

Supporting Information

Title: 2-Carbomethoxy-3-Hydroxyquinoxaline-di-N-Oxide as a Novel Ligand for the Copper-catalyzed Coupling Reaction of Phenols and Aryl Halides

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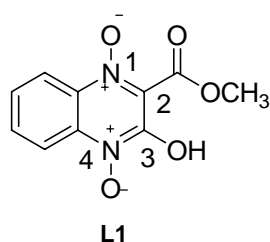
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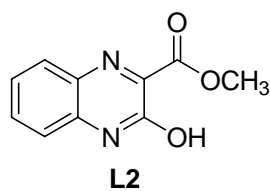
1. General Experimental Methods: ^1H NMR and ^{13}C NMR spectra were recorded on Bruker Avance ARX- 400. Mass spectra were performed on Kompact Axima-CFR MALDI mass spectrometers. Optical rotations were recorded on a Perkin Elmer 341 polarimeter. Anhydrous solvents were obtained as follows: DMSO from CaH_2 . All other solvents were reagent grade. All moisture sensitive reactions were carried out in flame dried flask under argon atmosphere.

3. Preparation of Ligands



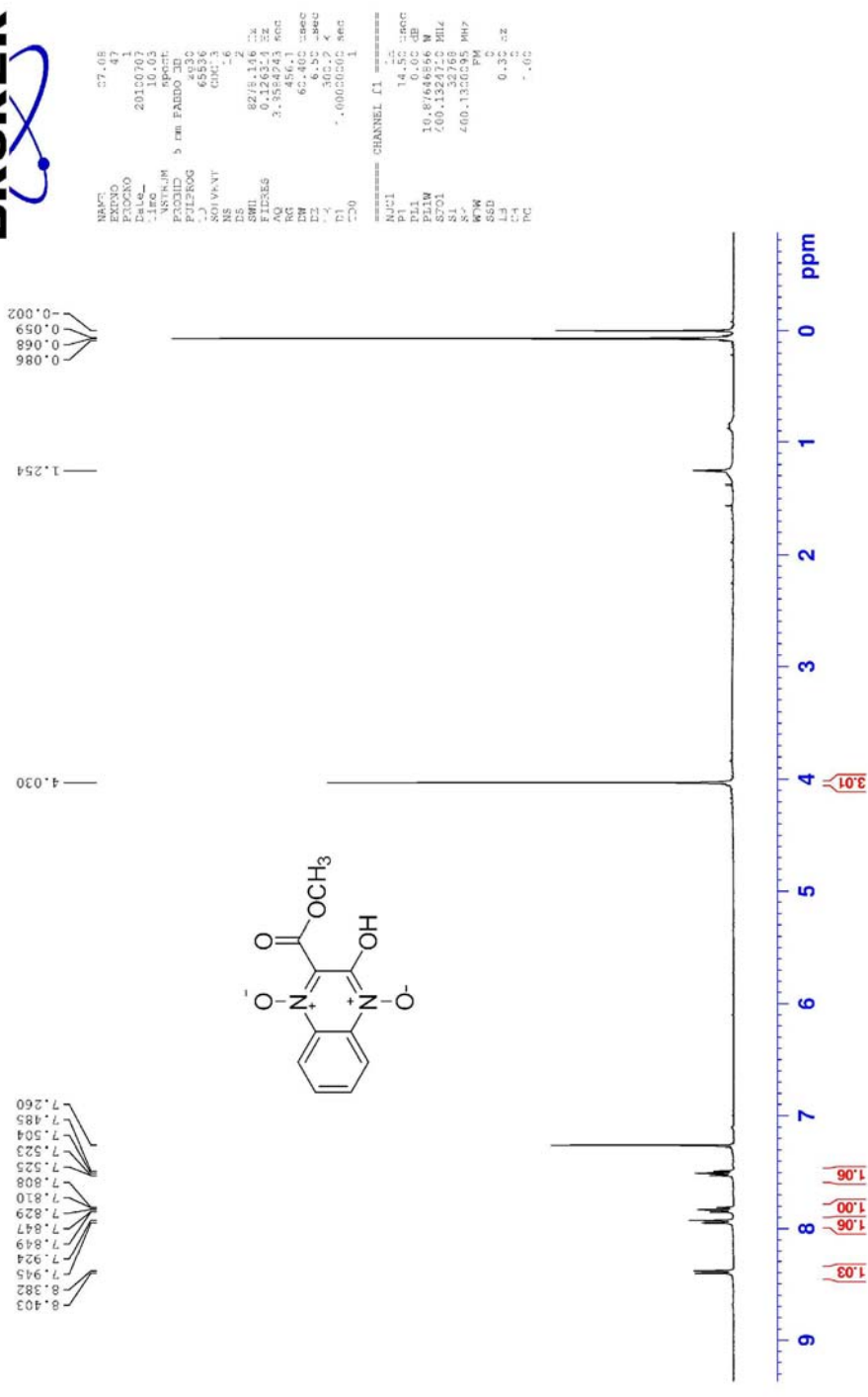
2-Carbomethoxy-3-Hydroxyquinoxaline-di-N-Oxide (L1).

To a solution of NaOCH_3 (0.91 g, 16.7 mmol) in dry THF (100 ml) cooled to $0\text{ }^\circ\text{C}$, dimethyl malonate (2.4 g, 17.8 mmol) was added with efficient stirring in ca. 20 min. After 30 min, the benzofuroxan (2.0 g, 14.8 mmol) in THF (50 mL) was added, and stirred at room temperature for 24 h. Subsequently, the solution was filtered, and the solid was washed with THF (3×20 ml). The remaining solid was dissolved by water (20 mL). The aqueous phase was acidified to $\text{pH}=1$, and extracted with ethyl acetate (3×20 ml). The organic phase was dried over Na_2SO_4 and concentrated to afford **L1** (3.9 g, 92%) as a brown solid. ^1H NMR (400MHz, CDCl_3): δ 8.39 (d, $J=8.4$ Hz, 1H), 7.93 (d, $J=8.4$ Hz, 1H), 7.92-7.81 (m, 1H), 7.53-7.49 (m, 1H), 4.03 (s, 3H) ppm. ^{13}C NMR (125 MHz, CH_3OD): δ 161.2, 152.6, 135.2, 134.5, 134.0, 131.2, 126.0, 121.1, 115.0, 54.0 ppm. MS (EI, m/z): 237 (M^++1).



2-Carbomethoxy-3-Hydroxyquinoxaline (L2).

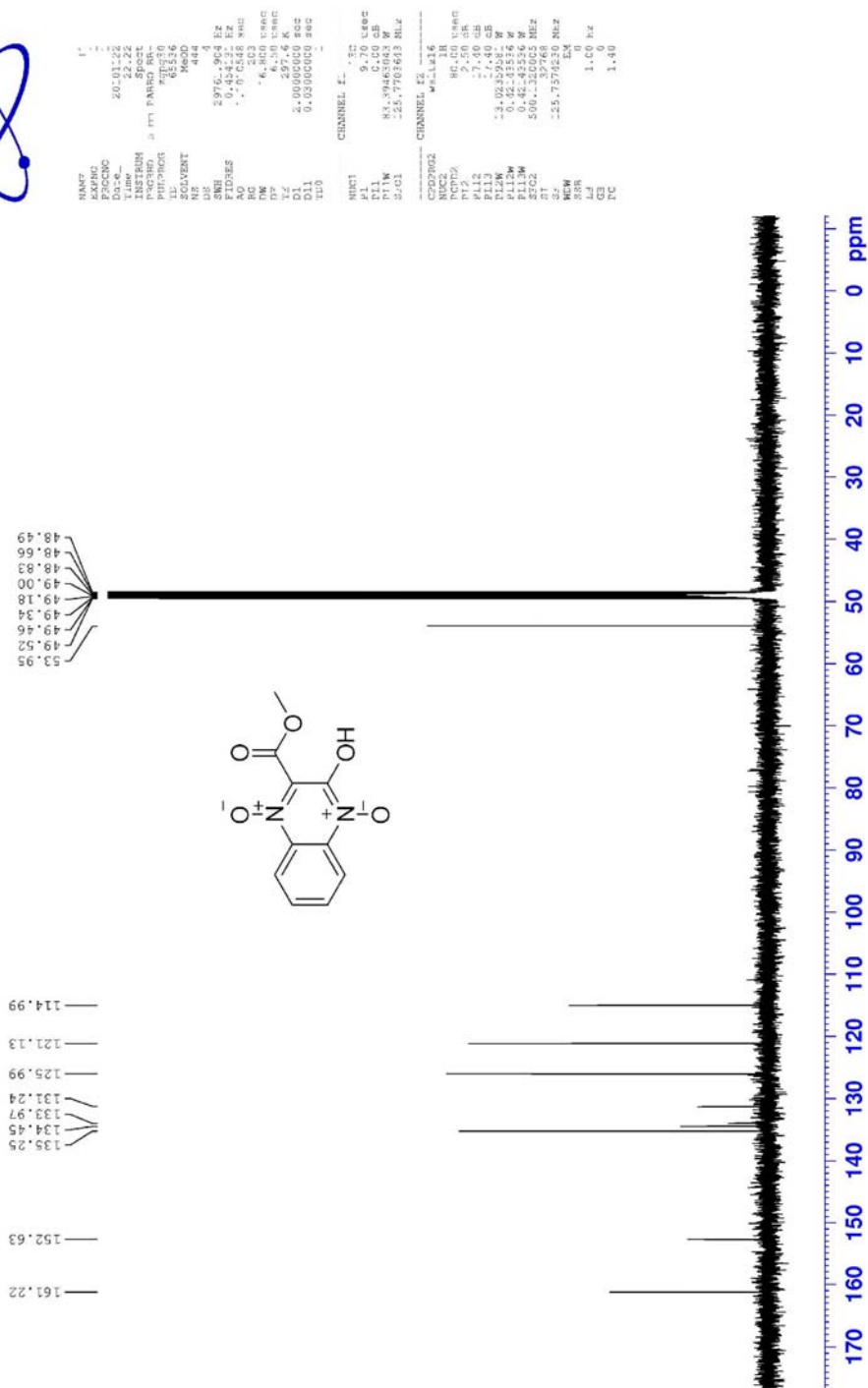
NaH (0.4 g, 16.7 mmol) was added to CH₃OH (100 mL) at 0 °C. Then, benzofuroxan (2.0 g, 14.8 mmol) was added to this solution. Subsequently, dimethyl malonate (2.4 g, 18.2 mmol) was added, and stirred at room temperature for 24 h. The solution was filtered, and the solid was washed with THF (3×20 ml). The remaining solid was dissolved by water (20 mL). The aqueous phase was acidified to pH = 1, and extracted with ethyl acetate (3×20 ml). The organic phase was dried over Na₂SO₄ and concentrated under reduced pressure. Purification by silica gel chromatography afforded **L2** (2.3 g, 75%) as a brown solid. ¹H NMR (400MHz, CDCl₃): δ 7.97-7.95 (m, 1H), 7.66-7.62 (m, 1H), 7.48-7.46 (m, 1H), 7.43-7.39 (m, 1H), 4.07 (s, 3H) ppm. ¹³C NMR (125 MHz, CDCl₃): δ 163.6, 154.6, 147.7, 133.0, 132.3, 132.0, 130.3, 125.1, 116.5, 53.3 ppm. MS (EI, *m/z*): 205 (M⁺+1).



L1



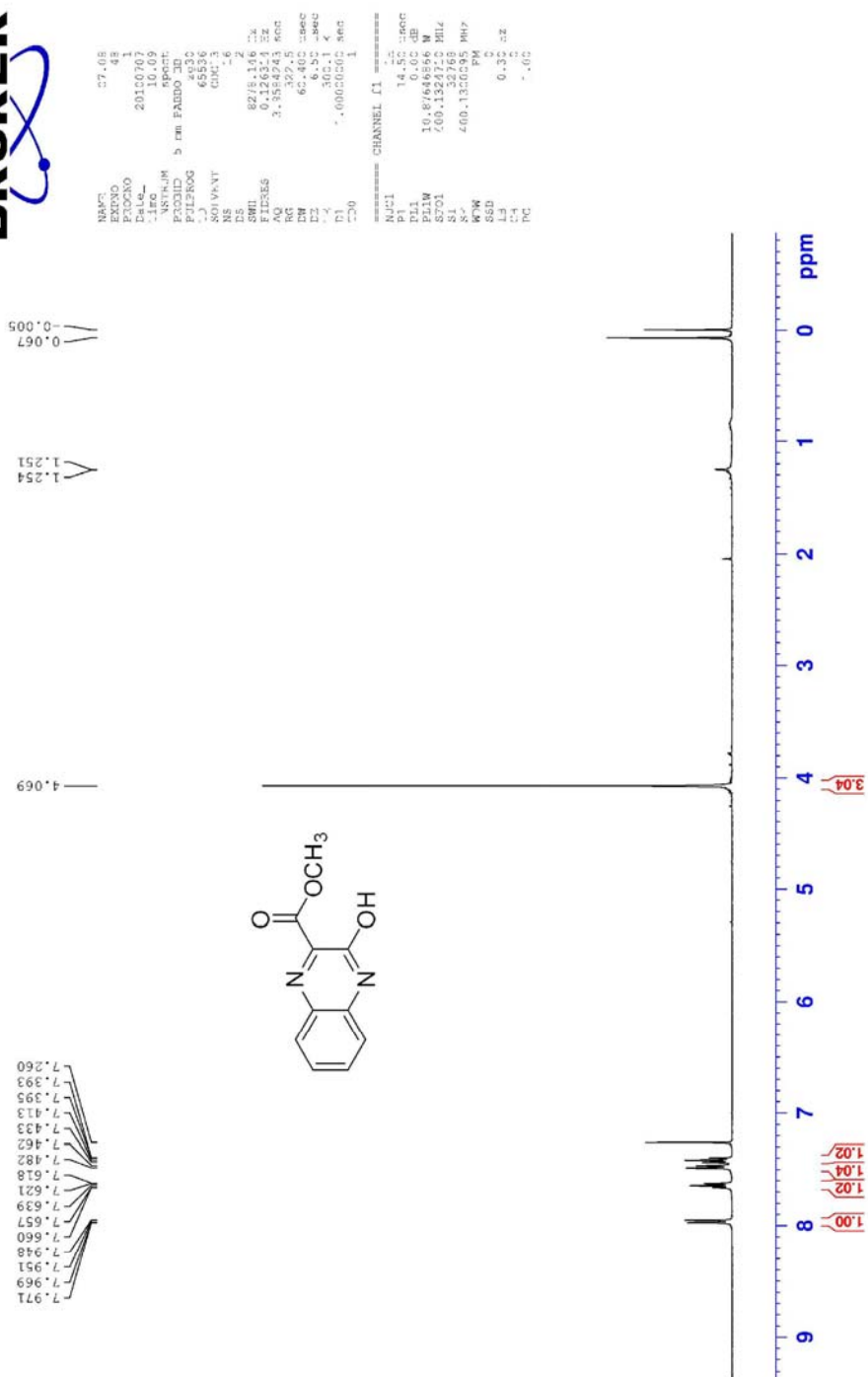
qyt-L1



L1



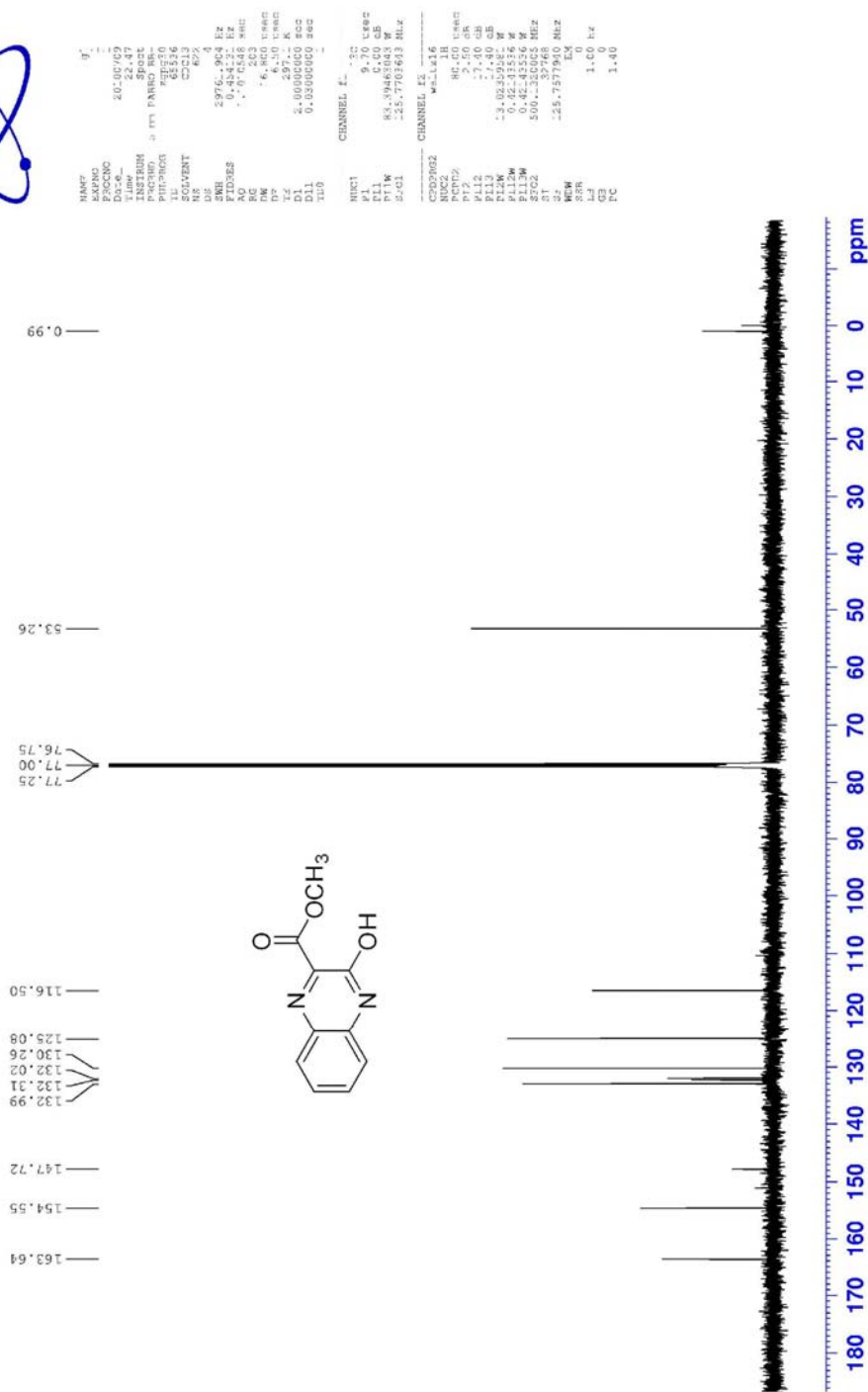
YKFG2



L2

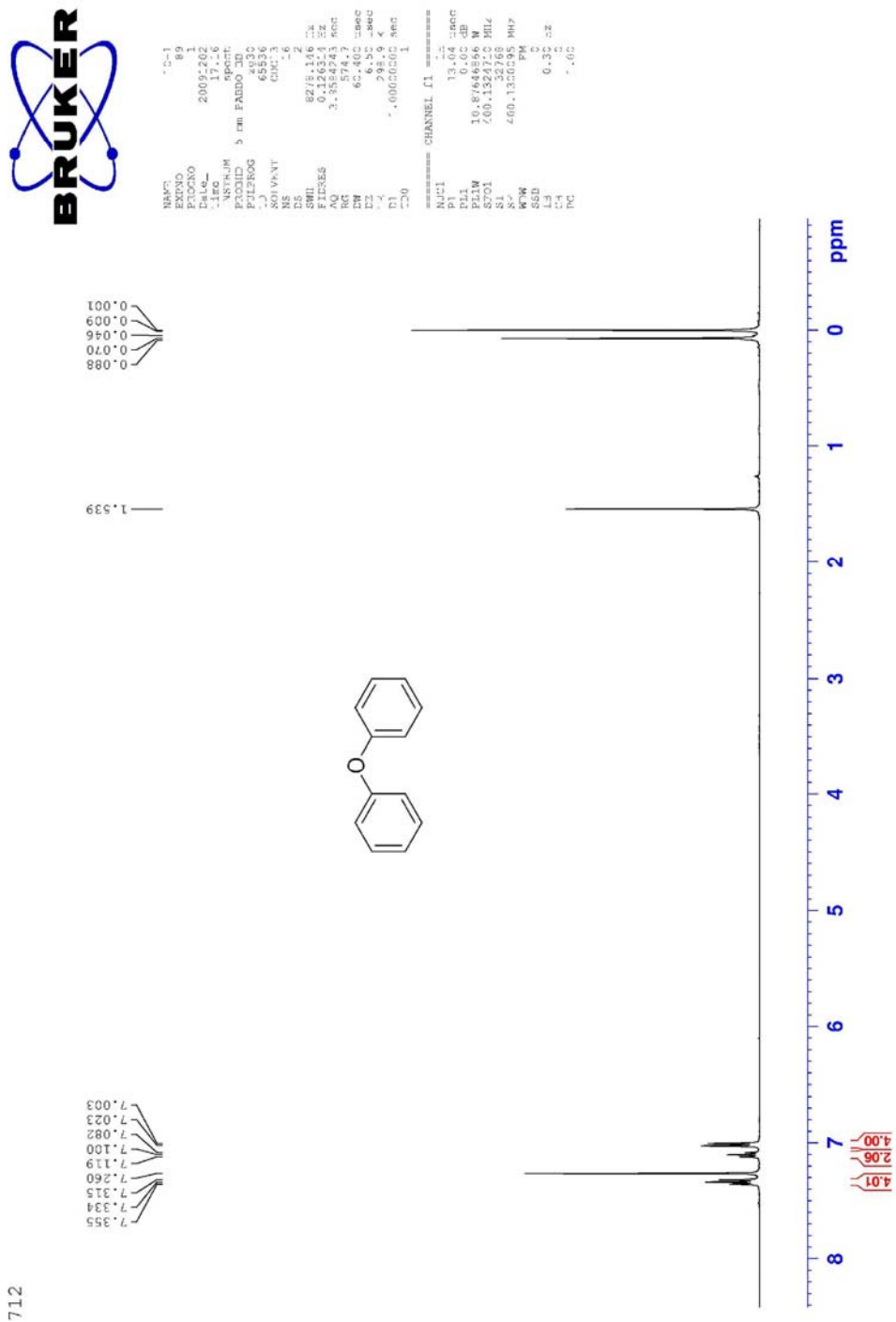


qyt-g1



L2

CuI-Catalyzed Coupling Reaction of Aryl Iodides with Phenols or 2-Naphthol: Table 2



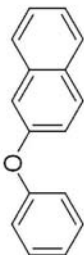
712

3a

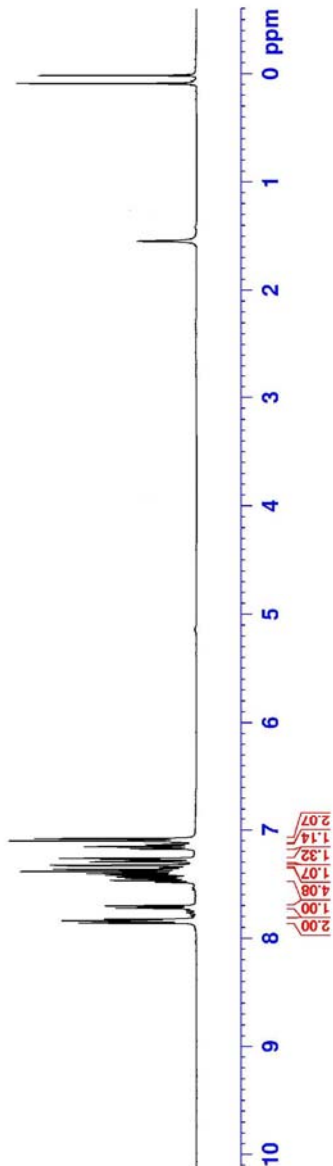
747



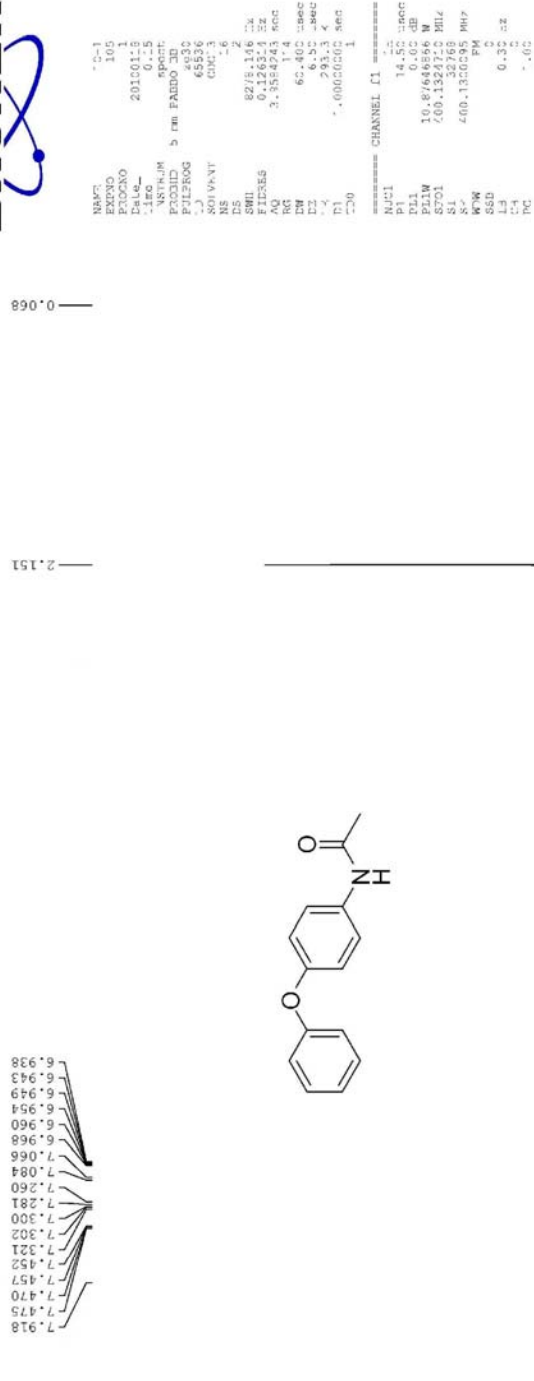
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7.843
7.835
7.824
7.721
7.701
7.484
7.480
7.466
7.463
7.447
7.443
7.434
7.431
7.414
7.411
7.401
7.397
7.382
7.380
7.366
7.361
7.348
7.329
7.324
7.293
7.287
7.271
7.265
7.260
7.173
7.171
7.154
7.136
7.101
7.099
7.080



```
NAME: *-1
EXPNO: 104
PROCNO: 1
Date_ : 20120118
Time: 0.09
INSTRUM: spect
PROBHD: 5 mm PABBO 3D
PULPROG: zgpg30
J: 65536
SOLVENT: CHCl3
DS: 2
SMIL: c1ccc(Oc2ccc3ccccc3c2)cc1
FIDRES: 0.12631 Hz
AQ: 3.151743 sec
RG: 64
DQ: 6.4000000 sec
DW: 6.4000000 sec
DE: 6.5000000 sec
TE: 293.2 K
C20: 1
===== CHANNEL f1 =====
NUC1: 13C
P1: 14.000000 sec
PL1: 0.00 dB
PL12: 0.00 dB
PL13: 0.00 dB
PL14: 0.00 dB
PL15: 10.87646566 W
SFO1: 100.6261250 MHz
SFO2: 32768 MHz
SFO3: 400.1325000 MHz
K0: 0
SSB: 0
LB: 0.300000 Hz
GB: 0
PC: 1.00
```



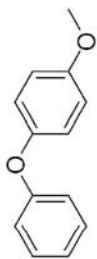
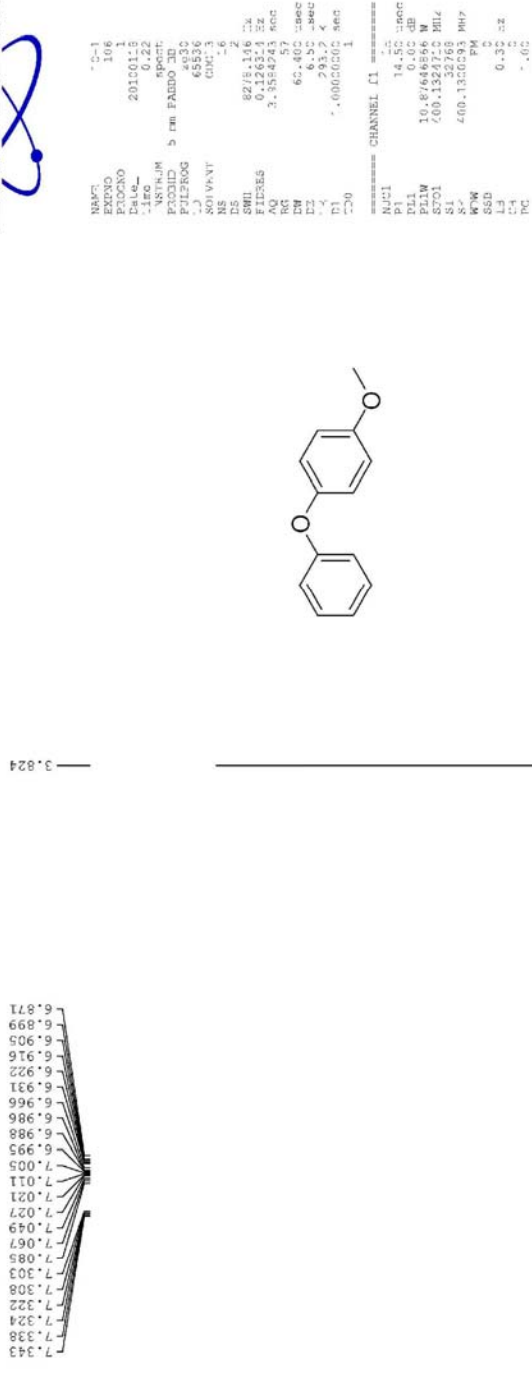
3b



748

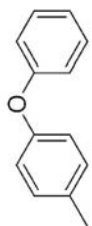
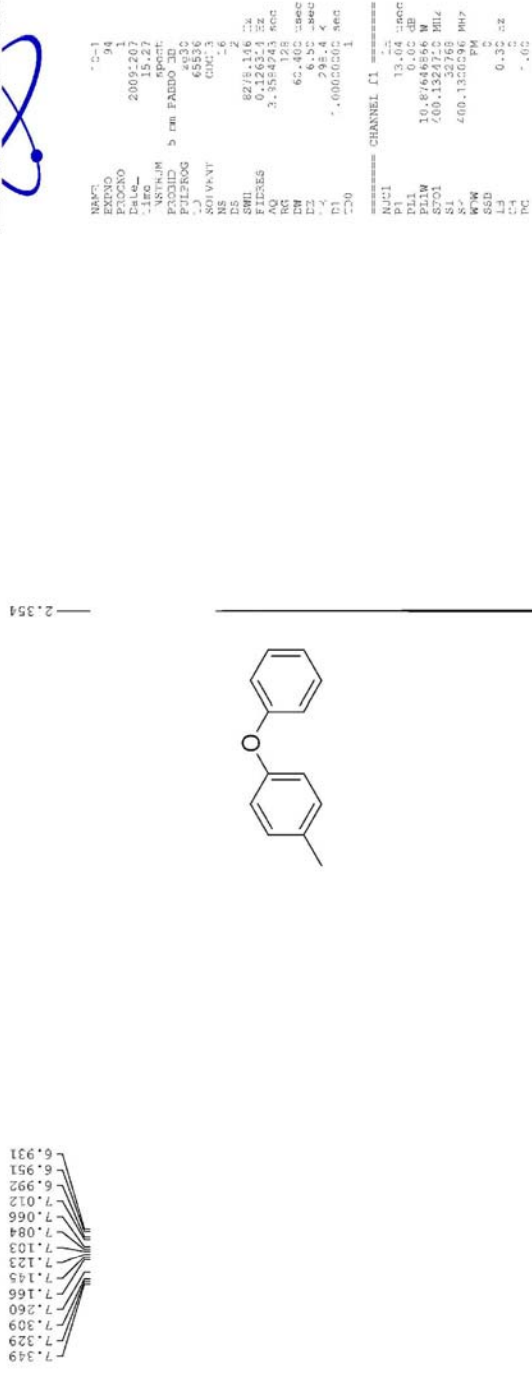
3c

749



3d

721



3e



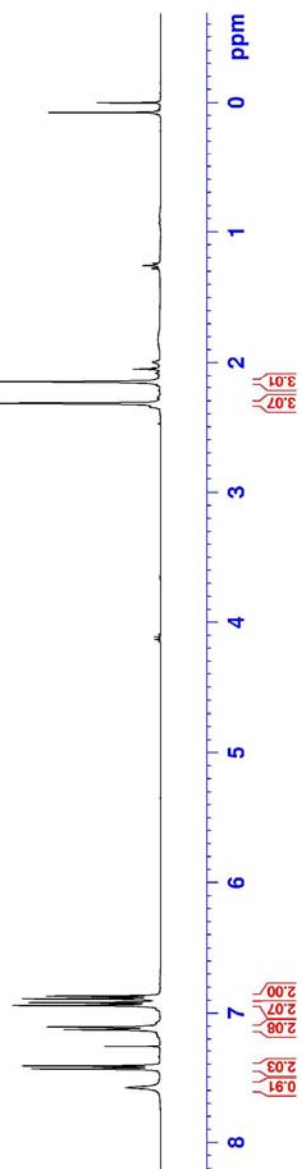
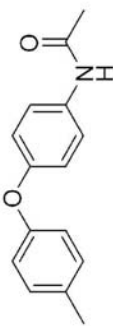
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EXPNO 103
PROCNO 1
Date_ 20120118
Time 0.05
PROBHD 5 mm PABBO 3H
PULPROG zgpg30
PCPDPRG3
RG 655.36
SOLVENT CHCl3
DS 2
SMIL 8278.146 EM
FIDRES 0.126374 Hz
AQ 3.3584728 Sec
RG 655.36
CW 65.400 MHz
DE 6.55 -sec
TE 300.2
DELTA 293.3 K
DELTA2 0.00000000 Sec
===== CHANNEL f1 =====
NUC1 13C
P1 14.00 usec
PL1 0.00 dB
PL12 10.8/646956 W
SFO1 100.626120 MHz
SI 32768
SF 400.1470000 MHz
PM 0
PC 0.30 usec
GC 0.00 usec
  
```

0.075
 0.001

2.152
 2.120

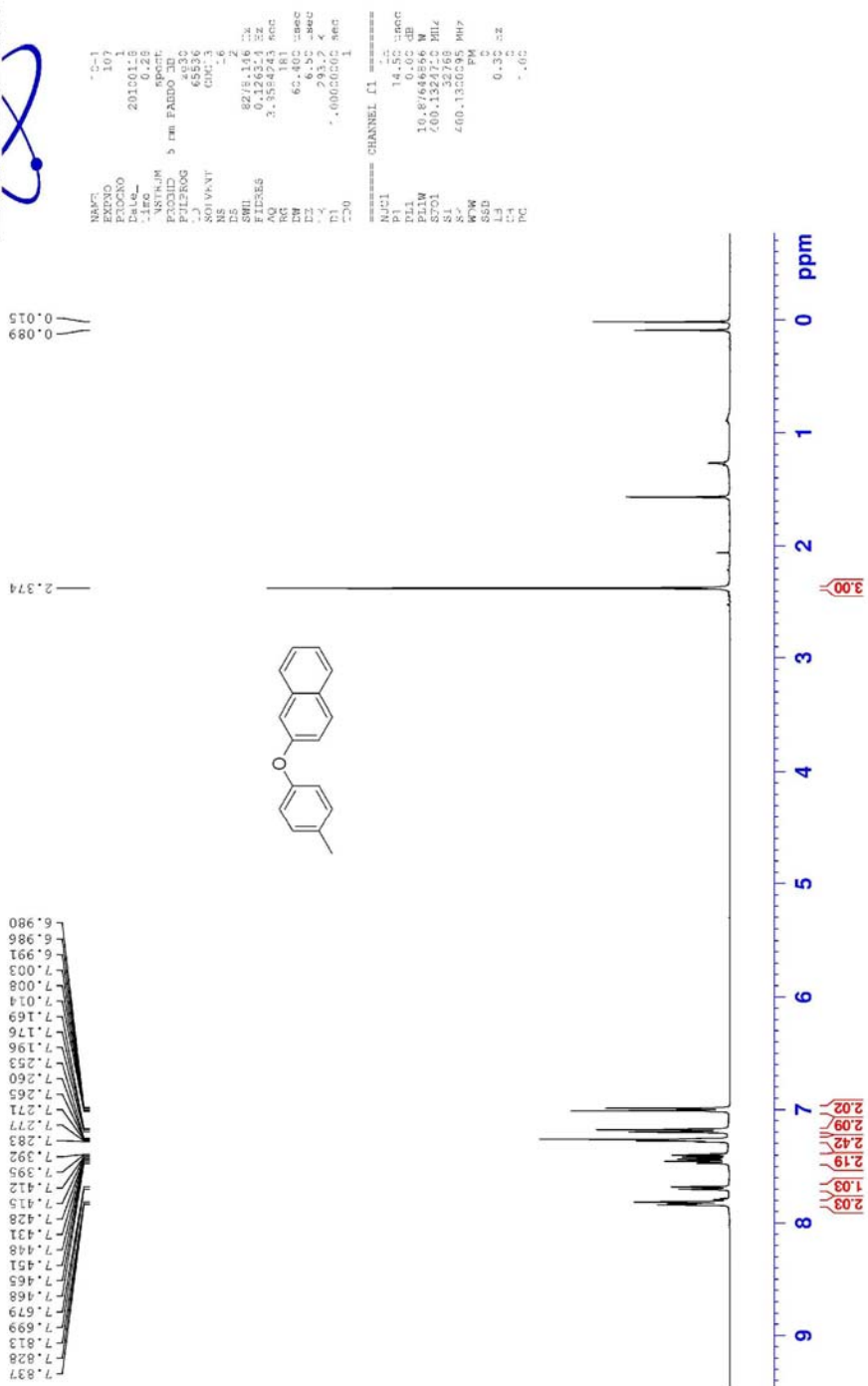
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 7.412
 7.416
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 7.105
 6.939
 6.934
 6.921
 6.916
 6.887
 6.866



741

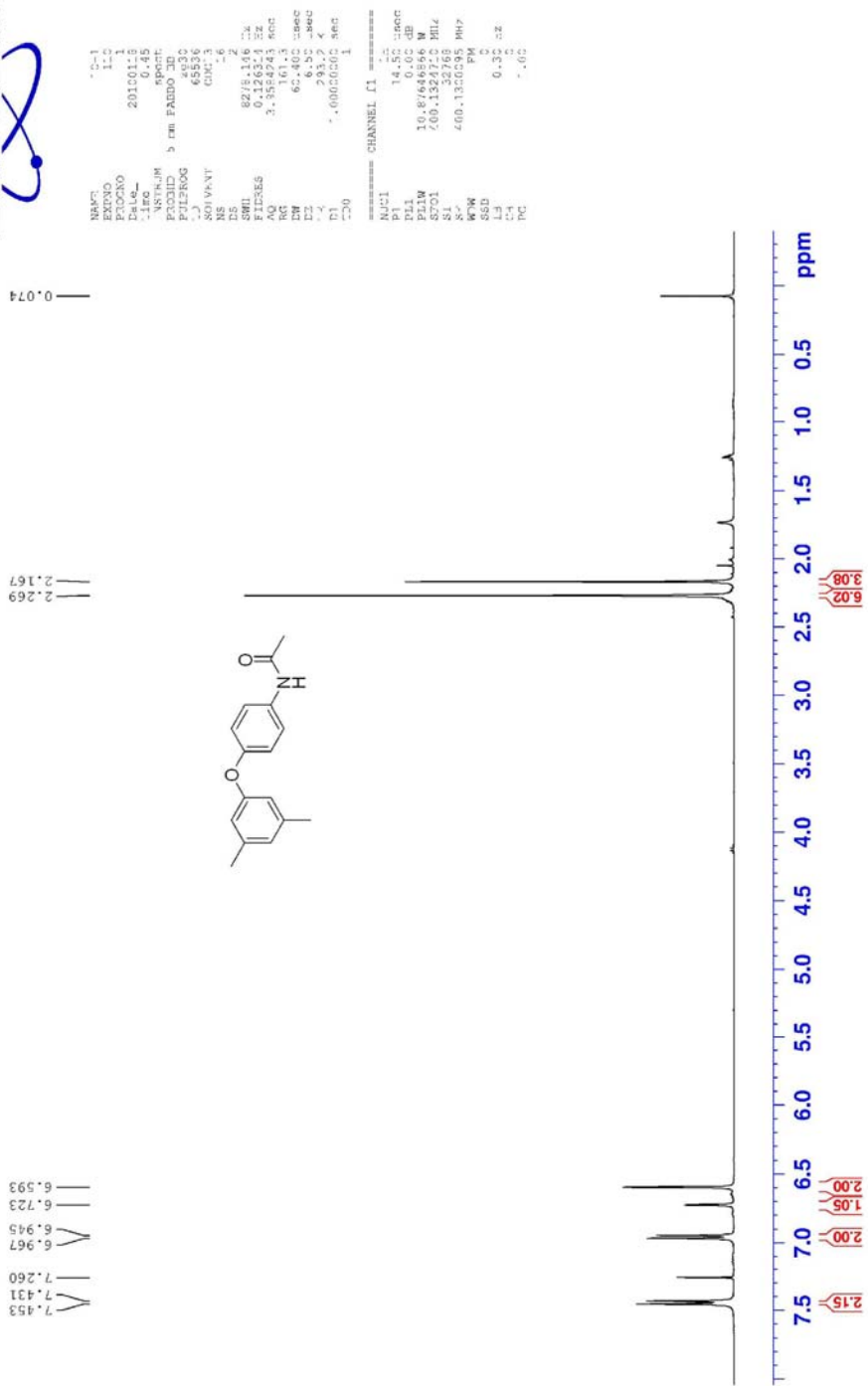


751



3g

757



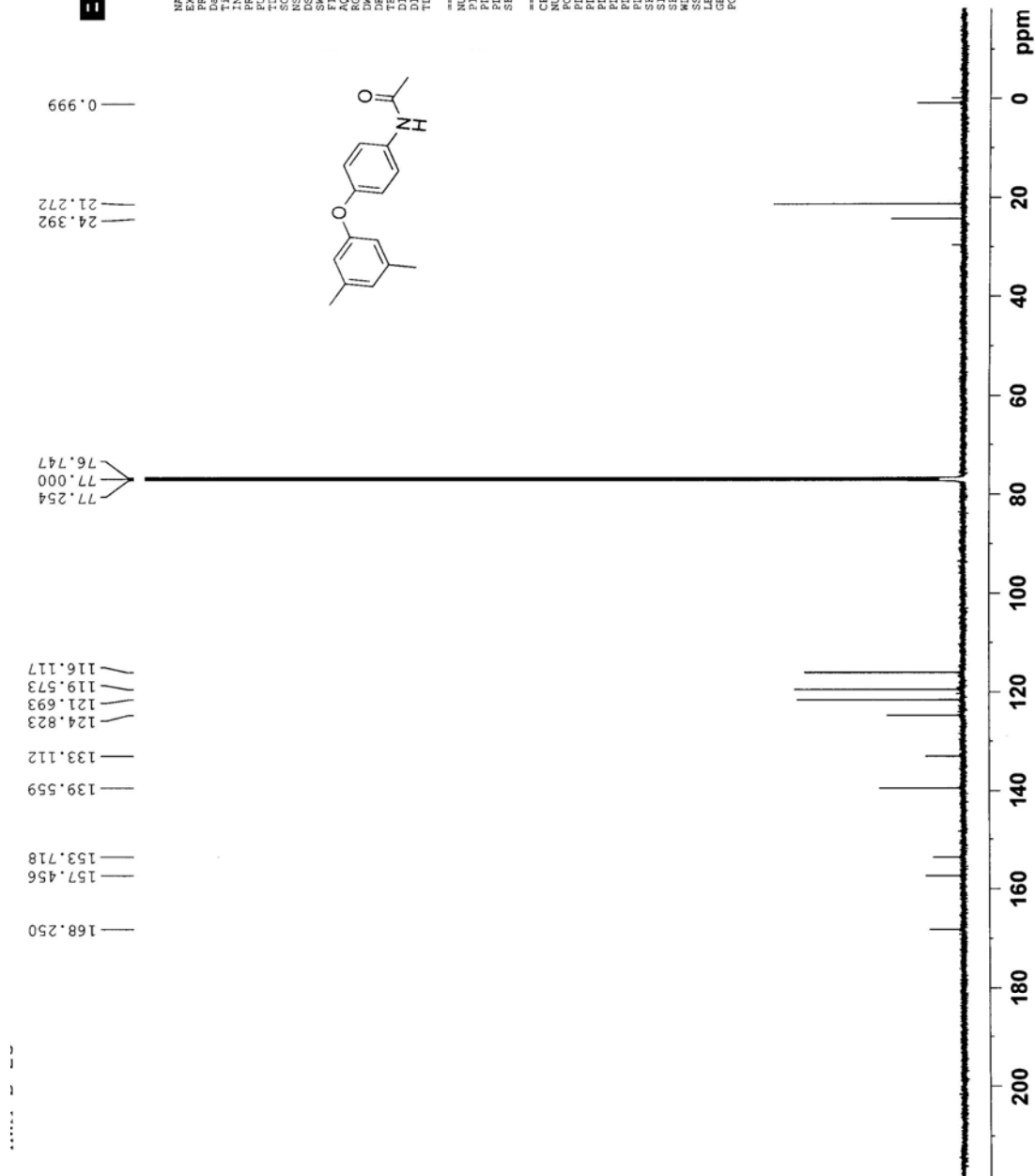
3h



NAME D-23
EXPNO 1
PROCNO 1
Date_ 20100711
Time 16.48
INSTRUM Spect
PROBHD 5 mm PABBO BBO
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 1024
DS 2
SWH 29761.904 Hz
FIDRES 0.454131 Hz
AQ 1.1010548 sec
RG 203
AQ 16.203 usec
DE 65.50 usec
TE 297.2 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1

===== CHANNEL f1 =====
NUC1 13C
P1 8.13C
PL1 0.00 usec
PL1W 0.00 dB
PL1W 83.39463043 W
SF01 125.7703643 MHz

===== CHANNEL f2 =====
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 2.50 usec
PL2W 17.40 dB
PL13 17.40 dB
PL2W 13.02359581 W
PL12W 0.4243536 W
PL13W 0.4243536 W
SF02 500.1362500 MHz
SI 32768
SF 125.7577941 MHz
EM
L2B 1.00 Hz
GB 0
FC 1.40



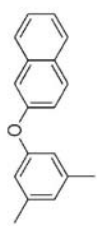
3h



NAME: c-1
EXNO: 96
PROCNO: 1
Date_: 20100117
Time: 22.24
PROBHD: 5 mm PABBO QNP
PULPROG: zgpg30
AQ: 49.33
RG: 655.36
SFO: 400.1320500 MHz
NUC1: 13C
NUC2: 1H
P1: 14.00 sec
PL1: 0.00 dB
PL12: 0.00 dB
PL1M: 10.00/64/65/66 W
SFO1: 100.1324750 MHz
SFO2: 400.1320500 MHz
PC: 1.00
C4: 0.32 sec
C5: 0.02 sec

0.099
0.023

1.573
2.316



7.651
7.628
7.733
7.713
7.486
7.482
7.465
7.449
7.445
7.433
7.429
7.412
7.410
7.395
7.392
7.326
7.321
7.287
7.265
6.691
6.712
6.750
6.801
6.860
6.920

9 8 7 6 5 4 3 2 1 0 ppm

6.03

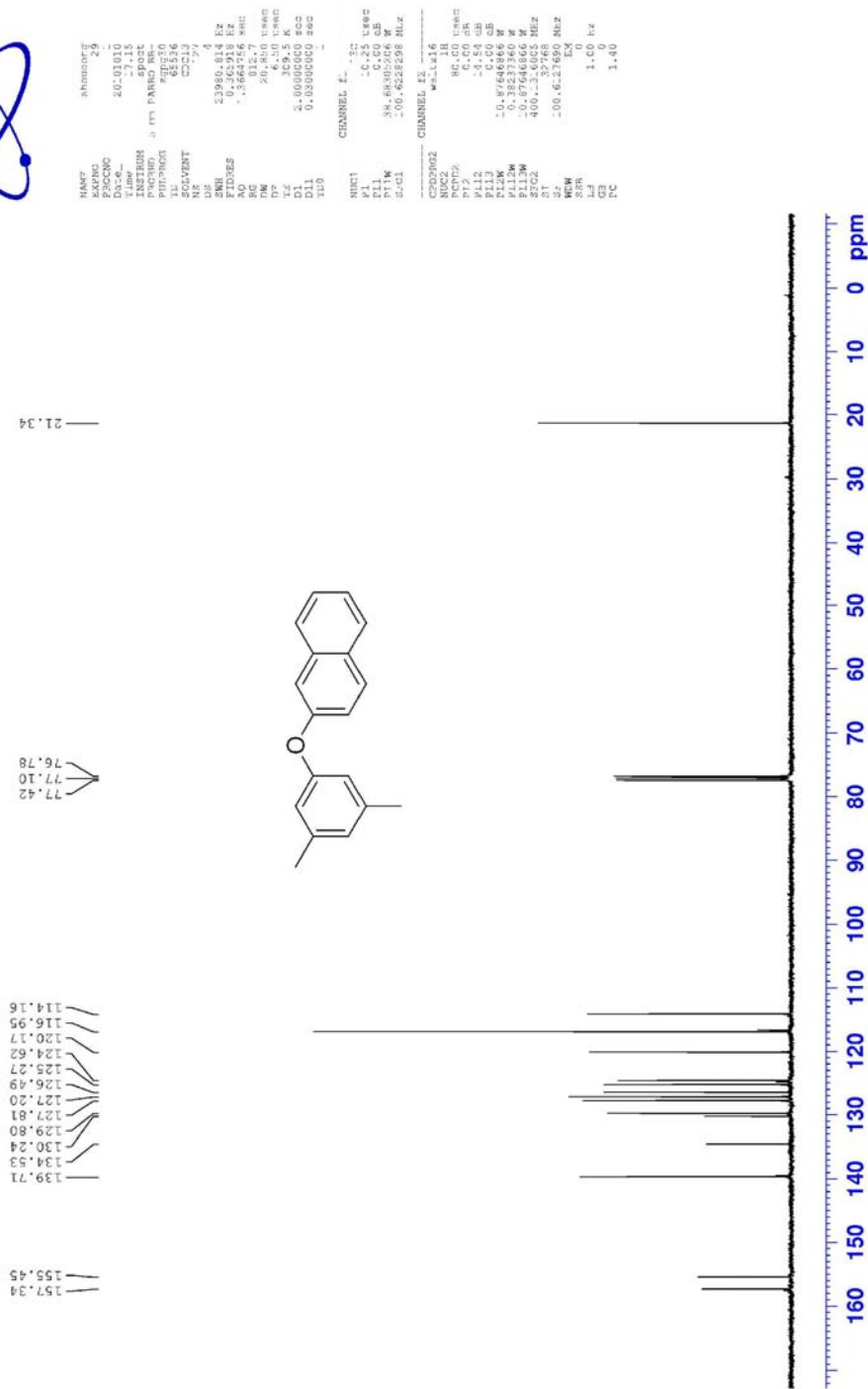
2.01
1.00
2.09
1.00
1.23
0.99
1.94

727

3i

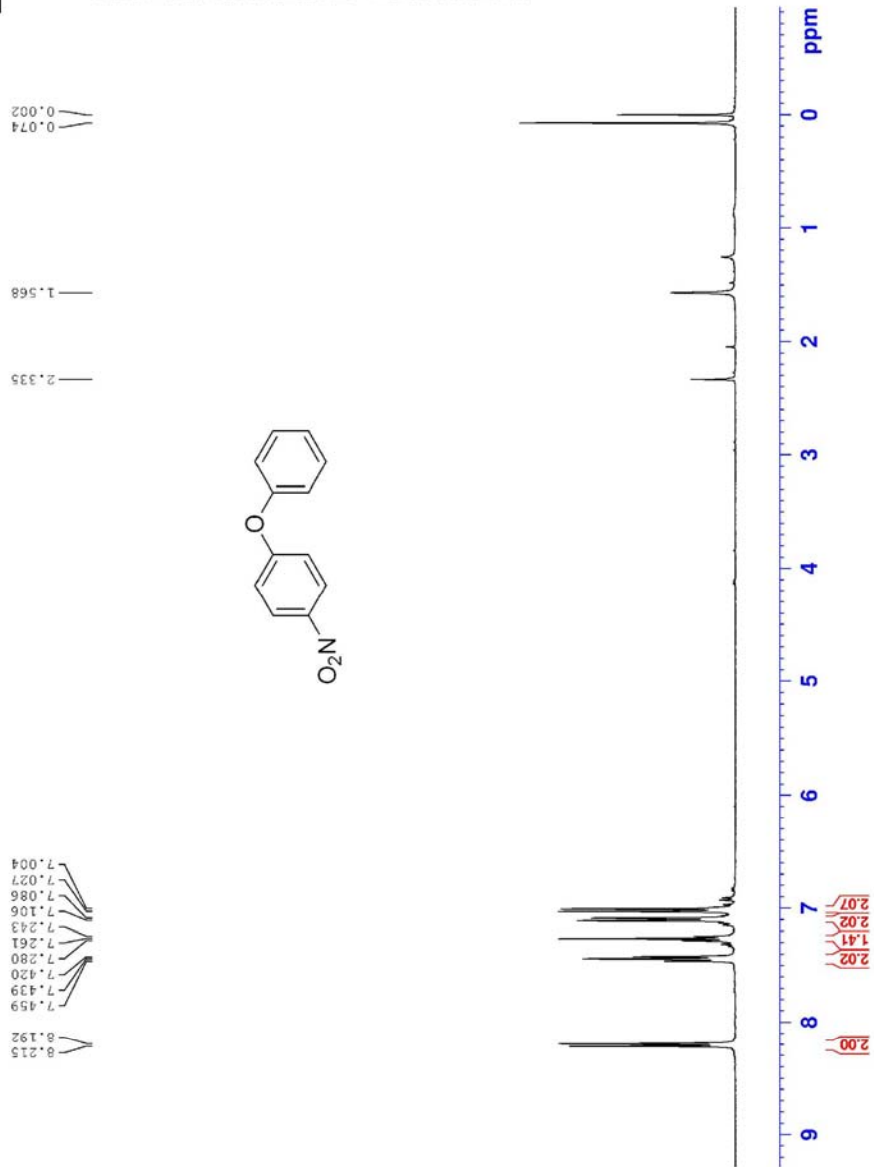
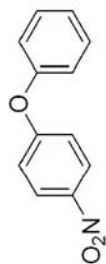


qyt-727c





NAME: C-1
EXPNO: 95
PROCNO: 1
Date_ : 20091207
Time: 15.33
PROBHD: 5 mm PABBO 2D
PULPROG: zgpg30
J: 65536
SOLVENT: CDCl3
NS: 2
DS: 2
SWH: 8278.146 Hz
FIDRES: 0.12633 Hz
AQ: 3.30574 sec
RG: 65.462 sec
DM: 62.462 sec
CZ: 6.52 sec
DZ: 288.4 sec
SFO: 400.1326000 MHz
===== CHANNEL f1 =====
NUC1: 13C
P1: 13.00 usec
PL1: 0.00 dB
PL12: 19.87646556 MHz
SFO1: 700.1326000 MHz
SI: 32769 MHz
RFW: 400.1326000 MHz
SSB: 0
L3: 0.32 usec
C4: 1.02
PC: 1.02



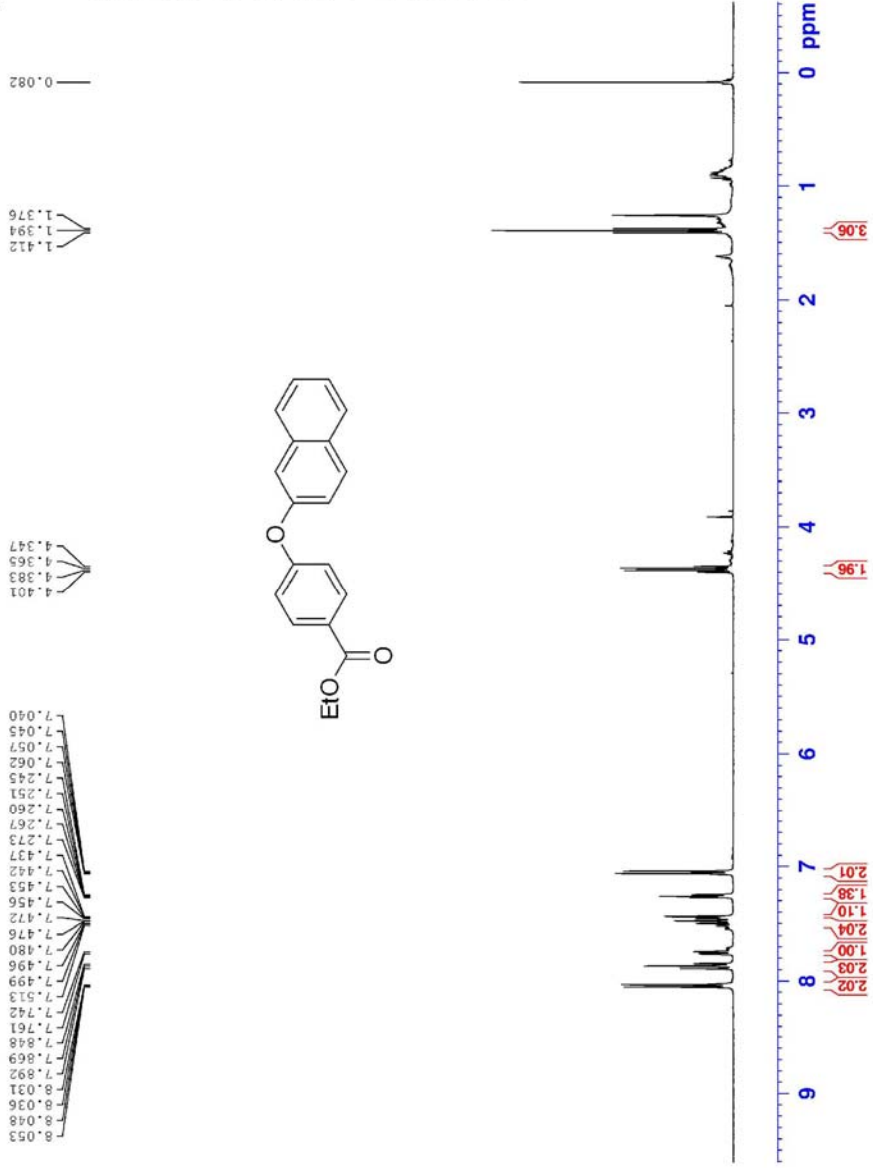
722

3j



```

NAME: 5-1
EXPNO: 97
PROCNO: 1
Date_ : 20120117
Time: 22.34
INSTRUM: spect
PROBHD: 5 mm PABBO 3D
PULPROG: zgpg30
J: 65536
SOLVENT: CDCl3
NS: 2
DS: 2
SWH: 8278.146 Hz
FIDRES: 0.12633 Hz
AQ: 3.355472 sec
RG: 65.402 uspec
CW: 65.402 uspec
CZ: 6.52 sec
SI: 284.24
SF: 400.1360500 MHz
D1: 0.00000000 sec
===== CHANNEL f1 =====
NUC1: 13C
P1: 18.00 uspec
PL1: 0.00 dB
PL12: 0.00 dB
PL1M: 10.87646556 MHz
SFO1: 76.001324740 MHz
SI: 32768
RG: 400.1360500 MHz
SSB: 0
L3: 0.00000000
C4: 0.00
PC: 0.00
    
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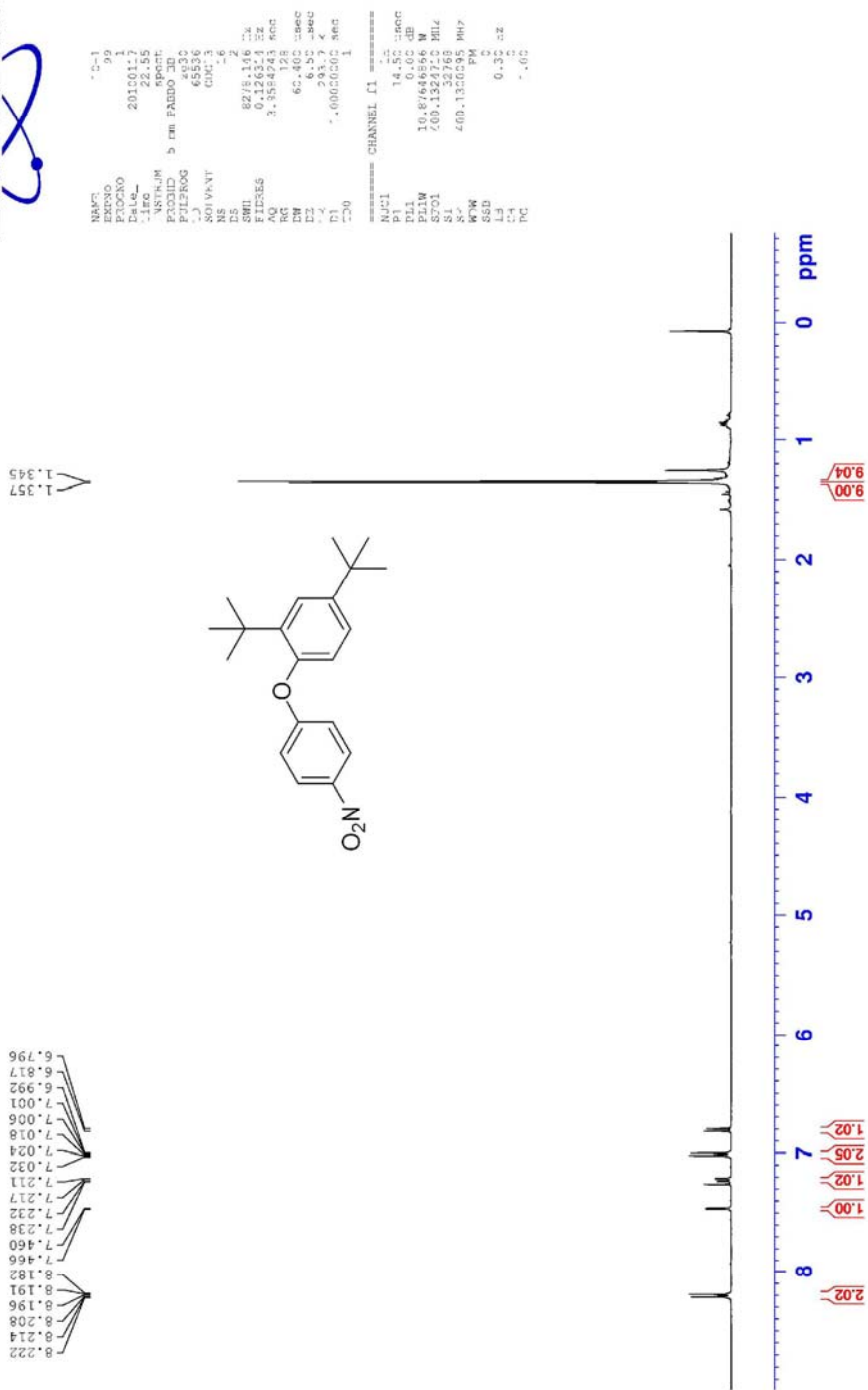


728

3j

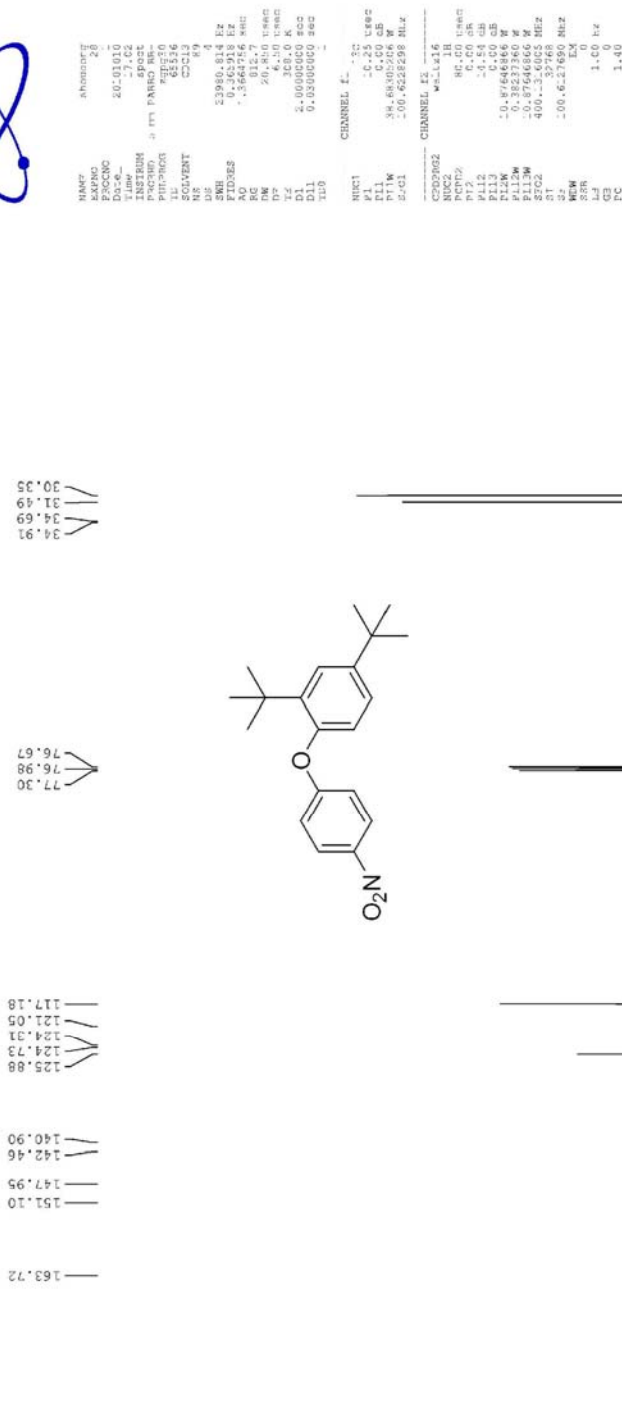


730





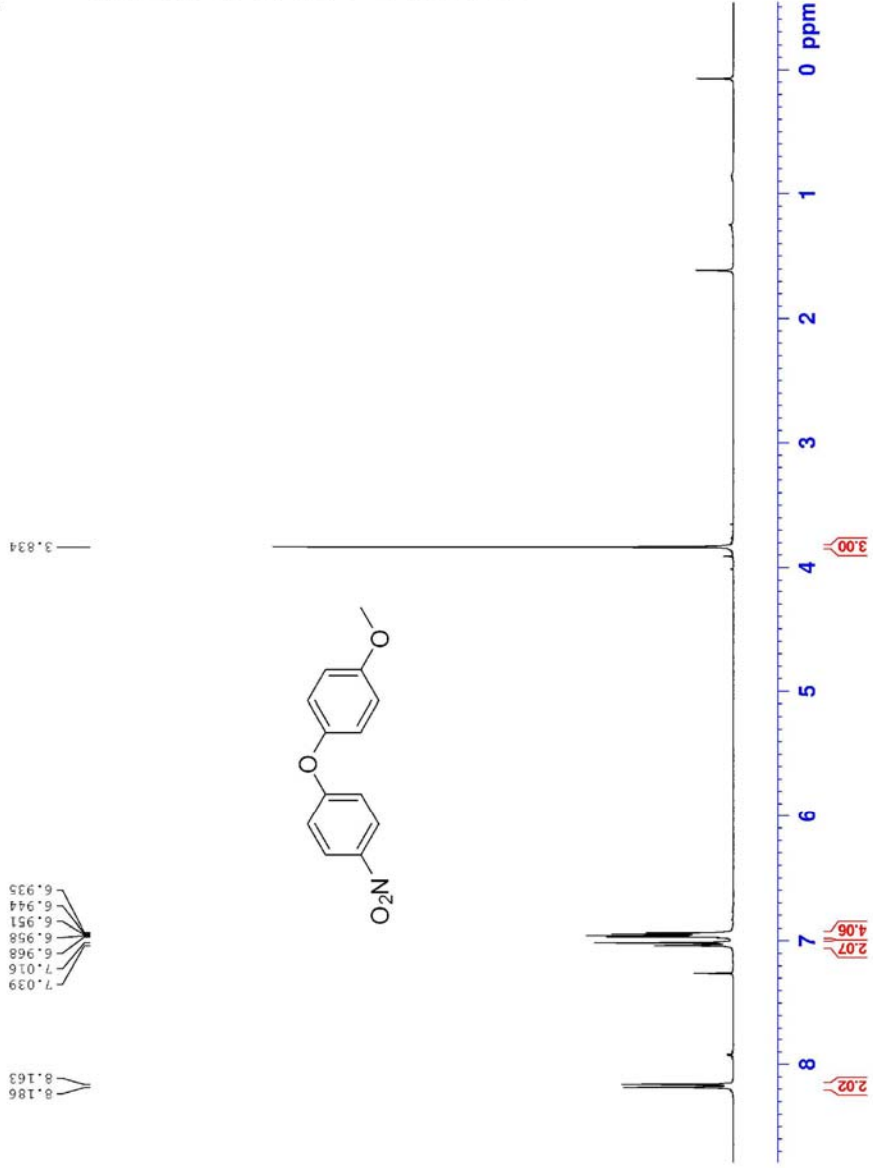
gvt-730c





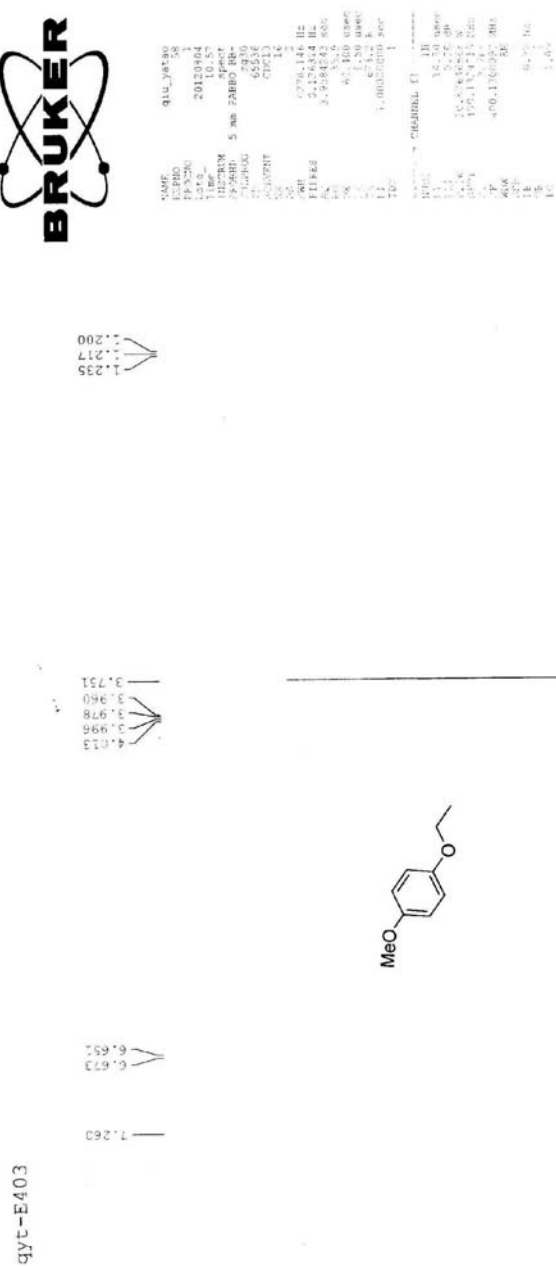
NAME: 7-31
 EXPNO: 109
 PROCNO: 1
 Date_ : 20130119
 Time: 0.39
 F2: 500.1362740 MHz
 PULPROG: zgpg30
 PCPDPRG: 5 DM PABDO 3D
 PULPROG: zgpg30
 PCPDPRG: 5 DM PABDO 3D
 SOLVENT: DMSO
 DMSO: 2
 DS: 2
 SWH: 8278.146 Hz
 FIDRES: 0.12634 Hz
 AQ: 3.38374 sec
 RG: 327.0
 CW: 62.462 MHz
 CZ: 6.52 MHz
 D1: 2.831 sec
 D2: 0.000000000 sec
 D3: 0

===== CHANNEL f1 =====
 NUCL1: 13C
 P1: 12.00 usec
 PL1: 0.00 dB
 PL12: 0.00 dB
 PL1M: 10.876466566 MHz
 SFO1: 700.1324740 MHz
 SI: 32768
 SF: 400.1324740 MHz
 SSB: 0
 L3: 0.32 usec
 C4: 1.00
 PC: 1.00



753

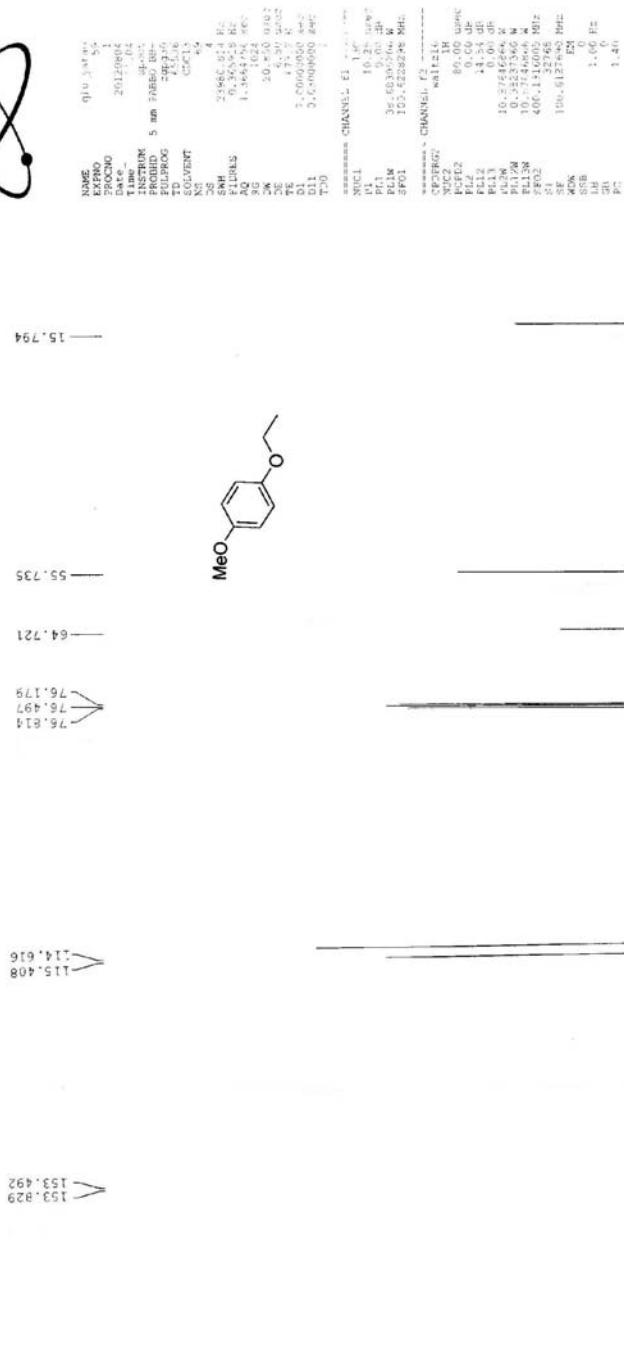
3m



3n



qyt-E403

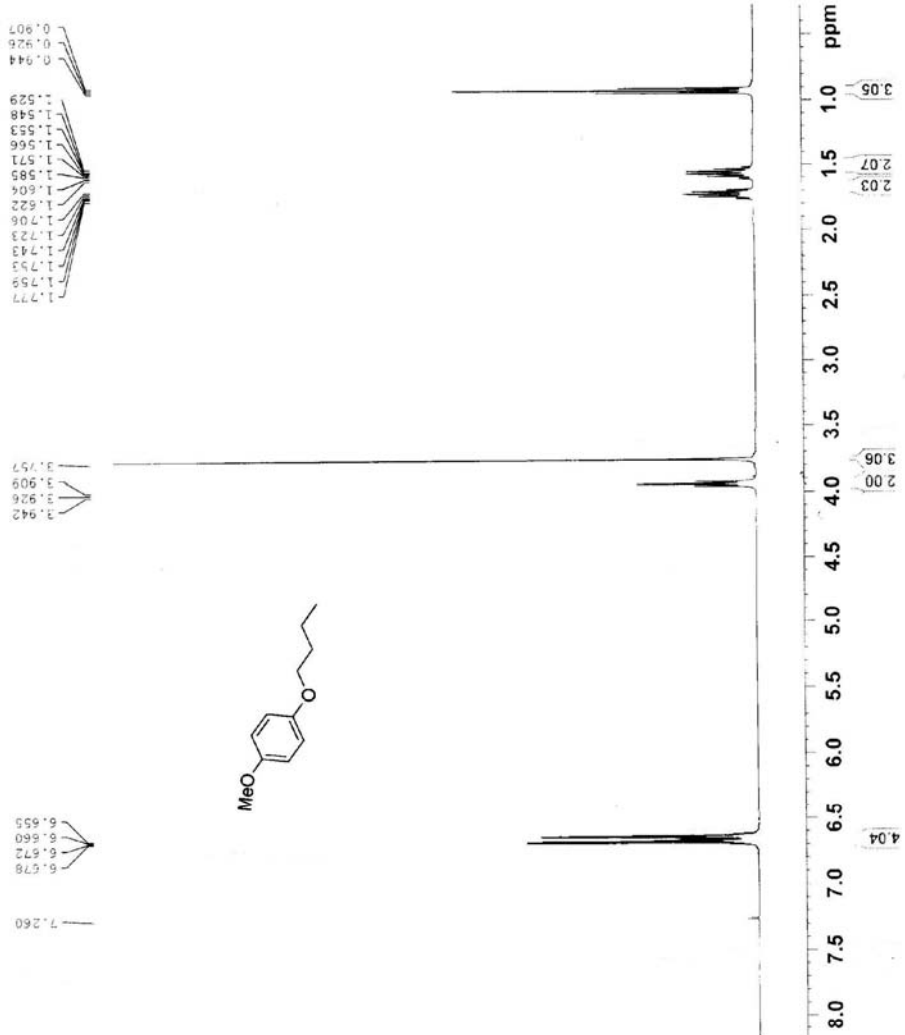


3n



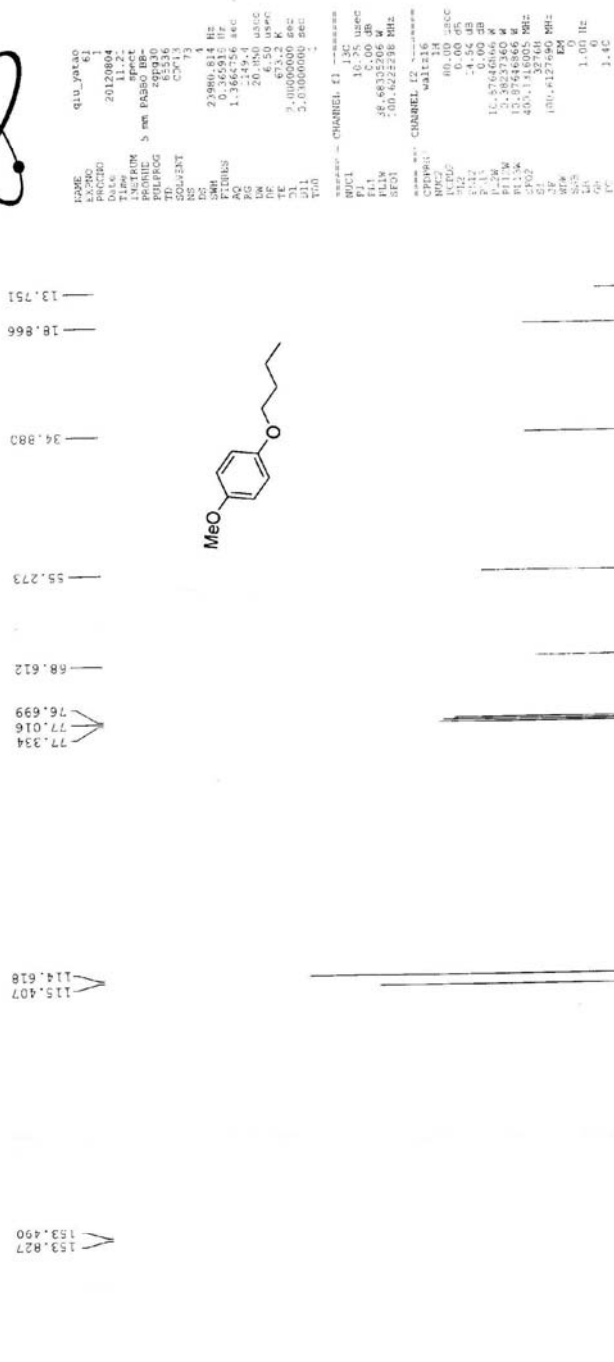
qyt-E404

NAME: qtu yarzo
 EXPNO: 62
 DATE_UTC: 20120804
 TIME: 13.13
 PROCNO: 1
 F2: 500
 F1: 125
 PULPROG: zgpg30
 TO: 60213
 CQ: 13
 ME: 14
 LS: 8378.147 Hz
 ST: 0.224213 Hz
 AN: 3.984243 deg
 PC: 40.000 usec
 SC: 4.50 usec
 TE: 300.2 K
 DE: 1.00000000 usec
 TD: 1
 =====
 CHANNEL f1 - 1H =====
 NU1: 14.50 MHz
 P1: 0.00 usec
 PL1: 0.00 dB
 SFO1: 420.134720 MHz
 AF1: 31.75 Hz
 ZF1: 0
 SF2: 455.1300000 MHz
 AF2: 0
 SF3: 0
 SF4: 0
 SSF: 0.0 Hz
 LS: 0
 TE: 1.00





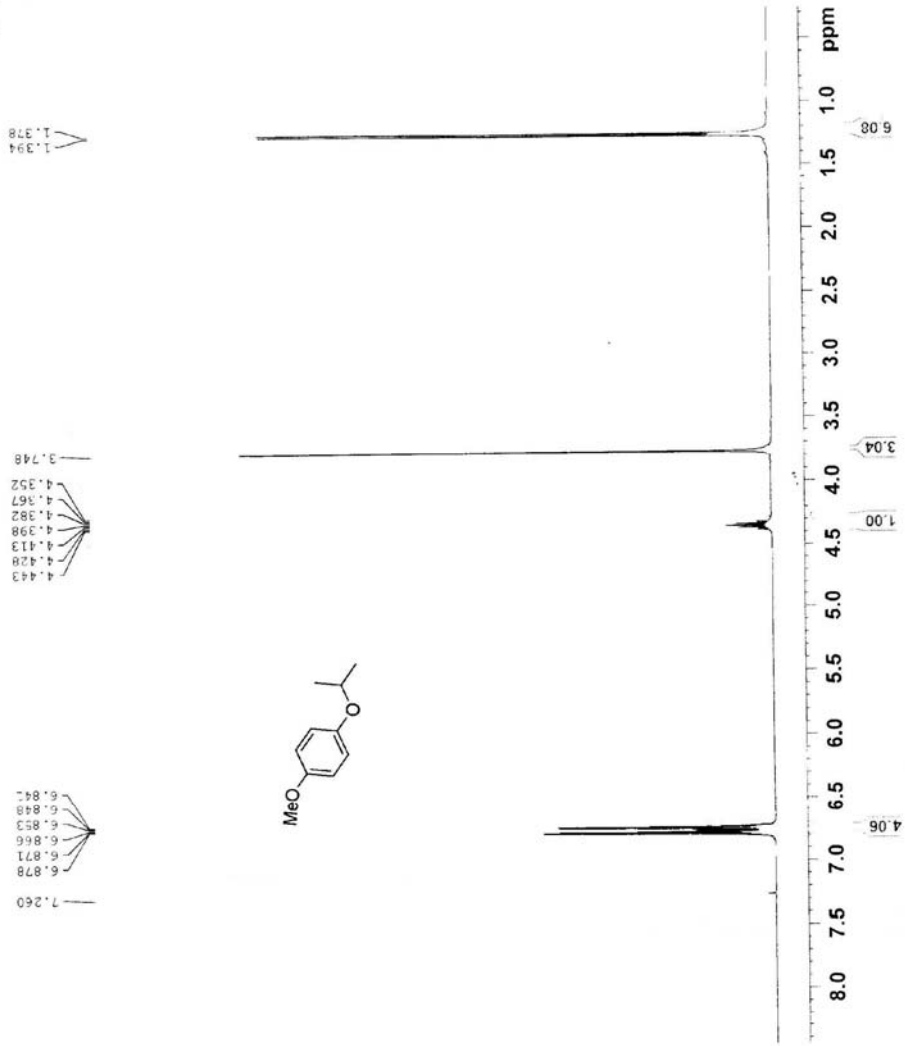
qyt-E404





q1y-E405

NAME q1y-E405
EXPNO 62
PROCNO 1
Date_ 11-28
Time 11:28
INSTRUM spect
PROBHD 5 mm QNP1H
PULPROG zgpg30
TD 65536
SOLVENT ccd1
US 2
DS 2
SWH 674.146 MHz
FIDRES 3.434233 Hz
AQ 0.0045
RG 32
WM 40.000000
TE 673.2 K
D0 1.00000000 sec
TD0 1
===== CHANNEL f1 =====
NUC1 1H
P1 12.50 sec
PL1 0.00 dB
PL2 0.00 dB
PL3 0.00 dB
PL4 0.00 dB
PL5 0.00 dB
PL6 0.00 dB
PL7 0.00 dB
PL8 0.00 dB
PL9 0.00 dB
PL10 0.00 dB
PL11 0.00 dB
PL12 0.00 dB
PL13 0.00 dB
PL14 0.00 dB
PL15 0.00 dB
PL16 0.00 dB
PL17 0.00 dB
PL18 0.00 dB
PL19 0.00 dB
PL20 0.00 dB
PL21 0.00 dB
PL22 0.00 dB
PL23 0.00 dB
PL24 0.00 dB
PL25 0.00 dB
PL26 0.00 dB
PL27 0.00 dB
PL28 0.00 dB
PL29 0.00 dB
PL30 0.00 dB
PL31 0.00 dB
PL32 0.00 dB
PL33 0.00 dB
PL34 0.00 dB
PL35 0.00 dB
PL36 0.00 dB
PL37 0.00 dB
PL38 0.00 dB
PL39 0.00 dB
PL40 0.00 dB
PL41 0.00 dB
PL42 0.00 dB
PL43 0.00 dB
PL44 0.00 dB
PL45 0.00 dB
PL46 0.00 dB
PL47 0.00 dB
PL48 0.00 dB
PL49 0.00 dB
PL50 0.00 dB
PL51 0.00 dB
PL52 0.00 dB
PL53 0.00 dB
PL54 0.00 dB
PL55 0.00 dB
PL56 0.00 dB
PL57 0.00 dB
PL58 0.00 dB
PL59 0.00 dB
PL60 0.00 dB
PL61 0.00 dB
PL62 0.00 dB
PL63 0.00 dB
PL64 0.00 dB
PL65 0.00 dB
PL66 0.00 dB
PL67 0.00 dB
PL68 0.00 dB
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PL70 0.00 dB
PL71 0.00 dB
PL72 0.00 dB
PL73 0.00 dB
PL74 0.00 dB
PL75 0.00 dB
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PL78 0.00 dB
PL79 0.00 dB
PL80 0.00 dB
PL81 0.00 dB
PL82 0.00 dB
PL83 0.00 dB
PL84 0.00 dB
PL85 0.00 dB
PL86 0.00 dB
PL87 0.00 dB
PL88 0.00 dB
PL89 0.00 dB
PL90 0.00 dB
PL91 0.00 dB
PL92 0.00 dB
PL93 0.00 dB
PL94 0.00 dB
PL95 0.00 dB
PL96 0.00 dB
PL97 0.00 dB
PL98 0.00 dB
PL99 0.00 dB
PL100 0.00 dB

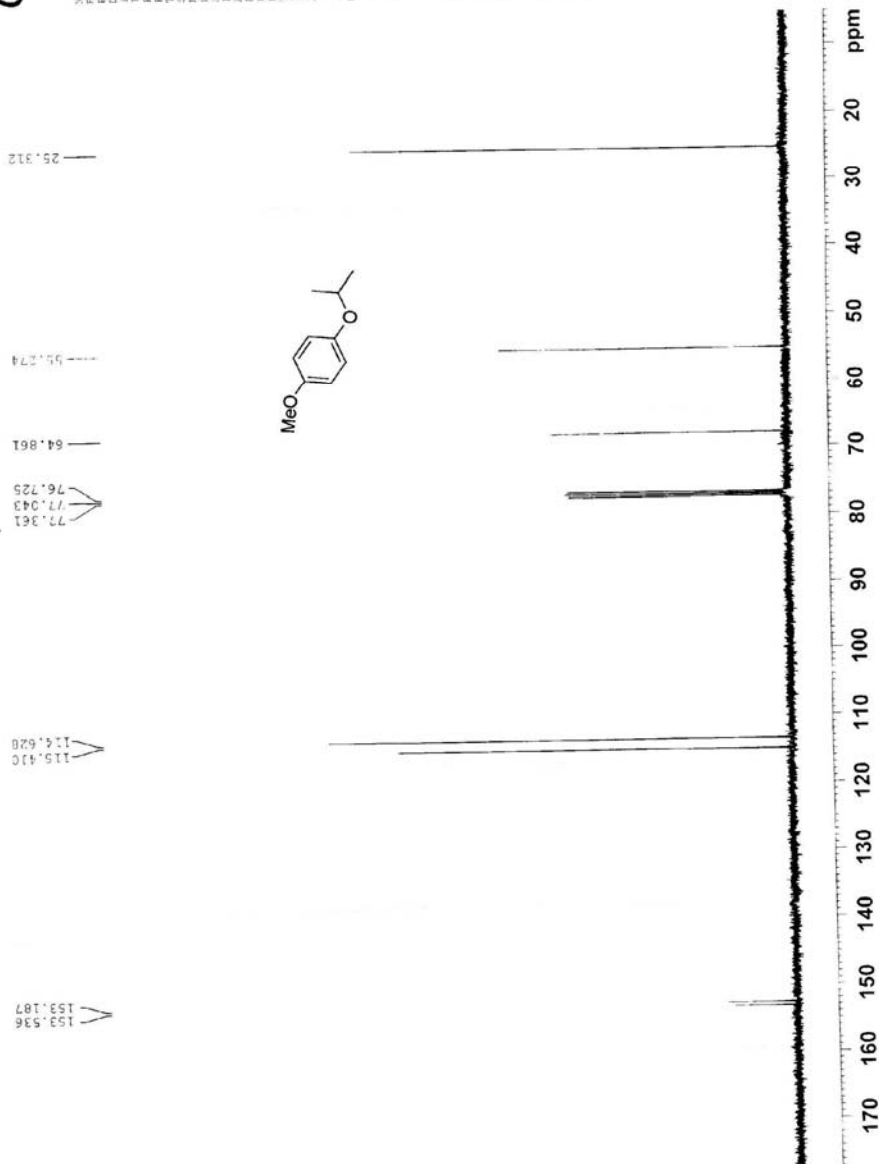


3p



NAME: 4-((2S)-2-oxo-2H-chromen-6-yl)phenol
PROCNO: 1
DATE_: 20110604
TIME: 12.00
INSTRUM: spect
PROBHD: 5 mm PABBO BBI
PULPROG: zgpg30
SOLVENT: CDCl3
NS: 413
DS: 4
SWH: 33960.816 MHz
FIDRES: 0.442018 MHz
AQ: 1.984356 sec
RG: 2048
UN: 20.4550 uSARC
UF: 4.50 uSAC
SI: 327680000
C11: 1.0000000 sec
T20: 1.0000000 sec

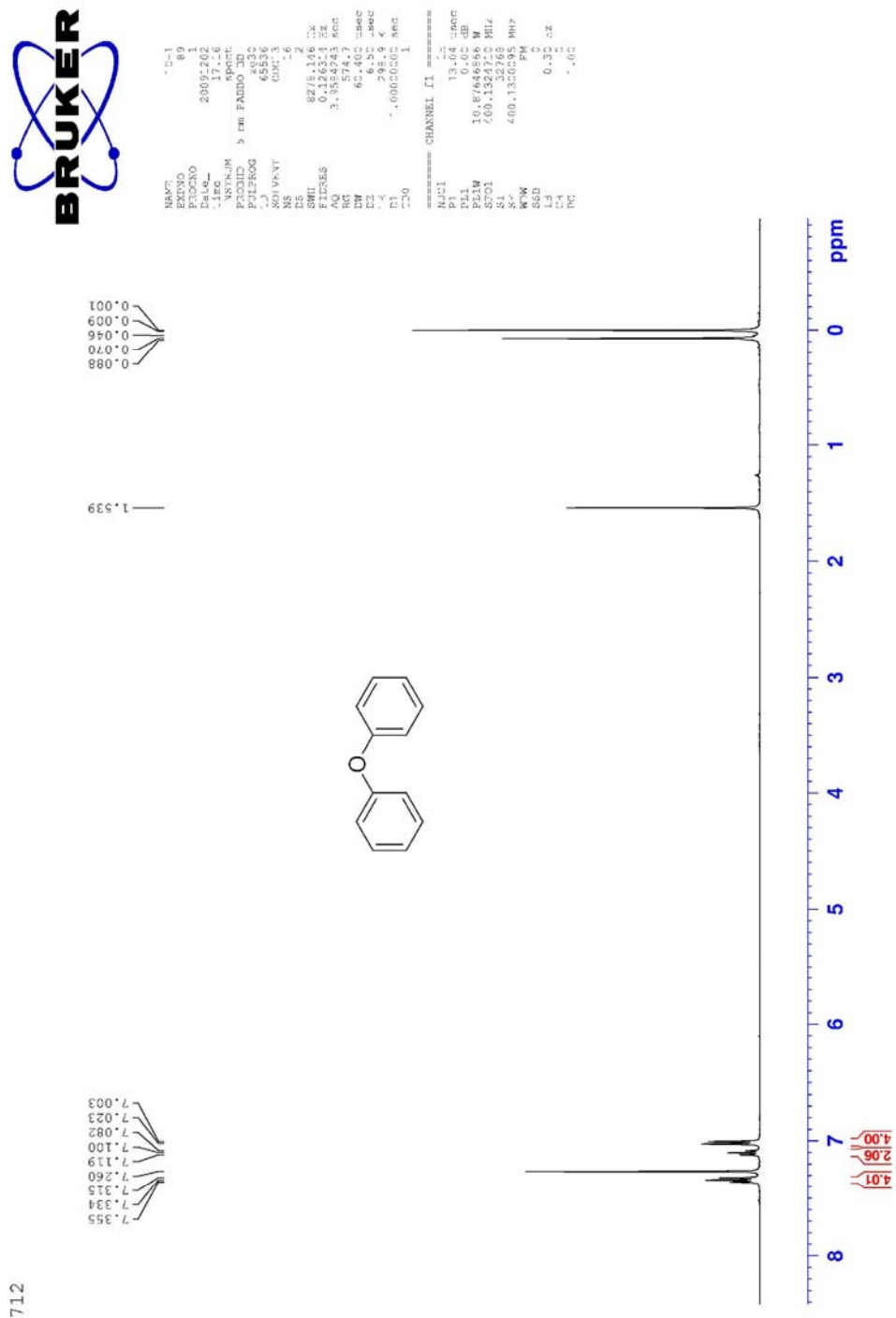
===== CHANNEL f1 =====
NUC1: 13C
P1: 120.000000 sec
PL1: 2.00 dB
PL12: 19.000000 dB
SFO1: 101.625375 MHz
===== CHANNEL f2 =====
CPDPRG2: zgpg30
NUC2: 1H
P2: 12.000000 sec
PL2: 0.00 dB
PL12: 19.000000 dB
SFO2: 500.136450 MHz
===== CHANNEL f3 =====
CPDPRG3: zgpg30
NUC3: 1H
P3: 12.000000 sec
PL3: 0.00 dB
PL13: 19.000000 dB
SFO3: 500.136450 MHz
===== CHANNEL f4 =====
CPDPRG4: zgpg30
NUC4: 1H
P4: 12.000000 sec
PL4: 0.00 dB
PL14: 19.000000 dB
SFO4: 500.136450 MHz



qyt-E405

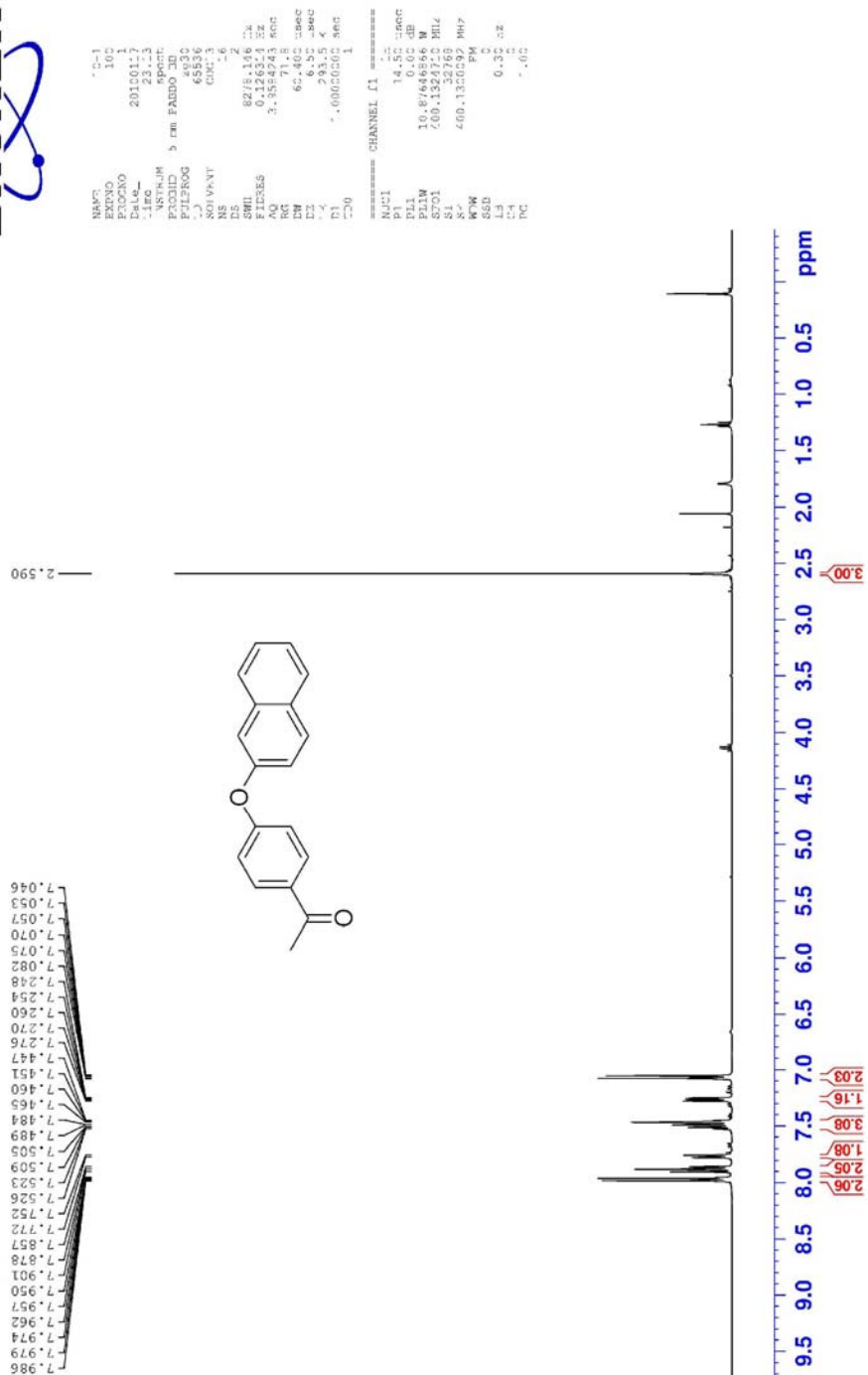
3p

CuI-Catalyzed Coupling Reaction of Aryl Bromide with Phenols or 2-Naphthol: Table 3



712

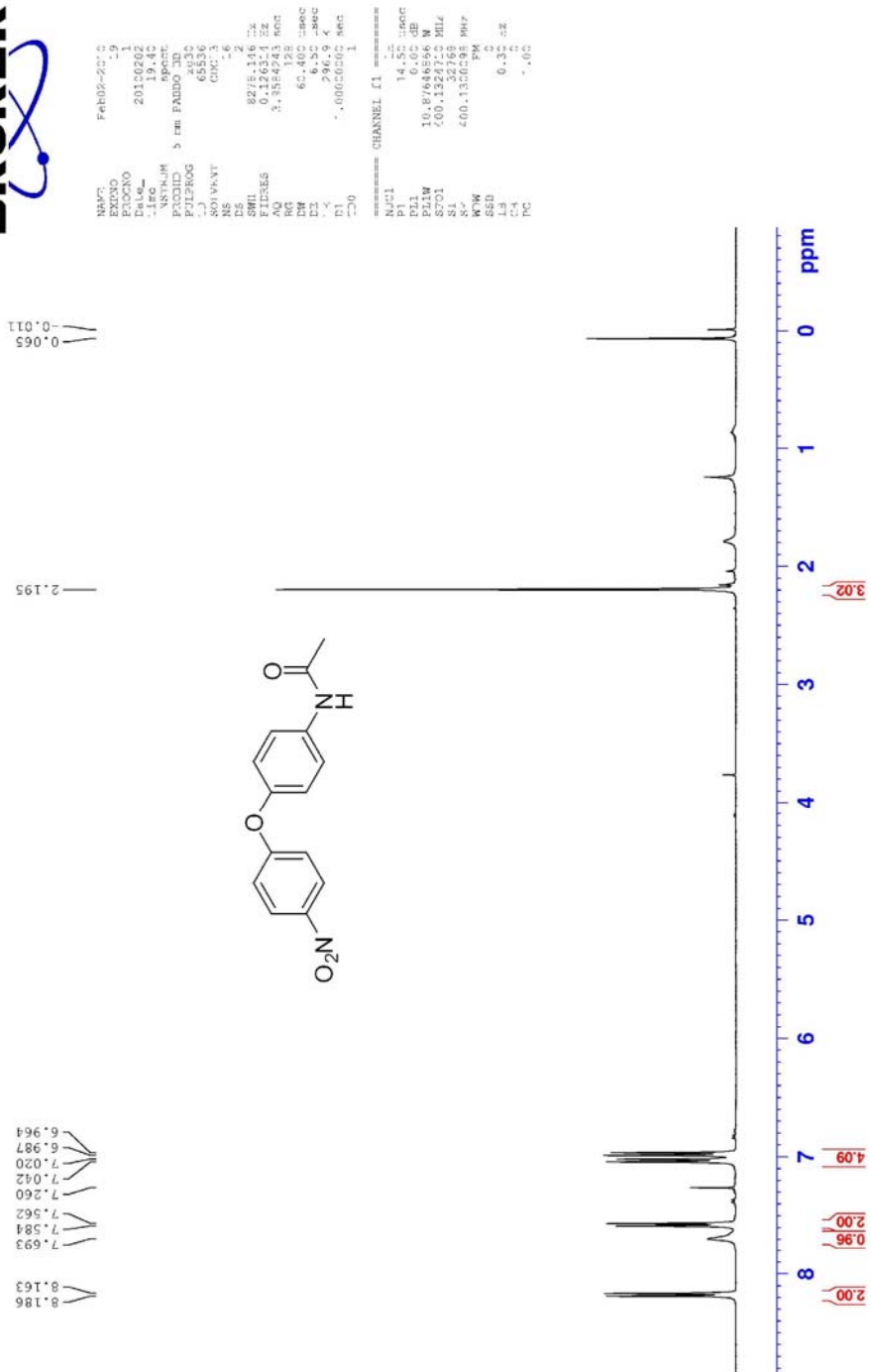
5a



5c

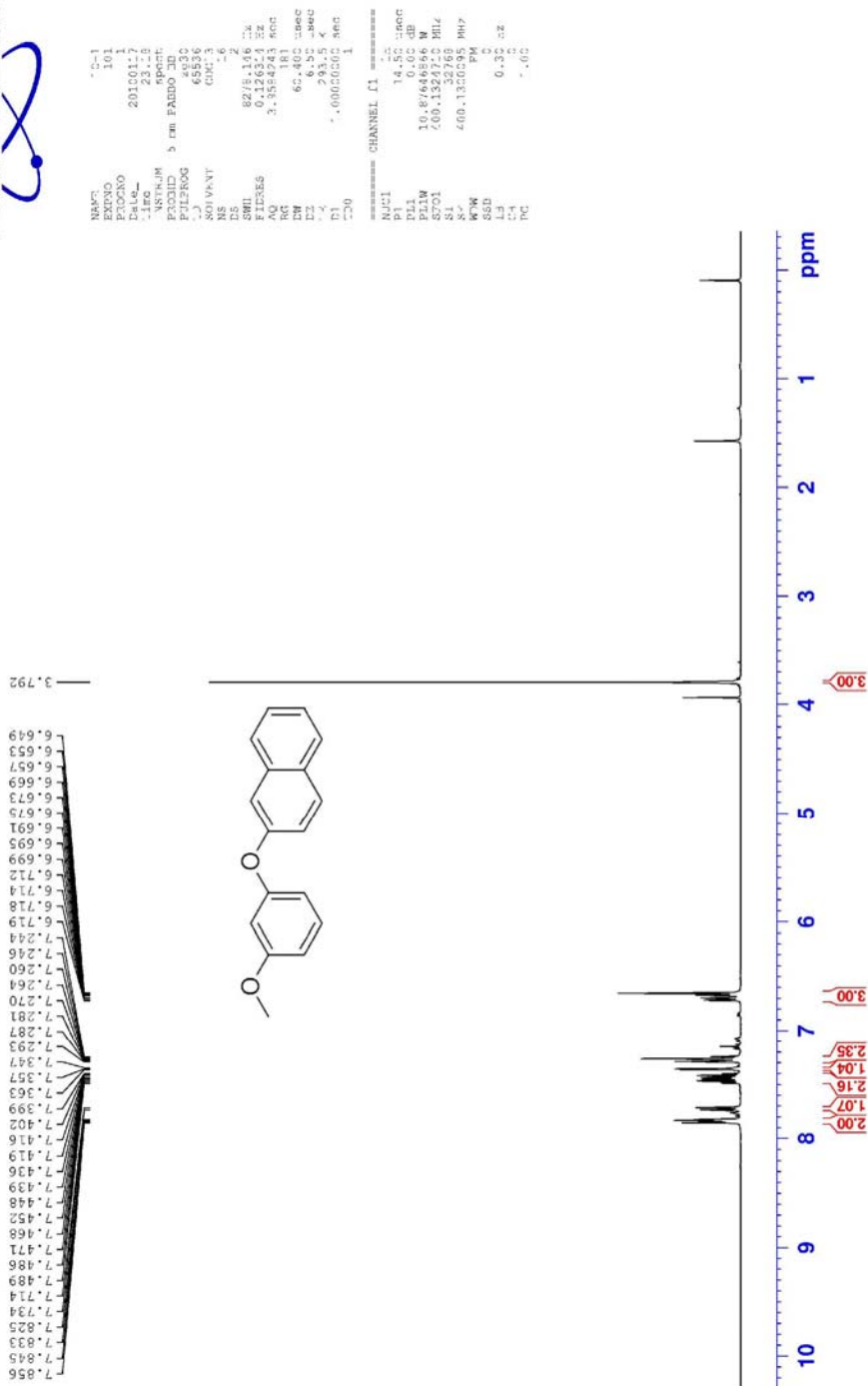


qyt473



5d

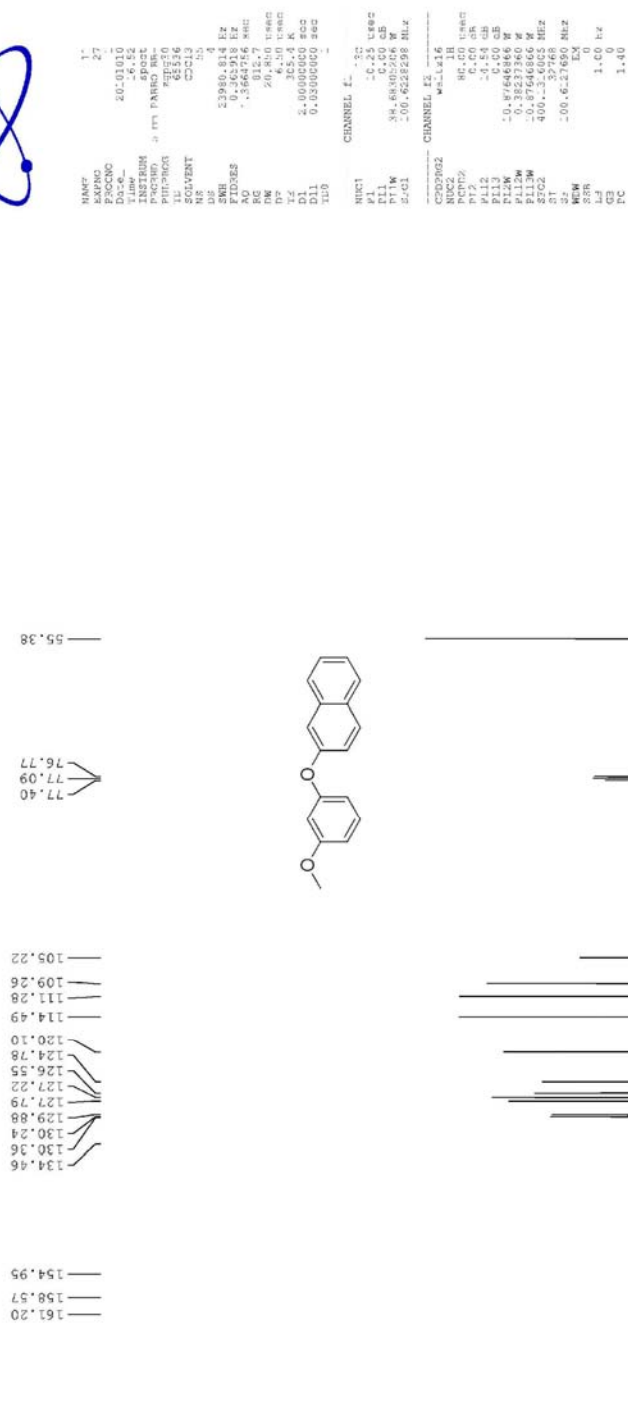
739



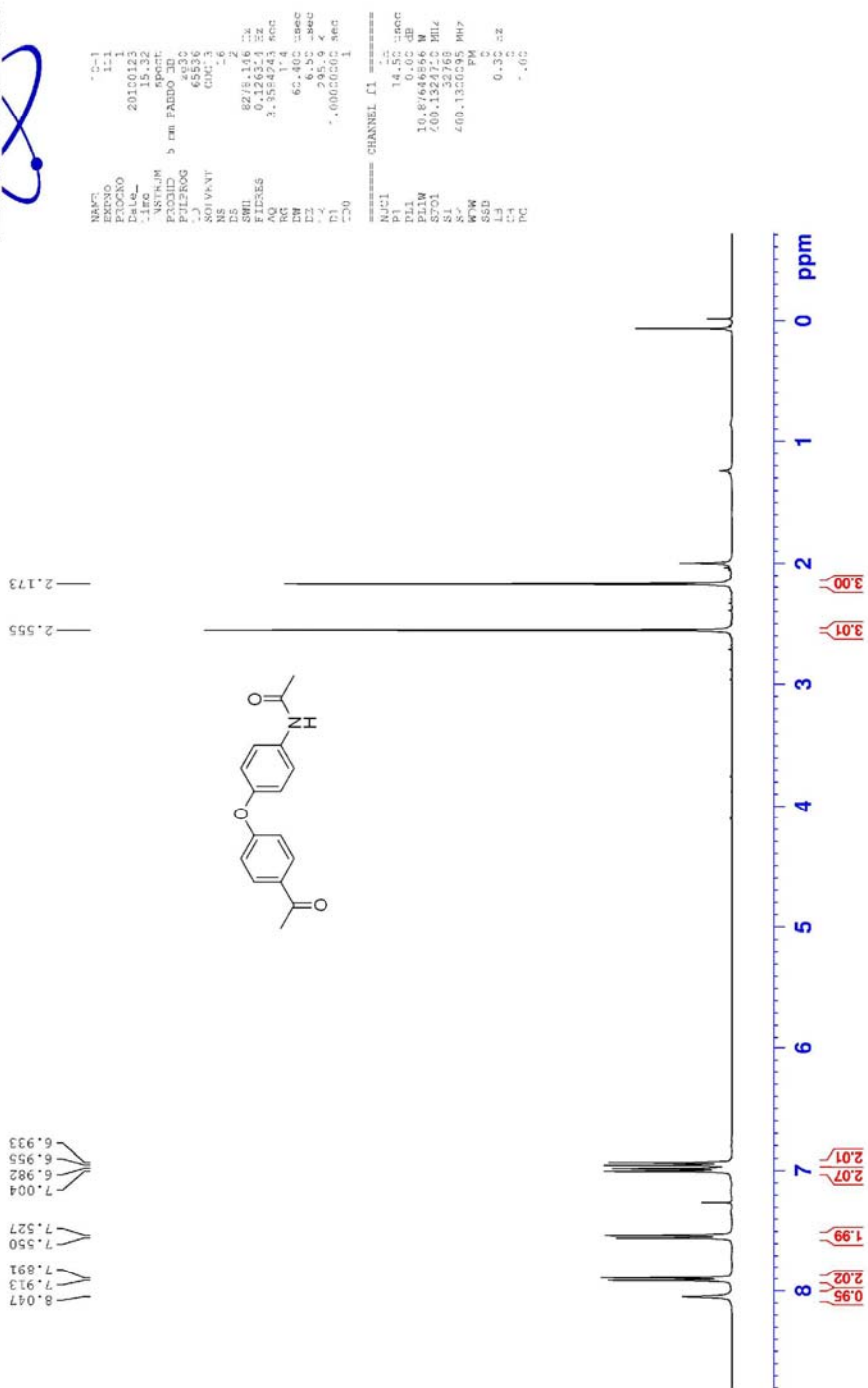
5e



gyl-739c



5e



5f



091-760



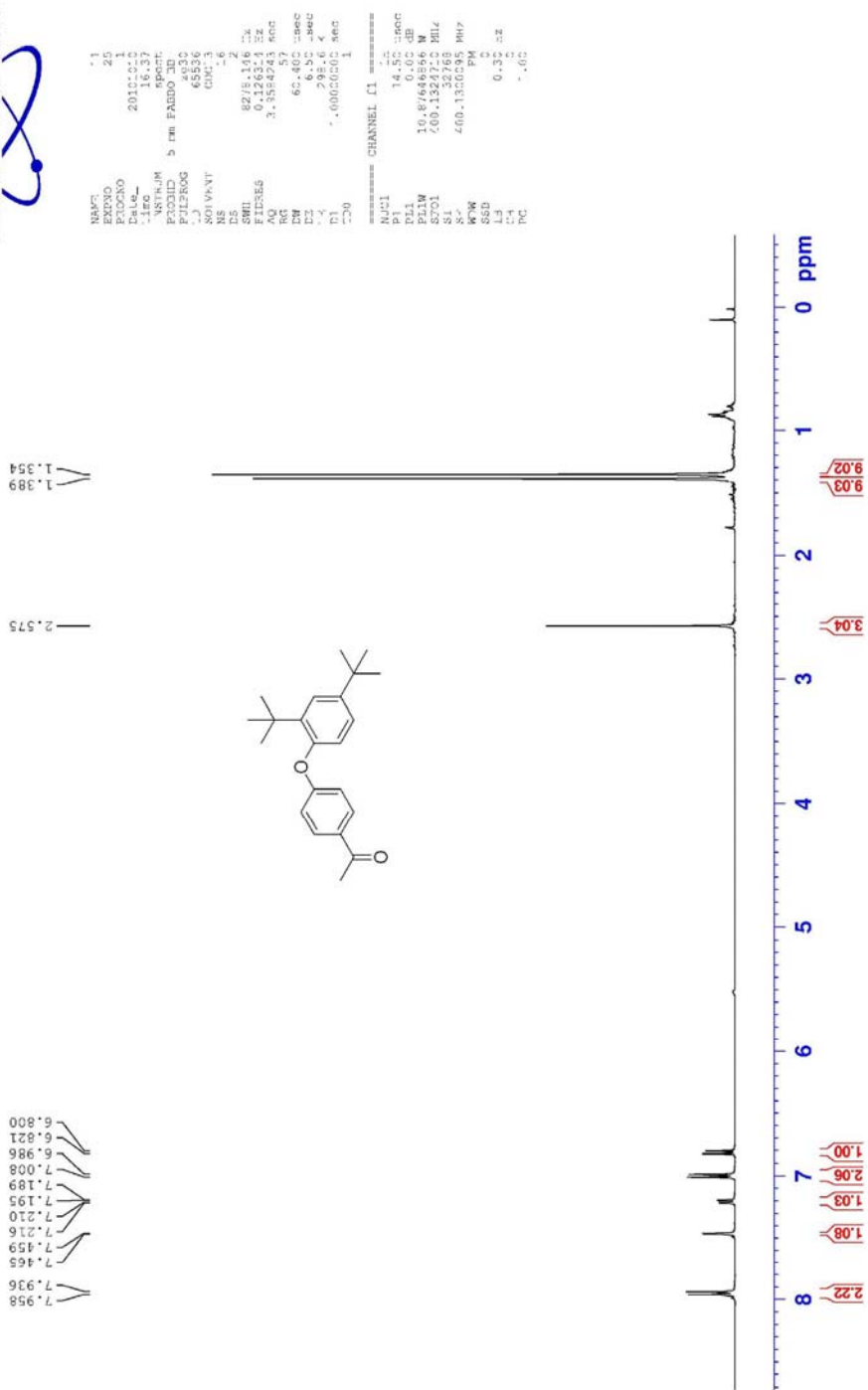
```

NAME_1 091-760
EXPNO 1
PROCNO 1
Date_ 20100121
Time 14.52
PULPROG zgpg30
PROBHD 5 mm PABBO-3D
PULPROG zgpg30
SOLVENT CDCl3
NS 2048
DS 4
SWH 8278.146 Hz
FIDRES 0.12637 Hz
AQ 3.358774 sec
RG 384
CM 62.400 usec
CZ 6.55 usec
D1 2.885 sec
D2 0.06000000 sec
D3 0.00000000 sec
===== CHANNEL f1 =====
NUC1 13C
P1 14.00 usec
PL1 0.00 dB
PL12 0.00 dB
PL13 0.00 dB
PL14 0.00 dB
PL15 0.00 dB
PL16 0.00 dB
PL17 0.00 dB
PL18 0.00 dB
PL19 0.00 dB
PL20 0.00 dB
PL21 10.87648556 MHz
SFO1 700.1324710 MHz
SI 32768
SF 700.1324710 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0.00 Hz
PC 1.00
    
```

5g



qyt-761



```

NAME_          1
EXPNO         25
PROCNO        1
Date_         2010-05-0
Time          16:37
INSTRUM       spect
PROBHD        5 mm F400QNP
PULPROG       zgpg30
AQ            65536
SOLVENT       CDCl3
NS            2
DS            2
SWH           8278.116 Hz
FIDRES        0.12651 Hz
AQ           3.358475 sec
RG            63 sec
CM           62.400 usec
CZ           6.55 usec
DI           288.6 Hz
DE           1.00000000 sec
===== CHANNEL f1 =====
NUC1          13C
P1           14.00 usec
PL1          0.00 dB
PL12         19.00 dB
PL13         19.00 dB
PL14         19.00 dB
PL15         19.00 dB
PL16         19.00 dB
PL17         19.00 dB
PL18         19.00 dB
PL19         19.00 dB
PL20         19.00 dB
PL21         19.00 dB
PL22         19.00 dB
PL23         19.00 dB
PL24         19.00 dB
PL25         19.00 dB
PL26         19.00 dB
PL27         19.00 dB
PL28         19.00 dB
PL29         19.00 dB
PL30         19.00 dB
=====
  
```

5h



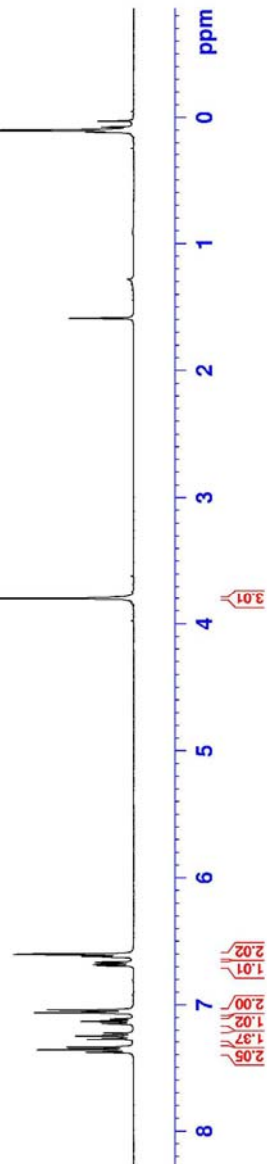
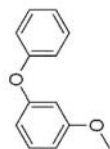
q17c-7163

7.380
7.361
7.341
7.278
7.266
7.260
7.244
7.224
7.189
7.130
7.112
7.061
7.040
6.990
6.684
6.667
6.618
6.603
6.600

3.800

```

NAME: 2m25-2013
EXPNO: 1
PROCNO: 1
Date_ : 20130125
Time: 19.49
INSTRUM: spect
PROBHD: 5 mm PAULI DR
PULPROG: zgpg
AQ: 6.556
RG: 320
SOLVENT: CHCl3
NS: 2
DS: 2
SWH: 8278.146 Hz
F2RES: 0.12633 Hz
AQ: 3.35578 sec
RG: 181.600
TM: 62.400 sec
E2: 6.32 sec
E3: 296.00 sec
D1: 1.00000000 sec
D2: 0
===== CHANNEL f1 =====
NUC1: 13C
P1: 14.00 sec
PL1: 0.00 dB
PL12: 0.00 dB
PL13: 10.87748556 W
SFO1: 100.628740 MHz
SI: 32768
SF: 400.1500000 MHz
WDW: EM
SSB: 0
LB: 0.30 Hz
GB: 0
PC: 1.00
    
```



5i

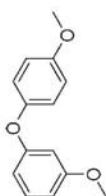


qyt-7164

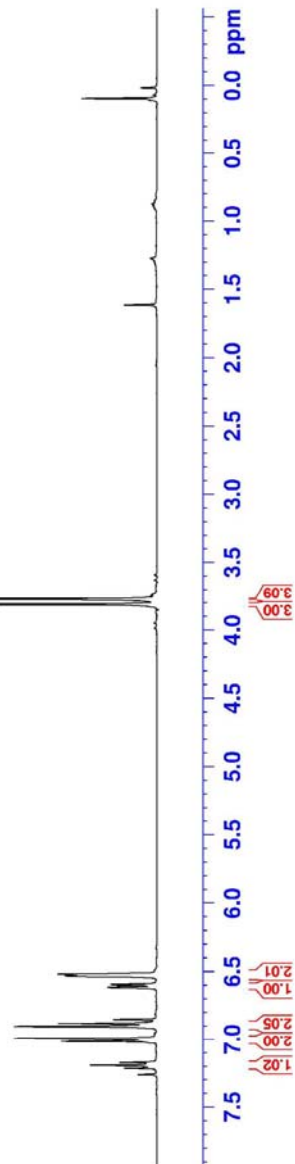
7.260
7.213
7.202
7.191
7.180
7.170
7.104
6.992
6.902
6.880
6.851
6.813
6.593
6.531
6.525
6.518

3.811
3.772

0.095
0.016

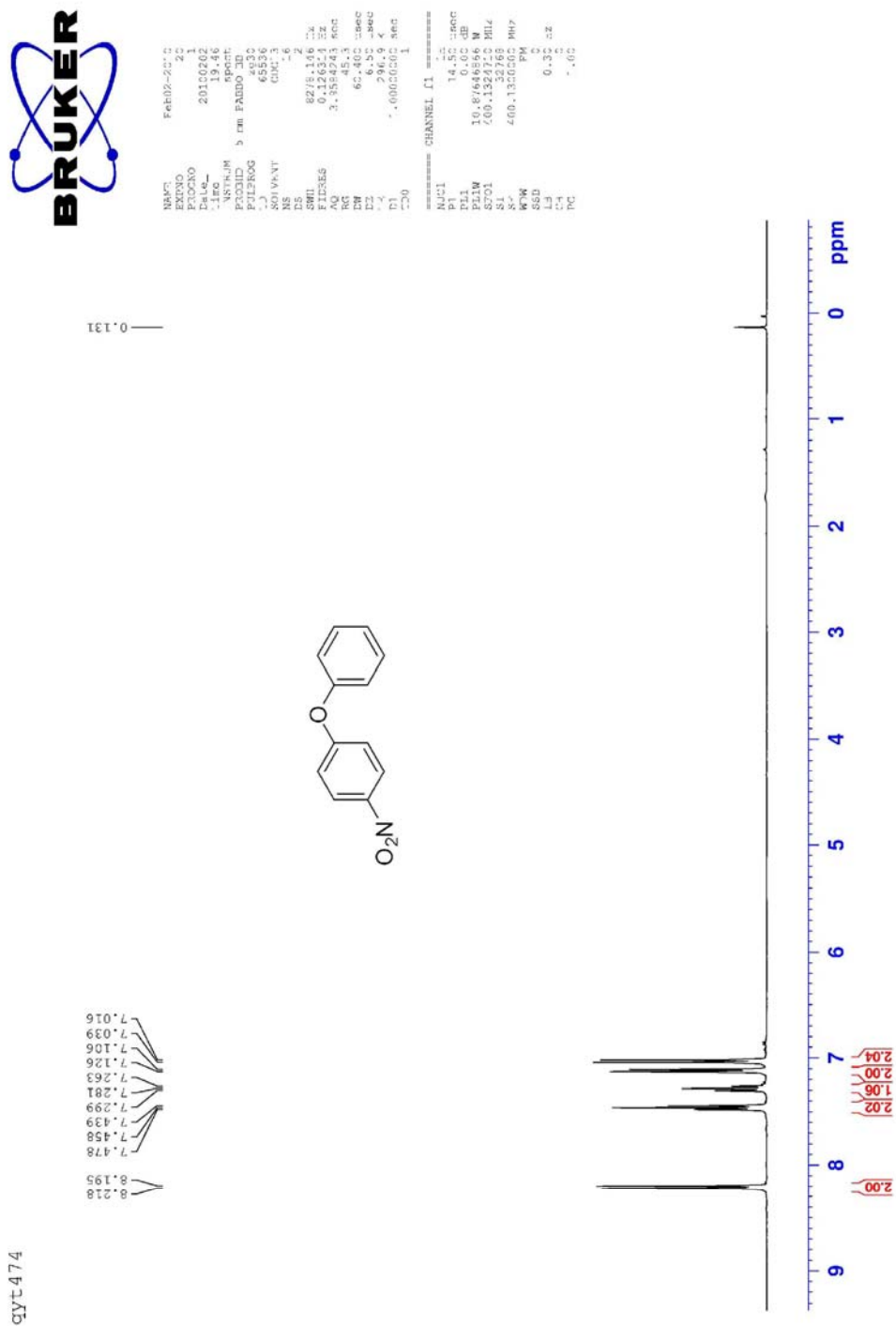


NAME: 2m25-201
EXPNO: 62
PROCNO: 1
Date_ : 20130125
Time: 19.55
PROBHD: 5 mm PABBO 3H
PULPROG: zgpg30
AQ: 6.556
RG: 327.50
SOLVENT: CHC-3
NS: 2
DS: 2
SWH: 8275.146 Hz
F2: 0.12633 Hz
AQ: 3.33574 sec
RG: 327.50
TM: 62.400 sec
E2: 6.556 sec
D1: 2.9600 sec
D2: 0.00000000 sec
D3: 0.00000000 sec
===== CHANNEL f1 =====
NUC1: 1H
P1: 12.00 usec
PL1: 0.00 dB
PL12: 0.00 dB
PL1W: 10.87448556 W
SFO1: 500.132740 MHz
SI: 32768
WDW: EM
SSB: 0
L3: 0.00 usec
C4: 0.00 usec
PC: 1.00



5j

CuI-Catalyzed Coupling Reaction of Aryl Chloride with Phenols or 2-Naphthol: Table 4

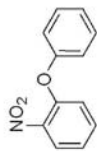


7a



```

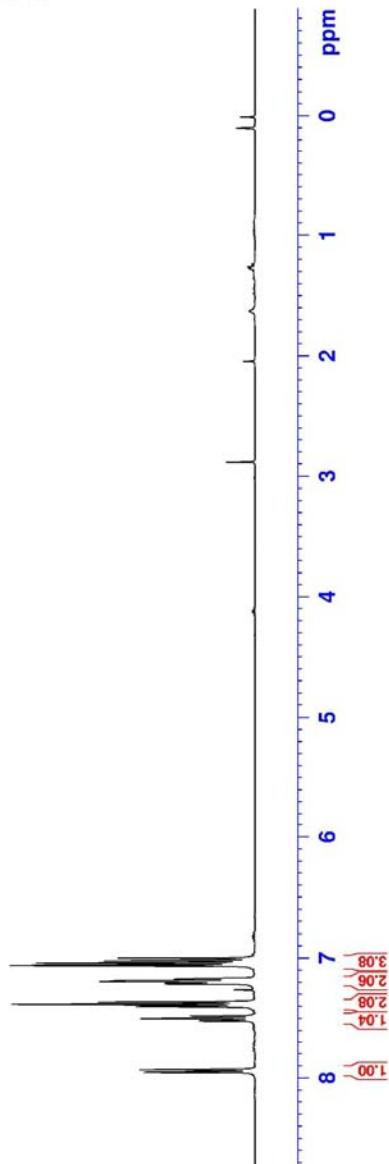
NAME: Feb02-2013
EXPNO: 21
PROCNO: 1
Date_ : 20100202
Time: 19:53
INSTRUM: spect
PROBHD: 5 mm F4ND0 1H
PULPROG: zgpg30
JMOD: zgpg30
SFO1: 400.1320000 MHz
WDW: EM
SSB: 0
LB: 0.35 Hz
GB: 0
PC: 1.60
===== CHANNEL f1 =====
NUC1: 13C
P1: 14.00 usec
PL1: 0.00 dB
PL12: 0.00 dB
PL14: 0.00 dB
PL1W: 10.87646566 W
SFO1: 101.6253750 MHz
SI: 32768
SF: 400.1320000 MHz
K0: 0
SSB: 0
LB: 0.35 Hz
GB: 0
PC: 1.60
    
```



qyt475

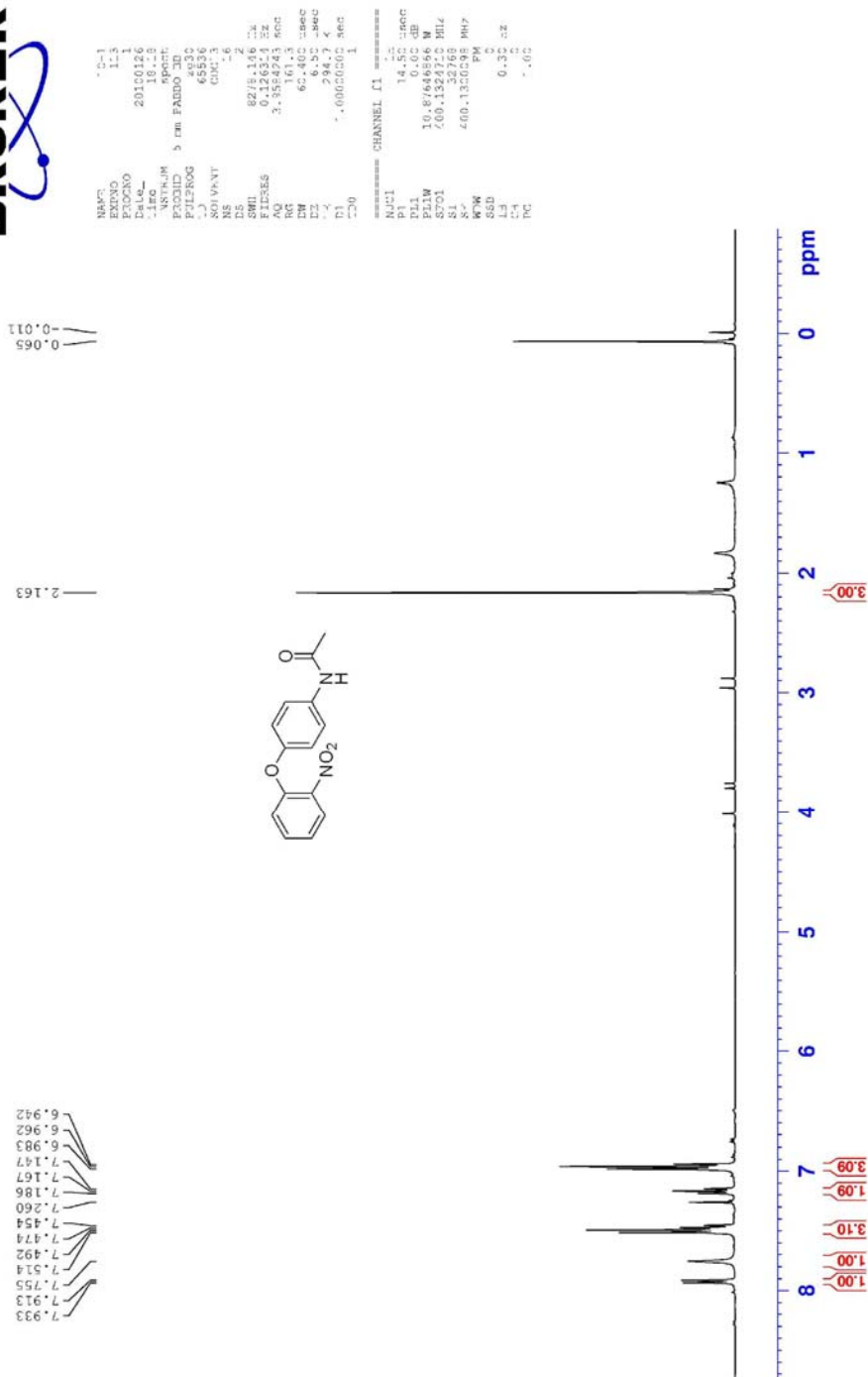
7.950
7.930
7.918
7.916
7.916
7.497
7.478
7.476
7.399
7.380
7.360
7.261
7.211
7.202
7.190
7.184
7.172
7.172
7.059
7.038
7.019
6.998

0.102
0.012



7b

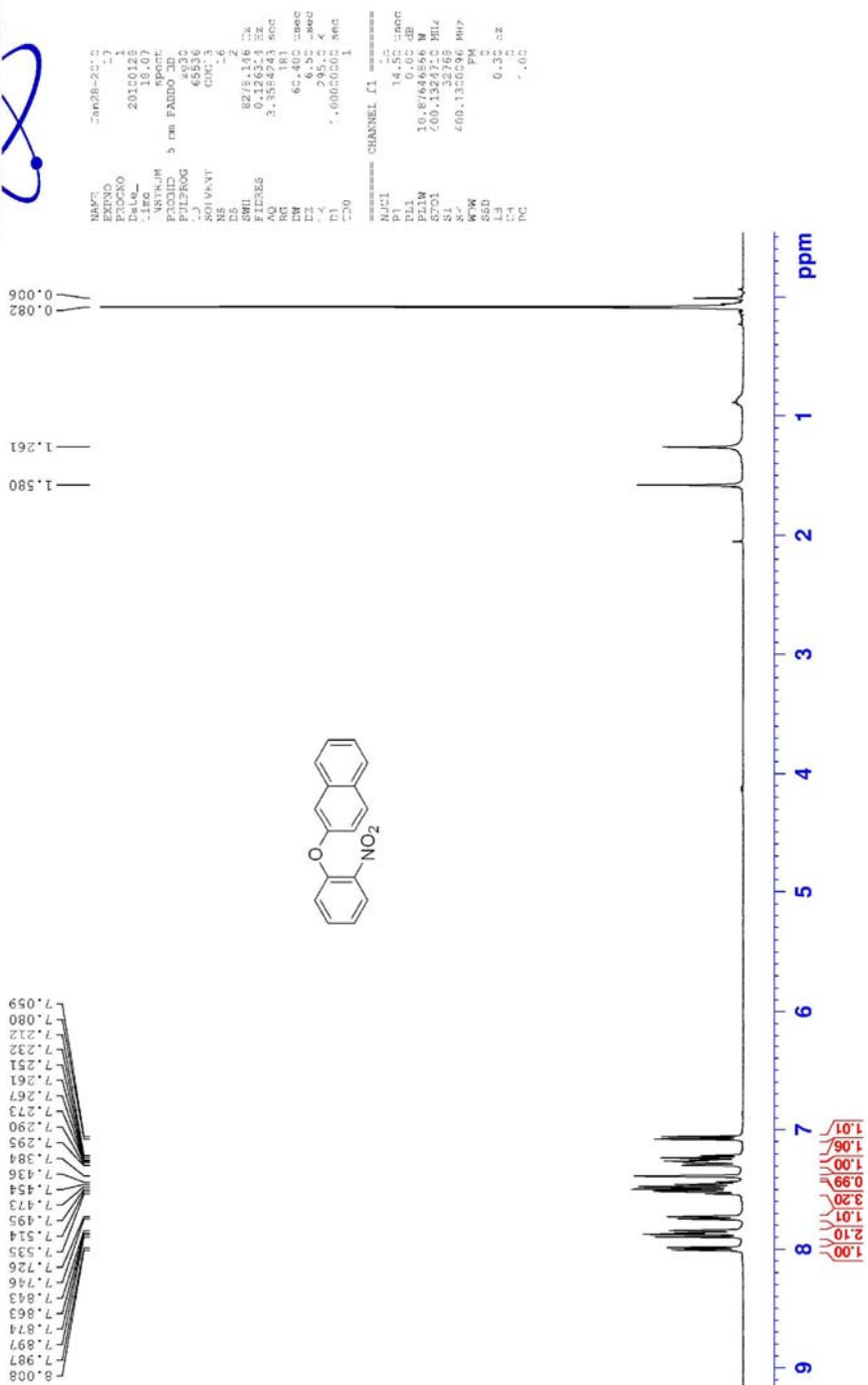
767



7c



qyt768



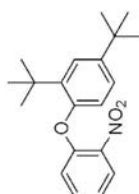
7d



qyt770

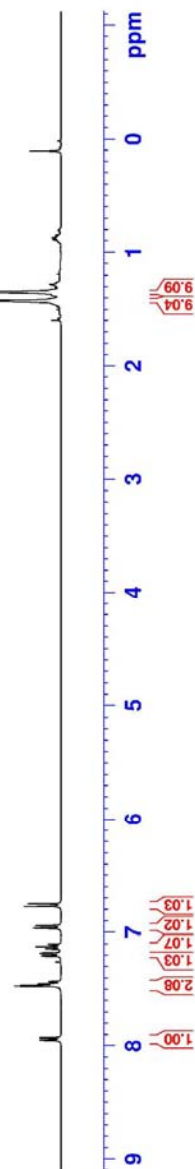
7.952
7.949
7.932
7.929
7.472
7.466
7.454
7.436
7.433
7.260
7.208
7.202
7.187
7.181
7.144
7.125
7.105
6.963
6.942
6.773
6.752

1.423
1.346



```

NAME:
EXPNO: 2
PROCNO: 1
Date_ : 20100203
Time: 14.02
PROBHD: 5 mm F4DD0 1H
PULPROG: zgpg30
F2 - : 65536
SFO1: 400.1324740 MHz
NUC1: 1H
NUC2:
PC:
===== CHANNEL f1 =====
NUC1: 1H
P1: 14.00 usec
PL1: 0.00 dB
PL12:
PL1W: 10.87646566 MHz
SFO1: 400.1324740 MHz
SI: 32768
SF: 400.1324740 MHz
KRM: 0
SSB: 0
LB: 0.30 usec
GB:
PC: 0.02
    
```



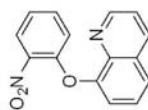
7e



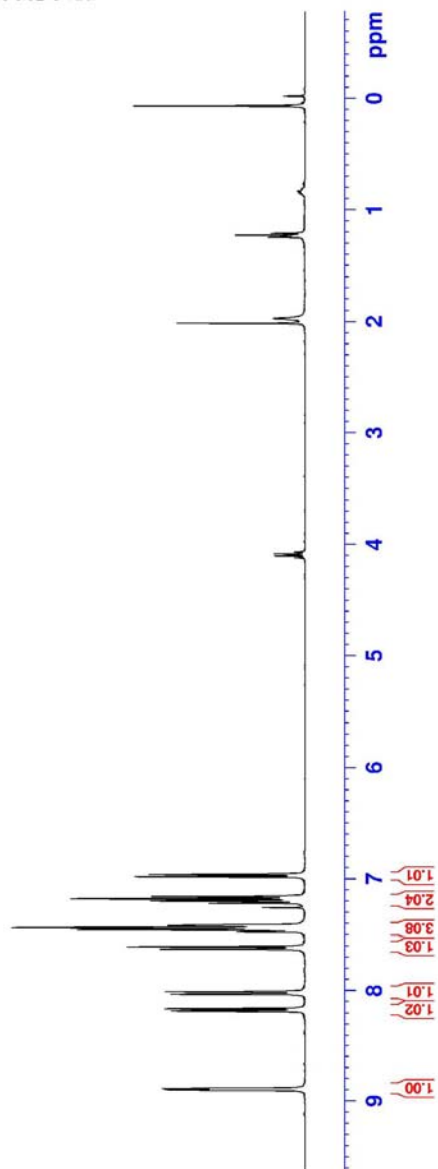
0.067
-0.021

qyt778

8.897
8.887
8.182
8.161
8.028
8.008
7.630
7.609
7.476
7.459
7.439
7.424
7.421
7.415
7.261
7.220
7.201
7.180
7.160
6.982
6.961

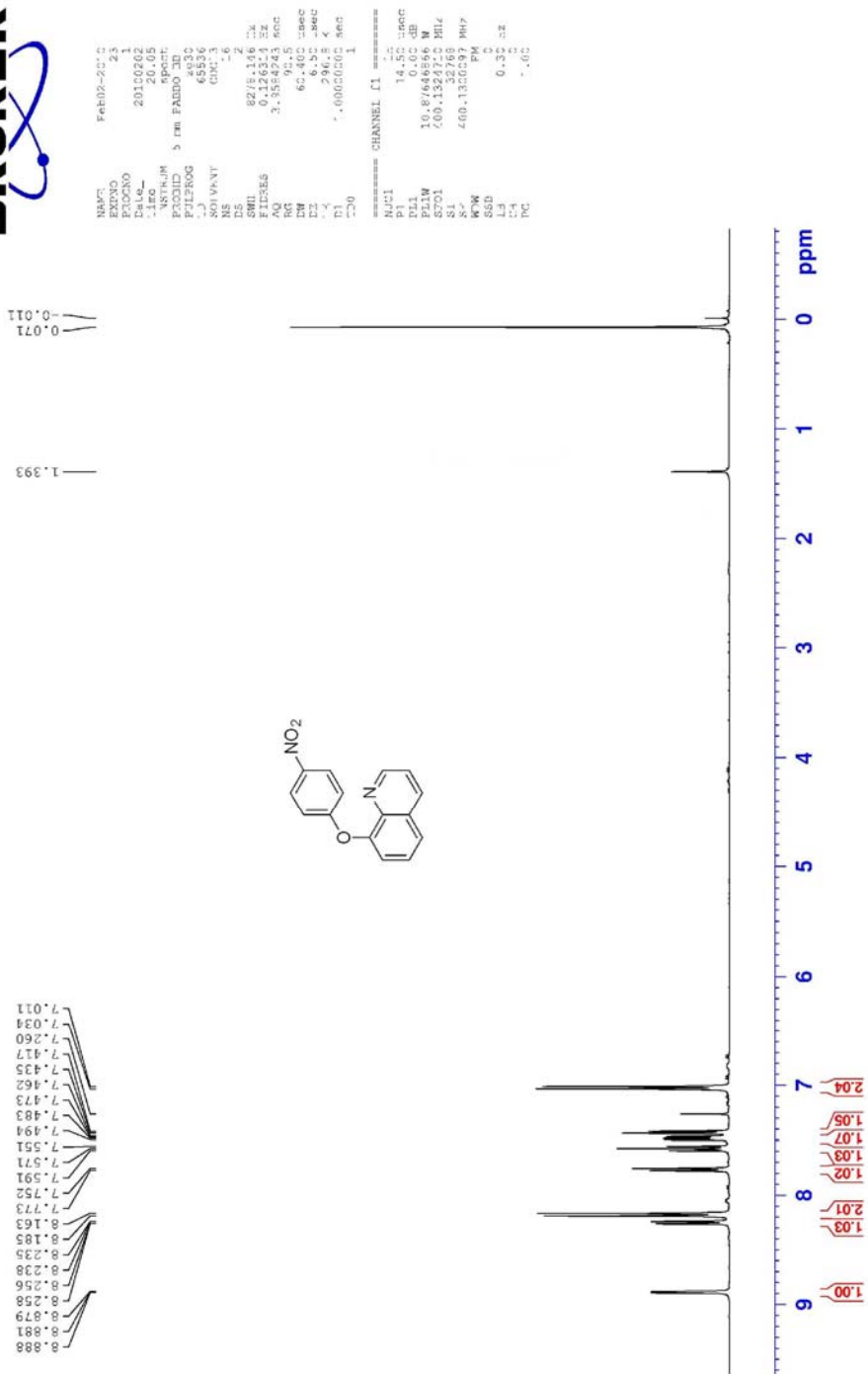


NAME: Feb02-2013
EXPNO: 1
PROCNO: 1
Date_ : 20130202
Time: 19.59
PROBHD: 5 mm F4DD020
PULPROG: zgpg30
F4: 65536
SOLVENT: CHCl3
DS: 2
SWH: 8228.146 Hz
FIDRES: 0.1263432
AQ: 3.354748 sec
RG: 62.402 bins
EQ: 6.85 bins
E2: 294.9 Hz
F1: 4.0000000 sec
C2: 1
===== CHANNEL f1 =====
NUC1: 13C
P1: 14.00 usec
PL1: 0.00 dB
PL12: 10.87666566 W
SFO1: 76.0132410 MHz
SI: 32768 bits
KRM: 0
SSB: 0
LB: 0.30 Hz
GB: 0
PC: 0.02



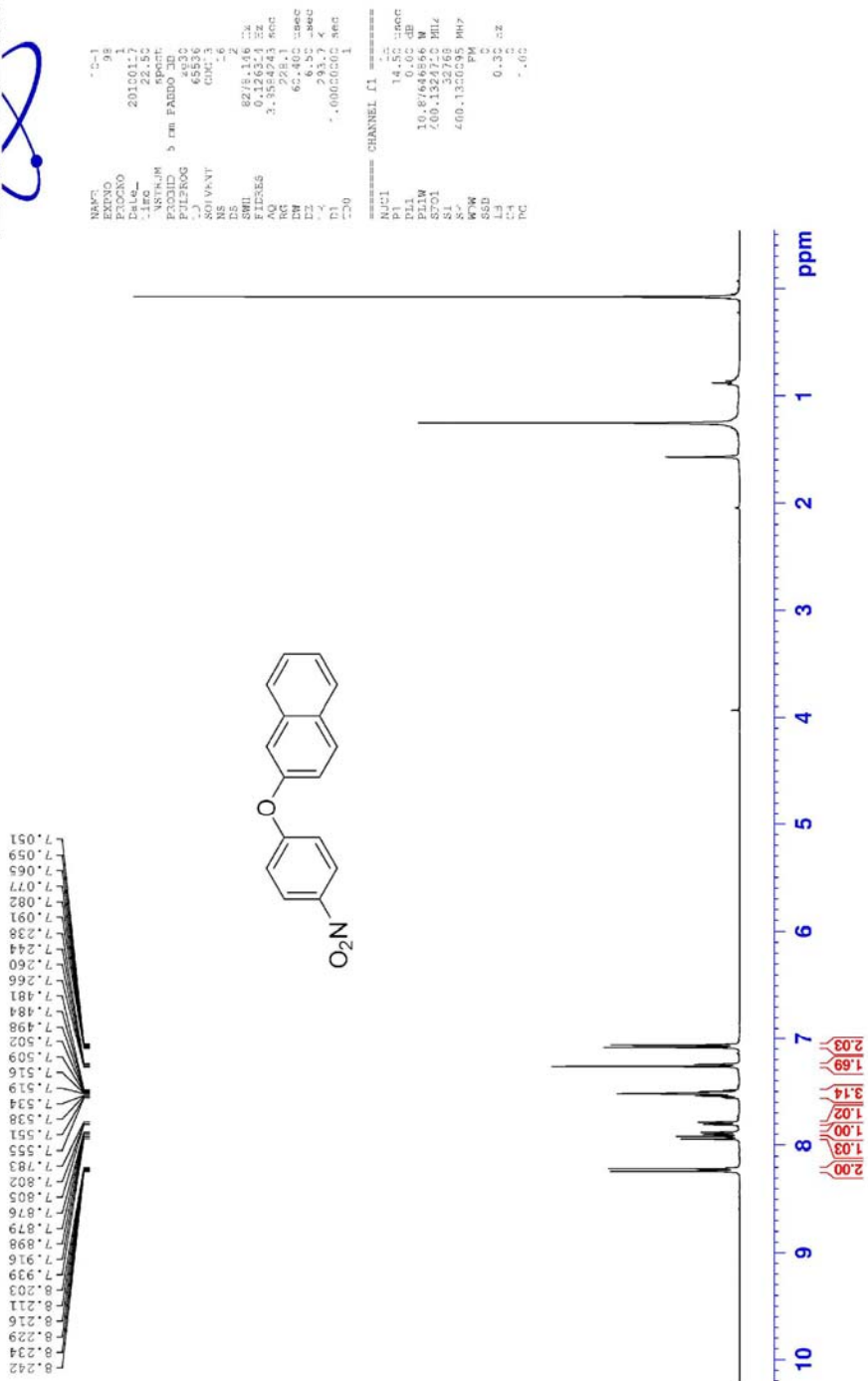


qyt779



7g

729



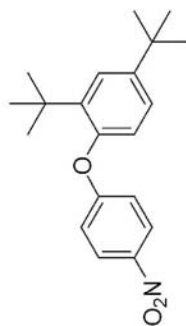
7h

730

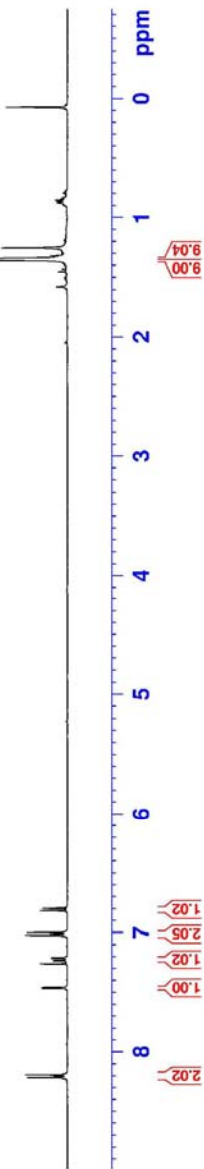


8.222
8.214
8.208
8.196
8.191
8.182
7.466
7.460
7.238
7.232
7.217
7.211
7.032
7.024
7.018
7.006
7.001
6.992
6.817
6.796

1.357
1.345



NAME:
EXPNO: 99
PROCNO: 1
Date_ : 20110117
Time: 22.55
PROBHD: 5 mm F4DD2 ZD
PULPROG: zgpg30
PCPDPRG: 65536
NOVPRG: CHC 3
DS: 2
SWH: 8224.116 Hz
FIDRES: 0.112631 Hz
AQ: 3.358473 sec
RG: 62.460
CW: 62.460
EZ: 6.55
DZ: 293.37
D1: 0.60000000 sec
D2: 1
D3: 0
===== CHANNEL f1 =====
NUC1: 1H
P1: 12.00
PL1: 0.00 dB
PL12: 10.87666666 M
SFO1: 200.1324740 MHz
SI: 32768
SF: 400.1324740 MHz
SSB: 0
LB: 0.32
GB: 0
PC: 0.02



7i

