The Development of Small Molecule Inhibitors for Fibrosis Drug Discovery

Lisa Margaret Miller

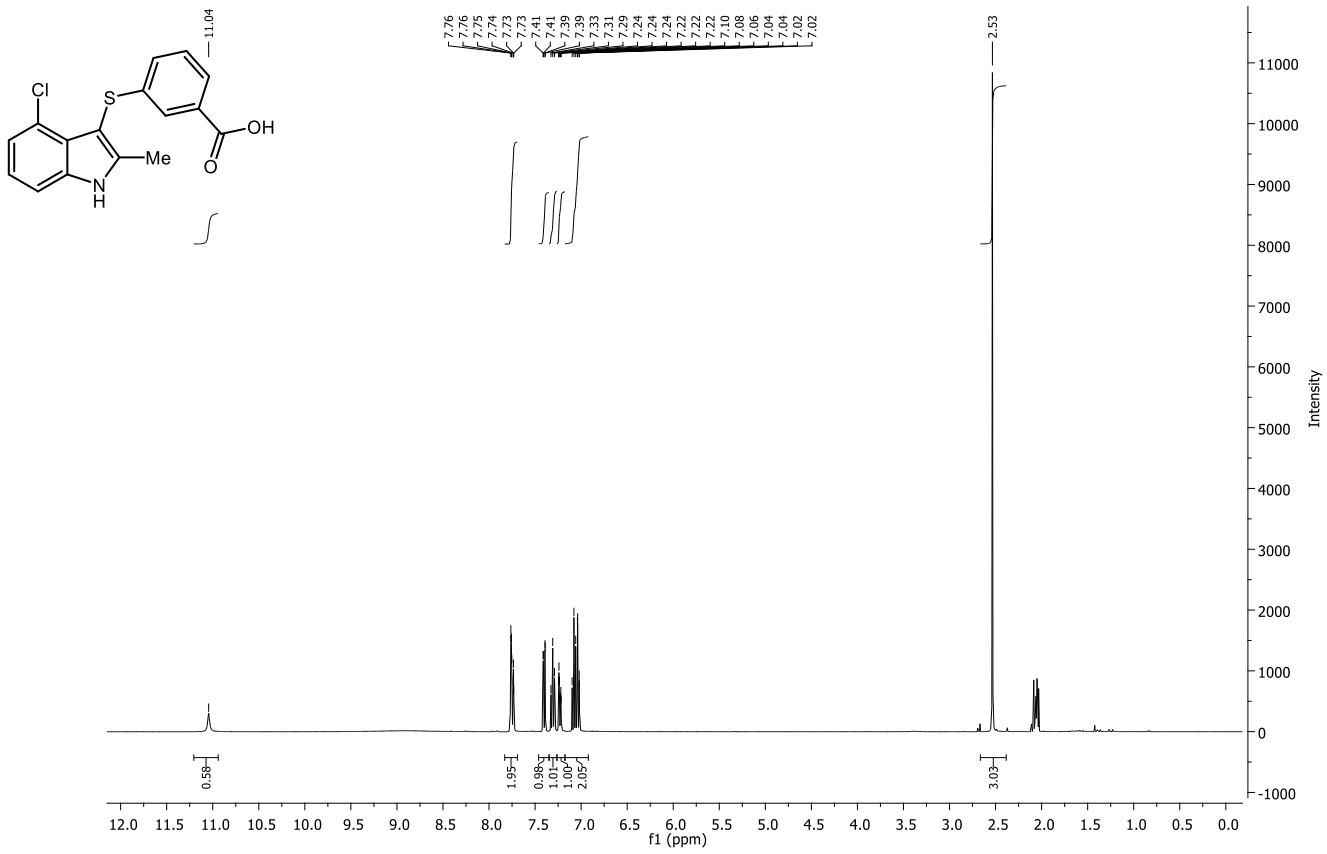
November 2016

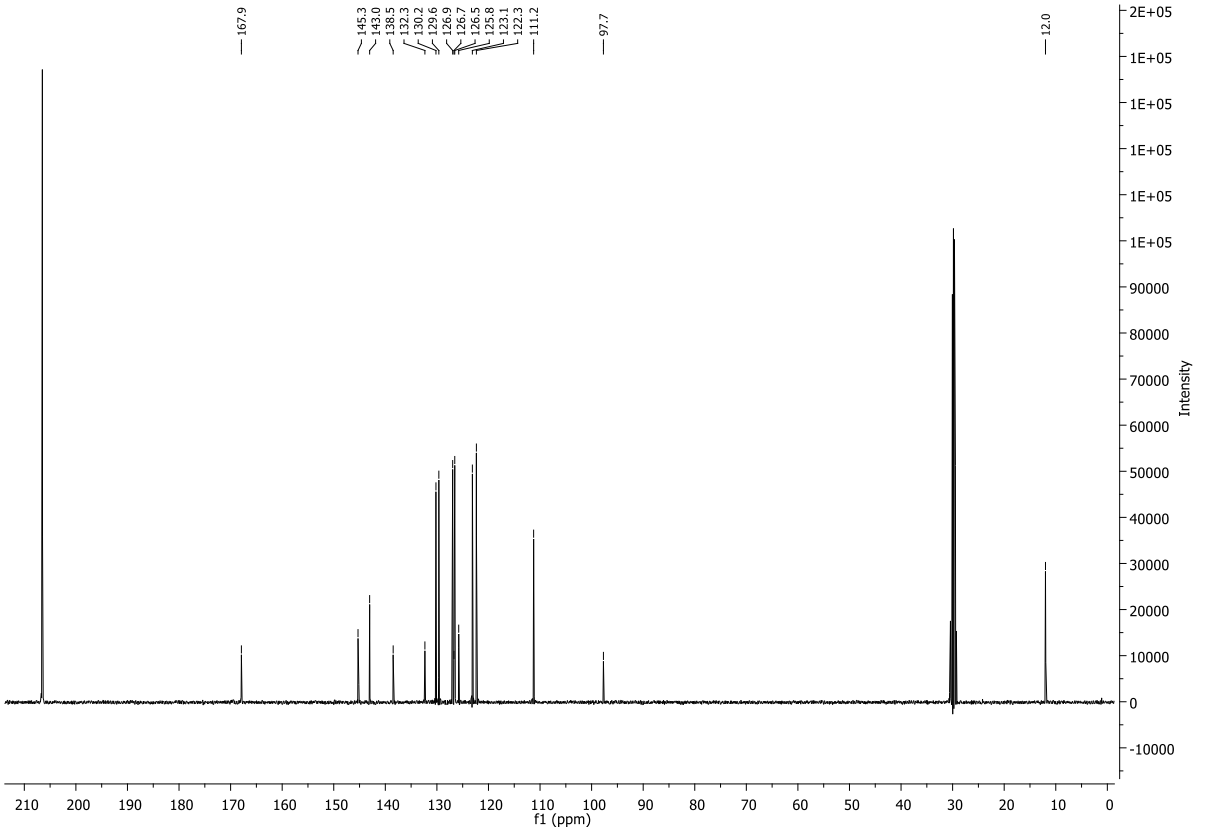
Supporting Information

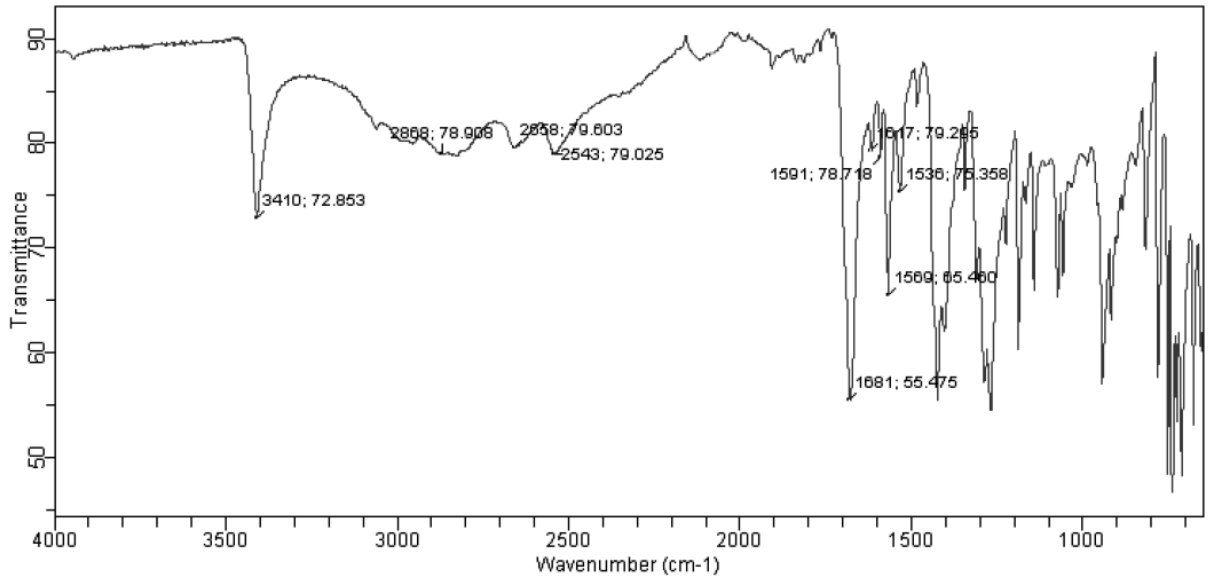
Contents

S1. ^{1}H NMR, ^{13}C NMR, IR and HRMS Spectra

3-((4-Chloro-2-methyl-1*H*-indol-3-yl)thio)benzoic acid (1.50).






Transmittance
Wavenumber (cm-1)
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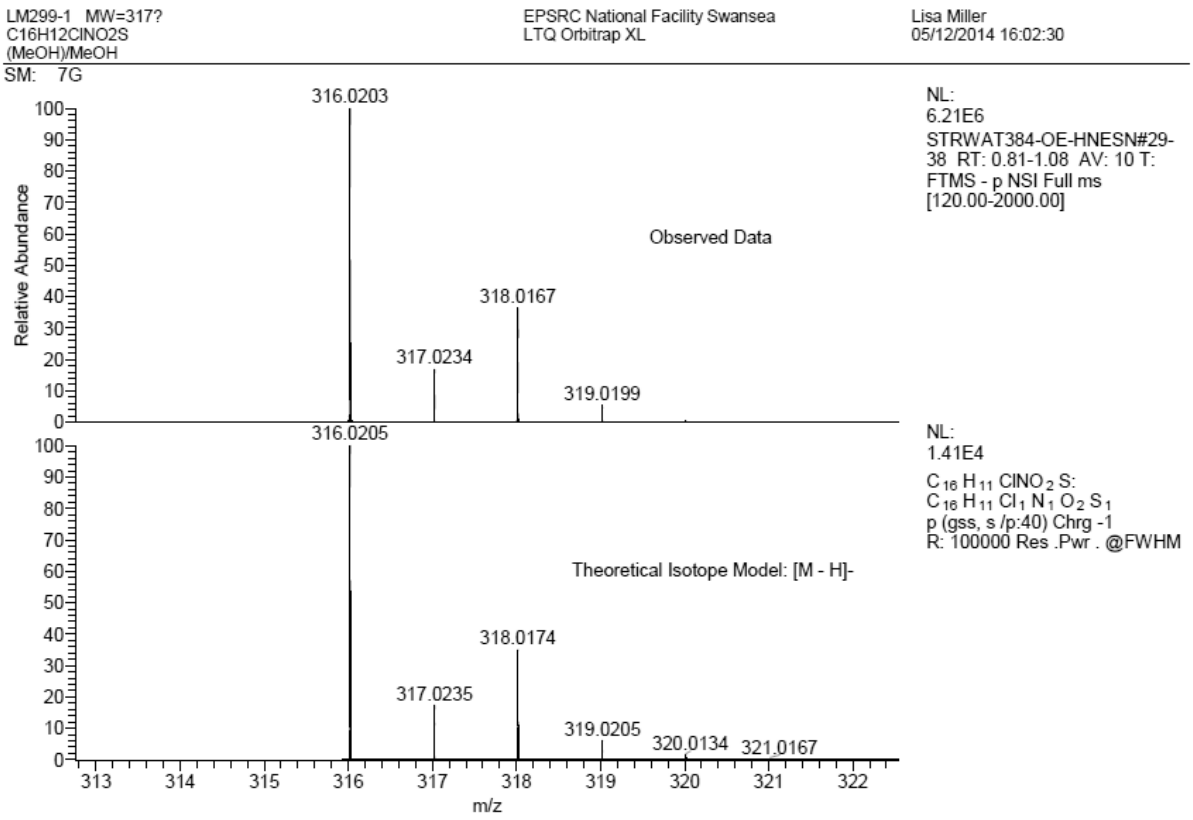
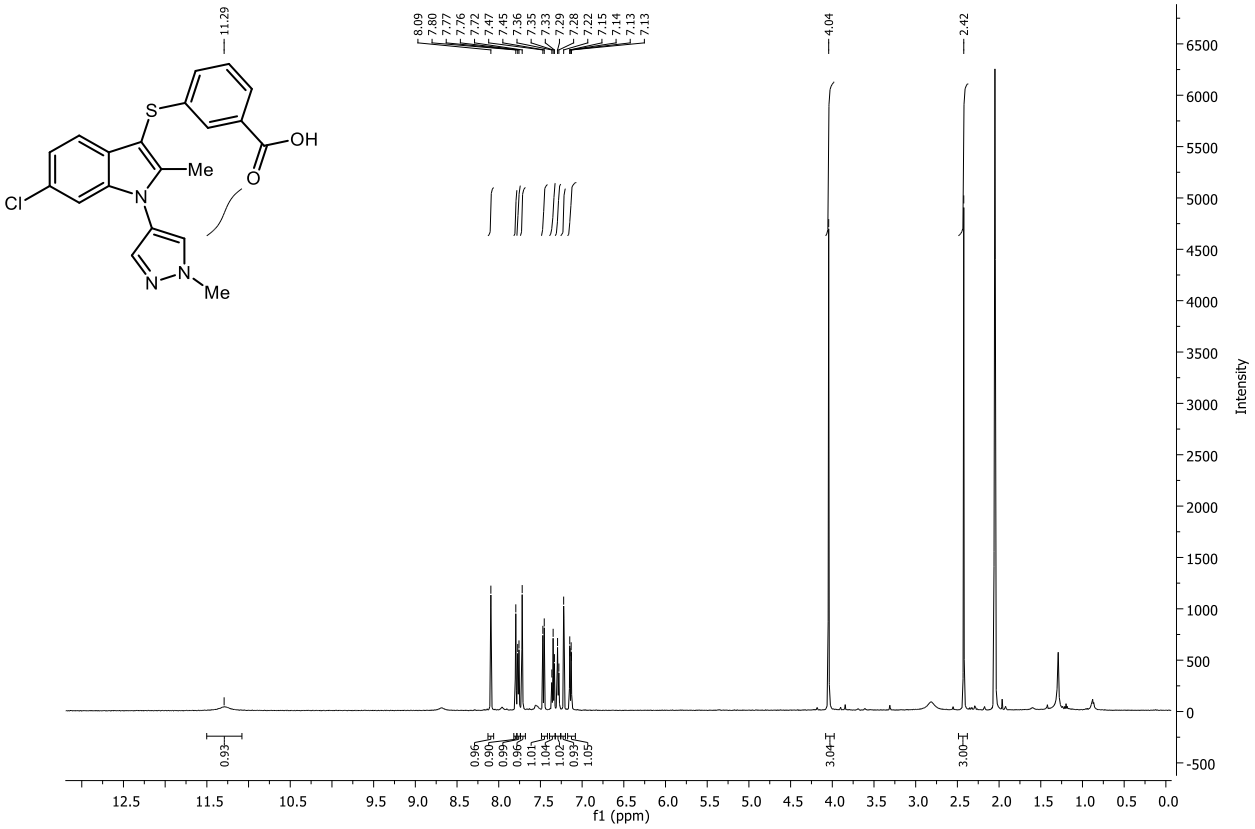
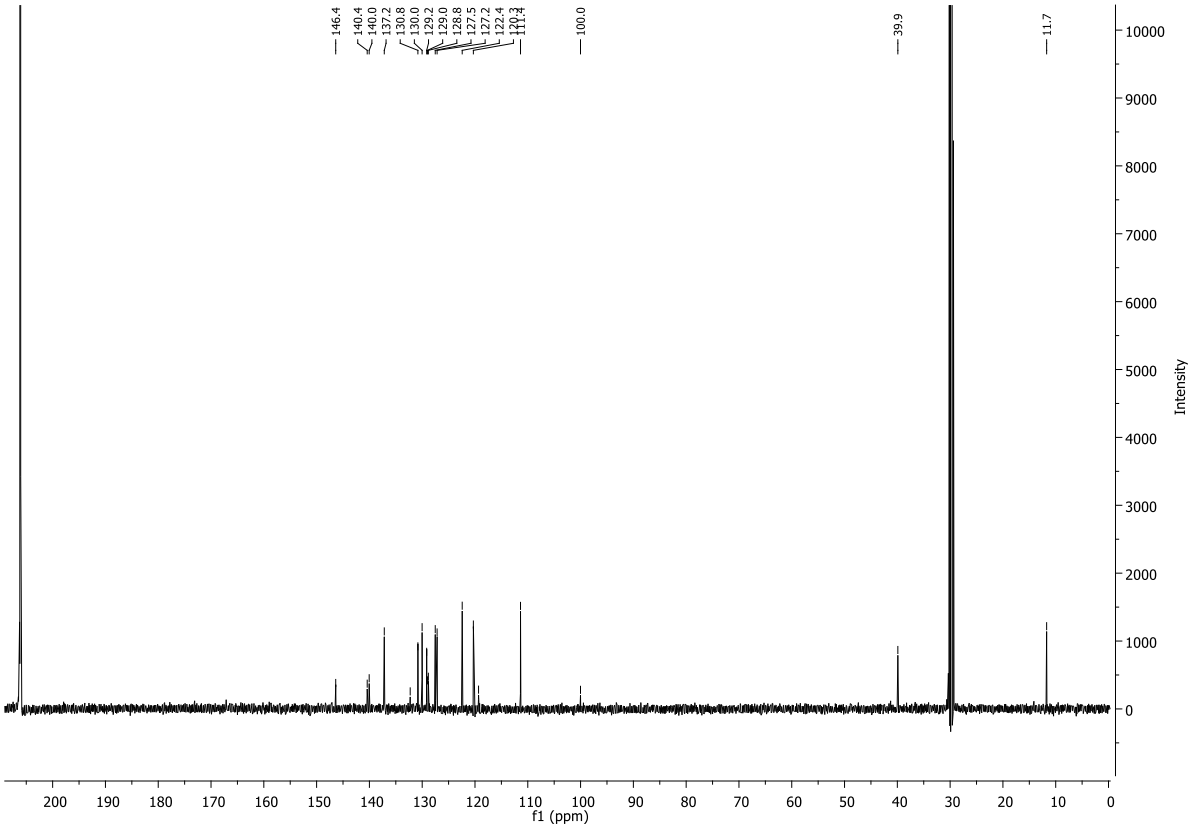
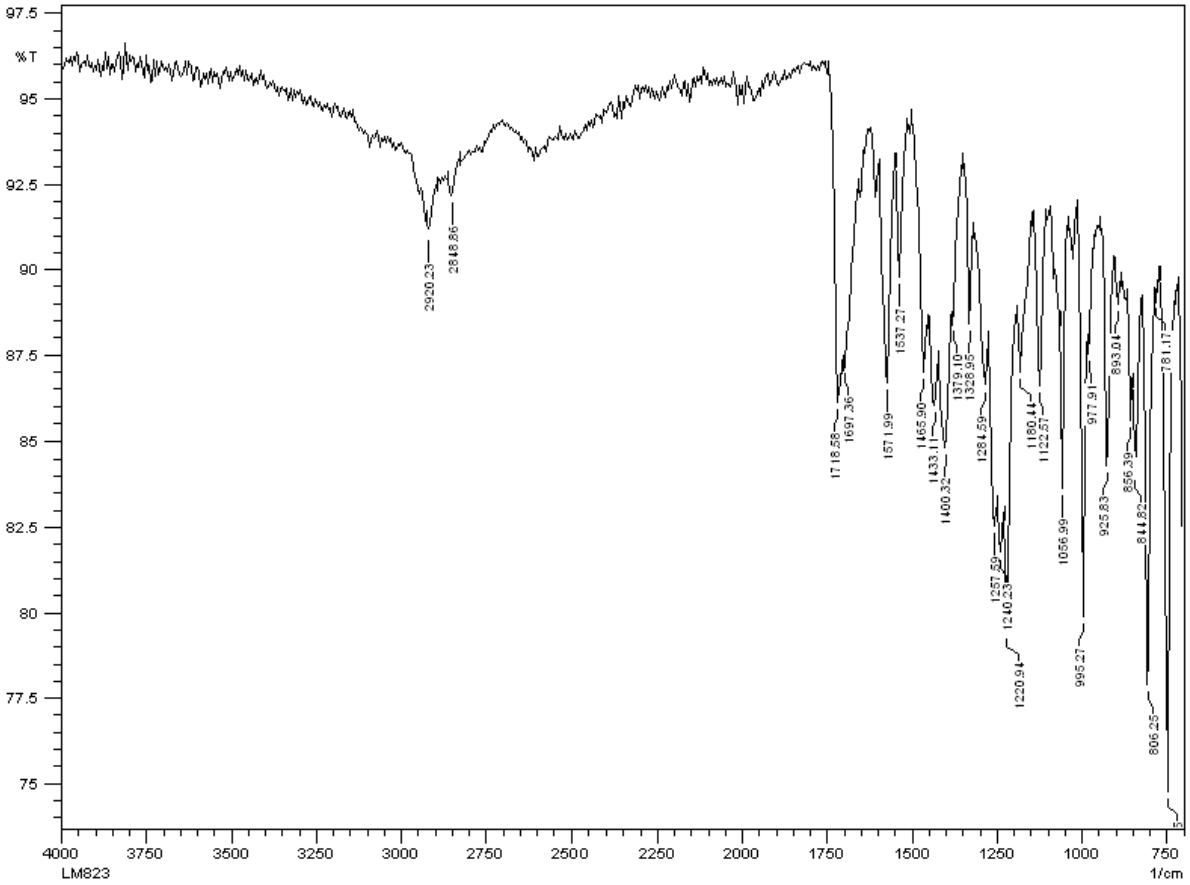
2858; 78.908
2658; 79.603
2543; 79.025
1591; 78.718
1536; 75.358
1569; 65.460
1681; 55.475


LM299-1 MW=317?
C16H12ClNO2S
(MeOH)/MeOH
SM: 7G
EPSRC National Facility Swansea
LTQ Orbitrap XL
Lisa Miller
05/12/2014 16:02:30
Relative Abundance
316.0203
318.0167
317.0234
319.0199
Observed Data
NL:
6.21E6
STRWAT384-OE-HNESN#29-38 RT: 0.81-1.08 AV: 10 T: FTMS - p NSI Full ms [120.00-2000.00]
316.0205
318.0174
317.0235
319.0205
320.0134
321.0167
Theoretical Isotope Model: [M - H]-
NL:
1.41E4
C16 H11 ClNO2 S:
C16 H11 Cl1 N1 O2 S1
p (gss, s /p:40) Chrg -1
R: 100000 Res .Pwr . @FWHM
m/z

3-((6-Chloro-2-methyl-1-(1-methyl-1*H*-pyrazol-4-yl)-1*H*-indol-3-yl)thio)benzoic acid (1.51).



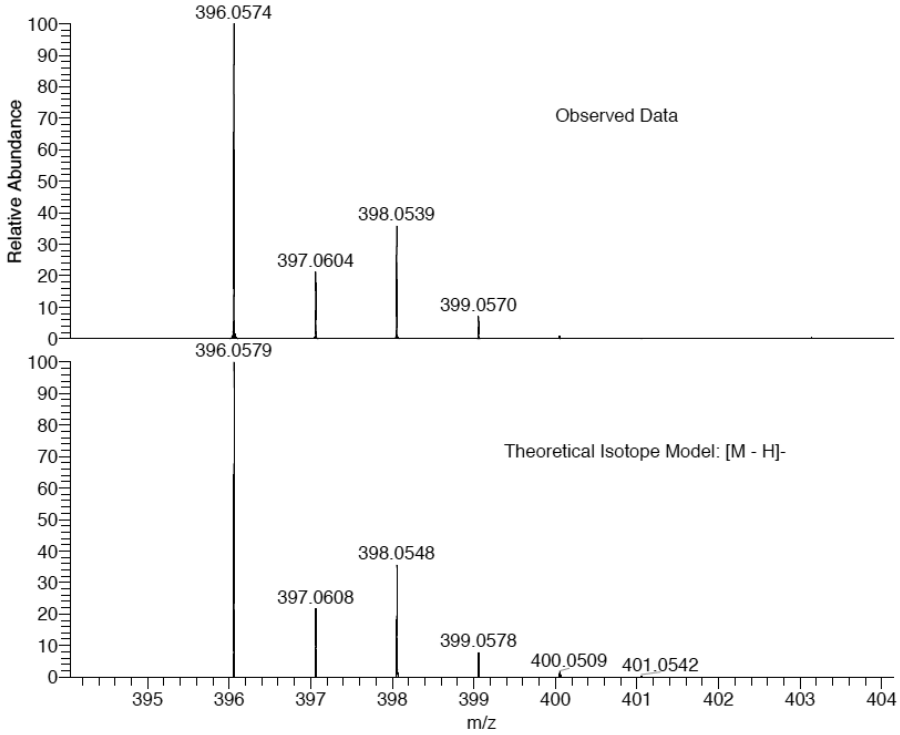




LM823
(MeCN)/MeCN
C20H16ClN3O2S

EPSRC National Facility Swansea
LTQ Orbitrap XL

STRWAT-LM
01/06/2016 07:31:49



NL:
9.06E7
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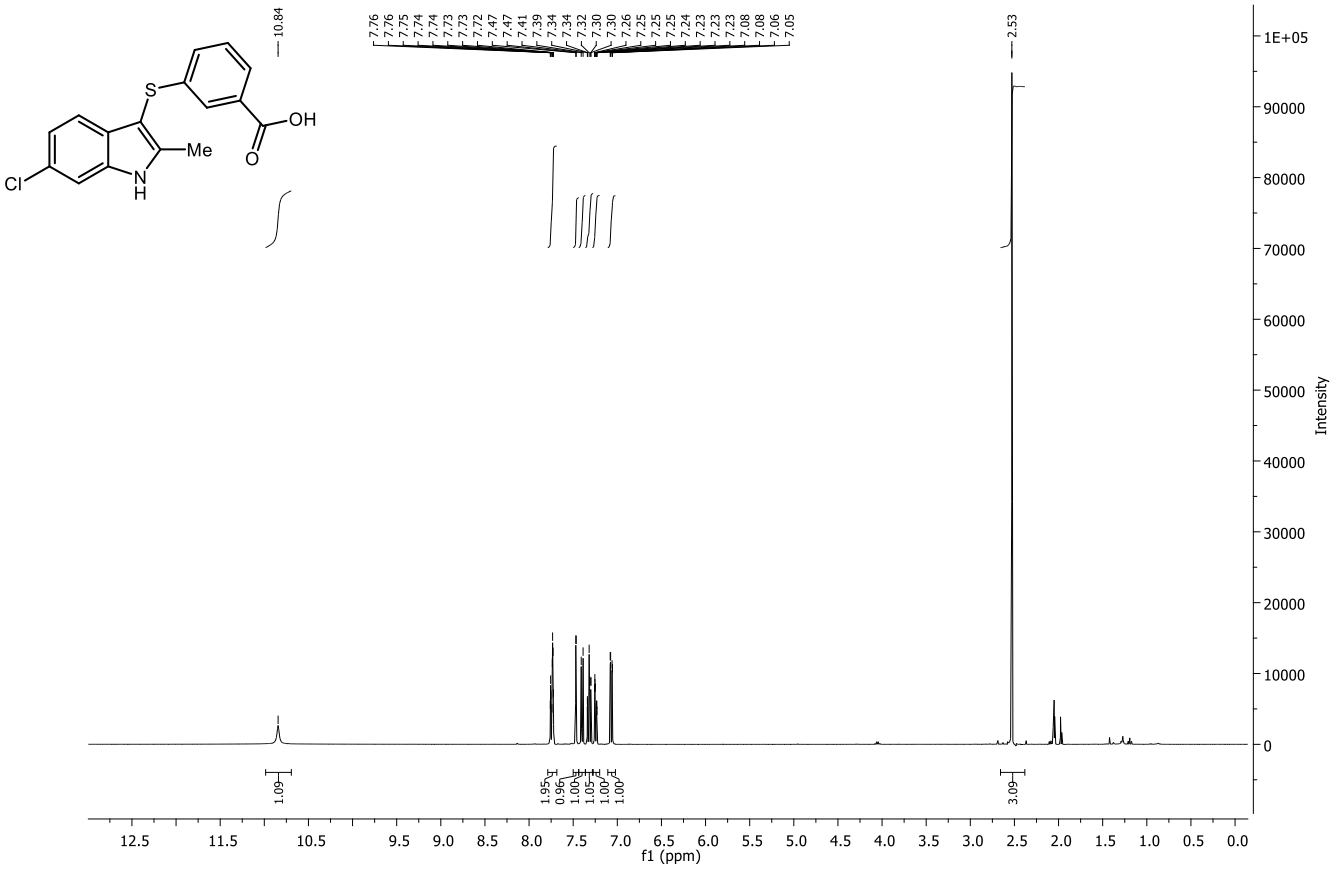
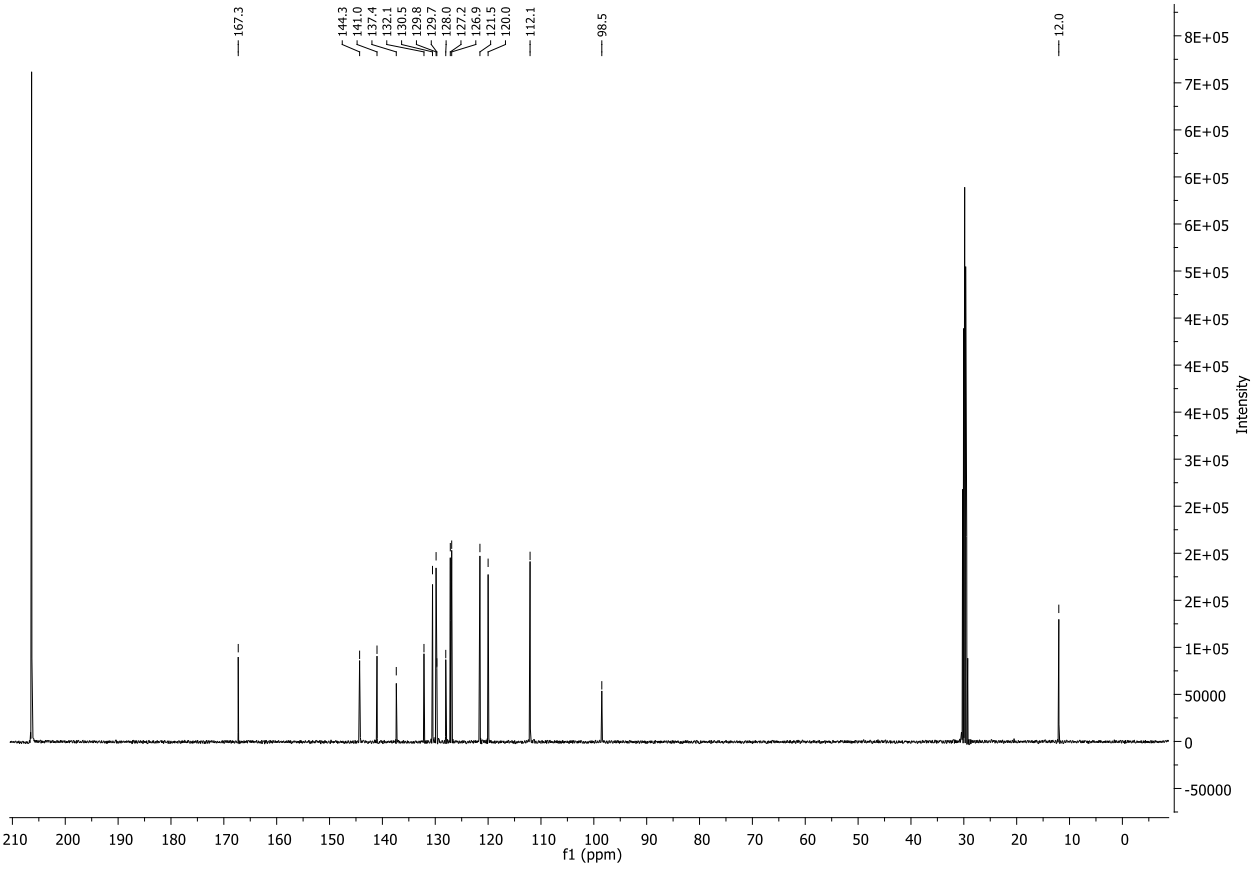
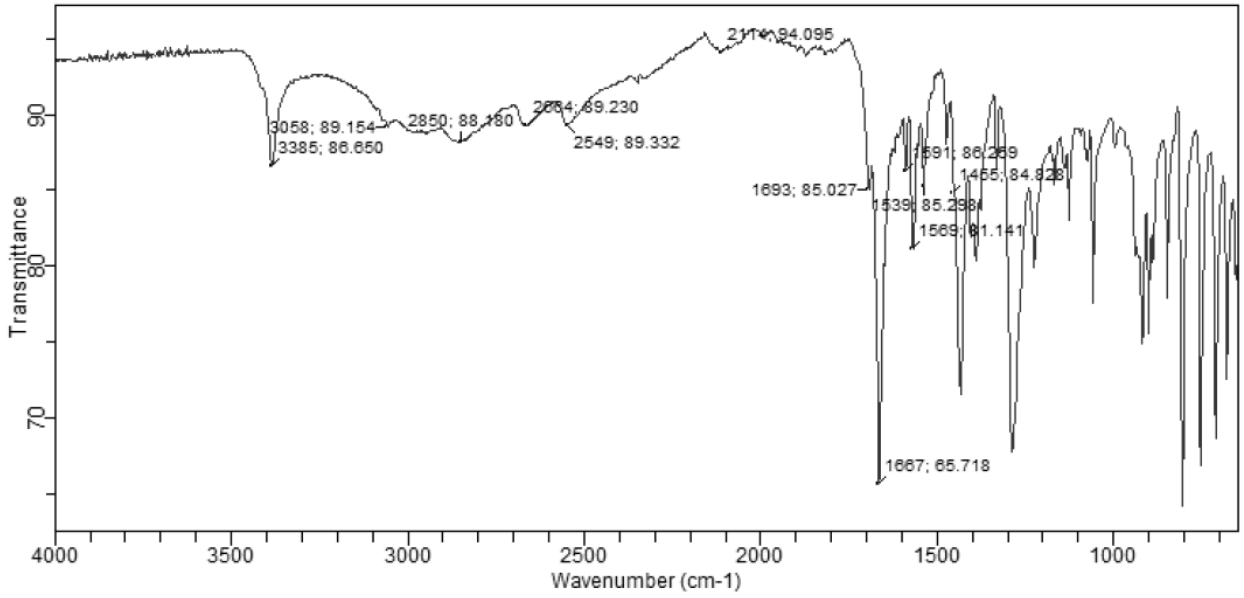
RT: 0.72-0.94 AV: 9 T: FTMS -
p NSI Full ms [120.00-615.00]

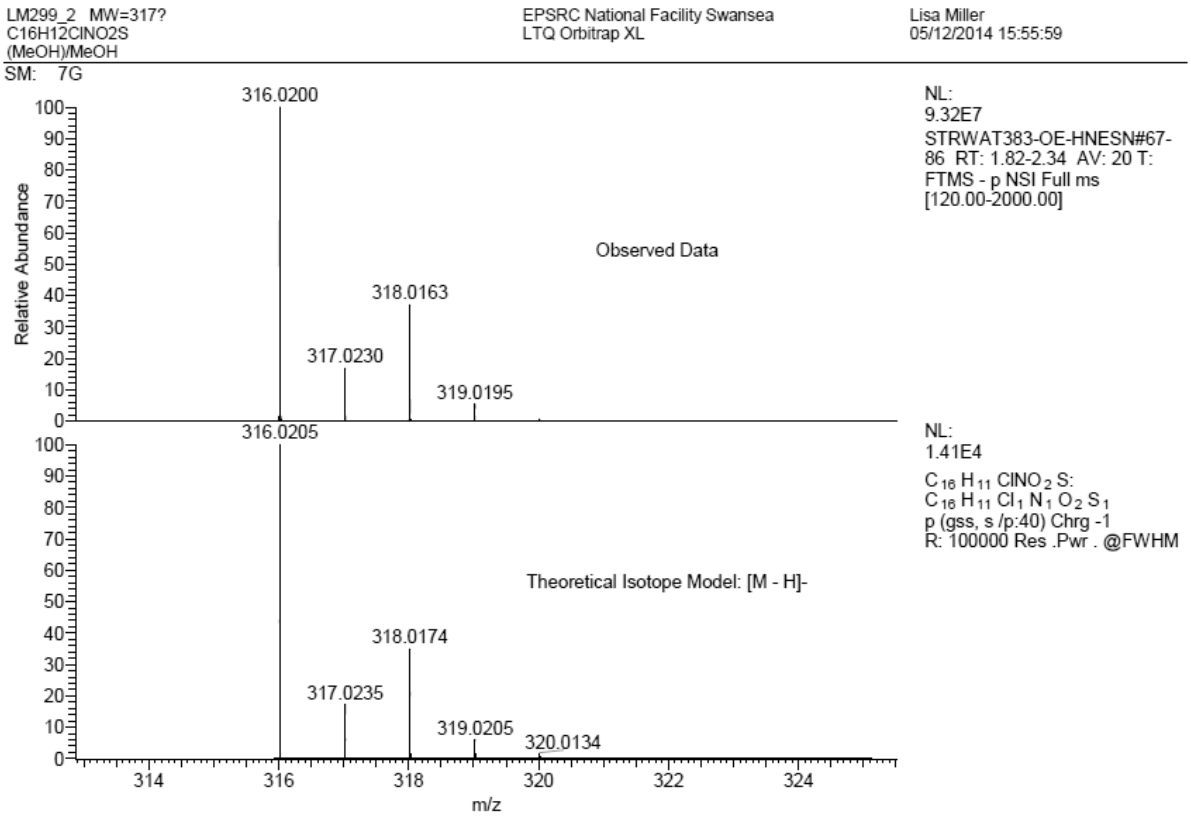
NL:
1.34E4
$C_{20}H_{15}ClN_3O_2S$:
$C_{20}H_{15}Cl_1N_3O_2S_1$
p (gss, s /p:40) Chrg -1
R: 100000 Res .Pwr . @FWHM

3-((6-Chloro-2-methyl-1*H*-indol-3-yl)thio)benzoic acid (1.52).

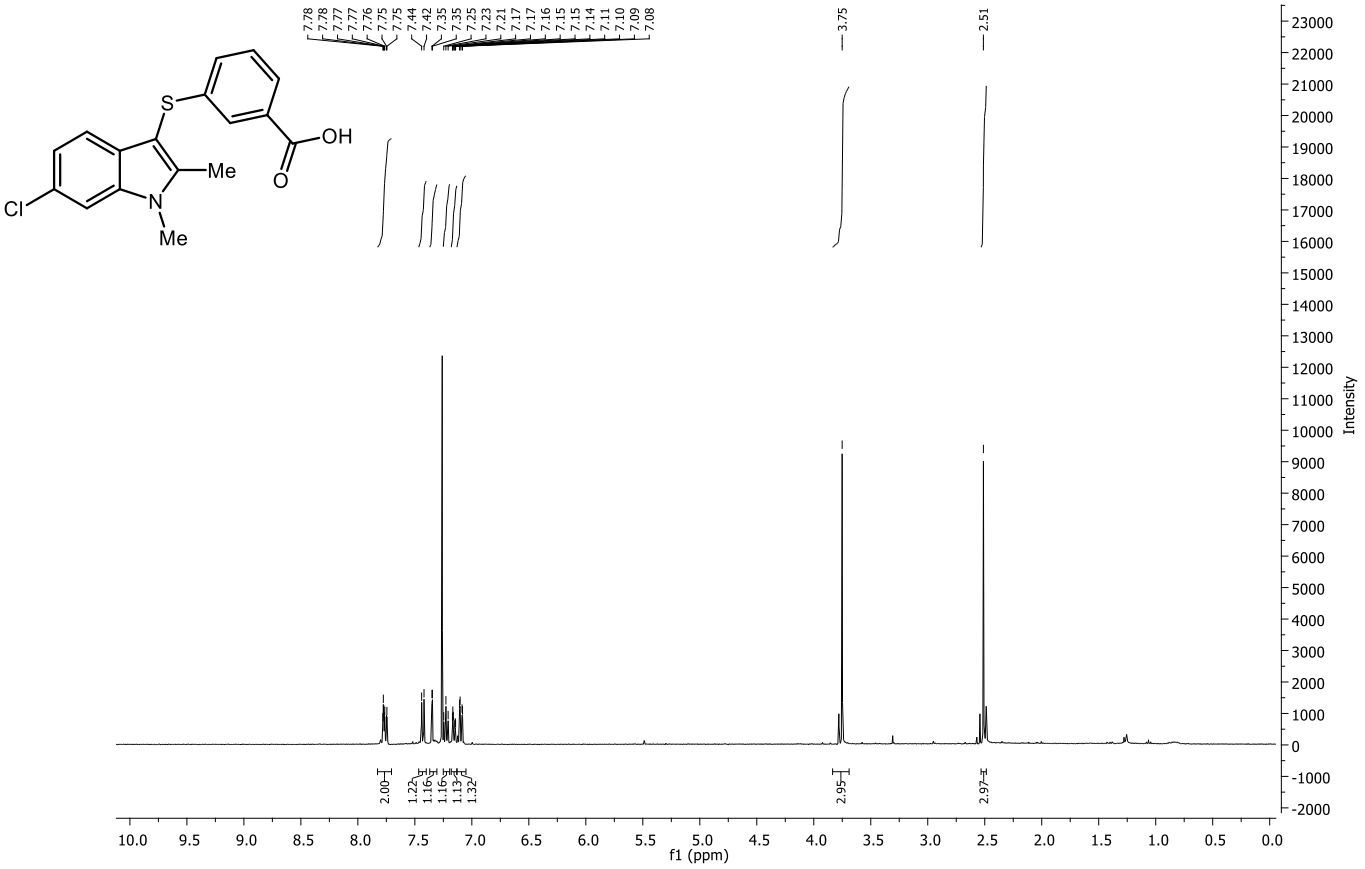


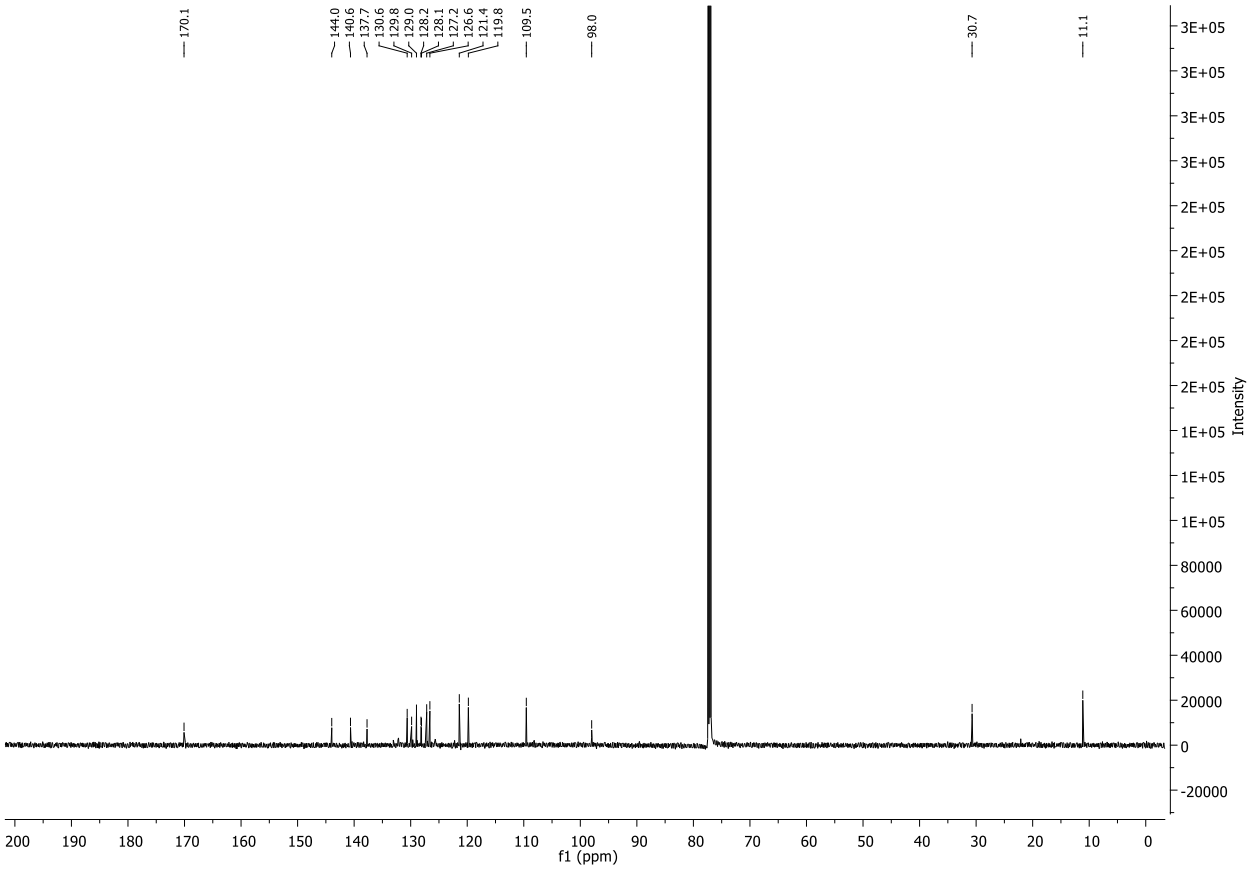


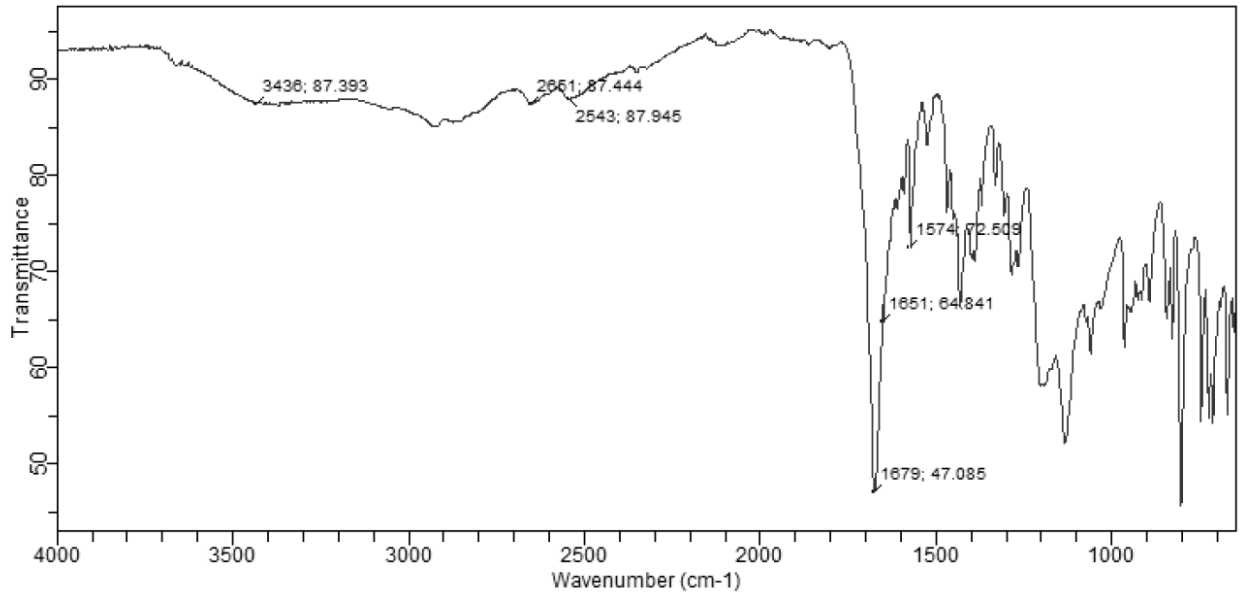

Transmittance
Wavenumber (cm-1)
3058; 89.154
3385; 86.650
2850; 88.180
2664; 89.230
2549; 89.332
1693; 85.027
1667; 65.718

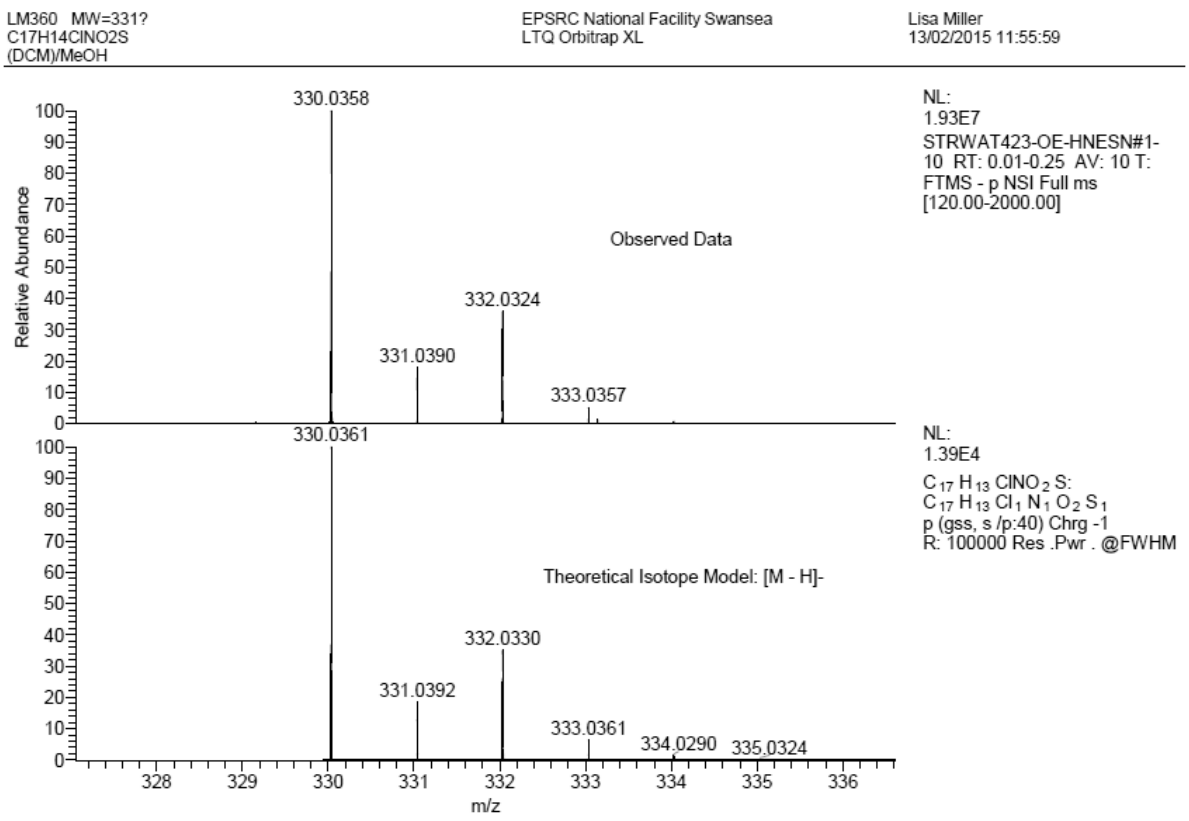

LM299_2 MW=317?
C16H12ClNO2S
(MeOH)/MeOH
SM: 7G
EPSRC National Facility Swansea
LTQ Orbitrap XL
Lisa Miller
05/12/2014 15:55:59
Observed Data
316.0200
318.0163
317.0230
319.0195
NL:
9.32E7
STRWAT383-OE-HNESN#67-86 RT: 1.82-2.34 AV: 20 T: FTMS - p NSI Full ms [120.00-2000.00]
Theoretical Isotope Model: [M - H]-
316.0205
318.0174
317.0235
319.0205
320.0134
NL:
1.41E4
C16 H11 ClNO2 S:
C16 H11 Cl1 N1 O2 S1
p (gss, s /p:40) Chrg -1
R: 100000 Res .Pwr . @FWHM
Relative Abundance
m/z

3-((6-Chloro-1,2-dimethyl-1*H*-indol-3-yl)thio)benzoic acid (1.53).

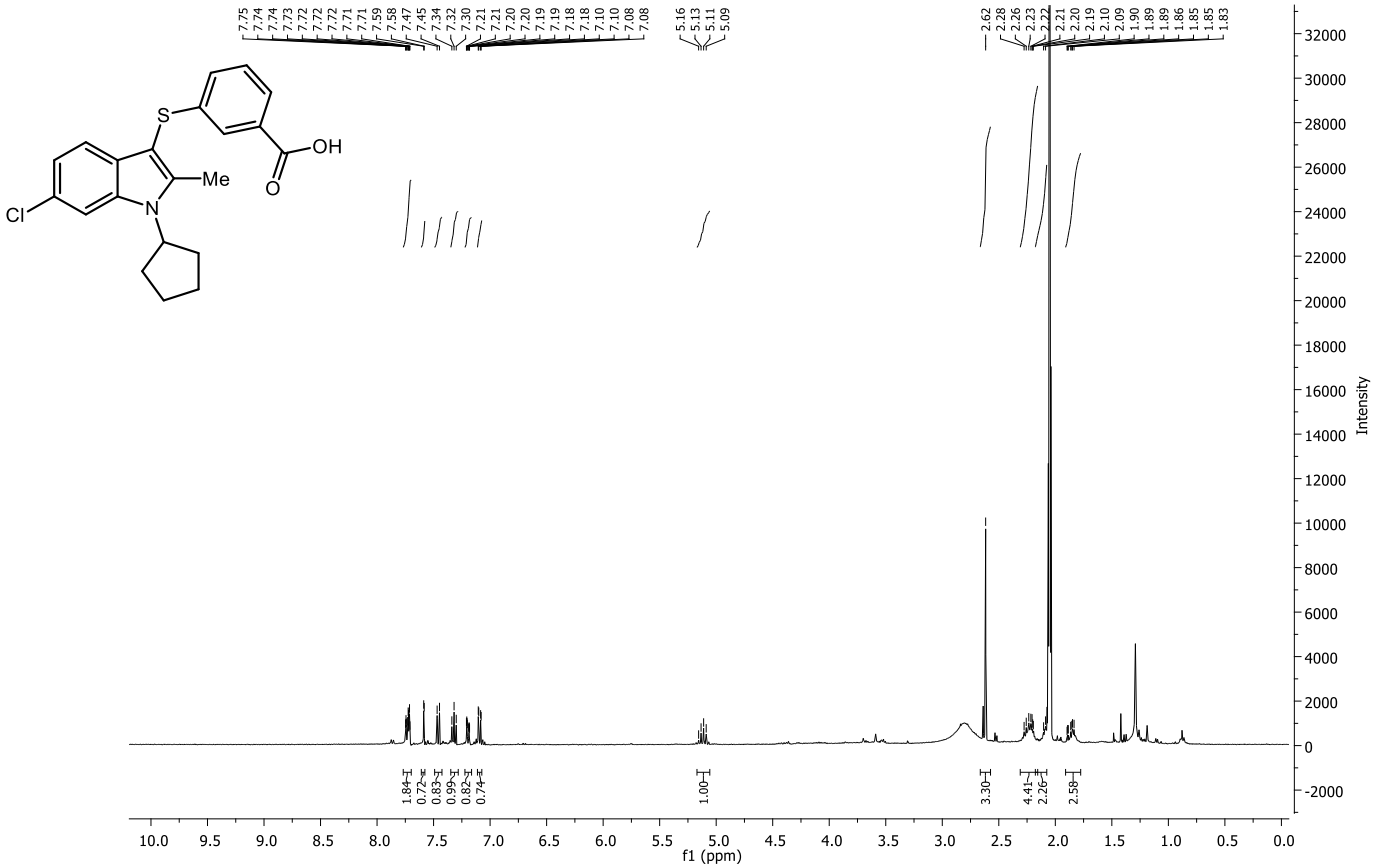


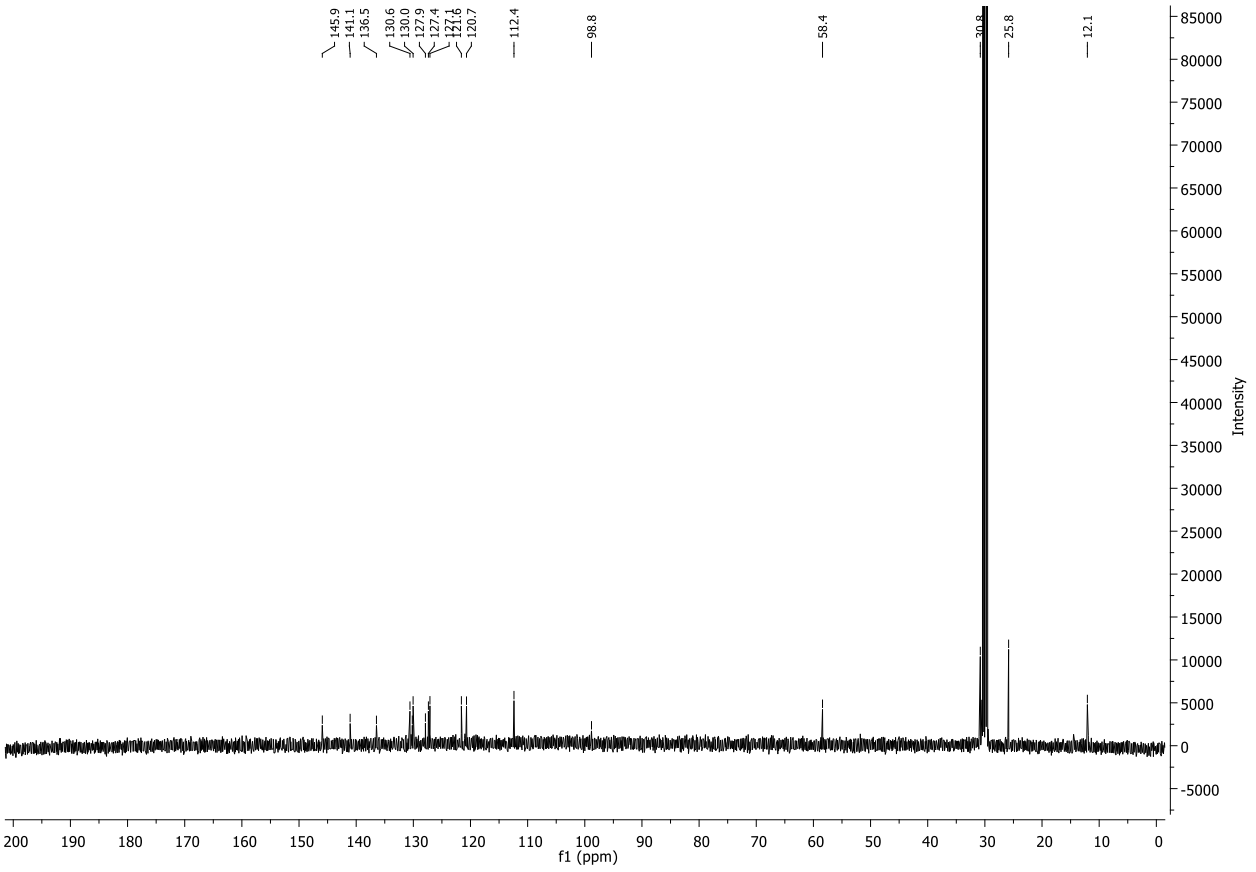


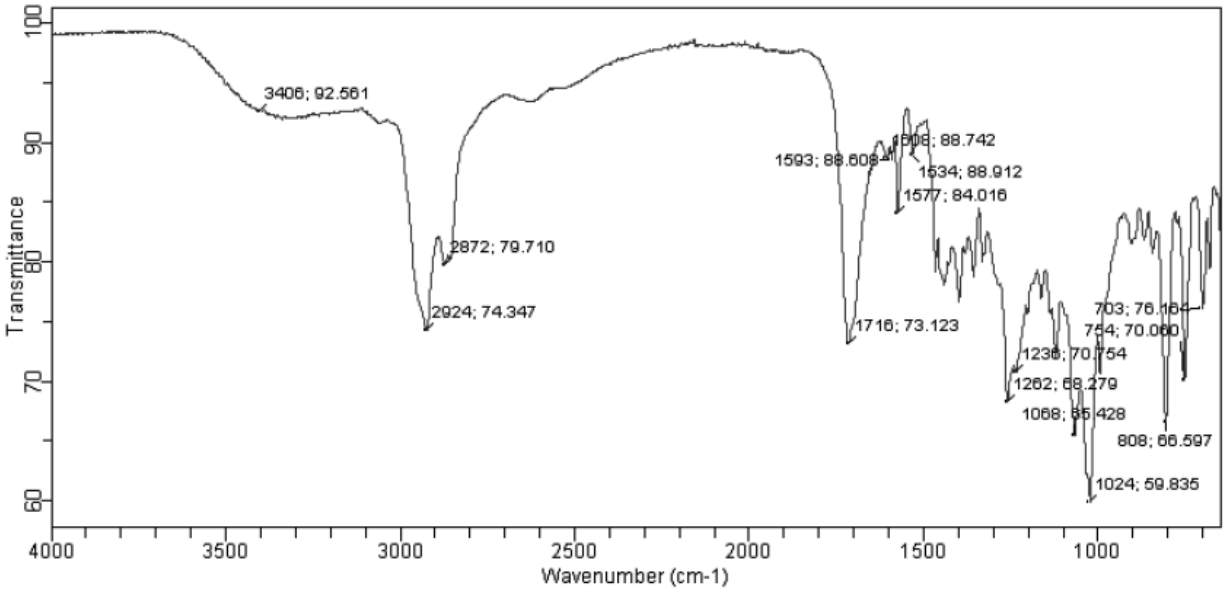

3436; 87.393
2661; 87.444
2543; 87.945
1574; 72.509
1651; 64.841
1679; 47.085
Transmittance
Wavenumber (cm-1)

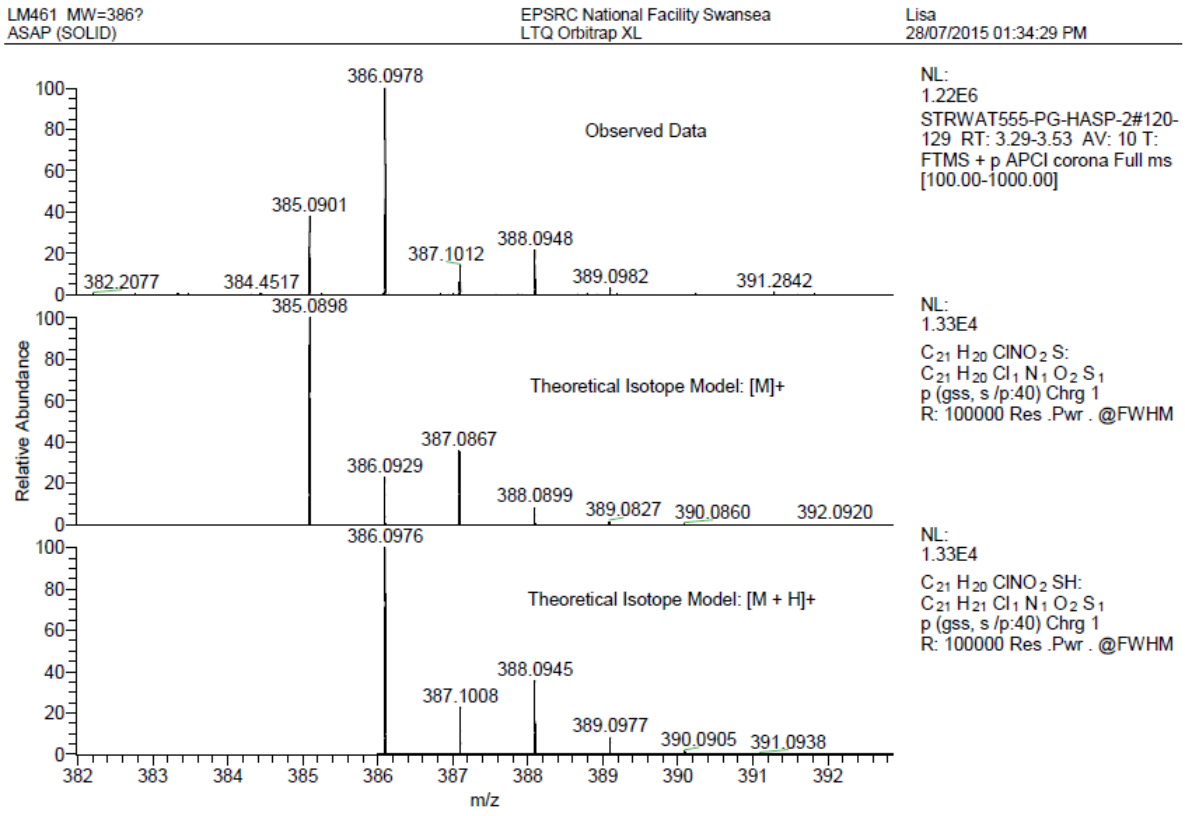

LM360 MW=331?
C17H14ClNO2S
(DCM)/MeOH
EPSRC National Facility Swansea
LTQ Orbitrap XL
Lisa Miller
13/02/2015 11:55:59
330.0358
Observed Data
332.0324
331.0390
333.0357
NL:
1.93E7
STRWAT423-OE-HNESN#1-10 RT: 0.01-0.25 AV: 10 T: FTMS - p NSI Full ms [120.00-2000.00]
330.0361
Theoretical Isotope Model: [M - H]-
332.0330
331.0392
333.0361
334.0290
335.0324
NL:
1.39E4
C17 H13 ClNO2 S:
C17 H13 Cl1 N1 O2 S1
p (gss, s /p:40) Chrg -1
R: 100000 Res .Pwr . @FWHM
Relative Abundance
m/z

3-((6-Chloro-1-cyclopentyl-2-methyl-1*H*-indol-3-yl)thio)benzoic acid (1.54).

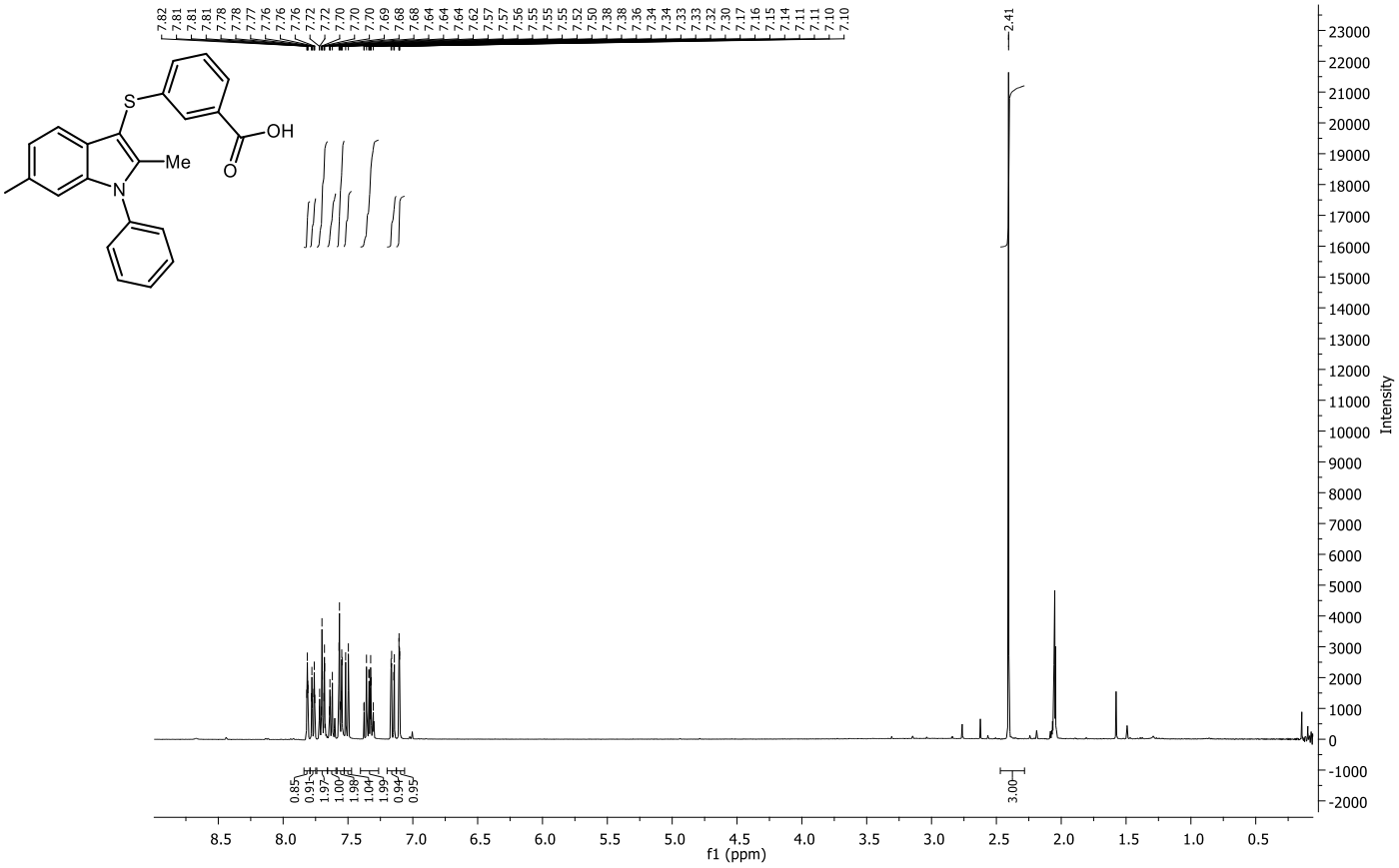


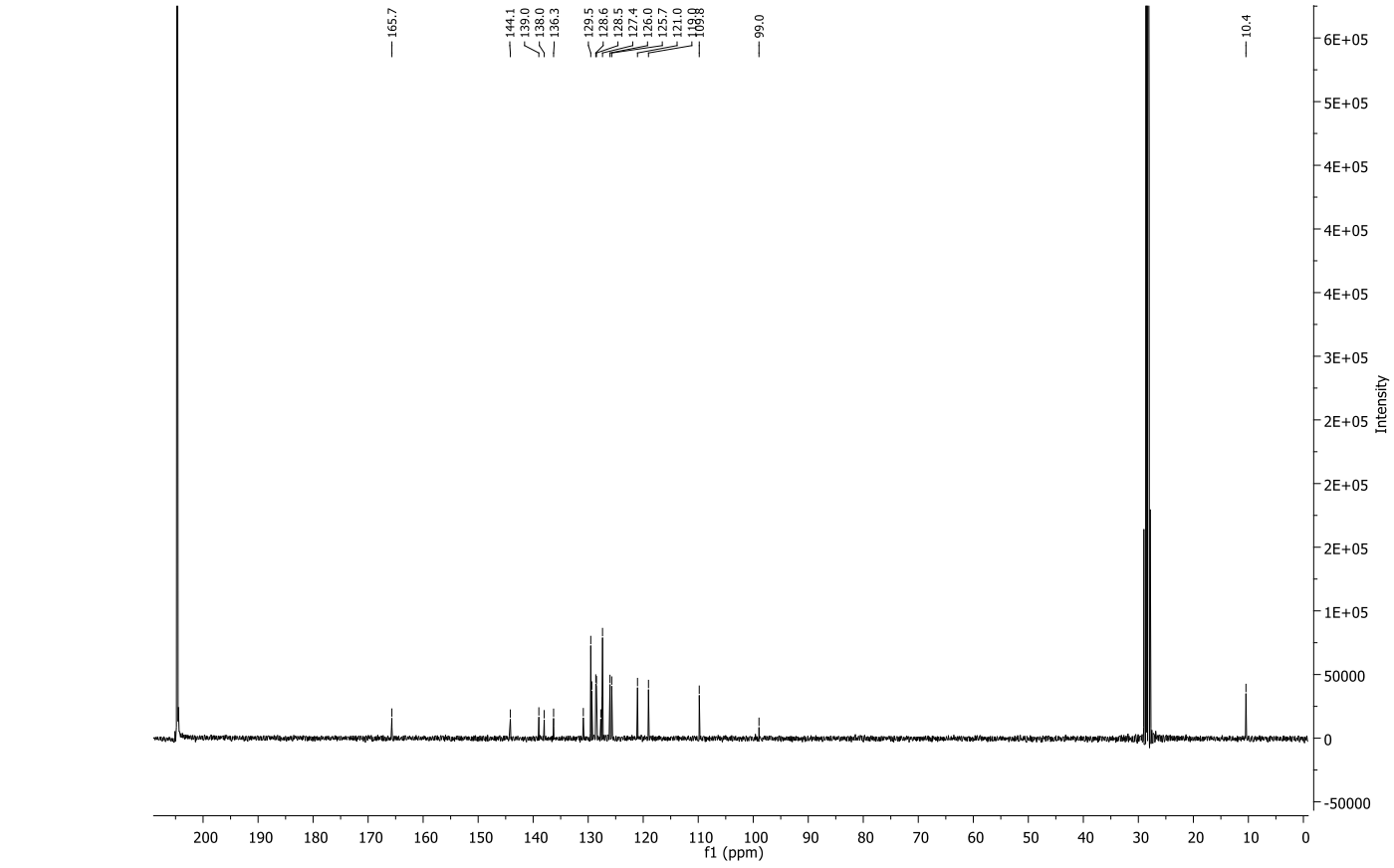


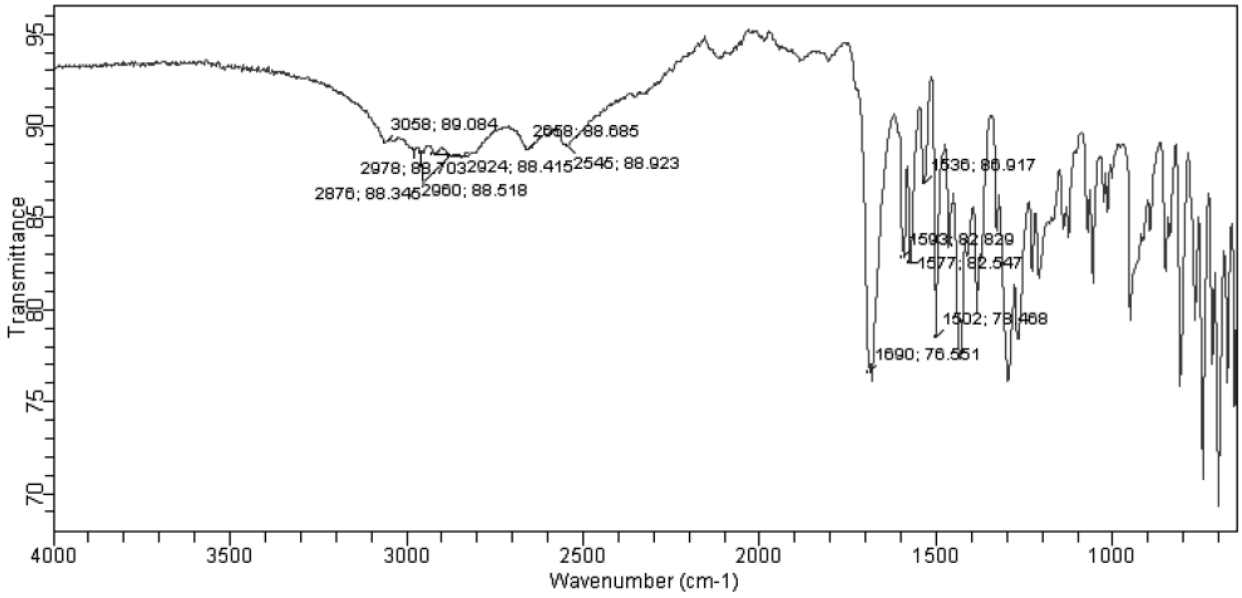

Transmittance
Wavenumber (cm-1)
3406; 92.561
2872; 79.710
2924; 74.347
1593; 88.608
1534; 88.912
1577; 84.016
1716; 73.123
1236; 70.754
1262; 68.279
1068; 65.428
1024; 59.835
808; 66.597
754; 70.060
703; 76.164


LM461 MW=386?
ASAP (SOLID)
EPSRC National Facility Swansea
LTQ Orbitrap XL
Lisa
28/07/2015 01:34:29 PM
Observed Data
Theoretical Isotope Model: [M]+
Theoretical Isotope Model: [M + H]+
Relative Abundance
m/z
NL:
1.22E6
STRWAT555-PG-HASP-2#120-129 RT: 3.29-3.53 AV: 10 T: FTMS + p APCI corona Full ms [100.00-1000.00]
NL:
1.33E4
C21 H20 ClNO2 S:
C21 H20 Cl1 N1 O2 S1
p (gss, s /p:40) Chrg 1
R: 100000 Res .Pwr . @FWHM
NL:
1.33E4
C21 H20 ClNO2 SH:
C21 H21 Cl1 N1 O2 S1
p (gss, s /p:40) Chrg 1
R: 100000 Res .Pwr . @FWHM

3-((6-Chloro-2-methyl-1-phenyl-1*H*-indol-3-yl)thio)benzoic acid (1.55).



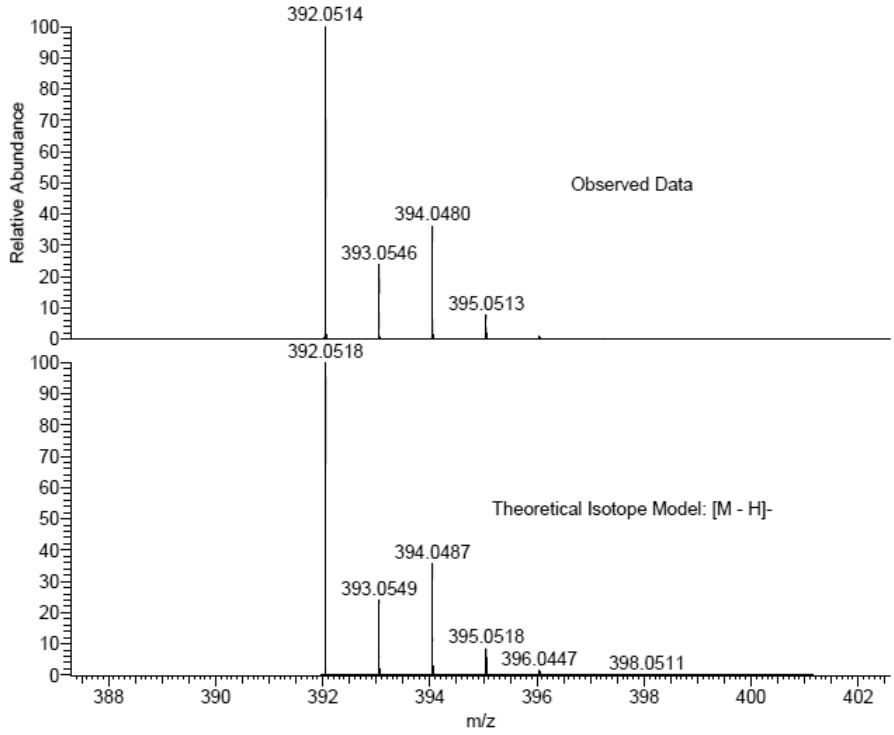




LM350 MW=393?
C22H16ClNO2S
(DCM)/MeOH

EPSRC National Facility Swansea
LTQ Orbitrap XL

Lisa Miller
20/01/2015 14:50:52



NL:
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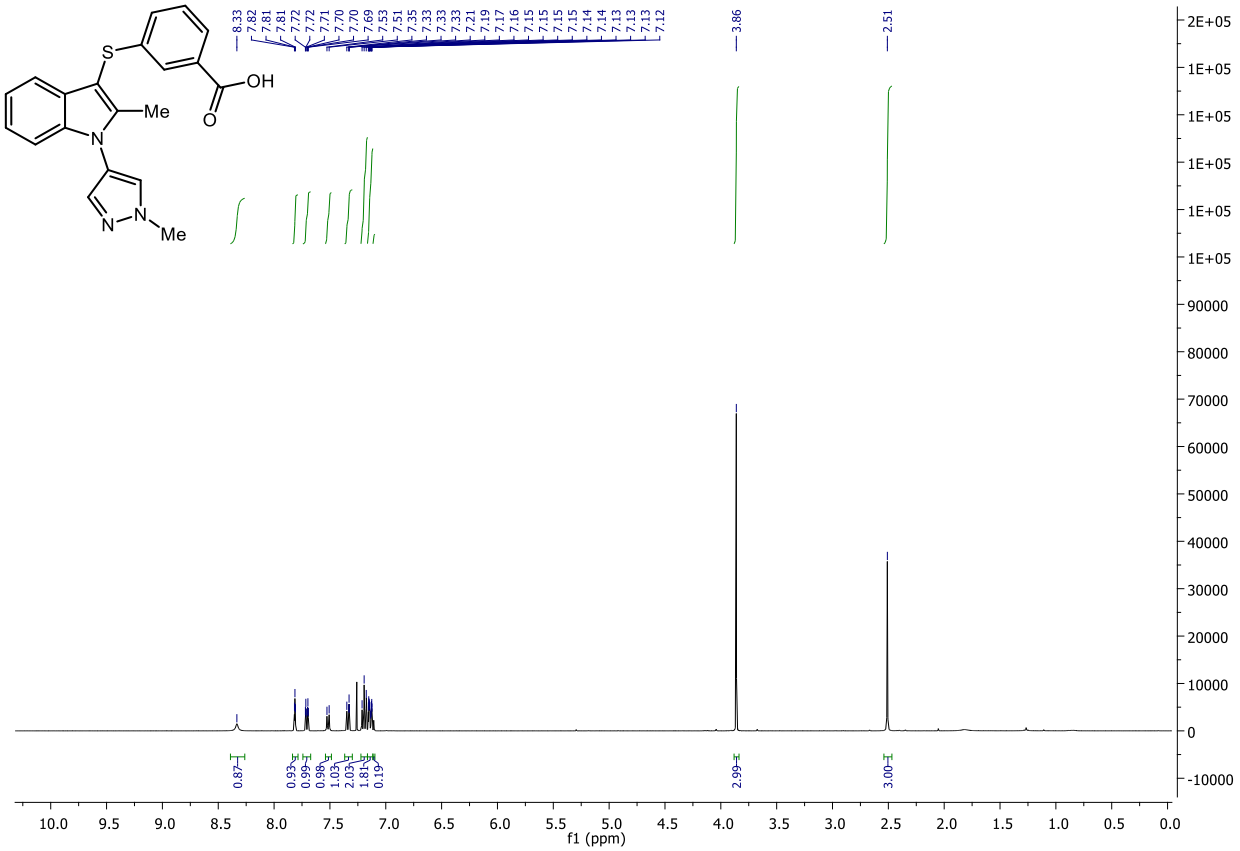
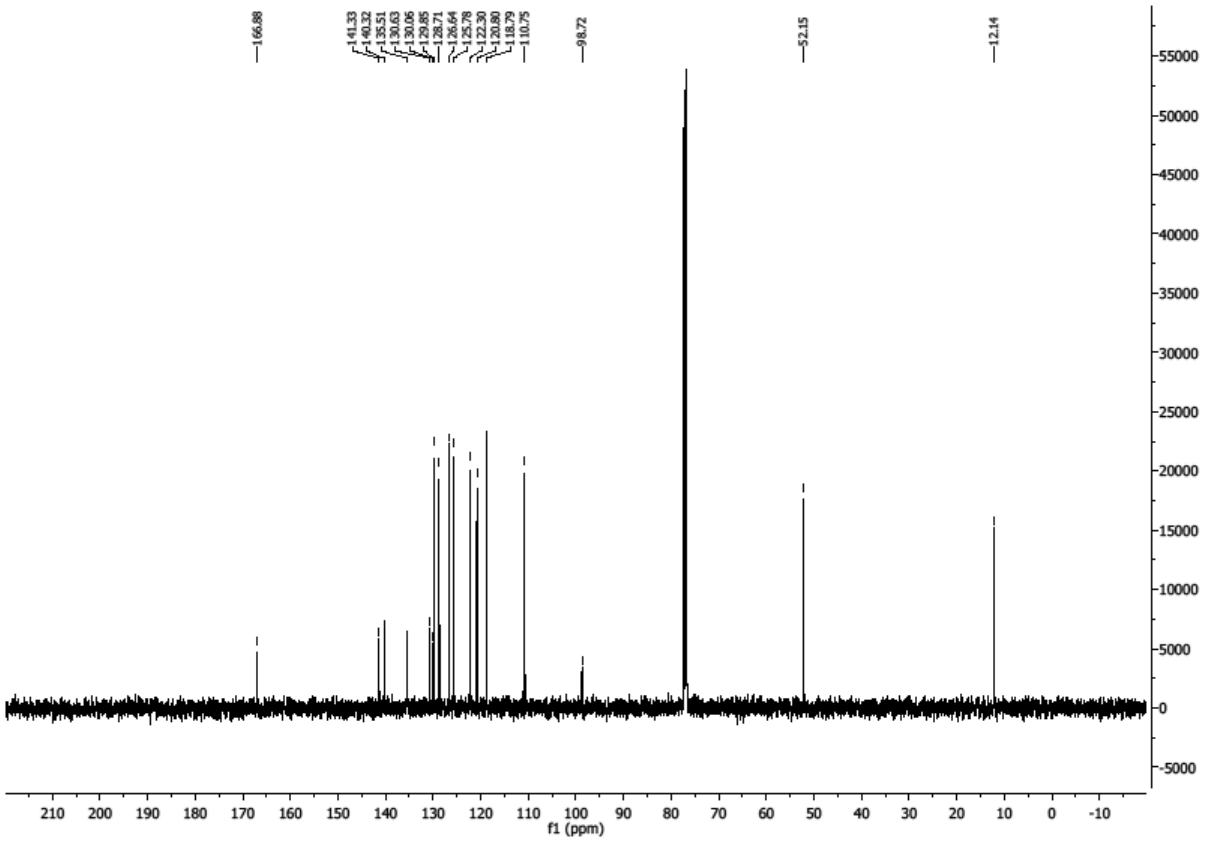
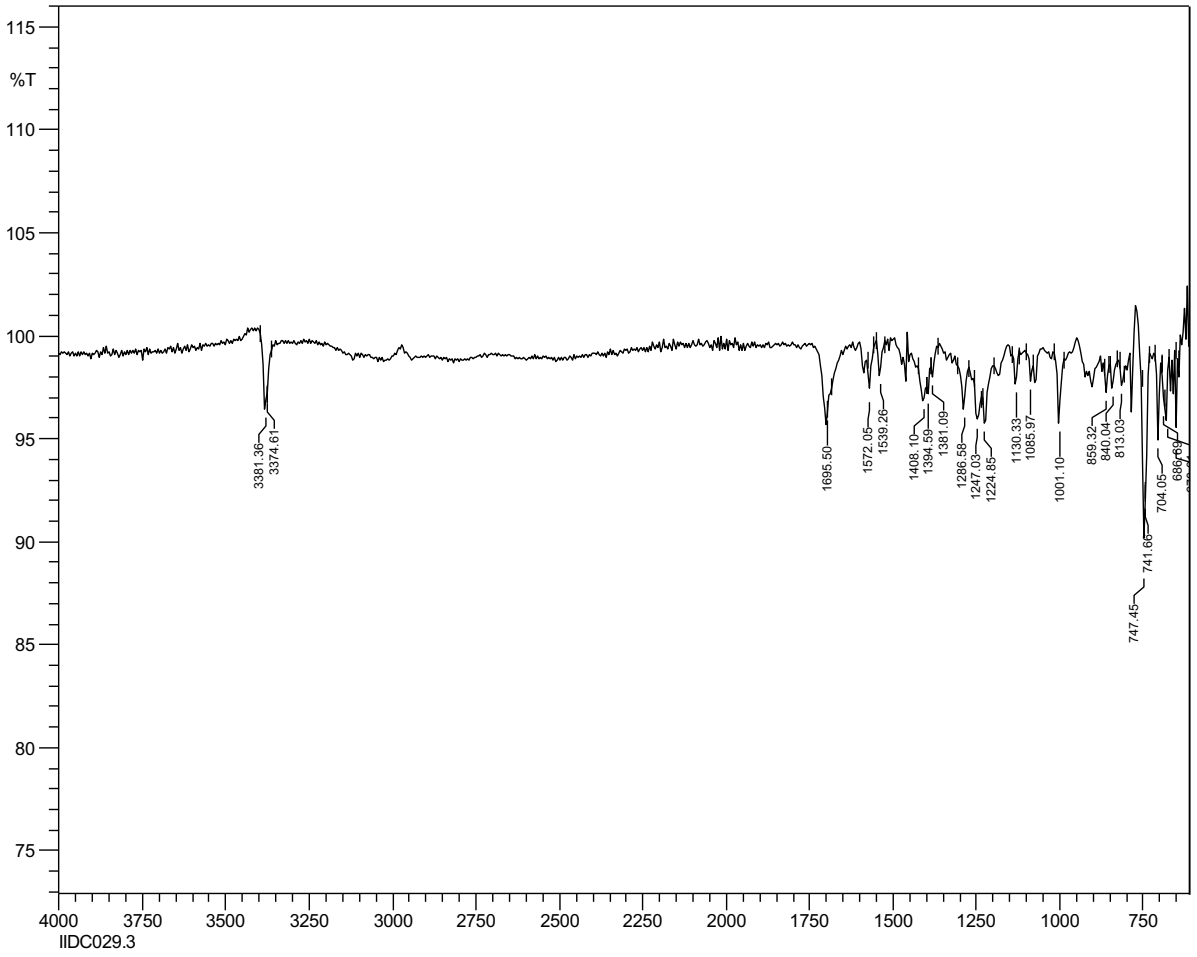
NL:
1.32E4
$C_{22}H_{15}ClNO_2S$:
$C_{22}H_{15}Cl_1N_1O_2S_1$
p (gss, s /p:40) Chrg -1
R: 100000 Res .Pwr . @FWHM

3-((2-Methyl-1-(1-methyl-1*H*-pyrazol-4-yl)-1*H*-indol-3-yl)thio)benzoic acid (1.56).



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1572.05
1539.26
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1394.59
1381.09
1286.58
1247.03
1224.85
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1001.10
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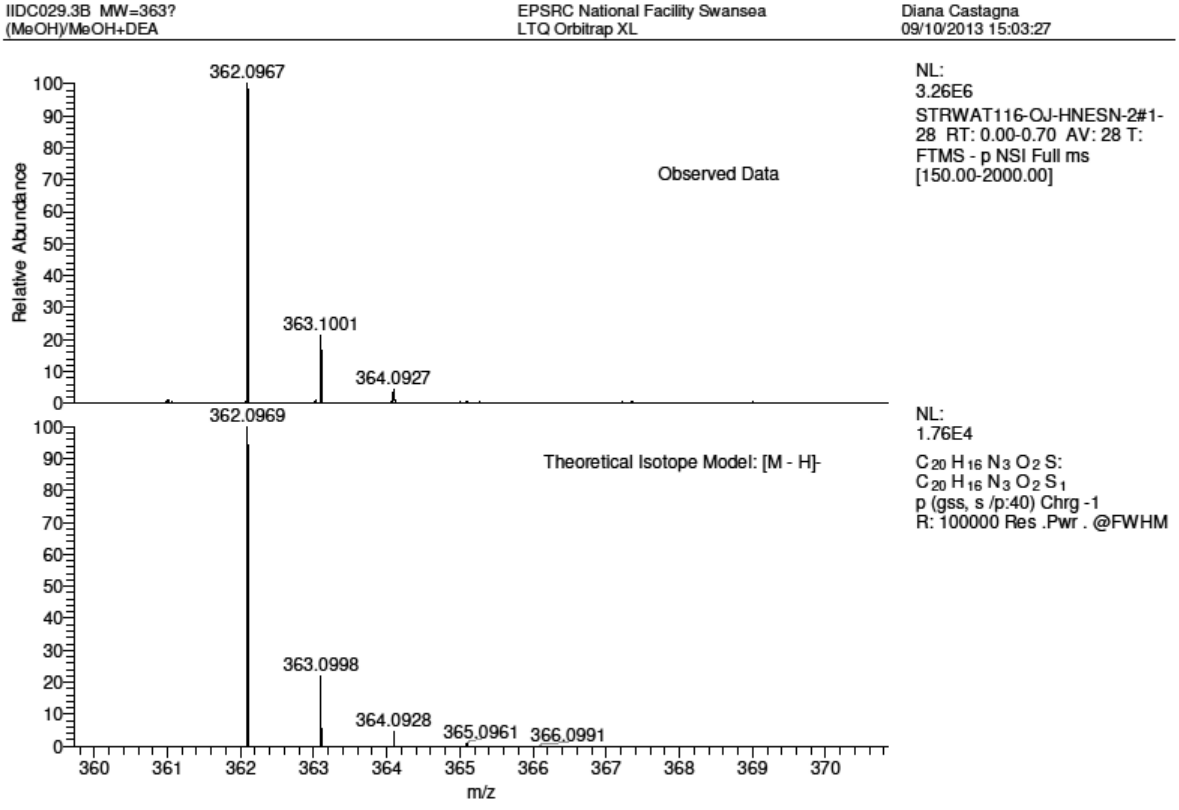
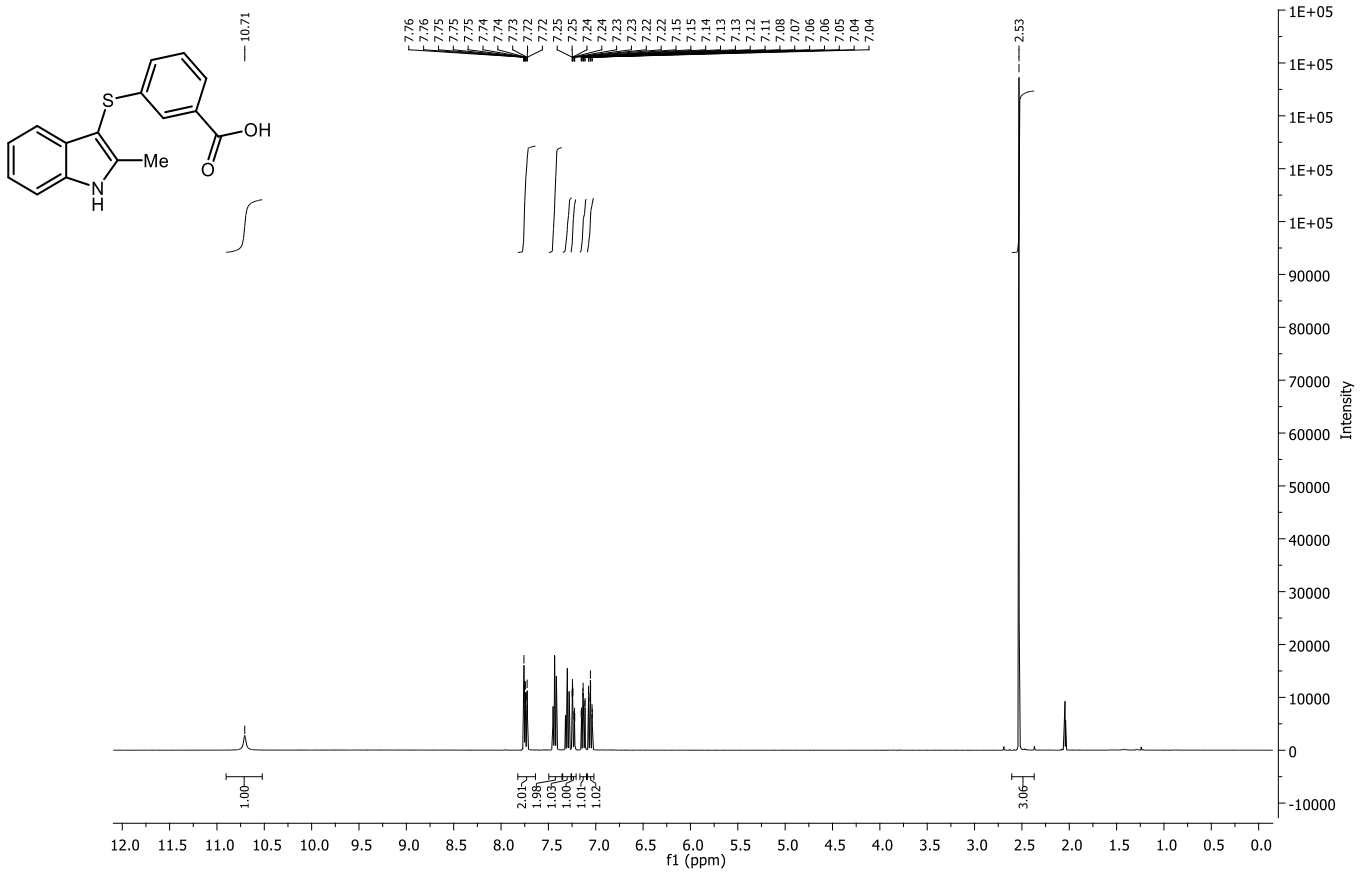
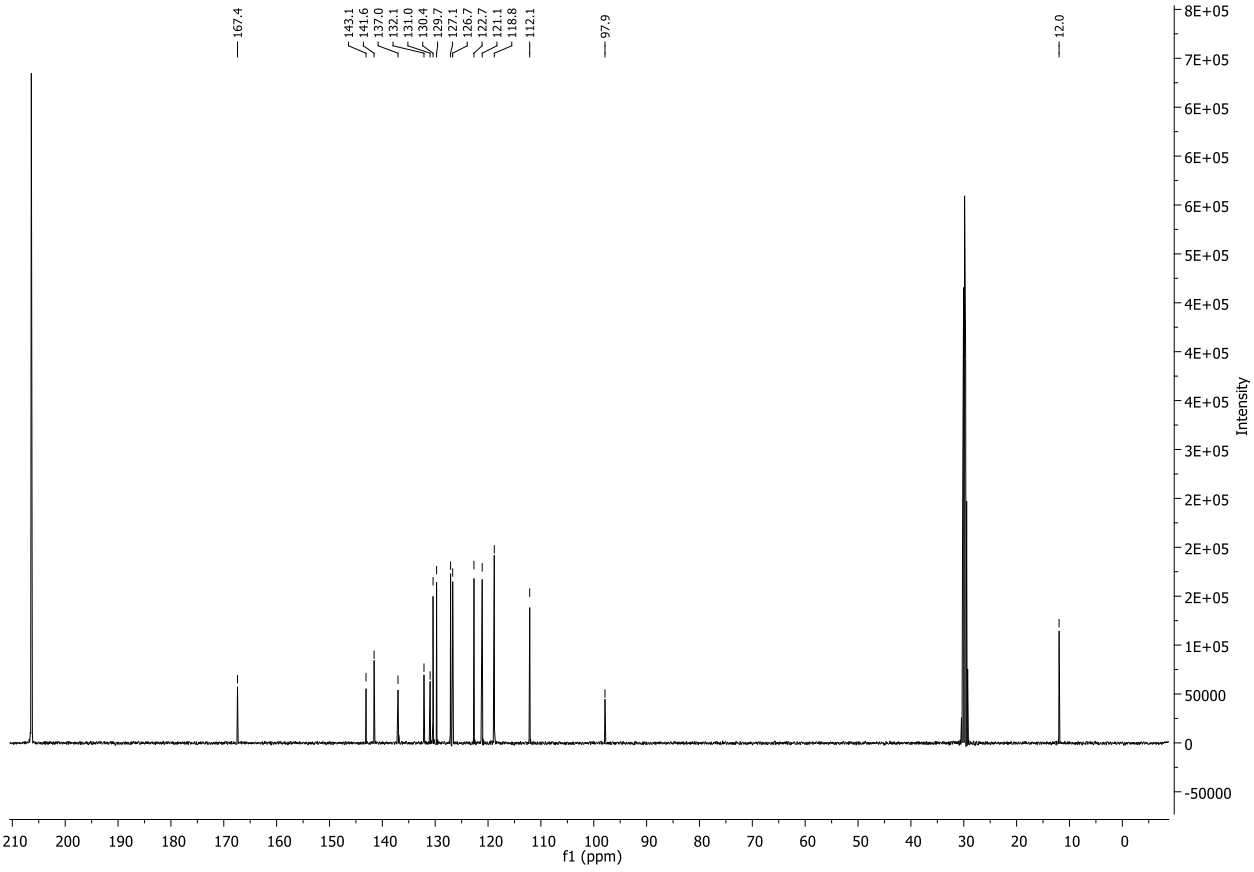
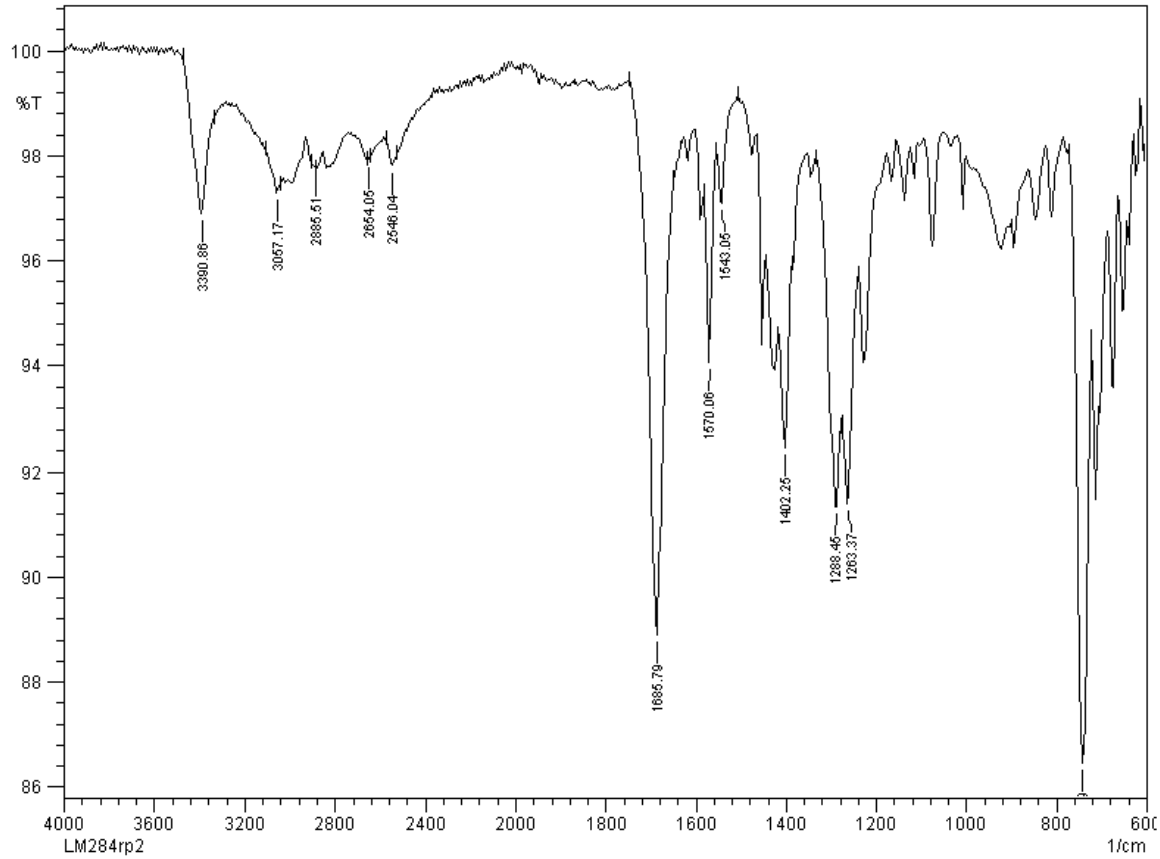
813.03
747.45
741.66
704.05
IIDC029.3


IIDC029.3B MW=363?
(MeOH)/MeOH+DEA
EPSRC National Facility Swansea
LTQ Orbitrap XL
Diana Castagna
09/10/2013 15:03:27
362.0967
363.1001
364.0927
Observed Data
NL:
3.26E6
STRWAT116-OJ-HNESN-2#1-28 RT: 0.00-0.70 AV: 28 T: FTMS - p NSI Full ms [150.00-2000.00]
362.0969
363.0998
364.0928
365.0961
366.0991
Theoretical Isotope Model: [M - H]-
NL:
1.76E4
C20 H16 N3 O2 S:
C20 H16 N3 O2 S1
p (gss, s /p:40) Chrg -1
R: 100000 Res .Pwr . @FWHM
Relative Abundance
m/z

3-((2-Methyl-1*H*-indol-3-yl)thio)benzoic acid (1.57).






100
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2885.51
2654.05
2546.04
1685.79
1570.06
1543.05
1402.25
1288.45
1263.37
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3200
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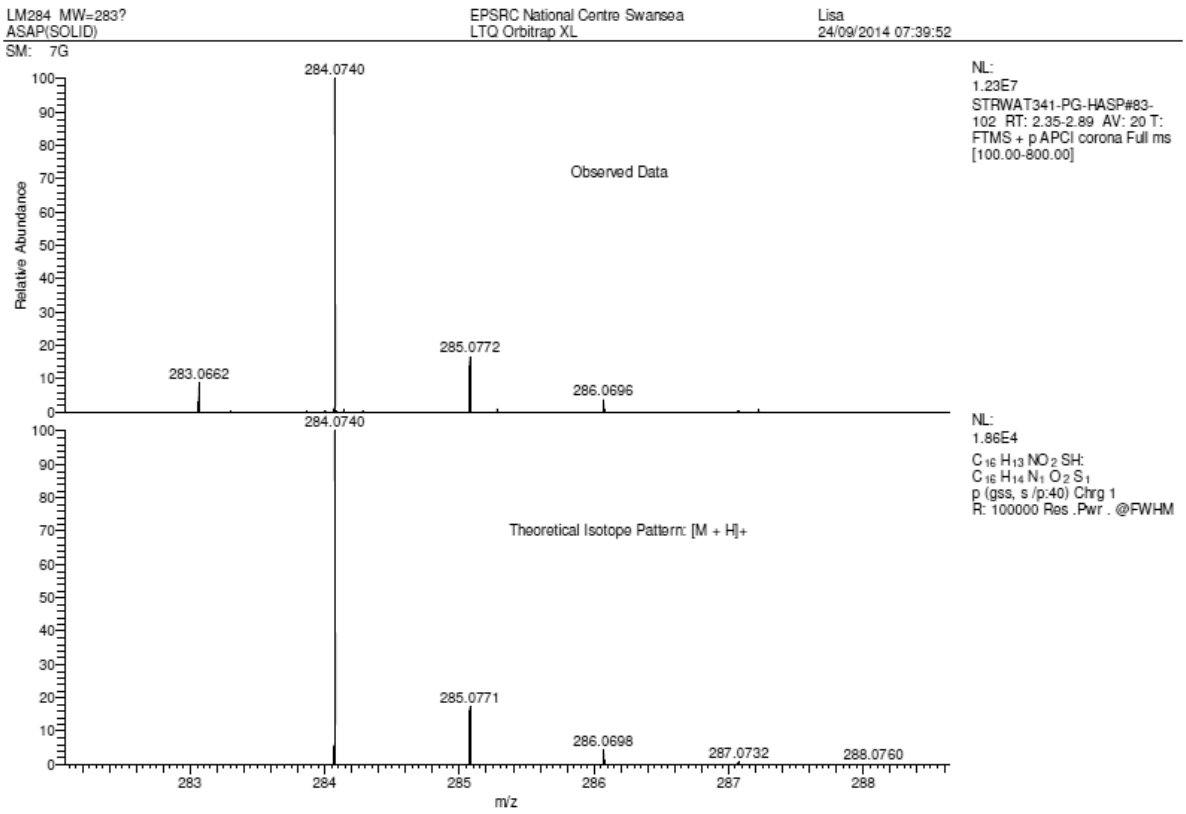
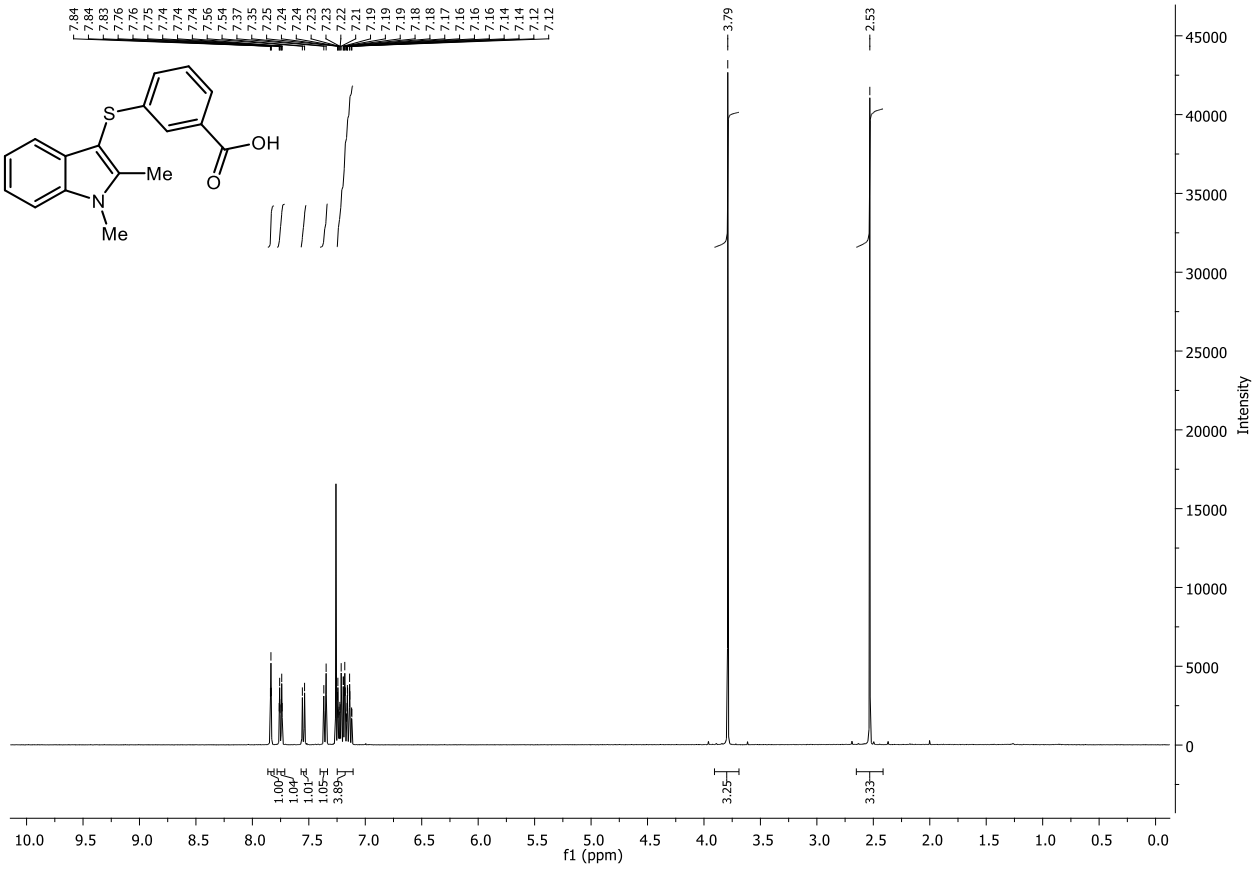
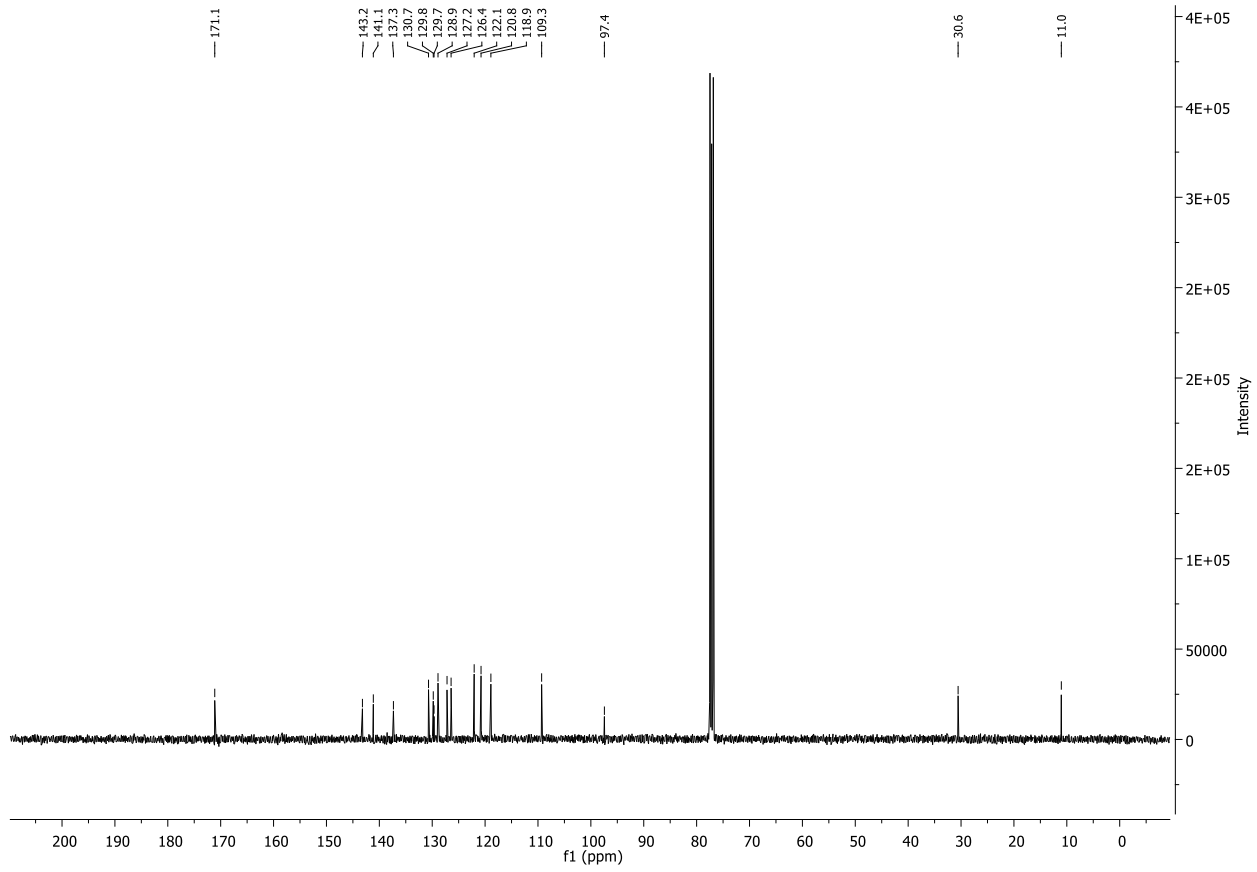
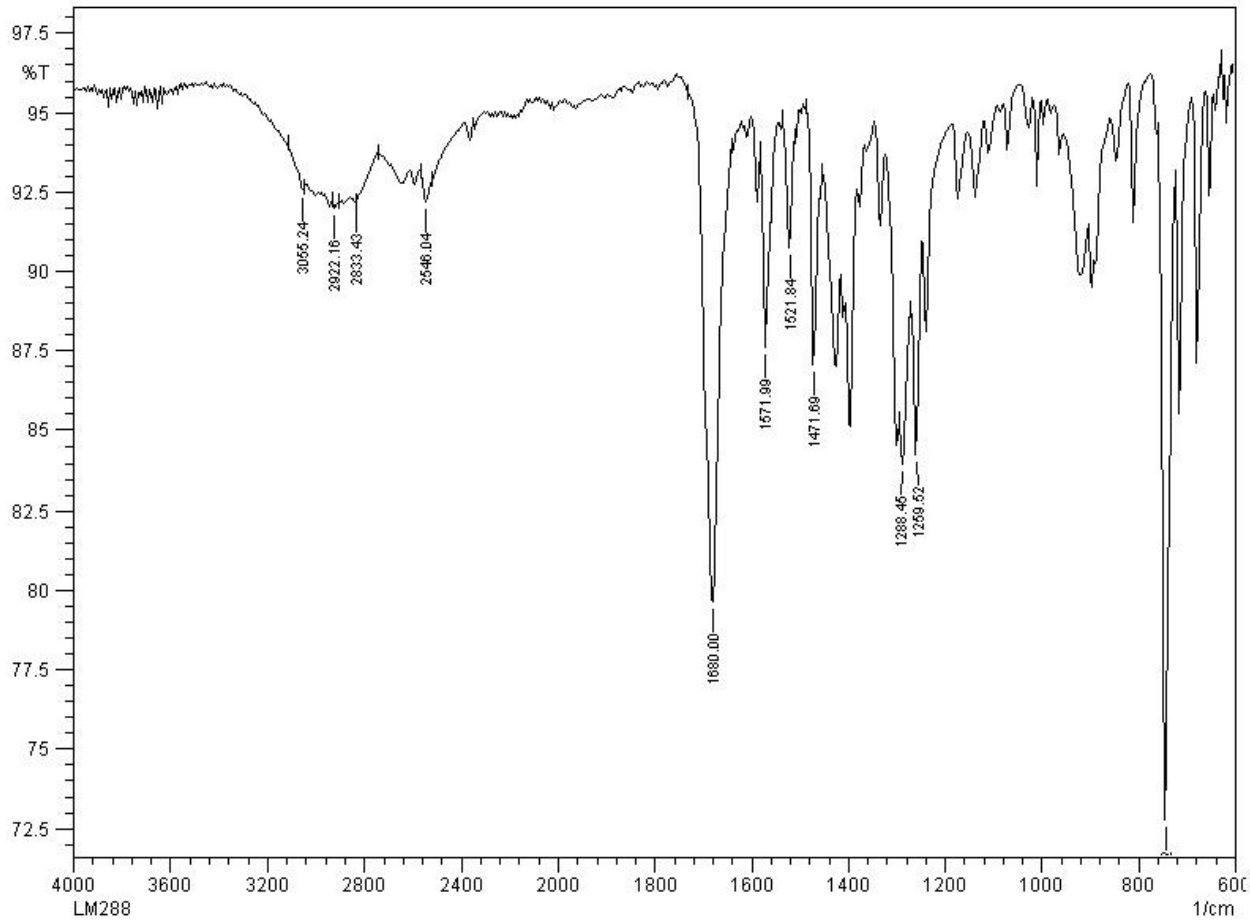
1400
1200
1000
800
LM284rp2
1/cm


LM284 MW=283?
ASAP(SOLID)
SM: 7G
EPSRC National Centre Swansea
LTQ Orbitrap XL
Lisa
24/09/2014 07:39:52
Relative Abundance
284.0740
285.0772
283.0662
286.0696
Observed Data
NL:
1.23E7
STRWAT341-PG-HASP#83-102 RT: 2.35-2.89 AV: 20 T: FTMS + p APCI corona Full ms [100.00-800.00]
284.0740
285.0771
286.0698
287.0732
288.0760
Theoretical Isotope Pattern: [M + H]+
NL:
1.86E4
C16 H13 NO2 SH:
C16 H14 N1 O2 S1
p (gss, s /p:40) Chrg 1
R: 100000 Res .Pwr . @FWHM
283
284
285
286
287
288
m/z

3-((1,2-Dimethyl-1*H*-indol-3-yl)thio)benzoic acid (1.58).



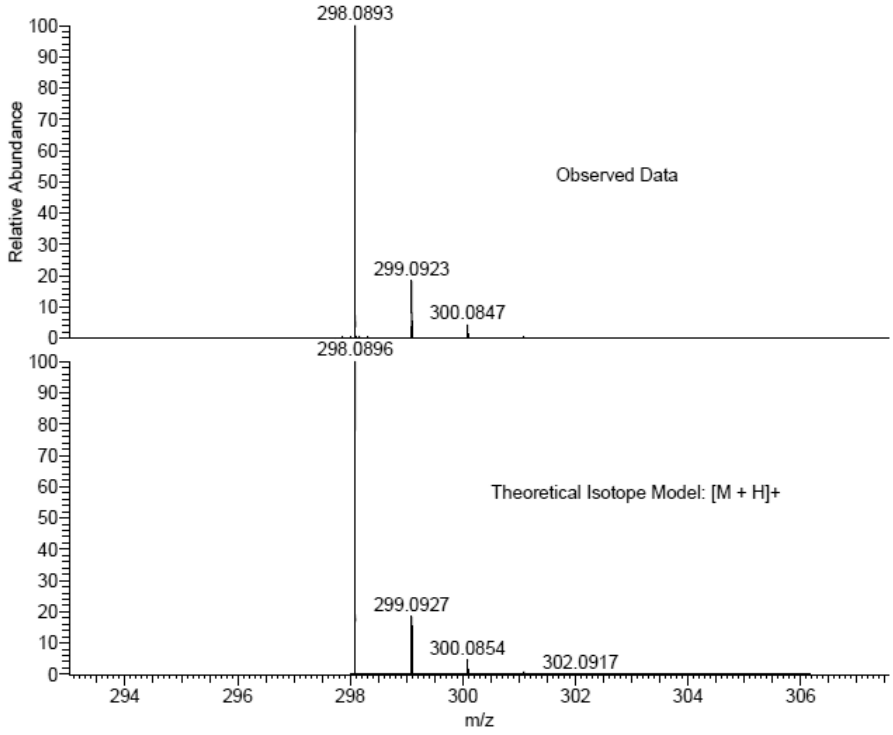




LM288 MW=297?
(MeOH)/MeOH + NH4OAc
C17H15NO2S

EPSRC National Facility Swansea
LTQ Orbitrap XL

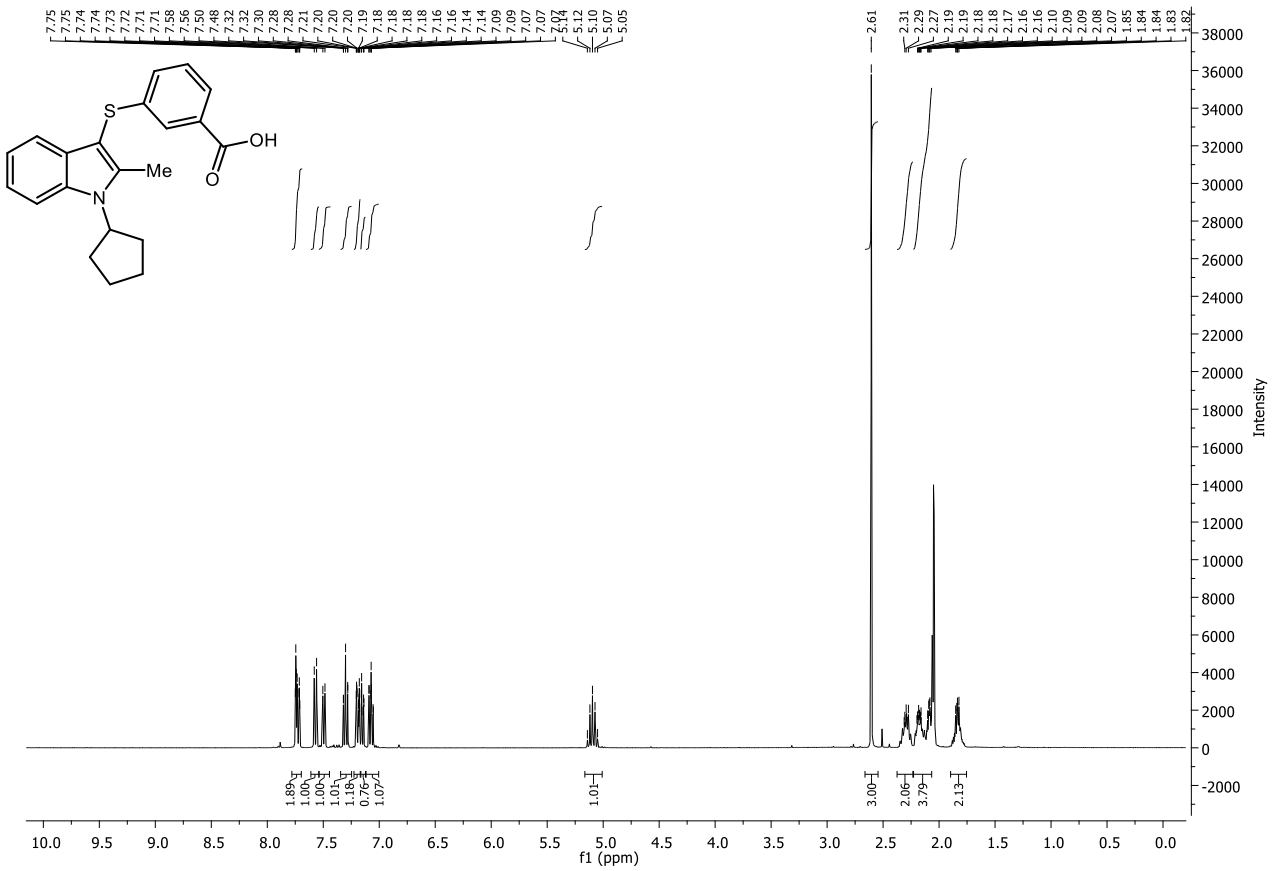
Lisa Miller
14/10/2014 14:21:22

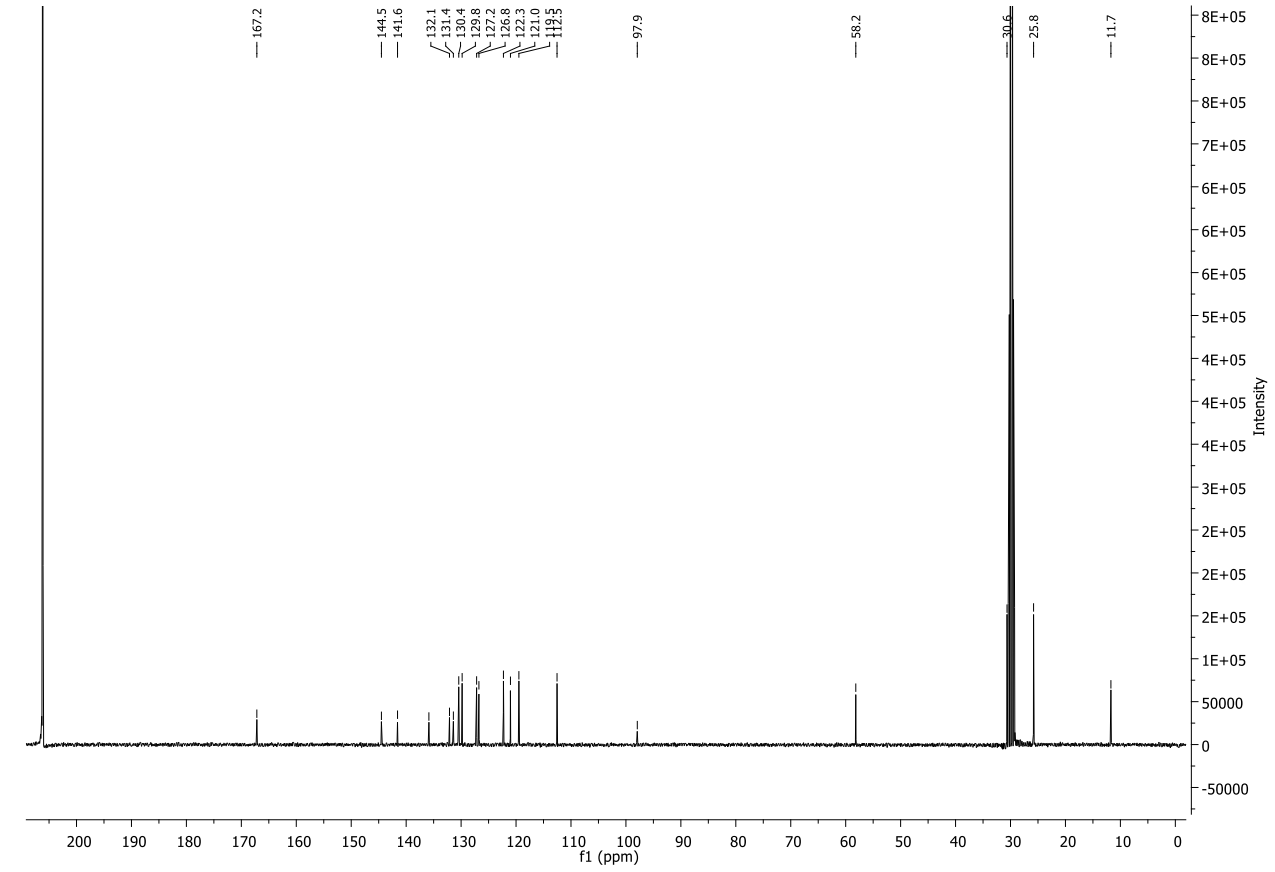


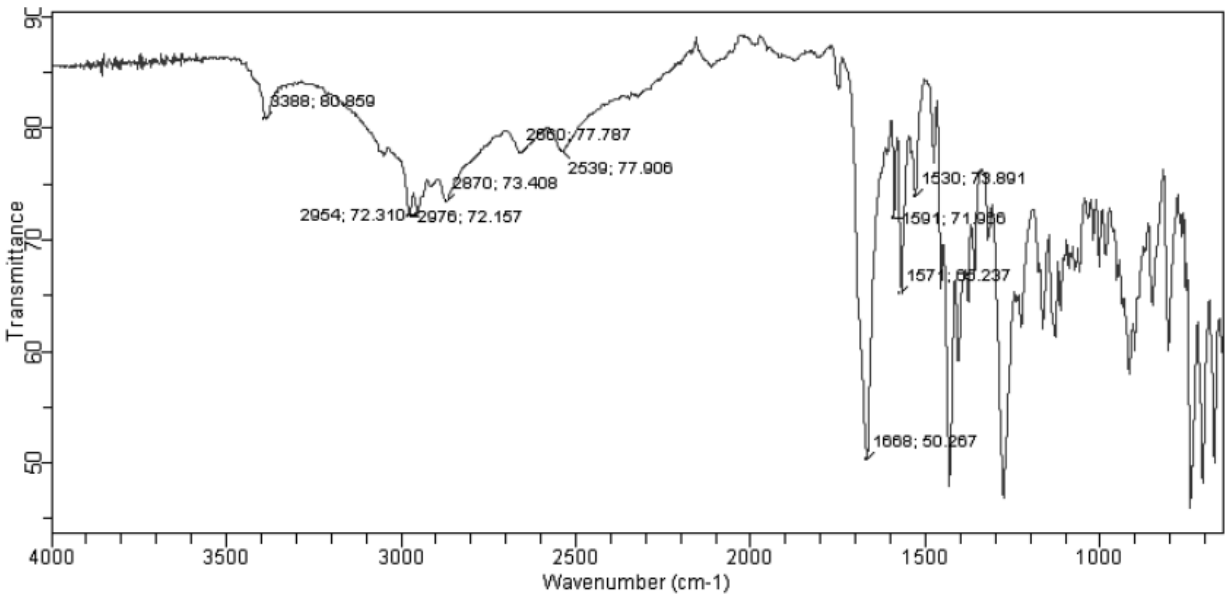
NL:
6.72E6
STRWAT353-OE-HNESP#9-23
RT: 0.16-0.59 AV: 15 T:
FTMS + p NSI Full ms
[120.00-2000.00]

NL:
1.84E4
$C_{17}H_{15}NO_2$ SH:
$C_{17}H_{16}N_1O_2S_1$
p (gss, s /p:40) Chrg 1
R: 100000 Res .Pwr . @FWHM

3-((1-Cyclopentyl-2-methyl-1*H*-indol-3-yl)thio)benzoic acid (1.59).



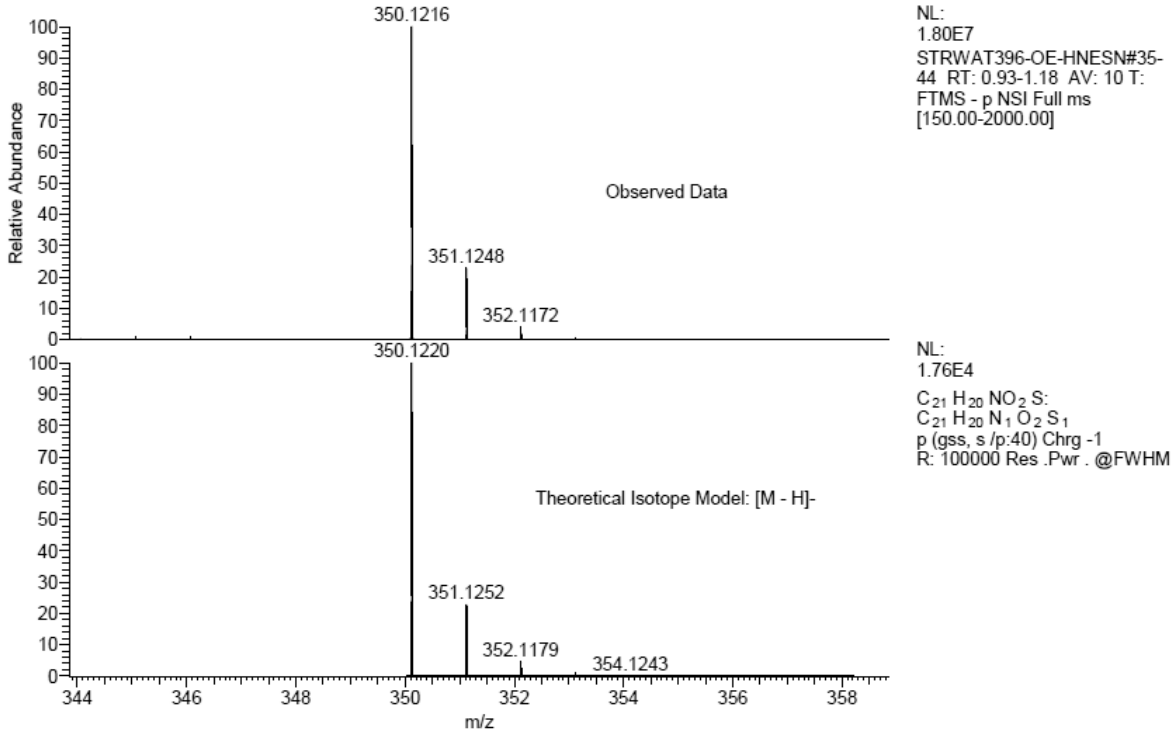




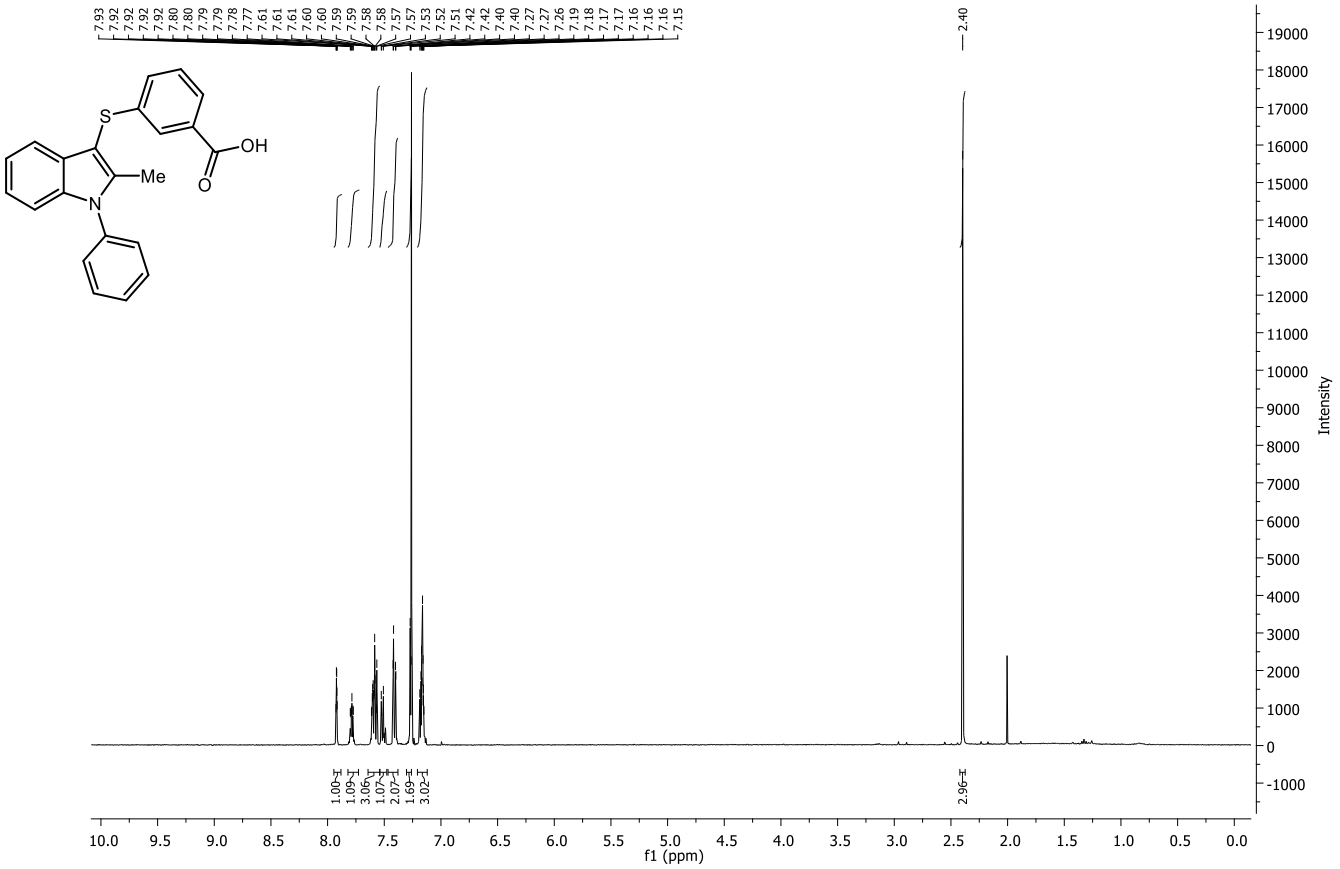
LM344 MW=351?
C21H21NO2S
(DCM)/MeOH

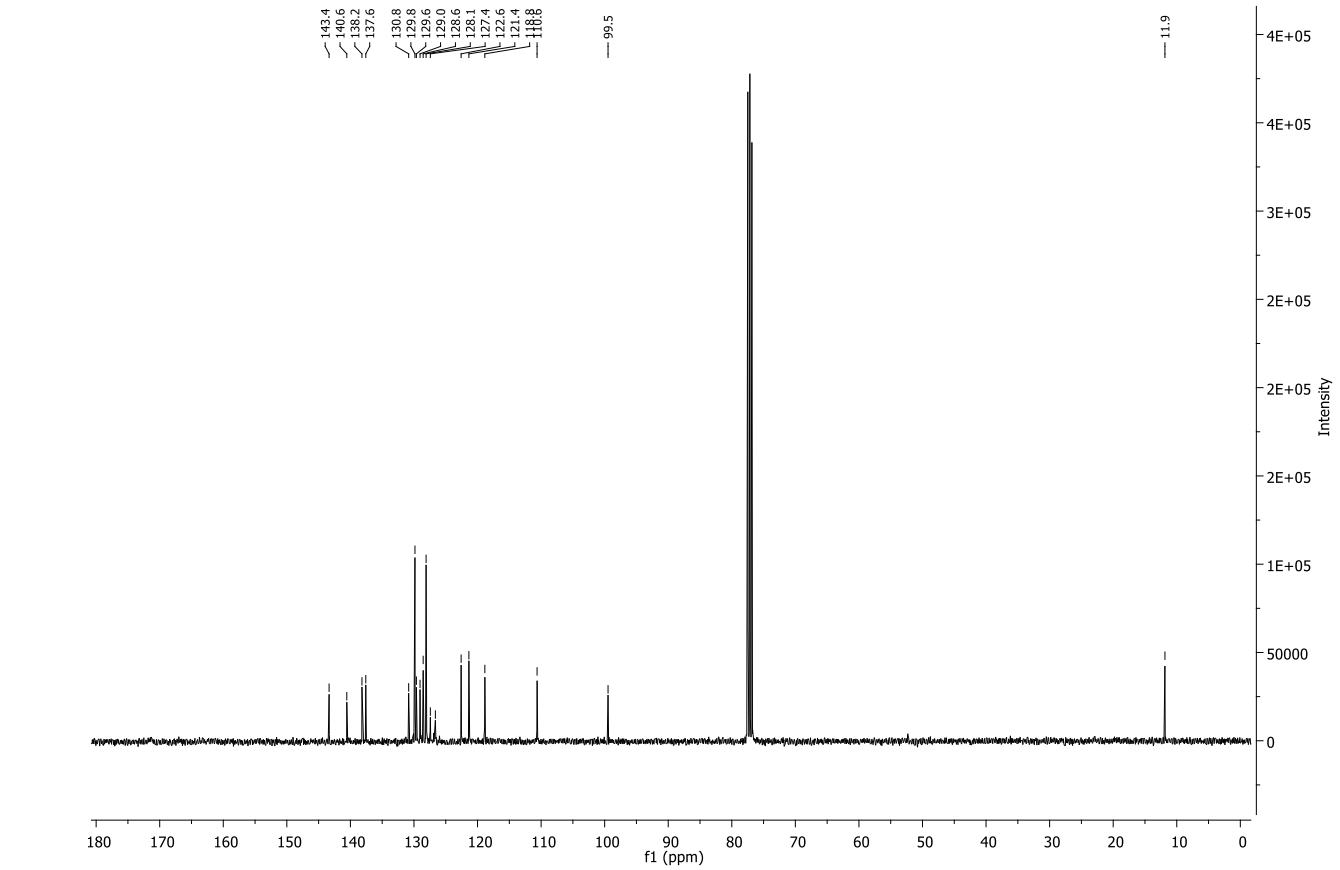
EPSRC National Facility Swansea
LTQ Orbitrap XL

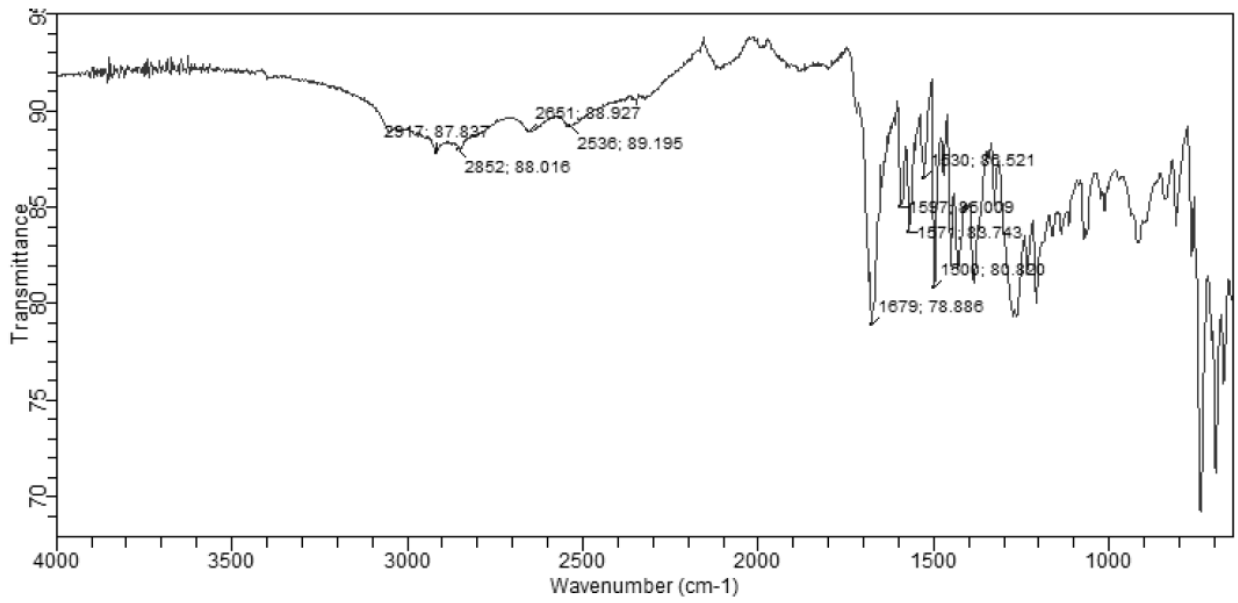
Lisa Miller
20/01/2015 14:56:05

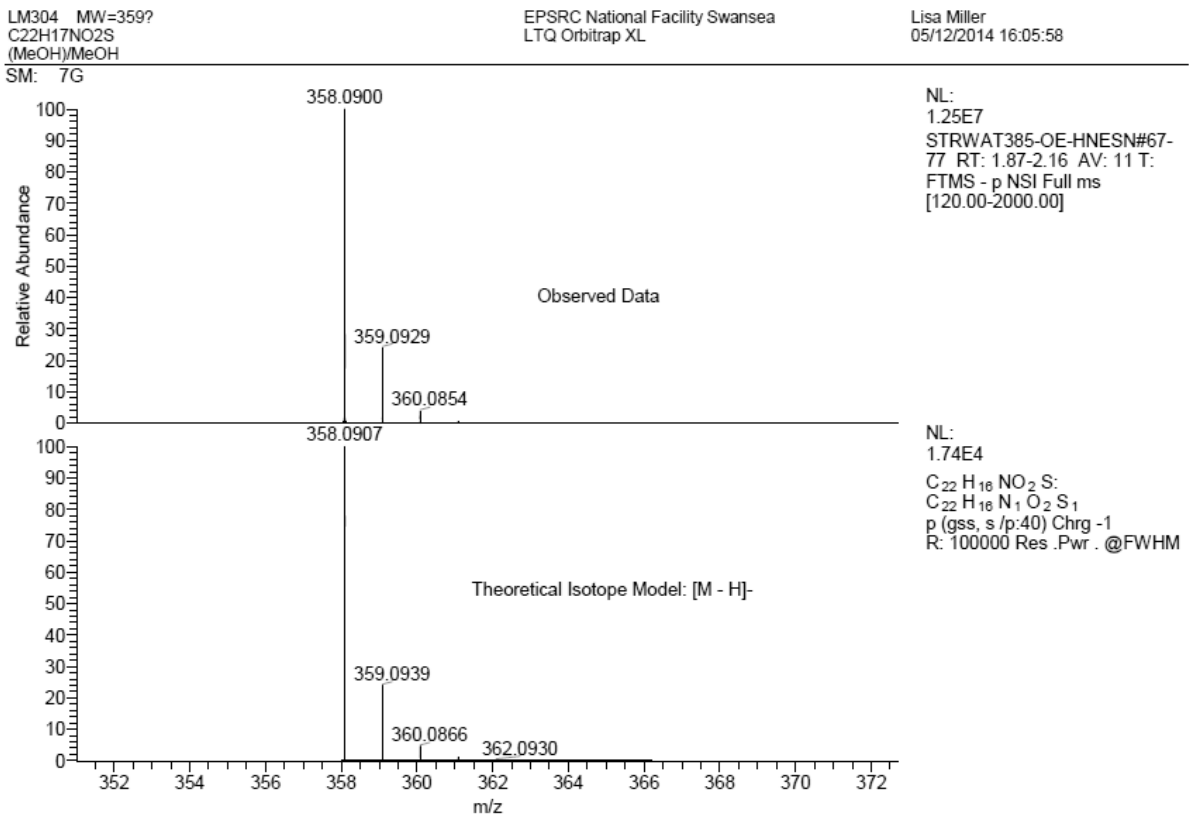


3-((2-Methyl-1-phenyl-1*H*-indol-3-yl)thio)benzoic acid (1.60).

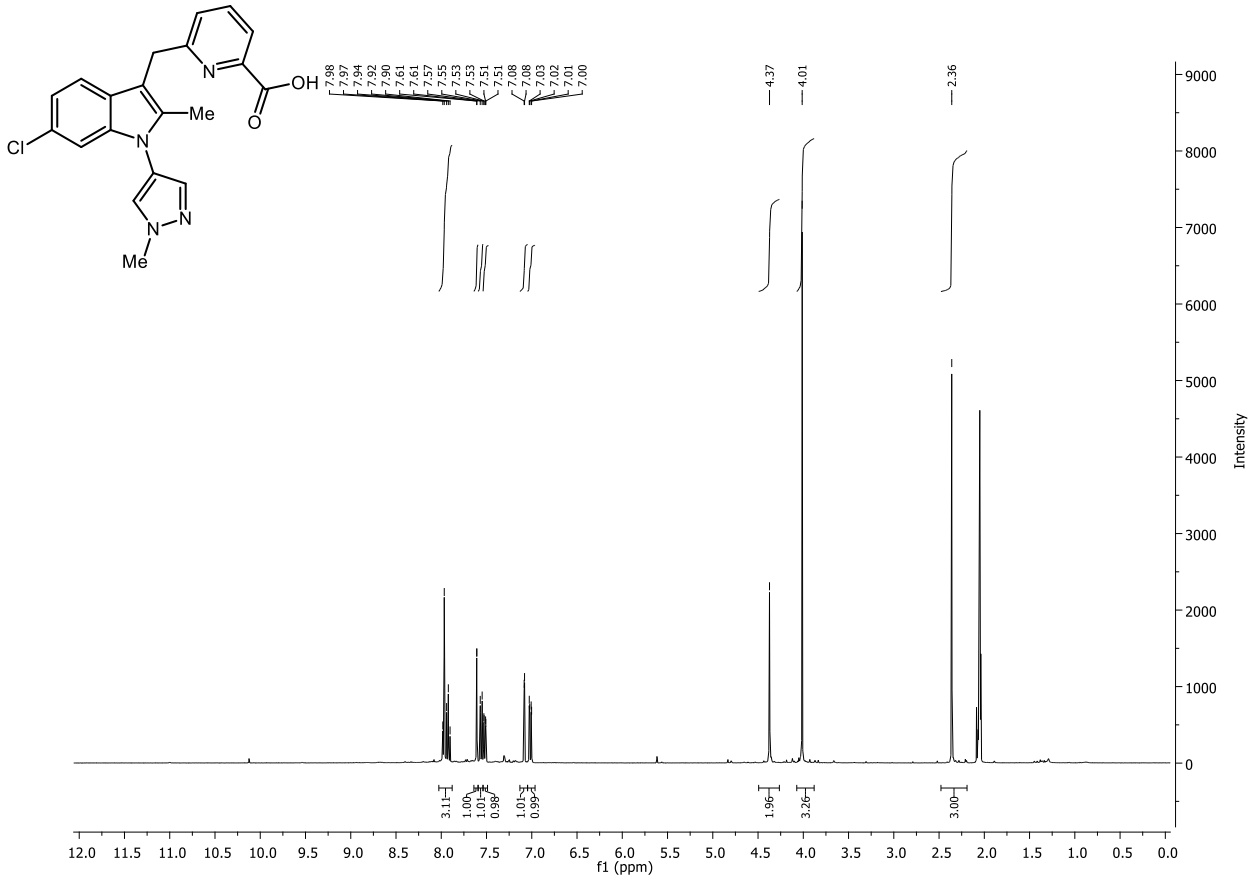


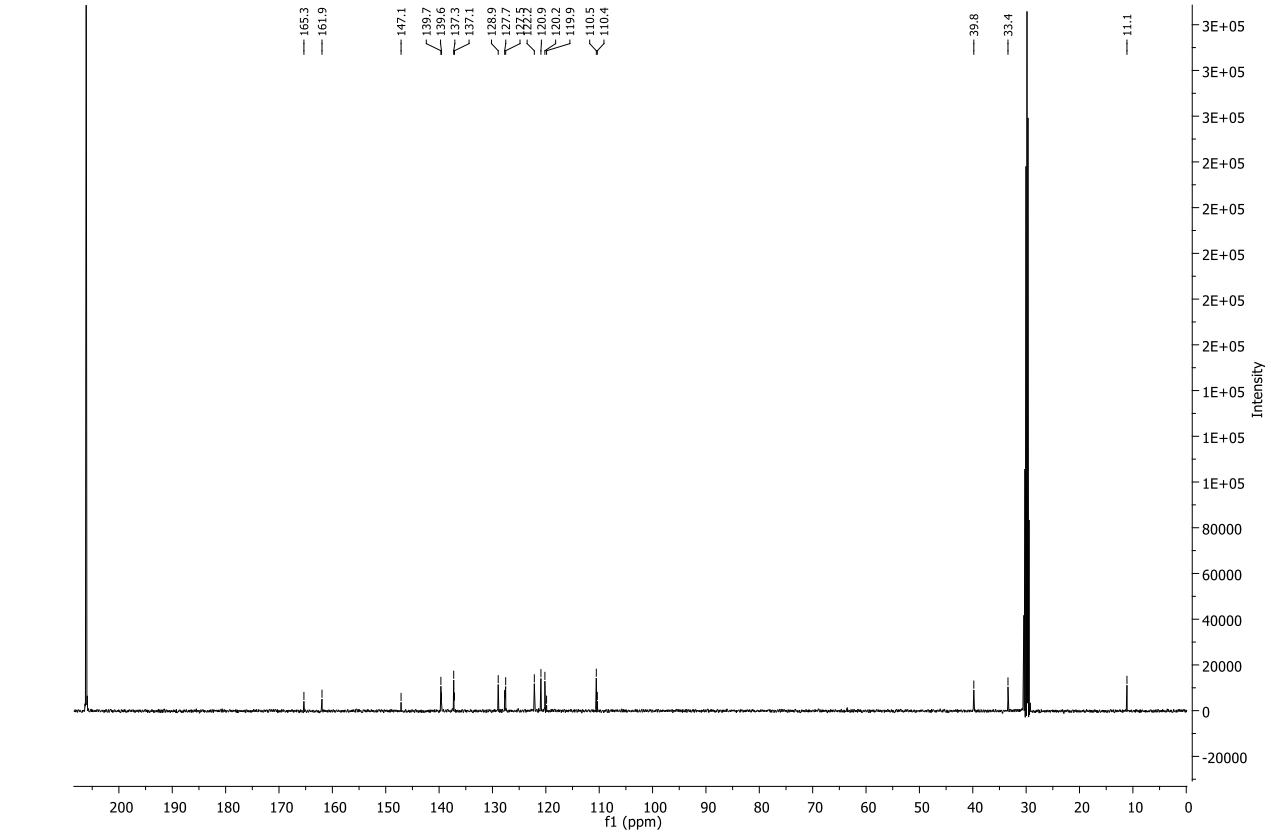


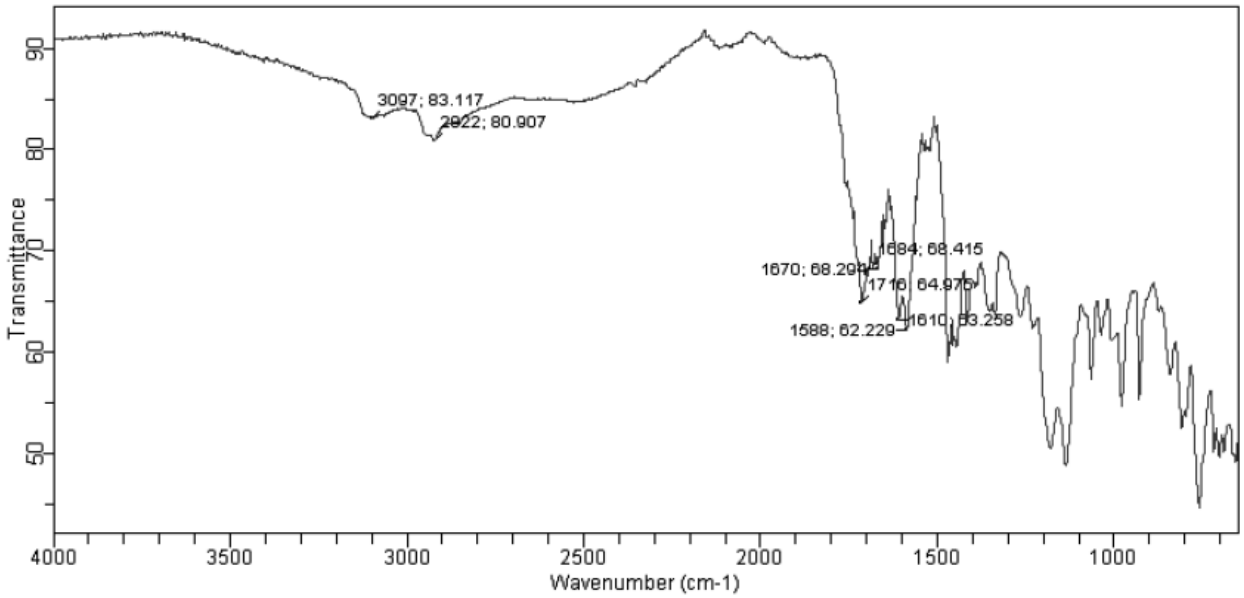

Transmittance
Wavenumber (cm-1)
2917; 87.837
2852; 88.016
2651; 88.927
2536; 89.195
1679; 78.886
4000
3500
3000
2500
2000
1500
1000

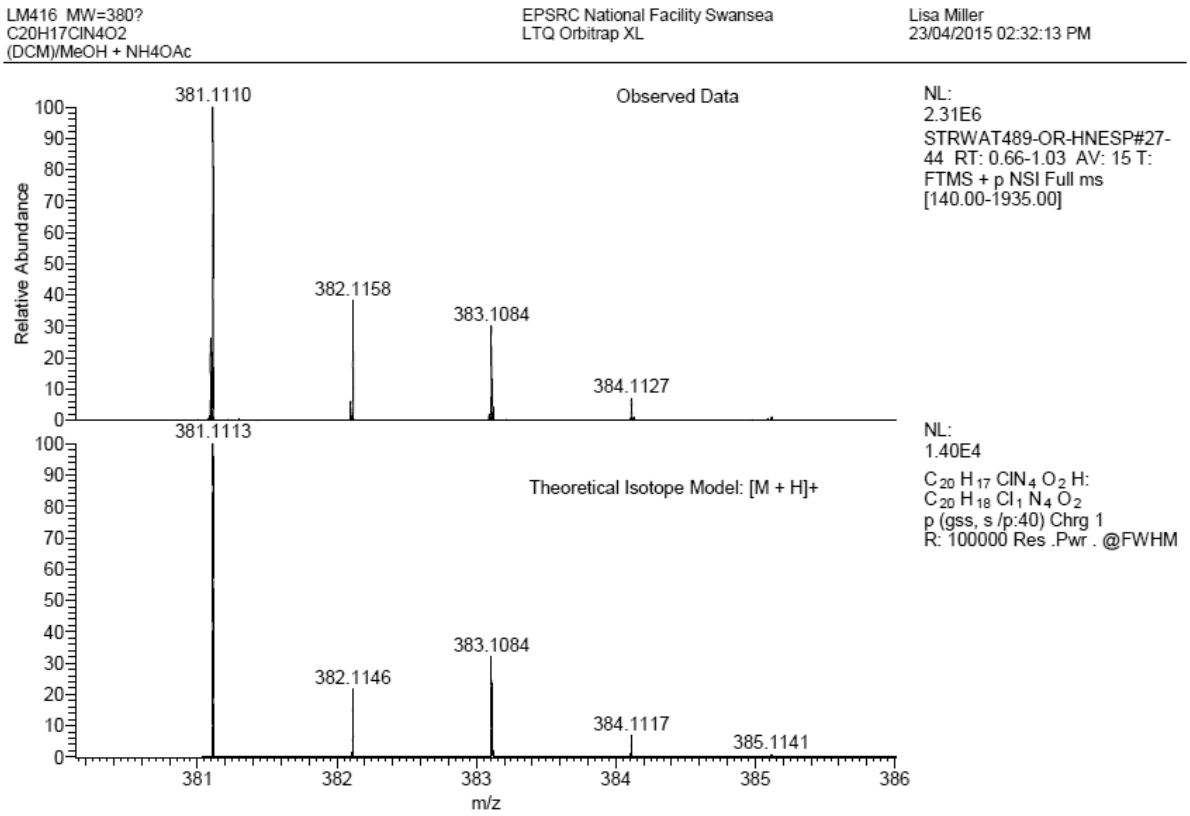

LM304 MW=359?
C22H17NO2S
(MeOH)/MeOH
SM: 7G
EPSRC National Facility Swansea
LTQ Orbitrap XL
Lisa Miller
05/12/2014 16:05:58
NL:
1.25E7
STRWAT385-OE-HNESN#67-77 RT: 1.87-2.16 AV: 11 T: FTMS - p NSI Full ms [120.00-2000.00]
Observed Data
358.0900
359.0929
360.0854
NL:
1.74E4
C22 H16 NO2 S:
C22 H16 N1 O2 S1
p (gss, s /p:40) Chrg -1
R: 100000 Res .Pwr . @FWHM
Theoretical Isotope Model: [M - H]-
358.0907
359.0939
360.0866
362.0930
Relative Abundance
m/z

6-((6-Chloro-2-methyl-1-(1-methyl-1*H*-pyrazol-4-yl)-1*H*-indol-3-yl)methyl)picolinic acid (1.61).

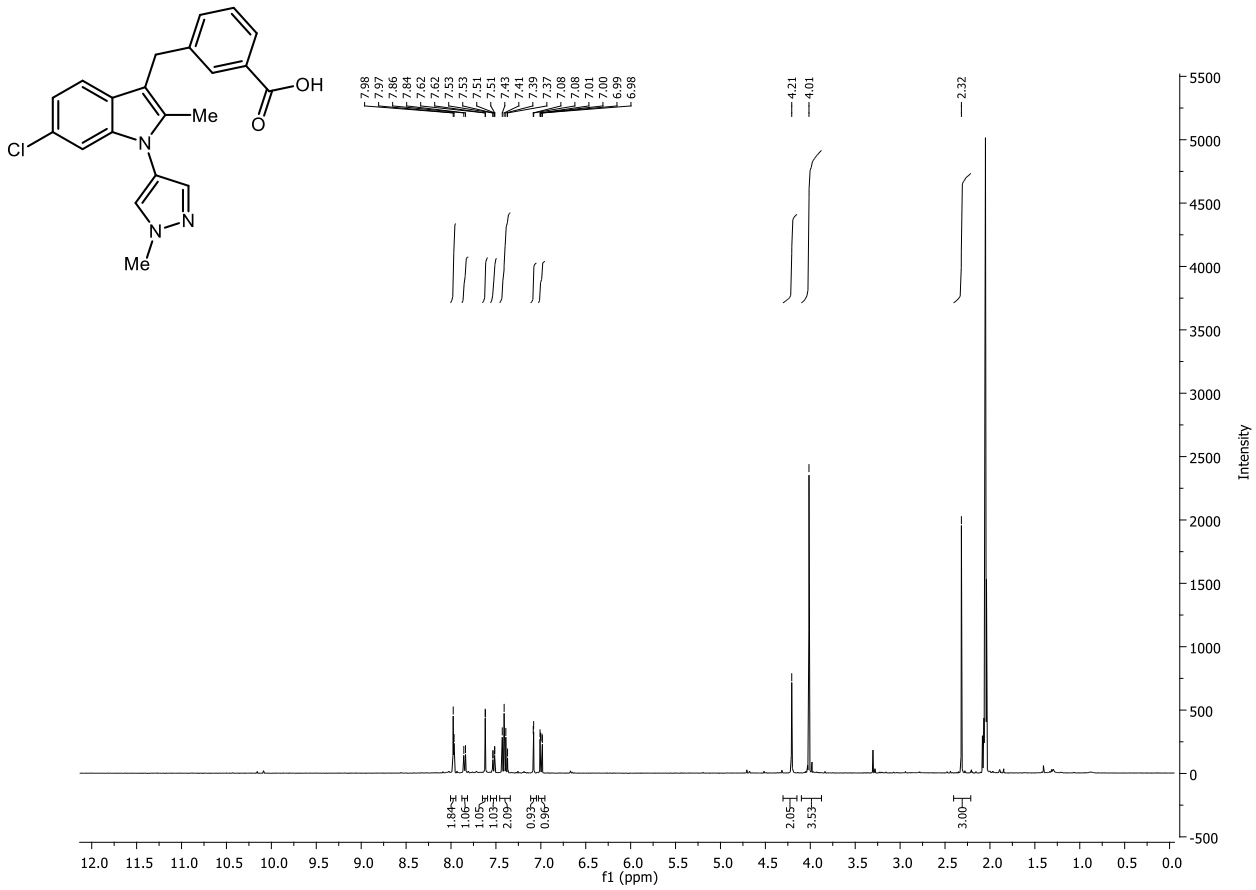


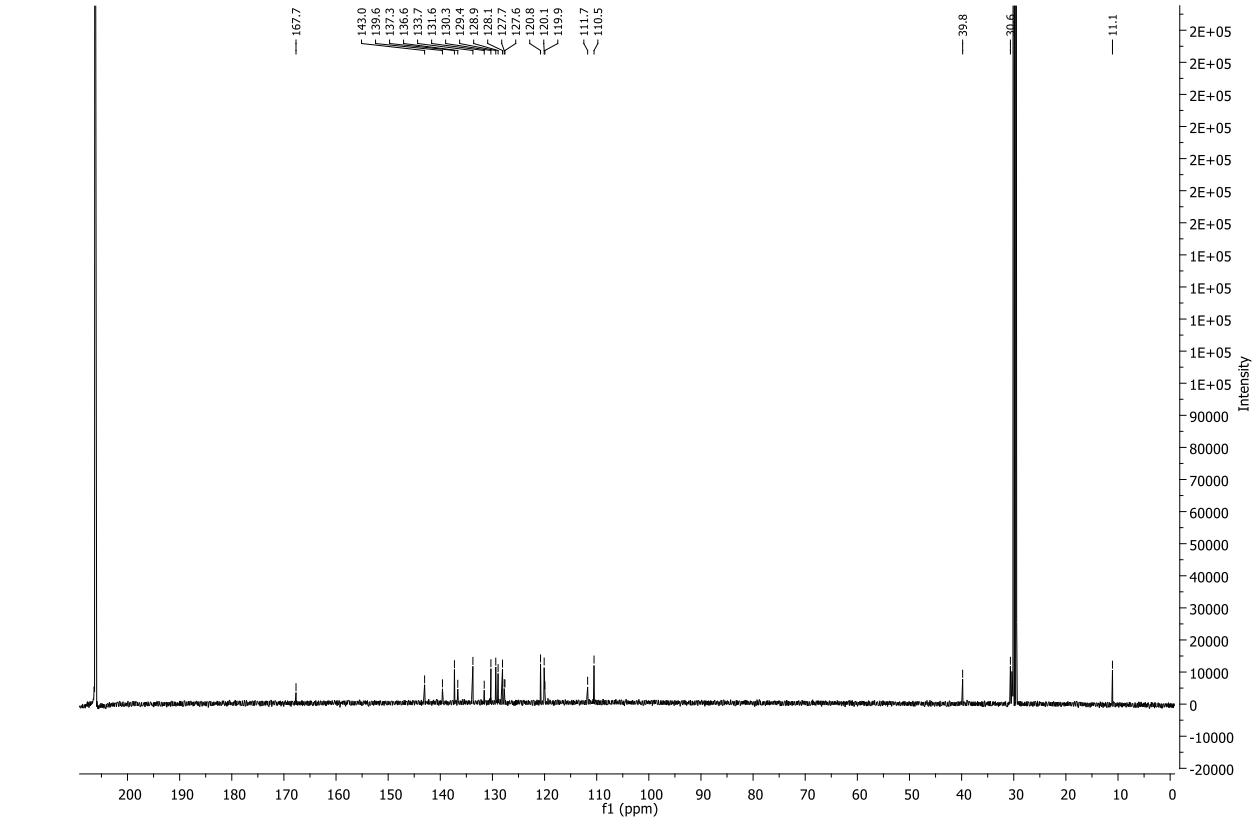


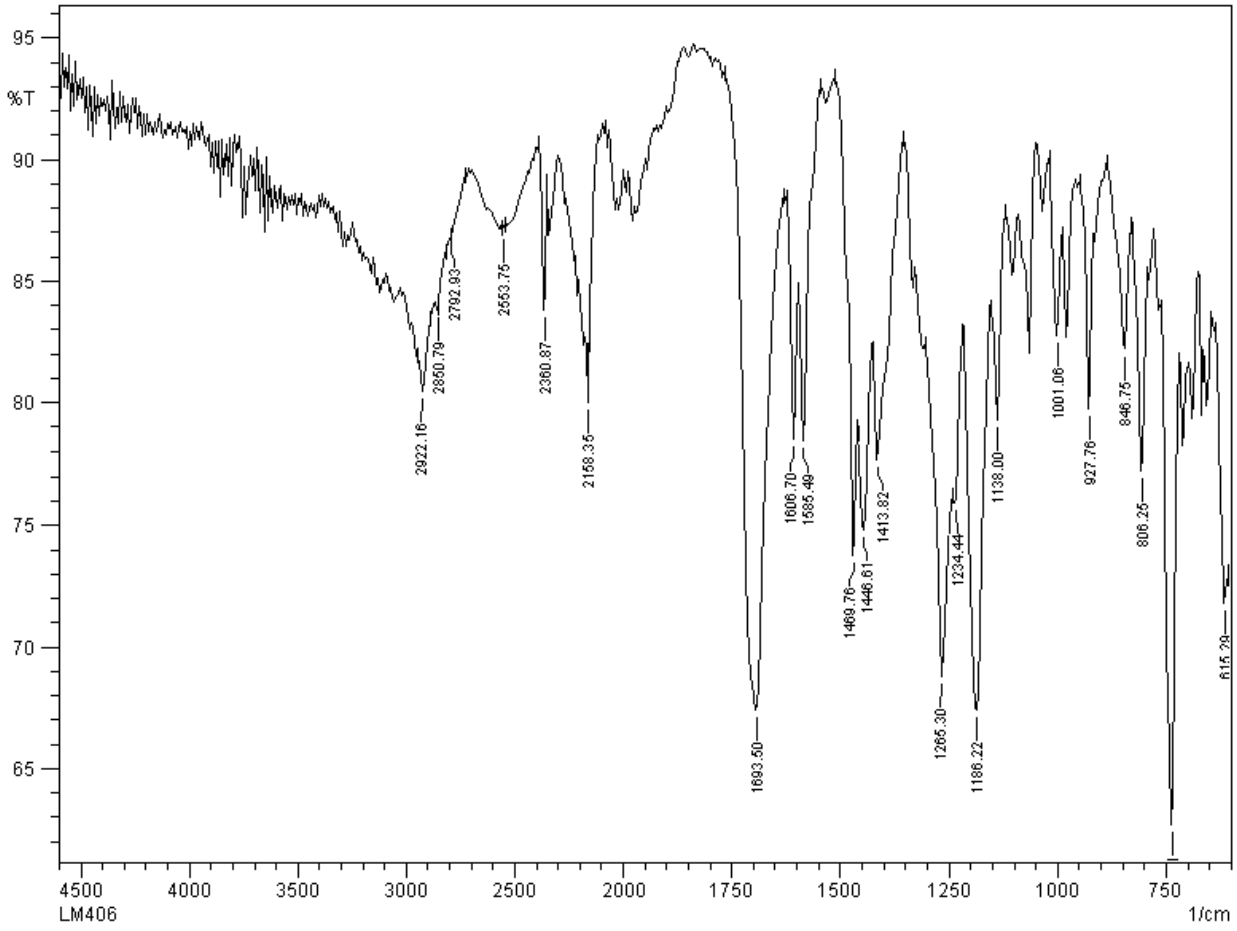

Transmittance
Wavenumber (cm-1)
3097; 83.117
2922; 80.907
1684; 68.415
1670; 68.294
1716; 64.975
1610; 63.258
1588; 62.229


LM416 MW=380?
C20H17ClN4O2
(DCM)/MeOH + NH4OAc
EPSRC National Facility Swansea
LTQ Orbitrap XL
Lisa Miller
23/04/2015 02:32:13 PM
Observed Data
381.1110
382.1158
383.1084
384.1127
NL:
2.31E6
STRWAT489-OR-HNESP#27-44 RT: 0.66-1.03 AV: 15 T: FTMS + p NSI Full ms [140.00-1935.00]
Theoretical Isotope Model: [M + H]+
381.1113
382.1146
383.1084
384.1117
385.1141
NL:
1.40E4
C20 H17 ClN4 O2 H:
C20 H18 Cl1 N4 O2
p (gss, s /p:40) Chrg 1
R: 100000 Res .Pwr . @FWHM
Relative Abundance
m/z

3-((6-Chloro-2-methyl-1-(1-methyl-1*H*-pyrazol-4-yl)-1*H*-indol-3-yl)methyl) benzoic acid (1.62).



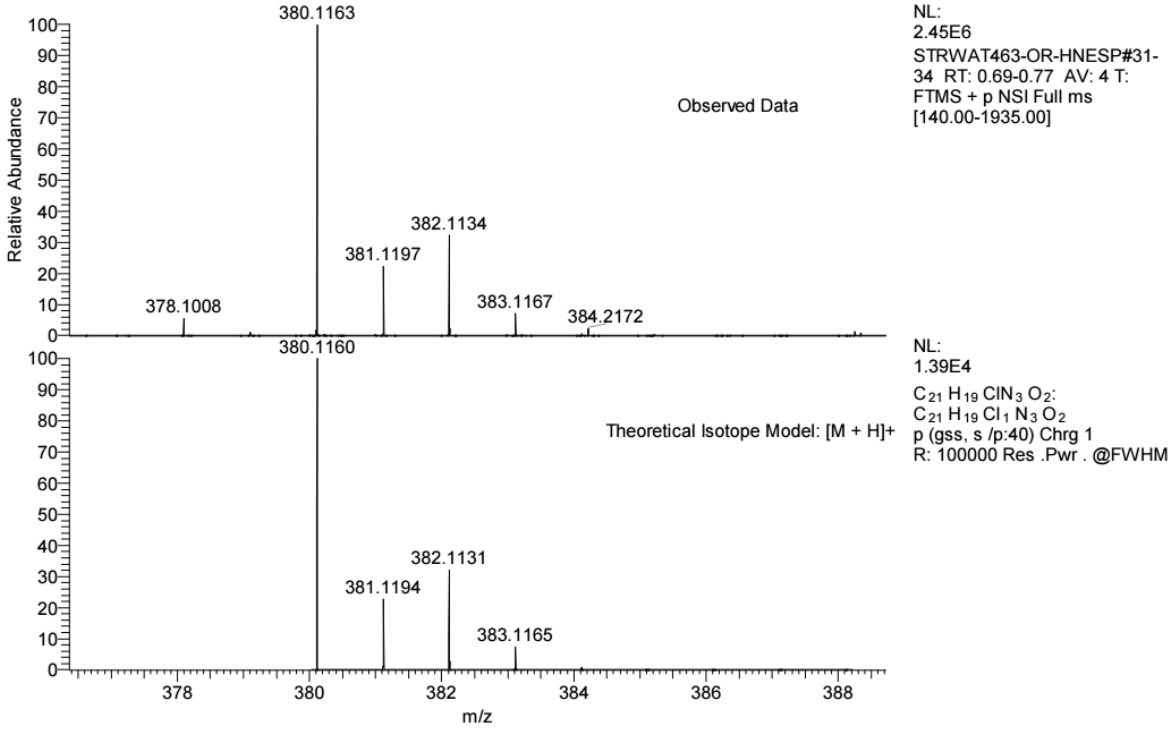




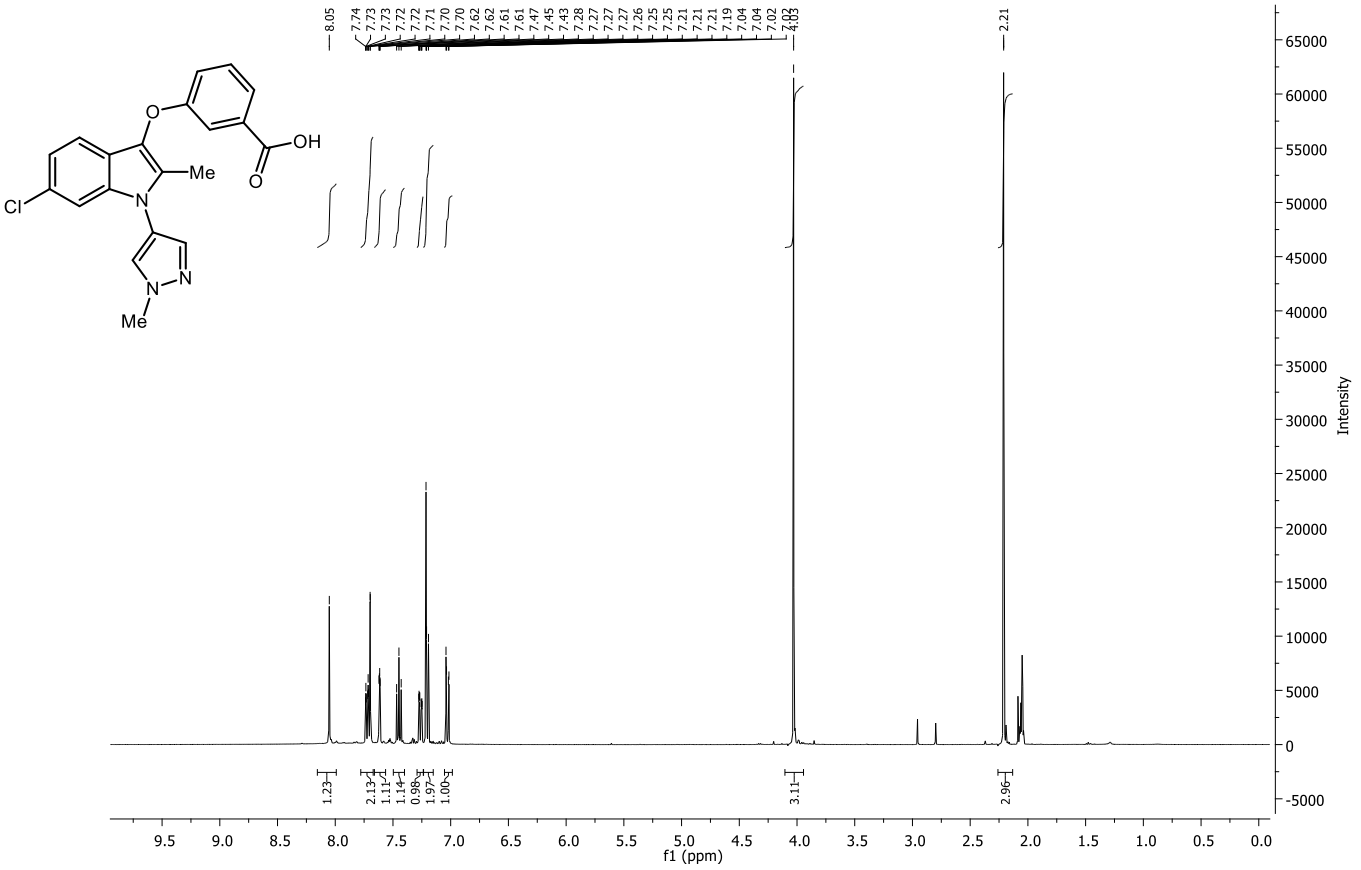
LM406 MW=379?
C21H18ClN3O2
(DCM)/MeOH + NH4OAc

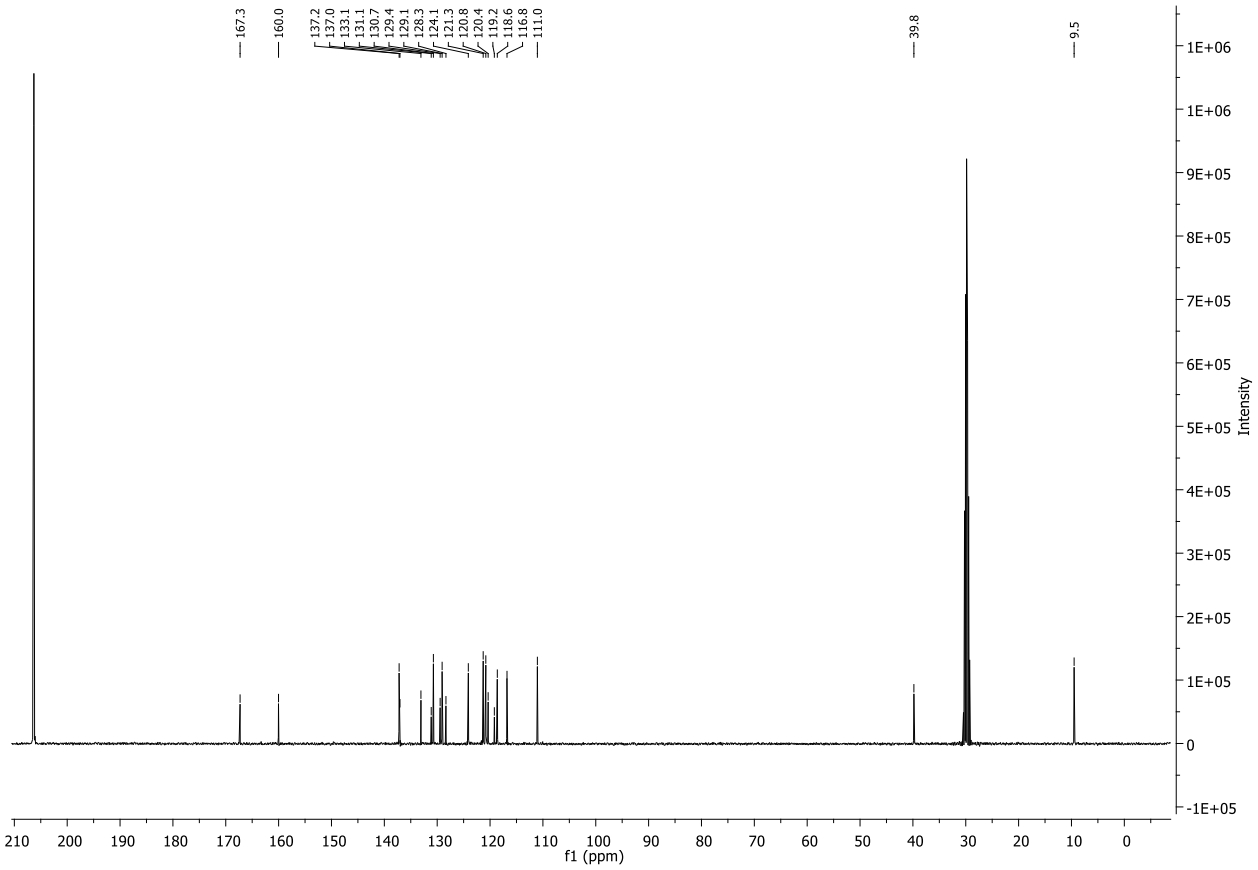
EPSRC National Facility Swansea
LTQ Orbitrap XL

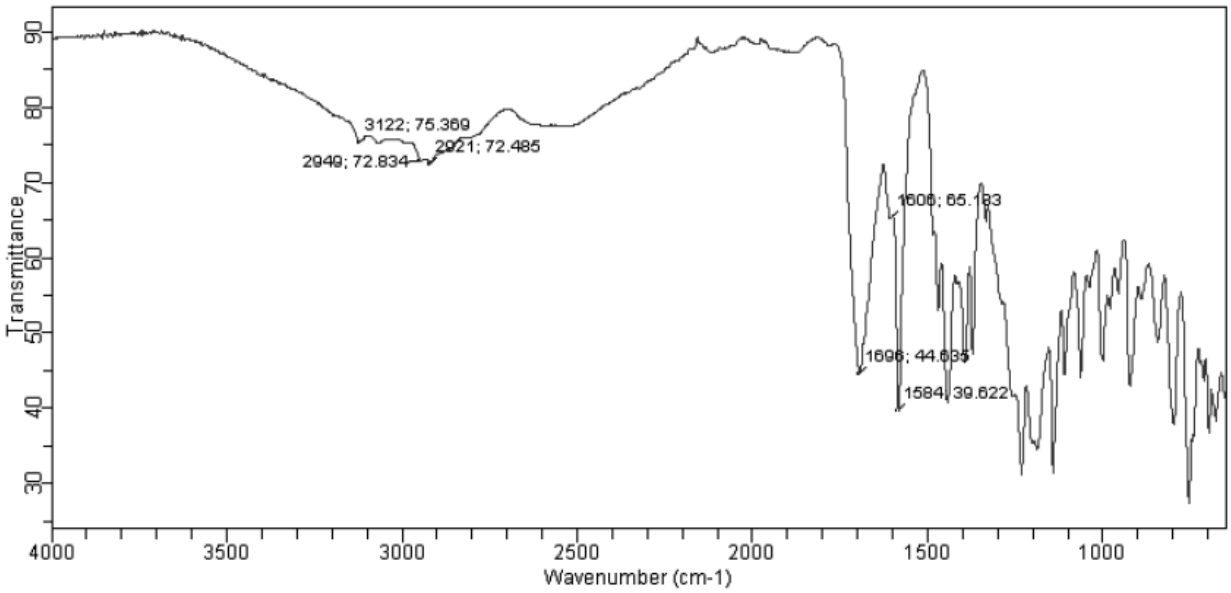
Lisa Miller
08/04/2015 12:28:46



3-((6-Chloro-2-methyl-1-(1-methyl-1*H*-pyrazol-4-yl)-1*H*-indol-3-yl)oxy)benzoic acid (1.63).



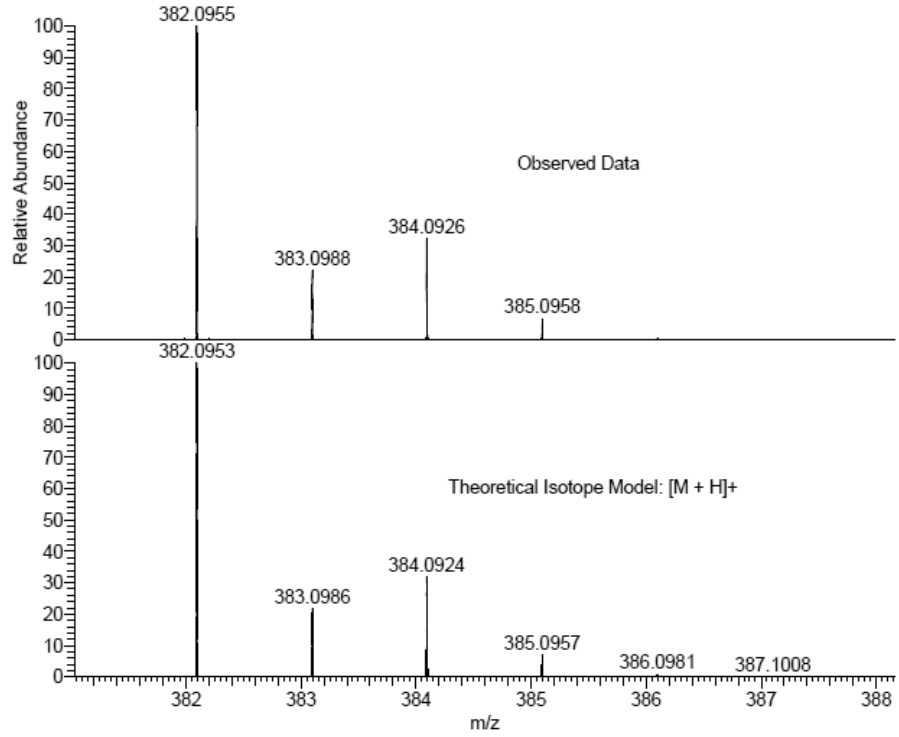




LM367-2 MW=381?
C20H16ClN3O3
(DCM)/MeOH + NH4OAc

EPSRC National Facility Swansea
LTQ Orbitrap XL

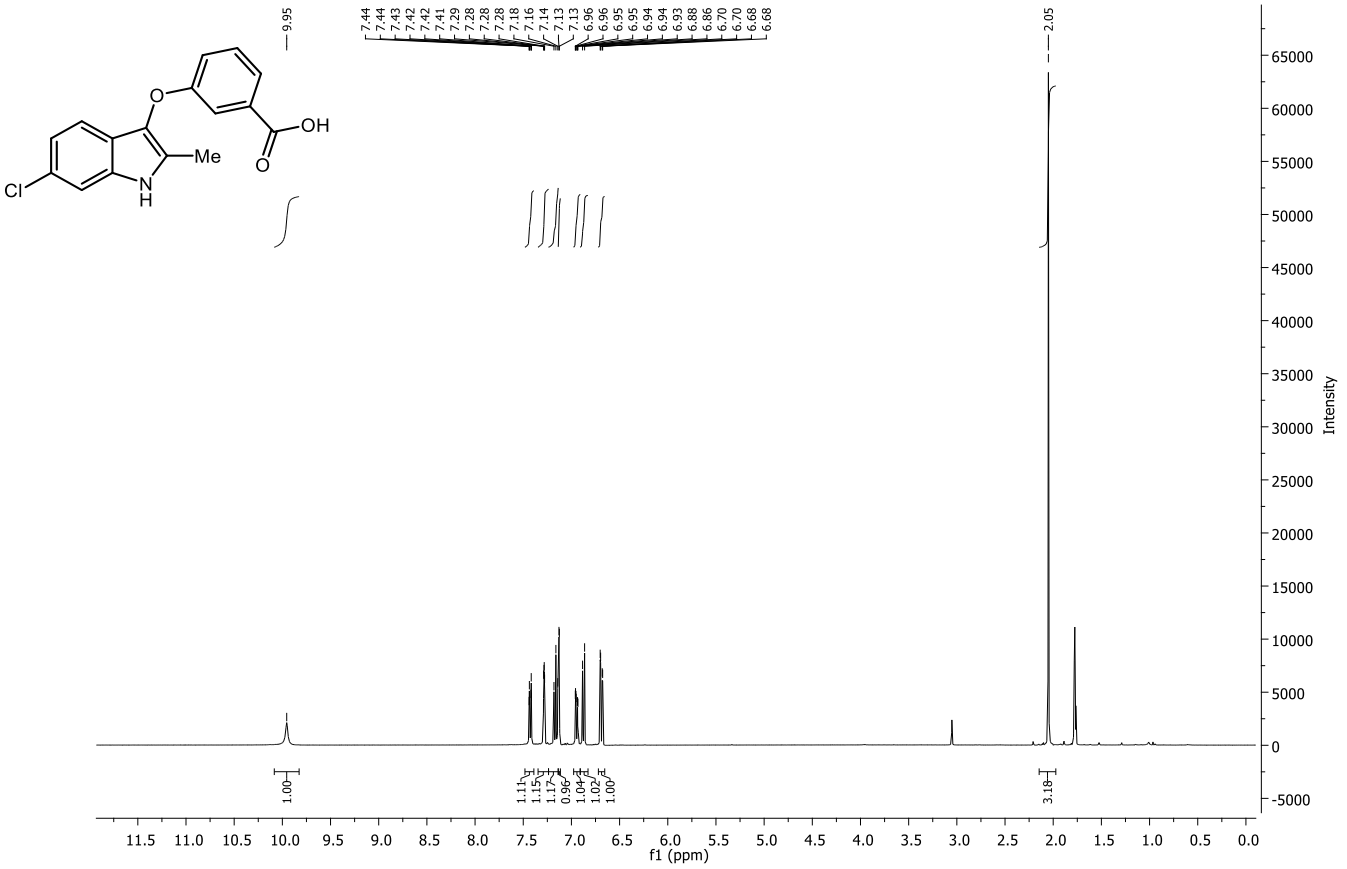
Lisa Miller
03/02/2015 02:40:44 PM

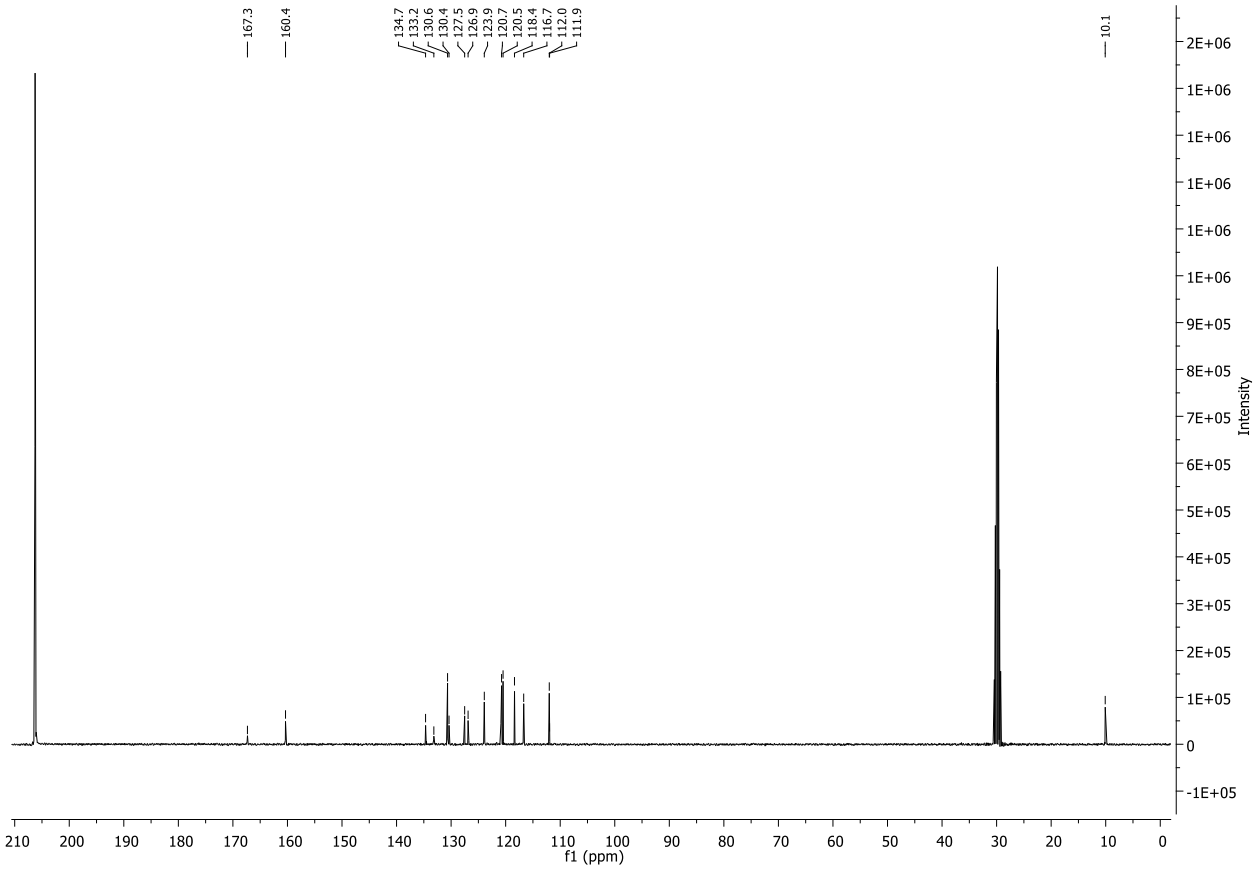


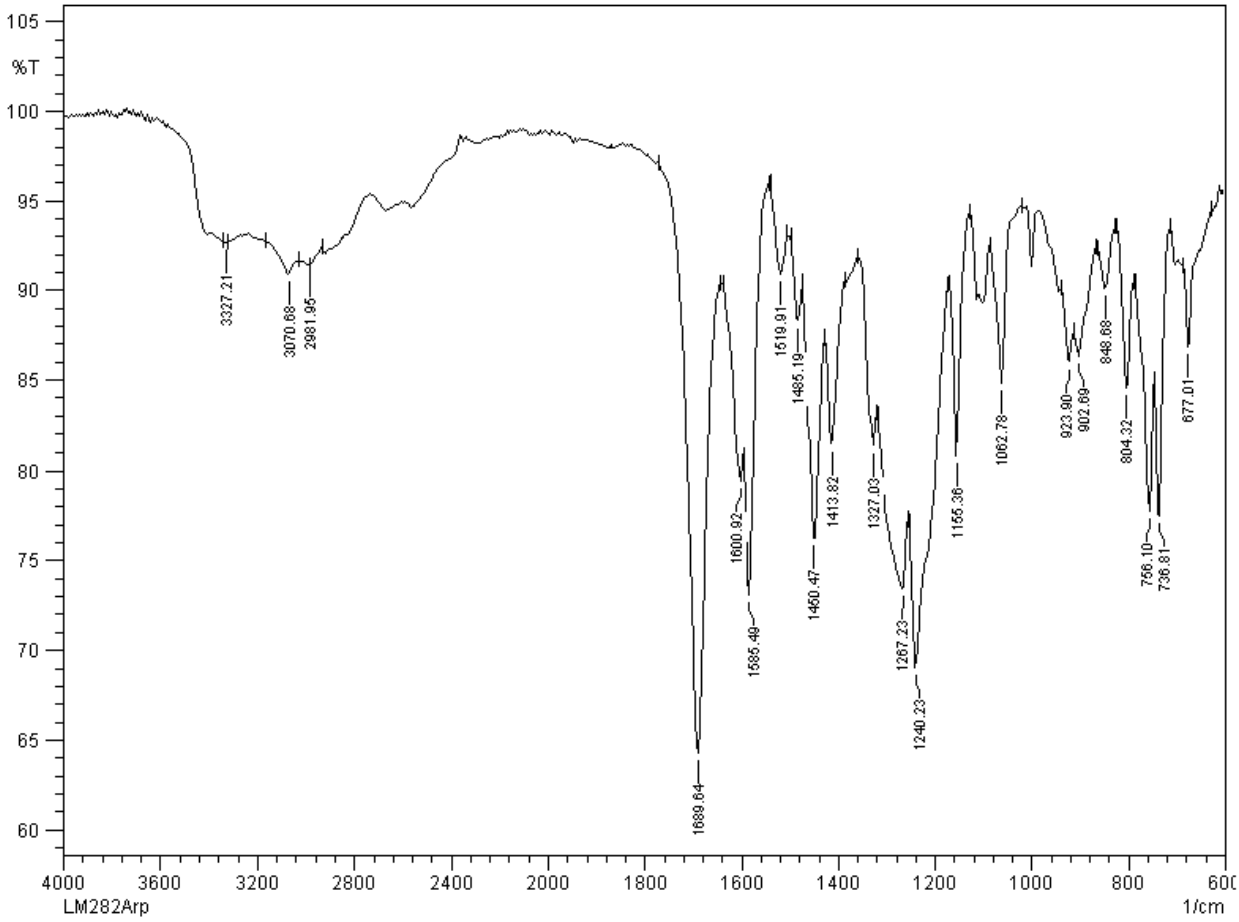
NL:
4.12E6
STRWAT413-OA-HNESP#27-41 RT: 0.66-1.03 AV: 14 T: FTMS + p NSI Full ms [140.00-1935.00]

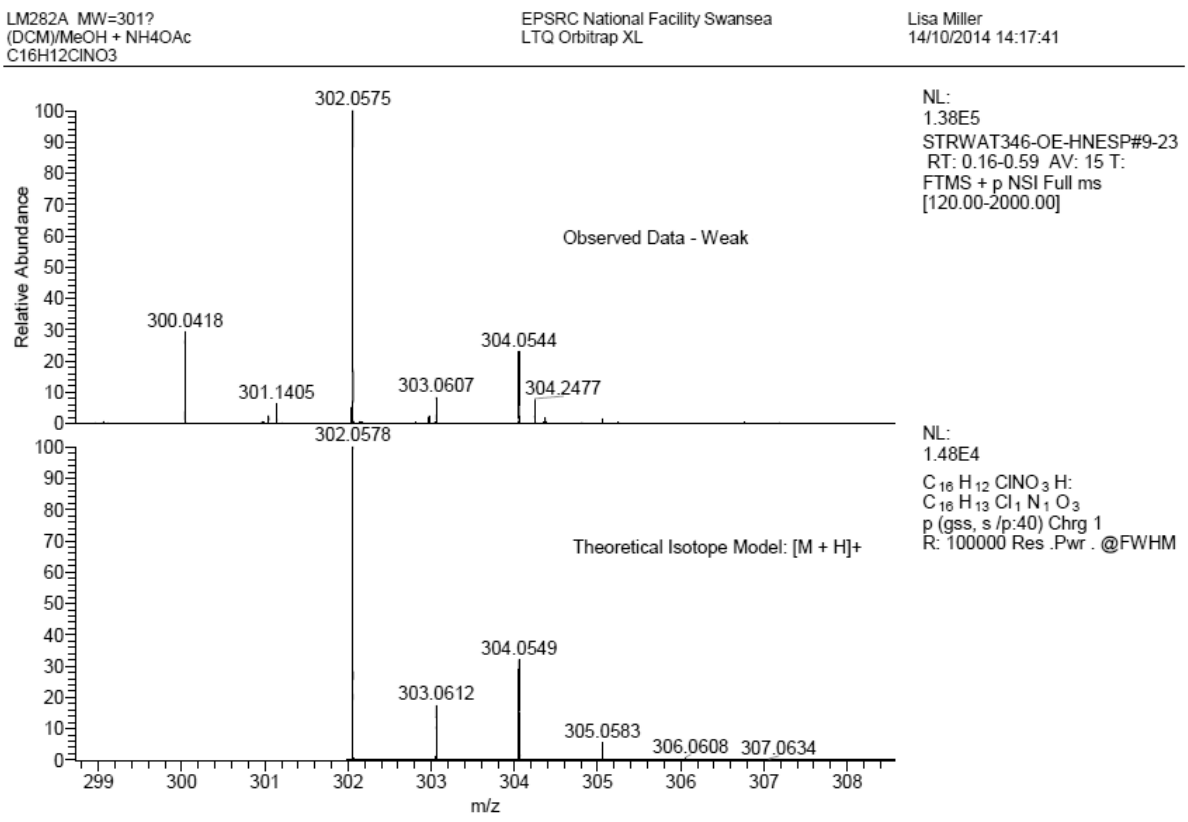
NL:
1.41E4
$C_{20}H_{16}ClN_3O_3H$:
$C_{20}H_{17}Cl_1N_3O_3$
p (gss, s /p:40) Chrg 1
R: 100000 Res .Pwr . @FWHM

3-((6-Chloro-2-methyl-1*H*-indol-3-yl)oxy)benzoic acid (1.64).

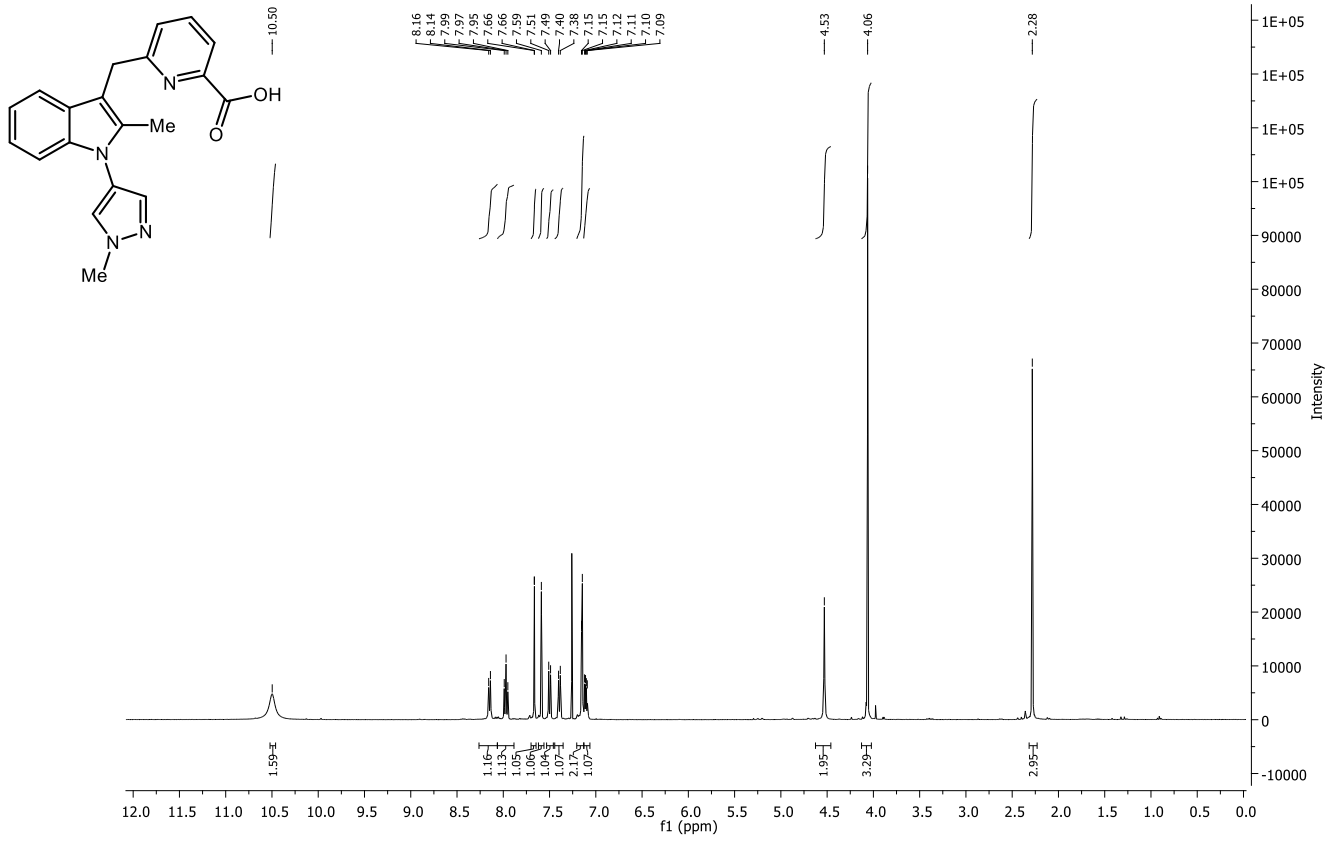


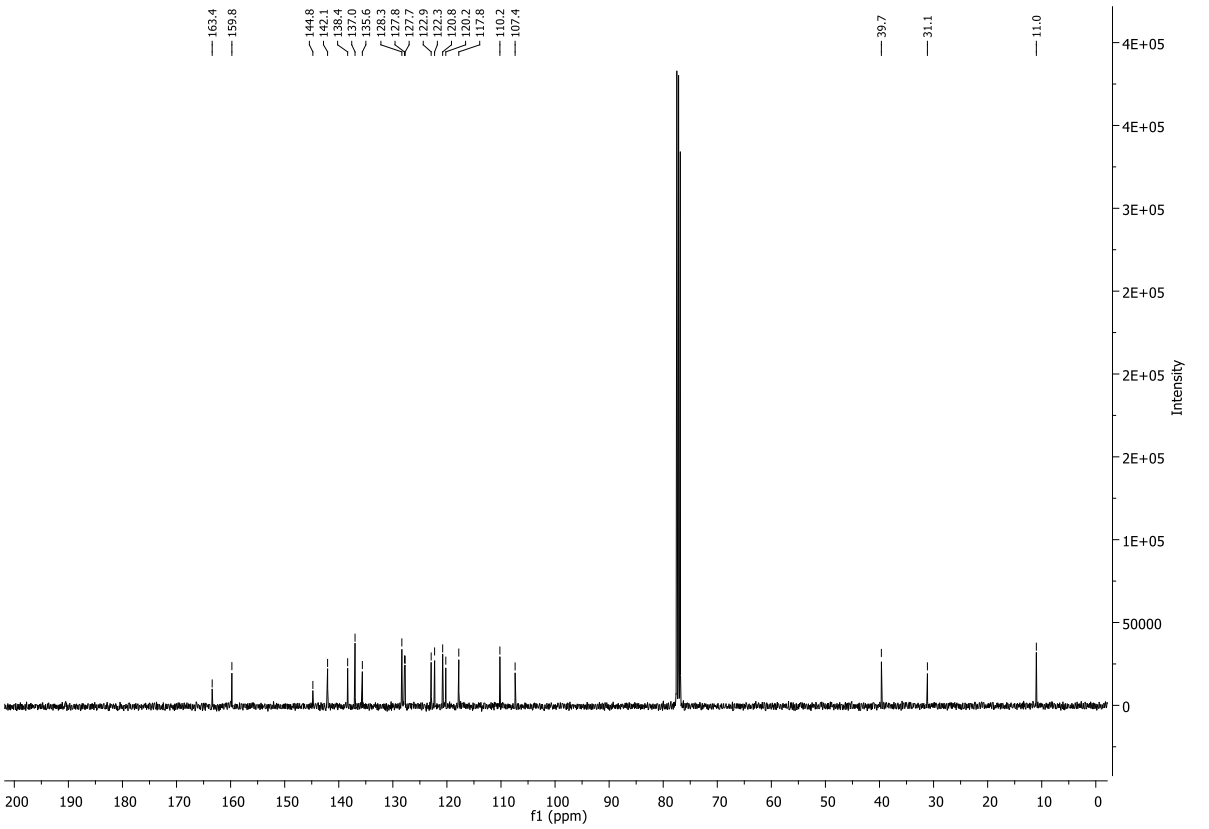


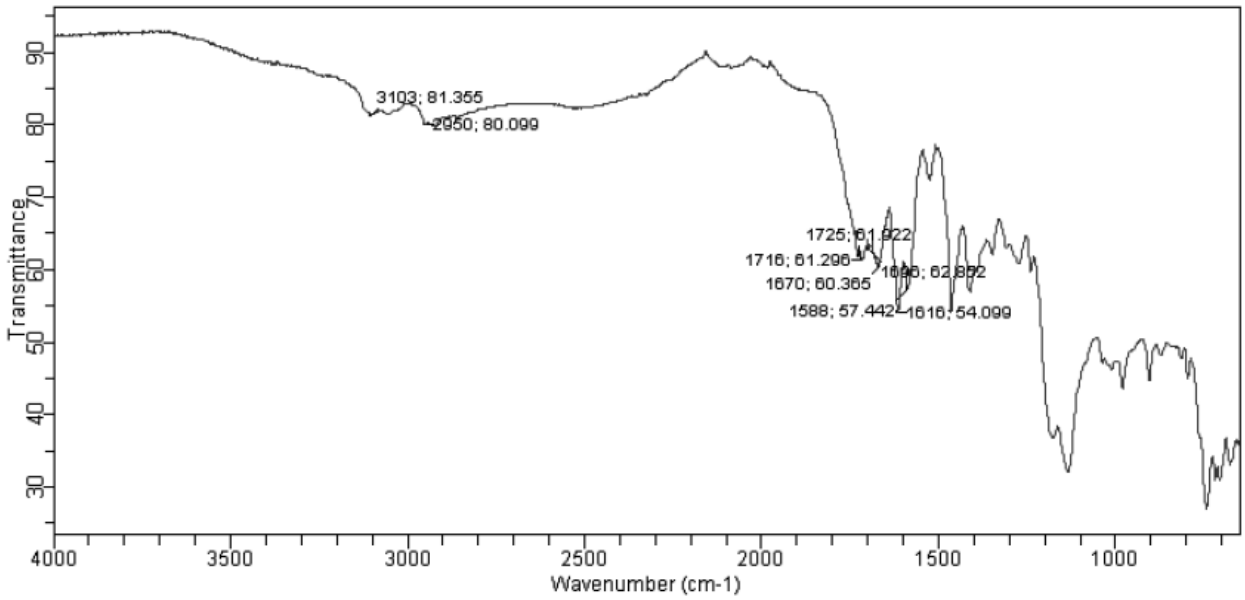

105
%T
100
95
90
85
80
75
70
65
60
3327.21
3070.88
2981.95
1689.64
1600.92
1585.49
1519.91
1485.19
1460.47
1413.82
1327.03
1267.23
1240.23
1155.36
1062.78
923.90
902.69
848.68
804.32
756.10
736.81
677.01
4000
3600
3200
2800
2400
2000
1800
1600
1400
1200
1000
800
600
LM282Arp
1/cm


LM282A MW=301?
(DCM)/MeOH + NH4OAc
C16H12ClNO3
EPSRC National Facility Swansea
LTQ Orbitrap XL
Lisa Miller
14/10/2014 14:17:41
NL:
1.38E5
STRWAT346-OE-HNESP#9-23
RT: 0.16-0.59 AV: 15 T:
FTMS + p NSI Full ms
[120.00-2000.00]
Relative Abundance
302.0575
Observed Data - Weak
300.0418
304.0544
301.1405
303.0607
304.2477
NL:
1.48E4
C16 H12 ClNO3 H:
C16 H13 Cl1 N1 O3
p (gss, s /p:40) Chrg 1
R: 100000 Res .Pwr . @FWHM
302.0578
Theoretical Isotope Model: [M + H]+
304.0549
303.0612
305.0583
306.0608
307.0634
299
300
301
302
303
304
305
306
307
308
m/z

6-((2-Methyl-1-(1-methyl-1*H*-pyrazol-4-yl)-1*H*-indol-3-yl)methyl)picolinic acid (1.65).



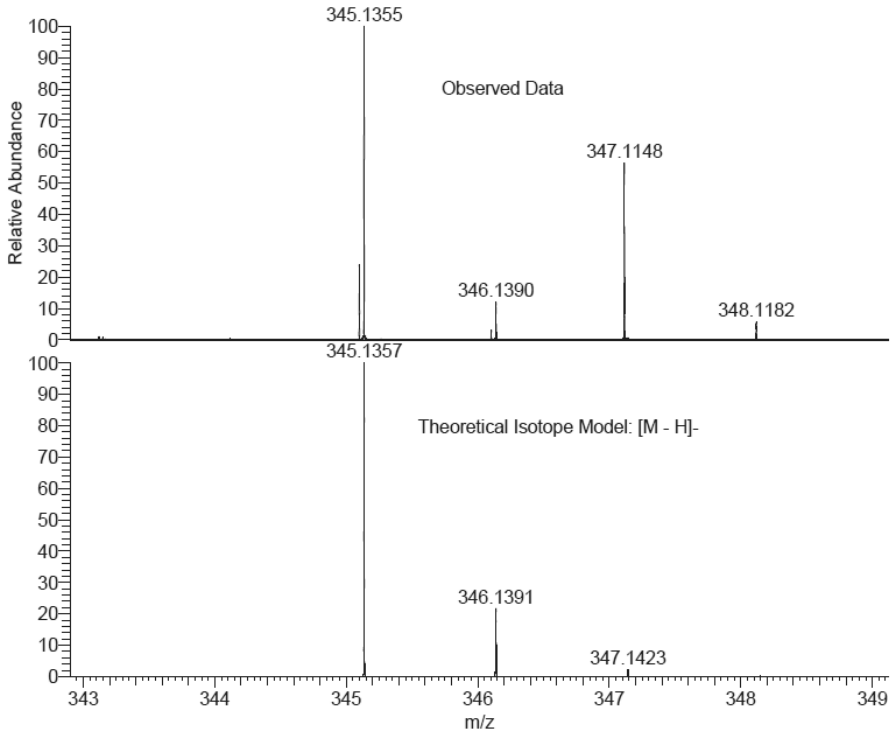




LM427 MW=346?
(DCM)/MeOH+DEA
C20H18N4O2

EPSRC National Facility Swansea
LTQ Orbitrap XL

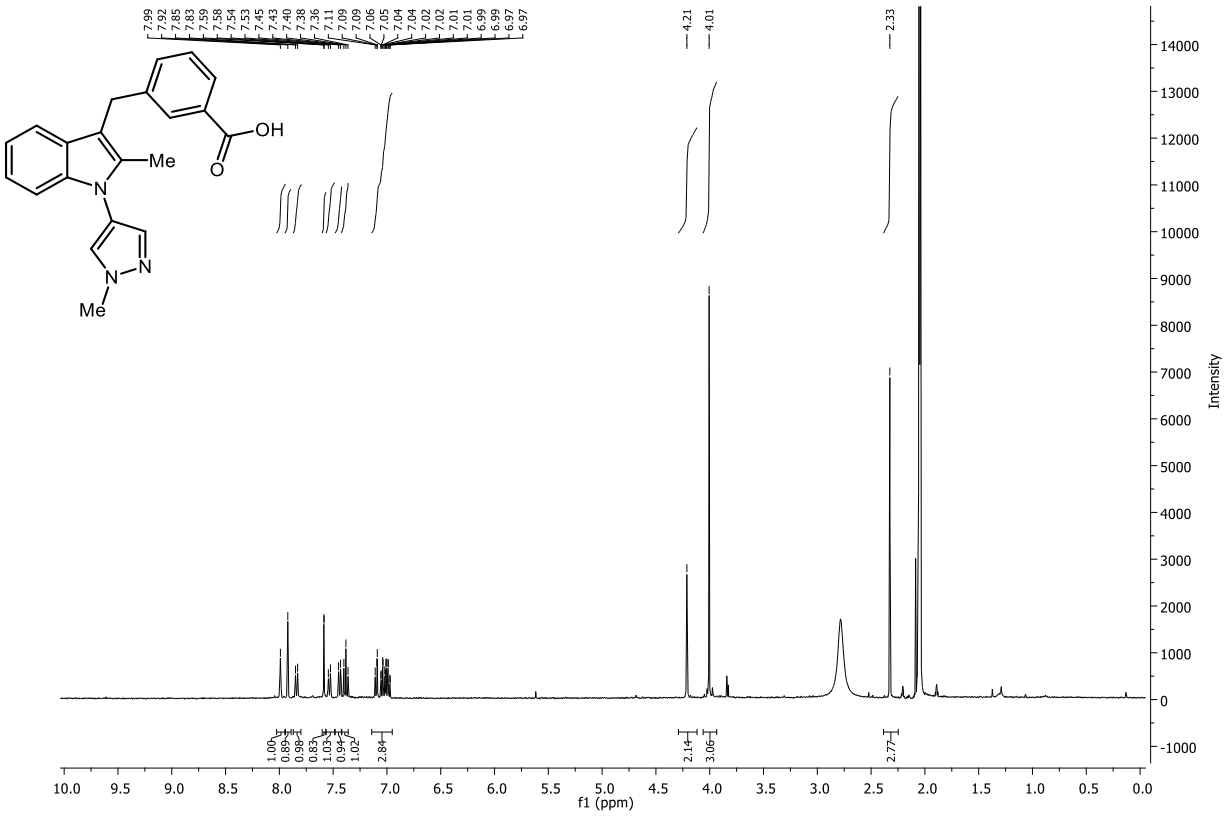
Lisa Miller
12/05/2015 16:12:28

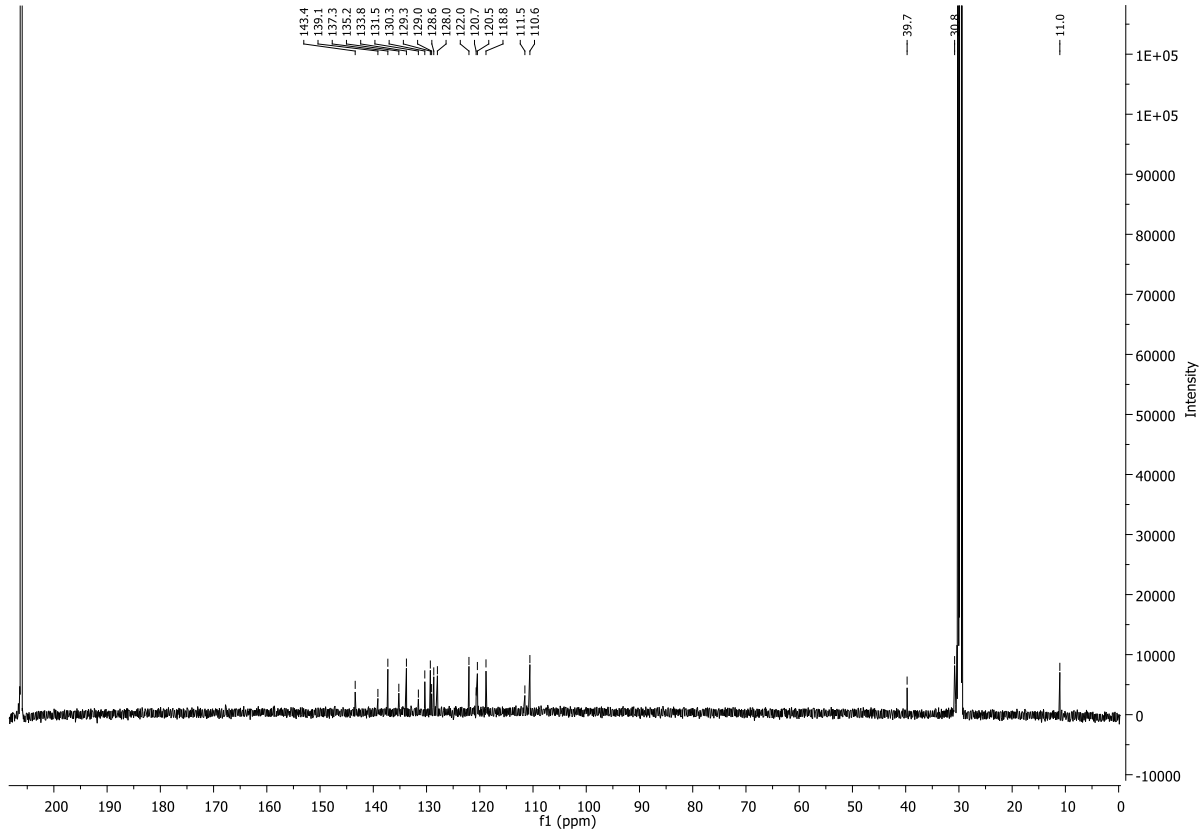


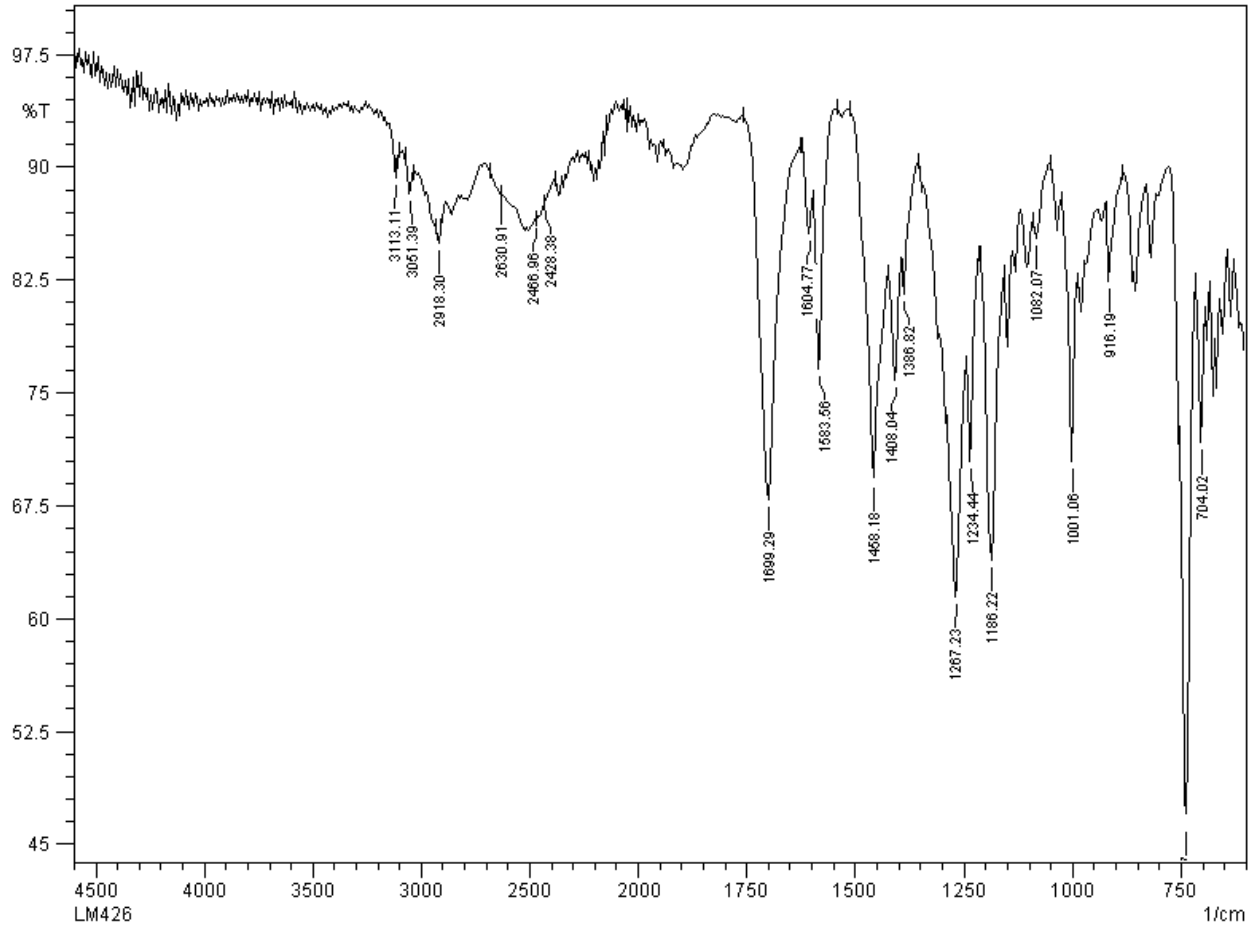
NL:
6.13E5
STRWAT506-OJ-HNESN#33-58 RT: 0.56-0.95 AV: 16 T: FTMS - p NSI Full ms [120.00-615.00]

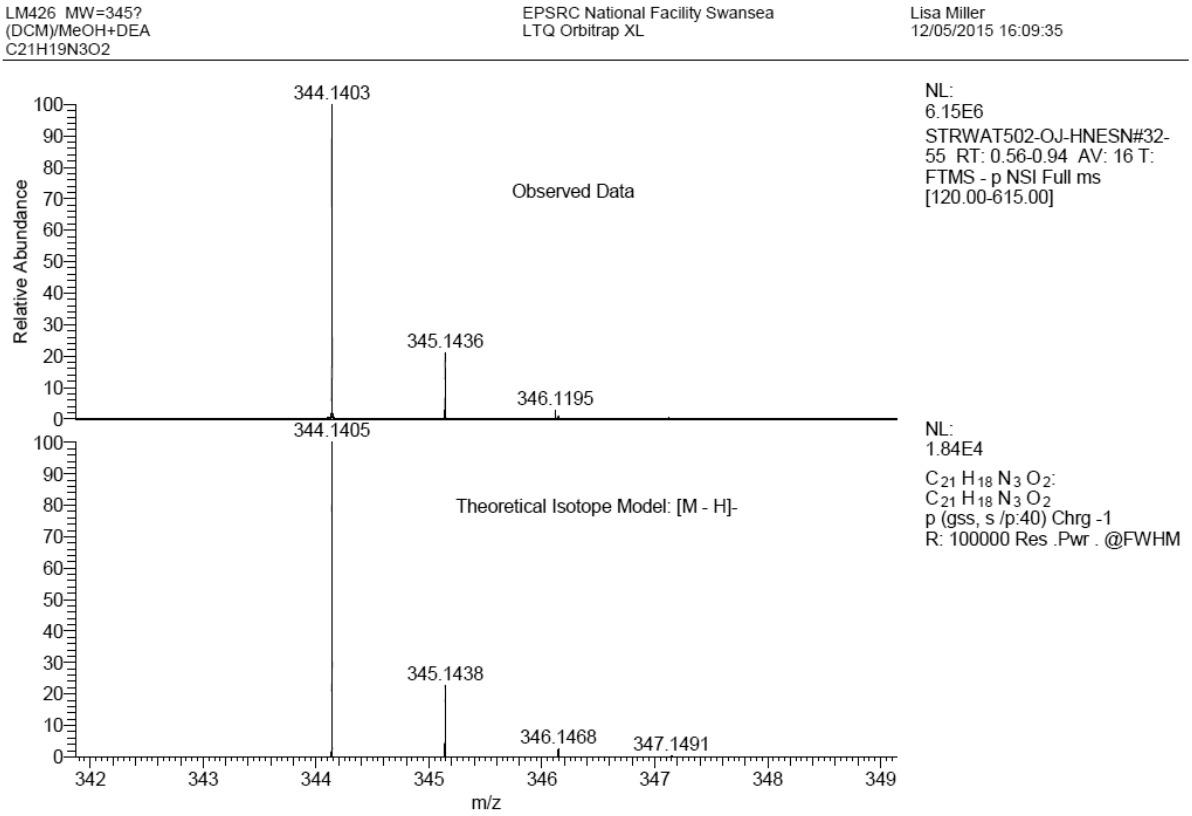
NL:
1.85E4
$C_{20}H_{17}N_4O_2$:
$C_{20}H_{17}N_4O_2$
p (gss, s /p:40) Chrg -1
R: 100000 Res .Pwr . @FWHM

3-((2-Methyl-1-(1-methyl-1*H*-pyrazol-4-yl)-1*H*-indol-3-yl)methyl)benzoic acid (1.66).

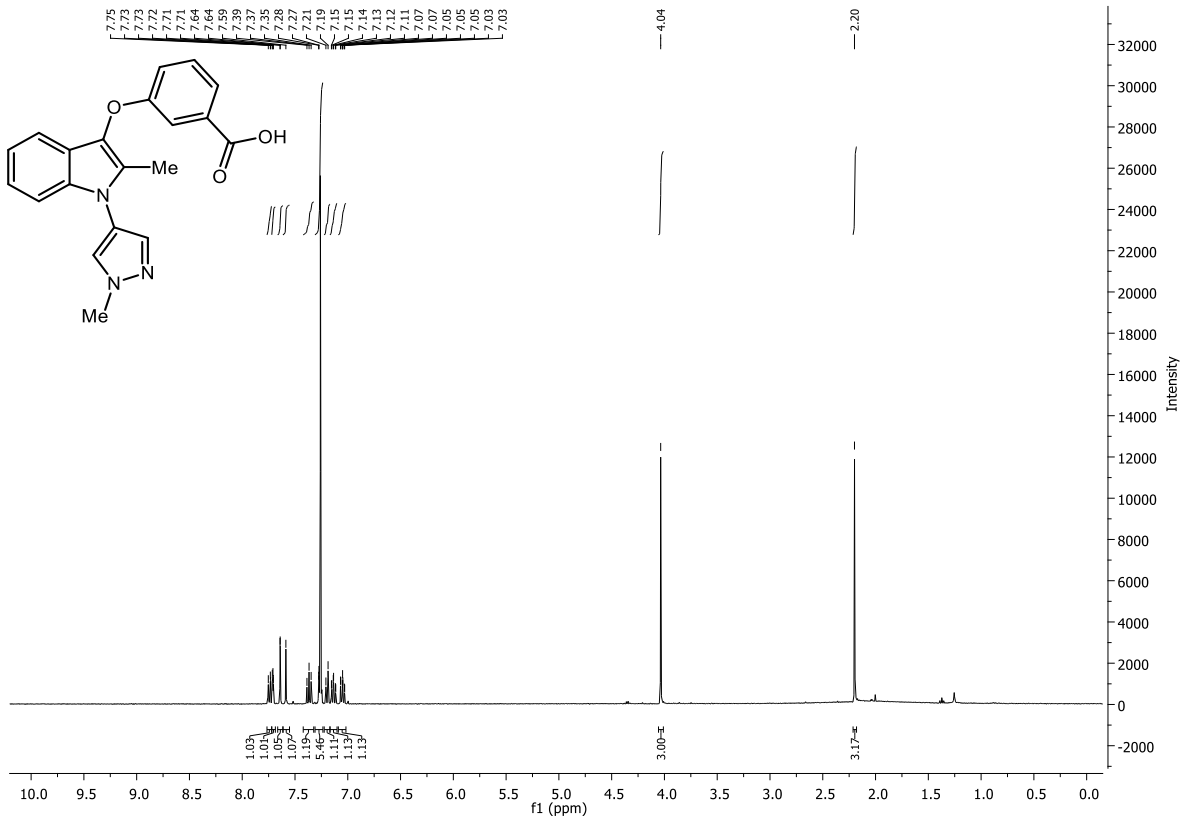


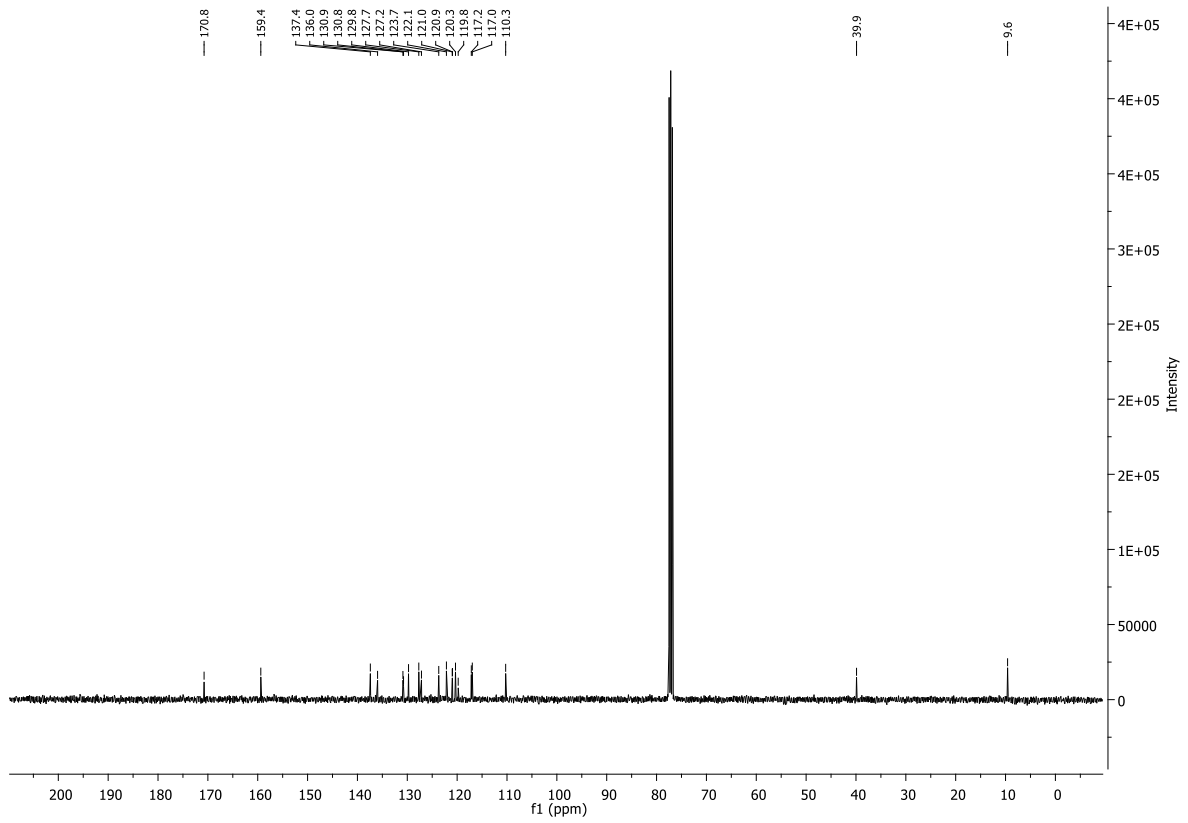


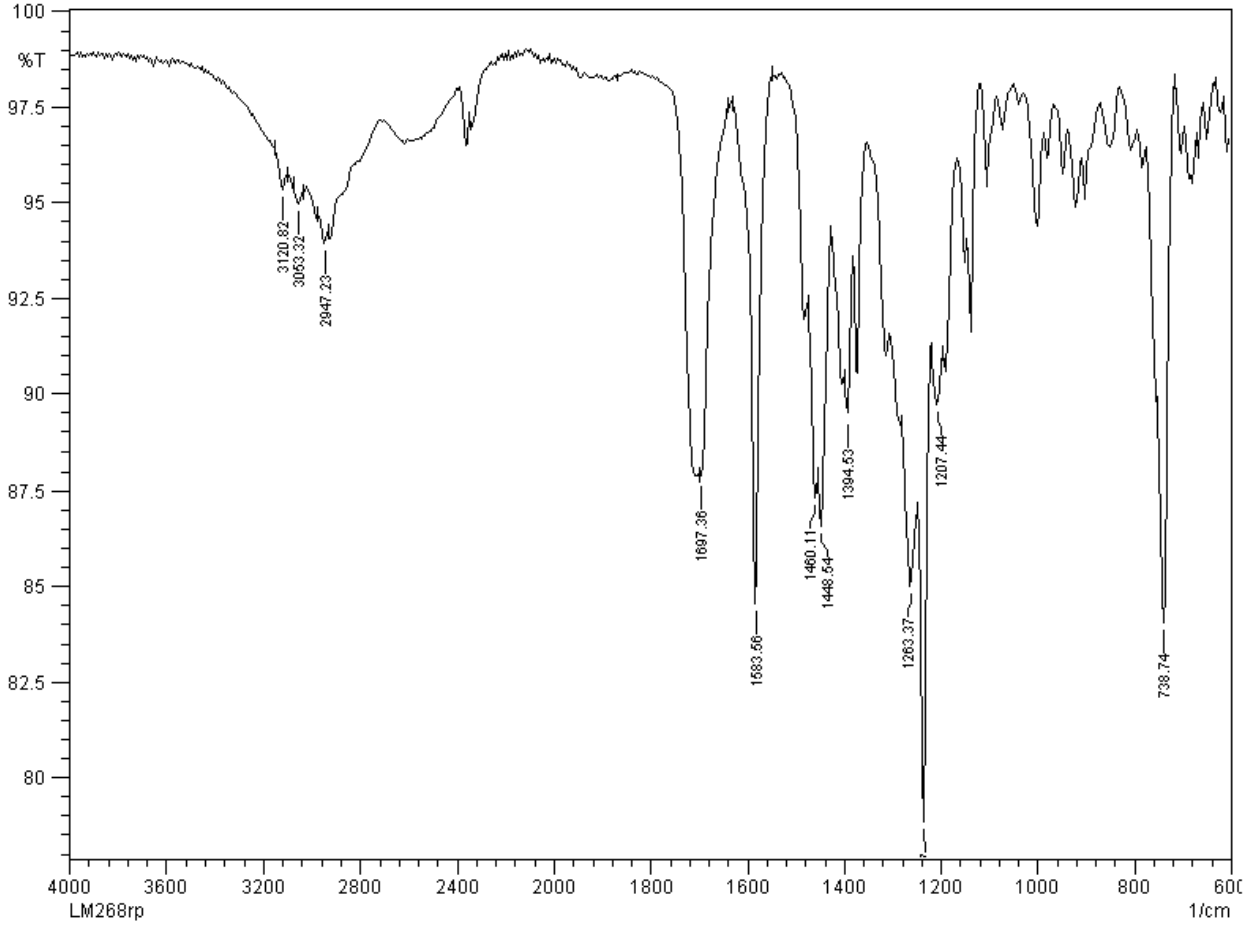

97.5
%T
90
82.5
75
67.5
60
52.5
45
3113.11
3051.39
2918.30
2630.91
2466.96
2428.39
1699.29
1604.77
1583.56
1468.18
1408.04
1386.82
1267.23
1234.44
1198.22
1082.07
1001.06
916.19
704.02
4500
4000
3500
3000
2500
2000
1750
1500
1250
1000
750
LM426
1/cm


LM426 MW=345?
(DCM)/MeOH+DEA
C21H19N3O2
EPSRC National Facility Swansea
LTQ Orbitrap XL
Lisa Miller
12/05/2015 16:09:35
Relative Abundance
344.1403
345.1436
346.1195
Observed Data
NL:
6.15E6
STRWAT502-OJ-HNESN#32-55 RT: 0.56-0.94 AV: 16 T: FTMS - p NSI Full ms [120.00-615.00]
344.1405
345.1438
346.1468
347.1491
Theoretical Isotope Model: [M - H]-
NL:
1.84E4
C21 H18 N3 O2:
C21 H18 N3 O2
p (gss, s /p:40) Chrg -1
R: 100000 Res .Pwr . @FWHM
m/z

3-((2-Methyl-1-(1-methyl-1*H*-pyrazol-4-yl)-1*H*-indol-3-yl)oxy)benzoic acid (1.67).



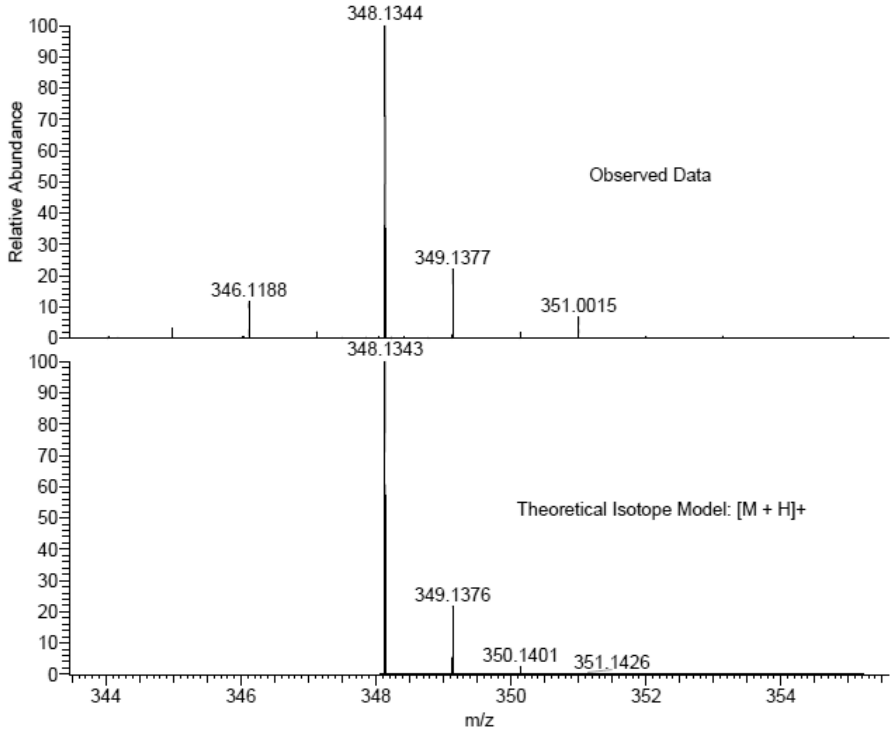




LM268 MW=347?
C20H17N3O3
(DCM)/MeOH + NH4OAc

EPSRC National Facility Swansea
LTQ Orbitrap XL

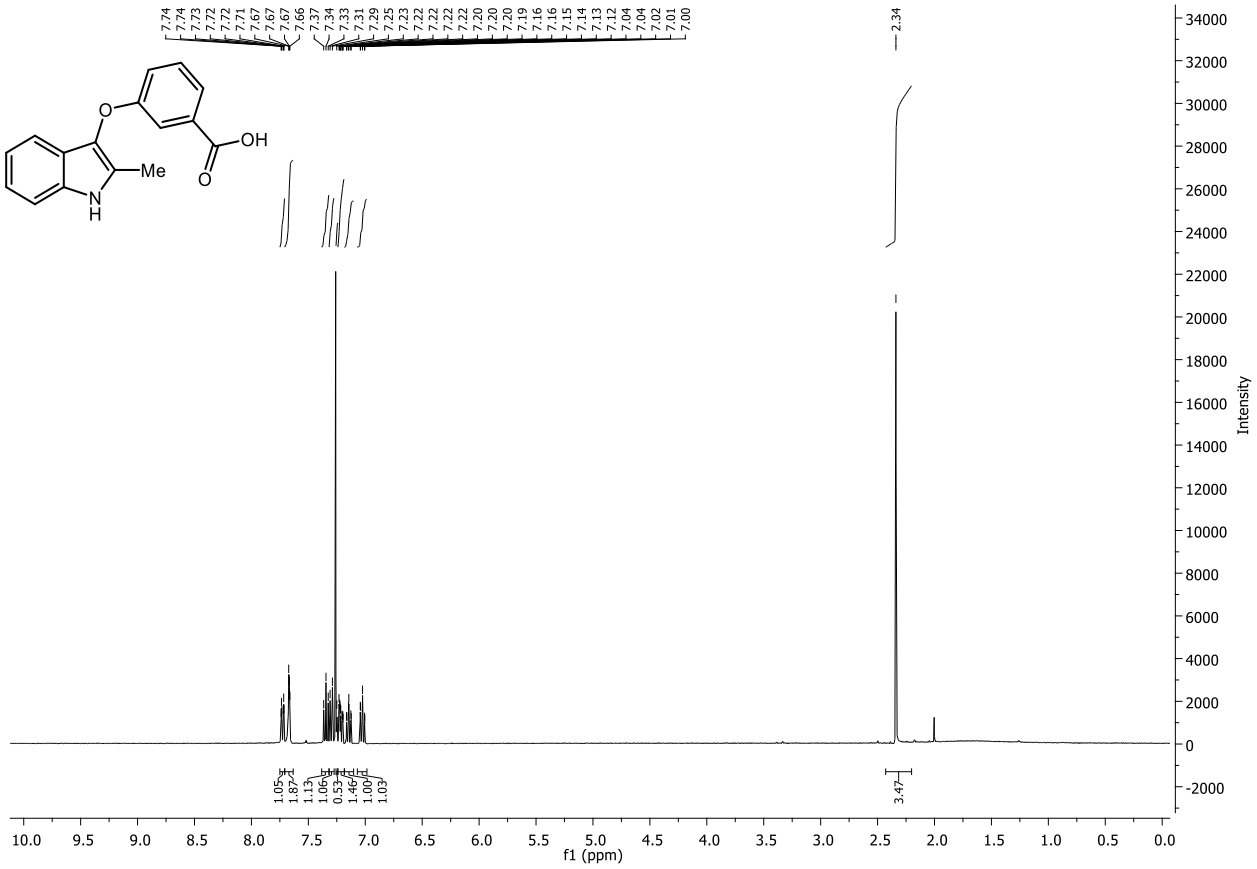
Lisa Miller
08/09/2014 10:22:13 AM

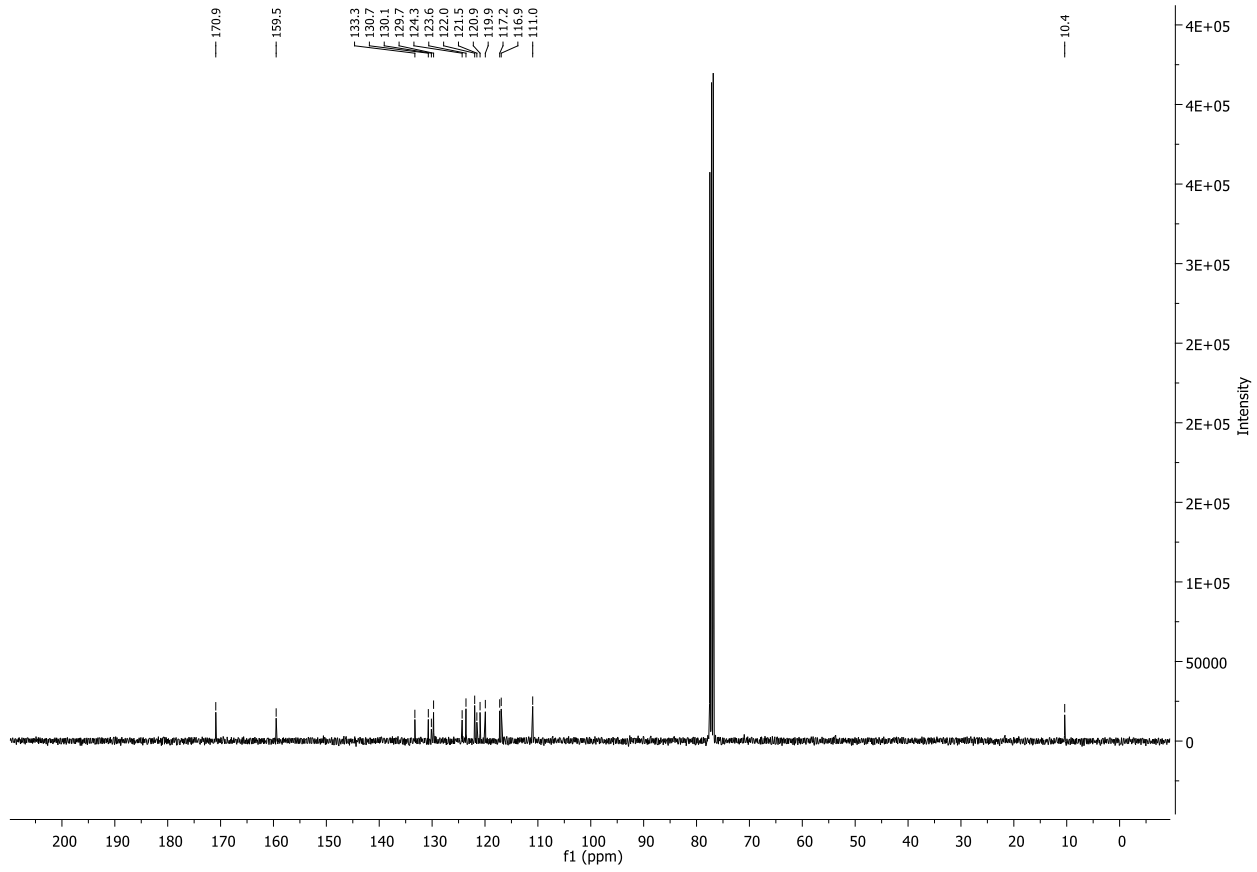


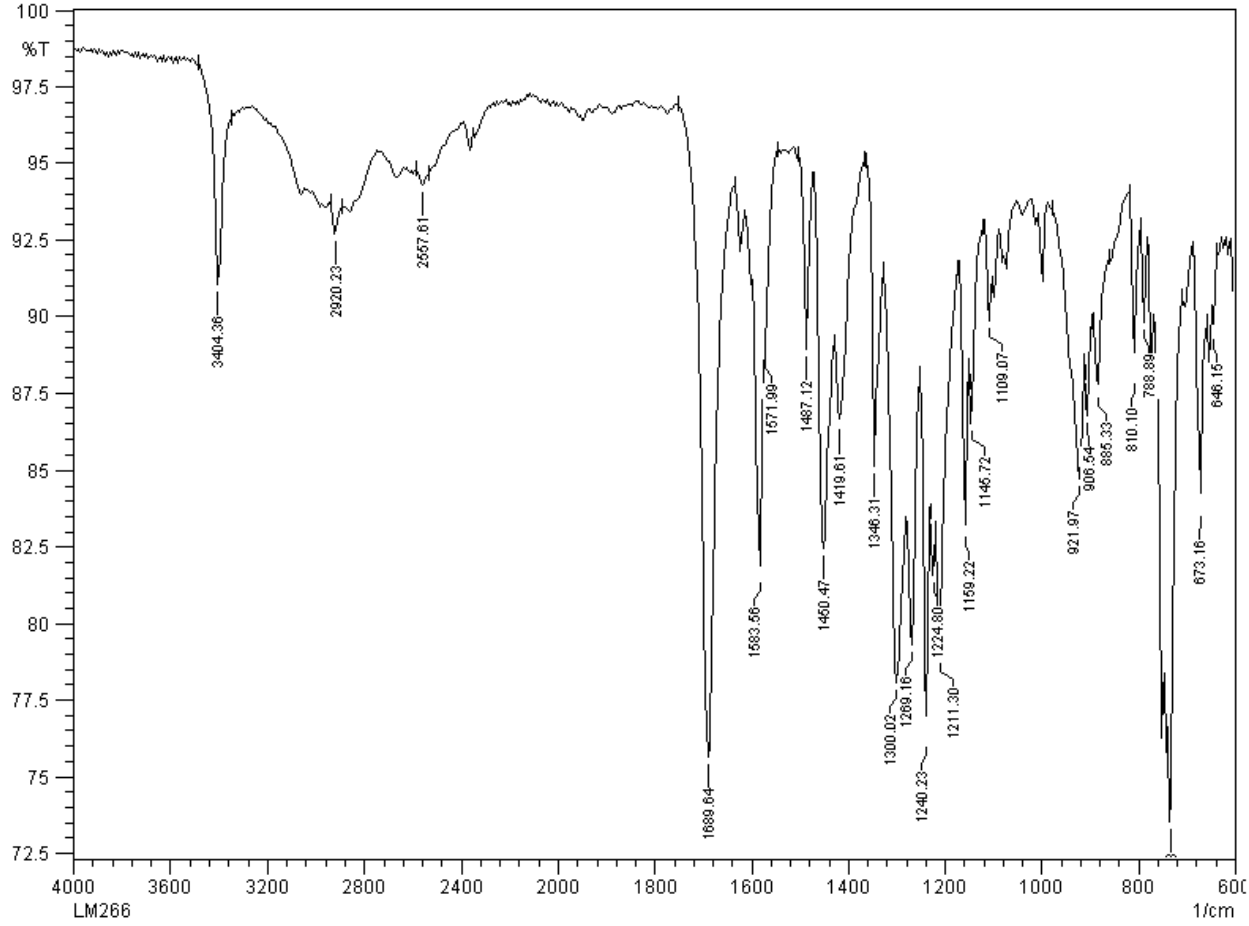
NL:
2.68E6
STRWAT325-OE-HNESP#8-23
RT: 0.12-0.54 AV: 16 T:
FTMS + p NSI Full ms
[140.00-1935.00]

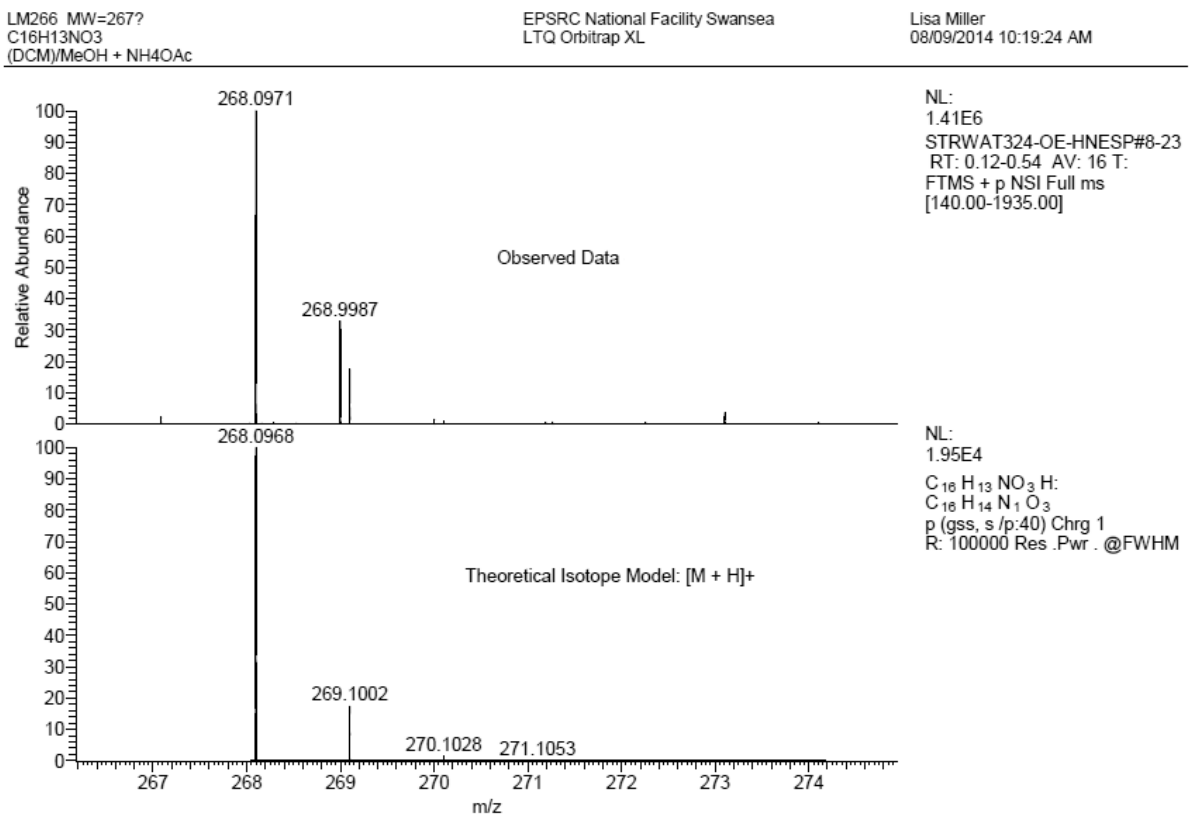
NL:
1.85E4
$C_{20}H_{17}N_3O_3H$:
$C_{20}H_{18}N_3O_3$
p (gss, s /p:40) Chrg 1
R: 100000 Res .Pwr . @FWHM

3-((2-Methyl-1*H*-indol-3-yl)oxy)benzoic acid (1.68).

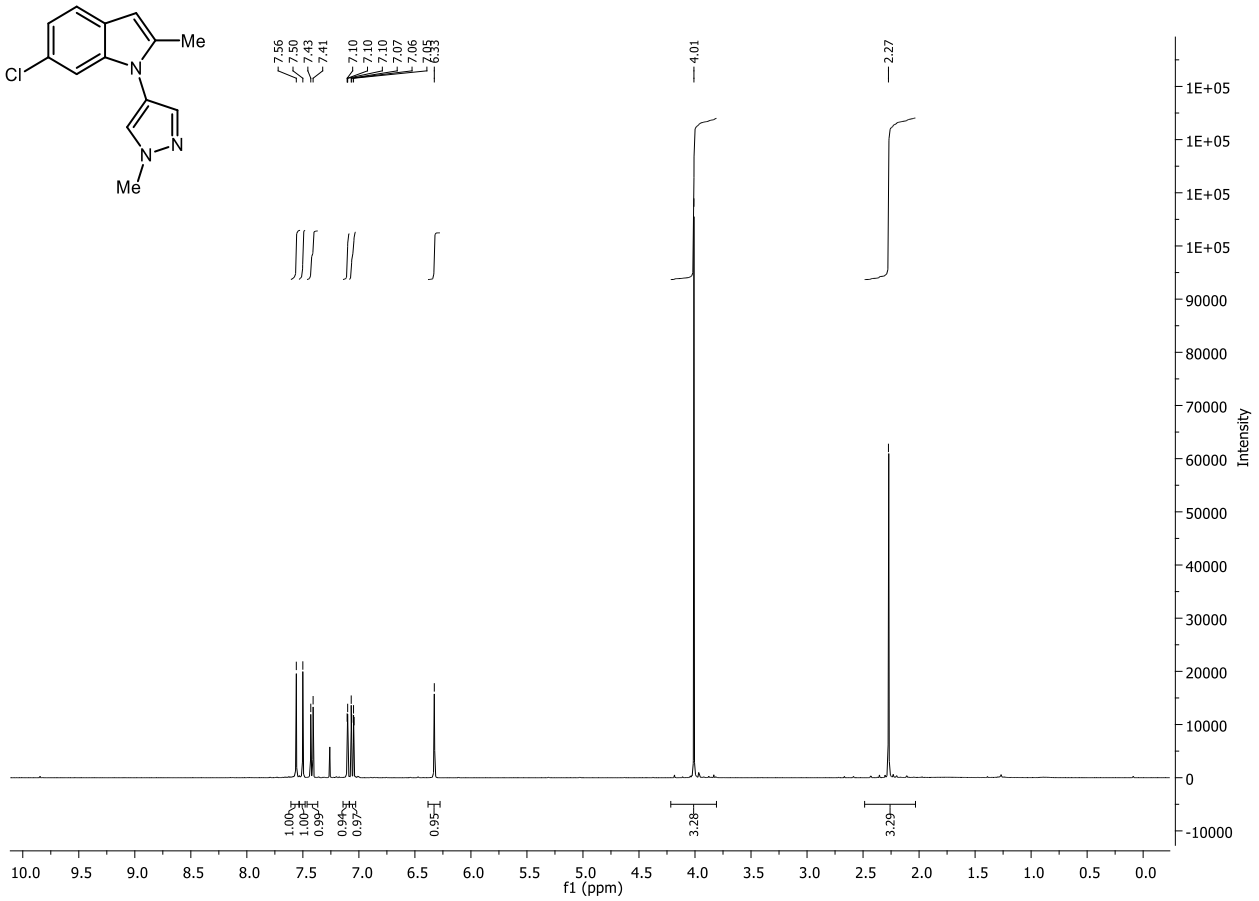


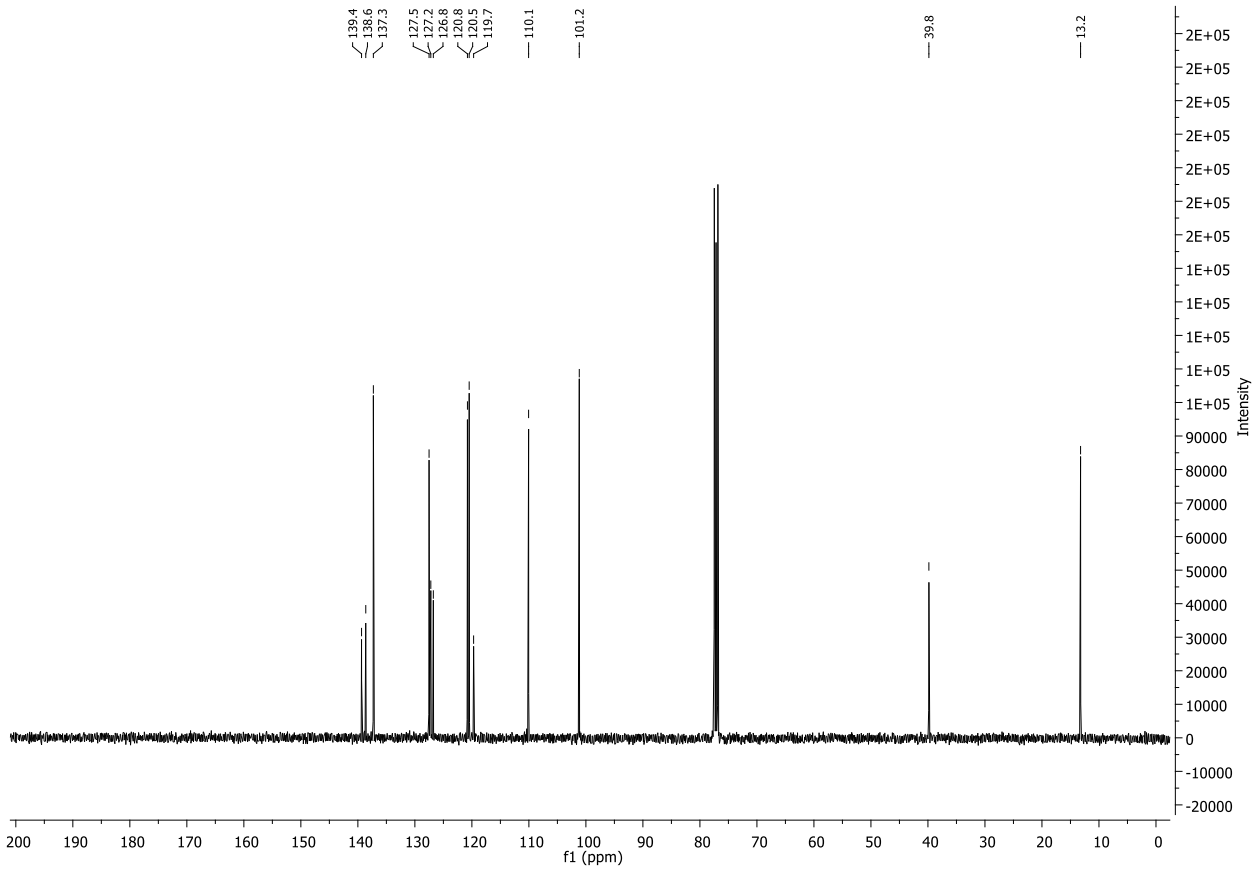


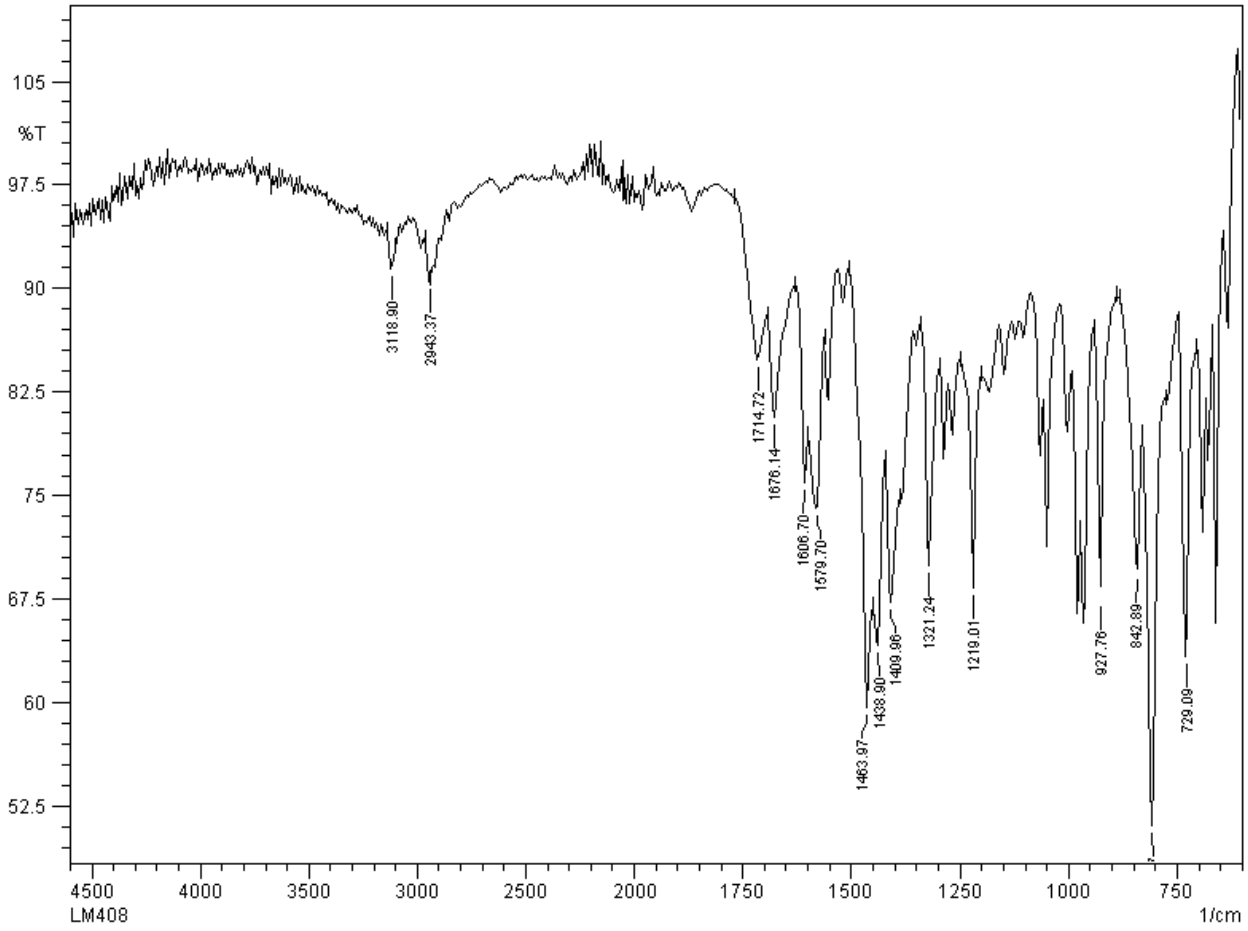

100
%T
97.5
95
92.5
90
87.5
85
82.5
80
77.5
75
72.5
3404.36
2920.23
2557.61
1689.64
1671.99
1583.56
1487.12
1460.47
1419.61
1346.31
1300.02
1269.16
1240.23
1224.80
1211.30
1159.22
1146.72
1109.07
921.97
906.54
885.33
810.10
788.89
673.16
646.15
4000
3600
3200
2800
2400
2000
1800
1600
1400
1200
1000
800
600
LM266
1/cm

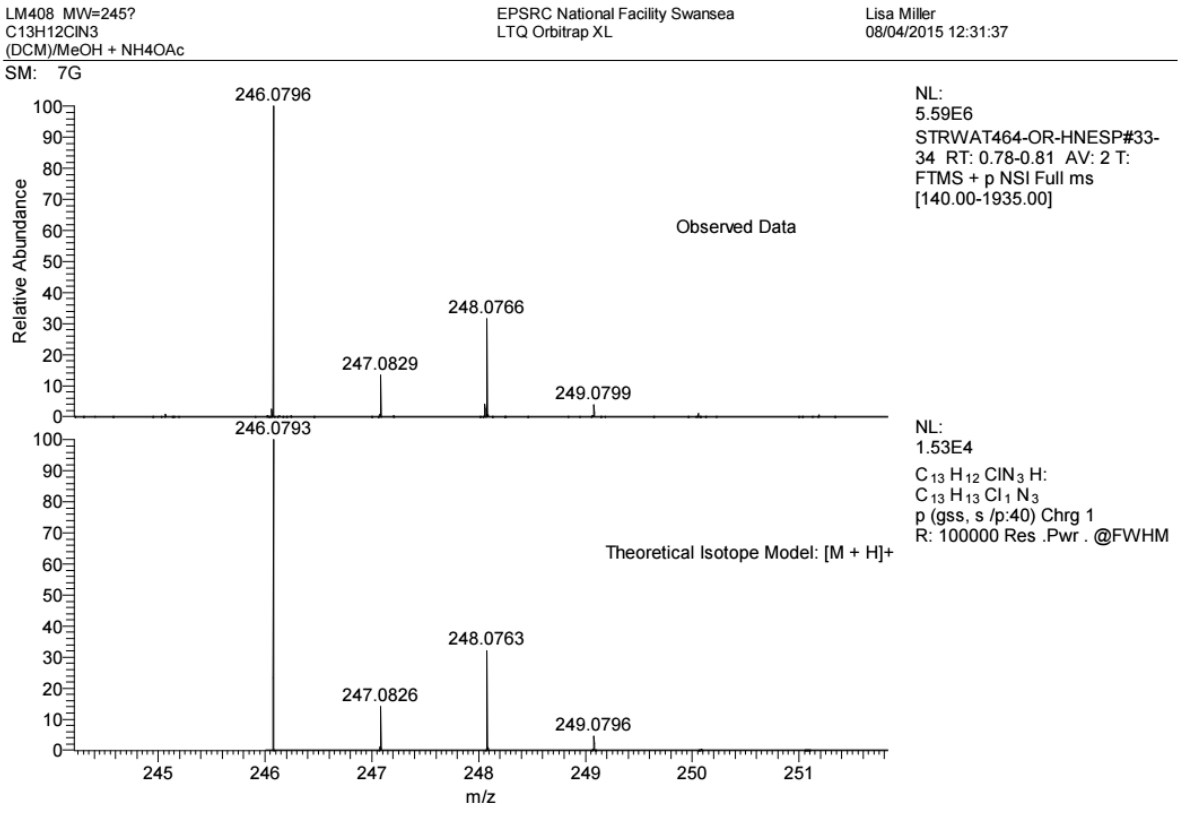

LM266 MW=267?
C16H13NO3
(DCM)/MeOH + NH4OAc
EPSRC National Facility Swansea
LTQ Orbitrap XL
Lisa Miller
08/09/2014 10:19:24 AM
268.0971
268.9987
Observed Data
Relative Abundance
NL:
1.41E6
STRWAT324-OE-HNESP#8-23
RT: 0.12-0.54 AV: 16 T:
FTMS + p NSI Full ms
[140.00-1935.00]
268.0968
269.1002
270.1028
271.1053
Theoretical Isotope Model: [M + H]+
NL:
1.95E4
C16 H13 NO3 H:
C16 H14 N1 O3
p (gss, s /p:40) Chrg 1
R: 100000 Res .Pwr . @FWHM
m/z

6-Chloro-2-methyl-1-(1-methyl-1*H*-pyrazol-4-yl)-1*H*-indole (1.72).

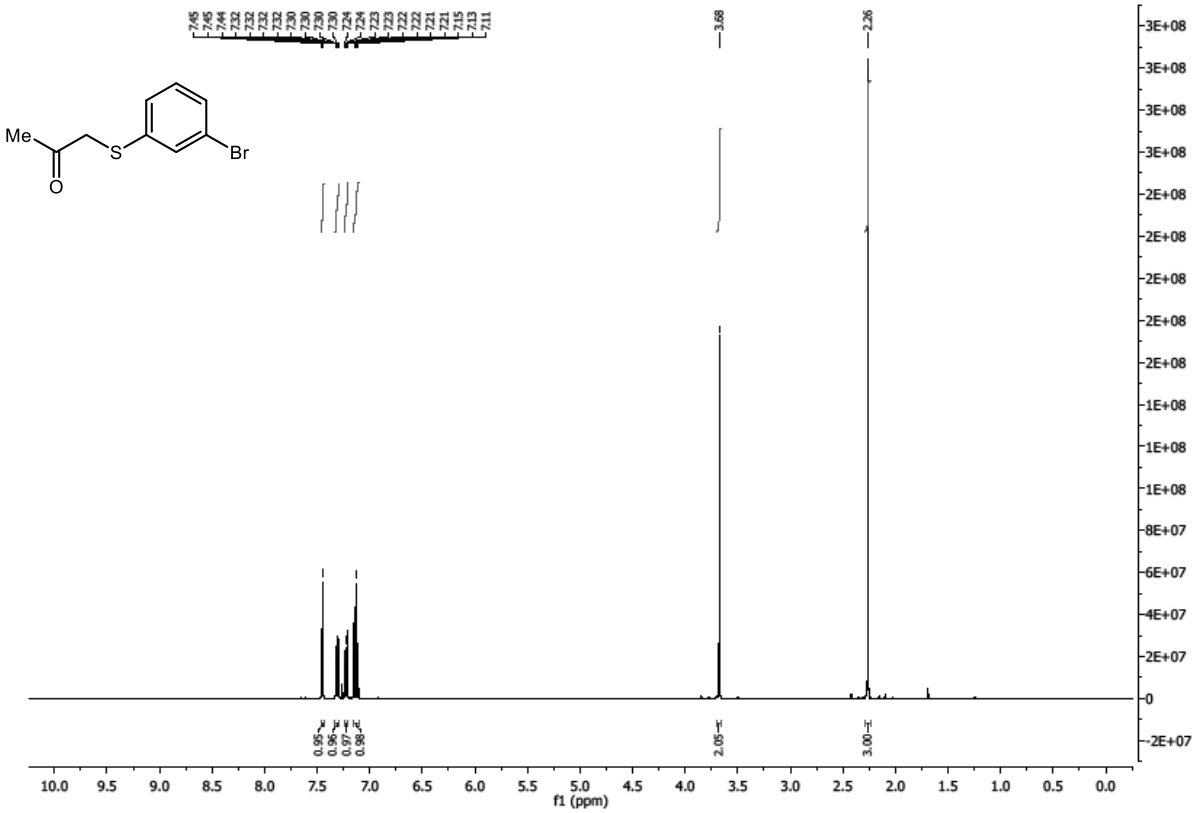


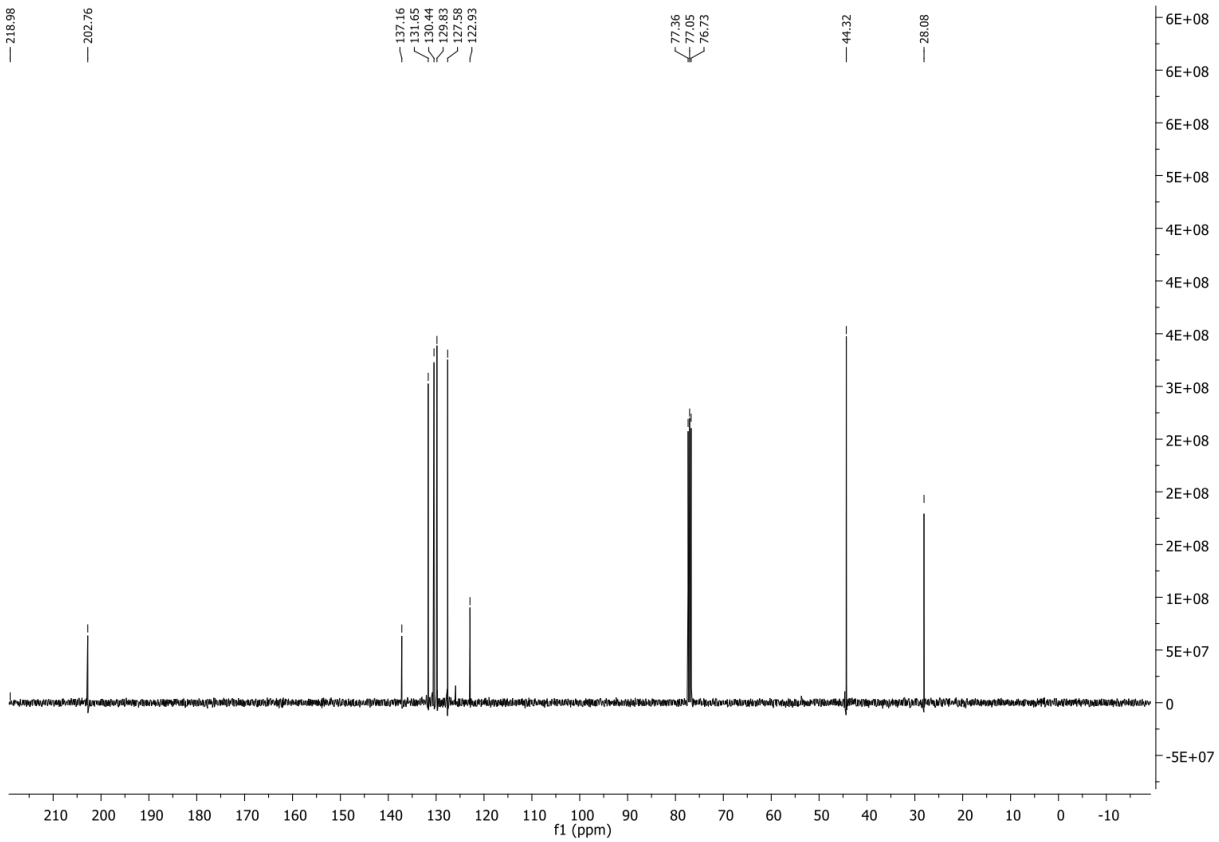


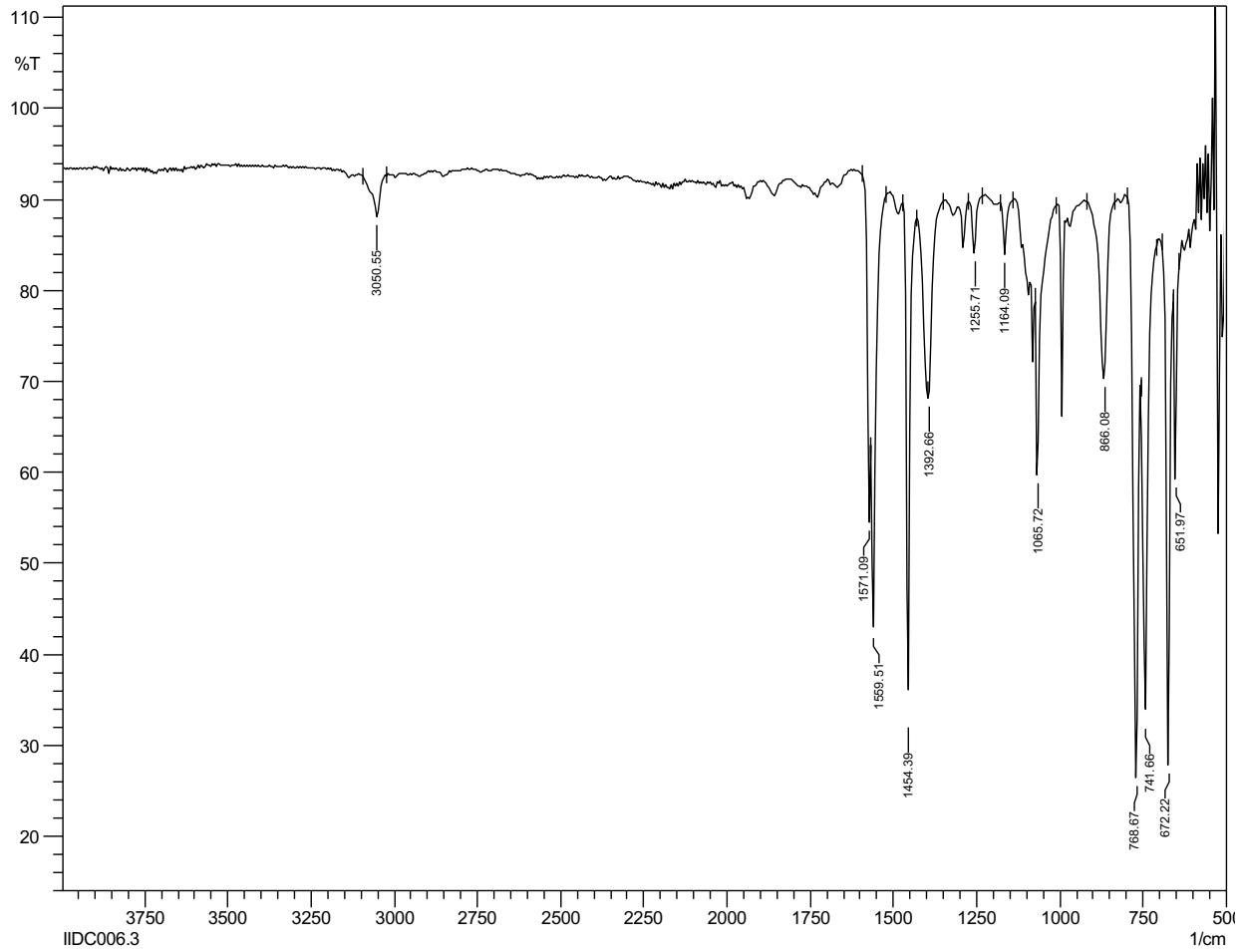

105
%T
97.5
90
82.5
75
67.5
60
52.5
3118.90
2943.37
1714.72
1676.14
1606.70
1579.70
1463.97
1438.90
1409.96
1321.24
1219.01
927.76
842.89
729.09
4500
4000
3500
3000
2500
2000
1750
1500
1250
1000
750
LM408
1/cm

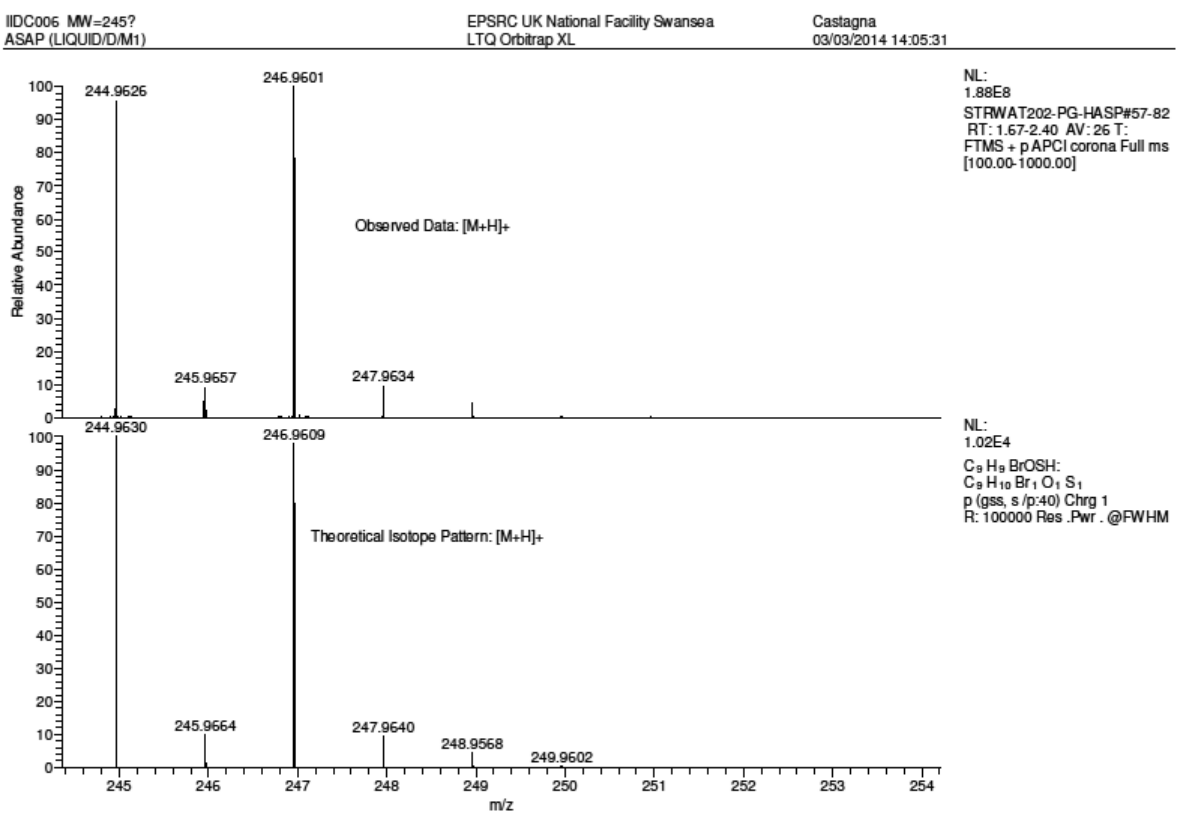

LM408 MW=245?
C13H12ClN3
(DCM)/MeOH + NH4OAc
EPSRC National Facility Swansea
LTQ Orbitrap XL
Lisa Miller
08/04/2015 12:31:37
SM: 7G
246.0796
248.0766
247.0829
249.0799
Observed Data
NL:
5.59E6
STRWAT464-OR-HNESP#33-34 RT: 0.78-0.81 AV: 2 T: FTMS + p NSI Full ms [140.00-1935.00]
246.0793
248.0763
247.0826
249.0796
Theoretical Isotope Model: [M + H]+
NL:
1.53E4
C13 H12 ClN3 H:
C13 H13 Cl1 N3
p (gss, s /p:40) Chrg 1
R: 100000 Res .Pwr . @FWHM
Relative Abundance
m/z
245
246
247
248
249
250
251

1-((3-Bromophenyl)thio)propan-2-one (1.74).

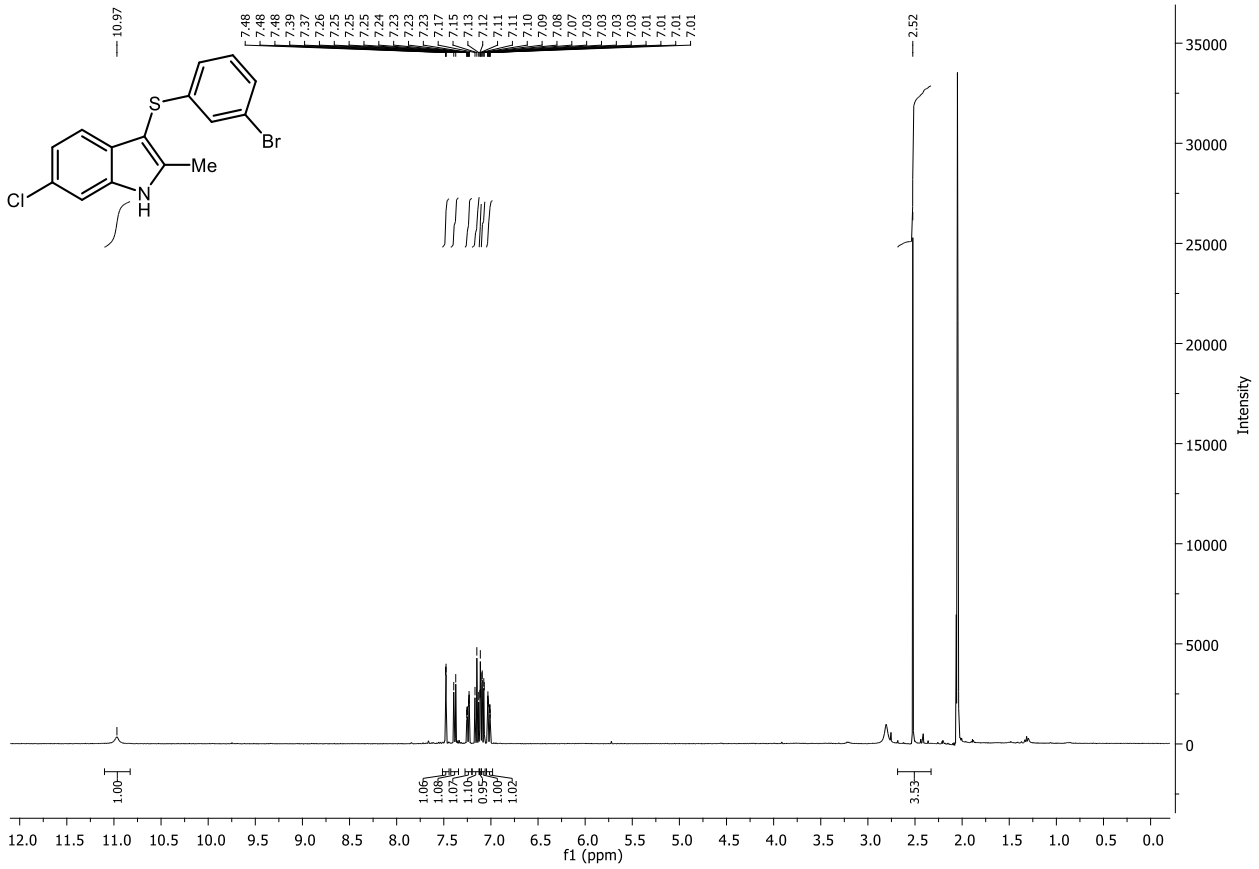


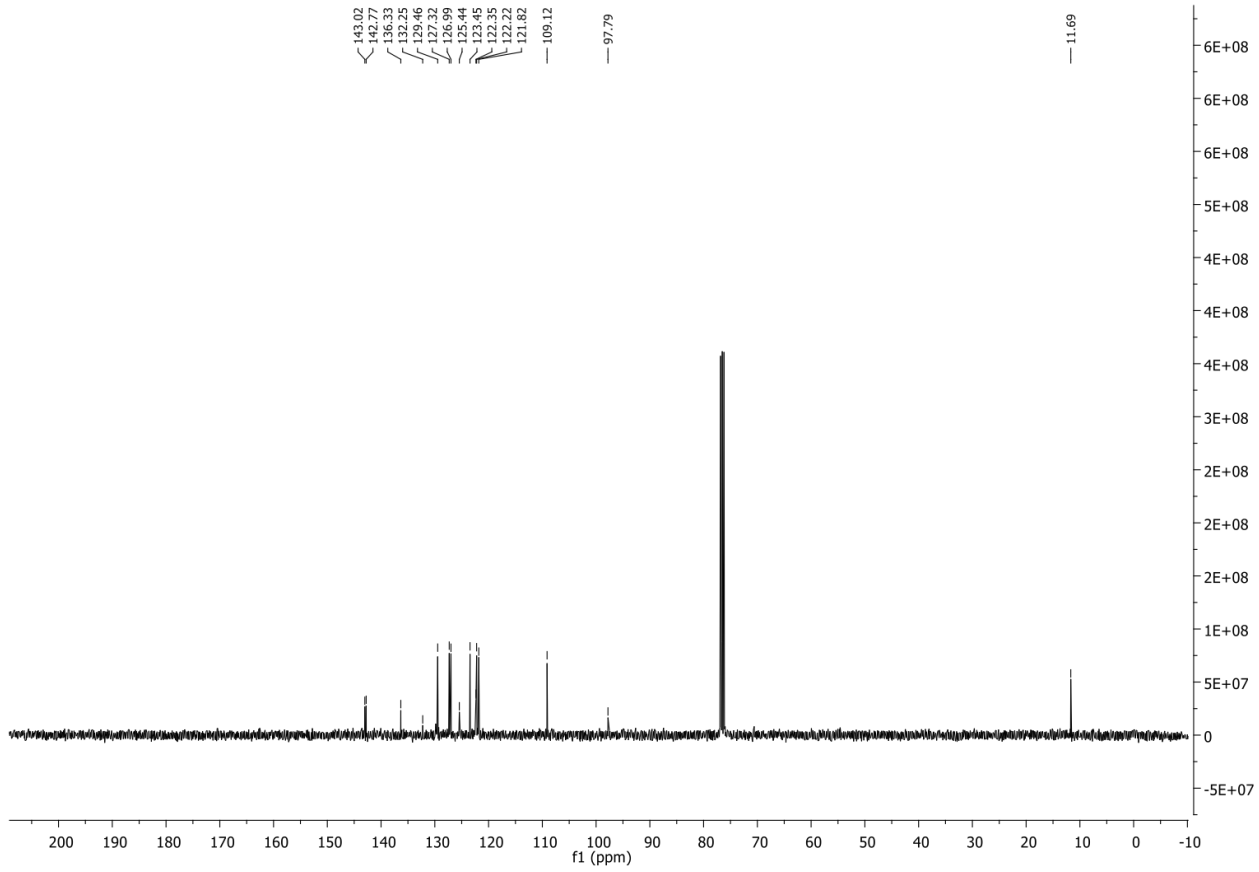


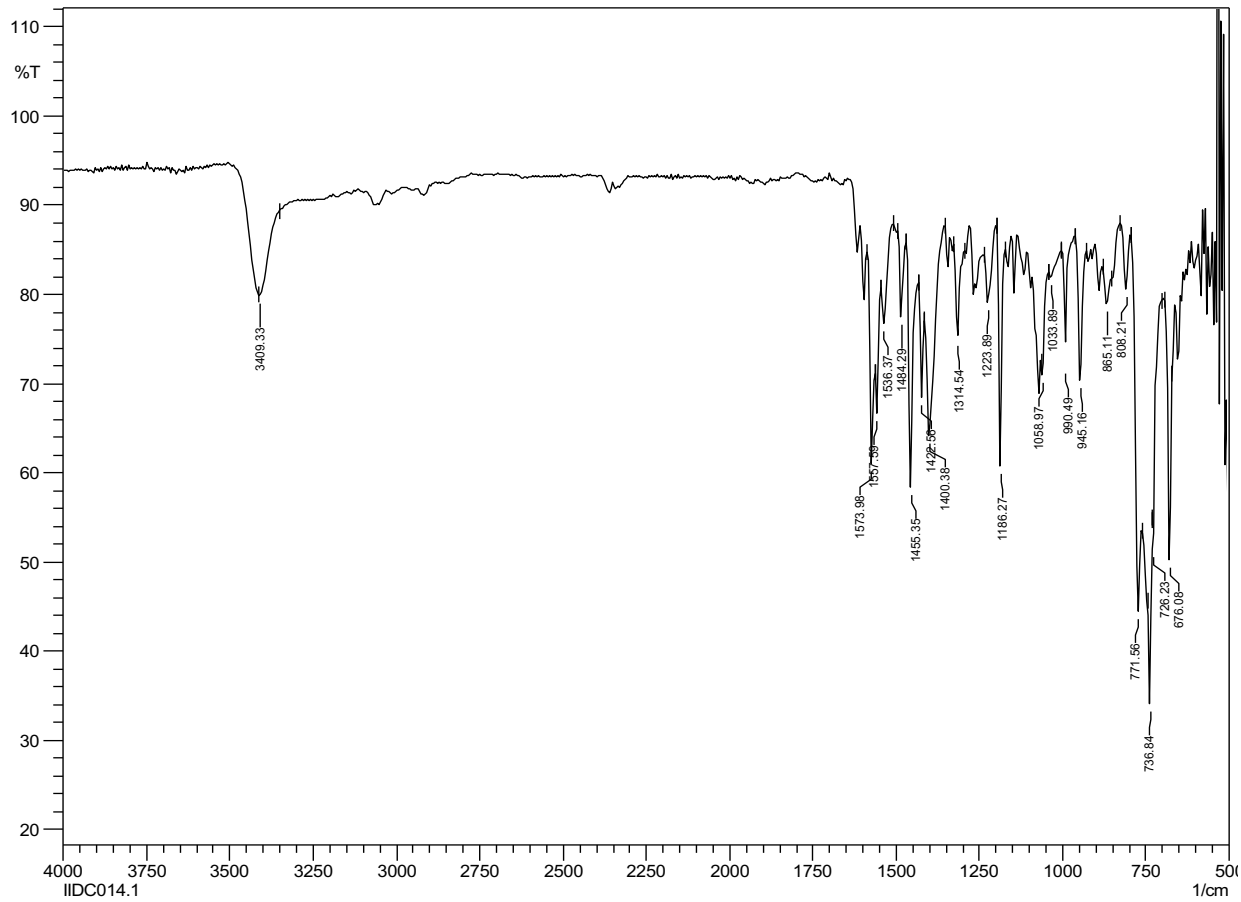

%T
3050.55
1571.09
1559.51
1454.39
1392.66
1255.71
1164.09
1065.72
866.08
768.67
741.66
672.22
651.97
IIDC006.3
1/cm

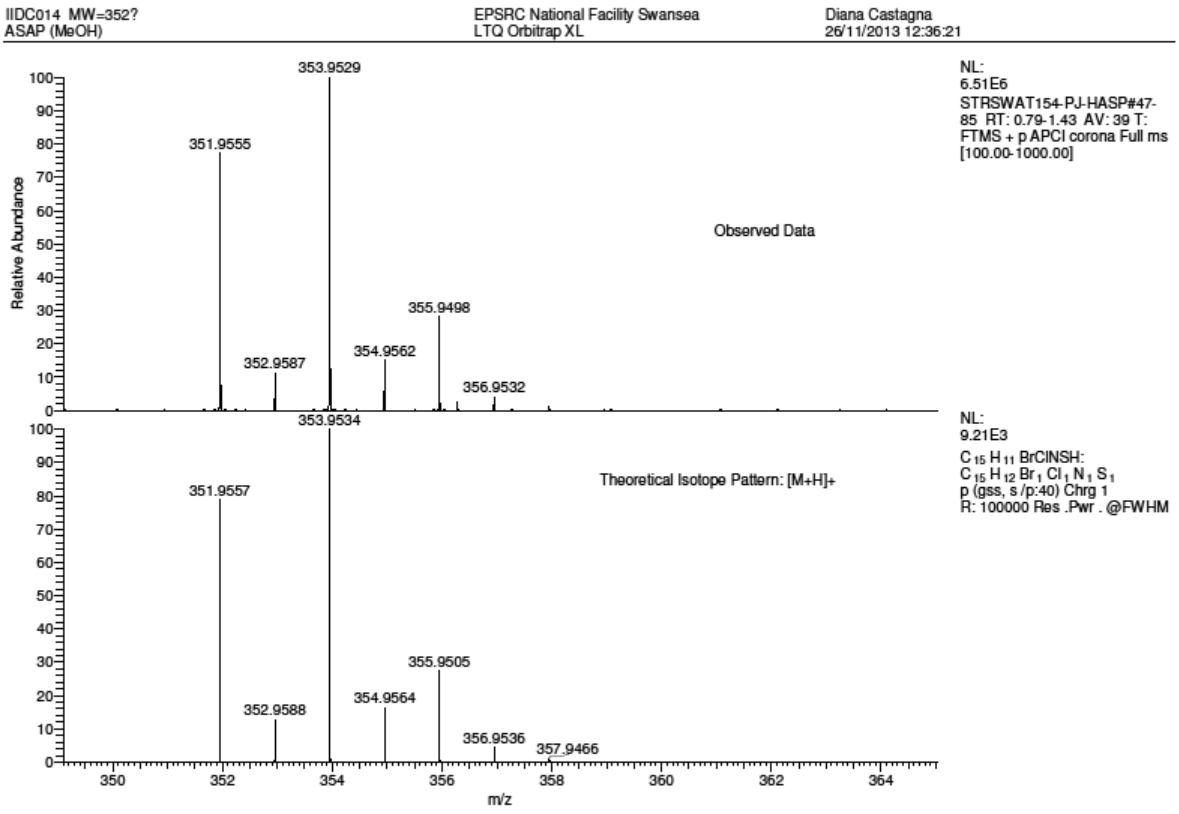

IIDC006 MW=245?
ASAP (LIQUID/D/M1)
EPSRC UK National Facility Swansea
LTQ Orbitrap XL
Castagna
03/03/2014 14:05:31
NL:
1.88E8
STRWAT202-PG-HASP#57-82
RT: 1.67-2.40 AV: 26 T:
FTMS + p APCI corona Full ms
[100.00-1000.00]
Observed Data: [M+H]+
244.9626
245.9657
246.9601
247.9634
Relative Abundance
NL:
1.02E4
C9 H9 BrOSH:
C9 H10 Br1 O1 S1
p (gss, s /p:40) Chrg 1
R: 100000 Res .Pwr . @FWHM
Theoretical Isotope Pattern: [M+H]+
244.9630
245.9664
246.9609
247.9640
248.9568
249.9602
m/z

3-((3-Bromophenyl)thio)-6-chloro-2-methyl-1*H*-indole (1.76).

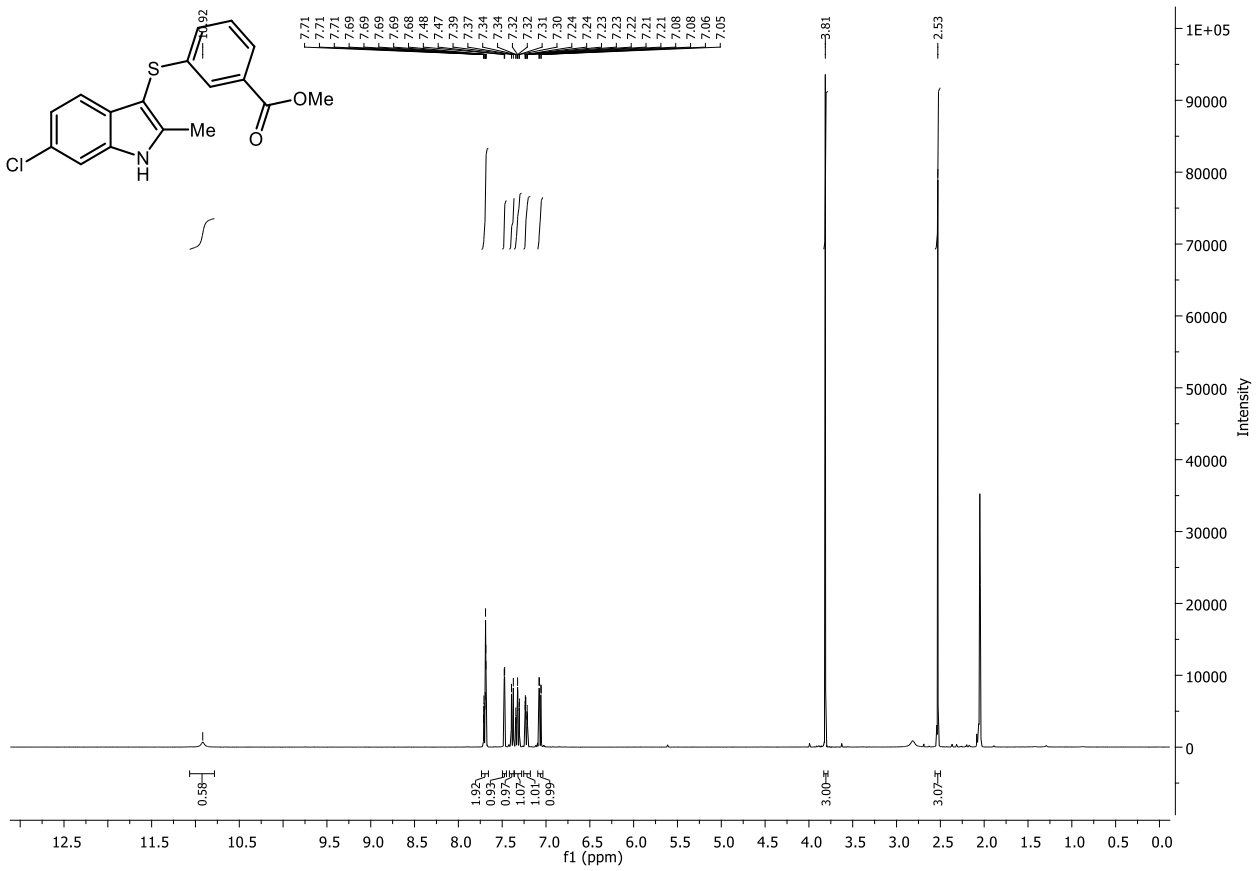


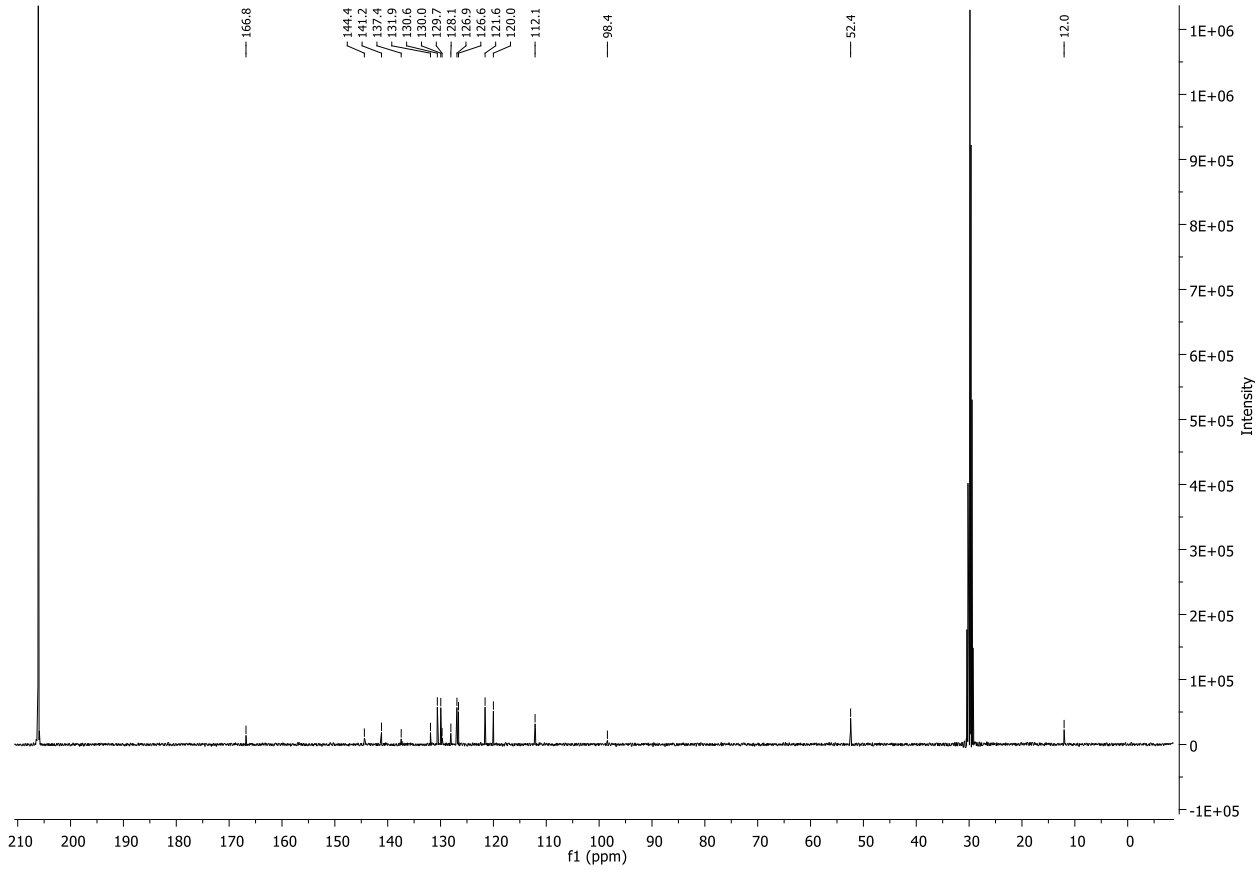


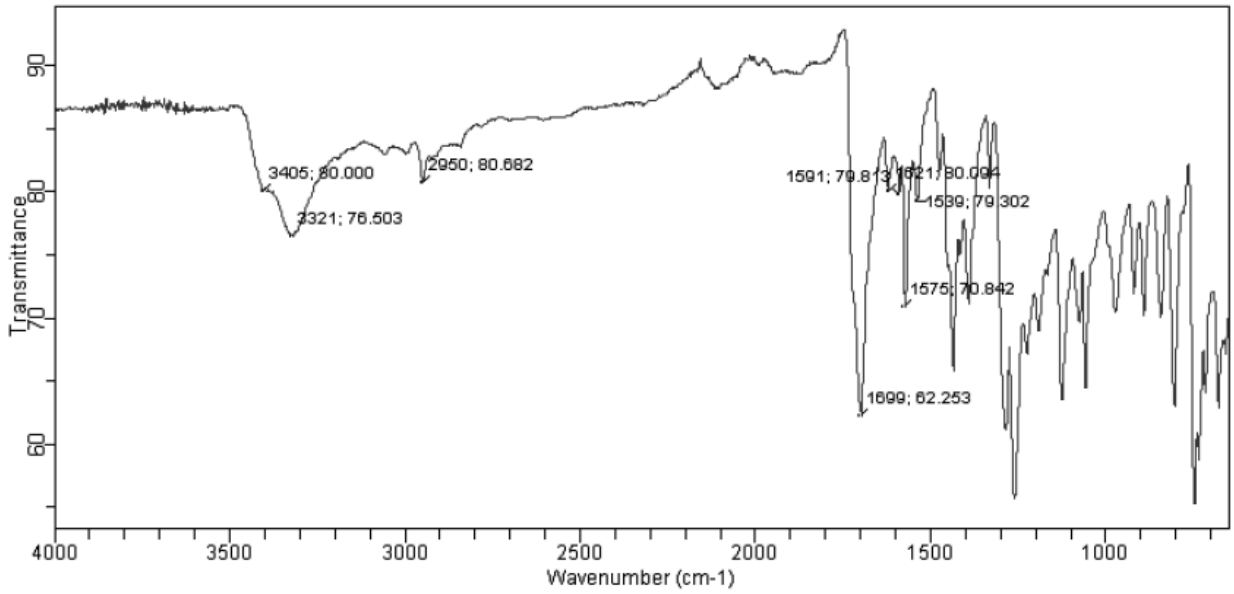

%T
3409.33
1573.98
1557.69
1536.37
1484.29
1455.35
1400.38
1314.54
1223.89
1186.27
1058.97
1033.89
990.49
945.16
865.11
808.21
771.56
736.84
726.23
676.08
IIDC014.1
1/cm

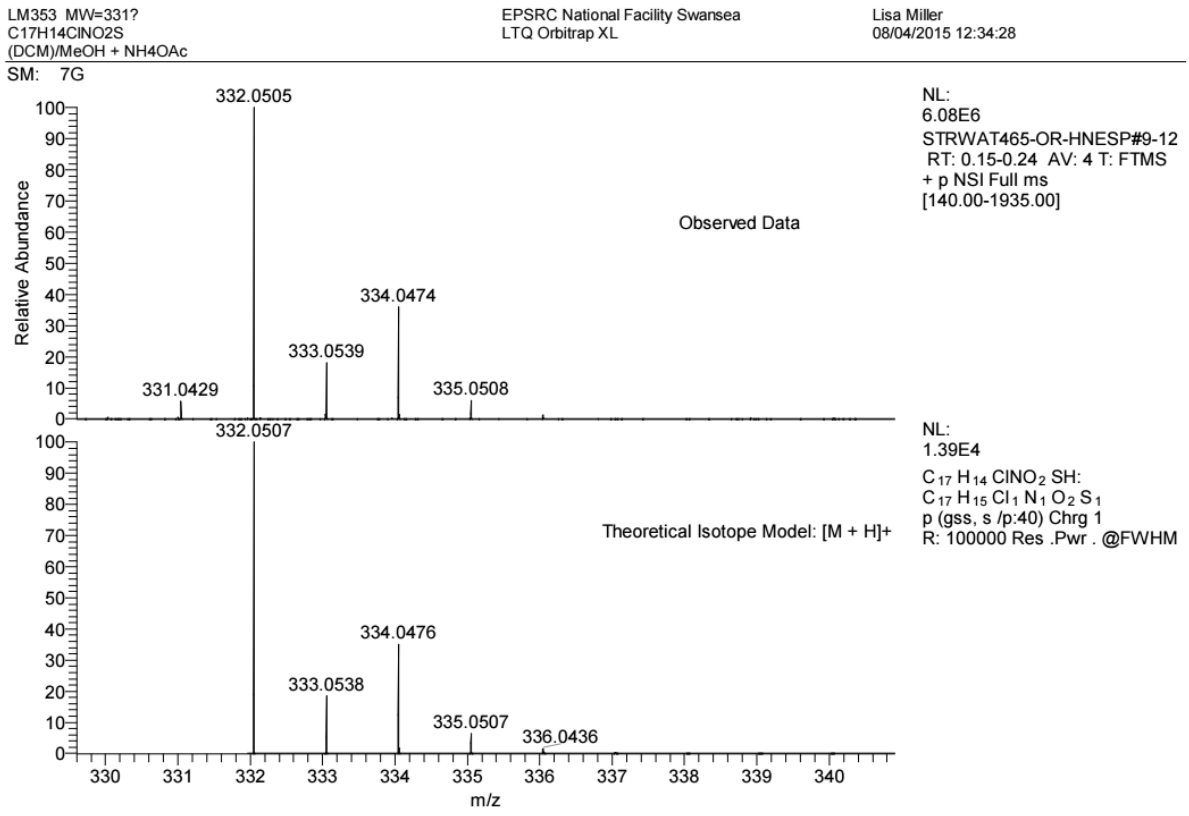

IIDC014 MW=352?
ASAP (MeOH)
EPSRC National Facility Swansea
LTQ Orbitrap XL
Diana Castagna
26/11/2013 12:36:21
Relative Abundance
353.9529
351.9555
355.9498
354.9562
352.9587
356.9532
Observed Data
NL:
6.51E6
STRSWAT154-PJ-HASP#47-85 RT: 0.79-1.43 AV: 39 T: FTMS + p APCI corona Full ms [100.00-1000.00]
353.9534
351.9557
355.9505
354.9564
352.9588
356.9536
357.9466
Theoretical Isotope Pattern: [M+H]+
NL:
9.21E3
C15 H11 BrClNSH:
C15 H12 Br1 Cl1 N1 S1
p (gss, s /p:40) Chrg 1
R: 100000 Res .Pwr . @FWHM
m/z

Methyl 3-((6-chloro-2-methyl-1*H*-indol-3-yl)thio)benzoate (1.77).

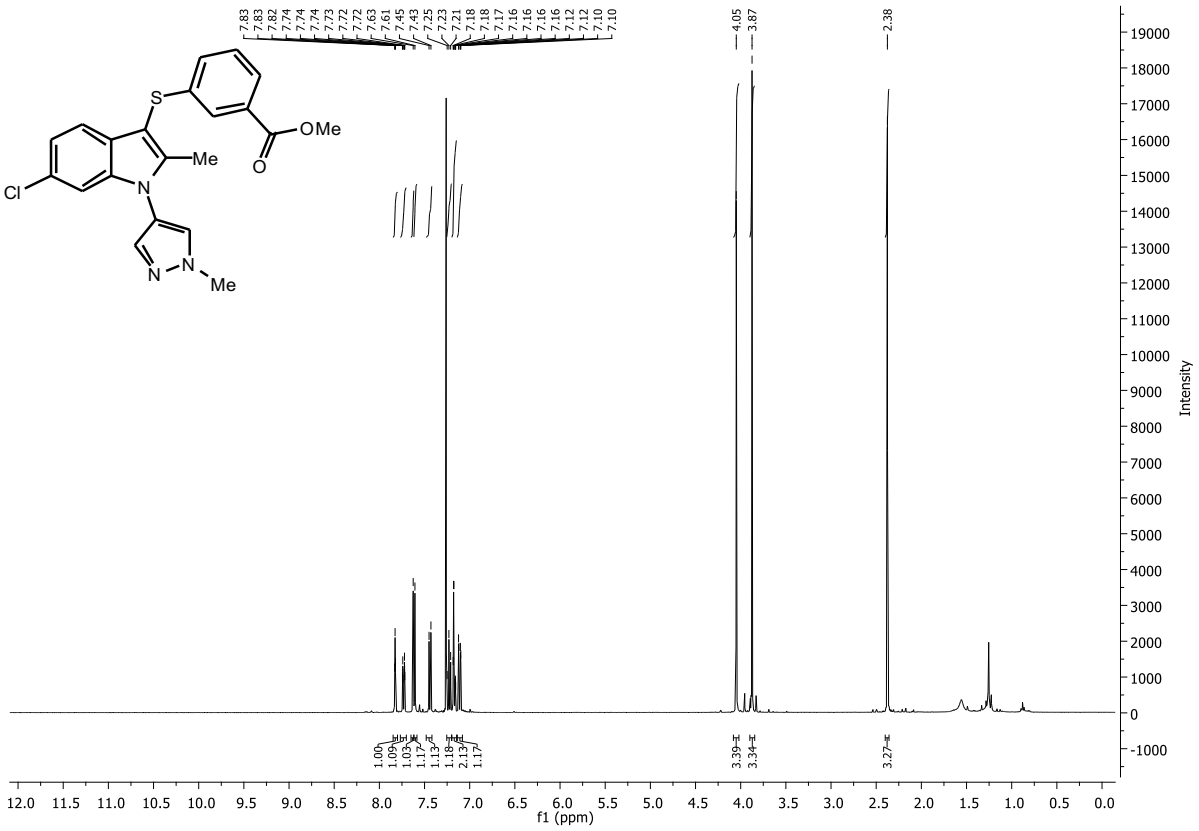


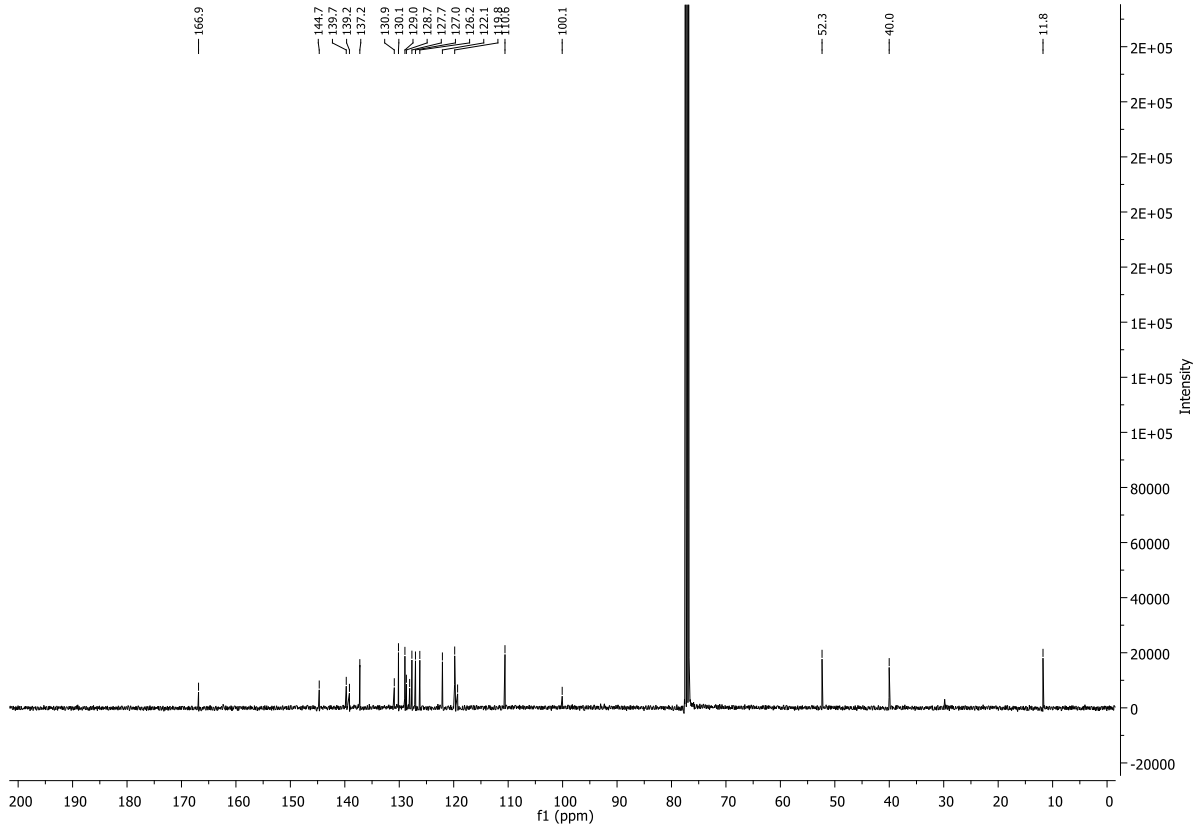


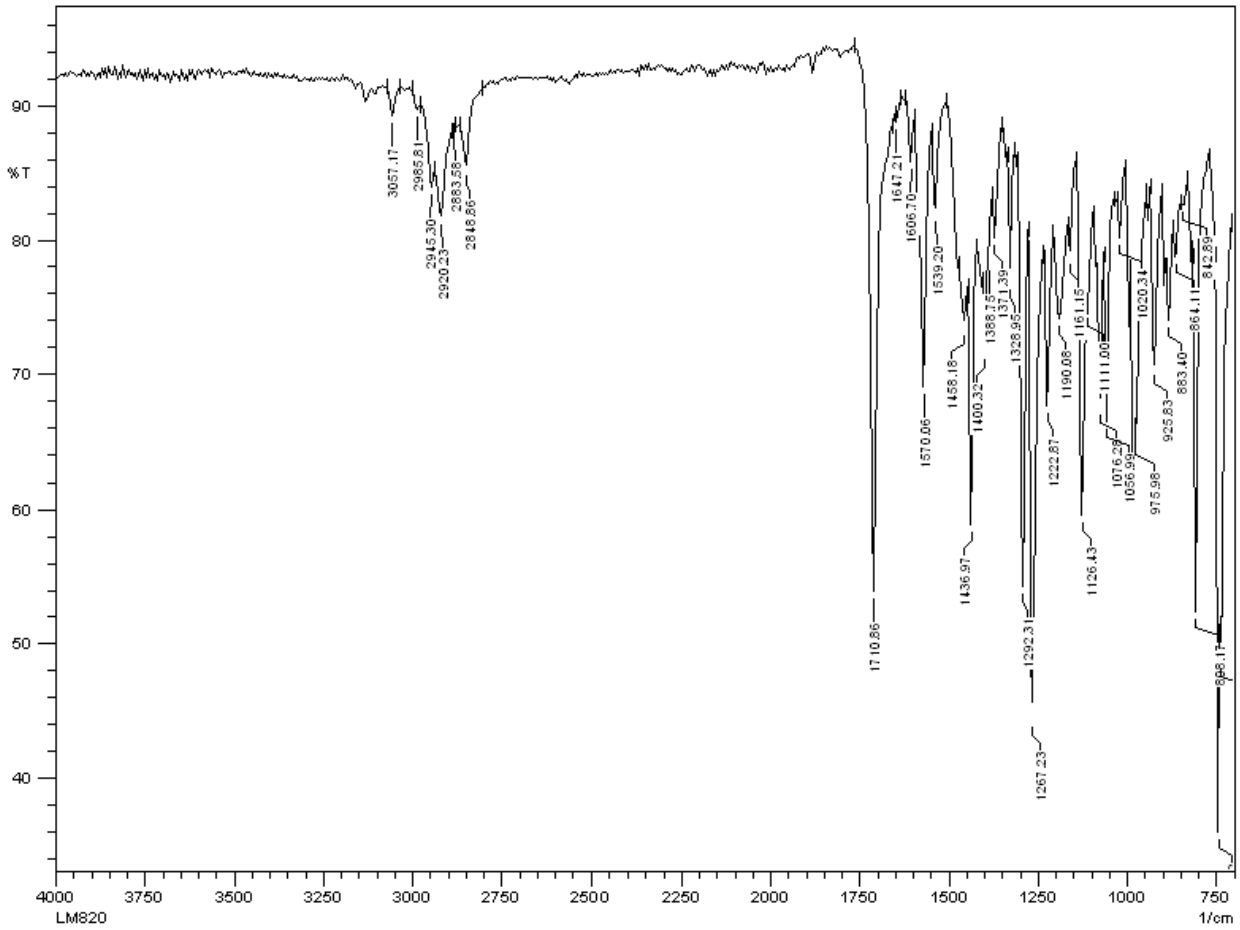

Transmittance
Wavenumber (cm-1)
3405; 80.000
3321; 76.503
2950; 80.682
1591; 79.813
1539; 79.302
1575; 70.842
1699; 62.253

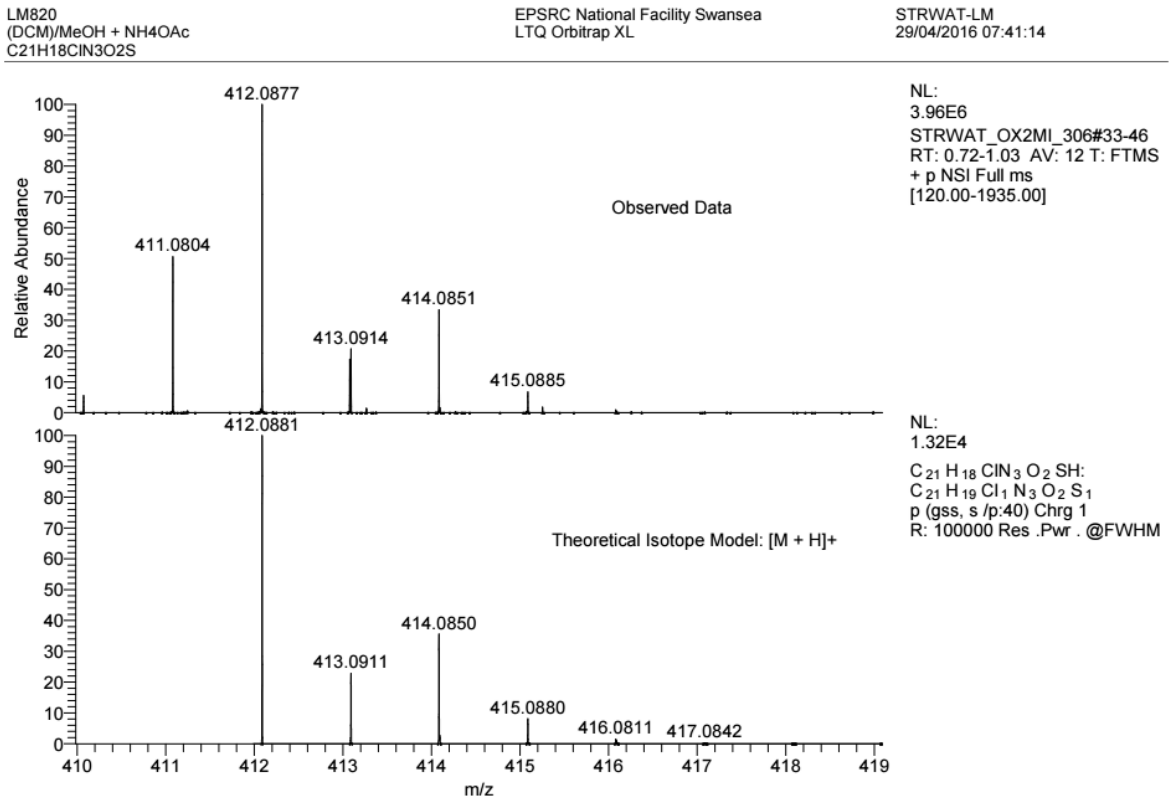

LM353 MW=331?
C17H14ClNO2S
(DCM)/MeOH + NH4OAc
EPSRC National Facility Swansea
LTQ Orbitrap XL
Lisa Miller
08/04/2015 12:34:28
SM: 7G
Relative Abundance
m/z
Observed Data
Theoretical Isotope Model: [M + H]+
NL:
6.08E6
STRWAT465-OR-HNESP#9-12
RT: 0.15-0.24 AV: 4 T: FTMS
+ p NSI Full ms
[140.00-1935.00]
NL:
1.39E4
C17 H14 ClNO2 SH:
C17 H15 Cl1 N1 O2 S1
p (gss, s /p:40) Chrg 1
R: 100000 Res .Pwr . @FWHM

Methyl 3-((6-chloro-2-methyl-1-(1-methyl-1*H*-pyrazol-4-yl)-1*H*-indol-3-yl)thio)benzoate (1.78).

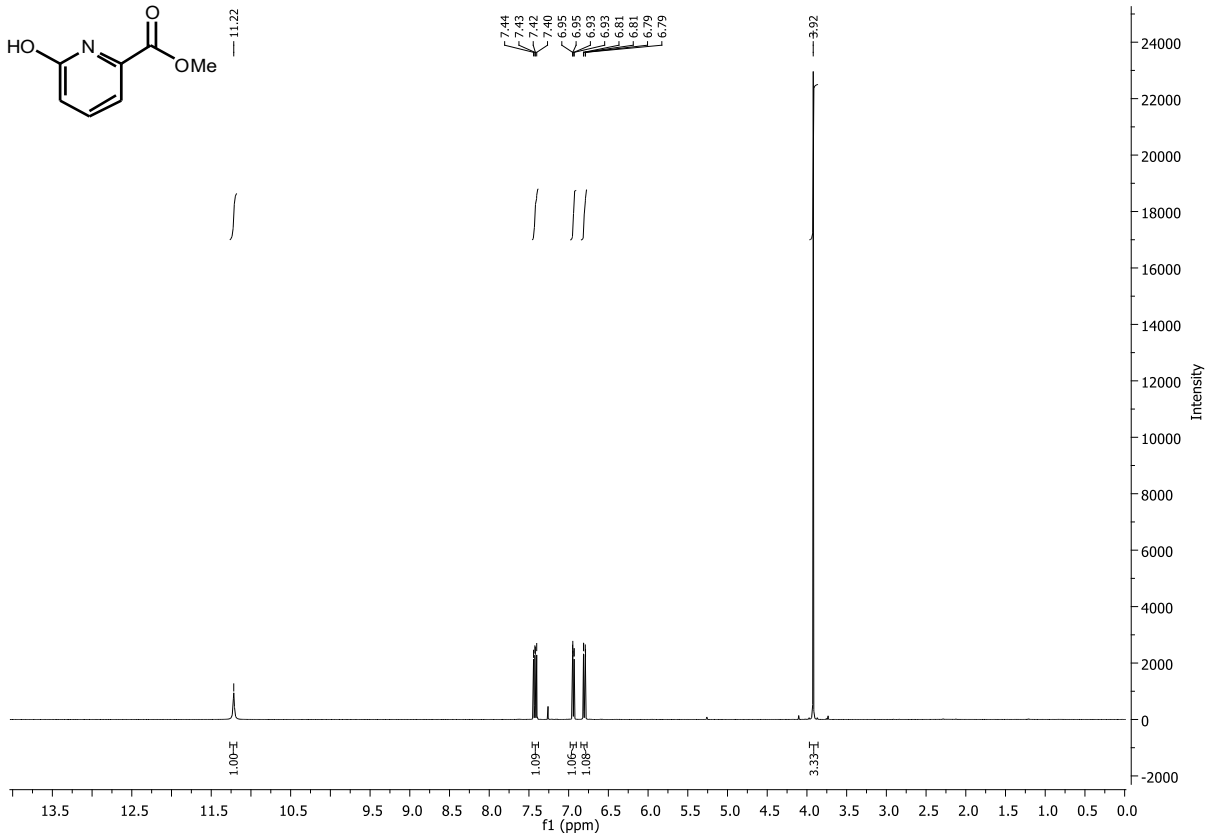


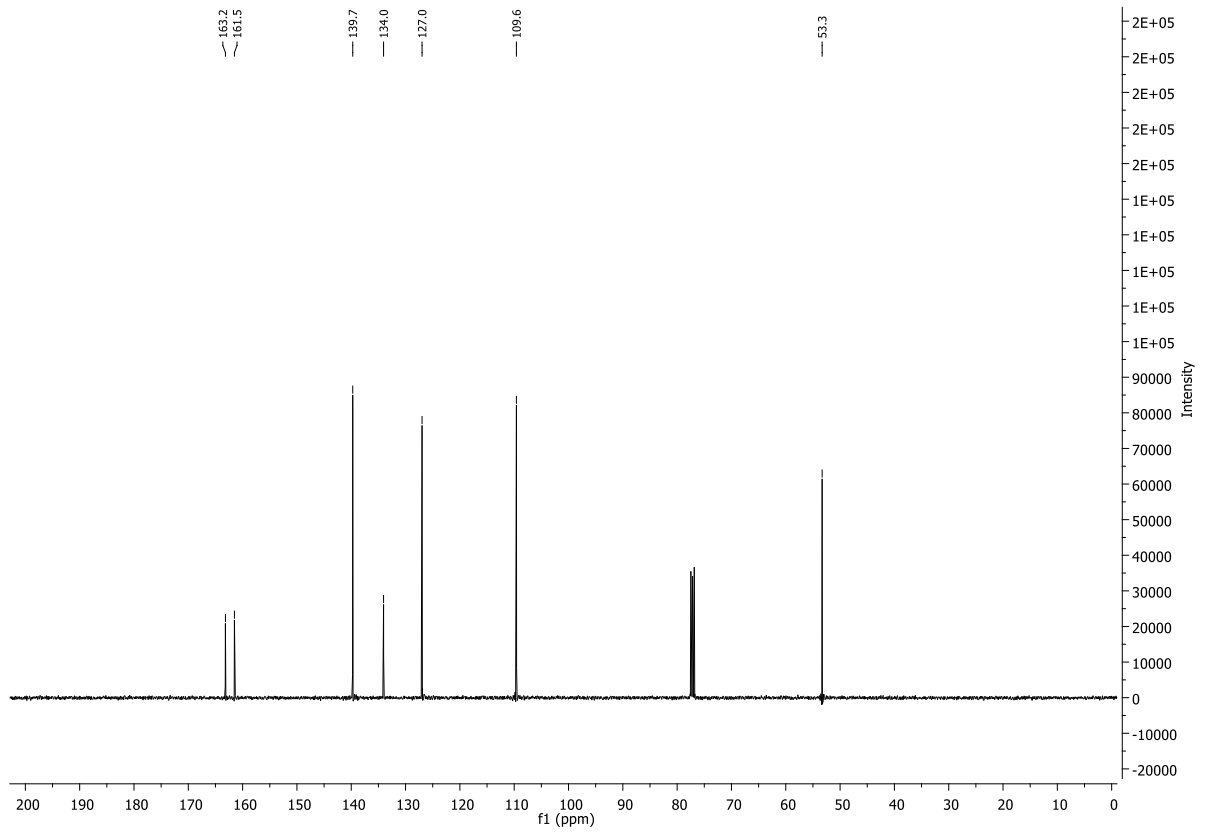


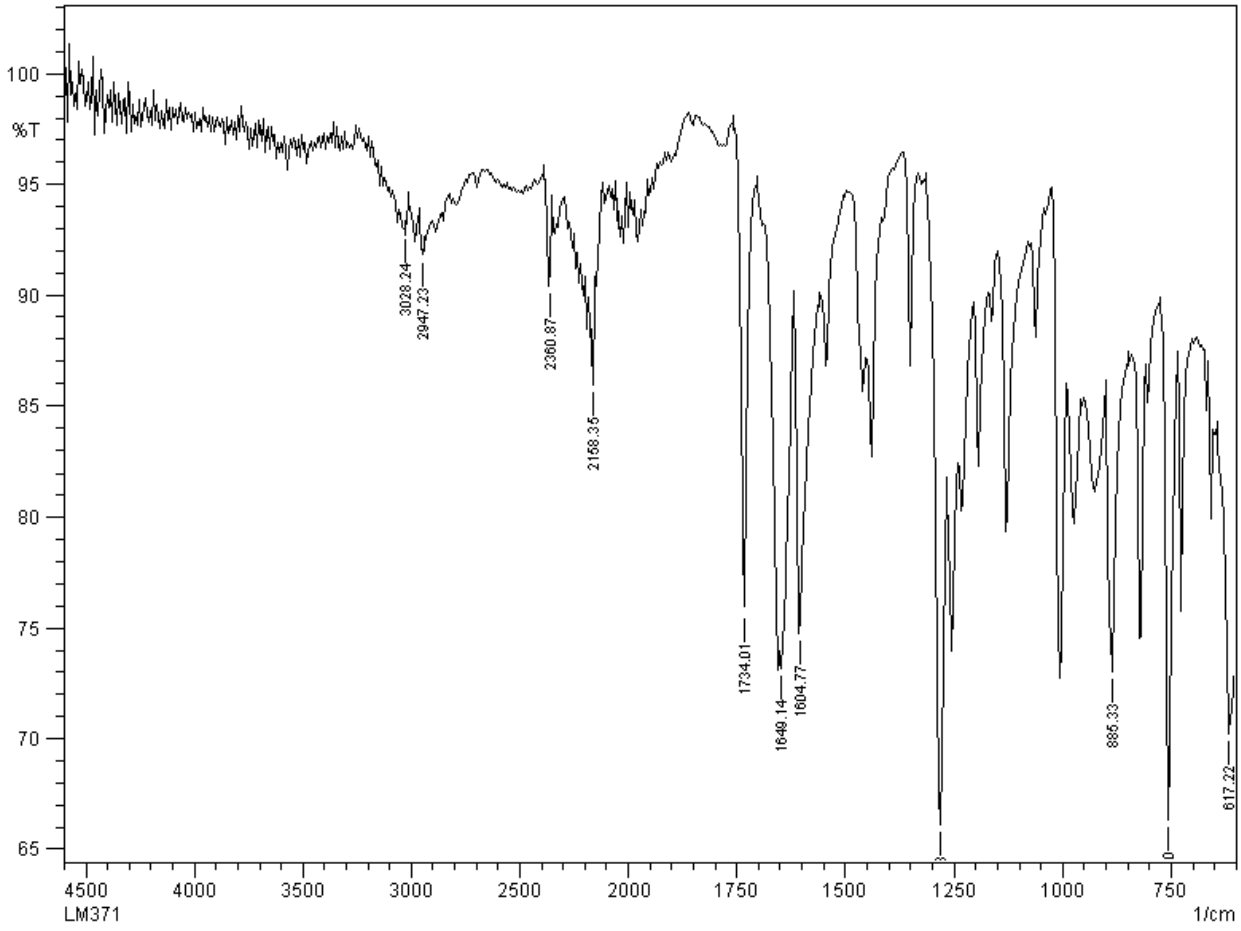

%T
3057.17
2985.81
2945.30
2920.23
2883.58
2848.86
1710.86
1647.21
1606.70
1570.06
1539.20
1458.18
1436.97
1400.32
1388.75
1371.39
1328.95
1292.31
1267.23
1222.87
1190.08
1161.15
1111.00
1076.28
1056.99
1020.34
975.98
925.83
883.40
864.11
842.89
4000
3750
3500
3250
3000
2750
2500
2250
2000
1750
1500
1250
1000
750
LM820
1/cm

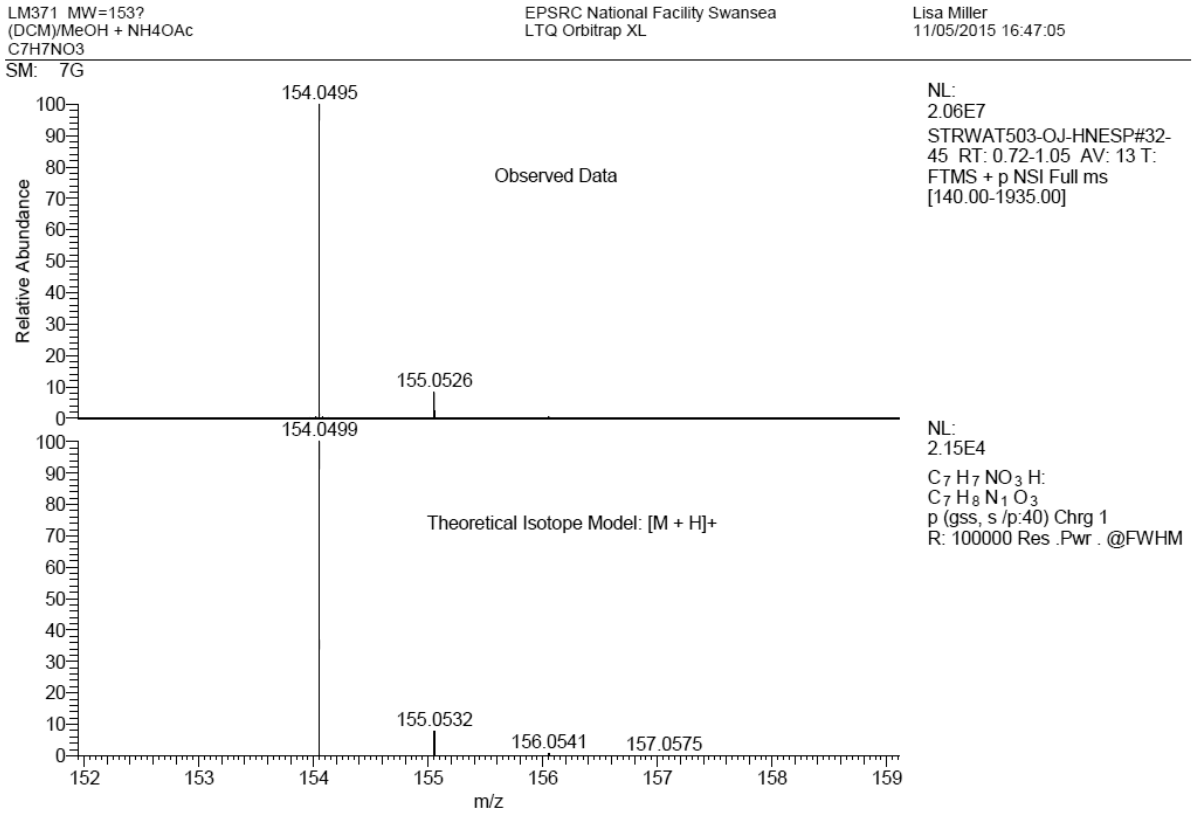

LM820
(DCM)/MeOH + NH4OAc
C21H18ClN3O2S
EPSRC National Facility Swansea
LTQ Orbitrap XL
STRWAT-LM
29/04/2016 07:41:14
Relative Abundance
412.0877
411.0804
414.0851
413.0914
415.0885
Observed Data
NL:
3.96E6
STRWAT_OX2MI_306#33-46
RT: 0.72-1.03 AV: 12 T: FTMS
+ p NSI Full ms
[120.00-1935.00]
412.0881
414.0850
413.0911
415.0880
416.0811
417.0842
Theoretical Isotope Model: [M + H]+
NL:
1.32E4
C21 H18 ClN3 O2 SH:
C21 H19 Cl1 N3 O2 S1
p (gss, s /p:40) Chrg 1
R: 100000 Res .Pwr . @FWHM
m/z

Methyl 6-hydroxypicolinate (1.80).

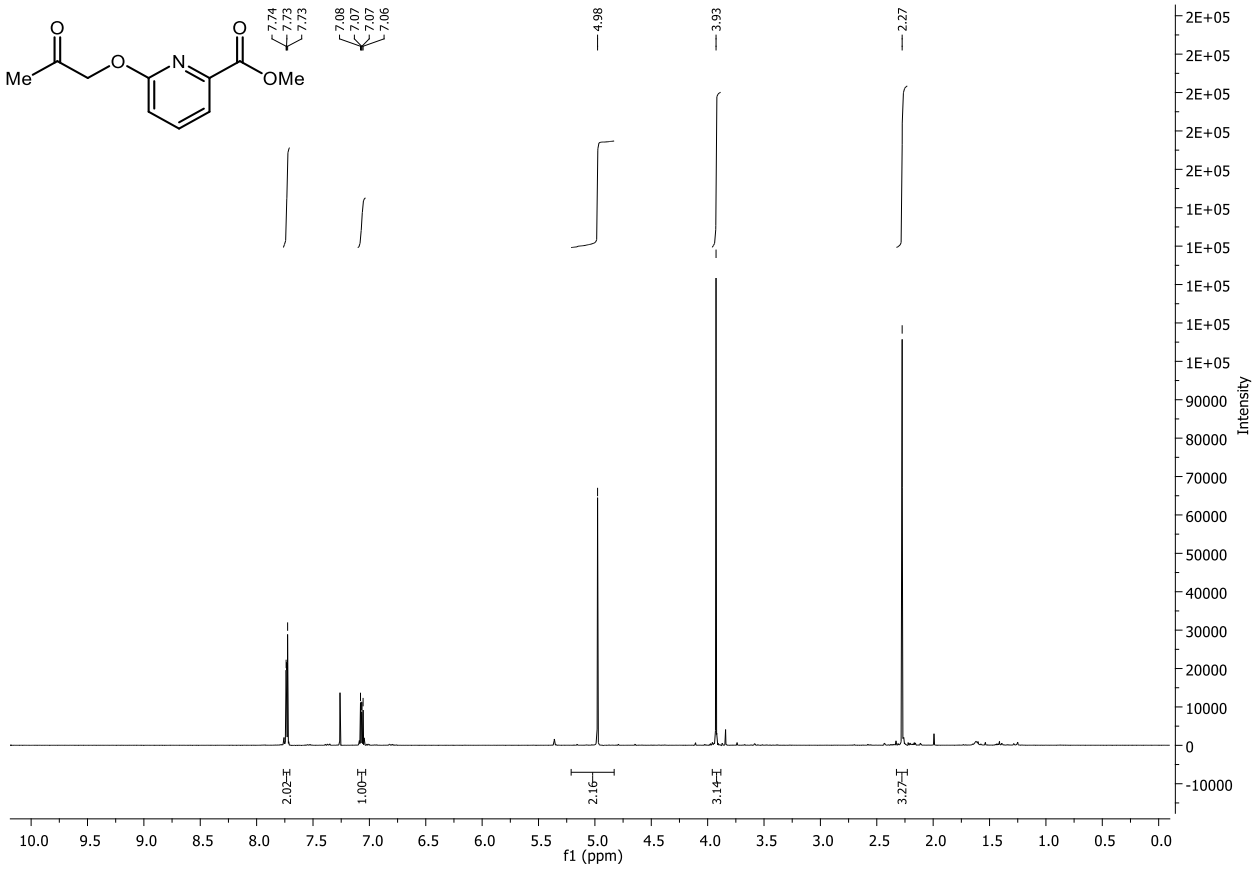


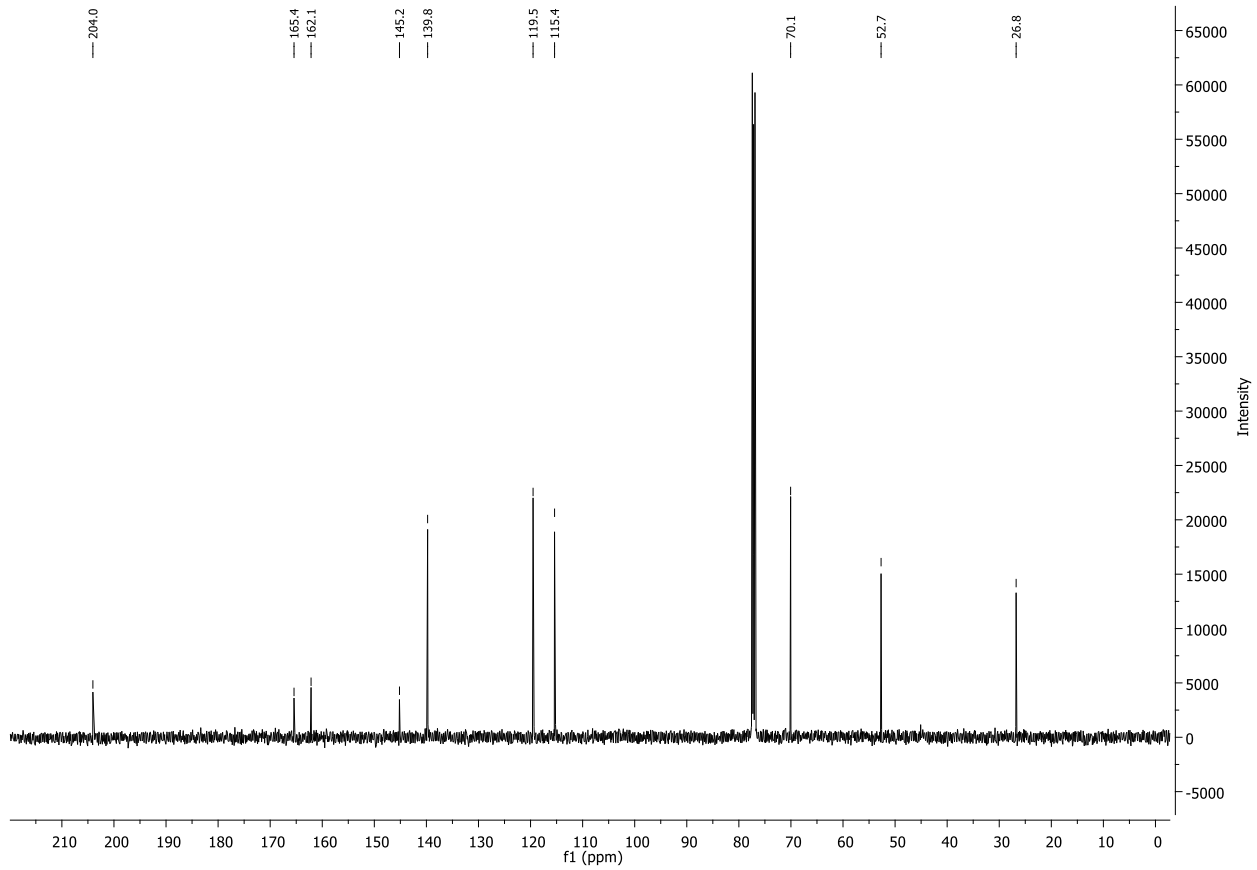


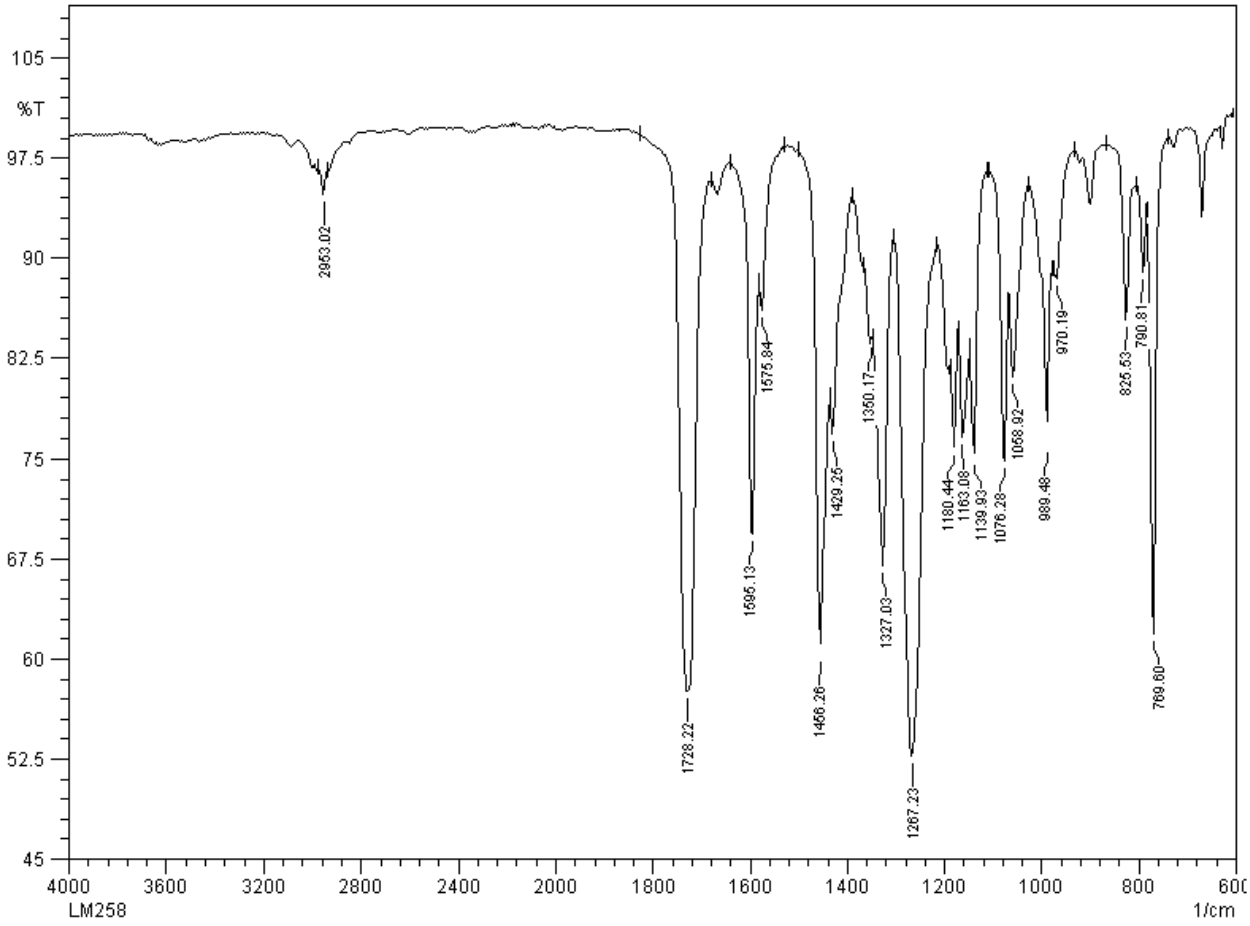

100
%T
95
90
85
80
75
70
65
3028.24
2947.23
2360.87
2158.35
1734.01
1649.14
1604.77
885.33
617.22
4500
4000
3500
3000
2500
2000
1750
1500
1250
1000
750
1/cm
LM371


LM371 MW=153?
(DCM)/MeOH + NH4OAc
C7H7NO3
SM: 7G
EPSRC National Facility Swansea
LTQ Orbitrap XL
Lisa Miller
11/05/2015 16:47:05
154.0495
Observed Data
155.0526
NL:
2.06E7
STRWAT503-OJ-HNESP#32-45 RT: 0.72-1.05 AV: 13 T: FTMS + p NSI Full ms [140.00-1935.00]
154.0499
Theoretical Isotope Model: [M + H]+
155.0532
156.0541
157.0575
NL:
2.15E4
C7 H7 NO3 H:
C7 H8 N1 O3
p (gss, s /p:40) Chrg 1
R: 100000 Res .Pwr . @FWHM
Relative Abundance
m/z

Methyl 6-(2-oxopropoxy)picolinate (1.81).



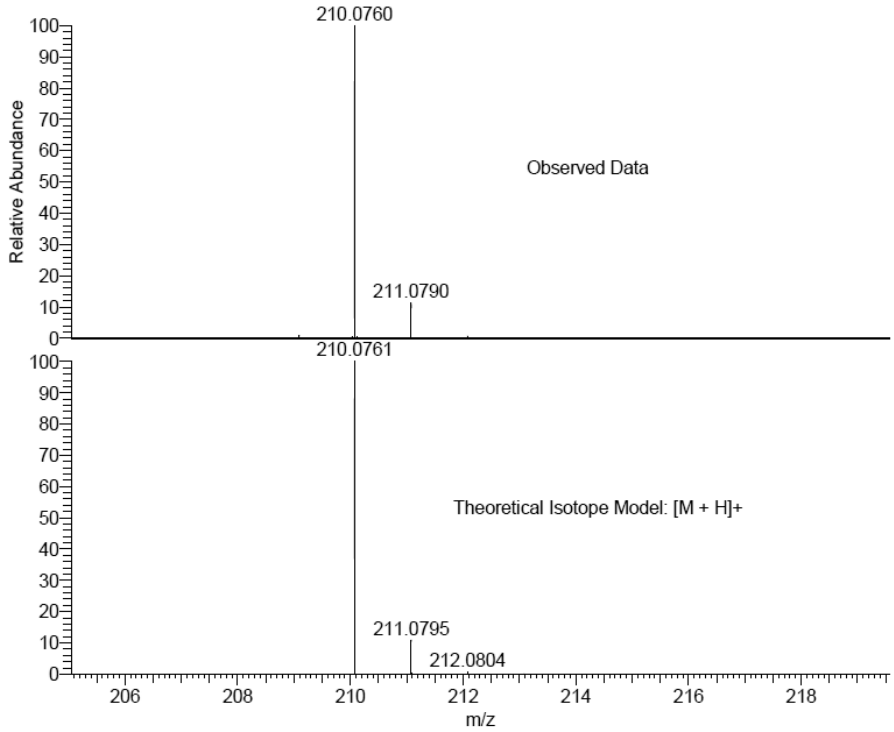




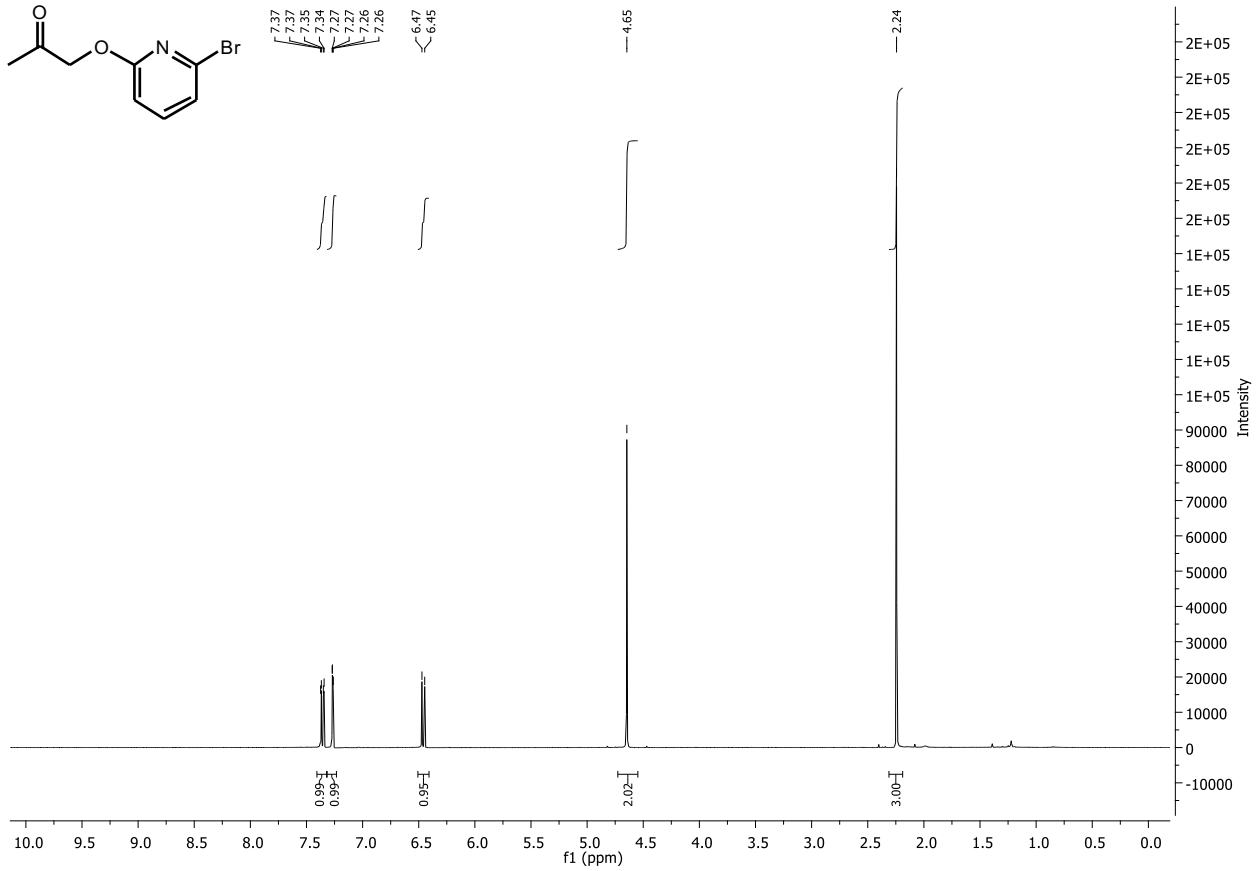
LM258 MW=209?
(DCM)/MeOH + NH4OAc
C10H11NO4

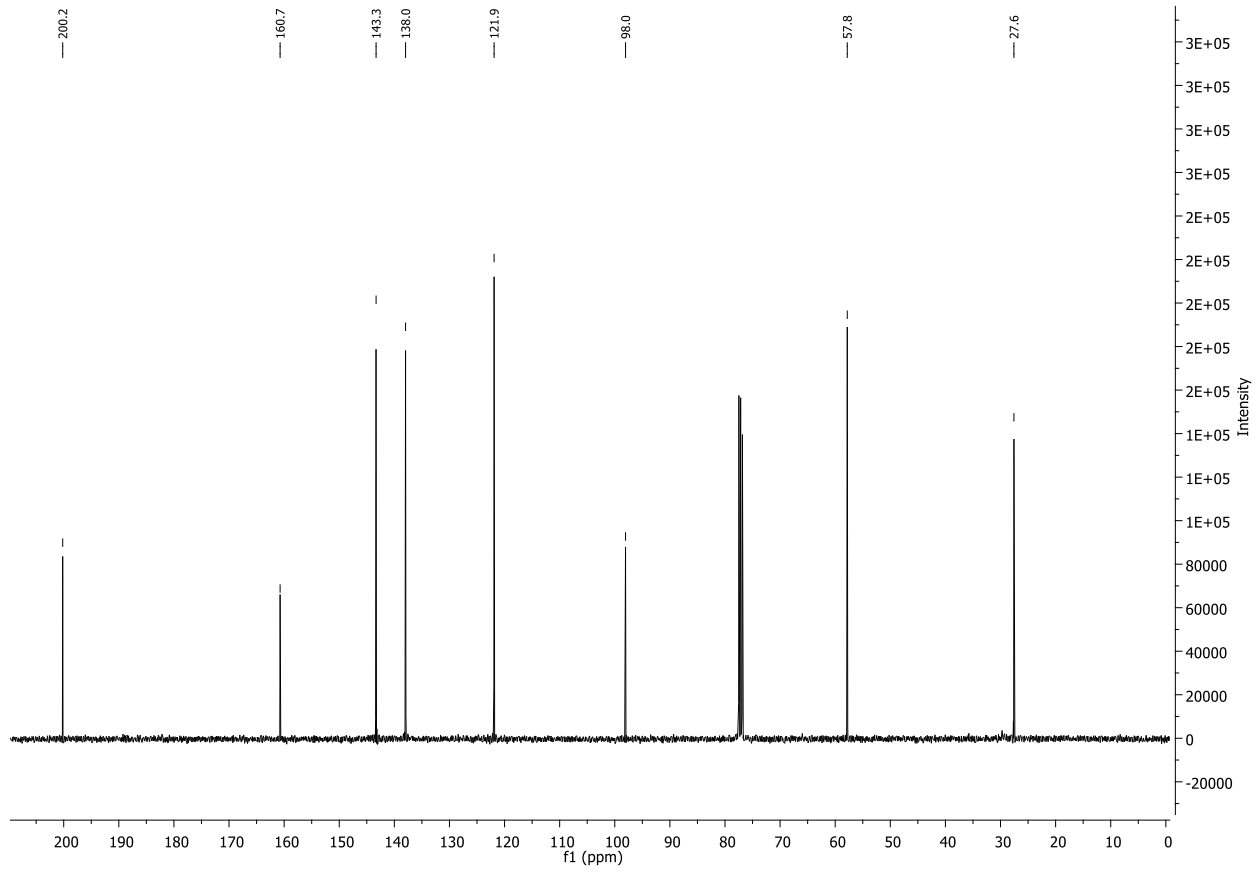
EPSRC National Facility Swansea
LTQ Orbitrap XL

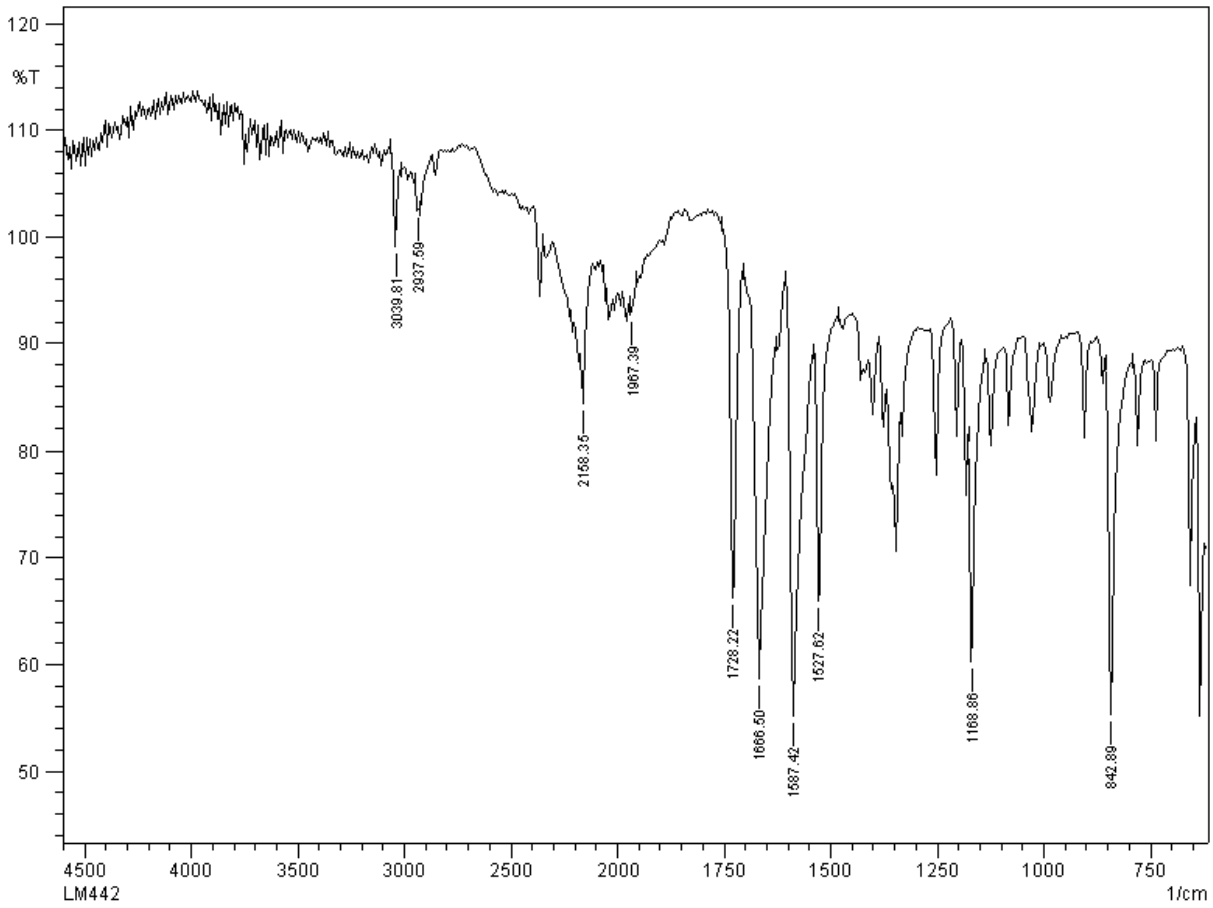
Lisa Miller
06/11/2014 12:00:27

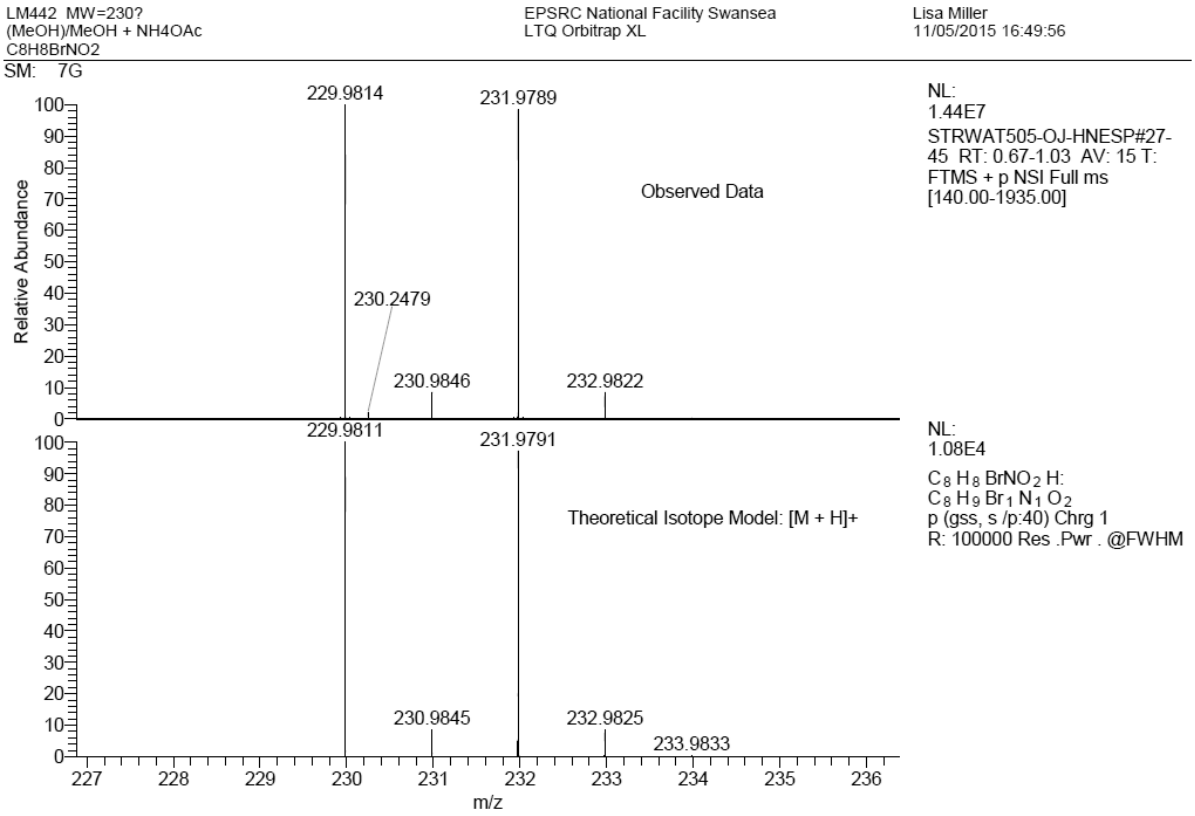


1-((6-Bromopyridin-2-yl)oxy)propan-2-one (1.84).

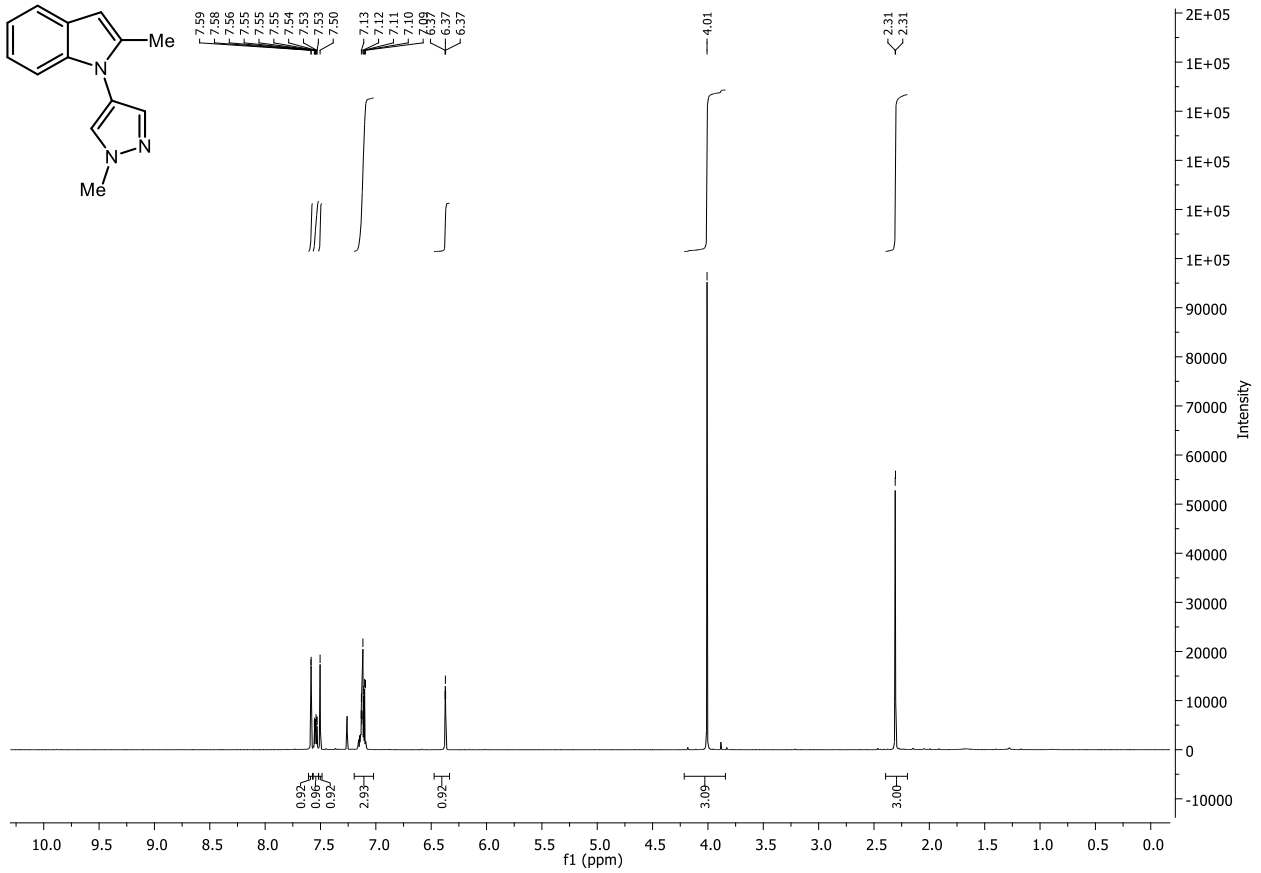


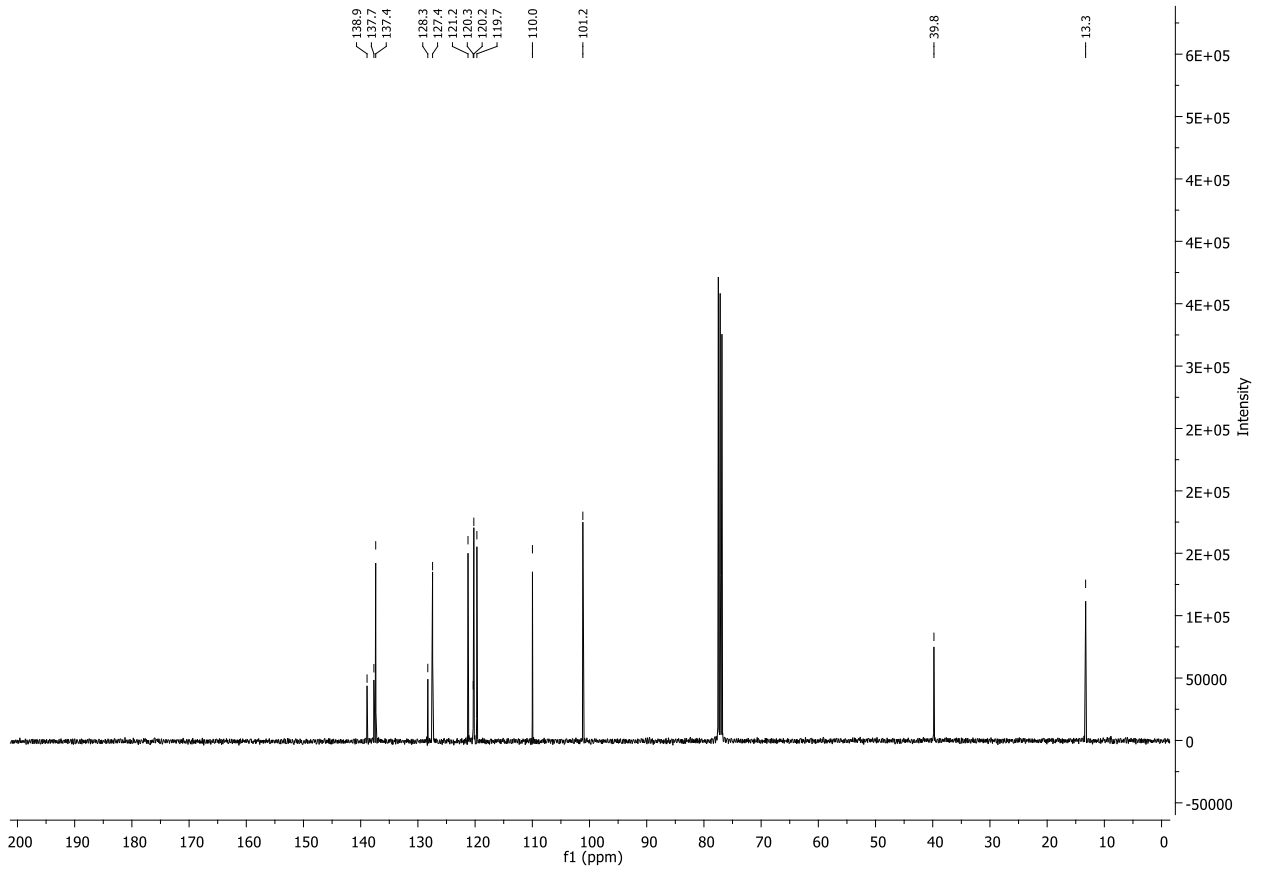


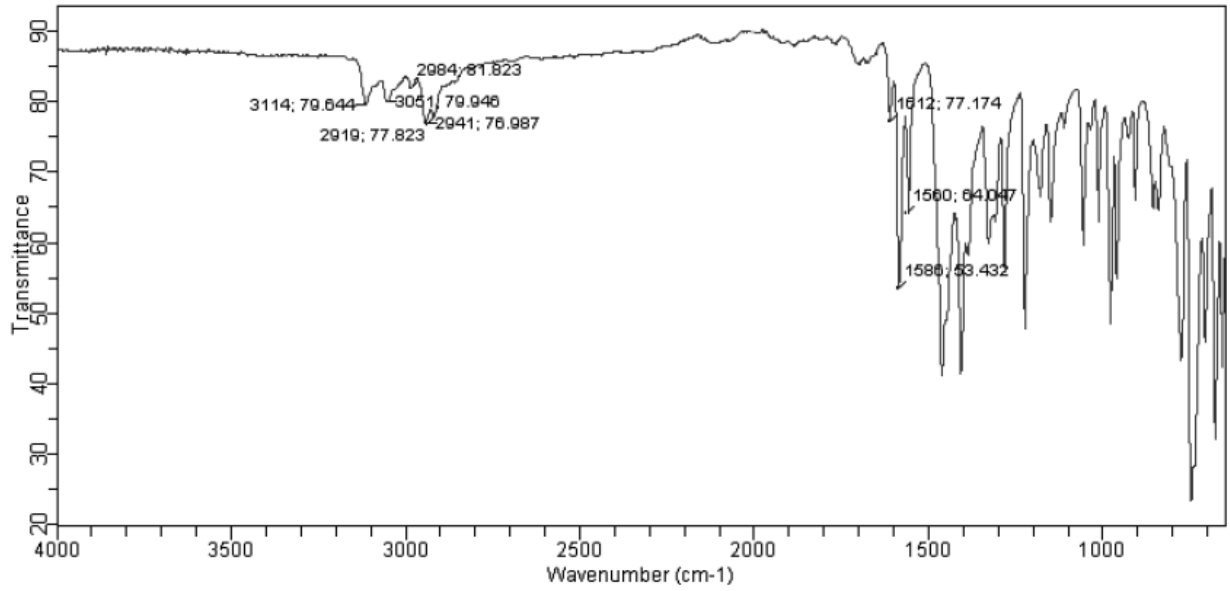

%T
3039.81
2937.59
2168.35
1967.39
1728.22
1666.50
1587.42
1527.62
1168.86
842.89
LM442
1/cm


LM442 MW=230?
(MeOH)/MeOH + NH4OAc
C8H8BrNO2
EPSRC National Facility Swansea
LTQ Orbitrap XL
Lisa Miller
11/05/2015 16:49:56
SM: 7G
229.9814
231.9789
Observed Data
230.2479
230.9846
232.9822
NL:
1.44E7
STRWAT505-OJ-HNESP#27-45 RT: 0.67-1.03 AV: 15 T: FTMS + p NSI Full ms [140.00-1935.00]
229.9811
231.9791
Theoretical Isotope Model: [M + H]+
230.9845
232.9825
233.9833
NL:
1.08E4
C8 H8 BrNO2 H:
C8 H9 Br1 N1 O2
p (gss, s /p:40) Chrg 1
R: 100000 Res .Pwr . @FWHM
Relative Abundance
m/z

2-Methyl-1-(1-methyl-1*H*-pyrazol-4-yl)-1*H*-indole (1.87).



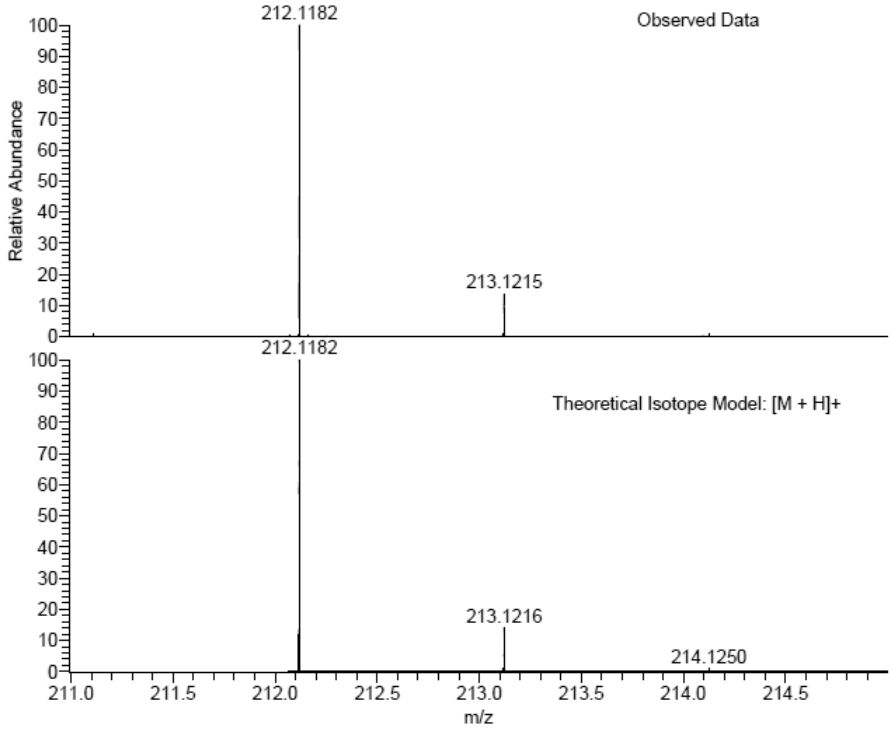




LM419 MW=211?
C13H13N3
(DCM)/MeOH + NH4OAc

EPSRC National Facility Swansea
LTQ Orbitrap XL

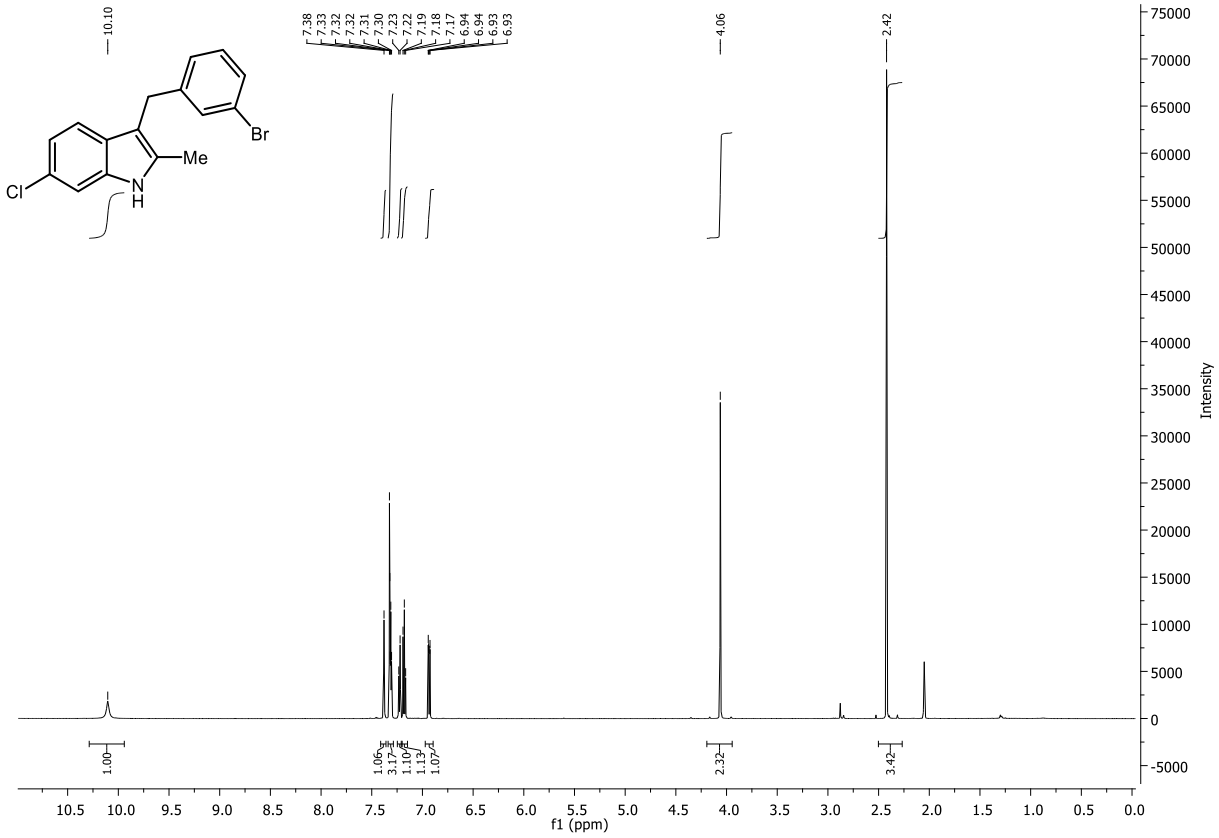
Lisa Miller
23/04/2015 02:26:35 PM

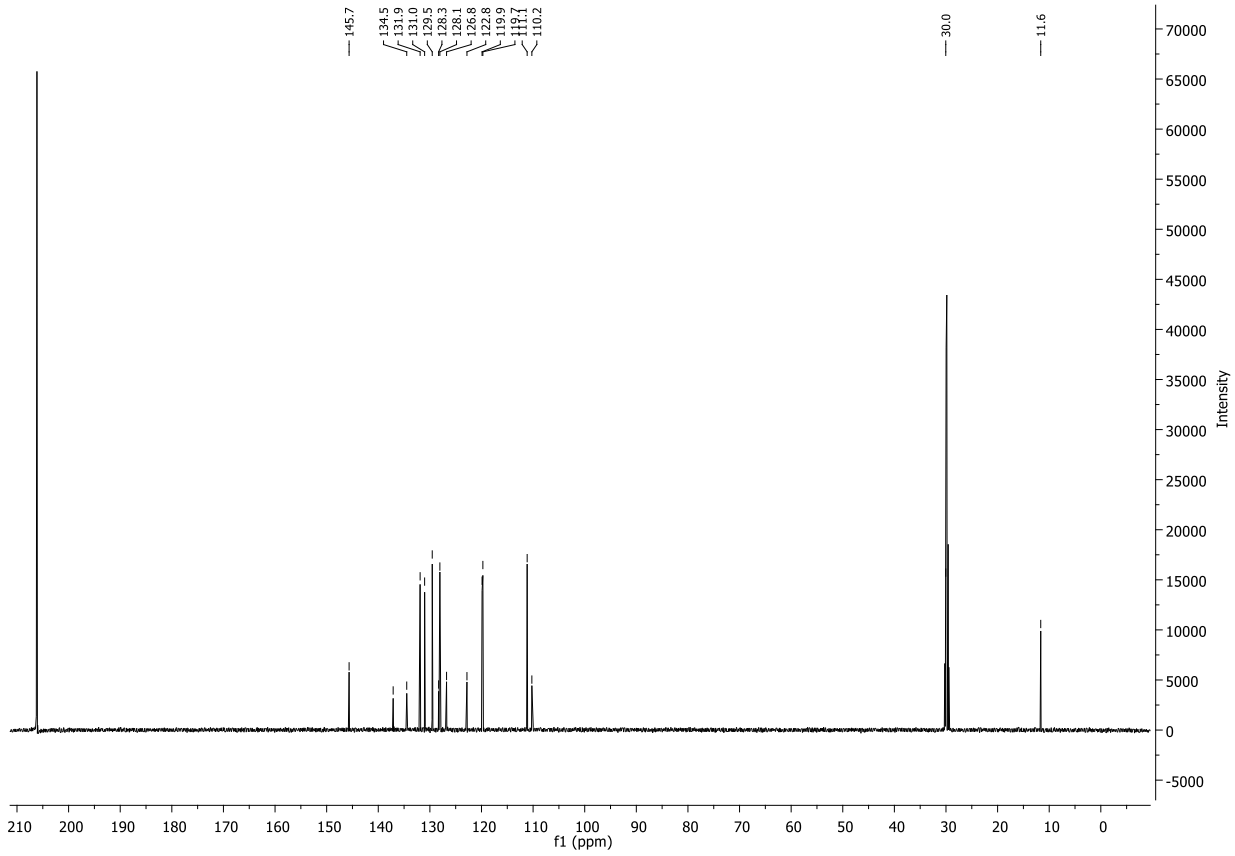


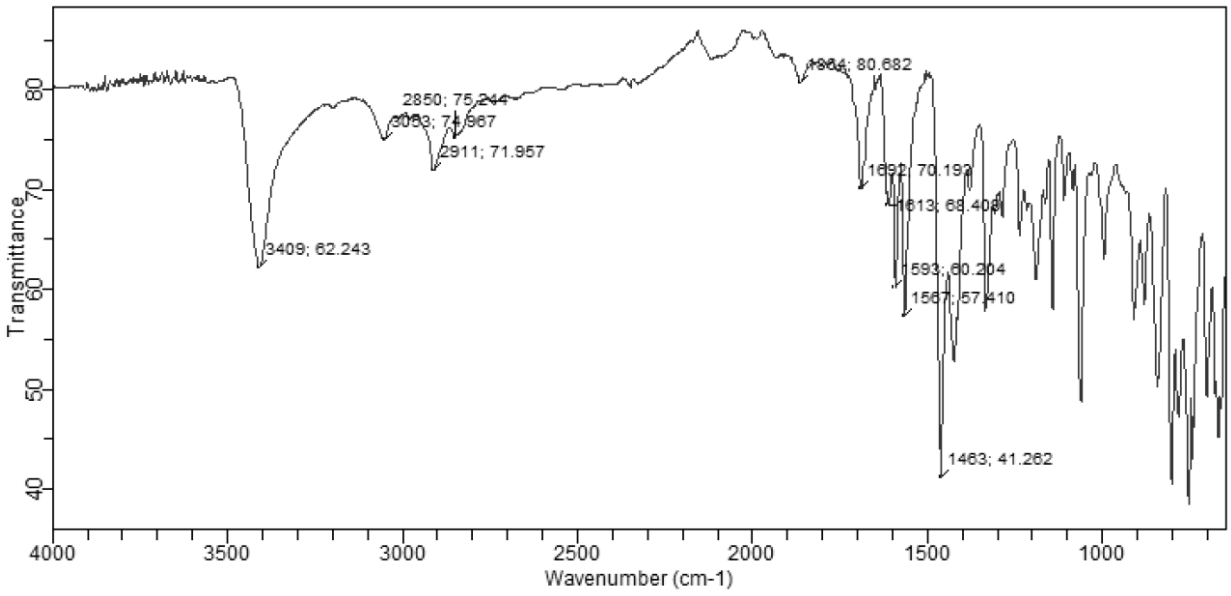
NL:
1.95E7
STRWAT487-OR-HNESP#26-47 RT: 0.66-1.05 AV: 16 T: FTMS + p NSI Full ms [140.00-1935.00]

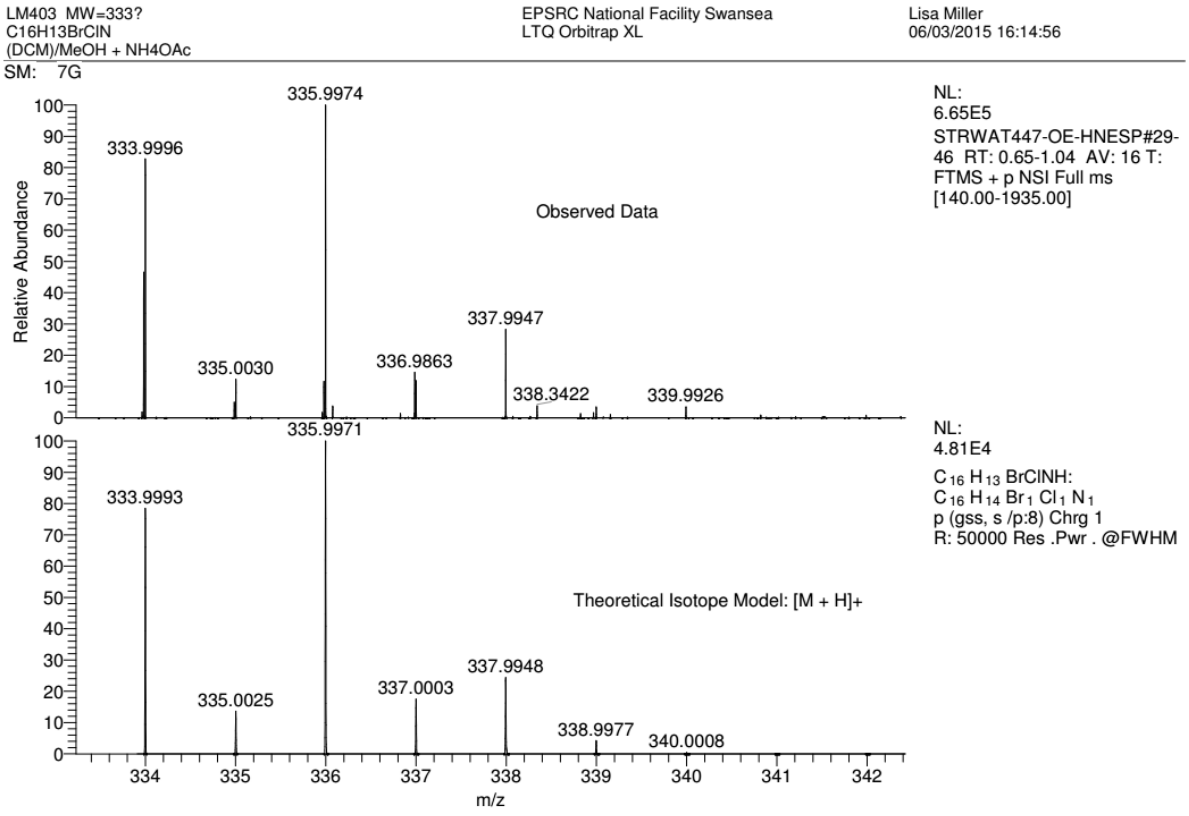
NL:
2.01E4
$C_{13}H_{13}N_3H$:
$C_{13}H_{14}N_3$
p (gss, s /p:40) Chrg 1
R: 100000 Res .Pwr . @FWHM

3-(3-Bromobenzyl)-6-chloro-2-methyl-1*H*-indole (1.91).

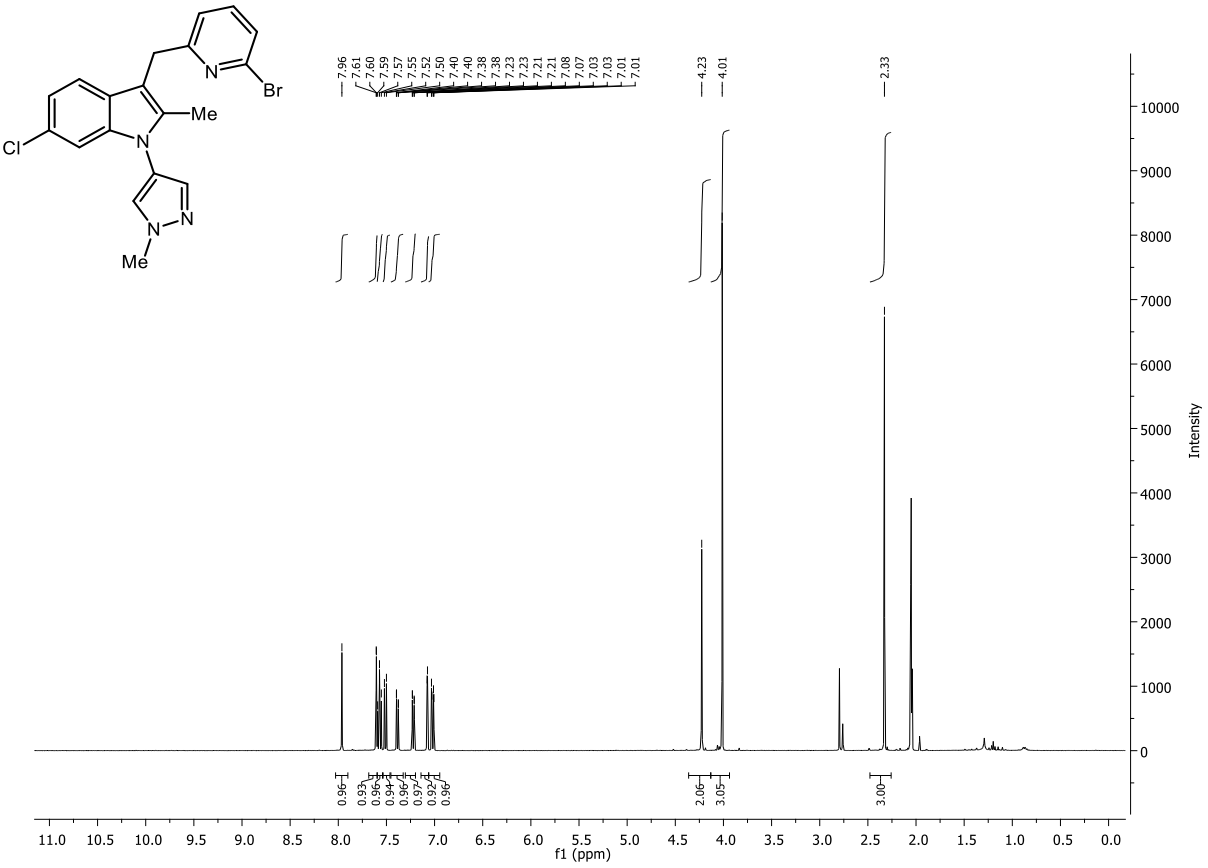


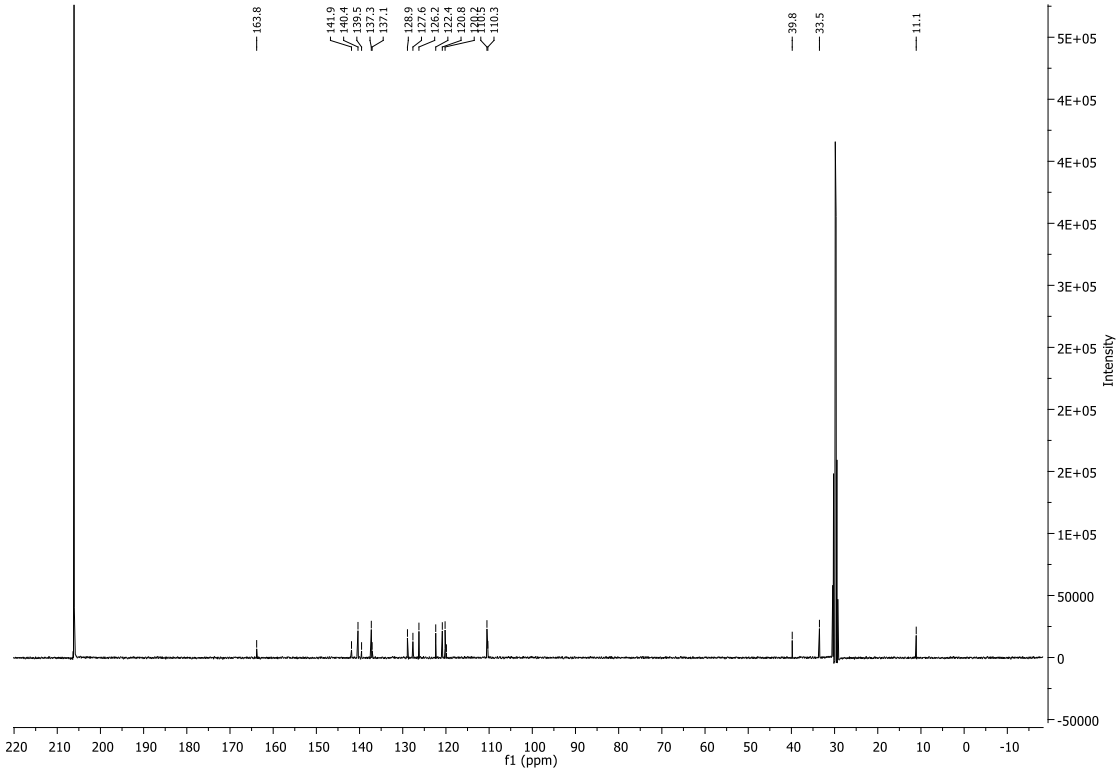


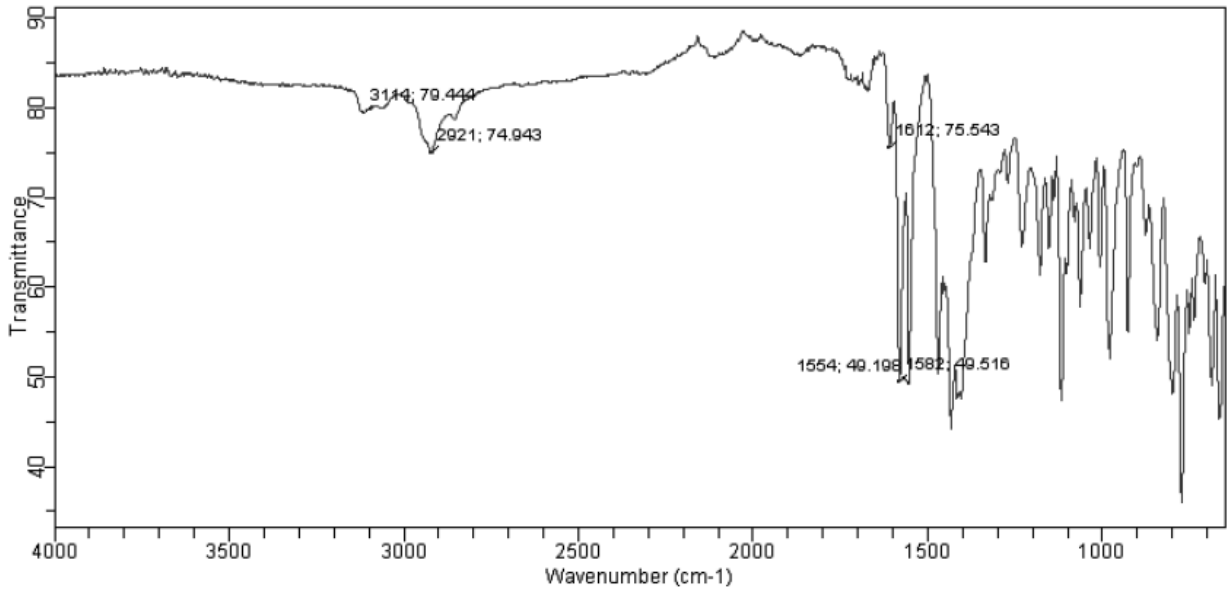

Transmittance
Wavenumber (cm-1)
3409; 62.243
2911; 71.957
1693; 70.192
1593; 60.204
1567; 57.410
1463; 41.262

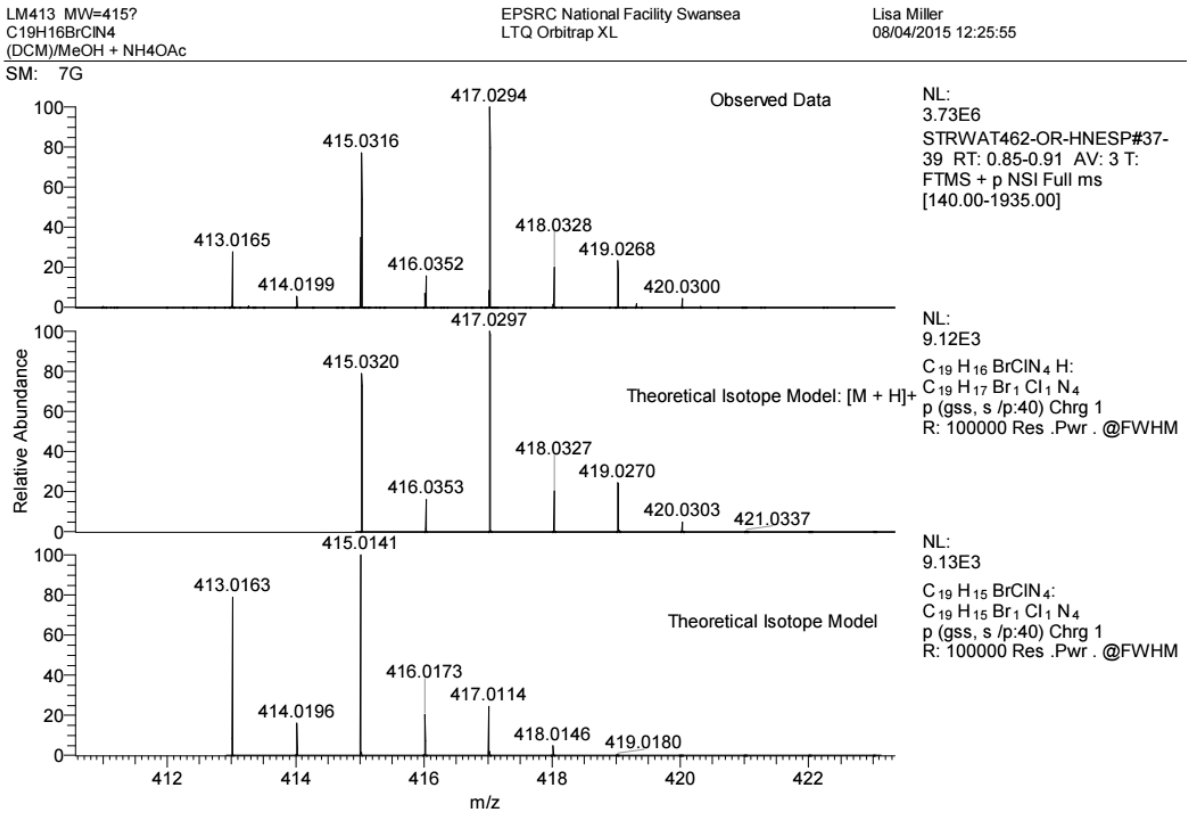

LM403 MW=333?
C16H13BrClN
(DCM)/MeOH + NH4OAc
SM: 7G
EPSRC National Facility Swansea
LTQ Orbitrap XL
Lisa Miller
06/03/2015 16:14:56
Relative Abundance
Observed Data
335.9974
333.9996
337.9947
335.0030
336.9863
338.3422
339.9926
NL:
6.65E5
STRWAT447-OE-HNESP#29-46 RT: 0.65-1.04 AV: 16 T: FTMS + p NSI Full ms [140.00-1935.00]
Theoretical Isotope Model: [M + H]+
335.9971
333.9993
337.9948
337.0003
335.0025
338.9977
340.0008
NL:
4.81E4
C16 H13 BrClNH:
C16 H14 Br1 Cl1 N1
p (gss, s /p:8) Chrg 1
R: 50000 Res .Pwr . @FWHM
m/z

3-((6-Bromopyridin-2-yl)methyl)-6-chloro-2-methyl-1-(1-methyl-1*H*-pyrazol-4-yl)-1*H*-indole (1.94).

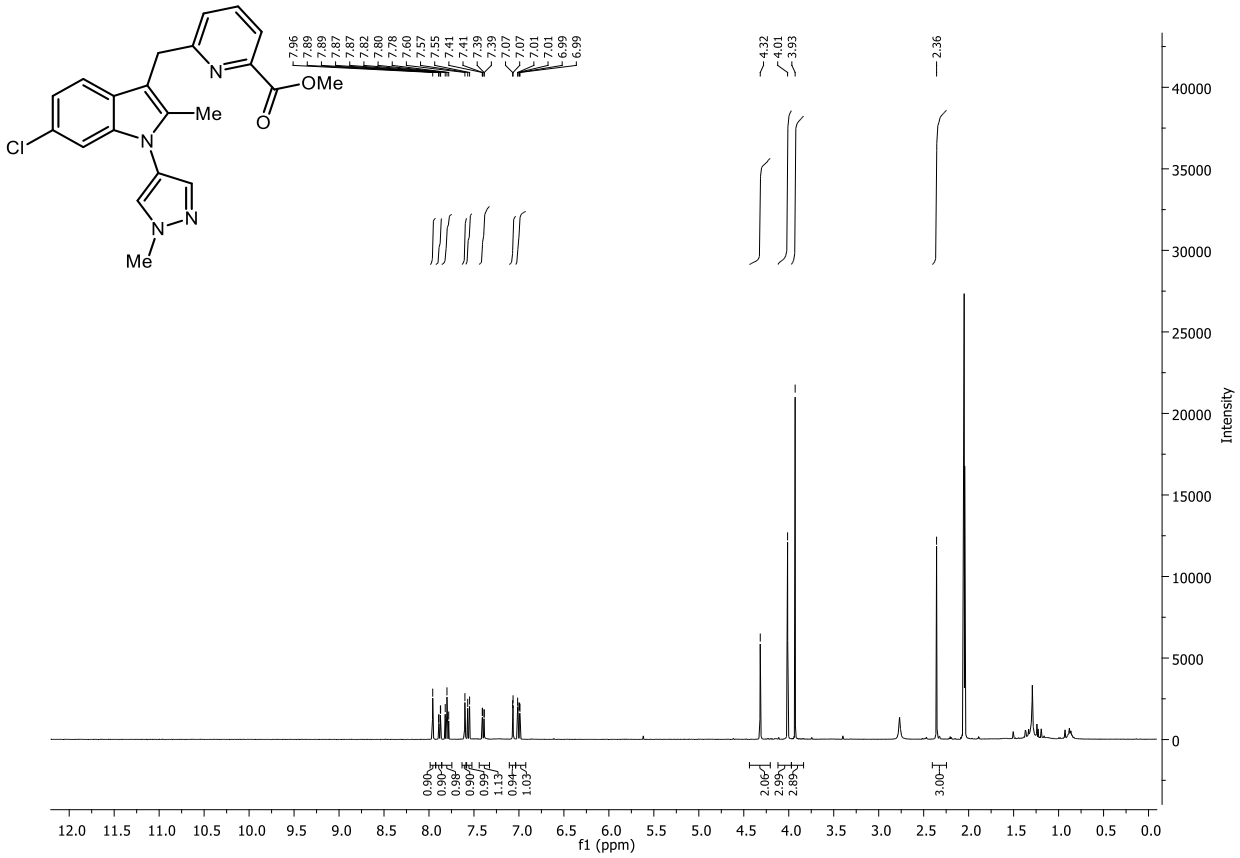


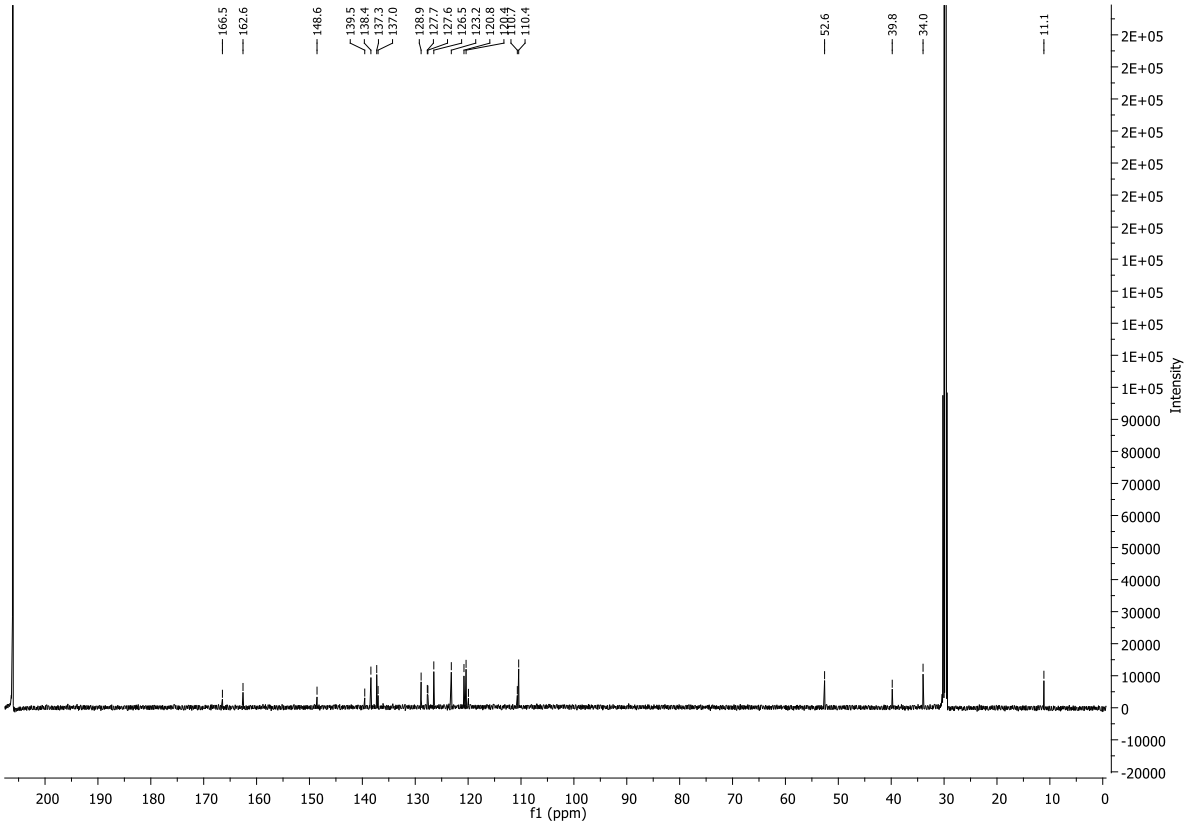


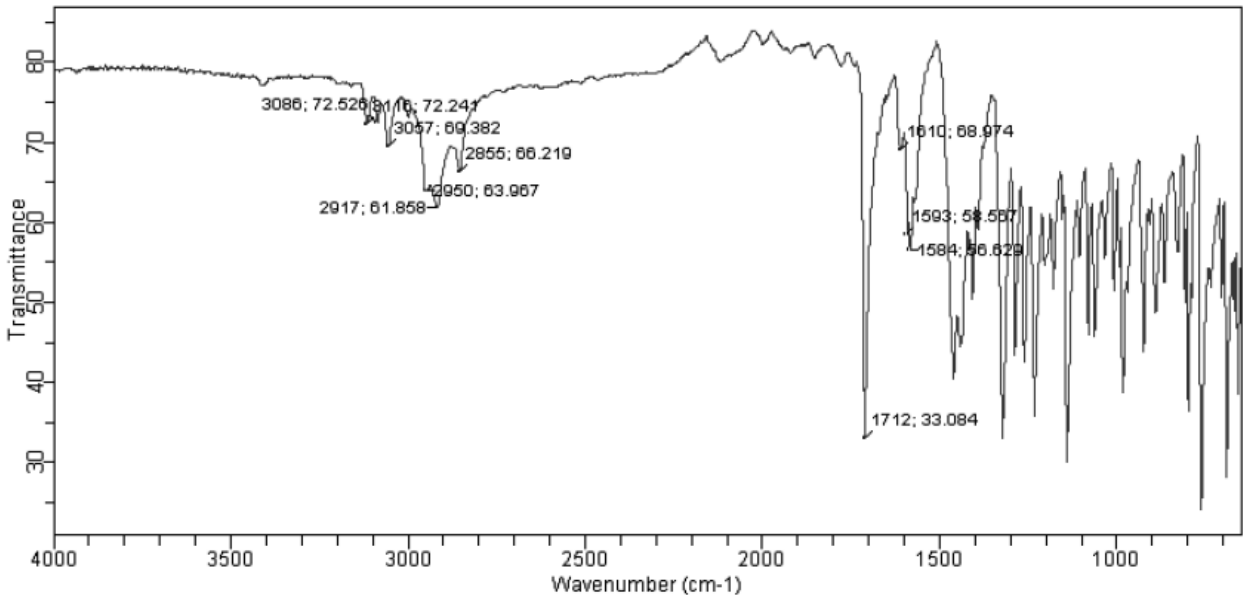

3114; 79.444
2921; 74.943
1612; 75.543
1554; 49.198
1582; 49.516
Transmittance
Wavenumber (cm-1)

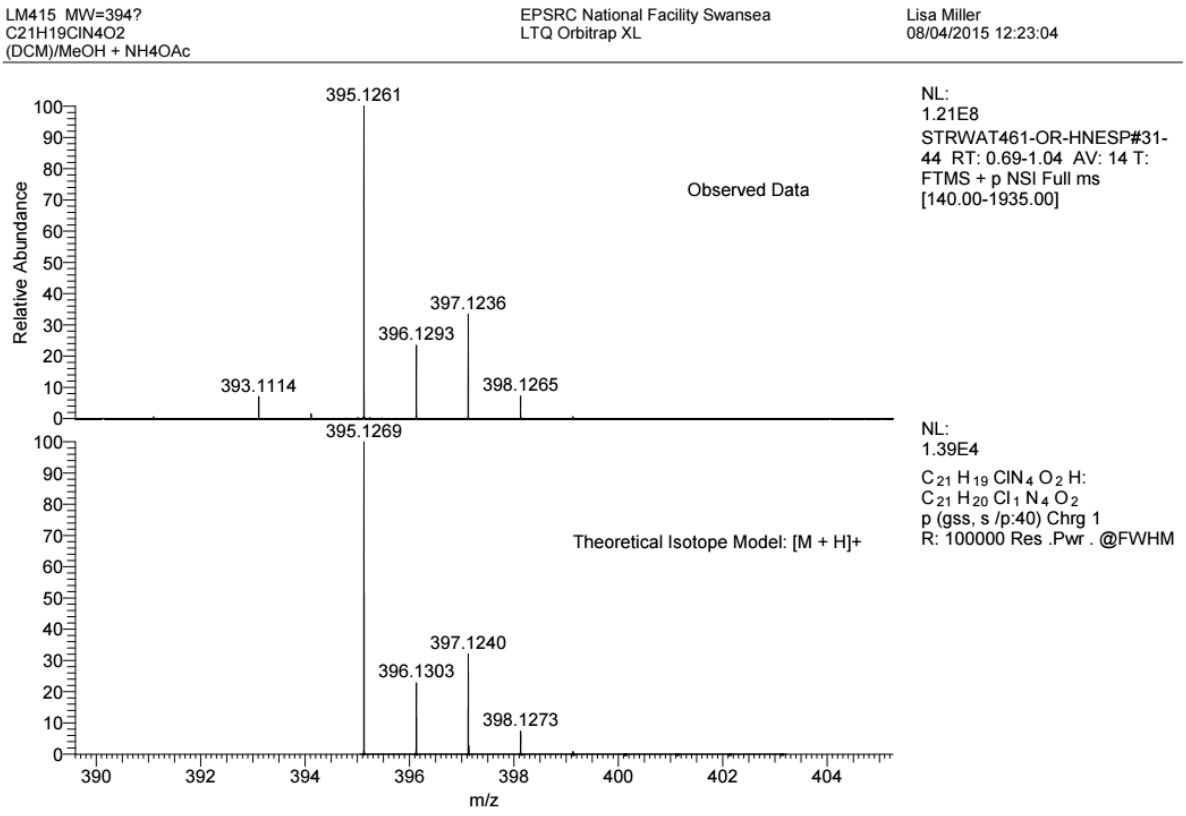

LM413 MW=415?
C19H16BrClN4
(DCM)/MeOH + NH4OAc
SM: 7G
EPSRC National Facility Swansea
LTQ Orbitrap XL
Lisa Miller
08/04/2015 12:25:55
Observed Data
NL:
3.73E6
STRWAT462-OR-HNESP#37-39 RT: 0.85-0.91 AV: 3 T: FTMS + p NSI Full ms [140.00-1935.00]
Theoretical Isotope Model: [M + H]+
NL:
9.12E3
C19 H16 BrClN4 H:
C19 H17 Br1 Cl1 N4
p (gss, s /p:40) Chrg 1
R: 100000 Res .Pwr . @FWHM
Theoretical Isotope Model
NL:
9.13E3
C19 H15 BrClN4:
C19 H15 Br1 Cl1 N4
p (gss, s /p:40) Chrg 1
R: 100000 Res .Pwr . @FWHM
Relative Abundance
m/z

Methyl 6-((6-chloro-2-methyl-1-(1-methyl-1*H*-pyrazol-4-yl)-1*H*-indol-3-yl)methyl)picolinate (1.95).

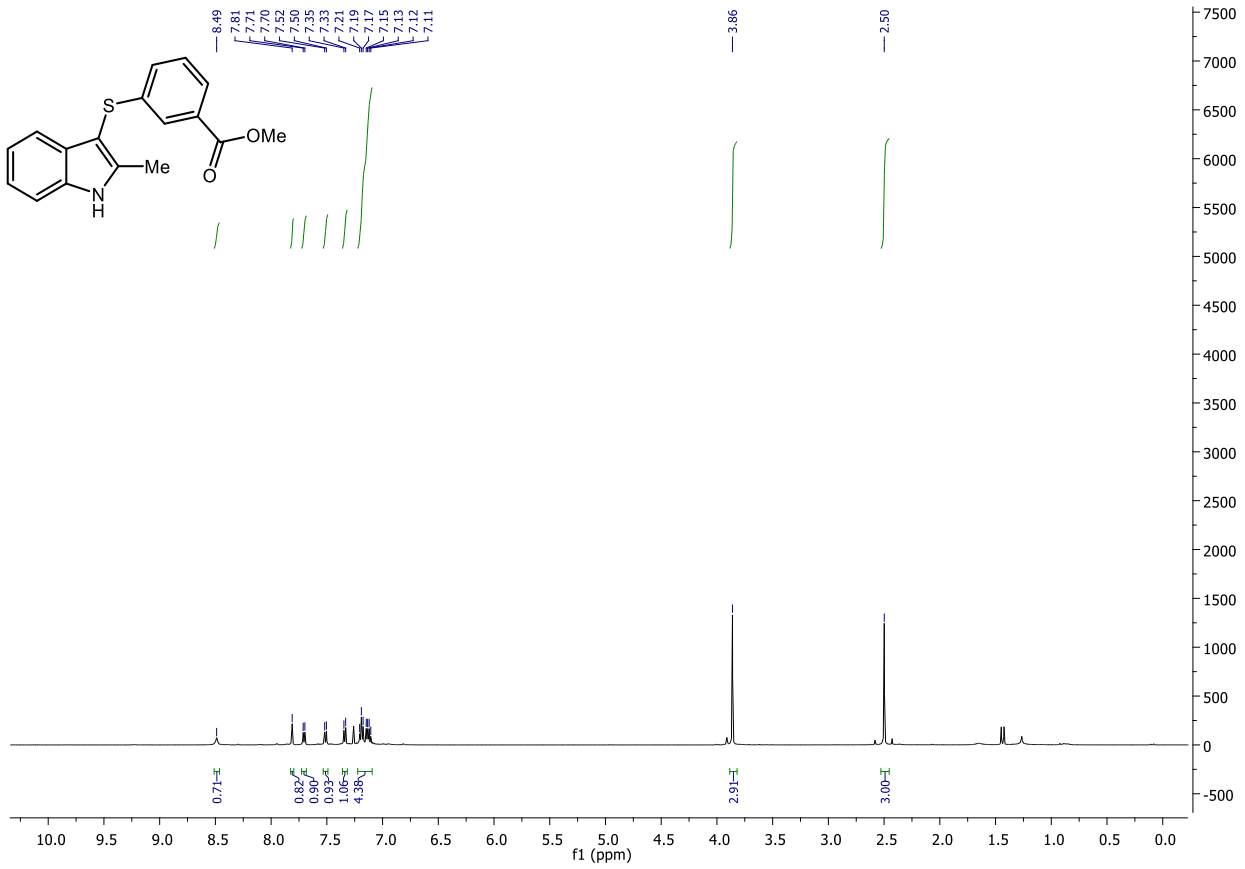


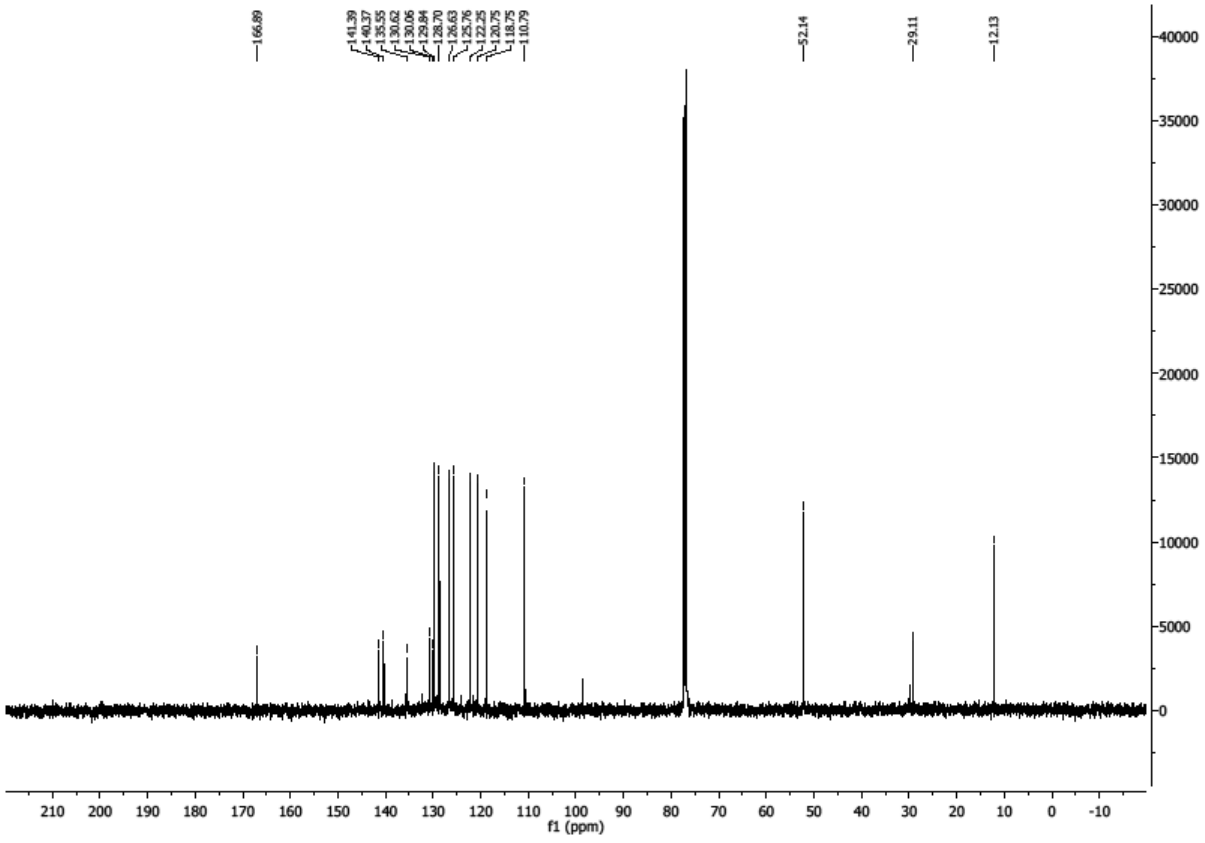


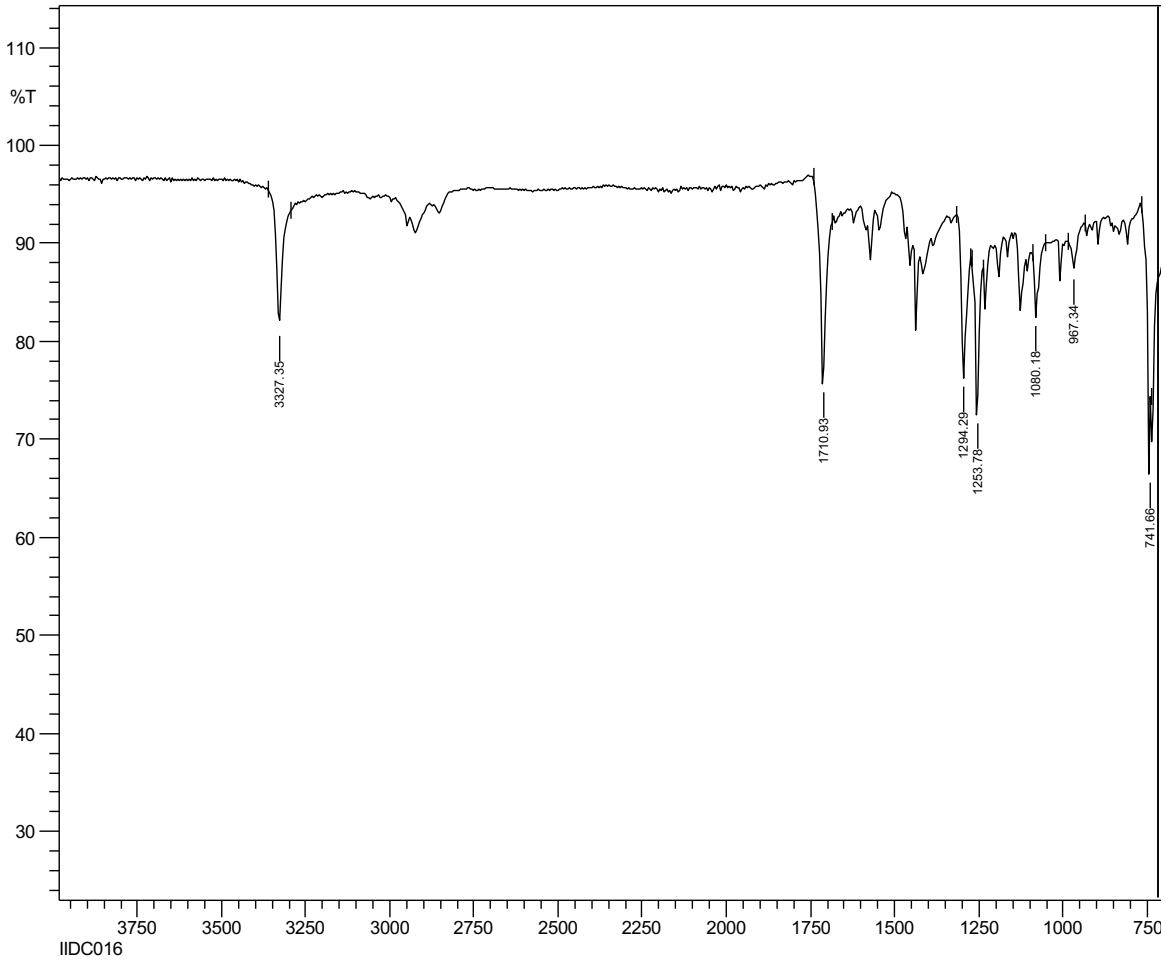

Transmittance
Wavenumber (cm-1)
3086; 72.526
3116; 72.241
3057; 69.382
2855; 66.219
2950; 63.967
2917; 61.858
1610; 68.974
1593; 58.587
1584; 56.629
1712; 33.084

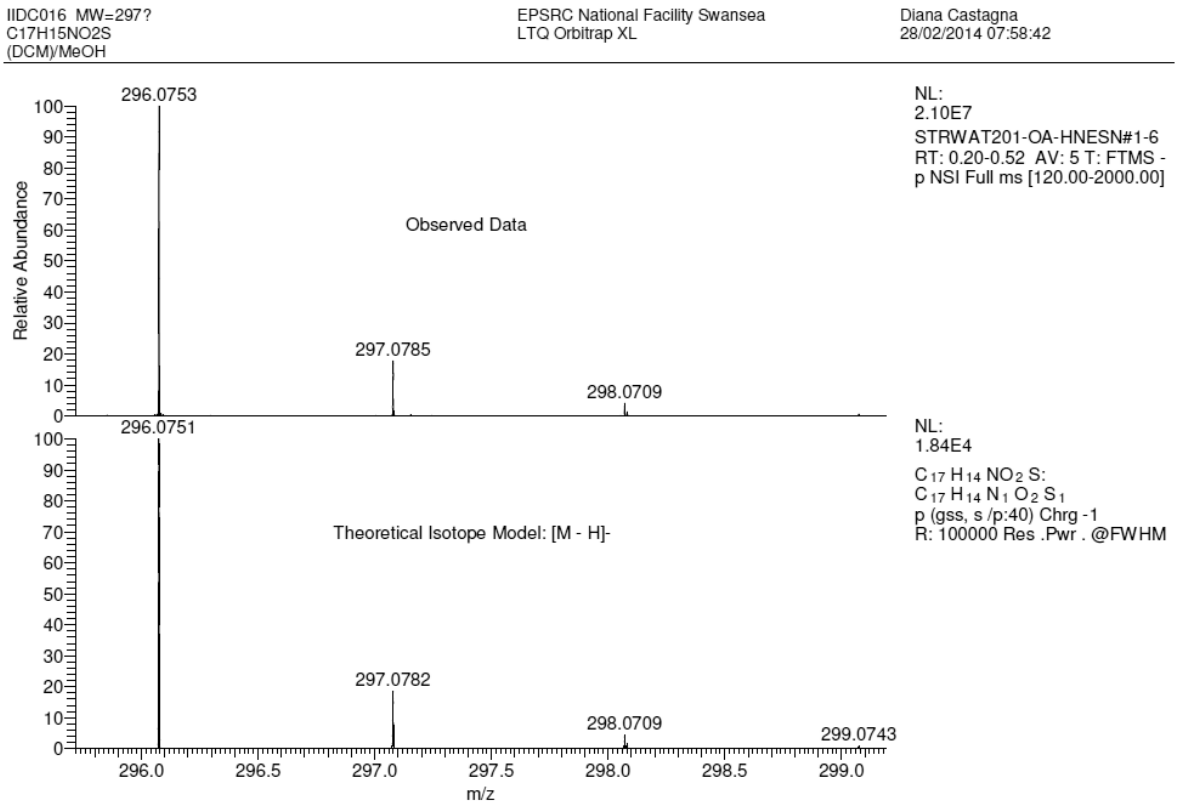

LM415 MW=394?
C21H19ClN4O2
(DCM)/MeOH + NH4OAc
EPSRC National Facility Swansea
LTQ Orbitrap XL
Lisa Miller
08/04/2015 12:23:04
Relative Abundance
Observed Data
395.1261
397.1236
396.1293
393.1114
398.1265
NL:
1.21E8
STRWAT461-OR-HNESP#31-44 RT: 0.69-1.04 AV: 14 T: FTMS + p NSI Full ms [140.00-1935.00]
Theoretical Isotope Model: [M + H]+
395.1269
397.1240
396.1303
398.1273
NL:
1.39E4
C21 H19 ClN4 O2 H:
C21 H20 Cl1 N4 O2
p (gss, s /p:40) Chrg 1
R: 100000 Res .Pwr . @FWHM
m/z

Methyl 3-((2-methyl-1*H*-indol-3-yl)thio)benzoate (1.100).

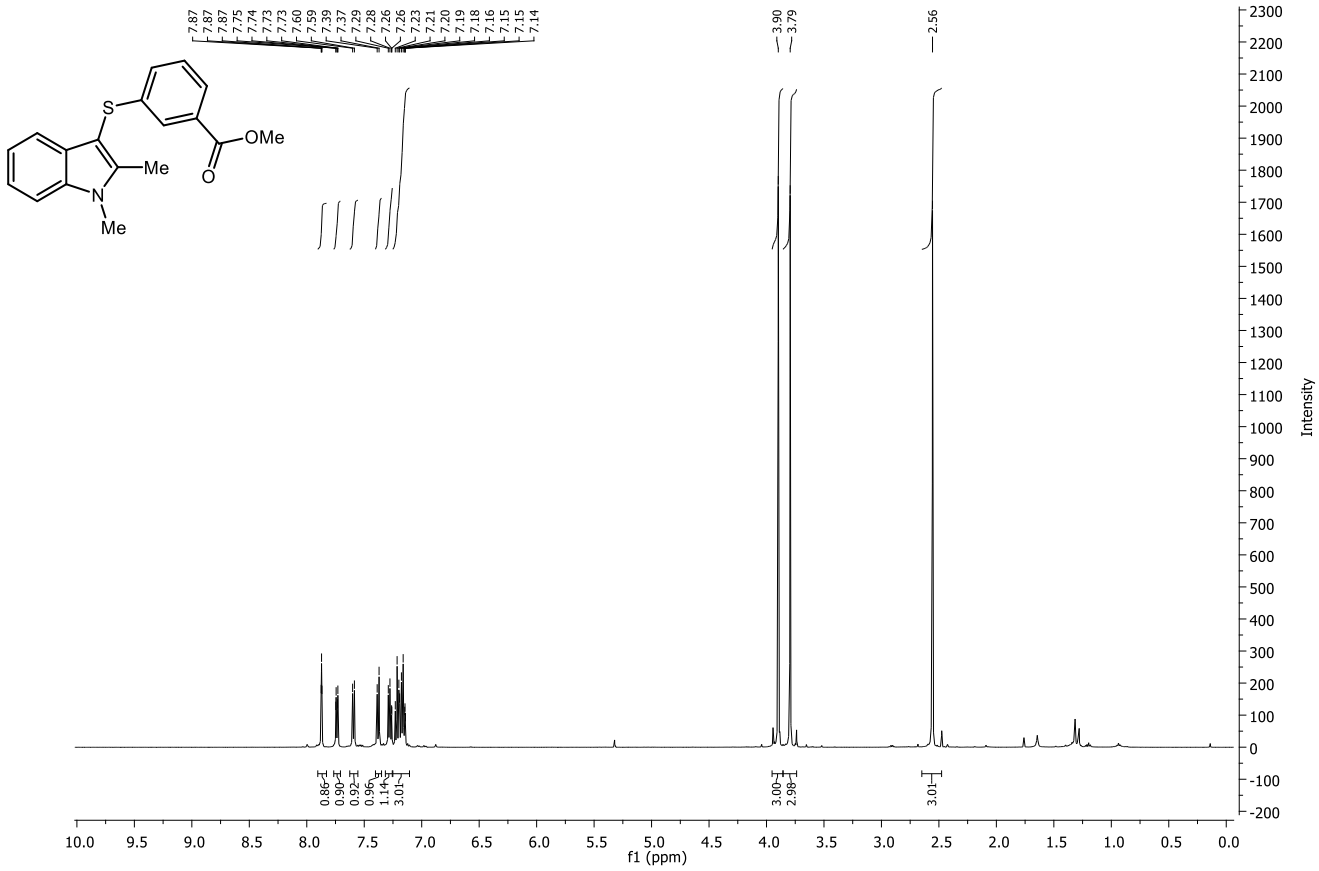


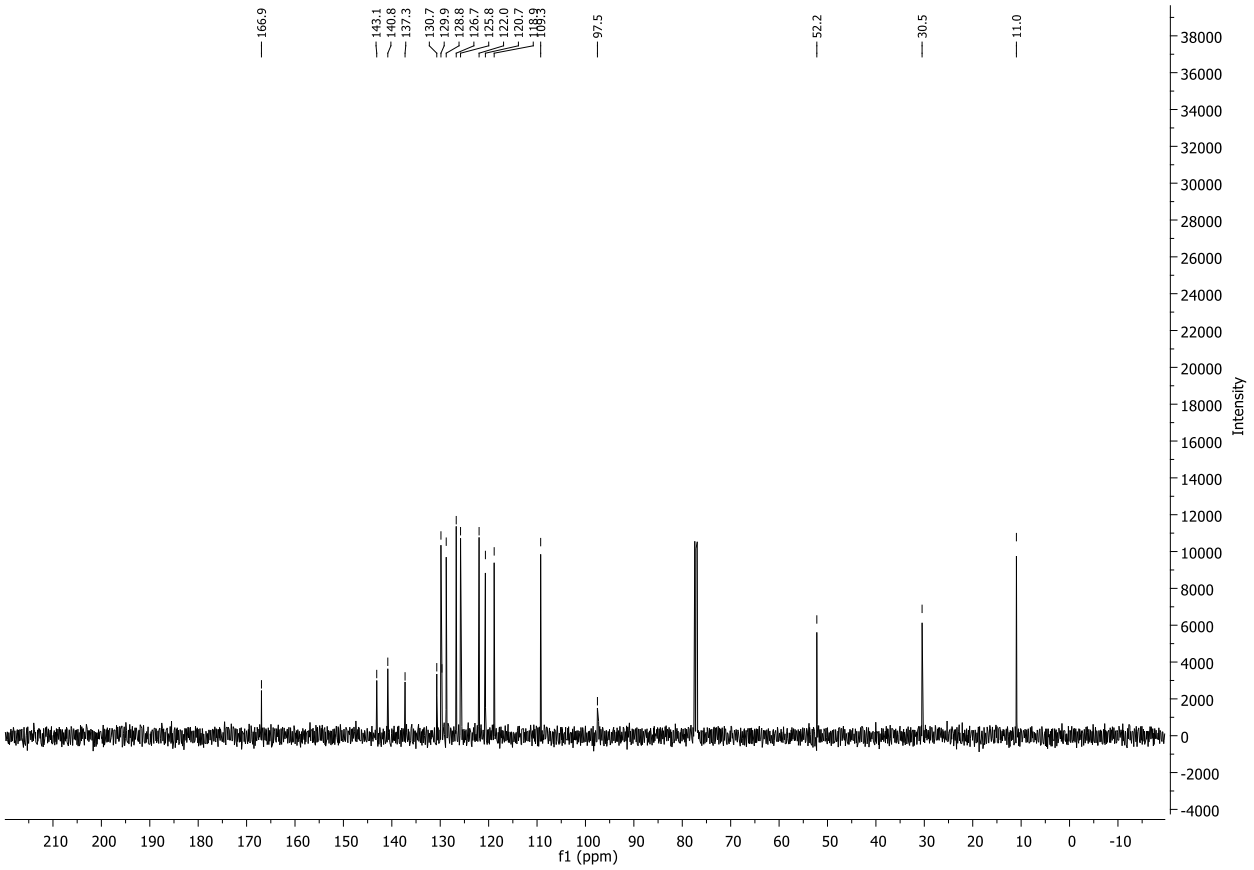


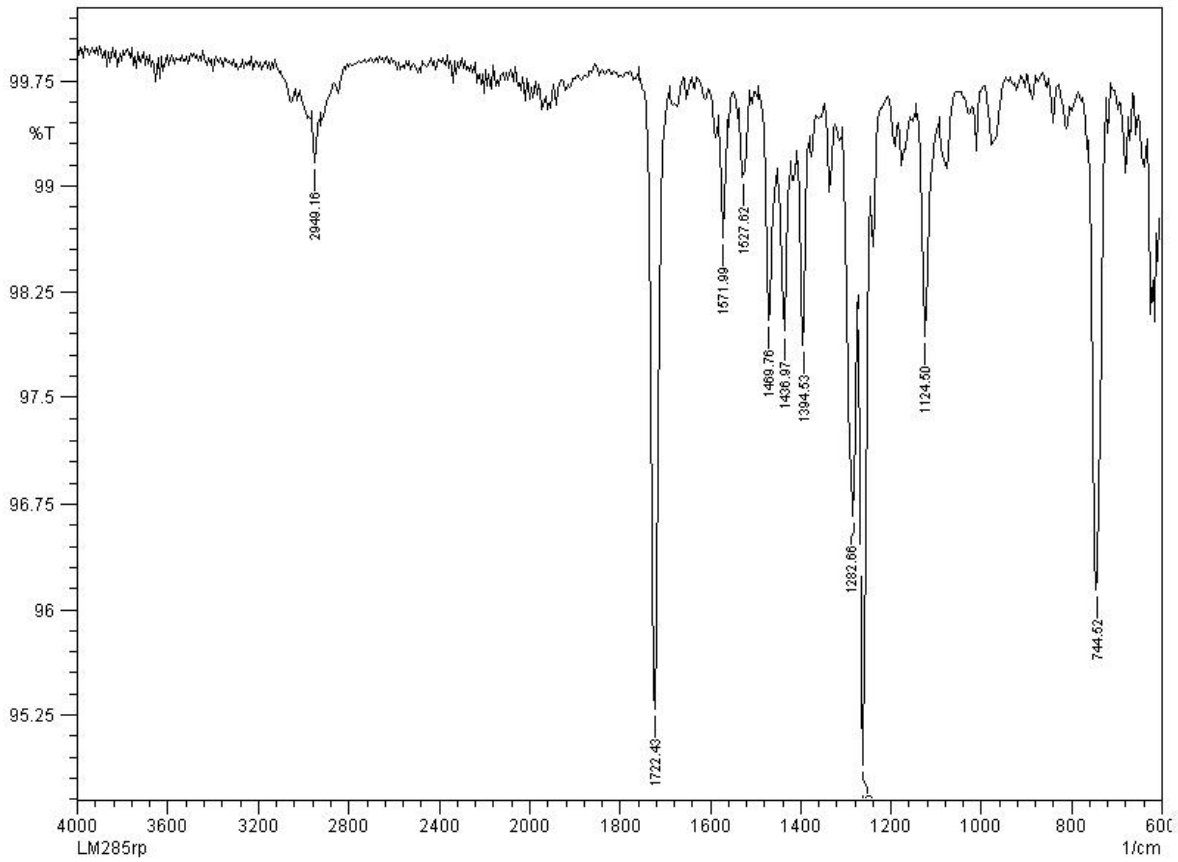

%T
110
100
90
80
70
60
50
40
30
3327.35
1710.93
1294.29
1253.78
1080.18
967.34
741.66
3750
3500
3250
3000
2750
2500
2250
2000
1750
1500
1250
1000
750
IIDC016

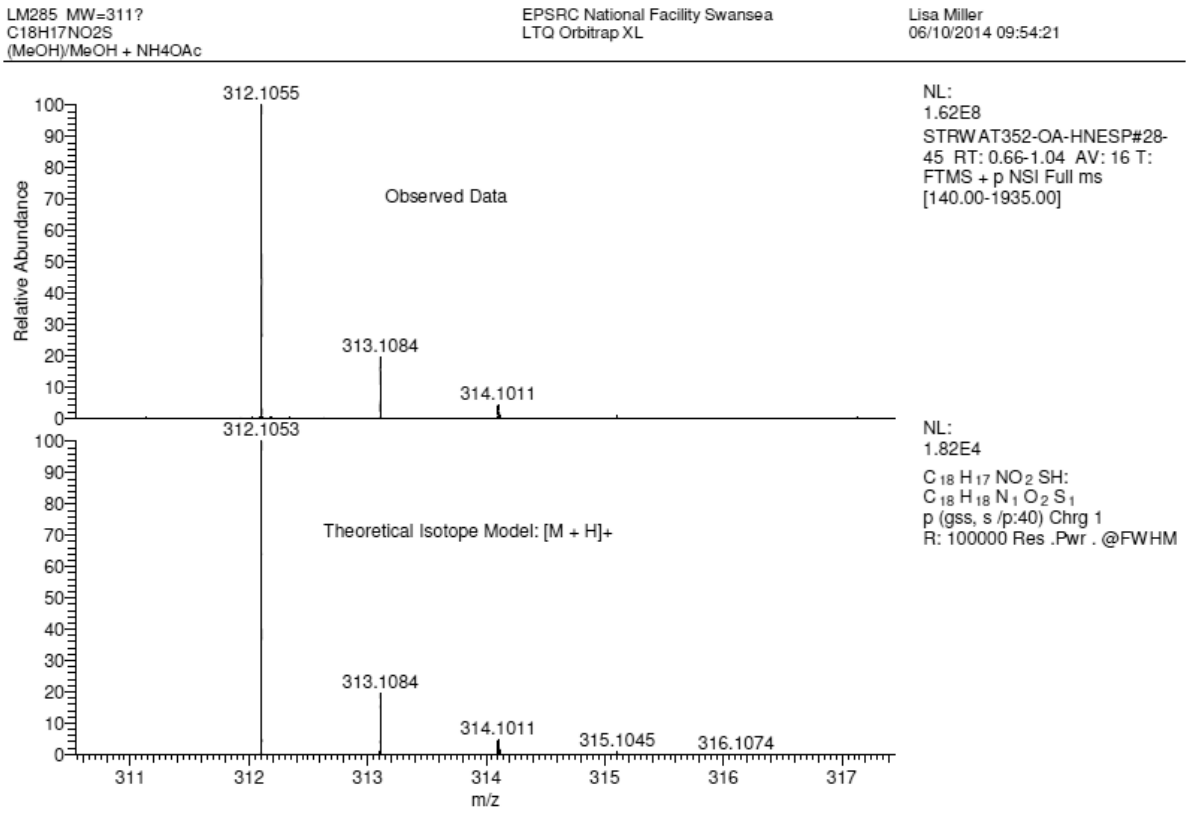

IIDC016 MW=297?
C17H15NO2S
(DCM)/MeOH
EPSRC National Facility Swansea
LTQ Orbitrap XL
Diana Castagna
28/02/2014 07:58:42
296.0753
Observed Data
297.0785
298.0709
NL:
2.10E7
STRWAT201-OA-HNESN#1-6
RT: 0.20-0.52 AV: 5 T: FTMS -
p NSI Full ms [120.00-2000.00]
296.0751
Theoretical Isotope Model: [M - H]-
297.0782
298.0709
299.0743
NL:
1.84E4
C17 H14 NO2 S:
C17 H14 N1 O2 S1
p (gss, s /p:40) Chrg -1
R: 100000 Res .Pwr . @FWHM
Relative Abundance
m/z

Methyl 3-((1,2-dimethyl-1*H*-indol-3-yl)thio)benzoate (1.101).

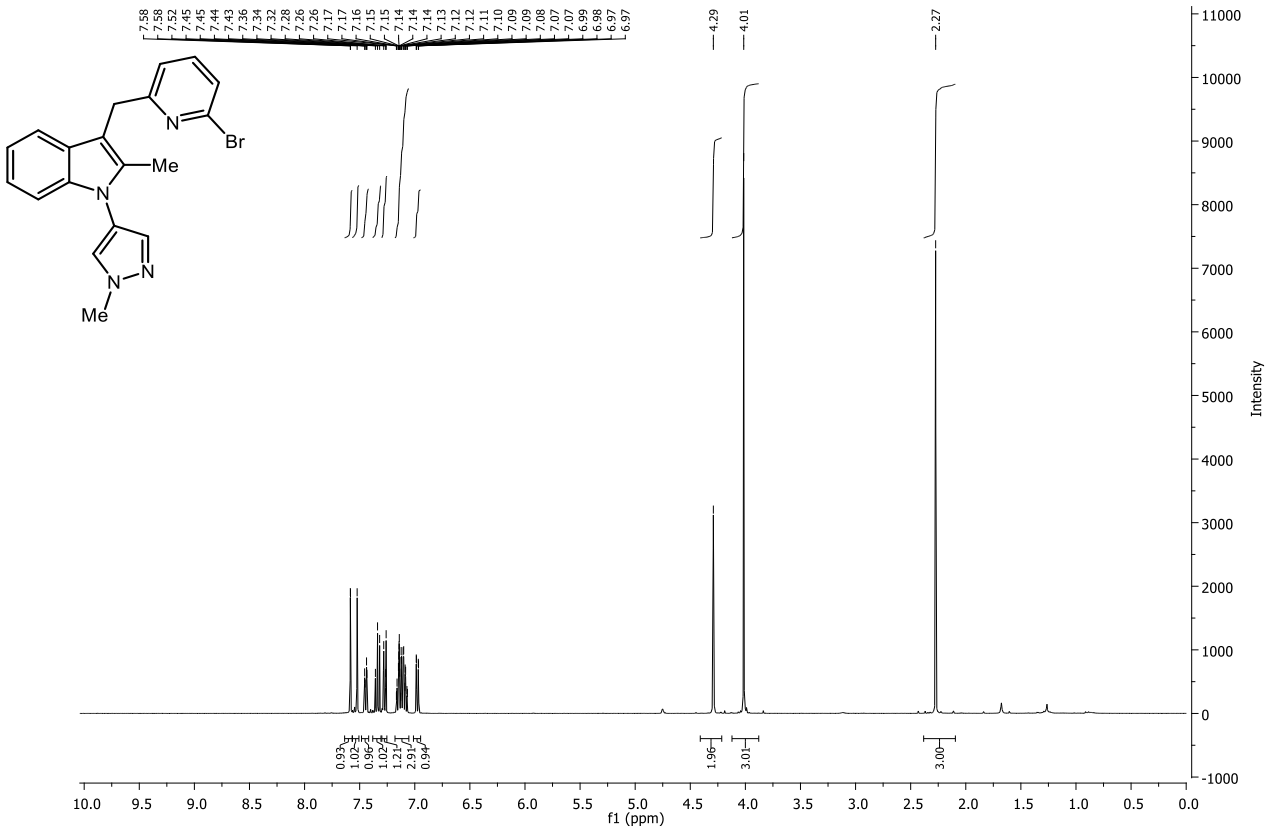


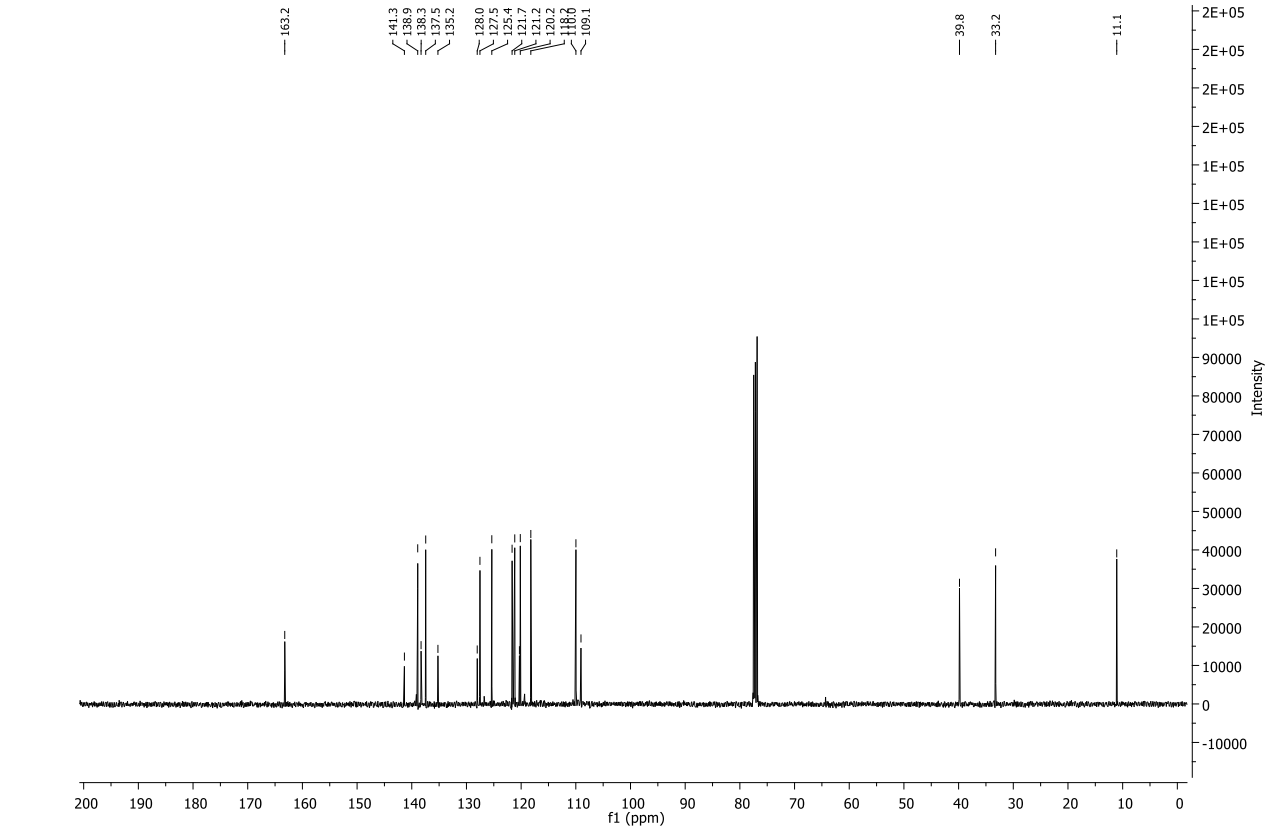


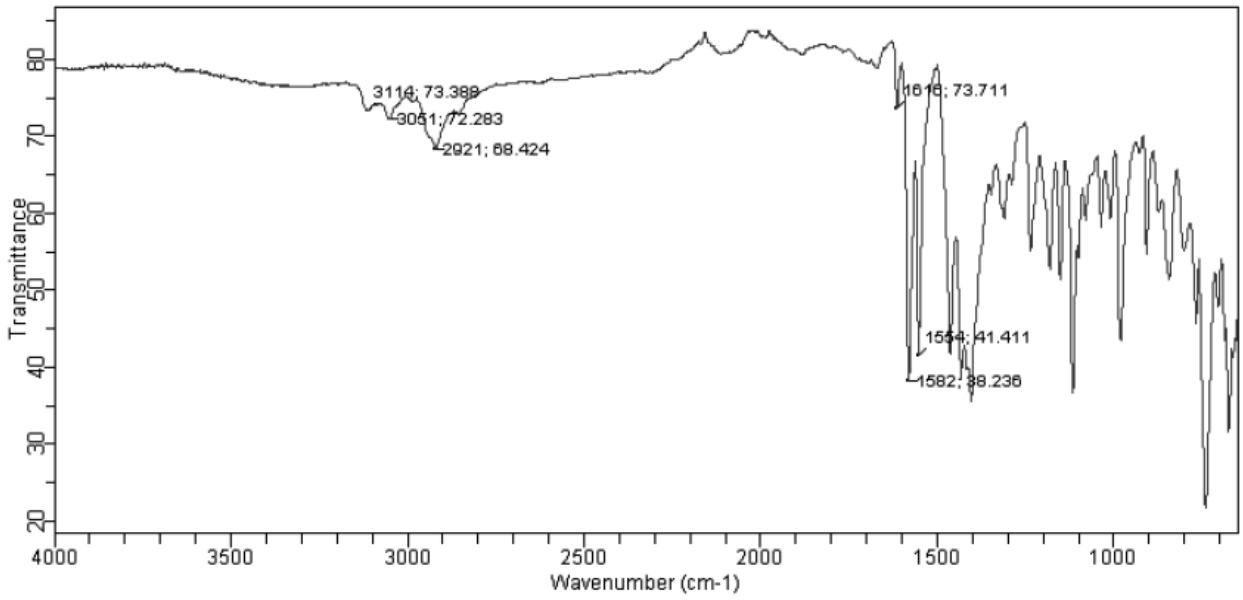

99.75
%T
99
98.25
97.5
96.75
96
95.25
2949.16
1722.43
1571.99
1527.62
1469.76
1436.97
1394.53
1282.66
1124.50
744.52
4000
3600
3200
2800
2400
2000
1800
1600
1400
1200
1000
800
600
LM285rp
1/cm

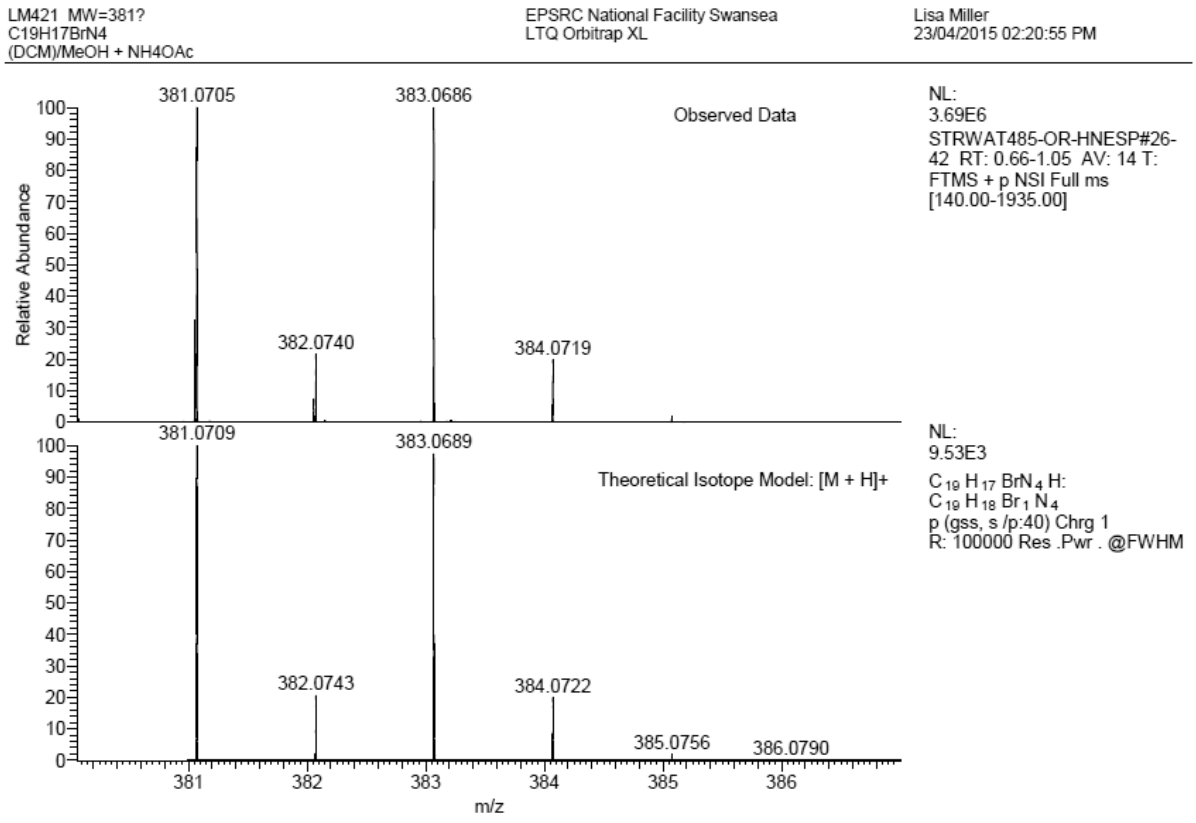

LM285 MW=311?
C18H17NO2S
(MeOH)/MeOH + NH4OAc
EPSRC National Facility Swansea
LTQ Orbitrap XL
Lisa Miller
06/10/2014 09:54:21
312.1055
Observed Data
313.1084
314.1011
NL:
1.62E8
STRWAT352-OA-HNESP#28-45 RT: 0.66-1.04 AV: 16 T: FTMS + p NSI Full ms [140.00-1935.00]
Relative Abundance
312.1053
Theoretical Isotope Model: [M + H]+
313.1084
314.1011
315.1045
316.1074
NL:
1.82E4
C18 H17 NO2 SH:
C18 H18 N1 O2 S1
p (gss, s /p:40) Chrg 1
R: 100000 Res .Pwr . @FWHM
311
312
313
314
315
316
317
m/z

3-((6-Bromopyridin-2-yl)methyl)-2-methyl-1-(1-methyl-1*H*-pyrazol-4-yl)-1*H*-indole (1.102).

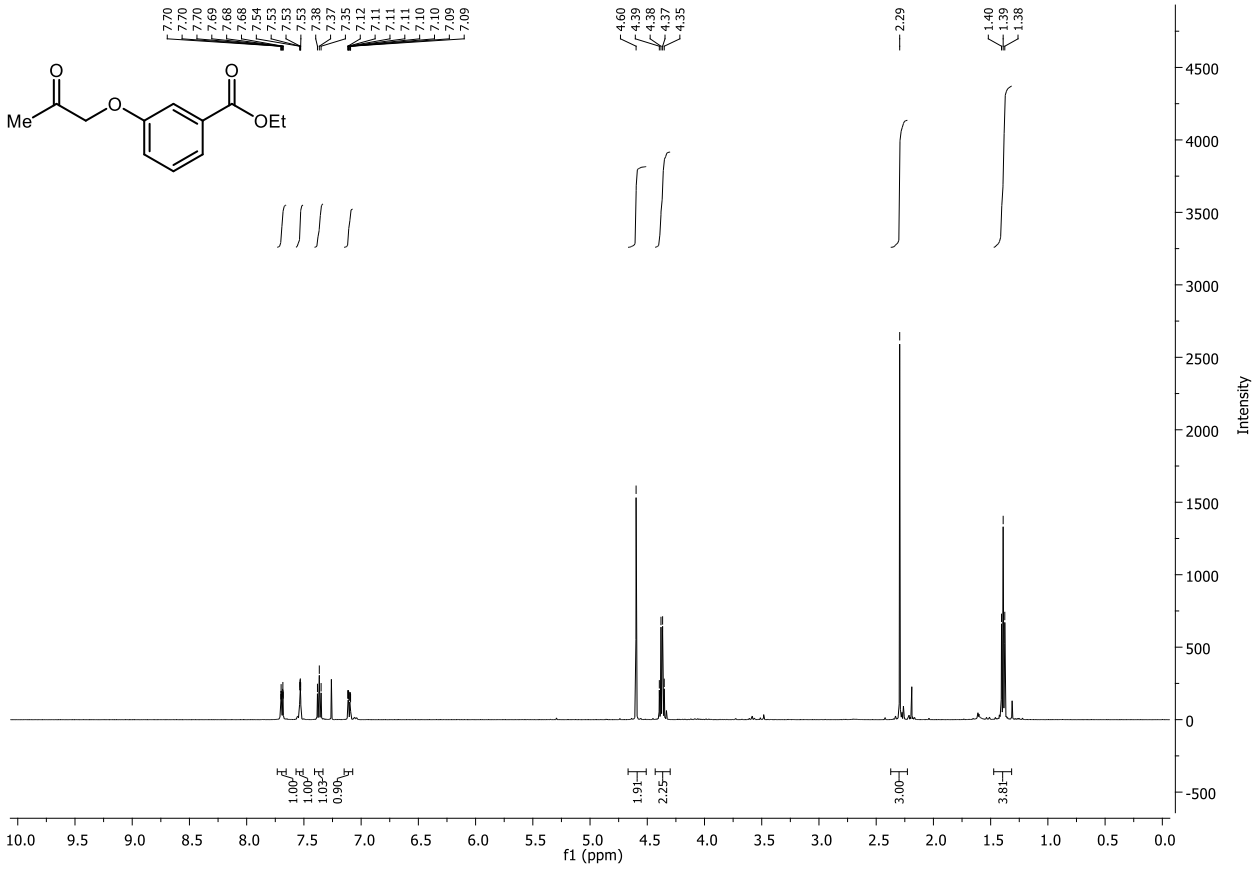


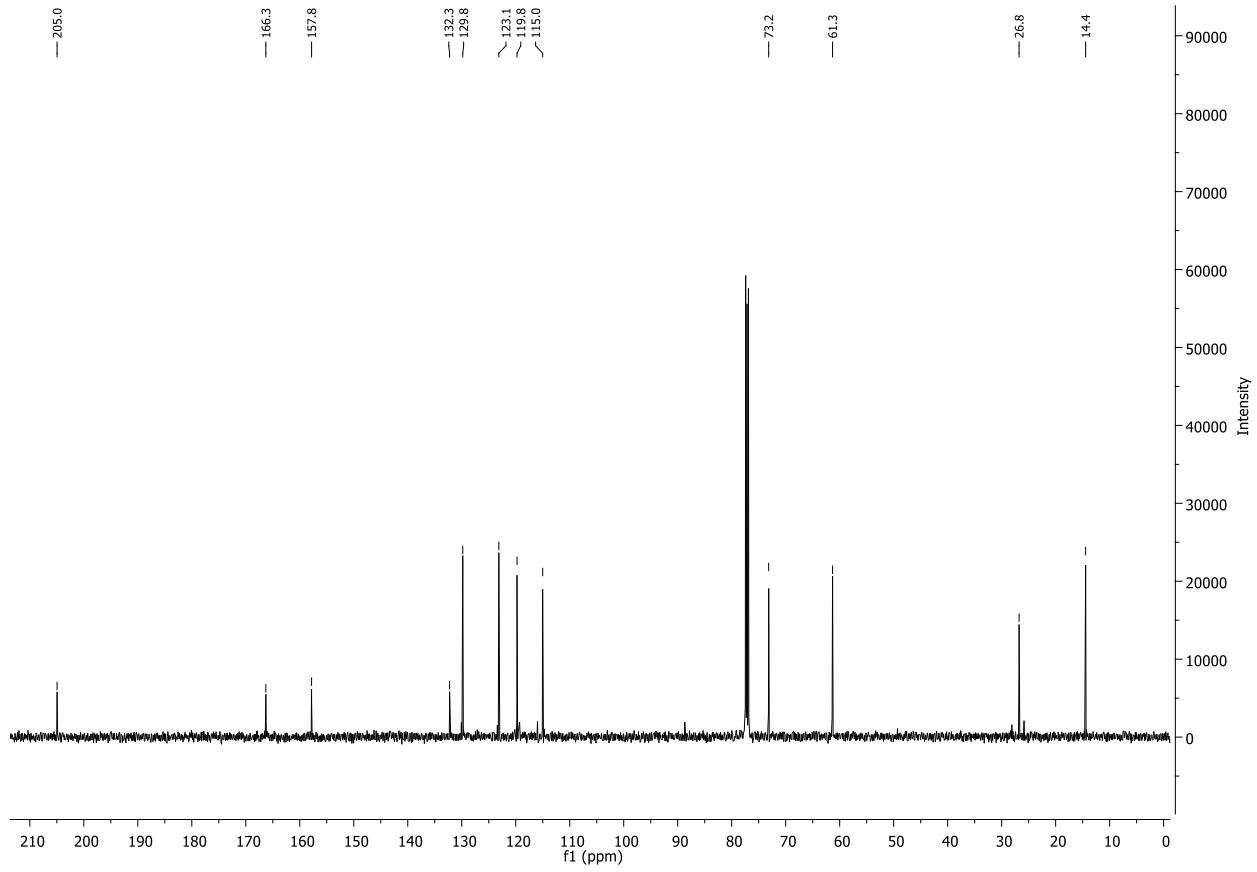


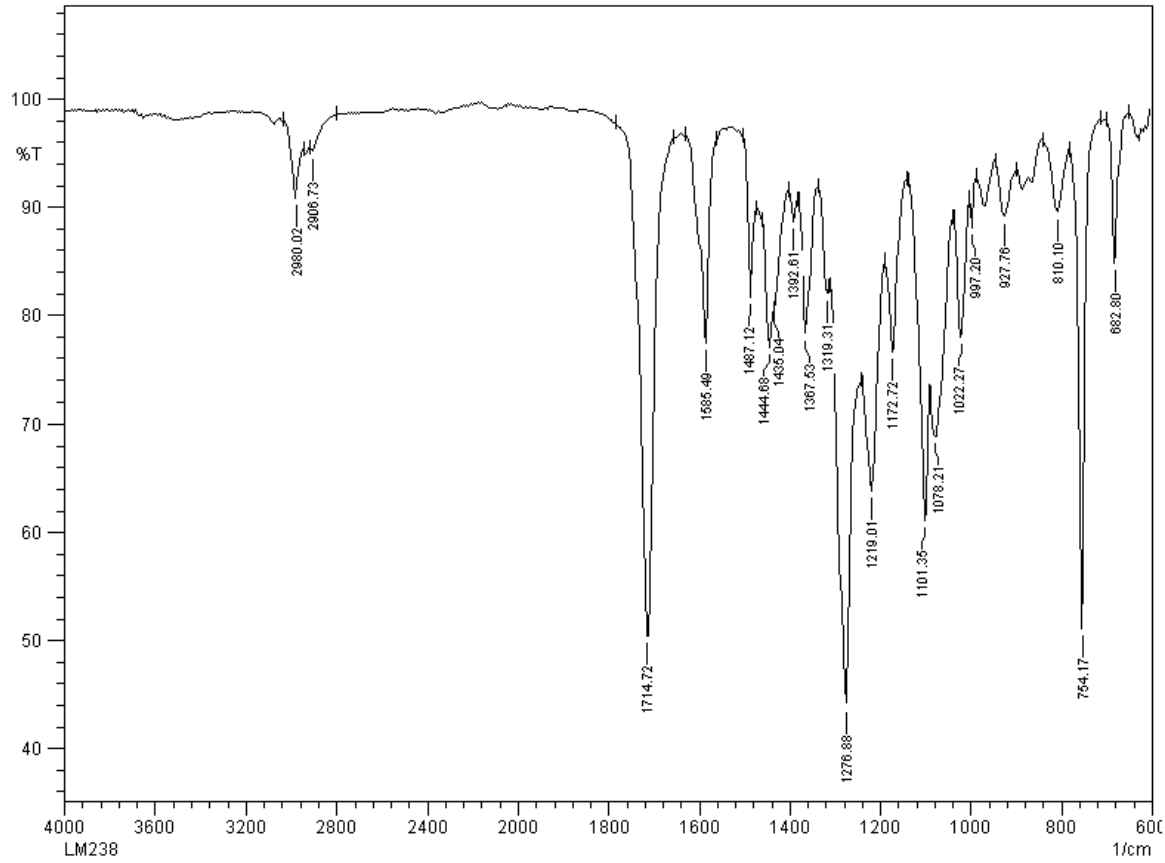

3114; 73.388
3051; 72.283
2921; 68.424
1616; 73.711
1554; 41.411
1582; 38.236
Transmittance
Wavenumber (cm-1)

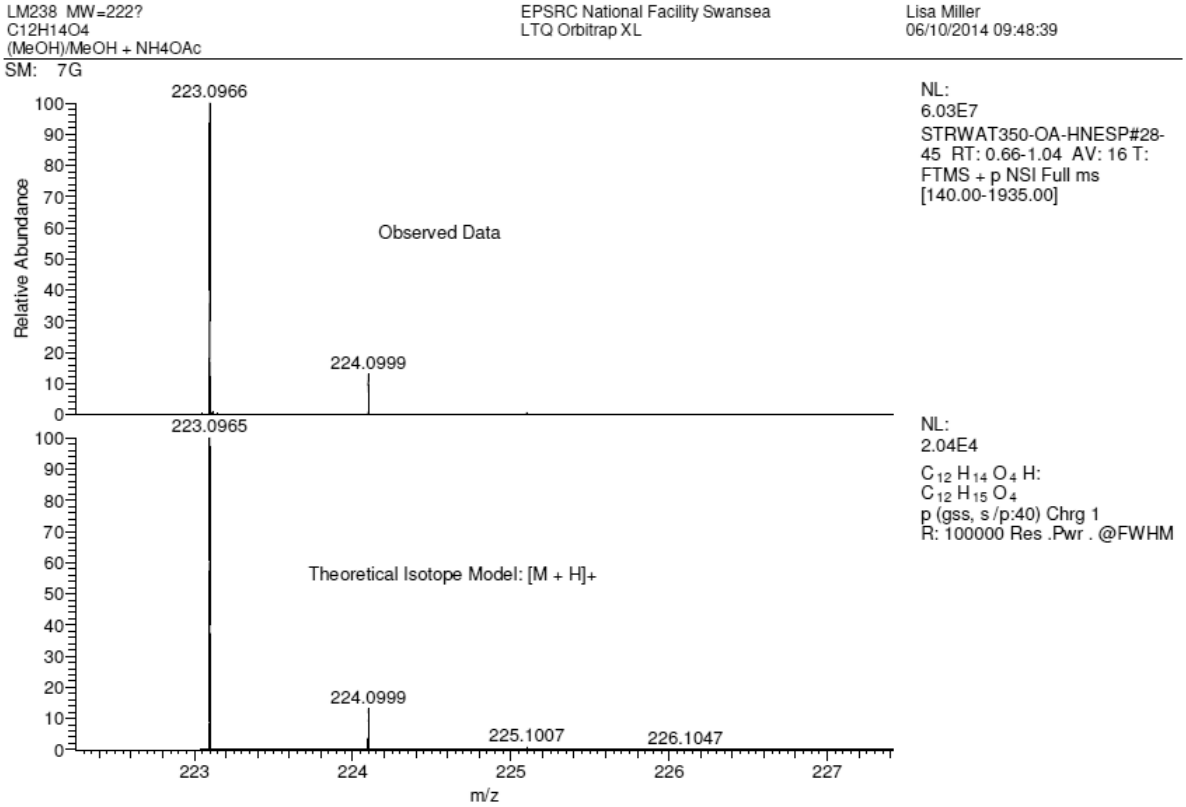

LM421 MW=381?
C19H17BrN4
(DCM)/MeOH + NH4OAc
EPSRC National Facility Swansea
LTQ Orbitrap XL
Lisa Miller
23/04/2015 02:20:55 PM
381.0705
383.0686
Observed Data
382.0740
384.0719
NL:
3.69E6
STRWAT485-OR-HNESP#26-42 RT: 0.66-1.05 AV: 14 T: FTMS + p NSI Full ms [140.00-1935.00]
381.0709
383.0689
Theoretical Isotope Model: [M + H]+
382.0743
384.0722
385.0756
386.0790
NL:
9.53E3
C19 H17 BrN4 H:
C19 H18 Br1 N4
p (gss, s /p:40) Chrg 1
R: 100000 Res .Pwr . @FWHM
Relative Abundance
m/z

Ethyl 3-(2-oxopropoxy)benzoate (1.103).

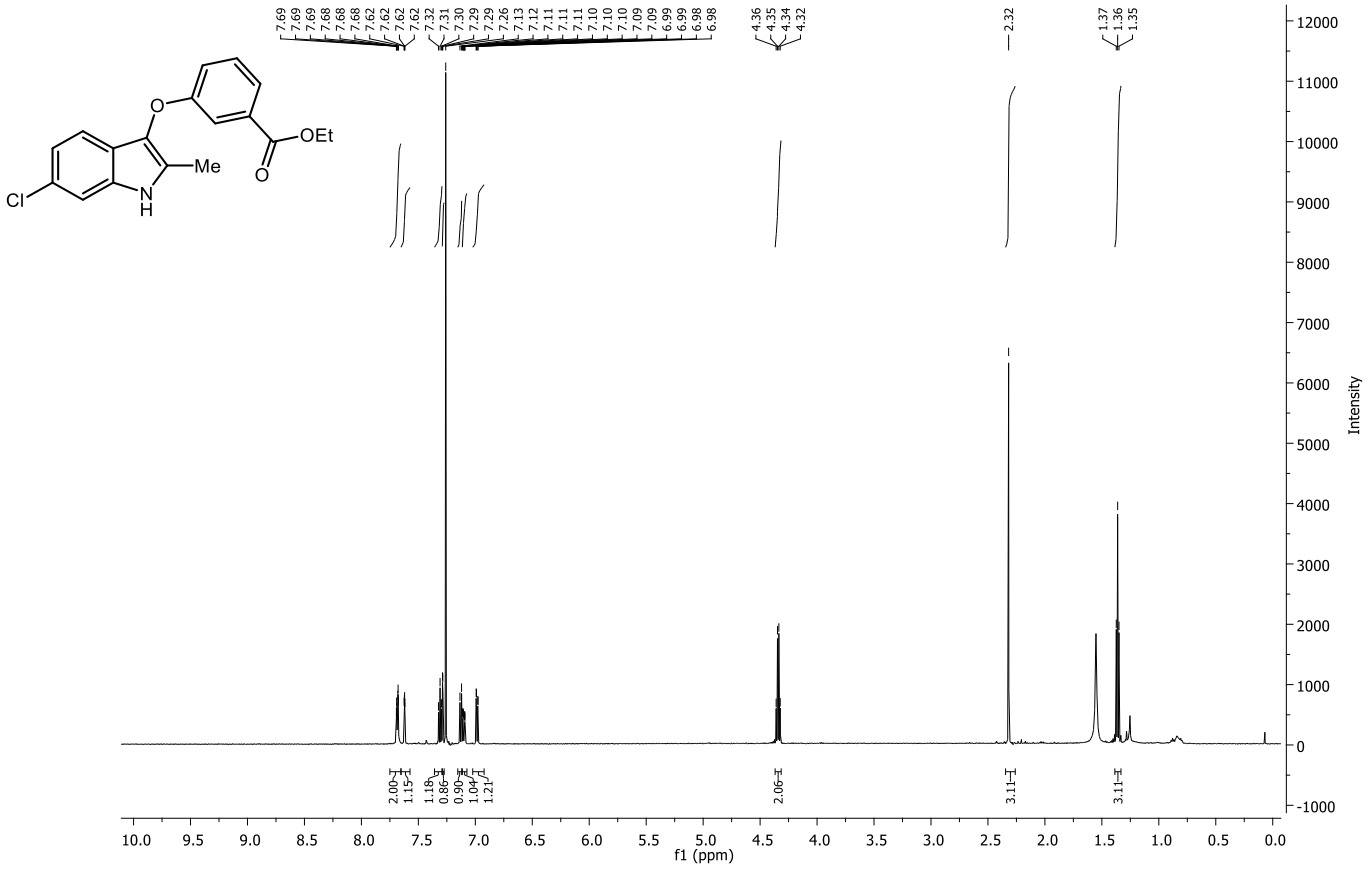


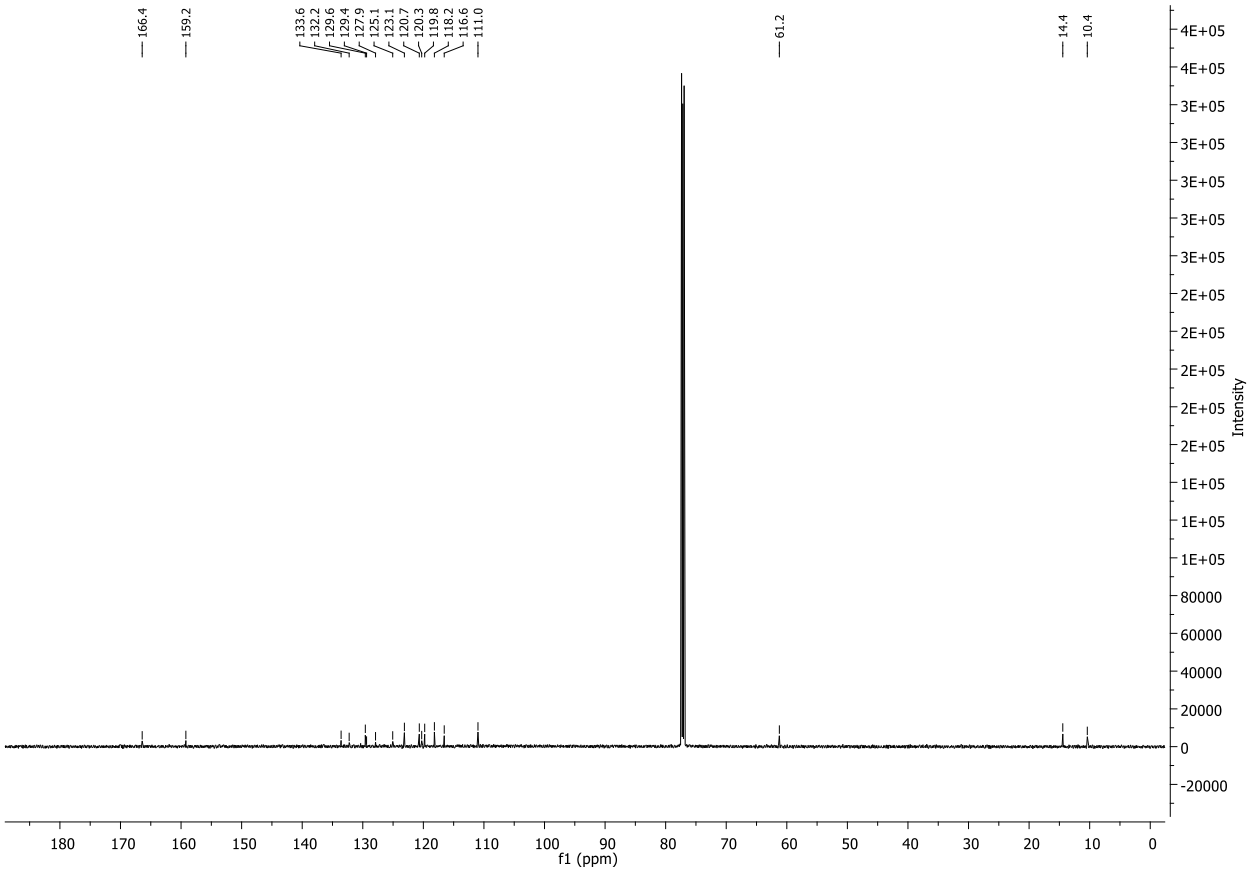


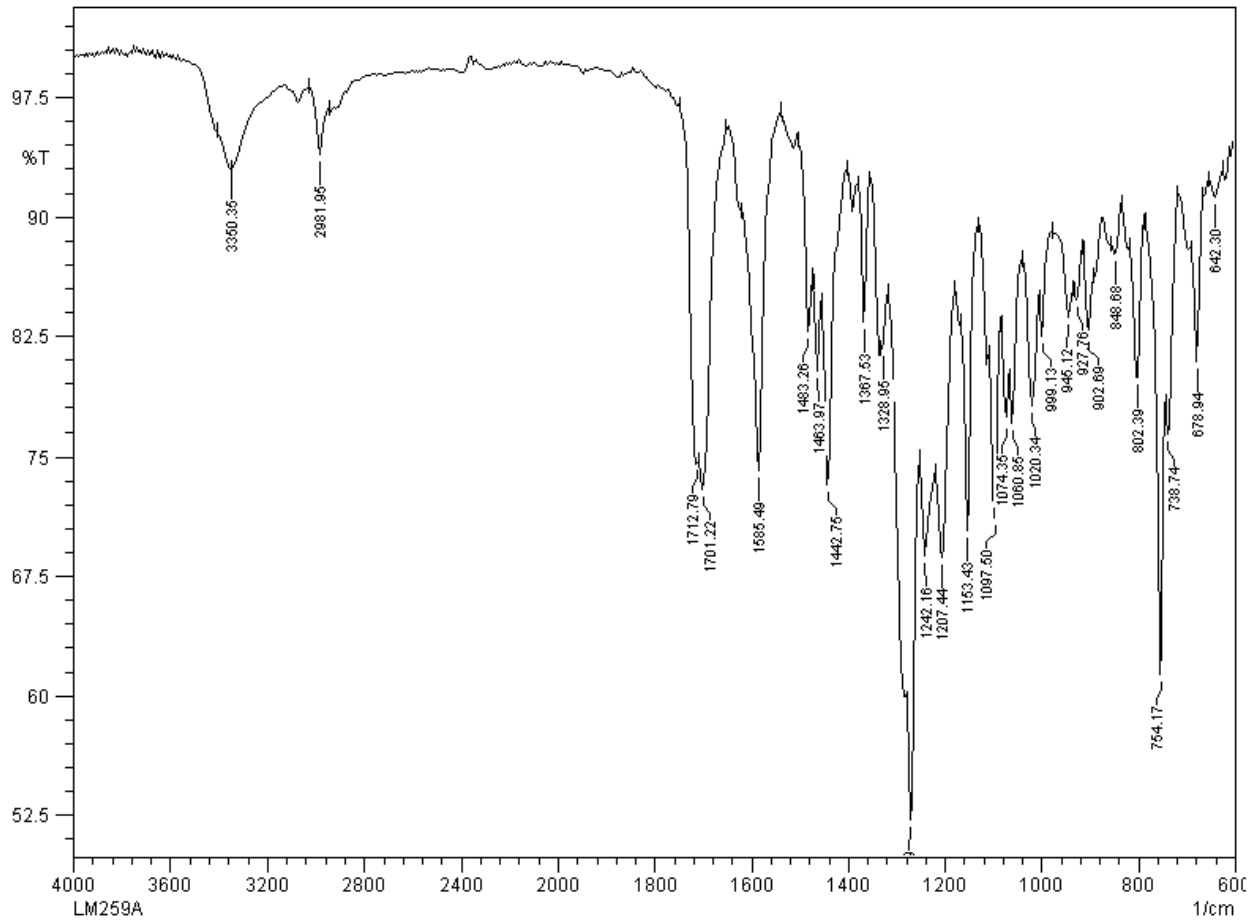

100
%T
90
80
70
60
50
40
2980.02
2906.73
1714.72
1585.49
1487.12
1444.68
1435.04
1392.61
1367.53
1319.31
1276.88
1219.01
1172.72
1101.35
1078.21
1022.27
997.20
927.76
810.10
764.17
682.80
4000
3600
3200
2800
2400
2000
1800
1600
1400
1200
1000
800
LM238
1/cm


LM238 MW=222?
C12H14O4
(MeOH)/MeOH + NH4OAc
EPSRC National Facility Swansea
LTQ Orbitrap XL
Lisa Miller
06/10/2014 09:48:39
SM: 7G
223.0966
Observed Data
224.0999
NL:
6.03E7
STRWAT350-OA-HNESP#28-45 RT: 0.66-1.04 AV: 16 T: FTMS + p NSI Full ms [140.00-1935.00]
223.0965
Theoretical Isotope Model: [M + H]+
224.0999
225.1007
226.1047
NL:
2.04E4
C12 H14 O4 H:
C12 H15 O4
p (gss, s /p:40) Chrg 1
R: 100000 Res .Pwr . @FWHM
Relative Abundance
m/z

Ethyl 3-((6-chloro-2-methyl-1*H*-indol-3-yl)oxy)benzoate (1.104).






97.5
%T
90
82.5
75
67.5
60
52.5
3350.35
2981.95
1712.79
1701.22
1585.49
1483.26
1463.97
1442.75
1367.53
1328.95
1242.16
1207.44
1153.43
1097.50
1074.35
1060.85
1020.34
999.13
946.12
927.76
902.69
848.68
802.39
754.17
738.74
678.94
642.30
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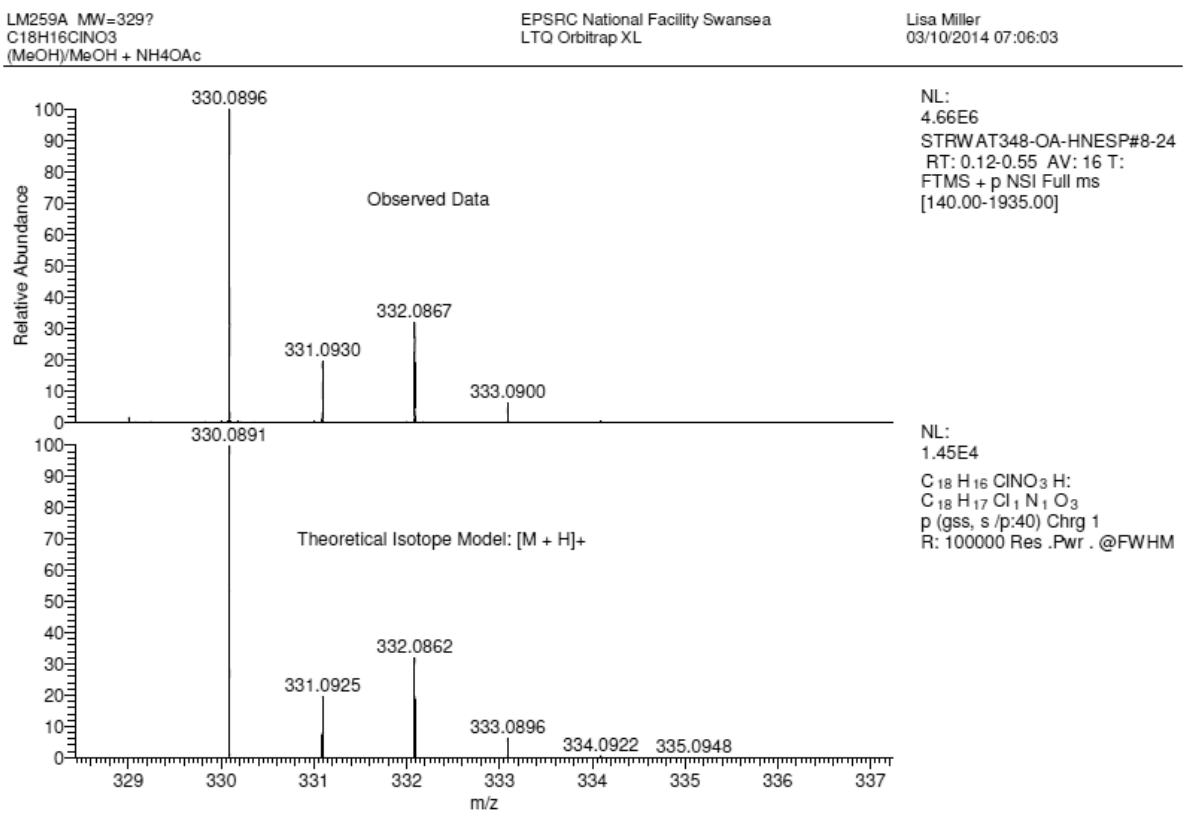
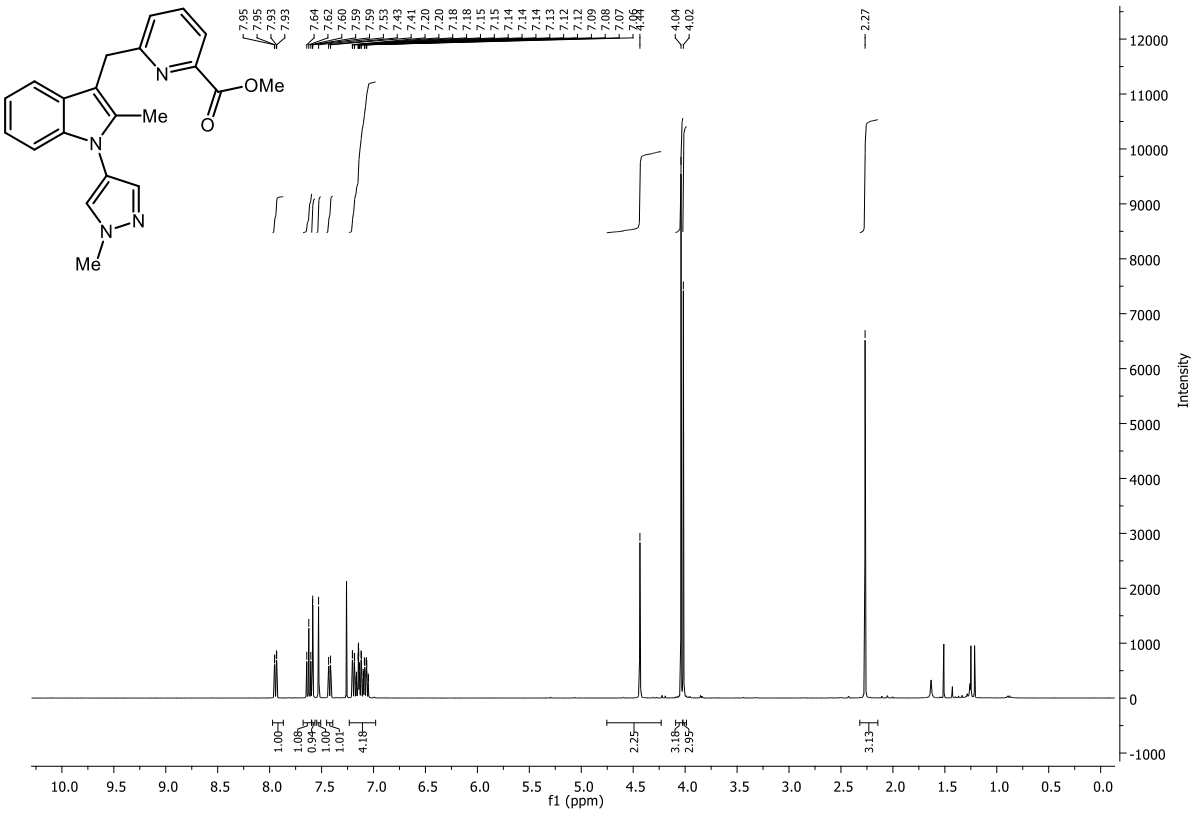
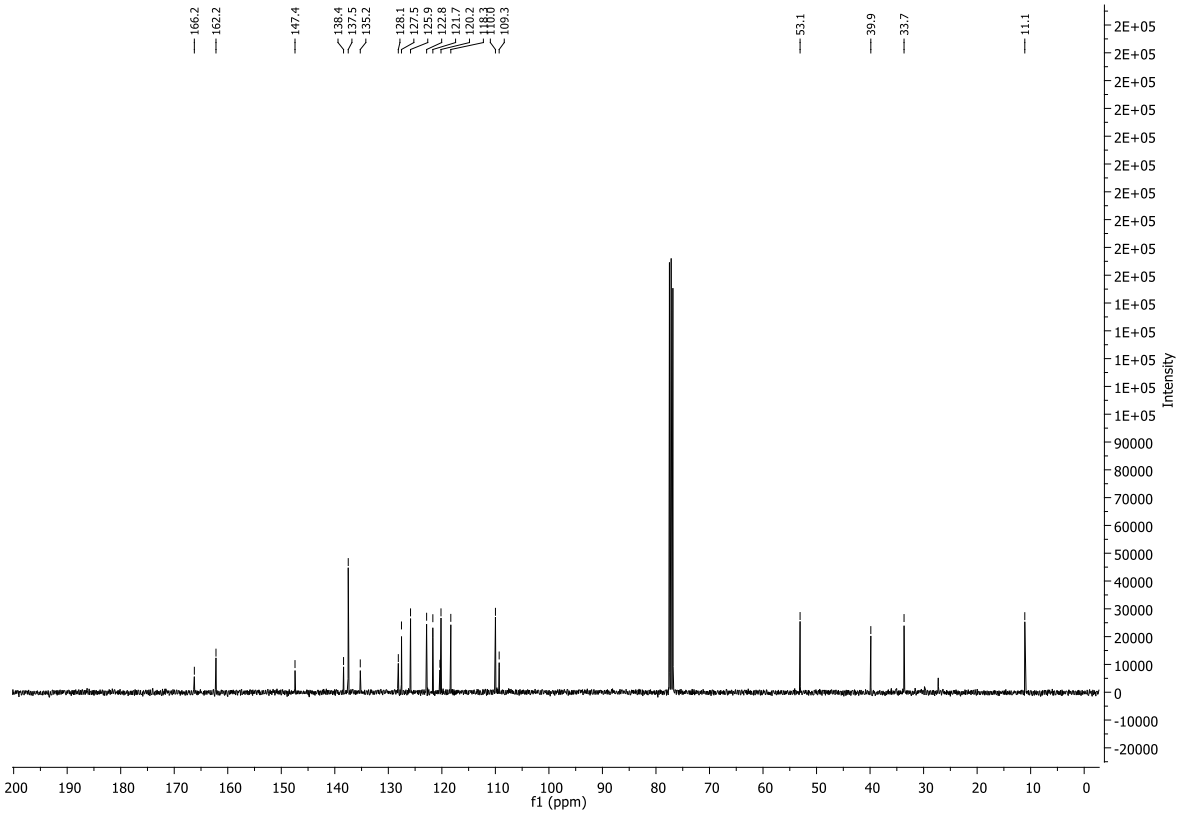
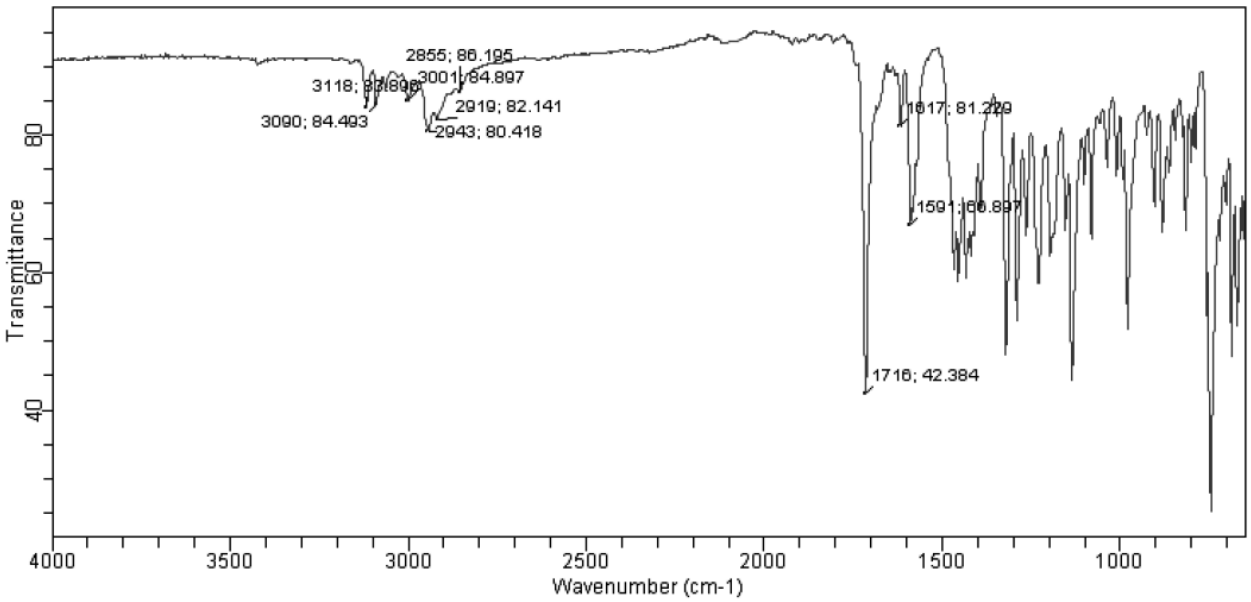
1600
1400
1200
1000
800
600
LM259A
1/cm

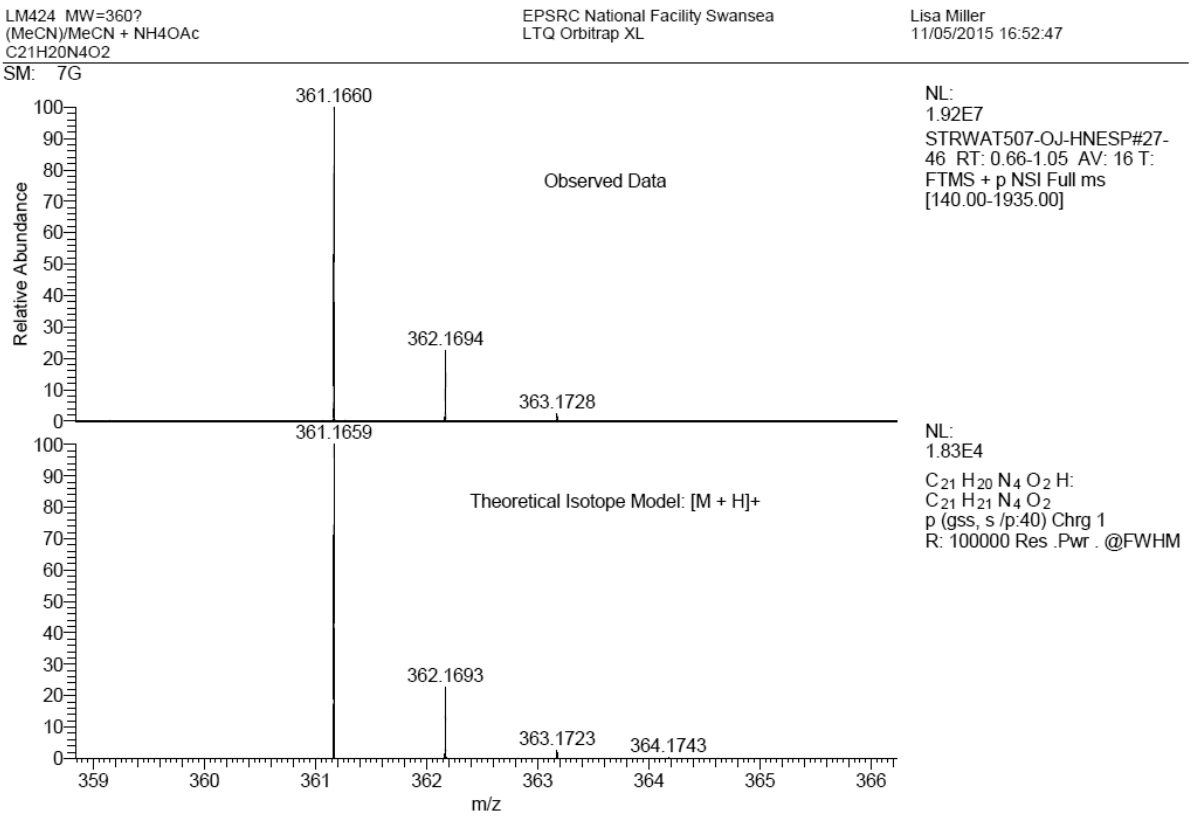

LM259A MW=329?
C18H16ClNO3
(MeOH)/MeOH + NH4OAc
EPSRC National Facility Swansea
LTQ Orbitrap XL
Lisa Miller
03/10/2014 07:06:03
330.0896
Observed Data
332.0867
331.0930
333.0900
Relative Abundance
NL:
4.66E6
STRWAT348-OA-HNESP#8-24
RT: 0.12-0.55 AV: 16 T:
FTMS + p NSI Full ms
[140.00-1935.00]
330.0891
Theoretical Isotope Model: [M + H]+
332.0862
331.0925
333.0896
334.0922
335.0948
NL:
1.45E4
C 18 H 16 ClNO 3 H:
C 18 H 17 Cl 1 N 1 O 3
p (gss, s /p:40) Chrg 1
R: 100000 Res .Pwr . @FWHM
m/z

Methyl 6-((2-methyl-1-(1-methyl-1*H*-pyrazol-4-yl)-1*H*-indol-3-yl)methyl)picolinate (1.105).

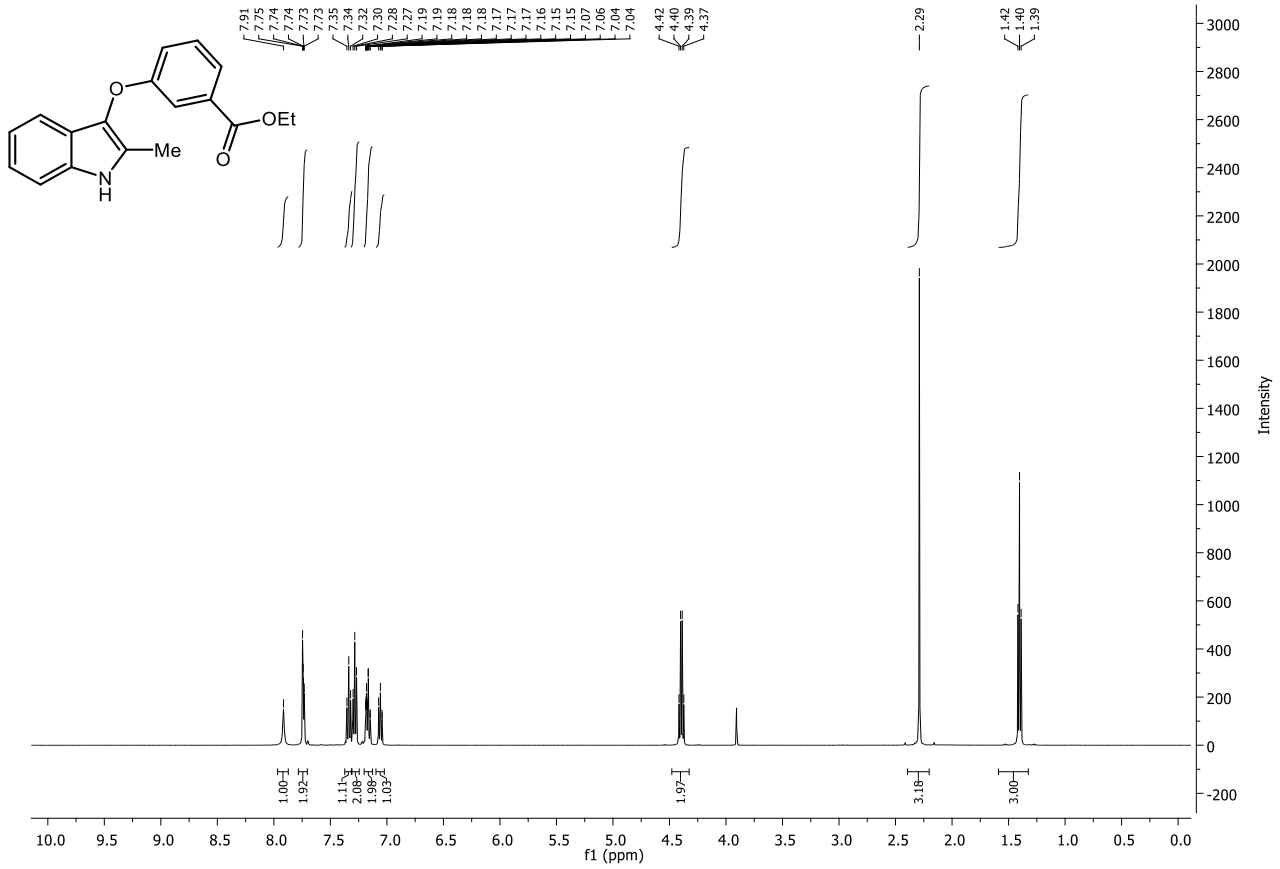


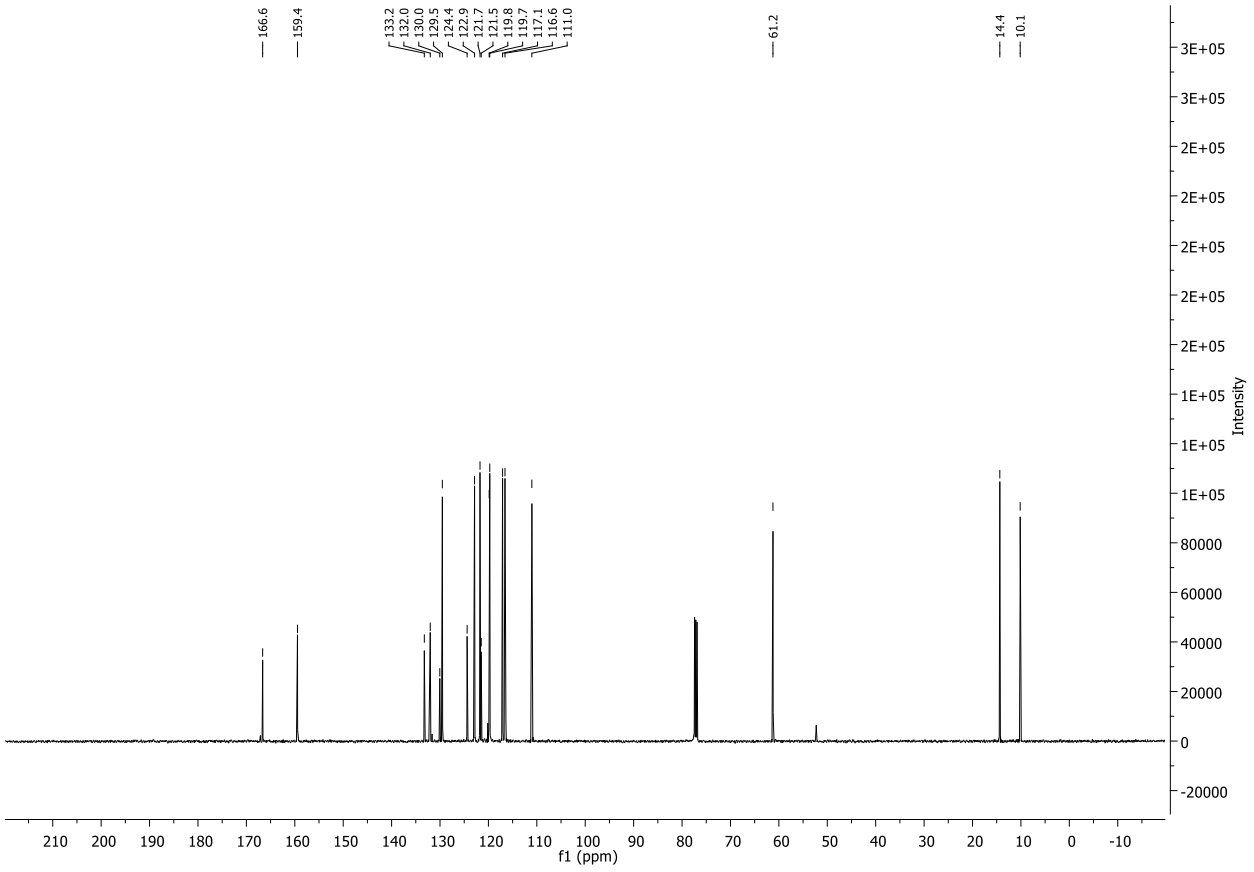


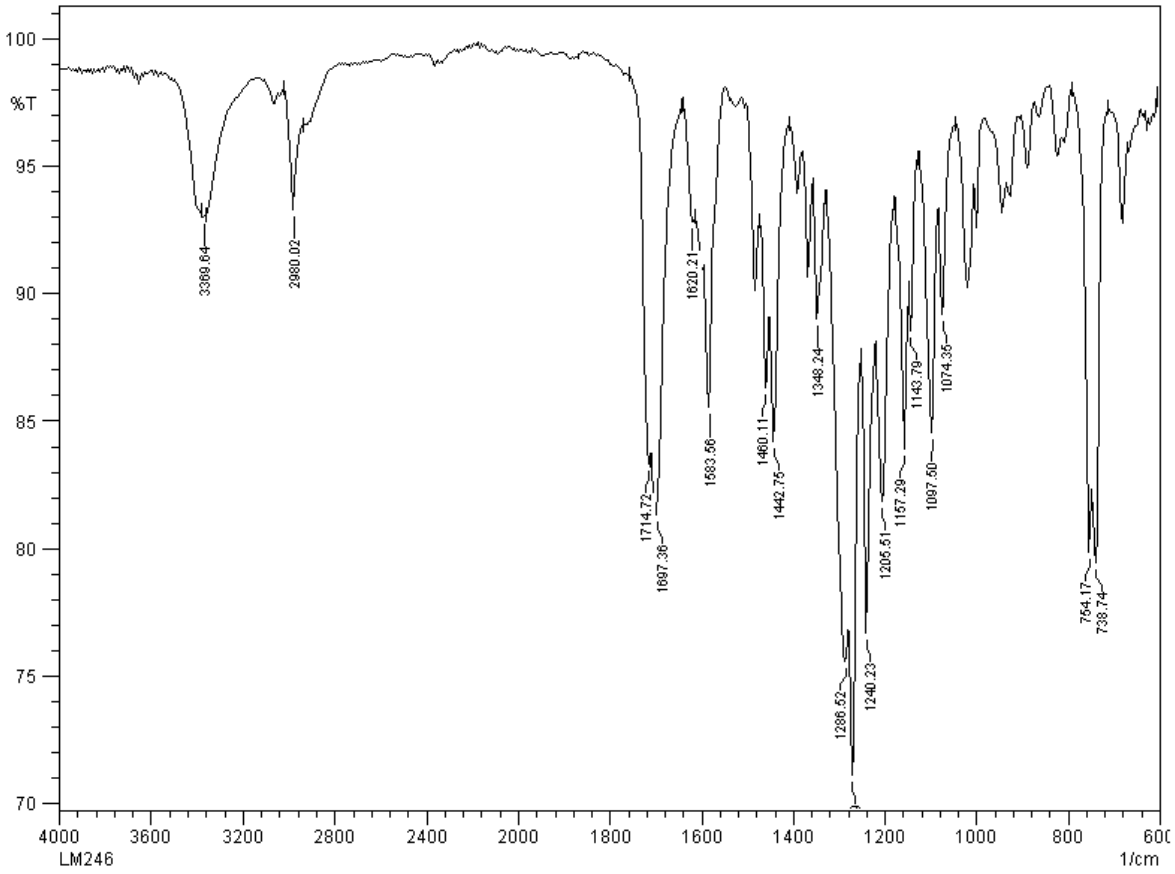

2855; 86.195
3001; 84.897
3118; 88.898
2919; 82.141
3090; 84.493
2943; 80.418
1617; 81.229
1591; 86.897
1716; 42.384
Transmittance
80
60
40
4000
3500
3000
2500
2000
1500
1000
Wavenumber (cm-1)


LM424 MW=360?
(MeCN)/MeCN + NH4OAc
C21H20N4O2
SM: 7G
EPSRC National Facility Swansea
LTQ Orbitrap XL
Lisa Miller
11/05/2015 16:52:47
361.1660
362.1694
363.1728
Observed Data
NL:
1.92E7
STRWAT507-OJ-HNESP#27-46 RT: 0.66-1.05 AV: 16 T: FTMS + p NSI Full ms [140.00-1935.00]
361.1659
362.1693
363.1723
364.1743
Theoretical Isotope Model: [M + H]+
NL:
1.83E4
C21 H20 N4 O2 H:
C21 H21 N4 O2
p (gss, s /p:40) Chrg 1
R: 100000 Res .Pwr . @FWHM
Relative Abundance
m/z

Ethyl 3-((2-methyl-1*H*-indol-3-yl)oxy)benzoate (1.106).



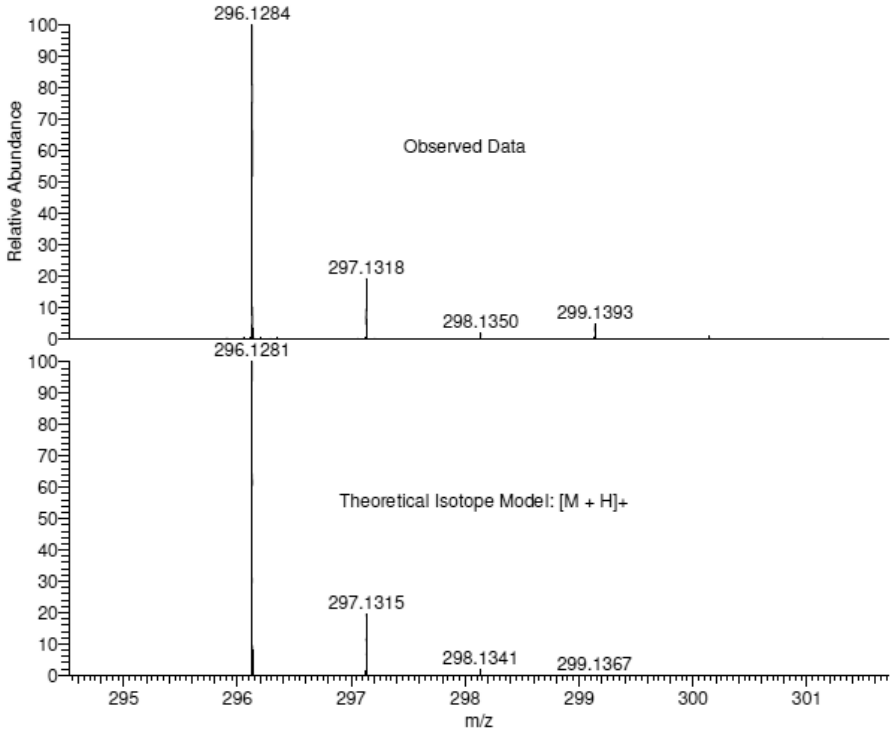




LM246 MW=295?
C18H17NO3
(MeOH)/MeOH + NH4OAc

EPSRC National Facility Swansea
LTQ Orbitrap XL

Lisa Miller
06/10/2014 09:45:48



NL:
5.95E7
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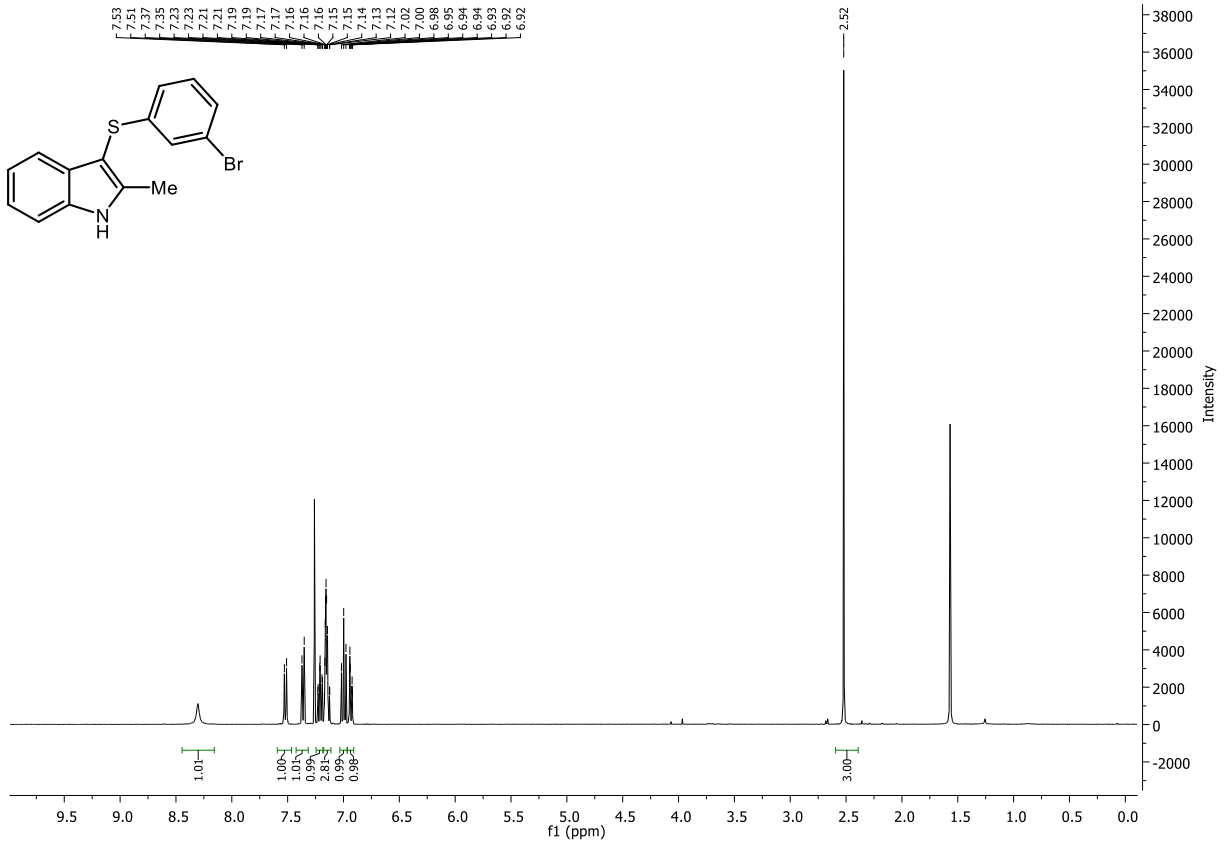
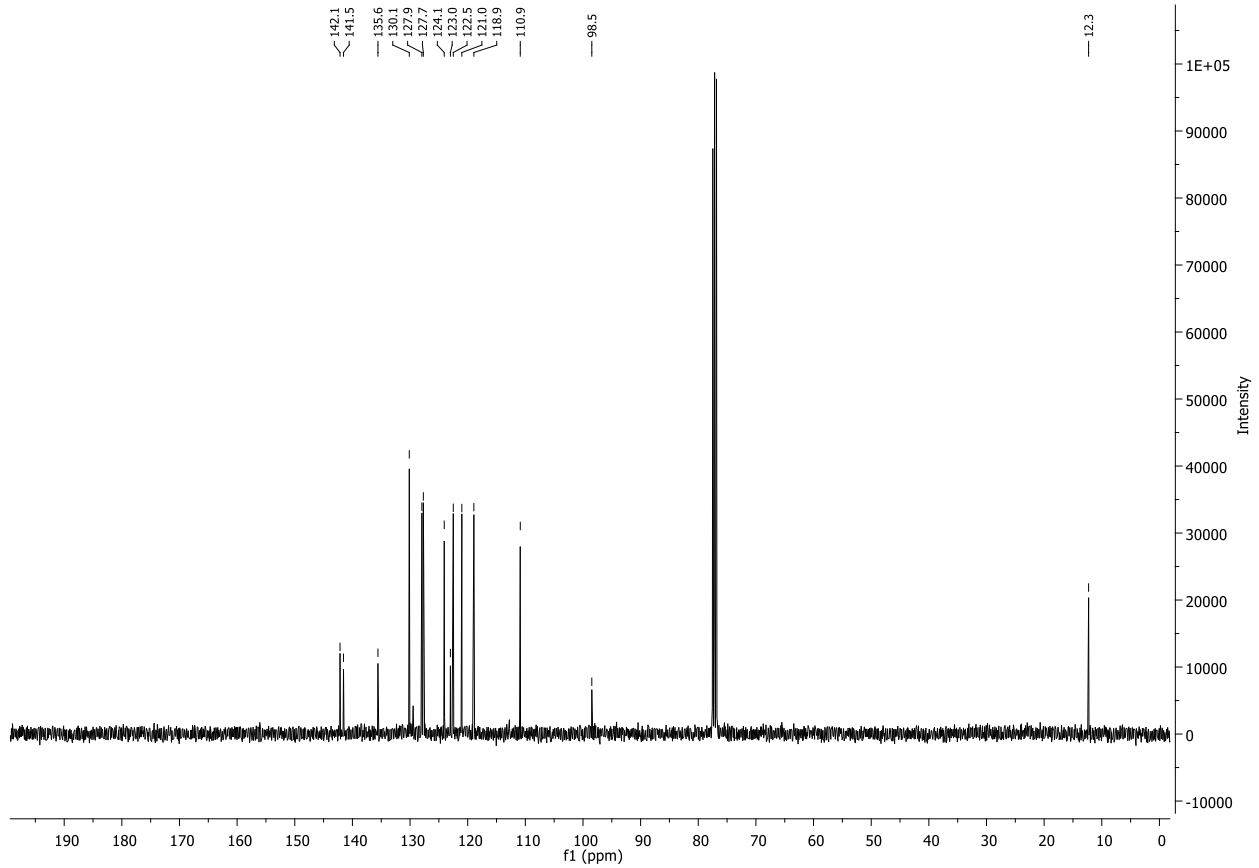
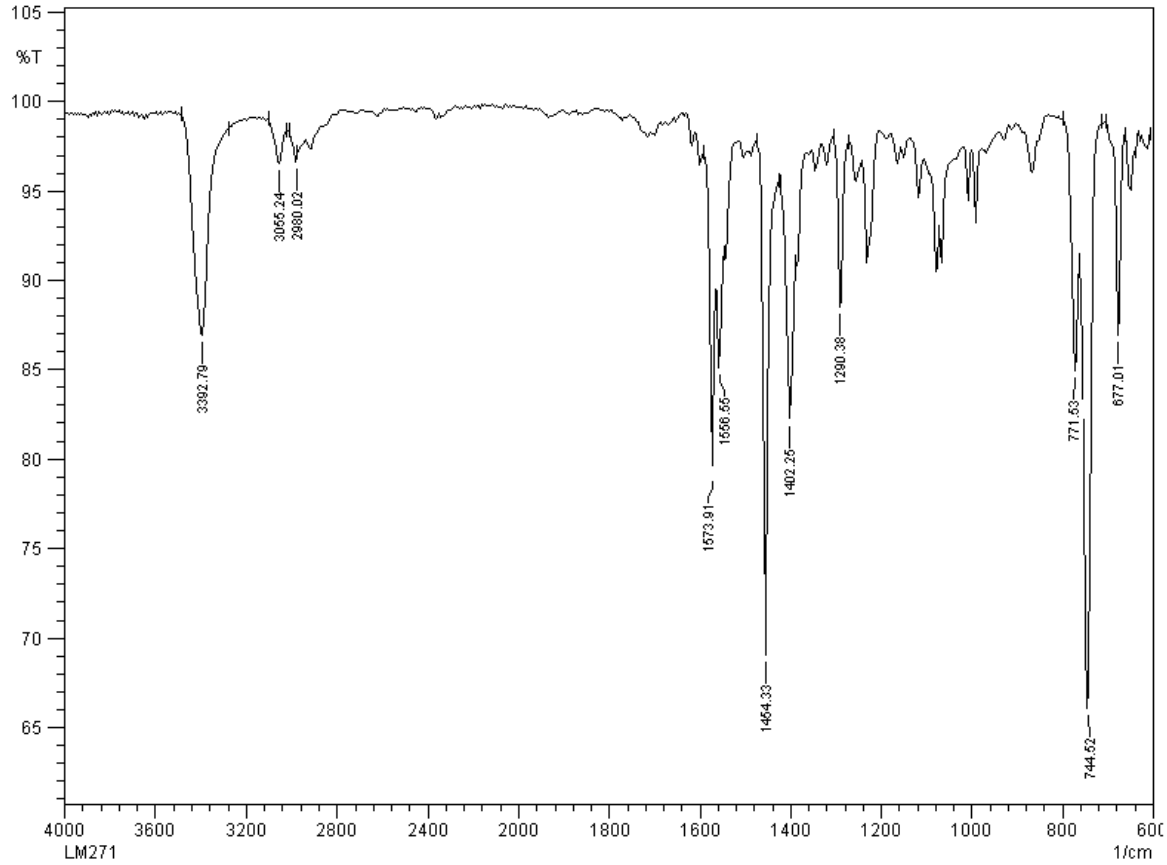
NL:
1.91E4
$C_{18}H_{17}NO_3$ H:
$C_{18}H_{18}N_1O_3$
p (gss, s /p:40) Chrg 1
R: 100000 Res .Pwr . @FWHM

3-((3-Bromophenyl)thio)-2-methyl-1*H*-indole (1.107).






105
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2980.02
1573.91
1556.65
1464.33
1402.25
1290.38
771.53
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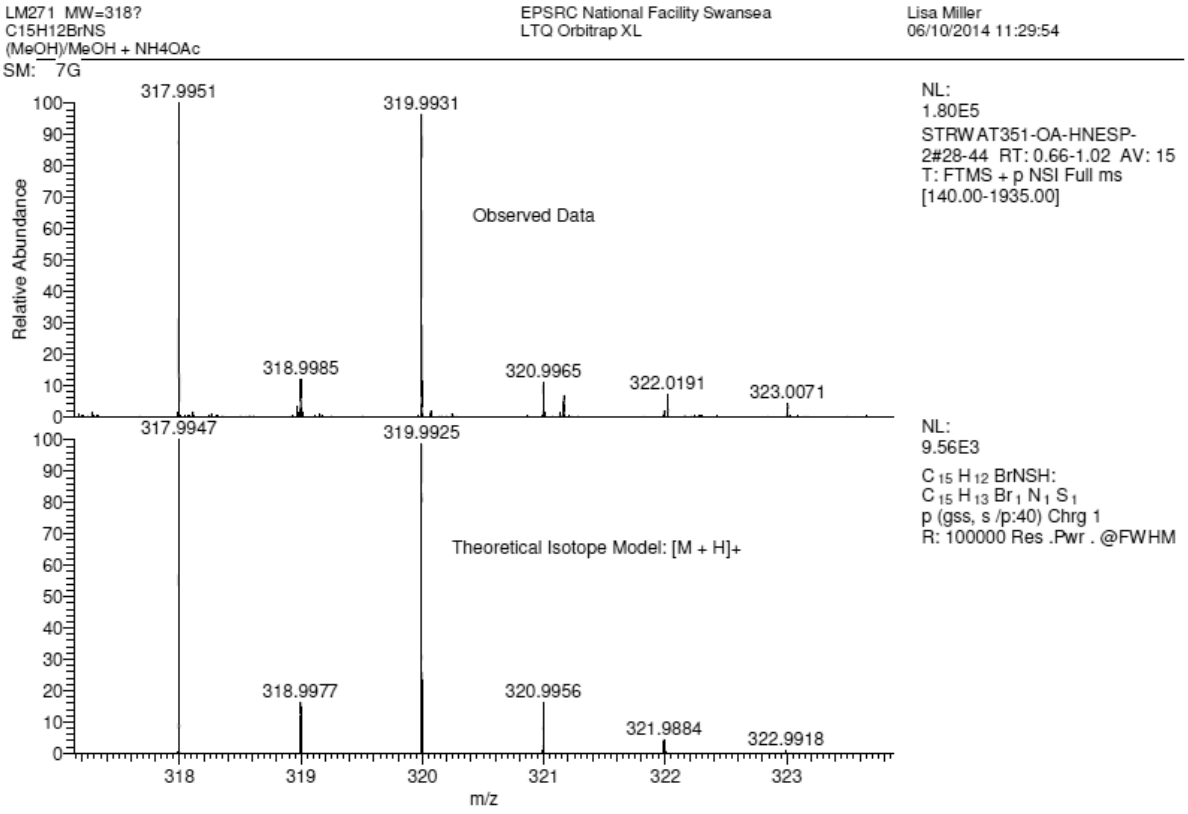
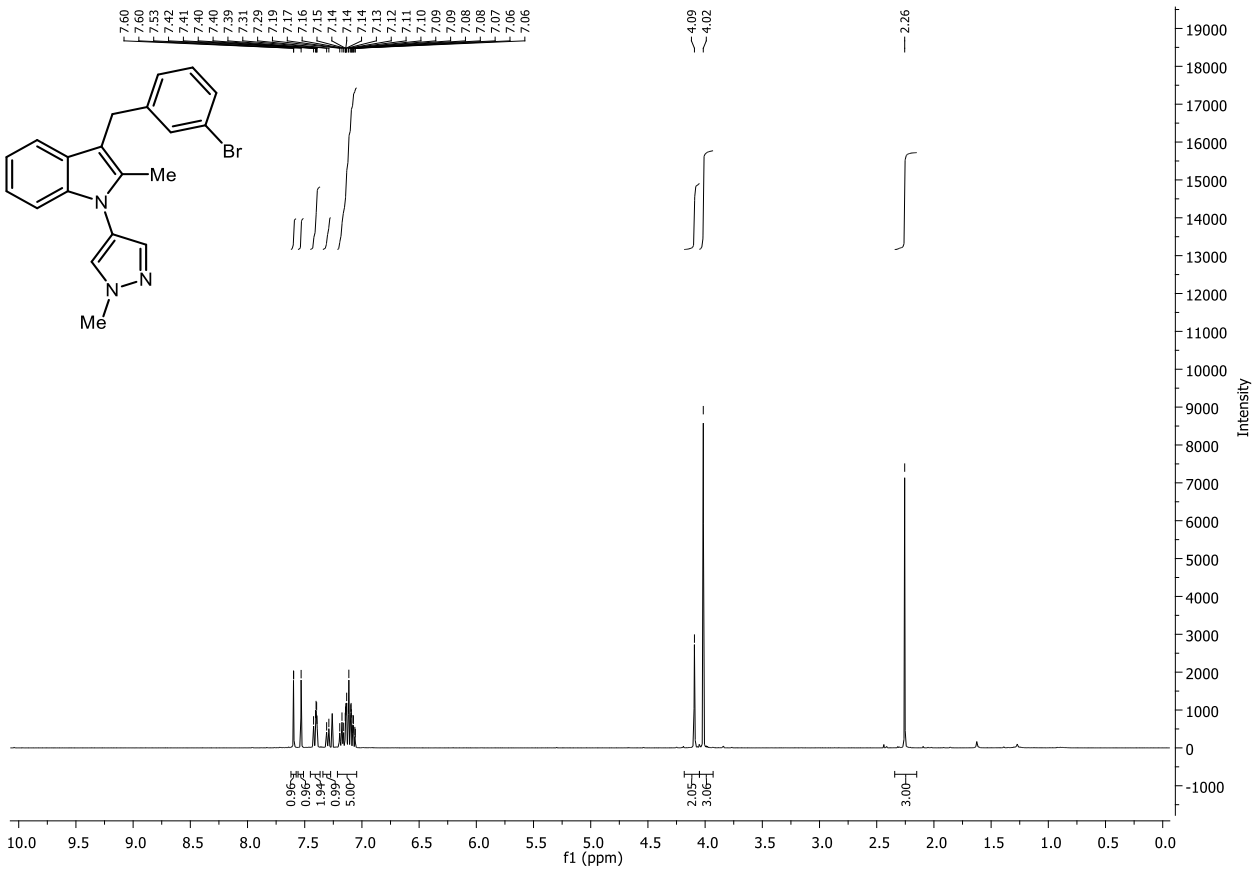
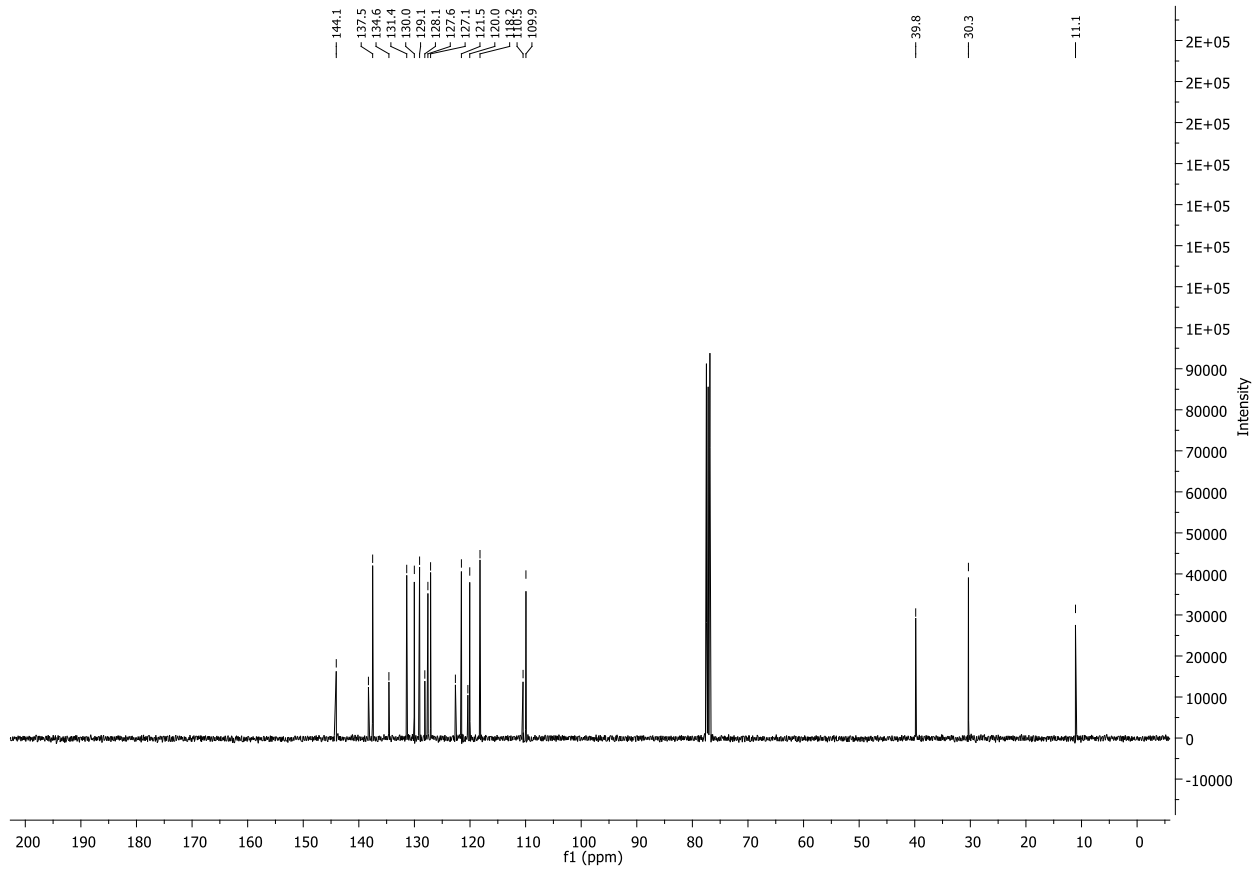
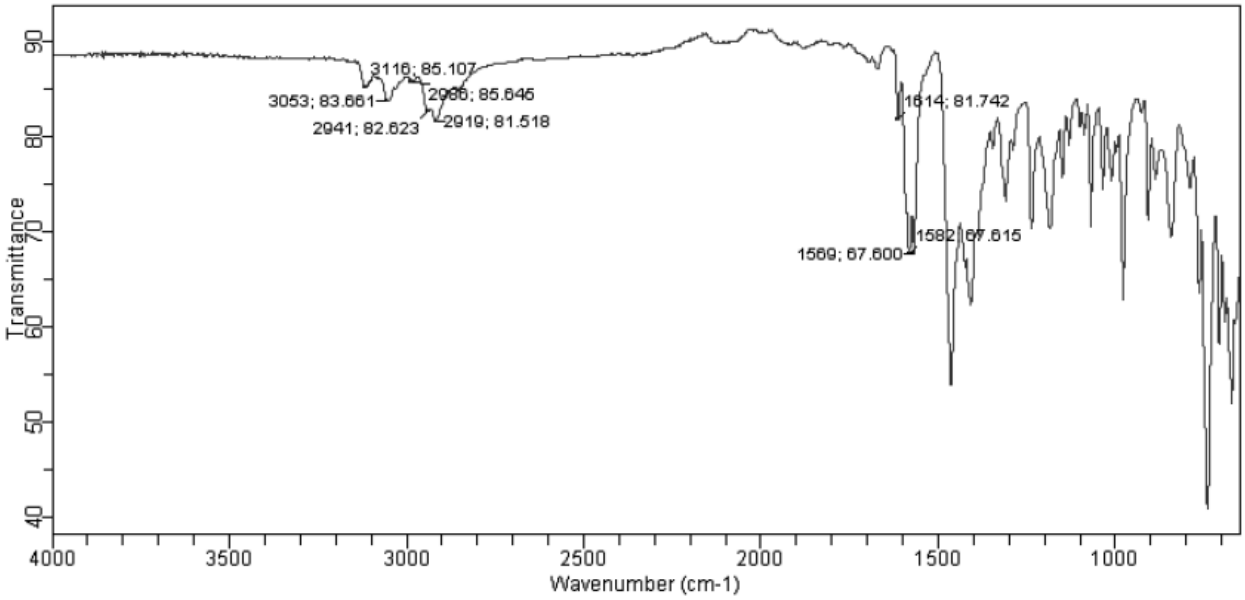
2000
1800
1600
1400
1200
1000
800
LM271
1/cm

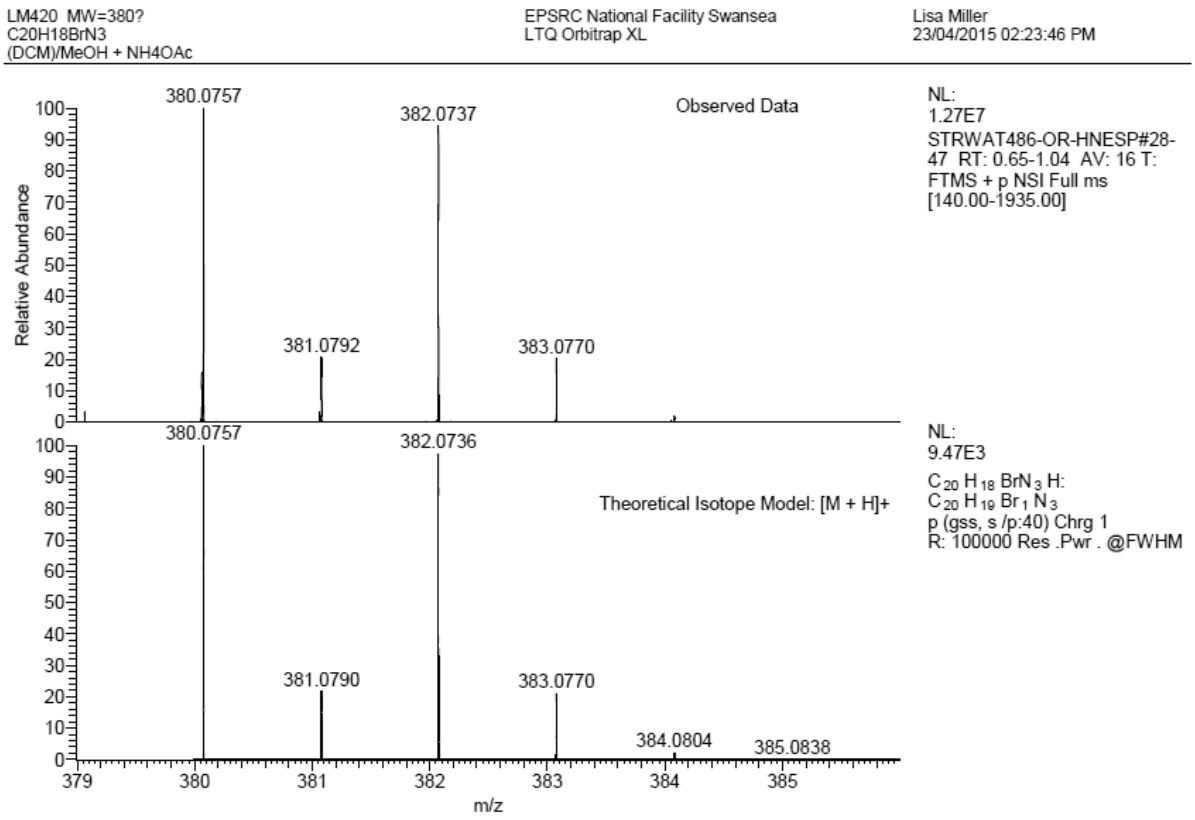

LM271 MW=318?
C15H12BrNS
(MeOH)/MeOH + NH4OAc
SM: 7G
EPSRC National Facility Swansea
LTQ Orbitrap XL
Lisa Miller
06/10/2014 11:29:54
317.9951
319.9931
318.9985
320.9965
322.0191
323.0071
Observed Data
Relative Abundance
NL:
1.80E5
STRWAT351-OA-HNESP-
2#28-44 RT: 0.66-1.02 AV: 15
T: FTMS + p NSI Full ms
[140.00-1935.00]
317.9947
319.9925
318.9977
320.9956
321.9884
322.9918
Theoretical Isotope Model: [M + H]+
NL:
9.56E3
C15 H12 BrNSH:
C15 H13 Br1 N1 S1
p (gss, s /p:40) Chrg 1
R: 100000 Res .Pwr . @FWHM
m/z

3-(3-Bromobenzyl)-2-methyl-1-(1-methyl-1*H*-pyrazol-4-yl)-1*H*-indole (1.108).






Transmittance
Wavenumber (cm-1)
3116; 85.107
3053; 83.661
2966; 85.646
2941; 82.623
2919; 81.518
1614; 81.742
1582; 67.615
1569; 67.600


LM420 MW=380?
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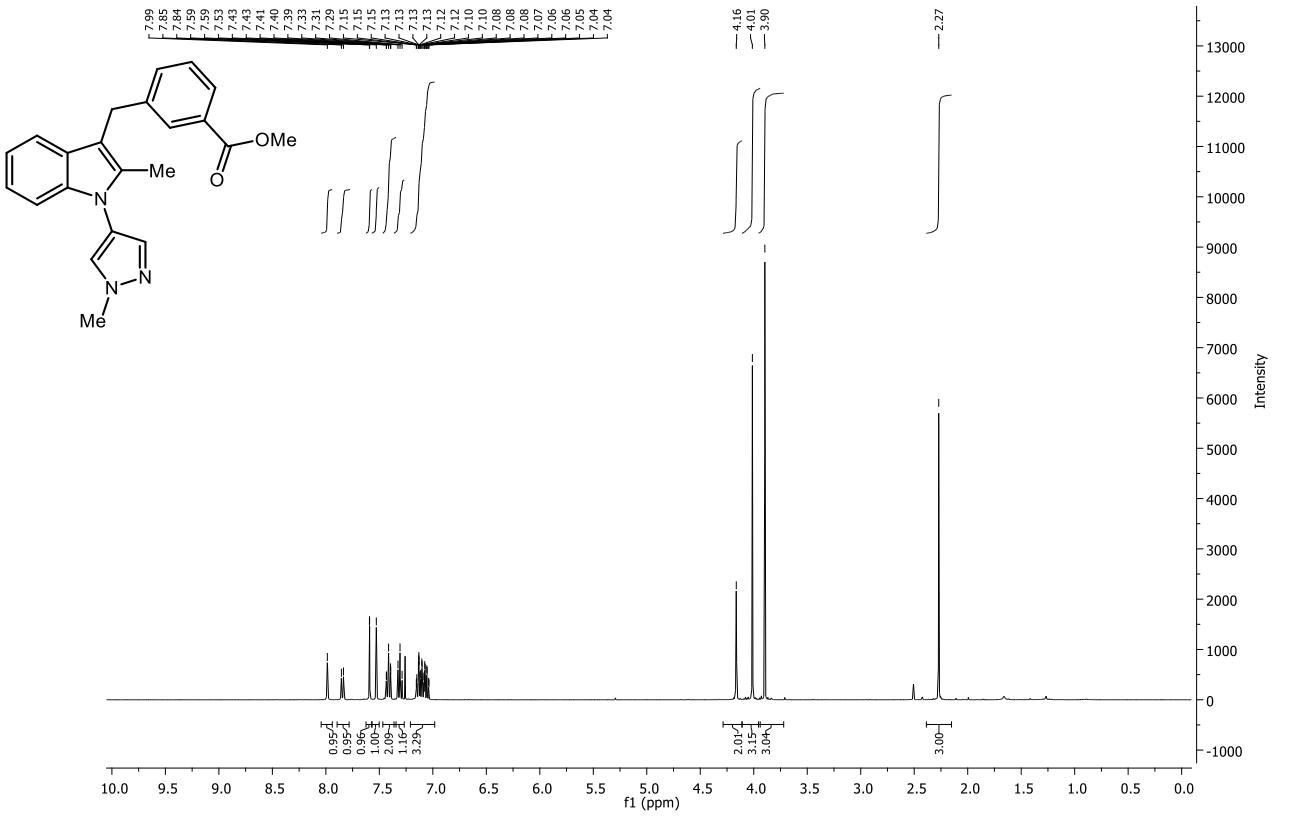
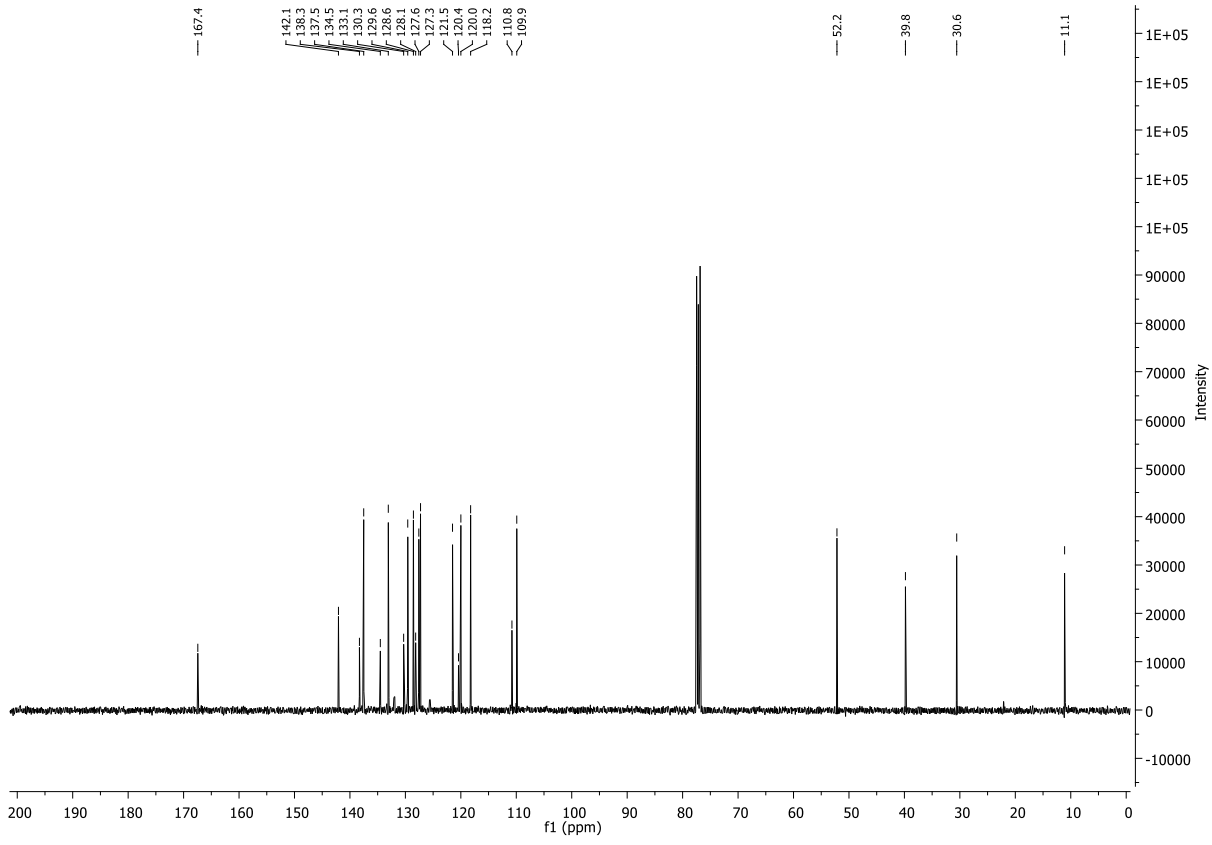
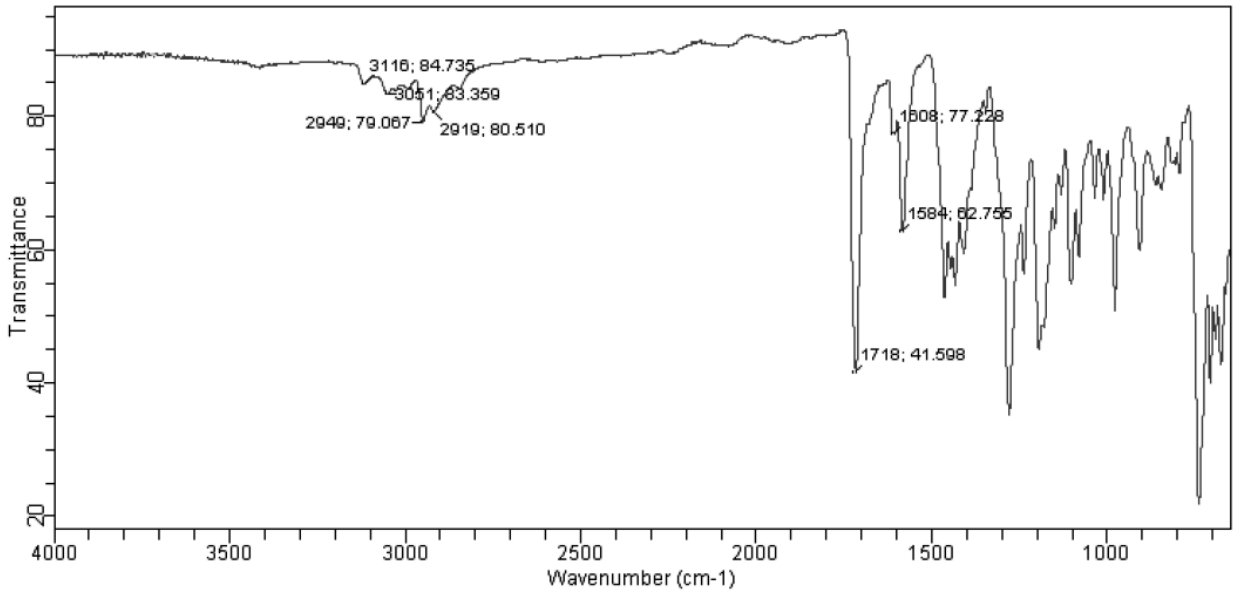
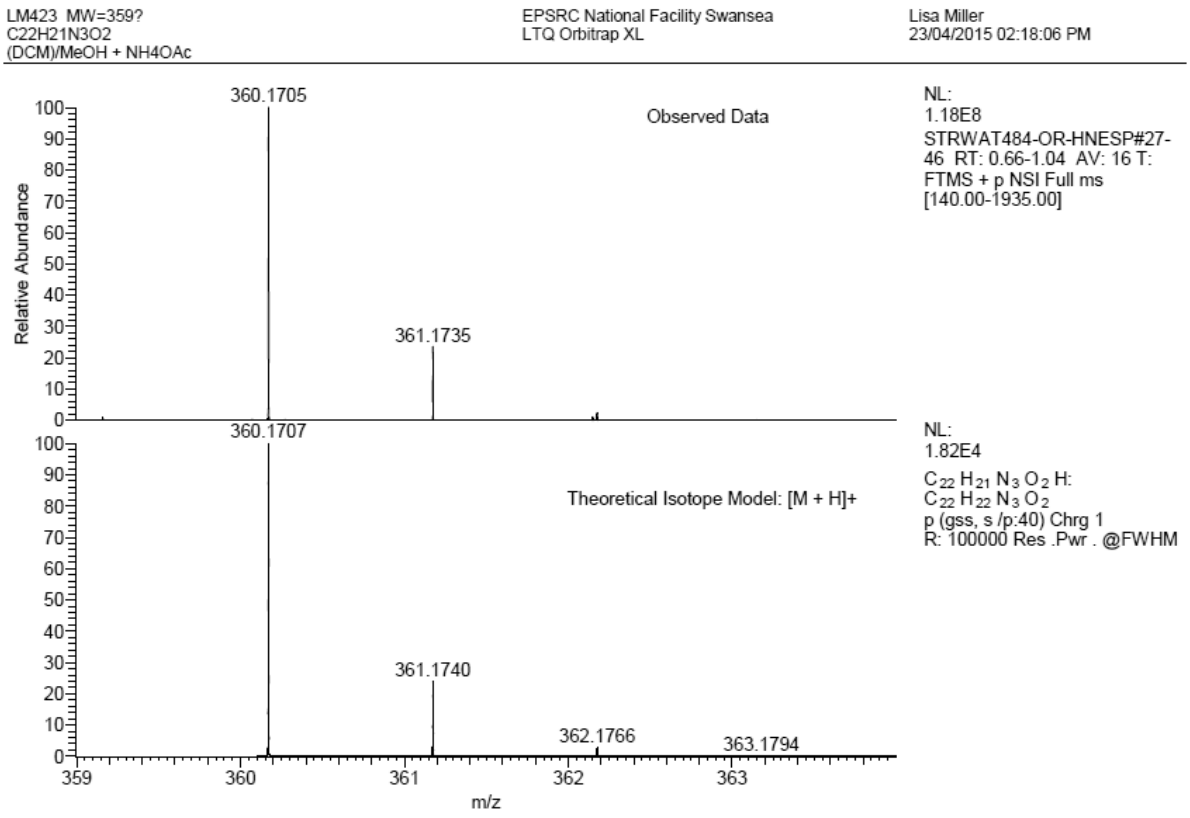
(DCM)/MeOH + NH4OAc
EPSRC National Facility Swansea
LTQ Orbitrap XL
Lisa Miller
23/04/2015 02:23:46 PM
Observed Data
NL:
1.27E7
STRWAT486-OR-HNESP#28-47 RT: 0.65-1.04 AV: 16 T: FTMS + p NSI Full ms [140.00-1935.00]
Theoretical Isotope Model: [M + H]+
NL:
9.47E3
C20 H18 BrN3 H:
C20 H19 Br1 N3
p (gss, s /p:40) Chrg 1
R: 100000 Res .Pwr . @FWHM
Relative Abundance
m/z

Methyl 3-((2-methyl-1-(1-methyl-1*H*-pyrazol-4-yl)-1*H*-indol-3-yl)methyl)benzoate (1.109).






3116; 84.735
3051; 83.359
2949; 79.067
2919; 80.510
1608; 77.228
1584; 82.755
1718; 41.598
Transmittance
Wavenumber (cm-1)


LM423 MW=359?
C22H21N3O2
(DCM)/MeOH + NH4OAc
EPSRC National Facility Swansea
LTQ Orbitrap XL
Lisa Miller
23/04/2015 02:18:06 PM
360.1705
Observed Data
361.1735
NL:
1.18E8
STRWAT484-OR-HNESP#27-46 RT: 0.66-1.04 AV: 16 T: FTMS + p NSI Full ms [140.00-1935.00]
360.1707
Theoretical Isotope Model: [M + H]+
361.1740
362.1766
363.1794
NL:
1.82E4
C22 H21 N3 O2 H:
C22 H22 N3 O2
p (gss, s /p:40) Chrg 1
R: 100000 Res .Pwr . @FWHM
Relative Abundance
m/z

S2. Biological Assay Results

S2a. Table S1. Summary of assay results

Compound	%inhibition at 30 μM inhibitor (bis-*p*NPP)	IC_{50} (bis-*p*NPP)	IC_{50} (LPC)
1.22	66	22 ±6.9 nM	4 ±0.5 nM [a]
1.24	49	-	258 ±127 nM
1.25	56	-	>30 μM
1.26	100	5700 ±2500 nM	1700 ±400 nM
1.27	38	816 ±564 nM	349 ±125 nM
1.28	48	-	>3500 nM [b]
1.29	52	85 ±22 nM	25 ±12 nM
1.30	44	-	>10 μM [b]
1.31	58	75 ±37 nM	124 ±37 nM
1.32	49	-	>30 μM
1.33	31	-	>30 μM
1.34	46	604 ±113 nM	25 ±13 nM
1.35	30	-	>30 μM
1.36	47	-	>30 μM
1.37	33	-	>30 μM
1.38	42	-	>20 μM [b]
1.39	50	-	>30 μM
1.40	11	>30 μM	>30 μM
1.41	42	-	>8000 nM [b]
1.42	21	-	>30 μM
1.43	13	-	>30 μM
1.44	56	>4000 nM [b]	31 ±11 nM
1.45	71	2000 ±785 nM	>2800 nM

1.46	47	-	- [c]
1.47	42	>30 μM	>30 μM
1.48	57	1388 ±746 nM	>30 μM
1.49	50	673 ±237 nM	>30 μM
1.50	63	2000 ±715 nM	>30 μM
1.51	38	-	11 ±7 nM[f]
1.52	41	290 ±35 nM	747 ±500 nM
1.53	92	100 ±36 nM	1200 ±800 nM [d]
1.54	44	>4000 nM [b]	>20 μM [b]
1.55	55	5 ±2.5 nM	81 ±28 nM [e]
1.56	67	3000 ±1400 nM	>30 μM
1.57	25	>30 μM	>30 μM
1.58	42	-	>30 μM
1.59	64	>30 μM	>30 μM
1.60	79	>30 μM	>5000 nM [b]
1.61	73	89 ±43 nM	339 ±190 nM
1.62	72	33 ±16 nM	660 ±224 nM
1.63	56	204 ±88 nM	726 ±155 nM
1.64	35	-	>30 μM
1.65	22	>30 μM	>30 μM
1.66	35	>30 μM	>30 μM
1.67	29	>30 μM	>30 μM
1.68	17	>30 μM	>30 μM
1.69	50	>30 μM	>30 μM
1.70	52	-	>30 μM
1.71	18	-	>10 μM [b]

1.72	9	>30 μM	>30 μM

[a] Consistent with the value of < 300 nM claimed in the patent, LPC assay. [b] Incomplete curve observed, data extrapolated using GraphPad Prism to determine IC_{50}. [c] Unable to determine IC_{50} due to solubility issues in the assay medium. [d] Consistent with the value of >1 uM claimed in the patent, LPC assay. [e] Consistent with the value of < 300 nM claimed in the patent, LPC assay. [f] Consistent with the value of < 300 nM claimed in the patent, LPC assay.

S2b. Bis-*p*NPP assay results

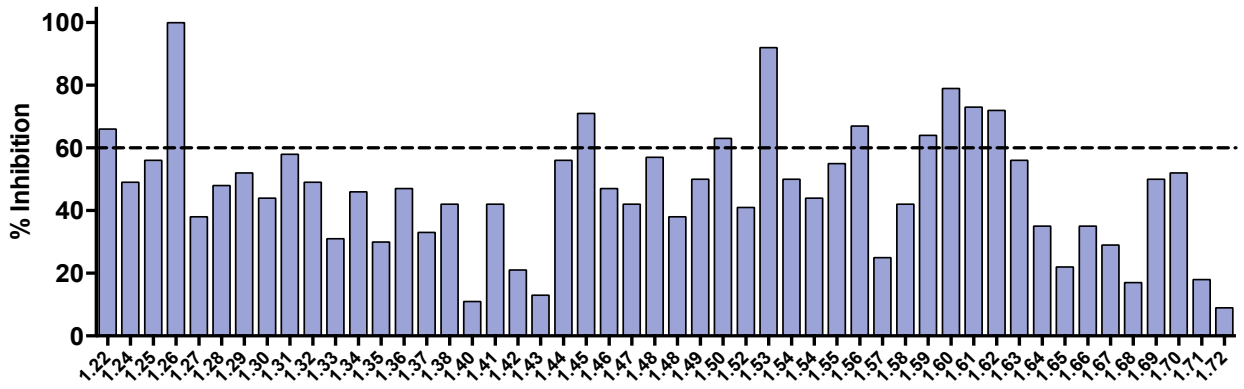
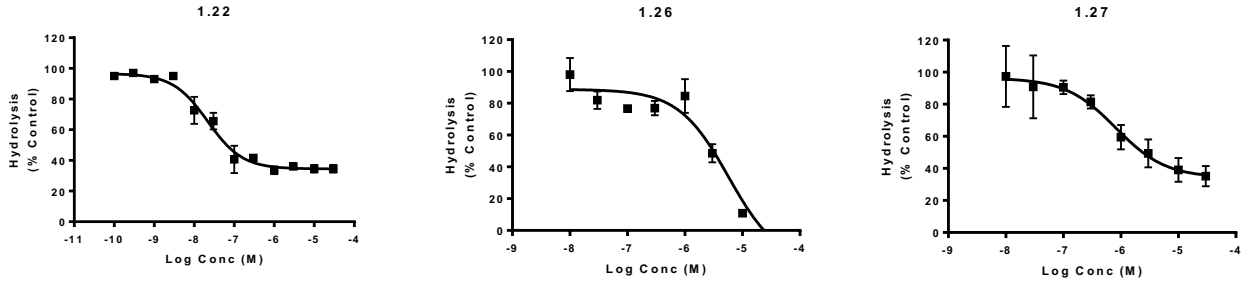
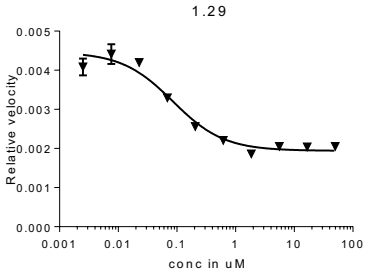
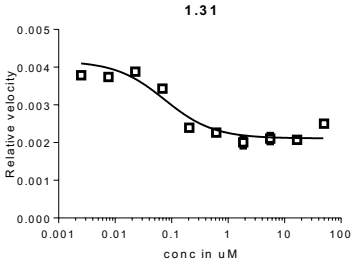


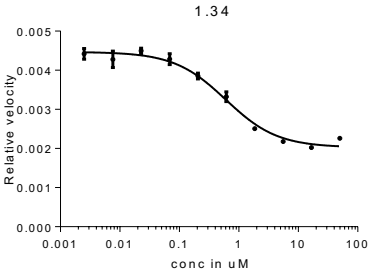
Figure S1. Bis-*p*NPP assay results, tested using 30 μM inhibitor with a >60% inhibition criterion, n = 2.

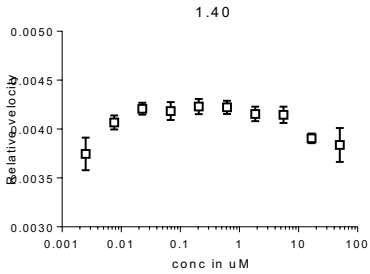
Bis-*p*NPP assay results: 1 nM – 30 μM of inhibitor.

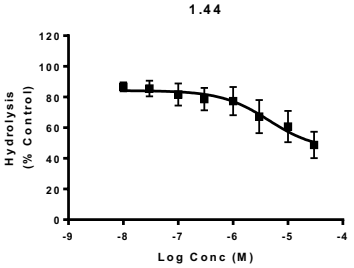


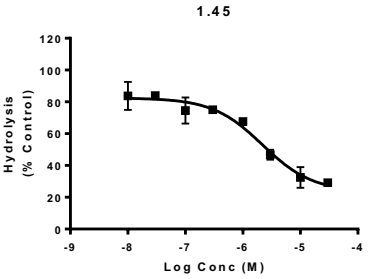

1.29
Relative velocity
conc in uM

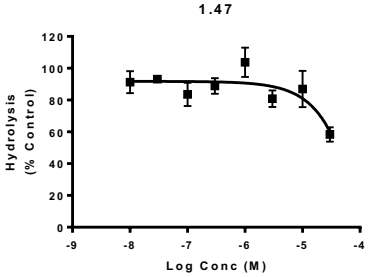

1.31
Relative velocity
conc in uM

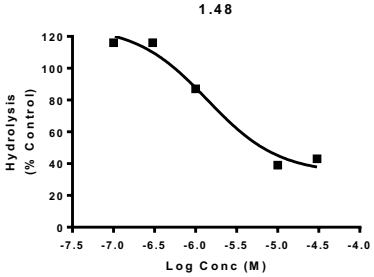

1.34
Relative velocity
conc in uM

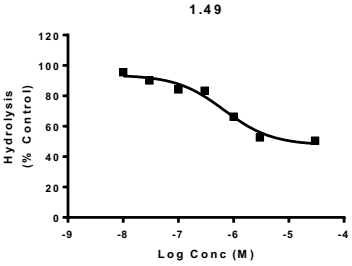

1.40
Relative velocity
conc in uM

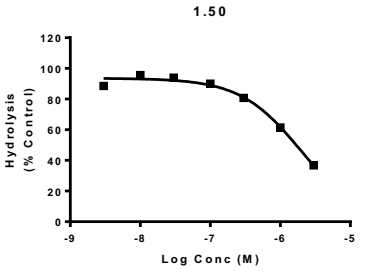

1.44
Hydrolysis (% Control)
Log Conc (M)

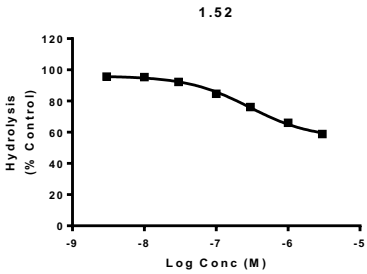

1.45
Hydrolysis (% Control)
Log Conc (M)

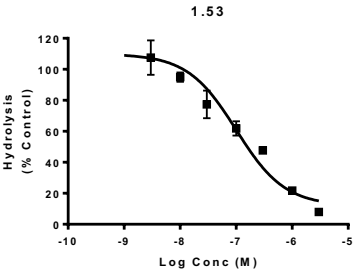

1.47
Hydrolysis (% Control)
Log Conc (M)

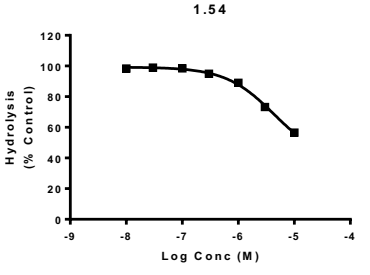

1.48
Hydrolysis (% Control)
Log Conc (M)

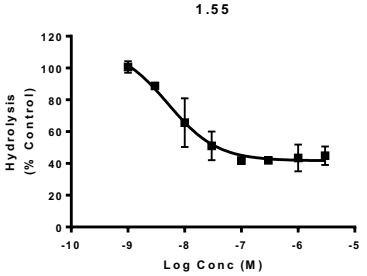

1.49
Hydrolysis (% Control)
Log Conc (M)

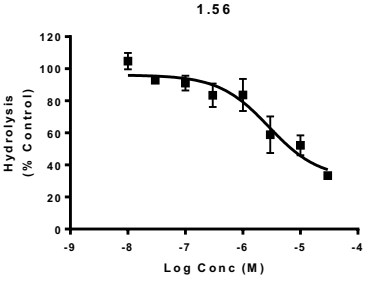

1.50
Hydrolysis (% Control)
Log Conc (M)

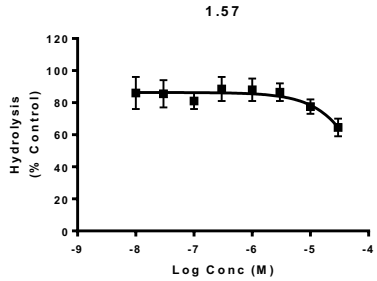

1.52
Hydrolysis (% Control)
Log Conc (M)

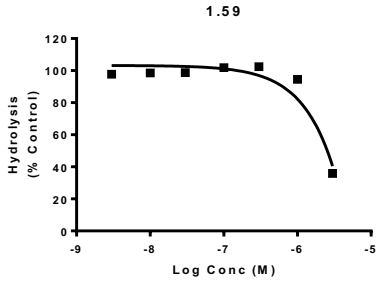

1.53
Hydrolysis (% Control)
Log Conc (M)

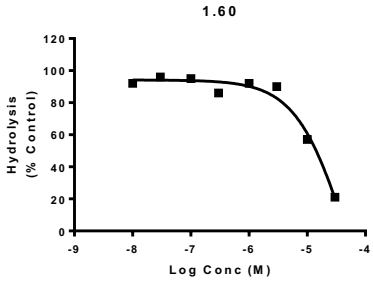

1.54
Hydrolysis (% Control)
Log Conc (M)

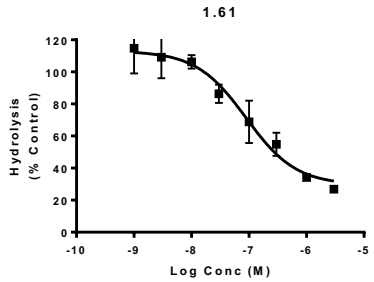

1.55
Hydrolysis (% Control)
Log Conc (M)

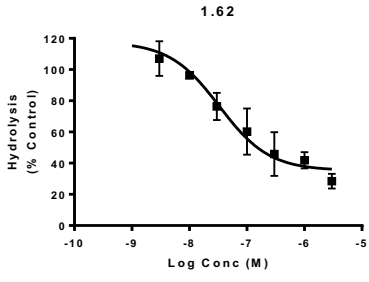

1.56
Hydrolysis (% Control)
Log Conc (M)

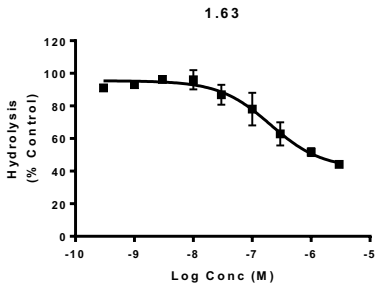

1.57
Hydrolysis (% Control)
Log Conc (M)

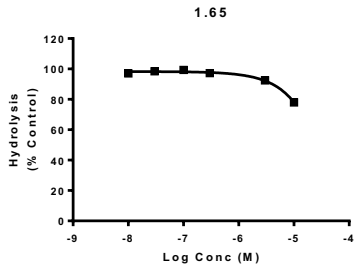

1.59
Hydrolysis (% Control)
Log Conc (M)

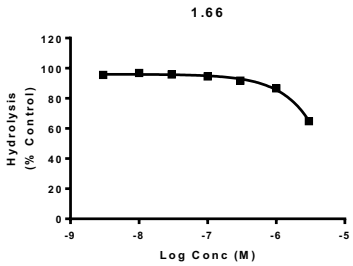

1.60
Hydrolysis (% Control)
Log Conc (M)

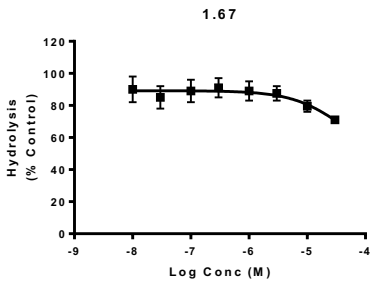

1.61
Hydrolysis (% Control)
Log Conc (M)

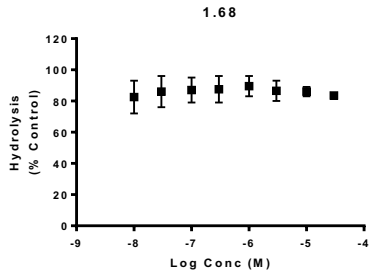

1.62
Hydrolysis (% Control)
Log Conc (M)

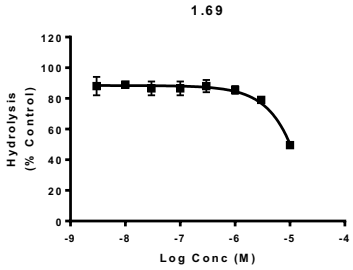

1.63
Hydrolysis (% Control)
Log Conc (M)

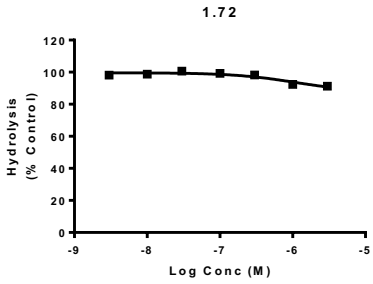

1.65
Hydrolysis (% Control)
Log Conc (M)


1.66
Hydrolysis (% Control)
Log Conc (M)


1.67
Hydrolysis (% Control)
Log Conc (M)


1.68
Hydrolysis (% Control)
Log Conc (M)


1.69
Hydrolysis (% Control)
Log Conc (M)


1.72
Hydrolysis (% Control)
Log Conc (M)

S2c. LPC assay control reactions.

All biochemical studies were performed with hATX. Choline oxidase and horseradish peroxidase (HRP) activity were measured using choline chloride . 20 nM ATX (prepared from HEK 293 Flp-In cells) was incubated with 80 µM choline chloride in a final volume of 100 µL buffer containing 50 mM Tris pH 7.4, 0.01% Triton X-100, 50 mM $CaCl_2$, 1 Unit ml^{-1} choline oxidase, 2 Unit ml^{-1} HRP, 2 mM homovanilic acid (HVA). The relative amount of released choline was measured by HVA fluorescence in a 96-well plate (Corning). Fluorescent intensity was determined at λex/λem = 320/450 nm every 30 seconds for 90 minutes with a Fluorostar plate reader (BMG Labtech). Four exemplar compounds were tested from 400 nM- 100 µM. No inhibition of choline oxidase or HRP was observed. Data analysis was performed using GraphPad Prism version 6.00 for Windows, GraphPad Software, La Jolla California USA, www.graphpad.com.

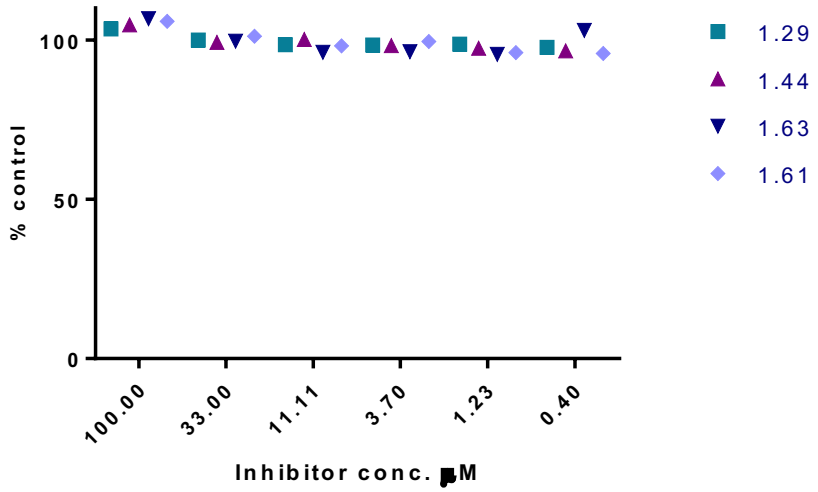
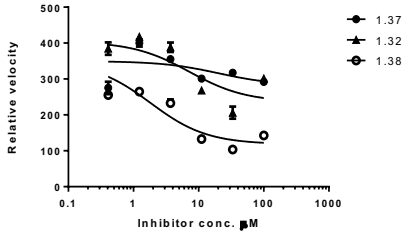
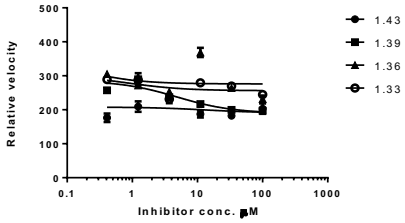
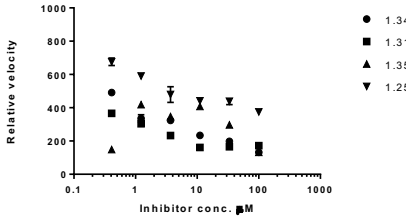


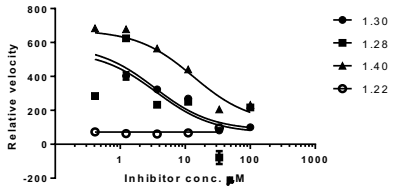
Figure S2. LPC control reactions ran using **1.29**, **1.44**, **1.63** and **1.61**.

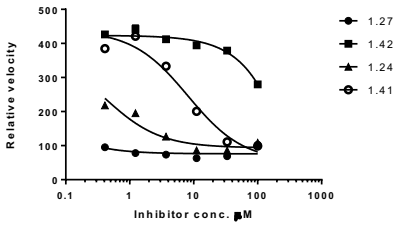
S2d. LPC assay results: 300 nM – 100 μM of inhibitor.

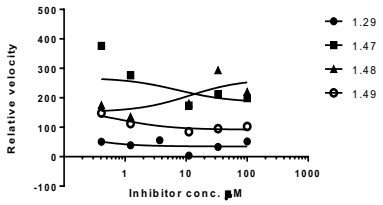


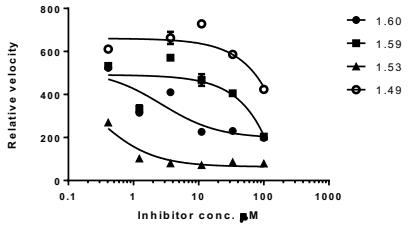


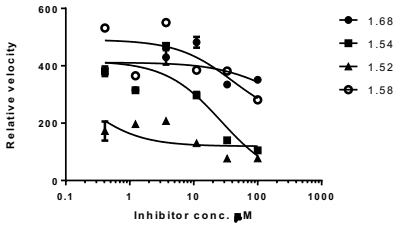


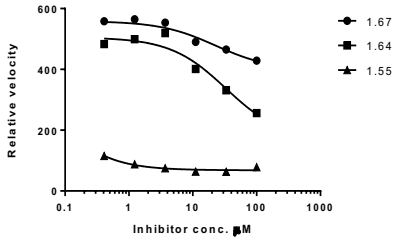


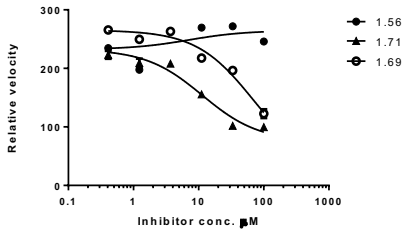


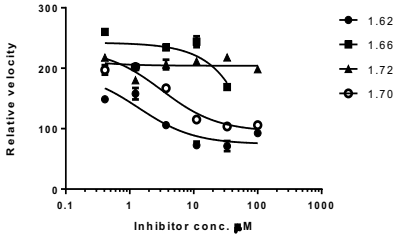


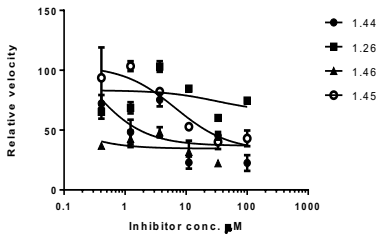


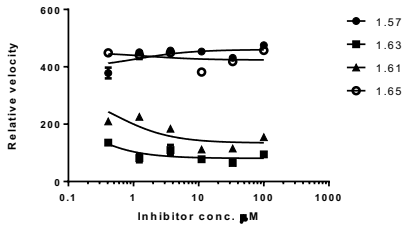




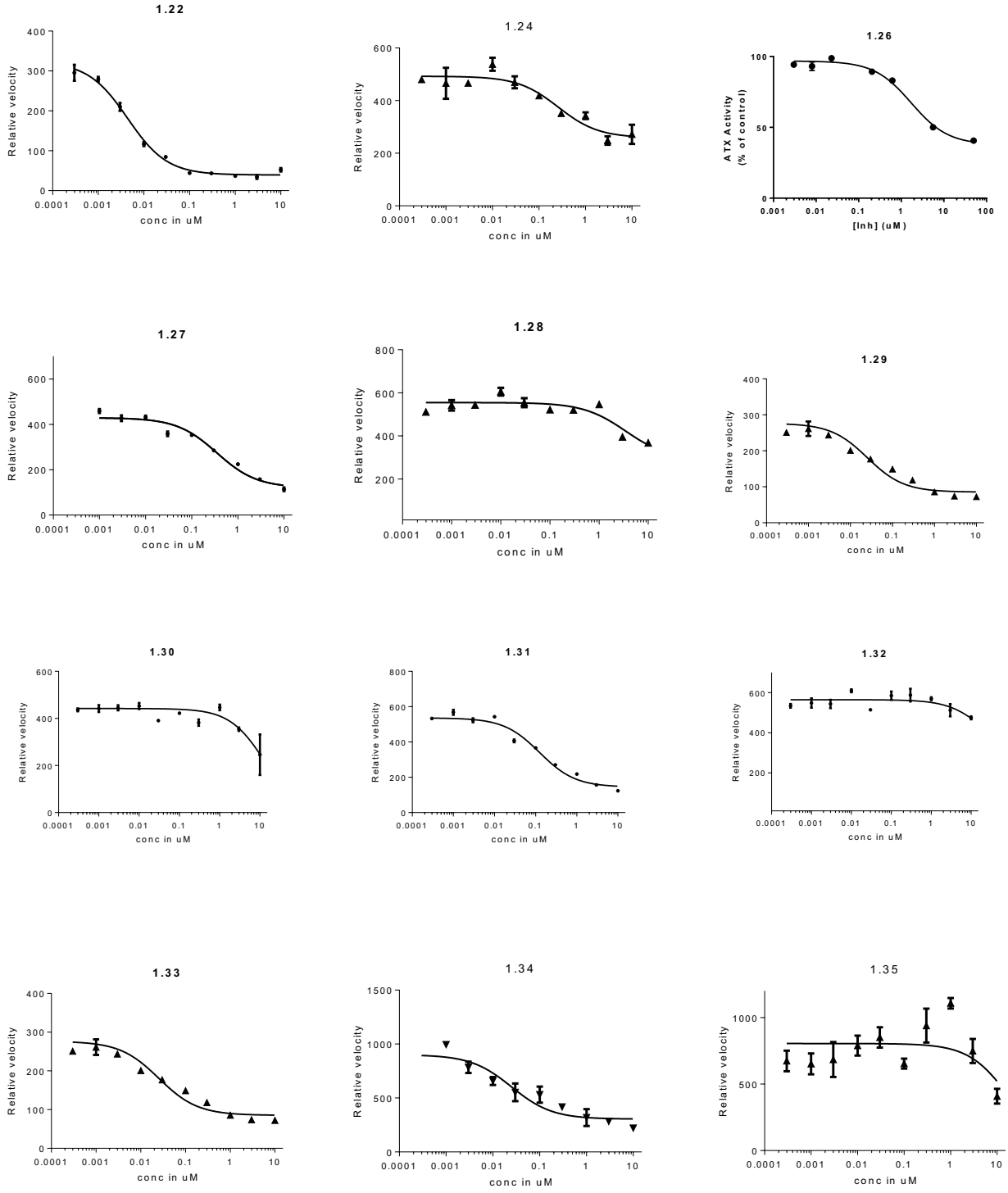


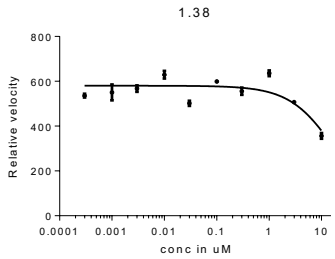


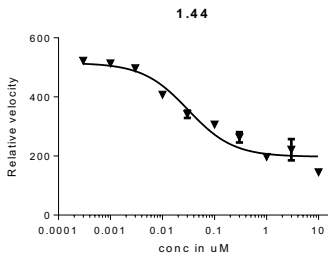


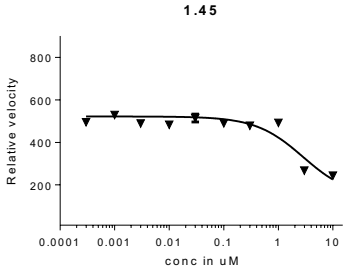


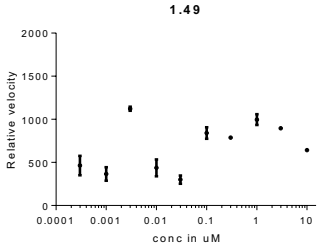
S2e. LPC assay results: 0.3 nM – 10 μM of inhibitor.

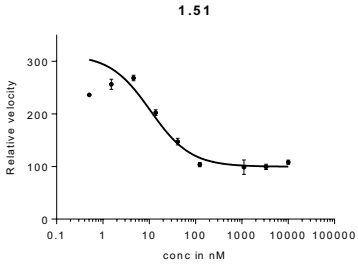


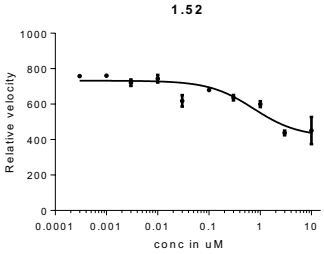

1.38
Relative velocity
conc in uM

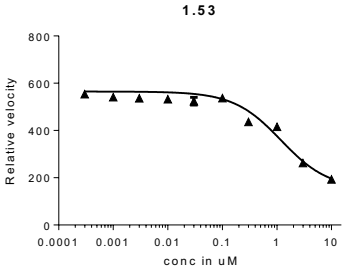

1.44
Relative velocity
conc in uM

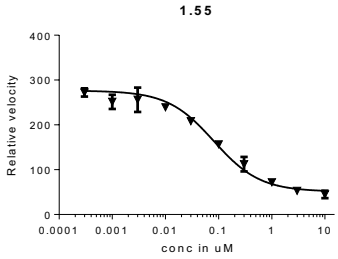

1.45
Relative velocity
conc in uM

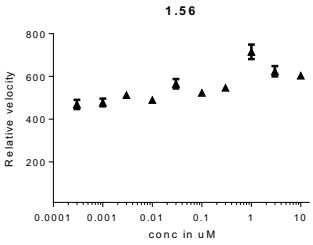

1.49
Relative velocity
conc in uM

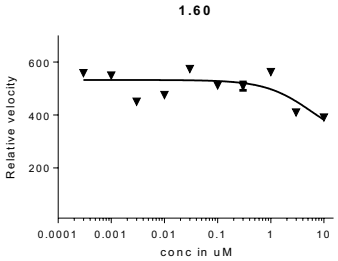

1.51
Relative velocity
conc in nM

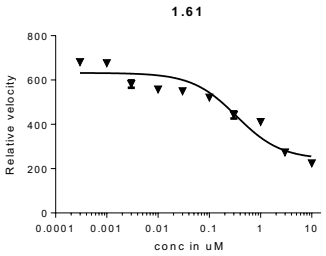

1.52
Relative velocity
conc in uM

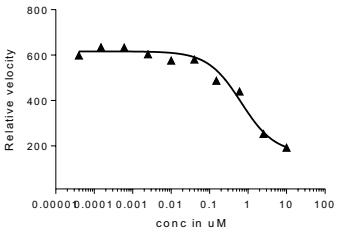

1.53
Relative velocity
conc in uM

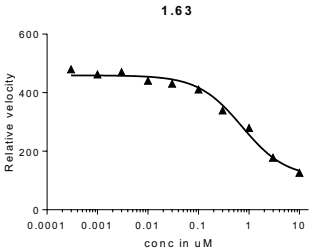

1.55
Relative velocity
conc in uM

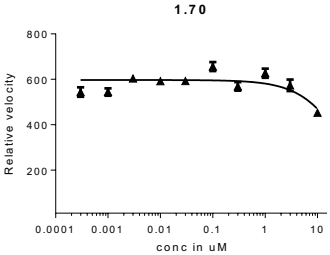

1.56
Relative velocity
conc in uM


1.60
Relative velocity
conc in uM


1.61
Relative velocity
conc in uM


1.62
Relative velocity
conc in uM


1.63
Relative velocity
conc in uM


1.70
Relative velocity
conc in uM

S3. Physicochemical Properties

Table S2. Physicochemical properties of select analogues.

Compound	logD[a]	HSA[b]	AGP[c]	Sol.[d] (μM)	P_{app}[e] ($nm\ s^{-1}$)
1.22	2.70	98.5	80.3	377	23
1.34	2.19	98.5	78.7	≥395	11
1.44	2.68	98.5	80.4	300	32
1.45	4.05	98.9	93.8	336	290
1.46	4.30	99.4	91.8	485	155
1.51	3.36	98.1	83.2	556	64

[a] logD, Chrom log D at pH 7.4; [b] human serum albumin (HSA) binding; [c] alpha 1 acid glycoprotein (AGP); [d]Chemiluminescent nitrogen detection (CLND) kinetic aqueous solubility assay; [e] P_{app} permeability pH 7.4 assay.

S4. Molecular Modeling. GOLD[1] software version 5.4.1 was used for the docking studies of compound **1.55** with double mutant hATX (PDB 4ZG7). Starting with the energy minimised structure of **1.55** (minimised using the MM2 calculation, Chem3D Pro software version 13.0.2.3021) the GOLD wizard was used to carry out the molecular modelling. The binding site was defined to within 7 Å of the PharmAkea analogue **1.21** and the docking was carried out using the slow method to identify six different solutions. The docking solutions were viewed using Discovery Studio Visualizer[2] with the protein surface colored by hydrophobicity. By comparing the docking solutions to the binding mode of **1.21**, the pose of **1.55** which gave the best overlay was selected for the basis of our docking model.

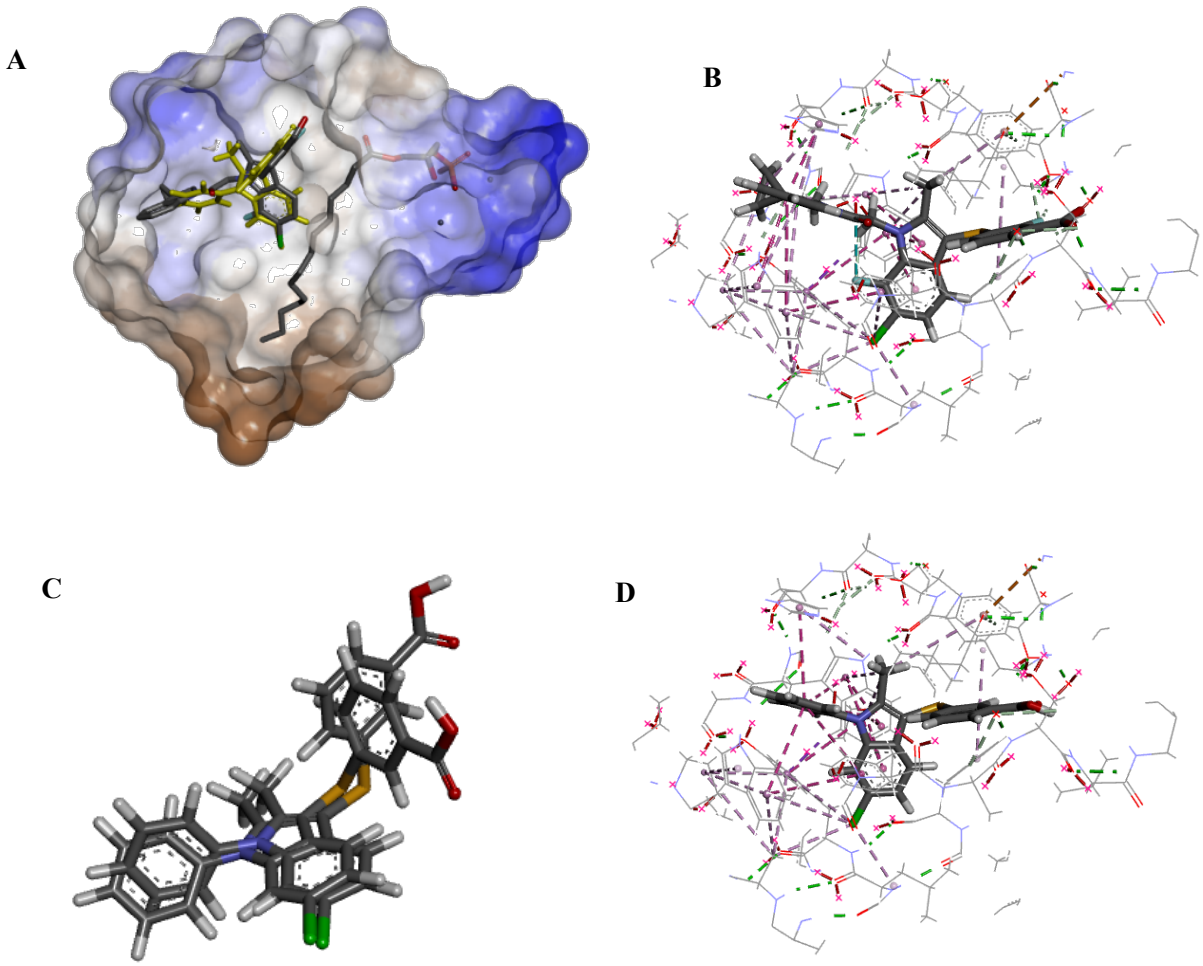


Figure S3. Docking studies of **1.55** using PDB 4ZG7. A: **1.55** (yellow) overlayed with **1.21** (colored by atom type), with **1.2** residing in the catalytic site and hydrophobic pocket. B: Potential binding interaction of **1.21**. C: Rotation of the thioether. D: Potential binding interactions of **1.55**. Docked using GOLD[1] and viewed using Discovery Studio Visualizer.[2]

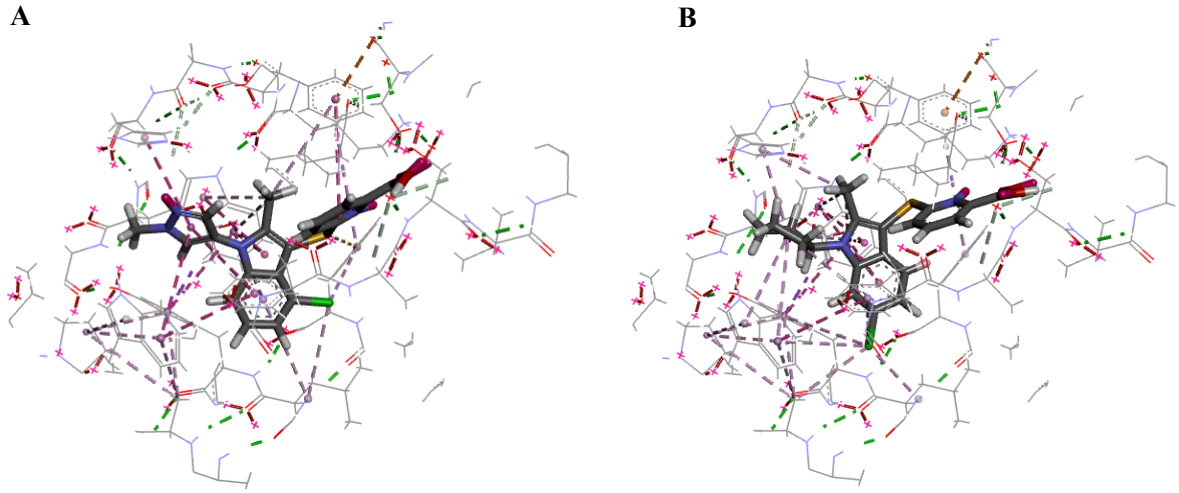


Figure S4. Docking of analogues **1.25** (A) and **1.45** (B).

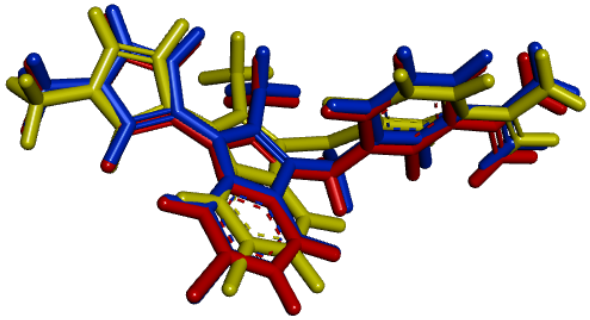


Figure S5. Overlay of different linker groups: Thioether **1.51** (yellow); ether **1.63** (red); methylene **1.62** (blue).

S5. Crystallographic Data

PDB reference 5LQQ

Table S3. Crystallography Details

	ATX-Compound 1.55
Data Collection	
Wavelength (Å)	0.97925
Resolution (Å)	46-2.49 (8.98-2.4)
Space Group	P 1 2_1 1
Unit Cell a, b , c (Å)	62.66, 89.07, 77.5
$CC_{1/2}$	0.999 (0.784)
R_{merge}	0.013 (0.531
I/σI	56.6 (1.8)
Completeness (%)	98.8 (99.4)
Redundancy	3.1 (3.0)
Refinement	
No. atoms	6466
Protein	6252
Ligand/Metal/Glycan	125
Water/Iodine	89
B-factors	62
Protein	62
Ligand/Metal/Glycan	67
Water/Iodine	50
TLS groups	1
R_{work}/R_{free} (%)	21.7/26.2
Validation	
Rmsd/rmsZ bond lengths (Å)	0.007/0.357
Rmsd/rmsZ bond angles (^{0})	1.207/0.535
Ramachandran (%) Preferred/ outliers	97.1/0.1

Sidechain rotamers Preferred/ outliers	96.0/1.1
MolProbity score/ clash score (%-ile)	100/100

High Resolution shell in parentheses

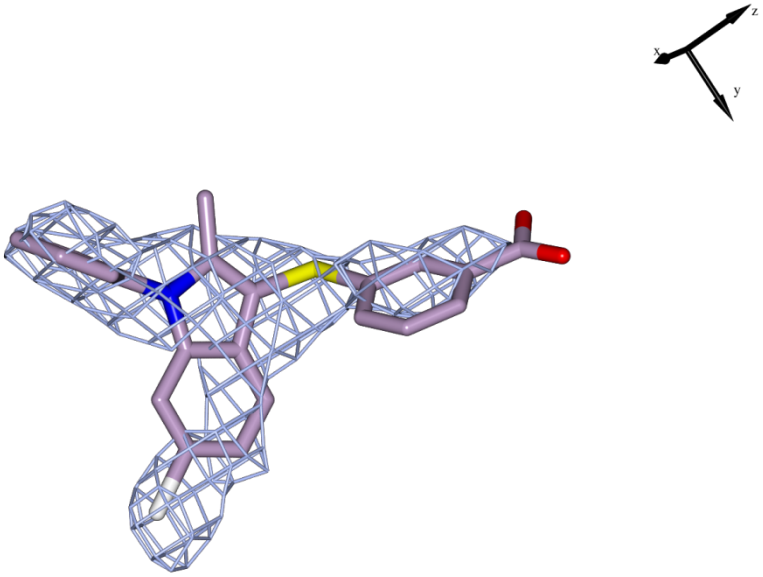
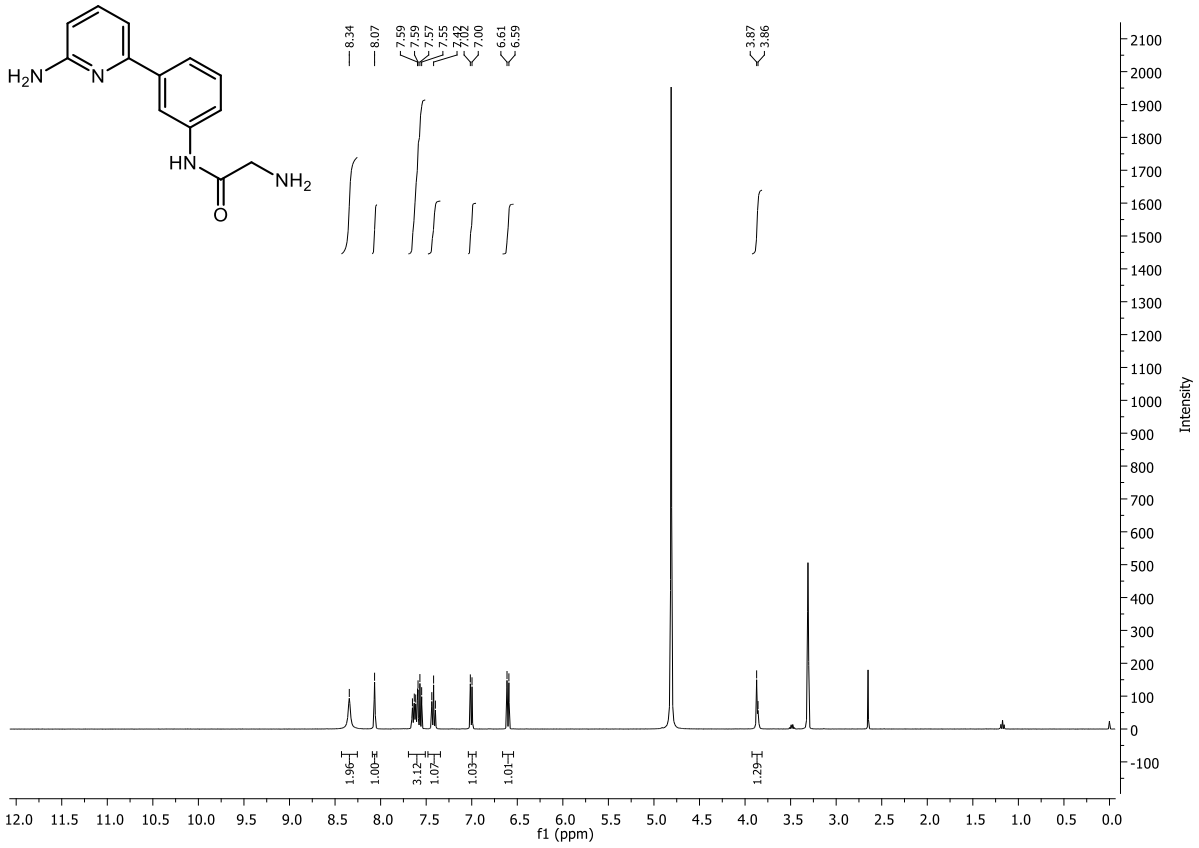
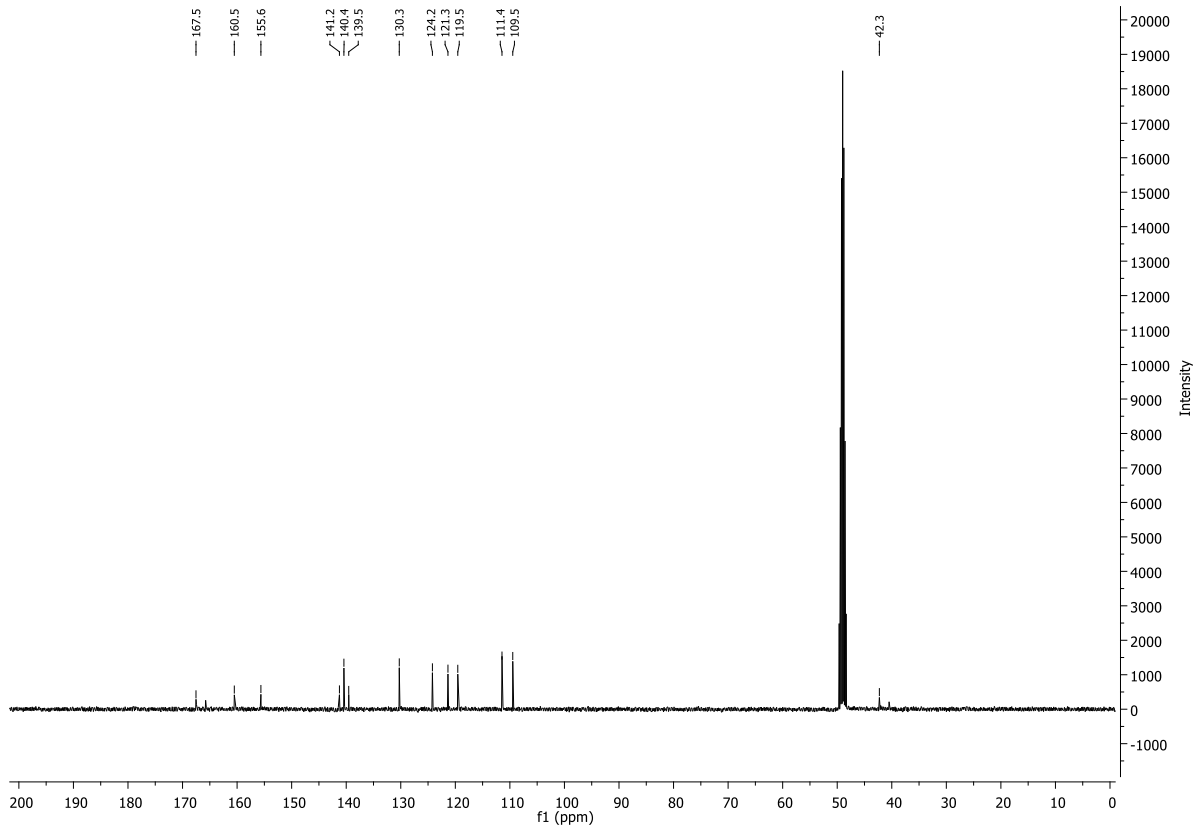


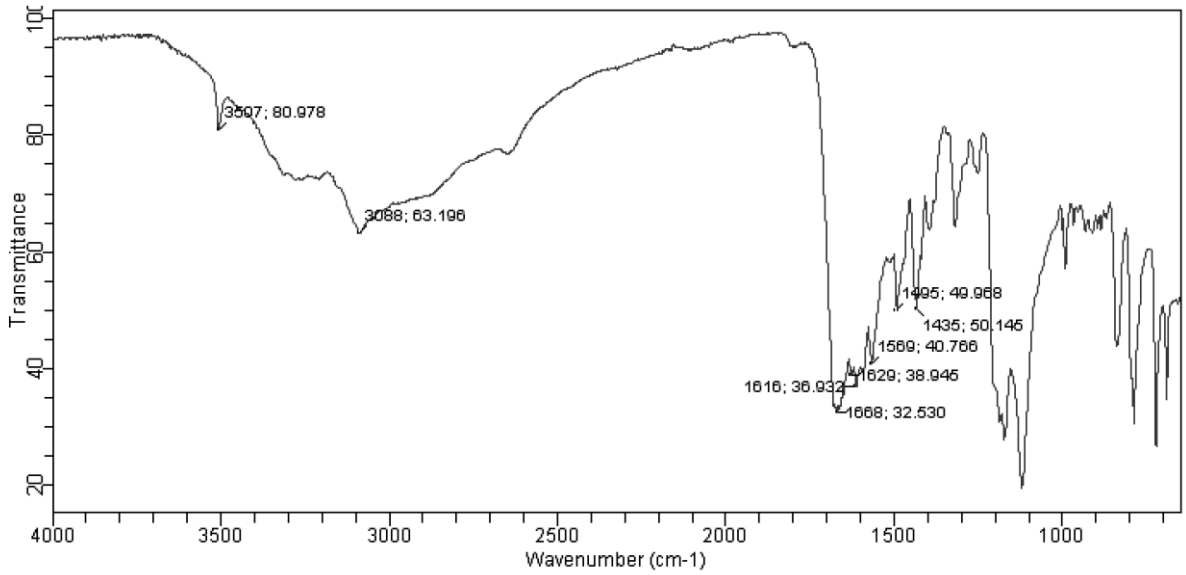
Figure S6. Experimental density for compound 1.55 bound to ATX.
The 2mFo-Dfc map is shown at 1.0 rms as a blue wireframe model.

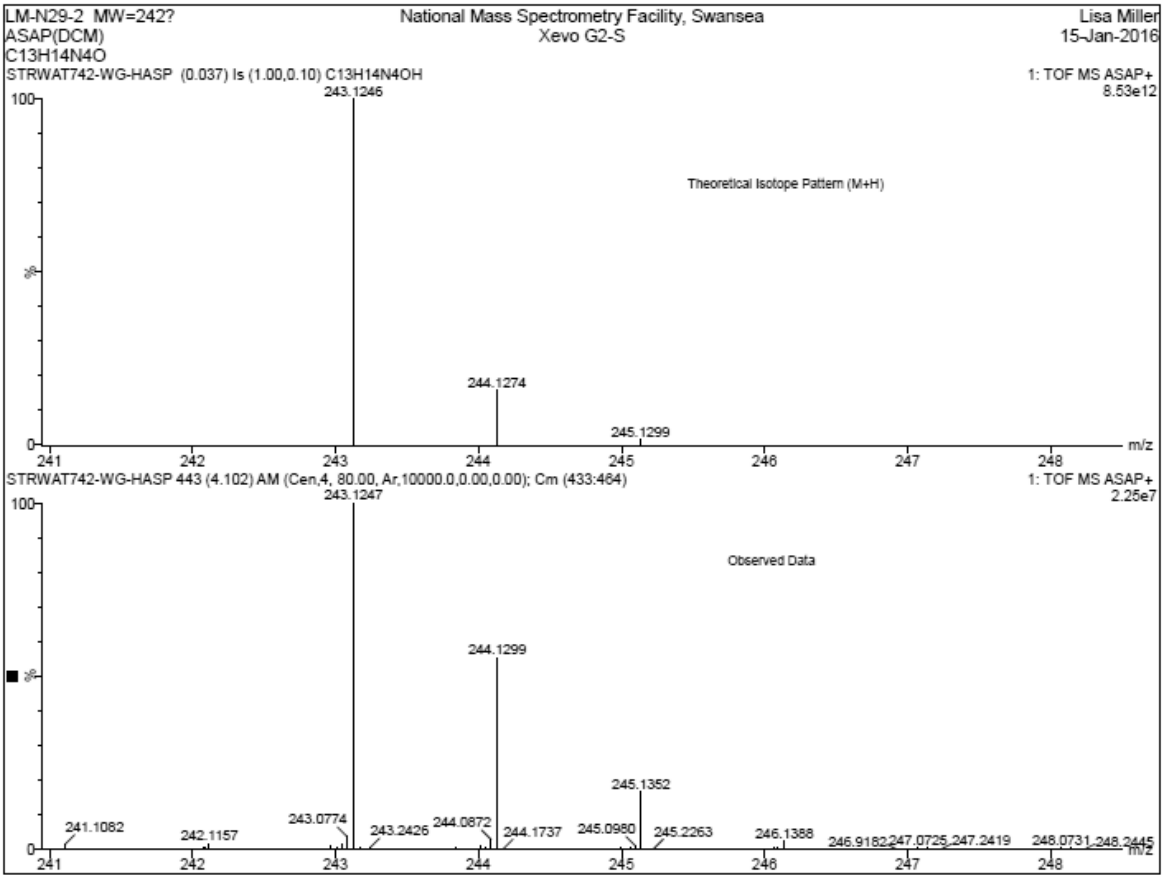
S6. ^{1}H NMR, ^{13}C NMR, IR, and HRMS Spectra

2-Amino-*N*-(3-(6-aminopyridin-2-yl)phenyl)acetamide (2.21).






Transmittance
Wavenumber (cm-1)
3507; 80.978
3088; 63.196
1616; 36.932
1668; 32.530
1629; 38.945
1569; 40.766
1495; 49.968
1435; 50.145


LM-N29-2 MW=242?
ASAP(DCM)
C13H14N4O
National Mass Spectrometry Facility, Swansea
Xevo G2-S
Lisa Miller
15-Jan-2016
STRWAT742-WG-HASP (0.037) Is (1.00,0.10) C13H14N4OH
1: TOF MS ASAP+
8.53e12
Theoretical Isotope Pattern (M+H)
243.1246
244.1274
245.1299
STRWAT742-WG-HASP 443 (4.102) AM (Cen,4, 80.00, Ar,10000.0,0.00,0.00); Cm (433:464)
1: TOF MS ASAP+
2.25e7
Observed Data
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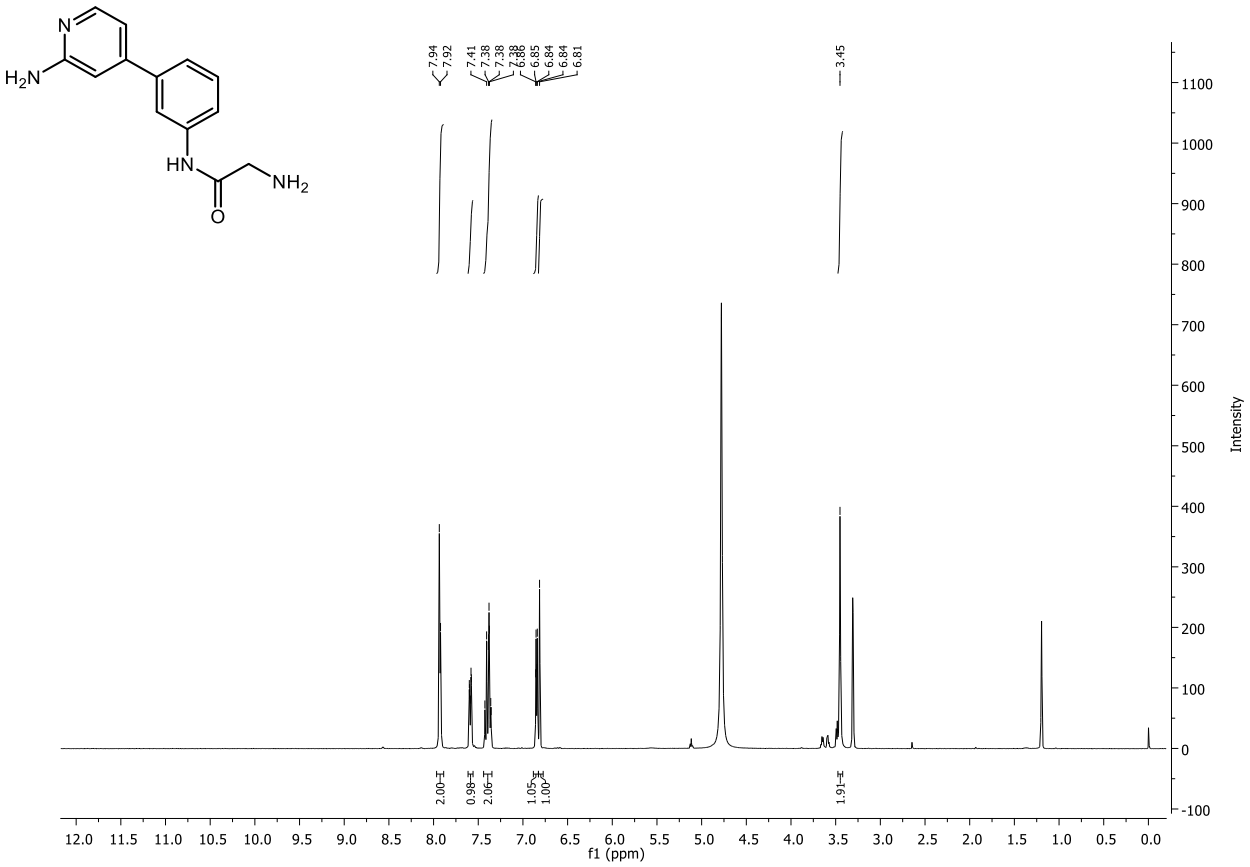
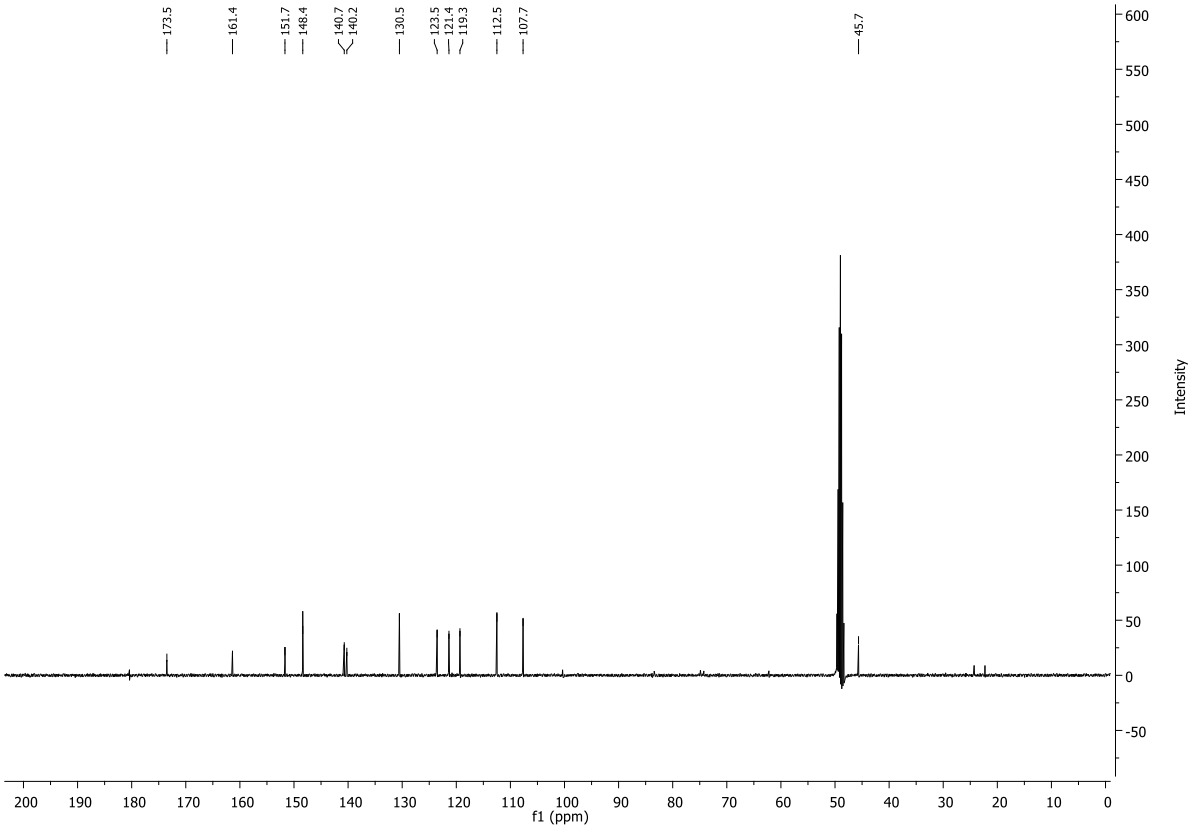
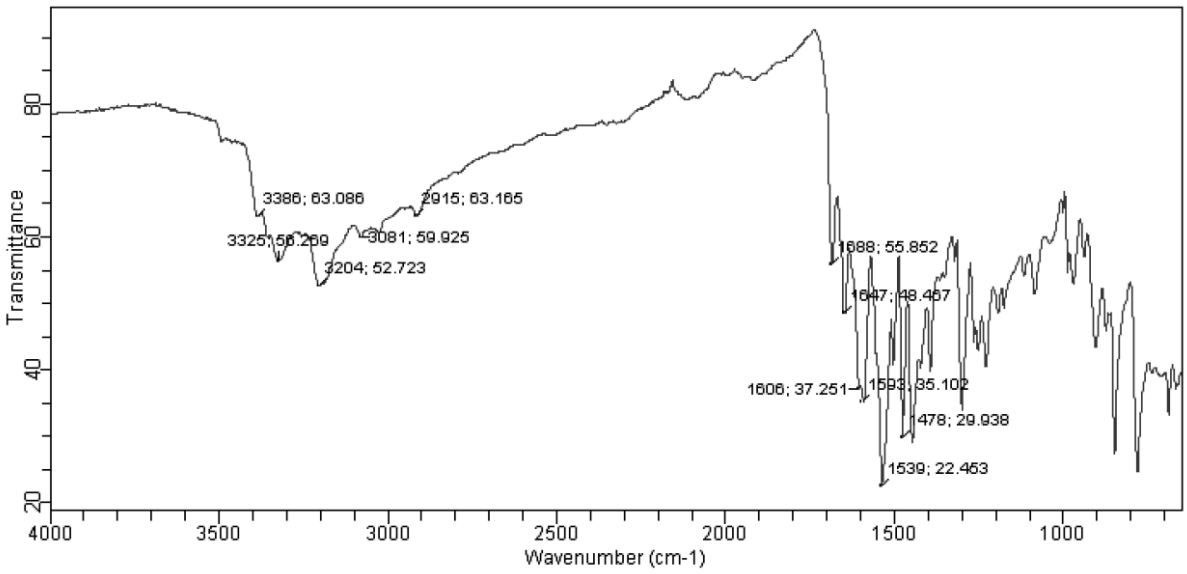
244.1299
245.1352
241.1082
242.1157
243.0774
243.2426
244.0872
244.1737
245.0980
245.2263
246.1388
246.9182
247.0725
247.2419
248.0731
248.2445
m/z

2-Amino-*N*-(3-(2-aminopyridin-4-yl)phenyl)acetamide (2.22).







LM-N31-2 MW=242?
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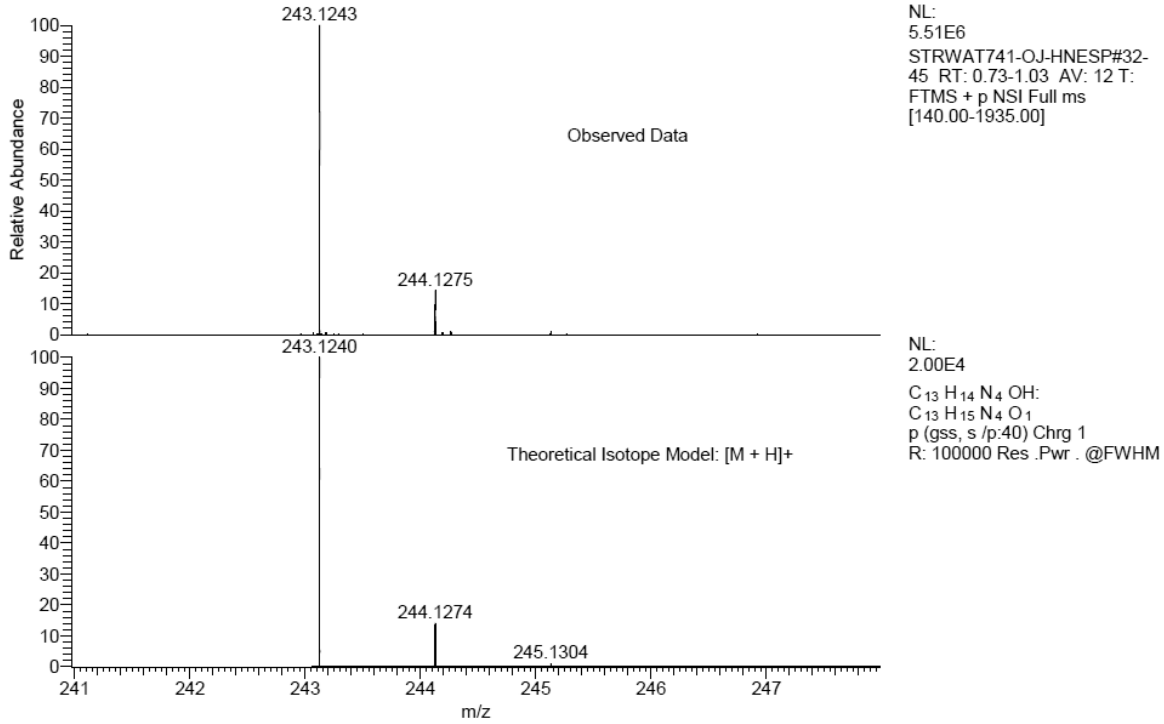
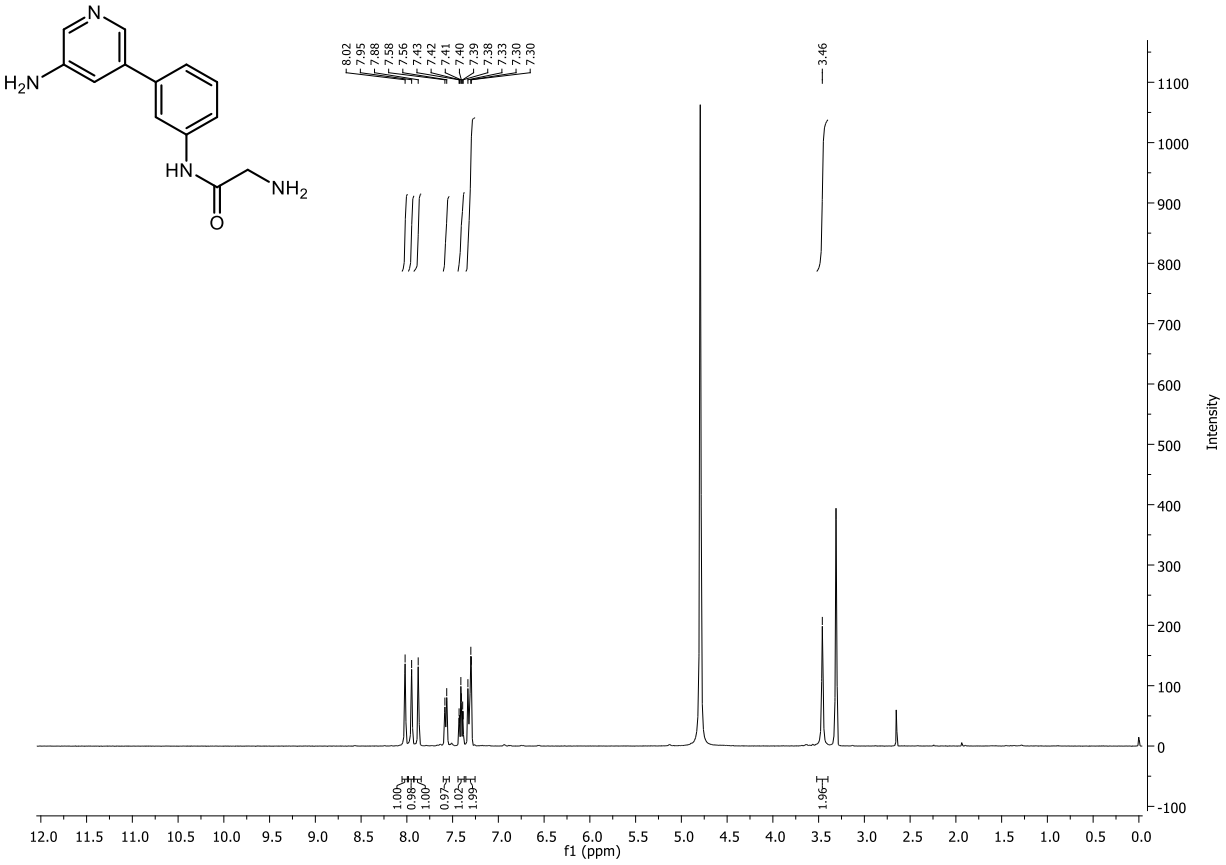
C13H14N4O

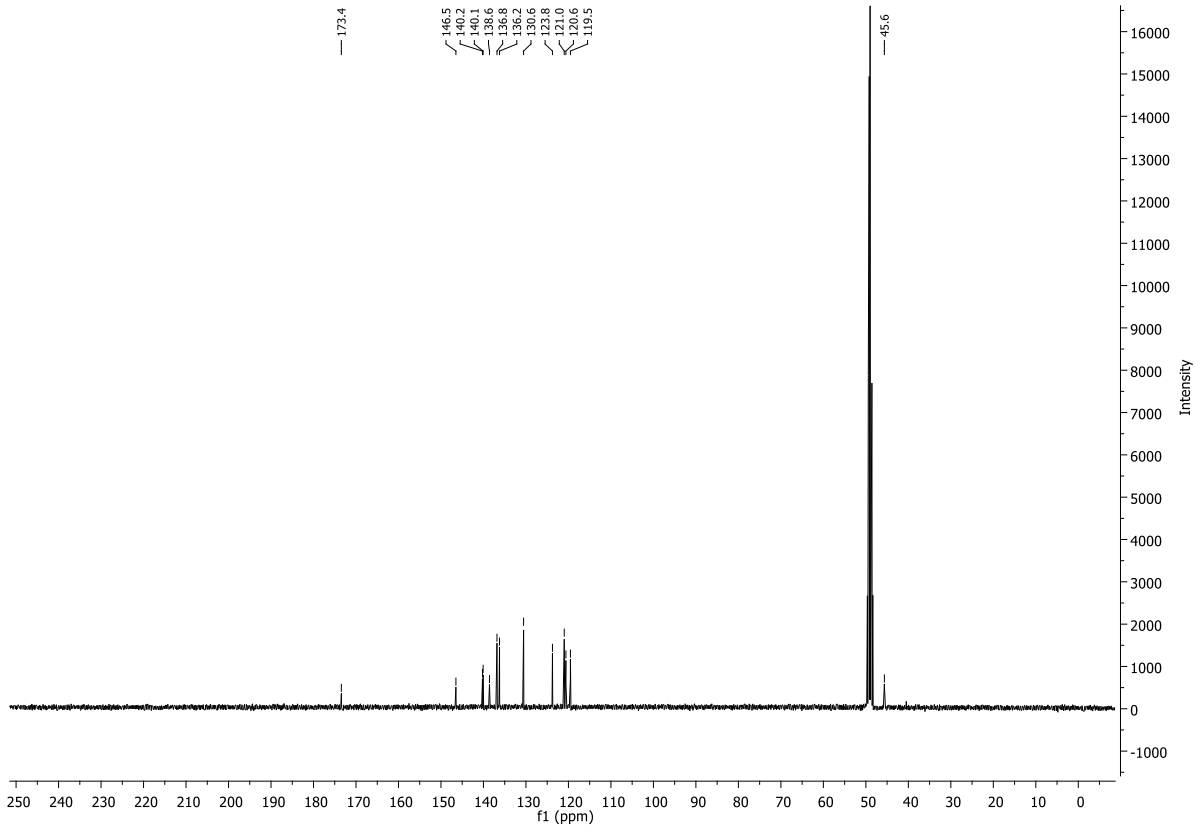
EPSRC National Facility Swansea
LTQ Orbitrap XL

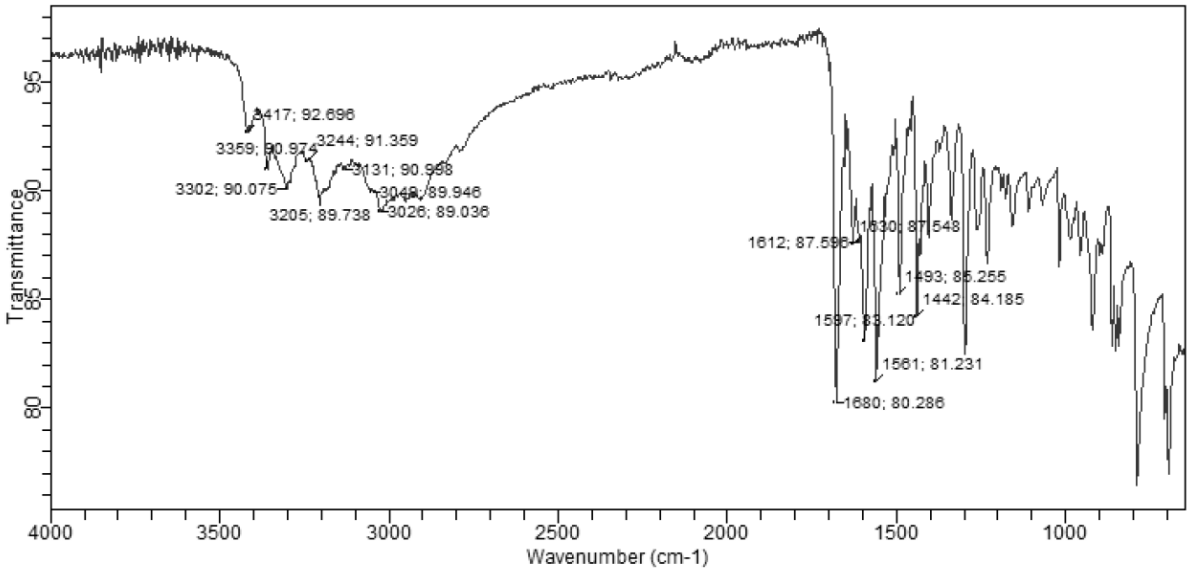
Lisa Miller
14/01/2016 09:26:11



2-Amino-*N*-(3-(5-aminopyridin-3-yl)phenyl)acetamide (2.23).



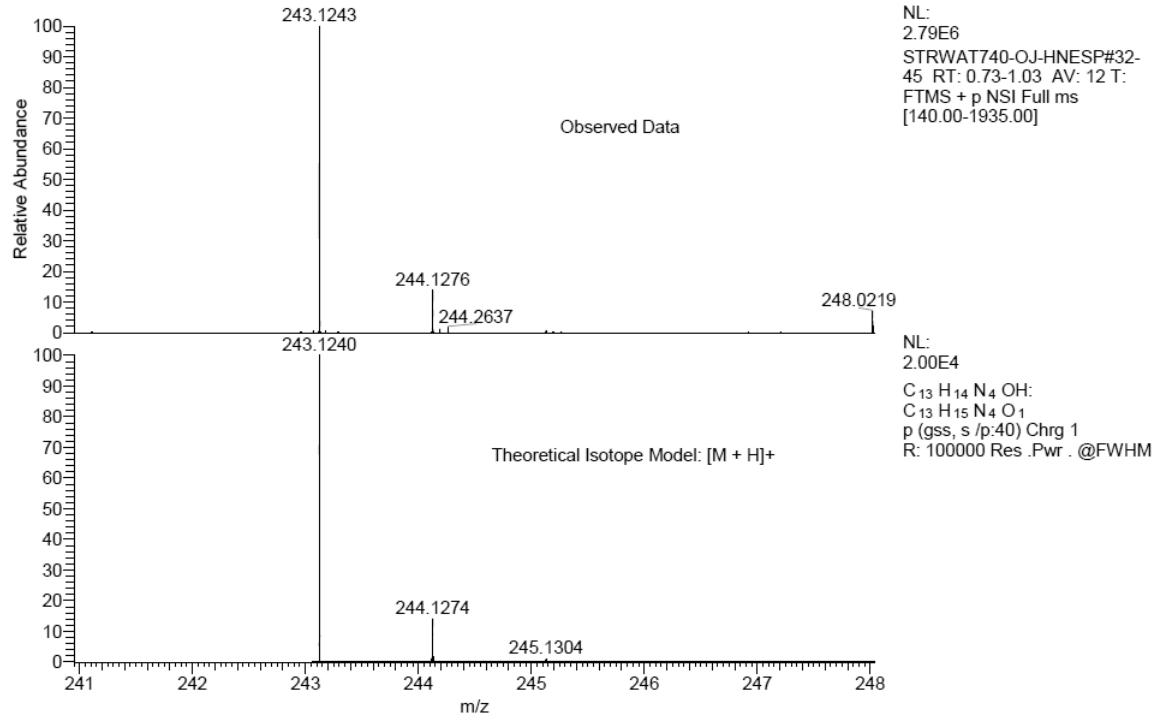




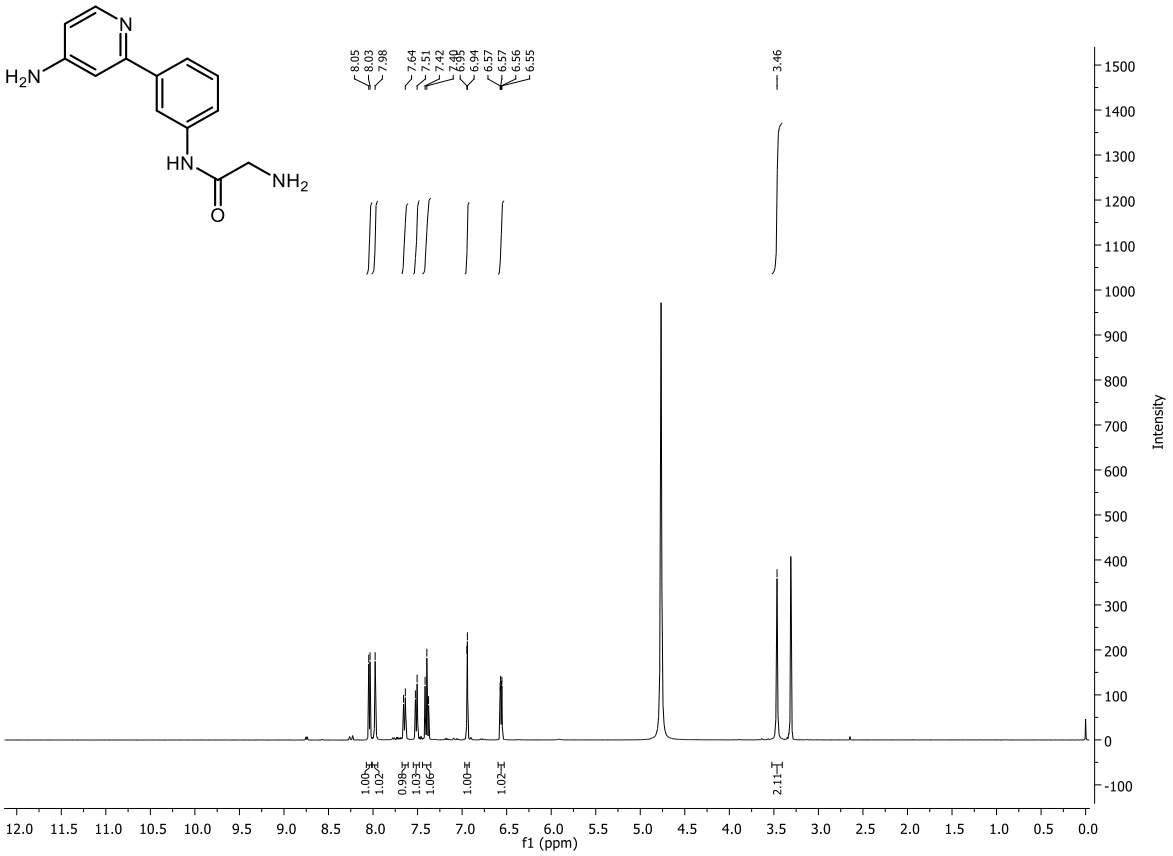
LM-N26-1 MW=242?
(DCM)/MeOH + NH4OAc
C13H14N4O

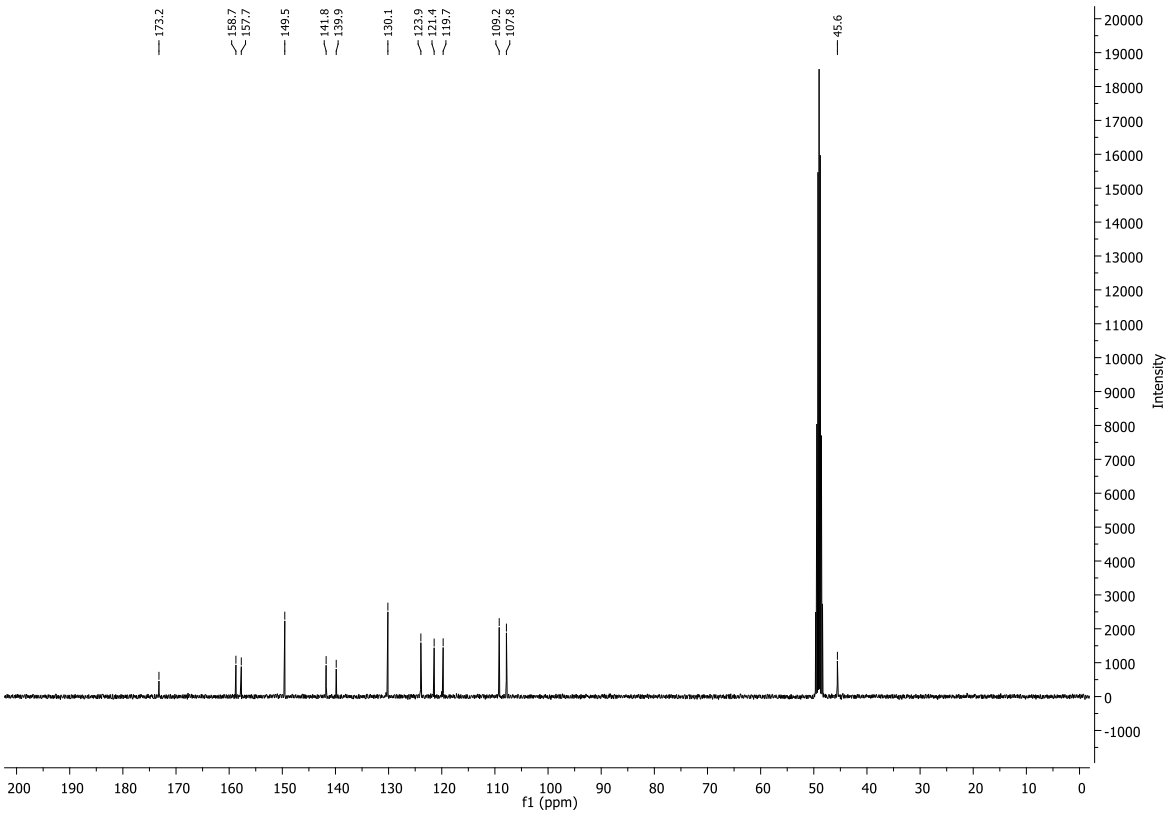
EPSRC National Facility Swansea
LTQ Orbitrap XL

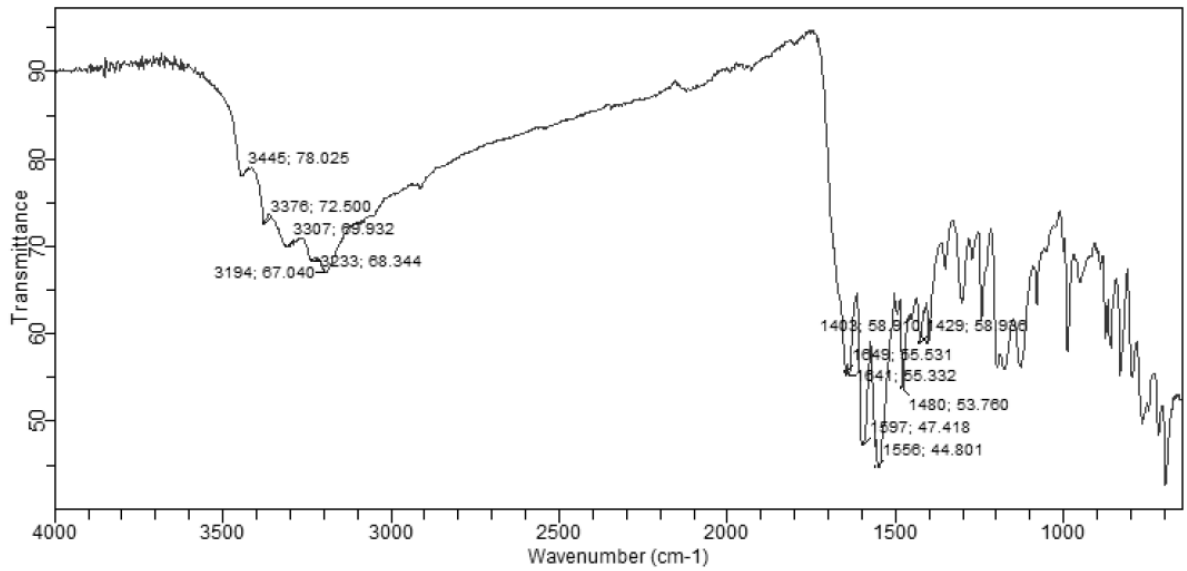
Lisa Miller
14/01/2016 09:23:18



Synthesis of 2-amino-N-(3-(4-aminopyridin-2-yl)phenyl)acetamide (2.24).






Transmittance
Wavenumber (cm-1)
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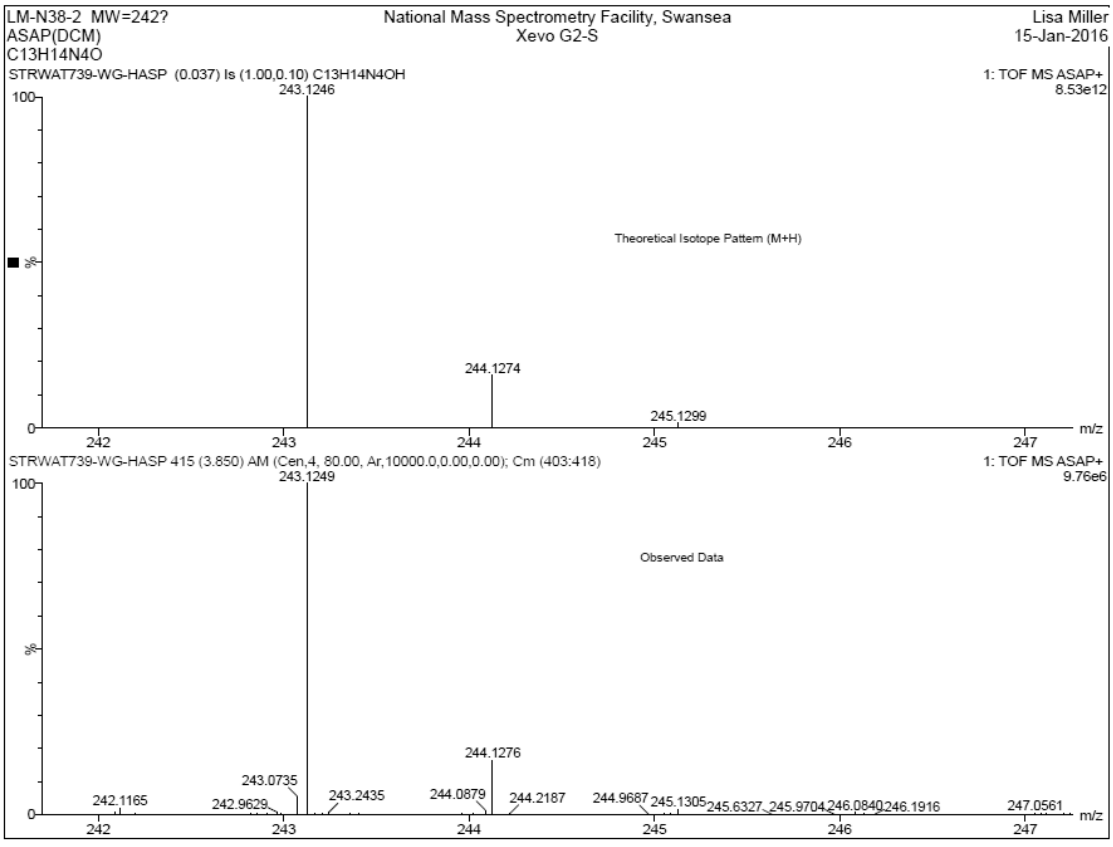
3376; 72.500
3307; 69.932
3233; 68.344
3194; 67.040
1649; 55.531
1641; 55.332
1480; 53.760
1597; 47.418
1556; 44.801


LM-N38-2 MW=242?
ASAP(DCM)
C13H14N4O
National Mass Spectrometry Facility, Swansea
Xevo G2-S
Lisa Miller
15-Jan-2016
STRWAT739-WG-HASP (0.037) Is (1.00,0.10) C13H14N4OH
1: TOF MS ASAP+
8.53e12
243.1246
Theoretical Isotope Pattern (M+H)
244.1274
245.1299
m/z
STRWAT739-WG-HASP 415 (3.850) AM (Cen,4, 80.00, Ar,10000.0,0.00,0.00); Cm (403:418)
1: TOF MS ASAP+
9.76e6
243.1249
Observed Data
244.1276
243.0735
242.1165
242.9629
243.2435
244.0879
244.2187
244.9687
245.1305
245.6327
245.9704
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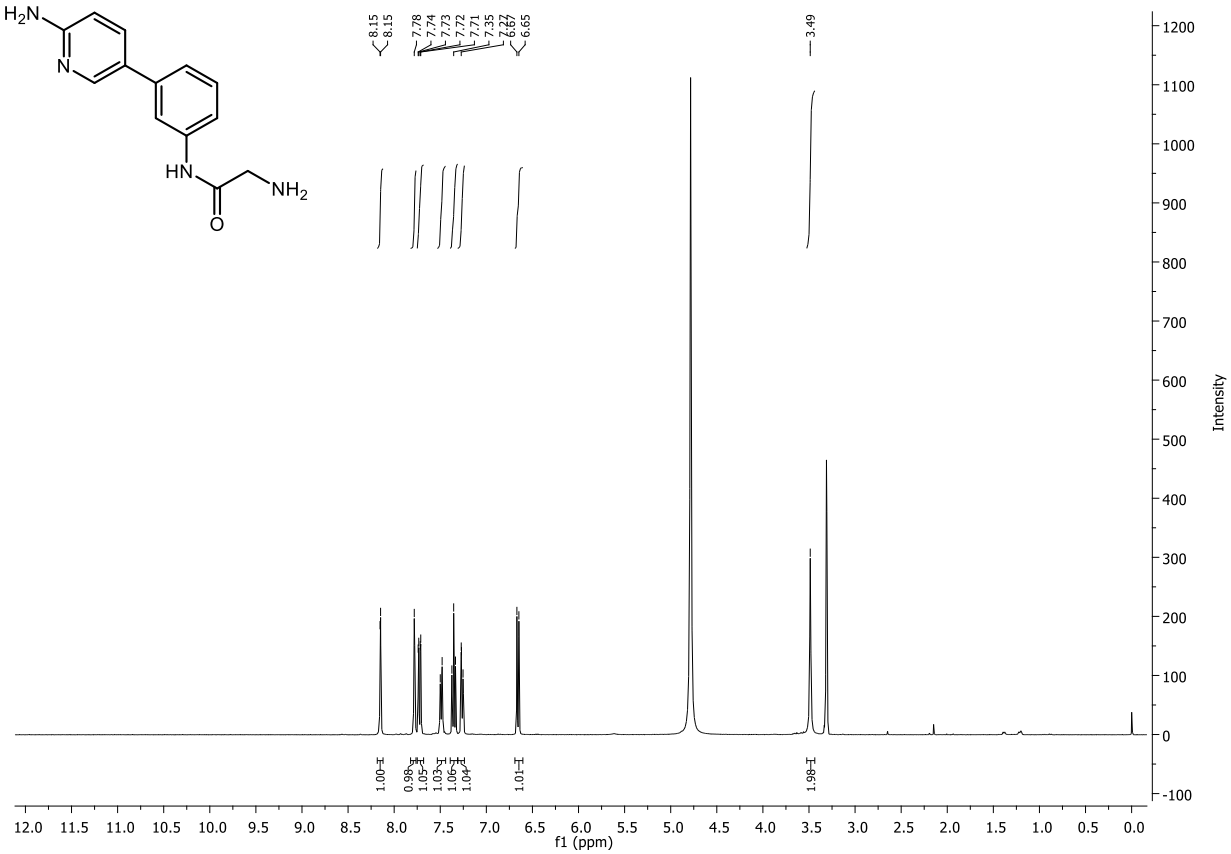
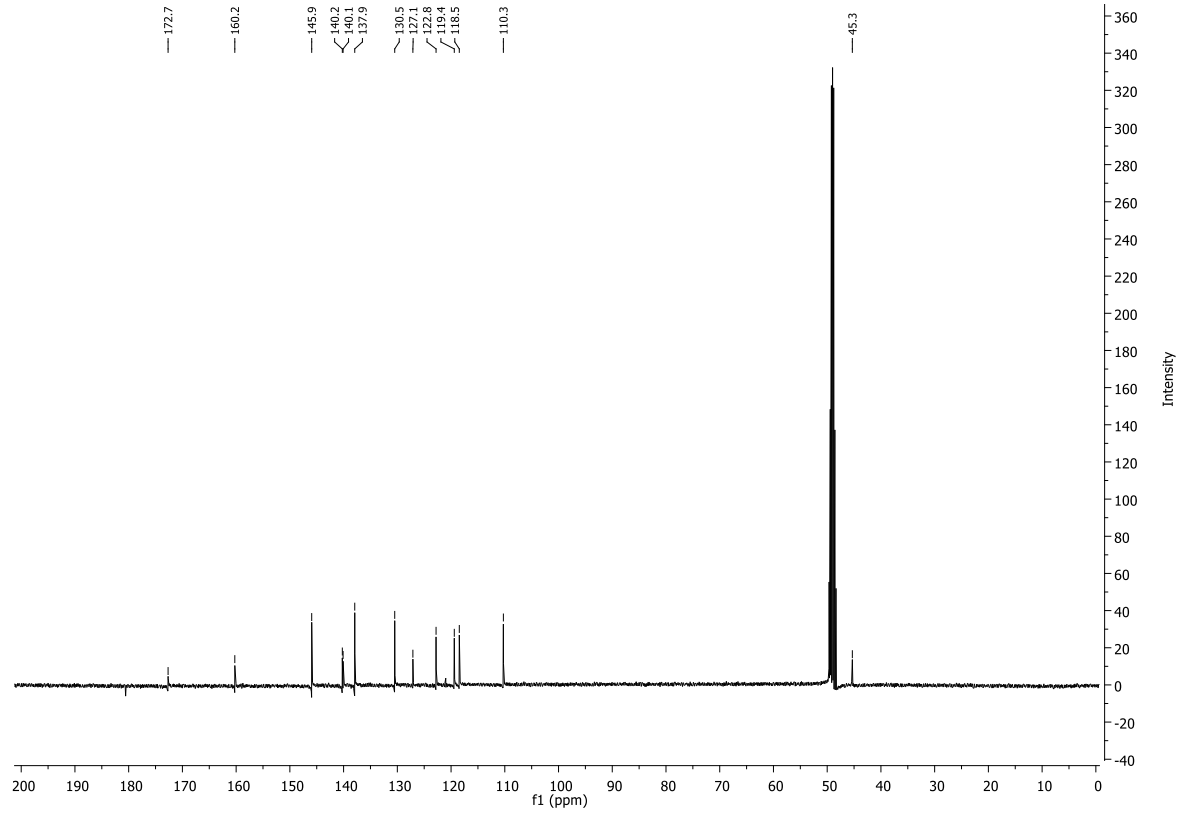
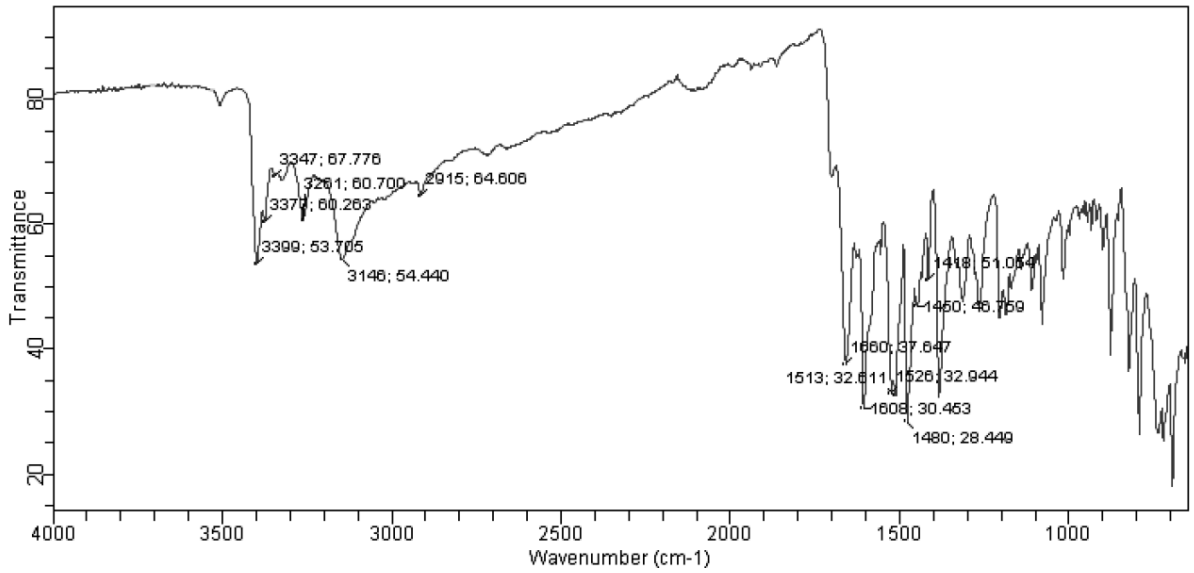
246.1916
247.0561
m/z

2-Amino-N-(3-(6-aminopyridin-3-yl)phenyl)acetamide (2.25).



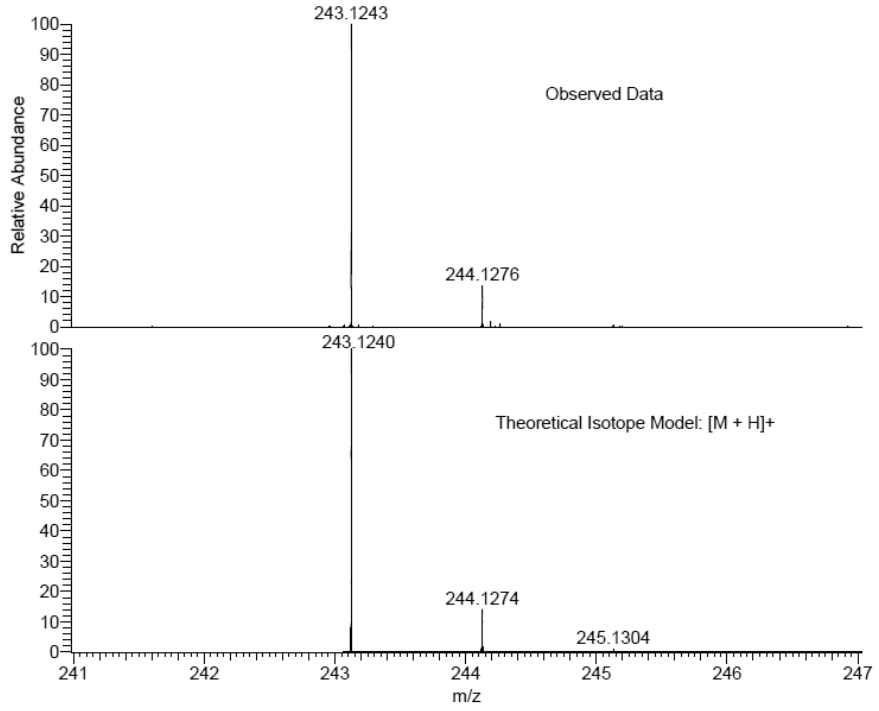




LM-N39-2 MW=242?
(DCM)/MeOH + NH4OAc
C13H14N4O

EPSRC National Facility Swansea
LTQ Orbitrap XL

Lisa Miller
14/01/2016 09:17:30



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2.15E6
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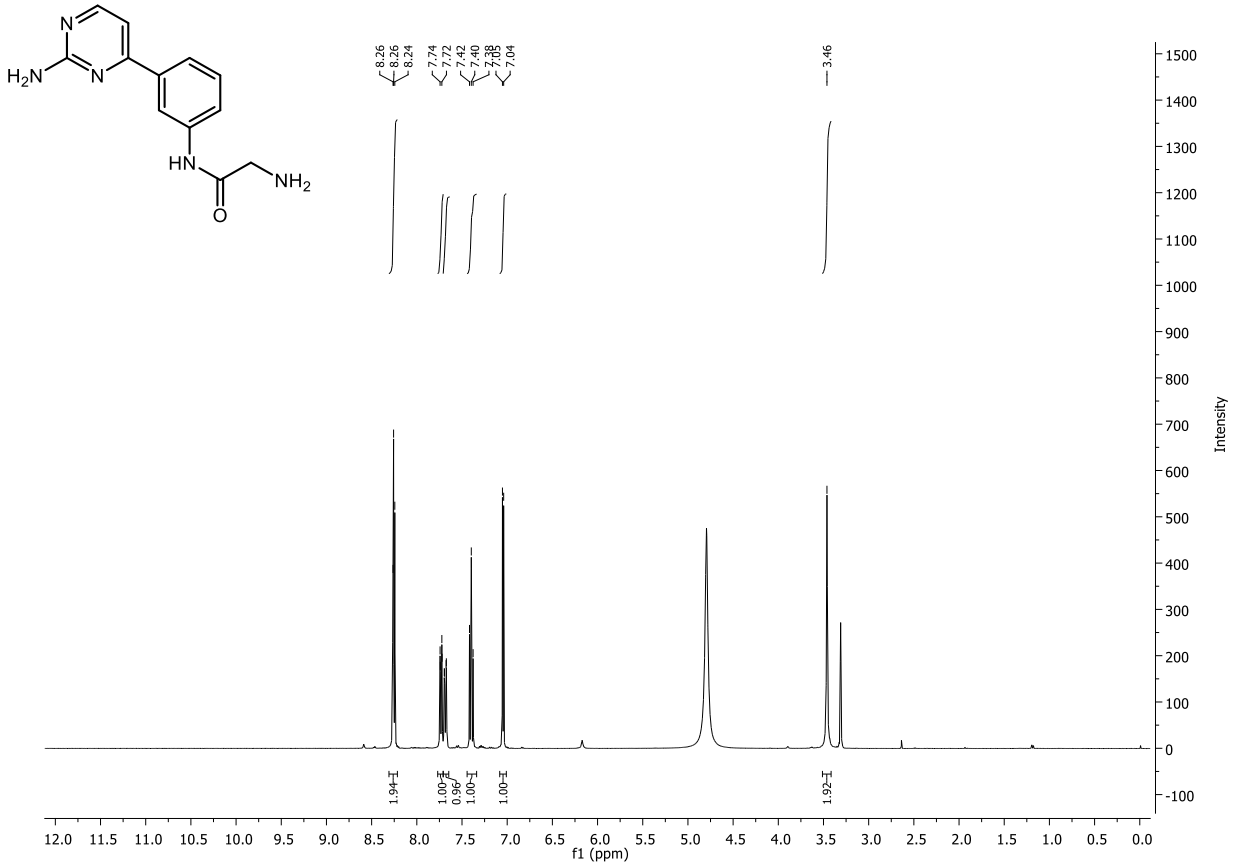
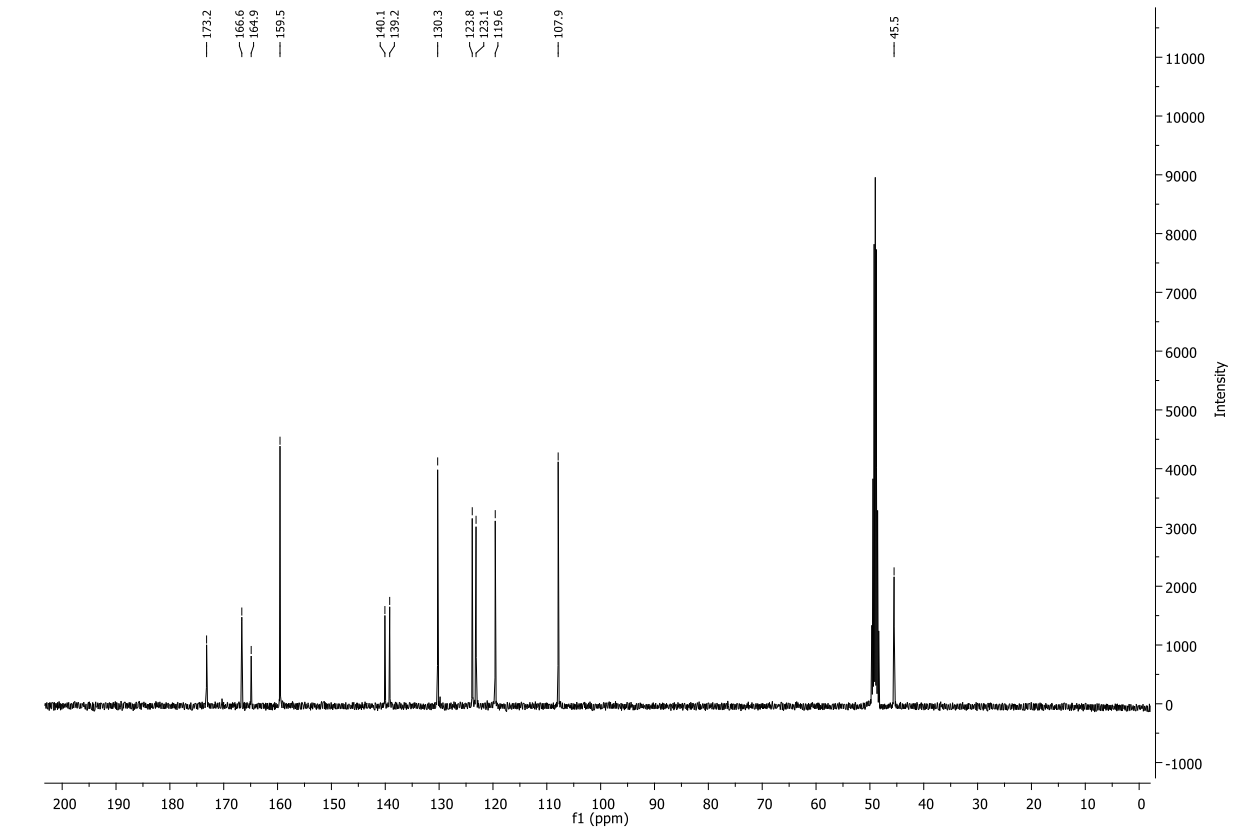
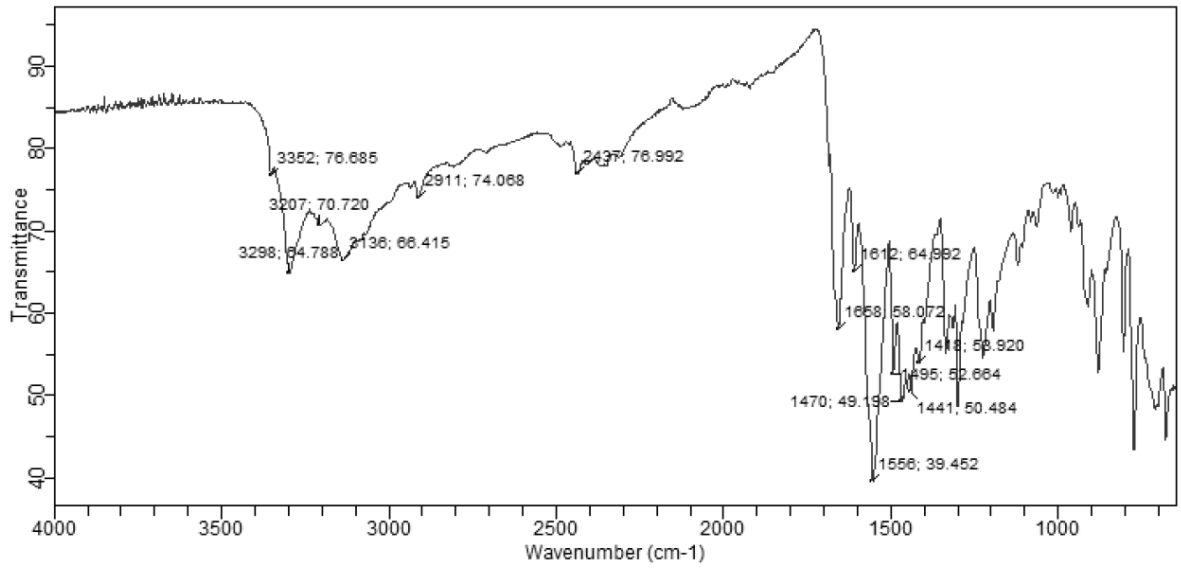
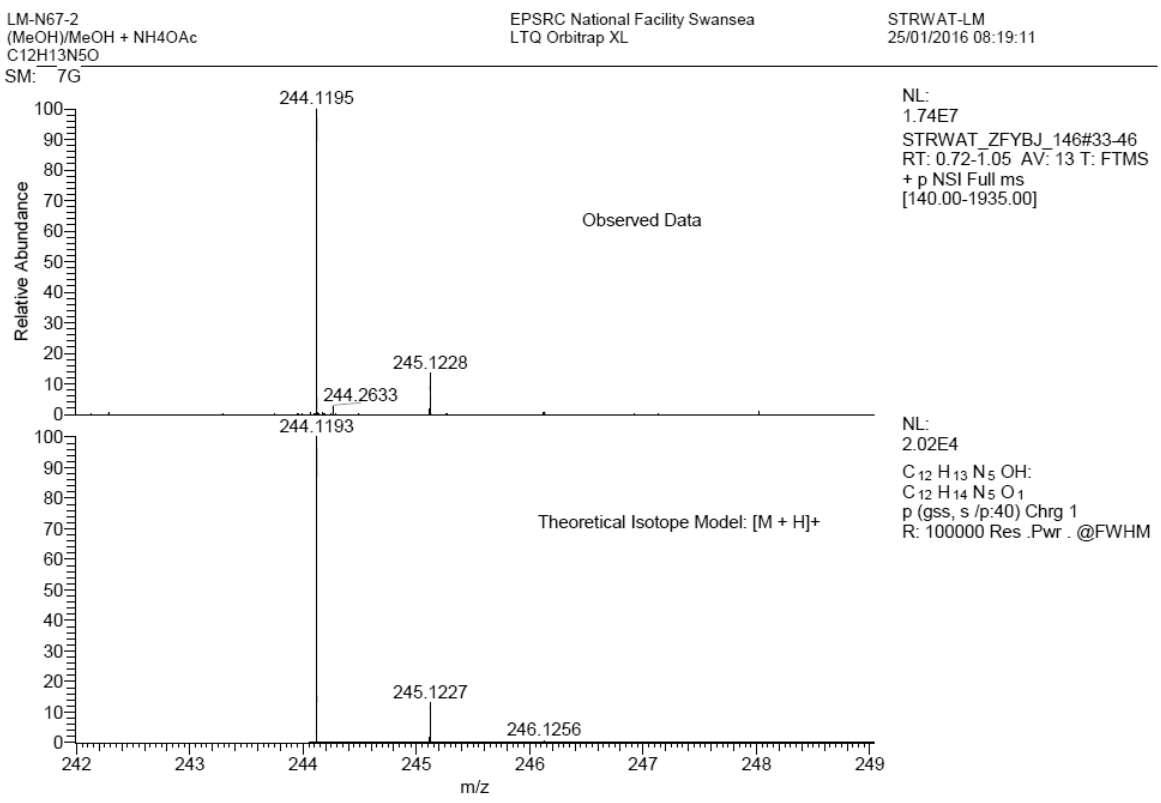
NL:
2.00E4
$C_{13}H_{14}N_4OH$:
$C_{13}H_{15}N_4O_1$
p (gss, s /p:40) Chrg 1
R: 100000 Res .Pwr . @FWHM

Synthesis of 2-amino-*N*-(3-(2-aminopyrimidin-4-yl)phenyl)acetamide (2.26).

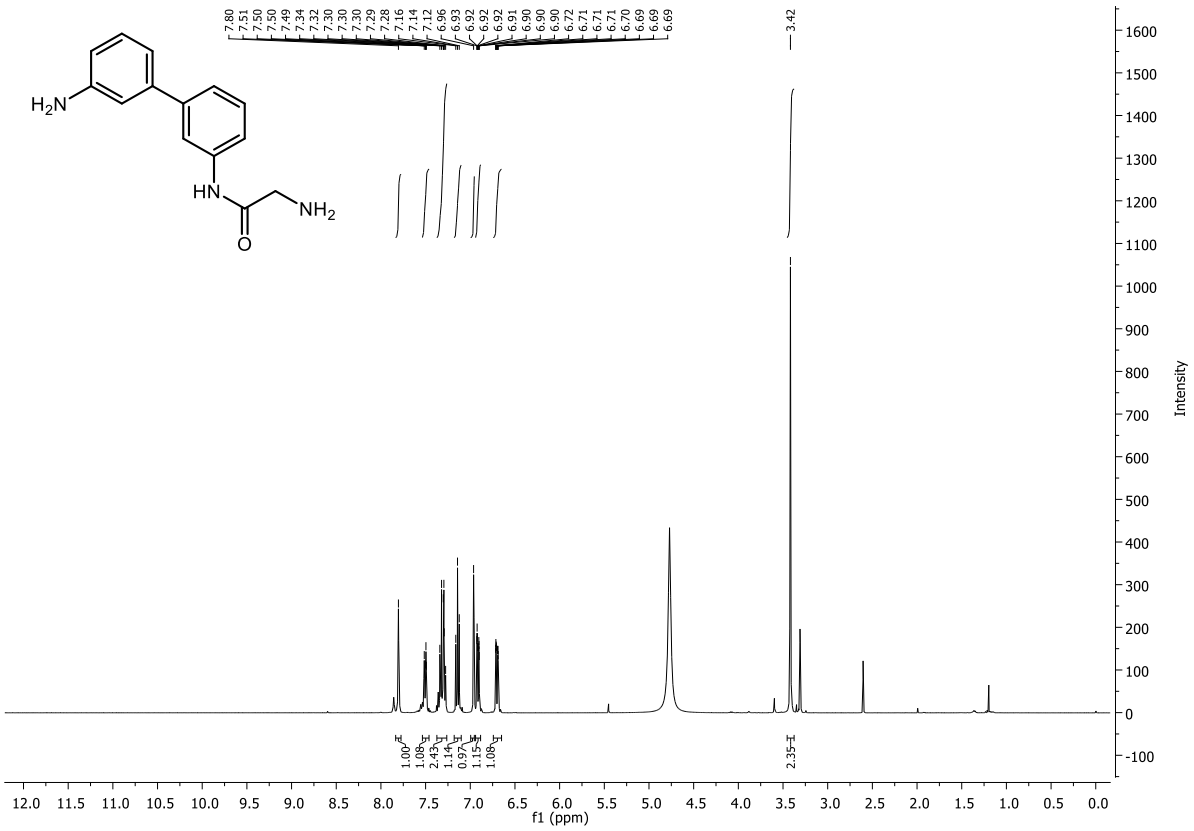


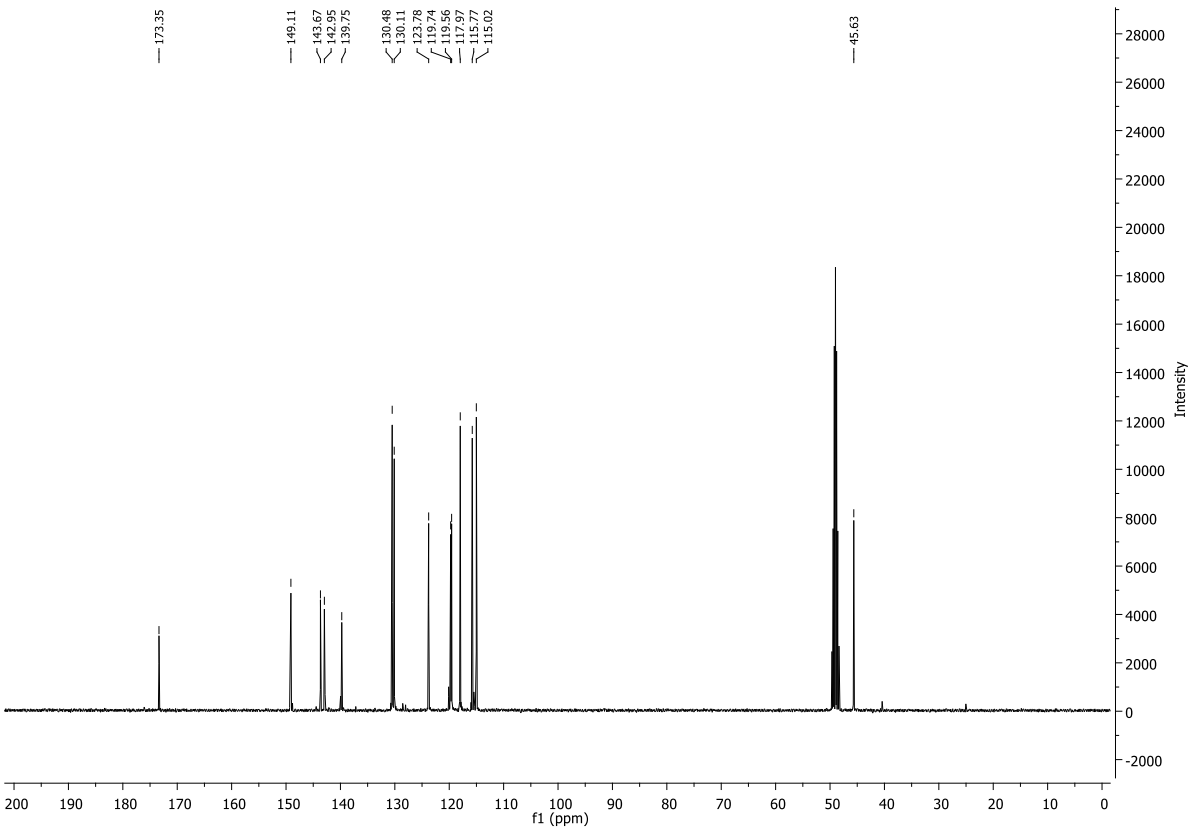


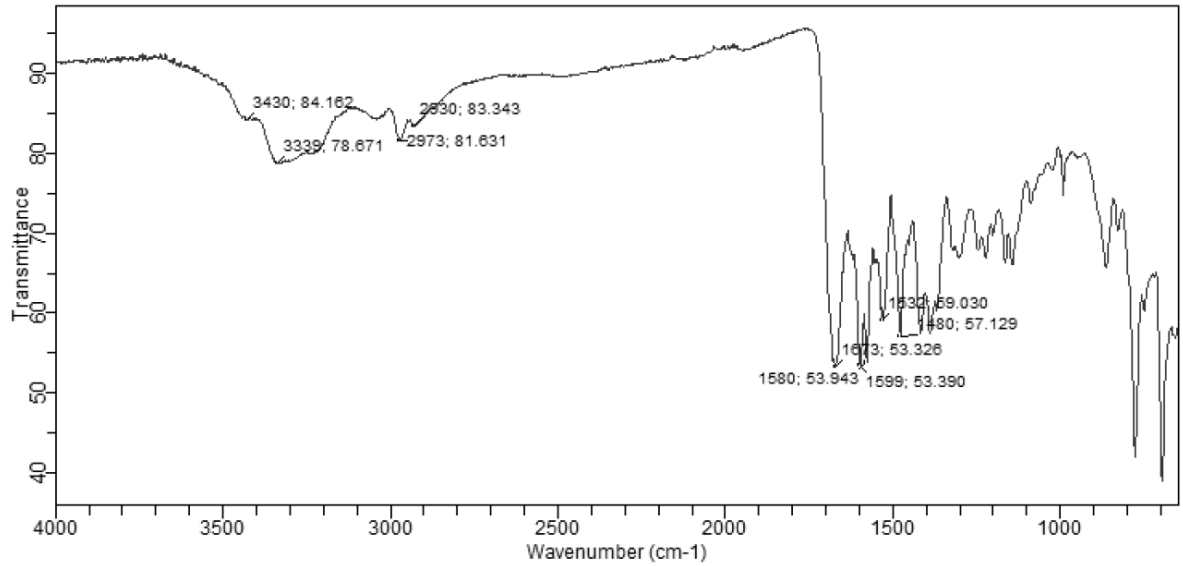

Transmittance
Wavenumber (cm-1)
3352; 76.685
3207; 70.720
3298; 64.788
2911; 74.068
2136; 66.415
2437; 76.992
1612; 64.992
1658; 58.072
1418; 58.920
1495; 52.664
1470; 49.198
1441; 50.484
1556; 39.452


LM-N67-2
(MeOH)/MeOH + NH4OAc
C12H13N5O
SM: 7G
EPSRC National Facility Swansea
LTQ Orbitrap XL
STRWAT-LM
25/01/2016 08:19:11
Relative Abundance
Observed Data
244.1195
245.1228
244.2633
NL:
1.74E7
STRWAT_ZFYBJ_146#33-46
RT: 0.72-1.05 AV: 13 T: FTMS
+ p NSI Full ms
[140.00-1935.00]
Theoretical Isotope Model: [M + H]+
244.1193
245.1227
246.1256
NL:
2.02E4
C12 H13 N5 OH:
C12 H14 N5 O1
p (gss, s /p:40) Chrg 1
R: 100000 Res .Pwr . @FWHM
m/z

2-Amino-*N*-(3'-amino-[1,1'-biphenyl]-3-yl)acetamide (2.27).






Transmittance
Wavenumber (cm-1)
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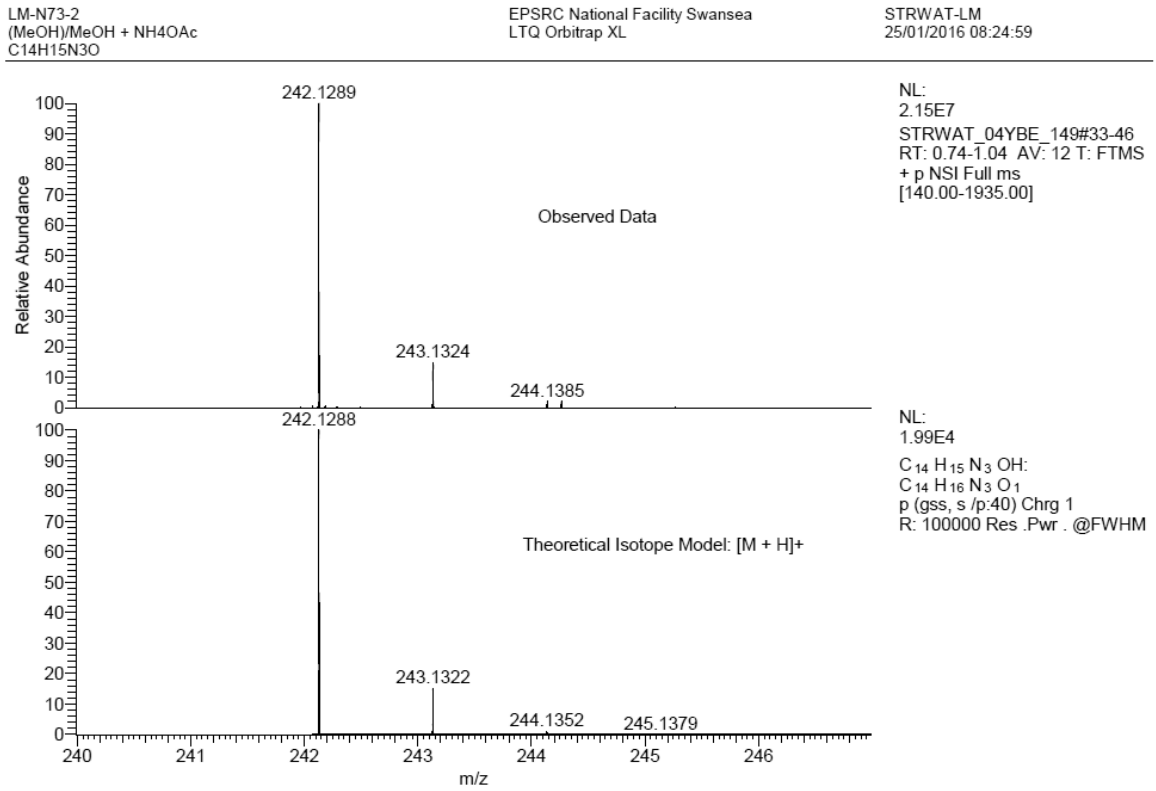
2973; 81.631
1580; 53.943
1599; 53.390
1480; 57.129


LM-N73-2
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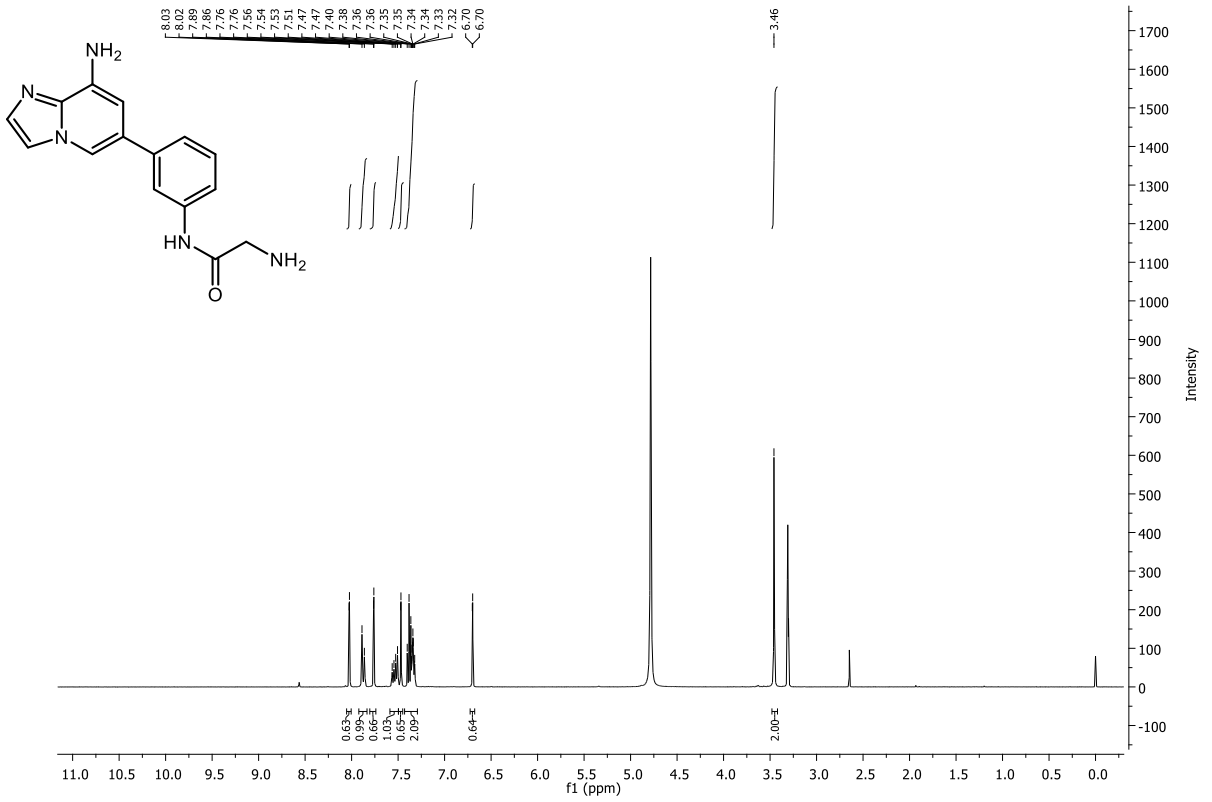
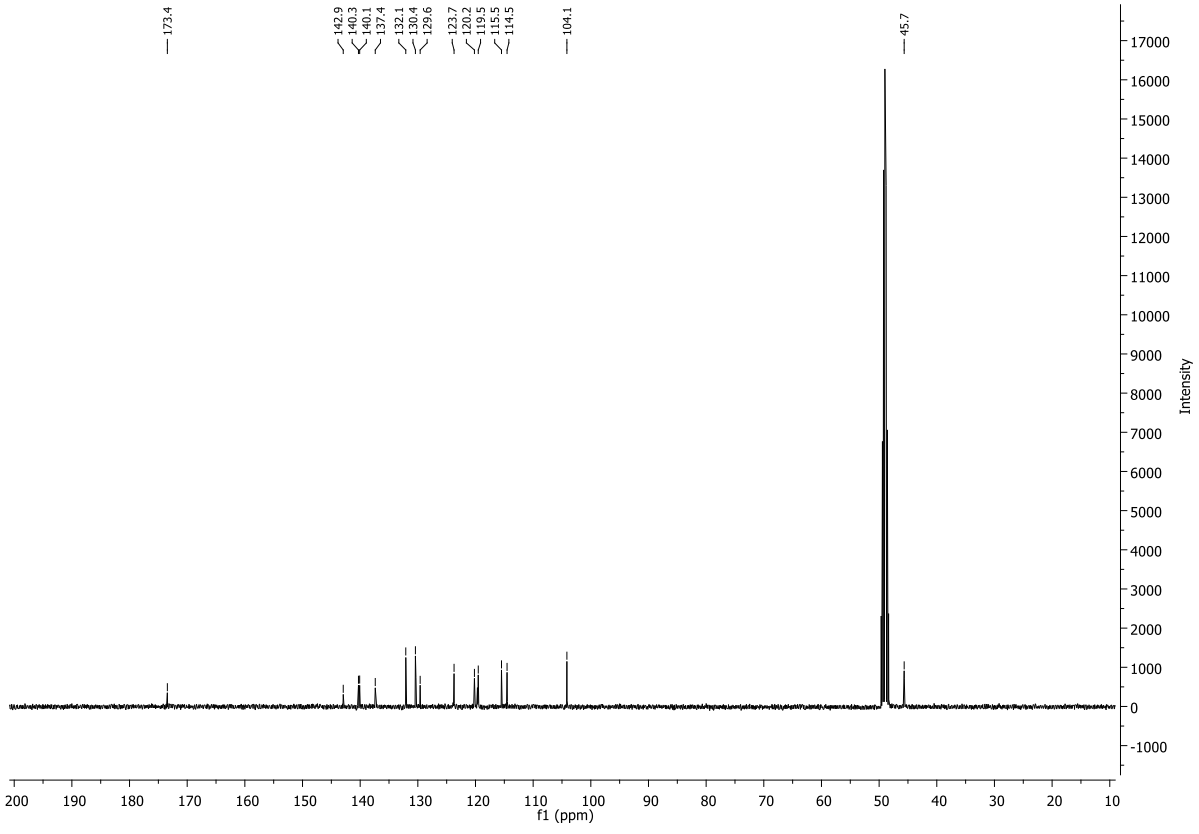
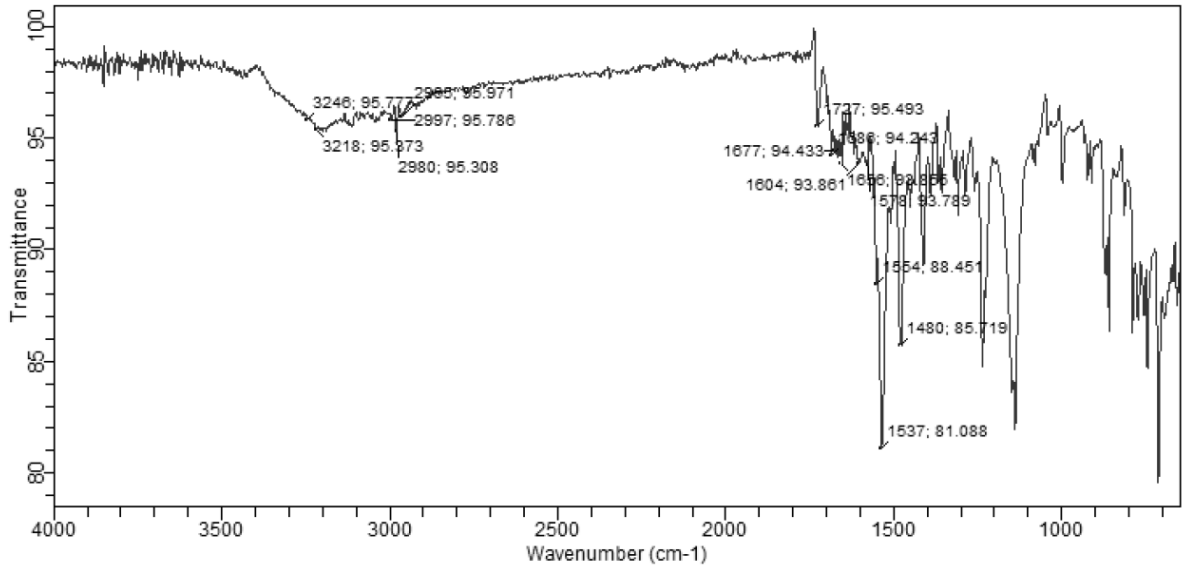
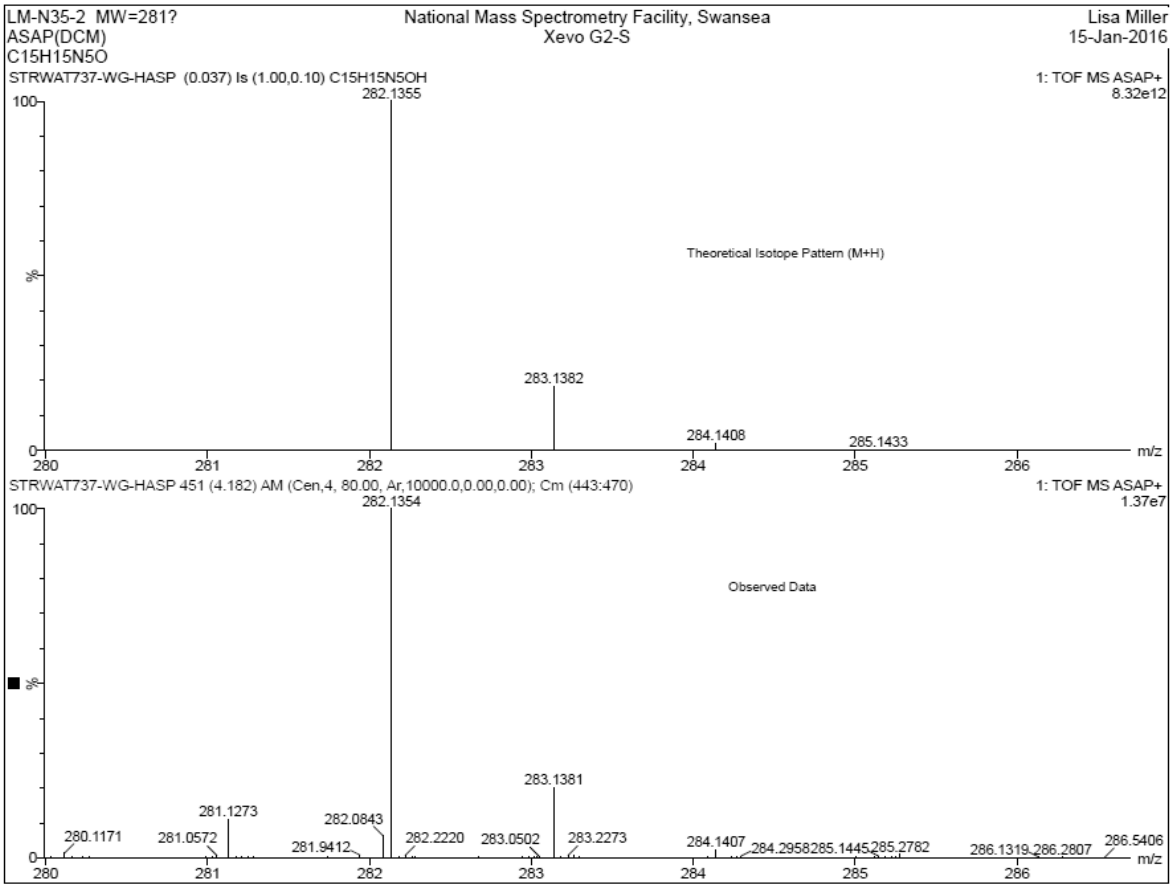
EPSRC National Facility Swansea
LTQ Orbitrap XL
STRWAT-LM
25/01/2016 08:24:59
242.1289
243.1324
244.1385
Observed Data
NL:
2.15E7
STRWAT_04YBE_149#33-46
RT: 0.74-1.04 AV: 12 T: FTMS
+ p NSI Full ms
[140.00-1935.00]
242.1288
243.1322
244.1352
245.1379
Theoretical Isotope Model: [M + H]+
NL:
1.99E4
C 14 H 15 N 3 OH:
C 14 H 16 N 3 O 1
p (gss, s /p:40) Chrg 1
R: 100000 Res .Pwr . @FWHM
Relative Abundance
m/z

2-Amino-*N*-(3-(8-aminoimidazo[1,2-α]113yridine-6-yl)phenyl)acetamide (2.28).

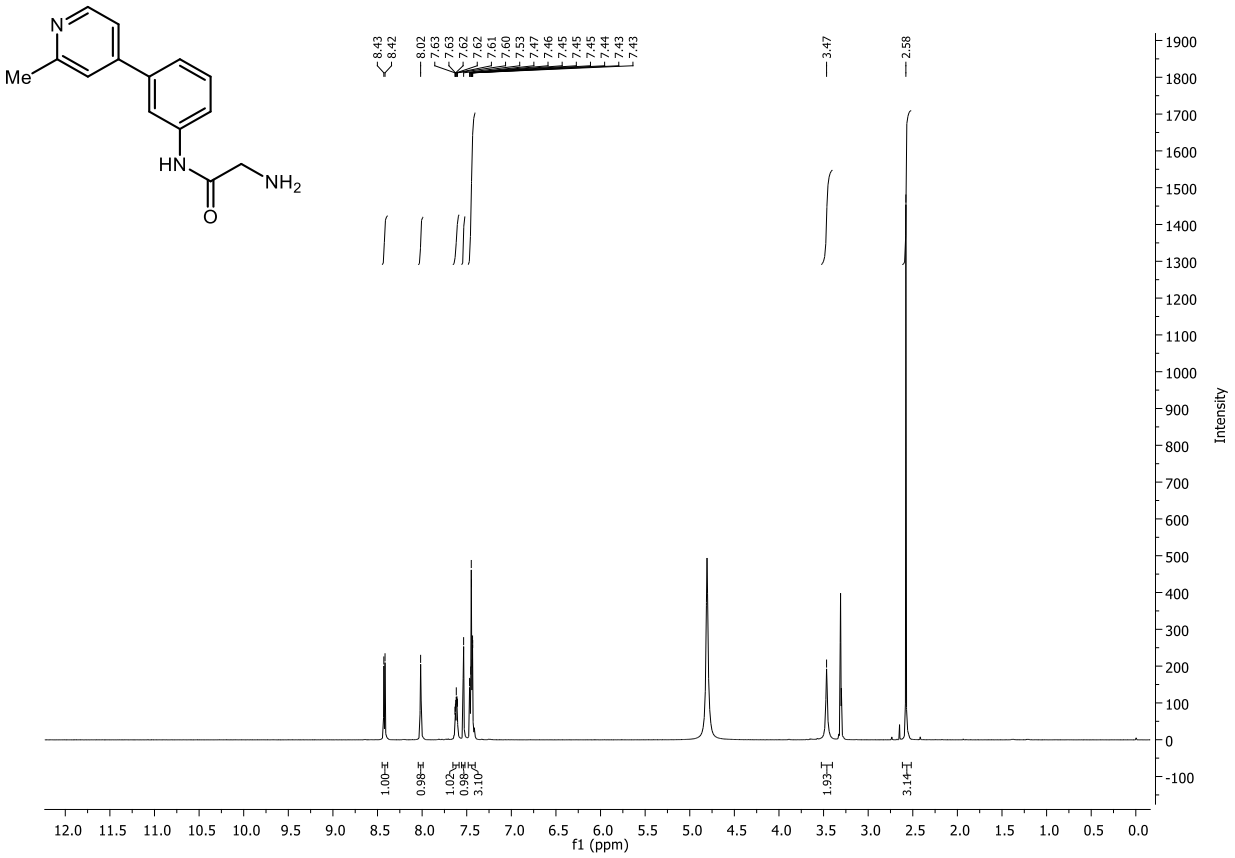


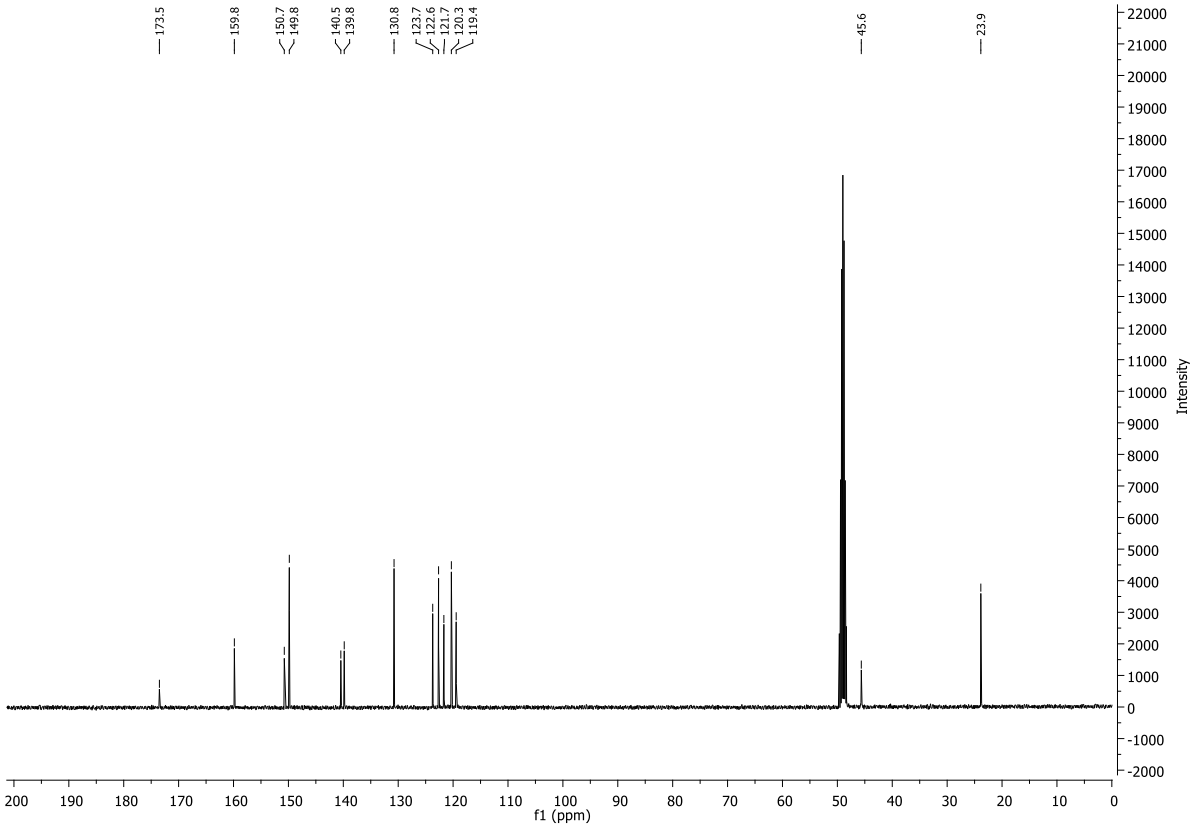


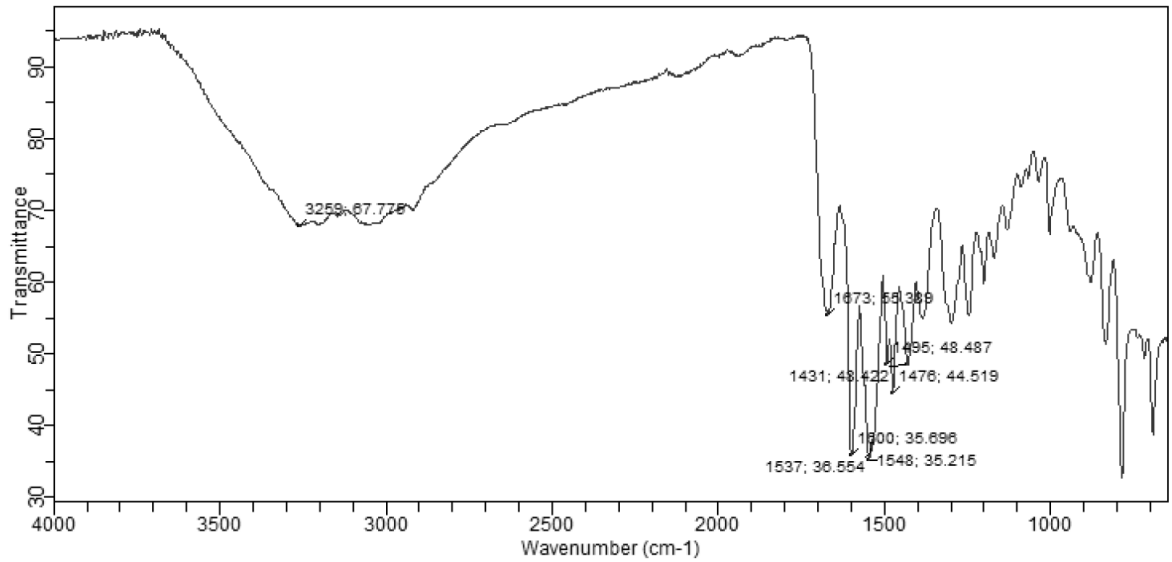

Transmittance
Wavenumber (cm-1)
3246; 95.777
2997; 95.786
3218; 95.373
2980; 95.308
1677; 94.433
1604; 93.861
1554; 88.451
1480; 85.719
1537; 81.088

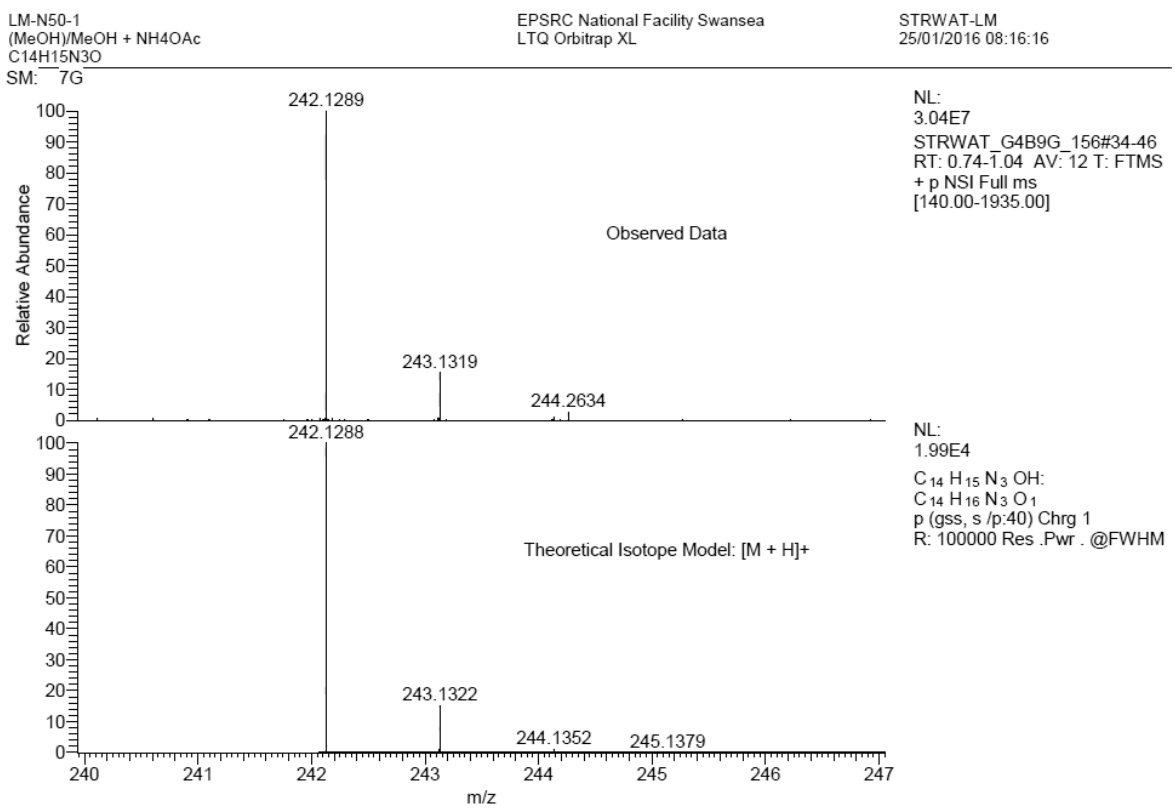

LM-N35-2 MW=281?
ASAP(DCM)
C15H15N5O
National Mass Spectrometry Facility, Swansea
Xevo G2-S
Lisa Miller
15-Jan-2016
STRWAT737-WG-HASP (0.037) Is (1.00,0.10) C15H15N5OH
1: TOF MS ASAP+
8.32e12
282.1355
Theoretical Isotope Pattern (M+H)
283.1382
284.1408
285.1433
STRWAT737-WG-HASP 451 (4.182) AM (Cen,4, 80.00, Ar,10000.0,0.00,0.00); Cm (443:470)
1: TOF MS ASAP+
1.37e7
282.1354
Observed Data
283.1381
281.1273
282.0843
280.1171
281.0572
281.9412
282.2220
283.0502
283.2273
284.1407
284.2958
285.1445
285.2782
286.1319
286.2807
286.5406
m/z

2-Amino-*N*-(3-(2-methylpyridin-4-yl)phenyl)acetamide (2.29).

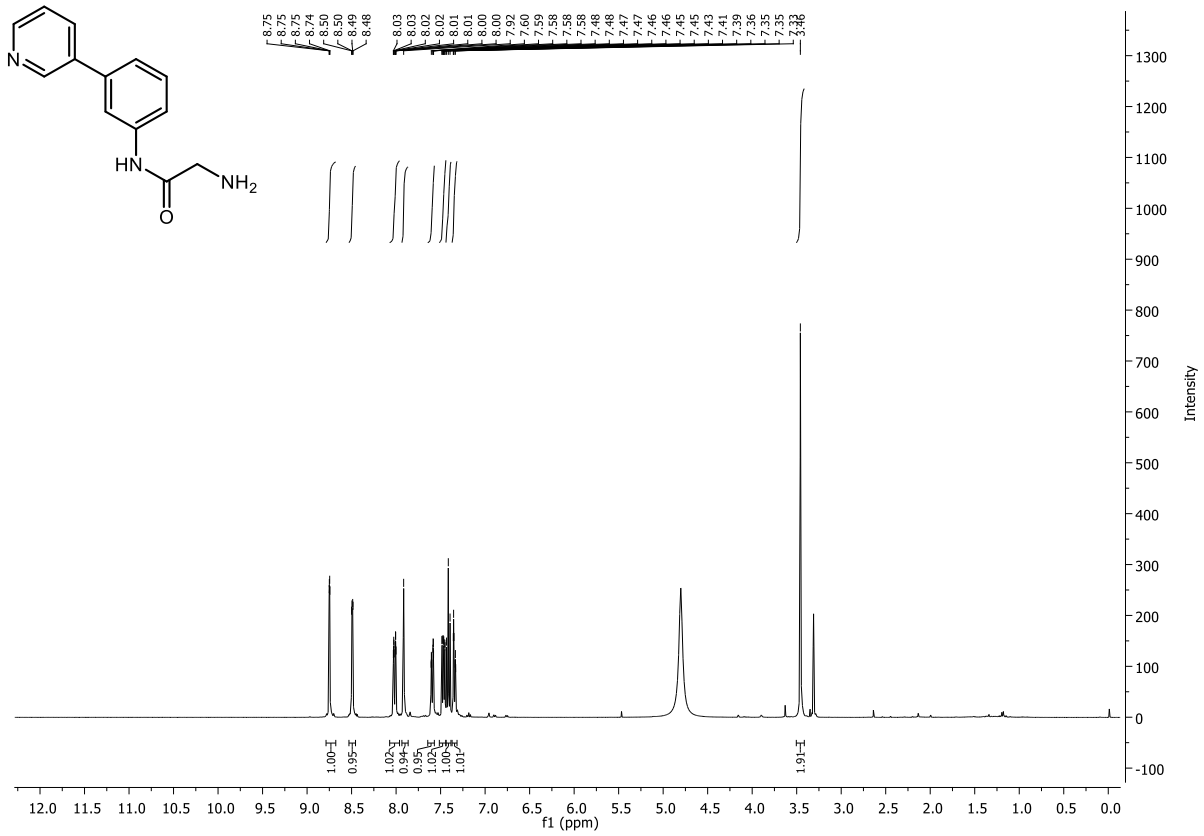


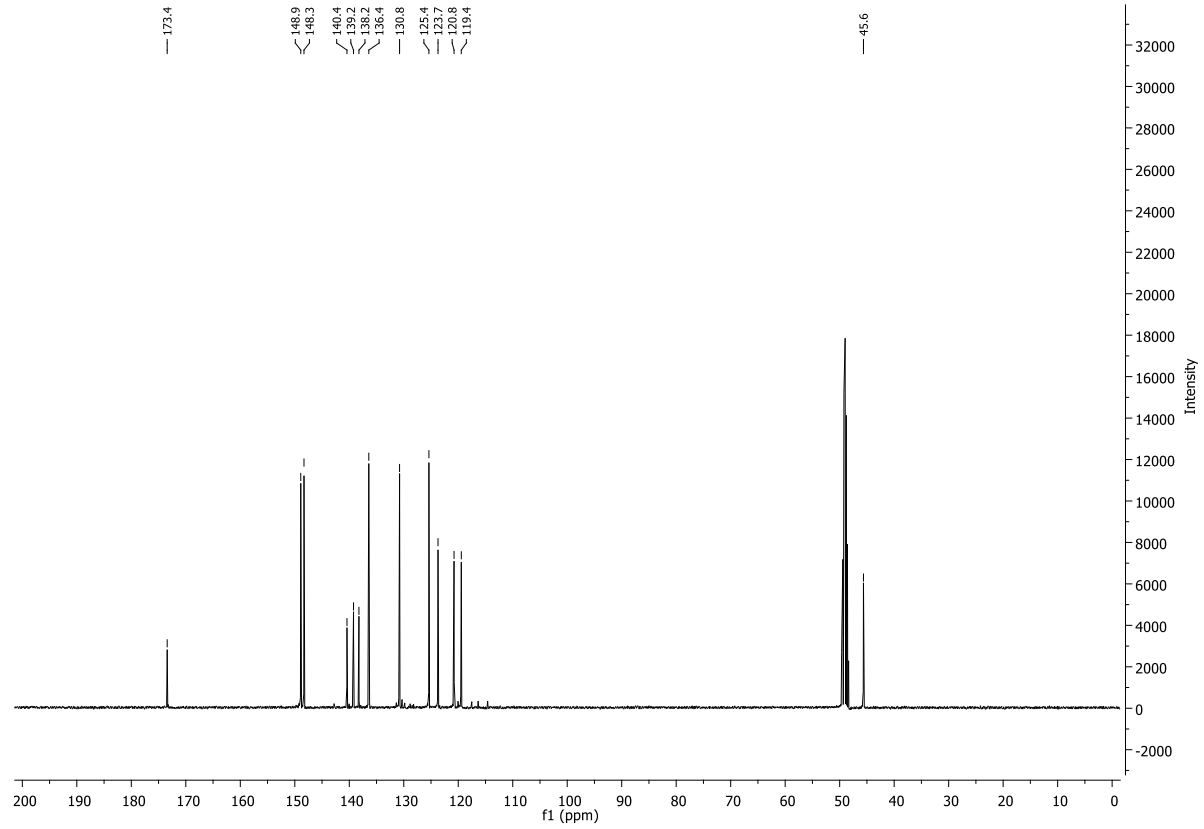


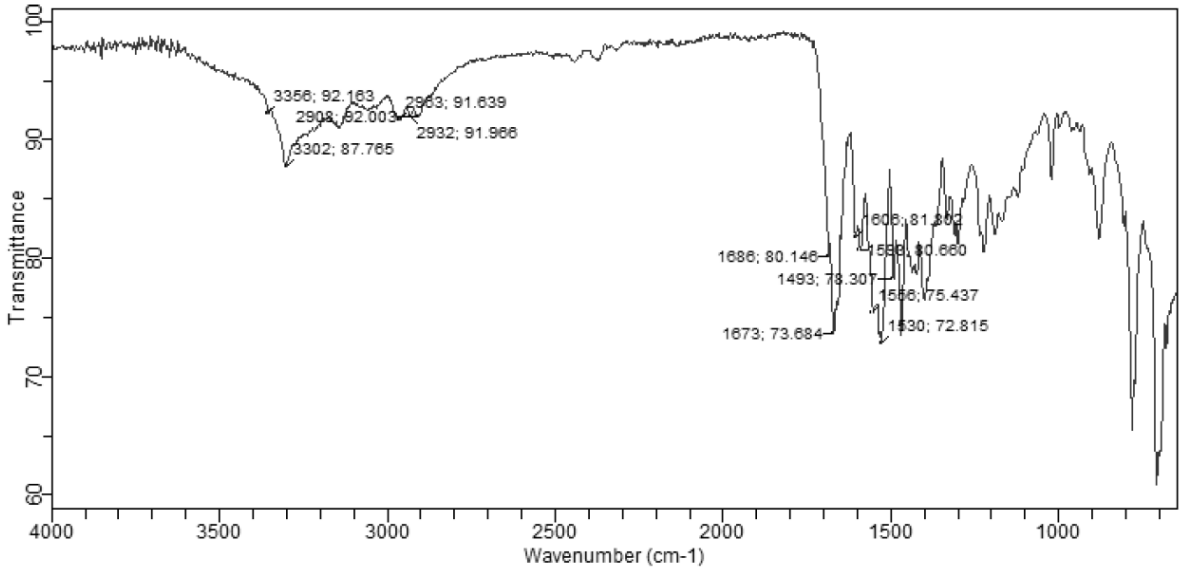

Transmittance
Wavenumber (cm-1)
3259; 67.776
1673; 55.389
1495; 48.487
1431; 48.422
1476; 44.519
1600; 35.696
1537; 36.554
1548; 35.215

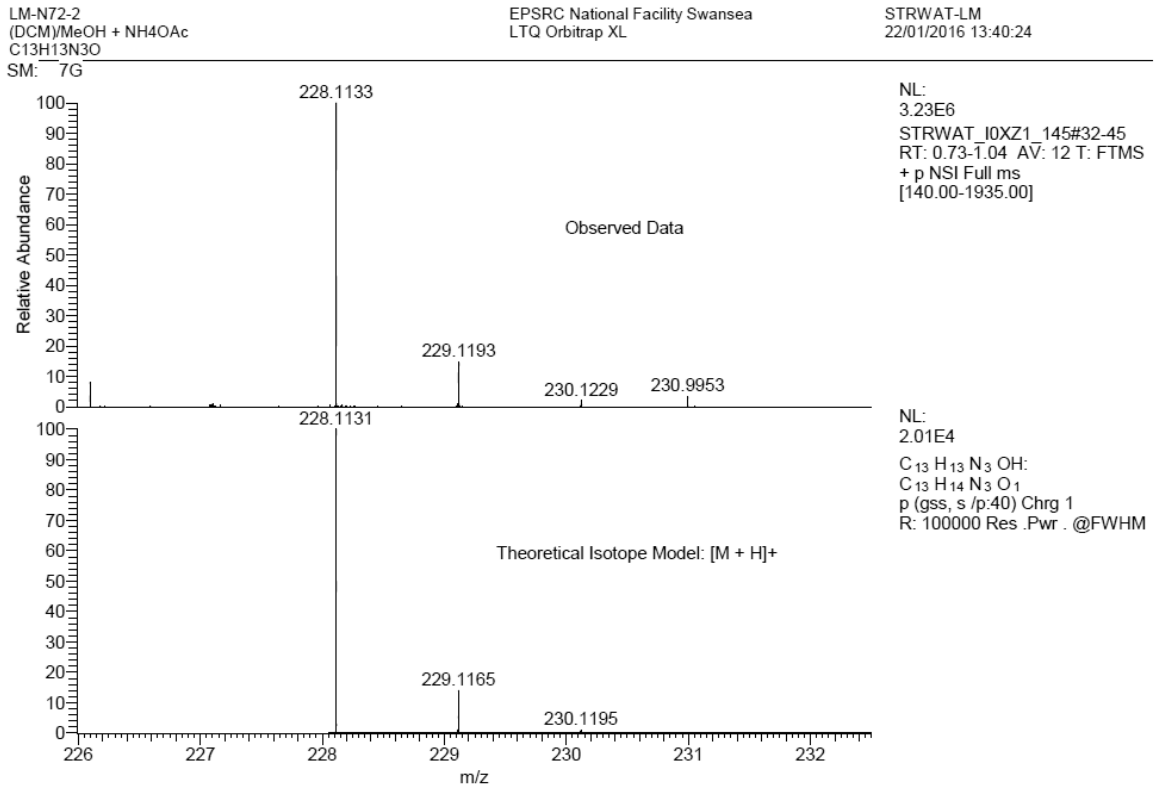

LM-N50-1
(MeOH)/MeOH + NH4OAc
C14H15N3O
SM: 7G
EPSRC National Facility Swansea
LTQ Orbitrap XL
STRWAT-LM
25/01/2016 08:16:16
242.1289
243.1319
244.2634
Observed Data
NL:
3.04E7
STRWAT_G4B9G_156#34-46
RT: 0.74-1.04 AV: 12 T: FTMS
+ p NSI Full ms
[140.00-1935.00]
242.1288
243.1322
244.1352
245.1379
Theoretical Isotope Model: [M + H]+
NL:
1.99E4
C 14 H 15 N 3 OH:
C 14 H 16 N 3 O 1
p (gss, s /p:40) Chrg 1
R: 100000 Res .Pwr . @FWHM
Relative Abundance
m/z

Synthesis of 2-amino-*N*-(3-(pyridin-3-yl)phenyl)acetamide (2.30).

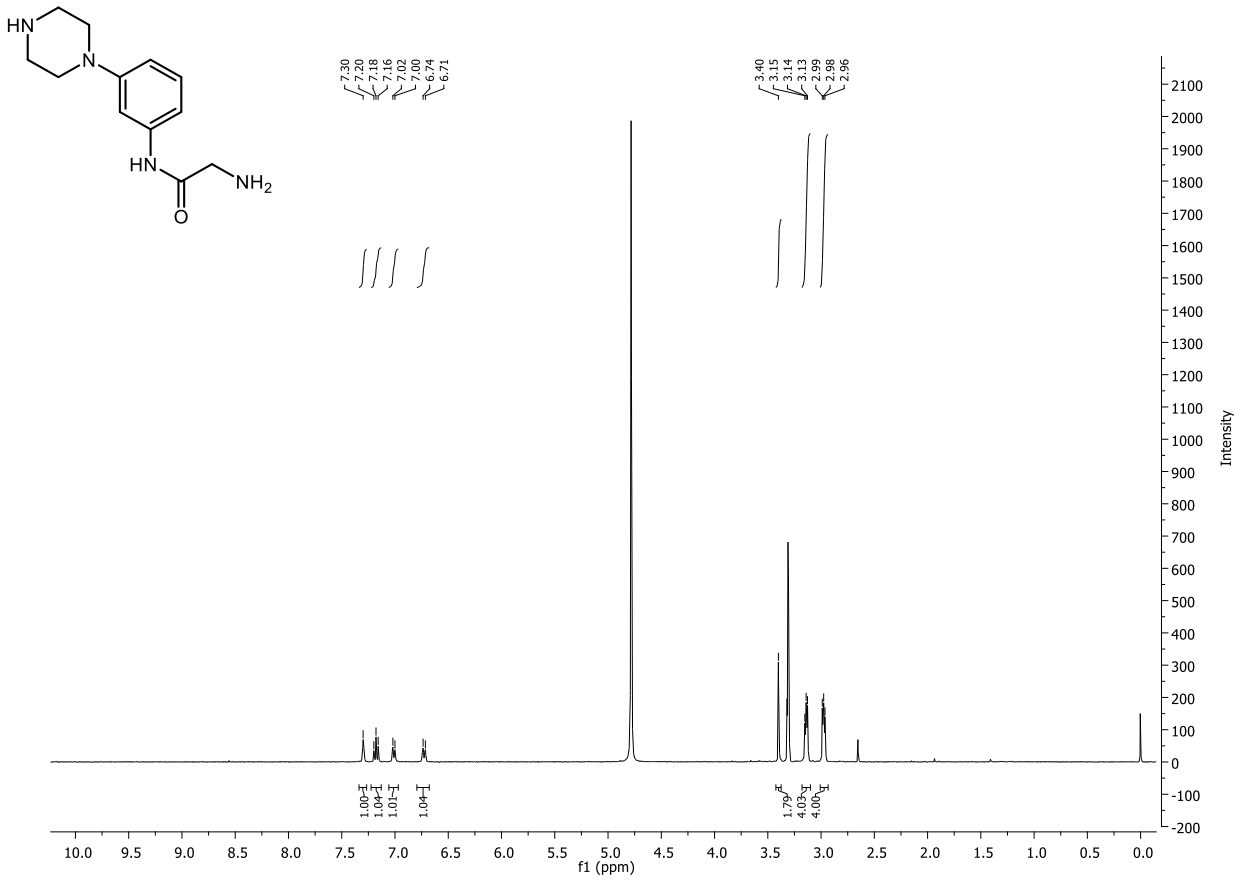


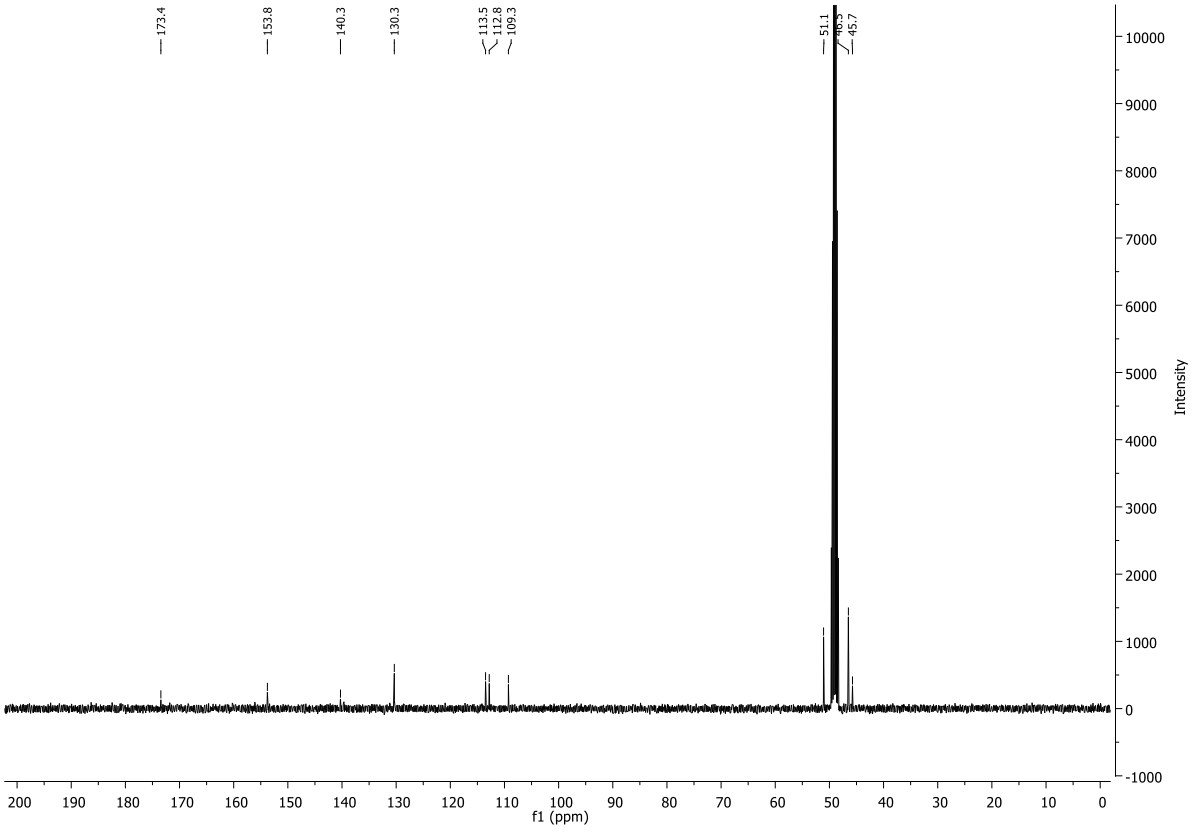


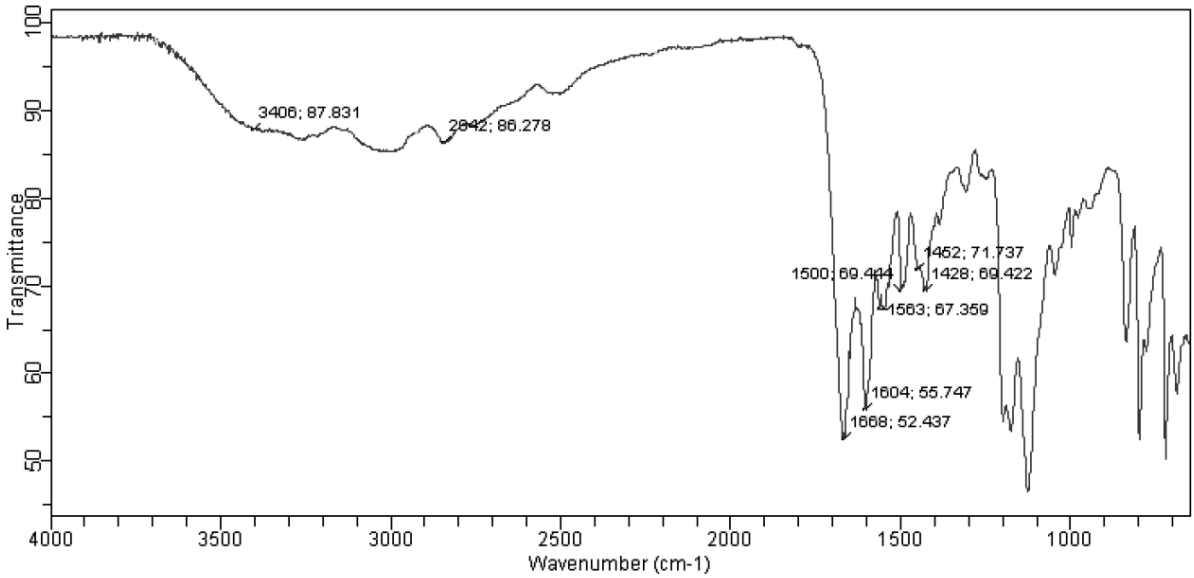

Transmittance
Wavenumber (cm-1)
3356; 92.163
2963; 91.639
2908; 92.003
2932; 91.966
3302; 87.765
1686; 80.146
1493; 78.307
1673; 73.684
1606; 81.852
1566; 75.437
1530; 72.815

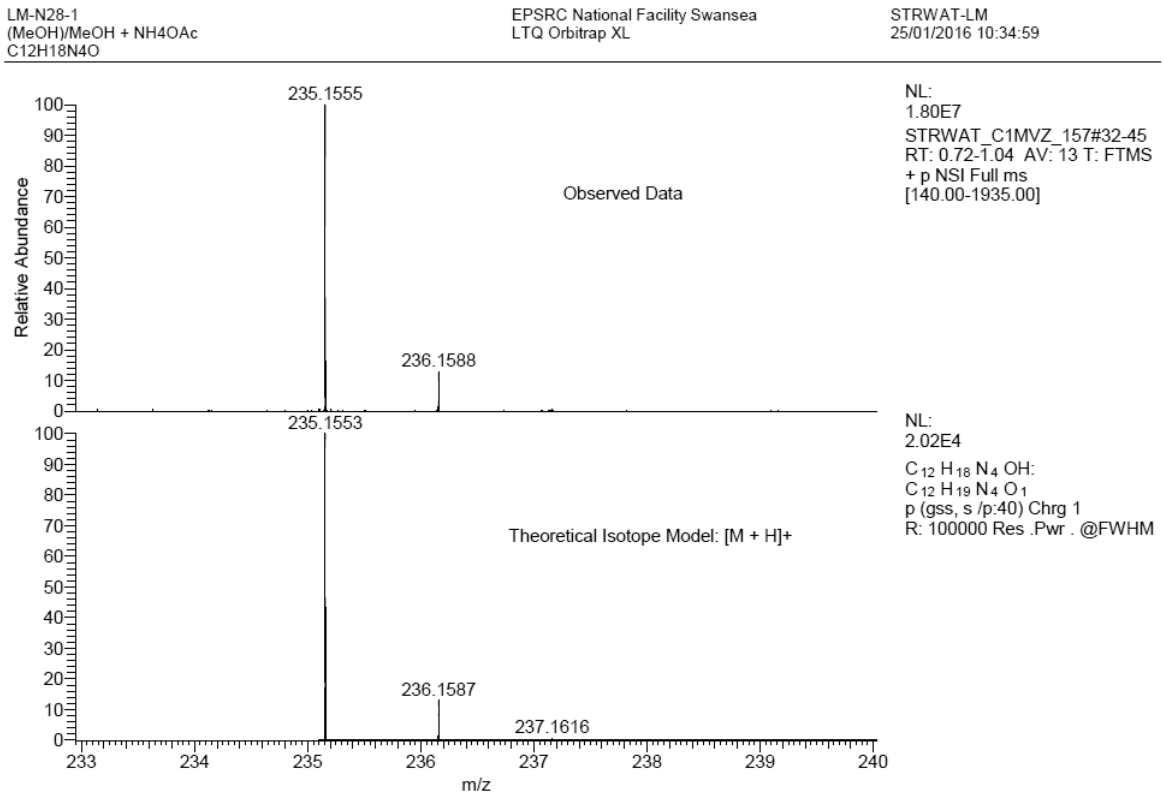

LM-N72-2
(DCM)/MeOH + NH4OAc
C13H13N3O
SM: 7G
EPSRC National Facility Swansea
LTQ Orbitrap XL
STRWAT-LM
22/01/2016 13:40:24
Relative Abundance
228.1133
229.1193
230.1229
230.9953
Observed Data
NL:
3.23E6
STRWAT_I0XZ1_145#32-45
RT: 0.73-1.04 AV: 12 T: FTMS
+ p NSI Full ms
[140.00-1935.00]
228.1131
229.1165
230.1195
Theoretical Isotope Model: [M + H]+
NL:
2.01E4
C13 H13 N3 OH:
C13 H14 N3 O1
p (gss, s /p:40) Chrg 1
R: 100000 Res .Pwr . @FWHM
m/z

2-Amino-*N*-(3-(piperazin-1-yl)phenyl)acetamide (2.31).

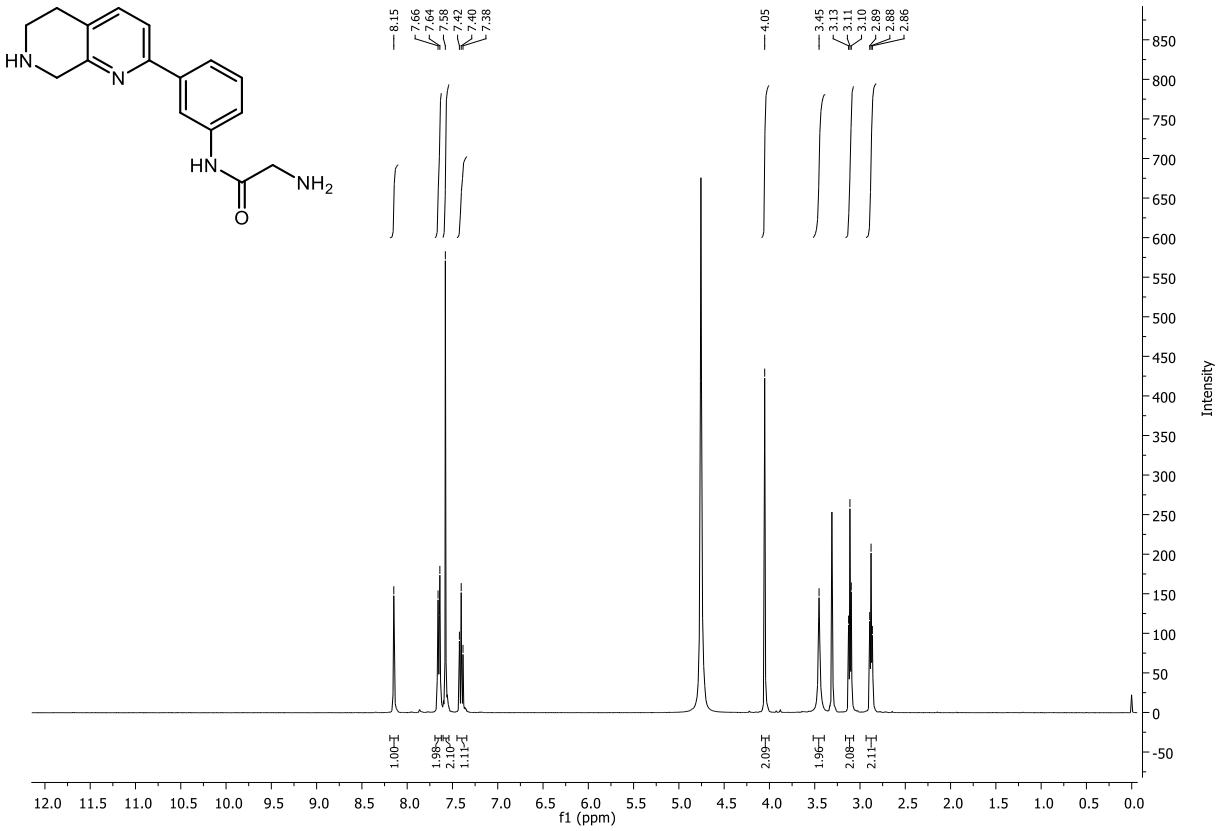


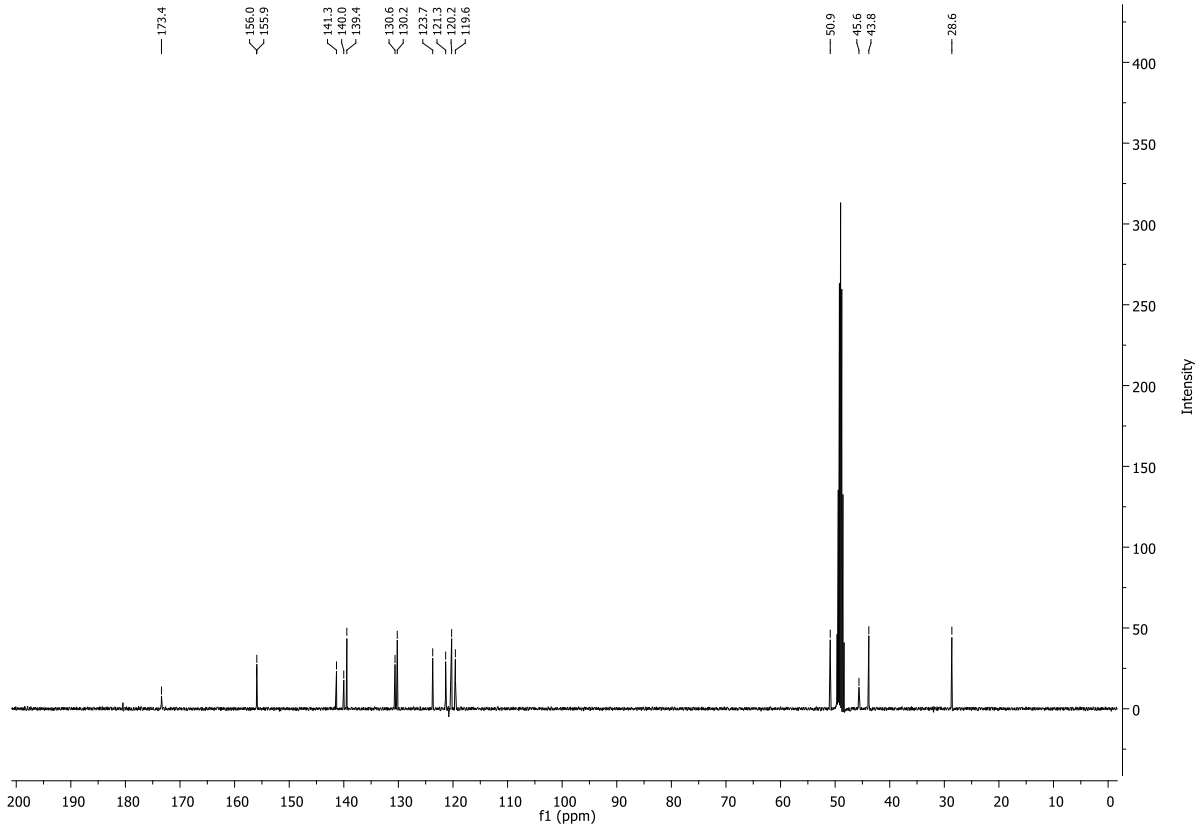


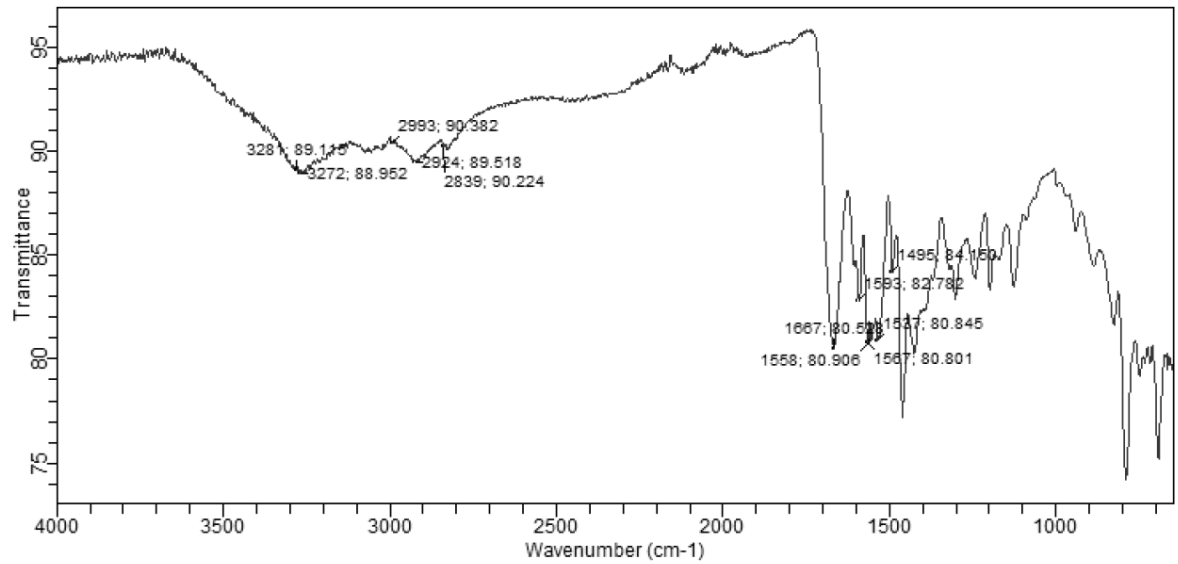

Transmittance
Wavenumber (cm-1)
3406; 87.831
2842; 86.278
1500; 69.444
1452; 71.737
1428; 69.422
1563; 67.359
1604; 55.747
1668; 52.437

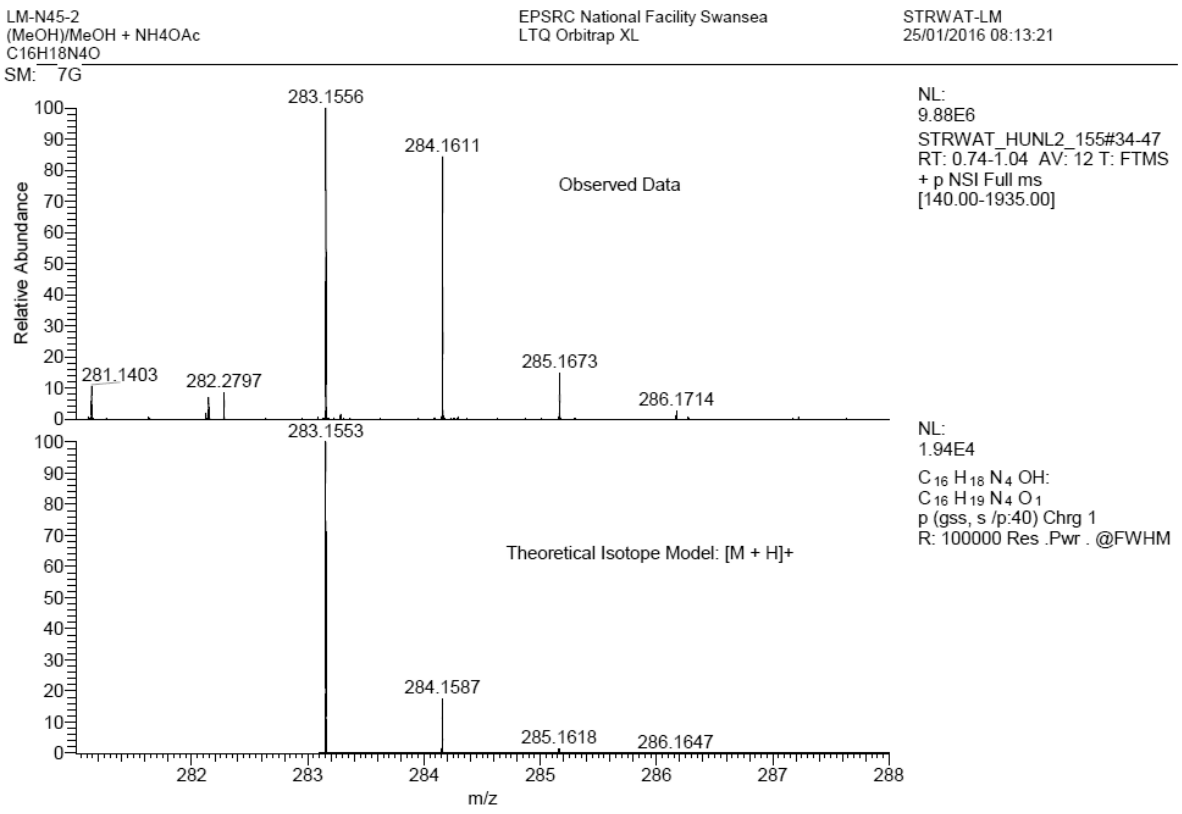

LM-N28-1
(MeOH)/MeOH + NH4OAc
C12H18N4O
EPSRC National Facility Swansea
LTQ Orbitrap XL
STRWAT-LM
25/01/2016 10:34:59
235.1555
236.1588
Observed Data
NL:
1.80E7
STRWAT_C1MVZ_157#32-45
RT: 0.72-1.04 AV: 13 T: FTMS
+ p NSI Full ms
[140.00-1935.00]
235.1553
236.1587
237.1616
Theoretical Isotope Model: [M + H]+
NL:
2.02E4
C12 H18 N4 OH:
C12 H19 N4 O1
p (gss, s /p:40) Chrg 1
R: 100000 Res .Pwr . @FWHM
Relative Abundance
m/z

2-Amino-*N*-(3-(5,6,7,8-tetrahydro-1,7-naphthyridin-2-yl)phenyl)acetamide (2.32).

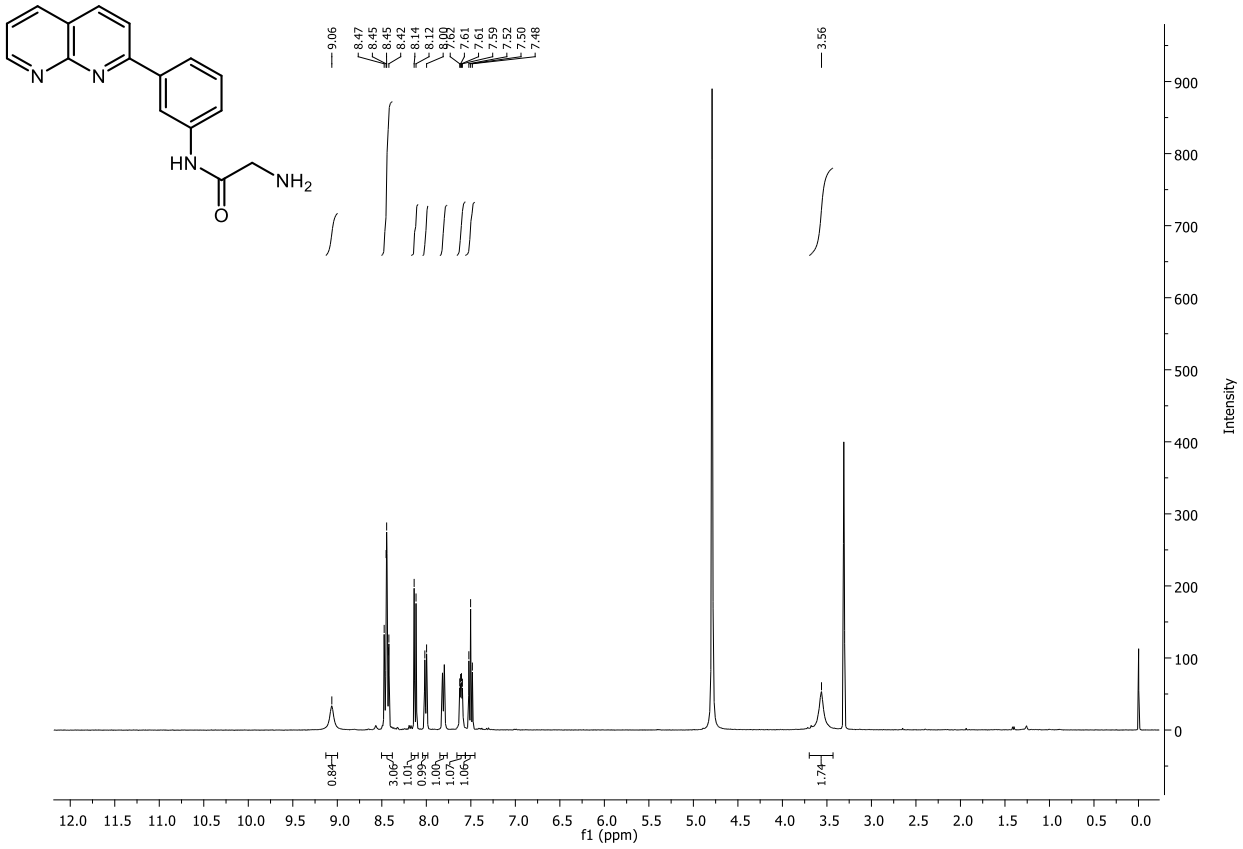


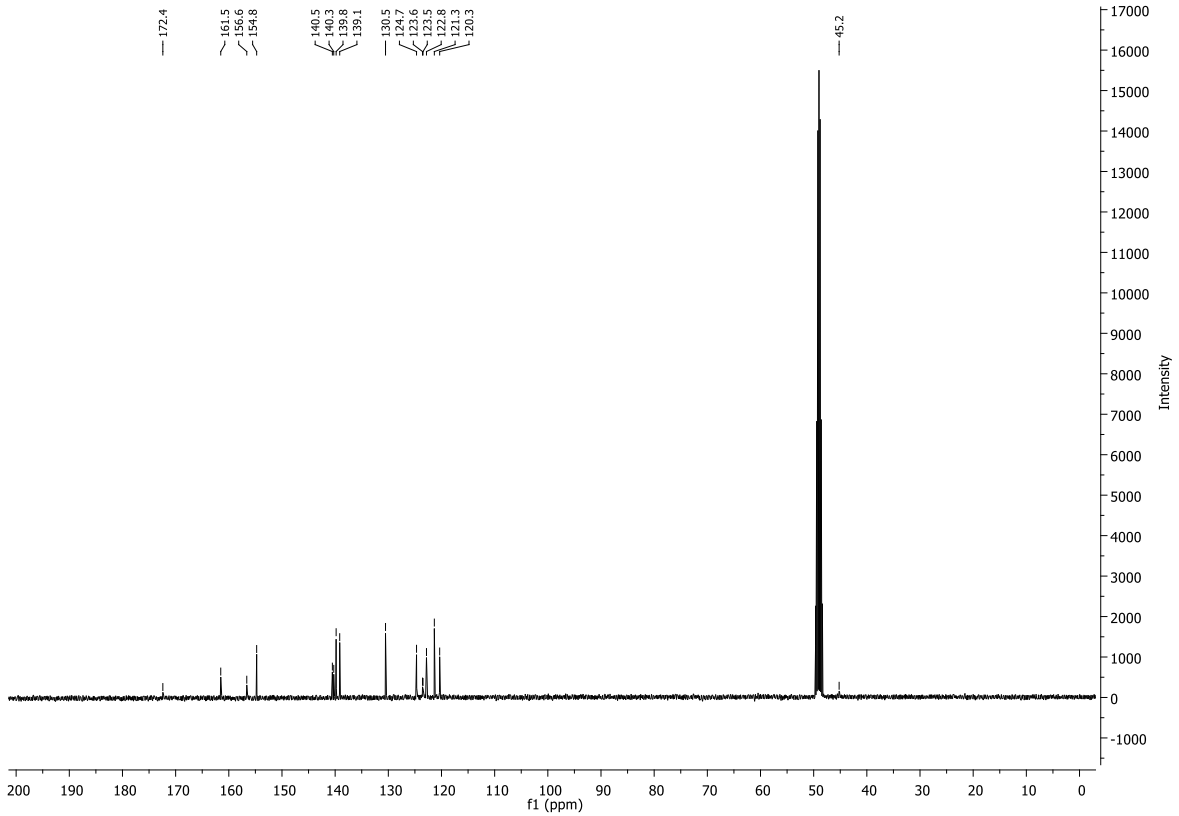


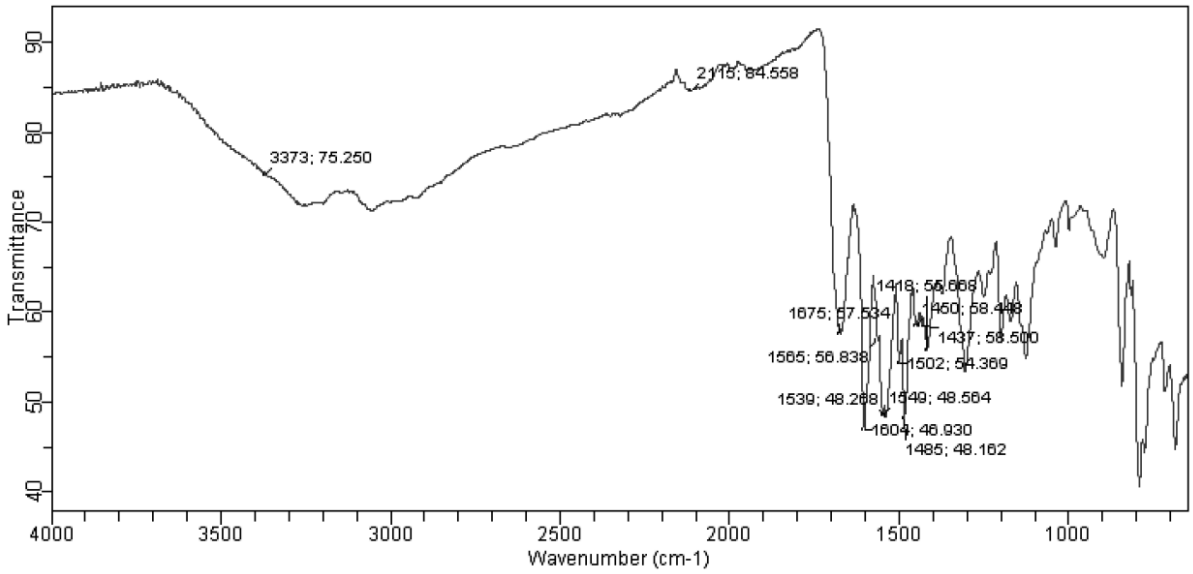

Transmittance
Wavenumber (cm-1)
2993; 90.382
3281; 89.119
3272; 88.952
2924; 89.518
2839; 90.224
1495; 84.150
1593; 82.782
1667; 80.528
1547; 80.845
1558; 80.906
1567; 80.801


LM-N45-2
(MeOH)/MeOH + NH4OAc
C16H18N4O
SM: 7G
EPSRC National Facility Swansea
LTQ Orbitrap XL
STRWAT-LM
25/01/2016 08:13:21
Relative Abundance
283.1556
284.1611
Observed Data
281.1403
282.2797
285.1673
286.1714
NL:
9.88E6
STRWAT_HUNL2_155#34-47
RT: 0.74-1.04 AV: 12 T: FTMS
+ p NSI Full ms
[140.00-1935.00]
283.1553
Theoretical Isotope Model: [M + H]+
284.1587
285.1618
286.1647
NL:
1.94E4
C16 H18 N4 OH:
C16 H19 N4 O1
p (gss, s /p:40) Chrg 1
R: 100000 Res .Pwr . @FWHM
m/z

***N*-(3-(1,8-naphthyridin-2-yl)phenyl)-2-aminoacetamide (2.33).**



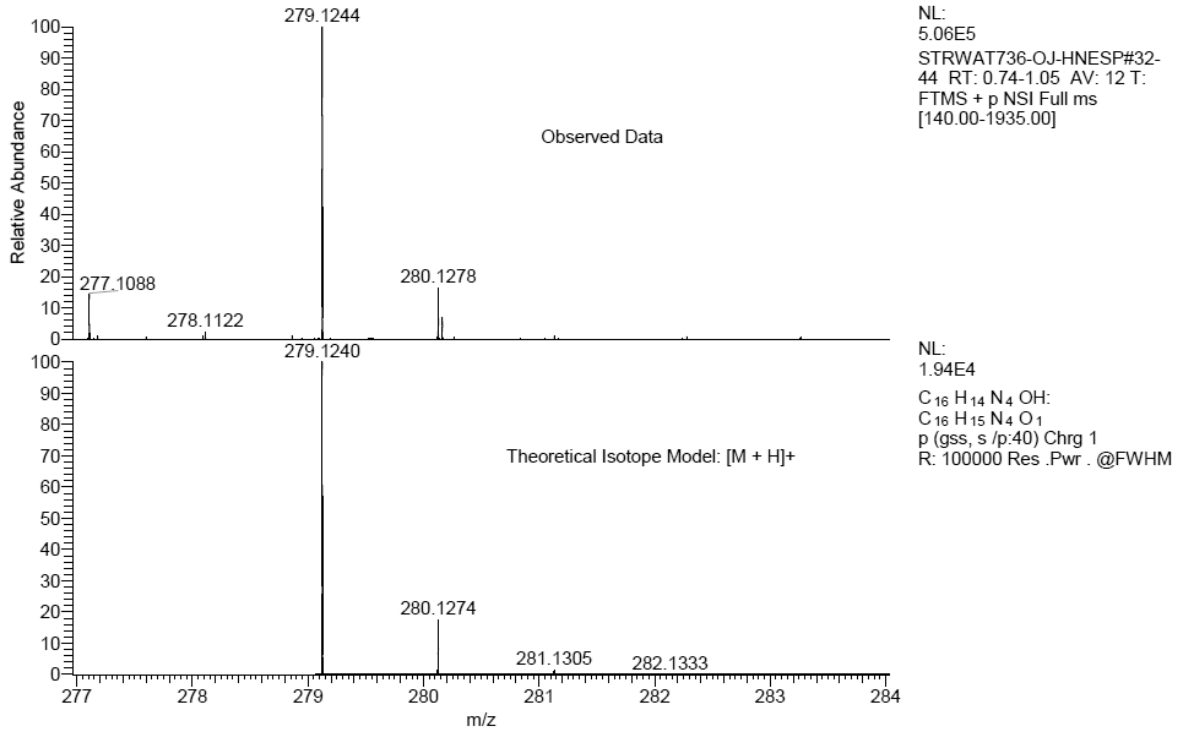




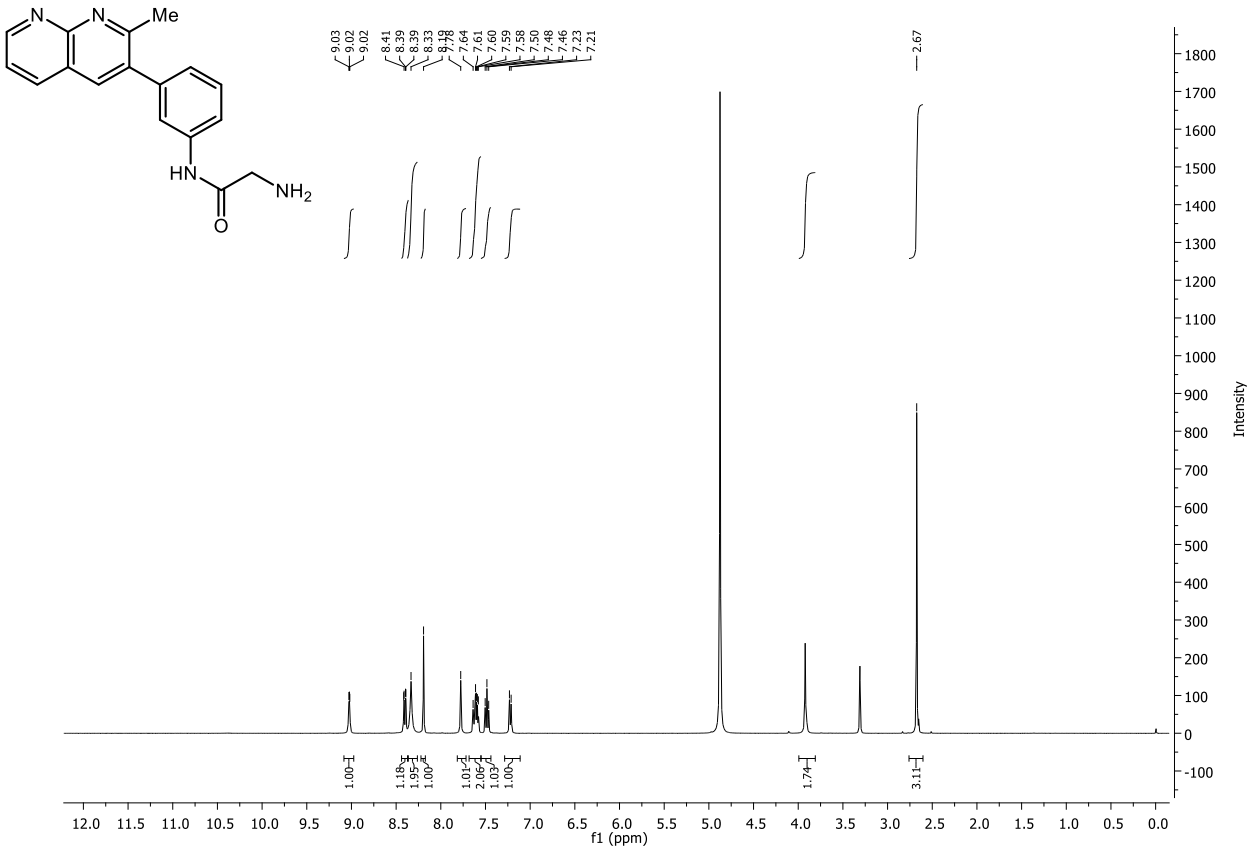
LM-N36-1 MW=278?
(DCM)/MeOH + NH4OAc
C16H14N4O

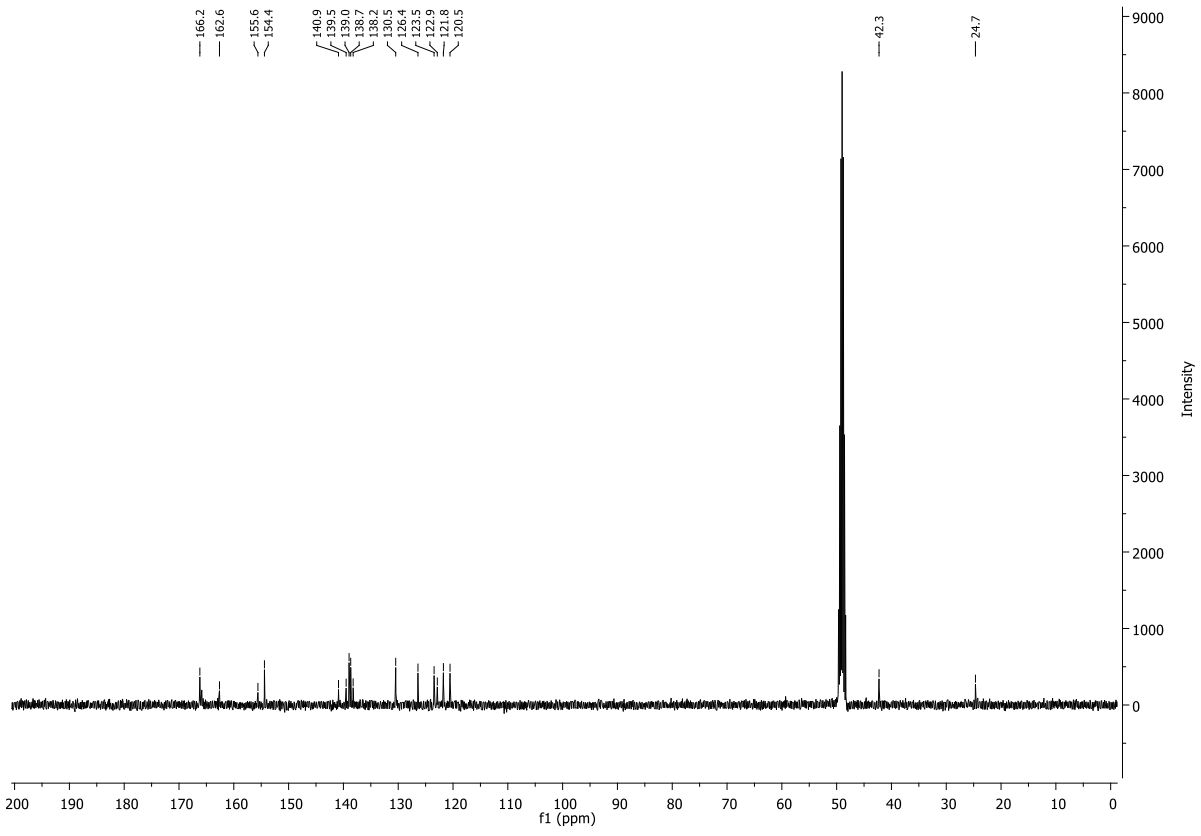
EPSRC National Facility Swansea
LTQ Orbitrap XL

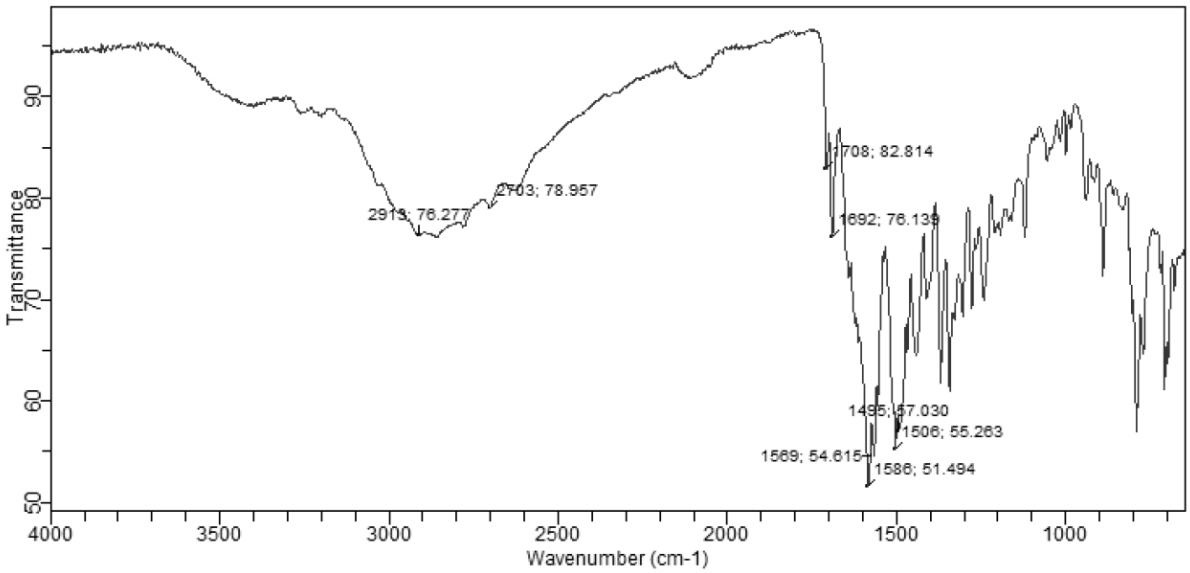
Lisa Miller
14/01/2016 09:11:41



2-Amino-*N*-(3-(2-methyl-1,8-naphthyridin-3-yl)phenyl)acetamide (2.34).



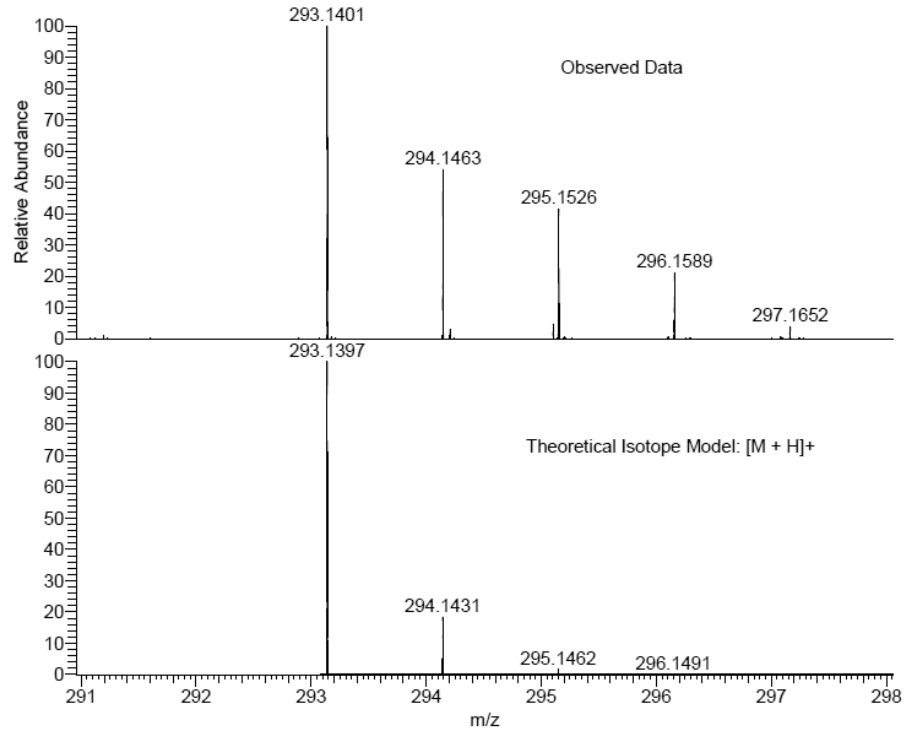




LM-N37-1 MW=292?
(DCM)/MeOH + NH4OAc
C17H16N4O

EPSRC National Facility Swansea
LTQ Orbitrap XL

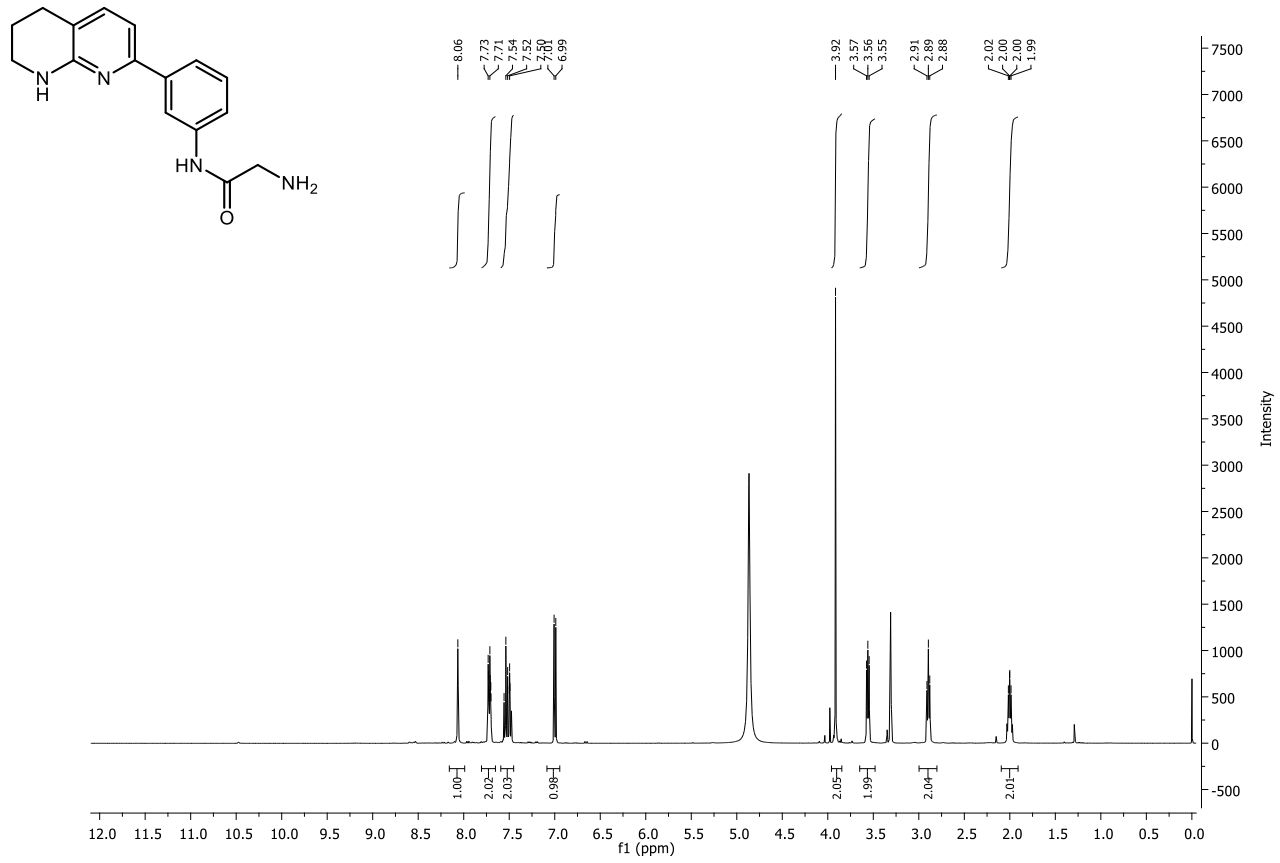
Lisa Miller
14/01/2016 09:08:44

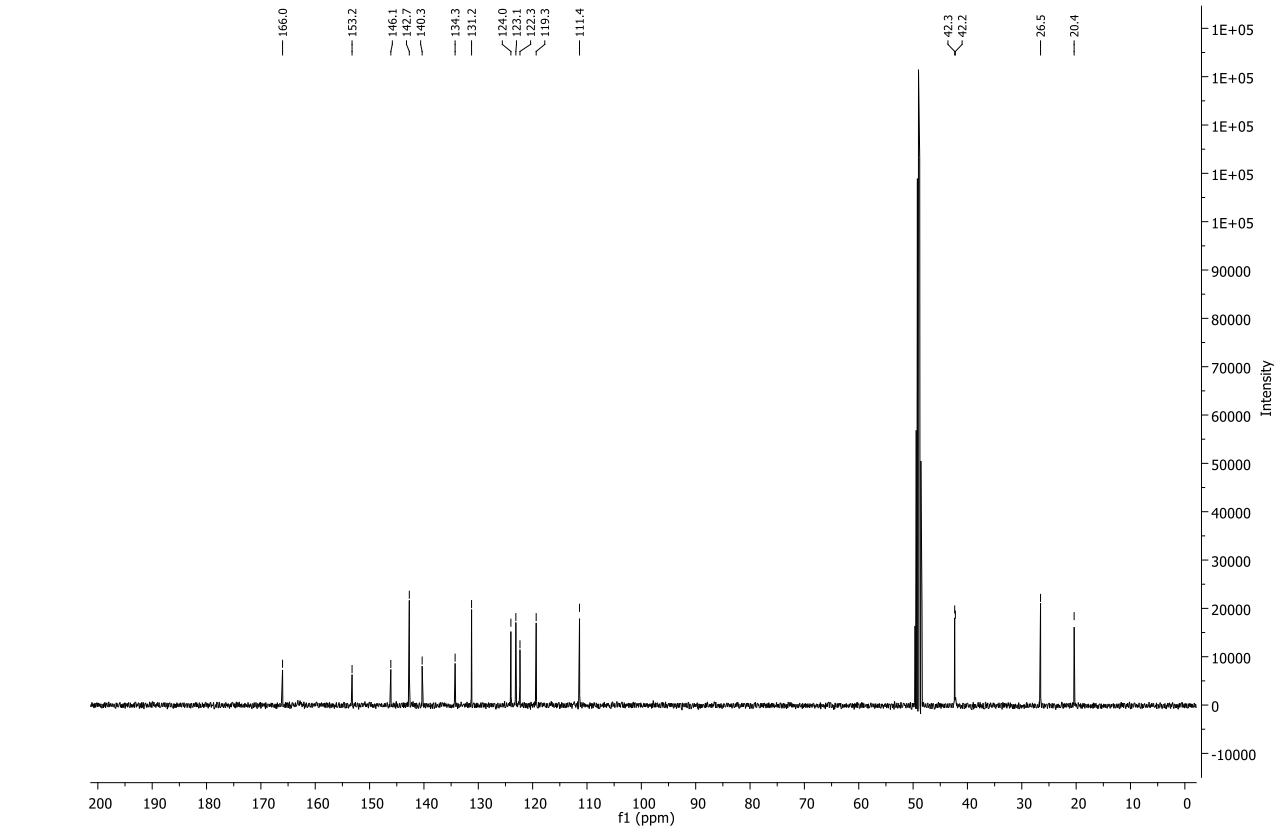


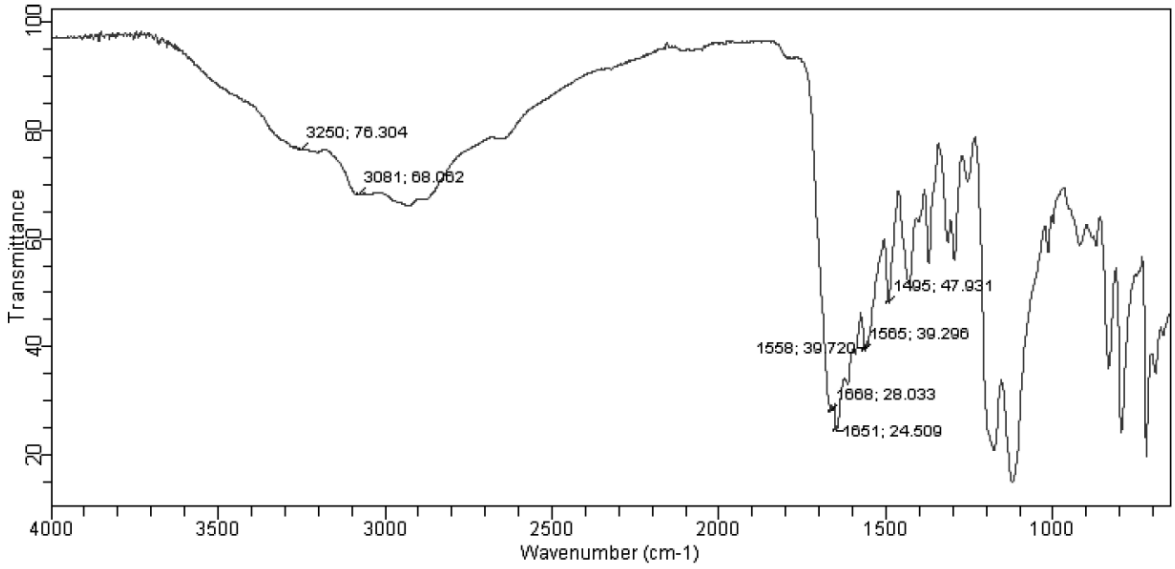
NL:
3.56E5
STRWAT735-OJ-HNESP#32-45 RT: 0.73-1.04 AV: 12 T: FTMS + p NSI Full ms [140.00-1935.00]

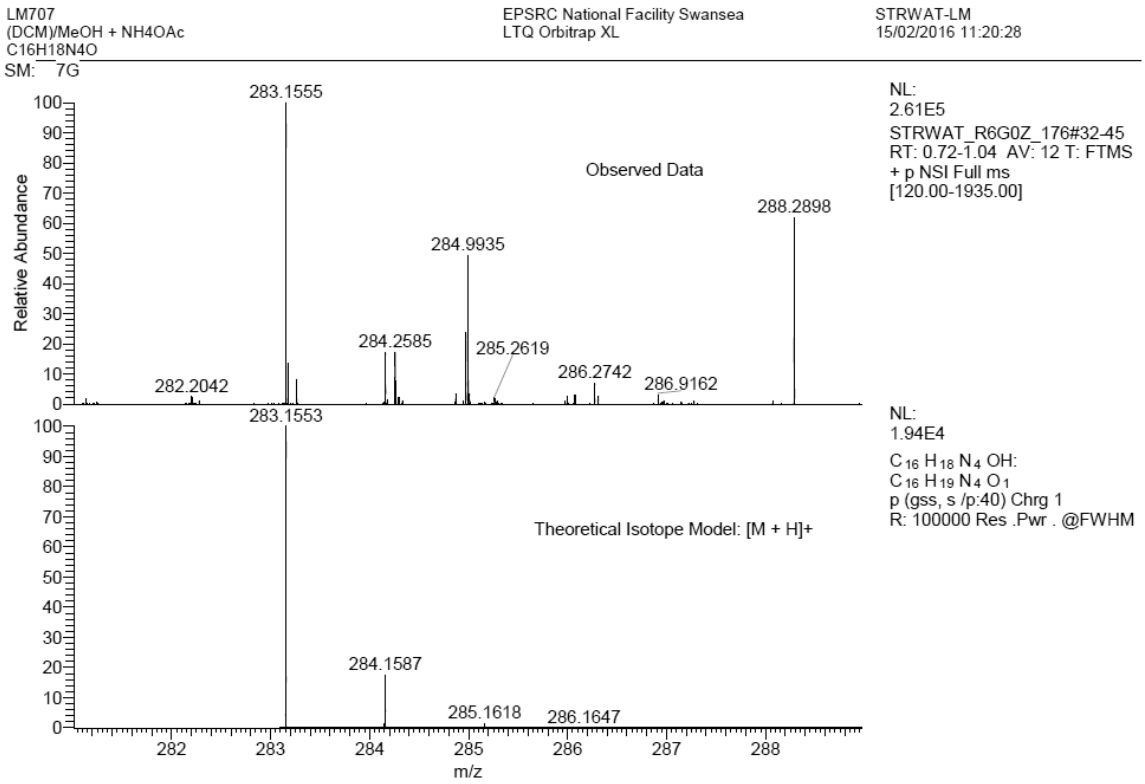
NL:
1.92E4
$C_{17}H_{16}N_4OH$:
$C_{17}H_{17}N_4O_1$
p (gss, s /p:40) Chrg 1
R: 100000 Res .Pwr . @FWHM

2-Amino-*N*-(3-(5,6,7,8-tetrahydro-1,8-naphthyridin-2-yl)phenyl)acetamide (2.35).

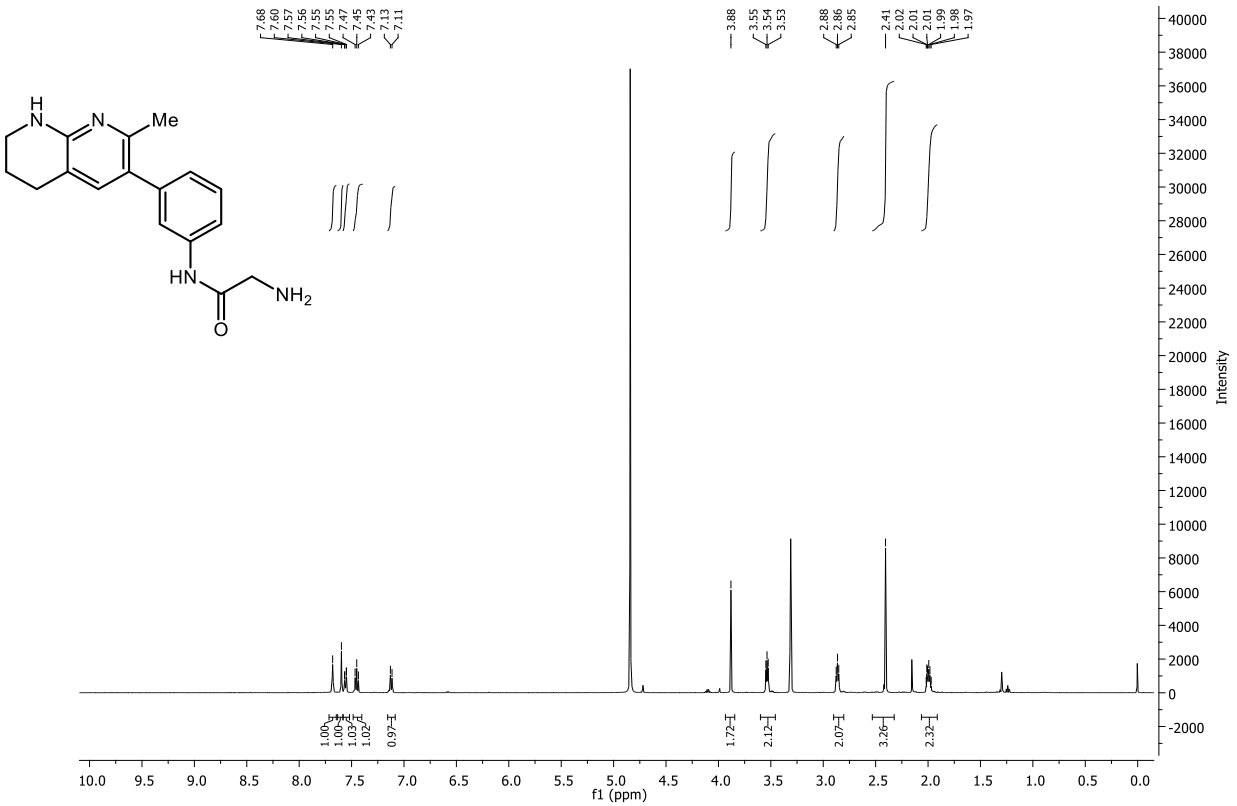


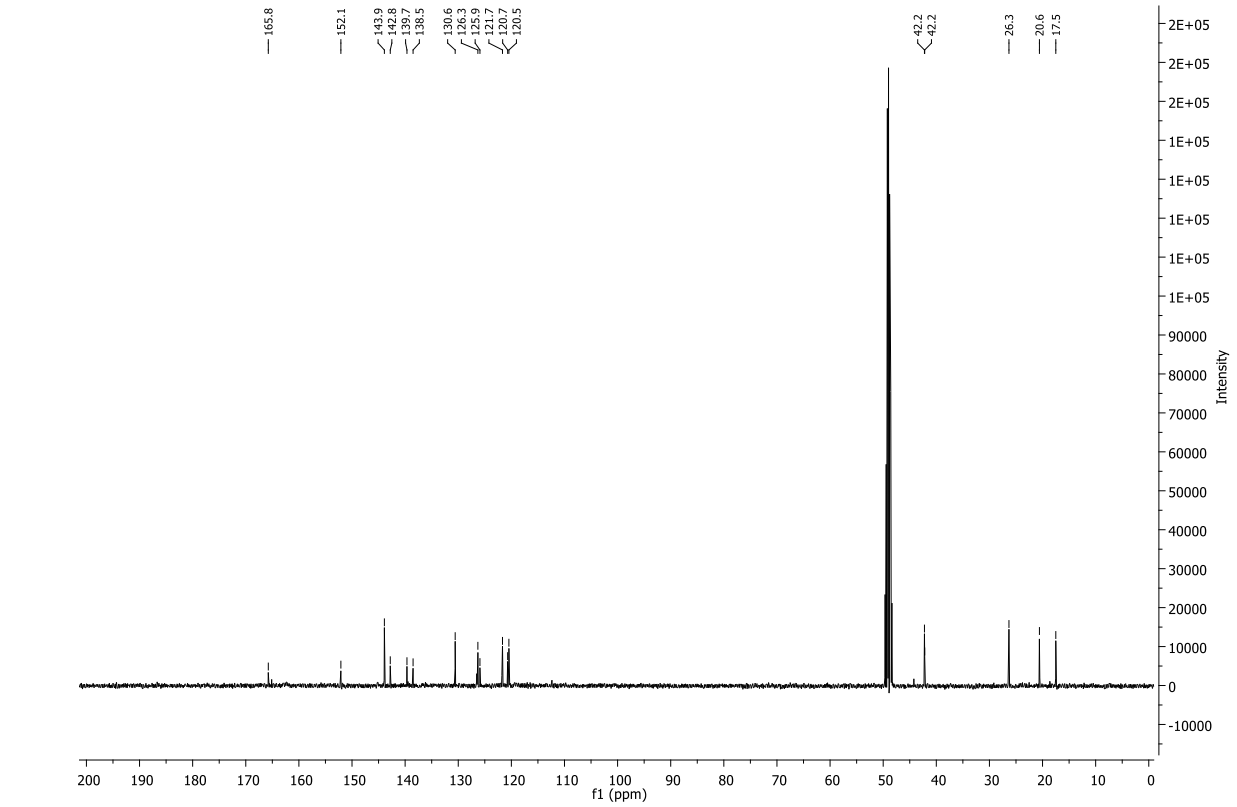


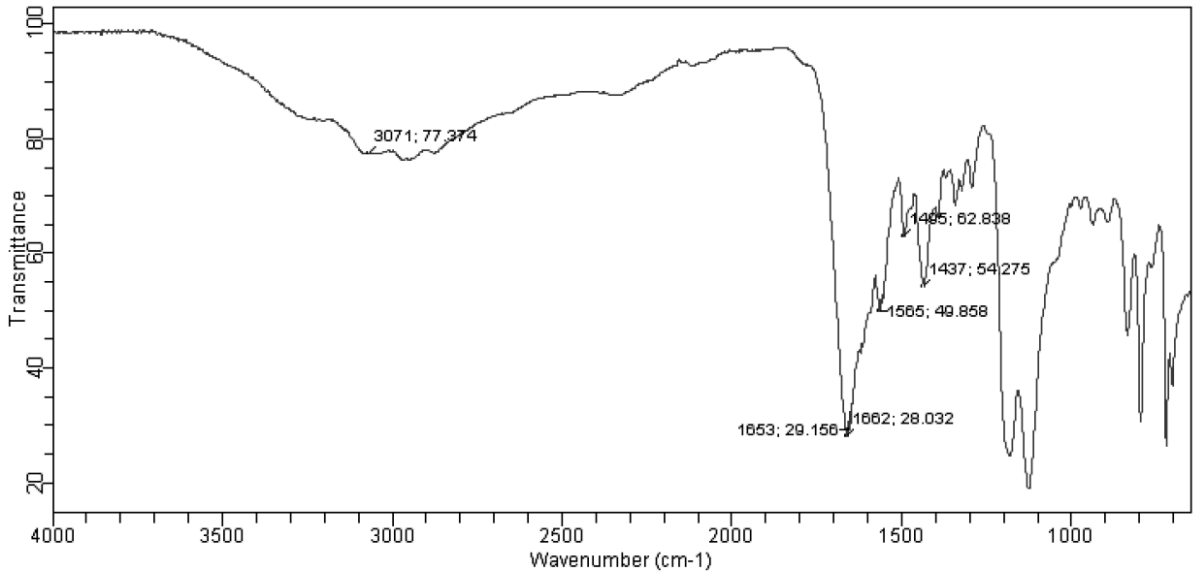

Transmittance
Wavenumber (cm-1)
3250; 76.304
3081; 68.062
1495; 47.931
1565; 39.296
1558; 39.720
1668; 28.033
1651; 24.509

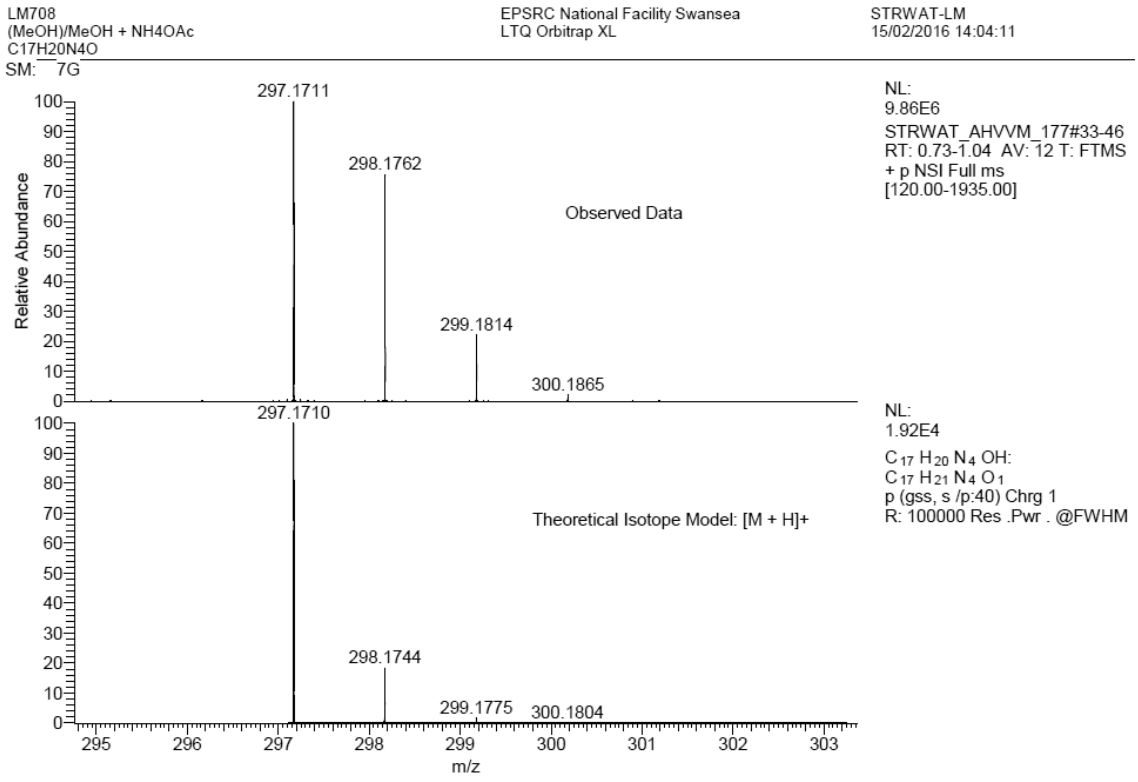

LM707
(DCM)/MeOH + NH4OAc
C16H18N4O
SM: 7G
EPSRC National Facility Swansea
LTQ Orbitrap XL
STRWAT-LM
15/02/2016 11:20:28
Observed Data
283.1555
288.2898
284.9935
284.2585
285.2619
286.2742
286.9162
282.2042
NL:
2.61E5
STRWAT_R6G0Z_176#32-45
RT: 0.72-1.04 AV: 12 T: FTMS
+ p NSI Full ms
[120.00-1935.00]
Theoretical Isotope Model: [M + H]+
283.1553
284.1587
285.1618
286.1647
NL:
1.94E4
C16 H18 N4 OH:
C16 H19 N4 O1
p (gss, s /p:40) Chrg 1
R: 100000 Res .Pwr . @FWHM
Relative Abundance
m/z

2-Amino-*N*-(3-(2-methyl-5,6,7,8-tetrahydro-1,8-naphthyridin-3-yl)phenyl) acetamide (2.36).

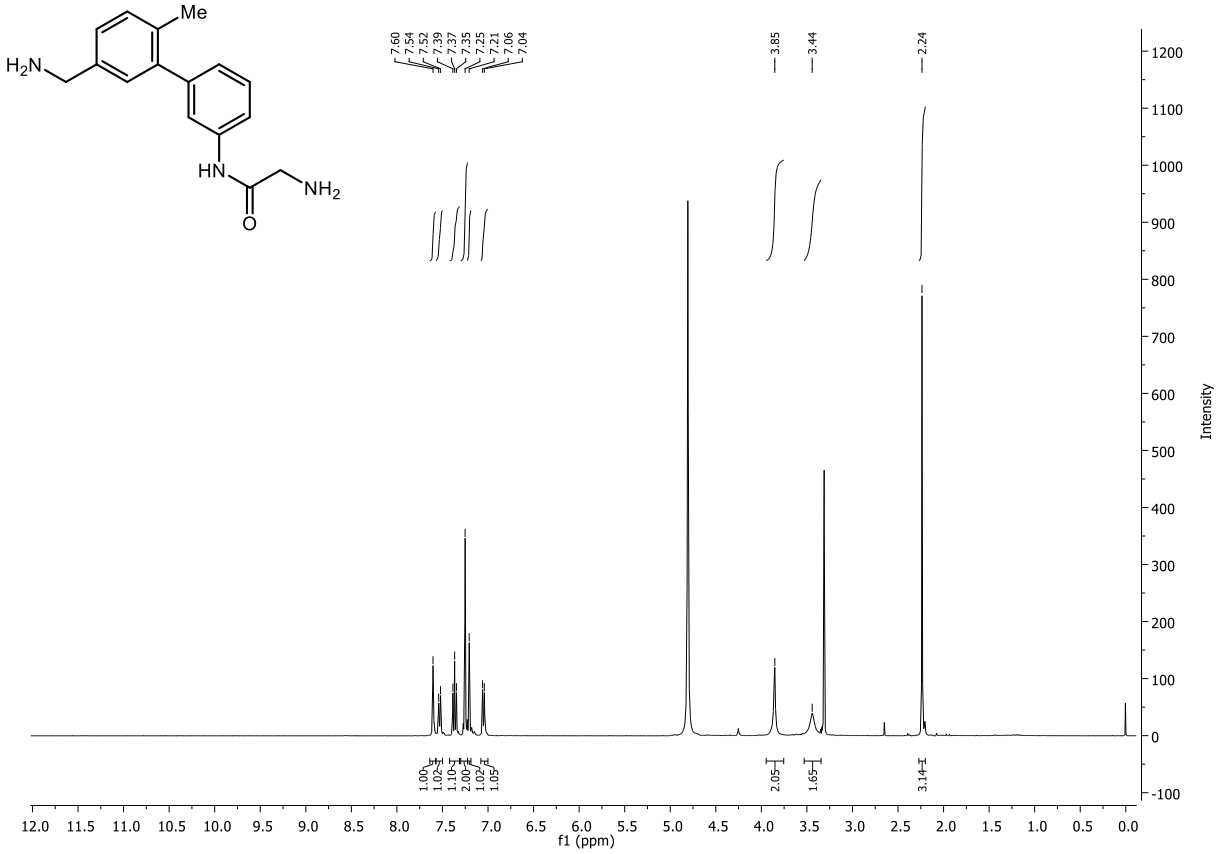


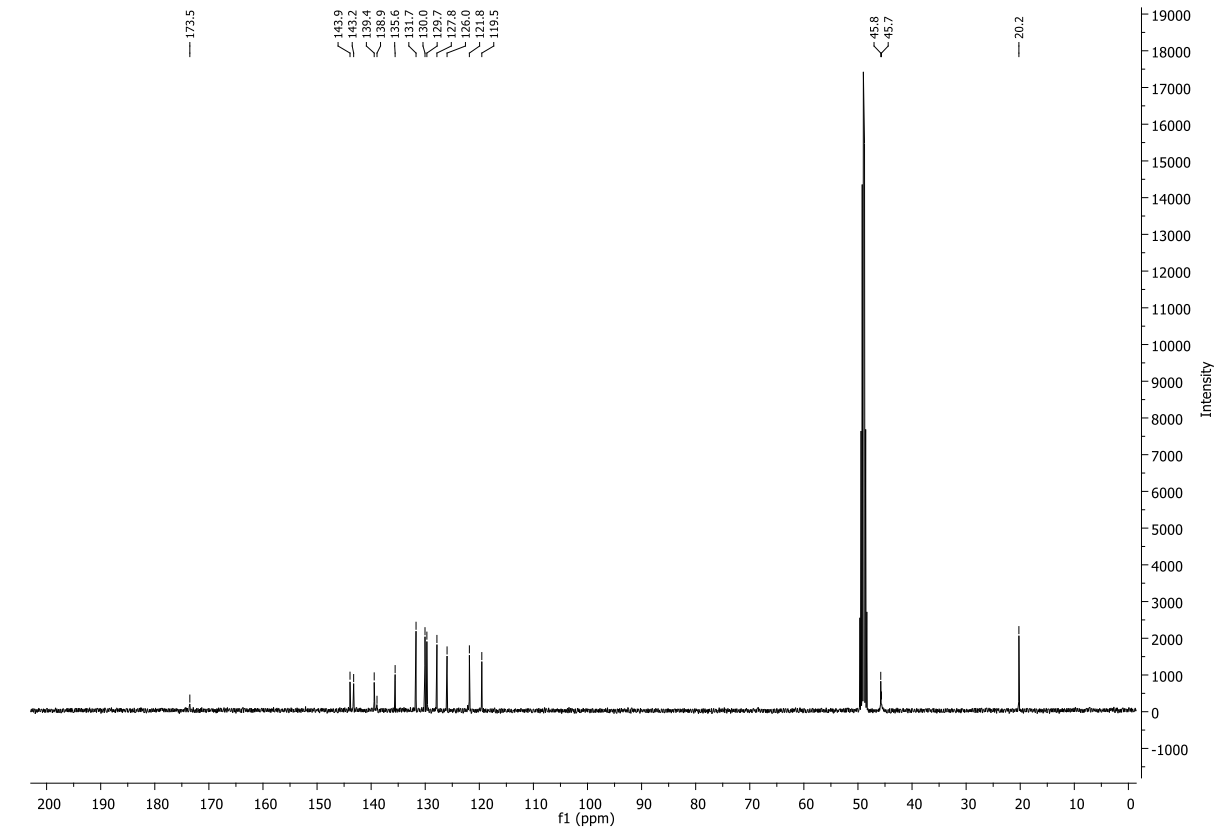


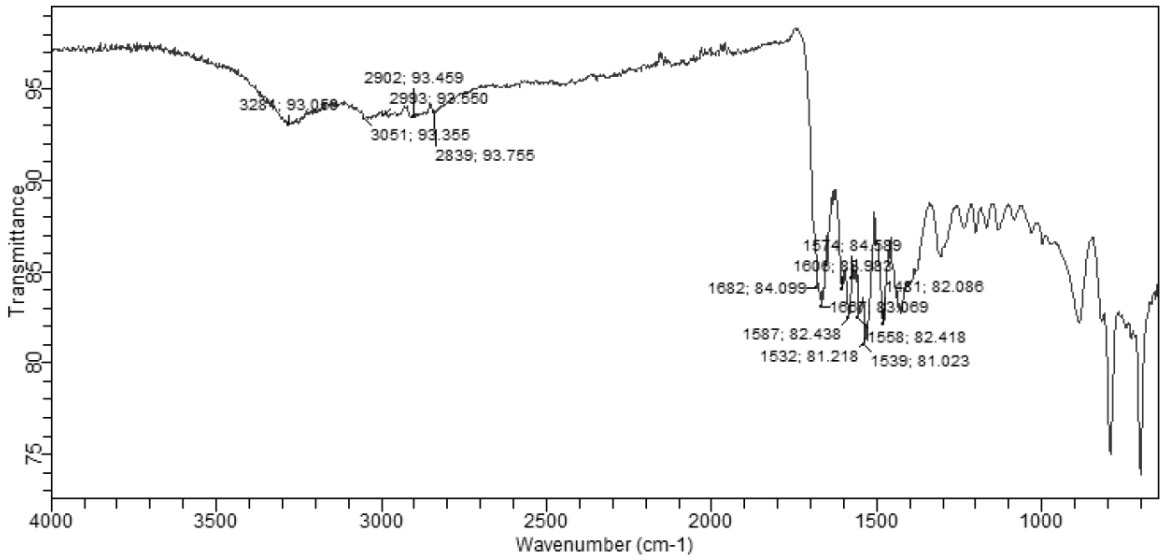

Transmittance
Wavenumber (cm-1)
3071; 77.374
1485; 62.838
1437; 54.275
1565; 49.858
1653; 29.156
1662; 28.032

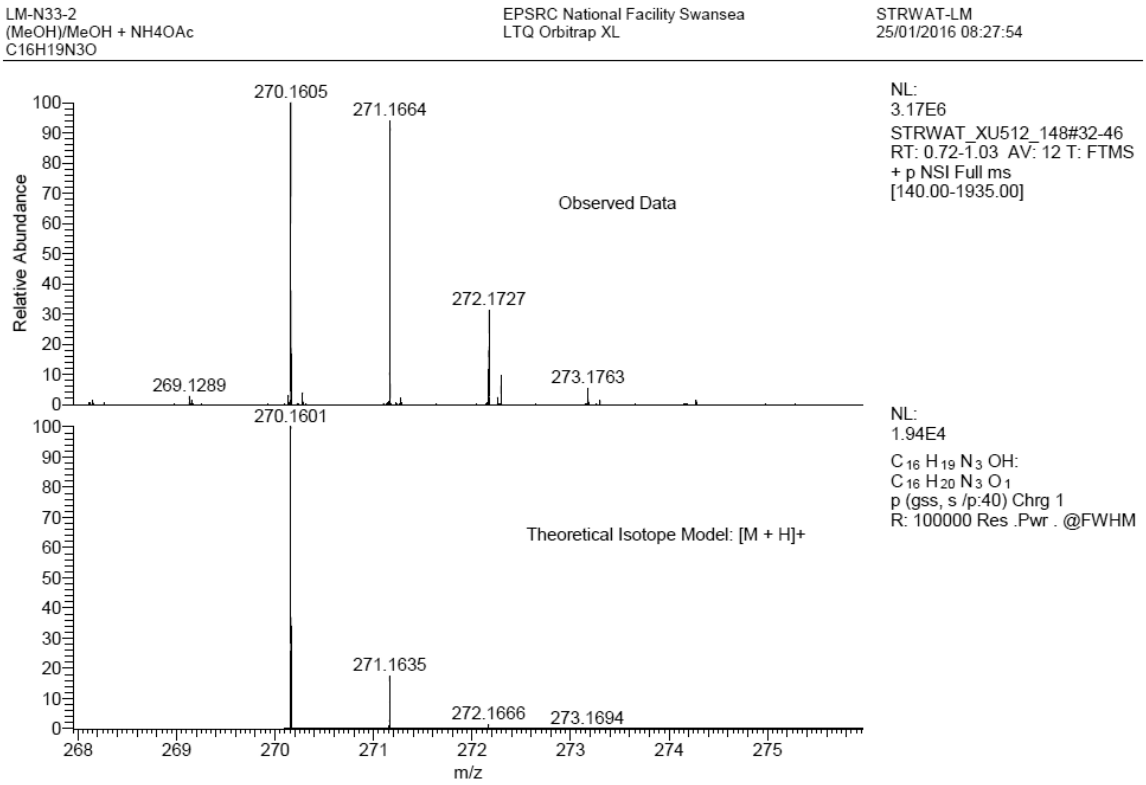

LM708
(MeOH)/MeOH + NH4OAc
C17H20N4O
SM: 7G
EPSRC National Facility Swansea
LTQ Orbitrap XL
STRWAT-LM
15/02/2016 14:04:11
Relative Abundance
m/z
297.1711
298.1762
299.1814
300.1865
Observed Data
NL:
9.86E6
STRWAT_AHVVM_177#33-46
RT: 0.73-1.04 AV: 12 T: FTMS
+ p NSI Full ms
[120.00-1935.00]
297.1710
298.1744
299.1775
300.1804
Theoretical Isotope Model: [M + H]+
NL:
1.92E4
C17 H20 N4 OH:
C17 H21 N4 O1
p (gss, s /p:40) Chrg 1
R: 100000 Res .Pwr . @FWHM

2-Amino-*N*-(5'-(aminomethyl)-2'-methyl-[1,1'-biphenyl]-3-yl)acetamide (2.37).

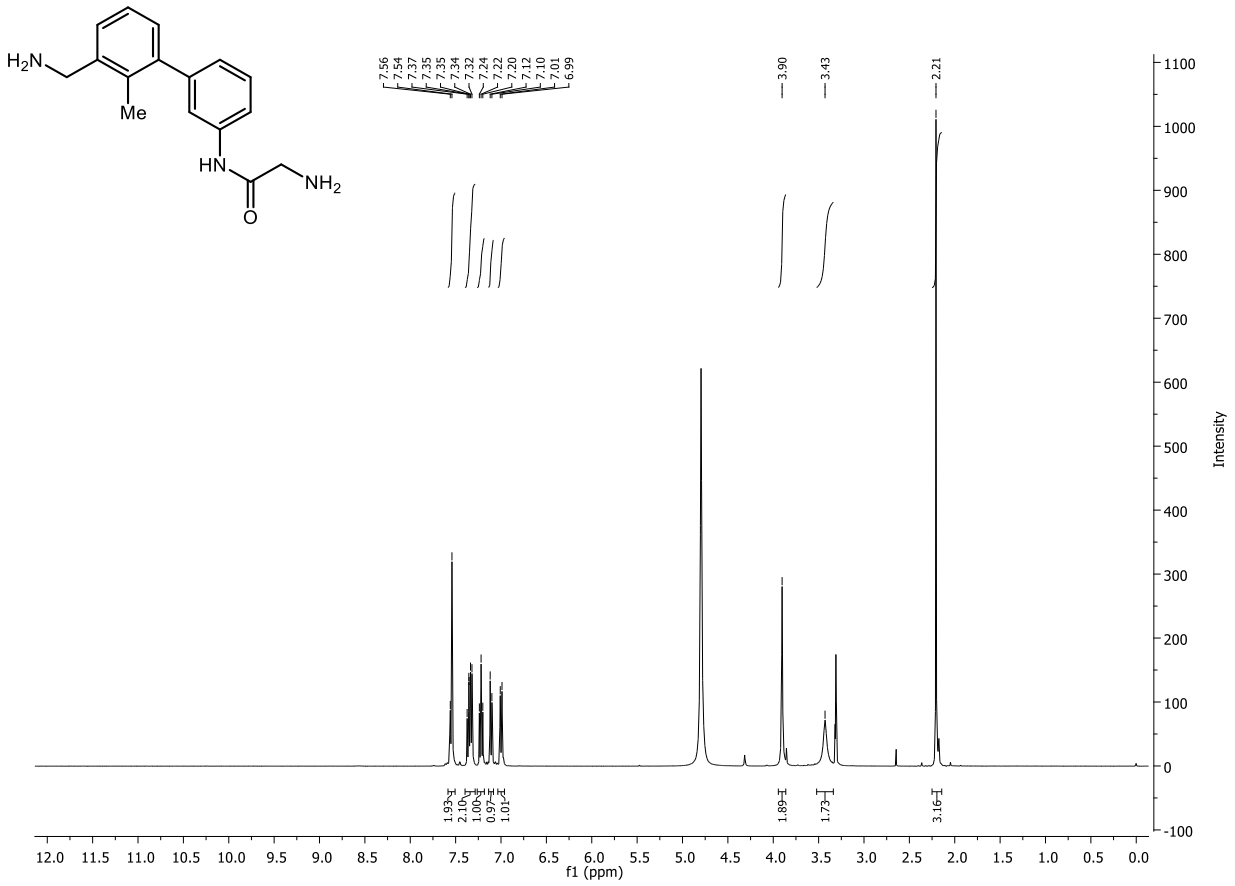


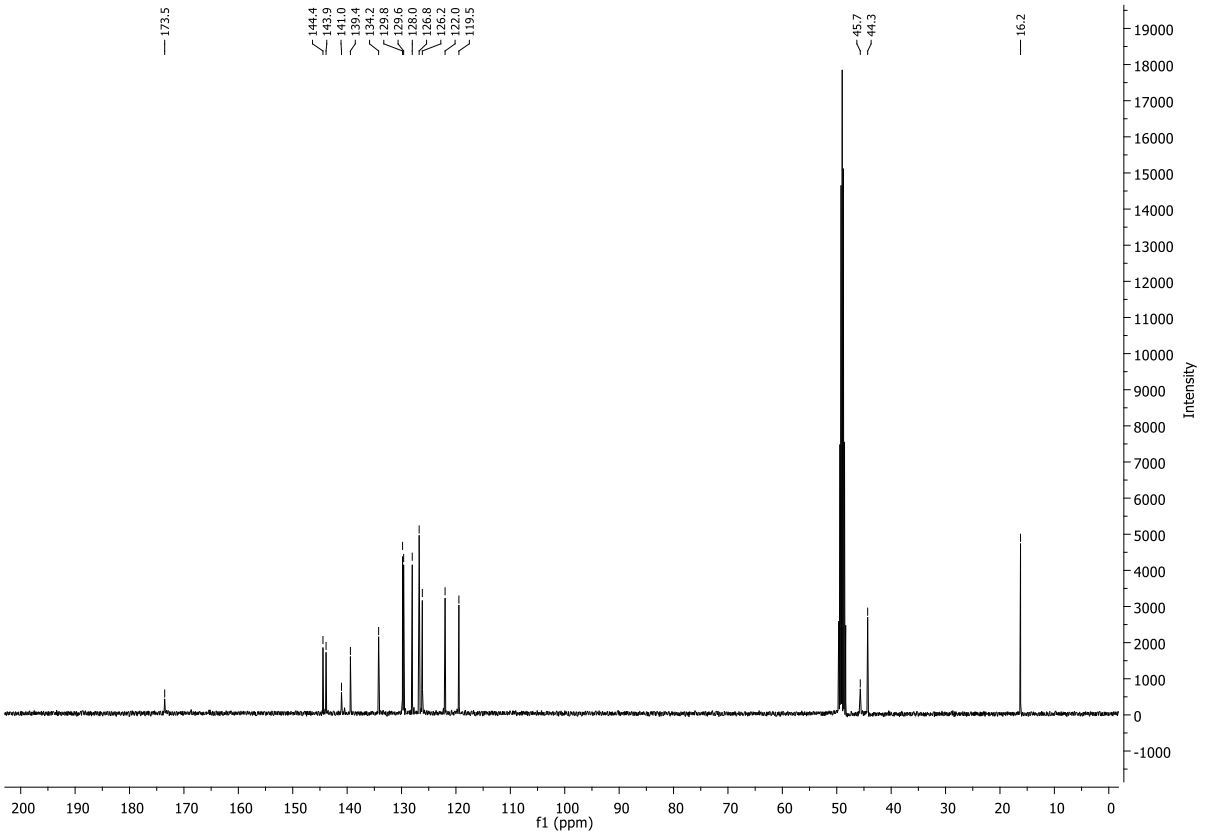


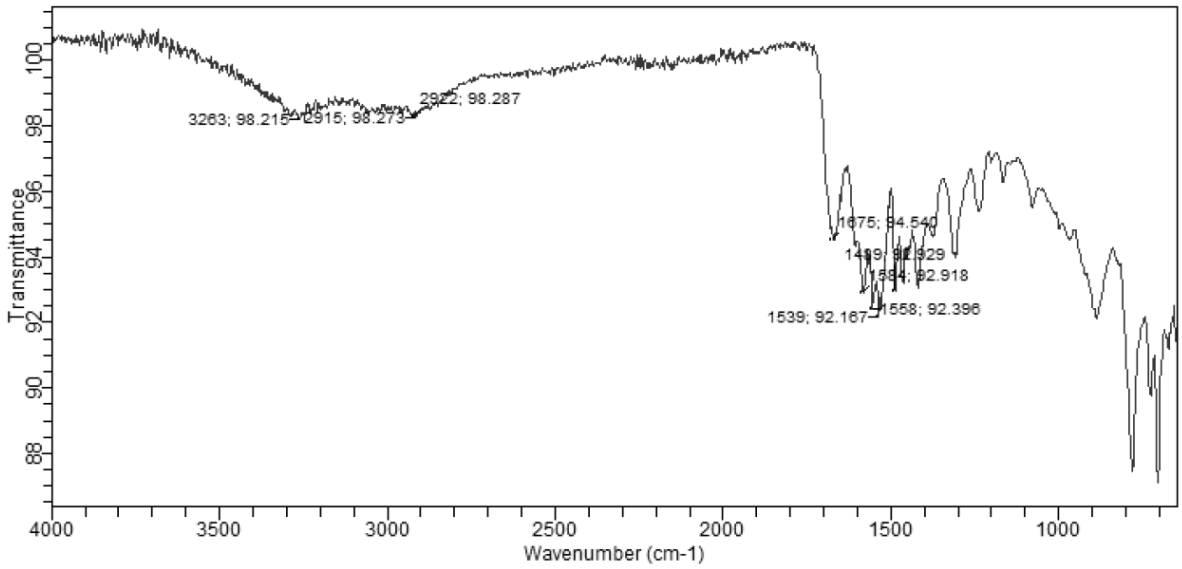

Transmittance
Wavenumber (cm-1)
2902; 93.459
2993; 92.550
3284; 93.058
3051; 93.355
2839; 93.755
1574; 84.589
1606; 83.992
1682; 84.099
1451; 82.086
1587; 82.438
1558; 82.418
1532; 81.218
1539; 81.023

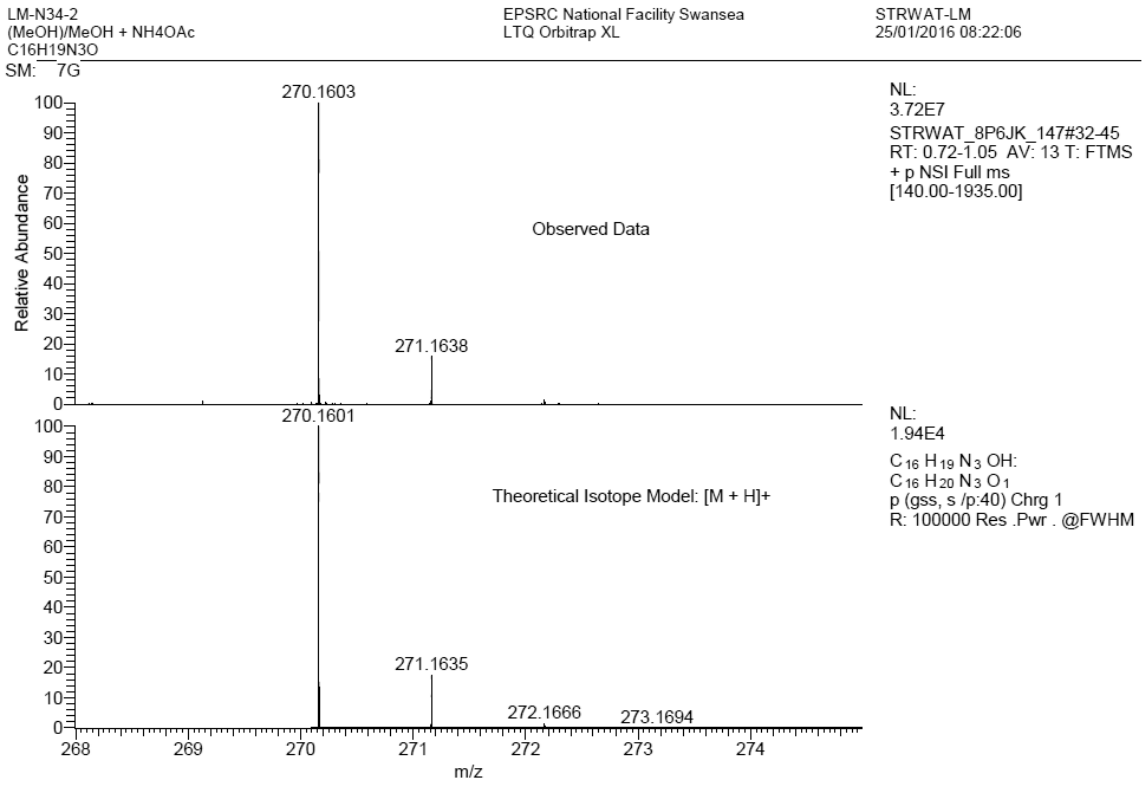

LM-N33-2
(MeOH)/MeOH + NH4OAc
C16H19N3O
EPSRC National Facility Swansea
LTQ Orbitrap XL
STRWAT-LM
25/01/2016 08:27:54
Relative Abundance
m/z
270.1605
271.1664
272.1727
269.1289
273.1763
Observed Data
NL:
3.17E6
STRWAT_XU512_148#32-46
RT: 0.72-1.03 AV: 12 T: FTMS
+ p NSI Full ms
[140.00-1935.00]
270.1601
271.1635
272.1666
273.1694
Theoretical Isotope Model: [M + H]+
NL:
1.94E4
C16 H19 N3 OH:
C16 H20 N3 O1
p (gss, s /p:40) Chrg 1
R: 100000 Res .Pwr . @FWHM

2-Amino-*N*-(3'-(aminomethyl)-2'-methyl-[1,1'-biphenyl]-3-yl)acetamide (2.38).

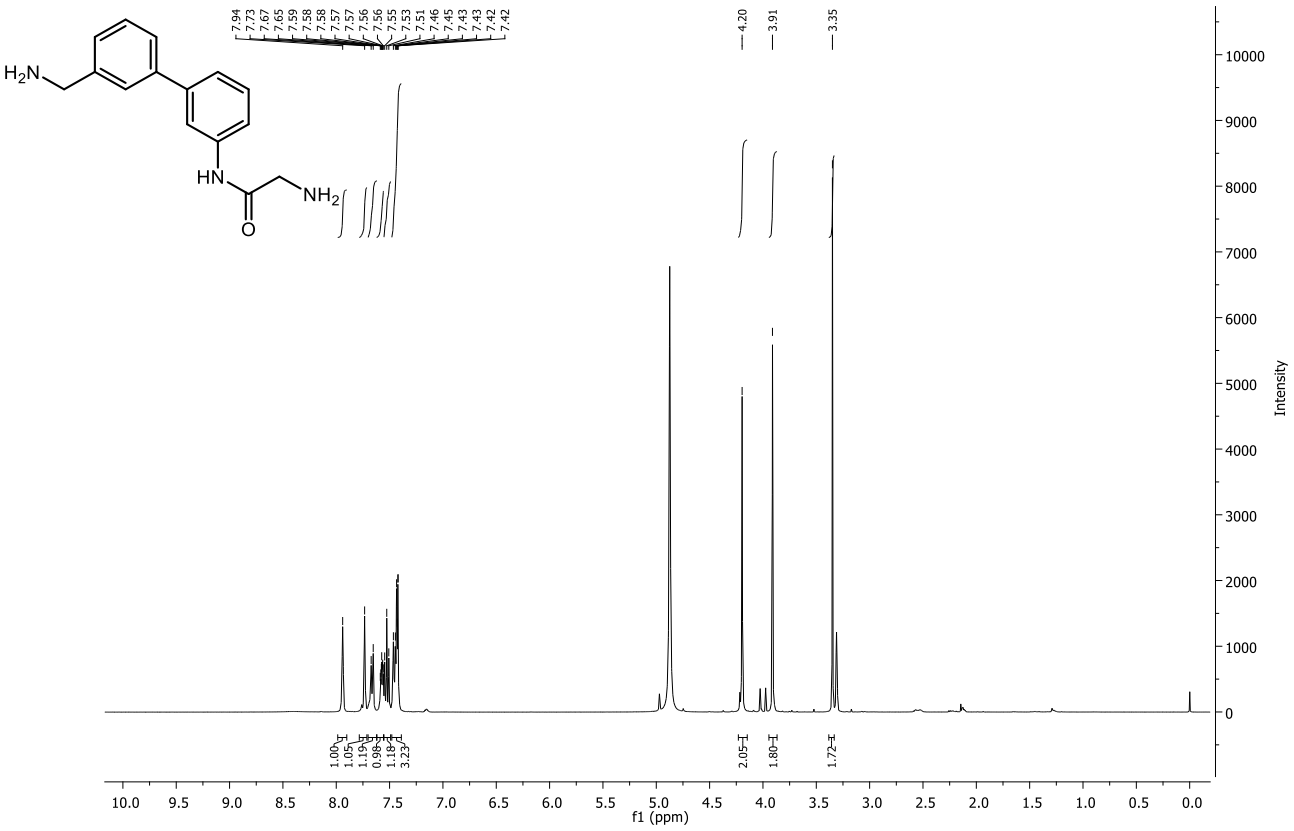


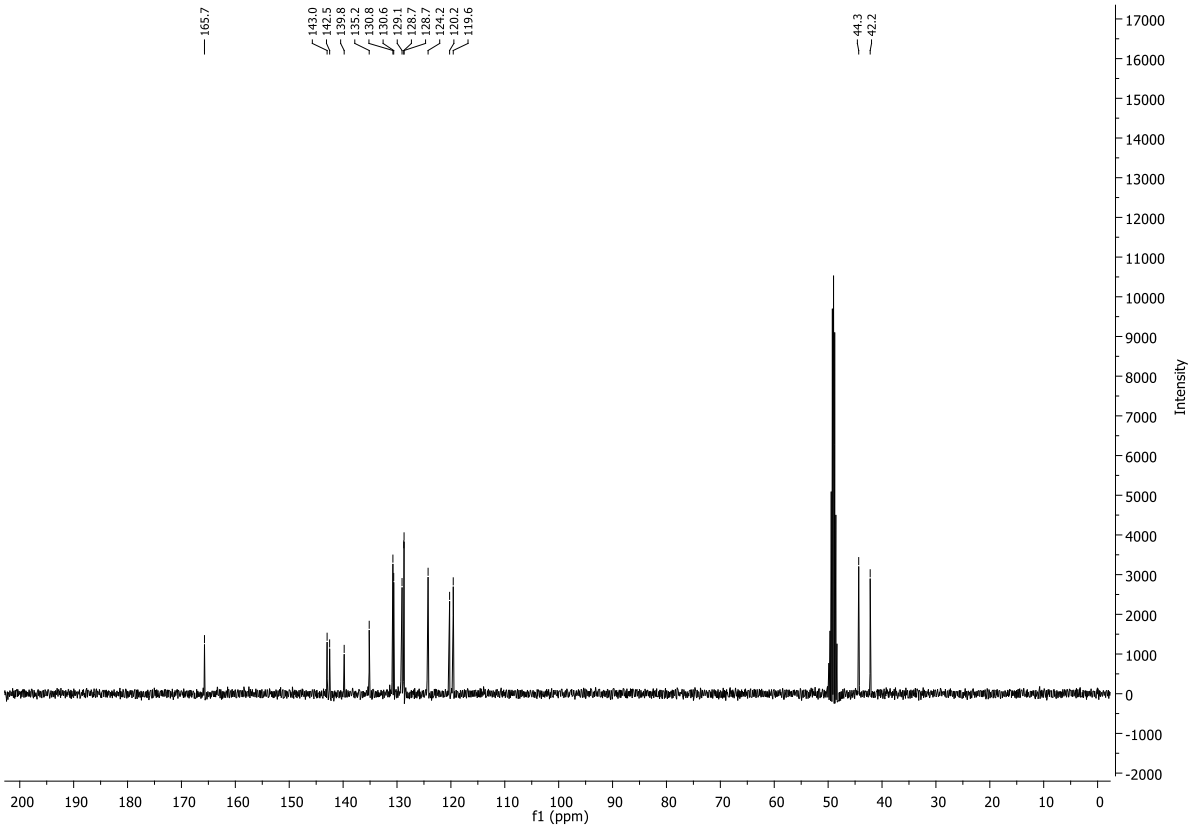


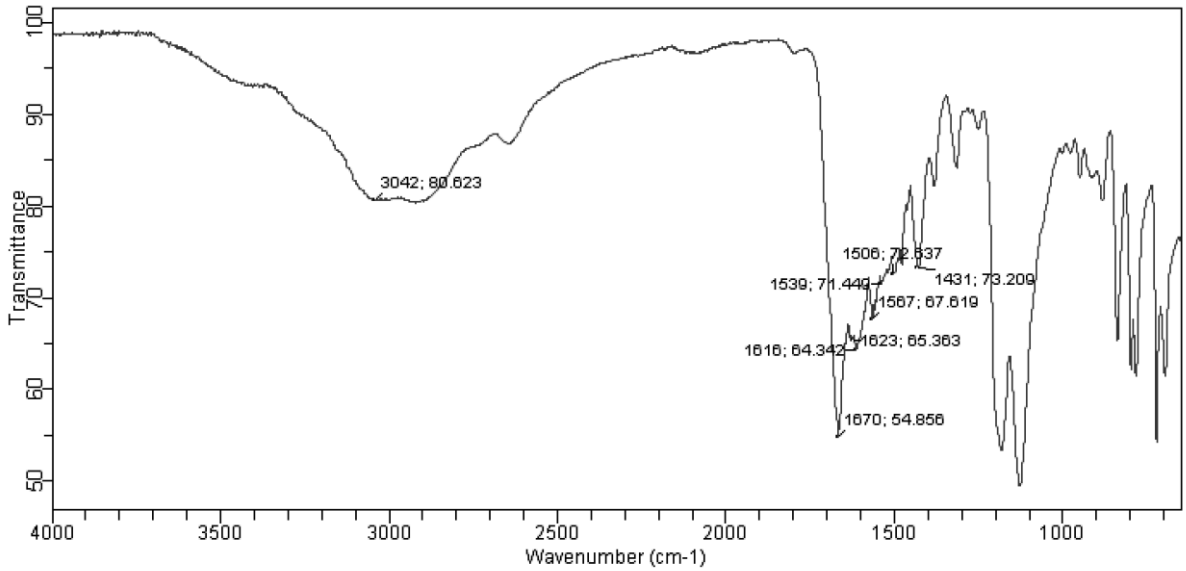

Transmittance
Wavenumber (cm-1)
3263; 98.215
2915; 98.273
2922; 98.287
1675; 94.540
1539; 92.167
1558; 92.396
4000
3500
3000
2500
2000
1500
1000

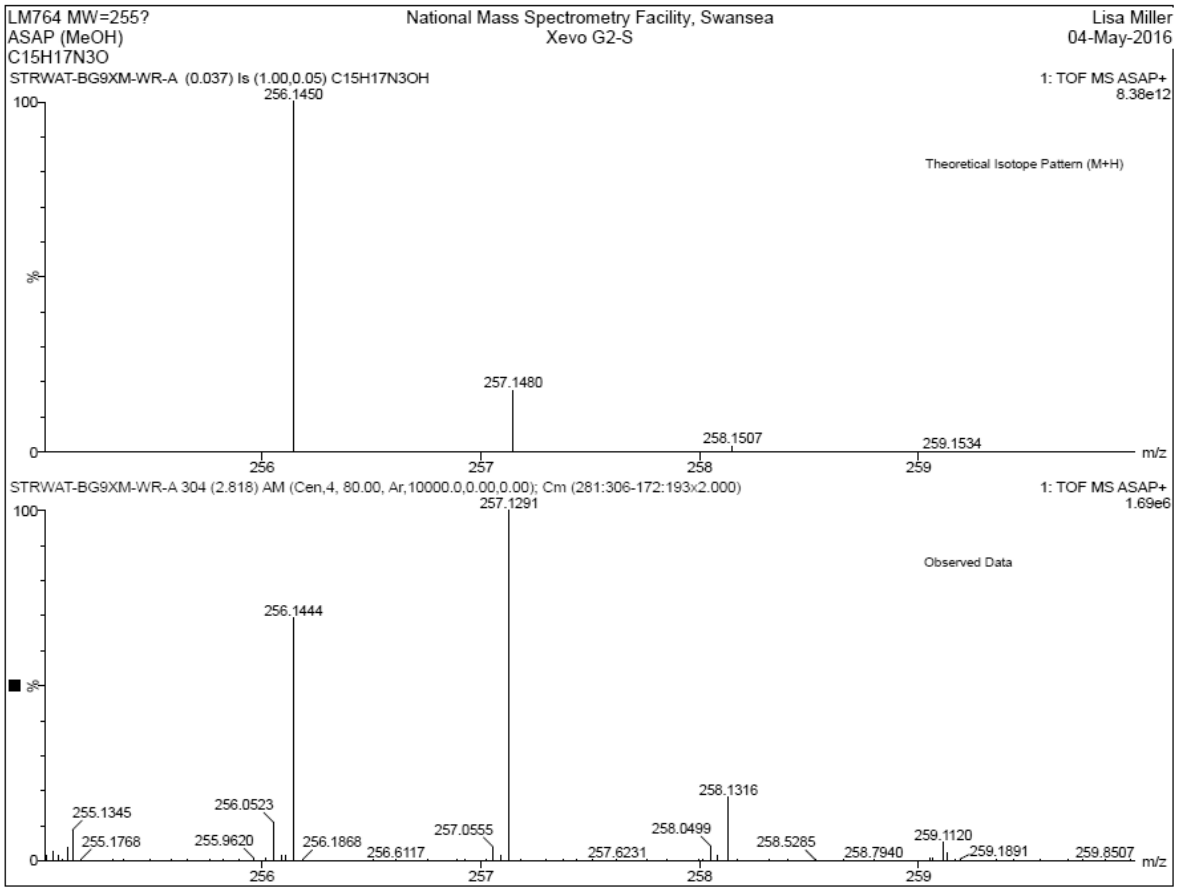

LM-N34-2
(MeOH)/MeOH + NH4OAc
C16H19N3O
SM: 7G
EPSRC National Facility Swansea
LTQ Orbitrap XL
STRWAT-LM
25/01/2016 08:22:06
270.1603
271.1638
Observed Data
NL:
3.72E7
STRWAT_8P6JK_147#32-45
RT: 0.72-1.05 AV: 13 T: FTMS
+ p NSI Full ms
[140.00-1935.00]
270.1601
271.1635
272.1666
273.1694
Theoretical Isotope Model: [M + H]+
NL:
1.94E4
C16 H19 N3 OH:
C16 H20 N3 O1
p (gss, s /p:40) Chrg 1
R: 100000 Res .Pwr . @FWHM
Relative Abundance
m/z

2-Amino-*N*-(3'-(aminomethyl)-[1,1'-biphenyl]-3-yl)acetamide (2.39).

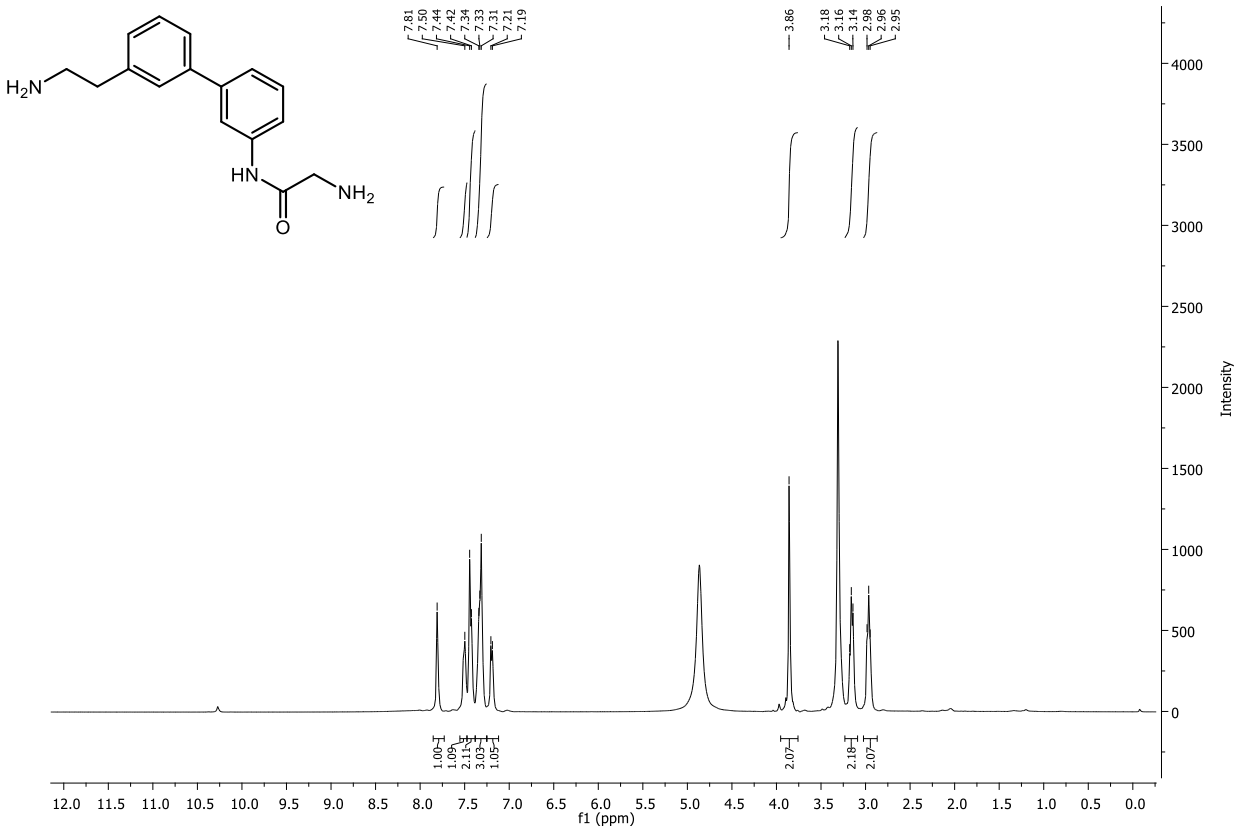


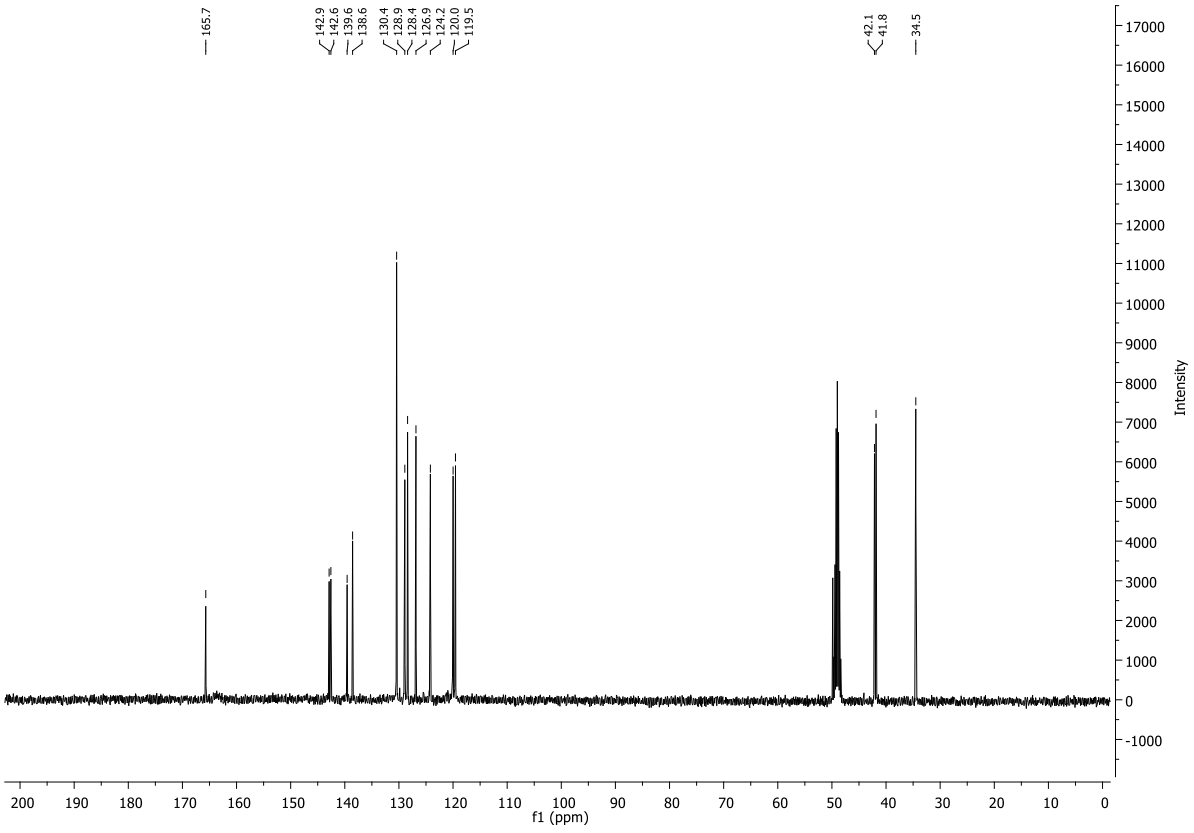


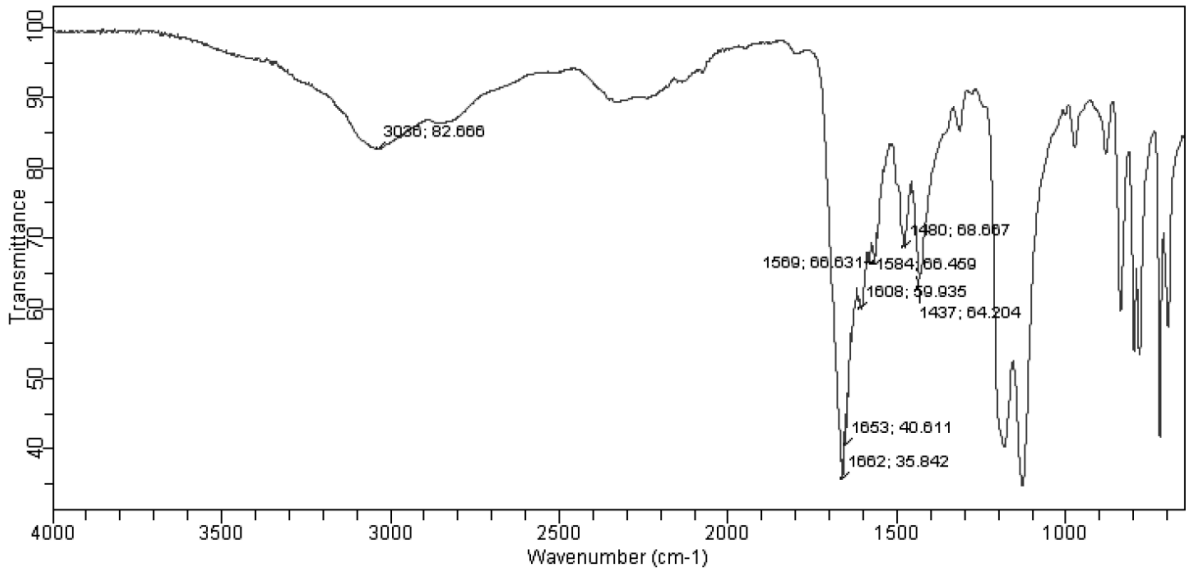

Transmittance
Wavenumber (cm-1)
3042; 80.623
1506; 72.537
1539; 71.449
1431; 73.209
1567; 67.619
1616; 64.342
1623; 65.363
1670; 54.856

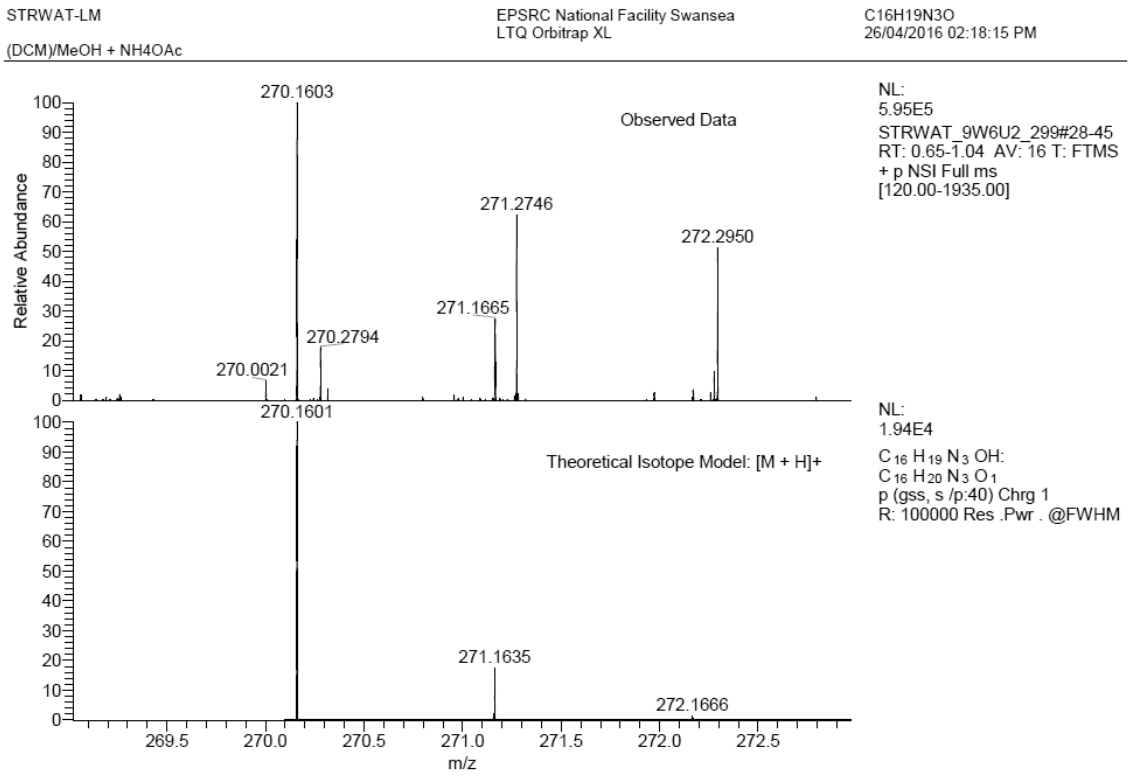

LM764 MW=255?
ASAP (MeOH)
C15H17N3O
National Mass Spectrometry Facility, Swansea
Xevo G2-S
Lisa Miller
04-May-2016
STRWAT-BG9XM-WR-A (0.037) Is (1.00,0.05) C15H17N3OH
1: TOF MS ASAP+
8.38e12
Theoretical Isotope Pattern (M+H)
256.1450
257.1480
258.1507
259.1534
m/z
STRWAT-BG9XM-WR-A 304 (2.818) AM (Cen,4, 80.00, Ar,10000.0,0.00,0.00); Cm (281:306-172:193x2.000)
1: TOF MS ASAP+
1.69e6
Observed Data
257.1291
256.1444
258.1316
256.0523
255.1345
255.1768
255.9620
256.1868
256.6117
257.0555
257.6231
258.0499
258.5285
258.7940
259.1120
259.1891
259.8507
m/z

2-Amino-*N*-(3'-(2-aminoethyl)-[1,1'-biphenyl]-3-yl)acetamide (2.40).

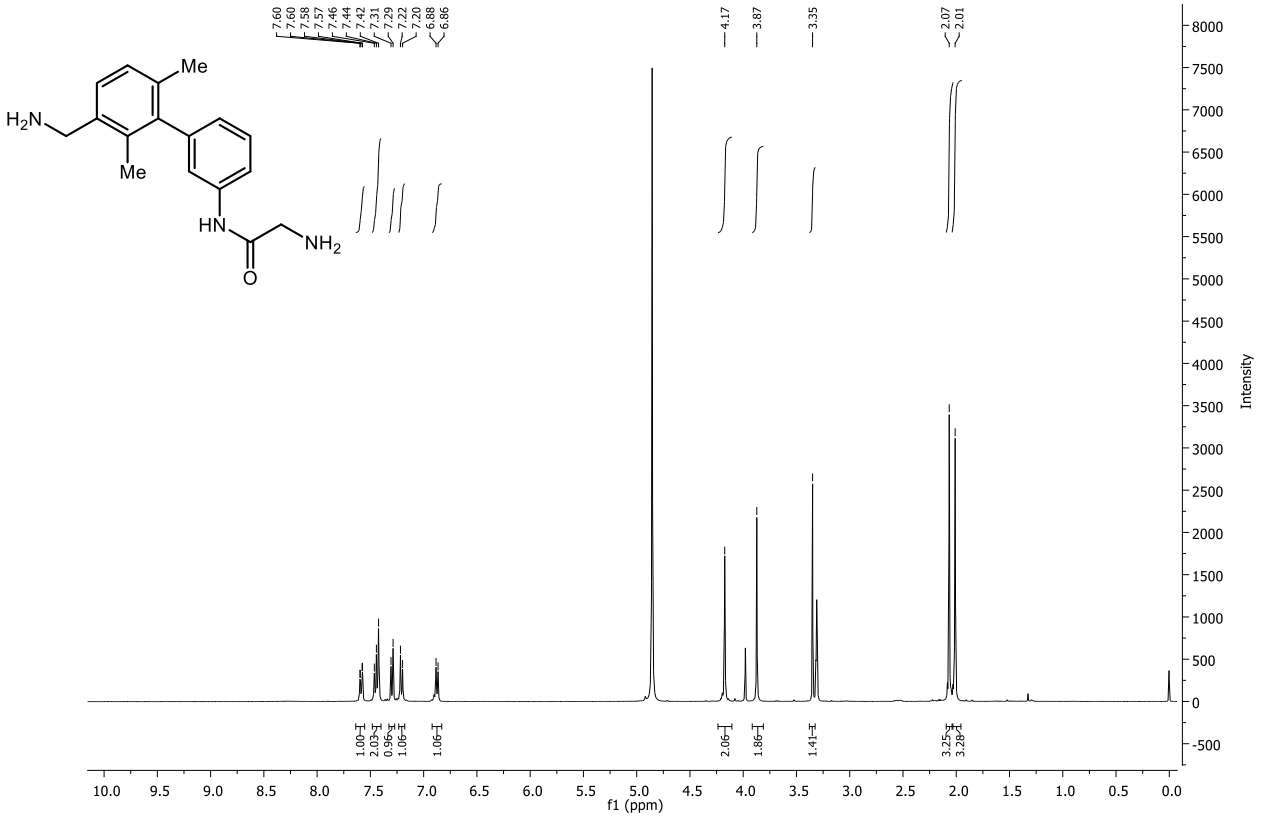


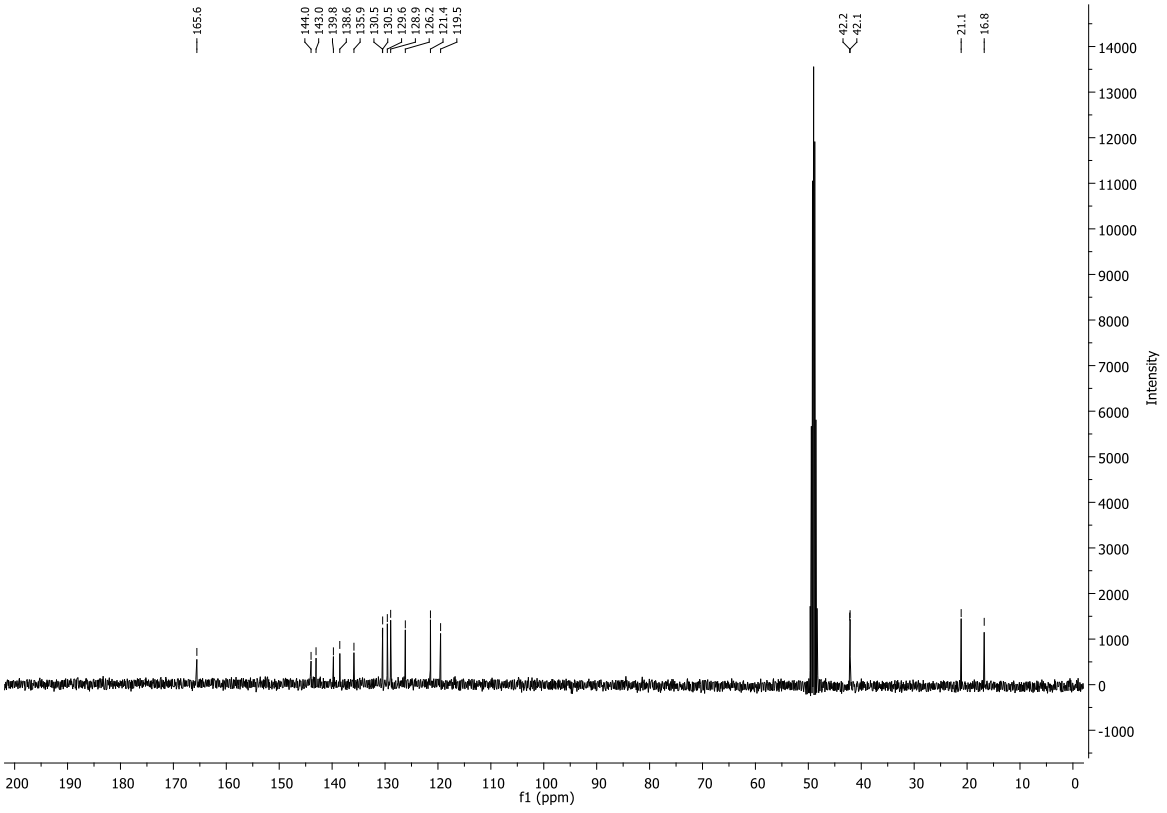


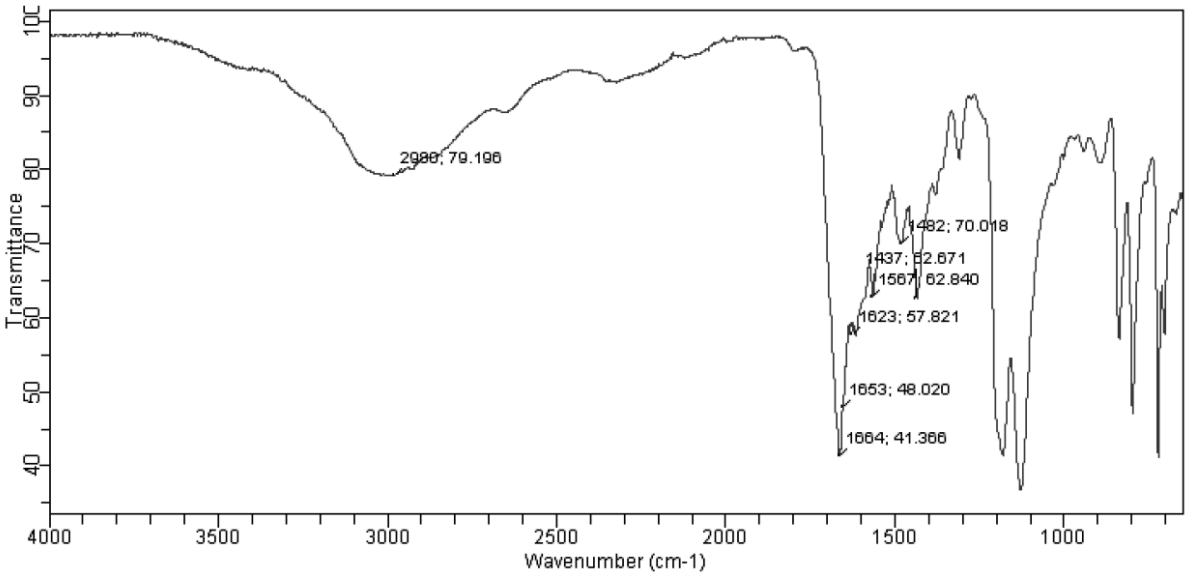

Transmittance
Wavenumber (cm-1)
3036; 82.666
1480; 68.667
1569; 66.631
1584; 66.459
1608; 59.935
1437; 64.204
1653; 40.611
1662; 35.842

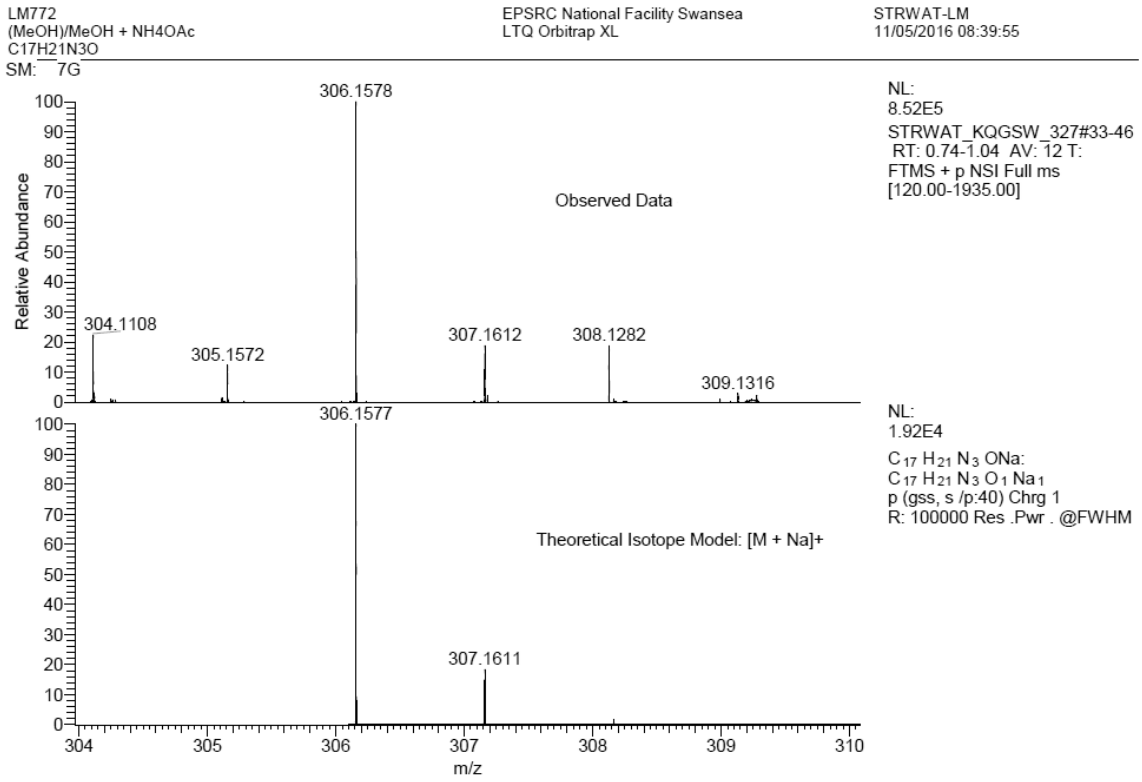

STRWAT-LM
(DCM)/MeOH + NH4OAc
EPSRC National Facility Swansea
LTQ Orbitrap XL
C16H19N3O
26/04/2016 02:18:15 PM
Observed Data
270.1603
271.2746
272.2950
271.1665
270.2794
270.0021
NL:
5.95E5
STRWAT_9W6U2_299#28-45
RT: 0.65-1.04 AV: 16 T: FTMS
+ p NSI Full ms
[120.00-1935.00]
Theoretical Isotope Model: [M + H]+
270.1601
271.1635
272.1666
NL:
1.94E4
C16 H19 N3 OH:
C16 H20 N3 O1
p (gss, s /p:40) Chrg 1
R: 100000 Res .Pwr . @FWHM
Relative Abundance
m/z

2-Amino-*N*-(3'-(aminomethyl)-2',6'-dimethyl-[1,1'-biphenyl]-3-yl)acetamide (2.41).

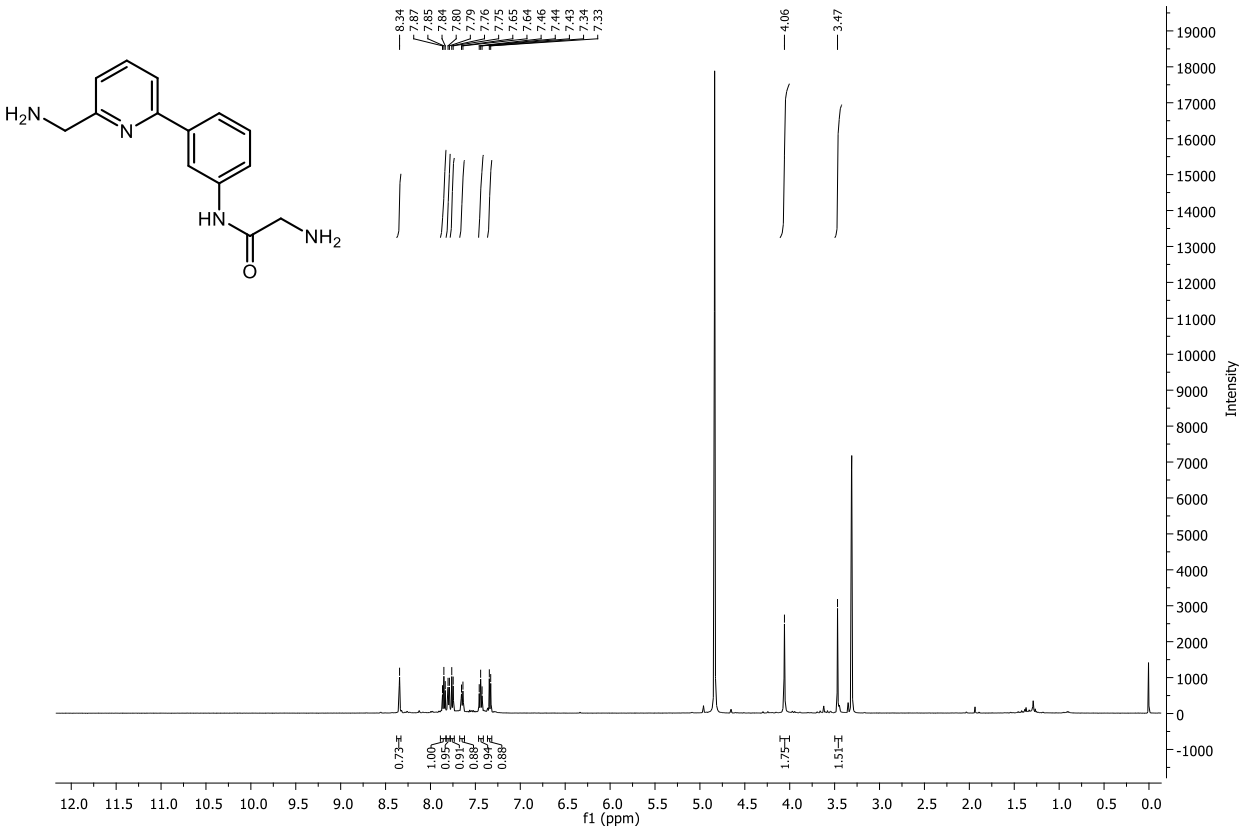


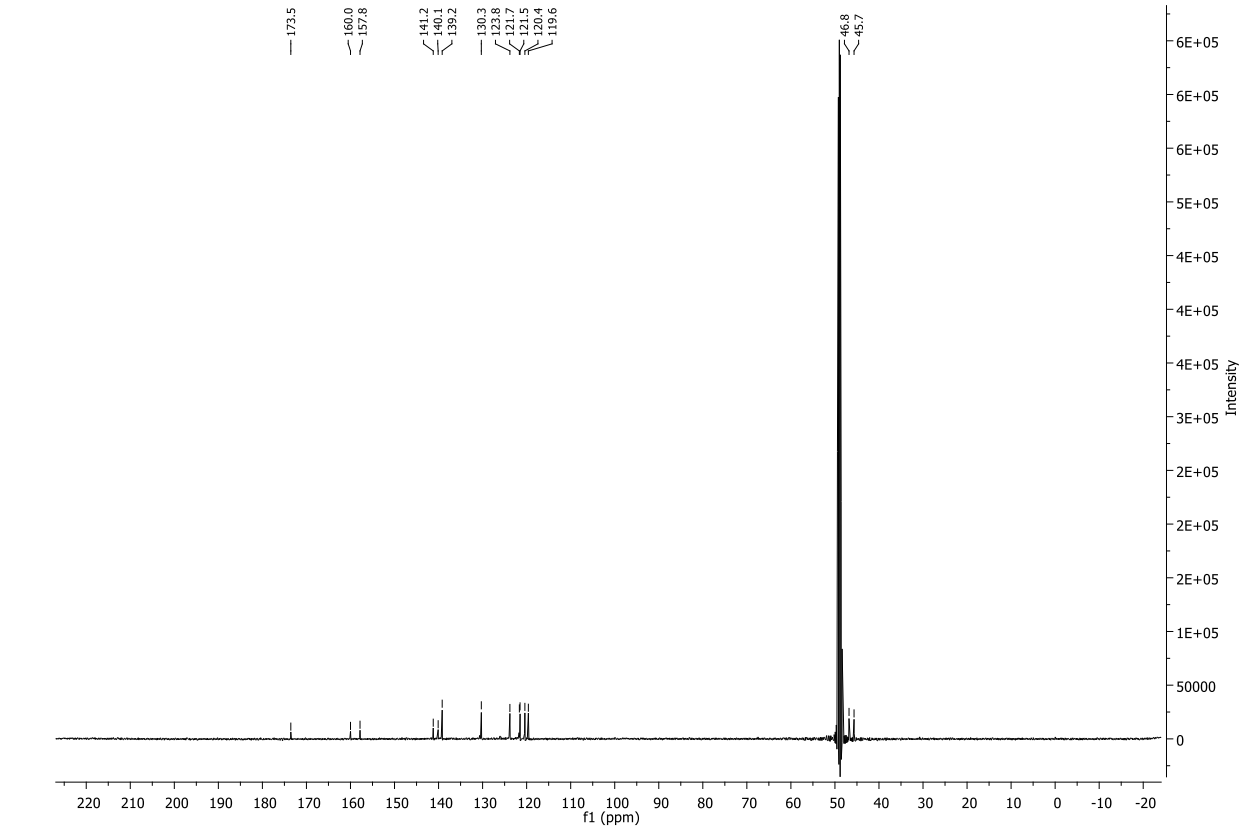


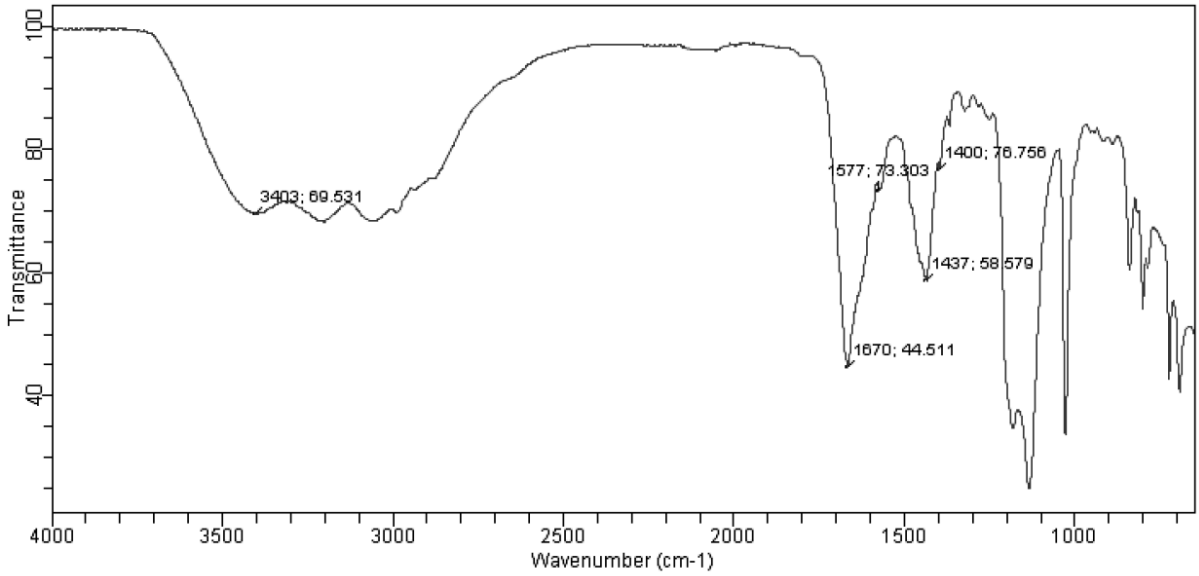

Transmittance
Wavenumber (cm-1)
2980; 79.196
1482; 70.018
1437; 62.671
1567; 62.840
1623; 57.821
1653; 48.020
1664; 41.366

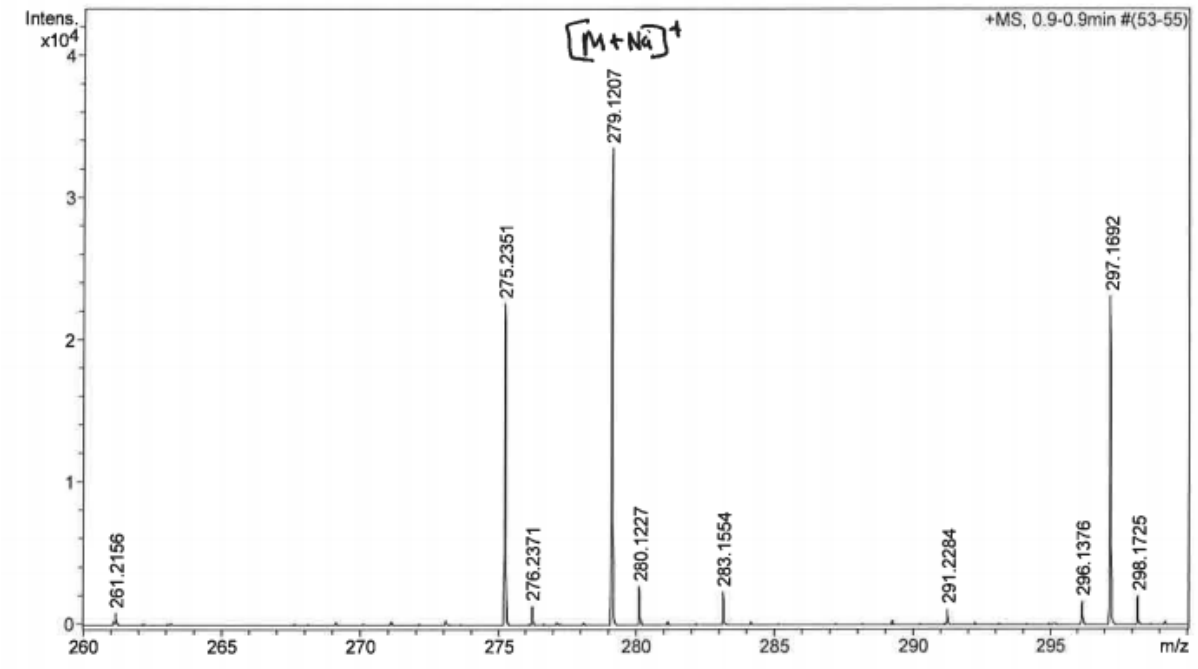

LM772
(MeOH)/MeOH + NH4OAc
C17H21N3O
SM: 7G
EPSRC National Facility Swansea
LTQ Orbitrap XL
STRWAT-LM
11/05/2016 08:39:55
NL:
8.52E5
STRWAT_KQGSW_327#33-46
RT: 0.74-1.04 AV: 12 T:
FTMS + p NSI Full ms
[120.00-1935.00]
Observed Data
306.1578
304.1108
305.1572
307.1612
308.1282
309.1316
Relative Abundance
NL:
1.92E4
C17 H21 N3 ONa:
C17 H21 N3 O1 Na1
p (gss, s /p:40) Chrg 1
R: 100000 Res .Pwr . @FWHM
Theoretical Isotope Model: [M + Na]+
306.1577
307.1611
m/z

2-Amino-*N*-(3-(6-(aminomethyl)pyridin-2-yl)phenyl)acetamide (2.42).



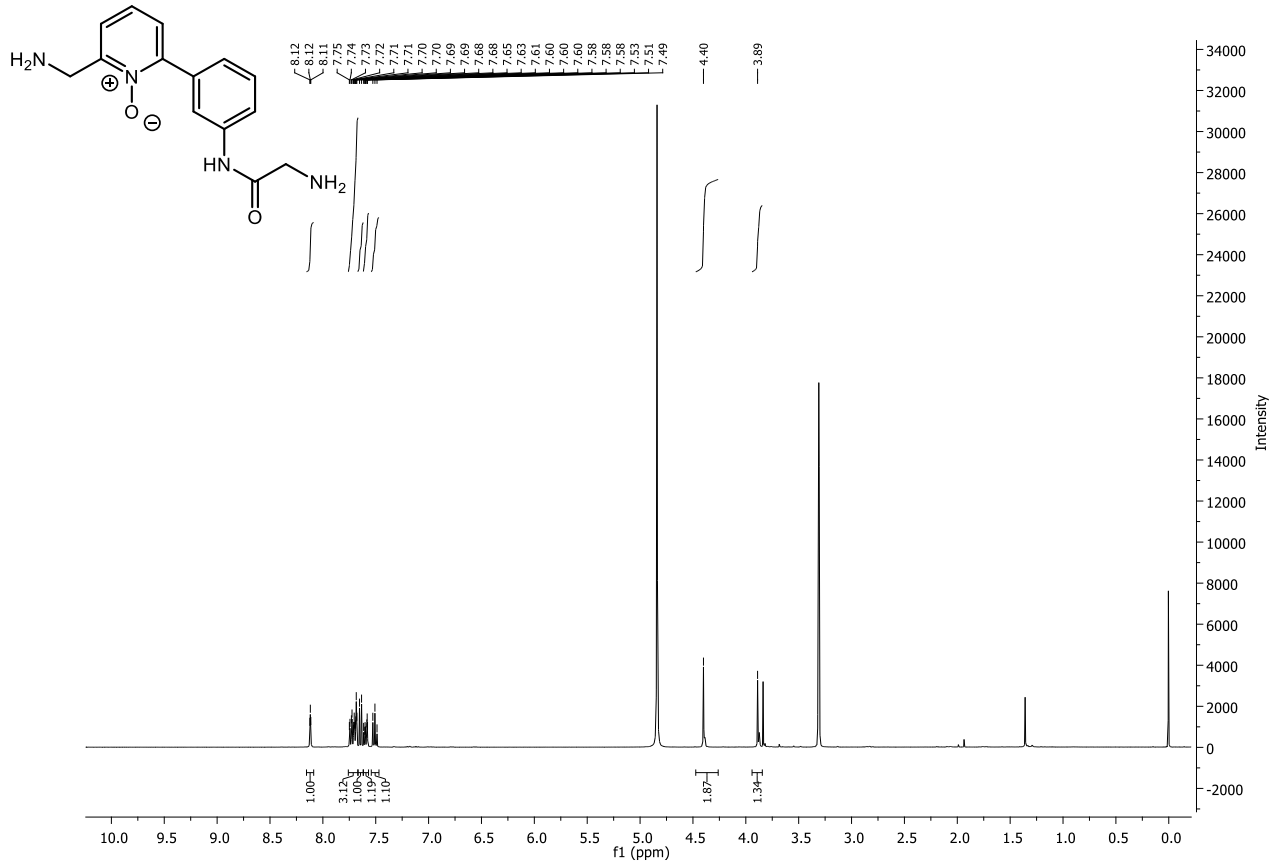


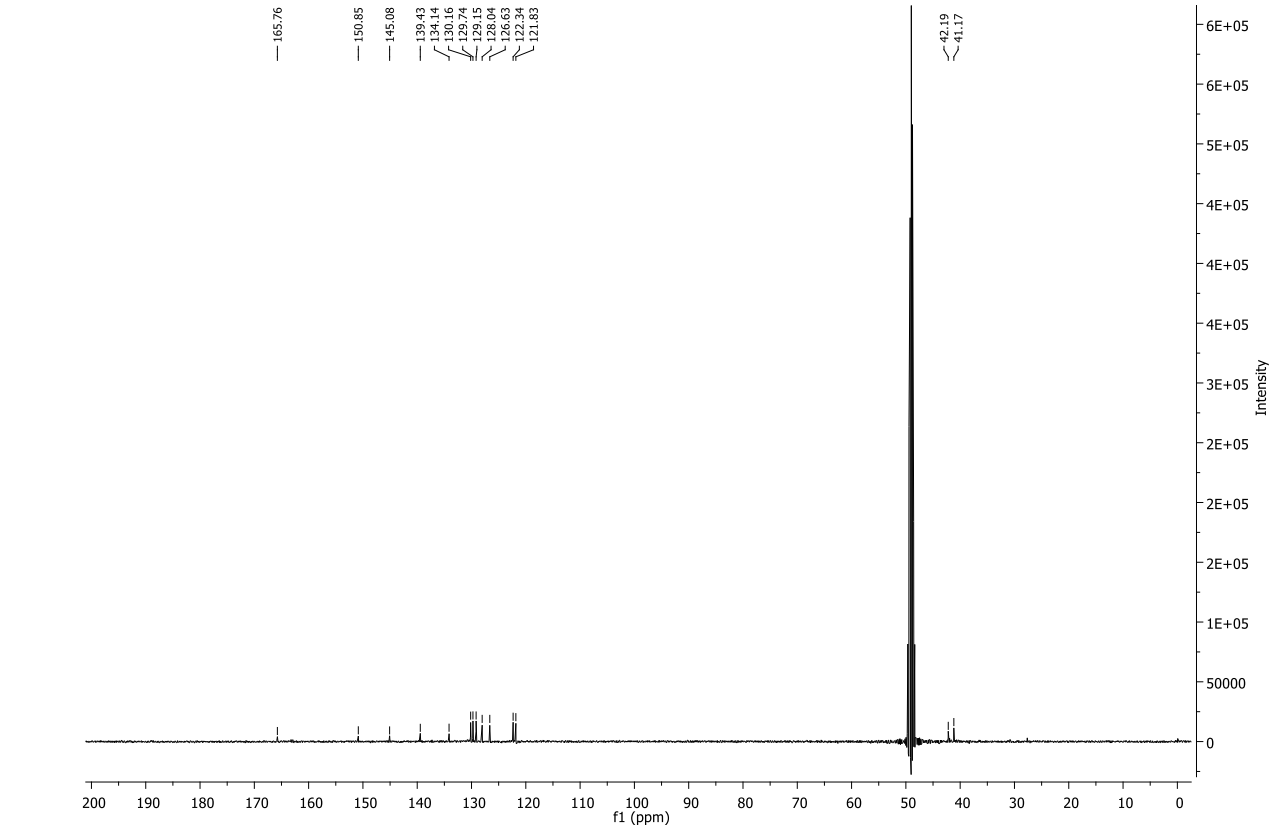


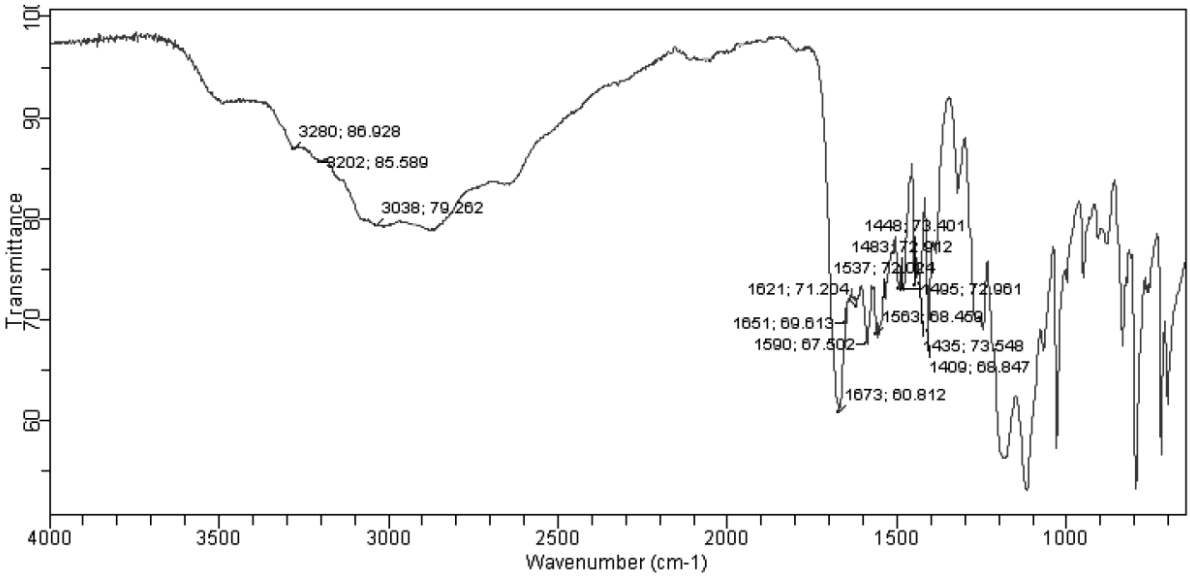


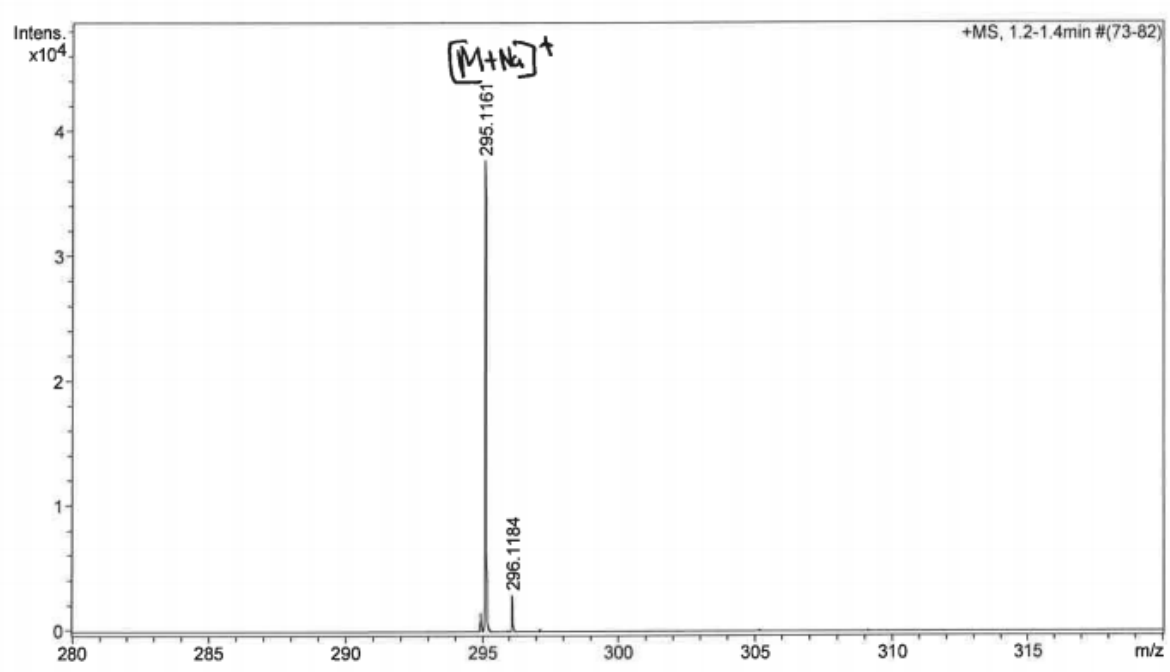
Formula	z	m/z	Meas. m/z	err [ppm]	err [mDa]
	1+		279.1207		
C 14 H 16 N 4 Na O		279.1216		3.4	1.0

2-(3-(2-Aminoacetamido)phenyl)-6-(aminomethyl)pyridine 1-oxide (2.43).



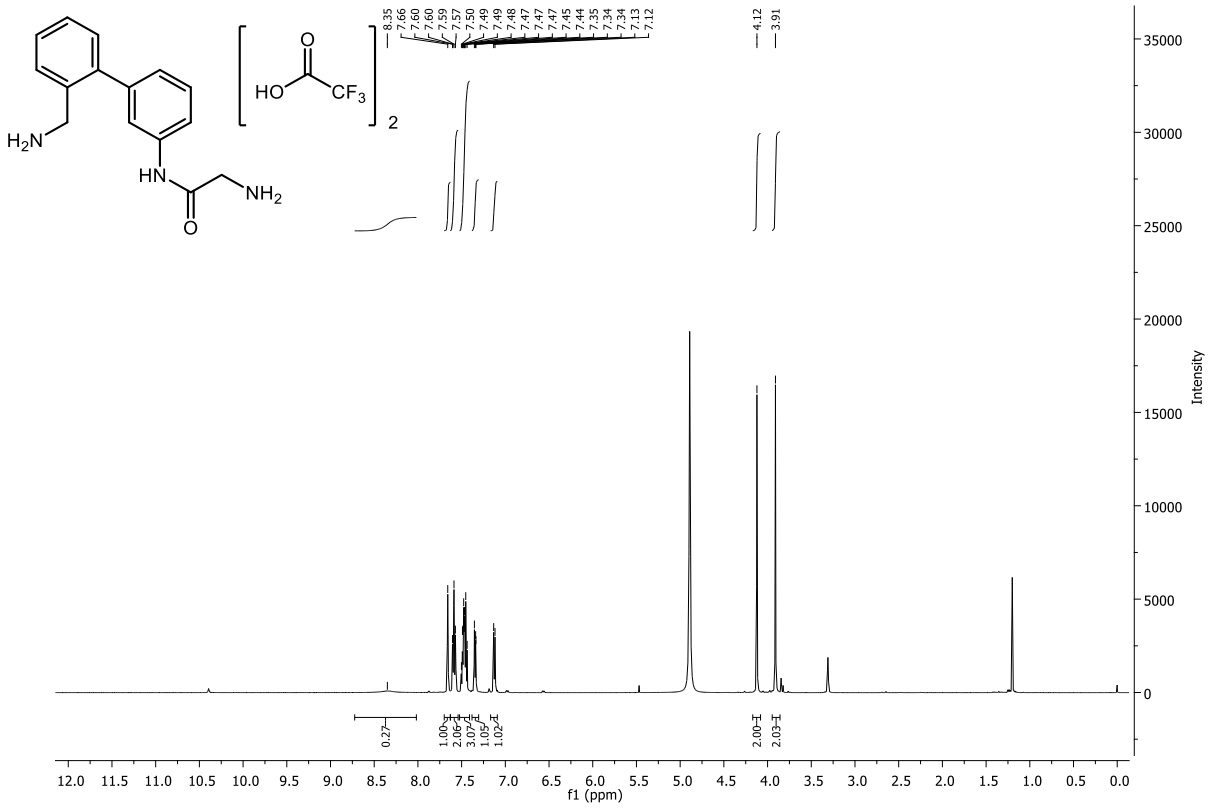


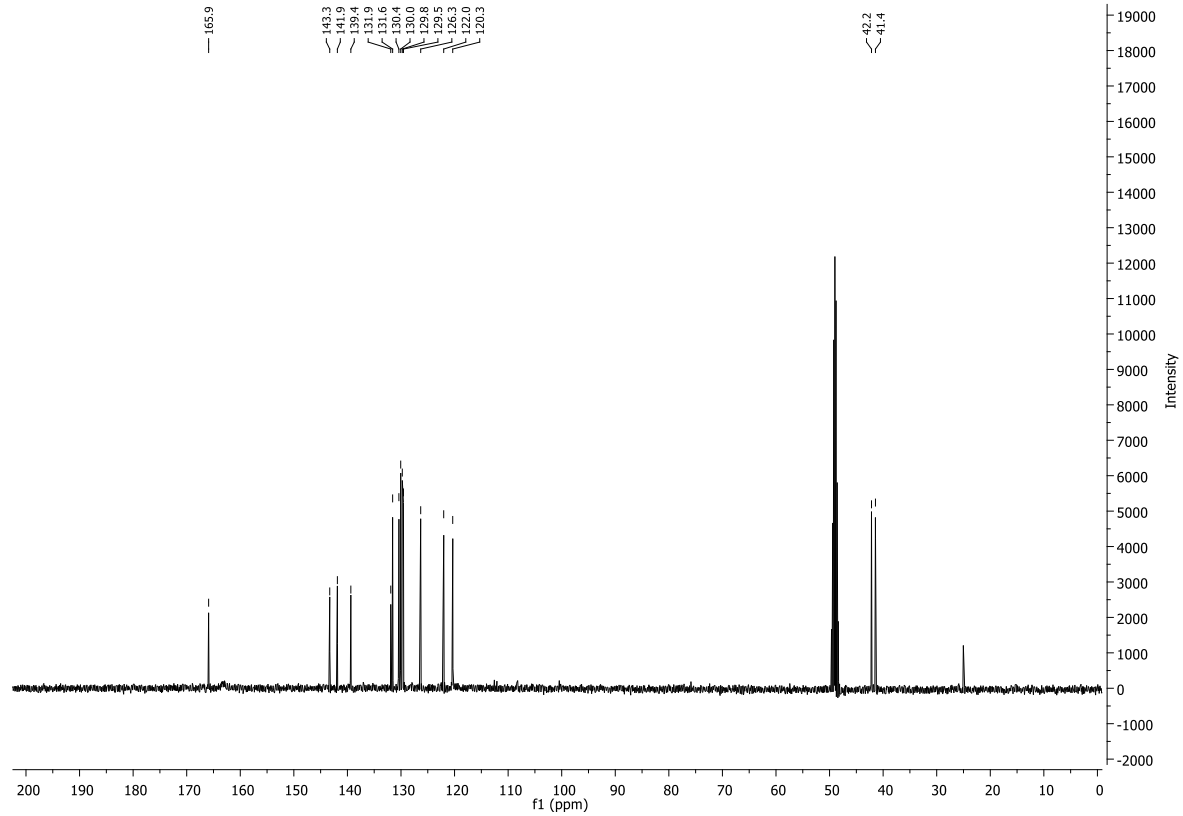


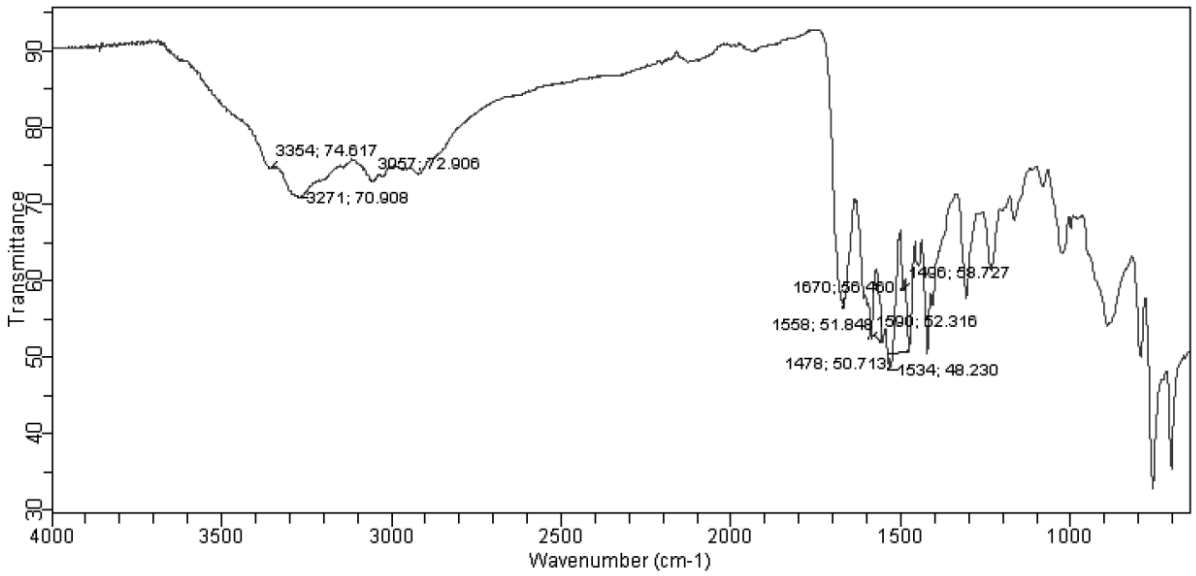


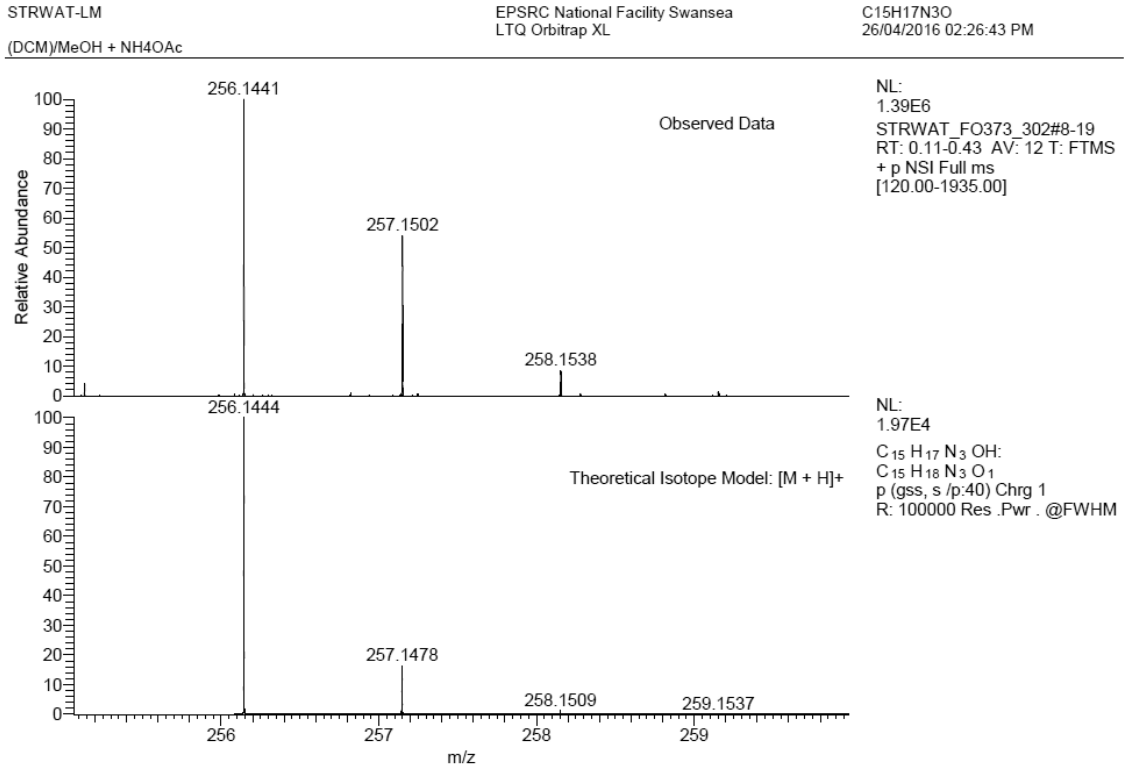
Formula	z	m/z	Meas. m/z	err [ppm]	err [mDa]
	1+		295.1161		
C 14 H 16 N 4 Na O 2		295.1165		1.5	0.4

2-Amino-*N*-(2'-(aminomethyl)-[1,1'-biphenyl]-3-yl)acetamide bis(2,2,2-trifluoroacetate) (2.44).

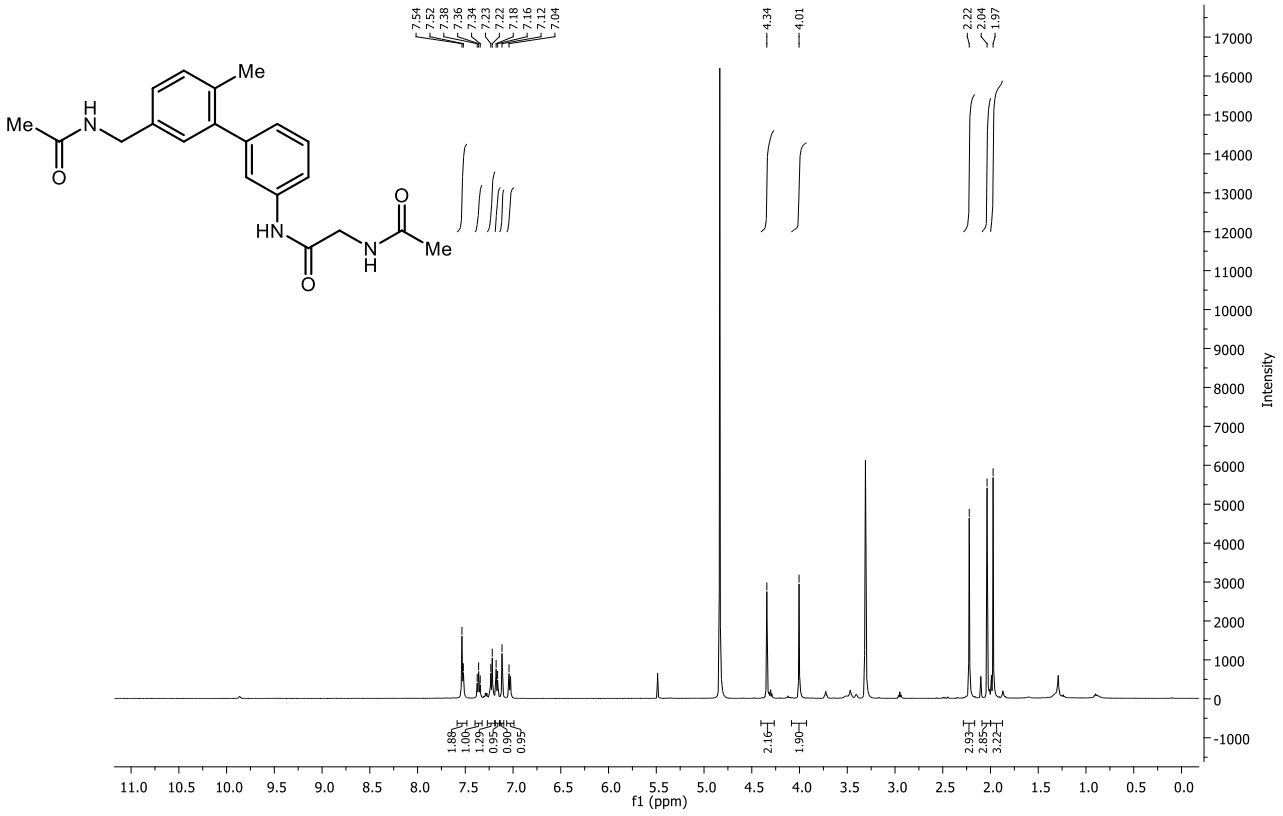


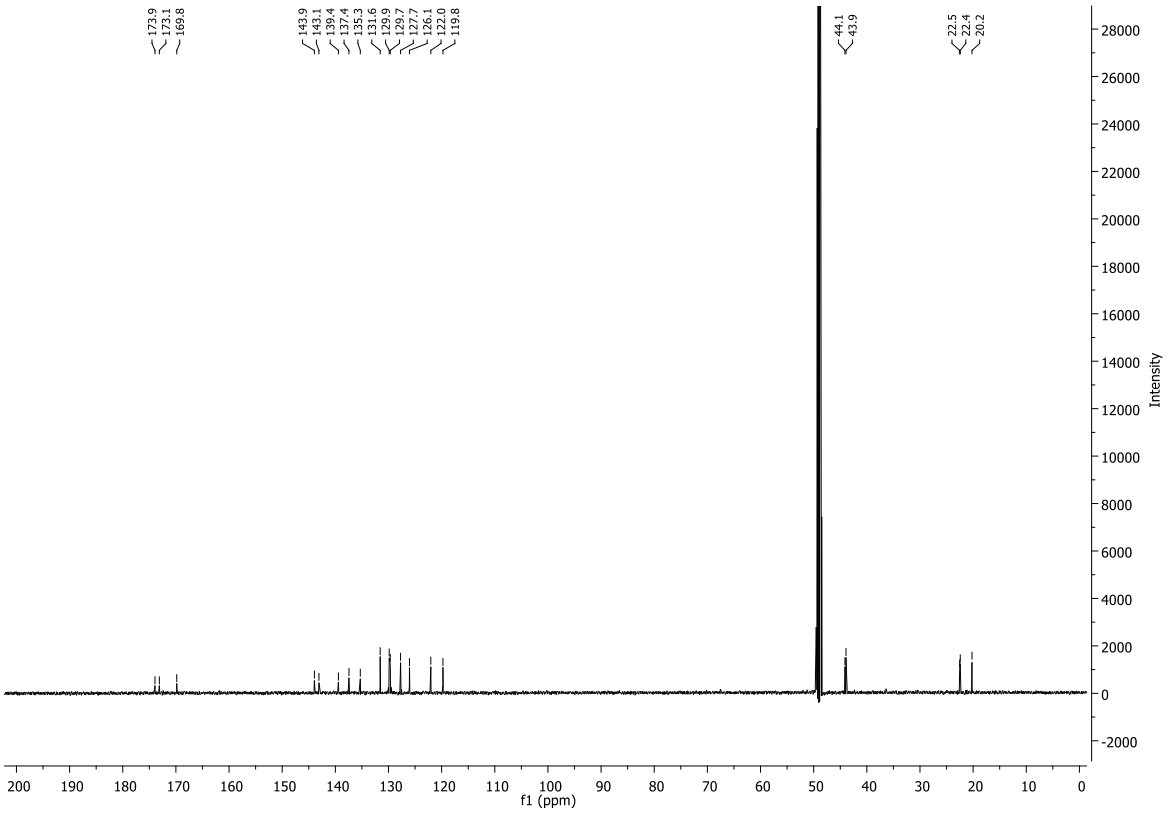


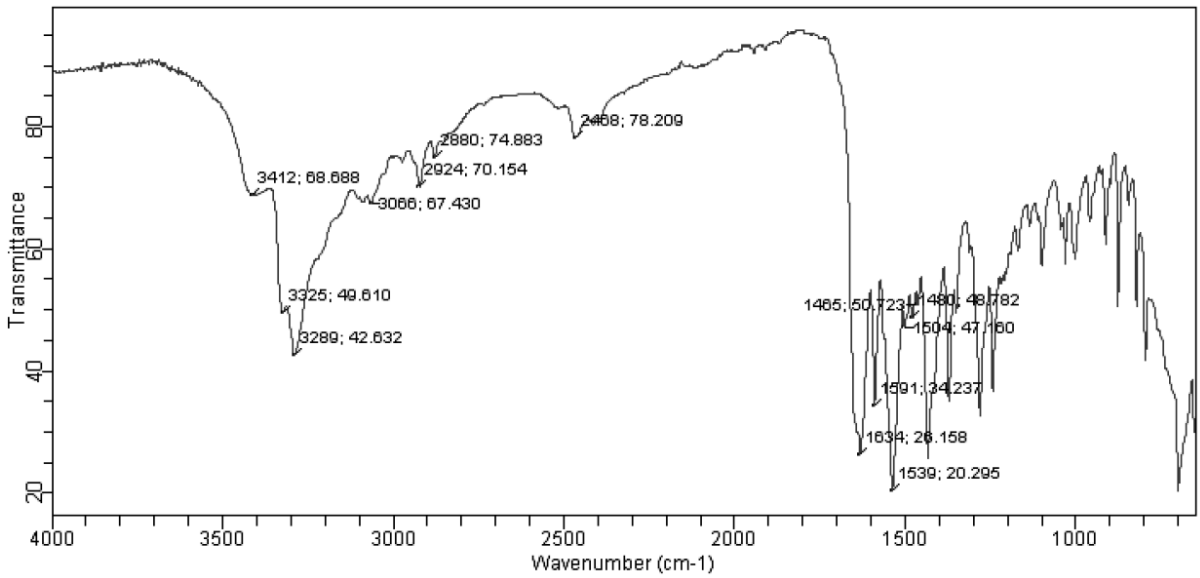

Transmittance
Wavenumber (cm-1)
3354; 74.617
3057; 72.906
3271; 70.908
1670; 56.460
1496; 58.727
1558; 51.848
1590; 52.316
1478; 50.713
1534; 48.230

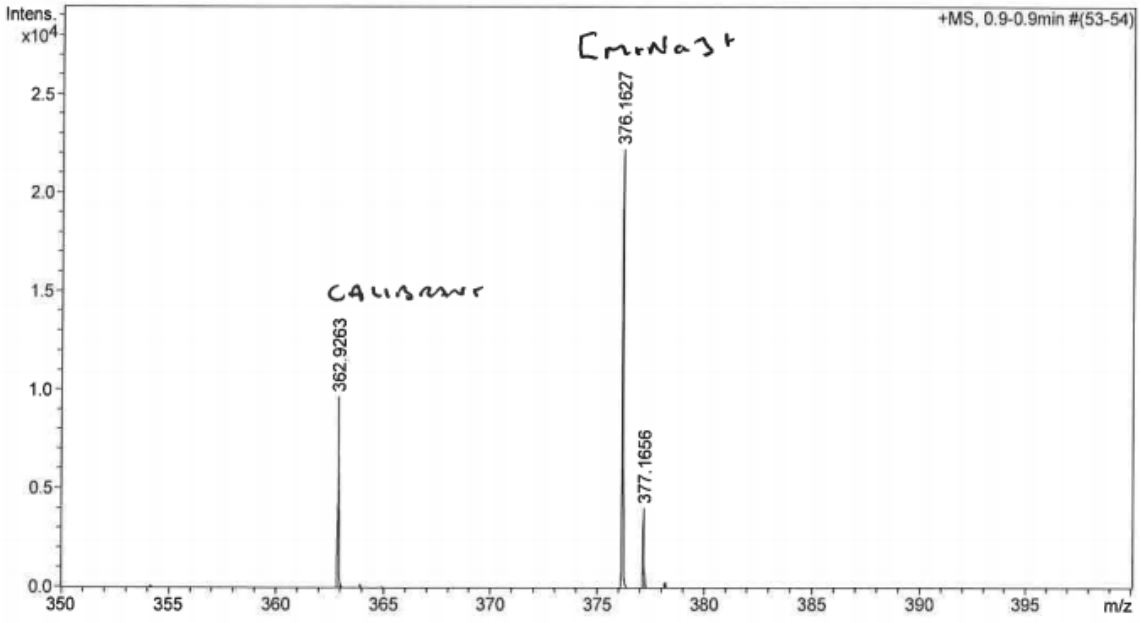

STRWAT-LM
(DCM)/MeOH + NH4OAc
EPSRC National Facility Swansea
LTQ Orbitrap XL
C15H17N3O
26/04/2016 02:26:43 PM
Observed Data
NL:
1.39E6
STRWAT_FO373_302#8-19
RT: 0.11-0.43 AV: 12 T: FTMS
+ p NSI Full ms
[120.00-1935.00]
256.1441
257.1502
258.1538
Theoretical Isotope Model: [M + H]+
NL:
1.97E4
C15 H17 N3 OH:
C15 H18 N3 O1
p (gss, s /p:40) Chrg 1
R: 100000 Res .Pwr . @FWHM
256.1444
257.1478
258.1509
259.1537
Relative Abundance
m/z

2-Acetamido-*N*-(5'-(acetamidomethyl)-2'-methyl-[1,1'-biphenyl]-3-yl)acetamide (2.45).



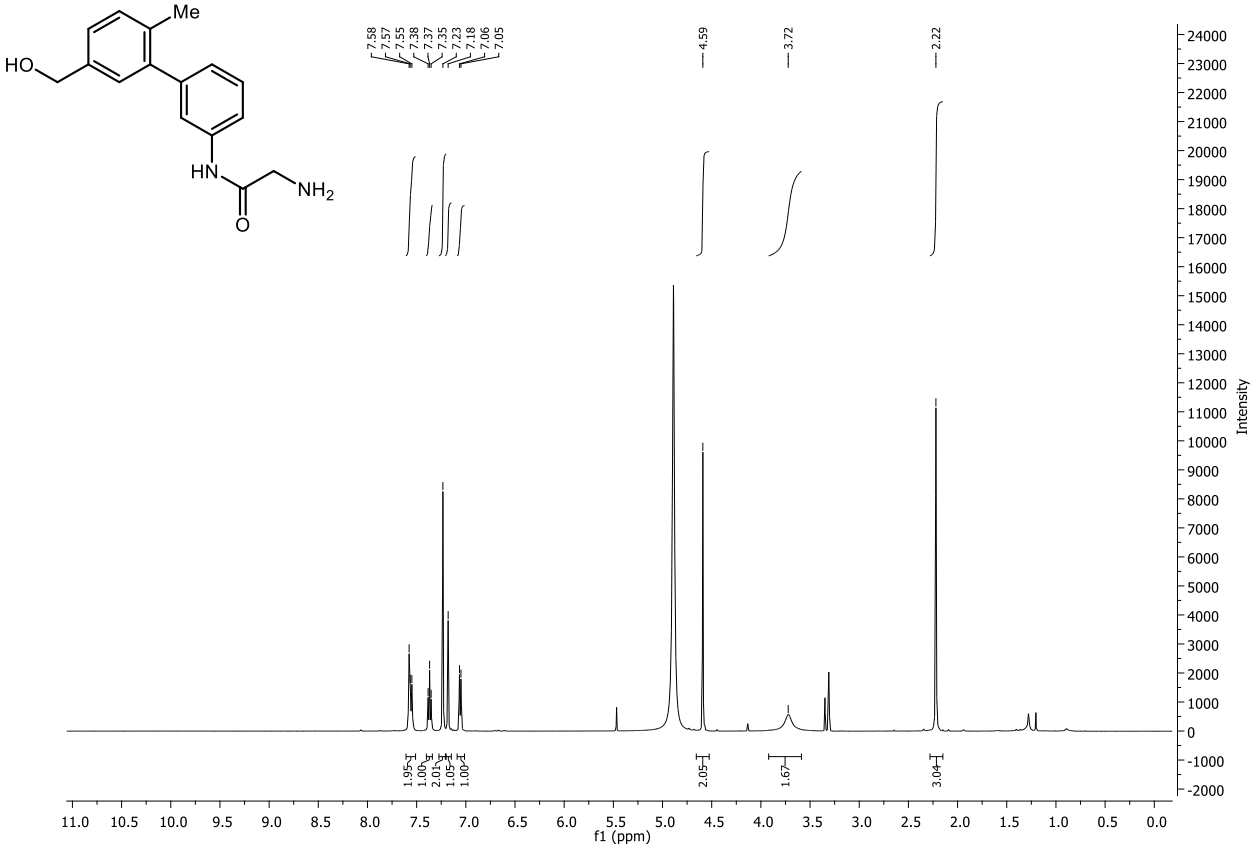


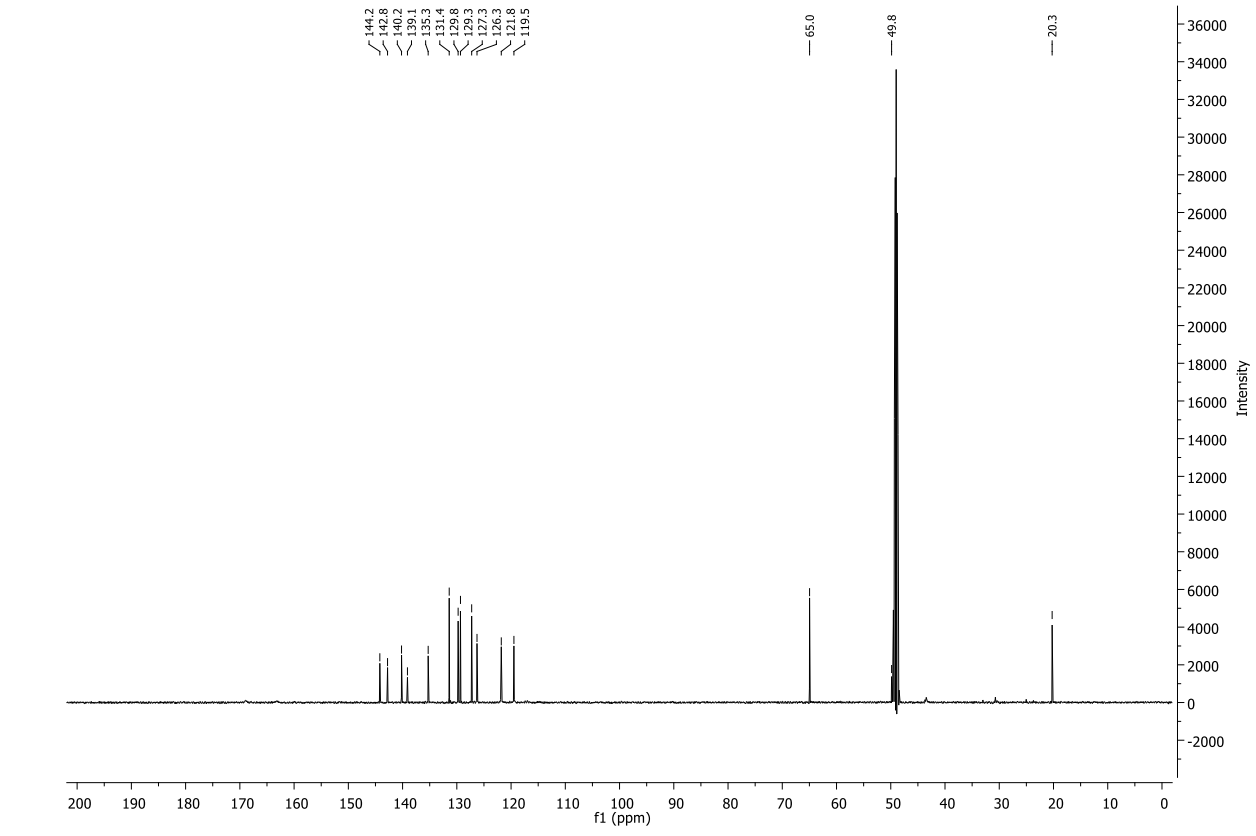


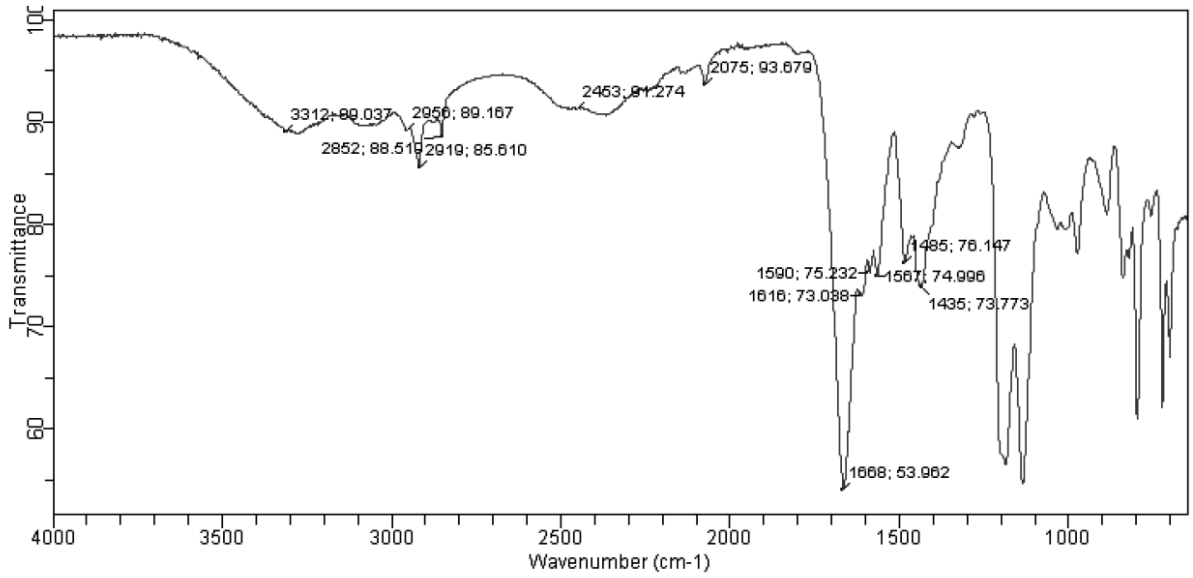


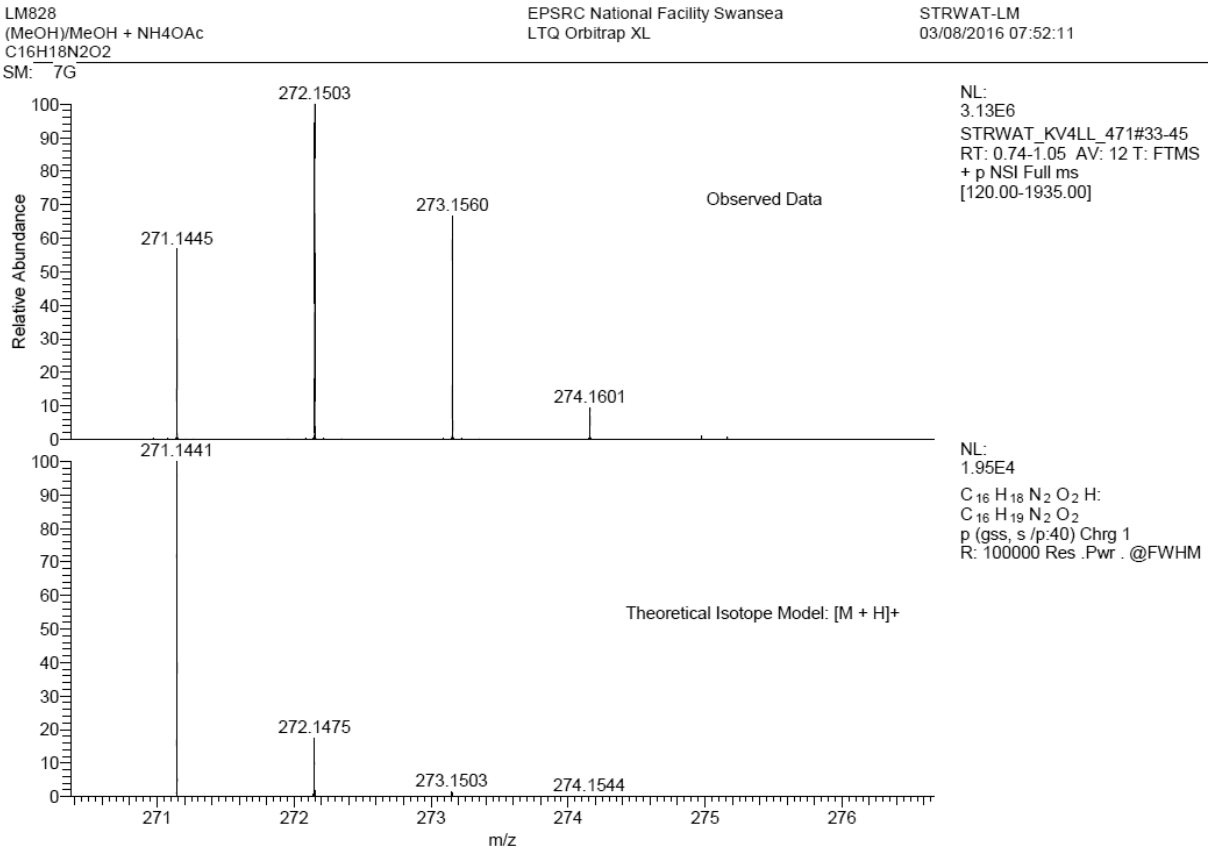
Formula	z	m/z	Meas. m/z	err [ppm]	err [mDa]
	1+		376.1627		
C 20 H 23 N 3 Na O 3		376.1632		1.2	0.5

2-Amino-*N*-(5'-(hydroxymethyl)-2'-methyl-[1,1'-biphenyl]-3-yl)acetamide (2.46).

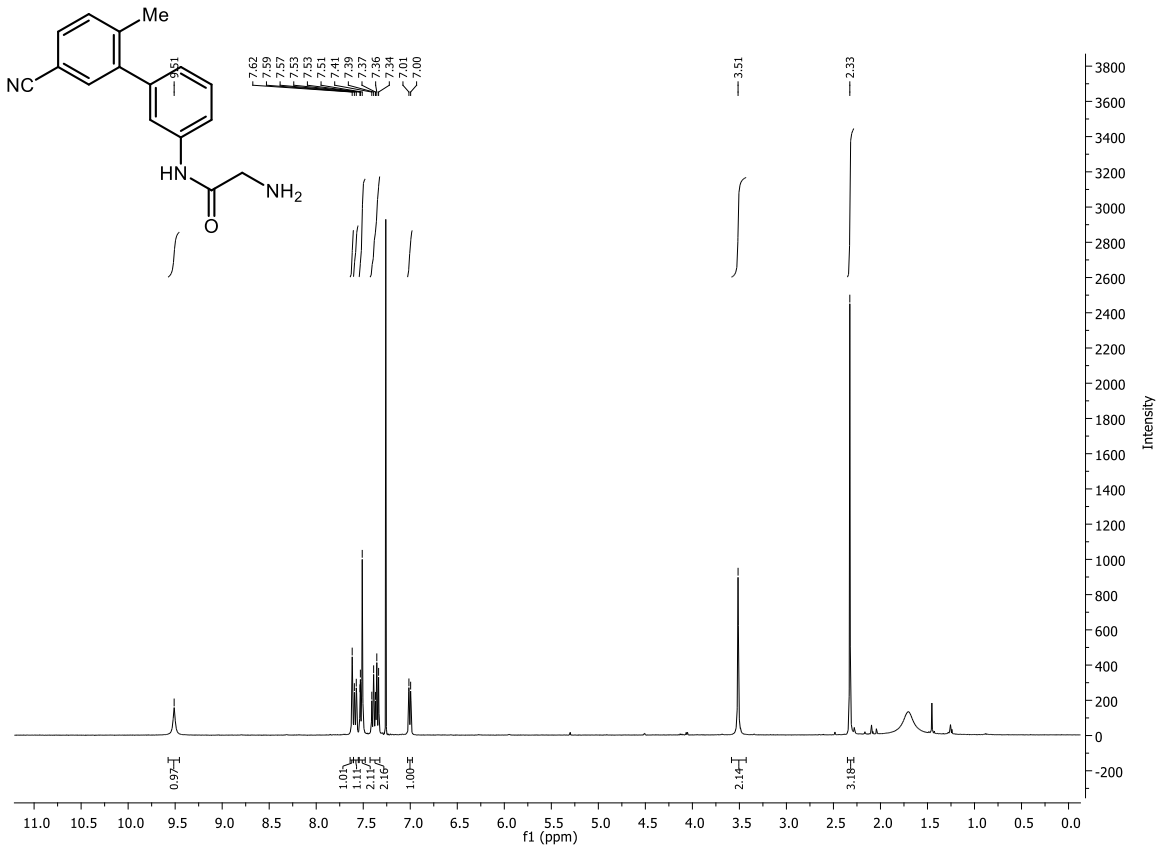


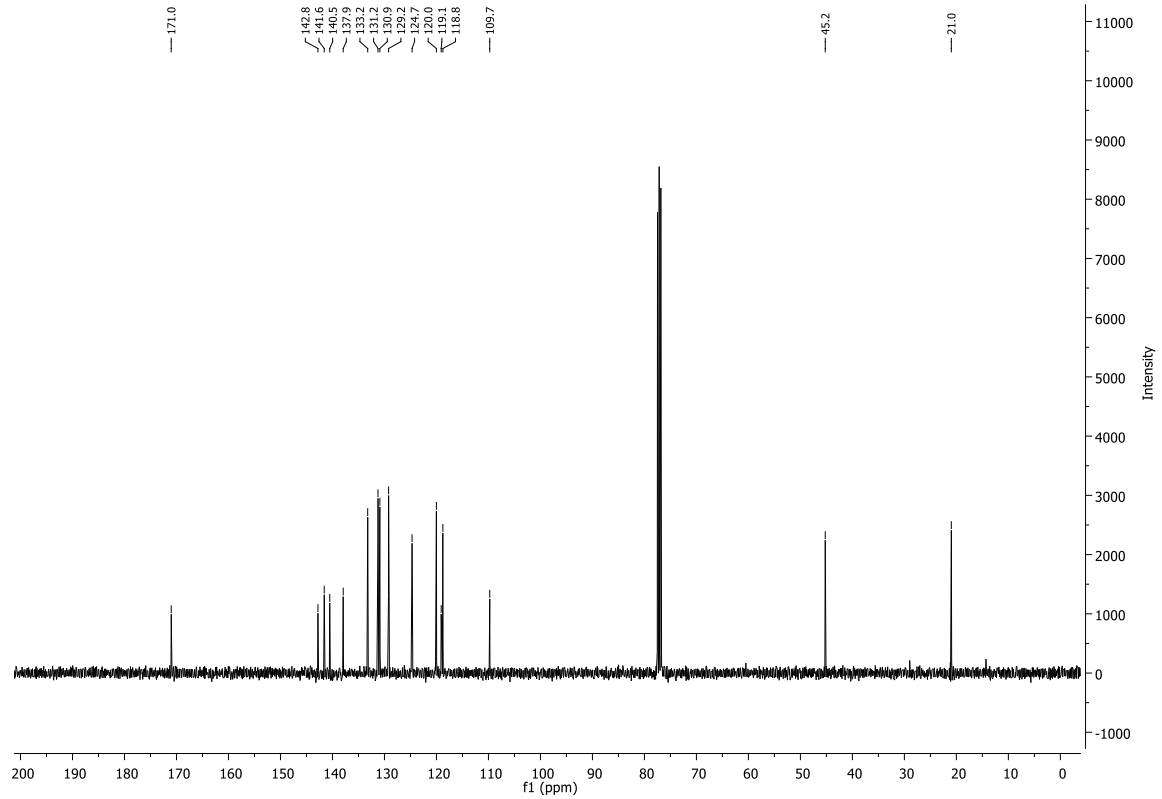


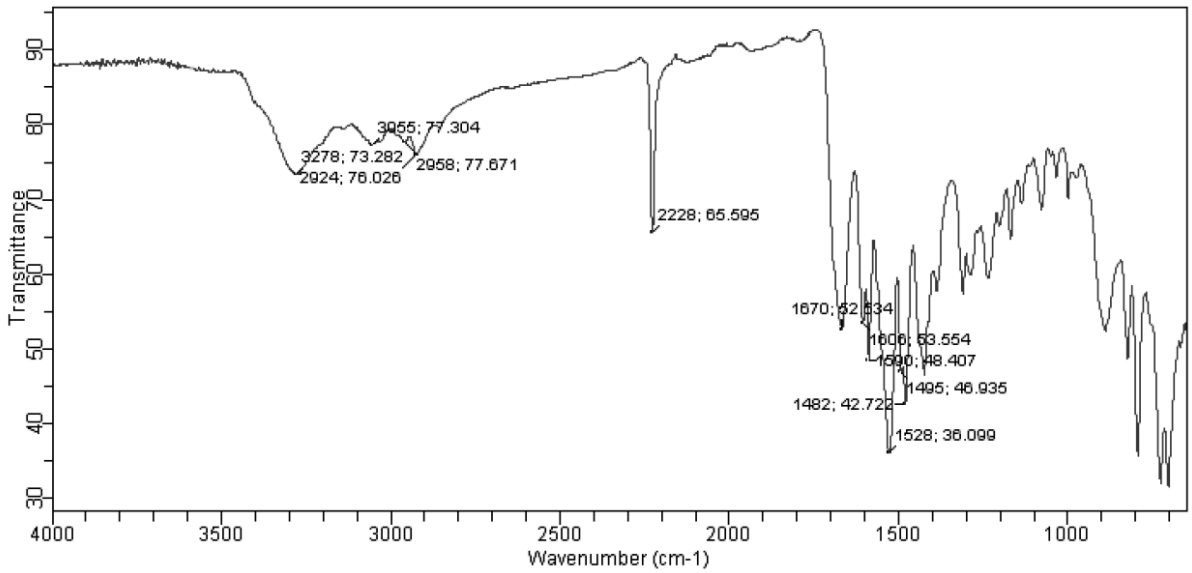

Transmittance
Wavenumber (cm-1)
3312; 89.037
2950; 89.167
2852; 88.519
2919; 85.610
2463; 91.274
2075; 93.679
1590; 75.232
1616; 73.038
1567; 74.996
1485; 76.147
1435; 73.773
1668; 53.962

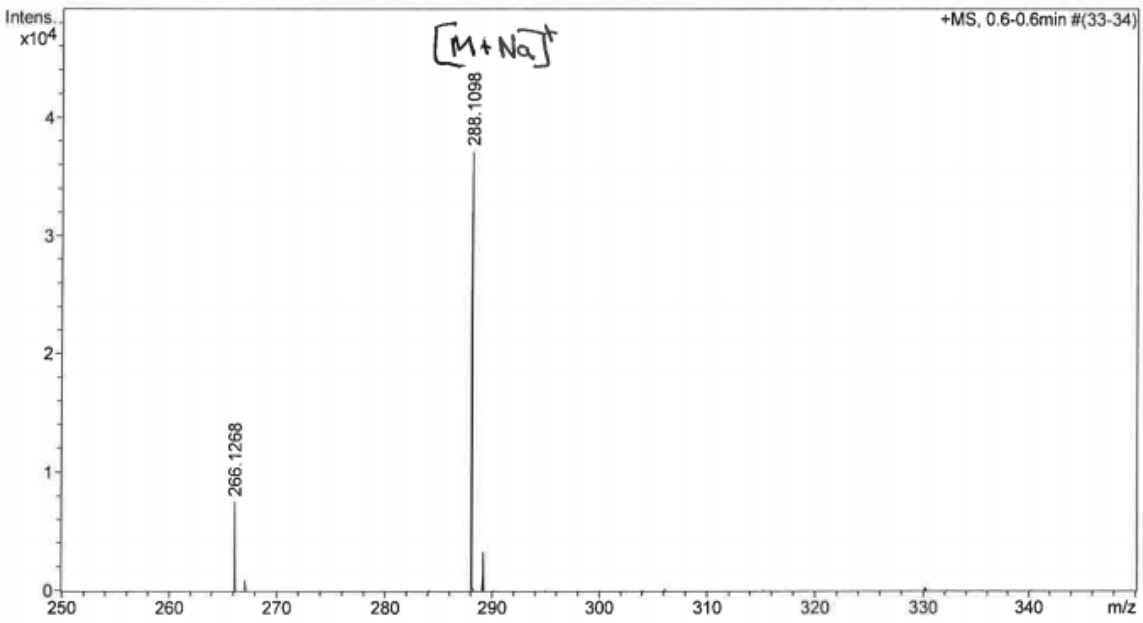

LM828
(MeOH)/MeOH + NH4OAc
C16H18N2O2
SM: 7G
EPSRC National Facility Swansea
LTQ Orbitrap XL
STRWAT-LM
03/08/2016 07:52:11
Relative Abundance
m/z
Observed Data
Theoretical Isotope Model: [M + H]+
272.1503
273.1560
271.1445
274.1601
271.1441
272.1475
273.1503
274.1544
NL:
3.13E6
STRWAT_KV4LL_471#33-45
RT: 0.74-1.05 AV: 12 T: FTMS
+ p NSI Full ms
[120.00-1935.00]
NL:
1.95E4
C16 H18 N2 O2 H:
C16 H19 N2 O2
p (gss, s /p:40) Chrg 1
R: 100000 Res .Pwr . @FWHM

2-Amino-*N*-(5'-cyano-2'-methyl-[1,1'-biphenyl]-3-yl)acetamide (2.47).



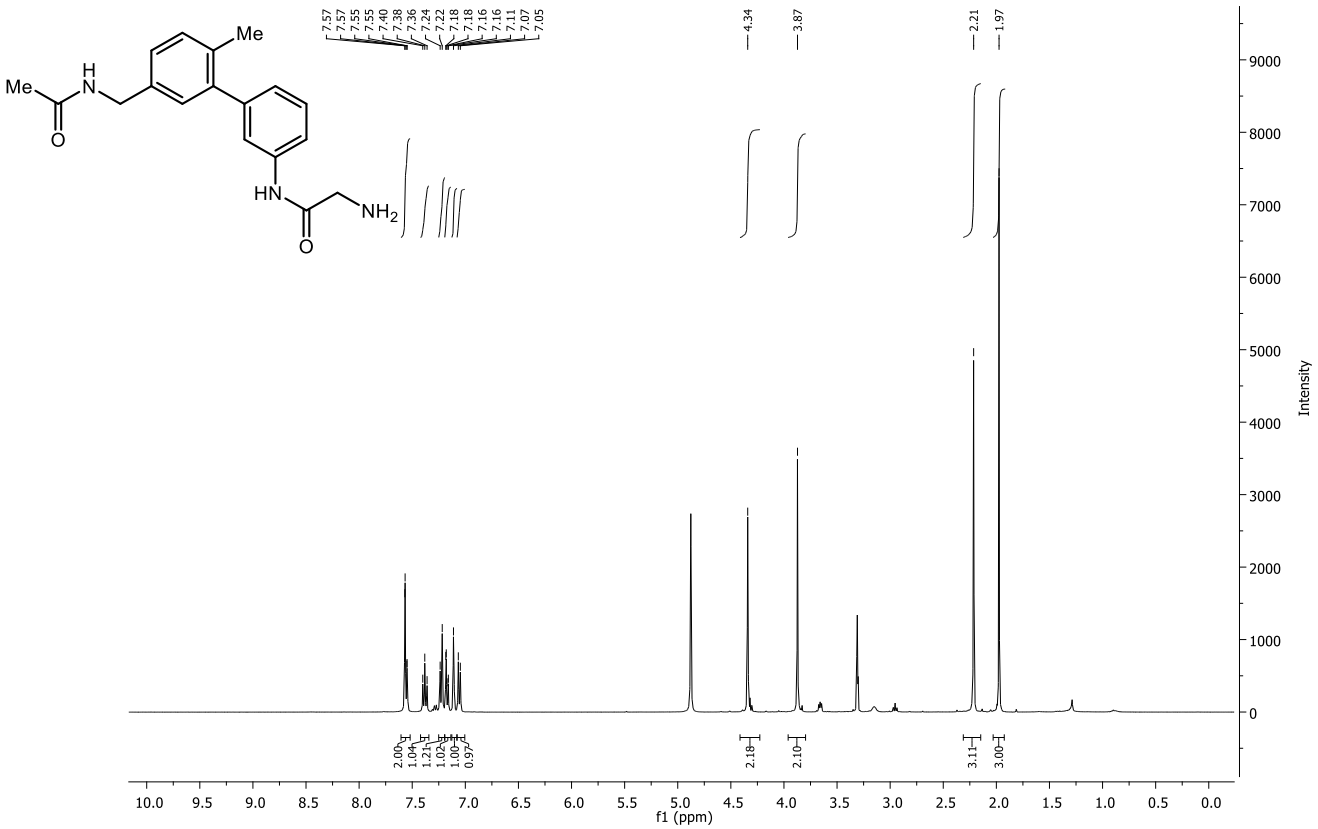


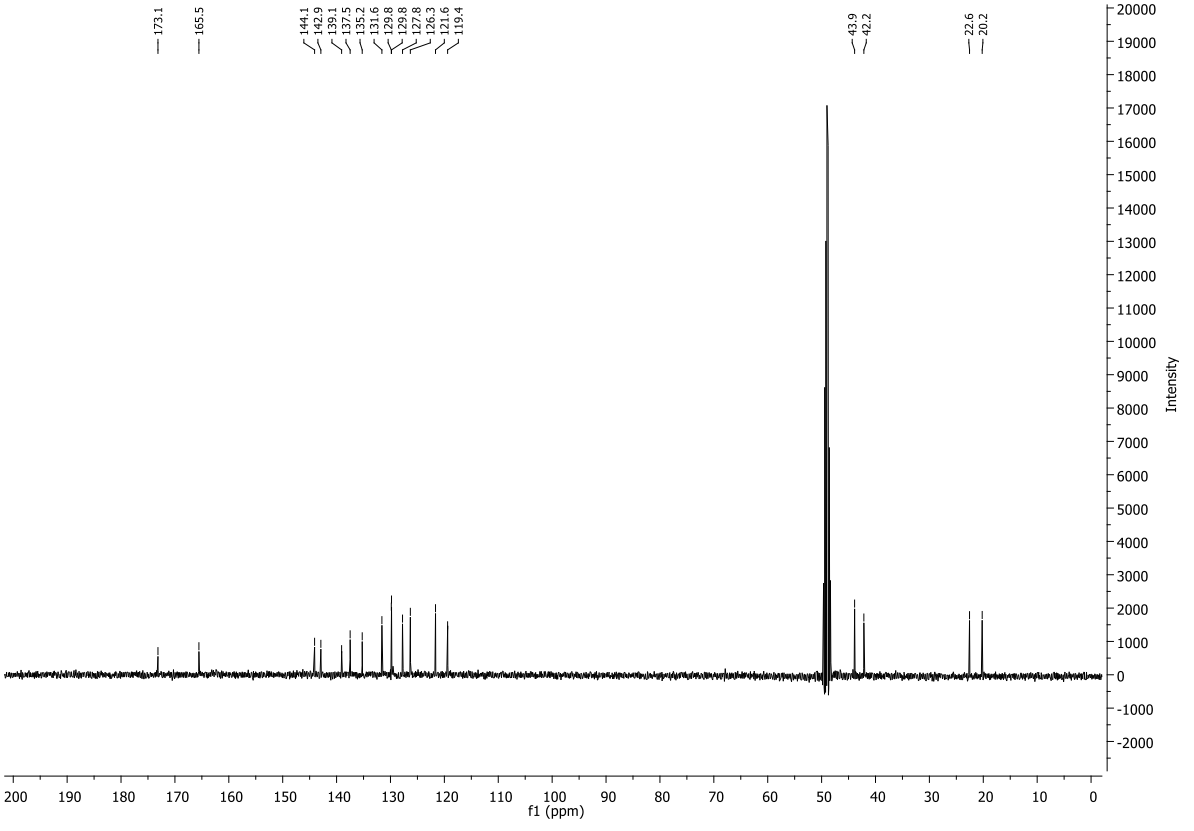


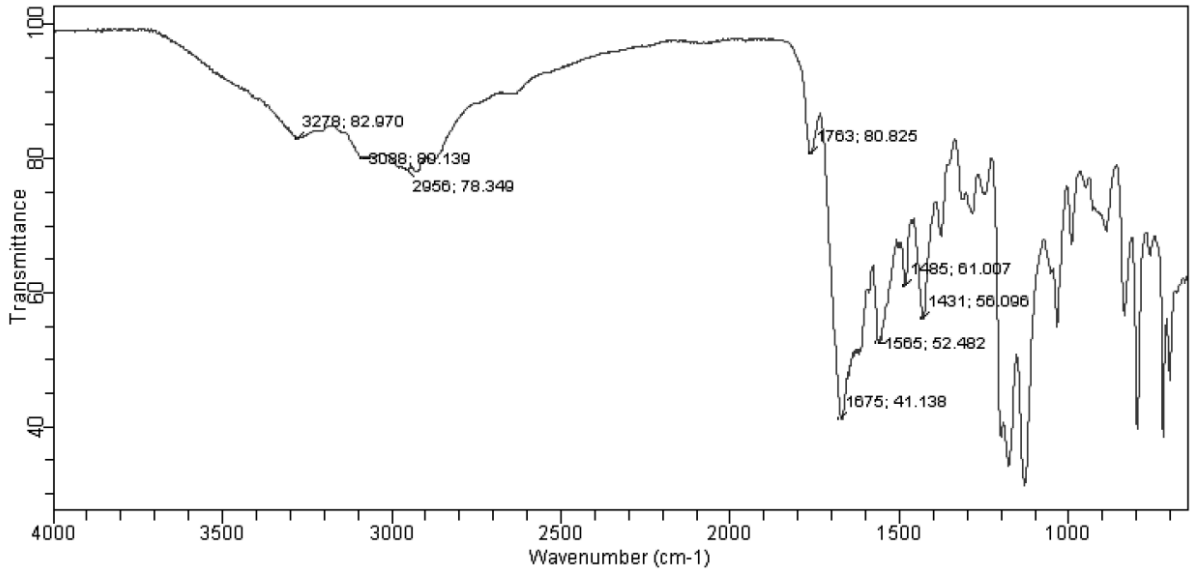


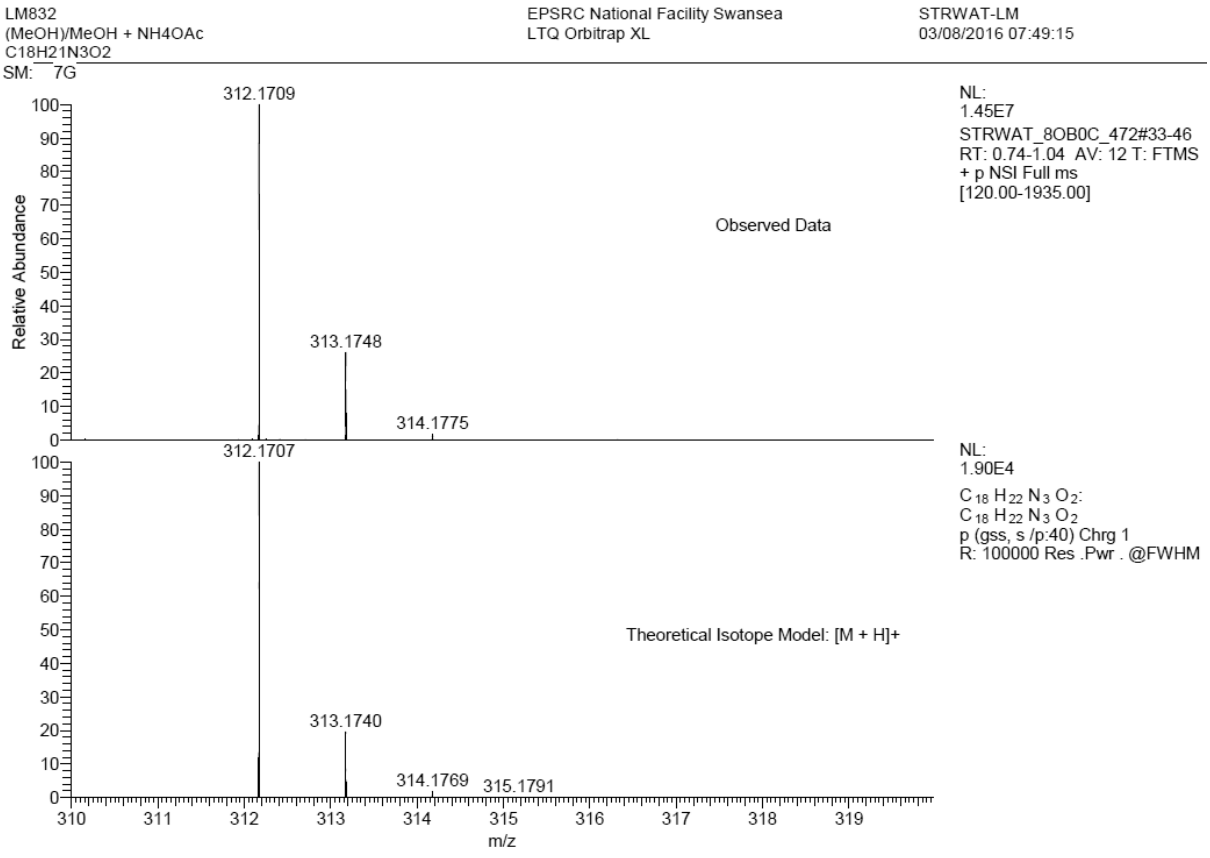
Formula	z	m/z	Meas. m/z	err [ppm]	err [mDa]
	1+		266.1268		
C 16 H 16 N 3 O		266.1288		7.3	2.0
	1+		288.1098		
C 16 H 15 N 3 Na O		288.1107		3.4	1.0

_N_-(5'-(acetamidomethyl)-2'-methyl-[1,1'-biphenyl]-3-yl)-2-aminoacetamide (2.48).

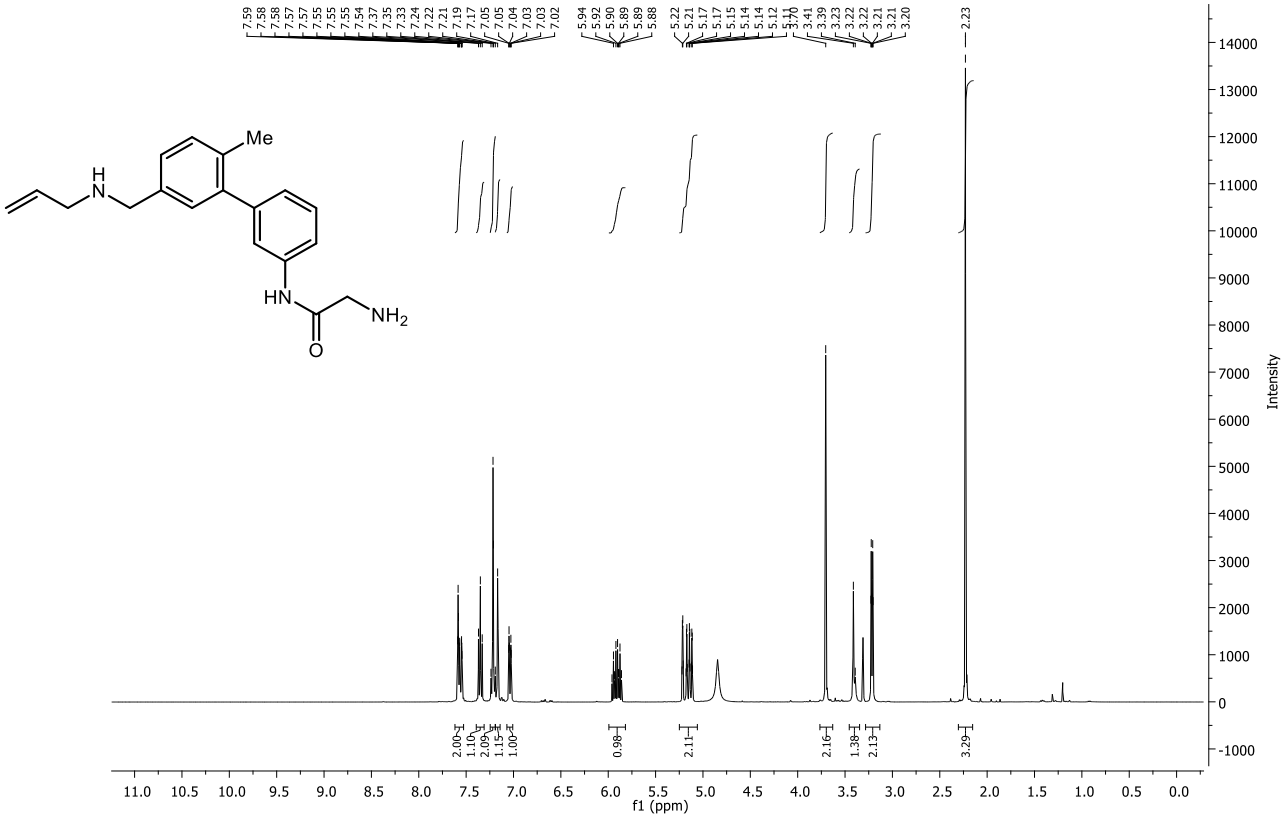


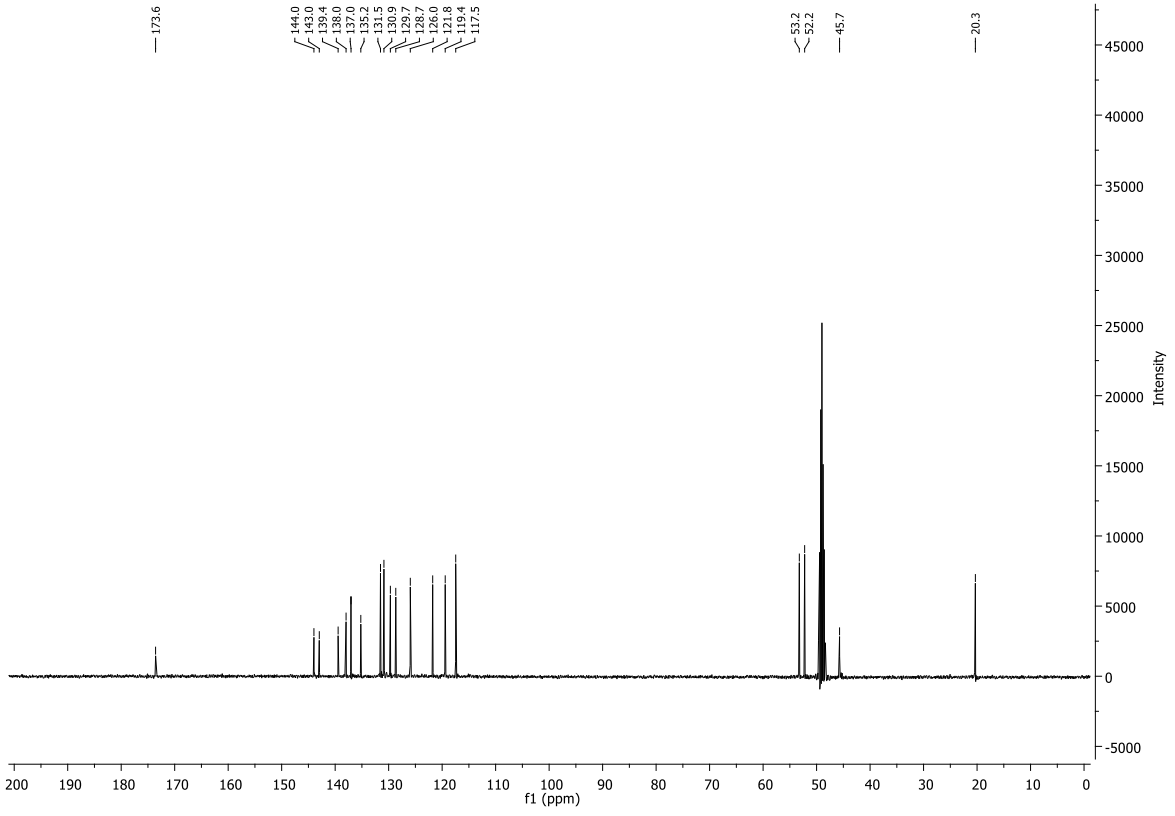


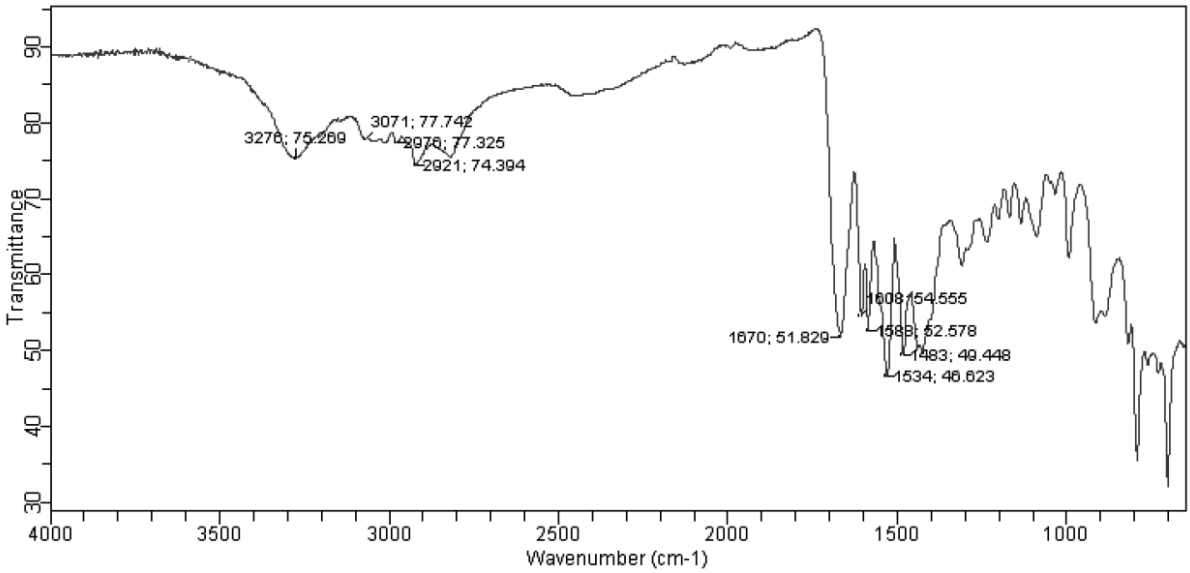

Transmittance
Wavenumber (cm-1)
3278; 82.970
3088; 99.139
2956; 78.349
1763; 80.825
1485; 61.007
1431; 56.096
1565; 52.482
1675; 41.138

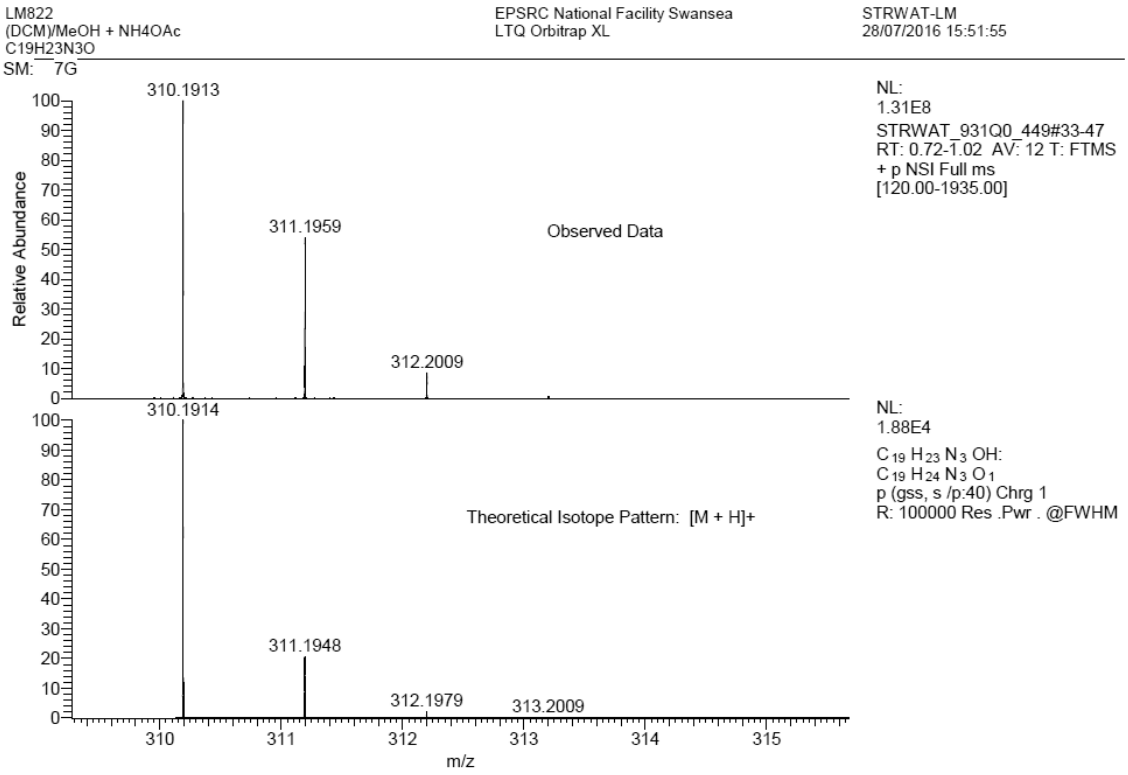

LM832
(MeOH)/MeOH + NH4OAc
C18H21N3O2
SM: 7G
EPSRC National Facility Swansea
LTQ Orbitrap XL
STRWAT-LM
03/08/2016 07:49:15
Relative Abundance
312.1709
313.1748
314.1775
Observed Data
NL:
1.45E7
STRWAT_8OB0C_472#33-46
RT: 0.74-1.04 AV: 12 T: FTMS
+ p NSI Full ms
[120.00-1935.00]
312.1707
313.1740
314.1769
315.1791
Theoretical Isotope Model: [M + H]+
NL:
1.90E4
C18 H22 N3 O2:
C18 H22 N3 O2
p (gss, s /p:40) Chrg 1
R: 100000 Res .Pwr . @FWHM
m/z

_N_-(5'-((allylamino)methyl)-2'-methyl-[1,1'-biphenyl]-3-yl)-2-aminoacetamide (2.49).

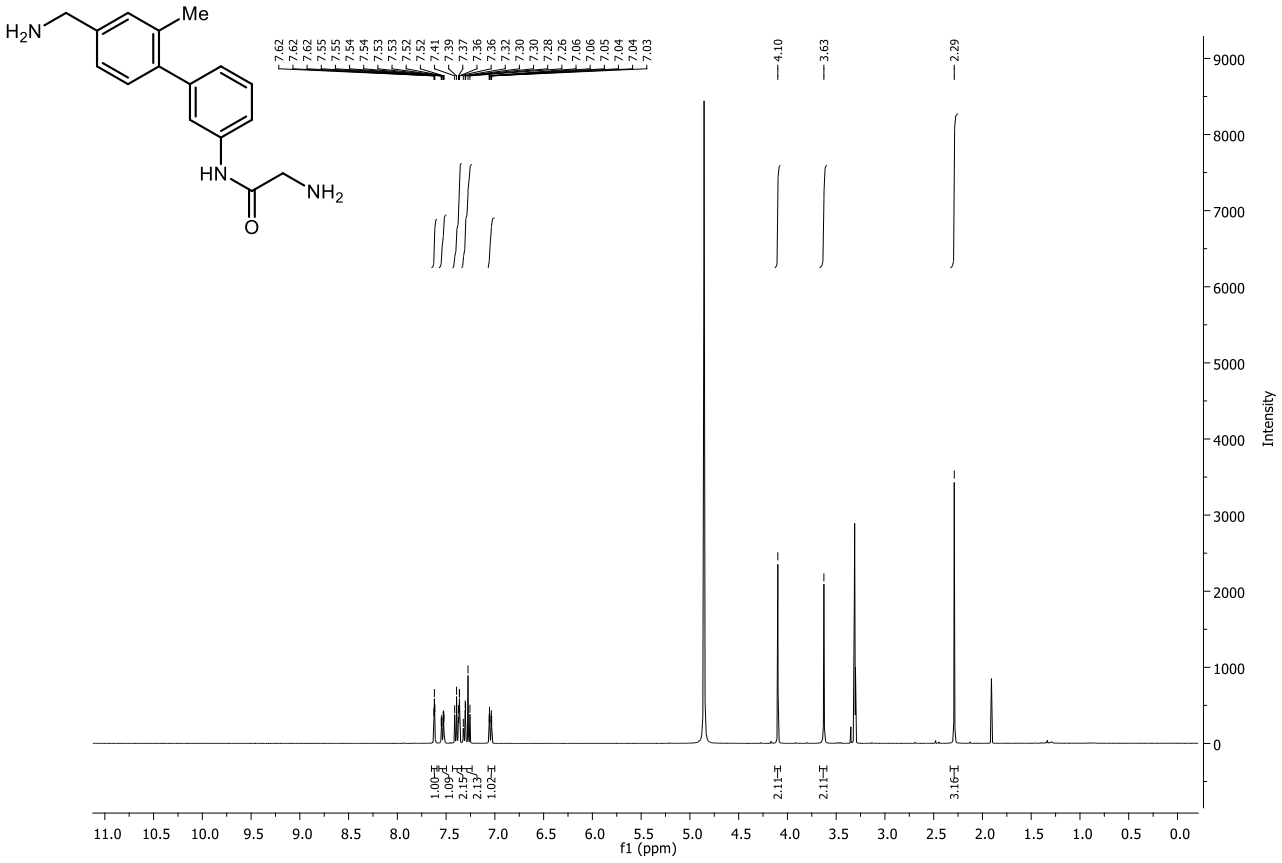


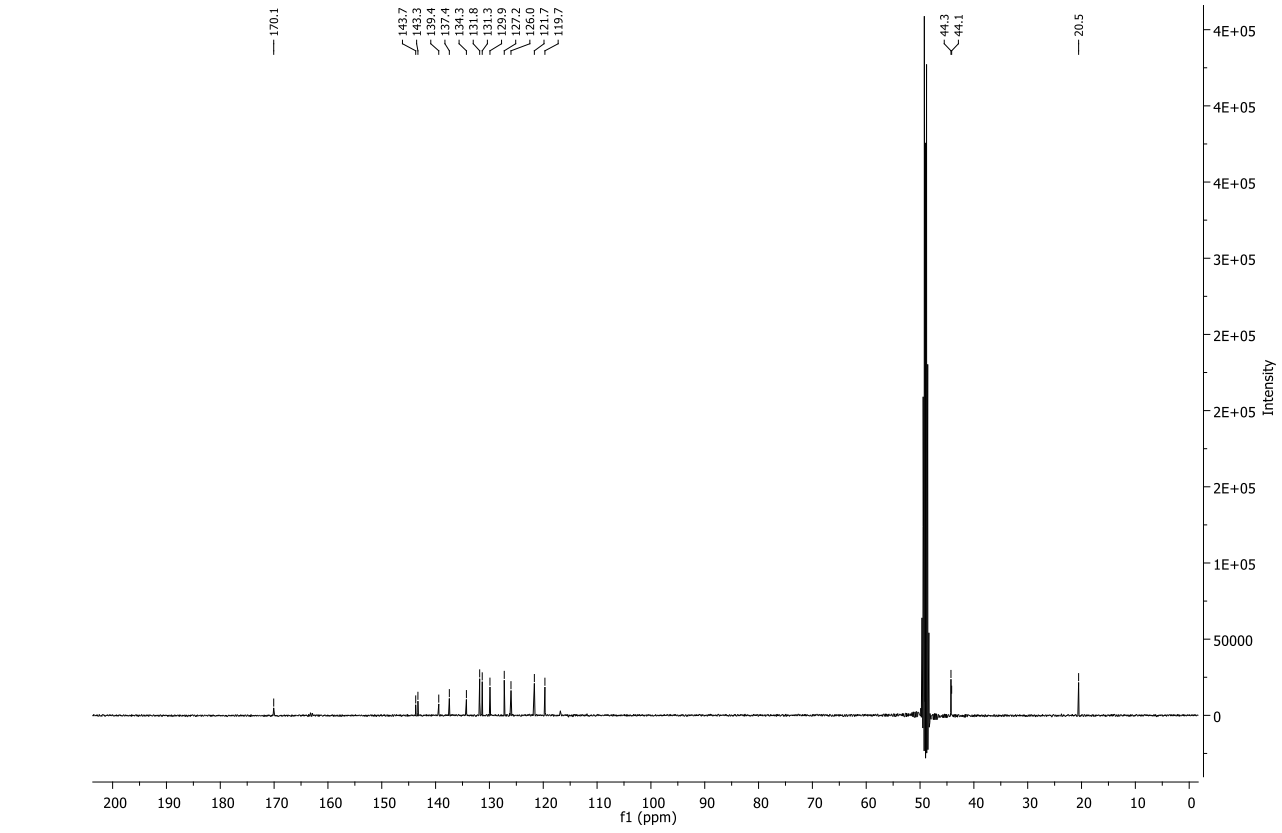


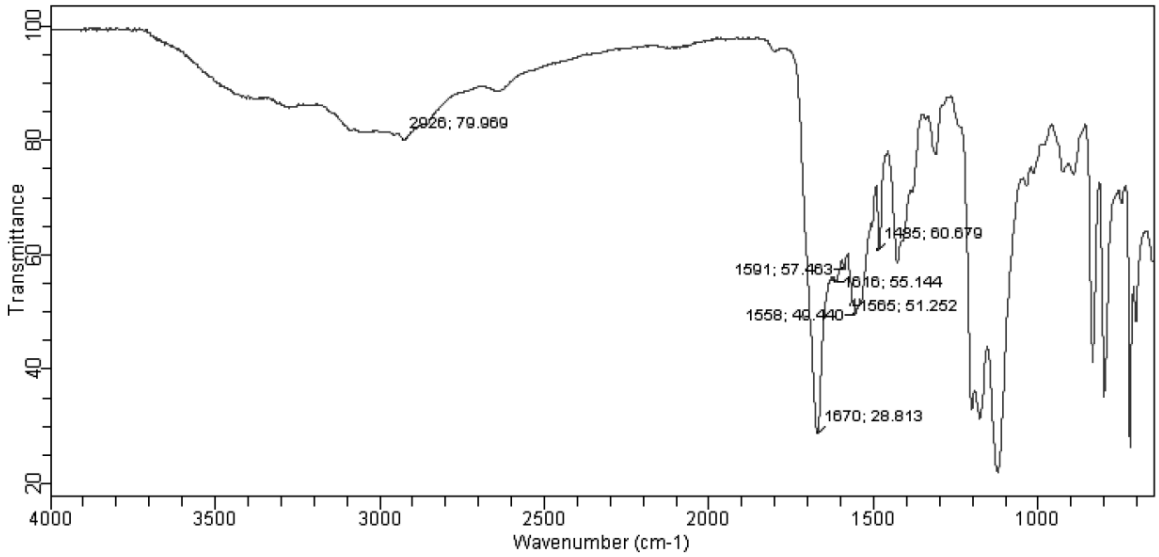

Transmittance
Wavenumber (cm-1)
3276; 75.269
3071; 77.742
2976; 77.325
2921; 74.394
1670; 51.829
1608; 54.555
1583; 52.578
1483; 49.448
1534; 46.623

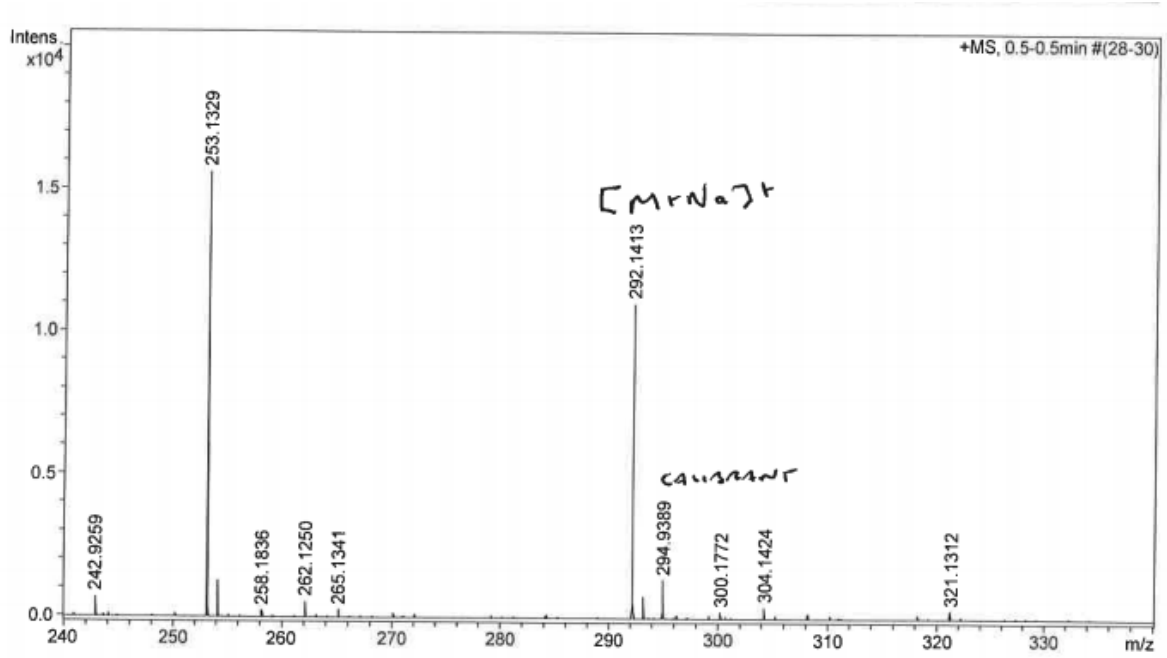

LM822
(DCM)/MeOH + NH4OAc
C19H23N3O
SM: 7G
EPSRC National Facility Swansea
LTQ Orbitrap XL
STRWAT-LM
28/07/2016 15:51:55
NL:
1.31E8
STRWAT_931Q0_449#33-47
RT: 0.72-1.02 AV: 12 T: FTMS
+ p NSI Full ms
[120.00-1935.00]
Relative Abundance
310.1913
311.1959
312.2009
Observed Data
NL:
1.88E4
C19 H23 N3 OH:
C19 H24 N3 O1
p (gss, s /p:40) Chrg 1
R: 100000 Res .Pwr . @FWHM
310.1914
311.1948
312.1979
313.2009
Theoretical Isotope Pattern: [M + H]+
m/z

2-Amino-*N*-(4'-(aminomethyl)-2'-methyl-[1,1'-biphenyl]-3-yl)acetamide (2.50).



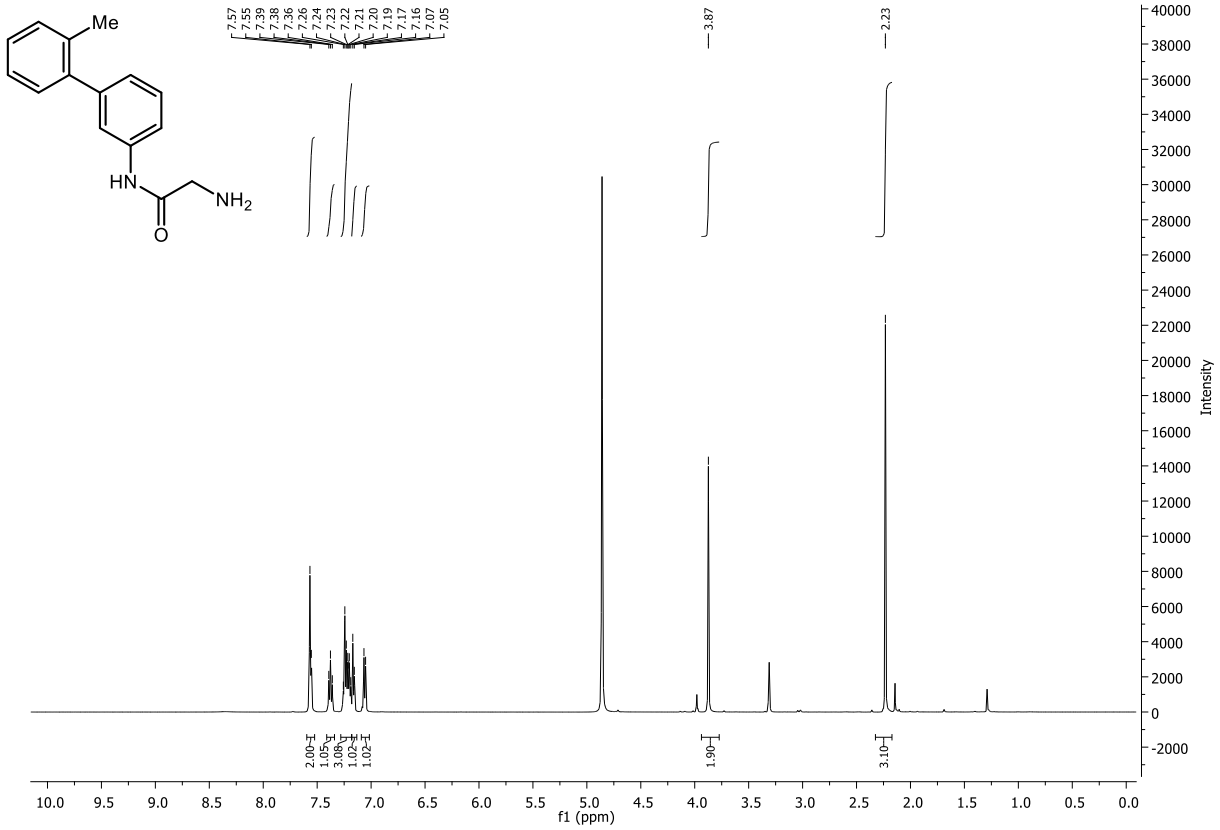


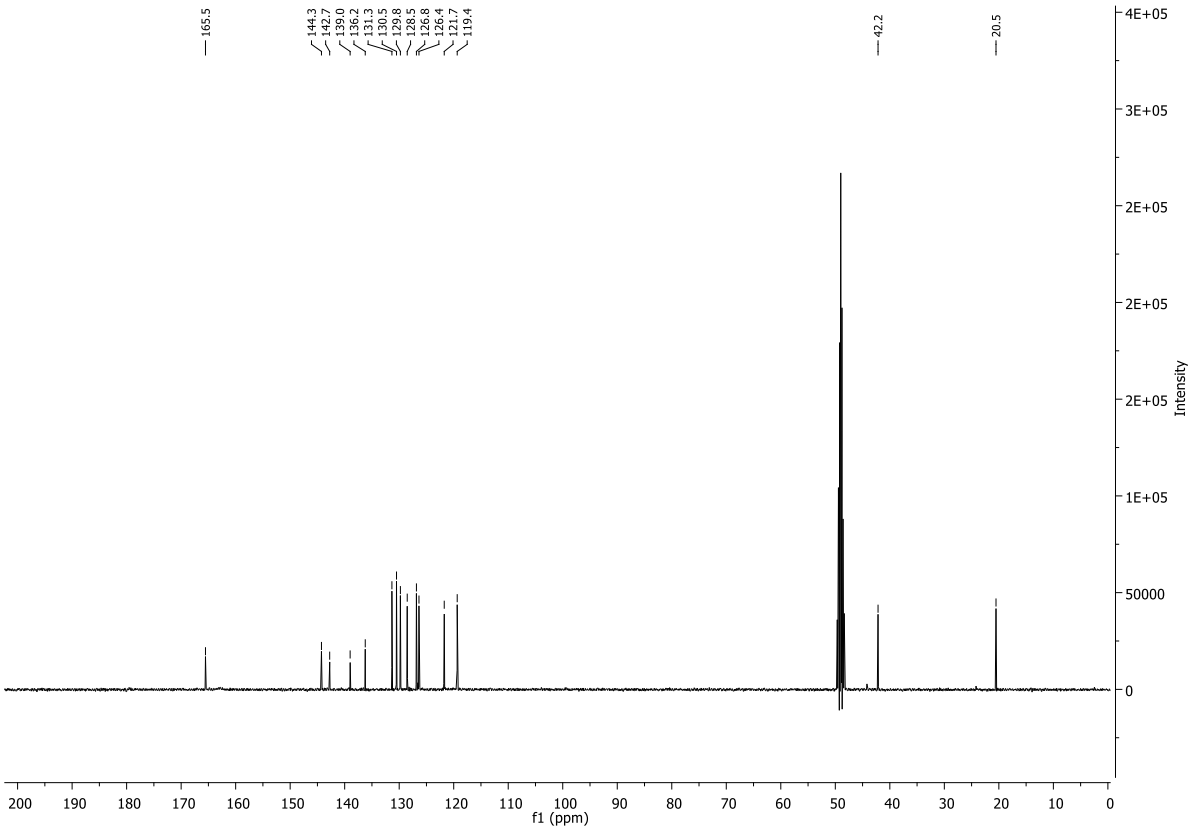


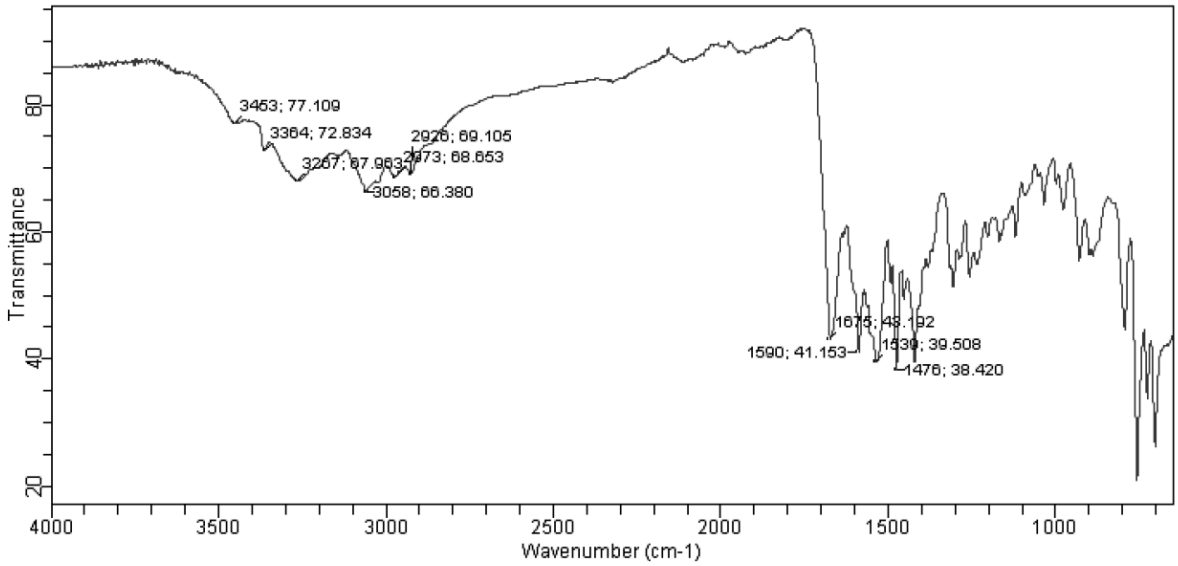


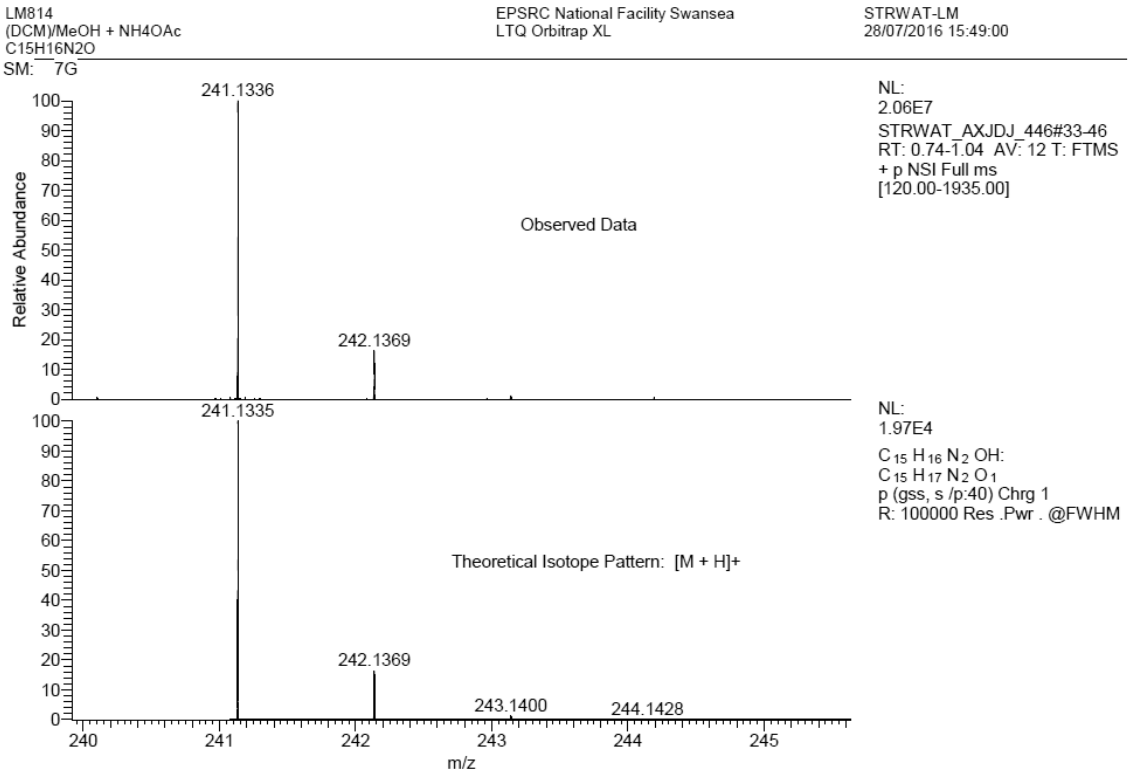
Formula	z	m/z	Meas. m/z	err [ppm]	err [mDa]
	1+		292.1413		
C 16 H 19 N 3 Na O		292.1420		2.4	0.7

2-Amino-N-(2'-methyl-[1,1'-biphenyl]-3-yl)acetamide (2.51).

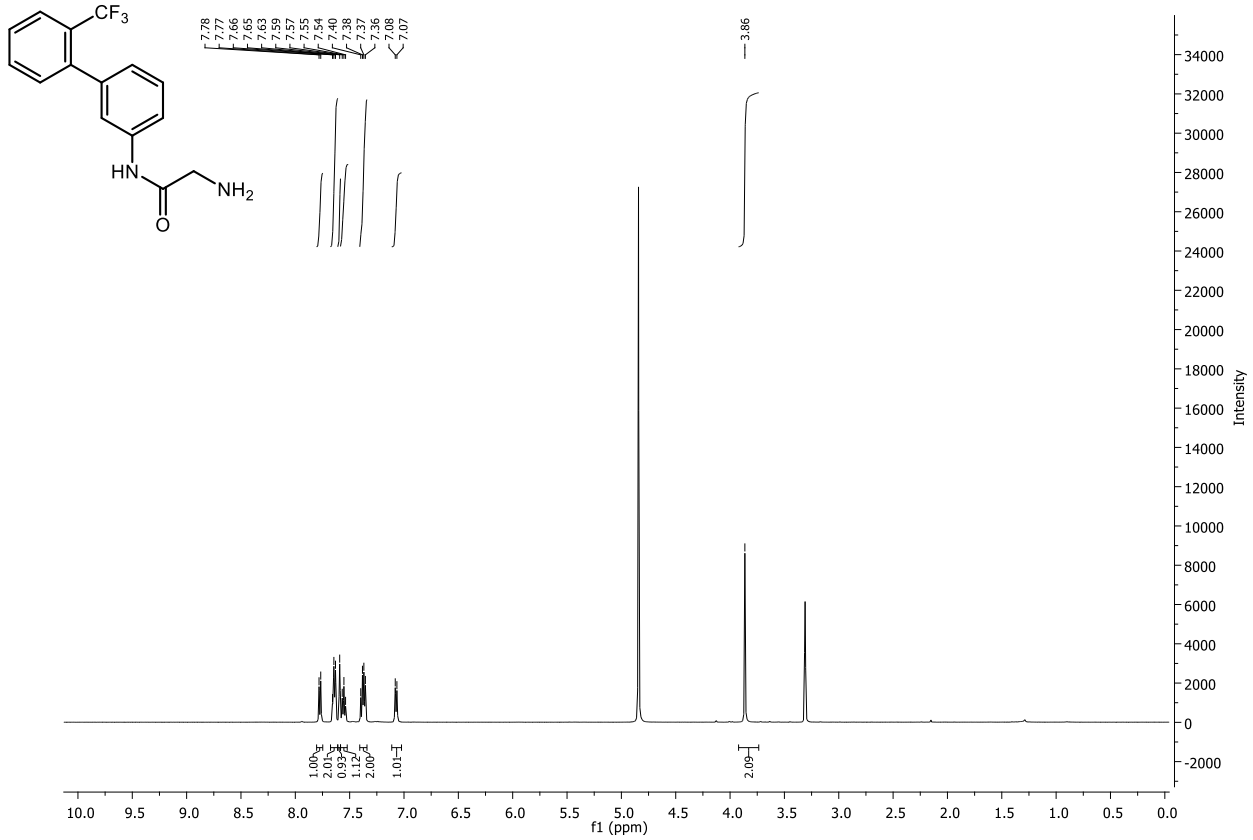


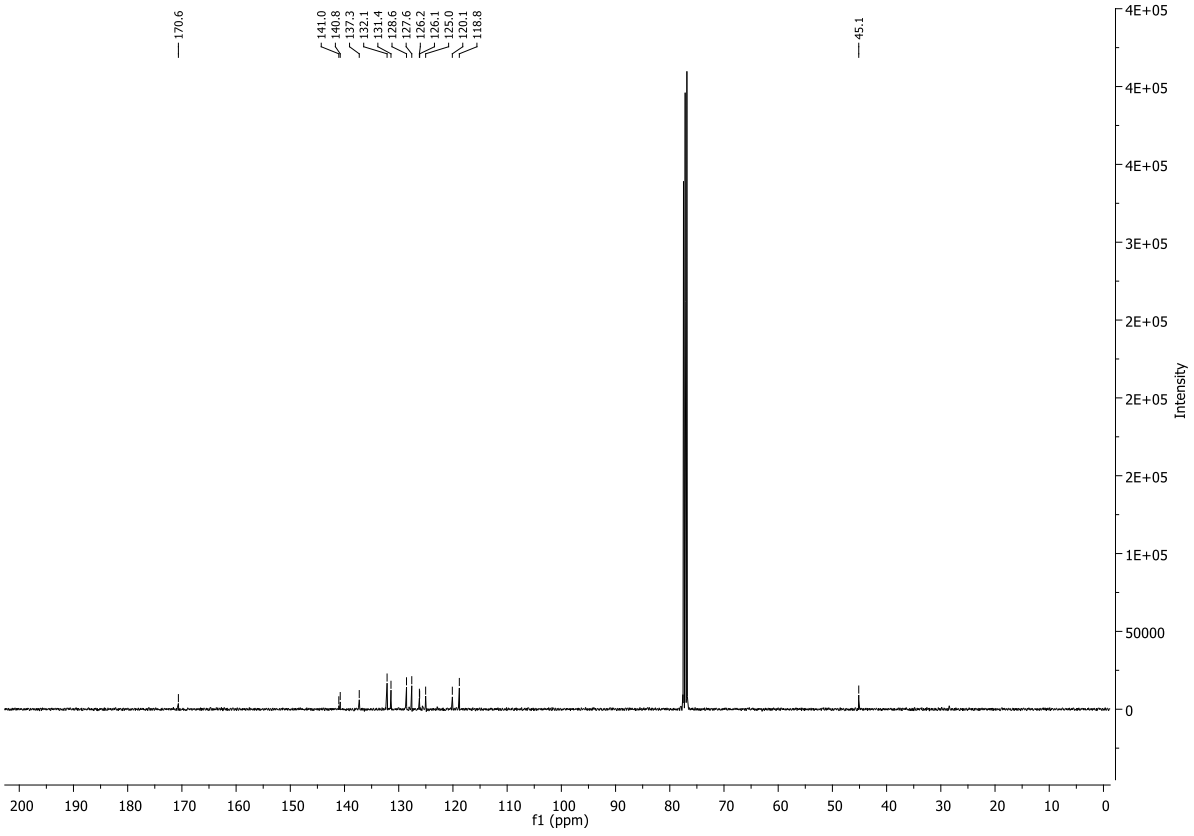


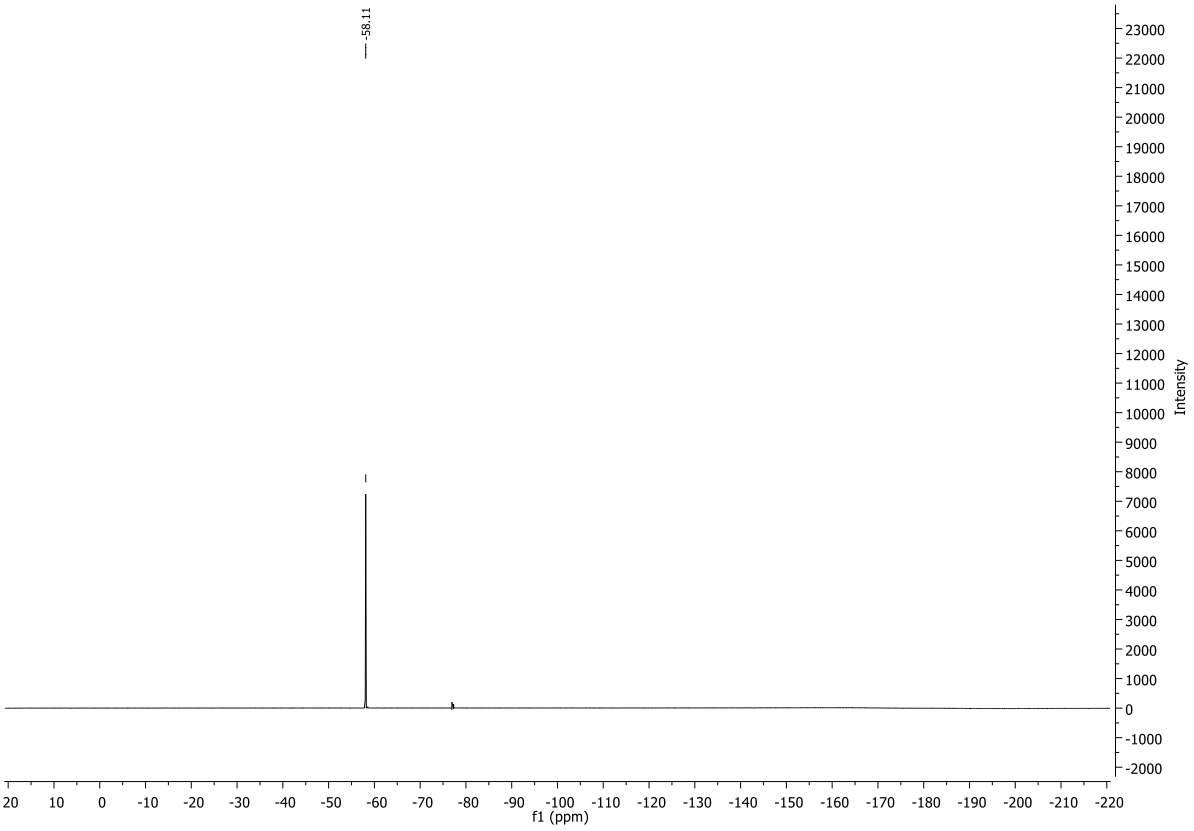

3453; 77.109
3364; 72.834
3207; 67.963
3058; 66.380
2926; 69.105
2873; 68.653
1675; 43.192
1590; 41.153
1539; 39.508
1476; 38.420
Transmittance
Wavenumber (cm-1)

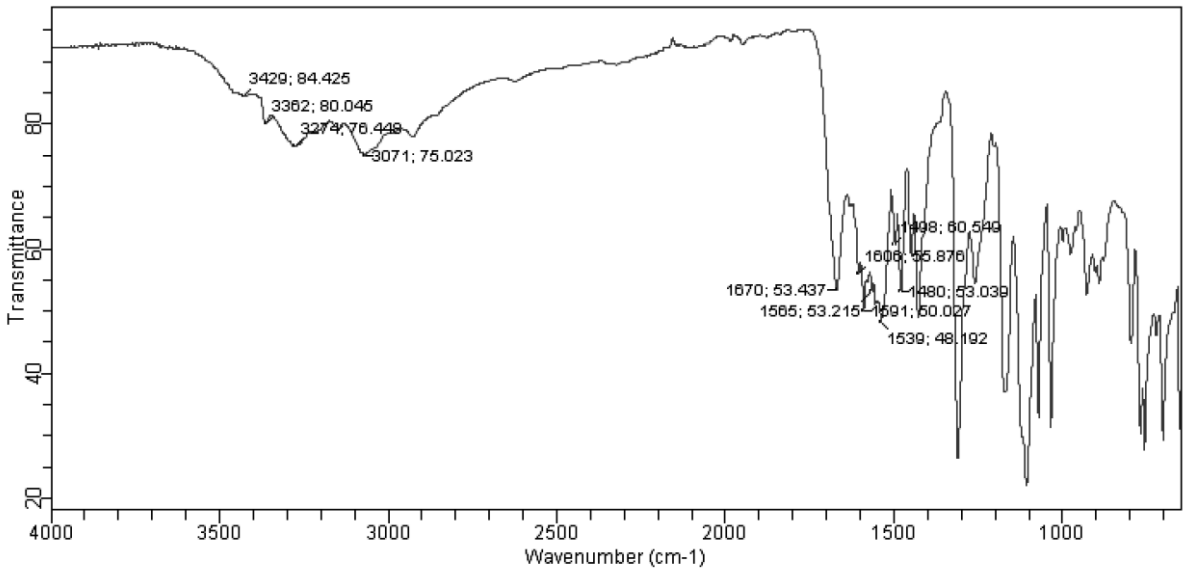

LM814
(DCM)/MeOH + NH4OAc
C15H16N2O
SM: 7G
EPSRC National Facility Swansea
LTQ Orbitrap XL
STRWAT-LM
28/07/2016 15:49:00
241.1336
242.1369
Observed Data
NL:
2.06E7
STRWAT_AXJDJ_446#33-46
RT: 0.74-1.04 AV: 12 T: FTMS
+ p NSI Full ms
[120.00-1935.00]
241.1335
242.1369
243.1400
244.1428
Theoretical Isotope Pattern: [M + H]+
NL:
1.97E4
C15 H16 N2 OH:
C15 H17 N2 O1
p (gss, s /p:40) Chrg 1
R: 100000 Res .Pwr . @FWHM
Relative Abundance
m/z

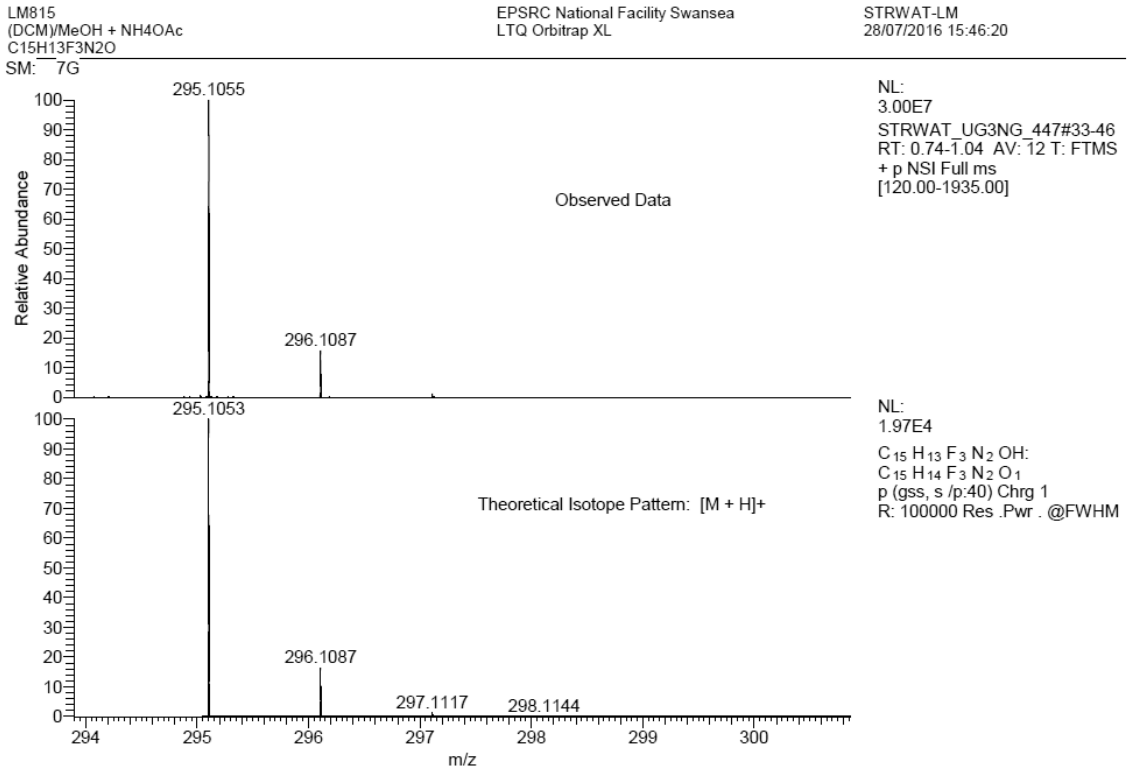
2-Amino-N-(2'-(trifluoromethyl)-[1,1'-biphenyl]-3-yl)acetamide (2.52).



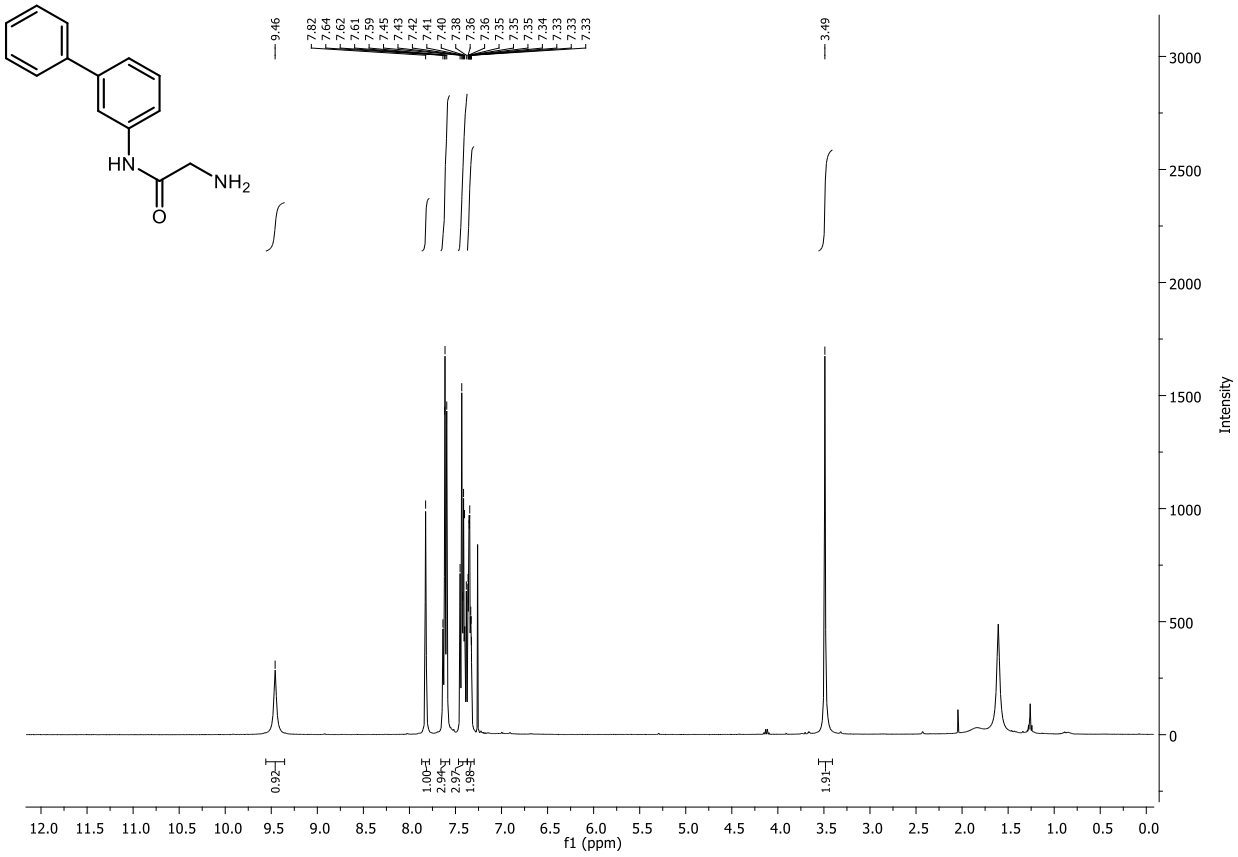


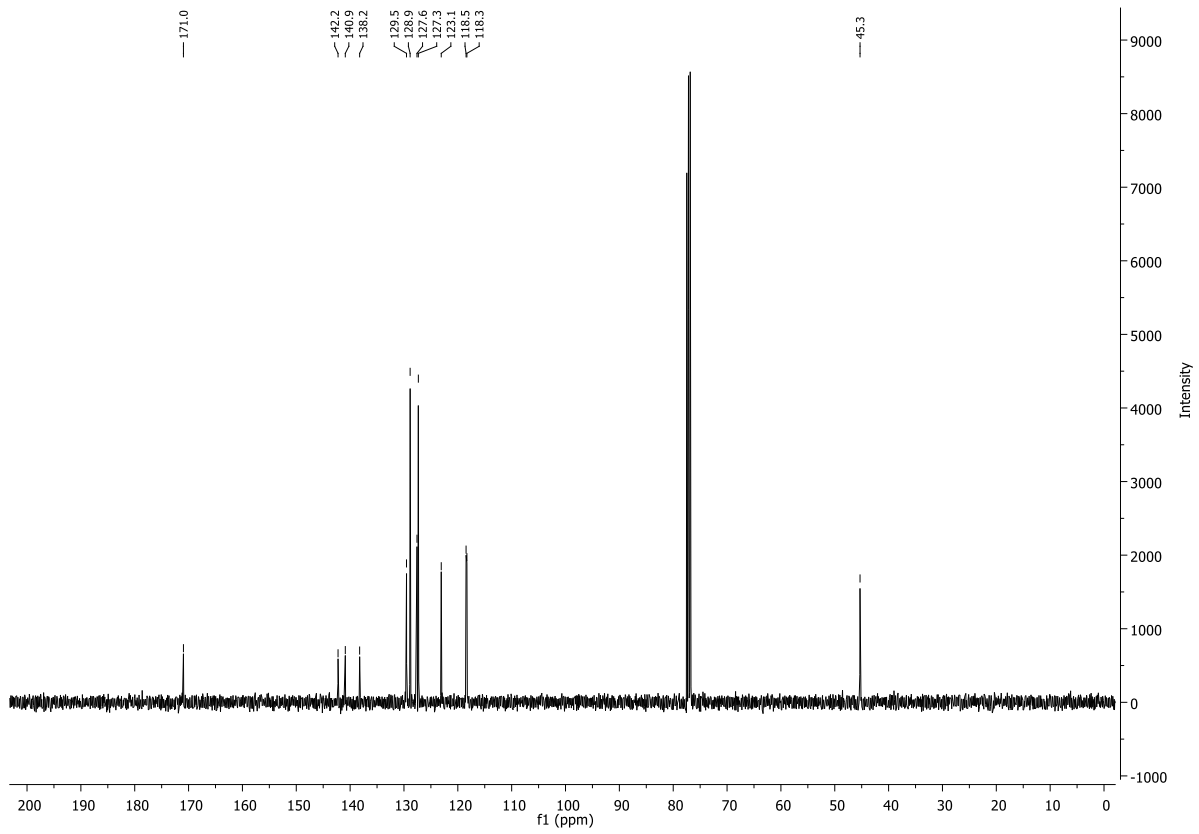

-58.11
Intensity
f1 (ppm)

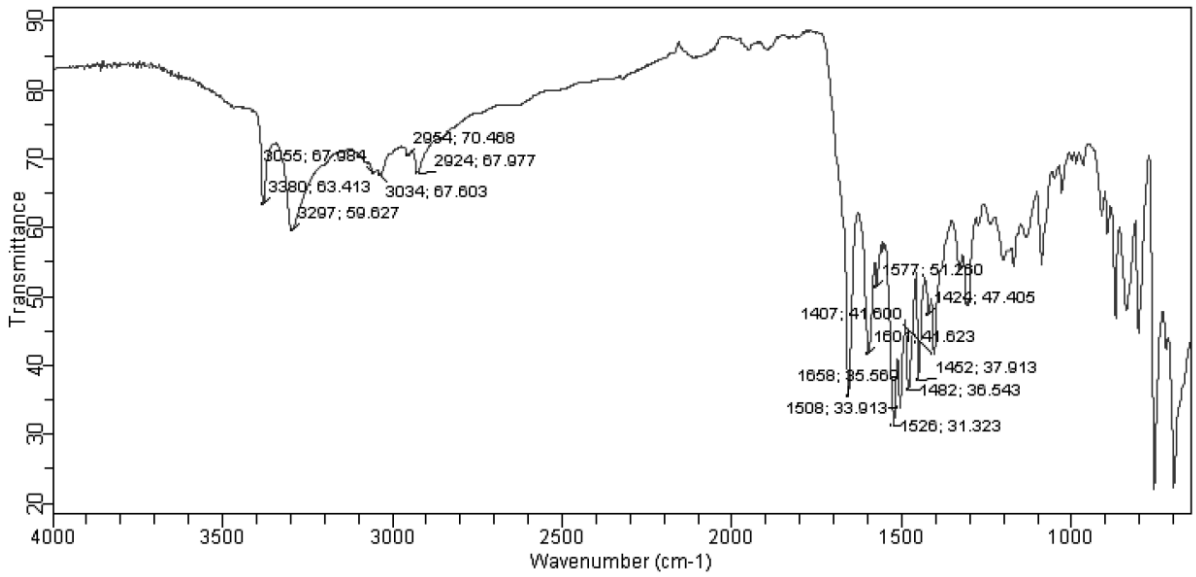

3429; 84.425
3362; 80.045
3274; 76.449
3071; 75.023
1670; 53.437
1565; 53.215
1498; 60.549
1606; 55.876
1480; 53.039
1591; 50.027
1539; 48.192
Transmittance
Wavenumber (cm-1)

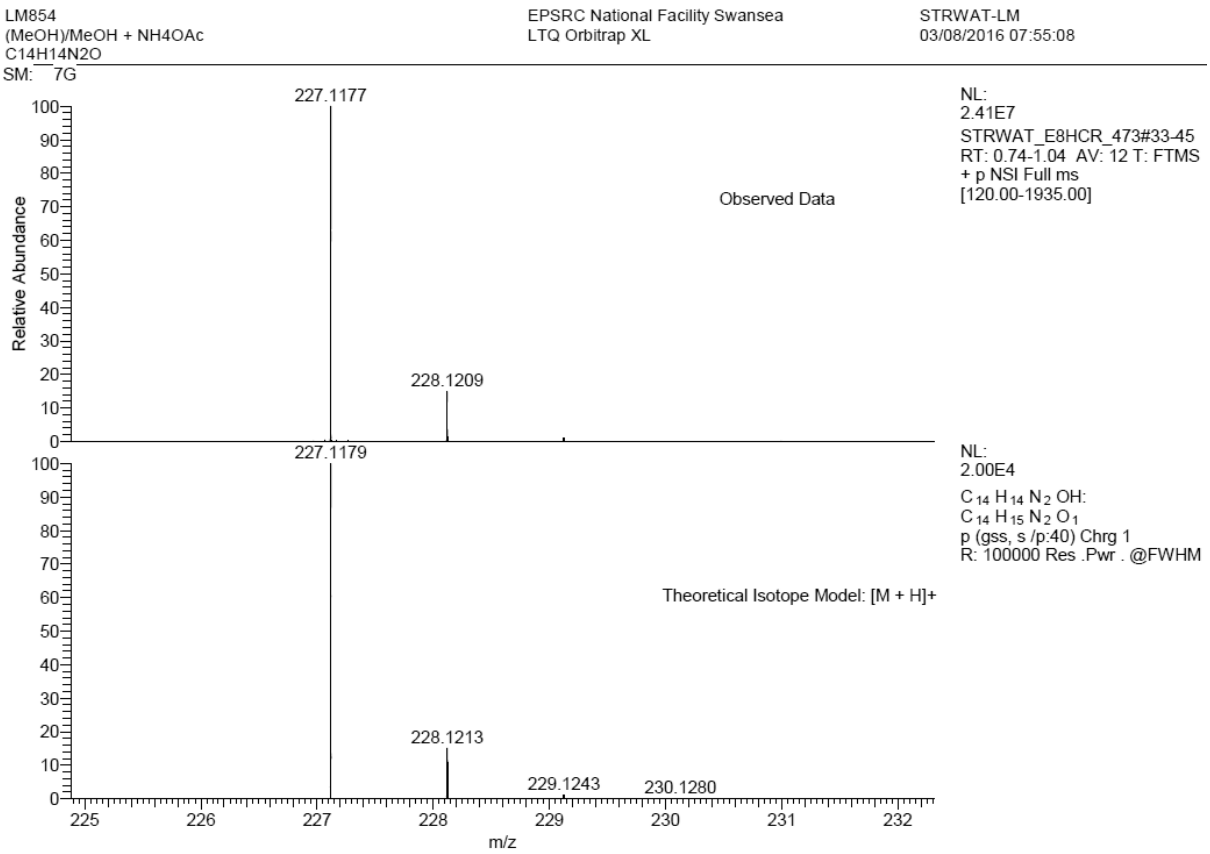


N-([1,1'-biphenyl]-3-yl)-2-aminoacetamide (2.53).

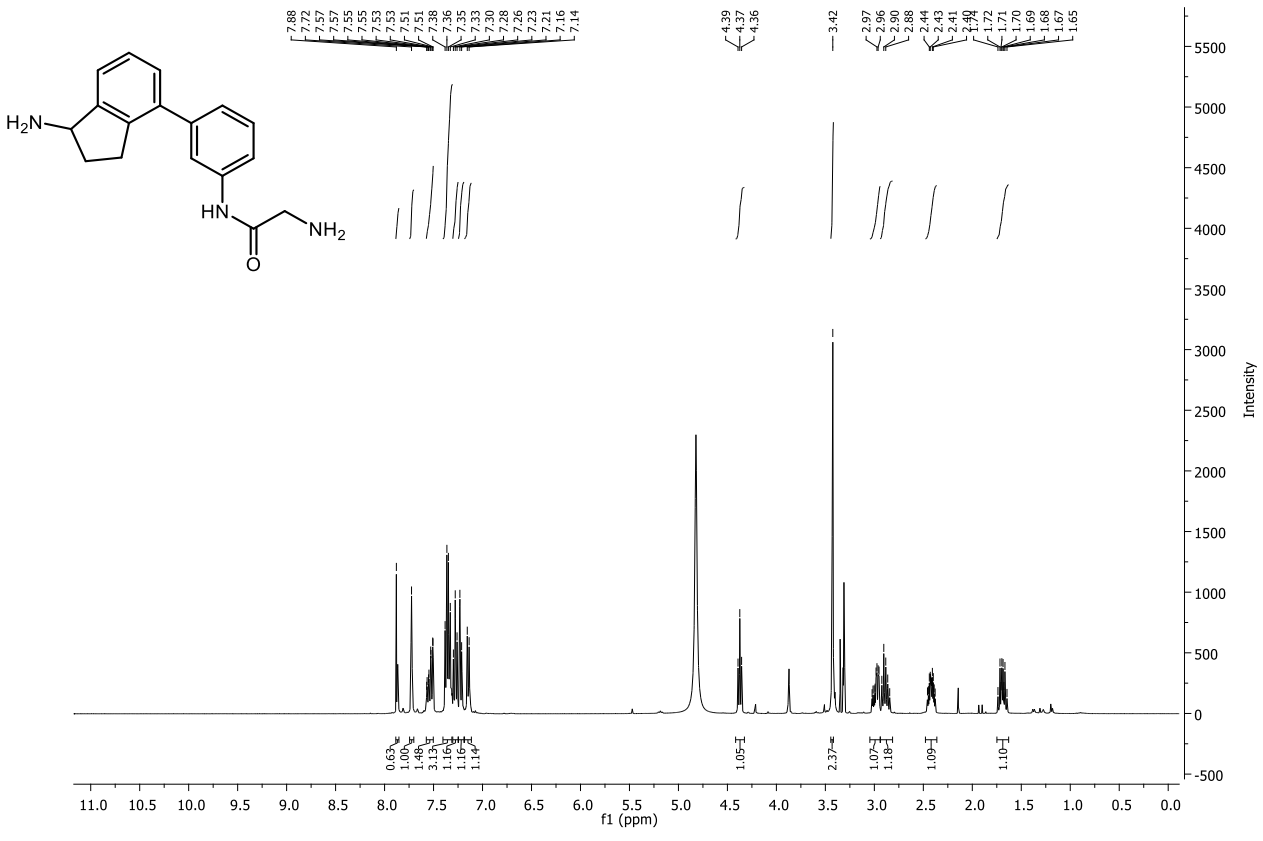


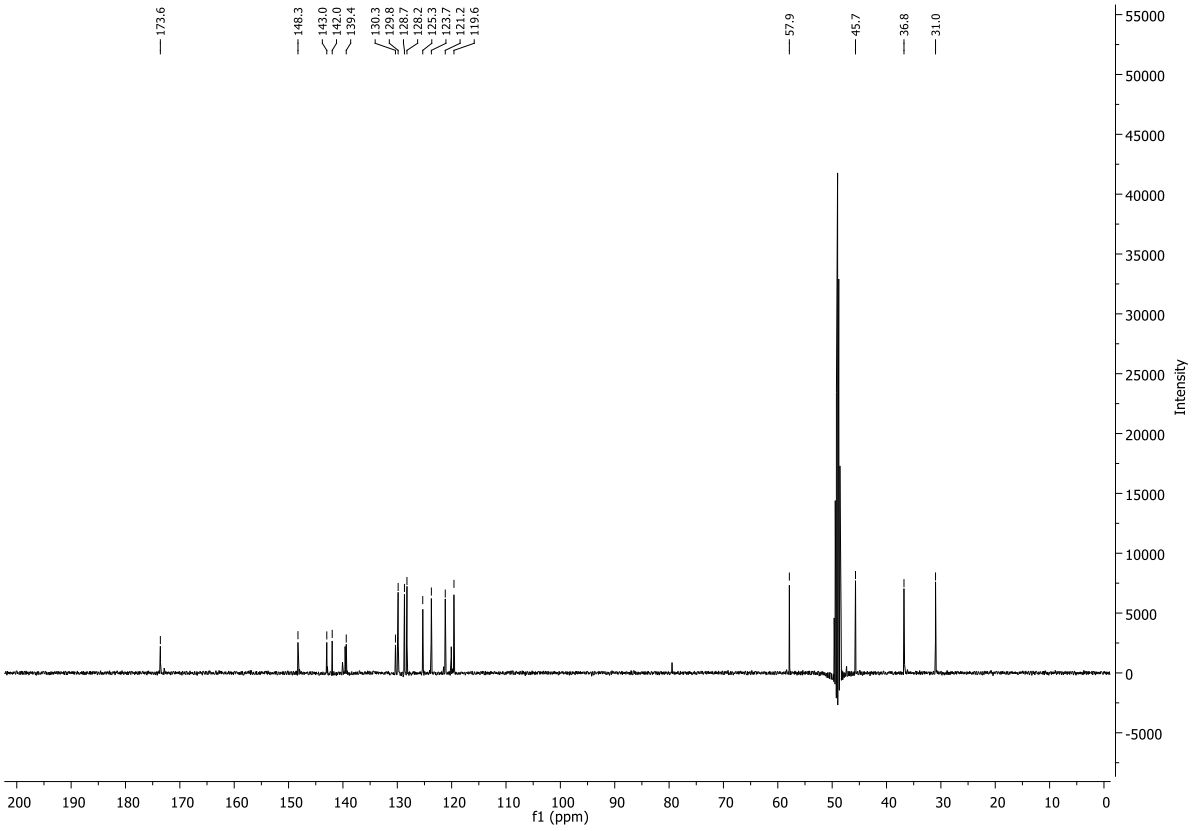

171.0
142.2
140.9
138.2
129.5
128.9
127.6
127.3
123.1
118.5
118.3
45.3
Intensity
f1 (ppm)

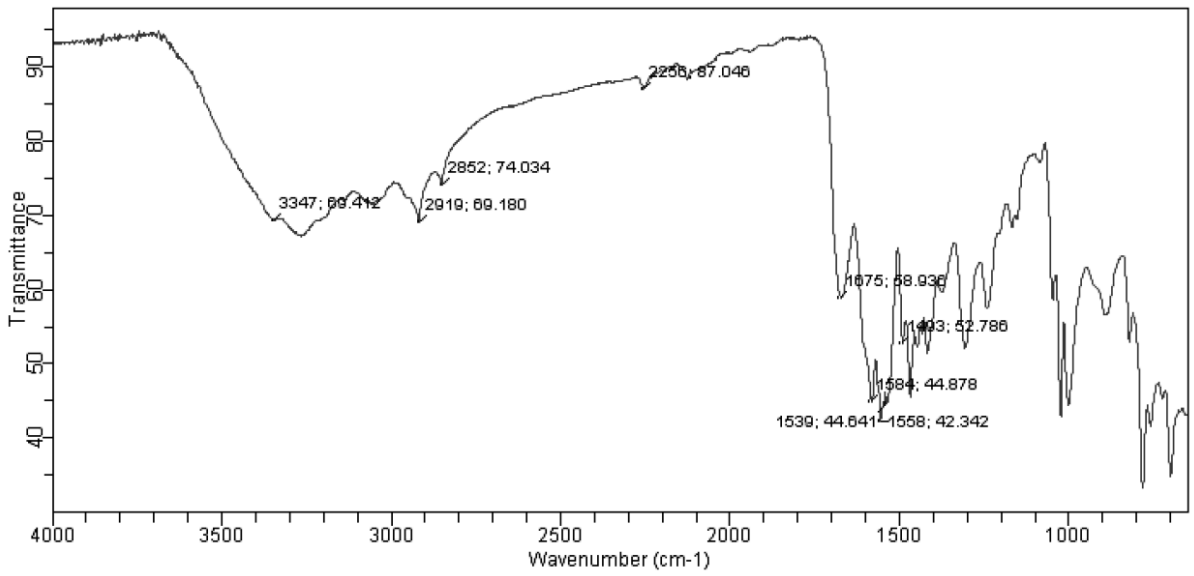

Transmittance
Wavenumber (cm-1)
3055; 67.984
3380; 63.413
3297; 59.627
2954; 70.468
2924; 67.977
3034; 67.603
1577; 51.250
1425; 47.405
1407; 41.600
1603; 41.623
1658; 35.569
1462; 37.913
1482; 36.543
1508; 33.913
1526; 31.323

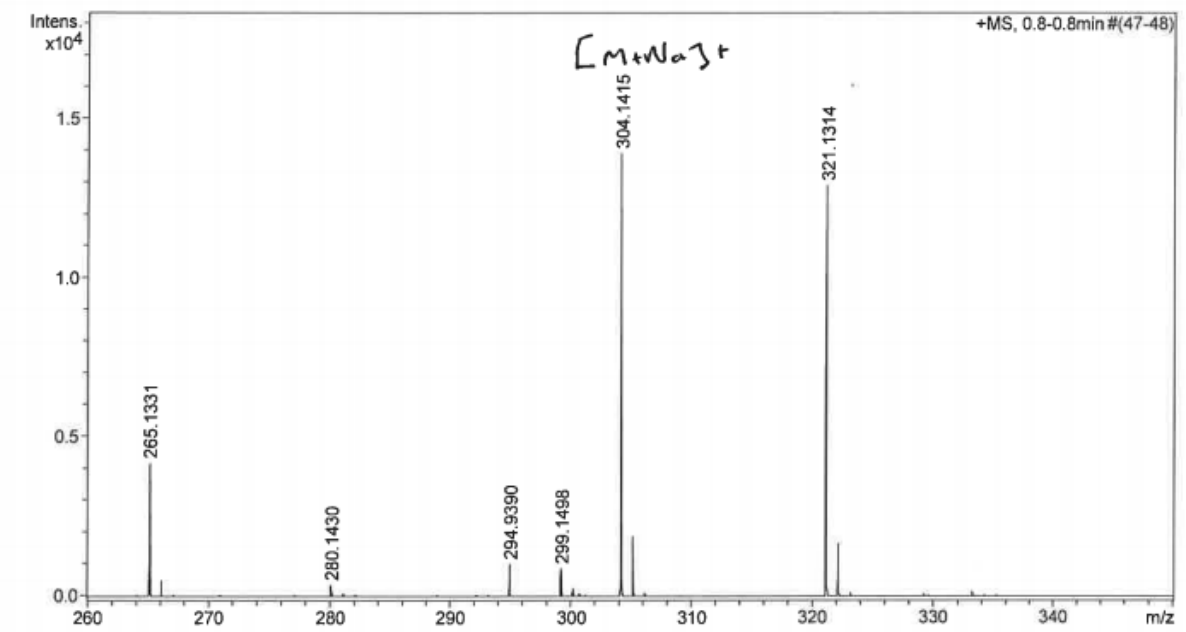


2-Amino-*N*-(3-(1-amino-2,3-dihydro-1*H*-inden-4-yl)phenyl)acetamide (2.54).



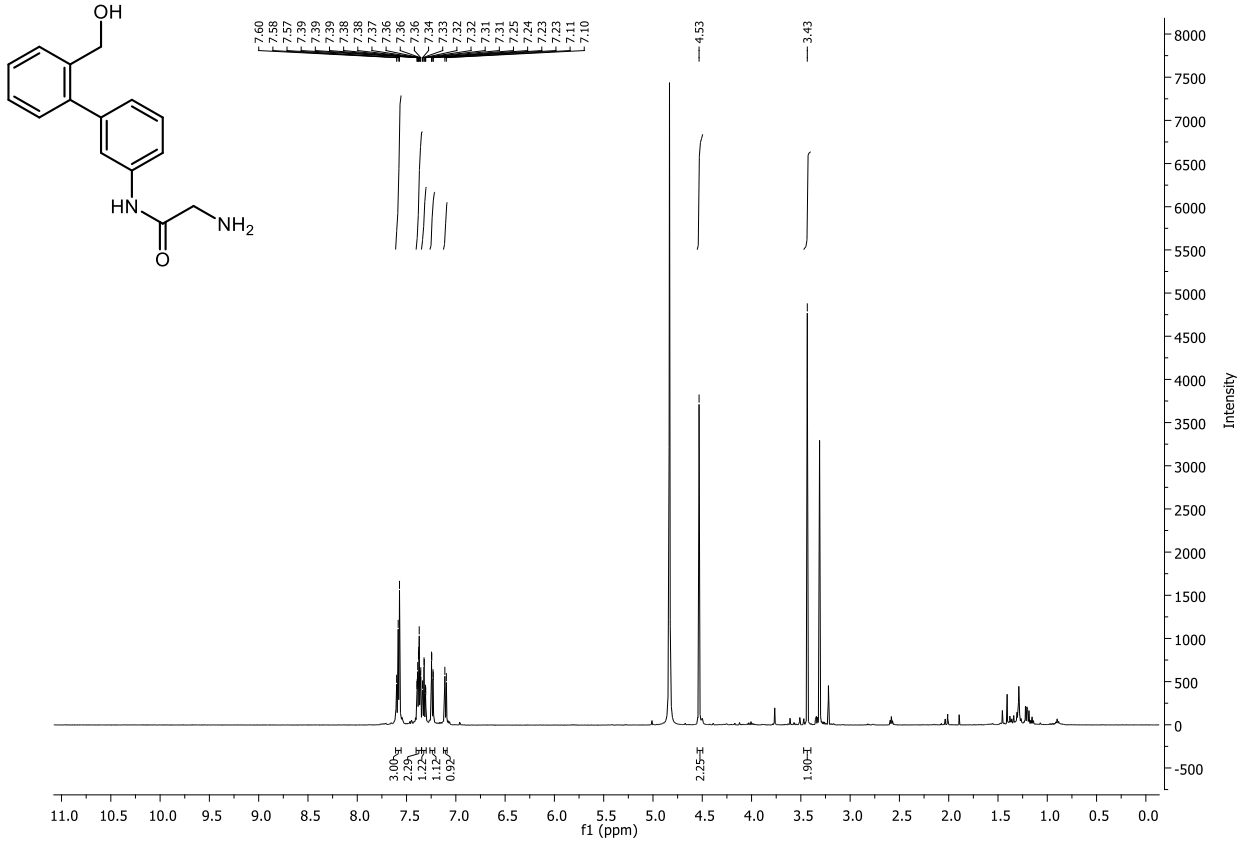

173.6
148.3
143.0
142.0
139.4
130.3
129.8
128.7
128.2
125.3
123.7
121.2
119.6
57.9
45.7
36.8
31.0
Intensity
f1 (ppm)

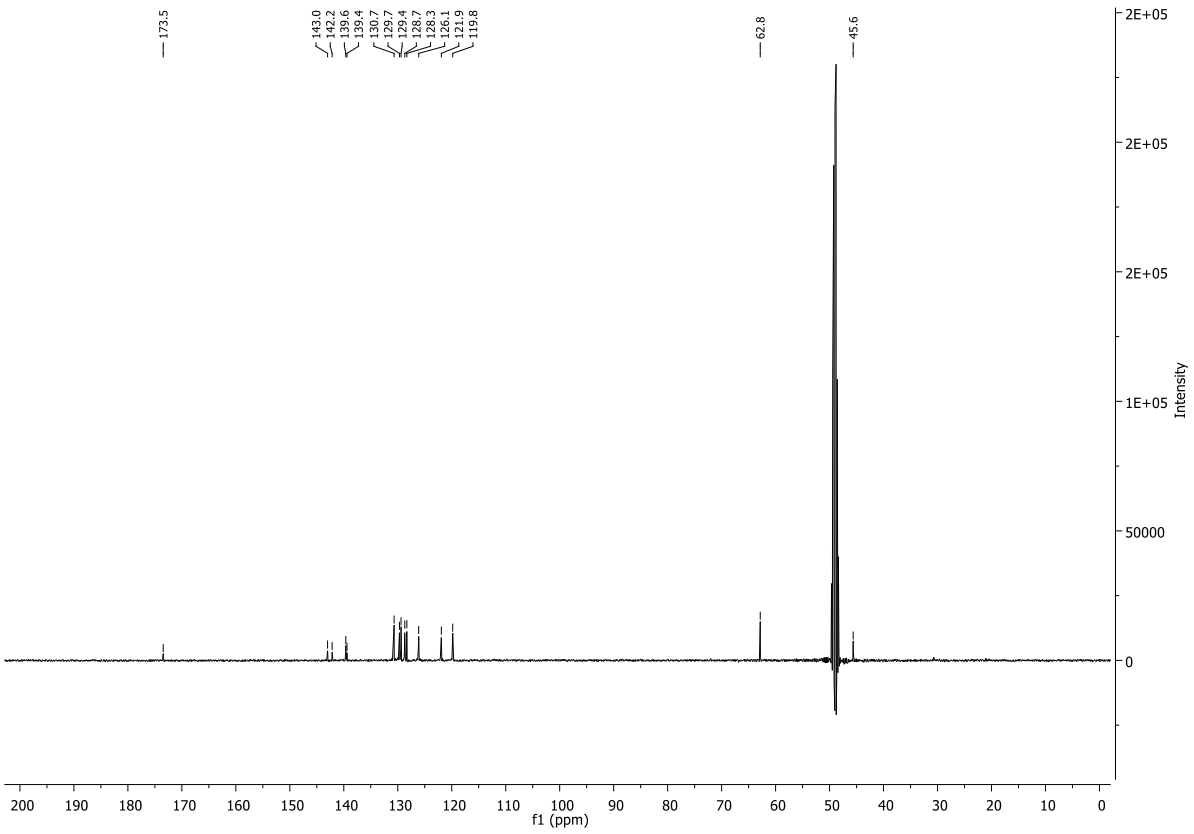

Transmittance
Wavenumber (cm-1)
3347; 69.412
2919; 69.180
2852; 74.034
2256; 87.046
1675; 58.936
1403; 52.786
1584; 44.878
1539; 44.641
1558; 42.342

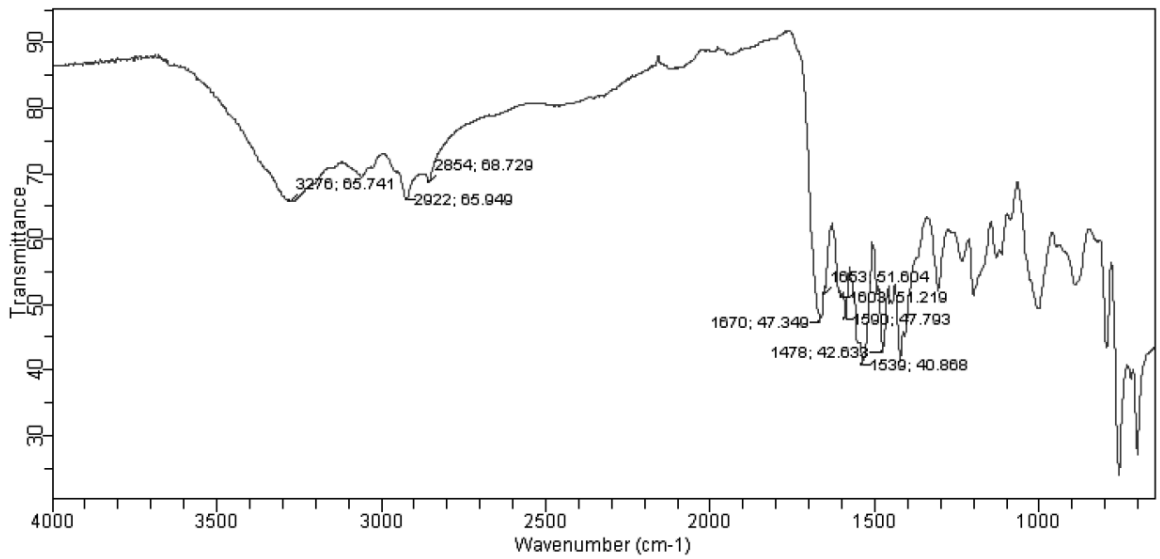


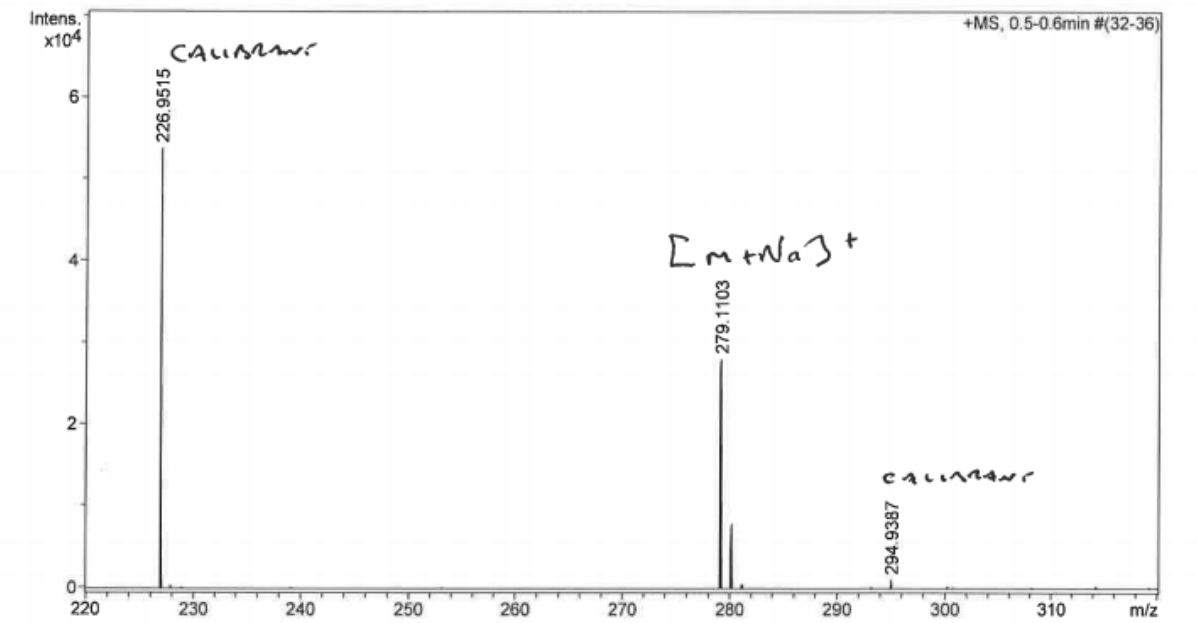
Formula	z	m/z	Meas. m/z	err [ppm]	err [mDa]
	1+		304.1415		
C 17 H 19 N 3 Na O		304.1420		1.7	0.5

2-Amino-*N*-(2'-(hydroxymethyl)-[1,1'-biphenyl]-3-yl)acetamide (2.55).



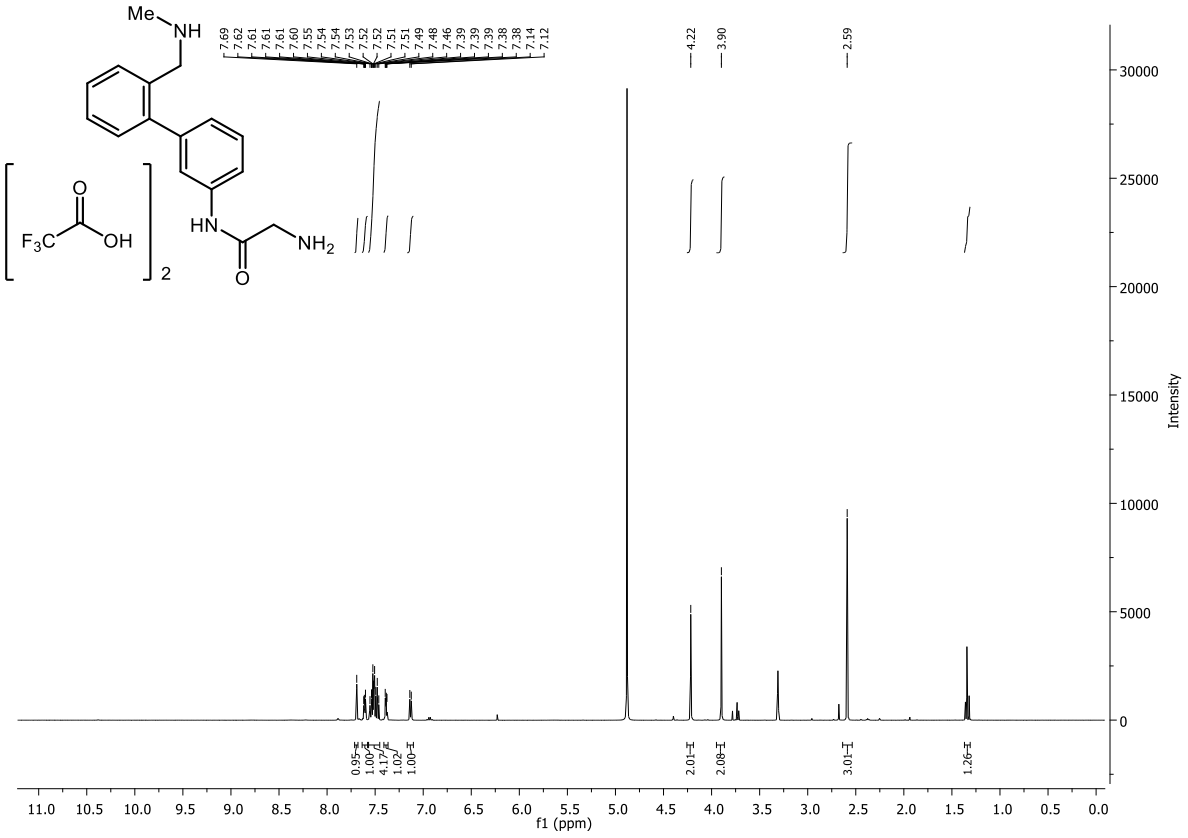

173.5
143.0
142.2
139.6
139.4
130.7
129.7
129.4
128.7
128.3
126.1
121.9
119.8
62.8
45.6
2E+05
2E+05
2E+05
1E+05
50000
0
Intensity
200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0
f1 (ppm)

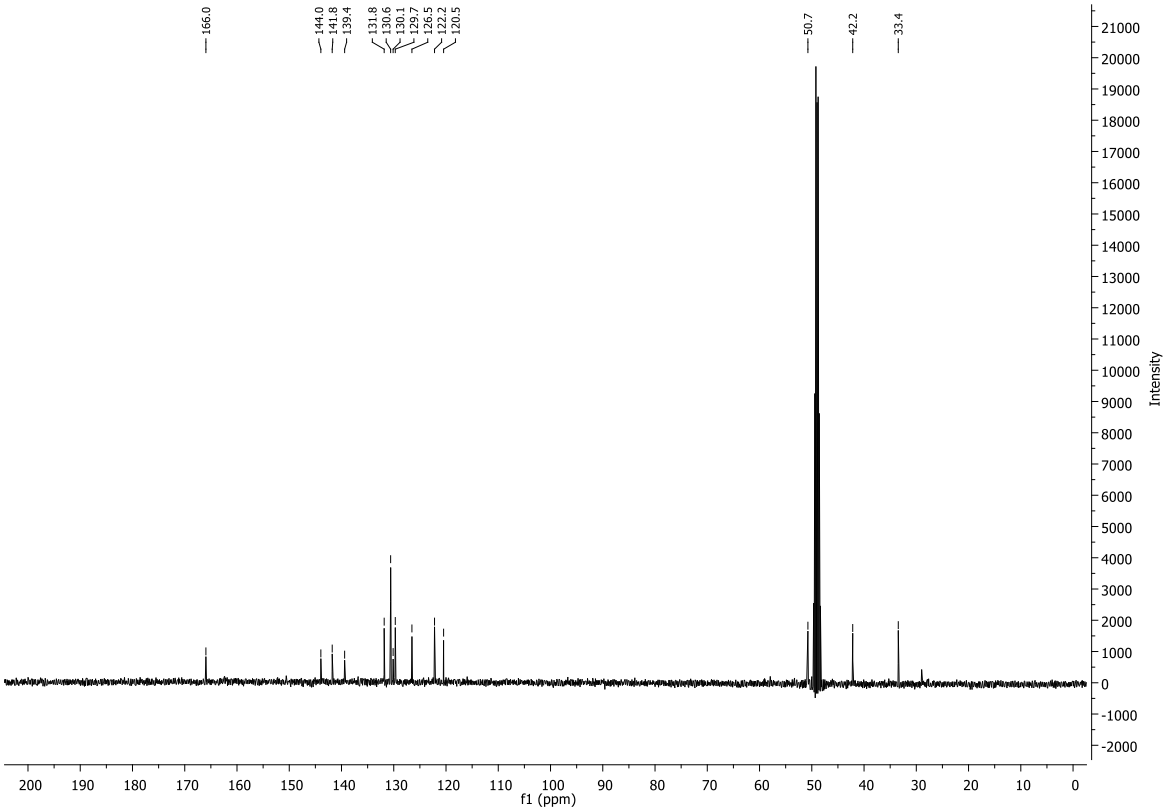

Transmittance
90 80 70 60 50 40 30
3276; 65.741
2854; 68.729
2922; 65.949
1653; 51.604
1603; 51.219
1590; 47.793
1670; 47.349
1478; 42.638
1539; 40.868
4000 3500 3000 2500 2000 1500 1000
Wavenumber (cm-1)

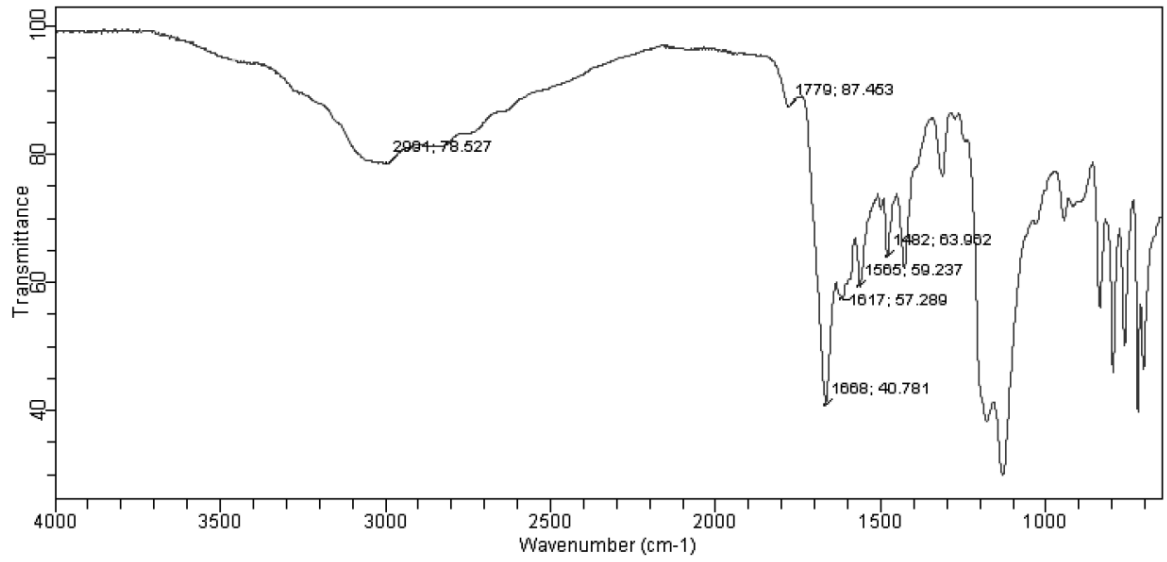


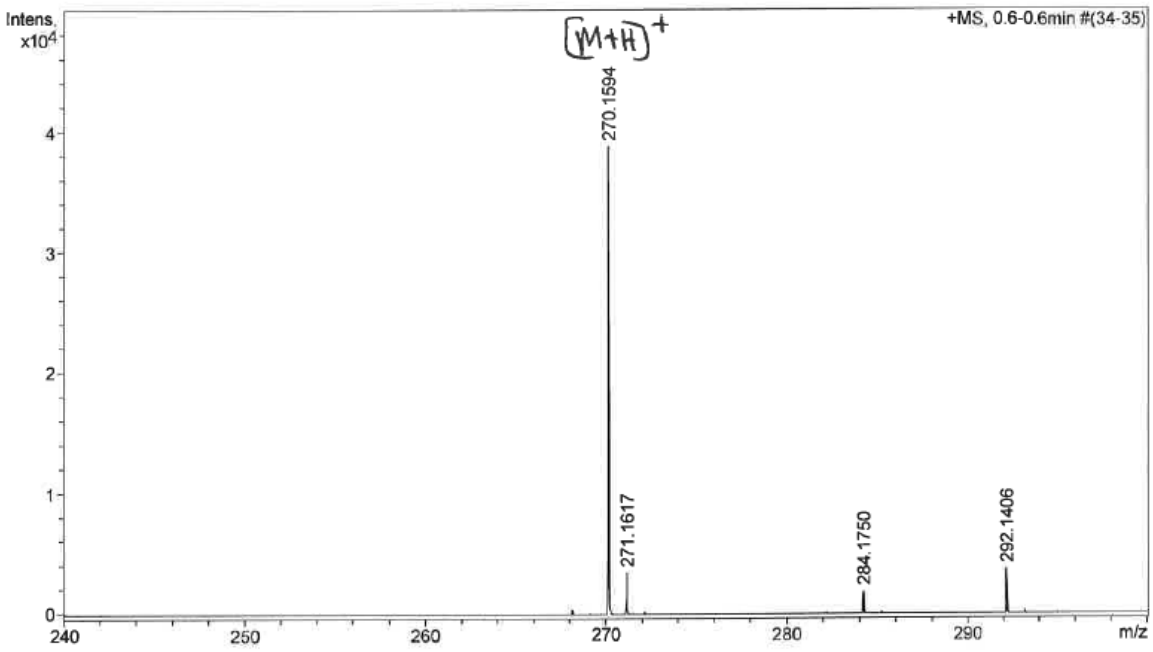
Formula	z	m/z	Meas. m/z	err [ppm]	err [mDa]
	1+		279.1103		
C 15 H 16 N 2 Na O 2		279.1104		0.5	0.1

2-Amino-N-(2'-((methylamino)methyl)-[1,1'-biphenyl]-3-yl)acetamide bis(2,2,2-trifluoroacetate) (2.56).



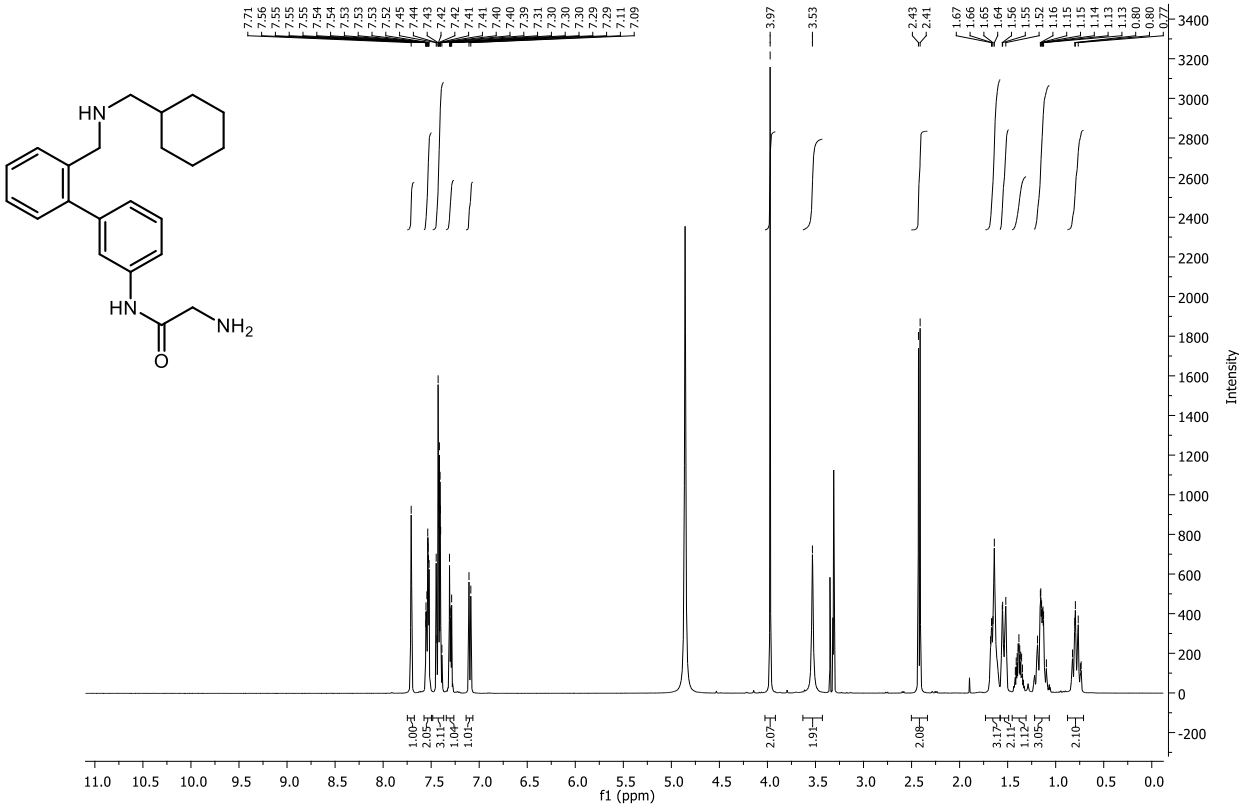

166.0
144.0
141.8
139.4
131.8
130.6
130.1
129.7
126.5
122.2
120.5
50.7
42.2
33.4
Intensity
f1 (ppm)

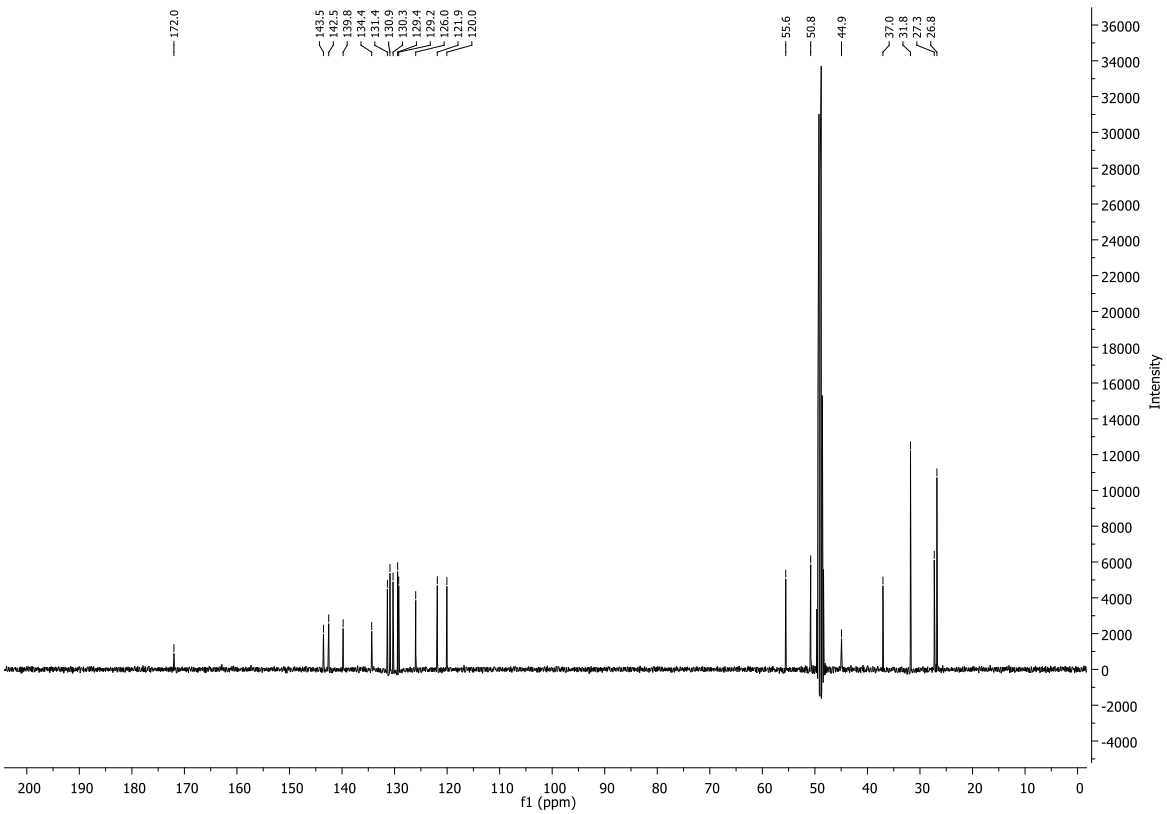

Transmittance
2981; 78.527
1779; 87.453
1482; 63.952
1565; 59.237
1617; 57.289
1668; 40.781
Wavenumber (cm-1)

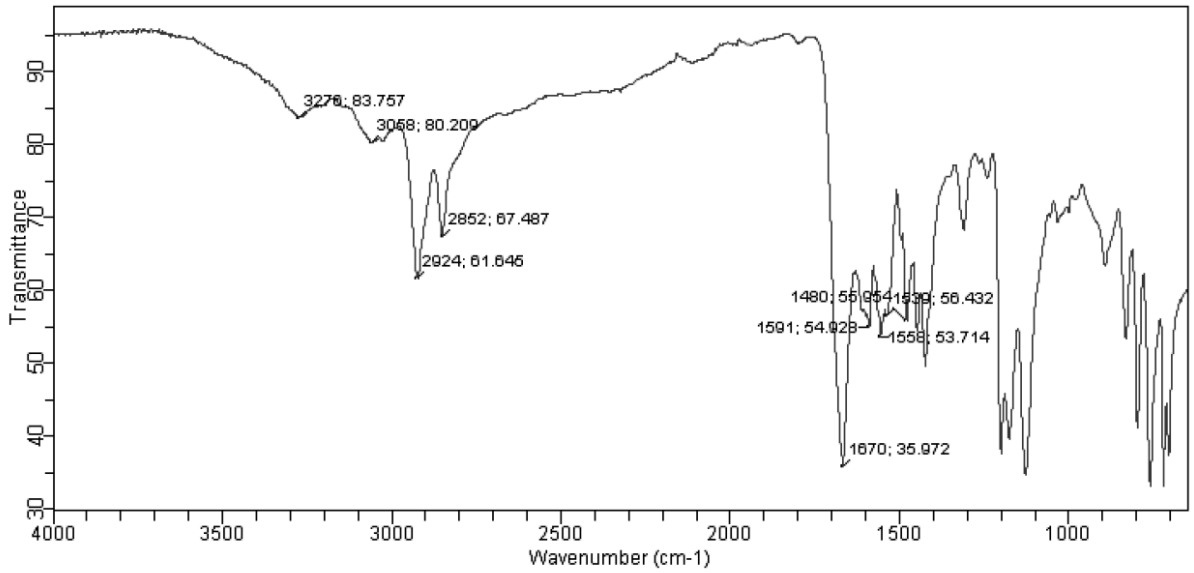


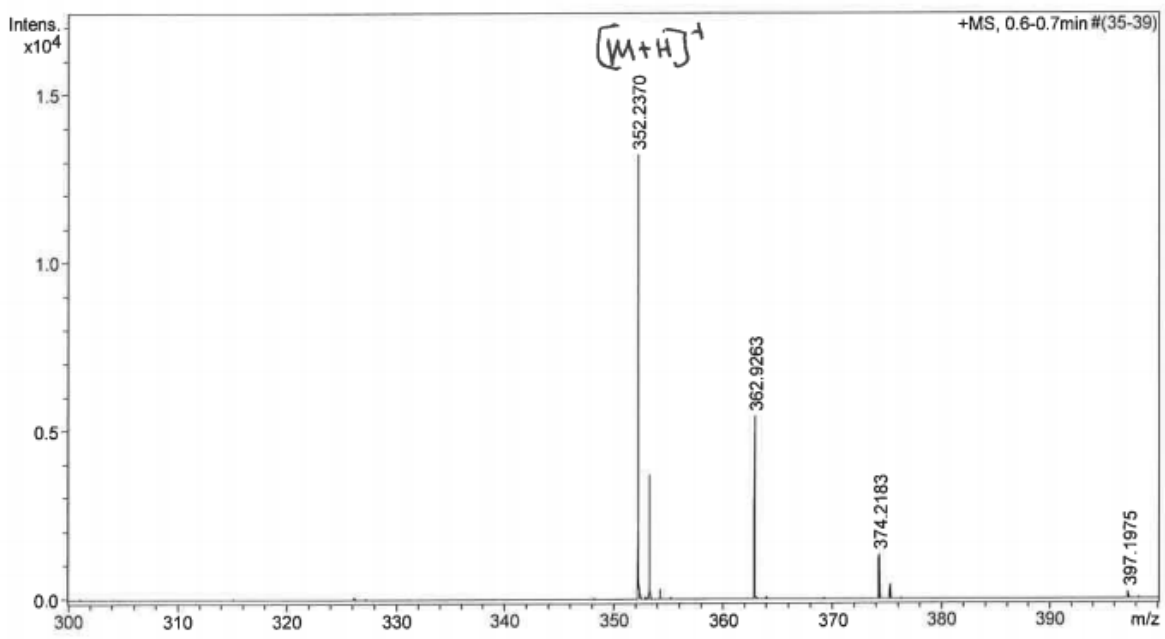
Formula	z	m/z	Meas. m/z	err [ppm]	err [mDa]
	1+		270.1594		
C 16 H 20 N 3 O		270.1601		2.6	0.7

2-Amino-*N*-(2'-(((cyclohexylmethyl)amino)methyl)-[1,1'-biphenyl]-3-yl)acetamide (2.57).



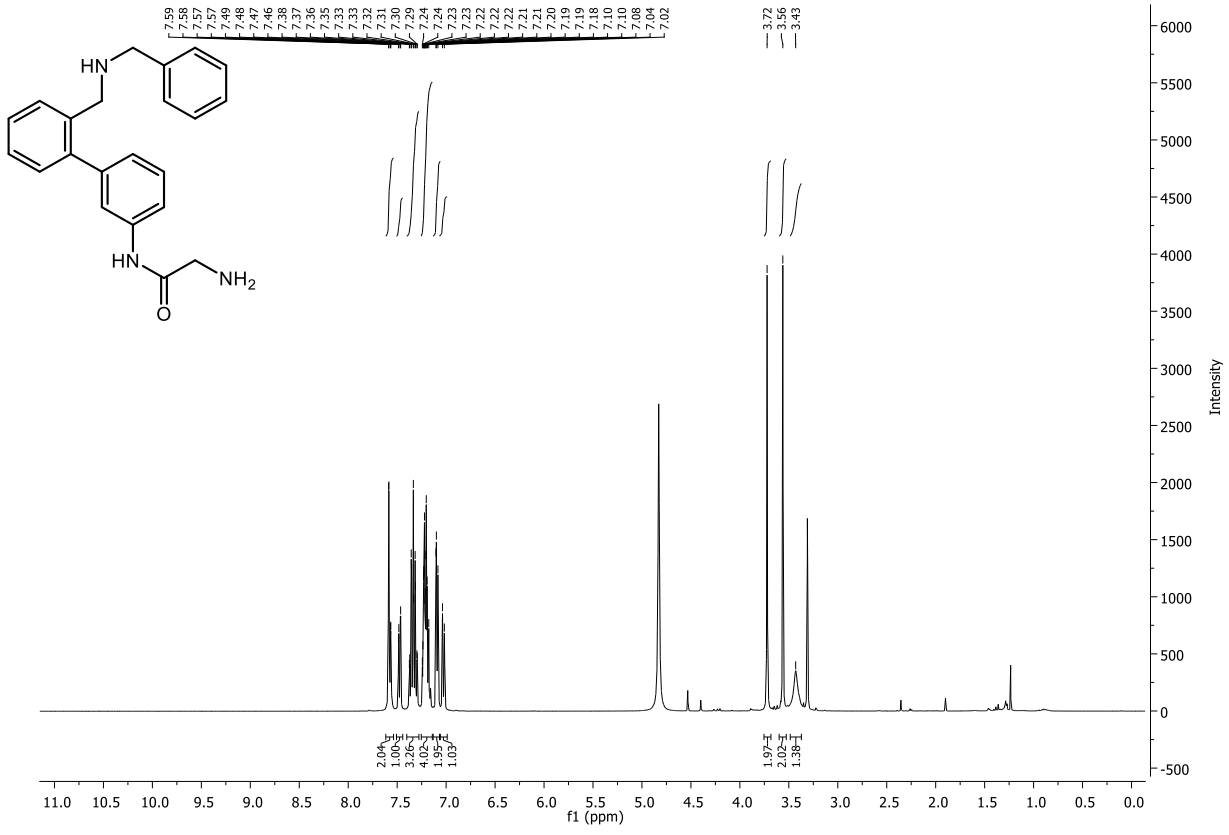

172.0
143.5
142.5
139.8
134.4
131.4
130.9
130.3
129.4
129.2
126.0
121.9
120.0
55.6
50.8
44.9
37.0
31.8
27.3
26.8
Intensity
f1 (ppm)

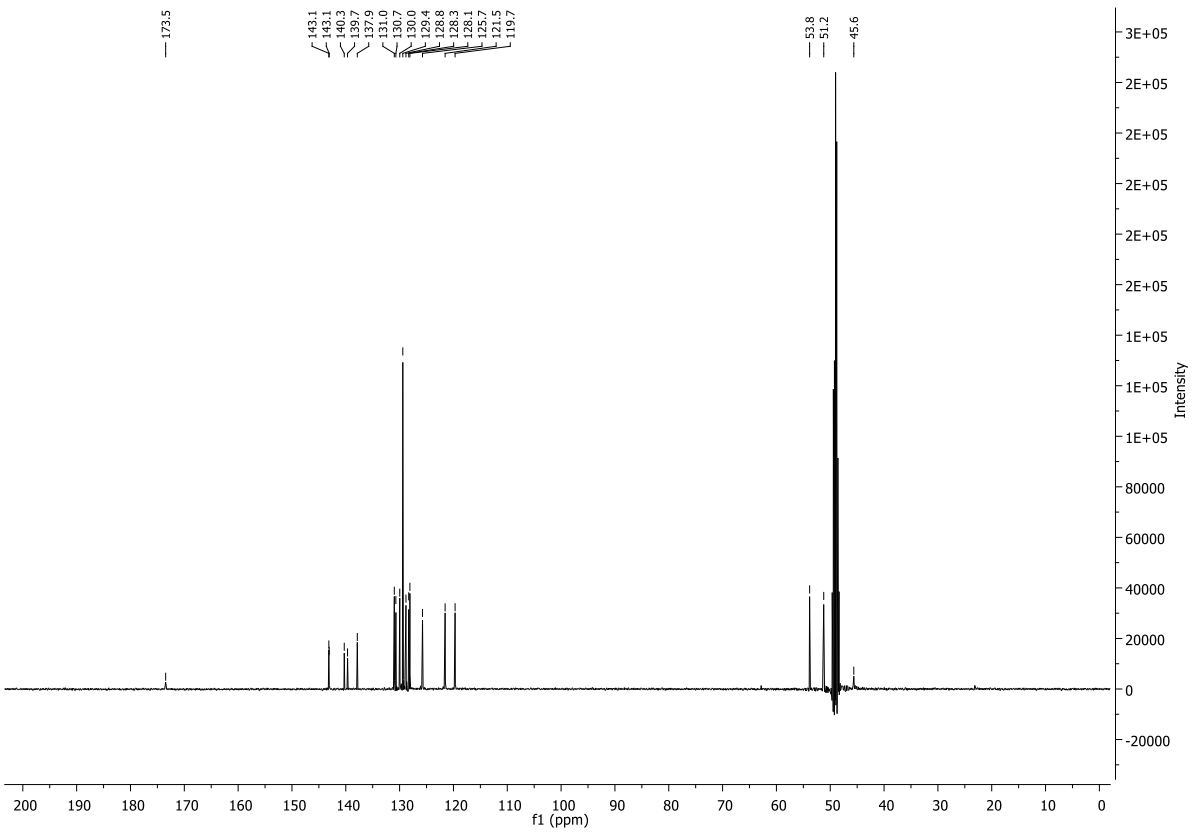

3276; 83.757
3058; 80.209
2852; 67.487
2924; 61.646
1480; 55.954
1539; 56.432
1591; 54.928
1558; 53.714
1670; 35.972
Transmittance
Wavenumber (cm-1)

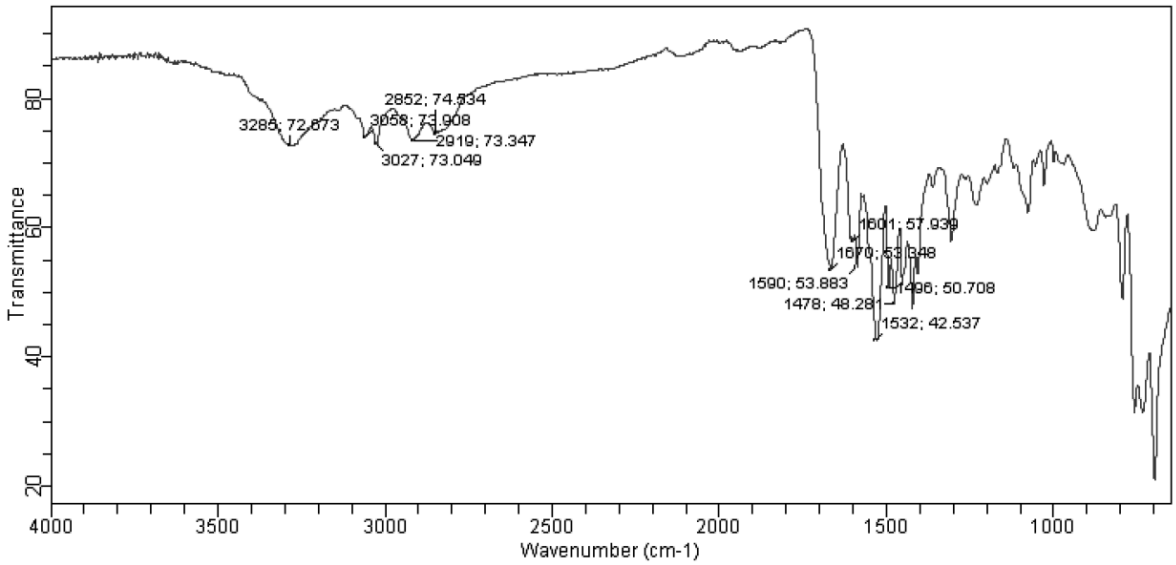


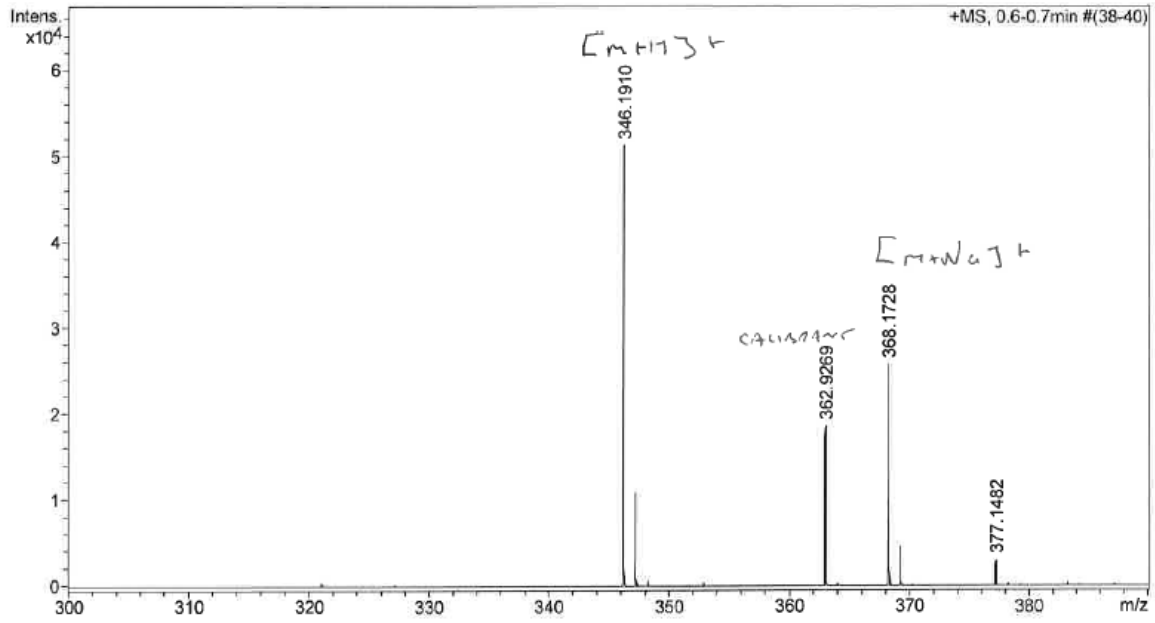
Formula	z	m/z	Meas. m/z	err [ppm]	err [mDa]
	1+		352.2370		
C 22 H 30 N 3 O		352.2383		3.9	1.4

2-Amino-*N*-(2'-((benzylamino)methyl)-[1,1'-biphenyl]-3-yl)acetamide (2.58).



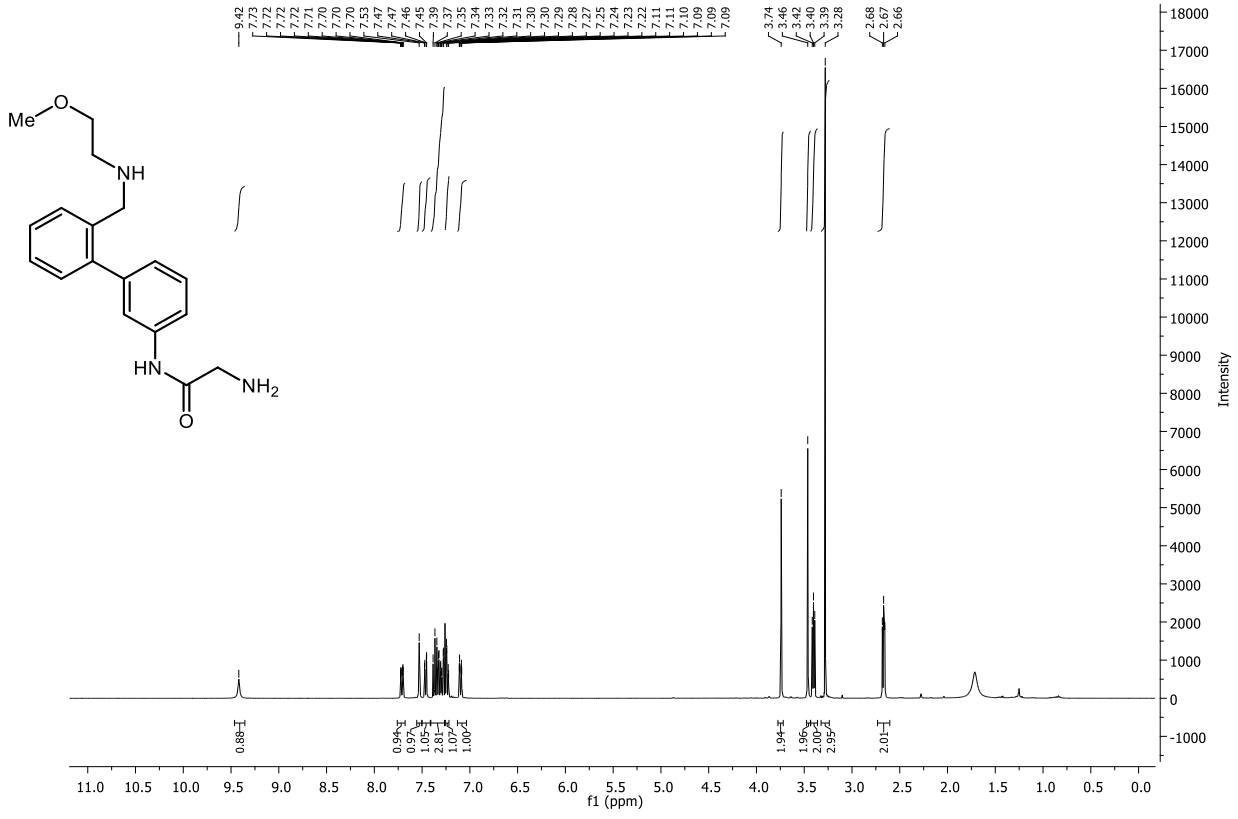

173.5
143.1
143.1
140.3
139.7
137.9
131.0
130.7
130.0
129.4
128.8
128.3
128.1
125.7
121.5
119.7
53.8
51.2
45.6
3E+05
2E+05
2E+05
2E+05
2E+05
2E+05
1E+05
1E+05
1E+05
80000
60000
40000
20000
0
-20000
Intensity
200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0
f1 (ppm)

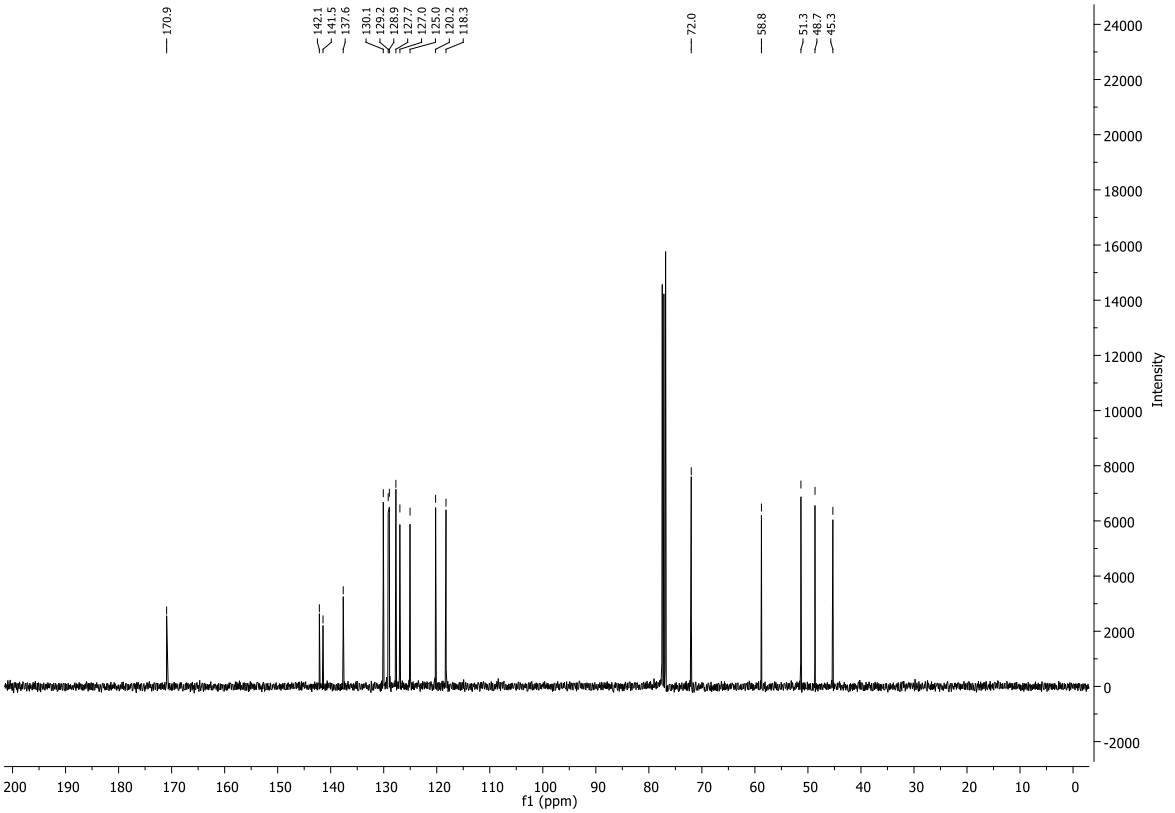

2852; 74.834
3285; 72.873
3058; 73.908
2919; 73.347
3027; 73.049
1601; 57.939
1590; 53.883
1478; 48.281
1496; 50.708
1532; 42.537
Transmittance
80
60
40
20
4000
3500
3000
2500
2000
1500
1000
Wavenumber (cm-1)

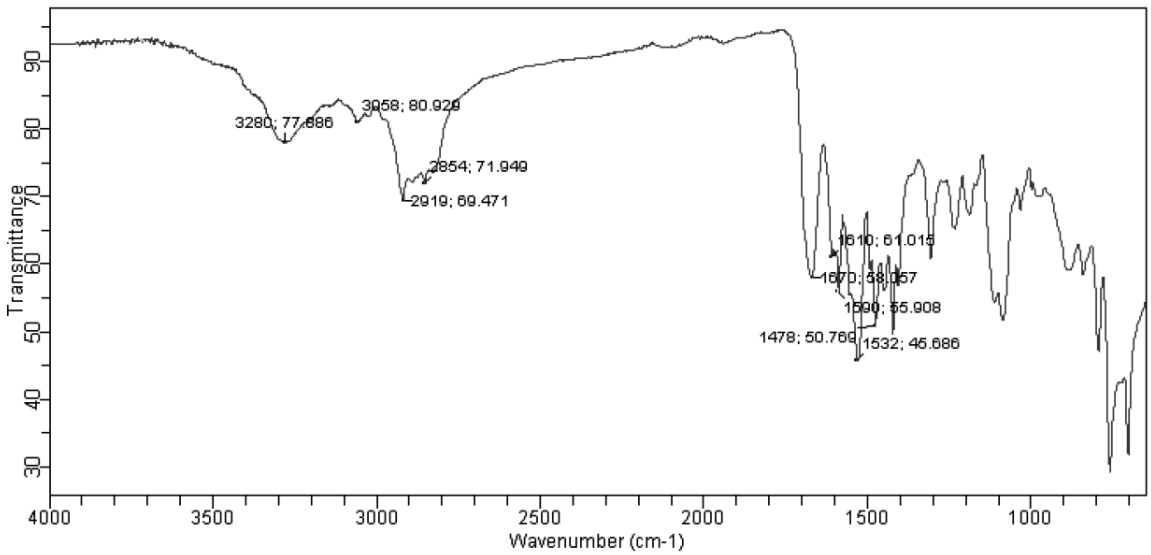


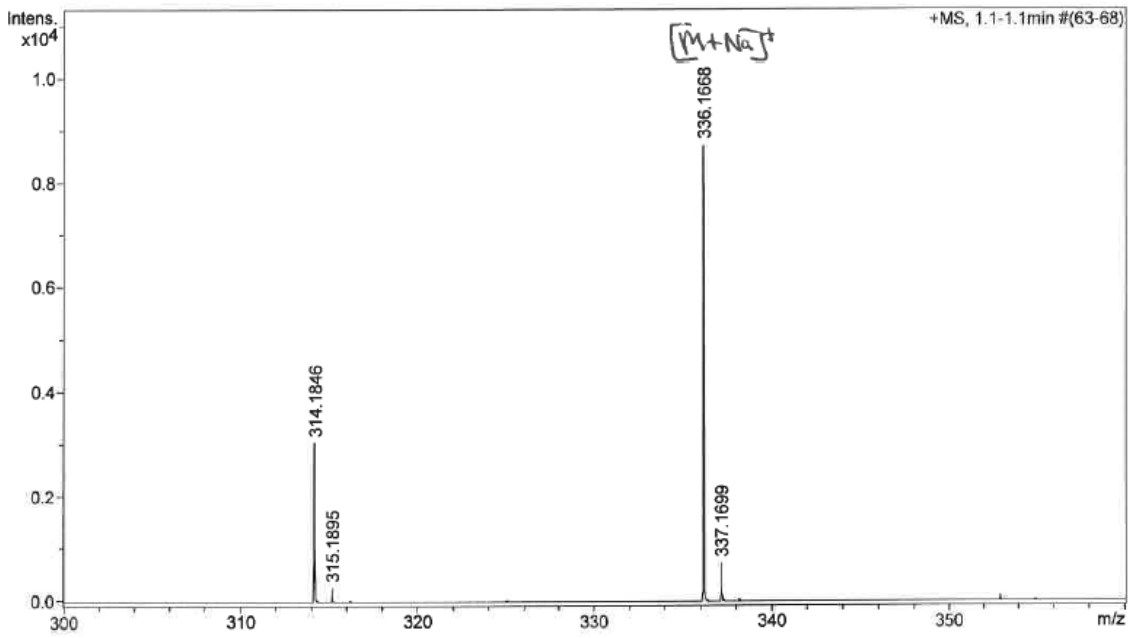
Formula	z	m/z	Meas. m/z	err [ppm]	err [mDa]
C 22 H 24 N 3 O	1+	346.1914	346.1910	1.1	0.4
C 22 H 23 N 3 Na O	1+	368.1733	368.1728	1.4	0.5

2-Amino-*N*-(2'-(((2-methoxyethyl)amino)methyl)-[1,1'-biphenyl]-3-yl)acetamide (2.59).



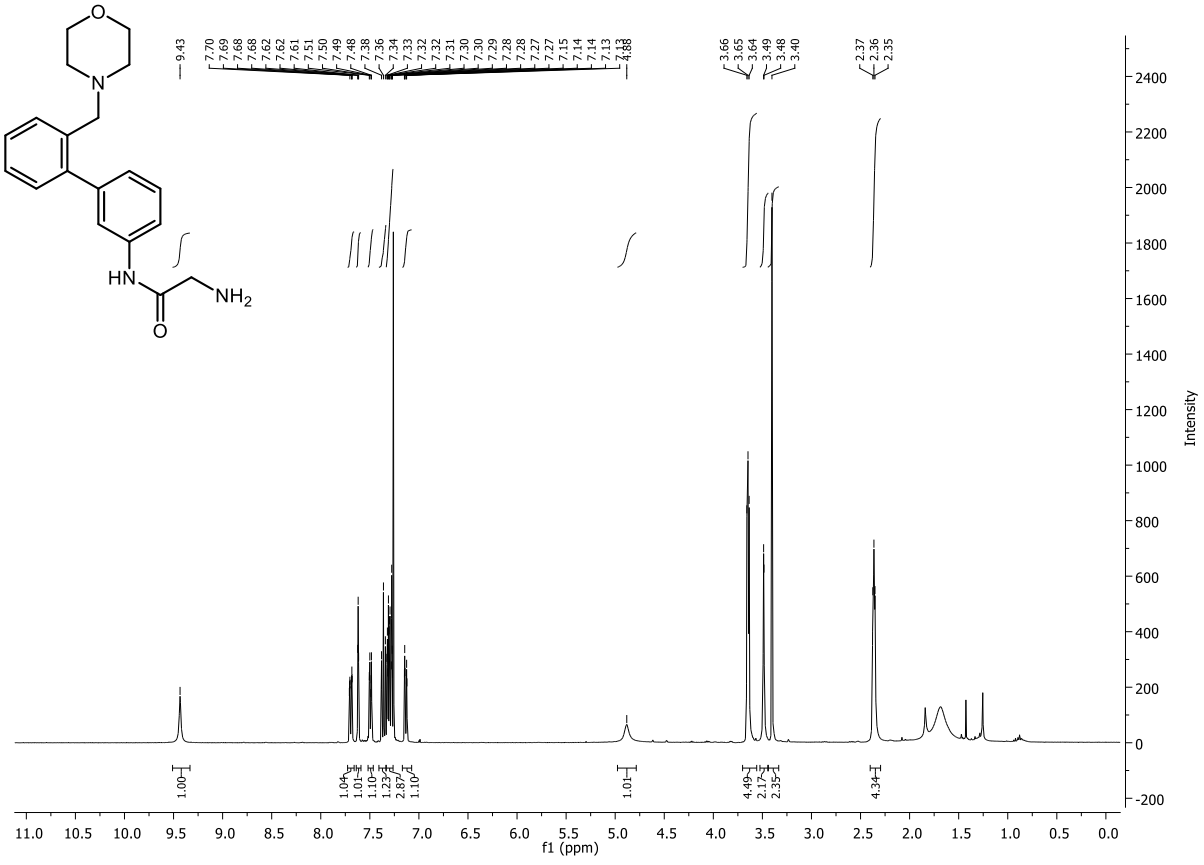

170.9
142.1
141.5
137.6
130.1
129.2
128.9
127.7
127.0
125.0
120.2
118.3
72.0
58.8
51.3
48.7
45.3
Intensity
f1 (ppm)

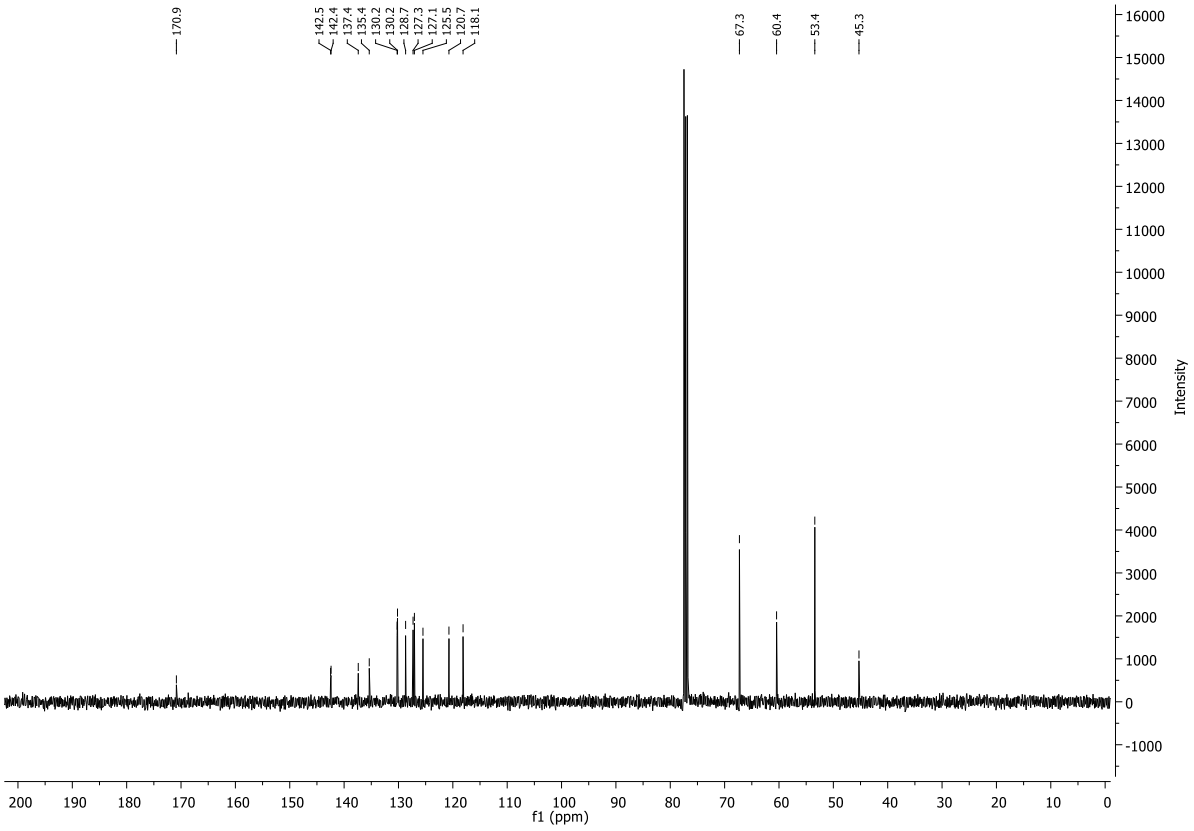

3280; 77.886
3058; 80.929
2854; 71.949
2919; 69.471
1610; 61.015
1670; 58.057
1590; 55.908
1478; 50.769
1532; 46.886
Transmittance
Wavenumber (cm-1)

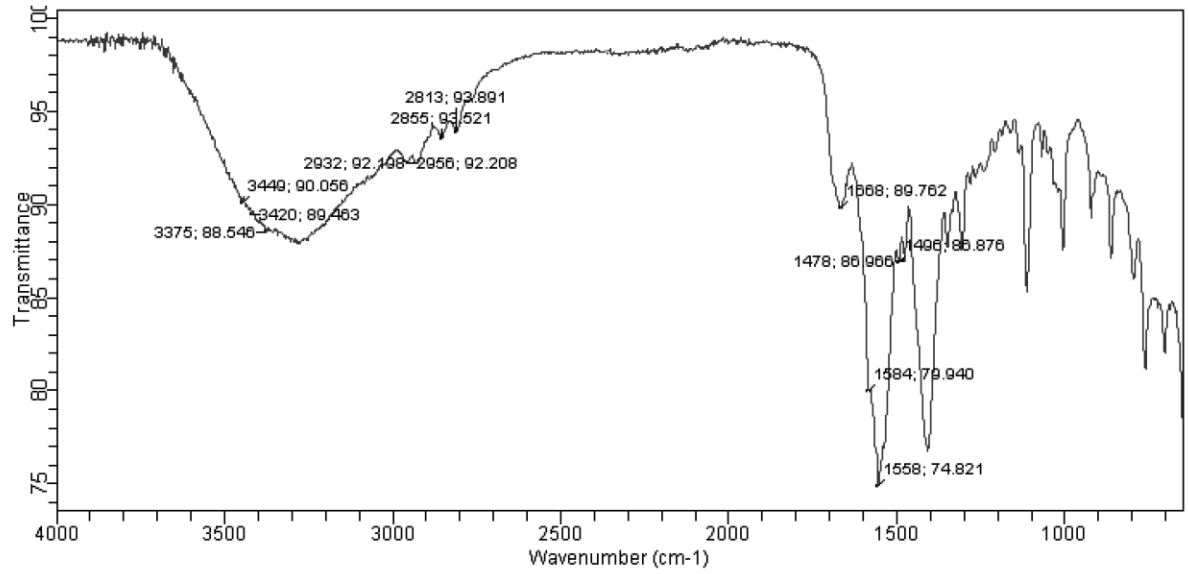


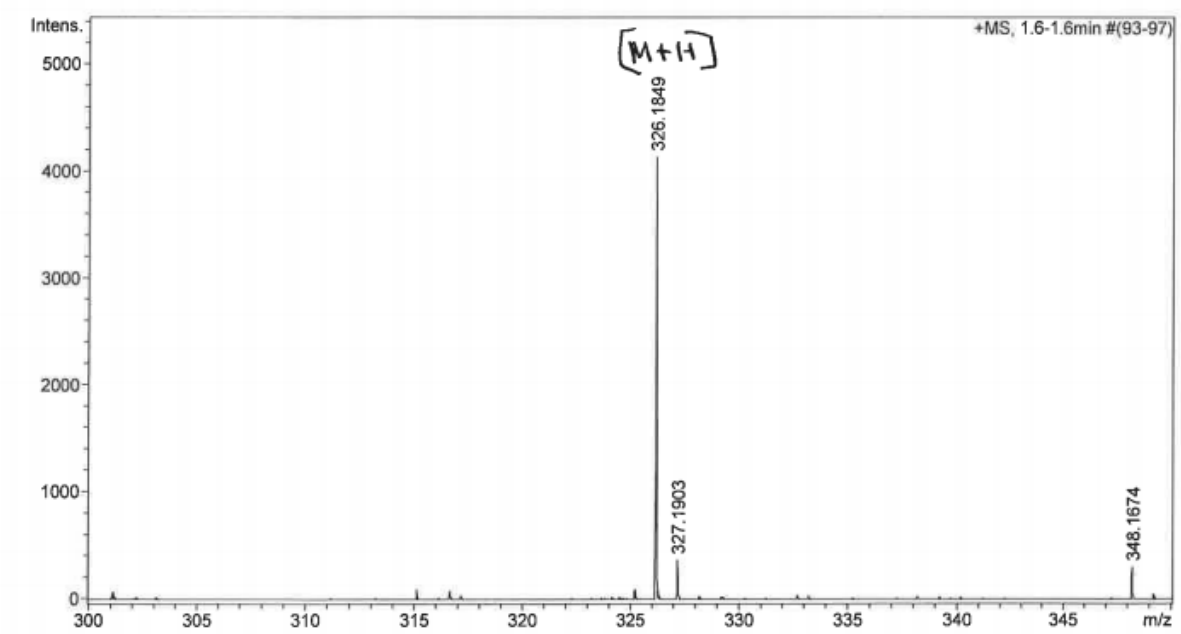
Formula	z	m/z	Meas. m/z	err [ppm]	err [mDa]
C 18 H 24 N 3 O 2	1+	314.1863	314.1846	5.4	1.7
C 18 H 23 N 3 Na O 2	1+	336.1682	336.1668	4.4	1.5

2-Amino-*N*-(2'-(morpholinomethyl)-[1,1'-biphenyl]-3-yl)acetamide (2.60).



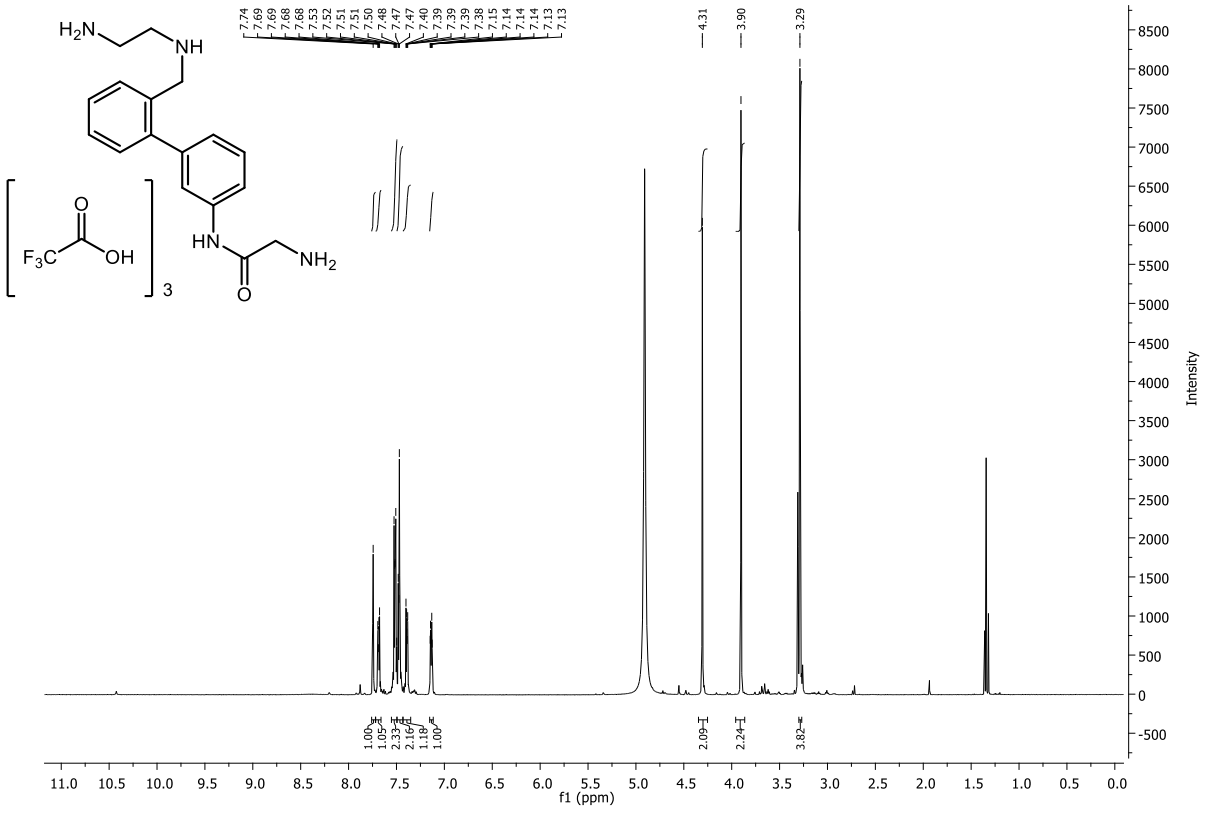

170.9
142.5
142.4
137.4
135.4
130.2
130.2
128.7
127.3
127.1
125.5
120.7
118.1
67.3
60.4
53.4
45.3
Intensity
f1 (ppm)

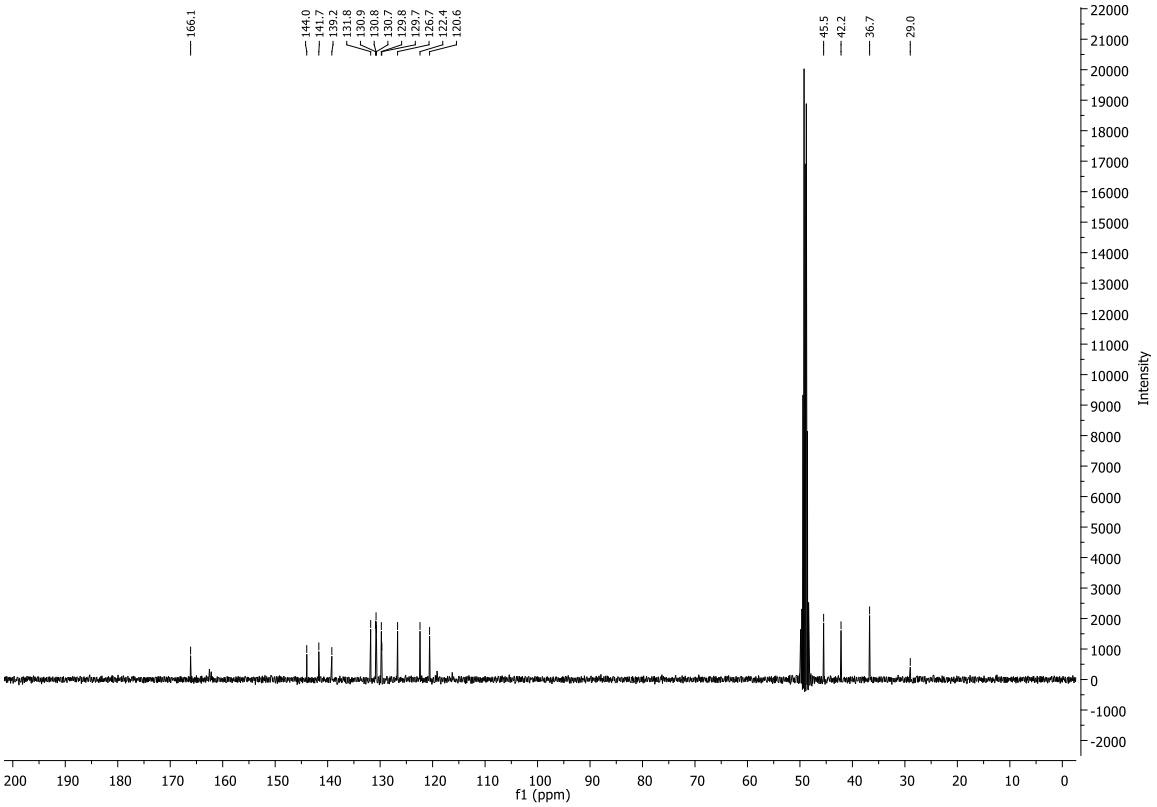

Transmittance
Wavenumber (cm-1)
2813; 93.891
2855; 93.521
2932; 92.498
2956; 92.208
3449; 90.056
3420; 89.463
3375; 88.546
1668; 89.762
1478; 86.966
1496; 86.876
1584; 79.940
1558; 74.821

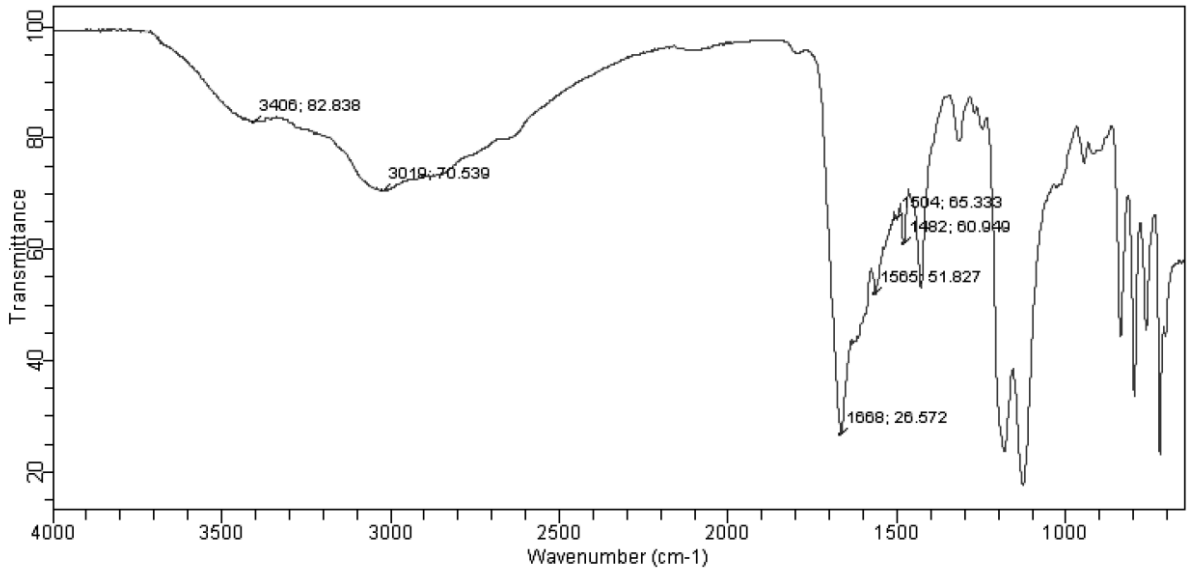


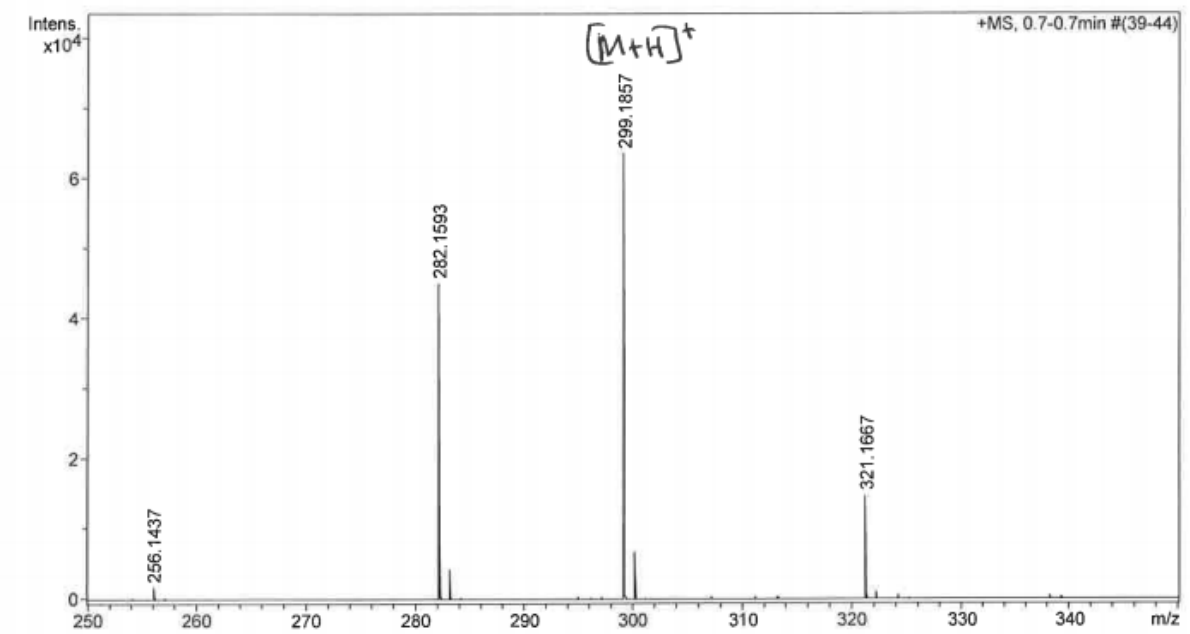
Formula	z	m/z	Meas. m/z	err [ppm]	err [mDa]
	1+		326.1849		
C 19 H 24 N 3 O 2		326.1863		4.2	1.4

2-Amino-*N*-(2'-(((2-aminoethyl)amino)methyl)-[1,1'-biphenyl]-3-yl)acetamide tris(2,2,2-trifluoroacetate) (2.61).



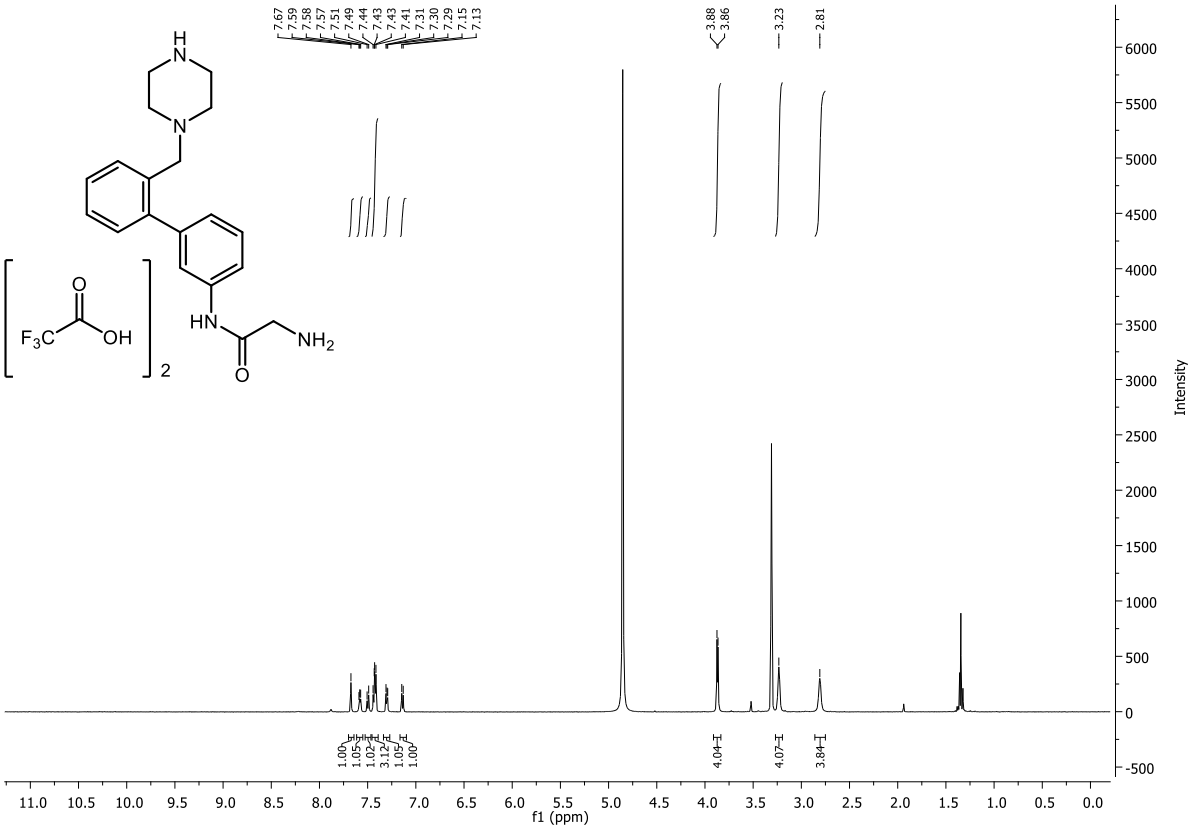

166.1
144.0
141.7
139.2
131.8
130.9
130.8
130.7
129.8
129.7
126.7
122.4
120.6
45.5
42.2
36.7
29.0
Intensity
f1 (ppm)

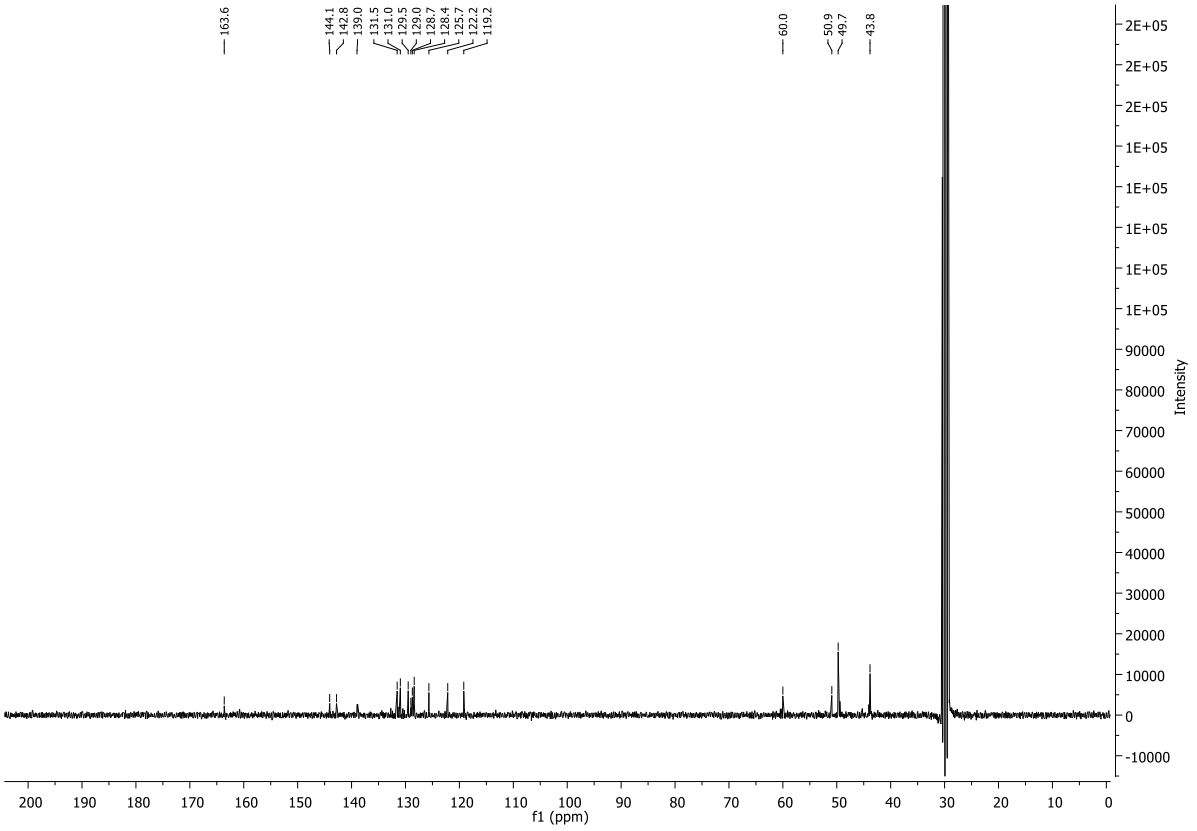

3406; 82.838
3019; 70.539
1504; 65.333
1482; 60.949
1565; 51.827
1668; 26.572
Transmittance
Wavenumber (cm-1)

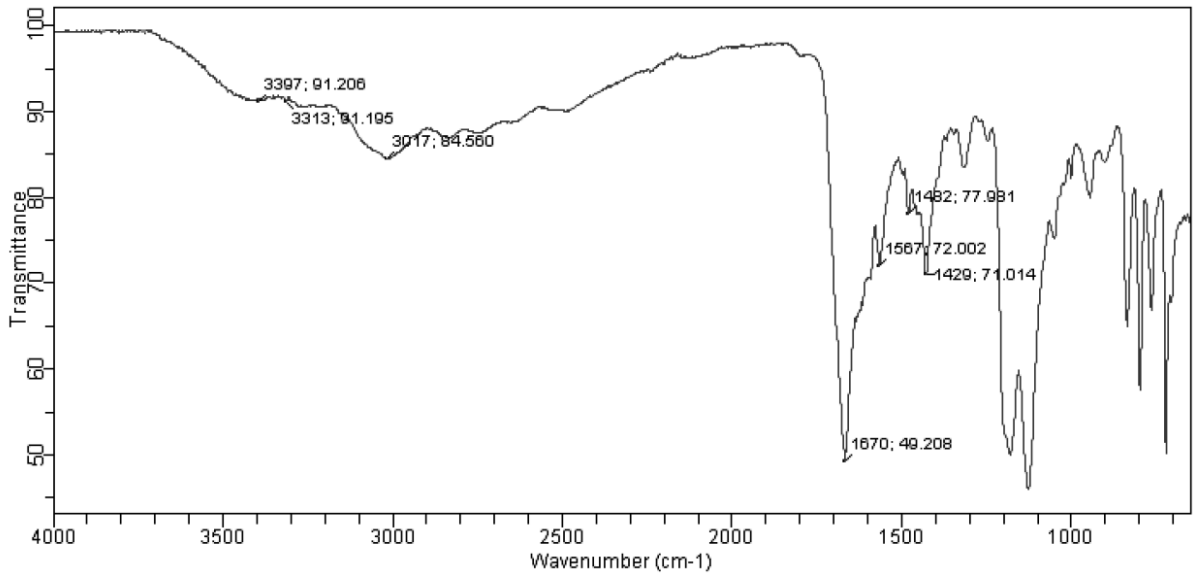


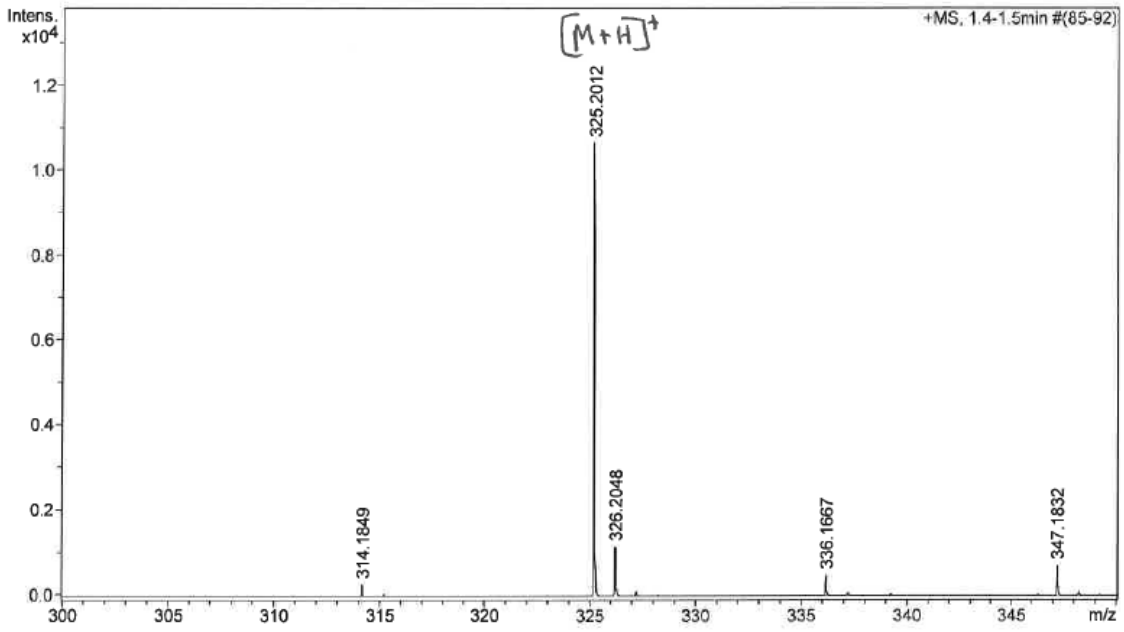
Formula	z	m/z	Meas. m/z	err [ppm]	err [mDa]
	1+		299.1857		
C 17 H 23 N 4 O		299.1866		3.0	0.9

2-Amino-*N*-(2'-(piperazin-1-ylmethyl)-[1,1'-biphenyl]-3-yl)acetamide bis(2,2,2-trifluoroacetate) (2.62).



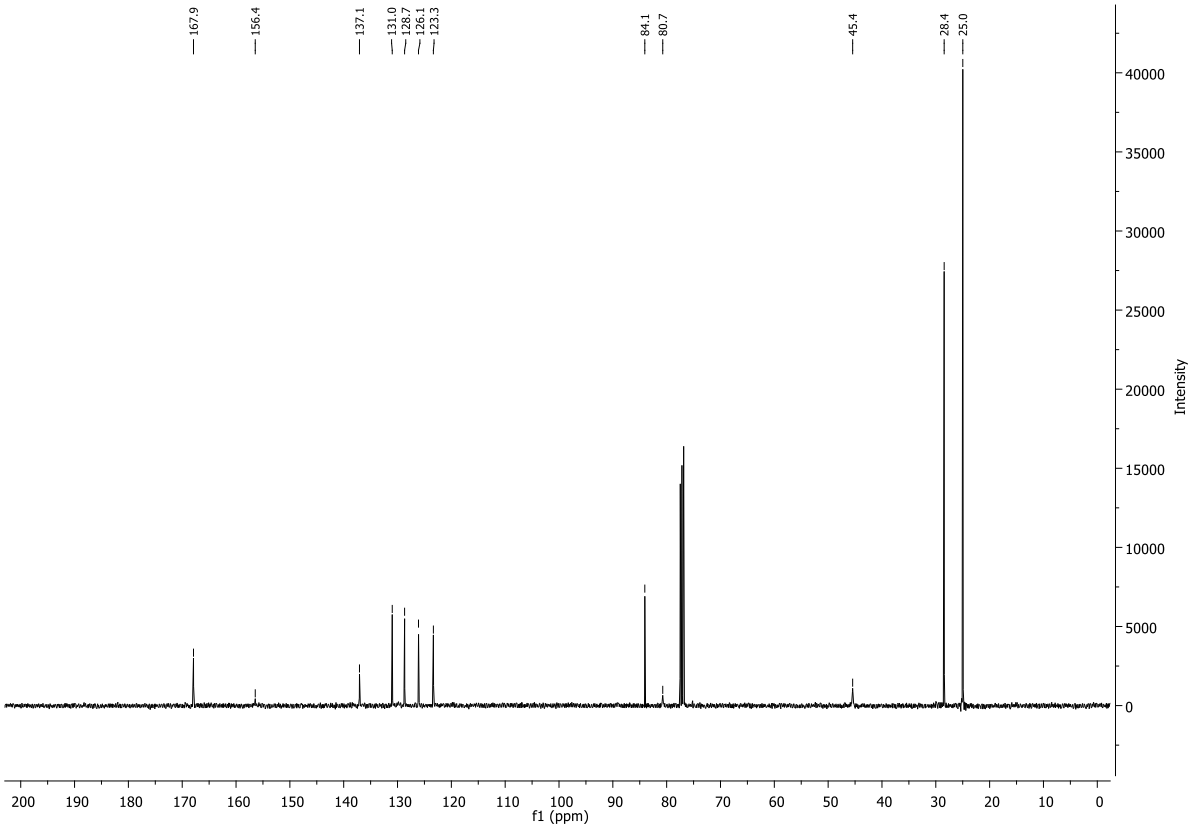

163.6
144.1
142.8
139.0
131.5
131.0
129.5
129.0
128.7
128.4
125.7
122.2
119.2
60.0
50.9
49.7
43.8
Intensity
f1 (ppm)

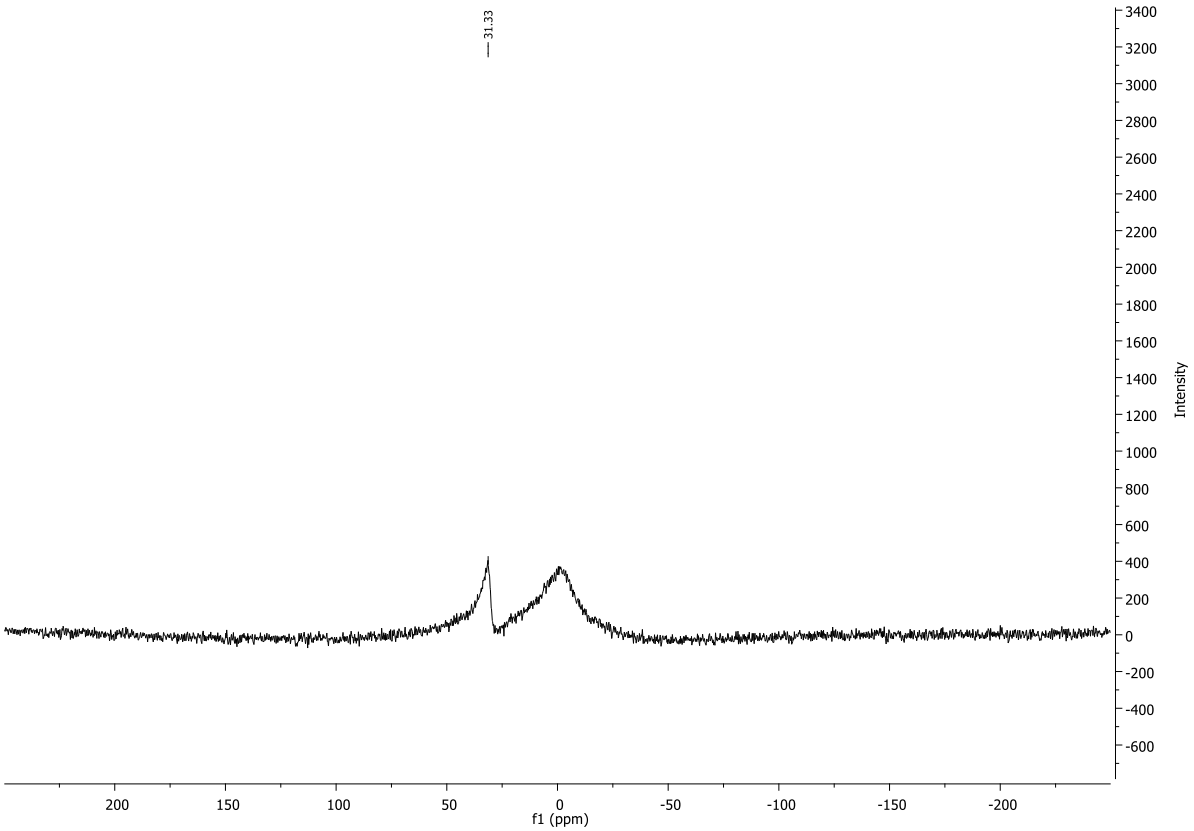

3397; 91.206
3313; 91.195
3017; 84.560
1482; 77.981
1567; 72.002
1429; 71.014
1670; 49.208
Transmittance
Wavenumber (cm-1)

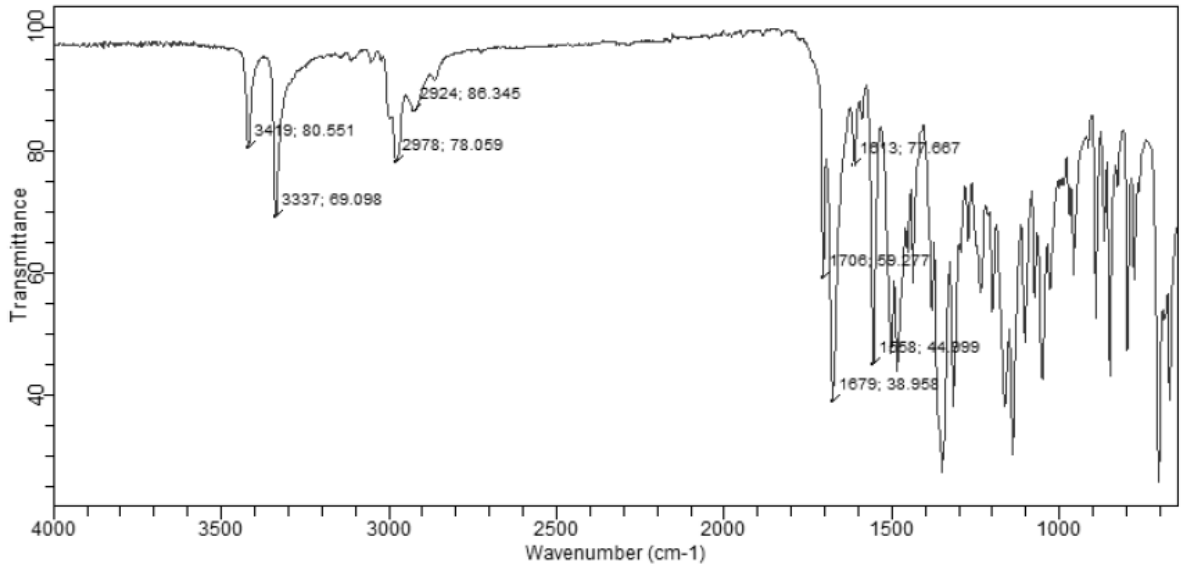


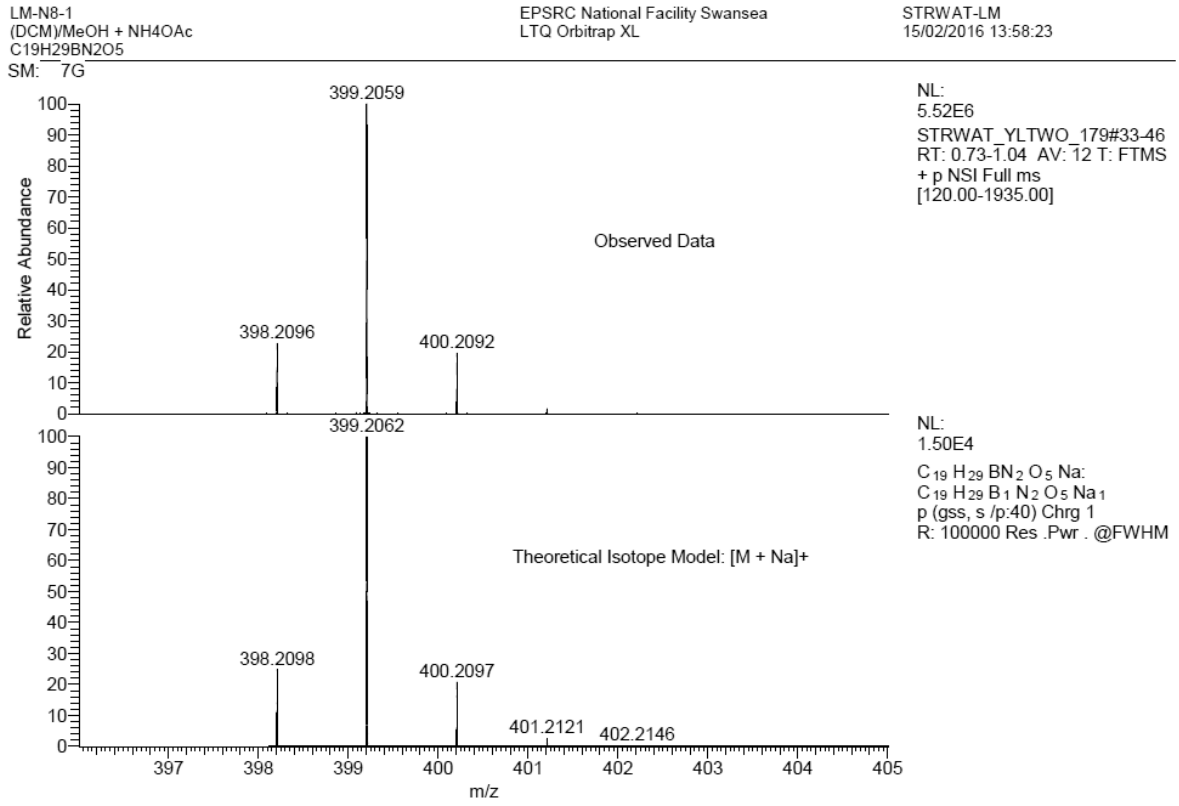
Formula	z	m/z	Meas. m/z	err [ppm]	err [mDa]
	1+		325.2012		
C 19 H 25 N 4 O		325.2023		3.3	1.1

***tert*-Butyl (2-oxo-2-((3-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)phenyl) amino)ethyl) carbamate (2.63).**

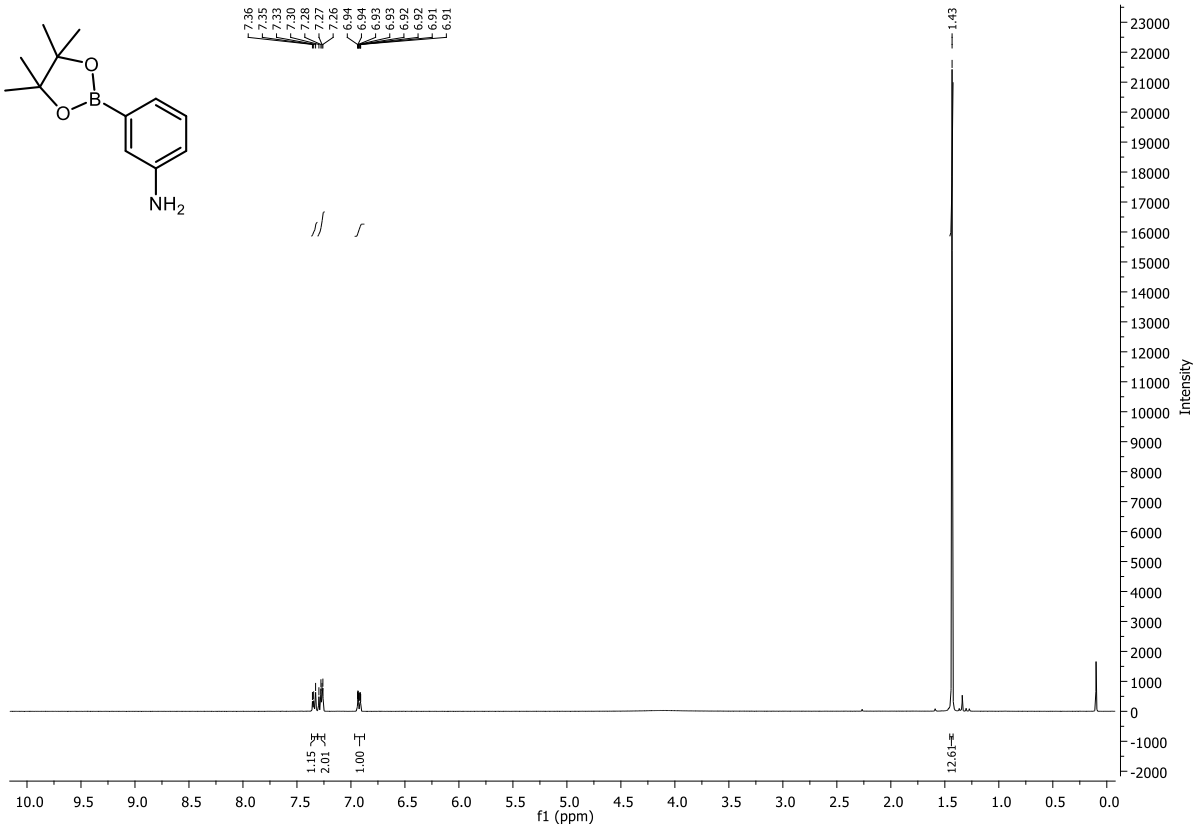

167.9
156.4
137.1
131.0
128.7
126.1
123.3
84.1
80.7
45.4
28.4
25.0
Intensity
f1 (ppm)

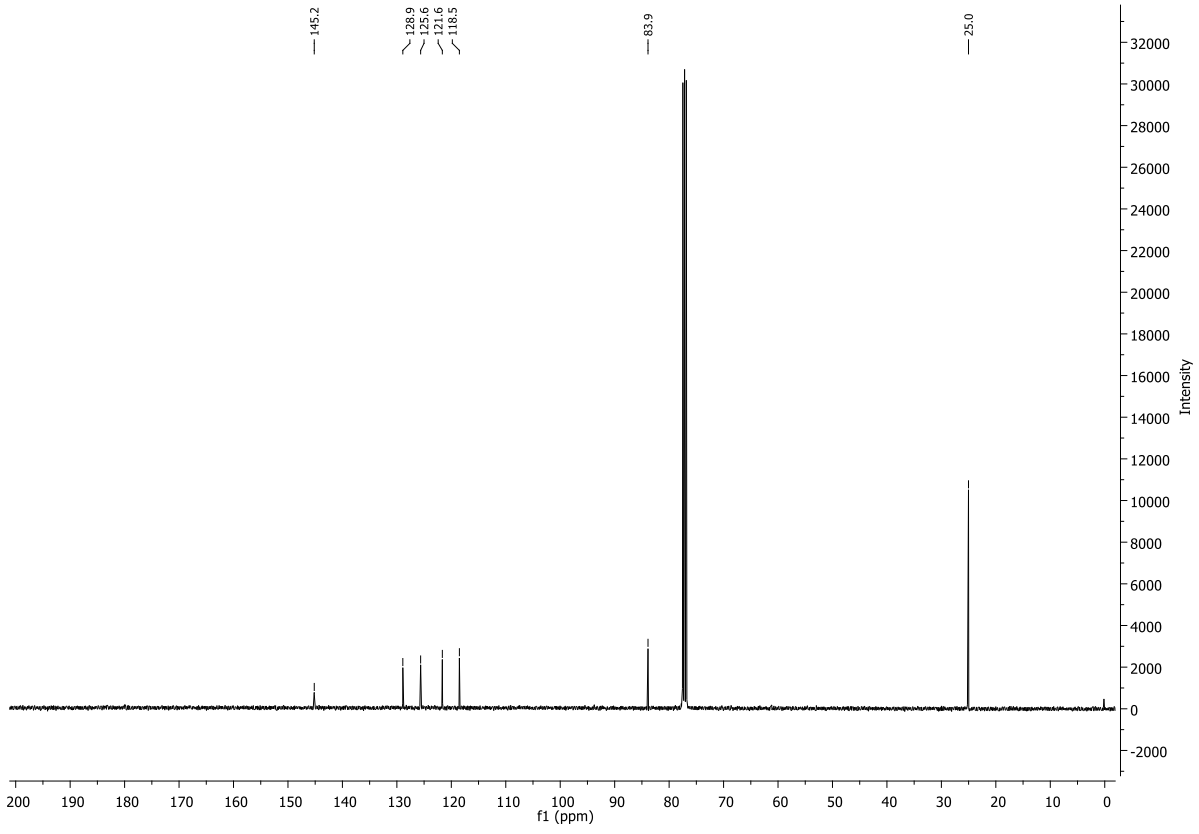

31.33
Intensity
f1 (ppm)

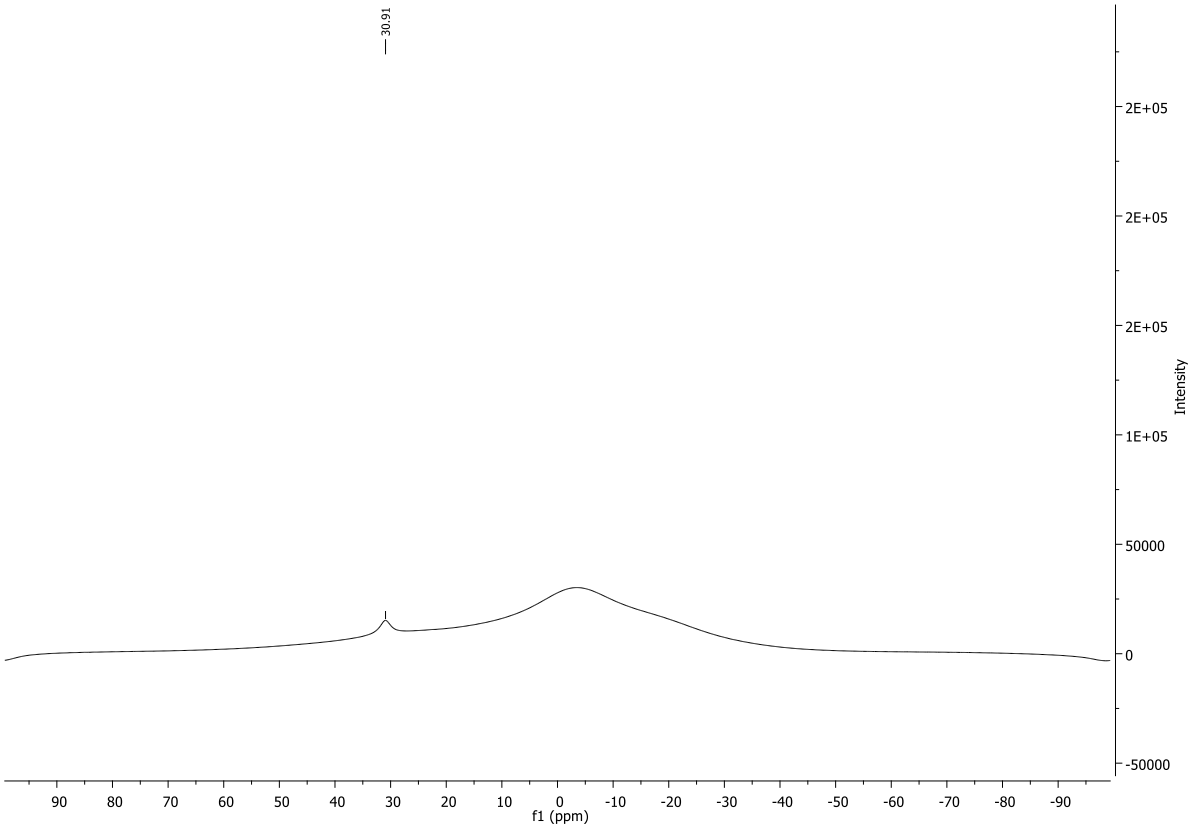

Transmittance
Wavenumber (cm-1)
3419; 80.551
3337; 69.098
2978; 78.059
2924; 86.345
1706; 59.277
1679; 38.958

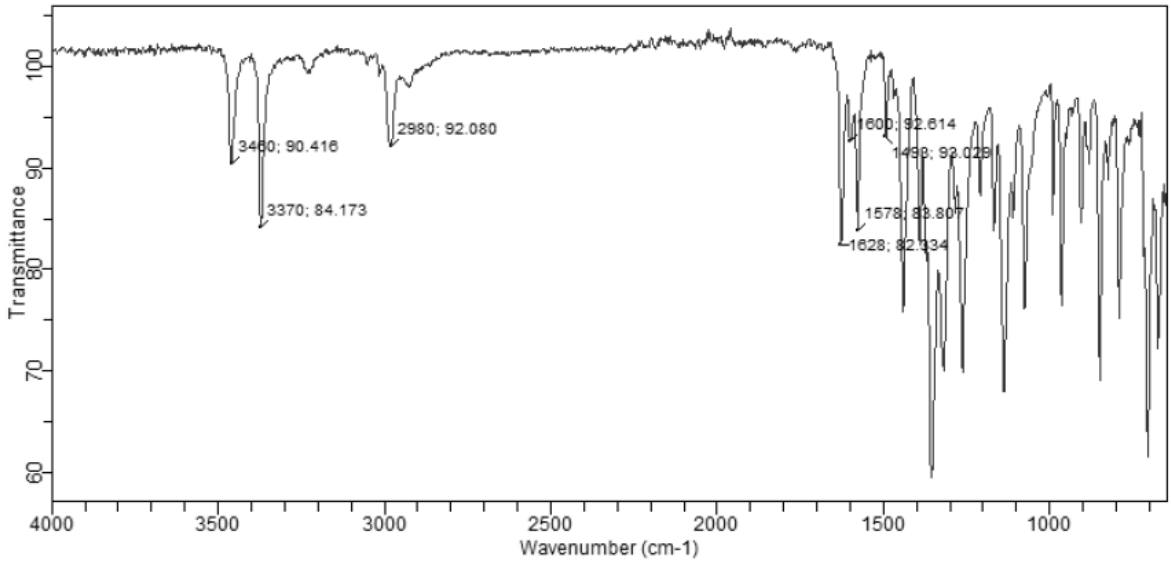

LM-N8-1
(DCM)/MeOH + NH4OAc
C19H29BN2O5
SM: 7G
EPSRC National Facility Swansea
LTQ Orbitrap XL
STRWAT-LM
15/02/2016 13:58:23
Relative Abundance
399.2059
398.2096
400.2092
Observed Data
NL:
5.52E6
STRWAT_YLTWO_179#33-46
RT: 0.73-1.04 AV: 12 T: FTMS
+ p NSI Full ms
[120.00-1935.00]
399.2062
398.2098
400.2097
401.2121
402.2146
Theoretical Isotope Model: [M + Na]+
NL:
1.50E4
C19 H29 BN2 O5 Na:
C19 H29 B1 N2 O5 Na1
p (gss, s /p:40) Chrg 1
R: 100000 Res .Pwr . @FWHM
m/z

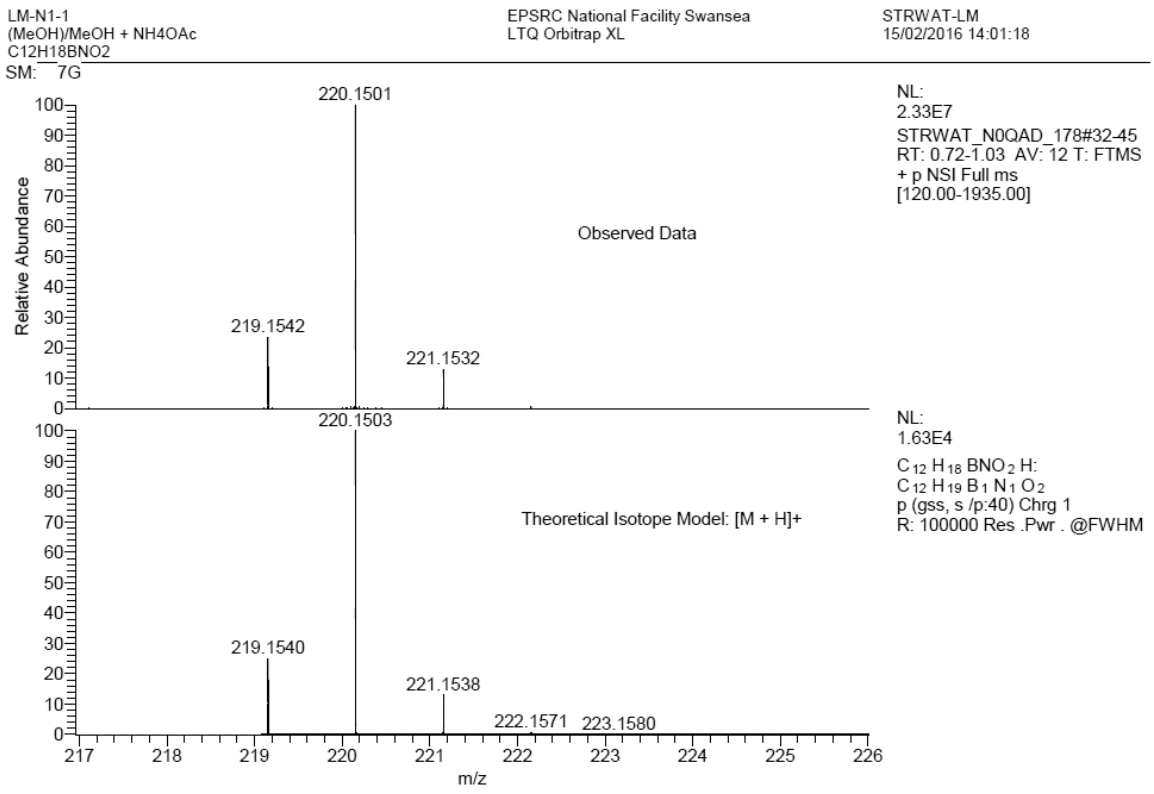
3-(4,4,5,5-Tetramethyl-1,3,2-dioxaborolan-2-yl)aniline (2.64).



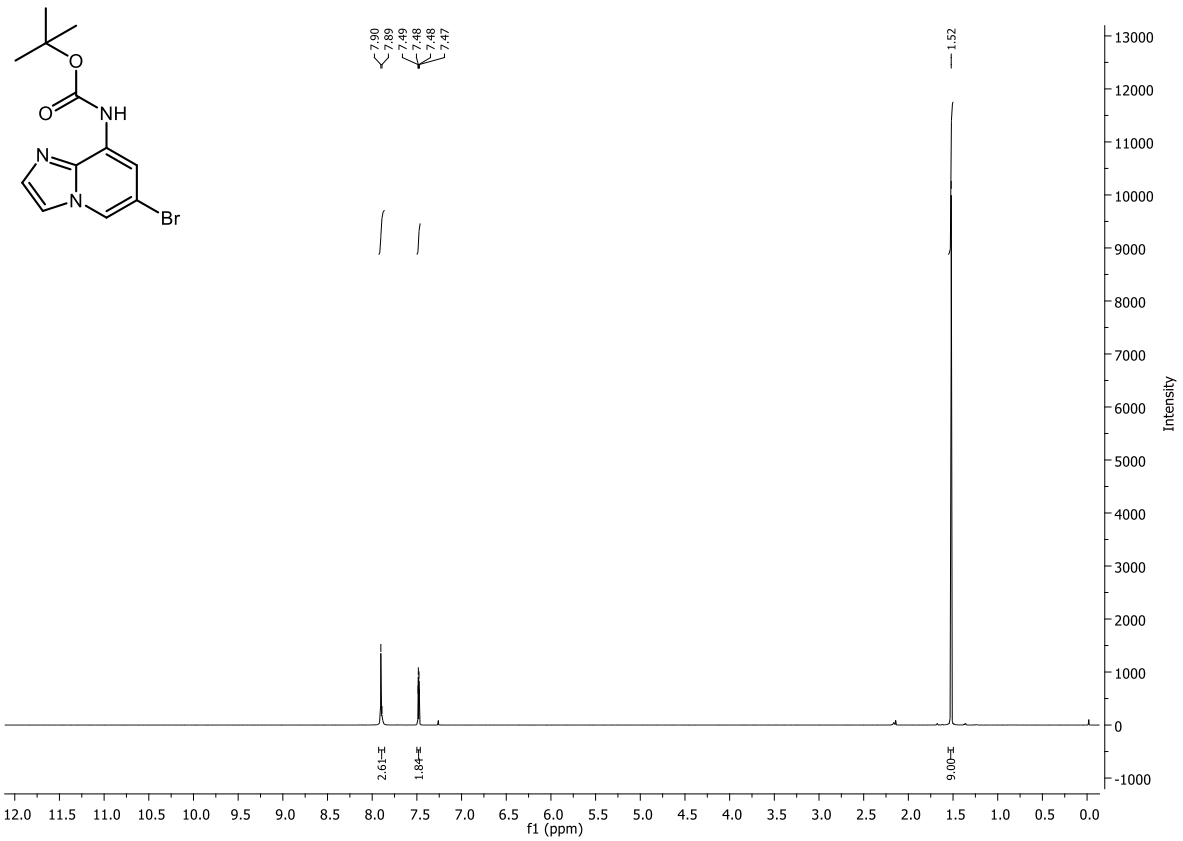


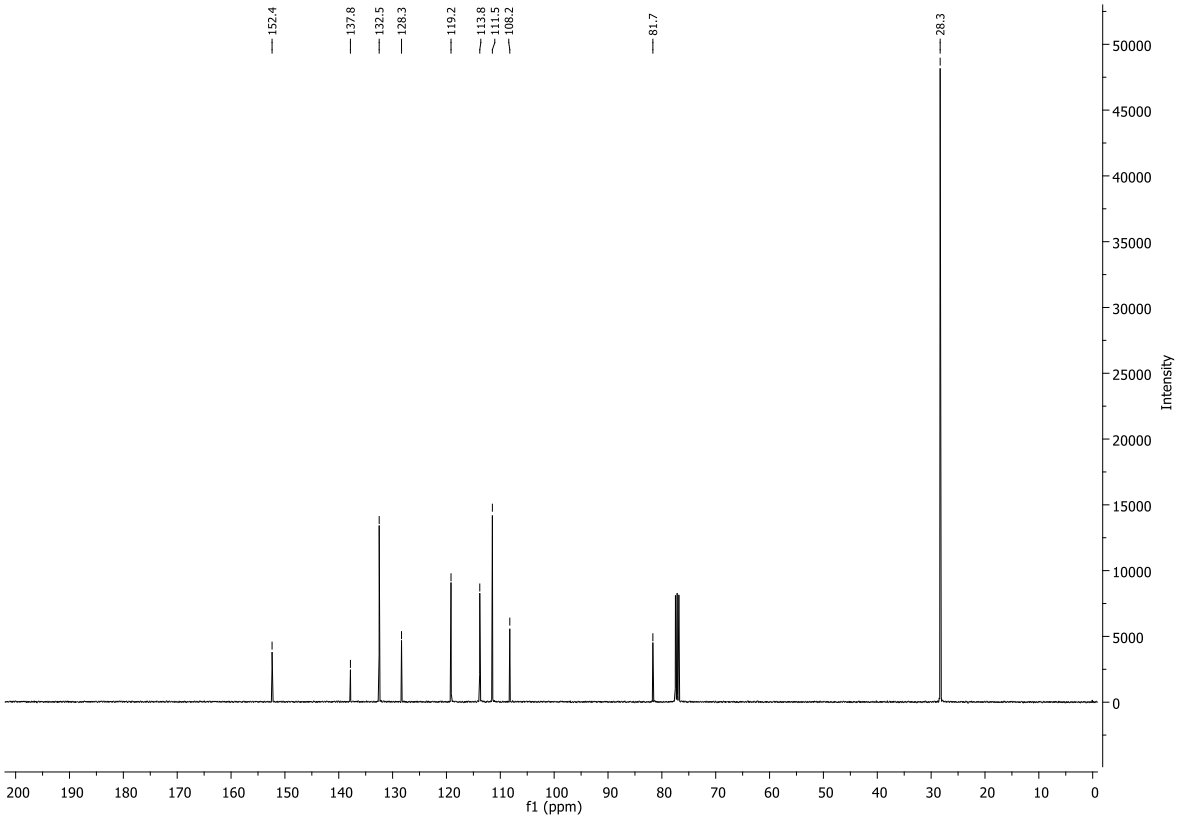

30.91
2E+05
2E+05
2E+05
1E+05
50000
0
-50000
Intensity
90 80 70 60 50 40 30 20 10 0 -10 -20 -30 -40 -50 -60 -70 -80 -90
f1 (ppm)

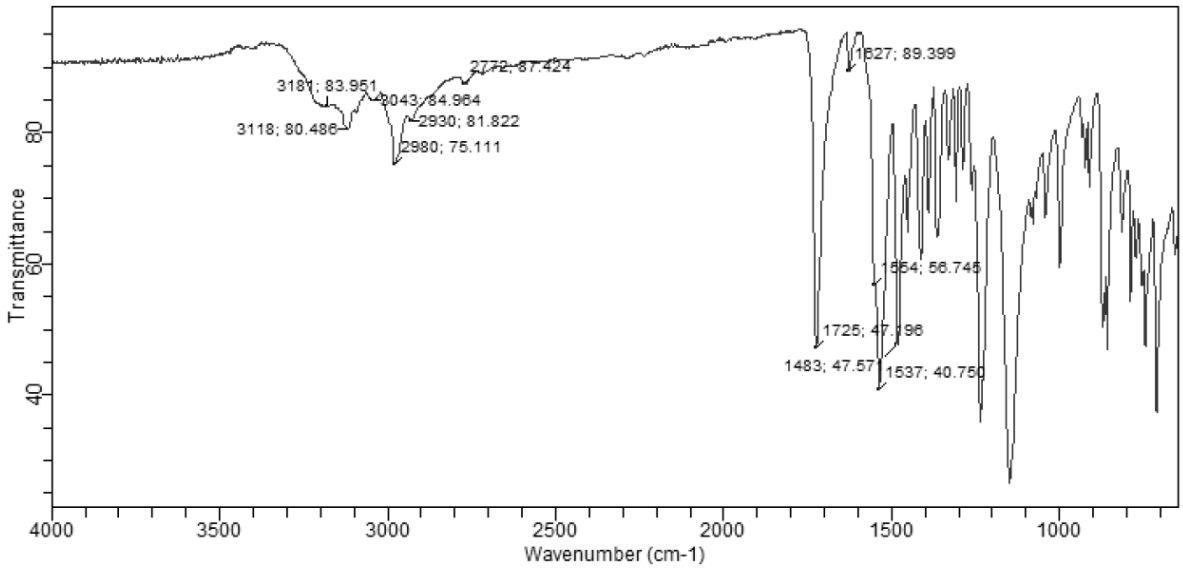

100
90
80
70
60
Transmittance
3460; 90.416
3370; 84.173
2980; 92.080
1600; 92.614
1498; 92.028
1578; 83.807
1628; 82.334
4000 3500 3000 2500 2000 1500 1000
Wavenumber (cm-1)

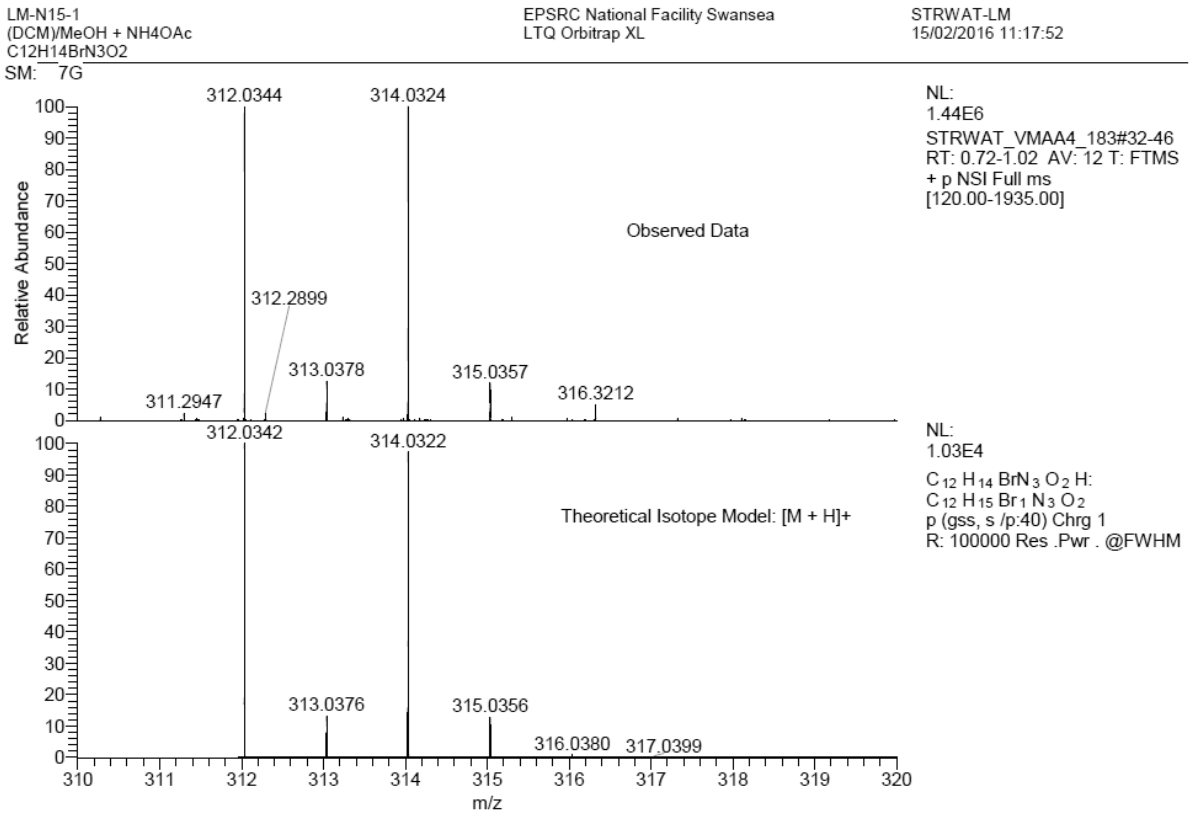


***tert*-Butyl (6-bromoimidazo[1,2-α]pyridin-8-yl)carbamate (2.69)**.

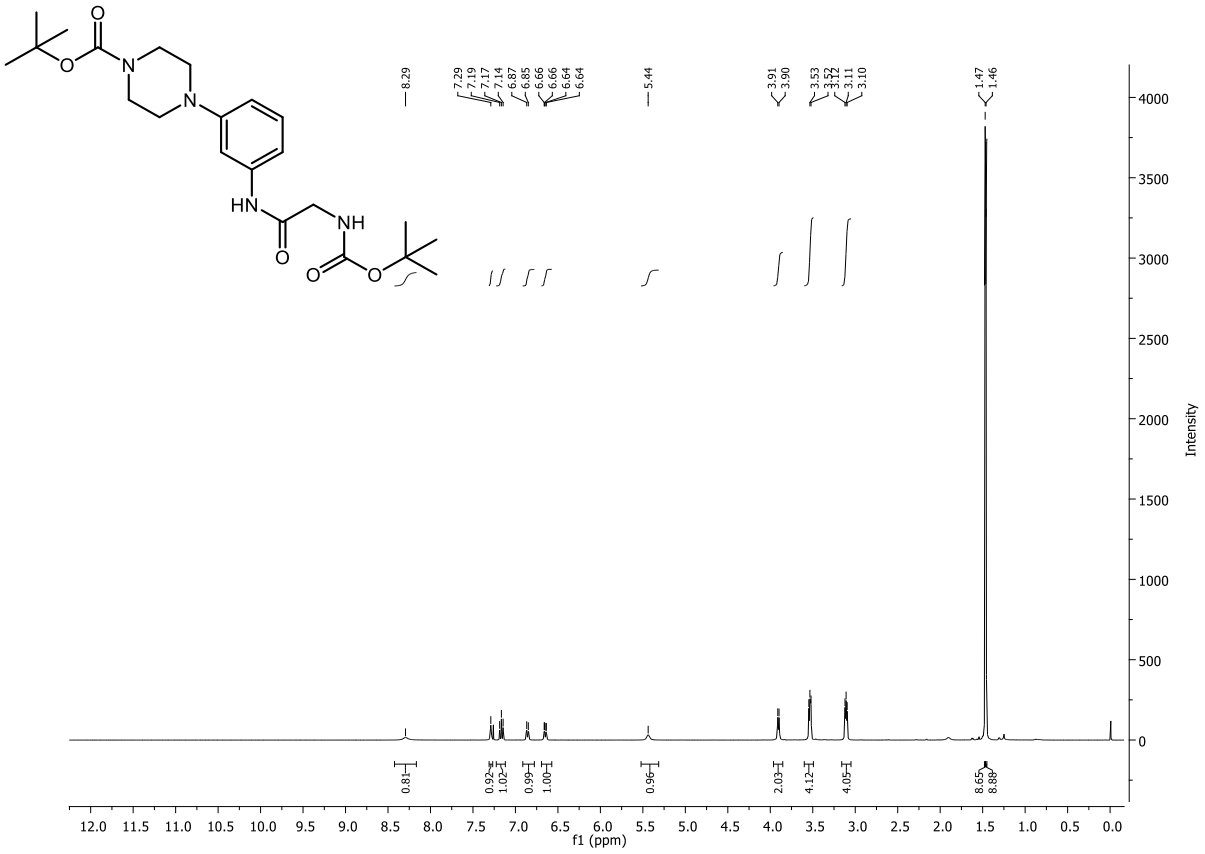


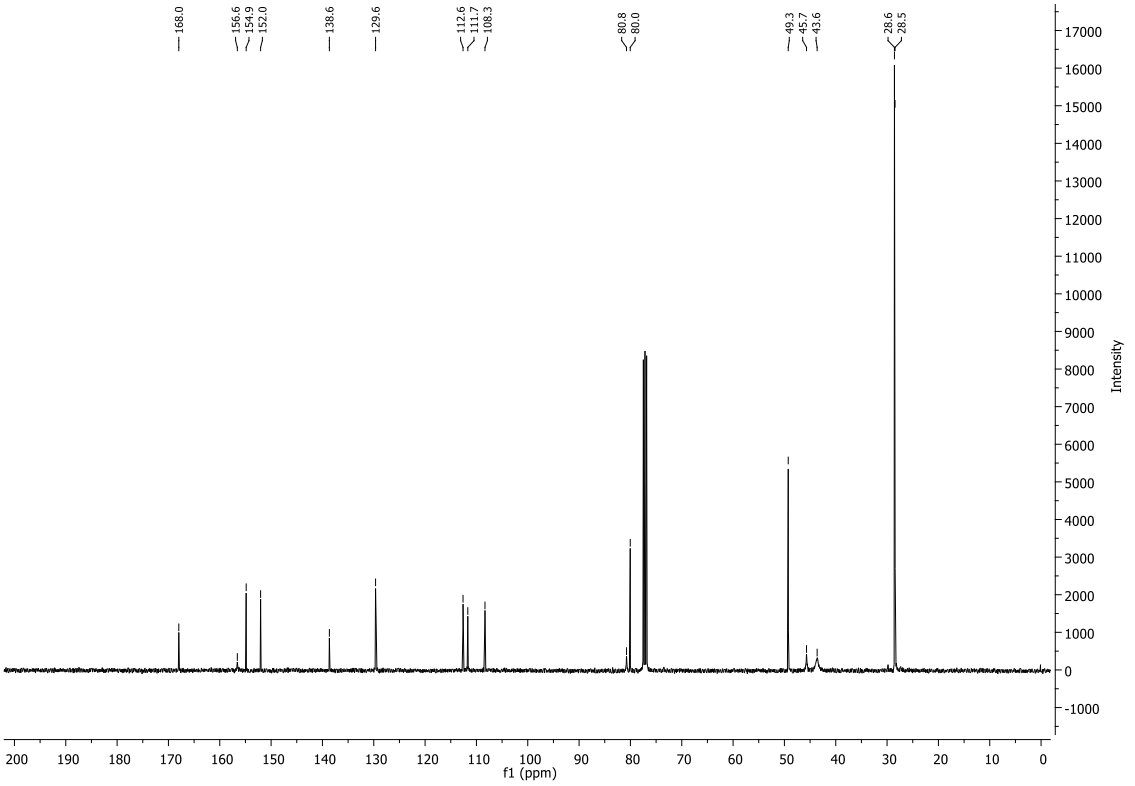

152.4
137.8
132.5
128.3
119.2
113.8
111.5
108.2
81.7
28.3
Intensity
f1 (ppm)

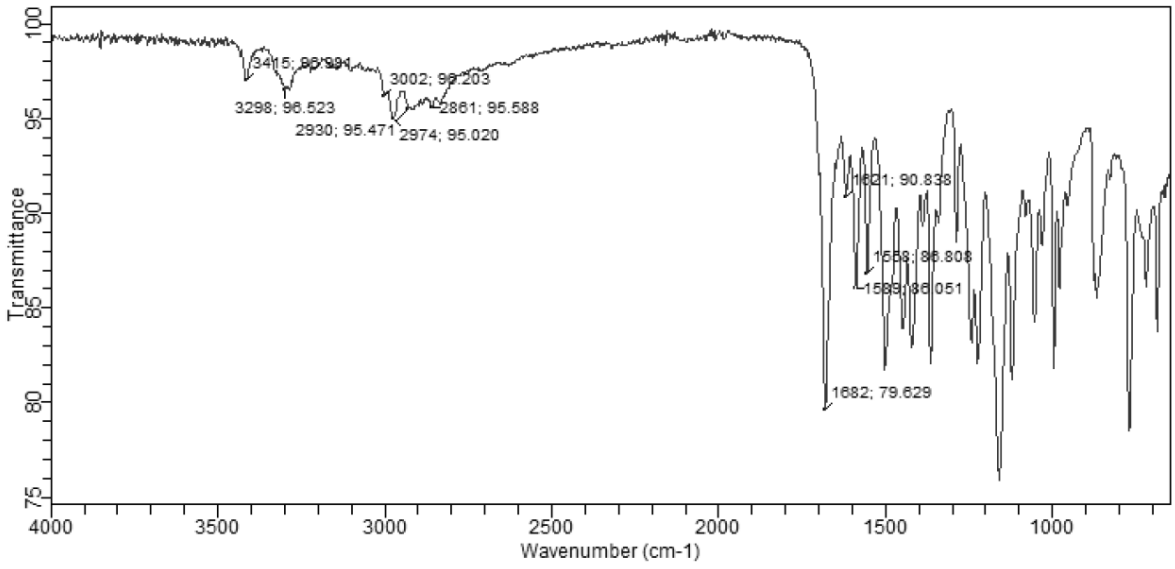

3181; 83.951
3118; 80.486
3043; 84.964
2930; 81.822
2980; 75.111
2772; 87.424
1627; 89.399
1554; 56.745
1725; 47.396
1483; 47.57
1537; 40.750
Transmittance
Wavenumber (cm-1)

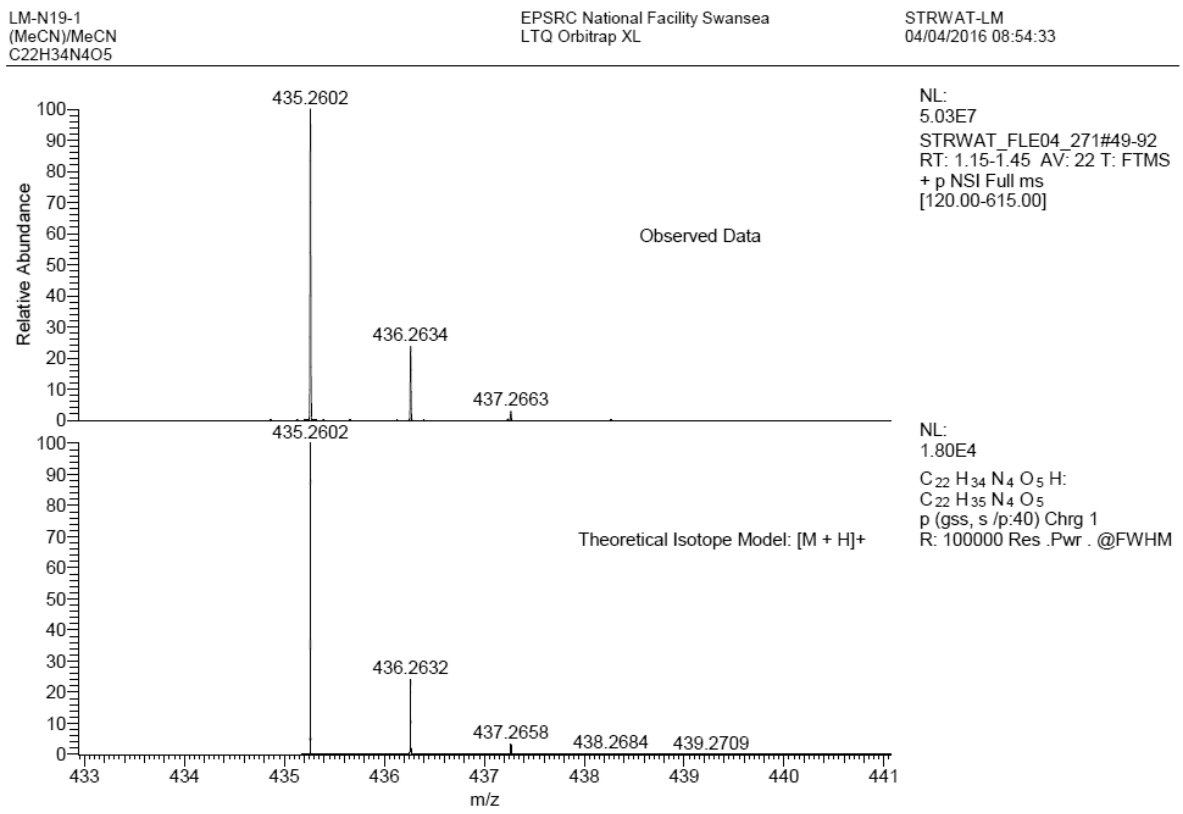


***tert*-Butyl 4-(3-(2-((*tert*-butoxycarbonyl)amino)acetamido)phenyl) piperazine-1-carboxylate (2.71).**

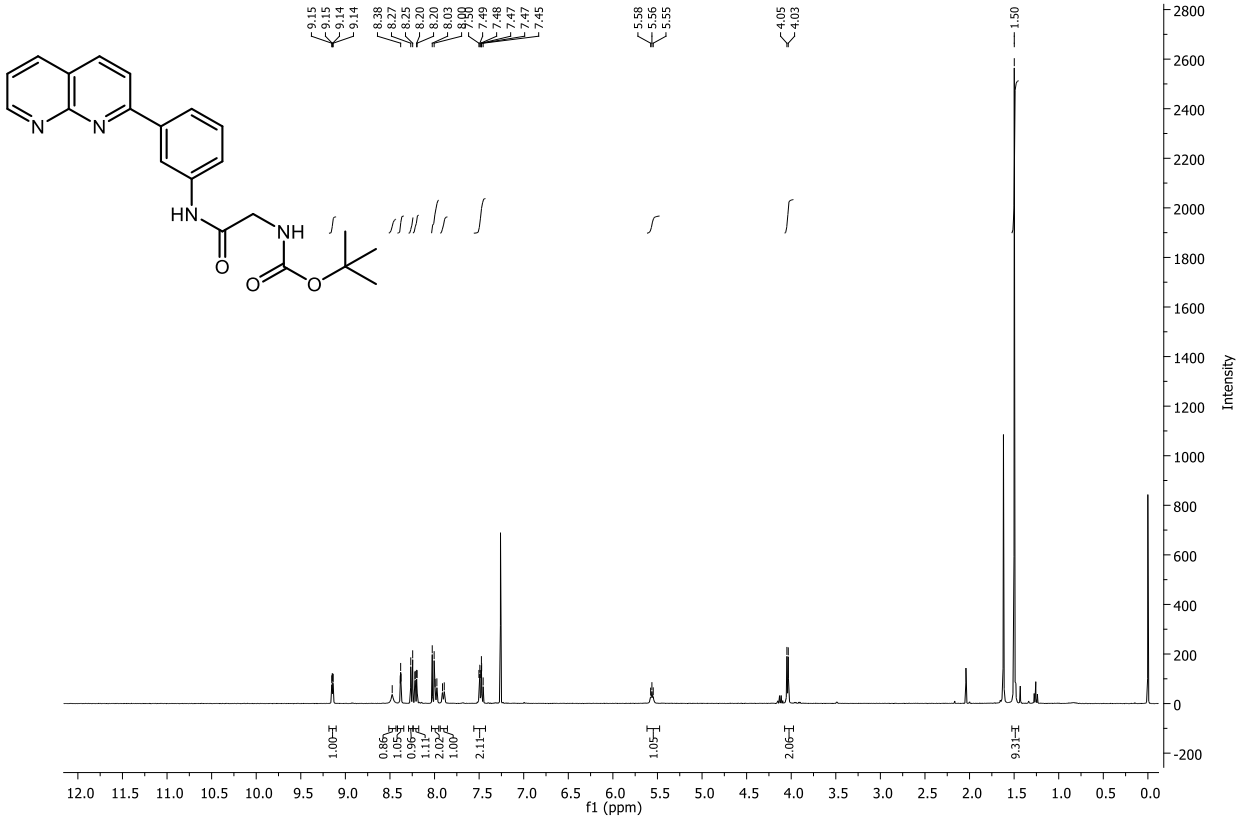


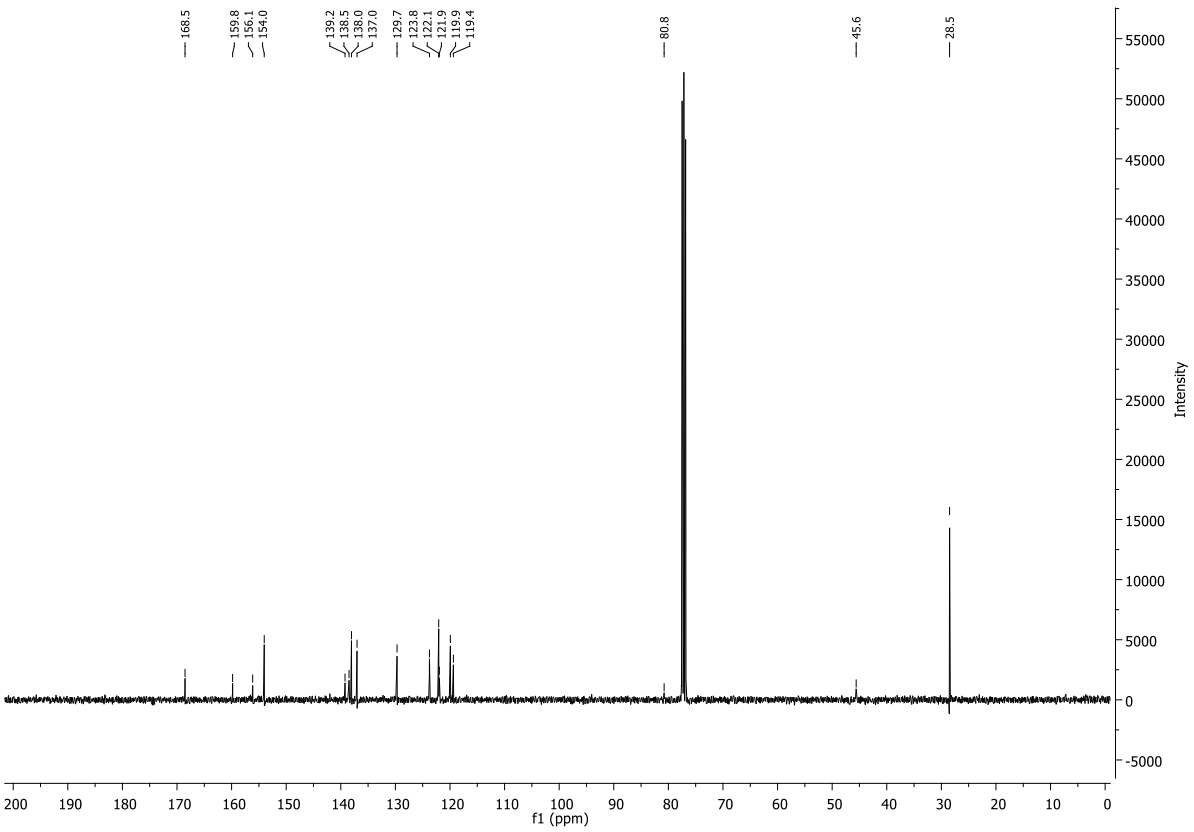

168.0
156.6
154.9
152.0
138.6
129.6
112.6
111.7
108.3
80.8
80.0
49.3
45.7
43.6
28.6
28.5
Intensity
f1 (ppm)

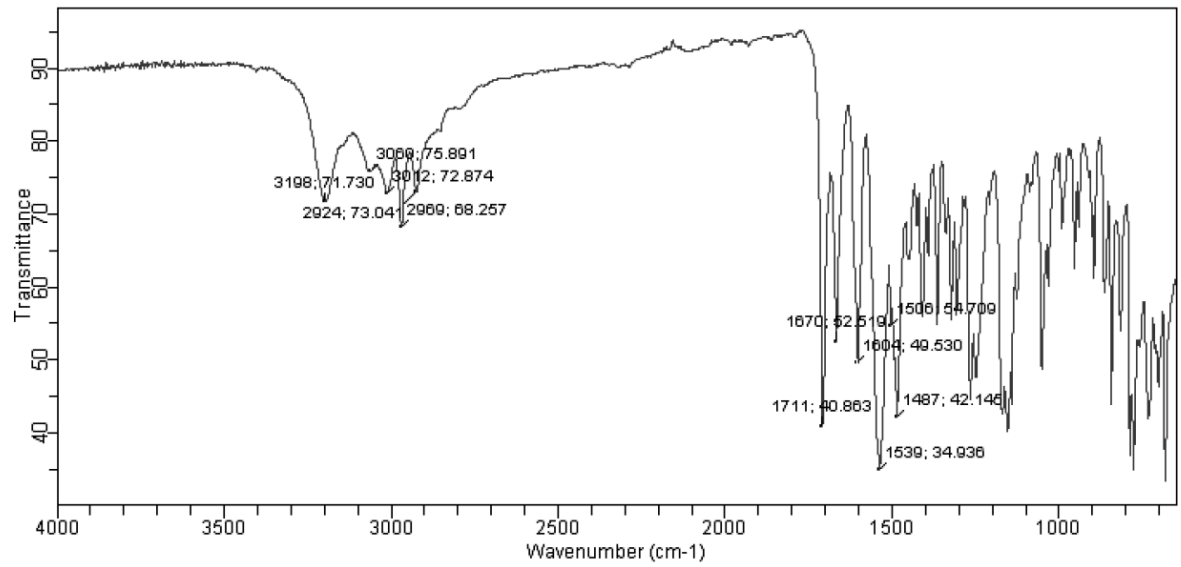

3415; 95.991
3298; 96.523
3002; 99.203
2930; 95.471
2974; 95.020
2861; 95.588
1621; 90.838
1588; 86.808
1589; 86.051
1682; 79.629
Transmittance
Wavenumber (cm-1)

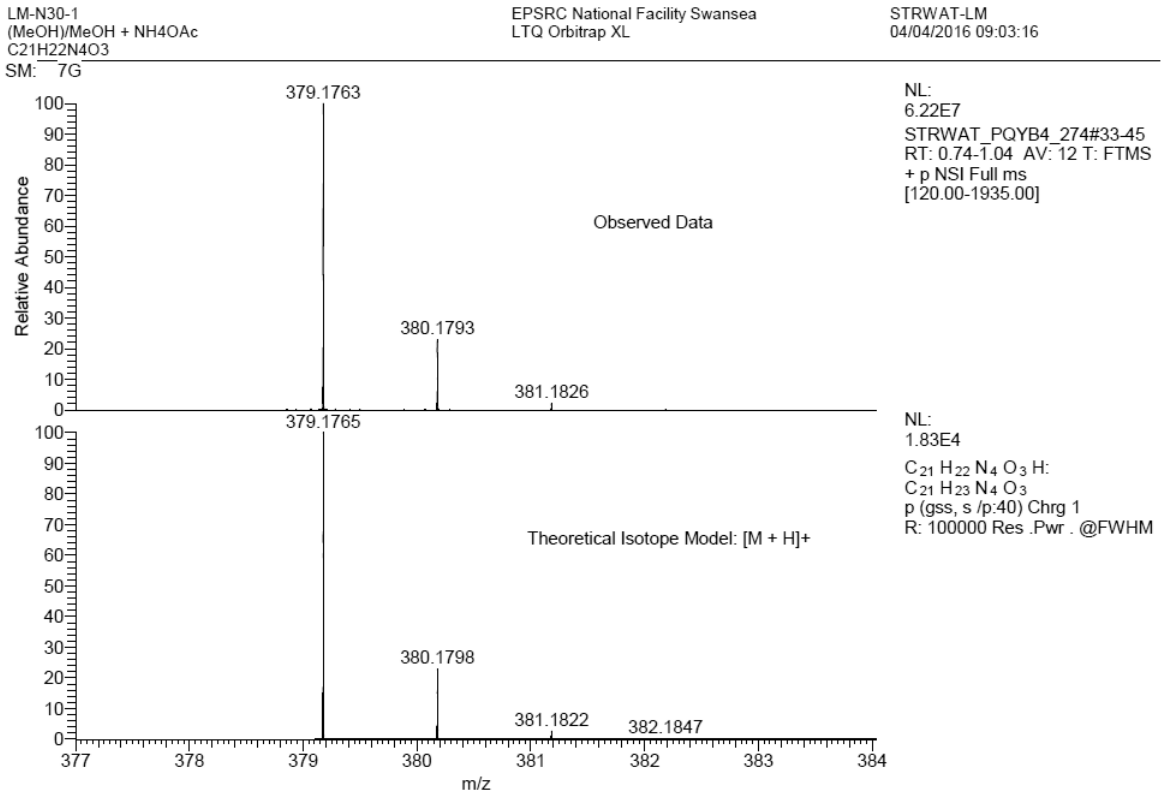


***tert*-Butyl (2-((3-(1,8-naphthyridin-2-yl)phenyl)amino)-2-oxoethyl) carbamate (2.73).**

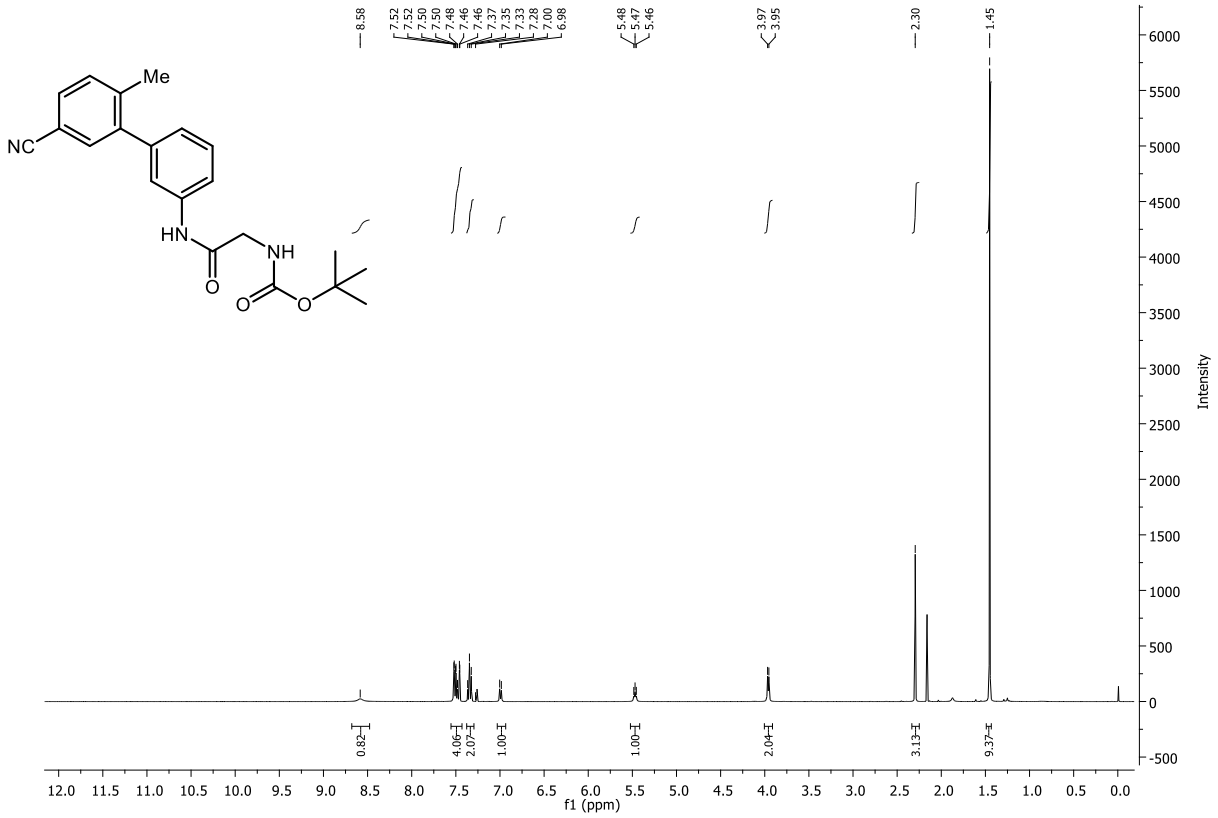


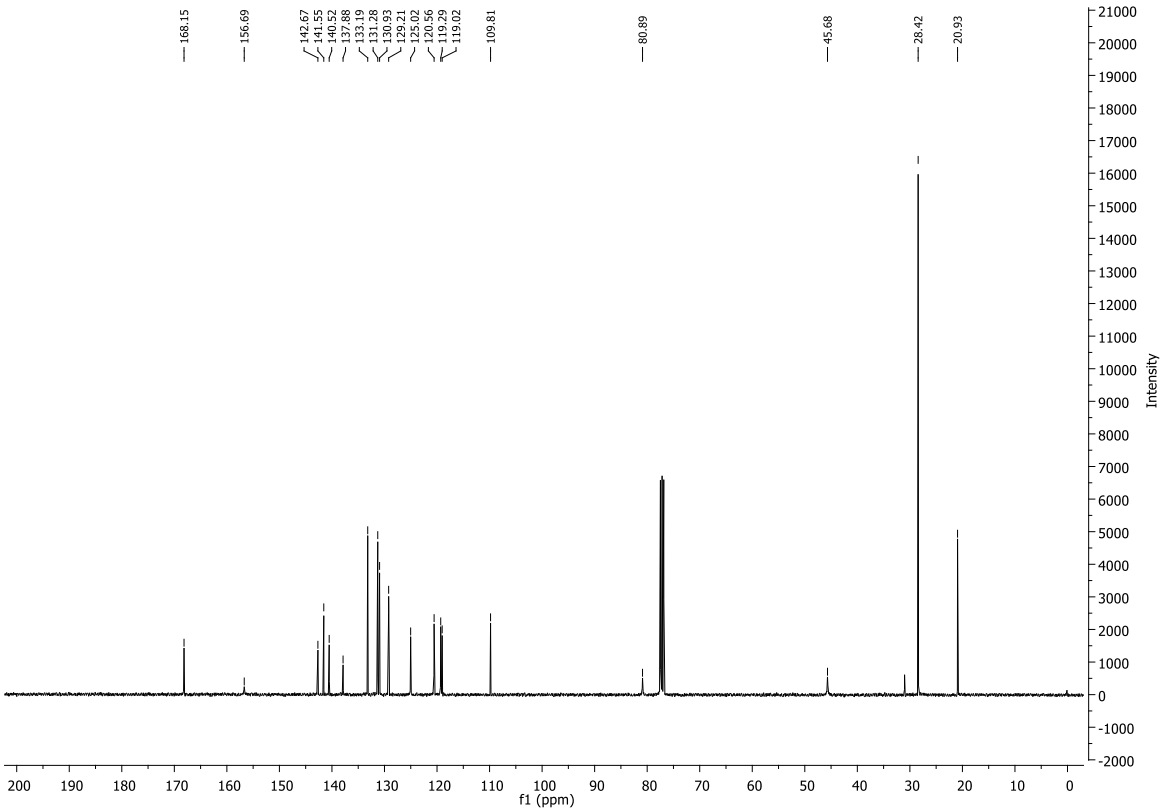

168.5
159.8
156.1
154.0
139.2
138.5
138.0
137.0
129.7
123.8
122.1
121.9
119.9
119.4
80.8
45.6
28.5
Intensity
f1 (ppm)

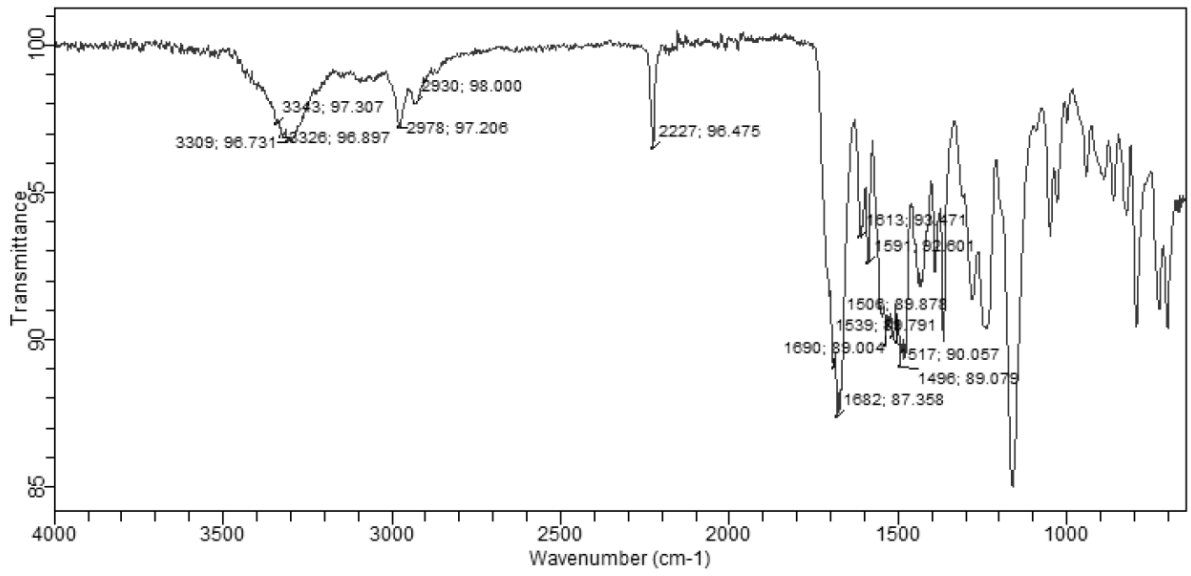

Transmittance
Wavenumber (cm-1)
3198; 71.730
3060; 75.891
3012; 72.874
2924; 73.041
2969; 68.257
1670; 52.519
1606; 54.709
1604; 49.530
1711; 40.863
1487; 42.145
1539; 34.936

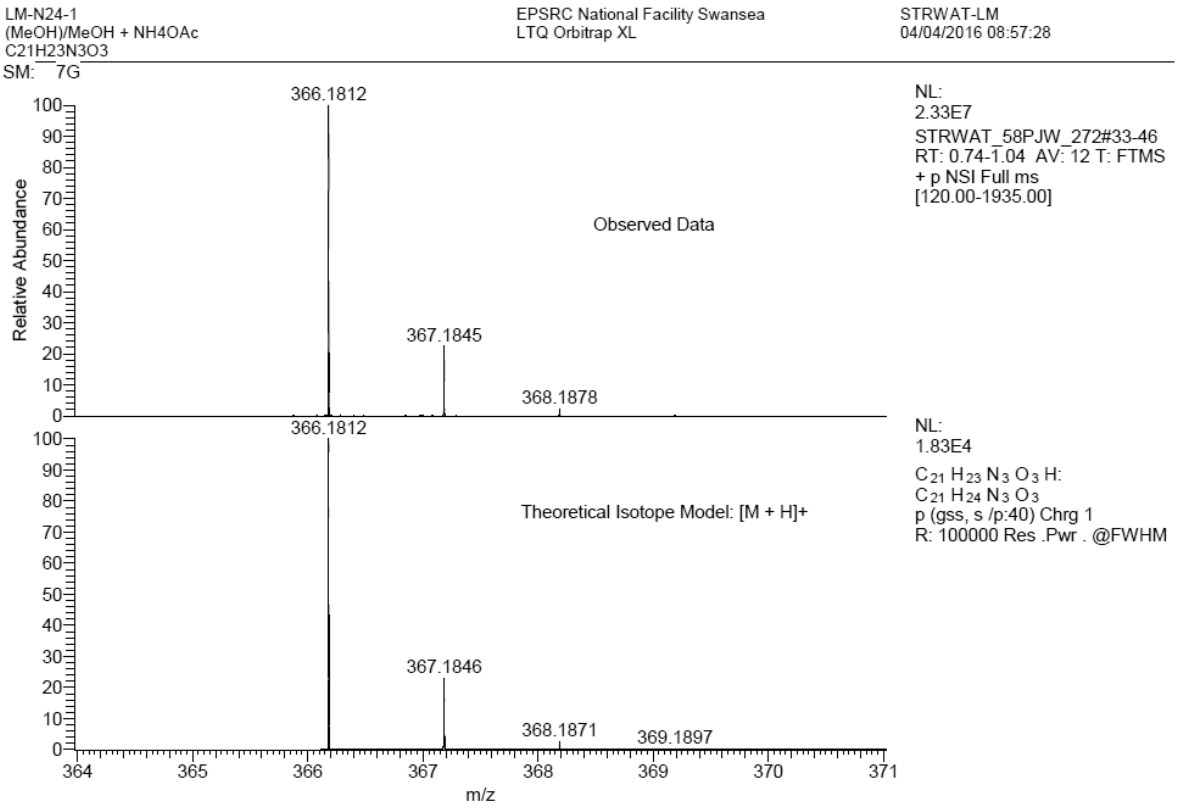


***tert*-Butyl (2-((5'-cyano-2'-methyl-[1,1'-biphenyl]-3-yl)amino)-2-oxoethyl) carbamate (2.75).**

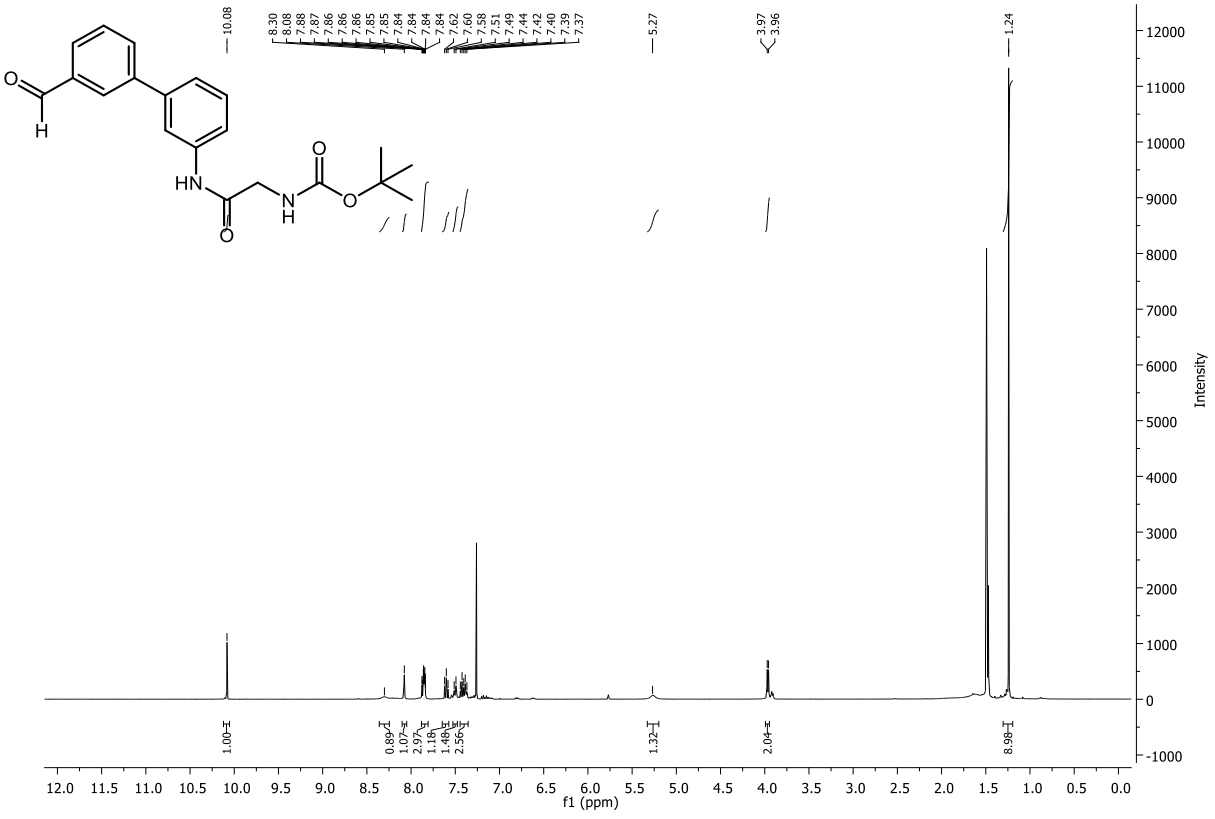


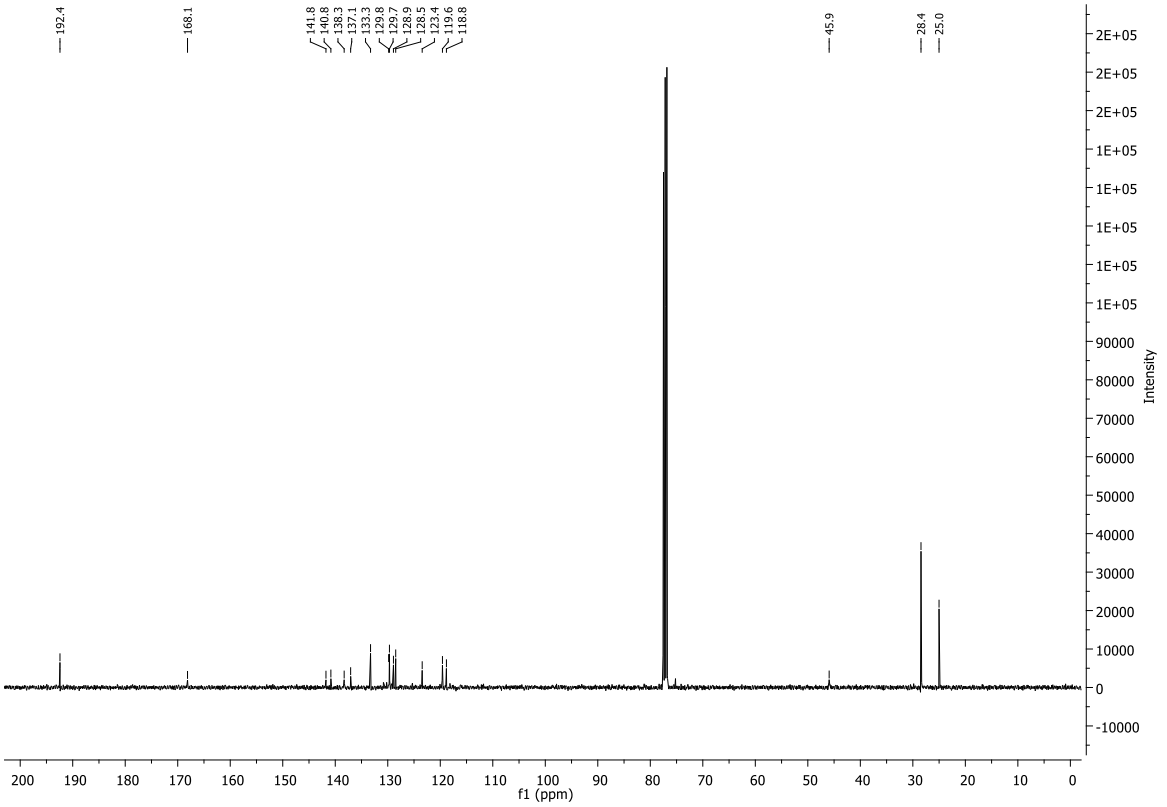

168.15
156.69
142.67
141.55
140.52
137.88
133.19
131.28
130.93
129.21
125.02
120.56
119.29
119.02
109.81
80.89
45.68
28.42
20.93
Intensity
f1 (ppm)

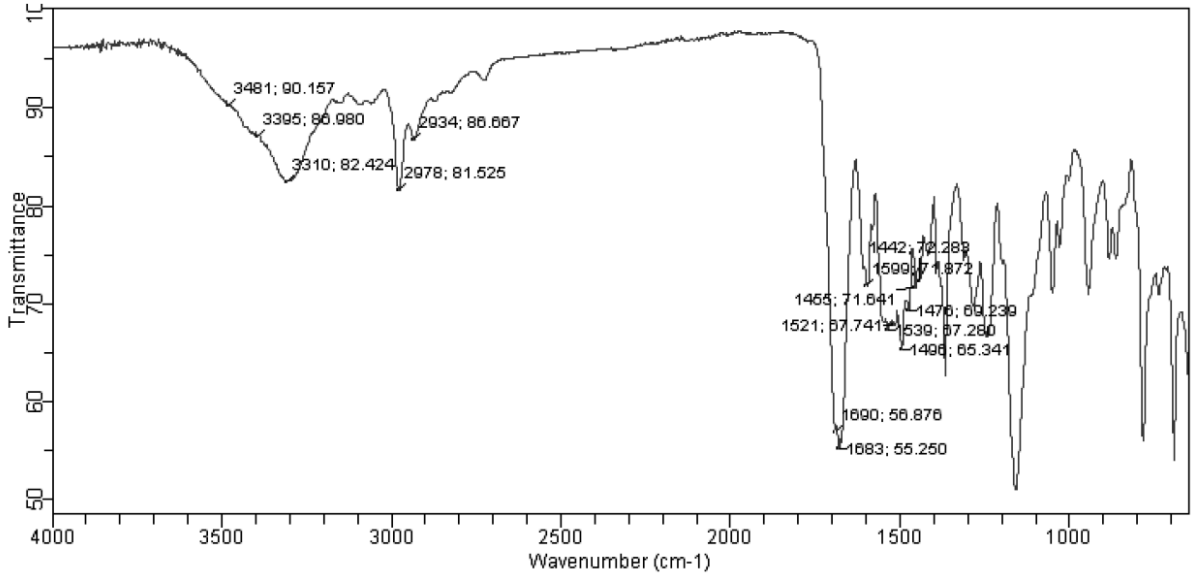

Transmittance
Wavenumber (cm-1)
3343; 97.307
3309; 96.731
3326; 96.897
2930; 98.000
2978; 97.206
2227; 96.475
1682; 87.358
1496; 89.079
1517; 90.057

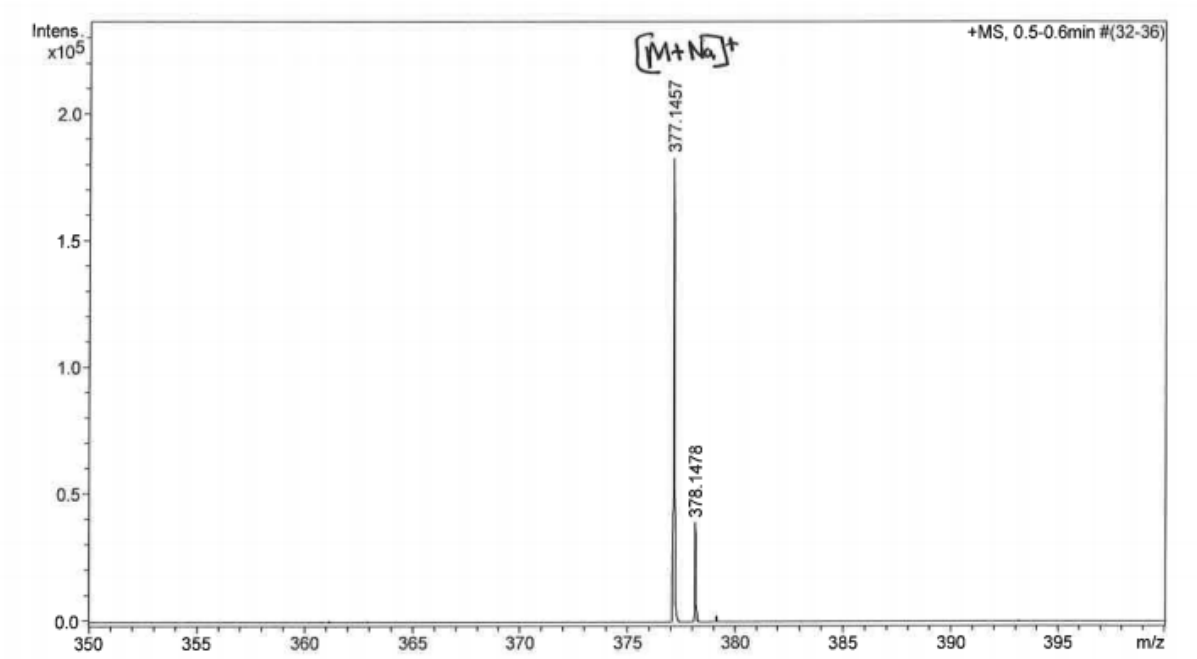


***tert*-Butyl (2-((3'-formyl-[1,1'-biphenyl]-3-yl)amino)-2-oxoethyl)carbamate (2.77).**



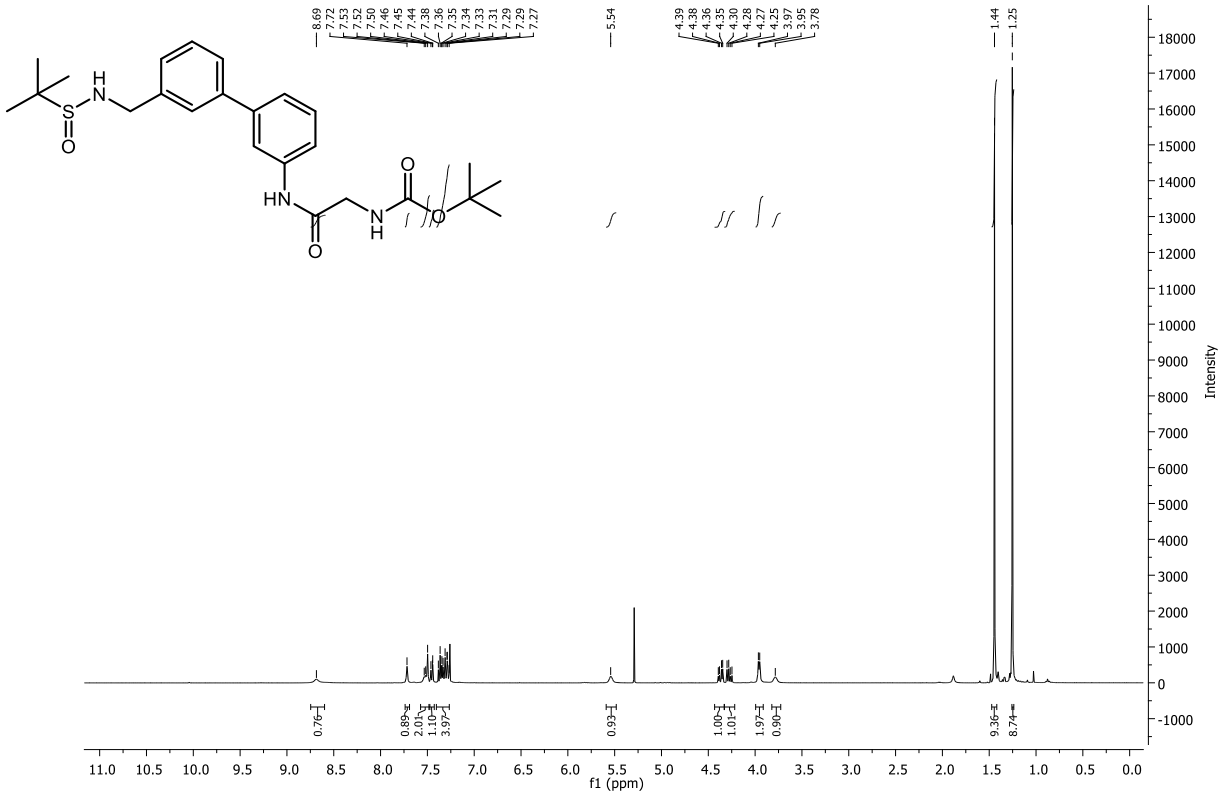

192.4
168.1
141.8
140.8
138.3
137.1
133.3
129.8
129.7
128.9
128.5
123.4
119.6
118.8
45.9
28.4
25.0
Intensity
f1 (ppm)

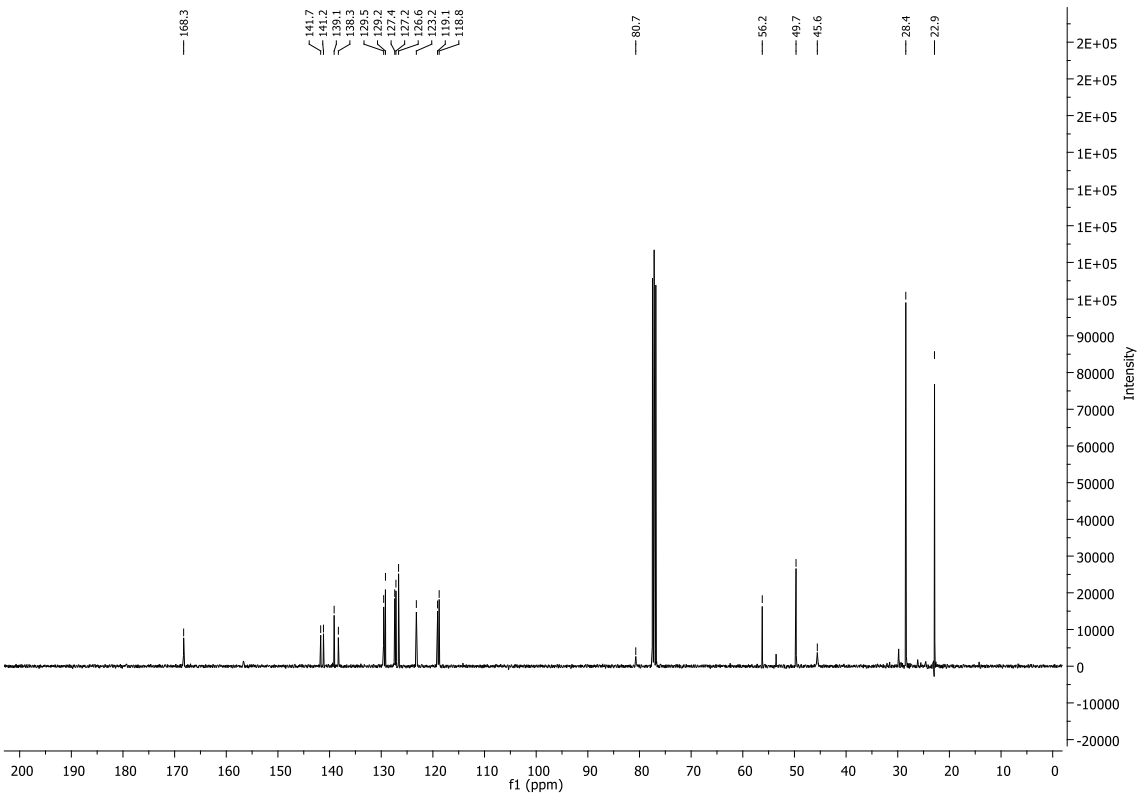

3481; 90.157
3395; 86.980
3310; 82.424
2934; 86.667
2978; 81.525
1442; 72.283
1599; 71.872
1455; 71.641
1521; 67.741
1476; 69.239
1539; 67.280
1496; 65.341
1690; 56.876
1683; 55.250
Transmittance
Wavenumber (cm-1)

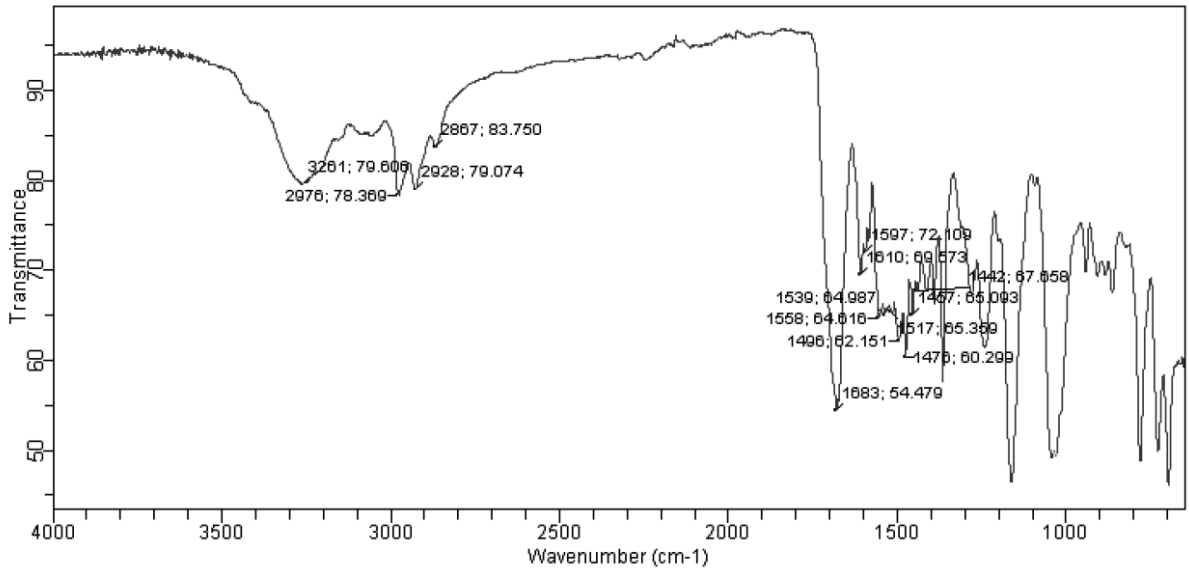


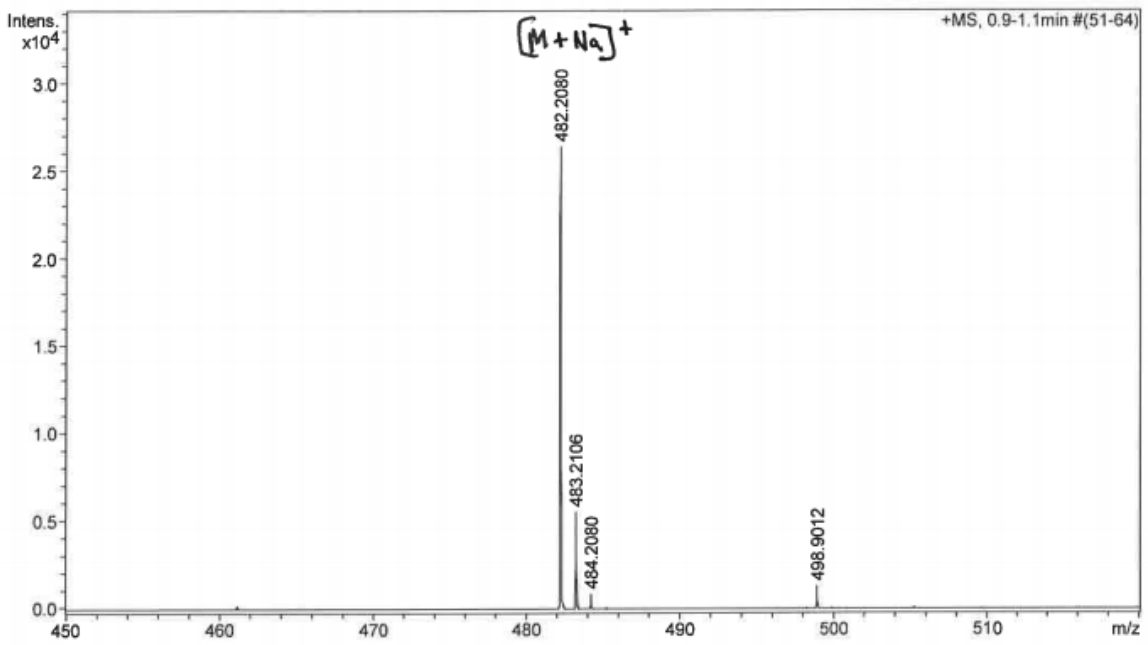
Formula	z	m/z	Meas. m/z	err [ppm]	err [mDa]
	1+		377.1457		
C 20 H 22 N 2 Na O 4		377.1472		4.0	1.5

***tert*-Butyl (2-((3'-(((tert-butylsulfinyl)amino)methyl)-[1,1'-biphenyl]-3-yl)amino)-2-oxoethyl) carbamate (2.78).**



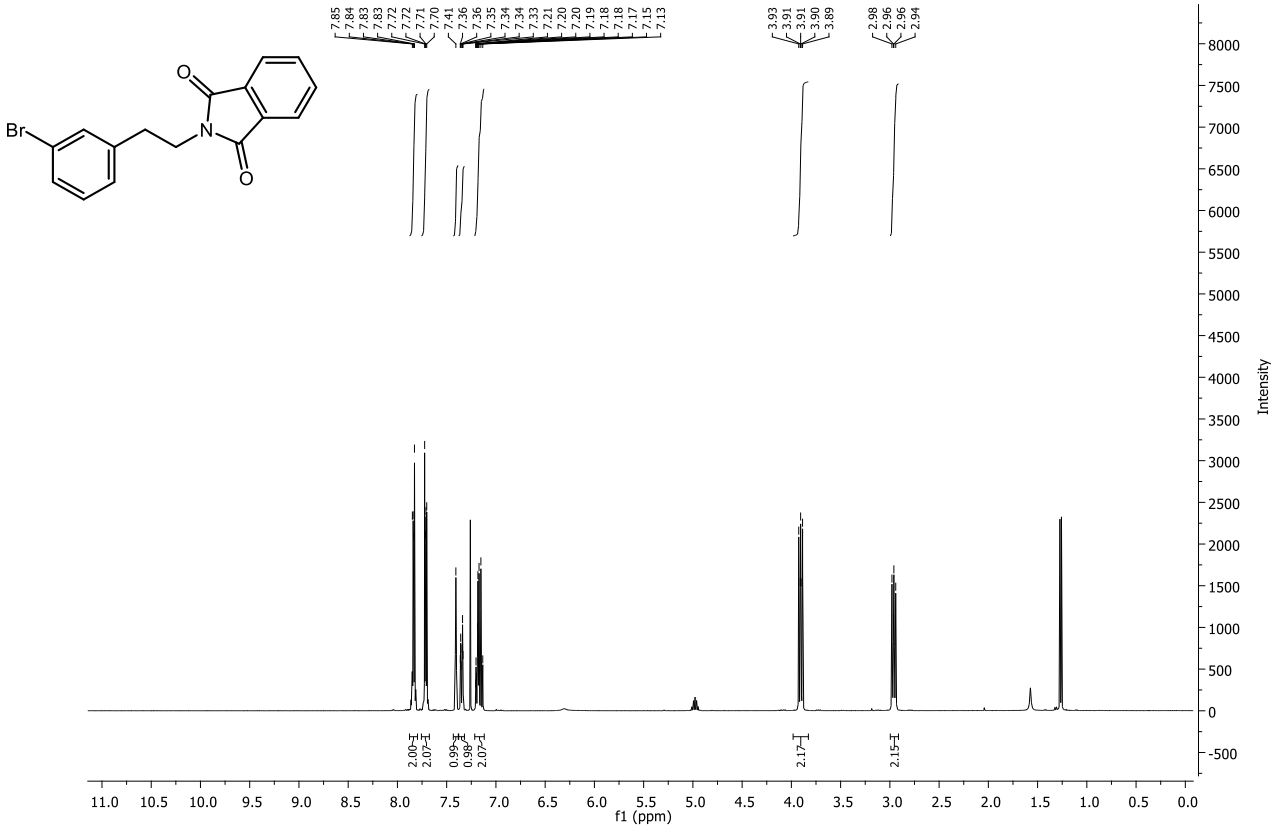

168.3
141.7
141.2
139.1
138.3
129.5
129.2
127.4
127.2
126.6
123.2
119.1
118.8
80.7
56.2
49.7
45.6
28.4
22.9
Intensity
f1 (ppm)

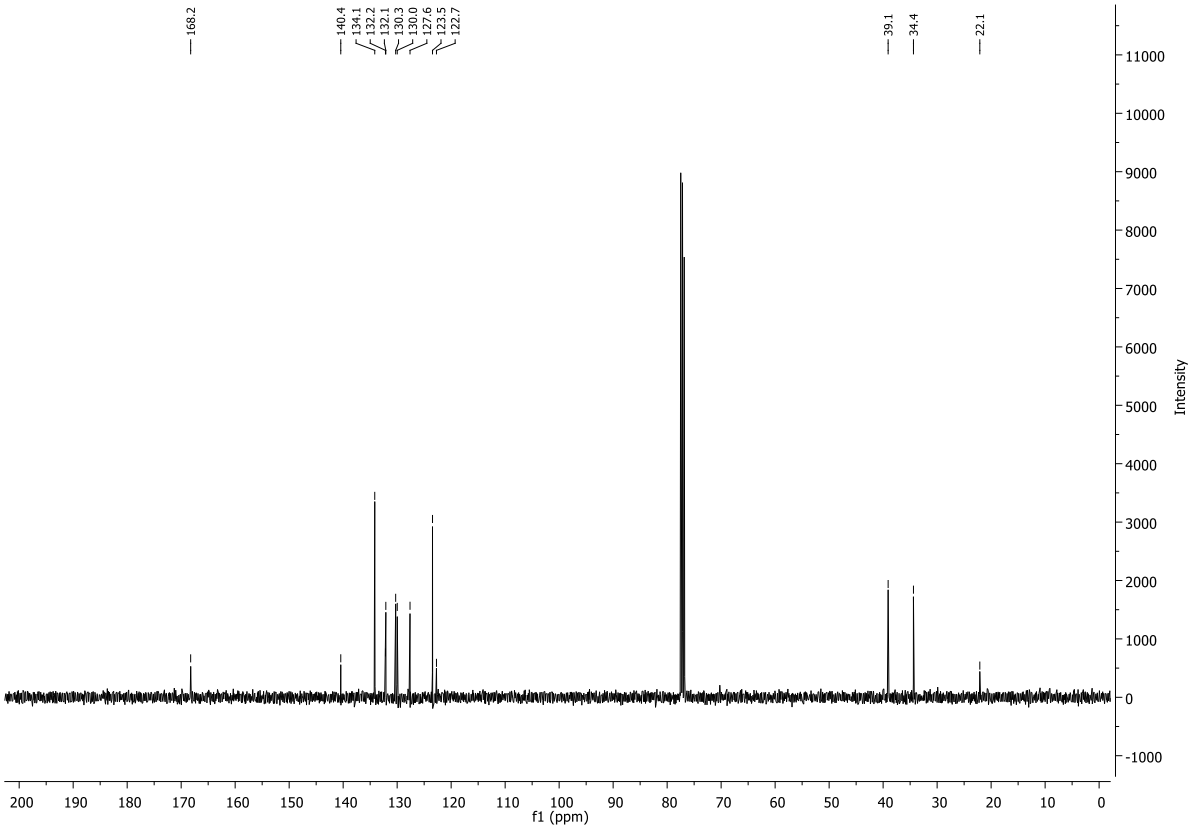

Transmittance
Wavenumber (cm-1)
2867; 83.750
3261; 79.606
2928; 79.074
2976; 78.369
1597; 72.109
1610; 69.573
1442; 67.658
1539; 64.987
1457; 65.093
1558; 64.616
1517; 65.359
1496; 62.151
1479; 60.299
1683; 54.479

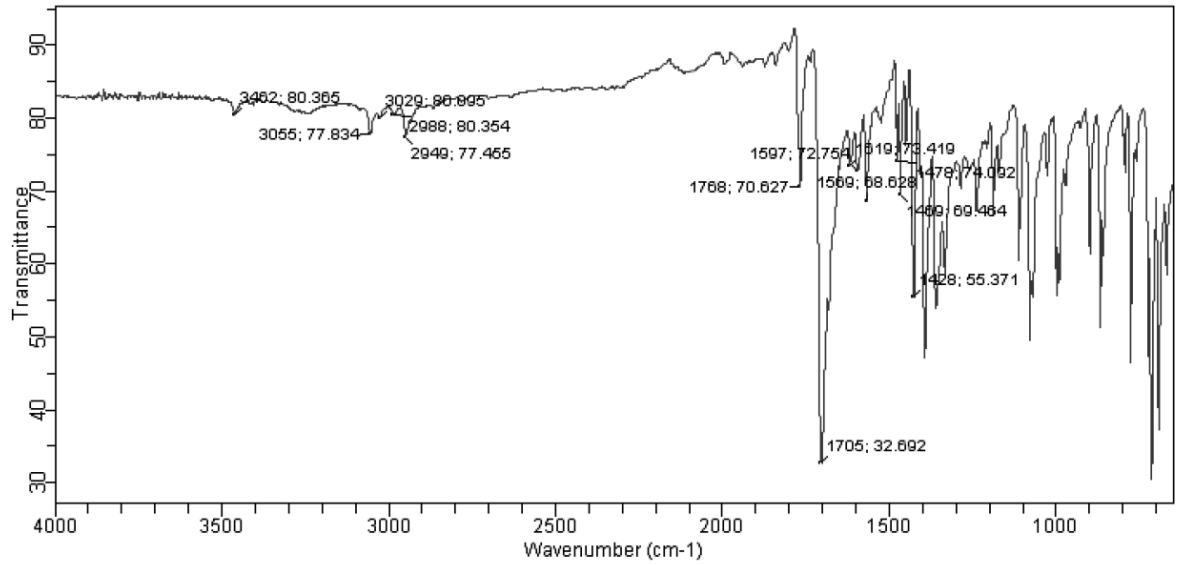


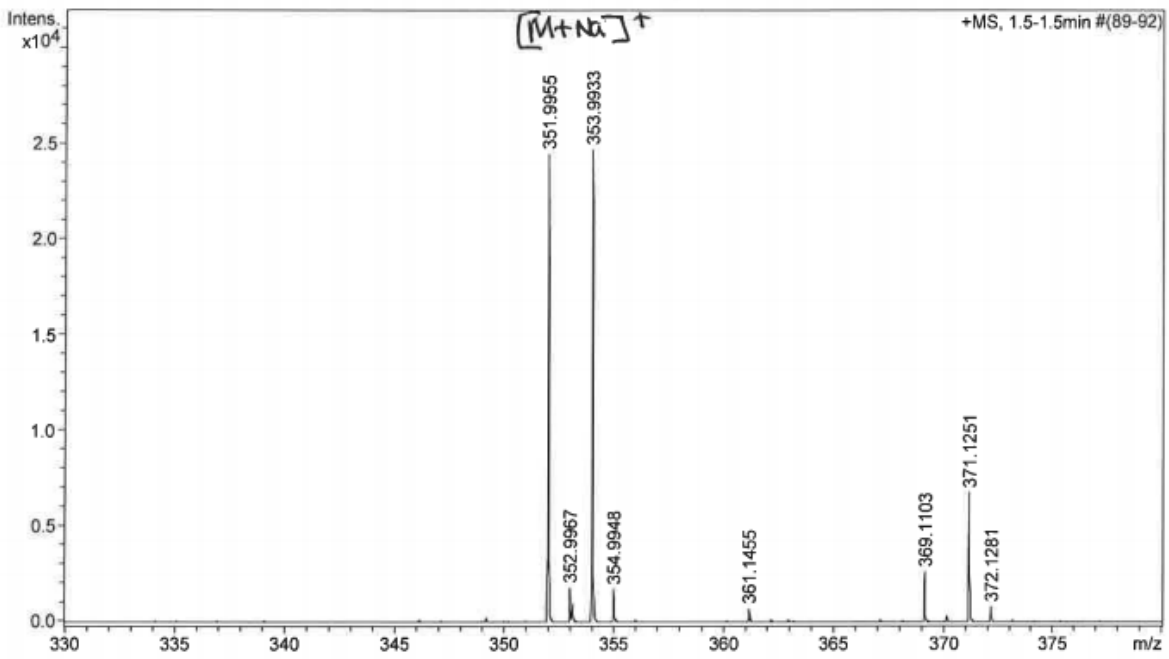
Formula	z	m/z	Meas. m/z	err [ppm]	err [mDa]
	1+		482.2080		
C 24 H 33 N 3 Na O 4 S		482.2084		0.9	0.4

2-(3-Bromophenethyl)isoindoline-1,3-dione (2.80).



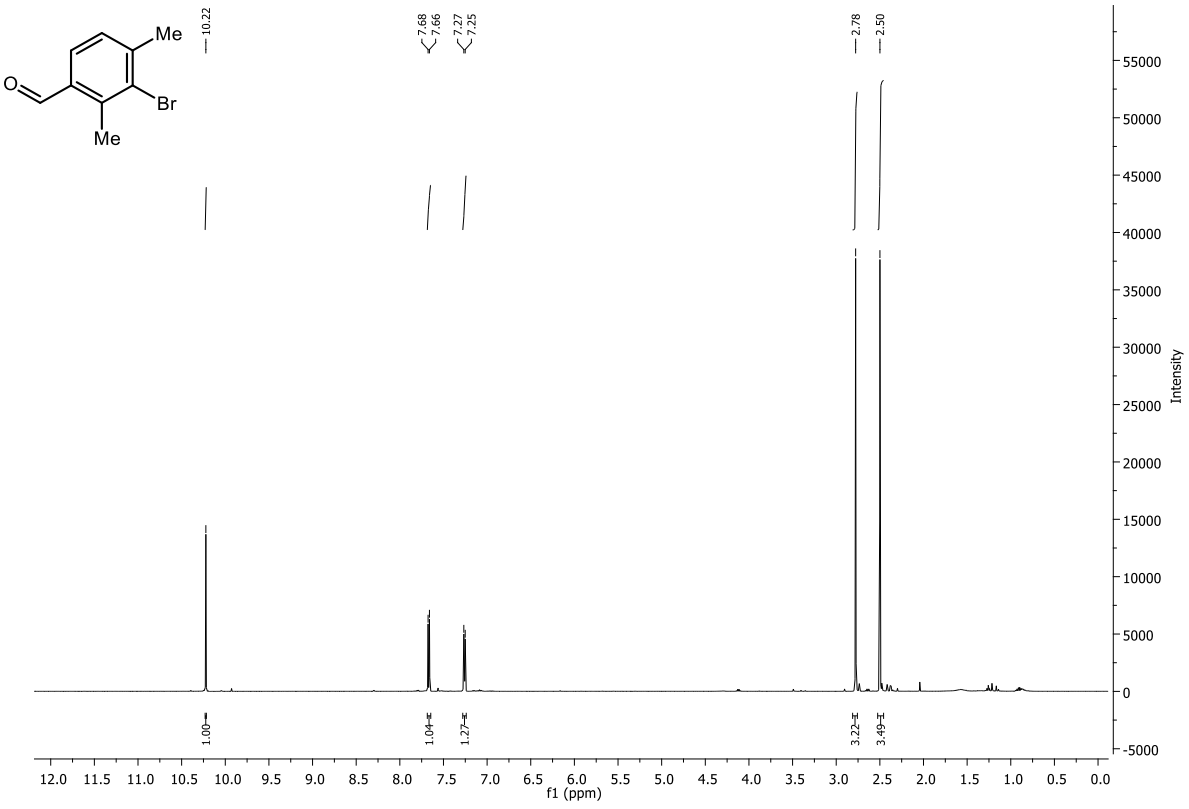

168.2
140.4
134.1
132.2
132.1
130.3
130.0
127.6
123.5
122.7
39.1
34.4
22.1
Intensity
f1 (ppm)

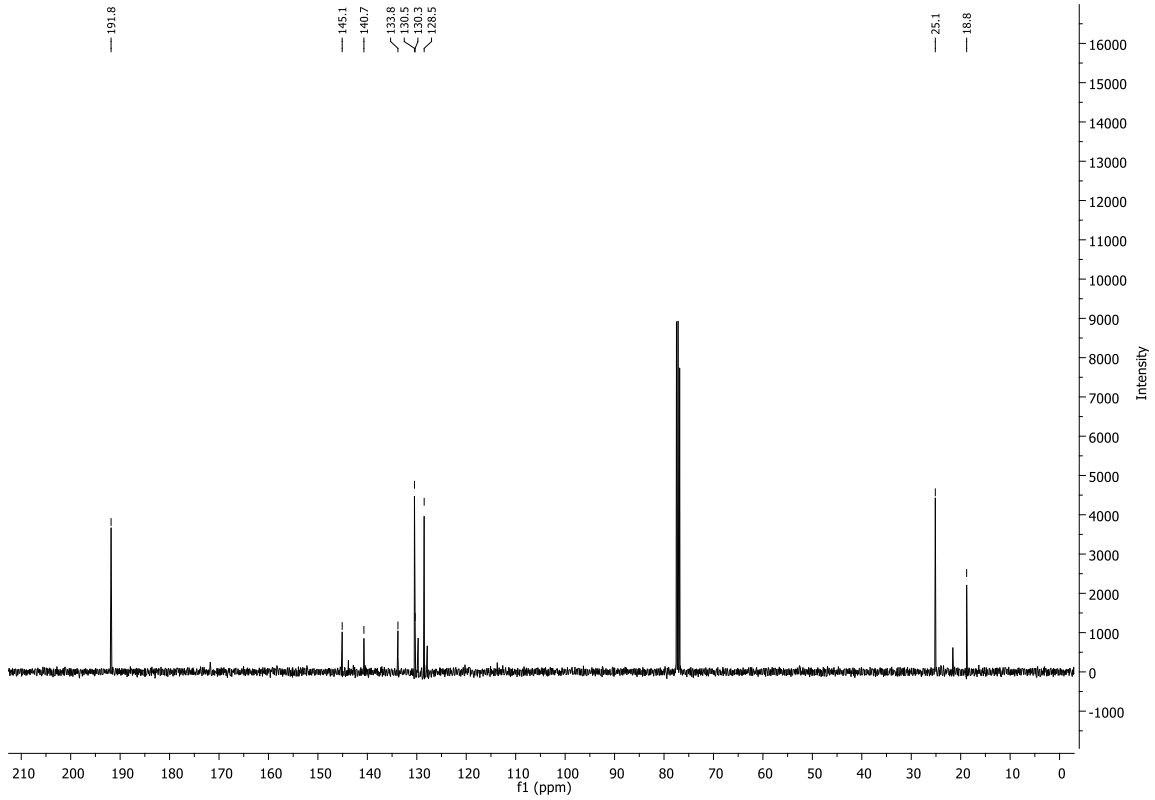

3462; 80.365
3029; 80.895
3055; 77.834
2988; 80.354
2949; 77.455
1597; 72.754
1519; 73.419
1768; 70.627
1569; 68.628
1478; 74.092
1469; 69.464
1428; 55.371
1705; 32.692
Transmittance
Wavenumber (cm-1)

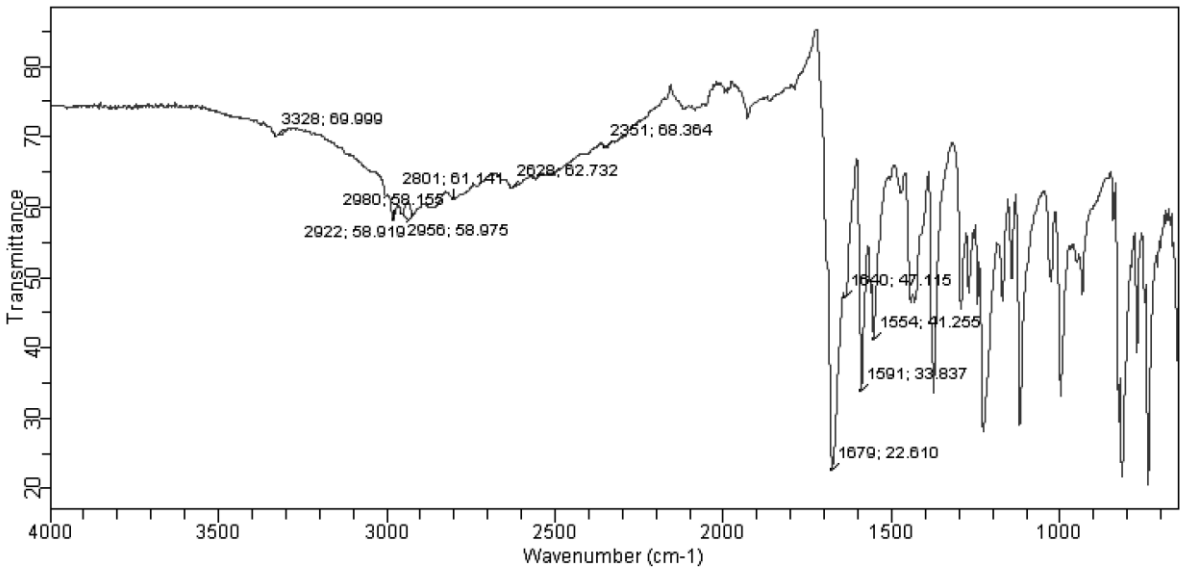


Formula	z	m/z	Meas. m/z	err [ppm]	err [mDa]
C 16 H 12 N Na O 2 ^79Br	1+	351.9944	351.9955	-3.3	-1.2
C 16 H 14 N Na O 2 ^79Br	1+	354.0100	353.9933	47.1	16.7

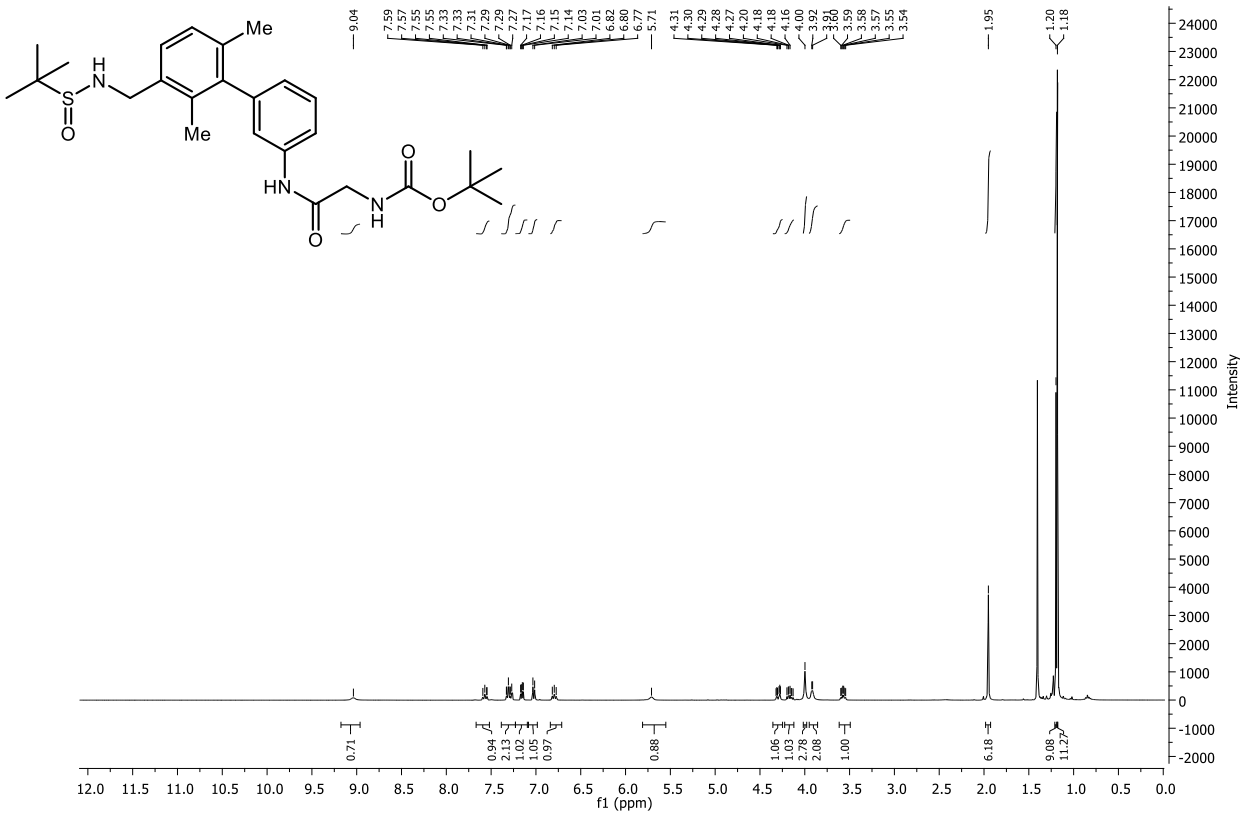
3-Bromo-2,4-dimethylbenzaldehyde (2.83).

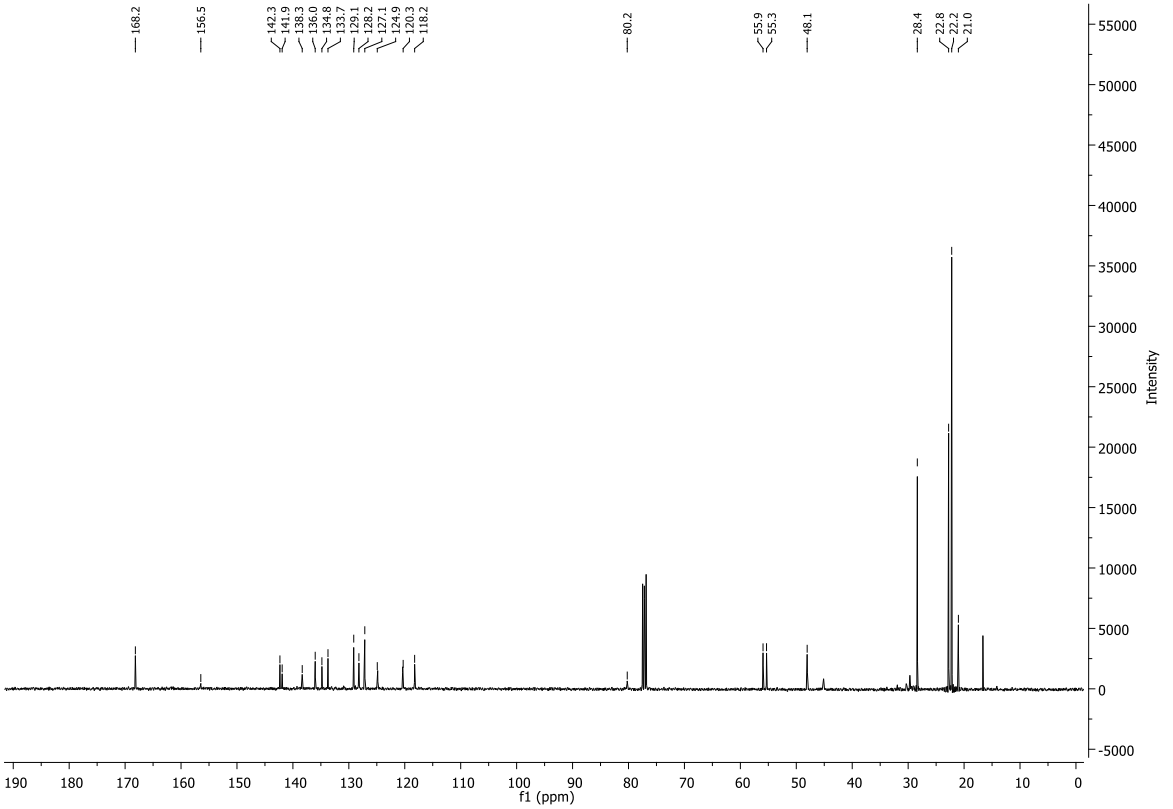


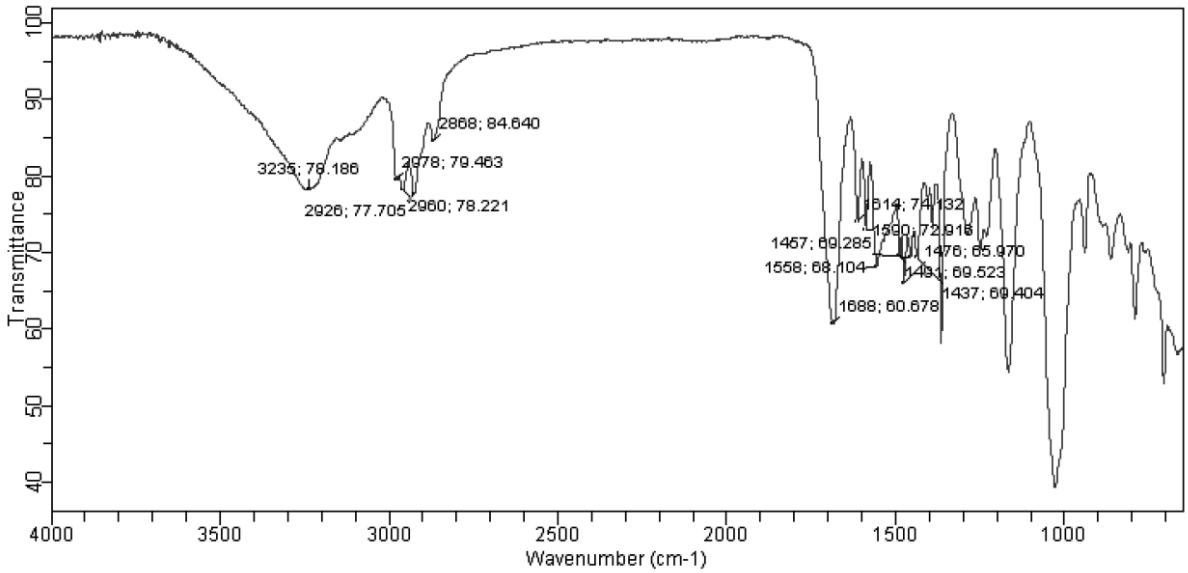

191.8
145.1
140.7
133.8
130.5
130.3
128.5
25.1
18.8
Intensity
f1 (ppm)

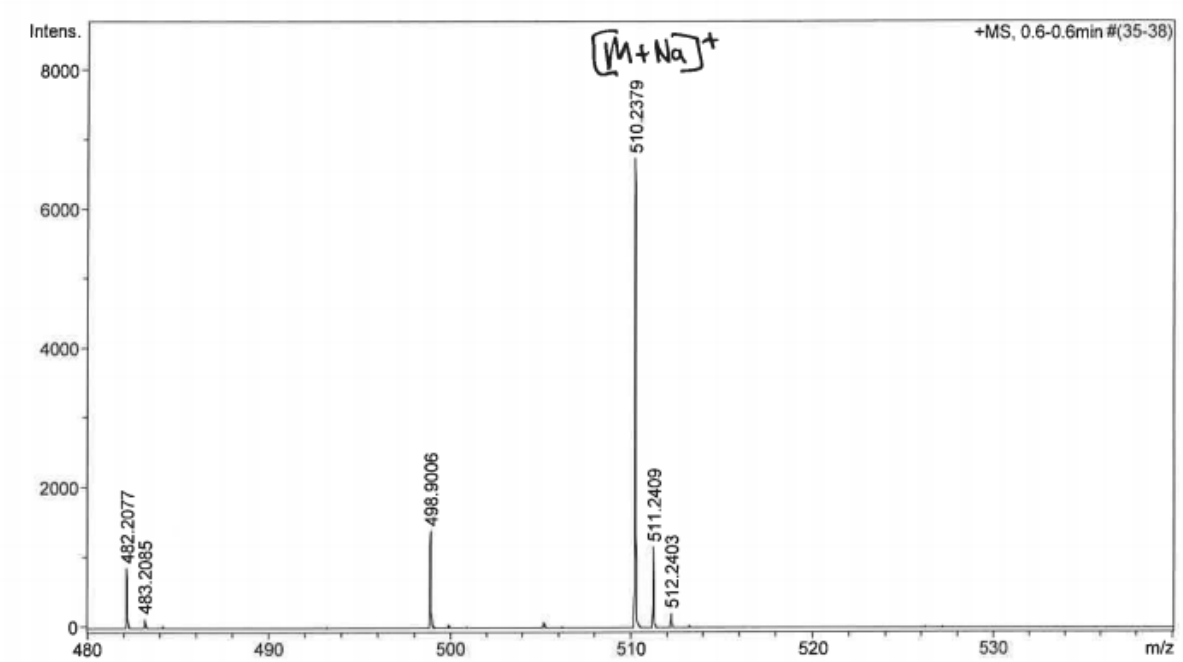

3328; 69.999
2980; 58.155
2922; 58.919
2956; 58.975
2801; 61.141
2628; 62.732
2351; 68.364
1640; 47.115
1554; 41.255
1591; 33.837
1679; 22.610
Transmittance
Wavenumber (cm-1)

***tert*-Butyl (2-((3'-(((*tert*-butylsulfinyl)amino)methyl)-2',6'-dimethyl-[1,1'-biphenyl]-3-yl)amino)-2-oxoethyl)carbamate (2.85).**



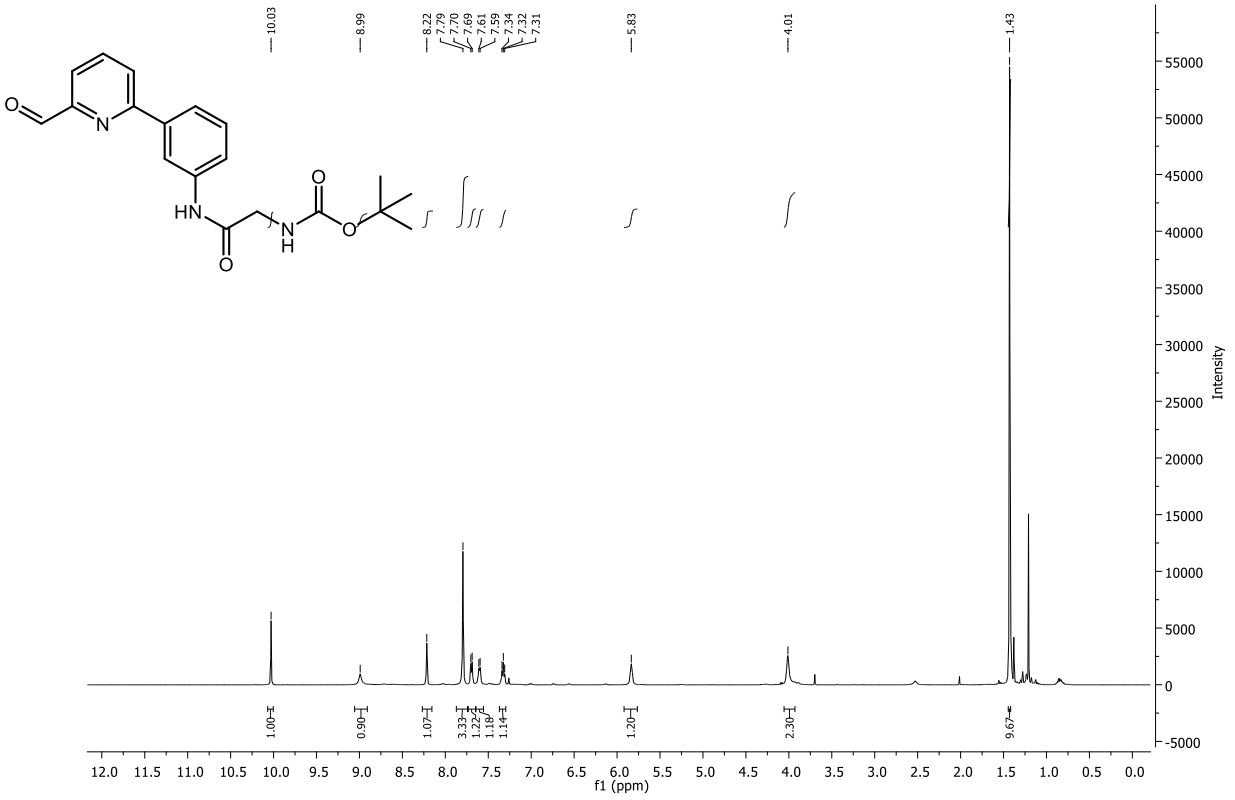


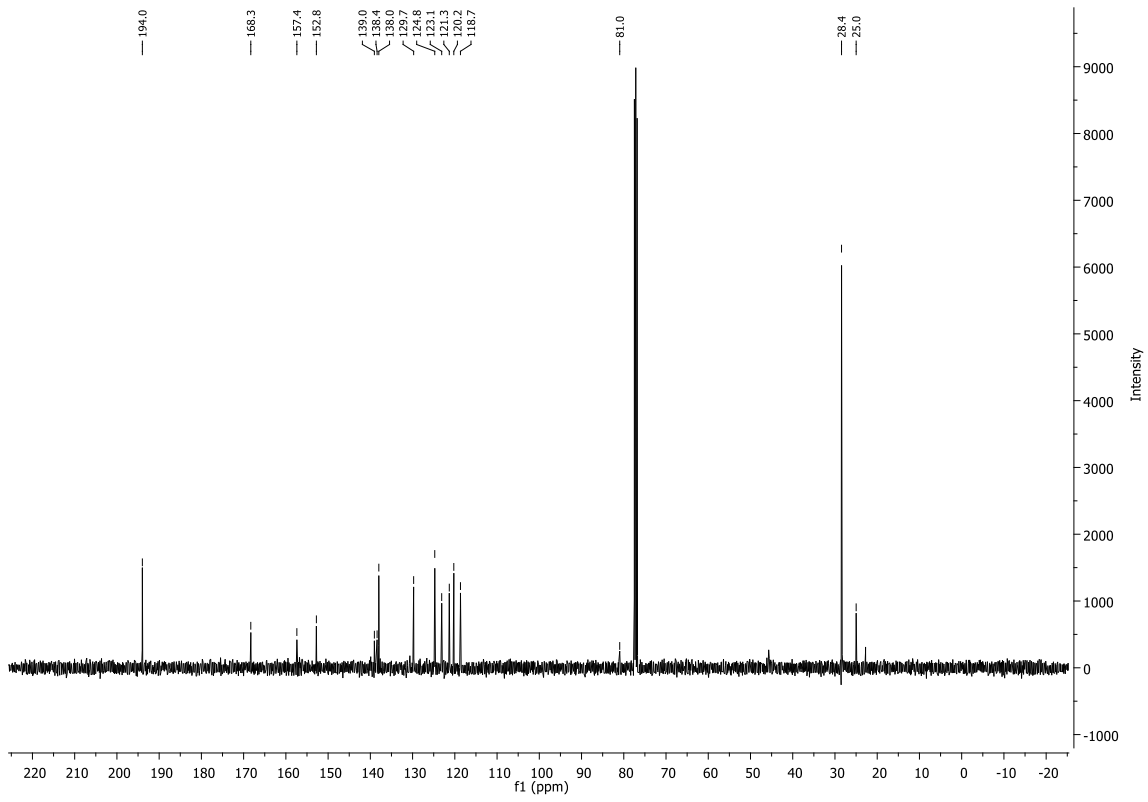


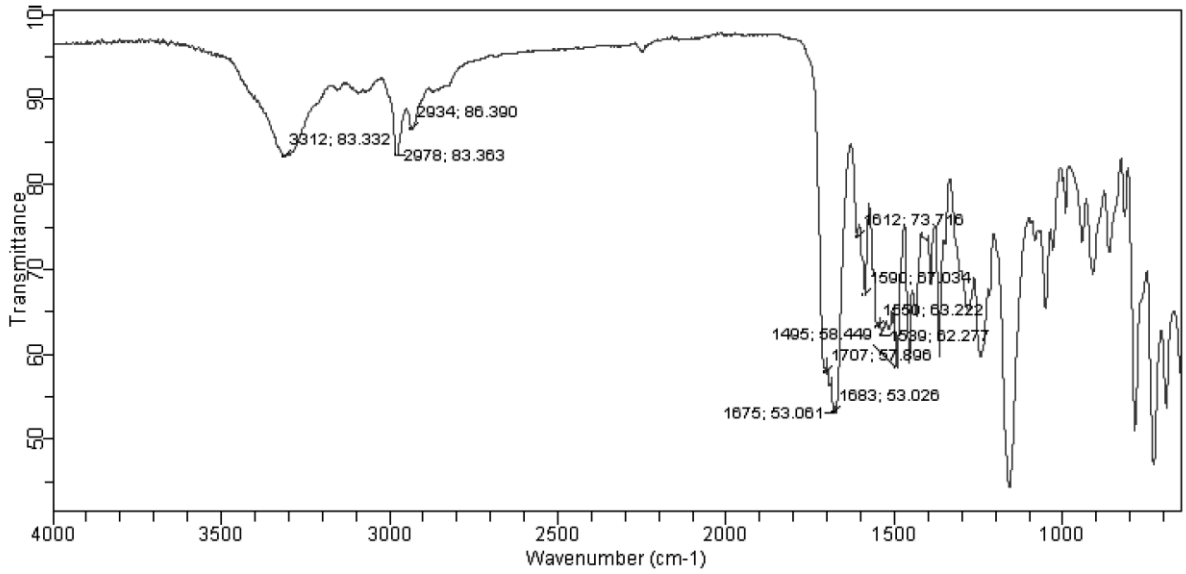


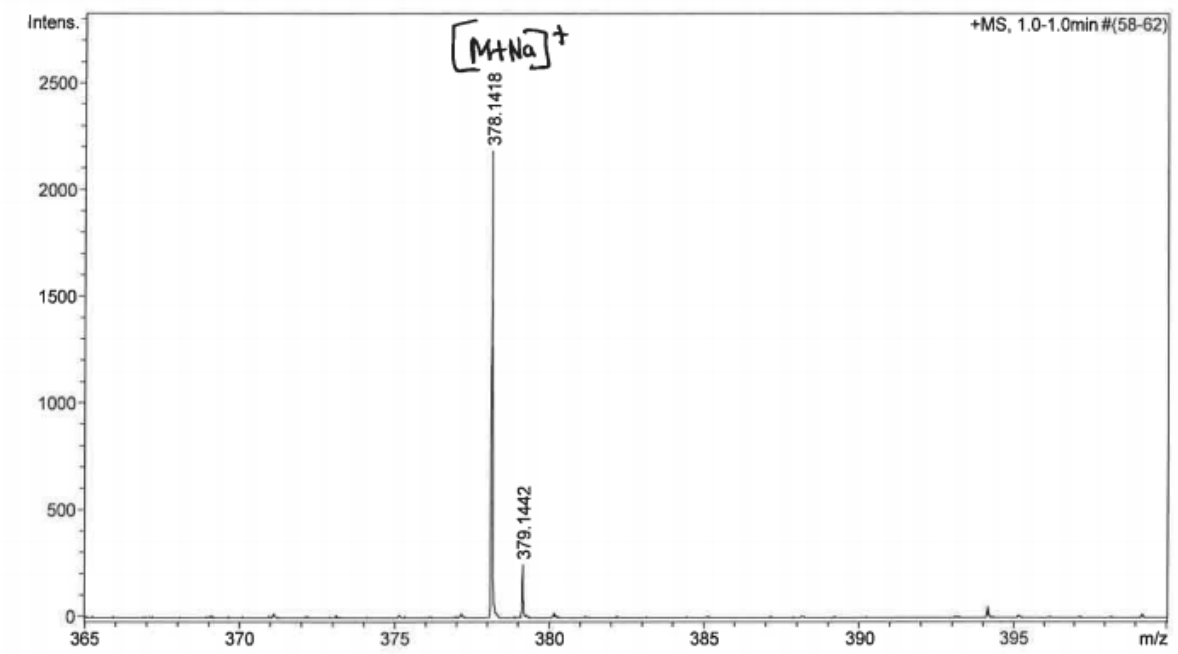
Formula	z	m/z	Meas. m/z	err [ppm]	err [mDa]
	1+		510.2379		
C 26 H 37 N 3 Na O 4 S		510.2397		3.5	1.8

***tert*-Butyl (2-((3-(6-formylpyridin-2-yl)phenyl)amino)-2-oxoethyl)carbamate (2.87).**



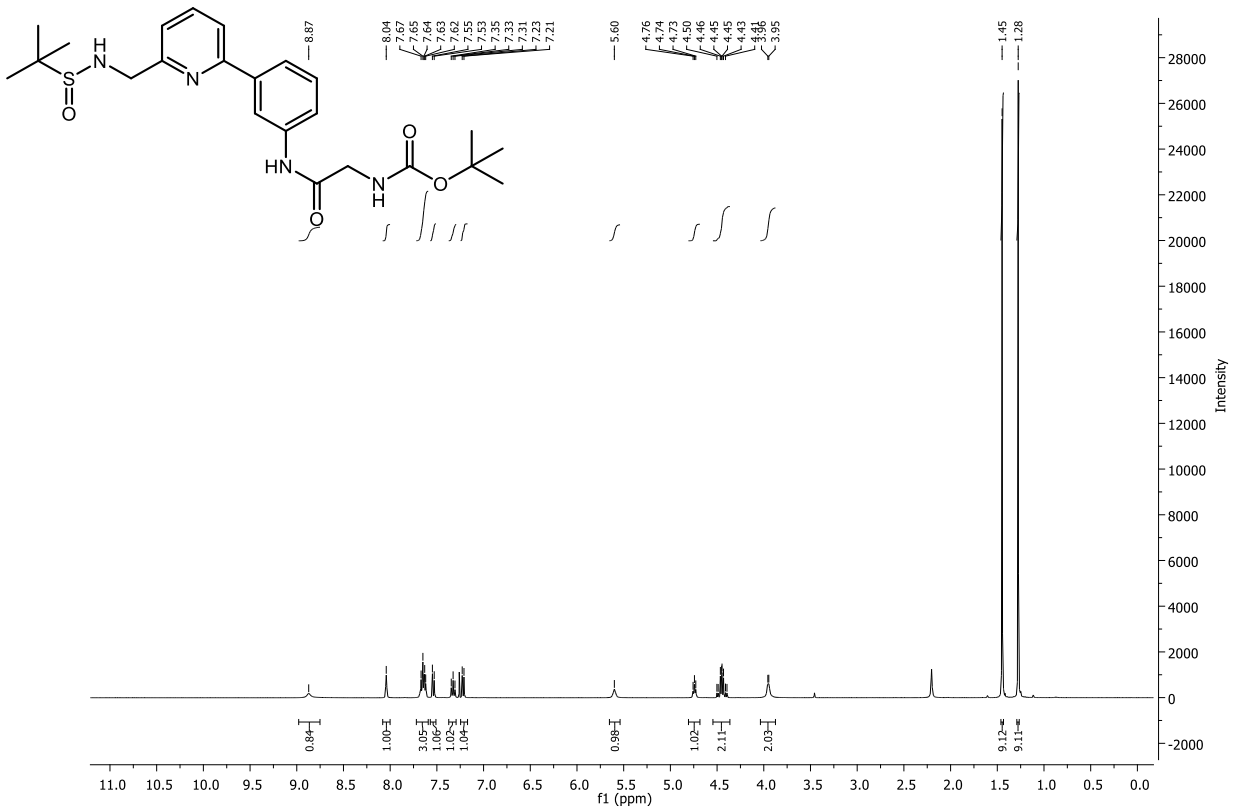


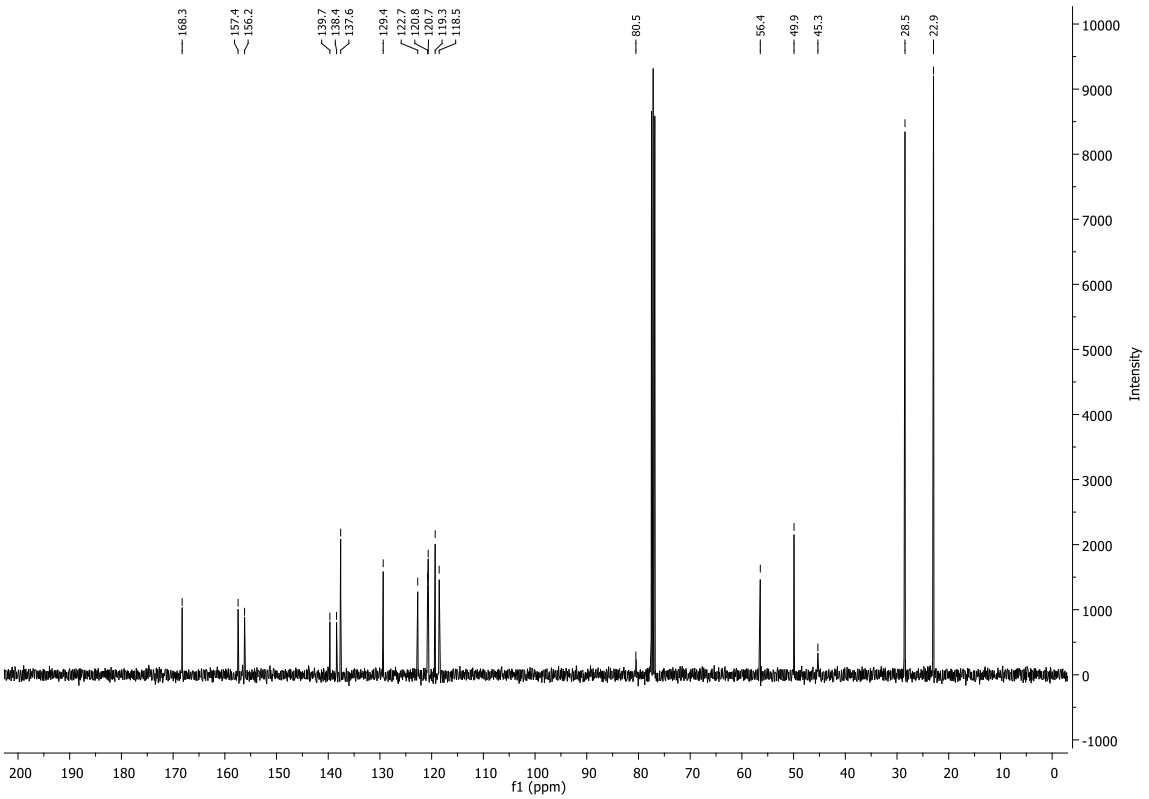


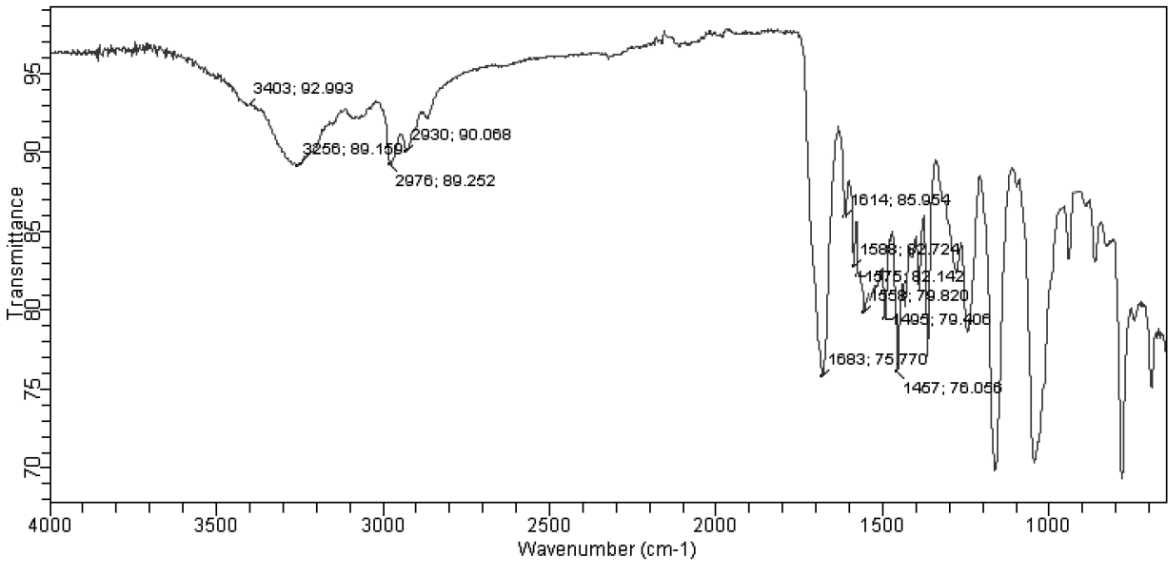


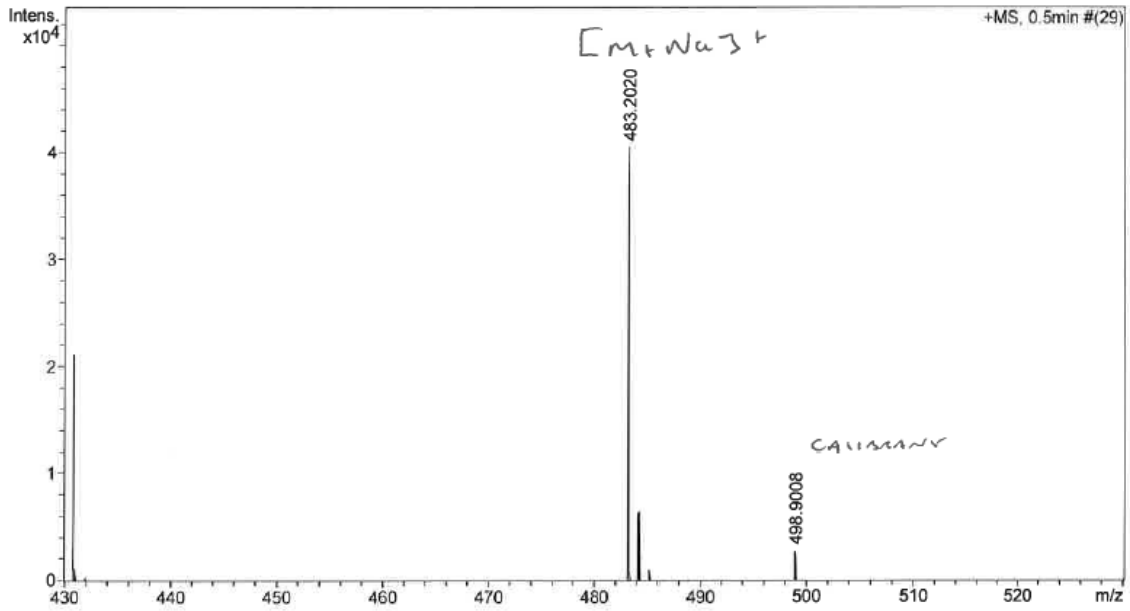
Formula	z	m/z	Meas. m/z	err [ppm]	err [mDa]
	1+		378.1418		
C 19 H 21 N 3 Na O 4		378.1424		1.5	0.6

***tert*-Butyl (2-((3-(6-(((*tert*-butylsulfinyl)amino)methyl)pyridin-2-yl)phenyl)amino)-2-oxoethyl)carbamate (2.88).**



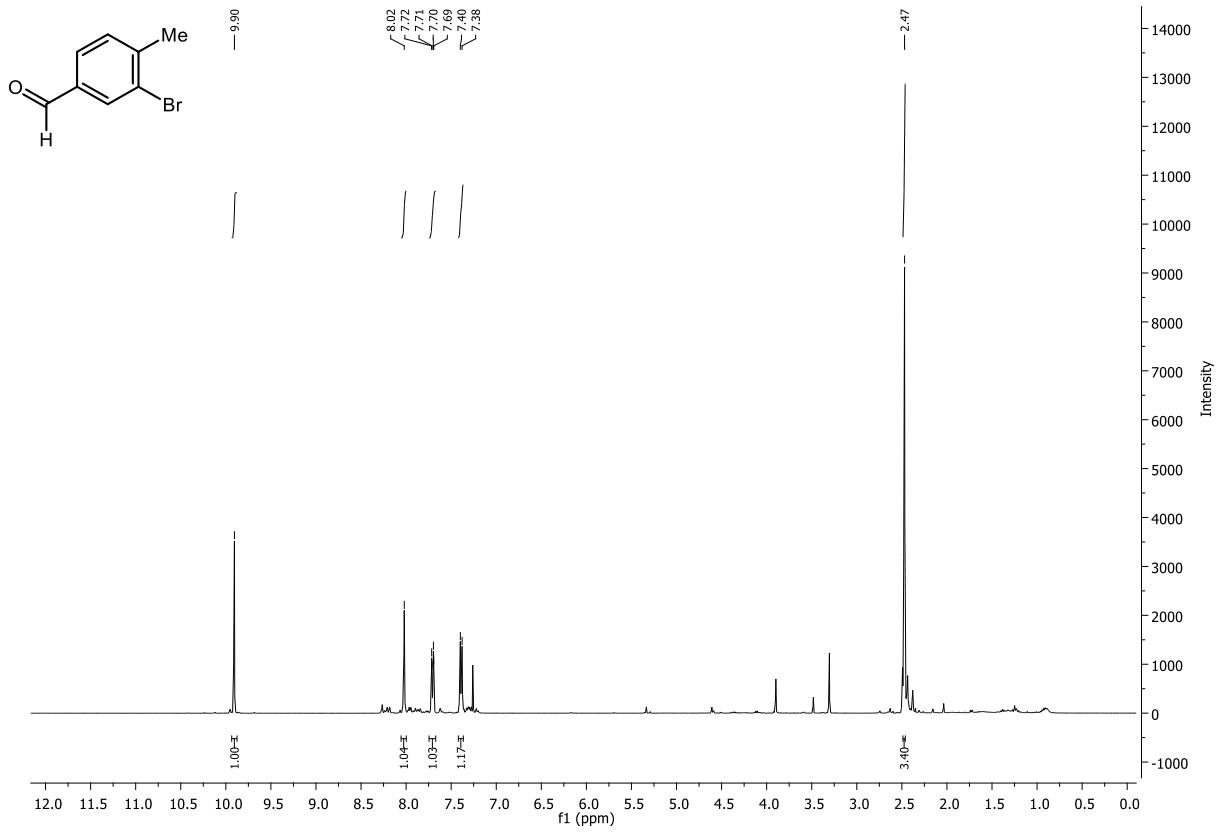


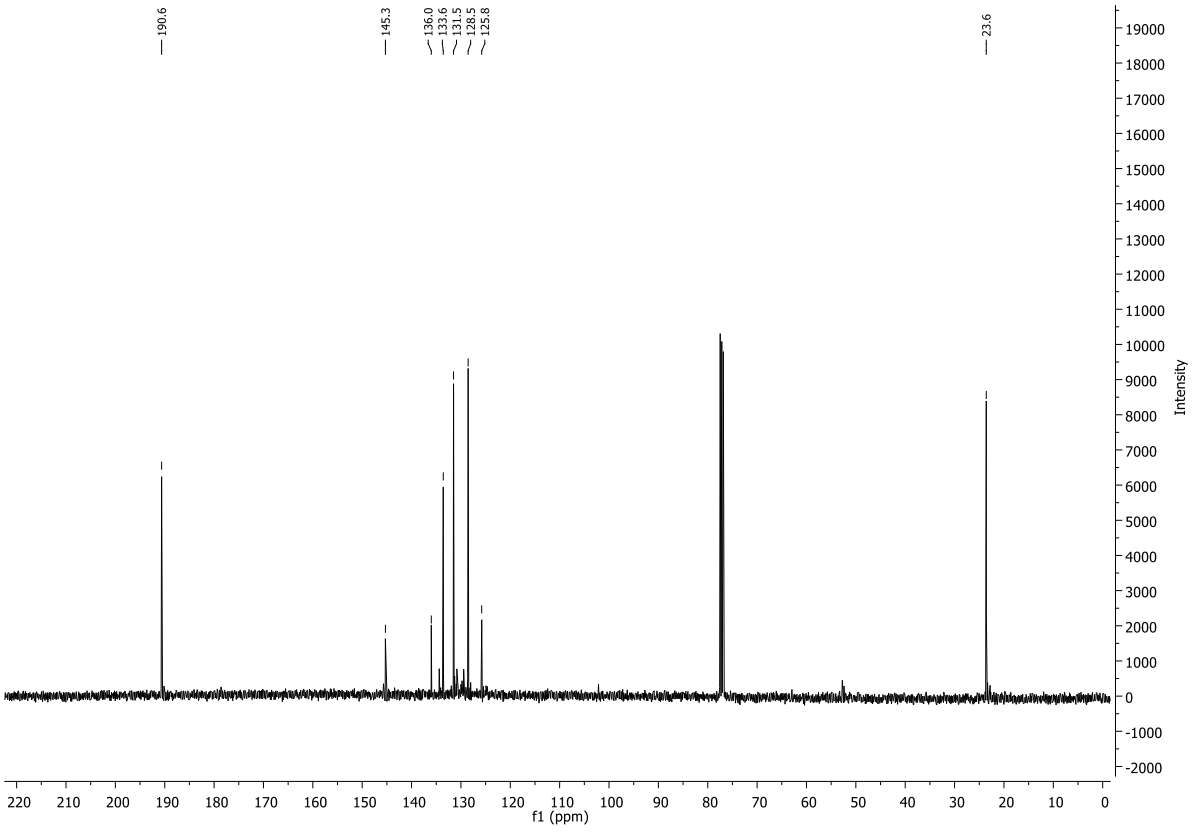


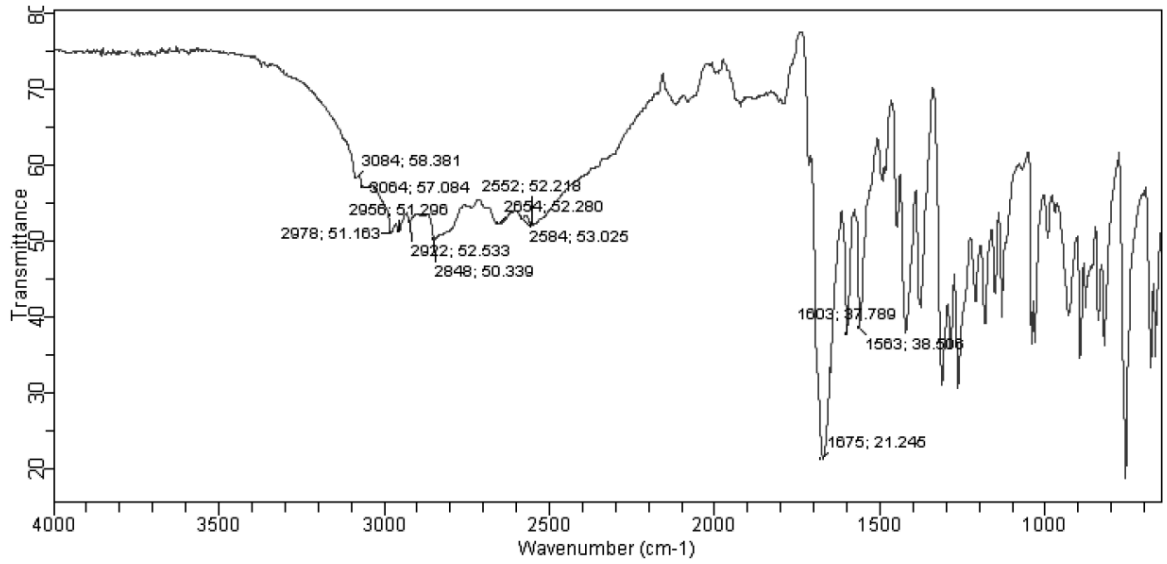


Formula	z	m/z	Meas. m/z	err [ppm]	err [mDa]
	1+		483.2020		
C 23 H 32 N 4 Na O 4 S		483.2036		3.5	1.7

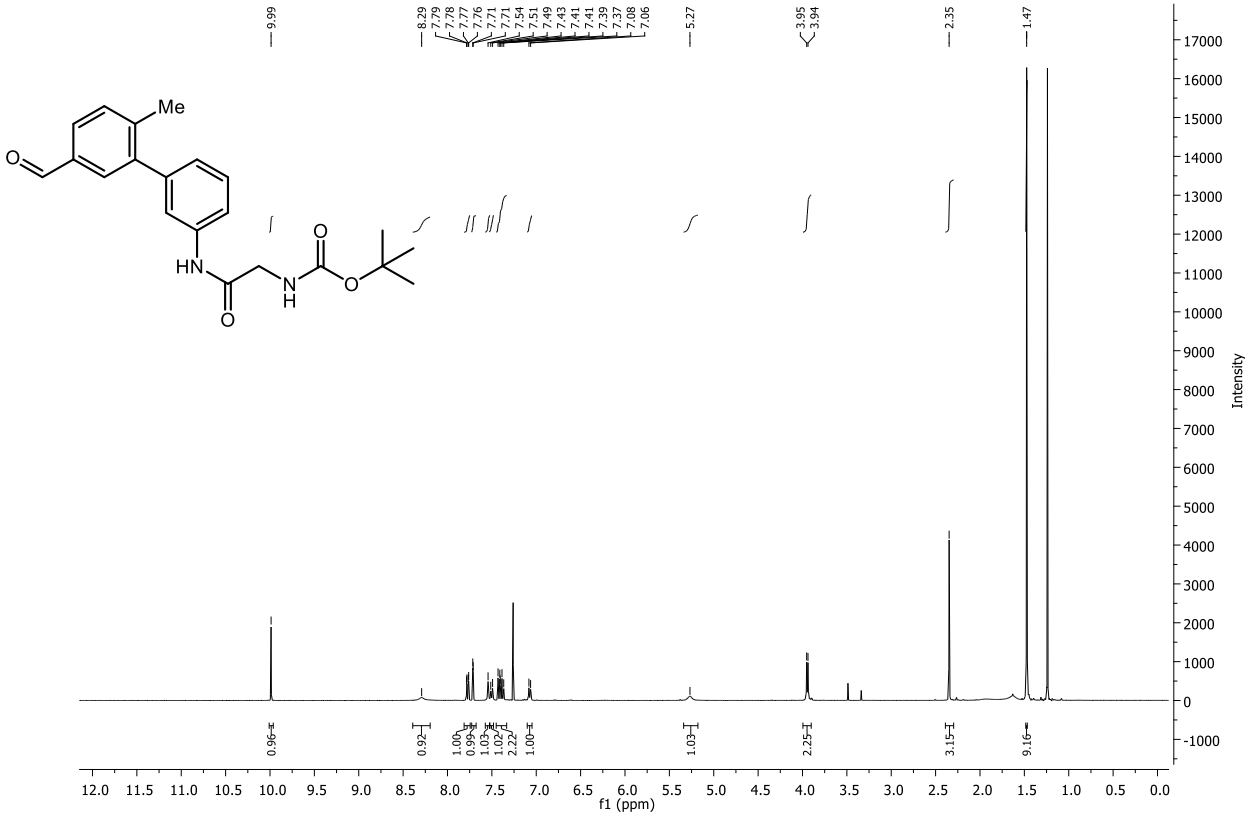
3-Bromo-4-methylbenzaldehyde (2.91).

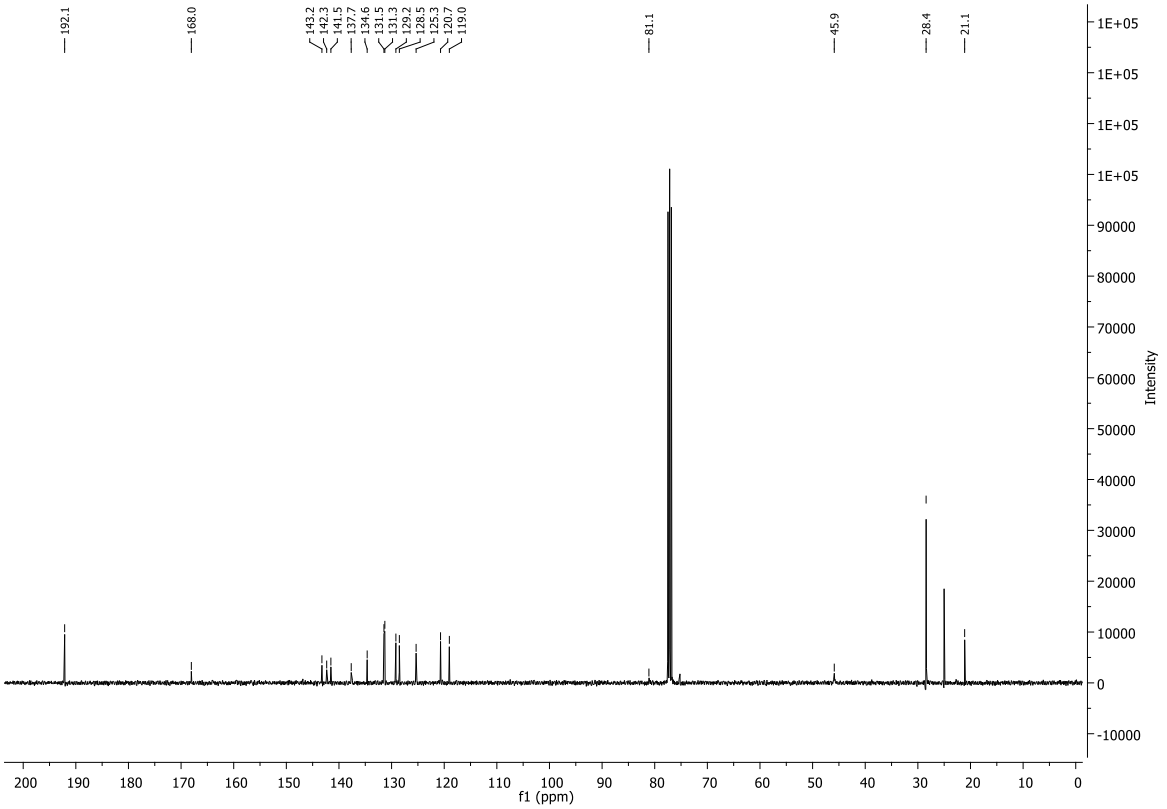


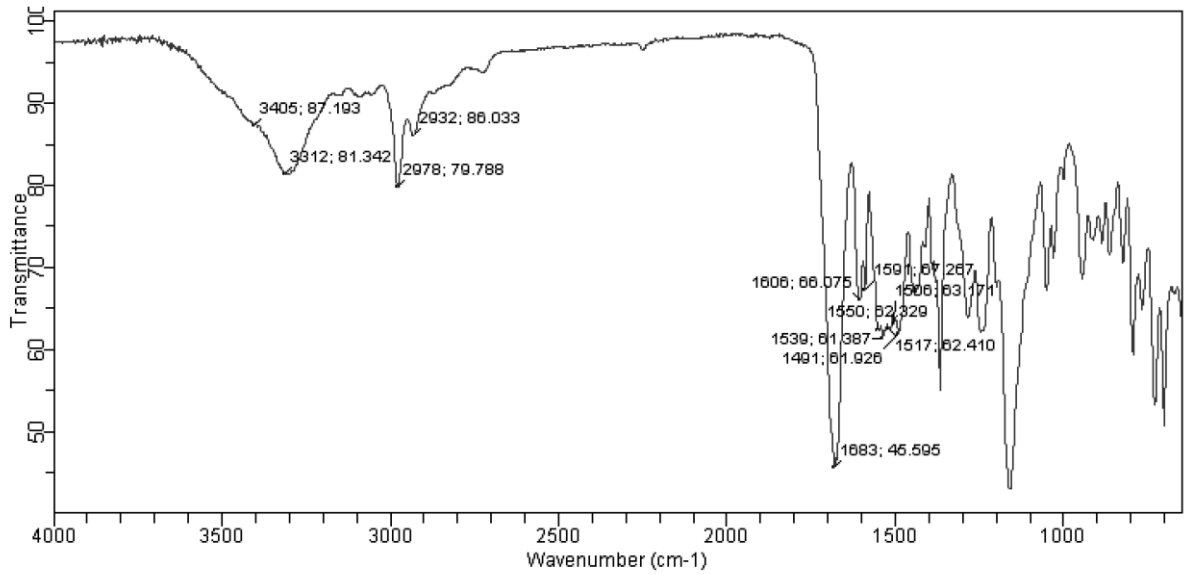


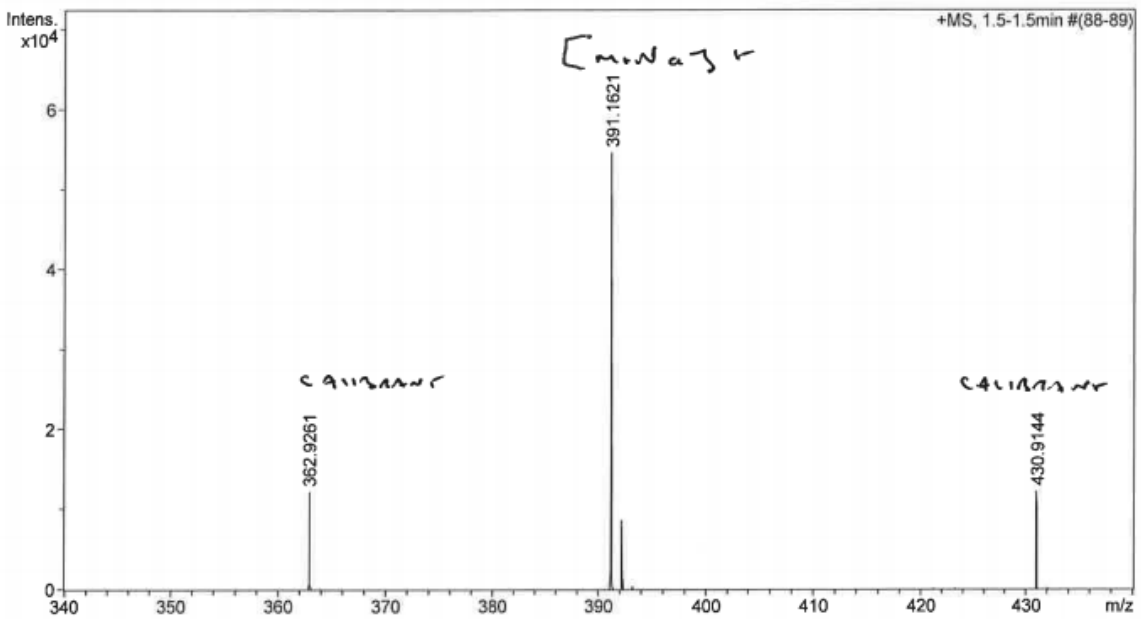


tert-Butyl (2-((5'-formyl-2'-methyl-[1,1'-biphenyl]-3-yl)amino)-2-oxoethyl)carbamate (2.92).



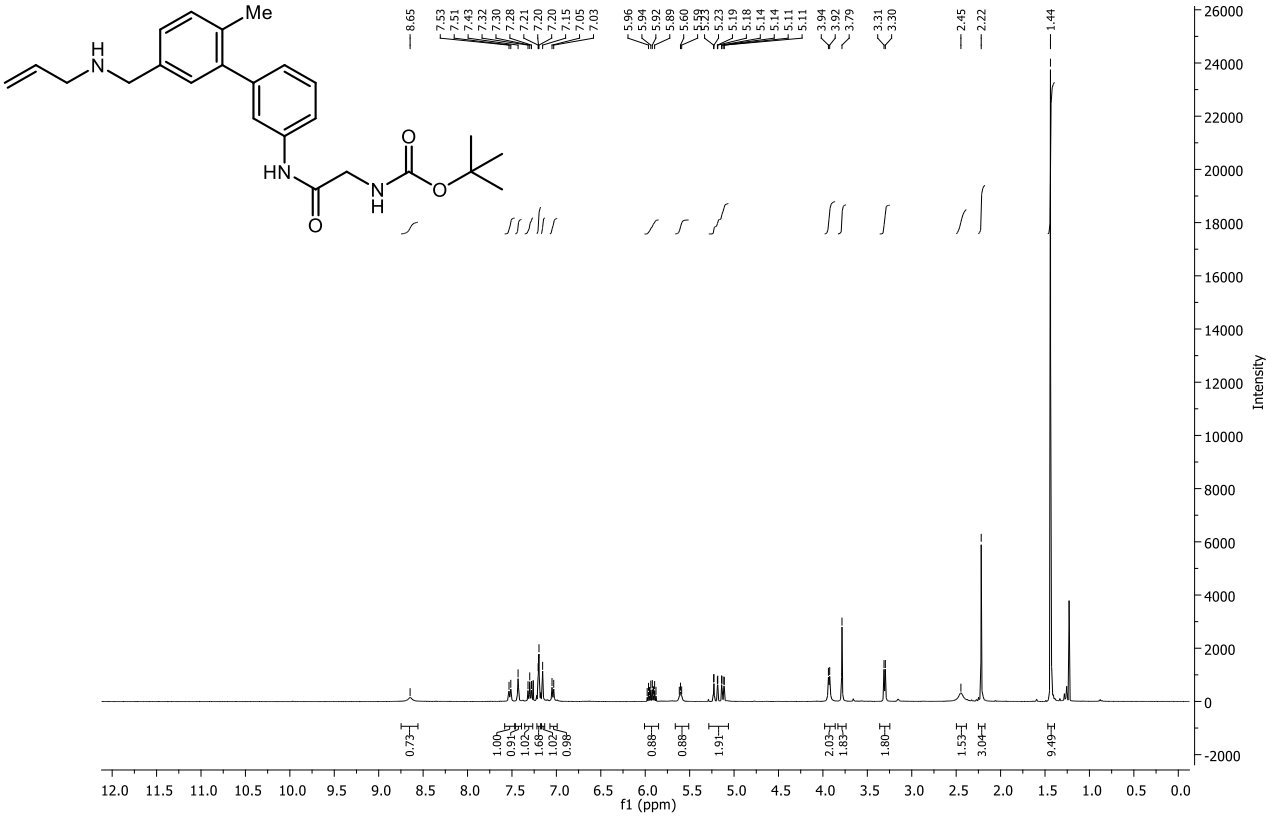

192.1
168.0
143.2
142.3
141.5
137.7
134.6
131.5
131.3
129.2
128.5
125.3
120.7
119.0
81.1
45.9
28.4
21.1
Intensity
f1 (ppm)

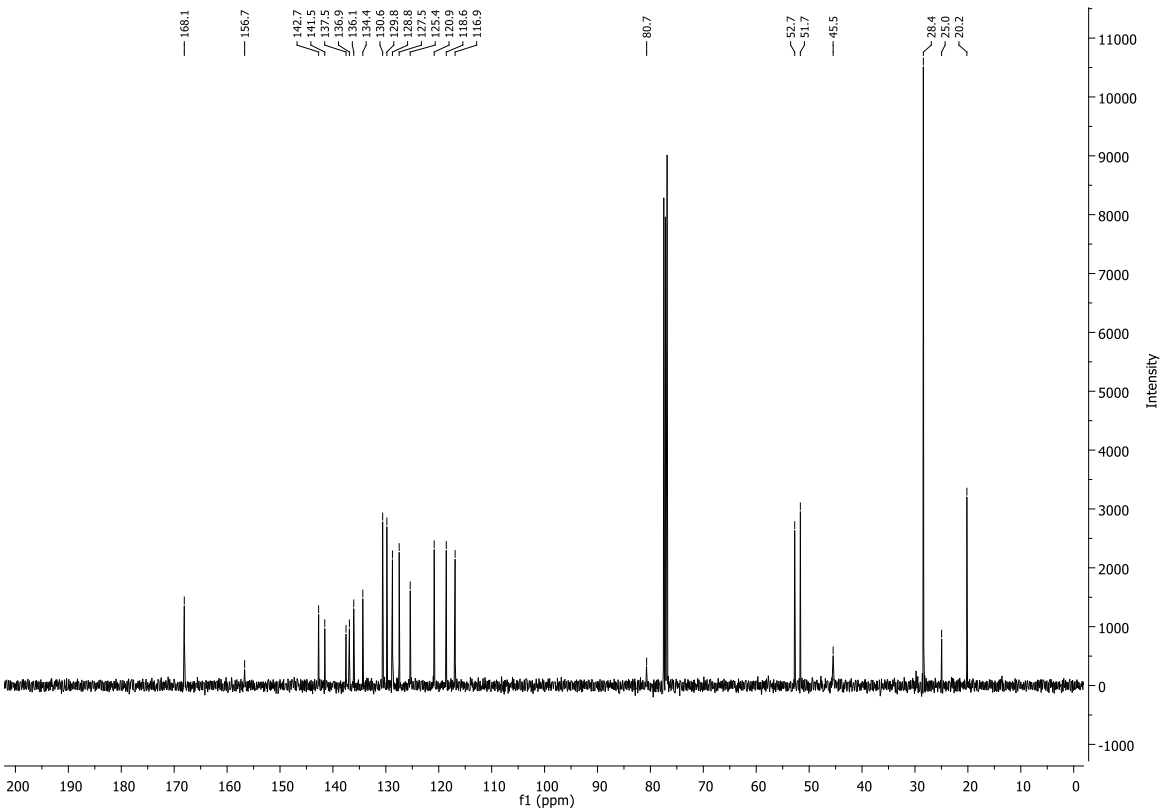

3405; 87.193
3312; 81.342
2932; 86.033
2978; 79.788
1606; 66.075
1591; 67.267
1506; 63.171
1550; 62.329
1539; 61.387
1491; 61.926
1517; 62.410
1683; 46.595
Transmittance
Wavenumber (cm-1)

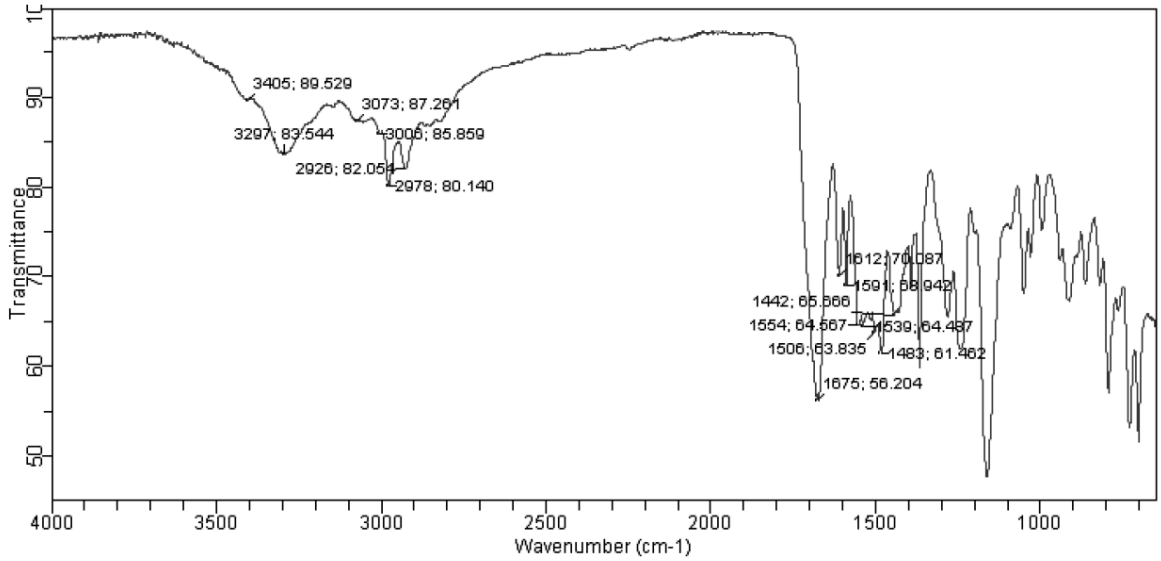


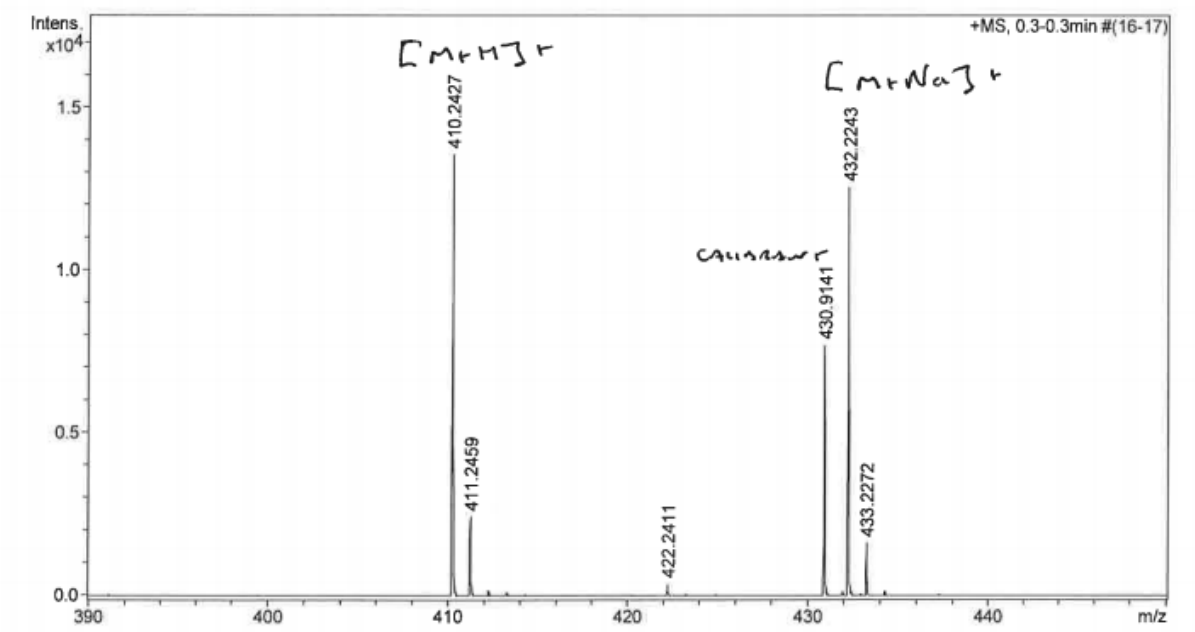
Formula	z	m/z	Meas. m/z	err [ppm]	err [mDa]
	1+		391.1621		
C 21 H 24 N 2 Na O 4		391.1628		1.9	0.8

***tert*-Butyl (2-((5'-((allylamino)methyl)-2'-methyl-[1,1'-biphenyl]-3-yl)amino)-2-oxoethyl)carbamate (2.93).**



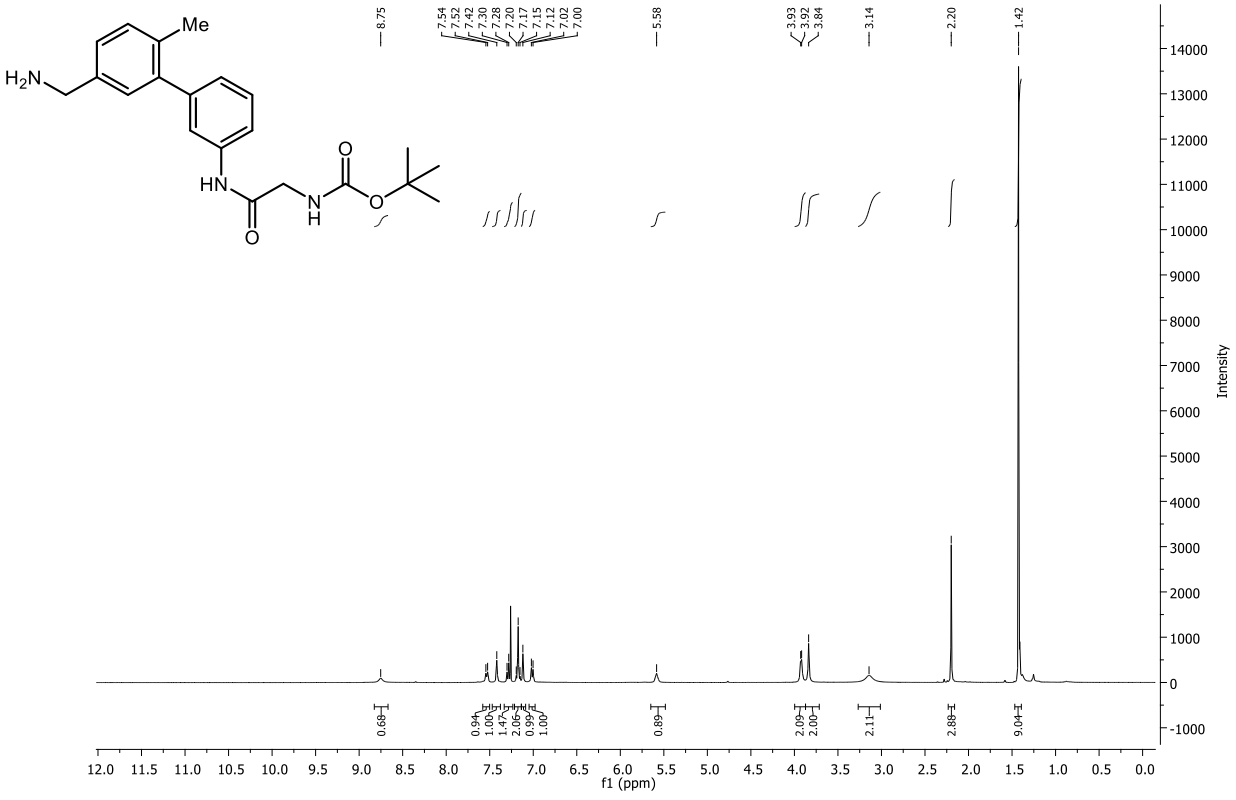

168.1
156.7
142.7
141.5
137.5
136.9
136.1
134.4
130.6
129.8
128.8
127.5
125.4
120.9
118.6
116.9
80.7
52.7
51.7
45.5
28.4
25.0
20.2
Intensity
f1 (ppm)

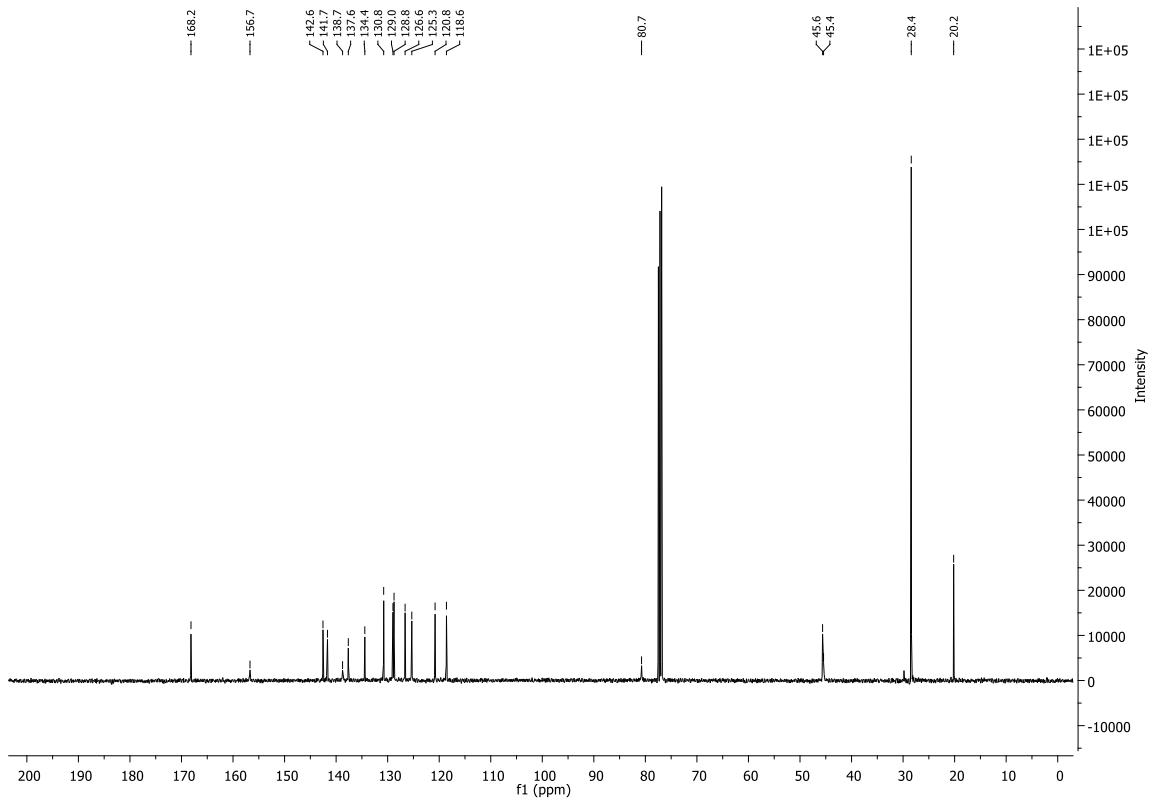

3405; 89.529
3073; 87.261
3297; 83.544
3006; 85.859
2926; 82.054
2978; 80.140
1612; 70.087
1591; 68.942
1442; 65.866
1554; 64.567
1539; 64.487
1506; 63.835
1483; 61.462
1675; 56.204
Transmittance
Wavenumber (cm-1)

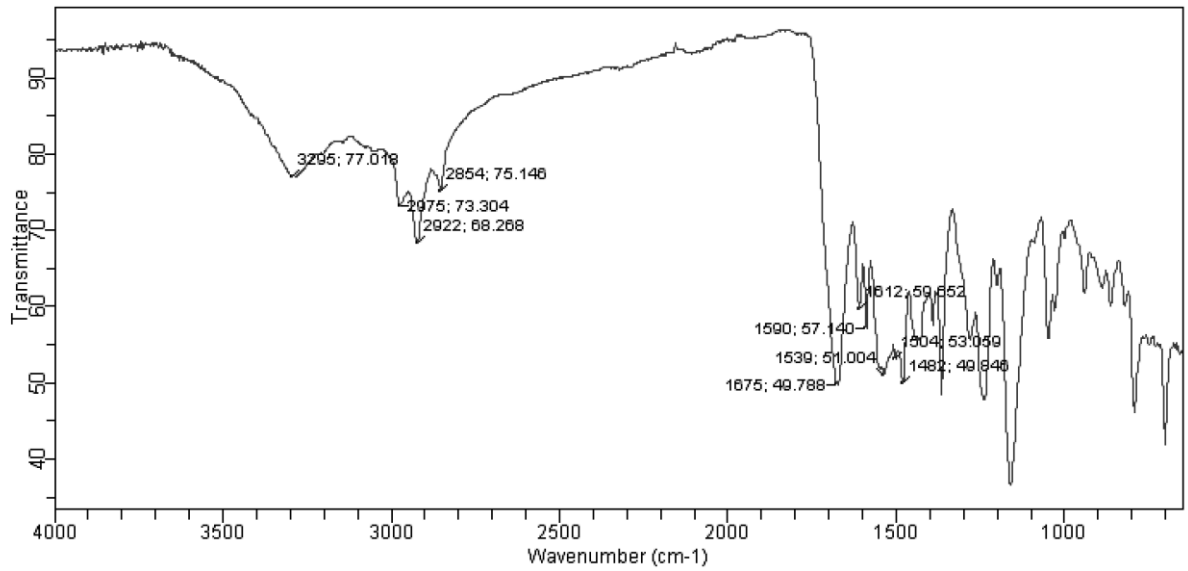


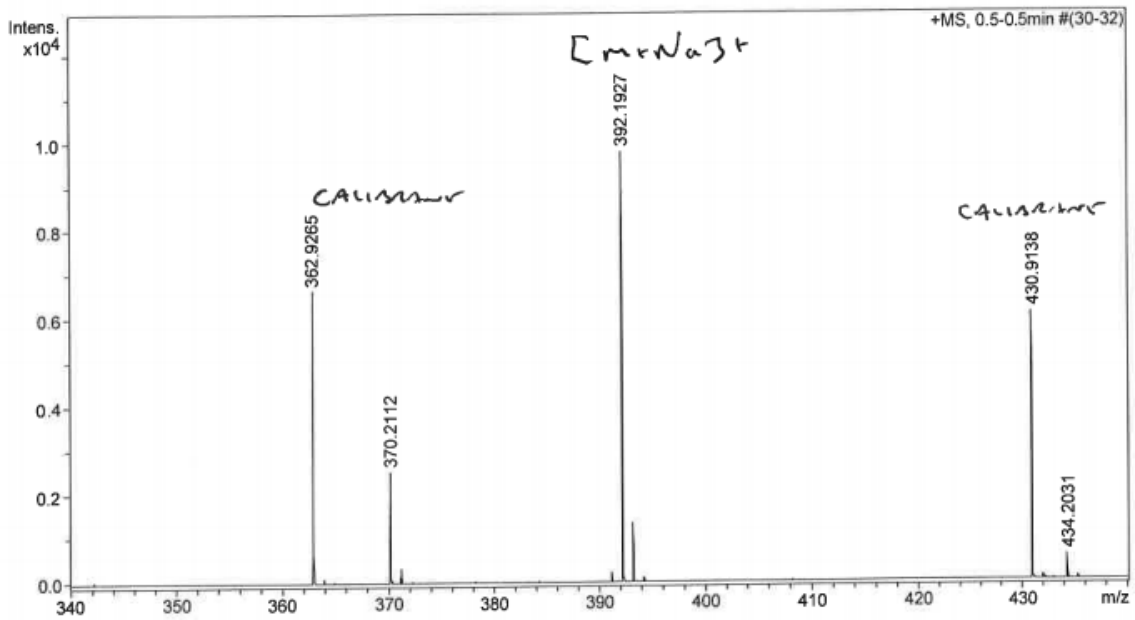
Formula	z	m/z	Meas. m/z	err [ppm]	err [mDa]
C 24 H 32 N 3 O 3	1+	410.2438	410.2427	2.8	1.1
C 24 H 31 N 3 Na O 3	1+	432.2258	432.2243	3.4	1.5

***tert*-Butyl (2-((5'-(aminomethyl)-2'-methyl-[1,1'-biphenyl]-3-yl)amino)-2-oxoethyl)carbamate (2.94).**



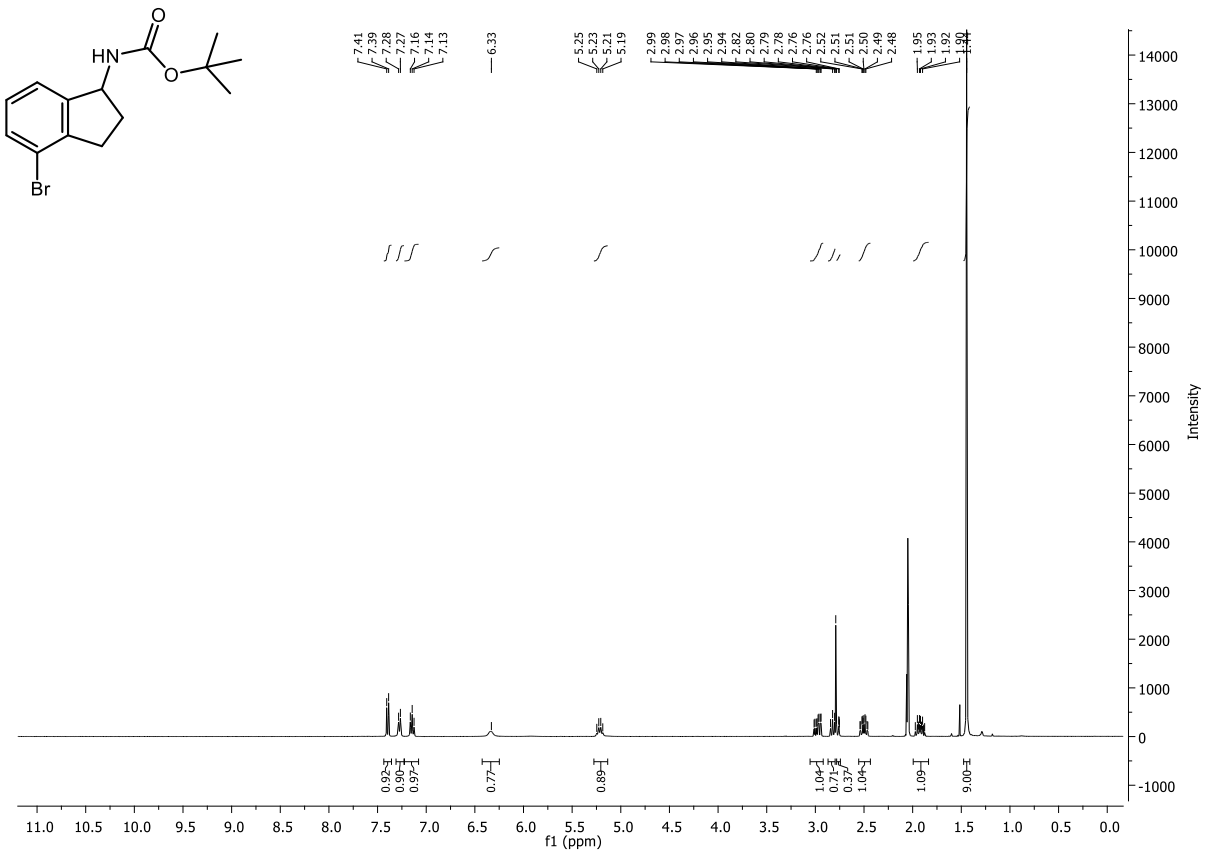

168.2
156.7
142.6
141.7
138.7
137.6
134.4
130.8
129.0
128.8
126.6
125.3
120.8
118.6
80.7
45.6
45.4
28.4
20.2
Intensity
f1 (ppm)

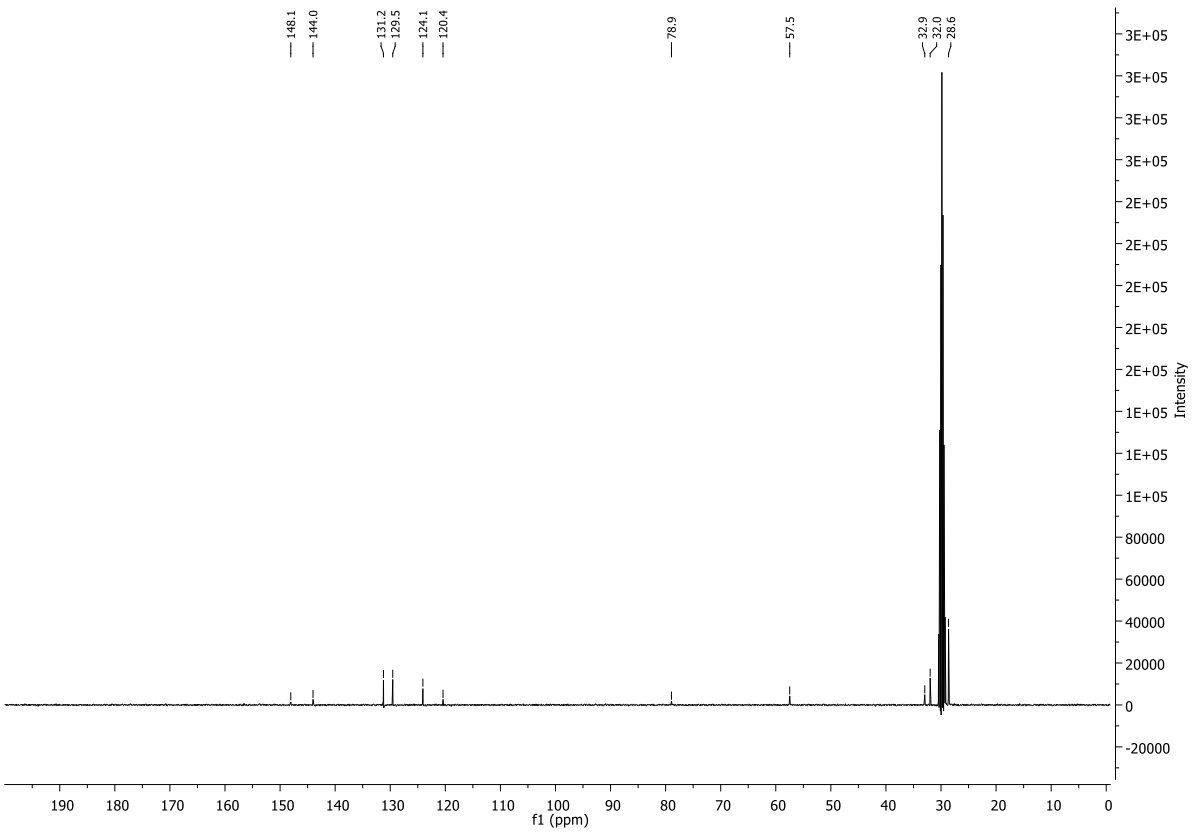

3295; 77.018
2854; 75.146
2975; 73.304
2922; 68.268
1612; 59.652
1590; 57.140
1504; 53.059
1539; 51.004
1482; 49.846
1675; 49.788
Transmittance
Wavenumber (cm-1)

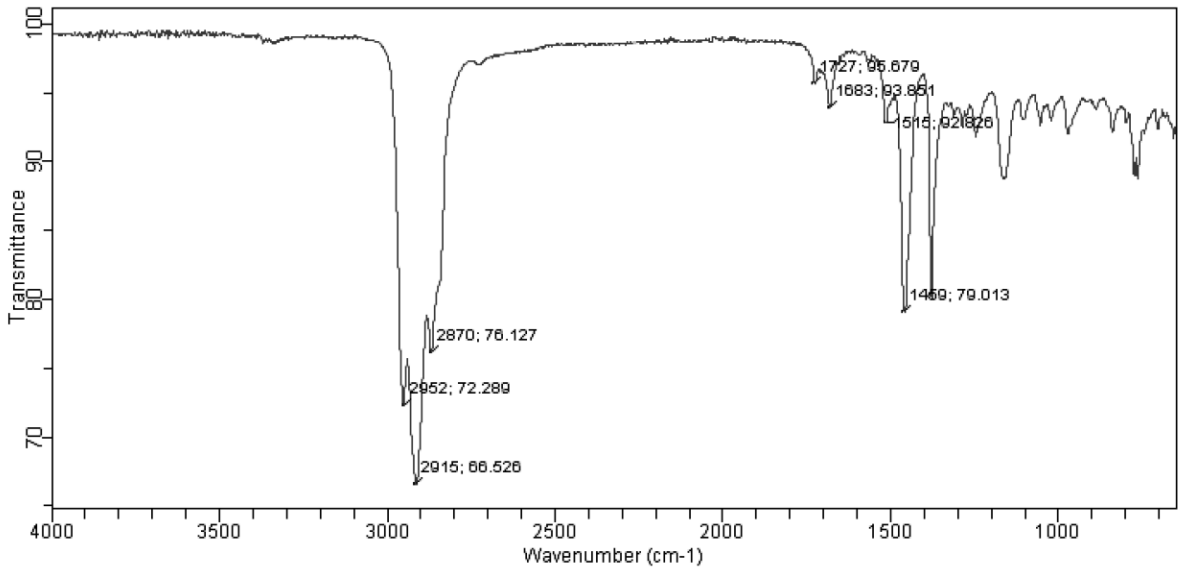


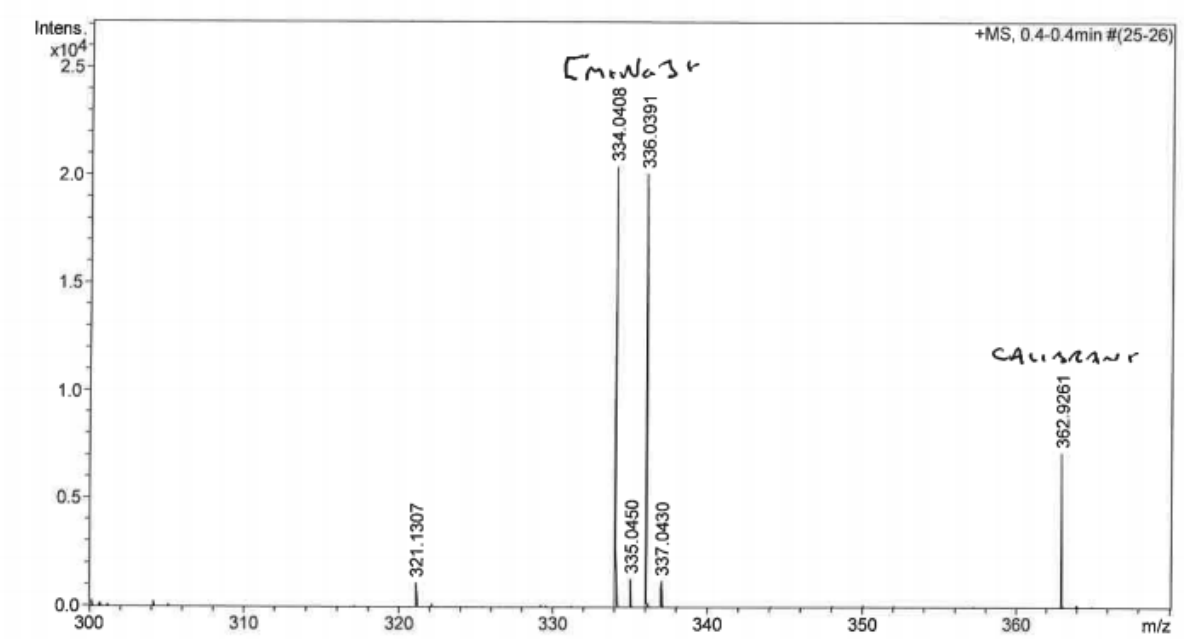
Formula	z	m/z	Meas. m/z	err [ppm]	err [mDa]
	1+		392.1927		
C 21 H 27 N 3 Na O 3		392.1945		4.4	1.7

***tert*-Butyl (4-bromo-2,3-dihydro-1H-inden-1-yl)carbamate (2.97).**



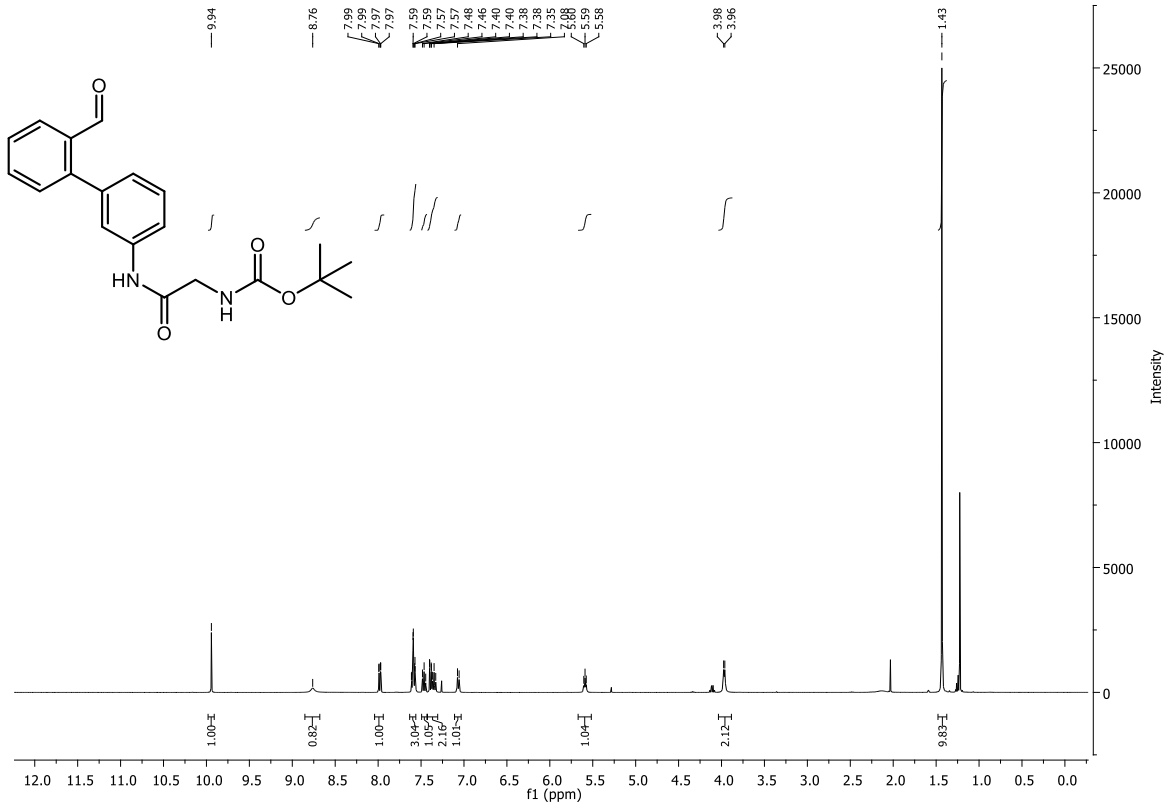

148.1
144.0
131.2
129.5
124.1
120.4
78.9
57.5
32.9
32.0
28.6
3E+05
2E+05
1E+05
80000
60000
40000
20000
0
-20000
Intensity
190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0
f1 (ppm)

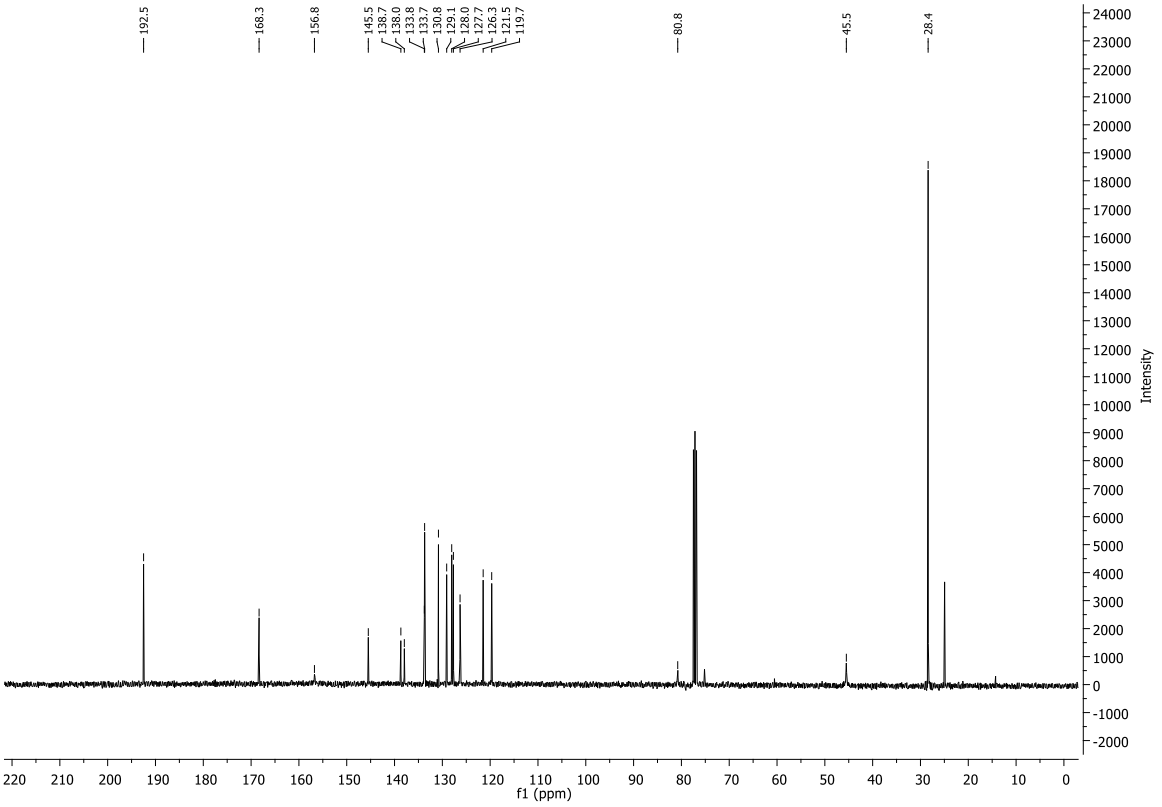

100
90
80
70
Transmittance
1727; 95.679
1683; 93.851
515; 92.826
1459; 79.013
2870; 76.127
2952; 72.289
2915; 66.526
4000 3500 3000 2500 2000 1500 1000
Wavenumber (cm-1)

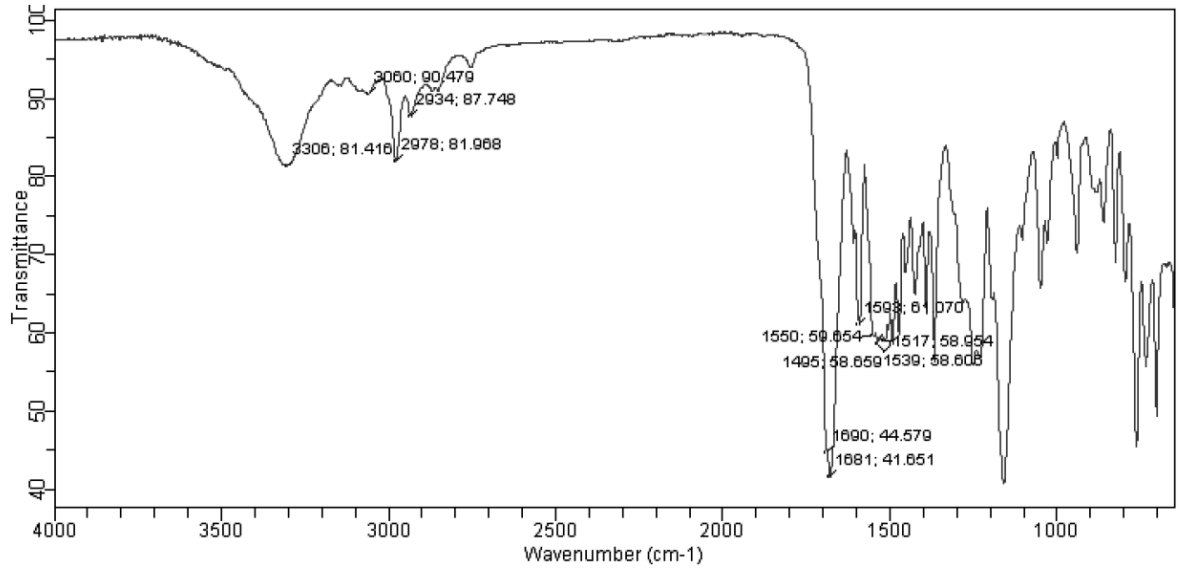


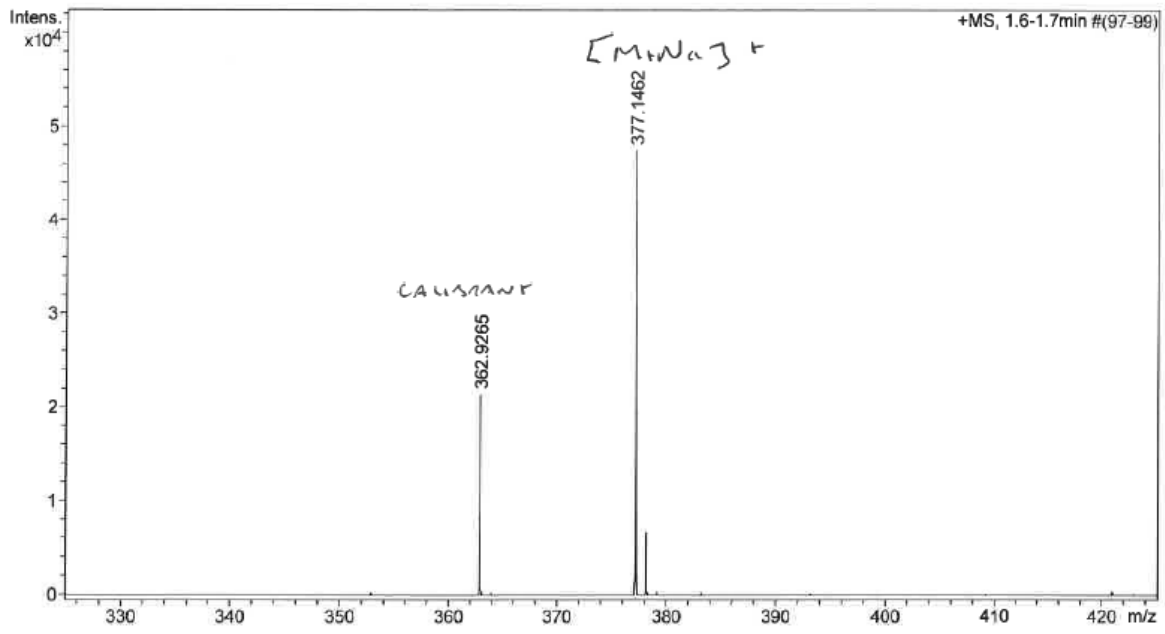
Formula	z	m/z	Meas. m/z	err [ppm]	err [mDa]
	1+		334.0408		
C 14 H 18 N Na O 2 ^79Br		334.0413		1.5	0.5

***tert*-Butyl (2-((2'-formyl-[1,1'-biphenyl]-3-yl)amino)-2-oxoethyl)carbamate (2.99).**



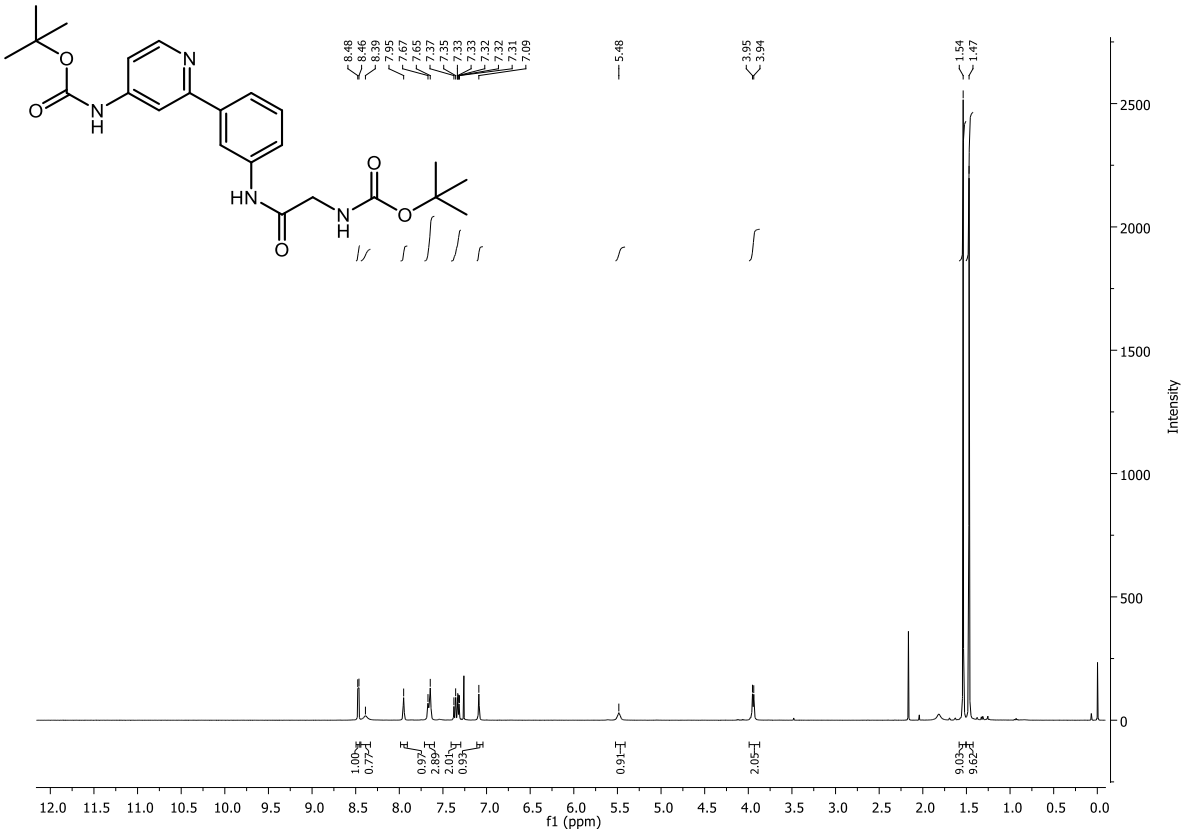

192.5
168.3
156.8
145.5
138.7
138.0
133.8
133.7
130.8
129.1
128.0
127.7
126.3
121.5
119.7
80.8
45.5
28.4
Intensity
f1 (ppm)

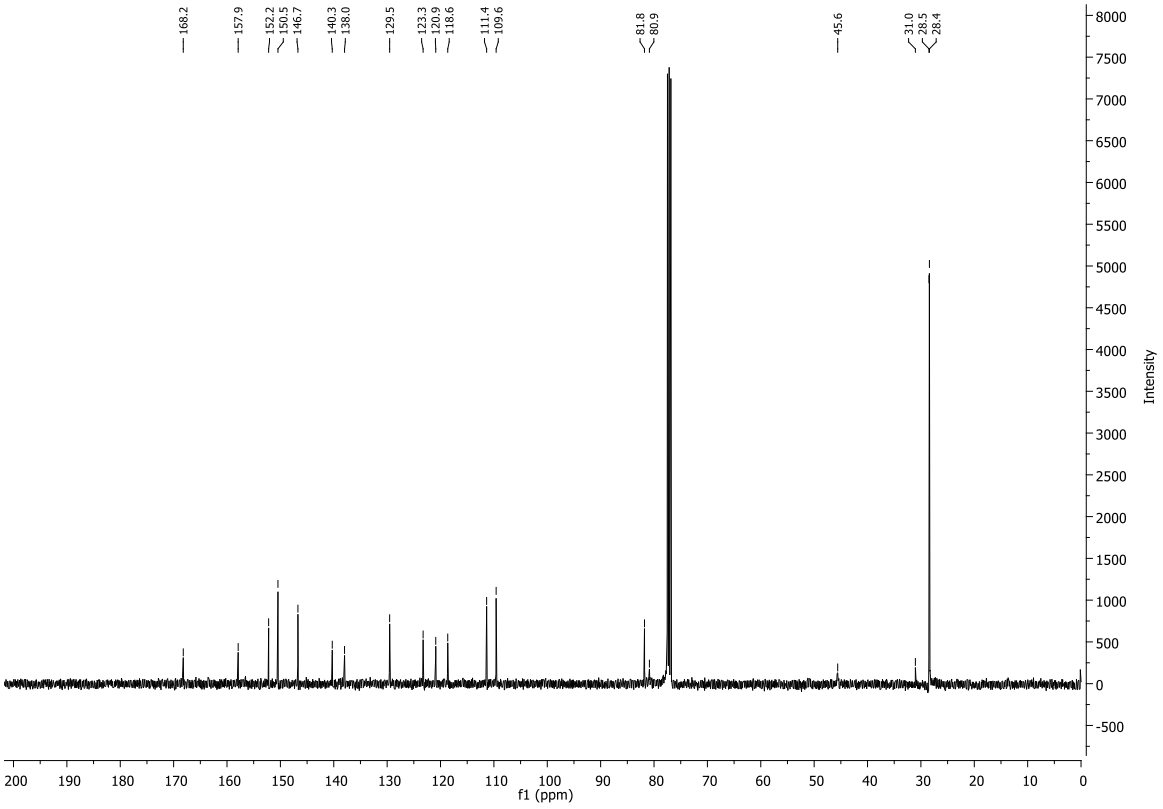

3060; 90.479
2934; 87.748
3306; 81.416
2978; 81.968
1593; 61.070
1550; 59.654
1517; 58.954
1495; 58.659
1539; 58.608
1690; 44.579
1681; 41.651
Transmittance
Wavenumber (cm-1)

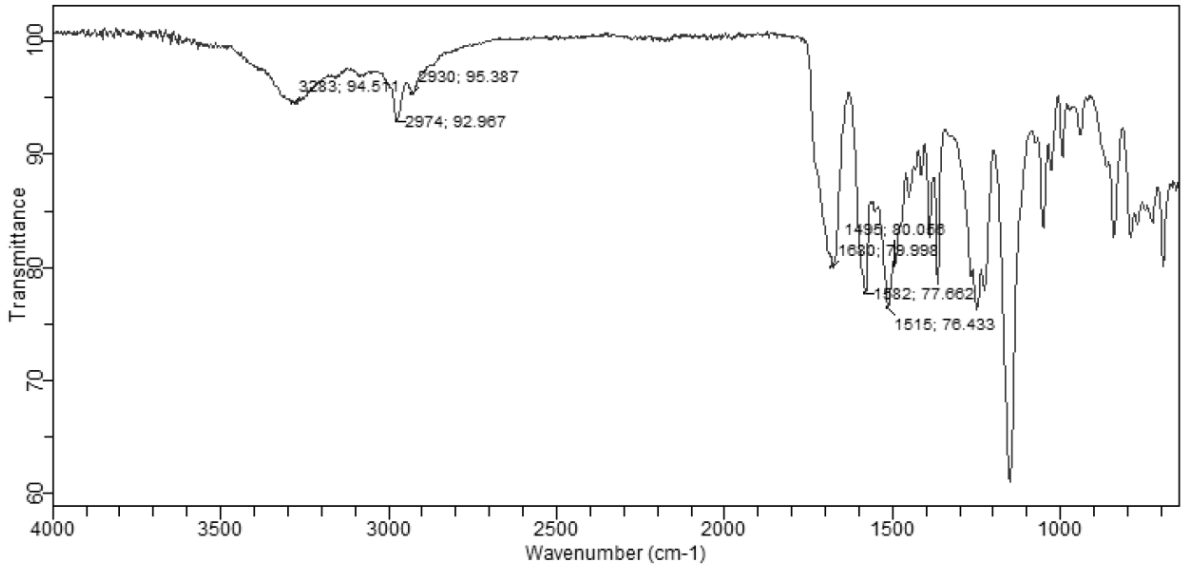


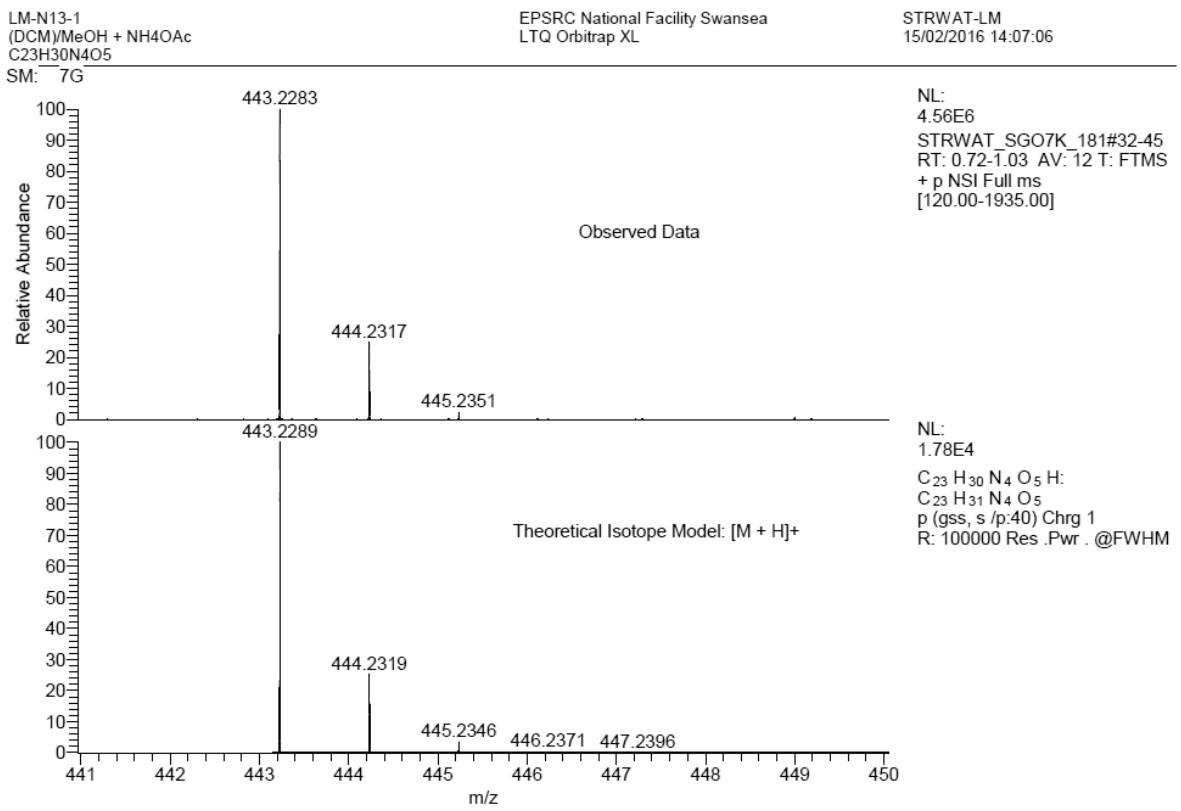
Formula	z	m/z	Meas. m/z	err [ppm]	err [mDa]
	1+		377.1462		
C 20 H 22 N 2 Na O 4		377.1472		2.6	1.0

t*ert*-Butyl *N*-({[3-(4-{[(*tert*-butoxy)carbonyl]amino}pyridin-2-yl)phenyl] carbamoyl} methyl)carbamate (2.102).

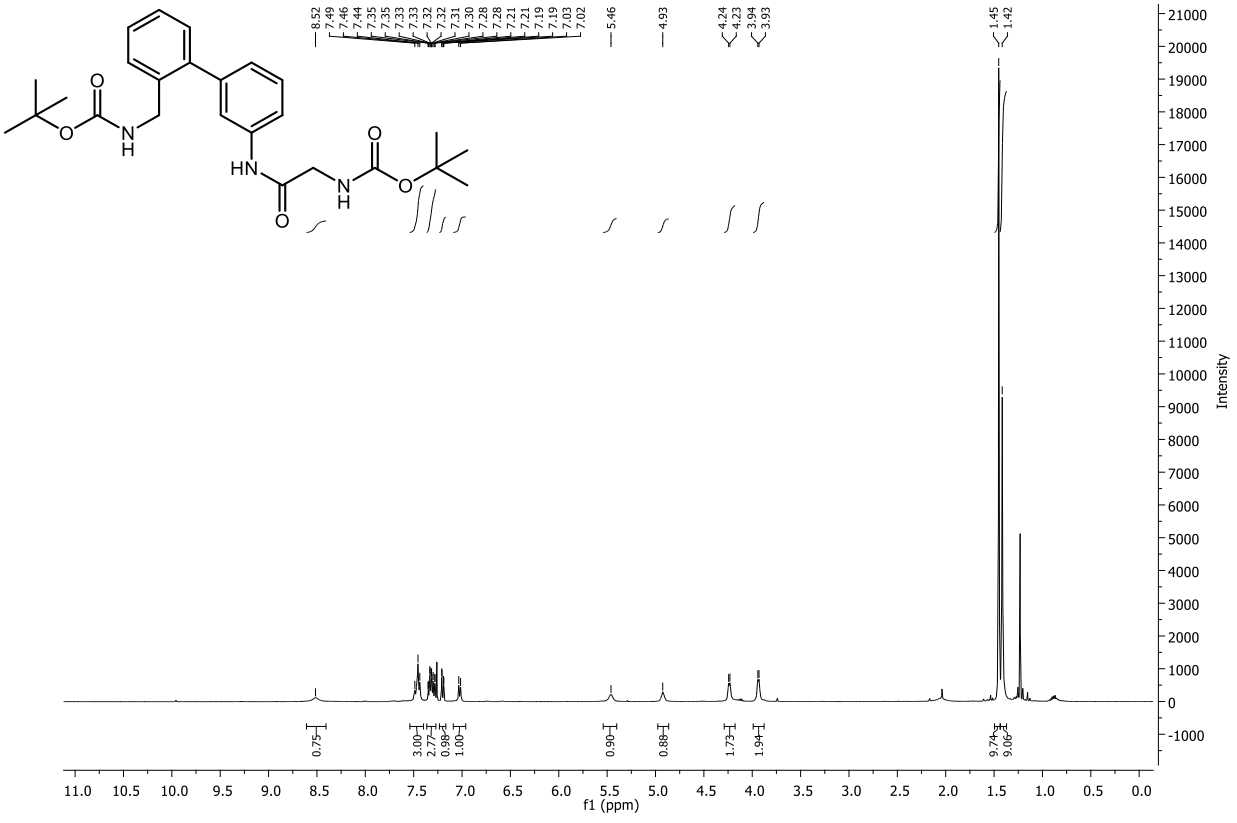


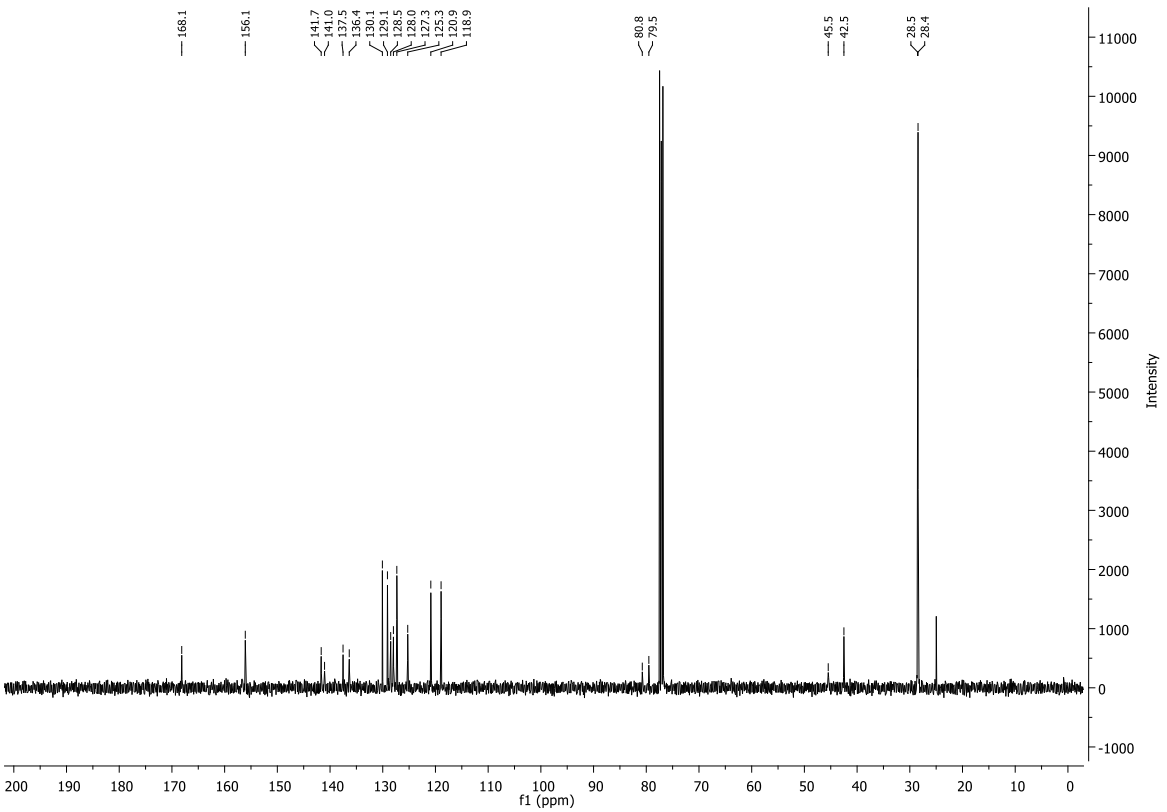

168.2
157.9
152.2
150.5
146.7
140.3
138.0
129.5
123.3
120.9
118.6
111.4
109.6
81.8
80.9
45.6
31.0
28.5
28.4
Intensity
f1 (ppm)

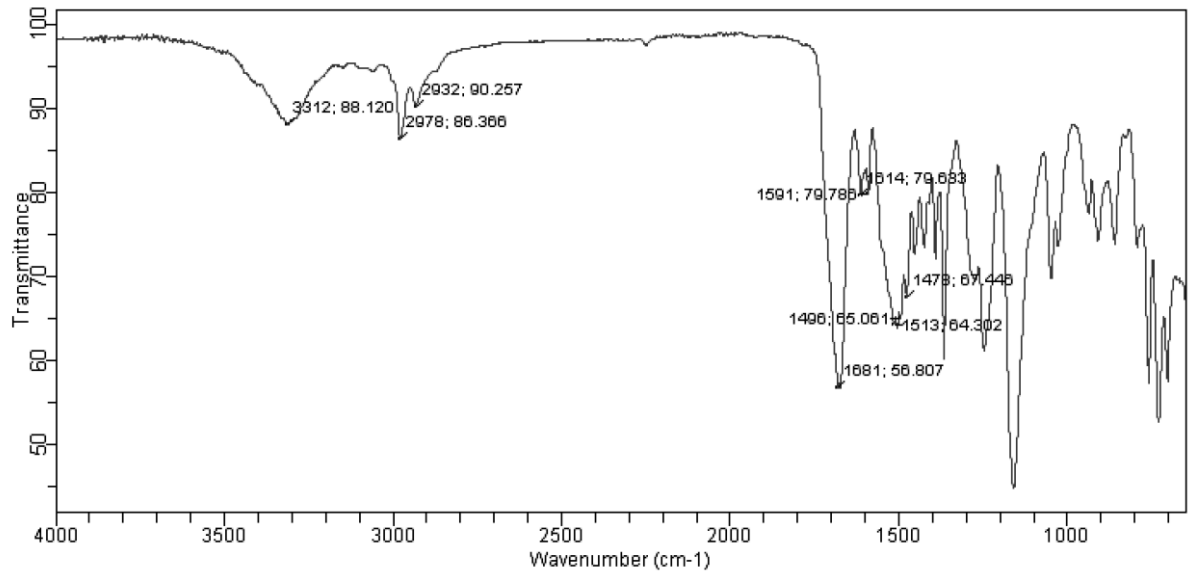

Transmittance
Wavenumber (cm-1)
3283; 94.511
2930; 95.387
2974; 92.967
1495; 80.088
1680; 79.998
1582; 77.662
1515; 76.433

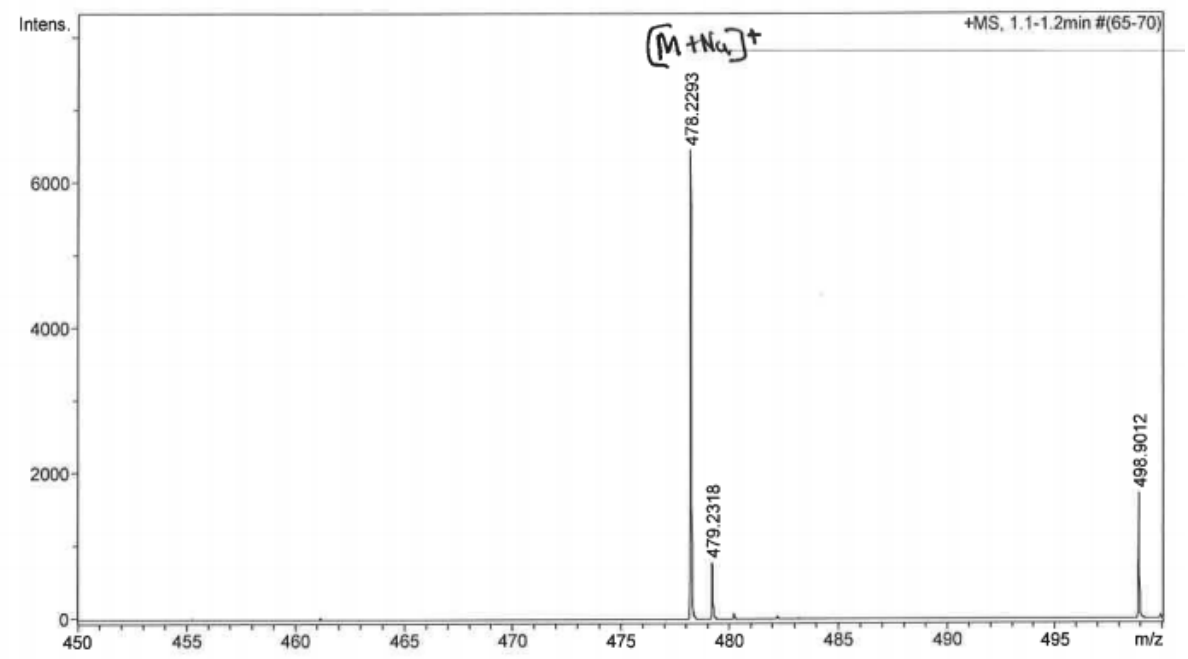


***tert*-Butyl ((3'-(2-((*tert*-butoxycarbonyl)amino)acetamido)-[1,1'-biphenyl]-2-yl)methyl) carbamate (2.106).**



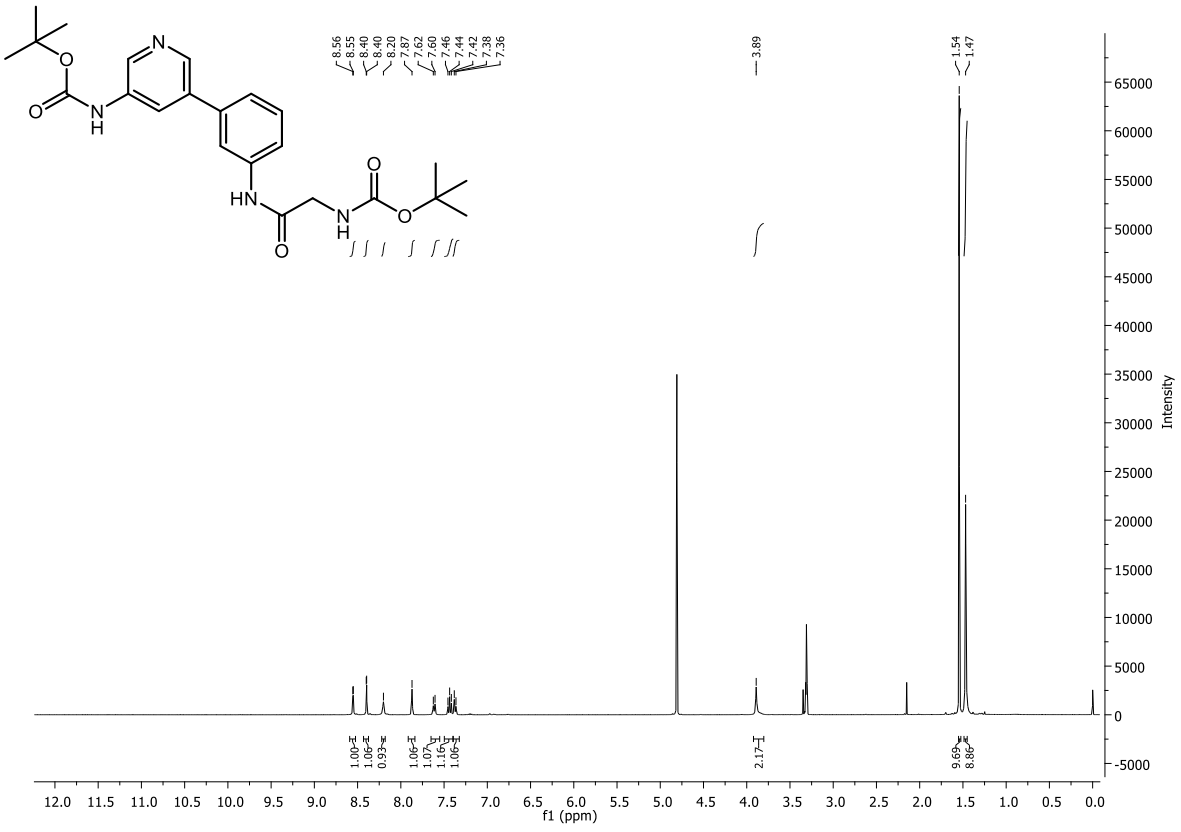

168.1
156.1
141.7
141.0
137.5
136.4
130.1
129.1
128.5
128.0
127.3
125.3
120.9
118.9
80.8
79.5
45.5
42.5
28.5
28.4
Intensity
f1 (ppm)

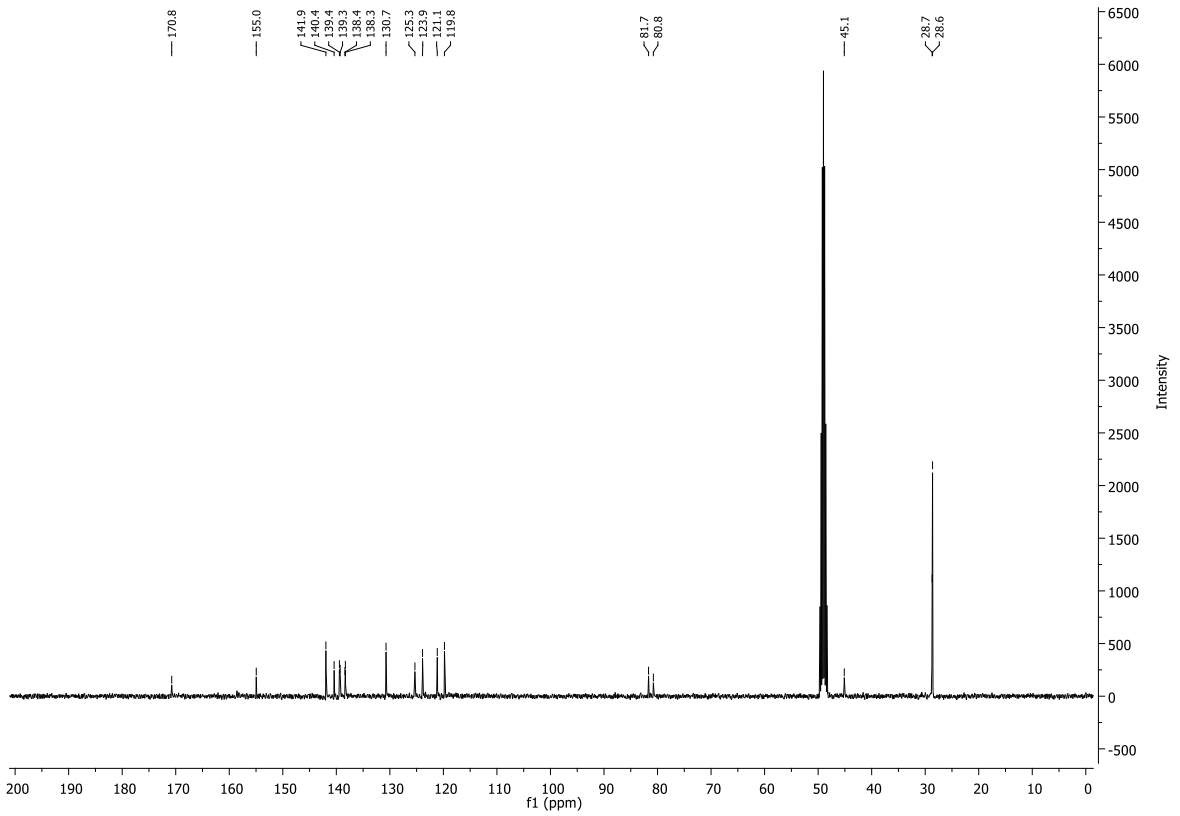

3312; 88.120
2932; 90.257
2978; 86.366
1591; 79.788
1614; 79.693
1478; 67.448
1496; 65.061
1513; 64.302
1681; 56.807
Transmittance
Wavenumber (cm-1)

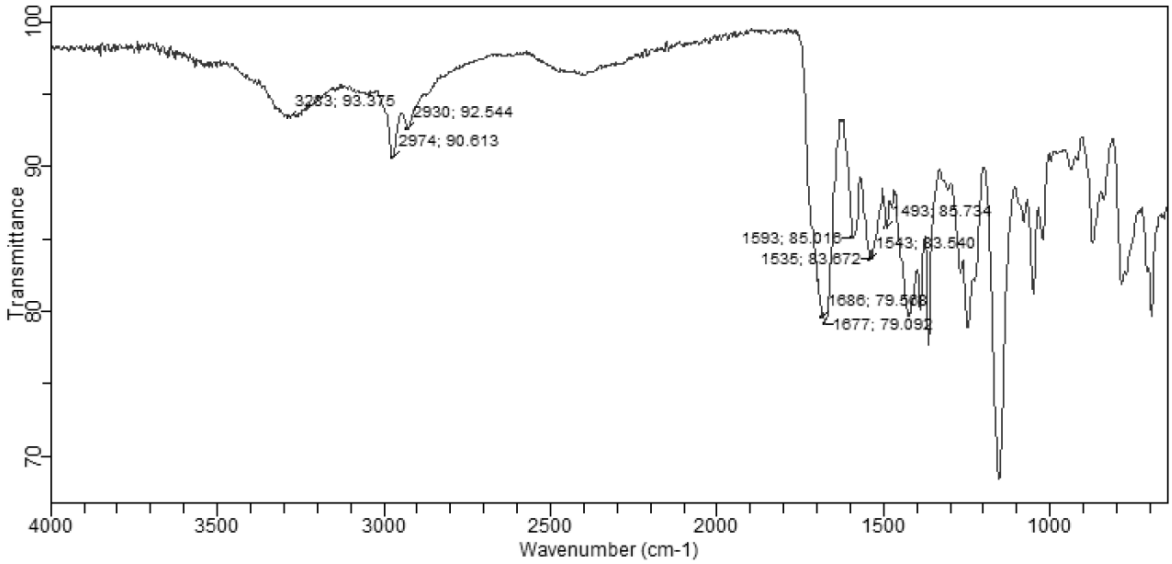


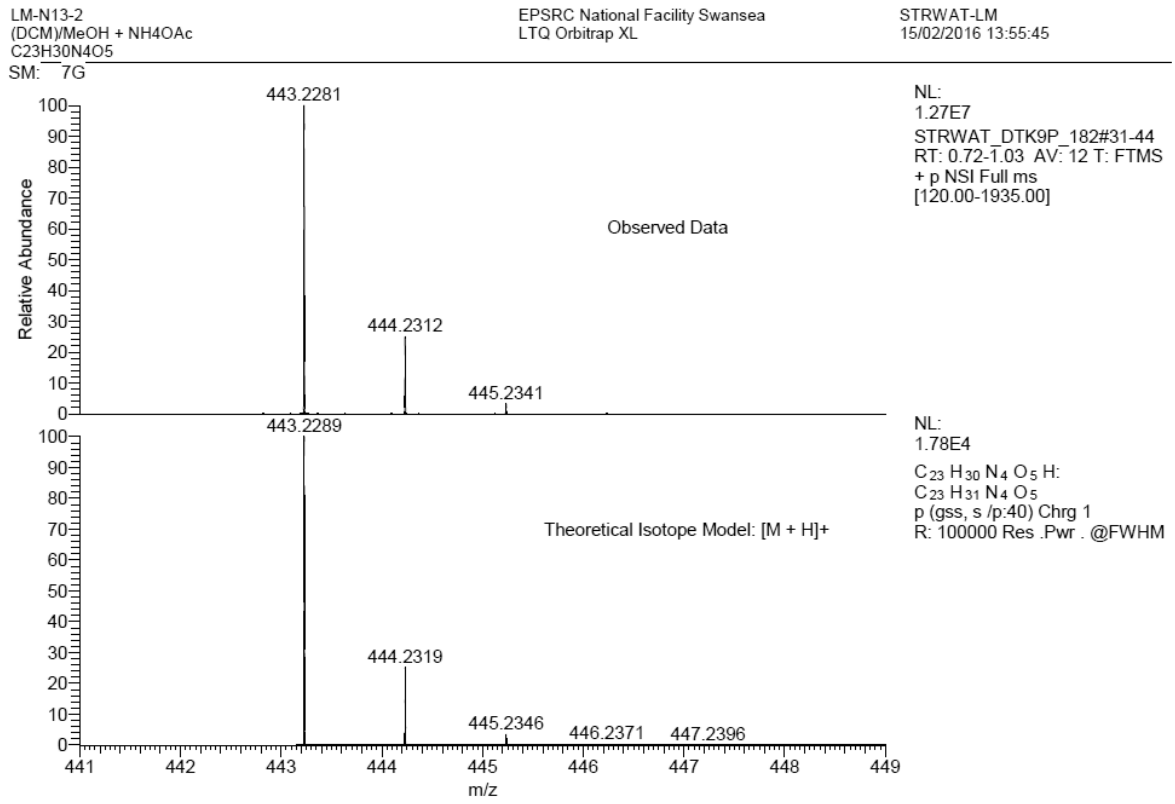
Formula	z	m/z	Meas. m/z	err [ppm]	err [mDa]
	1+		478.2293		
C 25 H 33 N 3 Na O 5		478.2312		4.0	1.9

***tert*-Butyl *N*-({[3-(5-{[(*tert*-butoxy) carbonyl]amino}pyridin-3-yl)phenyl] carbamoyl}methyl)carbamate (2.109).**

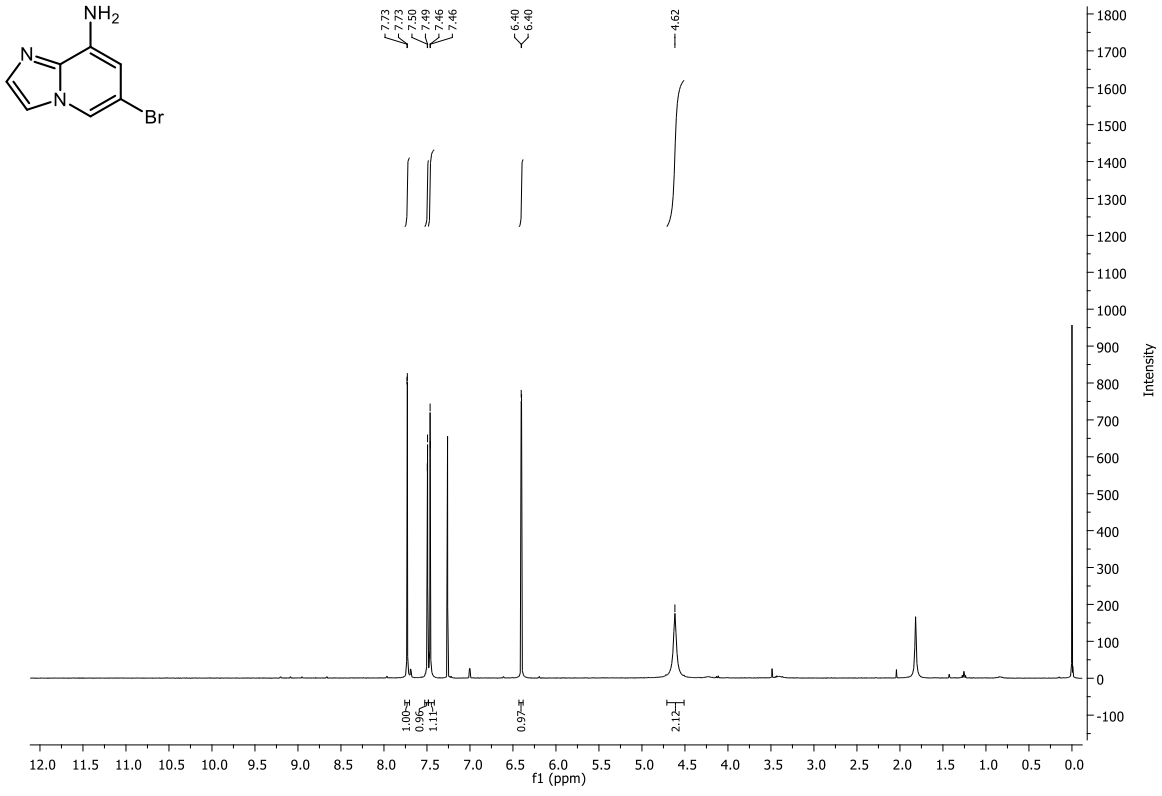


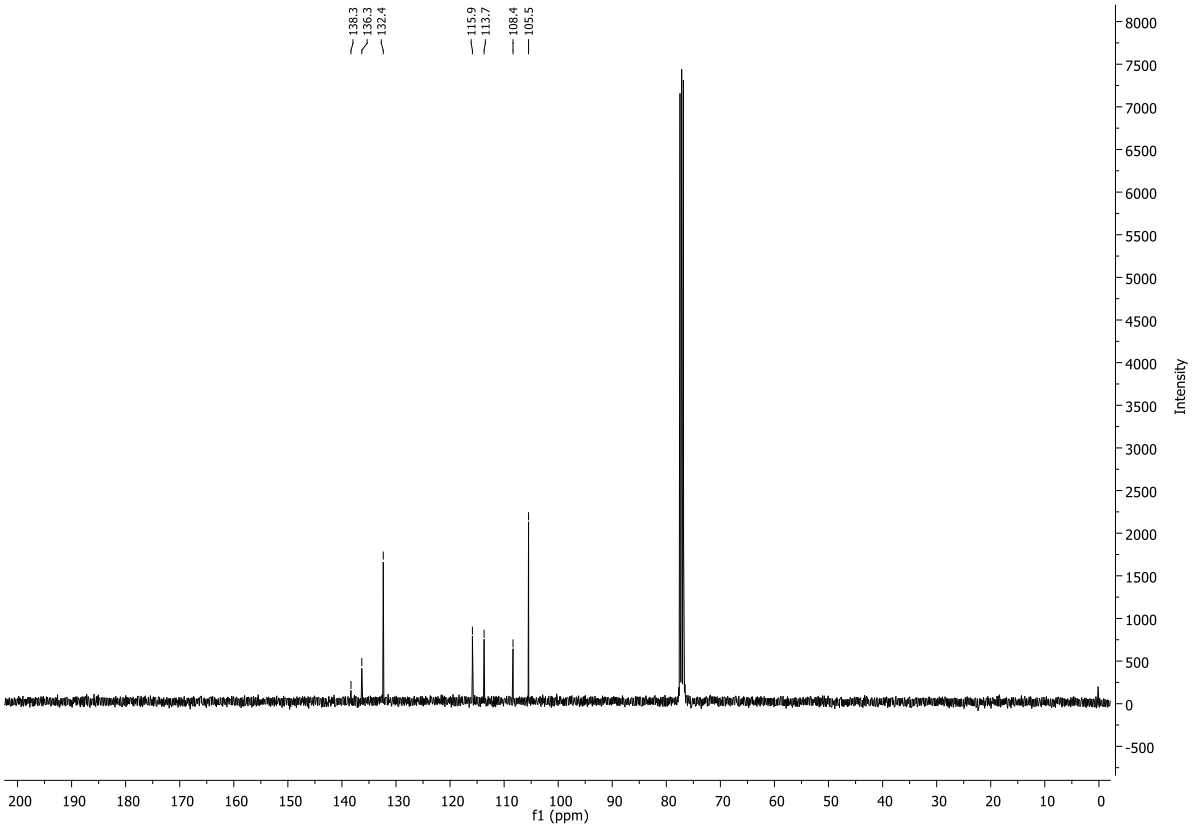

170.8
155.0
141.9
140.4
139.4
139.3
138.4
138.3
130.7
125.3
123.9
121.1
119.8
81.7
80.8
45.1
28.7
28.6
Intensity
f1 (ppm)

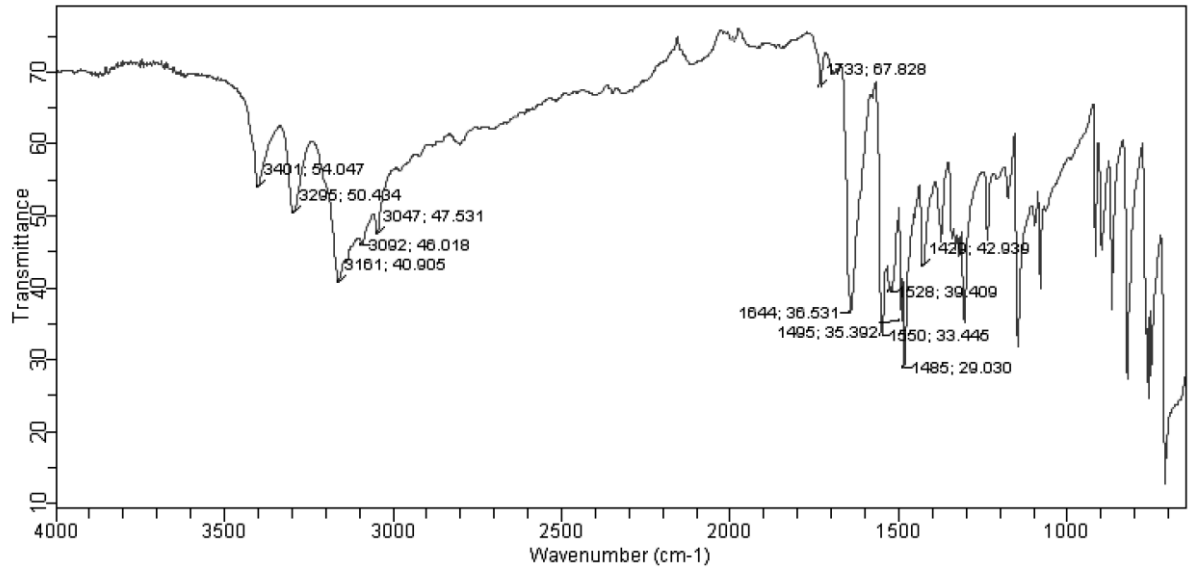

3283; 93.375
2930; 92.544
2974; 90.613
1593; 85.018
1535; 83.672
1543; 83.540
1493; 85.734
1686; 79.568
1677; 79.092
Transmittance
Wavenumber (cm-1)

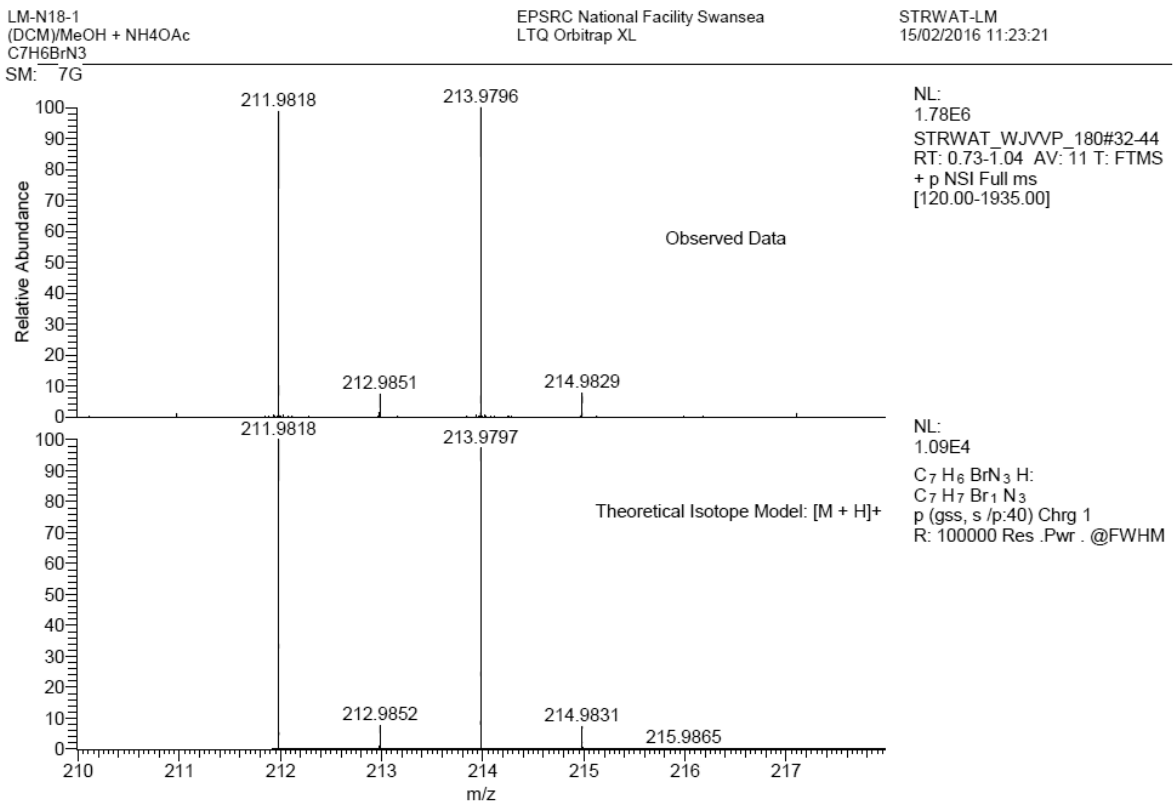


6-Bromoimidazo[1,2-α]pyridin-8-amine (2.110)

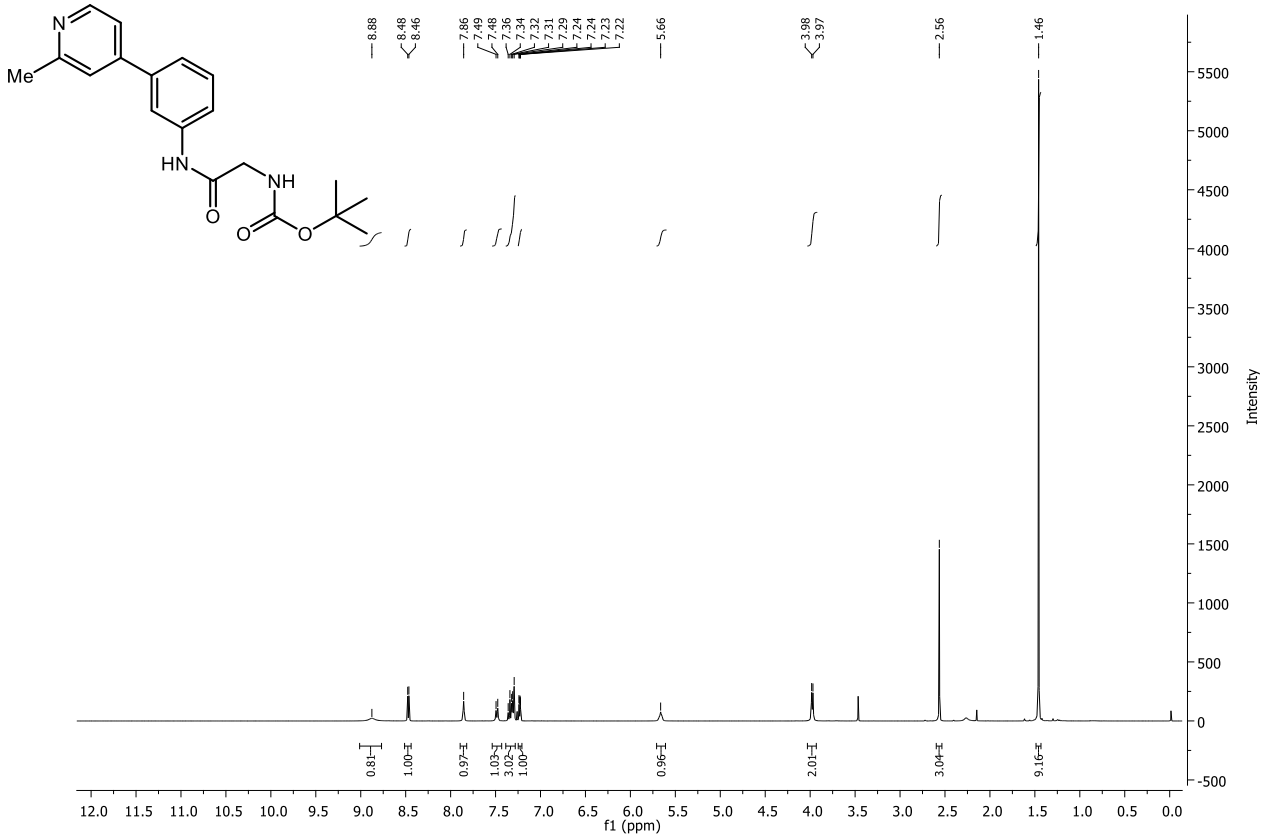


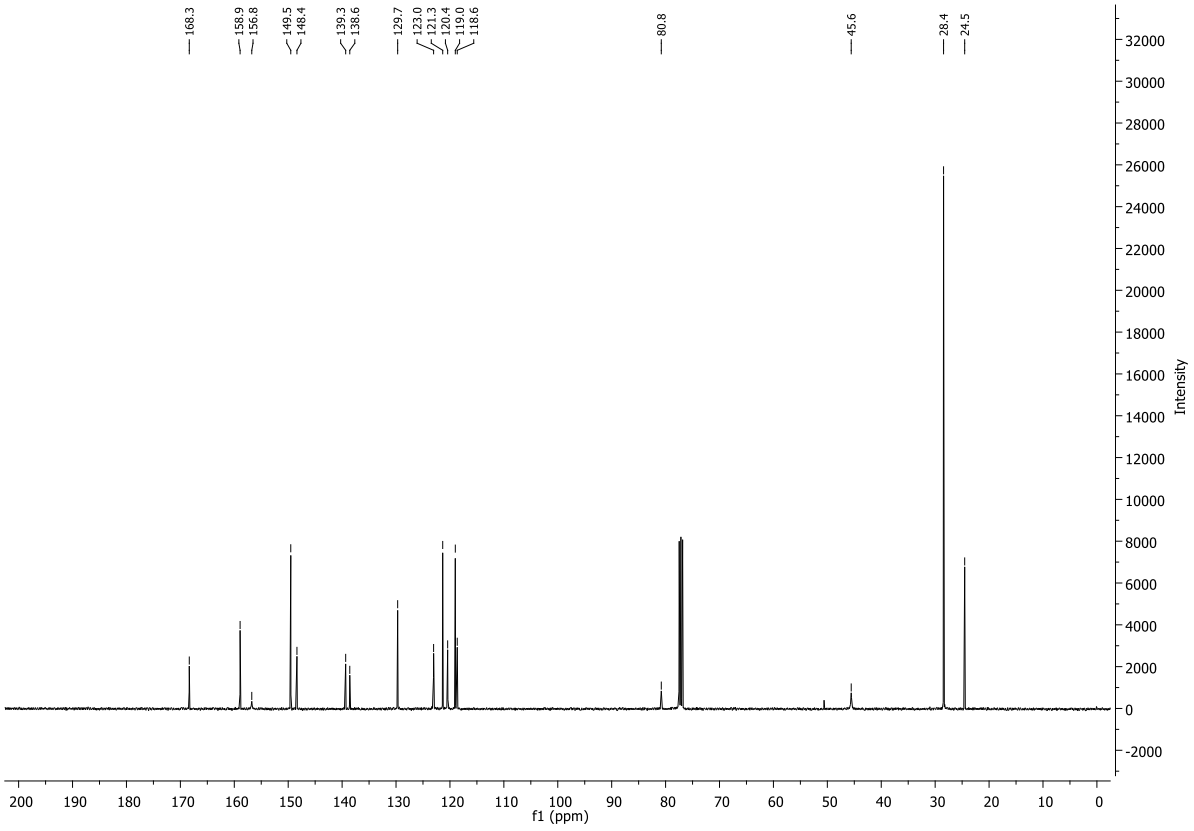

138.3
136.3
132.4
115.9
113.7
108.4
105.5
Intensity
f1 (ppm)

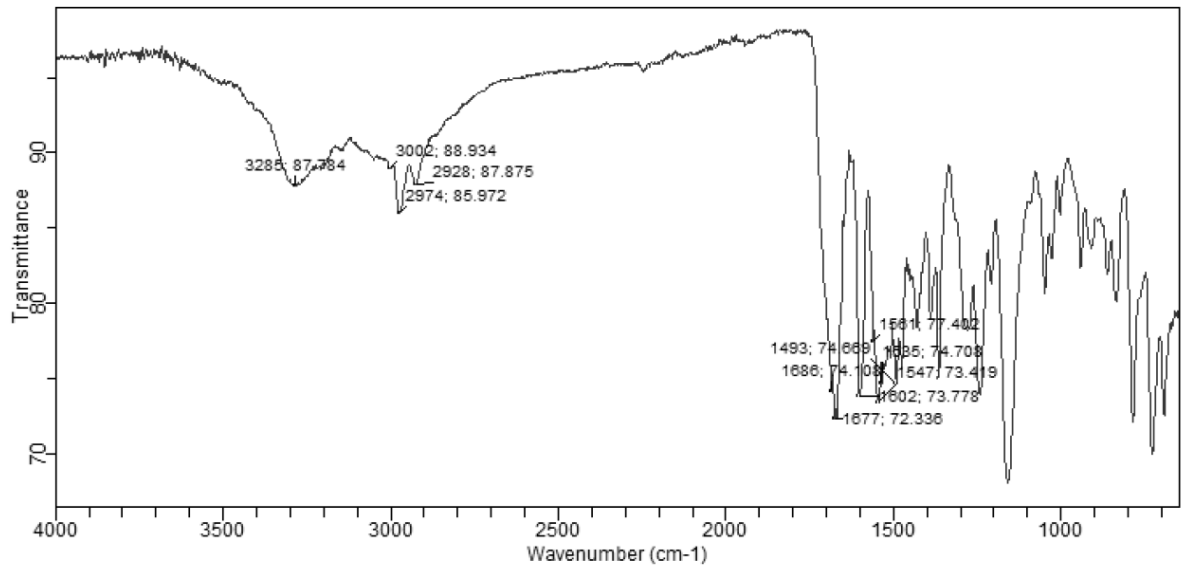

Transmittance
Wavenumber (cm-1)
3401; 54.047
3295; 50.484
3047; 47.531
3092; 46.018
3161; 40.905
1733; 67.828
1644; 36.531
1495; 35.392
1550; 33.445
1485; 29.030

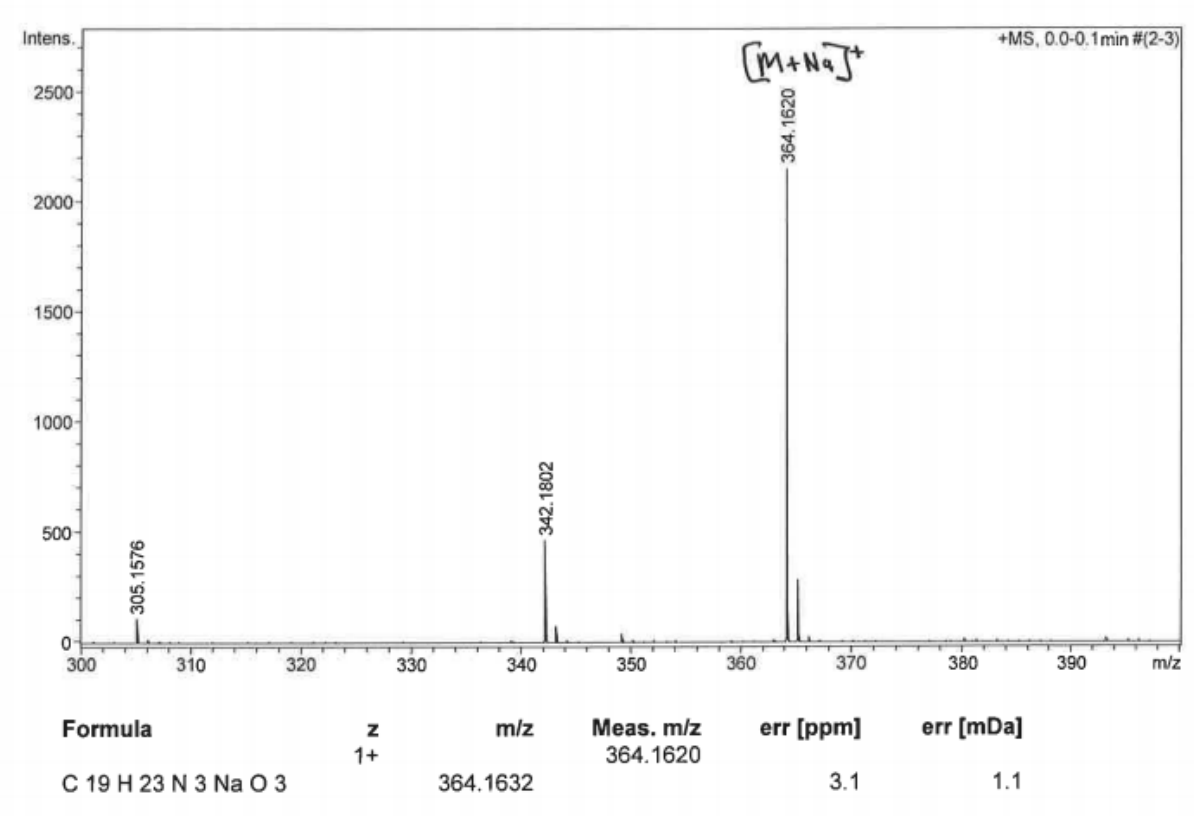


***tert*-Butyl (2-((3-(2-methylpyridin-4-yl)phenyl)amino)-2-oxoethyl) carbamate (2.111).**



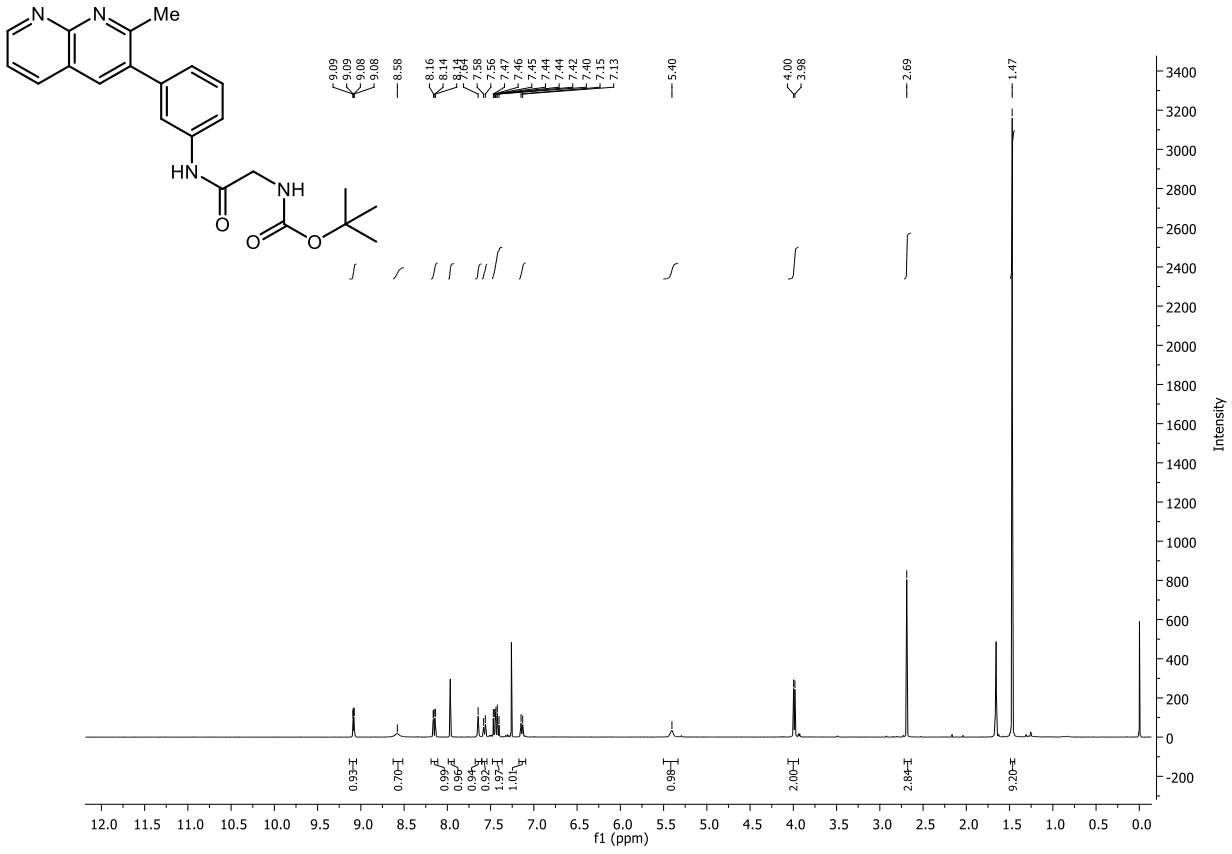

168.3
158.9
156.8
149.5
148.4
139.3
138.6
129.7
123.0
121.3
120.4
119.0
118.6
80.8
45.6
28.4
24.5
Intensity
f1 (ppm)

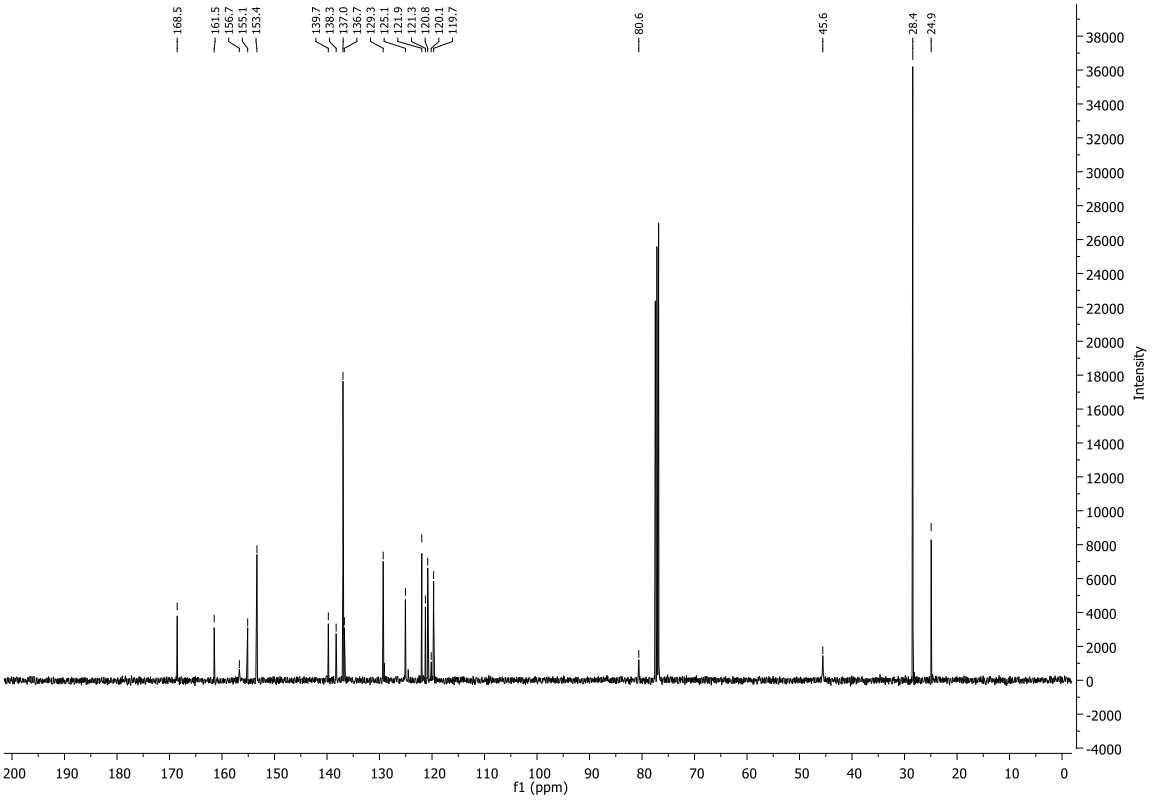

Transmittance
Wavenumber (cm-1)
3285; 87.784
3002; 88.934
2928; 87.875
2974; 85.972
1677; 72.336

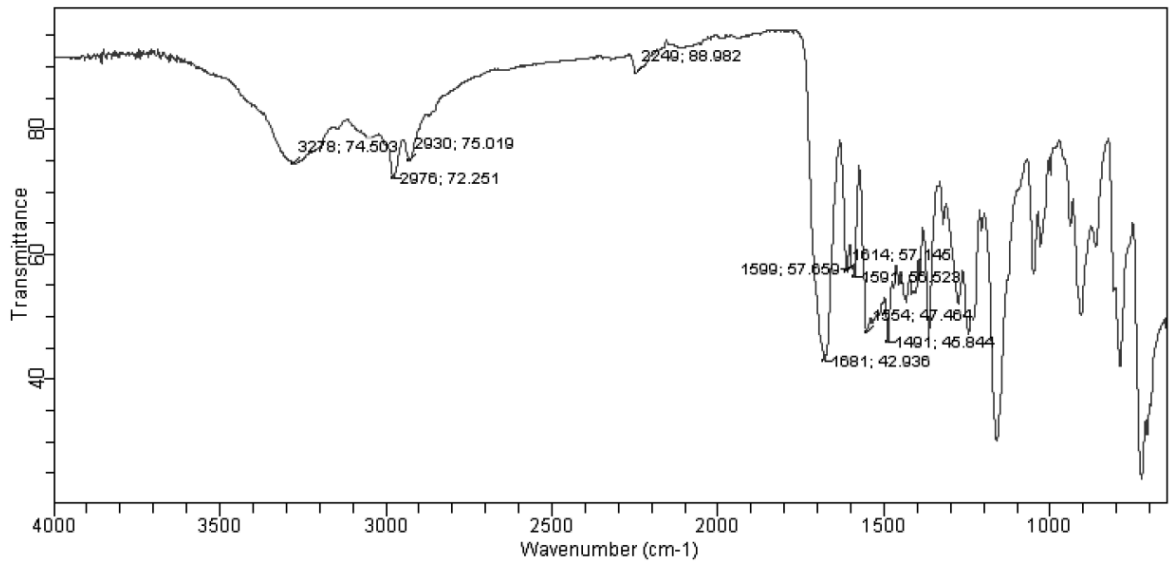


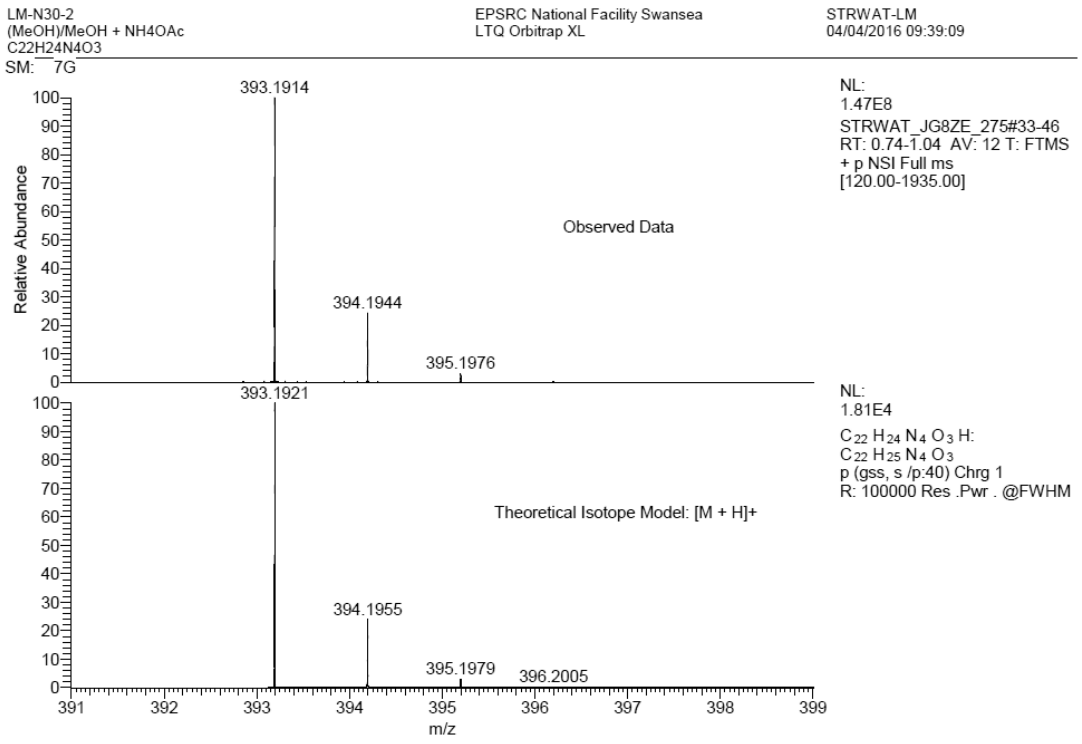
Formula	z	m/z	Meas. m/z	err [ppm]	err [mDa]
	1+		364.1620		
C 19 H 23 N 3 Na O 3		364.1632		3.1	1.1

***tert*-Butyl (2-((3-(2-methyl-1,8-naphthyridin-3-yl)phenyl)amino)-2-oxoethyl)carbamate (2.112)**

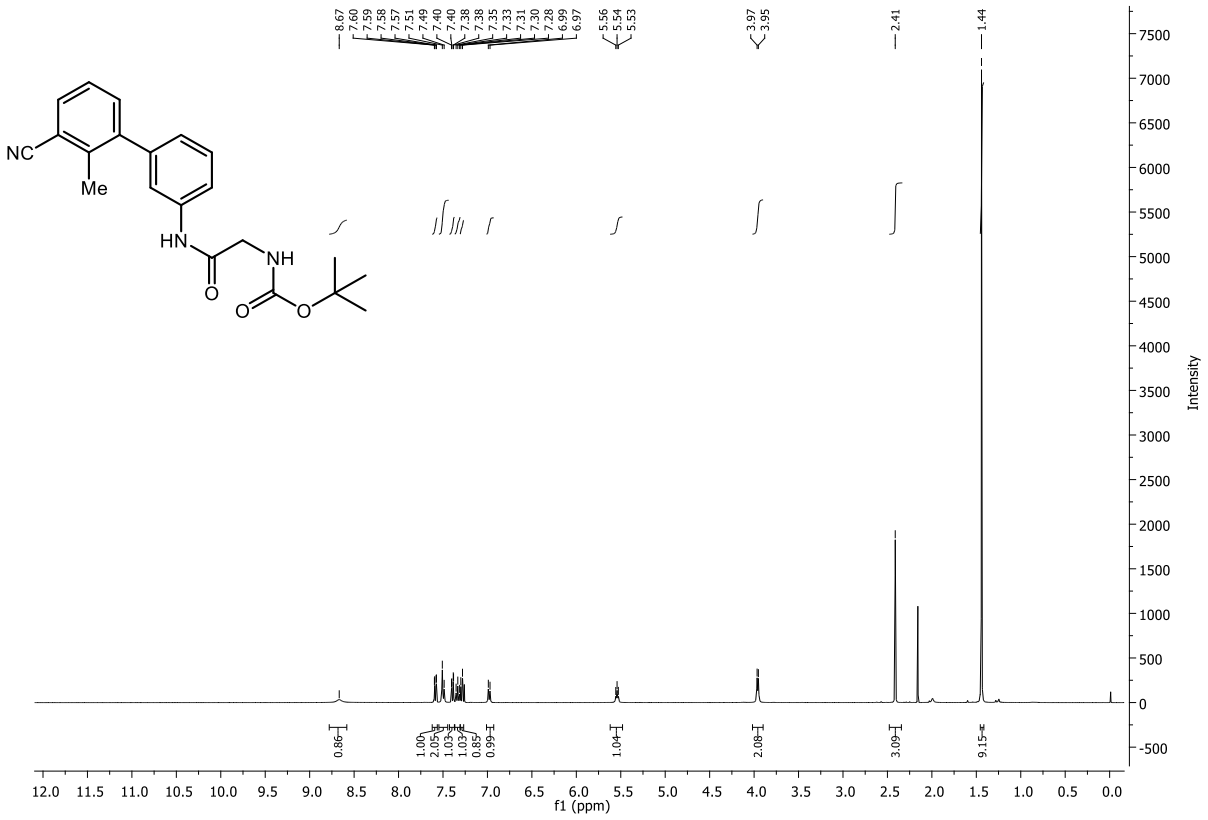


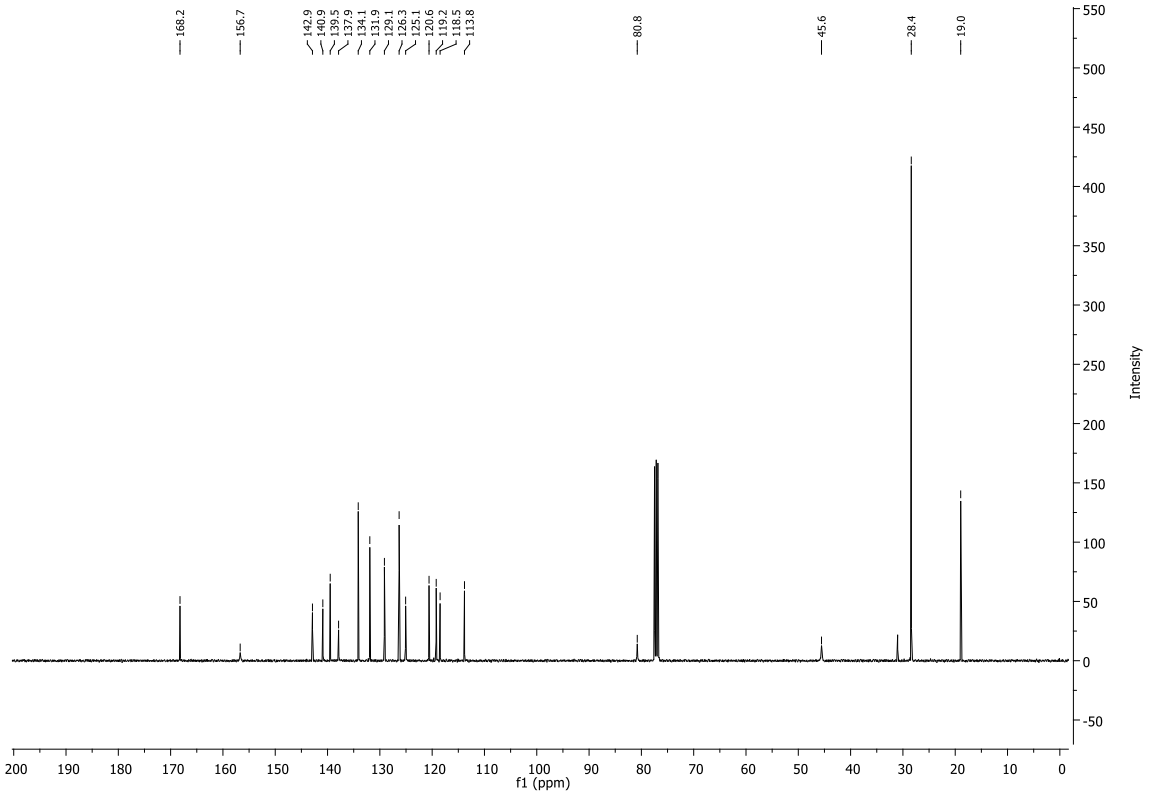

168.5
161.5
156.7
155.1
153.4
139.7
138.3
137.0
136.7
129.3
125.1
121.9
121.3
120.8
120.1
119.7
80.6
45.6
28.4
24.9
Intensity
f1 (ppm)

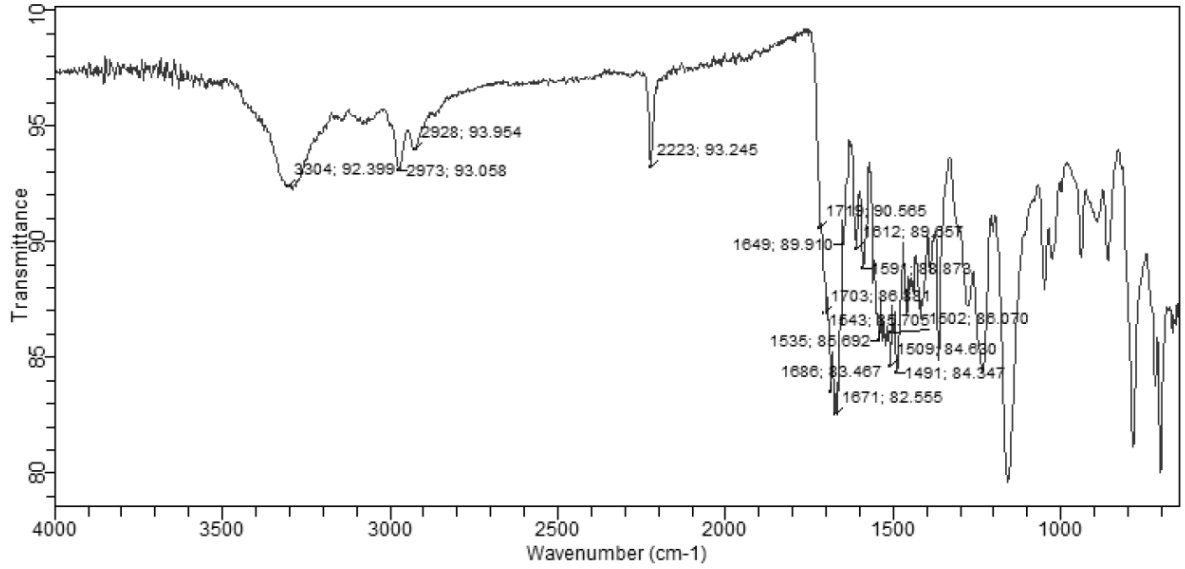

Transmittance
Wavenumber (cm-1)
3278; 74.503
2930; 75.019
2976; 72.251
2249; 88.982
1599; 57.659
1614; 57.146
1554; 47.464
1491; 45.844
1681; 42.936

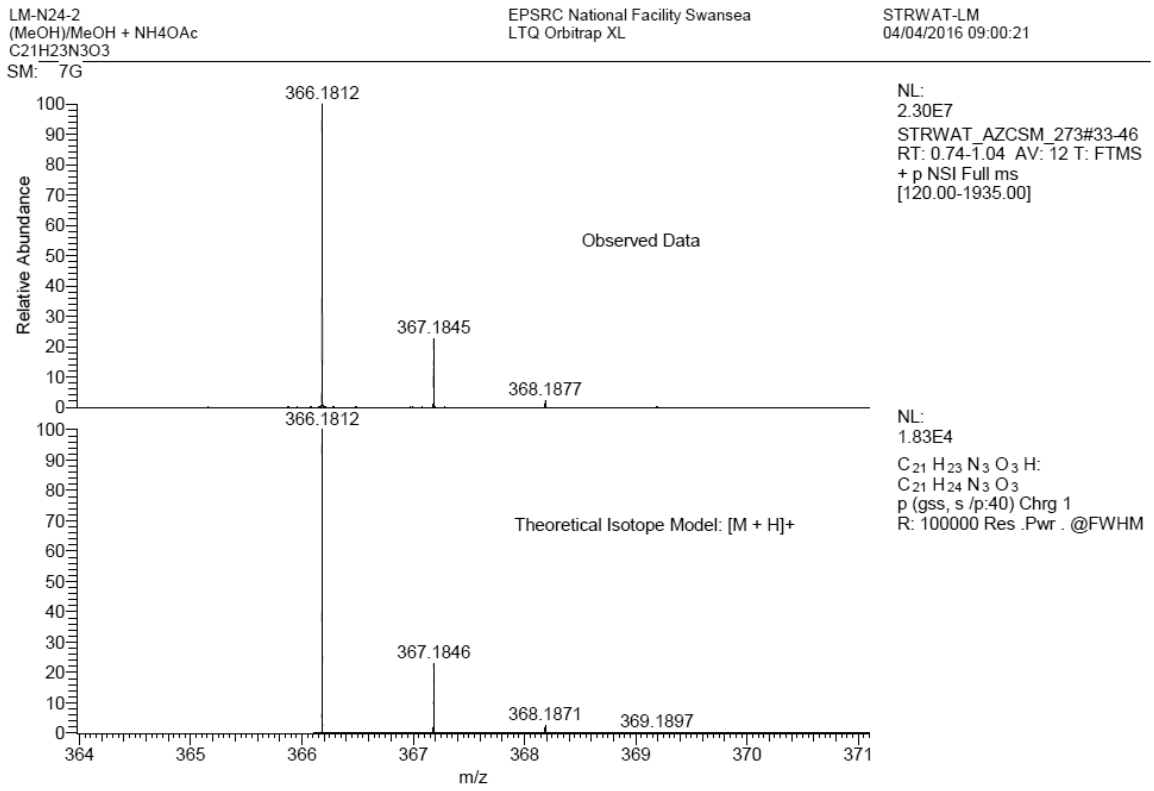


***tert*-Butyl (2-((3'-cyano-2'-methyl-[1,1'-biphenyl]-3-yl)amino)-2-oxoethyl)carbamate (2.113).**

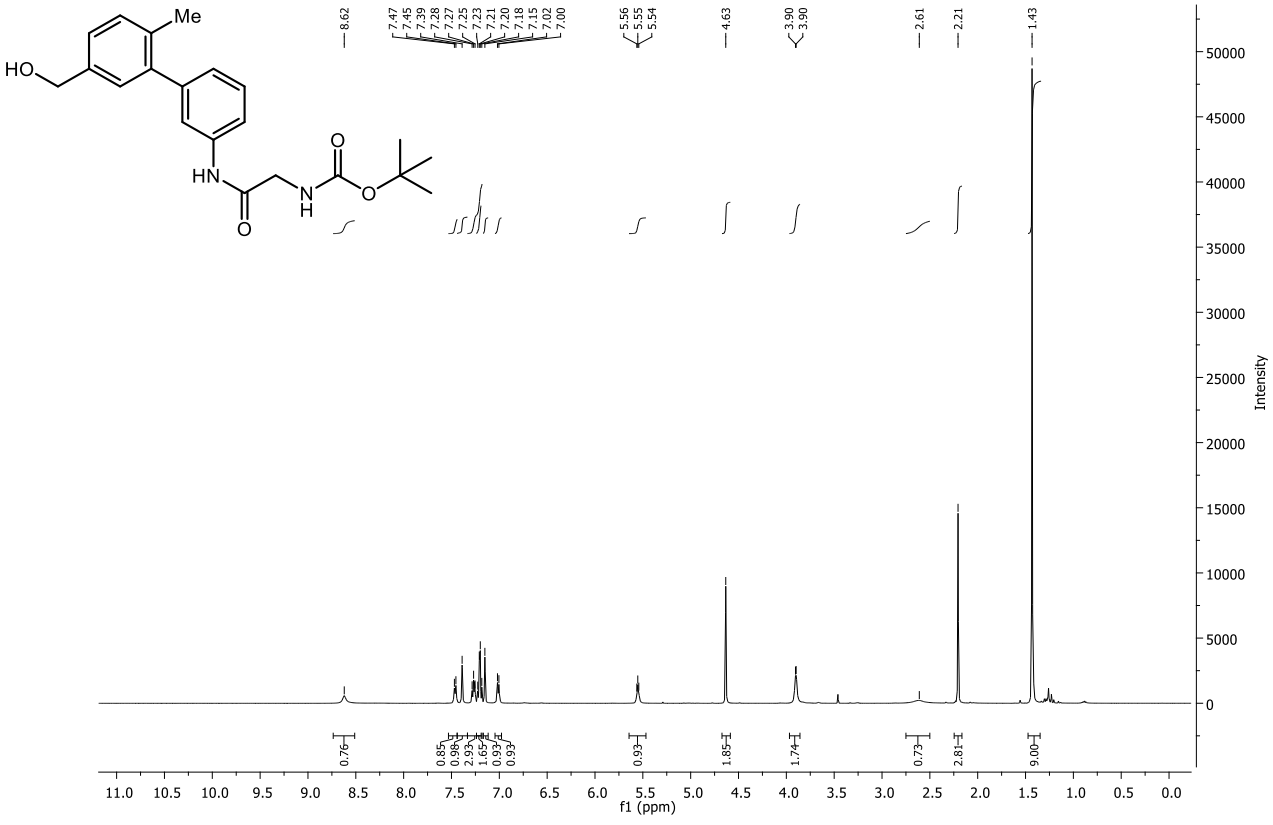


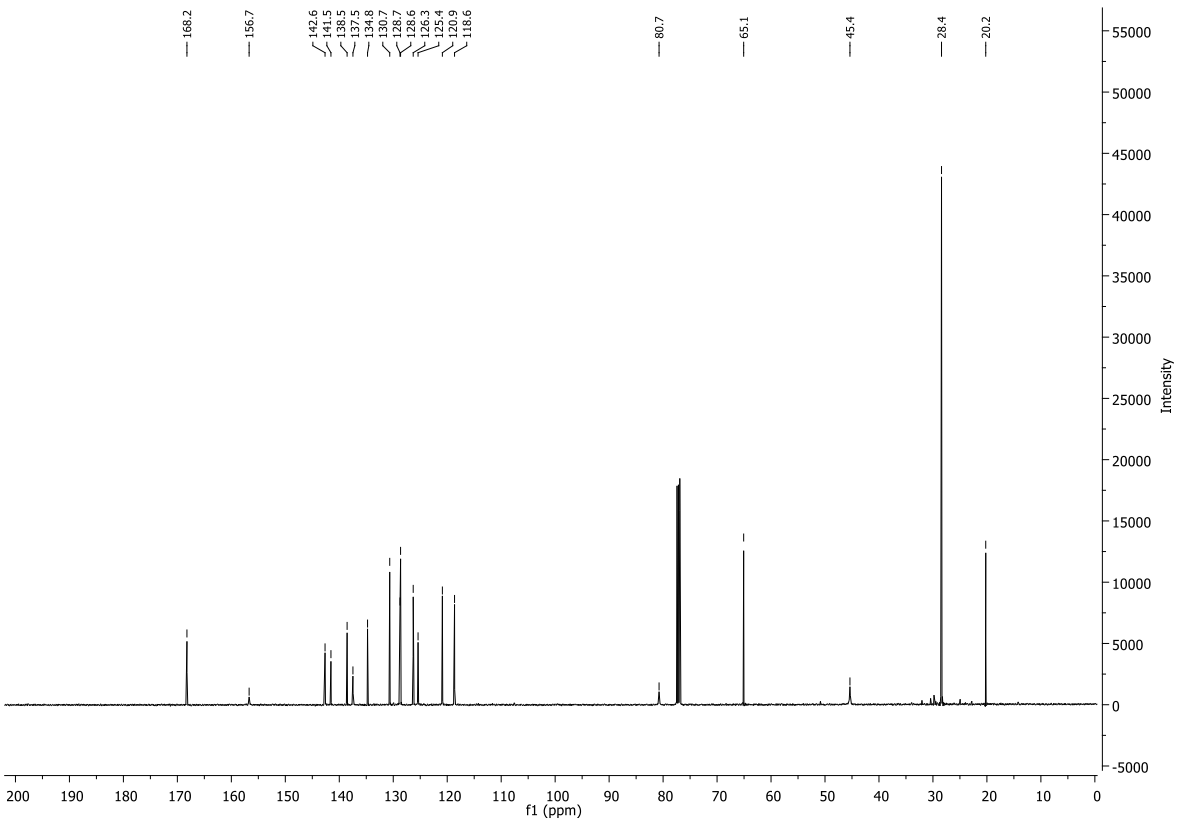

168.2
156.7
142.9
140.9
139.5
137.9
134.1
131.9
129.1
126.3
125.1
120.6
119.2
118.5
113.8
80.8
45.6
28.4
19.0
Intensity
f1 (ppm)

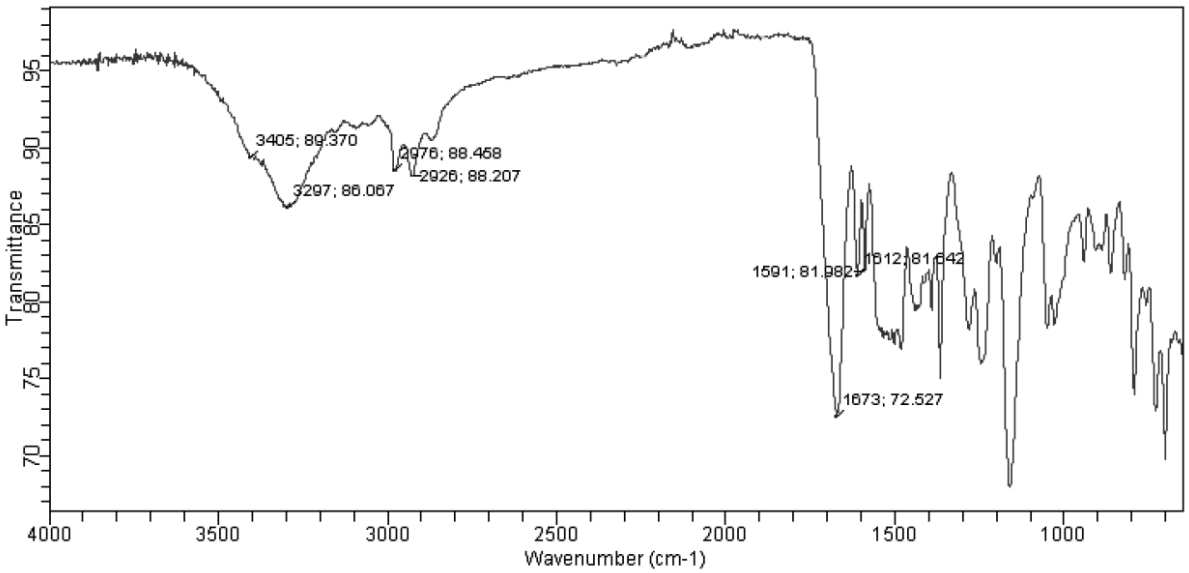

Transmittance
Wavenumber (cm-1)
3304; 92.399
2928; 93.954
2973; 93.058
2223; 93.245
1649; 89.910
1643; 88.705
1535; 85.692
1686; 83.467
1671; 82.555
1509; 84.630
1491; 84.347

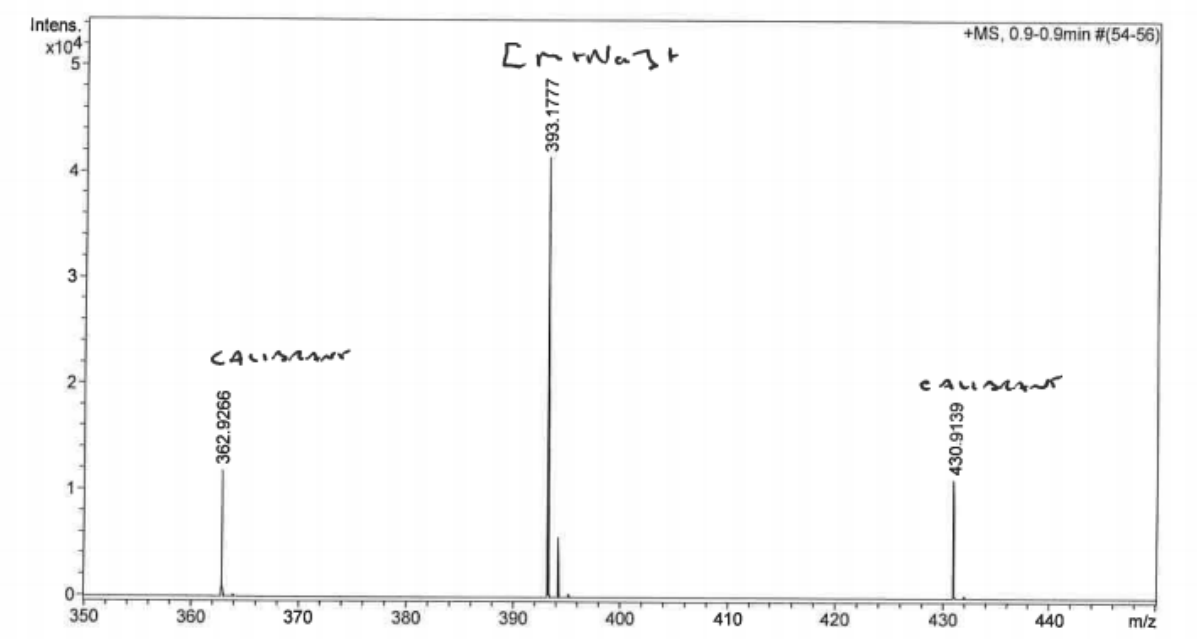


tert-Butyl (2-((5'-(hydroxymethyl)-2'-methyl-[1,1'-biphenyl]-3-yl)amino)-2-oxoethyl)carbamate (2.114).



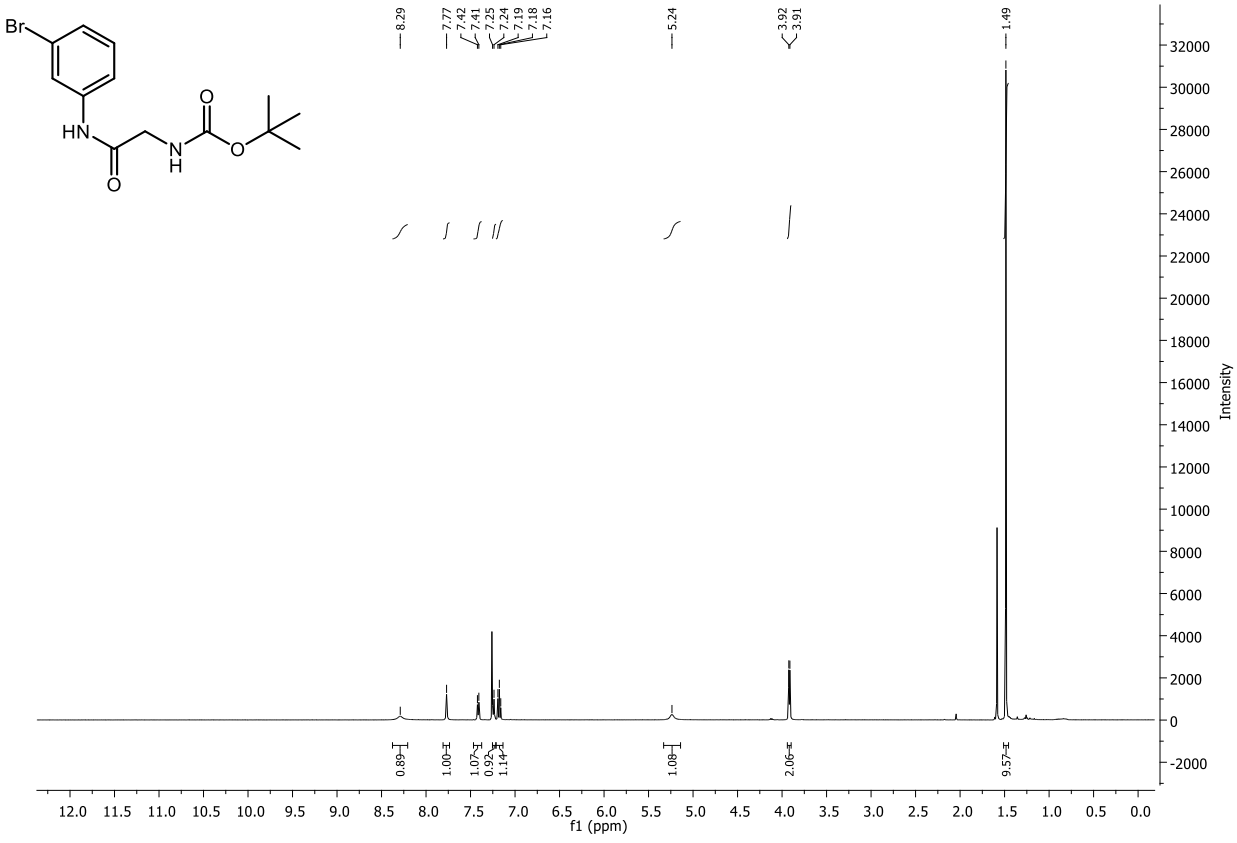

168.2
156.7
142.6
141.5
138.5
137.5
134.8
130.7
128.7
128.6
126.3
125.4
120.9
118.6
80.7
65.1
45.4
28.4
20.2
Intensity
f1 (ppm)

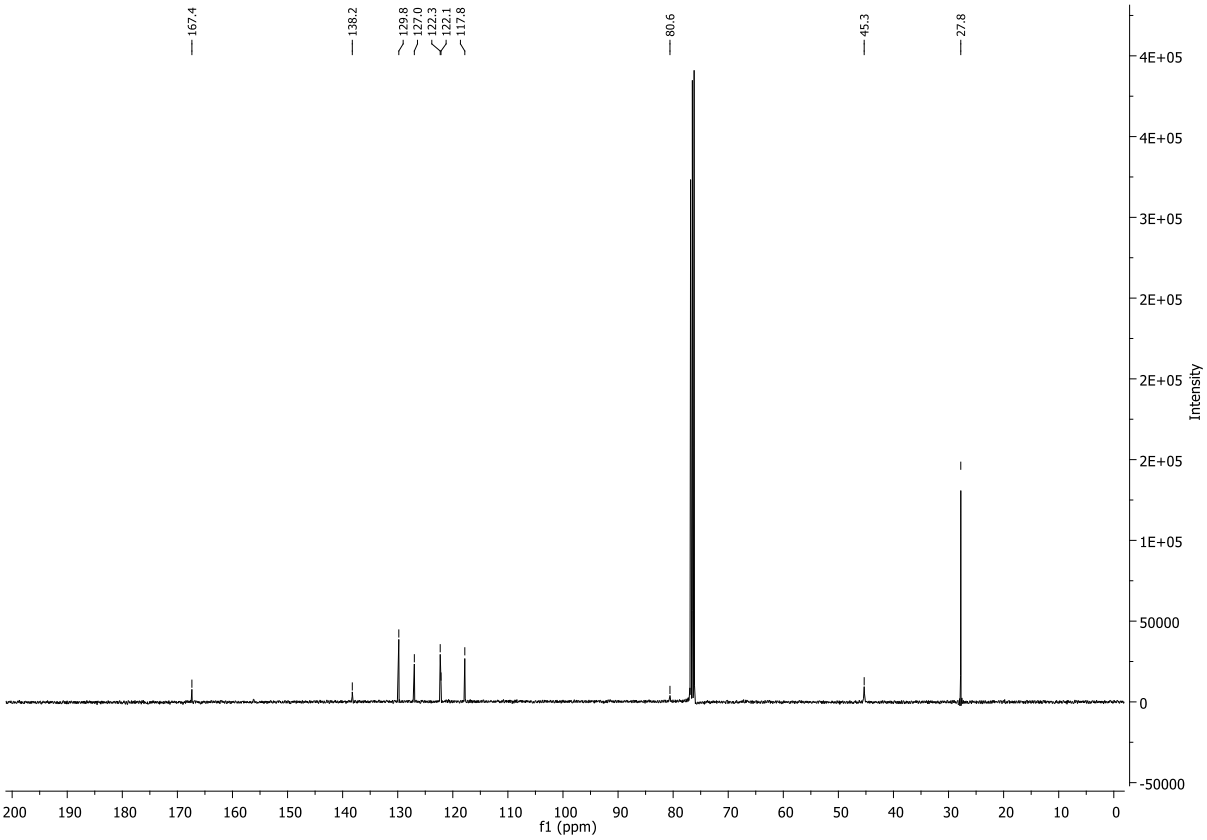

3405; 89.370
3297; 86.067
2976; 88.468
2926; 88.207
1591; 81.982
1612; 81.642
1673; 72.527
Transmittance
Wavenumber (cm-1)

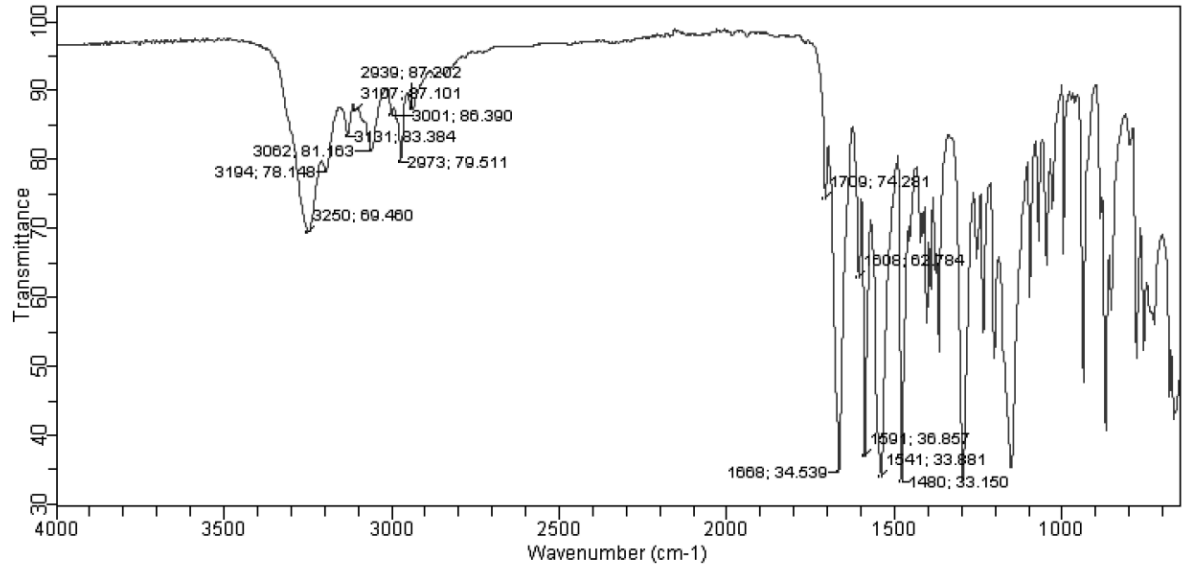


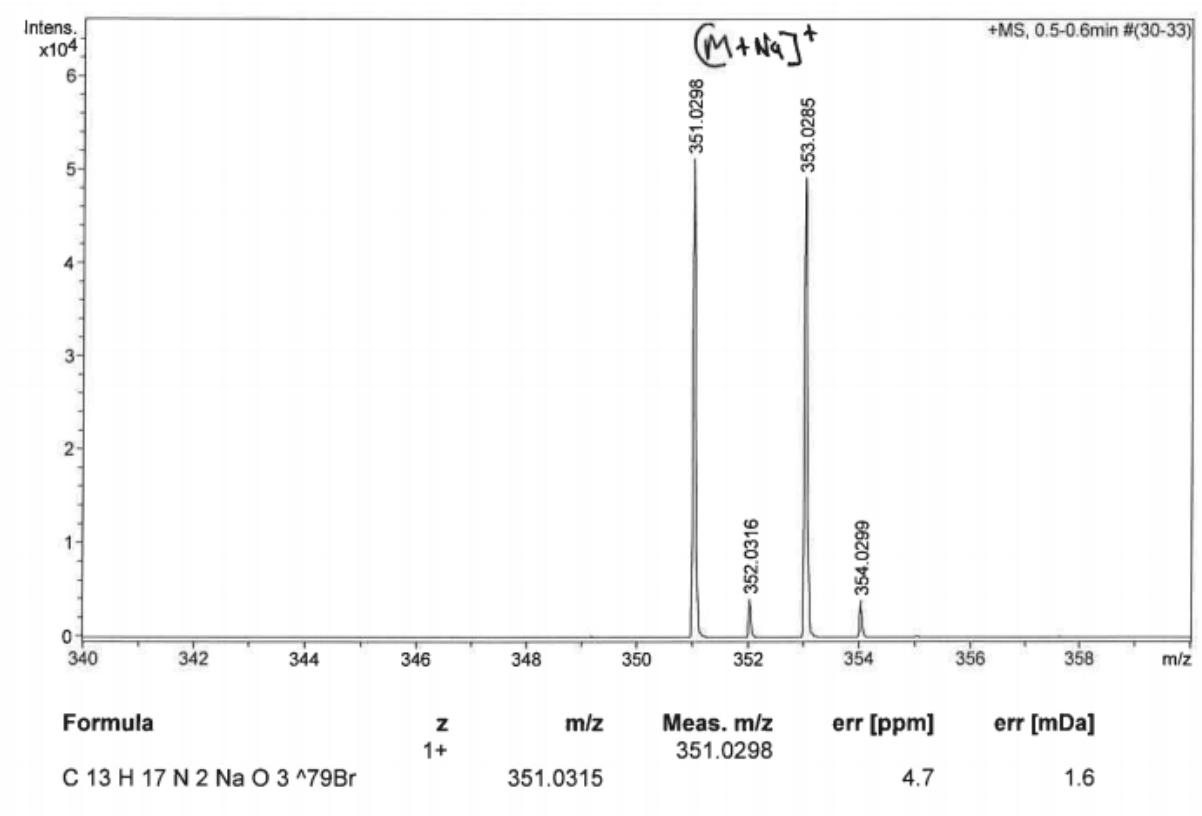
Formula	z	m/z	Meas. m/z	err [ppm]	err [mDa]
	1+		393.1777		
C 21 H 26 N 2 Na O 4		393.1785		2.0	0.8

***tert*-Butyl (2-((3-bromophenyl)amino)-2-oxoethyl)carbamate (2.115).**



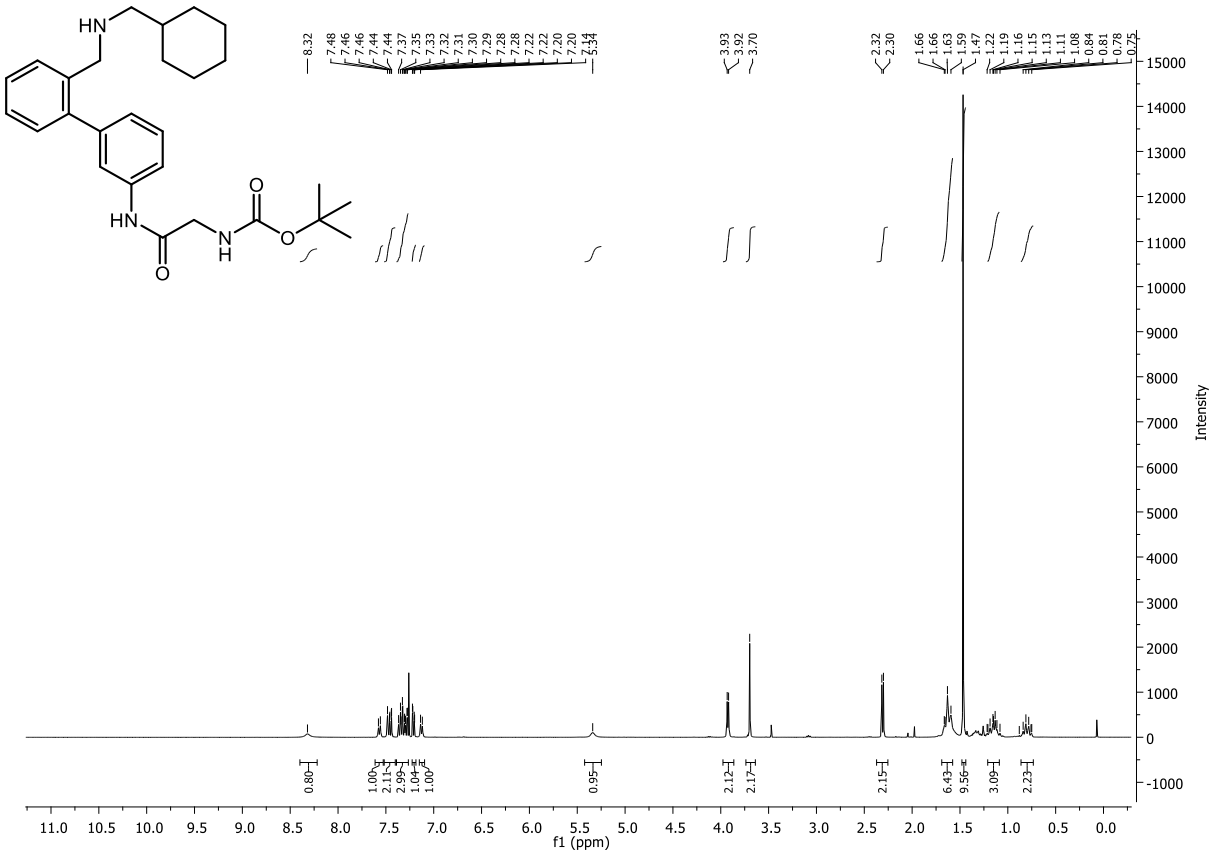

167.4
138.2
129.8
127.0
122.3
122.1
117.8
80.6
45.3
27.8
4E+05
4E+05
3E+05
2E+05
2E+05
2E+05
1E+05
50000
0
-50000
Intensity
200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0
f1 (ppm)

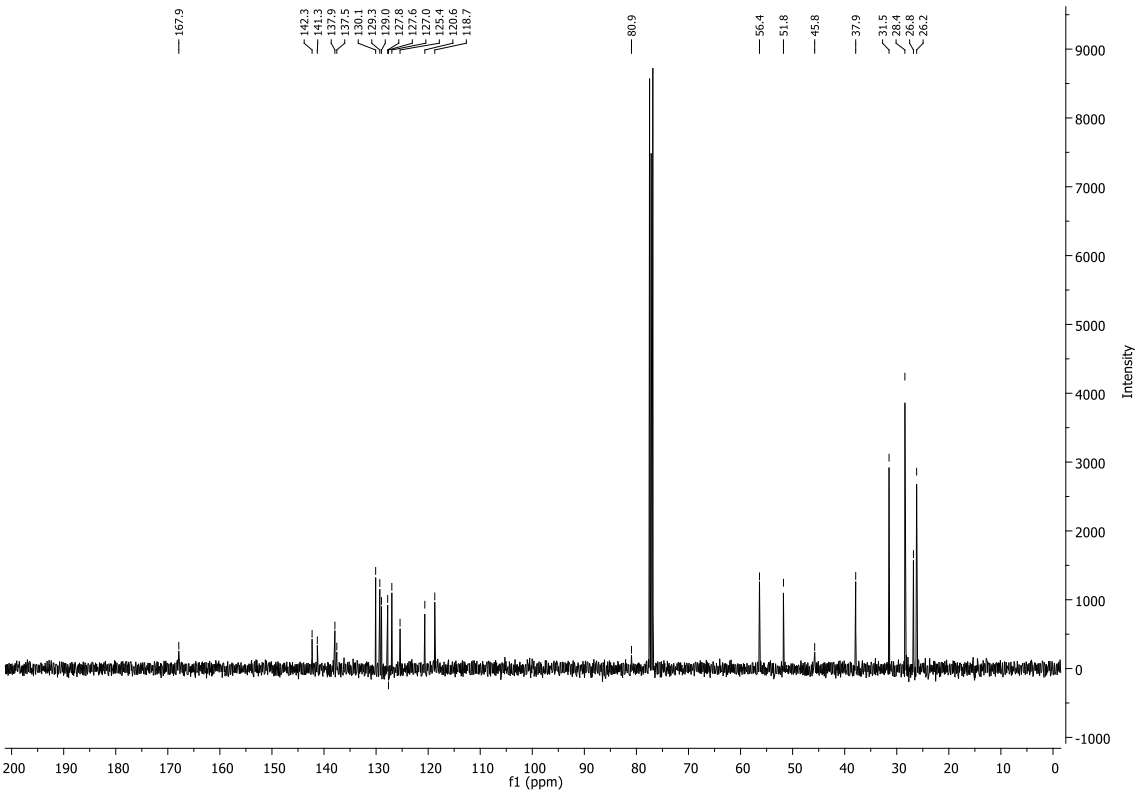

2939; 87.202
3107; 87.101
3001; 86.390
3131; 83.384
3062; 81.163
3194; 78.148
2973; 79.511
3250; 69.460
1709; 74.281
1508; 62.784
1591; 36.857
1541; 33.881
1668; 34.539
1480; 33.150
Transmittance
100 90 80 70 60 50 40 30
4000 3500 3000 2500 2000 1500 1000
Wavenumber (cm-1)

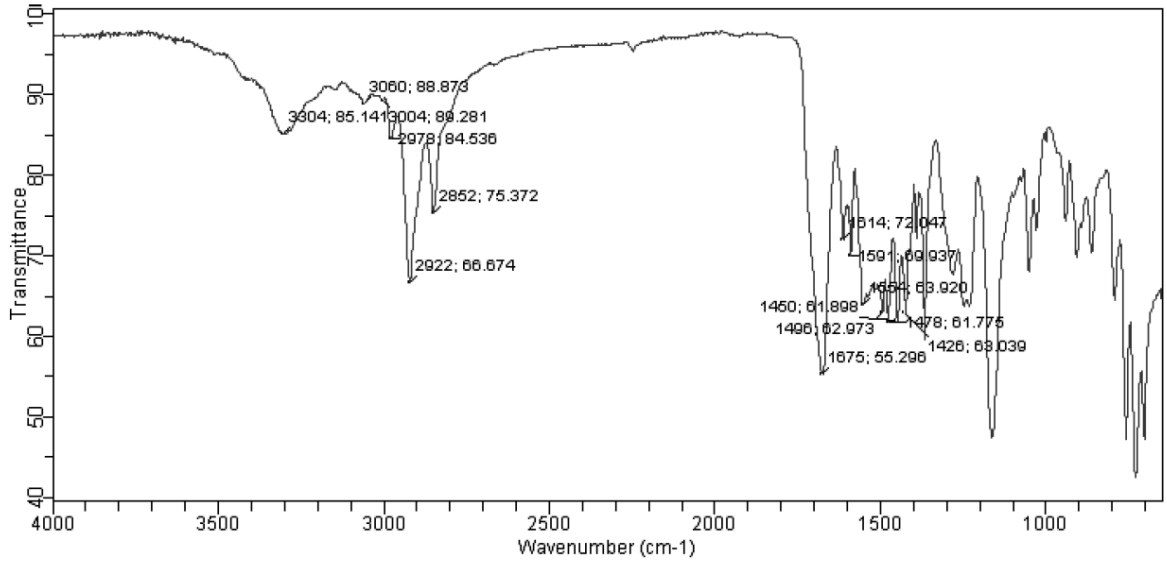


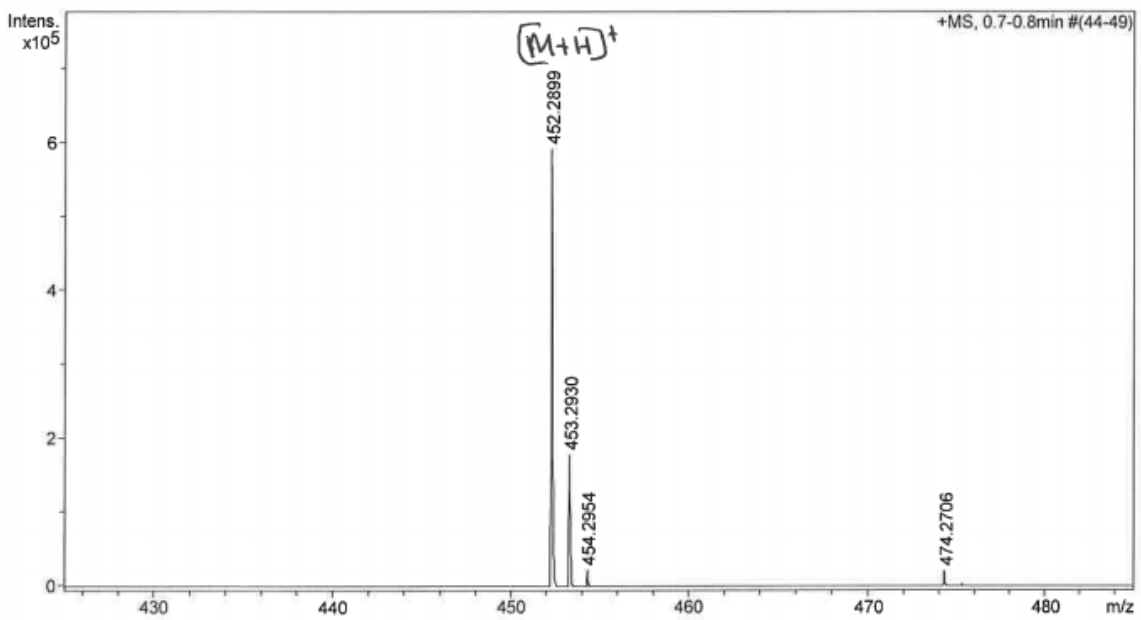
Formula	z	m/z	Meas. m/z	err [ppm]	err [mDa]
	1+		351.0298		
C 13 H 17 N 2 Na O 3 ^79Br		351.0315		4.7	1.6

***tert*-Butyl (2-((2'-(((cyclohexylmethyl)amino)methyl)-[1,1'-biphenyl]-3-yl)amino)-2-oxoethyl)carbamate (2.116).**



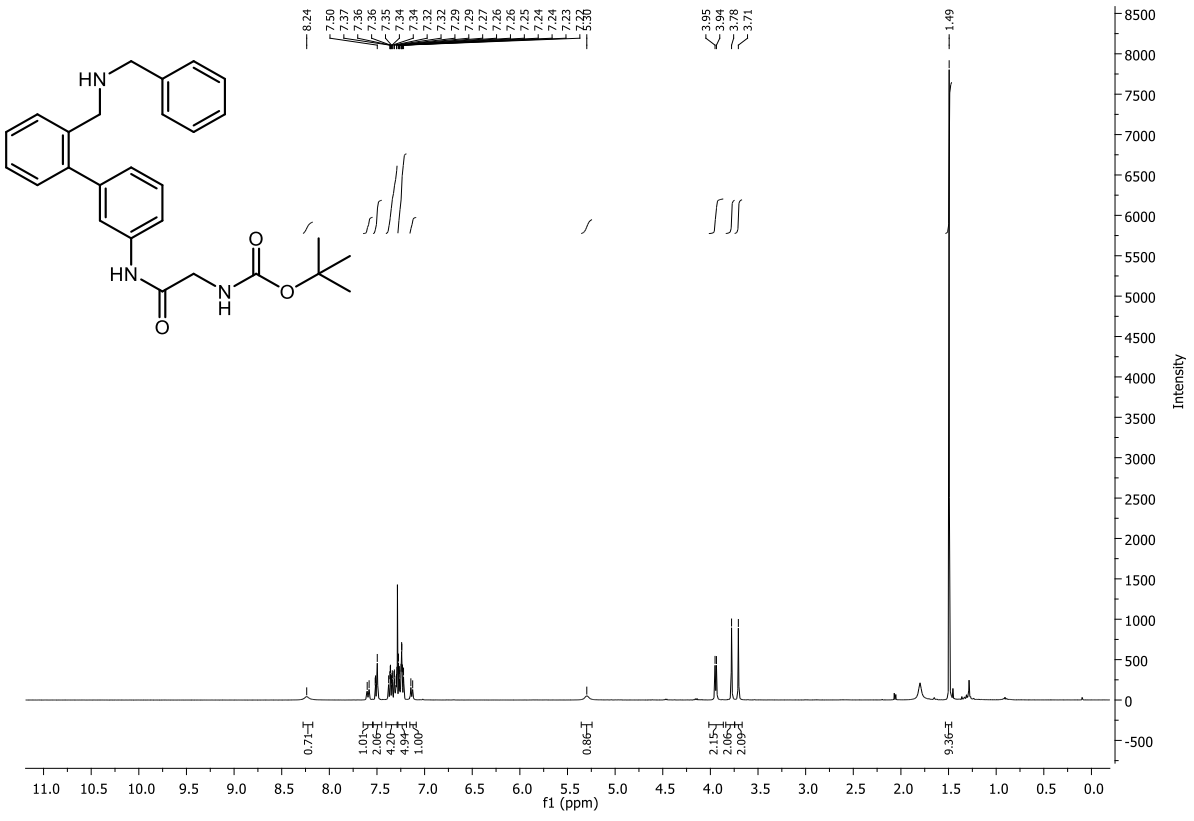

167.9
142.3
141.3
137.9
137.5
130.1
129.3
129.0
127.8
127.6
127.0
125.4
120.6
118.7
80.9
56.4
51.8
45.8
37.9
31.5
28.4
26.8
26.2
Intensity
f1 (ppm)

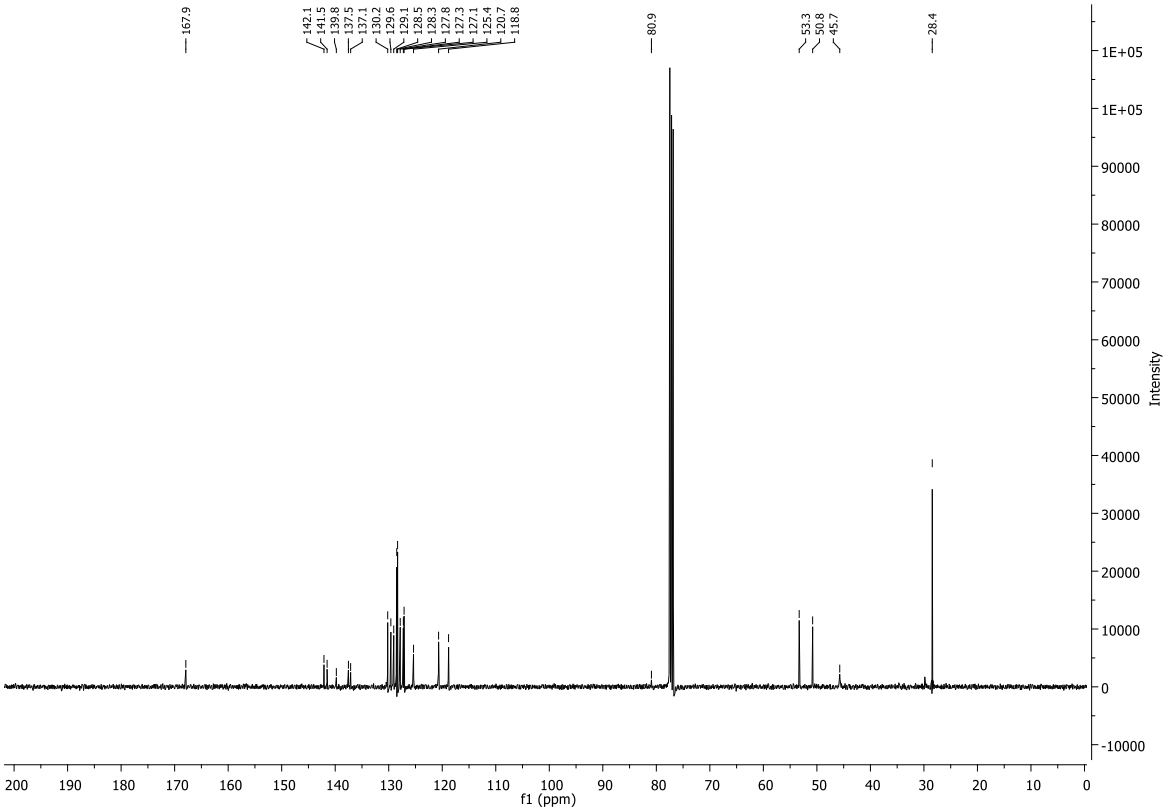

3060; 88.873
3304; 85.141
3004; 89.281
2978; 84.536
2852; 75.372
2922; 66.674
1514; 72.047
1591; 69.937
1554; 68.920
1460; 61.898
1496; 62.973
1478; 61.775
1426; 63.039
1675; 55.296
Transmittance
Wavenumber (cm-1)

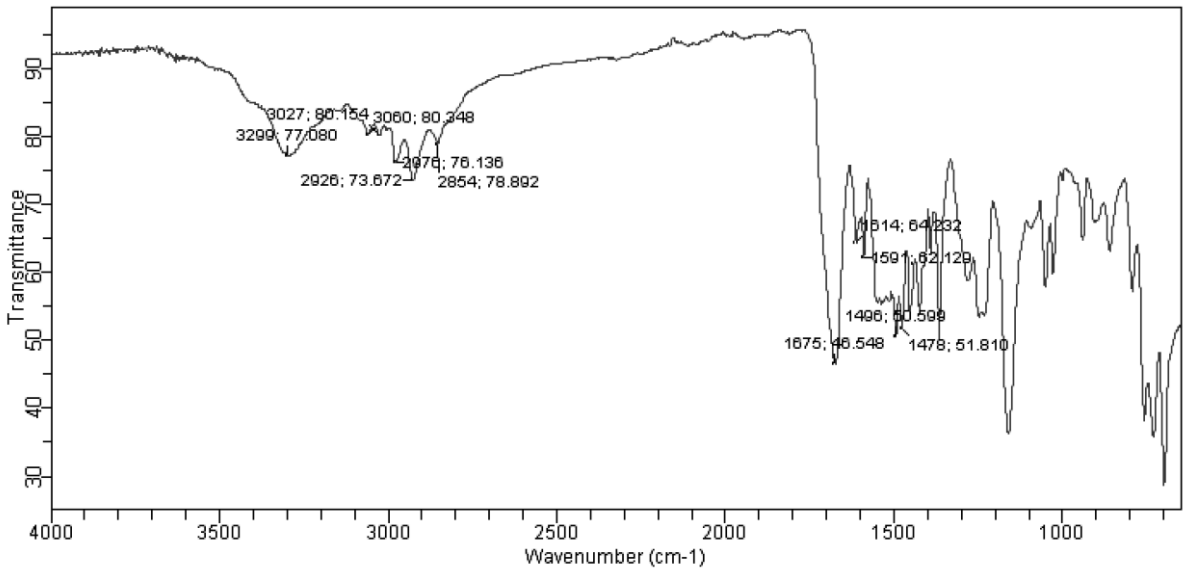


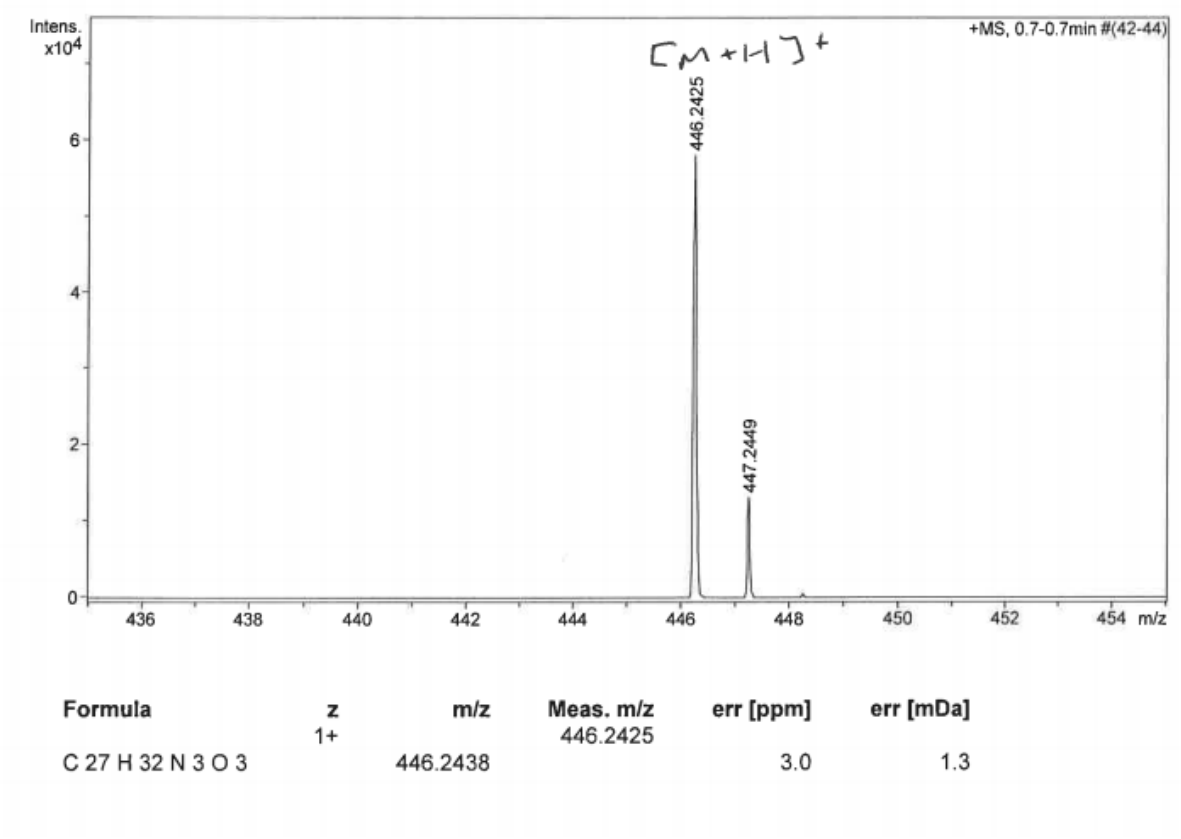
Formula	z	m/z	Meas. m/z	err [ppm]	err [mDa]
	1+		452.2899		
C 27 H 38 N 3 O 3		452.2908		2.0	0.9

***tert*-Butyl (2-((2'-((benzylamino)methyl)-[1,1'-biphenyl]-3-yl)amino)-2-oxoethyl) carbamate (2.117).**



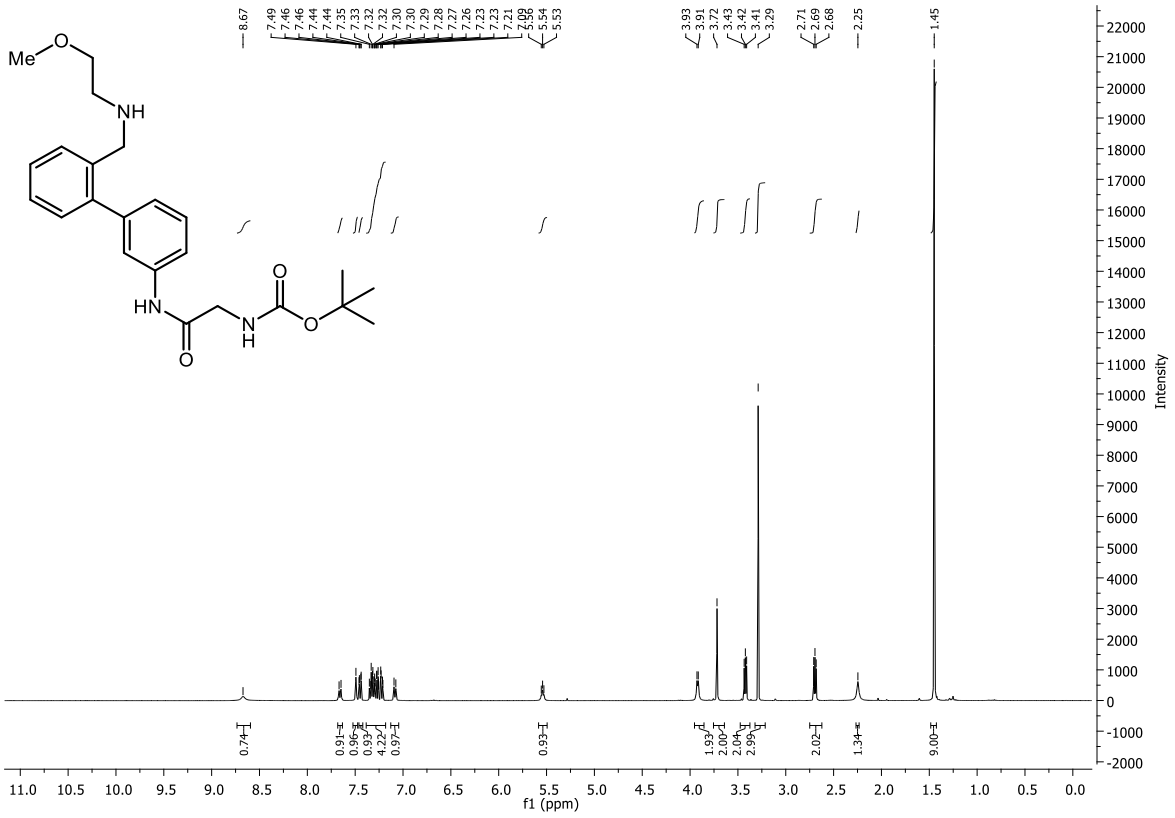

167.9
142.1
141.5
139.8
137.5
137.1
130.2
129.6
129.1
128.5
128.3
127.8
127.3
127.1
125.4
120.7
118.8
80.9
53.3
50.8
45.7
28.4
Intensity
f1 (ppm)

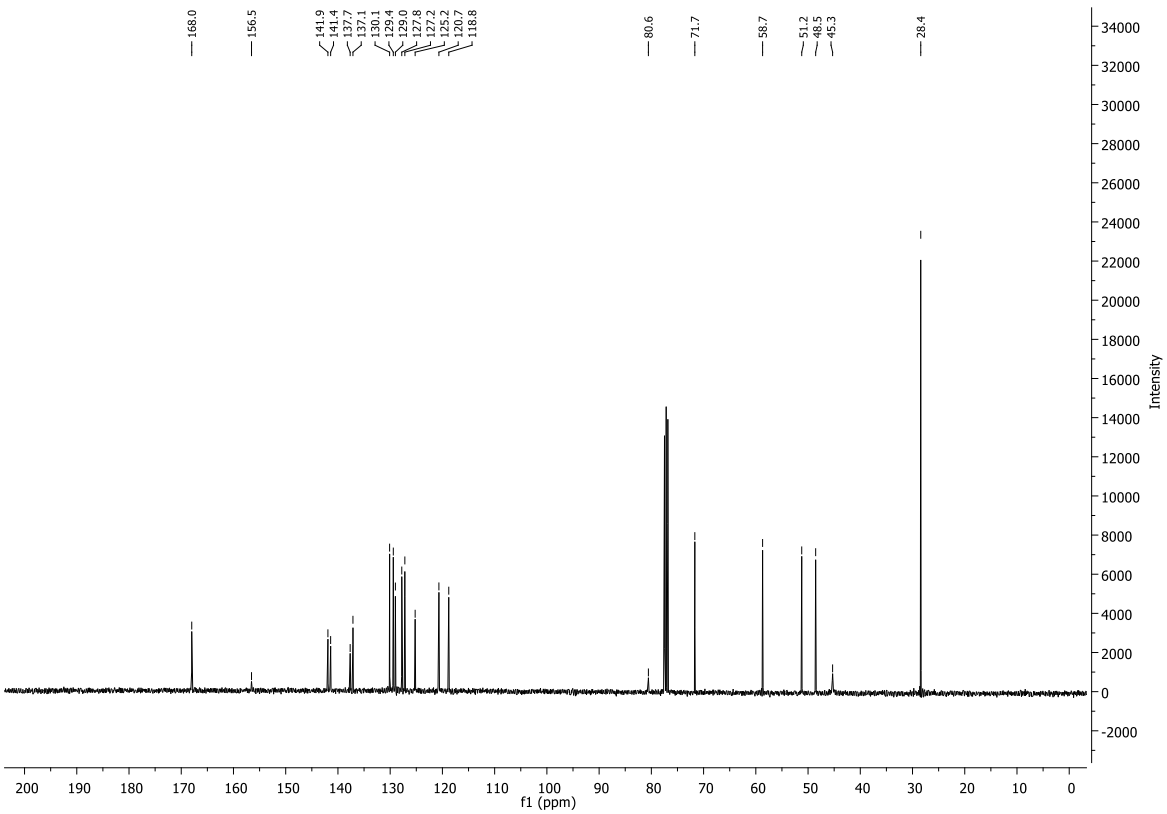

3027; 80.154
3060; 80.348
3299; 77.080
2976; 76.136
2926; 73.672
2854; 78.892
1614; 64.232
1591; 62.129
1496; 60.599
1675; 46.548
1478; 51.810
Transmittance
Wavenumber (cm-1)

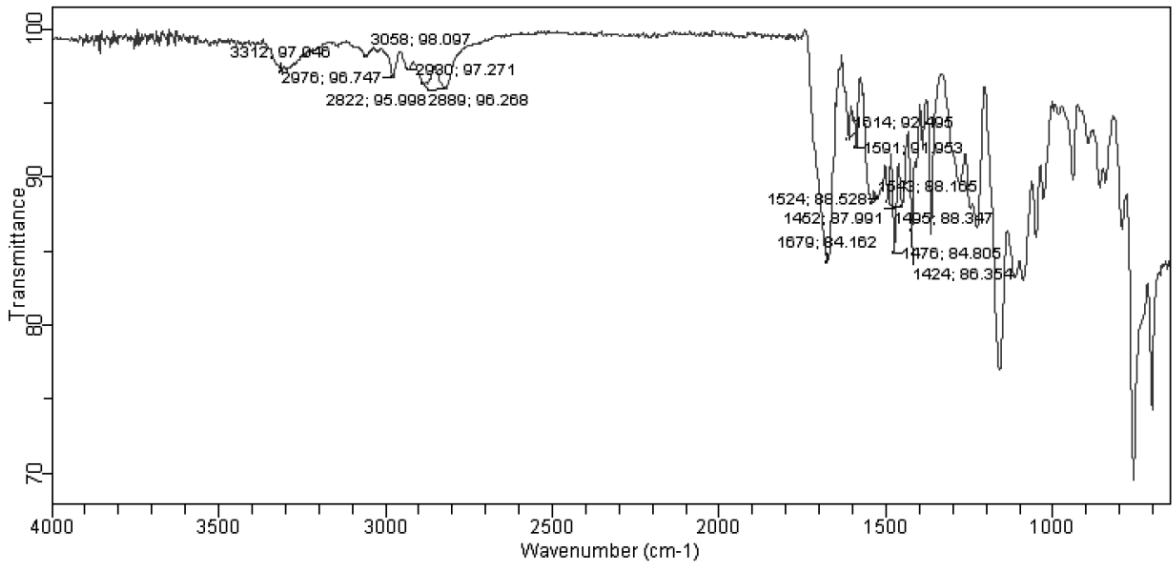


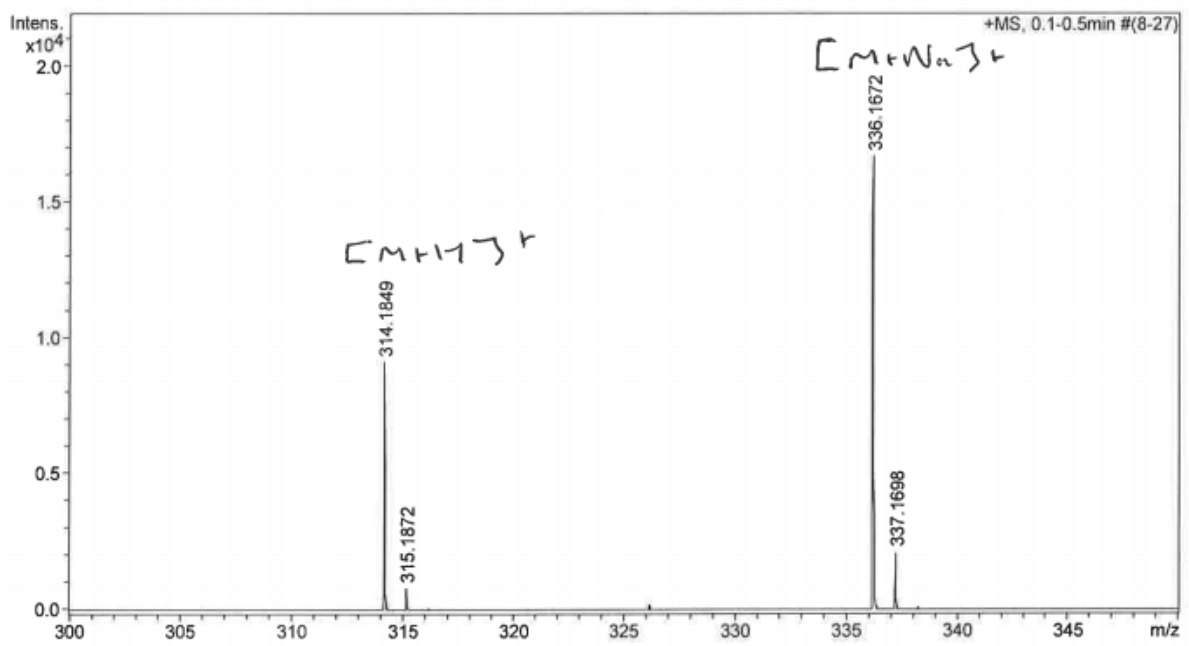
Formula	z	m/z	Meas. m/z	err [ppm]	err [mDa]
	1+		446.2425		
C 27 H 32 N 3 O 3		446.2438		3.0	1.3

***tert*-Butyl (2-((2'-(((2-methoxyethyl)amino)methyl)-[1,1'-biphenyl]-3-yl)amino)-2-oxoethyl)carbamate (2.118).**



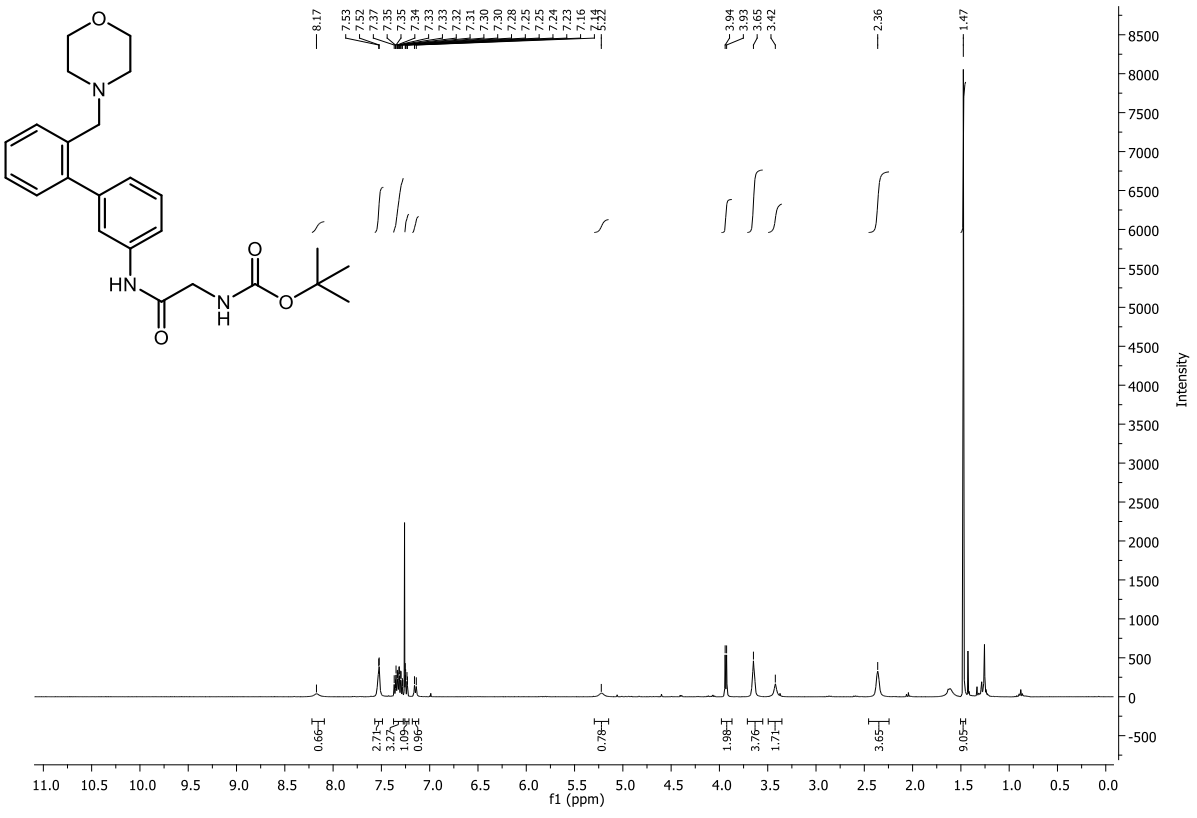

168.0
156.5
141.9
141.4
137.7
137.1
130.1
129.4
129.0
127.8
127.2
125.2
120.7
118.8
80.6
71.7
58.7
51.2
48.5
45.3
28.4
Intensity
f1 (ppm)

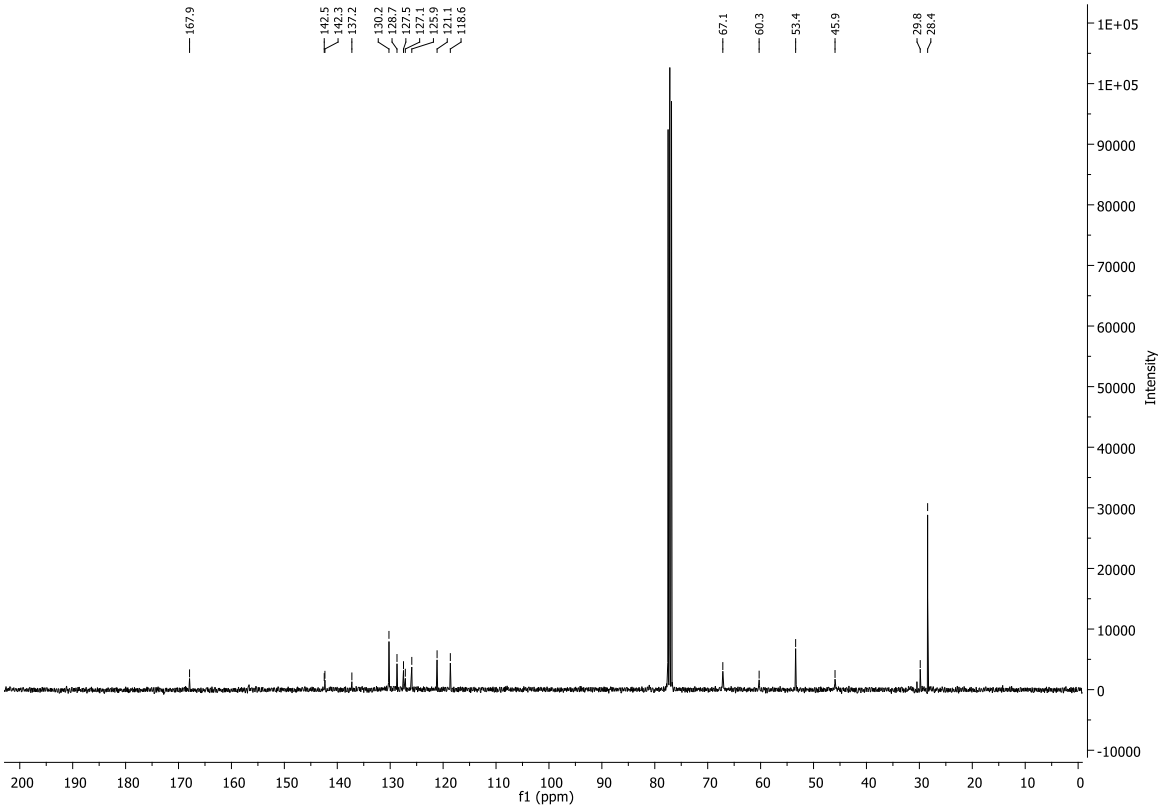

3312; 97.048
3058; 98.097
2976; 96.747
2960; 97.271
2822; 95.998
2889; 96.268
1614; 92.495
1591; 91.953
1524; 88.528
1462; 87.991
1495; 88.347
1679; 84.162
1476; 84.805
1424; 86.354
Transmittance
Wavenumber (cm-1)

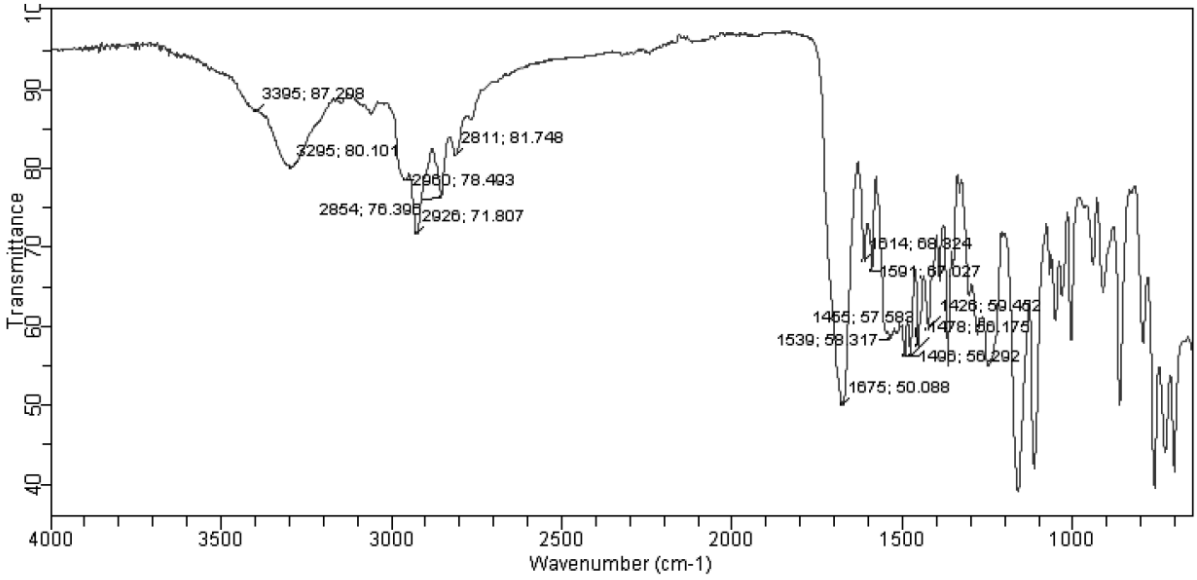


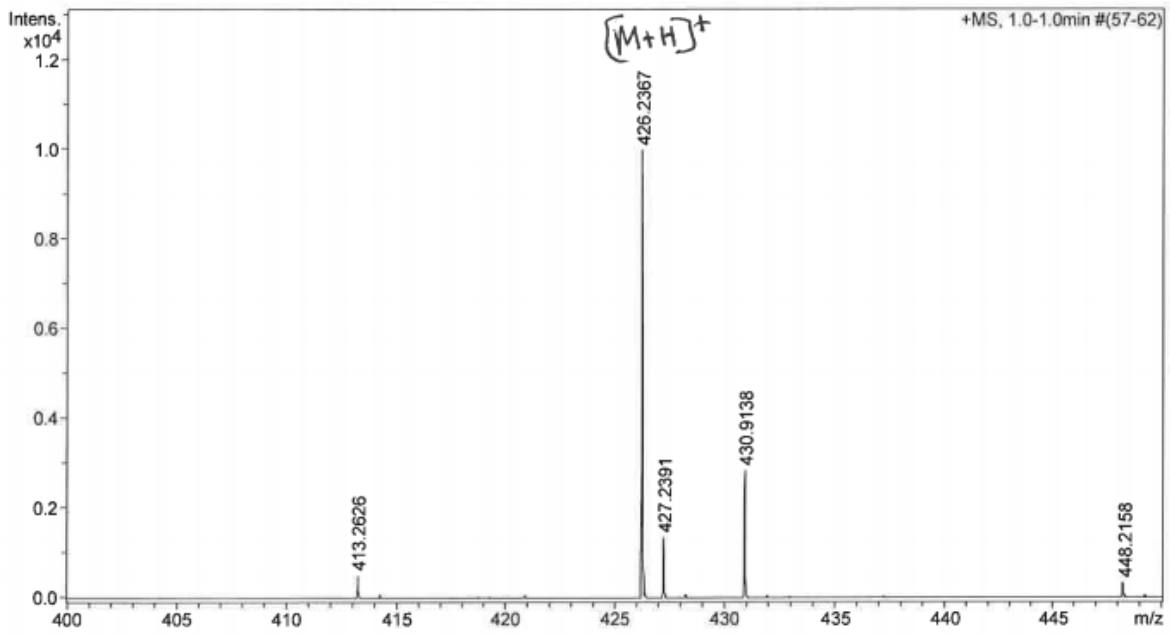
Formula	z	m/z	Meas. m/z	err [ppm]	err [mDa]
C 18 H 24 N 3 O 2	1+	314.1863	314.1849	4.3	1.4
C 18 H 23 N 3 Na O 2	1+	336.1682	336.1672	3.2	1.1

***tert*-Butyl (2-((2'-(morpholinomethyl)-[1,1'-biphenyl]-3-yl)amino)-2-oxoethyl)carbamate (2.119).**




167.9
142.5
142.3
137.2
130.2
128.7
127.5
127.1
125.9
121.1
118.6
67.1
60.3
53.4
45.9
29.8
28.4
Intensity
f1 (ppm)


3395; 87.298
3295; 80.101
2960; 78.493
2854; 76.396
2926; 71.807
2811; 81.748
1614; 68.824
1591; 67.027
1426; 59.452
1455; 57.583
1478; 58.175
1539; 58.317
1495; 58.292
1675; 50.088
Transmittance
Wavenumber (cm-1)



Formula	z	m/z	Meas. m/z	err [ppm]	err [mDa]
	1+		426.2367		
C 24 H 32 N 3 O 4		426.2387		4.9	2.1

S7. References

[1] Cole, J. C.; Nissink, J. W. M.; Taylor, R. Protein-Ligand Docking and Virtual Screening with GOLD. Virtual Screening in Drug Discovery (Eds. B. Shoichet, J. Alvarez), Taylor & Francis CRC Press, Boca Raton, Florida, USA (2005).

[2] Dassault Systèmes BIOVIA, Discovery Studio Modeling Environment, Release 4.5, San Diego: Dassault Systèmes, **2015**.