

Supporting information

Metal-Free Biaryl Coupling Reaction Activated by a Sulfonium Salt

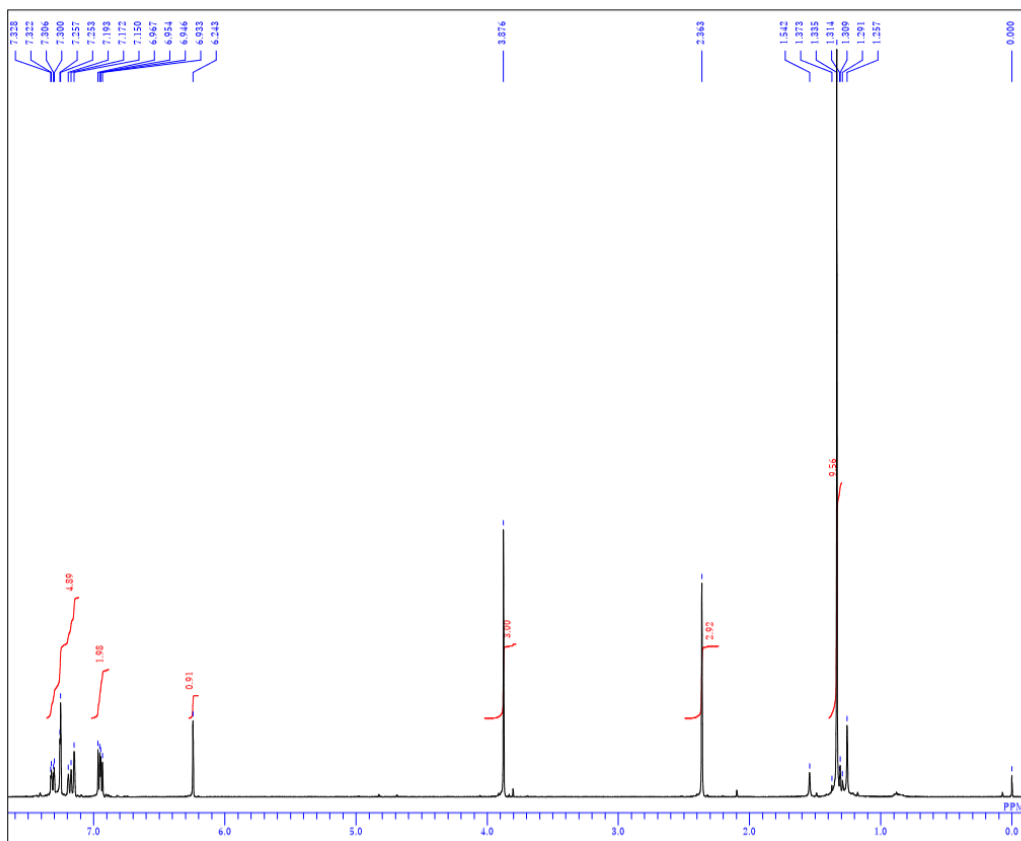
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Shigeo Sugiyama and Tomomi Kawasaki

Meiji Pharmaceutical University, 2-522-1 Noshio, Kiyose, Tokyo 204-8588, Japan

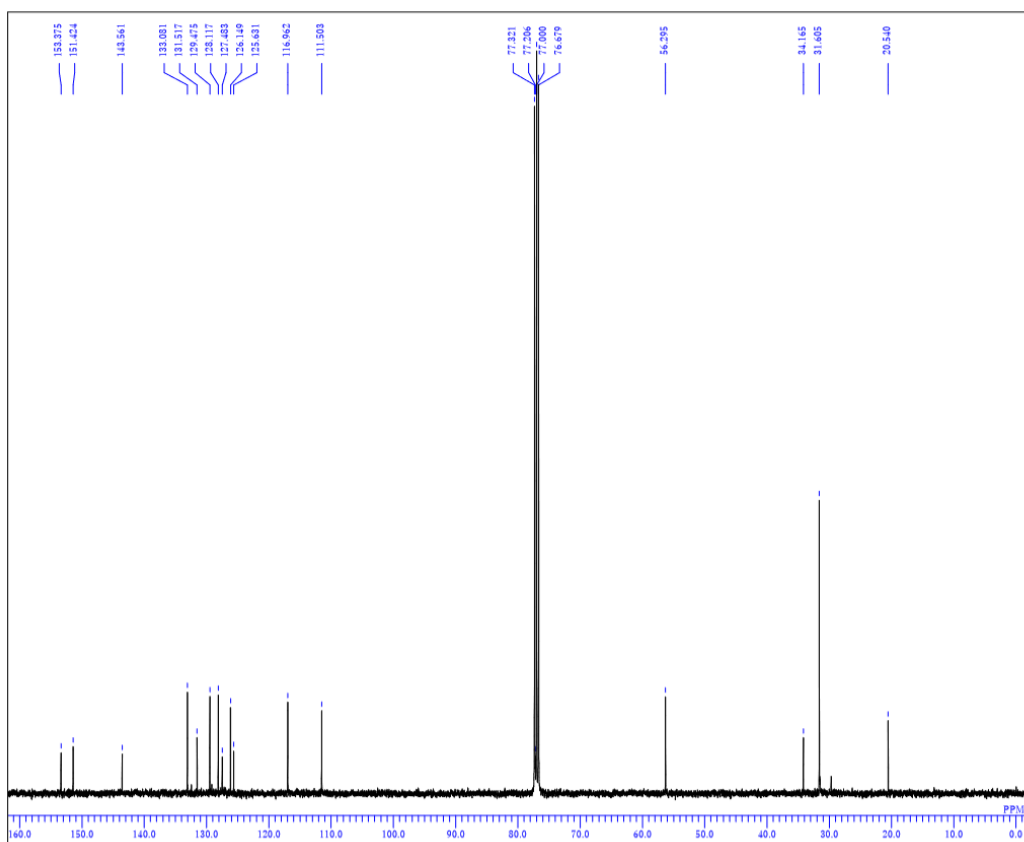
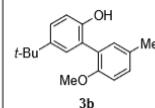
E-mail: khiguchi@my-pharm.ac.jp

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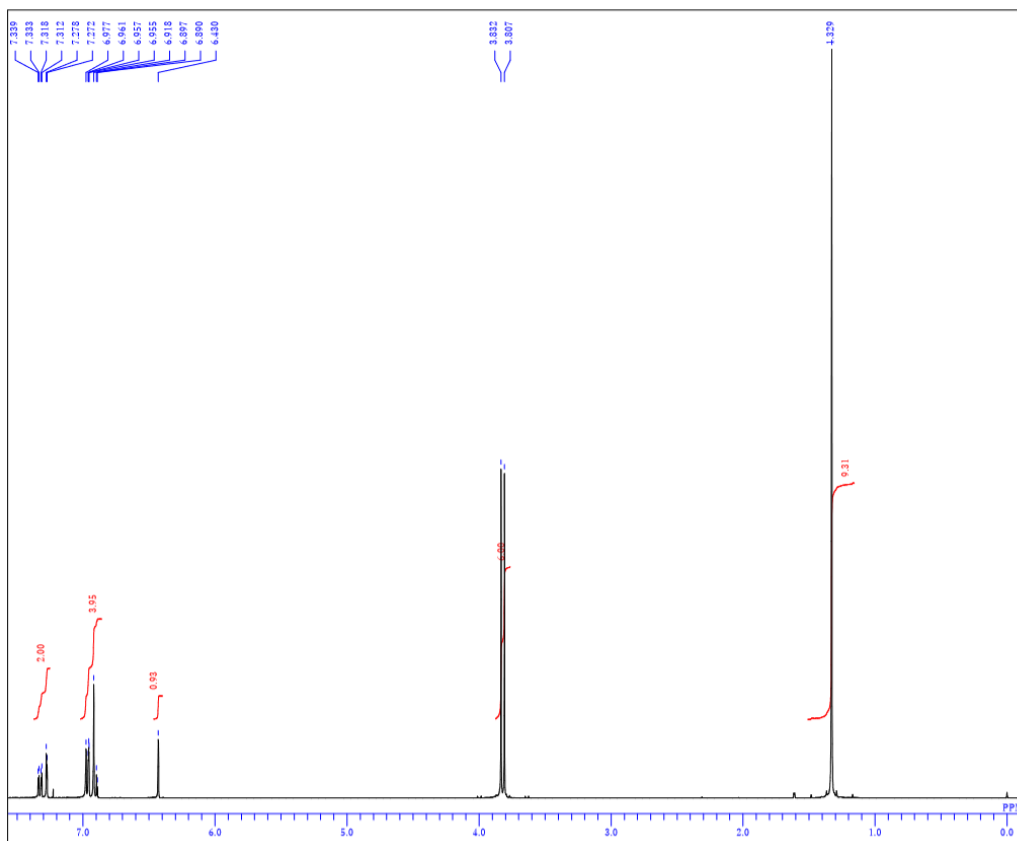
Copies of ^1H and ^{13}C NMR spectra of compounds



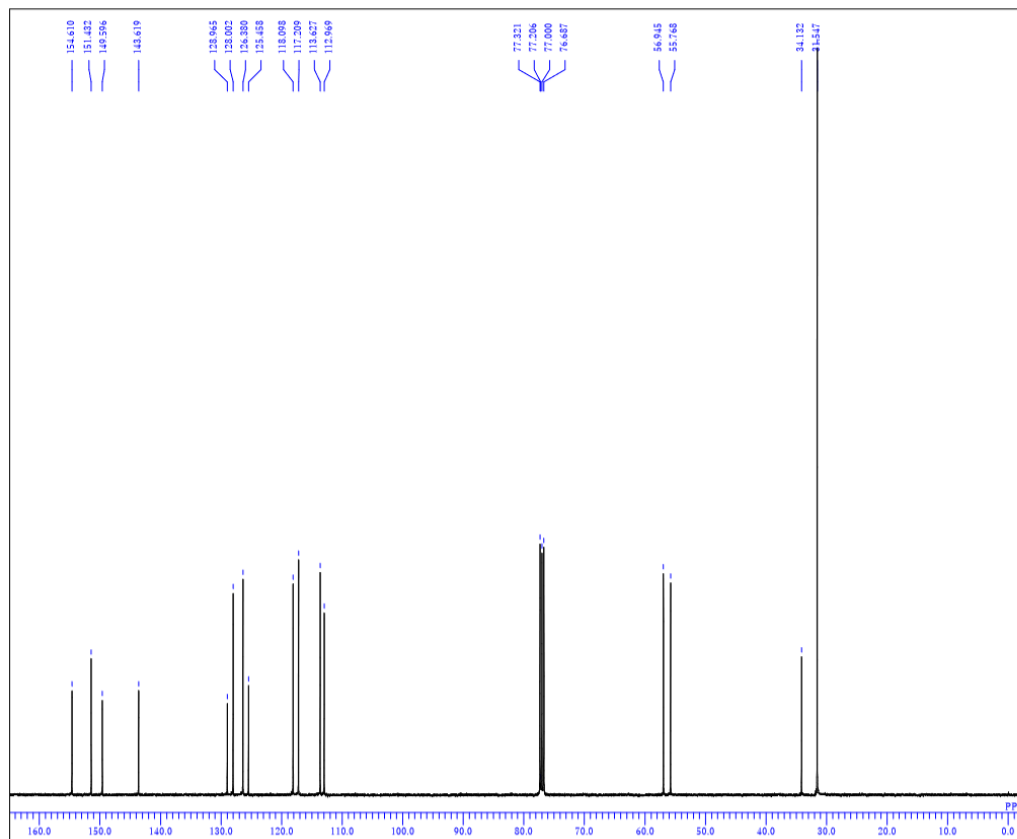
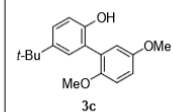
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 SCANS 16
 ACQTM 2.0500 sec
 PD 4.9500 sec
 PVI 5.60 usec
 IRNUC 1H
 CTEMP 24.5 c
 SLVNT CDCL3
 EXREF 0.00 ppm
 BF 0.12 Hz
 RGAIN 17



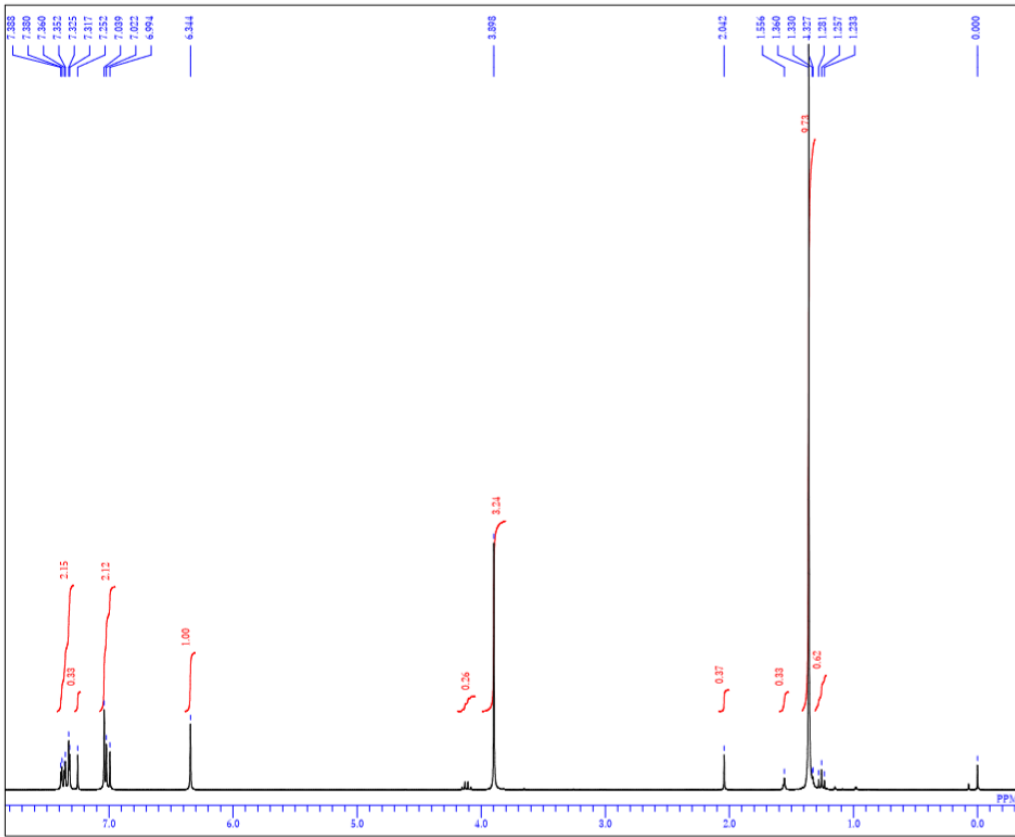
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 IRNUC 13C
 CTEMP 24.3 c
 SLVNT CDCL3
 EXREF 77.00 ppm
 BF 1.20 Hz
 RGAIN 24



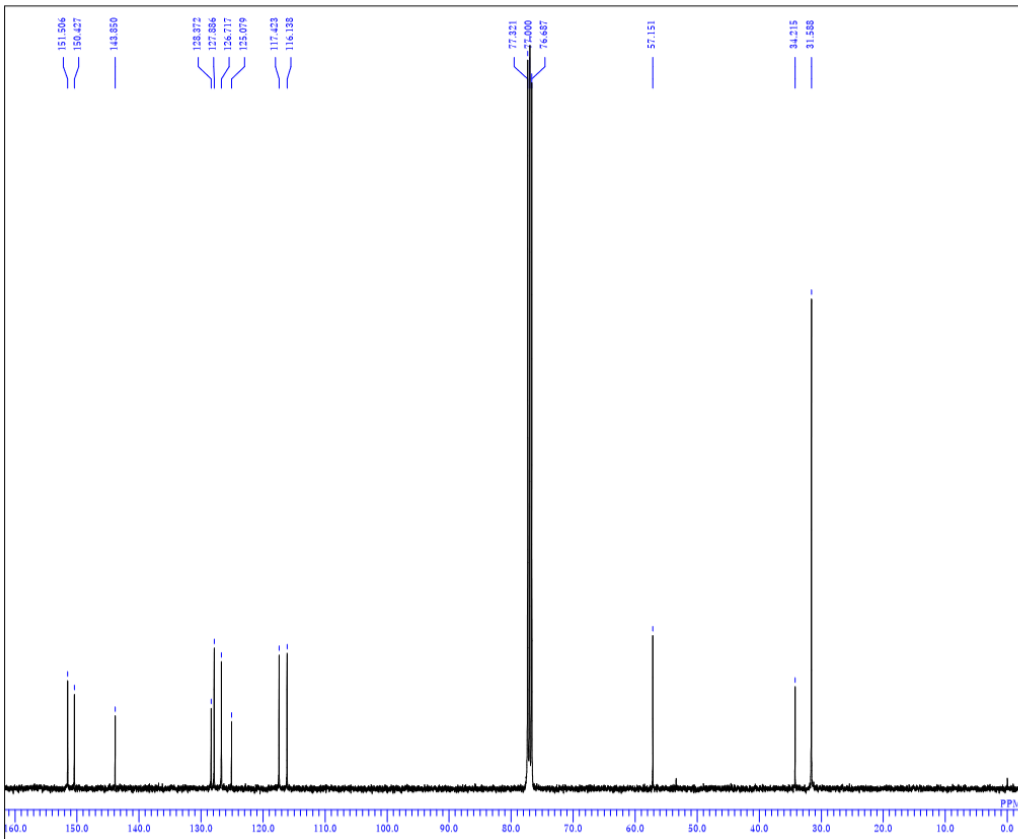
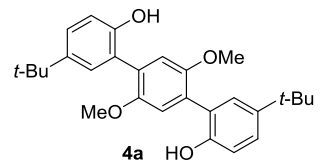
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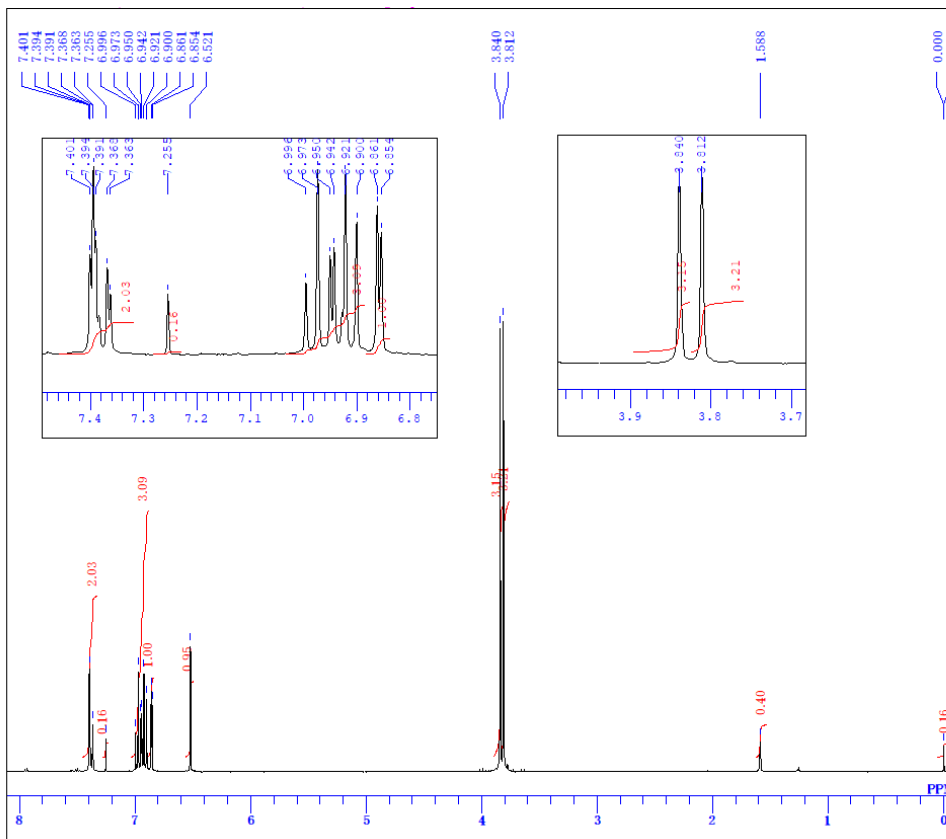
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 POINT 32768
 FREQU 27118.64 Hz
 SCANS 2000
 ACQTM 1.2083 sec
 PD 1.7920 sec
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 CTEMP 23.9 c
 SLVNT CDCL3
 EXREF 77.00 ppm
 BF 1.20 Hz
 RGAIN 25



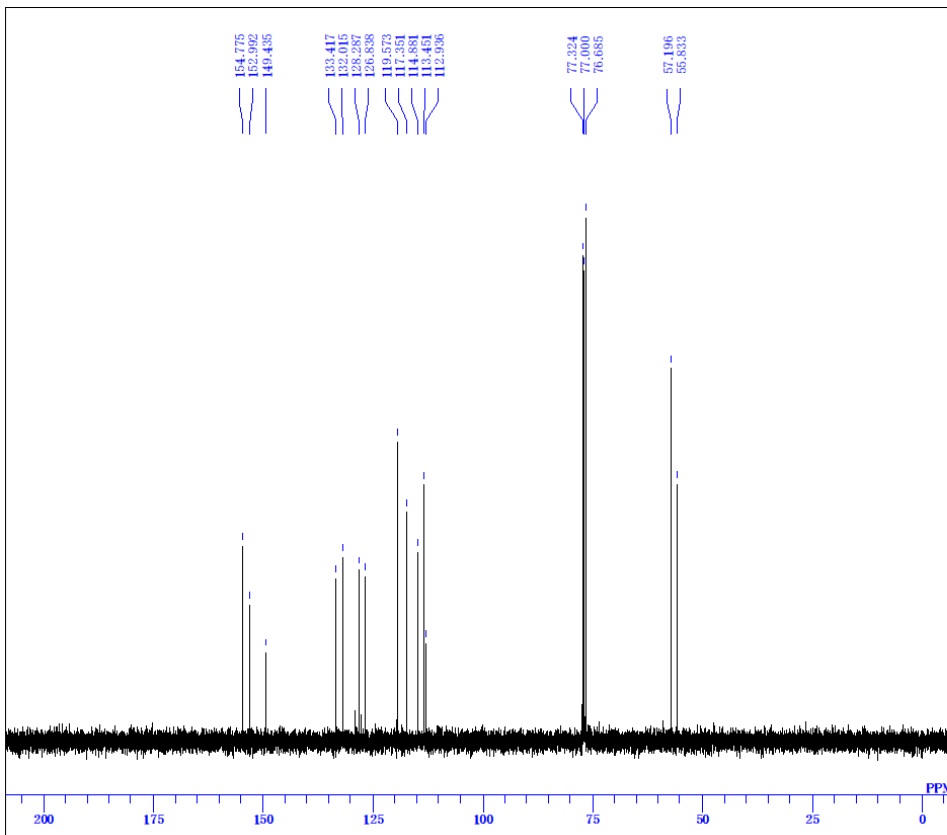
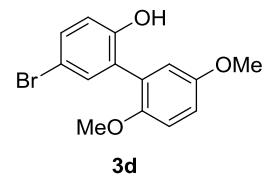
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 EXMOD NON
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 OBSST 130.00 KHz
 OSFIN 1150.00 Hz
 POINT 32768
 FREQU 6006.01 Hz
 SCANS 64
 ACQTM 5.4559 sec
 PD 1.5440 sec
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 IRNUC 1H
 CTMP 26.5 c
 SLVNT CDCL3
 EXREF 0.00 ppm
 BF 0.12 Hz
 RGAIN 15



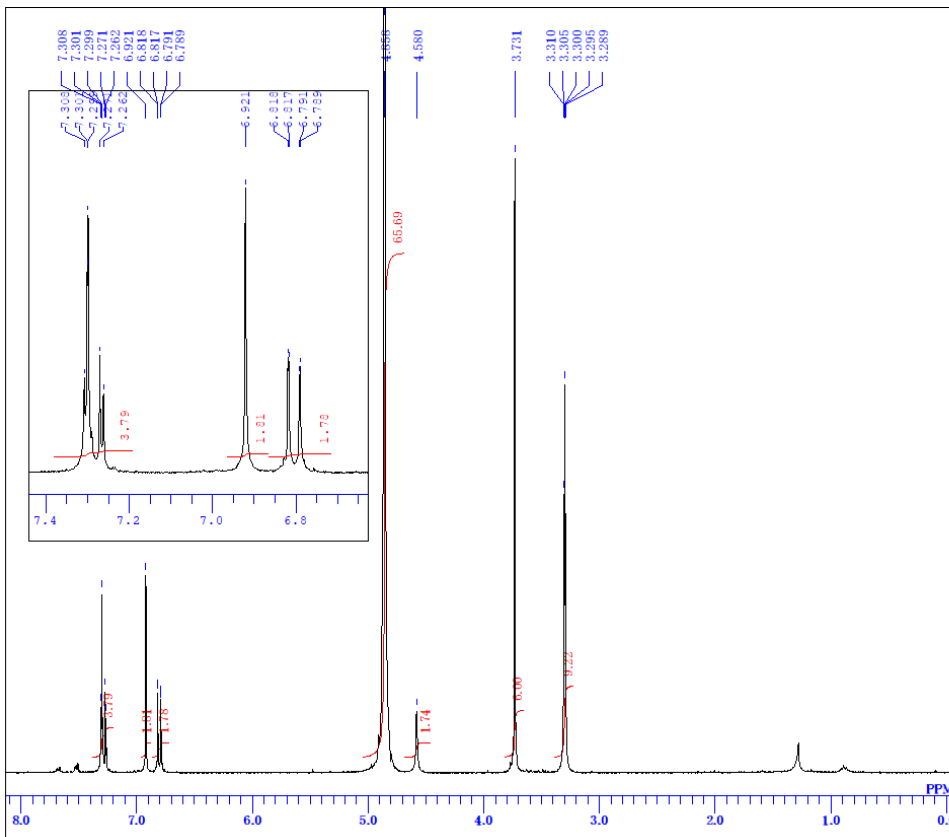
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 ACQTM 1.2083 sec
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 IRNUC 13C
 CTMP 24.2 c
 SLVNT CDCL3
 EXREF 77.00 ppm
 BF 1.20 Hz
 RGAIN 25



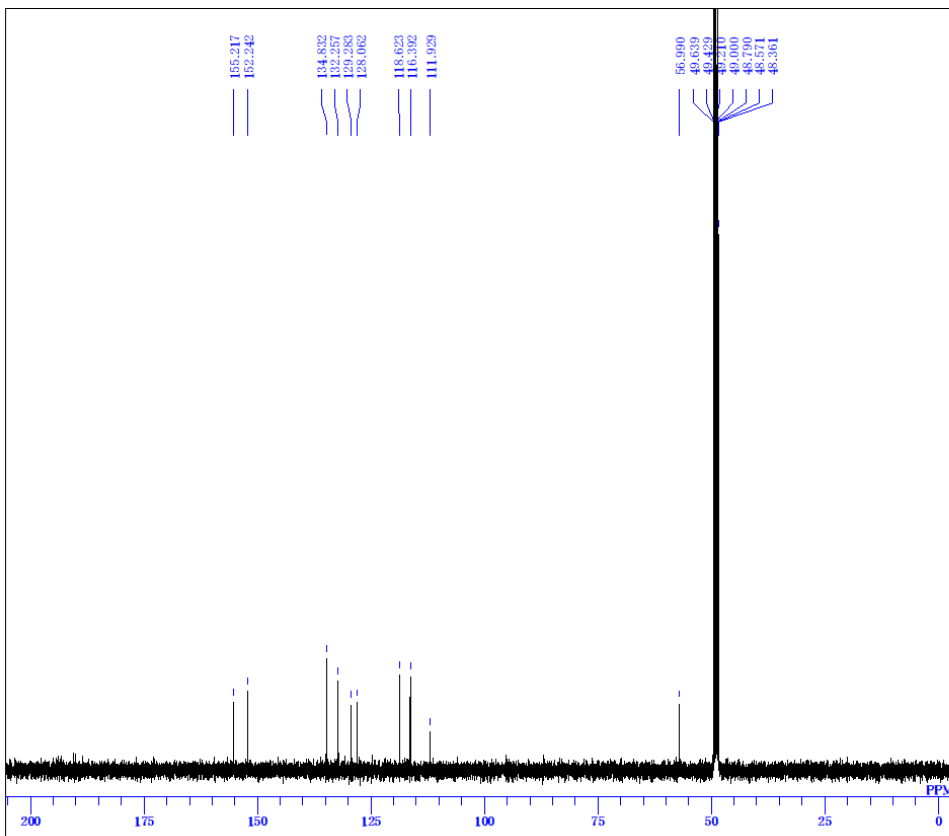
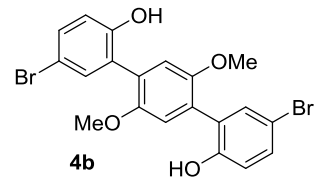
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 OBSFET 4.19 KHz
 OBFIN 7.29 Hz
 POINT 26214
 FREQU 6002.40 Hz
 SCANS 8
 ACQTM 4.5673 sec
 FD 5.0000 sec
 PW1 3.35 usec
 IRNUC 1H
 CTEMP 22.4 c
 SLVNT CDCL3
 EXREF 0.00 ppm
 BF 0.12 Hz
 RGAIN 34



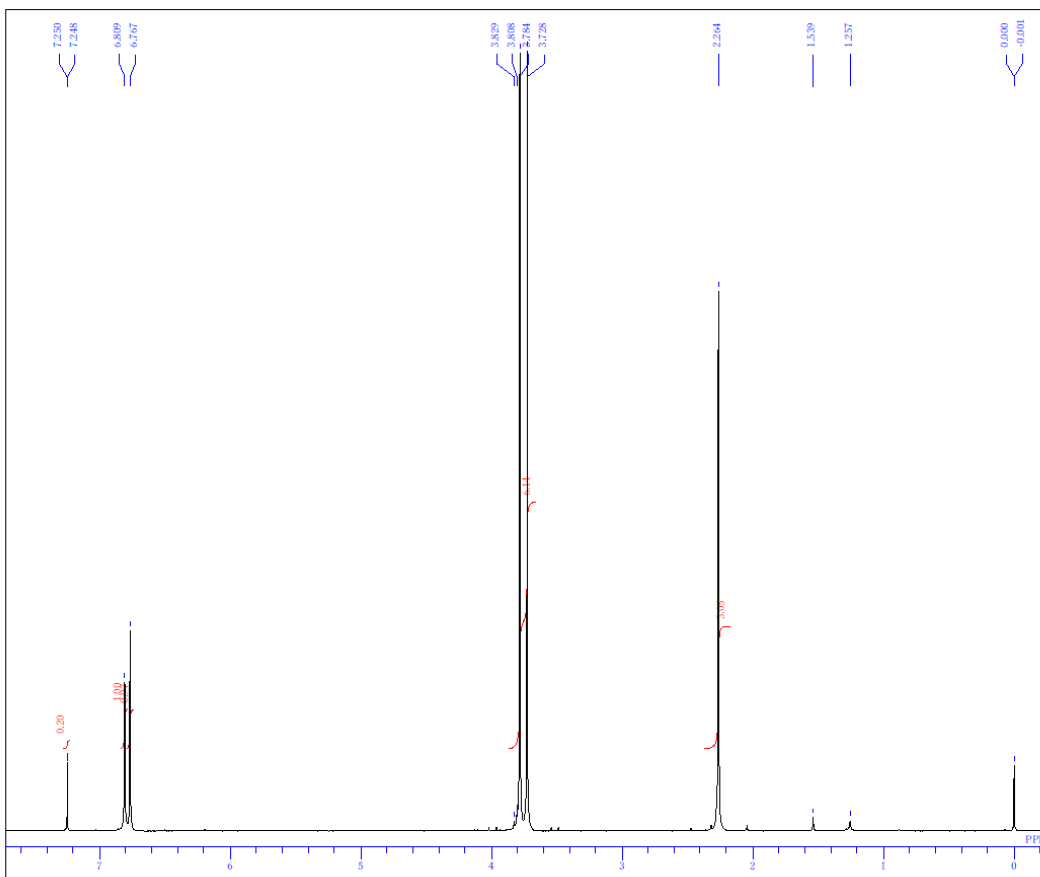
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 EXMOD single_pulse.dec
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 OBSFET 5.33 KHz
 OBFIN 5.80 Hz
 POINT 26214
 FREQU 25125.63 Hz
 SCANS 128
 ACQTM 0.0000 sec
 FD 2.0000 sec
 PW1 3.60 usec
 IRNUC 1H
 CTEMP 22.4 c
 SLVNT CDCL3
 EXREF 77.00 ppm
 BF 0.12 Hz
 RGAIN 60



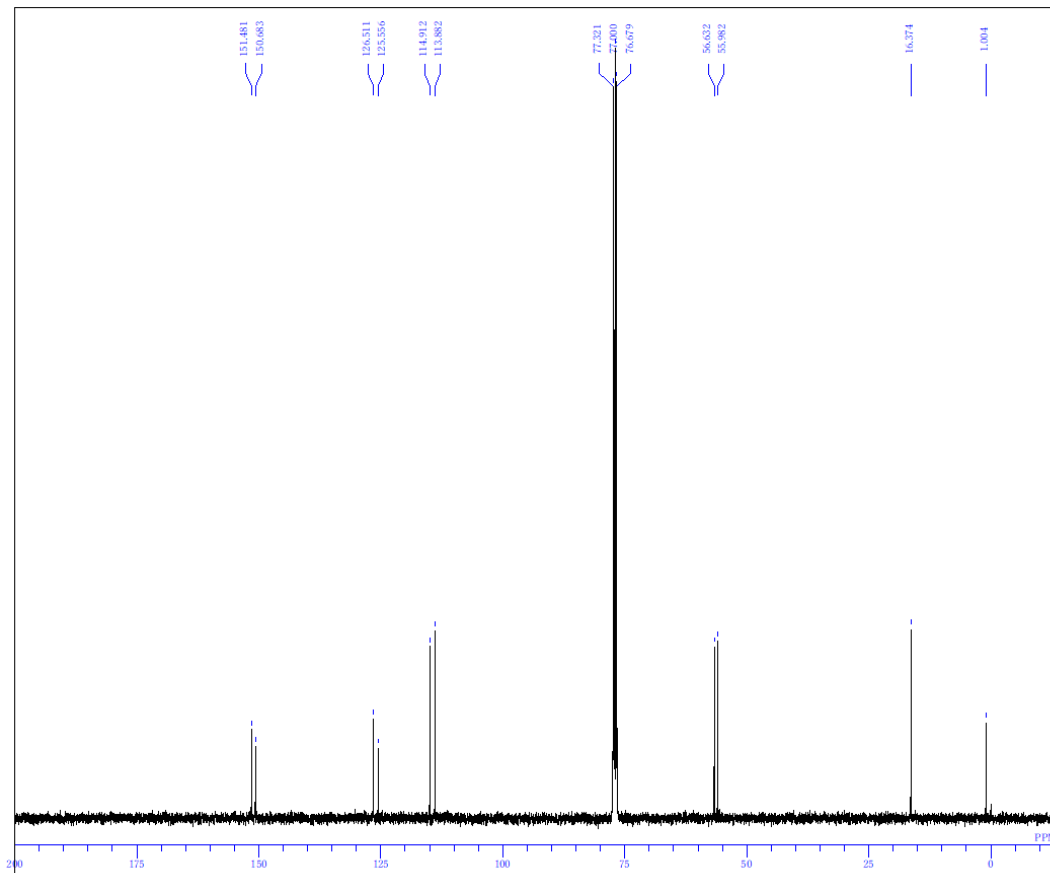
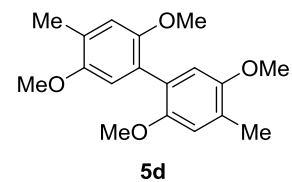
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 OBNUC 1H
 EXMOD NON
 OBFREQ 300.40 MHz
 OBSET 130.00 KHz
 OBFIN 1150.00 Hz
 POINT 32768
 FREQU 6006.01 Hz
 SCANS 16
 ACQTM 5.4559 sec
 PD 1.5440 sec
 PW1 5.20 usec
 IRNUC 1H
 CTEMP 25.3 c
 SLVNT CD3OD
 ENREF 3.30 ppm
 BF 0.12 Hz
 RGAIN 16



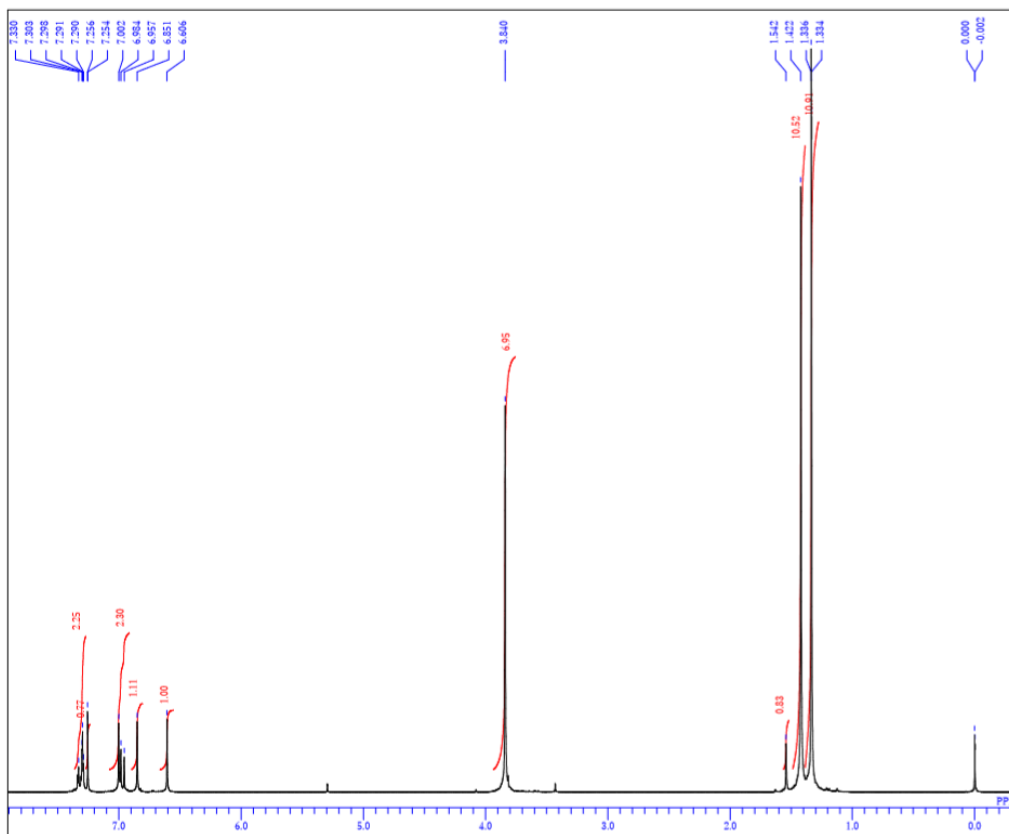
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 DATIM 2018-09-07 11:41:19
 OBNUC 13C
 EXMOD single pulse dec
 OBFREQ 100.53 MHz
 OBSET 3.35 KHz
 OBFIN 5.86 Hz
 POINT 26214
 FREQU 25125.63 Hz
 SCANS 900
 ACQTM 1.0433 sec
 PD 2.0000 sec
 PW1 3.60 usec
 IRNUC 1H
 CTEMP 22.3 c
 SLVNT CD3OD
 ENREF 49.00 ppm
 BF 0.12 Hz
 RGAIN 60



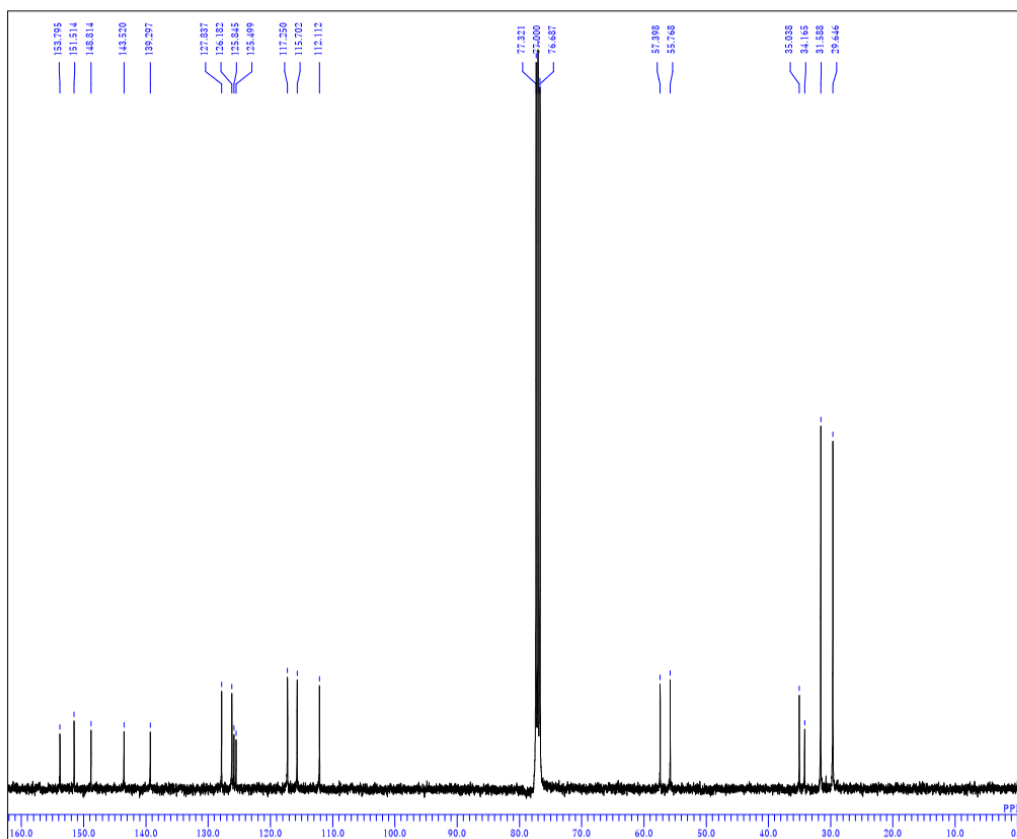
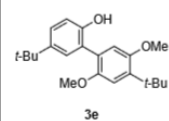
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 EXMOD NON
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 OBSET 130.00 KHz
 OBFIN 1150.00 Hz
 POINT 32768
 FREQU 6006.01 Hz
 SCANS 32
 ACQTM 5.4559 sec
 PD 1.3441 sec
 PW1 5.35 usec
 IRNUC 1H
 CTEMP 26.0 c
 SLVNT CDCL3
 EXREF 0.00 ppm
 BF 0.12 Hz
 RGAIN 16



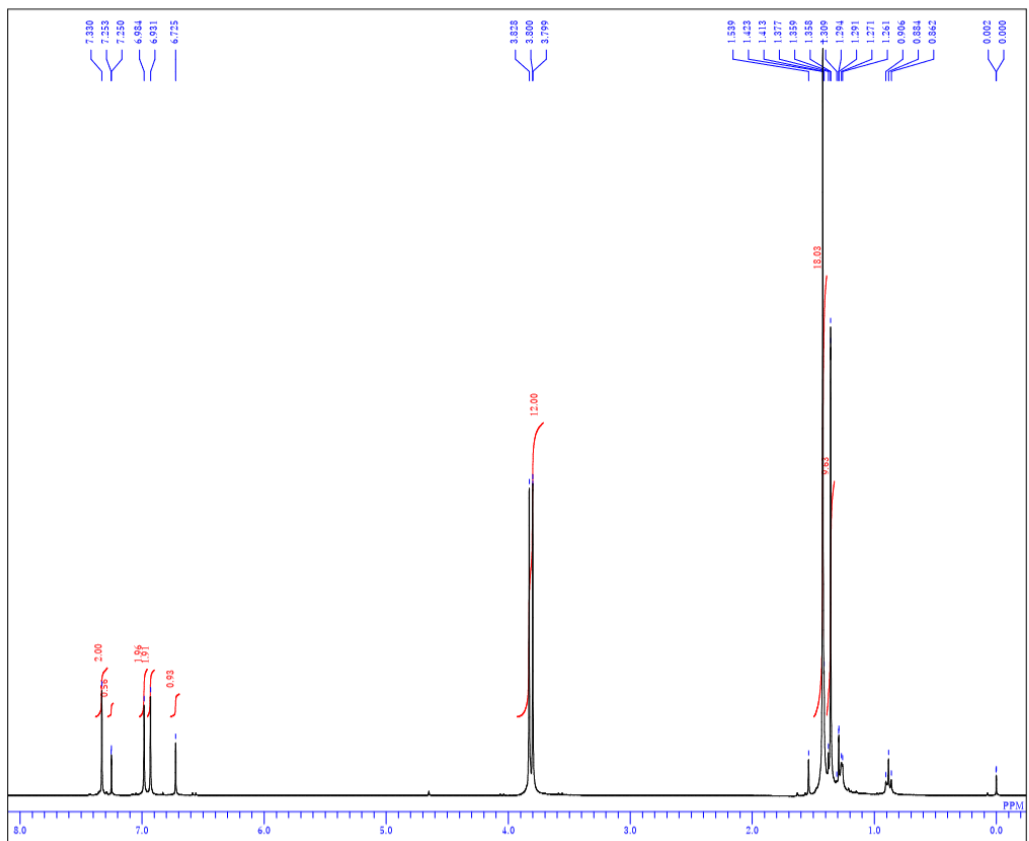
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 OBSET 125.00 KHz
 OBFIN 10500.00 Hz
 POINT 32768
 FREQU 27118.64 Hz
 SCANS 2000
 ACQTM 1.2083 sec
 PD 1.7920 sec
 PW1 6.10 usec
 IRNUC 1H
 CTEMP 24.3 c
 SLVNT CDCL3
 EXREF 77.00 ppm
 BF 1.20 Hz
 RGAIN 25



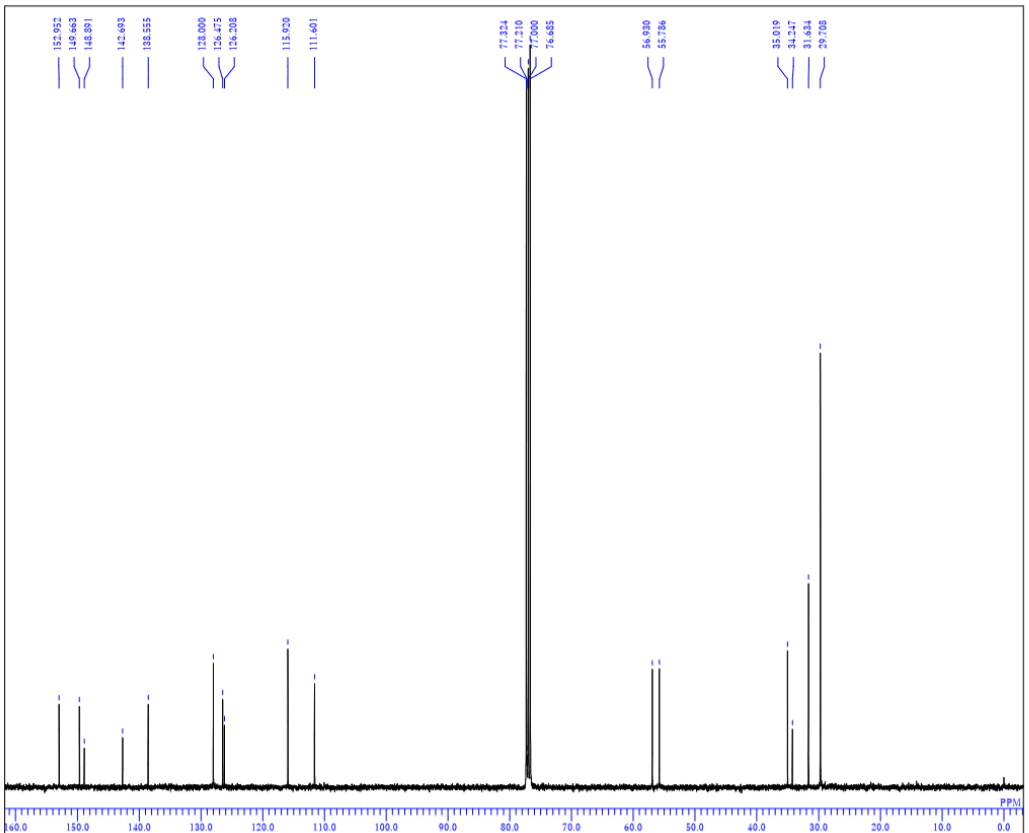
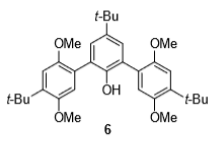
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 OBSET 130.00 kHz
 OBFIN 1150.00 Hz
 POINT 32768
 FREQU 4006.01 Hz
 SCANS 32
 ACQTM 5.4559 sec
 PD 1.5440 sec
 PWI 5.30 usec
 IRNUC 1H
 CTEMP 25.7 c
 SLVNT CDCL3
 EXREF 0.00 ppm
 BF 0.12 Hz
 RGAIN 17



DFILE TT308ra18-26re10-19_13C.ALS
 COMNT auo
 DATIM Mon Jun 25 16:08:29 2016
 IRNUC 13C
 EXMOD BCM
 OBFREQ 100.40 MHz
 OBSET 125.00 kHz
 OBFIN 10500.00 Hz
 POINT 32768
 FREQU 27118.64 Hz
 SCANS 2400
 ACQTM 1.2083 sec
 PD 1.7920 sec
 PWI 6.10 usec
 IRNUC 1H
 CTEMP 24.2 c
 SLVNT CDCL3
 EXREF 77.00 ppm
 BF 1.20 Hz
 RGAIN 25

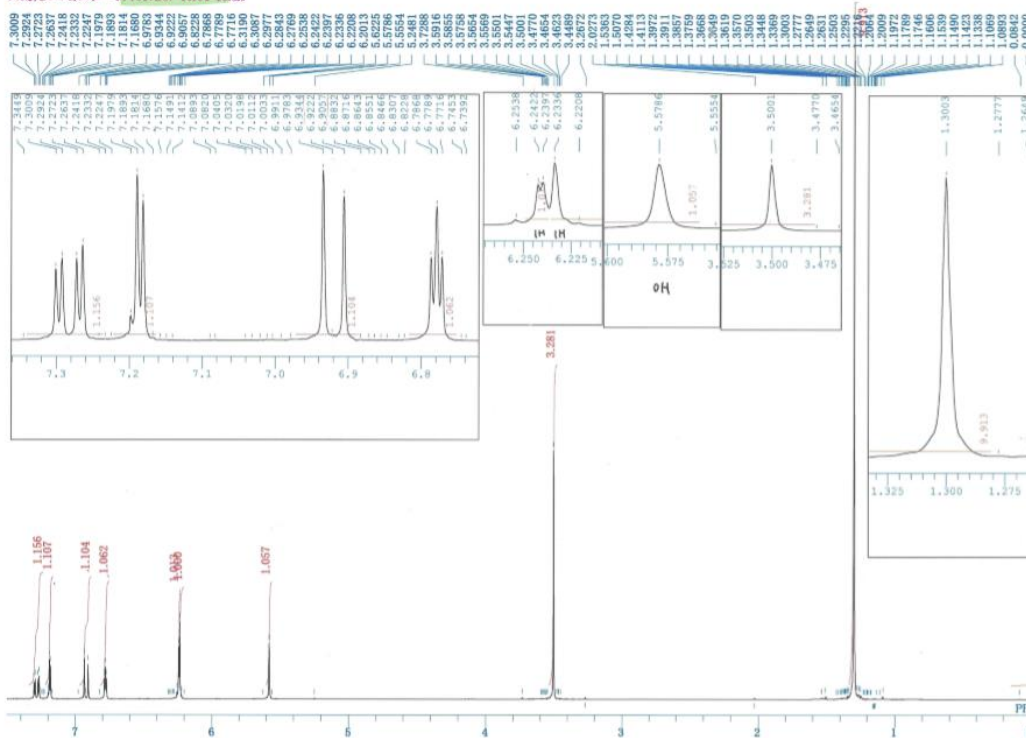


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 OBNUC 1H
 EXMOD NON
 OBFRQ 300.10 MHz
 OBSFQ 150.00 KHz
 OBFIN 1150.00 Hz
 POINT 32768
 FREQU 600.01 Hz
 SCANS 30
 ACQTM 5.4559 sec
 PD 1.5440 sec
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 IRNUC 1H
 CTEMP 25.5 c
 SLYNT CDCL3
 EXREF 0.00 ppm
 BF 0.12 Hz
 RGAIN 14



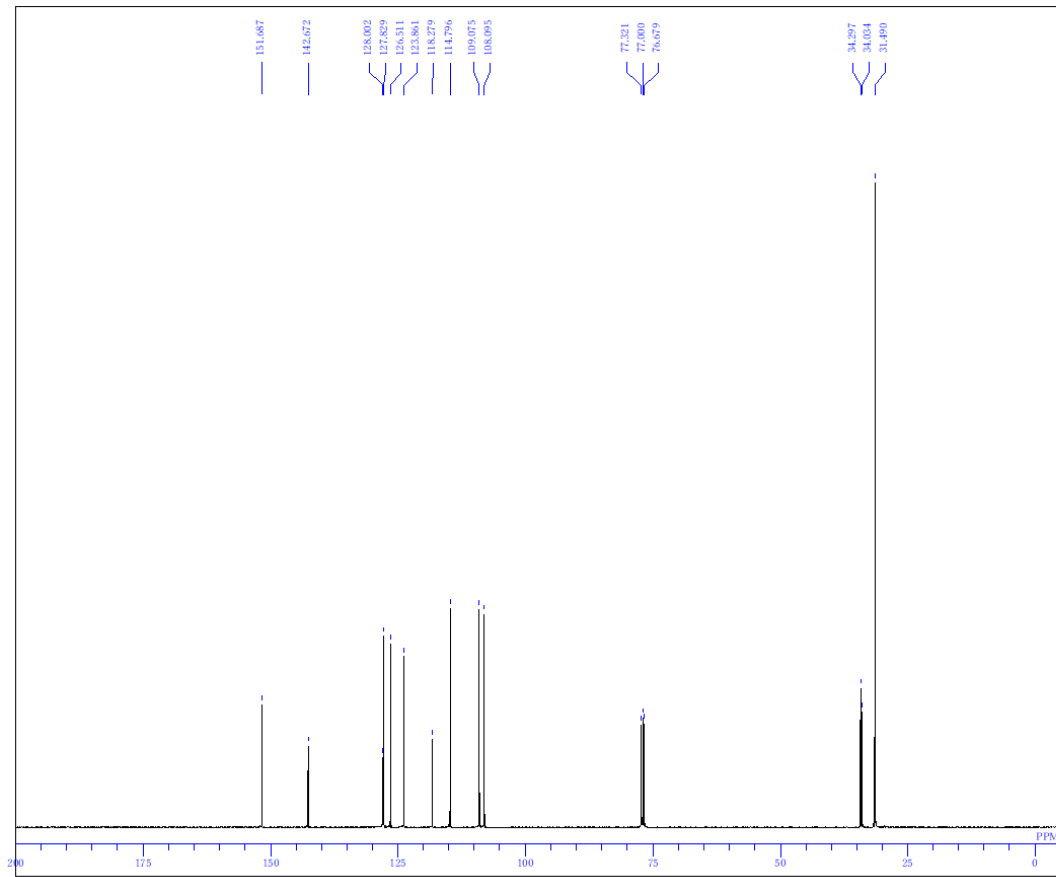
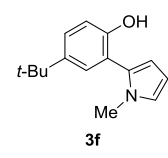
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 OBSFQ 5.35 KHz
 OBFIN 5.86 Hz
 POINT 32767
 FREQU 31407.04 Hz
 SCANS 2400
 ACQTM 1.0433 sec
 PD 1.7000 sec
 PWI 3.70 usec
 IRNUC 1H
 CTEMP 19.9 c
 SLYNT CDCL3
 EXREF 77.00 ppm
 BF 1.20 Hz
 RGAIN 60

F:\新しいフォルダー\TT317ra7-10ref-10.nls



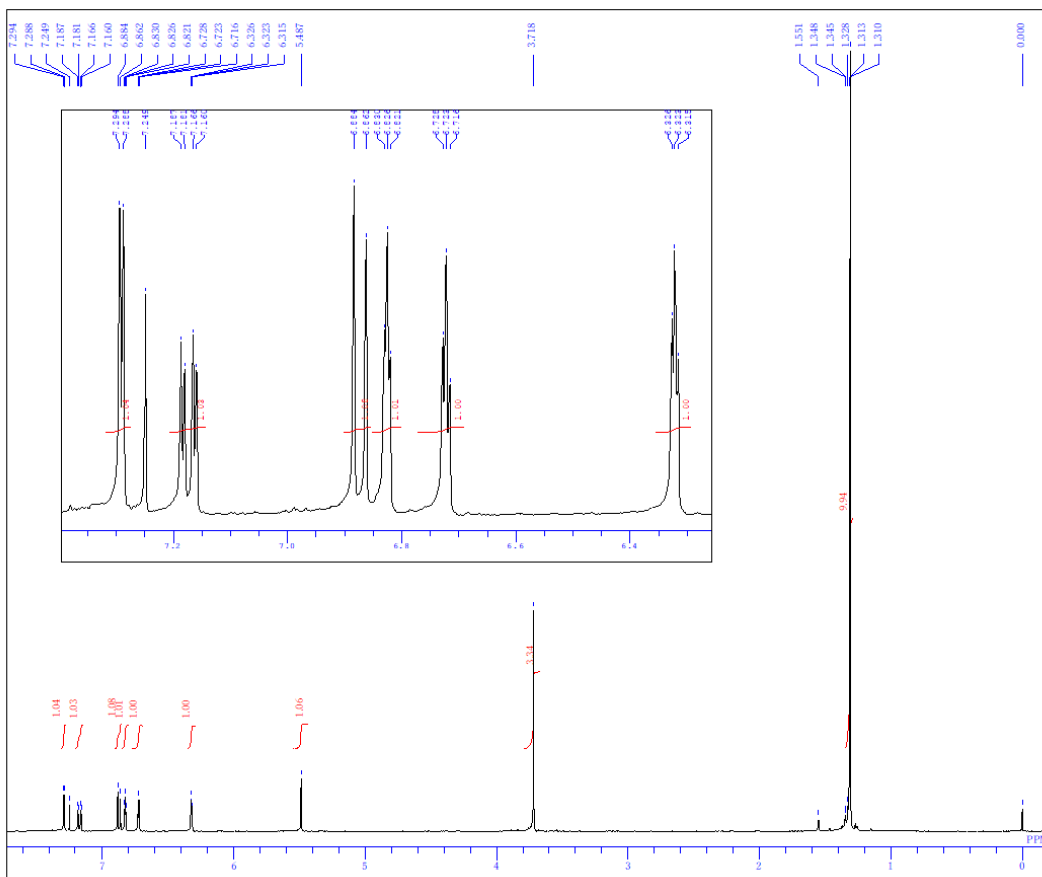
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OFR 300.40 MHz
OBSEF 130.00 KHz
OBFIN 1150.00 Hz
PW1 5.30 usec
DEADT 97.30 usec
PREDL 0.20000 msec
IWT 1.0000 sec
POINT 32768
SPO 32
TIMES 32
DUMMY 1
FREQU 6006.01 Hz
FLT 3000 Hz
DELAY 66.70 usec
ACQTM 5.4559 sec
PD 1.5440 sec
ADBIT 16
RGAIN 9
BF 0.12 Hz
T1 0.00
T2 0.00
T3 90.00
T4 100.00
EXMOD NON
EXPCM NON:Single.coupled:FW1_LAC
IRNUC 1H
IFR 300.40 MHz
IRSET 130.00 KHz
IRPIN 1150.00 Hz
IRRPW 60 usec
IRATN 811
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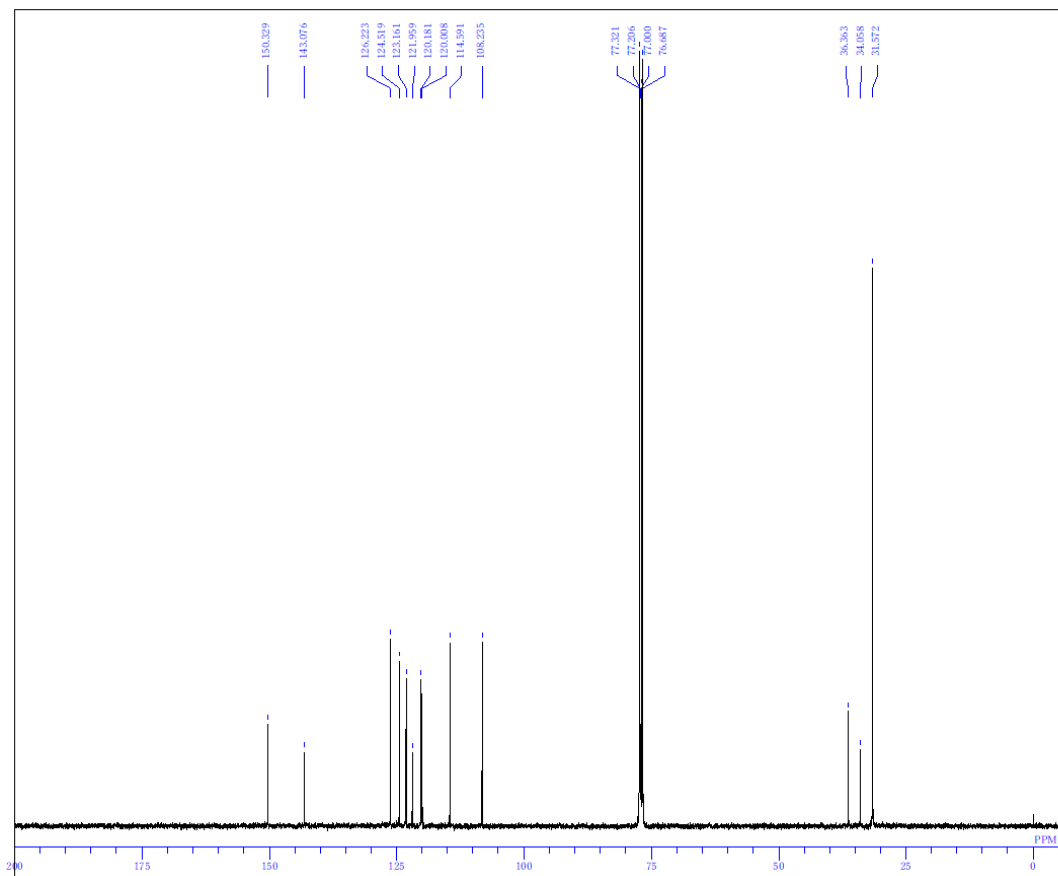


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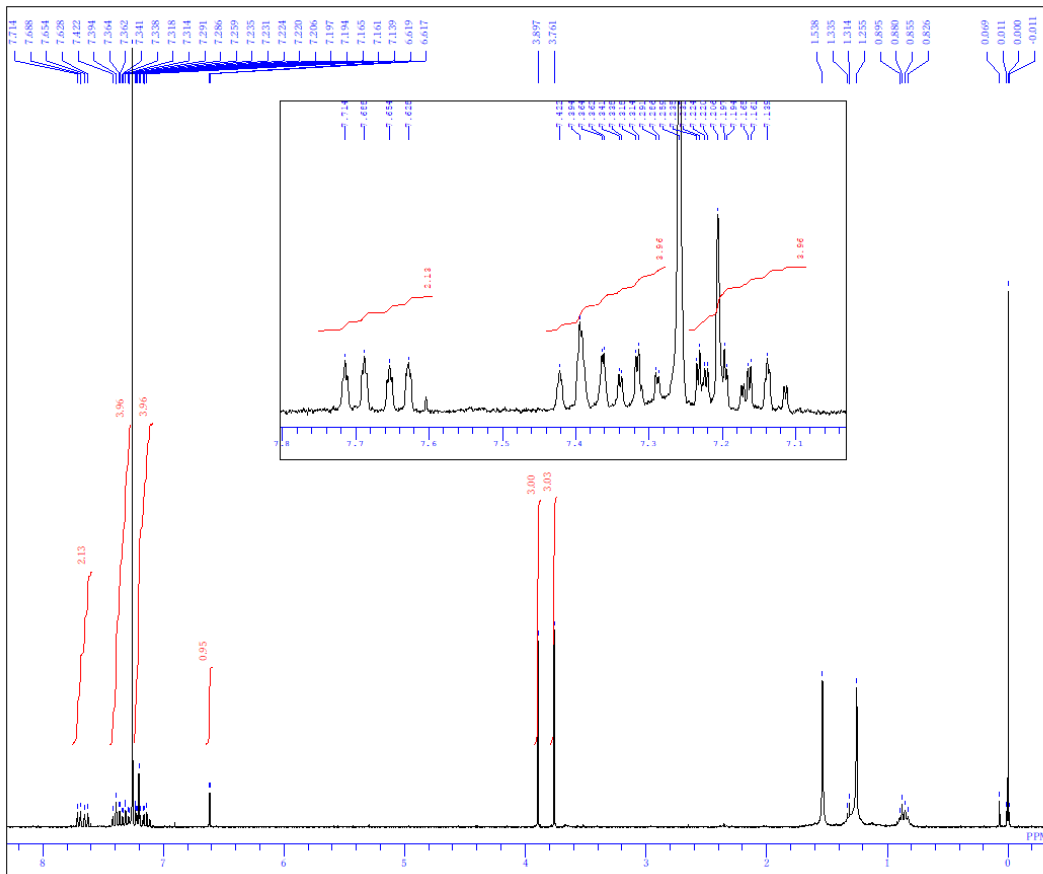
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OBFIN 10500.00 Hz
POINT 32768
FREQU 27118.64 Hz
SCANS 4400
ACQTM 1.2083 sec
PD 1.7920 sec
PW1 6.10 usec
IRNUC 1H
CTEMP 24.3 c
SLVNT CDCL3
EXREF 77.00 ppm
BF 1.20 Hz
RGAIN 24
    
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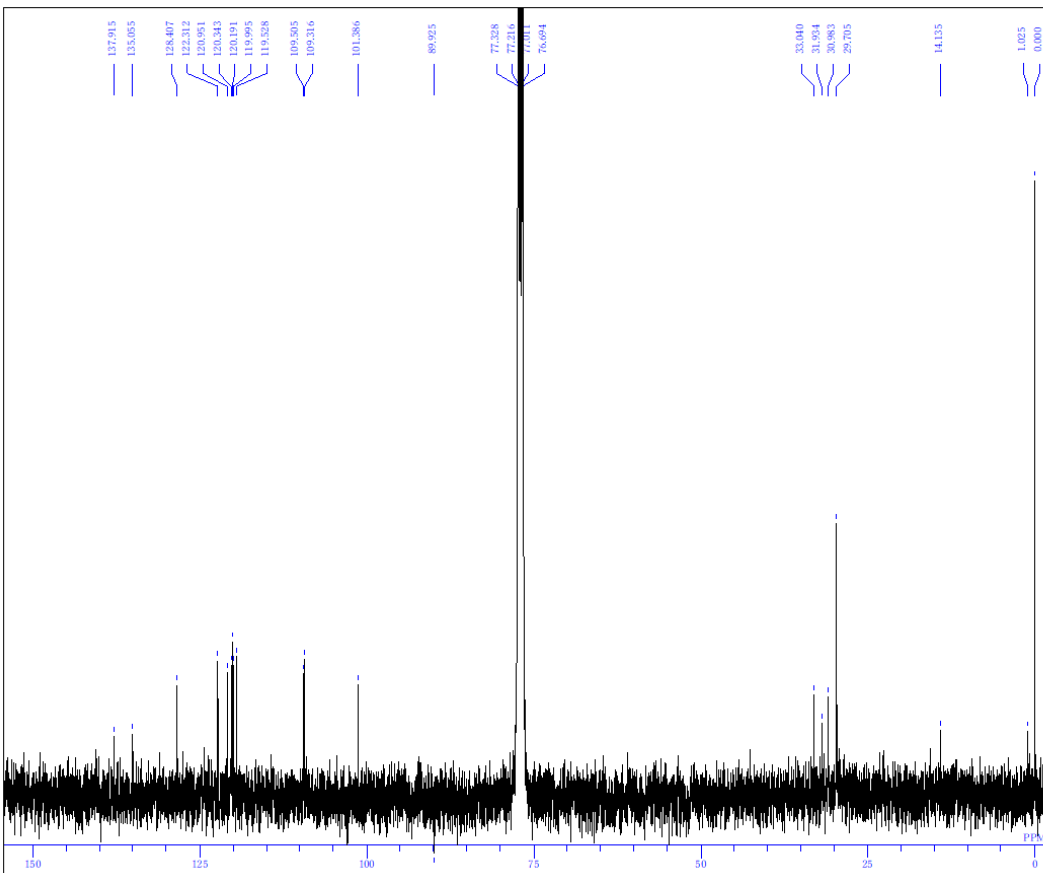
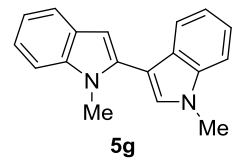
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 EXMOD NON
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 OBSET 124.00 KHz
 OBFIN 10500.00 Hz
 POINT 16384
 FREQU 7992.01 Hz
 SCANS 16
 ACQTM 2.0500 sec
 PD 4.9500 sec
 PW1 6.40 usec
 IRNUC 1H
 CTEMP 24.6 c
 SLVNT CDCL3
 EXREF 0.00 ppm
 BF 0.12 Hz
 RGAIN 17



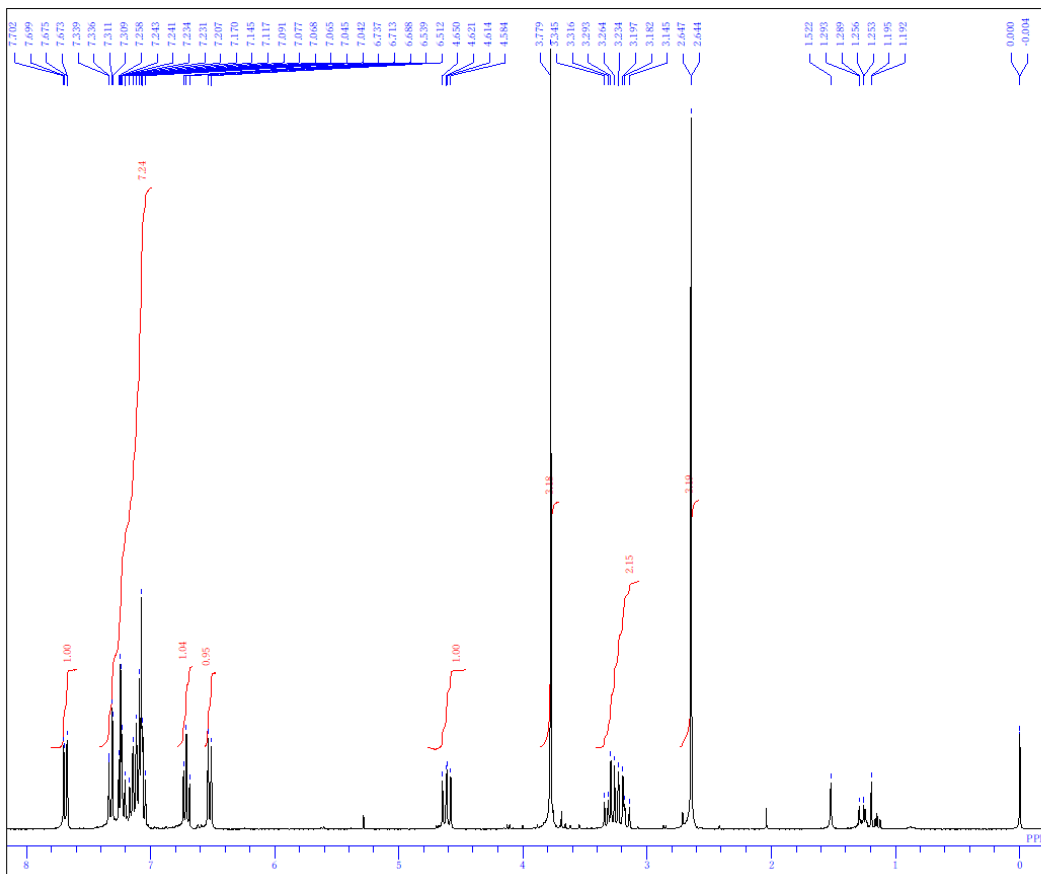
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 FREQU 27118.64 Hz
 SCANS 5300
 ACQTM 1.2083 sec
 PD 1.7920 sec
 PW1 6.10 usec
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 CTEMP 24.7 c
 SLVNT CDCL3
 EXREF 77.00 ppm
 BF 1.20 Hz
 RGAIN 25



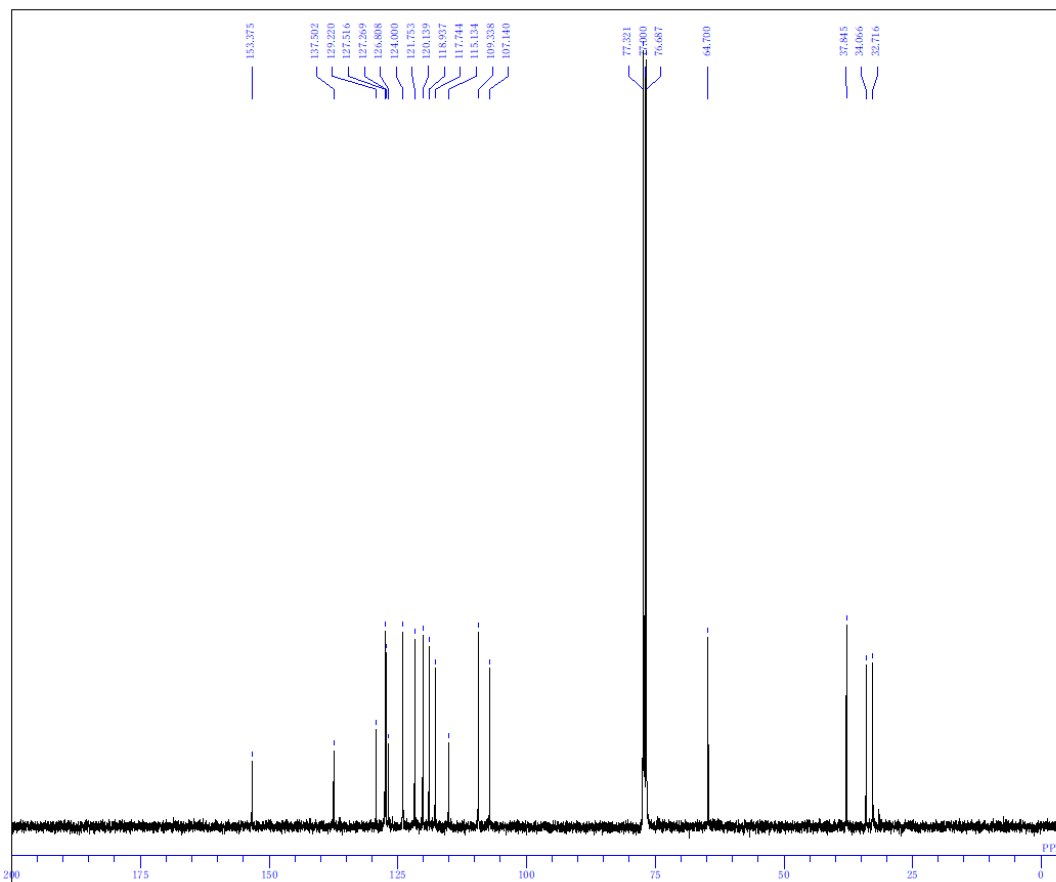
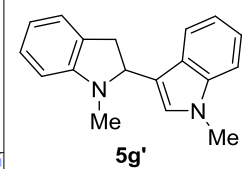
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 OBSET 130.00 KHz
 OBFIN 1150.00 Hz
 POINT 32768
 FREQU 6006.01 Hz
 SCANS 32
 ACQTM 5.4559 sec
 PD 1.5440 sec
 PW1 5.30 usec
 IRNUC 1H
 CTEMP 26.6 c
 SLVNT CDCL3
 EXREF 0.00 ppm
 BF 0.12 Hz
 RGAIN 24



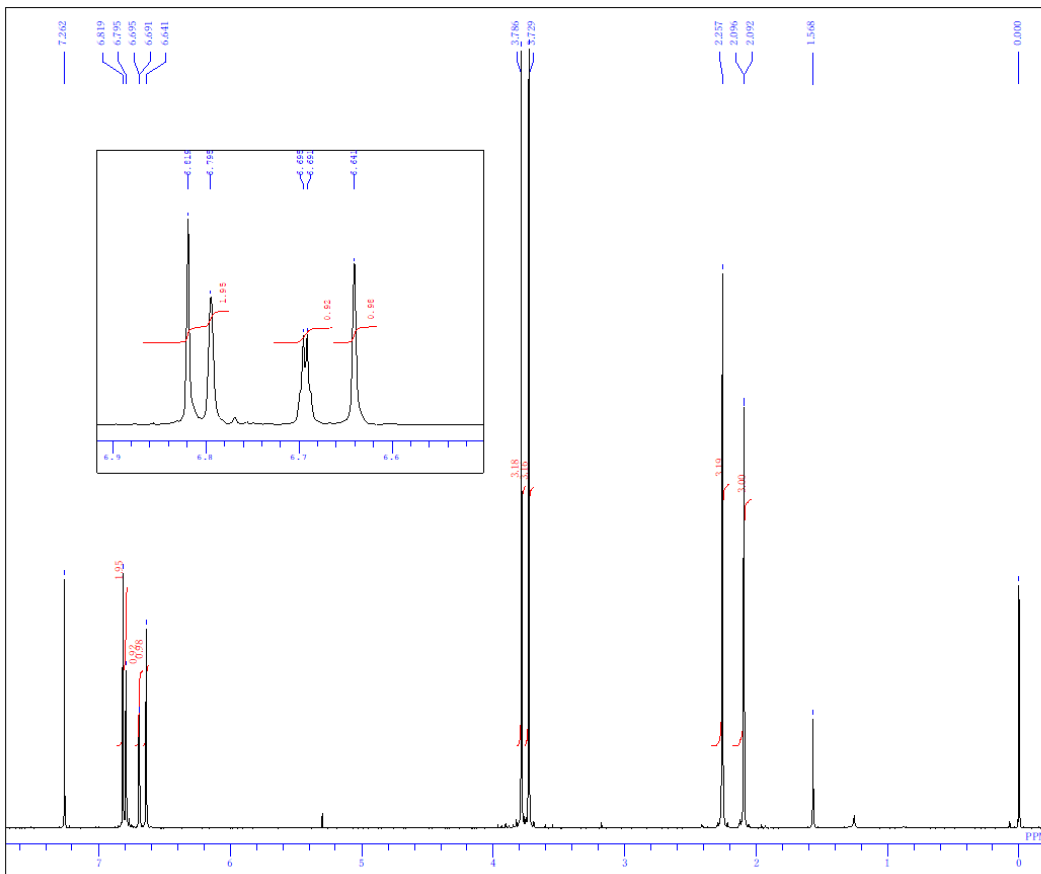
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 OBSET 5.35 KHz
 OBFIN 5.86 Hz
 POINT 131071
 FREQU 31407.04 Hz
 SCANS 50000
 ACQTM 1.0433 sec
 PD 1.7000 sec
 PW1 3.70 usec
 IRNUC 1H
 CTEMP 20.7 c
 SLVNT CDCL3
 EXREF 0.00 ppm
 BF 1.20 Hz
 RGAIN 60



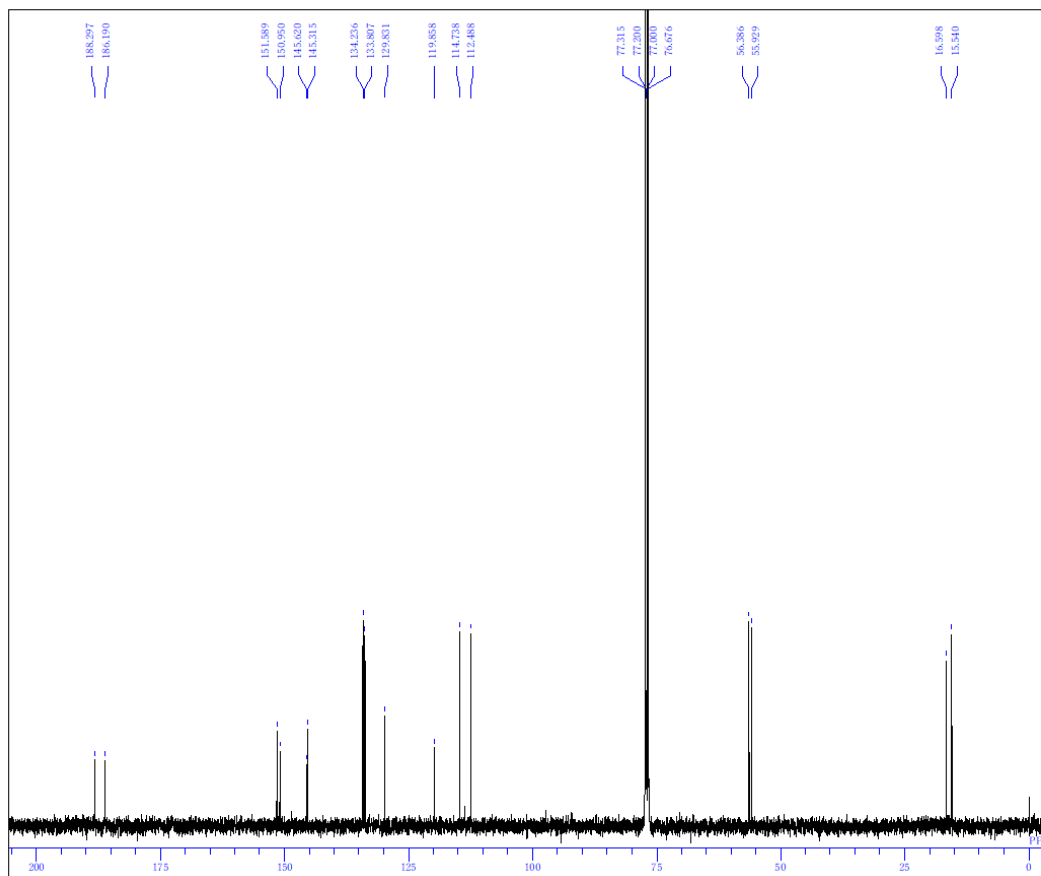
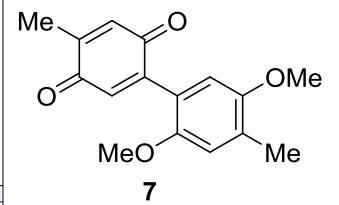
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 FREQU 6006.01 Hz
 SCANS 32
 ACQTM 5.4539 sec
 PD 1.5440 sec
 PW1 5.30 usec
 IRNUC 1H
 CTEMP 26.6 c
 SLVNT CDCL3
 EXREF 0.00 ppm
 BF 0.12 Hz
 RGAIN 18



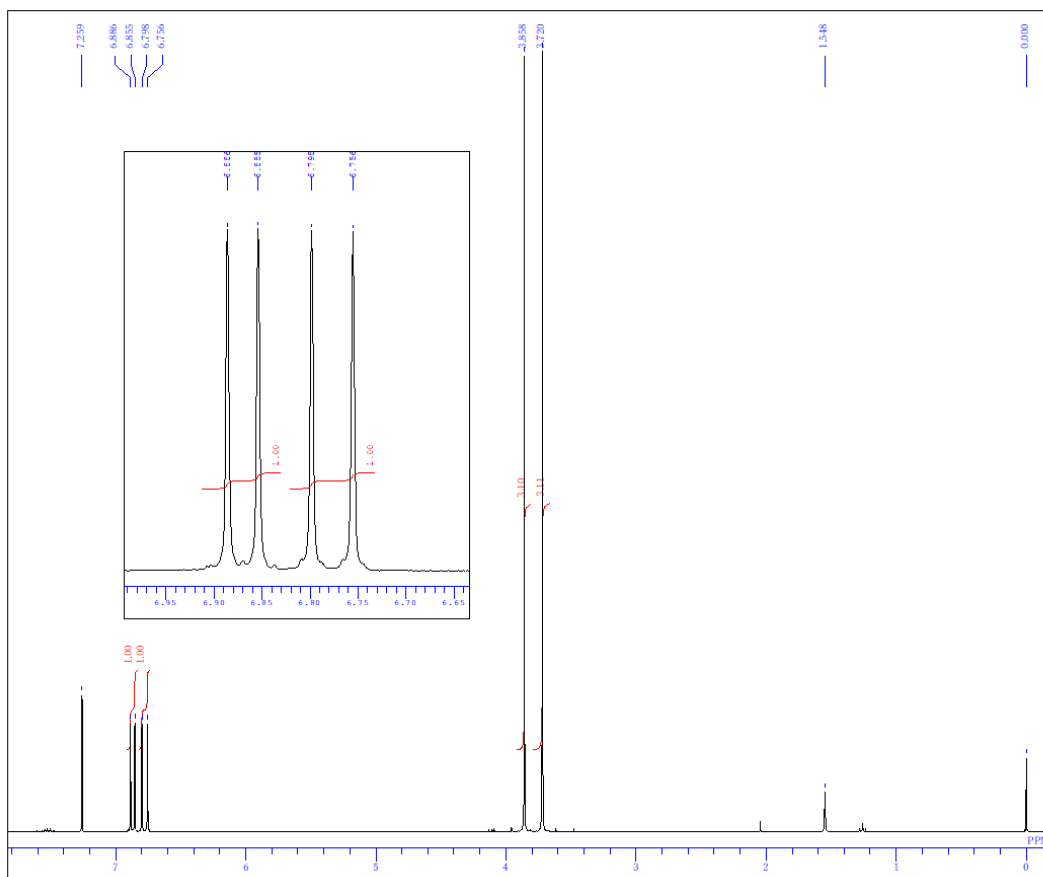
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 POINT 32768
 FREQU 27118.64 Hz
 SCANS 2000
 ACQTM 1.2083 sec
 PD 1.7920 sec
 PW1 6.10 usec
 IRNUC 1H
 CTEMP 24.0 c
 SLVNT CDCL3
 EXREF 77.00 ppm
 BF 1.20 Hz
 RGAIN 25



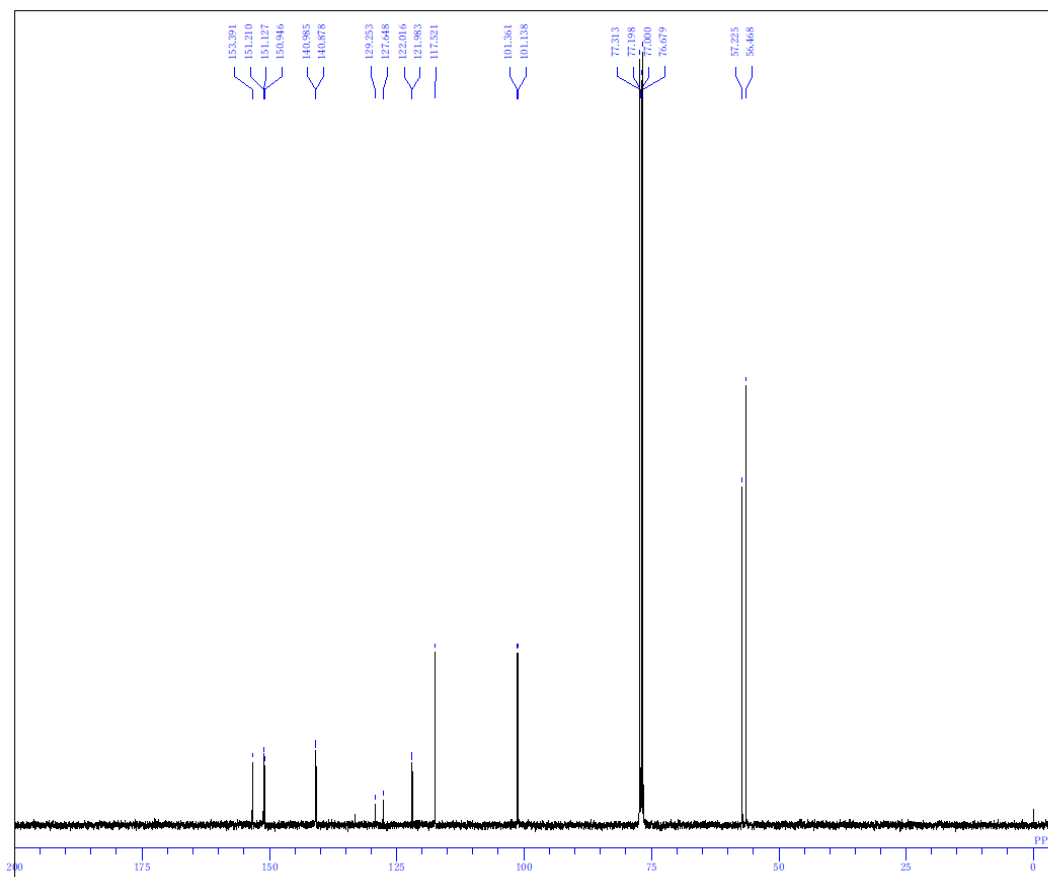
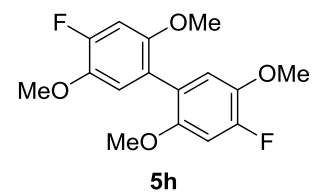
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 OBFIN 7.29 Hz
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 FREQU 7503.00 Hz
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 ACQTM 4.3673 sec
 PD 2.0000 sec
 PW1 3.00 usec
 IRNUC 1H
 CTEMP 20.3 c
 SLVNT CDCL3
 EXREF 0.00 ppm
 BF 0.12 Hz
 RGAIN 44



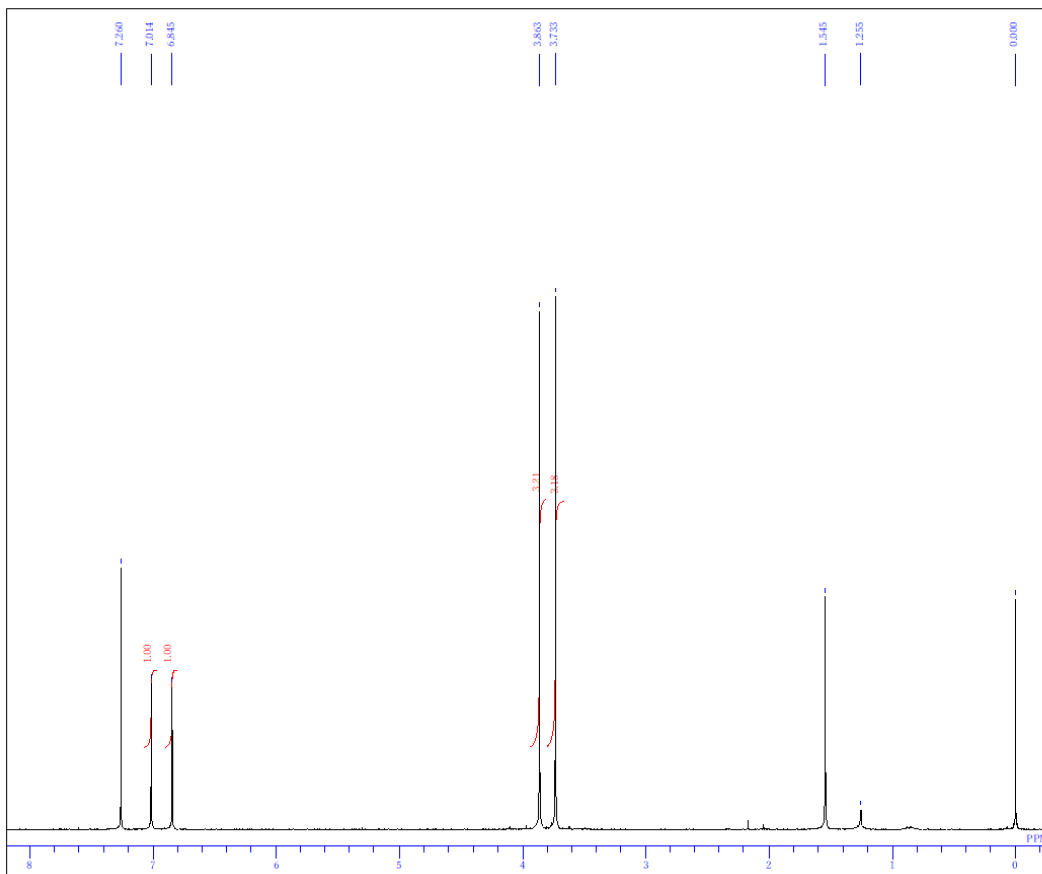
DFILE TT241_E13C-1-1.jdf
 COMNT single_pulse_decoupled_gated_NOI
 DATIM 2016-02-16 14:45:10
 OBNUC 13C
 EXMOD single_pulse_dec
 OBFRQ 100.53 MHz
 OBSET 5.35 KHz
 OBFIN 5.86 Hz
 POINT 32767
 FREQU 31407.04 Hz
 SCANS 2000
 ACQTM 1.0433 sec
 PD 1.7000 sec
 PW1 3.70 usec
 IRNUC 1H
 CTEMP 20.4 c
 SLVNT CDCL3
 EXREF 77.00 ppm
 BF 1.20 Hz
 RGAIN 60



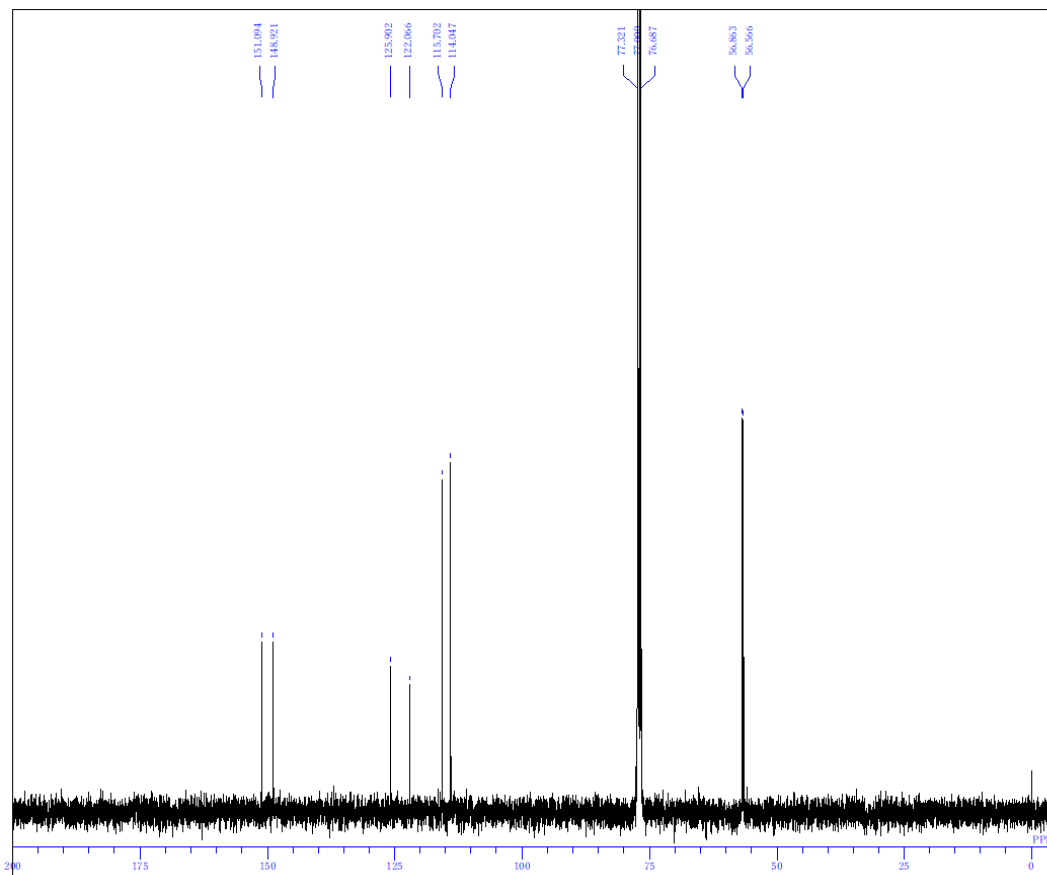
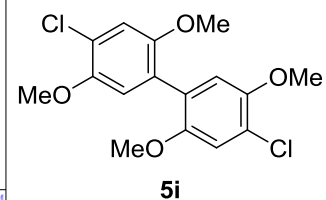
DFILE TT248fra19-22ab
 COMNT
 DATIM Mon Feb 16 19:35:15 2015
 OBNUC 1H
 EXMOD NON
 OBFREQ 300.40 MHz
 OBSET 130.00 KHz
 OBFIN 1150.00 Hz
 POINT 32768
 FREQU 6006.01 Hz
 SCANS 32
 ACQTM 5.459 sec
 PD 1.5440 sec
 PW1 5.30 usec
 IRNUC 1H
 CTEMP 25.5 c
 SLVNT CDCL3
 XREF 0.00 ppm
 BF 0.12 Hz
 RGAIN 18



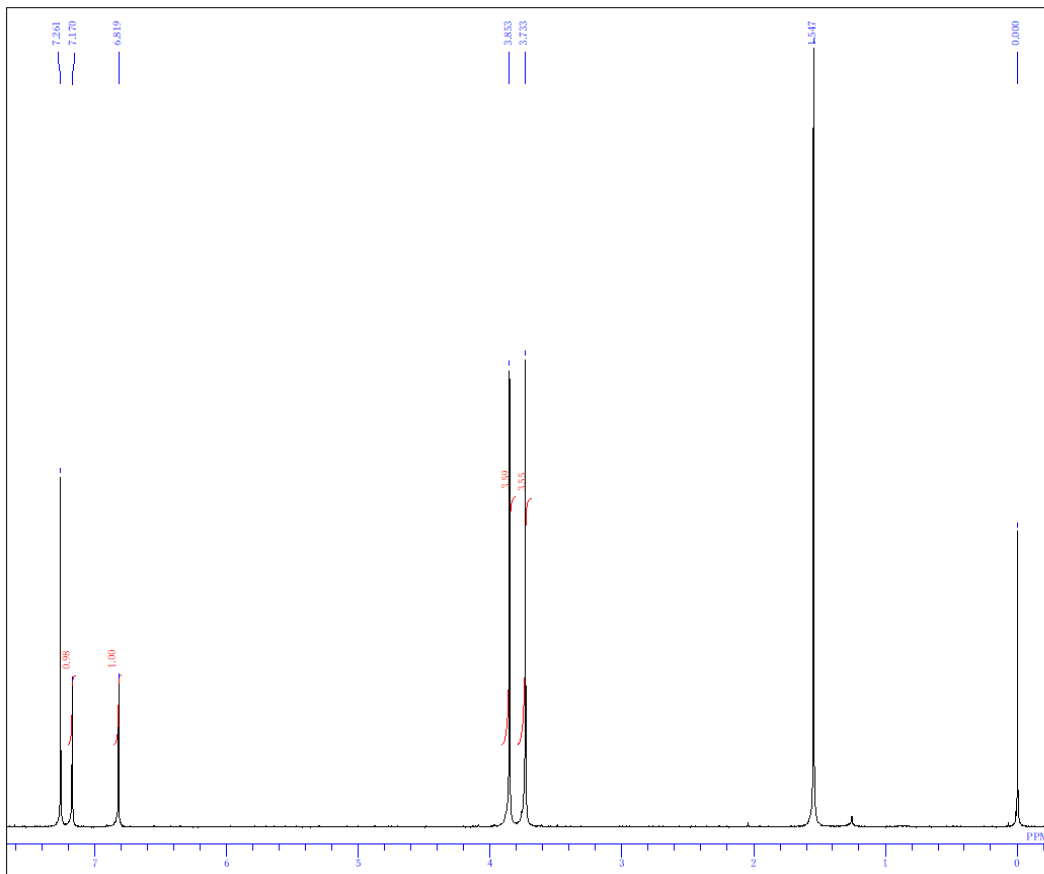
DFILE TT269.ALS
 COMNT auto
 DATIM Mon Sep 14 11:32:11 2015
 OBNUC 13C
 EXMOD BCM
 OBFREQ 100.40 MHz
 OBSET 125.00 KHz
 OBFIN 10500.00 Hz
 POINT 32768
 FREQU 27118.64 Hz
 SCANS 2000
 ACQTM 1.2083 sec
 PD 1.7920 sec
 PW1 6.10 usec
 IRNUC 1H
 CTEMP 24.4 c
 SLVNT CDCL3
 XREF 77.00 ppm
 BF 1.20 Hz
 RGAIN 25



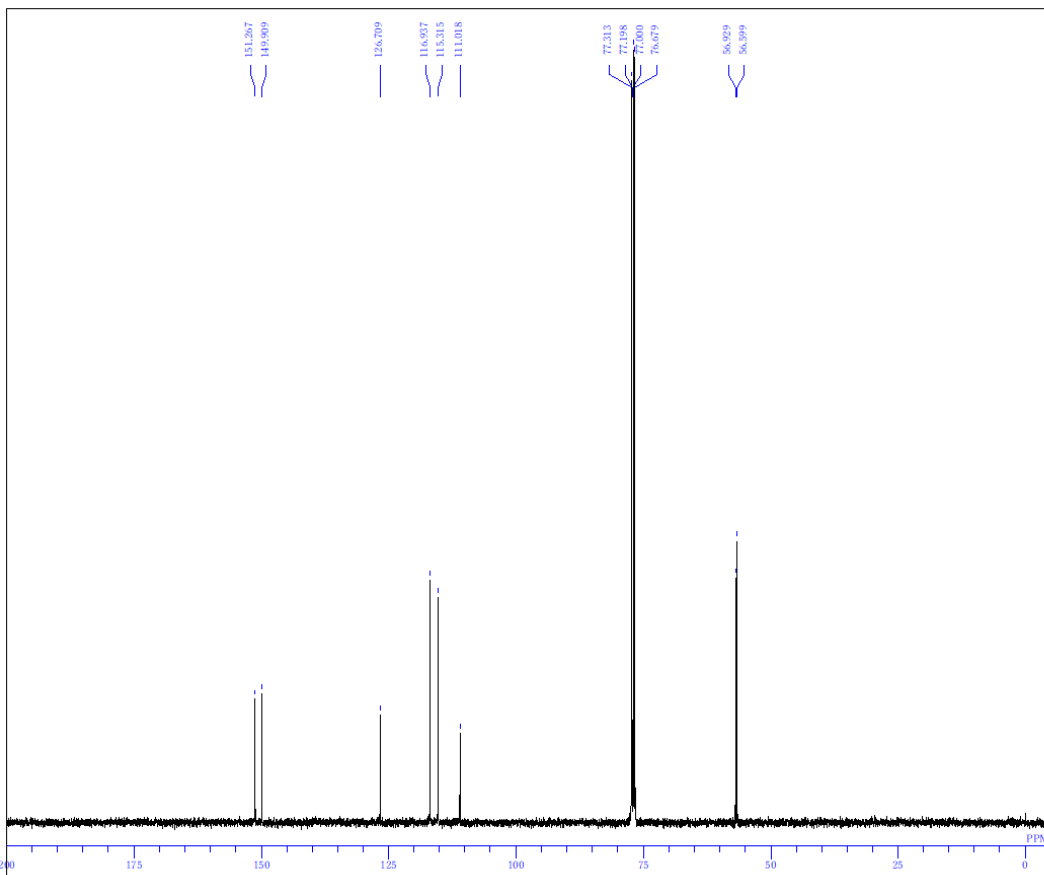
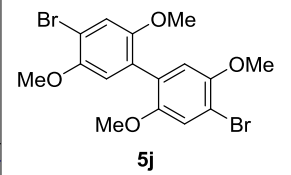
DFILE TT265reals
 COMNT
 DATIM Fri Oct 02 09:49:35 2015
 ORNUC 1H
 EXMOD NON
 OBFRQ 300.40 MHz
 OBSET 130.00 KHz
 ORFIN 1150.00 Hz
 POINT 32768
 FREQU 6006.01 Hz
 SCANS 32
 ACQTM 5.4559 sec
 PD 1.5440 sec
 PW1 5.30 usec
 IRNUC 1H
 CTEMP 26.0 c
 SLVNT CDCL3
 EXREF 0.00 ppm
 BF 0.12 Hz
 RGAIN 21



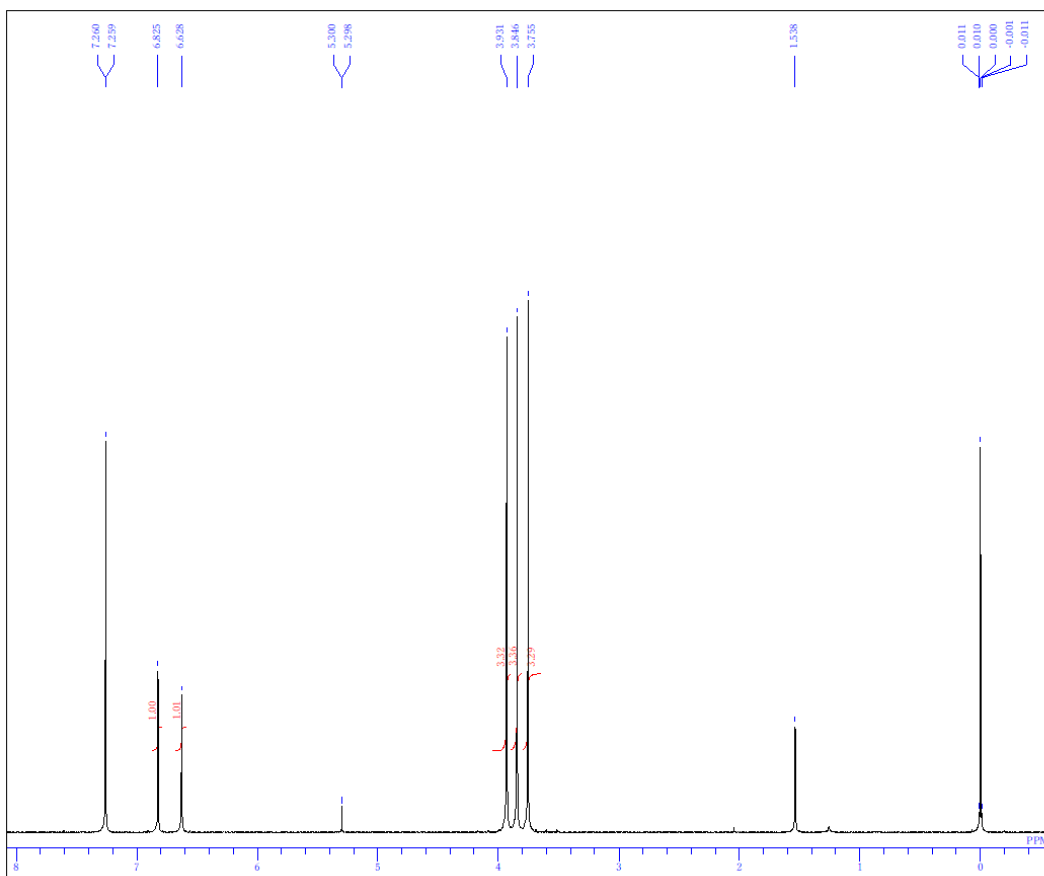
DFILE TT265_13C.ALS
 COMNT auto
 DATIM Wed Jan 06 17:51:13 2016
 ORNUC 13C
 EXMOD BCM
 OBFRQ 100.40 MHz
 OBSET 125.00 KHz
 ORFIN 10500.00 Hz
 POINT 32768
 FREQU 27118.64 Hz
 SCANS 2200
 ACQTM 1.2083 sec
 PD 1.7920 sec
 PW1 6.10 usec
 IRNUC 13C
 CTEMP 23.9 c
 SLVNT CDCL3
 EXREF 77.00 ppm
 BF 1.20 Hz
 RGAIN 24



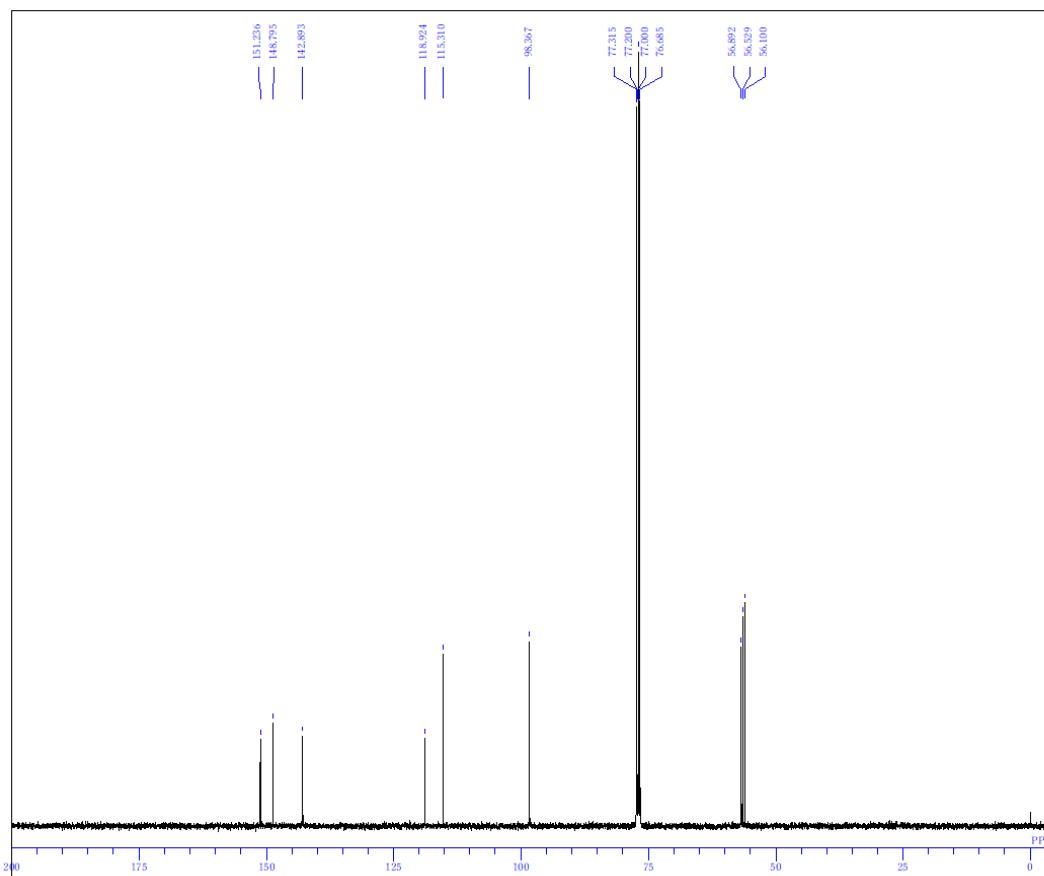
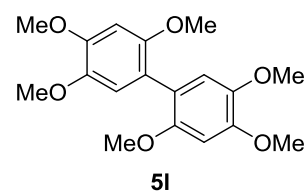
DFILE TT270.als
 COMNT
 DATIM Tue Jul 21 21:05:42 2015
 OBNUC 1H
 EXMOD NON
 OBFREQ 300.40 MHz
 OBSET 130.00 KHz
 OBFIN 1150.00 Hz
 POINT 32768
 FREQU 6006.01 Hz
 SCANS 32
 ACQTM 5.4559 sec
 PD 1.5440 sec
 PW1 5.30 usec
 IRNUC 1H
 CTEMP 27.1 c
 SLVNT CDCL3
 EXREF 0.00 ppm
 BF 0.12 Hz
 RGAIN 23



DFILE TT270.ALS
 COMNT auto
 DATIM Mon Sep 14 15:35:20 2015
 OBNUC 13C
 EXMOD BCM
 OBFREQ 100.40 MHz
 OBSET 125.00 KHz
 OBFIN 10500.00 Hz
 POINT 32768
 FREQU 27118.64 Hz
 SCANS 2000
 ACQTM 1.2083 sec
 PD 1.7920 sec
 PW1 6.10 usec
 IRNUC 13C
 CTEMP 24.3 c
 SLVNT CDCL3
 EXREF 77.00 ppm
 BF 1.20 Hz
 RGAIN 25



DFILE TT254fra2-60.als
 COMNT
 DATIM Fri Feb 20 16:10:38 2015
 OBNUC 1H
 EXMOD NON
 OBFREQ 300.40 MHz
 OBSET 130.00 KHz
 OBFIN 1150.00 Hz
 POINT 32768
 FREQU 6006.01 Hz
 SCANS 32
 ACQTM 5.4559 sec
 PD 1.5440 sec
 PW1 5.30usec
 IRNUC 1H
 CTEMP 25.5 c
 SLVNT CDCL3
 EXREF 0.00 ppm
 BF 0.12 Hz
 RGAIN 22



DFILE TT266_E13C-1-1.jdf
 COMNT single pulse decoupled gated NO
 DATIM 2015-09-17 14:12:32
 OBNUC 13C
 EXMOD single_pulse_dec
 OBFREQ 100.53 MHz
 OBSET 5.35 KHz
 OBFIN 5.86 Hz
 POINT 32767
 FREQU 31407.04 Hz
 SCANS 2000
 ACQTM 1.0433 sec
 PD 1.7000 sec
 PW1 3.70usec
 IRNUC 1H
 CTEMP 23.1 c
 SLVNT CDCL3
 EXREF 77.00 ppm
 BF 1.20 Hz
 RGAIN 60