

Supporting Information

for

Regioselective chlorination and bromination of unprotected anilines under mild conditions using copper halides in ionic liquids

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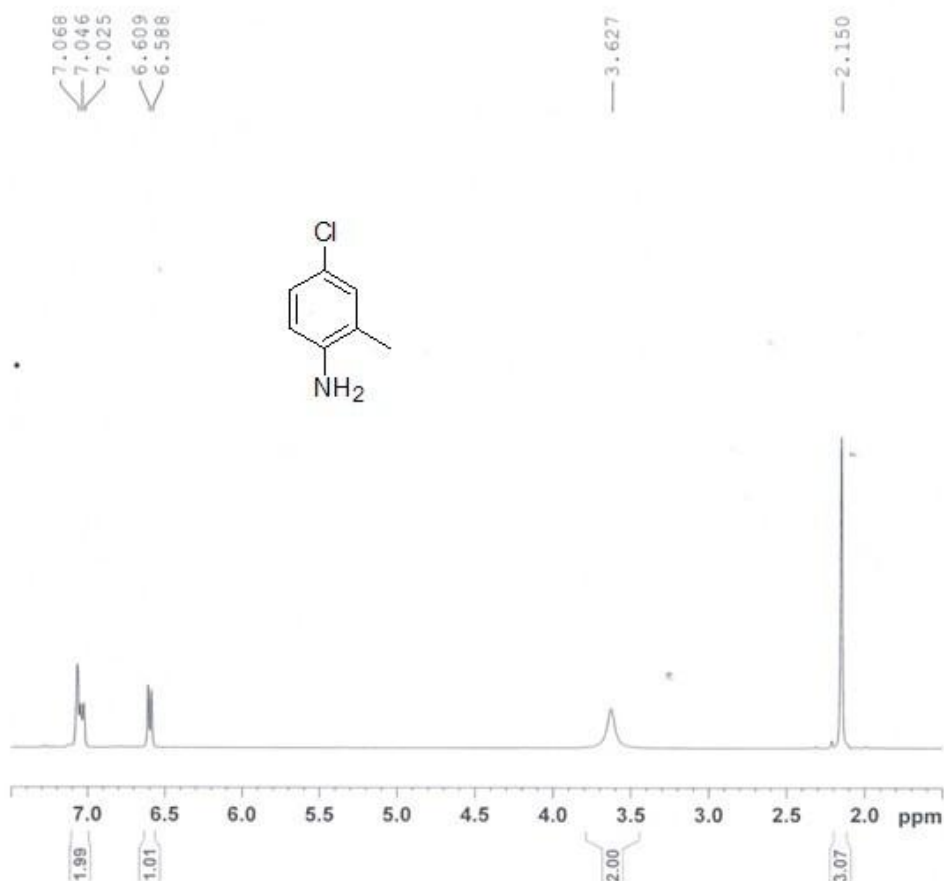
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* Corresponding author

NMR spectra of all compounds

4-CHLORO-2-METHYLANILINE (**4a**): ¹H NMR



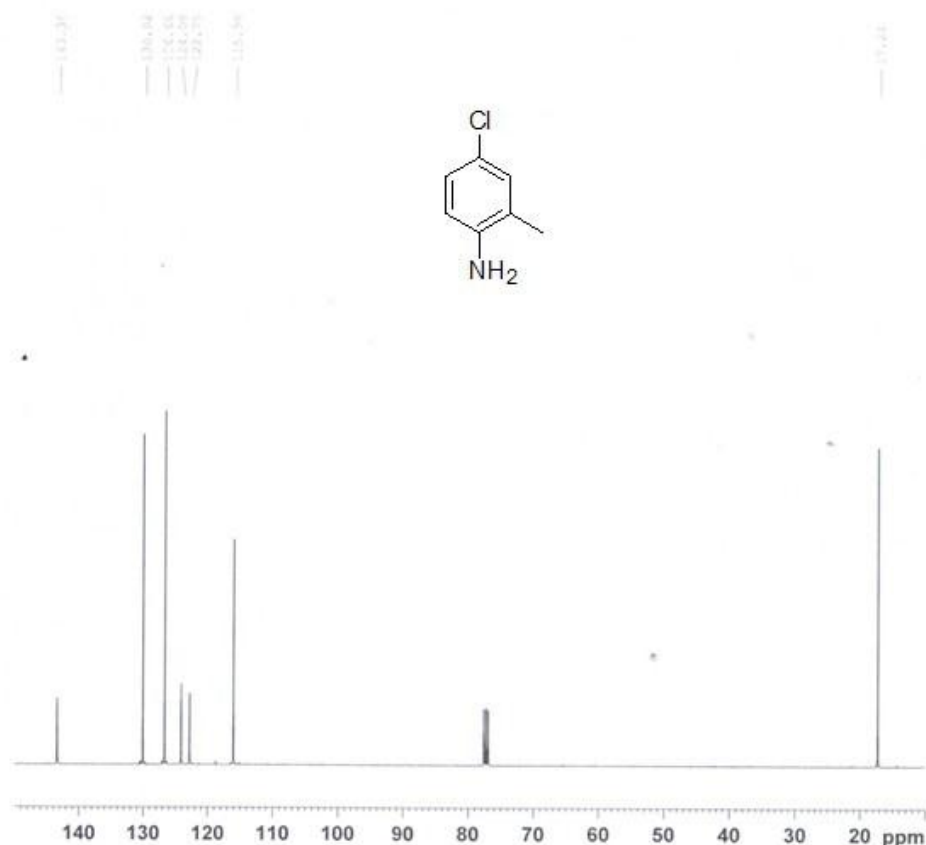
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NAME      sun110107-H
EXPNO     1
PROCNO    1
Date_     20110107
Time      12.58
INSTRUM   spect
PROBHD    5 mm PABBO BB-
PULPROG   zg30
TD         65536
SOLVENT   CDCl3
NS         16
DS         2
SWH        8223.685 Hz
FIDRES     0.125483 Hz
AQ         3.9846387 sec
RG         22.6
DW         60.800 usec
DE         6.50 usec
TE         293.4 K
D1         1.00000000 sec
TD0        1
    
```

```

----- CHANNEL f1 -----
NUC1      1H
P1        11.10 usec
PL1       -4.00 dB
PL1W      20.19063568 W
SFO1      400.1324710 MHz
S1        32768
SF        400.1300000 MHz
WOW       EM
SSB       0
LB        0.30 Hz
GB        0
PC        1.00
    
```

4-CHLORO-2-METHYLANILINE (**4a**): ¹³C NMR



```

NAME      sun110107-C
EXPNO     1
PROCNO    1
Date_     20110107
Time      14.06
INSTRUM   spect
PROBHD    5 mm PABBO BB-
PULPROG   zgpg30
TD         65536
SOLVENT   CDCl3
NS         1024
DS         4
SWH        24038.461 Hz
FIDRES     0.366798 Hz
AQ         1.3631988 sec
RG         406
DW         20.800 usec
DE         6.50 usec
TE         295.9 K
D1         2.00000000 sec
D11        0.03000000 sec
TD0        1
    
```

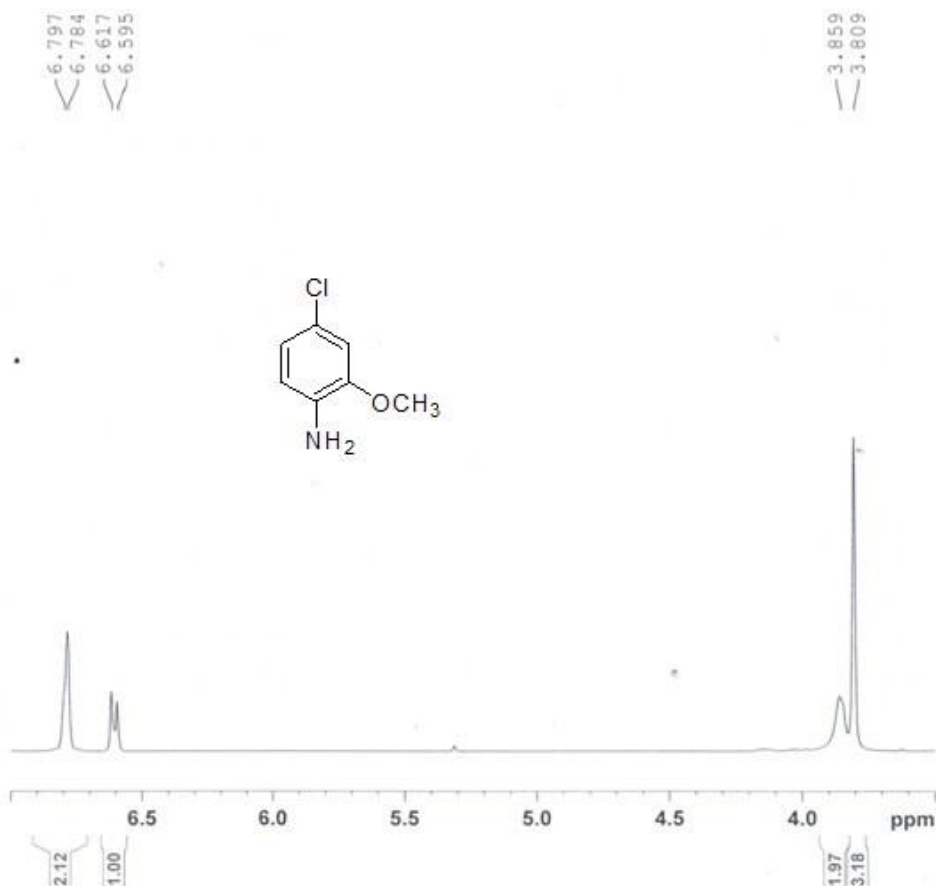
```

----- CHANNEL f1 -----
NUC1      13C
P1        9.30 usec
PL1       -3.00 dB
PL1W      64.15196228 W
SFO1      100.6228298 MHz
    
```

```

----- CHANNEL f2 -----
CPDPRG2   waltz16
NUC2      1H
PCPD2     80.00 usec
PL2       -4.00 dB
PL12      13.16 dB
PL13      12.00 dB
PL2W      20.19063568 W
PL12W     0.38828444 W
PL13W     0.50716585 W
SFO2      400.1316005 MHz
S1        32768
SF        100.6127690 MHz
WOW       EM
SSB       0
LB        1.00 Hz
GB        0
PC        1.40
    
```

4-CHLORO-2-METHOXYANILINE (4b): ¹H NMR



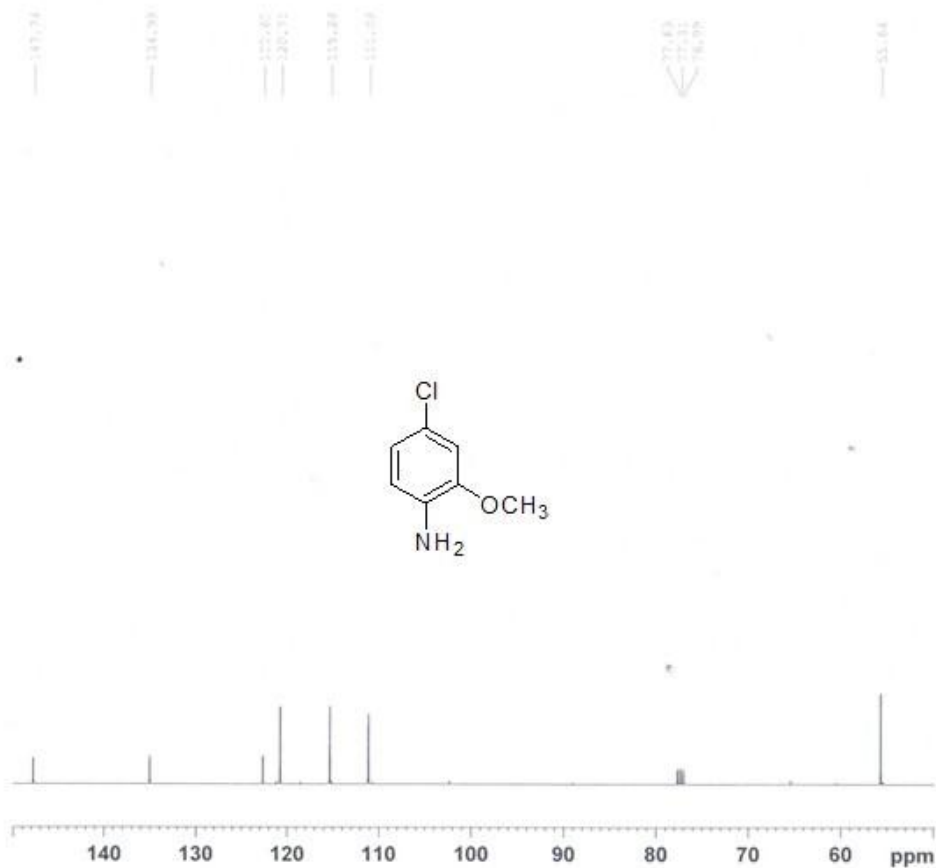
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NAME      sun110105-H
EXPNO     1
PROCNO    1
Date_     20110105
Time      16.32
INSTRUM   spect
PROBHD    5 mm PABBO BB-
PULPROG   zg30
TD         65536
SOLVENT   CDCl3
NS         16
DS         2
SWH        8223.685 Hz
FIDRES     0.125483 Hz
AQ         3.9846387 sec
RG         20.2
DW         60.800 usec
DE         6.50 usec
TE         293.3 K
D1         1.00000000 sec
TD0        1
    
```

```

----- CHANNEL f1 -----
NUC1      1H
F1        11.10 usec
PL1       -4.00 dB
PL1W      20.19063568 W
SFO1      400.1324710 MHz
SI         32768
SF         400.1300000 MHz
WDW        EM
SSB        0
LB         0.30 Hz
GB         0
PC         1.00
    
```

4-CHLORO-2-METHOXYANILINE (4b): ¹³C NMR



```

NAME      sun110105-C
EXPNO     1
PROCNO    1
Date_     20110105
Time      17.44
INSTRUM   spect
PROBHD    5 mm PABBO BB-
PULPROG   zgpg30
TD         65536
SOLVENT   CDCl3
NS         1024
DS         4
SWH        24038.461 Hz
FIDRES     0.366798 Hz
AQ         1.3631988 sec
RG         812
DW         20.800 usec
DE         6.50 usec
TE         296.0 K
D1         2.00000000 sec
D11        0.03000000 sec
TD0        1
    
```

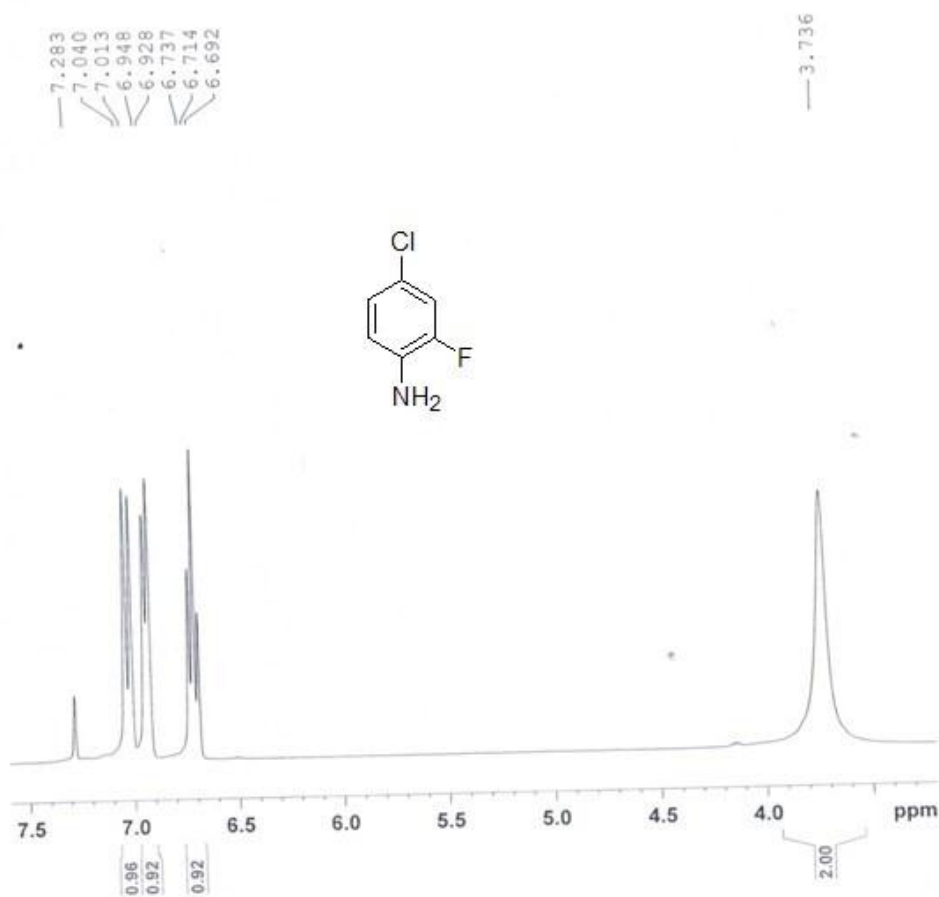
```

----- CHANNEL f1 -----
NUC1      13C
P1        9.30 usec
PL1       -3.00 dB
PL1W      64.15196228 W
SFO1      100.6228298 MHz
    
```

```

----- CHANNEL f2 -----
CPDPRG2   waltz16
NUC2      1H
PCPD2     80.00 usec
PL2       -4.00 dB
PL12      13.16 dB
PL13      12.00 dB
PL2W      20.19063568 W
PL12W     0.38828444 W
PL13W     0.50716595 W
SFO2      400.1316005 MHz
SI         32768
SF         100.6127690 MHz
WDW        EM
SSB        0
LB         1.00 Hz
GB         0
PC         1.40
    
```

4-CHLORO-2-FLUOROANILINE (4c): ¹H NMR



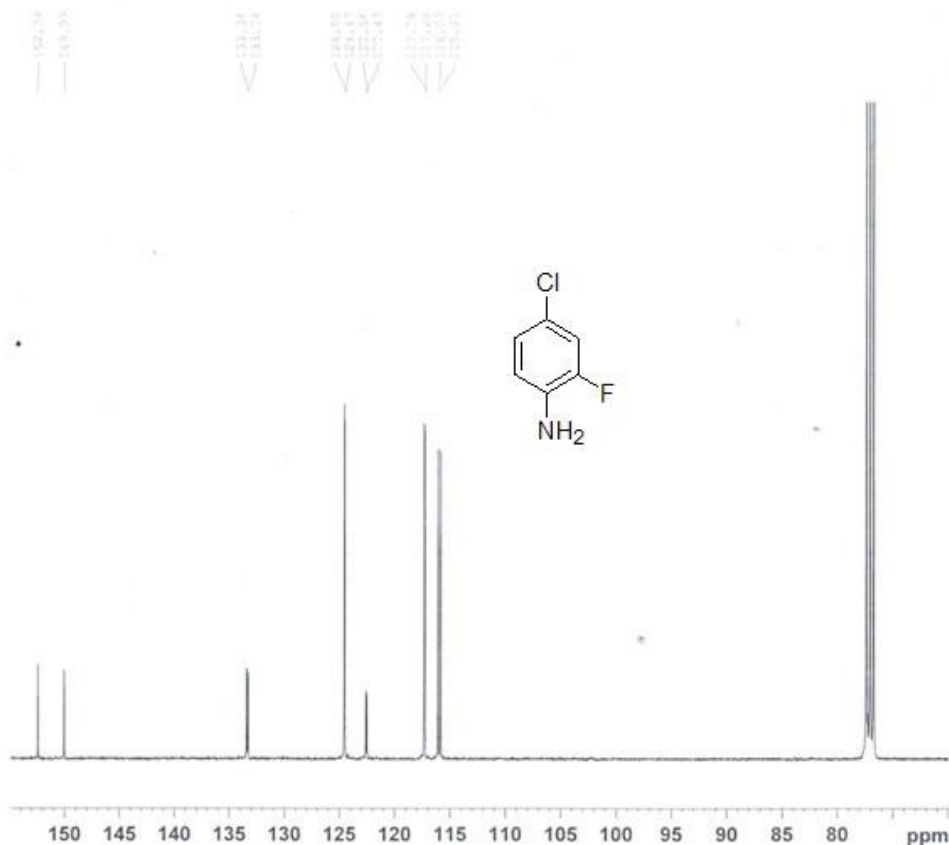
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NAME      sun110111-1
EXPNO     1
PROCNO    1
Date_     20110111
Time      17.22
INSTRUM   spect
PROBHD    5 mm PABBO BB-
PULPROG   zg30
TD         65536
SOLVENT   CDCl3
NS         16
DS         2
SWH        8223.685 Hz
FIDRES     0.125483 Hz
AQ         3.9846387 sec
RG         144
DW         60.800 usec
DE         6.50 usec
TE         293.1 K
D1         1.00000000 sec
TDO        1
    
```

```

----- CHANNEL f1 -----
NUC1      1H
P1        11.10 usec
PL1       -4.00 dB
PL1W      20.19063568 W
SFO1      400.1324710 MHz
SI         32768
SF         400.1300000 MHz
WDW        EM
SSB        0
LB         0.30 Hz
GB         0
PC         1.00
    
```

4-CHLORO-2-FLUOROANILINE (4c): ¹³C NMR



```

NAME      sun110111-C
EXPNO     1
PROCNO    1
Date_     20110112
Time      5.20
INSTRUM   spect
PROBHD    5 mm PABBO BB-
PULPROG   zgpg30
TD         65536
SOLVENT   CDCl3
NS         12288
DS         4
SWH        24038.461 Hz
FIDRES     0.366798 Hz
AQ         1.3631988 sec
RG         1030
DW         20.800 usec
DE         6.50 usec
TE         296.4 K
D1         2.00000000 sec
D11        0.03000000 sec
TDO        1
    
```

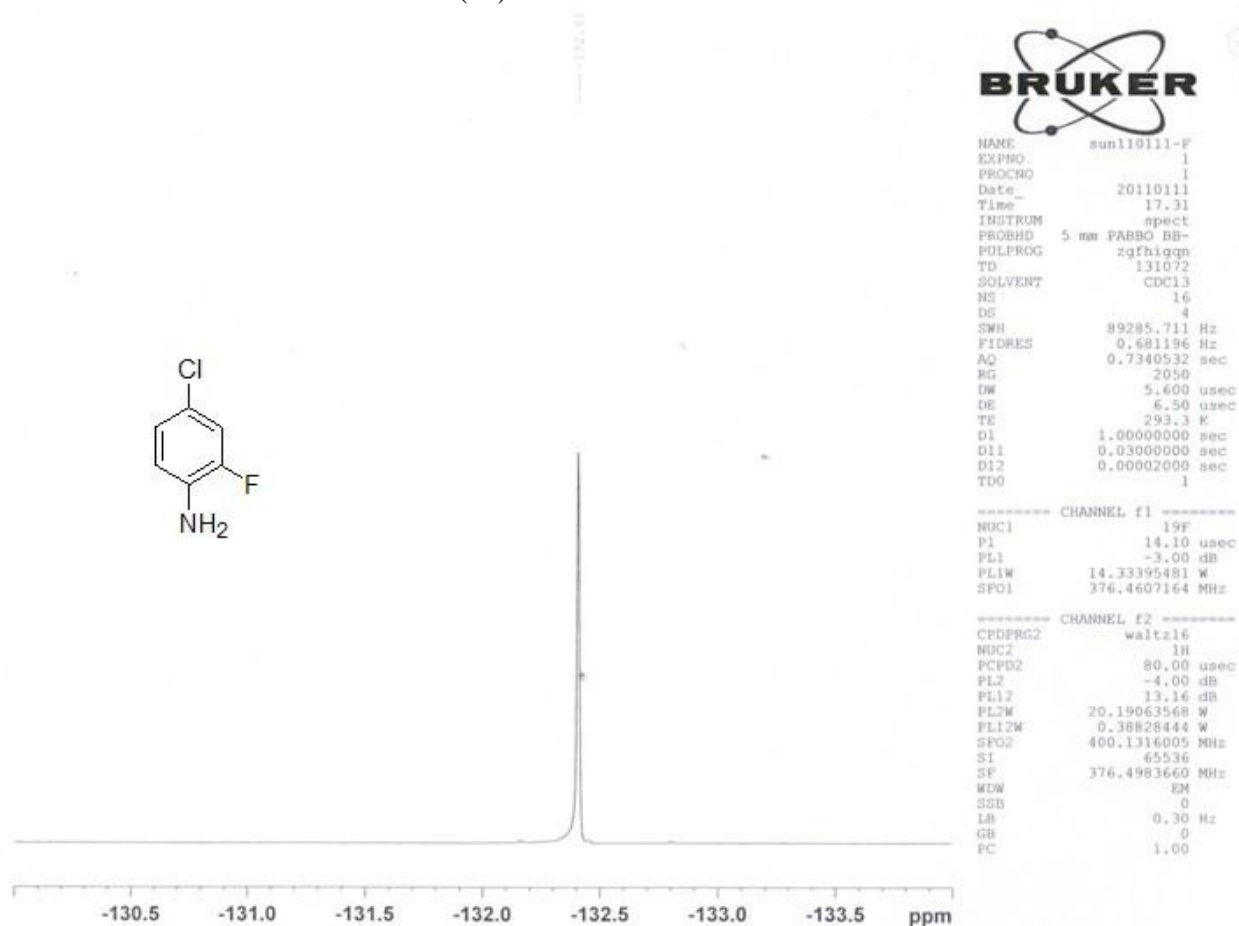
```

----- CHANNEL f1 -----
NUC1      13C
P1        9.30 usec
PL1       -3.00 dB
PL1W      64.15196228 W
SFO1      100.6228298 MHz
    
```

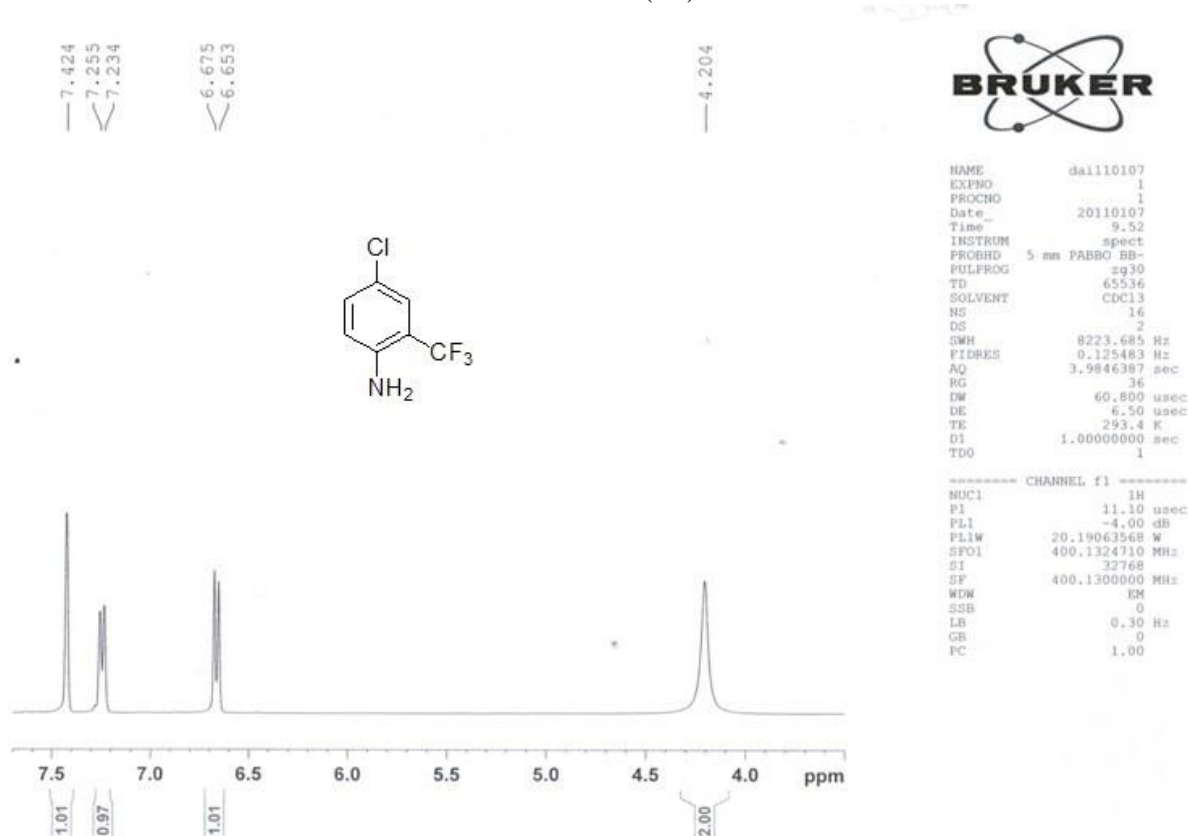
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----- CHANNEL f2 -----
CPDPRG2   waltz16
NUC2      1H
PCPD2     80.00 usec
PL2       -4.00 dB
PL12      13.16 dB
PL13      12.00 dB
PL2W      20.19063568 W
PL12W     0.38828444 W
PL13W     0.50716585 W
SFO2      400.1316005 MHz
SI         32768
SF         100.6127690 MHz
WDW        EM
SSB        0
LB         1.00 Hz
GB         0
PC         1.40
    
```

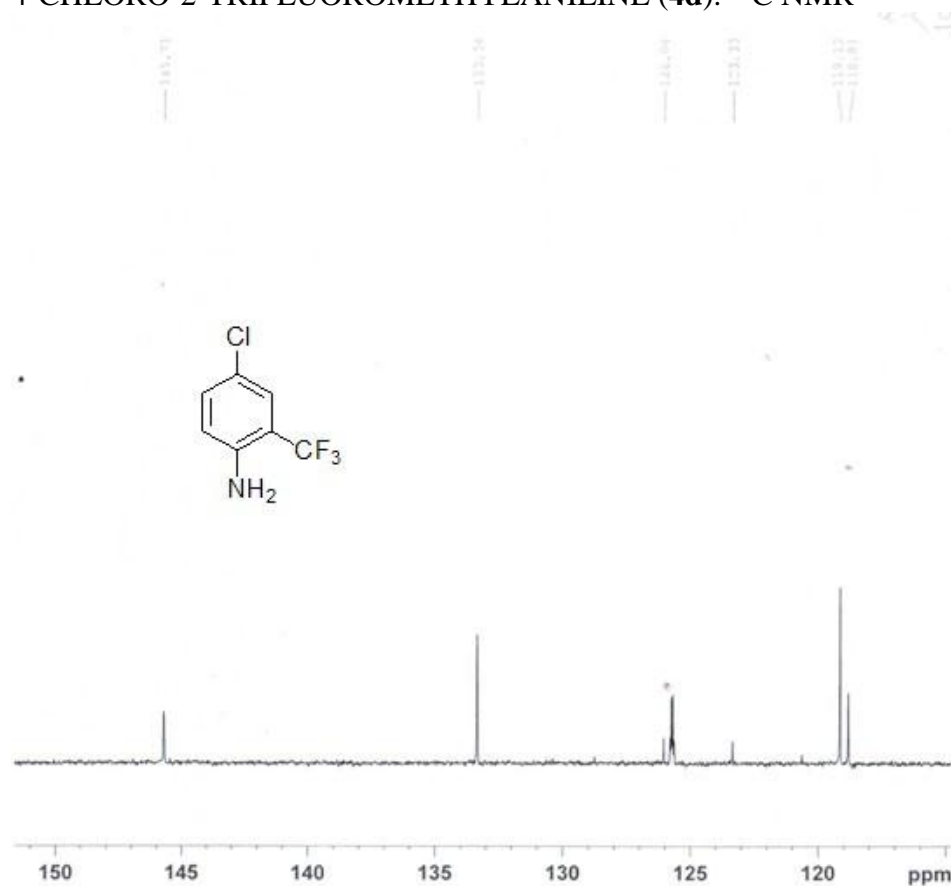
4-CHLORO-2-FLUOROANILINE (4c): ^{19}F NMR



4-CHLORO-2-TRIFLUOROMETHYLANILINE (4d): ^1H NMR



4-CHLORO-2-TRIFLUOROMETHYLANILINE (**4d**): ^{13}C NMR



```

NAME      da1110106-1C
EXPNO     1
PROCNO    1
Date_     20110107
Time      8.01
INSTRUM   spect
PROBHD    5 mm PABBO BB-
PULPROG   zgpg30
TD        65536
SOLVENT   DMSO
NS         12288
DS         4
SWH        24038.461 Hz
FIDRES     0.366798 Hz
AQ         1.3631988 sec
RG         2050
DW         20.800 usec
DE         6.50 usec
TE         295.9 K
D1         2.00000000 sec
D11        0.03000000 sec
TD0        1
    
```

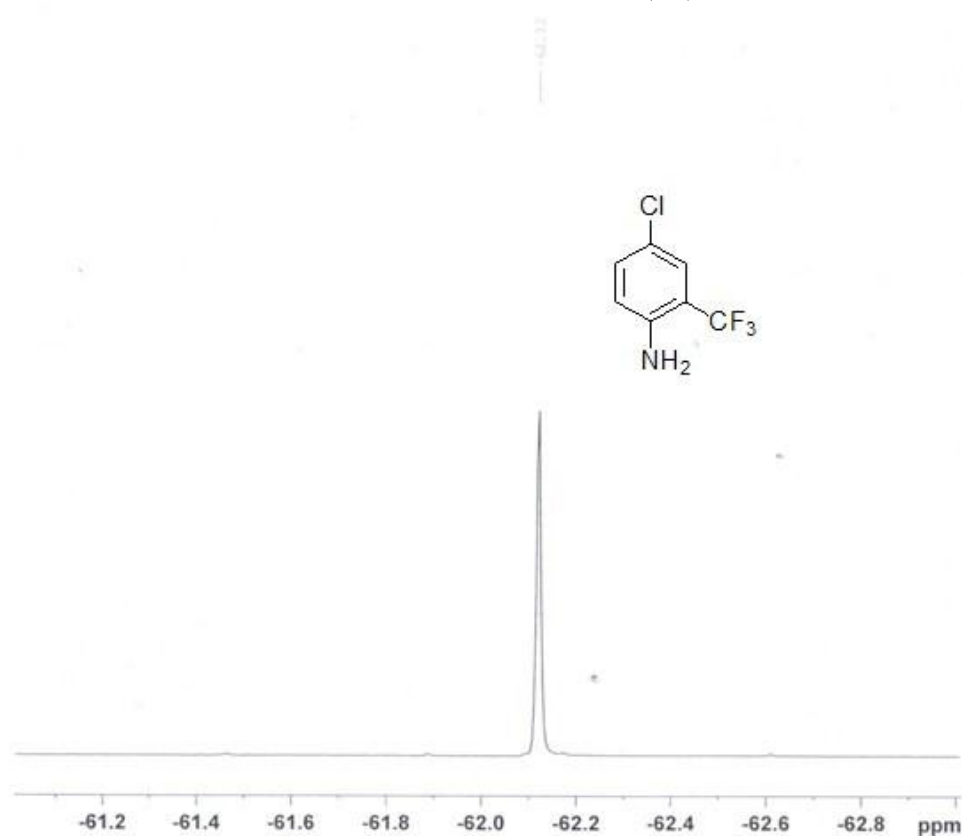
```

----- CHANNEL f1 -----
NUC1      13C
P1        9.30 usec
PL1       -3.00 dB
PL1W      64.15196228 W
SFO1      100.6229298 MHz
    
```

```

----- CHANNEL f2 -----
CPDPRG2   waltz16
NUC2       1H
PCPD2     80.00 usec
PL2        -4.00 dB
PL12       13.16 dB
PL13        12.00 dB
PL2W      20.19063568 W
PL12W     0.38828444 W
PL13W     0.50716585 W
SFO2      400.1316005 MHz
SI         32768
SF         100.6127690 MHz
WDW        EM
SSB         0
LB          1.00 Hz
GB          0
PC          1.40
    
```

4-CHLORO-2-TRIFLUOROMETHYLANILINE (**4d**): ^{19}F NMR



```

NAME      da1110106-F
EXPNO     1
PROCNO    1
Date_     20110106
Time      20.00
INSTRUM   spect
PROBHD    5 mm PABBO BB-
PULPROG   zgfh1qgn
TD        131072
SOLVENT   DMSO
NS         16
DS         4
SWH        89285.711 Hz
FIDRES     0.681196 Hz
AQ         0.7340532 sec
RG         2050
DW         5.600 usec
DE         6.50 usec
TE         293.8 K
D1         1.00000000 sec
D11        0.03000000 sec
D12        0.00002000 sec
TD0        1
    
```

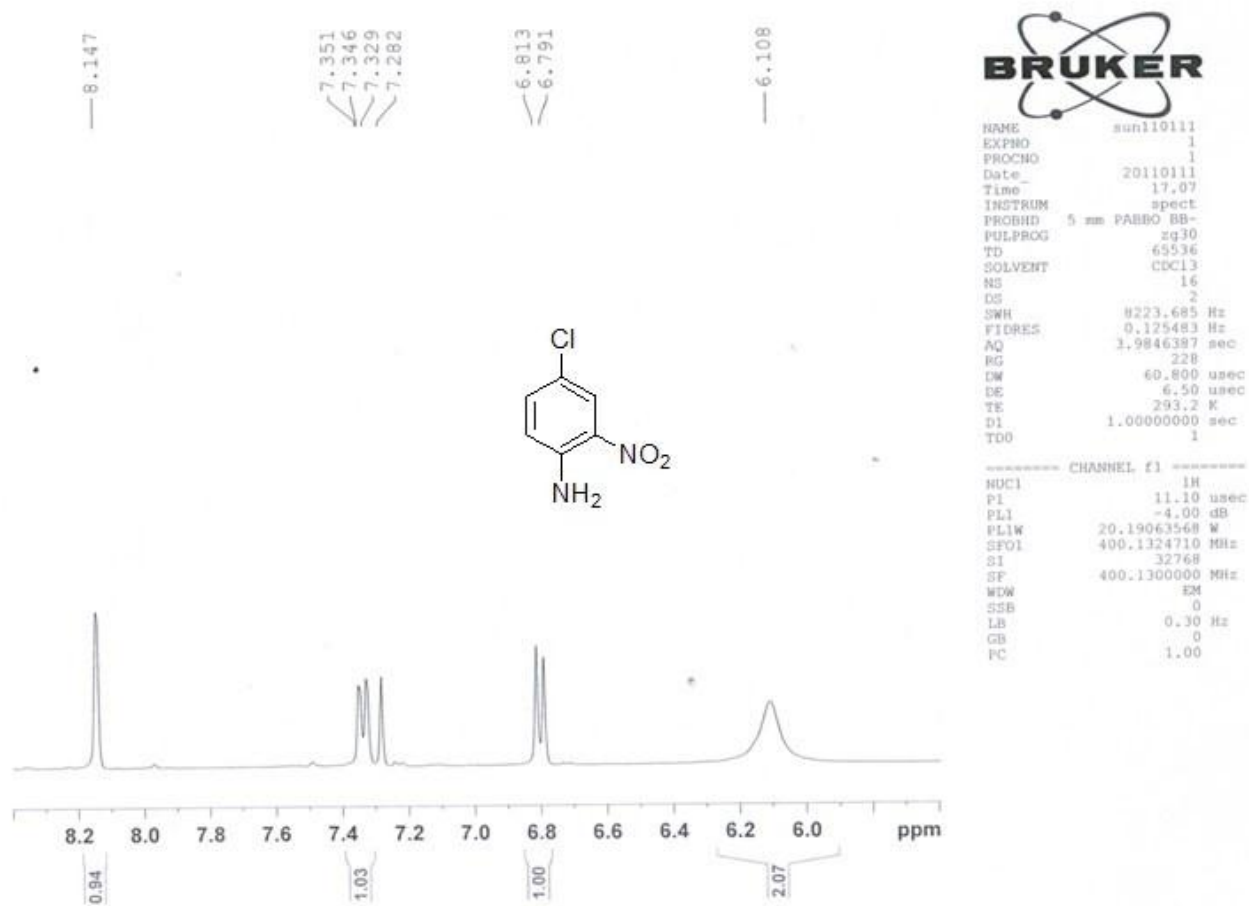
```

----- CHANNEL f1 -----
NUC1      19F
P1        14.10 usec
PL1       -3.00 dB
PL1W      14.33395481 W
SFO1      376.4607164 MHz
    
```

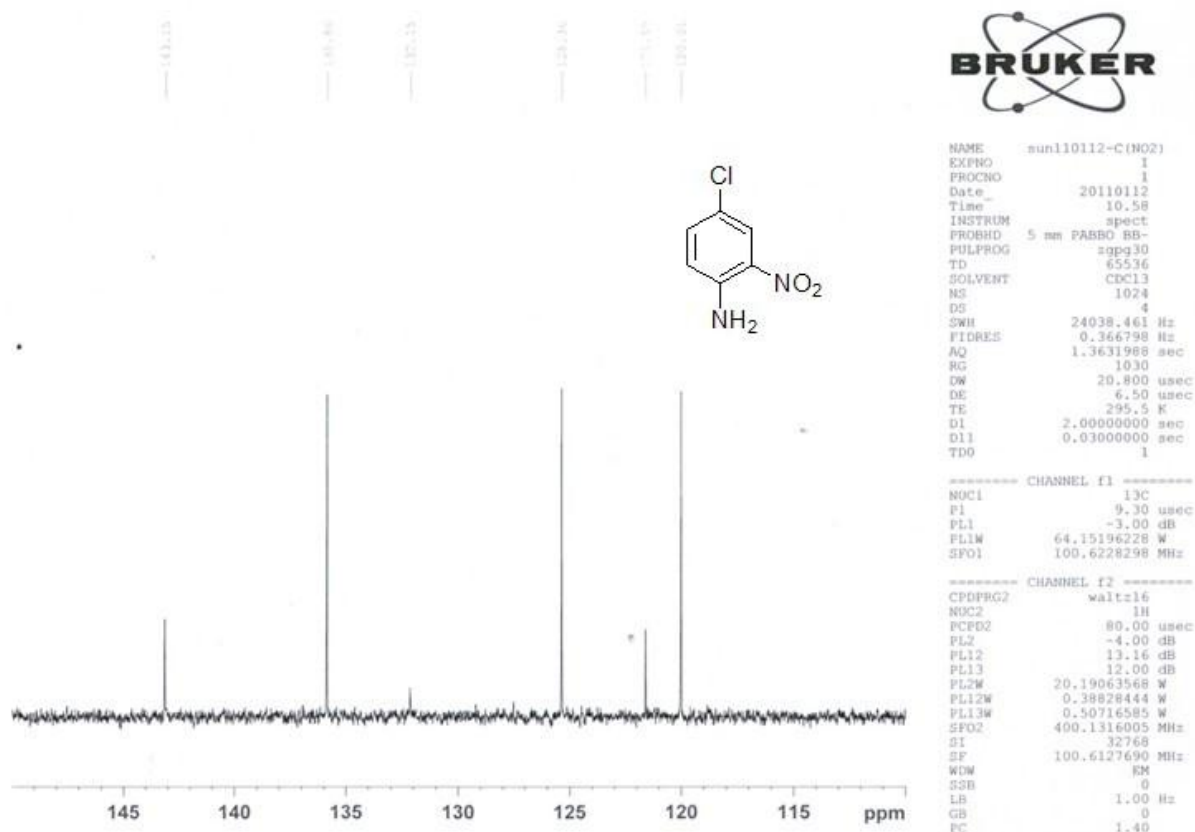
```

----- CHANNEL f2 -----
CPDPRG2   waltz16
NUC2       1H
PCPD2     80.00 usec
PL2        -4.00 dB
PL12       13.16 dB
PL13        12.00 dB
PL2W      20.19063568 W
PL12W     0.38828444 W
SFO2      400.1316005 MHz
SI         65536
SF         376.4983660 MHz
WDW        EM
SSB         0
LB          0.30 Hz
GB          0
PC          1.00
    
```

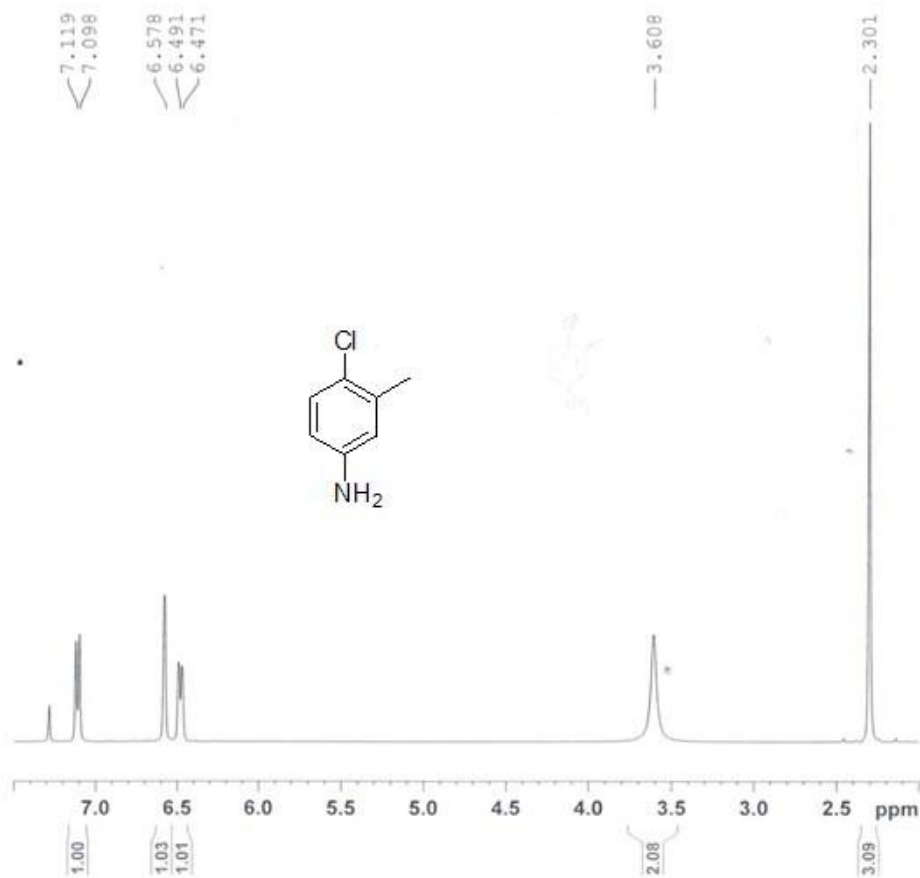
4-CHLORO-2-NITROANILINE (4e): ¹H NMR



4-CHLORO-2-NITROANILINE (4e): ¹³C NMR



4-CHLORO-3-METHYLANILINE (**4f**): ¹H NMR



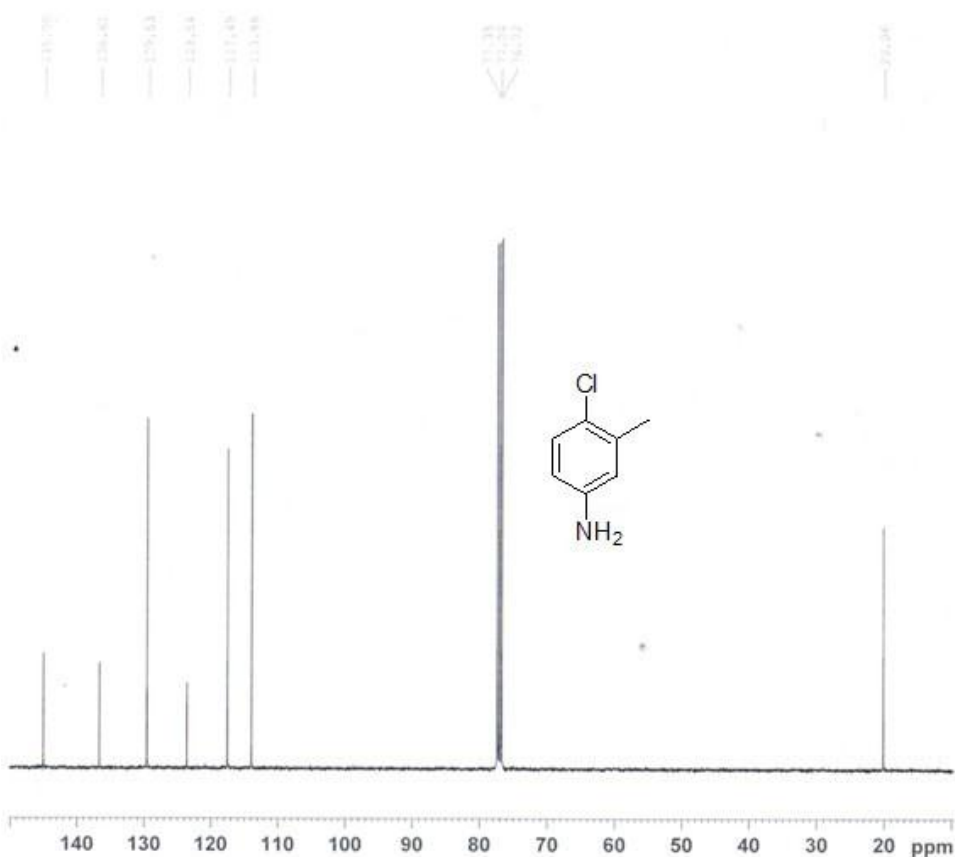
```

NAME      sun110104-H
EXPNO     1
PROCNO    1
Date_     20110104
Time      16.50
INSTRUM   spect
PROBHD    5 mm PABBO BB-
PULPROG   zg30
TD        65536
SOLVENT   CDCl3
NS        16
DS        2
SWH       8223.685 Hz
FIDRES    0.125483 Hz
AQ        3.9846387 sec
RG        144
DM        60.800 usec
DE        6.50 usec
TE        293.8 K
D1        1.00000000 sec
TD0       1
    
```

```

----- CHANNEL f1 -----
NUC1      1H
P1        11.10 usec
PL1       -4.00 dB
PL1W      20.19063568 W
SFO1      400.1324710 MHz
SI        32768
SF        400.1300000 MHz
WDW       EM
SSB       0
LB        0.30 Hz
GB        0
PC        1.00
    
```

4-CHLORO-3-METHYLANILINE (**4f**): ¹³C NMR



```

NAME      sun101223-C
EXPNO     2
PROCNO    1
Date_     20101223
Time      15.58
INSTRUM   spect
PROBHD    5 mm PABBO BB-
PULPROG   zgpg30
TD        65536
SOLVENT   CDCl3
NS        1024
DS        4
SWH       24038.461 Hz
FIDRES    0.366798 Hz
AQ        1.3631988 sec
RG        812
DM        20.800 usec
DE        6.50 usec
TE        297.0 K
D1        2.00000000 sec
D11       0.03000000 sec
TD0       1
    
```

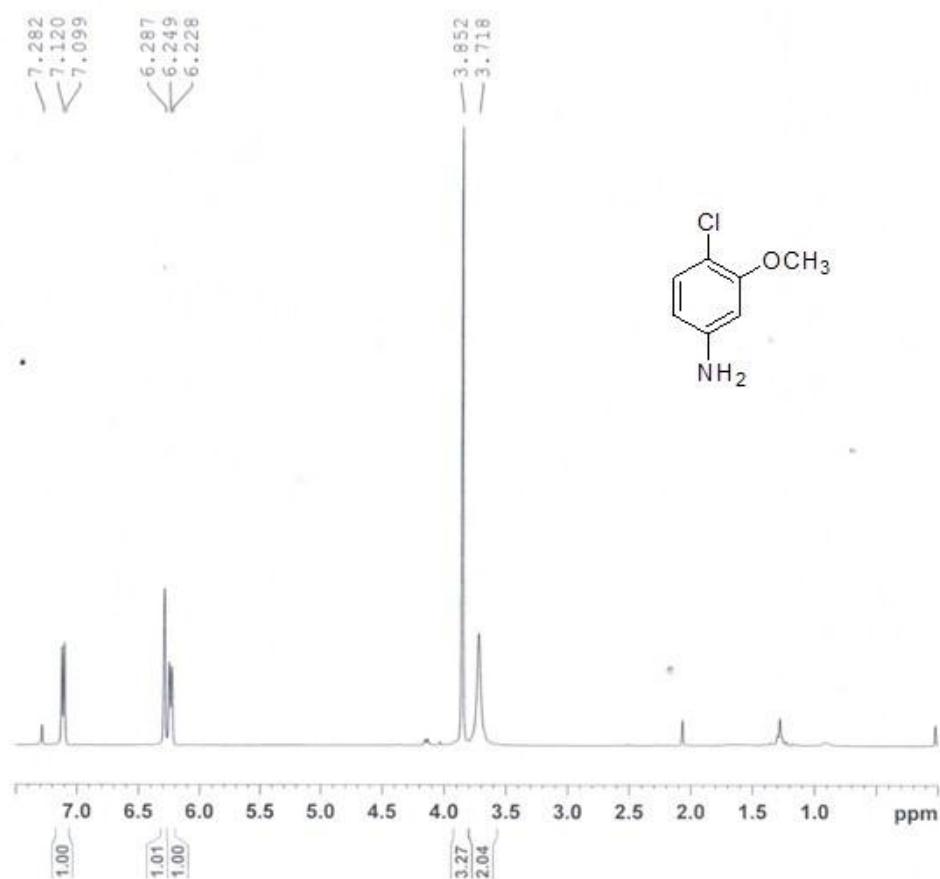
```

----- CHANNEL f1 -----
NUC1      13C
P1        9.30 usec
PL1       -3.00 dB
PL1W      64.15196228 W
SFO1      100.6228298 MHz
    
```

```

----- CHANNEL f2 -----
CPDPRG2   waltz16
NUC2      1H
PCPD2     80.00 usec
PL2       -4.00 dB
PL12      13.16 dB
PL13      12.00 dB
PL2W      20.19063568 W
PL12W     0.38828444 W
PL13W     0.50716585 W
SFO2      400.1316005 MHz
SI        32768
SF        100.6127690 MHz
WDW       EM
SSB       0
LB        1.00 Hz
GB        0
PC        1.40
    
```


4-CHLORO-3-METHOXYANILINE (4g): ¹H NMR



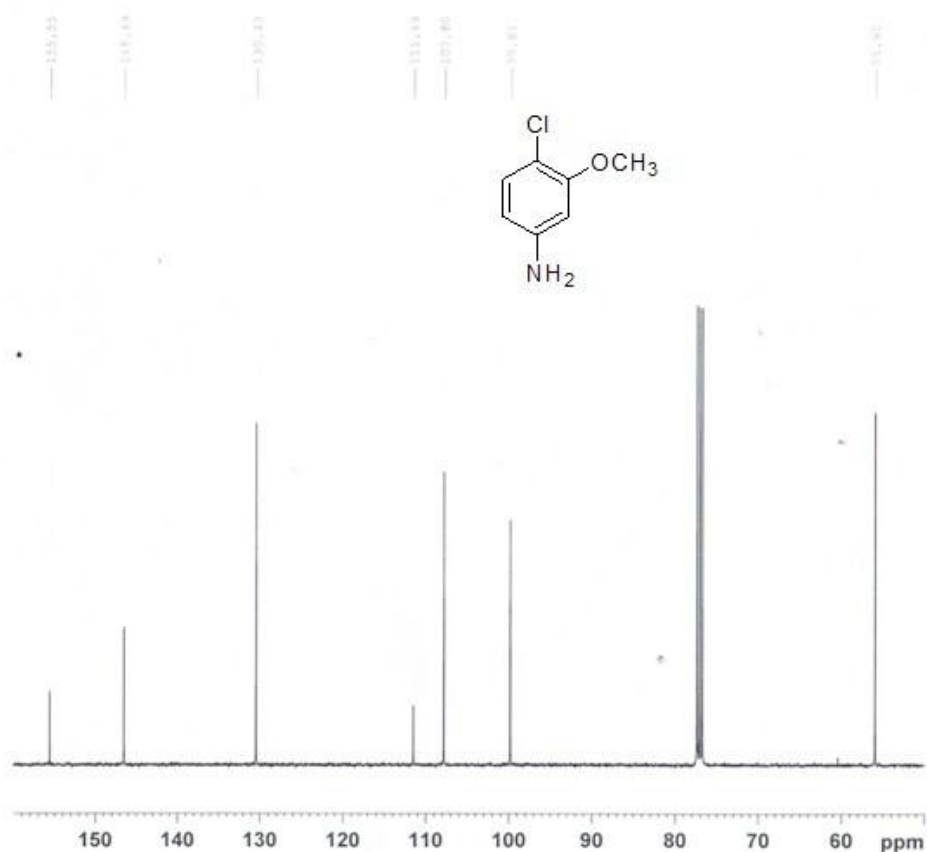
```

NAME      sun110107-OMe-H
EXPNO     1
PROCNO    1
Date_     20110107
Time      19.33
INSTRUM   spect
PROBHD    5 mm F4BBO BB-
PULPROG   zg30
TD         65536
SOLVENT   CDCl3
NS         16
DS         2
SWH        8223.685 Hz
FIDRES     0.125483 Hz
AQ         3.9846387 sec
RG         101
DW         60.800 usec
DE         6.50 usec
TE         293.2 K
D1         1.00000000 sec
TD0        1
    
```

```

----- CHANNEL f1 -----
NUC1      1H
P1         11.10 usec
PL1        -4.00 dB
PL1W      20.19063568 W
SFO1      400.1324710 MHz
SI         32768
SF         400.1300000 MHz
WDW        EM
SSB         0
LB         0.30 Hz
GB         0
PC         1.00
    
```

4-CHLORO-3-METHOXYANILINE (4g): ¹³C NMR



```

NAME      sun110107-OMe-C-1
EXPNO     1
PROCNO    1
Date_     20110107
Time      21.18
INSTRUM   spect
PROBHD    5 mm F4BBO BB-
PULPROG   zgpg30
TD         65536
SOLVENT   CDCl3
NS         1024
DS         4
SWH        24038.461 Hz
FIDRES     0.366798 Hz
AQ         1.3631988 sec
RG         912
DW         20.800 usec
DE         6.50 usec
TE         295.6 K
D1         2.00000000 sec
D11        0.03000000 sec
TD0        1
    
```

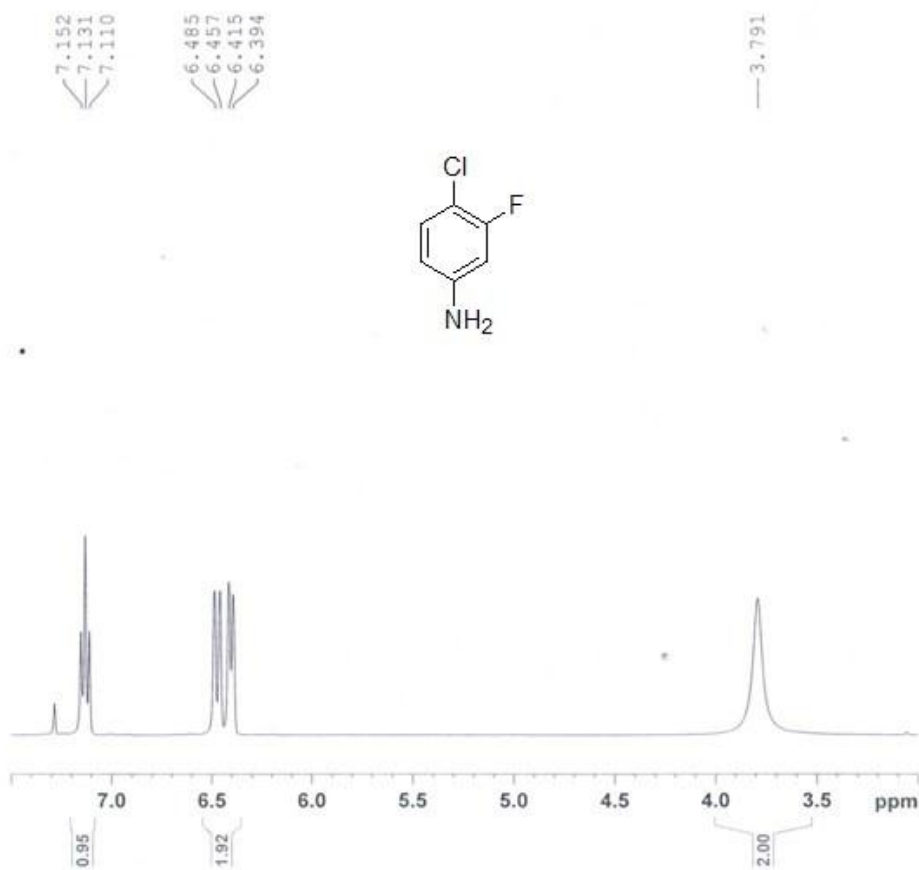
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----- CHANNEL f1 -----
NUC1      13C
P1         9.30 usec
PL1        -3.00 dB
PL1W      64.15196228 W
SFO1      100.6228298 MHz
    
```

```

----- CHANNEL f2 -----
CFDPRG2   waltz16
NUC2      1H
PCPD2     80.00 usec
PL2        -4.00 dB
PL12       13.16 dB
PL13       12.00 dB
PL2W      20.19063568 W
PL12W     0.38828444 W
PL13W     0.50716585 W
SFO2      400.1316005 MHz
SI         32768
SF         100.6127690 MHz
WDW        EM
SSB         0
LB         1.00 Hz
GB         0
PC         1.40
    
```

4-CHLORO-3-FLUOROANILINE (**4h**): ^1H NMR



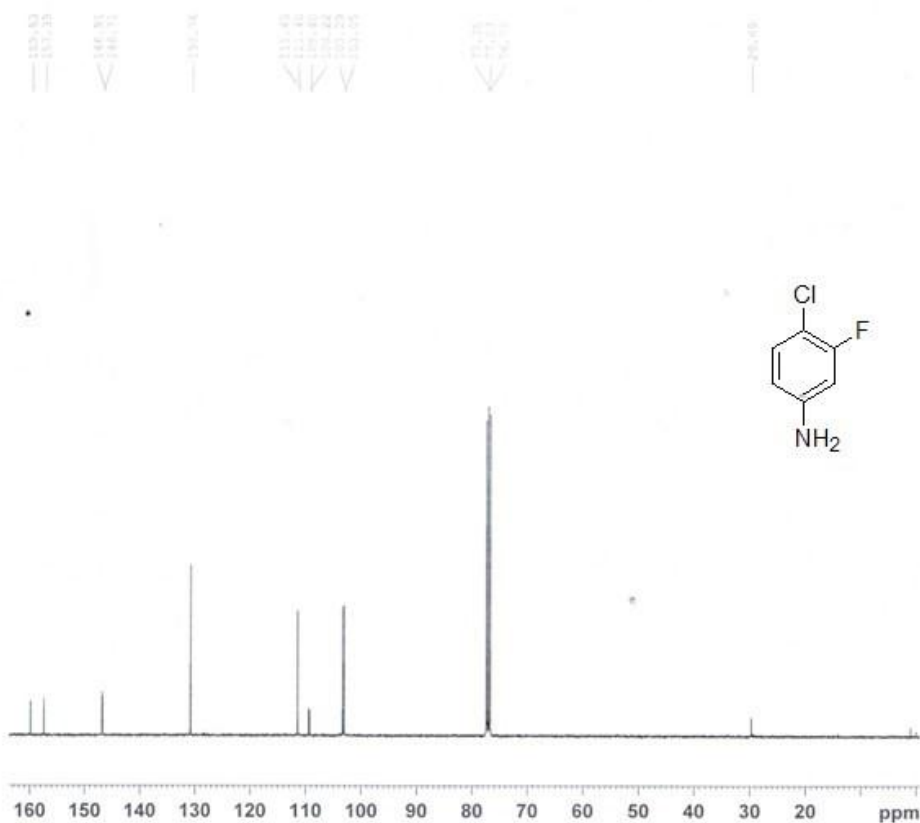
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NAME      sun101222-H
EXPNO     2
PROCNO    1
Date_     20101222
Time      14.31
INSTRUM   spect
PROBHD    5 mm PABBO BB-
PULPROG   zg30
TD         65536
SOLVENT   CDC13
NS         16
DS         2
SWH        8223.685 Hz
FIDRES    0.125483 Hz
AQ         3.9846387 sec
RG         128
DW         60.800 usec
DE         6.50 usec
TE         294.3 K
D1         1.00000000 sec
TDO        1
    
```

```

----- CHANNEL f1 -----
NUC1      1H
P1         11.10 usec
PL1        -4.00 dB
PL1W      20.19063568 W
SFO1      400.1324710 MHz
SI         32768
SF         400.1300000 MHz
WDW        EM
SSB        0
LB         0.30 Hz
GB         0
PC         1.00
    
```

4-CHLORO-3-FLUOROANILINE (**4h**): ^{13}C NMR



```

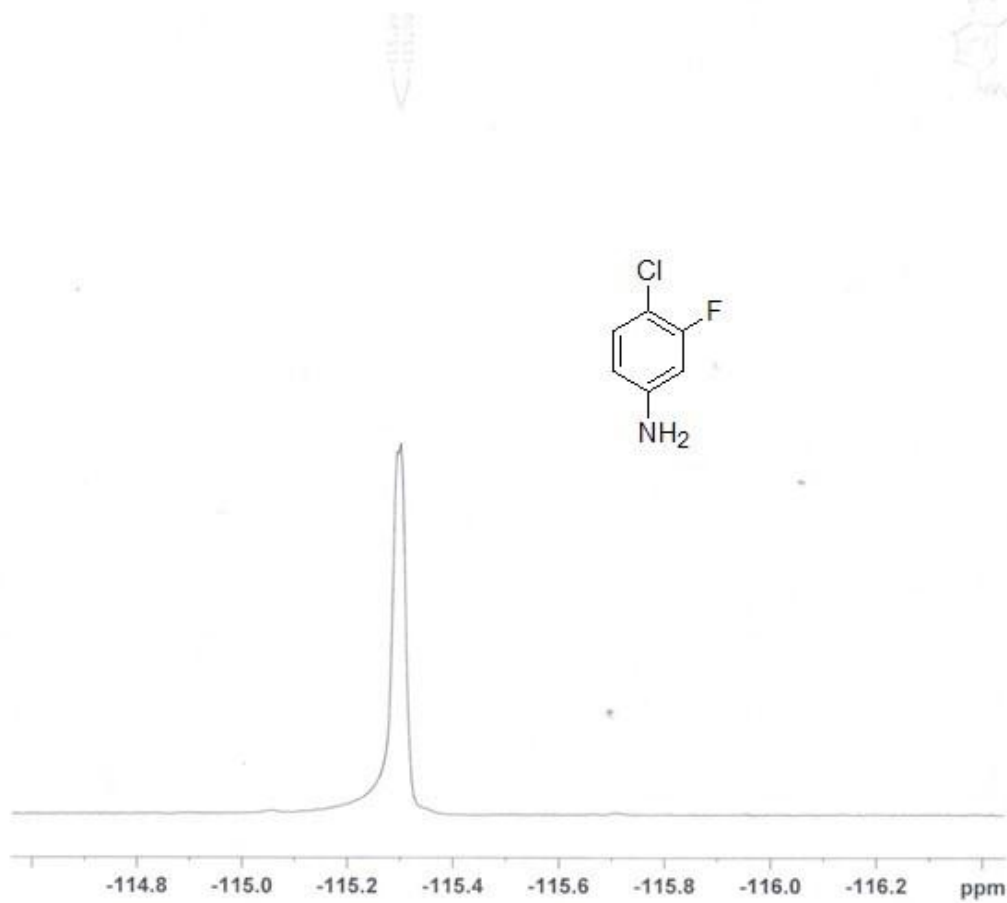
NAME      sun101222-C
EXPNO     2
PROCNO    1
Date_     20101222
Time      15.40
INSTRUM   spect
PROBHD    5 mm PABBO BB-
PULPROG   zgpg30
TD         65536
SOLVENT   CDC13
NS         1024
DS         4
SWH        24038.461 Hz
FIDRES    0.366798 Hz
AQ         1.3631988 sec
RG         724
DW         20.800 usec
DE         6.50 usec
TE         296.9 K
D1         2.00000000 sec
D11        0.03000000 sec
TDO        1
    
```

```

----- CHANNEL f1 -----
NUC1      13C
P1         9.30 usec
PL1        -3.00 dB
PL1W      64.15196228 W
SFO1      100.6228298 MHz

----- CHANNEL f2 -----
CPDPRG2   waltz16
NUC2      1H
PCPD2     80.00 usec
PL2        -4.00 dB
PL12      13.16 dB
PL13      12.00 dB
PL2W      20.19063568 W
PL12W     0.38828444 W
PL13W     0.50716585 W
SFO2      400.1316005 MHz
SI         32768
SF         100.6127690 MHz
WDW        EM
SSB        0
LB         1.00 Hz
GB         0
PC         1.40
    
```

4-CHLORO-3-FLUOROANILINE (**4h**): ^{19}F NMR



```

NAME      sun110112-F
EXPNO     1
PROCNO    1
Date_     20110112
Time      15.33
INSTRUM   spect
PROBHD    5 mm PABBO BB-
PULPROG   zgfhgqn
TD         131072
SOLVENT   CDC13
NS         16
DS         4
SWH        89285.711 Hz
FIDRES     0.681196 Hz
AQ         0.7340532 sec
RG         2050
DW         5.600 usec
DE         6.50 usec
TE         293.6 K
D1         1.00000000 sec
D11        0.03000000 sec
D12        0.00002000 sec
TDO        1
    
```

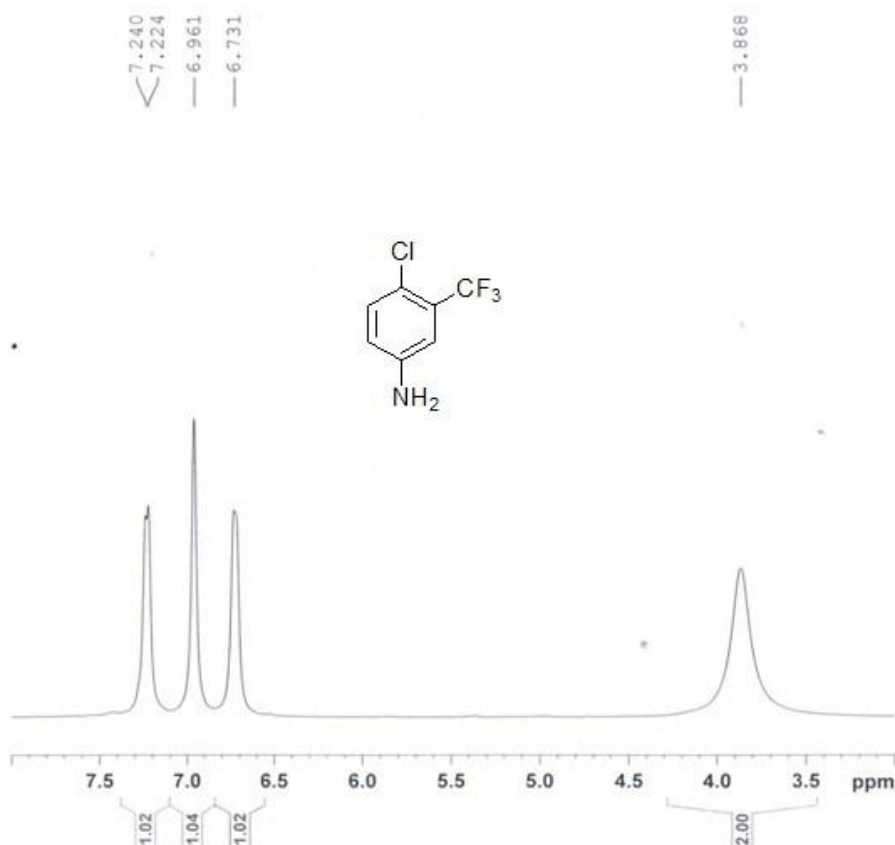
```

----- CHANNEL f1 -----
NUC1      19F
P1        14.10 usec
PL1       -3.00 dB
PL1W      14.33395481 W
SFO1      376.4607164 MHz
    
```

```

----- CHANNEL f2 -----
CPDPRG2   waltz16
NUC2       1H
PCPD2     80.00 usec
PL2        -4.00 dB
PL12       13.16 dB
PL2W      20.19063568 W
PL12W     0.38828444 W
SFO2      400.1316005 MHz
SI         65536
SF         376.4983660 MHz
WDW        EM
SSB         0
LB          0.30 Hz
GB          0
PC          1.00
    
```

4-CHLORO-3-TRIFLUOROMETHYLANILINE (**4i**): ^1H NMR



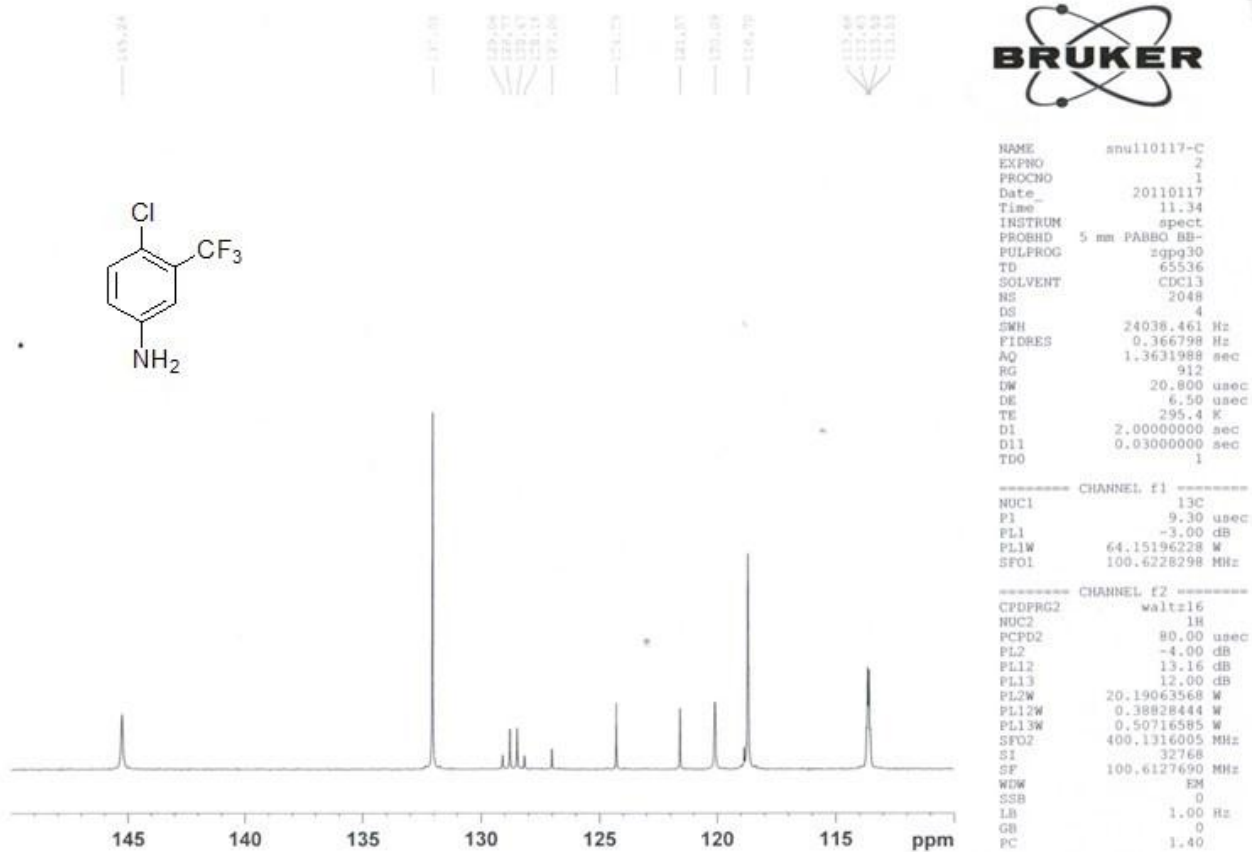
```

NAME      sun110114-H
EXPNO     2
PROCNO    1
Date_     20110114
Time      16.55
INSTRUM   spect
PROBHD    5 mm PABBO BB-
PULPROG   zg30
TD         65536
SOLVENT   CDC13
NS         16
DS         2
SWH        8223.685 Hz
FIDRES     0.125483 Hz
AQ         3.9846387 sec
RG         45.2
DW         60.800 usec
DE         6.50 usec
TE         293.7 K
D1         1.00000000 sec
TDO        1
    
```

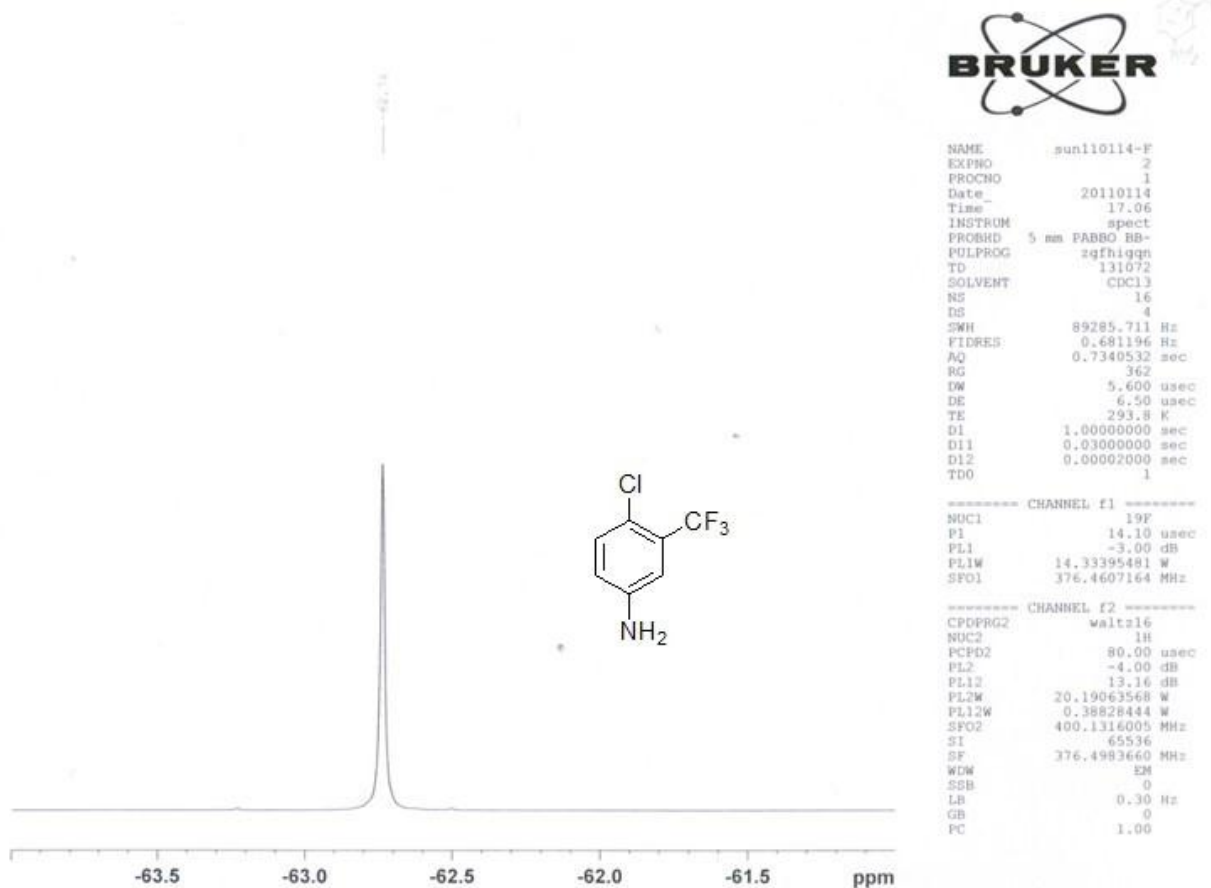
```

----- CHANNEL f1 -----
NUC1       1H
P1         11.10 usec
PL1        -4.00 dB
PL1W      20.19063568 W
SFO1      400.1324710 MHz
SI         32768
SF         400.1300000 MHz
WDW        EM
SSB         0
LB          0.30 Hz
GB          0
PC          1.00
    
```

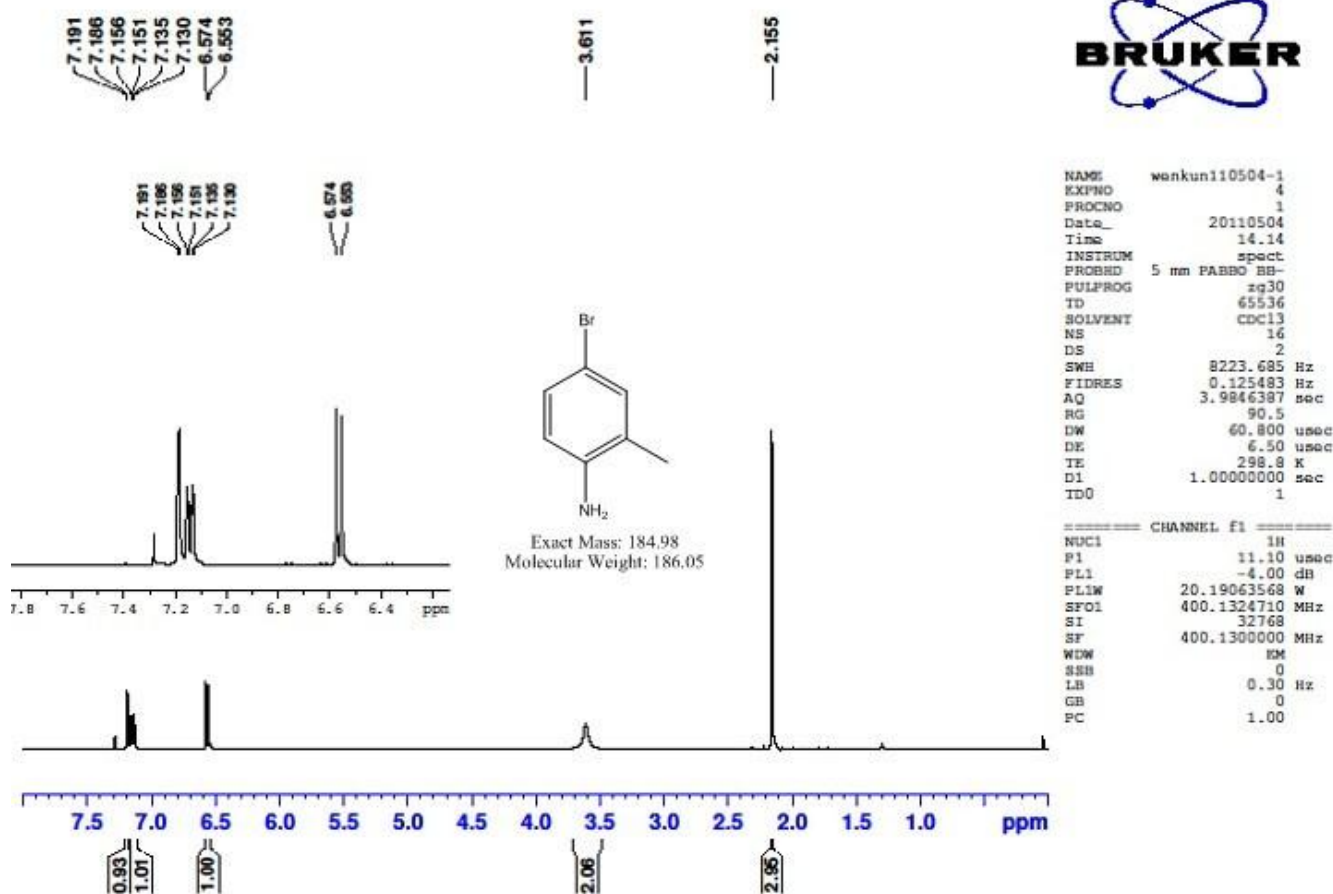
4-CHLORO-3-TRIFLUOROMETHYLANILINE (**4i**): ¹³C NMR



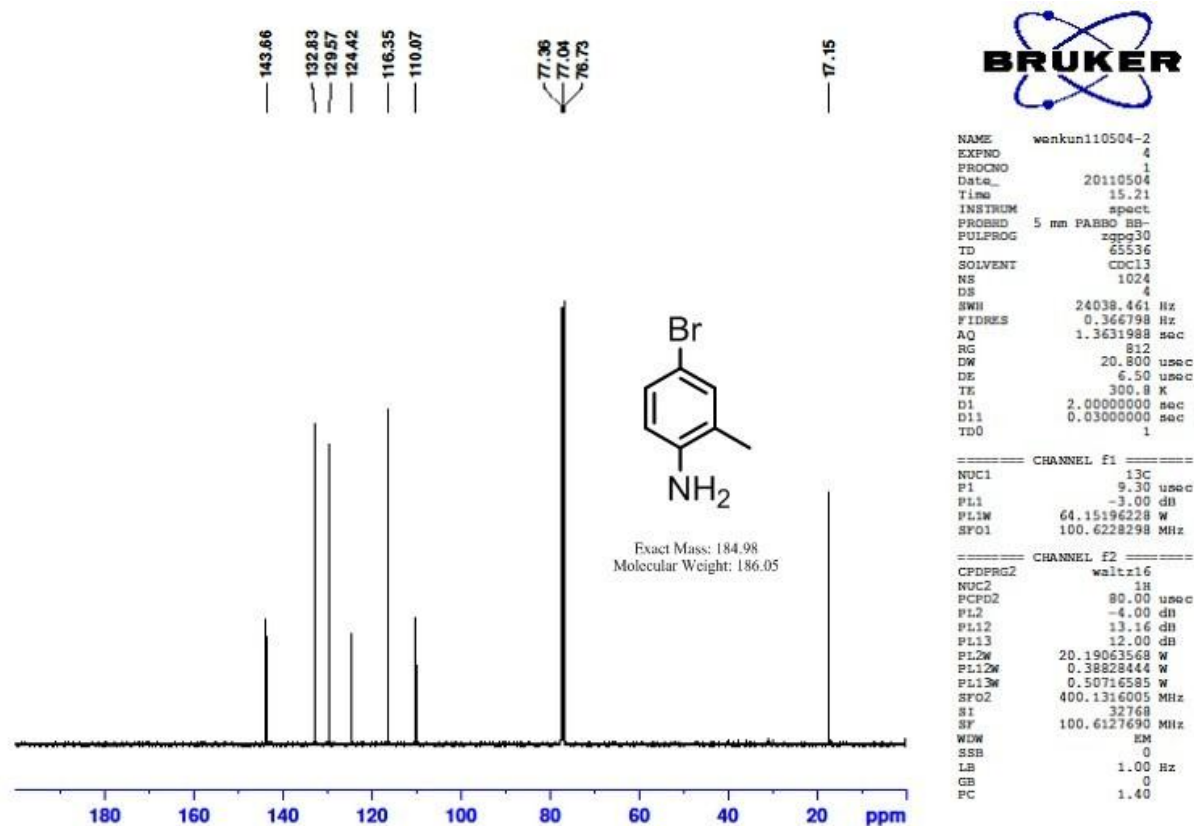
4-CHLORO-3-TRIFLUOROMETHYLANILINE (**4i**): ¹⁹F NMR



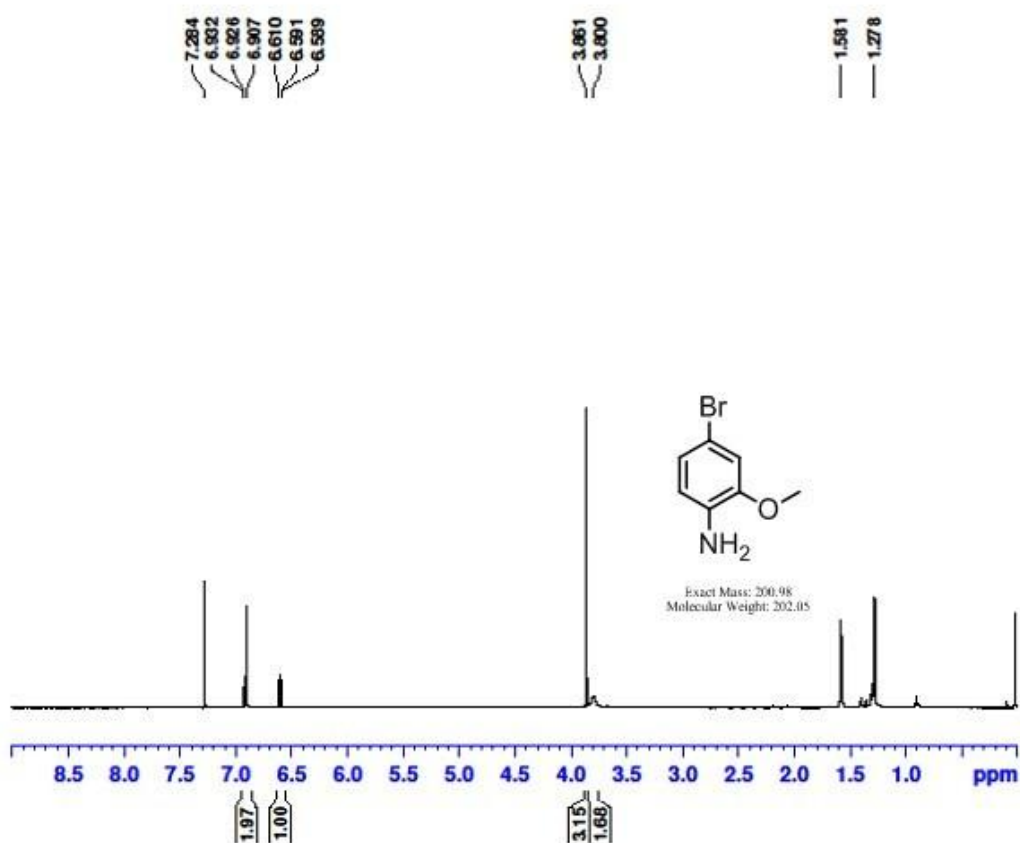
4-BROMO-2-METHYLANILINE (**5a**): ^1H NMR



4-BROMO-2-METHYLANILINE (**5a**): ^{13}C NMR



4-BROMO-2-METHOXYANILINE (**5b**): ¹H NMR

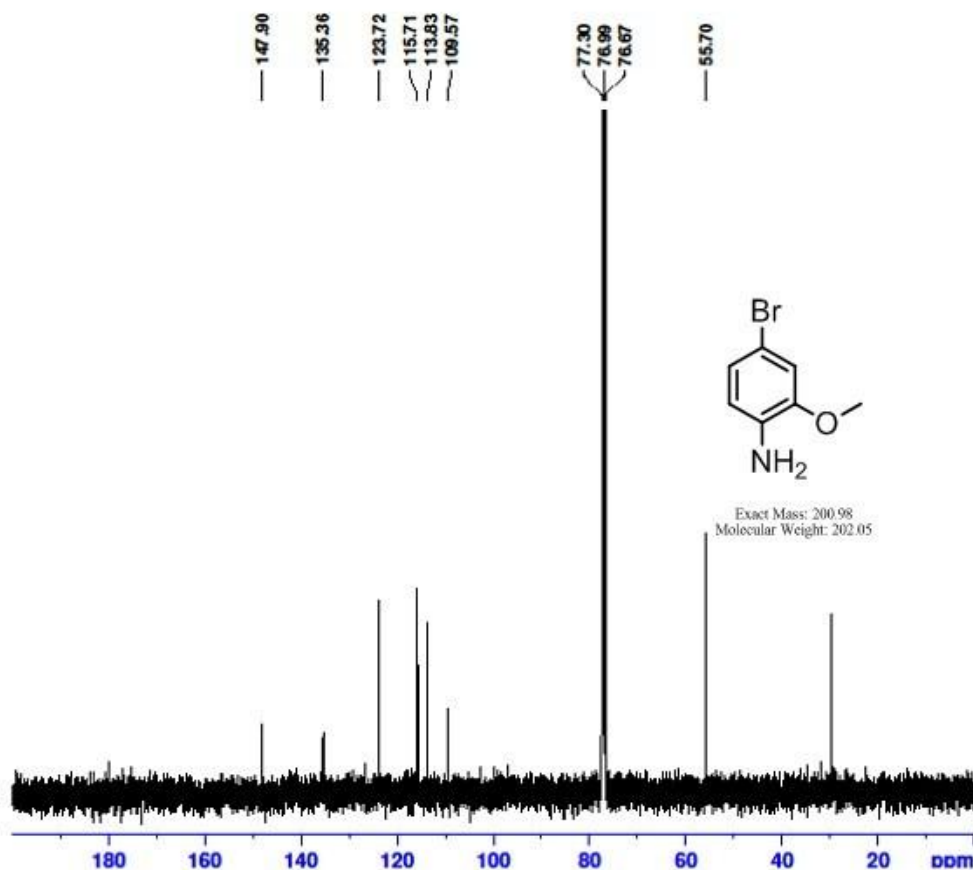


```

NAME wenkun110506-4
EXPNO 1
PROCNO 1
Date_ 20110506
Time 13.12
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 8223.685 Hz
FIDRES 0.125483 Hz
AQ 3.9846387 sec
RG 456
DW 60.800 usec
DE 6.50 usec
TE 298.4 K
D1 1.00000000 sec
TD0 1

===== CHANNEL f1 =====
NUC1 1H
P1 11.10 usec
PL1 -4.00 dB
PL1W 20.19063568 W
SFO1 400.1324710 MHz
SI 32768
SF 400.1300000 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
    
```

4-BROMO-2-METHOXYANILINE (**5b**): ¹³C NMR



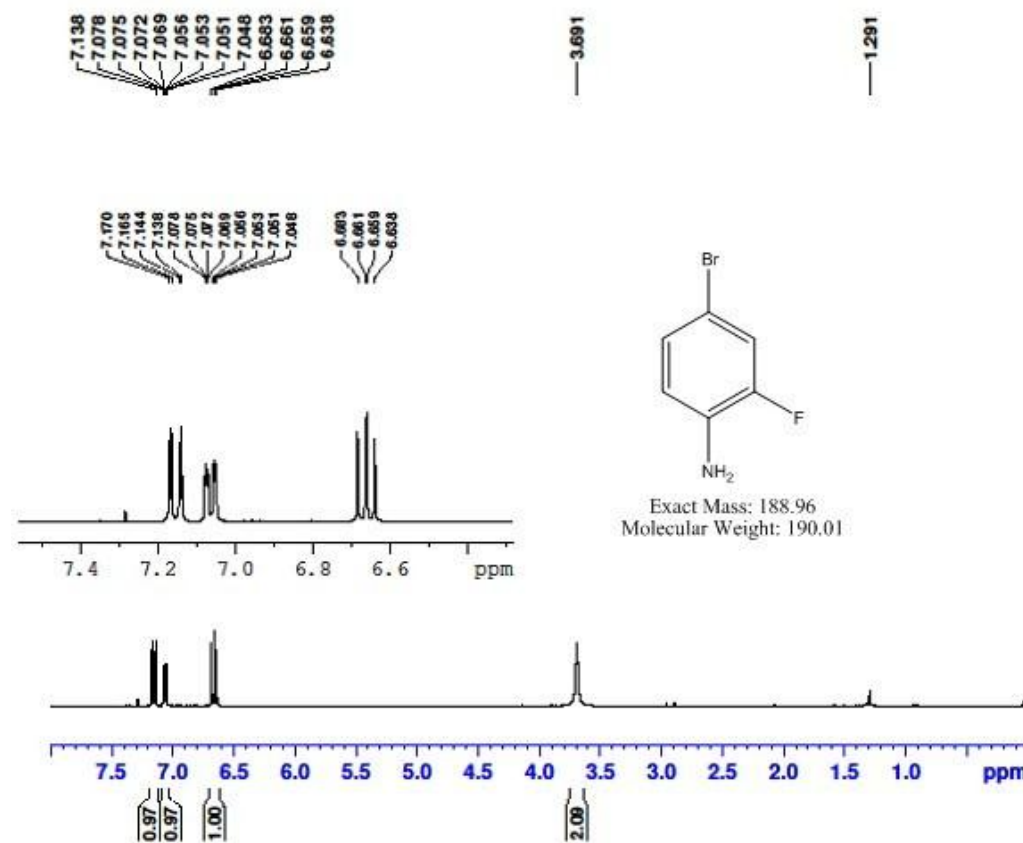
```

NAME wenkun110506-4c
EXPNO 4
PROCNO 1
Date_ 20110506
Time 14.15
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 1024
DS 4
SWH 24038.461 Hz
FIDRES 0.366798 Hz
AQ 1.3631988 sec
RG 575
DW 20.800 usec
DE 6.50 usec
TE 300.5 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1

===== CHANNEL f1 =====
NUC1 13C
P1 9.30 usec
PL1 -3.00 dB
PL1W 64.15196228 W
SFO1 100.6228298 MHz

===== CHANNEL f2 =====
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 -4.00 dB
PL12 13.16 dB
PL13 12.00 dB
PL2W 20.19063568 W
PL12W 0.38828444 W
PL13W 0.50716585 W
SFO2 400.1316005 MHz
SI 32768
SF 100.6127690 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
    
```

4-BROMO-2-FLUOROANILINE (**5c**): ^1H NMR



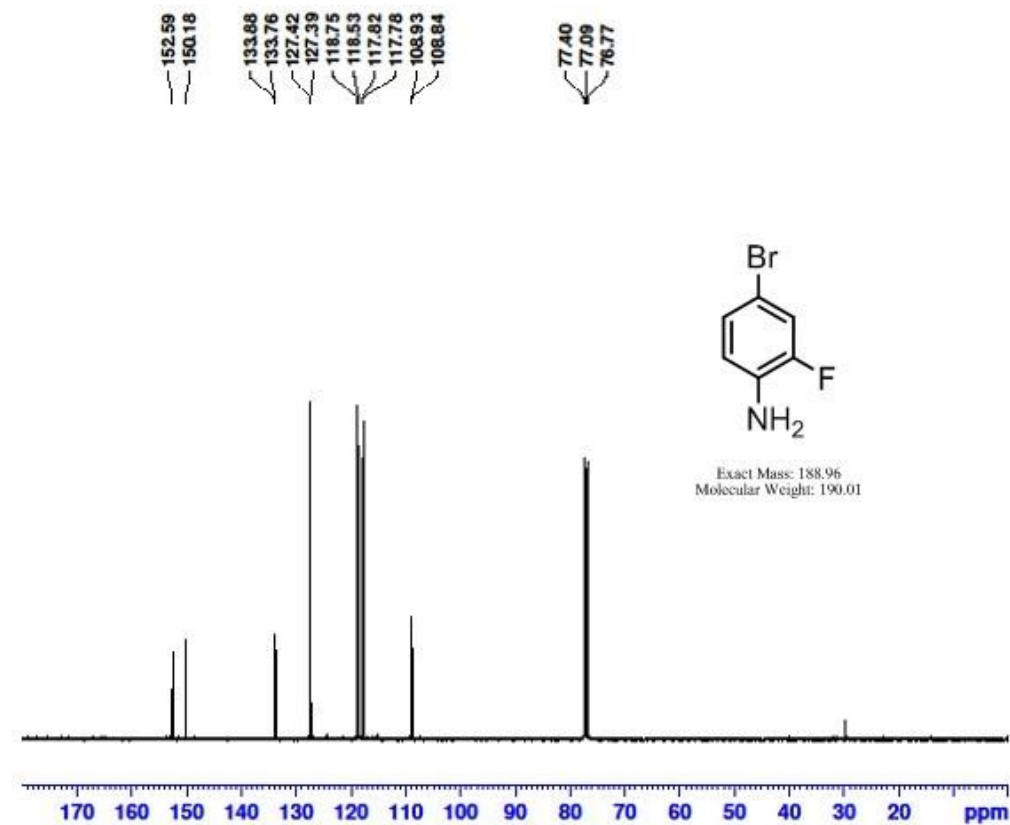
```

NAME wenkun110508-1
EXPNO 8
PROCNO 1
Date_ 20110508
Time 11.02
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 8223.685 Hz
FIDRES 0.125483 Hz
AQ 3.9846387 sec
RG 64
DW 60.800 usec
DE 6.50 usec
TE 299.1 K
D1 1.00000000 sec
TD0 1
    
```

```

===== CHANNEL f1 =====
NUC1 1H
P1 11.10 usec
PL1 -4.00 dB
PL1W 20.19063568 W
SFO1 400.1324710 MHz
SI 32768
SF 400.1300000 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
    
```

4-BROMO-2-FLUOROANILINE (**5c**): ^{13}C NMR



```

NAME wenkun110508-23
EXPNO 8
PROCNO 1
Date_ 20110508
Time 11.51
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 664
DS 4
SWH 24038.461 Hz
FIDRES 0.366798 Hz
AQ 1.3631988 sec
RG 645
DW 20.800 usec
DE 6.50 usec
TE 301.3 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1
    
```

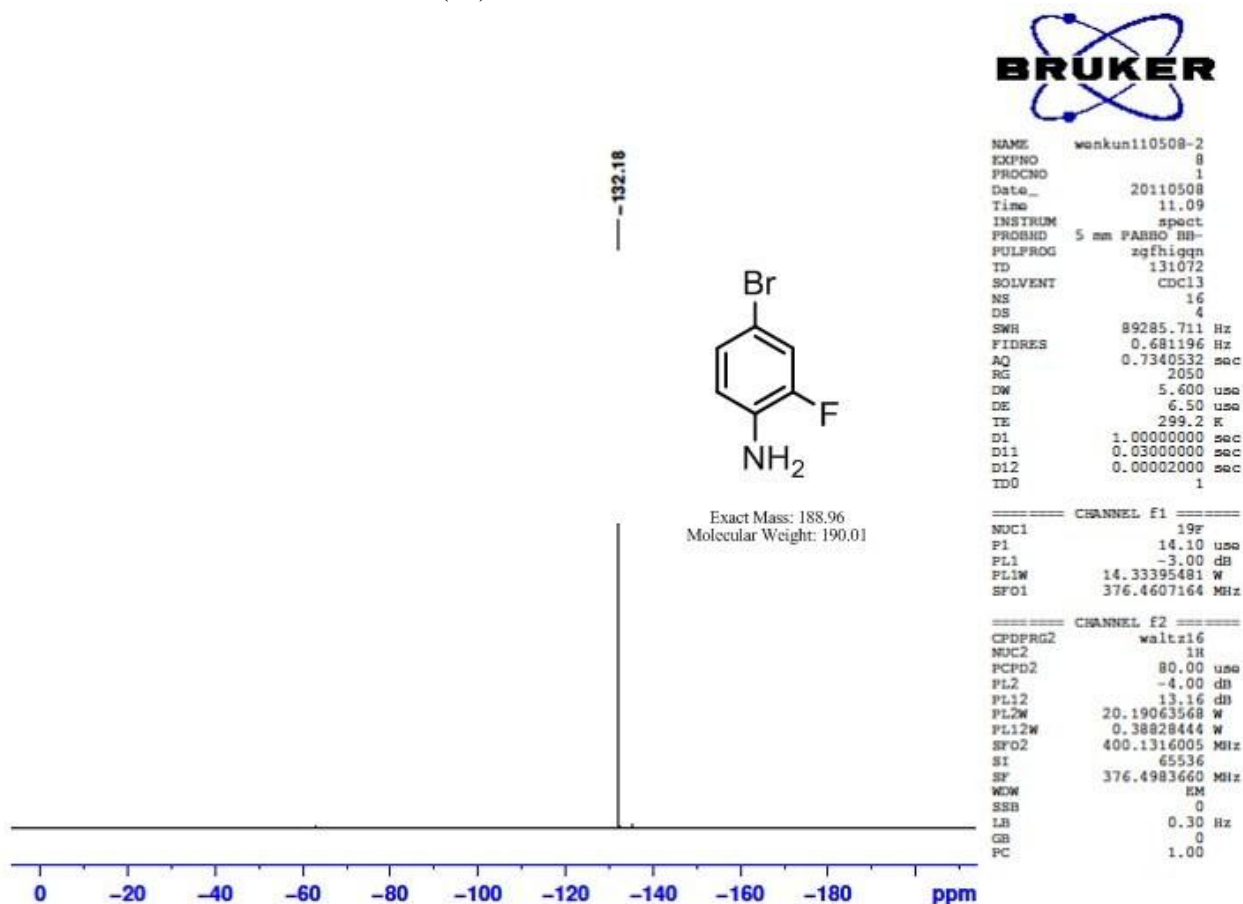
```

===== CHANNEL f1 =====
NUC1 13C
P1 9.30 usec
PL1 -3.00 dB
PL1W 64.15194228 W
SFO1 100.6228298 MHz
    
```

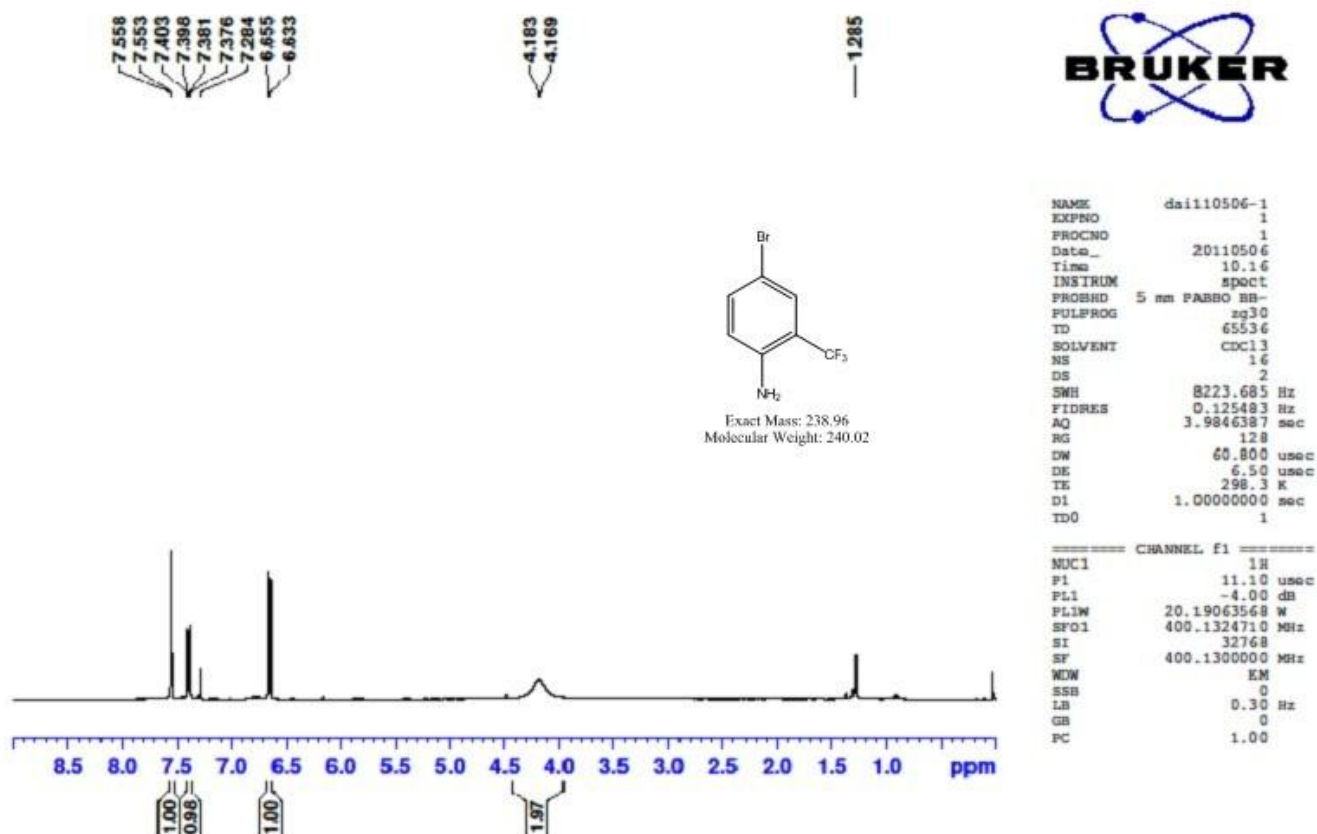
```

===== CHANNEL f2 =====
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 -4.00 dB
PL12 13.16 dB
PL13 12.00 dB
PL2W 20.19063568 W
PL2W 0.38828444 W
PL13W 0.50716585 W
SFO2 400.1316005 MHz
SI 32768
SF 100.6127690 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
    
```

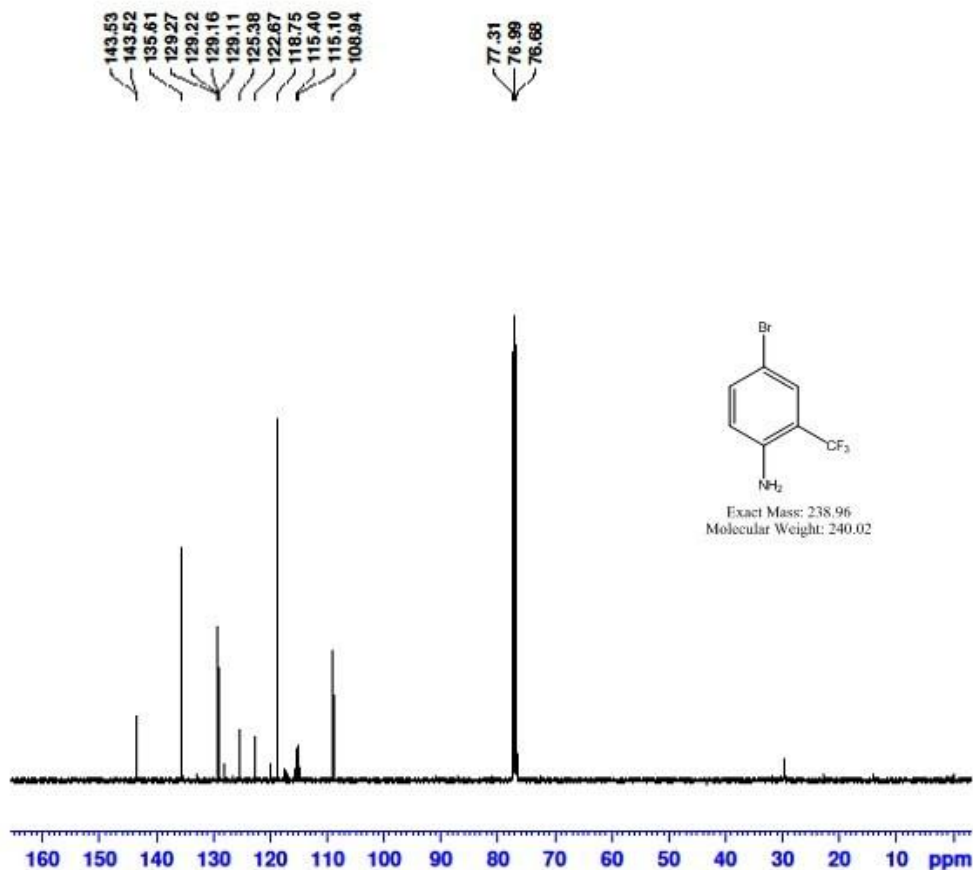
4-BROMO-2-FLUOROANILINE (**5c**): ^{19}F NMR



4-BROMO-2-TRIFLUOROMETHYLANILINE (**5d**): ^1H NMR



4-BROMO-2-TRIFLUOROMETHYLANILINE (**5d**): ^{13}C NMR



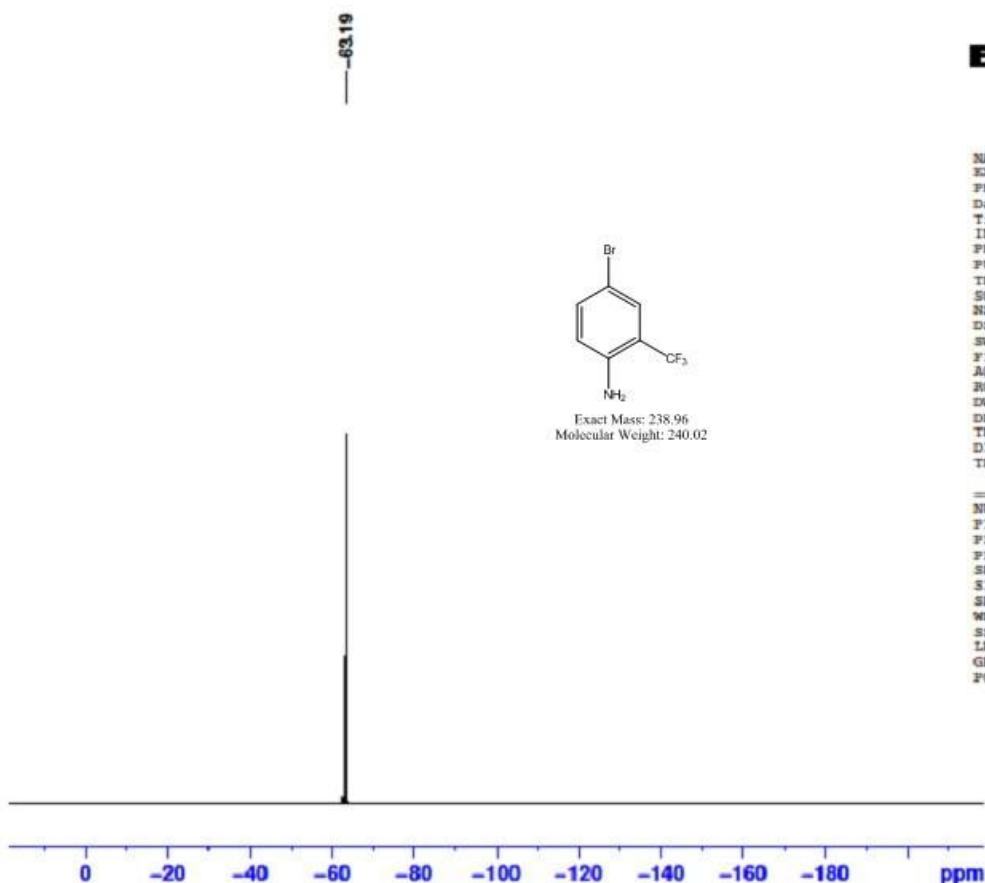
```

NAME      wenkun110506-2-C
EXPNO     1
PROCNO    1
Date_     20110506
Time      11.51
INSTRUM   spect
PROBHD    5 mm PABBO BB-
PULPROG   zgpg30
TD         65536
SOLVENT   CDC13
NS         1024
DS         4
SWH       24038.461 Hz
FIDRES    0.366798 Hz
AQ         1.3631988 sec
RG         645
DW         20.800 usec
DE         6.50 usec
TE         300.8 K
D1         2.00000000 sec
D11        0.03000000 sec
TD0        1

===== CHANNEL f1 =====
NUC1       13C
P1         9.30 usec
PL1        -3.00 dB
PL1W       64.15196228 W
SFO1       100.6228298 MHz

===== CHANNEL f2 =====
CPDPRG2    waltz16
NUC2       1H
PCPD2      90.00 usec
PL2        -4.00 dB
PL12       13.16 dB
PL13       12.00 dB
PL2W       20.19063568 W
PL12W      0.38828444 W
PL13W      0.50716585 W
SFO2       400.1316005 MHz
SI         32768
SF         100.6127690 MHz
WDW        EM
SSB         0
LB          1.00 Hz
GB          0
PC          1.40
    
```

4-BROMO-2-TRIFLUOROMETHYLANILINE (**5d**): ^{19}F NMR

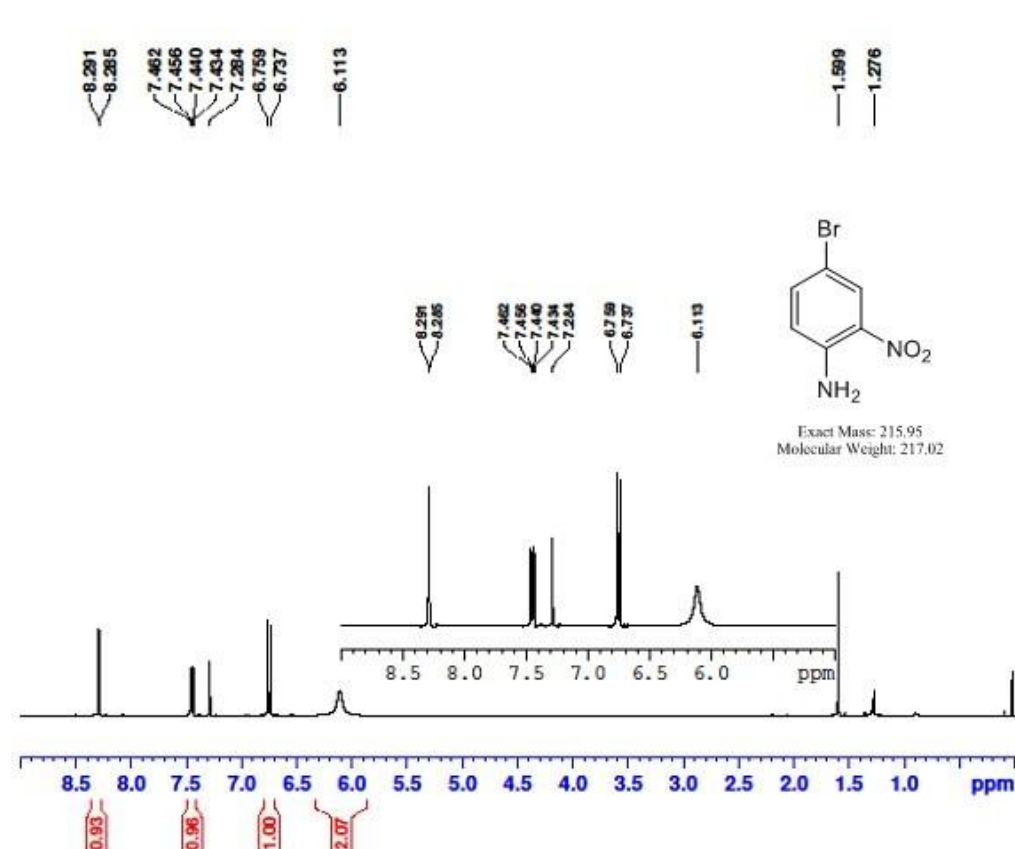


```

NAME      wenkun110506-2
EXPNO     1
PROCNO    1
Date_     20110506
Time      10.46
INSTRUM   spect
PROBHD    5 mm PABBO BB-
PULPROG   zgfg1qn
TD         131072
SOLVENT   CDC13
NS         16
DS         4
SWH       89285.711 Hz
FIDRES    0.681196 Hz
AQ         0.7340532 sec
RG         1150
DW         5.600 usec
DE         6.50 usec
TE         298.3 K
D1         1.00000000 sec
TD0        1

===== CHANNEL f1 =====
NUC1       19F
P1         14.10 usec
PL1        -3.00 dB
PL1W       14.33395481 W
SFO1       376.4607164 MHz
SI         65536
SF         376.4983660 MHz
WDW        EM
SSB         0
LB          0.30 Hz
GB          0
PC          1.00
    
```

4-BROMO-2-NITROANILINE (5e): ¹H NMR



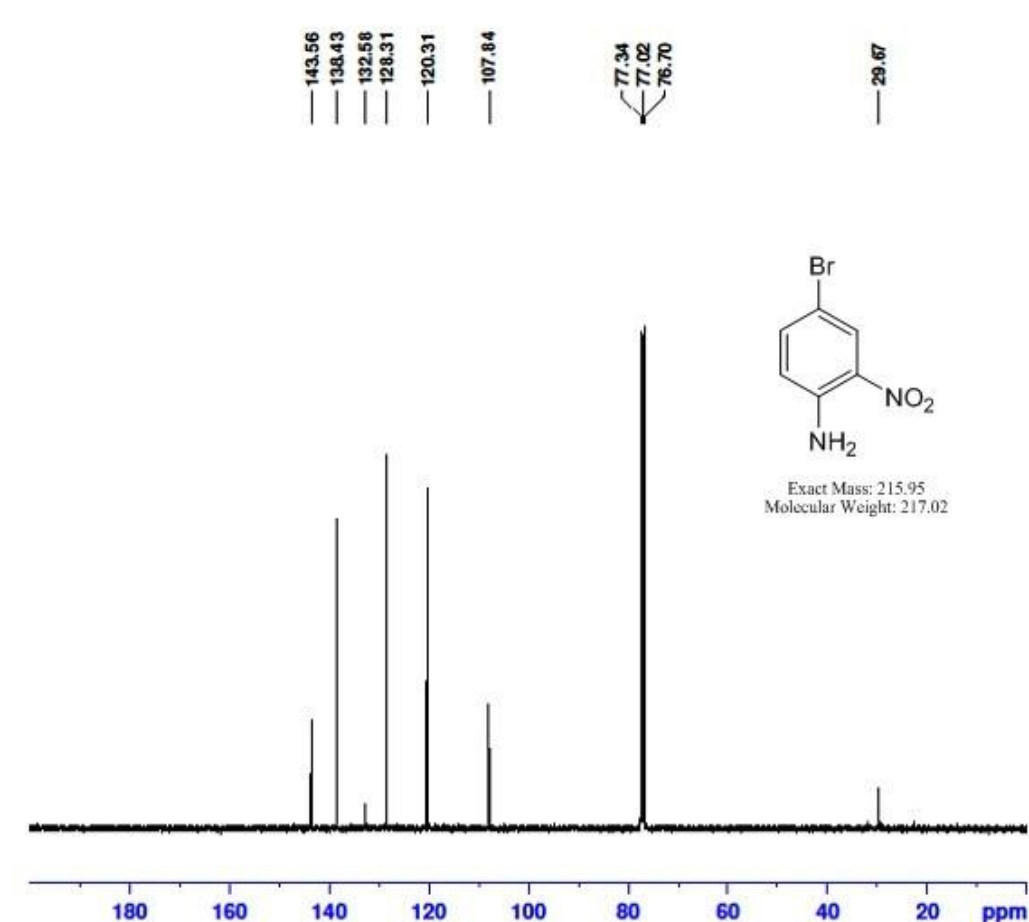
```

NAME      wenkun110511-2
EXPNO    5
PROCNO   1
Date_    20110511
Time     9.25
INSTRUM  spect
PROBHD   5 mm PABBO BB-
PULPROG  zg30
TD       65536
SOLVENT  CDCl3
NS       16
DS       2
SWH      8223.685 Hz
FIDRES   0.125483 Hz
AQ       3.9846387 sec
RG       406
EW       60.800 usec
DE       6.50 usec
TE       299.6 K
D1       1.00000000 sec
TD0     1
    
```

```

===== CHANNEL f1 =====
NUC1     1H
P1       11.10 usec
PL1      -4.00 dB
PL1W     20.19063568 W
SFO1     400.1324710 MHz
SI       32768
SF       400.1300000 MHz
WDW      EM
SSB      0
LB       0.30 Hz
GB       0
PC       1.00
    
```

4-BROMO-2-NITROANILINE (5e): ¹³C NMR



```

NAME      wenkun110511-6
EXPNO    12
PROCNO   1
Date_    20110511
Time     14.57
INSTRUM  spect
PROBHD   5 mm PABBO BB-
PULPROG  zgpg30
TD       65536
SOLVENT  CDCl3
NS       784
DS       4
SWH      24038.461 Hz
FIDRES   0.366798 Hz
AQ       1.3631988 sec
RG       912
DW       20.800 usec
DE       6.50 usec
TE       301.8 K
D1       2.00000000 sec
D11     0.03000000 sec
TD0     1
    
```

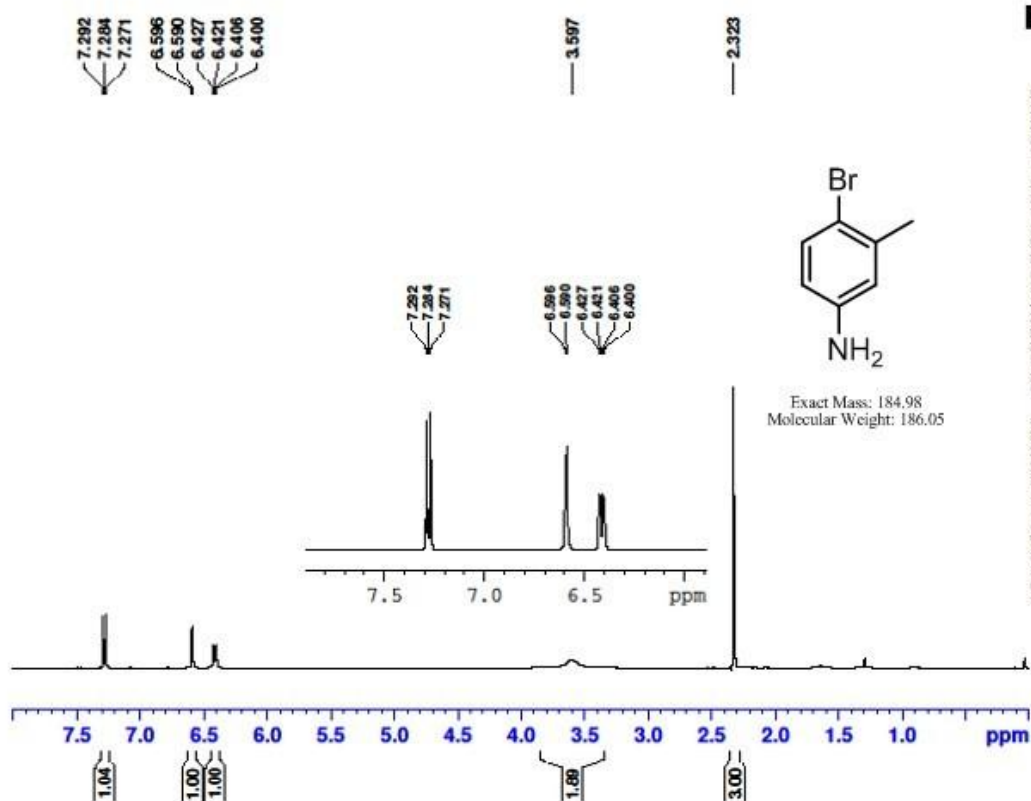
```

===== CHANNEL f1 =====
NUC1     13C
P1       9.30 usec
PL1      -3.00 dB
PL1W     64.15196228 W
SFO1     100.6228298 MHz
    
```

```

===== CHANNEL f2 =====
CPDPRG2  waltz16
NUC2     1H
PCPD2    80.00 usec
PL2      -4.00 dB
PL12     13.16 dB
PL13     12.00 dB
PL2W     20.19063568 W
PL12W    0.38828444 W
PL13W    0.50716585 W
SFO2     400.1316005 MHz
SI       32768
SF       100.6127690 MHz
WDW      EM
SSB      0
LB       1.00 Hz
GB       0
PC       1.40
    
```

4-BROMO-3-METHYLANILINE (**5f**): ¹H NMR



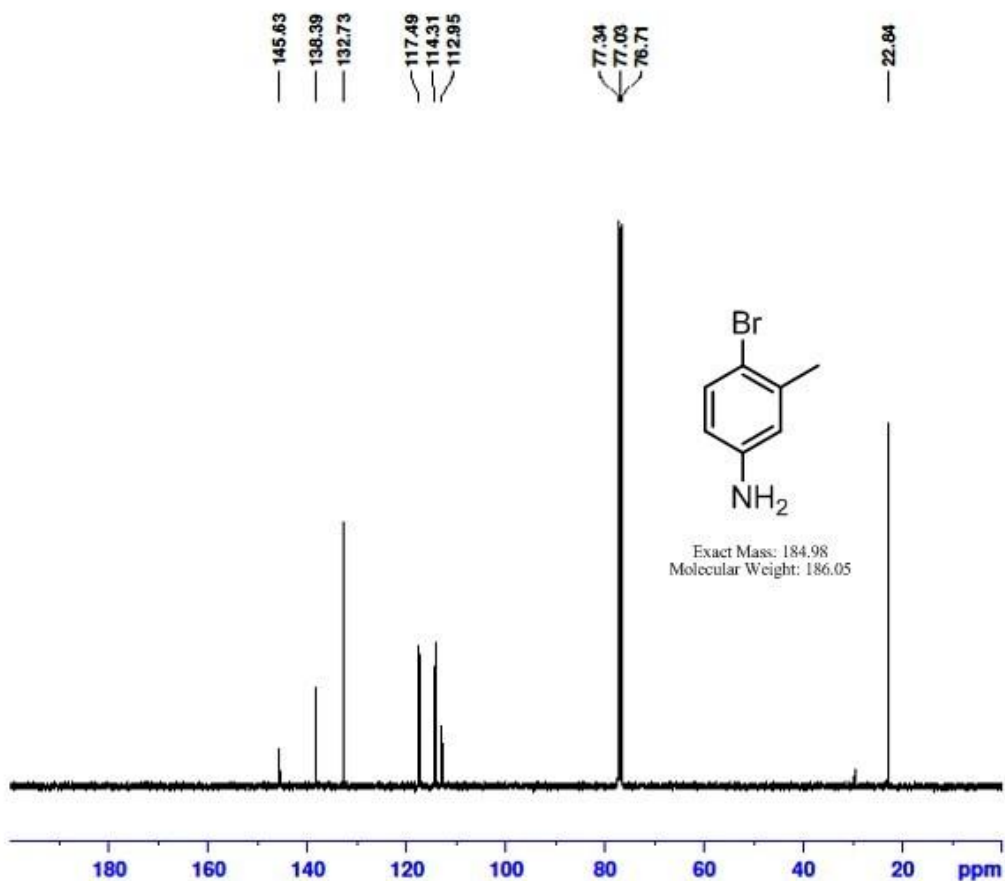
```

NAME wenkun110511-8
EXPNO 12
PROCNO 1
Date_ 20110511
Time 16.24
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 8
DS 2
SWH 8223.685 Hz
FIDRES 0.125483 Hz
AQ 3.9846387 sec
RG 128
DE 60.800 usec
TE 299.5 K
D1 1.00000000 sec
TD0 1
    
```

```

===== CHANNEL f1 =====
NUC1 1H
P1 11.10 usec
PL1 -4.00 dB
PL1W 20.19063568 W
SFO1 400.1324710 MHz
SI 32768
SF 400.1300000 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
    
```

4-BROMO-3-METHYLANILINE (**5f**): ¹³C NMR



```

NAME wenkun110511-9
EXPNO 12
PROCNO 1
Date_ 20110511
Time 17.13
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 768
DS 4
SWH 24038.461 Hz
FIDRES 0.366798 Hz
AQ 1.3631988 sec
RG 512
DE 20.800 usec
TE 301.7 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1
    
```

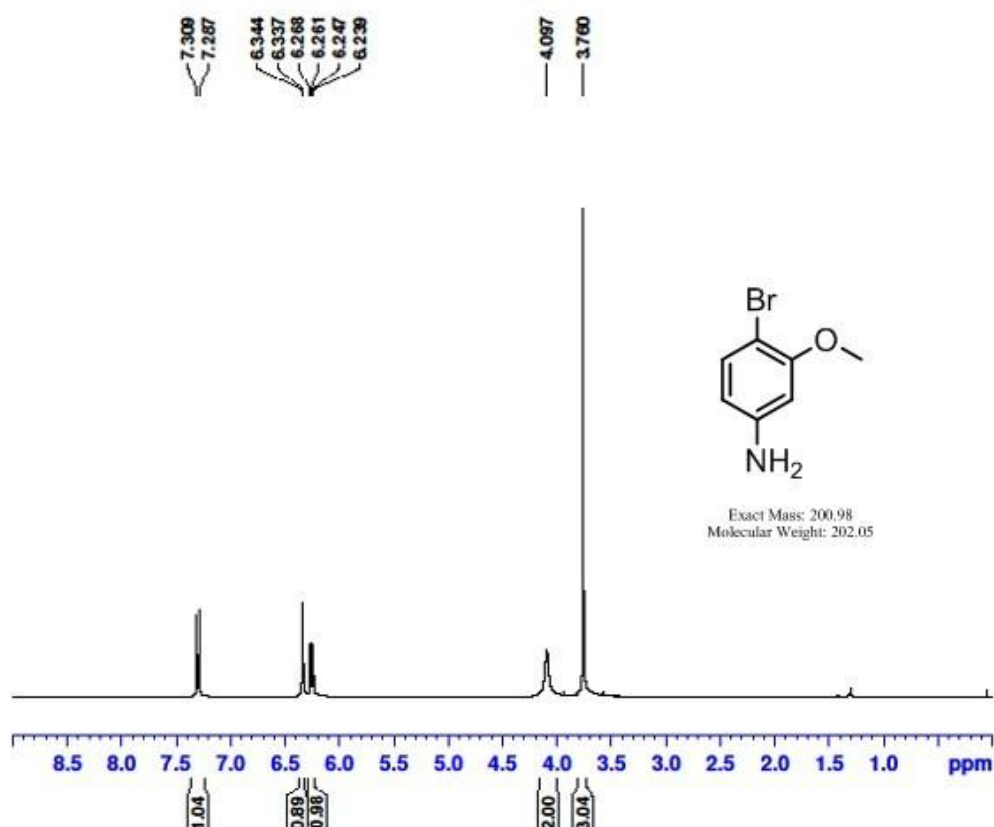
```

===== CHANNEL f1 =====
NUC1 13C
P1 9.30 usec
PL1 -3.00 dB
PL1W 64.15196228 W
SFO1 100.6228298 MHz
    
```

```

===== CHANNEL f2 =====
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 -4.00 dB
PL12 13.16 dB
PL13 12.00 dB
PL2W 20.19063568 W
PL12W 0.38828444 W
PL13W 0.50716585 W
SFO2 400.1316005 MHz
SI 32768
SF 100.6127690 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
    
```

4-BROMO-3-METHOXYANILINE (5g): ^1H NMR



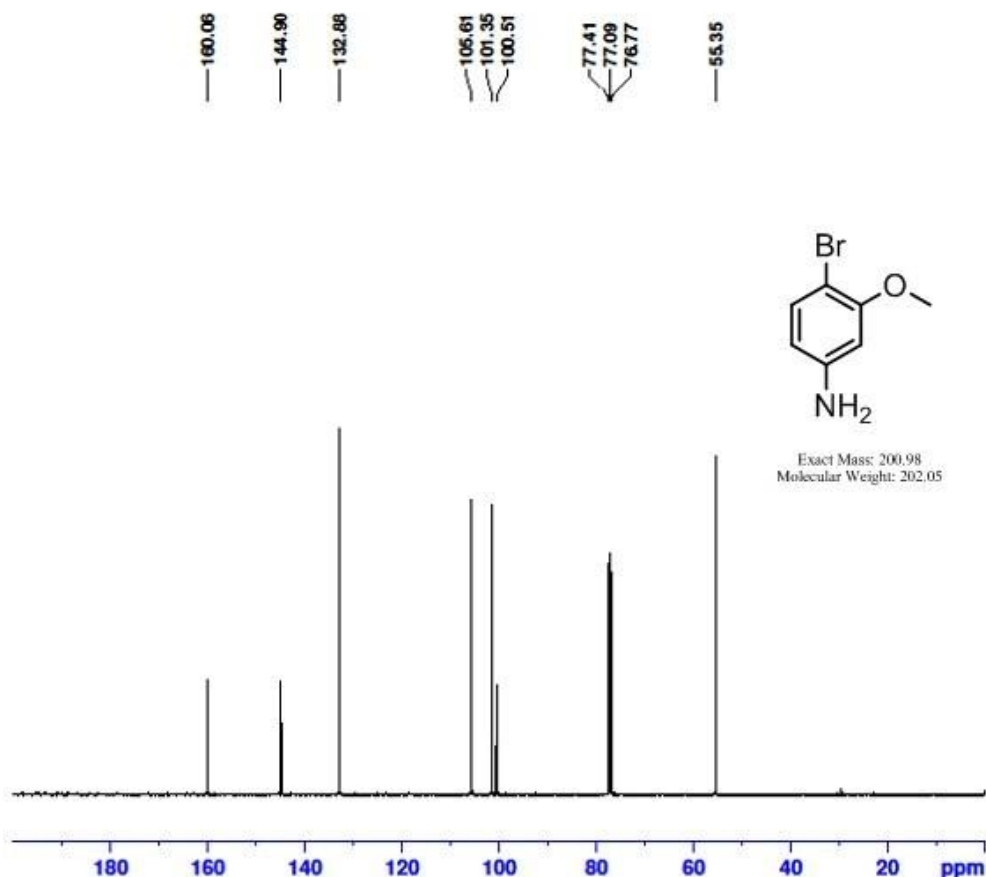
```

NAME wenkun110522-1
EXPNO 1
PROCNO 1
Date_ 20110522
Time 11.07
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zg30
TD 65536
SOLVENT cdcl3
NS 16
DS 2
SWH 8223.685 Hz
FIDRES 0.125483 Hz
AQ 3.9846387 sec
RG 64
DW 60.800 usec
DE 6.50 usec
TE 299.7 K
D1 1.0000000 sec
TD0 1
    
```

```

===== CHANNEL f1 =====
NUC1 1H
P1 11.10 usec
PL1 -4.00 dB
PL1W 20.19063568 W
SFO1 400.1324710 MHz
SI 32768
SF 400.1300000 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
    
```

4-BROMO-3-METHOXYANILINE (5g): ^{13}C NMR



```

NAME wenkun110522-3-C
EXPNO 1
PROCNO 1
Date_ 20110522
Time 12.16
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zgpg30
TD 65536
SOLVENT cdcl3
NS 1024
DS 4
SWH 24038.461 Hz
FIDRES 0.366798 Hz
AQ 1.3651988 sec
RG 1030
DW 20.800 usec
DE 6.50 usec
TE 301.4 K
D1 2.0000000 sec
D11 0.03000000 sec
TD0 1
    
```

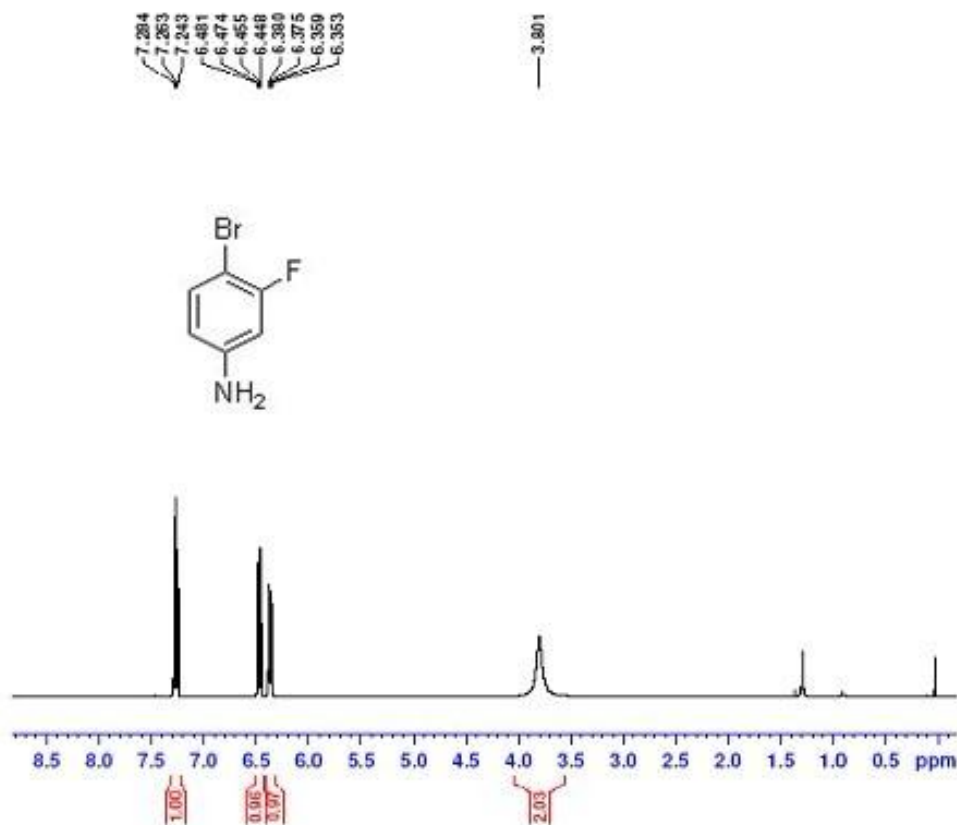
```

===== CHANNEL f1 =====
NUC1 13C
P1 9.30 usec
PL1 -3.00 dB
PL1W 64.15196228 W
SFO1 100.6228298 MHz
    
```

```

===== CHANNEL f2 =====
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 -4.00 dB
PL12 13.16 dB
PL13 12.00 dB
PL2W 20.19063568 W
PL12W 0.38828444 W
PL13W 0.50716585 W
SFO2 400.1316005 MHz
SI 32768
SF 100.6127690 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
    
```

4-BROMO-3-FLUOROANILINE (**5h**): ¹H NMR



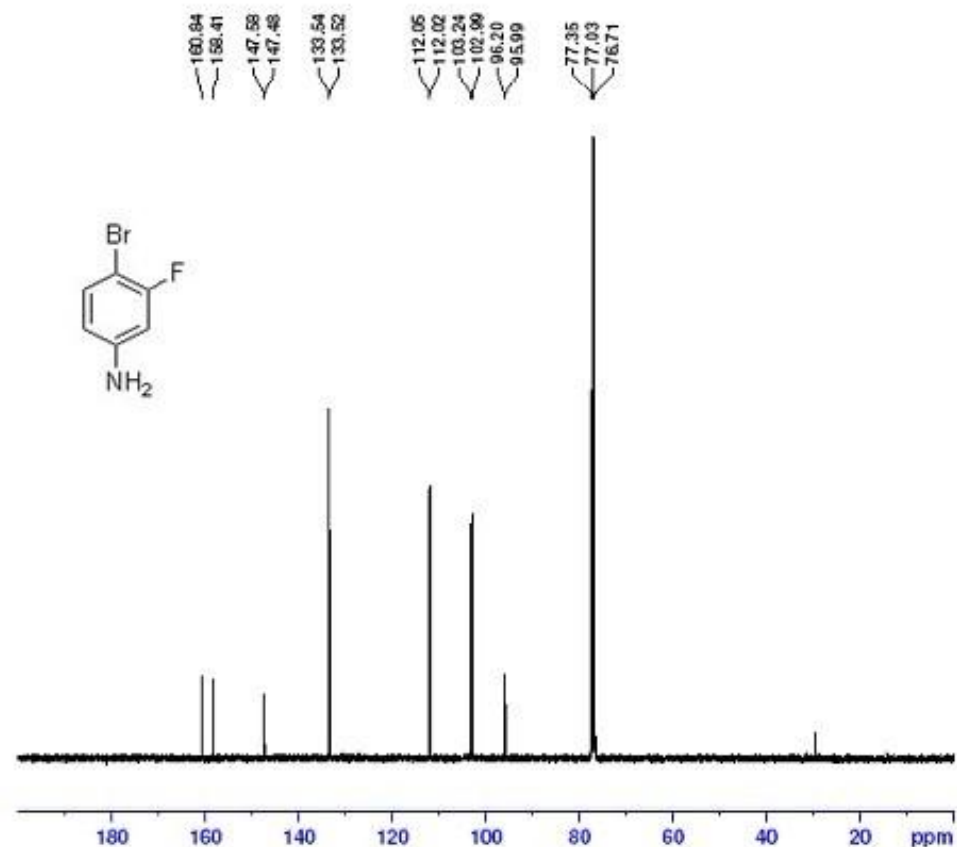
```

NAME      wankun110524-1
EXPNO    1
PROCNO   1
Date_    20110524
Time     10.42
INSTRUM  spect
PROBHD   5 mm PABBO BB-
PULPROG  zgpg30
TD        65536
SOLVENT  CDCl3
NS        16
DS        4
SWH       3223.465 Hz
FIDRES   0.125483 Hz
AQ        3.9846387 sec
RG         128
DN        60.800 usec
DE        6.50 usec
TE        298.3 K
D1        1.0000000 sec
D11       1
  
```

```

===== CHANNEL f1 =====
NUC1      1H
P1        11.10 usec
PL1       -4.00 dB
PL1W      20.19063569 W
SFO1      400.1324710 MHz
SI        32768
SF        400.1300000 MHz
MSW       EM
SSB       0
LB        0.30 Hz
GB        0
PC        1.00
  
```

4-BROMO-3-FLUOROANILINE (**5h**): ¹³C NMR



```

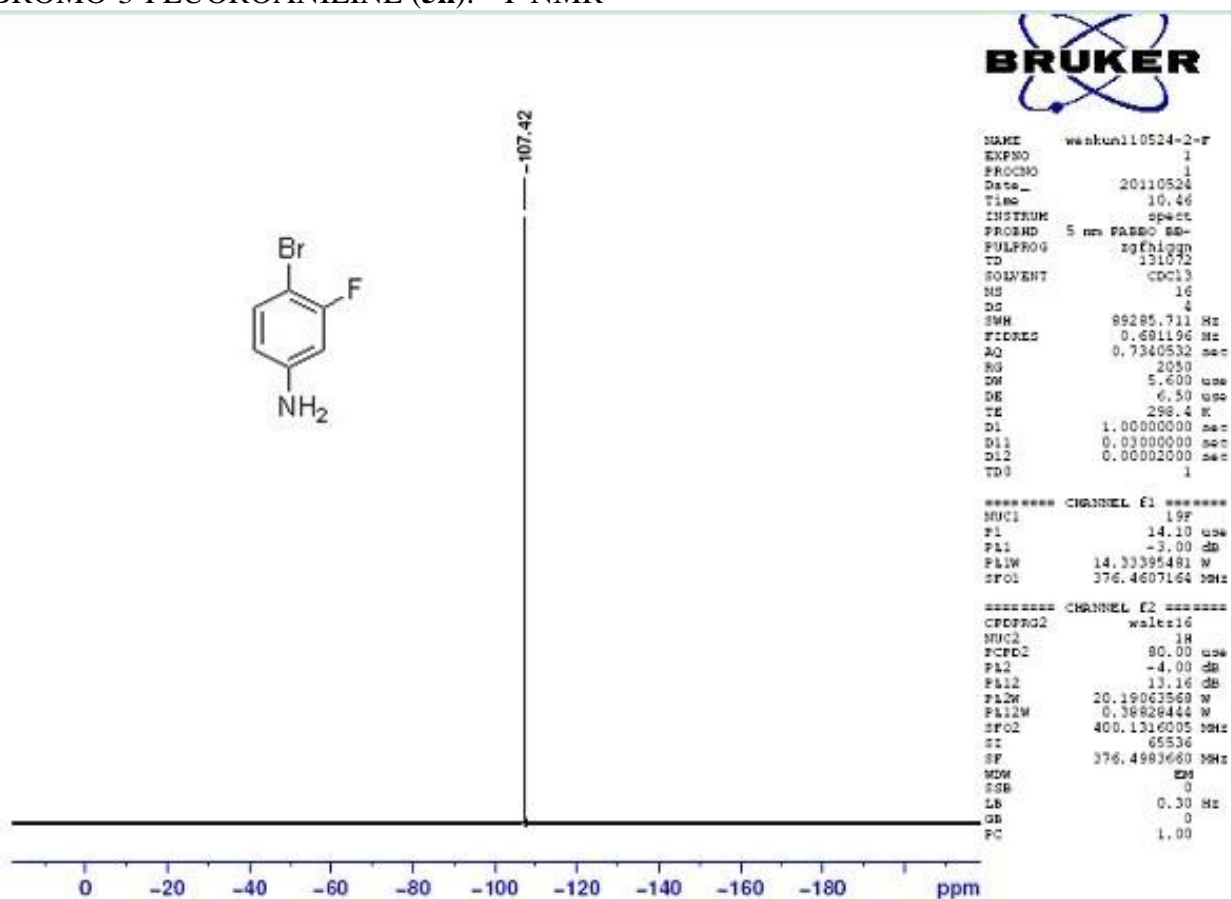
NAME      wankun110524-2-C
EXPNO    1
PROCNO   1
Date_    20110524
Time     11.50
INSTRUM  spect
PROBHD   5 mm PABBO BB-
PULPROG  zgpg30
TD        65536
SOLVENT  CDCl3
NS        1024
DS        4
SWH       24038.461 Hz
FIDRES   0.366799 Hz
AQ        1.3631988 sec
RG         812
DN        20.800 usec
DE        6.50 usec
TE        300.2 K
D1        2.0000000 sec
D11       0.0300000 sec
D12       1
  
```

```

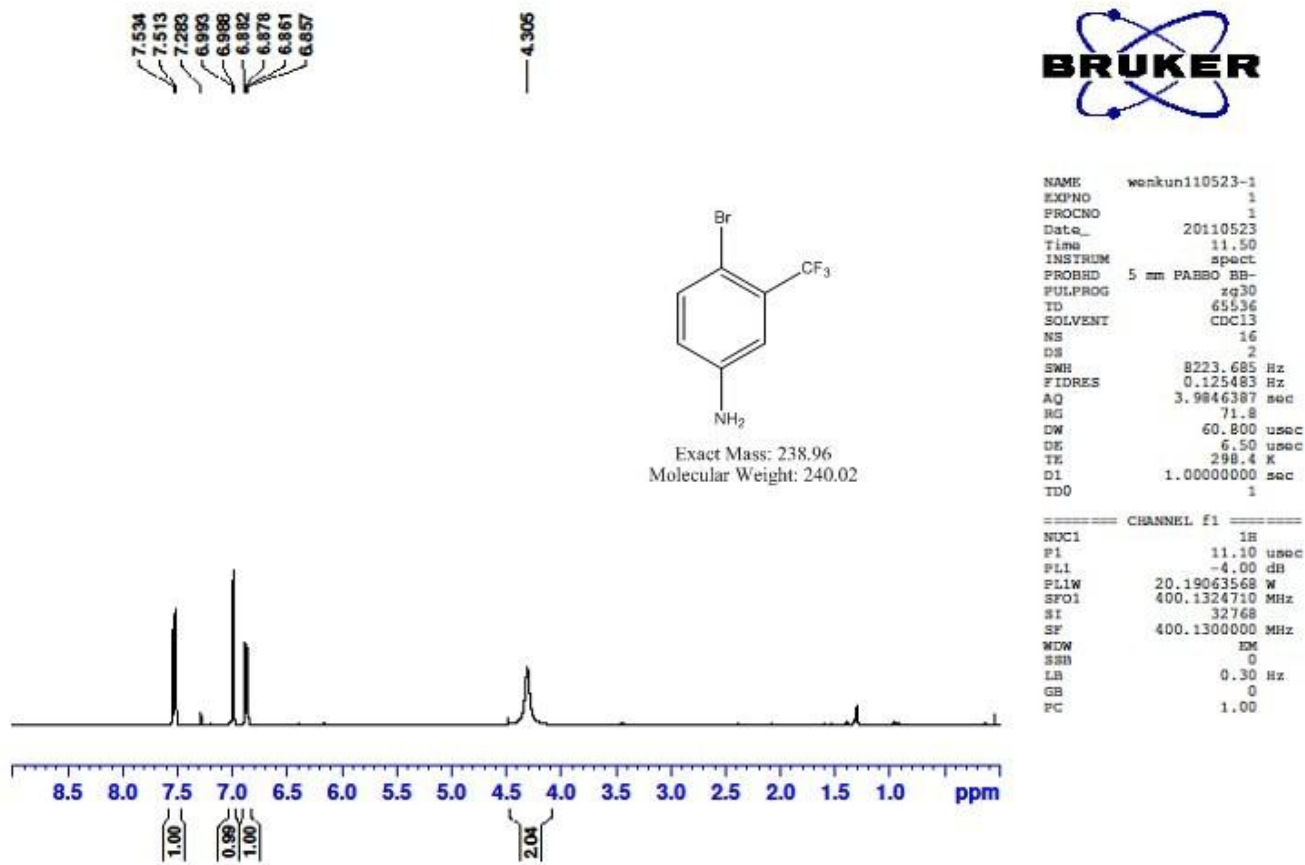
===== CHANNEL f1 =====
NUC1      13C
P1        9.30 usec
PL1       -3.00 dB
PL1W      64.15196223 W
SFO1      100.6228298 MHz

===== CHANNEL f2 =====
CPDPRG2  waltz16
NUC2      1H
PCPD2    80.00 usec
PL2      -4.00 dB
PL2W     13.16 dB
PL13     12.00 dB
PL2W     20.19063569 W
PL12W    0.38828444 W
PL13W    0.50716585 W
SFO2     400.1316005 MHz
SI        32768
SF        100.6127690 MHz
MSW       EM
SSB       0
LB        1.00 Hz
GB        0
PC        1.40
  
```

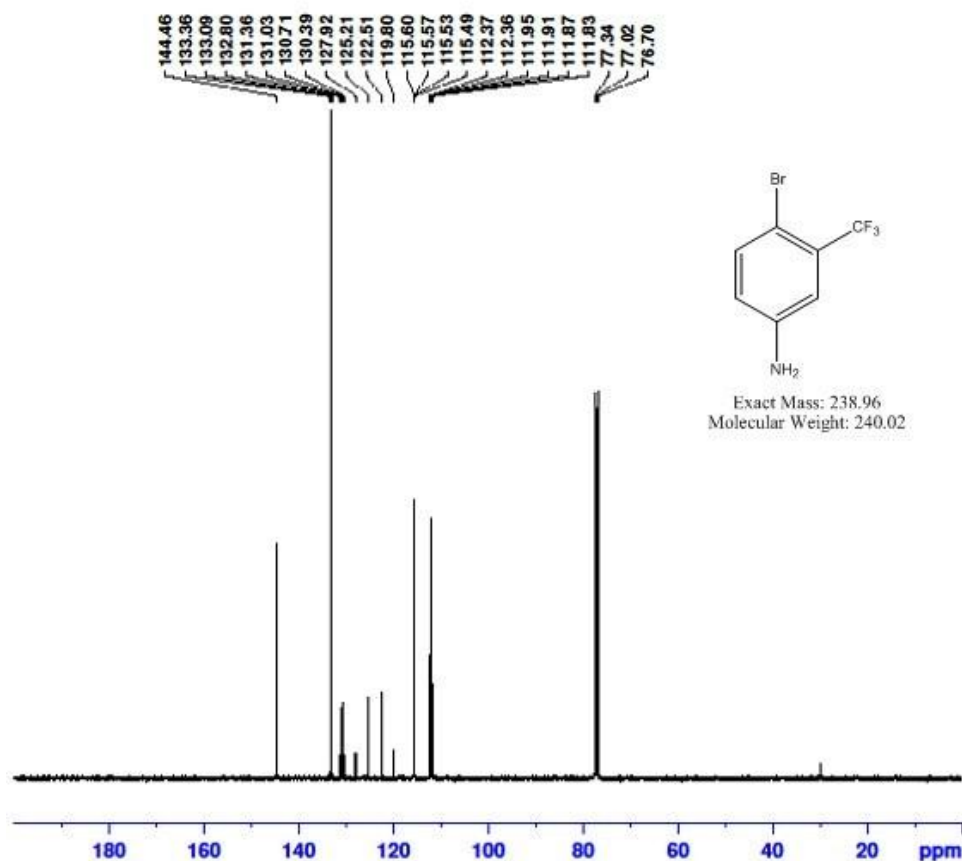
4-BROMO-3-FLUOROANILINE (**5h**): ^{19}F NMR



4-BROMO-3-TRIFLUOROMETHYLANILINE (**5i**): ^1H NMR



4-BROMO-3-TRIFLUOROMETHYLANILINE (**5i**): ¹³C NMR



```

NAME wenkun110523-3-C
EXPNO 1
PROCNO 1
Date_ 20110523
Time 12.39
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zgpg30
ID 65536
SOLVENT CDCl3
NS 696
DS 4
SWH 24038.461 Hz
FIDRES 0.366798 Hz
AQ 1.3631988 sec
RG 812
DW 20.800 usec
DE 6.50 usec
TE 300.8 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1
    
```

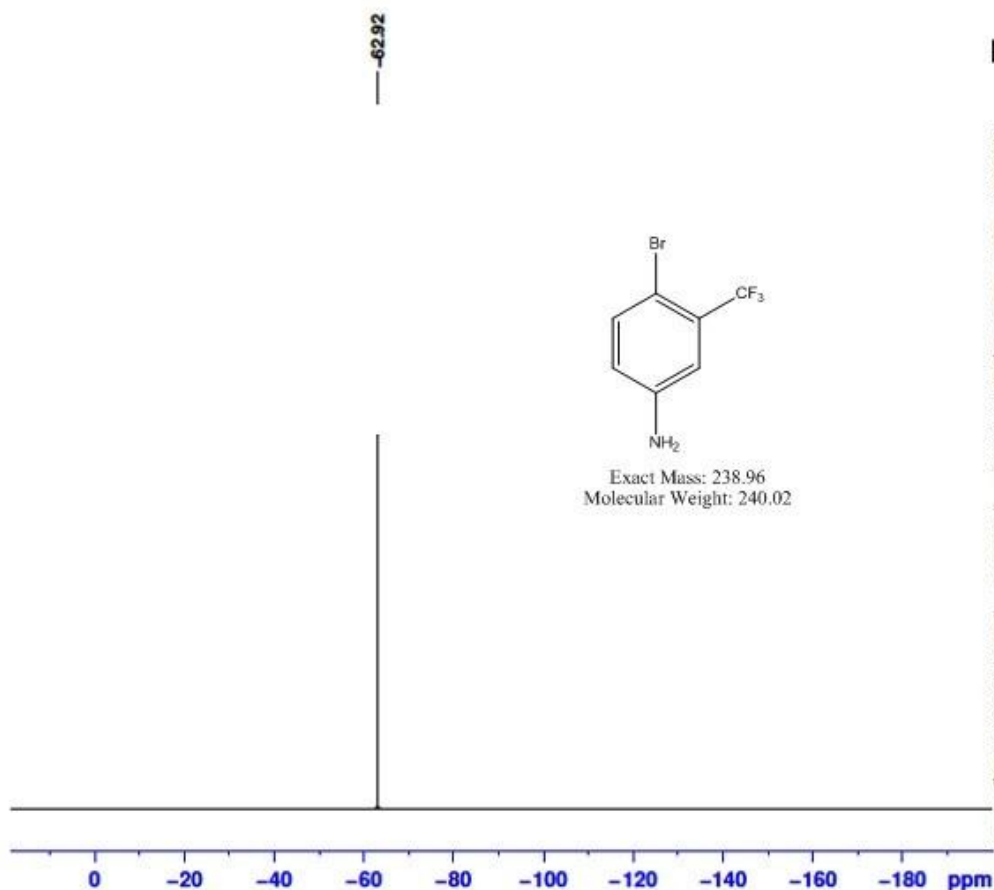
```

===== CHANNEL f1 =====
NUC1 13C
P1 9.30 usec
PL1 -3.00 dB
PL1W 64.15196228 W
SFO1 100.6228298 MHz
    
```

```

===== CHANNEL f2 =====
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 -4.00 dB
PL12 13.16 dB
PL13 12.00 dB
PL2W 20.19063568 W
PL12W 0.38828444 W
PL13W 0.50716585 W
SFO2 400.1316005 MHz
SI 32768
SF 100.6127690 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
    
```

4-BROMO-3-TRIFLUOROMETHYLANILINE (**5i**): ¹⁹F NMR



```

NAME wenkun110523-2-F
EXPNO 1
PROCNO 1
Date_ 20110523
Time 11.56
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zgfg1qsn
TD 131072
SOLVENT CDCl3
NS 16
DS 4
SWH 89285.711 Hz
FIDRES 0.681196 Hz
AQ 0.7340532 sec
RG 406
DW 5.600 usec
DE 6.50 usec
TE 298.5 K
D1 1.00000000 sec
D11 0.03000000 sec
D12 0.00002000 sec
TD0 1
    
```

```

===== CHANNEL f1 =====
NUC1 19F
P1 14.10 usec
PL1 -3.00 dB
PL1W 14.33395481 W
SFO1 376.4607164 MHz
    
```

```

===== CHANNEL f2 =====
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 -4.00 dB
PL12 13.16 dB
PL2W 20.19063568 W
PL12W 0.38828444 W
SFO2 400.1316005 MHz
SI 65536
SF 376.4983660 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
    
```