

Supporting Information

Cobalt catalysed, copper assisted C_(sp2)- P cross coupling

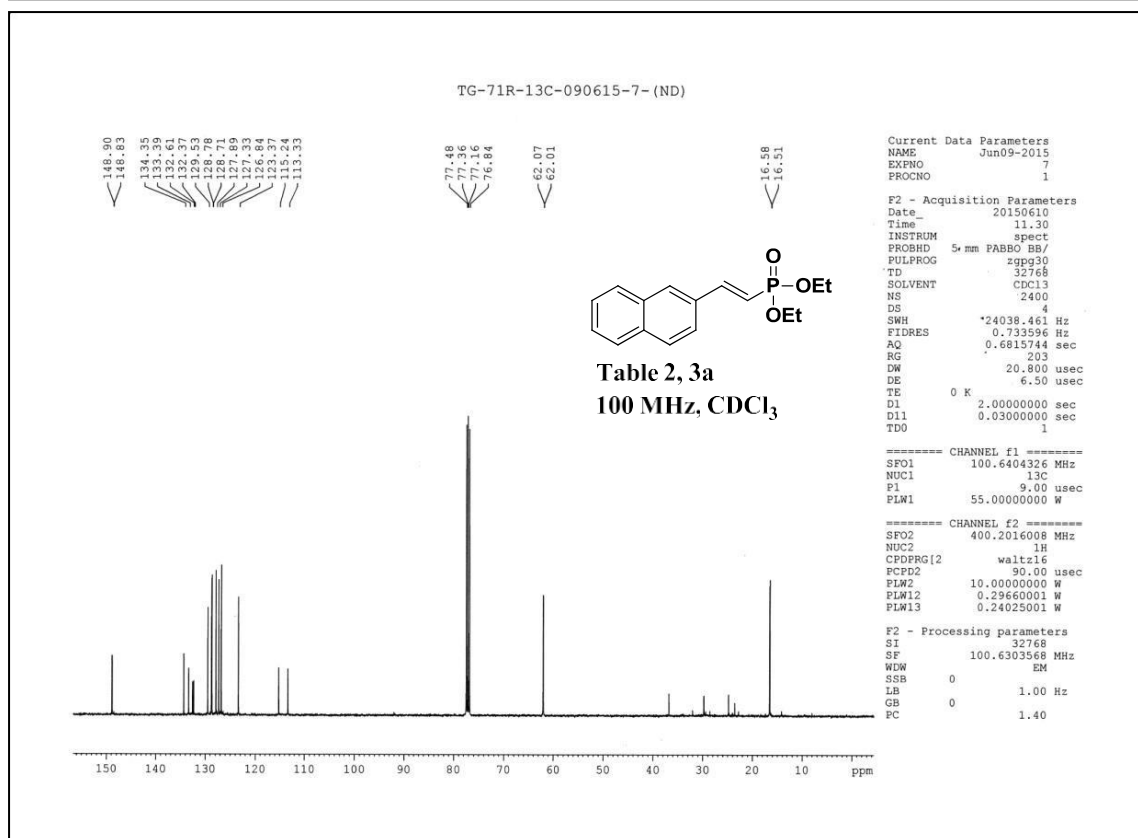
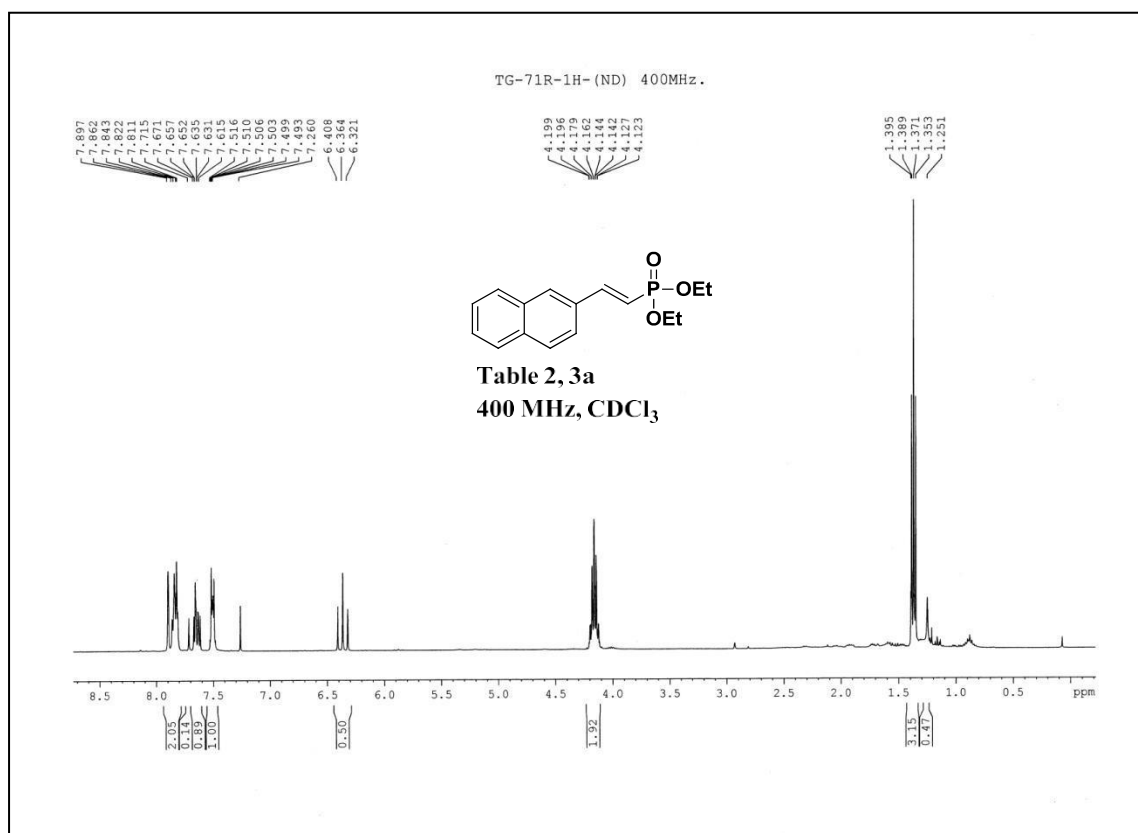
Tubai Ghosh, Pintu Maity, Debasish Kundu and Brindaban C. Ranu*

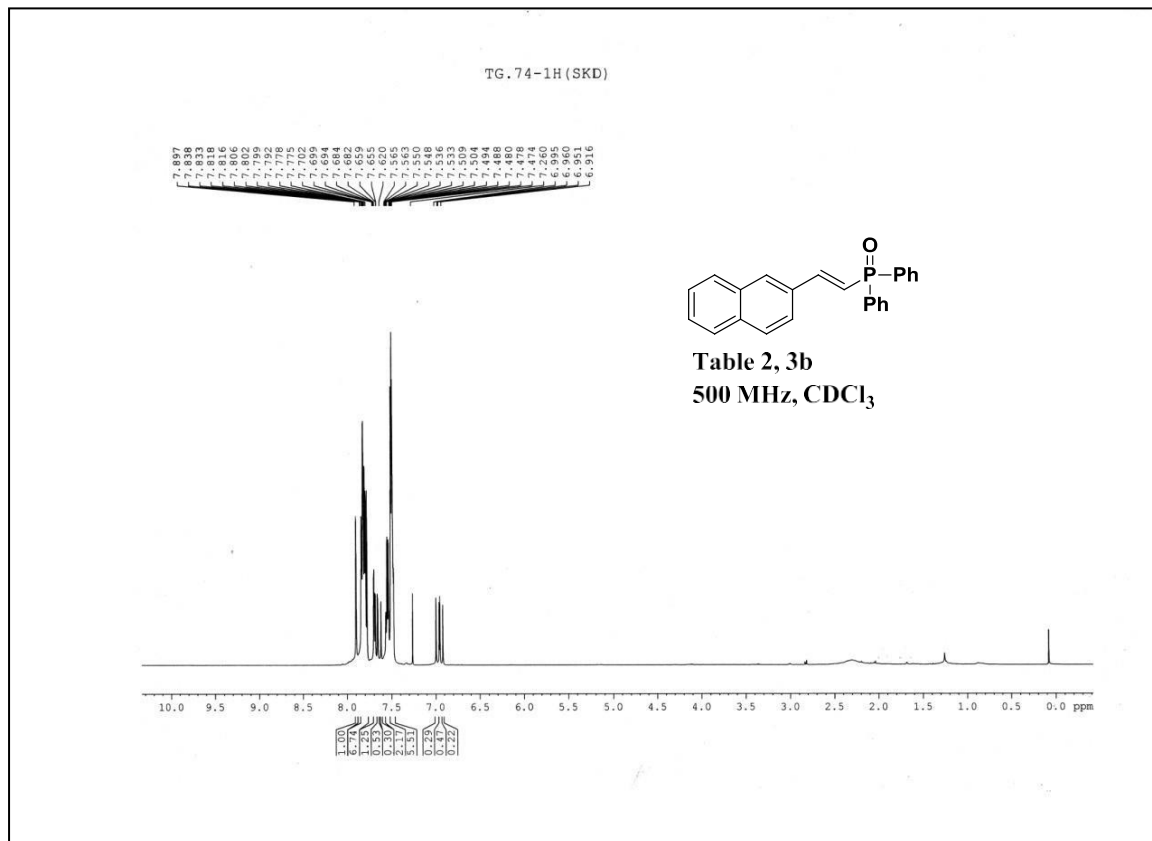
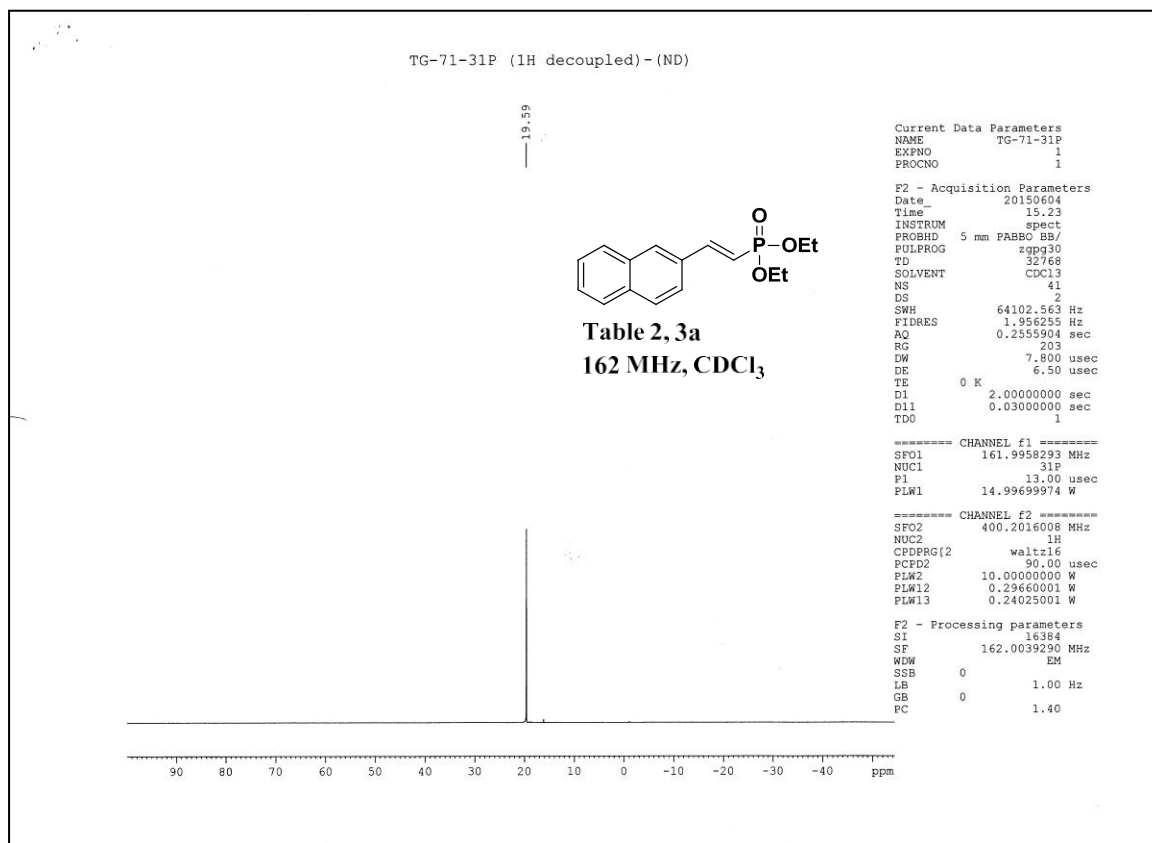
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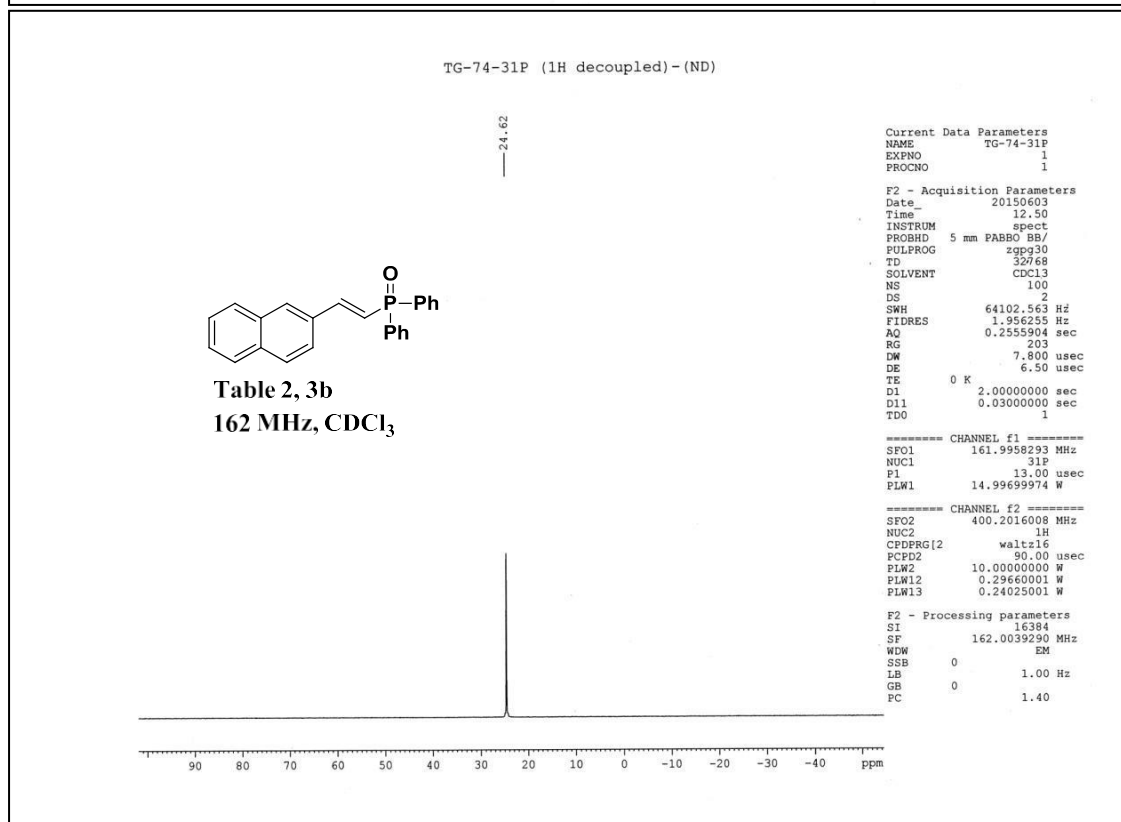
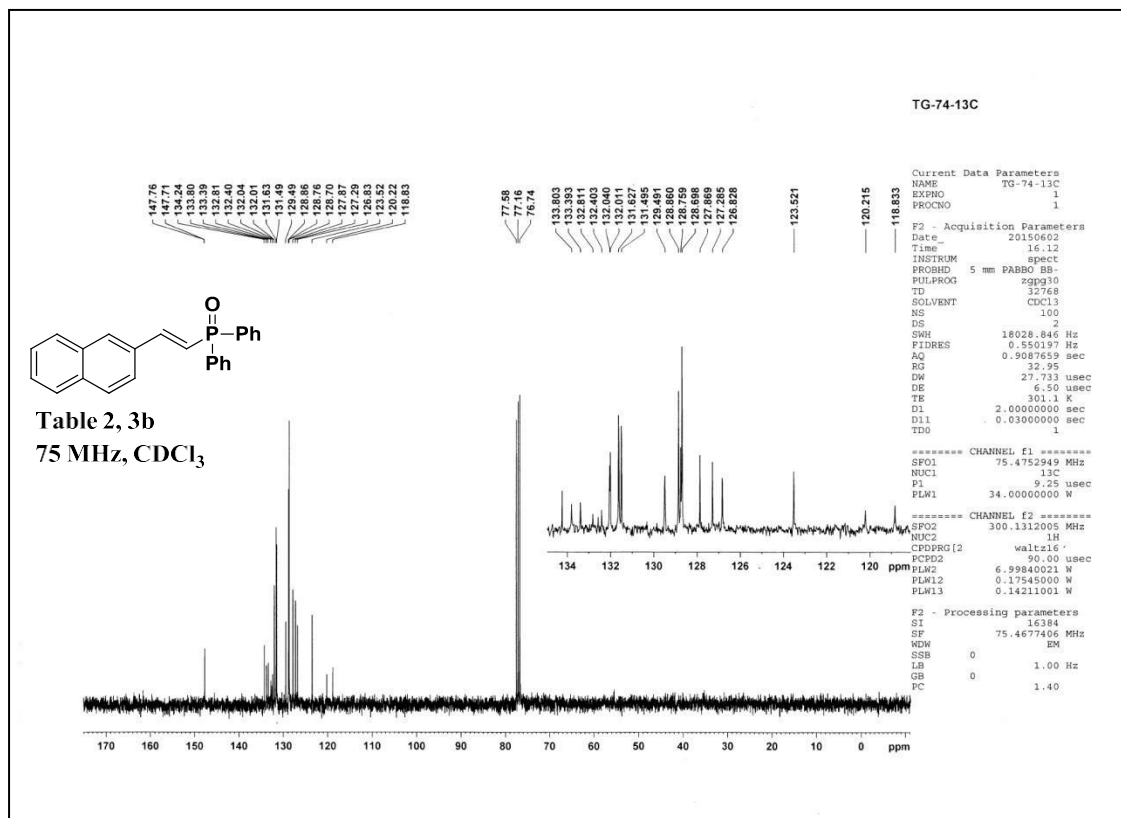
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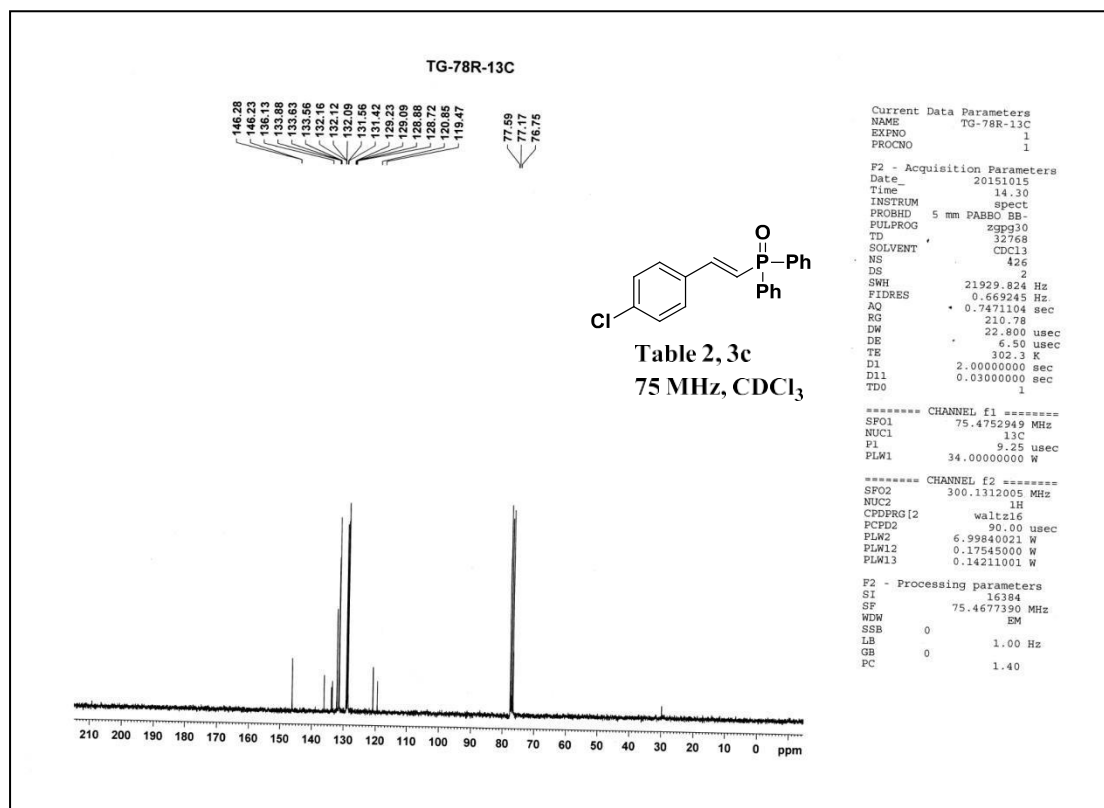
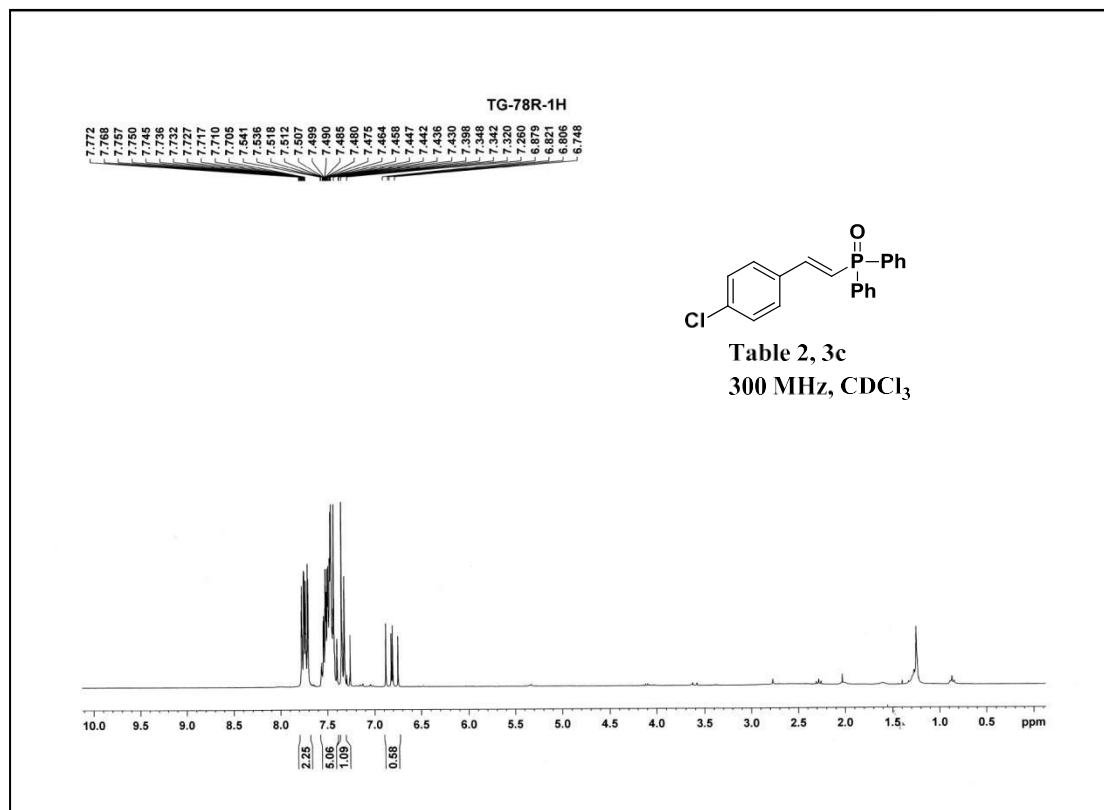
¹H, ¹³C and ³¹P NMR of all compounds in Table 2 and 3

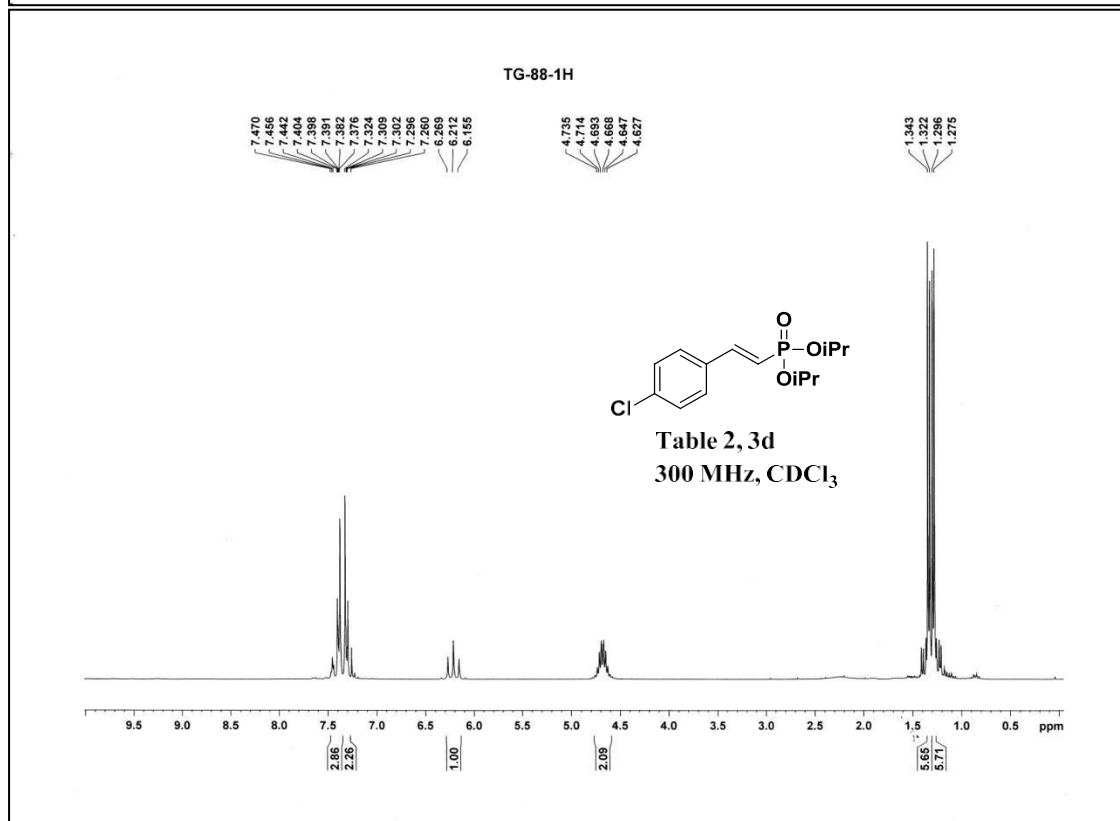
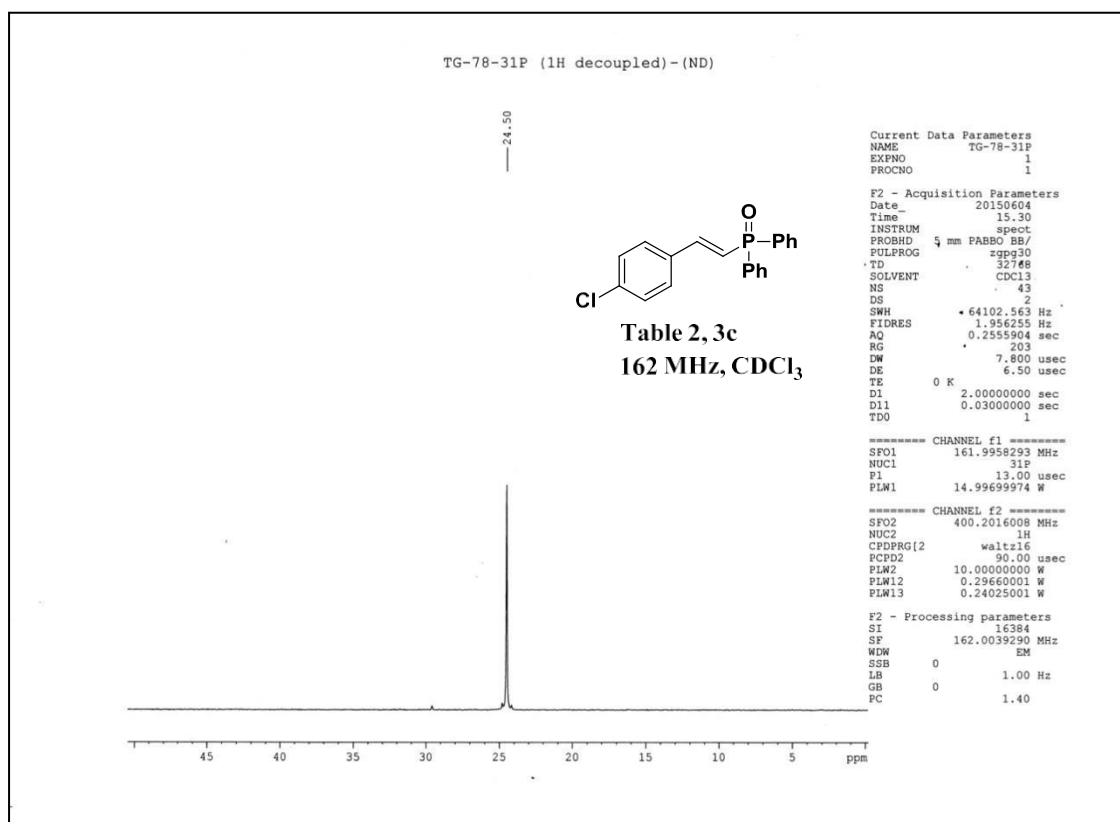
S2...S55

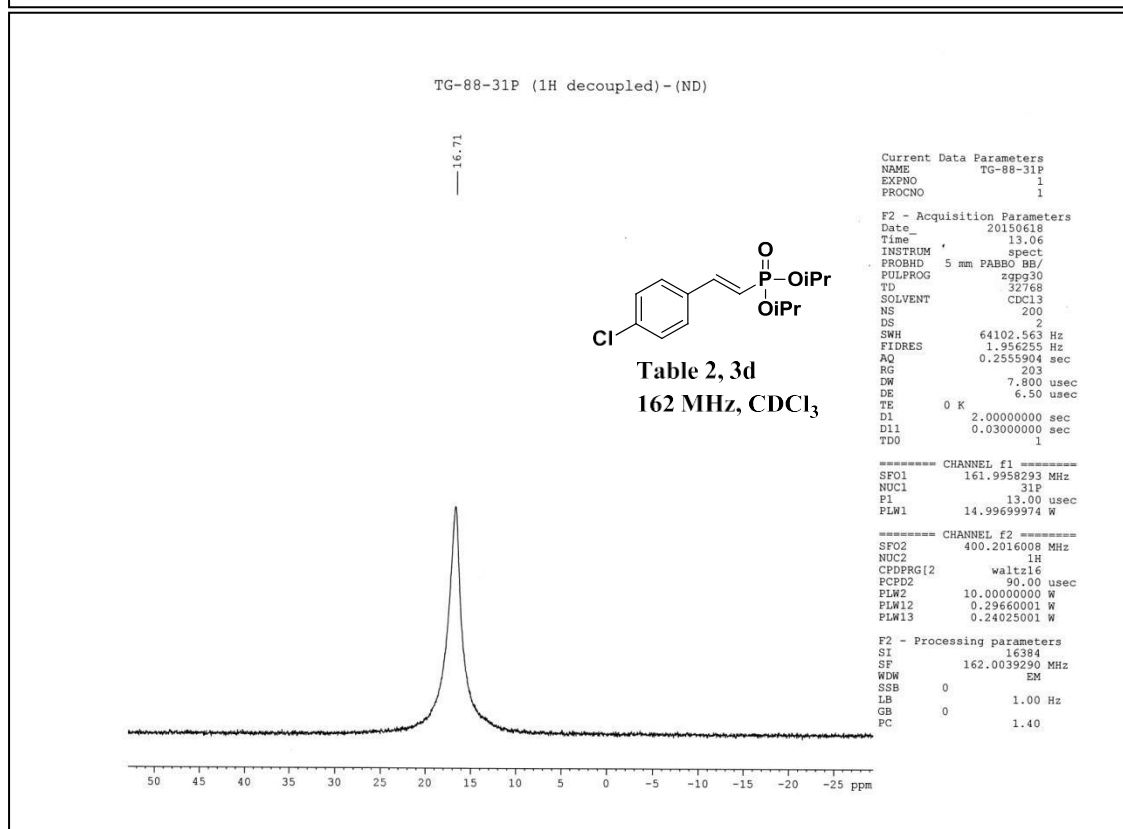
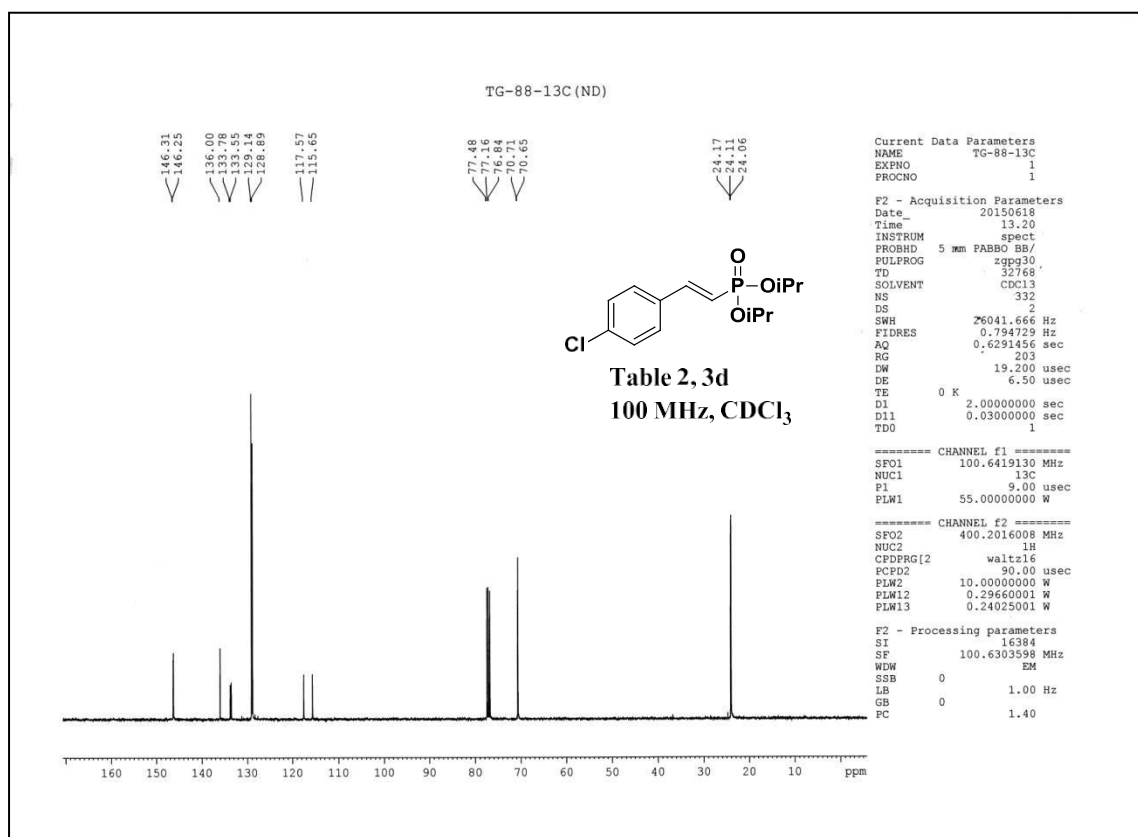


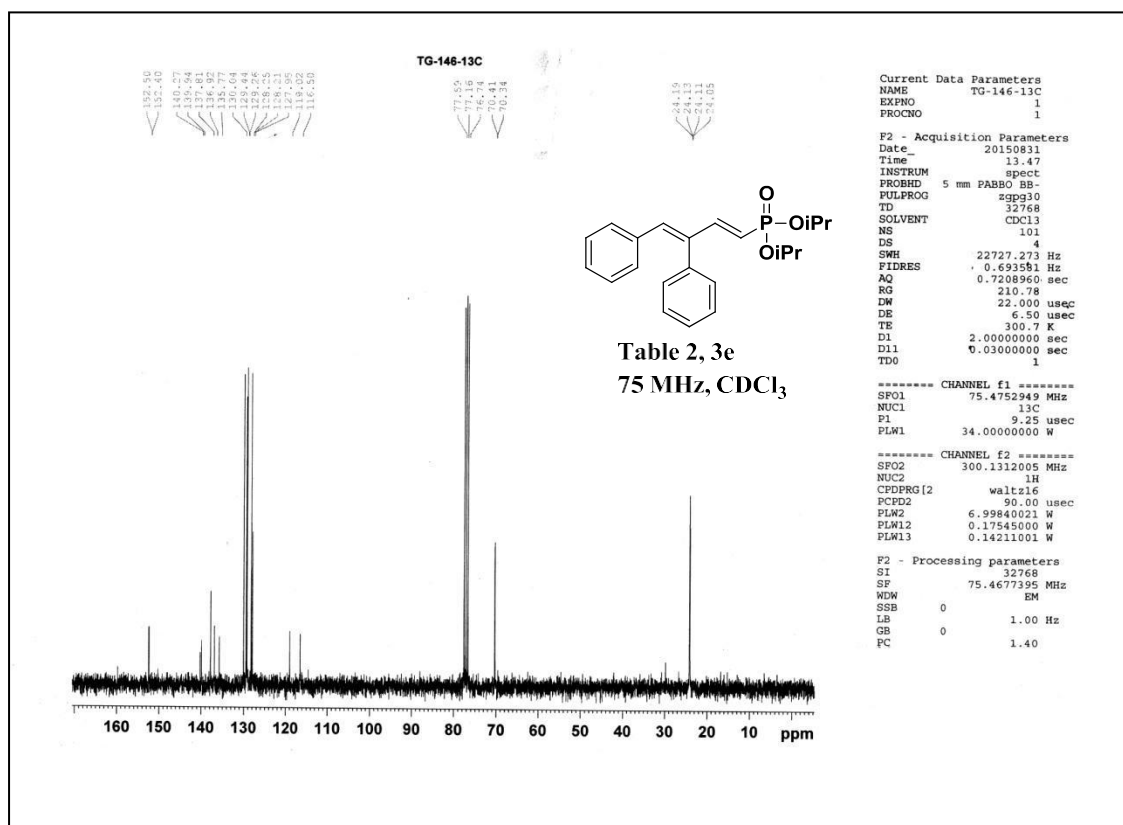
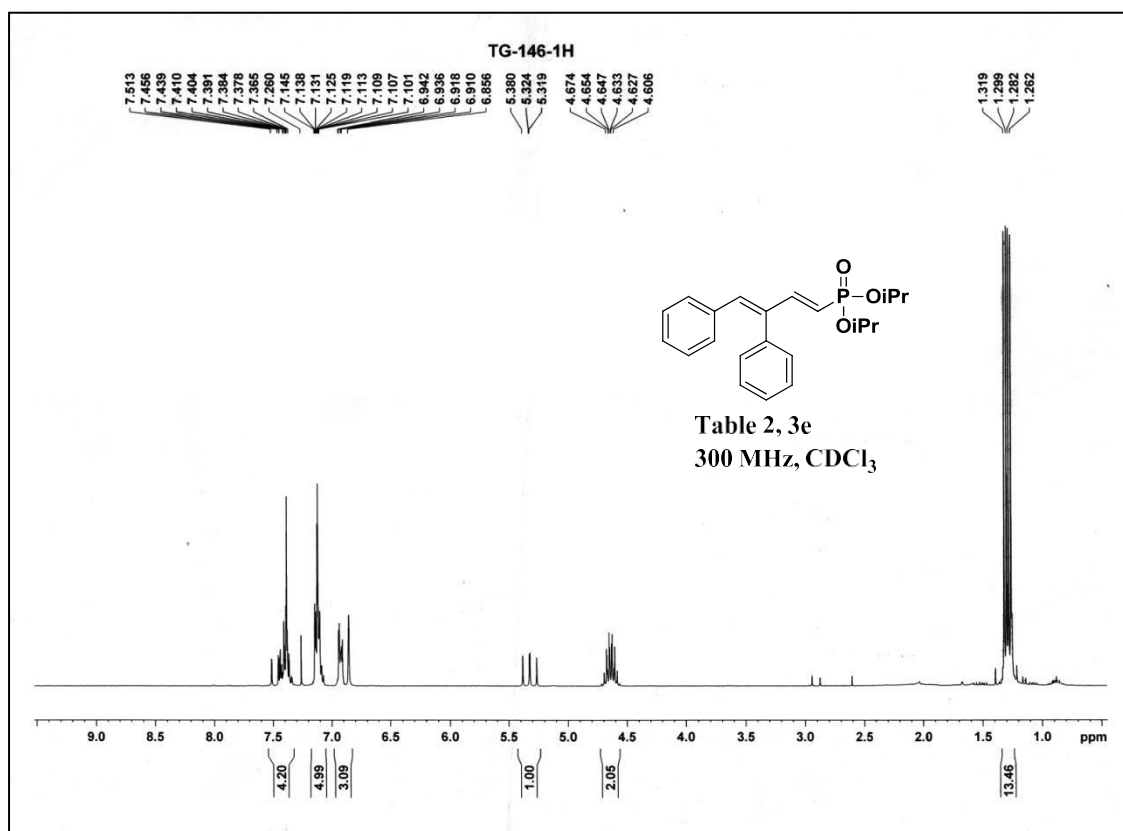


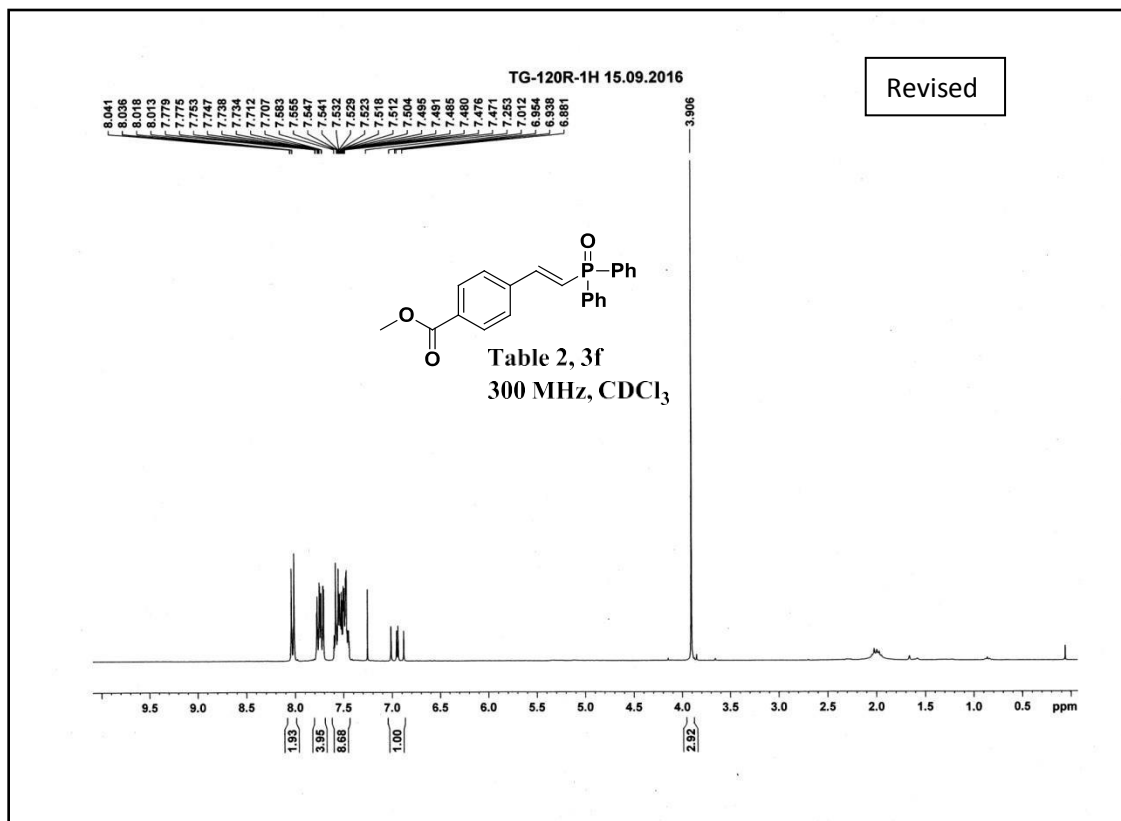
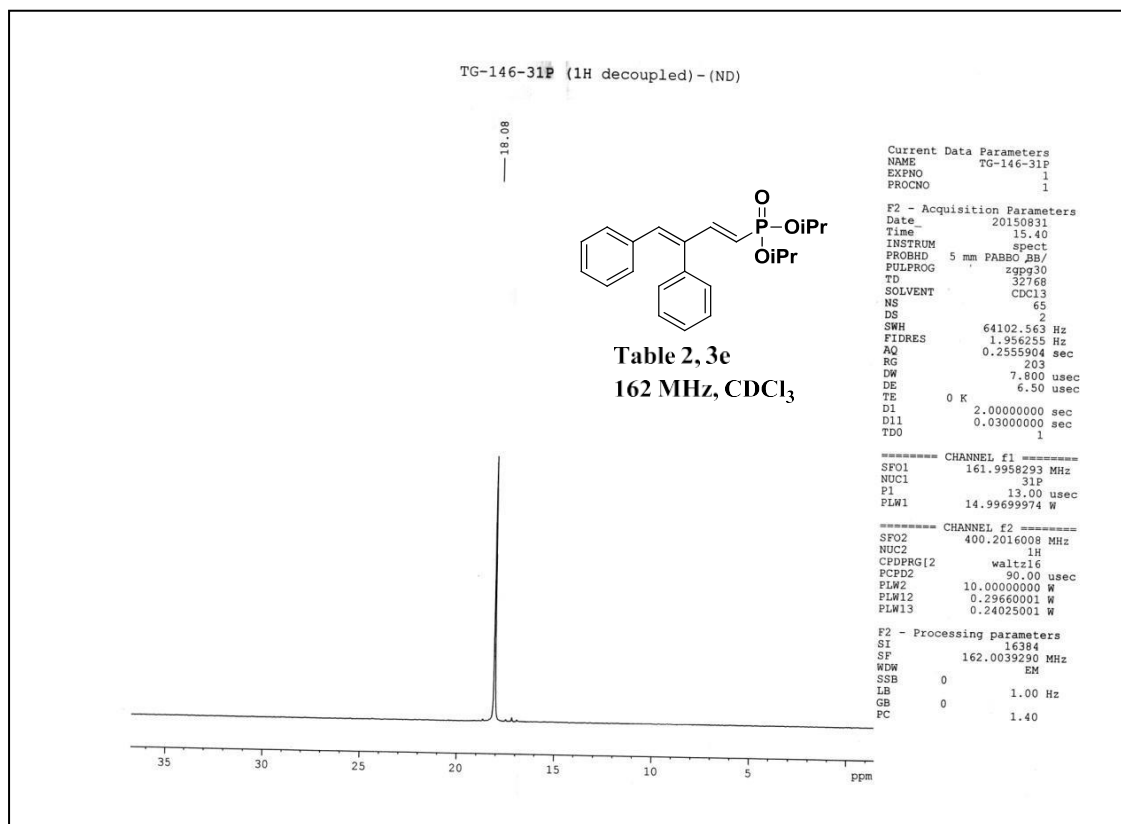


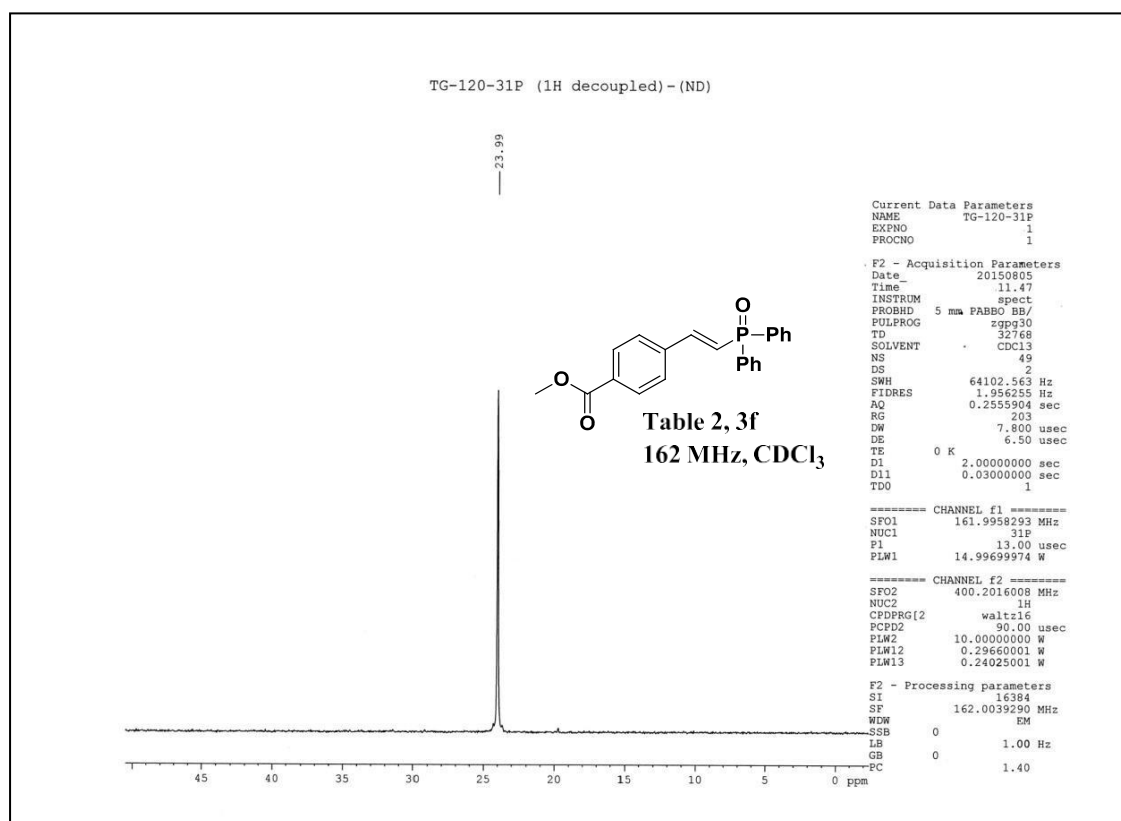
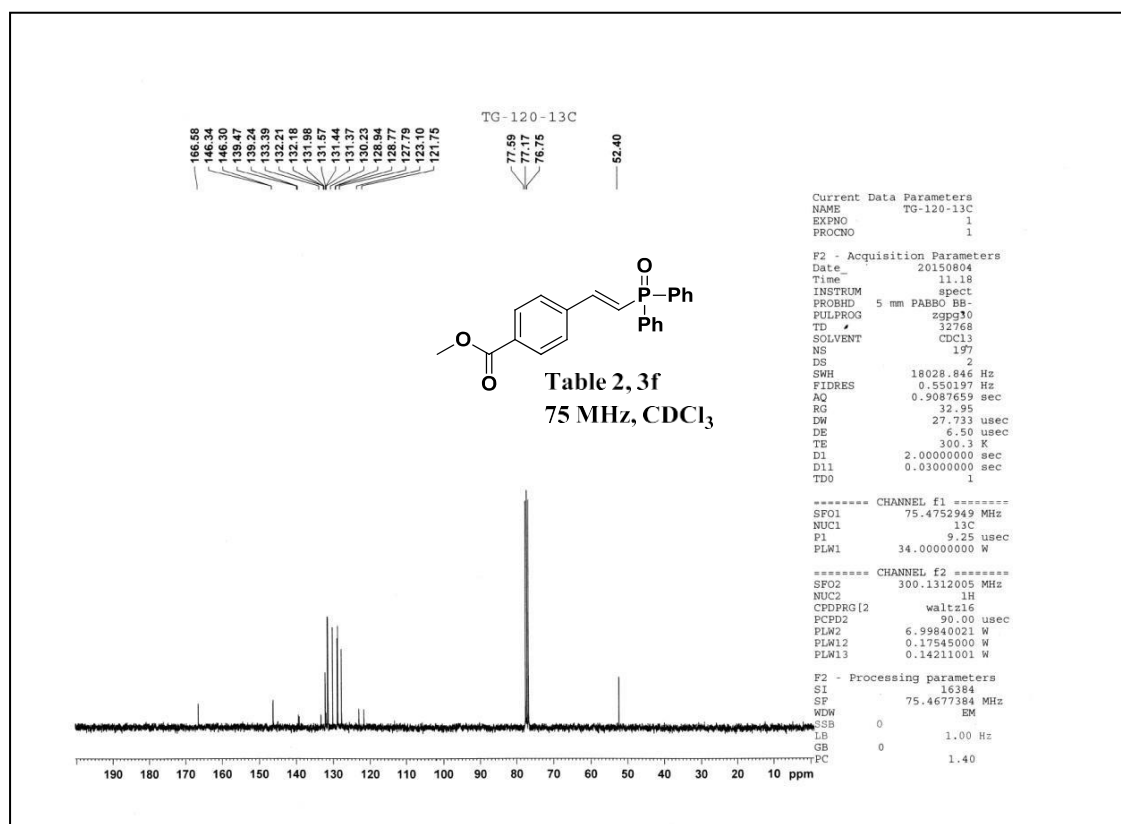


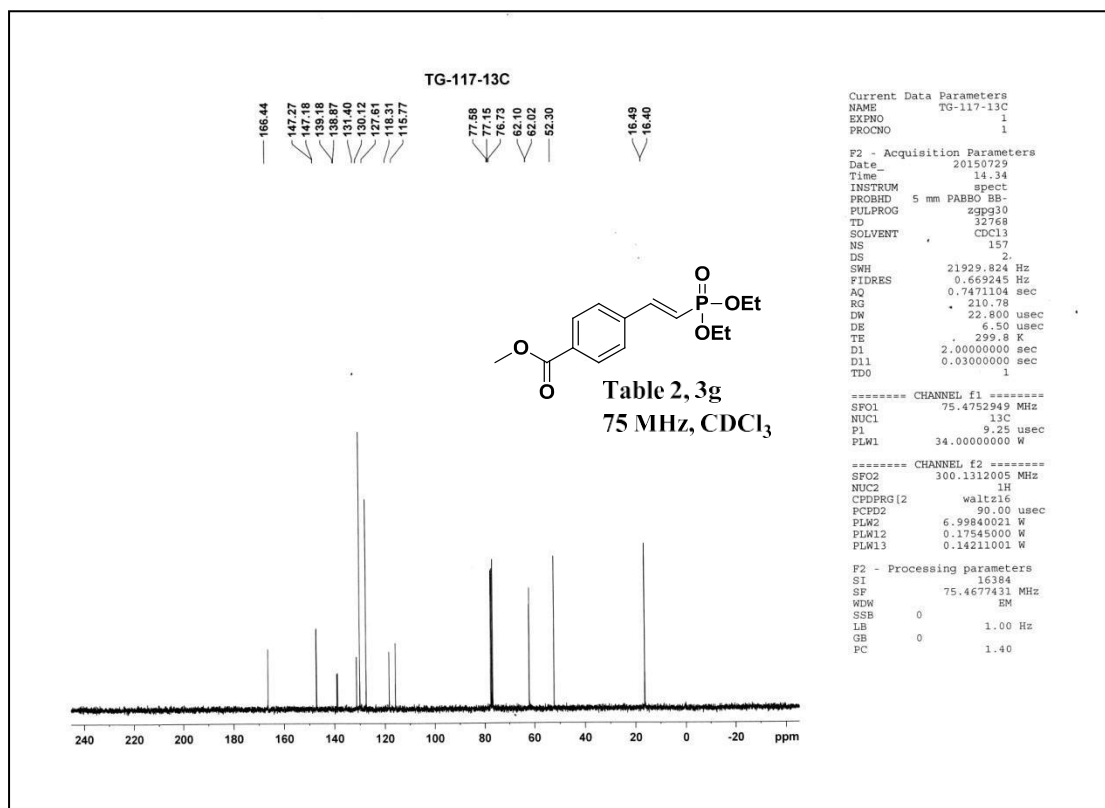
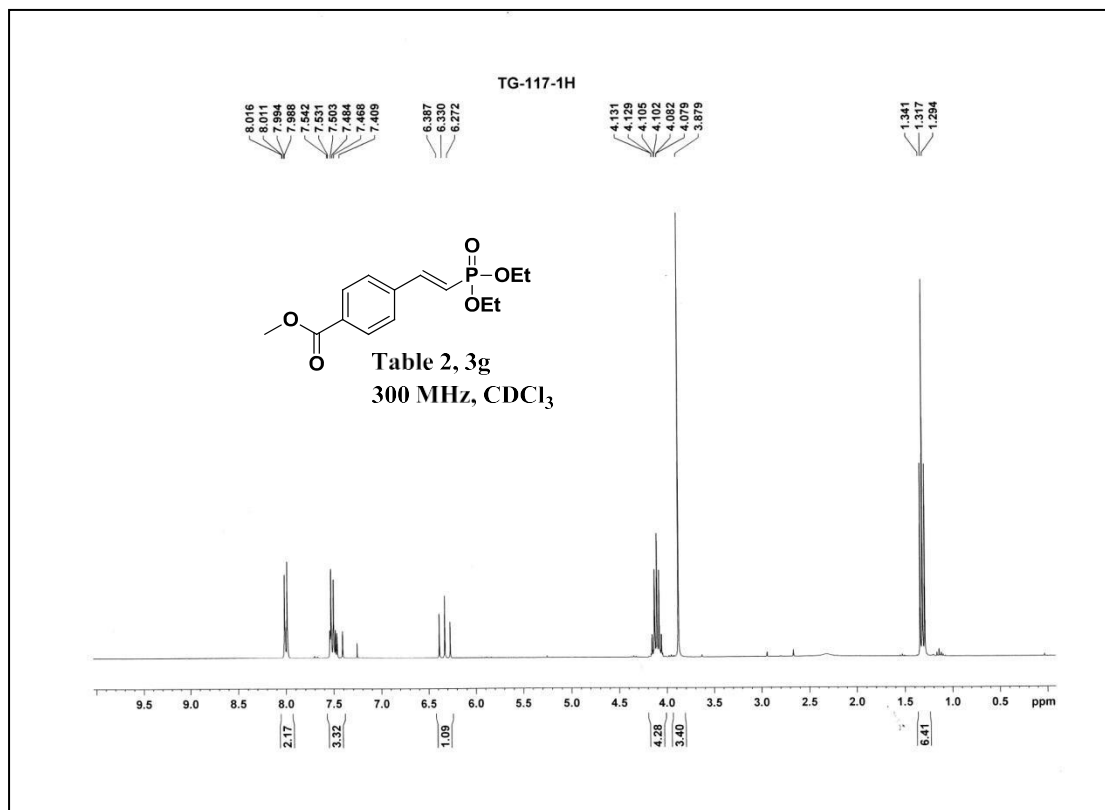


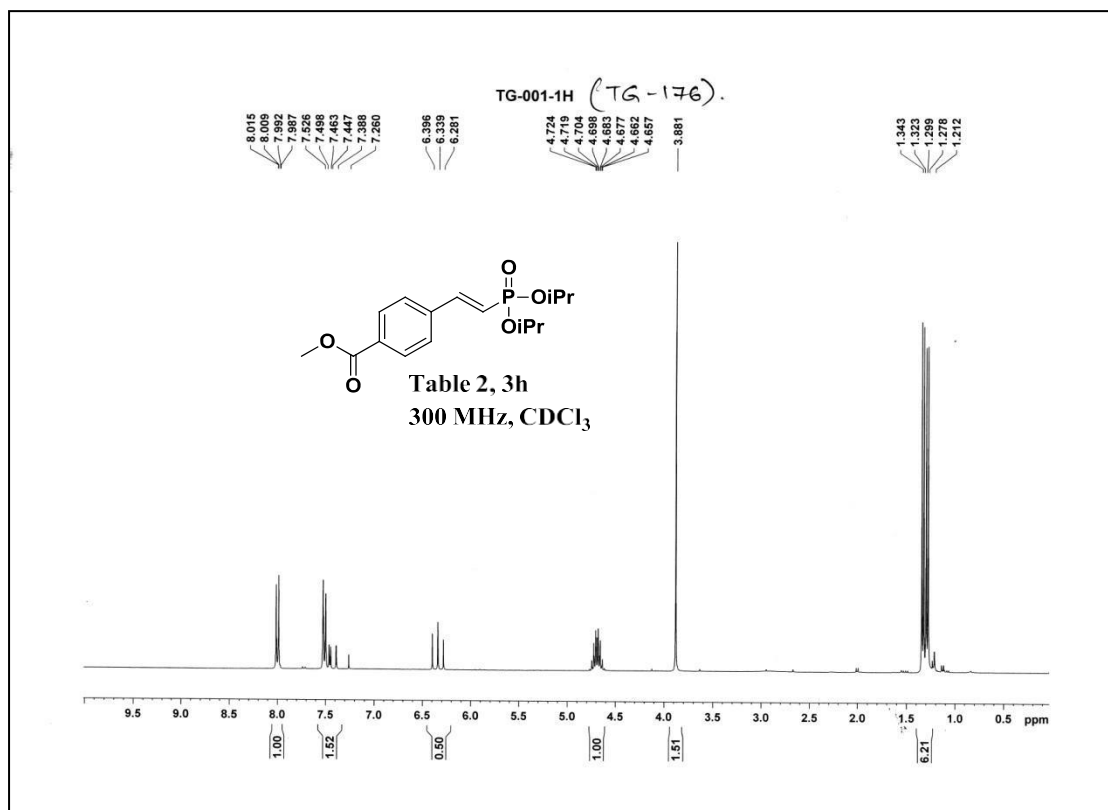
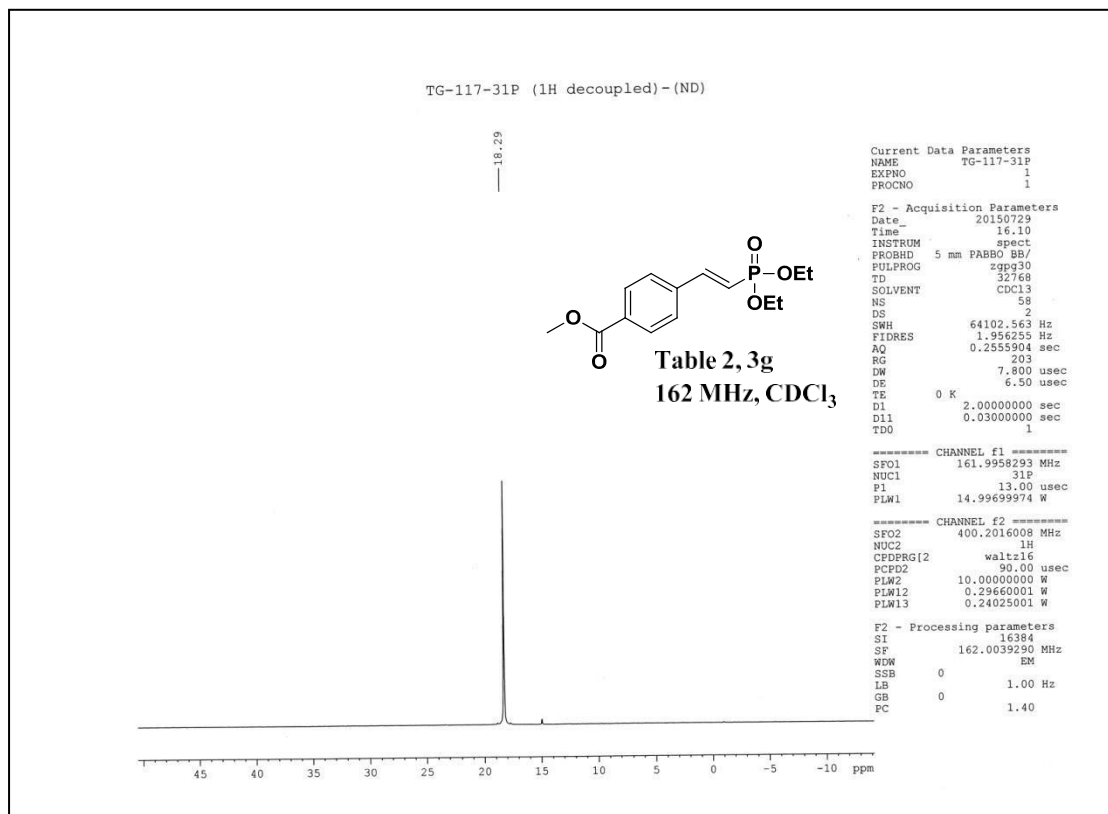


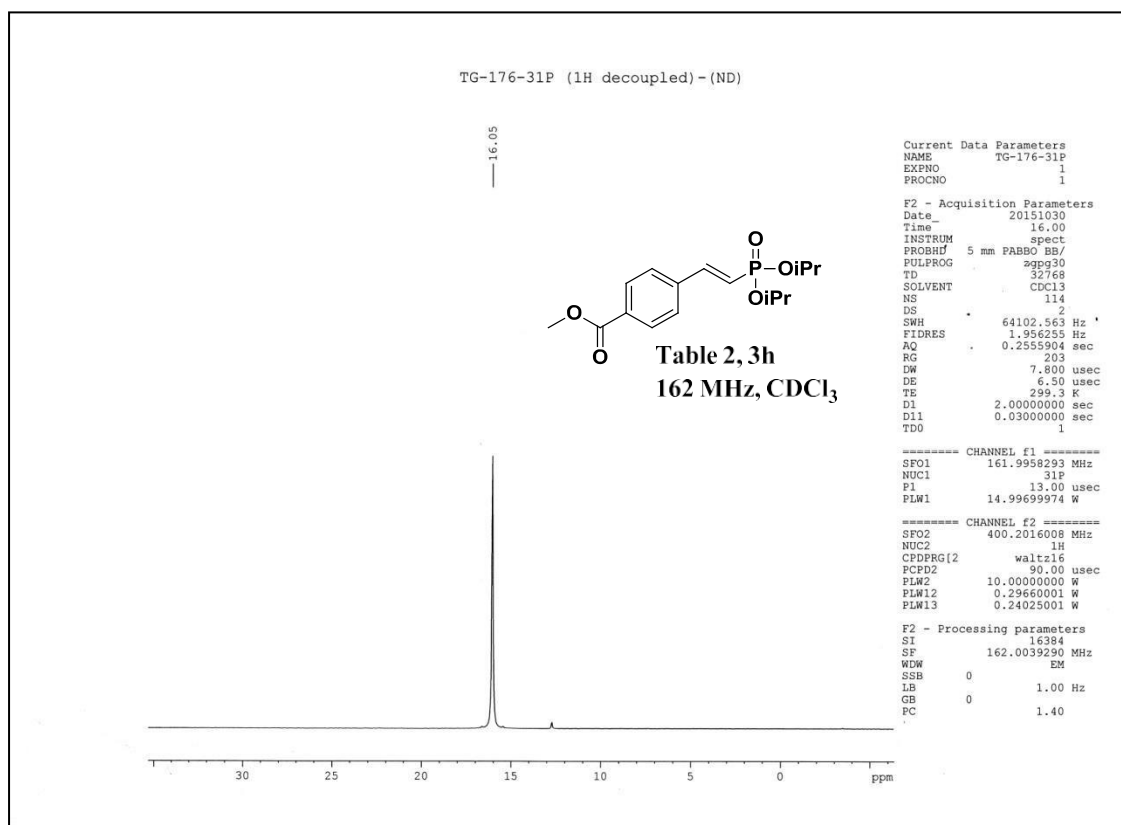
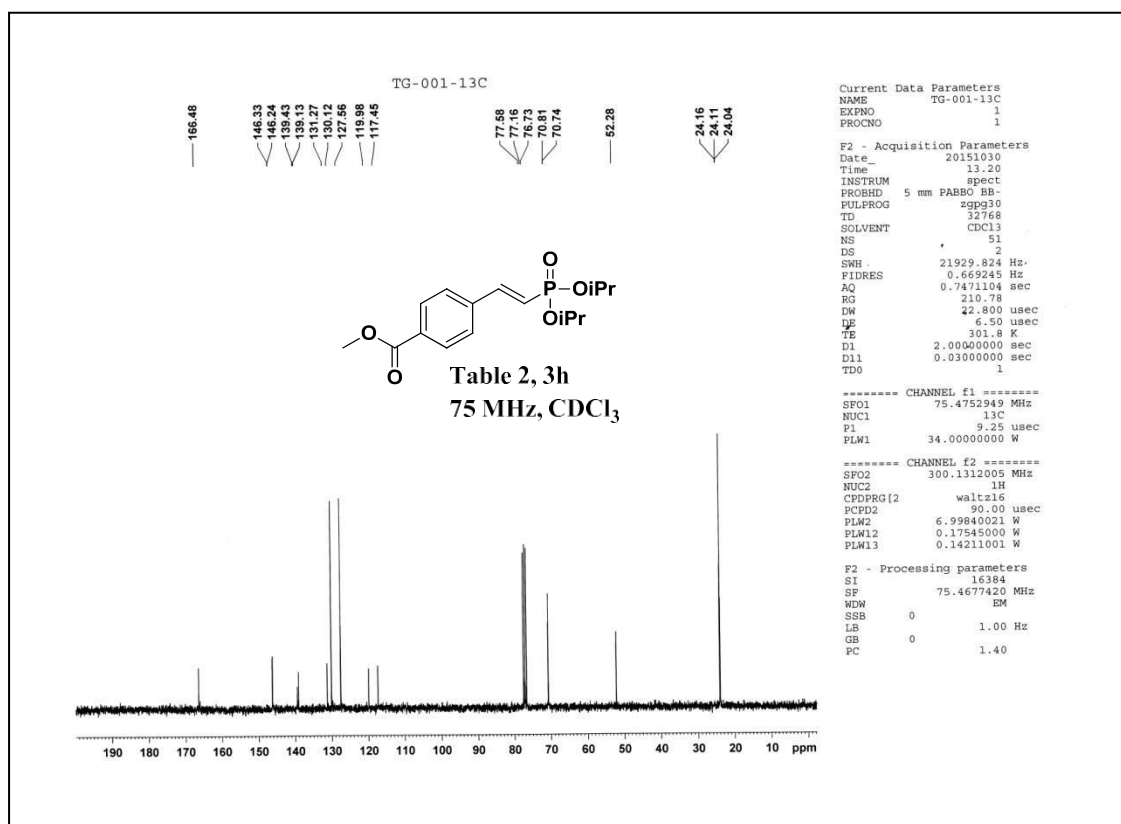


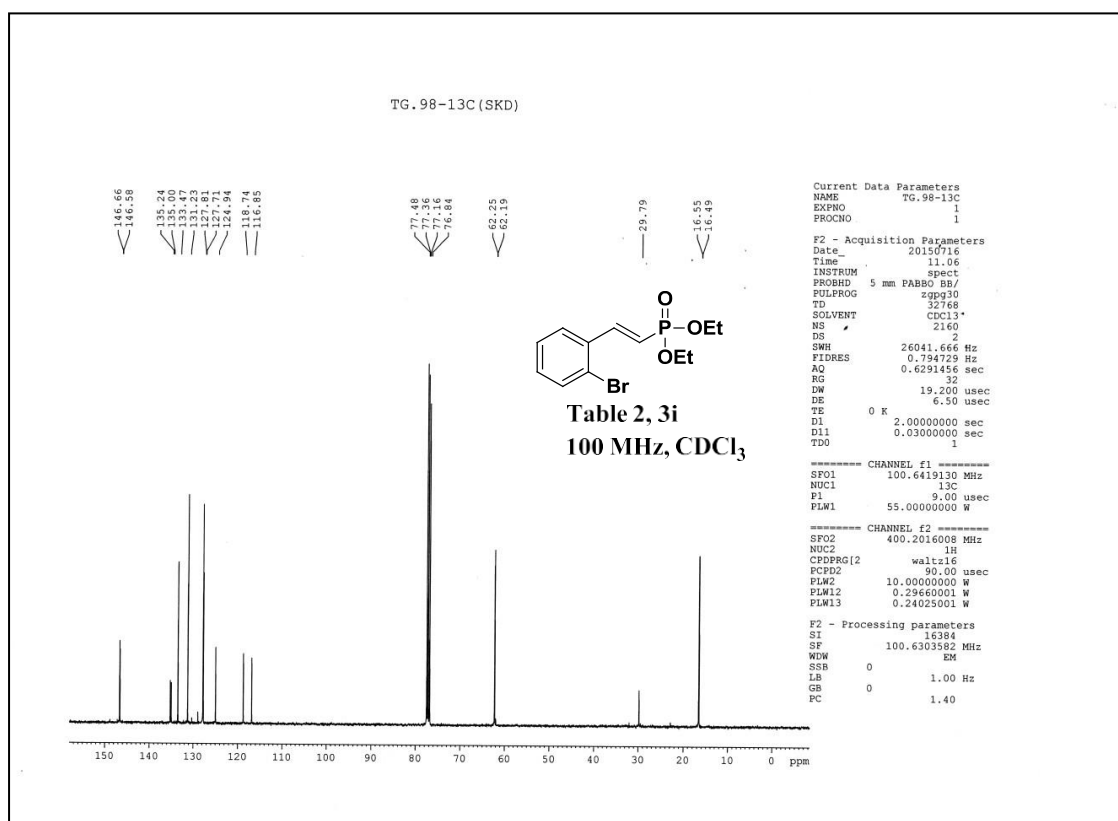
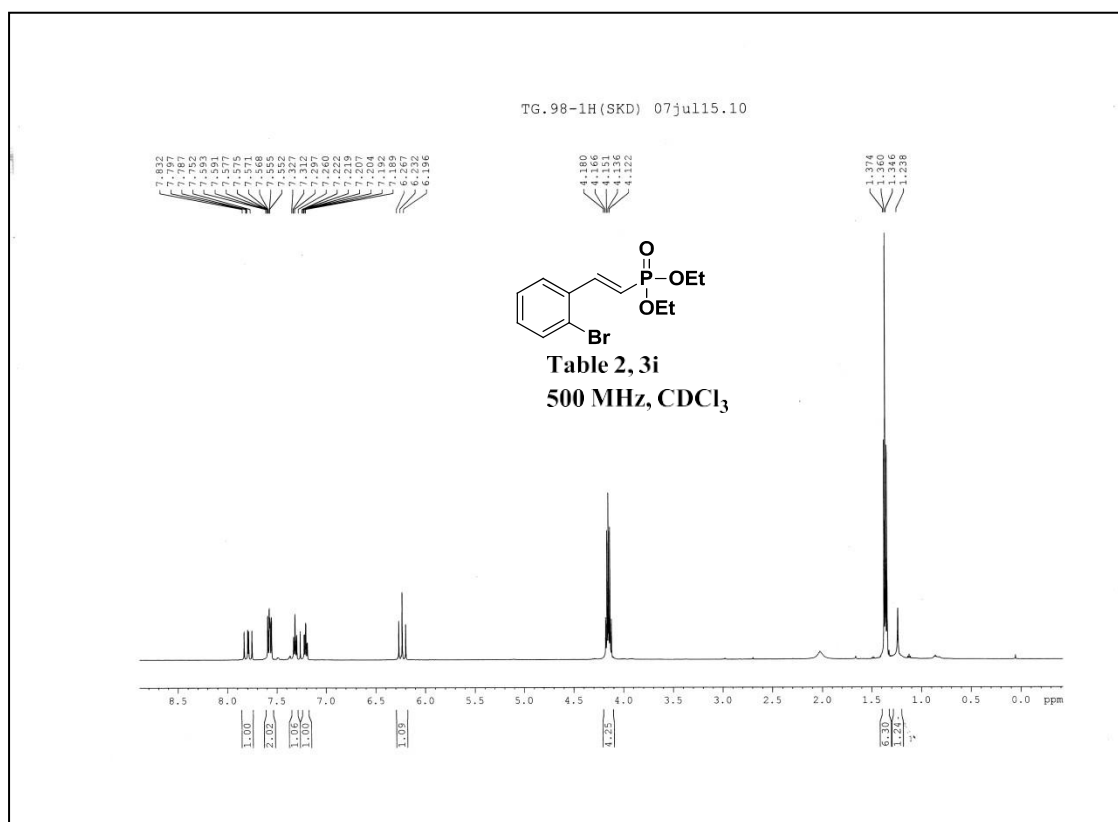


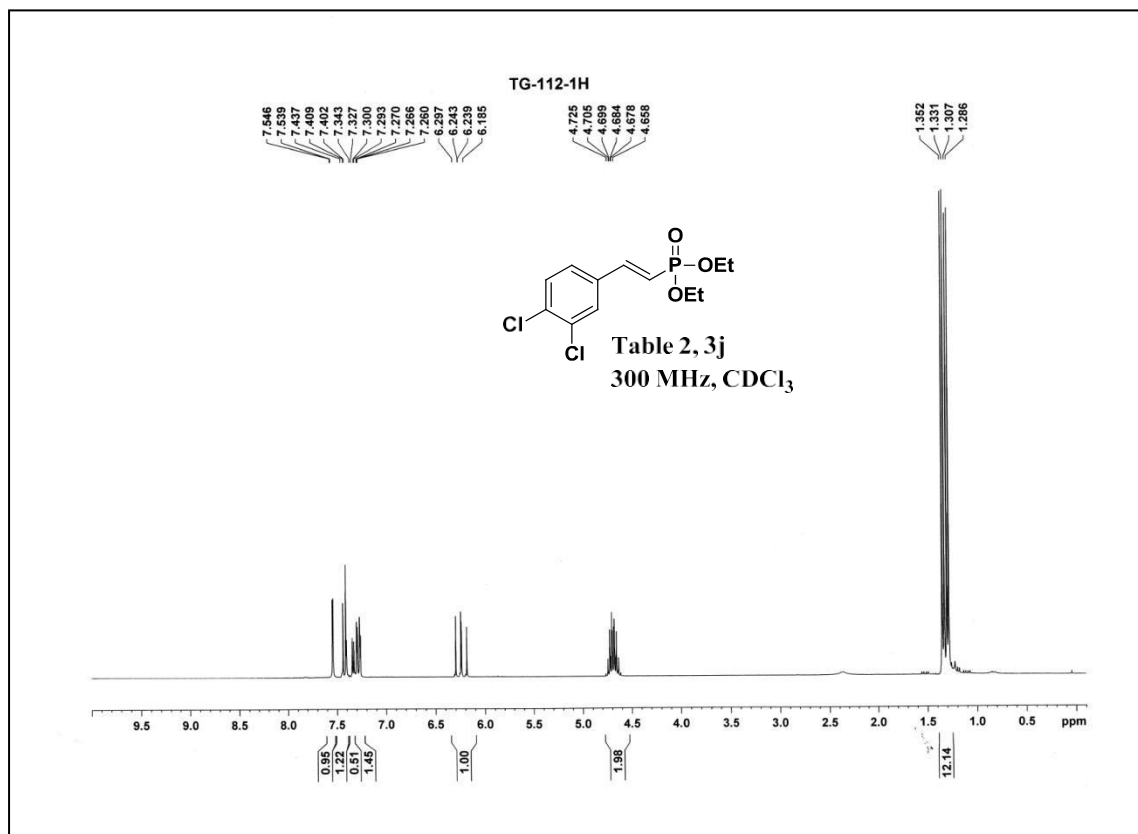
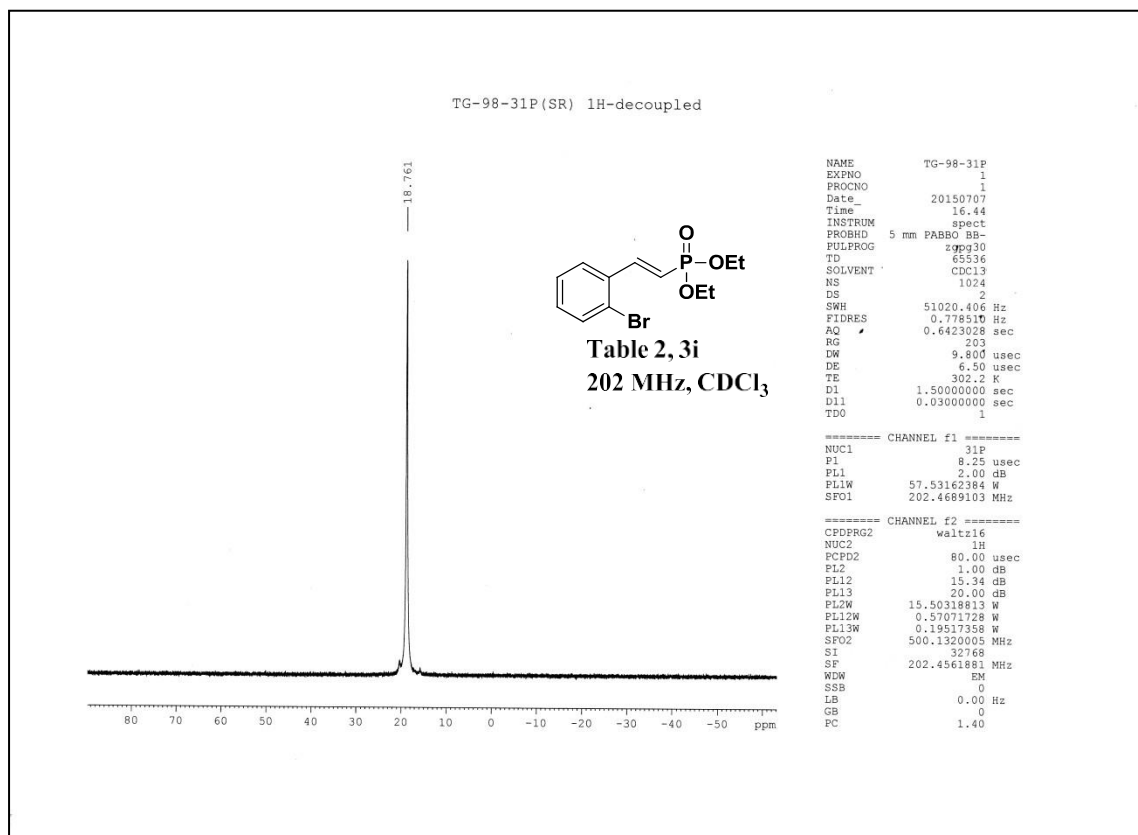


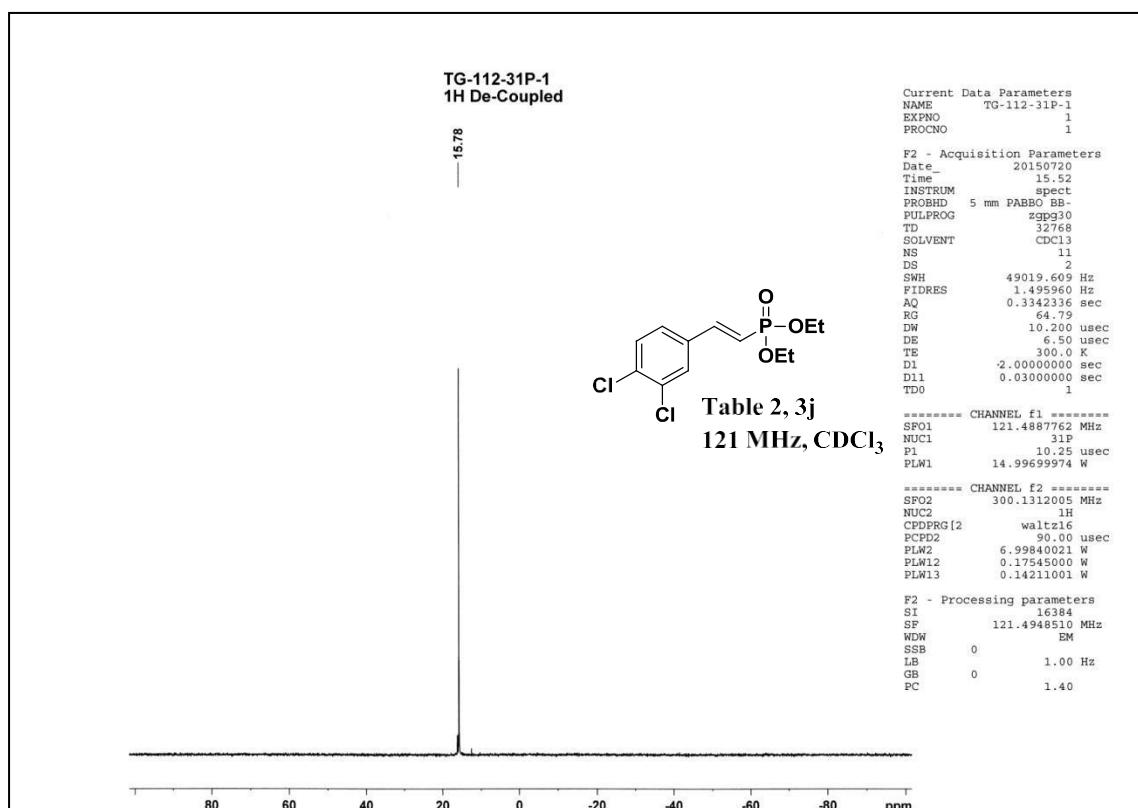
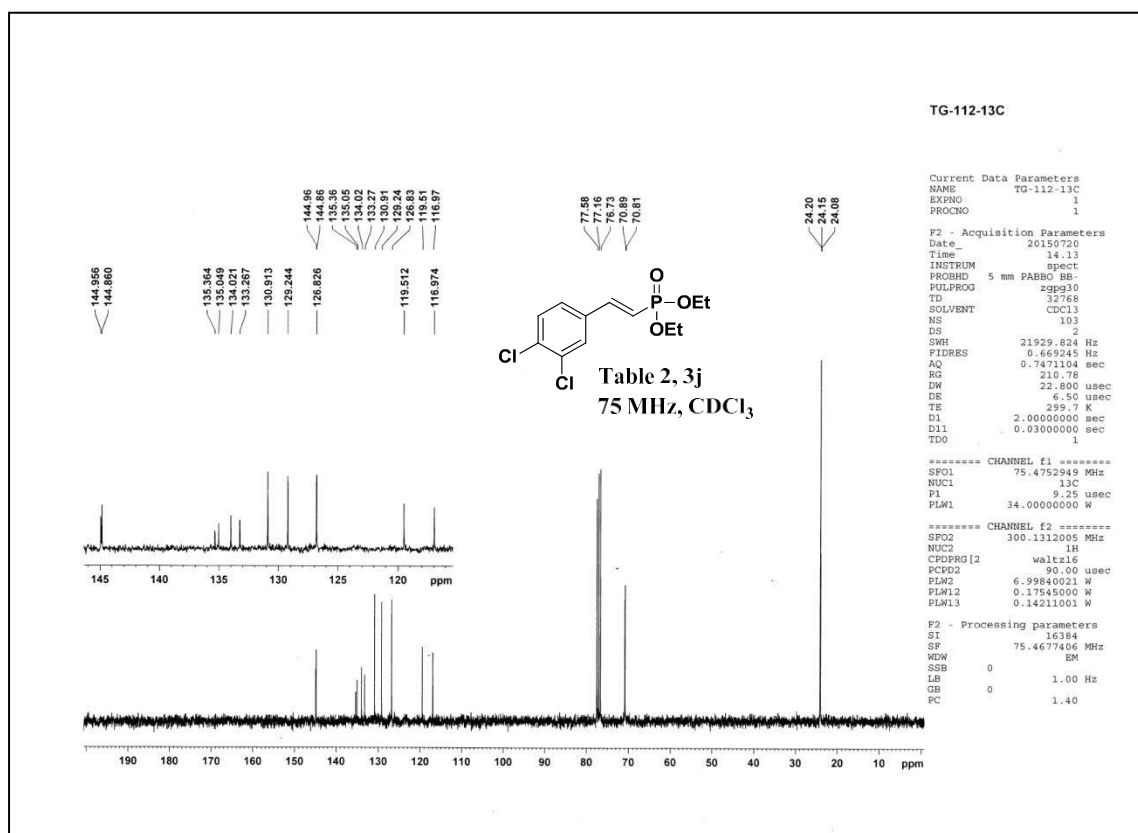


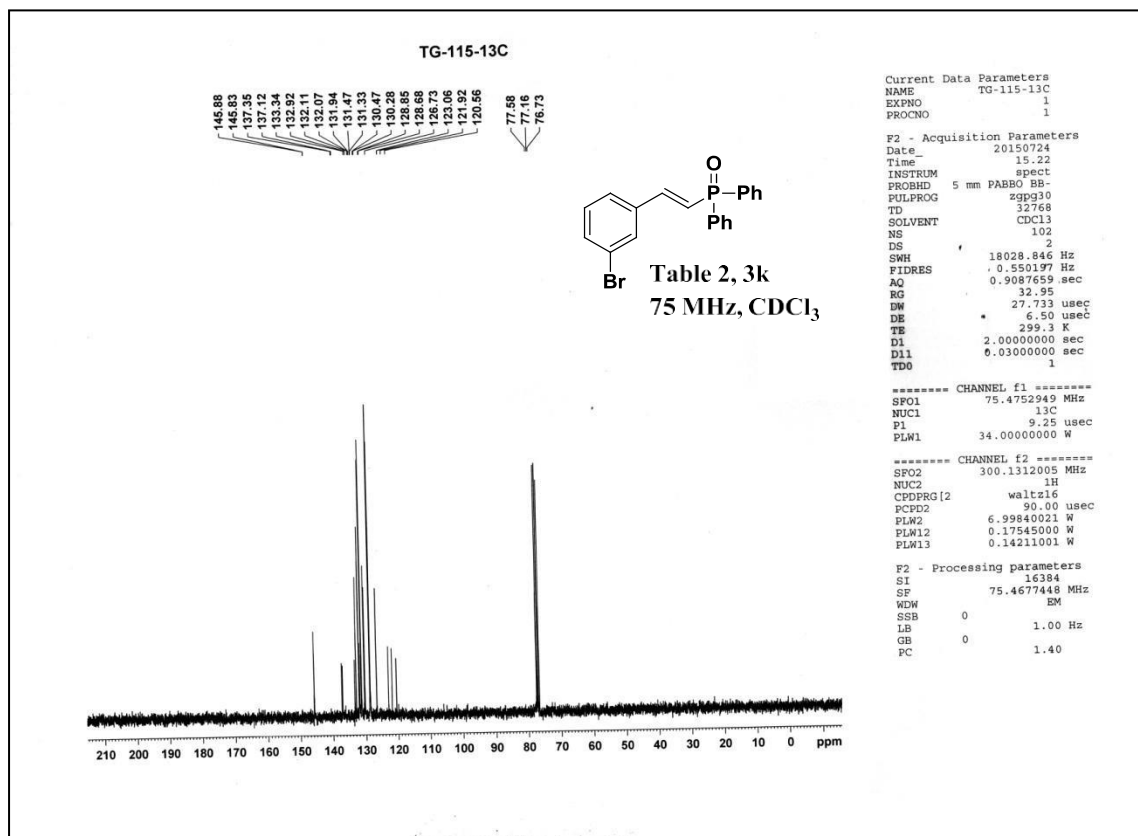
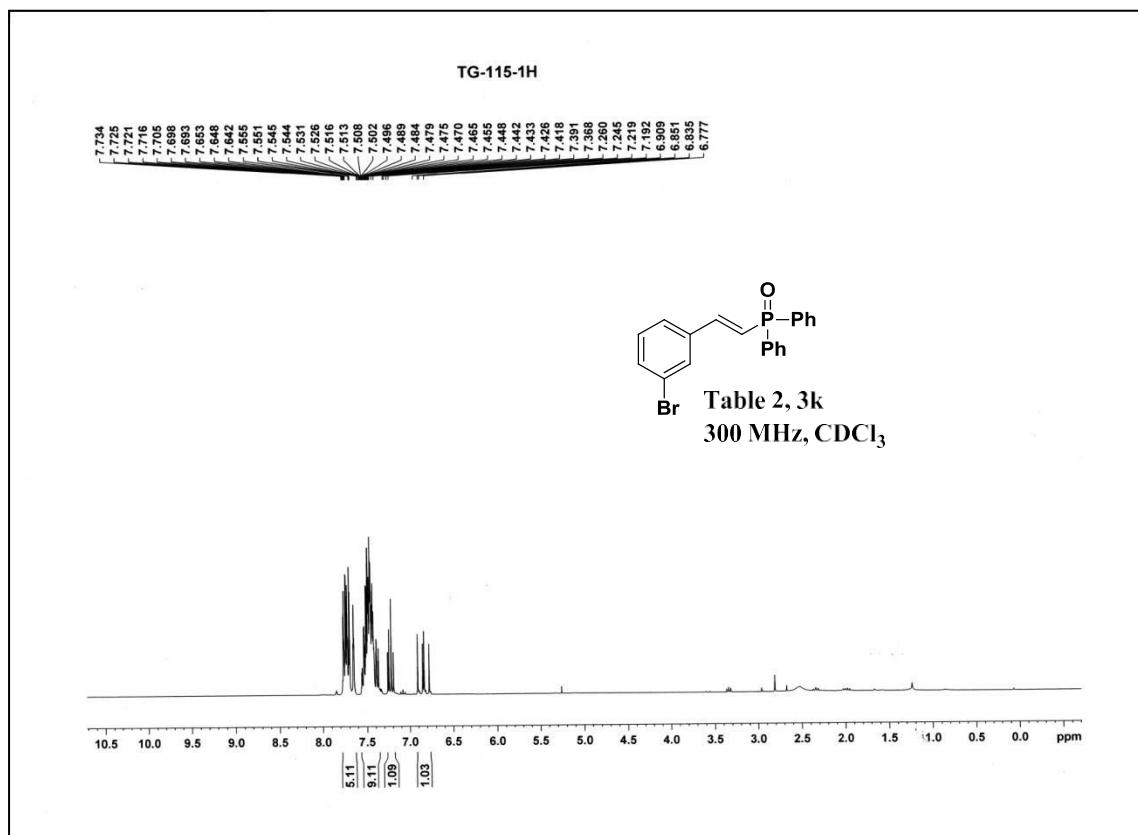


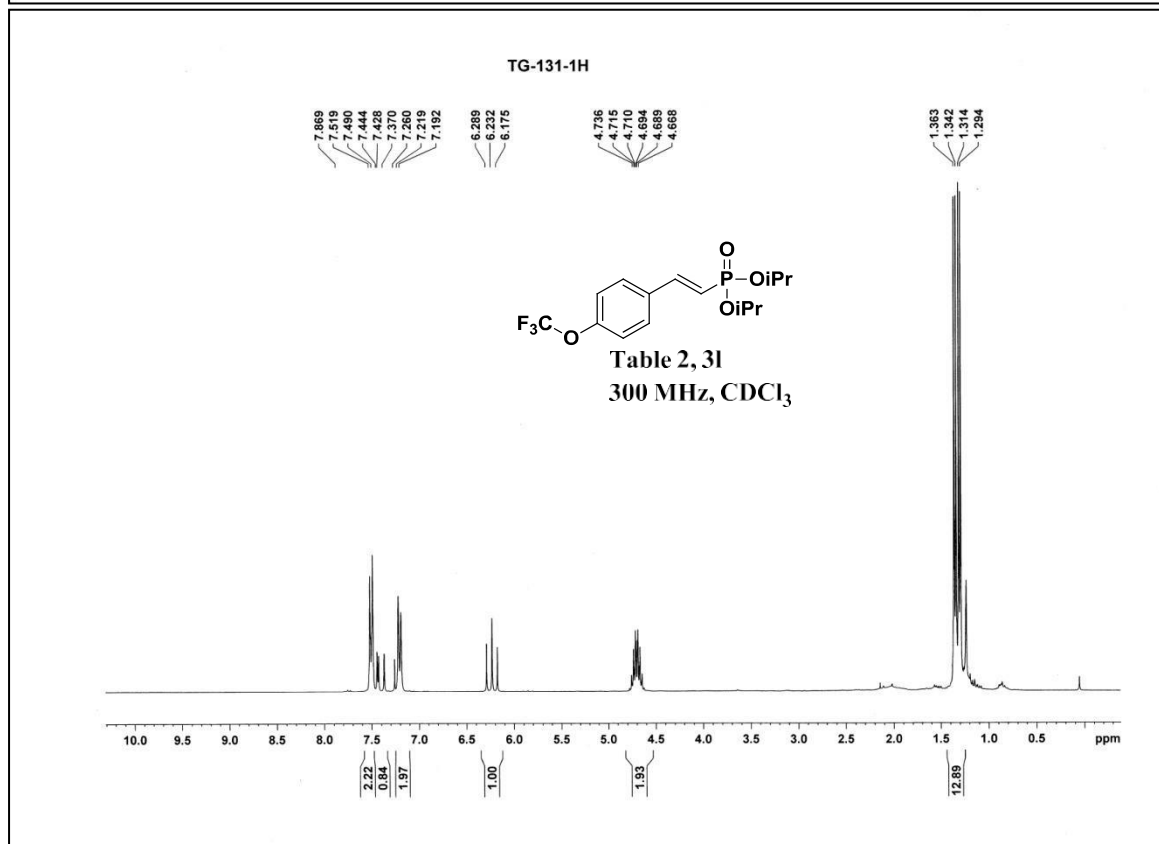
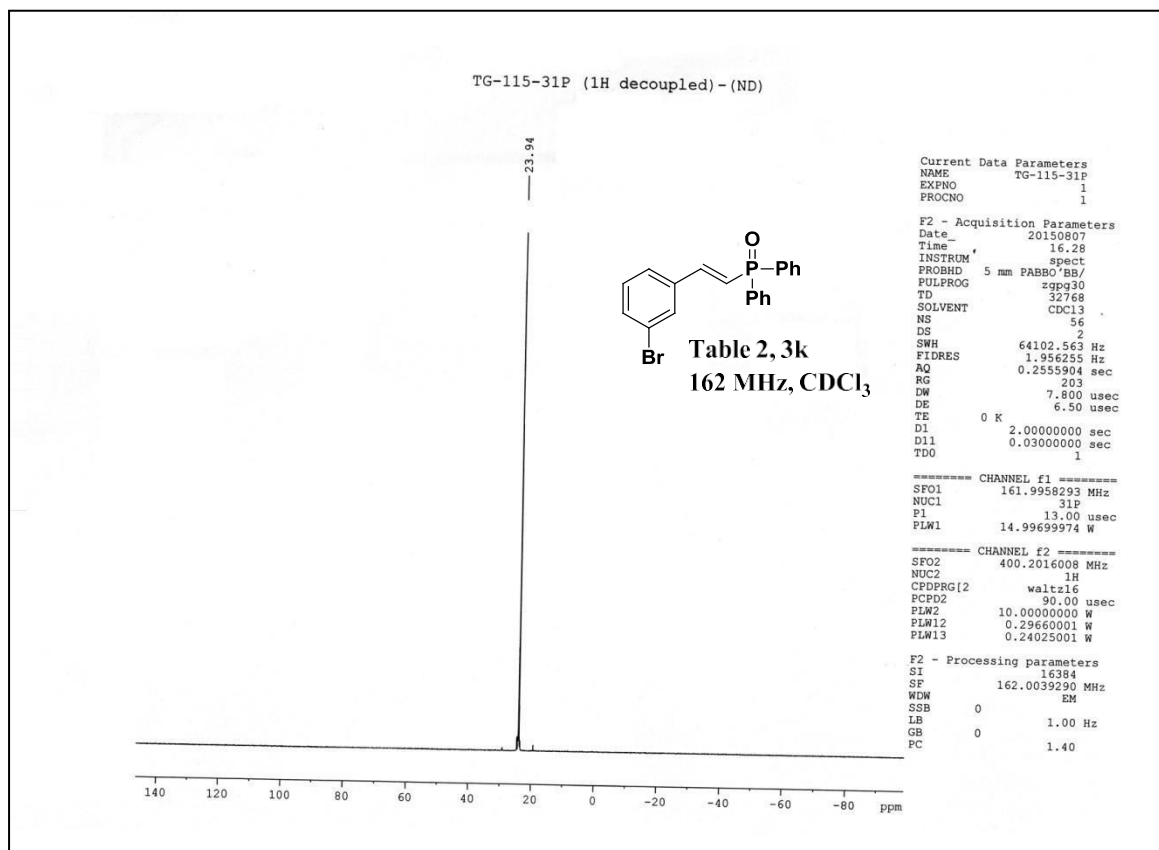


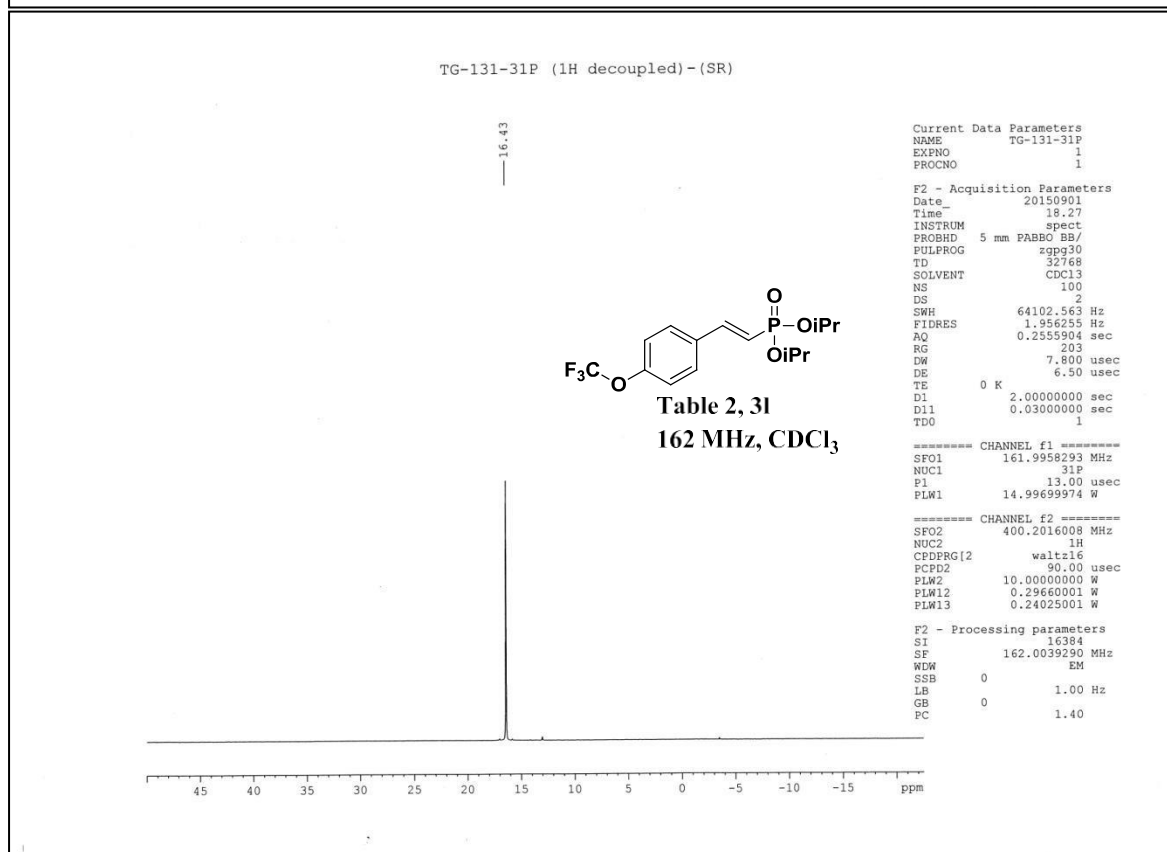
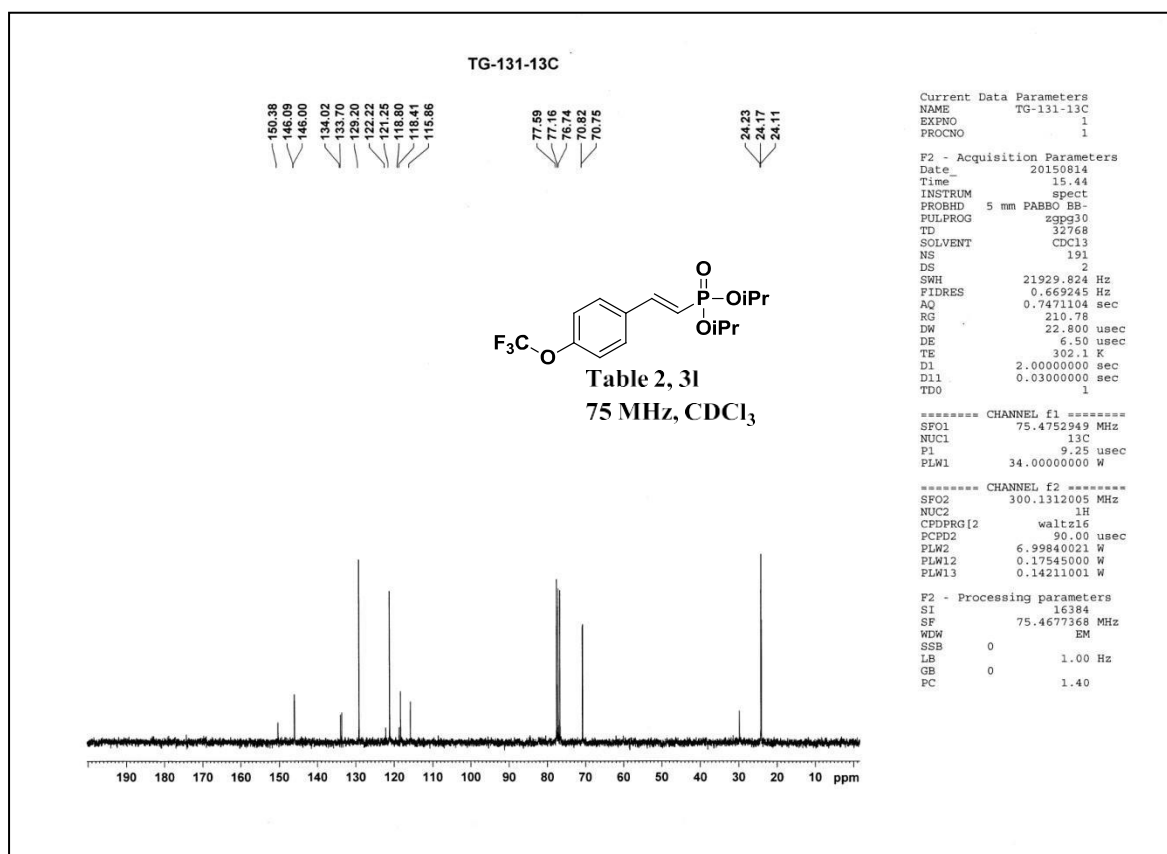


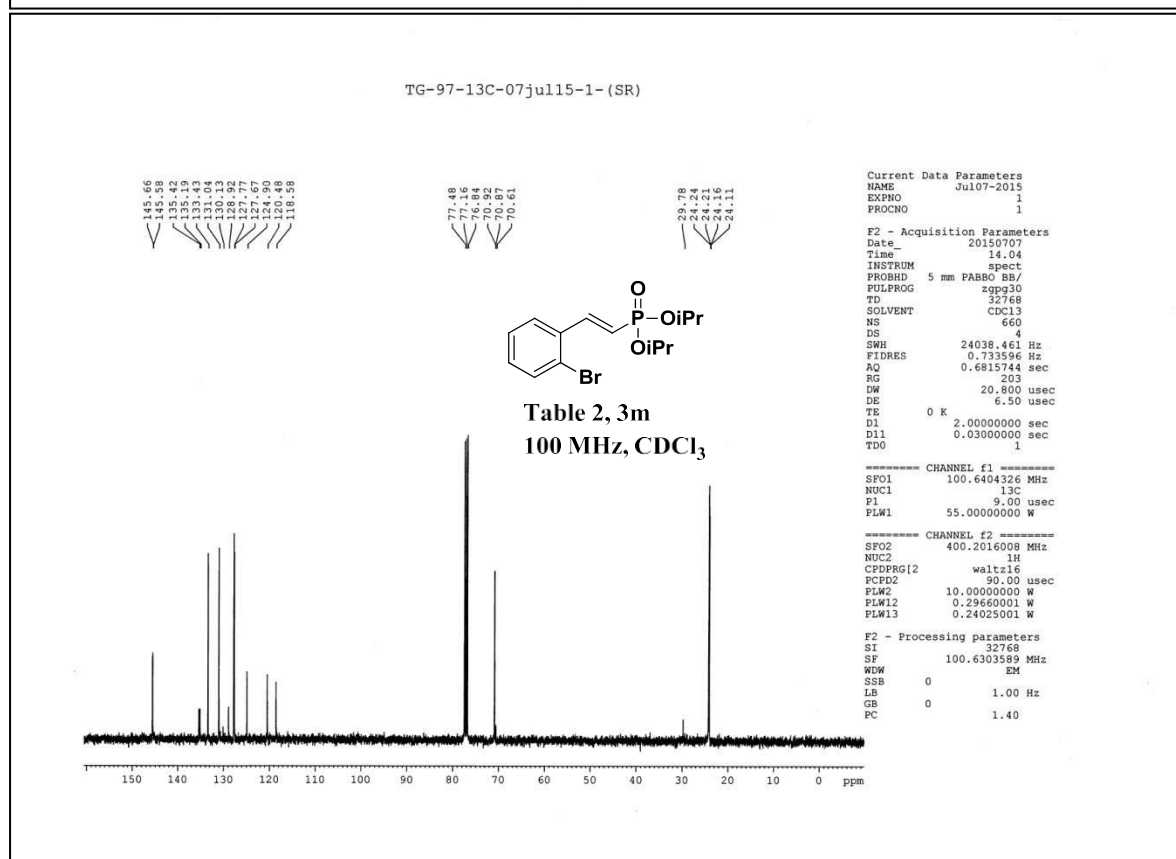
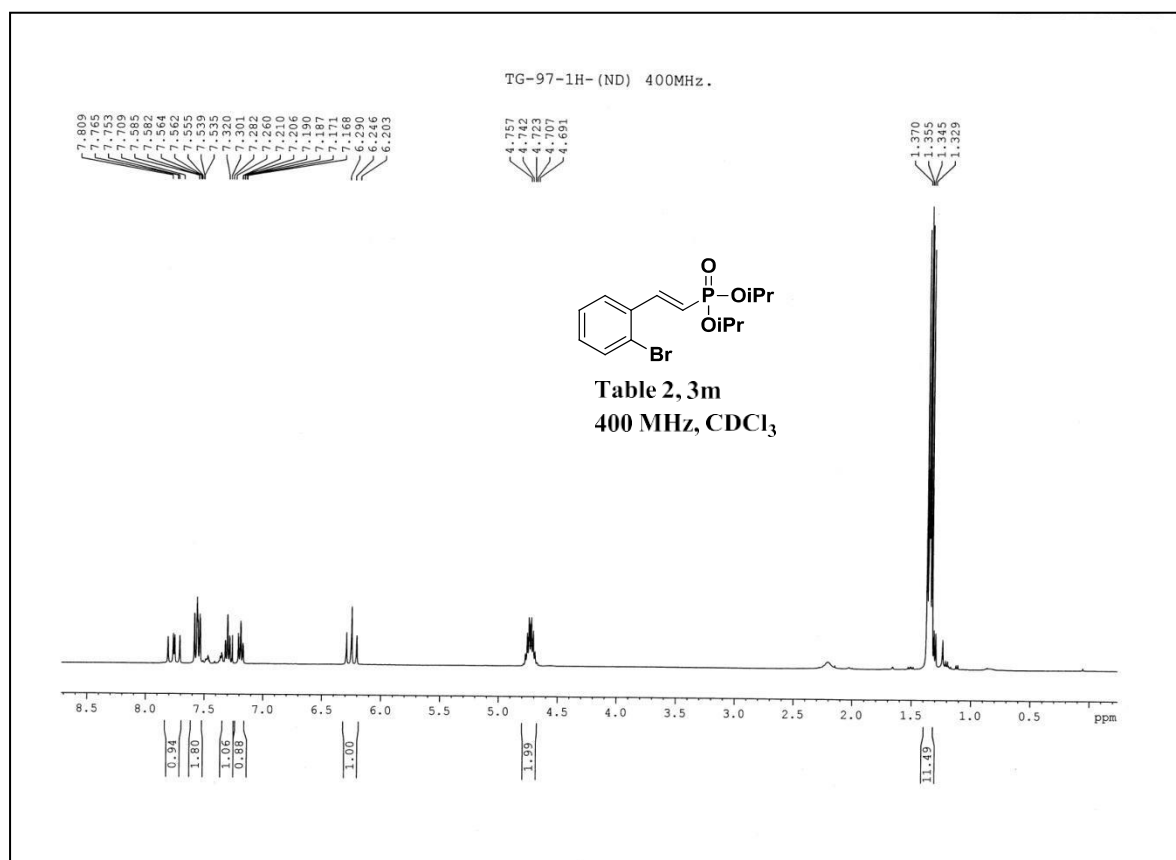




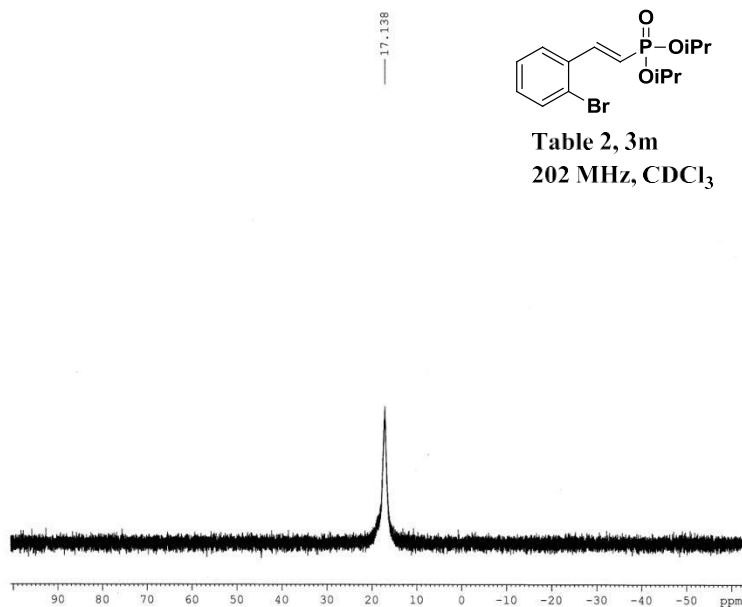








TG-97-31P(SR) 1H-decoupled



```

NAME      TG-97-31P
EXPNO     1
PROCNO    1
Date_     20150706
Time      19.03
INSTRUM   spect
PROBHD    5 mm PABBO BB-
PULPROG   zgpg30
TD         65536
SOLVENT   CDCl3
NS         106
DS         2
SWH        51020.406 Hz
FIDRES     0.778510 Hz
AQ         0.6423028 sec
RG         203
DW         9.800 usec
DE         6.50 usec
TE         300.7 K
D1         1.50000000 sec
D11        0.03000000 sec
TDQ        1
===== CHANNEL f1 =====
NUC1       31P
P1         8.25 usec
PL1        2.00 dB
PL1W       57.53162384 W
SFO1       202.4689103 MHz

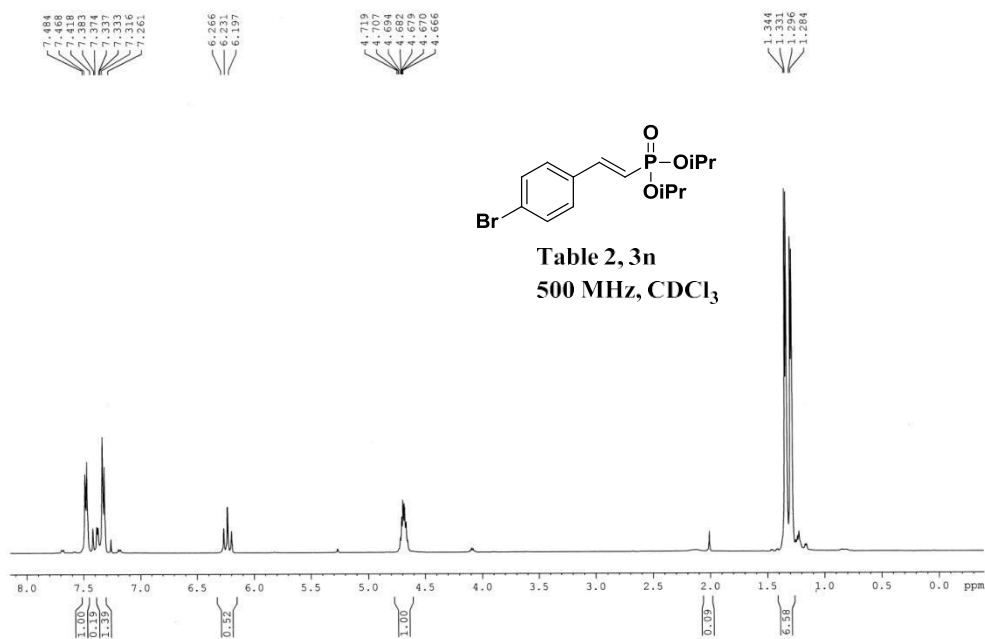
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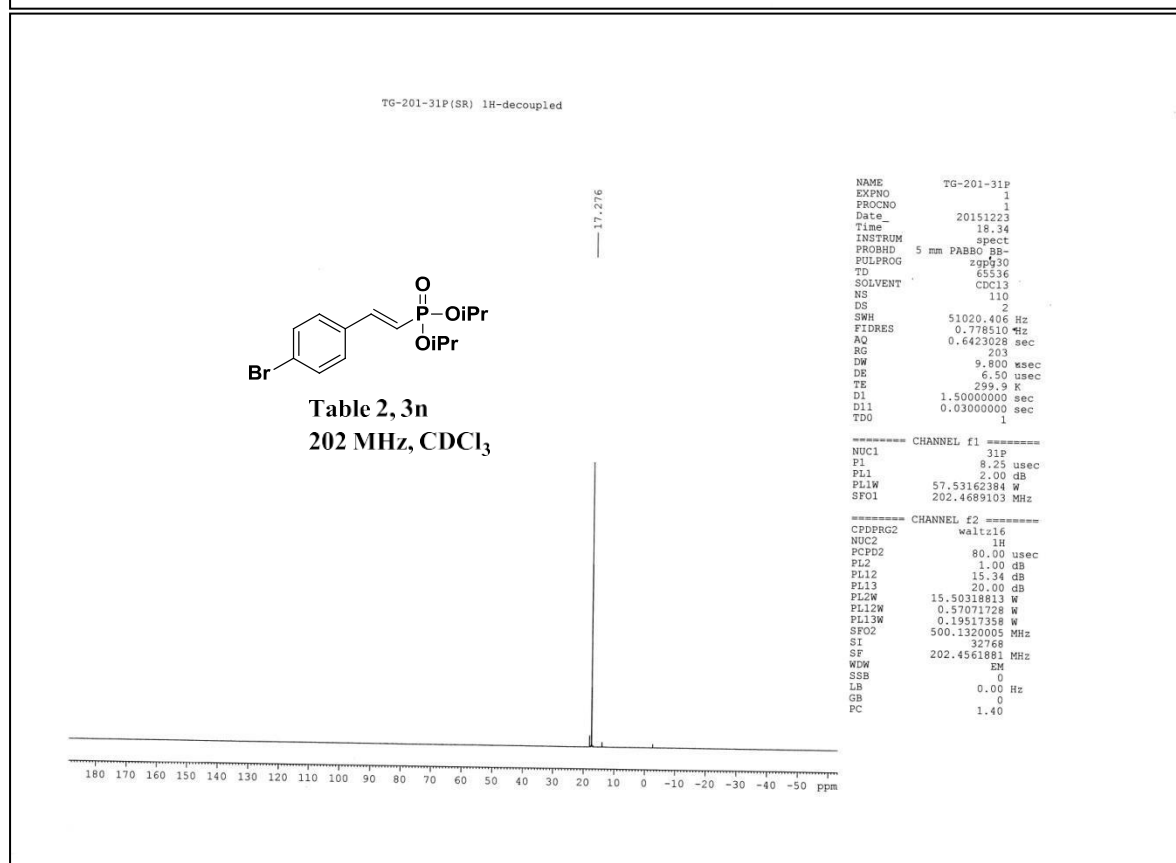
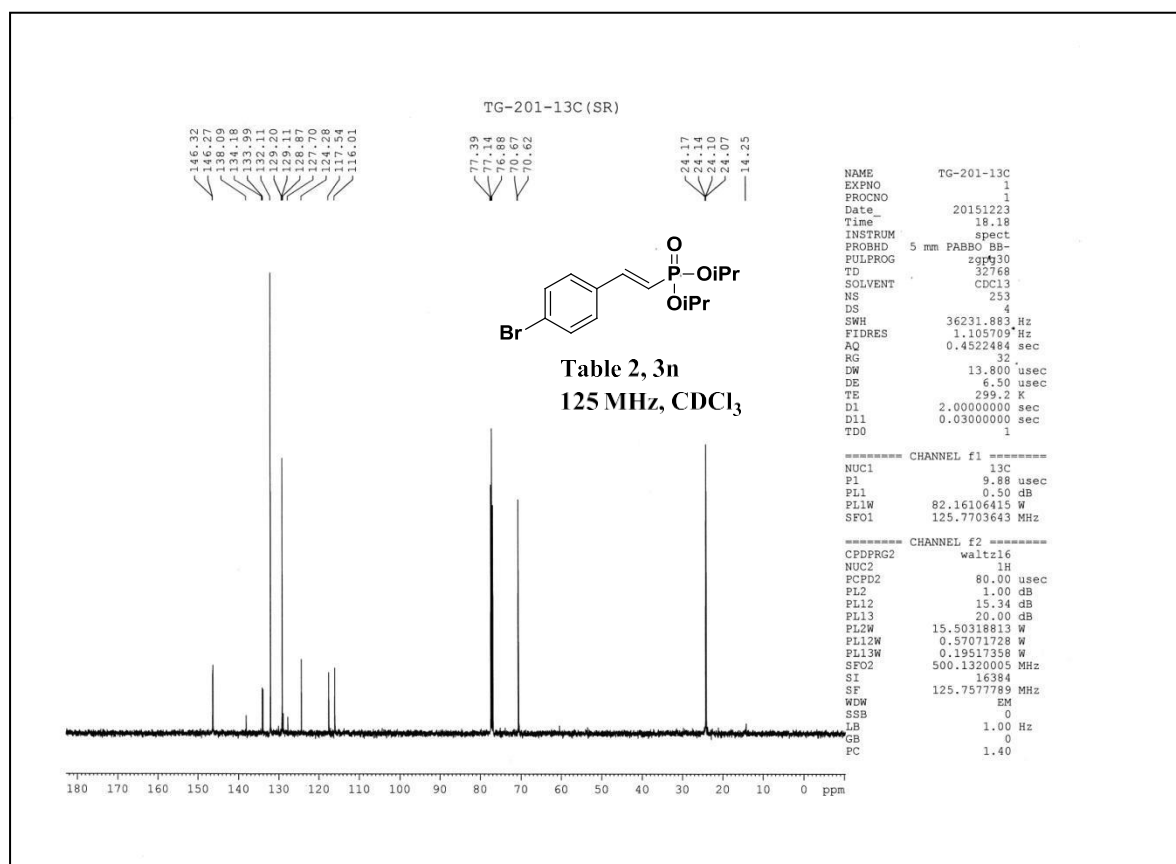
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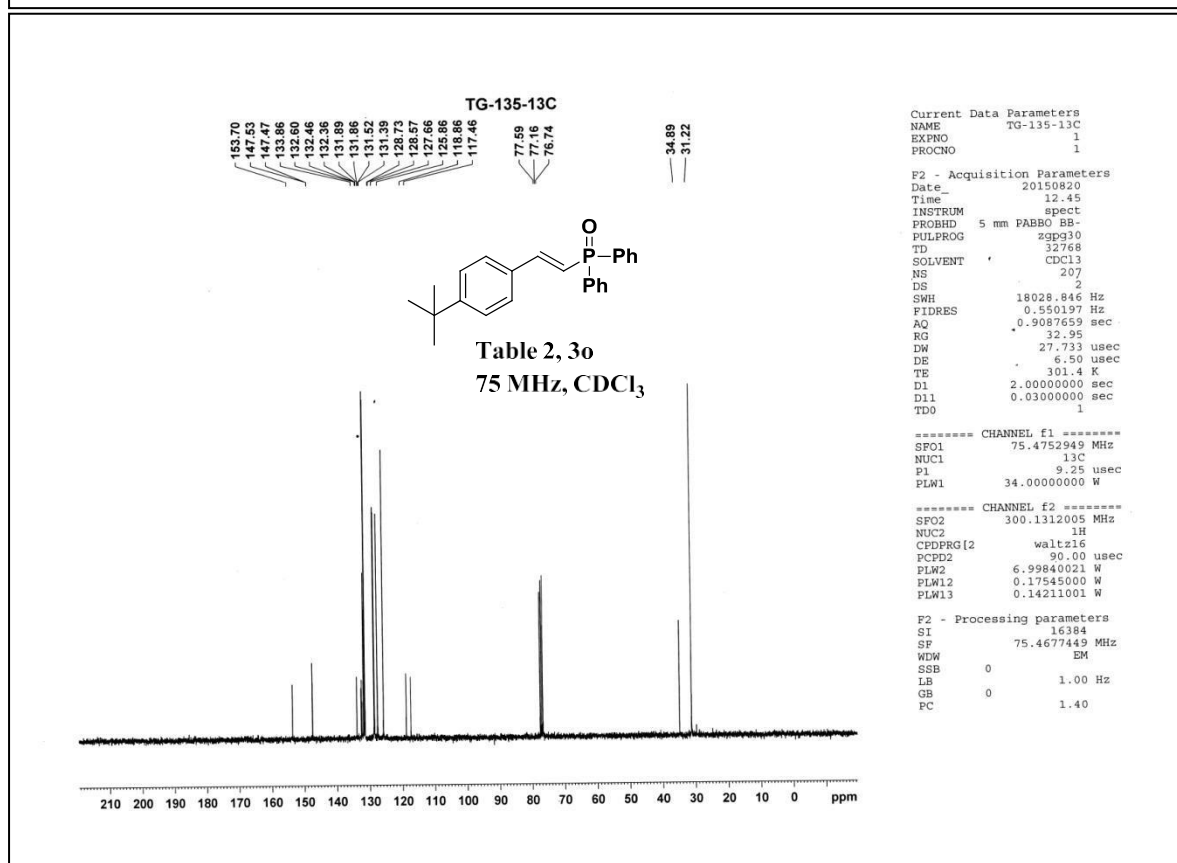
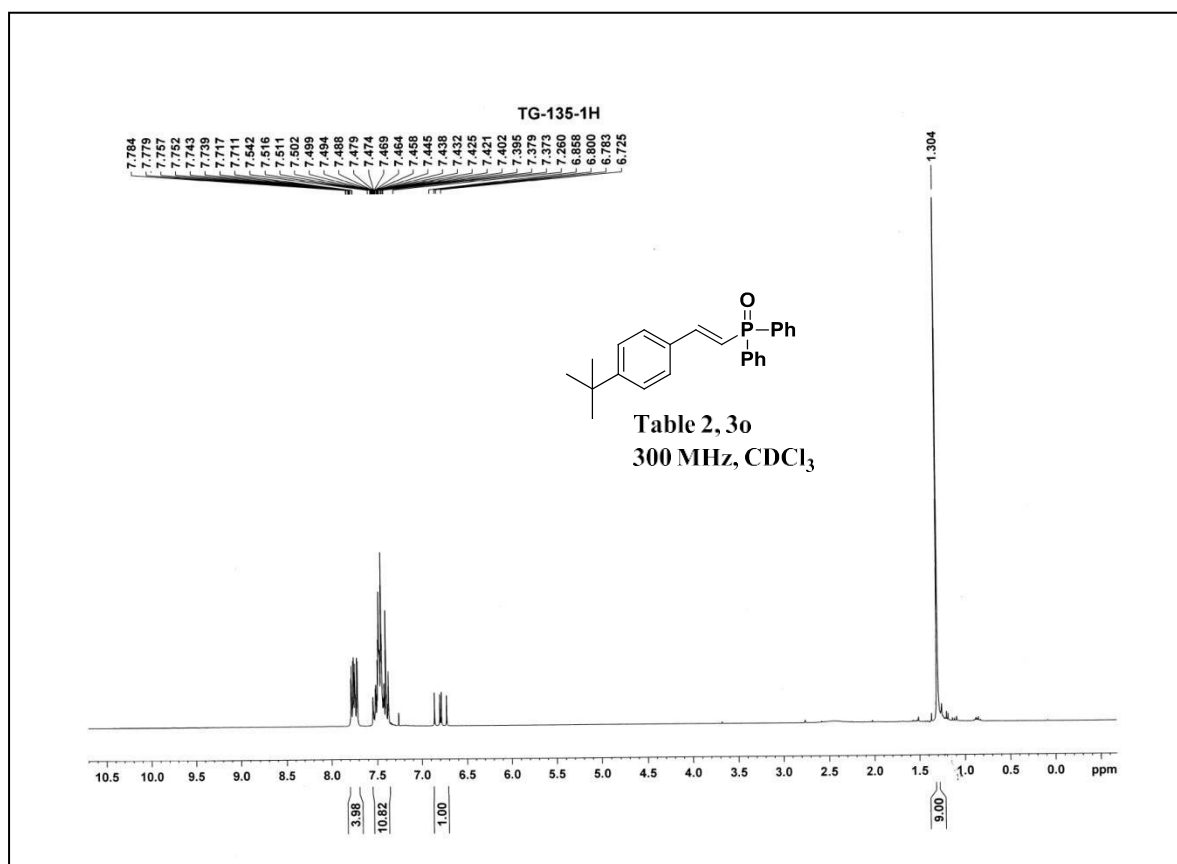
===== CHANNEL f2 =====
CPDPRG2    waltz16
NUC2        1H
PCPD2      80.00 usec
PL2         1.00 dB
PL12        15.34 dB
PL13        20.00 dB
PL2W       15.50318813 W
PL12W      0.57071728 W
PL13W      0.19517358 W
SFO2       500.1320005 MHz
SI         32768
SF         202.4561881 MHz
WDW         EM
SSB         0
LB          0.00 Hz
GB          0
PC          1.40

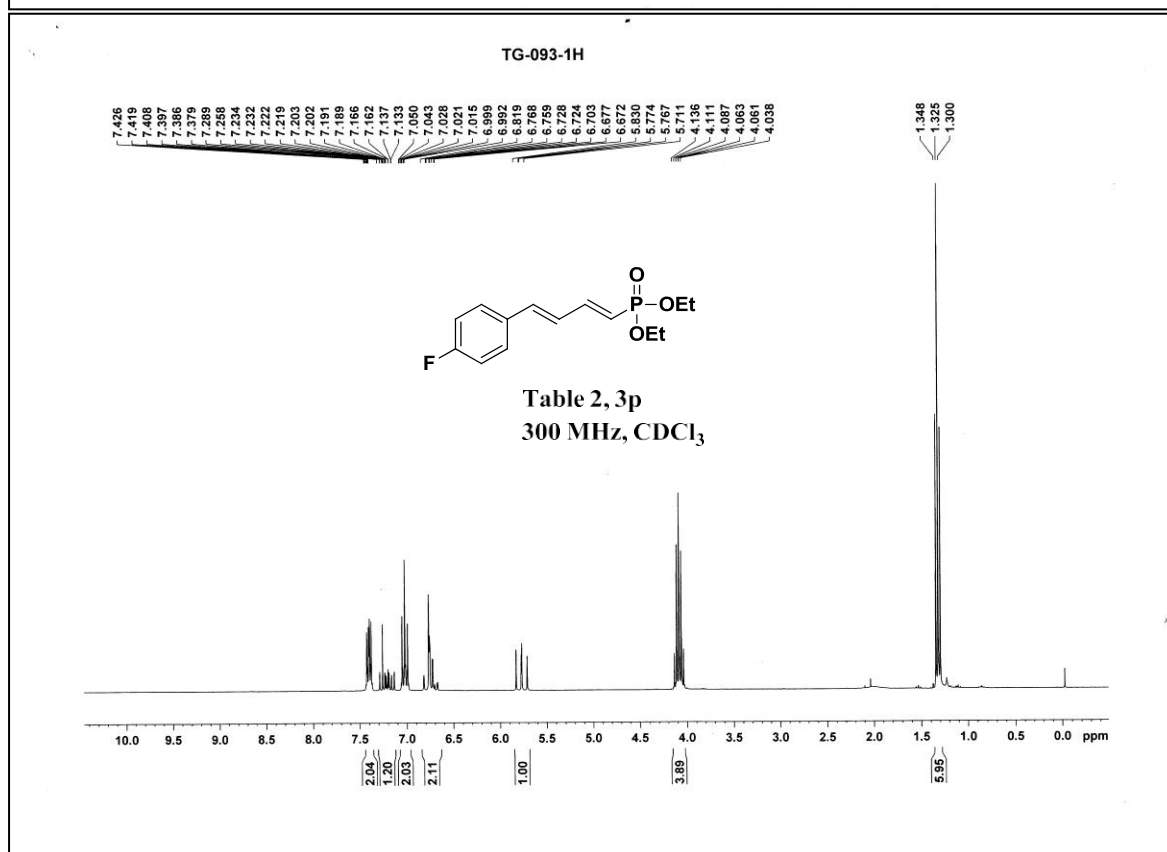
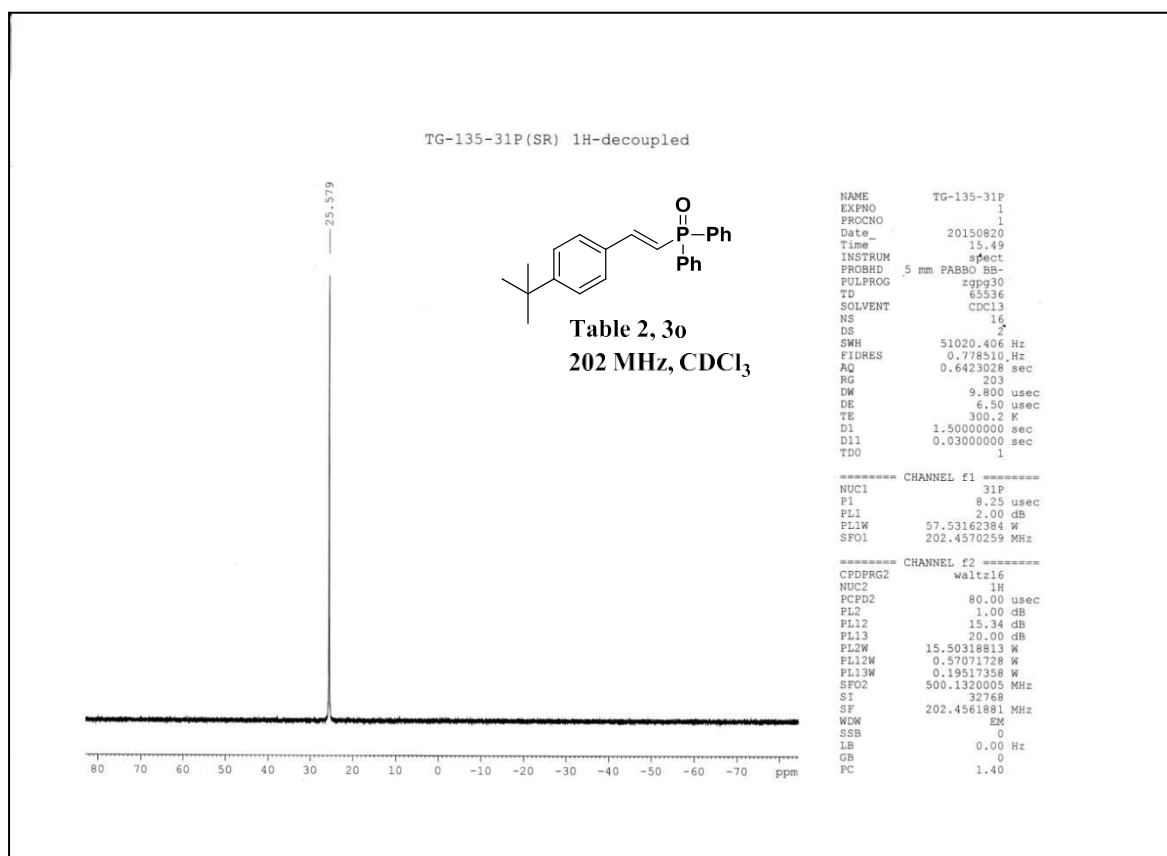
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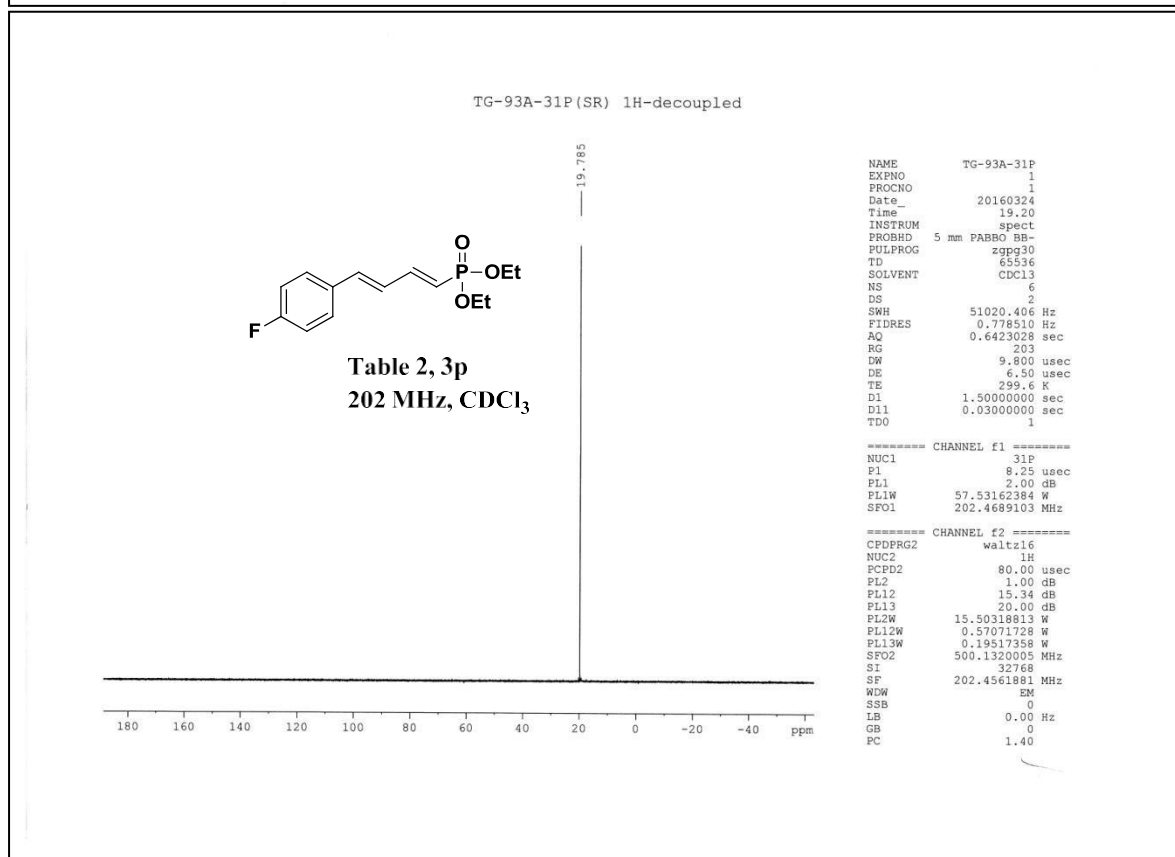
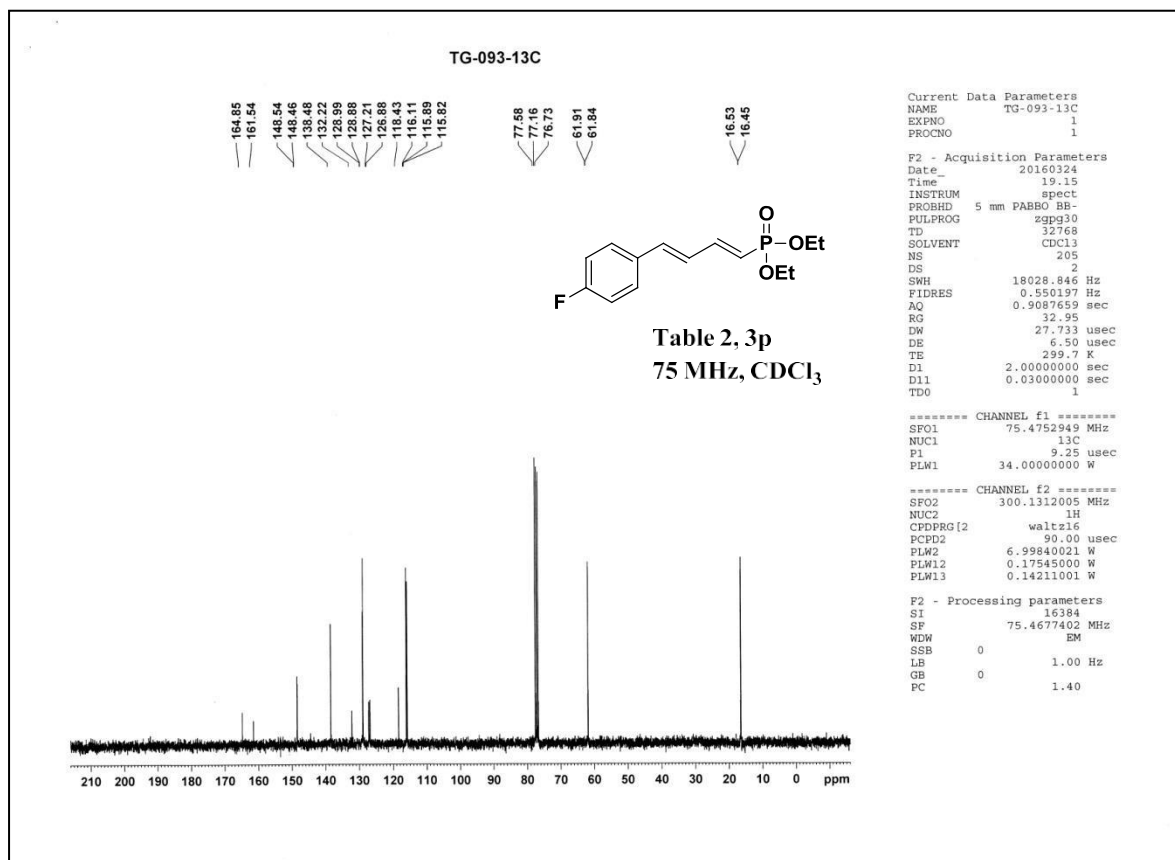
TG-201-1H(SR) 500MHz

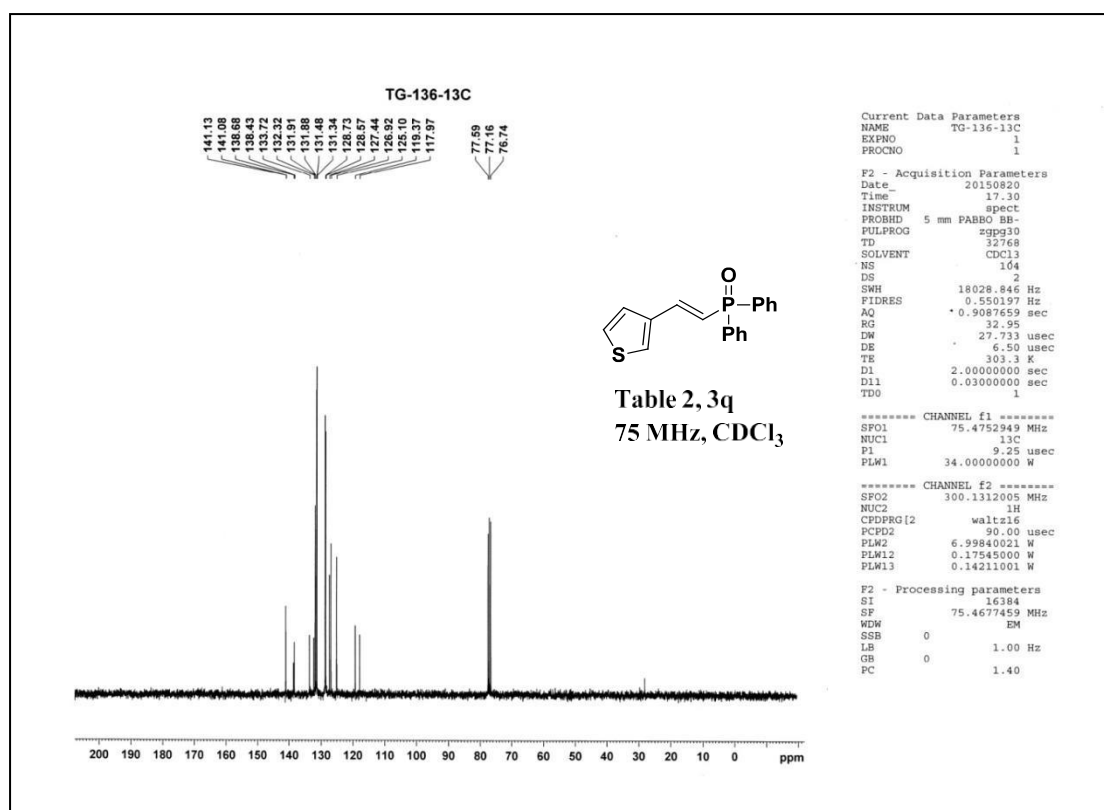
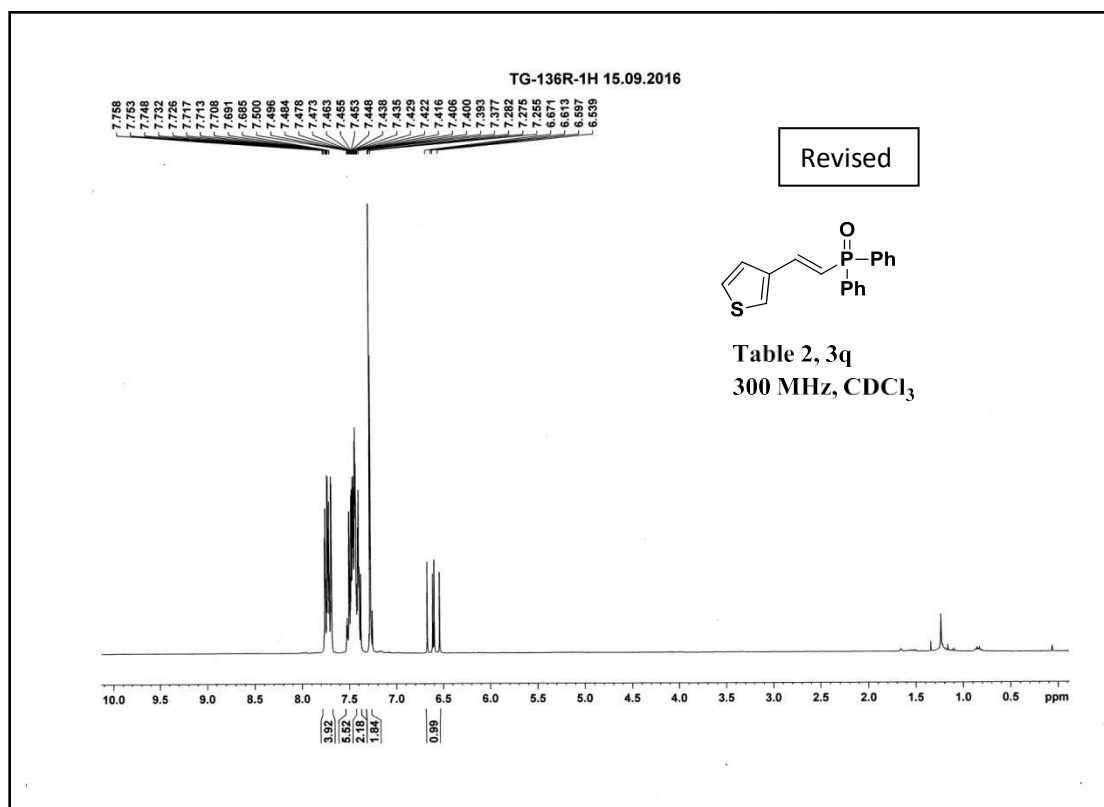












TG-136-31P (1H decoupled) - (ND)

24.70

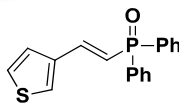
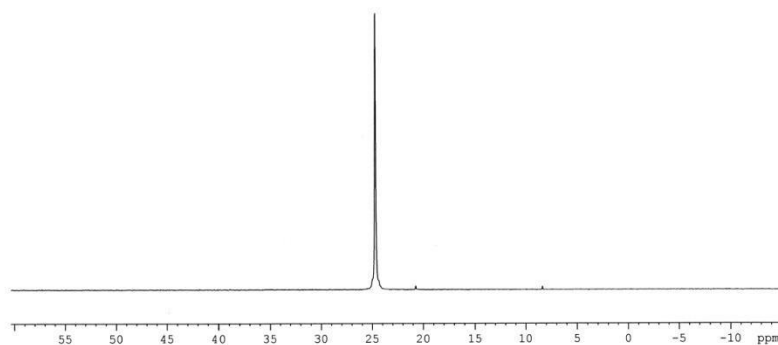


Table 2, 3q
162 MHz, CDCl₃



Current Data Parameters
NAME TG-136-31P
EXPNO 1
PROCNO 1
F2 - Acquisition Parameters
Date_ 20150821
Time_ 15.43
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zgpg30
TD 32768
SOLVENT CDCl3
NS 56
DS 2
SWH 64102.563 Hz
FIDRES 1.956255 Hz
AQ 0.2555904 sec
RG 203
DW 7.800 usec
DE 6.50 usec
TE 0 K
D1 2.0000000 sec
D11 0.0300000 sec
TDO 1

===== CHANNEL f1 =====
SFO1 161.9958293 MHz
NUC1 31P
P1 13.00 usec
PLW1 14.99699974 W

===== CHANNEL f2 =====
SFO2 400.2016008 MHz
NUC2 1H
CPDPRG2 waltz16
PCPD2 90.00 usec
PLW2 10.00000000 W
PLW12 0.29660001 W
PLW13 0.24025001 W

F2 - Processing parameters
SI 16384
SF 162.0039290 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40

TG-142-1H

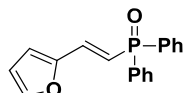
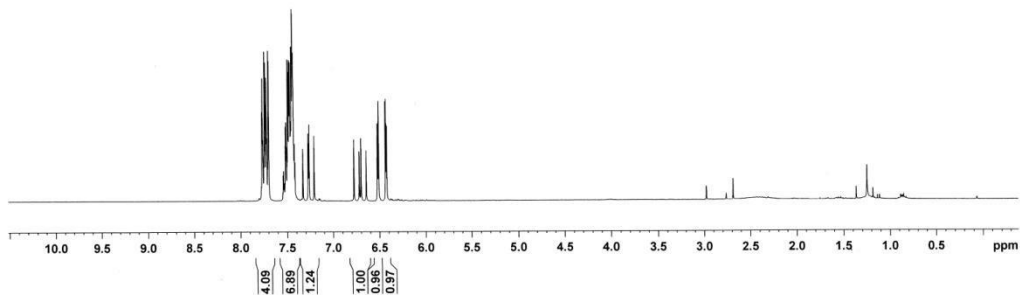
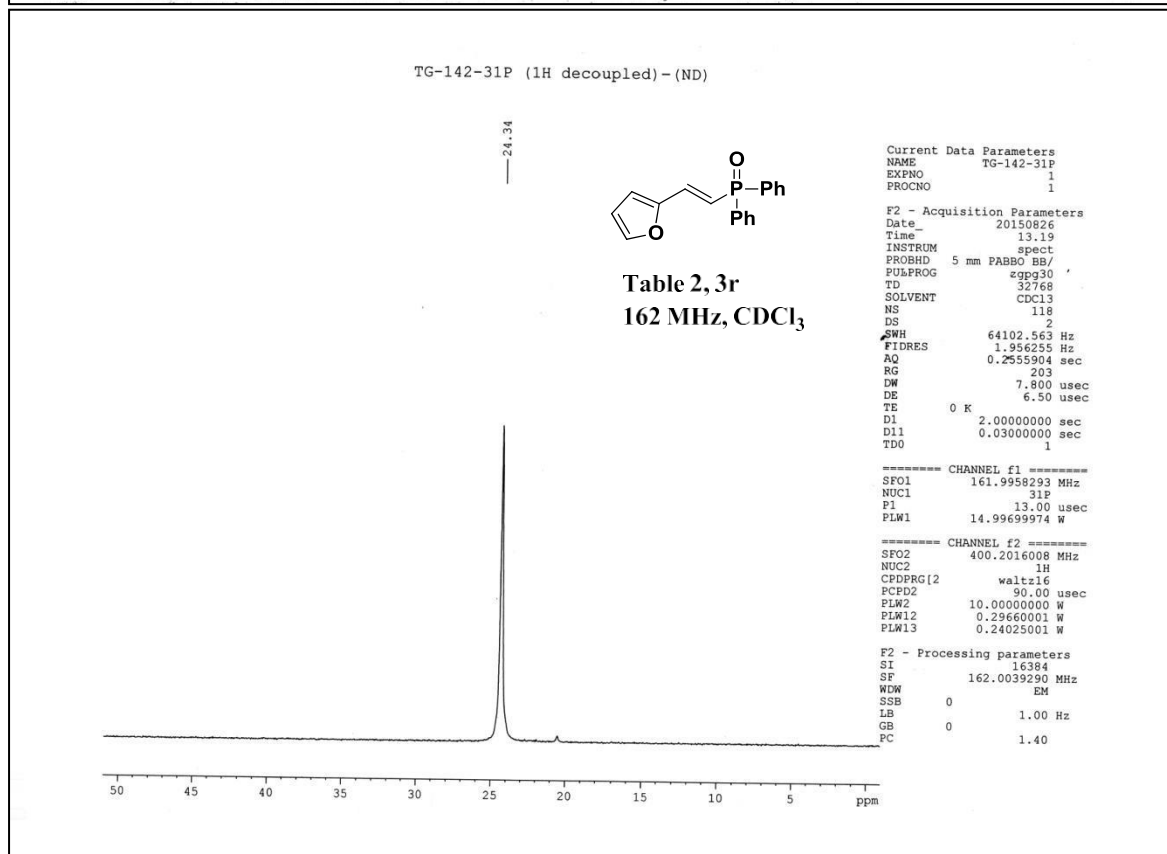
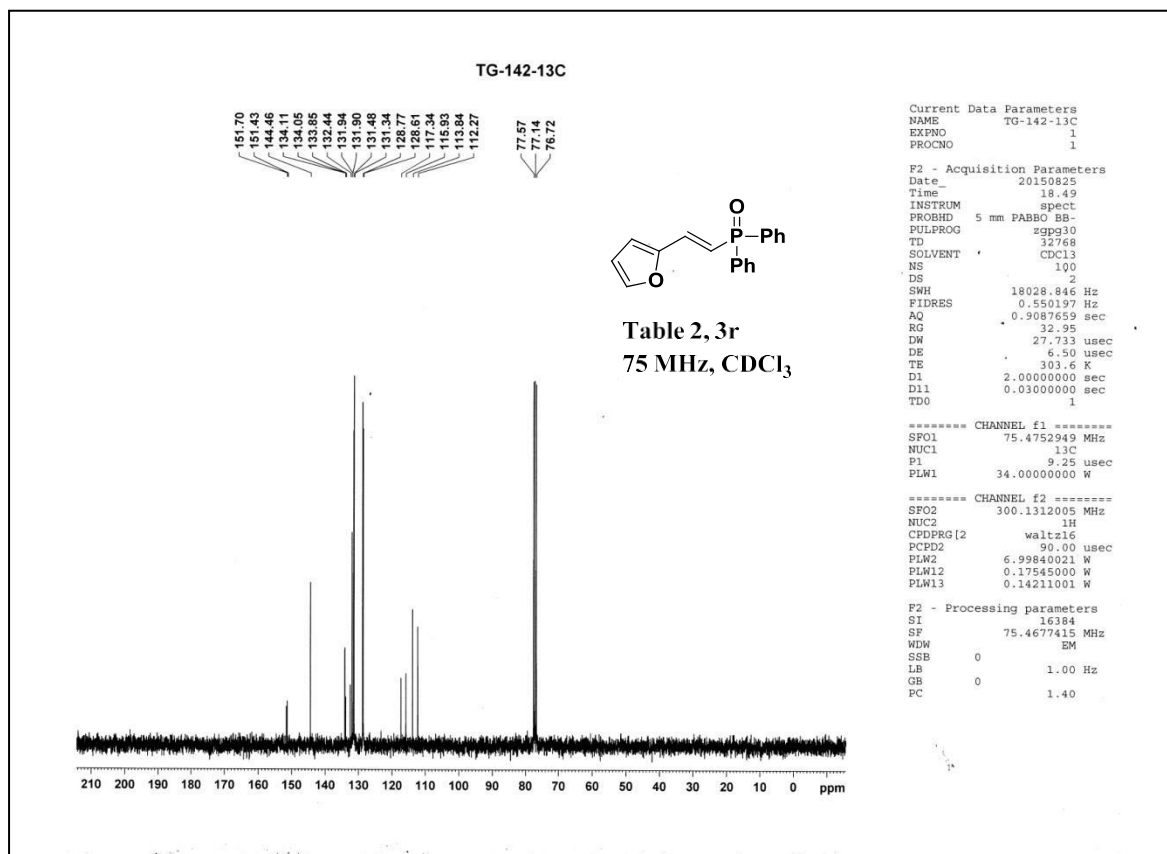
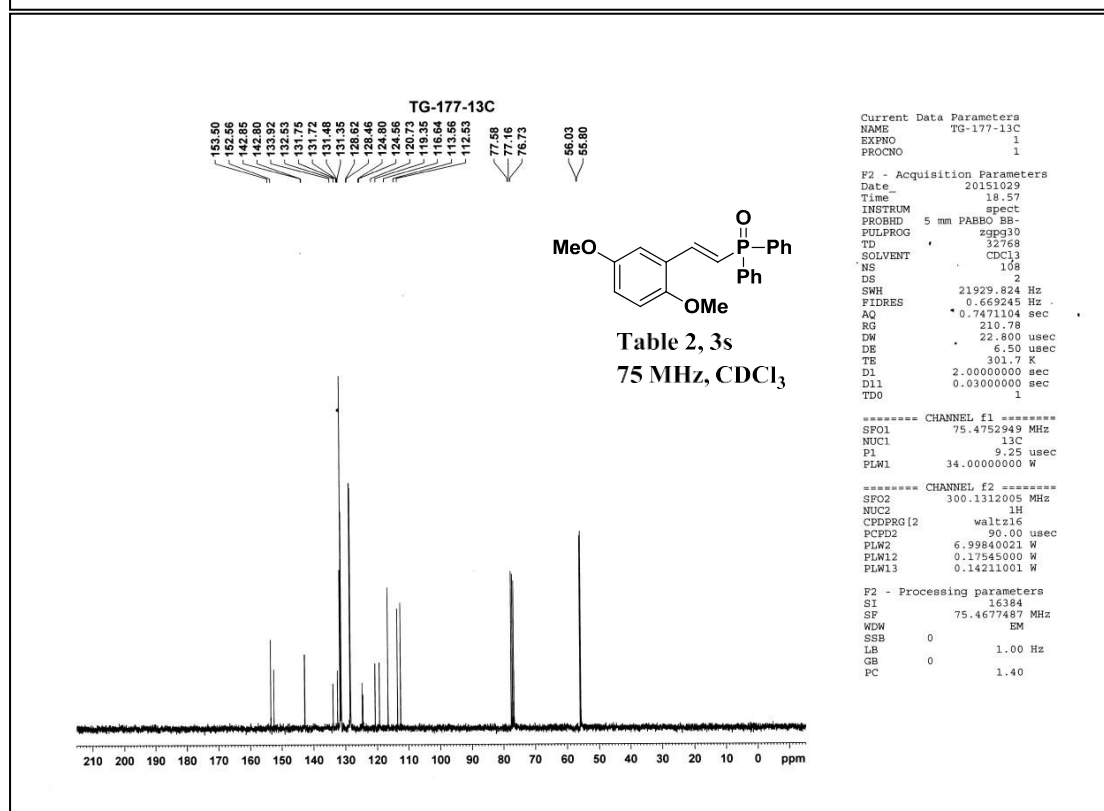
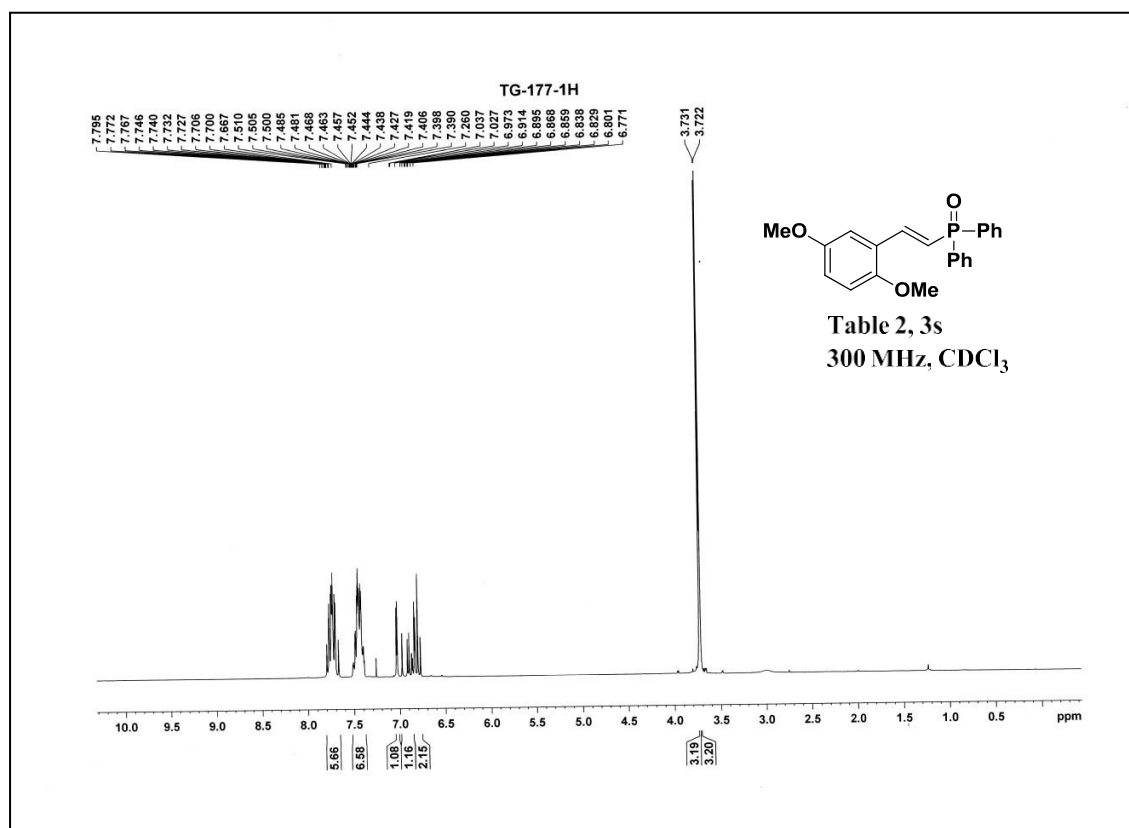


Table 2, 3r
300 MHz, CDCl₃







TG-177-31P (1H decoupled)-(ND)

25.09

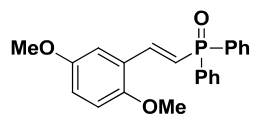
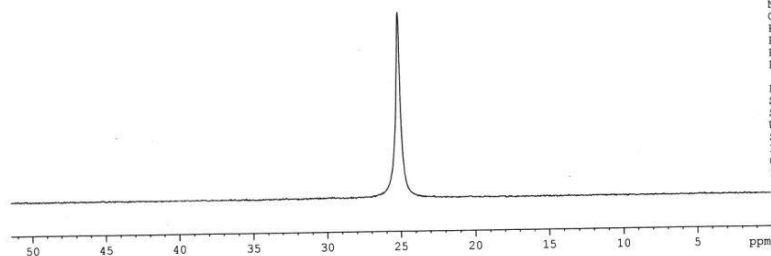


Table 2, 3s
162 MHz, CDCl₃



Current Data Parameters
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EXPNO 1
PROCNO 1

F2 - Acquisition Parameters
Date_ 20151030
Time 16.06
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zgpg30
TD 32768
SOLVENT CDCl3
NS 67
DS 2
SWH 64102.563 Hz
FIDRES 1.956255 Hz
AQ 0.2555904 sec
RG 203
DW 7.800 usec
DE 6.50 usec
TE 299.2 K
D1 2.00000000 sec
D11 0.03000000 sec
TDO 1

===== CHANNEL f1 =====
SFO1 161.9958293 MHz
NUC1 31P
P1 13.00 usec
PLW1 14.99699974 W

===== CHANNEL f2 =====
SFO2 400.2016008 MHz
NUC2 1H
CPDPRG2 waltz16
PCPD2 90.00 usec
PLW2 10.00000000 W
PLW12 0.29660001 W
PLW13 0.24025001 W

F2 - Processing parameters
SI 16384
SF 162.0039290 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40

TG-197-1H

7.384
7.335
7.325
7.310
7.287
7.283
7.276
7.260
7.253
7.240
7.235
7.223
7.213
7.205
7.195
7.184
7.170
6.947
6.940
6.917
6.911
6.893
6.880
6.775
6.748
6.040
5.982
5.924
5.076
4.080
4.070
4.066
4.055
4.046
4.042
4.031
4.022
4.020
4.016
4.008
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3.992
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3.969
3.958
3.805

1.269
1.246
1.222

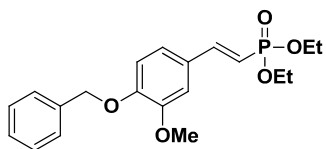
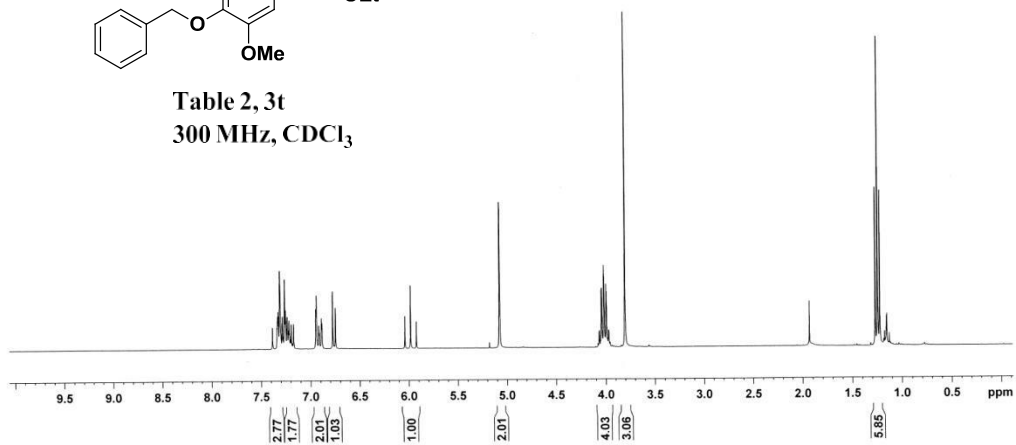
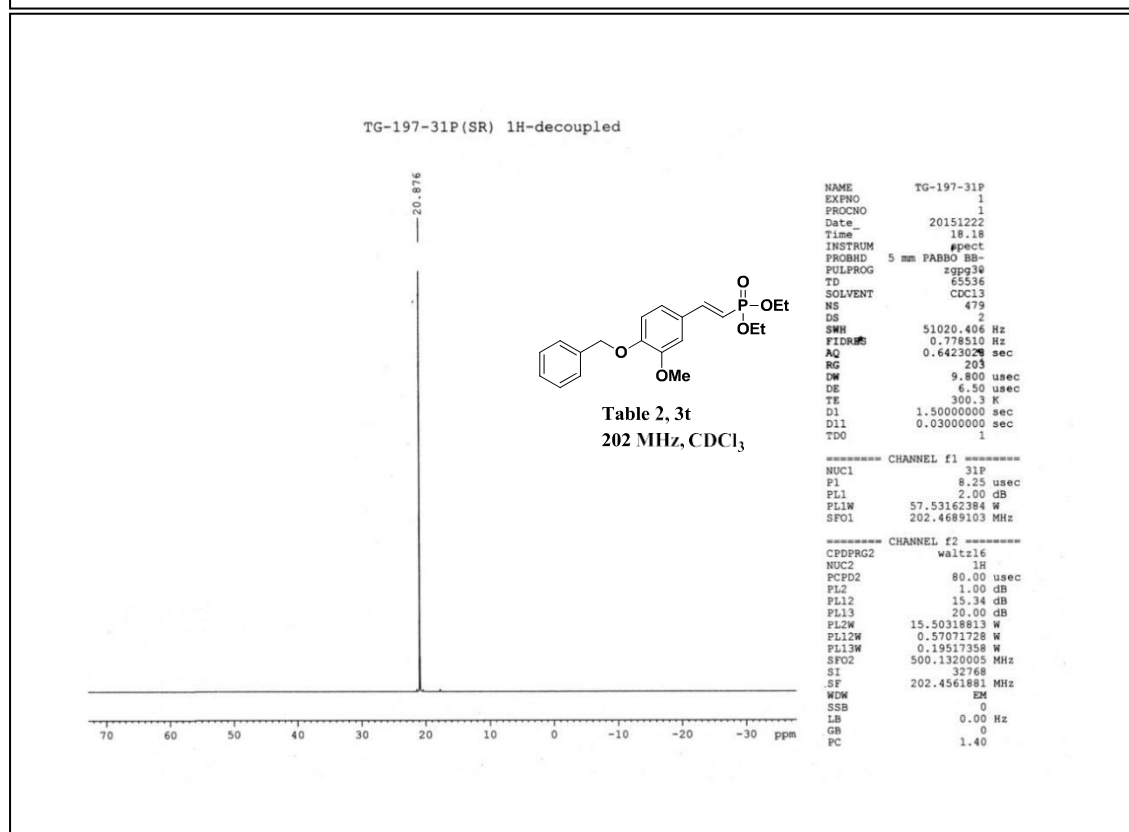
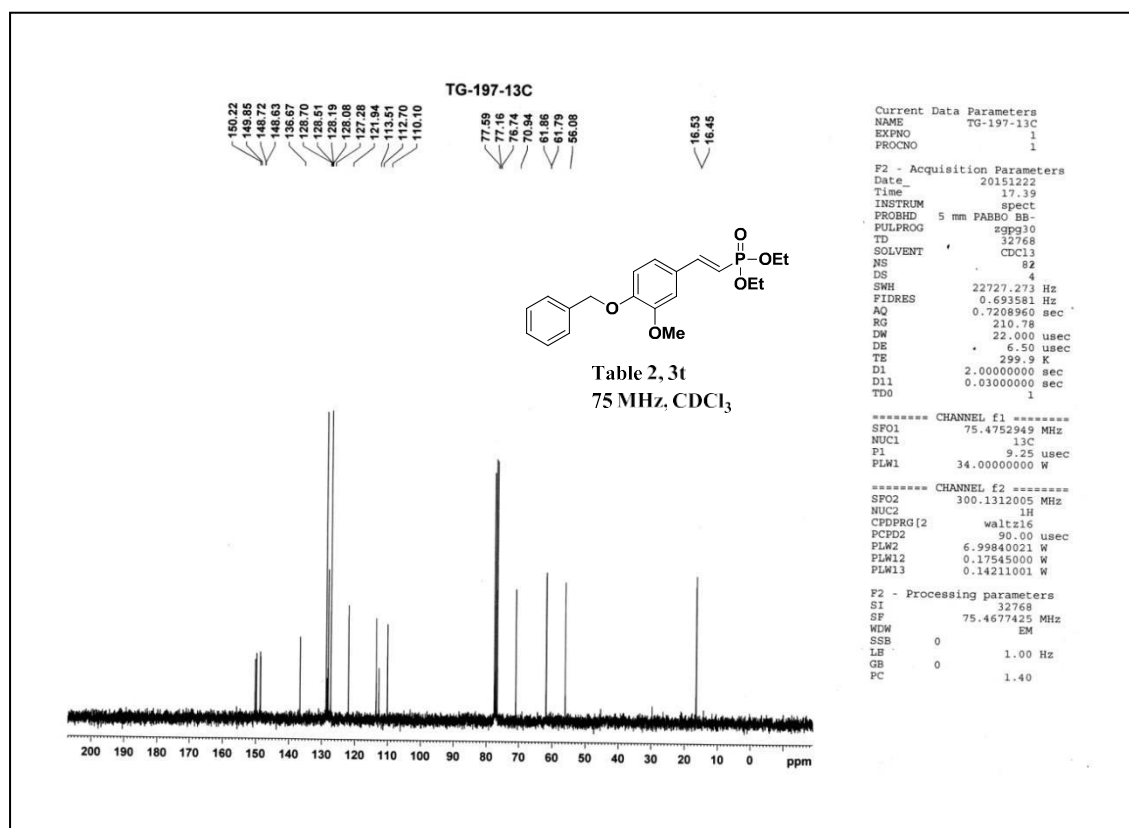
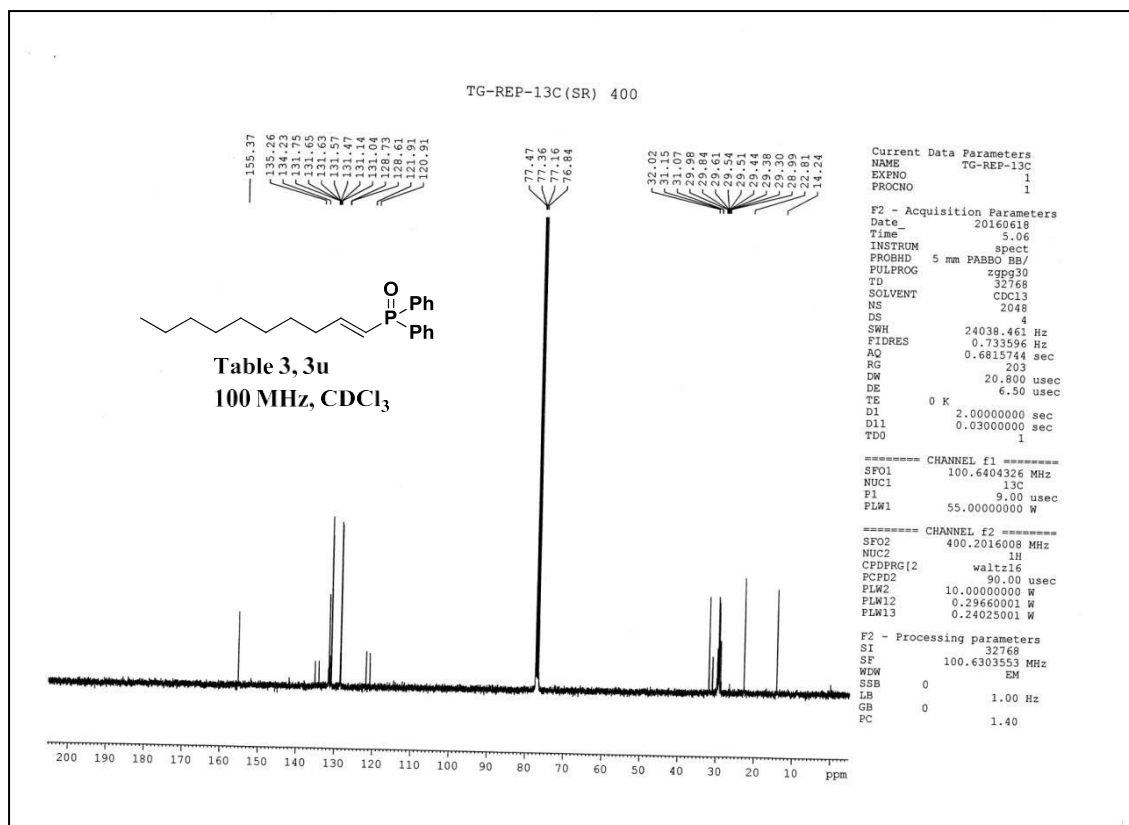
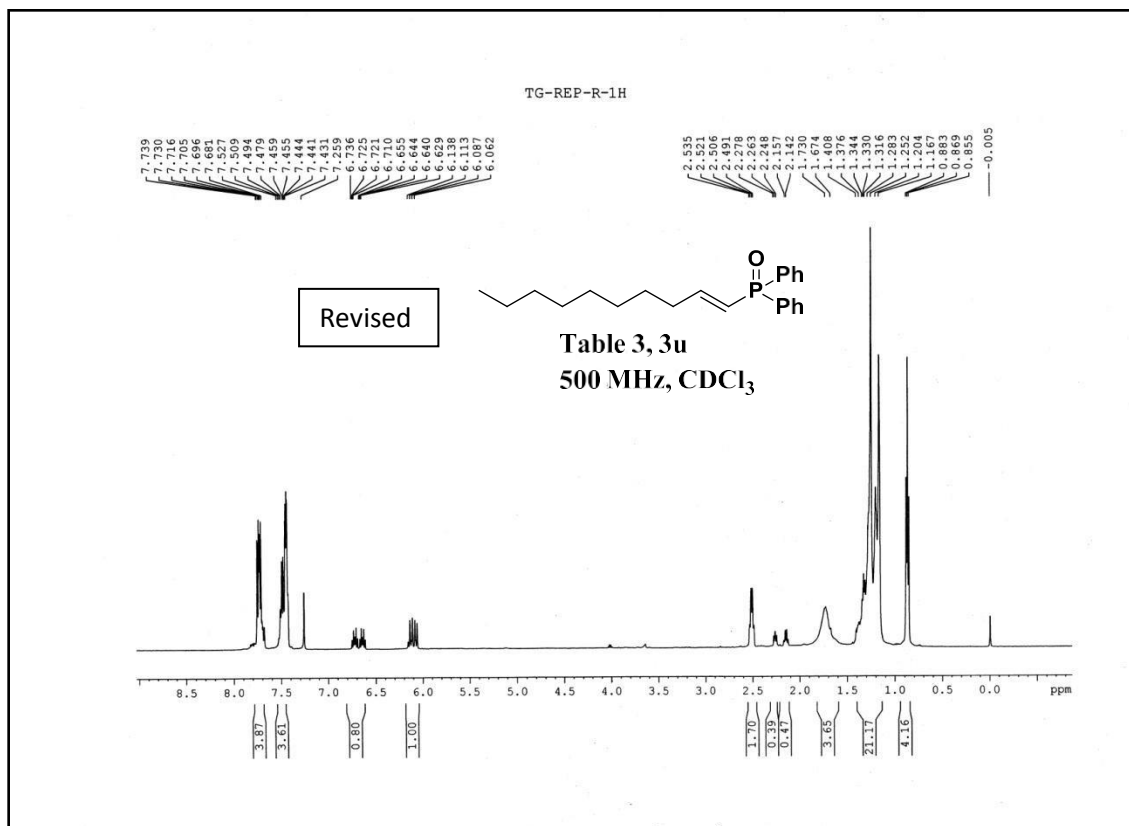
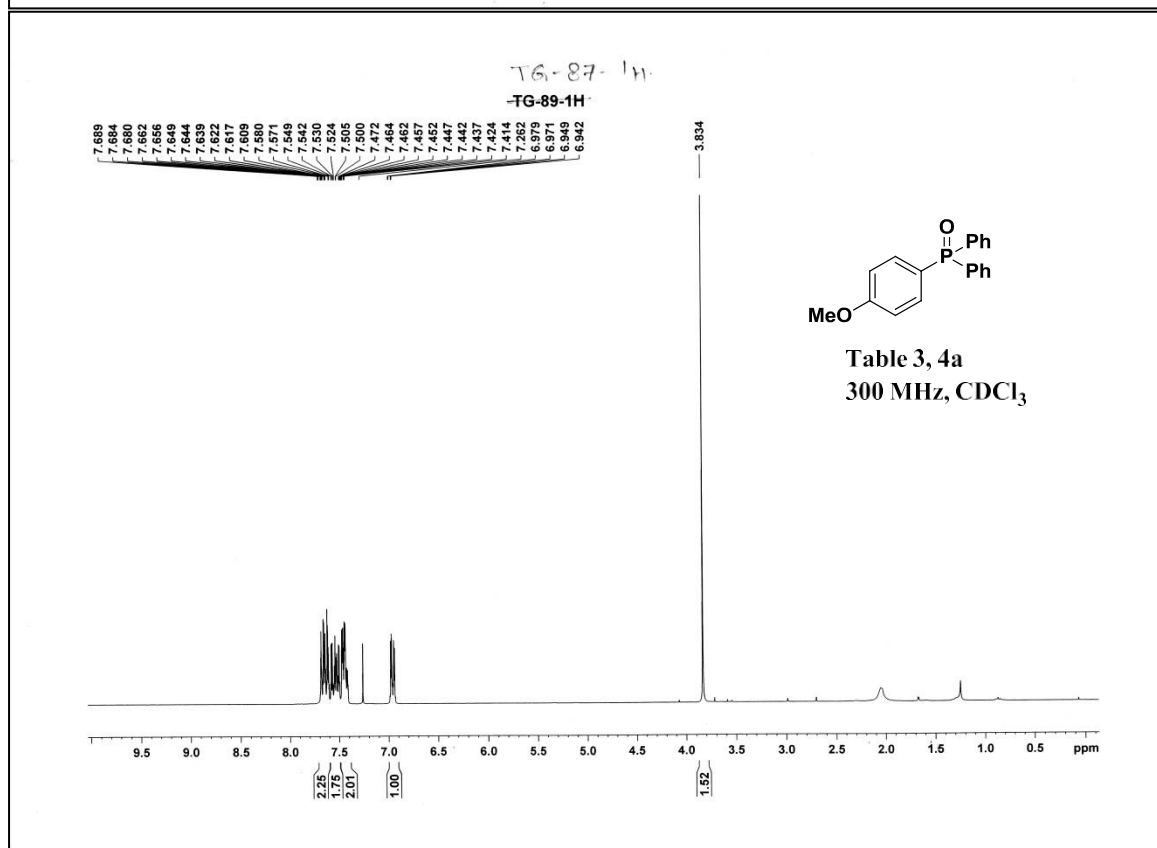
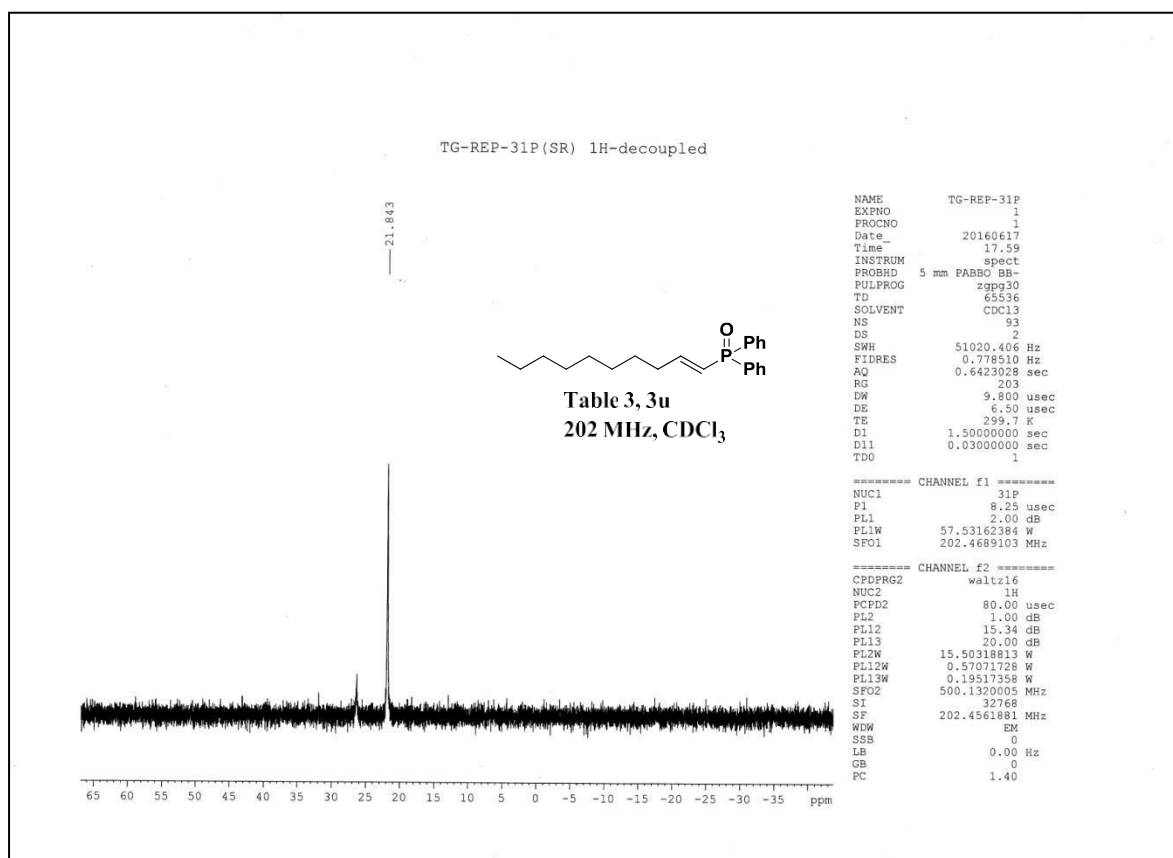


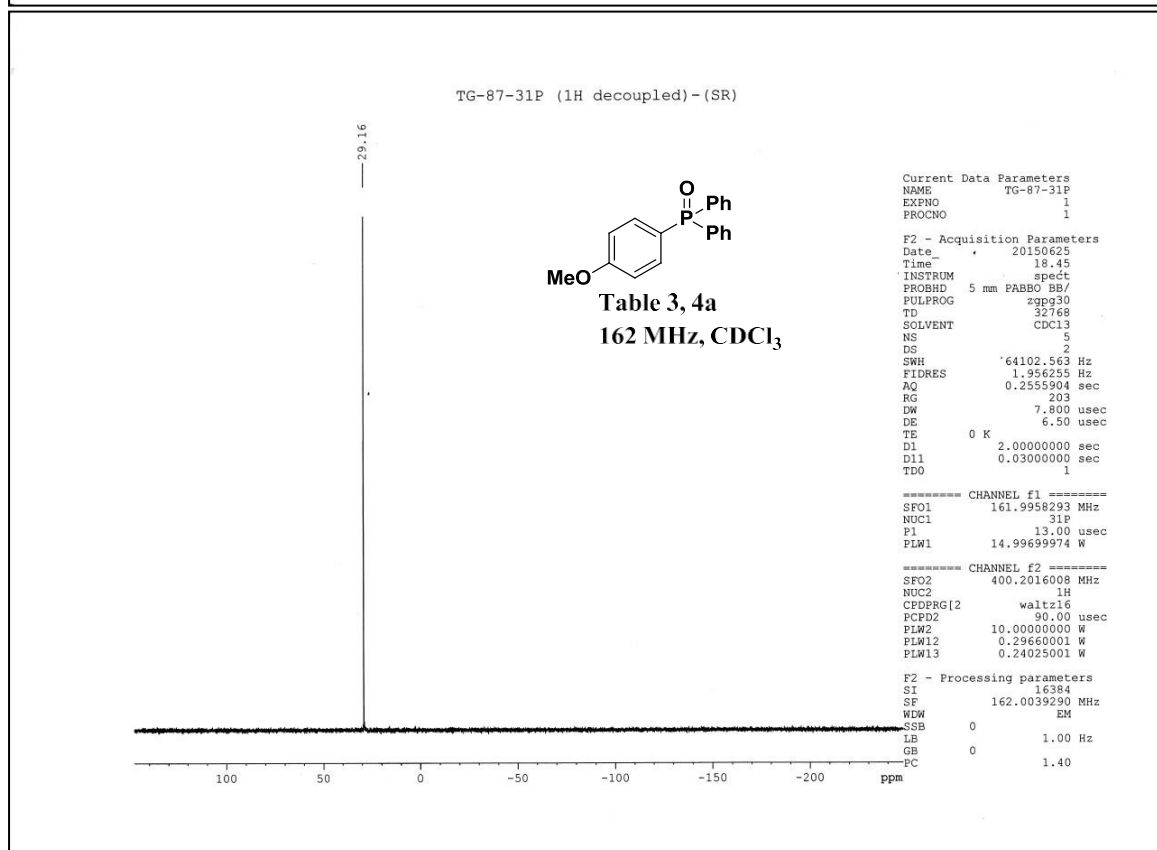
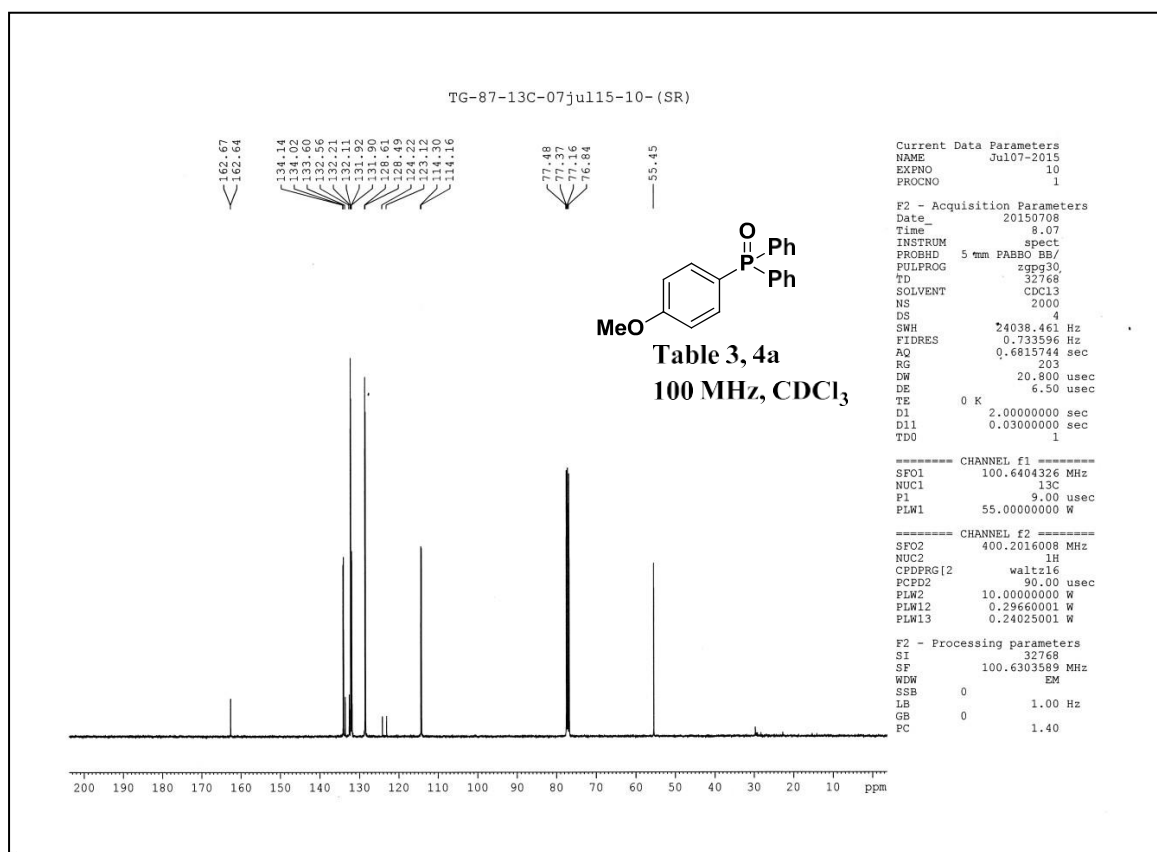
Table 2, 3t
300 MHz, CDCl₃

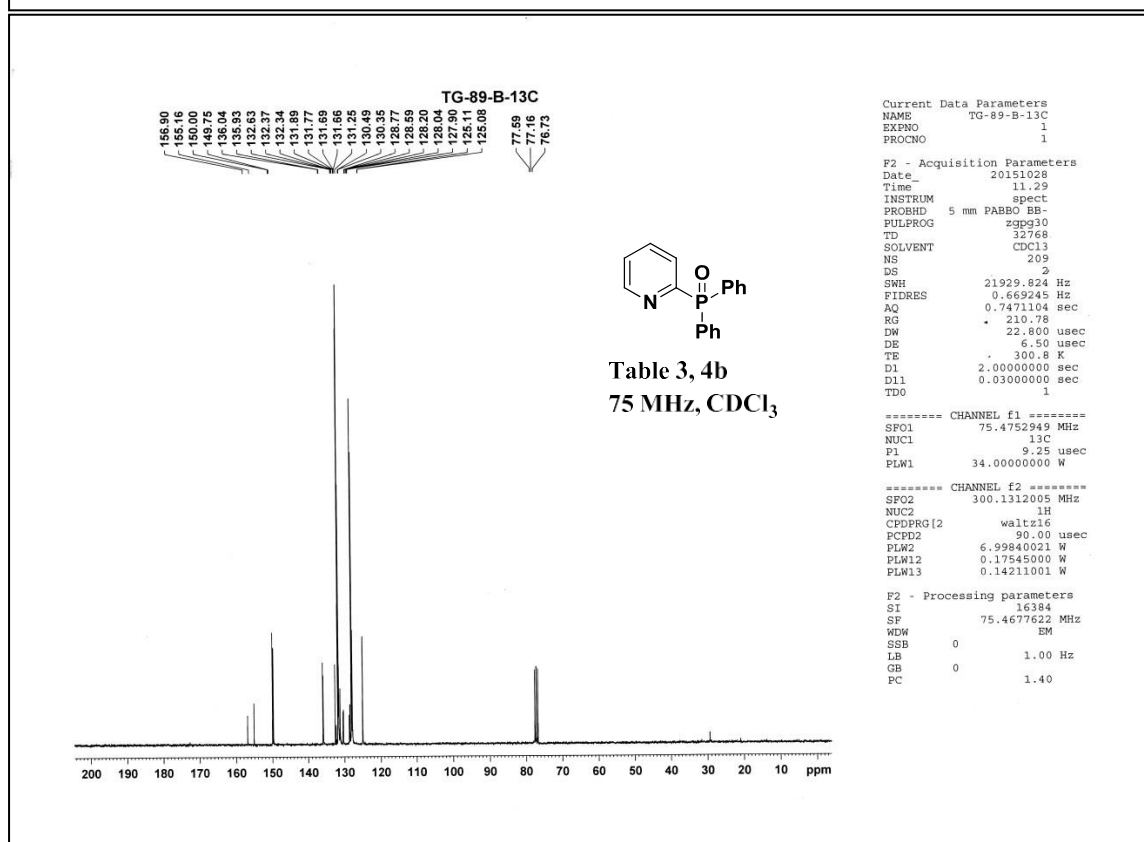
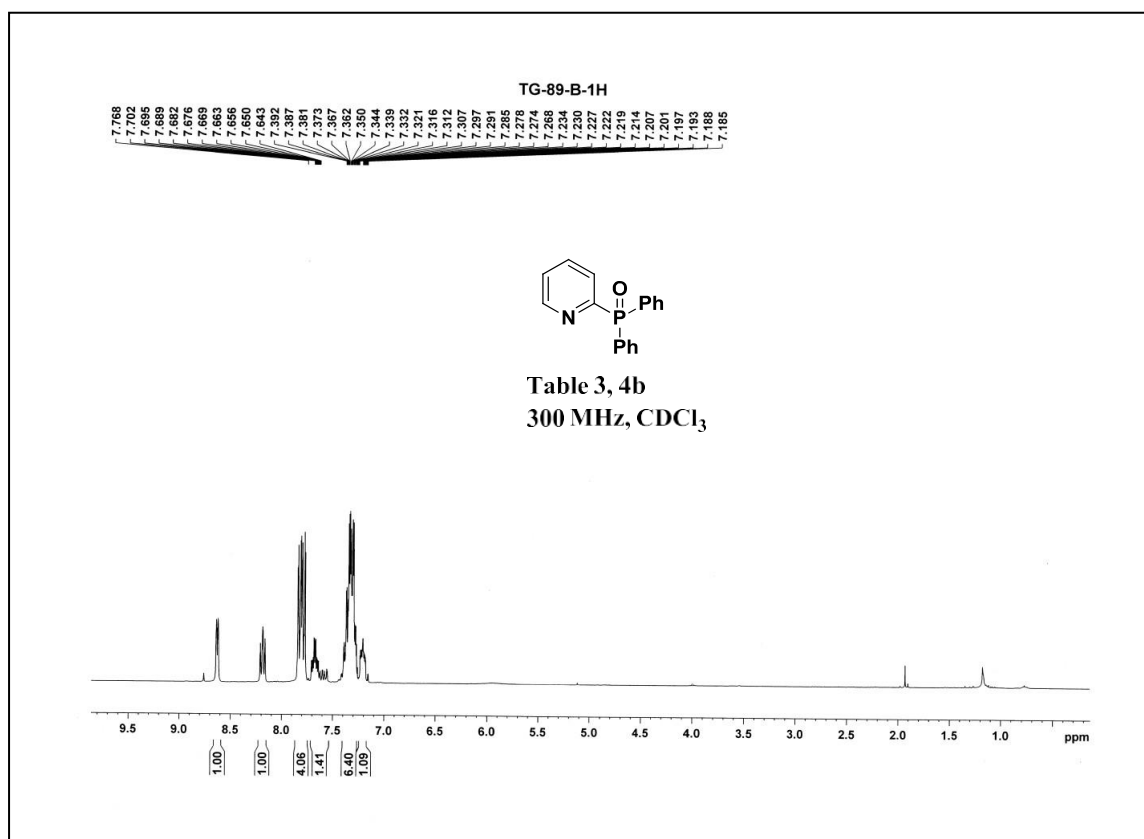


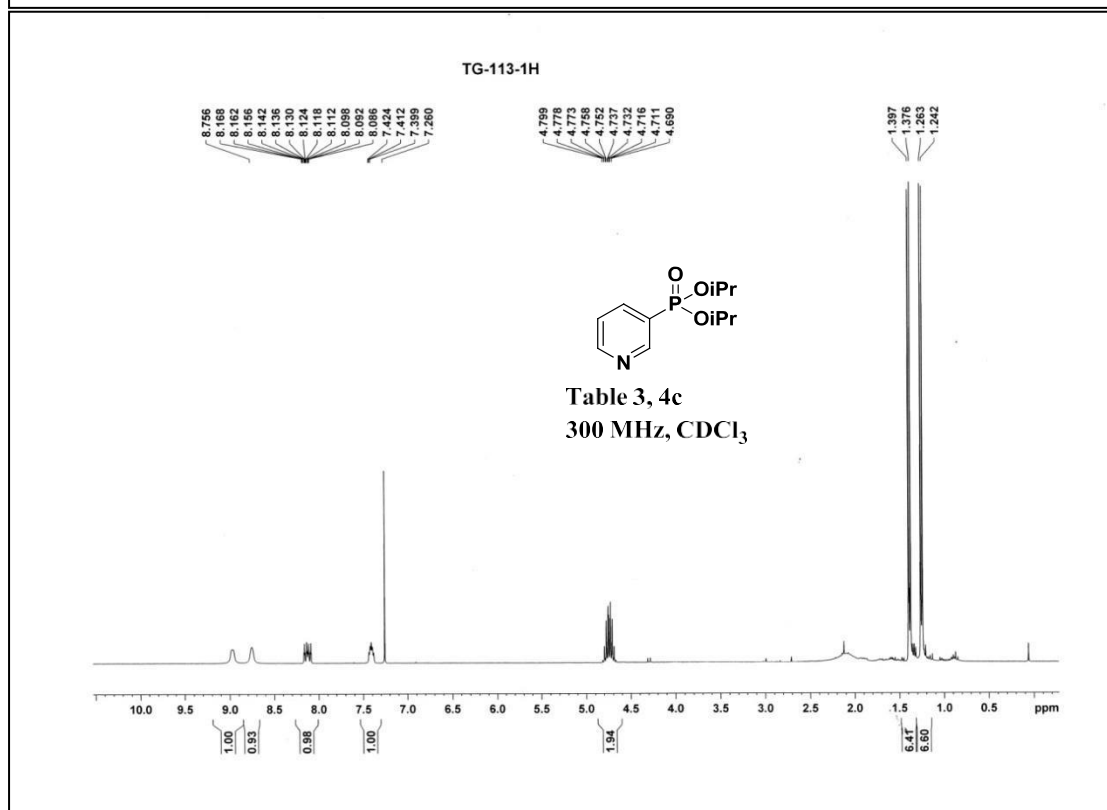
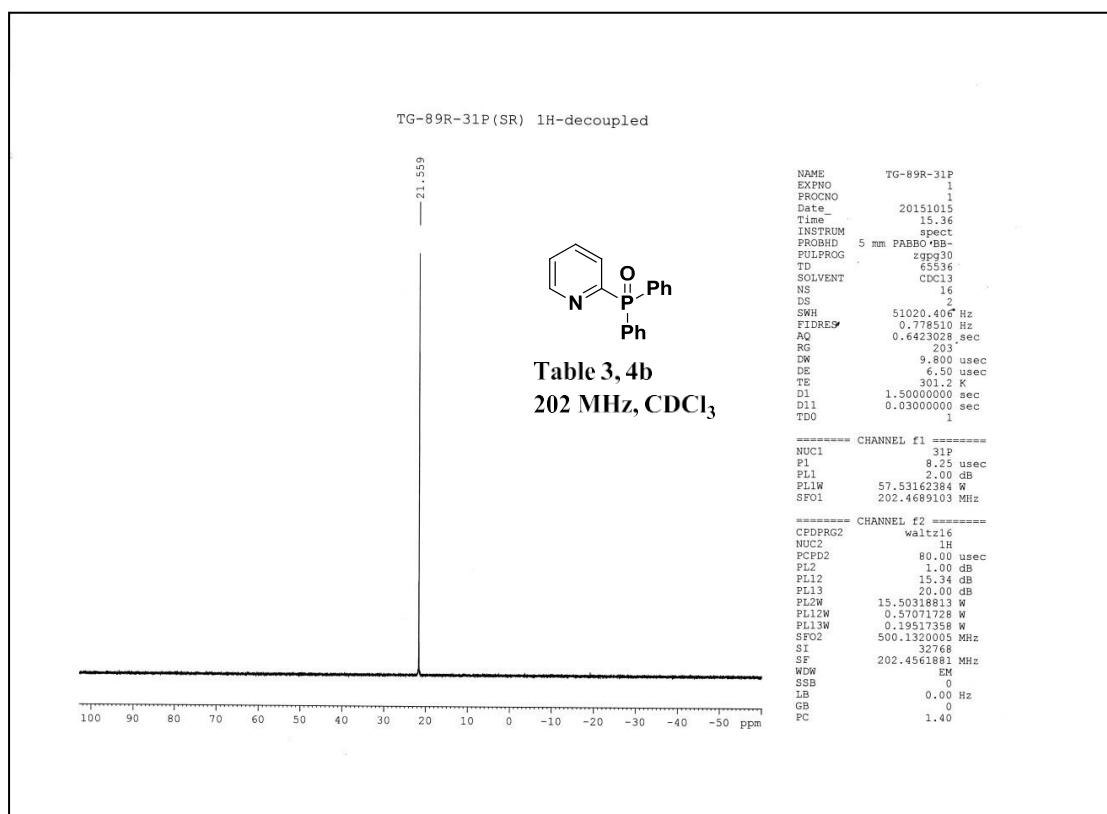


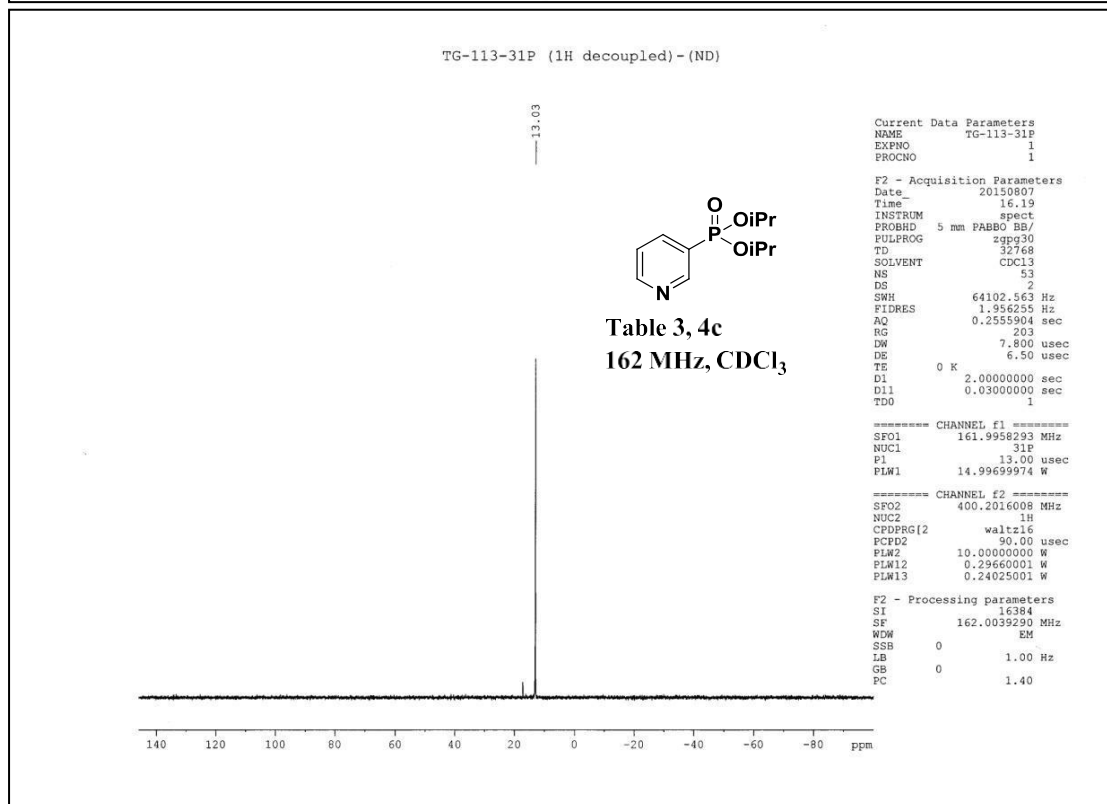
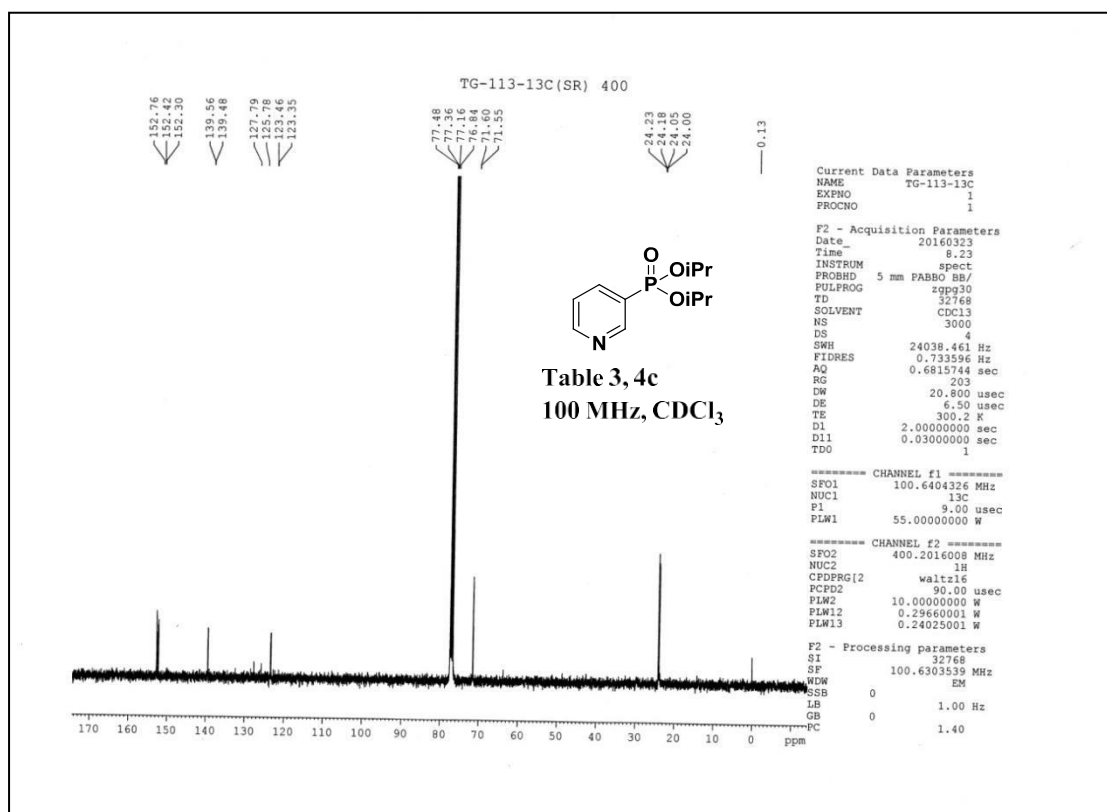


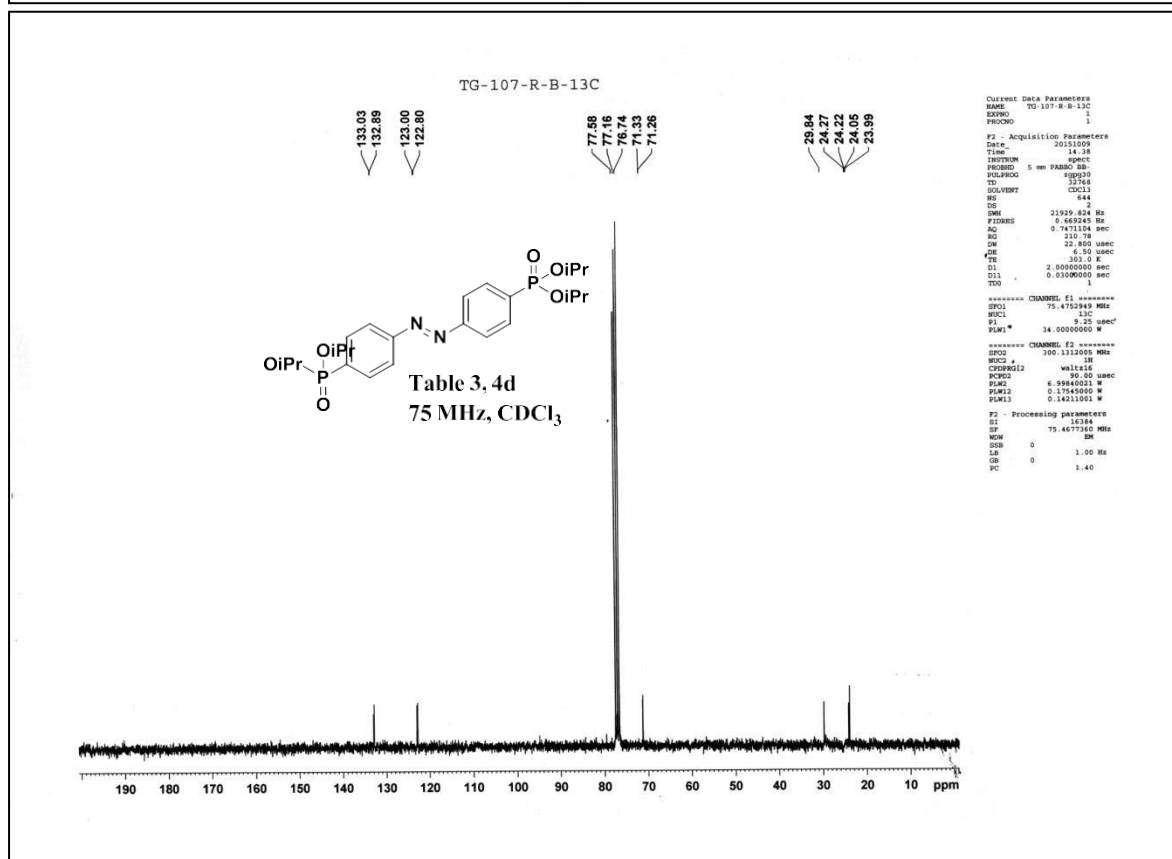
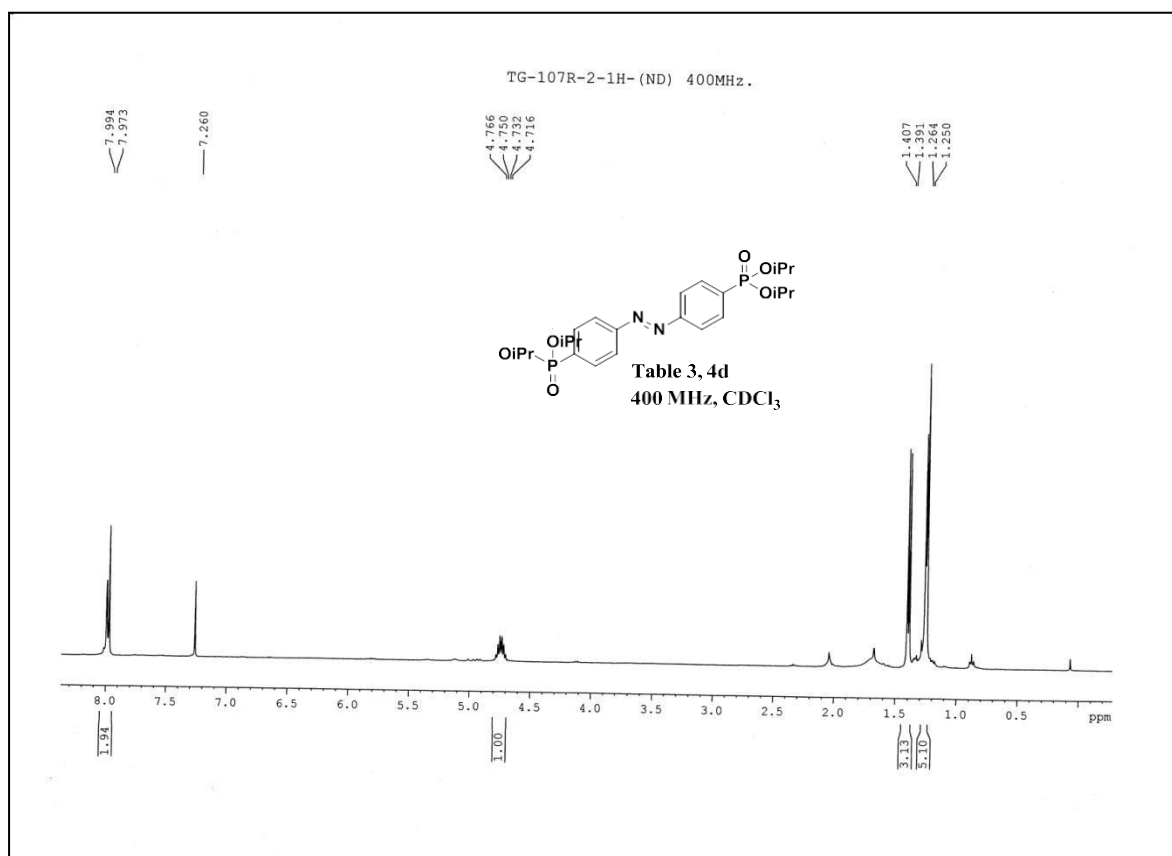


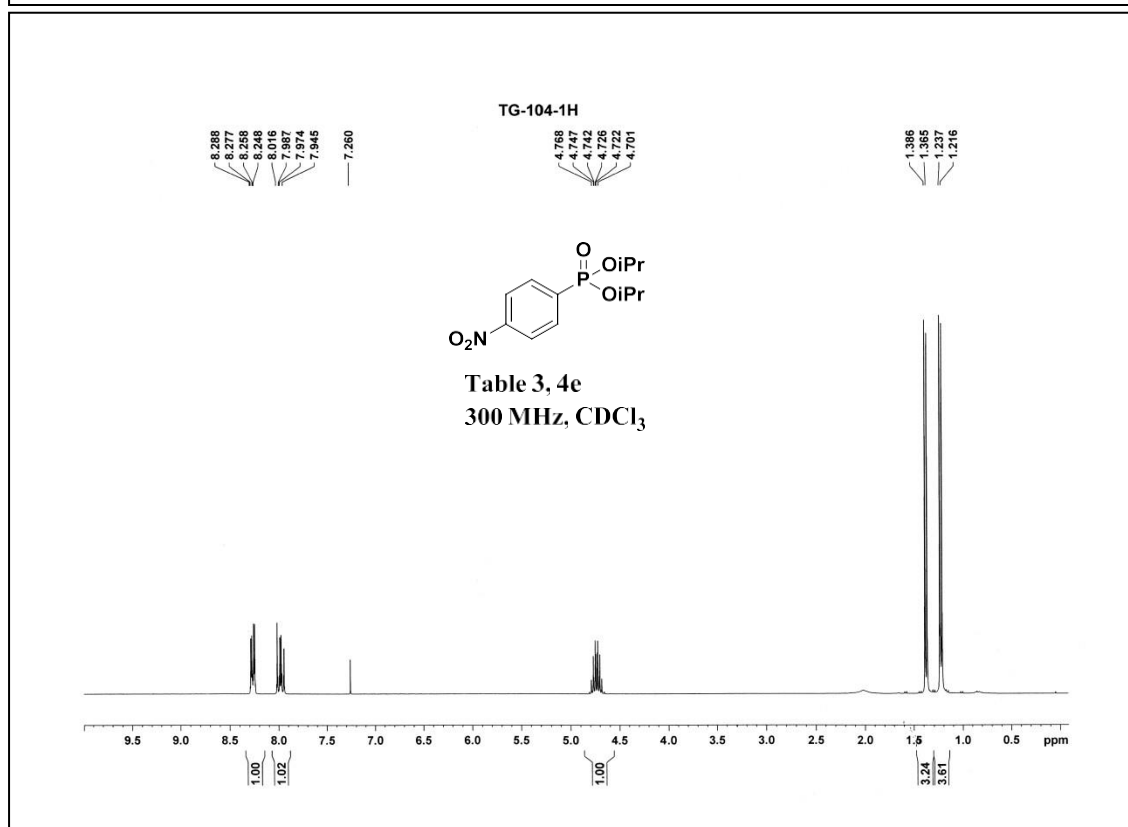
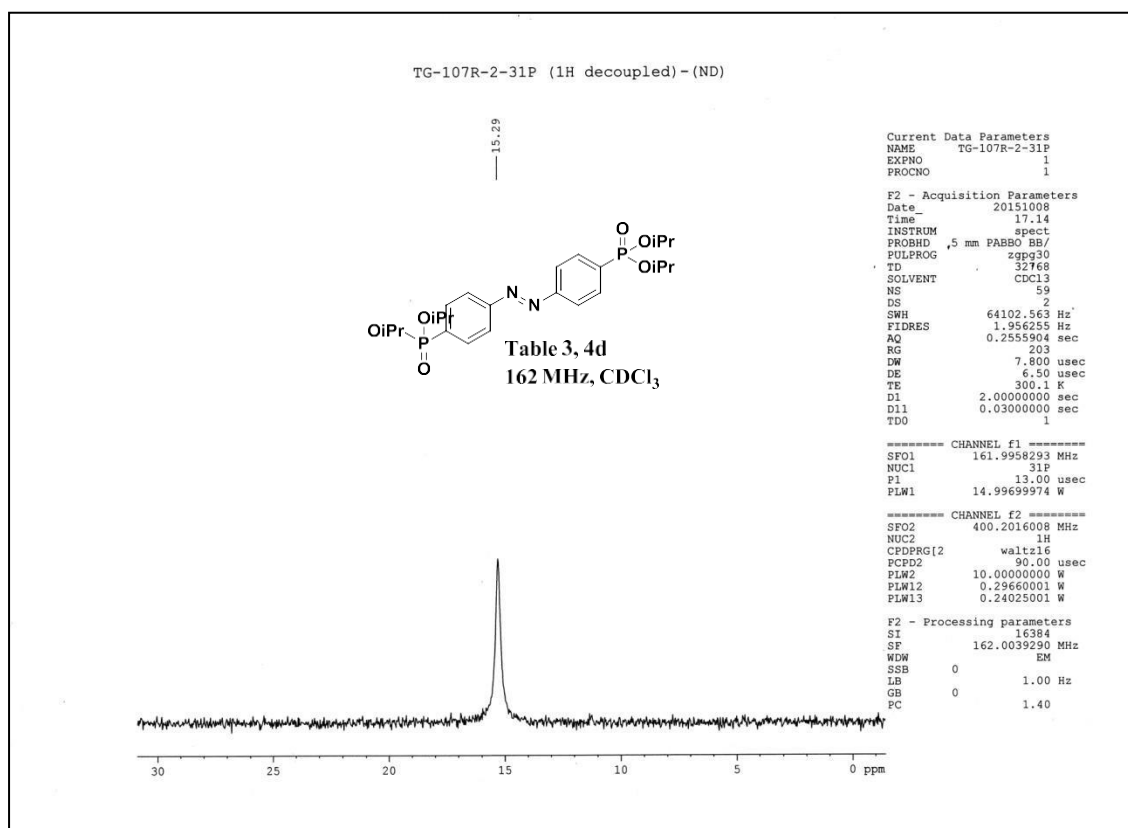


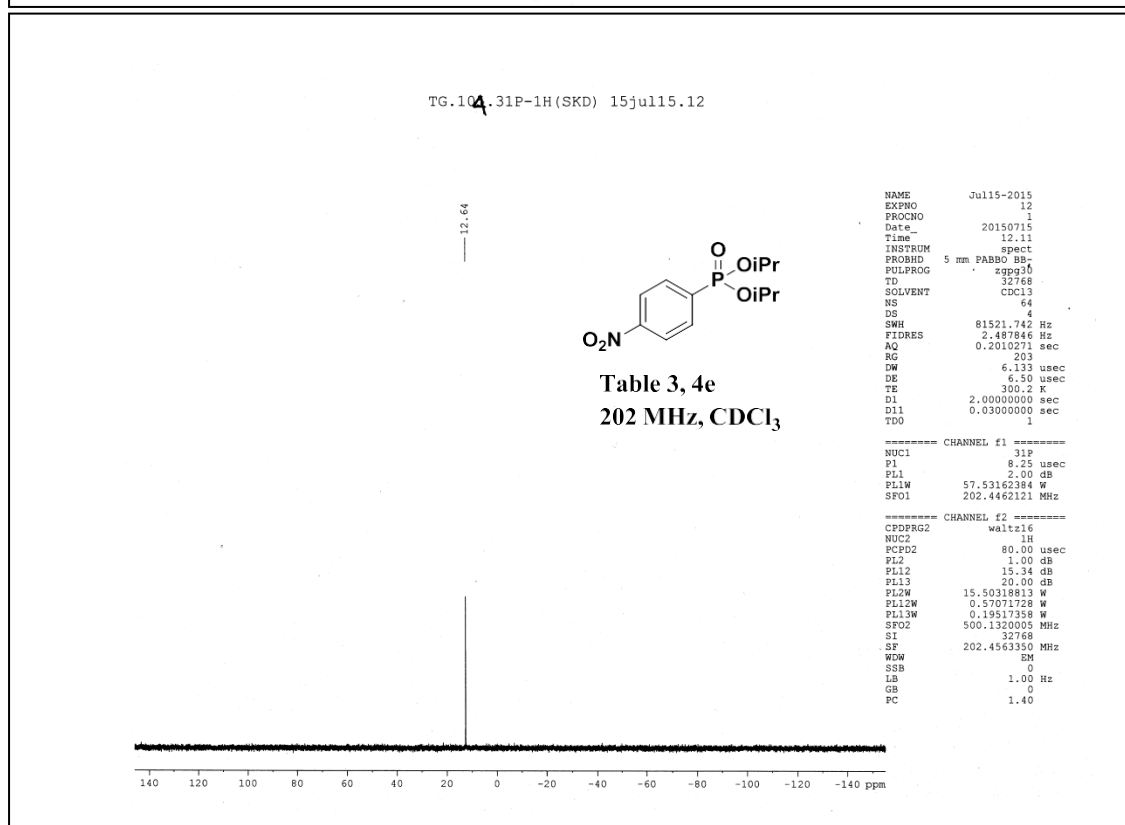
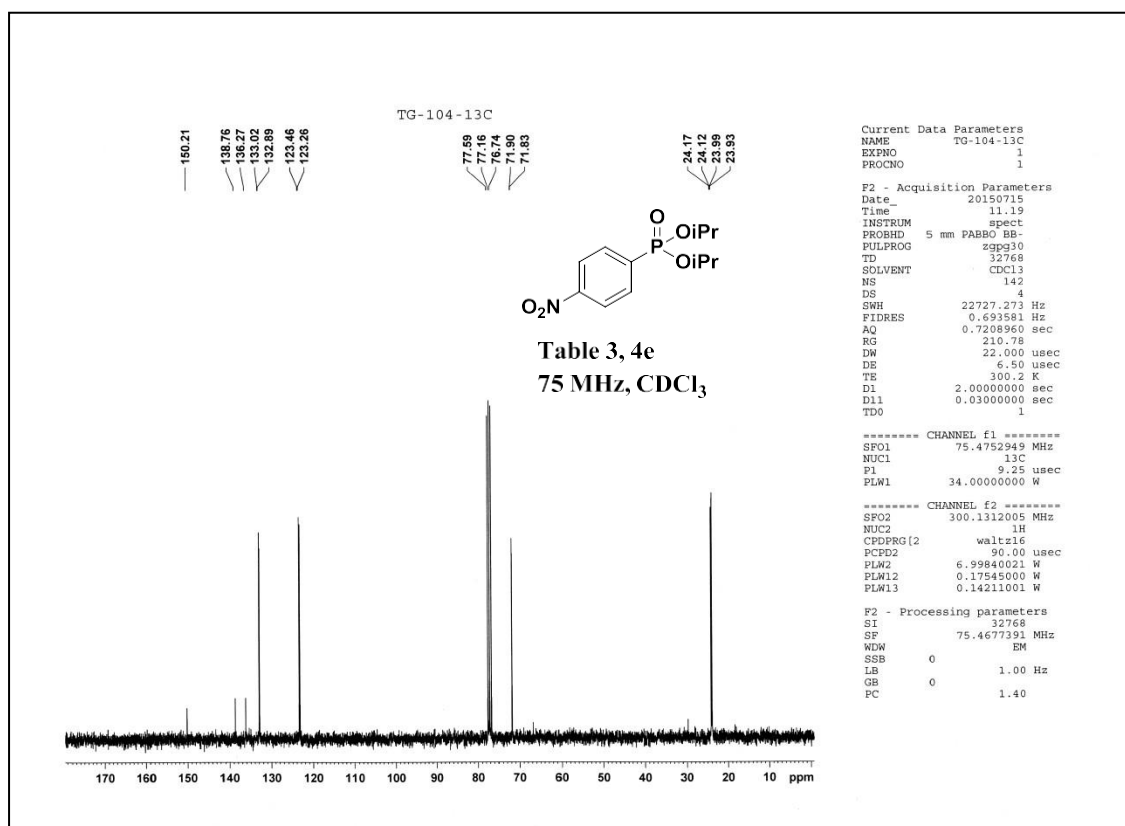


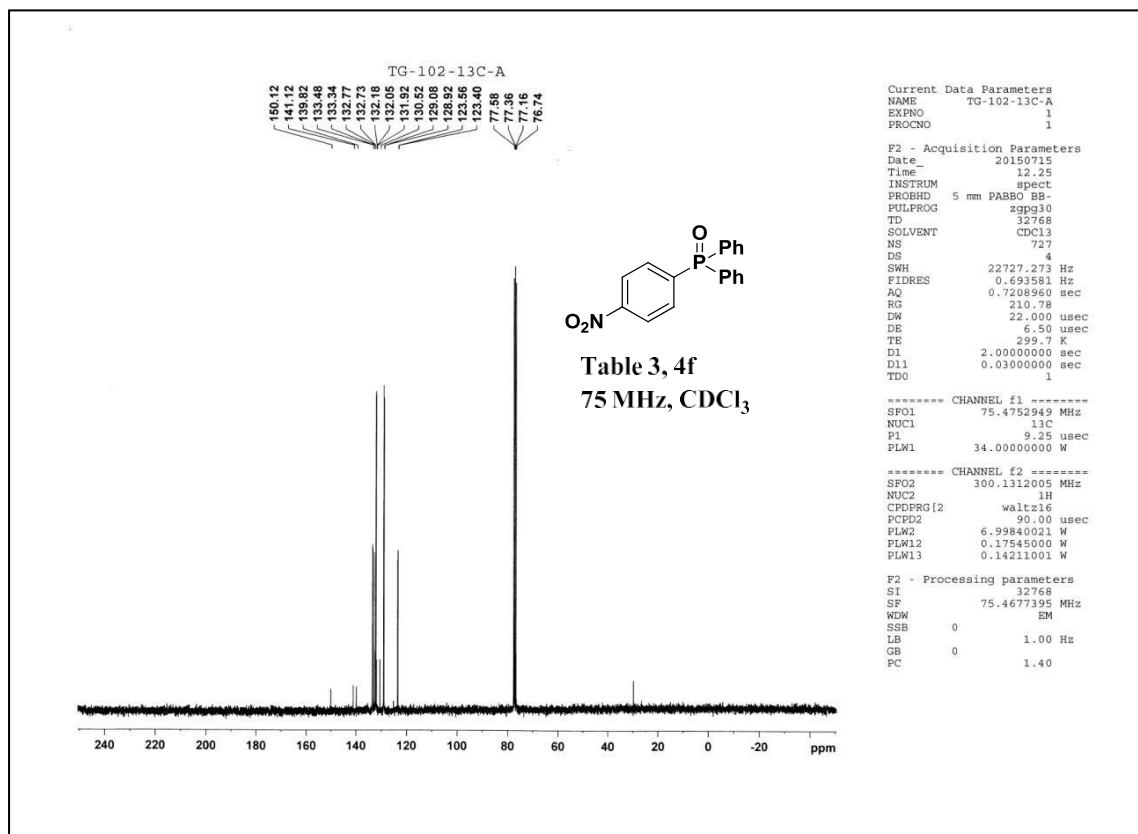
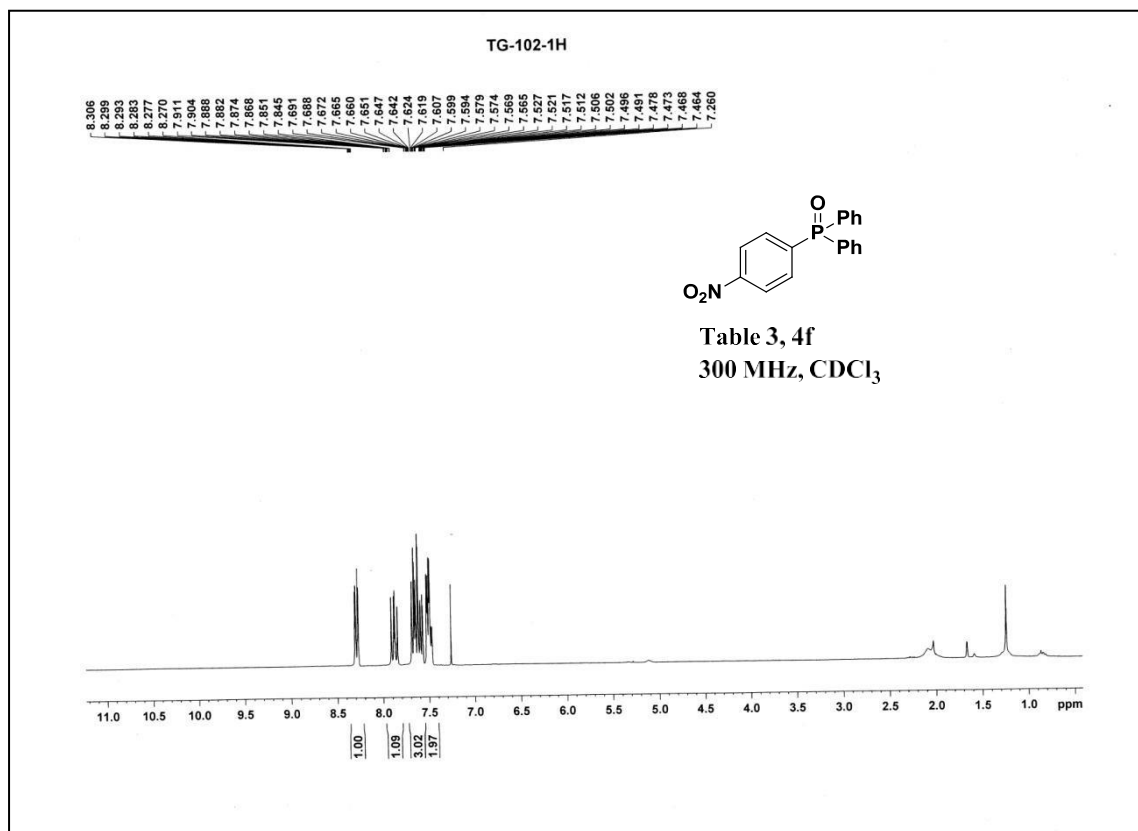












TG.102-31P(SKD) 15jul15.21

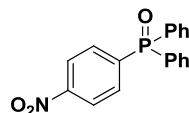
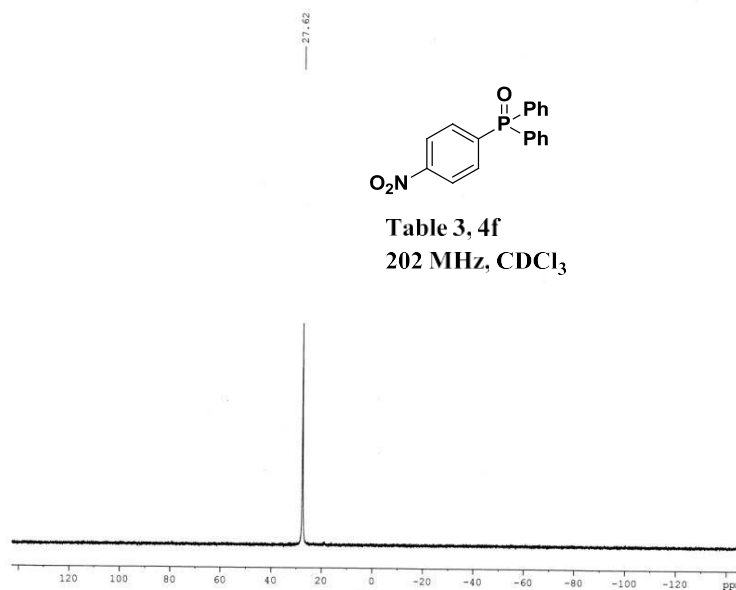


Table 3, 4f
202 MHz, CDCl₃



```

NAME      Jul15-2015
EXPNO     21
PROCNO    1
Date_     20150715
Time      13.28
INSTRUM   spect
PROBHD    5 mm PABBO BB-
PULPROG   zgpg30
TD         32768
SOLVENT   CDCl3
NS         128
DS         4
SWH        81521.742 Hz
FIDRES     2.487846 Hz
AQ         0.2010271 sec
RG         203
DW         6.133 usec
DE         6.50 usec
TE         300.6 K
D1         2.00000000 sec
D11        0.03000000 sec
TDO        1

===== CHANNEL f1 =====
NUC1       31P
P1         8.25 usec
PL1        2.00 dB
PL1W       57.53162384 W
SFO1       202.4462121 MHz

===== CHANNEL f2 =====
CPDPRG2    waltz16
NUC2       1H
PCPD2      80.00 usec
PL2        1.00 dB
PL12       15.34 dB
PL13       20.00 dB
PL1W       15.50318813 W
PL12W      0.57071728 W
PL13W      0.19517358 W
SFO2       500.1320005 MHz
SI         32768
SF         202.4563350 MHz
WDW        EM
SSB         0
LB         1.00 Hz
GB         0
PC         1.40
    
```

TG-183-A-1H.

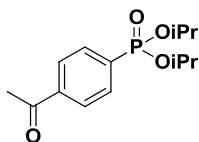
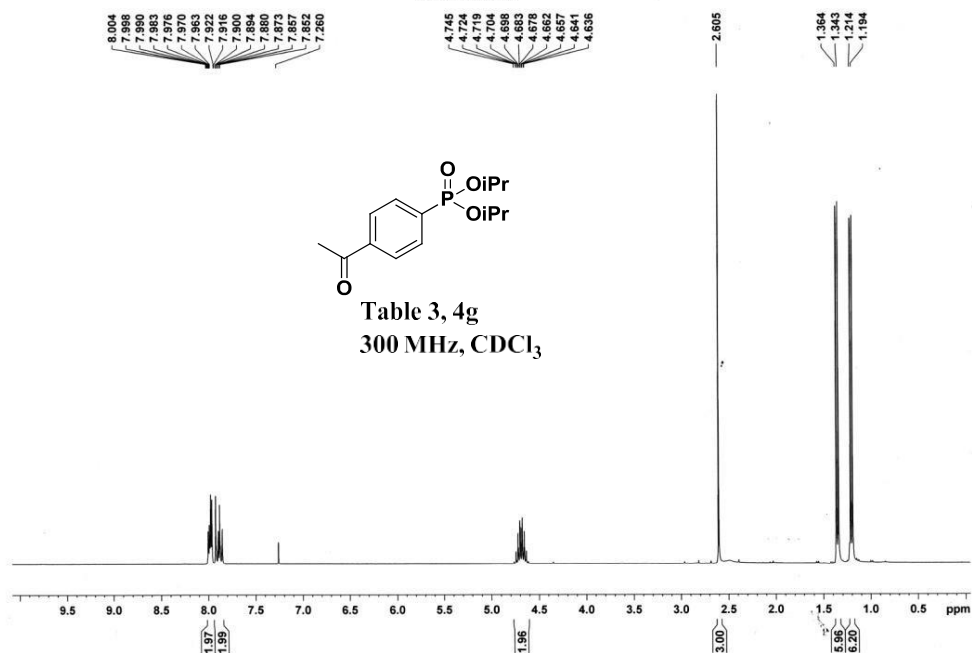
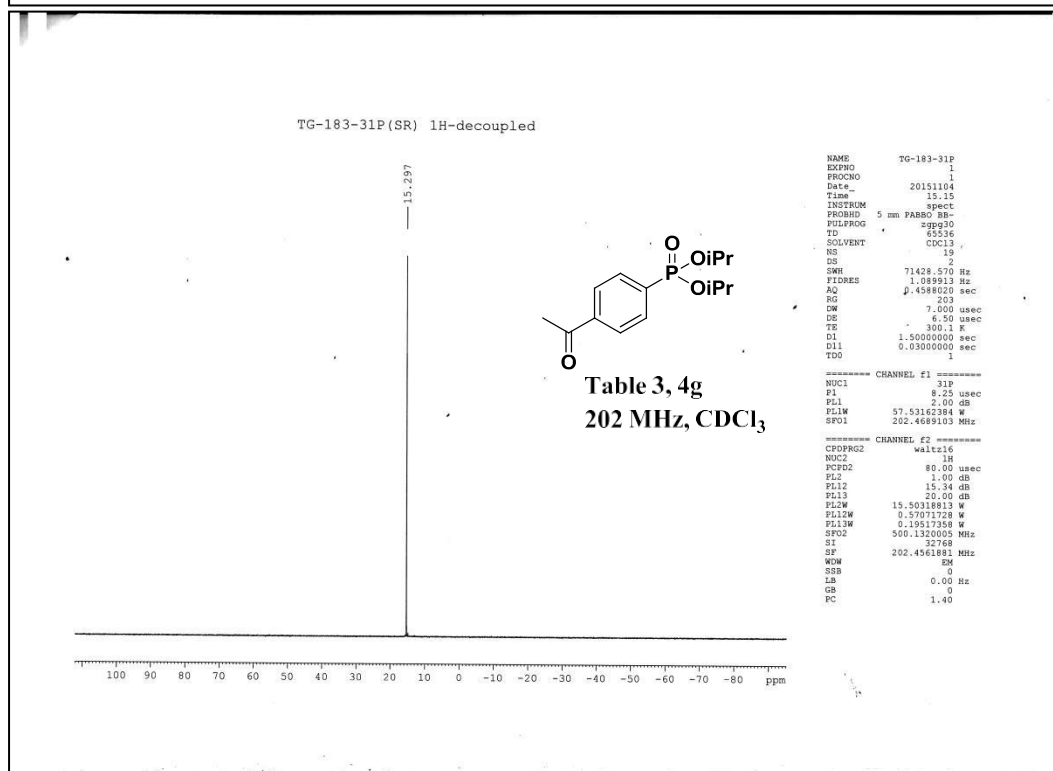
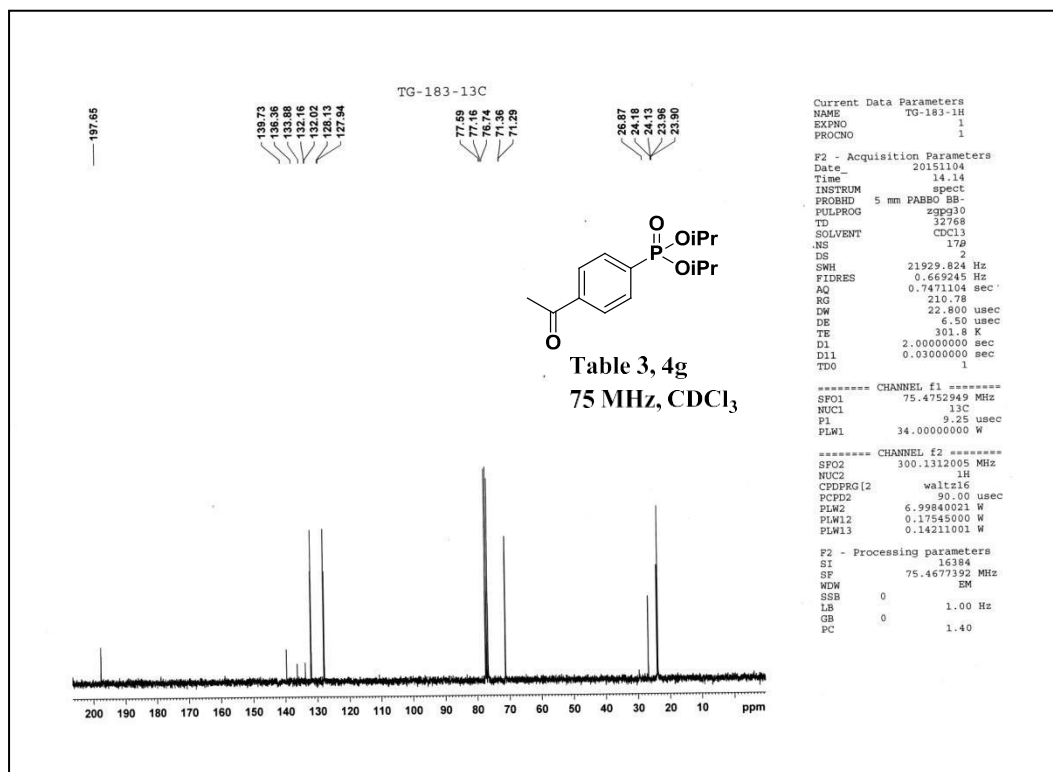
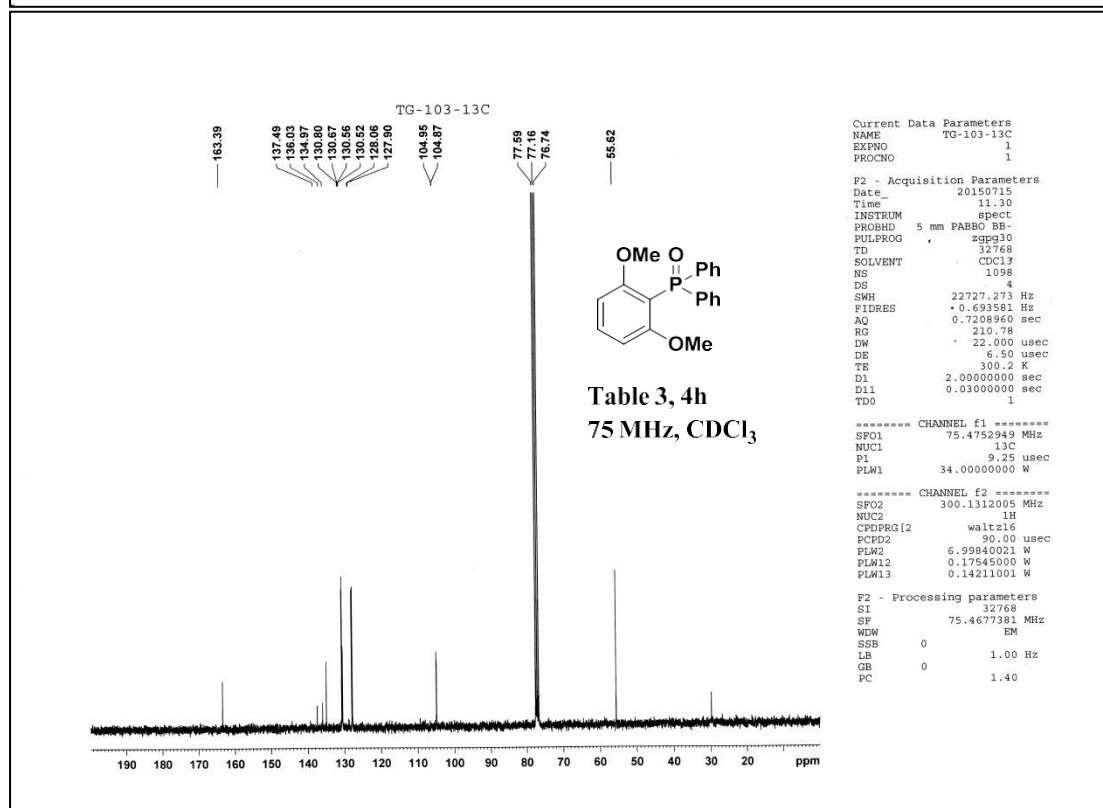
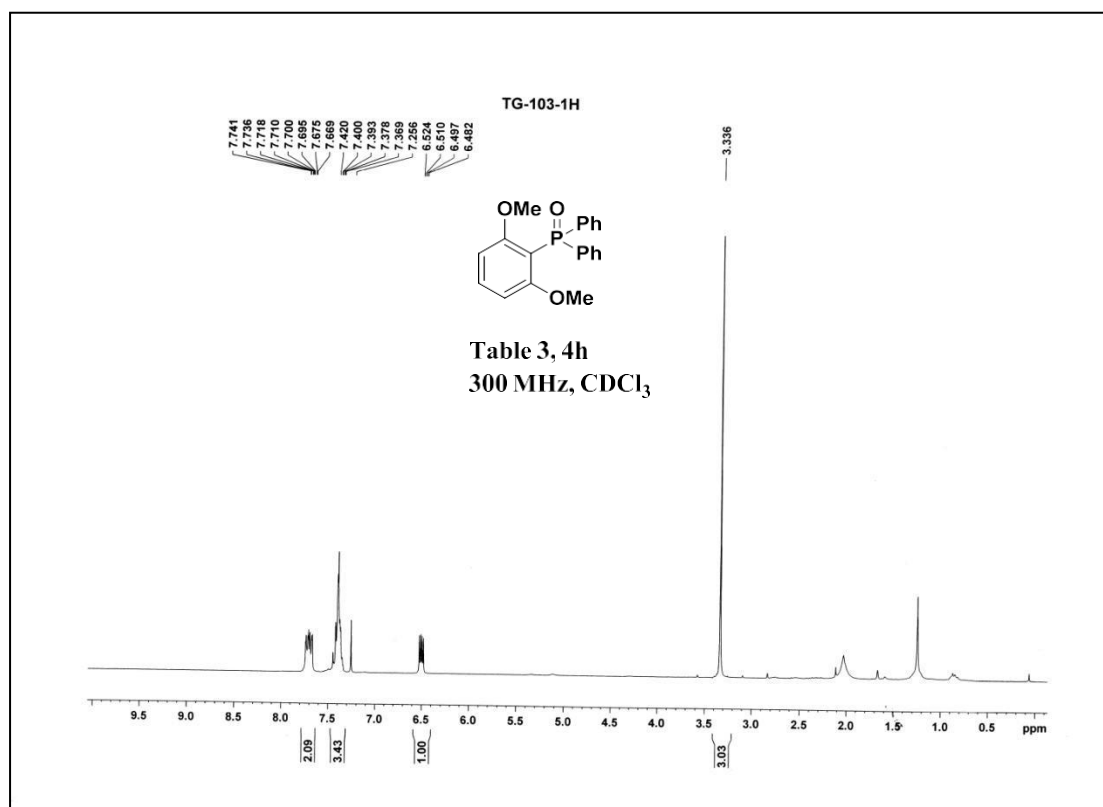


Table 3, 4g
300 MHz, CDCl₃







TG.103-31P(SKD) 13jul15.7

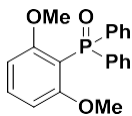
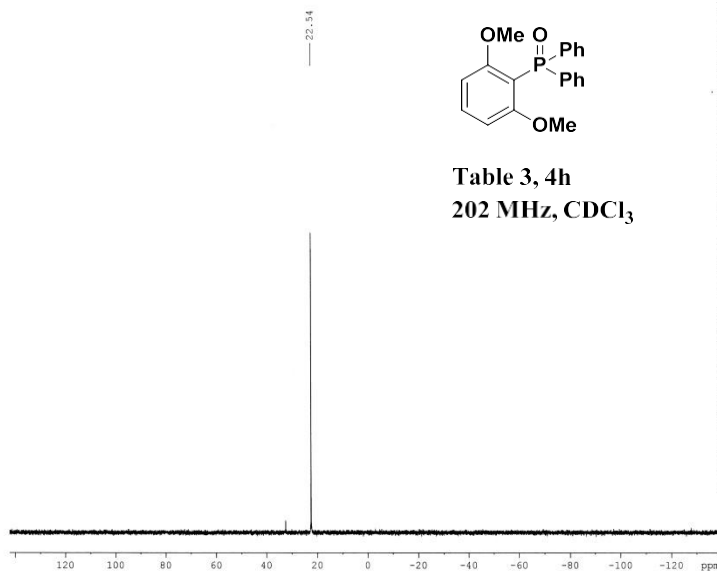


Table 3, 4h
202 MHz, CDCl₃



```

NAME      Jul13-2015
EXPNO     7
PROCNO    1
Date       20150713
Time       11.55
INSTRUM    spect
PROBHD     5 mm PABBO BB-
PULPROG    zgpg30
TD          32768
SOLVENT    CDCl3
NS          32
DS          4
SWH         81521.742 Hz
FIDRES     2.487846 Hz
AQ          0.2010271 sec
RG          203
DM          6.133 usec
DE          6.50 usec
TE          299.9 K
D1          2.00000000 sec
D11         0.03000000 sec
TD0         1

===== CHANNEL f1 =====
NUC1       31P
P1          8.25 usec
PL1         2.00 dB
PL1W        57.53162384 W
SFO1        202.4462121 MHz

===== CHANNEL f2 =====
CPDPRG2    waltz16
NUC2        1H
PCPD2       80.00 usec
PL2          1.00 dB
PL12         15.34 dB
PL13         20.00 dB
PL2W        15.50318813 W
PL12W        0.57071728 W
PL13W        0.18517358 W
SFO2        500.1320005 MHz
SI          32768
SF          202.4563350 MHz
WDW         EM
SSB          0
LB           1.00 Hz
GB           0
PC           1.40
    
```

TG-228-1H

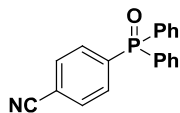
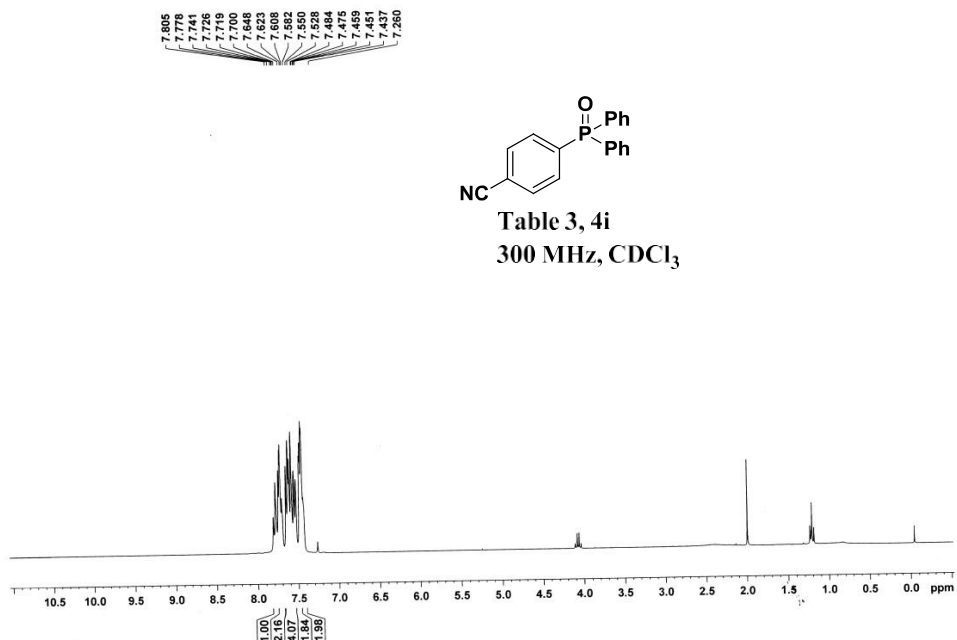
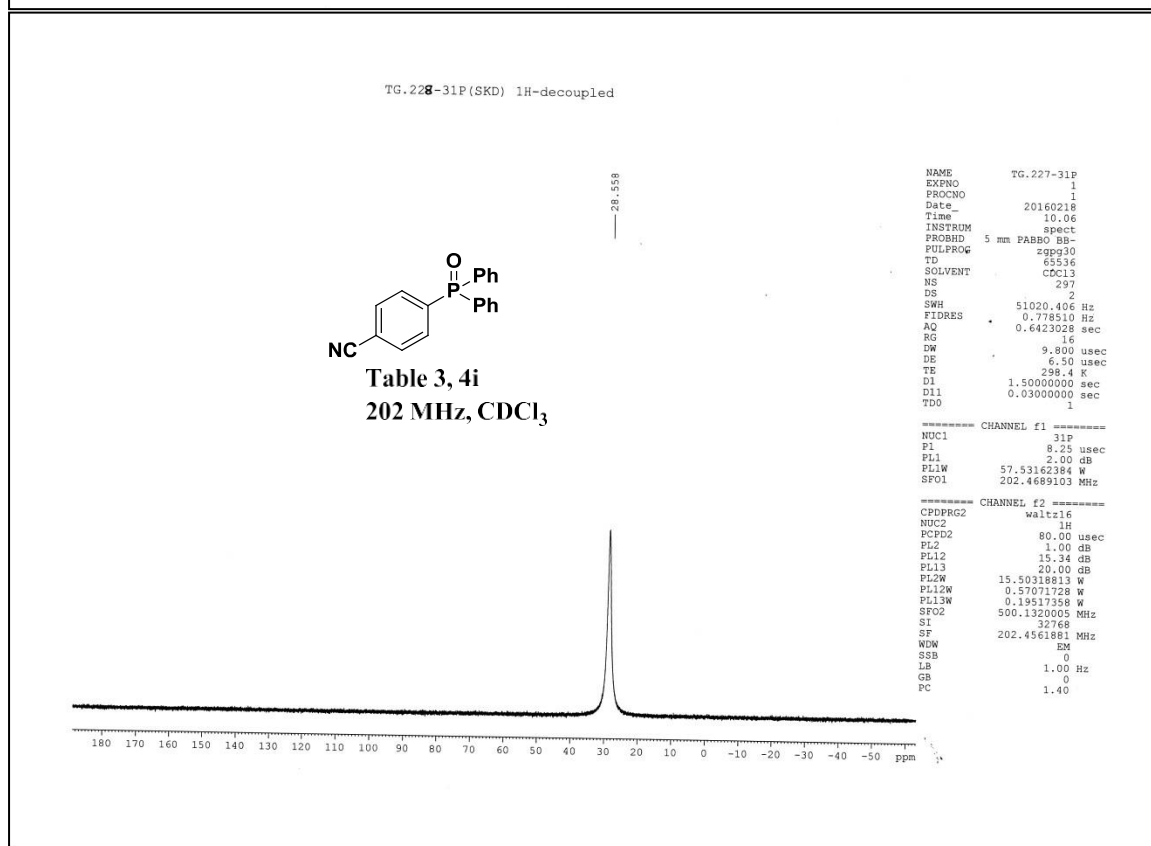
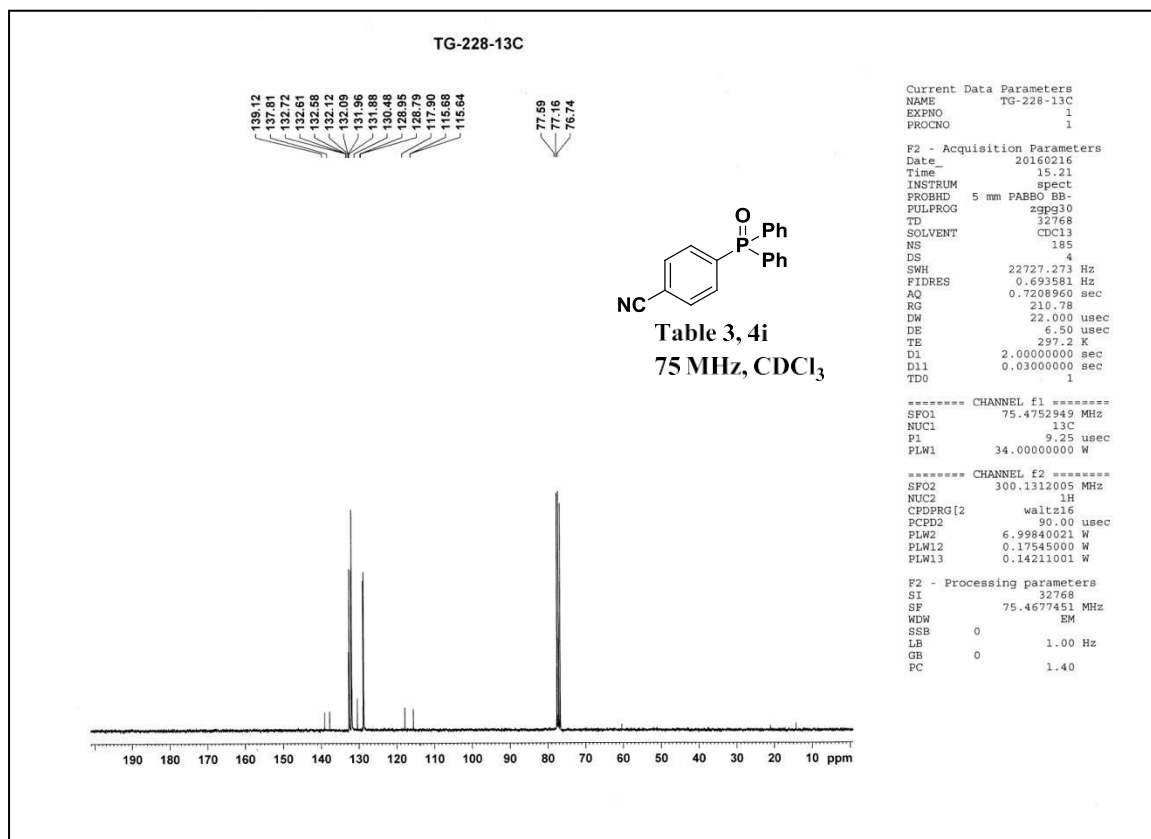
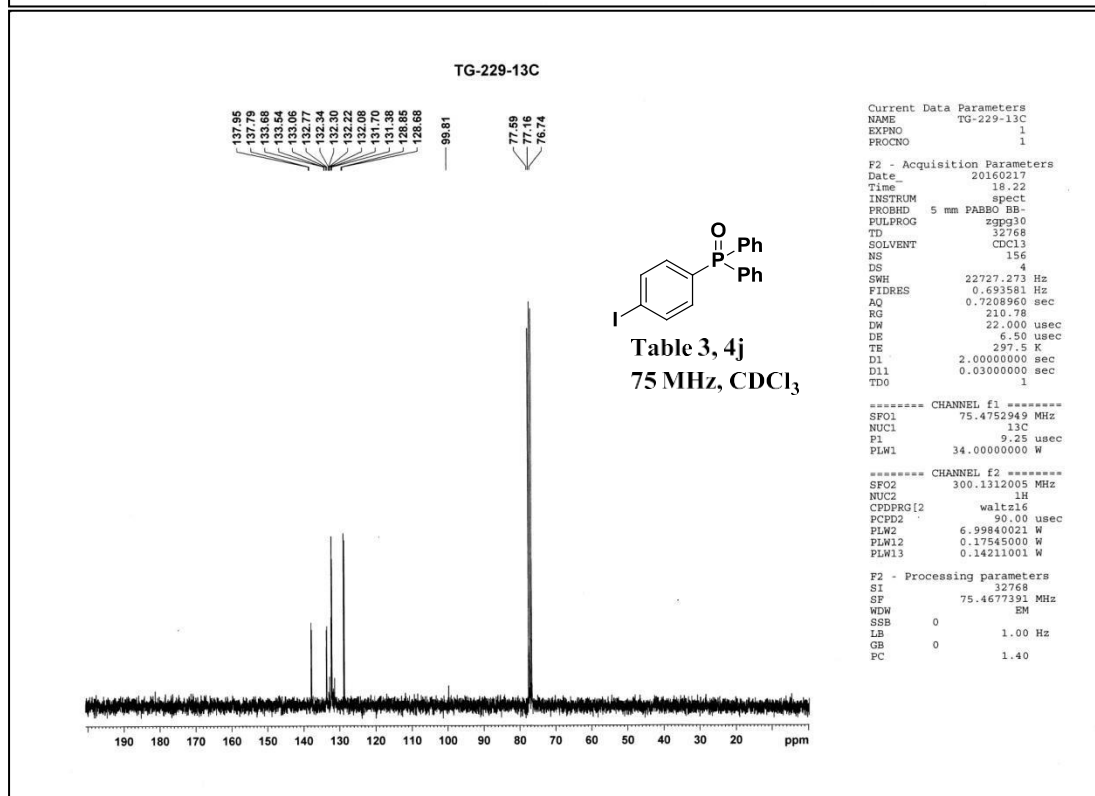
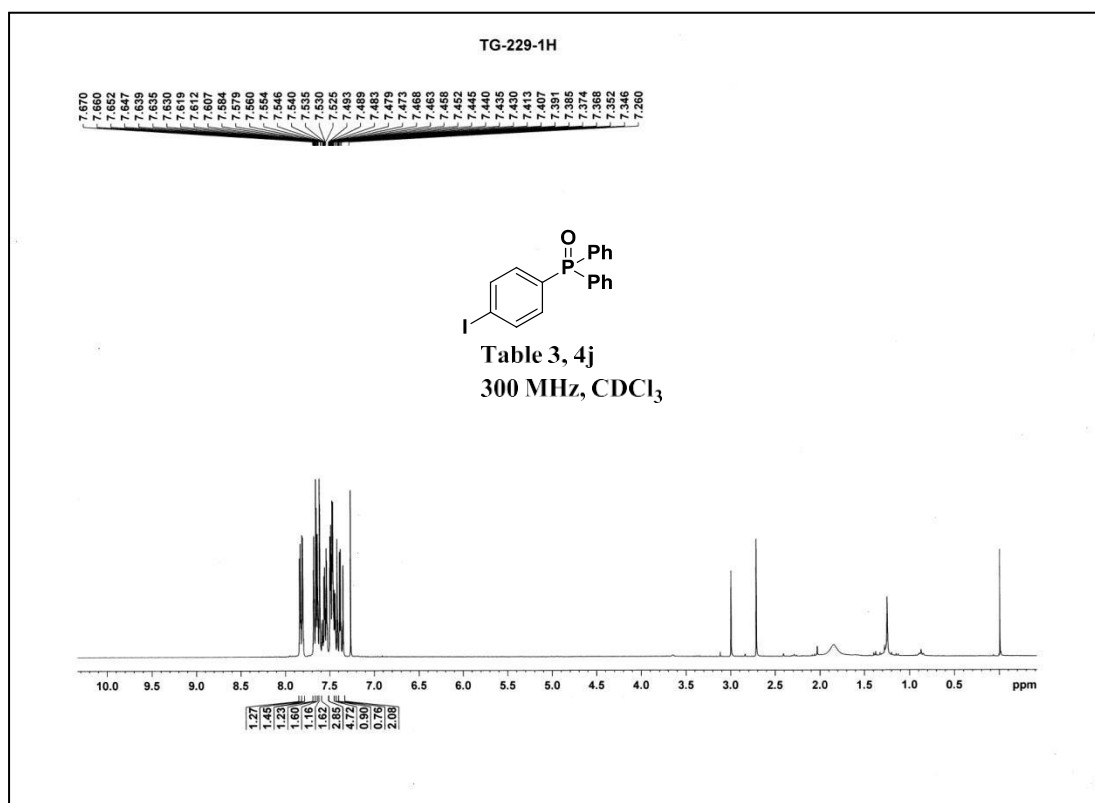
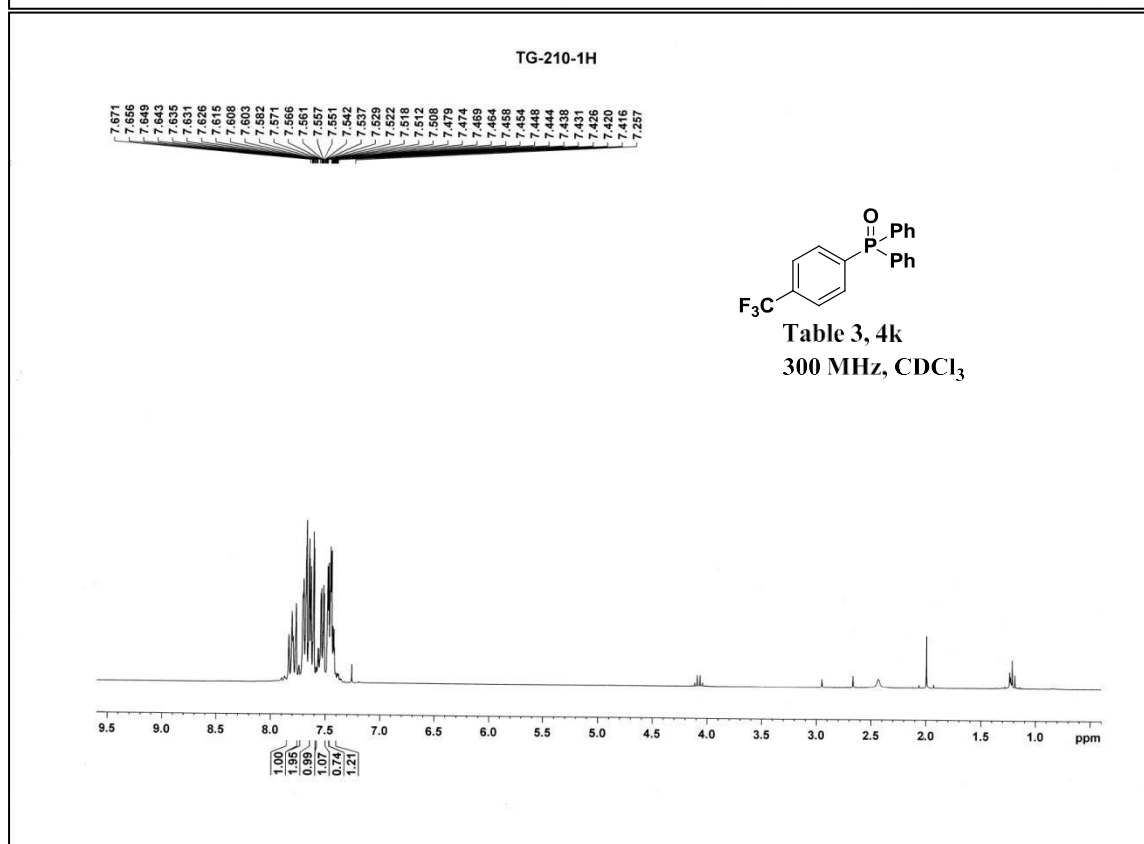
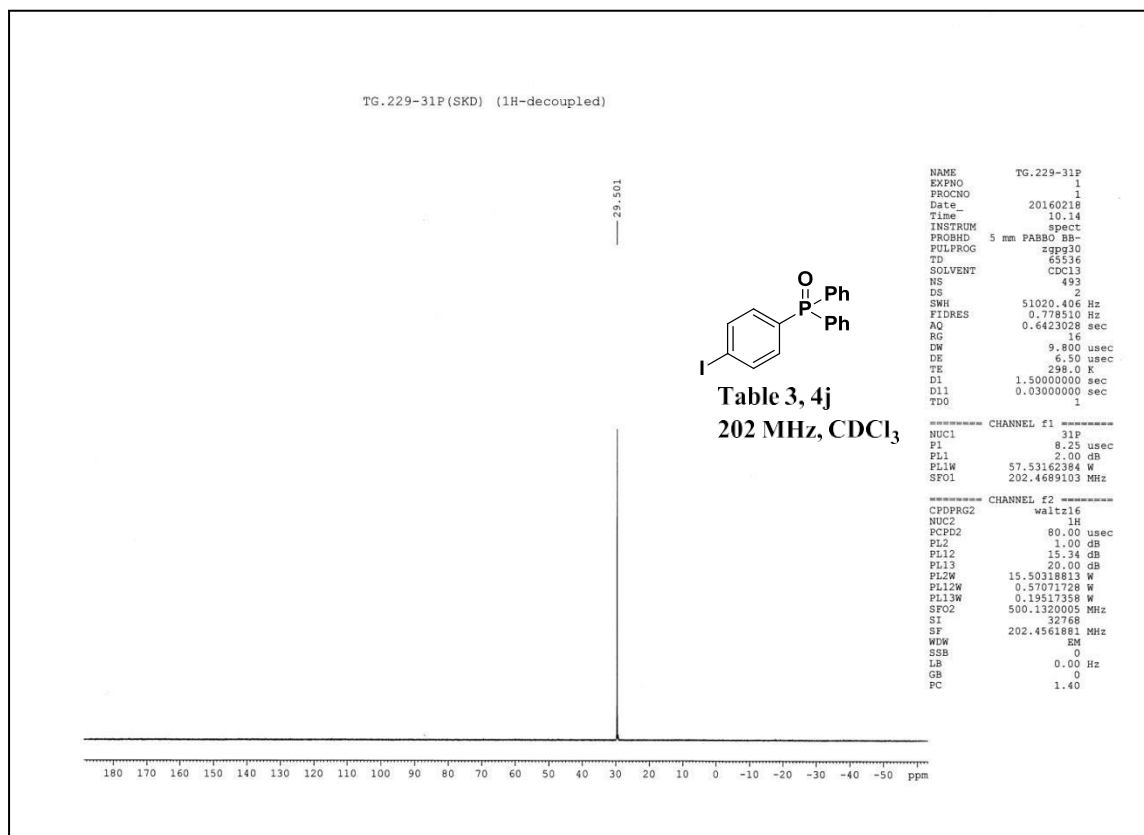


Table 3, 4i
300 MHz, CDCl₃









TG-210-13C

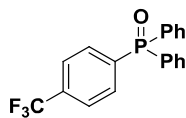
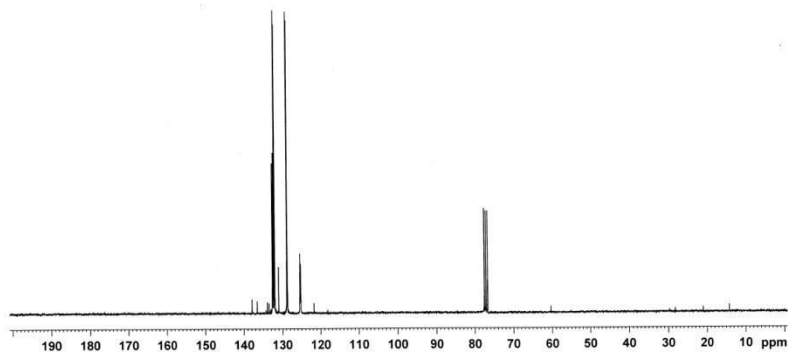


Table 3, 4k
75 MHz, CDCl₃



Current Data Parameters
NAME TG-210-13C
EXPNO 1
PROCNO 1

F2 - Acquisition Parameters
Date_ 20160121
Time 17.35
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zgpg30
TD 32768
SOLVENT CDCl3
NS 621
DS 4
SWH 22727.273 Hz
FIDRES 0.693581 Hz
AQ 0.7208960 sec
RG 210.78
DW 22.000 usec
DE 6.50 usec
TE 301.0 K
D1 2.0000000 sec
D11 0.0300000 sec
TDO 1

===== CHANNEL f1 =====
SFO1 75.4752949 MHz
NUC1 13C
P1 9.25 usec
PLW1 34.0000000 W
===== CHANNEL f2 =====
SFO2 300.1312005 MHz
NUC2 1H
CPDPRG2 waltz16
PCPD2 90.00 usec
PLM2 6.99840021 W
PLW2 0.17545000 W
PLW3 0.14211001 W

F2 - Processing parameters
SI 32768
SF 75.4677446 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40

TG.210-31P(SKD)
(1H-decoupled)

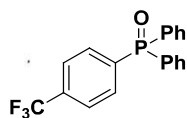
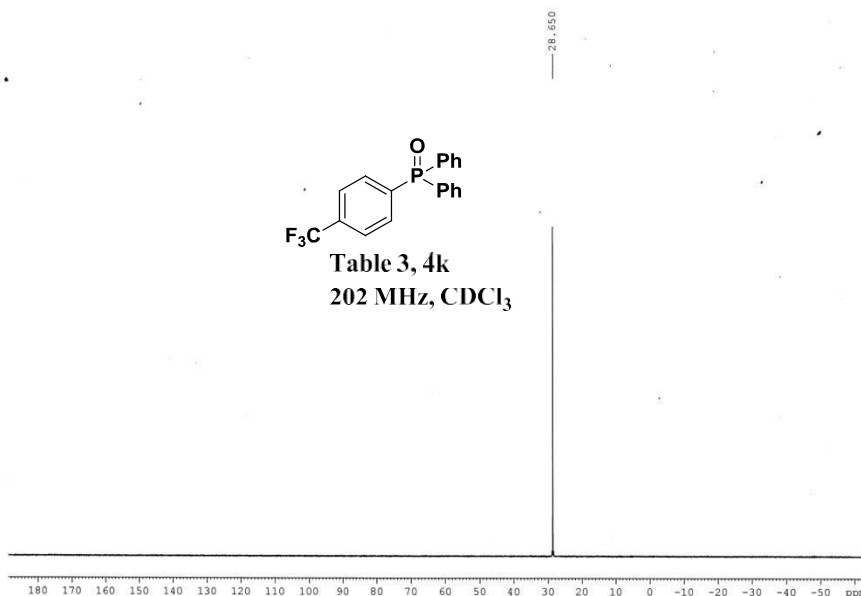


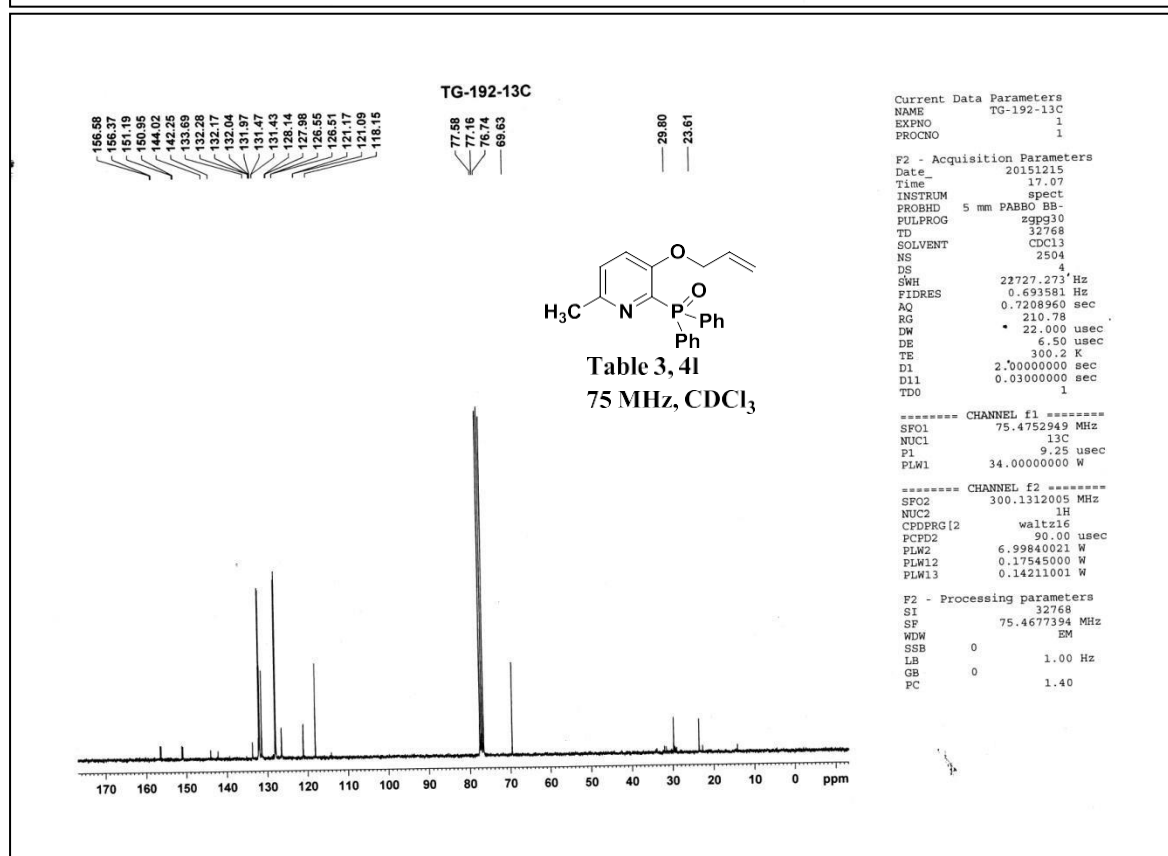
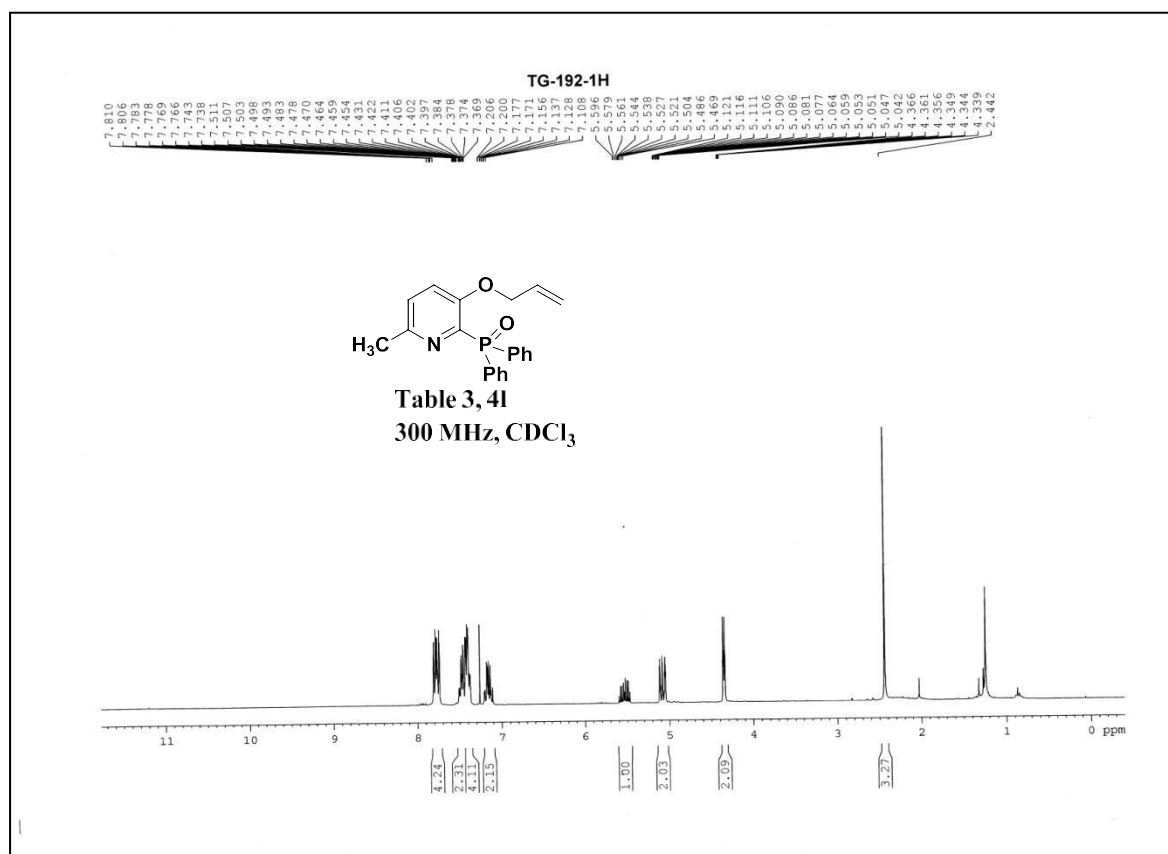
Table 3, 4k
202 MHz, CDCl₃

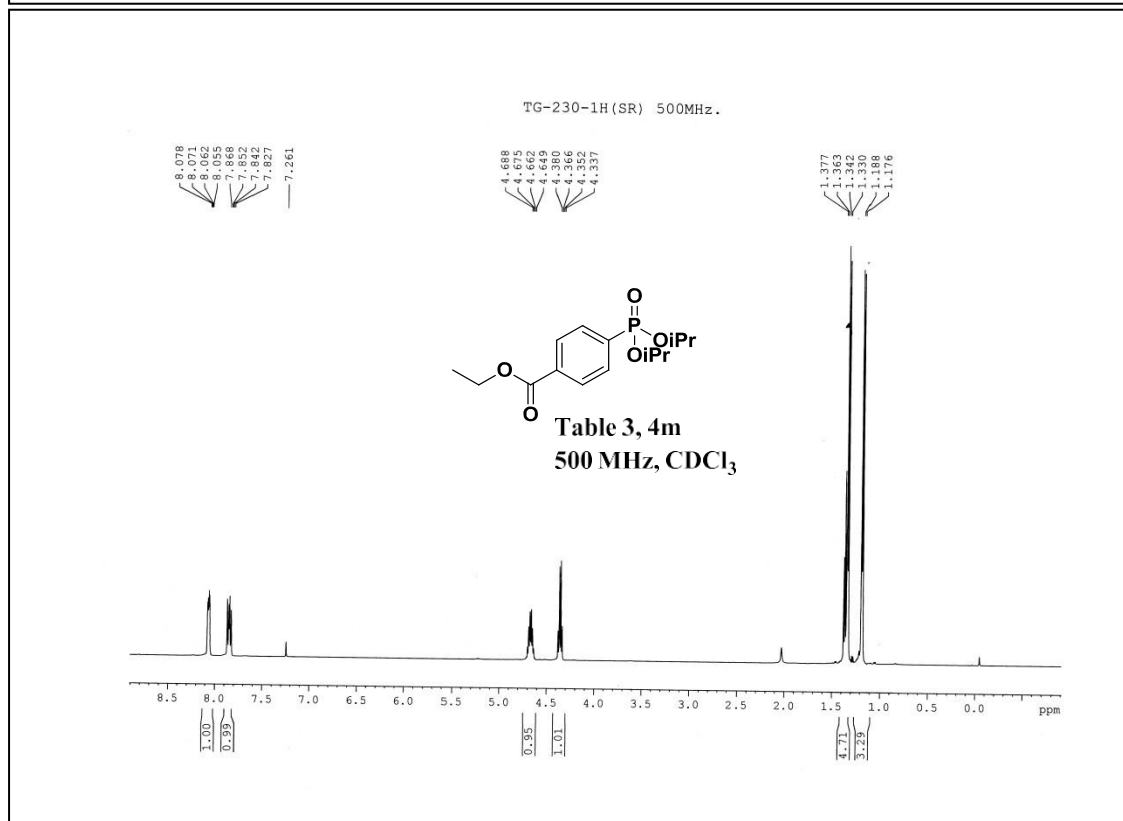
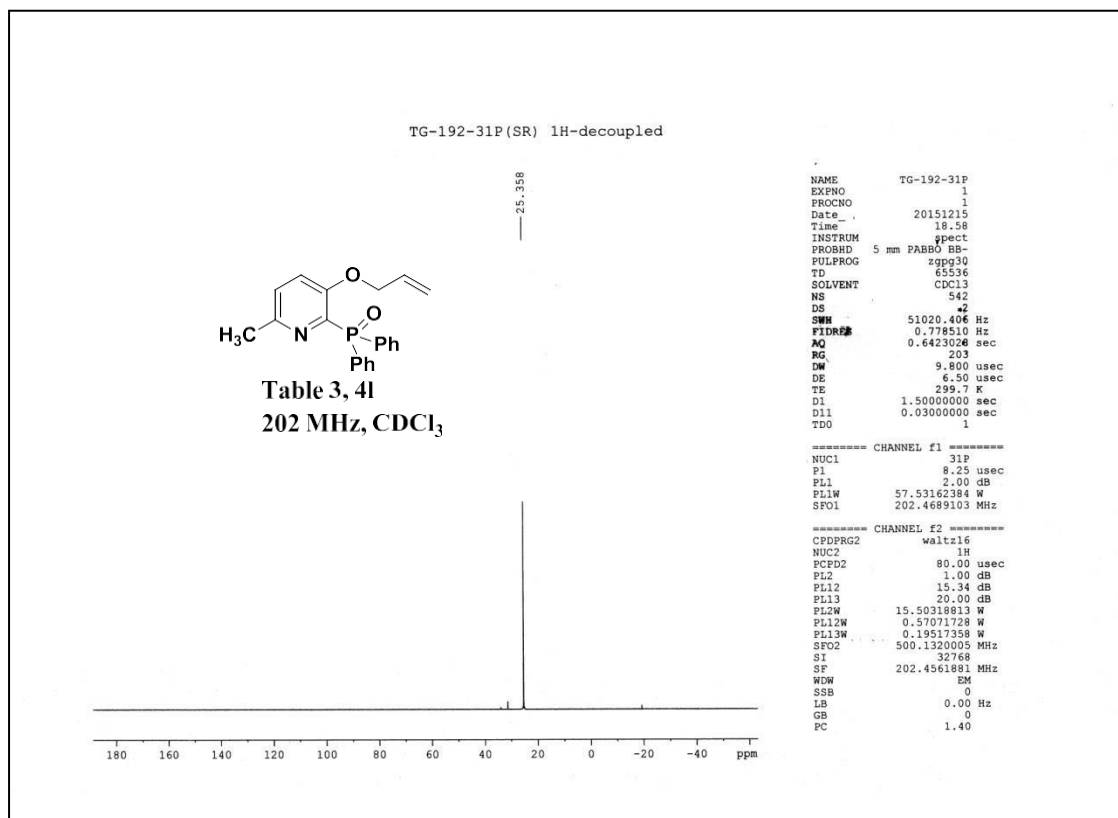


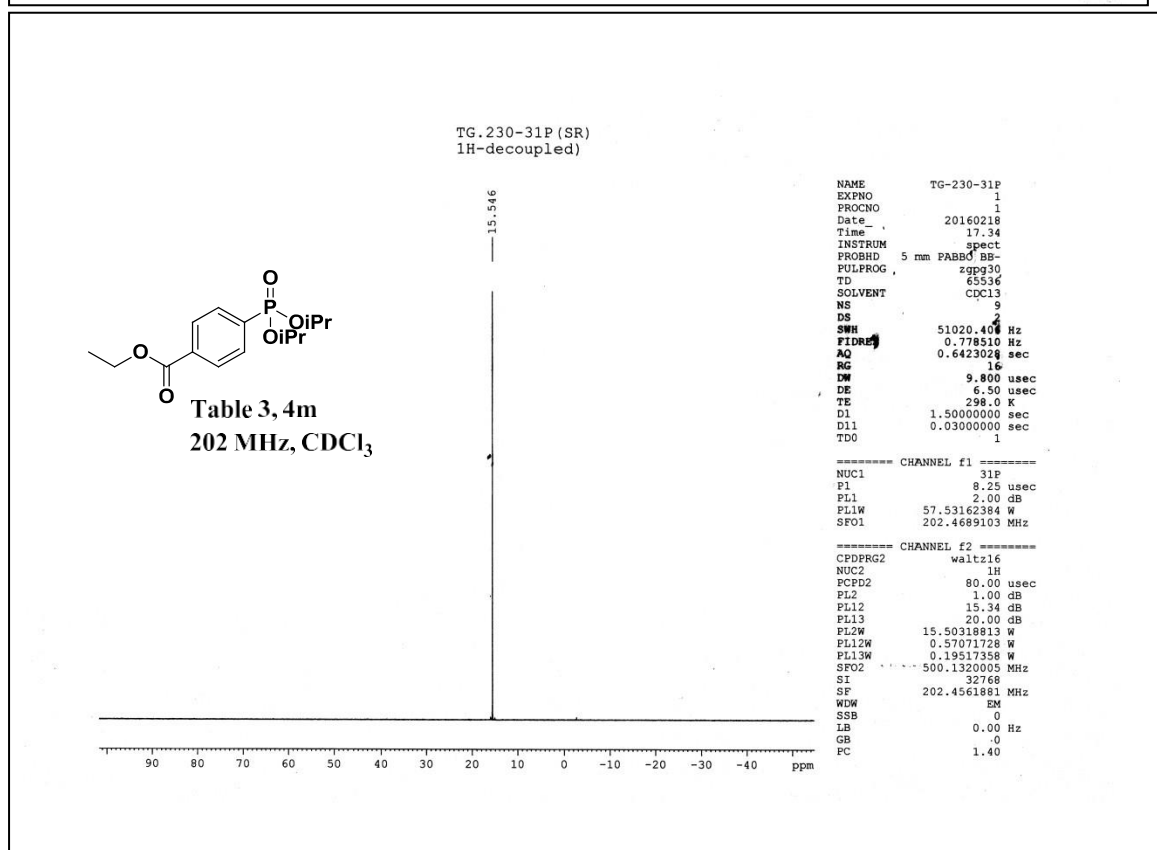
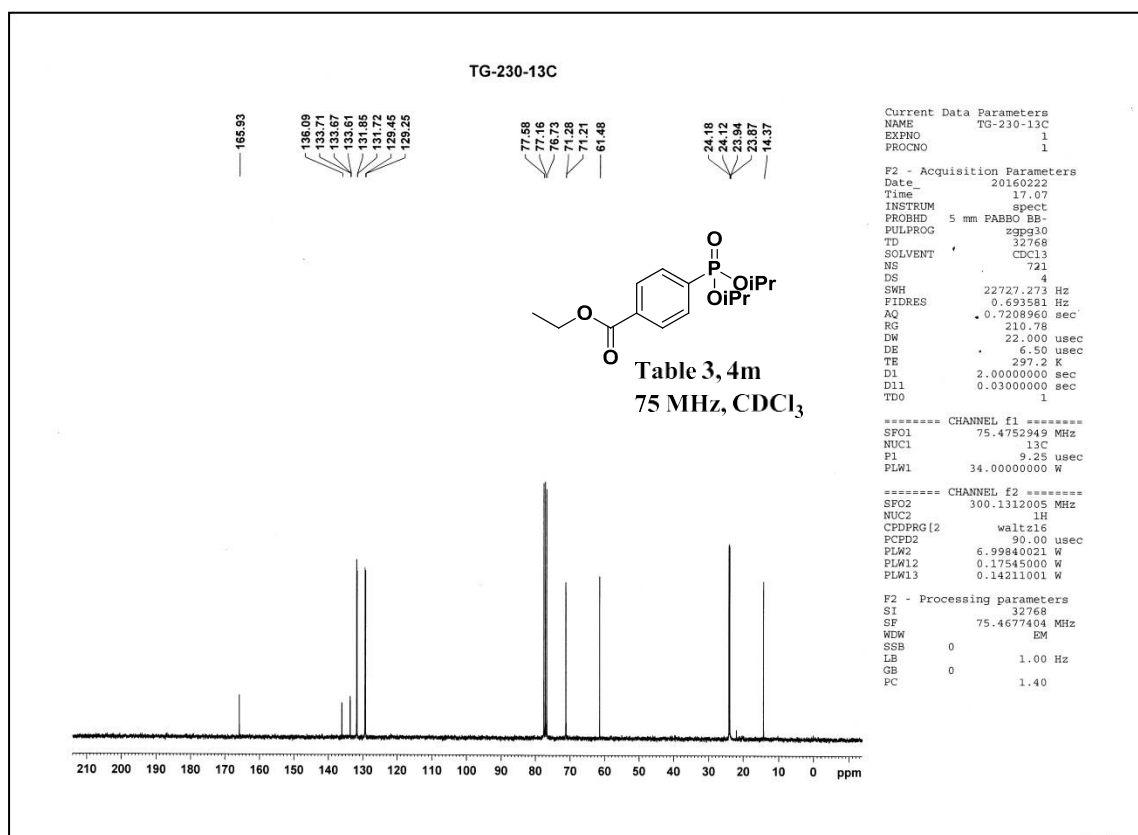
NAME TG.210-31P
EXPNO 1
PROCNO 1
Date_ 20160122
Time 10.05
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 28
DS 2
SWH 51020.406 Hz
FIDRES 0.778510 Hz
AQ 0.6423028 sec
RG 8
DW 9.800 usec
DE 6.50 usec
TE 298.8 K
D1 1.5000000 sec
D11 0.0300000 sec
TDO 1

===== CHANNEL f1 =====
NUC1 31P
P1 8.25 usec
PL1 2.00 dB
PLW 57.53162384 W
SFO1 202.4689103 MHz

===== CHANNEL f2 =====
CPDPRG2 waltz16
NUC2 1H
FCPD2 80.00 usec
PL2 1.00 dB
PL12 15.34 dB
PL13 20.00 dB
PL2W 15.50318813 W
PL12W 0.57071728 W
PL13W 0.19517358 W
SFO2 500.1320005 MHz
SI 32768
SF 202.4561881 MHz
WDW EM
SSB 0
LB 0.00 Hz
GB 0
PC 1.40







TG-212A-1H

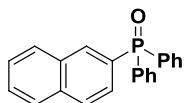
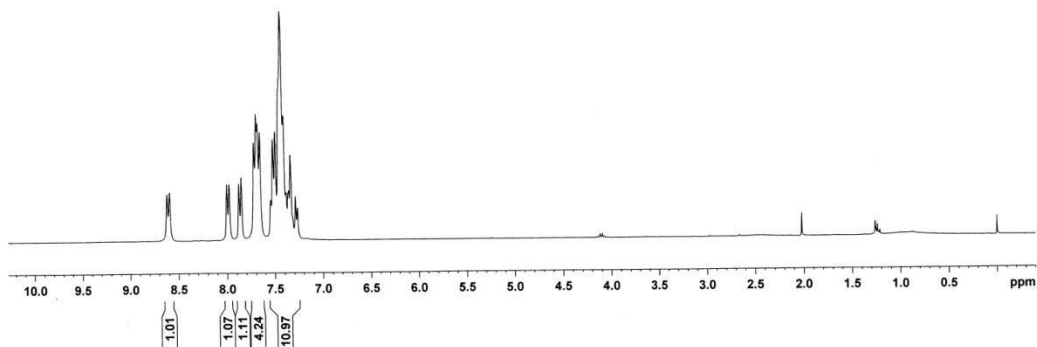


Table 3, 4n
300 MHz, CDCl₃



TG-212A-13C

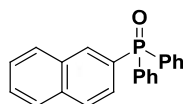
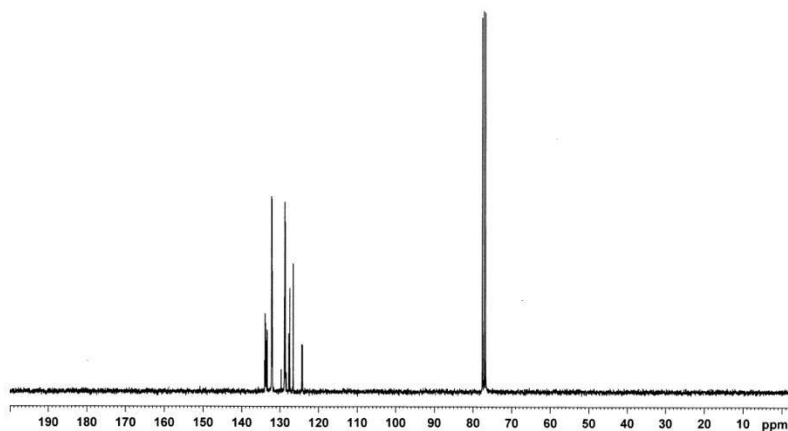


Table 3, 4n
75 MHz, CDCl₃



Current Data Parameters
NAME TG-212A-13C
EXPNO 1
PROCNO 1

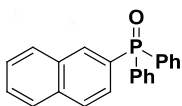
F2 - Acquisition Parameters
Date_ 20160204
Time 11.13
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zgpg30
TD 32768
SOLVENT CDCl3
NS 145
DS 2
SWH 21929.824 Hz
FIDRES 0.669245 Hz
AQ 0.7471104 sec
RG 210.78
DW 22.800 usec
DE 6.50 usec
TE 299.4 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1

===== CHANNEL f1 =====
SFO1 75.4752949 MHz
NUC1 13C
P1 9.25 usec
PLN1 34.00000000 W

===== CHANNEL f2 =====
SFO2 300.1312005 MHz
NUC2 1H
CPDPRG[2] waltz16
PCPD2 90.00 usec
PLN2 6.99840021 W
PLN12 0.17845000 W
PLN13 0.14211001 W

F2 - Processing parameters
SI 16384
SF 75.4677425 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40

—32.19



```

F2 - Acquisition Parameters
Date_      20160204
Time_      12.43
INSTRUM    spect
PROBHD     5 mm PABBO BB/
PULPROG    zgpg30
TD          32768
SOLVENT    CDCl3
NS          90
DS          2
SWH         64102.563 Hz
FIDRES     1.956255 Hz
AQ         0.2553904 sec
RG         16
DW          7.800 usec
DE          6.50 usec
TE          298.5 K
D1          2.0000000 sec
D11         0.0300000 sec
TD0         1

```

```

===== CHANNEL f1 =====
SFO1      161.9958293 MHz
NUC1              31P
P1              13.00 usec
PLW1      14.99699974 W

```

```

SFO2      400.2016008 MHz
NUC2      1H
CPDPRG[2  waltz16
PCPD2     90.00 usec
PLW2      10.00000000 W
PLW12     0.29660000 W
PLW13     0.24025001 W

```

```
F2 - Processing parameters
SI                16384
SF                162.0039290 MHz
WDW              EM
SSB              0
LB                1.00 Hz
GB              0
PC                1.40
```

TG-187R-1H

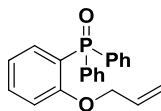


Table 3, 4o
300 MHz, CDCl₃

