Supporting Information

Synthesis of Symmetrical Organic Carbonates via Significantly Enhanced Alkylation of Metal Carbonates with Alkyl halides/Sulfonates in Ionic Liquid

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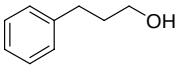
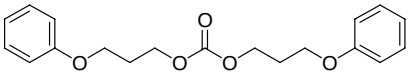
List of Supporting Information:

Di(3-phenylpropyl)carbonate (**2a**)..... S2
3-Phenyl-propan-1-ol (**3a**)..... S2
Di(3-phenoxypropyl)carbonate (**4**)..... S3
3-Phenoxy-1-propanol (**5**)..... S3
Dipentylcarbonate (**6**)..... S3
Diphenethylcarbonate (**8**)..... S3
2-Phenylethanol (**9**)..... S3
Styrene..... S3
Di(biphenyl-4-yl-methyl)carbonate (**10**)..... S4
1,1′-Biphenyl-4yl methanol (**11**)..... S4
Dipentadecanylcarbonate (**12**)..... S4
Pentadecan-1-ol (**13**)..... S4
1-*n*-Butyl-3-methylimidazolium Hexafluorophosphate..... S4
Di(3-phenylpropyl)carbonate (**2a**) ^{1}H and ^{13}C NMR (400, 100 MHz, $CDCl_3$)..... S5
3-Phenyl-1-propanol (**3a**) ^{1}H and ^{13}C NMR (400, 100 MHz, $CDCl_3$)..... S6
Di(3-phenoxypropyl)carbonate (**4**) ^{1}H and ^{13}C NMR (400, 100 MHz, $CDCl_3$)..... S7
3-Phenoxy-1-propanol (**5**) ^{1}H and ^{13}C NMR (400, 100 MHz, $CDCl_3$)..... S8
Dipentylcarbonate (**6**) ^{1}H and ^{13}C NMR (400, 100 MHz, $CDCl_3$)..... S9
Diphenethylcarbonate (**8**) ^{1}H and ^{13}C NMR (400, 100 MHz, $CDCl_3$)..... S10
2-Phenylethanol (**9**) ^{1}H and ^{13}C NMR (400, 100 MHz, $CDCl_3$)..... S11
Styrene ^{1}H and ^{13}C NMR (400, 100 MHz, $CDCl_3$)..... S12
Di(biphenyl-4-yl-methyl)carbonate (**10**) ^{1}H and ^{13}C NMR (400, 100 MHz, $CDCl_3$)..... S13
1,1′-Biphenyl-4yl-methanol (**11**) ^{1}H and ^{13}C NMR (400, 100 MHz, $CDCl_3$)..... S14

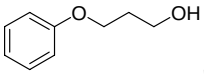
Dipentadecanylcarbonate (**12**) ^{1}H and ^{13}C NMR (400, 100 MHz, $CDCl_3$).....S15
Pentadecan-1-ol (**13**) ^{1}H and ^{13}C NMR (400, 100 MHz, $CDCl_3$).....S16
1-*n*-Butyl-3-methylimidazolium Hexafluorophosphate ^{1}H, ^{19}F and ^{13}C NMR (400, 100 MHz, DMSO–d_6)..... S17
1-*n*-Butyl-3-methylimidazolium Hexafluorophosphate (Recycle 1) ^{1}H, ^{19}F and ^{13}C NMR (400, 100 MHz, DMSO–d_6) S18
1-*n*-Butyl-3-methylimidazolium Hexafluorophosphate (Recycle 2) ^{1}H, ^{19}F and ^{13}C NMR (400, 100 MHz, DMSO–d_6) S19
1-*n*-Butyl-3-methylimidazolium Hexafluorophosphate (Recycle 3) ^{1}H, ^{19}F and ^{13}C NMR (400, 100 MHz, DMSO–d_6) S20
References S21



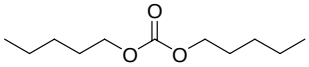
3-Phenyl-1-propanol (3a).[2] colorless liquid; ^{1}H NMR (400 MHz, $CDCl_3$) δ 1.46 (bs, OH), 1.86-1.93 (m, 2H), 2.70 (t, *J* = 8.0 Hz, 2H), 3.67 (t, *J* = 6.4 Hz, 2H), 7.17-7.30 (m, 5H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 32.0, 34.2, 62.2, 125.8, 128.3, 128.4, 141.8; MS (EI) 136 (M^+), 117 (100); Registry No. 122-97-4.



Di(3-phenoxypropyl)carbonate (4).[3] colorless liquid; ^{1}H NMR (400 MHz, $CDCl_3$) δ 2.15 (quintet, *J* = 6.4 Hz, 4H), 4.05 (t, *J* = 6.0 Hz, 4 H), 4.34 (t, *J* = 6.4 Hz, 4H), 6.88-6.96 (m, 6H), 7.25-7.29 (m, 4H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 28.6, 63.8, 64.7, 114.4, 120.8, 129.4, 155.1, 158.6; MS FAB 331.0 ($M+H^+$), 135.5 (100). Anal. Calcd: C, 69.07; H, 6.71. Found: C, 69.06; H, 6.78; Registry No. 109460-00-6.

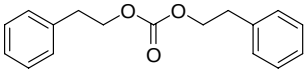


3-Phenoxy-1-propanol (5).[4] colorless liquid; ^{1}H NMR (400 MHz, $CDCl_3$) δ 1.90 (bs, OH), 2.04 (quintet, *J* = 5.6 Hz, 2H), 3.86 (t, *J* = 6.0 Hz, 2H), 4.12 (t, *J* = 6.0 Hz, 2H), 6.89-6.97 (m, 3H), 7.25-7.30 (m, 2H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 31.9, 60.2, 65.6, 114.5, 120.8, 129.5, 158.7; MS (EI) 152 (M^+), 94 (100); Registry No. 6180-61-6.

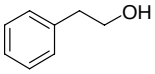


Dipentylcarbonate (6).[5] colorless liquid; ^{1}H NMR (400 MHz, $CDCl_3$) δ 0.87-0.92 (m, 6H), 1.30-1.36 (m, 8H), 1.62-1.69 (m, 4H), 4.10 (t, *J* = 6.8 Hz, 4H); ^{13}C NMR (100 MHz,

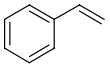
$CDCl_3$) δ 13.9, 22.3, 27.8, 28.3, 67.9, 155.4; MS FAB 203.0 ($M+H^+$), 154.23 (100). HR FAB Calcd for $C_{11}H_{22}O_3$ ($M+H^+$) 203.1647, found 203.1647; Registry No. 2050-94-4.



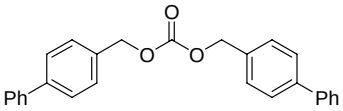
Diphenethylcarbonate (8).[1] colorless liquid; ^{1}H NMR (400 MHz, $CDCl_3$) δ 2.97 (t, *J* = 7.2 Hz, 4H), 4.32 (t, *J* = 7.2 Hz, 4H), 7.20-7.32 (m, 10H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 35.1, 68.2, 126.7, 128.5, 128.9, 137.2, 155.0; MS FAB 271.0 ($M+H^+$), 105.9 (100). Anal. Calcd: C, 75.53; H, 6.71. Found: C, 75.57; H, 6.99; Registry No. 67879-62-3.



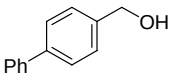
2-Phenylethanol (9).[6] colorless liquid; ^{1}H NMR (400 MHz, $CDCl_3$) δ 1.49 (bs, OH), 2.87 (t, *J* = 6.8 Hz, 2H), 3.86 (t, *J* = 6.8 Hz, 2H), 7.21-7.34 (m, 5H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 39.1, 63.6, 126.4, 128.5, 129.0, 138.4; MS (EI) 122 (M^+), 91 (100); Registry No. 60-12-8.



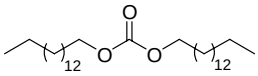
Styrene. colorless liquid; ^{1}H NMR (400 MHz, $CDCl_3$) δ 5.24 (dd, *J* = 10.4, 0.8 Hz, 1H), 5.74 (dd, *J* = 17.2, 0.8 Hz, 1H), 6.71 (dd, *J* = 10.4, 6.8 Hz, 1H), 7.22-7.26 (m, 2H), 7.30-7.34 (m, 2H), 7.39-7.41 (m, 2H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 113.8, 126.2, 127.8, 128.5, 136.9, 137.5; MS (EI) 104 (M^+, 100); Registry No. 100-42-5.

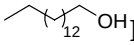


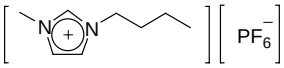
Di(biphenyl-4-yl-methyl)carbonate (10).[7] white solid; m.p. 166-168 °C; ^{1}H NMR (400 MHz, $CDCl_3$) δ 5.22 (s, 4H), 7.35-7.61 (m, 18H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 69.5, 127.1, 127.3, 127.5, 128.7, 128.8, 134.1, 140.6, 141.5, 155.1; MS (EI) 394 (M^+), 167 (100). Anal. Calcd: C, 82.21; H, 5.62. Found: C, 82.12; H, 5.94; Registry No. 30952-04-6.



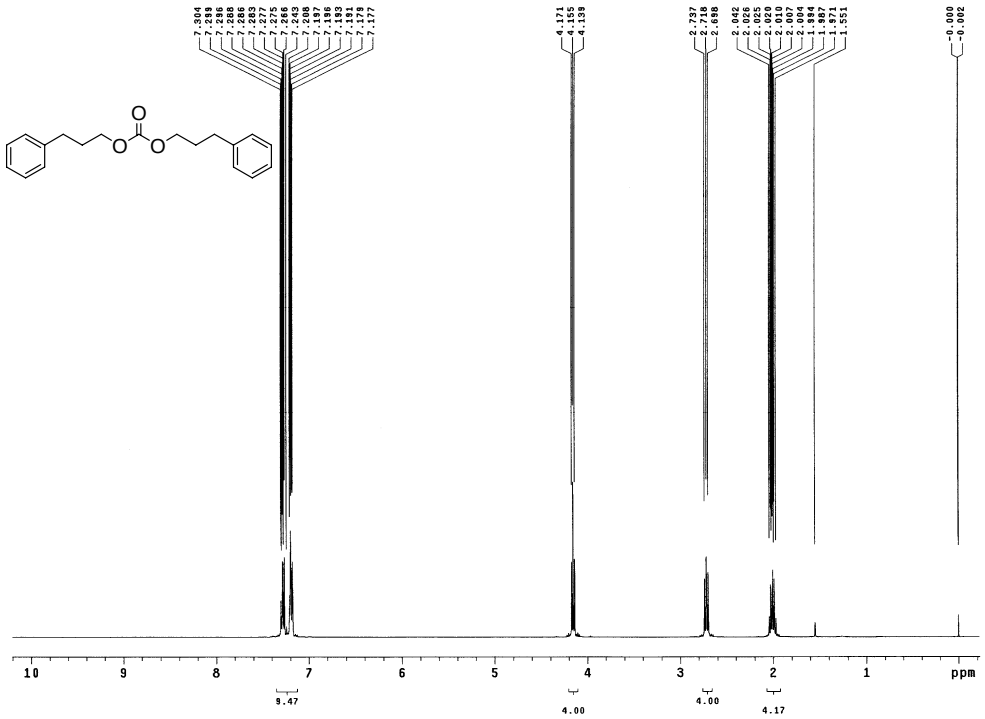
1,1′-Biphenyl-4yl-methanol (11).[8] colorless liquid; ^{1}H NMR (400 MHz, $CDCl_3$) δ 1.83 (bs, OH), 4.73 (s, 2H), 7.32-7.36 (m, 1H), 7.40-7.45 (m, 4H), 7.56-7.59 (m, 4H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 65.1, 127.1, 127.3, 127.4, 128.7, 139.8, 140.6, 140.8; MS (EI) 184 (M^+, 100). Anal. Calcd: C, 84.75; H, 6.57. Found: C, 85.0437; H, 6.9451; Registry No. 3597-91-9.


Dipentadecanylcarbonate (12).[9] white solid; m.p. 39-41 °C; ^{1}H NMR (400 MHz, $CDCl_3$) δ 0.86-0.89 (m, 6H), 1.20-1.38 (m, 48H), 1.66 (t, *J* = 7.2 Hz, 4H), 4.18 (t, *J* = 6.8 Hz, 4H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 14.1, 22.7, 25.7, 28.7, 29.2, 29.3, 29.4, 29.5, 29.6, 29.7, 31.9, 68.0, 155.4; MS FAB 483.41 ($M+H^+$), 154.29 (100). Anal. Calcd: C, 77.12; H, 12.94. Found: C, 77.45; H, 13.06; Registry No. 145197-00-8.

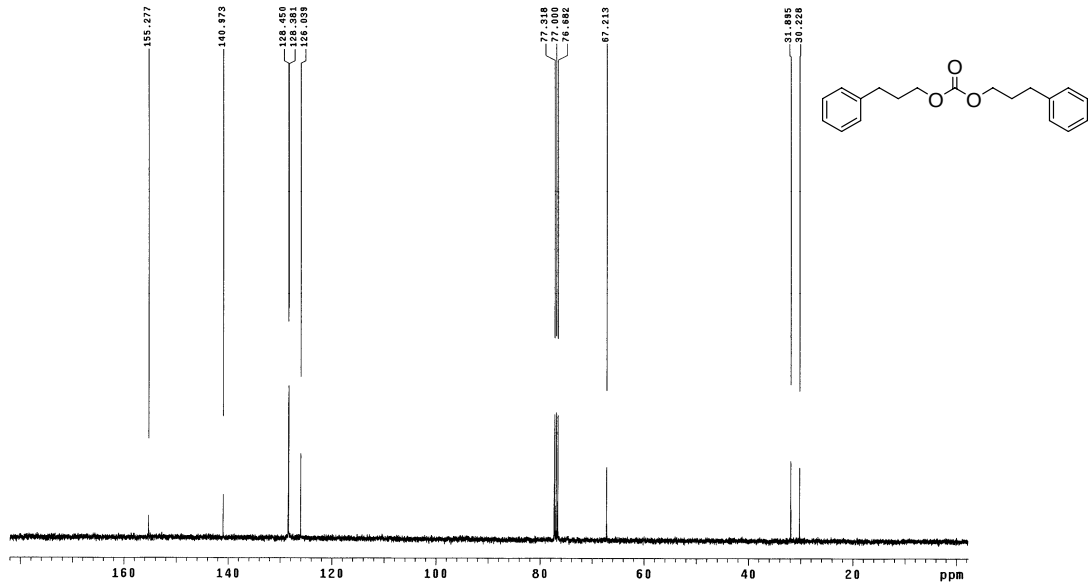

Pentadecan-1-ol (13).[10] white solid; m.p. 45-47 °C; ^{1}H NMR (400 MHz, $CDCl_3$) δ 0.86 (t, *J* = 7.2 Hz, 3H), 1.23-1.31 (m, 24H), 1.45 (bs, OH), 1.50-1.56 (m, 2H), 3.62 (t, *J* = 6.4 Hz, 2H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 14.1, 22.7, 25.7, 29.3, 29.4, 29.5, 29.6, 29.7, 31.9, 32.8, 63.1; MS (EI) 210 ($M–H_2O$), 58 (100). MS FAB 211.1 ($M+H–H_2O$), 154.23 (100); Registry No. 629-76-5.


1-*n*-Butyl-3-methylimidazolium Hexafluorophosphate. colorless liquid; ^{1}H NMR (400 MHz, DMSO–d_6) δ 0.94 (t, *J* = 7.2 Hz, 3H), 1.30 (tq, *J* = 7.6, 7.2 Hz, 2H), 1.80 (quintet, *J* = 7.6 Hz, 2H), 3.88 (s, 3H), 4.19 (t, *J* = 7.2 Hz, 2H), 7.74 (d, *J* = 1.6 Hz, 2H), 9.11 (s, 1H); ^{13}C NMR (100 MHz, DMSO–d_6) δ 13.2, 18.8, 31.3, 35.7, 48.5, 122.2, 123.6, 136.5; ^{19}F NMR (400 MHz, DMSO–d_6) δ –66.83, –64.95; Registry No. 174501-64-5.

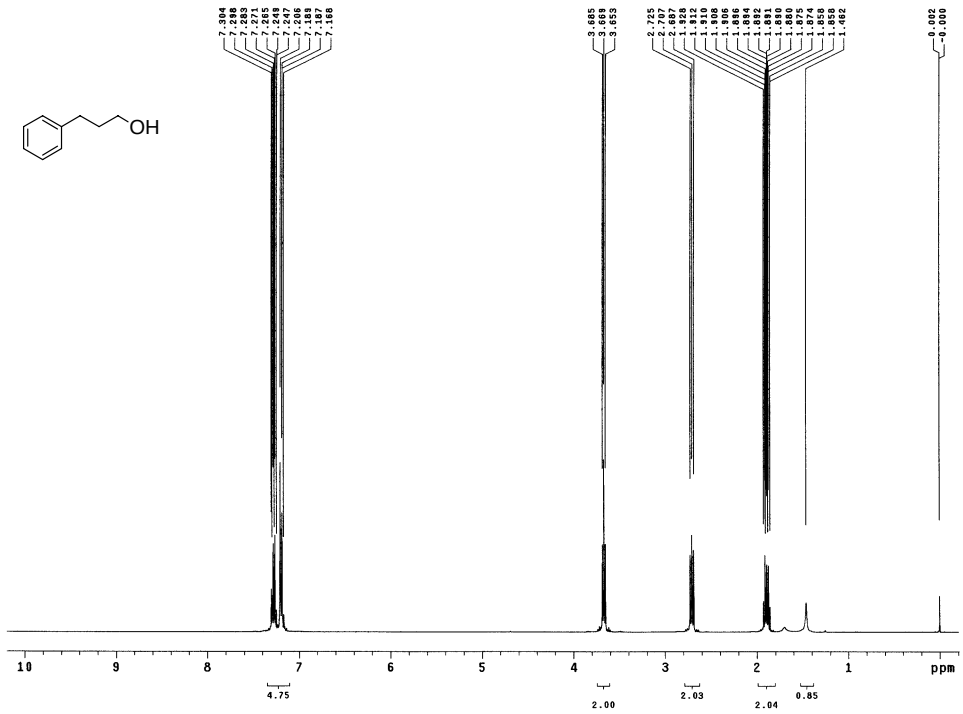
Di(3-phenylpropyl)carbonate (2a). ^{1}H NMR (400 MHz, $CDCl_3$)



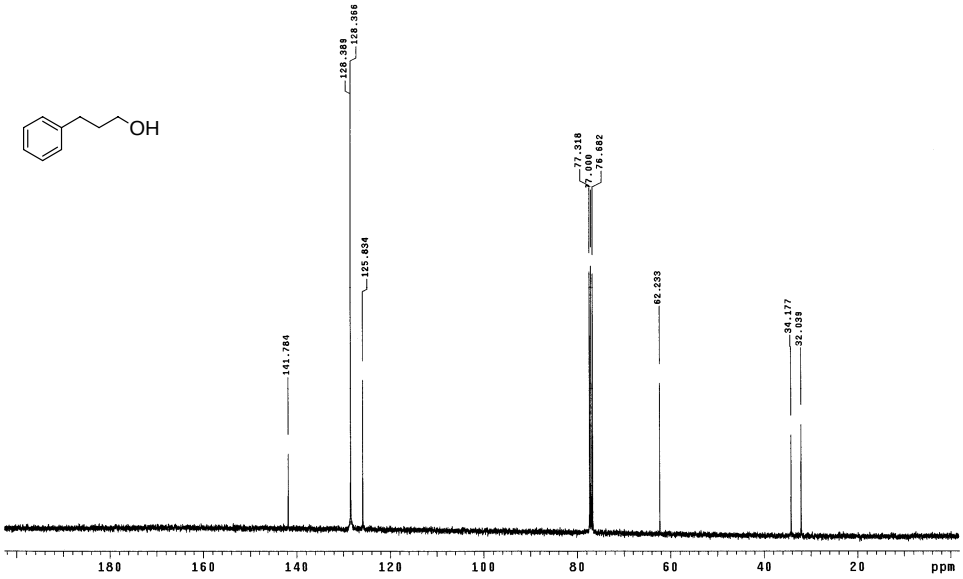
Di(3-phenylpropyl)carbonate (2a). ^{13}C NMR (100 MHz, $CDCl_3$)



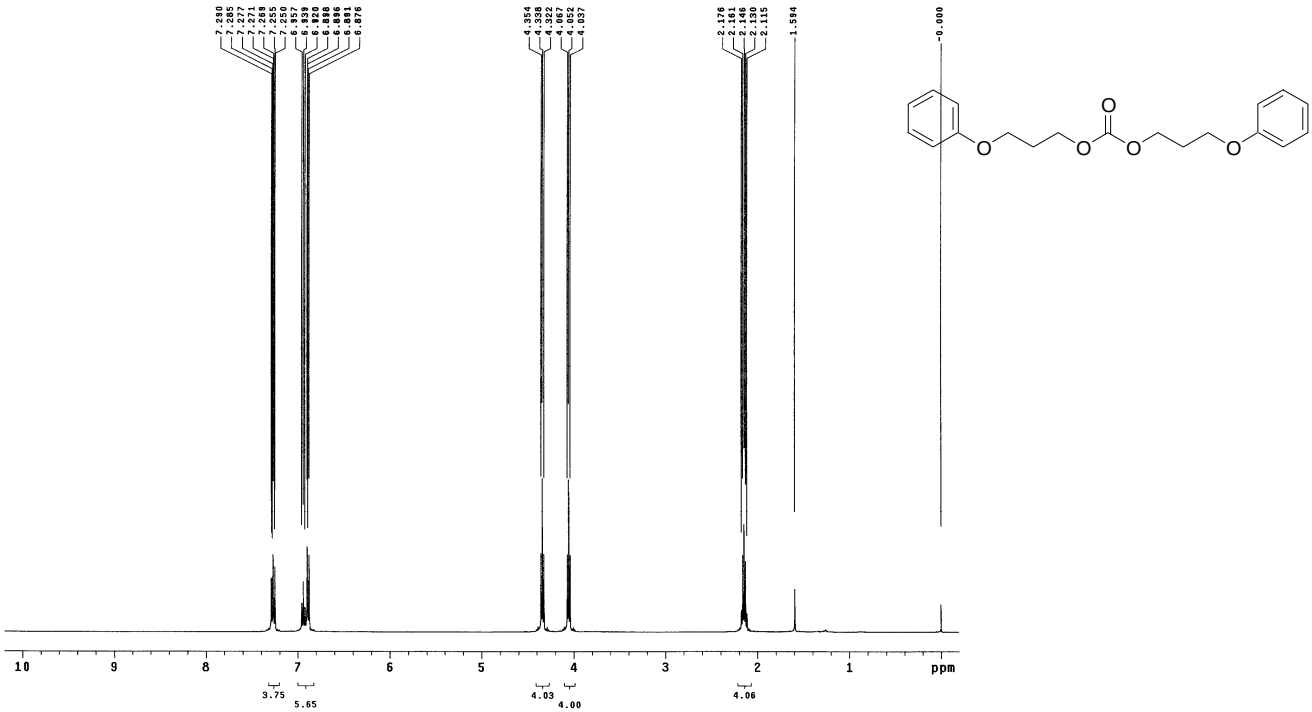
3-Phenyl-1-propanol (3a). ^{1}H NMR (400 MHz, $CDCl_3$)



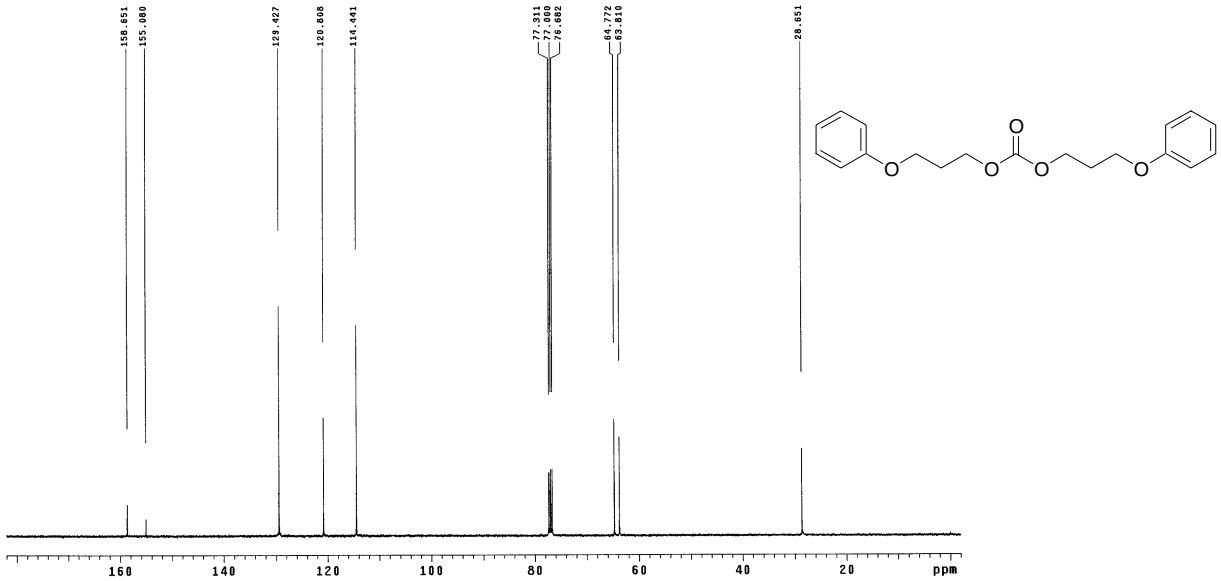
3-Phenyl-1-propanol (3a). ^{13}C NMR (100 MHz, $CDCl_3$)



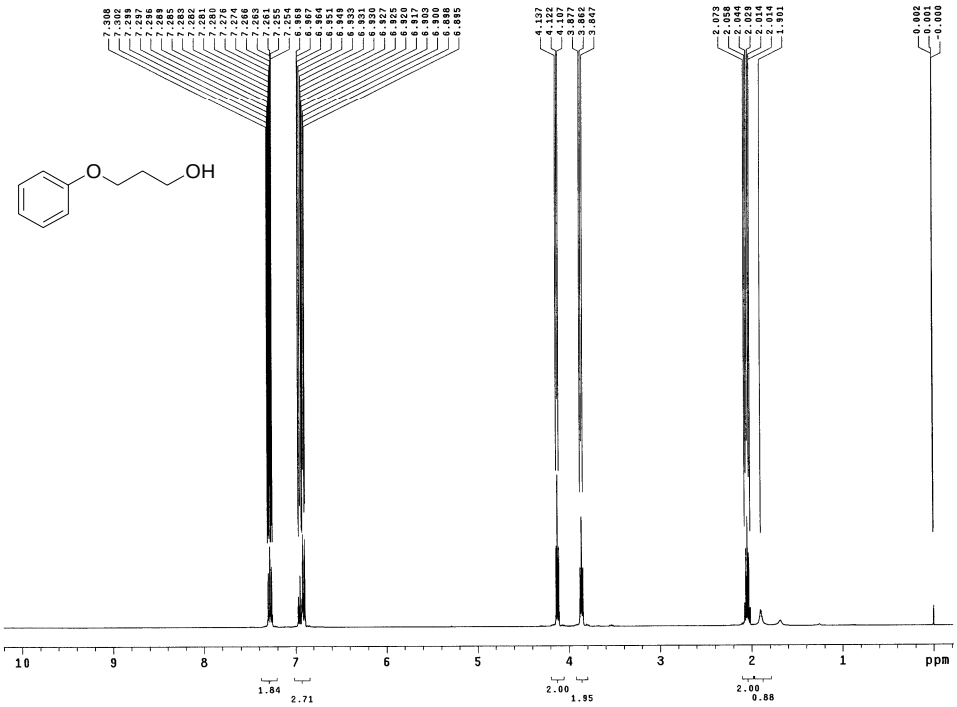
Di(3-phenoxypropyl)carbonate (4). ^{1}H NMR (400 MHz, $CDCl_3$)



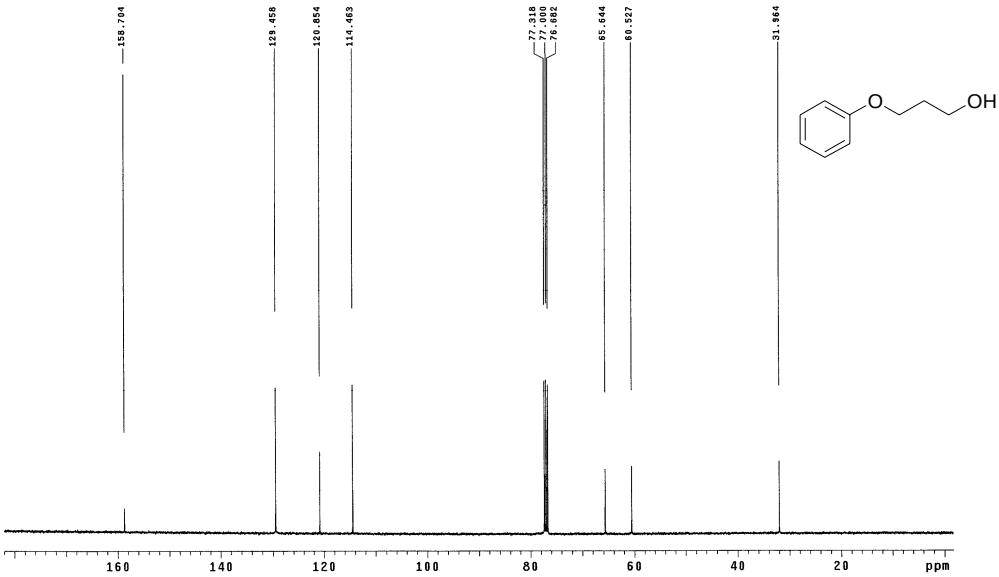
Di(3-phenoxypropyl)carbonate (4). ^{13}C NMR (100 MHz, $CDCl_3$)



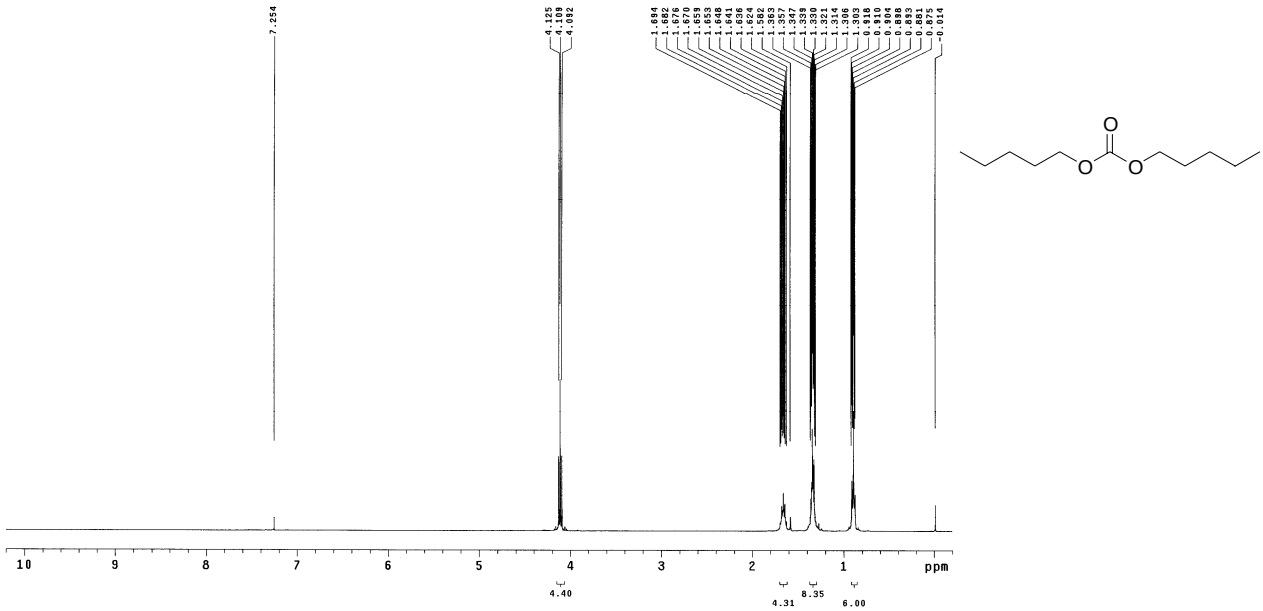
3-Phenoxy-1-propanol (5). ^{1}H NMR (400 MHz, $CDCl_3$)



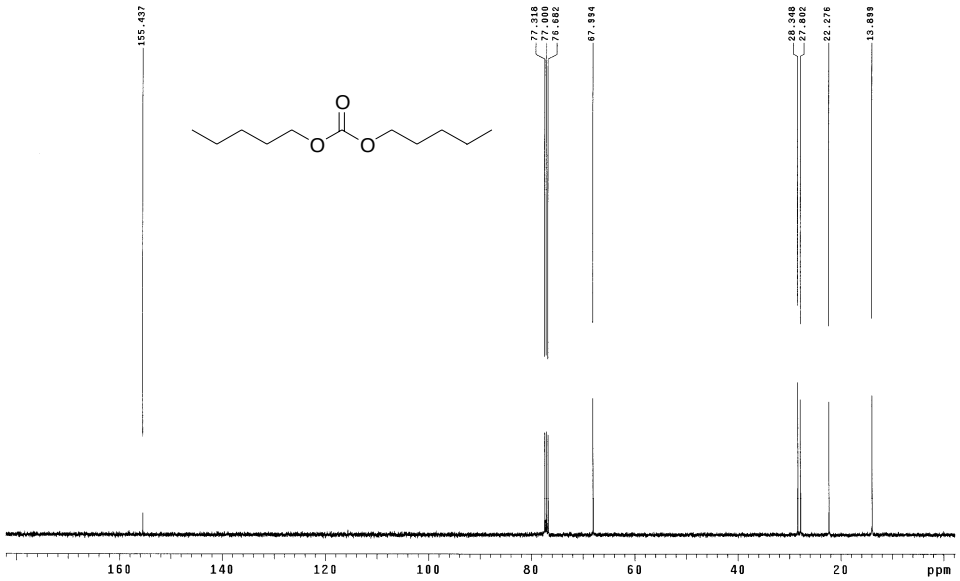
3-Phenoxy-1-propanol (5). ^{13}C NMR (100 MHz, $CDCl_3$)



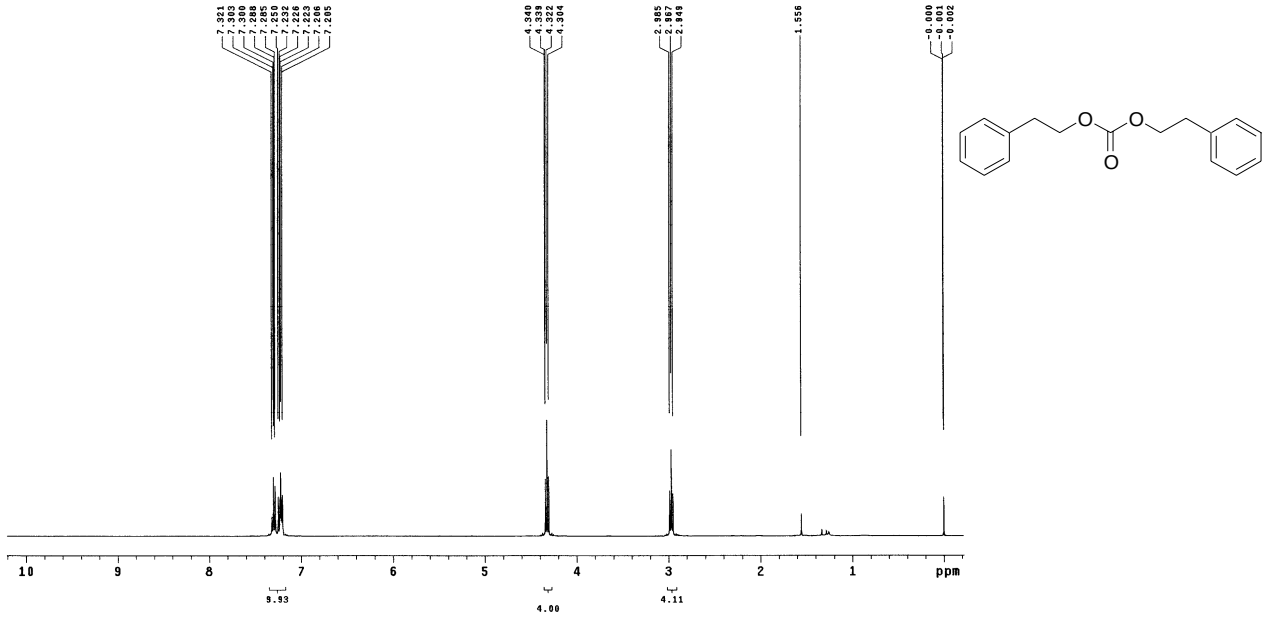
Dipentylcarbonate (6). ^{1}H NMR (400 MHz, $CDCl_3$)



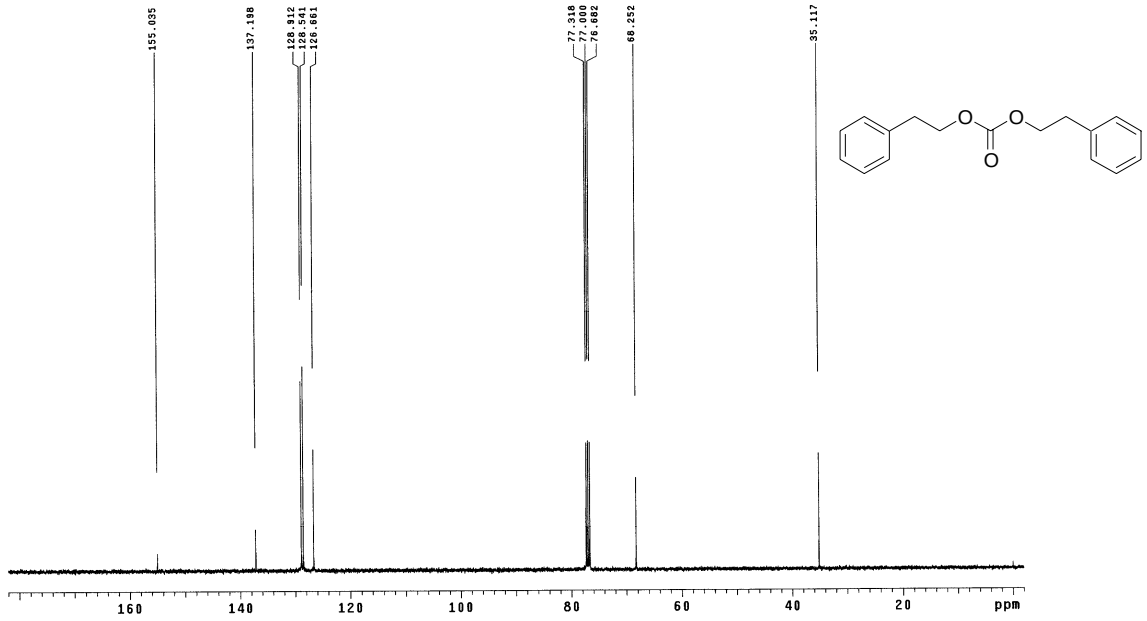
Dipentylcarbonate (6). ^{13}C NMR (100 MHz, $CDCl_3$)



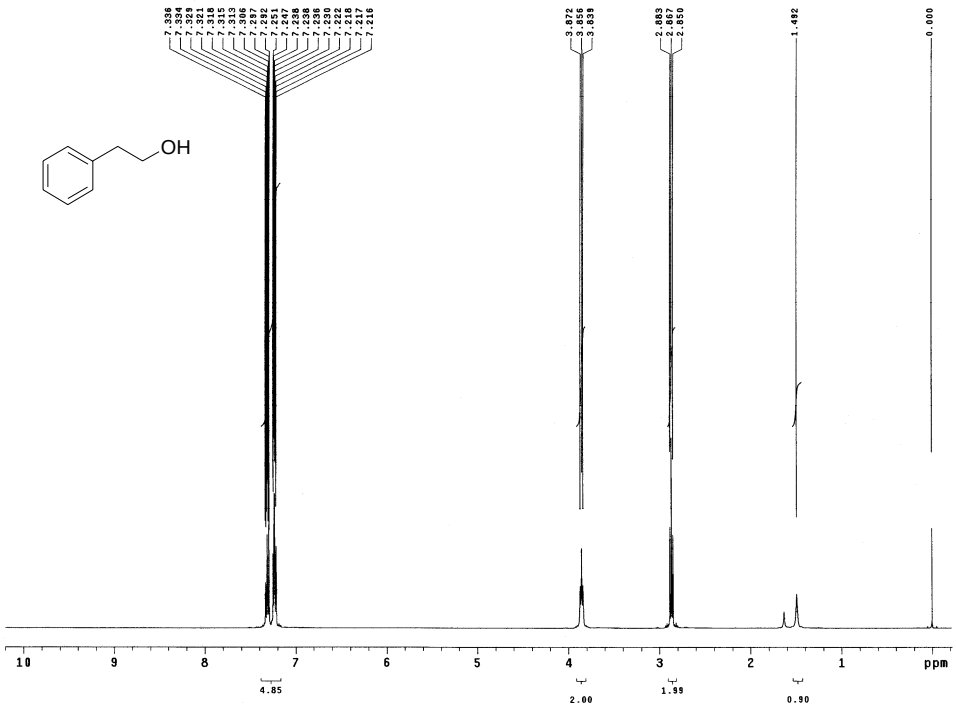
Diphenethylcarbonate (8). ^{1}H NMR (400 MHz, $CDCl_3$)



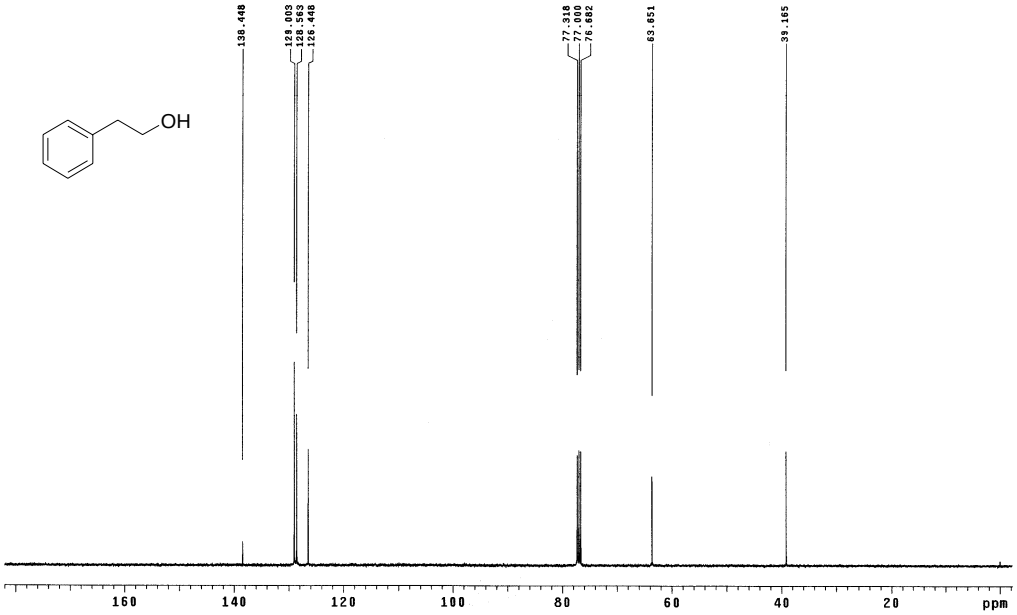
Diphenethylcarbonate (8). ^{13}C NMR (100 MHz, $CDCl_3$)



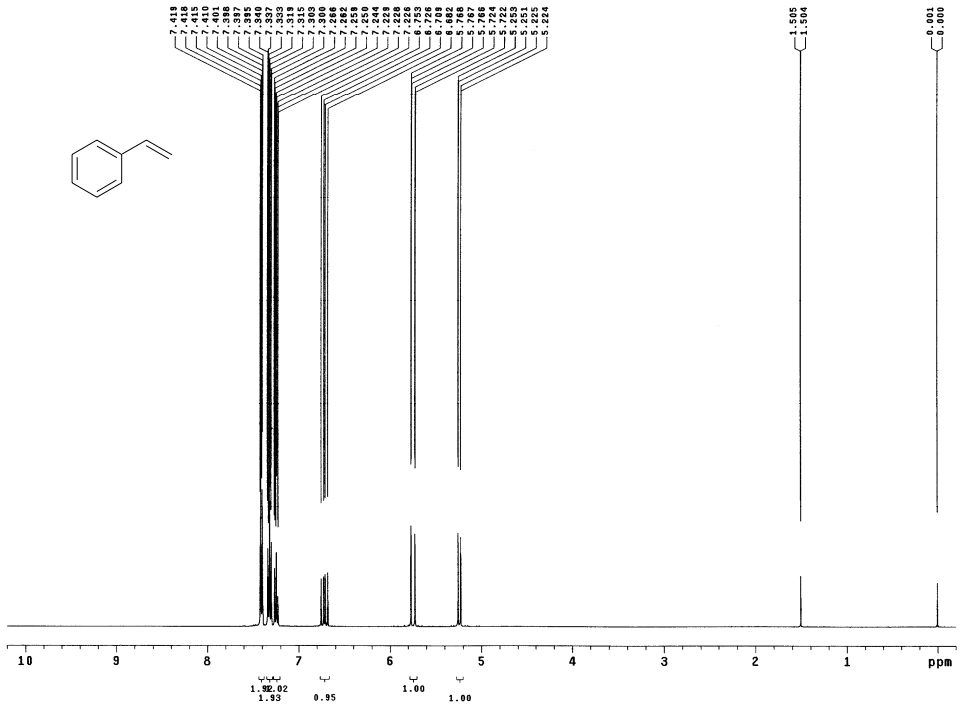
2-Phenylethanol (9). ^{1}H NMR (400 MHz, $CDCl_3$)



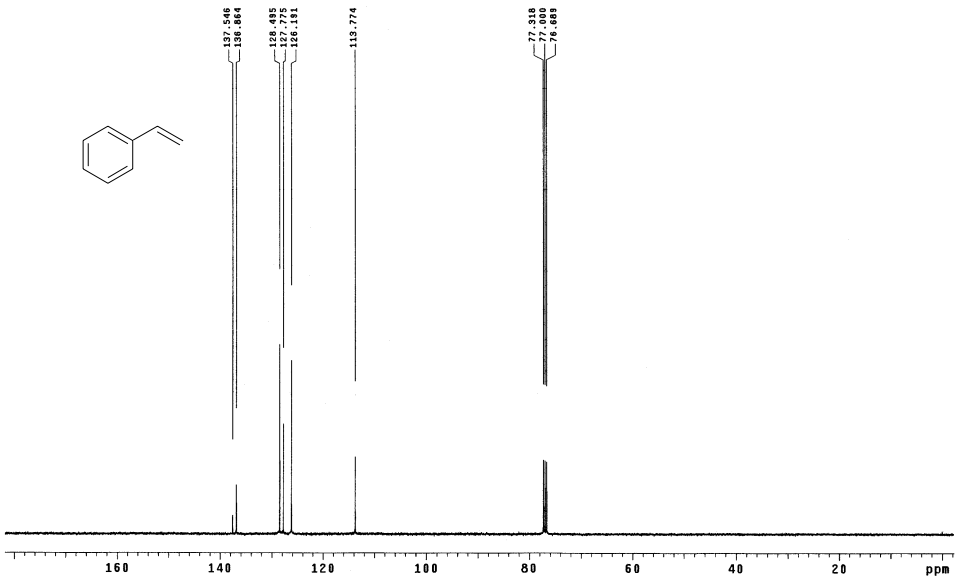
2-Phenylethanol (9). ^{13}C NMR (100 MHz, $CDCl_3$)



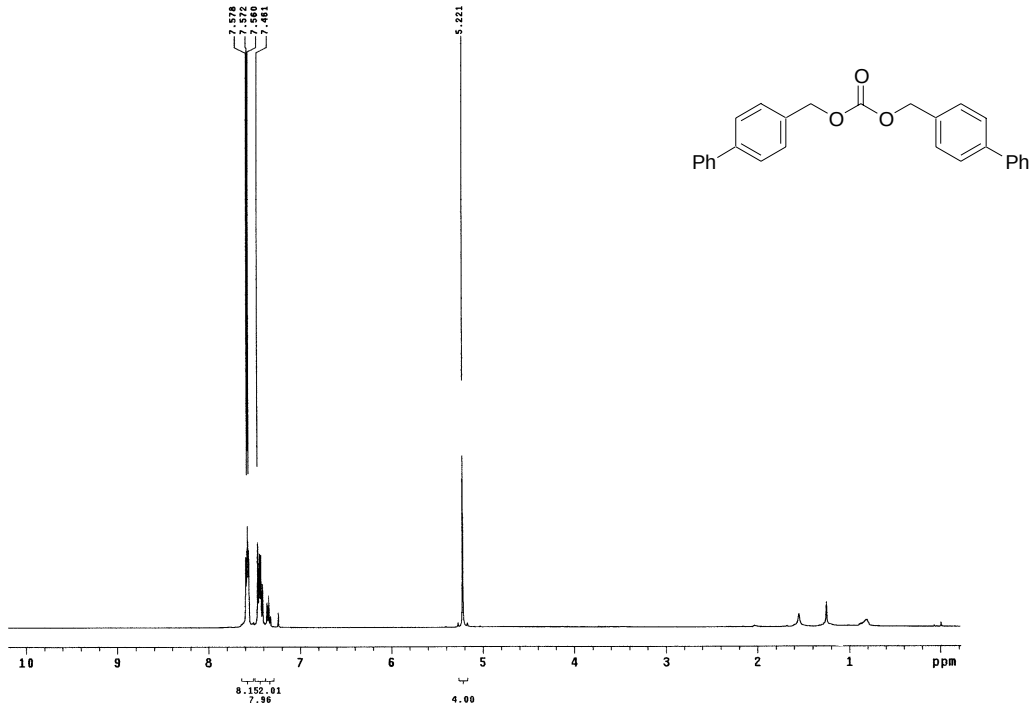
Styrene. ^{1}H NMR (400 MHz, $CDCl_3$)



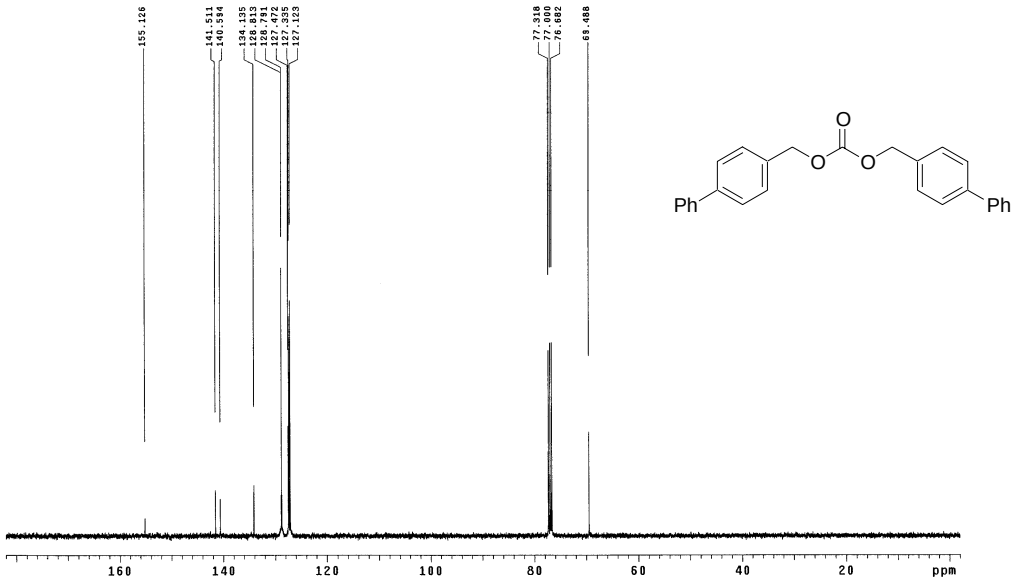
Styrene. ^{13}C NMR (100 MHz, $CDCl_3$)



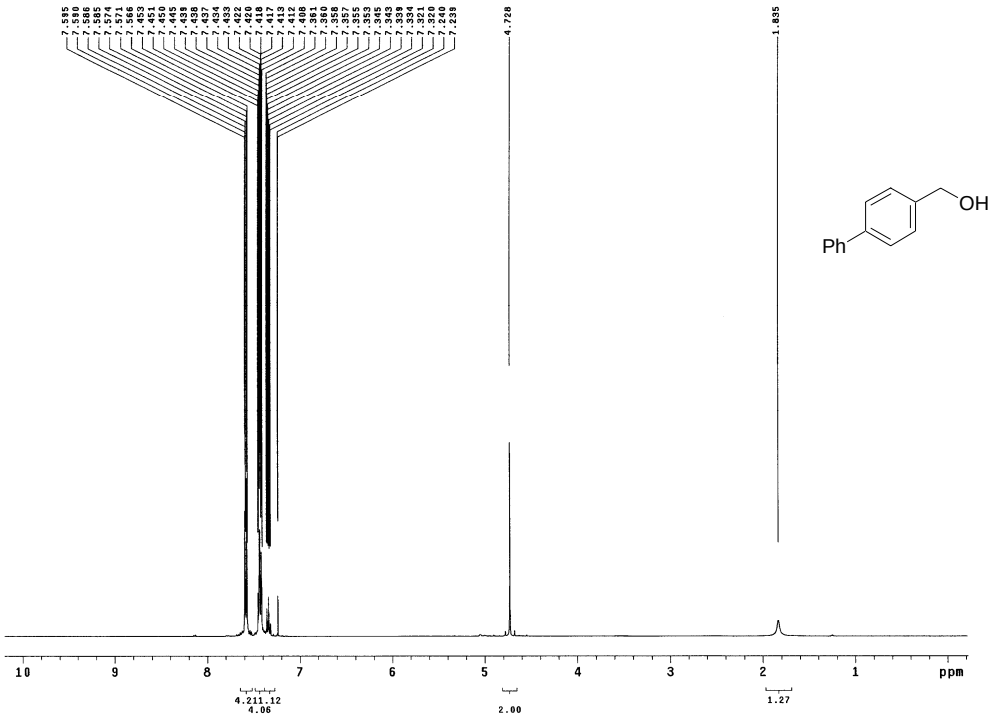
Di(biphenyl-4-ylmethyl)carbonate (10). ^{1}H NMR (400 MHz, $CDCl_3$)



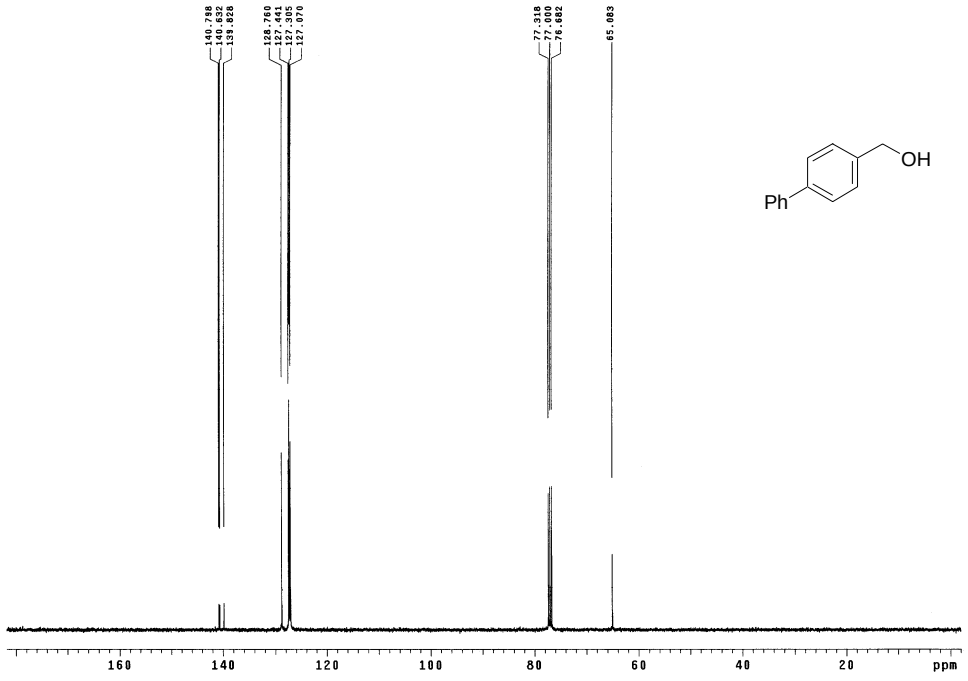
Di(biphenyl-4-ylmethyl)carbonate (10). ^{13}C NMR (100 MHz, $CDCl_3$)



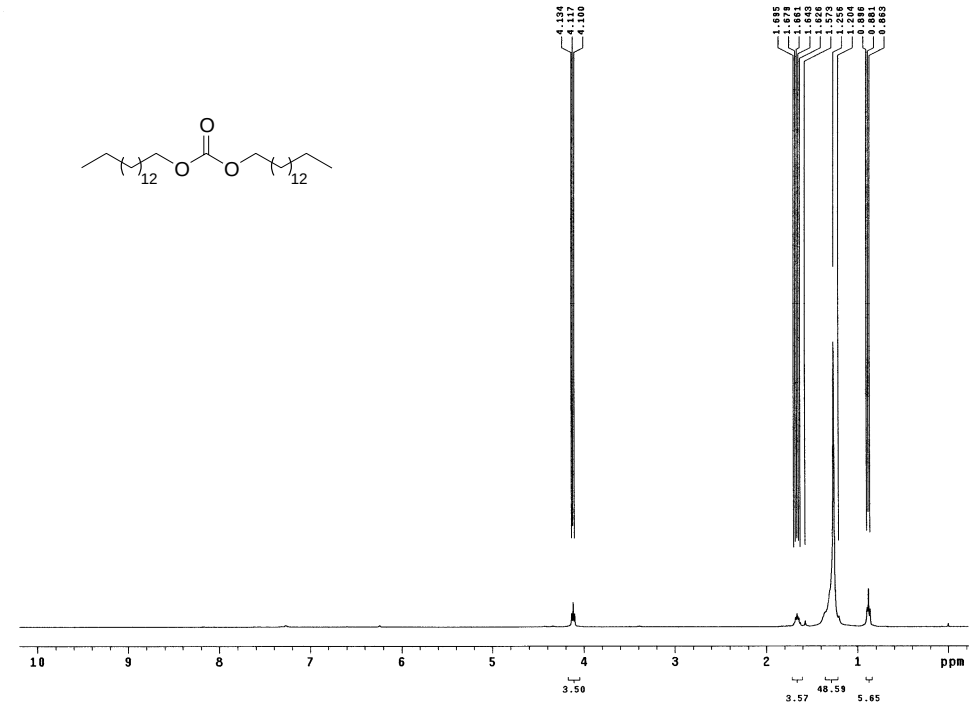
1,1′-Biphenyl-4-yl-methanol (11). ^{1}H NMR (400 MHz, $CDCl_3$)



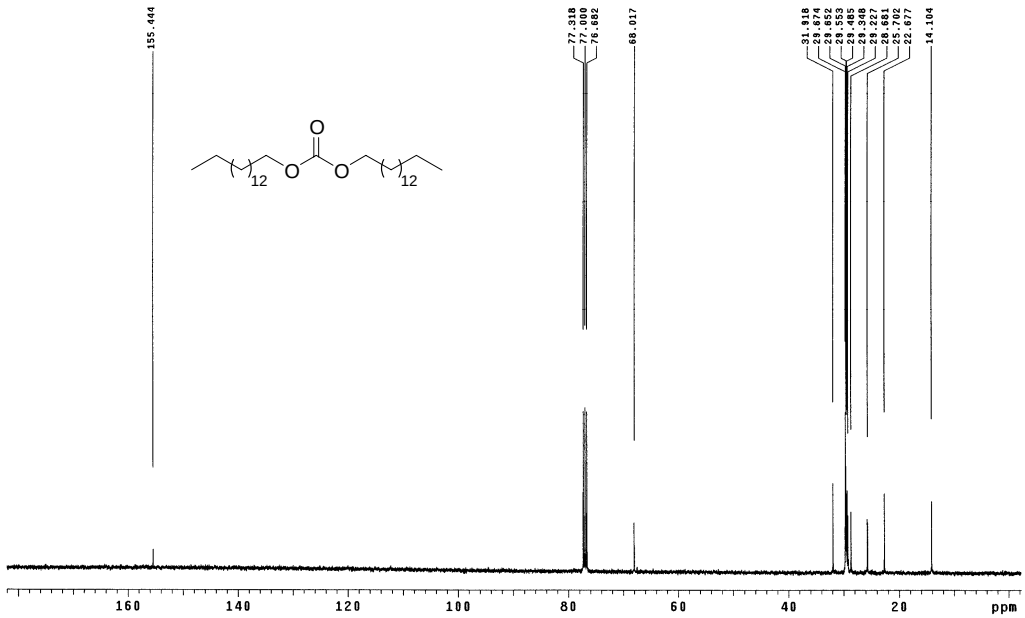
1,1′-Biphenyl-4yl-methanol (11). ^{13}C NMR (100 MHz, $CDCl_3$)



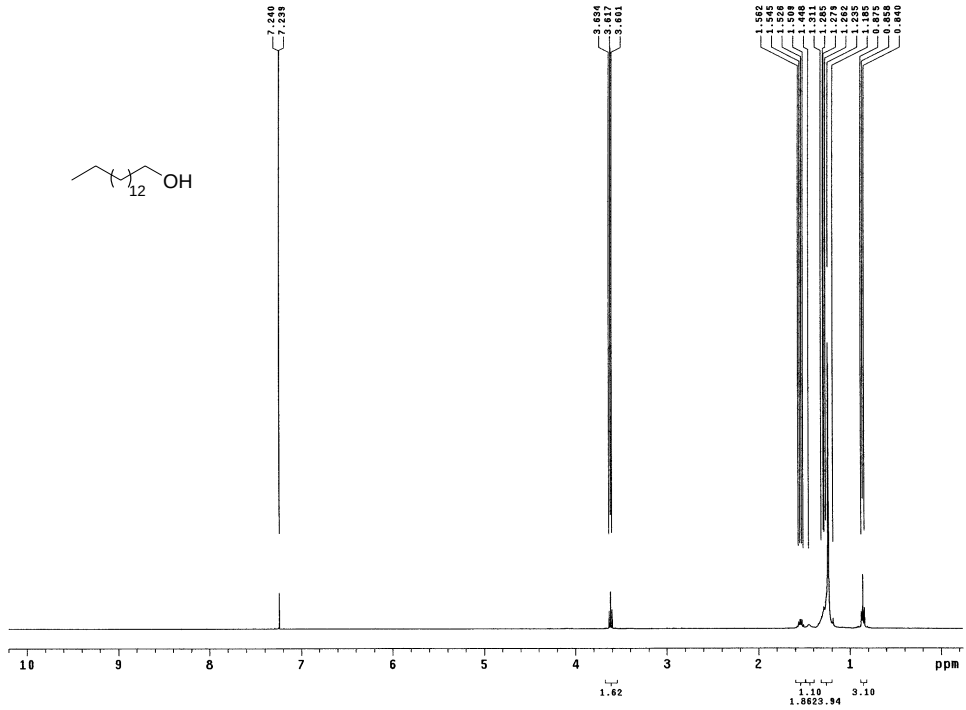
Dipentadecanylcarbonate (12). ^{1}H NMR (400 MHz, $CDCl_3$)



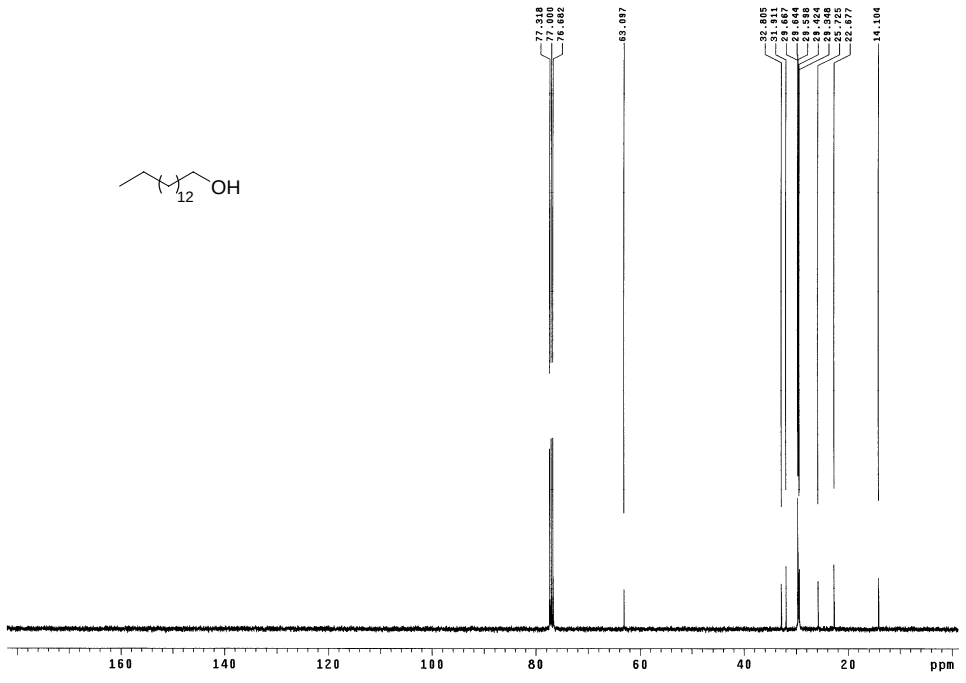
Dipentadecanylcarbonate (12). ^{13}C NMR (100 MHz, $CDCl_3$)



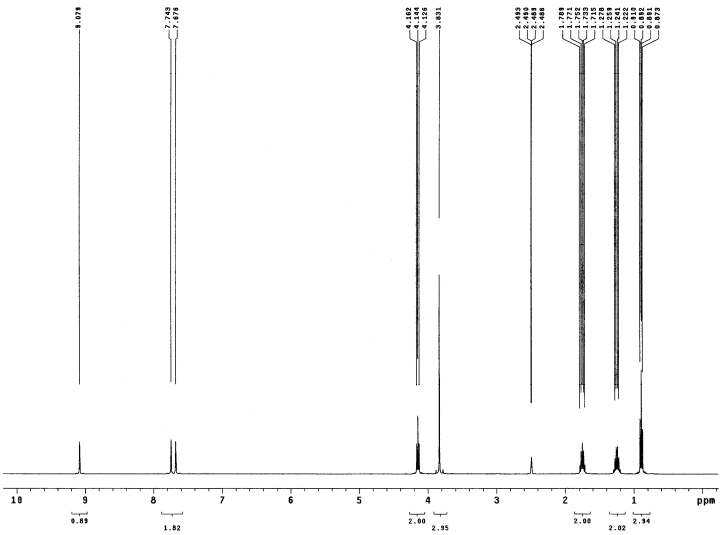
Pentadecan-1-ol (13). ^{1}H NMR (400 MHz, $CDCl_3$)

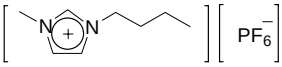


Pentadecan-1-ol (13). ^{13}C NMR (100 MHz, $CDCl_3$)

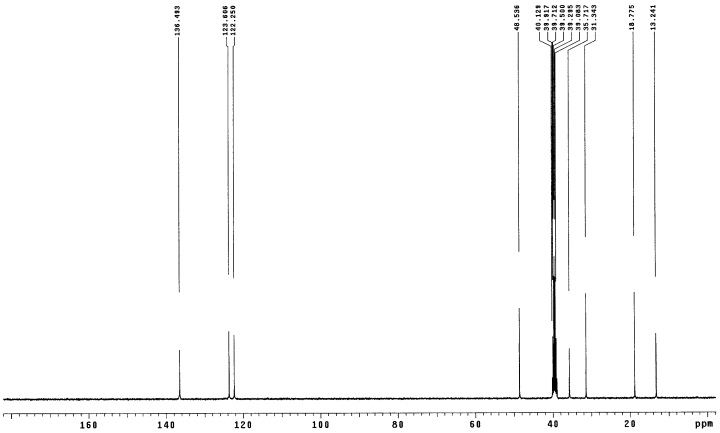


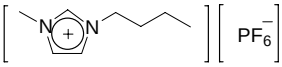
1-*n*-Butyl-3-methylimidazolium Hexafluorophosphate. ^{1}H NMR (400 MHz, DMSO–d_6)



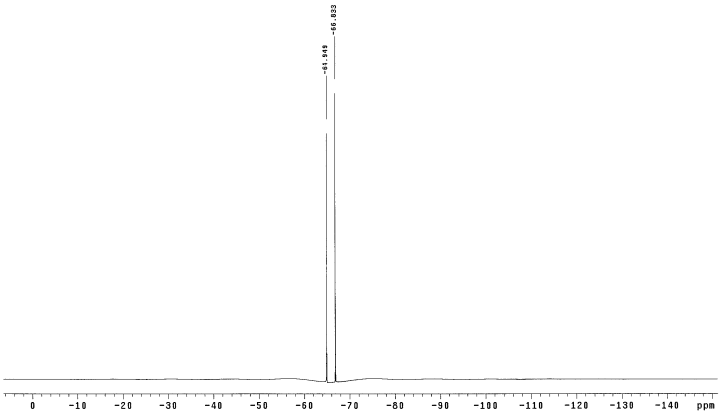


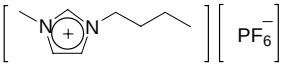
1-*n*-Butyl-3-methylimidazolium Hexafluorophosphate. ^{13}C NMR (100 MHz, DMSO–d_6)



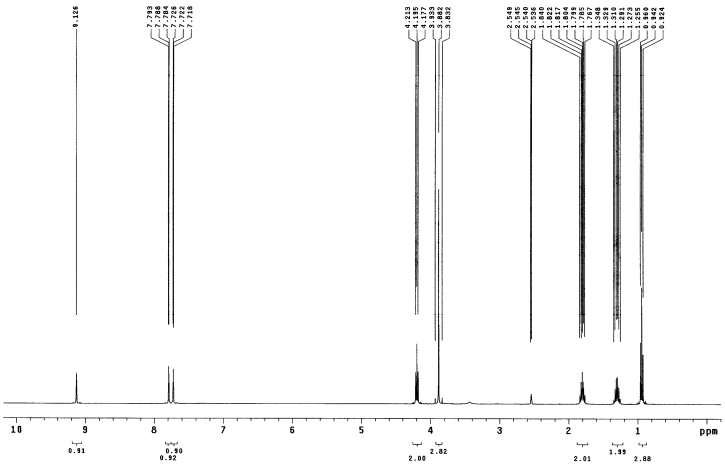


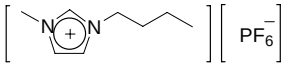
1-*n*-Butyl-3-methylimidazolium Hexafluorophosphate. ^{19}F NMR (400 MHz, DMSO–d_6)



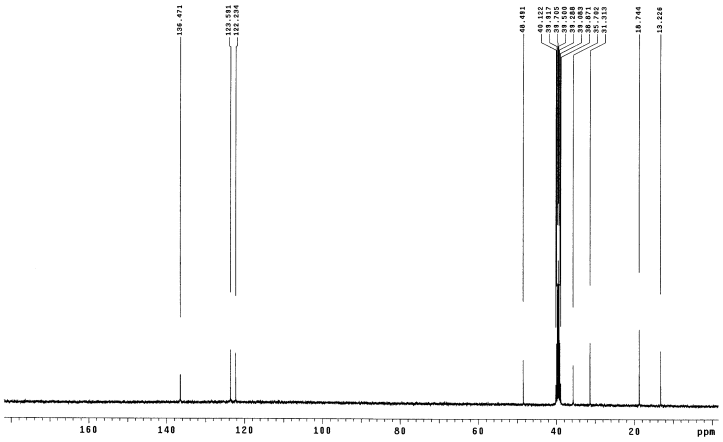


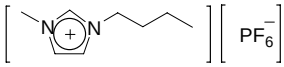
1-*n*-Butyl-3-methylimidazolium Hexafluorophosphate (Recycle 1). ^{1}H NMR (400 MHz, DMSO–d_6)



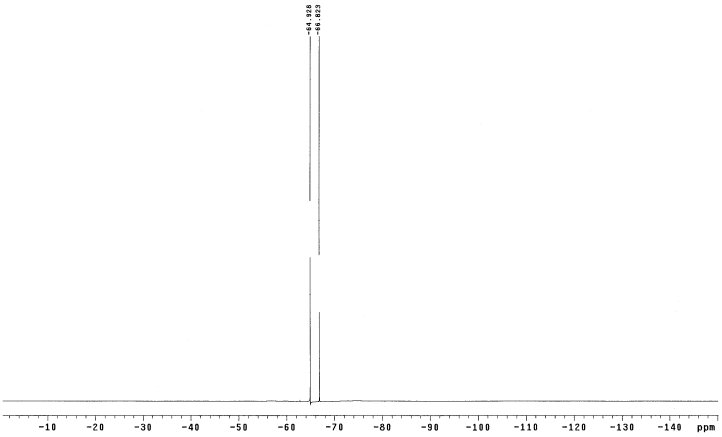


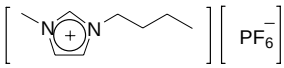
1-*n*-Butyl-3-methylimidazolium Hexafluorophosphate (Recycle 1). ^{13}C NMR (100 MHz, DMSO–d_6)



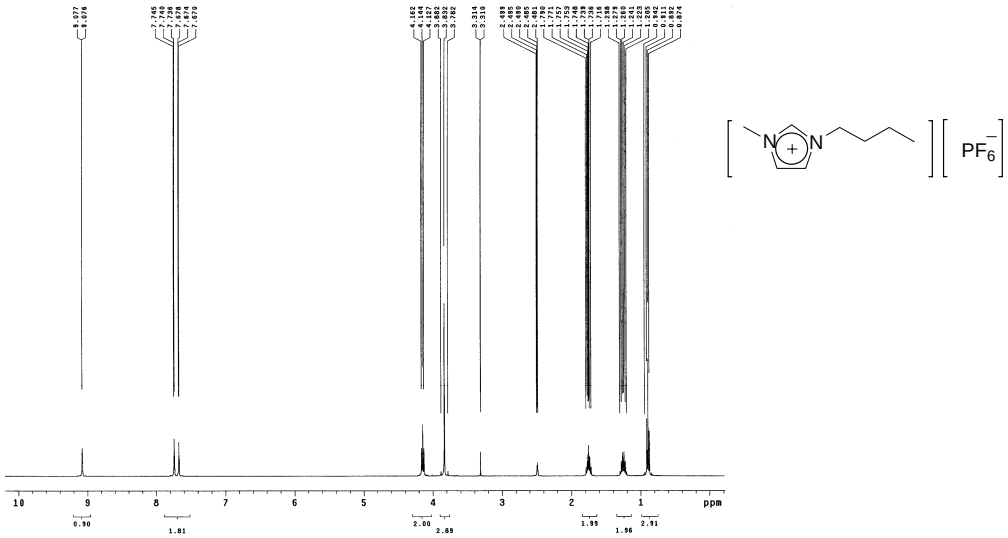


1-*n*-Butyl-3-methylimidazolium Hexafluorophosphate (Recycle 1). ^{19}F NMR (400 MHz, DMSO–d_6)

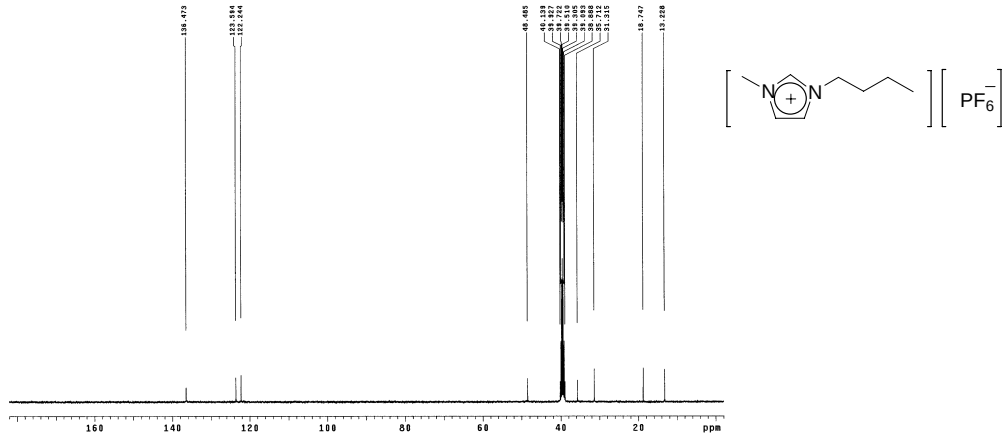




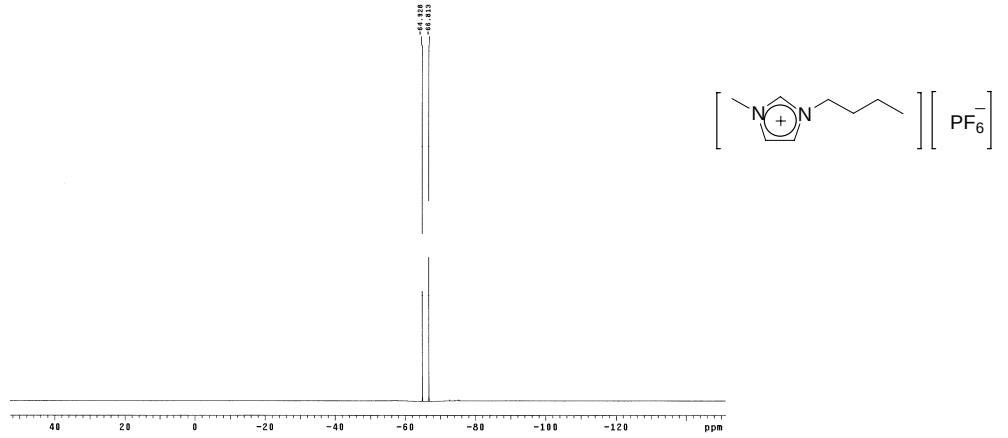
1-*n*-Butyl-3-methylimidazolium Hexafluorophosphate (Recycle 2). ^{1}H NMR (400 MHz, DMSO–d_6)



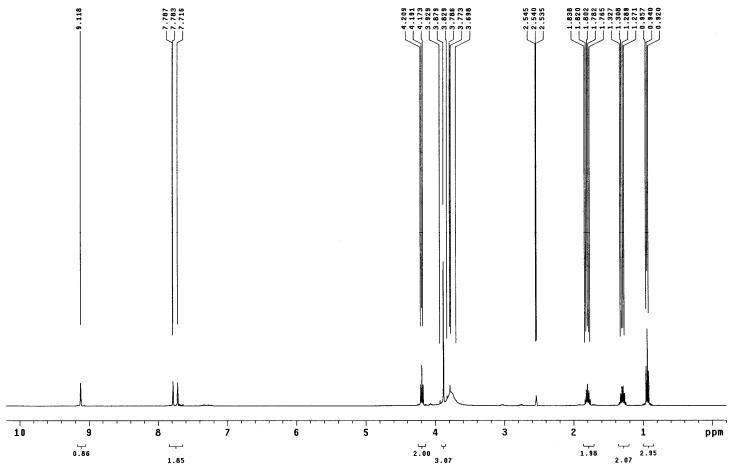
1-*n*-Butyl-3-methylimidazolium Hexafluorophosphate (Recycle 2). ^{13}C NMR (100 MHz, DMSO–d_6)

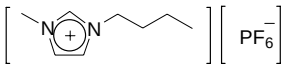


1-*n*-Butyl-3-methylimidazolium Hexafluorophosphate (Recycle 2). ^{19}F NMR (400 MHz, DMSO–d_6)

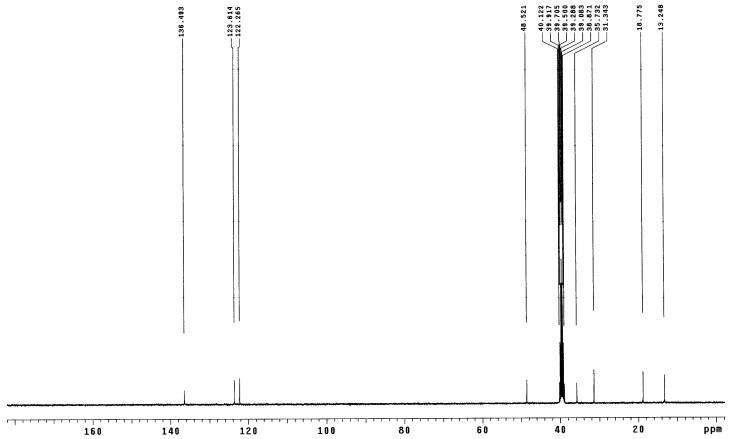


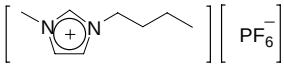
1-*n*-Butyl-3-methylimidazolium Hexafluorophosphate (recycle 3). ^{1}H NMR (400 MHz, DMSO–d_6)



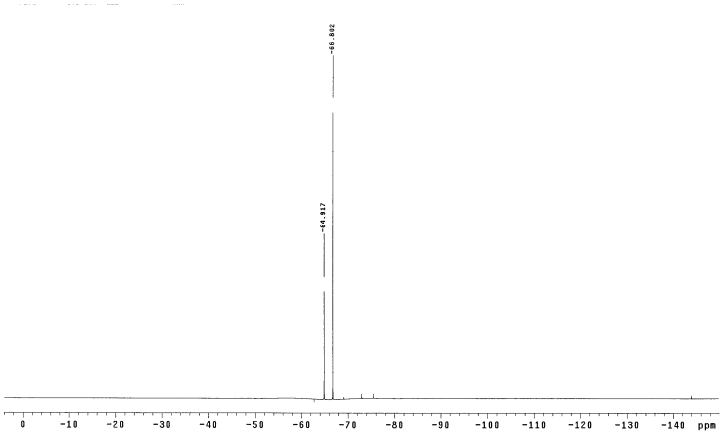


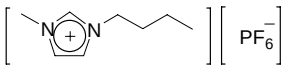
1-*n*-Butyl-3-methylimidazolium Hexafluorophosphate (Recycle 3). ^{13}C NMR (100 MHz, DMSO–d_6)





1-*n*-Butyl-3-methylimidazolium Hexafluorophosphate (Recycle 3). ^{19}F NMR (400 MHz, DMSO–d_6)





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