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Supporting Information: Syntheses of 3,3-disubstituted Dihydrobenzofurans, Indolines, Indolinones and Isochromanes by Palladium-Catalyzed Tandem Reaction Using $Pd(PPh_3)_2Cl_2$/(±)-BINAP as a Catalytic System

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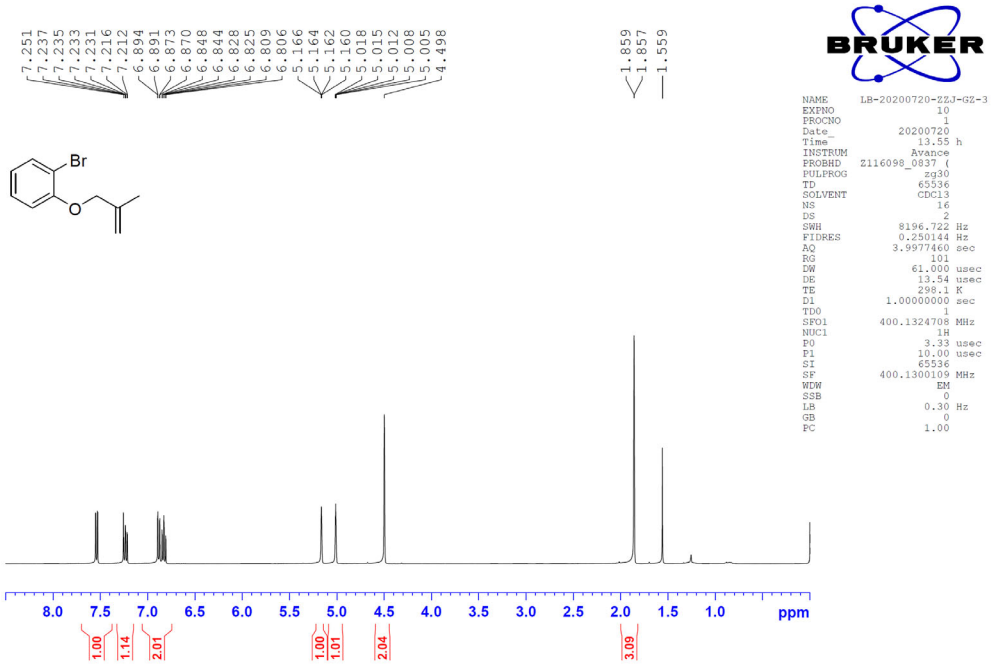
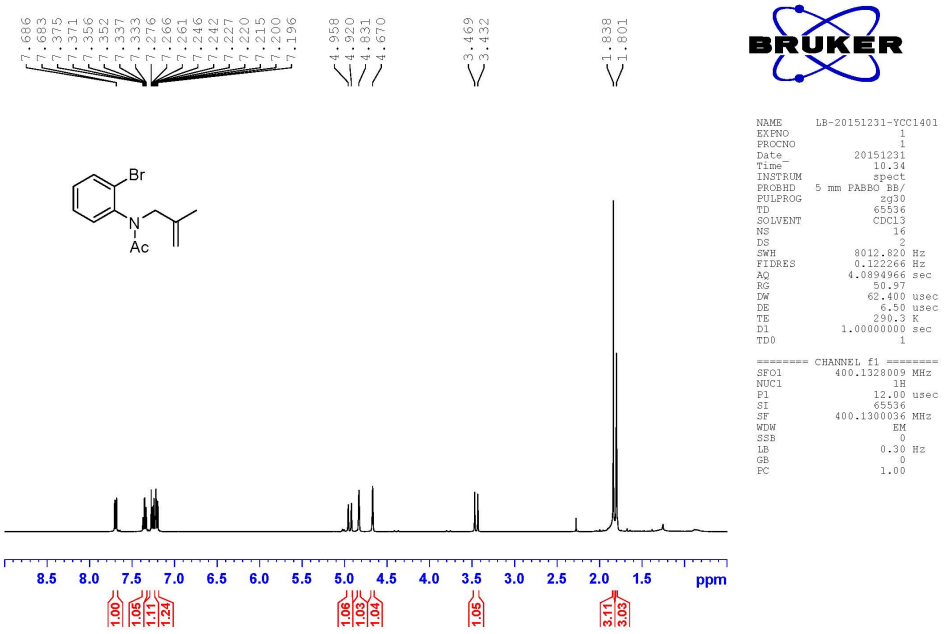
‡ The authors contributed equally to this work

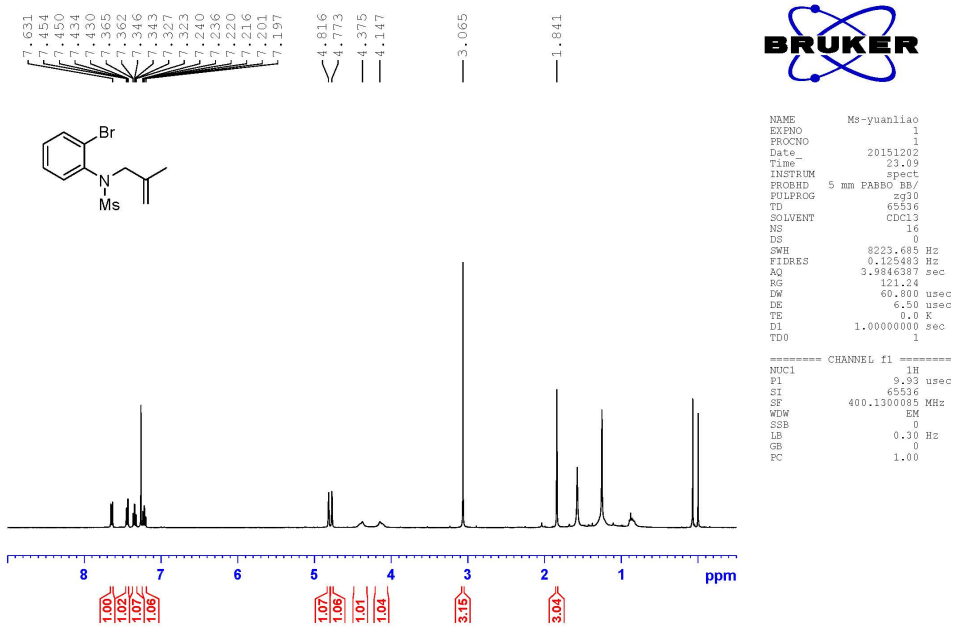
[1]H NMR Spectra for Compound **1a**

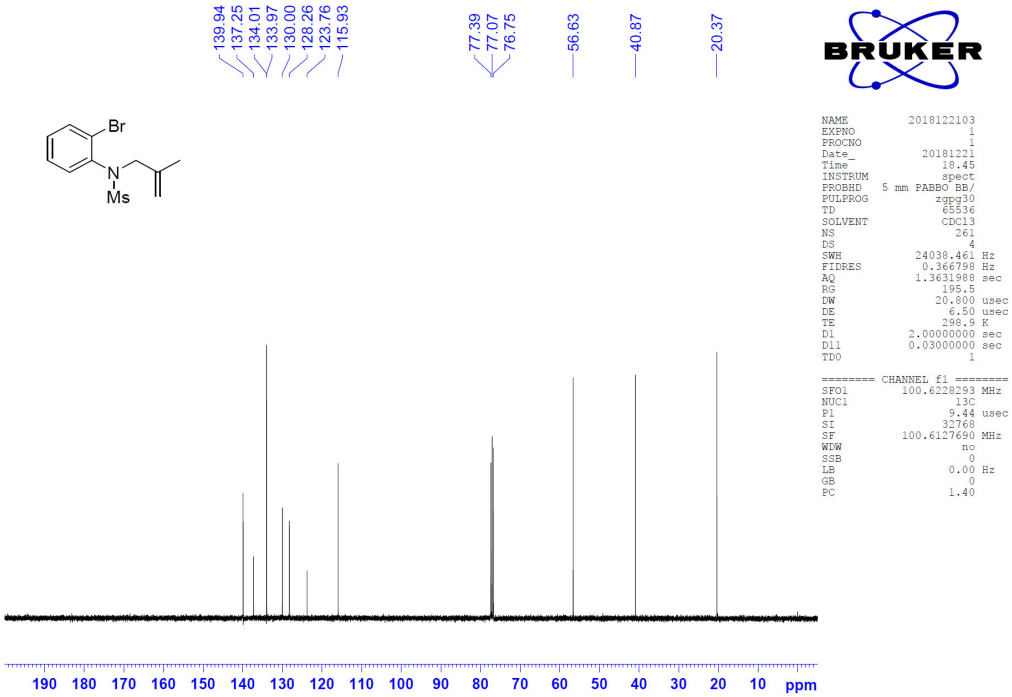


[1]H NMR Spectra for Compound **1b**



^{1}H and ^{13}C NMR Spectra for Compound **1c**





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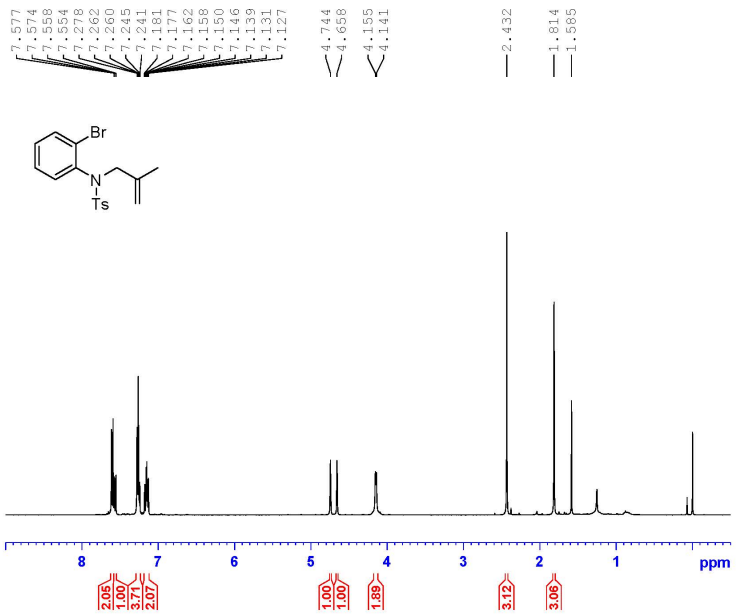

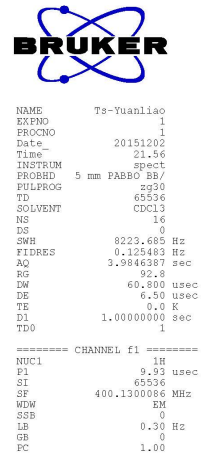

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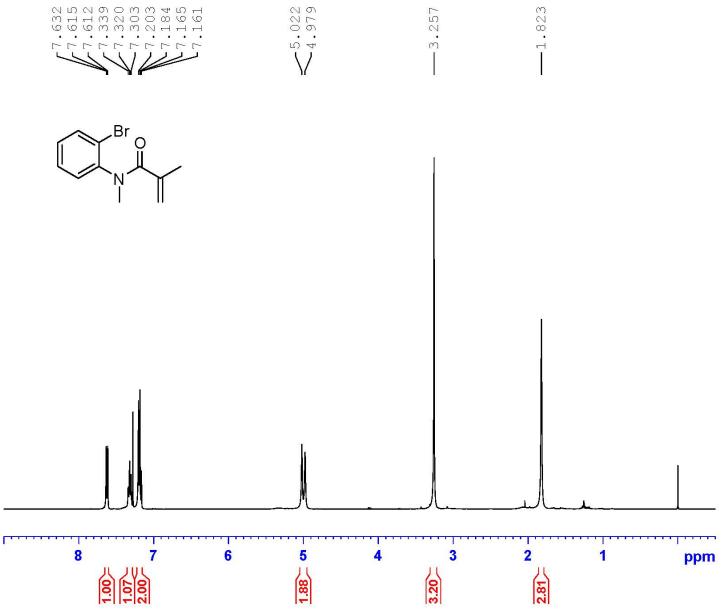

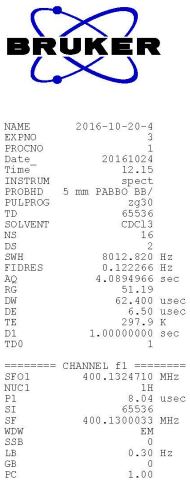

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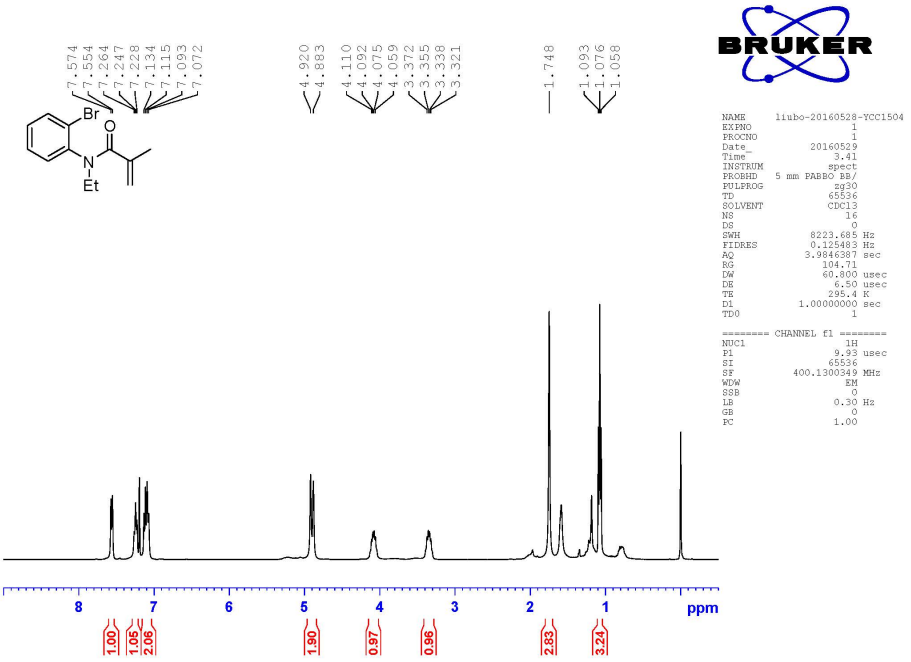

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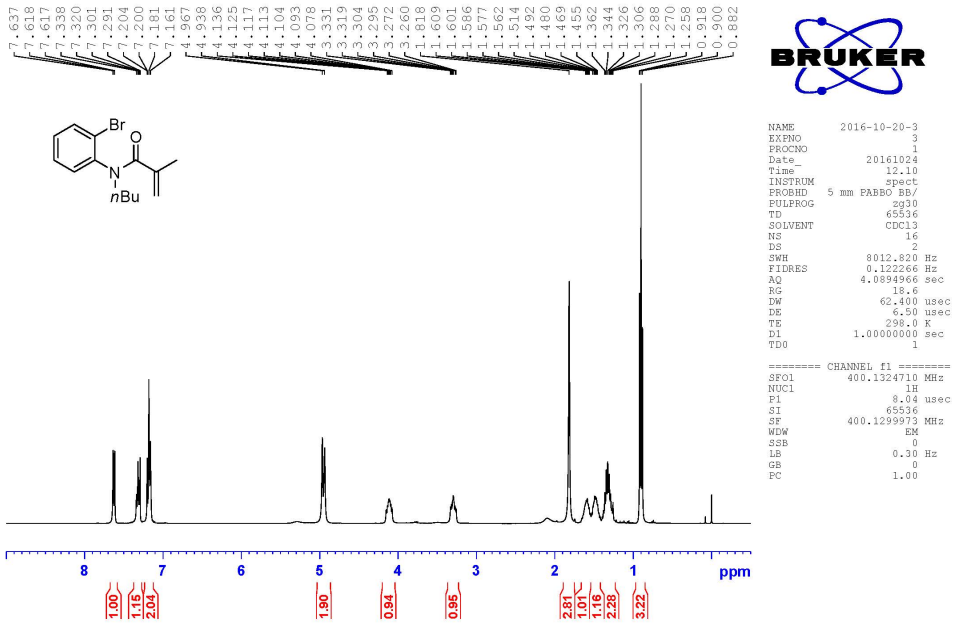

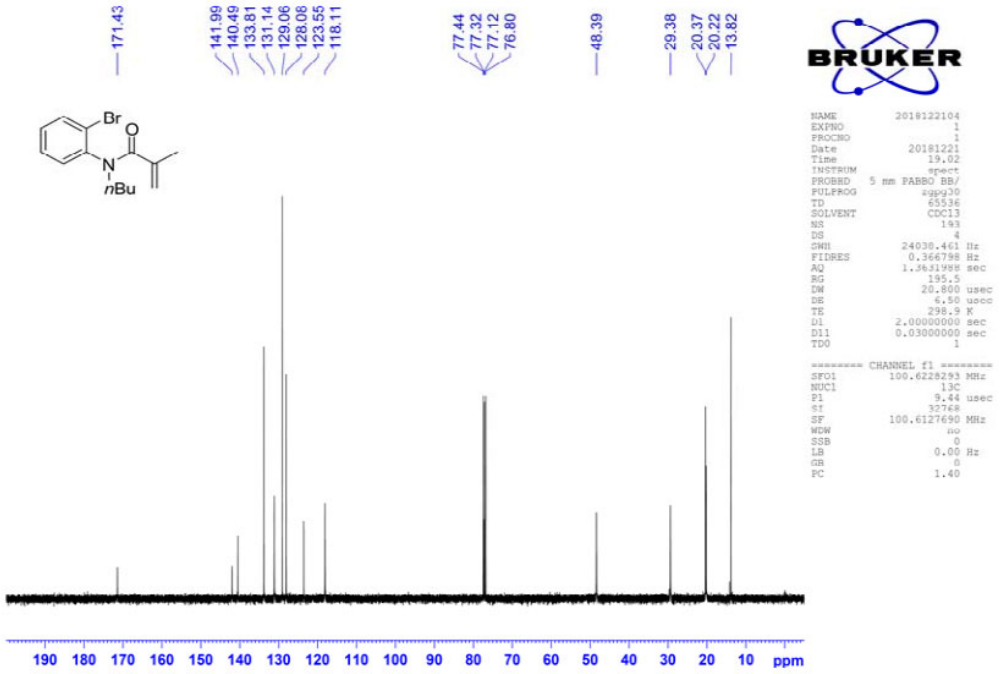

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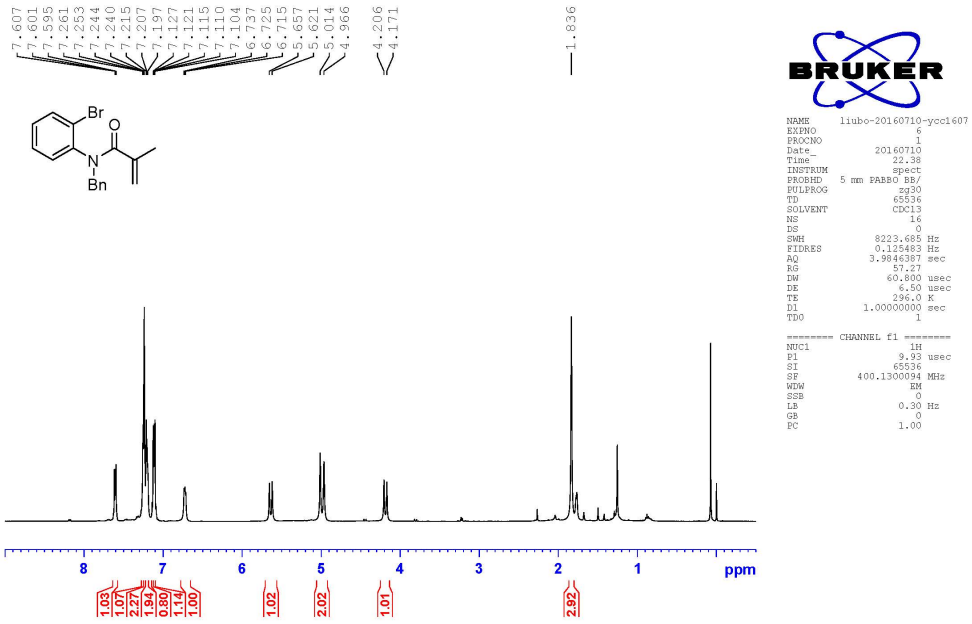

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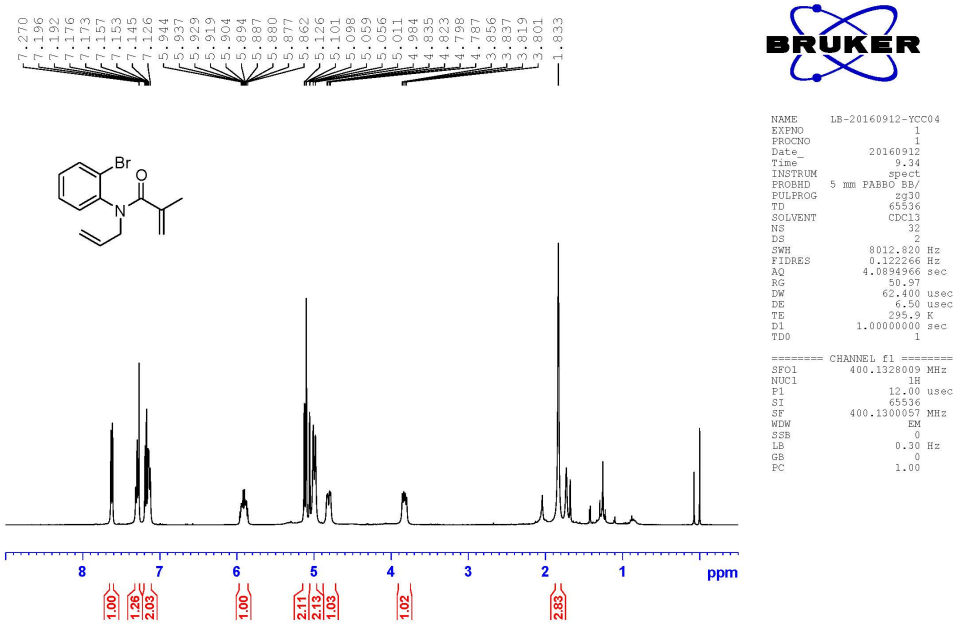

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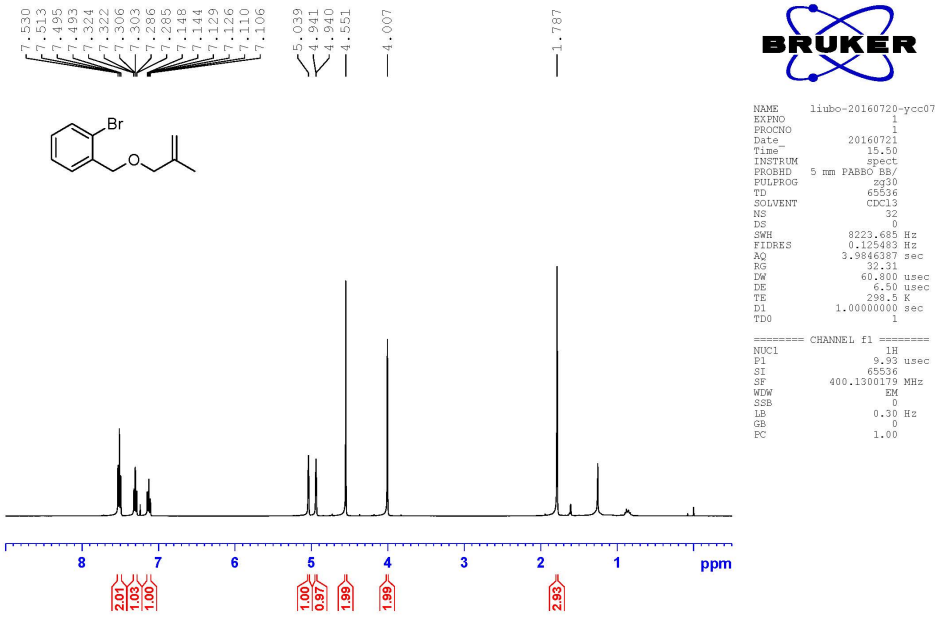

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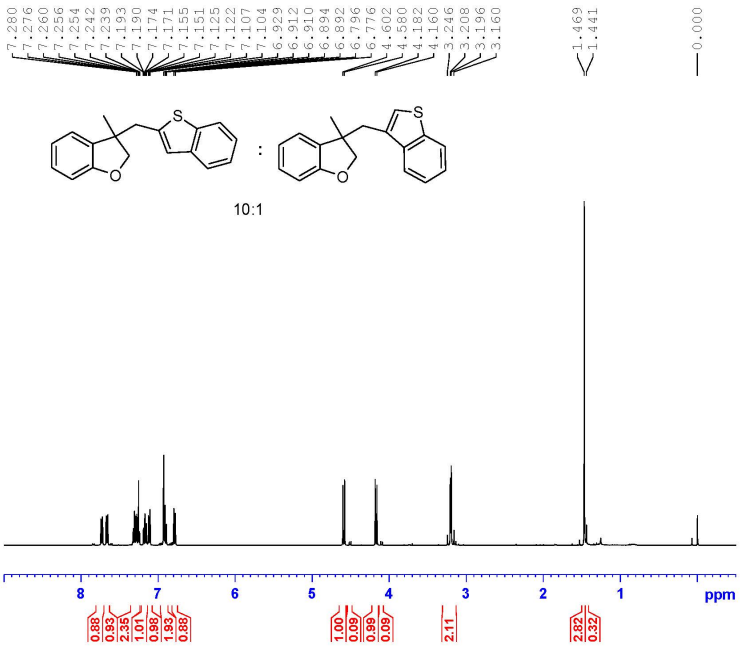
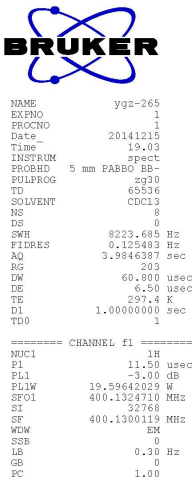
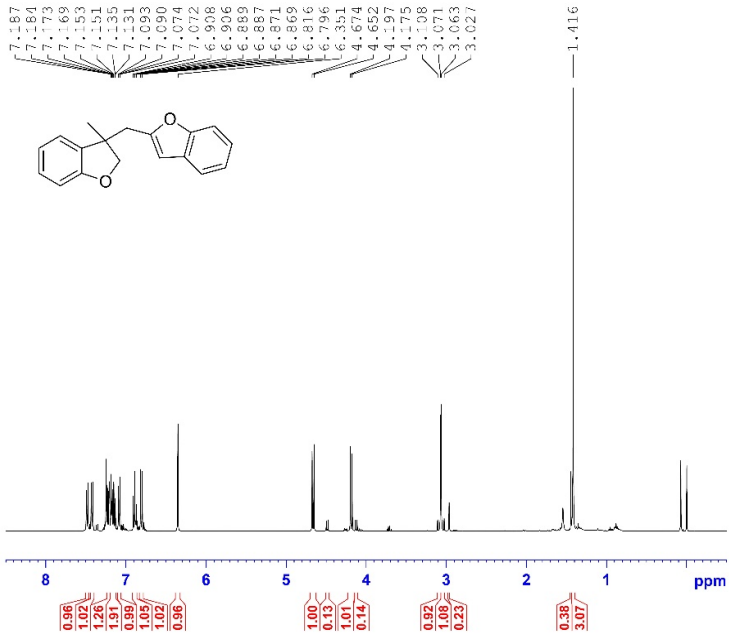
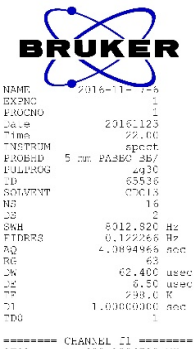
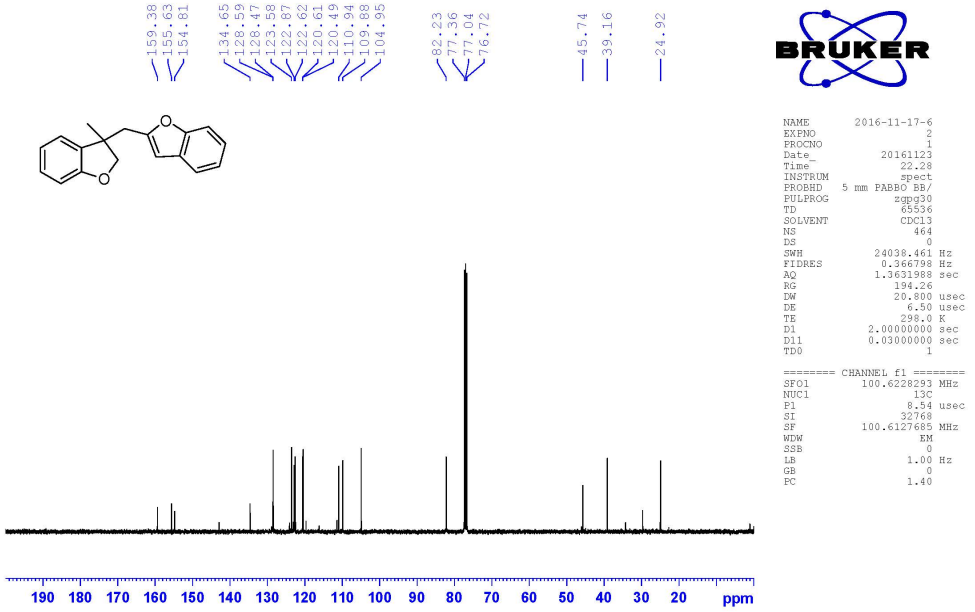




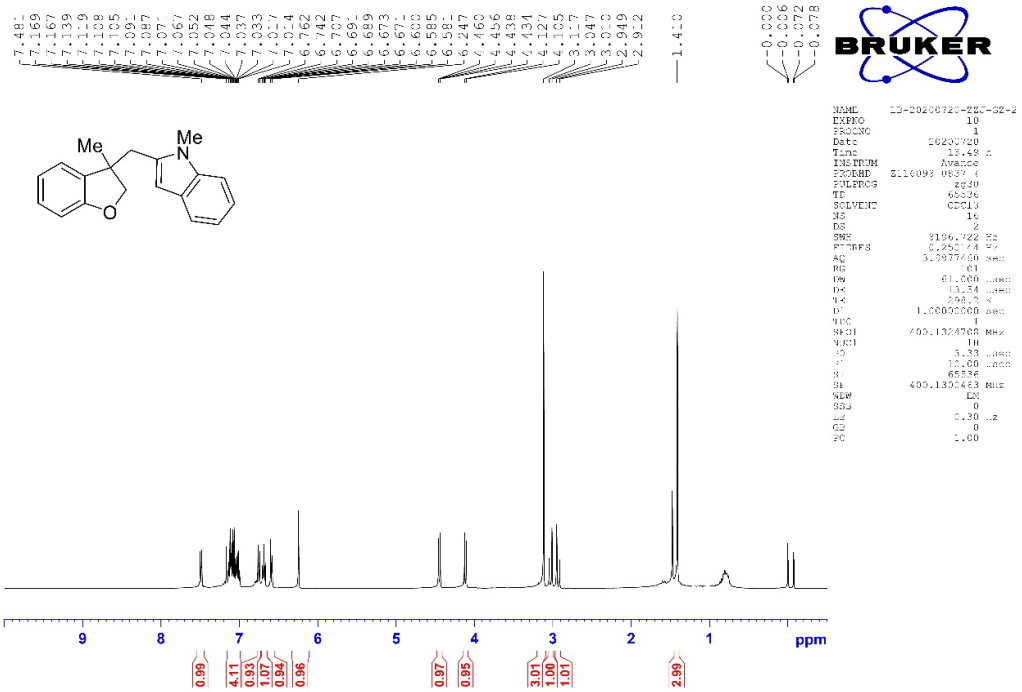
^{1}H and ^{13}C NMR Spectra for Compound **2ab**

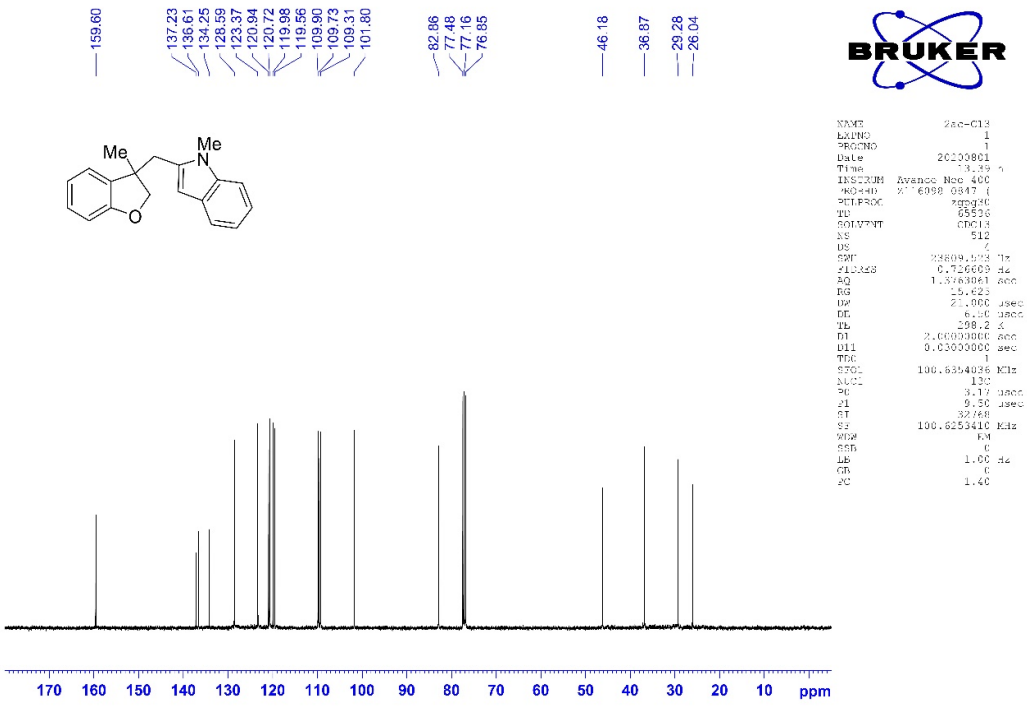






^{1}H and ^{13}C NMR Spectra for Compound **2ac**





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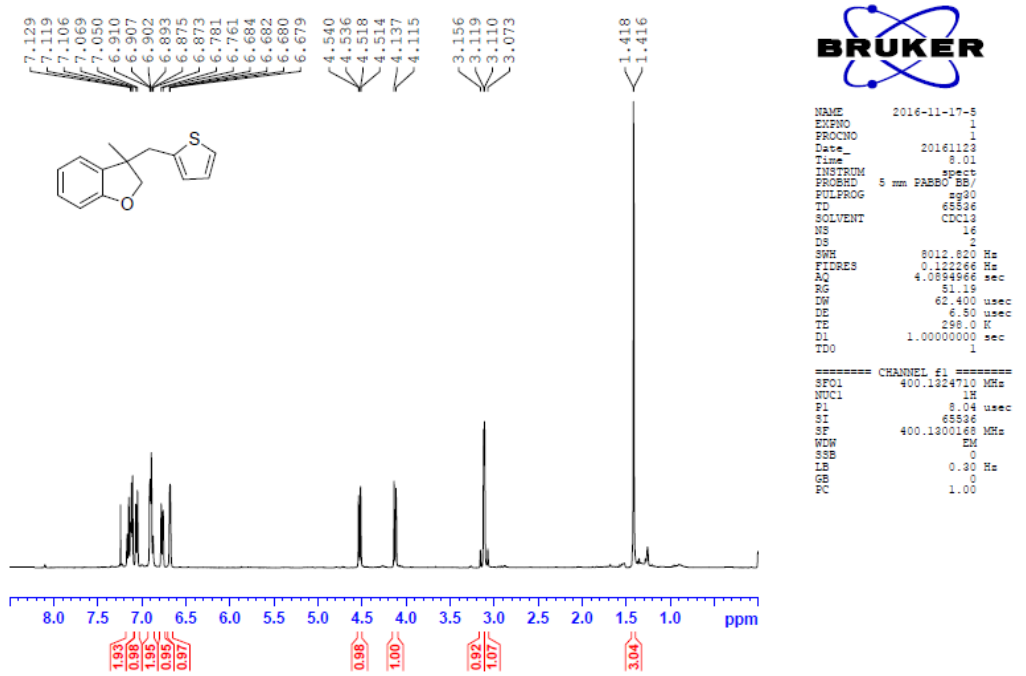

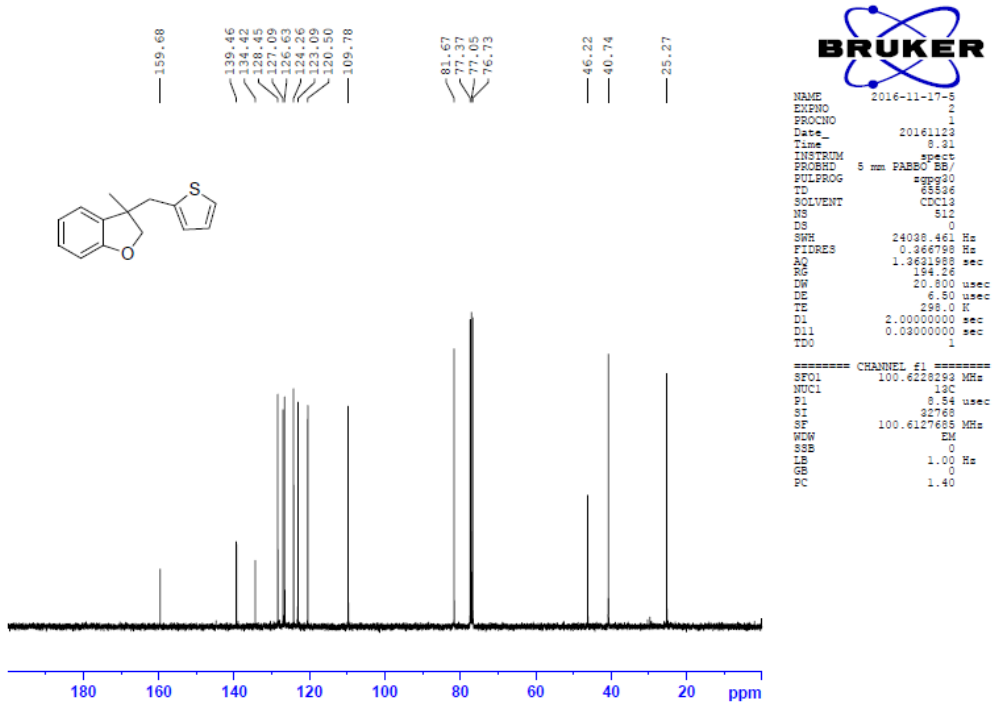

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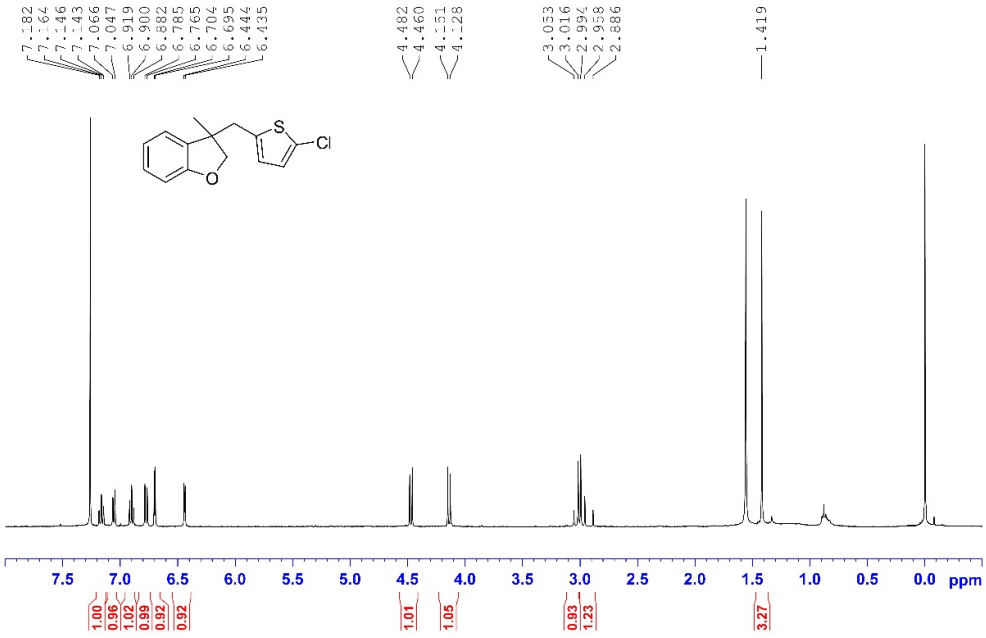

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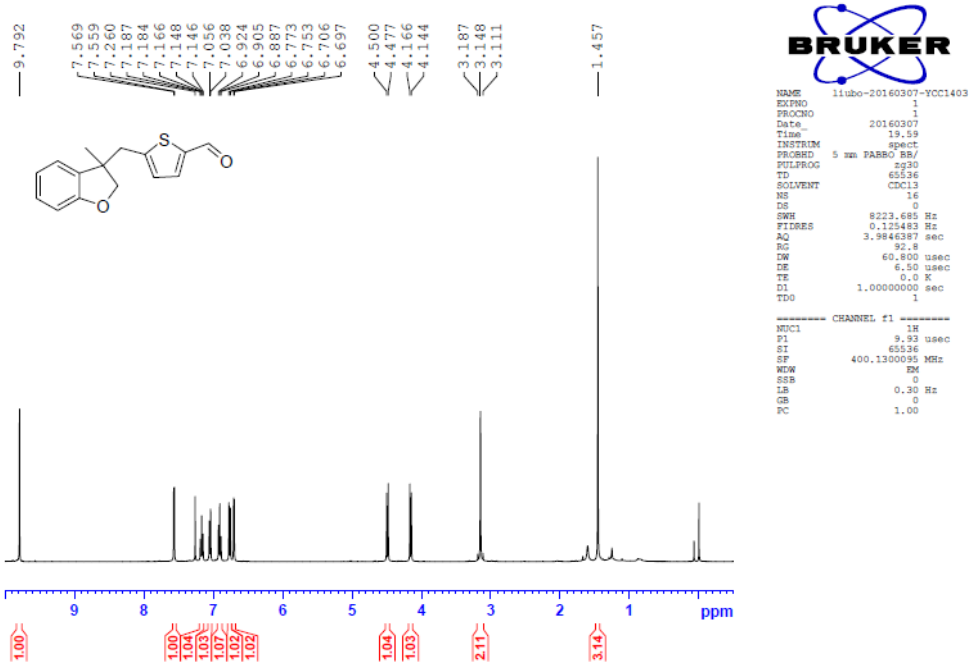

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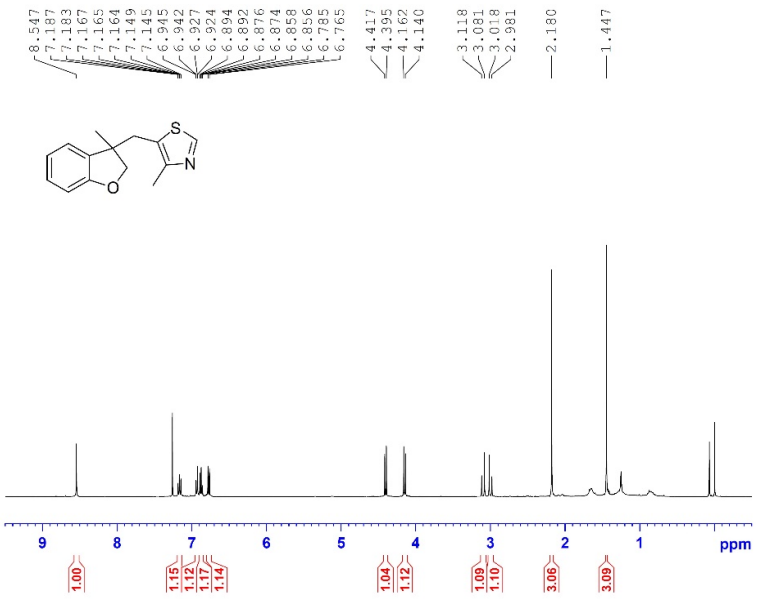
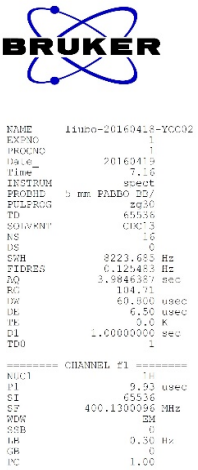
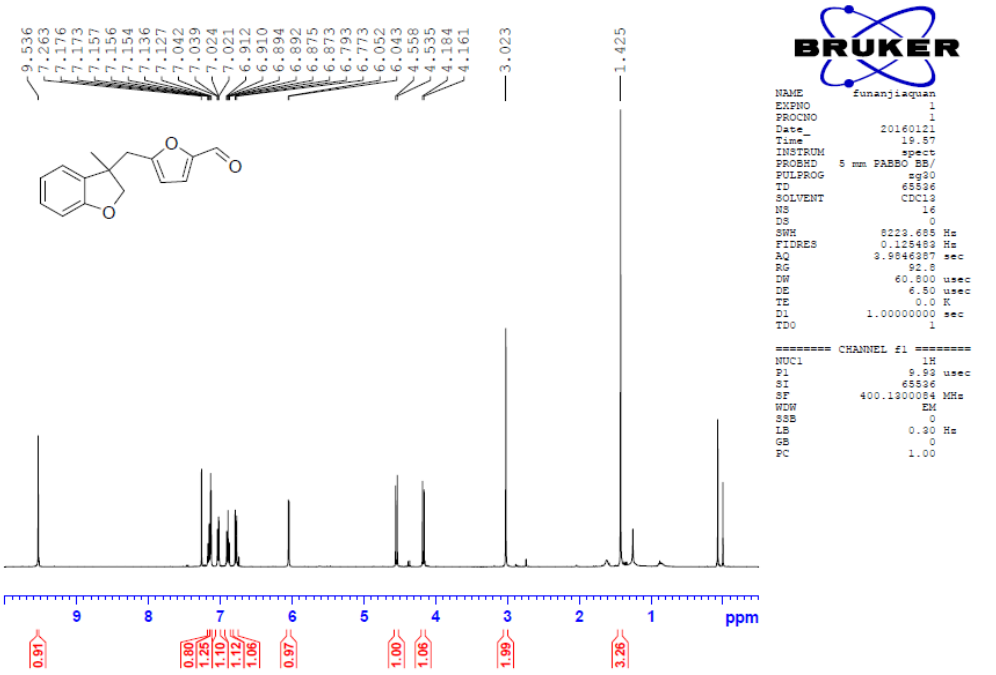
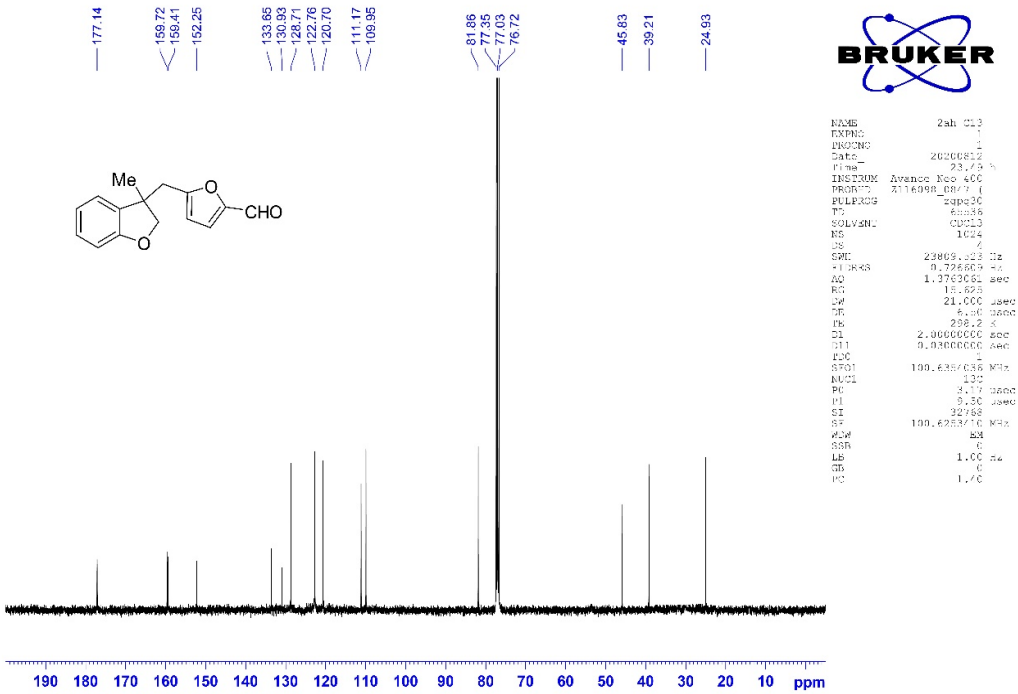




^{1}H and ^{13}C NMR Spectra for Compound **2ah**





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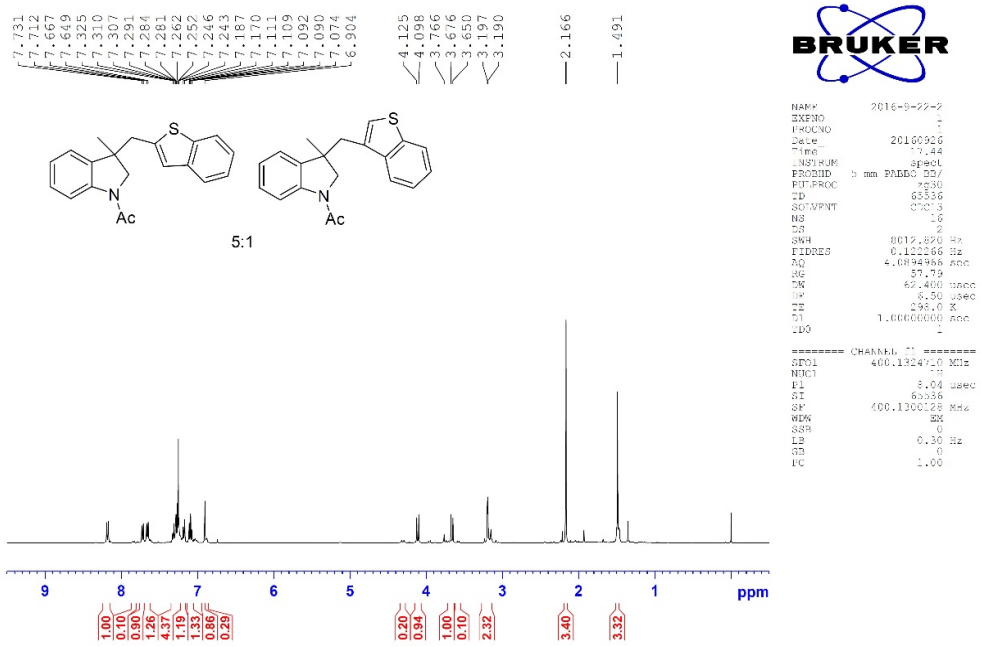
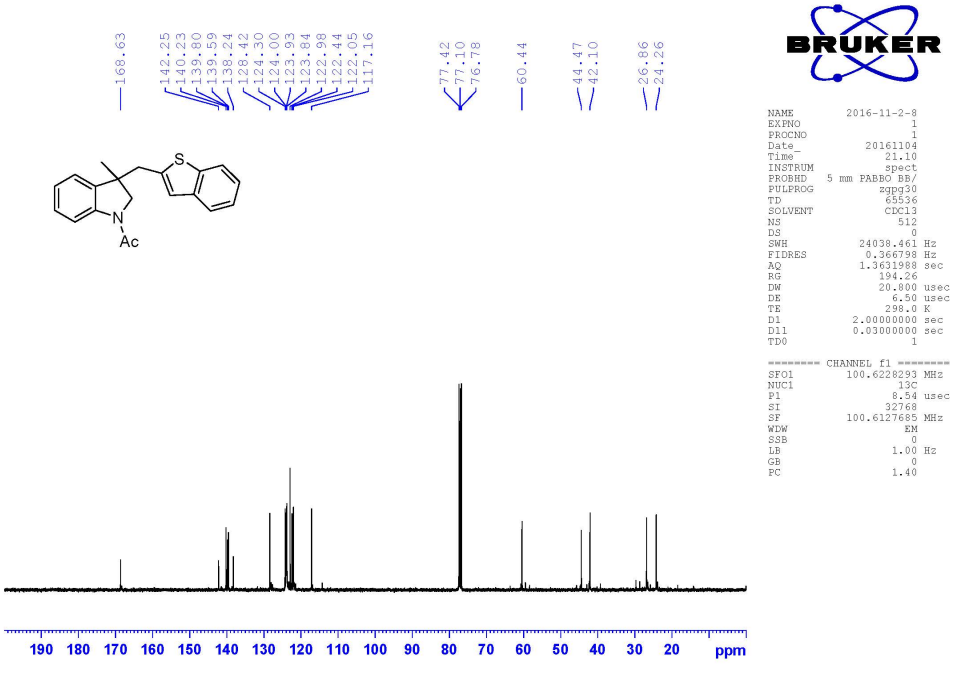
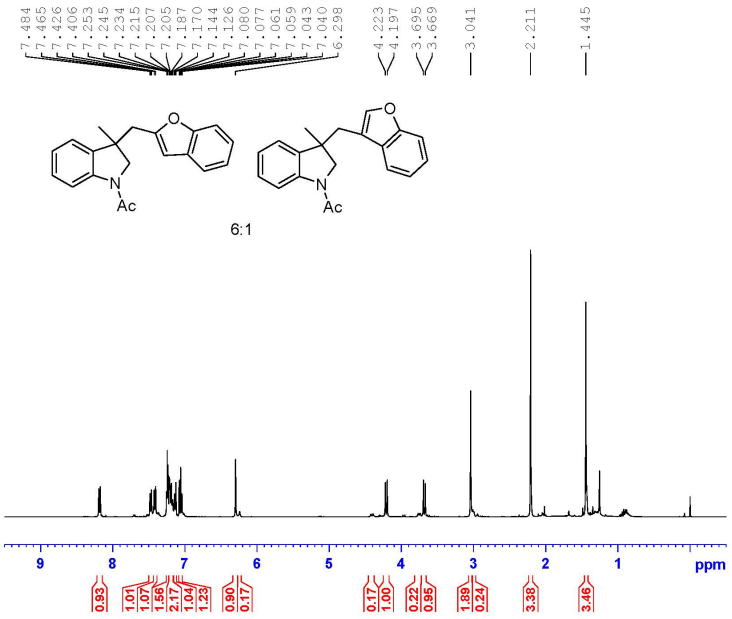




^{1}H and ^{13}C NMR Spectra for Compound **2bb**



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FIDRES            0.122266 Hz
AQ             4.0894966 sec
RG                  32.77
DW                62.400 usec
DE                 6.50 usec
TE                298.0 K
D1             1.00000000 sec
TD0                     1

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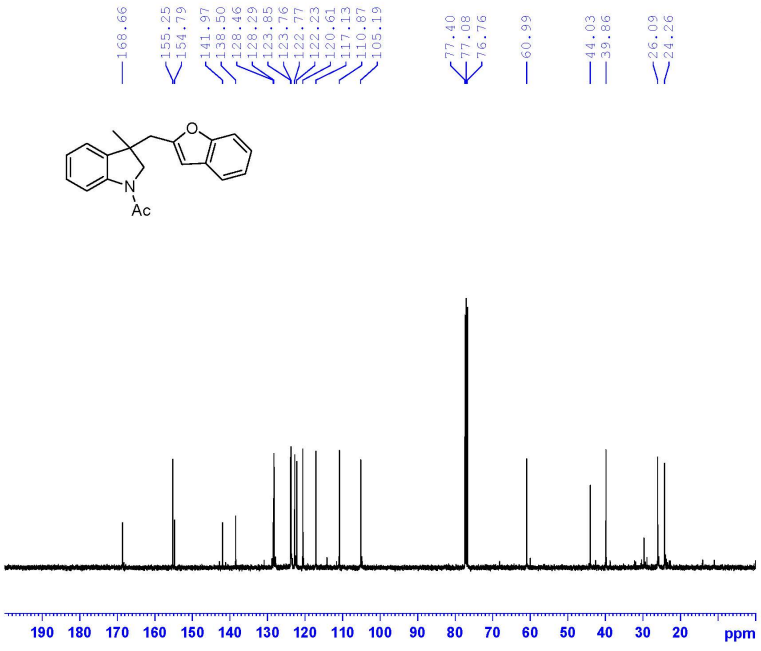

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AQ             1.3631988 sec
RG                 194.26
DW                20.800 usec
DE                 6.50 usec
TE                298.0 K
D1             2.00000000 sec
D11            0.03000000 sec
TD0                     1

======== CHANNEL f1 ========
SFO1         100.6228293 MHz
NUC1                   13C
P1                  8.54 usec
SI                 32768
SF          100.6127685 MHz
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PC                  1.40
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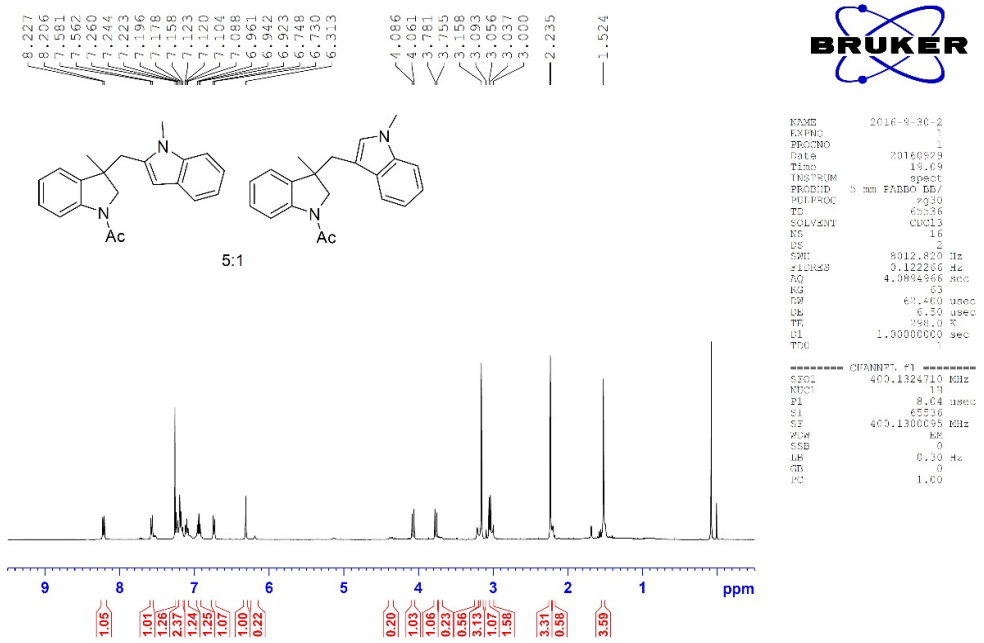
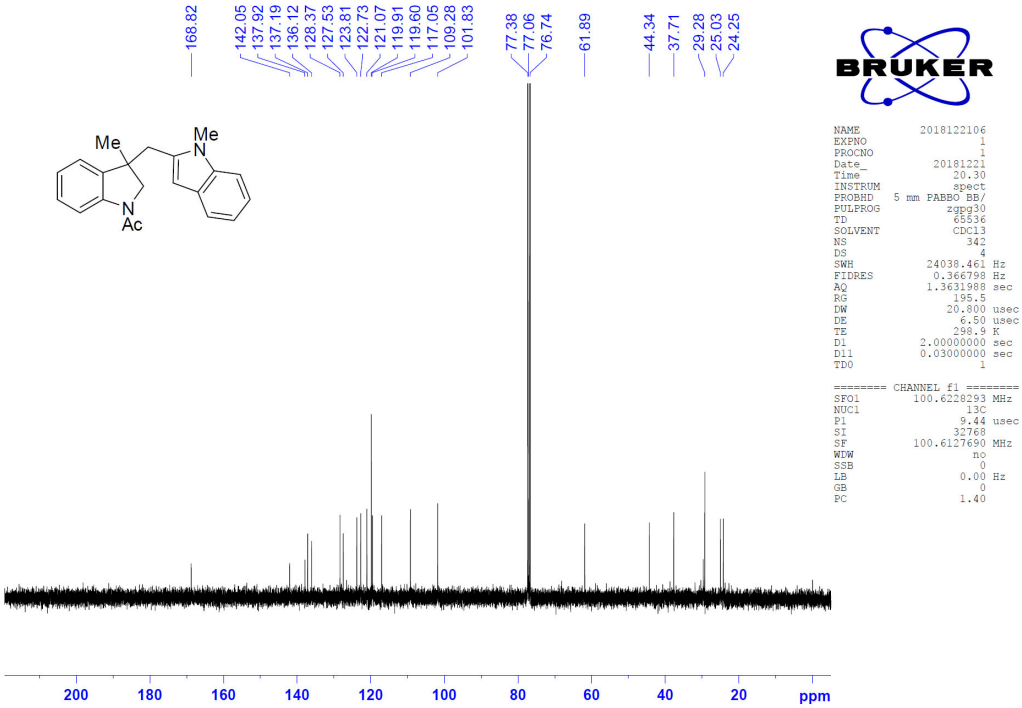
^{1}H and ^{13}C NMR Spectra for Compound **2bc**





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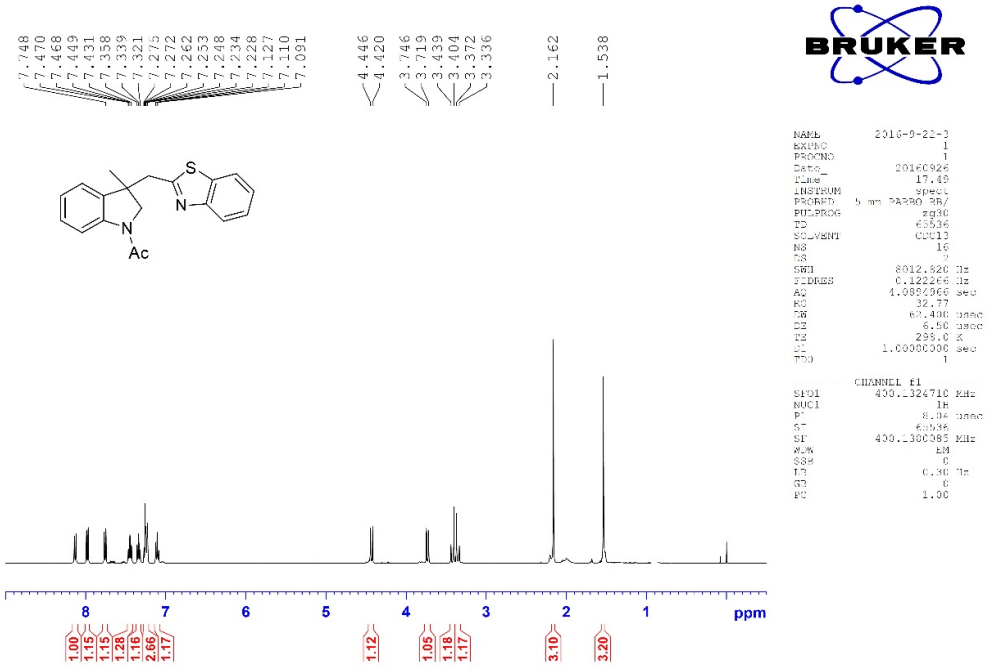

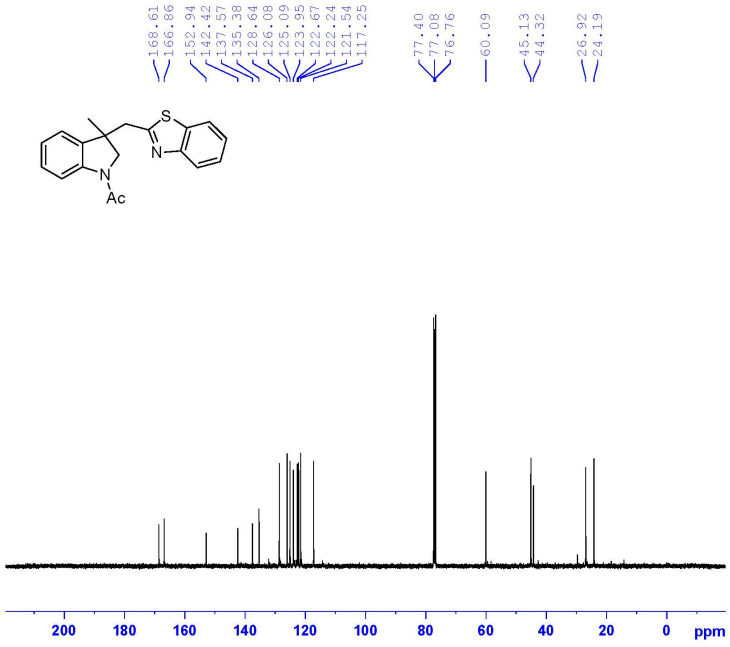

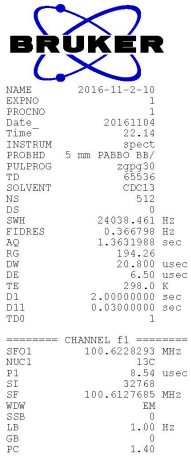

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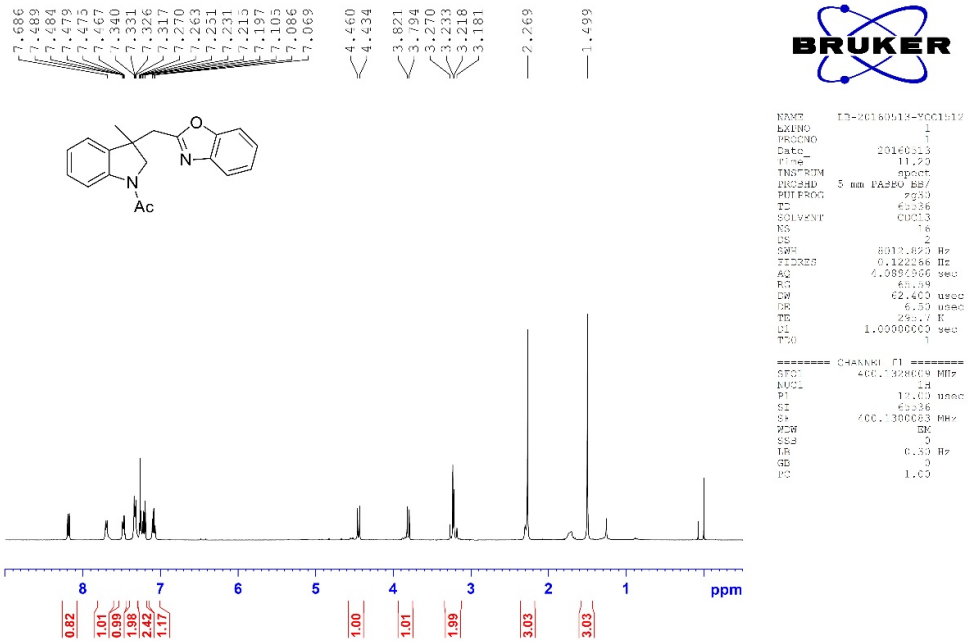
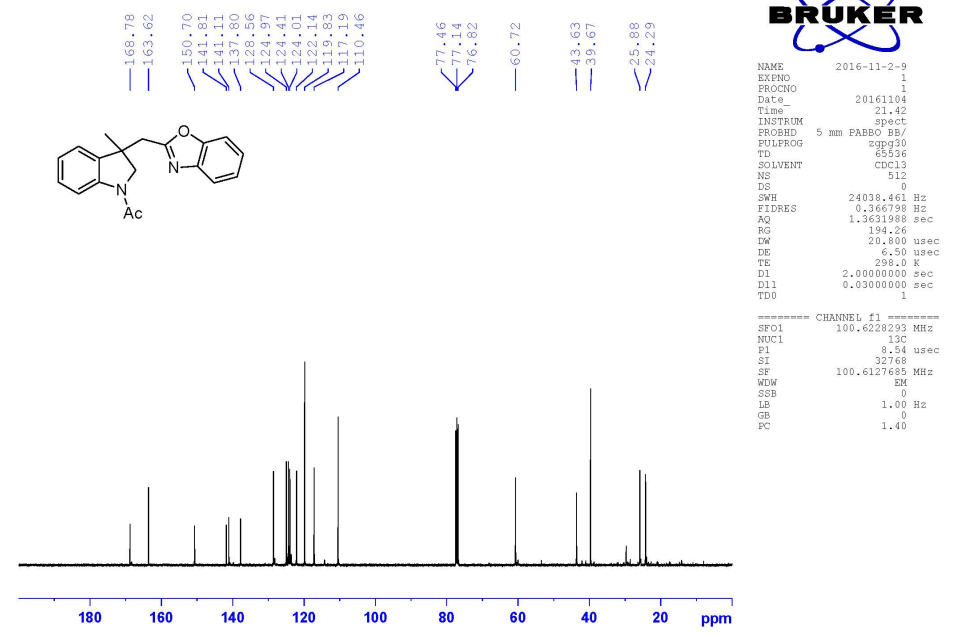
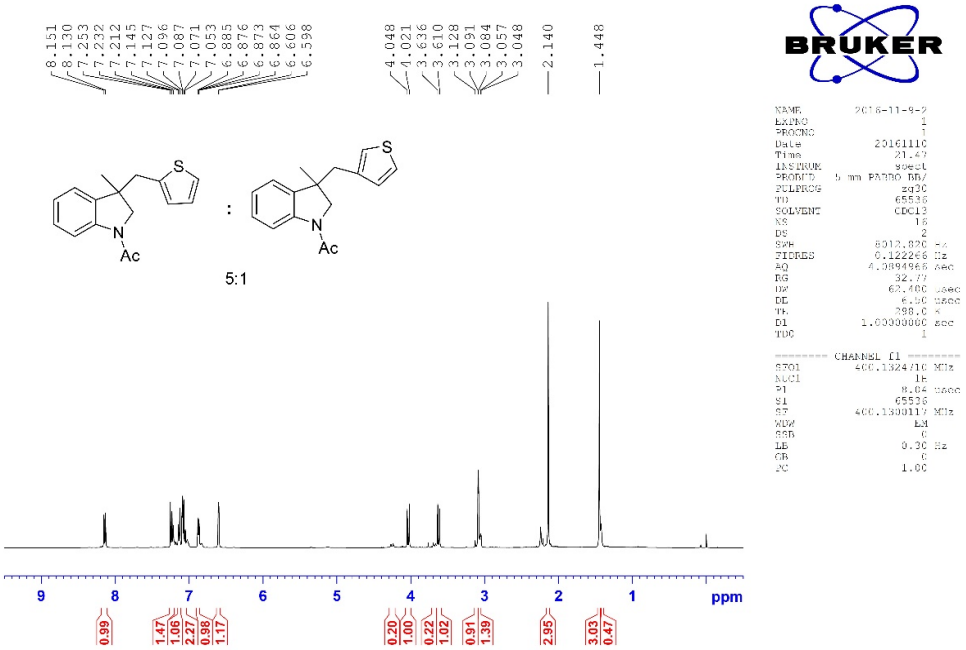




^{1}H and ^{13}C NMR Spectra for Compound **2bf**

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FIDRES              0.122246 Hz
AQ                  4.0894966 sec
RG                       32.77
DW                      62.400 usec
DE                       6.50 usec
TE                     298.0 K
D1                  1.00000000 sec
TD0                           1

======== CHANNEL f1 ========
SFO1             400.1324710 MHz
NUC1                       1H
P1                       8.04 usec
SI                      65536
SF               400.1300113 MHz
WDW                        EM
SSB                         0
LB                       0.30 Hz
GB                          0
PC                       1.00
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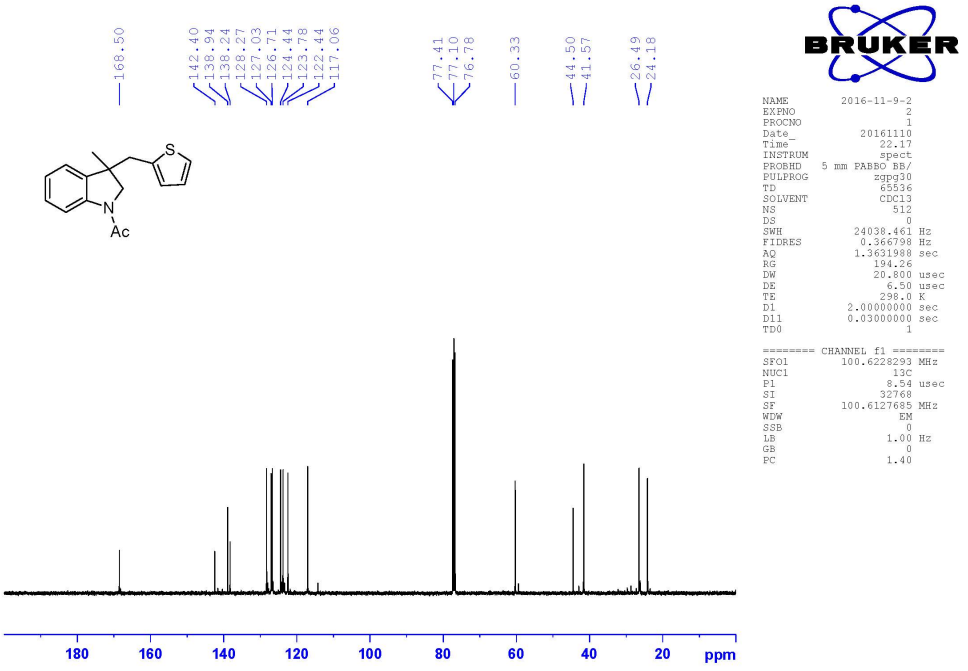


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SWH                24038.461 Hz
FIDRES              0.366798 Hz
AQ                  1.3631988 sec
RG                      194.26
DW                      20.800 usec
DE                       6.50 usec
TE                     298.0 K
D1                  2.00000000 sec
D11                 0.03000000 sec
TD0                           1

======== CHANNEL f1 ========
SFO1            100.6228293 MHz
NUC1                       13C
P1                       8.54 usec
SI                      32768
SF              100.6127685 MHz
WDW                        EM
SSB                         0
LB                       1.00 Hz
GB                          0
PC                       1.40
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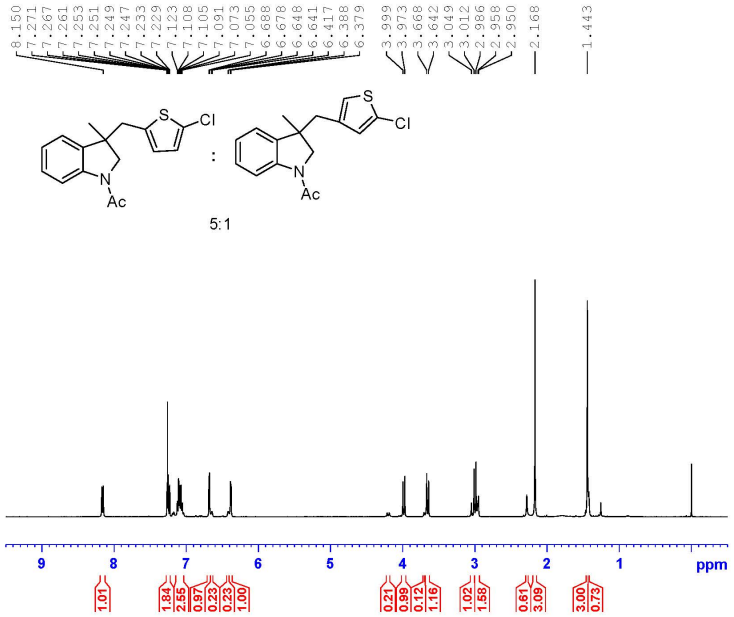
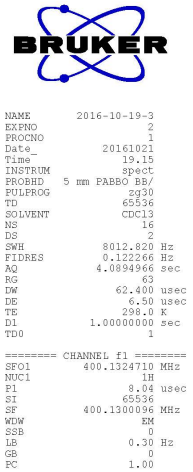
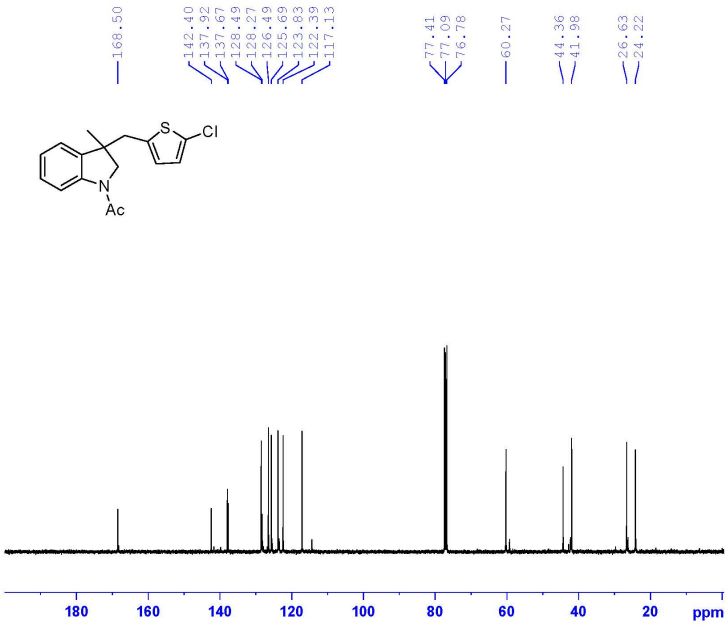
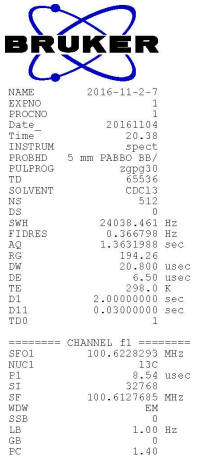
^{1}H and ^{13}C NMR Spectra for Compound **2bg**

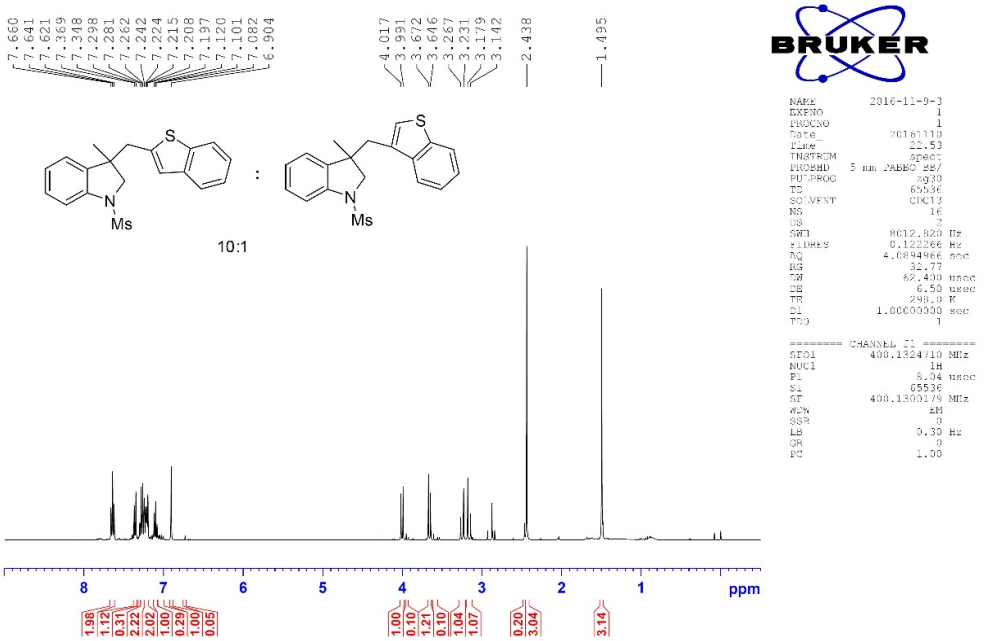




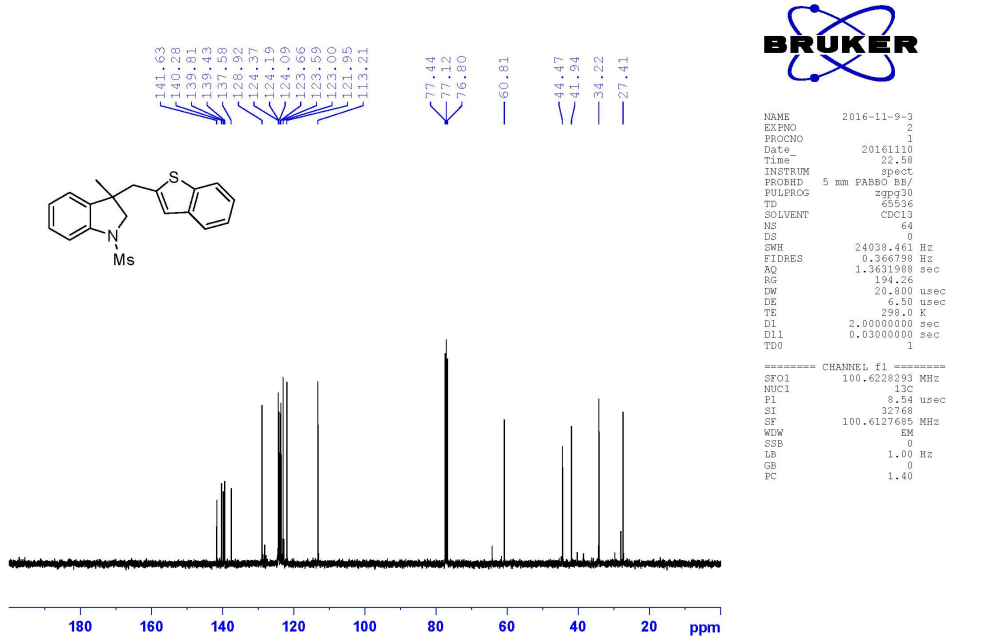




^{1}H and ^{13}C NMR Spectra for Compound **2ca**

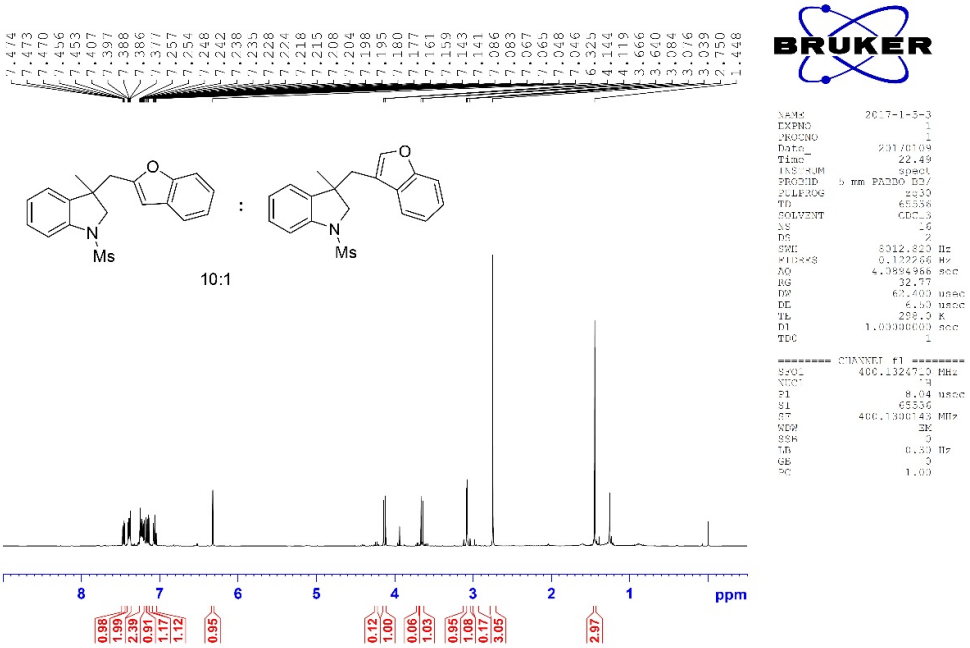



```
NAME            2016-11-9-3
EXPNO                     1
PROCNO                    1
Date_              20161110
Time_                 22.53
INSTRUM               spect
PROBHD   5 mm PABBO BB/
PULPROG               zg30
TD                   65536
SOLVENT              CDCl3
NS                      16
DS                       2
SWH              8012.820 Hz
FIDRES           0.122266 Hz
AQ               4.0894966 sec
RG                   32.77
DW                  62.400 usec
DE                   6.50 usec
TE                  298.0 K
D1               1.00000000 sec
TD0                       1

======== CHANNEL f1 ========
SFO1          400.1324710 MHz
NUC1                    1H
P1                    8.04 usec
SI                   65536
SF            400.1300179 MHz
WDW                     EM
SSB                      0
LB                    0.30 Hz
GB                       0
PC                    1.00
```

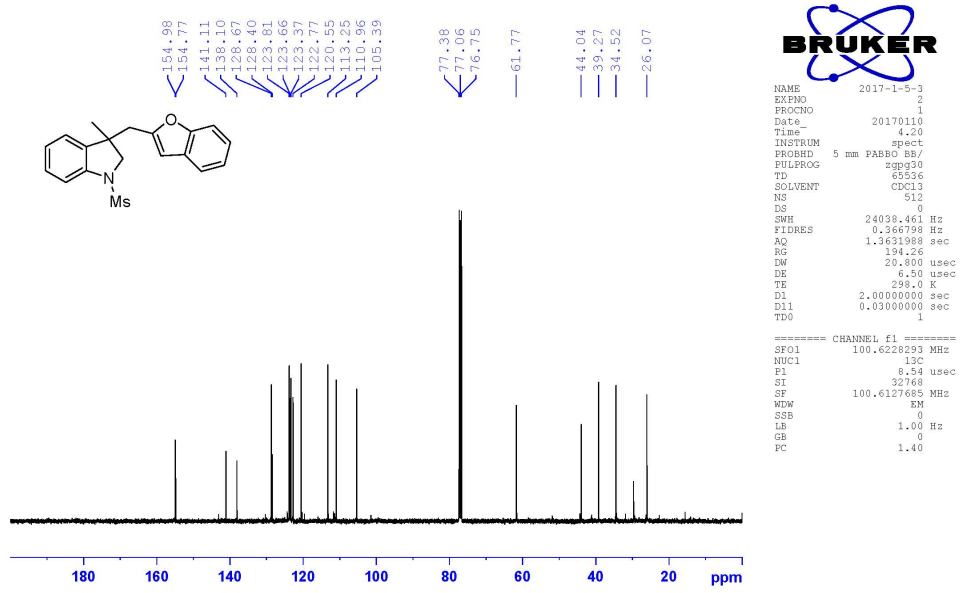



```
NAME            2016-11-9-3
EXPNO                     2
PROCNO                    1
Date_              20161110
Time                  22.58
INSTRUM               spect
PROBHD   5 mm PABBO BB/
PULPROG             zgpg30
TD                   65536
SOLVENT              CDCl3
NS                      64
DS                       0
SWH             24038.461 Hz
FIDRES           0.366798 Hz
AQ               1.3631988 sec
RG                  194.26
DW                  20.800 usec
DE                   6.50 usec
TE                  298.0 K
D1               2.00000000 sec
D11              0.03000000 sec
TD0                       1

======== CHANNEL f1 ========
SFO1          100.6228293 MHz
NUC1                    13C
P1                    8.54 usec
SI                   32768
SF            100.6127685 MHz
WDW                     EM
SSB                      0
LB                    1.00 Hz
GB                       0
PC                    1.40
```

^{1}H and ^{13}C NMR Spectra for Compound **2cb**

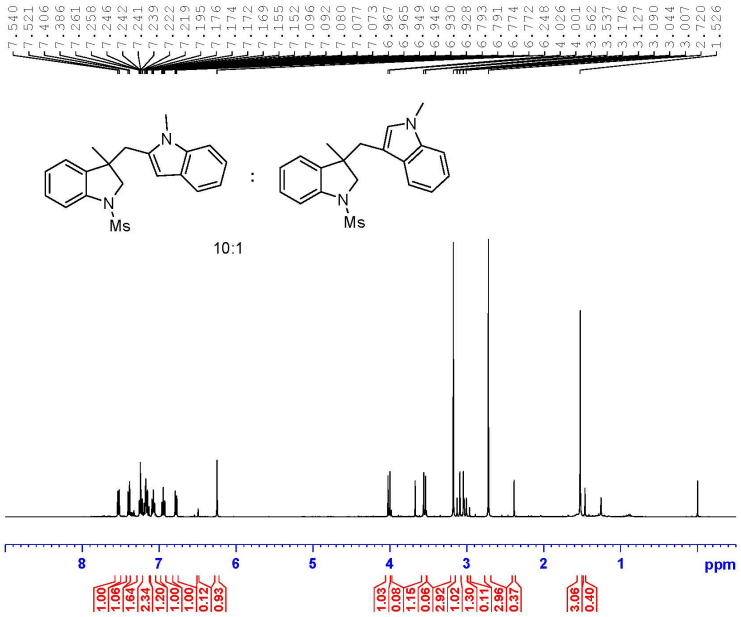


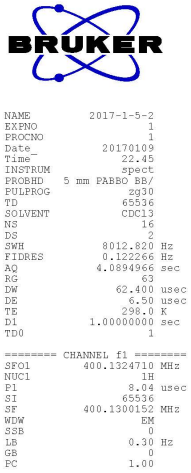

```
NAME                2017-1-5-3
EXPNO                        1
PROCNO                       1
Date_               20170109
Time                    22.49
INSTRUM                  spect
PROBHD     5 mm PABBO BB/
PULPROG                  zg30
TD                      65536
SOLVENT                 CDCl3
NS                          16
DS                           2
SWH                 8012.820 Hz
FIDRES              0.122266 Hz
AQ                  4.0894966 sec
RG                      32.77
DW                     62.400 usec
DE                      6.50 usec
TE                     298.0 K
D1                  1.00000000 sec
TD0                          1

======== CHANNEL f1 ========
SFO1              400.1324710 MHz
NUC1                       1H
P1                       8.04 usec
SI                      65536
SF                400.1300043 MHz
WDW                        EM
SSB                         0
LB                       0.30 Hz
GB                          0
PC                       1.00
```



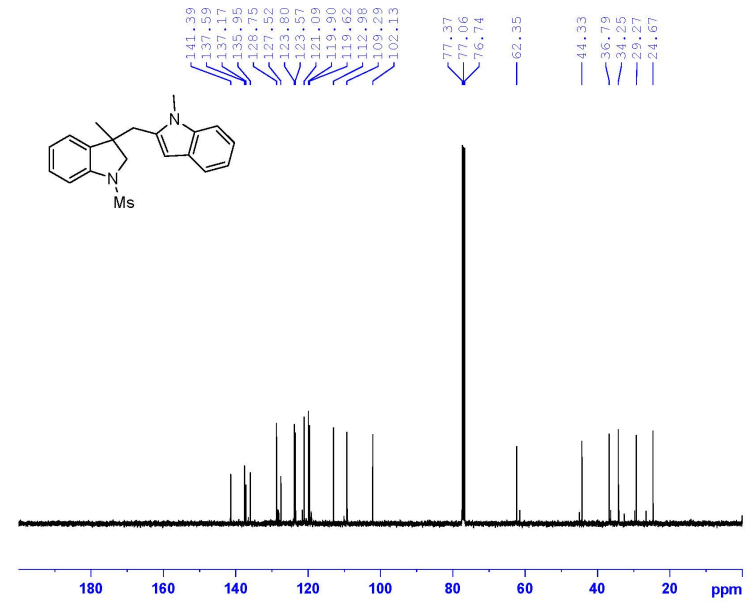

```
NAME                2017-1-5-3
EXPNO                        2
PROCNO                       1
Date_               20170110
Time                    4.20
INSTRUM                  spect
PROBHD     5 mm PABBO BB/
PULPROG                 zgpg30
TD                      65536
SOLVENT                 CDCl3
NS                        512
DS                          0
SWH                24038.461 Hz
FIDRES              0.366798 Hz
AQ                  1.3631988 sec
RG                     194.26
DW                     20.800 usec
DE                      6.50 usec
TE                     298.0 K
D1                  2.00000000 sec
D11                 0.03000000 sec
TD0                          1

======== CHANNEL f1 ========
SFO1              100.6228293 MHz
NUC1                       13C
P1                       8.54 usec
SI                      32768
SF                100.6127685 MHz
WDW                        EM
SSB                         0
LB                       1.00 Hz
GB                          0
PC                       1.40
```

^{1}H and ^{13}C NMR Spectra for Compound **2cc**



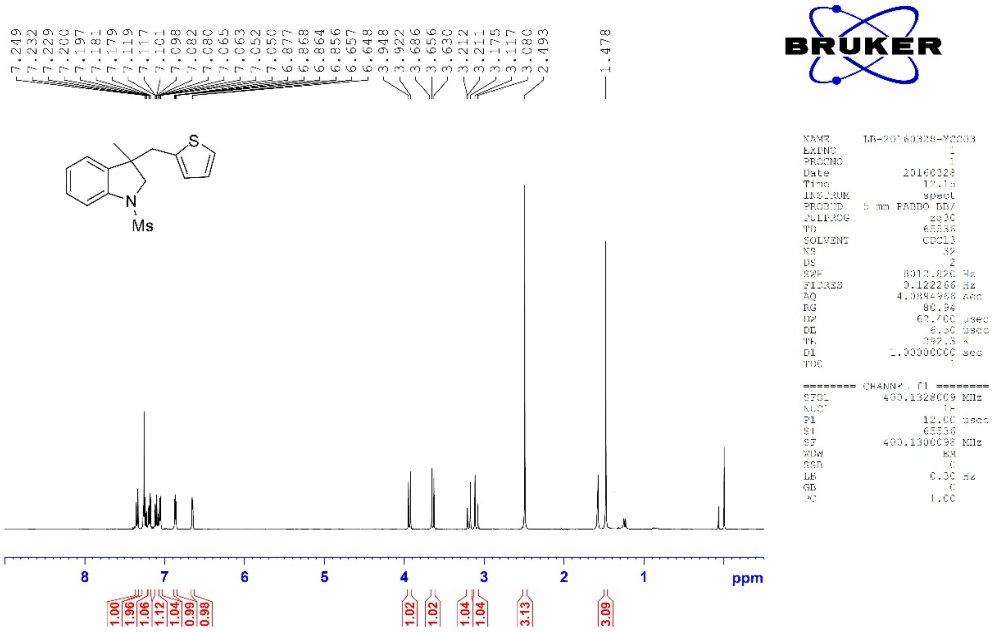


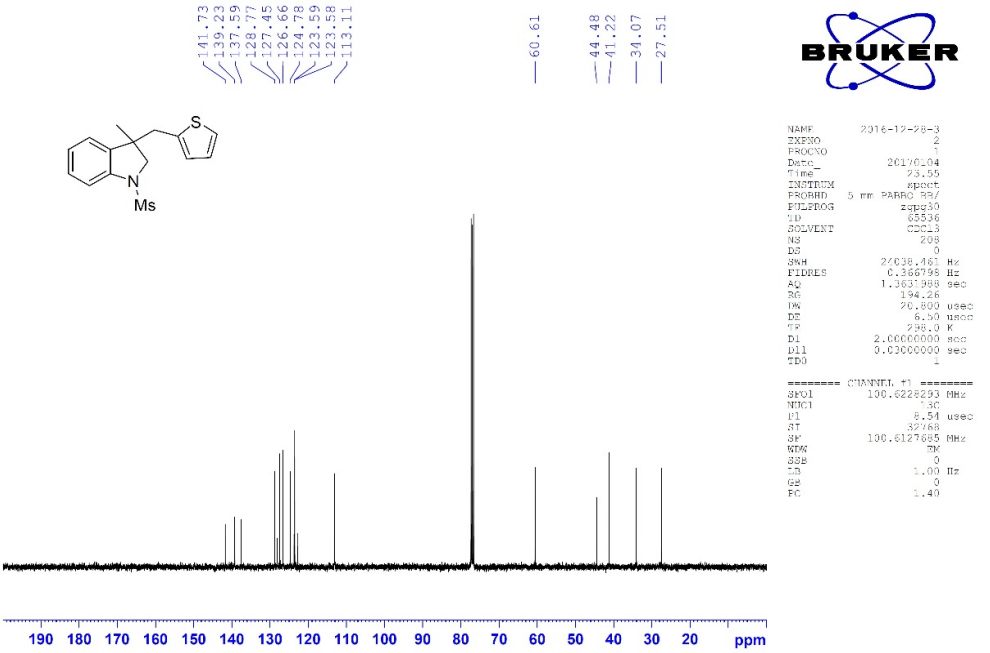

```
NAME                 2017-1-5-2
EXPNO                         1
PROCNO                        1
Date_                 20170109
Time                     22.45
INSTRUM                  spect
PROBHD     5 mm PABBO BB/
PULPROG                   zg30
TD                       65536
SOLVENT                  CDCl3
NS                          16
DS                           2
SWH                   8012.820 Hz
FIDRES                0.122266 Hz
AQ                    4.0894966 sec
RG                          63
DW                      62.400 usec
DE                       6.50 usec
TE                      298.0 K
D1                    1.00000000 sec
TD0                           1

======== CHANNEL f1 ========
SFO1                400.1324710 MHz
NUC1                        1H
P1                       8.04 usec
SI                       65536
SF                  400.1300152 MHz
WDW                         EM
SSB                          0
LB                        0.30 Hz
GB                           0
PC                        1.00
```



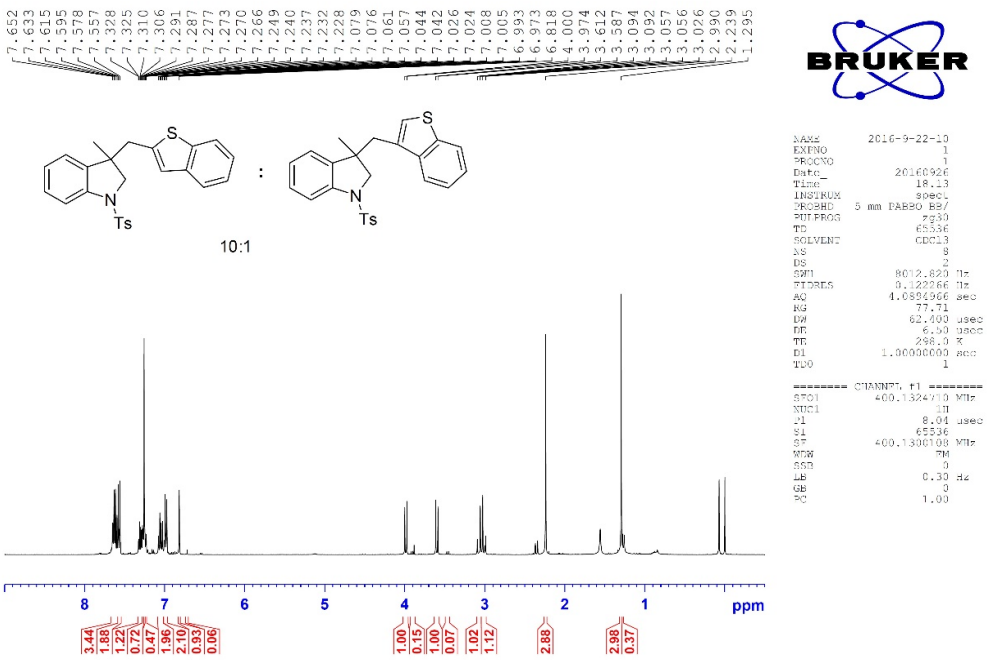

```
NAME                 2017-1-5-2
EXPNO                         2
PROCNO                        1
Date_                 20170110
Time                      3.48
INSTRUM                  spect
PROBHD     5 mm PABBO BB/
PULPROG                 zgpg30
TD                       65536
SOLVENT                  CDCl3
NS                         512
DS                           0
SWH                  24038.461 Hz
FIDRES                0.366798 Hz
AQ                    1.3631988 sec
RG                       194.26
DW                      20.800 usec
DE                       6.50 usec
TE                      298.0 K
D1                    2.00000000 sec
D11                   0.03000000 sec
TD0                           1

======== CHANNEL f1 ========
SFO1                100.6228293 MHz
NUC1                        13C
P1                       8.54 usec
SI                       32768
SF                  100.6127685 MHz
WDW                         EM
SSB                          0
LB                        1.00 Hz
GB                           0
PC                        1.40
```

^{1}H and ^{13}C NMR Spectra for Compound **2cd**

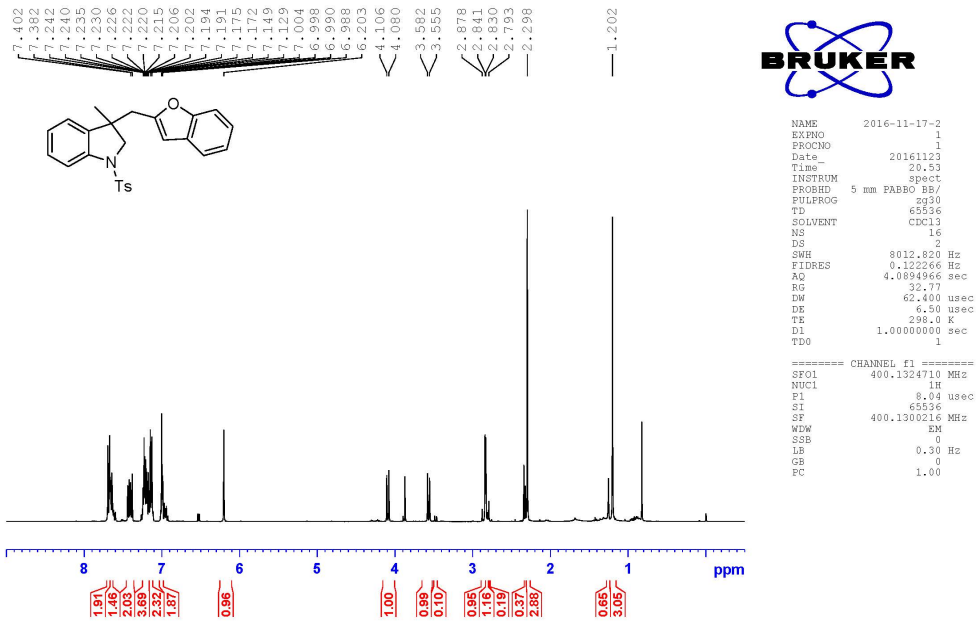


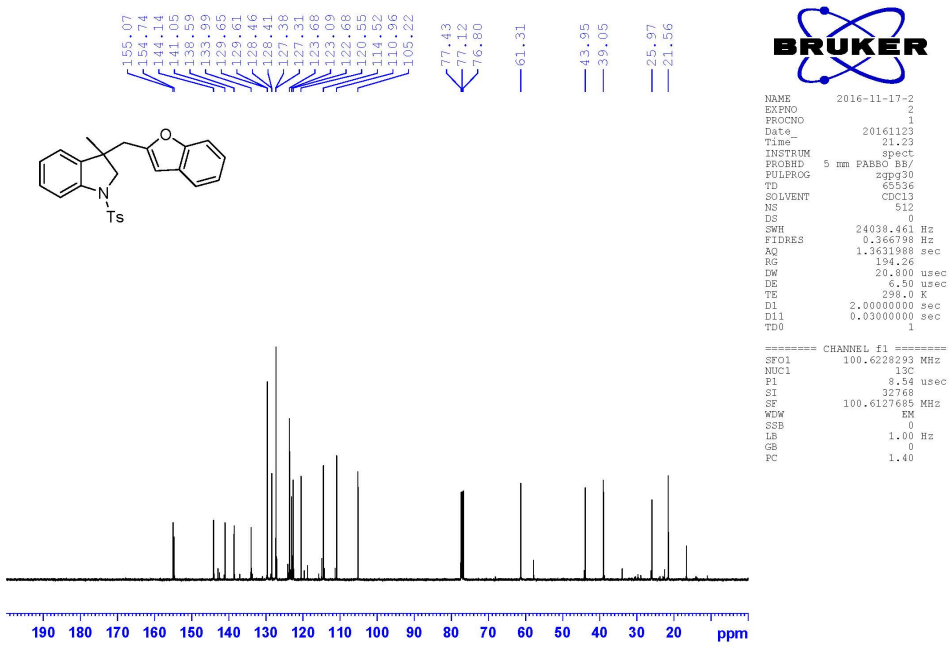


^{1}H Spectra for Compound **2da**

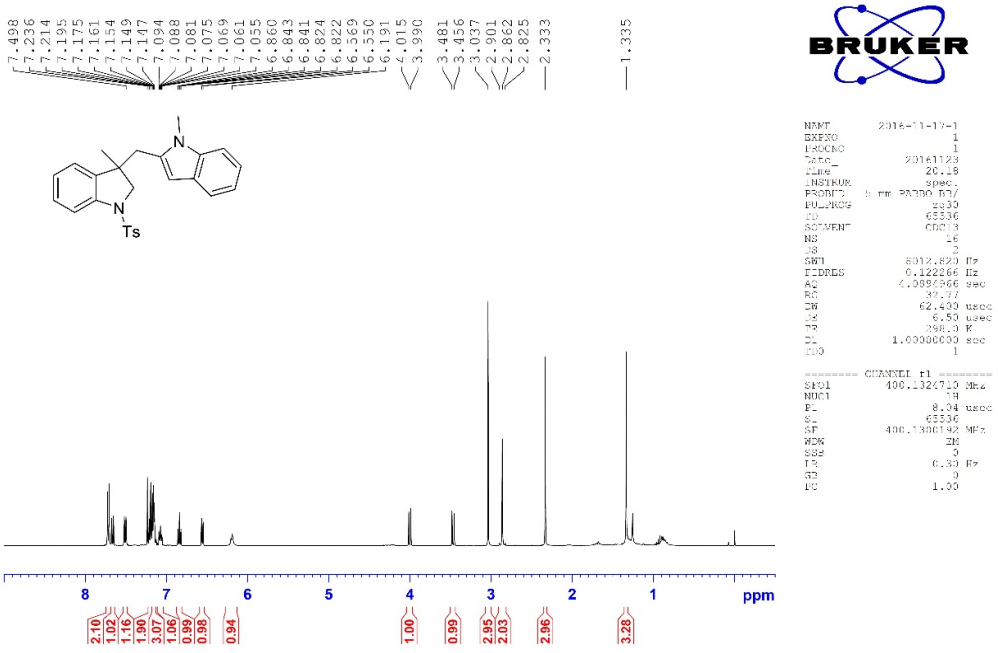


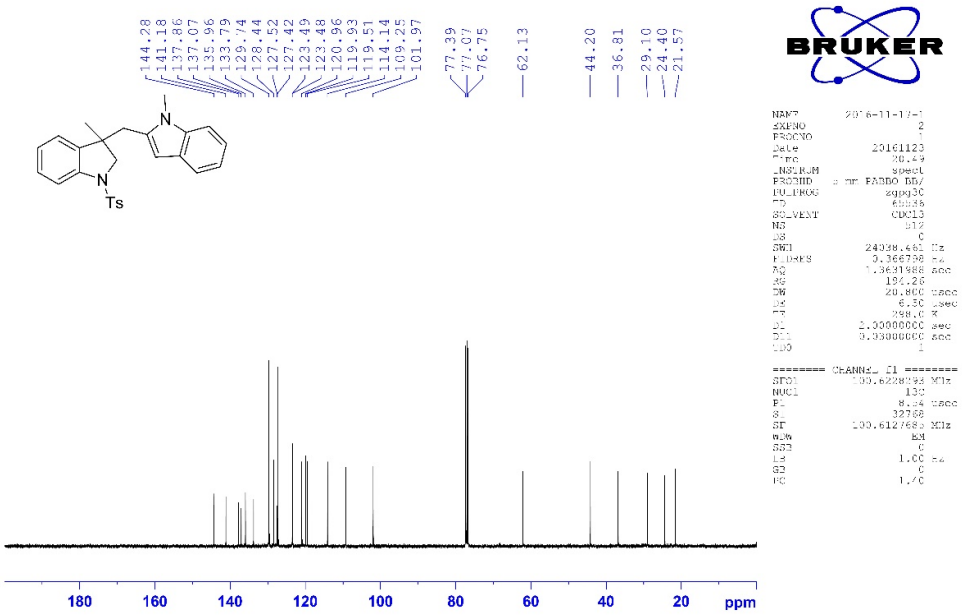
^{1}H and ^{13}C NMR Spectra for Compound **2db**



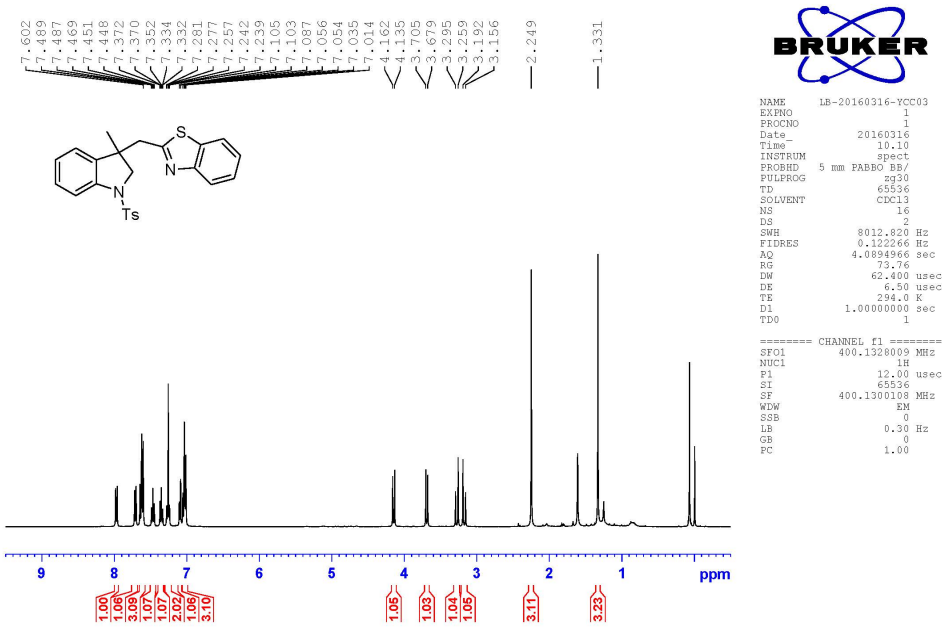


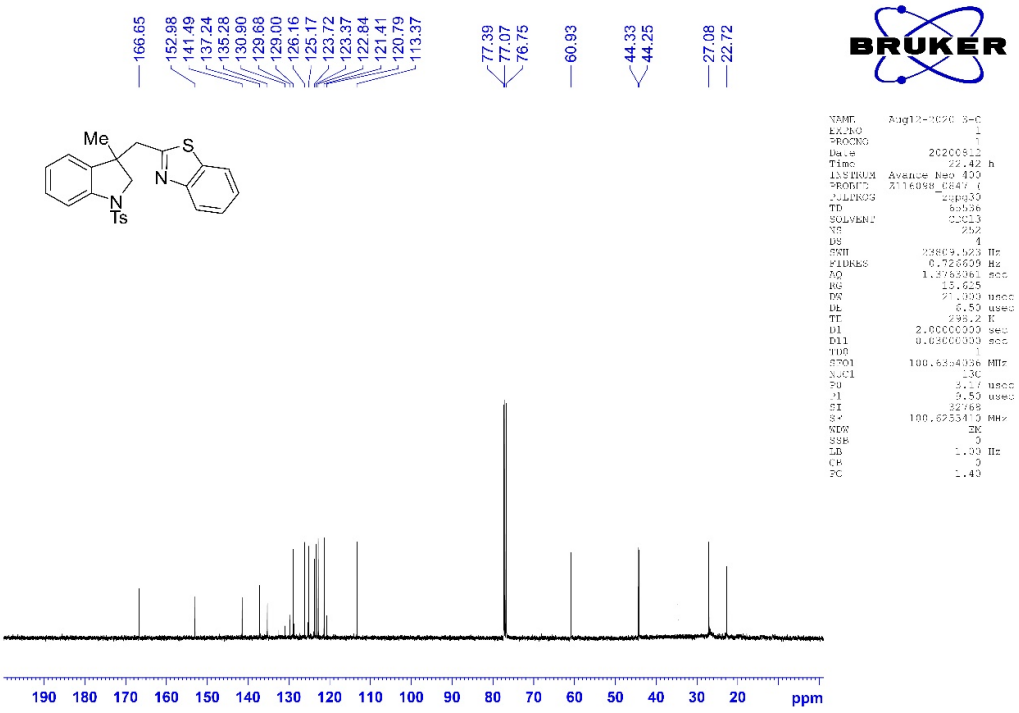
^{1}H and ^{13}C NMR Spectra for Compound **2dc**



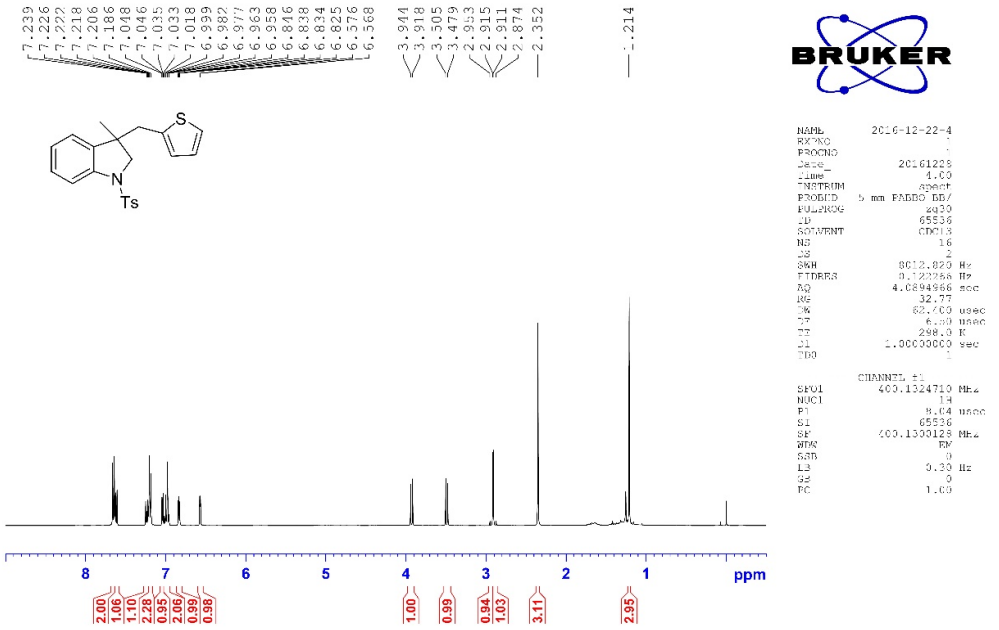


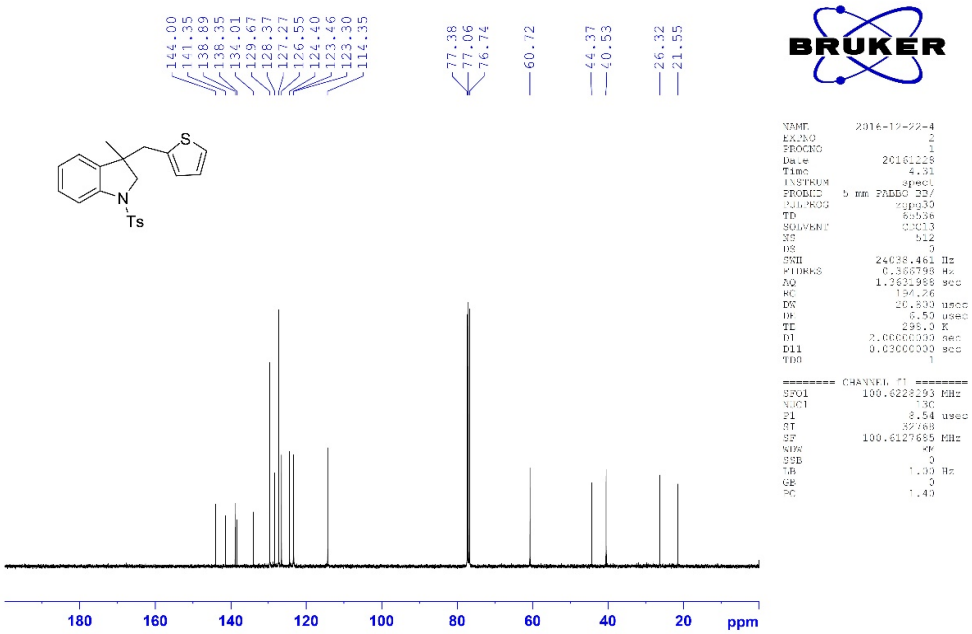
^{1}H and ^{13}C NMR Spectra for Compound **2dd**





^{1}H and ^{13}C NMR Spectra for Compound **2de**





BRUKER

NAME 2016-12-22-4
EXPNO 2
PROCNO 1
Date 20161228
Time 4.31
INSTRUM spect
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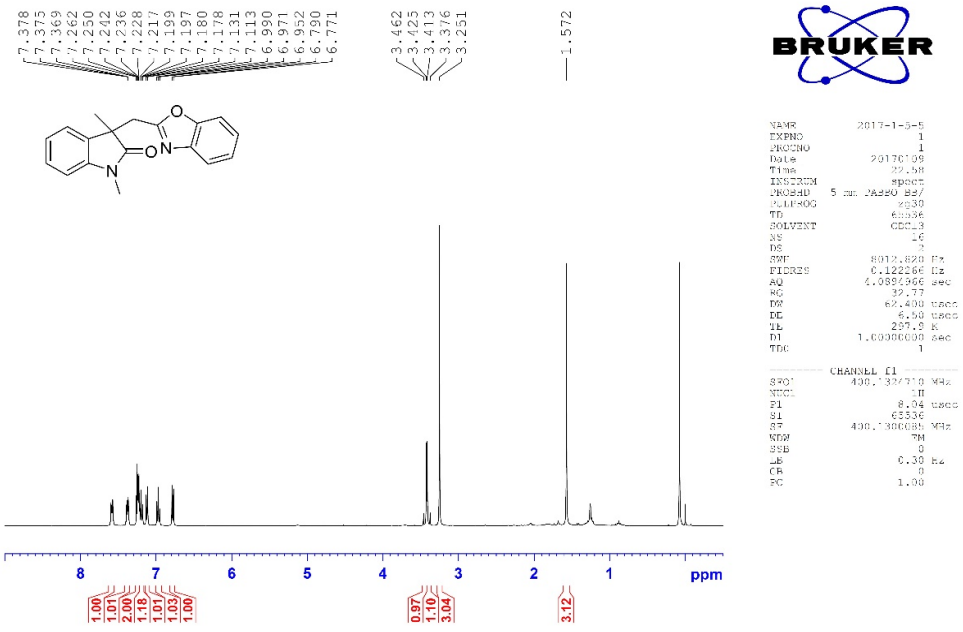
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 512
DS 0
SWH 24038.461 Hz
FIDRES 0.366798 Hz
AQ 1.3631968 sec
RG 194.26
DW 20.800 usec
DE 6.50 usec
TE 295.0 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1

======== CHANNEL f1 ========
SFO1 100.6228293 MHz
NUC1 13C
P1 8.54 usec
SI 32768
SF 100.6127685 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40

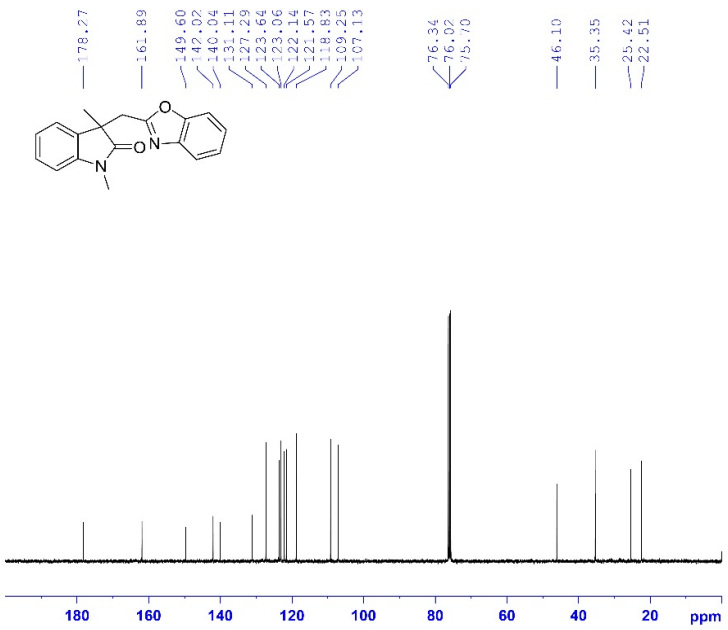
^{1}H and ^{13}C NMR Spectra for Compound **2ea**

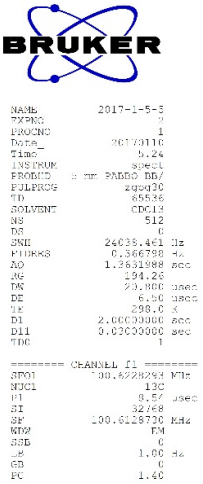


BRUKER

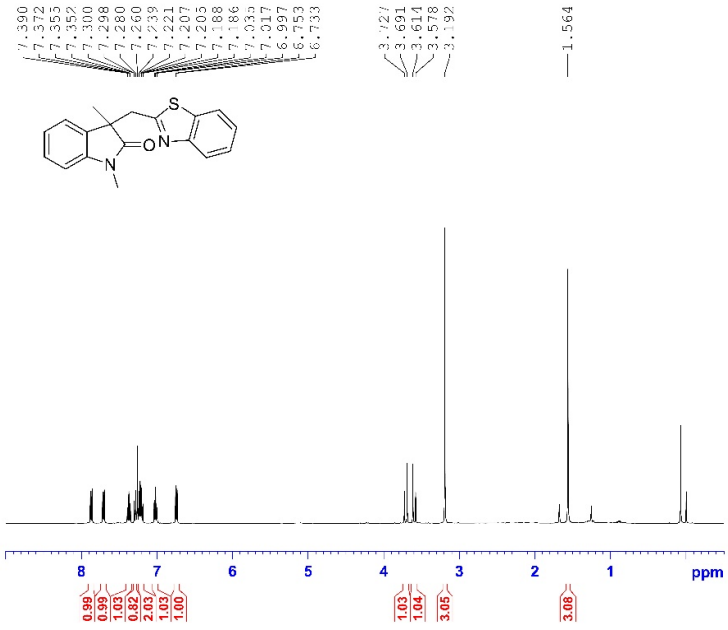
NAME 2017-1-5-5
EXPNO 1
PROCNO 1
Date 20170109
Time 22.58
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 8012.820 Hz
FIDRES 0.122266 Hz
AQ 4.0892966 sec
RG 32.77
DW 62.400 usec
DE 6.50 usec
TE 297.9 K
D1 1.00000000 sec
TD0 1

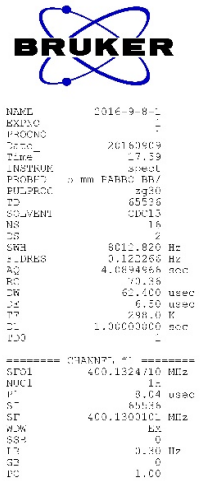
CHANNEL f1
SFO1 400.1324710 MHz
NUC1 1H
P1 8.04 usec
SI 65536
SF 400.1300000 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

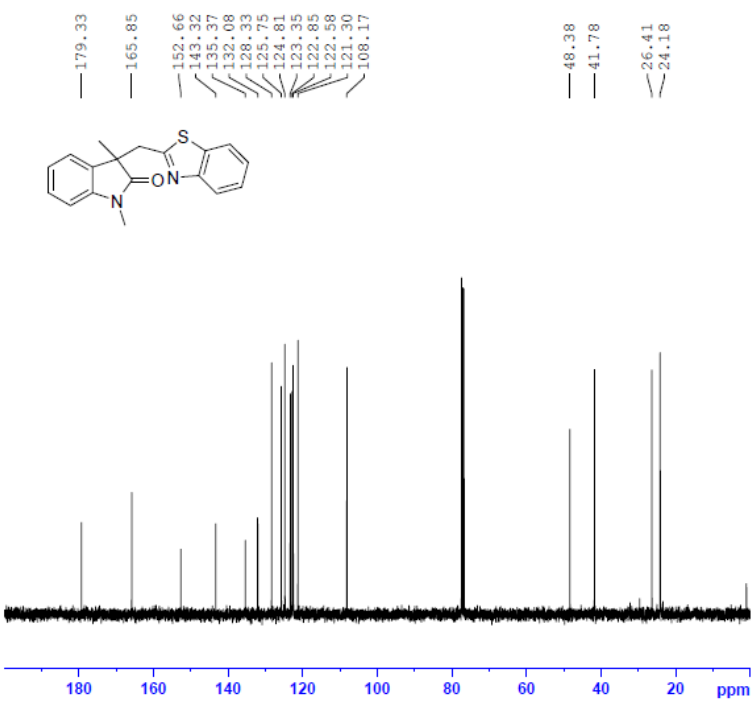


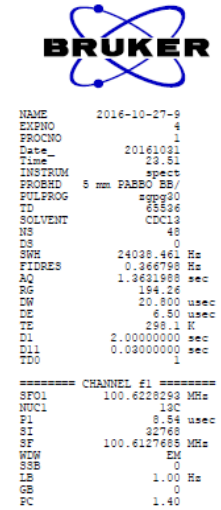


^{1}H and ^{13}C NMR Spectra for Compound **2eb**

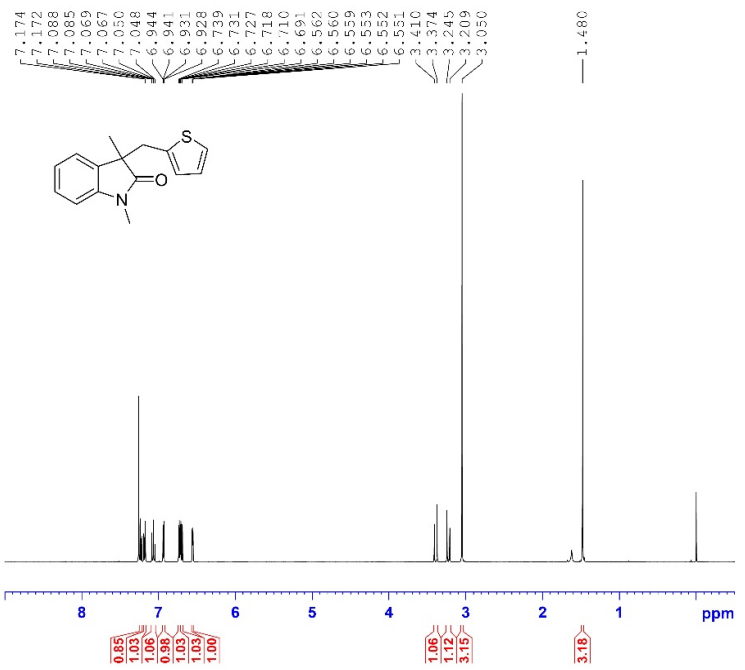


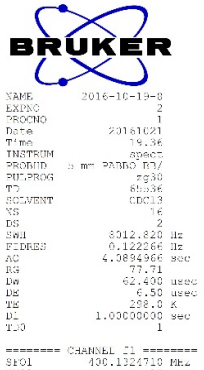


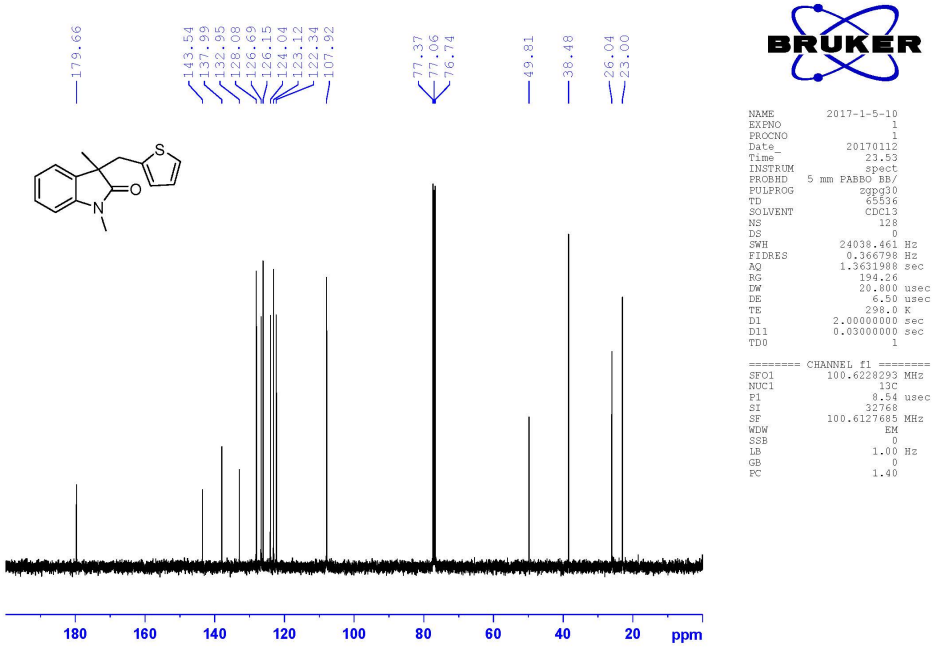




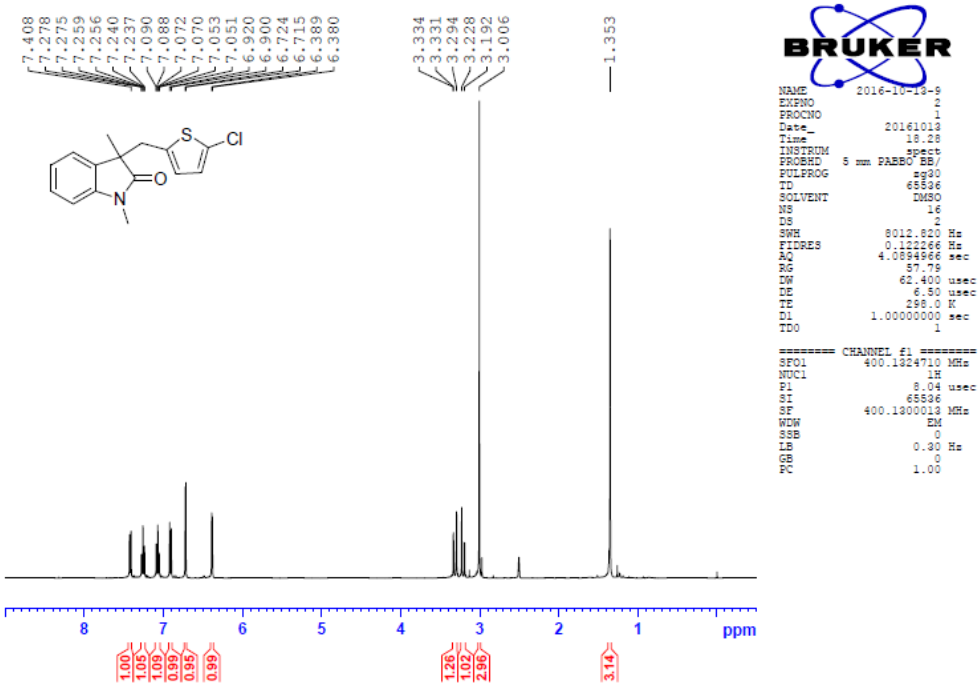
^{1}H and ^{13}C NMR Spectra for Compound **2ec**

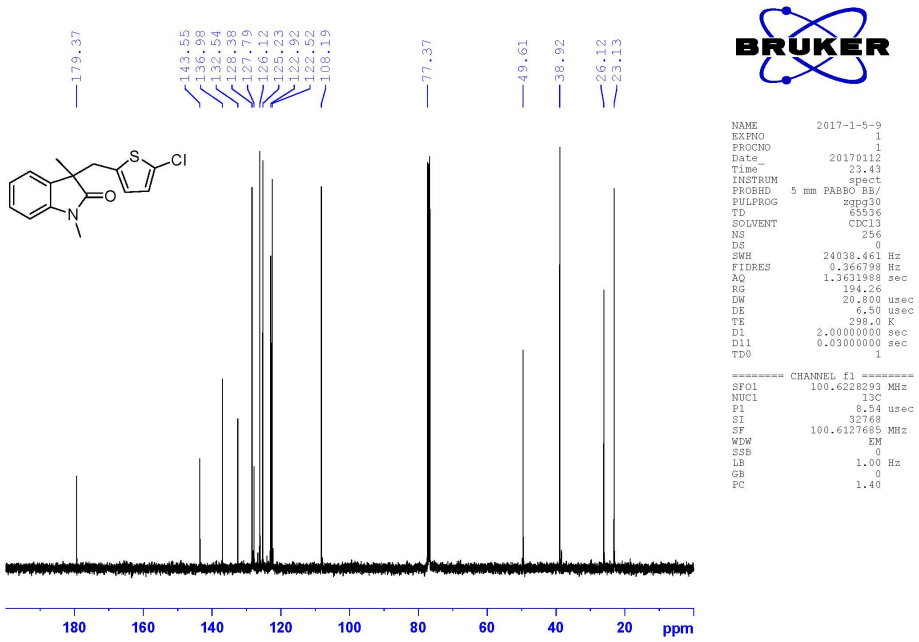




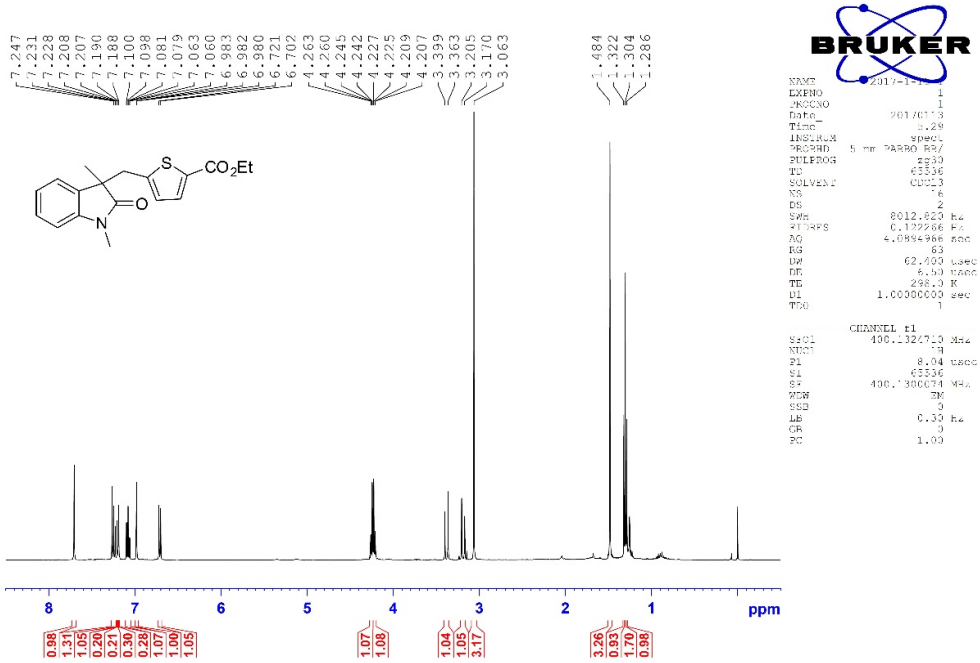


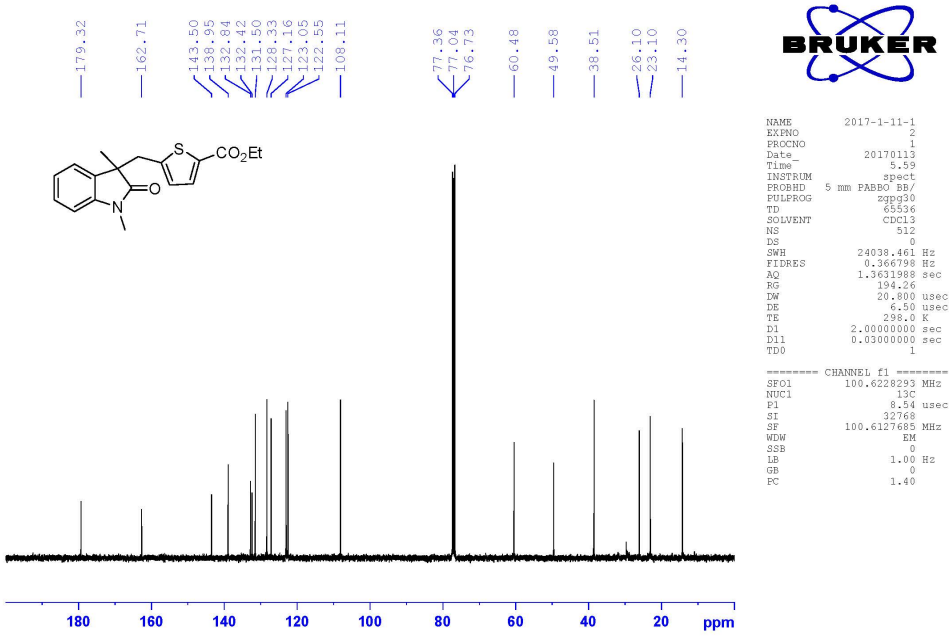
^{1}H and ^{13}C NMR Spectra for Compound **2ed**



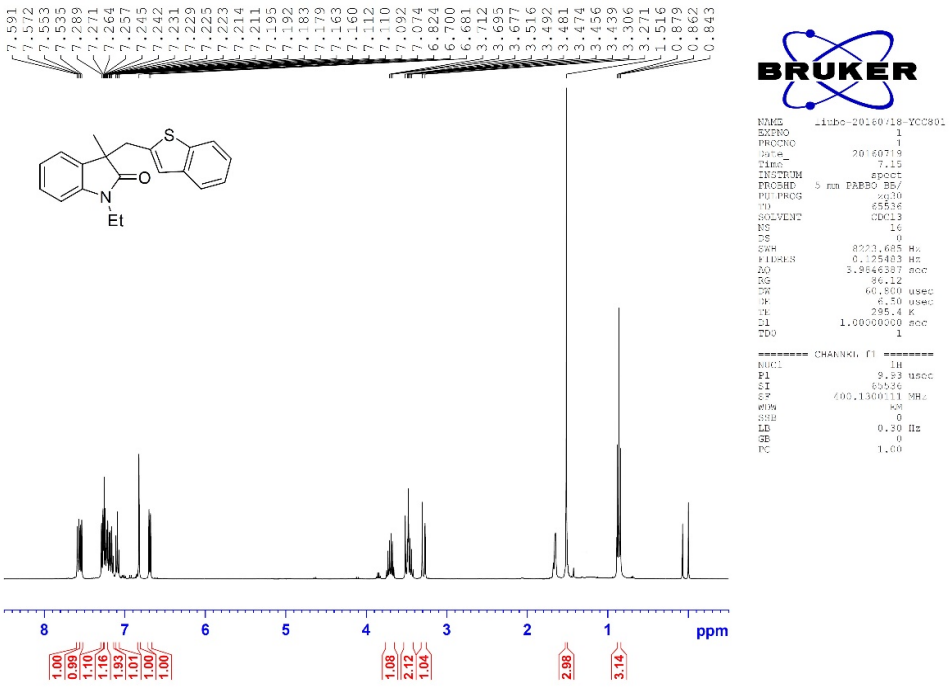


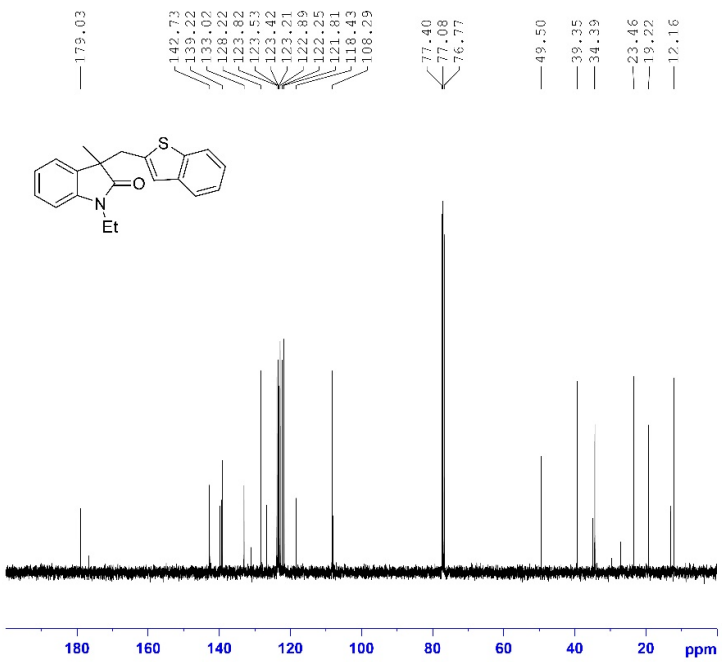
^{1}H and ^{13}C NMR Spectra for Compound **2ee**

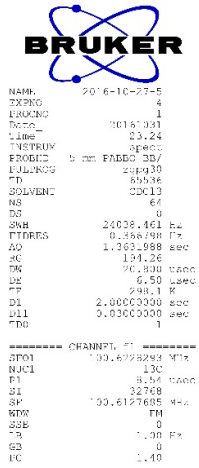




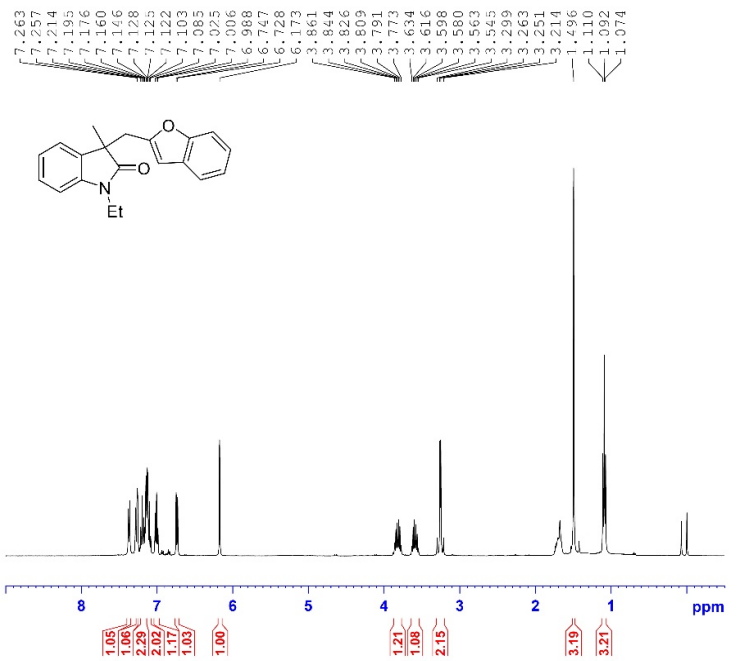
^{1}H and ^{13}C NMR Spectra for Compound **2fa**

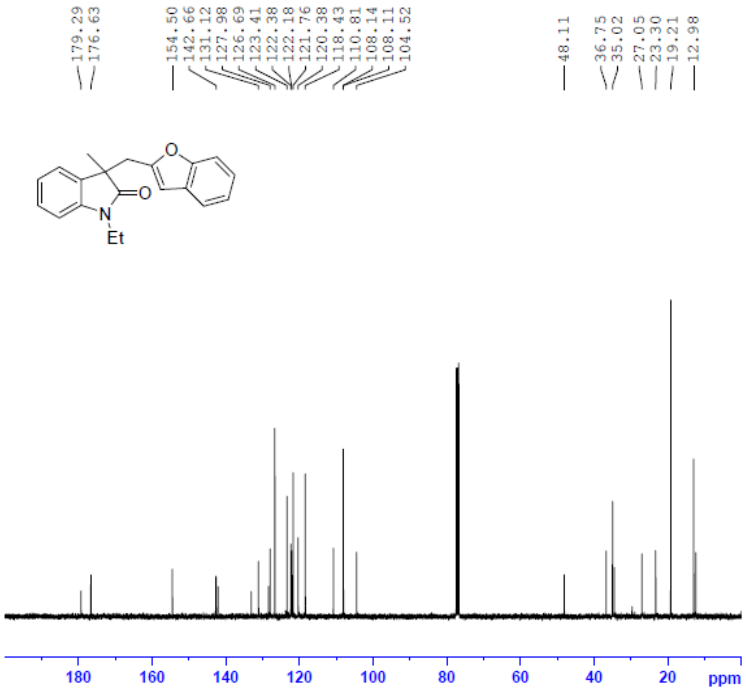


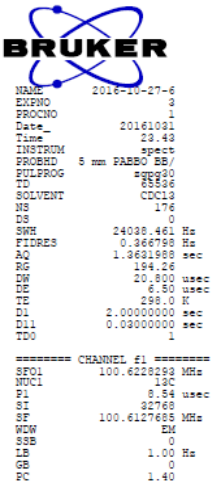




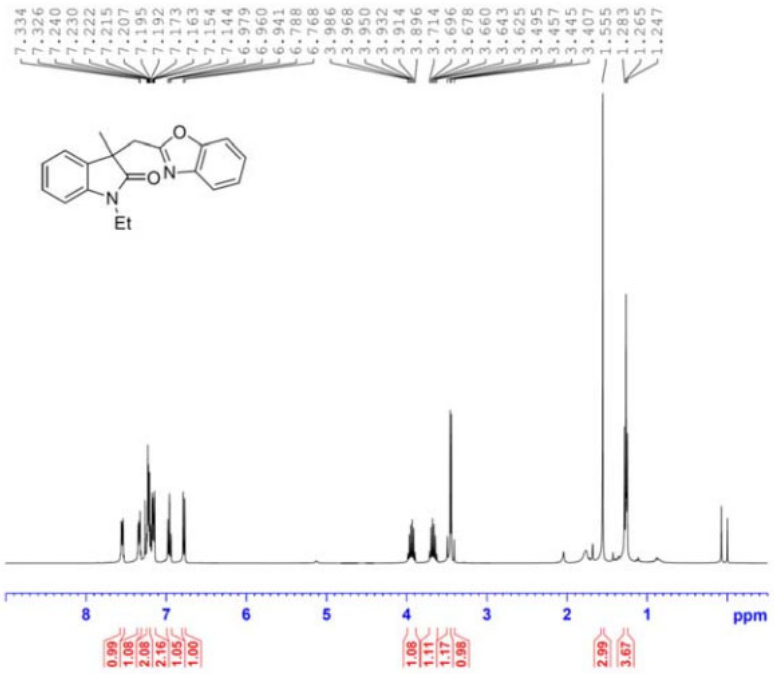
[1]H and [13]C NMR Spectra for Compound **2fb**

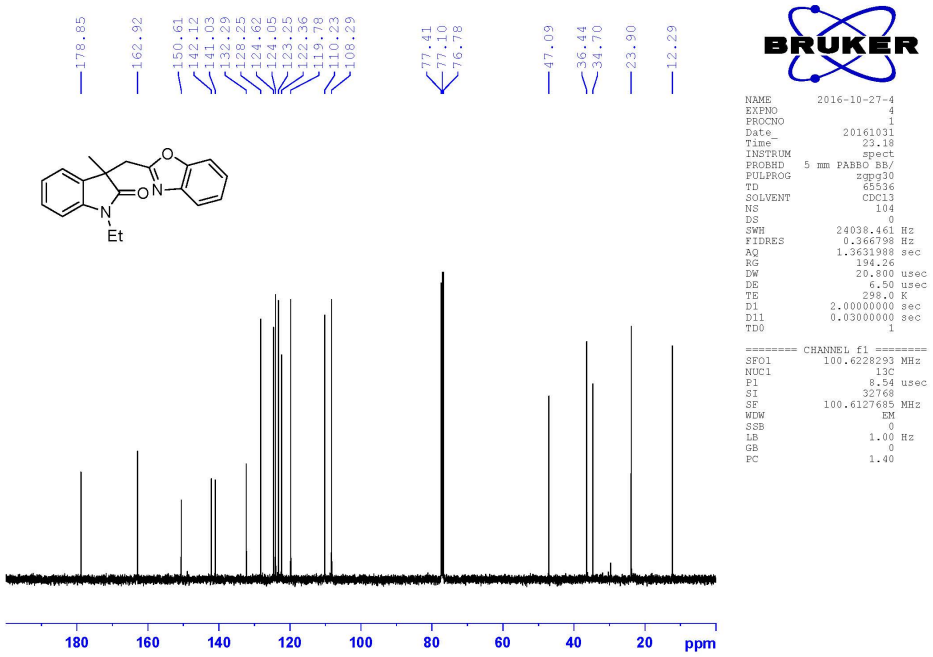




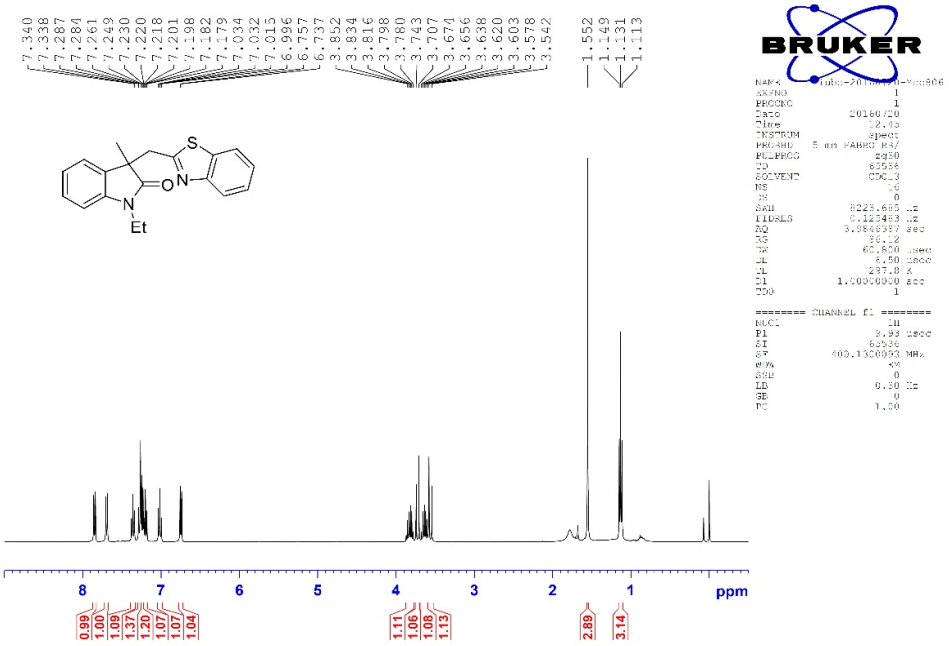


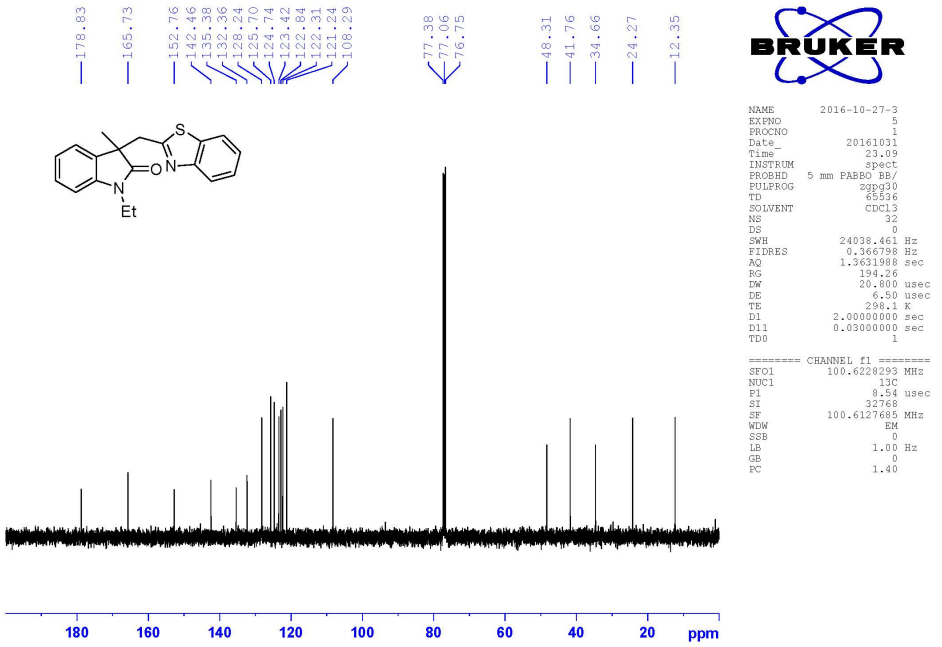
^{1}H and ^{13}C NMR Spectra for Compound **2fc**



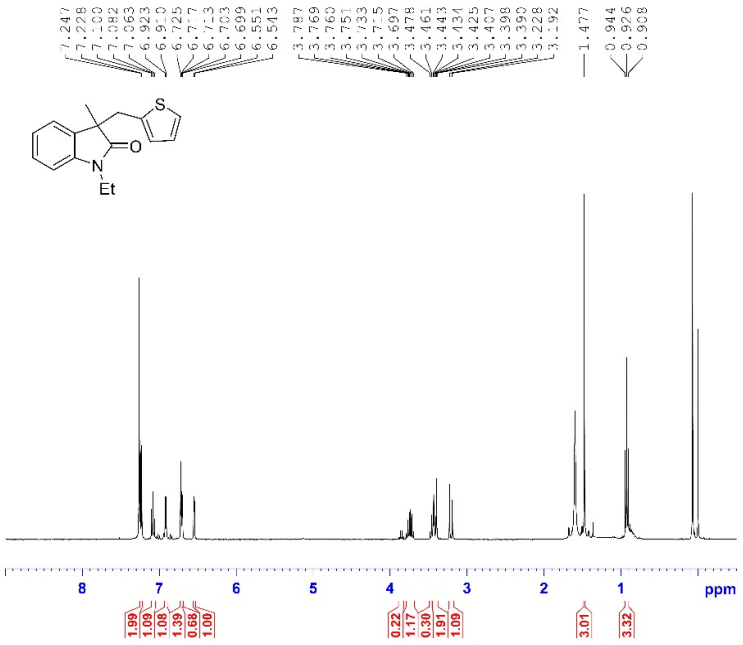


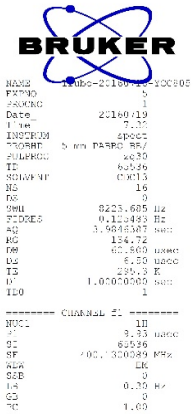
^{1}H and ^{13}C NMR Spectra for Compound **2fd**

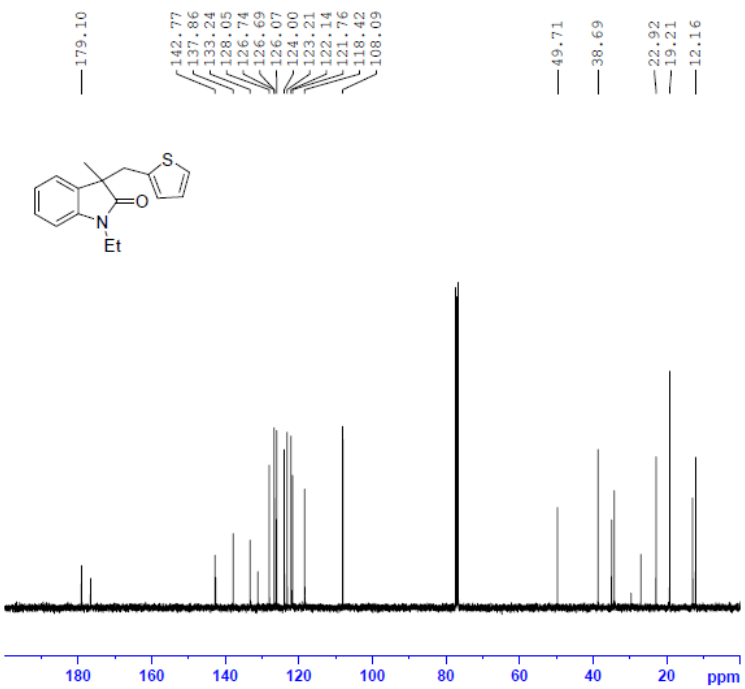


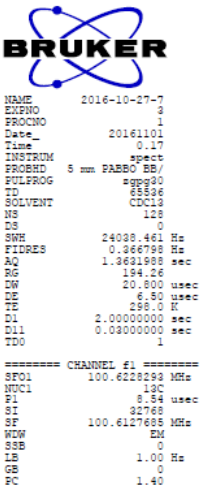


^{1}H and ^{13}C NMR Spectra for Compound **2fe**

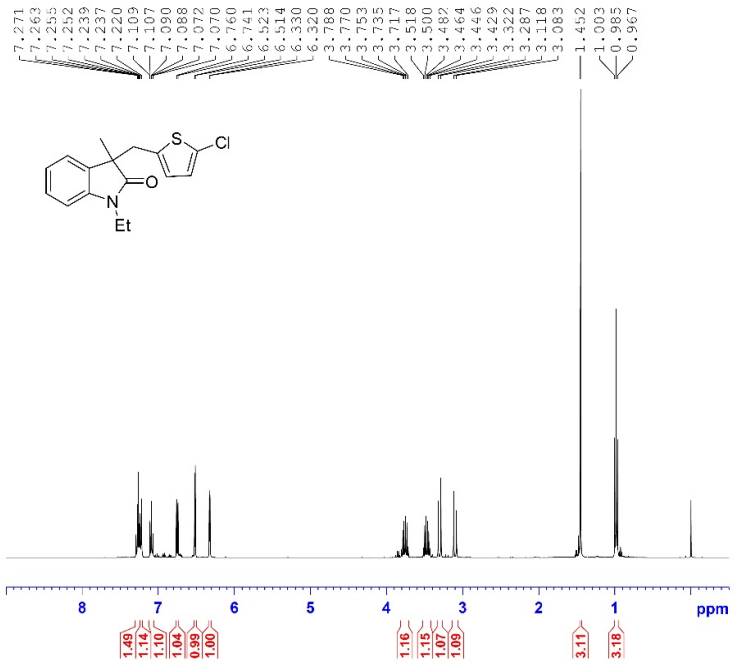


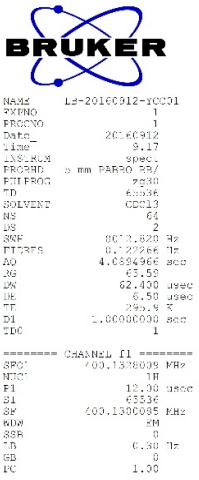


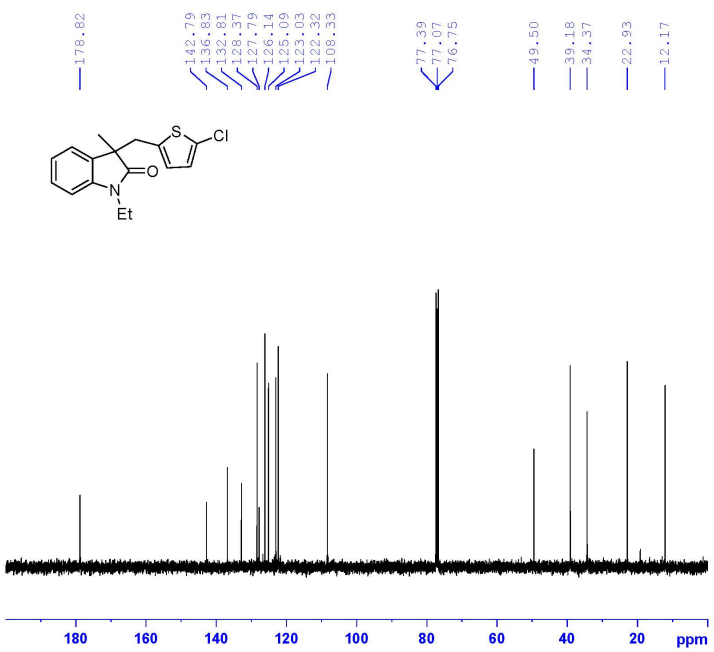


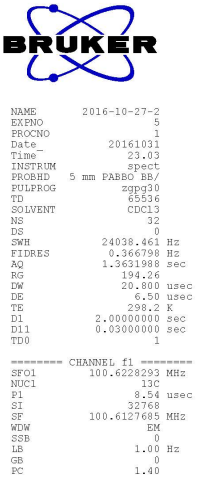


^{1}H and ^{13}C NMR Spectra for Compound **2ff**

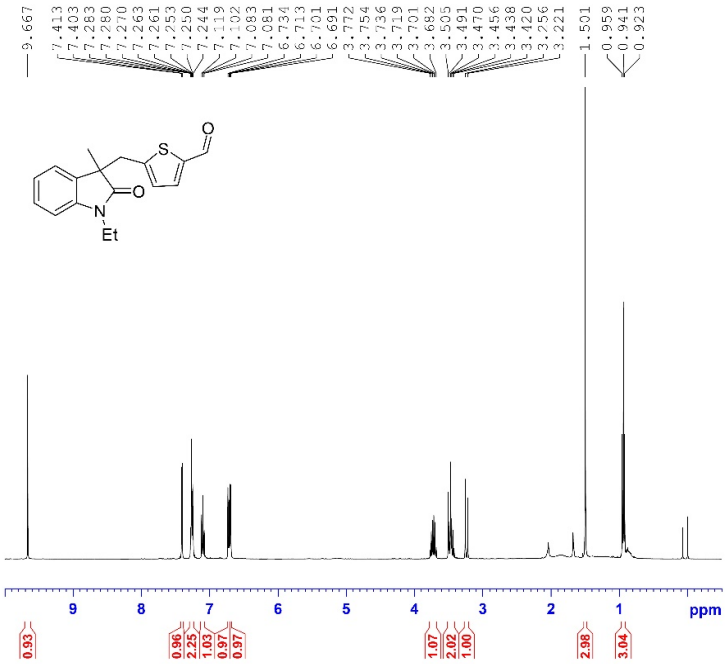


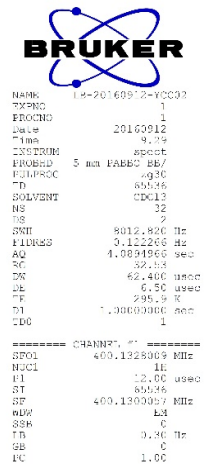


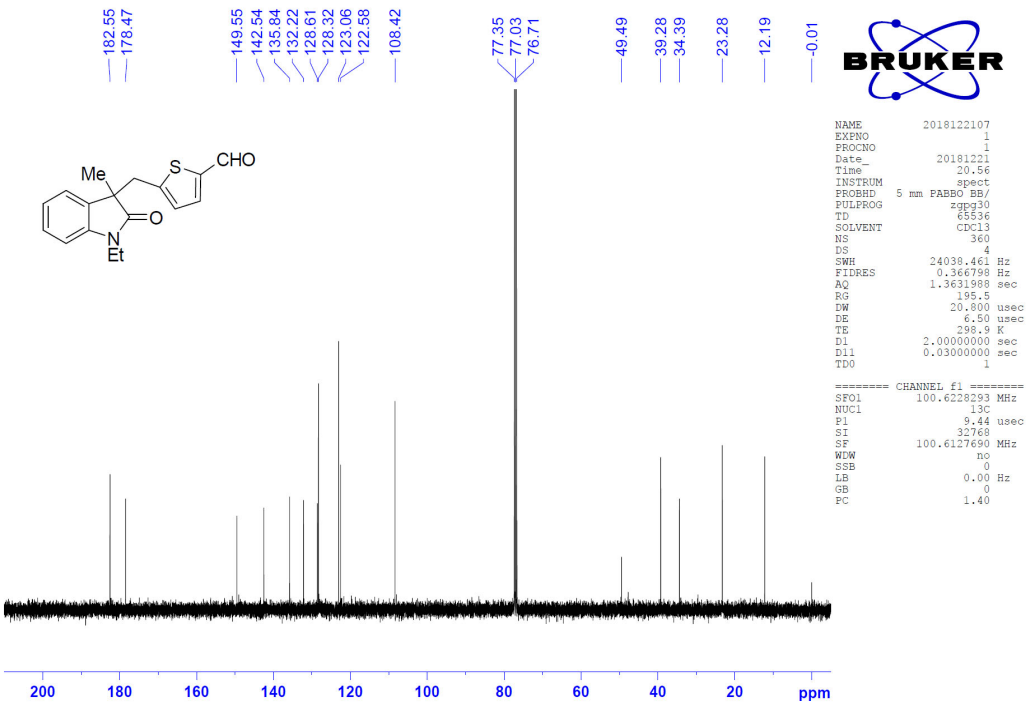




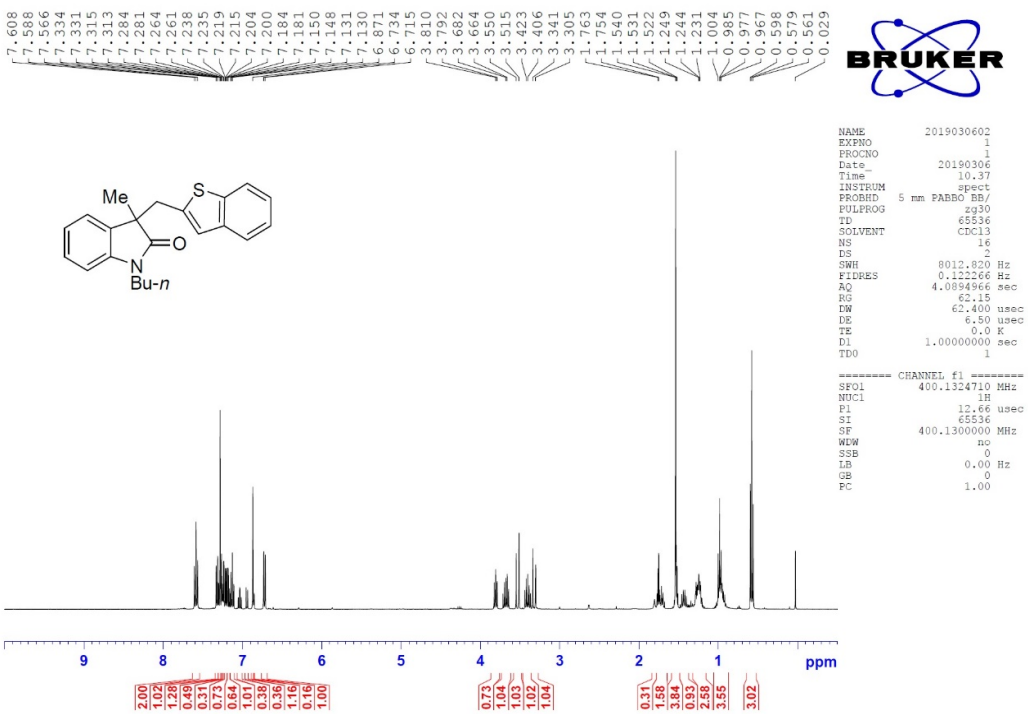
[1]H and [13]C NMR Spectra for Compound **2fg**

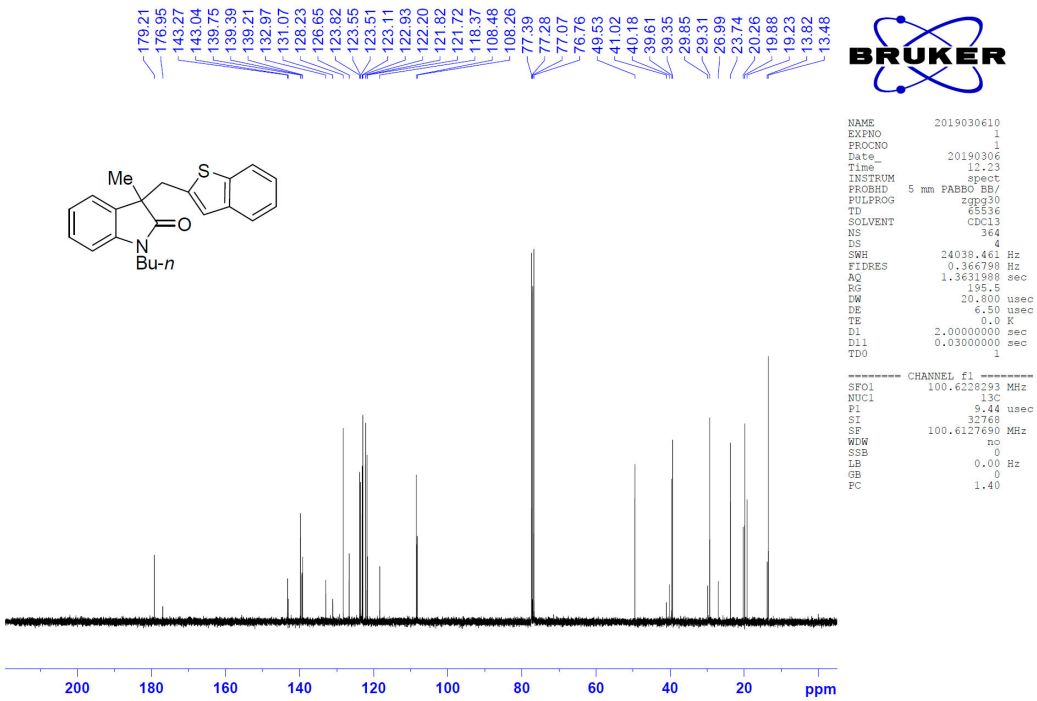




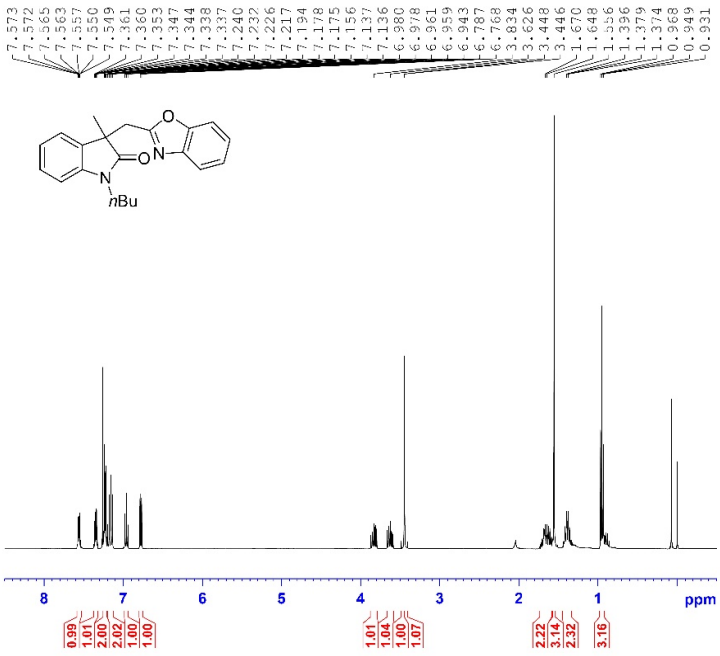


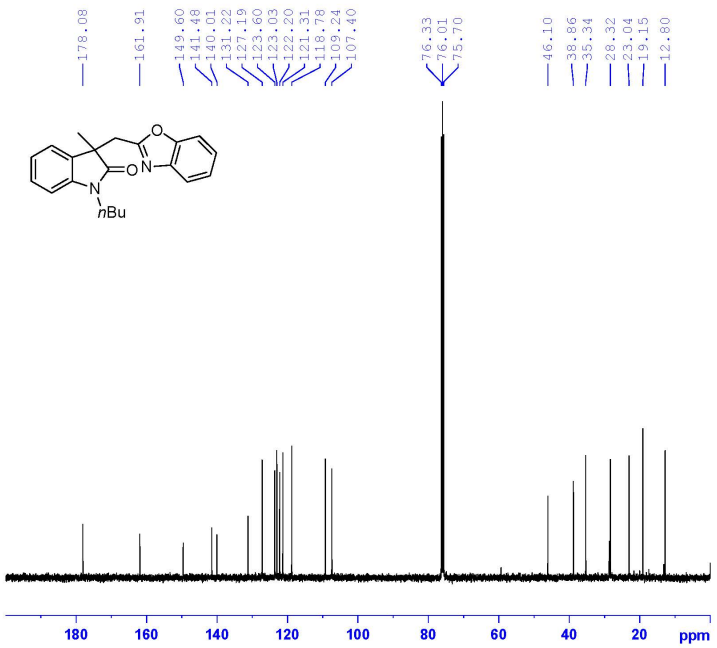
^{1}H and ^{13}C NMR Spectra for Compound **2ga**

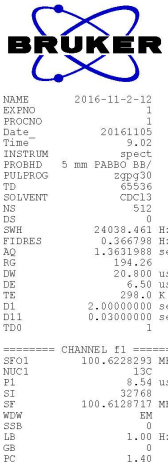




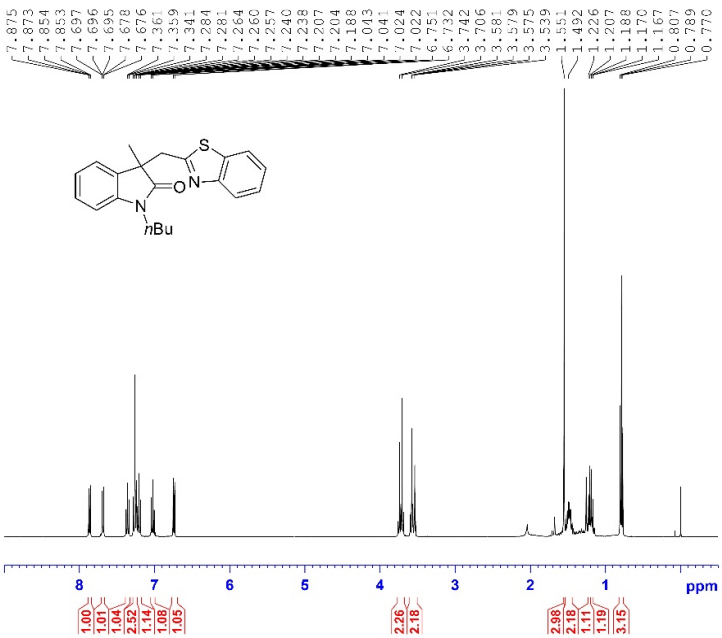
^{1}H and ^{13}C NMR Spectra for Compound **2gb**

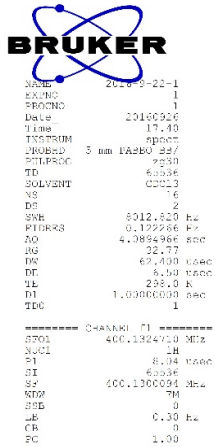


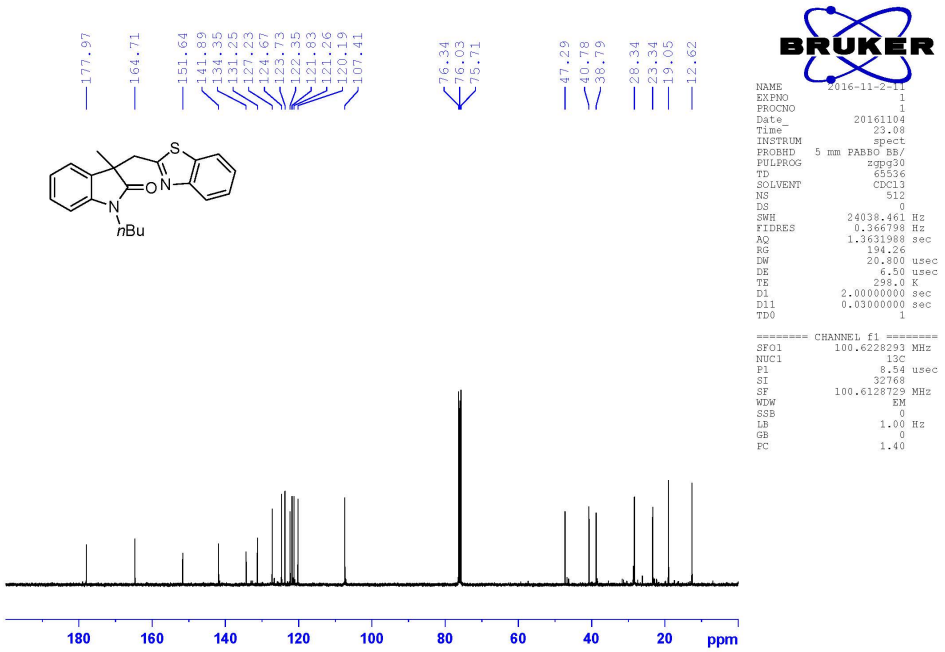




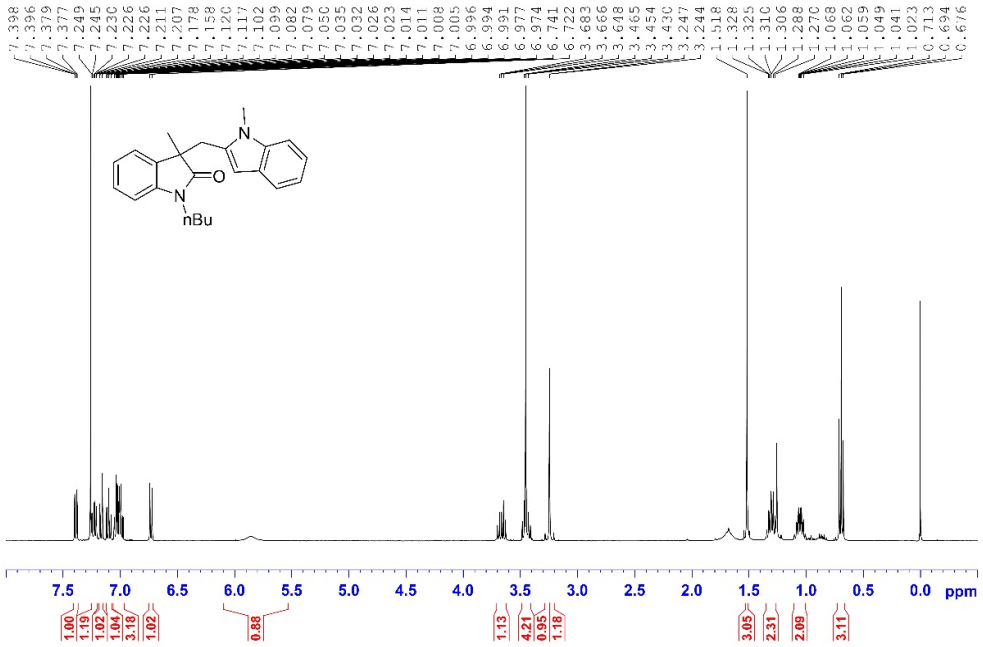
[1]H and [13]C NMR Spectra for Compound **2gc**

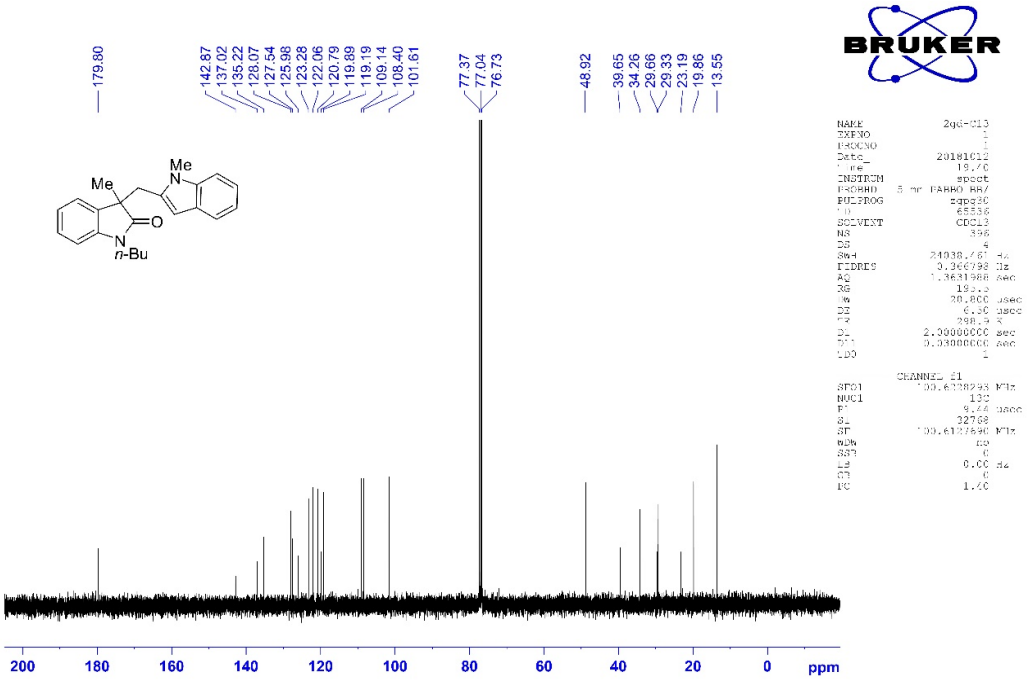




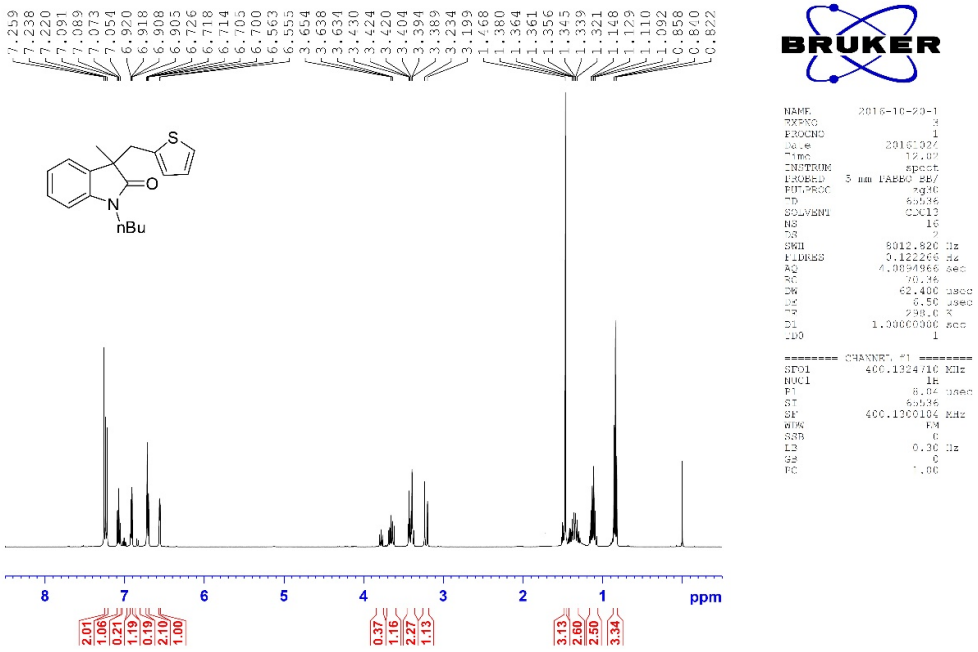


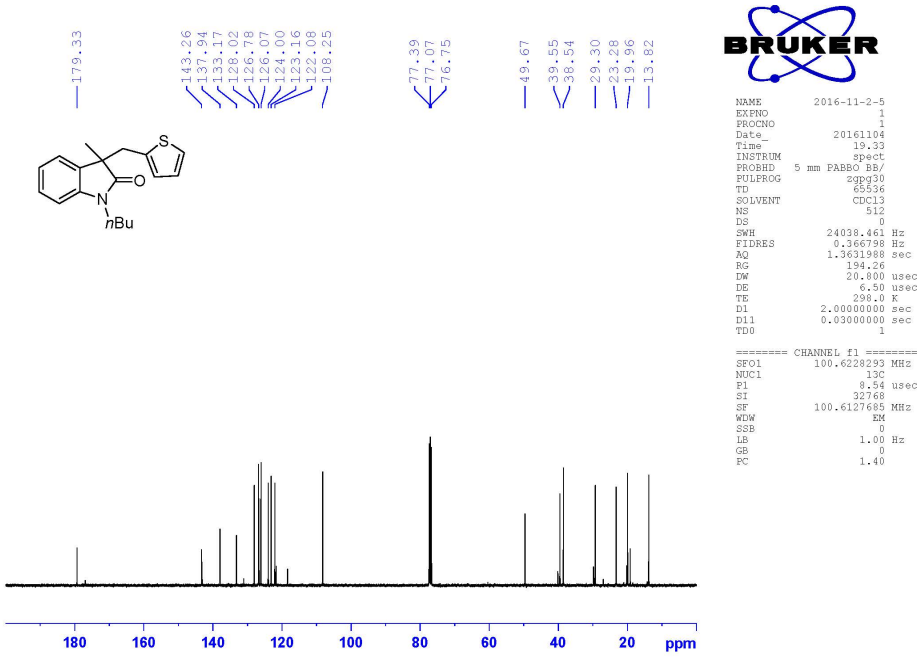
^{1}H and ^{13}C NMR Spectra for Compound **2gd**



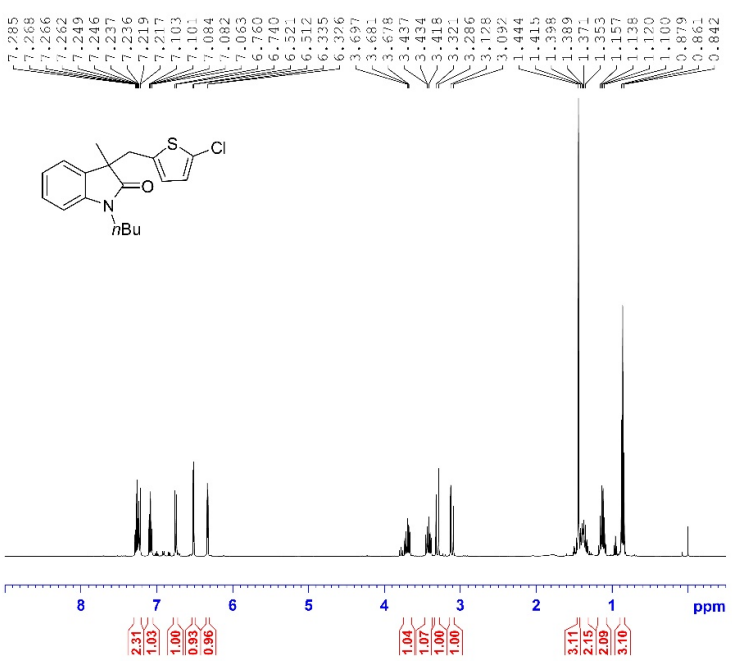


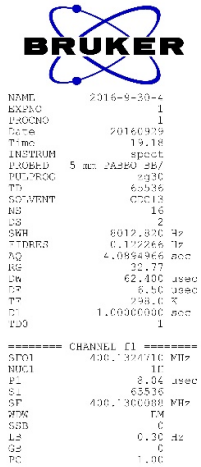
^{1}H and ^{13}C NMR Spectra for Compound **2ge**

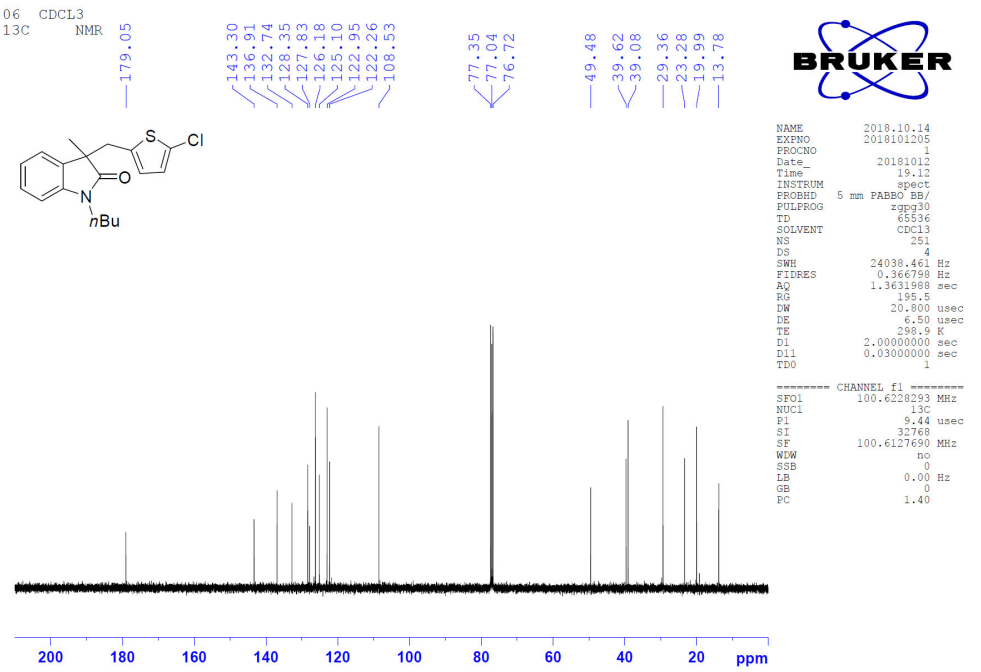




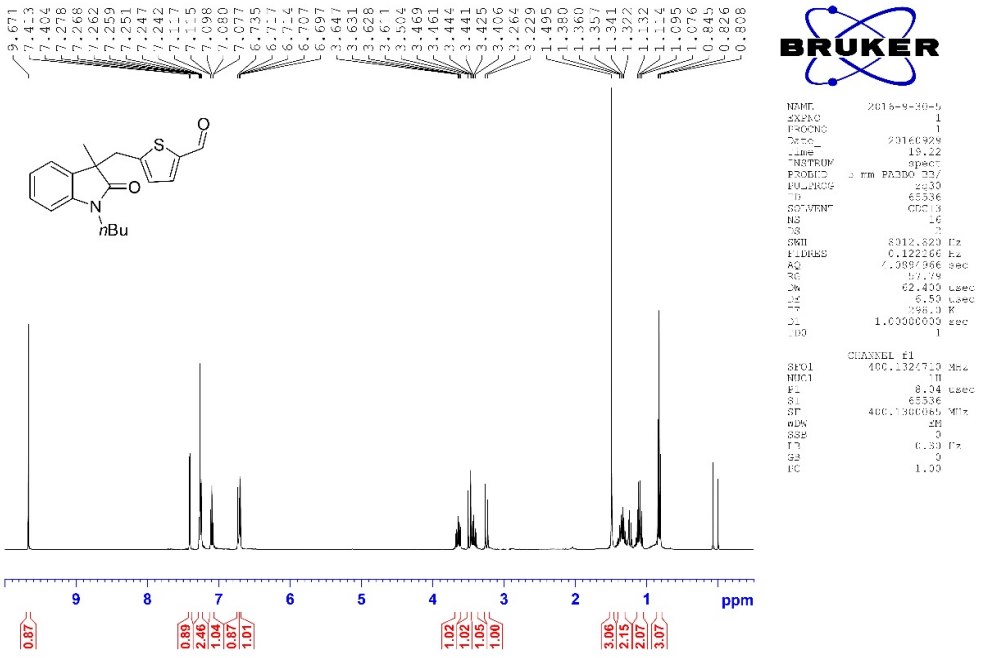
^{1}H and ^{13}C NMR Spectra for Compound **2gf**

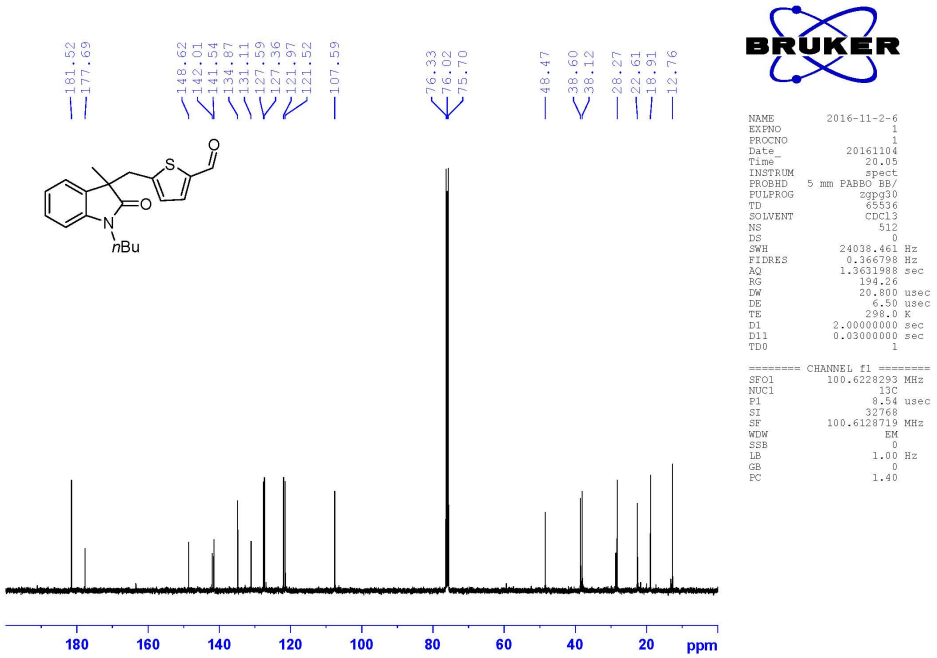






^{1}H and ^{13}C NMR Spectra for Compound **2gg**



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RG                194.26
DW                20.800 usec
DE                 6.50 usec
TE               298.0 K
D1            2.00000000 sec
D11           0.03000000 sec
TD0                    1

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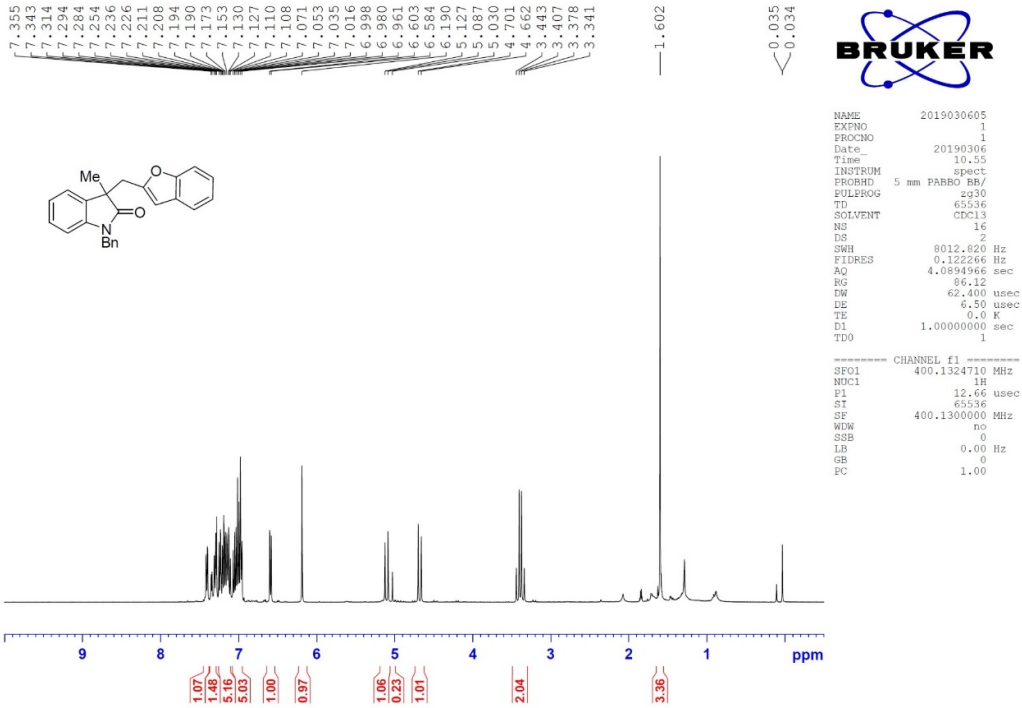
[1]H and [13]C NMR Spectra for Compound **2ha**

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D1            1.00000000 sec
TD0                   1

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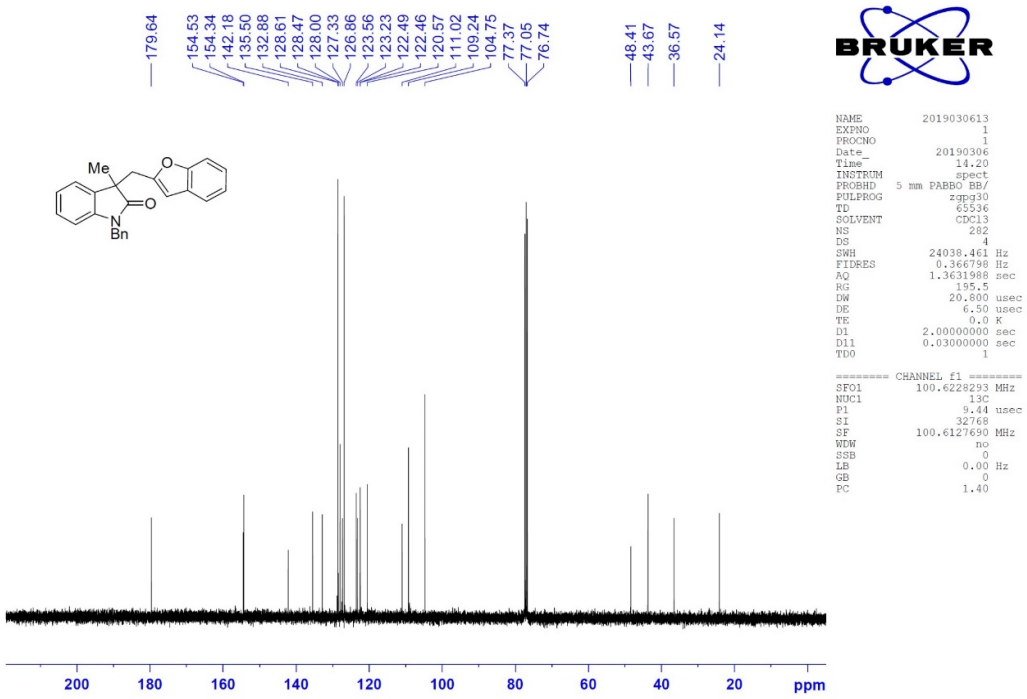
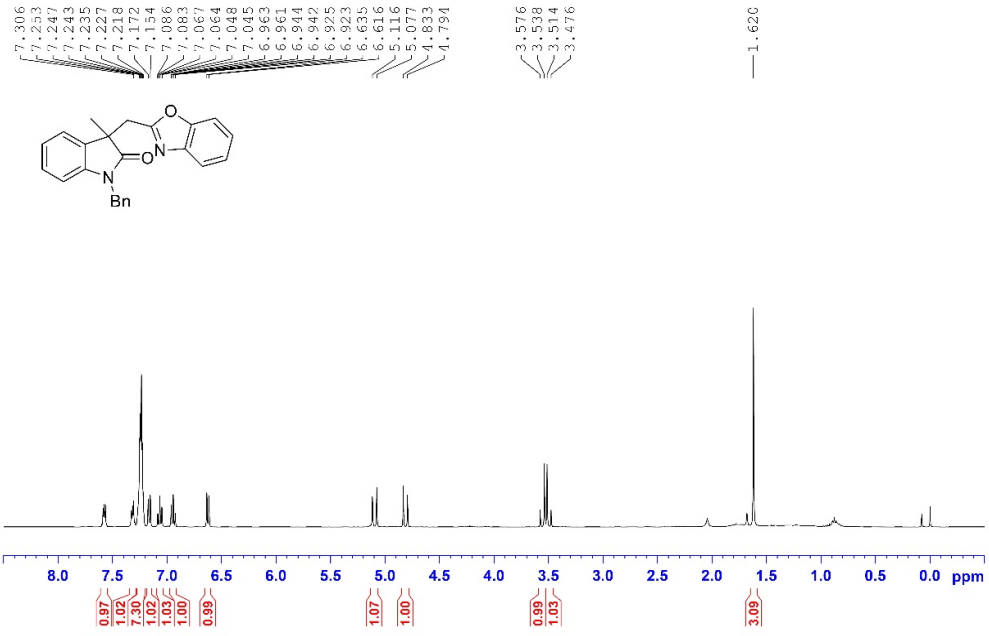
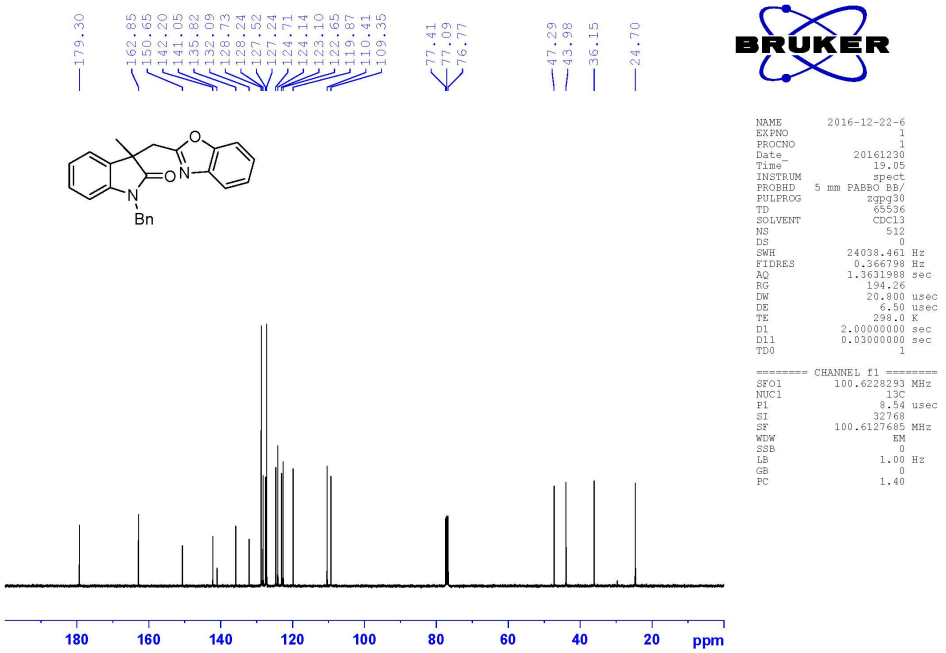
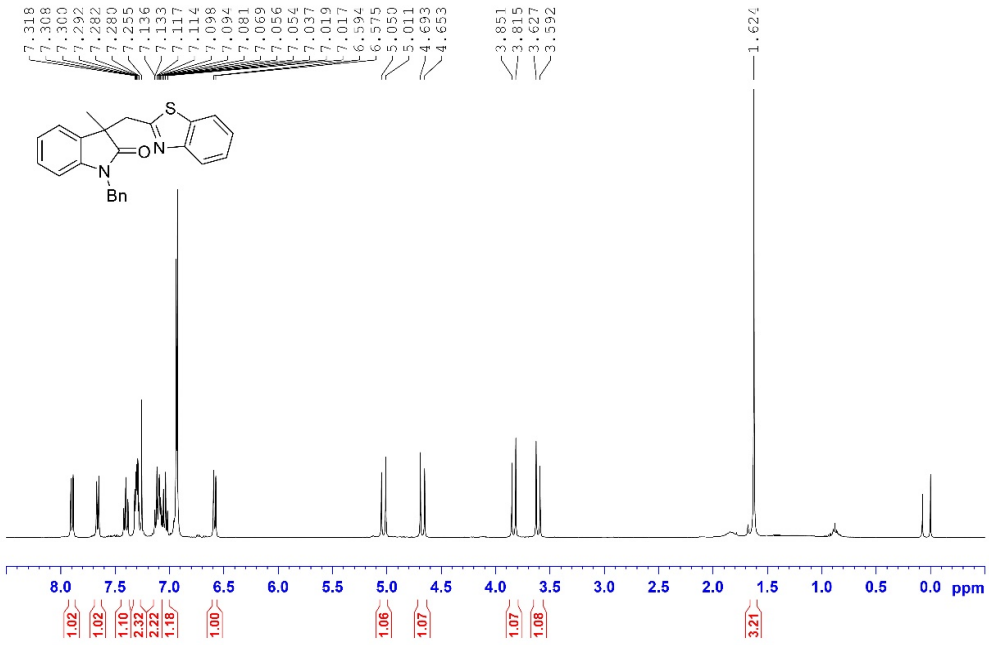


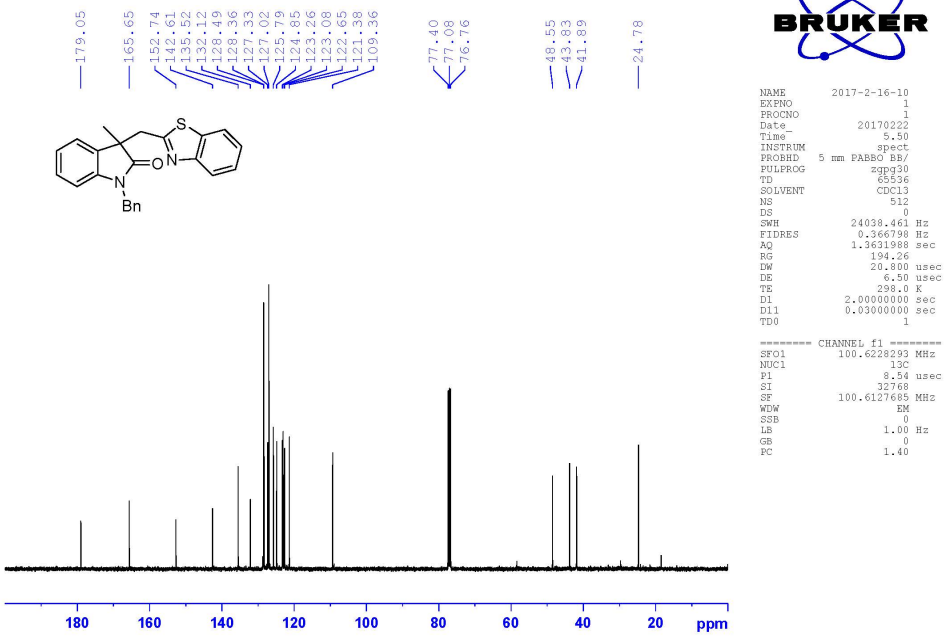
^{1}H and ^{13}C NMR Spectra for Compound **2hb**





^{1}H and ^{13}C NMR Spectra for Compound **2hc**





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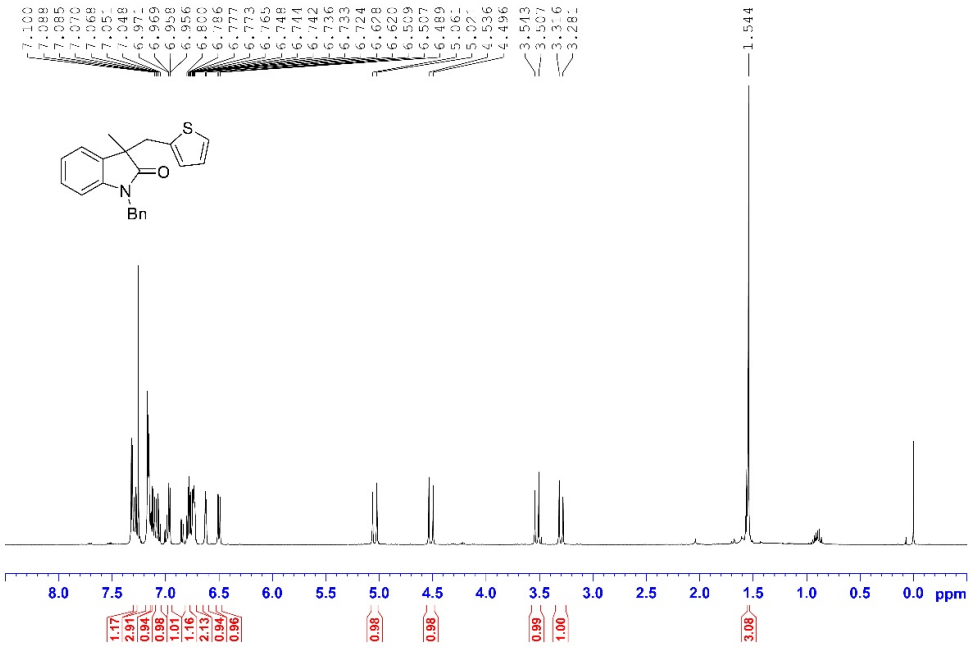

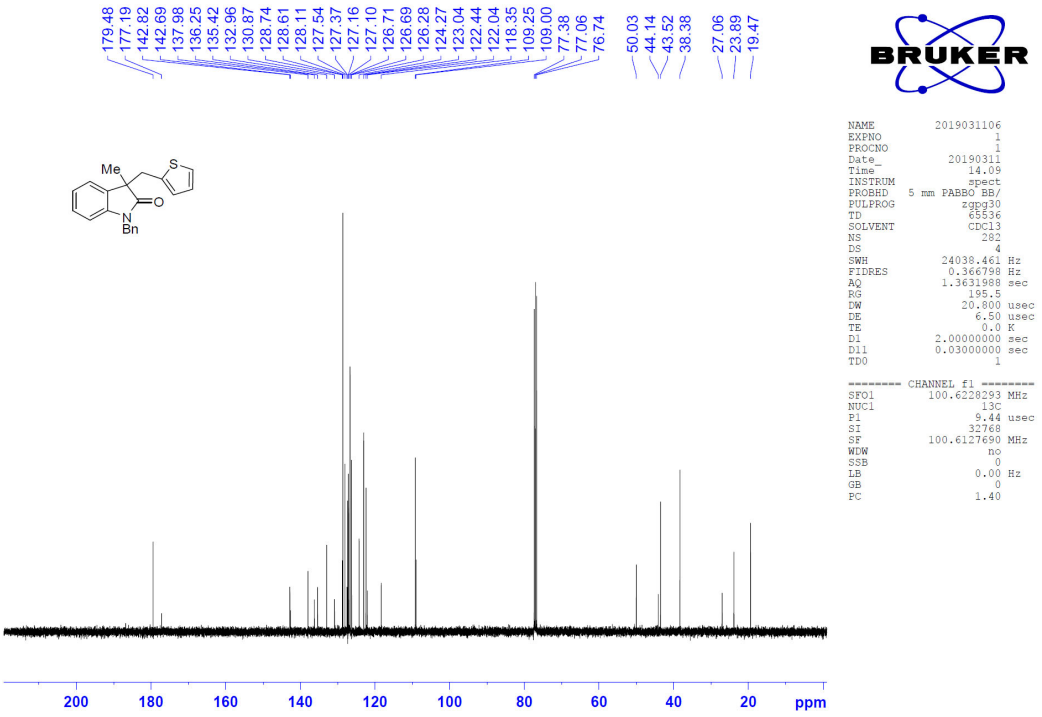

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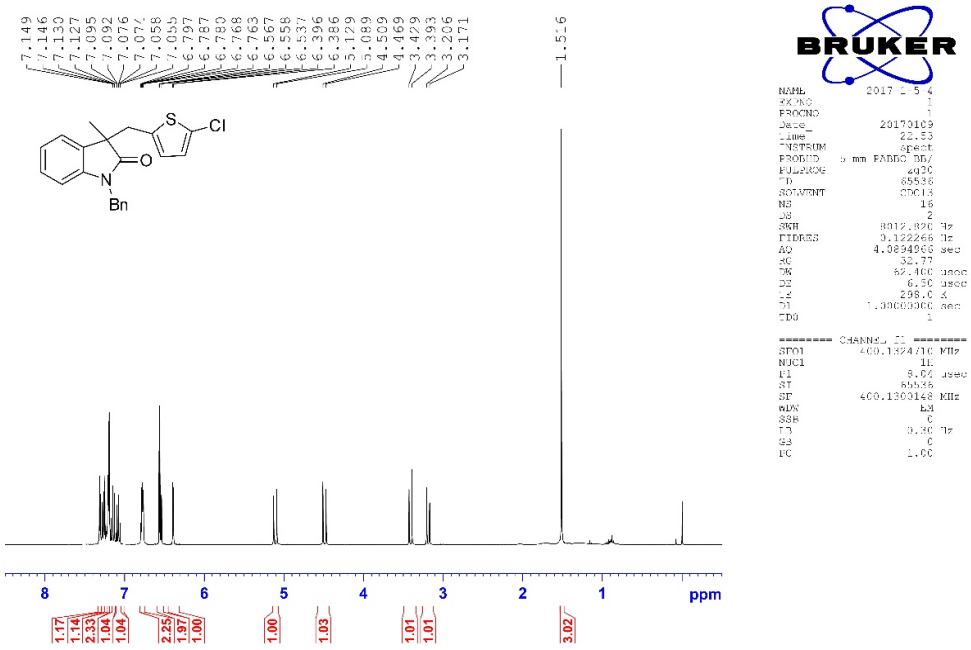

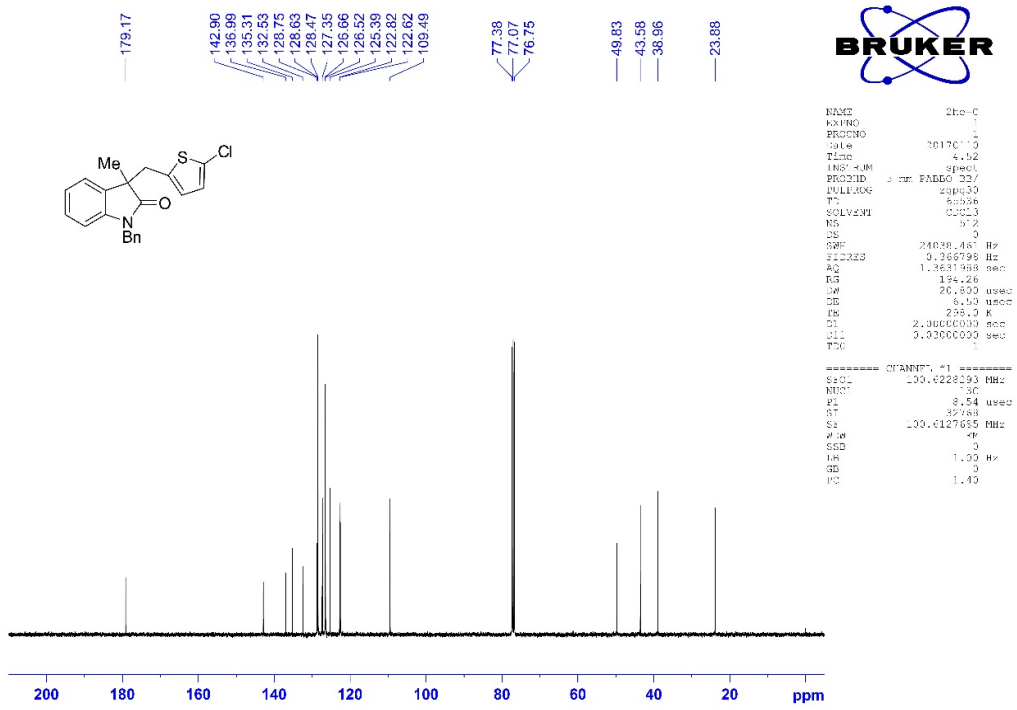

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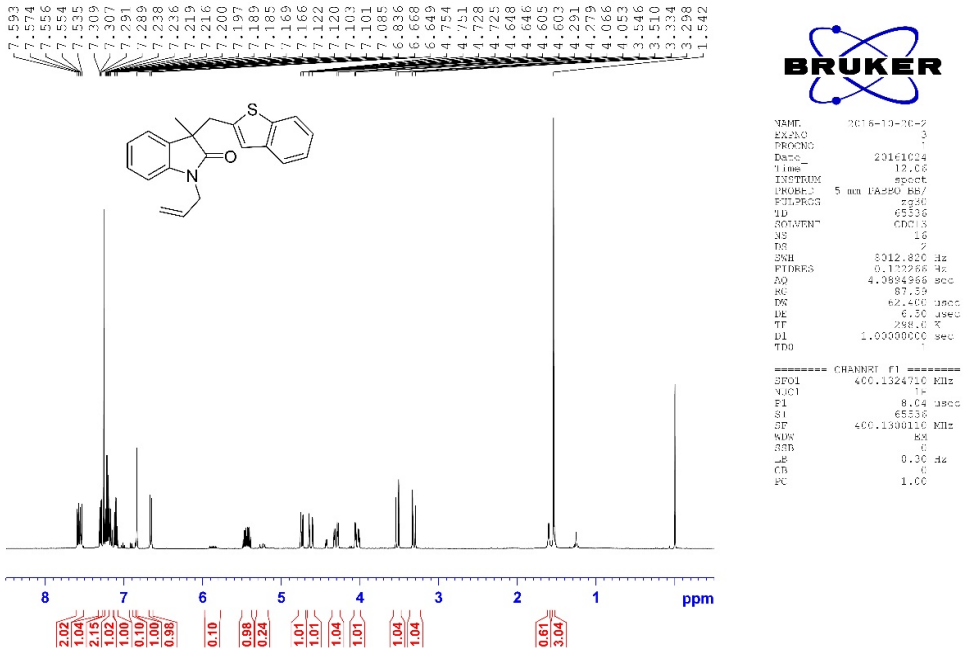
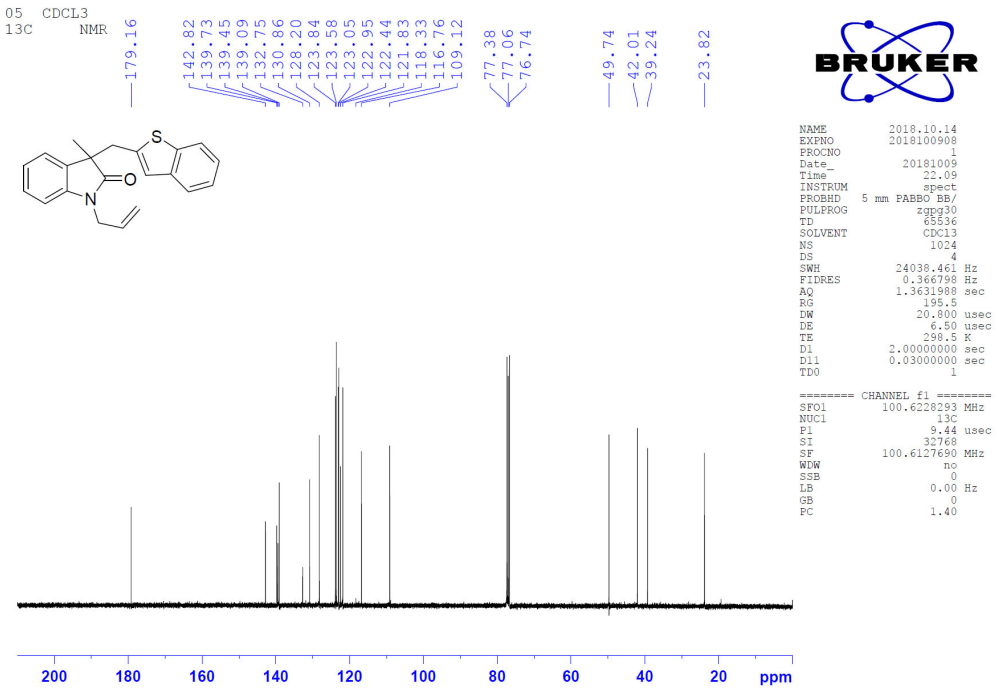
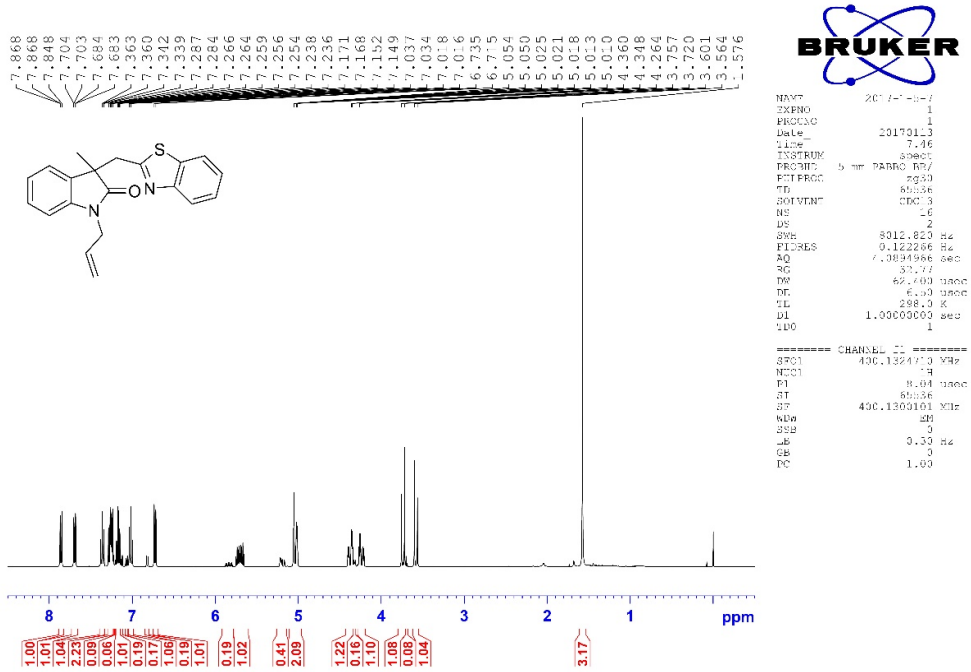
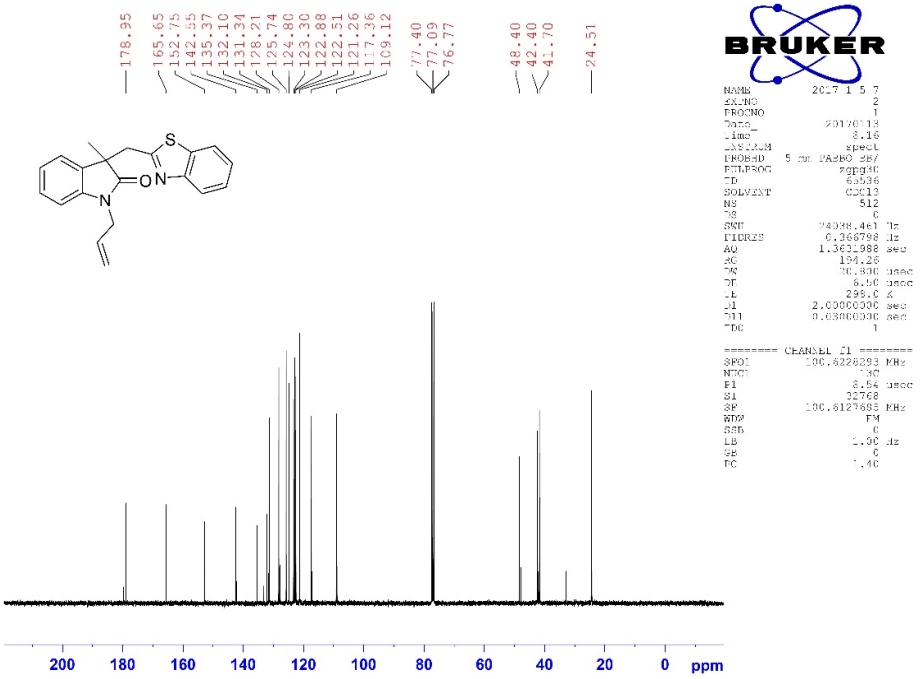




^{1}H and ^{13}C NMR Spectra for Compound **2ib**





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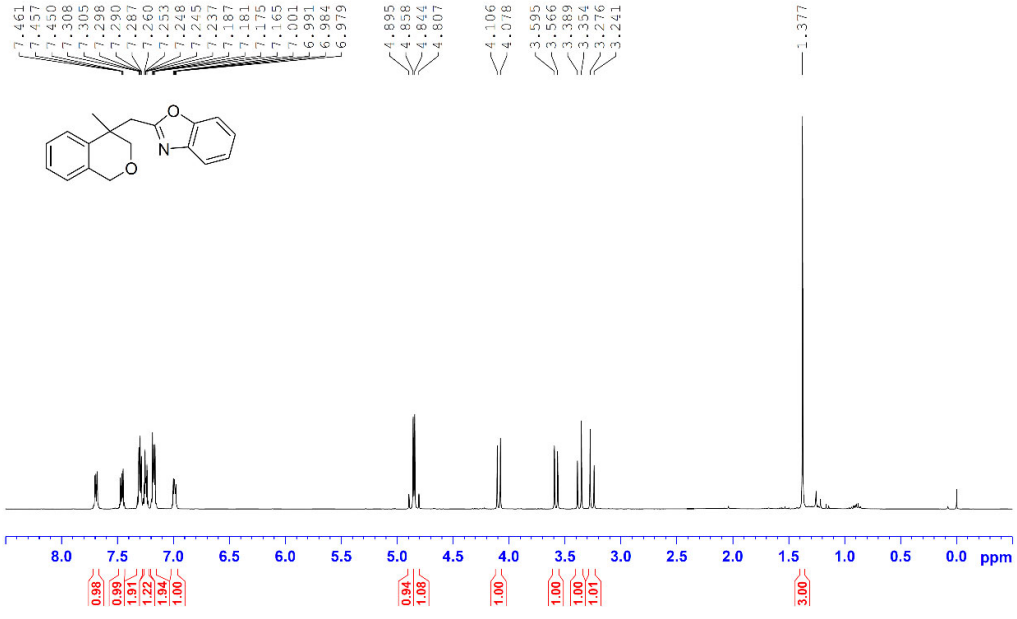

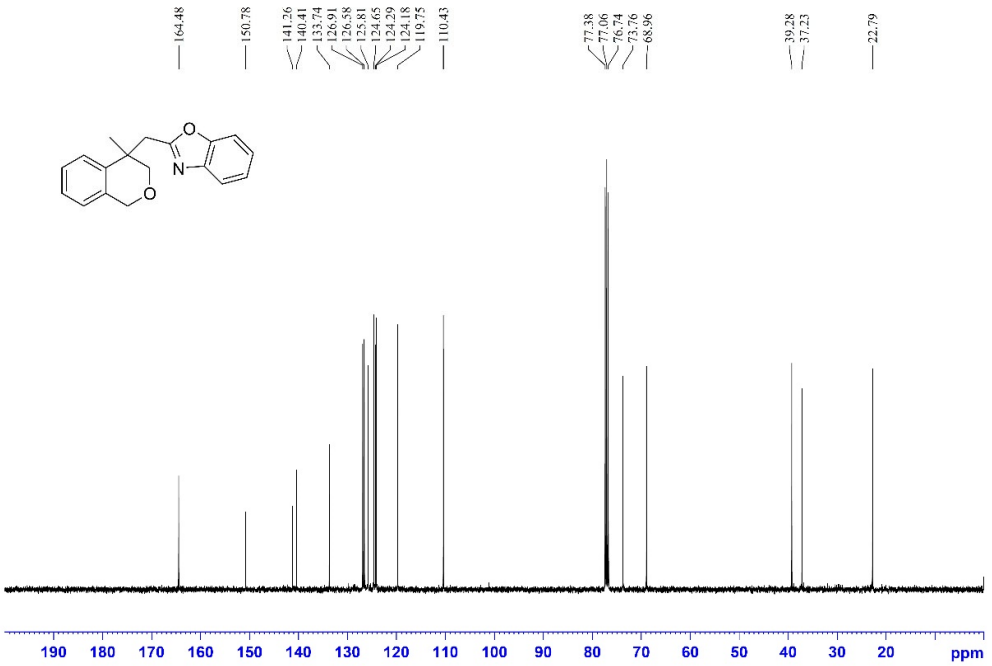

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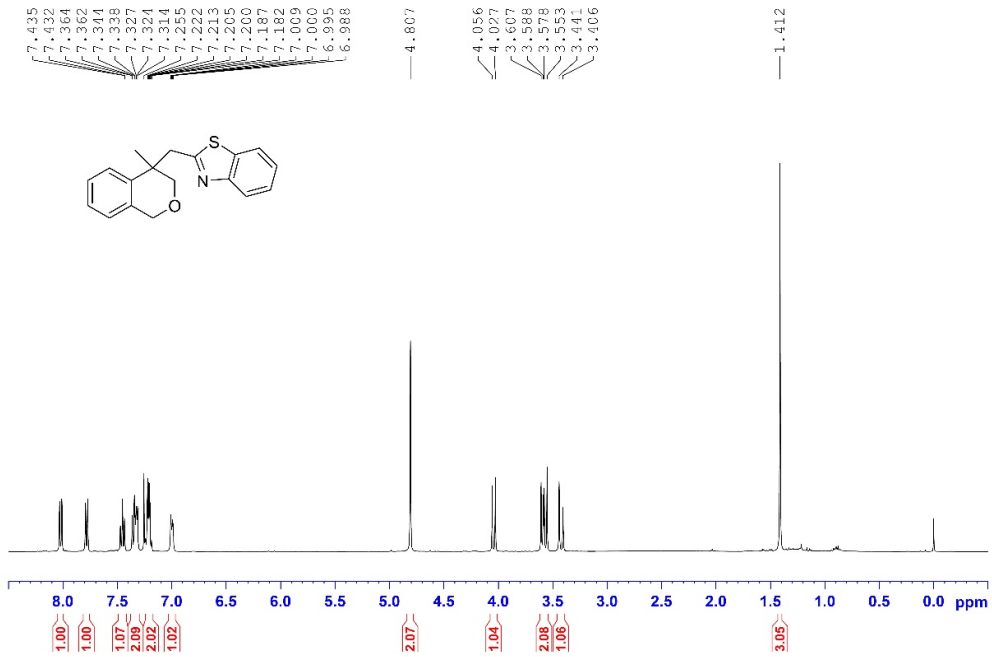

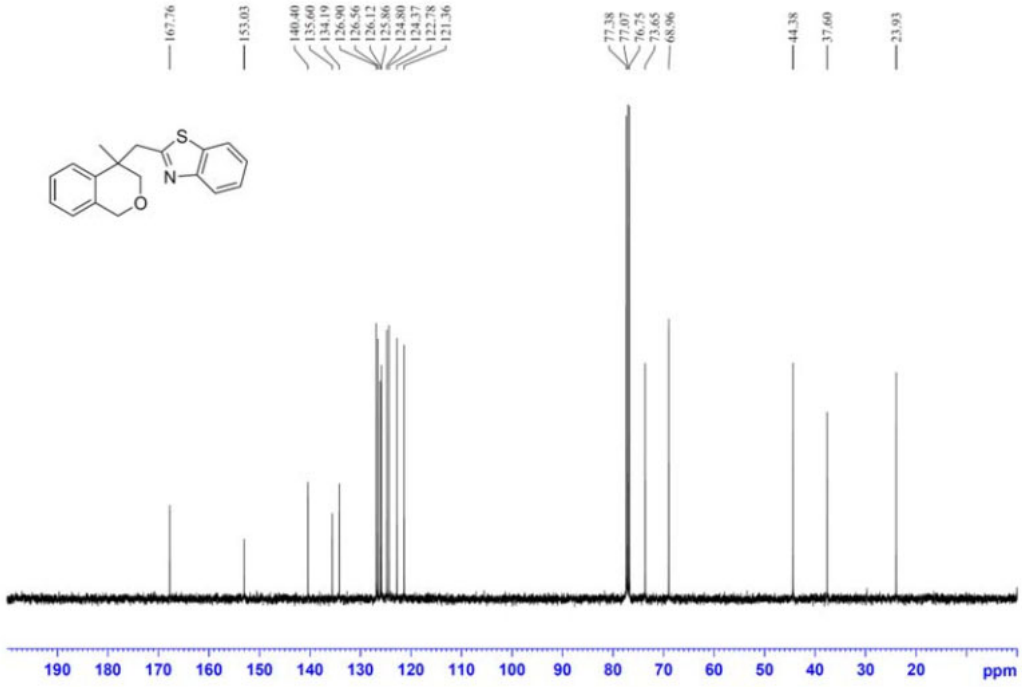

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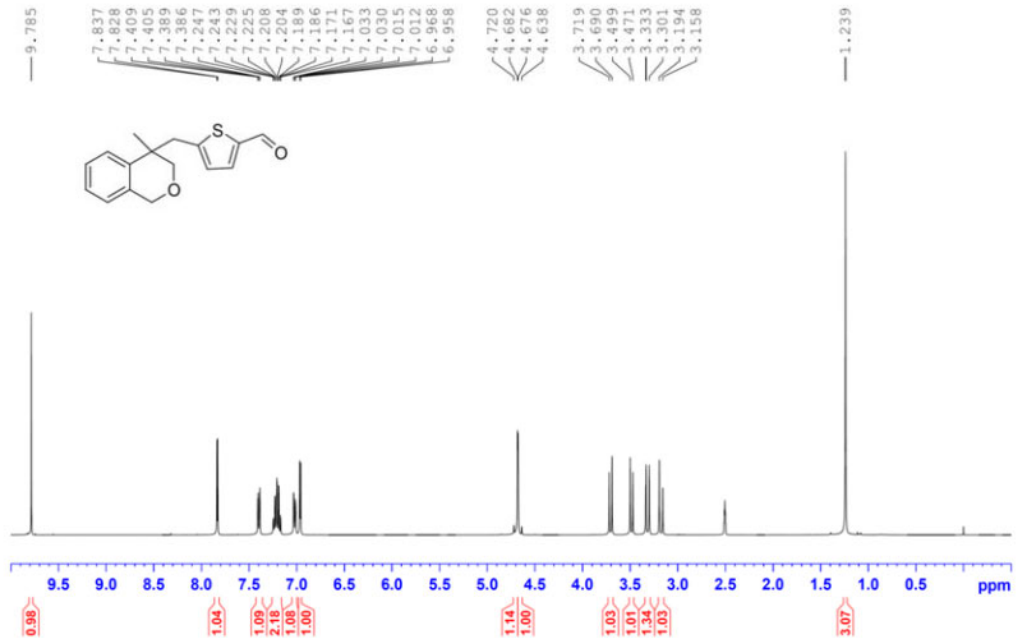

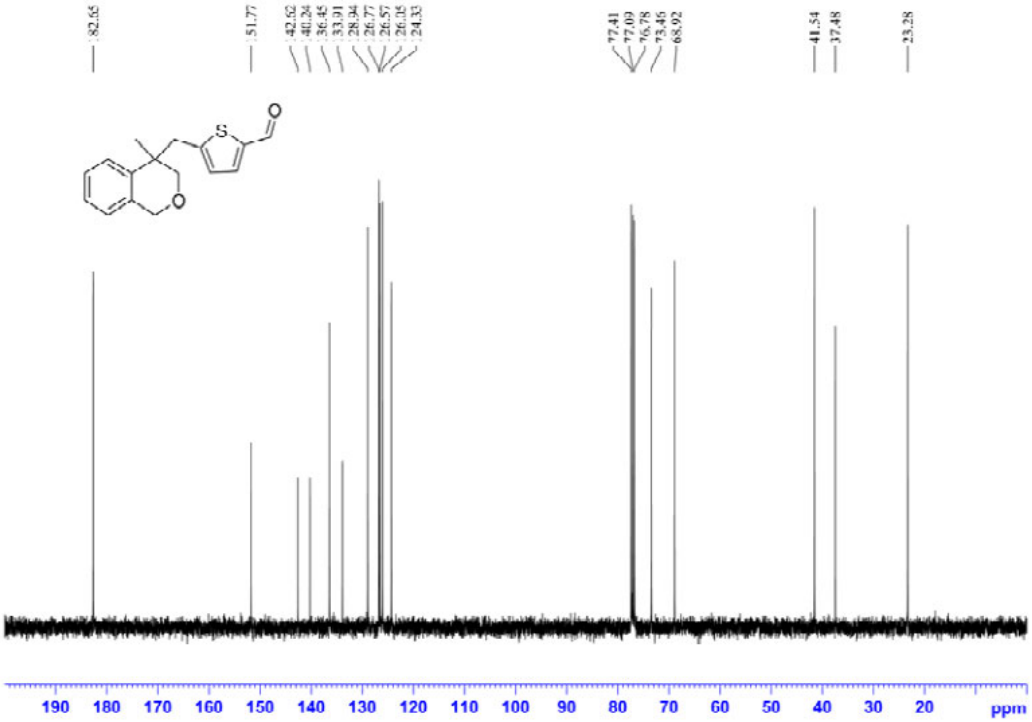
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O
S
O
190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 ppm