Eletronic Supplementary Information

Amino acid ionic liquids as catalysts in a solvent-free Morita–Baylis–Hillman reaction

Mathias Prado Pereira,[a] Rafaela de Souza Martins[a], Marcone Augusto Leal de Oliveira[a] and Fernanda Irene Bombonato*[a]

Nucleus of studies in organic synthesis and catalysis, Department of Chemistry, University of Juiz de Fora, São Pedro 36036-900, Juiz de Fora, Brazil.

fernanda.bombonato@ufjf.edu.br

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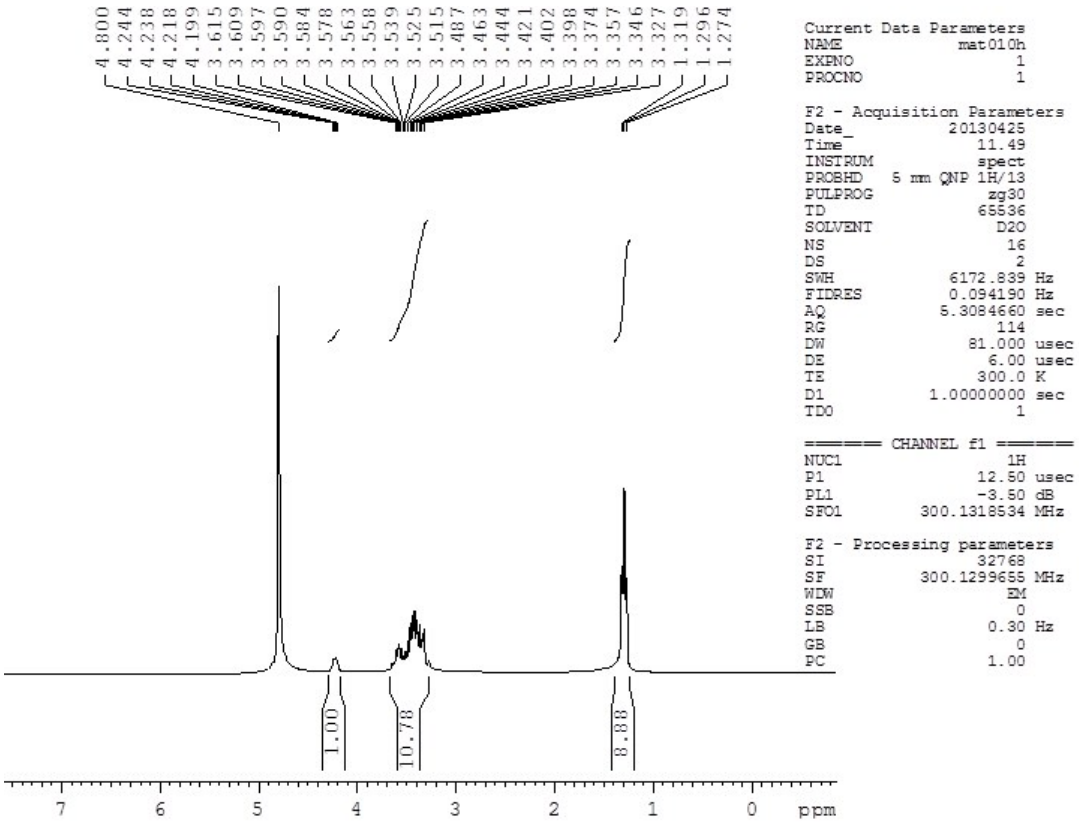
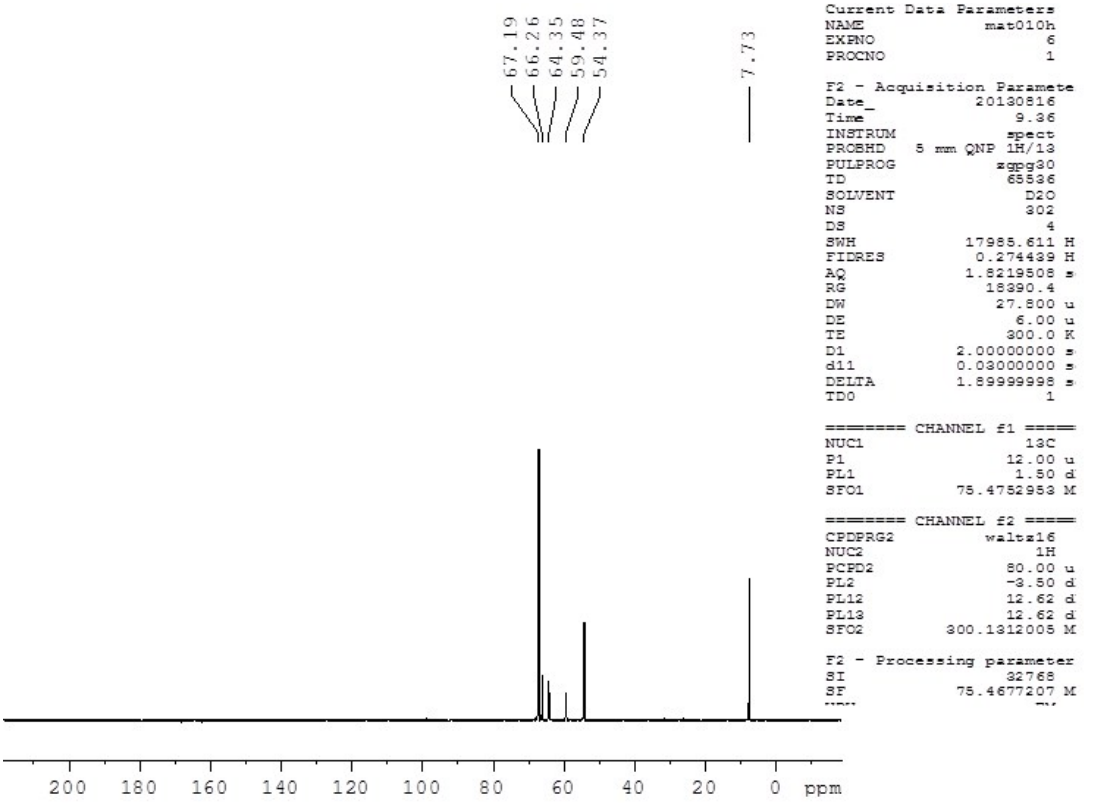
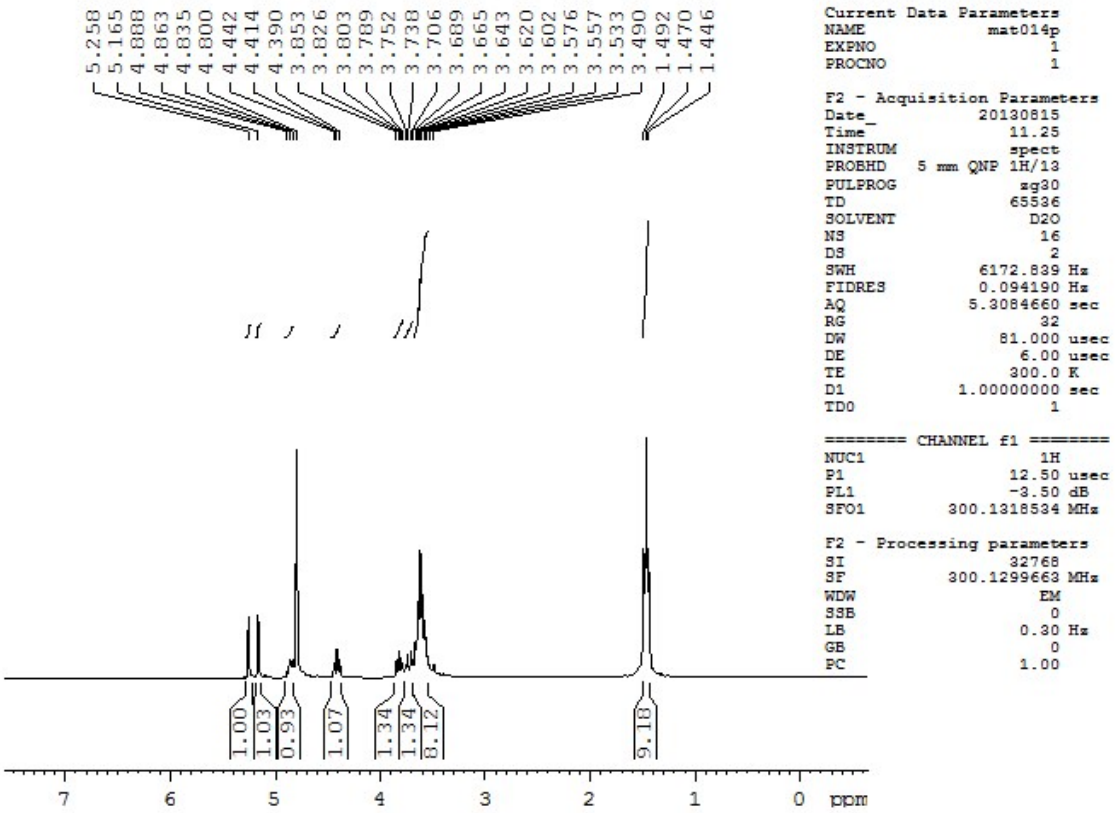
^{1}H and ^{13}C NMR spectra compounds.



^{1}H NMR of **2** (300 MHz, D_2O)



^{13}C NMR of **2** (75 MHz, D_2O)



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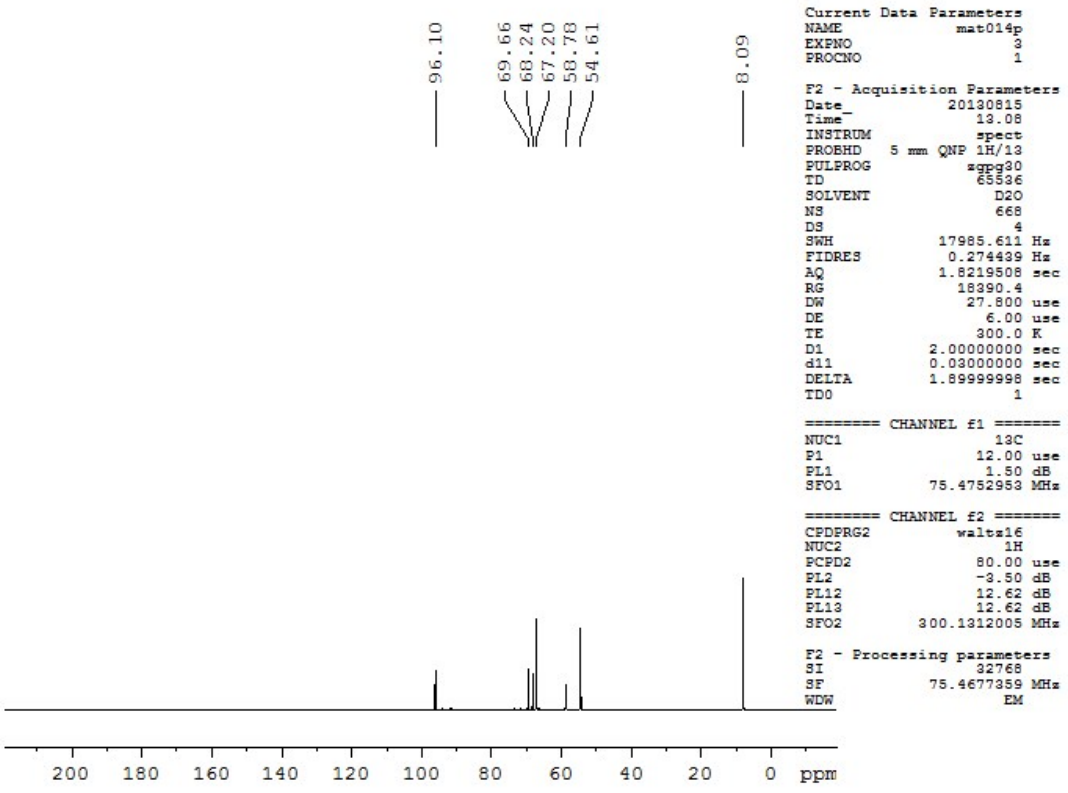
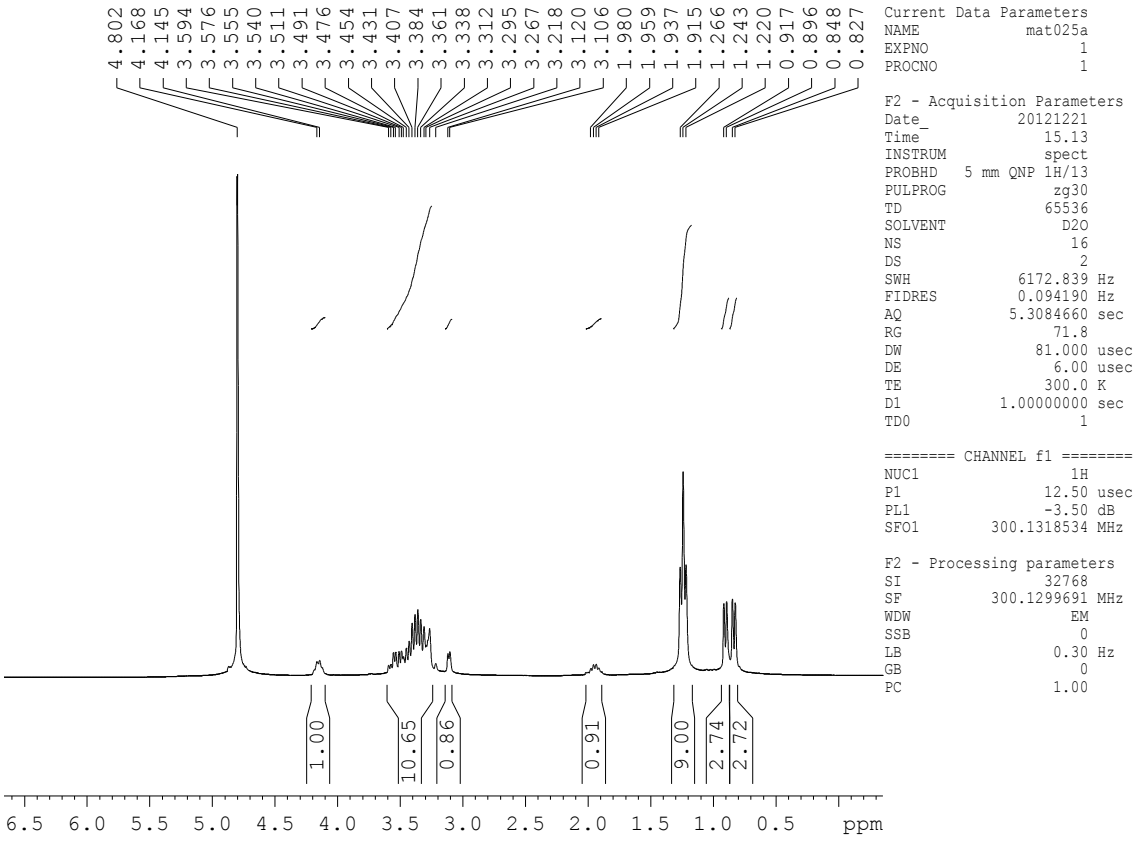
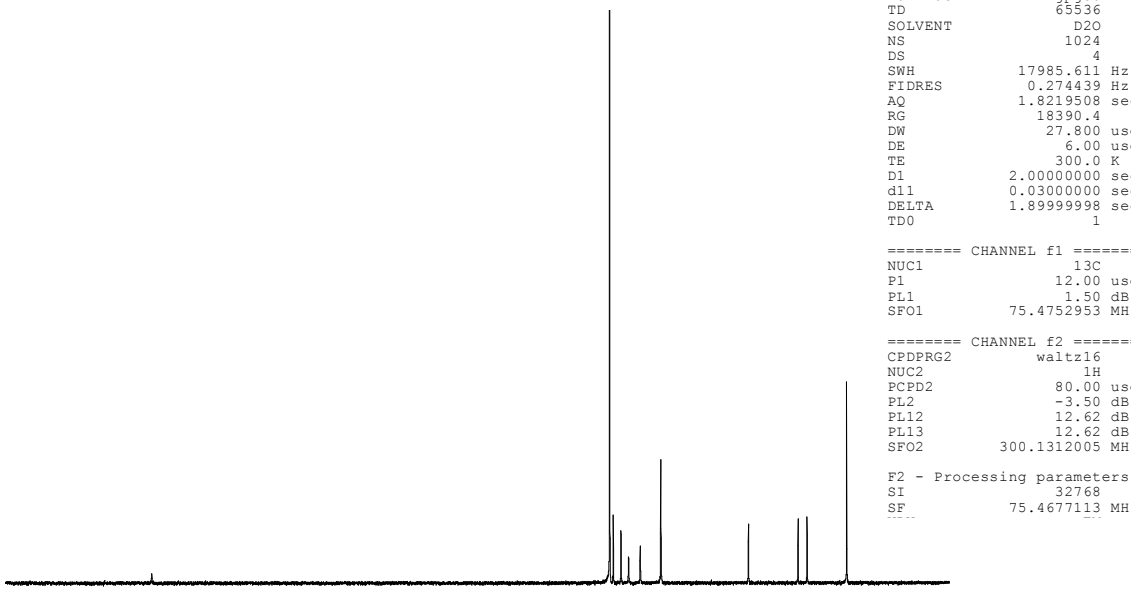


^{13}C NMR of **3** (75 MHz, D_2O)



^{1}H NMR of **4a** (300 MHz, D_2O)



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FIDRES         0.274439 Hz
AQ             1.8219508 se
RG               18390.4
DW                27.800 us
DE                 6.00 us
TE                300.0 K
D1           2.00000000 se
d11          0.03000000 se
DELTA        1.89999998 se
TD0                    1

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P1                 12.00 us
PL1                 1.50 dB
SFO1         75.4752953 MH

======== CHANNEL f2 ======
CPDPRG2          waltz16
NUC2                  1H
PCPD2              80.00 us
PL2                -3.50 dB
PL12               12.62 dB
PL13               12.62 dB
SFO2        300.1312005 MH

F2 - Processing parameters
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SF           75.4677113 MH
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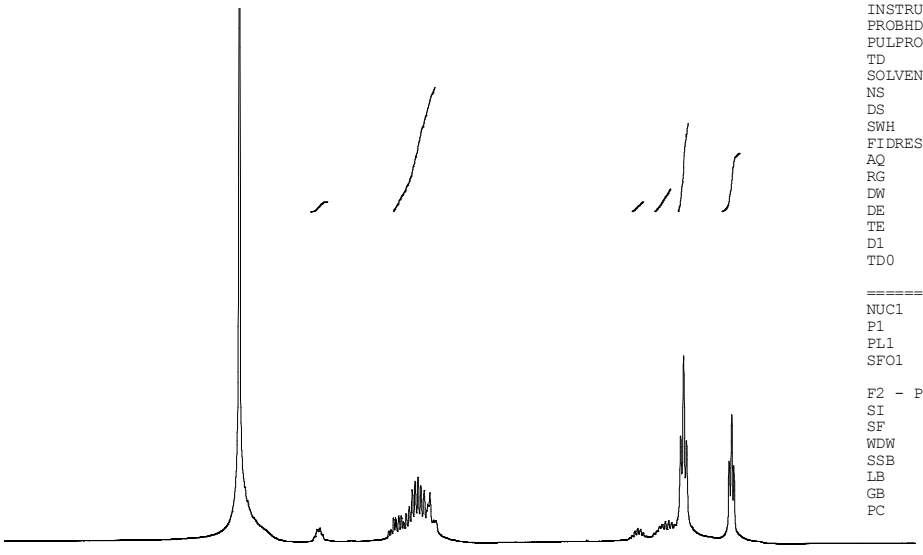
^{13}C NMR of **4a** (75 MHz, D_2O)



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TD                65536
SOLVENT             D2O
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           1.00000000 sec
TD0                    1

======== CHANNEL f1 ========
NUC1                  1H
P1                12.50 usec
PL1                -3.50 dB
SFO1        300.1318534 MHz

F2 - Processing parameters
SI                 32768
SF          300.1299702 MHz
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PC                 1.00
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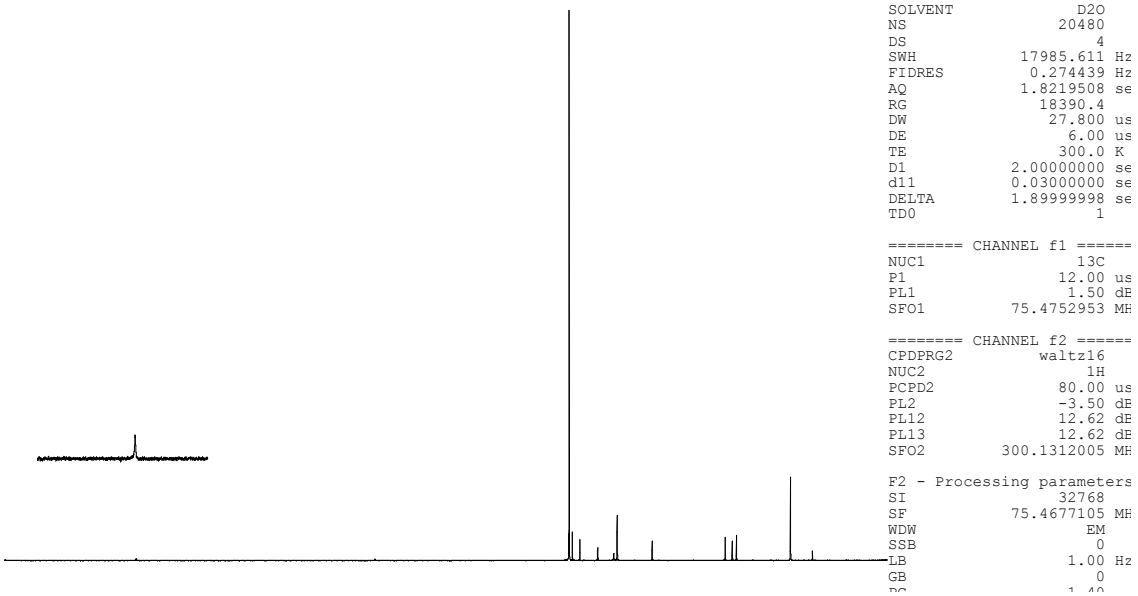

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FIDRES         0.274439 Hz
AQ             1.8219508 se
RG               18390.4
DW                27.800 us
DE                 6.00 us
TE                300.0 K
D1           2.00000000 se
d11          0.03000000 se
DELTA        1.89999998 se
TD0                   1

======== CHANNEL f1 ======
NUC1                 13C
P1                 12.00 us
PL1                 1.50 dB
SFO1         75.4752953 MH

======== CHANNEL f2 ======
CPDPRG2          waltz16
NUC2                 1H
PCPD2              80.00 us
PL2                -3.50 dB
PL12               12.62 dB
PL13               12.62 dB
SFO2        300.1312005 MH

F2 - Processing parameters
SI                32768
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WDW                  EM
SSB                   0
LB                 1.00 Hz
GB                    0
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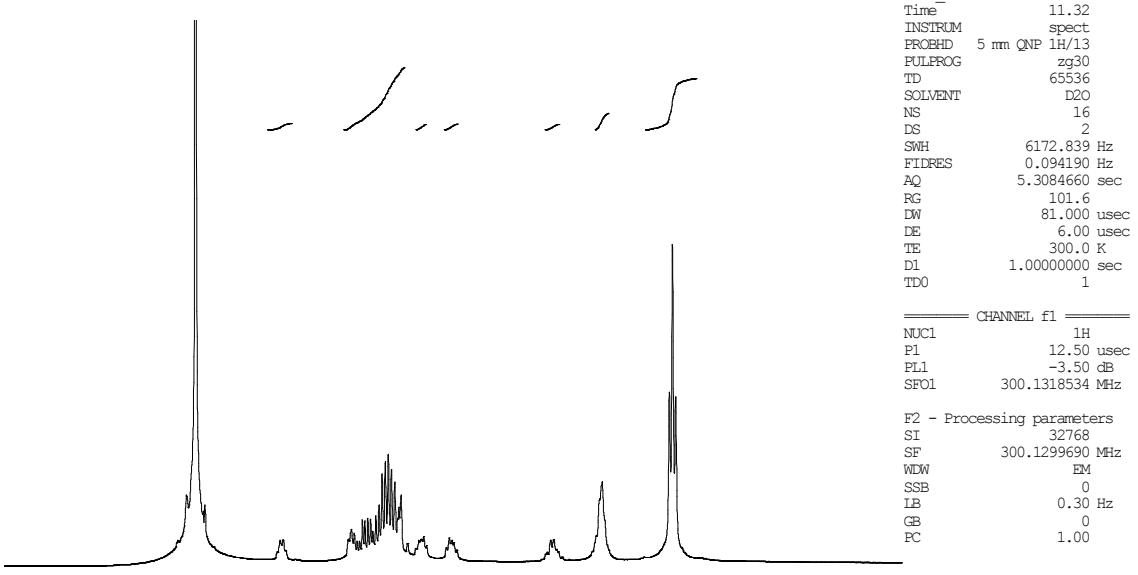
^{13}C NMR of **4b** (75 MHz, D_2O)



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TD                65536
SOLVENT             D2O
NS                   16
DS                    2
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FIDRES        0.094190 Hz
AQ            5.3084660 sec
RG                101.6
DW               81.000 usec
DE                 6.00 usec
TE                300.0 K
D1           1.00000000 sec
TD0                   1

======== CHANNEL f1 ========
NUC1                 1H
P1                12.50 usec
PL1               -3.50 dB
SFO1        300.1318534 MHz

F2 - Processing parameters
SI                32768
SF          300.1299690 MHz
WDW                  EM
SSB                   0
LB                 0.30 Hz
GB                    0
PC                 1.00
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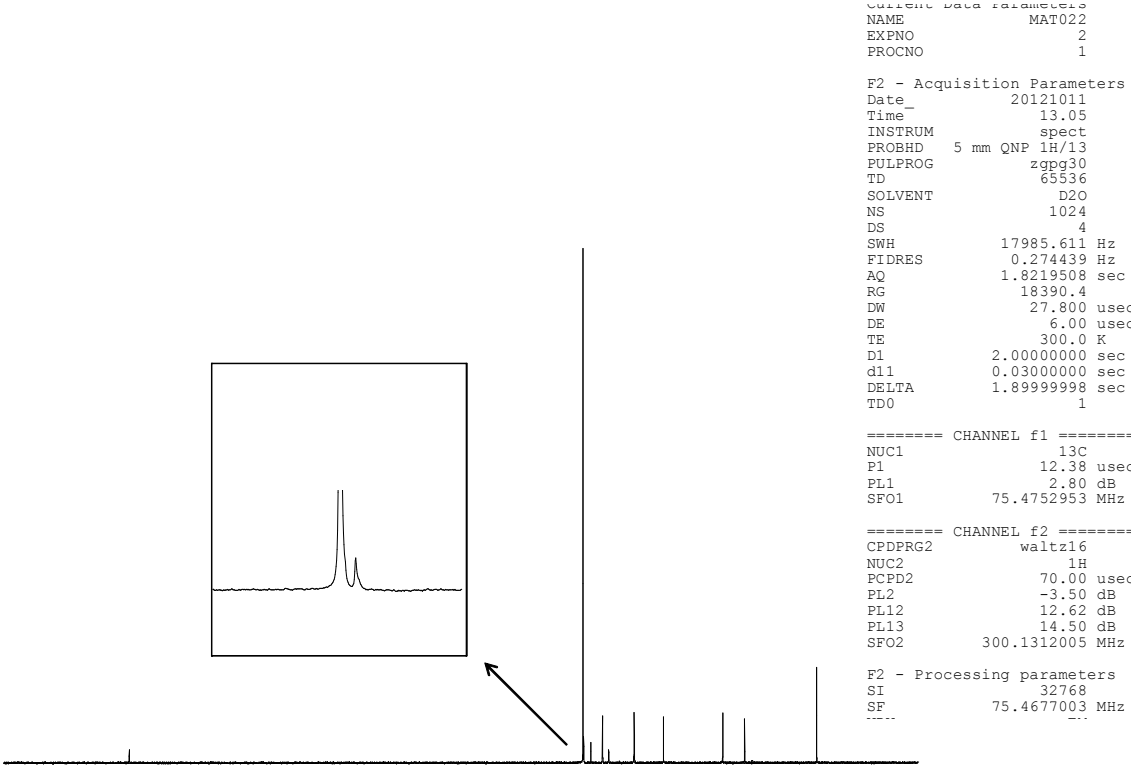
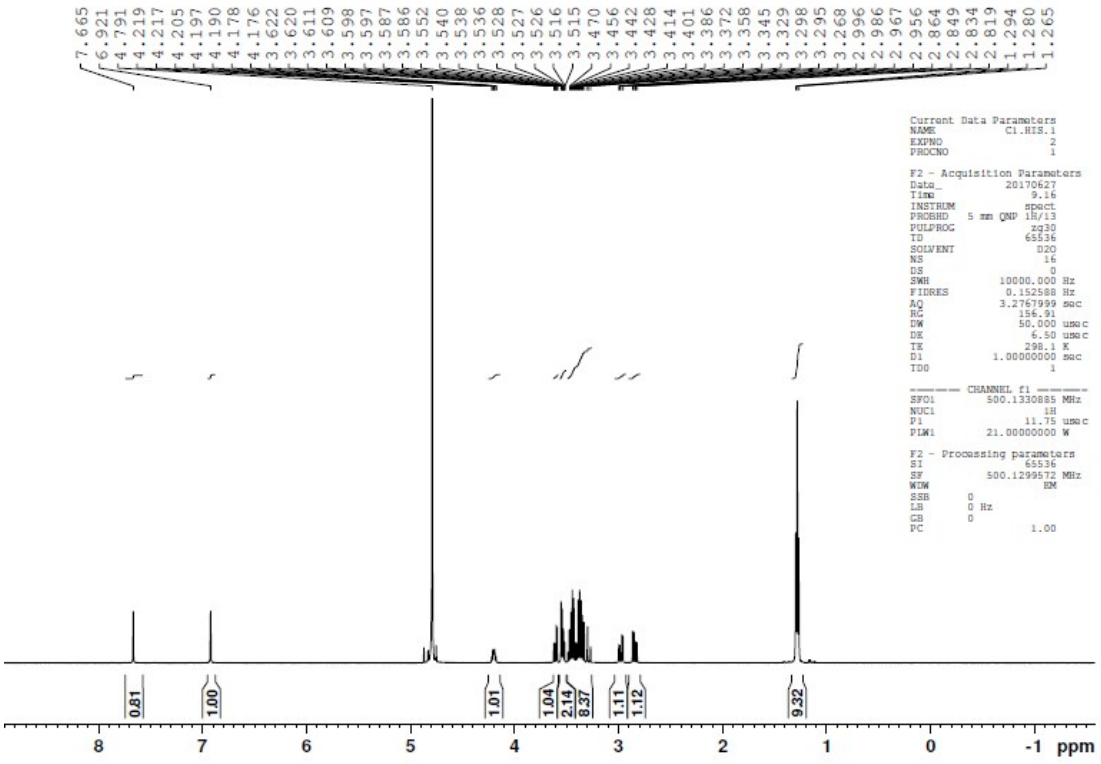
^{1}H NMR of **4c** (300 MHz, D_2O)



^{13}C NMR of **4c** (75 MHz, D_2O)



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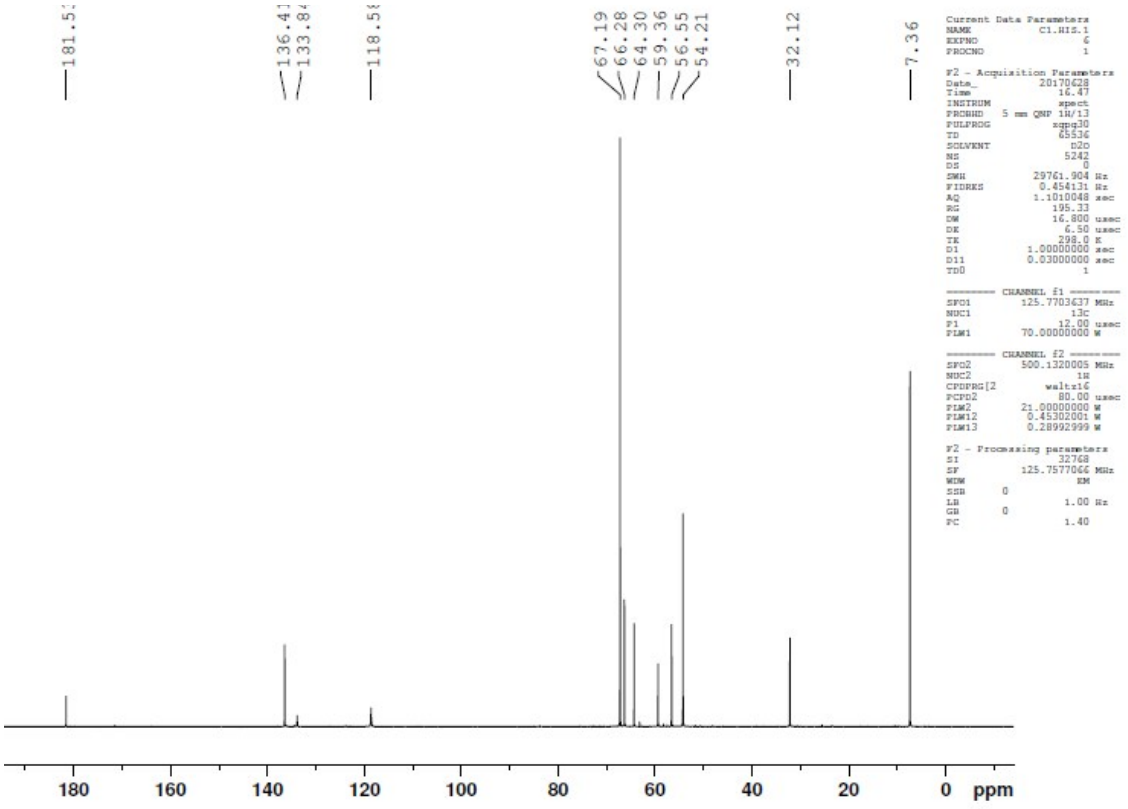
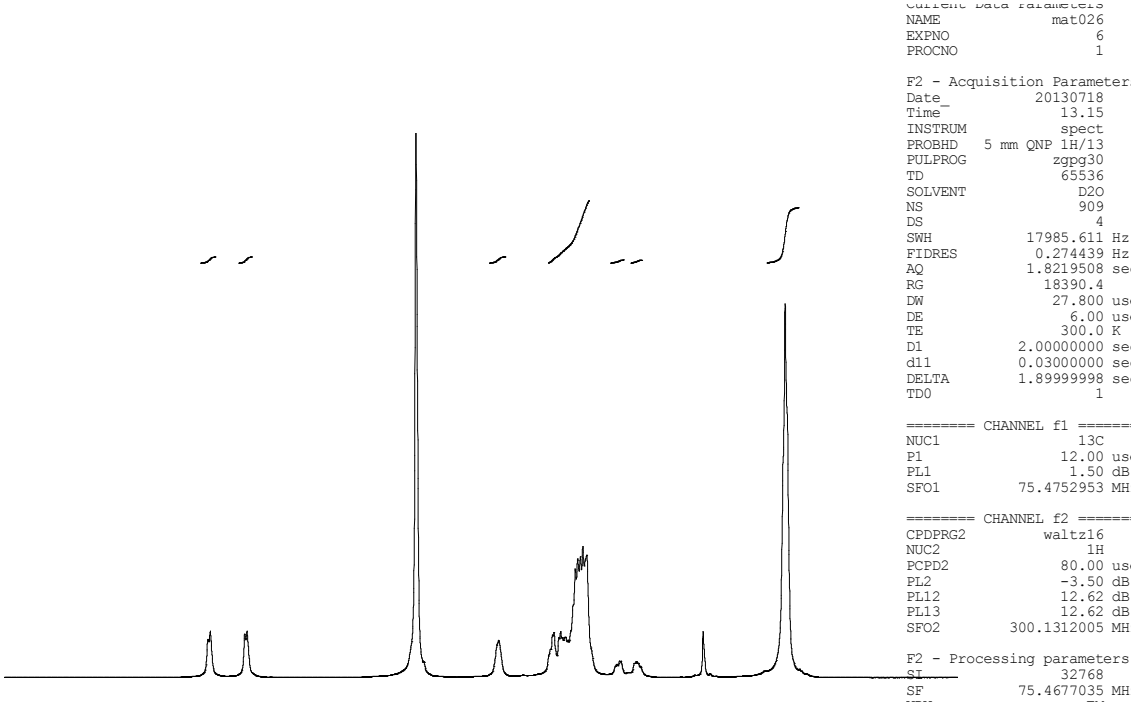
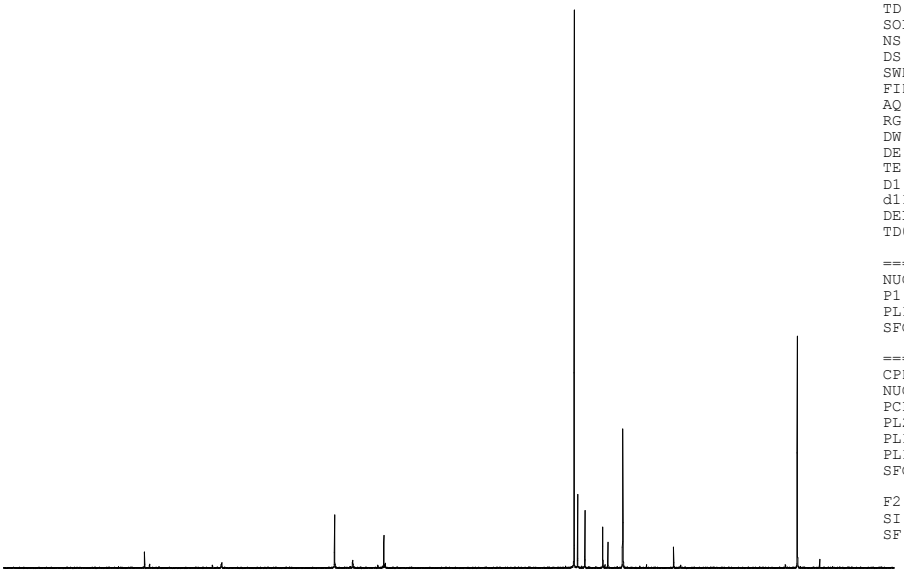


^{13}C NMR of **4d** (125 MHz, D_2O)



^{1}H NMR of**4e** (300 MHz, D_2O)



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TD                    65536
SOLVENT                 D2O
NS                        909
DS                          4
SWH               17985.611 Hz
FIDRES             0.274439 Hz
AQ                1.8219508 se
RG                  18390.4
DW                   27.800 us
DE                    6.00 us
TE                   300.0 K
D1               2.00000000 se
d11              0.03000000 se
DELTA            1.89999998 se
TD0                        1

======== CHANNEL f1 ======
NUC1                     13C
P1                     12.00 us
PL1                     1.50 dB
SFO1             75.4752953 MH

======== CHANNEL f2 ======
CPDPRG2              waltz16
NUC2                     1H
PCPD2                  80.00 us
PL2                    -3.50 dB
PL12                   12.62 dB
PL13                   12.62 dB
SFO2            300.1312005 MH

F2 - Processing parameters
SI                       32768
SF                75.4677035 MH
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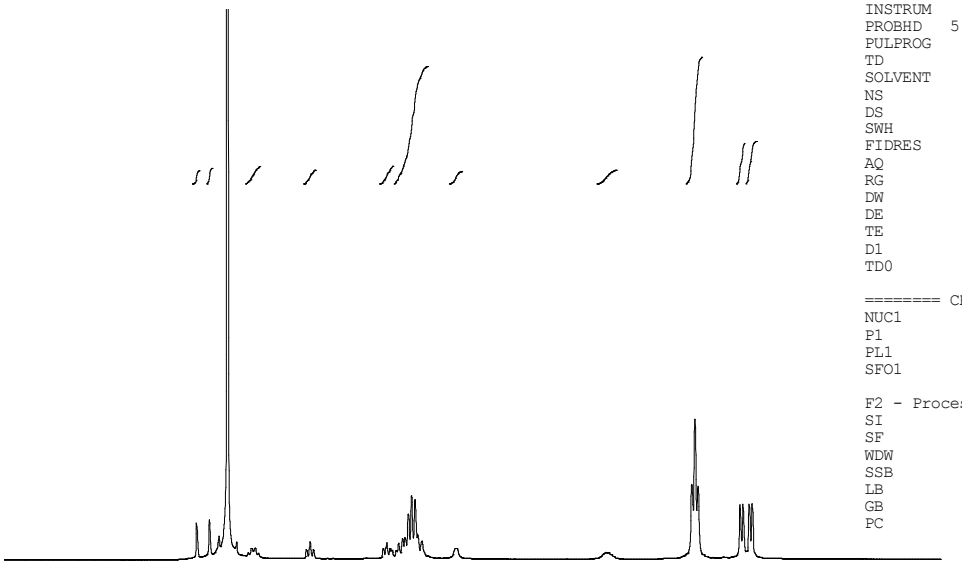
^{13}C NMR of **4e** (75 MHz, D_2O)



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PULPROG               zg30
TD                    65536
SOLVENT                 D2O
NS                         32
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                    12.50 usec
PL1                   -3.50 dB
SFO1           300.1318534 MHz

F2 - Processing parameters
SI                       32768
SF             300.1299700 MHz
WDW                      EM
SSB                       0
LB                     0.30 Hz
GB                        0
PC                     1.00
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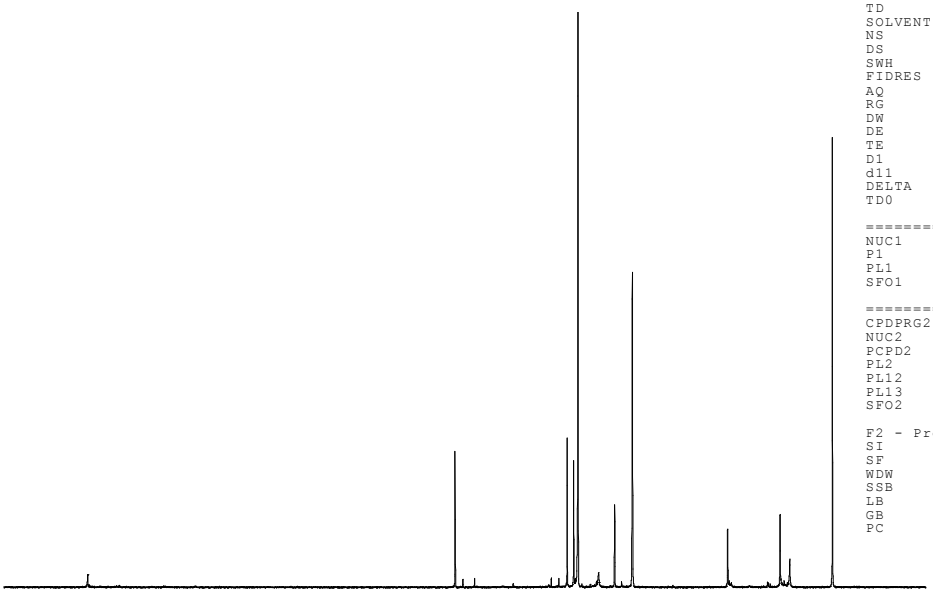
^{1}H NMR of **5a** (300 MHz, D_2O)



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Current Data Parameters
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EXPNO                     5
PROCNO                    1

F2 - Acquisition Parameters
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Time                   7.27
INSTRUM               spect
PROBHD    5 mm QNP 1H/13
PULPROG            zgpg30
TD                    65536
SOLVENT                 D2O
NS                    11504
DS                        4
SWH               17985.611 Hz
FIDRES             0.274439 Hz
AQ                 1.8219508 sec
RG                   18390.4
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                    12.00 usec
PL1                    1.50 dB
SFO1             75.4752953 MHz

======== CHANNEL f2 ========
CPDPRG2             waltz16
NUC2                    1H
PCPD2                 80.00 usec
PL2                   -3.50 dB
PL12                  12.62 dB
PL13                  12.62 dB
SFO2            300.1312005 MHz

F2 - Processing parameters
SI                    32768
SF               75.4677149 MHz
WDW                      EM
SSB                       0
LB                     1.00 Hz
GB                        0
PC                     1.40
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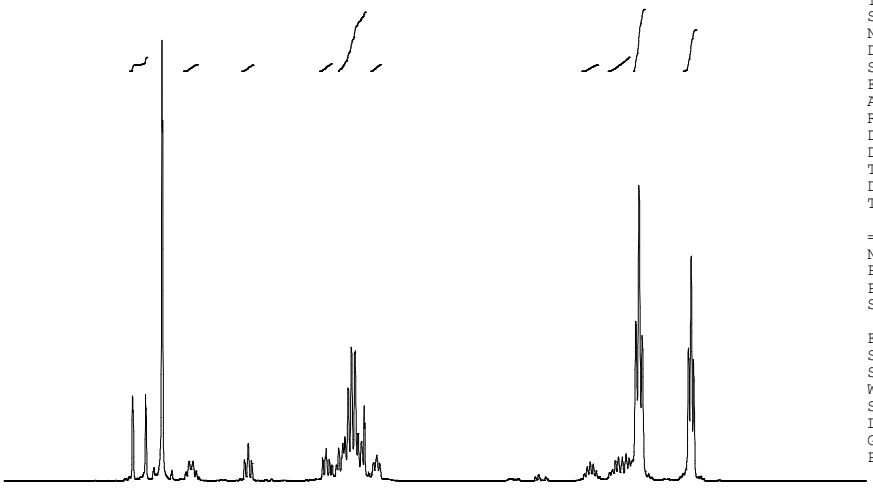
^{13}C NMR of **5a** (75 MHz, D_2O)



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PROCNO                     1

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PULPROG               zg30
TD                    65536
SOLVENT                 D2O
NS                       32
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                    12.50 usec
PL1                   -3.50 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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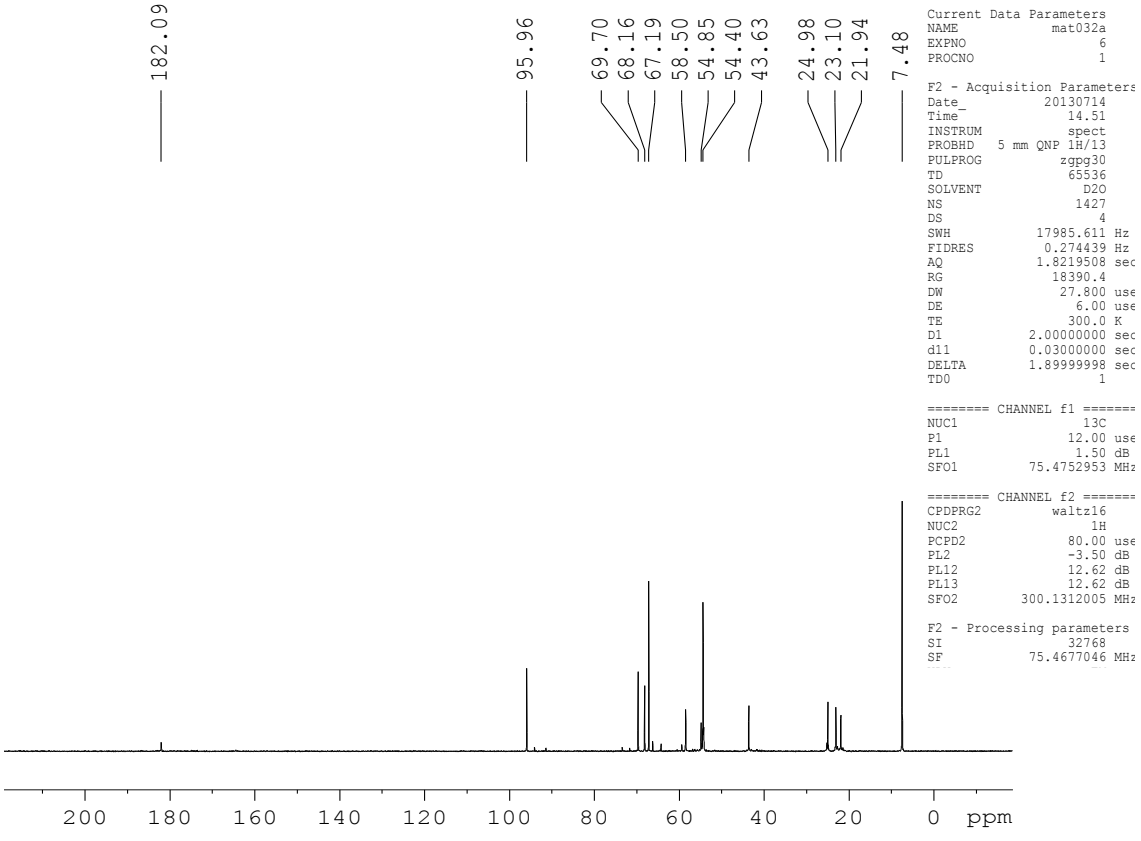
^{1}H NMR of **5b** (300 MHz, D_2O)



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PROCNO 1

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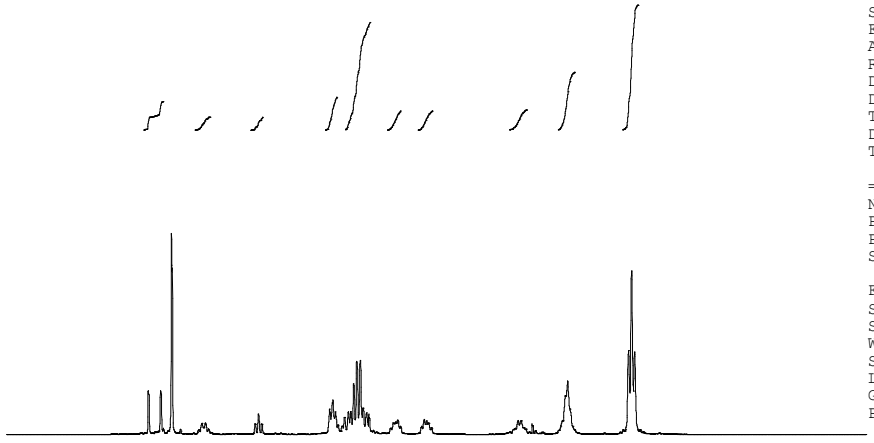
PULPROG zgpg30
TD 65536
SOLVENT D2O
NS 1427
DS 4
SWH 17985.611 Hz
FIDRES 0.274439 Hz
AQ 1.8219508 sec
RG 18390.4
DW 27.800 use
DE 6.00 use
TE 300.0 K
D1 2.00000000 sec
d11 0.03000000 sec
DELTA 1.89999998 sec
TD0 1

======== CHANNEL f1 =======
NUC1 13C
P1 12.00 use
PL1 1.50 dB
SFO1 75.4752953 MHz

======== CHANNEL f2 =======
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 use
PL2 -3.50 dB
PL12 12.62 dB
PL13 12.62 dB
SFO2 300.1312005 MHz

F2 - Processing parameters
SI 32768
SF 75.4677046 MHz

^{13}C NMR of **5b** (75 MHz, D_2O)



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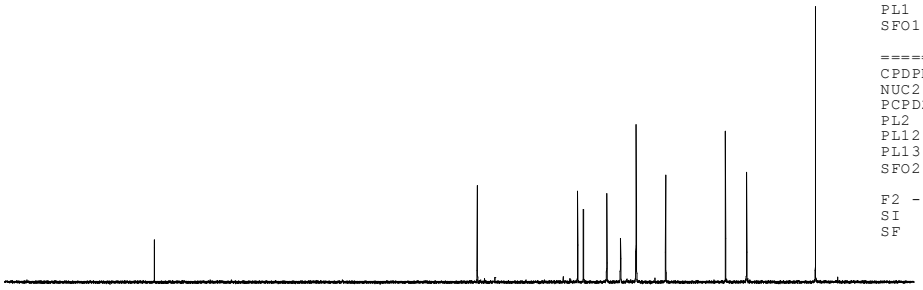
PULPROG zg30
TD 65536
SOLVENT D2O
NS 16
DS 2
SWH 6172.839 Hz
FIDRES 0.094190 Hz
AQ 5.3084660 sec
RG 90.5
DW 81.000 usec
DE 6.00 usec
TE 300.0 K
D1 1.00000000 sec
TD0 1

======== CHANNEL f1 ========
NUC1 1H
P1 12.50 usec
PL1 -3.50 dB
SFO1 300.1318534 MHz

F2 - Processing parameters
SI 32768
SF 300.1299704 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

^{1}H NMR of **5c** (300 MHz, D_2O)



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PROCNO                 1

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PROBHD   5 mm QNP 1H/13
PULPROG           zgpg30
TD                 65536
SOLVENT              D2O
NS                  1024
DS                     4
SWH           17985.611 H
FIDRES         0.274439 H
AQ            1.8219508 s
RG              18390.4
DW               27.800 u
DE                6.00 u
TE               300.0 K
D1           2.00000000 s
d11          0.03000000 s
DELTA        1.89999998 s
TD0                    1

======== CHANNEL f1 =====
NUC1                 13C
P1                 12.00 u
PL1                 1.50 d
SFO1         75.4752953 M

======== CHANNEL f2 =====
CPDPRG2          waltz16
NUC2                 1H
PCPD2              80.00 u
PL2                -3.50 d
PL12               12.62 d
PL13               12.62 d
SFO2        300.1312005 M

F2 - Processing parameter
SI                 32768
SF          75.4677490 M
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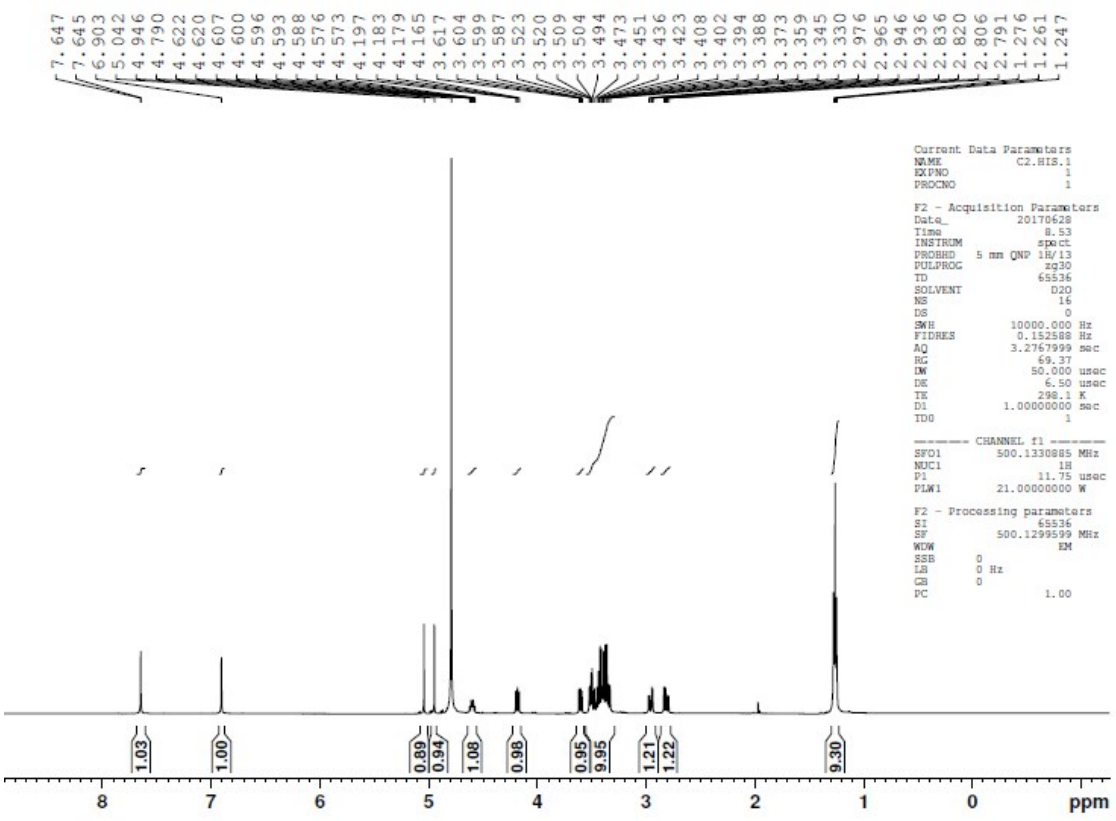
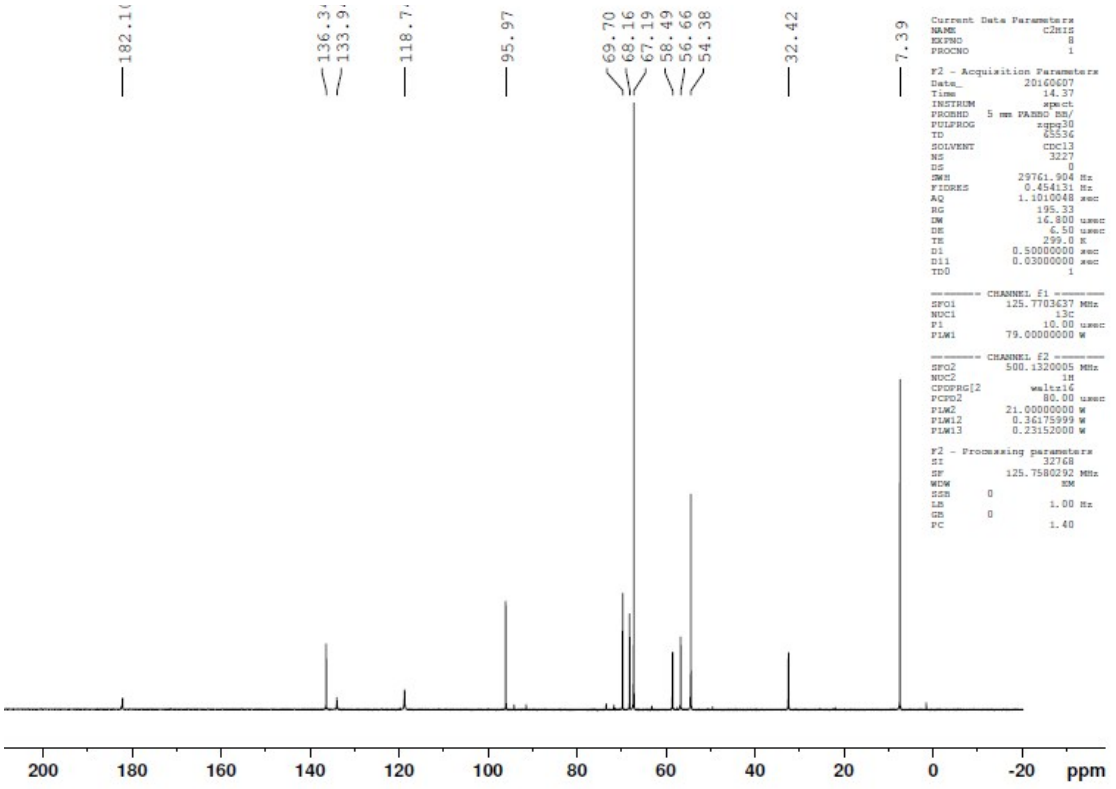
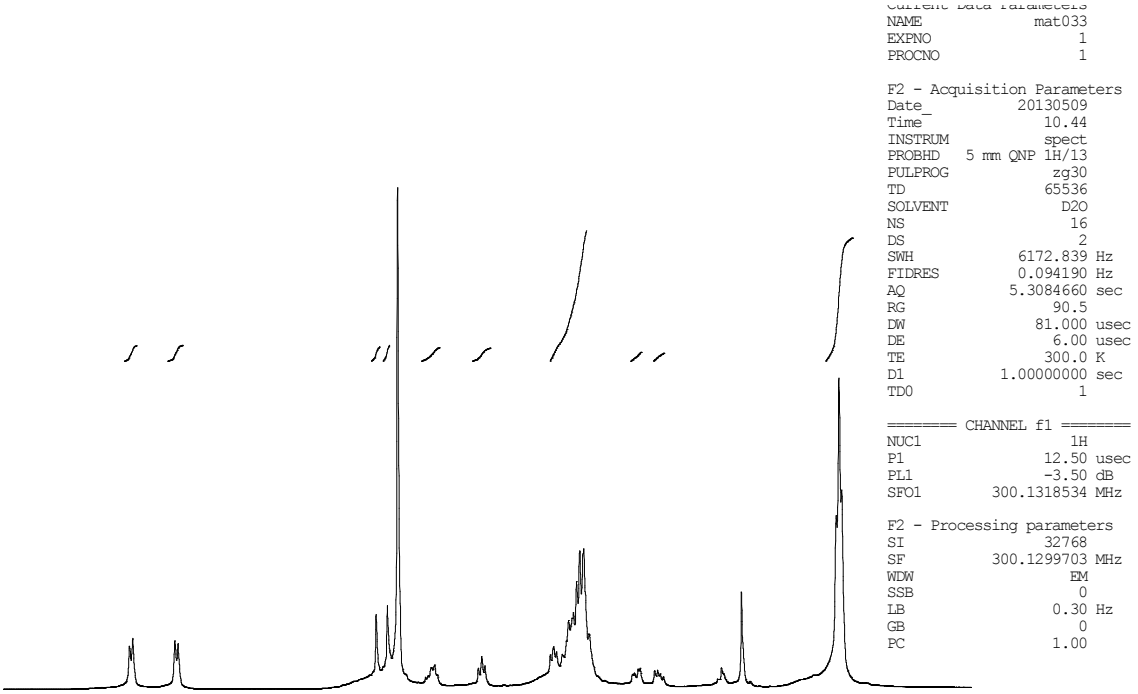
^{13}C NMR of **5c** (75 MHz, D_2O)



^{1}H NMR of **5d** (D_2O, 500 MHz)



^{13}C NMR of **5d** (125 MHz, D_2O)



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Current Data Parameters
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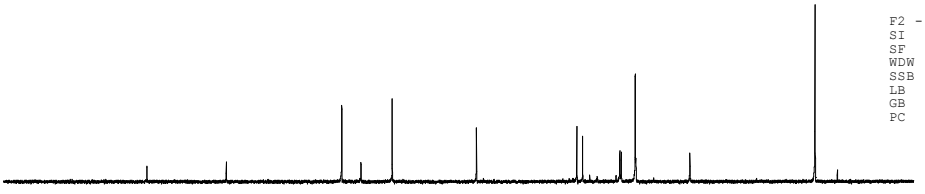
EXPNO                     1
PROCNO                    1

F2 - Acquisition Parameters
Date_              20130509
Time                 10.44
INSTRUM              spect
PROBHD   5 mm QNP 1H/13
PULPROG              zg30
TD                  65536
SOLVENT               D2O
NS                     16
DS                      2
SWH              6172.839 Hz
FIDRES           0.094190 Hz
AQ               5.3084660 sec
RG                   90.5
DW                 81.000 usec
DE                   6.00 usec
TE                  300.0 K
D1              1.00000000 sec
TD0                     1

======== CHANNEL f1 ========
NUC1                   1H
P1                  12.50 usec
PL1                 -3.50 dB
SFO1          300.1318534 MHz

F2 - Processing parameters
SI                  32768
SF            300.1299703 MHz
WDW                    EM
SSB                     0
LB                   0.30 Hz
GB                      0
PC                   1.00
```

^{1}H NMR of **5e** (300 MHz, D_2O)



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Current Data Parameters
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EXPNO                     4
PROCNO                    1

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Date_              20130715
Time                  7.23
INSTRUM              spect
PROBHD   5 mm QNP 1H/13
PULPROG            zgpg30
TD                  65536
SOLVENT               D2O
NS                  15069
DS                      4
SWH             17985.611 Hz
FIDRES           0.274439 Hz
AQ               1.8219508 sec
RG                 18390.4
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                  12.00 usec
PL1                  1.50 dB
SFO1          75.4752953 MHz

======== CHANNEL f2 ========
CPDPRG2           waltz16
NUC2                   1H
PCPD2               80.00 usec
PL2                 -3.50 dB
PL12                12.62 dB
PL13                12.62 dB
SFO2          300.1312005 MHz

F2 - Processing parameters
SI                  32768
SF            75.4677073 MHz
WDW                    EM
SSB                     0
LB                   1.00 Hz
GB                      0
PC                   1.40
```
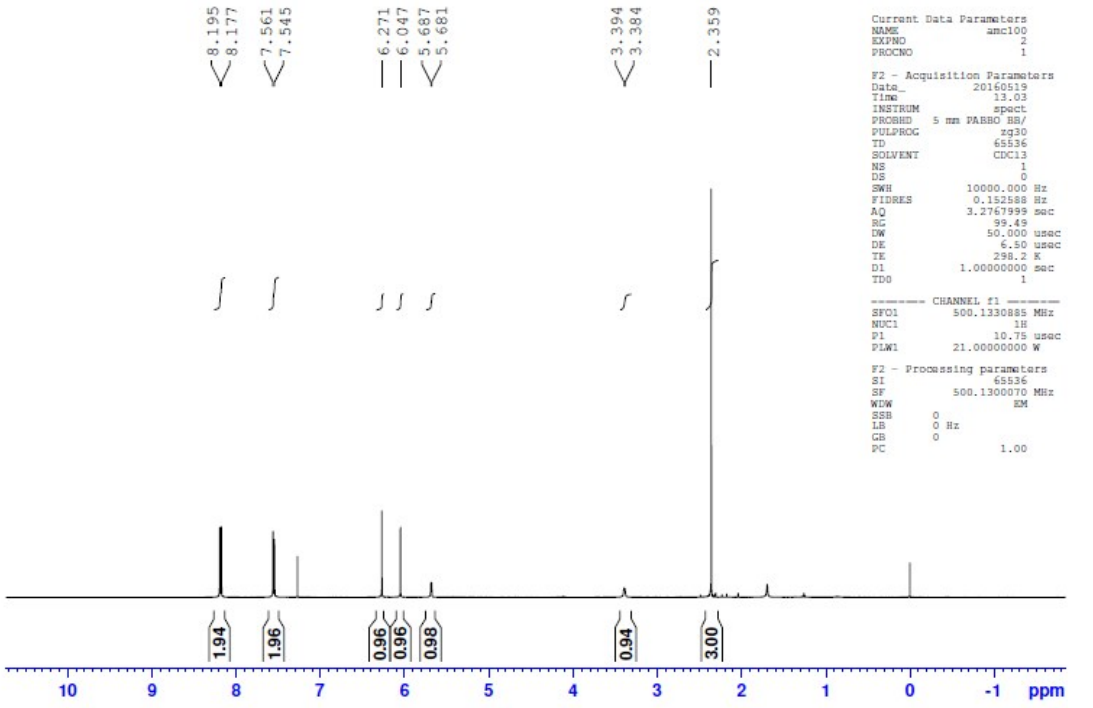
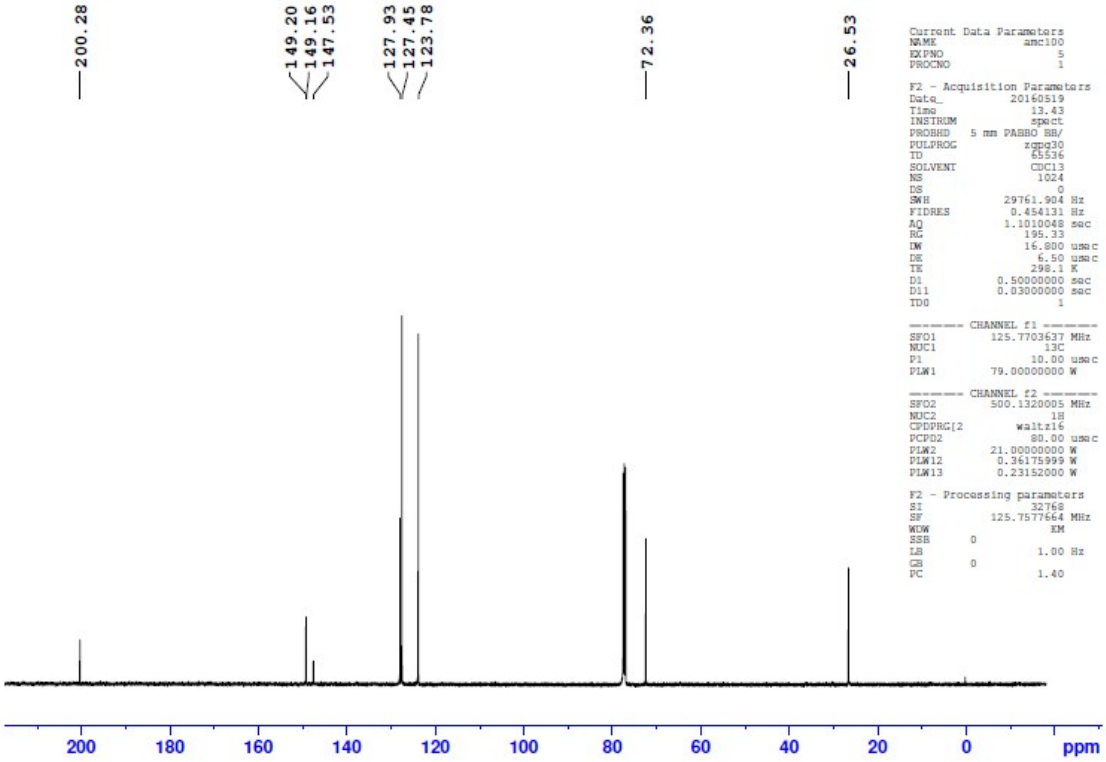
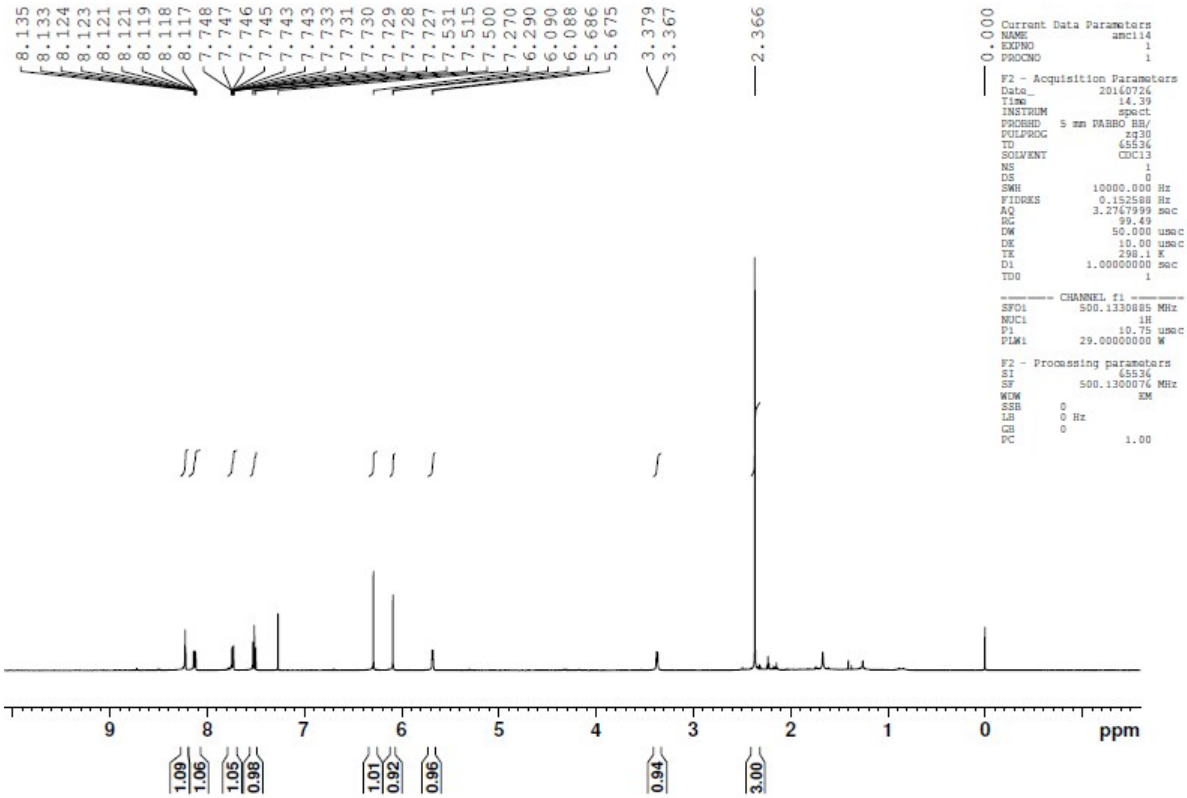

^{13}C NMR of **5e** (75 MHz, D_2O)



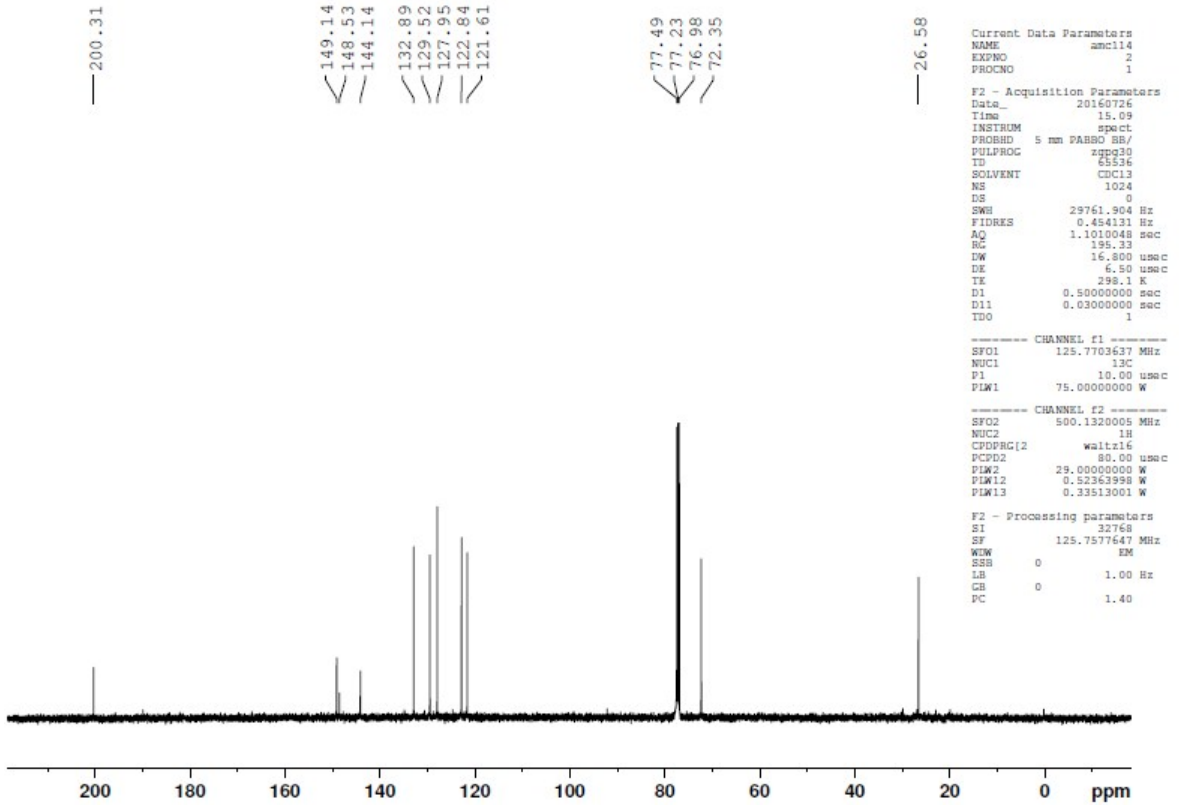
^{1}H NMR of **8a** (500 MHz, $CDCl_3$)



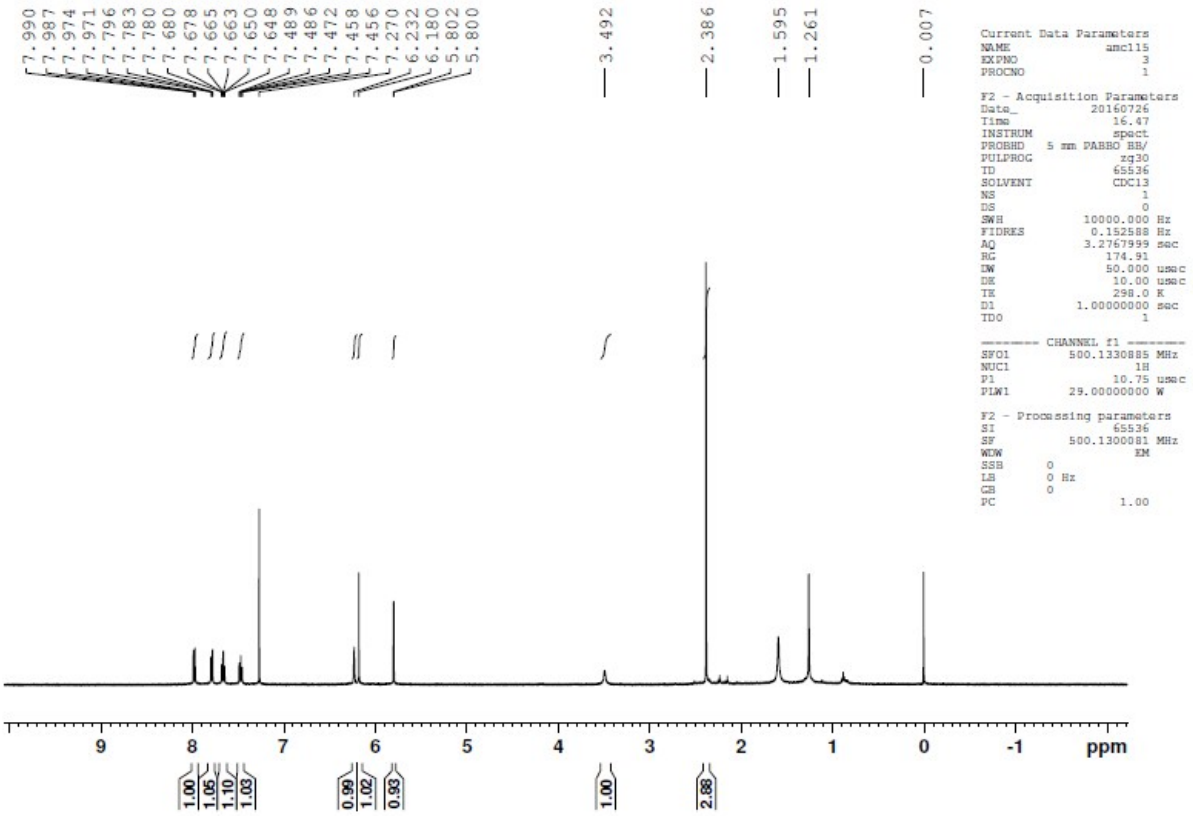
^{13}C NMR of **8a** (125 MHz, $CDCl_3$)



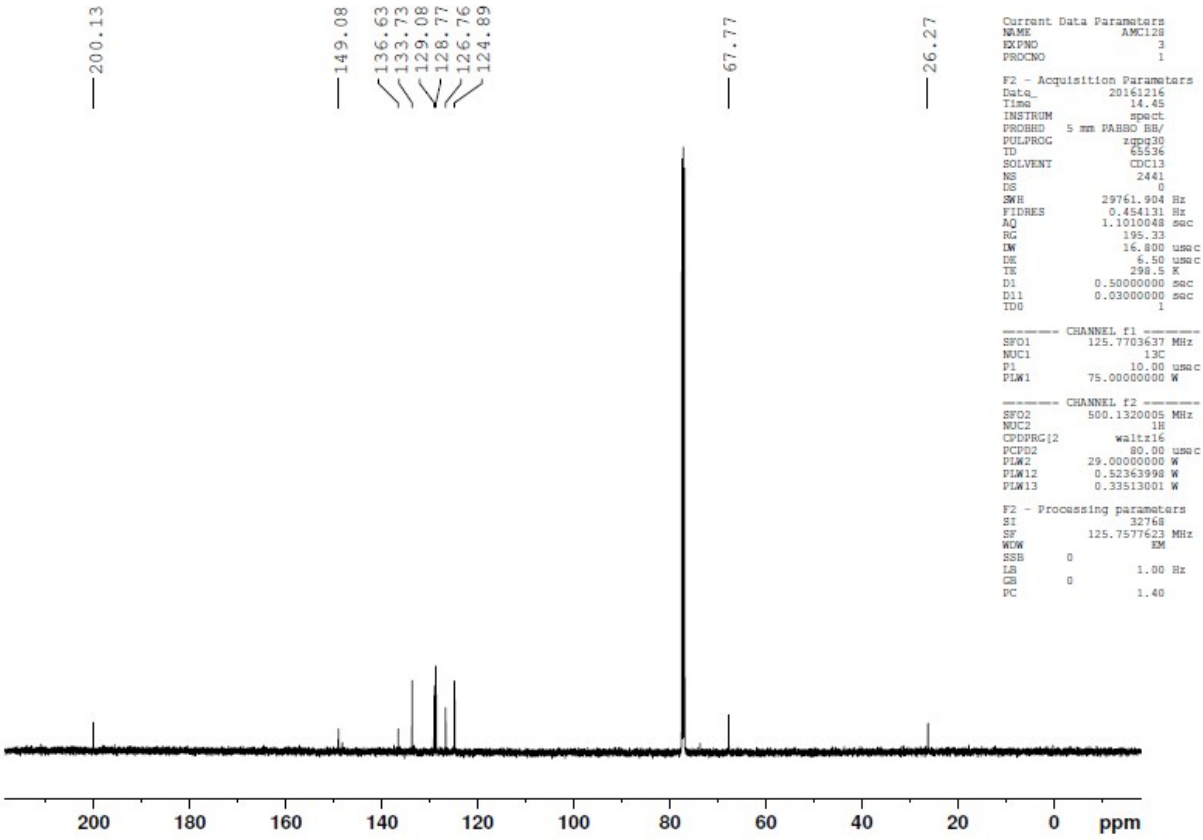
^{1}H NMR of **8b** (500 MHz, $CDCl_3$)



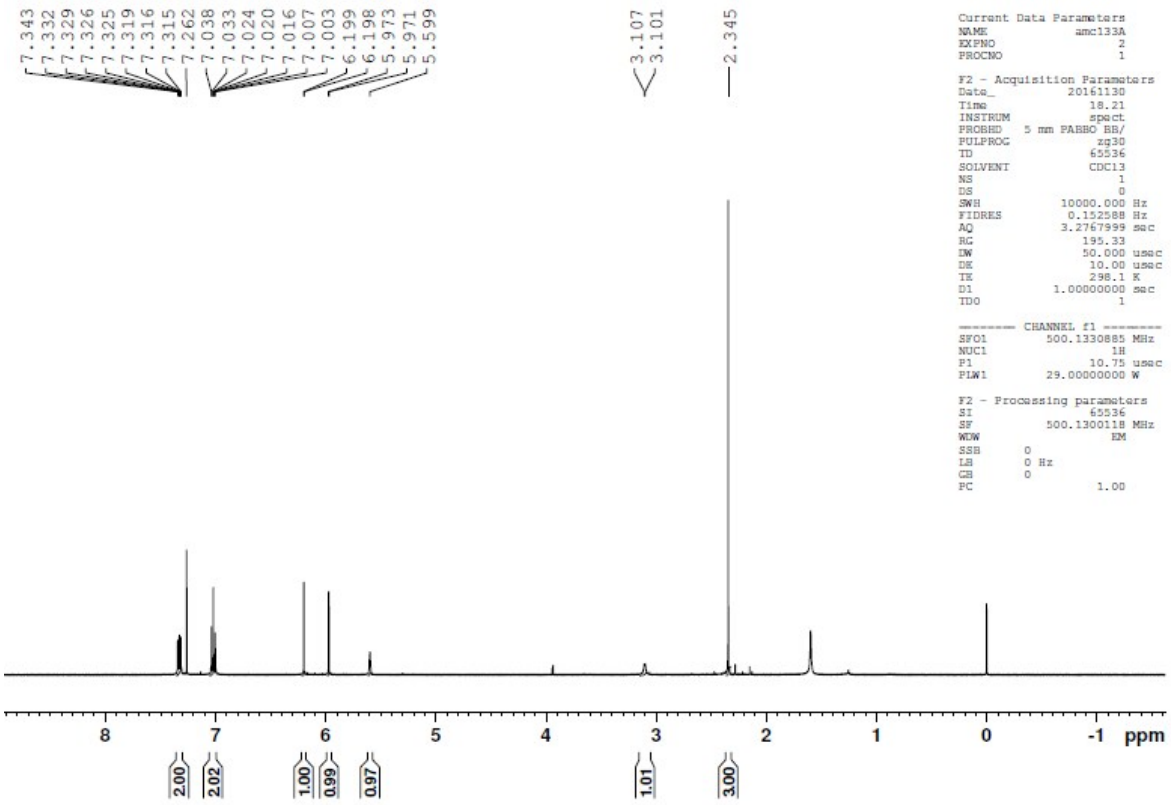
^{13}C NMR of **8b** (125 MHz, $CDCl_3$)



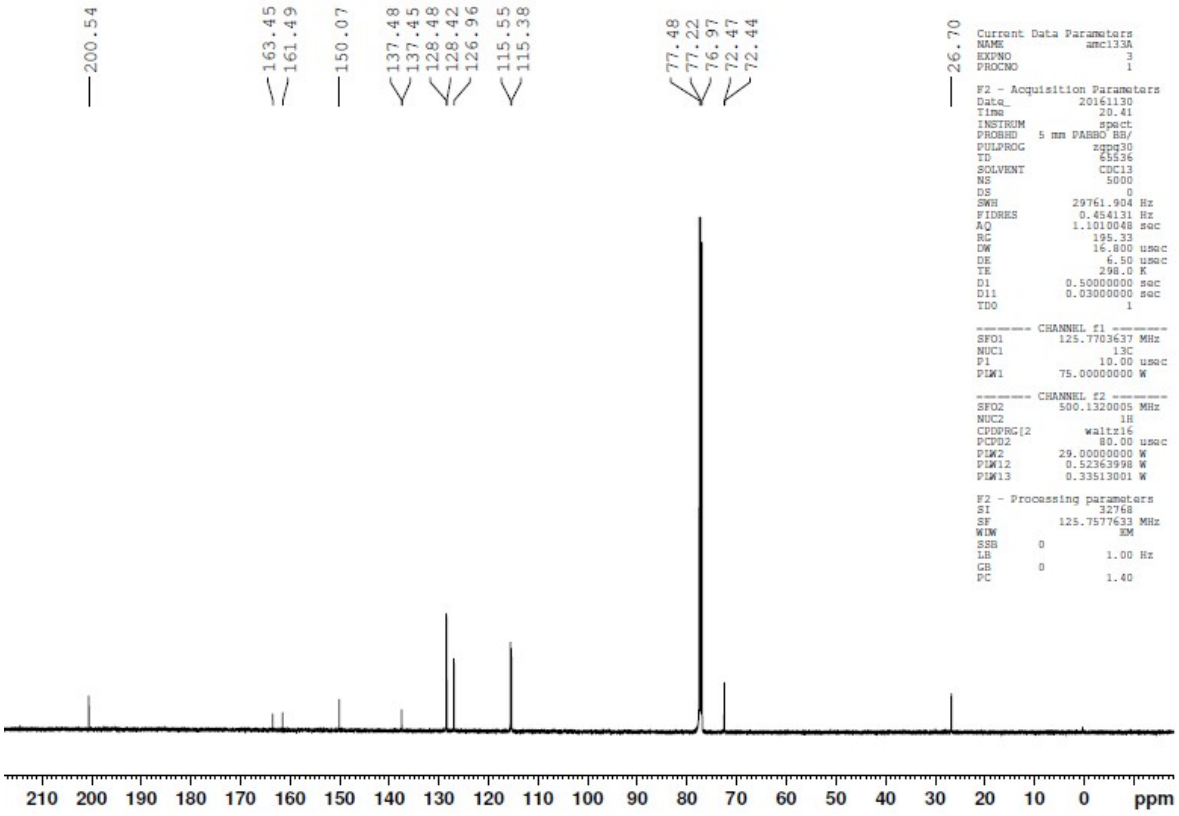
^{1}H NMR of **8c** (500 MHz, $CDCl_3$)



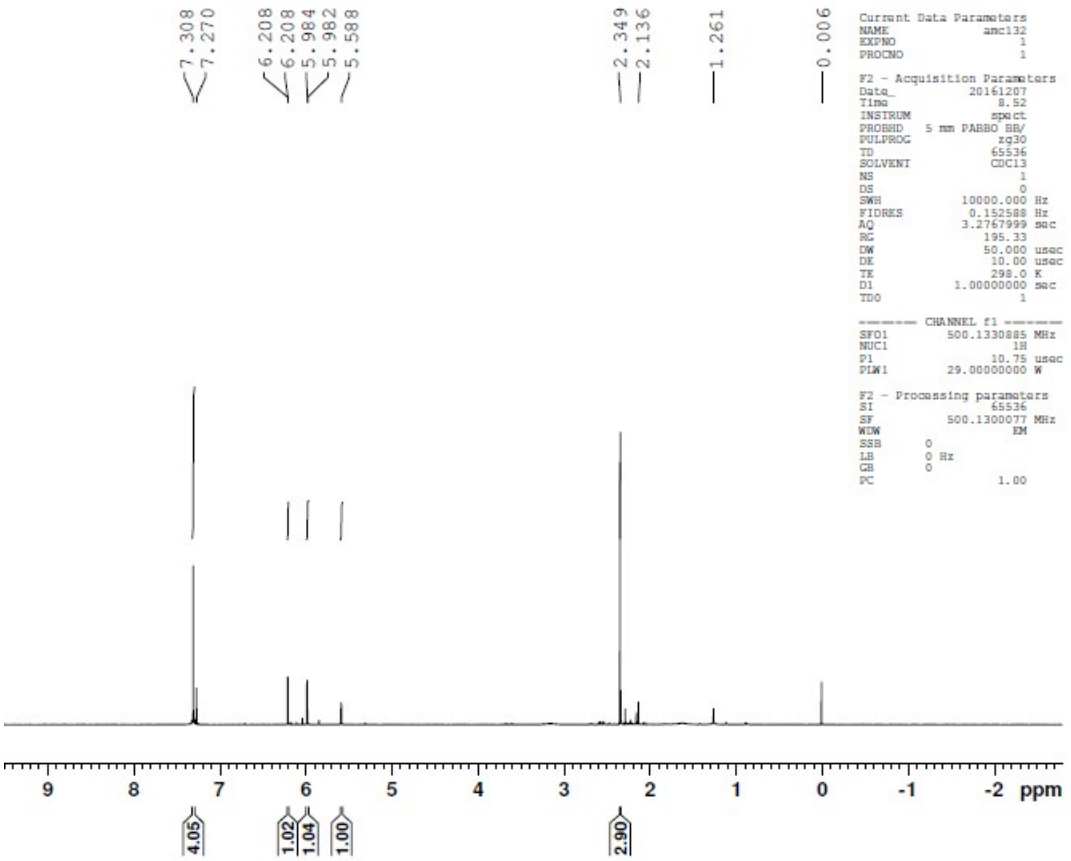
^{13}C NMR of **8c** (125 MHz, $CDCl_3$)



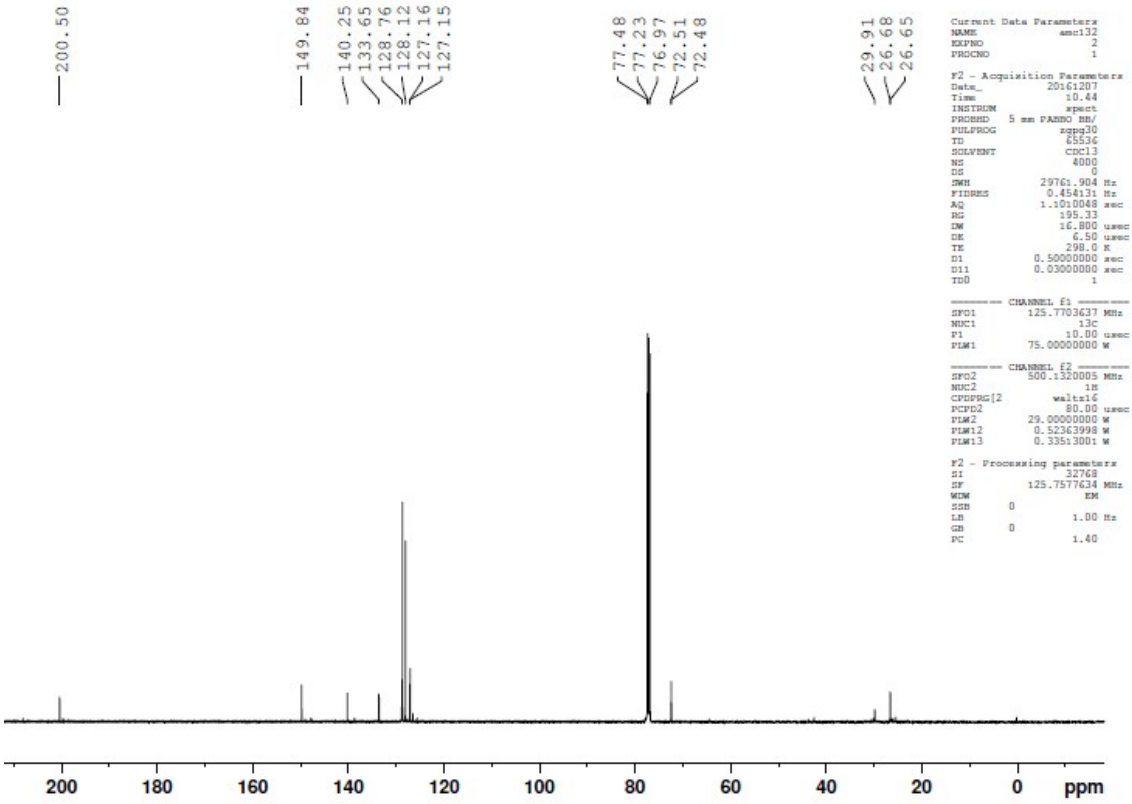
^{1}H NMR of **8d** (500 MHz, $CDCl_3$)



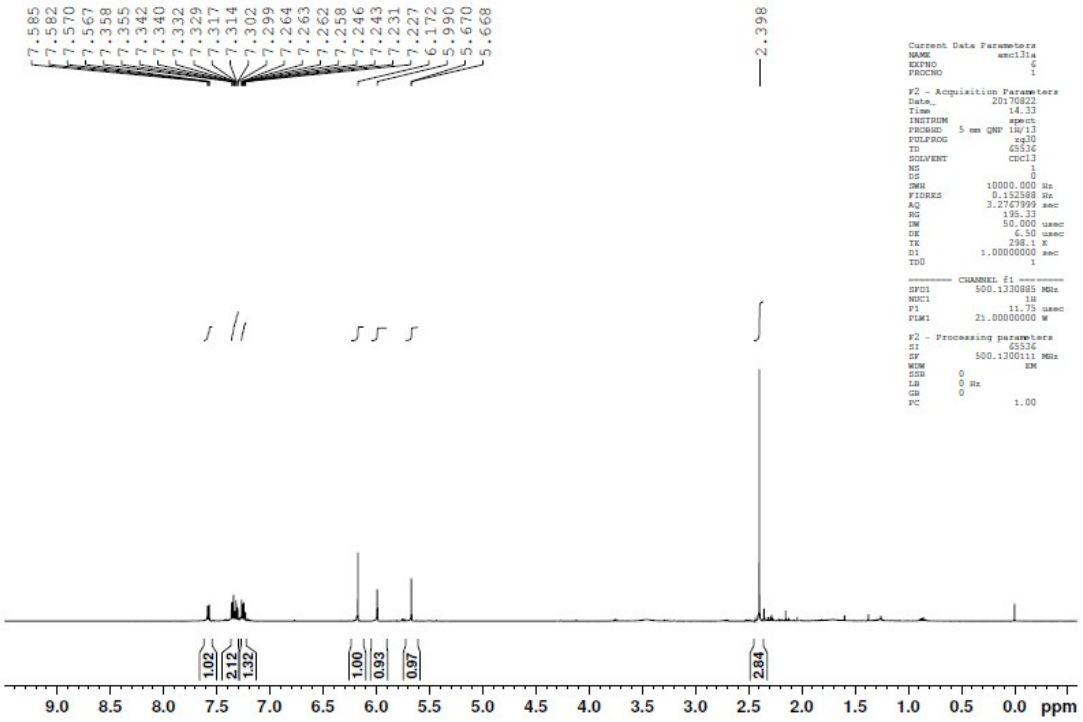
^{13}C NMR of **8d** (125 MHz, $CDCl_3$)



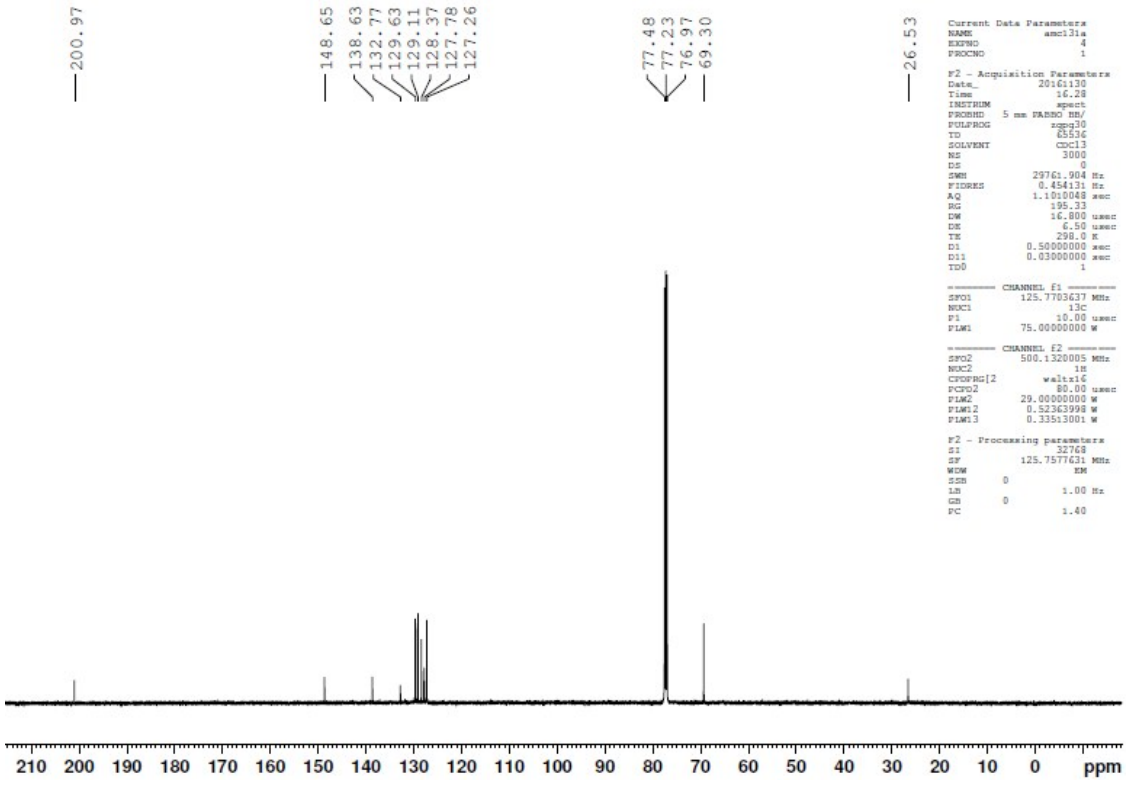
^{1}H NMR of **8e** (500 MHz, $CDCl_3$)



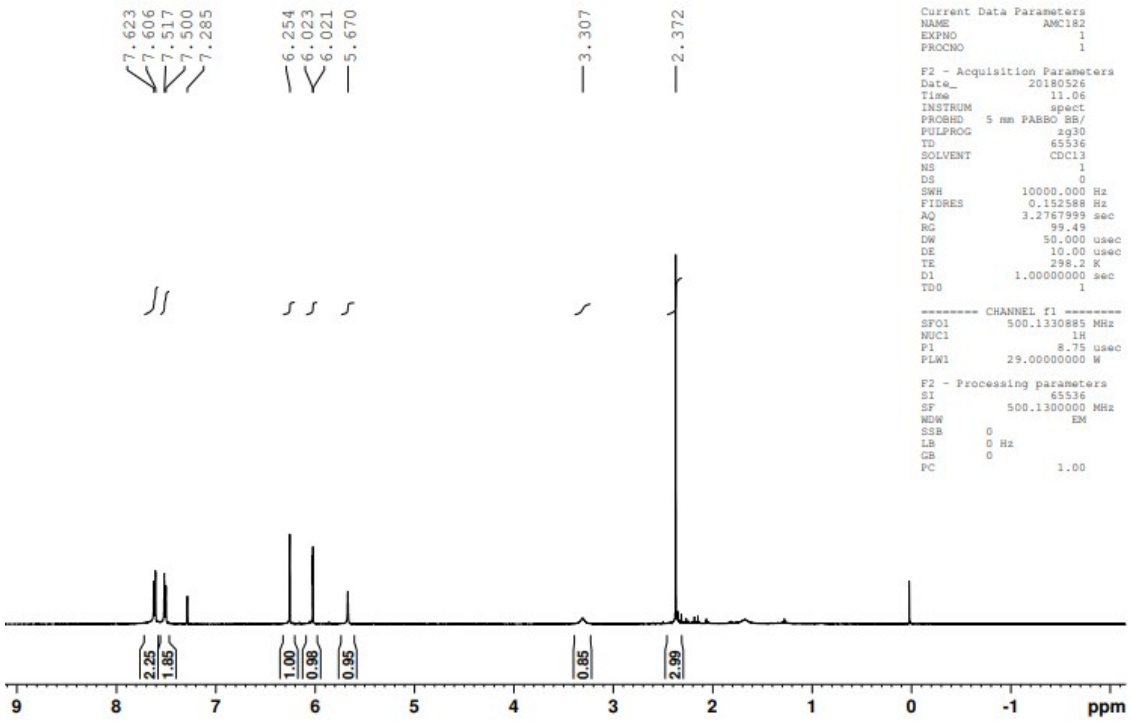
^{13}C NMR of **8e** (125 MHz, $CDCl_3$)



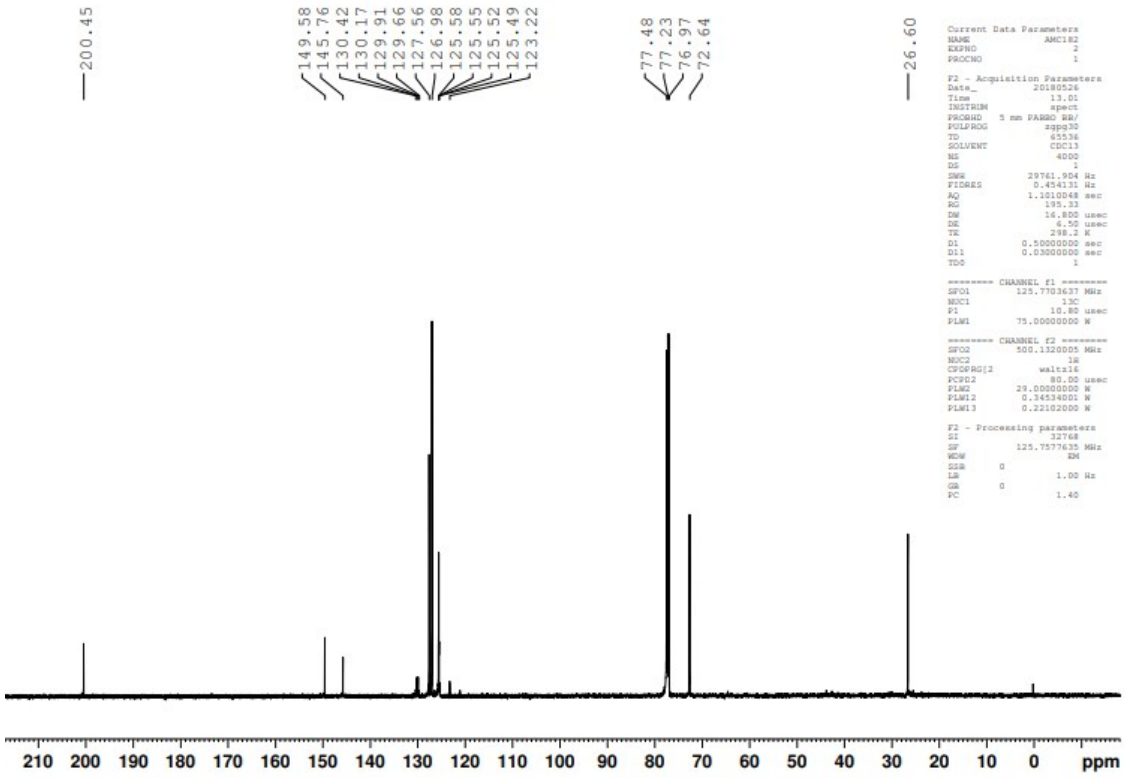
^{1}H NMR of **8f** (500 MHz, $CDCl_3$)



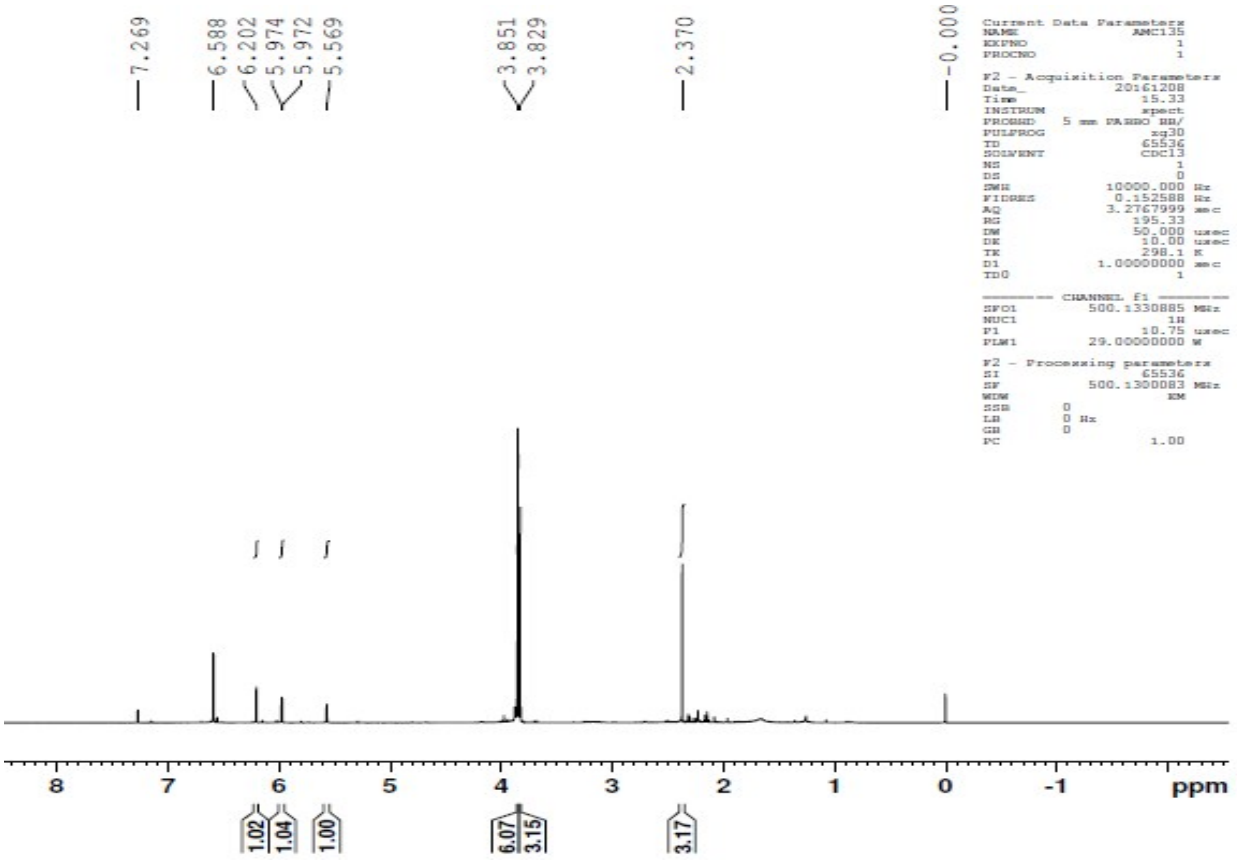
^{13}C NMR of **8f** (125 MHz, $CDCl_3$)



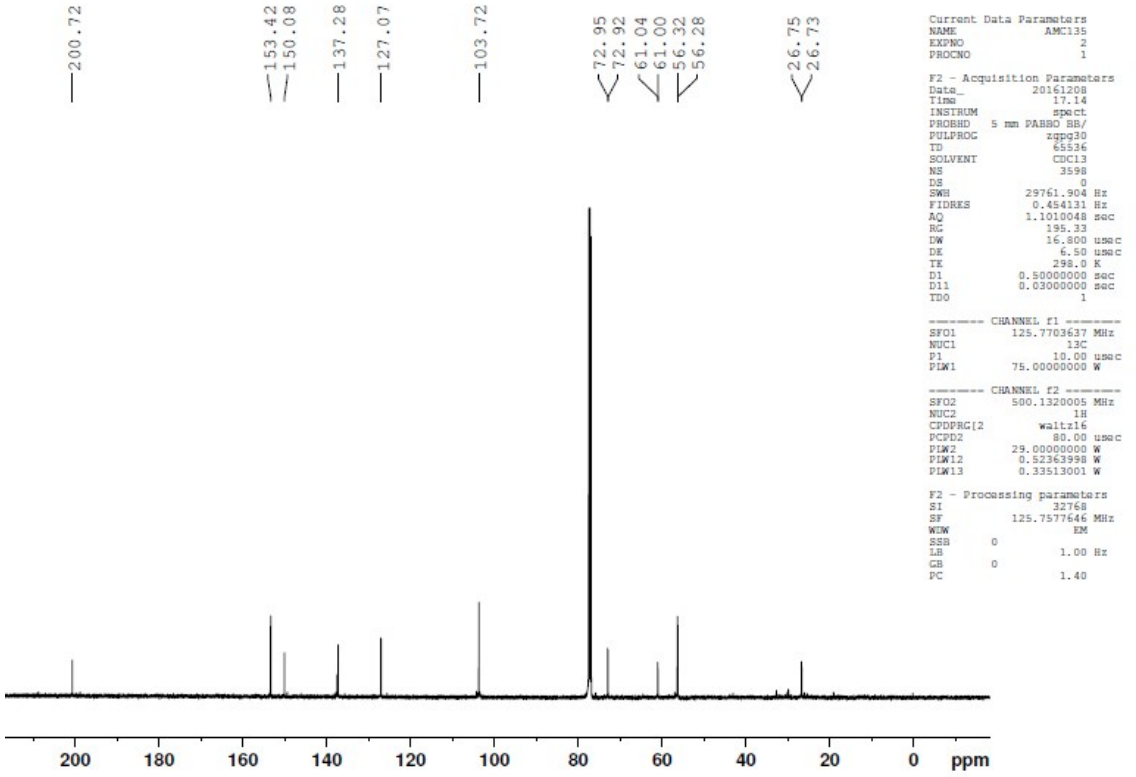
^{1}H NMR of **8g** (500 MHz, $CDCl_3$)



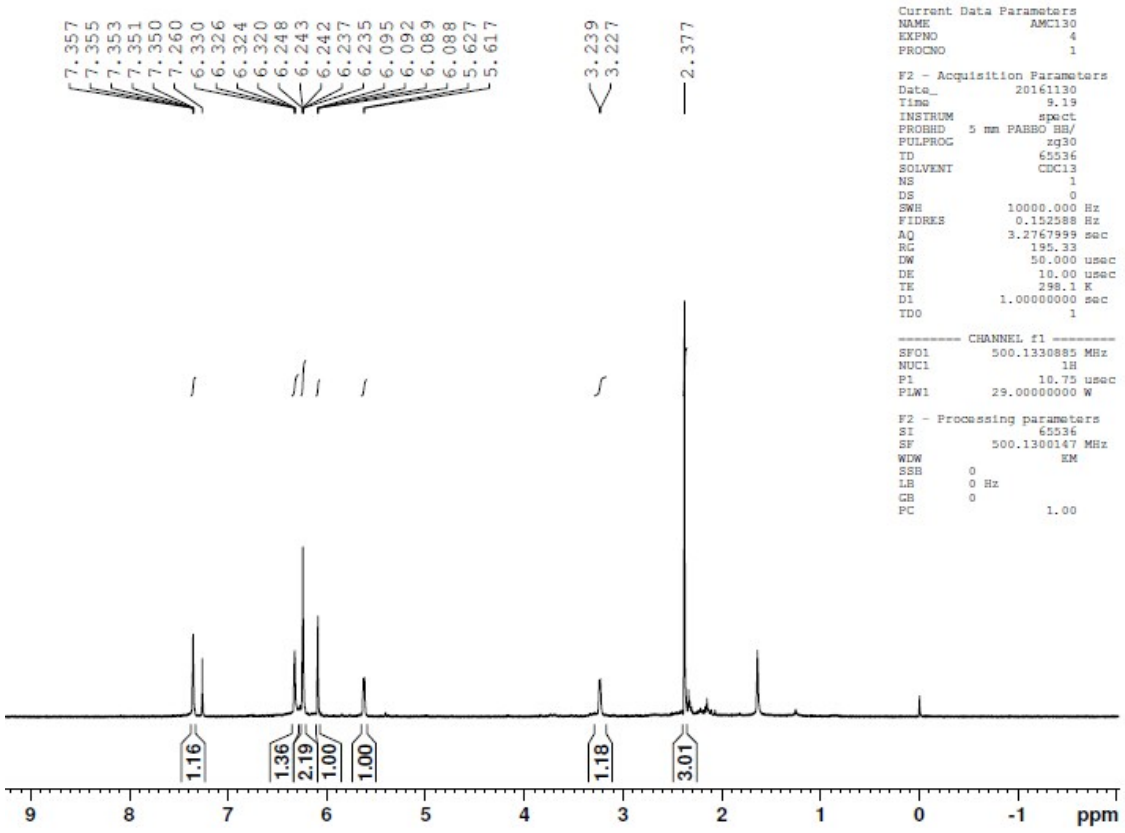
^{13}C NMR of **8g** (125 MHz, $CDCl_3$)



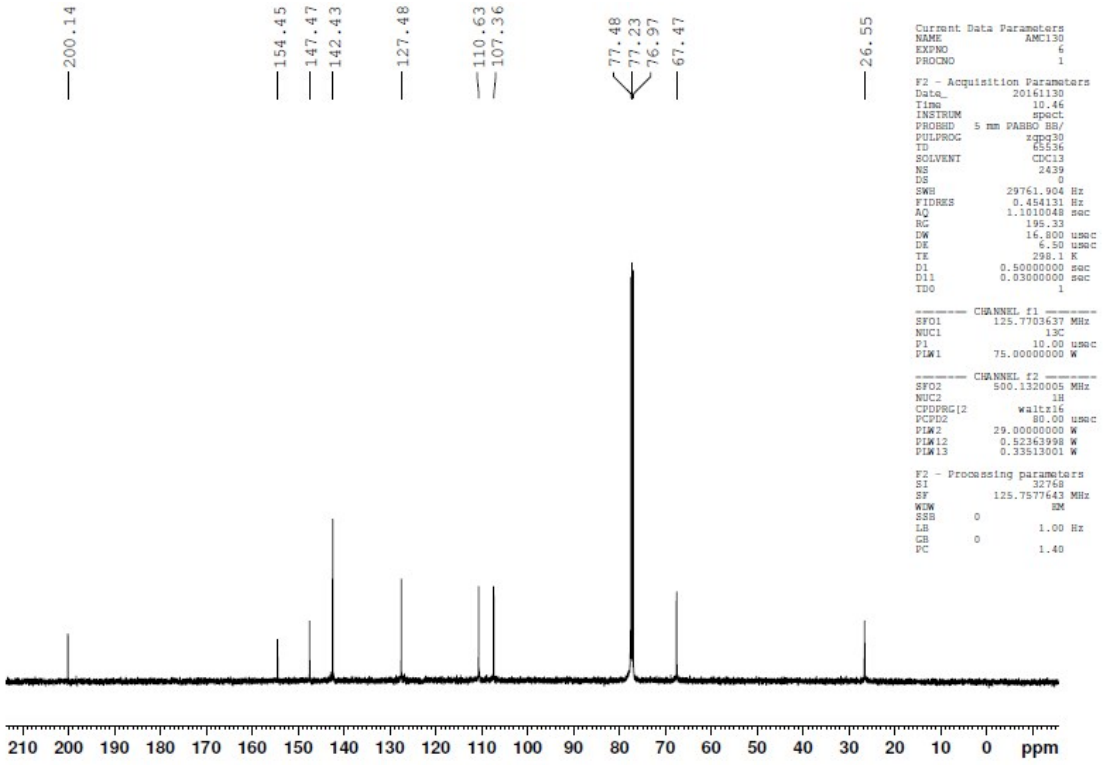
^{1}H NMR of **8h** (500 MHz, $CDCl_3$)



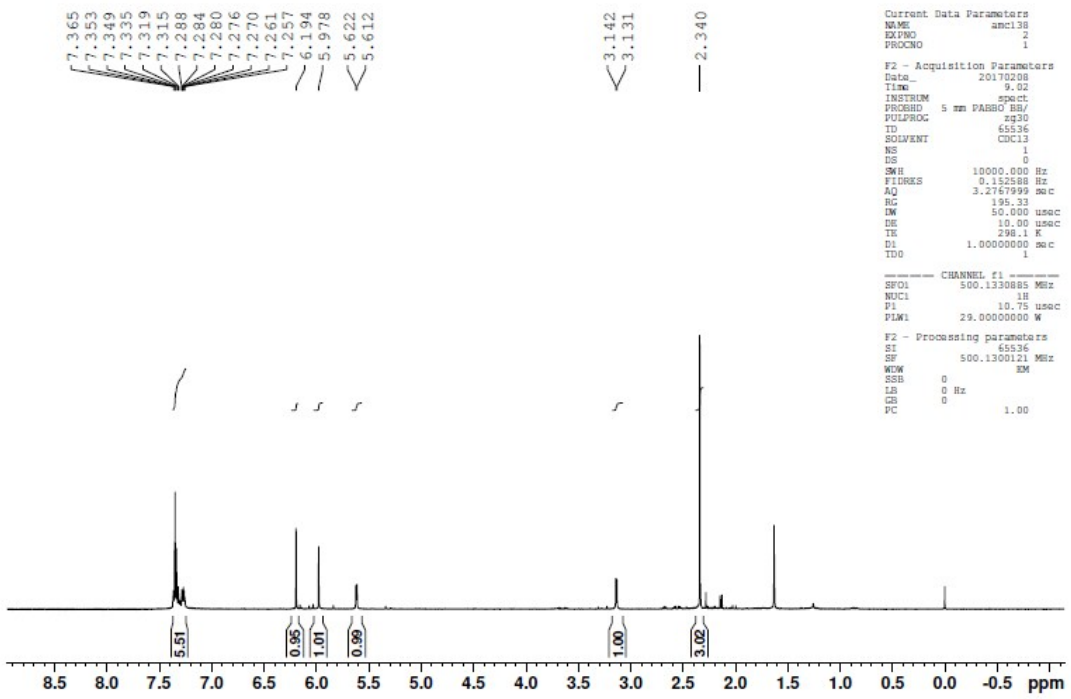
^{13}C NMR of **8h** (125 MHz, $CDCl_3$)



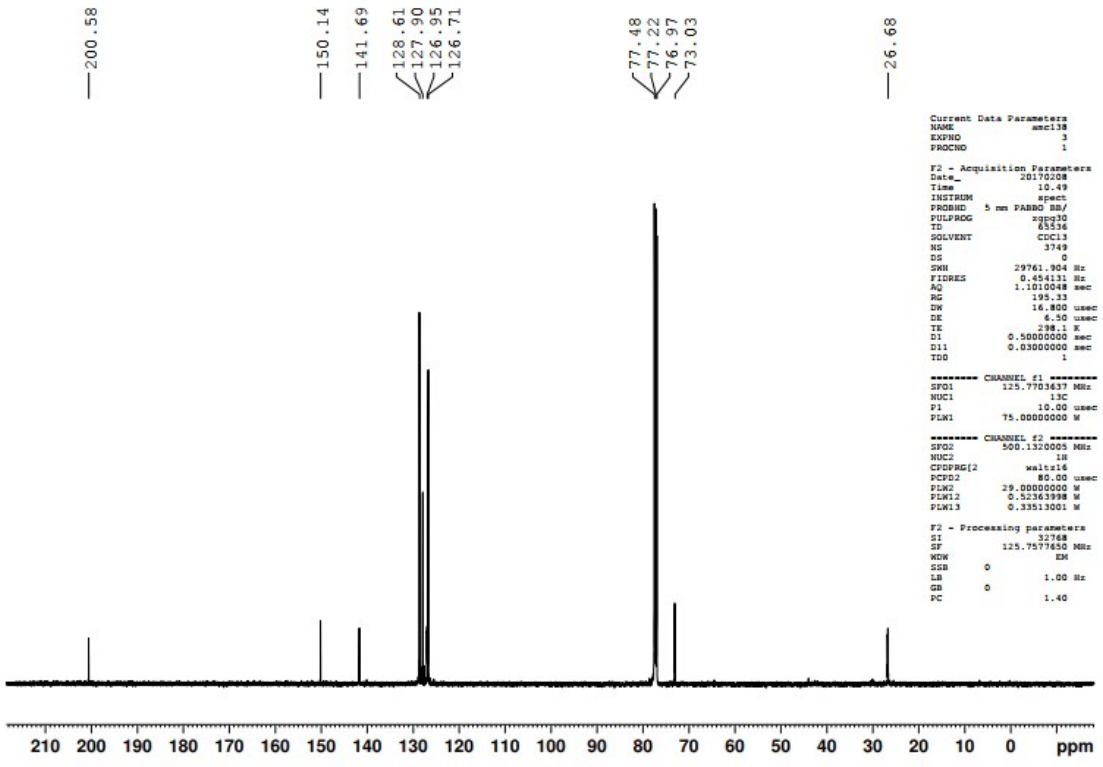
^{1}H NMR of **8i** (500 MHz, $CDCl_3$)



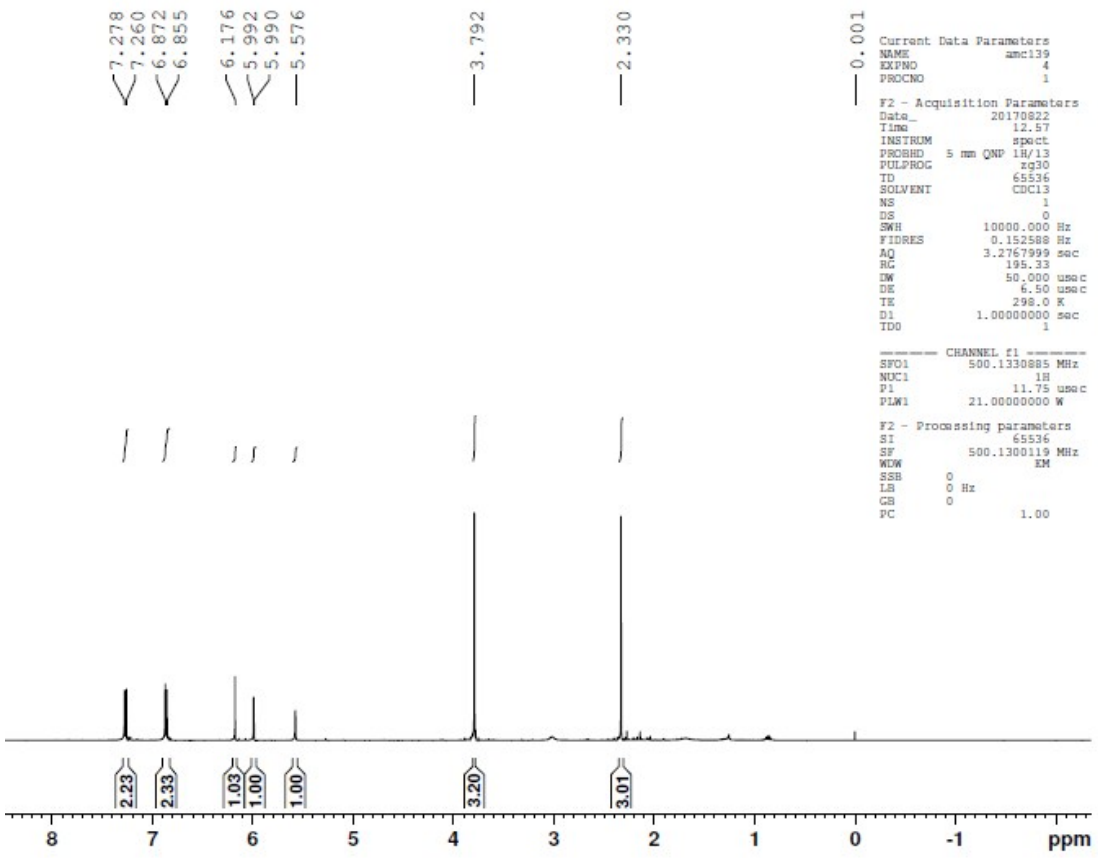
^{13}C NMR of **8i** (125 MHz, $CDCl_3$)



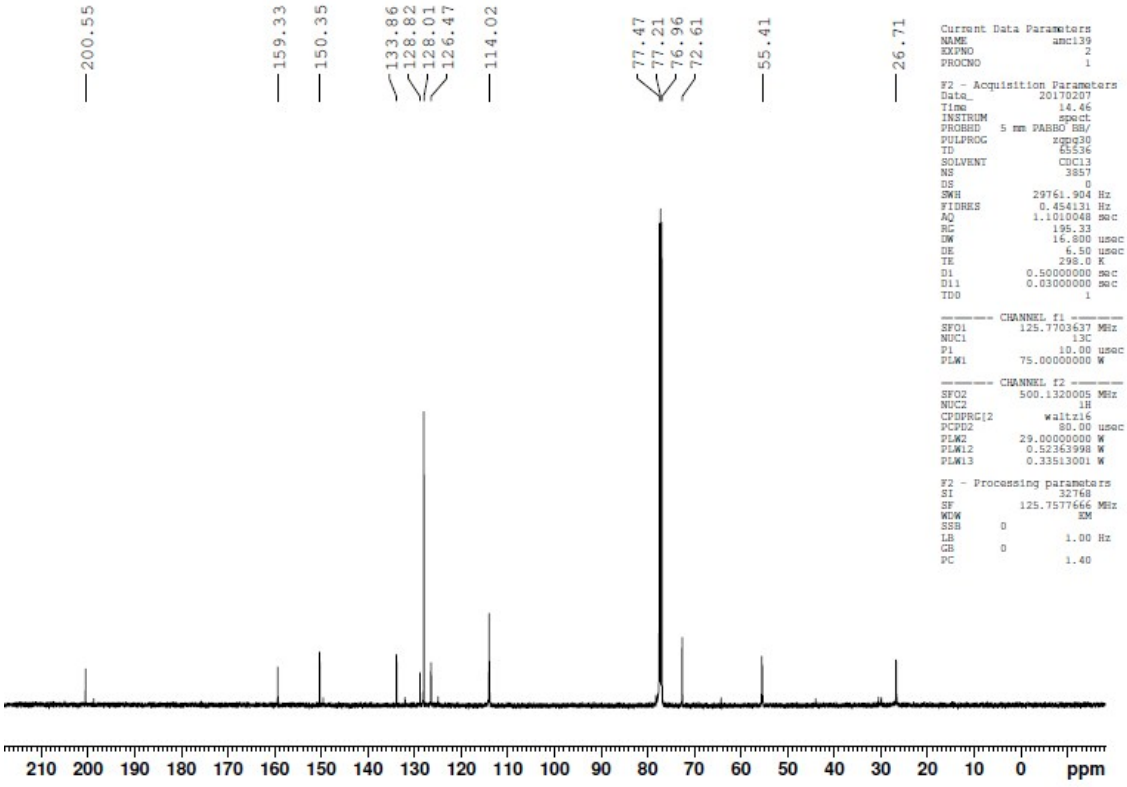
^{1}H NMR of **8j** (500 MHz, $CDCl_3$)



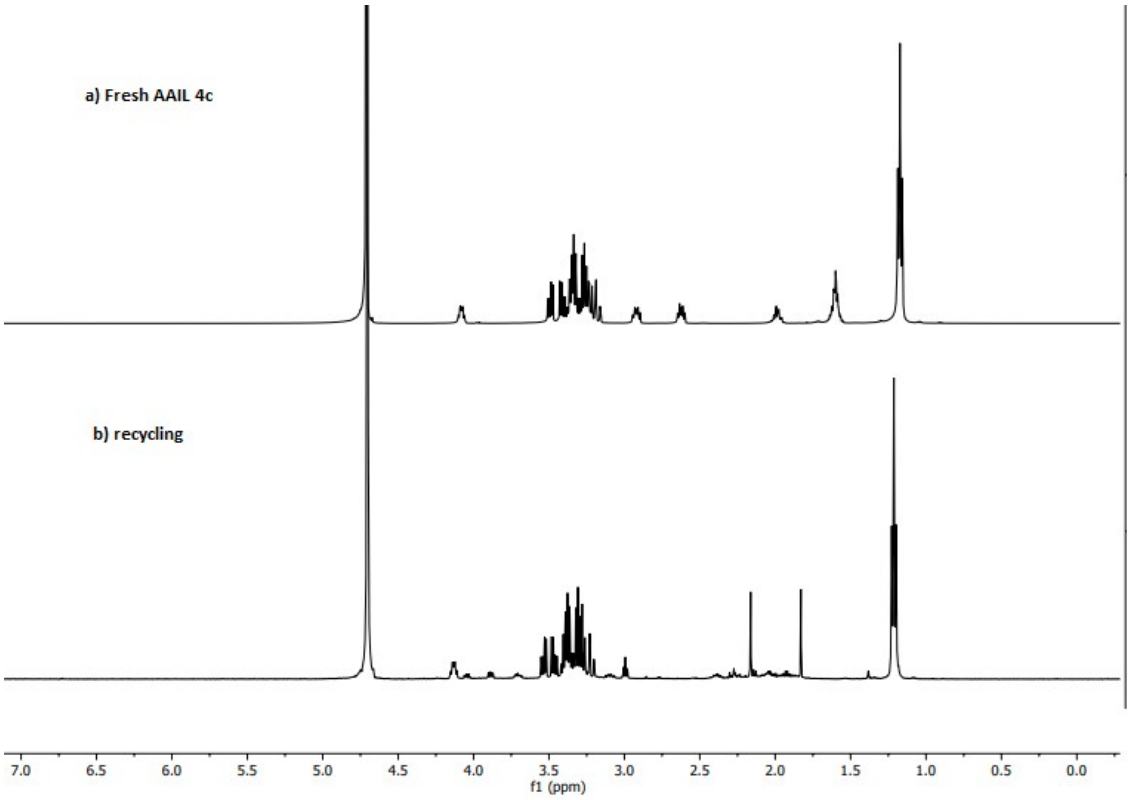
^{13}C NMR of **8j** (125 MHz, $CDCl_3$)



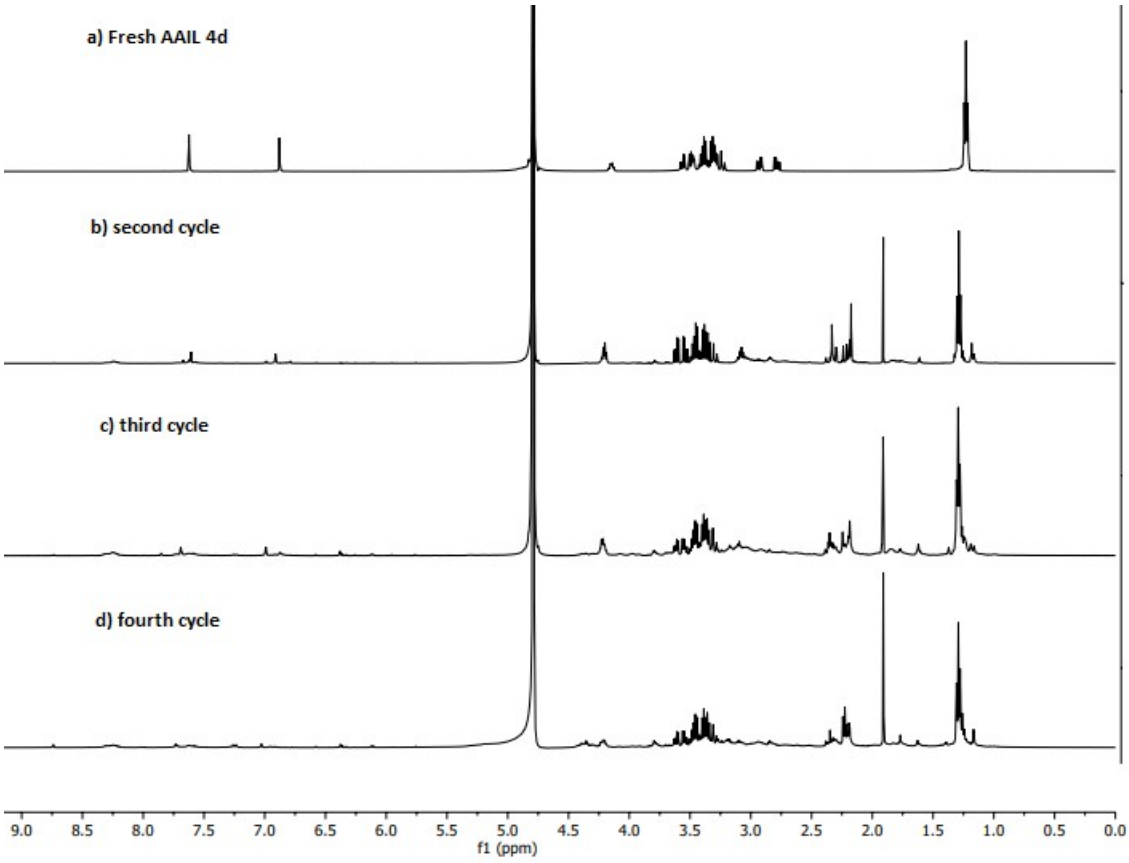
^{1}H NMR of **8k** (500 MHz, $CDCl_3$)



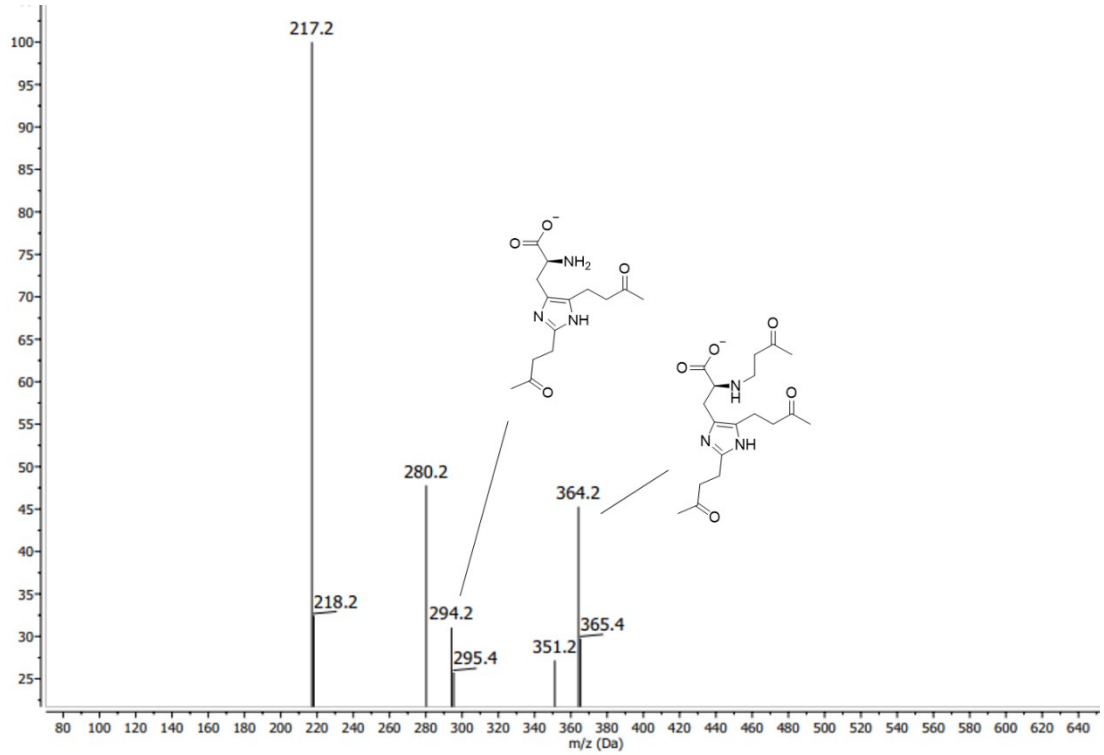
^{13}C NMR of **8k** (125 MHz, $CDCl_3$)



^{1}H NMR of recycle AAIL **4c** (500 MHz, D_2O): a) AAIL fresh before reaction; b) after the reaction.



^{1}H NMR of recycle AAIL **4d** (500 MHz, D_2O): a) AAIL fresh before reaction; b) second cycle; c) third cycle; d) fourth cycle.



ESI-(-)MS of the recycle AAIL **4d** after the MBH reaction.