Supporting Information For

D-glucosamine-a novel and natural ligand for the *N*-arylation of imidazoles with aryl and heteroaryl bromides catalyzed by CuI

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General Consideration. All reactions were carried out in Schlenk tube, and run under an atmosphere of N_2. All the copper sources, ligands and bases were commercially available. All products were confirmed by ^1H NMR, ^{13}C NMR. Unknown compound was additionally confirmed by Elemental analysis.

Typical Procedure

A Schlenk tube equipped with a Teflon valve was charged with a magnetic stir bar, Cs_2CO_3 (684mg, 2.1mmol), CuI (0.38mg, 0.20mmol, 20mol%), and D-glucosamine hydrochloride (83mg, 0.40mmol, 40mol%). The tube was evacuated and backfilled with N_2 (this procedure was repeated three times). Under a counter flow of N_2, DMSO (0.5mL) was added by syringe at room temperature and pre-stirred for 0.5 h. Then a solution of bromobenzene (188mg, 1.2mmol), imidazole (68mg, 1.0mmol) in DMSO (0.5mL) was added via syringe under a counter flow of N_2. The tube was sealed and the mixture was allowed to stir for 24 h at 110˚C temperature. H_2O (5mL) was added to the reaction mixture after the completion of the reaction. Then it was extracted with (20mL×3) ethyl acetate and the combined organic layer was dried by Na_2SO_4, concentrated by vacuum. The residue was purified by column chromatography on silica gel using hexane/ethyl acetate (1:3) as eluent to give an oil of 1-phenylimidazole (121mg, 84%), **3a**: 1-(phenyl)-1H-imidazole[1]

^1H NMR (400MHz, $CDCl_3$/TMS): δ 7.86 (s, 1H), 7.50-7.21 (m, 7H), ^{13}C NMR (100MHz, $CDCl_3$/TMS): δ 137.2, 135.5, 130.3, 129.8, 127.4, 121.4, 118.2.

3b: 1-(4-methylphenyl)-1H-imidazole[1]

m.p.: 45－46˚C, ^1H NMR (400MHz, $CDCl_3$/TMS): δ 7.80 (s, 1H), 7.26-7.18 (m, 6H), 2.39 (s, 3H) ^{13}C NMR (100MHz, $CDCl_3$/TMS): 137.4, 135.6, 134.9, 130.3, 130.2, 121.3, 118.3, 20.9.

3c: 1-(2-methylphenyl)-1H-imidazole[1]

^1H NMR (400MHz, $CDCl_3$/TMS): δ 7.58 (s, 1H), 7.35-7.32 (m, 2H), 7.30-7.27 (m, 1H), 7.22-7.20 (m, 2H), 7.05 (s, 1H), 2.18 (s, 3H) ^{13}C NMR (100MHz, $CDCl_3$/TMS): 137.3, 136.5, 133.7, 131.1, 129.2, 128.6, 126.7, 126.4, 120.3, 17.4.

3d: 1-(4-methoxyphenyl)-1H-imidazole[1]

^1H NMR (400MHz, $CDCl_3$/TMS): δ 7.74 (s, 1H), 7.30-7.27 (m, 2H), 7.19-7.17 (m,

2H), 6.98-6.96 (m, 2H), 3.83 (s, 3H), ^{13}C NMR (100MHz, $CDCl_3$/TMS): δ 158.8, 135.7, 130.6, 129.9, 123.0, 118.6, 114.8, 55.4.

3e: 1-(3, 4-dimethoxyphenyl)-1H-imidazole[2]

^{1}H NMR (400MHz, $CDCl_3$/TMS): δ 7.77 (s, 1H), 7.22 (s, 1H), 7.19 (s, 1H), 6.93-6.88 (m, 3H), 3.92 (s, 6H), ^{13}C NMR (100MHz, $CDCl_3$/TMS): δ 149.7, 148.6, 135.9, 130.9, 130.0, 118.8, 114.1, 111.6, 106.2, 56.2, 56.1.

3f: 1-(4-fluorophenyl)-1H-imidazole[2]

^{1}H NMR (400MHz, $CDCl_3$/TMS): δ 7.78 (s, 1H), 7.37-7.33 (m, 2H), 7.21-7.14 (m, 4H), ^{13}C NMR (100MHz, $CDCl_3$/TMS): δ 162.8, 160.3, 134.7 (*J*=194.4Hz), 130.3, 123.4 (*J*=8.2Hz), 118.5, 116.6 (*J*=22.7Hz).

3g: 1-(4-trifluoromethylphenyl)-1H-imidazole[2]

m.p.: 69-70˚C, ^{1}H NMR (400MHz, $CDCl_3$/TMS): δ 7.93 (s, 1H), 7.76 (d, *J*=8.0Hz, 2H), 7.53 (d, *J*=8.0Hz, 2H), 7.34 (s, 1H), 7.27 (s, 1H), ^{13}C NMR (100MHz, $CDCl_3$/TMS): δ 139.9, 135.4, 131.1, 129.5 (*J*=29.6, 62.5Hz), 127.2, 123.6 (*J*=272.1, 549.0Hz), 121.2, 117.8.

3h: 1-(3, 5-bis(trifluoromethyl)phenyl)-1H-imidazole

m.p.: 93-95˚C, ^{1}H NMR (400MHz, $CDCl_3$/TMS): δ 7.93 (s, 1H), 7.87 (s, 1H), 7.83 (s, 2H), 7.34 (s, 1H), 7.27 (s, 1H), ^{13}C NMR (100MHz, $CDCl_3$/TMS): δ 138.4, 135.3, 133.6 (*J*=33.7, 68.6Hz), 131.6, 122.4 (*J*=271.7, 543.1Hz), 121.2, 120.9, 117.8. Anal. Calc. for $C_{11}H_6F_6N_2$: C, 47.16; H, 2.16; N, 10.00. Found: C, 47.30; H, 2.09; N, 9.82%.

3i: 1-(1-naphthalenyl)-1H-imidazole[1]

m.p.: 61-63˚C, ^{1}H NMR (400MHz, $CDCl_3$/TMS): δ 7.93 (d, *J*=8.0Hz, 2H), 7.75(s, 1H), 7.60-7.41 (m, 5H), 7.29 (s, 1H), 7.23 (s, 1H), ^{13}C NMR (100MHz, $CDCl_3$/TMS): δ 138.3, 134.1, 133.9, 129.4, 129.4, 129.2, 128.2, 127.5, 126.9, 125.1, 123.54, 122.2, 121.6.

3j: 1-(2-naphthalenyl)-1H-imidazole[3]

m.p.: 122-123˚C, ^{1}H NMR (400MHz, $CDCl_3$/TMS): δ 7.97-7.81 (m, 5H), 7.59-7.51 (m, 3H), 7.40 (s, 1H), 7.26 (s, 1H), ^{13}C NMR (100MHz, $CDCl_3$/TMS): δ 135.8, 134.7, 133.5, 132.1, 130.5, 130.0, 127.8, 127.8, 127.3, 126.5, 120.2, 119.0, 118.4.

3k: 1-(4-acetamidophenyl)-1H-imidazole

m.p.: 164-166˚C, ^{1}H NMR (400MHz, $CDCl_3$/TMS): δ 10.08 (s, 1H), 8.16 (s, 1H), 7.70 (d, *J* = 8.8Hz, 2H), 7.66 (s, 1H), 7.55 (d, *J* = 9.2Hz, 2H), 7.08 (s, 1H), ^{13}C NMR (100MHz, DMSO/TMS): δ 168.9, 138.8, 135.8, 132.5, 130.2, 121.3, 120.3, 118.3, 24.2. Anal. Calc. for $C_{11}H_{11}N_3O$: C, 65.66; H, 5.51; N, 20.88. Found: C, 65.78; H, 5.55; N, 20.68%.

3l: 1-(2- trifluoroacetamido-5-methylphenyl)-1H-imidazole

m.p.: 178-180˚C, ^{1}H NMR (400MHz, $CDCl_3$/TMS): δ 11.06 (s, 1H), 7.77 (s, 1H), 7.42-7.28 (m, 4H), 7.06 (s, 1H), 2.38 (s, 3H), ^{13}C NMR (100MHz, DMSO/TMS): 156.0 (*J*=36.6, 73.0Hz), 139.5, 133.8, 129.7, 129.3, 129.0, 127.3, 126.6, 120.3, 116.2 (*J*=287.0, 573.9Hz), 20.8. Anal. Calc. for $C_{12}H_{10}F_3N_3O$: C, 53.54; H, 3.74; N, 15.61. Found: C, 53.48; H, 3.90; N, 15.49%.

3m: 1-(pyridine-2-yl)-1H-imidazole[1]

^{1}H NMR (400MHz, $CDCl_3$/TMS): δ 8.46 (s, 1H), 8.35 (s, 1H), 7.82-7.77 (m, 1H), 7.64-7.63 (t, 1H), 7.36-7.33 (m, 1H), 7.24-7.19 (m, 2H)，^{13}C NMR (100MHz, $CDCl_3$/TMS): δ 149.1, 138.9, 134.9, 130.5, 121.9, 116.0, 112.2.

3n: 1-(pyridine-3-yl)-1H-imidazole[4]

^{1}H NMR (400MHz, $CDCl_3$/TMS): δ 8.71 (d, 1H), 8.60-8.58 (m, 1H), 7.84 (s, 1H), 7.42-7.39 (m, 1H), 7.27-7.25 (m, 1H), 7.21 (s, 1H), ^{13}C NMR (100MHz, $CDCl_3$/TMS): 148.7, 142.8, 135.5, 133.8, 131.1, 128.8, 124.2, 118.0.

3o: 1-(thien-2-yl)-1H-imidazole[1]

^{1}H NMR (400MHz, $CDCl_3$/TMS): δ 7.81 (s, 1H), 7.43 (dd, 1H), 7.24-7.17 (m, 4H), ^{13}C NMR (100MHz, $CDCl_3$/TMS): δ 136.2, 135.7, 129.9, 127.1, 121.3, 118.4, 113.1.

3p: 1-(thien-3-yl)-1H-imidazole[5]

m.p.: 81-83˚C, ^{1}H NMR (400MHz, $CDCl_3$/TMS): δ 7.79 (s, 1H), 7.41 (dd, 1H), 7.21-7.14 (m, 4H), ^{13}C NMR (100MHz, $CDCl_3$/TMS): 136.2, 135.8, 129.9, 127.1, 121.4, 118.5, 113.2.

3q: 1-(6-methoxy-pyridine-3-yl)-1H-imidazole

m.p.: 186-188˚C, ^{1}H NMR (400MHz, $CDCl_3$/TMS): δ 8.24 (t, 1H), 7.75 (s, 1H), 7.61-7.58 (t, 1H), 7.22-7.18 (t, 2H), 6.87-6.85 (dd, 1H), 3.98 (s, 3H), ^{13}C NMR

(100MHz, $CDCl_3$/TMS): 163.3, 140.3, 136.0, 133.1, 130.5, 128.3, 118.8, 111.7, 53.9. Anal. Calc. for $C_9H_9N_3O$: C, 61.70; H, 5.18; N, 23.99. Found: C, 61.52; H, 5.39; N, 23.80%.

3r: 2-(1H-imidazol-1-yl)-pyrimidine[1]

m.p.: 122-123˚C, ^{1}H NMR (400MHz, $CDCl_3$/TMS): δ 8.68-8.67 (d, 2H), 8.60 (s, 1H), 7.87 (t, 1H), 7.19-7.15 (m, 2H), ^{13}C NMR (100MHz, $CDCl_3$/TMS): δ 158.7, 154.7, 136.1, 130.6, 118.8, 116.5.

3s: 1-phenyl-1H-benzimidazole[2]

m.p.: 96-98˚C, ^{1}H NMR (400MHz, $CDCl_3$/TMS): δ 8.11 (s, 1H), 7.90-7.88 (m, 1H), 7.58-7.43 (m, 6H), 7.36-7.30 (m, 2H), ^{13}C NMR (100MHz, $CDCl_3$/TMS): δ 143.9, 142.3, 136.2, 133.6, 129.9, 127.9, 123.9, 123.6, 122.7, 120.5, 110.3.

1. L. Zhu, L. Cheng, Y. Zhang, R. Xie, J. You, *J. Org. Chem.* 2007, **72**, 2737.

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3. E. Alcalde, I. Dinarès, S. Rodríguez, C. Garcia de Miguel, *Eur. J. Org. Chem.* 2005, **70**, 1637.

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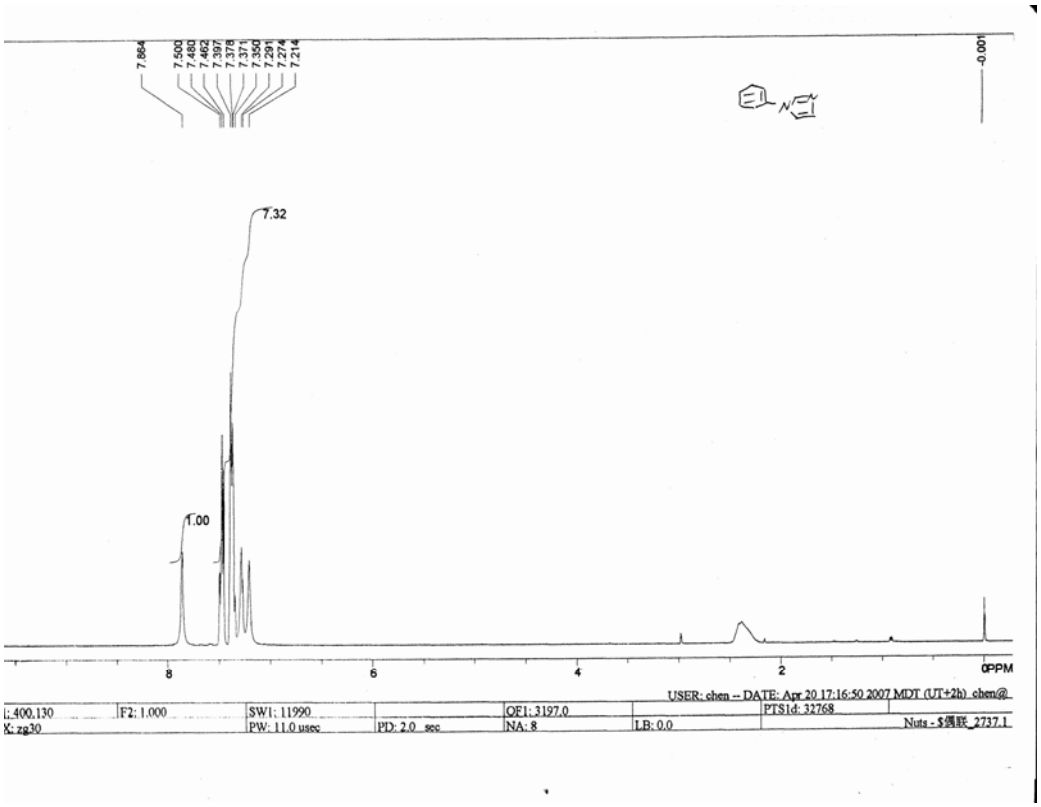
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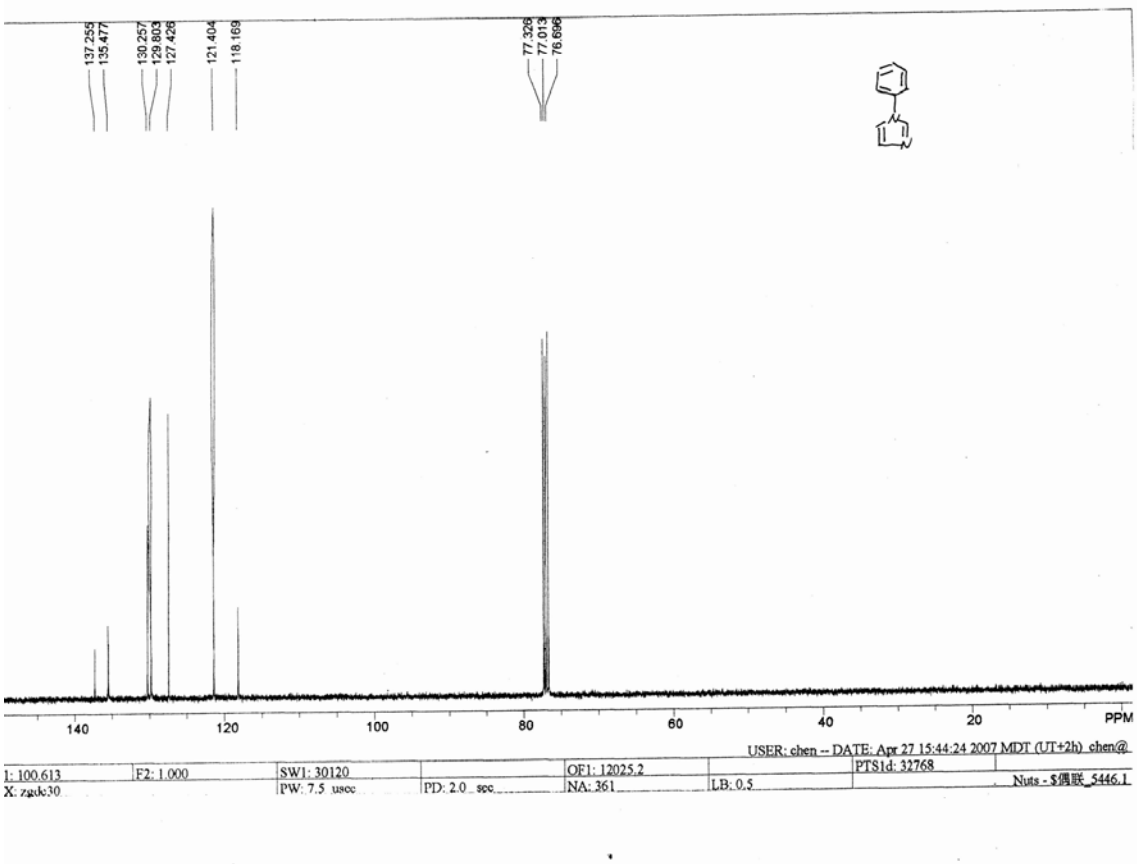
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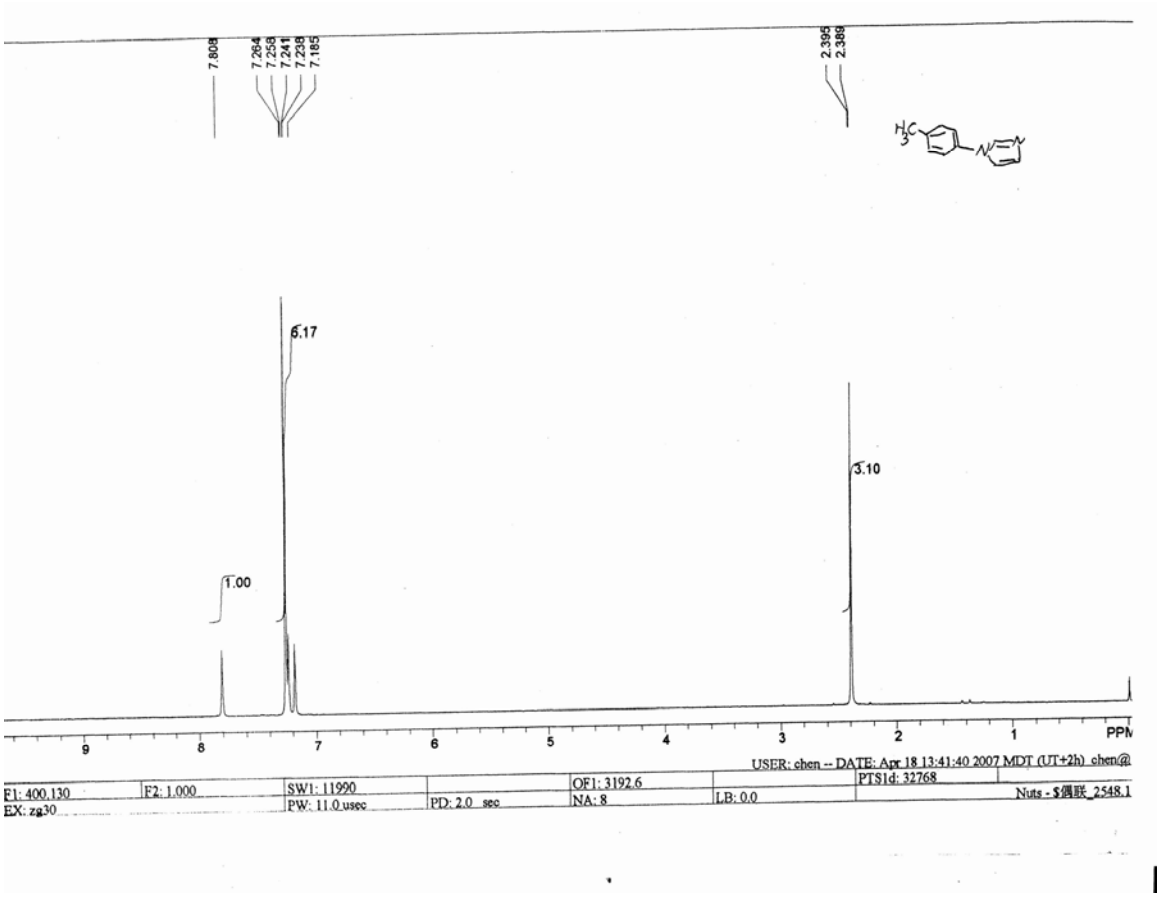
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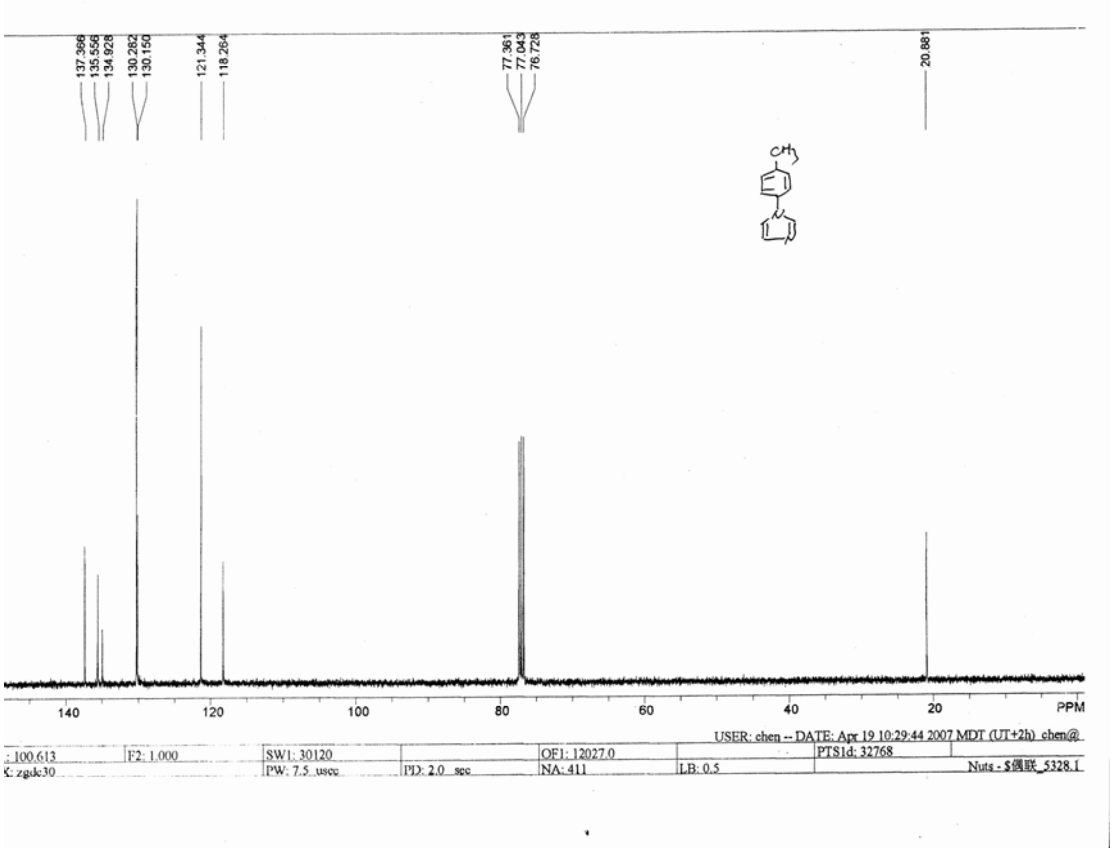
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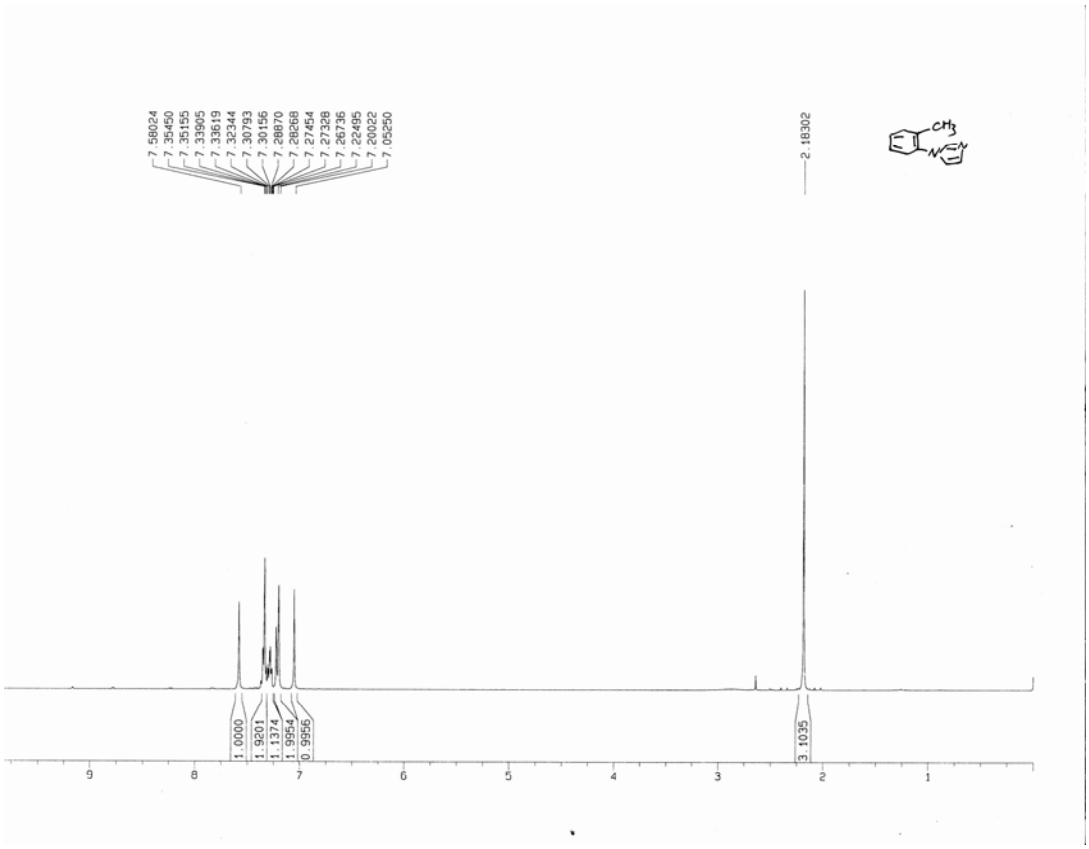
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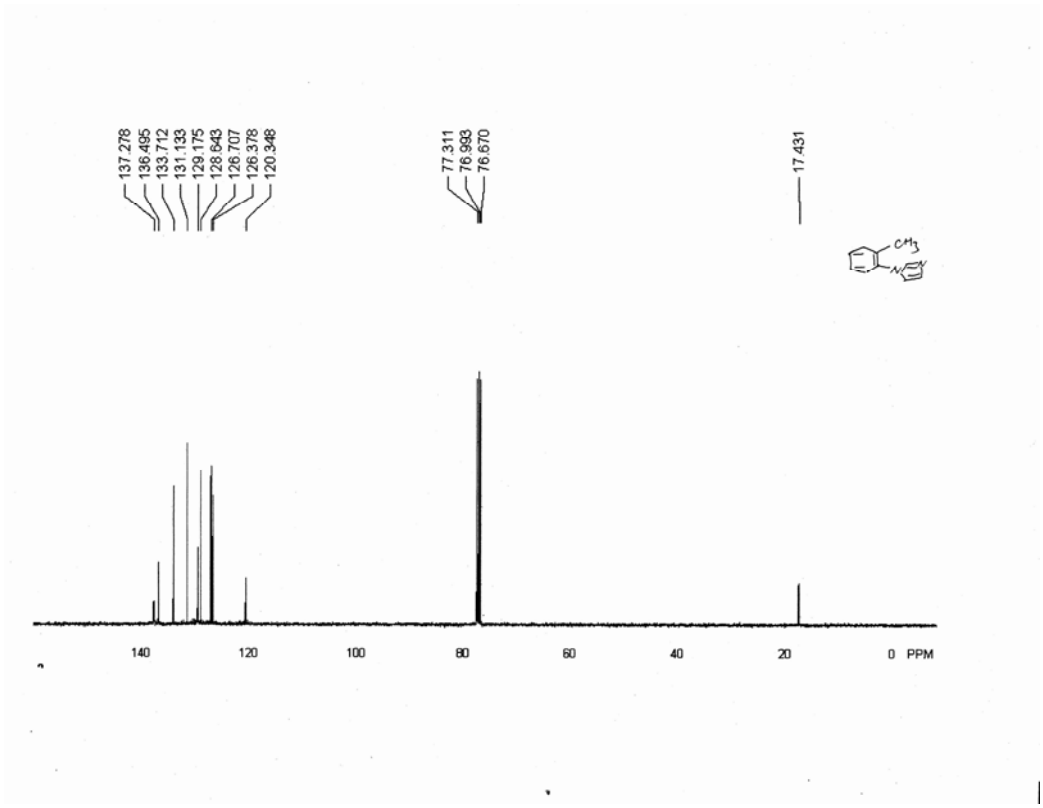
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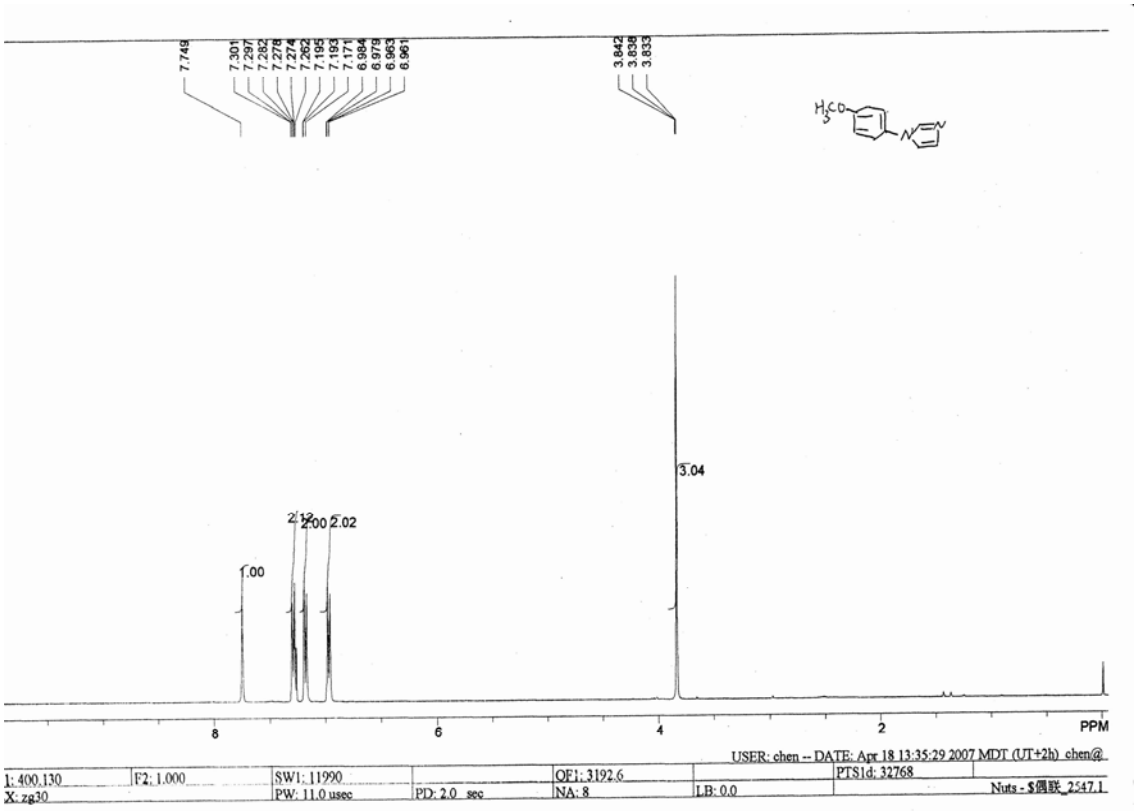
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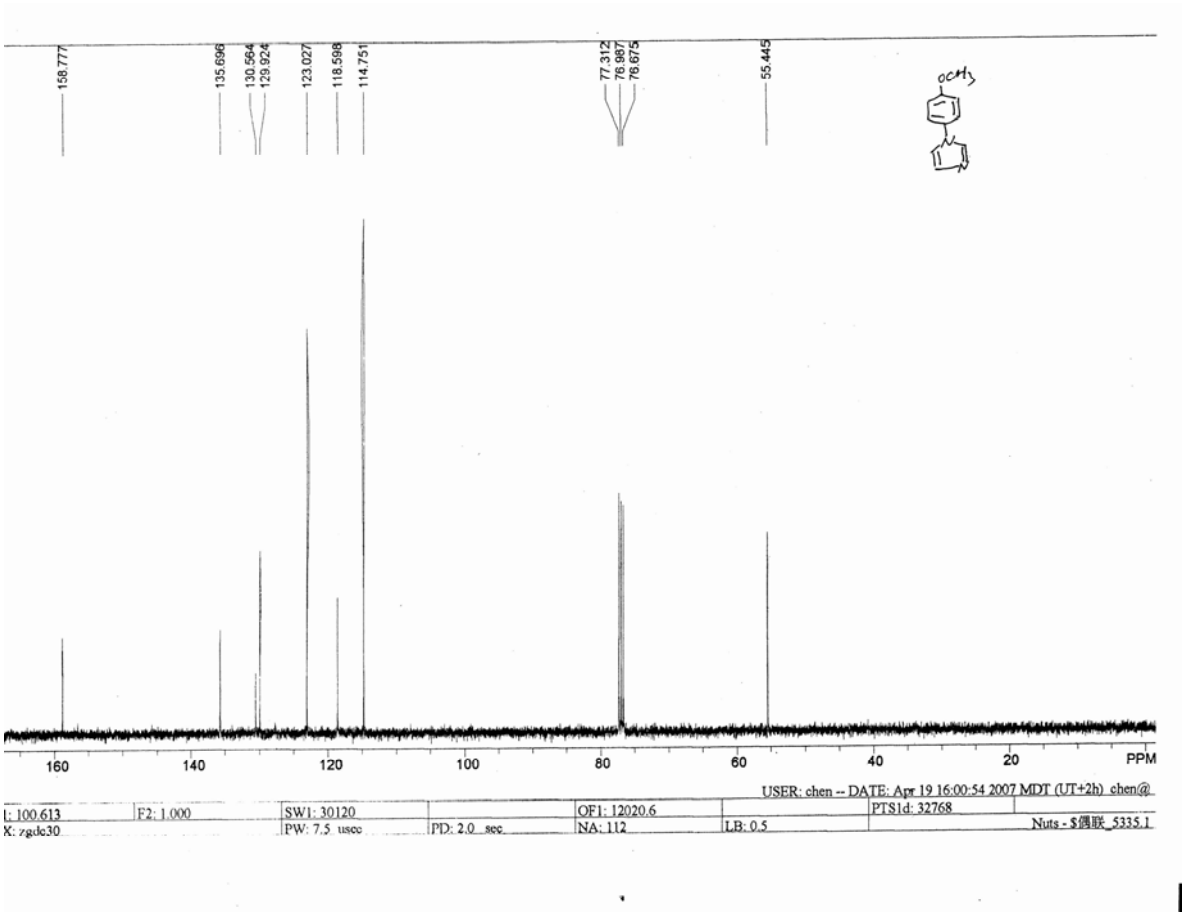
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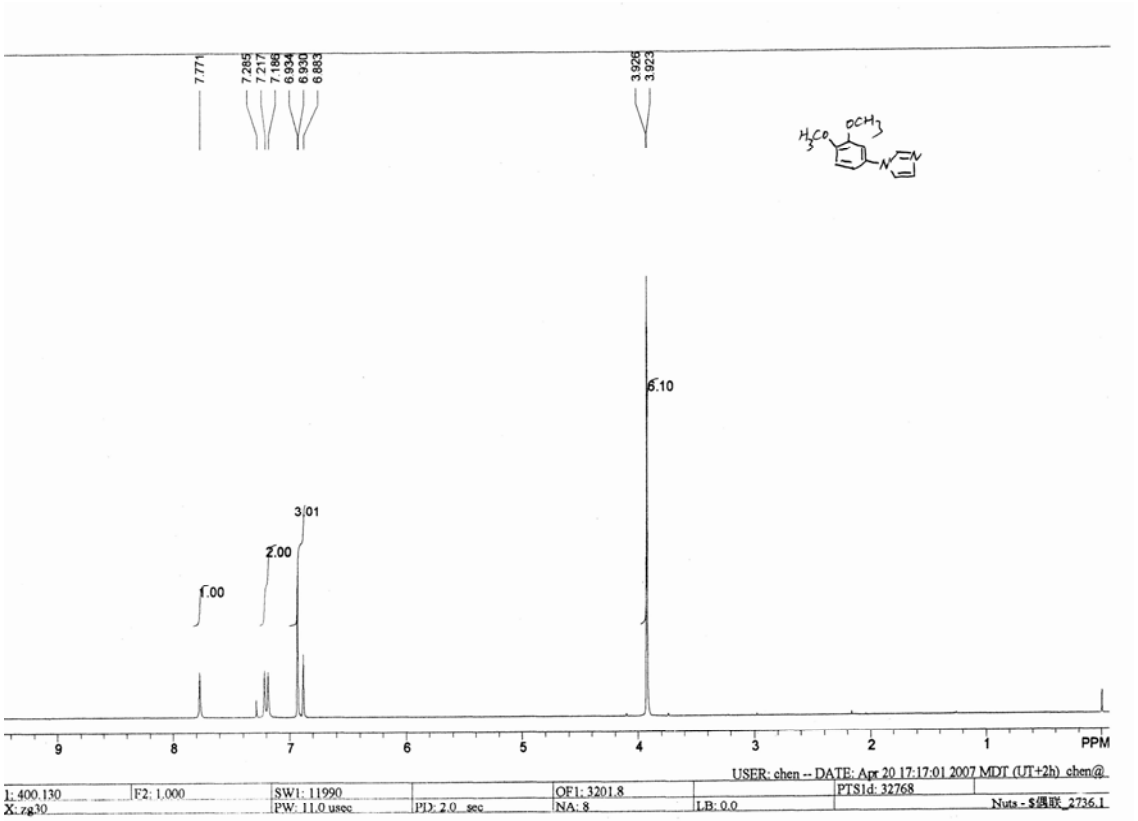
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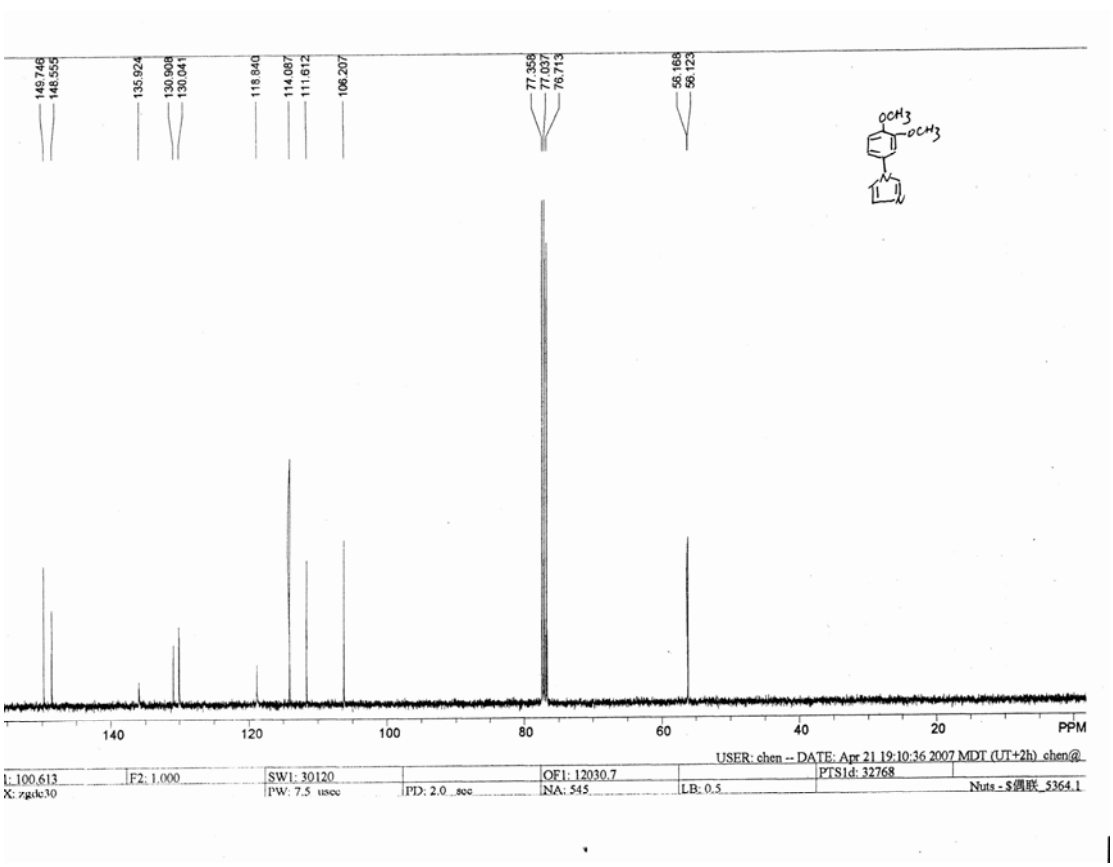
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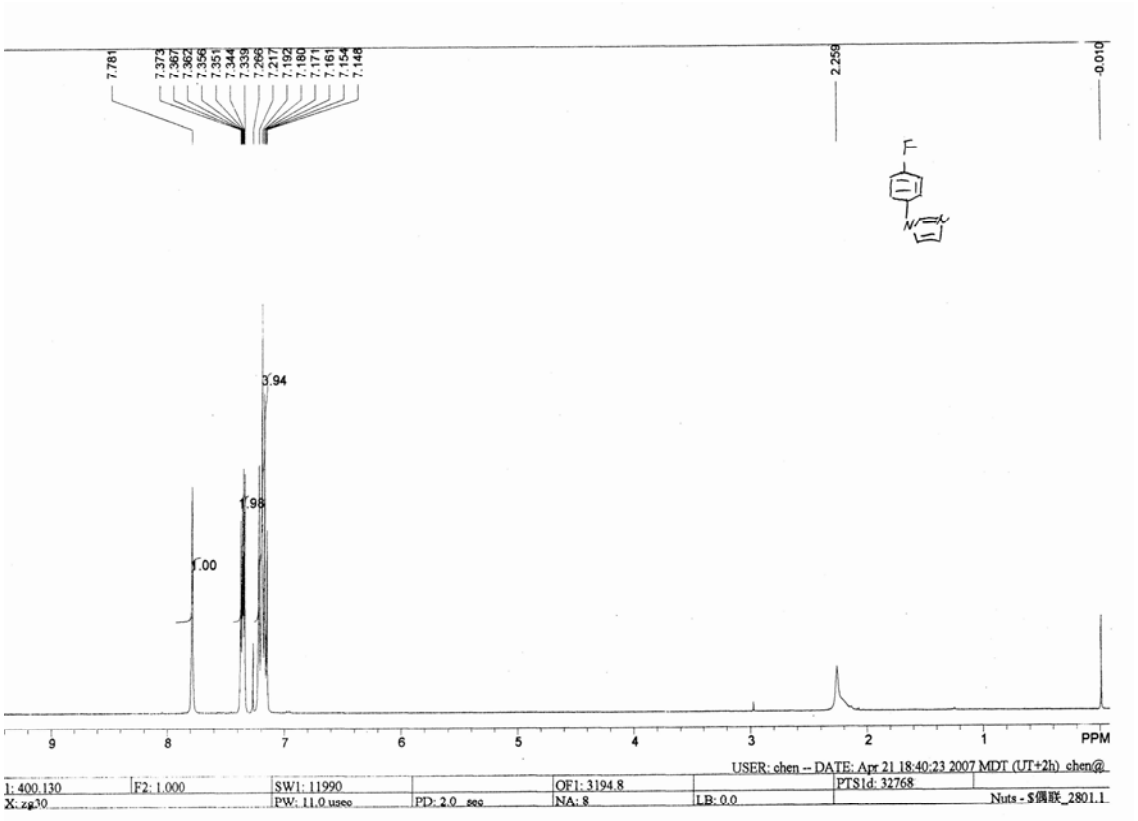
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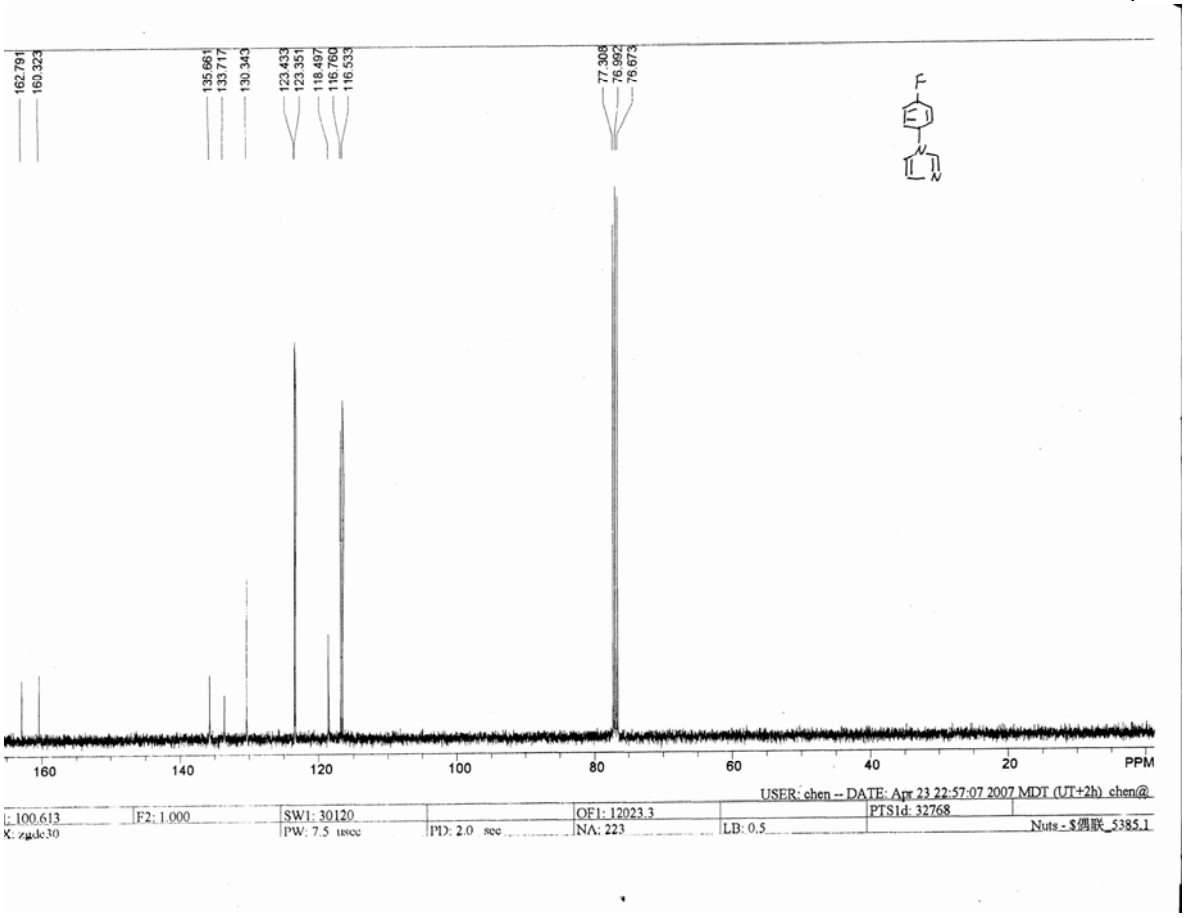
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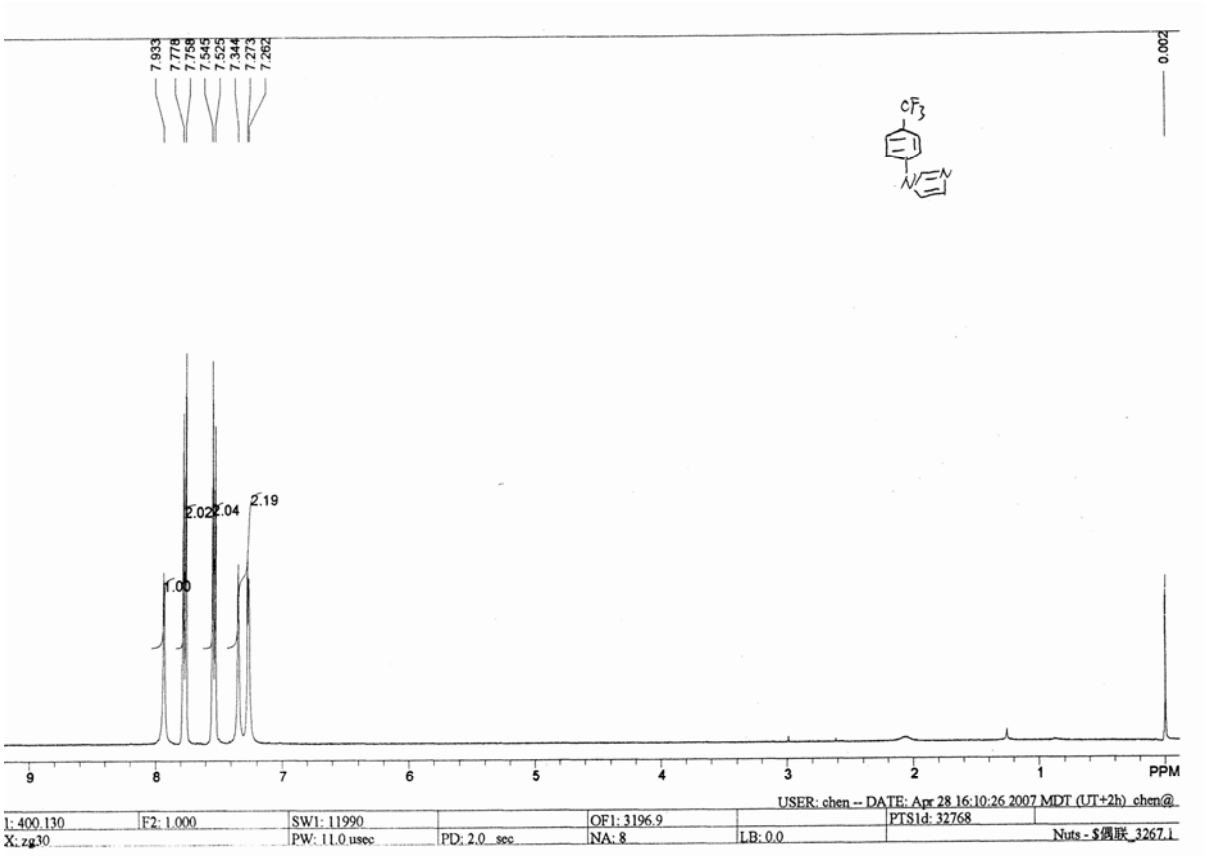
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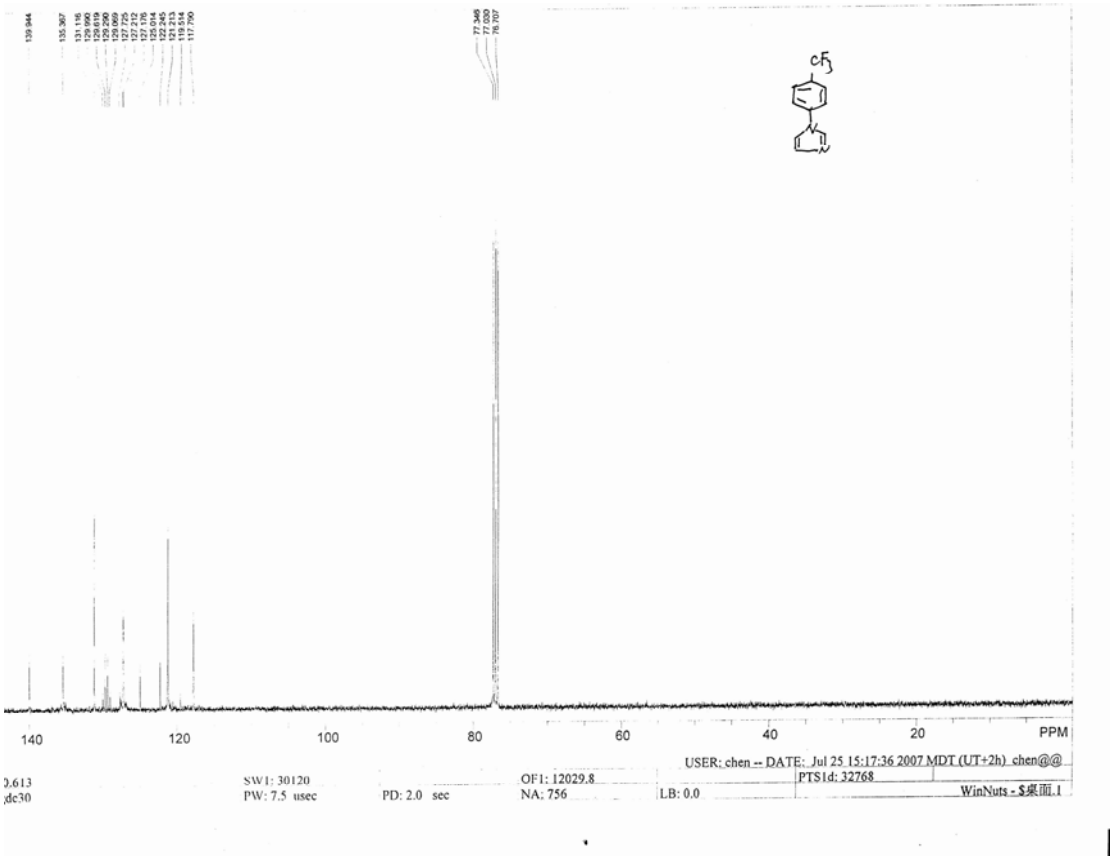
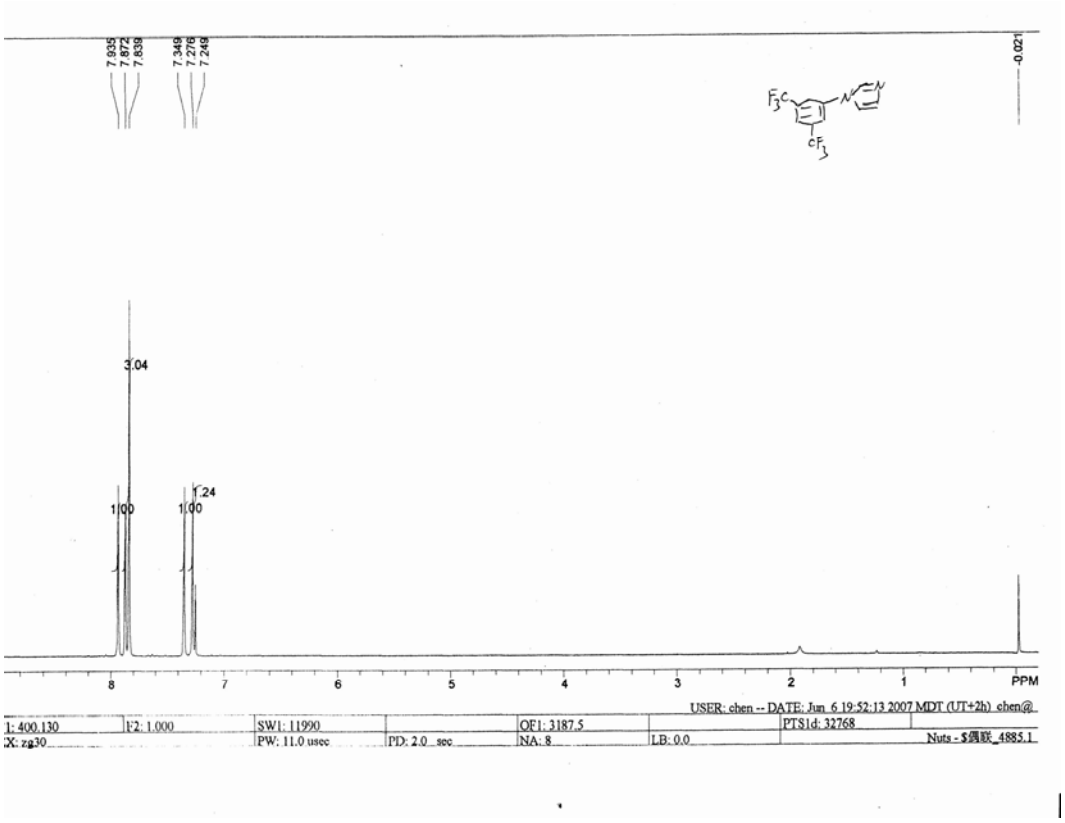
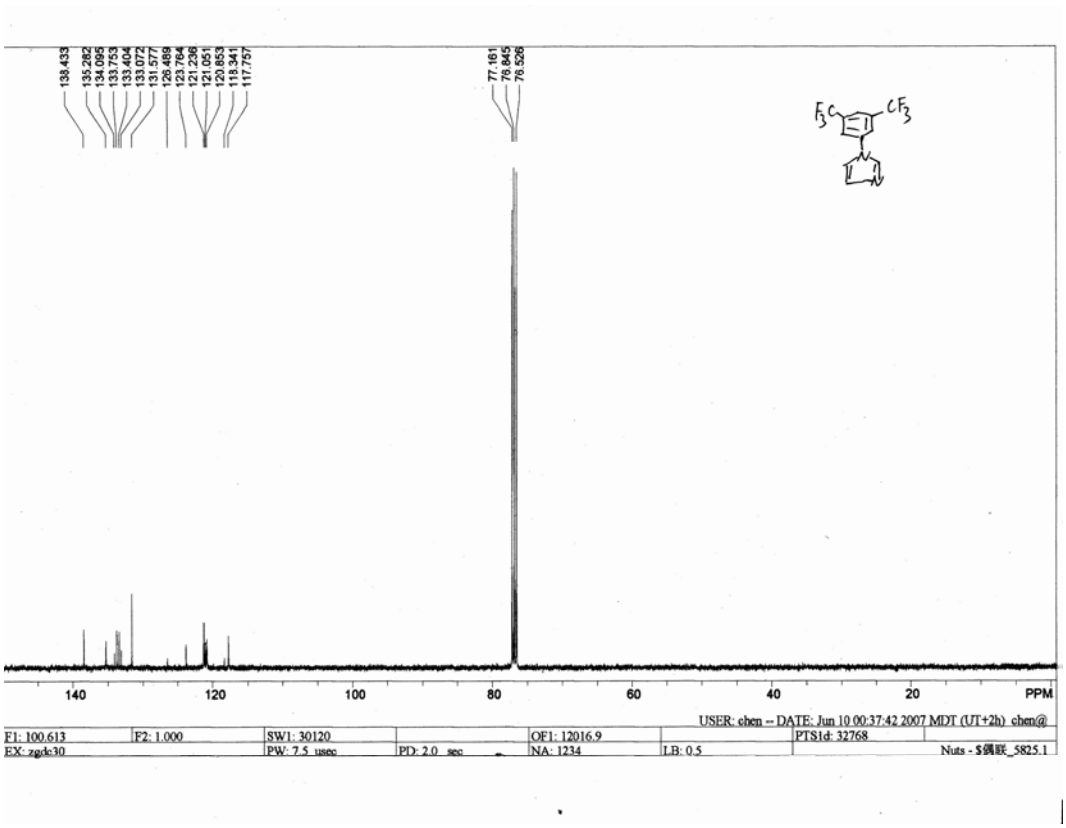
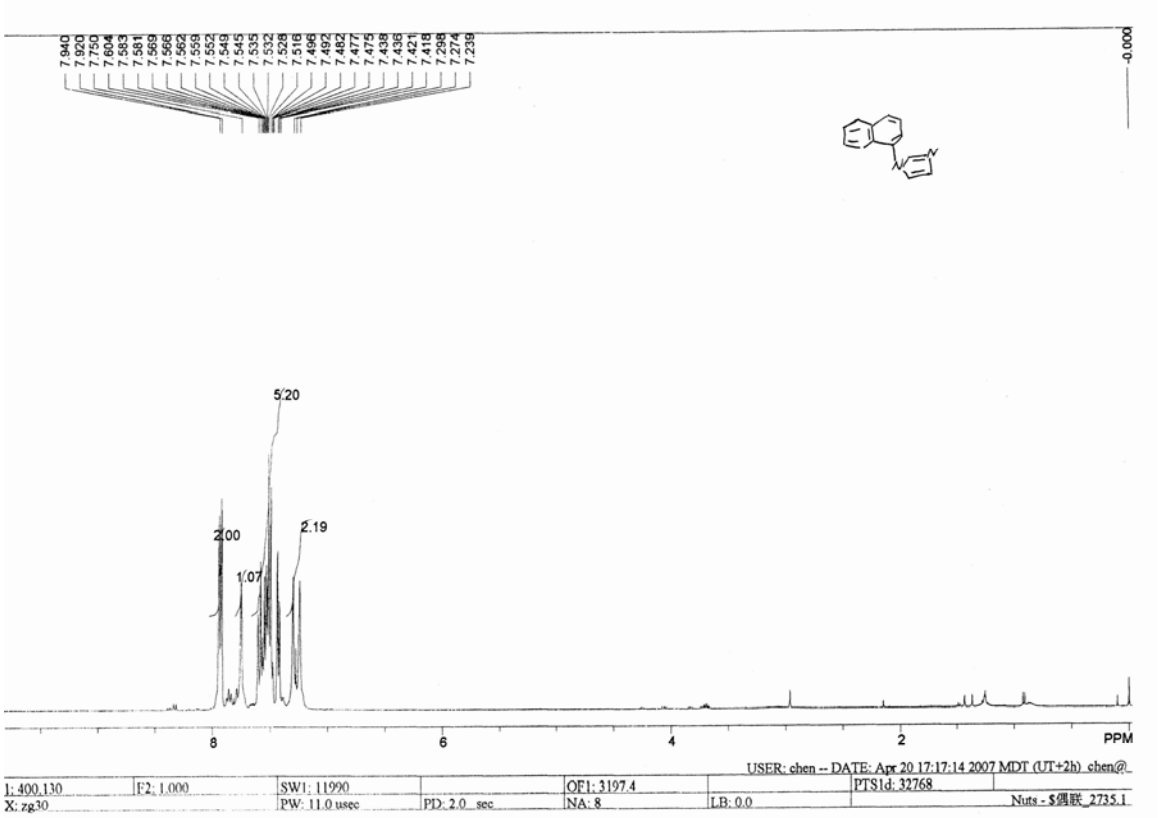
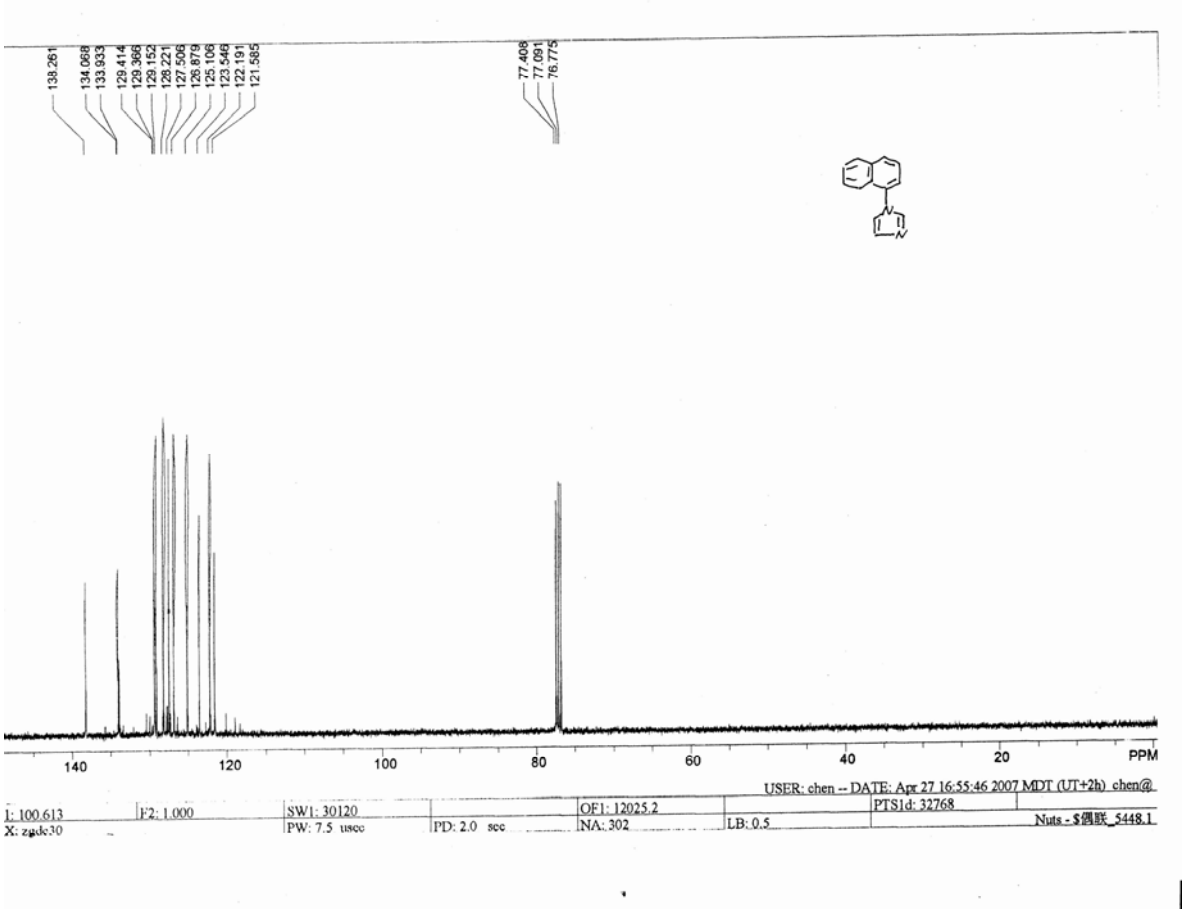
LB: 0.0
Nuts - $偶联_3267.1

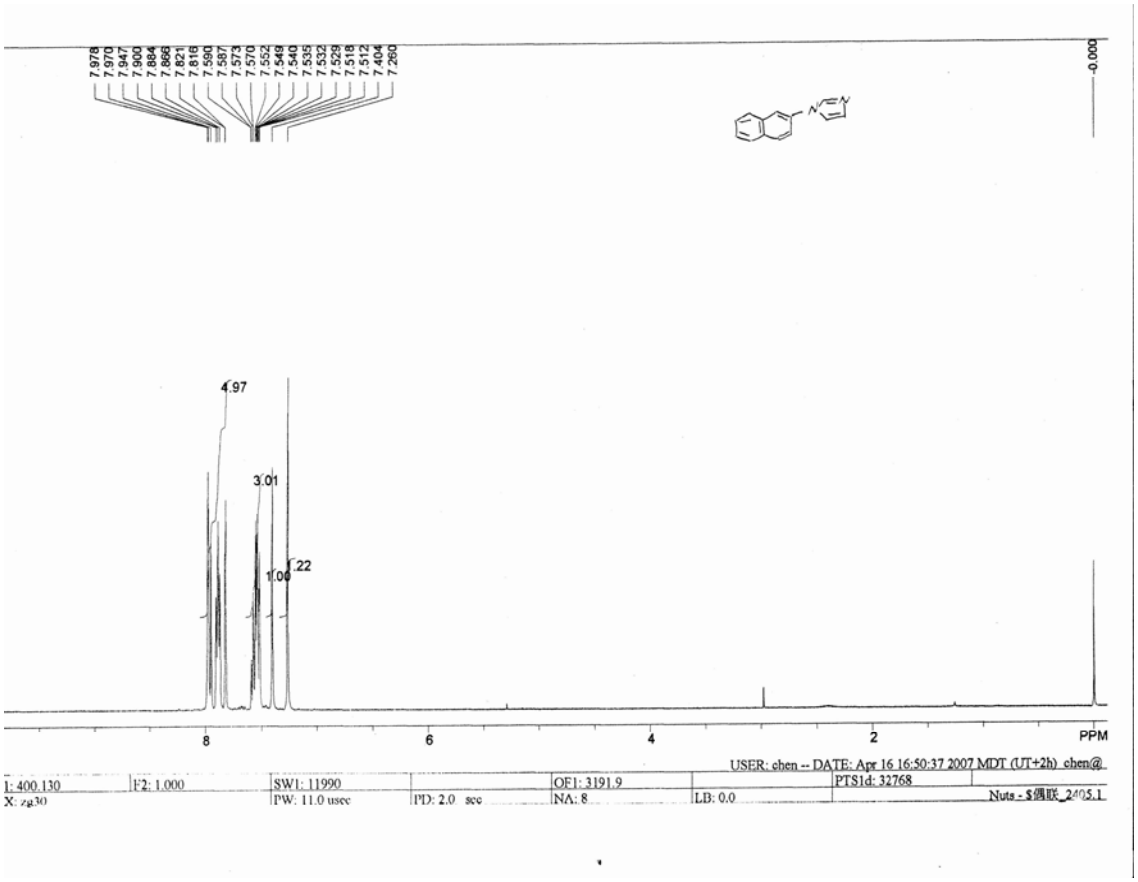

139.944
135.367
131.116
129.290
127.759
127.212
127.076
122.245
121.213
118.554
117.790
77.345
77.030
76.707
CF3
140
120
100
80
60
40
20
PPM
USER: chen -- DATE: Jul 25 15:17:36 2007 MDT (UT+2h) chen@@
PTS1d: 32768
SW1: 30120
OF1: 12029.8
PW: 7.5 usec
PD: 2.0 sec
NA: 756
LB: 0.0
WinNuts - $桌面.1

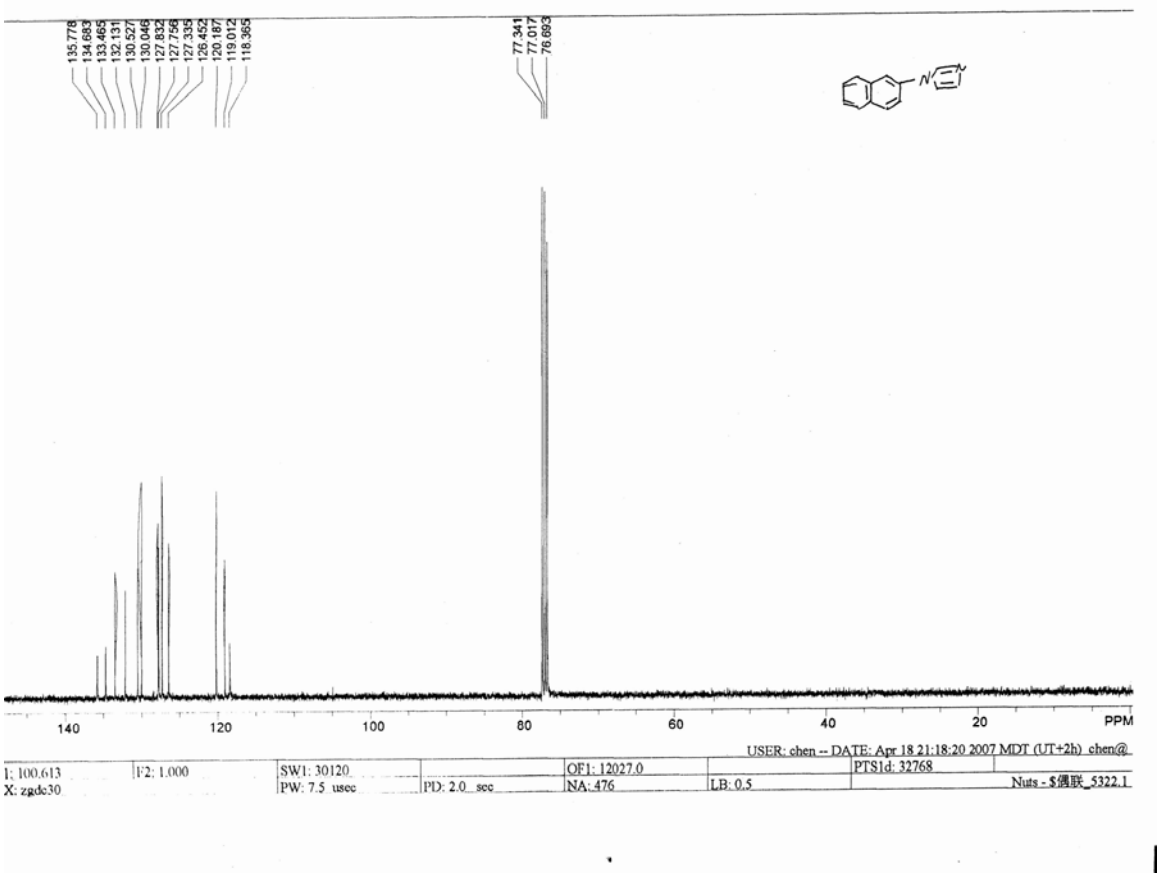

7.935
7.872
7.839
7.349
7.276
7.249
-0.021
3.04
1.00
1.24
1.00
8
7
6
5
4
3
2
1
PPM
USER: chen -- DATE: Jun 6 19:52:13 2007 MDT (UT+2h) chen@
1: 400.130 F2: 1.000 SW1: 11990 OF1: 3187.5 PTS1d: 32768
X: zg30 PW: 11.0 usec PD: 2.0 sec NA: 8 LB: 0.0 Nuts - $偶联_4885.1

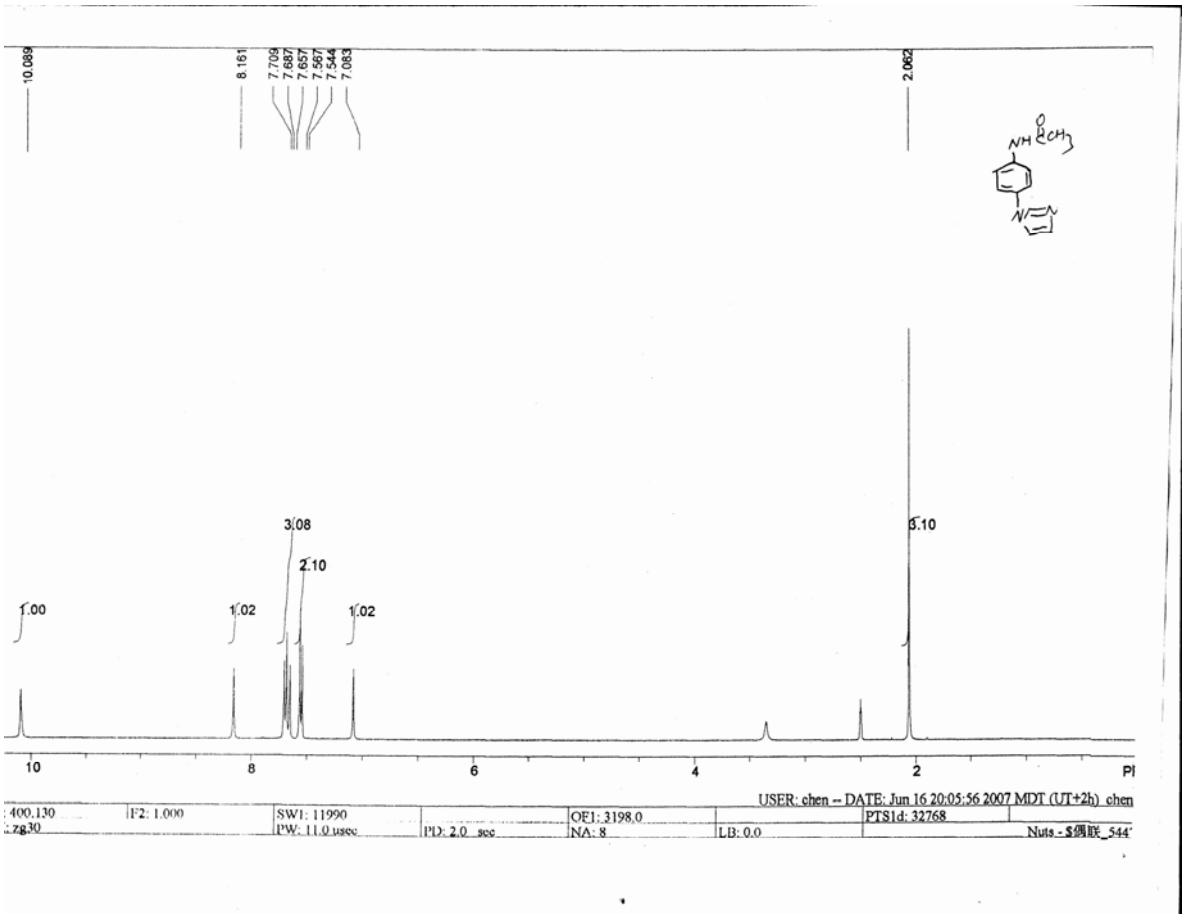

138.433
135.282
134.095
133.753
133.404
133.072
131.577
126.489
123.764
121.236
121.051
120.853
118.341
117.757
77.161
76.845
76.526
140
120
100
80
60
40
20
PPM
USER: chen -- DATE: Jun 10 00:37:42 2007 MDT (UT+2h) chen@
F1: 100.613 F2: 1.000 SW1: 30120 OF1: 12016.9 PTS1d: 32768
EX: zgdc30 PW: 7.5 usec PD: 2.0 sec NA: 1234 LB: 0.5 Nuts - $偶联_5825.1

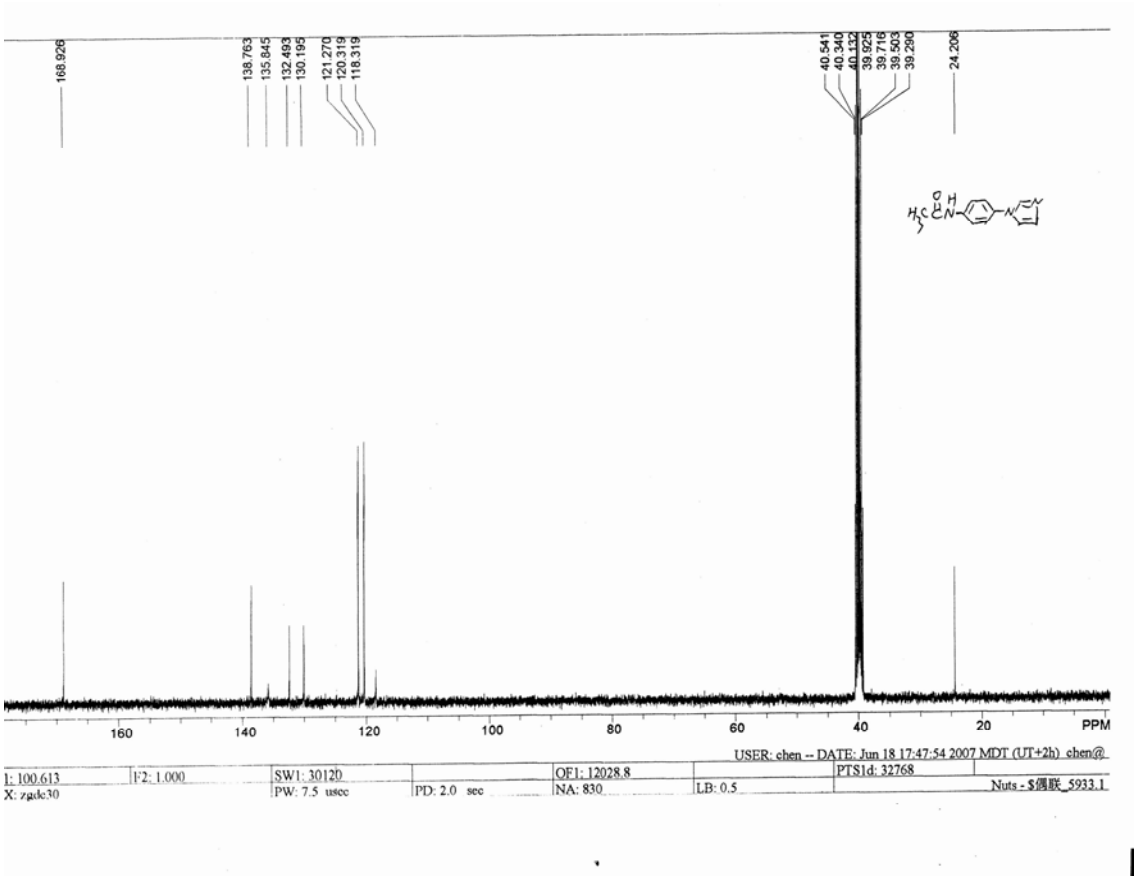

7.940
7.920
7.750
7.604
7.583
7.581
7.569
7.566
7.562
7.559
7.552
7.549
7.545
7.535
7.532
7.528
7.516
7.496
7.492
7.482
7.477
7.475
7.438
7.436
7.421
7.418
7.298
7.274
7.239
0.000
5.20
2.00
2.19
1.07
8
6
4
2
PPM
USER: chen -- DATE: Apr 20 17:17:14 2007 MDT (UT+2h) chen@
1: 400.130 F2: 1.000 SW1: 11990 OF1: 3197.4 PTS1d: 32768
X: zg30 PW: 11.0 usec PD: 2.0 sec NA: 8 LB: 0.0 Nuts - $偶联_2735.1

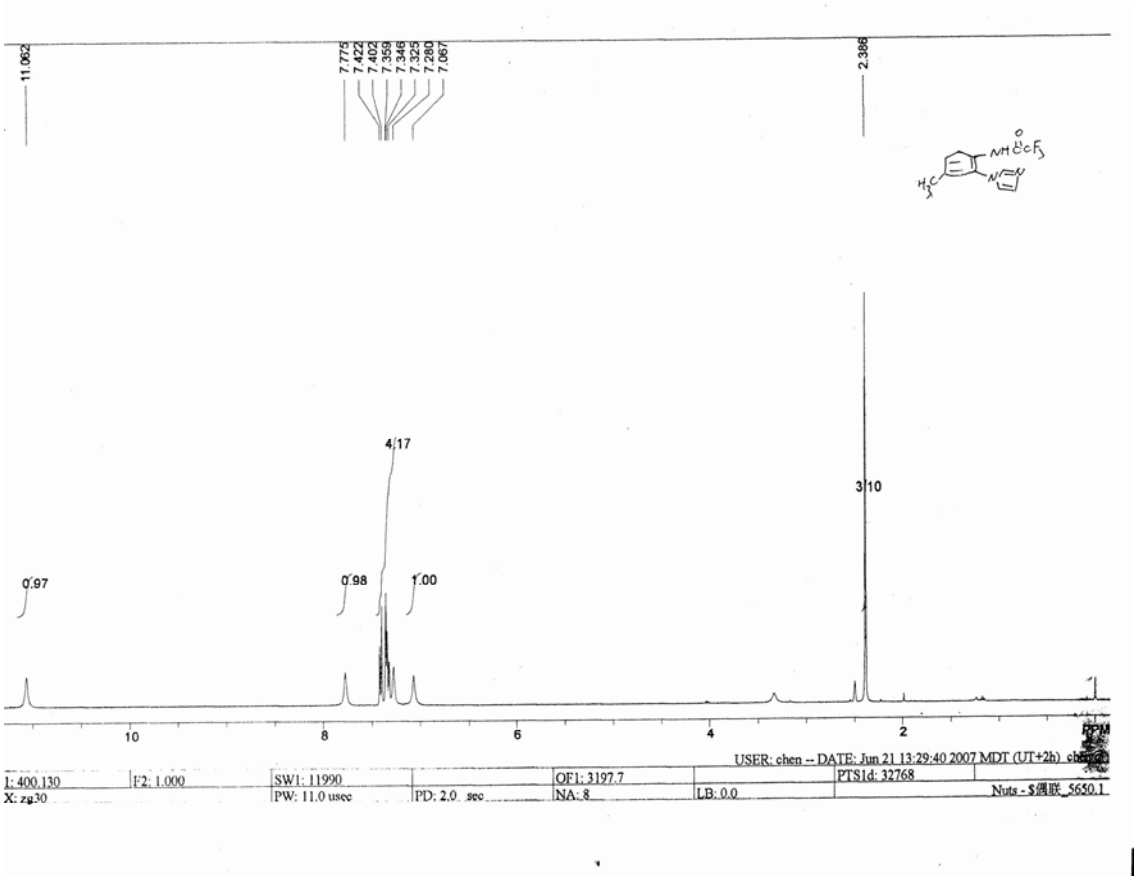

138.261
134.068
133.933
129.414
129.366
129.152
128.221
127.506
126.879
125.106
123.546
122.191
121.585
77.408
77.091
76.775
140
120
100
80
60
40
20
PPM
USER: chen -- DATE: Apr 27 16:55:46 2007 MDT (UT+2h) chen@
1: 100.613 F2: 1.000 SW1: 30120 OF1: 12025.2 PTS1d: 32768
X: zgdc30 PW: 7.5 usec PD: 2.0 sec NA: 302 LB: 0.5 Nuts - $偶联_5448.1

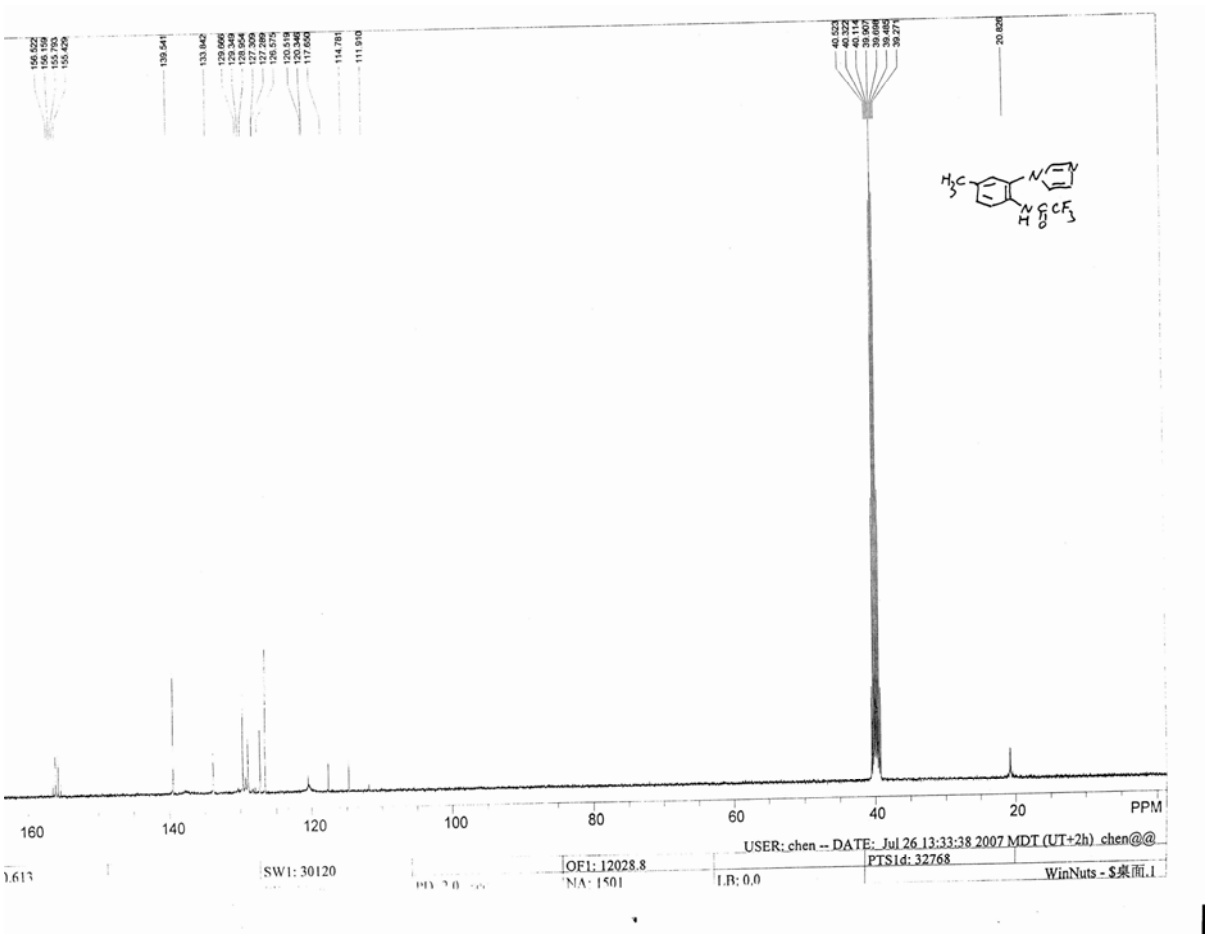

7.978
7.970
7.947
7.900
7.884
7.866
7.821
7.816
7.590
7.587
7.573
7.570
7.552
7.549
7.540
7.535
7.532
7.529
7.518
7.512
7.404
7.260
0.000
4.97
3.01
1.00
2.22
8
6
4
2
PPM
USER: chen -- DATE: Apr 16 16:50:37 2007 MDT (UT+2h) chen@
1: 400.130
X: zg30
F2: 1.000
SW1: 11990
PW: 11.0 usec
PD: 2.0 sec
OF1: 3191.9
NA: 8
LB: 0.0
PTS1d: 32768
Nuts - $偶联_2405.1

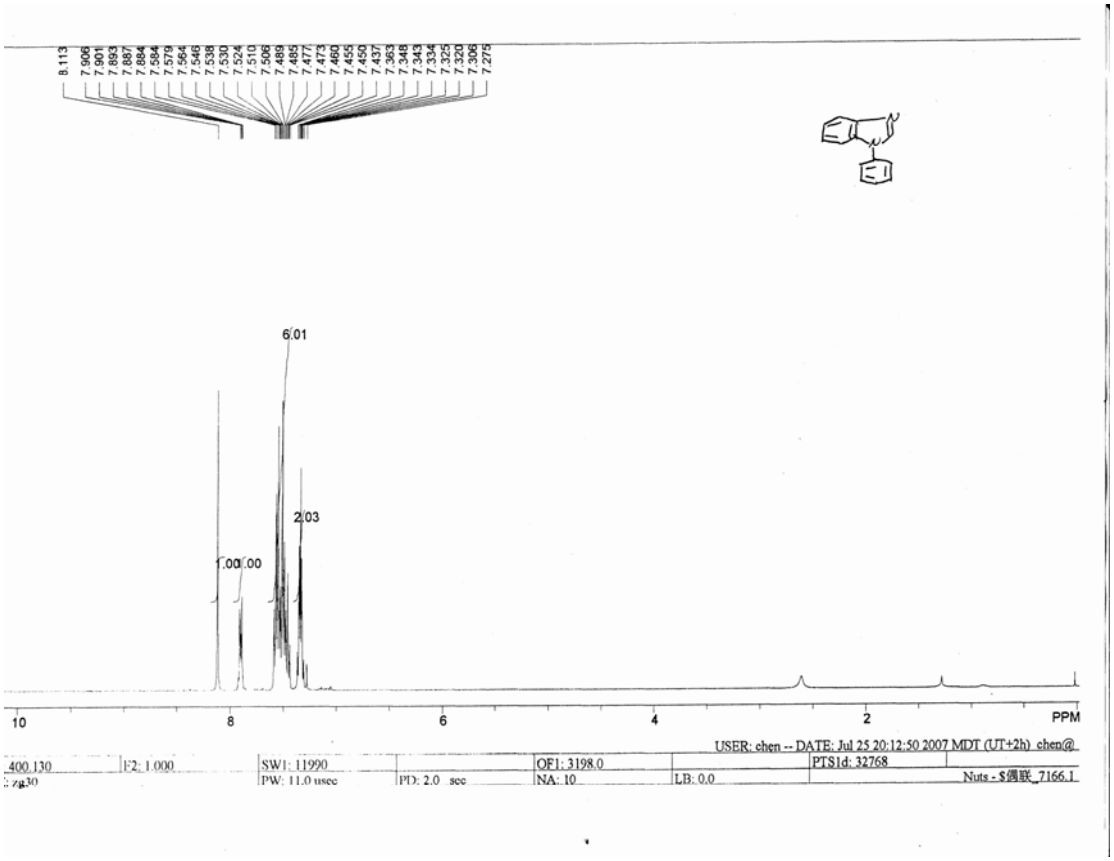

135.778
134.683
133.465
132.131
130.527
130.046
127.832
127.756
127.335
126.452
120.187
119.012
118.365
77.341
77.017
76.693
140
120
100
80
60
40
20
PPM
USER: chen -- DATE: Apr 18 21:18:20 2007 MDT (UT+2h) chen@
1: 100.613
X: zgdc30
F2: 1.000
SW1: 30120
PW: 7.5 usec
PD: 2.0 sec
OF1: 12027.0
NA: 476
LB: 0.5
PTS1d: 32768
Nuts - $偶联_5322.1

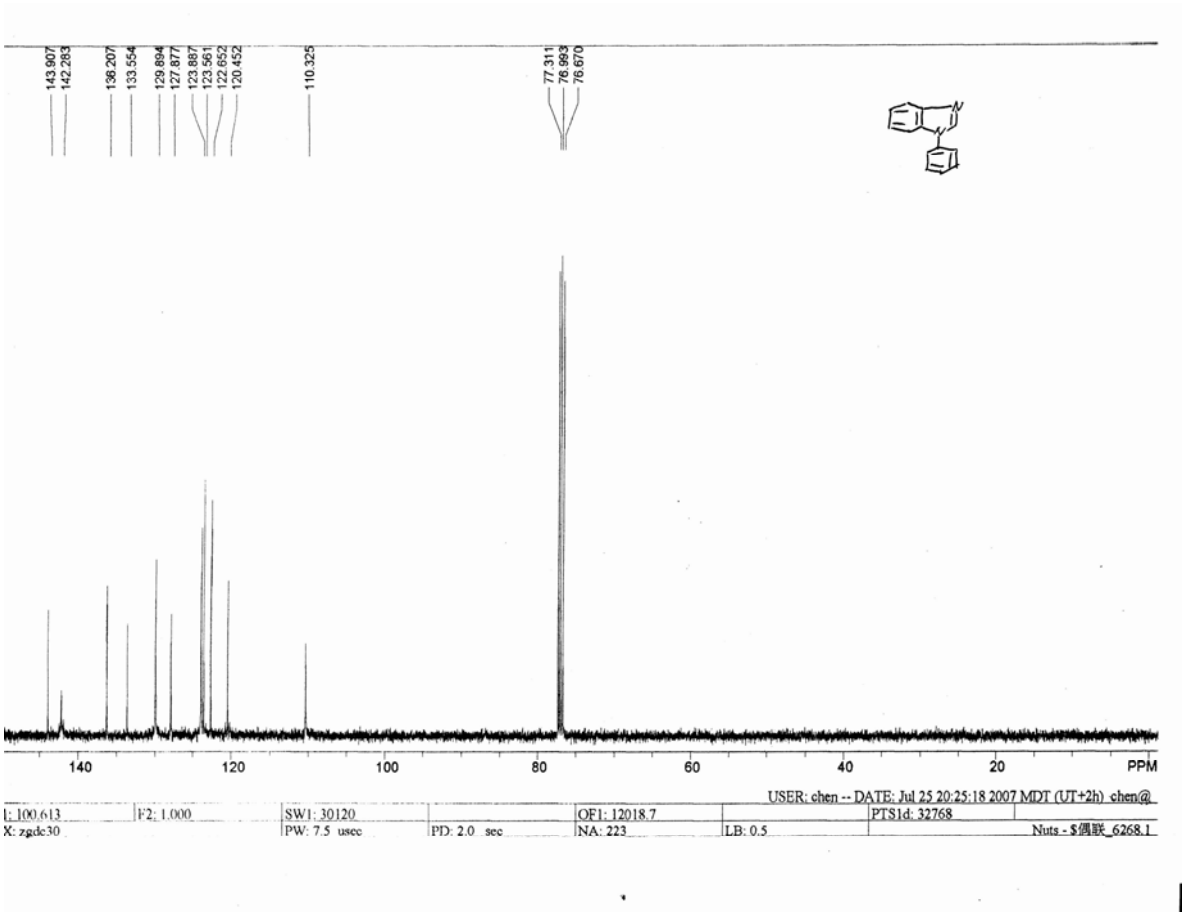

10.089
8.161
7.709
7.687
7.657
7.567
7.544
7.083
2.062
3.08
2.10
1.00
1.02
1.02
6.10
10
8
6
4
2
USER: chen -- DATE: Jun 16 20:05:56 2007 MDT (UT+2h) chen
400.130
F2: 1.000
SW1: 11990
OF1: 3198.0
PTS1d: 32768
zg30
PW: 11.0 usec
PD: 2.0 sec
NA: 8
LB: 0.0
Nuts - $偶联_544

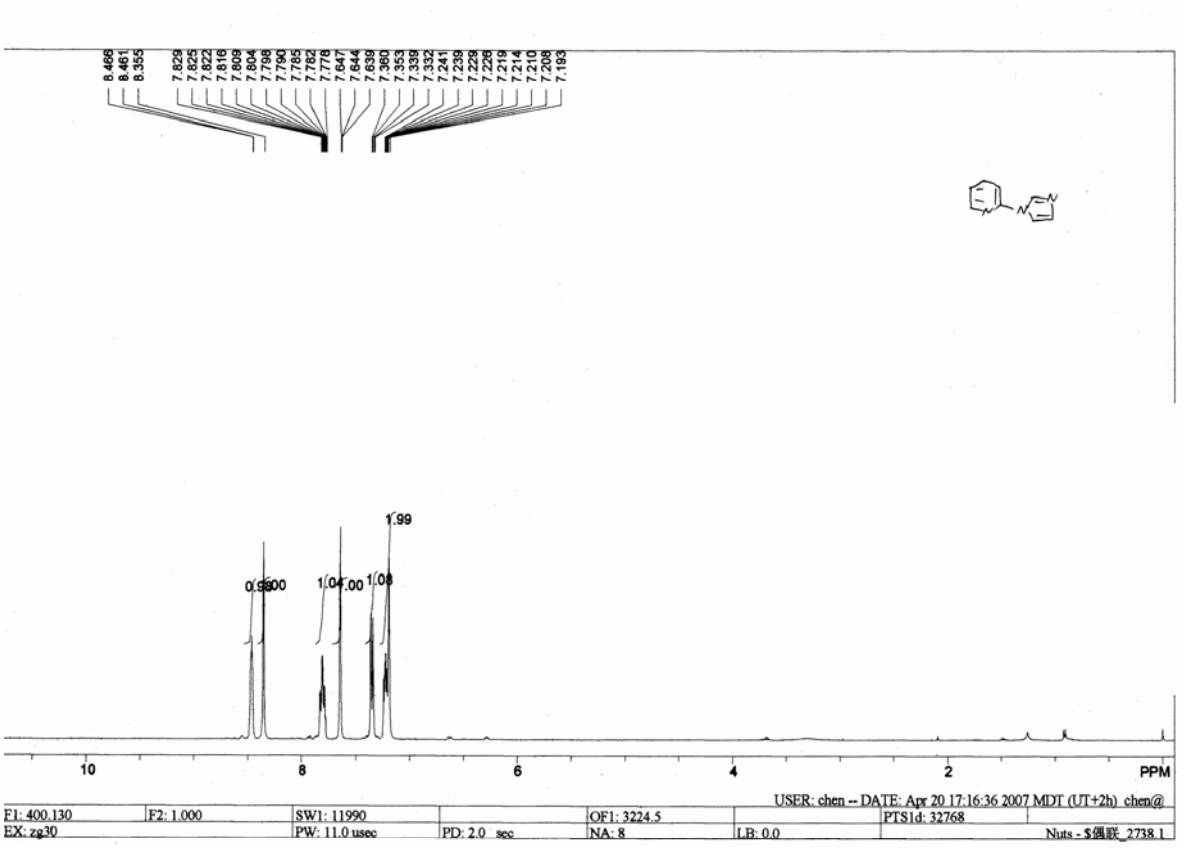

168.926
138.763
135.845
132.493
130.195
121.270
120.319
118.319
40.541
40.340
40.132
39.925
39.716
39.503
39.290
24.206
160
140
120
100
80
60
40
20
PPM
USER: chen -- DATE: Jun 18 17:47:54 2007 MDT (UT+2h) chen@
100.613
F2: 1.000
SW1: 30120
OF1: 12028.8
PTS1d: 32768
X: zgdc30
PW: 7.5 usec
PD: 2.0 sec
NA: 830
LB: 0.5
Nuts - $偶联_5933.1

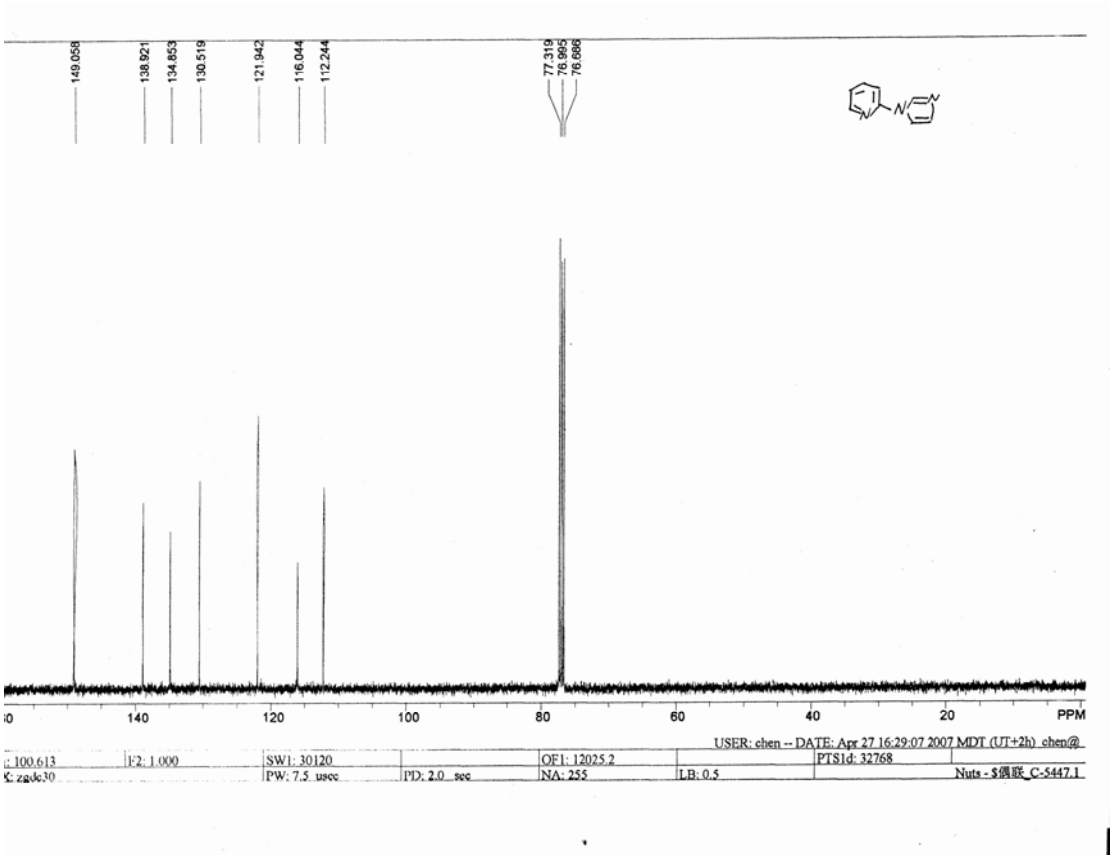

11.062
7.775
7.422
7.402
7.359
7.346
7.325
7.280
7.067
2.386
4.17
3.10
0.97
0.98
1.00
10
8
6
4
2
PPM
USER: chen -- DATE: Jun 21 13:29:40 2007 MDT (UT+2h)
1: 400.130
F2: 1.000
SW1: 11990
OF1: 3197.7
PTS1d: 32768
X: zg30
PW: 11.0 usec
PD: 2.0 sec
NA: 8
LB: 0.0
Nuts - $偶联_5650.1

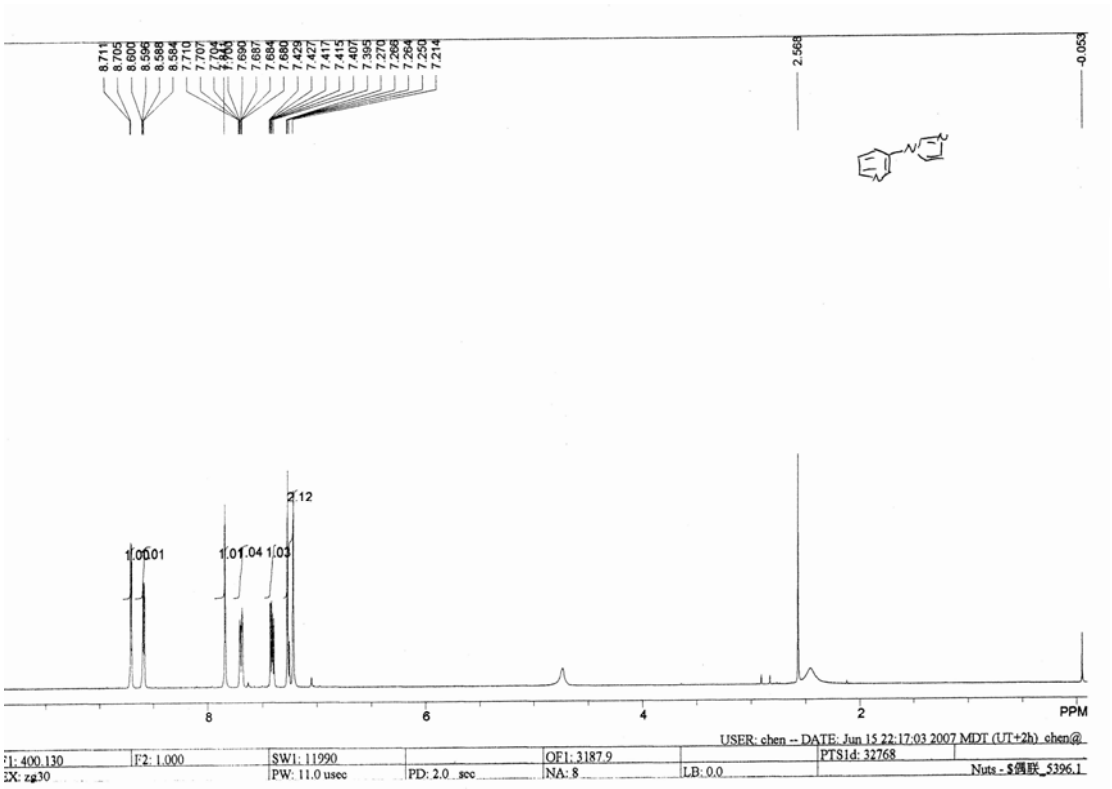

156.522
155.159
155.793
155.429
139.541
133.942
129.666
129.349
128.954
127.739
127.289
126.575
120.519
117.568
114.781
111.910
40.523
40.322
40.114
39.907
39.698
39.489
39.281
20.826
160
140
120
100
80
60
40
20
PPM
USER: chen -- DATE: Jul 26 13:33:38 2007 MDT (UT+2h) chen@@
PTS1d: 32768
SW1: 30120
OF1: 12028.8
NA: 1501
LB: 0.0
WinNuts - $桌面.1

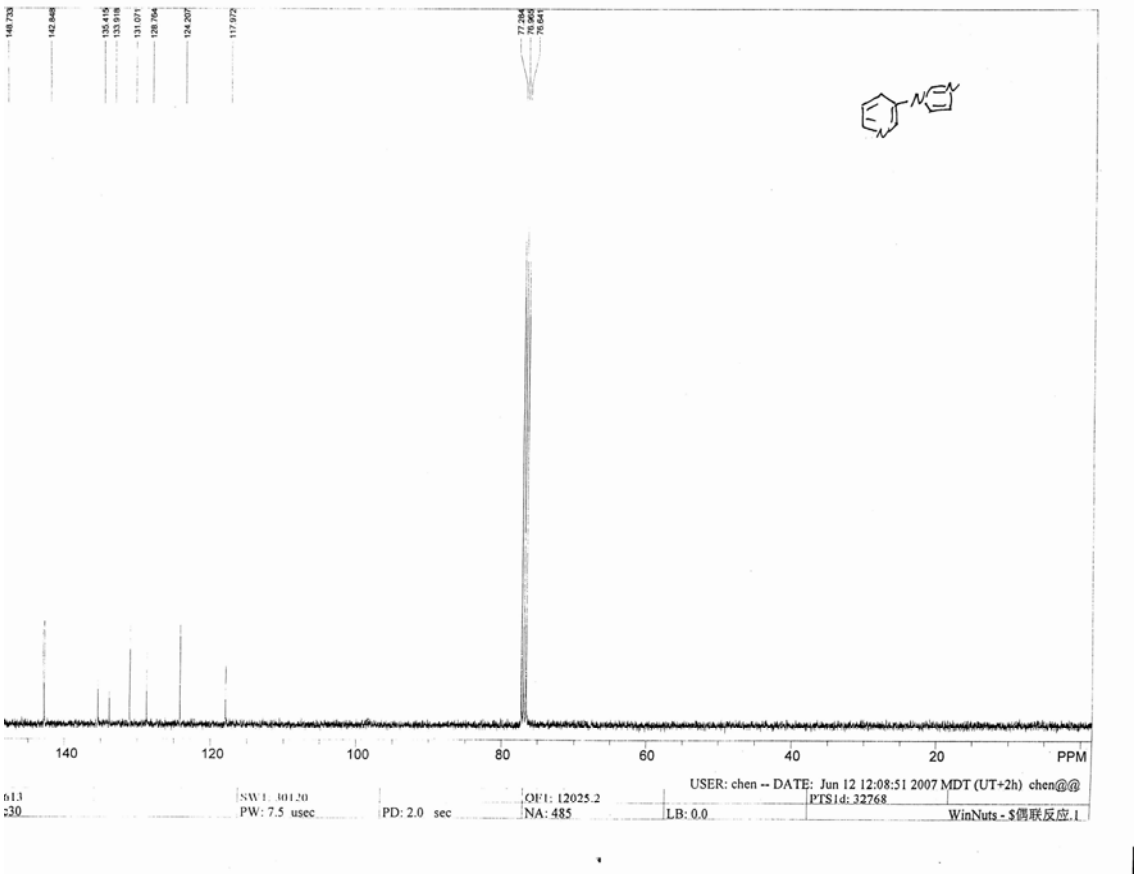

8.113
7.906
7.901
7.893
7.887
7.884
7.584
7.579
7.564
7.546
7.538
7.530
7.524
7.510
7.506
7.489
7.485
7.477
7.473
7.460
7.455
7.450
7.437
7.363
7.348
7.343
7.334
7.325
7.320
7.306
7.275
6.01
2.03
1.00
1.00
10
8
6
4
2
PPM
USER: chen -- DATE: Jul 25 20:12:50 2007 MDT (UT+2h) chen@
400.130
F2: 1.000
SW1: 11990
OF1: 3198.0
PTS1d: 32768
: zg30
PW: 11.0 usec
PD: 2.0 sec
NA: 10
LB: 0.0
Nuts - $偶联_7166.1

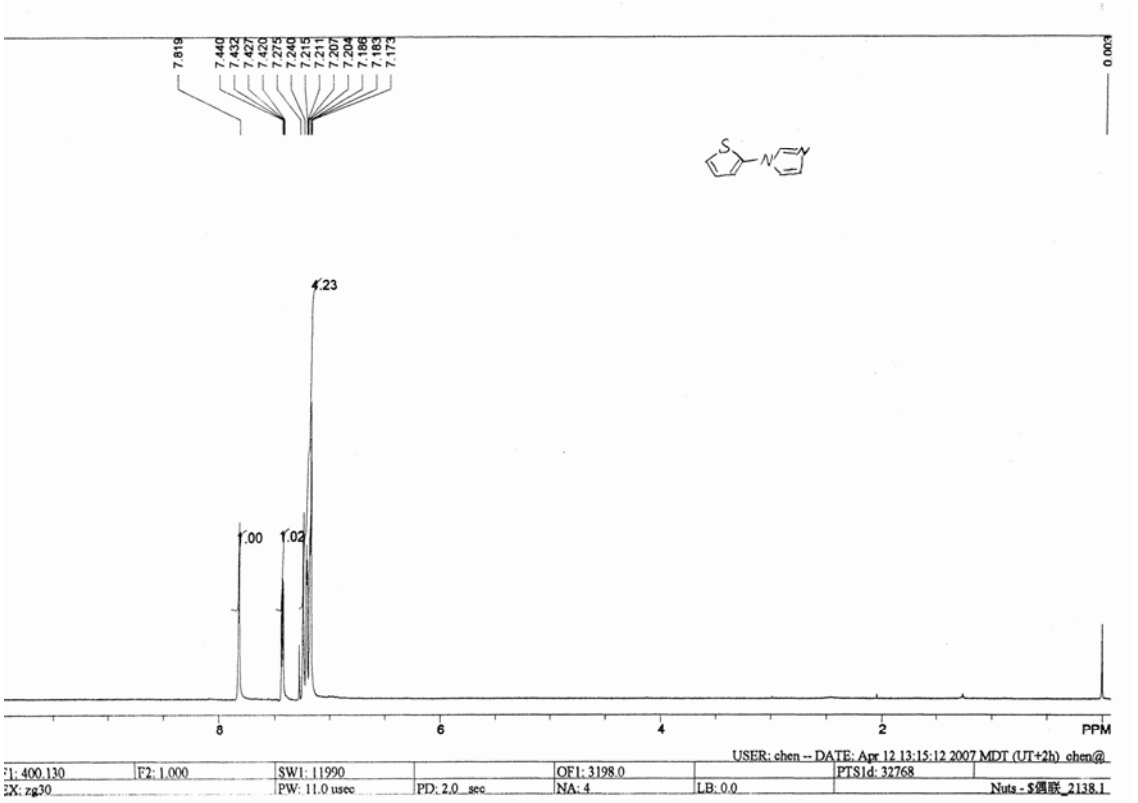

143.907
142.283
136.207
133.554
129.894
127.877
123.887
123.561
122.652
120.452
110.325
77.311
76.993
76.670
140
120
100
80
60
40
20
PPM
USER: chen -- DATE: Jul 25 20:25:18 2007 MDT (UT+2h) chen@
1: 100.613
F2: 1.000
SW1: 30120
OF1: 12018.7
PTS1d: 32768
X: zgdc30
PW: 7.5 usec
PD: 2.0 sec
NA: 223
LB: 0.5
Nuts - $偶联_6268.1

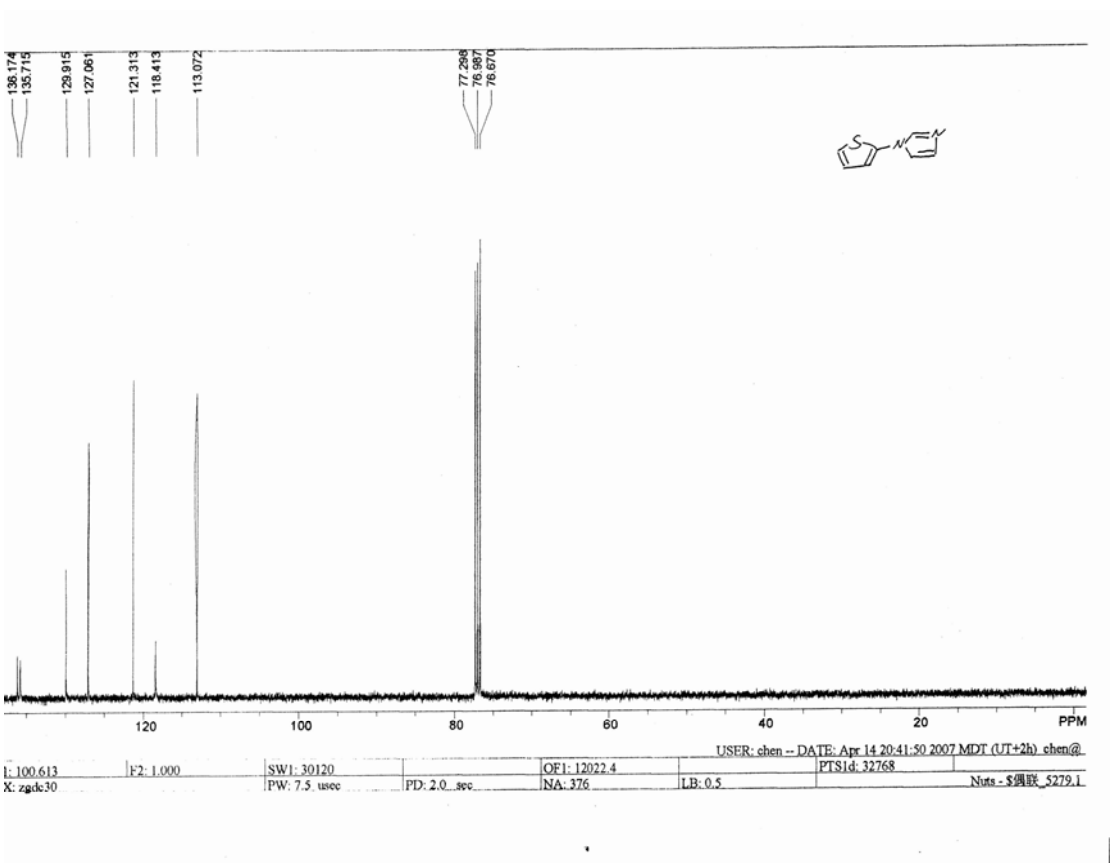

8.466
8.461
8.355
7.829
7.825
7.822
7.816
7.809
7.804
7.798
7.790
7.785
7.782
7.778
7.647
7.644
7.639
7.360
7.353
7.339
7.332
7.241
7.239
7.229
7.226
7.219
7.214
7.210
7.208
7.193
1.99
0.98
1.04
1.00
1.08
10
8
6
4
2
PPM
USER: chen -- DATE: Apr 20 17:16:36 2007 MDT (UT+2h) chen@
F1: 400.130
F2: 1.000
SW1: 11990
OF1: 3224.5
PTS1d: 32768
EX: zg30
PW: 11.0 usec
PD: 2.0 sec
NA: 8
LB: 0.0
Nuts - $偶联_2738.1

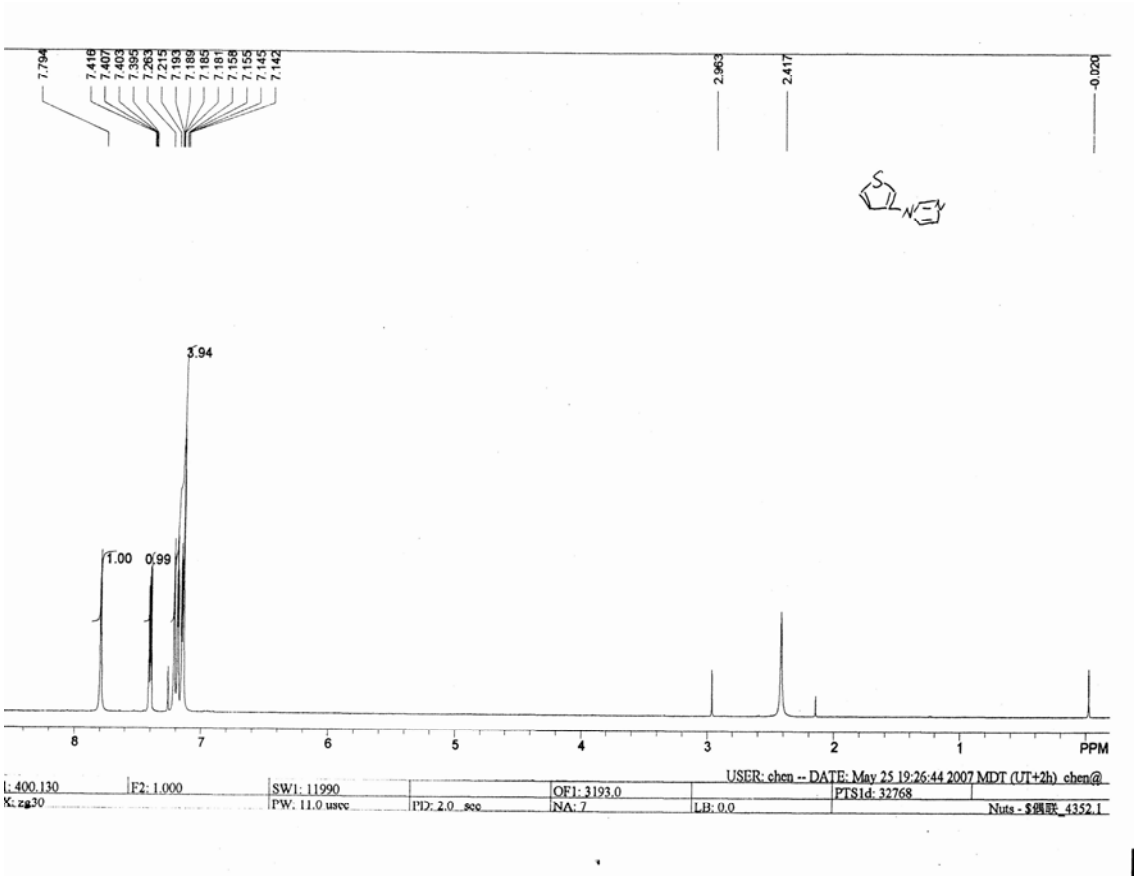

149.058
138.921
134.853
130.519
121.942
116.044
112.244
77.319
76.995
76.686
140
120
100
80
60
40
20
PPM
USER: chen -- DATE: Apr 27 16:29:07 2007 MDT (UT+2h) chen@
F2: 1.000
SW1: 30120
OF1: 12025.2
PTS1d: 32768
PW: 7.5 usec
PD: 2.0 sec
NA: 255
LB: 0.5
Nuts - $偶联_C-5447.1

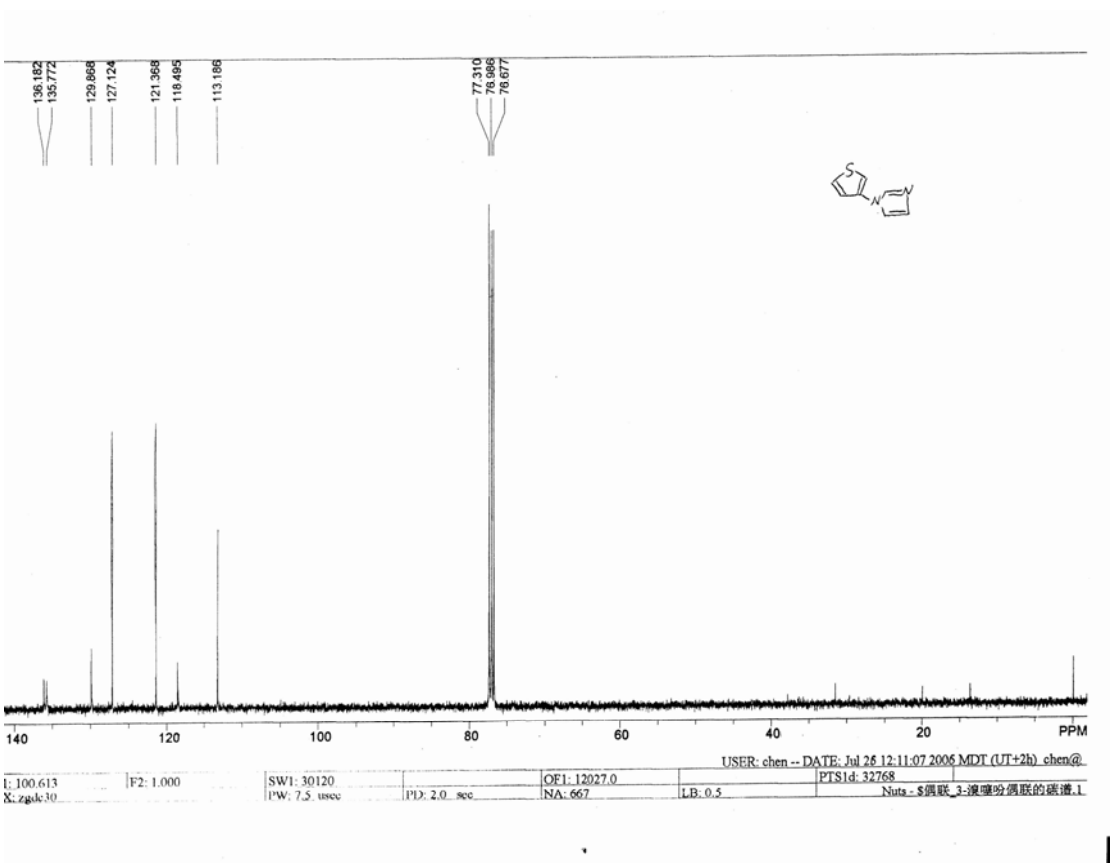

8.711
8.705
8.600
8.596
8.588
8.584
7.710
7.707
7.690
7.687
7.684
7.680
7.429
7.427
7.417
7.415
7.407
7.395
7.270
7.268
7.264
7.259
7.214
2.568
-0.053
1.0001
1.01
1.04
1.03
2.12
8
6
4
2
PPM
USER: chen -- DATE: Jun 15 22:17:03 2007 MDT (UT+2h) chen@
F1: 400.130
F2: 1.000
SW1: 11990
OF1: 3187.9
PTS1d: 32768
EX: zg30
PW: 11.0 usec
PD: 2.0 sec
NA: 8
LB: 0.0
Nuts - $偶联_5396.1

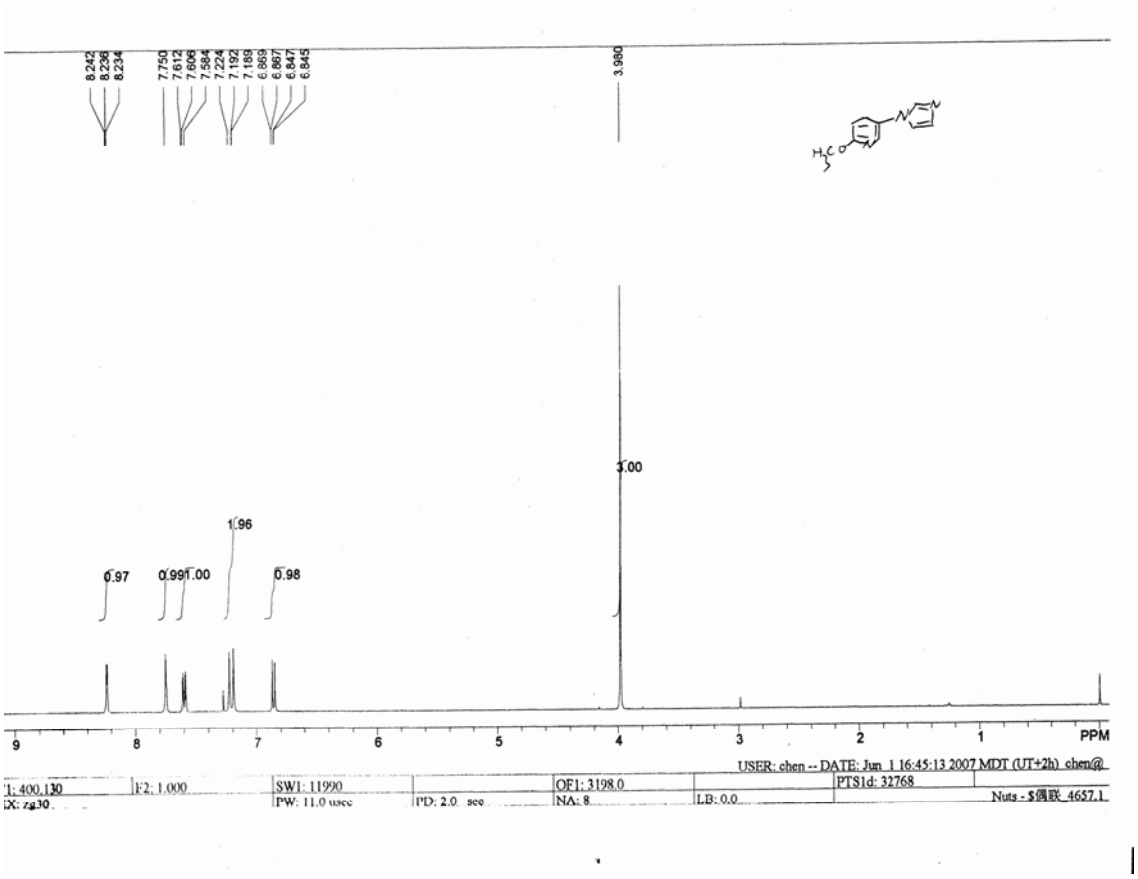

148.733
142.848
135.415
133.918
131.071
128.764
124.207
117.972
77.264
77.000
76.641
140
120
100
80
60
40
20
PPM
USER: chen -- DATE: Jun 12 12:08:51 2007 MDT (UT+2h) chen@@
PTS1d: 32768
PW: 7.5 usec
PD: 2.0 sec
NA: 485
OF1: 12025.2
LB: 0.0
WinNuts - $偶联反应.1

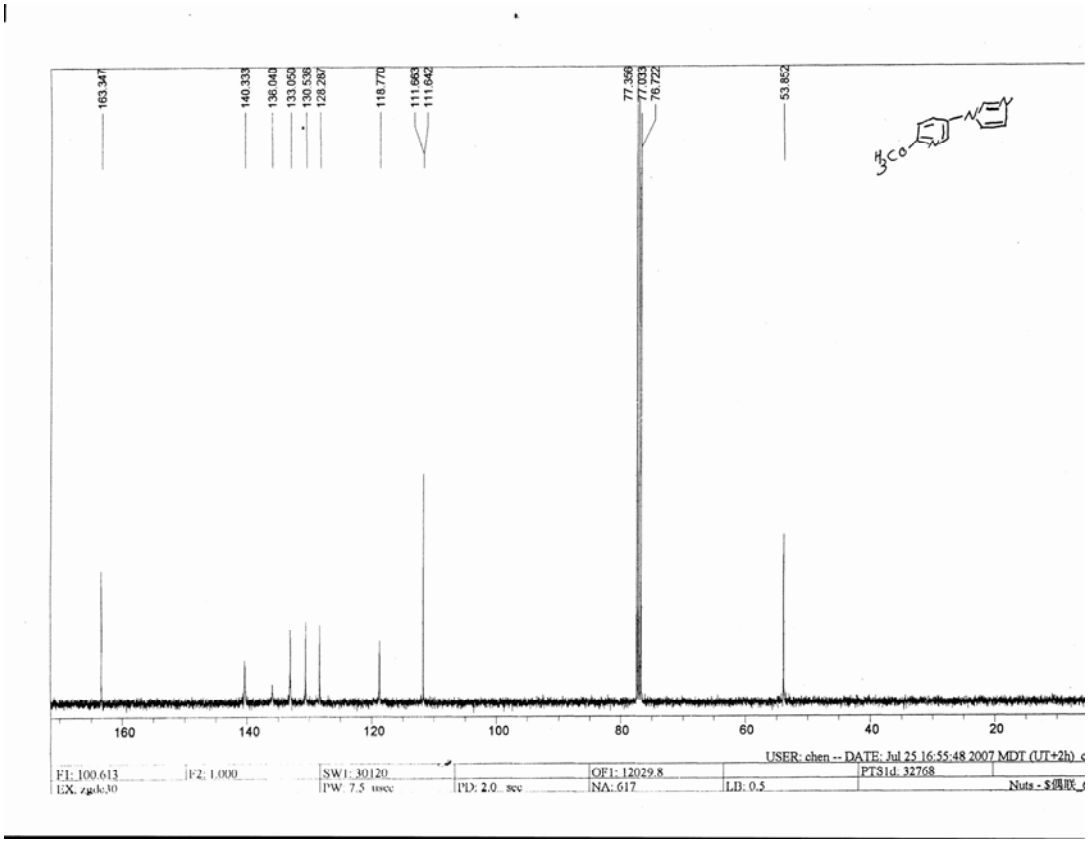

7.819
7.440
7.432
7.427
7.420
7.275
7.240
7.215
7.211
7.207
7.204
7.186
7.183
7.173
4.23
1.00
1.02
8
6
4
2
PPM
USER: chen -- DATE: Apr 12 13:15:12 2007 MDT (UT+2h) chen@
F1: 400.130
F2: 1.000
SW1: 11990
OF1: 3198.0
PTS1d: 32768
EX: zg30
PW: 11.0 usec
PD: 2.0 sec
NA: 4
LB: 0.0
Nuts - $偶联_2138.1

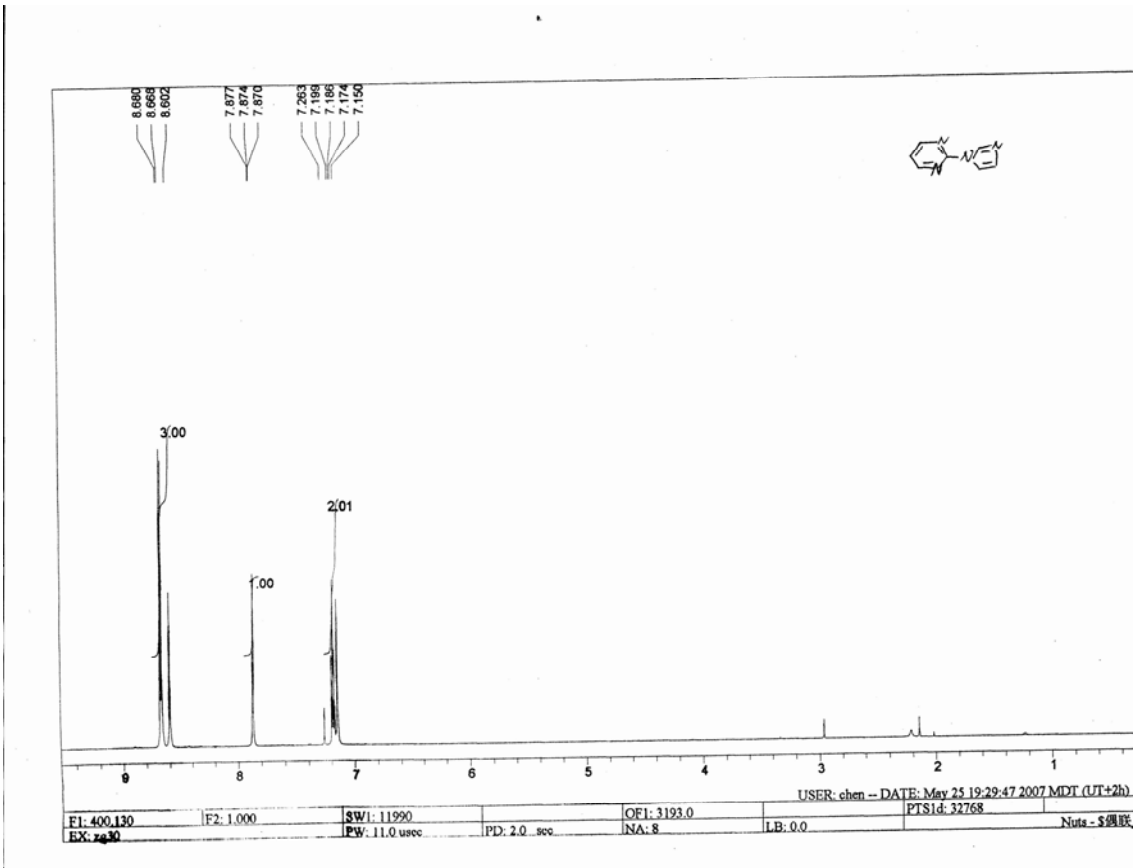

136.174
135.715
129.915
127.061
121.313
118.413
113.072
77.298
76.987
76.670
120
100
80
60
40
20
PPM
USER: chen -- DATE: Apr 14 20:41:50 2007 MDT (UT+2h) chen@
F1: 100.613
F2: 1.000
SW1: 30120
OF1: 12022.4
PTS1d: 32768
EX: zgdc30
PW: 7.5 usec
PD: 2.0 sec
NA: 376
LB: 0.5
Nuts - $偶联_5279.1

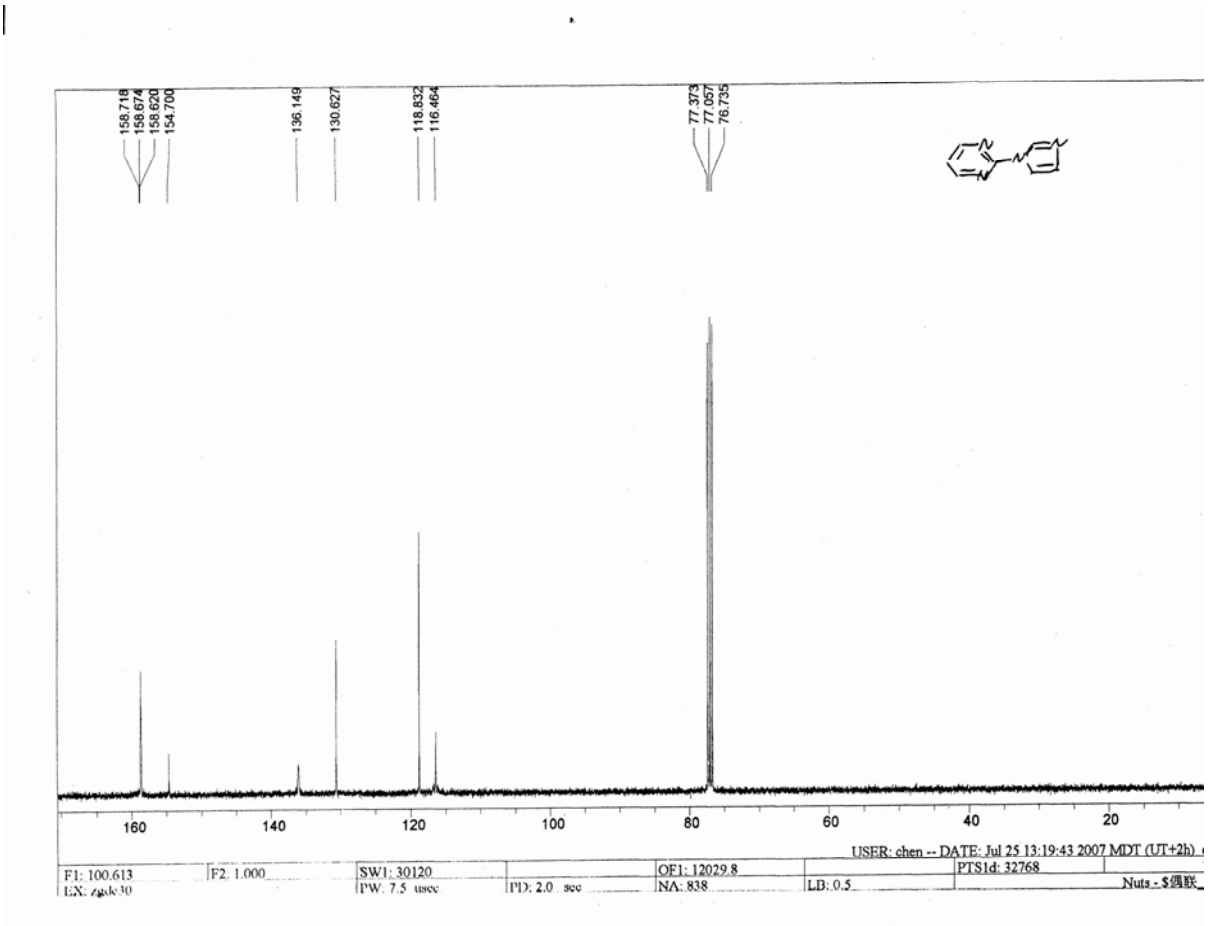

7.794
7.416
7.407
7.403
7.395
7.263
7.215
7.193
7.189
7.185
7.181
7.158
7.155
7.145
7.142
2.963
2.417
0.020
3.94
1.00
0.99
8
7
6
5
4
3
2
1
PPM
1: 400.130
F2: 1.000
SW1: 11990
OF1: 3193.0
PTS1d: 32768
X: zg30
PW: 11.0 usec
PD: 2.0 sec
NA: 7
LB: 0.0
USER: chen -- DATE: May 25 19:26:44 2007 MDT (UT+2h) chen@
Nuts - $偶联_4352.1


136.182
135.772
129.868
127.124
121.368
118.495
113.186
77.310
76.986
76.677
140
120
100
80
60
40
20
PPM
1: 100.613
F2: 1.000
SW1: 30120
OF1: 12027.0
PTS1d: 32768
X: zgdc30
PW: 7.5 usec
PD: 2.0 sec
NA: 667
LB: 0.5
USER: chen -- DATE: Jul 25 12:11:07 2006 MDT (UT+2h) chen@
Nuts - $偶联_3-溴噻吩偶联的碳谱.1


8.242
8.236
8.234
7.750
7.612
7.606
7.584
7.224
7.192
7.189
6.869
6.867
6.847
6.845
3.980
3.00
1.96
0.97
0.99
1.00
0.98
9
8
7
6
5
4
3
2
1
PPM
USER: chen -- DATE: Jun 1 16:45:13 2007 MDT (UT+2h) chen@
1: 400.130
F2: 1.000
SW1: 11990
OF1: 3198.0
PTS1d: 32768
X: zg30
PW: 11.0 usec
PD: 2.0 sec
NA: 8
LB: 0.0
Nuts - $


163.347
140.333
136.040
133.050
130.538
128.287
118.770
111.663
111.642
77.359
77.033
76.722
53.852
160
140
120
100
80
60
40
20
USER: chen -- DATE: Jul 25 16:55:48 2007 MDT (UT+2h)
F1: 100.613
F2: 1.000
SW1: 30120
OF1: 12029.8
PTS1d: 32768
EX: zgdc30
PW: 7.5 usec
PD: 2.0 sec
NA: 617
LB: 0.5
Nuts - $


8.680
8.668
8.602
7.877
7.874
7.870
7.263
7.199
7.186
7.174
7.150
3.00
2.01
1.00
9
8
7
6
5
4
3
2
1
USER: chen -- DATE: May 25 19:29:47 2007 MDT (UT+2h)
F1: 400.130
F2: 1.000
SW1: 11990
PW: 11.0 usec
PD: 2.0 sec
OF1: 3193.0
NA: 8
PTS1d: 32768
LB: 0.0
Nuts - $偶联


158.718
158.674
158.620
154.700
136.149
130.627
118.832
116.464
77.373
77.057
76.735
160
140
120
100
80
60
40
20
USER: chen -- DATE: Jul 25 13:19:43 2007 MDT (UT+2h)
F1: 100.613
F2: 1.000
SW1: 30120
PW: 7.5 usec
PD: 2.0 sec
OF1: 12029.8
NA: 838
PTS1d: 32768
LB: 0.5
Nuts - $偶联