

# Synthesis, photophysical and electrochemical properties of 1, 2, 3- triazolyl bridged ferrocenyl dendrimers through click reaction

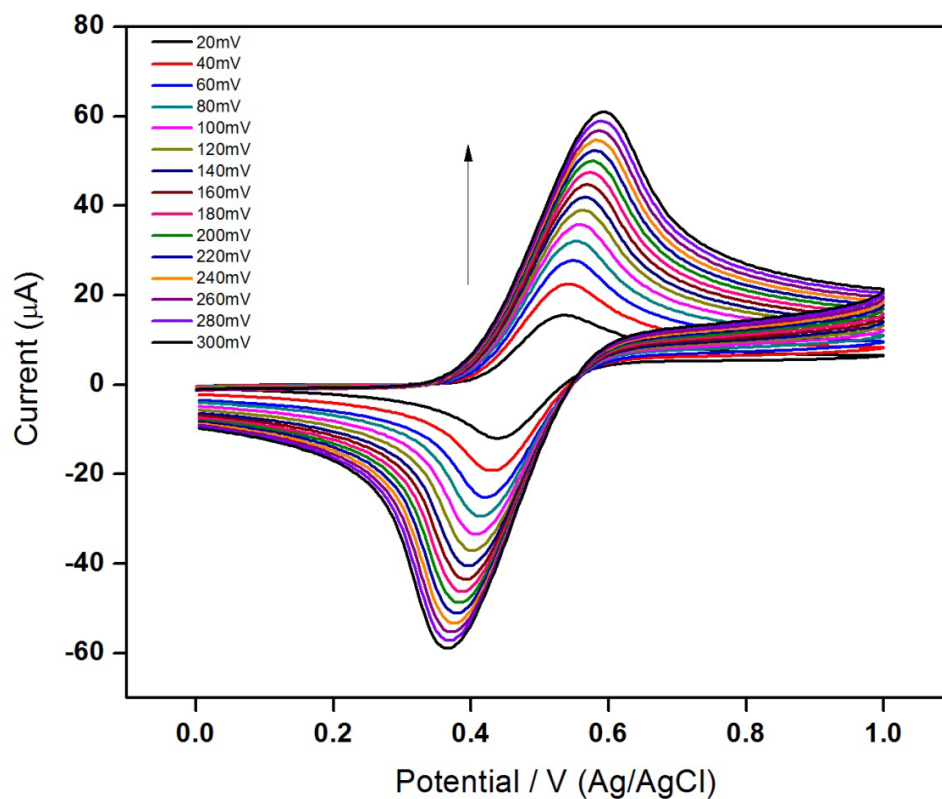
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Tamil Nadu, India Tel.: +91 44 22202812;

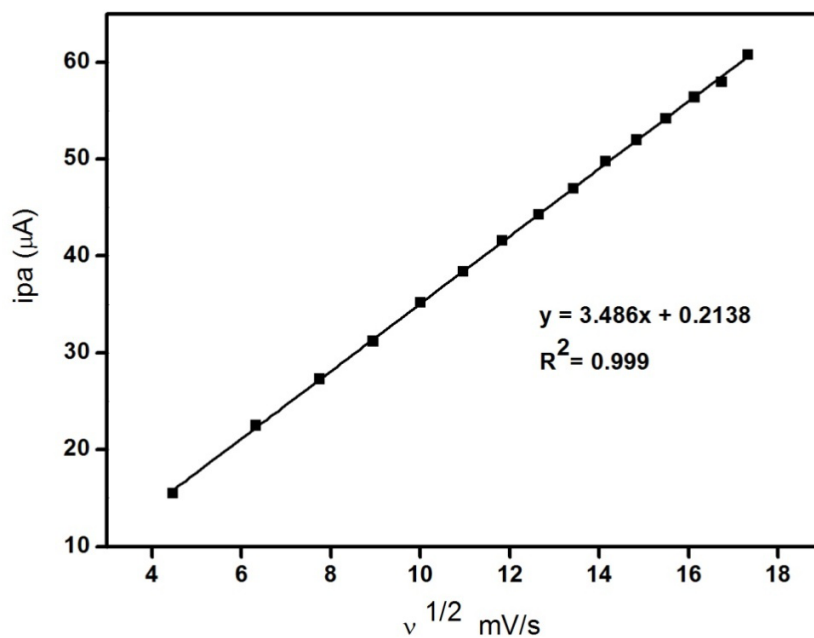
Fax: +91 44 22352492; E-mail: [perumalrajakumar@gmail.com](mailto:perumalrajakumar@gmail.com)

## SUPPORTING INFORMATIONS

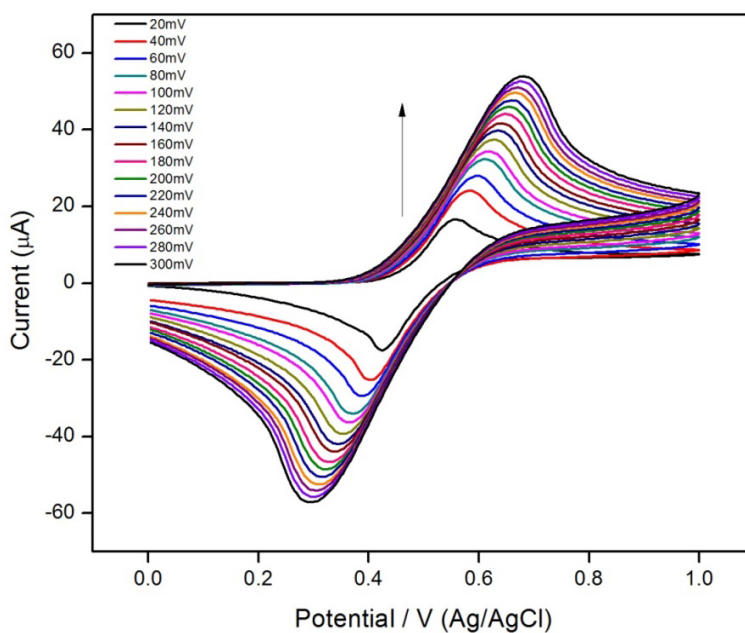
1. Ferrocenyl dendrimer 3 and 4 Various scan rate plots - P-1-P-3
2. <sup>1</sup>H and <sup>13</sup>C NMR spectra of compounds 1, 2, 3, 4, 6, 7, 10, 11, 12, 13, 15 and 16 - P-4-P-27



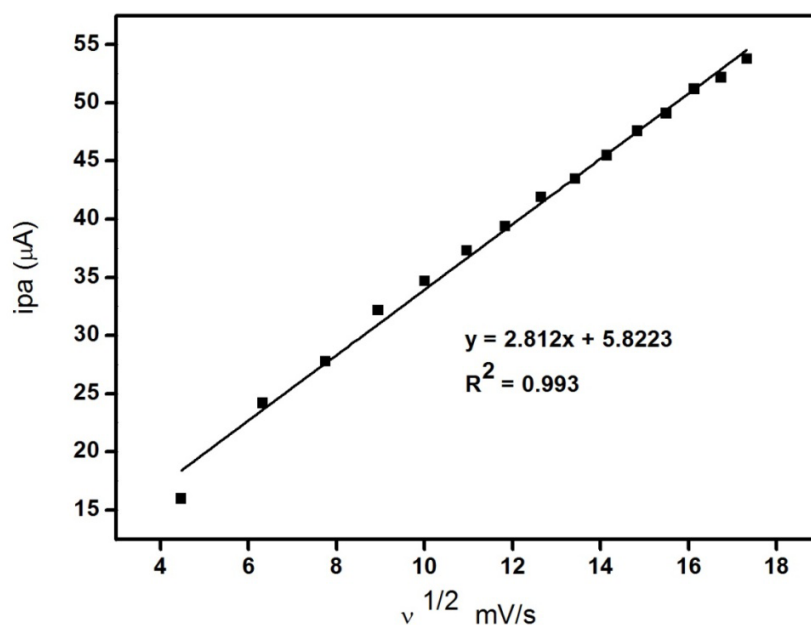
**Figure S1:** Ferrocenyldendrimer **3** for various scan rates (From inner to outer at 20 mV/s, 40 mV/s, 60 mV/s, 80 mV/s, 100 mV/s, 120 mV/s, 140 mV/s, 160 mV/s, 180 mV/s, 200 mV/s, 220 mV/s, 240 mV/s, 260 mV/s, 280 mV/s and 300 mV/s)



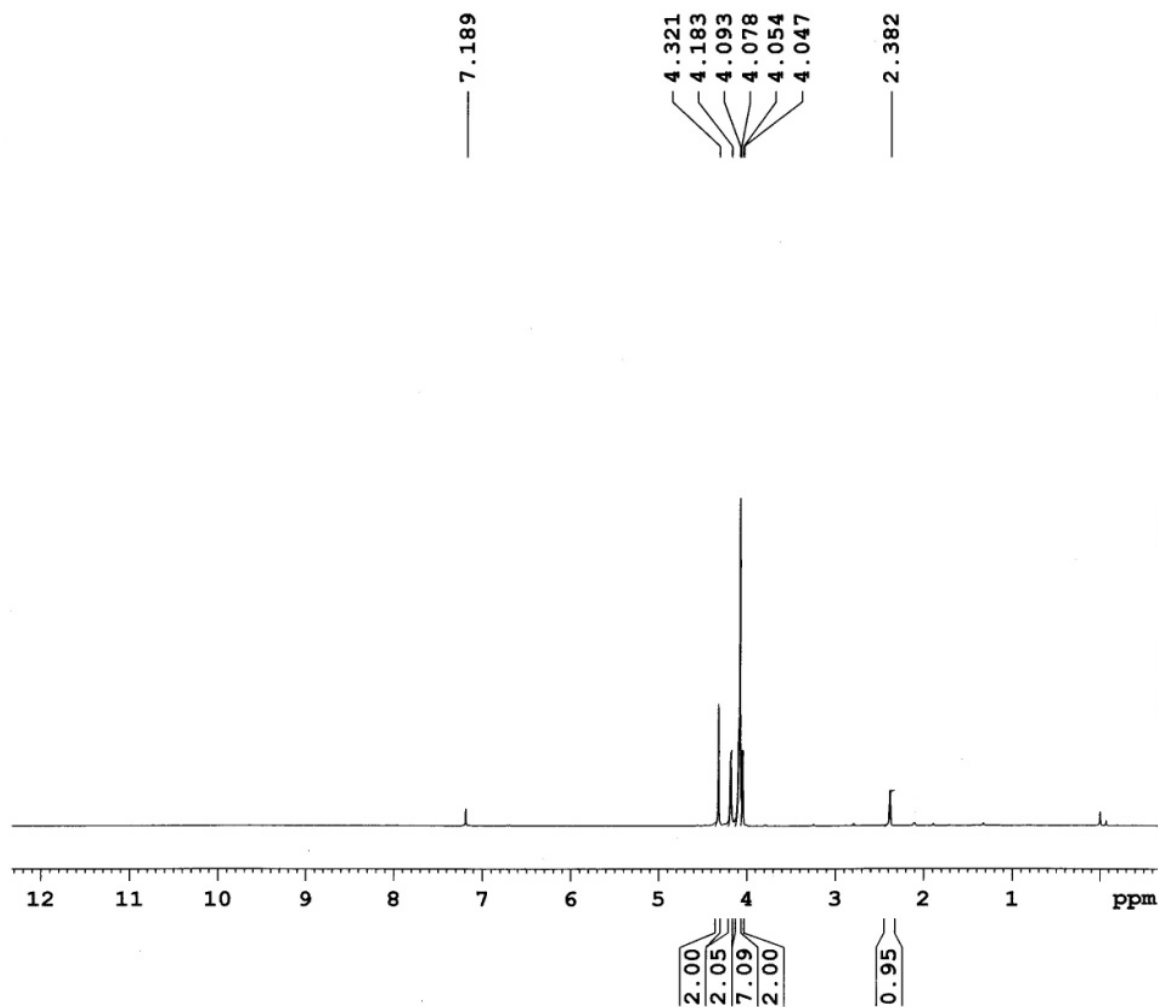
**Figure S2:** Ferrocenyldendrimer **3** Calibration plot of square root of scan rate ( $v^{1/2}$ ) vs. anodic peak current ( $i_{pa}$ )



**Figure S3:** Ferrocenyldendrimer 4 for various scan rates (From inner to outer at 20 mV/s, 40 mV/s, 60 mV/s, 80 mV/s, 100 mV/s, 120 mV/s, 140 mV/s, 160 mV/s, 180 mV/s, 200 mV/s, 220 mV/s, 240 mV/s, 260 mV/s, 280 mV/s and 300 mV/s)



**Figure S4:** Ferrocenyldendrimer 4 Calibration plot of square root of scan rate ( $v^{1/2}$ ) vs. anodic peak current ( $i_{pa}$ )



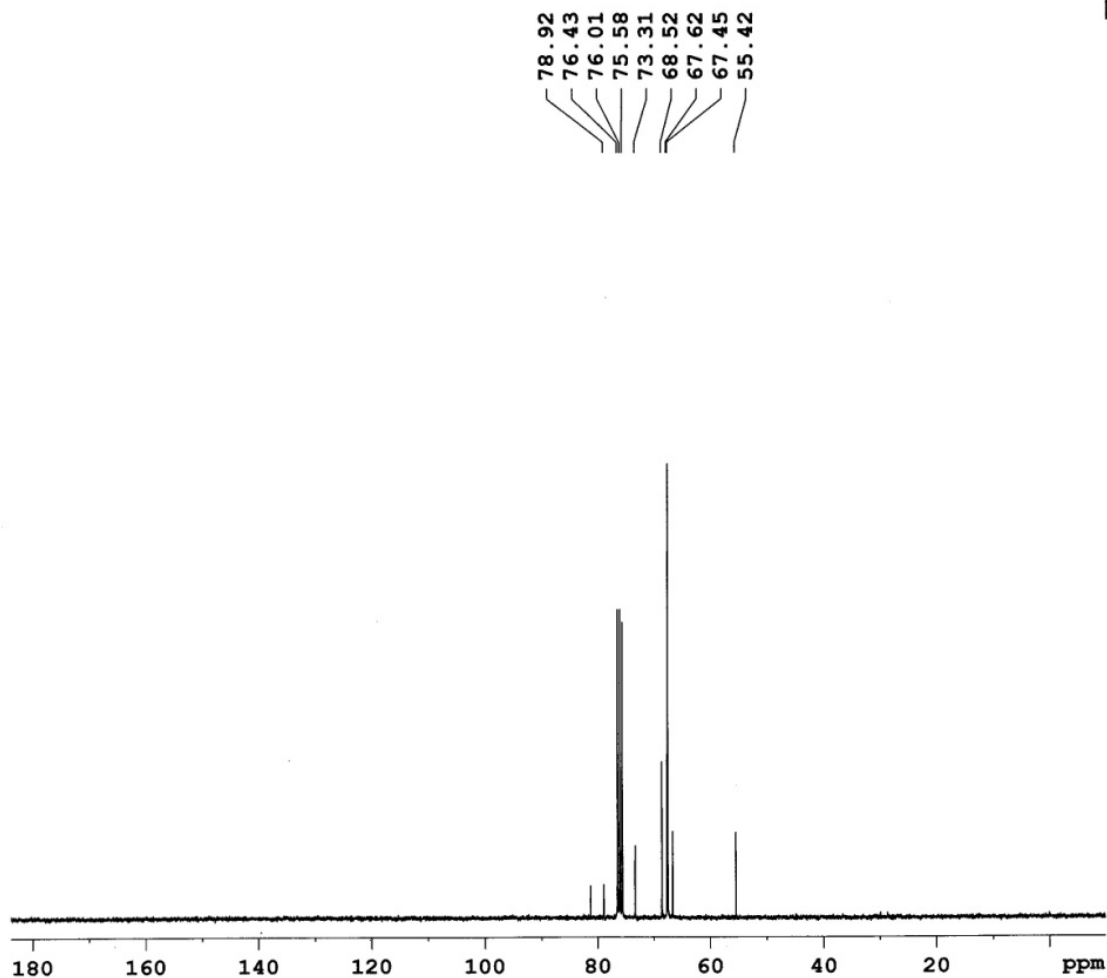
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EXPNO 1  
PROCNO 1

F2 - Acquisition Parameters  
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PROBHD 5 mm DUL 13C-1  
PULPROG zg30  
TD 65536  
SOLVENT CDCl3  
NS 16  
DS 2  
SWH 6172.839 Hz  
FIDRES 0.094190 Hz  
AQ 5.3084660 sec  
RG 128  
DW 81.000 usec  
DE 6.00 usec  
TE 300.0 K  
D1 1.00000000 sec  
TDO 1

----- CHANNEL f1 -----  
NUC1 1H  
P1 13.15 usec  
PL1 0.00 dB  
SFO1 300.1318534 MHz

F2 - Processing parameters  
SI 32768  
SF 300.1300278 MHz  
WDW EM  
SSB 0  
LB 0.30 Hz  
GB 0  
PC 1.00

$^1\text{H}$  ( $\text{CDCl}_3$ ) NMR spectra of the compound **6**



```
Current Data Parameters
NAME      RACD-F-O-pro
EXPNO    2
PROCNO   1

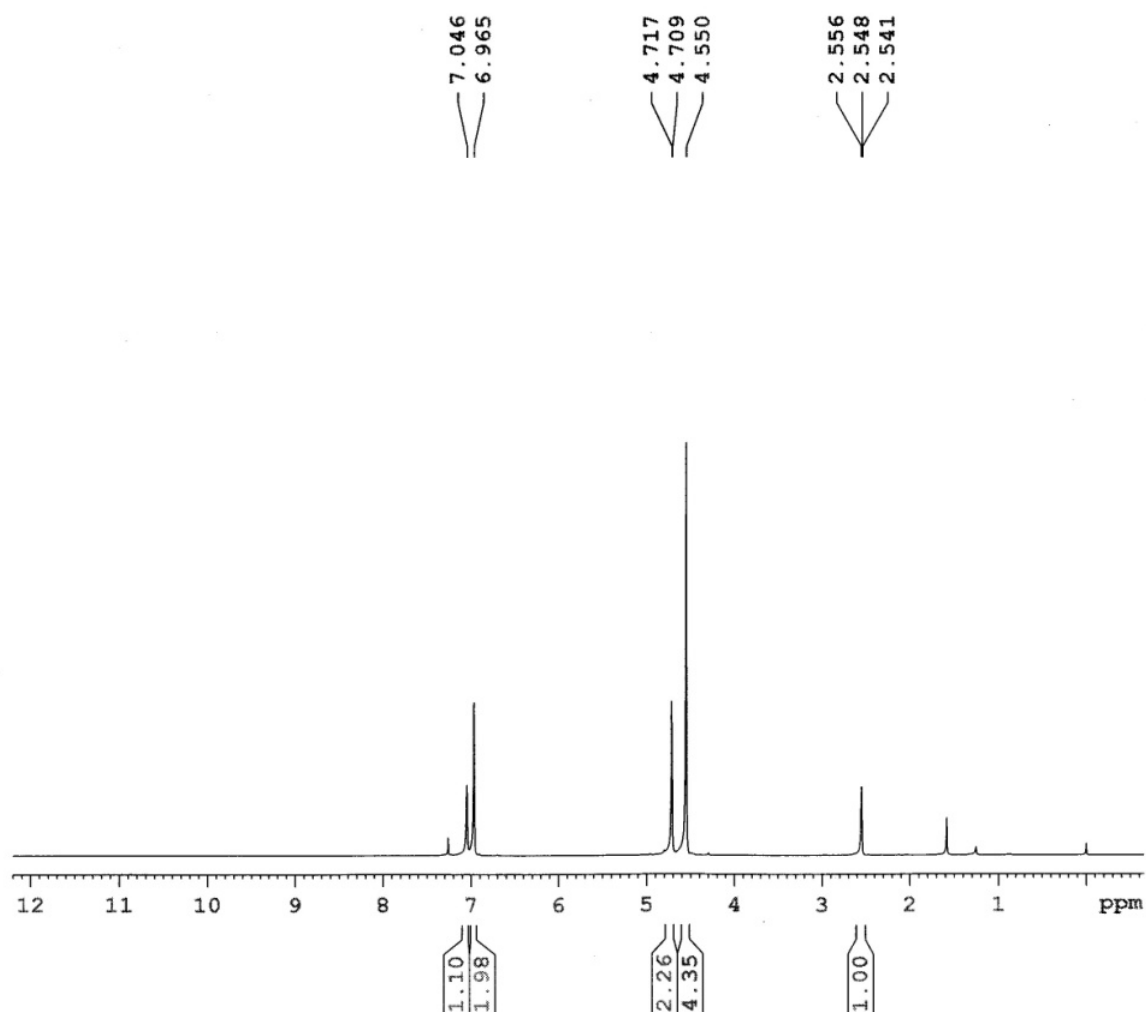
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PULPROG  zgpg30
TD       65536
SOLVENT  CDCl3
NS       456
DS       4
SWH      17985.611 Hz
FIDRES   0.274439 Hz
AQ       1.8219508 sec
RG       724.1
BW       27.800 usec
DE       6.00 usec
TE       300.0 K
D1       2.0000000 sec
d11      0.0300000 sec
DELTA    1.89999998 sec
TD0      1

===== CHANNEL f1 =====
NUC1     13C
P1       9.30 usec
PL1      0.00 dB
SFO1     75.4752953 MHz

===== CHANNEL f2 =====
CPDPRG2  waltz16
NUC2     1H
PCPD2    80.00 usec
PL2      0.00 dB
PL12     15.68 dB
PL13     16.00 dB
SFO2     300.1312005 MHz

F2 - Processing parameters
SI       32768
SF       75.4678273 MHz
WDW      EM
SSB      0
LB       1.00 Hz
GB       0
PC       1.40
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$^{13}\text{C}$  ( $\text{CDCl}_3$ ) NMR spectra of the compound **6**



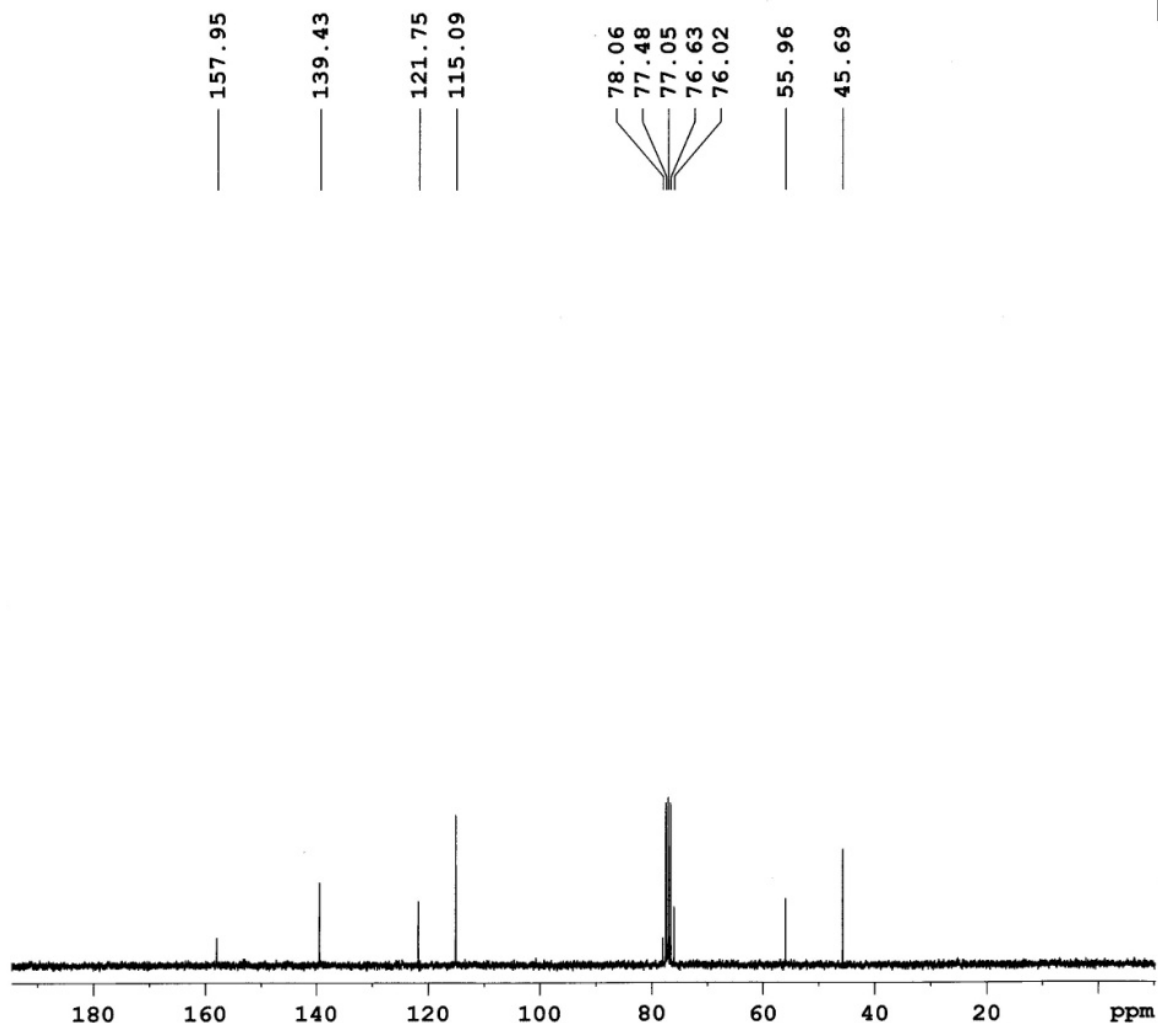
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NAME RACD-568  
EXPNO 1  
PROCNO 1

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PULPROG zg30  
TD 65536  
SOLVENT CDCl3  
NS 16  
DS 2  
SWH 6172.839 Hz  
FIDRES 0.094190 Hz  
AQ 5.3084660 sec  
RG 128  
DW 81.000 usec  
DE 6.000 usec  
TE 300.0 K  
D1 1.00000000 sec  
TDO 1

CHANNEL f1  
NUC1 1H  
F1 13.15 usec  
FL1 0.00 dB  
SFO1 300.1318534 MHz

F2 - Processing parameters  
SI 32768  
SF 300.1300070 MHz  
WDW EM  
SSB 0  
LB 0.30 Hz  
GB 0  
PC 1.00

(CDCl<sub>3</sub>) NMR spectra of the compound 7



Current Data Parameters  
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EXPNO 2  
PROCNO 1

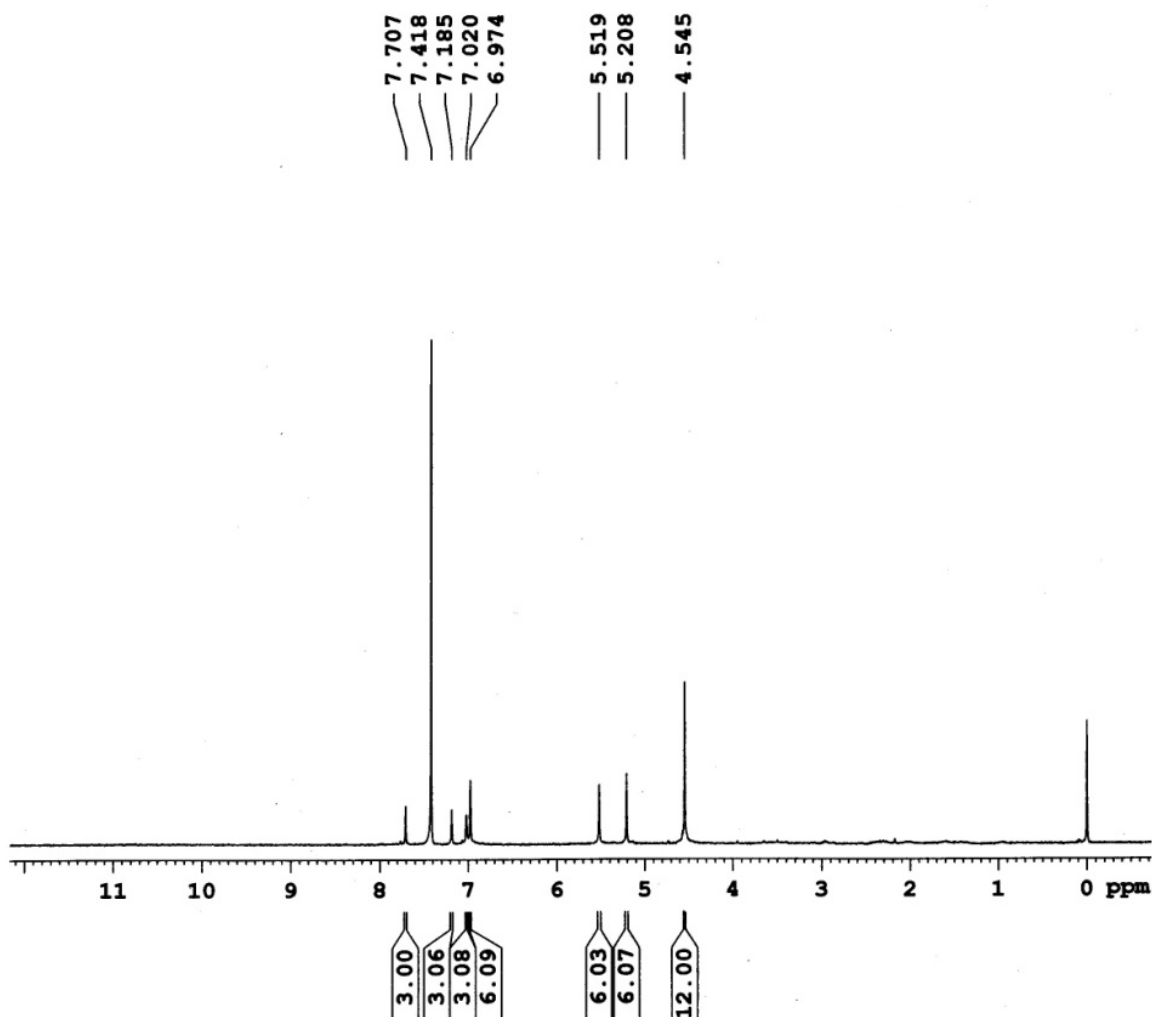
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PULPROG zgpg30  
TD 65536  
SOLVENT CDCl3  
NS 55  
DS 4  
SWH 17985.611 Hz  
FIDRES 0.274439 Hz  
AQ 1.8219508 sec  
RG 1290.2  
DW 27.800 usec  
DE 6.00 usec  
TE 300.0 K  
D1 2.0000000 sec  
d11 0.0300000 sec  
DELTA 1.89999998 sec  
TDO 1

===== CHANNEL f1 =====  
NUC1 13C  
P1 9.30 usec  
PL1 0.00 dB  
SFO1 75.4752953 MHz

===== CHANNEL f2 =====  
CPDPRG2 waltz16  
NUC2 1H  
PCPD2 80.00 usec  
PL2 0.00 dB  
PL12 15.68 dB  
PL13 16.00 dB  
SFO2 300.1312005 MHz

F2 - Processing parameters  
SI 32768  
SF 75.4677490 MHz  
WDW EM  
SSB 0  
LB 1.00 Hz  
GB 0  
PC 1.40

$^{13}\text{C}$  ( $\text{CDCl}_3$ ) NMR spectra of the compound 7



Current Data Parameters  
NAME RACD-571-3  
EXPNO 1  
PROCNO 1

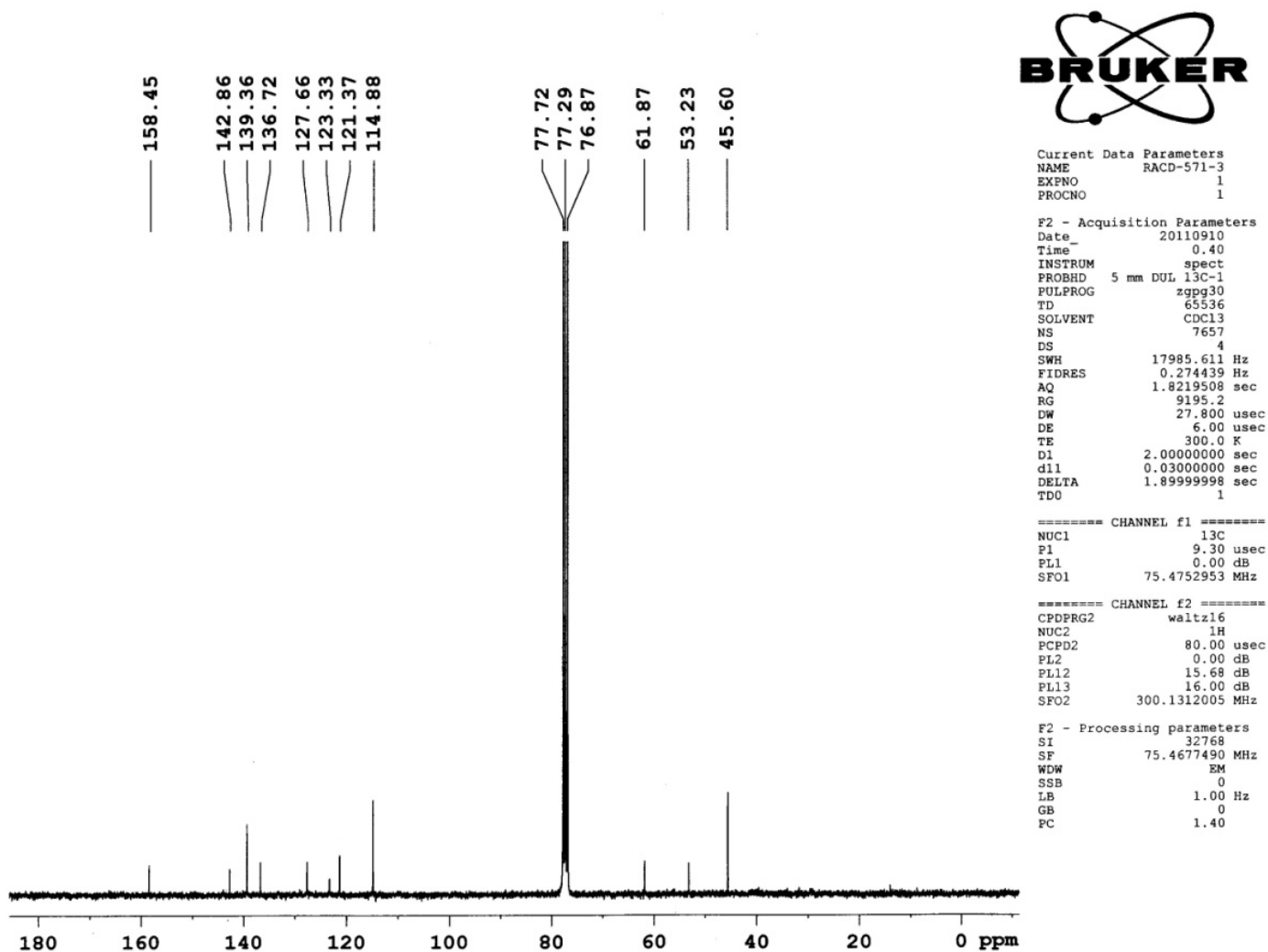
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PULPROG zg30  
TD 65536  
SOLVENT CDC13  
NS 16  
DS 2  
SWH 6172.839 Hz  
FIDRES 0.094190 Hz  
AQ 5.3084660 sec  
RG 512  
DW 81.000 usec  
DE 6.00 usec  
TE 300.0 K  
D1 1.00000000 sec  
TDO 1

CHANNEL f1  
NUC1 1H  
P1 13.15 usec  
PL1 0.00 dB  
SFO1 300.1318534 MHz

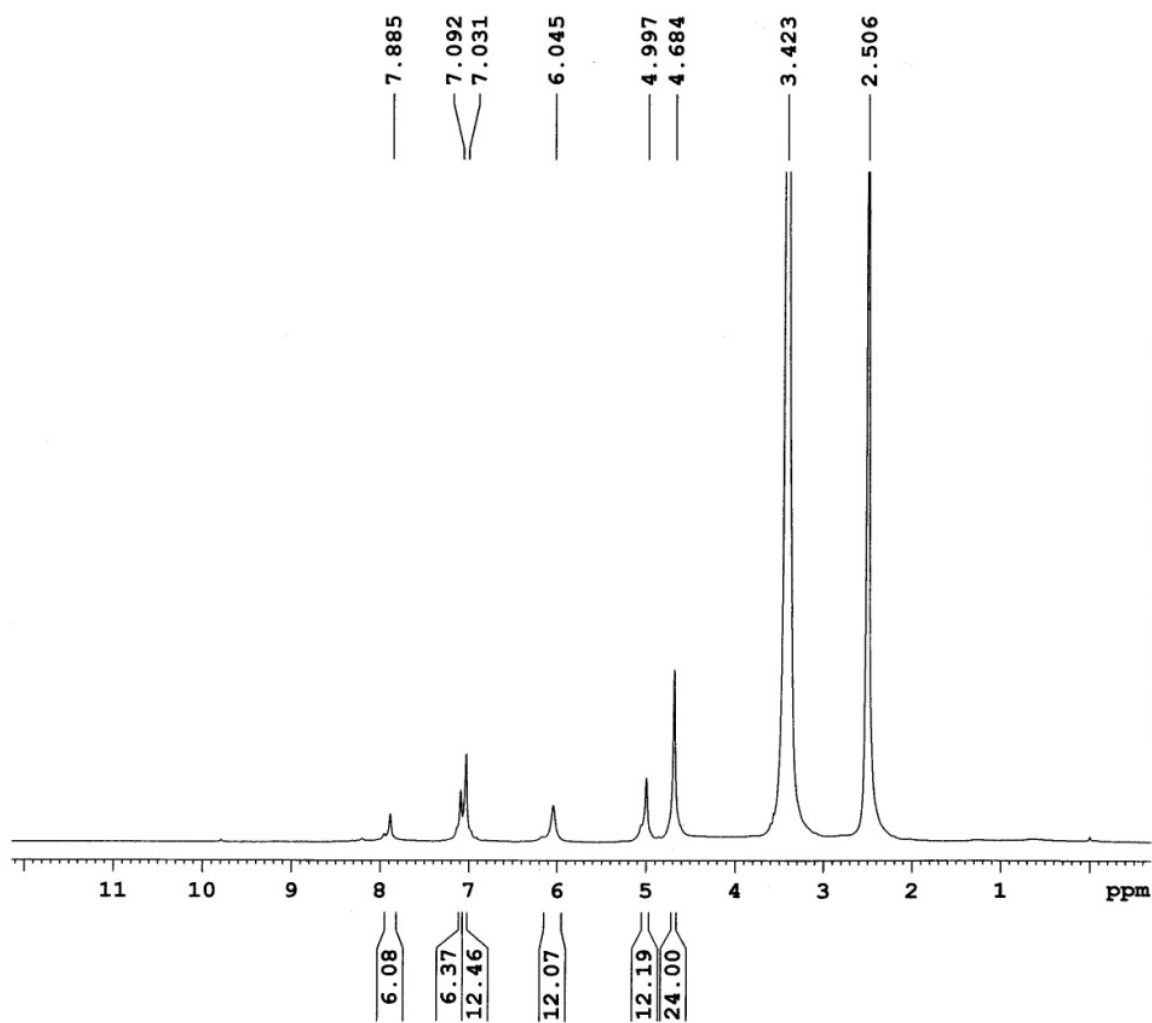
F2 - Processing parameters  
SI 32768  
SF 300.1299590 MHz  
WDW EM  
SSB 0  
LB 0.30 Hz  
GB 0  
PC 1.00

$^1\text{H}$  (DMSO- $d_6$ ) NMR spectra of the compound **10**





$^{13}\text{C}$  (DMSO- $d_6$ ) NMR spectra of the compound **10**



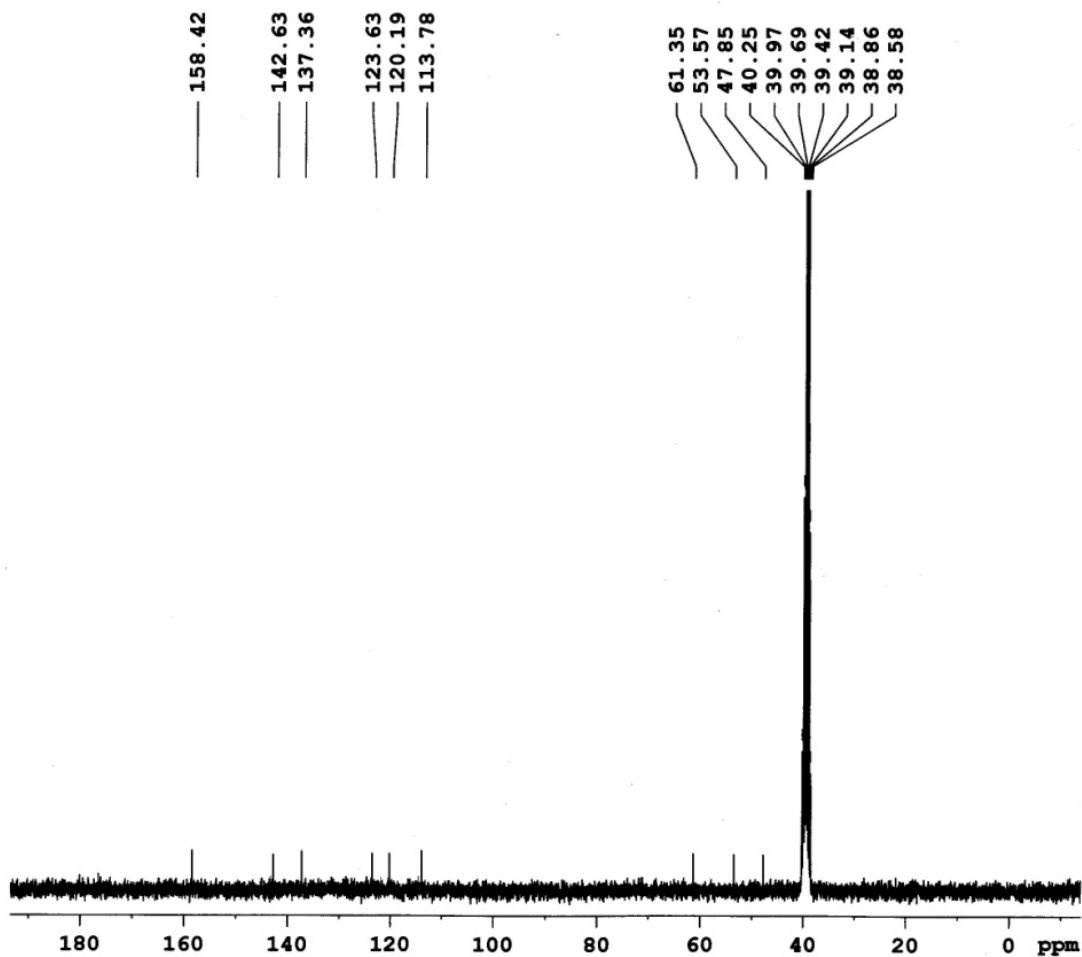
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EXPNO         2
PROCNO        1

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FULPROG       zg30
TD            65536
SOLVENT       DMSO
NS            16
DS            2
SWH           6172.839 Hz
FIDRES        0.094190 Hz
AQ            5.3084660 sec
RG            80.6
DW            81.000 usec
DE            6.00 usec
TE            300.0 K
D1            1.00000000 sec
TD0           1

===== CHANNEL f1 =====
NUC1          1H
P1            13.15 usec
PL1           0.00 dB
SFO1          300.1318534 MHz

F2 - Processing parameters
SI            32768
SF            300.1300000 MHz
WDW           EM
SSB           0
LB            0.30 Hz
GB            0
PC            1.00
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$^1\text{H}$  (DMSO- $d_6$ ) NMR spectra of the compound **11**



Current Data Parameters  
NAME RACD-604  
EXPNO 3  
PROCNO 1

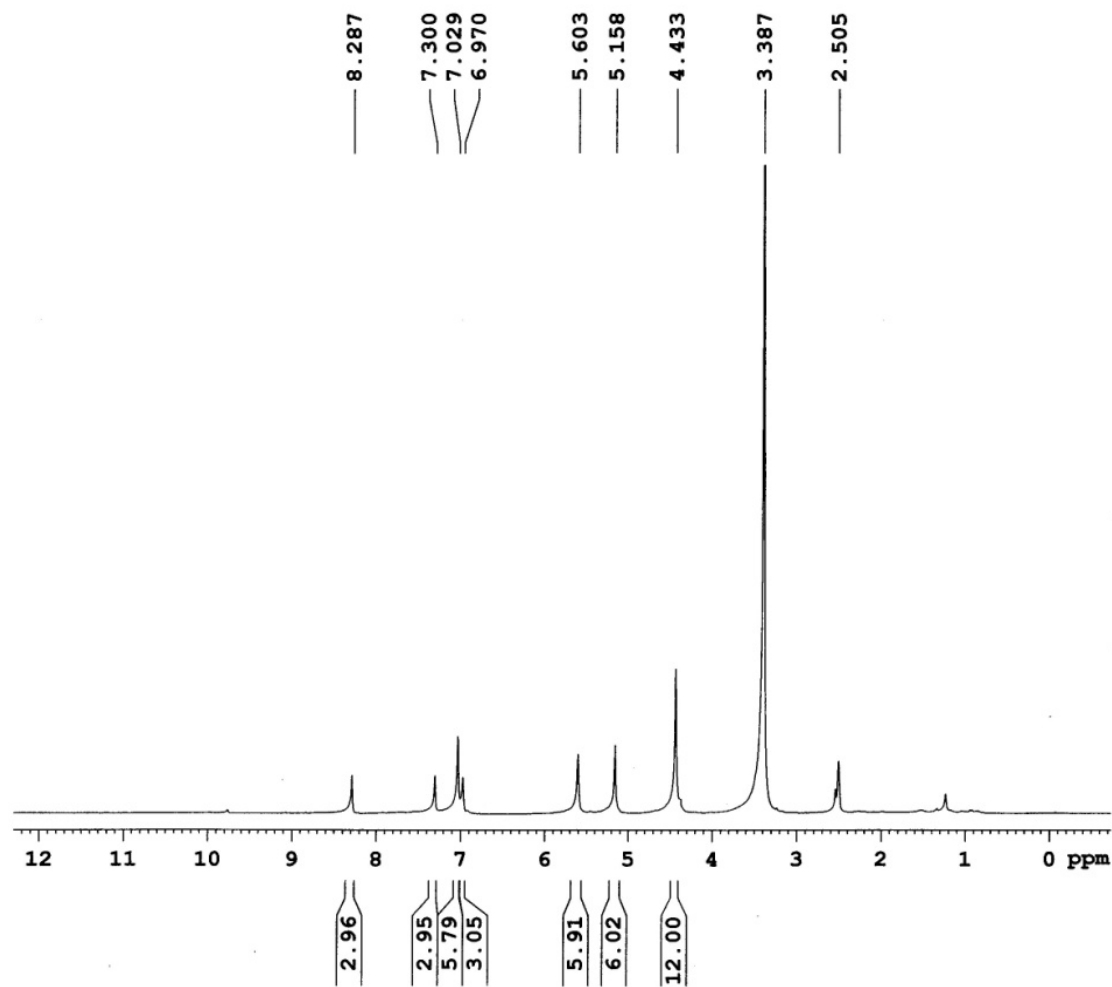
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Time 22.27  
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PULPROG zgpg30  
TD 65536  
SOLVENT DMSO  
NS 127  
DS 4  
SWH 17985.611 Hz  
FIDRES 0.274439 Hz  
AQ 1.8219508 sec  
RG 574.7  
DW 27.800 usec  
DE 6.00 usec  
TE 300.0 K  
D1 2.00000000 sec  
d11 0.03000000 sec  
DELTA 1.89999998 sec  
TDO 1

===== CHANNEL f1 =====  
NUC1 13C  
P1 9.30 usec  
PL1 0.00 dB  
SFO1 75.4752953 MHz

===== CHANNEL f2 =====  
CPDPRG2 waltz16  
NUC2 1H  
PCPD2 80.00 usec  
PL2 0.00 dB  
PL12 15.68 dB  
PL13 16.00 dB  
SFO2 300.1312005 MHz

F2 - Processing parameters  
SI 32768  
SF 75.4677867 MHz  
WDW EM  
SSB 0  
LB 1.00 Hz  
GB 0  
PC 1.40

$^{13}\text{C}$  (DMSO- $d_6$ ) NMR spectra of the compound **11**



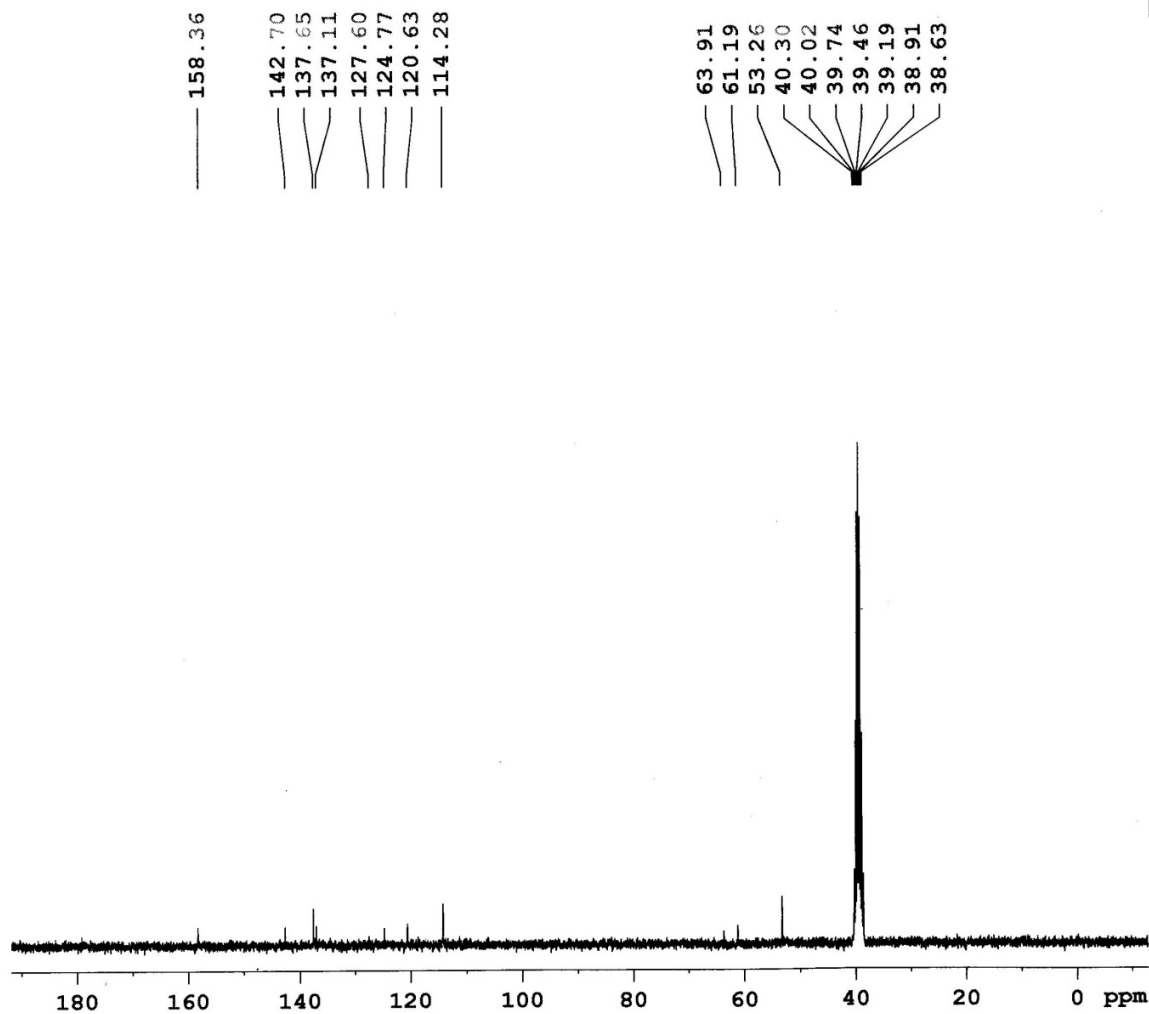
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PROCNO 1

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Time\_ 11.59  
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PULPROG zg30  
TD 65536  
SOLVENT DMSO  
NS 16  
DS 2  
SWH 6172.839 Hz  
FIDRES 0.094190 Hz  
AQ 5.3084660 sec  
RG 128  
DW 81.000 usec  
DE 6.00 usec  
TE 300.0 K  
D1 1.00000000 sec  
TD0 1

===== CHANNEL f1 =====  
NUC1 1H  
P1 13.15 usec  
PL1 0.00 dB  
SFO1 300.1318534 MHz

F2 - Processing parameters  
SI 32768  
SF 300.1300000 MHz  
WDW EM  
SSB 0  
LB 0.30 Hz  
GB 0  
PC 1.00

$^1\text{H}$  (DMSO- $d_6$ ) NMR spectra of the compound **12**



Current Data Parameters  
NAME RACD-580  
EXPNO 2  
PROCNO 1

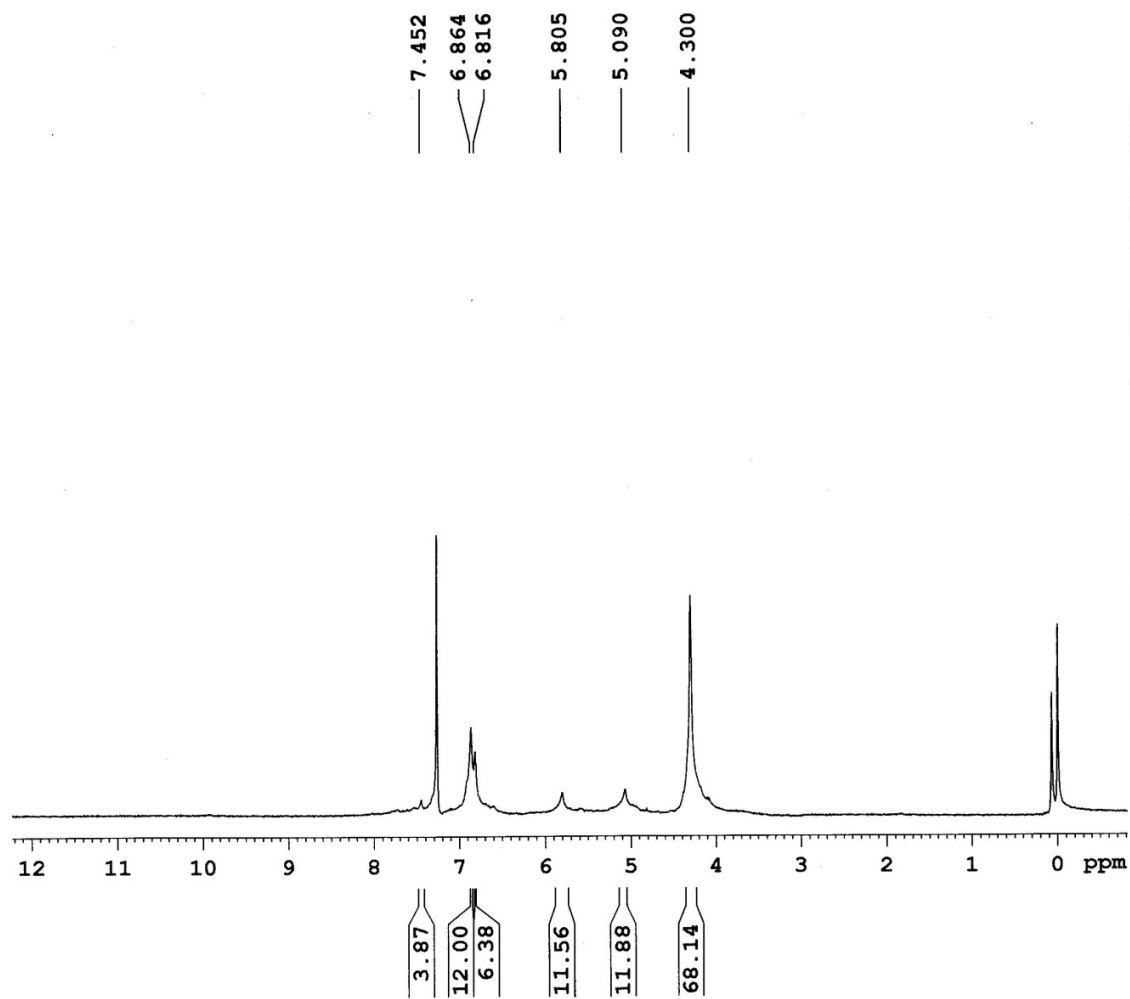
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PULPROG zgpg30  
TD 65536  
SOLVENT DMSO  
NS 200  
DS 4  
SWH 17985.611 Hz  
FIDRES 0.274439 Hz  
AQ 1.8219508 sec  
RG 4096  
DW 27.800 usec  
DE 6.00 usec  
TE 300.0 K  
D1 2.00000000 sec  
d11 0.03000000 sec  
DELTA 1.89999998 sec  
TDO 1

==== CHANNEL f1 =====  
NUC1 13C  
P1 9.30 usec  
PL1 0.00 dB  
SFO1 75.4752953 MHz

==== CHANNEL f2 =====  
CPDPRG2 waltz16  
NUC2 1H  
PCPD2 80.00 usec  
PL2 0.00 dB  
PL12 15.68 dB  
PL13 16.00 dB  
SFO2 300.1312005 MHz

F2 - Processing parameters  
SI 32768  
SF 75.4677867 MHz  
WDW EM  
SSB 0  
LB 1.00 Hz  
GB 0  
PC 1.40

$^{13}\text{C}$  (DMSO- $d_6$ ) NMR spectra of the compound **12**



Current Data Parameters  
NAME RACD-610  
EXPNO 1  
PROCNO 1

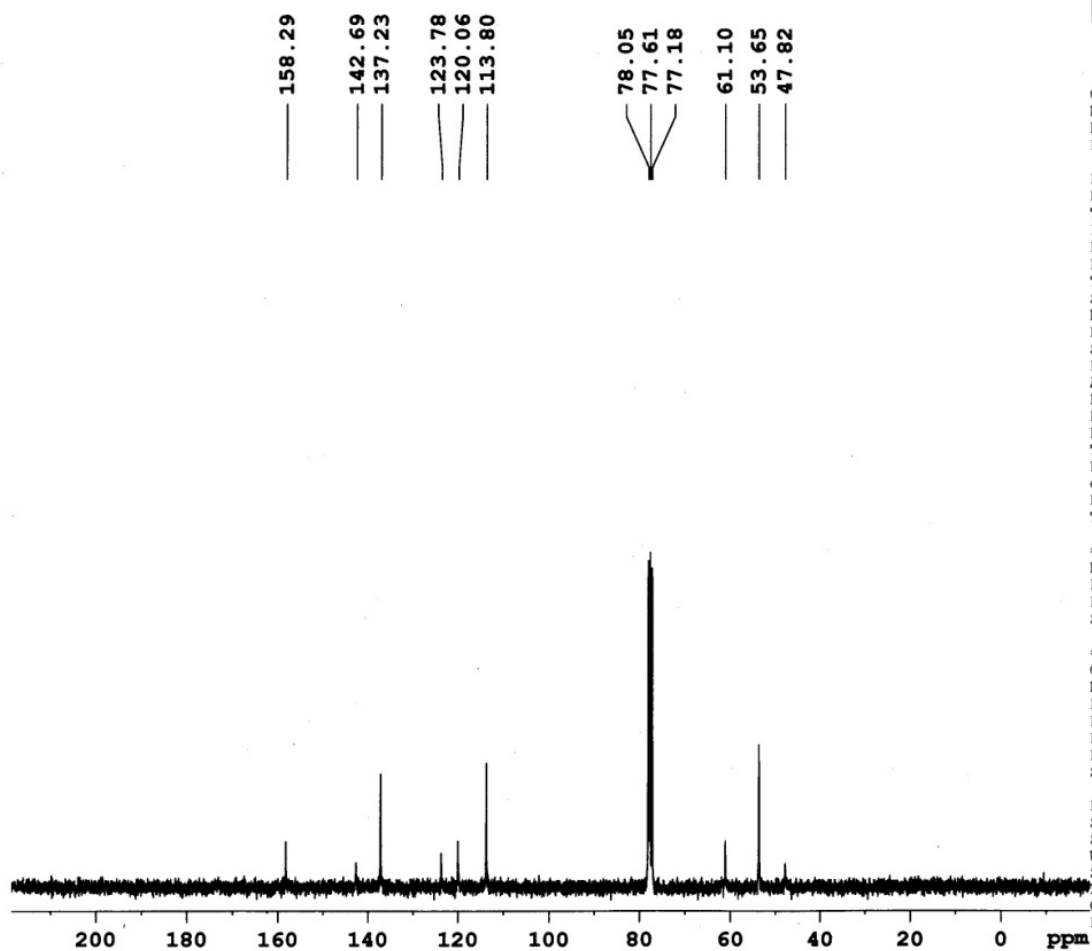
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PULPROG zg30  
TD 65536  
SOLVENT CDCl3  
NS 16  
DS 2  
SWH 6172.839 Hz  
FIDRES 0.094190 Hz  
AQ 5.3084660 sec  
RG 322.5  
DW 81.000 usec  
DE 6.00 usec  
TE 300.0 K  
D1 1.0000000 sec  
TD0 1

===== CHANNEL f1 =====  
NUC1 1H  
P1 13.15 usec  
PL1 0.00 dB  
SFO1 300.1318534 MHz

F2 - Processing parameters  
SI 32768  
SF 300.1300050 MHz  
WDW EM  
SSB 0  
LB 0.30 Hz  
GB 0  
PC 1.00

$^1\text{H}$  (DMSO- $d_6$ ) NMR spectra of the compound **13**

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Current Data Parameters  
NAME RACD-610  
EXPNO 1  
PROCNO 1

F2 - Acquisition Parameters  
Date\_ 20120312  
Time\_ 15.54  
INSTRUM spect  
PROBHD 5 mm DUL 13C-1  
PULPROG zgpg30  
TD 65536  
SOLVENT DMSO  
NS 440  
DS 4  
SWH 17985.611 Hz  
FIDRES 0.274439 Hz  
AQ 1.8219508 sec  
RG 456.1  
DW 27.800 usec  
DE 6.00 usec  
TE 300.0 K  
D1 2.00000000 sec  
d11 0.03000000 sec  
DELTA 1.89999998 sec  
TDO 1

===== CHANNEL f1 =====  
NUC1 13C  
P1 9.30 usec  
PL1 0.00 dB  
SFO1 75.4752953 MHz

===== CHANNEL f2 =====  
CPDPRG2 waltz16  
NUC2 1H  
PCPD2 80.00 usec  
PL2 0.00 dB  
PL12 15.68 dB  
PL13 16.00 dB  
SFO2 300.1312005 MHz

F2 - Processing parameters  
SI 32768  
SF 75.4677867 MHz  
WDW EM  
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LB 1.00 Hz  
GB 0  
PC 1.40

$^{13}\text{C}$  (DMSO-d<sub>6</sub>) NMR spectra of the compound 13

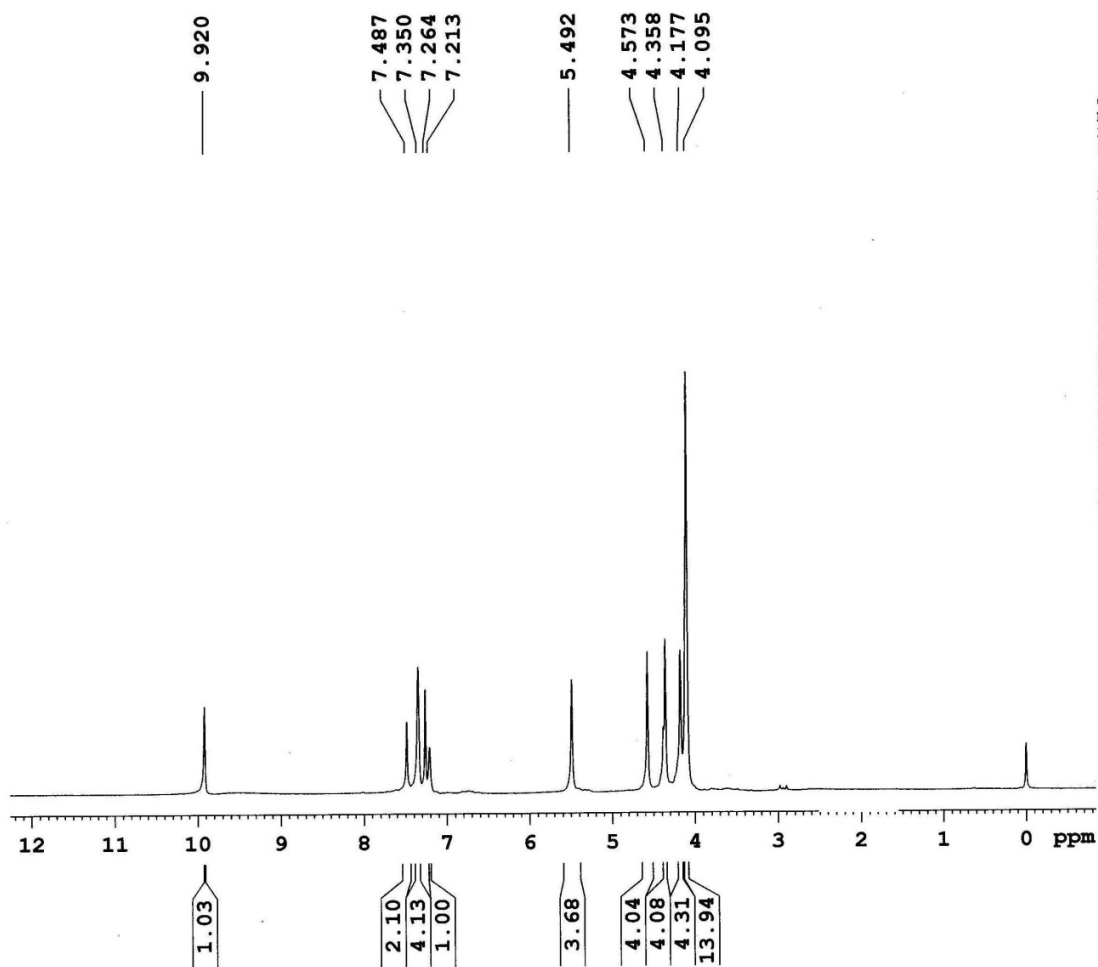


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NAME RACD-532  
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PROCNO 1

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Time\_ 20.51  
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PULPROG zg30  
TD 65536  
SOLVENT CDCl3  
NS 16  
DS 2  
SWH 6172.839 Hz  
FIDRES 0.094190 Hz  
AQ 5.3084660 sec  
RG 181  
RG 81.000 usec  
DE 6.00 usec  
TE 300.0 K  
D1 1.0000000 sec  
TD0 1

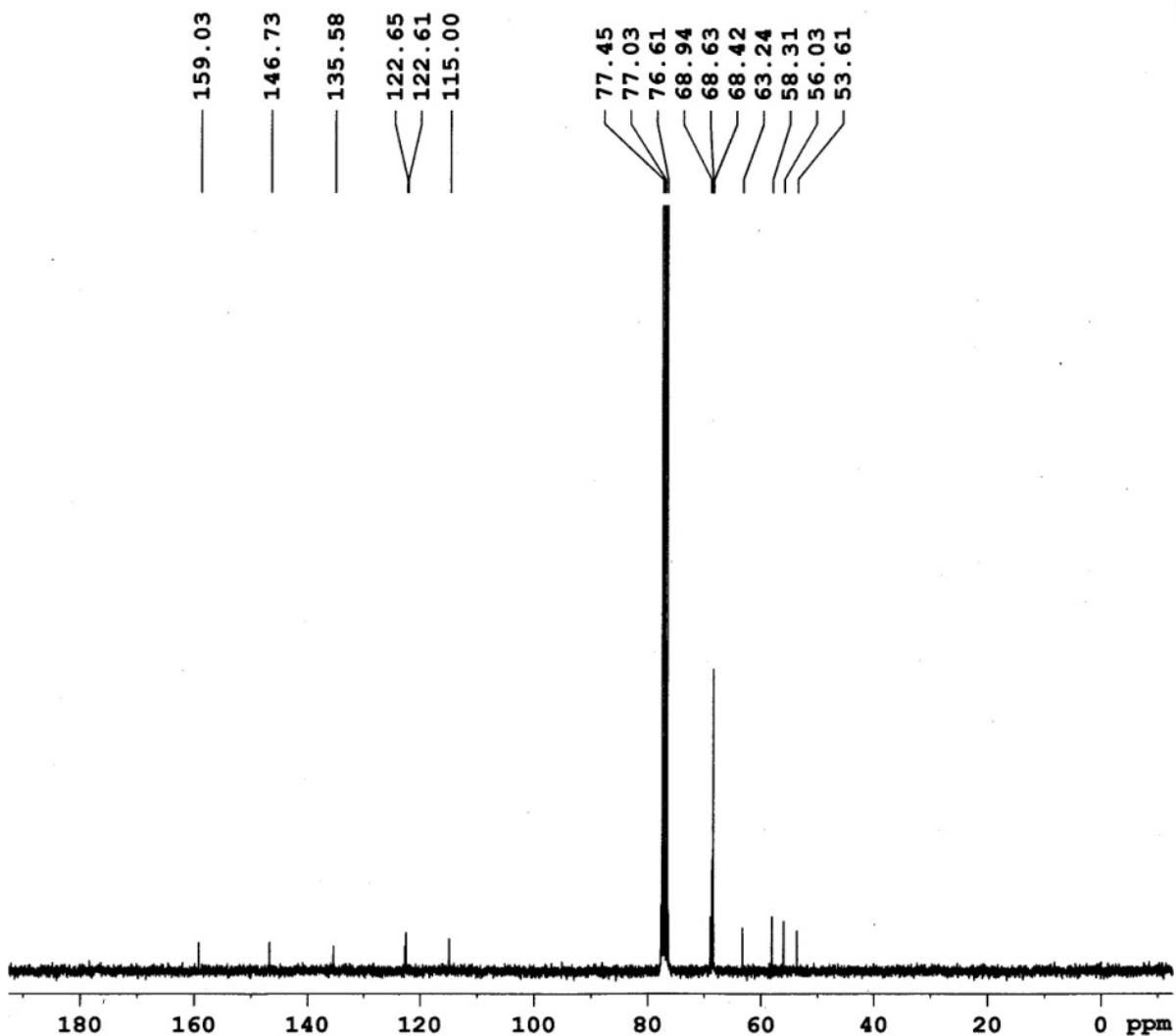
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P1 13.15 usec  
PL1 0.00 dB  
SFO1 300.1318534 MHz

F2 - Processing parameters  
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SF 300.1300055 MHz  
WDW EM  
SSB 0  
LB 0.30 Hz  
GB 0  
PC 1.00



$^1\text{H}$  (CDCl<sub>3</sub>) NMR spectra of the compound **15**





Current Data Parameters  
NAME RACD-532  
EXPNO 2  
PROCNO 1

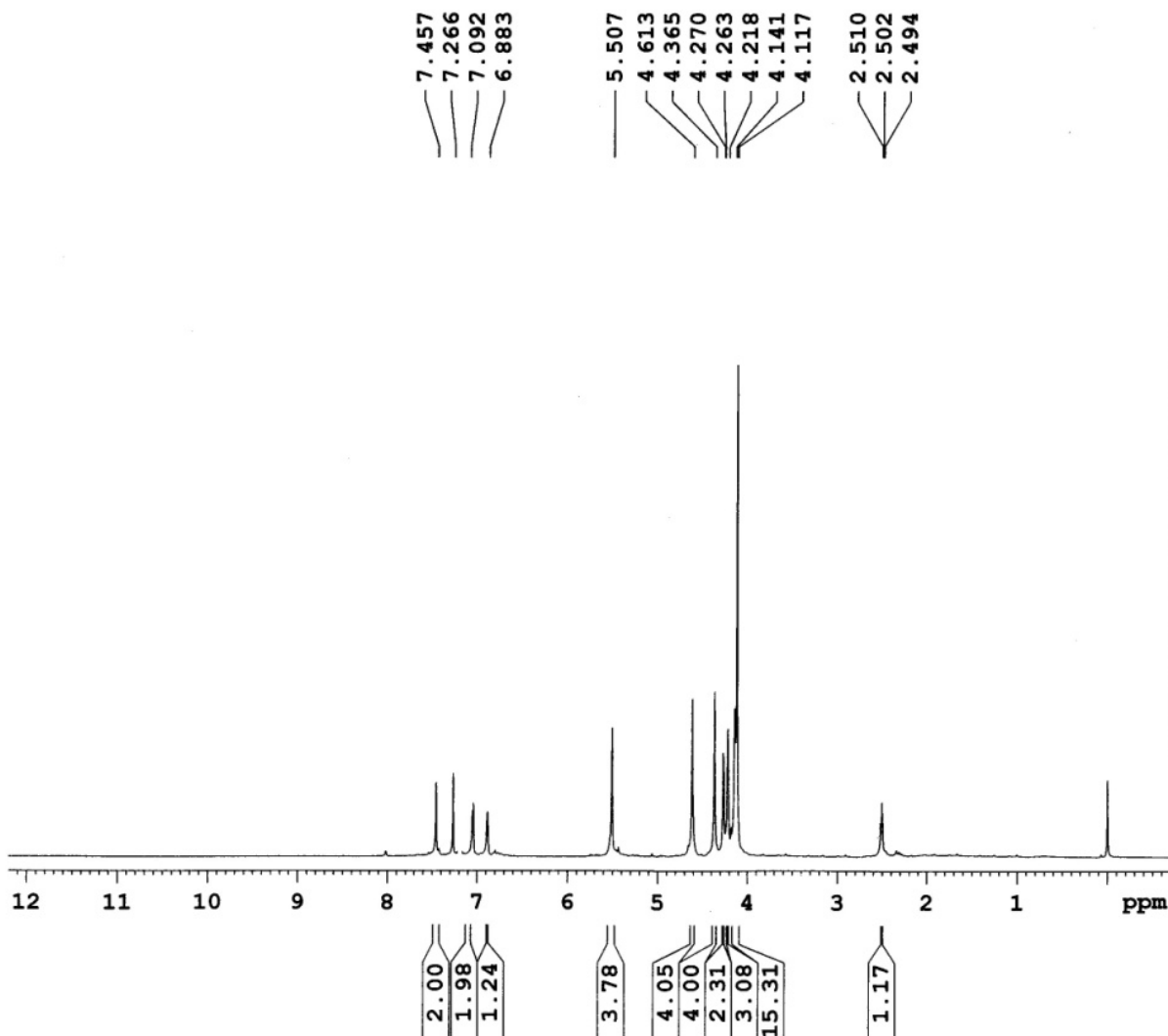
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Time 16.13  
INSTRUM spect  
PROBHD 5 mm DUL 13C-1  
PULPROG zgpg30  
TD 65536  
SOLVENT CDCl3  
NS 500  
DS 4  
SWH 17985.611 Hz  
FIDRES 0.274439 Hz  
AQ 1.8219508 sec  
RG 724.1  
DW 27.800 usec  
DE 6.00 usec  
TE 300.0 K  
D1 2.00000000 sec  
d11 0.03000000 sec  
DELTA 1.89999998 sec  
TDO 1

==== CHANNEL f1 =====  
NUC1 13C  
P1 9.30 usec  
PL1 0.00 dB  
SFO1 75.4752953 MHz

==== CHANNEL f2 =====  
CPDPRG2 waltz16  
NUC2 1H  
PCPD2 80.00 usec  
PL2 0.00 dB  
PL12 15.68 dB  
PL13 16.00 dB  
SFO2 300.1312005 MHz

F2 - Processing parameters  
SI 32768  
SF 75.4677490 MHz  
WDW EM  
SSB 0  
LB 1.00 Hz  
GB 0  
PC 1.40

$^{13}\text{C}$  ( $\text{CDCl}_3$ ) NMR spectra of the compound 15



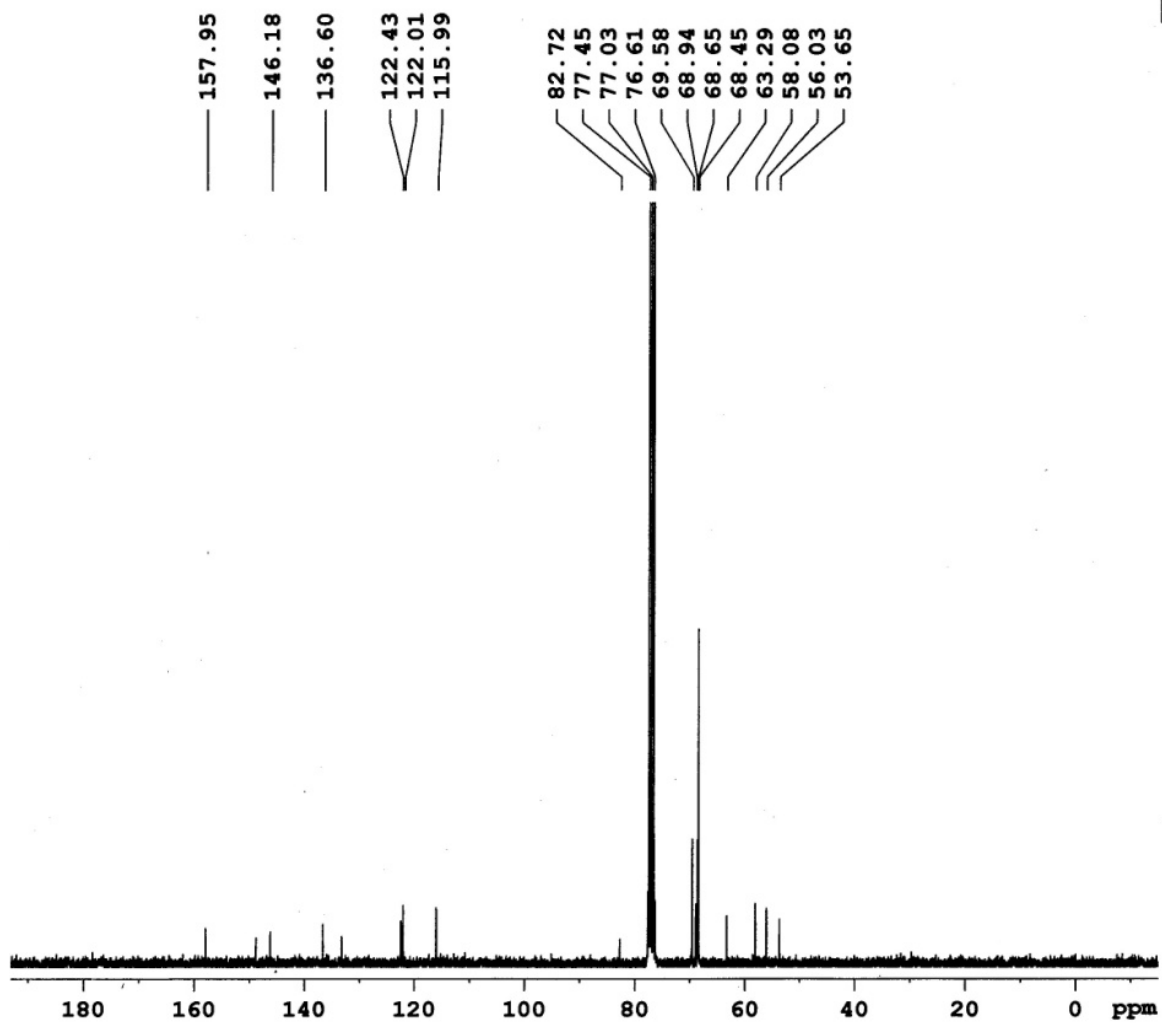
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PROCNO 1

F2 - Acquisition Parameters  
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INSTRUM spect  
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PULPROG zg30  
TD 65536  
SOLVENT CDCl3  
NS 16  
DS 2  
SWH 6172.839 Hz  
FIDRES 0.094190 Hz  
AQ 5.3084660 sec  
RG 161.3  
DW 81.000 usec  
DE 6.00 usec  
TE 300.0 K  
D1 1.0000000 sec  
TDO 1

===== CHANNEL f1 =====  
NUC1 1H  
P1 13.15 usec  
PL1 0.00 dB  
SFO1 300.1318534 MHz

F2 - Processing parameters  
SI 32768  
SF 300.1300048 MHz  
WDW EM  
SSB 0  
LB 0.30 Hz  
GB 0  
PC 1.00

$^1\text{H}$  (CDCl<sub>3</sub>) NMR spectra of the compound **16**



```
Current Data Parameters
NAME          RACD-540
EXPNO         2
PROCNO        1

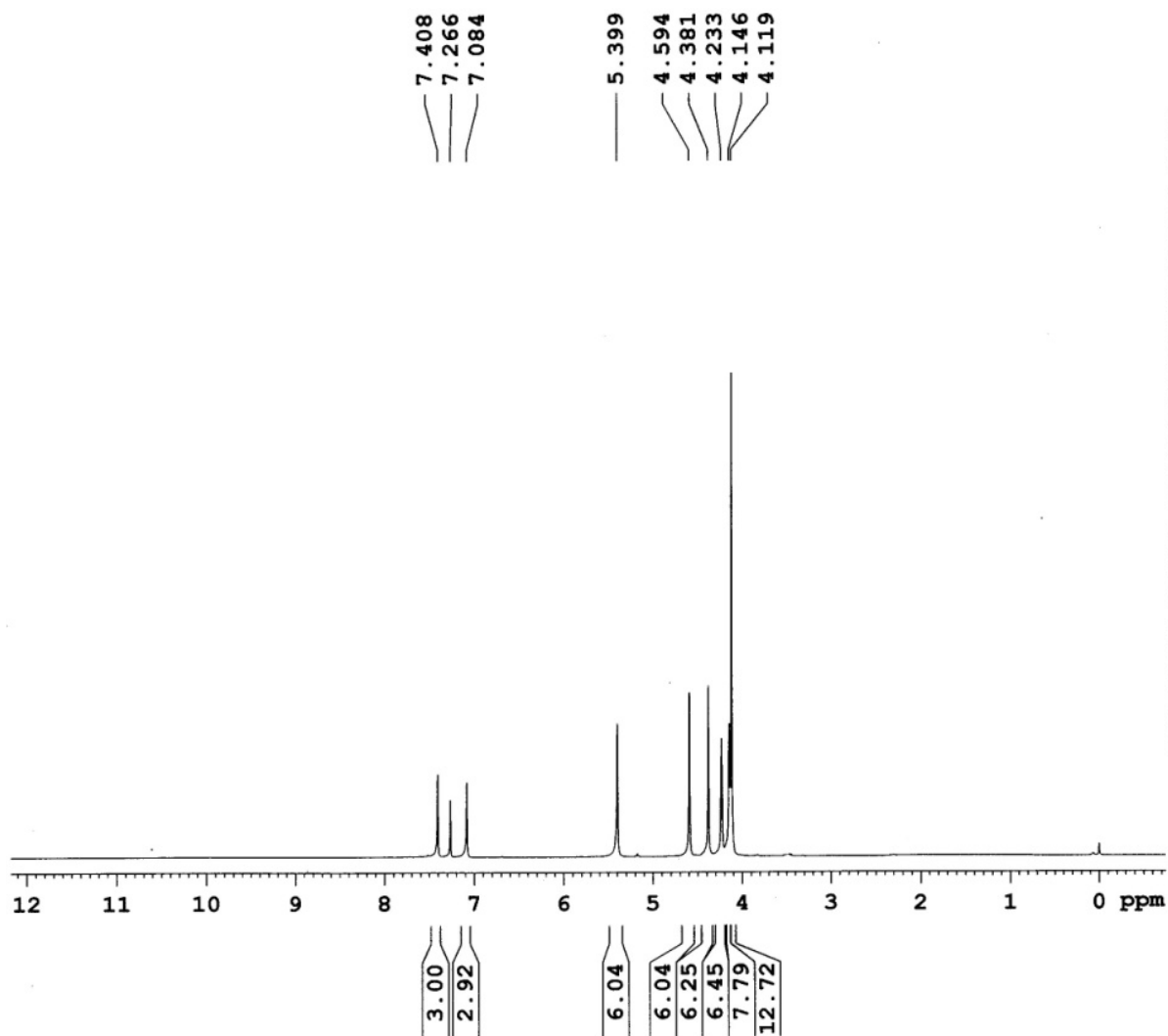
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Time          16.03
INSTRUM      spect
PROBHD       5 mm DUL 13C-1
PULPROG      zgpg30
TD           65536
SOLVENT      CDC13
NS           500
DS           4
SWH          17985.611 Hz
FIDRES       0.274439 Hz
AQ           1.8219508 sec
RG           724.1
DW           27.800 usec
DE           6.00 usec
TE           300.0 K
D1           2.00000000 sec
d11          0.03000000 sec
DELTA        1.89999998 sec
TD0          1

===== CHANNEL f1 =====
NUC1          13C
P1            9.30 usec
PL1           0.00 dB
SFO1          75.4752953 MHz

===== CHANNEL f2 =====
CPDPRG2      waltz16
NUC2          1H
PCPD2        80.00 usec
PL2           0.00 dB
PL12         15.68 dB
PL13         16.00 dB
SFO2          300.1312005 MHz

F2 - Processing parameters
SI            32768
SF            75.4677490 MHz
WDW           EM
SSB           0
LB            1.00 Hz
GB            0
PC            1.40
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$^{13}\text{C}$  ( $\text{CDCl}_3$ ) NMR spectra of the compound 16



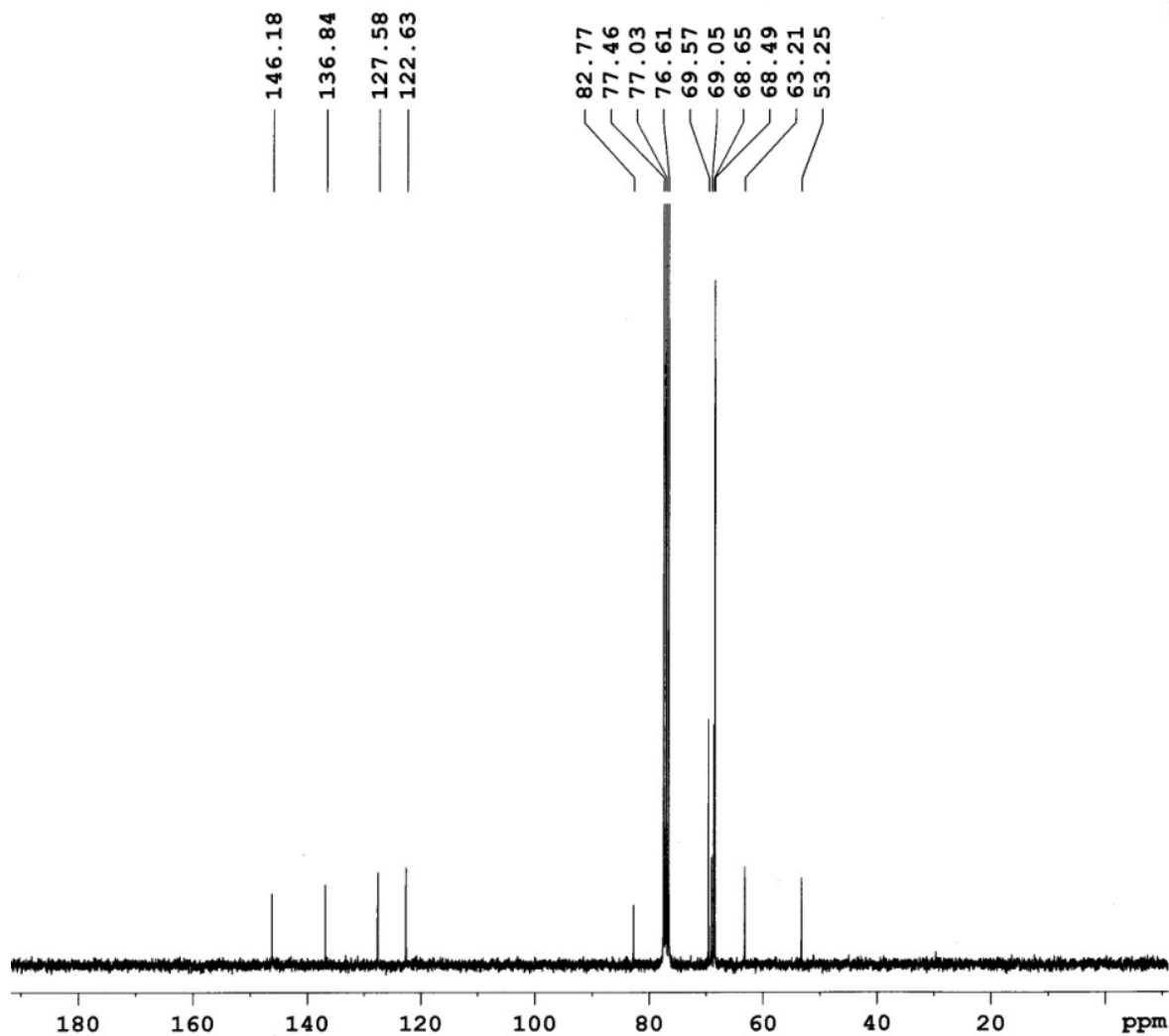
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PROCNO 1

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PULPROG zg30  
TD 65536  
SOLVENT CDCl3  
NS 16  
DS 2  
SWH 6172.839 Hz  
FIDRES 0.094190 Hz  
AQ 5.3084660 sec  
RG 181  
DW 81.000 usec  
DE 6.00 usec  
TE 300.0 K  
D1 1.00000000 sec  
TD0 1

----- CHANNEL f1 -----  
NUC1 1H  
P1 13.15 usec  
PL1 0.00 dB  
SFO1 300.1318534 MHz

F2 - Processing parameters  
SI 32768  
SF 300.1300045 MHz  
WDW EM  
SSB 0  
LB 0.30 Hz  
GB 0  
PC 1.00

$^1\text{H}$  ( $\text{CDCl}_3\text{-d}_6$ ) NMR spectra of the compound **1**



Current Data Parameters  
NAME RACD-524  
EXPNO 2  
PROCNO 1

F2 - Acquisition Parameters  
Date\_ 20110604  
Time 19.40  
INSTRUM spect  
PROBHD 5 mm DUL 13C-1  
PULPROG zgpg30  
TD 65536  
SOLVENT CDCl3  
NS 625  
DS 4  
SWH 17985.611 Hz  
FIDRES 0.274439 Hz  
AQ 1.8219508 sec  
RG 13004  
DW 27.800 usec  
DE 6.00 usec  
TE 300.0 K  
D1 2.00000000 sec  
d11 0.03000000 sec  
DELTA 1.89999998 sec  
TD0 1

===== CHANNEL f1 =====  
NUC1 13C  
P1 9.30 usec  
PL1 0.00 dB  
SFO1 75.4752953 MHz

===== CHANNEL f2 =====  
CPDPRG2 waltz16  
NUC2 1H  
PCPD2 80.00 usec  
PL2 0.00 dB  
PL12 15.68 dB  
PL13 16.00 dB  
SFO2 300.1312005 MHz

F2 - Processing parameters  
SI 32768  
SF 75.4677490 MHz  
WDW EM  
SSB 0  
LB 1.00 Hz  
GB 0  
PC 1.40

$^{13}\text{C}$  ( $\text{CDCl}_3\text{-d}_6$ ) NMR spectra of the compound **1**

UNIV OF MADRAS

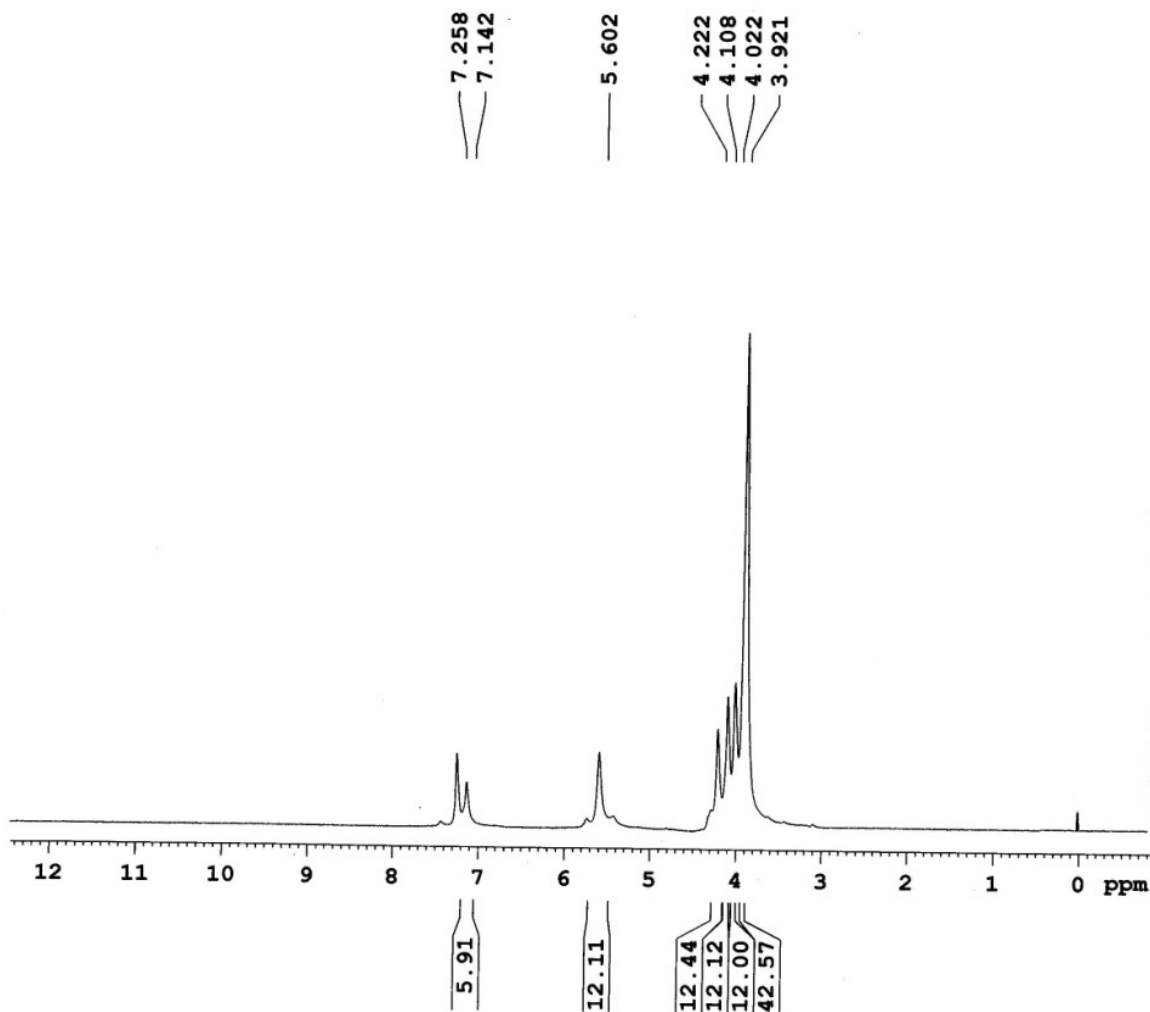


Current Data Parameters  
NAME RACD-600-2  
EXPNO 1  
PROCNO 1

F2 - Acquisition Parameters  
Date\_ 20120427  
Time 19.28  
INSTRUM spect  
PROBHD 5 mm DUL 13C-1  
PULPROG zg30  
TD 65536  
SOLVENT DMSO  
NS 16  
DS 2  
SWH 6172.839 Hz  
FIDRES 0.094190 Hz  
AQ 5.3084660 sec  
RG 181  
DW 81.000 usec  
DE 6.00 usec  
TE 300.0 K  
D1 1.00000000 sec  
TD0 1

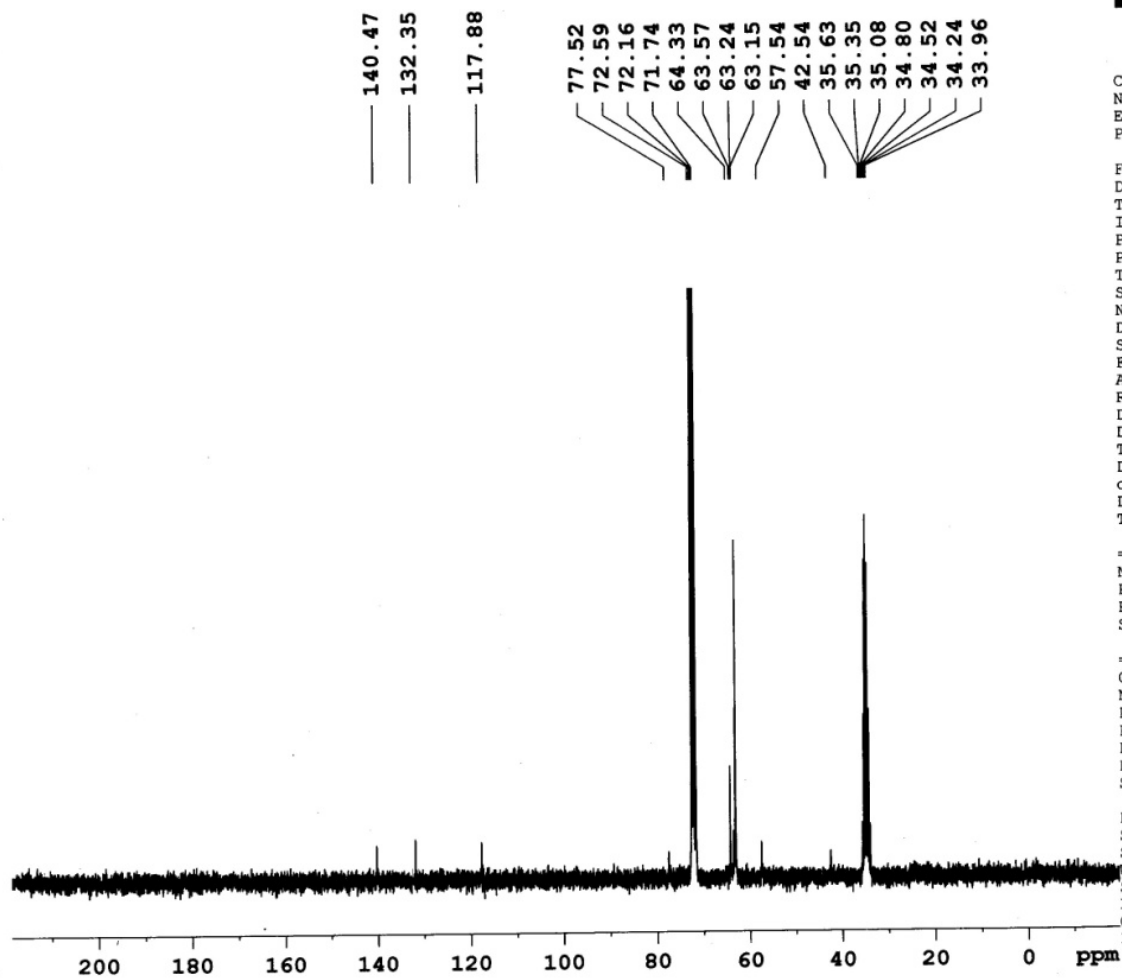
===== CHANNEL f1 =====  
NUC1 1H  
P1 13.15 usec  
PL1 0.00 dB  
SF01 300.1318534 MHz

F2 - Processing parameters  
SI 32768  
SF 300.1285949 MHz  
WDW EM  
SSB 0  
LB 0.30 Hz  
GB 0  
PC 1.00

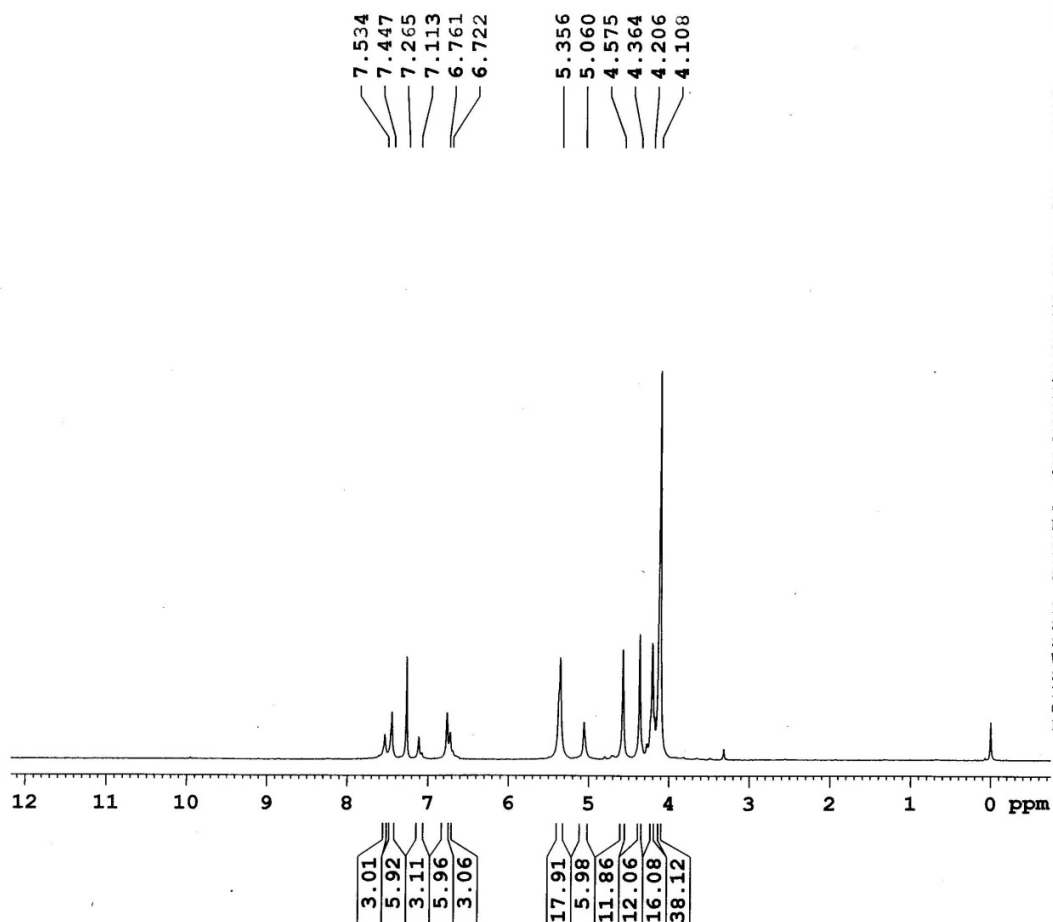


$^1\text{H}$  ( $\text{CDCl}_3\text{-d}_6$ ) NMR spectra of the compound **2**

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$^{13}\text{C}$  ( $\text{CDCl}_3\text{-d}_6$ ) NMR spectra of the compound 2



Current Data Parameters  
NAME AK-T-FE-DEN  
EXPNO 1  
PROCNO 1

F2 - Acquisition Parameters  
Date\_ 20130511  
Time 22.23  
INSTRUM spect  
PROBHD 5 mm DUL 13C-1  
PULPROG zg30  
TD 65536  
SOLVENT CDC13  
NS 16  
DS 2  
SWH 6172.839 Hz  
FIDRES 0.094190 Hz  
AQ 5.3084660 sec  
RG 256  
DW 81.000 usec  
DE 6.00 usec  
TE 300.0 K  
D1 1.00000000 sec  
TD0 1

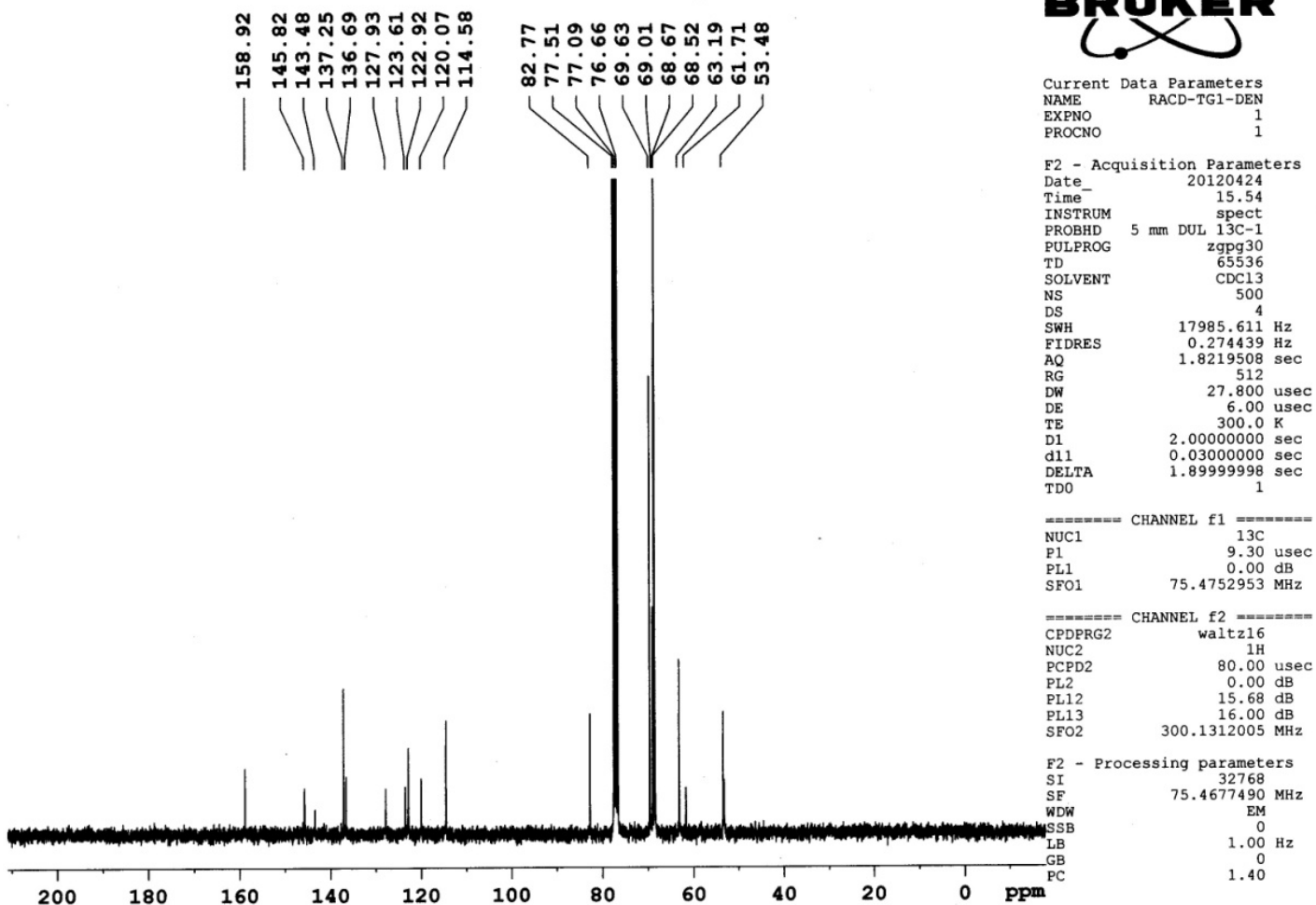
===== CHANNEL f1 =====  
NUC1 1H  
P1 13.15 usec  
PL1 0.00 dB  
SFO1 300.1318534 MHz

F2 - Processing parameters  
SI 32768  
SF 300.1300058 MHz  
WDW EM  
SSB 0  
LB 0.30 Hz  
GB 0  
PC 1.00

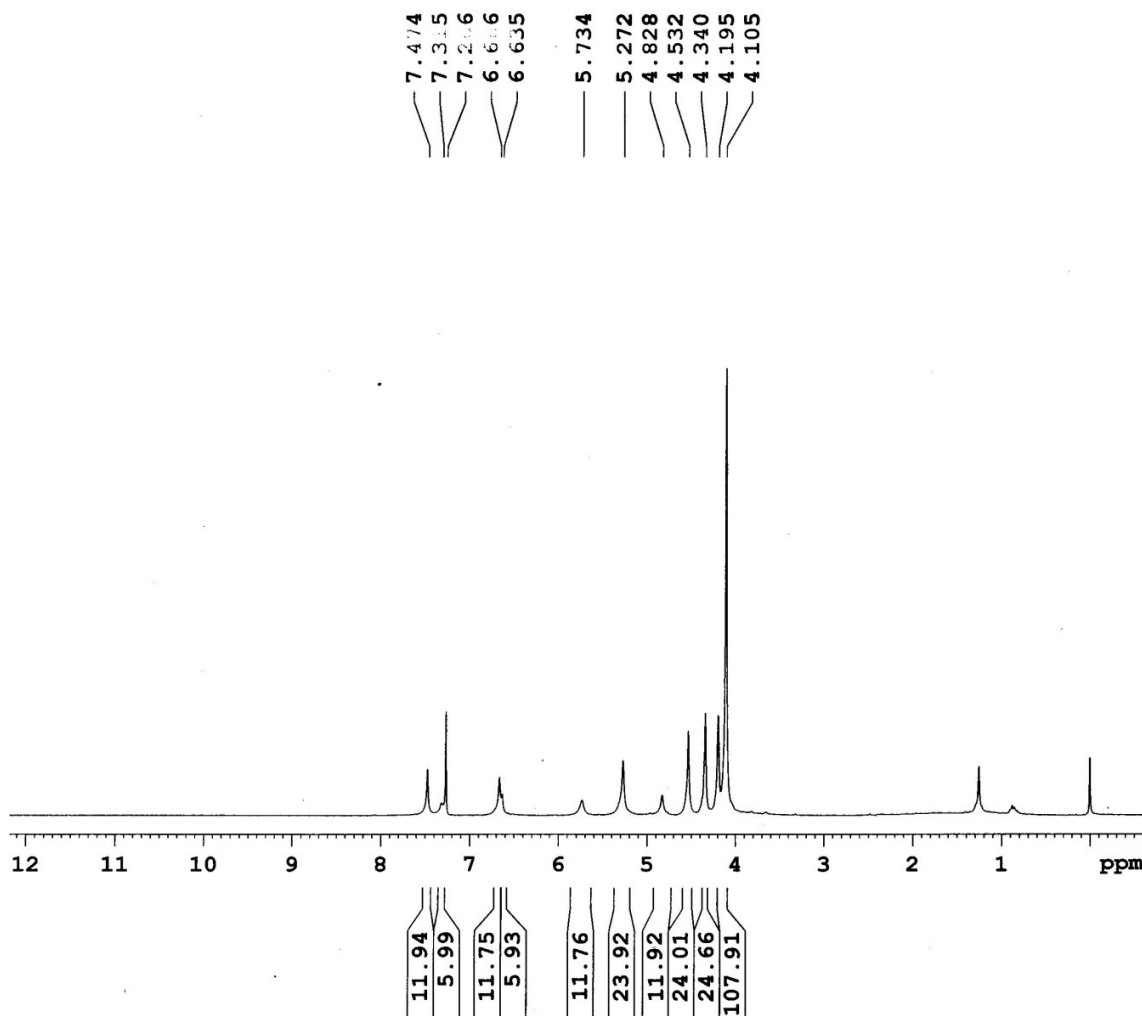
$^1\text{H}$  ( $\text{CDCl}_3\text{-d}_6$ ) NMR spectra of the compound **3**



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$^{13}\text{C}$  ( $\text{CDCl}_3\text{-d}_6$ ) NMR spectra of the compound 3



Current Data Parameters  
NAME RACD-615  
EXPNO 2  
PROCNO 1

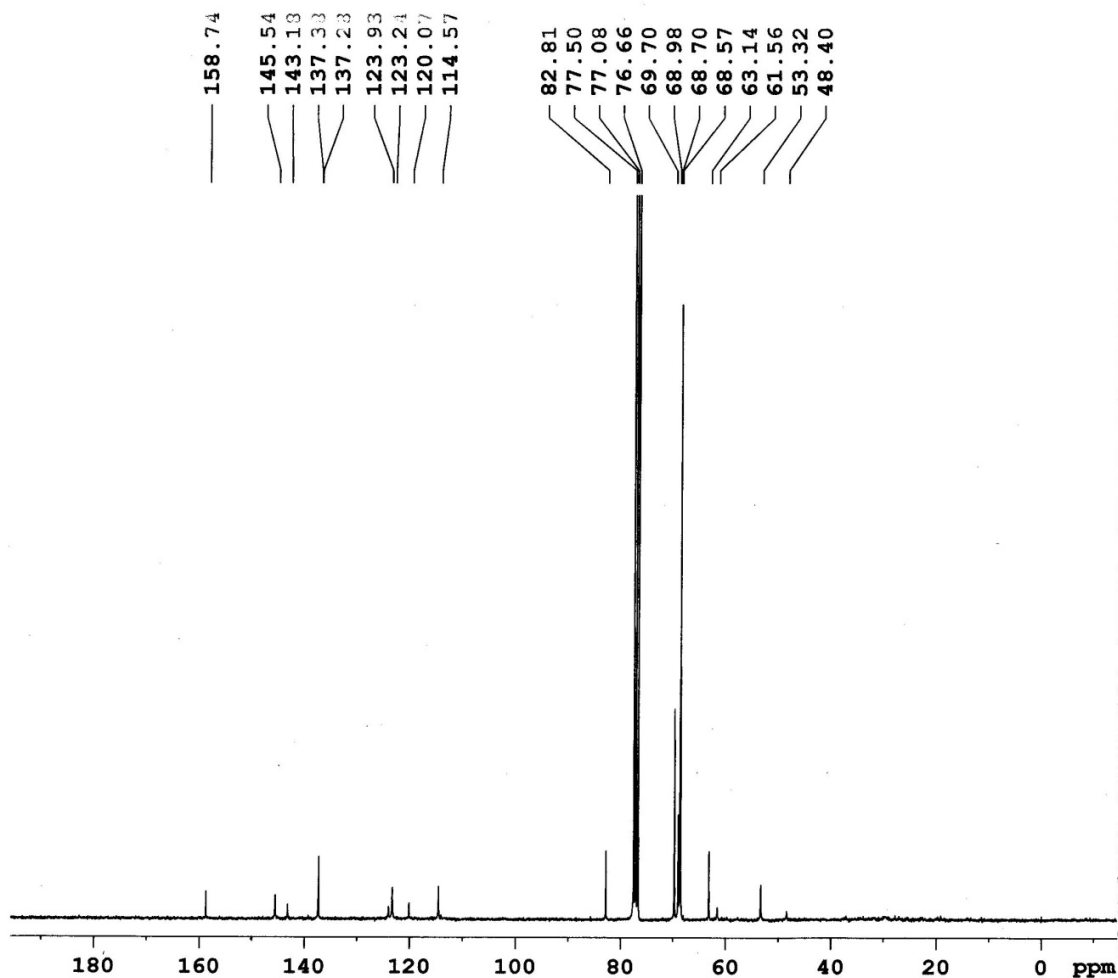
F2 - Acquisition Parameters  
Date\_ 20120104  
Time 13.48  
INSTRUM spect  
PROBHD 5 mm DUL 13C-1  
PULPROG zg30  
TD 65536  
SOLVENT CDCl3  
NS 16  
DS 2  
SWH 6172.839 Hz  
FIDRES 0.094190 Hz  
AQ 5.3084660 sec  
RG 256  
DW 81.000 usec  
DE 6.00 usec  
TE 300.0 K  
D1 1.00000000 sec  
TDO 1

===== CHANNEL f1 =====  
NUC1 1H  
P1 13.15 usec  
PL1 0.00 dB  
SFO1 300.1318534 MHz

F2 - Processing parameters  
SI 32768  
SF 300.1300046 MHz  
WDW EM  
SSB 0  
LB 0.30 Hz  
GB 0  
PC 1.00

$^1\text{H}$  ( $\text{CDCl}_3\text{-d}_6$ ) NMR spectra of the compound 4

UNIV OF MADRAS



Current Data Parameters  
NAME RACD-615  
EXPNO 1  
PROCNO 1

F2 - Acquisition Parameters  
Date\_ 20120321  
Time 9.01  
INSTRUM spect  
PROBHD 5 mm DUL 13C-1  
PULPROG zgpg30  
TD 65536  
SOLVENT CDCl3  
NS 5304  
DS 4  
SWH 17985.611 Hz  
FIDRES 0.274439 Hz  
AQ 1.8219508 sec  
RG 724.1  
DW 27.800 usec  
DE 6.00 usec  
TE 300.0 K  
D1 2.00000000 sec  
d11 0.03000000 sec  
DELTA 1.89999998 sec  
TDO 1

==== CHANNEL f1 =====  
NUC1 13C  
P1 9.30 usec  
PL1 0.00 dB  
SFO1 75.4752953 MHz

==== CHANNEL f2 =====  
CPDPRG2 waltz16  
NUC2 1H  
PCPD2 80.00 usec  
PL2 0.00 dB  
PL12 15.68 dB  
PL13 16.00 dB  
SFO2 300.1312005 MHz

F2 - Processing parameters  
SI 32768  
SF 75.4677490 MHz  
WDW EM  
SSB 0  
LB 1.00 Hz  
GB 0  
PC 1.40

$^{13}\text{C}$  ( $\text{CDCl}_3\text{-d}_6$ ) NMR spectra of the compound 4