

Supporting Information

Electroactive imidazolium salts based on 1,4-dimethoxybenzene
redox groups : synthesis and electrochemical characterisation

John C. Forgie and Dominic Rochefort*

^aDépartement de chimie, Université de Montreal,

CP6128 Succ. Centre-Ville,

Montréal, QC, Canada, H3C 3J7

dominic.rochefort@umontreal.ca

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General

2,5-di-tert-butyl-4-methoxyphenol was purchased from Frontier Scientific. 2,5-di-tert-butyl-1,4-dimethoxybenzene was purchased from 3M. Dichloromethane, hexanes, methanol, and ether were purchased from Fisher. All other chemicals and solvents were purchased from Sigma-Aldrich. All were used without further purification. Melting points and crystallisation temperatures were obtained using a Perkin Elmer Jade DSC. Glass transition temperatures were obtained on a TA Instruments Q1000 DSC. Infrared spectra were taken on a Perkin Elmer Spectrum One FTIR. ^1H and ^{13}C Nuclear magnetic resonance spectra were recorded either on a Bruker AMX300, Avance 500 or Avance 700 using CDCl_3 or deuterated DMSO as the solvent. Electrospray ionisation mass spectrometry were performed by the Centre régional de spectroscopie de masse de l'Université de Montréal. Elemental analyses were performed by the Laboratoire d'analyse élémentaire de l'Université de Montréal. Thermogravimetric analysis was performed on a TGA 2950 TA Instruments, measurements were performed under nitrogen from room temperature to 600 °C.

Electrochemical Measurements.

Cyclic voltammetry measurements were performed in a heart-shaped electrochemical cell using a BioLogic SP-50 potentiostat. The electrodes were platinum, platinum wire and silver wire as the working, counter and reference electrodes, respectively. The solutions were degassed with argon for 15 minutes prior to measurements. All measurements are referenced against the $E_{1/2}$ of the Fc/Fc^+ redox couple. Diffusion coefficients were calculated from the gradient of peak current (i_p) against the square root of the scan rate through the Randles-Sevcik equation:

$$i_p = 0.4463nFAC(nF/RT)^{1/2}v^{1/2}D^{1/2} \quad (1)$$

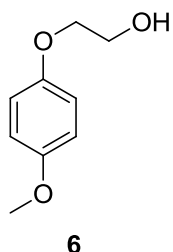
where n is the number of electrons, in this case one, F is the Faraday constant, A is the electrode area, C is the concentration, R is the gas constant, T is the temperature, v is the scan rate and D is the diffusion coefficient. The heterogeneous rate transfer constant (k_s) was determined using peak-to-peak separation (Δ_p) using Nicholson's method, which relates Δ_p with a kinetic parameter ψ , which in turn allows the heterogeneous rate transfer to be calculated from the following equation:

$$k_s = \frac{\psi \left[\pi D_O \frac{nFv}{RT} \right]^{1/2}}{\gamma^\alpha} \quad (2)$$

where $\gamma = (D_O / D_R)^{1/2}$ and $\alpha = 0.5$. The value of α is nearly independent for reversible reactions.

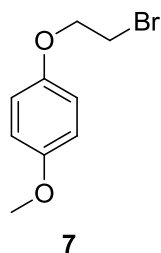
Experimental Procedures

2-(4-methoxyphenoxy)ethanol (**6**)



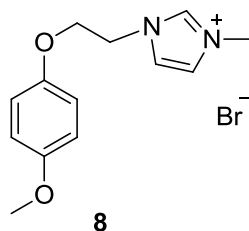
10.0 g 4-methoxyphenol (**5**) (80.61 mmol) and 41.85 cm³ 2-chloroethanol (50.22 g) were dissolved in 10% sodium hydroxide solution (300 cm³) and the mixture was stirred at room temperature for 24 h. The solution was extracted with 5 x 100 cm³ dichloromethane. The organic extract was washed with water (5 x 200 cm³), dried with MgSO₄ and evaporated to dryness on a rotary evaporator. The white powder was recrystallised from 10% sodium hydroxide solution. . Yield: 10.77 g (64.08 mmol, 80%). White crystals, m.p. 67-68 °C. IR (ν, cm⁻¹): 3302, 2936, 1509, 1443, 1379, 1230, 1117, 1090, 1053, 1033, 922, 892, 827, 728. ¹H-NMR (CDCl₃-d₆, δ, ppm): 2.07 (s, 1H, OH); 3.72 (s, 3H, OCH₃); 3.94 (t, *J* = 4.5 Hz, 2H, CH₂); 4.04 (t, *J* = 4.5 Hz, 2H, CH₂); 6.84 (s, 2H, 2 x Ar-H); 6.86 (s, 2H, 2 x Ar-H). ¹³C-NMR (CDCl₃, δ, ppm): 55.84 (OCH₃); 61.71 (CH₂); 69.93 (CH₂); 114.78 (2 x Ar C); 115.65 (2 x Ar C); 152.82 (Ar C); 154.19 (Ar C). HRMS (ESI) *m/z* [M+H]⁺ calcd for C₉H₁₃O₃ 169.08592; found 169.08547. Anal. Calcd for C₉H₁₂O₃: C, 64.27; H, 10.719. Found: C, 64.09; H, 7.27.

1-(2-bromoethoxy)-4-methoxybenzene (7)



23.4 g of carbon tetrabromide was slowly added to a cold solution (0 °C) of 9.96 g (59.26 mmol) of **6** and 18.58 g triphenylphosphine in 180 cm³ anhydrous acetonitrile with stirring. The reaction mixture was stirred for 4 h at room temperature under argon and then poured into an ice-cold 300 cm³ solution of methanol-water (3:2). The precipitate was filtered and washed with methanol-water (3:2) and recrystallized from methanol. Yield: 10.69 g (46.26 mmol, 78%). White crystals, m.p. 49-50 °C. IR (ν, cm⁻¹): 1509, 1463, 1428, 1279, 1227, 1111, 1030, 879, 822, 723. ¹H-NMR (CDCl₃-d₆, δ, ppm): 3.61 (t, *J* = 6.3 Hz, 2H, CH₂); 3.77 (s, 3H, OCH₃); 4.24 (t, *J* = 6.3 Hz, 2H, CH₂); 6.84 (s, 2H, 2 x Ar-H); 6.86 (s, 2H, 2 x Ar-H). ¹³C-NMR (CDCl₃, δ, ppm): 29.48 (CH₂); 55.86 (OCH₃); 68.95 (CH₂); 114.87 (2 x Ar C); 116.23 (2 x Ar C); 152.33 (Ar C); 154.54 (Ar C). HRMS (ESI) *m/z* [M*Ag]⁺ calcd for C₉H₁₁O₂AgBr 336.89879; found 336.89795. Anal. Calcd for C₉H₁₁O₂Br: C, 46.78; H, 4.80. Found: C, 46.80; H, 4.78.

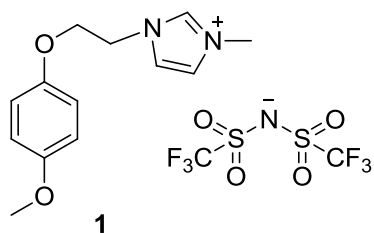
1-(2-(4-methoxyphenoxy)ethyl)-3-methyl-1*H*-imidazol-3-ium bromide (8)



8.36 g of **7** (40.50 mmol) and 3.34 g of 1-methylimidazole were dissolved in 50 cm³ anhydrous acetonitrile and refluxed overnight under argon. The resulting mixture was evaporated to dryness and washed with small portions of ether. Yield: 10.34 g (33.14 mmol, 82%). Pale-yellow liquid, $T_g = -44.0$ °C. IR (ν , cm⁻¹): 1567, 1509, 1467, 1293, 1226, 1171, 1112, 1061, 1031, 914, 831, 738, 655, 623. ¹H-NMR (DMSO, δ , ppm): 3.65 (s, 3H, OCH₃); 3.88 (s, 3H, CH₃); 4.28 (t, $J = 4.9$ Hz, 2H, CH₂); 4.57 (t, $J = 4.8$ Hz, 2H, CH₂); 6.86 (s, 2H, 2 x Ar-H); 6.88 (s, 2H, 2 x Ar-H); 7.74 (s, 1H, Imidazolium H); 7.83 (s, 1H, Imidazolium H); 9.24 (s, 1H, Imidazolium H). ¹³C-NMR (DMSO, δ , ppm): 35.82 (CH₂); 48.58 (CH₂); 55.40 (OCH₃); 66.35 (CH₂); 114.64 (2 x Ar C); 115.71 (2 x Ar C); 122.77 (Imidazolium C); 123.52 (Imidazolium C); 137.03 (Imidazolium C); 151.66 (Ar C); 153.87 (Ar C). HRMS (ESI) m/z [M]⁺ calcd for C₁₃H₁₇O₂N₂ 233.12845; found 233.12865.

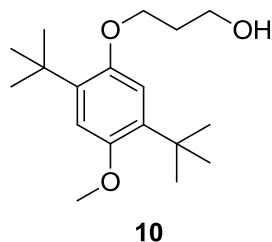
1-(2-(4-methoxyphenoxy)ethyl)-3-methyl-1*H*-imidazol-3-ium

bis((trifluoromethyl)sulfonyl)amide (1)



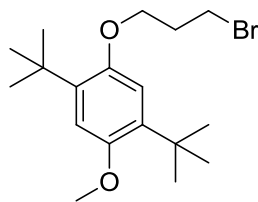
An aqueous solution of lithium bis(trifluoromethanesulfonyl)amide (13.06 g, 45.50 mmol, 1.5 equivalents) was added dropwise to an aqueous solution of **8** (9.50 g, 30.33 mmol) and the solution was stirred for 2 h at room temperature and left over-night to allow a colourless liquid to separate from the aqueous phase. The mixture was extracted with dichloromethane and the organic layer washed with five portions of water and dried over MgSO₄. The solvent was then evaporated under reduced pressure and the product vacuum-dried at 80°C for 24 h. Yield: 7.66 g (14.92 mmol, 49%). Colourless liquid, $T_g = -62.4$ °C, density 1.68 g cm⁻³. IR (ν , cm⁻¹): 1512, 1351, 1181, 1136, 1055, 831, 791, 741, 654, 614, 570, 515. ¹H-NMR (DMSO, δ , ppm): 3.69 (s, 3H, OCH₃); 3.87 (s, 3H, CH₃); 4.28 (t, $J = 4.8$ Hz, 2H, CH₂); 4.56 (t, $J = 4.8$ Hz, 2H, CH₂); 6.87 (s, 2H, 2 x Ar-H); 6.88 (s, 2H, 2 x Ar-H); 7.71 (s, 1H, Imidazolium H); 7.80 (s, 1H, Imidazolium H); 9.16 (s, 1H, Imidazolium H). ¹³C-NMR (DMSO, δ , ppm): 35.80 (CH₂); 48.58 (CH₂); 55.37 (OCH₃); 66.31 (CH₂); 114.63 (2 x Ar C); 115.69 (2 x Ar C); 121.62 (CF₃); 122.80 (Imidazolium C); 123.53 (Imidazolium C); 137.02 (Imidazolium C); 151.66 (Ar C); 153.89 (Ar C). HRMS (ESI) m/z [M]⁺ calcd for C₁₃H₁₇O₂N₂ 233.12845; found 233.12852; [M]⁻ calcd for C₂F₆NO₄S₂ calcd 279.91784; found 279.91881. Anal. Calcd for C₁₅H₁₇O₆N₃F₆S₂: C, 35.09; H, 3.34; N, 8.18; S, 12.49 Found: C, 35.04; H, 3.24; N, 8.15; S, 12.50.

3-(2,5-Di-tert-butyl-4-methoxy-phenoxy)-propan-1-ol (10)



17.0 g 2,5-di-tert-butyl-4-methoxyphenol (**9**) (71.94 mmol) and 29.9 g of tetrabutylammonium bromide in 70 cm³ anhydrous dimethylformamide was added slowly to a stirred solution of 3.74 g sodium hydride (60% in mineral oil) under argon and the mixture was stirred at room temperature for 1 hour until the evolution of H₂ gas ceased. The solution was cooled to 0 °C and 7.5 cm³ 3-bromo-propanol (11.53 g, 82.96 mmol) in 30 cm³ dimethylformamide was added slowly over a period of 15 minutes. The reaction mixture was stirred at room temperature for 40 h and then poured into 750 cm³ ice-cold water. The precipitate was filtered and washed with water and then redissolved in 250 cm³ dichloromethane. The organic solution was washed with water (3 x 250 cm³), dried with MgSO₄ and evaporated to dryness on a rotary evaporator. The brown powder (15.15 g) was chromatographed on silica gel (ethyl acetate-hexanes 3:7) and the pure fractions were recrystallized from acetonitrile. Yield: 11.9 g (40.42 mmol, 56%). White crystals, m.p. 96-97 °C. IR (ν , cm⁻¹): 3281, 2958, 1510, 1466, 1398, 1377, 1209, 1128, 1074, 1040, 933, 864, 781. ¹H-NMR (CDCl₃-d₆, δ , ppm): 1.37 (s, 9H, *t*-Bu); 1.39 (s, 9H, *t*-Bu); 1.72 (s, 1H, OH); 2.10 (q, *J* = 6.1 Hz, 2H, CH₂); 3.82 (s, 3H, OCH₃); 3.93 (t, *J* = 6.2 Hz, 2H, CH₂); 4.12 (t, *J* = 5.9 Hz, 2H, CH₂); 6.85 (s, 1H, Ar-H); 6.86 (s, 1H, Ar-H). ¹³C-NMR (CDCl₃, δ , ppm): 29.92 (3 x CH₃); 30.07 (3 x CH₃); 32.75 (CH₂); 34.72 (C); 34.75 (C); 56.05 (OCH₃); 60.75 (CH₂); 66.07 (CH₂); 111.92 (Ar C); 112.24 (Ar C); 136.26 (Ar C); 136.49 (Ar C); 151.17 (Ar C); 151.18 (Ar C). HRMS (ESI) *m/z* [M]⁺ calcd for C₁₈H₃₀O₃ 294.21895; found 294.21984. Anal. Calcd for C₁₈H₃₀O₃: C, 73.43; H, 10.27. Found: C, 73.21; H, 10.39.

1-(3-bromopropoxy)-2,5-di-tert-butyl-4-methoxybenzene (11)

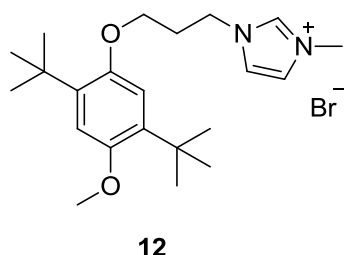


11

14.1 g of carbon tetrabromide was slowly added to a cold solution (0 °C) of 10.5 g (35.66 mmol) of 10 and 11.19 g triphenylphosphine in 100 cm³ anhydrous acetonitrile with stirring. The reaction mixture was stirred for 4 h at room temperature under argon and the poured into an ice-cold 200 cm³ solution of methanol-water (3:2). The precipitate was filtered and washed with methanol-water (3:2) and recrystallized from methanol. Yield: 10.47 g (29.31 mmol, 82%). White crystals, m.p. 60-61 °C. IR (ν , cm⁻¹): 2955, 1509, 1469, 1397, 1376, 1254, 1204, 1129, 1041, 863, 780. ¹H-NMR (DMSO, δ , ppm): 1.31 (s, 9H, *t*-Bu); 1.33 (s, 9H, *t*-Bu); 2.28 (q, $J = 6.2$ Hz, 2H, CH₂); 3.71 (t, $J = 6.6$ Hz, 2H, CH₂); 3.76 (s, 3H, OCH₃); 4.06 (t, $J = 5.9$ Hz, 2H, CH₂); 6.79 (s, 1H, Ar-H); 6.81 (s, 1H, Ar-H). ¹³C-NMR (DMSO, δ , ppm): 29.58 (3 x CH₃); 29.69 (3 x CH₃); 31.54 (CH₂); 32.29 (CH₂); 34.19 (C); 34.21 (C); 55.74 (OCH₃); 65.66 (CH₂); 111.54 (2 x Ar C); 135.29 (Ar C); 135.44 (Ar C); 150.32 (Ar C); 151.50 (Ar C). HRMS (ESI) m/z [M]⁺ calcd for C₁₈H₂₉O₂Br 356.13454; found 356.13369. Anal. Calcd for C₁₈H₂₉O₂Br: C, 60.50; H, 8.18. Found: C, 60.83; H, 8.48.

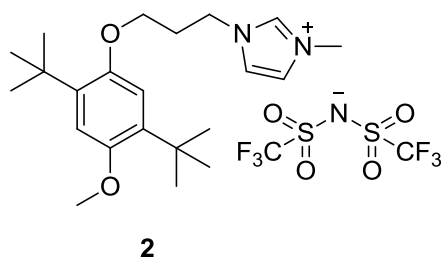
1-(3-(2,5-di-tert-butyl-4-methoxyphenoxy)propyl)-3-methyl-1*H*-imidazol-3-ium bromide

(12)



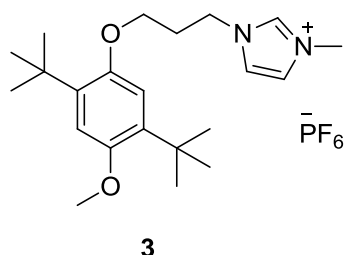
9.6 g of 11 (26.88 mmol) and 2.22 g of 1-methylimidazole were dissolved in 30 cm³ anhydrous acetonitrile and refluxed overnight under argon. The resulting mixture was evaporated to dryness and washed with small portions of ether. Yield: 8.64 g (19.65 mmol, 73%). White powder, m.p. 183-184 °C. IR (v, cm⁻¹): 2954, 1571, 1512, 1465, 1210, 1168, 1129, 1041, 859, 818, 787, 620. ¹H-NMR (DMSO, δ, ppm): 1.30 (s, 9H, *t*-Bu); 1.32 (s, 9H, *t*-Bu); 2.32 (q, *J* = 6.5 Hz, 2H, CH₂); 3.75 (s, 3H, OCH₃); 3.86 (s, 3H, CH₃); 4.01 (t, *J* = 5.9 Hz, 2H, CH₂); 4.38 (t, *J* = 6.6 Hz, 2H, CH₂); 6.76 (s, 1H, Ar-H); 6.80 (s, 1H, Ar-H); 7.76 (s, 1H, Imidazolium H); 7.86 (s, 1H, Imidazolium H); 9.29 (s, 1H, Imidazolium H). ¹³C-NMR (DMSO, δ, ppm): 29.58 (3 x CH₃); 29.78 (3 x CH₃); 34.17 (C); 34.19 (C); 35.15 (CH₂); 46.50 (CH₂); 55.74 (OCH₃); 65.20 (CH₂); 111.43 (Ar C); 112.04 (Ar C); 123.33 (Imidazolium C); 123.68 (Imidazolium C); 135.44 (Ar C); 135.51 (Ar C); 136.74 (Imidazolium C); 150.35 (Ar C); 151.63 (Ar C). HRMS (ESI) *m/z* [M]⁺ calcd for C₂₂H₃₅O₂N₂ 359.2693; found 359.27016. Anal. Calcd for C₂₂H₃₅O₂N₂Br: C, 60.13; H, 8.03; N, 6.37. Found: C, 60.11; H, 8.05; N, 6.34.

**1-(3-(2,5-di-tert-butyl-4-methoxyphenoxy)propyl)-3-methyl-1*H*-imidazol-3-ium
bis(trifluoromethanesulfonyl)amide (2)**



5.0 g (11.38 mmol) of 12 and 4.9 g (17.07 mmol, 1.5 equivalents) of lithium bis(trifluoromethanesulfonyl)amide were dissolved in 40 cm³ of methanol and refluxed for 3 h. The resulting mixture was evaporated to dryness and redissolved in 100 cm³ dichloromethane. The organic solution was washed with water (5 x 100 cm³), dried with MgSO₄ and the solvent was then evaporated under reduced pressure and the product vacuum-dried at 80°C for 24 h. Yield: 4.89 g (7.64 mmol, 67%). Off-white powder, m.p. 93-94 °C. IR (ν, cm⁻¹): 2962, 1577, 1510, 1482, 1377, 1332, 1183, 1131, 1049, 859, 789, 765, 740, 652, 623. ¹H-NMR (DMSO, δ, ppm): 1.31 (s, 9H, *t*-Bu); 1.33 (s, 9H, *t*-Bu); 2.32 (q, *J* = 6.7 Hz, 2H, CH₂); 3.76 (s, 3H, OCH₃); 3.85 (s, 3H, CH₃); 4.01 (t, *J* = 6.2 Hz, 2H, CH₂); 4.36 (t, *J* = 7.3 Hz, 2H, CH₂); 6.76 (s, 1H, Ar-H); 6.81 (s, 1H, Ar-H); 7.72 (t, *J* = 1.6 Hz, 1H, Imidazolium H); 7.82 (t, *J* = 1.7 Hz, 1H, Imidazolium H); 9.18 (s, 1H, Imidazolium H). ¹³C-NMR (DMSO, δ, ppm): 29.58 (3 x CH₃); 29.78 (3 x CH₃); 34.18 (C); 34.21 (C); 35.74 (CH₂); 46.55 (CH₂); 55.74 (OCH₃); 65.20 (CH₂); 111.46 (Ar C); 112.05 (Ar C); 121.61 (CF₃); 122.35 (Imidazolium C); 123.71 (Imidazolium C); 135.48 (Ar C); 135.55 (Ar C); 136.74 (Imidazolium C); 150.37 (Ar C); 151.67 (Ar C). HRMS (ESI) *m/z* [M]⁺ calcd for C₂₂H₃₅O₂N₂ 359.2693; found 359.27023; [M]⁻ calcd for C₂F₆NO₄S₂ calcd 279.91784; found 279.91868. Anal. Calcd for C₂₄H₃₅O₆N₃F₆S₂: C, 45.06; H, 5.52; N, 6.57; S, 10.03. Found: C, 44.98; H, 5.59; N, 6.55; S, 10.13.

**1-(3-(2,5-di-tert-butyl-4-methoxyphenoxy)propyl)-3-methyl-1*H*-imidazol-3-ium
hexafluorophosphate (3)**



2.5 g (5.69 mmol) of 12 and 1.44 g (5.69 mmol) of silver hexafluorophosphate were dissolved in anhydrous acetonitrile and stirred for 2 h at room temperature. The resulting precipitate was filtered off and the solution was collected and evaporated to dryness on a rotary evaporator. The product was then vacuum-dried at 80°C for 24 h. Yield: 2.16 g (4.29 mmol, 75%). Light purple powder, m.p. 148-149 °C. IR (ν, cm⁻¹): 2956, 2343, 1579, 1511, 1468, 1378, 1211, 1175, 1127, 1055, 824, 623. ¹H-NMR (DMSO, δ, ppm): 1.31 (s, 9H, *t*-Bu); 1.33 (s, 9H, *t*-Bu); 2.32 (q, *J* = 6.6 Hz, 2H, CH₂); 3.76 (s, 3H, OCH₃); 3.85 (s, 3H, CH₃); 4.01 (t, *J* = 5.9 Hz, 2H, CH₂); 4.36 (t, *J* = 6.8 Hz, 2H, CH₂); 6.77 (s, 1H, Ar-H); 6.81 (s, 1H, Ar-H); 7.72 (s, 1H, Imidazolium H); 7.82 (s, 1H, Imidazolium H); 9.18 (s, 1H, Imidazolium H). ¹³C-NMR (DMSO, δ, ppm): 29.58 (3 x CH₃); 29.78 (3 x CH₃); 34.17 (C); 34.19 (C); 35.15 (CH₂); 46.50 (CH₂); 55.74 (OCH₃); 65.20 (CH₂); 111.43 (Ar C); 112.04 (Ar C); 123.33 (Imidazolium C); 123.68 (Imidazolium C); 135.44 (Ar C); 135.51 (Ar C); 136.74 (Imidazolium C); 150.35 (Ar C); 151.63 (Ar C). HRMS (ESI) *m/z* [M]⁺ calcd for C₂₂H₃₅O₂N₂ 359.2693; found 359.26993; [M]⁻ calcd for PF₆ calcd 144.96473; found 144.96439. Anal. Calcd for C₂₂H₃₅O₂N₂PF₆: C, 52.38; H, 6.99; N, 5.55. Found: C, 52.22; H, 7.12; N, 5.57.

Differential Scanning Calorimetry:

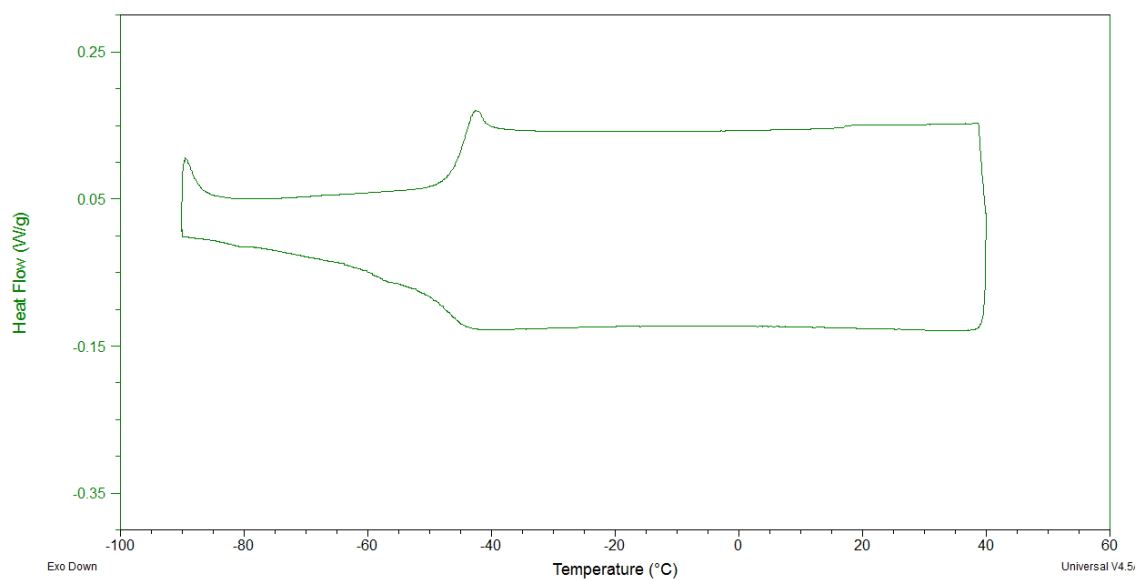


Figure S1. DSC of compound 1

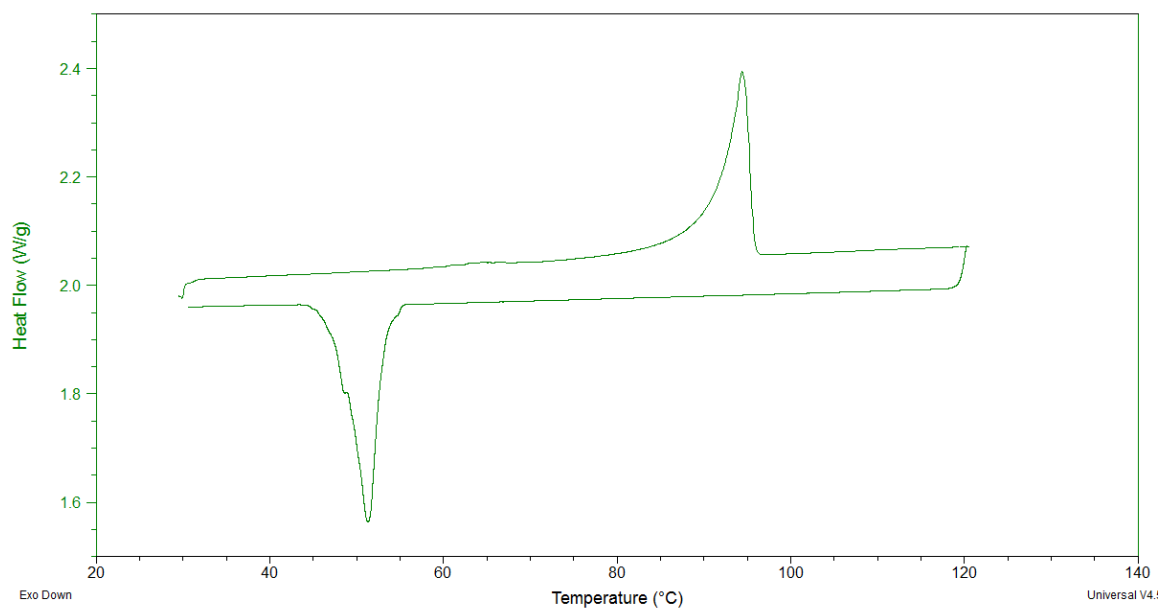


Figure S2. DSC of compound 2

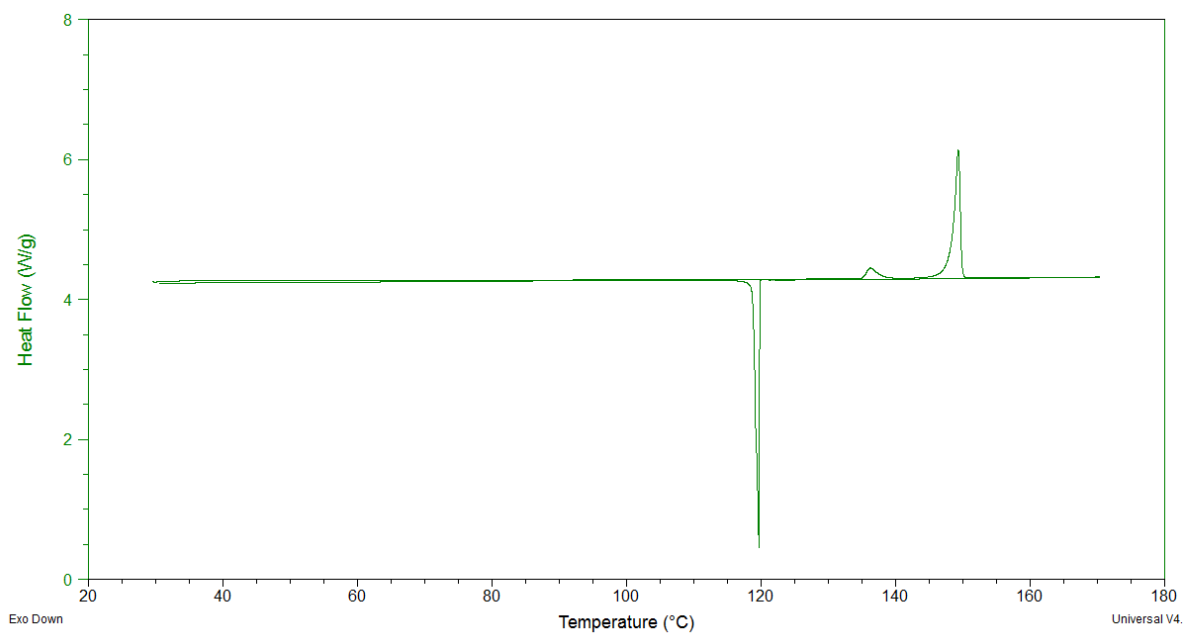


Figure S3. DSC of compound 3

Thermogravimetric Analysis:

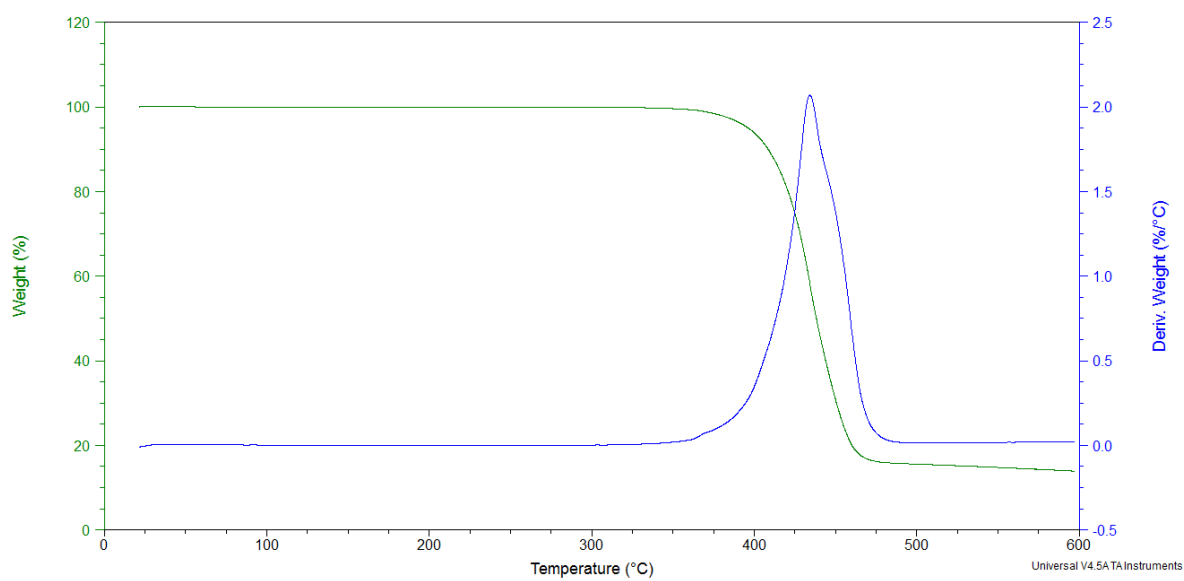


Figure S4. TGA of compound 1

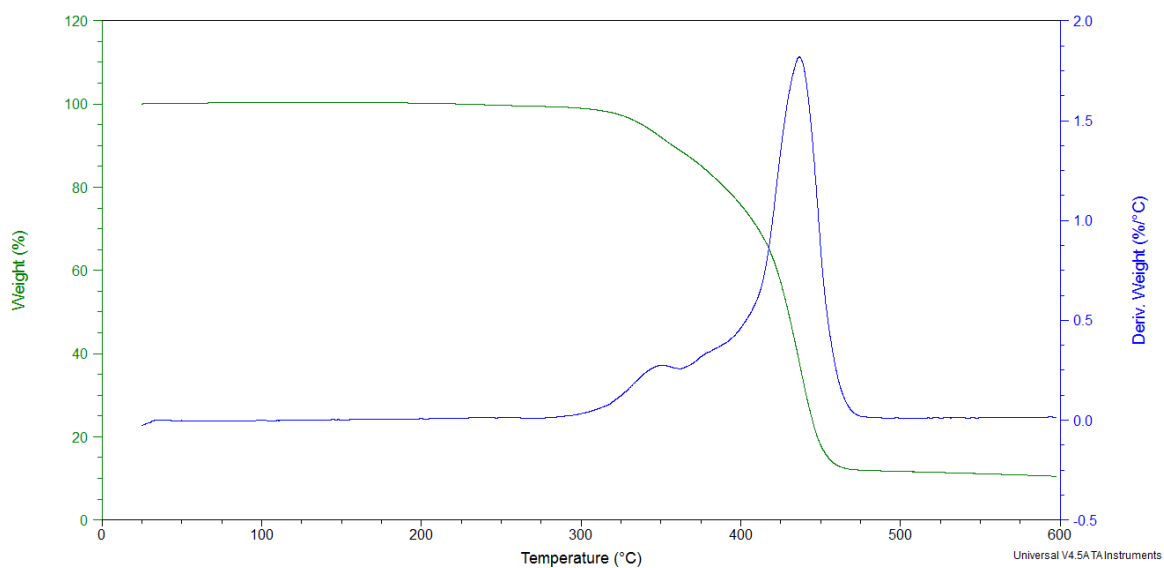


Figure S5. TGA of compound 2

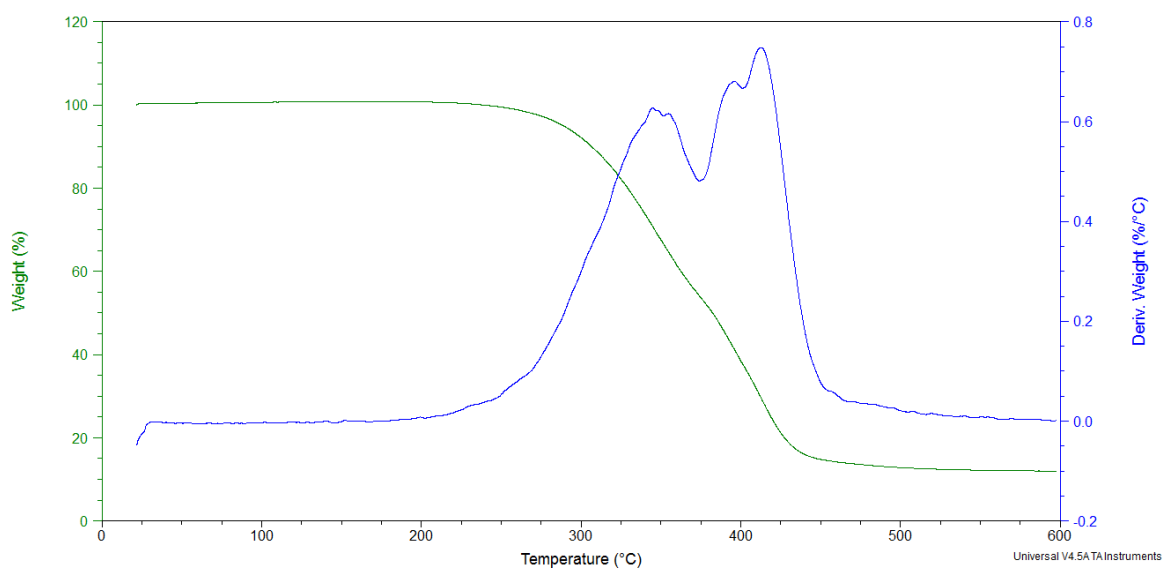


Figure S6. TGA of compound 3

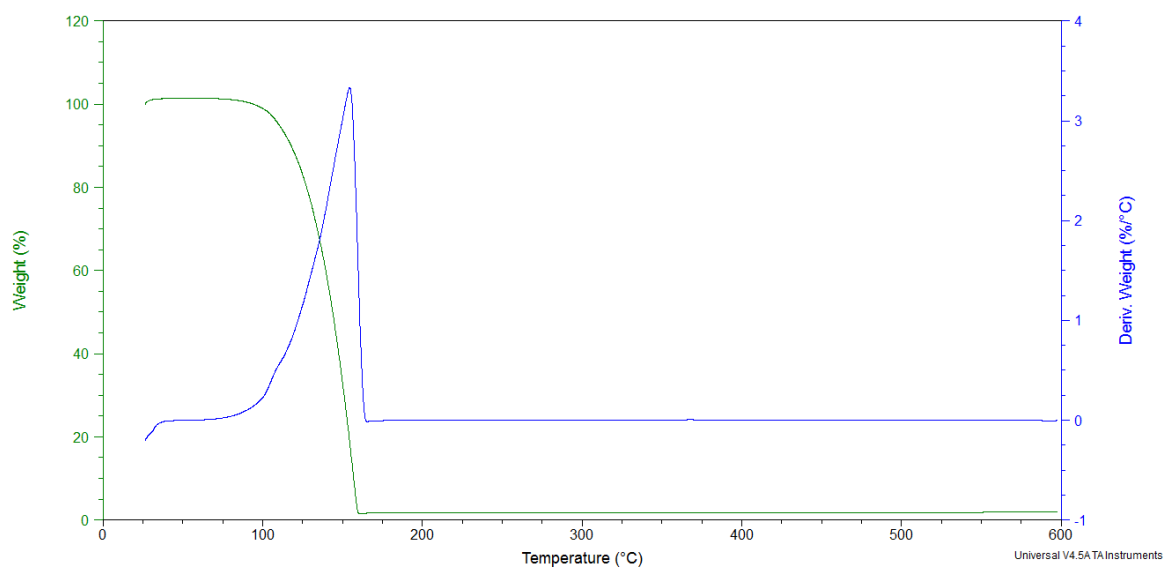


Figure S7. TGA of compound **4**

Additional Cyclic Voltammograms

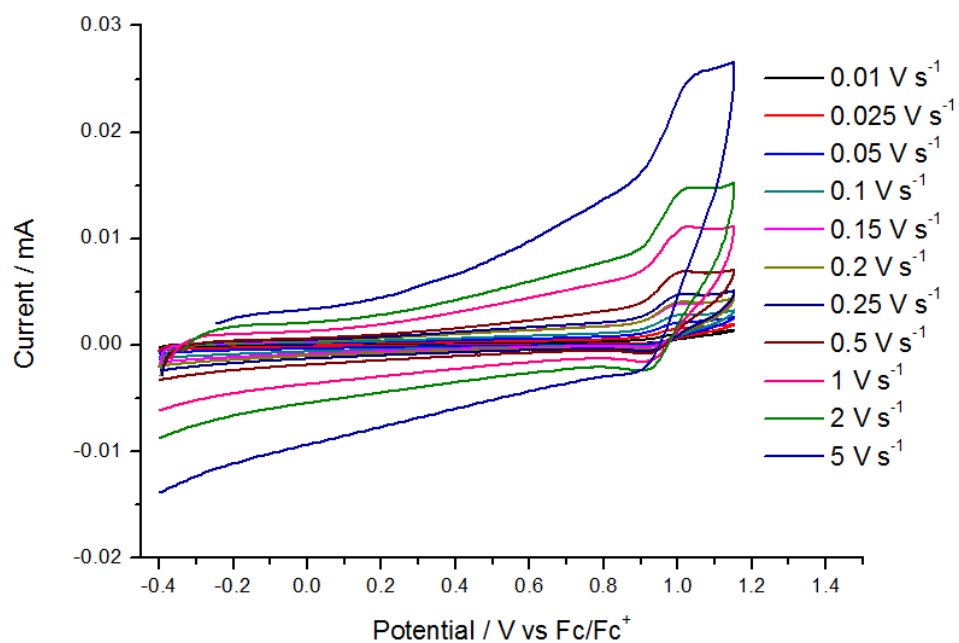


Figure S8. Cyclic voltammogram of compound **1** (1 mM) in EC:DEC + 1.5 M LiTFSI at different scan rates

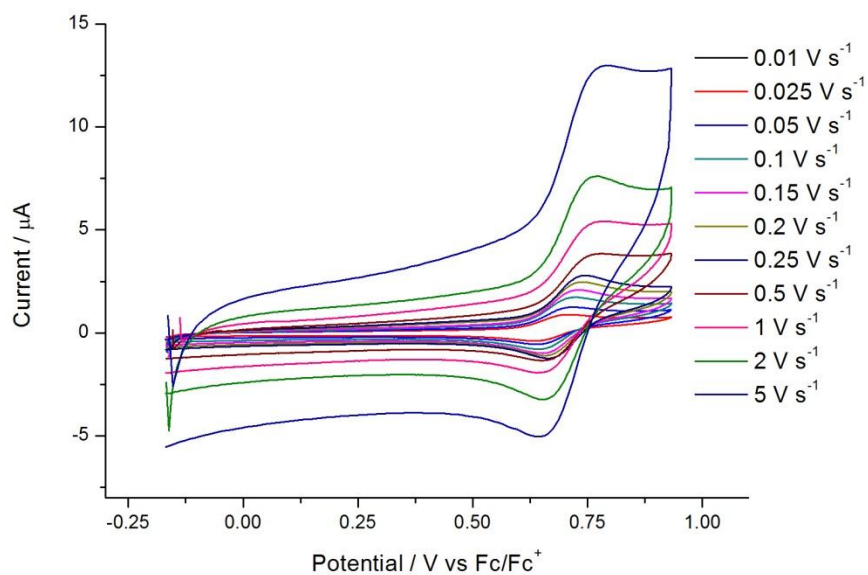


Figure S9. Cyclic voltammogram of compound **2** (1 mM) in EC:DEC + 1.5 M LiTFSI at different scan rates

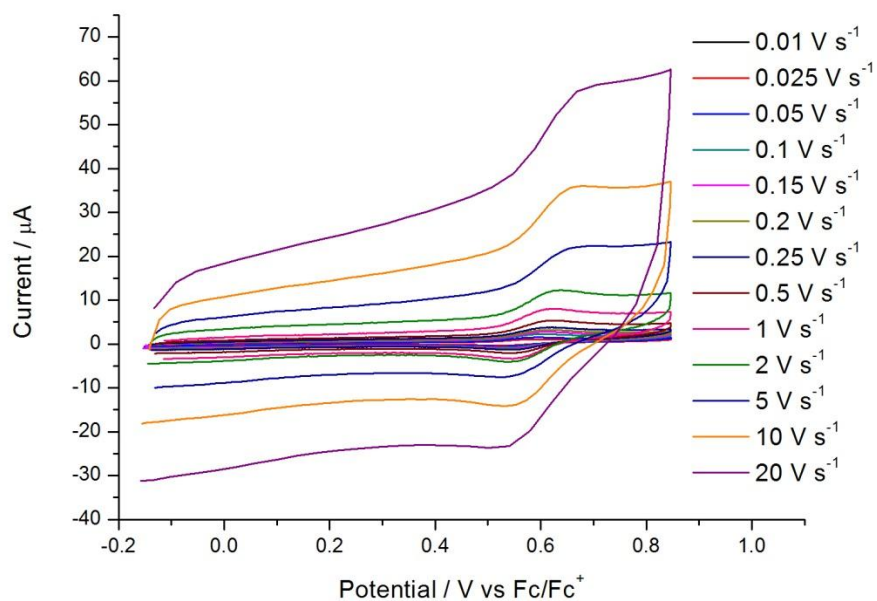


Figure S10. Cyclic voltammogram of compound **3** (1 mM) in EC:DEC + 1.5 M LiTFSI at different scan rates

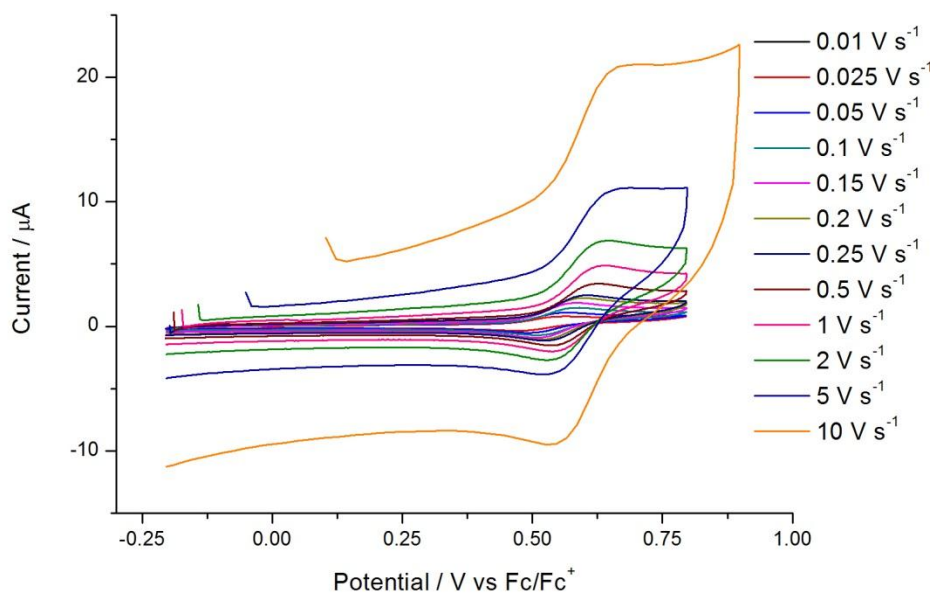


Figure S11. Cyclic voltammogram of compound **4** (1 mM) in EC:DEC + 1.5 M LiTFSI at different scan rates

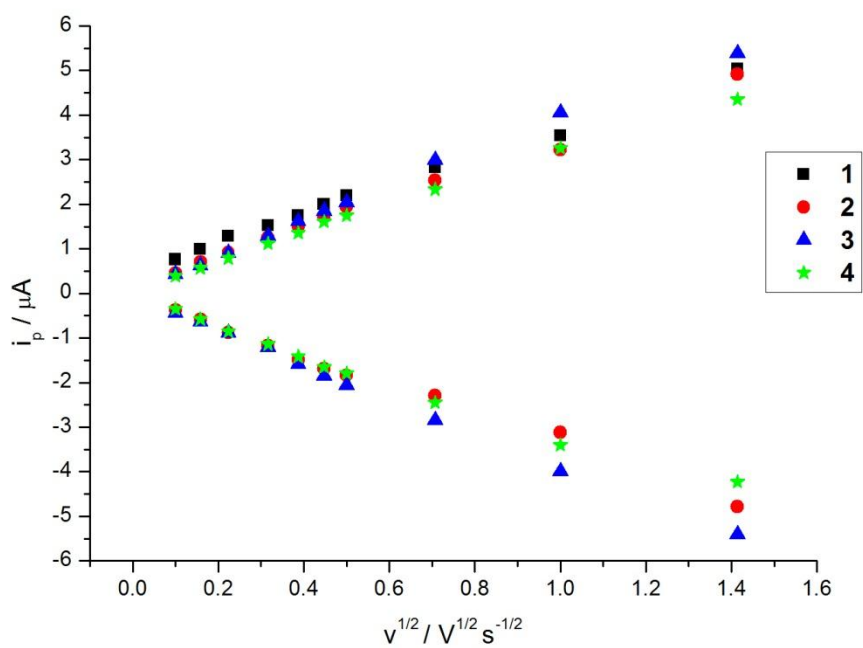
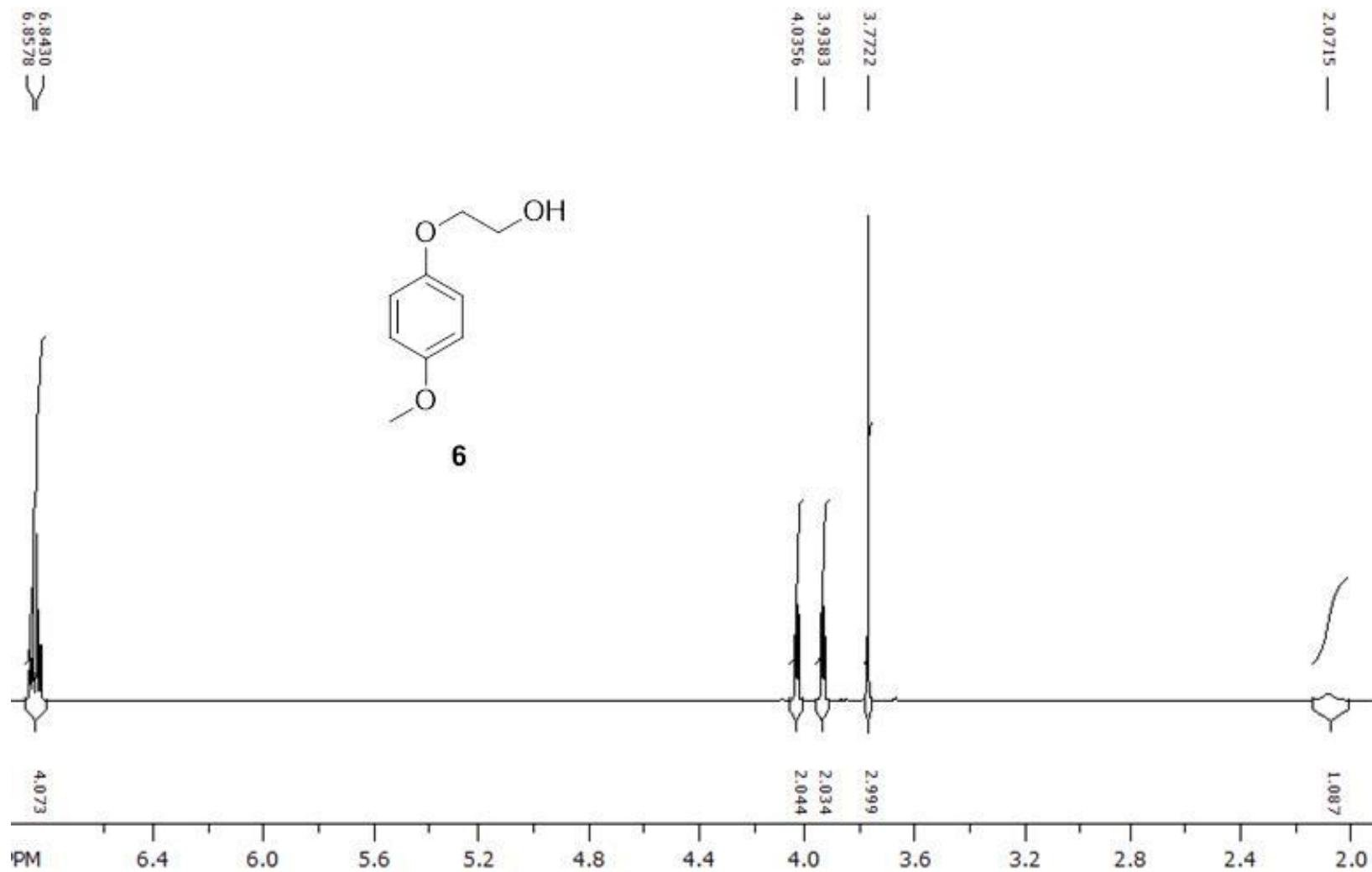
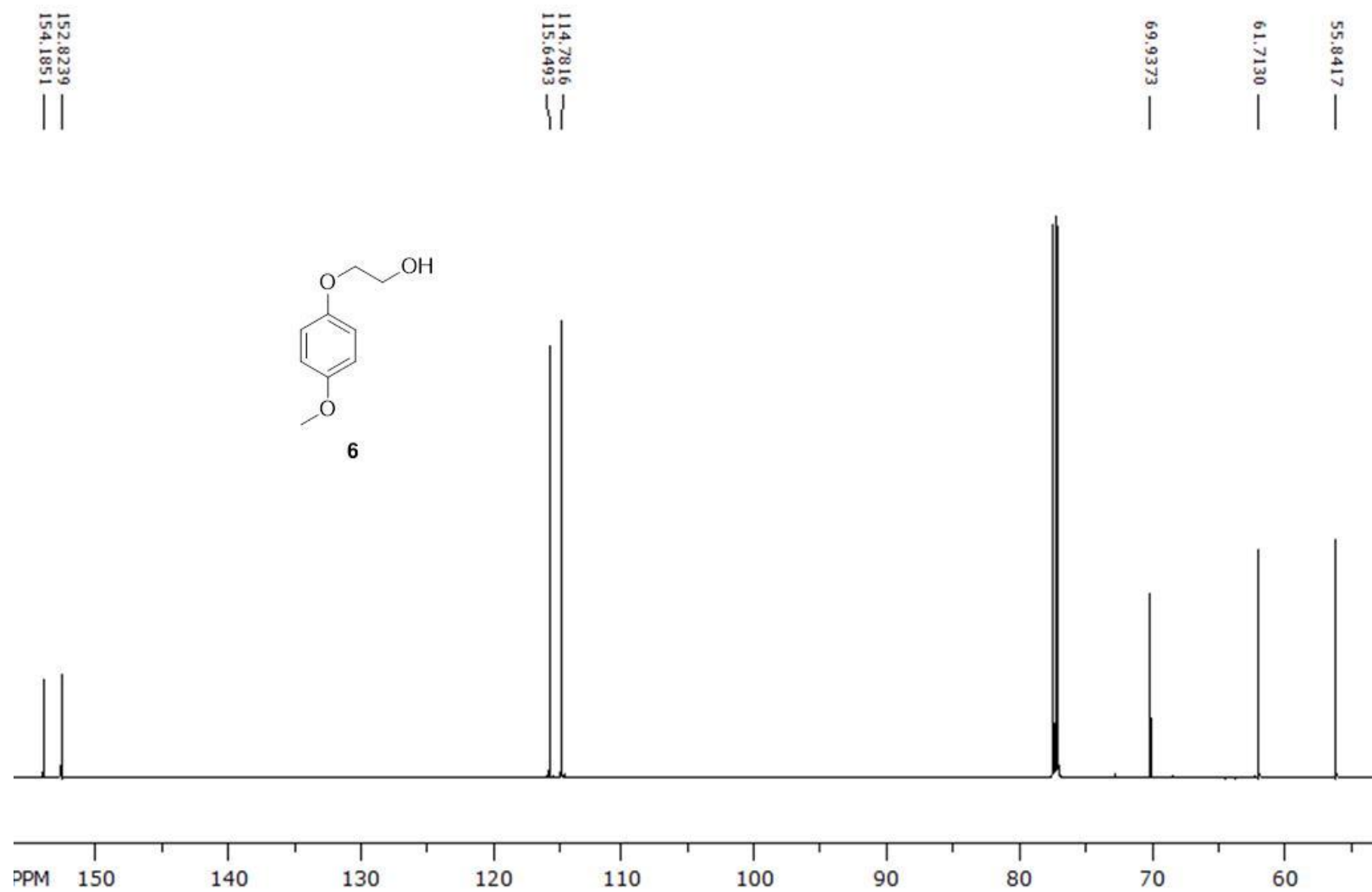


Figure S12. Plot of current maximum against square root of scan rate for compounds 1-4

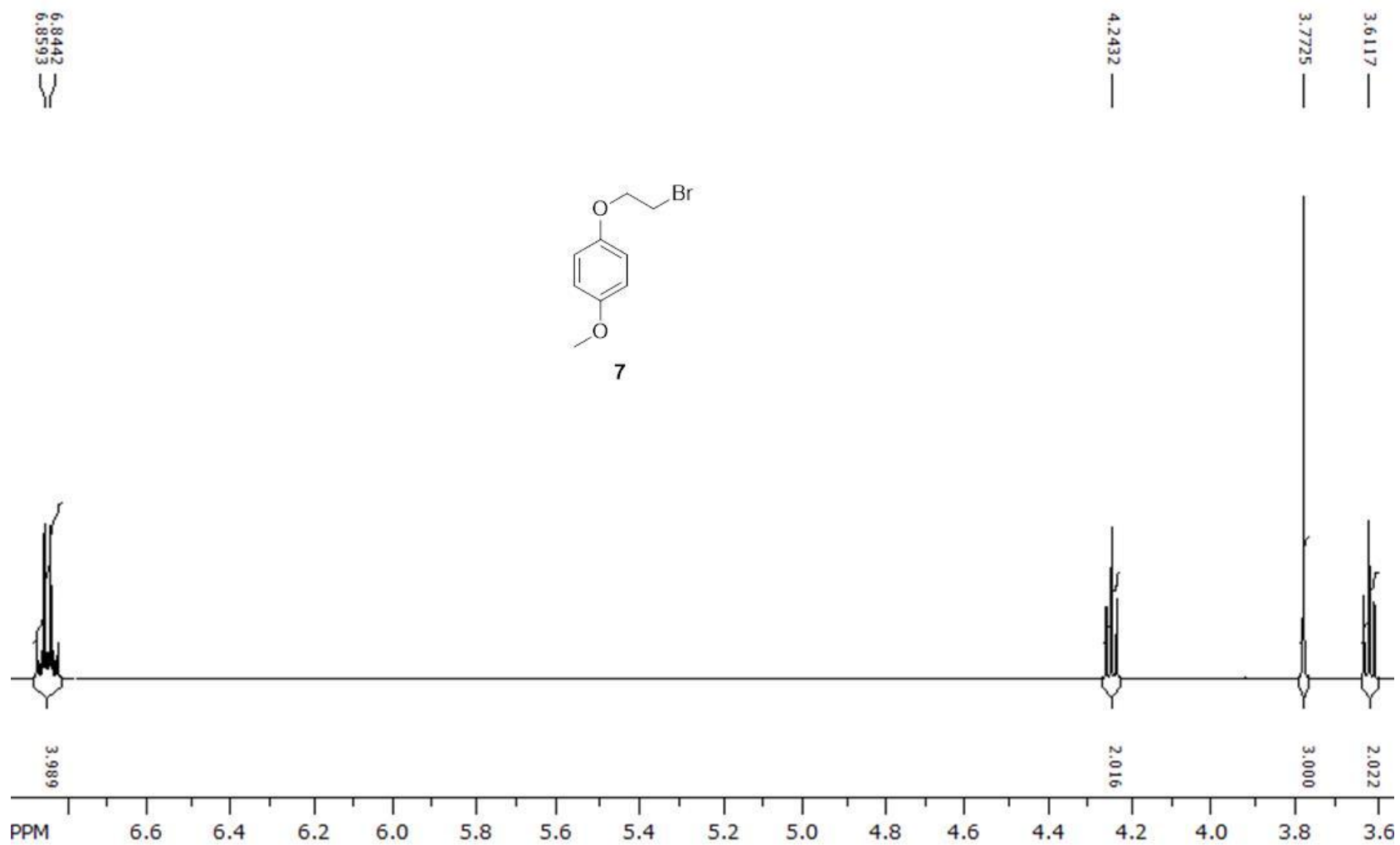
2-(4-methoxyphenoxy)ethanol **6**; 700 Hz, CDCl₃



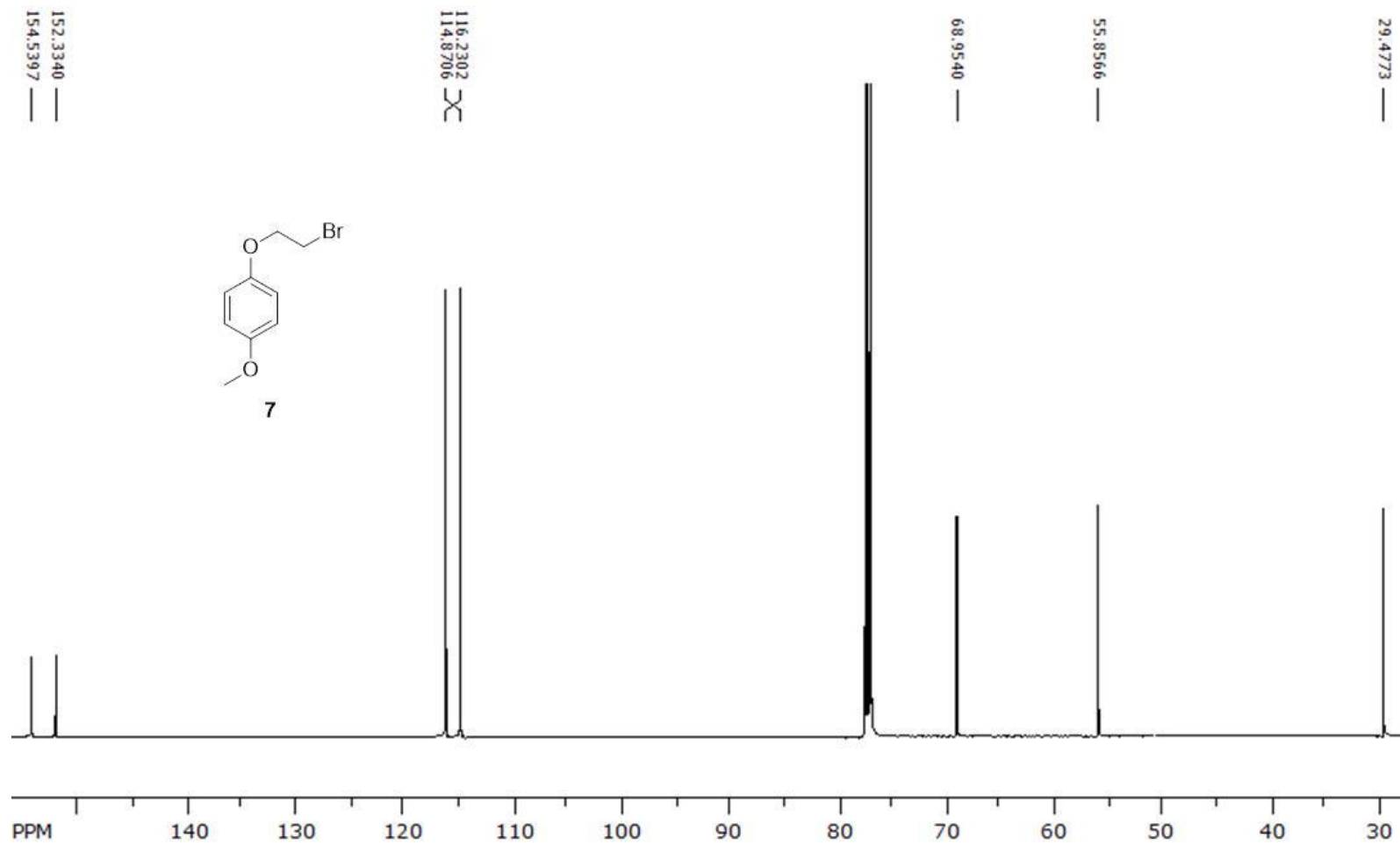
2-(4-methoxyphenoxy)ethanol **6**; 176.1 Hz, CDCl₃



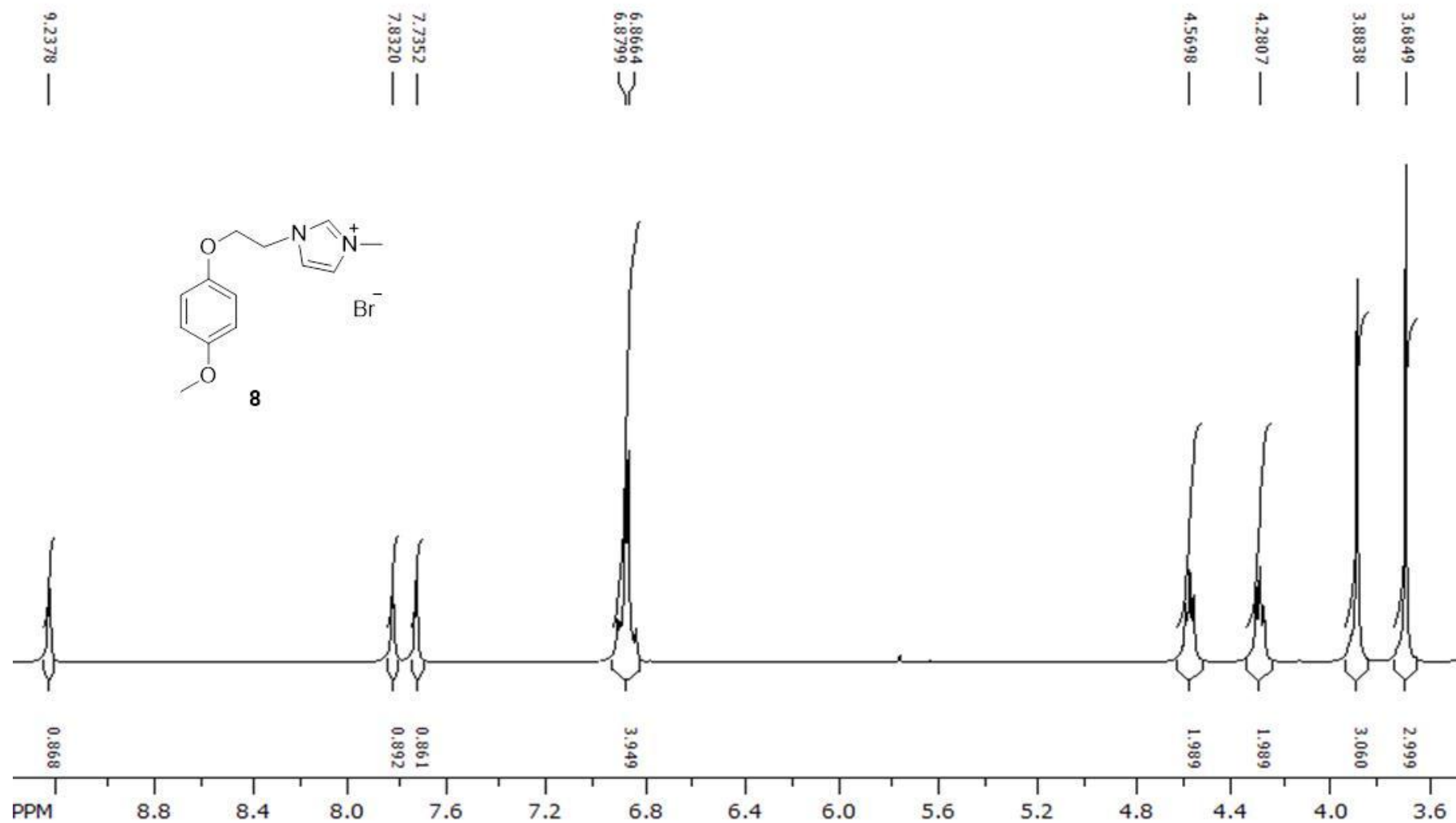
1-(2-bromoethoxy)-4-methoxybenzene **7**; 500 Hz, CDCl₃



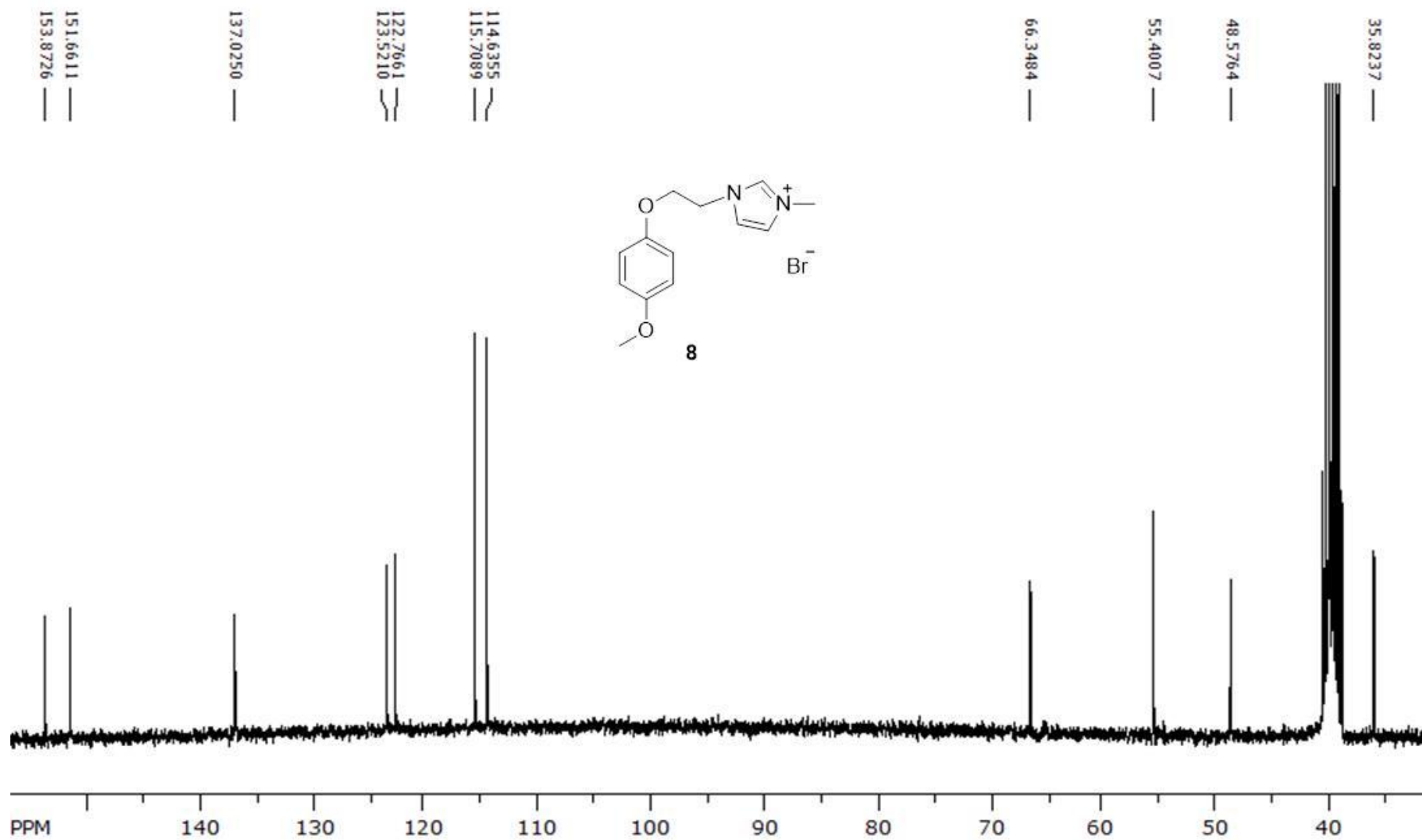
1-(2-bromoethoxy)-4-methoxybenzene **7**; 125.8 Hz, CDCl₃



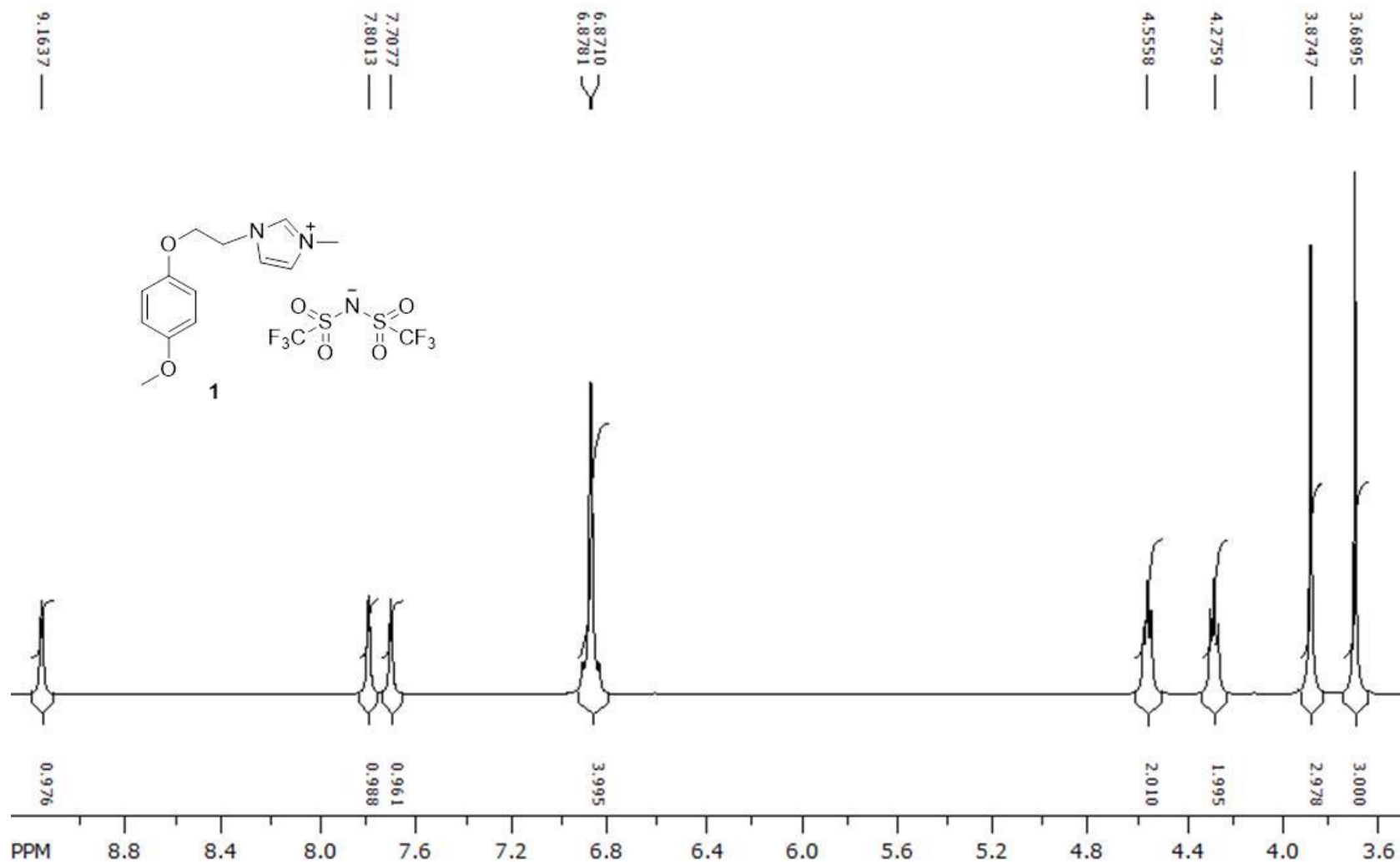
1-(2-(4-methoxyphenoxy)ethyl)-3-methyl-1*H*-imidazol-3-ium bromide **8**; 300 Hz DMSO



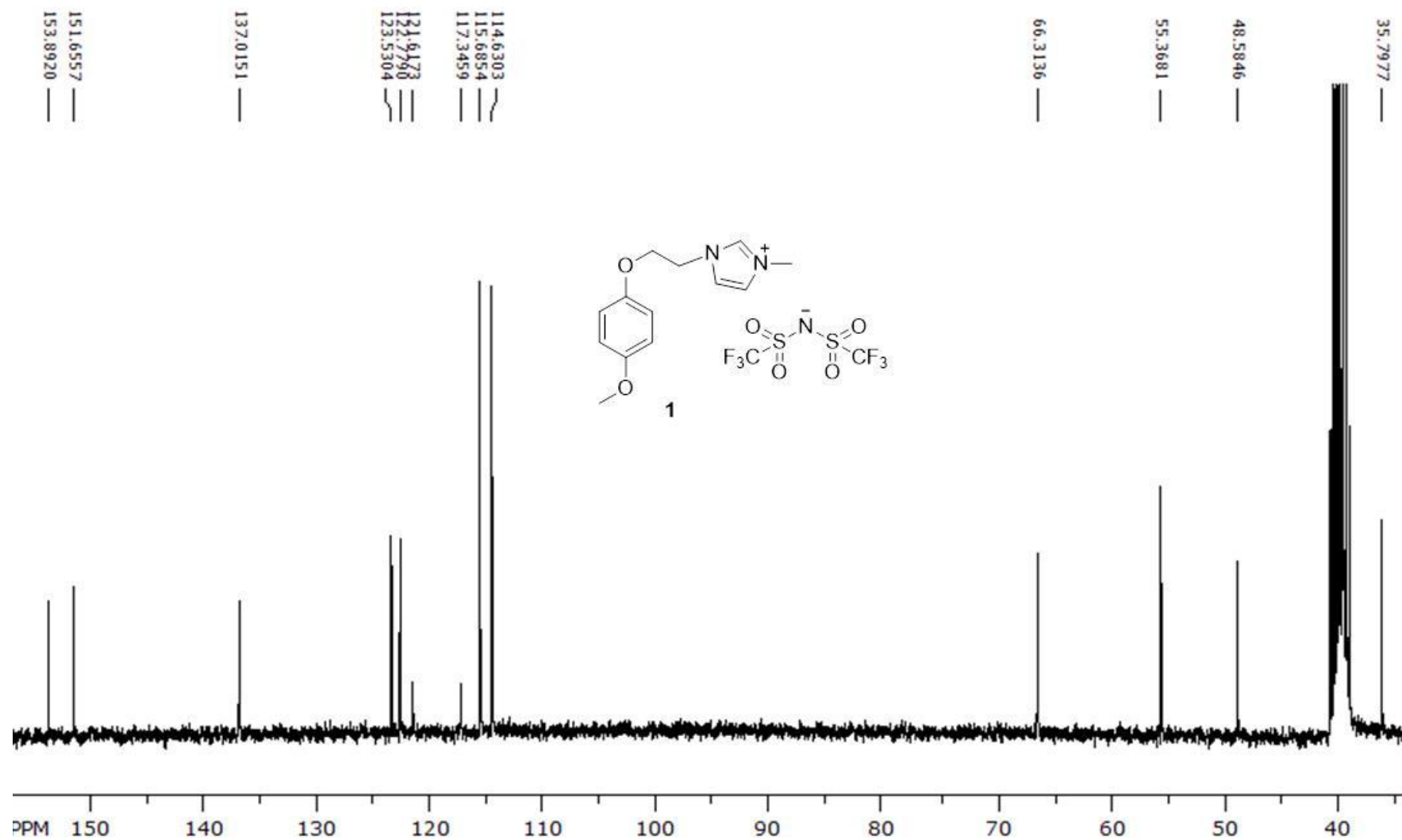
1-(2-(4-methoxyphenoxy)ethyl)-3-methyl-1*H*-imidazol-3-ium bromide **8**; 75.5 Hz DMSO



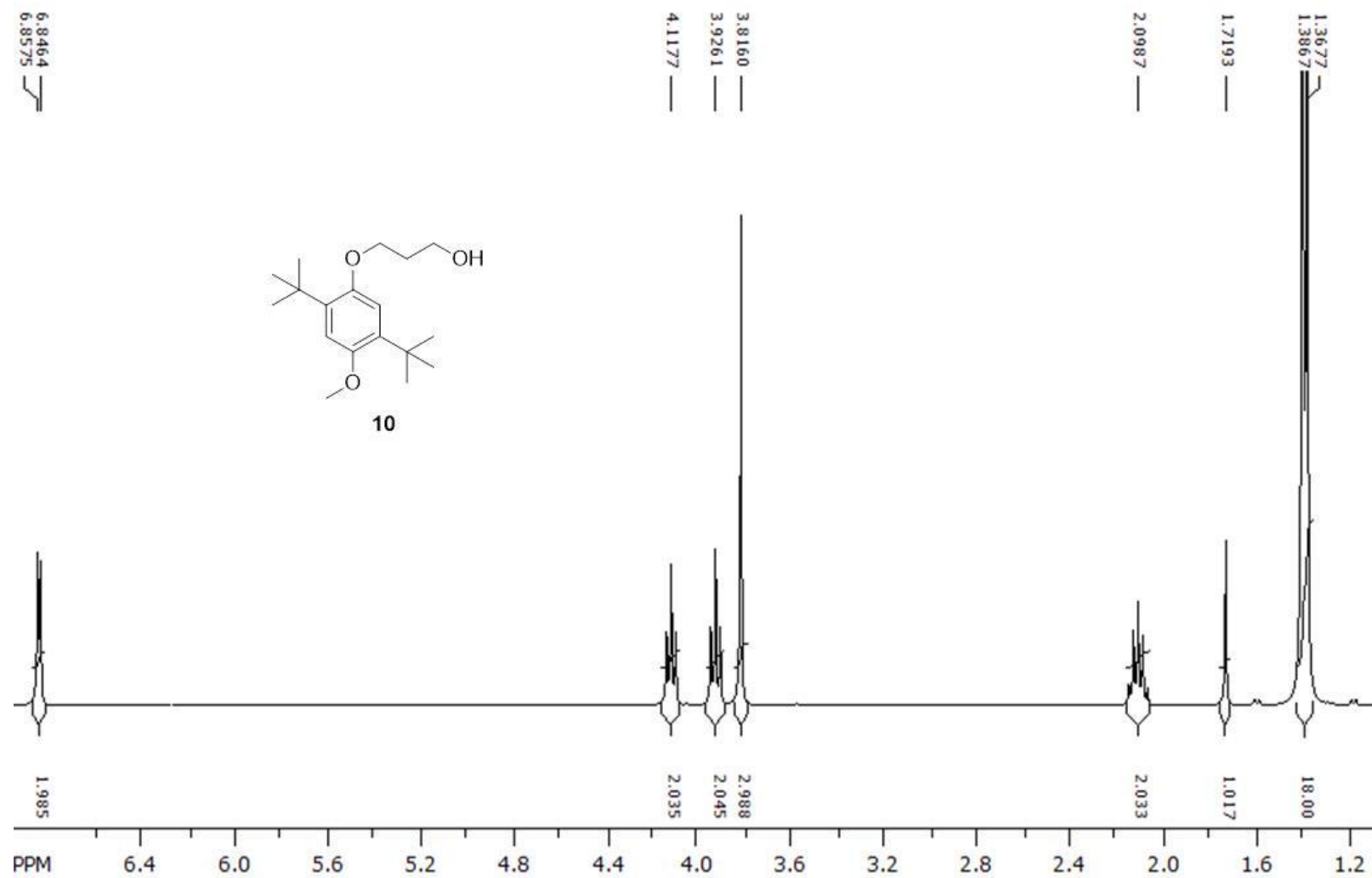
1-(2-(4-methoxyphenoxy)ethyl)-3-methyl-1*H*-imidazol-3-ium bis((trifluoromethyl)sulfonyl)amide **1**; 300 Hz, DMSO



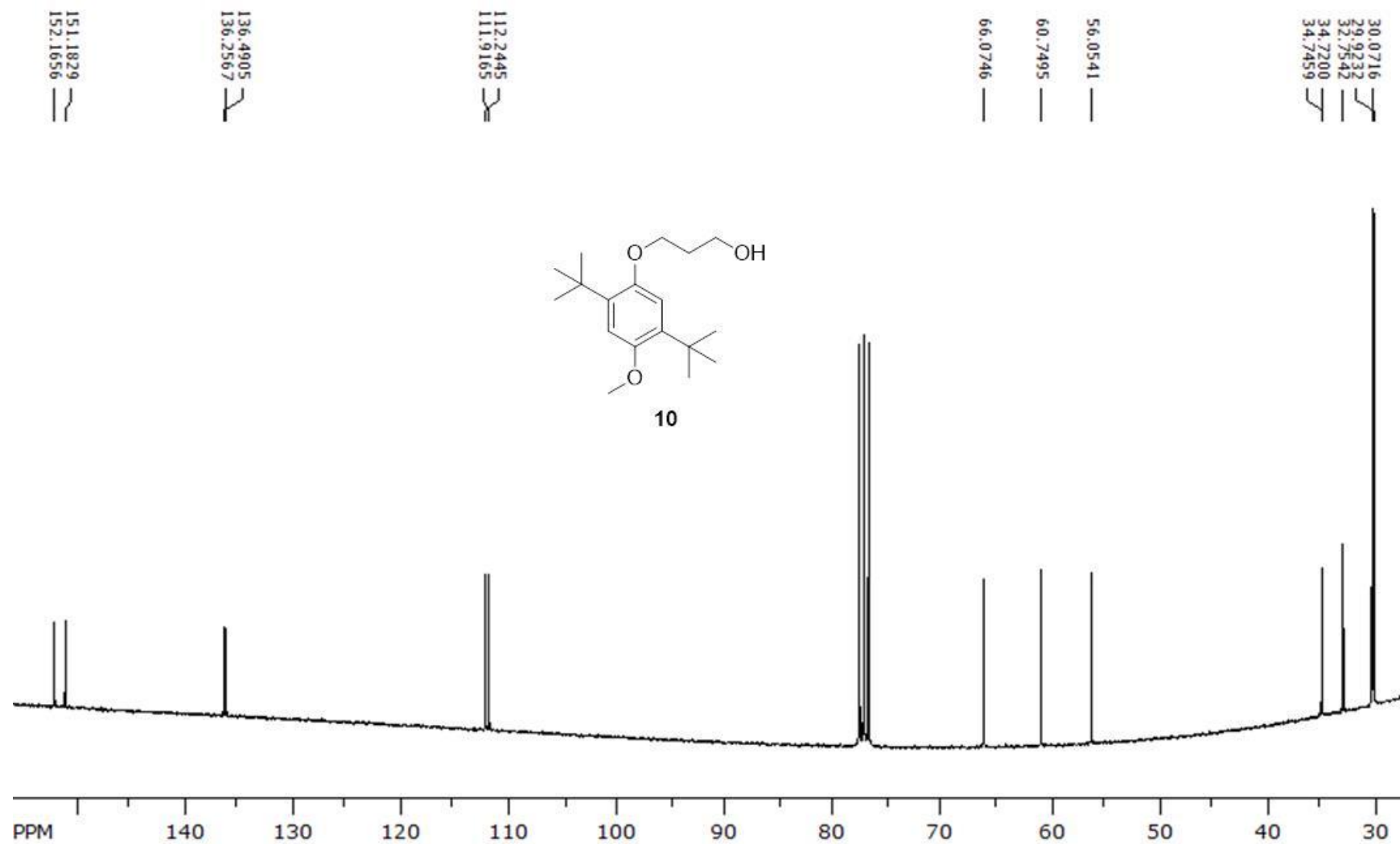
1-(2-(4-methoxyphenoxy)ethyl)-3-methyl-1*H*-imidazol-3-ium bis((trifluoromethyl)sulfonyl)amide **1**; 75.5 Hz, DMSO



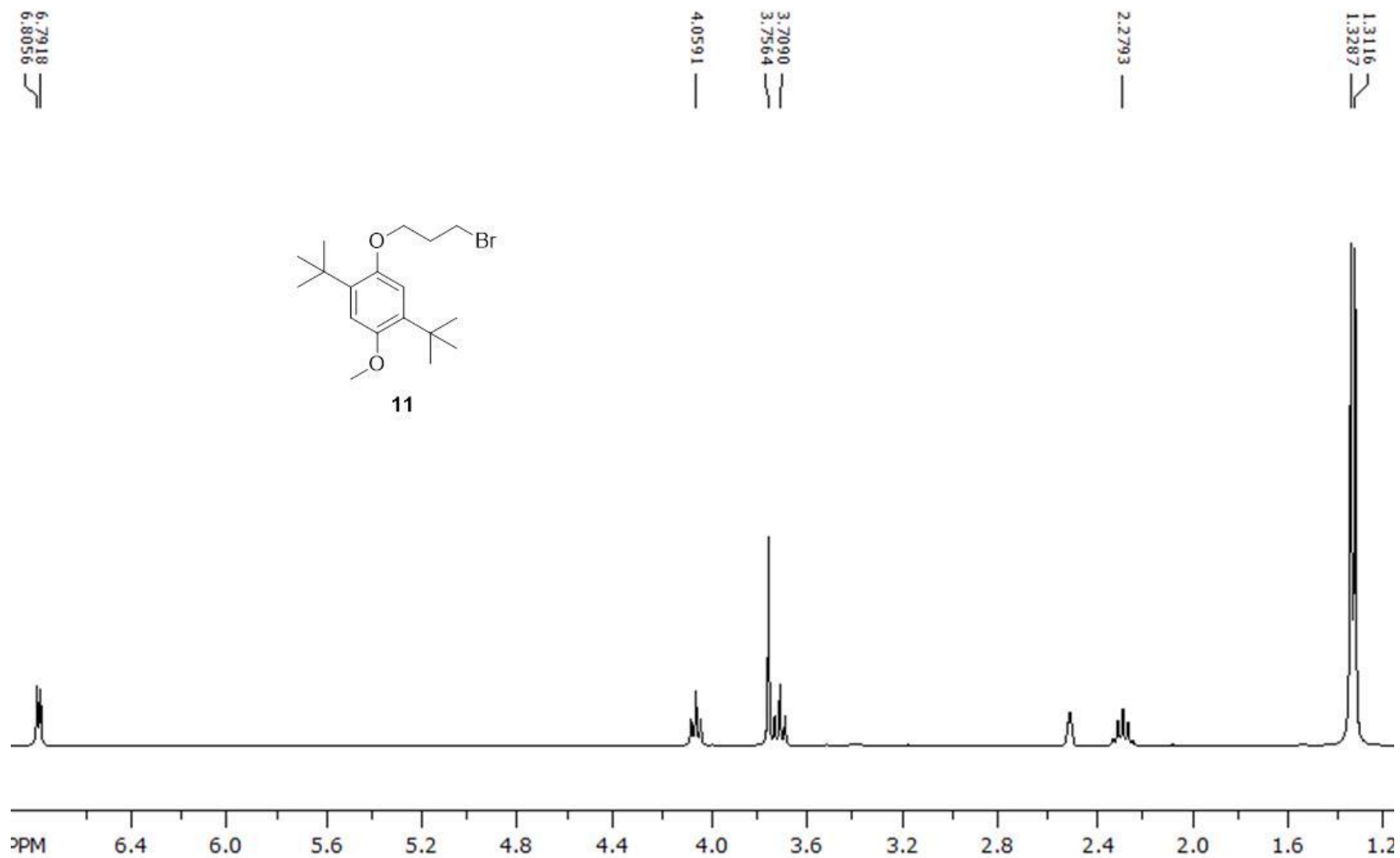
3-(2,5-Di-tert-butyl-4-methoxy-phenoxy)-propan-1-ol **10**; 300 Hz, CDCl₃



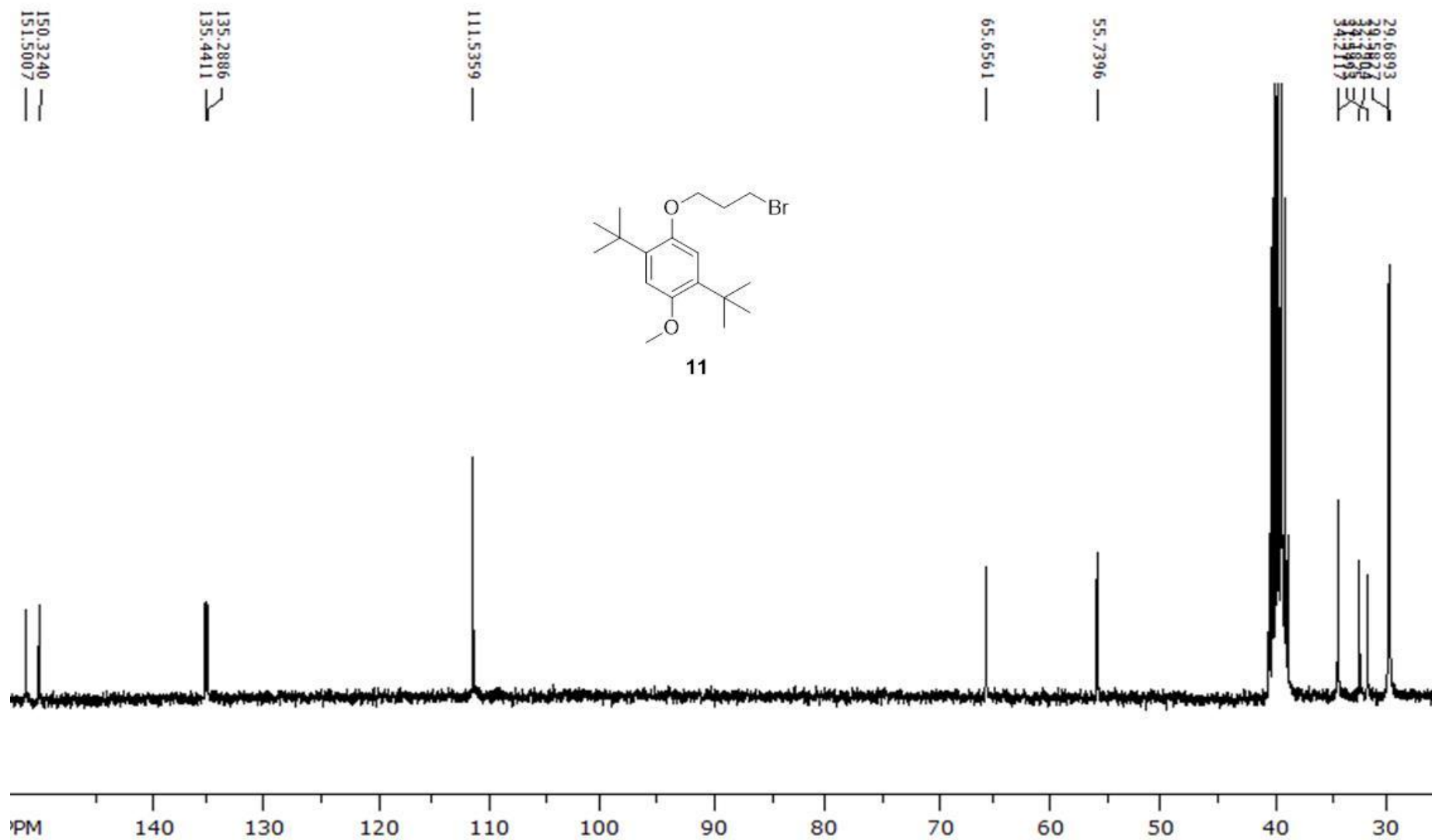
3-(2,5-Di-tert-butyl-4-methoxy-phenoxy)-propan-1-ol **10**; 75.5 Hz, CDCl₃



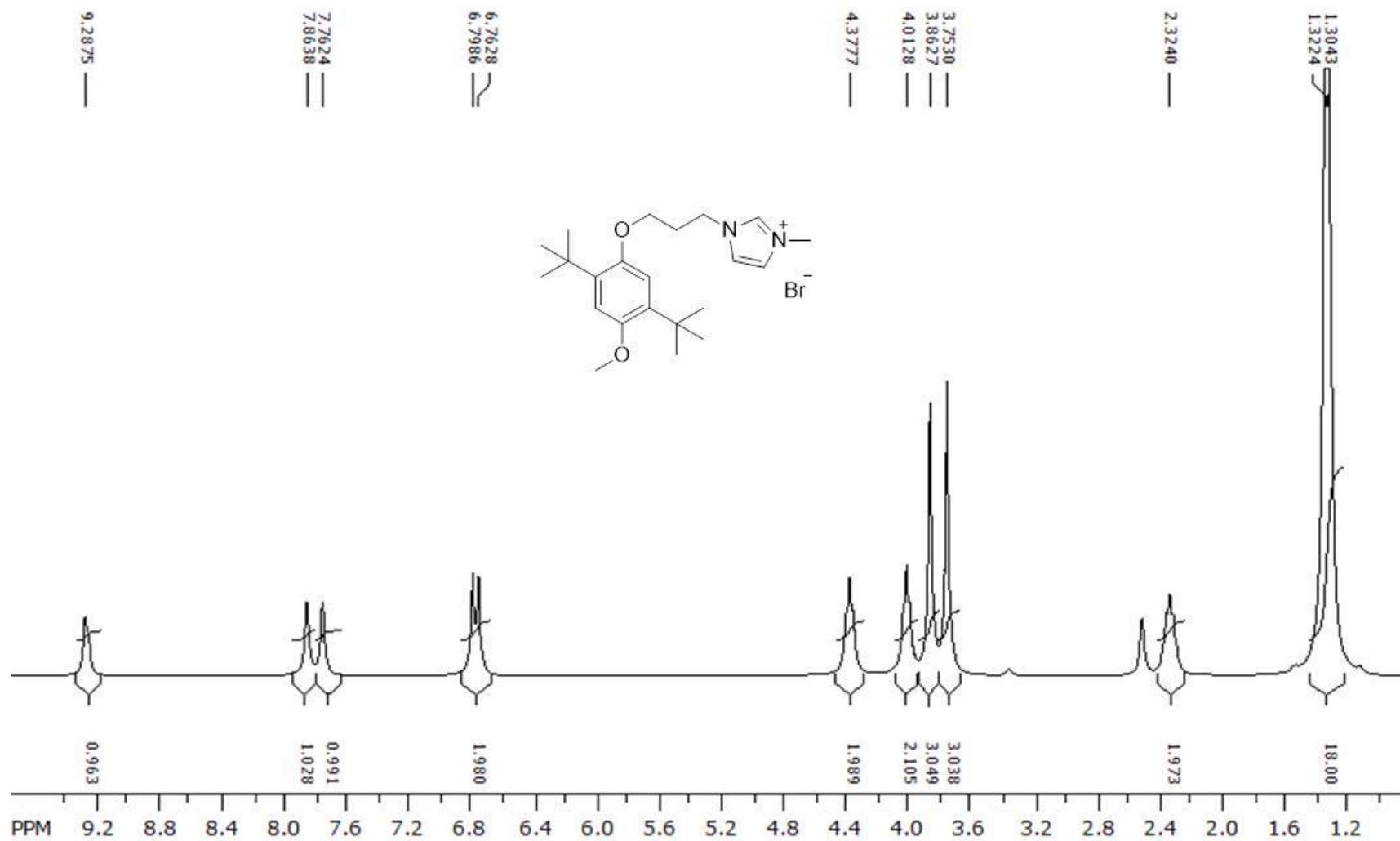
1-(3-bromopropoxy)-2,5-di-tert-butyl-4-methoxybenzene **11**; 300 Hz, DMSO



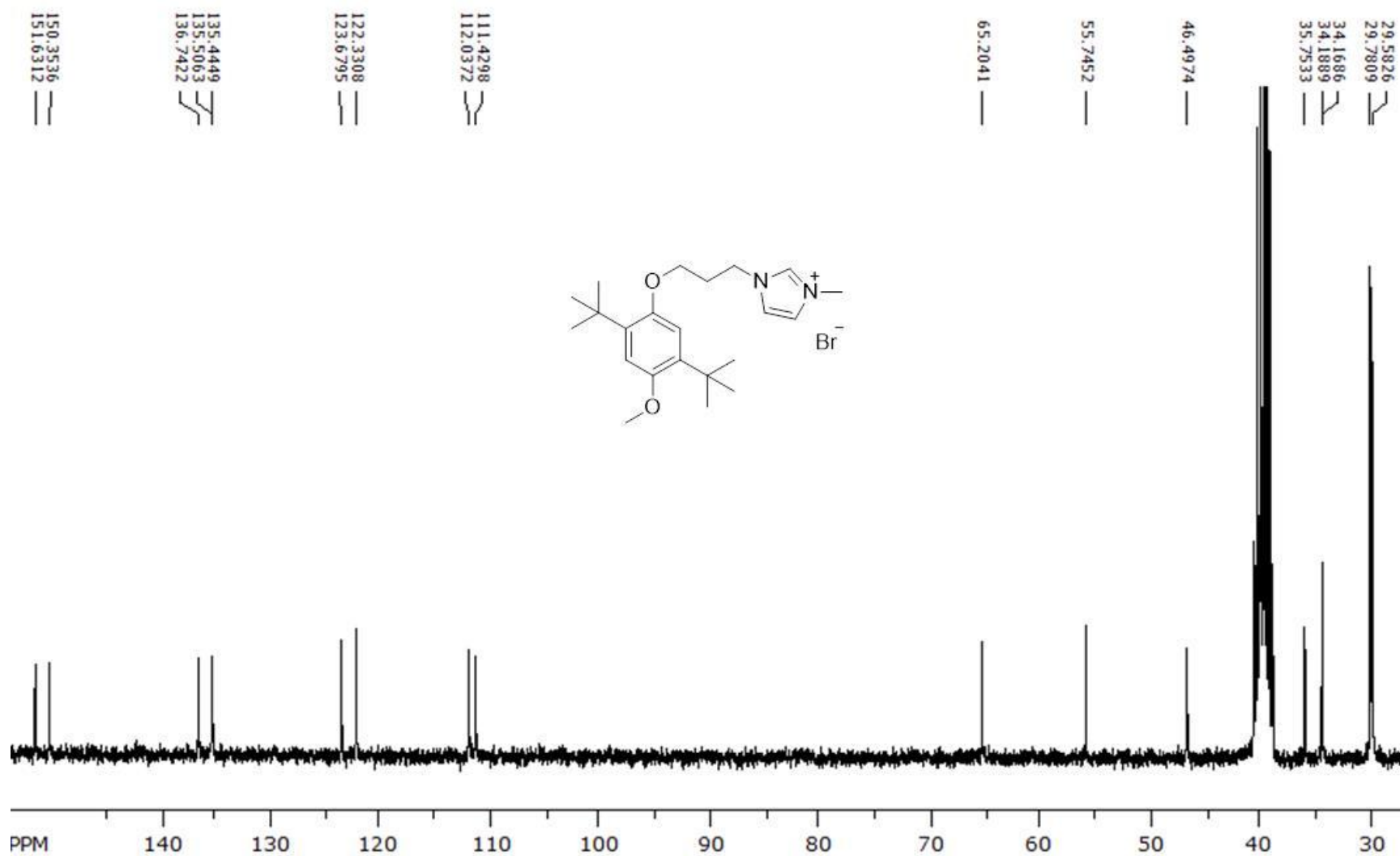
1-(3-bromopropoxy)-2,5-di-tert-butyl-4-methoxybenzene **11**; 75.5, DMSO



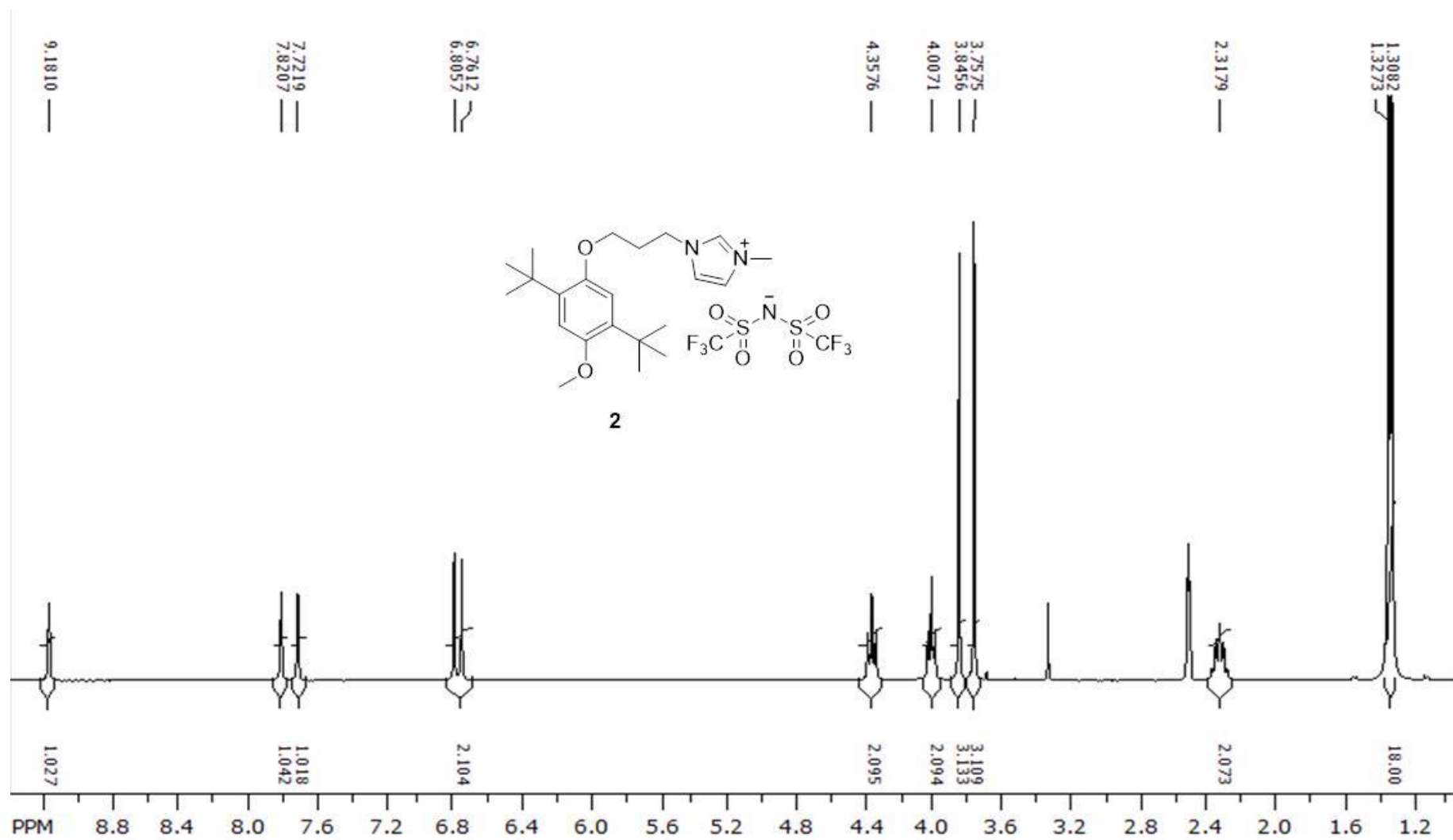
1-(3-(2,5-di-tert-butyl-4-methoxyphenoxy)propyl)-3-methyl-1*H*-imidazol-3-ium bromide **12**; 300 Hz, DMSO



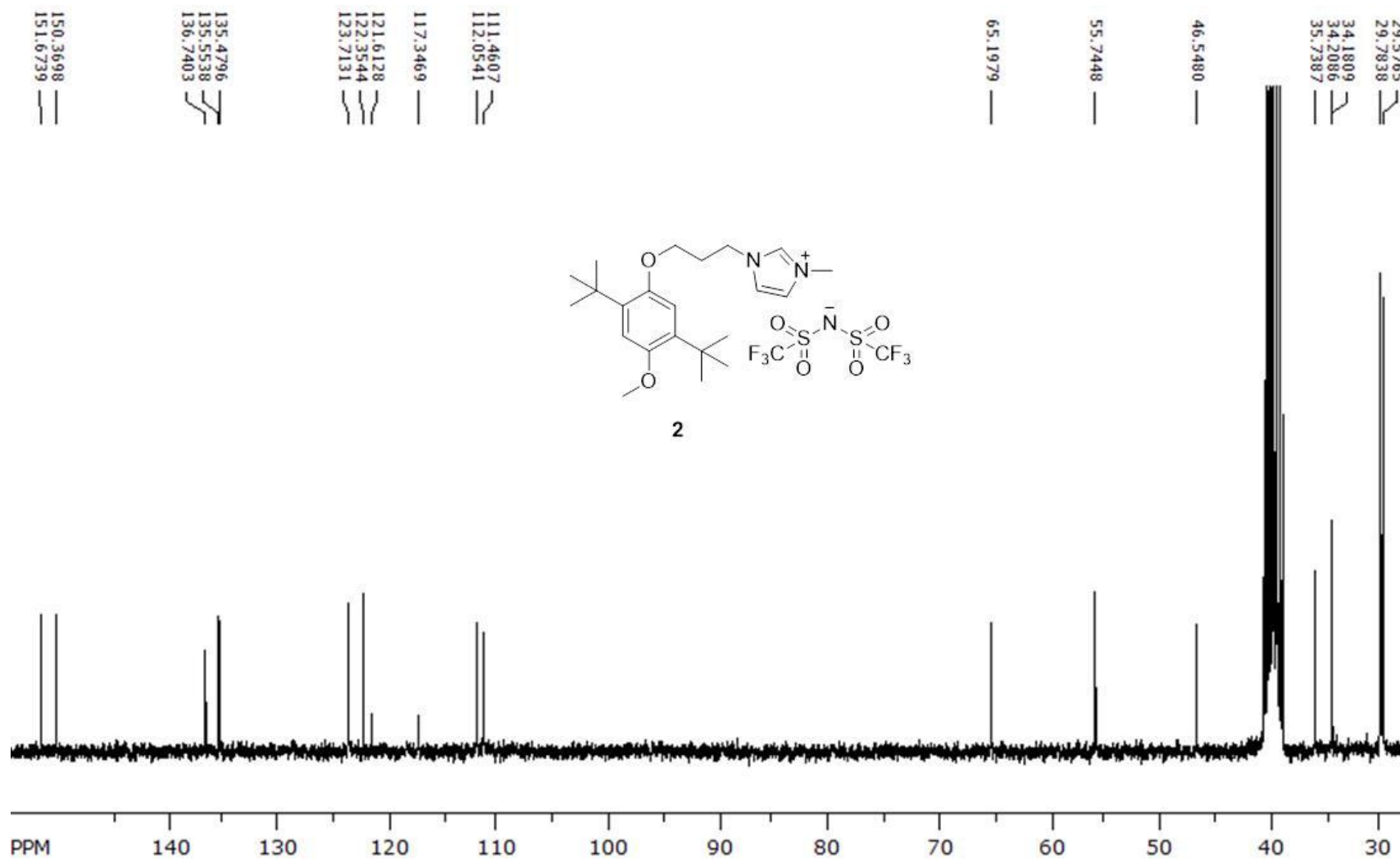
1-(3-(2,5-di-tert-butyl-4-methoxyphenoxy)propyl)-3-methyl-1*H*-imidazol-3-ium bromide **12**; 75.5 Hz, DMSO



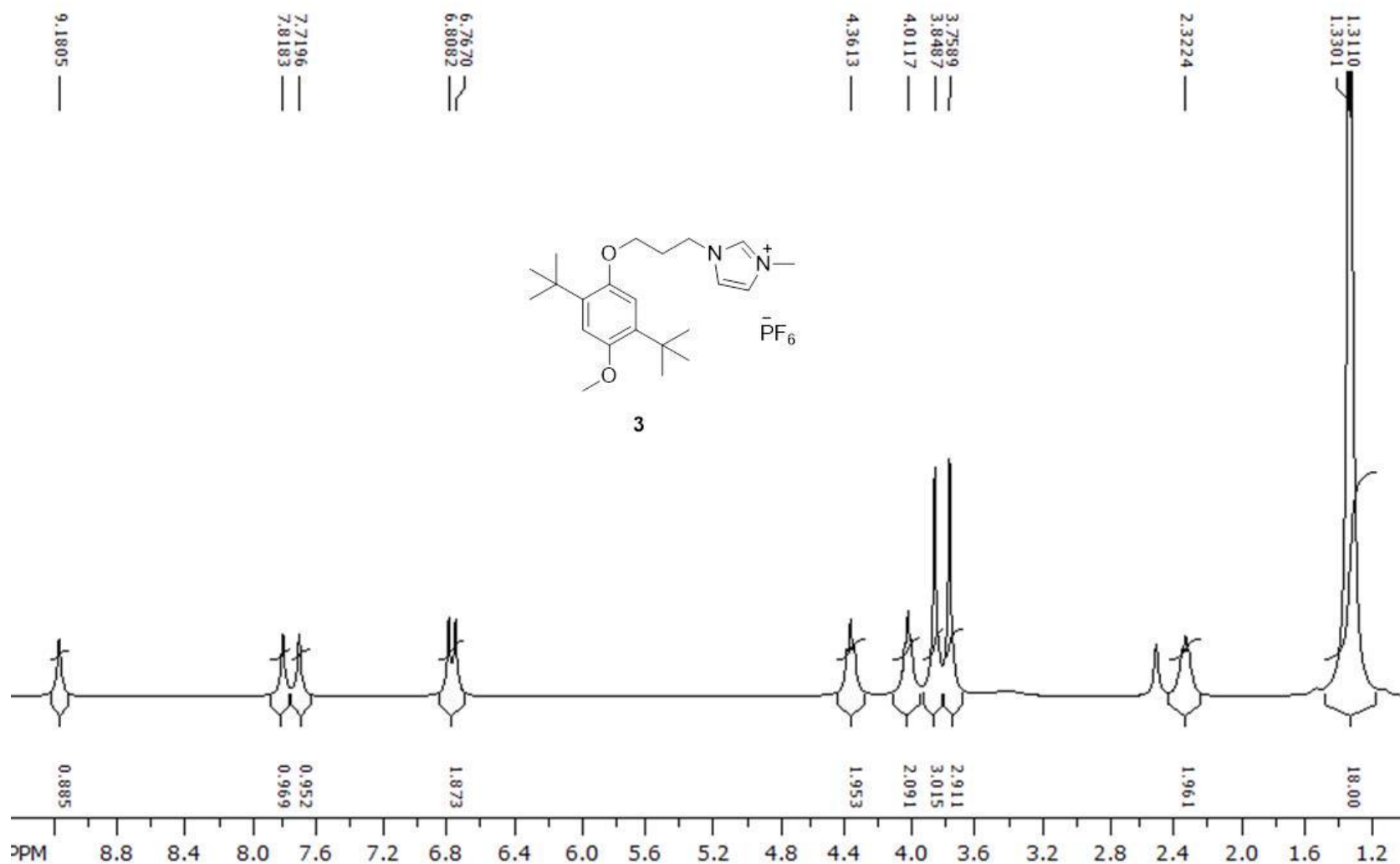
1-(3-(2,5-di-tert-butyl-4-methoxyphenoxy)propyl)-3-methyl-1*H*-imidazol-3-ium bis(trifluoromethanesulfonyl)amide **2**; 300 Hz, DMSO



1-(3-(2,5-di-tert-butyl-4-methoxyphenoxy)propyl)-3-methyl-1*H*-imidazol-3-ium bis(trifluoromethanesulfonyl)amide **2**; 75.5 Hz, DMSO



1-(3-(2,5-di-tert-butyl-4-methoxyphenoxy)propyl)-3-methyl-1*H*-imidazol-3-ium hexafluorophosphate **3**; 300 Hz, DMSO



1-(3-(2,5-di-tert-butyl-4-methoxyphenoxy)propyl)-3-methyl-1*H*-imidazol-3-ium hexafluorophosphate **3**; 75.5 Hz, DMSO

