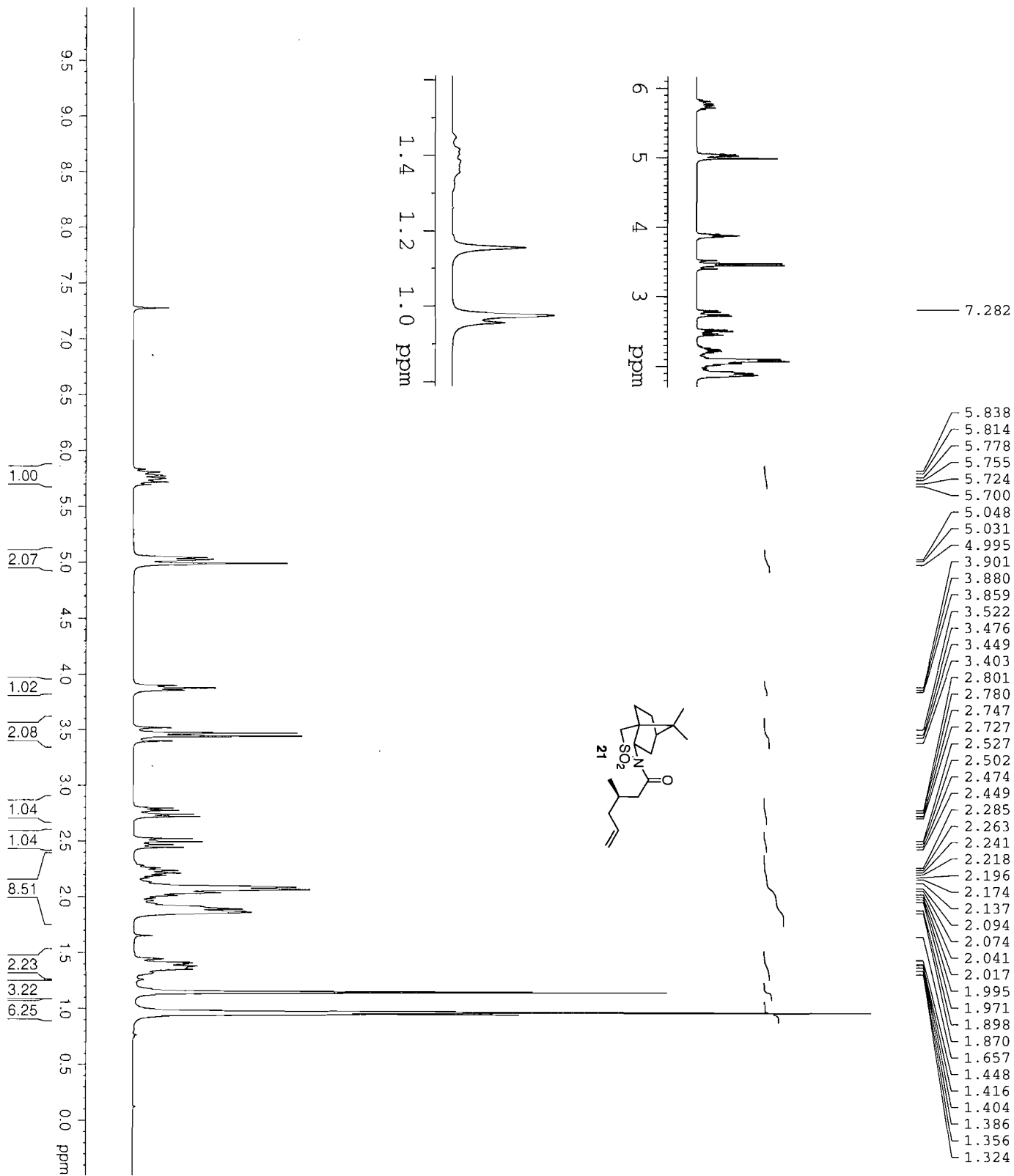
Hua Yang and Rich G. Carter* and Lev N. Zakharov

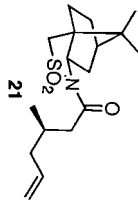
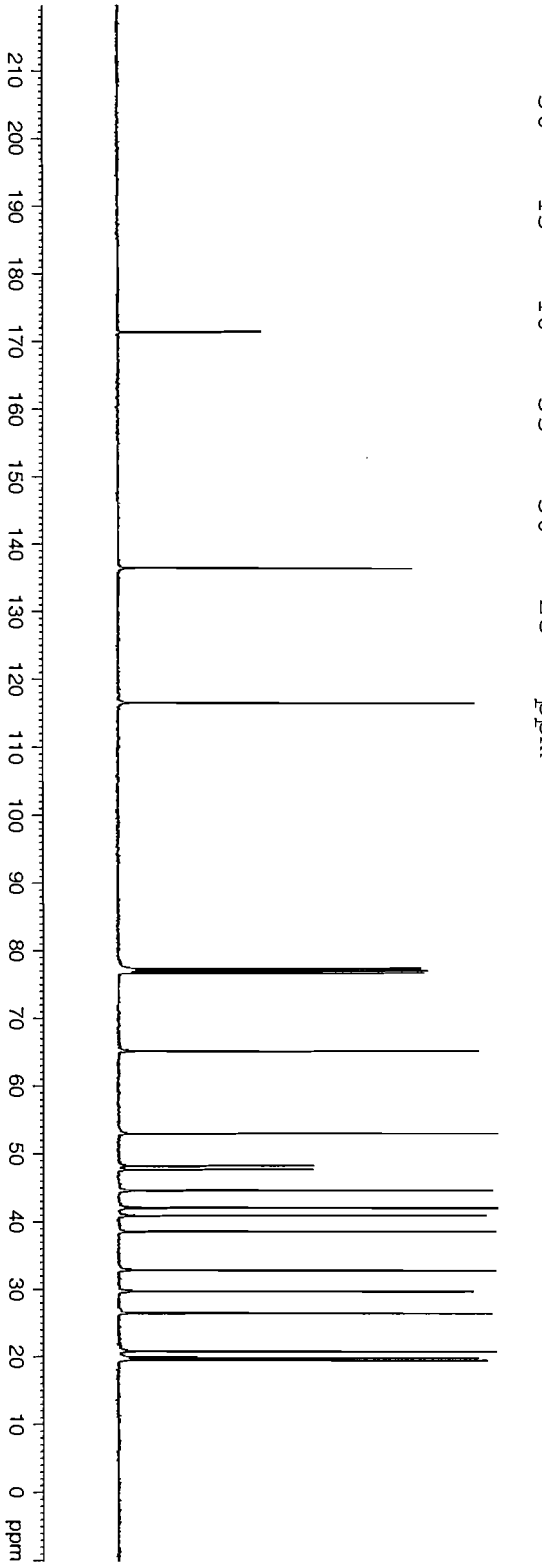
Department of Chemistry, Oregon State University, Corvallis, OR 97331.

Electronic Supplementary Information: Spectral Data

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171.41
136.48
116.59
77.41
77.10
76.78
65.21
53.03
48.30
47.73
44.66
42.09
40.92
38.58
32.83
29.69
26.47
20.81
19.90
19.55

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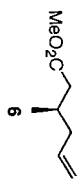
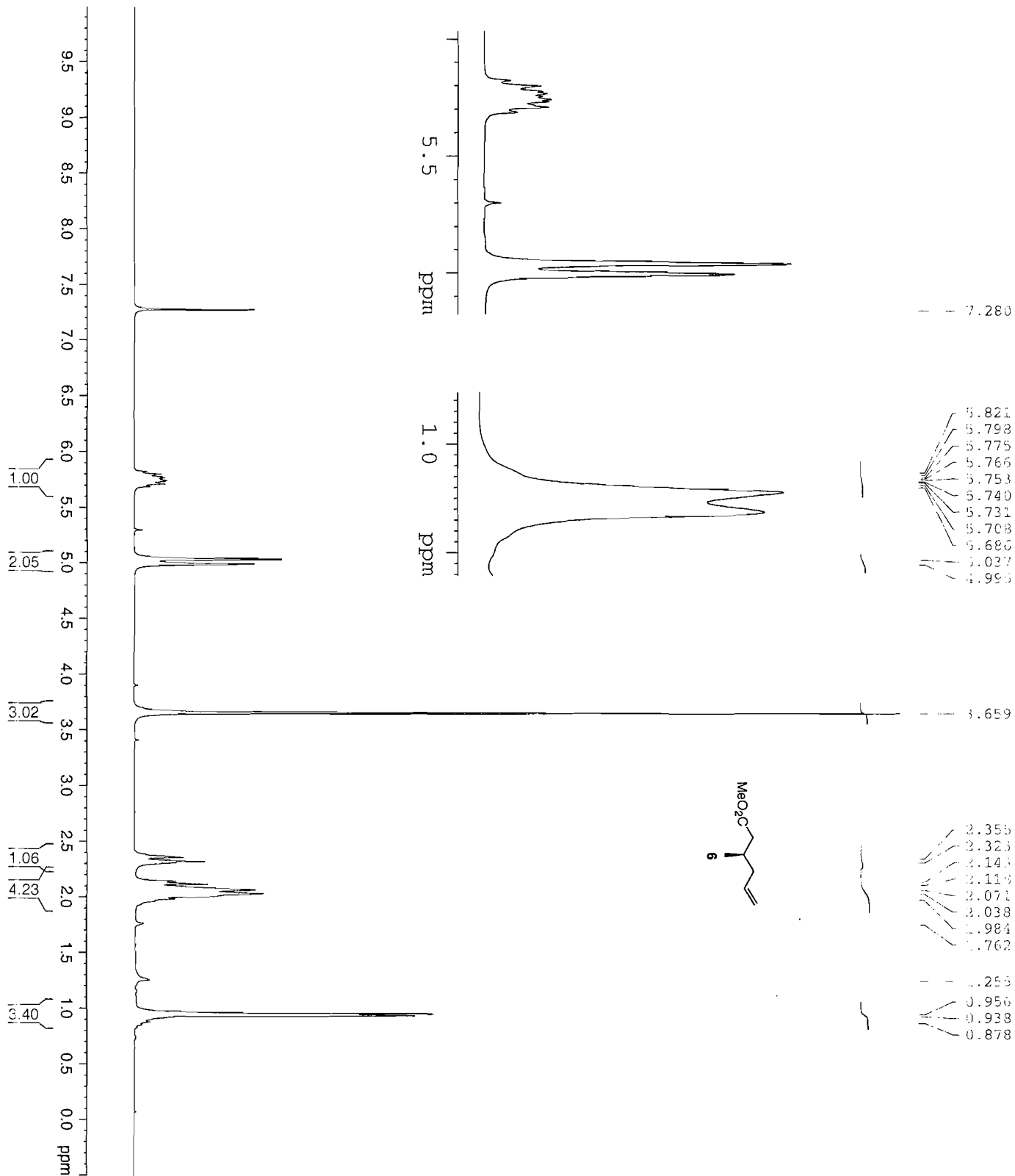
Current Data Parameters
NAME          HY4-33
EXPNO        2
PROCNO       1
DU           /n
USER         yang

F2 - Acquisition Parameters
Date_        20071004
Time         17.17
INSTRUM     DPX400
PROBHD      5 mm BBO BB-1H
PULPROG     zgpg30
TD          65536
SOLVENT     NS
NS          2546
DS          4
SWH         25125.629 Hz
FIDRES      0.383387 Hz
AQ          1.3042164 sec
RG          2896.3
DM          19.900 usec
DE          298.2 K
TE          0.15000001 sec
D1          0.03000000 sec
d11         0.03000000 sec
DELTA       0.05000000 sec
TD0         1

===== CHANNEL f1 =====
NUC1        13C
P1          7.80 usec
PL1         -3.00 dB
SFO1        100.5936591 MHz

===== CHANNEL f2 =====
CPDPRG2     waltz16
NUC2        1H
PCPD2       135.00 usec
PL2         17.40 dB
PL12        17.40 dB
PL13        17.40 dB
SFO2        400.0116000 MHz

F2 - Processing parameters
SI          32768
SF          100.5825950 MHz
WDW         EM
SSB         0
LB          3.00 Hz
GB          0
PC          1.40
  
```



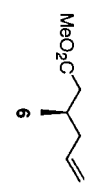
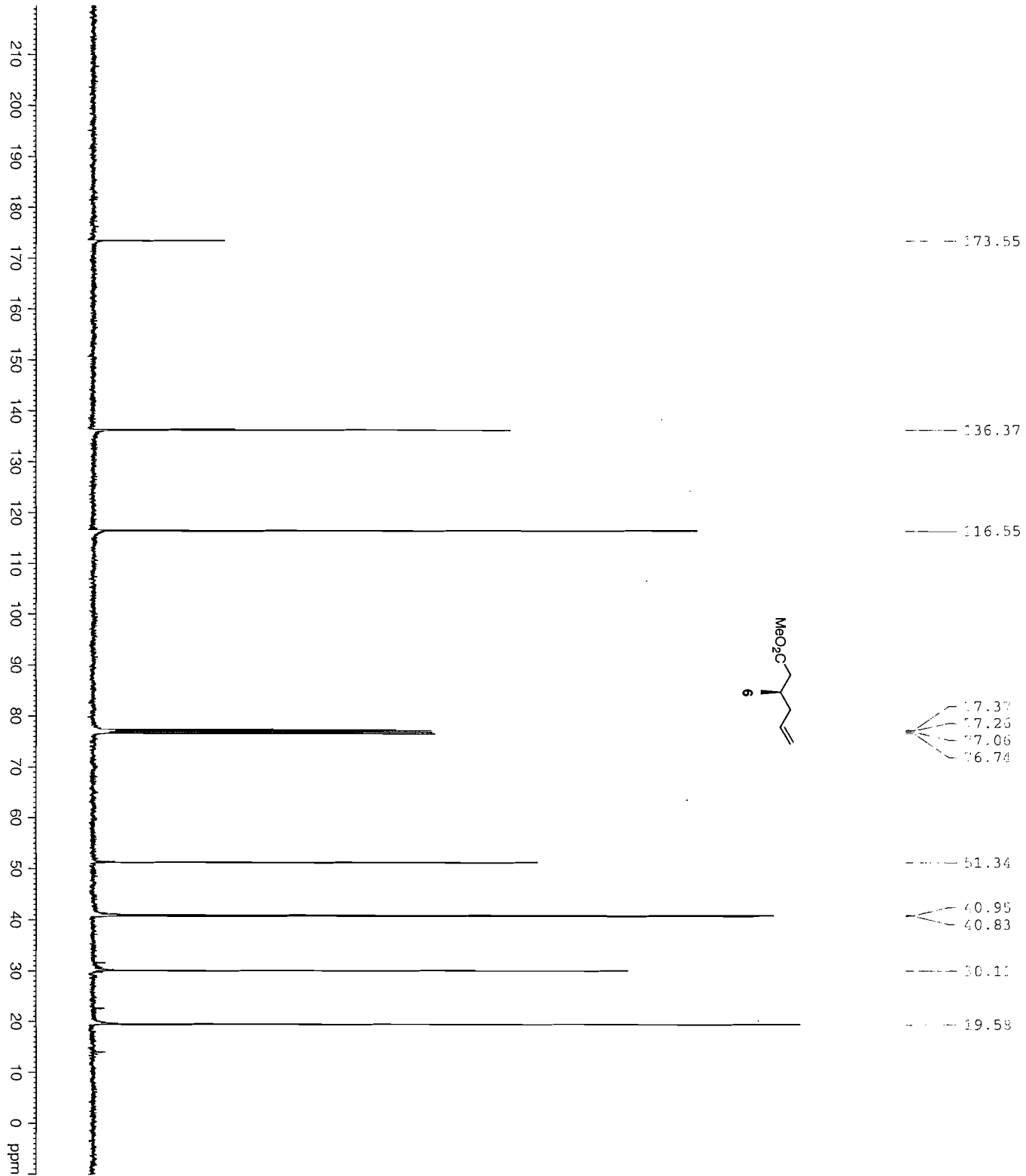
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Current Data Parameters
NAME      HY4-75-ester
EXPNO     1
PROCNO    1
PR        /n
USER      Yang

F2 - Acquisition Parameters
Date_     z060616
Time      20:45
INSTRUM   DPX100
PROBHD    5 mm QNP 1H/1
PULPROG   zg30
TD         32768
SOLVENT   CDCl3
NS         19
DS         1
SWH        4789.272 Hz
FIDRES     0.146157 Hz
AQ         3.4210251 sec
RG         57
RG         104.400 usec
DE         6.00 usec
TE         298.2 K
D1         2.00000000 sec
TD0        1

===== CHANNEL f1 =====
NUC1       1H
P1         9.00 usec
PL1        -3.00 dB
SFO1       300.1321009 MHz

F2 - Processing parameters
SI         32768
SF         300.1300000 MHz
WDW        EM
SSB        0
LB         0.30 Hz
GB         0
PC         1.00
  
```



173.55
 136.37
 116.55
 67.37
 67.26
 67.06
 66.74
 51.34
 40.95
 40.83
 30.11
 19.58

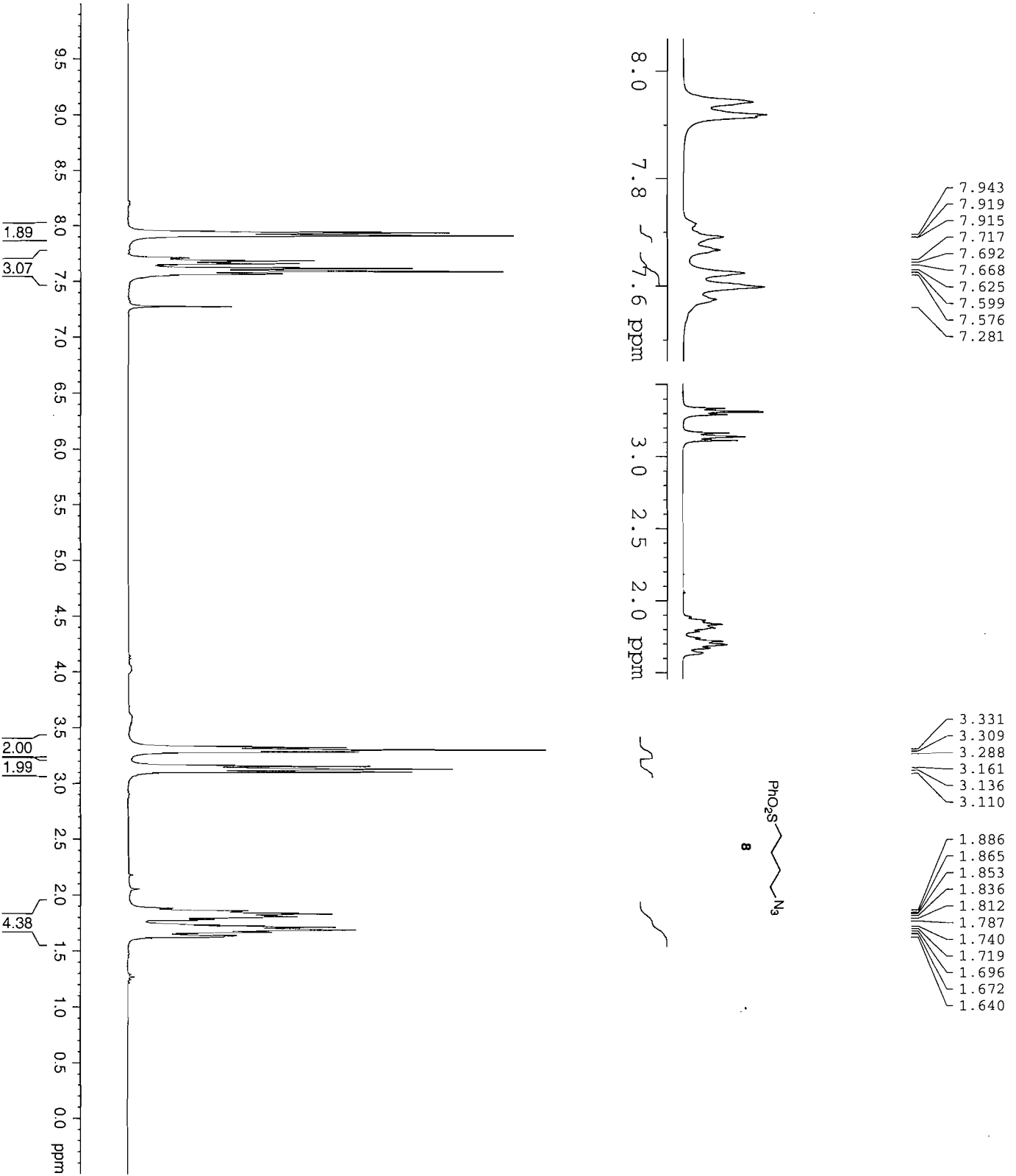
Current Data Parameters
 NAME HY4-79ester
 EXPNO 2
 PROCNO 1
 DU /n
 USER yang

Acquisition Parameters
 Date_ 20080116
 Time 02:13
 INSTRUM DPX400
 PROBD 5 mm BBO BB-1H
 PULPROG zgpg30
 TD 65536
 SOLVENT CDCl3
 NS 1009
 DS 4
 SSB 25125.639 Hz
 HYDRS 0.381987 Hz
 AQ 1.3042164 sec
 RG 2896.3
 DW 19.900 usec
 DE 6.00 usec
 TE 298.2 K
 D1 0.1500001 sec
 d11 0.0300000 sec
 DELTA 0.0500000 sec
 TDO 1

===== CHANNEL F1 =====
 NUC1 13C
 P1 7.80 usec
 PL1 -3.00 dB
 SF01 100.5936591 MHz

===== CHANNEL F2 =====
 CPDPRG2 waltz16
 NUC2 1H
 PCPD2 135.00 usec
 PL2 17.40 dB
 PL12 17.40 dB
 PL13 17.40 dB
 SF02 400.0116000 MHz

F2 - Processing parameters
 SI 32768
 SF 100.5825950 MHz
 WDW EM
 SSB 0
 LB 3.00 Hz
 GB 0
 PC 1.40



7.943
7.919
7.915
7.717
7.692
7.668
7.625
7.599
7.576
7.281

3.331
3.309
3.288
3.161
3.136
3.110

1.886
1.865
1.853
1.836
1.812
1.787
1.740
1.719
1.696
1.672
1.640

Current Data Parameters
 NAME sulphoneazide
 EXPNO 1
 PROCNO /n
 DU /n
 USER yang

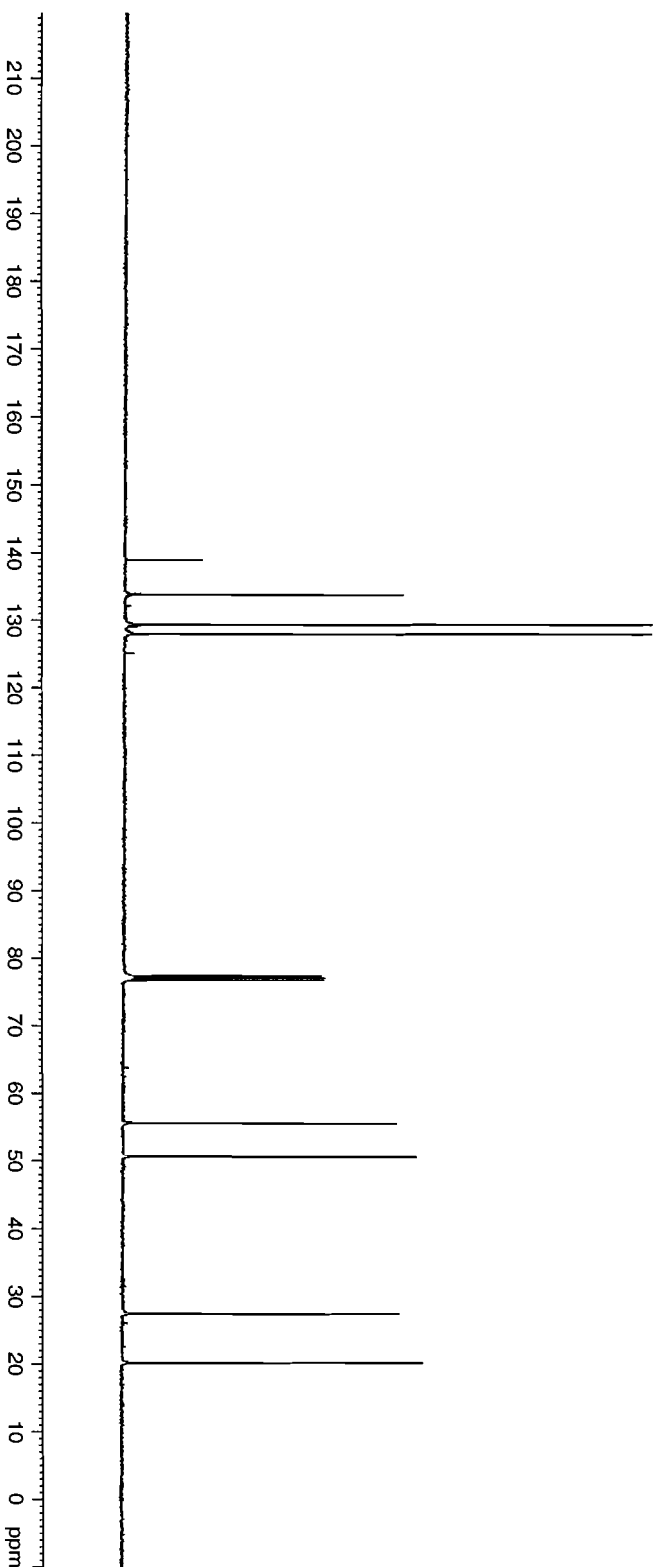
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 Time 20.08
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 PROBHD 5 mm QNP 1H/1
 PULPROG zg30
 TD 32768
 SOLVENT CDCl3
 NS 7
 DS 2

SWH 4789.272 Hz
 FIDRES 0.146157 Hz
 AQ 3.4210291 sec
 RG 322.5
 DW 104.400 usec
 DE 6.00 usec
 TE 298.2 K
 D1 2.00000000 sec
 TDO 1

===== CHANNEL f1 =====
 NUC1 1H
 P1 9.00 usec
 PL -3.00 dB
 SF01 300.1321009 MHz

F2 - Processing parameters
 SI 300.1300000 MHz
 SF 32768
 WDW EM
 SSB 0
 LB 0.30 Hz
 GB 0
 PC 1.00

138.94
 133.85
 129.39
 128.03
 77.43
 77.12
 76.80
 55.61
 50.71
 27.52
 20.23



Current Data Parameters
 NAME HYS-5
 EXPNO 2
 PROCNO 1
 DU /n
 DDFR yang

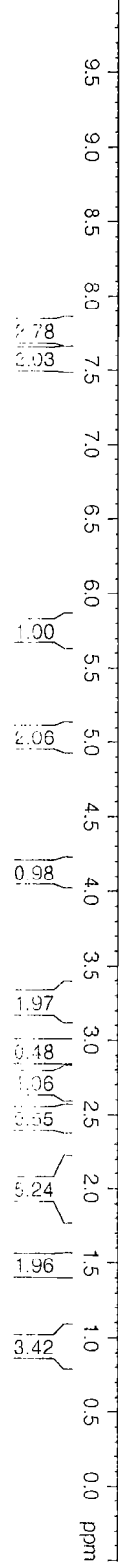
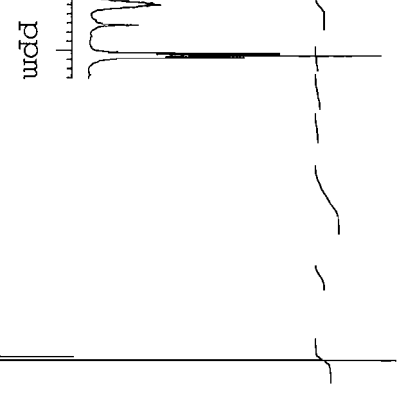
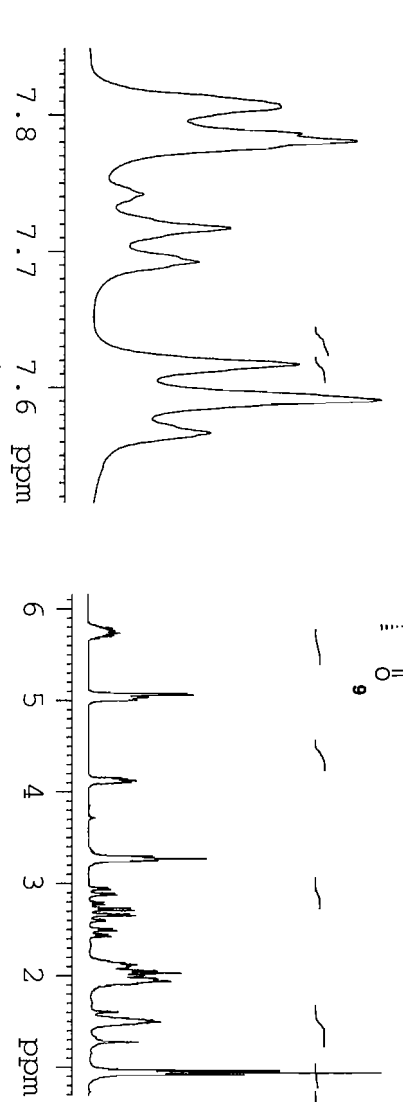
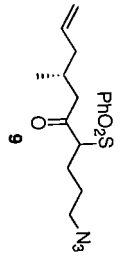
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 Time 21.52
 INSTRUM DPX400
 PROBHD 5 mm BBO BB-1H
 PULPROG zgpg30
 TD 65536
 SOLVENT CDCl3
 NS 1225
 DS 4
 SMH 25125.629 Hz
 FIDRES 0.383387 Hz
 AQ 1.3042164 sec
 RG 2298.8
 DW 19.900 usec
 DE 6.00 usec
 TE 298.2 K
 D1 0.15000001 sec
 D11 0.03000000 sec
 DELTA 0.05000000 sec
 TDO 1

==== CHANNEL f1 =====
 NUC1 13C
 P1 7.80 usec
 PL1 -3.00 dB
 SFO1 100.5785700 MHz

==== CHANNEL f2 =====
 CPDPRG2 waltz16
 NUC2 1H
 PCPD2 135.00 usec
 PL2 17.40 dB
 PL12 17.40 dB
 PL13 17.40 dB
 SFO2 399.9516000 MHz

F2 - Processing parameters
 SI 32768
 SF 100.5675080 MHz
 WDW EM
 SSB 0
 LB 3.00 Hz
 GB 0
 PC 1.40

7.806
7.787
7.782
7.742
7.717
7.693
7.617
7.591
7.567
7.281
7.790
5.767
5.755
5.736
5.713
5.700
5.074
5.064
5.038
5.012
5.007
4.151
4.141
4.135
4.121
4.111
4.103
4.093
3.292
3.270
3.249
2.952
2.935
2.891
2.873
2.770
2.735
2.708
2.667
2.651
2.606
2.589
2.508
2.485
2.447
2.423
2.156
2.133
2.116
2.097
2.084
2.050
2.026
2.003
1.990
1.962
1.950
1.938
1.884
1.602
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1.514
1.495
1.484
1.473
1.462
1.273
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0.941
0.918

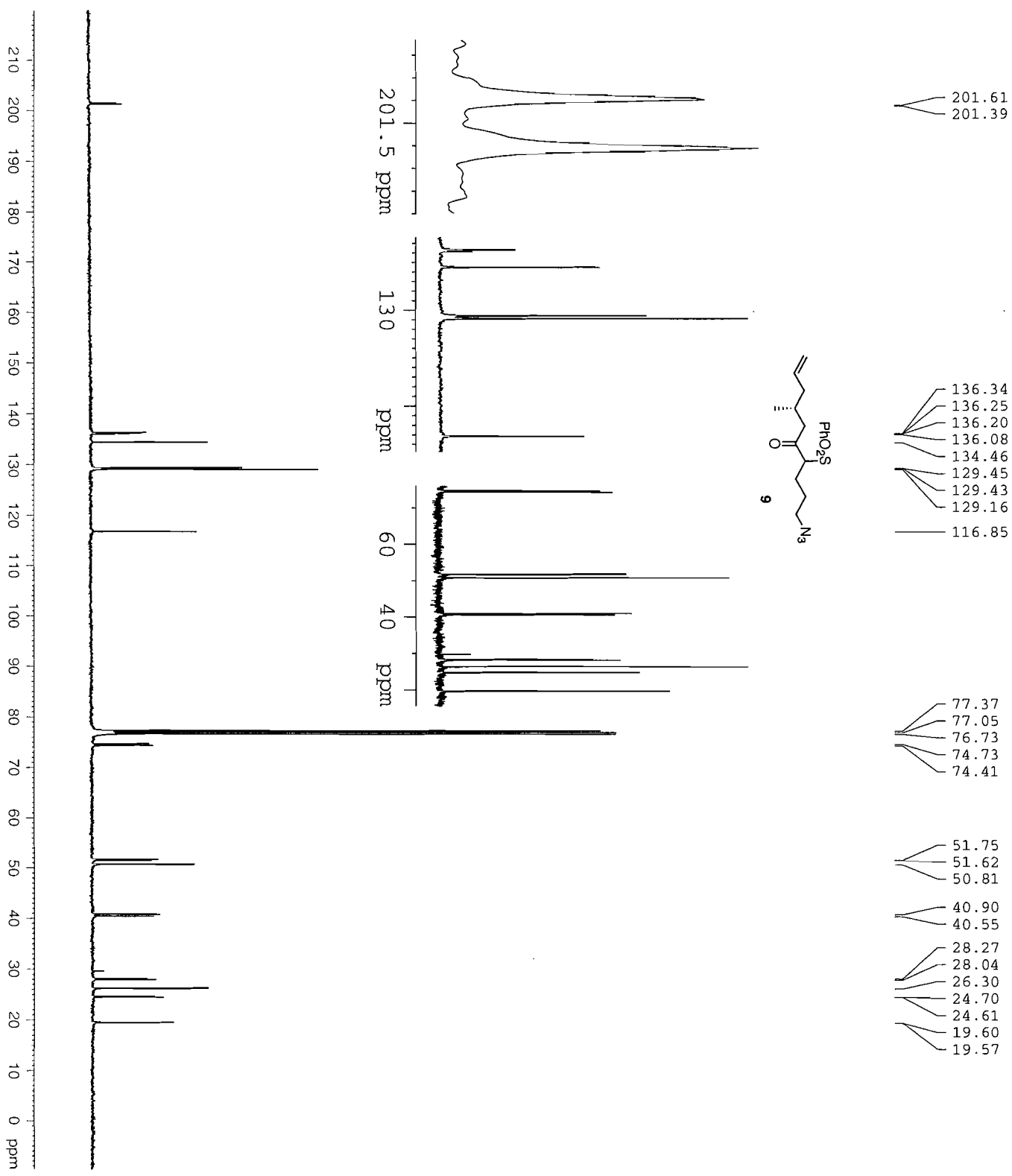


Current Data Parameters
 NAME HX3-282nd
 EXPNO 1
 PROCNO 1
 DU /n
 USER Yang

F2 - Acquisition Parameters
 Date_ 20070423
 Time 17.39
 INSTRUM DFX300
 PROBHD 5 mm QNP 1H/1
 PULPROG zg30
 TD 32768
 SOLVENT CDCl3
 NS 32
 DS 2
 SWH 4789.272 Hz
 FIDRES 0.146157 Hz
 AQ 3.4210291 sec
 RG 104.4256
 DW 6.00 usec
 DE 298.2 K
 TE 298.2 K
 D1 2.00000000 sec
 TDO 1

==== CHANNEL f1 =====
 NUCL1 1H
 P1 9.00 usec
 PL1 -3.00 dB
 SFO1 300.1321009 MHz

F2 - Processing parameters
 SI 300.1300000 MHz
 SF 32768
 EM 0
 MWDW 0
 SSB 0.30 Hz
 LB 0
 GB 0
 PC 1.00



```

Current Data Parameters
NAME          HY3-28P
EXPNO        3
PROCNO       1
DU           /n
USER         yang

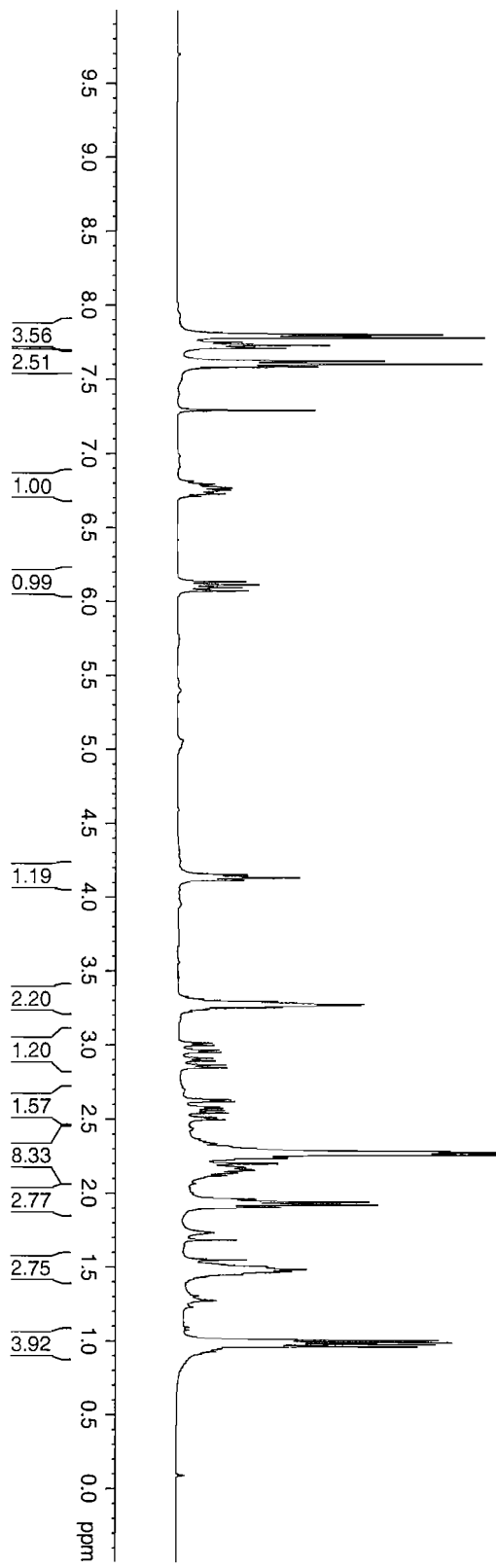
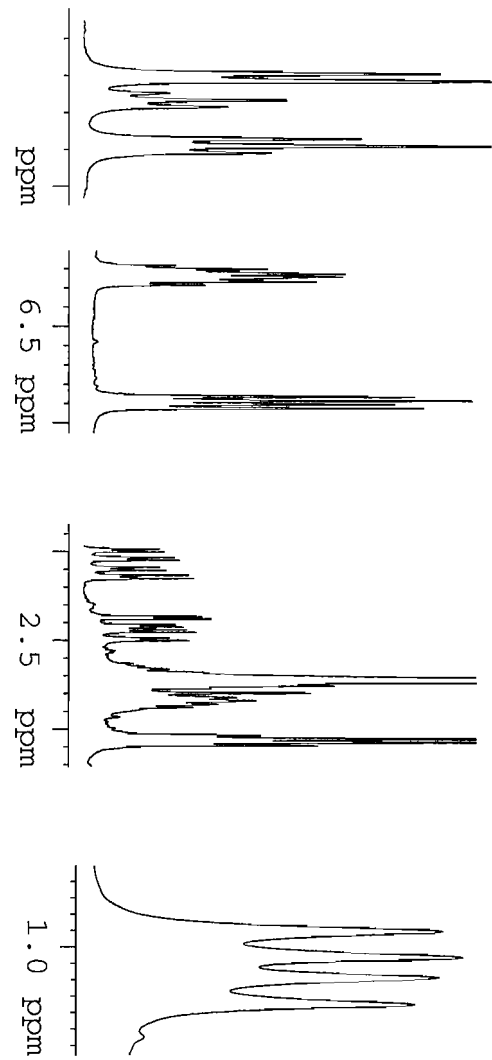
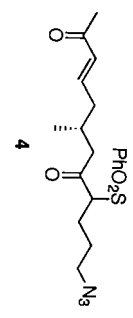
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Date_        20070423
Time         22.23
INSTRUM     DPK400
PROBHD      5 mm BBO BB-1H
PULPROG     zgpg30
TD          65536
SOLVENT     NS
DS          4
SWH         25125.629 Hz
FIDRES     0.383387 Hz
AQ         1.3042164 sec
RG         4597.6
DM         19.900 usec
DE         6.00 usec
TE         298.2 K
D1         0.1500001 sec
d11        0.0300000 sec
DELTA      0.0500000 sec
TD0        1

===== CHANNEL f1 =====
NUC1       13C
P1         7.80 usec
PL1        -3.00 dB
SFO1       100.593591 MHz

===== CHANNEL f2 =====
CPDPRG2    waltz16
NUC2       1H
PCPD2      135.00 usec
PL2        17.40 dB
PL12       17.40 dB
PL13       17.40 dB
SFO2       400.011600 MHz

F2 - Processing parameters
SI         32768
SF         100.5825950 MHz
WDW        EM
SSB        0
LB         3.00 Hz
GB         0
PC         1.40
  
```

7.806
7.787
7.753
7.734
7.715
7.629
7.609
7.590
7.295
6.798
6.789
6.771
6.758
6.740
6.731
6.137
6.117
6.098
6.077
4.153
4.135
4.120
3.311
3.296
3.280
3.272
3.256
3.241
3.014
2.999
2.967
2.952
2.913
2.895
2.866
2.848
2.633
2.621
2.587
2.575
2.561
2.545
2.514
2.498
2.353
2.337
2.284
2.270
2.244
2.202
2.177
2.159
2.139
2.122
1.963
1.945
1.927
1.907
1.736
1.686
1.552
1.489
1.472
1.275
1.010
0.994
0.982
0.965
0.945
0.929



Current Data Parameters
 NAME H14-80
 EXPNO 4
 PROCNO 1
 DU /n
 USER Yang

F2 - Acquisition Parameters
 Date_ 2008011/
 Time 21.41
 INSTRUM DEX400
 PROBHD 5 mm BBO BB-1H
 PULPROG zg30
 TD 32768
 SOLVENT CDCl3
 NS 32
 DS 2
 SWH 6410.256 Hz
 FIDRES 0.195625 Hz
 AQ 2.559549 sec
 RG 128
 TM 78.000 usec
 DE 6.00 usec
 TE 298.2 K
 D1 2.0000000 sec
 TDO 1

==== CHANNEL f1 =====
 NUCL1 1H
 P1 14.70 usec
 PL1 0.00 dB
 SFO1 400.0128001 MHz

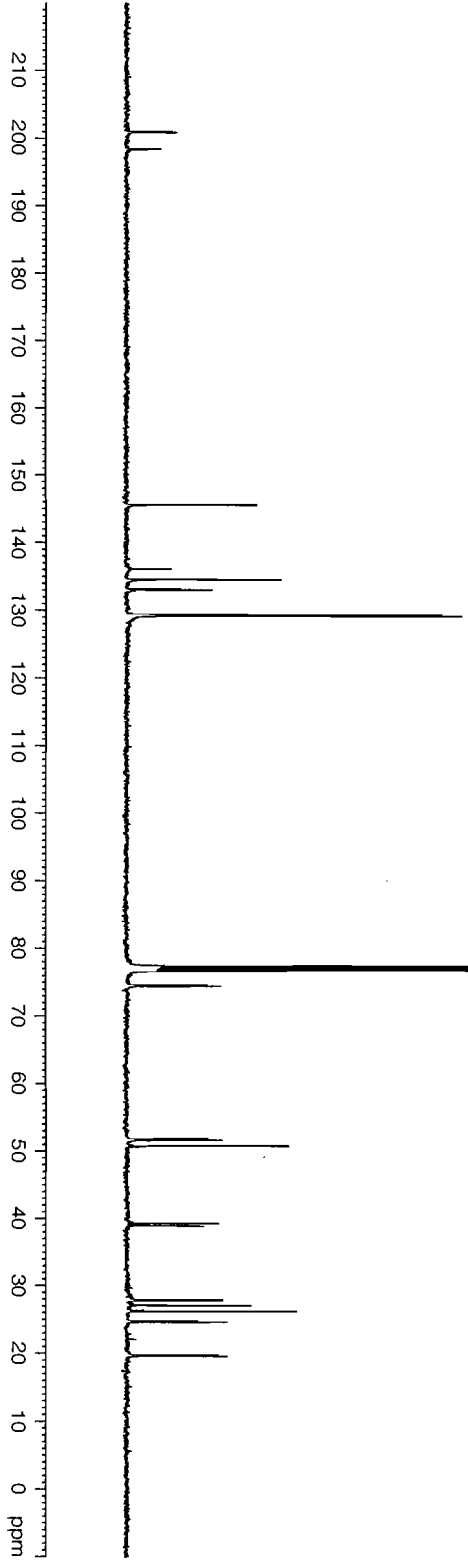
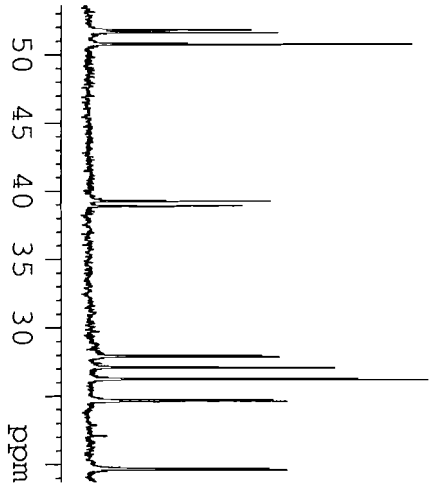
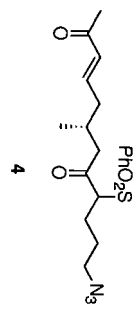
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 SI 32768
 SF 400.0100000 MHz
 EM 0
 WDW SSB
 LB 0
 GB 0
 PC 1.00

201.01
200.88
198.47
198.38

145.57
136.13
136.08
134.56
133.08
133.01
129.36
129.24

77.39
77.07
76.76
74.62
74.48

51.82
51.62
50.78
39.26
38.90
27.91
27.85
27.07
26.25
24.72
24.65
19.73
19.65



```

Current Data Parameters
NAME          HY4-80
EXPNO         5
PROCNO       1
DU            /n
USR          Yang

F2 - Acquisition Parameters
Date_        20080117
Time         22.57
INSTRUM     DPX400
PROBHD      5 mm BBO-BB-1H
PULPROG     zgpg30
TD           65536
SOLVENT     2771
NS           4
DS           4
SWH          25125.629 Hz
FIDRES       0.383387 Hz
AQ           1.3042164 sec
RG           1.3042164
RG           6502
DE           19.900 usec
TE           298.2 K
D1           6.00 usec
d11          0.15000001 sec
d12          0.02000000 sec
DELTPIA     0.03000000 sec
TD0          1

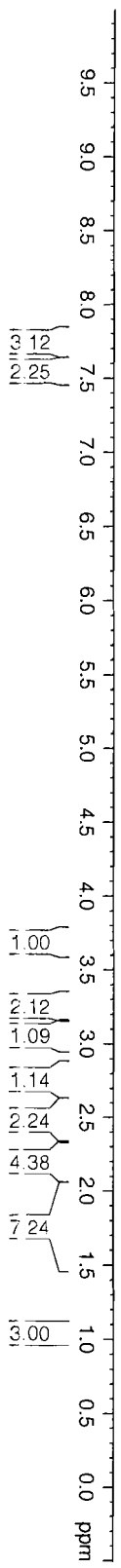
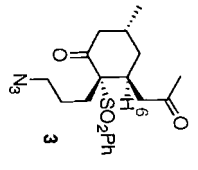
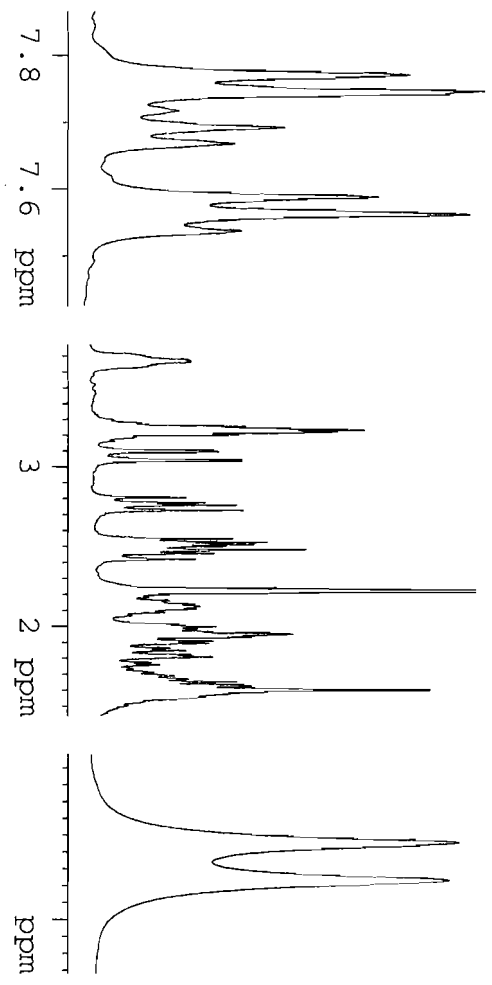
===== CHANNEL f1 =====
NUC1         13C
P1           13.00 usec
PL1          -3.00 dB
SFO1         100.593591 MHz

===== CHANNEL f2 =====
CPDPRG2     waltz16
NUC2         1H
PCPD2       135.00 usec
PL2         17.40 dB
PL12        17.40 dB
PL13        17.40 dB
SFO2         400.0116000 MHz

F2 - Processing parameters
SI           32768
SF           100.5825950 MHz
WDW          EM
SSB          0
LB           3.00 Hz
GB           0
PC           1.40
  
```

7.772
7.747
7.718
7.693
7.668
7.582
7.533
7.28

3.660
3.257
3.237
3.225
3.204
3.093
3.045
2.863
2.775
2.760
2.729
2.550
2.529
2.515
2.502
2.480
2.453
2.421
2.224
2.184
2.162
2.141
2.127
2.119
2.089
2.071
2.060
1.993
1.968
1.950
1.935
1.909
1.889
1.864
1.839
1.774
1.760
1.690
1.670

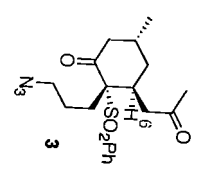
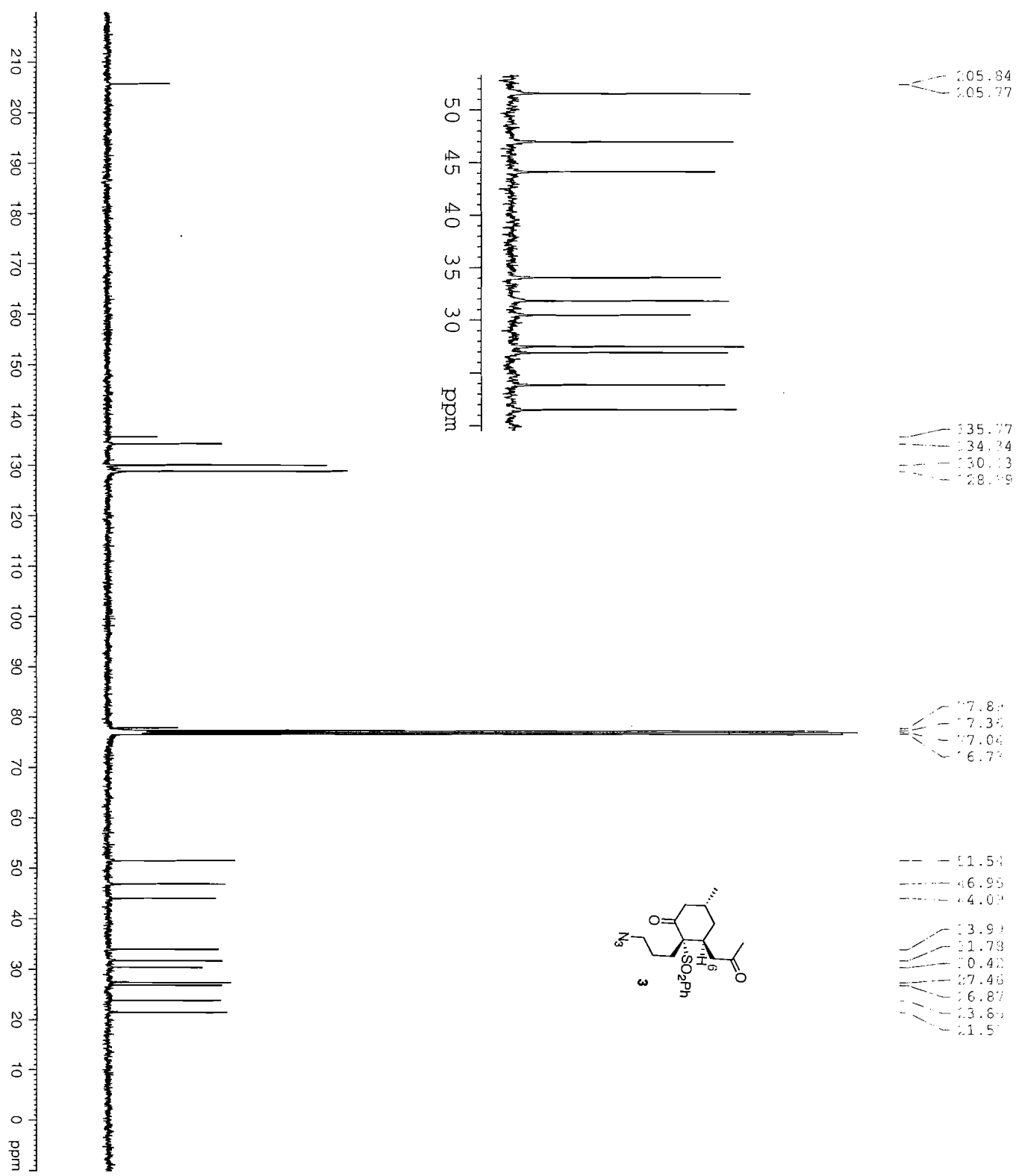


```

Current Data Parameters
NAME      h1-21
EXPNO     7
PROCNO    1
INSTRUM   Yang
PULPROG   zgpg
TD        65536
SOLVENT   CDCl3
NS        32
DS        2
SWH        4789.272 Hz
FIDRES     0.146157 Hz
AQ         3.4210291 sec
RG         322.5
DM         104.400 usec
DE         6.00 usec
TE         298.2 K
D1         2.00000000 sec
TD0        1

===== CHANNEL f1 =====
NUC1       1H
P1         9.00 usec
PL1        -3.00 dB
SFO1       300.1321009 MHz

F2 - Processing parameters
SI         32768
SF         300.1300000 MHz
WDW        EM
SSB        0
LB         0.30 Hz
GB         0
PC         1.00
  
```



7.05.84
7.05.77

5.35.77
5.34.74
5.30.13
5.28.98

4.7.84
4.7.35
4.7.04
4.6.77

3.1.54
3.6.95
3.4.04

2.3.94
2.1.78
2.0.43
2.7.46
2.6.87
2.3.84
2.1.54

Current Data Parameters
 NAME HY4-81
 EXNO 6
 EXPNO 1
 DU /h
 USER yang

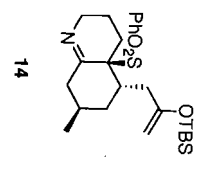
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 Time 11:02
 INSTRUM DPX400
 PROBD 5 mm BBO BB-1H
 PULPROG zgpg30
 TD 49936
 SOLVENT 45536
 NS 2299
 DS 4
 SWH 25125.629 HZ
 FIDRES 0.232357 HZ
 AQ 1.3042164 sec
 RG 1824.6
 DW 19.900 usec
 DE 6.00 usec
 TE 298.2 K
 D1 0.1500001 sec
 d11 0.0300000 sec
 DELTA 0.0500000 sec
 TD0 1

===== CHANNEL f1 =====
 NUC1 13C
 P1 7.80 usec
 PL1 -3.00 dB
 SFO1 100.5936591 MHz

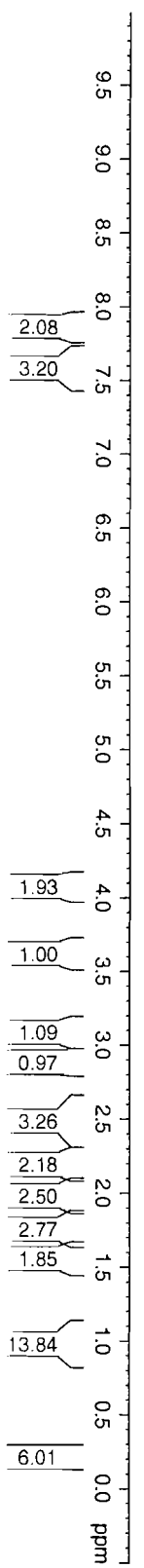
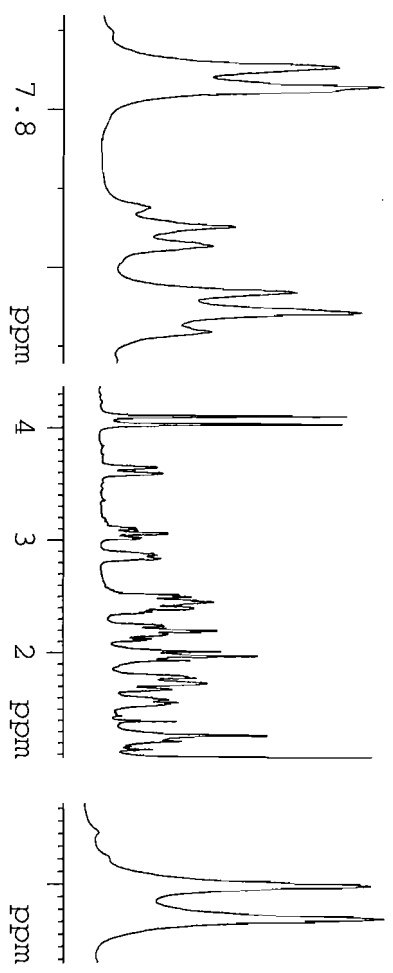
===== CHANNEL f2 =====
 CPDPRG2 waltz16
 NUC2 1H
 FCPD2 135.00 usec
 PL2 17.40 dB
 PL12 17.40 dB
 PL13 17.40 dB
 SFO2 400.0116000 MHz

F2 - Processing Parameters
 SI 32768
 SF 100.5825950 MHz
 WDW EM
 SSB 0
 LB 3.00 HZ
 GB 0
 PC 1.40

7.853
7.820
7.675
7.627
7.563
7.541
7.513
7.280



4.103
4.032
3.651
3.599
3.103
3.072
3.029
2.874
2.845
2.502
2.456
2.405
2.238
2.201
2.167
2.123
2.109
2.015
1.971
1.932
1.775
1.725
1.674
1.583
1.556
1.392
1.265
1.213
1.141
1.064
1.042
1.000
0.962
0.923
0.241



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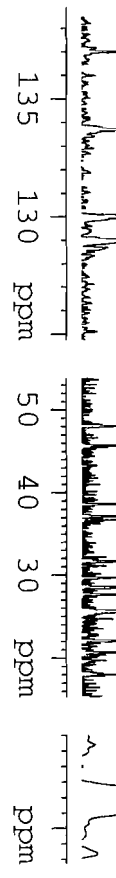
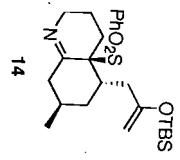
Current Data Parameters
NAME      H14-63
EXPNO     1
PROCNO    1
PI        1
USER      Yang

F2 - Acquisition Parameters
Date_     20061122
Time      11:23
INSTRUM   DPX300
PROBHD    1H/1
PULPROG   zg30
TD         32768
SOLVENT   CDCl3
NS         32
DS         2
SMH        4789.272 Hz
FIDRES     0.146157 Hz
AQ         3.4110291 sec
RG         101.016
DM         104.400 usec
DE         6.00 usec
TE         298.2 K
D1         2.00000000 sec
TD0        1

===== CHANNEL f1 =====
NUC1       1H
P1         9.00 usec
PL1        -3.00 dB
SFO1       300.1321009 MHz

F2 - Processing parameters
SI         32768
SF         300.1300000 MHz
WDW        EM
SSB        0
GB         0.30 Hz
PC         1.00
  
```

165.38	156.13	136.39	133.70	129.89	128.97	128.65	91.95	77.46	77.04	66.64	69.42	48.04	45.67	38.62	37.11	1.67	19.69	18.55	17.63	15.63	12.10	10.71	8.00	4.78	4.83
--------	--------	--------	--------	--------	--------	--------	-------	-------	-------	-------	-------	-------	-------	-------	-------	------	-------	-------	-------	-------	-------	-------	------	------	------

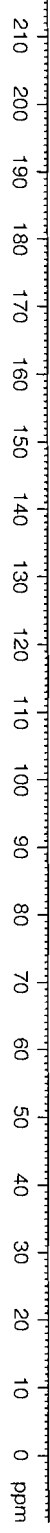


```

===== CHANNEL F1 =====
NUC1      13C
P1         8.80 usec
PL1        -3.00 dB
SFO1      75.4760505 MHz

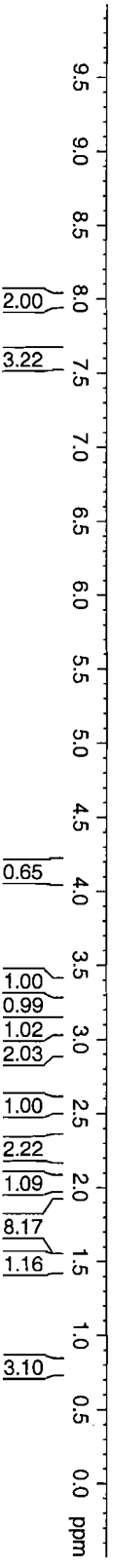
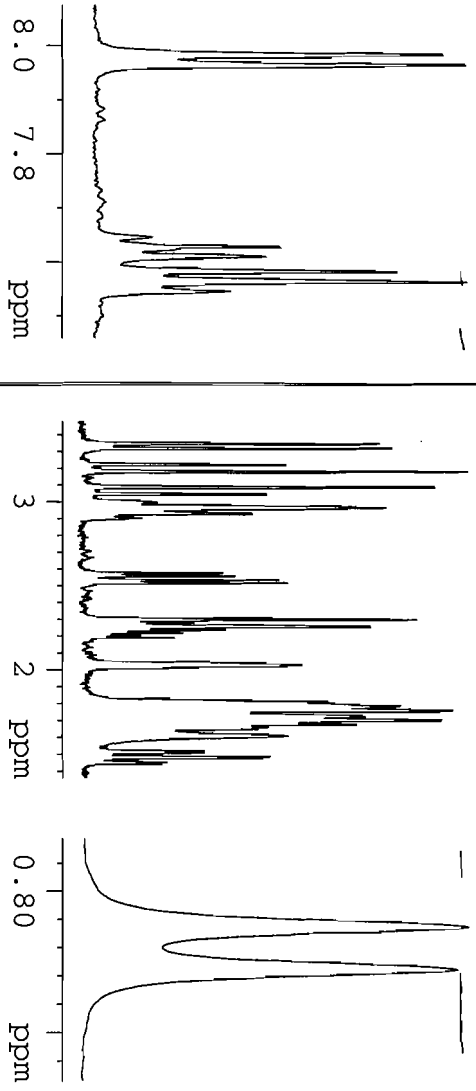
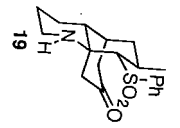
===== CHANNEL F2 =====
CPDPRG2   waltz16
NUC2      1H
RCPD2     60.00 usec
PL2       -3.00 dB
PLI2      17.55 dB
PLI3      17.55 dB
SFO2     300.1312905 MHz

F2 - Processing parameters
SI         32768
SF         75.4677490 MHz
WDW        EM
SSB        0
LB         3.00 Hz
GB         0
PC         1.00
  
```



7.984
7.965
7.646
7.627
7.609
7.582
7.563
7.545

4.145
3.345
3.316
3.222
3.179
3.087
3.045
2.998
2.963
2.928
2.902
2.577
2.561
2.535
2.518
2.300
2.282
2.257
2.237
2.222
2.193
2.030
1.810
1.784
1.776
1.762
1.732
1.705
1.678
1.604
1.519
1.508
1.484
1.475
1.451

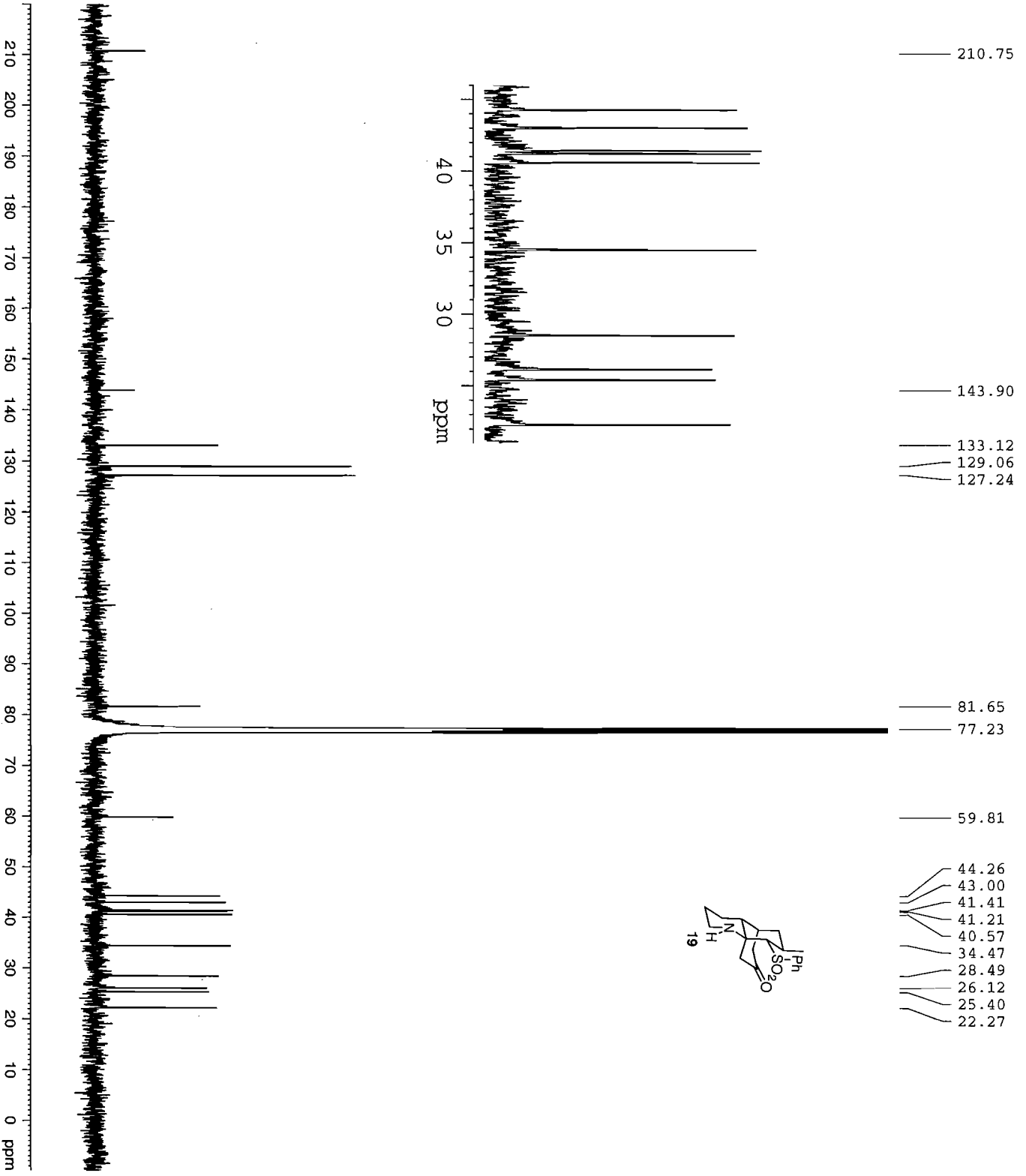


Current Data Parameters
NAME H14-95
EXNO 7
PROCNO 1
USER /n yang

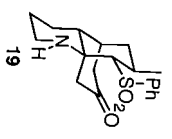
F2 - Acquisition Parameters
Date_ 20080220
Time 21.55
INSTRUM DPK400
PROBHD 5 mm BBO BS-1H
PULPROG zg30
TD 32768
SOLVENT CDCl3
NS 32
DS 2
SWH 6410.256 Hz
FIDRES 0.195625 Hz
AQ 2.5559540 sec
RG 1448.2
DW 78.000 usec
DE 6.00 usec
TE 299.2 K
D1 2.00000000 sec
TD0 1

==== CHANNEL f1 =====
NUC1 1H
PI 14.70 usec
PL 0.00 dB
SFO1 400.0128001 MHz

F2 - Processing parameters
SI 32768
SF 400.0100000 MHz
WDW EM
SSB 0
DS 0
GB 0
PC 1.00



210.75
143.90
133.12
129.06
127.24
81.65
77.23
59.81
44.26
43.00
41.41
41.21
40.57
34.47
28.49
26.12
25.40
22.27



```

Current Data Parameters
NAME          H14-99
EXPNO         8
PROCNO       1
DU            /n
USER          yang
F2 - Acquisition Parameters
Date_         20080221
Time          7.42
INSTRUM      DPX400
PROBHD       5 mm BBO BB-1H
PULPROG      zgpg30
TD            65536
SOLVENT      SOLVENT
NS            23000
DS            4
SWH           25125.629 Hz
FIDRES       0.383387 Hz
AQ           1.3042164 sec
RG           4597.6
DW           19.900 usec
DE           6.00 usec
TE           299.2 K
D1           0.15000001 sec
d11          0.03000000 sec
DELTA        0.05000000 sec
TD0          1
===== CHANNEL f1 =====
NUC1          13C
P1            7.80 usec
PL1          -3.00 dB
SFO1         100.5936591 MHz
===== CHANNEL f2 =====
CPDPRG2      waltz16
NUC2          1H
PCPD2        135.00 usec
PL2          17.40 dB
PL12         17.40 dB
PL13         17.40 dB
SFO2         400.0116000 MHz
F2 - Processing parameters
SI           32768
SF           100.5825950 MHz
WDW          EM
SSB          0
LB           3.00 Hz
GB           0
PC           1.40
  
```

Current Data Parameters

NAME	H13-23
EXPNO	1
PROCNO	1
DU	/n
USER	Yang

F2 - Acquisition Parameters

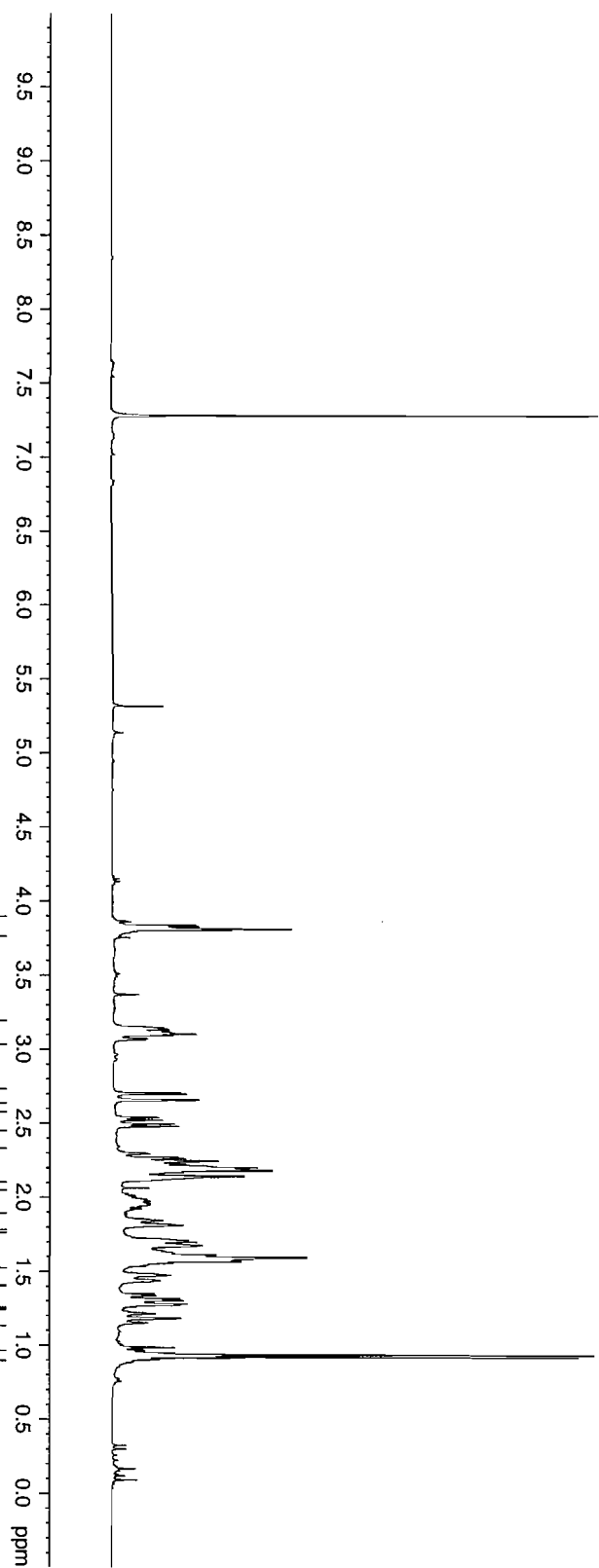
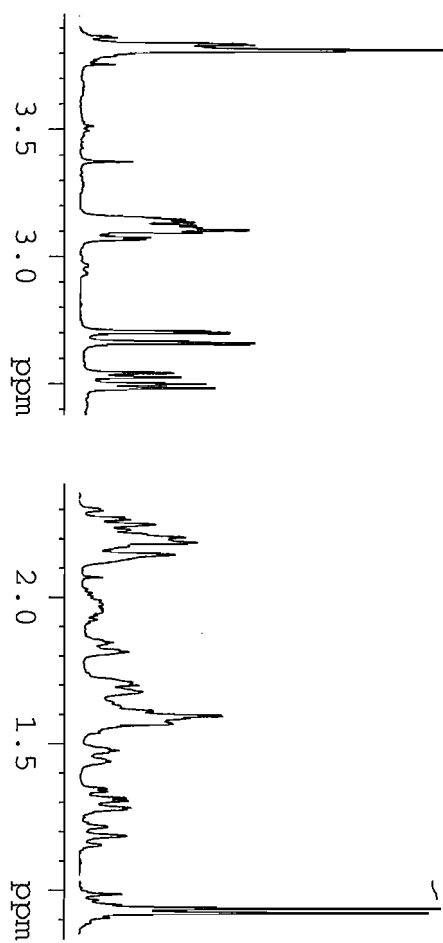
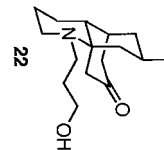
Date_	20080403
Time	9.20
INSTRUM	DEK400
PROBHD	5 mm BBO BB-1H
PULPROG	ZG30
TD	32768
SOLVENT	CDCl3
NS	32
DS	2
SWH	6410.256 Hz
FIDRES	0.195625 Hz
AQ	2.559940 sec
RG	512
DW	78.000 usec
DE	6.00 usec
TE	298.2 K
D1	2.00000000 sec
TD0	1

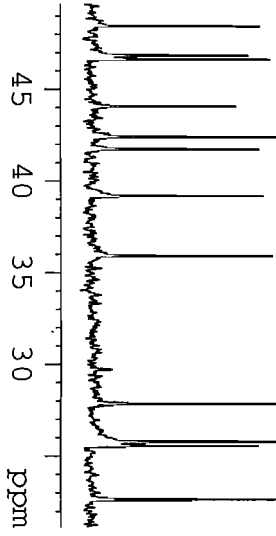
==== CHANNEL f1 =====

MUCL	1H
PL	14.70 usec
PL1	0.00 dB
SFO1	399.9528000 MHz

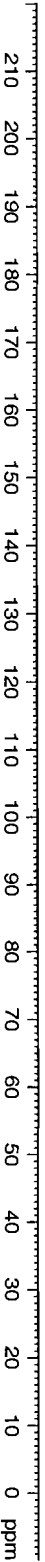
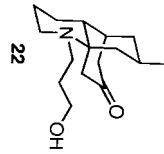
F2 - Processing parameters

SI	32768
SF	399.9500000 MHz
WDW	EM
SSB	0
BK	0
DB	0
GB	0
PC	1.00





- 77.44
- 77.21
- 77.01
- 76.59
- 64.44
- 59.26
- 48.43
- 46.81
- 46.60
- 44.03
- 42.37
- 41.69
- 39.14
- 35.87
- 27.81
- 25.75
- 25.53
- 22.63



Current Data Parameters
 NAME HYS-23
 EXPNO 2
 PROCNO 1
 F2 1
 USER yang

F2 - Acquisition Parameters

Date_ 20080403
 Time 9:27
 INSTRUM DFX300
 PROBHD 1H/1
 PULPROG zgpg30
 TD 65536
 SOLVENT CDCl3
 NS 14000
 DS 4

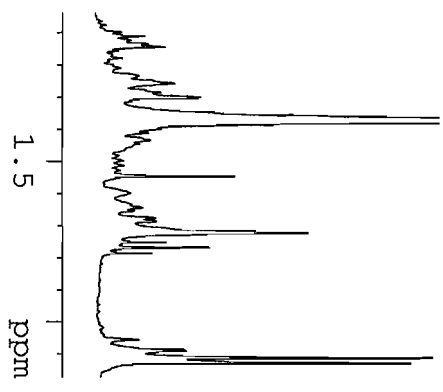
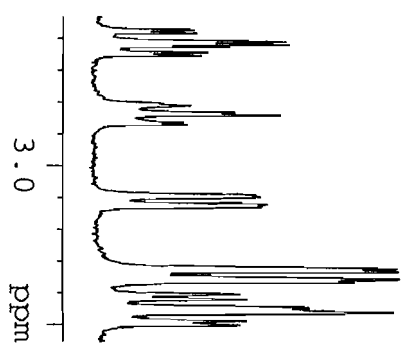
SWH 18832.393 Hz
 FIDRES 0.287360 Hz
 AQ 1.7400308 sec
 RG 9195.2
 DW 26.550 usec
 DE 6.00 usec
 TE 298.2 K
 D1 0.15000001 sec
 d11 0.03000000 sec
 DELTA 0.05000000 sec
 TD0 1

==== CHANNEL F1 =====
 NUC1 13C
 P1 8.80 usec
 PL1 -3.00 dB
 SFO1 75.4760505 MHz

==== CHANNEL F2 =====
 CPDPRG2 waltz16
 NUC2 1H
 PCPD2 80.00 usec
 PL2 -3.00 dB
 PL12 17.55 dB
 PL13 17.55 dB
 SFO2 300.1312005 MHz

F2 - Processing parameters
 SI 32768
 SF 75.4677450 MHz
 WDW EM
 SSB 0
 LB 3.00 Hz
 GB 0
 FC 1.40

3.428
3.419
3.393
3.383
3.375
3.357
3.348
3.191
3.162
3.139
3.132
2.910
2.904
2.880
2.875
2.678
2.669
2.644
2.636
2.596
2.580
2.555
2.540
2.512
2.500
2.295
2.240
2.196
2.112
2.063
1.924
1.902
1.889
1.877
1.866
1.856
1.843
1.821
1.790
1.767
1.743
1.715
1.701
1.631
1.602
1.590
1.568



9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0 ppm

1.16
1.00
1.04
2.23
2.32
1.62
3.55
7.68
8.17
8.78
4.23

```

Current Data Parameters
NAME      HYS-47
EXPNO    1
PROCNO   1
DU        /h
USER     yang

F2 - Acquisition Parameters
Date_    20080513
Time     17:52
INSTRUM  DPX400
PROBHD   5 mm BBO BB-1H
PULPROG  zg30
TD       32768
SOLVENT  CDCl3
NS       32
DS       2
SWH      6410.256 Hz
FIDRES   0.139625 Hz
AQ       2.5539540 sec
RG       1024
RG       78.000 usec
DE       6.00 usec
TE       298.2 K
D1       2.00000000 sec
TD0      1

===== CHANNEL f1 =====
NUC1     1H
P1       14.70 usec
PL1      0.00 dB
SFO1     399.9528000 MHz

F2 - Processing parameters
SI       32768
SF       399.9500000 MHz
WDW      EM
SSB      0
LB       0.70 Hz
GB       0
PC       1.00
  
```

- 59.87
- 47.19
- 46.60
- 44.92
- 43.10
- 42.99
- 42.84
- 42.44
- 36.73
- 31.94
- 29.71
- 29.37
- 26.41
- 26.05
- 25.34
- 25.13
- 23.44
- 22.88
- 22.71
- 19.48
- 18.79



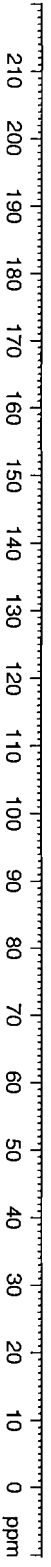
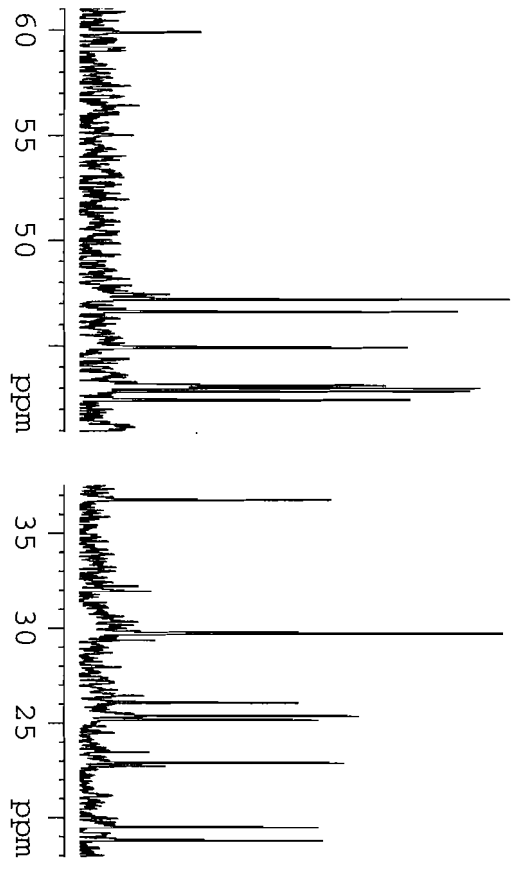
Current Data Parameters
 NAME HYS-47
 EXPMO 6
 PROCNO 1
 DU /n
 USER yang

F2 - Acquisition Parameters
 Date_ 20080513
 Time_ 21.02
 INSTRUM DPX400
 PROBD 5 mm BBO BB-1H
 PULPROG zgpg30
 TD 65536
 SOLVENT NS
 NS 26000
 DS 4
 SWH 25125.629 Hz
 FIDRES 0.383387 Hz
 AQ 1.3042184 sec
 RG 16384
 DW 19.900 usec
 DE 6.00 usec
 TE 298.2 K
 D1 0.1500001 sec
 d11 0.0300000 sec
 DELTA 0.0500000 sec
 TD0 1

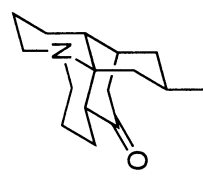
==== CHANNEL F1 =====
 NUC1 13C
 P1 7.80 usec
 PL1 -3.00 dB
 SFO1 100.5785700 MHz

==== CHANNEL F2 =====
 CPDPRG2 waitz16
 NUC2 1H
 RCPD2 135.00 usec
 PL2 17.40 dB
 PL12 17.40 dB
 PL13 17.40 dB
 SFO2 399.9516000 MHz

F2 - Processing parameters
 SI 32768
 SF 100.5675080 MHz
 NDDW EM
 SSB 0
 LB 3.00 Hz
 GB 0
 PC 1.40

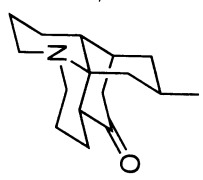
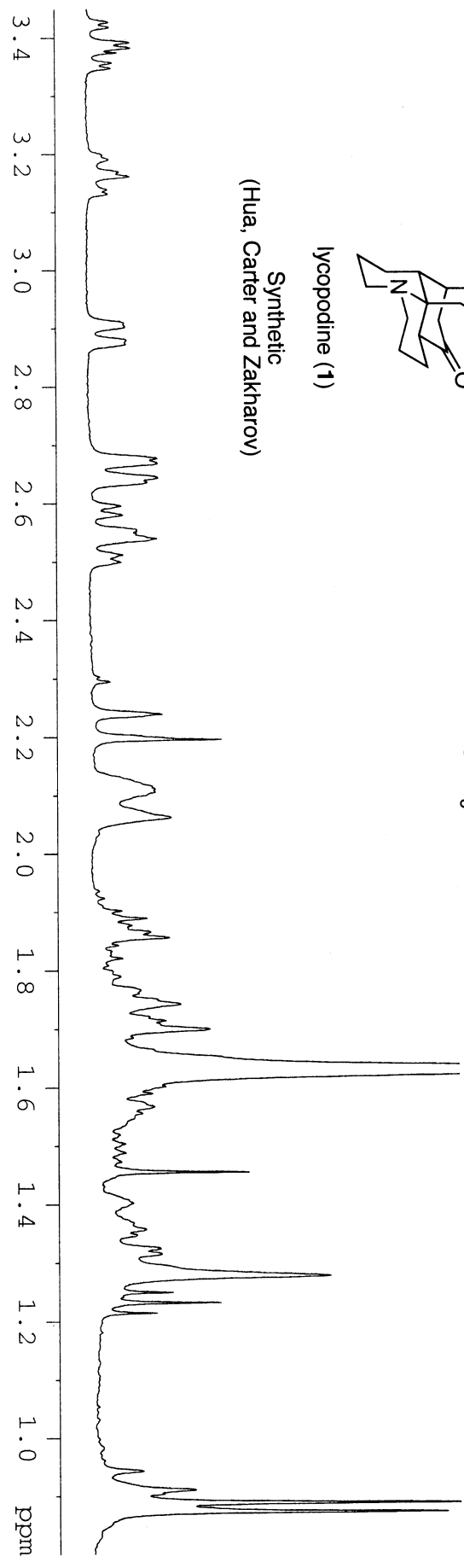


¹H NMR (400 MHz)
CDCl₃



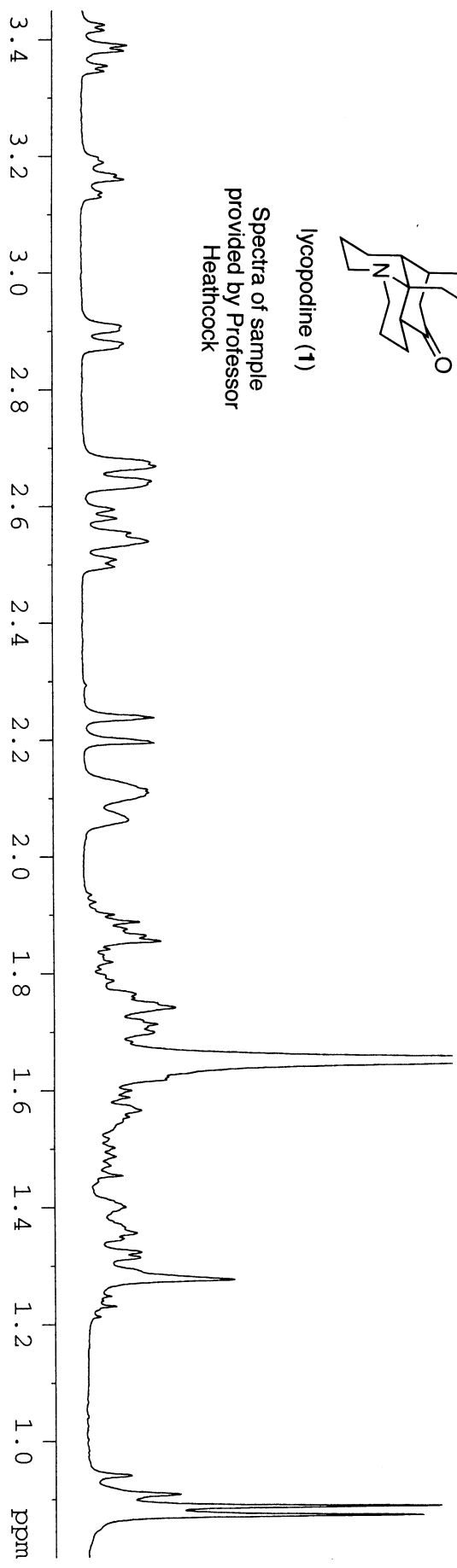
lycopodine (1)

Synthetic
(Hua, Carter and Zakharov)



lycopodine (1)

Spectra of sample
provided by Professor
Heathcock



Comparison of ^{13}C NMR Data for Synthesis and Natural Lycopodine (1)

Synthetic 1 ^{13}C NMR Data (CDCl_3 , 100 MHz)	Natural 1 ^{13}C NMR Data ^a (CDCl_3 , Jeol FX 90Q Spectrometer)
213.7	213.3
59.9	59.7
47.2	47.1
46.6	46.6
44.9	44.9
43.1	43.2
42.99	42.8
42.84	42.7
42.2	42.4
36.7	36.7
26.1	26.1
25.3	25.2
25.1	25.1
22.9	22.8
19.5	19.5
18.8	18.7

^a Kraus, G. A.; Hon, Y. S. *Heterocycles* **1987**, *25*, 377-386.