

## Accessory Publication

# A Speedy One-Pot Synthesis of Second-Generation Ionic Liquids under Ultrasound and/or Microwave Irradiation

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## Synthetic Procedures

### 3-Octyl-1-methylimidazolium hexafluorophosphate.

**A)** In a pressure-resistant reactor (Milestone) or in a 100 mL two-necked round-bottomed flask 3.3 g of 1-methylimidazole (PM 82.1, 40.2 mmol), 7.4 g of  $\text{KPF}_6$  (PM 184.06, 40.2 mmol) and 7.8 g of 1-bromooctane (PM 193.12, 40.2 mmol) were placed. Reactions were carried out under MW or simultaneous MW/US irradiation for the times and at the temperature and power levels listed in the Tables.

MW (entry 1). The reaction mixture was irradiated with MW for 30 min at 120°C.

Step	Time (min)	Temp. (°C)	MW max power (W)	MW average power (W)
I	4	25 to 120	200	100
II	30	120	80	70

MW/US (entry 18).

The reaction mixture was simultaneously irradiated with MW/US for 3 min at 120°C.

Step	Time (min)	Temp. (°C)	MW max power (W)	MW average power (W)	US power (W)
I	3	25 to 120	150	65	45
II	3	120	70	35	45

Work up.

The reacted mixture was dissolved in acetone and filtered on a Celite<sup>®</sup> pad; the solvent was then removed under vacuum. The residue was washed with diethyl ether (4x20 mL), then with water (4x20 mL). Finally solvents were removed under vacuum; the product, dried at 90°C under vacuum (3 h), weighed respectively 10.6 g (entry 1, yield 77%) and 12.7 g (entry 18, yield 93%) of OMIImPF<sub>6</sub>.

MW/US (entry 30).

**B)** In a two-necked round-bottomed flask 3.3 g of 1-methylimidazole (PM 82.1, 40.2 mmol), 7.4 g of  $\text{KPF}_6$  (PM 184.06, 40.2 mmol) and 6.0 g of 1-chlorooctane (PM 148.67, 40.2 mmol) were placed. Reactions were carried out under MW/US irradiation. Reaction times, temperature and power levels are listed in the Table.

MW/US.

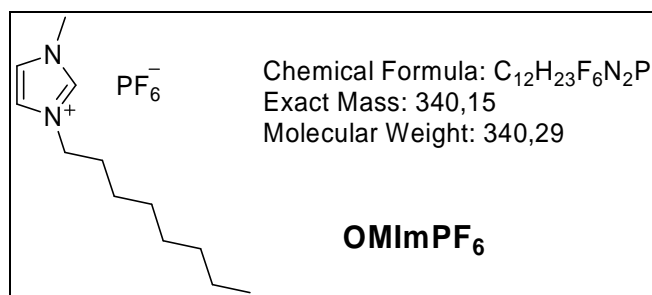
The reaction mixture was simultaneously irradiated with MW/US for 20 min at 130°C.

Step	Time (min)	Temp. (°C)	MW max power (W)	MW average power (W)	US power (W)
I	3.5	25 to 120	150	60	40
II	10	120	70	20	40

### Work up.

The reacted mixture was dissolved in acetone and filtered on a Celite<sup>®</sup> pad; the solvent was then removed under vacuum. The residue was washed with diethyl ether (4x20 mL) and then with water (4x20 mL). Finally solvents were removed under vacuum; the product, dried at 90°C under vacuum (3 h), weighed 7.52 g (yield 55%).

Light yellow oil. <sup>1</sup>H NMR (300 MHz, CDCl<sub>3</sub>): δ = 8.44 (s, 1H, H-2), 7.30 (d, 1H, *J* = 1.5 Hz, H-4), 7.28 (d, 1H, *J* = 1.5 Hz, H-5), 4.11 (t, 2H, *J* = 7.2 Hz, H-1' *oct*), 3.88 (s, 3H, N<sup>1</sup>-CH<sub>3</sub>), 1.84 (m, 2H, H-2' *oct*), 1.35-1.15 (overlapped, 10H, H-3', 4', 5', 6', 7' *oct*), 0.85 (t, 3H, *J* = 7.2 Hz, H-8' *oct*). <sup>13</sup>C NMR APT (75 MHz, CDCl<sub>3</sub>): δ = 135.4 (C2), 123.5 (C4), 122.1 (C5), 49.8 (C1'), 35.8 (N<sup>1</sup>-CH<sub>3</sub>), 31.4 (C6'), 29.7 (C2'), 28.7 (C4'), 28.6 (C5'), 25.9 (C3'), 22.4 (C7'), 13.8 (C8'). IR (neat, cm<sup>-1</sup>): ν = 3171, 2930, 1576, 1468, 1169, 835, 750, 740.



### **1-Octyl-3-methylimidazolium tetrafluoroborate**

In a two-necked round-bottomed flask 3.3 g of 1-methylimidazole (PM 82.1, 40.2 mmol), 5.1 g of KBF<sub>4</sub> (PM 125.9, 40.2 mmol) and 10.0 g of 1-bromooctane (PM 193.12, 51.8 mmol) were placed. Reactions were carried out under MW or simultaneous MW/US irradiation for the times and at the temperature and power levels listed in the Tables.

MW (entry 2). The reaction mixture was irradiated with MW for 20 min at 140°C under vigorous magnetic stirring.

Step	Time (min)	Temp. (°C)	MW max power (W)	MW average power (W)
I	5	25 to 140	250	90
II	20	140	100	45

### MW/US (entry 20).

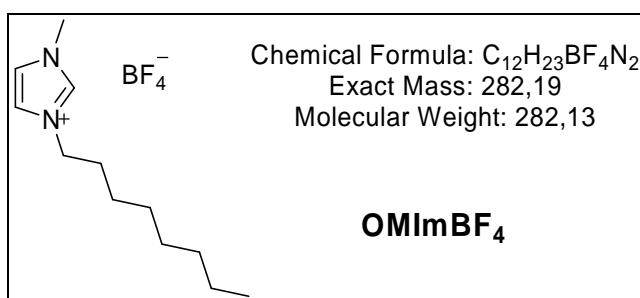
The reaction mixture was simultaneously irradiated with MW/US for 20 min at 140°C.

Step	Time (min)	Temp. (°C)	MW max power (W)	MW average power (W)	US power (W)
I	4	25 to 140	200	90	35
II	20	140	80	20	35

### Work up.

The reacted mixture was dissolved in acetone and filtered on a Celite<sup>®</sup> pad; the solvent was then removed under vacuum. The residue was dissolved in water (50 mL) and extracted with CH<sub>2</sub>Cl<sub>2</sub> (4x25 mL). After removal of CH<sub>2</sub>Cl<sub>2</sub> under vacuum, the ionic liquid was washed with diethyl ether (4x20 mL). After solvents were removed under vacuum, the product dried at 90°C under vacuum (3 h) weighed respectively 7.9 g (entry 2, yield 70%) and 10.7 g (entry 20, yield 94%) of OMImBF<sub>4</sub>.

Orange oil. <sup>1</sup>H NMR (300 MHz, CDCl<sub>3</sub>): δ = 8.69 (s, 1H, H-2), 7.38 (d, 1H, *J* = 1.5 Hz, H-4), 7.33 (d, 1H, *J* = 1.5 Hz, H-5), 4.12 (t, 2H, *J* = 7.5 Hz, H-1' *oct*), 3.89 (s, 3H, N<sup>1</sup>-CH<sub>3</sub>), 1.82 (m, 2H, H-2' *oct*), 1.35-1.15 (overlapped, 10H, H-3', 4', 5', 6', 7' *oct*), 0.81 (t, 3H, *J* = 6.9 Hz, H-8' *oct*). <sup>13</sup>C NMR (75 MHz, CDCl<sub>3</sub>): δ = 136.7 (C2), 123.8 (C4), 122.1 (C5), 50.2 (C1'), 36.5 (N<sup>1</sup>-CH<sub>3</sub>), 31.7 (C6'), 30.2 (C2'), 29.1 (C4'), 29.0 (C5'), 26.2 (C3'), 22.6 (C7'), 14.1 (C8'). IR (neat, cm<sup>-1</sup>): ν = 3157, 2928, 1574, 1468, 1170, 1062, 850, 763.



### **1-Octyl-3-methylimidazolium triflate**

In a two-necked round-bottomed flask 3.3 g of 1-methylimidazole (PM 82.1, 40.2 mmol), 7.6 g of KOTf (PM 188.17, 40.2 mmol) and 10 g of 1-bromooctane (PM 193.12, 51.8 mmol) were placed. Reactions were carried out under MW or simultaneous MW/US irradiation for the times and at the temperature and power levels listed in the Tables.

MW (entry 3). The reaction mixture was irradiated with MW for 25 min at 110°C under vigorous magnetic stirring.

Step	Time (min)	Temp. (°C)	MW max power (W)	MW average power (W)
I	5	25 to 110	250	90
II	25	110	120	60

### MW/US (entry 21).

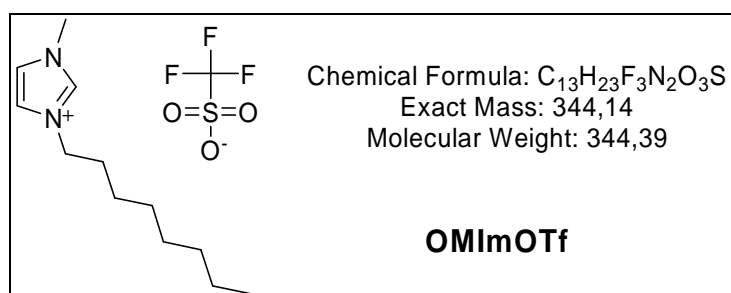
The reaction mixture was simultaneously irradiated with MW/US for 25 min at 110°C.

Step	Time (min)	Temp. (°C)	MW max power (W)	MW average power (W)	US power (W)
I	6	25 to 110	200	110	35
II	25	110	80	35	35

### Work up.

The reacted mixture was dissolved in acetone and filtered on a Celite<sup>®</sup> pad; finally the solvent was removed under vacuum. The residue was washed with diethyl ether (4x20 mL) and then with water (4x20 mL). Finally solvents were removed under vacuum; the product, dried at 90°C under vacuum (3 h), weighed respectively 10.1 g (entry 3, yield 73%) and 11.9 g (entry 21, yield 86%) of OMIImOTf.

Orange oil. <sup>1</sup>H NMR (300 MHz, CDCl<sub>3</sub>): δ = 9.06 (s, 1H, H-2), 7.42 (d, 1H, *J* = 1.5 Hz, H-4), 7.36 (d, 1H, *J* = 1.5 Hz, H-5), 4.16 (t, 2H, *J* = 7.2 Hz, H-1' *oct*), 3.95 (s, 3H, N<sup>1</sup>-CH<sub>3</sub>), 1.85 (m, 2H, H-2' *oct*), 1.40-1.15 (overlapped, 10H, H-3', 4', 5', 6', 7' *oct*), 0.84 (t, 3H, *J* = 6.9 Hz, H-8' *oct*). <sup>13</sup>C NMR (75 MHz, CDCl<sub>3</sub>): δ = 126.6 (C2), 118.7, 116.0 (C4), 115.2, 114.7 (C5), 112.6, 108.1, 54.7 (C1'), 43.3 (N<sup>1</sup>-CH<sub>3</sub>), 39.4 (C6'), 38.1 (C2'), 37.1 (C4'), 37.0 (C5'), 34.8 (C3'), 31.8 (C7'), 24.7 (C8'). IR (neat, cm<sup>-1</sup>): ν = 3154, 2930, 2858, 1574, 1468, 1261, 1224, 1163, 1032, 756.



### **1-Octyl-3-methylimidazolium bis(trifluoromethanesulfon)imide**

In a two-necked round-bottomed flask, 3.3 g of 1-methylimidazole (PM 82.1, 40.2 mmol), 11.5 g of LiN(Tf)<sub>2</sub> (PM 287.09, 40.2 mmol) and 7.8 g of 1-bromooctane (PM 193.12, 40.2 mmol) were placed. Reactions were carried out under MW or simultaneous MW/US irradiation for the time and at the temperature and power levels listed in the Tables.

MW (entry 4). The reaction mixture was irradiated with MW for 25 min at 140°C under vigorous magnetic stirring.

Step	Time (min)	Temp. (°C)	MW max power (W)	MW average power (W)
I	6	25 to 140	230	160
II	25	140	100	80

MW/US (entry 22).

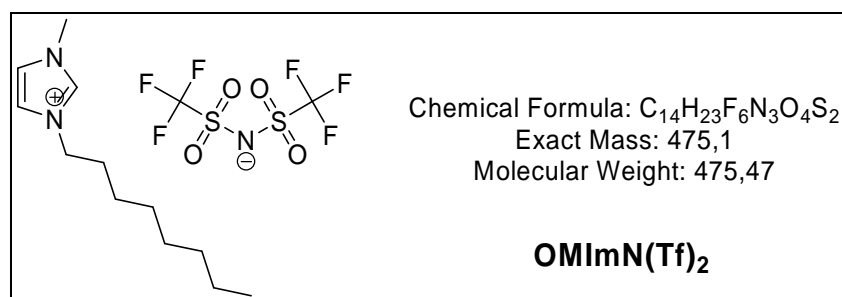
The reaction mixture was simultaneously irradiated with MW/US for 25 min at 140°C.

Step	Time (min)	Temp. (°C)	MW max power (W)	MW average power (W)	US power (W)
I	3	25 to 140	200	100	45
II	25	140	100	45	45

Work up.

The reacted mixture was dissolved in acetone and filtered on a celite<sup>®</sup> pad; finally the solvent was removed under vacuum. The residue was poured into water (50 mL) and extracted with diethyl ether (4x25 mL). After removing diethyl ether under vacuum, the ionic liquid was washed with cyclohexane (4x20 mL). Finally solvents were removed under vacuum; the product, dried at 90°C under vacuum (3 h), weighed respectively 5.9 g (entry 4, yield 31%) and 18 g (entry 22, yield 94%) of OMIImN(Tf)<sub>2</sub>.

Transparent oil. <sup>1</sup>H NMR (300 MHz, CDCl<sub>3</sub>): δ = 8.70 (s, 1H, H-2), 7.33 (d, 1H, H-4), 7.31 (d, 1H, H-5), 4.14 (t, 2H, *J* = 7.5 Hz, H-1' *oct*), 3.92 (s, 3H, N<sup>1</sup>-CH<sub>3</sub>), 1.82 (m, 2H, H-2' *oct*), 1.40-1.20 (overlapped, 10H, H-3', 4', 5', 6', 7' *oct*), 0.86 (t, 3H, *J* = 6.6 Hz, H-8' *oct*). <sup>13</sup>C NMR APT (75 MHz, CDCl<sub>3</sub>): δ = 135.9 (C2), 126.0, 123.6 (C4), 122.2 (C5), 121.7, 117.5, 113.2, 49.9 (C1'), 36.1 (N<sup>1</sup>-CH<sub>3</sub>), 31.4 (C6'), 29.9 (C2'), 28.7 (C4'), 28.6 (C5'), 25.9 (C3'), 22.3 (C7'), 13.8 (C8'). IR (neat, cm<sup>-1</sup>): ν = 3157, 2928, 1574, 1468, 1170, 1062, 850, 763.



***N*-Octylpyridinium hexafluorophosphate**

In a two-necked round-bottomed flask, 3.2 g of pyridine (PM 79.1, 40.2 mmol), 7.4 g of KPF<sub>6</sub> (PM 184.06, 40.2 mmol) and 10.0 g of 1-bromooctane (PM 193.12, 51.8 mmol) were placed. Reactions were carried out under MW or simultaneous MW/US irradiation for the time and at the temperature and power levels listed in the Tables.

MW (entry 5). The reaction mixture was irradiated with MW for 10 min at 120°C under vigorous magnetic stirring.

Step	Time (min)	Temp. (°C)	MW max power (W)	MW average power (W)
I	5	25 to 110	200	110
II	10	110	80	45

#### MW/US (entry 23).

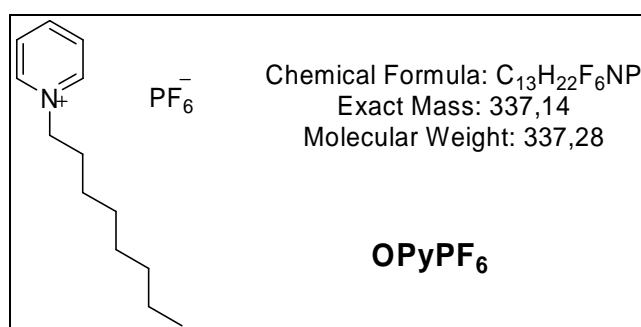
The reaction mixture was simultaneously irradiated with MW/US for 10 min at 110°C.

Step	Time (min)	Temp. (°C)	MW max power (W)	MW average power (W)	US power (W)
I	3	25 to 110	150	65	40
II	10	110	70	20	40

#### Work up.

The reacted mixture was dissolved in acetone and filtered on a Celite<sup>®</sup> pad; the solvent was then removed under vacuum. The residue was precipitated with diethyl ether as a white powder, filtered and washed with diethyl ether (4x20 mL), then with water (4x20 mL). Finally solvents were removed under vacuum; the product dried at 90°C under vacuum (3 h) weighed respectively 12.1 g (entry 5, yield 89%) and 12.9 g (entry 23, yield 95%) of OPyPF<sub>6</sub>.

White powder. Mp 64-65°C. <sup>1</sup>H NMR (300 MHz, CDCl<sub>3</sub>): δ = 8.67 (d, 2H, *J* = 5.7 Hz, H-2, 6), 8.47 (t, 1H, *J* = 7.8 Hz, H-4), 8.00 (t, 2H, *J* = 6.6 Hz, H-3, 5), 4.55 (t, 2H, *J* = 7.8 Hz, H-1' *oct*), 1.98 (m, 2H, H-2' *oct*), 1.35-1.15 (overlapped, 10H, H-3', 4', 5', 6', 7' *oct*), 0.85 (t, 3H, *J* = 6.9 Hz, H-8' *oct*). <sup>13</sup>C NMR APT (75 MHz, CDCl<sub>3</sub>): δ = 145.8 (C2, 6), 144.2 (C4), 128.7 (C3, 5), 62.7 (C1'), 31.7 (C6'), 31.5 (C2'), 29.0 (C4'), 28.95 (C5'), 26.1 (C3'), 22.7 (C7'), 14.2 (C8'). IR (KBr, cm<sup>-1</sup>): ν = 3148, 2926, 1640, 1489, 1226, 1182, 877, 777.



#### **N-Octylpyridinium tetrafluoroborate**

In a two-necked round-bottomed flask, 3.2 g of pyridine (PM 79.1, 40.2 mmol), 5.1 g of KBF<sub>4</sub> (PM 125.9, 40.2 mmol) and 10.0 g of 1-bromooctane (PM 193.12, 51.8 mmol) were placed. Reactions were carried out under MW or simultaneous MW/US irradiation for the time and at the temperature and power levels listed in the Tables.

MW (entry 6). The reaction mixture was irradiated with MW for 30 min at 140°C under vigorous magnetic stirring in a pressure-resistant reactor (Milestone).

Step	Time (min)	Temp. (°C)	MW max power (W)	MW average power (W)
I	5	25 to 140	200	120
II	30	140	100	35

MW/US (entry 25 bis).

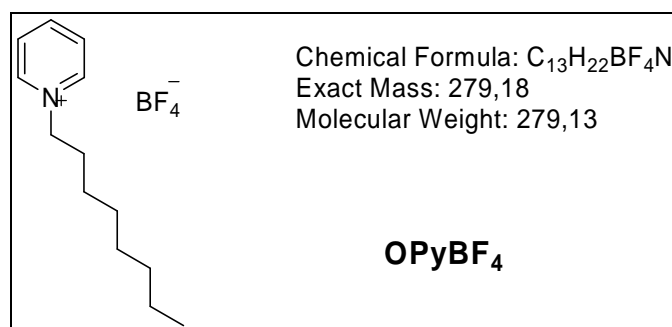
The reaction mixture was simultaneously irradiated with MW/US for 5 min at 110°C and 8 min at 140°C.

Step	Time (min)	Temp. (°C)	MW max power (W)	MW average power (W)	US power (W)
I	5	25 to 110	190	110	35
II	5	110	100	30	35
III	1.5	110 to 140	100	60	35
IV	8	140	80	45	35

Work up.

The reacted mixture was dissolved in acetone and filtered on a Celite<sup>®</sup> pad; the solvent was then removed under vacuum. The residue was dissolved in water (50 mL) and extracted with CH<sub>2</sub>Cl<sub>2</sub> (4x25 mL). After removal of CH<sub>2</sub>Cl<sub>2</sub> under vacuum, the ionic liquid was washed with diethyl ether (4x20 mL). Finally solvents were removed under vacuum and the product, dried at 90°C under vacuum (3 h), weighed respectively 7.6 g (entry 6, yield 68%) and 9.0 g (entry 25 bis, yield 80%) of OPyBF<sub>4</sub>.

Orange oil. <sup>1</sup>H NMR (300 MHz, CDCl<sub>3</sub>): δ = 8.97 (d, 2H, *J* = 5.4 Hz, H-2, 6), 8.51 (t, 1H, *J* = 7.8 Hz, H-4), 8.08 (t, 2H, *J* = 6.9 Hz, H-3, 5), 4.69 (t, 2H, *J* = 7.5 Hz, H-1' *oct*), 2.00 (m, 2H, H-2' *oct*), 1.40-1.15 (overlapped, 10H, H-3', 4', 5', 6', 7' *oct*), 0.85 (t, 3H, *J* = 6.9 Hz, H-8' *oct*). <sup>13</sup>C NMR APT (75 MHz, CDCl<sub>3</sub>): δ = 145.6 (C2, 6), 144.6 (C4), 128.7 (C3, 5), 62.4 (C1'), 31.74 (C6'), 31.71 (C2'), 29.0 (C4'), 28.98 (C5'), 26.1 (C3'), 22.6 (C7'), 14.1 (C8'). IR (neat, cm<sup>-1</sup>): ν = 3140, 2928, 1637, 1491, 1174, 1062, 775, 686.





### ***N*-Octylpyridinium triflate**

In a two-necked round-bottomed flask, 3.2 g of pyridine (PM 79.1, 40.2 mmol), 7.6 g of KOTf (PM 188.17, 40.2 mmol) and 10.0 g of 1-bromooctane (PM 193.12, 51.8 mmol) were placed. Reactions were carried out under MW or simultaneous MW/US irradiation for the time and at the temperature and power levels listed in the Tables.

MW (entry 7). The reaction mixture was irradiated with MW for 25 min at 110°C under vigorous magnetic stirring.

<b>Step</b>	<b>Time (min)</b>	<b>Temp. (°C)</b>	<b>MW max power (W)</b>	<b>MW average power (W)</b>
<b>I</b>	11	25 to 110	300	230
<b>II</b>	25	110	150	45

### MW/US (entry 26).

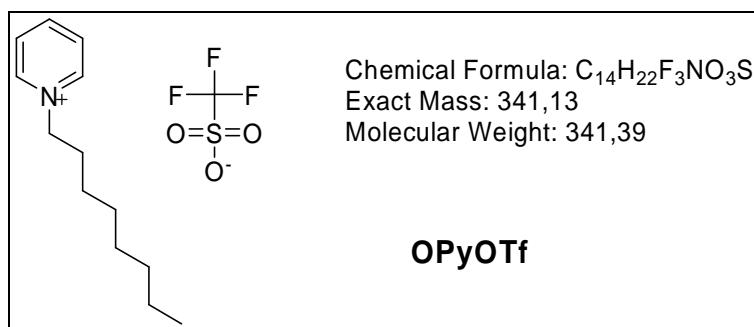
The reaction mixture was simultaneously irradiated with MW/US for 25 min at 110°C.

<b>Step</b>	<b>Time (min)</b>	<b>Temp. (°C)</b>	<b>MW max power (W)</b>	<b>MW average power (W)</b>	<b>US power (W)</b>
<b>I</b>	4	25 to 110	200	75	35
<b>II</b>	25	110	80	30	35

### Work up.

The reacted mixture was dissolved in acetone and filtered on a Celite<sup>®</sup> pad; the solvent was then removed under vacuum. The residue was precipitated with diethyl ether as a white powder, filtered and washed with diethyl ether (4x20 mL), then with water (4x20 mL). Finally solvents were removed under vacuum; the product, dried at 90°C under vacuum (3 h), weighed respectively 8.8 g (entry 7, yield 64%) and 13.2 g (entry 26, yield 96%) of OPyOTf.

White powder. Mp 70-71°C. <sup>1</sup>H NMR (300 MHz, CDCl<sub>3</sub>): δ = 8.97 (d, 2H, *J* = 5.7 Hz, H-2, 6), 8.49 (t, 1H, *J* = 7.8 Hz, H-4), 8.06 (t, 2H, *J* = 6.9 Hz, H-3, 5), 4.65 (t, 2H, *J* = 7.5 Hz, H-1' *oct*), 1.98 (m, 2H, H-2' *oct*), 1.40-1.15 (overlapped, 10H, H-3', 4', 5', 6', 7' *oct*), 0.82 (t, 3H, *J* = 6.9 Hz, H-8' *oct*). <sup>13</sup>C NMR APT (75 MHz, CDCl<sub>3</sub>): δ = 145.8 (C2, 6), 145.1 (C4), 129.0 (C3, 5), 62.8 (C1'), 32.0 (C6'), 31.96 (C2'), 29.3 (C4'), 29.2 (C5'), 26.3 (C3'), 22.9 (C7'), 14.4 (C8'). IR (KBr, cm<sup>-1</sup>): ν = 3140, 2929, 2926, 1639, 1489, 1261, 1159, 1034, 777.



### ***N*-Octylpyridinium bis(trifluoromethanesulfon)imide**

In a two-necked round-bottomed flask, 3.2 g of pyridine (PM 79.1, 40.2 mmol), 11.5 g of LiN(Tf)<sub>2</sub> (PM 287.09, 40.2 mmol) and 10.0 g of 1-bromooctane (PM 193.12, 51.8 mmol) were placed. Reactions were carried out under MW or simultaneous MW/US irradiation for the time and at the temperature and power levels listed in the Tables.

MW (entry 8). The reaction mixture was irradiated with MW for 30 min at 140°C under vigorous magnetic stirring in a pressure-resistant reactor (Milestone).

Step	Time (min)	Temp. (°C)	MW max power (W)	MW average power (W)
<b>I</b>	5	25 to 140	250	90
<b>II</b>	30	140	100	40

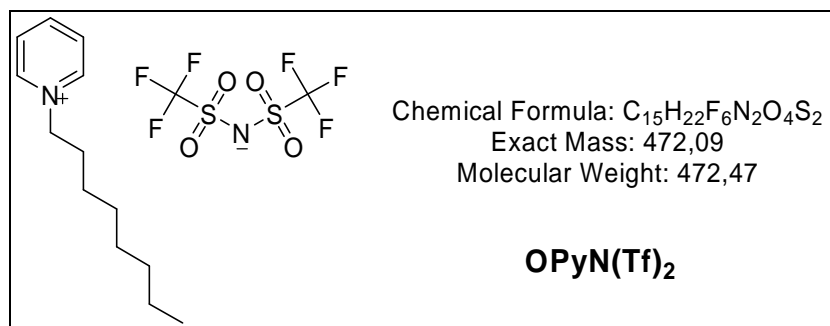
MW/US procedure (entry 24 bis). The reaction mixture was simultaneously irradiated with MW/US for 10 min at 110°C and for 10 min at 140°C.

Step	Time (min)	Temp. (°C)	MW max power (W)	MW average power (W)	US power (W)
<b>I</b>	4	25 to 110	200	85	35
<b>II</b>	10	110	80	35	35
<b>III</b>	3	110 to 140	200	80	35
<b>IV</b>	10	140	100	60	35

### Work up.

The reacted mixture was dissolved in acetone and filtered on a Celite<sup>®</sup> pad; the solvent was then removed under vacuum. The residue was dissolved in water (50 mL) and extracted with diethyl ether (4x25 mL). After removing diethyl ether under vacuum, the ionic liquid was washed with cyclohexane (4x20 mL). Finally solvents were removed under vacuum; the product, dried at 90°C under vacuum (3 h), weighed respectively 16.4 g (entry 8, yield 86%) and 18.2 g (entry 24 bis, yield 96%) of OPyN(Tf)<sub>2</sub>.

Light yellow oil.  $^1\text{H}$  NMR (300 MHz,  $\text{CDCl}_3$ ):  $\delta$  = 8.82 (d, 2H,  $J$  = 5.7 Hz, H-2, 6), 8.47 (t, 1H,  $J$  = 7.8 Hz, H-4), 8.05 (t, 2H,  $J$  = 6.9 Hz, H-3, 5), 4.58 (t, 2H,  $J$  = 7.5 Hz, H-1' *oct*), 1.99 (m, 2H, H-2' *oct*), 1.40-1.15 (overlapped, 10H, H-3', 4', 5', 6', 7' *oct*), 0.85 (t, 3H,  $J$  = 6.9 Hz, H-8' *oct*).  $^{13}\text{C}$  NMR APT (75 MHz,  $\text{CDCl}_3$ ):  $\delta$  = 145.5 (C2, 6), 144.5 (C4), 128.8 (C3, 5), 126.3, 122.0, 117.8, 113.5, 62.7 (C1'), 31.7 (C6', 2'), 28.97 (C4'), 28.88 (C5'), 26.0 (C3'), 22.6 (C7'), 14.1 (C8'). IR (neat,  $\text{cm}^{-1}$ ):  $\nu$  = 3138, 2932, 2860, 1637, 1489, 1352, 1226, 1186, 1138, 1059, 780, 773, 740.



### 3-Butyl-1-methylimidazolium hexafluorophosphate

In a two-necked round-bottomed flask, 3.30 g of 1-methylimidazole (PM 82.1, 40.2 mmol), 7.4 g of  $\text{KPF}_6$  (PM 184.06, 40.2 mmol) and 5.5 g of 1-bromobutane (PM 137.02, 40.2 mmol) were placed. Reactions were carried out under MW or simultaneous MW/US irradiation for the time and at the temperature and power levels listed in the Tables.

MW (entry 9). The reaction mixture was irradiated with MW for 30 min at 120°C under vigorous magnetic stirring in a pressure-resistant reactor (Milestone).

Step	Time (min)	Temp. (°C)	MW max power (W)	MW average power (W)
I	4.5	25 to 120	200	45
II	30	120	90	40

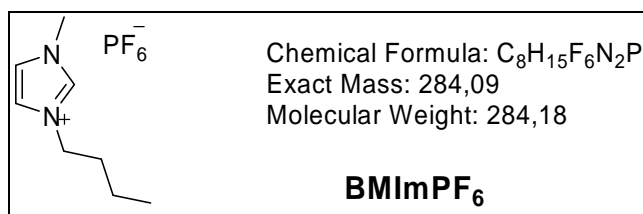
MW/US (entry 27 bis). The reaction mixture was simultaneously irradiated with MW/US for 5 min at 95°C and for 5 min at 120°C.

Step	Time (min)	Temp. (°C)	MW max power (W)	MW average power (W)	US power (W)
I	2.5	25 to 95	200	40	35
II	5	95	80	30	35
III	3	95 to 120	200	75	35
IV	5	120	80	40	35

### Work up.

The reacted mixture was dissolved in acetone and filtered on a Celite<sup>®</sup> pad; finally the solvent was removed under vacuum. The obtained product was dissolved in water (10 mL) and extracted with CH<sub>2</sub>Cl<sub>2</sub> (3x100 mL). After removing CH<sub>2</sub>Cl<sub>2</sub> under vacuum, the ionic liquid was washed with diethyl ether (4x20 mL). Finally solvents were removed under vacuum; the product, dried at 90°C under vacuum (3 h), weighed respectively 9.2 g (entry 9, yield 80%) and 10.7 g (entry 27 bis, yield 94%) of BMImPF<sub>6</sub>.

Yellow oil. <sup>1</sup>H NMR (300 MHz, CDCl<sub>3</sub>): δ = 8.36 (s, 1H, H-2), 7.32 (d, 1H, H-4), 7.29 (d, 1H, H-5), 4.09 (t, 2H, *J* = 7.2 Hz, H-1' *bu*), 3.84 (s, 3H, N<sup>1</sup>-CH<sub>3</sub>), 1.79 (m, 2H, H-2' *bu*), 1.35 (m, 2H, H-3' *bu*), 0.86 (t, 3H, *J* = 7.5 Hz, H-4' *bu*). <sup>13</sup>C NMR APT (75 MHz, CDCl<sub>3</sub>): δ = 135.8 (C2), 123.7 (C4), 122.4 (C5), 49.7 (C1'), 36.0 (N<sup>1</sup>-CH<sub>3</sub>), 31.7 (C2'), 19.2 (C3'), 13.2 (C4'). IR (neat, cm<sup>-1</sup>): ν = 3171, 2966, 1576, 1468, 1169, 850, 752.



### **3-Butyl-1-methylimidazolium tetrafluoroborate**

In a two-necked round-bottomed flask, 3.3 g of 1-methylimidazole (PM 82.1, 40.2 mmol), 5.1 g of KBF<sub>4</sub> (PM 125.9, 40.2 mmol) and 5.5 g of 1-bromobutane (PM 137.02, 40.2 mmol) were placed. Reactions were carried out under MW or simultaneous MW/US irradiation for the time and at the temperature and power levels listed in the Tables.

MW (entry 11). The reaction mixture was irradiated with MW for 30 min at 120°C under vigorous magnetic stirring in a pressure-resistant reactor (Milestone).

Step	Time (min)	Temp. (°C)	MW max power (W)	MW average power (W)
I	5	25 to 120	200	65
II	30	120	80	35

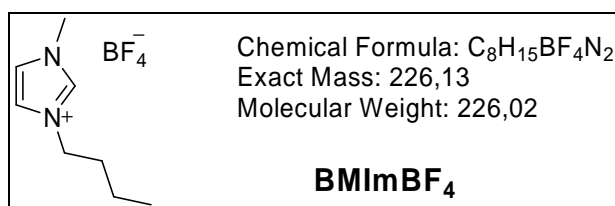
MW/US (entry 28). The reaction mixture was simultaneously irradiated with MW/US for 5 min at 95°C and for 5 min at 120°C.

Step	Time (min)	Temp. (°C)	MW max power (W)	MW average power (W)	US power (W)
I	2.5	25 to 95	180	50	35
II	5	95	80	30	35
III	3	95 to 120	150	80	35
IV	5	120	70	50	35

### Work up.

The reacted mixture was dissolved in acetone and filtered on a Celite<sup>®</sup> pad; finally the solvent was removed under vacuum. The obtained product was dissolved in water (10 mL) and extracted with CH<sub>2</sub>Cl<sub>2</sub> (3x100 mL). After removing CH<sub>2</sub>Cl<sub>2</sub> under vacuum, the ionic liquid was washed with diethyl ether (4x20 mL). Finally solvents were removed under vacuum; the product, dried at 90°C under vacuum (3 h), weighed respectively 5.5 g (entry 11, yield 60%) and 8.2 g (entry 28, yield 90%) of BMImBF<sub>4</sub>.

Yellow oil. <sup>1</sup>H NMR (300 MHz, CDCl<sub>3</sub>): δ = 9.03 (s, 1H, H-2), 7.35 (d, 1H, H-4), 7.31 (d, 1H, H-5), 4.05 (t, 2H, *J* = 7.2 Hz, H-1' *bu*), 3.80 (s, 3H, N<sup>1</sup>-CH<sub>3</sub>), 1.68 (m, 2H, H-2' *bu*), 1.18 (m, 2H, H-3' *bu*), 0.74 (t, 3H, *J* = 7.5 Hz, H-4' *bu*). <sup>13</sup>C NMR APT (75 MHz, CDCl<sub>3</sub>): δ = 136.6 (C2), 124.1 (C4), 122.6 (C5), 49.9 (C1'), 36.4 (N<sup>1</sup>-CH<sub>3</sub>), 32.2 (C2'), 19.6 (C3'), 13.6 (C4'). IR (neat, cm<sup>-1</sup>): ν = 3157, 2963, 1574, 1468, 1170, 1062, 846, 754.



### **3-Butyl-1-methylimidazolium triflate**

In a two-necked round-bottomed flask, 3.3 g of 1-methylimidazole (PM 82.1, 40.2 mmol), 7.6 g of KOTf (PM 188.17, 40.2 mmol) and 5.5 g of 1-bromobutane (PM 137.02, 40.2 mmol) were placed. Reactions were carried out under MW or simultaneous MW/US irradiation for the time and at the temperature and power levels listed in the Tables.

MW procedure (entry 12). The reaction mixture was irradiated with MW for 30 min at 120°C under vigorous magnetic stirring in a pressure-resistant reactor (Milestone).

Step	Time (min)	Temp. (°C)	MW max power (W)	MW average power (W)
I	5	25 to 120	200	75
II	30	120	100	45

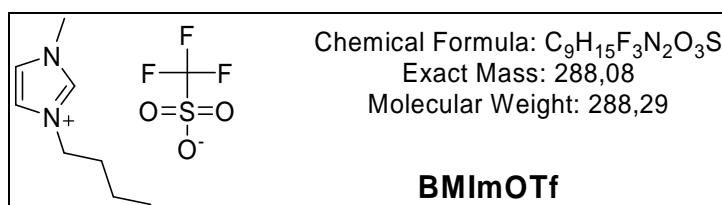
MW/US procedure (entry 29). The reaction mixture was simultaneously irradiated with MW/US for 5 min at 95°C and for 5 min at 120°C.

Step	Time (min)	Temp. (°C)	MW max power (W)	MW average power (W)	US power (W)
I	2.5	25 to 95	180	50	35
II	5	95	80	30	35
III	3	95 to 120	150	80	35
IV	5	120	70	45	35

### Work up.

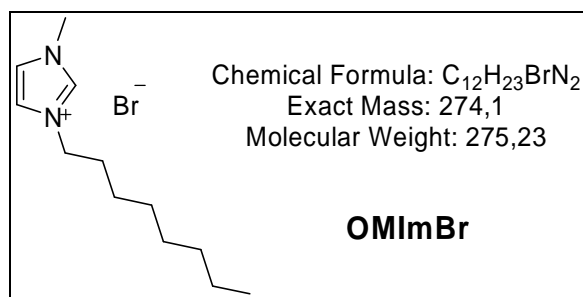
The reacted mixture was dissolved in acetone and filtered on a Celite<sup>®</sup> pad; finally the solvent was removed under vacuum. The obtained product was dissolved in water (10 mL) and extracted with CH<sub>2</sub>Cl<sub>2</sub> (3x100 mL). After removing CH<sub>2</sub>Cl<sub>2</sub> under vacuum, the ionic liquid was washed with diethyl ether (4x20 mL). Finally solvents were removed under vacuum; the product, dried at 90°C under vacuum (3 h), weighed respectively 9.1 g (entry 12, yield 79%) and 11.2 g (entry 29, yield 97%) of BMImOTf.

Orange oil. <sup>1</sup>H NMR (300 MHz, CDCl<sub>3</sub>): δ = 9.05 (s, 1H, H-2), 7.40 (d, 1H, *J* = 1.8 Hz, H-4), 7.38 (d, 1H, *J* = 1.8 Hz, H-5), 4.17 (t, 2H, *J* = 7.2 Hz, H-1' *bu*), 3.95 (s, 3H, N<sup>1</sup>-CH<sub>3</sub>), 1.83 (m, 2H, *J* = 7.5 Hz, H-2' *bu*), 1.35 (m, 2H, *J* = 7.5 Hz, H-3' *bu*), 0.93 (t, 3H, *J* = 7.5 Hz, H-4' *bu*). <sup>13</sup>C NMR APT (75 MHz, CDCl<sub>3</sub>): δ = 136.0 (C2), 126.7, 123.5 (C4), 122.5, 122.2 (C5), 118.3, 114.0, 49.4 (C1'), 35.9 (N<sup>1</sup>-CH<sub>3</sub>), 31.6 (C2'), 19.0 (C3'), 13.0 (C4'). IR (neat, cm<sup>-1</sup>): ν = 3154, 2964, 1574, 1468, 1277, 1224, 1167, 1032, 844, 756.



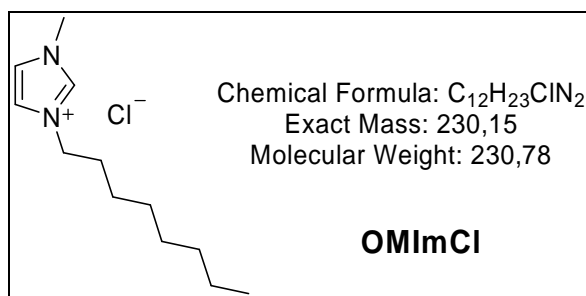
### **3-Octyl-1-methylimidazolium bromide**

Orange oil. <sup>1</sup>H NMR (300 MHz, CDCl<sub>3</sub>): δ = 10.25 (s, 1H, H-2), 7.62 (d, 1H, *J* = 1.5 Hz, H-4), 7.44 (d, 1H, *J* = 1.5 Hz, H-5), 4.25 (t, 2H, *J* = 7.5 Hz, H-1' *oct*), 4.06 (s, 3H, N<sup>1</sup>-CH<sub>3</sub>), 1.84 (m, 2H, H-2' *oct*), 1.30-1.00 (overlapped, 10H, H-3', 4', 5', 6', 7' *oct*), 0.79 (t, 3H, *J* = 6.9 Hz, H-8' *oct*). <sup>13</sup>C NMR APT (75 MHz, CDCl<sub>3</sub>): δ = 135.2 (C2), 122.5 (C4), 121.0, (C5), 48.4 (C1'), 35.2 (N<sup>1</sup>-CH<sub>3</sub>), 30.1 (C6'), 28.8 (C2'), 27.43 (C4'), 27.37 (C5'), 24.6 (C3'), 21.0 (C7'), 12.6 (C8'). IR (neat, cm<sup>-1</sup>): ν = 3138, 2926, 2856, 1570, 1466, 1379, 1169, 1118, 866, 765.



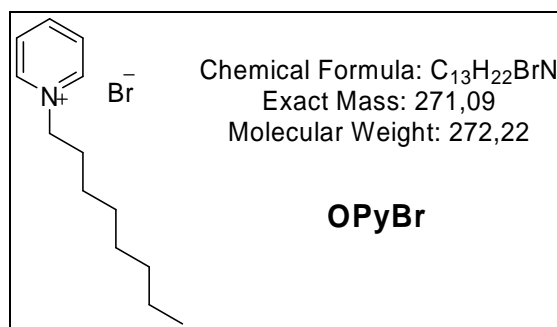
### 3-Octyl-1-methylimidazolium chloride

Orange oil. <sup>1</sup>H NMR (300 MHz, CDCl<sub>3</sub>): δ = 10.5 (s, 1H, H-2), 7.63 (d, 1H, *J* = 1.8 Hz, H-4), 7.40 (d, 1H, *J* = 1.8 Hz, H-5), 4.20 (t, 2H, *J* = 7.5 Hz, H-1' *oct*), 4.03 (s, 3H, N<sup>1</sup>-CH<sub>3</sub>), 1.81 (m, 2H, H-2' *oct*), 1.30-1.05 (overlapped, 10H, H-3', 4', 5', 6', 7' *oct*), 0.76 (t, 3H, *J* = 6.9 Hz, H-8' *oct*). <sup>13</sup>C NMR APT (75 MHz, CDCl<sub>3</sub>): δ = 136.8 (C2), 123.3 (C4), 121.5, (C5), 49.3 (C1'), 35.8 (N<sup>1</sup>-CH<sub>3</sub>), 31.0 (C6'), 29.7 (C2'), 28.3 (C4'), 28.26 (C5'), 25.5 (C3'), 21.9 (C7'), 13.4 (C8'). IR (neat, cm<sup>-1</sup>): ν = 3140, 2928, 2856, 1574, 1466, 1379, 1336, 1170, 871, 769, 725.



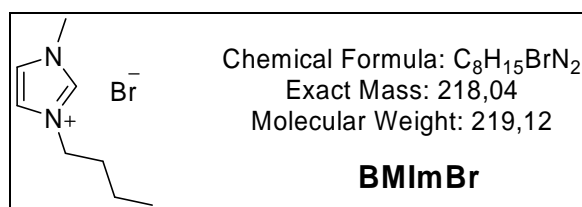
### N-Octylpyridinium bromide

Orange oil. <sup>1</sup>H NMR (300 MHz, CDCl<sub>3</sub>): δ = 9.49 (d, 2H, *J* = 5.7 Hz, H-2, 6), 8.52 (t, 1H, *J* = 7.8 Hz, H-4), 8.16 (t, 2H, *J* = 7.5 Hz, H-3, 5), 4.97 (t, 2H, *J* = 7.5 Hz, H-1' *oct*), 2.02 (m, 2H, H-2' *oct*), 1.40-1.10 (overlapped, 10H, H-3', 4', 5', 6', 7' *oct*), 0.83 (t, 3H, *J* = 7.2 Hz, H-8' *oct*). <sup>13</sup>C NMR (75 MHz, CDCl<sub>3</sub>): δ = 145.2 (C2, 6, 4), 128.6 (C3, 5), 62.2 (C1'), 32.1 (C6'), 31.7 (C2'), 29.1 (C4'), 29.0 (C5'), 26.1 (C3'), 22.6 (C7'), 14.1 (C8'). IR (neat, cm<sup>-1</sup>): ν = 3028, 2856, 1633, 1502, 1468, 1377, 1321, 1219, 1172, 775, 723.



### 3-Butyl-1-methylimidazolium bromide

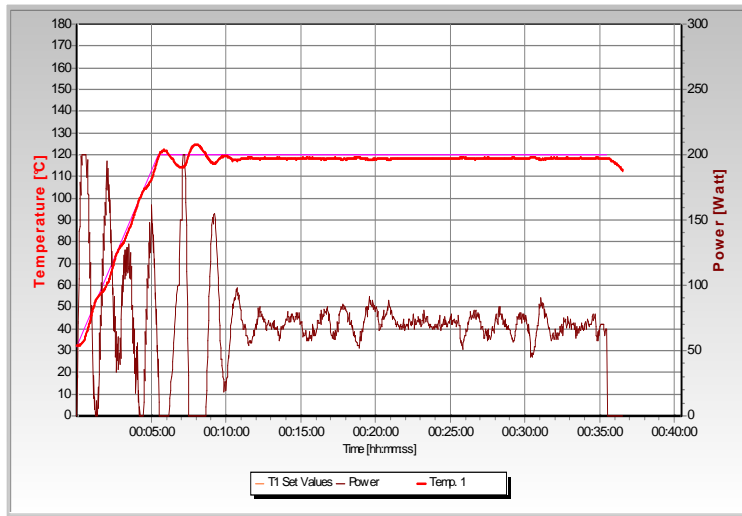
Orange oil. <sup>1</sup>H NMR (300 MHz, CDCl<sub>3</sub>): δ = 9.89 (s, 1H, H-2), 7.47 (d, 1H, *J* = 1.8 Hz, H-4), 7.36 (d, 1H, *J* = 1.8 Hz, H-5), 4.04 (t, 2H, *J* = 7.2 Hz, H-1' *but*), 3.81 (s, 3H, N<sup>1</sup>-CH<sub>3</sub>), 1.59 (m, 2H, *J* = 7.5 Hz, H-2' *but*), 1.05 (m, 2H, *J* = 7.5 Hz, H-3' *but*), 0.62 (t, 3H, *J* = 7.5 Hz, H-4' *but*). <sup>13</sup>C NMR APT (75 MHz, CDCl<sub>3</sub>): δ = 136.2 (C2), 123.2 (C4), 121.7 (C5), 49.0 (C1'), 36.0 (N<sup>1</sup>-CH<sub>3</sub>), 31.5 (C2'), 18.7 (C3'), 12.8 (C4'). IR (neat, cm<sup>-1</sup>): ν = 3138, 2872, 1570, 1464, 1381, 1336, 1172, 1115, 825, 754.



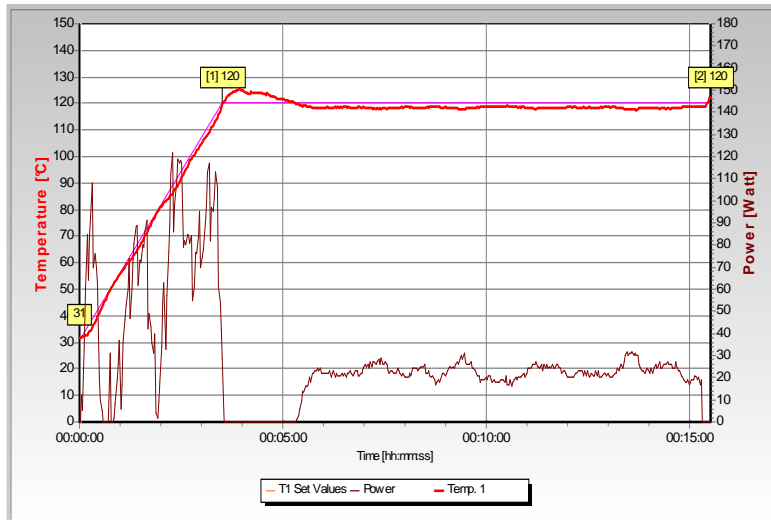


# Graphics

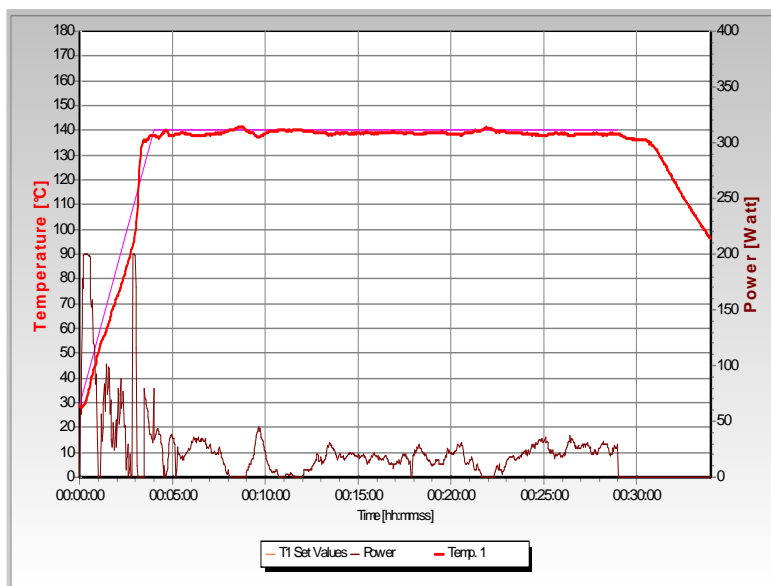
## OMImPF<sub>6</sub> (entry 1)



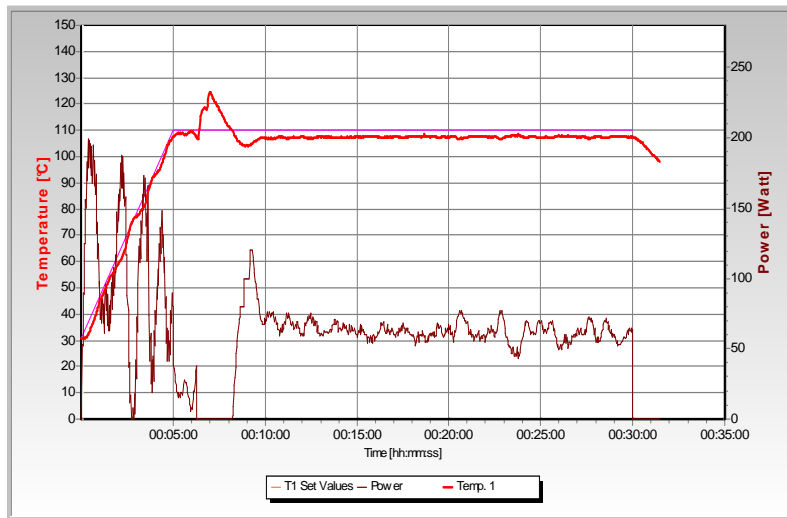
## OMImPF<sub>6</sub> (B)



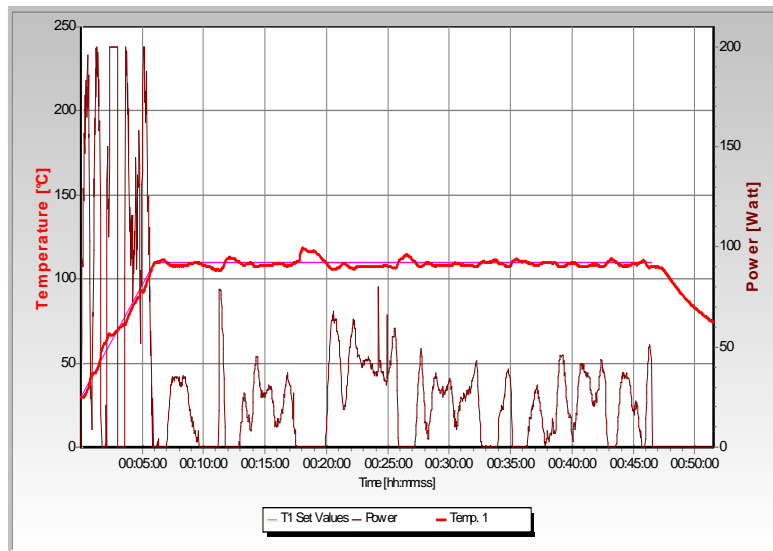
## OMImBF<sub>4</sub> (entry 20)



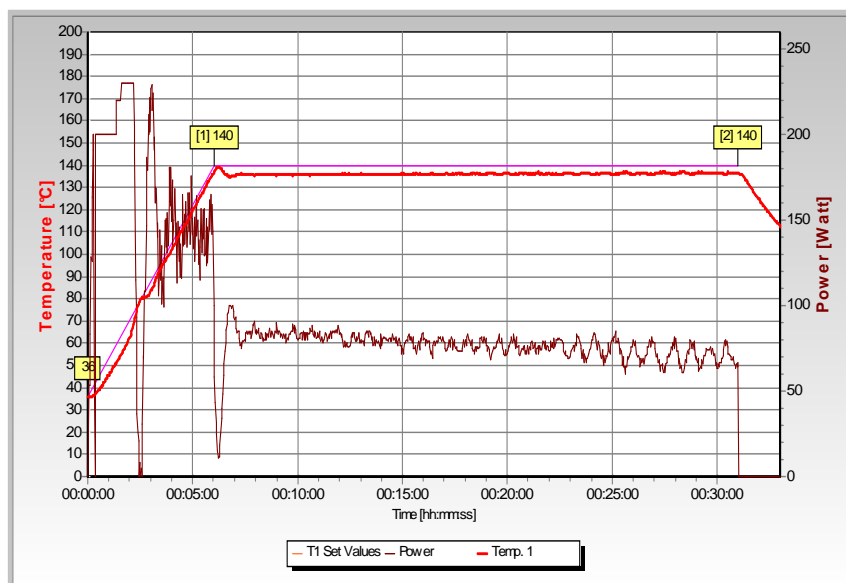
### OMImOTf (entry 3)



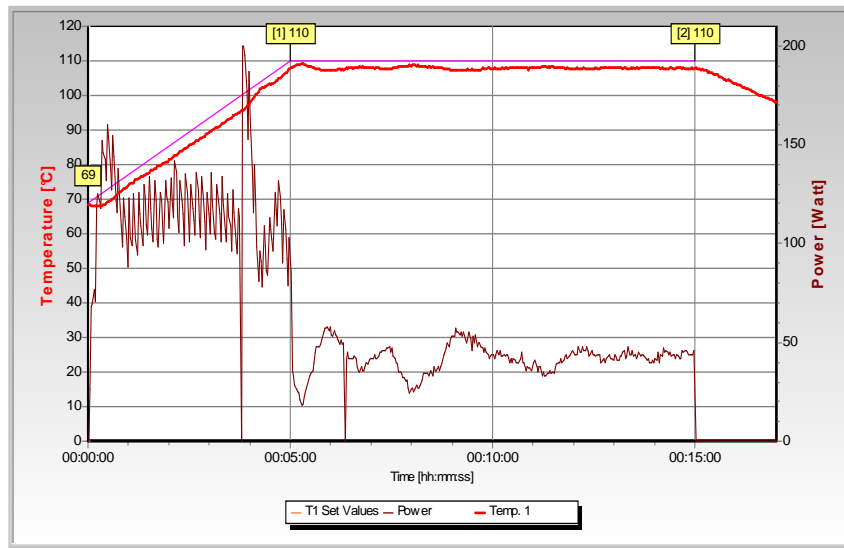
### OMImOTf (entry 21)



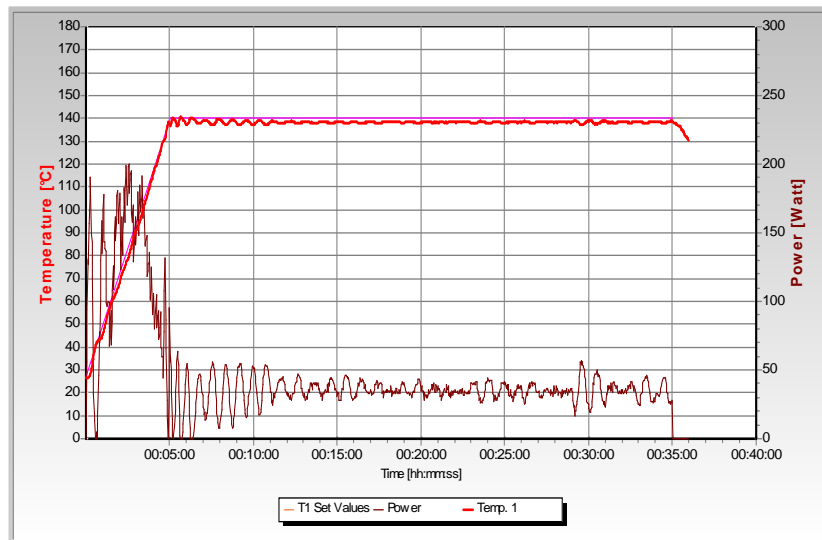
### OMImN(Tf)<sub>2</sub> (entry 4)



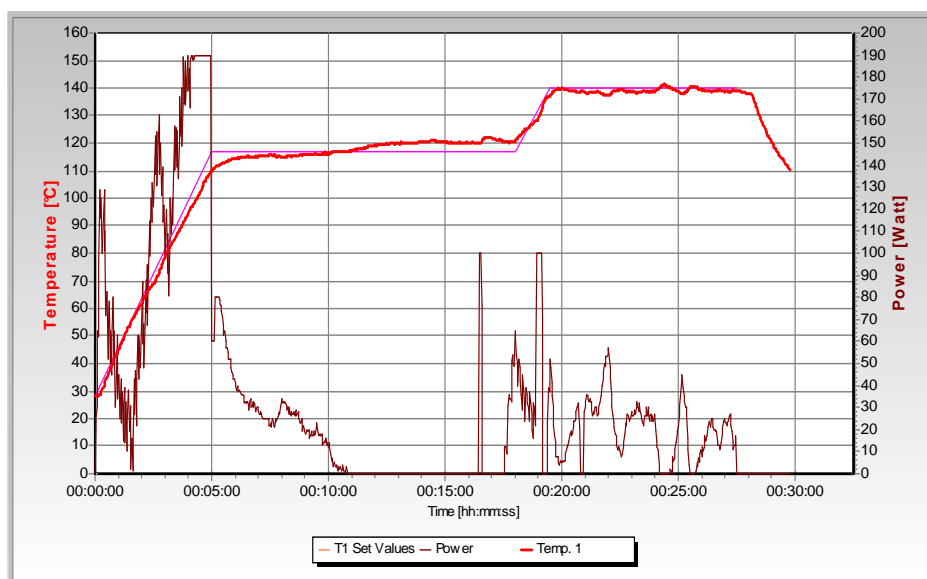
### OPyPF<sub>6</sub> (entry 5)



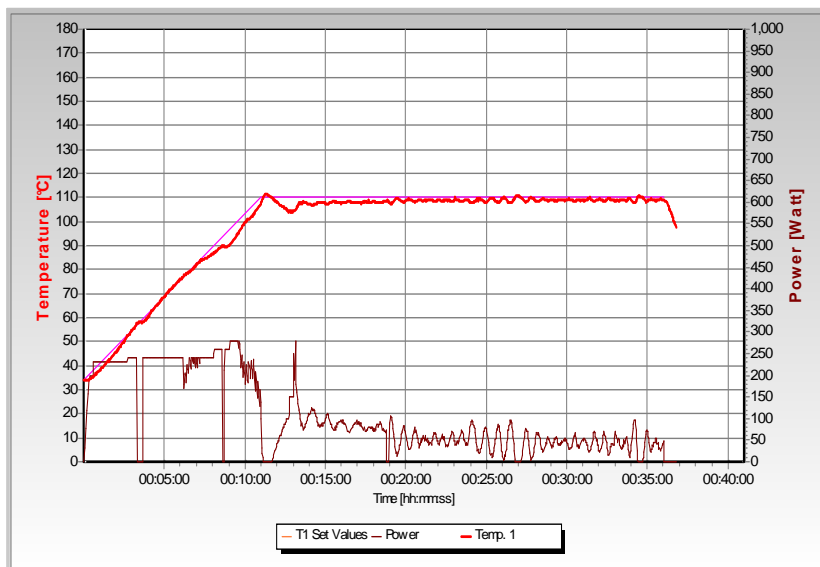
### OPyBF<sub>4</sub> (entry 6)



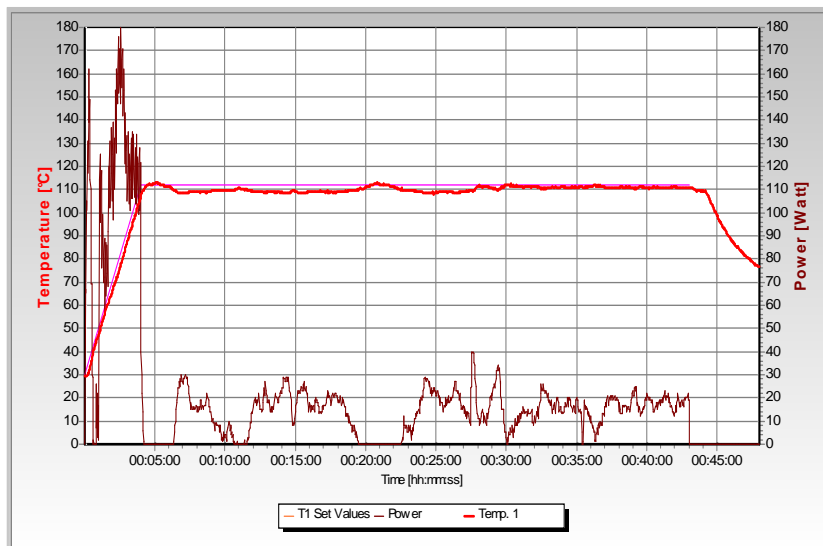
### OPyBF<sub>4</sub> (entry 25)



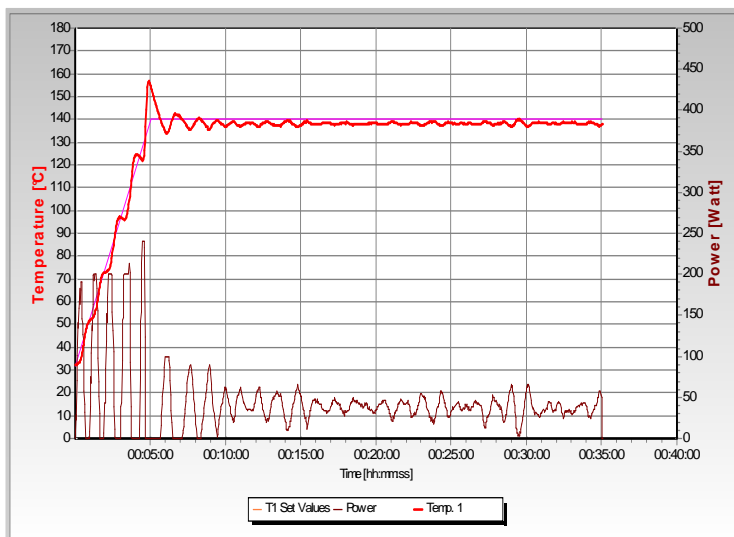
### OPyOTf (entry 7)



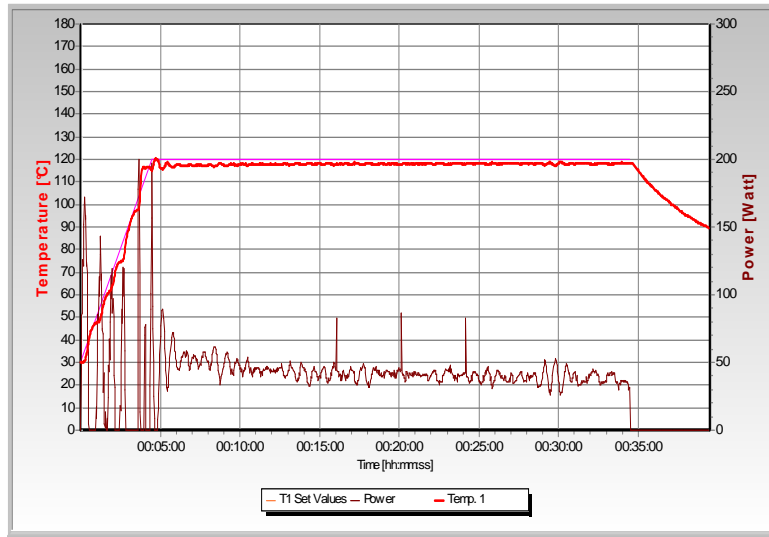
### OPyOTf (entry 26)



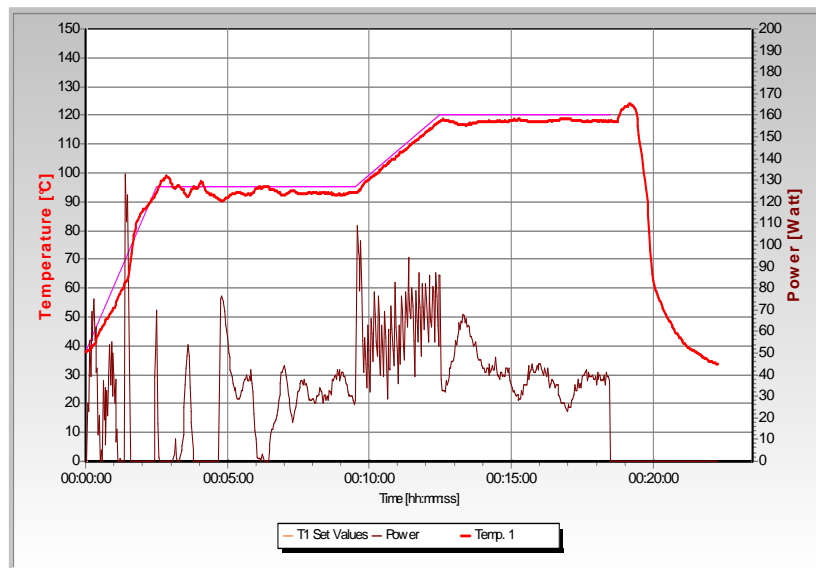
### OpyN(Tf)<sub>2</sub> (entry 8)



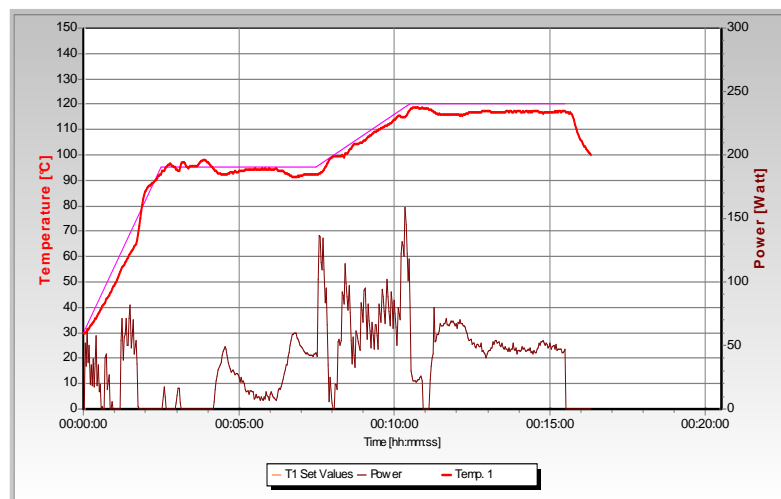
### BMIImPF<sub>6</sub> (entry 10)



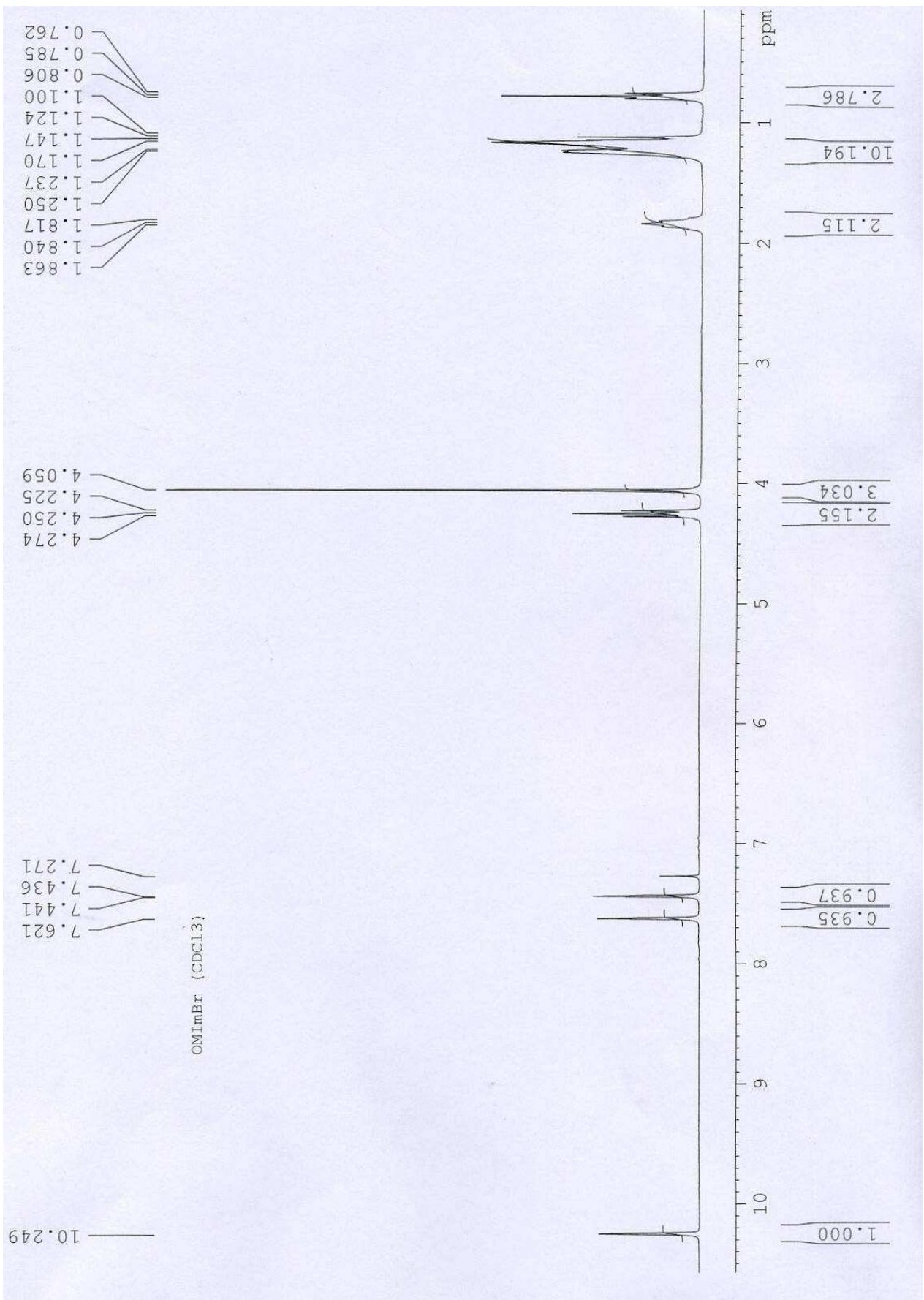
### BMIImPF<sub>6</sub> (entry 27 bis)

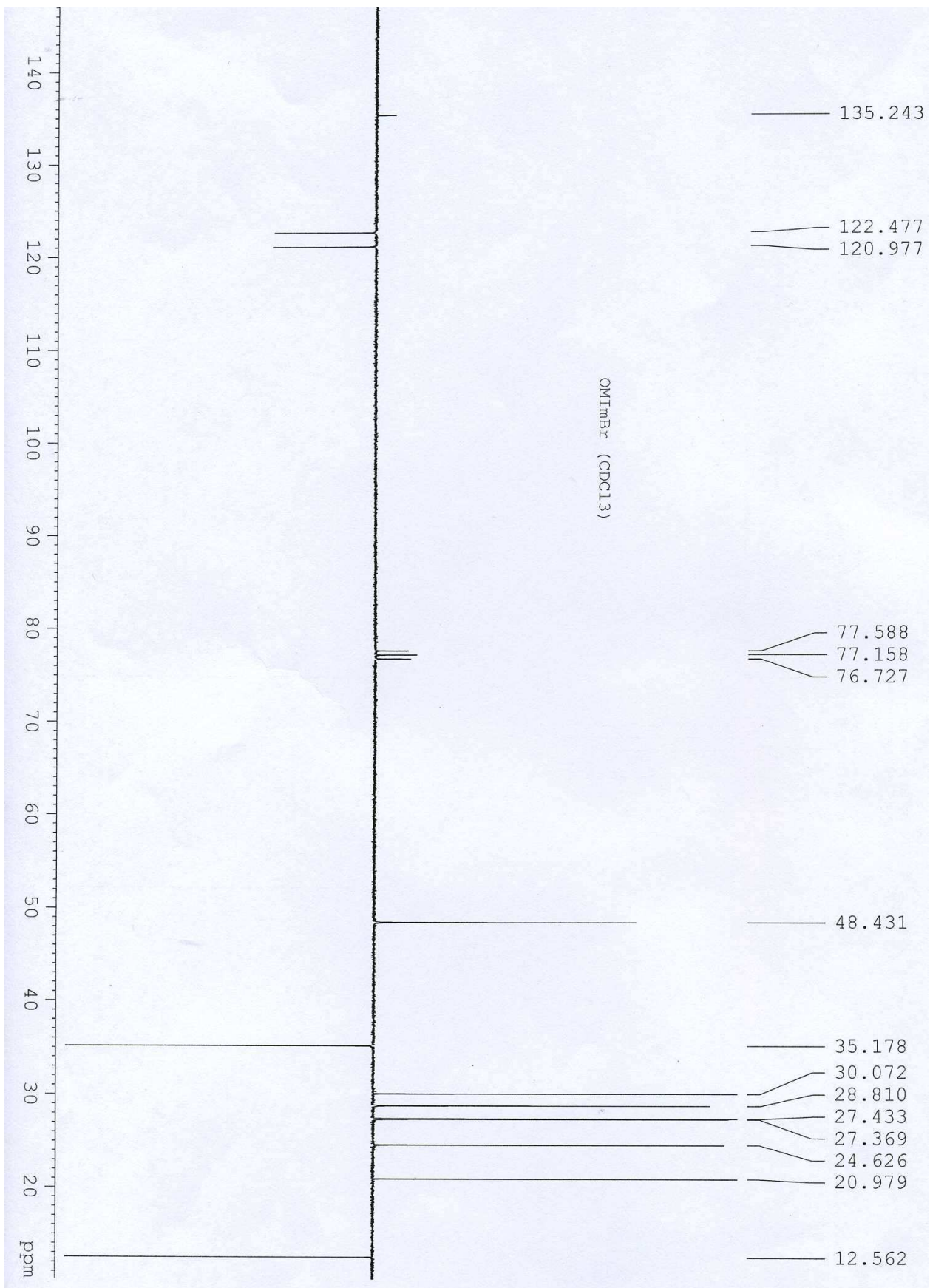


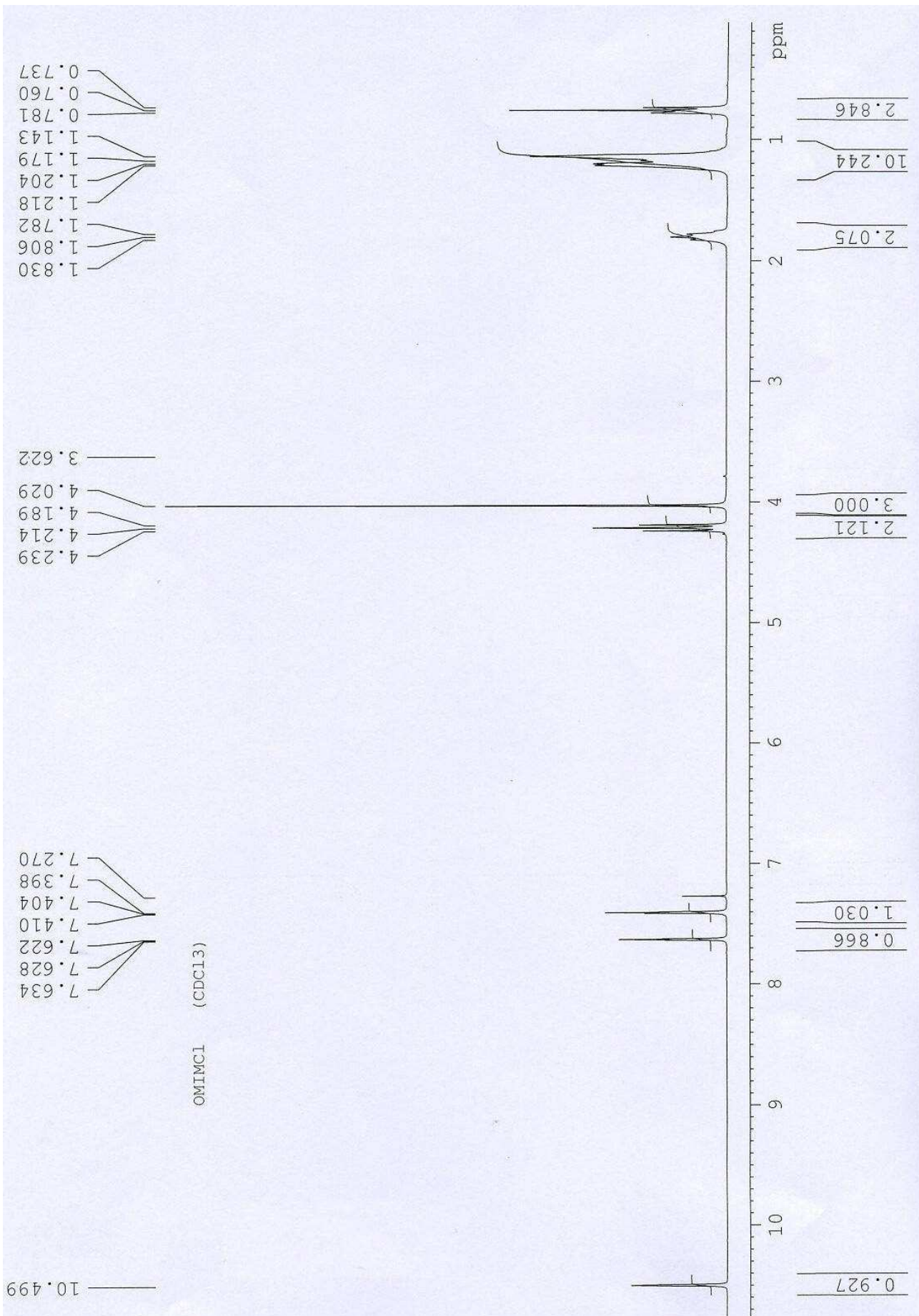
### BMIImBF<sub>4</sub> (entry 28)



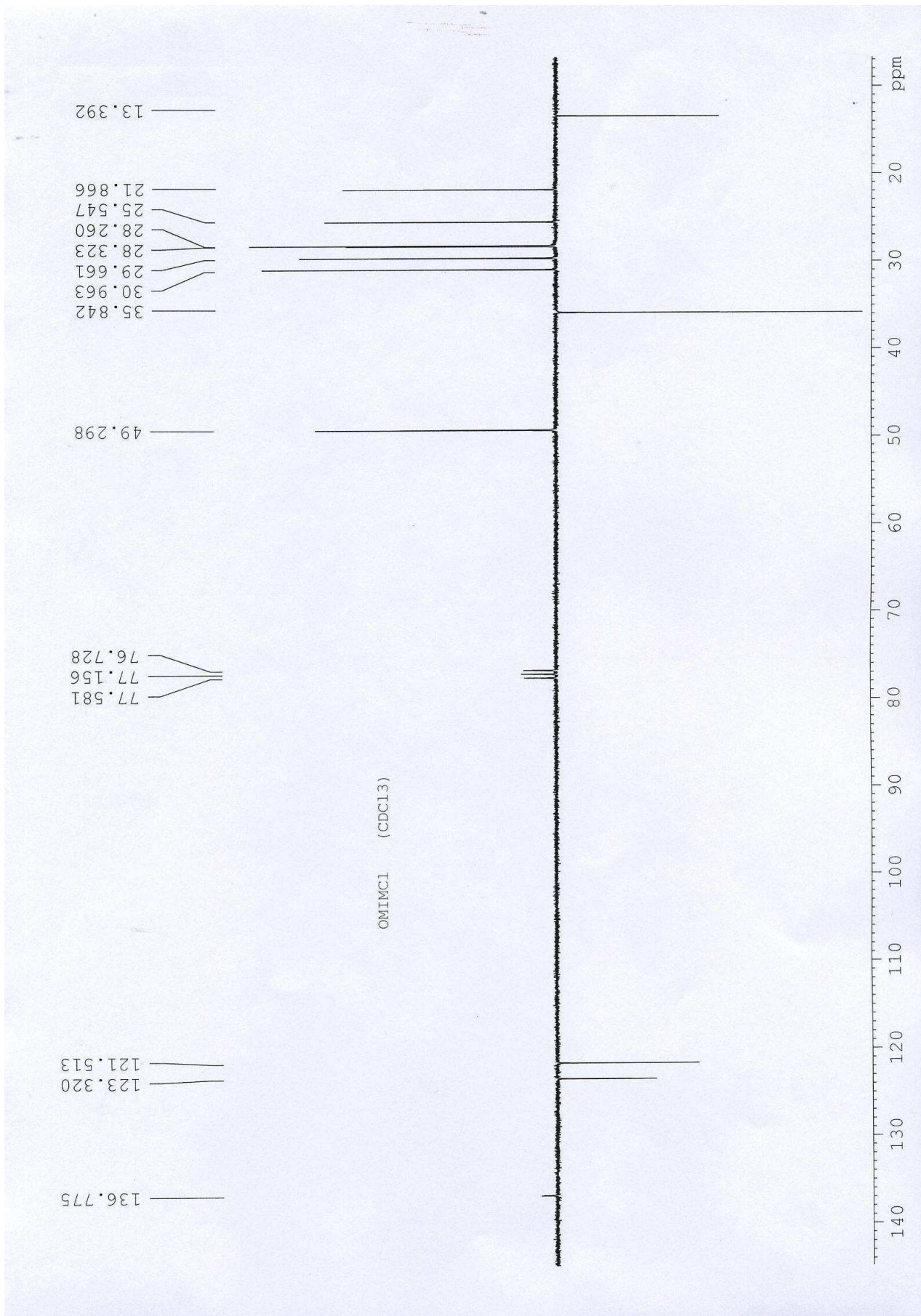
# NMR spectra

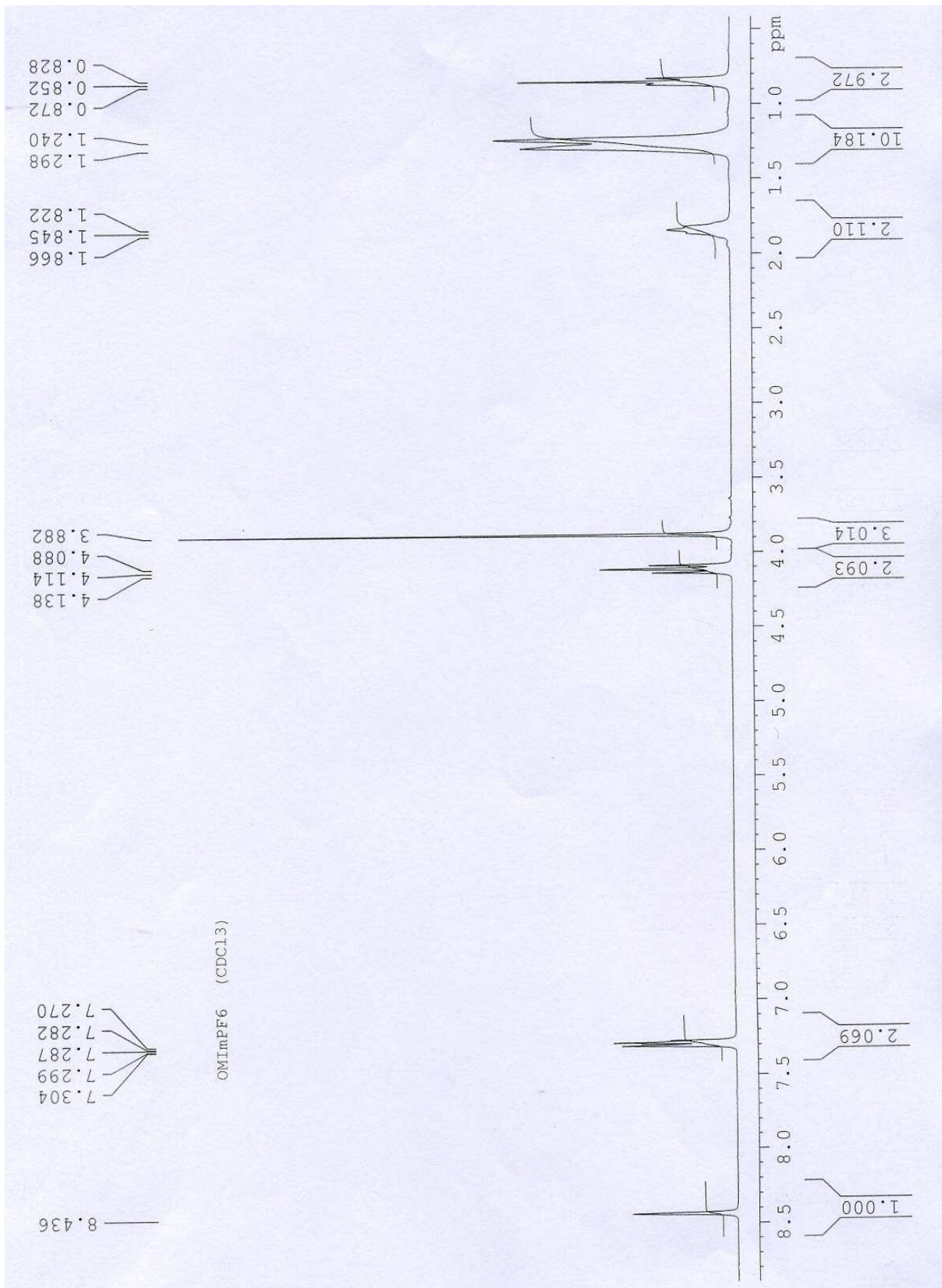


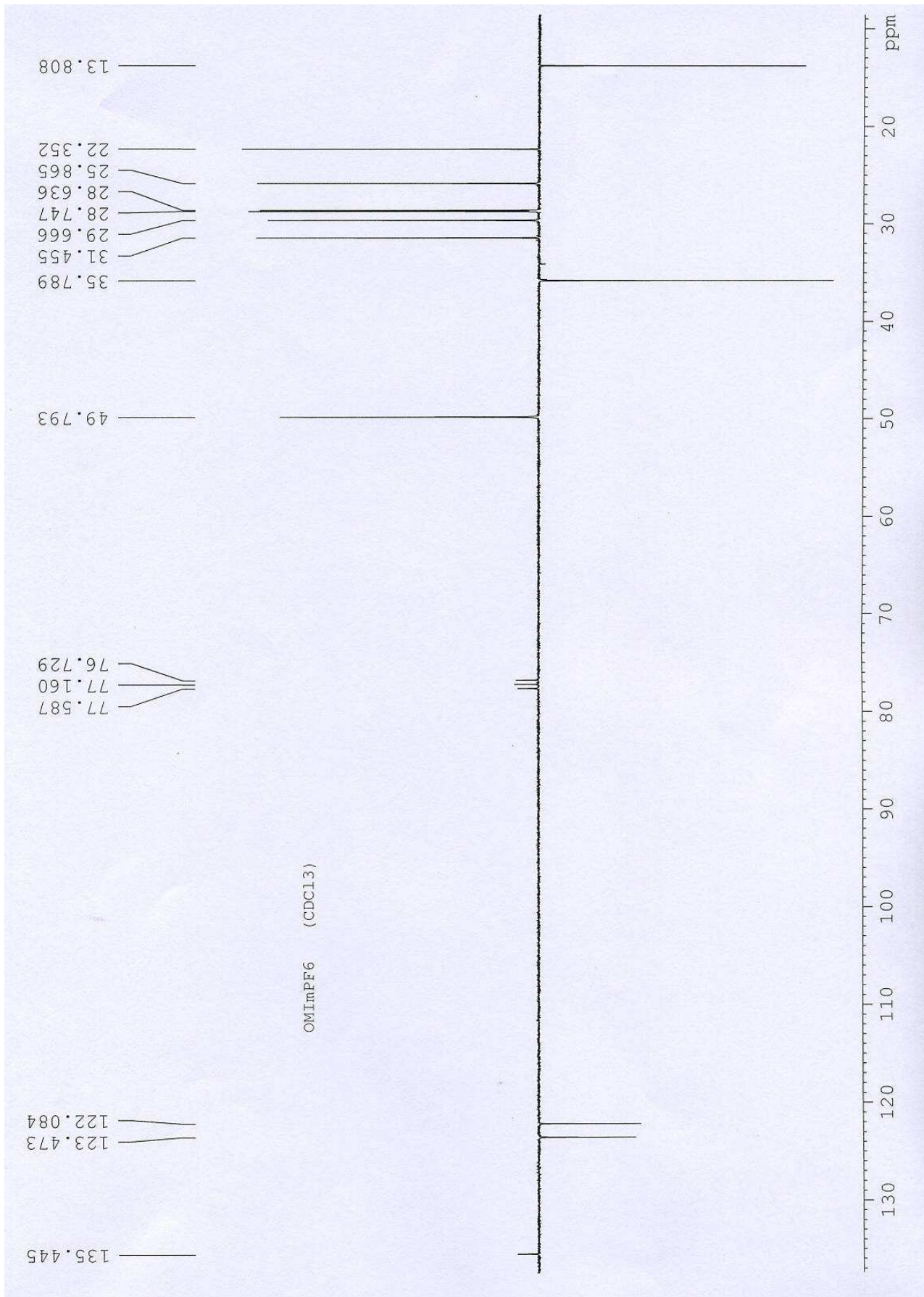


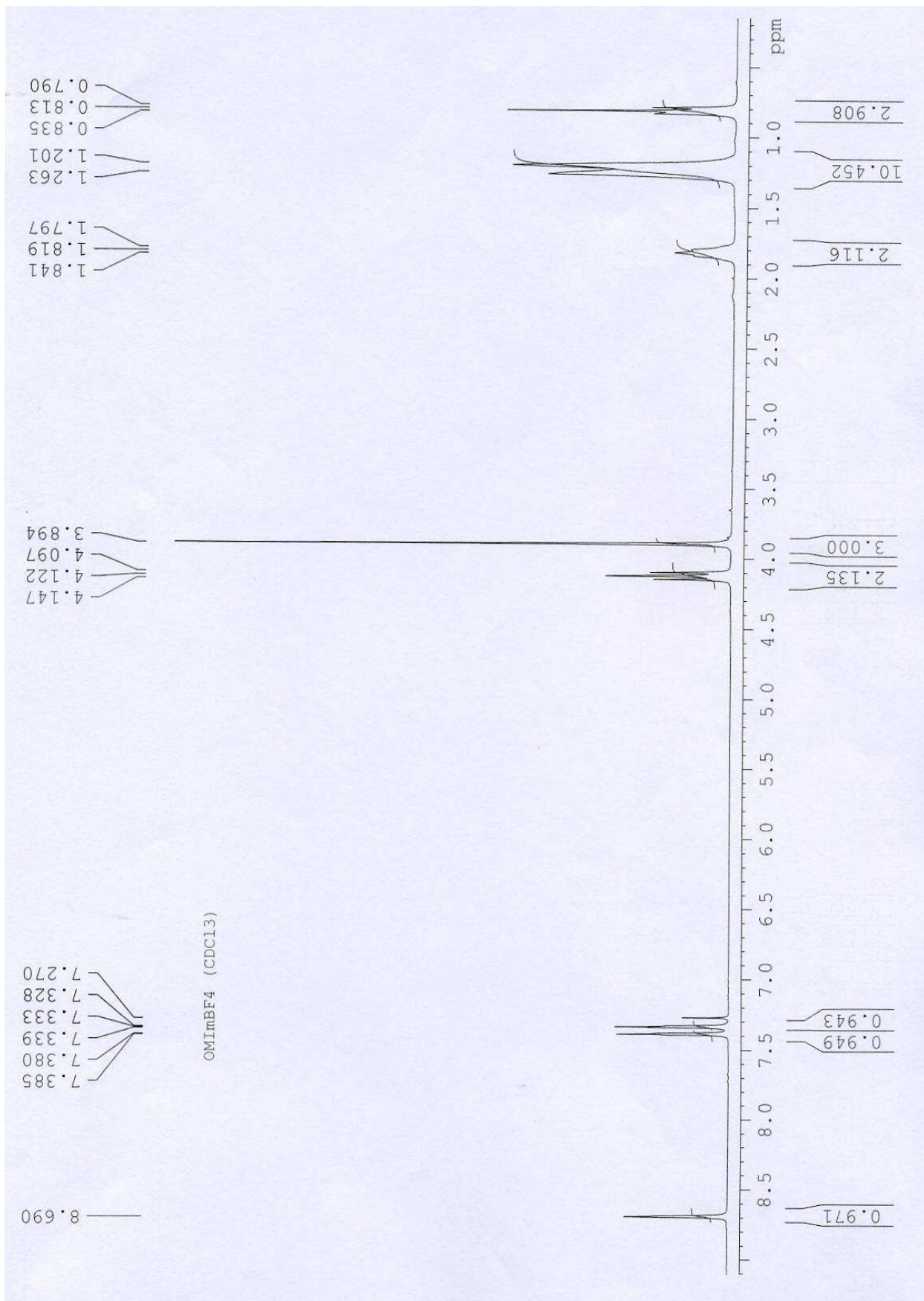


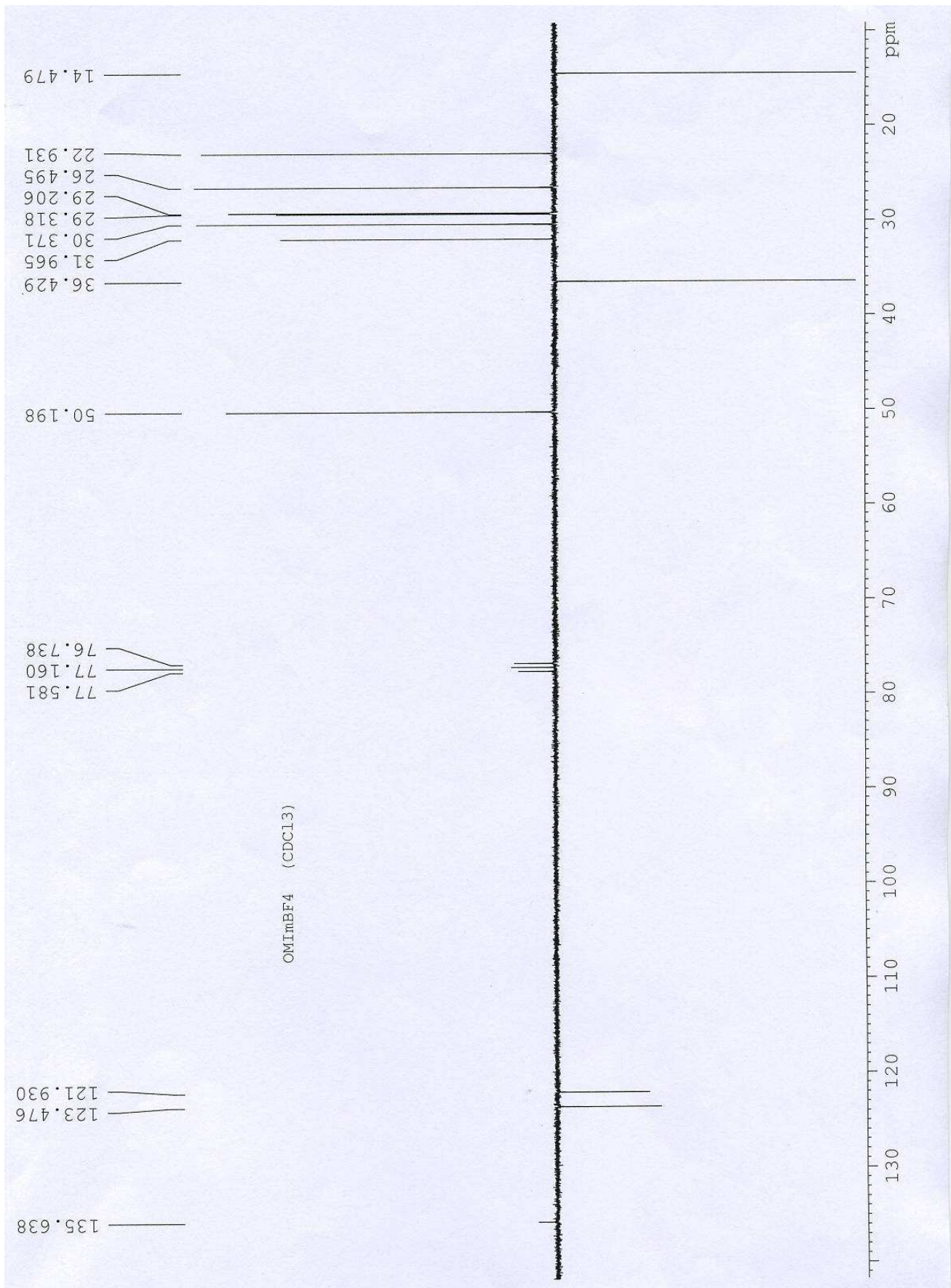


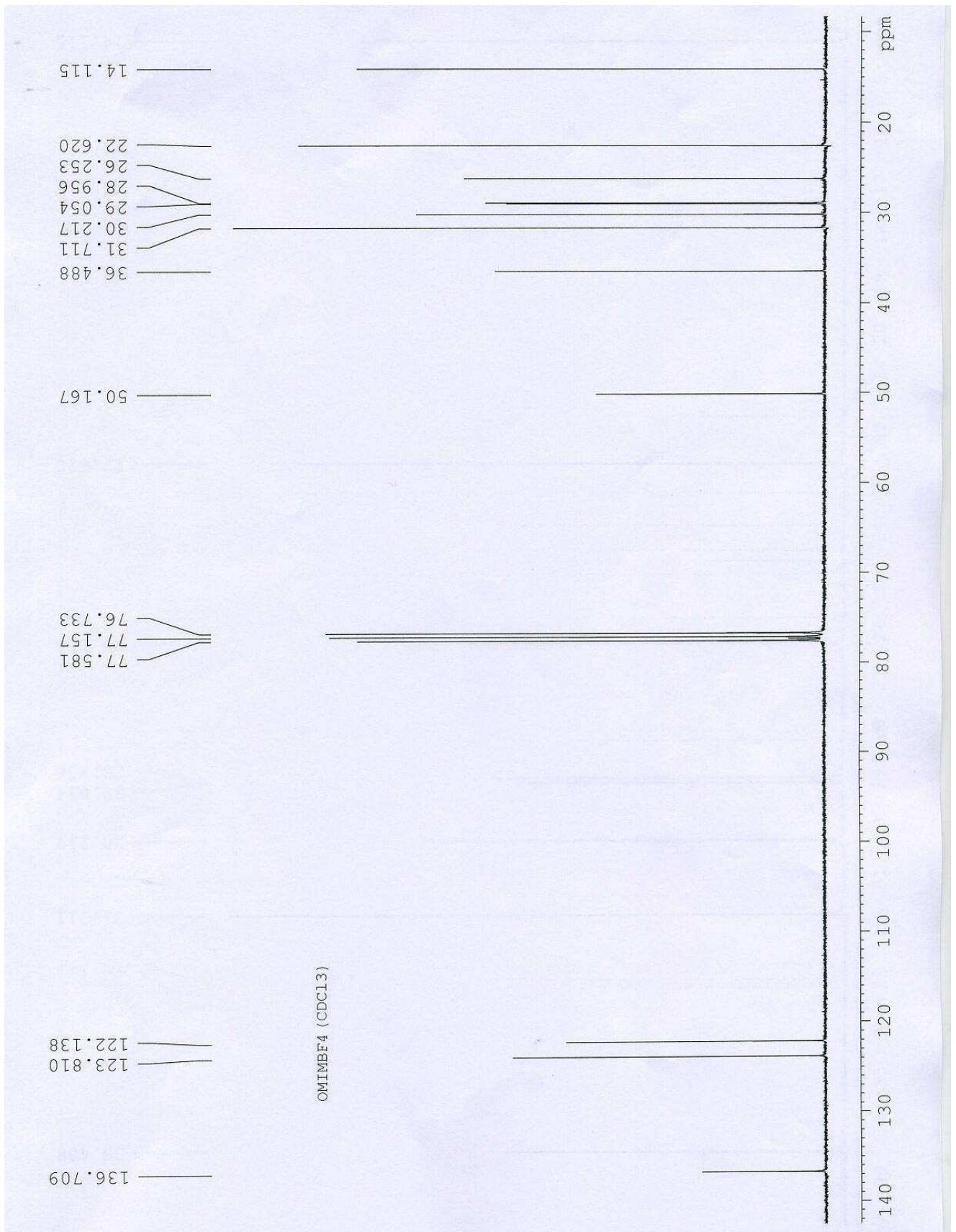


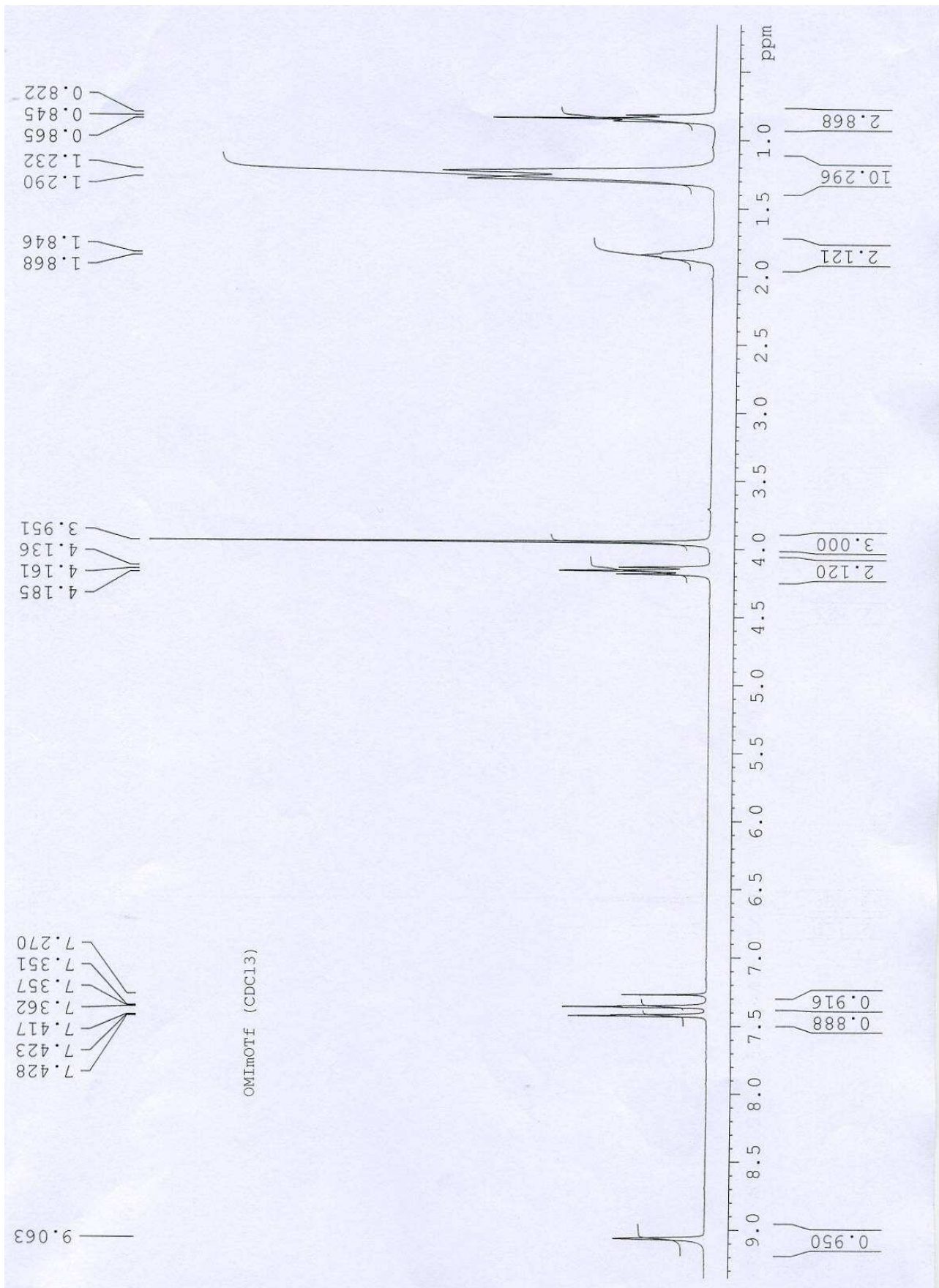


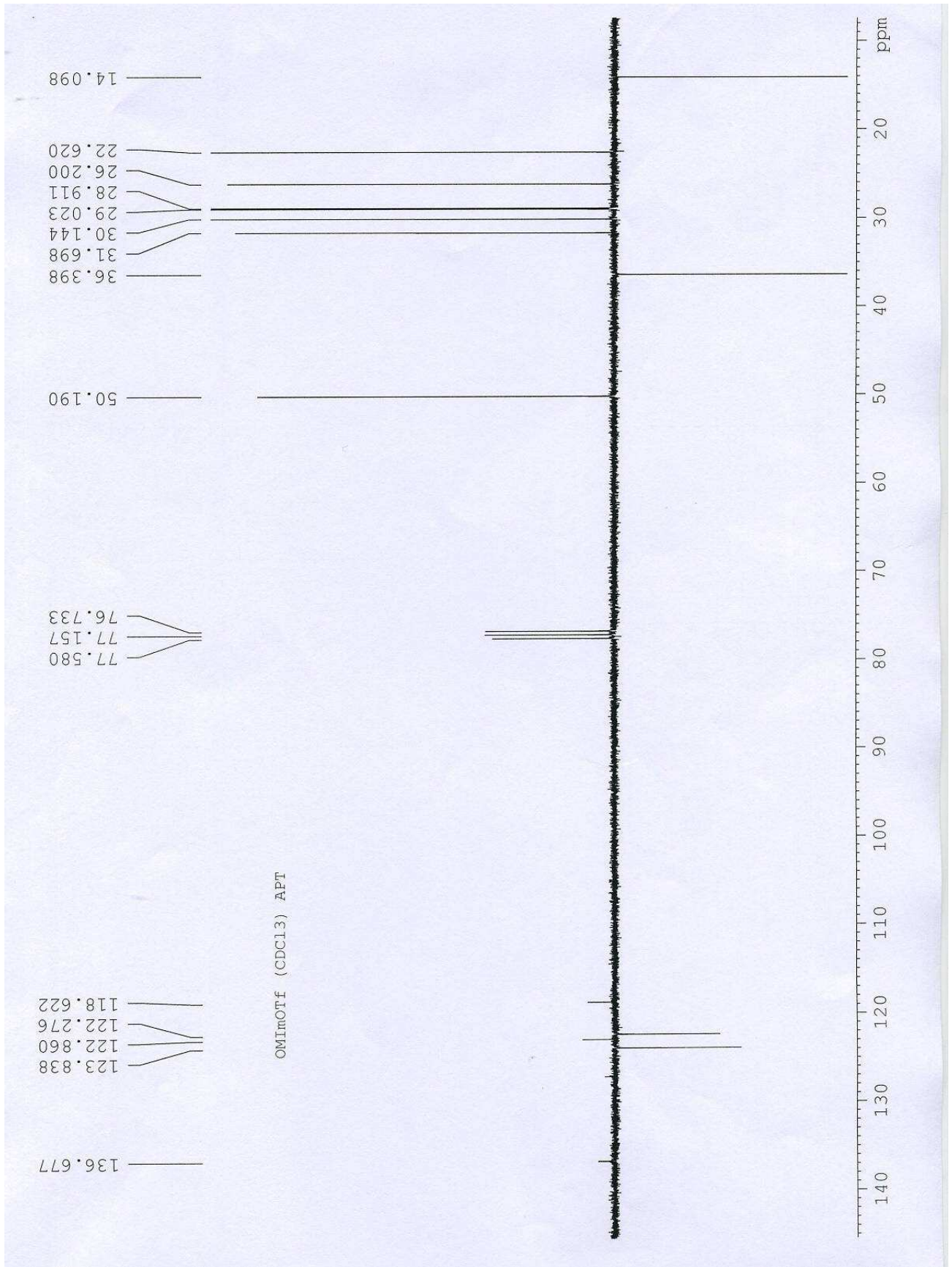




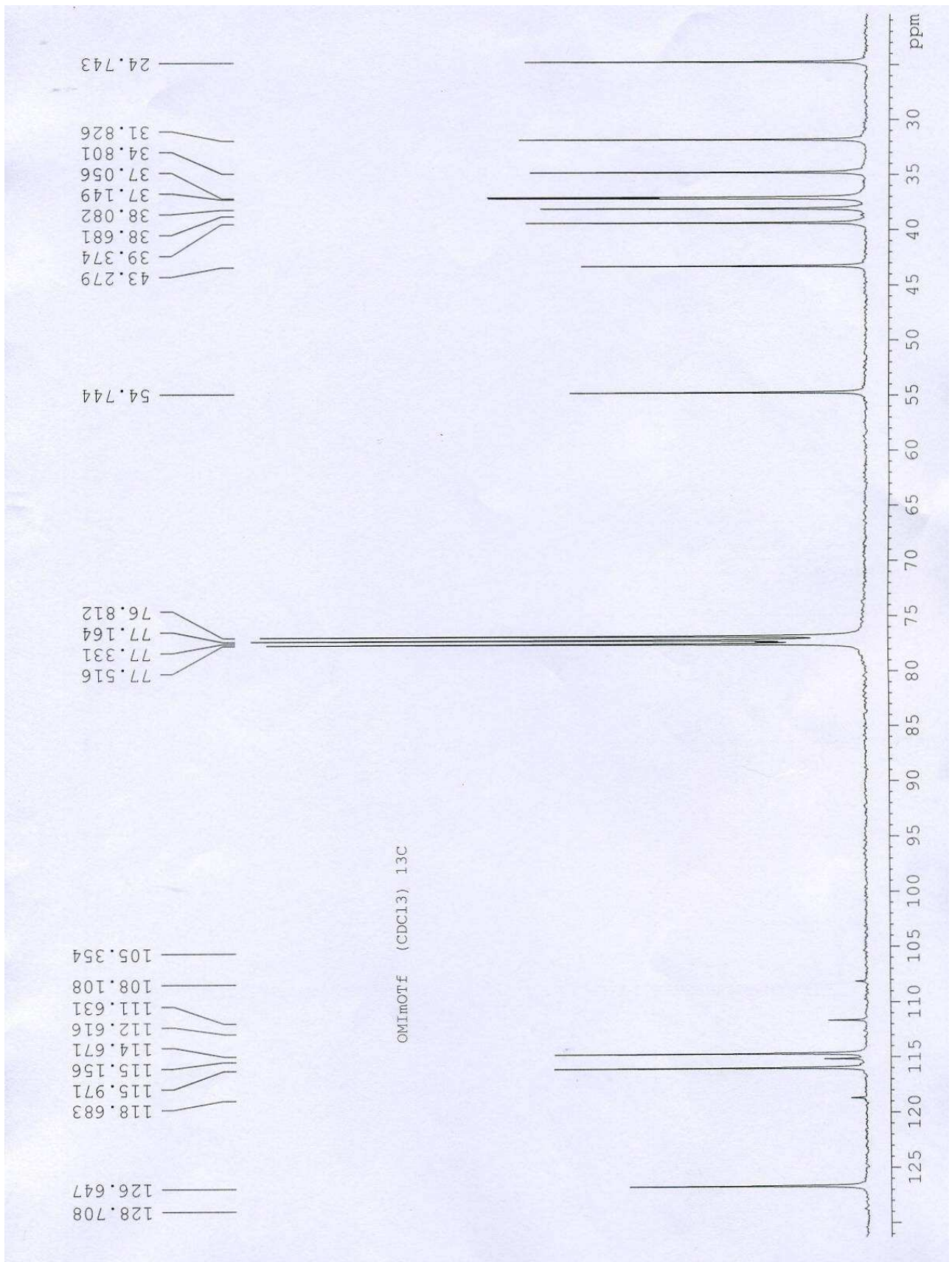


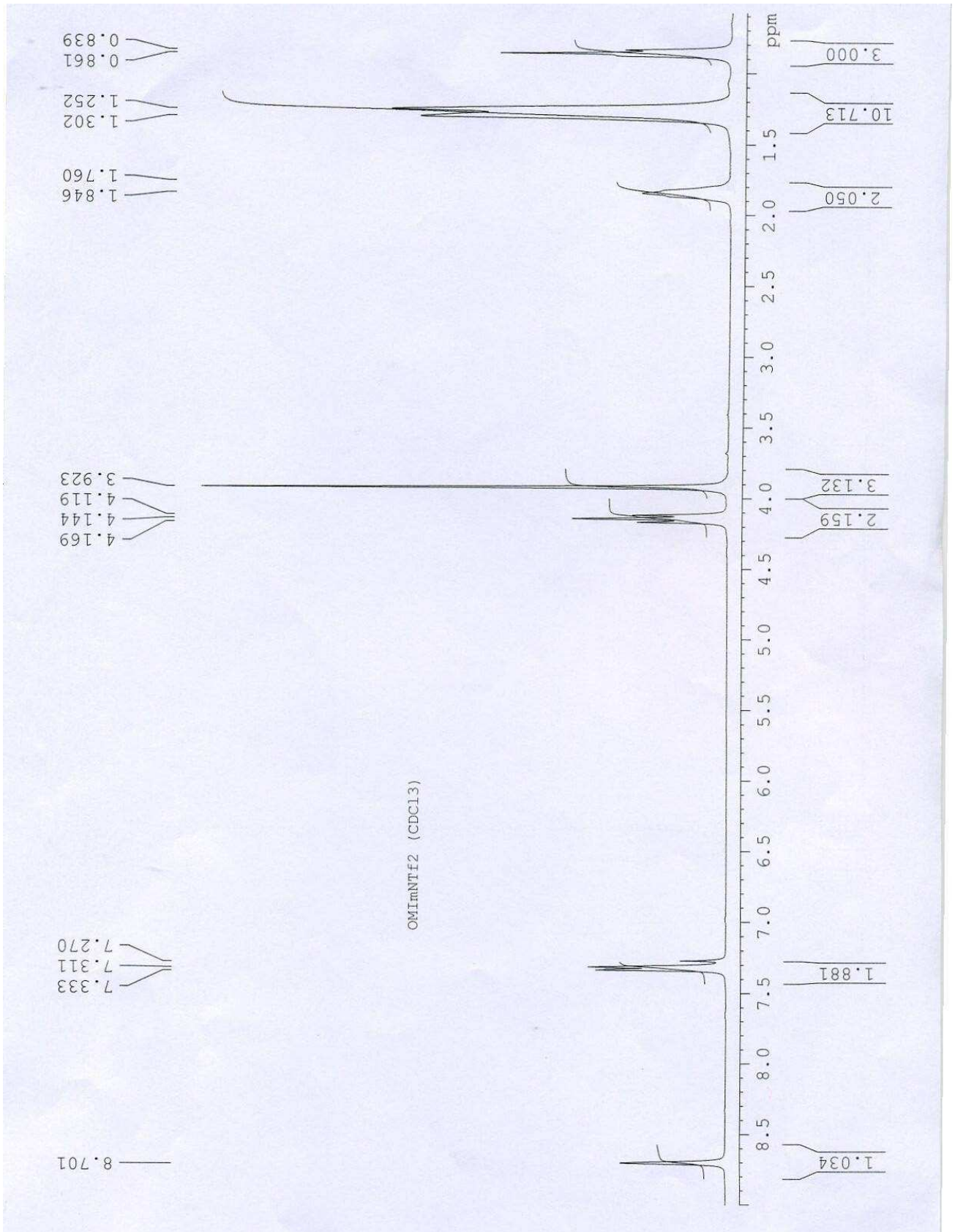


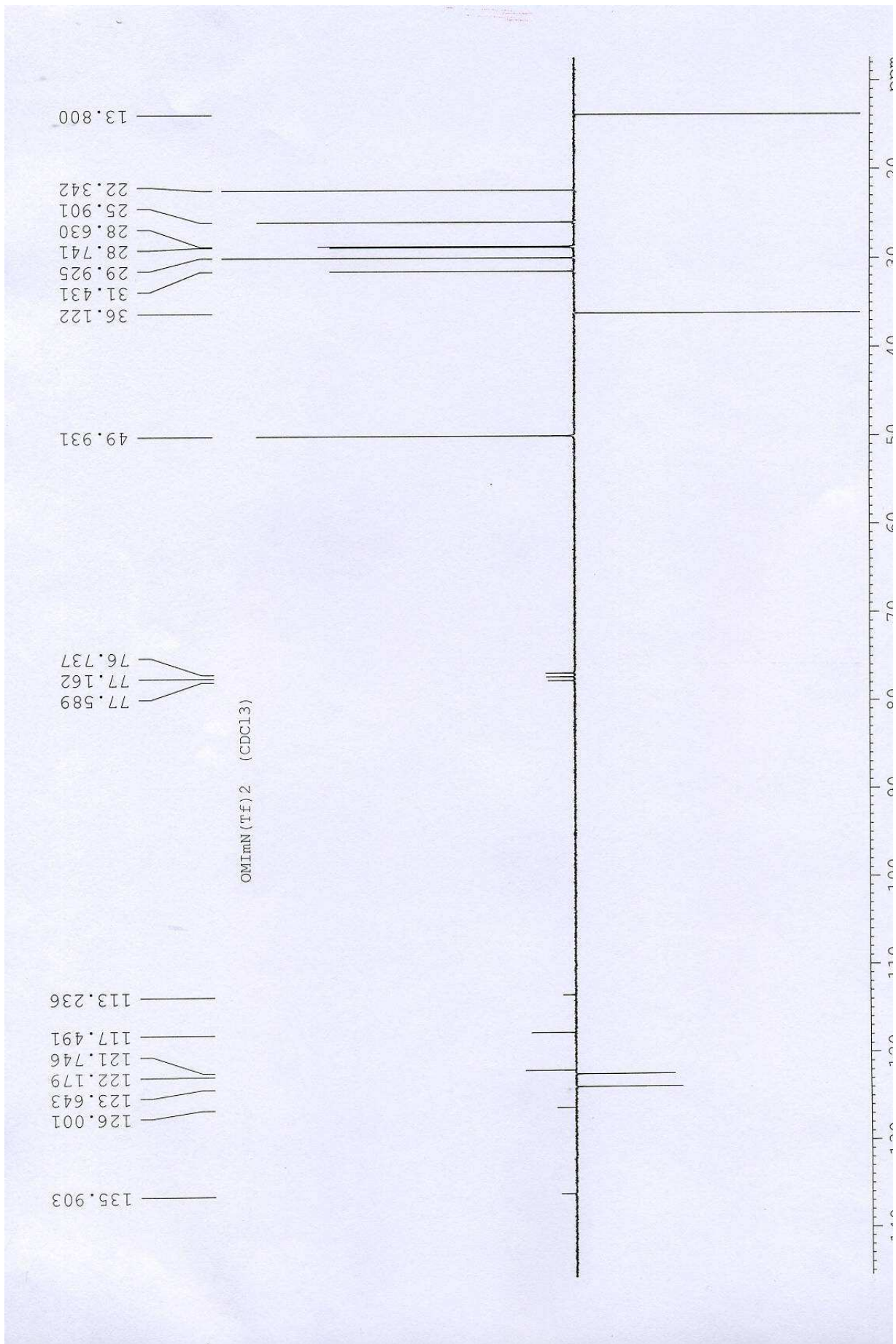


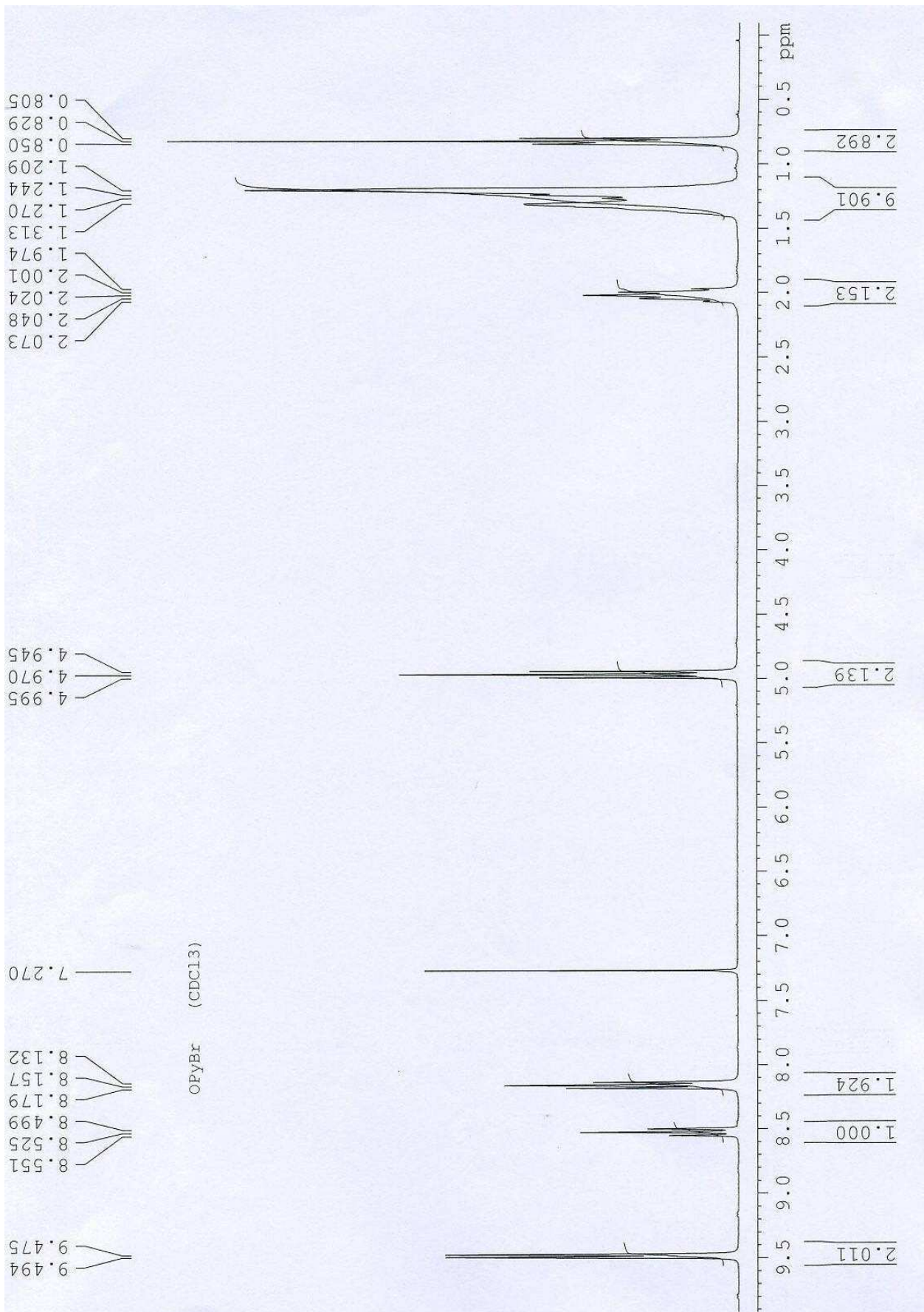


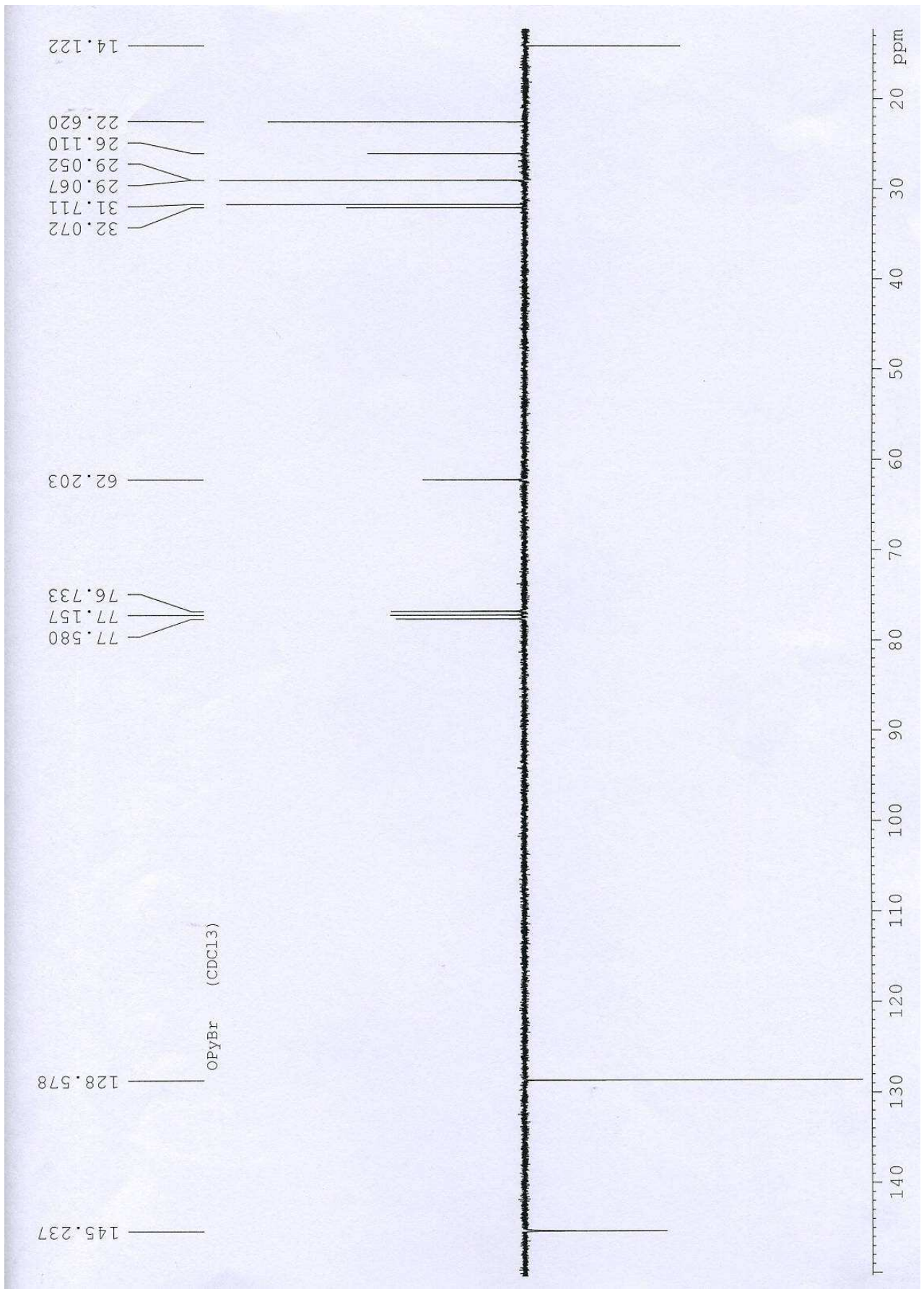


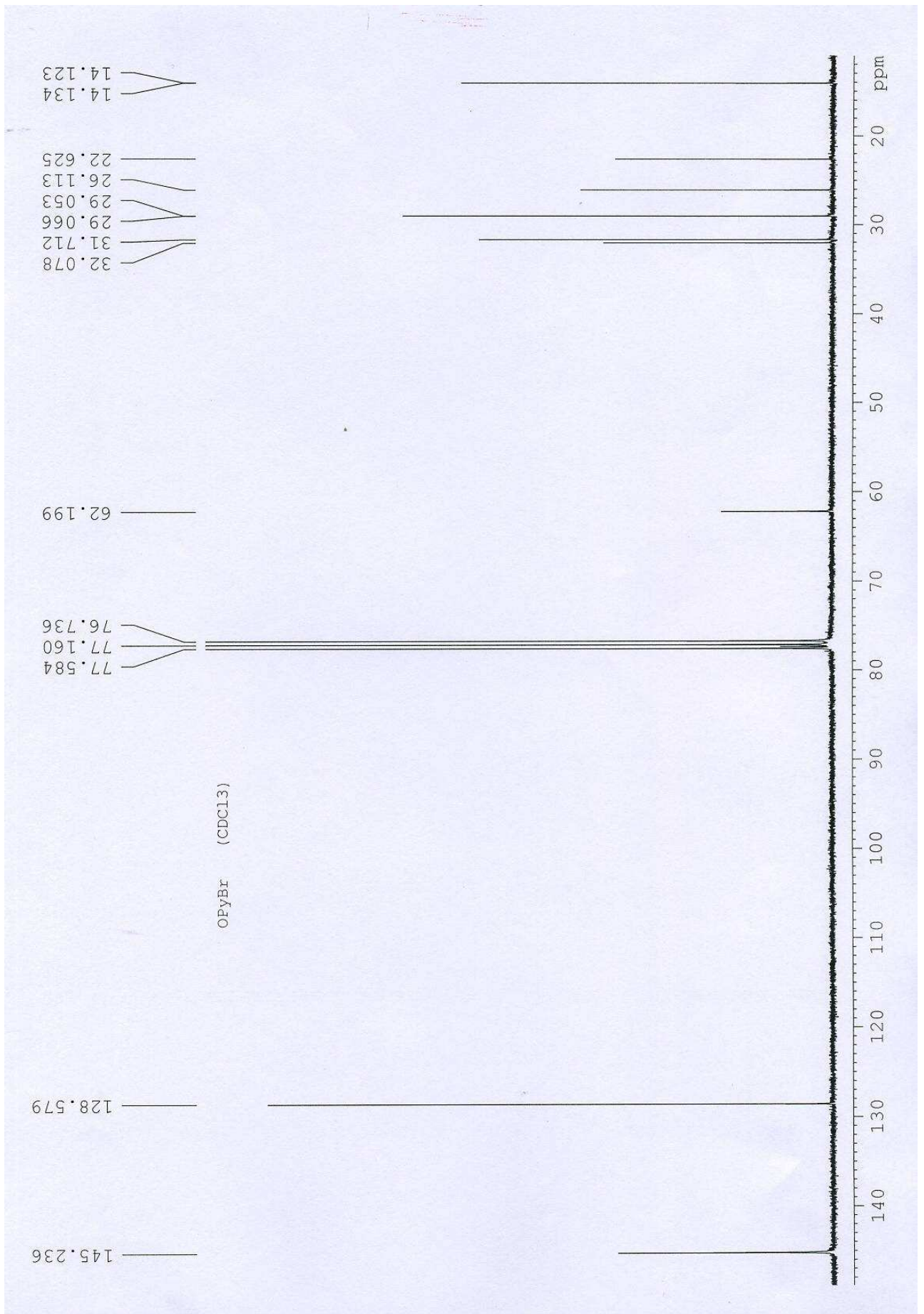


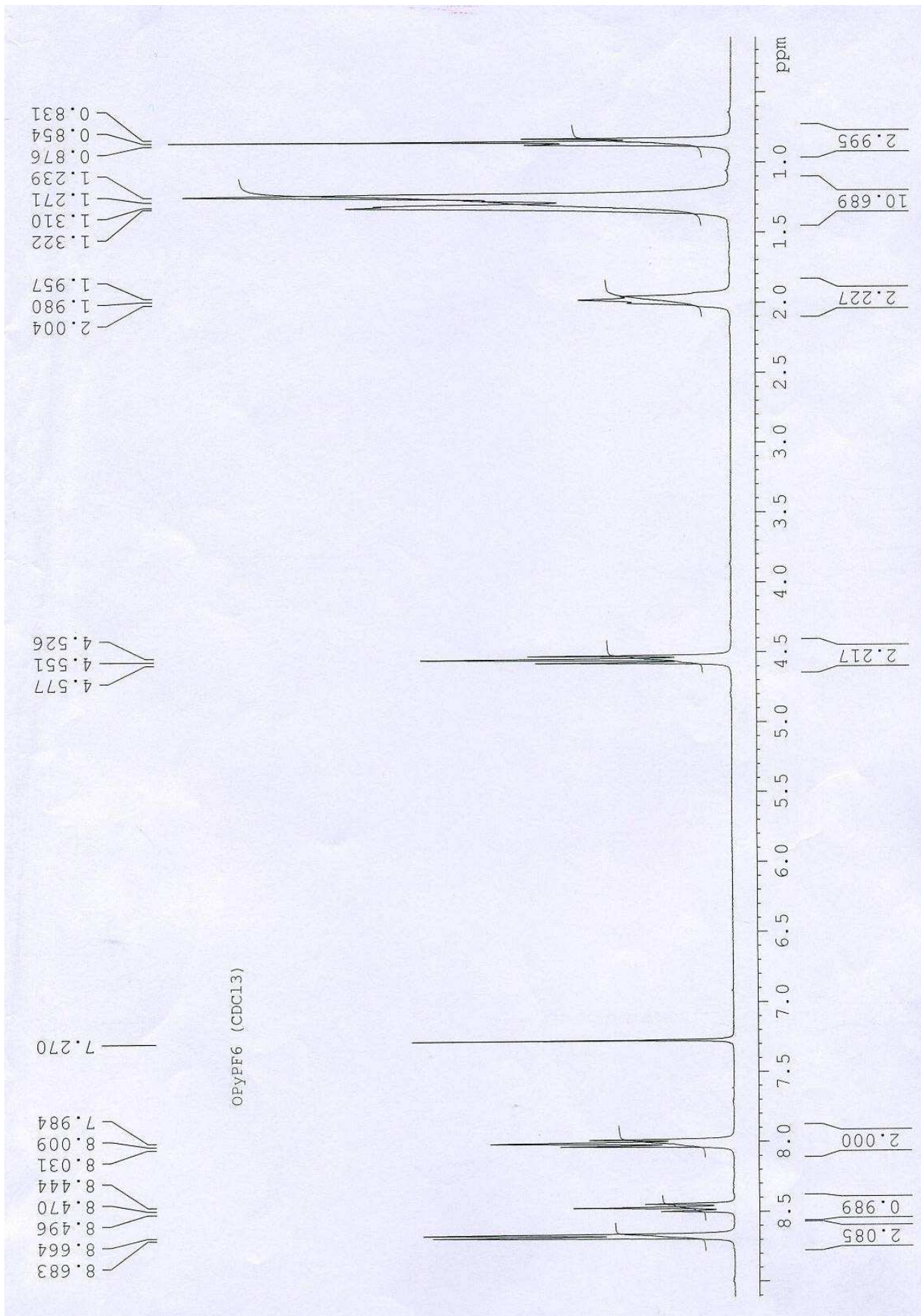


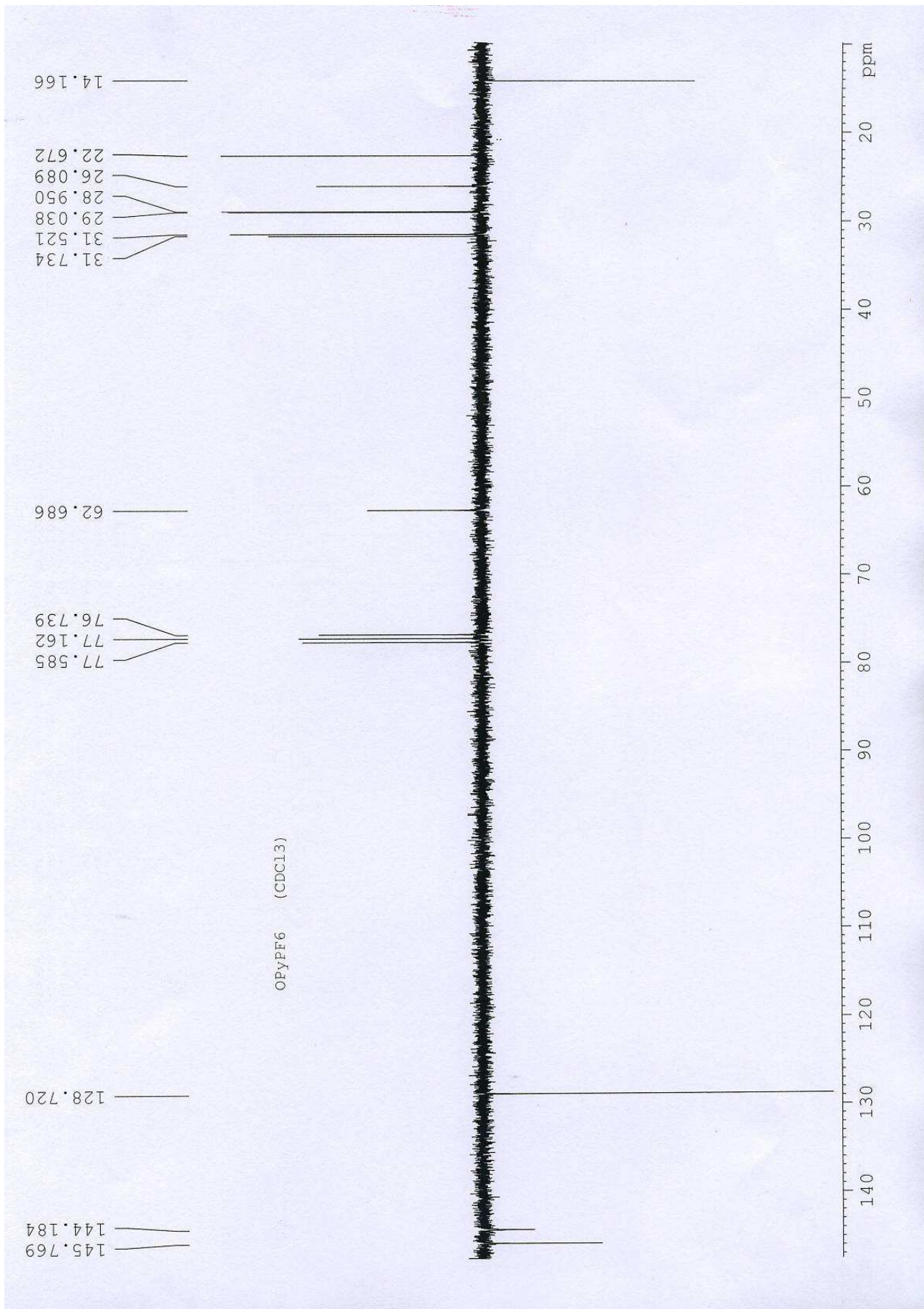




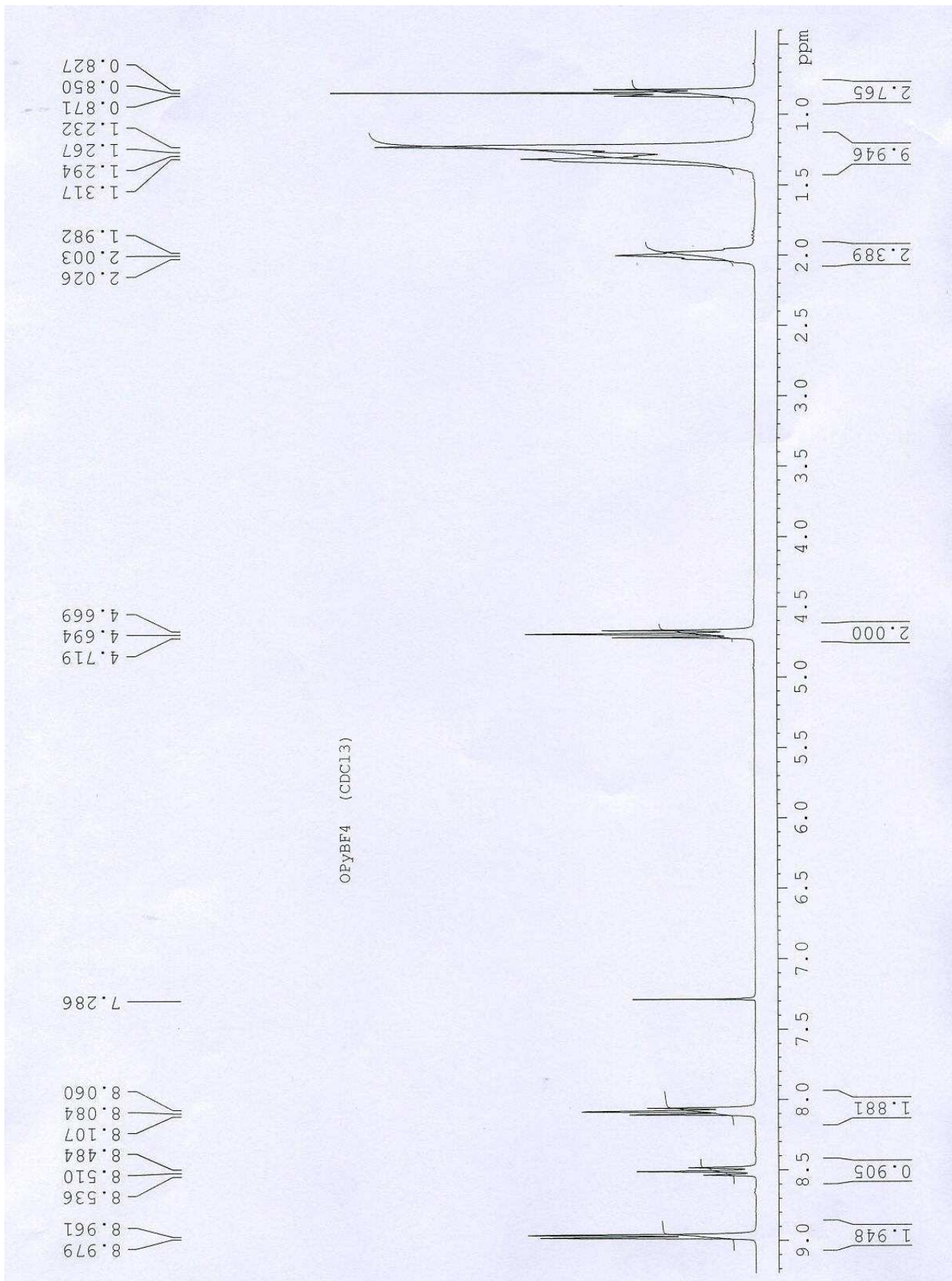


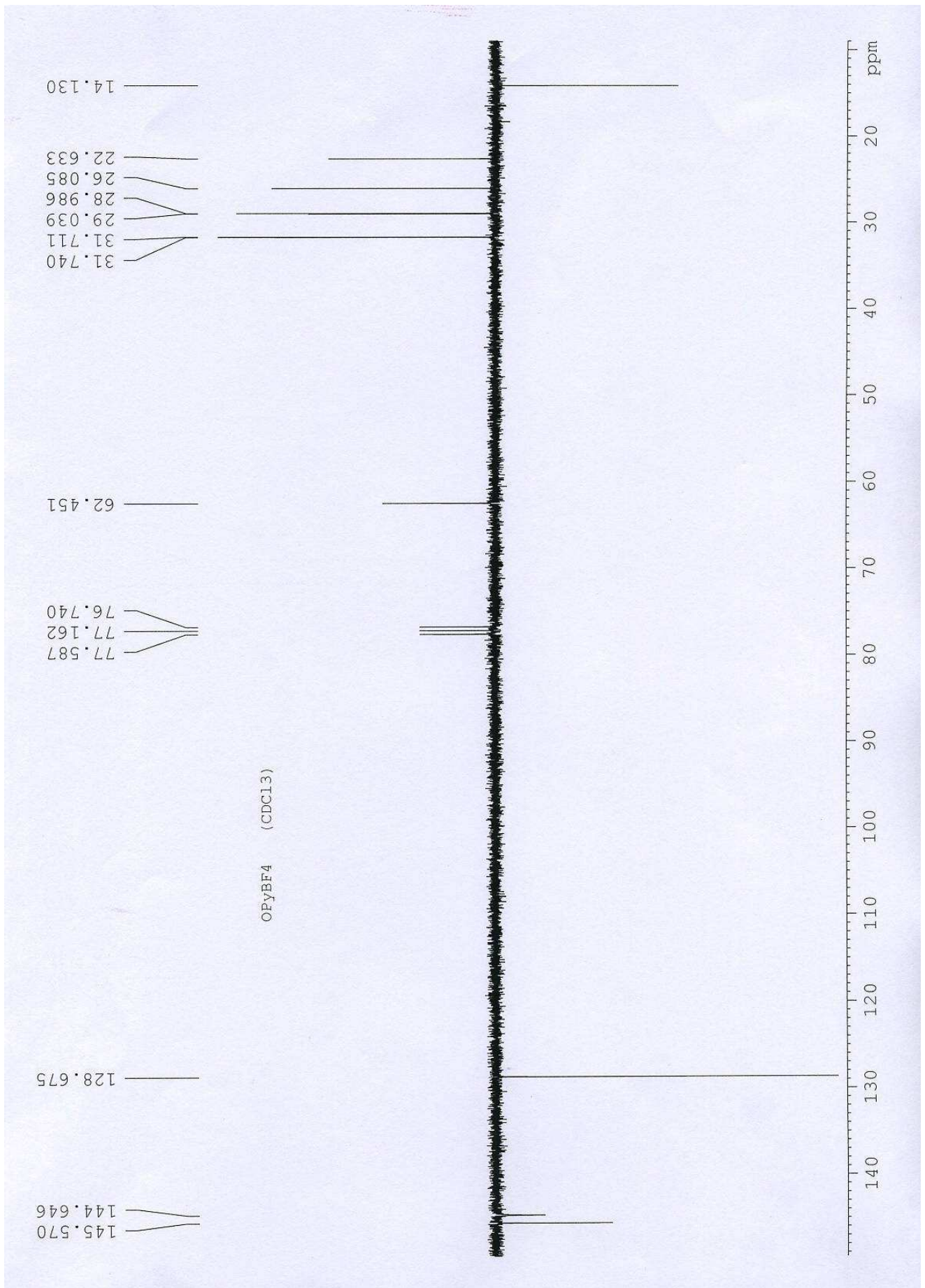


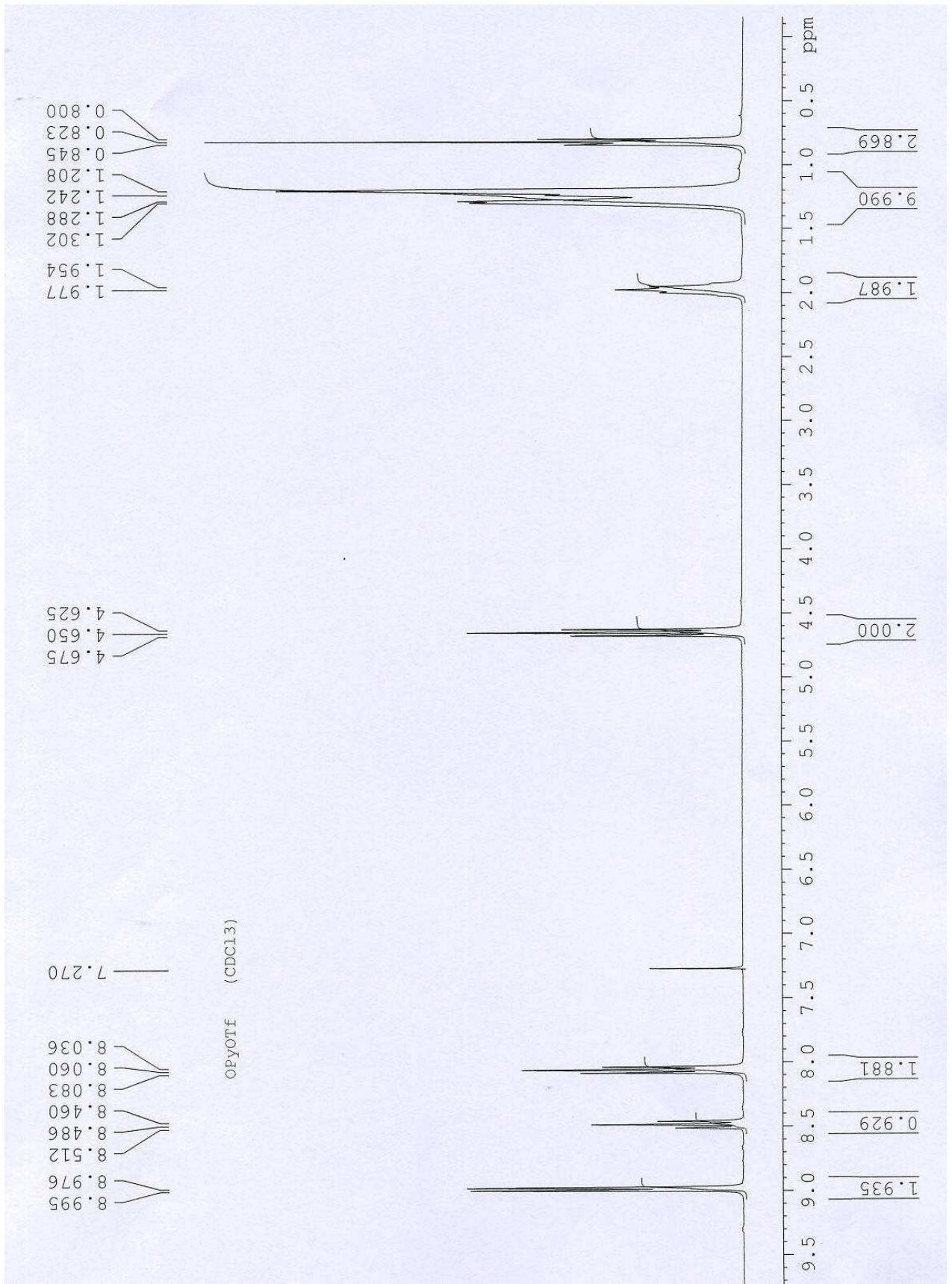


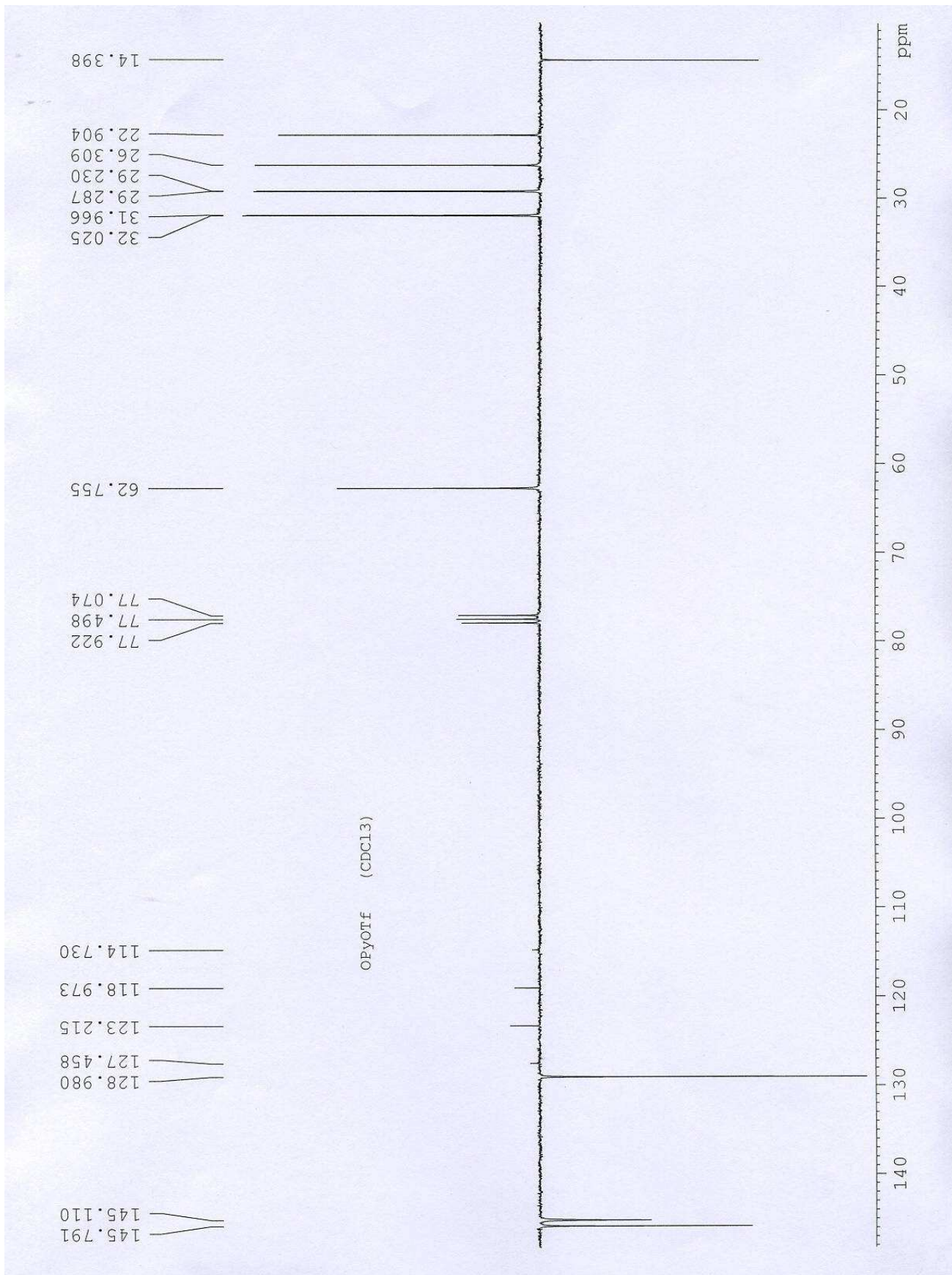


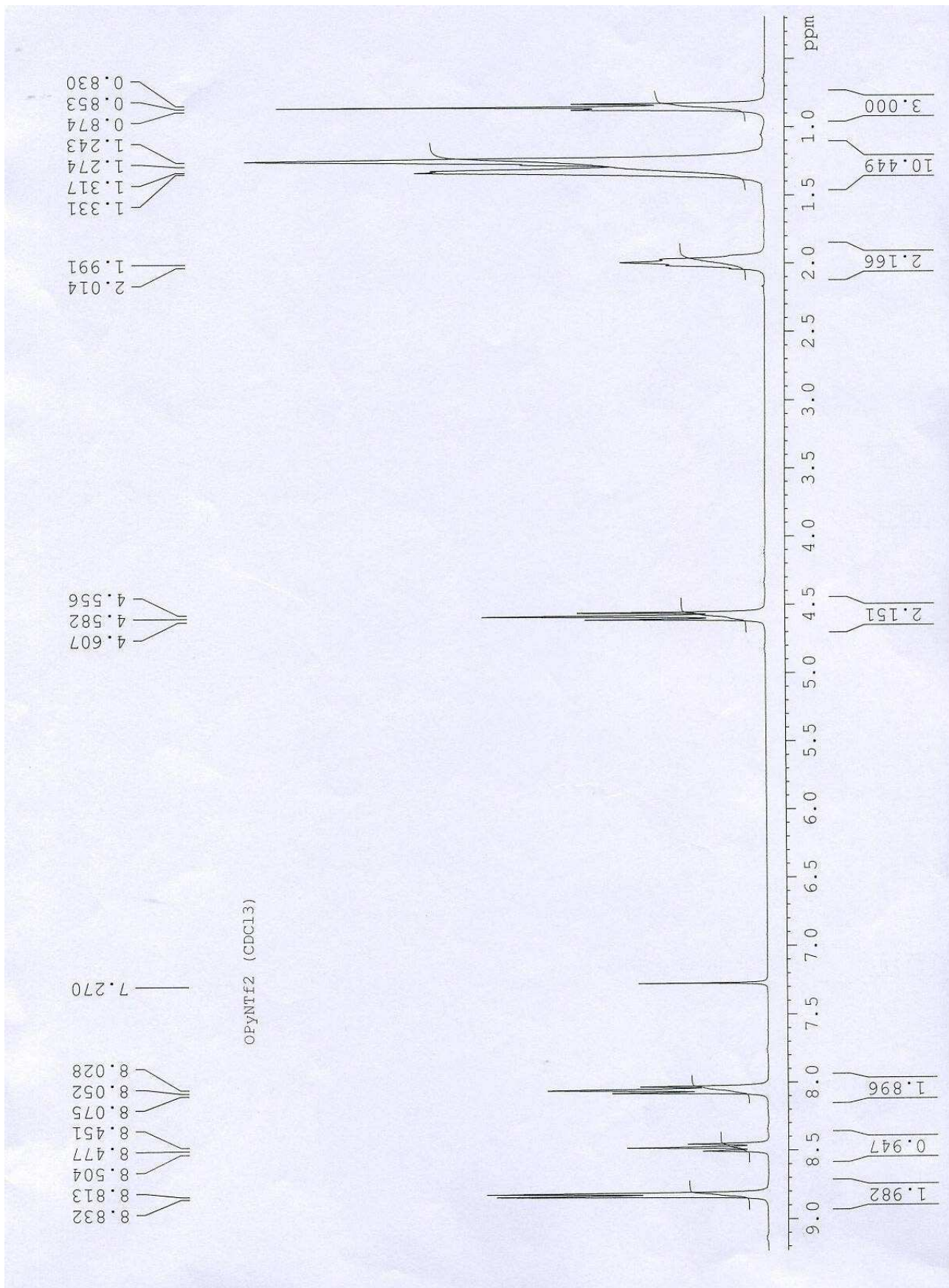


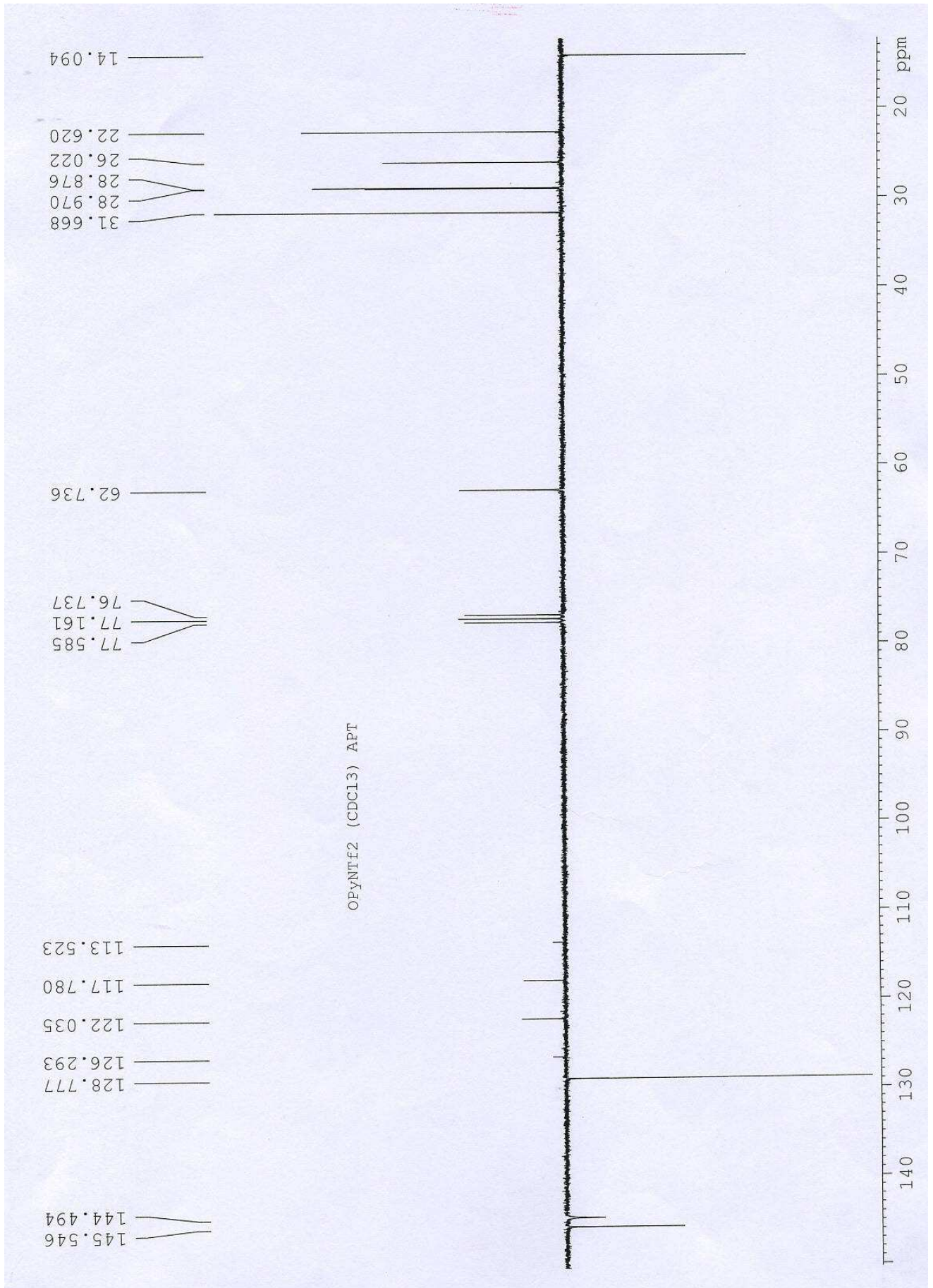


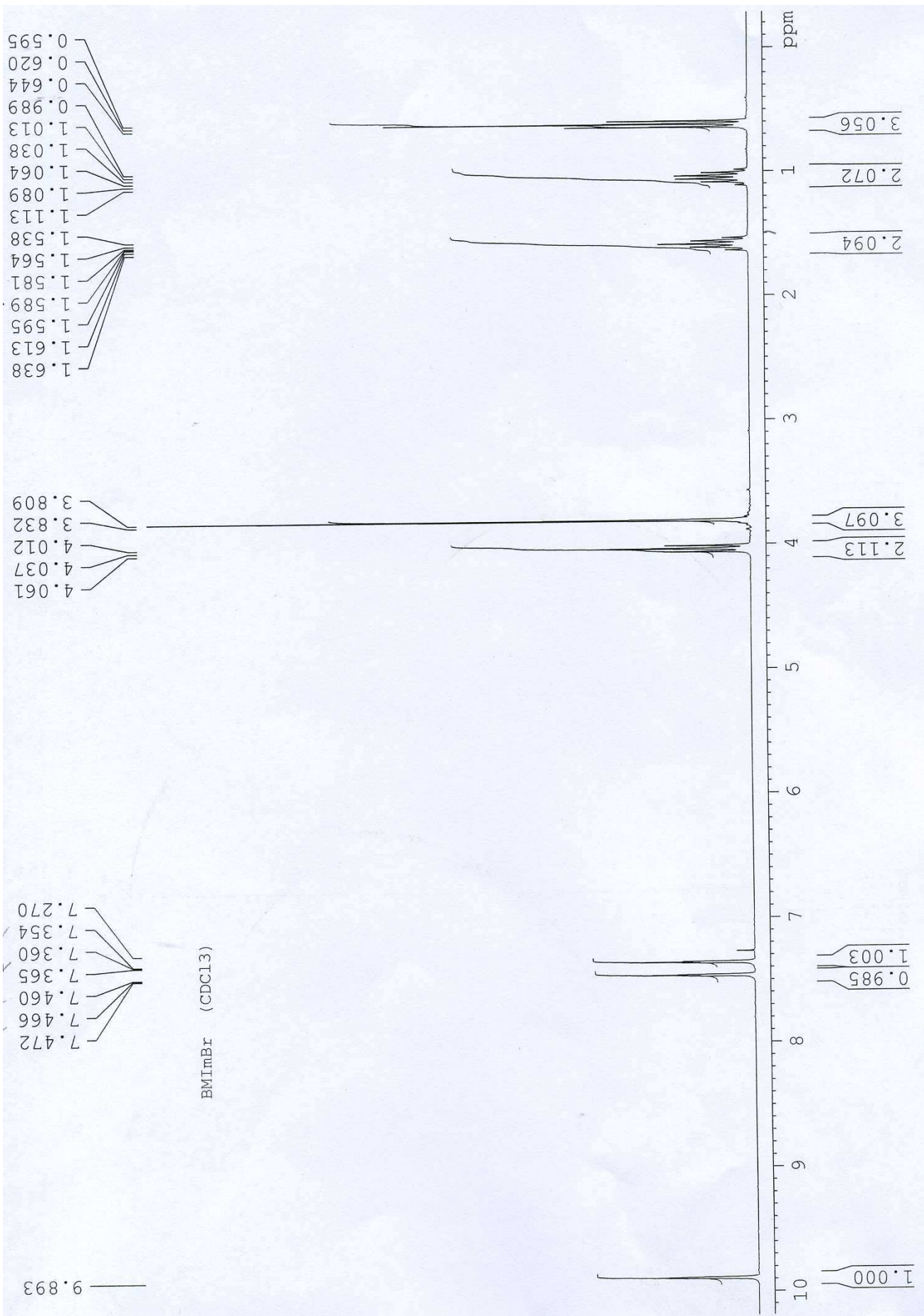


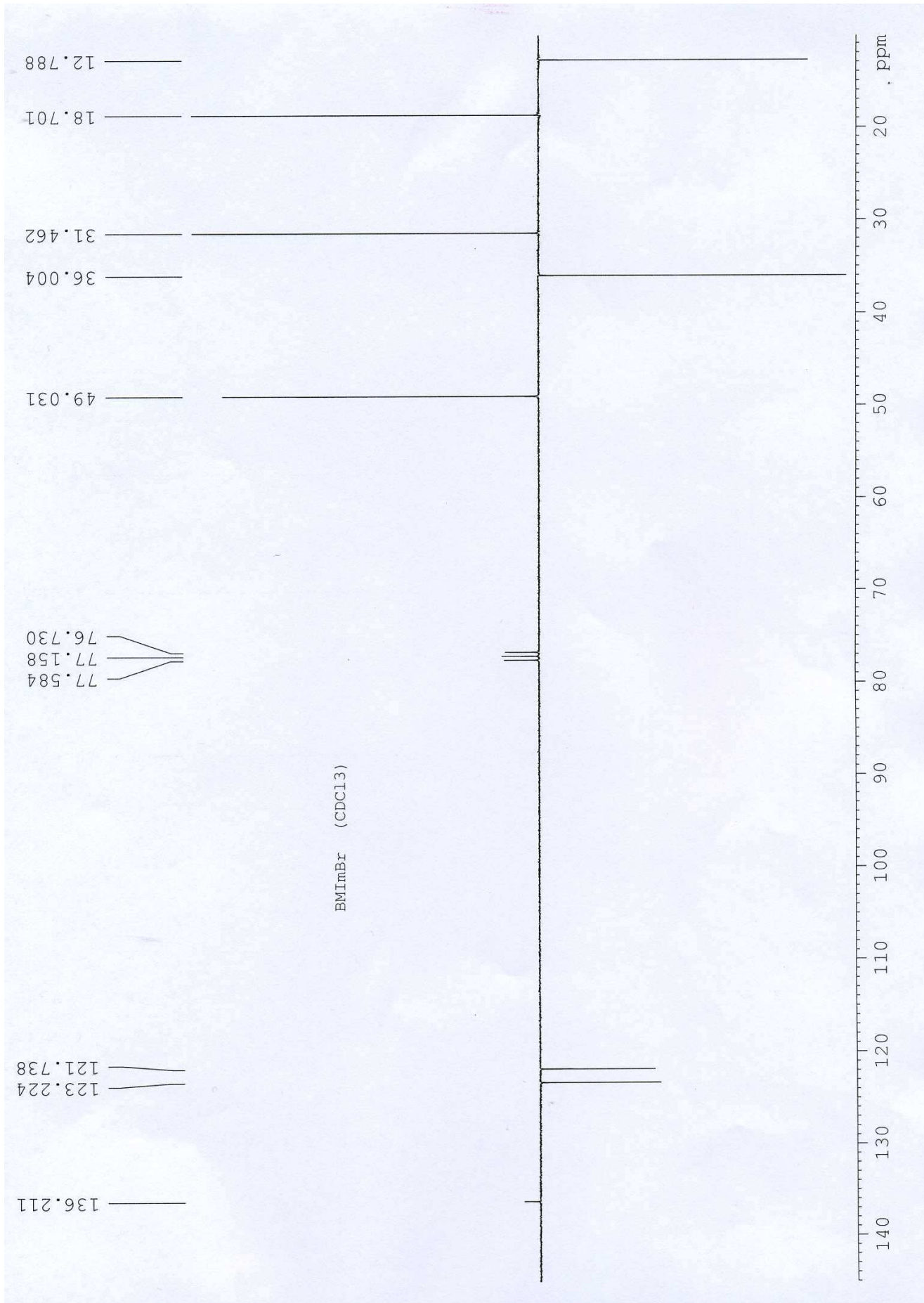




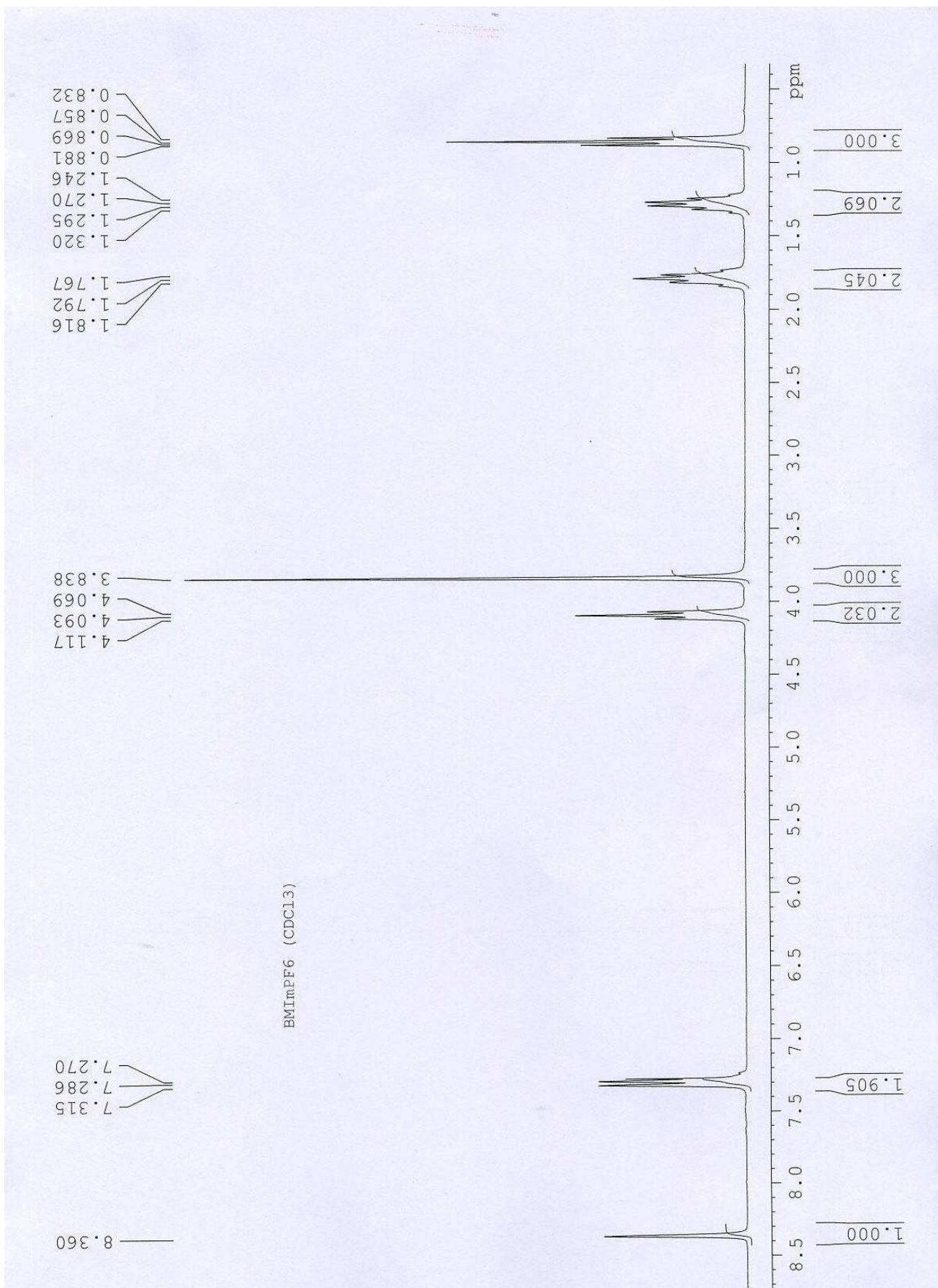


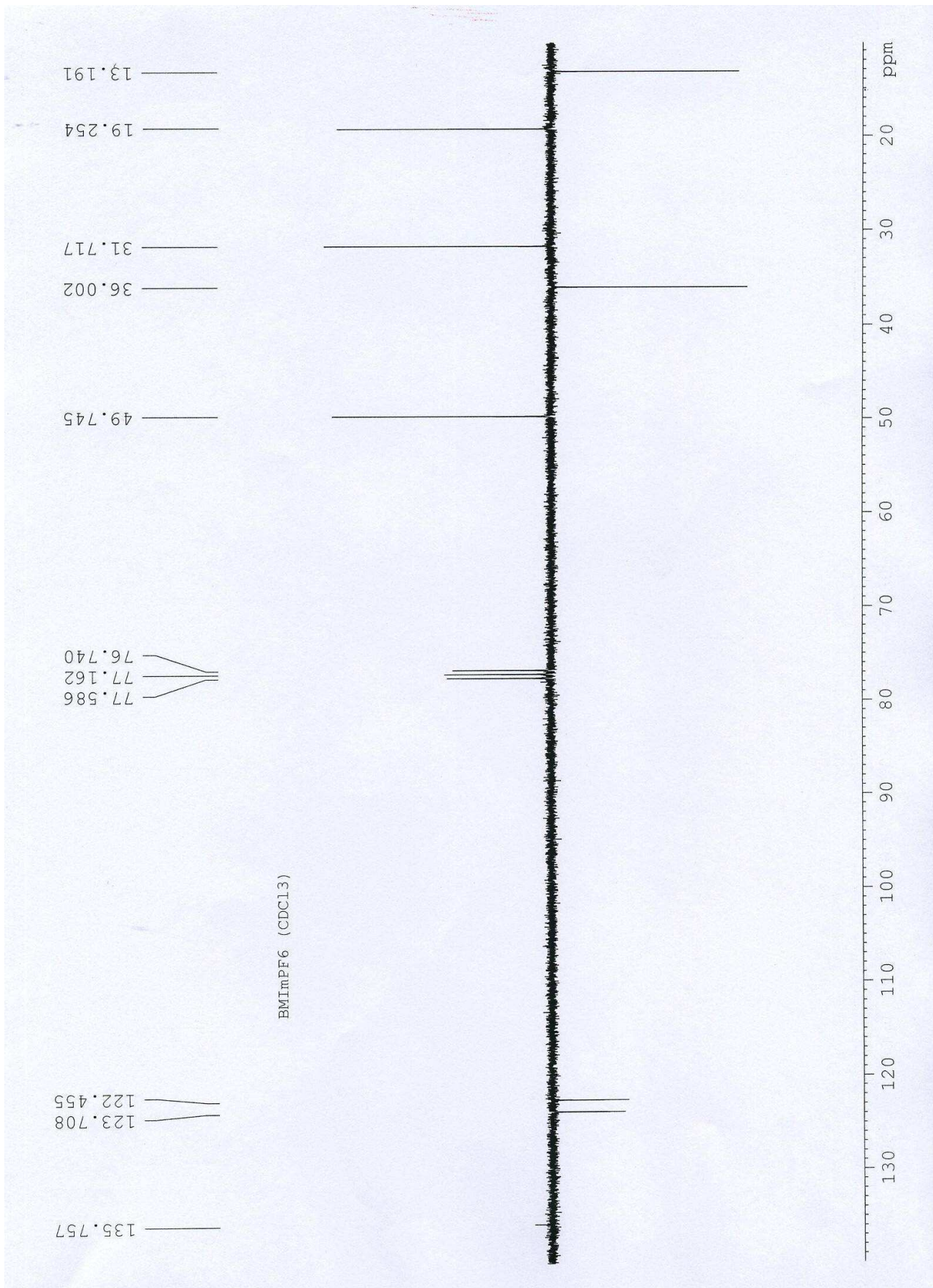


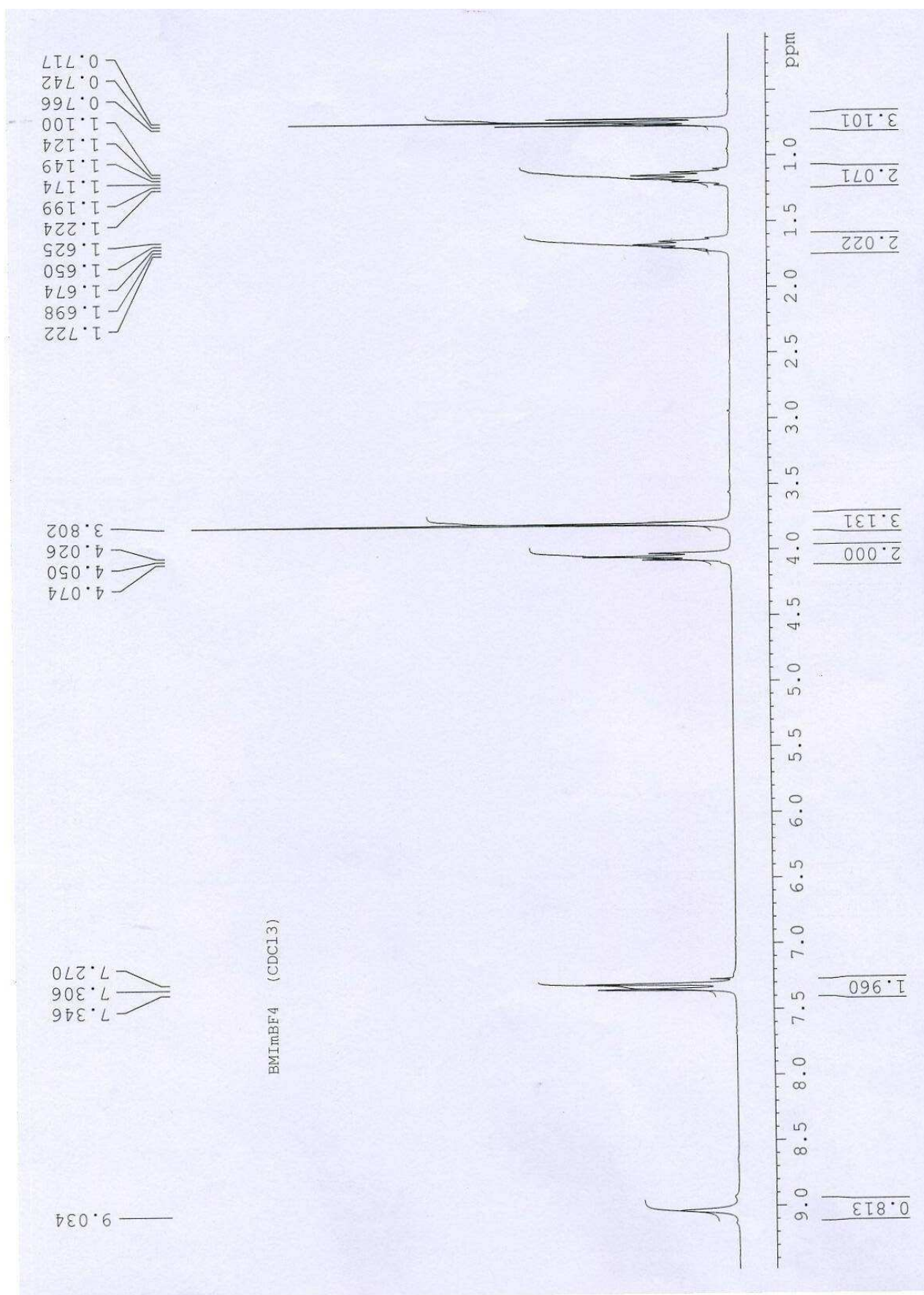


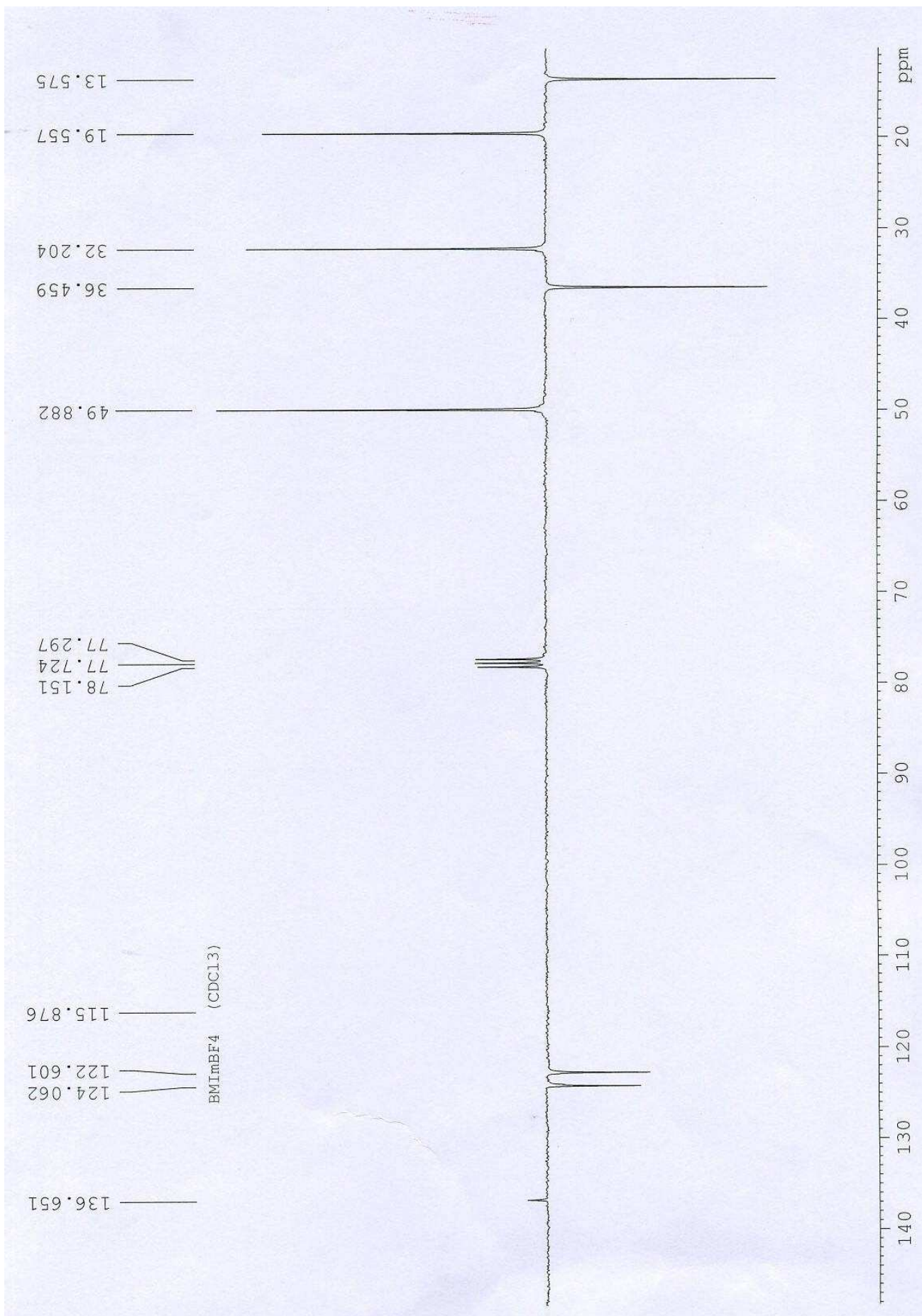


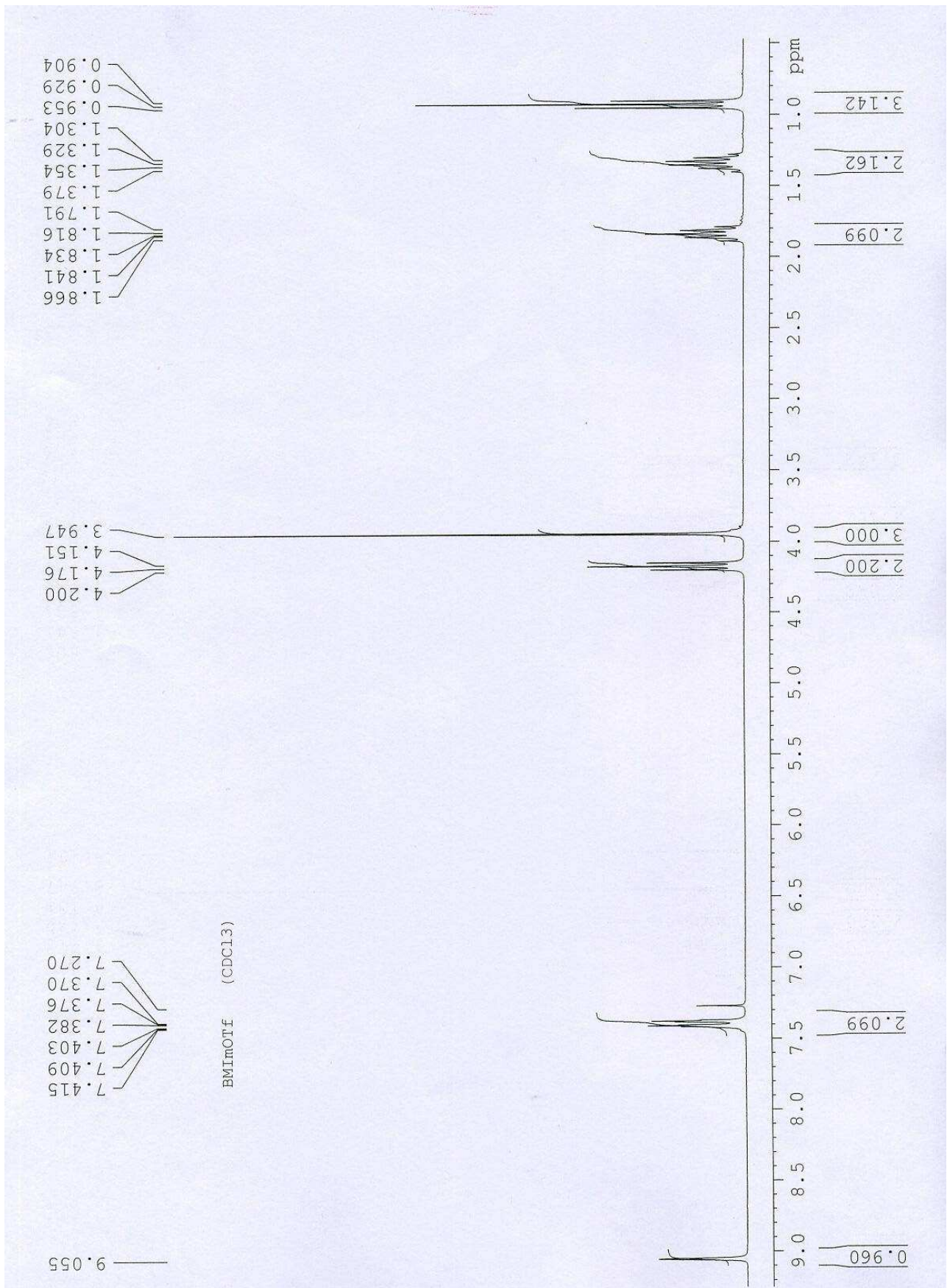


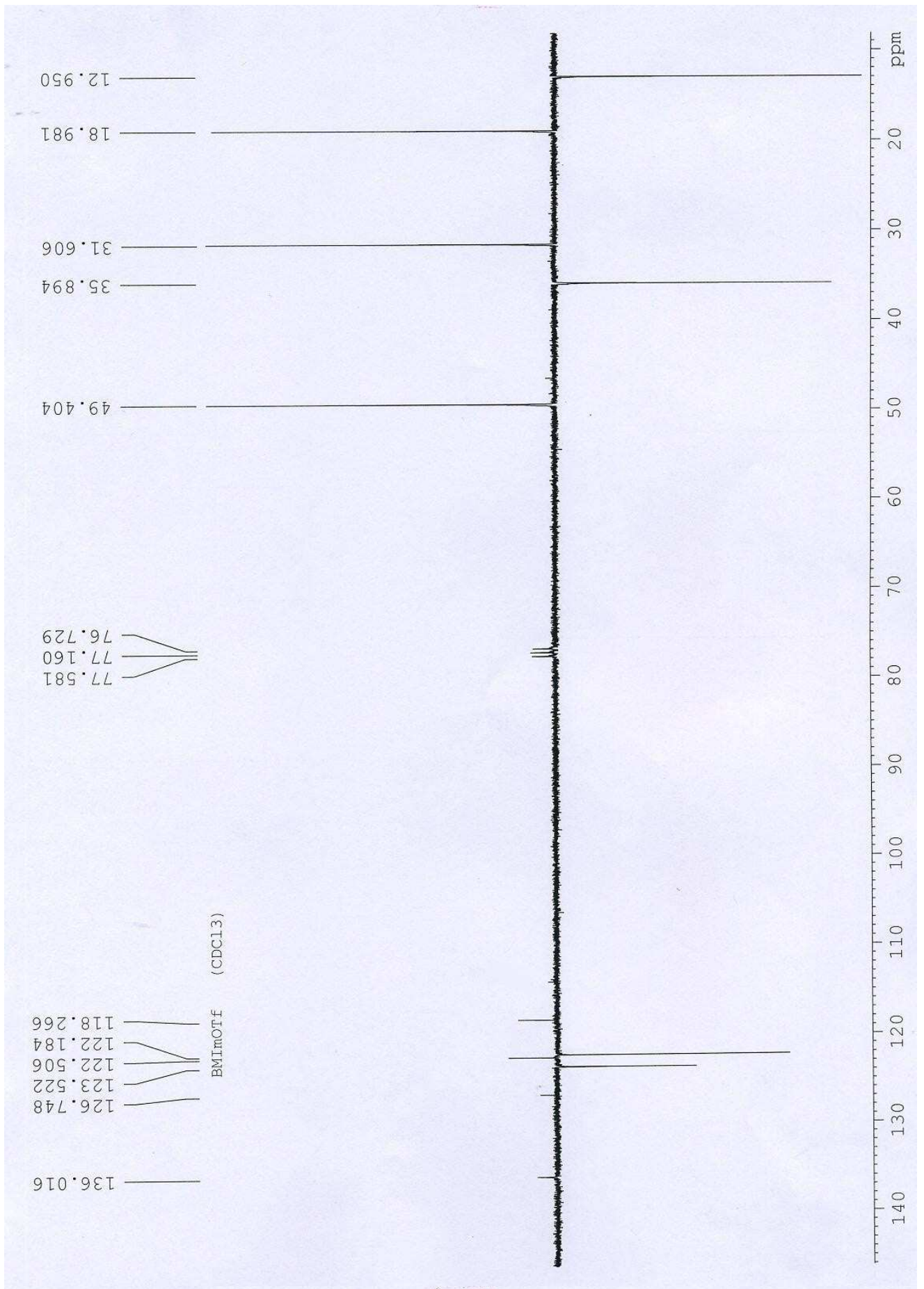










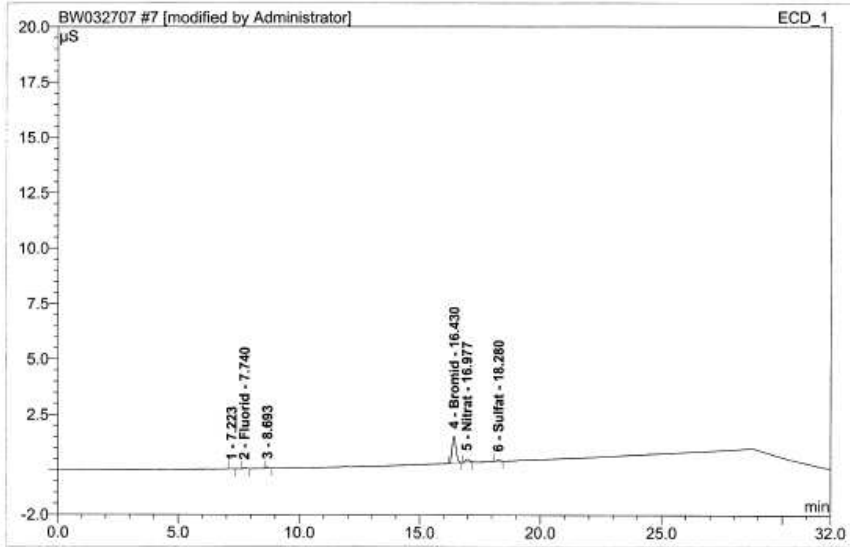


## Examples of ion-exchange chromatography analysis

Operator:Administrator Timebase:IC-1 Sequence:BW032707


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28.3.07 11:09 AM

<b>7 BMIMPF6 (JE 428)</b>		NRD/CM	
Sample Name:	<b>BMIMPF6 (JE 428)</b>	Injection Volume:	<b>25.0</b>
Vial Number:	<b>11</b>	Channel:	<b>ECD_1</b>
Sample Type:	<b>unknown</b>	Dionex:	<b>IC-1</b>
Control Program:	<b>Anionen_Standard_280604</b>	Sequenz:	<b>BW032707</b>
Quantif. Method:	<b>Mehrelementen-Anionen_Standard_031907</b>	Dilution Factor:	<b>10000.0000</b>
Recording Time:	<b>27.3.07 14:54</b>	Sample Weight:	<b>15.8600</b>
Run Time (min):	<b>32.00</b>	Sample Amount:	<b>1.0000</b>

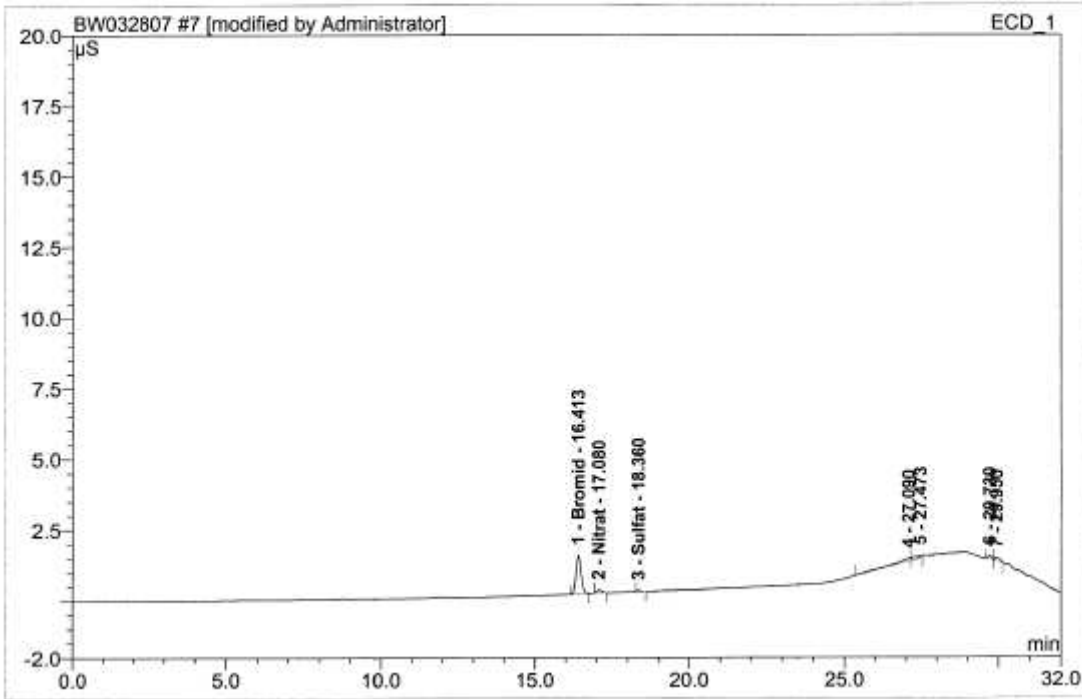


No.	Ret.Time min	Peak Name	Height µS	Area µS*min	Rel.Area %	Content ppm	Type
1	7.22	n.a.	0.023	0.003	1.00	n.a.	BMB*
2	7.74	Fluorid	0.050	0.007	2.43	18.792	BMB*
3	8.69	n.a.	0.056	0.007	2.37	n.a.	BMB*
4	16.43	Bromid	1.201	0.227	81.04	2198.011	BMB
5	16.98	Nitrat	0.145	0.026	9.30	201.417	BMB
6	18.28	Sulfat	0.067	0.011	3.86	60.640	BMB
<b>Total:</b>			<b>1.542</b>	<b>0.280</b>	<b>100.00</b>	<b>2478.860</b>	

suzi260203ppm/Integration

  
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<b>7 BMIMPF6 (JE 428)</b>		NRD/CM	
Sample Name:	<b>BMIMPF6 (JE 428)</b>	Injection Volume:	<b>25.0</b>
Vial Number:	<b>11</b>	Channel:	<b>ECD_1</b>
Sample Type:	<b>unknown</b>	Dionex:	<b>IC-1</b>
Control Program:	<b>Anionen_Standard_280604</b>	Sequenz:	<b>BW032807</b>
Quantif. Method:	<b>Mehrelementen-Anionen_Standard_031907</b>	Dilution Factor:	<b>10000.0000</b>
Recording Time:	<b>28.3.07 19:51</b>	Sample Weight:	<b>16.7300</b>
Run Time (min):	<b>32.00</b>	Sample Amount:	<b>1.0000</b>

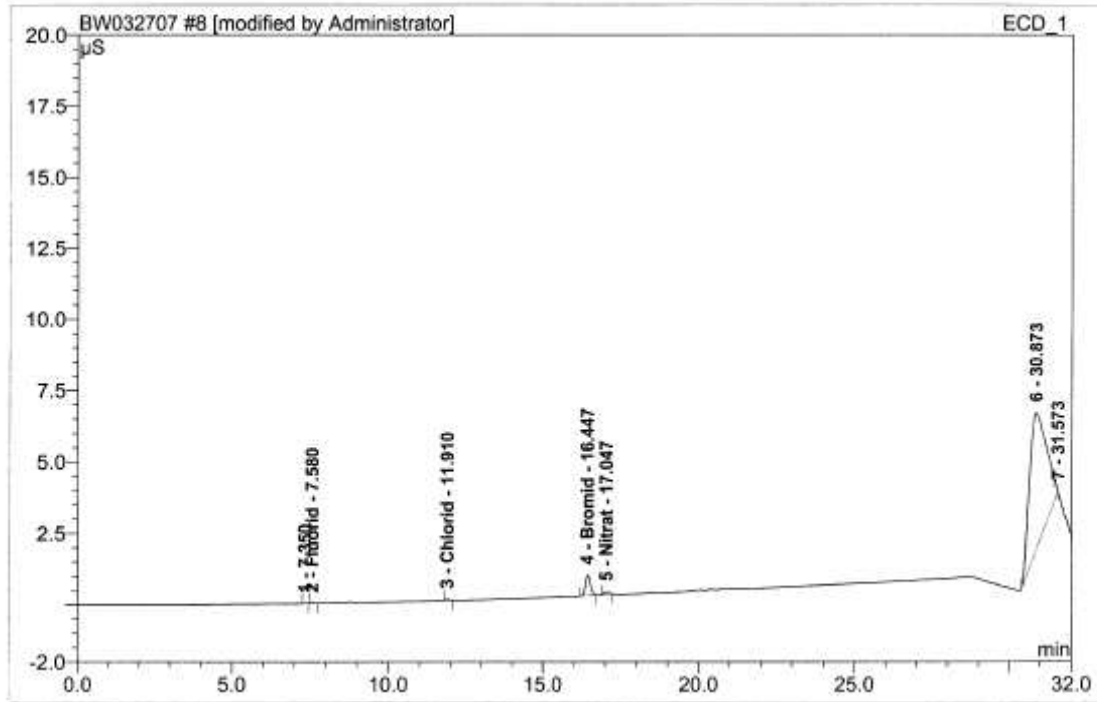


No.	Ret.Time min	Peak Name	Height µS	Area µS*min	Rel.Area %	Content ppm	Type
1	16.41	Bromid	1.358	0.253	63.59	2168.556	BMB
2	17.08	Nitrat	0.098	0.017	4.39	119.125	BMB*
3	18.36	Sulfat	0.042	0.006	1.49	29.287	BMB*
4	27.09	n.a.	0.096	0.059	14.91	n.a.	BM
5	27.47	n.a.	0.083	0.028	7.16	n.a.	MB
6	29.73	n.a.	0.124	0.016	4.05	n.a.	BMB
7	29.95	n.a.	0.088	0.018	4.42	n.a.	bMB
<b>Total:</b>			<b>1.890</b>	<b>0.398</b>	<b>100.00</b>	<b>2316.968</b>	

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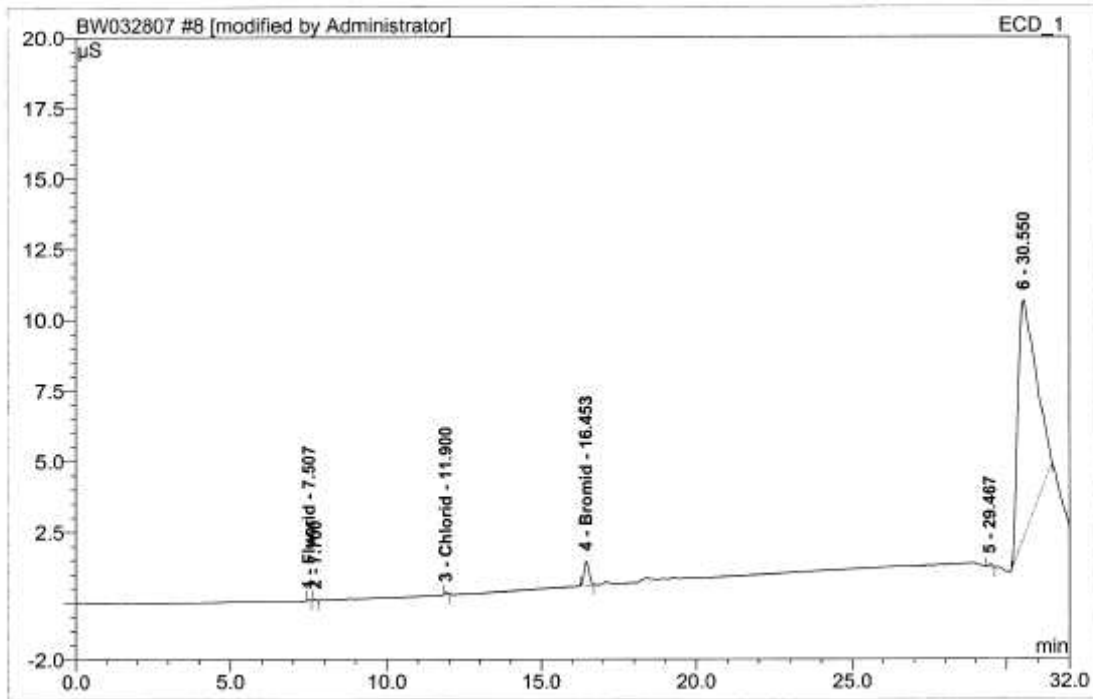
<b>8 OMIMOTf (JE 402)</b>		NRD/CM	
Sample Name:	OMIMOTf (JE 402)	Injection Volume:	25.0
Vial Number:	12	Channel:	ECD_1
Sample Type:	unknown	Dionex:	IC-1
Control Program:	Anionen_Standard_280604	Sequenz:	BW032707
Quantif. Method:	Mehrelementen-Anionen_Standard_031907	Dilution Factor:	10000.0000
Recording Time:	27.3.07 15:28	Sample Weight:	11.7000
Run Time (min):	32.00	Sample Amount:	1.0000



No.	Ret.Time min	Peak Name	Height µS	Area µS*min	Rel.Area %	Content ppm	Type
1	7.35	n.a.	0.013	0.001	0.04	n.a.	BMB*
2	7.58	Fluorid	0.019	0.003	0.08	9.742	BM *
3	11.91	Chlorid	0.061	0.007	0.21	38.452	BMB*
4	16.45	Bromid	0.722	0.132	4.21	1735.996	BMB
5	17.05	Nitrat	0.101	0.017	0.53	174.561	BMB
6	30.87	n.a.	4.821	2.925	93.31	n.a.	BM
7	31.57	n.a.	0.000	0.051	1.61	n.a.	MB
<b>Total:</b>			5.737	3.135	100.00	1958.751	

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Version 6.40+SP1, Build 711

<b>8 OMIMOTf (JE 402)</b>		NRD/CM	
Sample Name:	OMIMOTf (JE 402)	Injection Volume:	25.0
Vial Number:	12	Channel:	ECD_1
Sample Type:	unknown	Dionex:	IC-1
Control Program:	Anionen_Standard_280604	Sequenz:	BW032807
Quantif. Method:	Mehrelementen-Anionen_Standard_031907	Dilution Factor:	10000.0000
Recording Time:	28.3.07 20:25	Sample Weight:	12.1800
Run Time (min):	32.00	Sample Amount:	1.0000

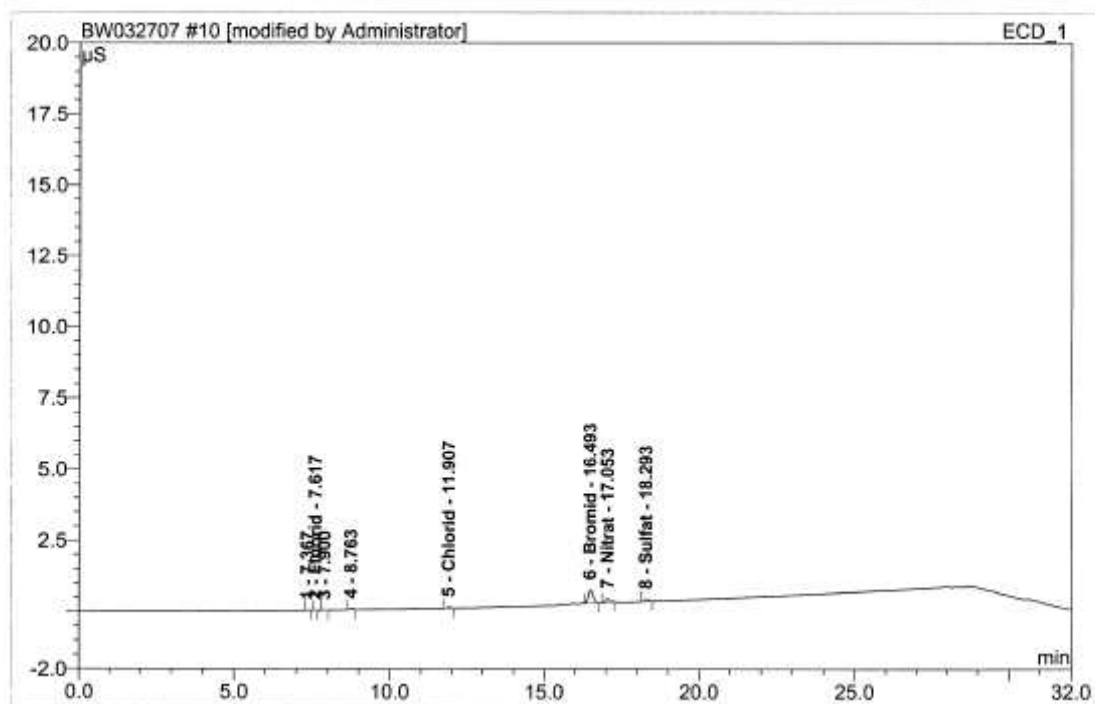


No.	Ret.Time min	Peak Name	Height µS	Area µS*min	Rel.Area %	Content ppm	Type
1	7.51	Fluorid	0.035	0.003	0.05	9.692	BMB*
2	7.70	n.a.	0.038	0.004	0.06	n.a.	BMB*
3	11.90	Chlorid	0.074	0.008	0.14	41.388	BMB*
4	16.45	Bromid	0.854	0.161	2.83	1901.821	BMB
5	29.47	n.a.	0.096	0.014	0.25	n.a.	BMB
6	30.55	n.a.	8.396	5.508	96.66	n.a.	BMB
<b>Total:</b>			9.494	5.698	100.00	1952.900	

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suzi260203ppm/Integration

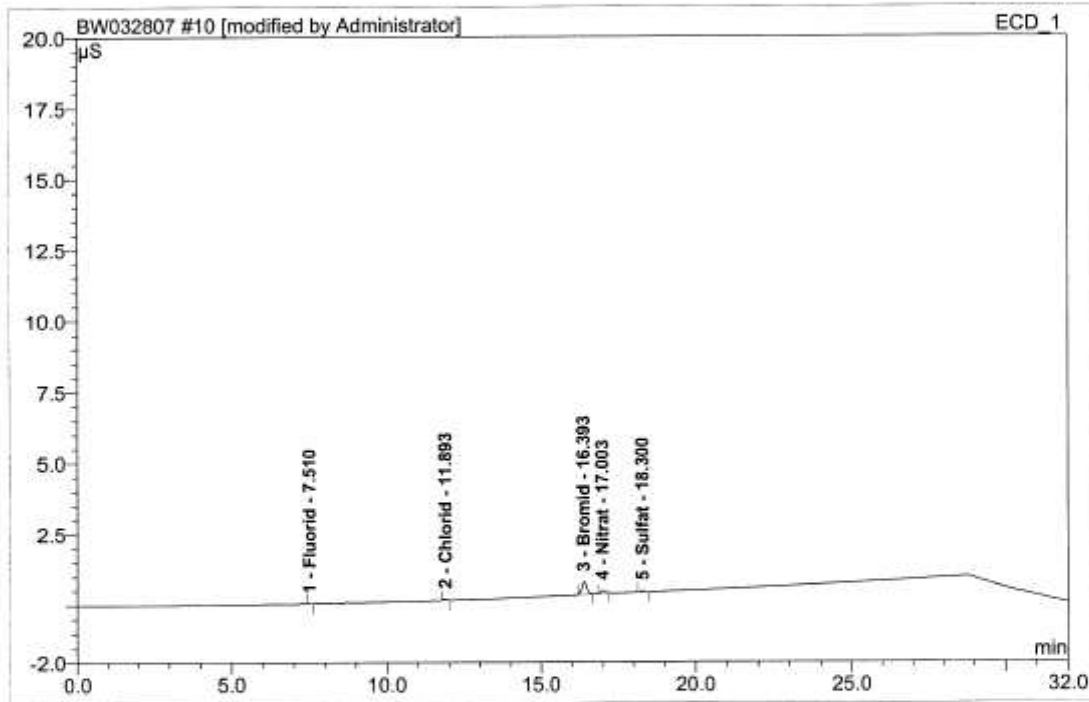
<b>10 OMIMPF6 (JE397)</b>		NRD/CM	
Sample Name:	OMIMPF6 (JE397)	Injection Volume:	25.0
Vial Number:	14	Channel:	ECD_1
Sample Type:	unknown	Dionex:	IC-1
Control Program:	Anionen_Standard_280604	Sequenz:	BW032707
Quantif. Method:	Mehrelementen-Anionen_Standard_031907	Dilution Factor:	10000.0000
Recording Time:	27.3.07 16:36	Sample Weight:	13.4500
Run Time (min):	32.00	Sample Amount:	1.0000



No.	Ret.Time min	Peak Name	Height µS	Area µS*min	Rel.Area %	Content ppm	Type
1	7.37	n.a.	0.011	0.001	0.84	n.a.	BMB*
2	7.62	Fluorid	0.011	0.001	0.83	3.561	BMB*
3	7.90	n.a.	0.011	0.001	0.90	n.a.	BMB*
4	8.76	n.a.	0.035	0.004	2.77	n.a.	BMB*
5	11.91	Chlorid	0.044	0.006	4.28	28.488	BMB*
6	16.49	Bromid	0.462	0.084	63.78	964.104	BMB
7	17.05	Nitrat	0.129	0.023	17.52	211.453	BMB*
8	18.29	Sulfat	0.077	0.012	9.08	79.555	BMB
<b>Total:</b>			0.782	0.132	100.00	1287.160	

*Handwritten signature*

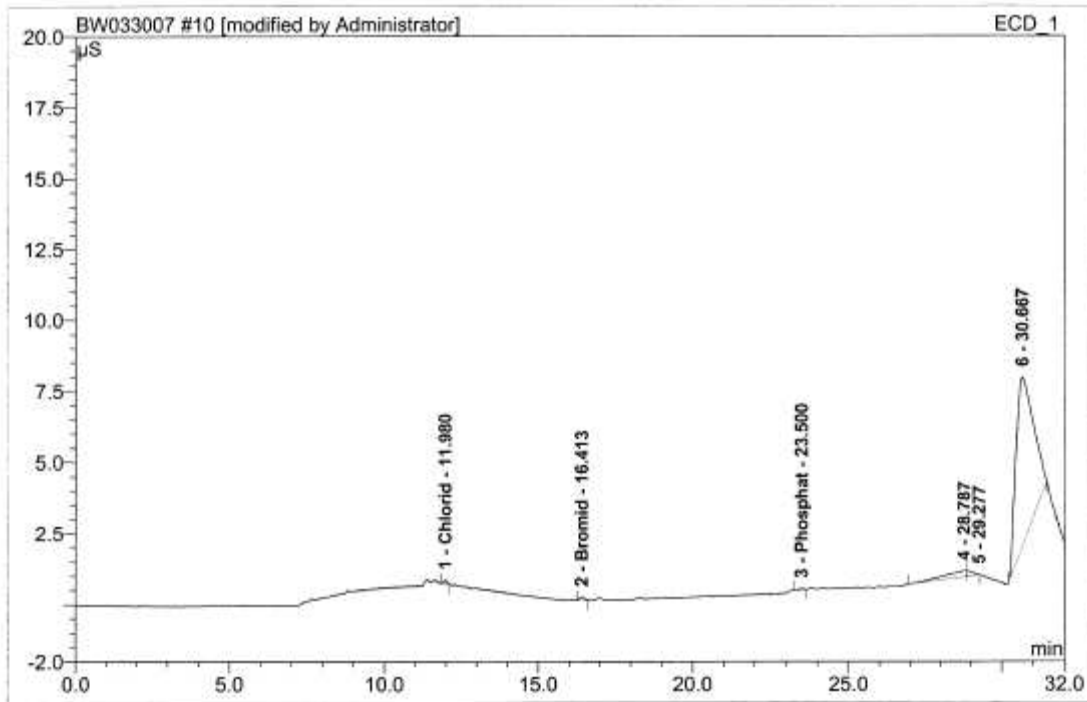
10 OMIMPF6 (JE397)		NRD/CM	
Sample Name:	OMIMPF6 (JE397)	Injection Volume:	25.0
Vial Number:	14	Channel:	ECD_1
Sample Type:	unknown	Dionex:	IC-1
Control Program:	Anionen_Standard_280604	Sequenz:	BW032807
Quantif. Method:	Mehrelementen-Anionen_Standard_031907	Dilution Factor:	10000.0000
Recording Time:	28.3.07 21:34	Sample Weight:	12.4600
Run Time (min):	32.00	Sample Amount:	1.0000



No.	Ret. Time min	Peak Name	Height µS	Area µS*min	Rel. Area %	Content ppm	Type
1	7.51	Fluorid	0.013	0.002	1.35	5.206	BMB*
2	11.89	Chlorid	0.056	0.007	6.19	36.134	BMB*
3	16.39	Bromid	0.447	0.082	70.62	939.458	BMB
4	17.00	Nitrat	0.105	0.017	14.60	154.653	BMB*
5	18.30	Sulfat	0.048	0.008	7.24	55.562	BMB*
<b>Total:</b>			0.669	0.116	100.00	1191.013	

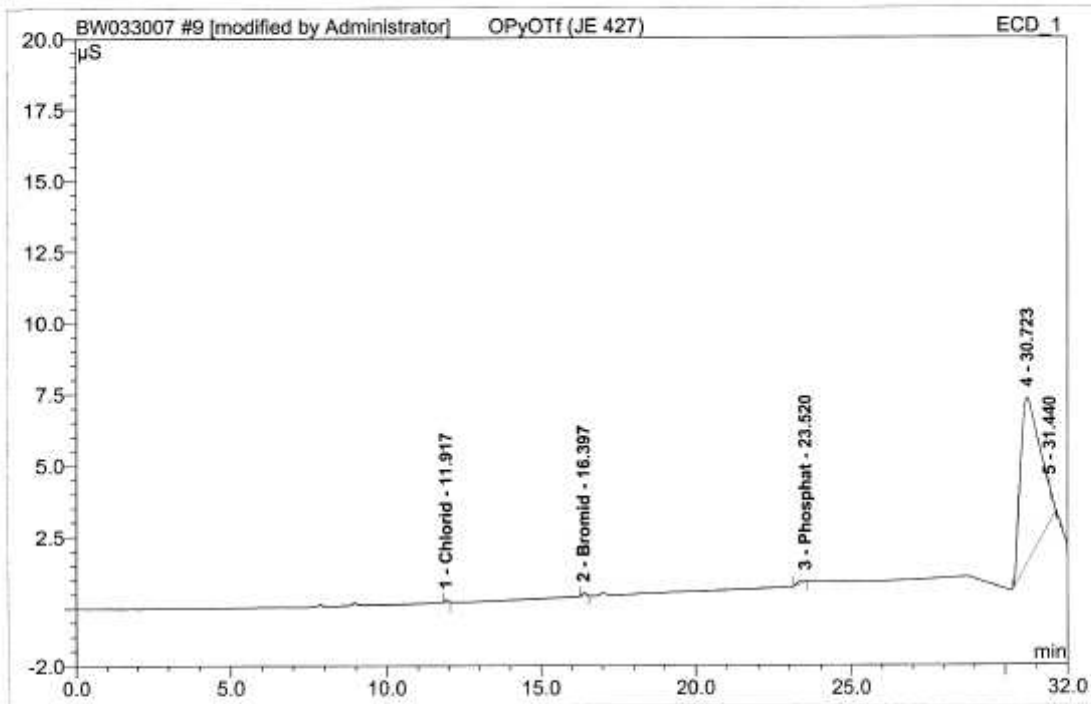
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<b>10 OPyOTf (JE 427)</b>		NRD/CM	
Sample Name:	OPyOTf (JE 427)	Injection Volume:	25.0
Vial Number:	14	Channel:	ECD_1
Sample Type:	unknown	Dionex:	IC-1
Control Program:	Anionen_Standard_280604	Sequenz:	BW033007
Quantif. Method:	Mehrelementen-Anionen_Standard_031907	Dilution Factor:	10000.0000
Recording Time:	30.3.07 19:31	Sample Weight:	10.5400
Run Time (min):	32.00	Sample Amount:	1.0000



No.	Ret.Time min	Peak Name	Height µS	Area µS*min	Rel.Area %	Content ppm	Type
1	11.98	Chlorid	0.135	0.017	0.41	100.710	BMB*
2	16.41	Bromid	0.128	0.020	0.50	282.581	BMB
3	23.50	Phosphat	0.059	0.013	0.31	233.596	BMB
4	28.79	n.a.	0.213	0.190	4.68	n.a.	BM
5	29.28	n.a.	0.000	0.045	1.10	n.a.	MB
6	30.67	n.a.	5.913	3.786	93.01	n.a.	BMB
<b>Total:</b>			6.449	4.070	100.00	616.886	

<b>9 OPyOTf (JE 427)</b>		NRD/CM	
Sample Name:	OPyOTf (JE 427)	Injection Volume:	25.0
Vial Number:	13	Channel:	ECD_1
Sample Type:	unknown	Dionex:	IC-1
Control Program:	Anionen_Standard_280604	Sequenz:	BW033007
Quantif. Method:	Mehrelementen-Anionen_Standard_031907	Dilution Factor:	10000.0000
Recording Time:	30.3.07 18:57	Sample Weight:	10.3700
Run Time (min):	32.00	Sample Amount:	1.0000



No.	Ret.Time min	Peak Name	Height µS	Area µS*min	Rel.Area %	Content ppm	Type
1	11.92	Chlorid	0.105	0.012	0.29	75.065	BMB
2	16.40	Bromid	0.121	0.018	0.42	251.683	BMB*
3	23.52	Phosphat	0.061	0.029	0.69	553.424	BMB
4	30.72	n.a.	5.782	4.165	98.56	n.a.	BMB
5	31.44	n.a.	0.096	0.002	0.04	n.a.	Rd
<b>Total:</b>			6.166	4.226	100.00	880.172	

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Version 6.40+SP1, Build 711