ELECTRONIC SUPPORTING INFORMATION

Synthesis, properties and evaluation of biological activity of herbicidal ionic liquids with 4-(4-chloro-2-methylphenoxy)butanoate anion

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*1-Ethyl-1-methylpiperidinium 4-(4-chloro-2-methylphenoxy)butanoate (**1**)*

Elemental analysis calculated for $C_{19}H_{30}ClNO_3$ (M_{mol} = 355.90 g mol^{-1}) (%): C = 64.12, H = 8.50, N = 3.94; found: C = 64.33, H = 8.78, N = 3.70.

*1-Methyl-1-propylpiperidinium 4-(4-chloro-2-methylphenoxy)butanoate (**2**)*

Elemental analysis calculated for $C_{20}H_{32}ClNO_3$ (M_{mol} = 369.93 g mol^{-1}) (%): C = 64.94, H = 8.72, N = 3.79; found: C = 64.85, H = 8.89, N = 3.53.

*1-Butyl-1-methylpiperidinium 4-(4-chloro-2-methylphenoxy)butanoate (**3**)*

Elemental analysis calculated for $C_{21}H_{34}ClNO_3$ (M_{mol} = 383.95 g mol^{-1}) (%): C = 65.69, H = 8.93, N = 3.65; found: C = 65.49, H = 8.71, N = 3.53.

*1-Methyl-1-pentylpiperidinium 4-(4-chloro-2-methylphenoxy)butanoate (**4**)*

Elemental analysis calculated for $C_{22}H_{36}ClNO_3$ (M_{mol} = 397,98 g mol^{-1}) (%): C = 66.39, H = 9.12, N = 3.52; found: C = 66.79, H = 8.88, N = 3.74.

*1-Hexyl-1-methylpiperidinium 4-(4-chloro-2-methylphenoxy)butanoate (**5**)*

Elemental analysis calculated for $C_{23}H_{38}ClNO_3$ (M_{mol} = 412,01 g mol^{-1}) (%): C = 67.05, H = 9.30, N = 3.40; found: C = 66.75, H = 9.04, N = 3.62.

*1-Heptyl-1-methylpiperidinium 4-(4-chloro-2-methylphenoxy)butanoate (**6**)*

Elemental analysis calculated for $C_{24}H_{40}ClNO_3$ (M_{mol} = 426,03 g mol^{-1}) (%): C = 67.66, H = 9.46, N = 3.29; found: C = 67.91, H = 9.12, N = 3.53.

1-Methyl-1-octylpiperidinium 4-(4-chloro-2-methylphenoxy)butanoate (7)

Elemental analysis calculated for $C_{25}H_{42}ClNO_3$ (M_{mol} = 440,06 g mol^{-1}) (%): C = 68.23, H = 9.62, N = 3.18; found: C = 67.99, H = 9.48, N = 3.45.

*1-Methyl-1-nonylpiperidinium 4-(4-chloro-2-methylphenoxy)butanoate (**8**)*

Elemental analysis calculated for $C_{26}H_{44}ClNO_3$ (M_{mol} = 454,09 g mol^{-1}) (%): C = 68.77, H = 9.77, N = 3.08; found: C = 68.43, H = 9.60, N = 3.23.

*1-Decyl-1-methylpiperidinium 4-(4-chloro-2-methylphenoxy)butanoate (**9**)*

Elemental analysis calculated for $C_{27}H_{46}ClNO_3$ (M_{mol} = 468.11 g mol^{-1}) (%): C = 69.28, H = 9.90, N = 2.99; found: C = 69.05, H = 9.68, N = 3.21.

*1-Methyl-1-undecylpiperidinium 4-(4-chloro-2-methylphenoxy)butanoate (**10**)*

Elemental analysis calculated for $C_{28}H_{48}ClNO_3$ (M_{mol} = 482.14 g mol^{-1}) (%): C = 69.75, H = 10.03, N = 2.91; found: C = 69.98, H = 10.35, N = 3.30.

*1-Dodecyl-1-methylpiperidinium 4-(4-chloro-2-methylphenoxy)butanoate (**11**)*

Elemental analysis calculated for $C_{29}H_{50}ClNO_3$ (M_{mol} = 496.17 g mol^{-1}) (%): C = 70.20, H = 10.16, N = 2.82; found: C = 69.99, H = 9.88, N = 3.03.

*1-Methyl-1-tetradecylpiperidinium 4-(4-chloro-2-methylphenoxy)butanoate (**12**)*

Elemental analysis calculated for $C_{31}H_{54}ClNO_3$ (M_{mol} = 524.22 g mol^{-1}) (%): C = 71.03, H = 10.38, N = 2.67; found: C = 71.24, H = 10.13, N = 2.91.

*1-Hexadecyl-1-methylpiperidinium 4-(4-chloro-2-methylphenoxy)butanoate (**13**)*

Elemental analysis calculated for $C_{33}H_{58}ClNO_3$ (M_{mol} = 552.27 g mol^{-1}) (%): C = 71.77, H = 10.59, N = 2.54; found: C = 71.51, H = 10.37, N = 2.82.

*1-Methyl-1-octadecylpiperidinium 4-(4-chloro-2-methylphenoxy)butanoate (**14**)*

Elemental analysis calculated for $C_{35}H_{62}ClNO_3$ (M_{mol} = 580.32 g mol^{-1}) (%): C = 72.44, H = 10.77, N = 2.41; found: C = 72.59, H = 10.93, N = 2.61.

The following abbreviations were used to explain the multiplicities:
s = singlet, d = doublet, t = triplet, q = quartet, m = multiplet, quin = quintuplet, sext = sextet, sep = septet.

Figure S1. ^{1}H NMR spectrum of 1-ethyl-1-methylpiperidinium 4-(4-chloro-2-methylphenoxy)butanoate (**1**).

Acquisition Time (sec)	4.0000	*Comment*	[EMPip] [MCPB]	*Date*	Apr 10 2014	*Date Stamp*	Apr 10 2014
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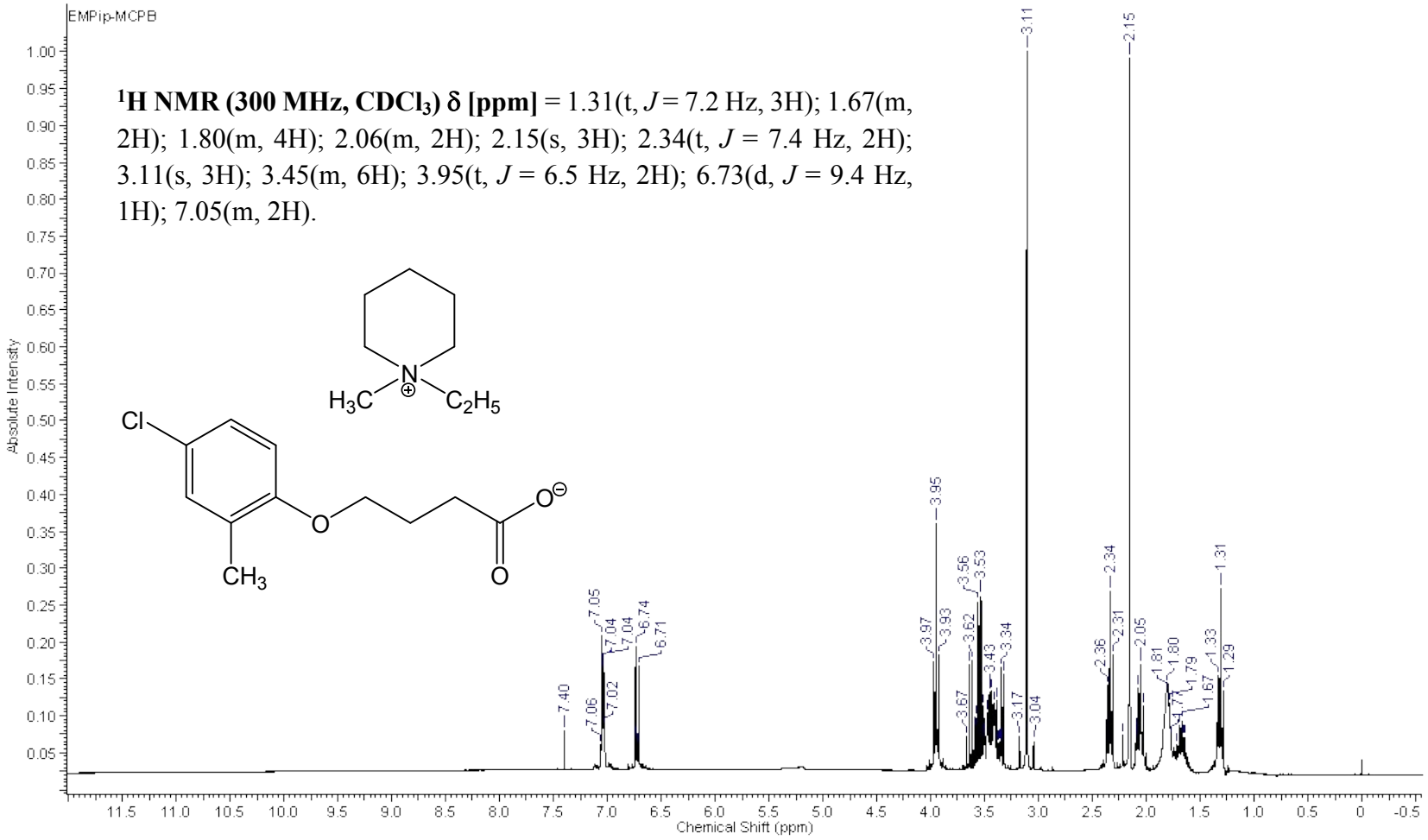
Nucleus	1H	*Number of Transients*	64	*Original Points Count*	17116	*Points Count*	32768
Pulse Sequence	s2pul	*Solvent*	CHLOROFORM-d			*Spectrum Offset (Hz)*	1857.9465
Spectrum Type	STANDARD	*Sweep Width (Hz)*	4278.99	*Temperature (degree C)*	AMBIENT TEMPERATURE		



^{1}H NMR (300 MHz, $CDCl_3$) δ [ppm] = 1.31(t, *J* = 7.2 Hz, 3H); 1.67(m, 2H); 1.80(m, 4H); 2.06(m, 2H); 2.15(s, 3H); 2.34(t, *J* = 7.4 Hz, 2H); 3.11(s, 3H); 3.45(m, 6H); 3.95(t, *J* = 6.5 Hz, 2H); 6.73(d, *J* = 9.4 Hz, 1H); 7.05(m, 2H).

Figure S2. ^{13}C NMR spectrum of 1-ethyl-1-methylpiperidinium 4-(4-chloro-2-methylphenoxy)butanoate (**1**).

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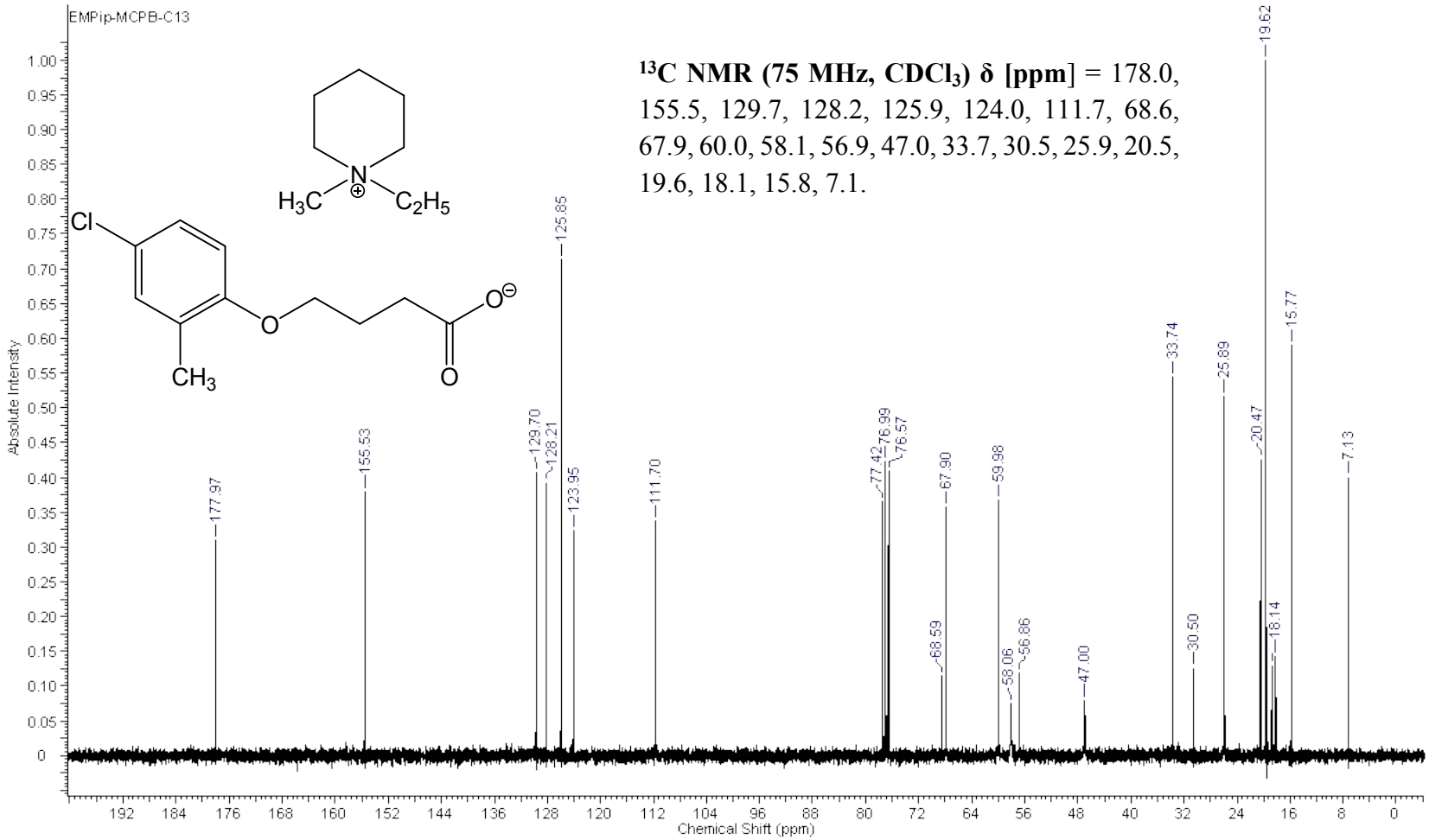
Nucleus	13C	*Number of Transients*	700	*Original Points Count*	16830	*Points Count*	16384
Pulse Sequence	s2pul	*Receiver Gain*	30.00	*Solvent*	CHLOROFORM-d		
Spectrum Offset (Hz)	7412.2061	*Spectrum Type*	STANDARD	*Sweep Width (Hz)*	16920.47	*Temperature (degree C)*	AMBIENT TEMPERATURE



^{13}C NMR (75 MHz, $CDCl_3$) δ [ppm] = 178.0, 155.5, 129.7, 128.2, 125.9, 124.0, 111.7, 68.6, 67.9, 60.0, 58.1, 56.9, 47.0, 33.7, 30.5, 25.9, 20.5, 19.6, 18.1, 15.8, 7.1.

Figure S3. ^{1}H NMR spectrum of 1-methyl-1-propylpiperidinium 4-(4-chloro-2-methylphenoxy)butanoate (**2**).

Acquisition Time (sec)	7.0001	*Comment*	[PMPip][MPB]	*Date*	Apr 14 2014	*Date Stamp*	Apr 14 2014
File Name	C:\Documents and Settings\Mariusz\Pulpit\Niemcz\NMR\UAM\PO\PMPip-MCPB-H1.fid\fid					*Frequency (MHz)*	402.64
Nucleus	1H	*Number of Transients*	64	*Original Points Count*	40698	*Points Count*	65536
Pulse Sequence	s2pul	*Receiver Gain*	22.00	*Solvent*	CHLOROFORM-d		
Spectrum Offset (Hz)	2188.3943	*Spectrum Type*	STANDARD	*Sweep Width (Hz)*	5813.95	*Temperature (degree C)*	AMBIENT TEMPERATURE

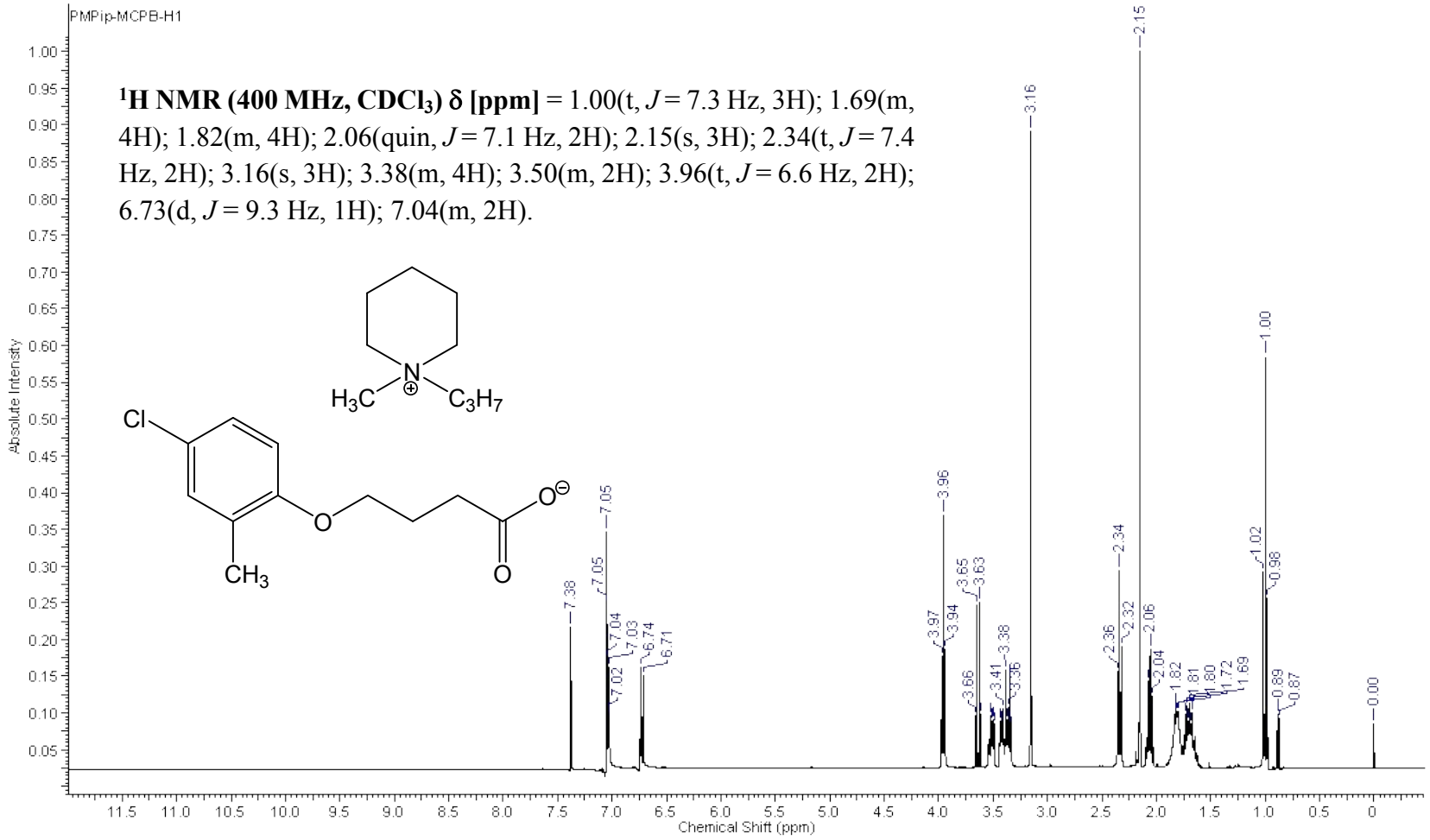


Figure S4. ^{13}C NMR spectrum of 1-methyl-1-propylpiperidinium 4-(4-chloro-2-methylphenoxy)butanoate (**2**).

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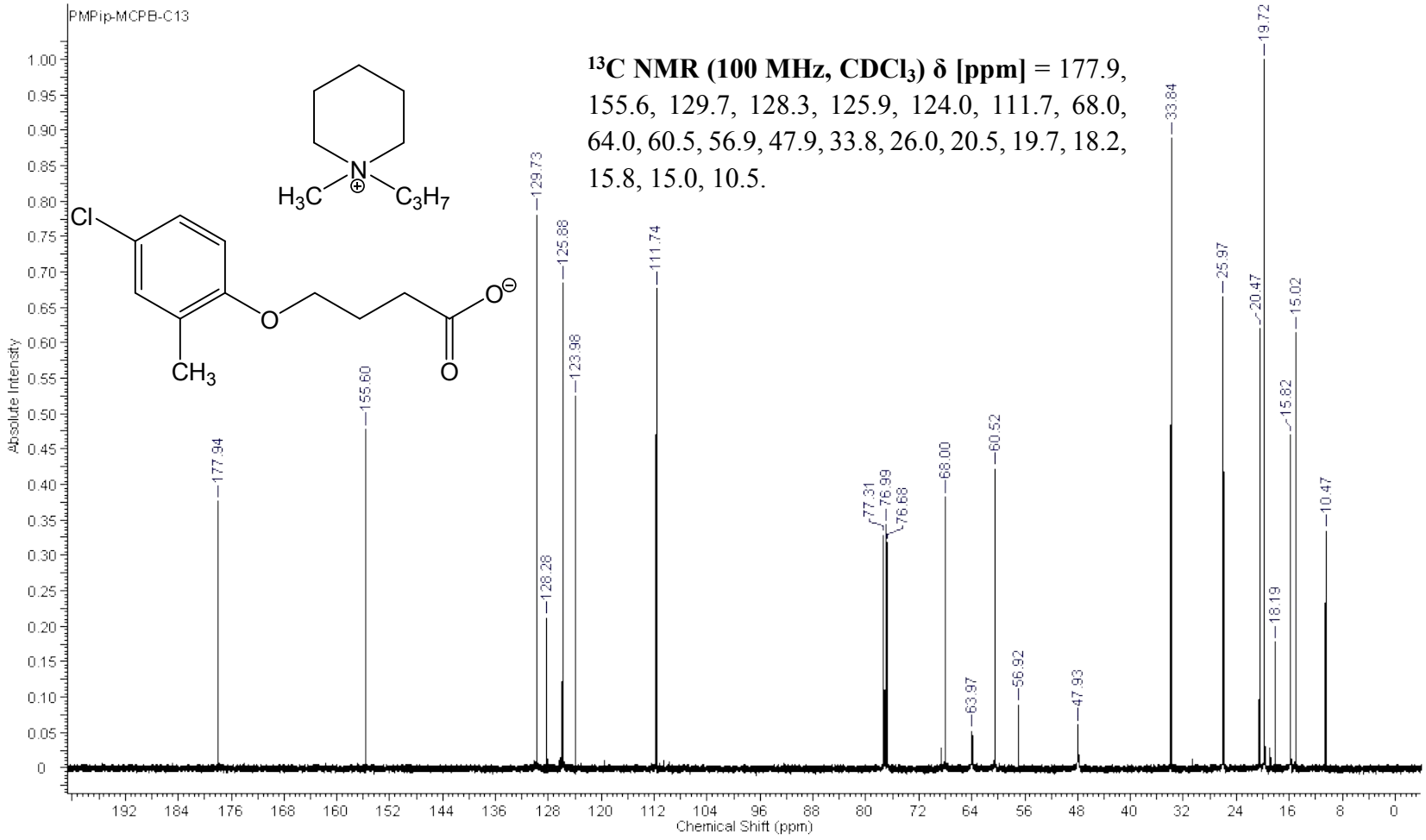
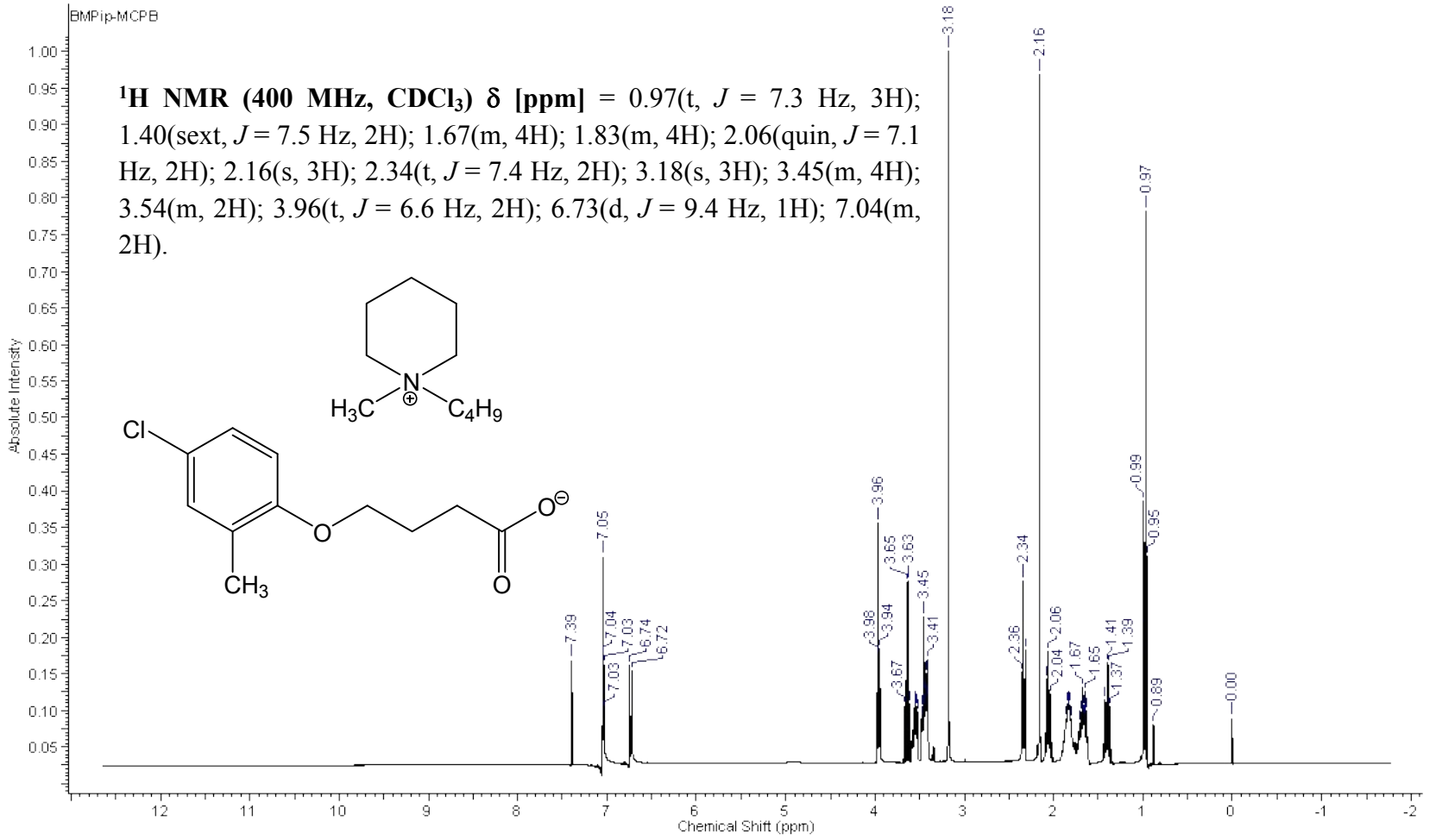
Nucleus	13C	*Number of Transients*	1024	*Original Points Count*	31878	*Points Count*	32768
Pulse Sequence	s2pul	*Receiver Gain*	36.00	*Solvent*	CHLOROFORM-d		
Spectrum Offset (Hz)	11115.3262	*Spectrum Type*	STANDARD	*Sweep Width (Hz)*	24509.80	*Temperature (degree C)*	AMBIENT TEMPERATURE



^{13}C NMR (100 MHz, $CDCl_3$) δ [ppm] = 177.9, 155.6, 129.7, 128.3, 125.9, 124.0, 111.7, 68.0, 64.0, 60.5, 56.9, 47.9, 33.8, 26.0, 20.5, 19.7, 18.2, 15.8, 15.0, 10.5.

Figure S5. ^{1}H NMR spectrum of 1-butyl-1-methylpiperidinium 4-(4-chloro-2-methylphenoxy)butanoate (**3**).

Acquisition Time (sec)	7.0001	*Comment*	[BMPip][MCPB]	*Date*	Apr 14 2014	*Date Stamp*	Apr 14 2014
File Name	C:\Documents and Settings\Mariusz\Pulpit\Niemcz\NMR\UAM\PO\BMPip-MCPB.fid\fid					*Frequency (MHz)*	402.64
Nucleus	1H	*Number of Transients*	32	*Original Points Count*	40698	*Points Count*	65536
Pulse Sequence	s2pul	*Receiver Gain*	22.00	*Solvent*	CHLOROFORM-d		
Spectrum Offset (Hz)	2192.7412	*Spectrum Type*	STANDARD	*Sweep Width (Hz)*	5813.95	*Temperature (degree C)*	AMBIENT TEMPERATURE



^{1}H NMR (400 MHz, $CDCl_3$) δ [ppm] = 0.97(t, *J* = 7.3 Hz, 3H); 1.40(sext, *J* = 7.5 Hz, 2H); 1.67(m, 4H); 1.83(m, 4H); 2.06(quin, *J* = 7.1 Hz, 2H); 2.16(s, 3H); 2.34(t, *J* = 7.4 Hz, 2H); 3.18(s, 3H); 3.45(m, 4H); 3.54(m, 2H); 3.96(t, *J* = 6.6 Hz, 2H); 6.73(d, *J* = 9.4 Hz, 1H); 7.04(m, 2H).

Figure S6. ^{13}C NMR spectrum of 1-butyl-1-methylpiperidinium 4-(4-chloro-2-methylphenoxy)butanoate (**3**).

Acquisition Time (sec)	1.3006	*Comment*	[BMPip][MCPB]	*Date*	Apr 14 2014	*Date Stamp*	Apr 14 2014
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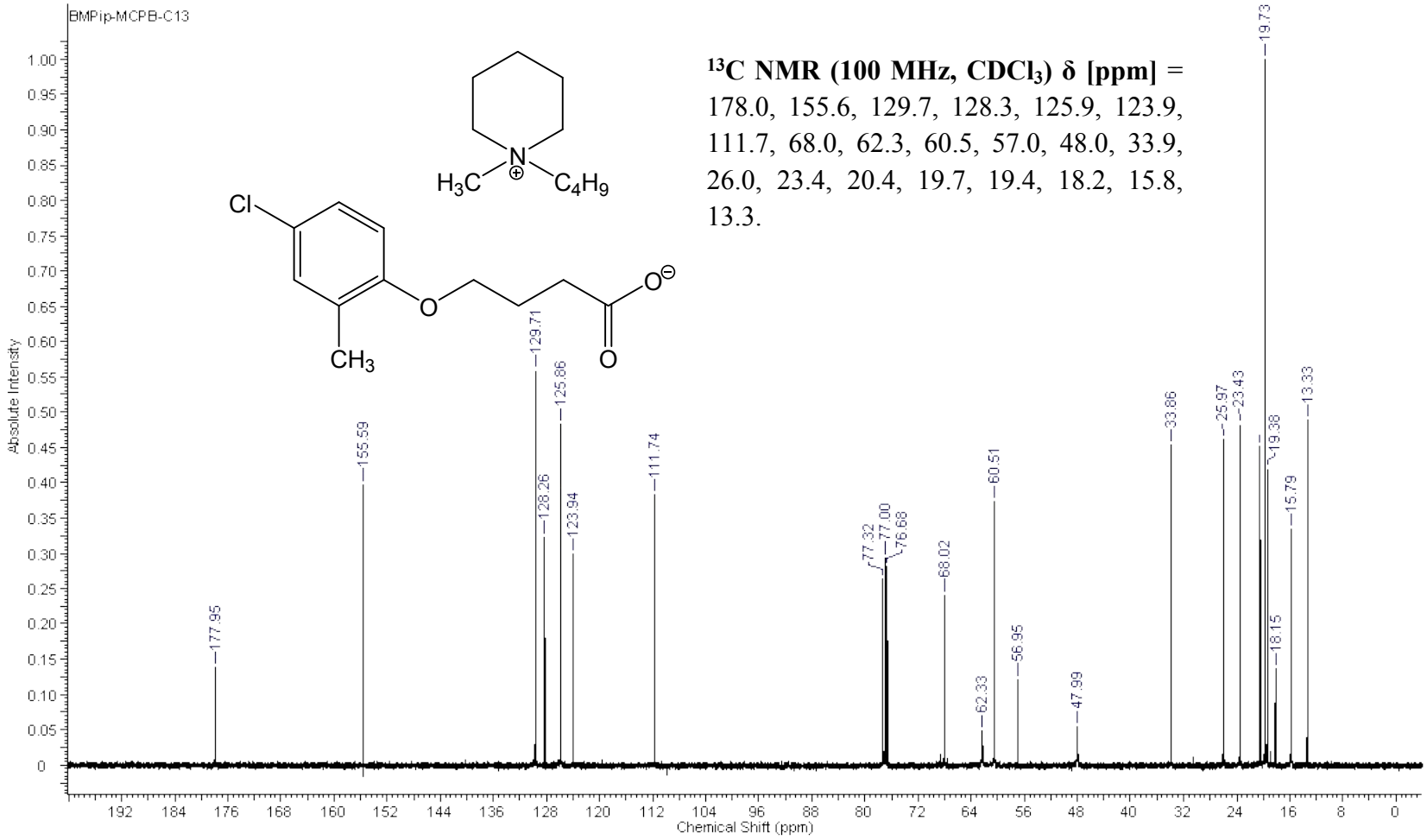
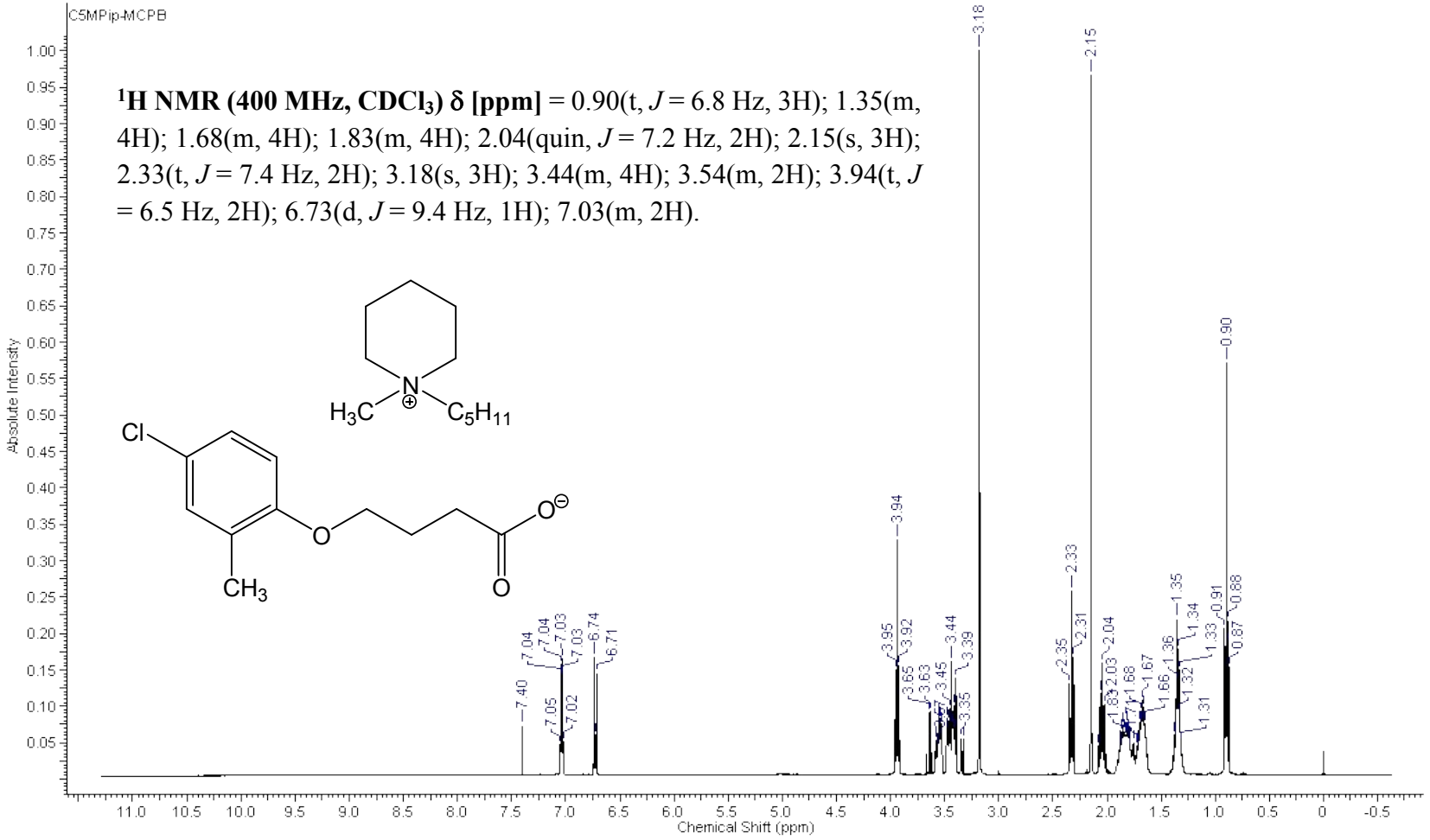
Nucleus	13C	*Number of Transients*	904	*Original Points Count*	31878	*Points Count*	32768
Pulse Sequence	s2pul	*Receiver Gain*	36.00	*Solvent*	CHLOROFORM-d		
Spectrum Offset (Hz)	11114.2031	*Spectrum Type*	STANDARD	*Sweep Width (Hz)*	24509.80	*Temperature (degree C)*	AMBIENT TEMPERATURE



^{13}C NMR (100 MHz, $CDCl_3$) δ [ppm] = 178.0, 155.6, 129.7, 128.3, 125.9, 123.9, 111.7, 68.0, 62.3, 60.5, 57.0, 48.0, 33.9, 26.0, 23.4, 20.4, 19.7, 19.4, 18.2, 15.8, 13.3.

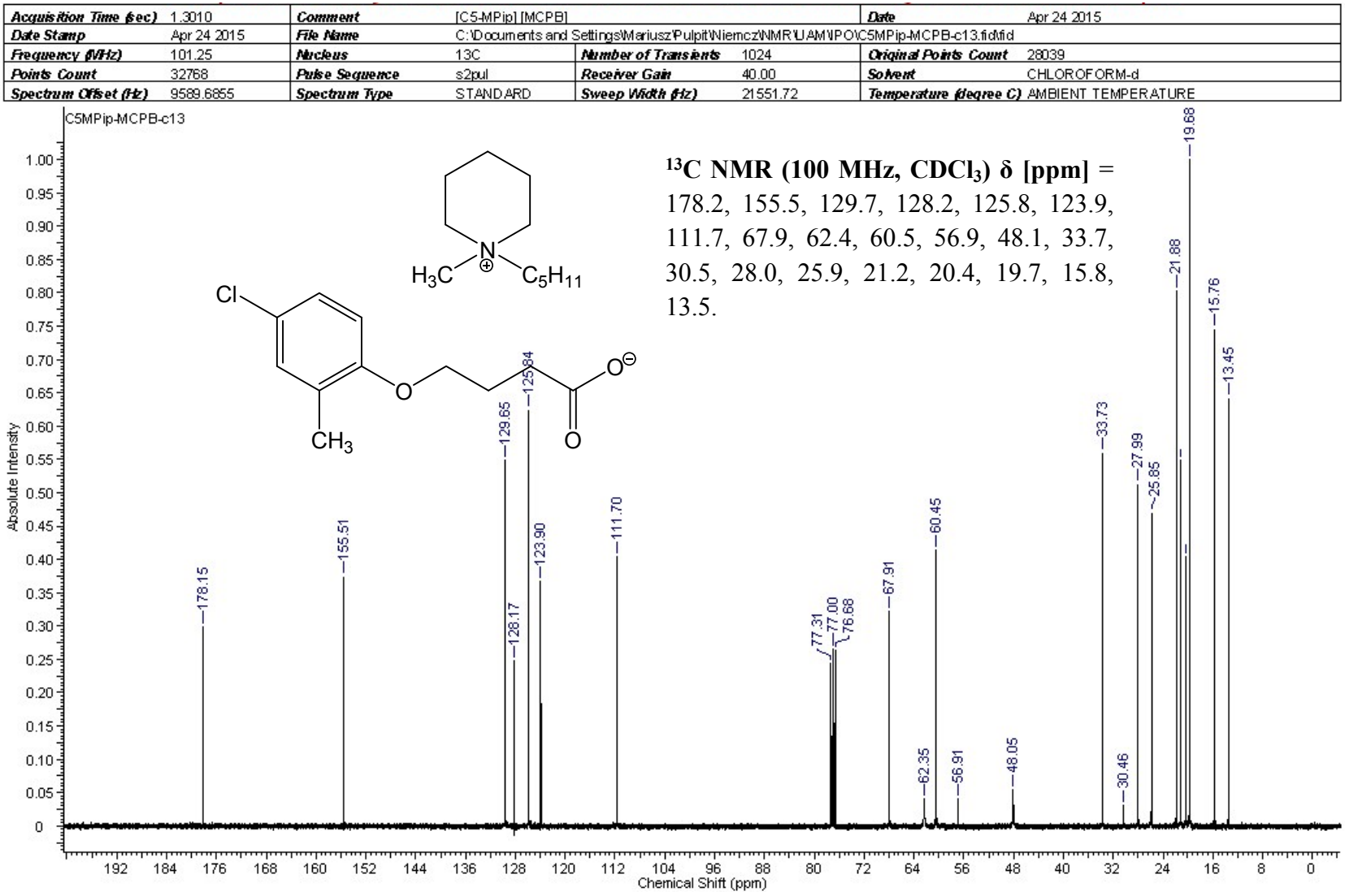
Figure S7. ^{1}H NMR spectrum of 1-methyl-1-pentylpiperidinium 4-(4-chloro-2-methylphenoxy)butanoate (**4**).

Acquisition Time (sec)	5.5001	*Comment*	[C5-MPip] [MCPB]			*Date*	Apr 24 2015
Date Stamp	Apr 24 2015	*File Name*	C:\Documents and Settings\Mariusz\Pulpit\Niemcz\NMR\UAM\PO\C5MPip-MCPB.fid\fid				
Frequency (MHz)	402.64	*Nucleus*	1H	*Number of Transients*	64	*Original Points Count*	26443
Points Count	32768	*Pulse Sequence*	s2pul	*Receiver Gain*	18.00	*Solvent*	CHLOROFORM-d
Spectrum Offset (Hz)	2149.5820	*Spectrum Type*	STANDARD	*Sweep Width (Hz)*	4807.69	*Temperature (degree C)*	AMBIENT TEMPERATURE



^{1}H NMR (400 MHz, $CDCl_3$) δ [ppm] = 0.90(t, *J* = 6.8 Hz, 3H); 1.35(m, 4H); 1.68(m, 4H); 1.83(m, 4H); 2.04(quin, *J* = 7.2 Hz, 2H); 2.15(s, 3H); 2.33(t, *J* = 7.4 Hz, 2H); 3.18(s, 3H); 3.44(m, 4H); 3.54(m, 2H); 3.94(t, *J* = 6.5 Hz, 2H); 6.73(d, *J* = 9.4 Hz, 1H); 7.03(m, 2H).

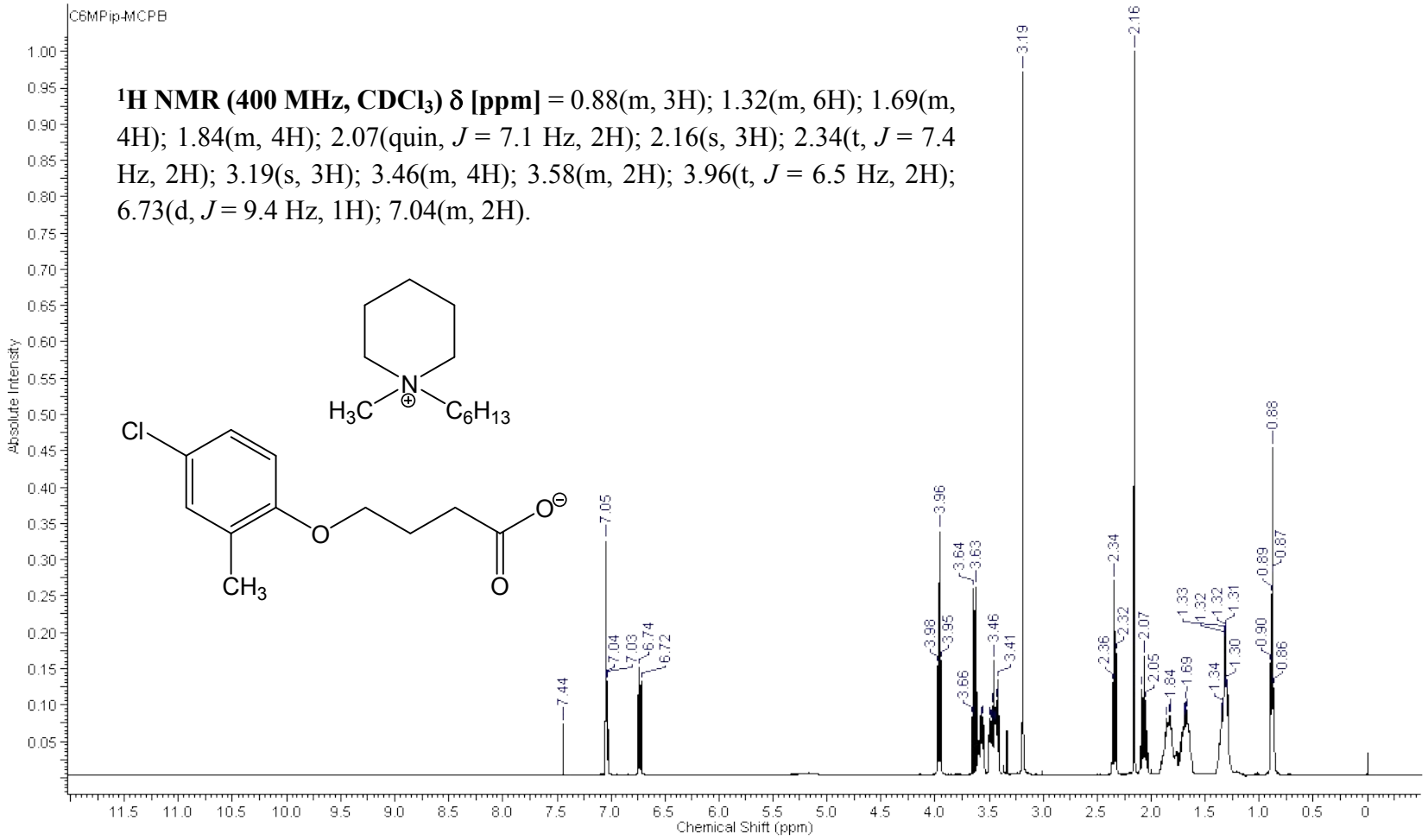
Figure S8. ^{13}C NMR spectrum of 1-methyl-1-pentylpiperidinium 4-(4-chloro-2-methylphenoxy)butanoate (**4**).



^{13}C NMR (100 MHz, $CDCl_3$) δ [ppm] = 178.2, 155.5, 129.7, 128.2, 125.8, 123.9, 111.7, 67.9, 62.4, 60.5, 56.9, 48.1, 33.7, 30.5, 28.0, 25.9, 21.2, 20.4, 19.7, 15.8, 13.5.

Figure S9. ^{1}H NMR spectrum of 1-hexyl-1-methylpiperidinium 4-(4-chloro-2-methylphenoxy)butanoate (**5**).

Acquisition Time (sec)	6.9999	*Comment*	[C6-MPip] [MCPB]			*Date*	Apr 24 2015
Date Stamp	Apr 24 2015	*File Name*	C:\Documents and Settings\Mariusz\Pulpit\Niemcz\NMR\UAM\PO\C6MPip-MCPB.fid\fid				
Frequency (MHz)	402.64	*Nucleus*	1H	*Number of Transients*	64	*Original Points Count*	36458
Points Count	65536	*Pulse Sequence*	s2pul	*Receiver Gain*	18.00	*Solvent*	CHLOROFORM-d
Spectrum Offset (Hz)	2301.2163	*Spectrum Type*	STANDARD	*Sweep Width (Hz)*	5208.33	*Temperature (degree C)*	AMBIENT TEMPERATURE



^{1}H NMR (400 MHz, $CDCl_3$) δ [ppm] = 0.88(m, 3H); 1.32(m, 6H); 1.69(m, 4H); 1.84(m, 4H); 2.07(quin, *J* = 7.1 Hz, 2H); 2.16(s, 3H); 2.34(t, *J* = 7.4 Hz, 2H); 3.19(s, 3H); 3.46(m, 4H); 3.58(m, 2H); 3.96(t, *J* = 6.5 Hz, 2H); 6.73(d, *J* = 9.4 Hz, 1H); 7.04(m, 2H).

Figure S10. ^{13}C NMR spectrum of 1-hexyl-1-methylpiperidinium 4-(4-chloro-2-methylphenoxy)butanoate (**5**).

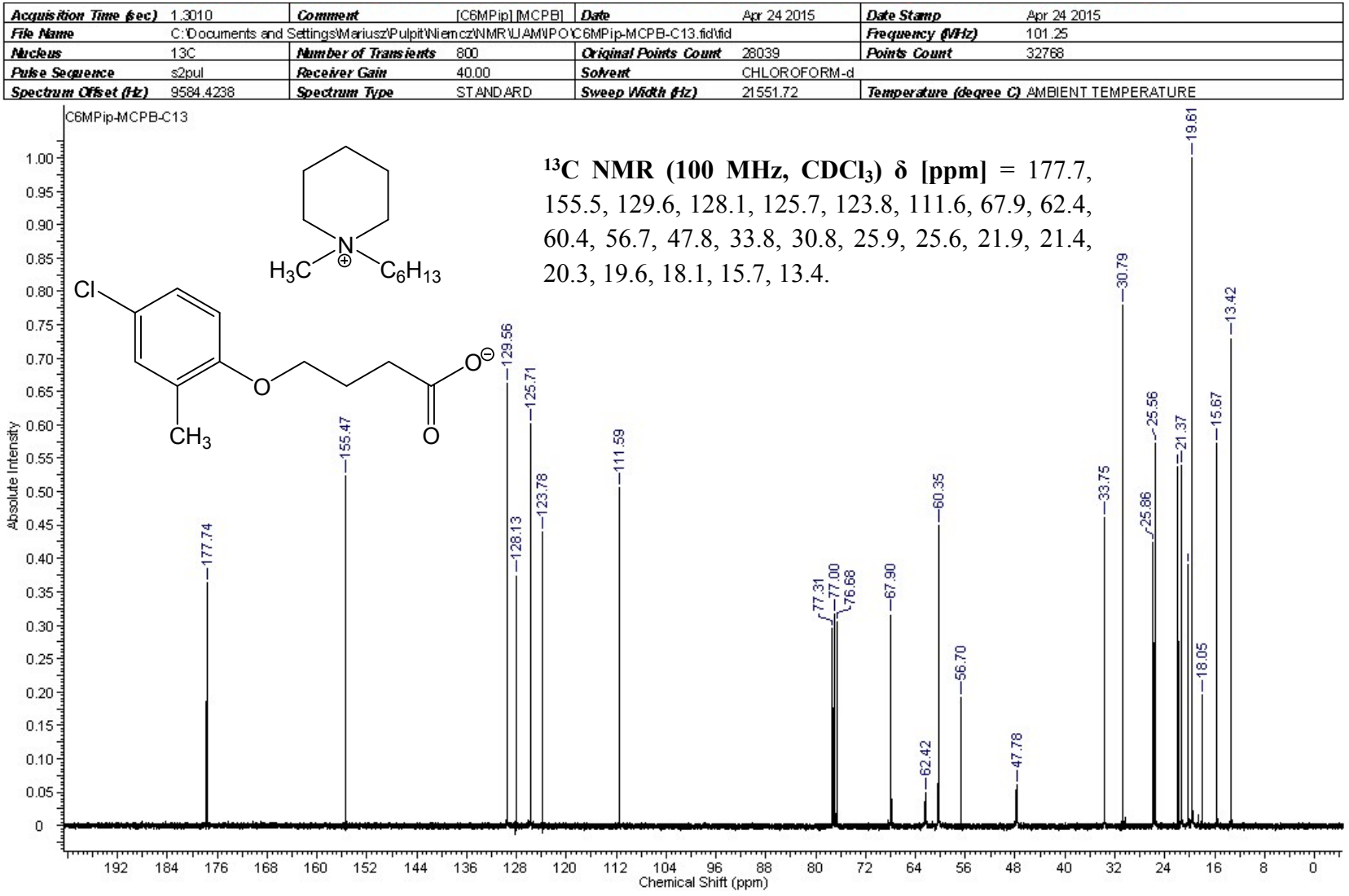
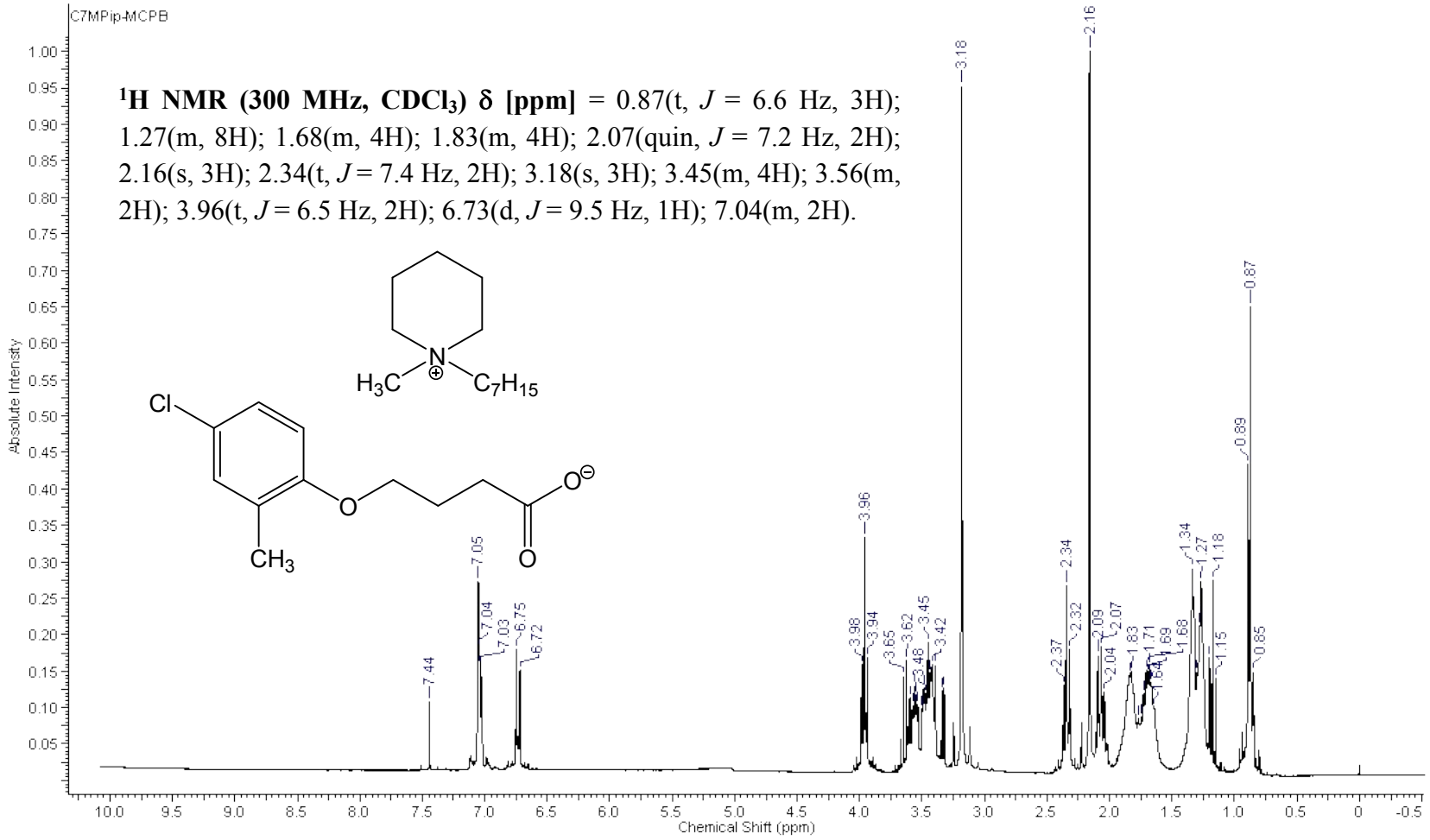


Figure S11. ^{1}H NMR spectrum of 1-heptyl-1-methylpiperidinium 4-(4-chloro-2-methylphenoxy)butanoate (**6**).

Acquisition Time (sec)	4.0001	*Comment*	[C7-MPip] [MCPB]			*Date*	Apr 23 2015
Date Stamp	Apr 23 2015	*File Name*	C:\Documents and Settings\Mariusz\Pulpit\Niemcz\NMR\UAM\PO\C7MPip-MCPB.fid\fid				
Frequency (MHz)	300.07	*Nucleus*	1H	*Number of Transients*	64	*Original Points Count*	12941
Points Count	16384	*Pulse Sequence*	s2pul	*Solvent*	CHLOROFORM-d		
Spectrum Offset (Hz)	1408.3865	*Spectrum Type*	STANDARD	*Sweep Width (Hz)*	3235.20	*Temperature (degree C)*	AMBIENT TEMPERATURE



^{1}H NMR (300 MHz, $CDCl_3$) δ [ppm] = 0.87(t, *J* = 6.6 Hz, 3H); 1.27(m, 8H); 1.68(m, 4H); 1.83(m, 4H); 2.07(quin, *J* = 7.2 Hz, 2H); 2.16(s, 3H); 2.34(t, *J* = 7.4 Hz, 2H); 3.18(s, 3H); 3.45(m, 4H); 3.56(m, 2H); 3.96(t, *J* = 6.5 Hz, 2H); 6.73(d, *J* = 9.5 Hz, 1H); 7.04(m, 2H).

Figure S12. ^{13}C NMR spectrum of 1-heptyl-1-methylpiperidinium 4-(4-chloro-2-methylphenoxy)butanoate (**6**).

Acquisition Time (sec)	0.6400	***Comment***	[C7-MPip] [MCPB]			***Date***	Apr 23 2015
Date Stamp	Apr 23 2015	***File Name***	C:\Documents and Settings\Mariusz\Pulpit\Niemcz\NMR\UAM\PO\C7MPip-MCPB-c13.fid\fid				
Frequency (MHz)	75.46	***Nucleus***	13C	***Number of Transients***	1452	***Original Points Count***	10257
Points Count	16384	***Pulse Sequence***	s2pul	***Receiver Gain***	34.00	***Solvent***	CHLOROFORM-d
Spectrum Offset (Hz)	7082.9160	***Spectrum Type***	STANDARD	***Sweep Width (Hz)***	16025.64	***Temperature (degree C)***	AMBIENT TEMPERATURE

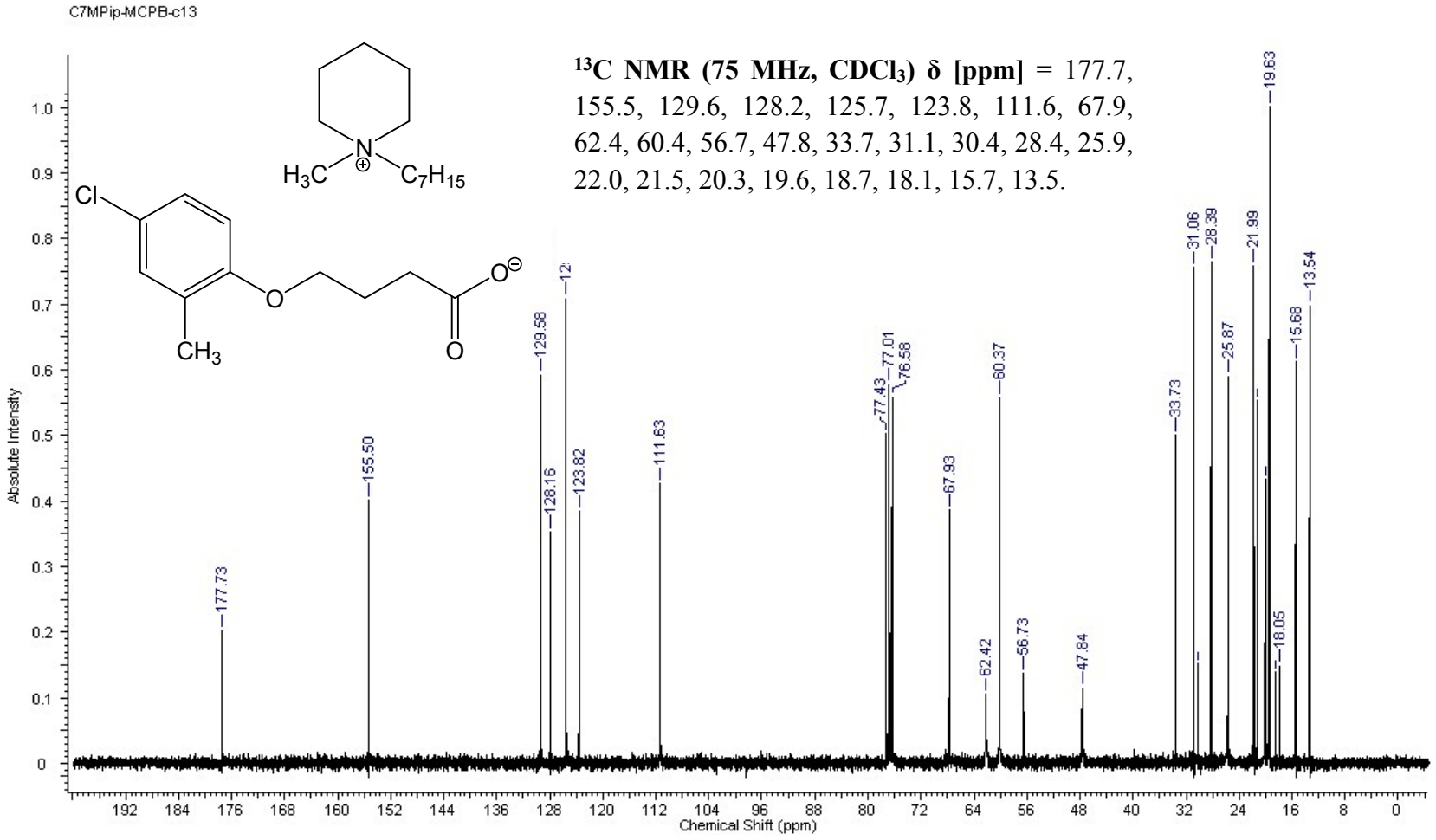


Figure S13. ^{1}H NMR spectrum of 1-methyl-1-octylpiperidinium 4-(4-chloro-2-methylphenoxy)butanoate (**7**).

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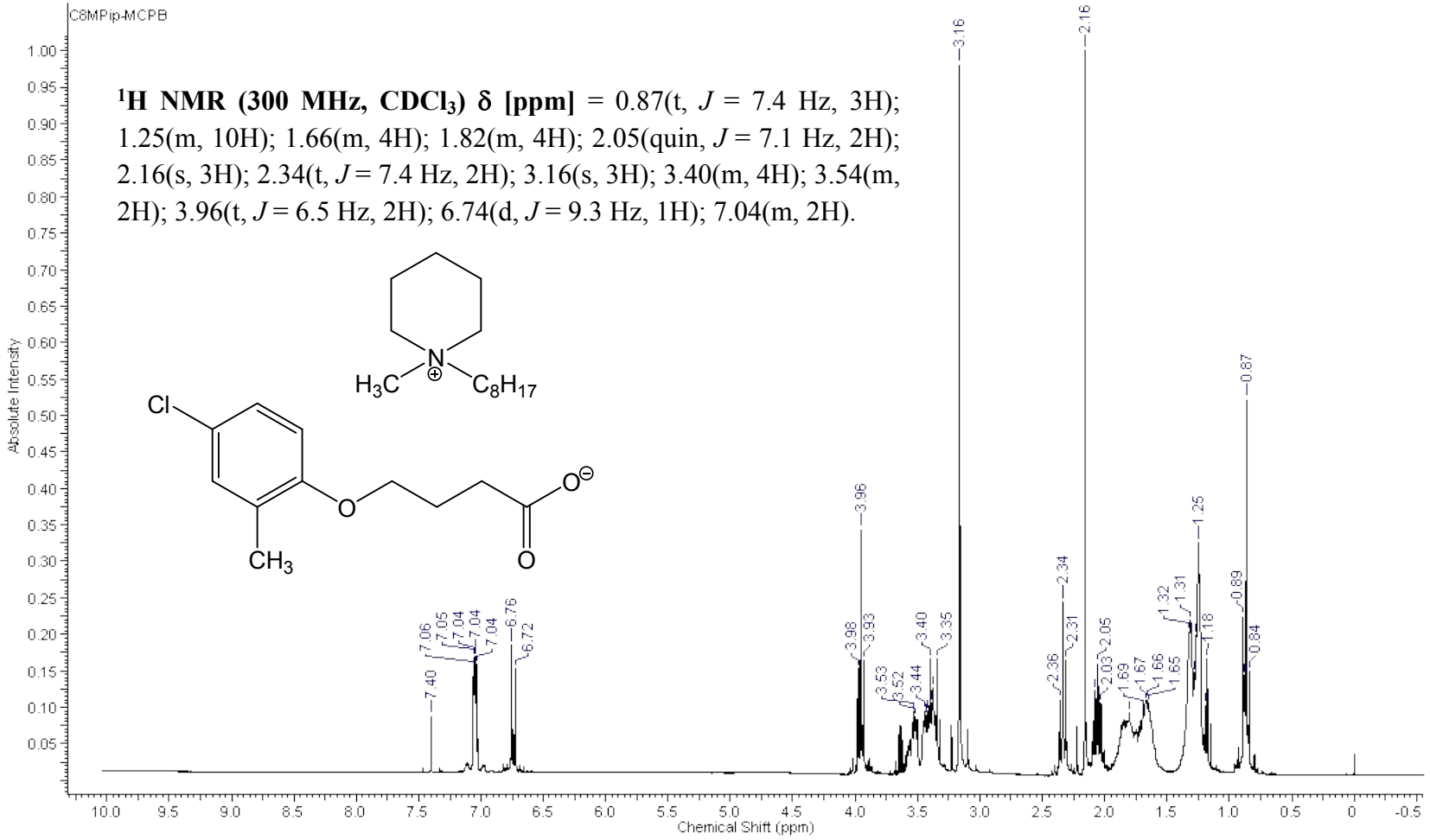
Date Stamp	Apr 23 2015	*File Name*	C:\Documents and Settings\Mariusz\Pulpit\Niemcz\NMR\LAM\PO\C8MPip-MCPB.fid\fid				
Frequency (MHz)	300.07	*Nucleus*	1H	*Number of Transients*	64	*Original Points Count*	12941
Points Count	16384	*Pulse Sequence*	s2pul	*Solvent*	CHLOROFORM-d		
Spectrum Offset (Hz)	1395.3539	*Spectrum Type*	STANDARD	*Sweep Width (Hz)*	3235.20	*Temperature (degree C)*	AMBIENT TEMPERATURE

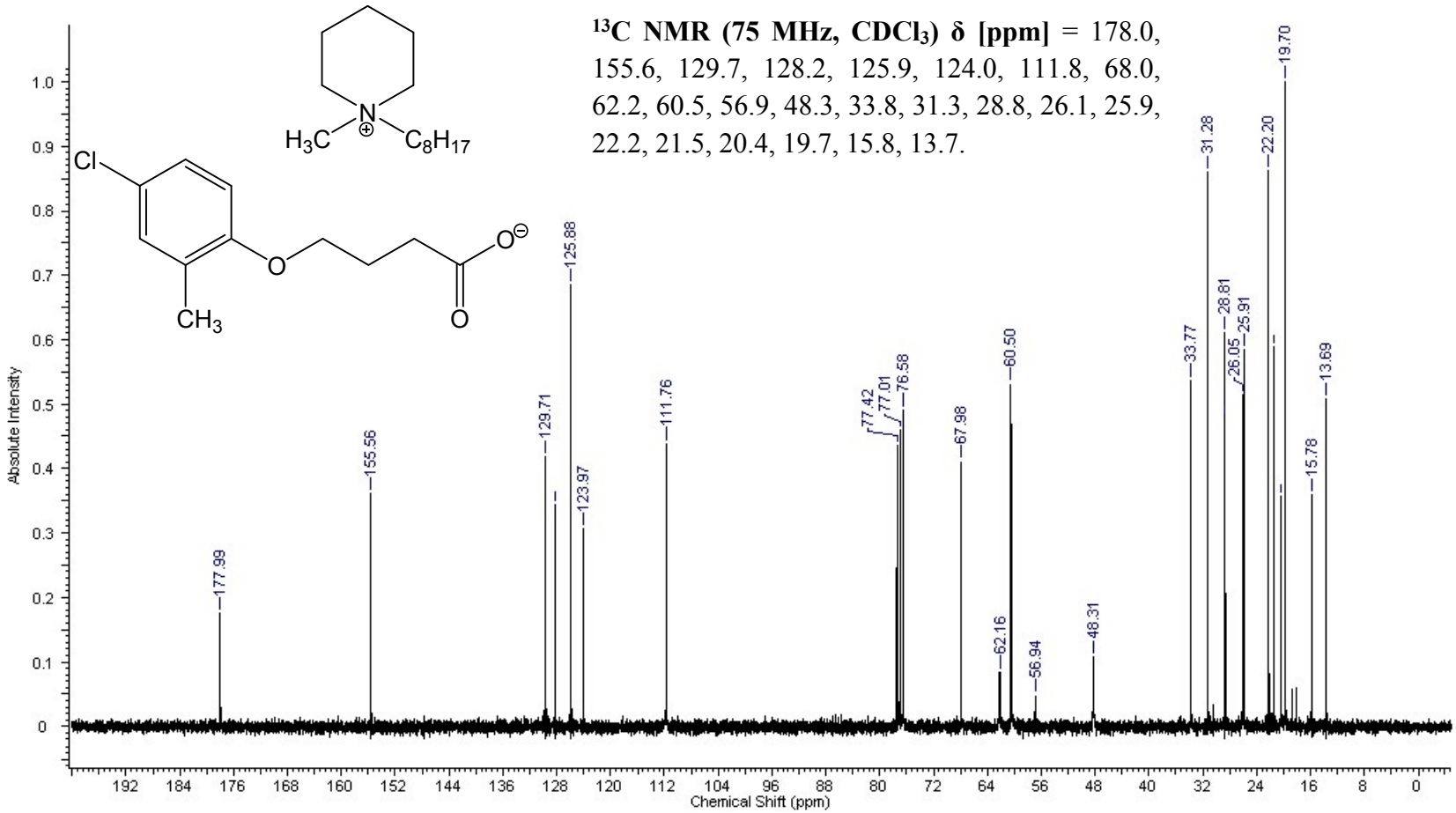


^{1}H NMR (300 MHz, $CDCl_3$) δ [ppm] = 0.87(t, *J* = 7.4 Hz, 3H); 1.25(m, 10H); 1.66(m, 4H); 1.82(m, 4H); 2.05(quin, *J* = 7.1 Hz, 2H); 2.16(s, 3H); 2.34(t, *J* = 7.4 Hz, 2H); 3.16(s, 3H); 3.40(m, 4H); 3.54(m, 2H); 3.96(t, *J* = 6.5 Hz, 2H); 6.74(d, *J* = 9.3 Hz, 1H); 7.04(m, 2H).

Figure S14. ^{13}C NMR spectrum of 1-methyl-1-octylpiperidinium 4-(4-chloro-2-methylphenoxy)butanoate (**7**).

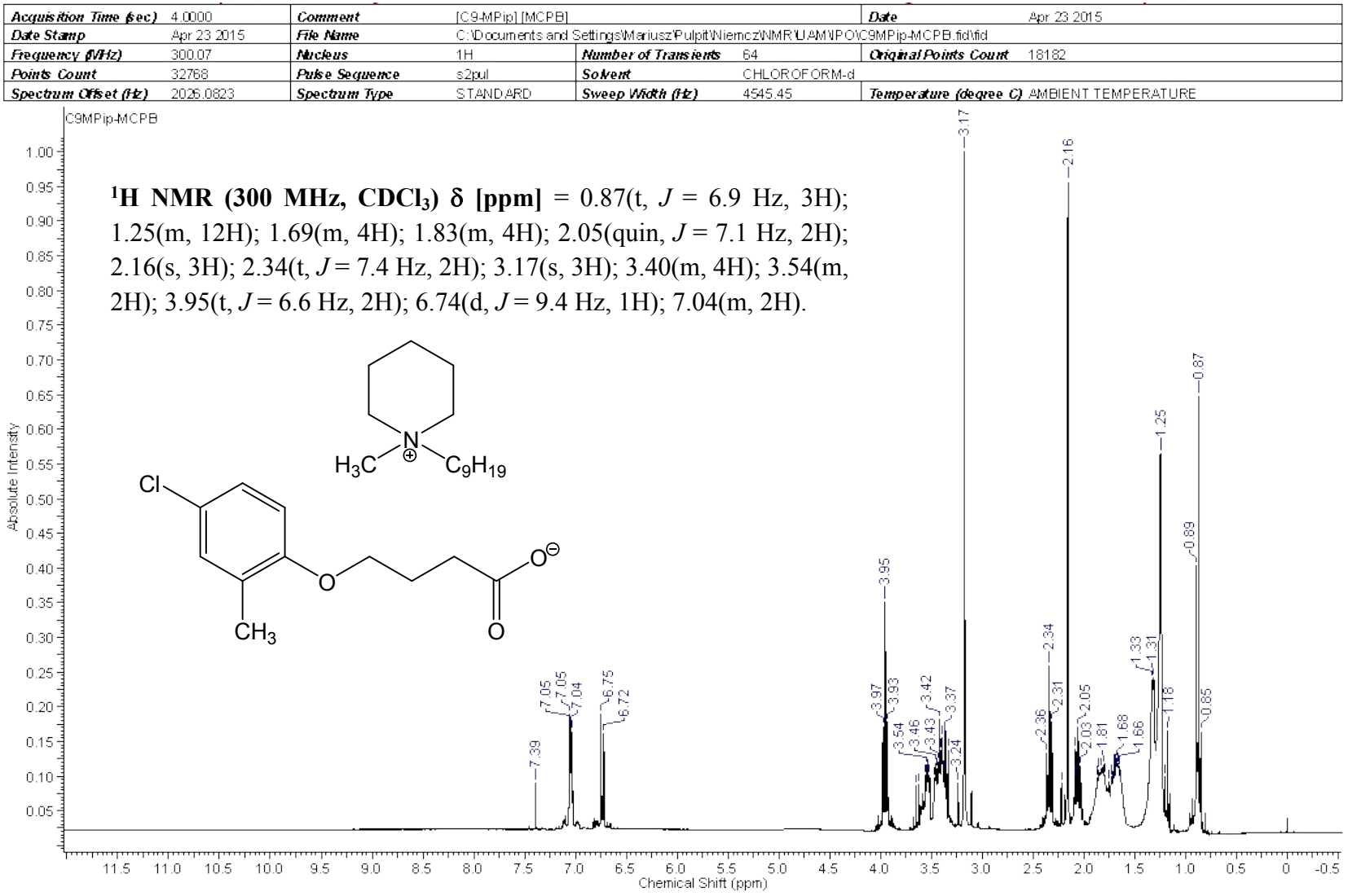
Acquisition Time (sec)	0.6400	***Comment***	[C8-MPip] [MCPB]			***Date***	Apr 23 2015
Date Stamp	Apr 23 2015	***File Name***	C:\Documents and Settings\Mariusz\Pulpit\Niemcz\NMR\JAM\PO\C8MPip-MCPB-c13.fid\fid				
Frequency (MHz)	75.46	***Nucleus***	13C	***Number of Transients***	1148	***Original Points Count***	10257
Points Count	16384	***Pulse Sequence***	s2pul	***Receiver Gain***	34.00	***Solvent***	CHLOROFORM-d
Spectrum Offset (Hz)	7087.8071	***Spectrum Type***	STANDARD	***Sweep Width (Hz)***	16025.64	***Temperature (degree C)***	AMBIENT TEMPERATURE

C8MPip-MCPB-c13



^{13}C NMR (75 MHz, $CDCl_3$) δ [ppm] = 178.0, 155.6, 129.7, 128.2, 125.9, 124.0, 111.8, 68.0, 62.2, 60.5, 56.9, 48.3, 33.8, 31.3, 28.8, 26.1, 25.9, 22.2, 21.5, 20.4, 19.7, 15.8, 13.7.

Figure S15. ^{1}H NMR spectrum of 1-methyl-1-nonylpiperidinium 4-(4-chloro-2-methylphenoxy)butanoate (**8**).

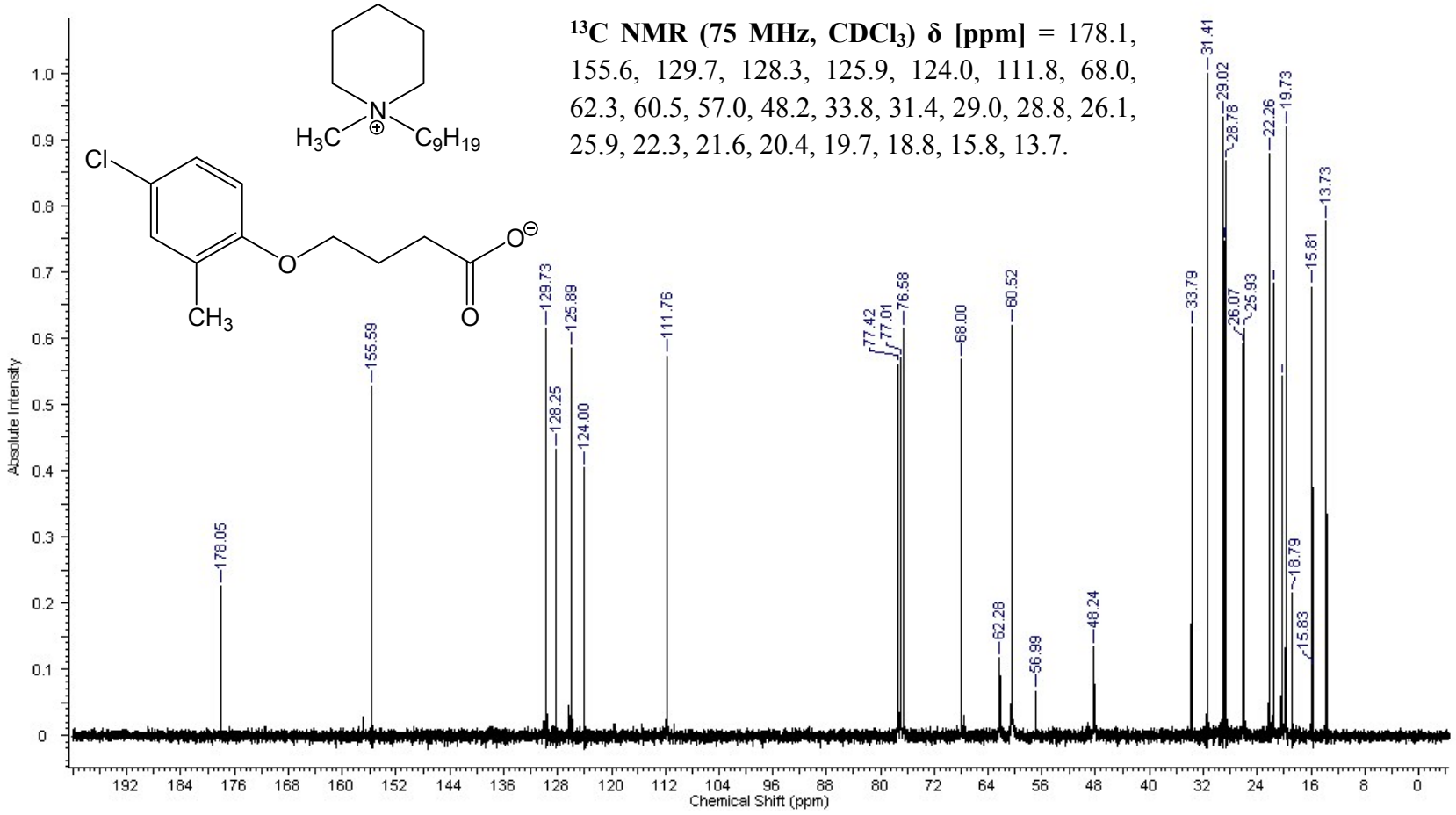


^{1}H NMR (300 MHz, $CDCl_3$) δ [ppm] = 0.87(t, *J* = 6.9 Hz, 3H); 1.25(m, 12H); 1.69(m, 4H); 1.83(m, 4H); 2.05(quin, *J* = 7.1 Hz, 2H); 2.16(s, 3H); 2.34(t, *J* = 7.4 Hz, 2H); 3.17(s, 3H); 3.40(m, 4H); 3.54(m, 2H); 3.95(t, *J* = 6.6 Hz, 2H); 6.74(d, *J* = 9.4 Hz, 1H); 7.04(m, 2H).

Figure S16. ^{13}C NMR spectrum of 1-methyl-1-nonylpiperidinium 4-(4-chloro-2-methylphenoxy)butanoate (**8**).

Acquisition Time (sec)	0.6400	*Comment*	[C9-MPip] [MCPB]			*Date*	Apr 23 2015
Date Stamp	Apr 23 2015	*File Name*	C:\Documents and Settings\Mariusz\Pulpit\Niemcz\NMR\UAM\PO\C9-MPip-MCPB-C13.fid\fid				
Frequency (MHz)	75.46	*Nucleus*	13C	*Number of Transients*	2000	*Original Points Count*	10257
Points Count	16384	*Pulse Sequence*	s2pul	*Receiver Gain*	34.00	*Solvent*	CHLOROFORM-d
Spectrum Offset (Hz)	7088.7847	*Spectrum Type*	STANDARD	*Sweep Width (Hz)*	16025.64	*Temperature (degree C)*	AMBIENT TEMPERATURE

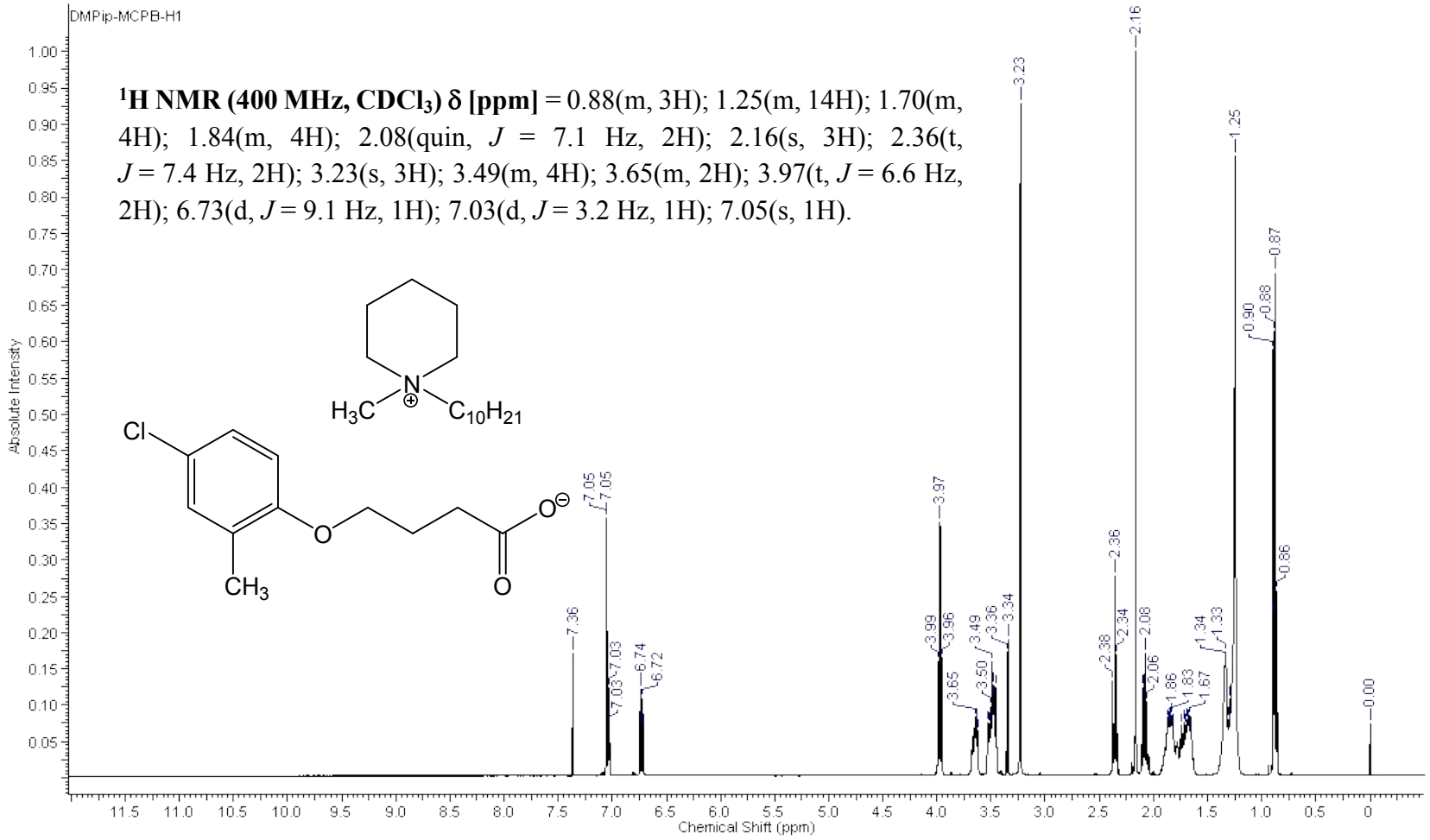
C9-MPip-MCPB-C13



^{13}C NMR (75 MHz, $CDCl_3$) δ [ppm] = 178.1, 155.6, 129.7, 128.3, 125.9, 124.0, 111.8, 68.0, 62.3, 60.5, 57.0, 48.2, 33.8, 31.4, 29.0, 28.8, 26.1, 25.9, 22.3, 21.6, 20.4, 19.7, 18.8, 15.8, 13.7.

Figure S17. ^{1}H NMR spectrum of 1-decyl-1-methylpiperidinium 4-(4-chloro-2-methylphenoxy)butanoate (**9**).

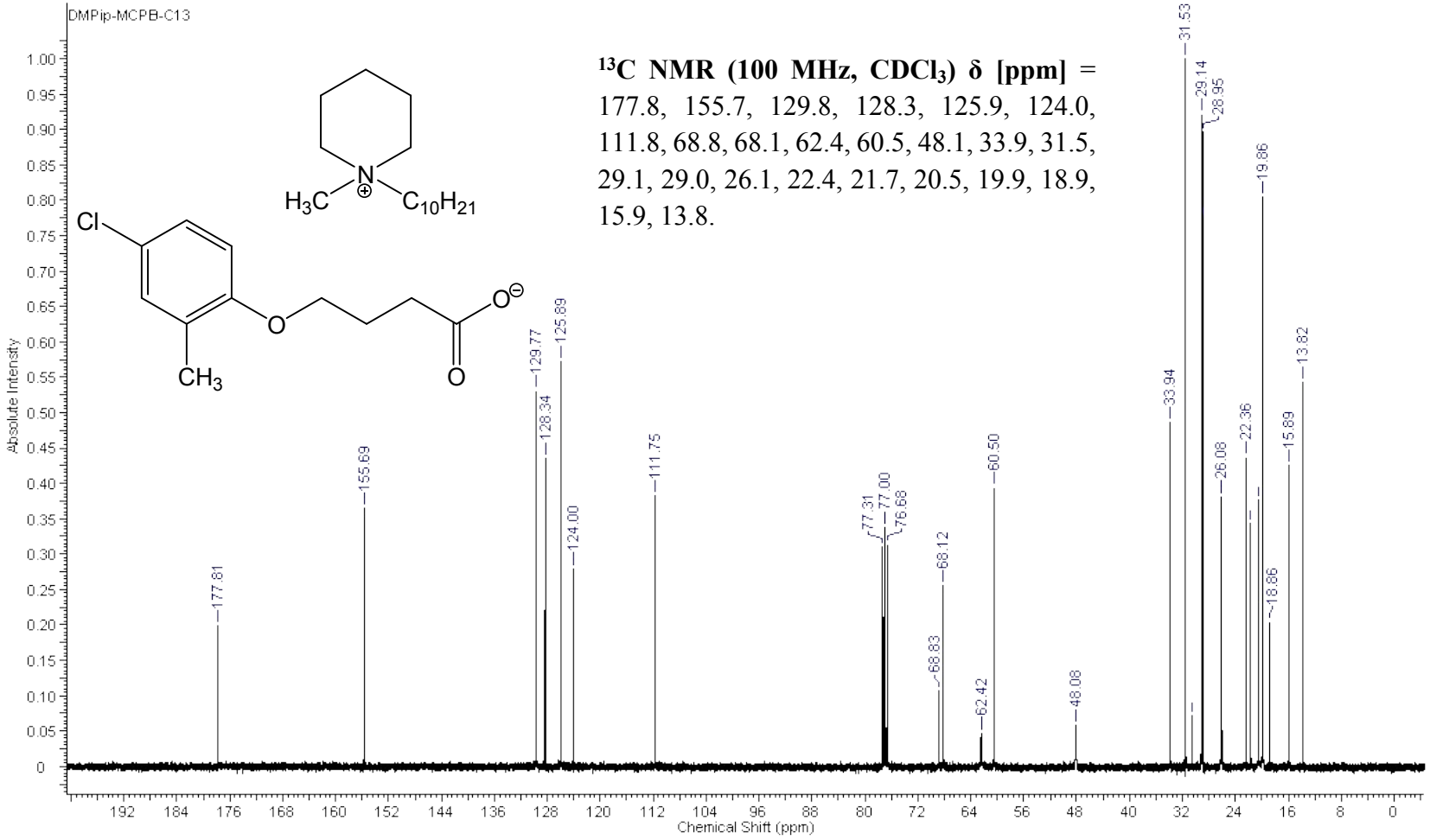
Acquisition Time (sec)	6.0000	*Comment*	[DMPip][MCPB]	*Date*	Mar 31 2014	*Date Stamp*	Mar 31 2014
File Name	C:\Documents and Settings\Mariusz\Pulpit\Niemcz\NMR\UAM\PO\DMPip-MCPB-H1.fid\fid					*Frequency (MHz)*	402.64
Nucleus	1H	*Number of Transients*	64	*Original Points Count*	31250	*Points Count*	32768
Pulse Sequence	s2pul	*Receiver Gain*	20.00	*Solvent*	CHLOROFORM-d		
Spectrum Offset (Hz)	2323.7070	*Spectrum Type*	STANDARD	*Sweep Width (Hz)*	5208.33	*Temperature (degree C)*	AMBIENT TEMPERATURE



^{1}H NMR (400 MHz, $CDCl_3$) δ [ppm] = 0.88(m, 3H); 1.25(m, 14H); 1.70(m, 4H); 1.84(m, 4H); 2.08(quin, *J* = 7.1 Hz, 2H); 2.16(s, 3H); 2.36(t, *J* = 7.4 Hz, 2H); 3.23(s, 3H); 3.49(m, 4H); 3.65(m, 2H); 3.97(t, *J* = 6.6 Hz, 2H); 6.73(d, *J* = 9.1 Hz, 1H); 7.03(d, *J* = 3.2 Hz, 1H); 7.05(s, 1H).

Figure S18. ^{13}C NMR spectrum of 1-decyl-1-methylpiperidinium 4-(4-chloro-2-methylphenoxy)butanoate (**9**).

Acquisition Time (sec)	1.3010	*Comment*	[DMPip][MCPB]	*Date*	Mar 31 2014	*Date Stamp*	Mar 31 2014
File Name	C:\Documents and Settings\Mariusz\Pulpit\Nienncz\NMR\UAM\PO\DMPip-MCPB-C13.fid\fid					*Frequency (MHz)*	101.25
Nucleus	13C	*Number of Transients*	940	*Original Points Count*	28038	*Points Count*	32768
Pulse Sequence	s2pul	*Receiver Gain*	36.00	*Solvent*	CHLOROFORM-d		
Spectrum Offset (Hz)	9600.5371	*Spectrum Type*	STANDARD	*Sweep Width (Hz)*	21551.72	*Temperature (degree C)*	AMBIENT TEMPERATURE



^{13}C NMR (100 MHz, $CDCl_3$) δ [ppm] = 177.8, 155.7, 129.8, 128.3, 125.9, 124.0, 111.8, 68.8, 68.1, 62.4, 60.5, 48.1, 33.9, 31.5, 29.1, 29.0, 26.1, 22.4, 21.7, 20.5, 19.9, 18.9, 15.9, 13.8.

Figure S19. [1]H NMR spectrum of 1-methyl-1-undecylpiperidinium 4-(4-chloro-2-methylphenoxy)butanoate (**10**).

Acquisition Time (sec)	4.0000	*Comment*	C11-MPip-MCPB	*Date*	Apr 23 2015	*Date Stamp*	Apr 23 2015
File Name	C:\Documents and Settings\Mariusz\Pulpit\Niemcz\NMR\UAM\PO\C11-MPip-MCPB-H1.fid\fid					*Frequency (MHz)*	300.07
Nucleus	1H	*Number of Transients*	64	*Original Points Count*	18182	*Points Count*	32768
Pulse Sequence	s2pul	*Solvent*	CHLOROFORM-d	*Spectrum Offset (Hz)*	2029.9664	*Spectrum Type*	STANDARD
Sweep Width (Hz)	4545.45	*Temperature (degree C)*	AMBIENT TEMPERATURE				

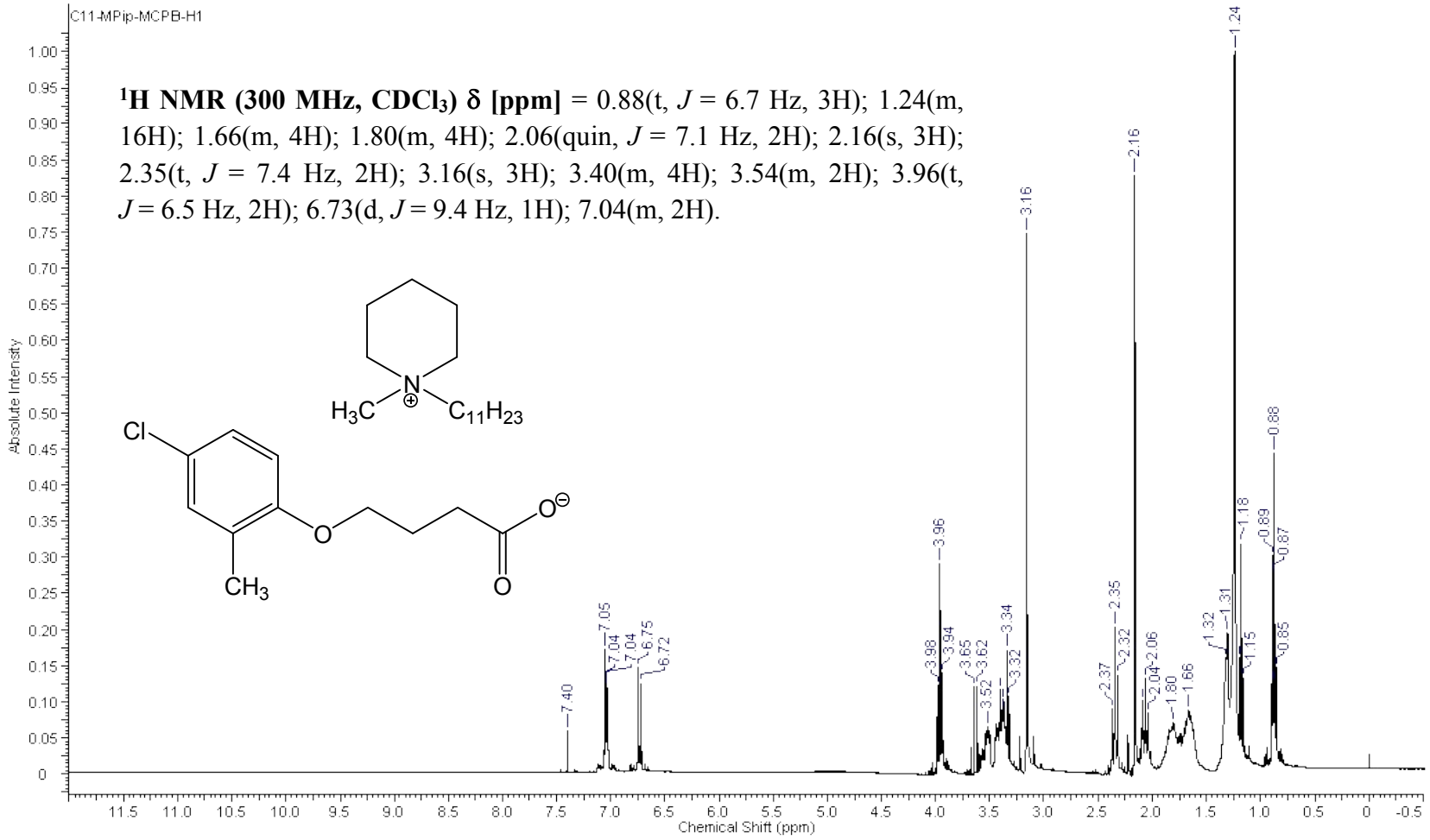
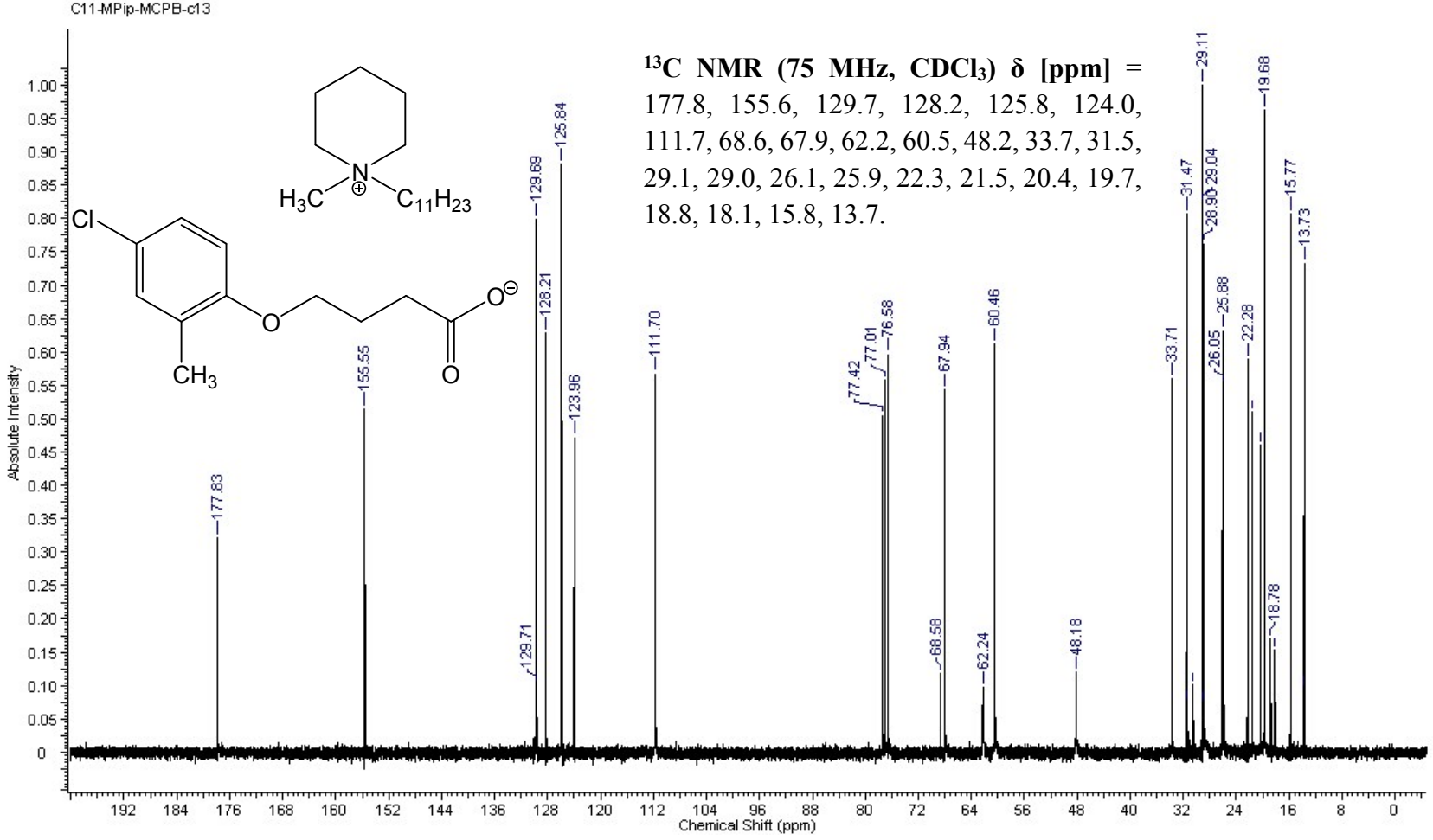


Figure S20. ^{13}C NMR spectrum of 1-methyl-1-undecylpiperidinium 4-(4-chloro-2-methylphenoxy)butanoate (**10**).

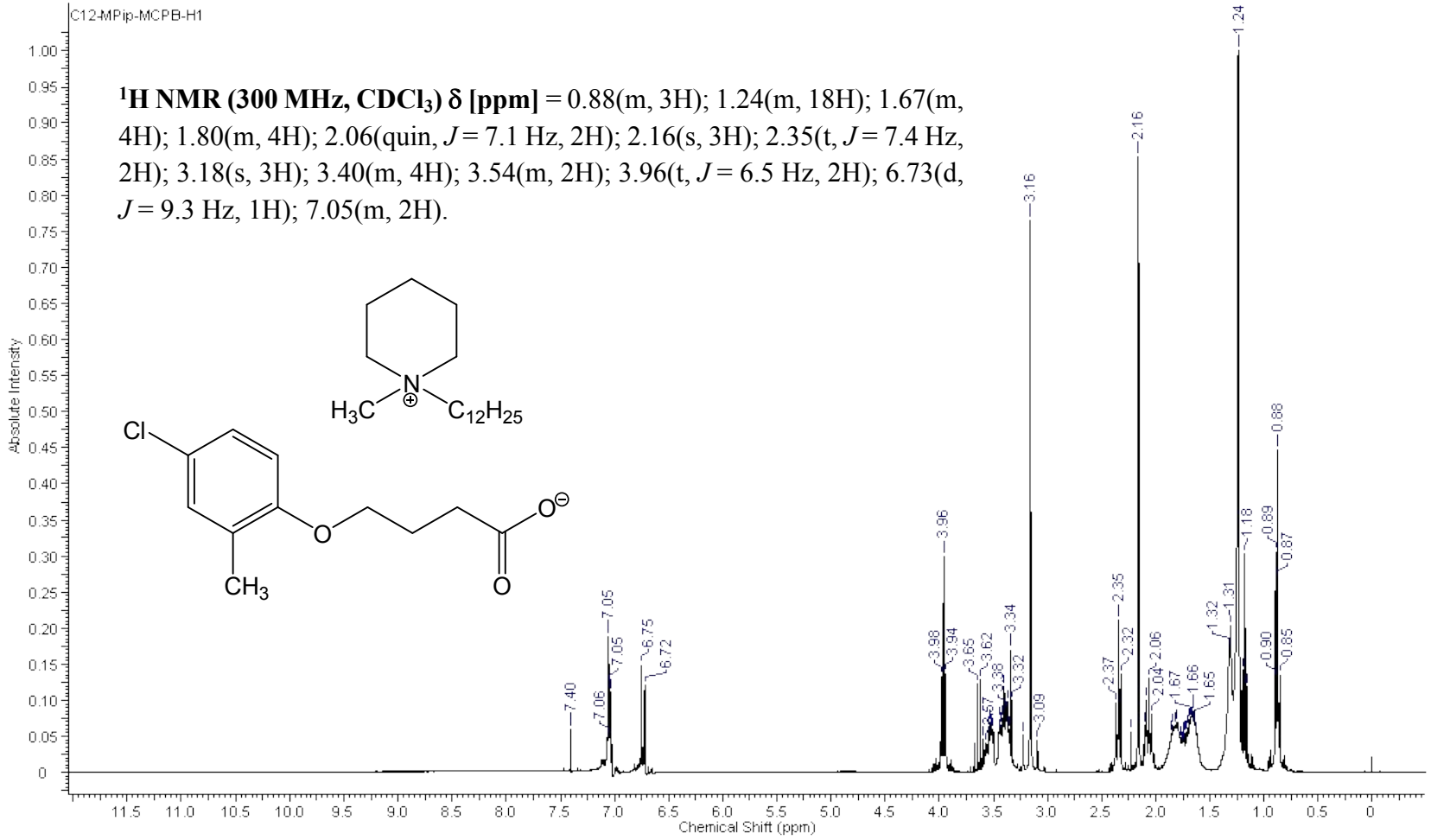
Acquisition Time (sec)	0.6400	***Comment***	C11-MPip-MCPB	***Date***	Apr 23 2015	***Date Stamp***	Apr 23 2015
File Name	C:\Documents and Settings\Mariusz\Pulpit\Nienncz\NMR\UAM\PO\C11-MPip-MCPB-c13.fid\fid					***Frequency (MHz)***	75.46
Nucleus	13C	***Number of Transients***	1572	***Original Points Count***	10257	***Points Count***	16384
Pulse Sequence	s2pul	***Receiver Gain***	34.00	***Solvent***	CHLOROFORM-d		
Spectrum Offset (Hz)	7086.8291	***Spectrum Type***	STANDARD	***Sweep Width (Hz)***	16025.64	***Temperature (degree C)***	AMBIENT TEMPERATURE



^{13}C NMR (75 MHz, $CDCl_3$) δ [ppm] = 177.8, 155.6, 129.7, 128.2, 125.8, 124.0, 111.7, 68.6, 67.9, 62.2, 60.5, 48.2, 33.7, 31.5, 29.1, 29.0, 26.1, 25.9, 22.3, 21.5, 20.4, 19.7, 18.8, 18.1, 15.8, 13.7.

Figure S21. ^{1}H NMR spectrum of 1-dodecyl-1-methylpiperidinium 4-(4-chloro-2-methylphenoxy)butanoate (**11**).

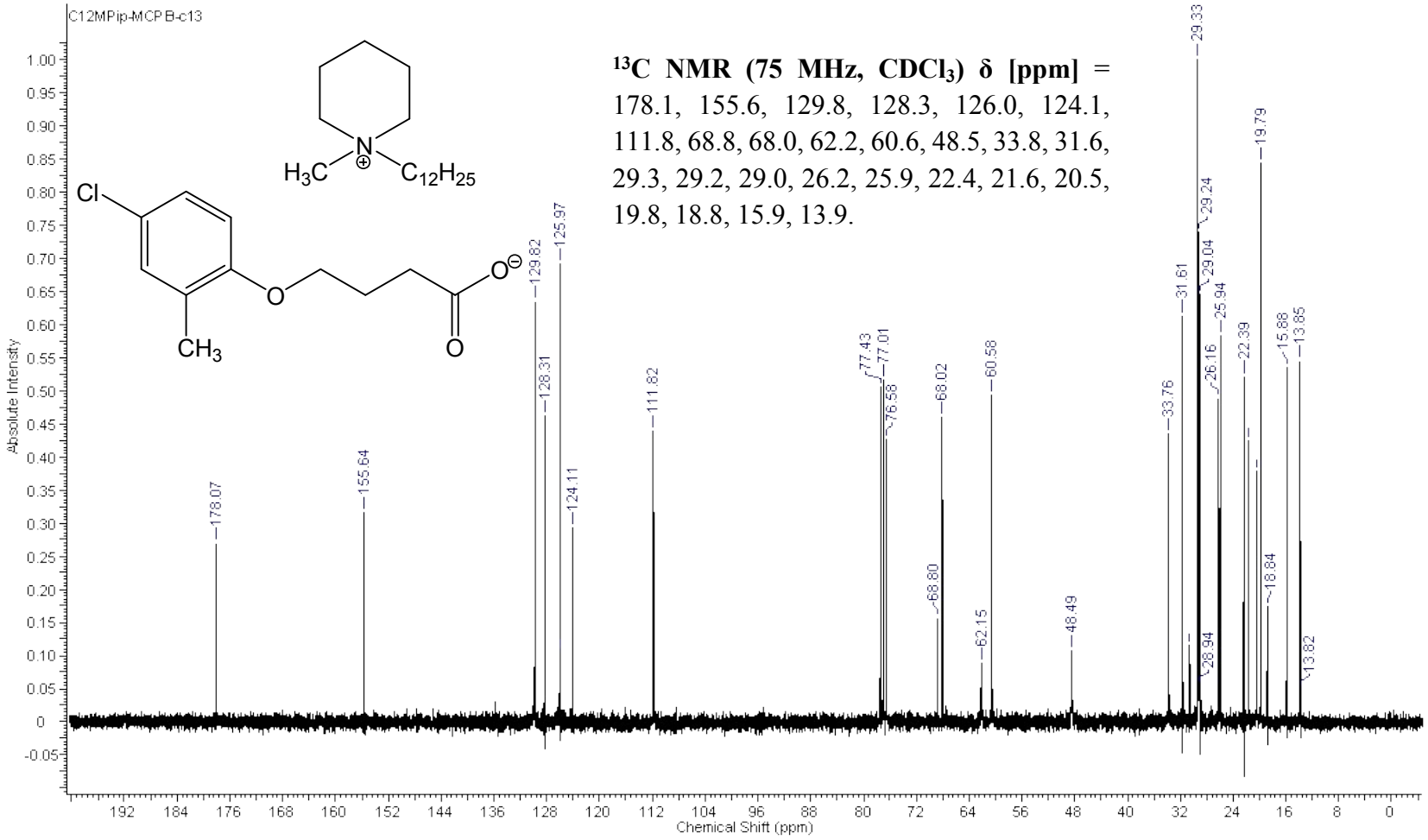
Acquisition Time (sec)	4.0000	*Comment*	C11-MPip-MCPB	*Date*	Apr 23 2015	*Date Stamp*	Apr 23 2015
File Name	C:\Documents and Settings\Mariusz\Pulpit\Niemcz\NMR\UAM\PO\C12-MPip-MCPB-H1.fid\fid					*Frequency (MHz)*	300.07
Nucleus	1H	*Number of Transients*	64	*Original Points Count*	18182	*Points Count*	32768
Pulse Sequence	s2pul	*Solvent*	CHLOROFORM-d	*Spectrum Offset (Hz)*	2029.9664	*Spectrum Type*	STANDARD
Sweep Width (Hz)	4545.45	*Temperature (degree C)*	AMBIENT TEMPERATURE				



^{1}H NMR (300 MHz, $CDCl_3$) δ [ppm] = 0.88(m, 3H); 1.24(m, 18H); 1.67(m, 4H); 1.80(m, 4H); 2.06(quin, *J* = 7.1 Hz, 2H); 2.16(s, 3H); 2.35(t, *J* = 7.4 Hz, 2H); 3.18(s, 3H); 3.40(m, 4H); 3.54(m, 2H); 3.96(t, *J* = 6.5 Hz, 2H); 6.73(d, *J* = 9.3 Hz, 1H); 7.05(m, 2H).

Figure S22. ^{13}C NMR spectrum of 1-dodecyl-1-methylpiperidinium 4-(4-chloro-2-methylphenoxy)butanoate (**11**).

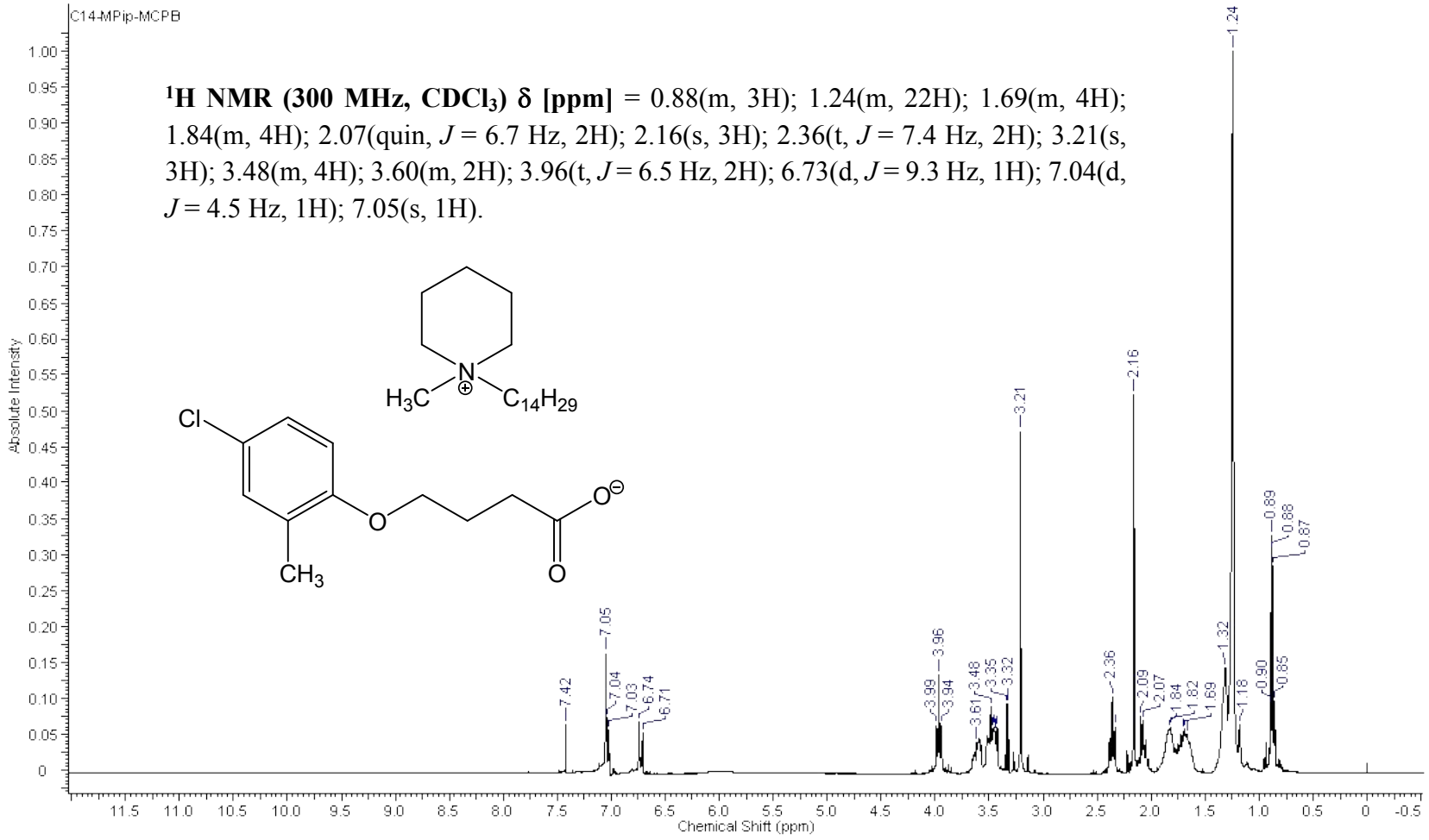
Acquisition Time (sec)	0.6400	*Comment*	C12-MPip-MCPB	*Date*	Apr 23 2015	*Date Stamp*	Apr 23 2015
File Name	C:\Documents and Settings\Mariusz\Pulpit\Niemcz\NMR\UAM\PO\C12MPip-MCPB-c13.fid\fid					*Frequency (MHz)*	75.46
Nucleus	13C	*Number of Transients*	800	*Original Points Count*	10257	*Points Count*	16384
Pulse Sequence	s2pul	*Receiver Gain*	34.00	*Solvent*	CHLOROFORM-d		
Spectrum Offset (Hz)	7092.6973	*Spectrum Type*	STANDARD	*Sweep Width (Hz)*	16025.64	*Temperature (degree C)*	AMBIENT TEMPERATURE



^{13}C NMR (75 MHz, $CDCl_3$) δ [ppm] = 178.1, 155.6, 129.8, 128.3, 126.0, 124.1, 111.8, 68.8, 68.0, 62.2, 60.6, 48.5, 33.8, 31.6, 29.3, 29.2, 29.0, 26.2, 25.9, 22.4, 21.6, 20.5, 19.8, 18.8, 15.9, 13.9.

Figure S23. ^{1}H NMR spectrum of 1-methyl-1-tetradecylpiperidinium 4-(4-chloro-2-methylphenoxy)butanoate (**12**).

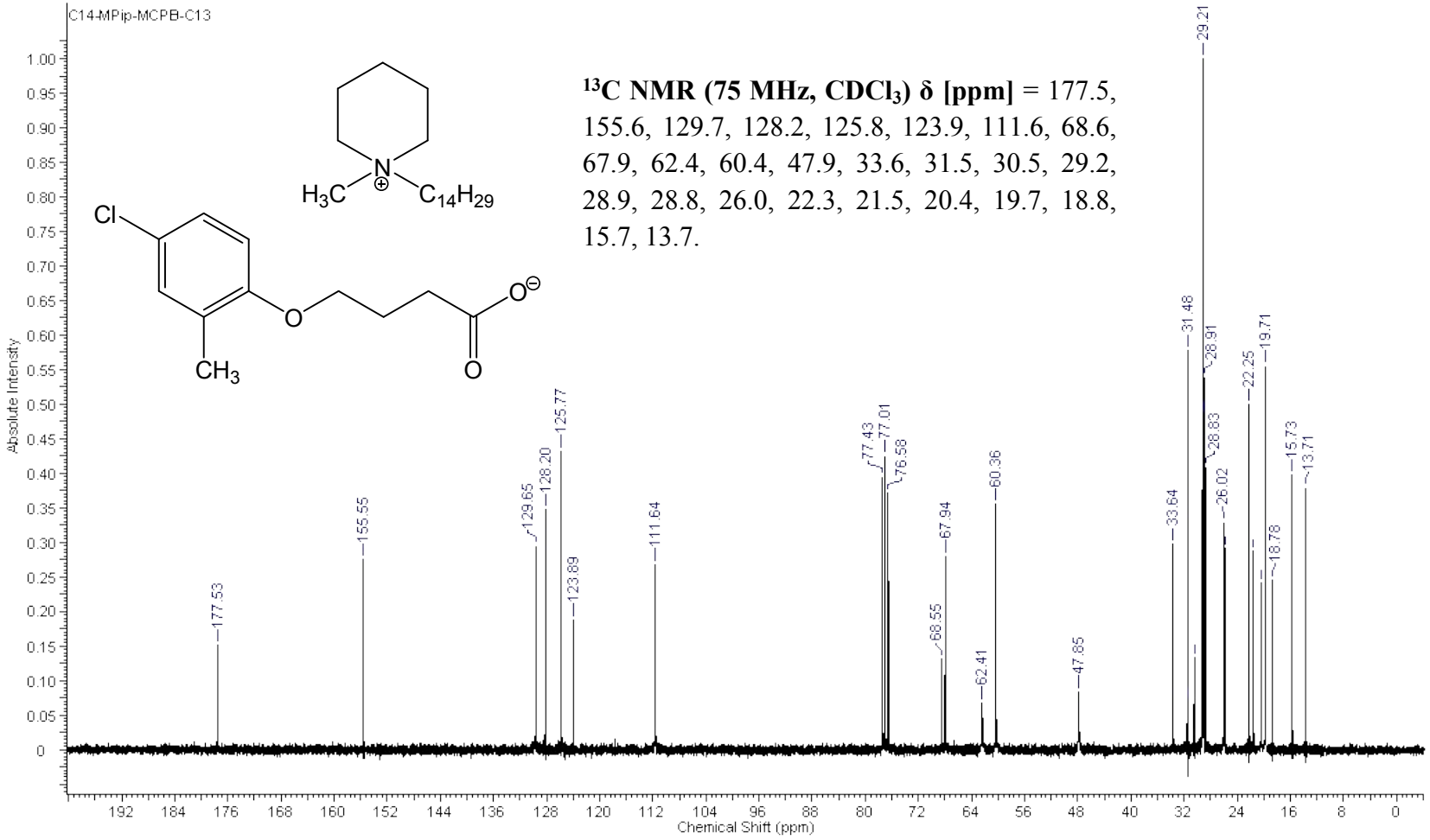
Acquisition Time (sec)	4.0002	*Comment*	[C14-MPip][MCPB]			*Date*	Apr 24 2015
Date Stamp	Apr 24 2015	*File Name*	C:\Documents and Settings\Mariusz\Pulpit\Niemcz\NMR\UAM\PO\C14-MPip-MCPB.fid\fid				
Frequency (MHz)	300.07	*Nucleus*	1H	*Number of Transients*	64	*Original Points Count*	23311
Points Count	32768	*Pulse Sequence*	s2pul	*Solvent*	CHLOROFORM-d	*Spectrum Offset (Hz)*	2281.2554
Spectrum Type	STANDARD	*Sweep Width (Hz)*	5827.51	*Temperature (degree C)*	AMBIENT TEMPERATURE		



^{1}H NMR (300 MHz, $CDCl_3$) δ [ppm] = 0.88(m, 3H); 1.24(m, 22H); 1.69(m, 4H); 1.84(m, 4H); 2.07(quin, *J* = 6.7 Hz, 2H); 2.16(s, 3H); 2.36(t, *J* = 7.4 Hz, 2H); 3.21(s, 3H); 3.48(m, 4H); 3.60(m, 2H); 3.96(t, *J* = 6.5 Hz, 2H); 6.73(d, *J* = 9.3 Hz, 1H); 7.04(d, *J* = 4.5 Hz, 1H); 7.05(s, 1H).

Figure S24. ^{13}C NMR spectrum of 1-methyl-1-tetradecylpiperidinium 4-(4-chloro-2-methylphenoxy)butanoate (**12**).

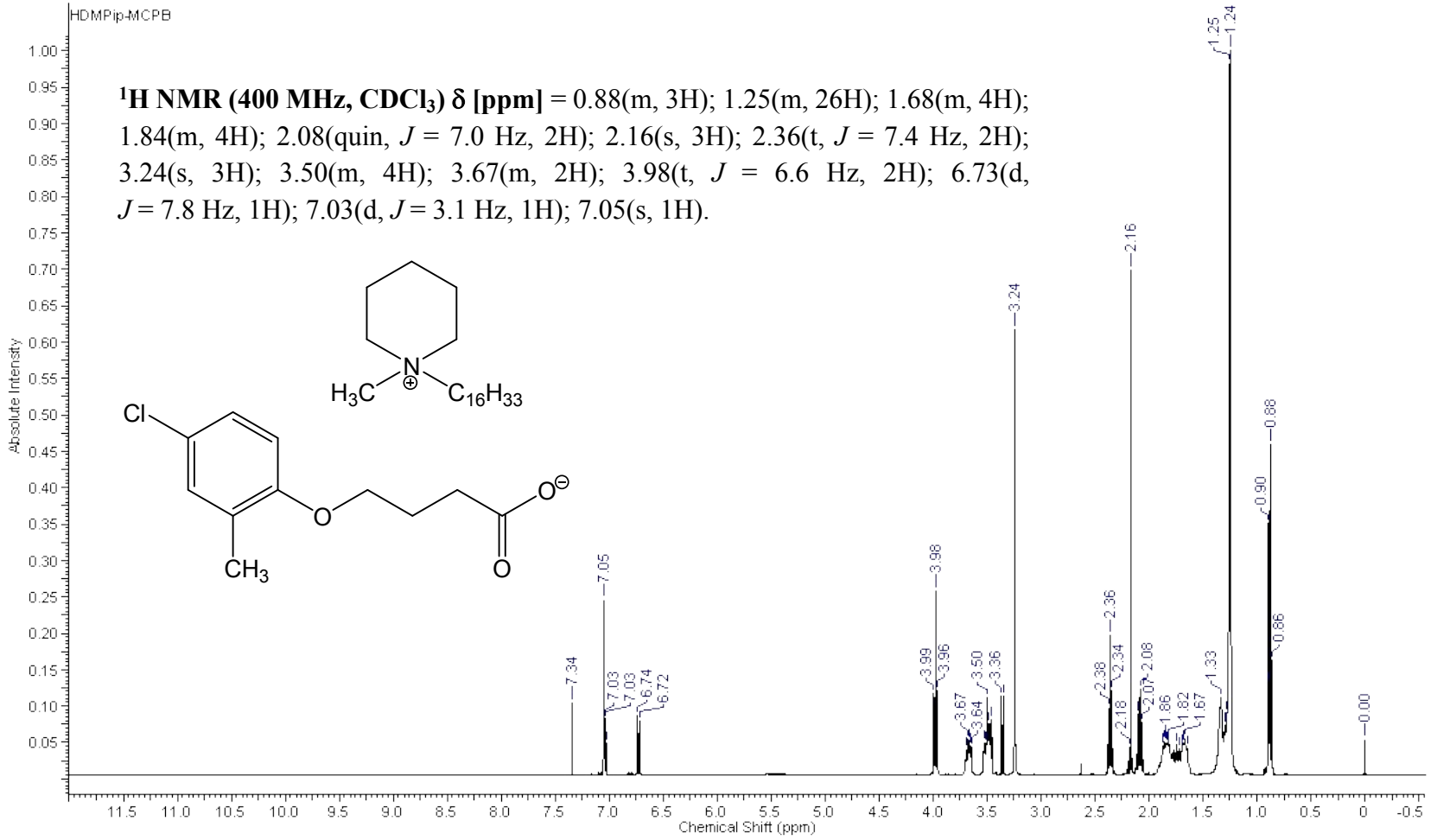
Acquisition Time (sec)	0.6400	*Comment*	[C14-MPip][MCPB]			*Date*	Apr 24 2015
Date Stamp	Apr 24 2015	*File Name*	C:\Documents and Settings\Mariusz\Pulpit\Niemcz\NMR\UAM\PO\C14-MPip-MCPB-C13.fid\fid				
Frequency (MHz)	75.46	*Nucleus*	13C	*Number of Transients*	1292	*Original Points Count*	10257
Points Count	16384	*Pulse Sequence*	s2pul	*Receiver Gain*	34.00	*Solvent*	CHLOROFORM-d
Spectrum Offset (Hz)	7190.5166	*Spectrum Type*	STANDARD	*Sweep Width (Hz)*	16025.64	*Temperature (degree C)*	AMBIENT TEMPERATURE



^{13}C NMR (75 MHz, $CDCl_3$) δ [ppm] = 177.5, 155.6, 129.7, 128.2, 125.8, 123.9, 111.6, 68.6, 67.9, 62.4, 60.4, 47.9, 33.6, 31.5, 30.5, 29.2, 28.9, 28.8, 26.0, 22.3, 21.5, 20.4, 19.7, 18.8, 15.7, 13.7.

Figure S25. ^{1}H NMR spectrum of 1-hexadecyl-1-methylpiperidinium 4-(4-chloro-2-methylphenoxy)butanoate (**13**).

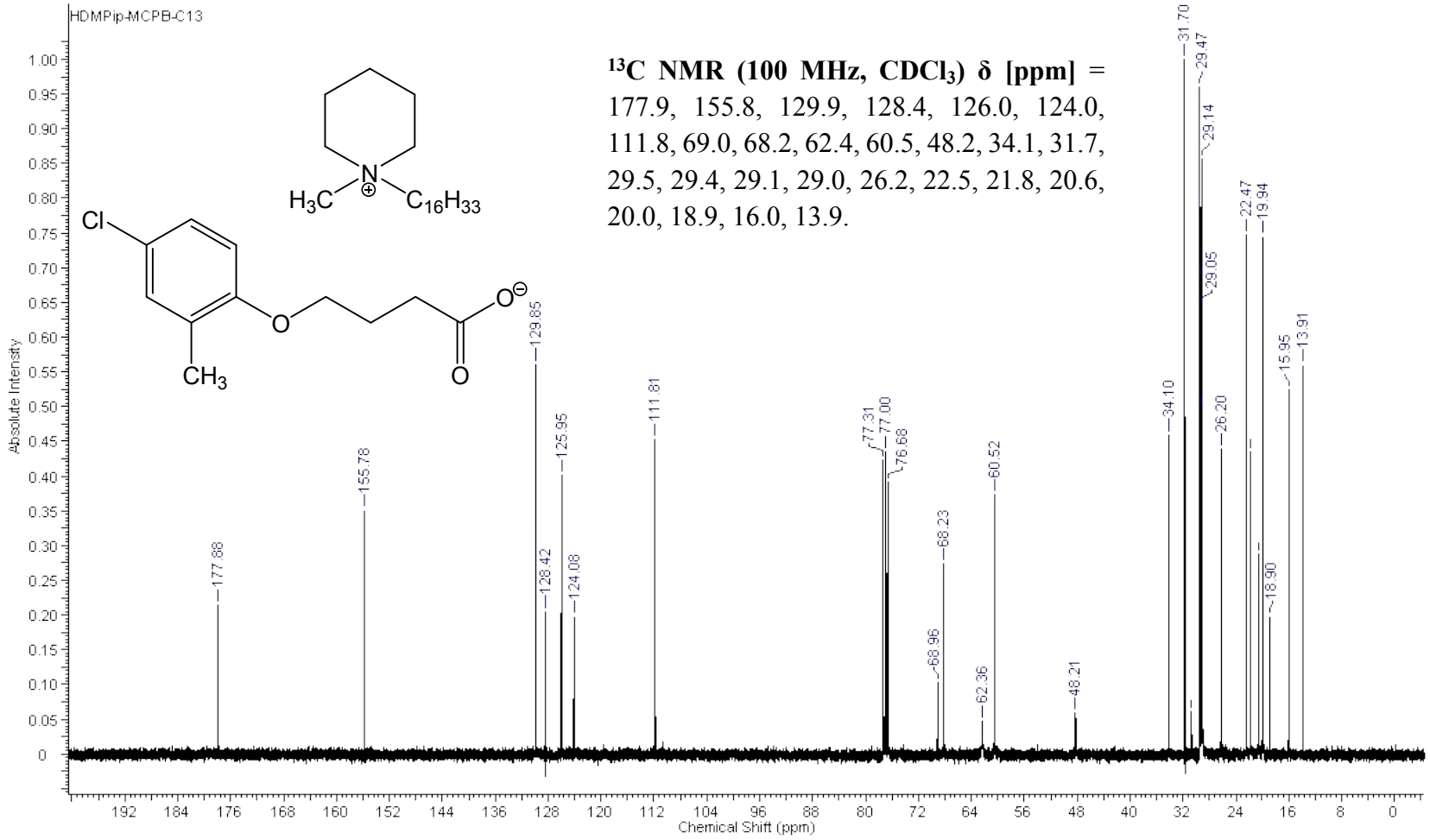
Acquisition Time (sec)	4.5000	*Comment*	[HDMPip] [MCPB]			*Date*	Mar 28 2014
Date Stamp	Mar 28 2014	*File Name*	C:\Documents and Settings\Mariusz\Pulpit\Niemcz\NMR\UAM\POL\HDMPip-MCPB.fid\fid				
Frequency (MHz)	402.64	*Nucleus*	1H	*Number of Transients*	64	*Original Points Count*	28846
Points Count	32768	*Pulse Sequence*	s2pul	*Receiver Gain*	20.00	*Solvent*	CHLOROFORM-d
Spectrum Offset (Hz)	2917.4609	*Spectrum Type*	STANDARD	*Sweep Width (Hz)*	6410.26	*Temperature (degree C)*	AMBIENT TEMPERATURE



^{1}H NMR (400 MHz, $CDCl_3$) δ [ppm] = 0.88(m, 3H); 1.25(m, 26H); 1.68(m, 4H); 1.84(m, 4H); 2.08(quin, *J* = 7.0 Hz, 2H); 2.16(s, 3H); 2.36(t, *J* = 7.4 Hz, 2H); 3.24(s, 3H); 3.50(m, 4H); 3.67(m, 2H); 3.98(t, *J* = 6.6 Hz, 2H); 6.73(d, *J* = 7.8 Hz, 1H); 7.03(d, *J* = 3.1 Hz, 1H); 7.05(s, 1H).

Figure S26. ^{13}C NMR spectrum of 1-hexadecyl-1-methylpiperidinium 4-(4-chloro-2-methylphenoxy)butanoate (**13**).

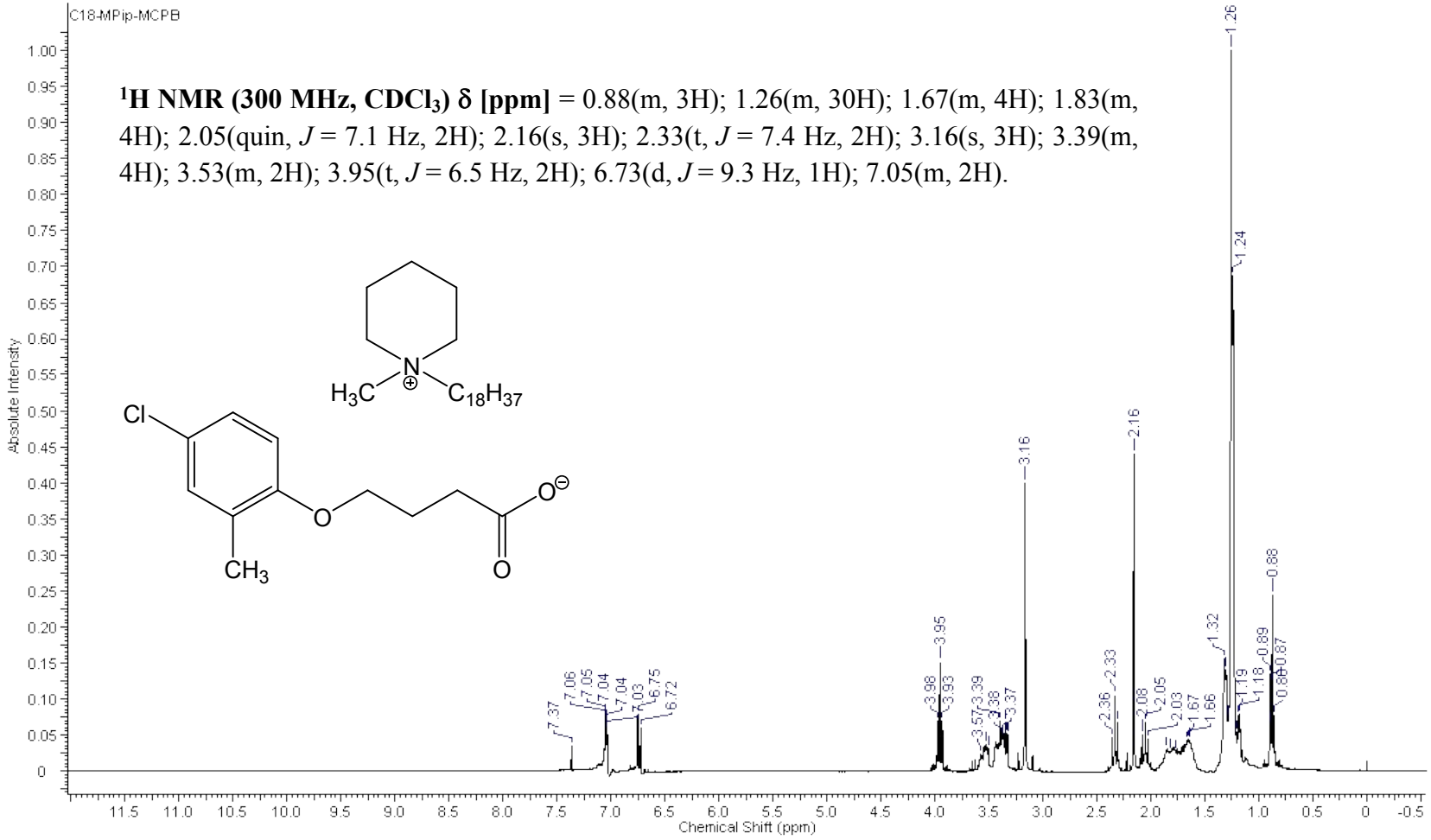
Acquisition Time (sec)	1.3010	*Comment*	[HDMPip] [MCPB]			*Date*	Mar 28 2014
Date Stamp	Mar 28 2014	*File Name*	C:\Documents and Settings\Mariusz\Pulpit\Niemcz\NMR\UAM\PO\HDMPip-MCPB-C13.fid\fid				
Frequency (MHz)	101.25	*Nucleus*	13C	*Number of Transients*	604	*Original Points Count*	28038
Points Count	32768	*Pulse Sequence*	s2pul	*Receiver Gain*	36.00	*Solvent*	CHLOROFORM-d
Spectrum Offset (Hz)	9605.7988	*Spectrum Type*	STANDARD	*Sweep Width (Hz)*	21551.72	*Temperature (degree C)*	AMBIENT TEMPERATURE



^{13}C NMR (100 MHz, $CDCl_3$) δ [ppm] = 177.9, 155.8, 129.9, 128.4, 126.0, 124.0, 111.8, 69.0, 68.2, 62.4, 60.5, 48.2, 34.1, 31.7, 29.5, 29.4, 29.1, 29.0, 26.2, 22.5, 21.8, 20.6, 20.0, 18.9, 16.0, 13.9.

Figure S27. ^{1}H NMR spectrum of 1-methyl-1-octadecylpiperidinium 4-(4-chloro-2-methylphenoxy)butanoate (**14**).

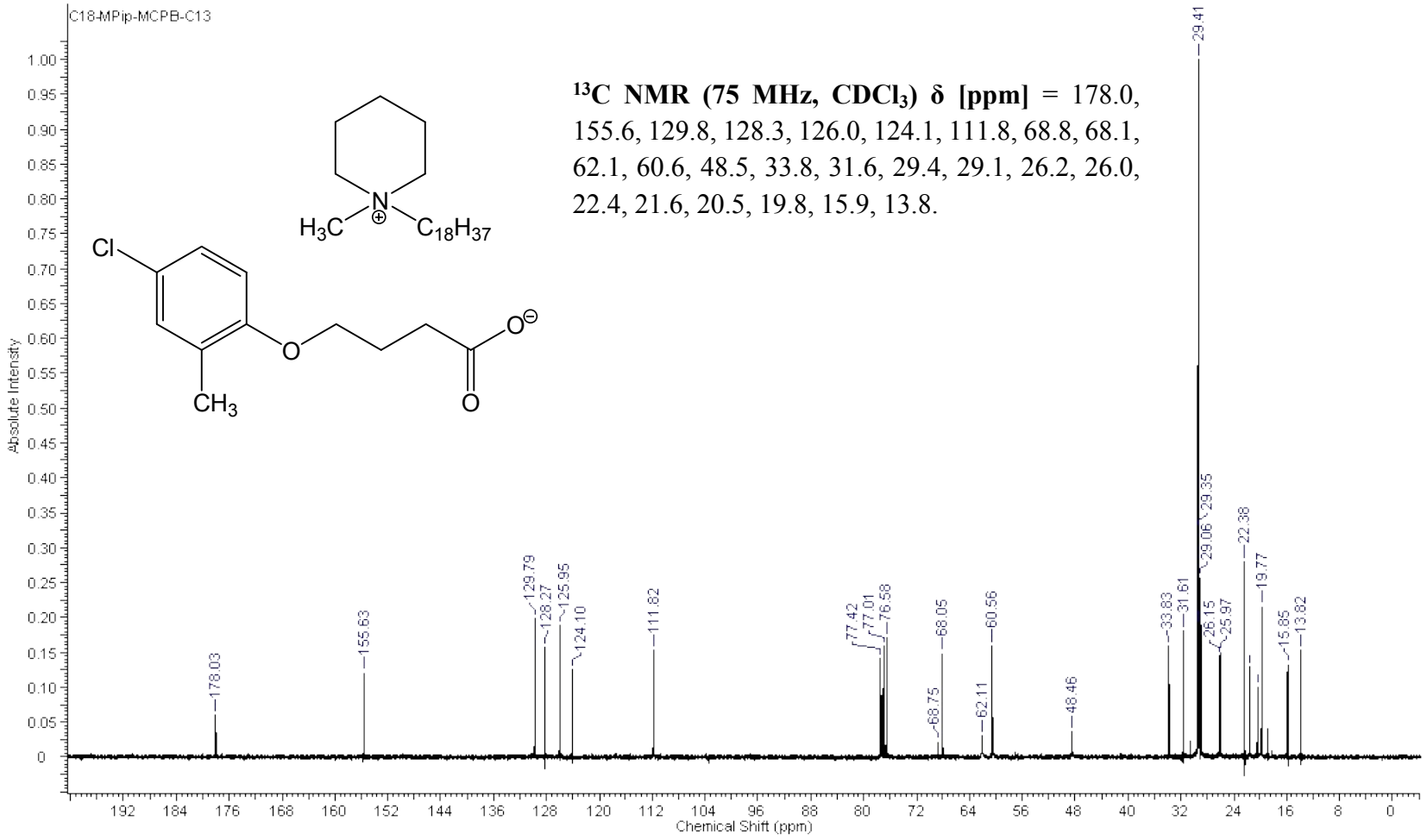
Acquisition Time (sec)	4.0001	*Comment*	[C18-MPip][MCPB]			*Date*	Apr 24 2015
Date Stamp	Apr 24 2015	*File Name*	C:\Documents and Settings\Mariusz\Pulpit\Niemcz\NMR\UAM\PO\C18-MPip-MCPB.fid\fid				
Frequency (MHz)	300.07	*Nucleus*	1H	*Number of Transients*	64	*Original Points Count*	19734
Points Count	32768	*Pulse Sequence*	s2pul	*Solvent*	CHLOROFORM-d	*Spectrum Offset (Hz)*	2183.0444
Spectrum Type	STANDARD	*Sweep Width (Hz)*	4933.40	*Temperature (degree C)*	AMBIENT TEMPERATURE		



^{1}H NMR (300 MHz, $CDCl_3$) δ [ppm] = 0.88(m, 3H); 1.26(m, 30H); 1.67(m, 4H); 1.83(m, 4H); 2.05(quin, *J* = 7.1 Hz, 2H); 2.16(s, 3H); 2.33(t, *J* = 7.4 Hz, 2H); 3.16(s, 3H); 3.39(m, 4H); 3.53(m, 2H); 3.95(t, *J* = 6.5 Hz, 2H); 6.73(d, *J* = 9.3 Hz, 1H); 7.05(m, 2H).

Figure S28. ^{13}C NMR spectrum of 1-methyl-1-octadecylpiperidinium 4-(4-chloro-2-methylphenoxy)butanoate (**14**).

Acquisition Time (sec)	0.6400	*Comment*	[C18-MPip][MCPB]			*Date*	Apr 24 2015
Date Stamp	Apr 24 2015	*File Name*	C:\Documents and Settings\Mariusz\Pulpit\Niemcz\NMR\UAM\PO\C18-MPip-MCPB-C13.fid\fid				
Frequency (MHz)	75.46	*Nucleus*	13C	*Number of Transients*	1716	*Original Points Count*	10257
Points Count	16384	*Pulse Sequence*	s2pul	*Receiver Gain*	34.00	*Solvent*	CHLOROFORM-d
Spectrum Offset (Hz)	7196.3853	*Spectrum Type*	STANDARD	*Sweep Width (Hz)*	16025.64	*Temperature (degree C)*	AMBIENT TEMPERATURE



^{13}C NMR (75 MHz, $CDCl_3$) δ [ppm] = 178.0, 155.6, 129.8, 128.3, 126.0, 124.1, 111.8, 68.8, 68.1, 62.1, 60.6, 48.5, 33.8, 31.6, 29.4, 29.1, 26.2, 26.0, 22.4, 21.6, 20.5, 19.8, 15.9, 13.8.

Table S1. Viscosity values (Pa·s) for of the HILs (**5-10**)

HIL	R	Temperature [°C]						
		20	**30**	**40**	**50**	**60**	**70**	**80**
5	C_6H_{13}	1.4293	0.5685	0.2646	0.1359	0.0821	0.0559	0.0426
6	C_7H_{15}	1.5138	0.4896	0.2266	0.1355	0.0800	0.0502	0.0406
7	C_8H_{17}	2.2696	0.8712	0.3842	0.1827	0.1083	0.0701	0.0535
8	C_9H_{19}	1.5092	0.6217	0.2857	0.1492	0.0861	0.0568	0.0422
9	$C_{10}H_{21}$	13.0937	1.3535	0.4887	0.2520	0.1383	0.0840	0.0578
10	$C_{11}H_{23}$	1.6705	0.6456	0.3122	0.1650	0.1036	0.0673	0.0519

Table S2. Density values ($g \cdot cm^{-3}$) for of the HILs (**5-10**)

HIL	R	Temperature [°C]						
		20	**30**	**40**	**50**	**60**	**70**	**80**
5	C_6H_{13}	1.10650	1.09956	1.09280	1.08587	1.07875	1.07147	1.06420
6	C_7H_{15}	1.09183	1.08484	1.07798	1.07104	1.06401	1.05703	1.04988
7	C_8H_{17}	1.08652	1.07973	1.07325	1.06664	1.05968	1.05256	1.04539
8	C_9H_{19}	1.07489	1.06795	1.06107	1.05414	1.04724	1.04034	1.03304
9	$C_{10}H_{21}$	1.06717	1.06039	1.05409	1.04732	1.04038	1.03344	1.02621
10	$C_{11}H_{23}$	1.05584	1.04955	1.04254	1.03559	1.02868	1.02155	1.01441

Table S3. Refractive index values for of the HILs (**5-10**)

HIL	R	Temperature [°C]						
		20	**30**	**40**	**50**	**60**	**70**	**80**
5	C_6H_{13}	1.51434	1.51118	1.50801	1.50485	1.50169	1.49961	1.49706
6	C_7H_{15}	1.51291	1.50973	1.50657	1.50335	1.50017	1.49733	1.49492
7	C_8H_{17}	1.51387	1.51067	1.50751	1.50435	1.50115	1.49802	1.49508
8	C_9H_{19}	1.50879	1.50565	1.50211	1.49856	1.49534	1.49275	1.48975
9	$C_{10}H_{21}$	1.51322	1.50997	1.50619	1.50166	1.49903	1.49610	1.49386
10	$C_{11}H_{23}$	1.50711	1.50377	1.5003	1.49653	1.49354	1.49114	1.48864