Electronic Supplementary Material (ESI) for ChemComm.

Supporting Information for

Facile Reduction of Carboxylic Acids under Metal free and solvent free conditions

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FS63. ^{11}B NMR spectrum (128.4 MHz, 25°C, $CDCl_3$) of **1u.**

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FS65. ^{1}H NMR spectrum (400 MHz, 25°C, $CDCl_3$) of **1v.**

FS66. ^{11}B NMR spectrum (128.4 MHz, 25°C, $CDCl_3$) of **1v.**

FS67. ^{13}C NMR spectrum (100 MHz, 25°C, $CDCl_3$ of **1v.**

FS104. ^{13}C NMR spectrum (100 MHz, 25°C, $CDCl_3$ of **2l.**

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FS113. ^{1}H NMR spectrum (400 MHz, 25°C, $CDCl_3$) of **3c.**

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FS115. ^{13}C NMR spectrum (100 MHz, 25°C, $CDCl_3$) of **3c.**

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FS117. ^{11}B NMR spectrum (128.4 MHz, 25°C, $CDCl_3$) of **3d.**

FS118. ^{13}C NMR spectrum (100 MHz, 25°C, $CDCl_3$) of **3d.**

General Experimental Procedures

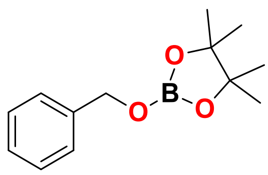
All manipulations involving air- and moisture-sensitive compounds were carried out under argon using the standard Schlenk technique or argon-filled glove box. $CDCl_3$ was distilled and stored in the glove box. ^{1}H NMR (400 MHz), ^{13}C{^{1}H} NMR (100 MHz), and ^{11}B{^{1}H} (128.3 MHz) spectra were measured on a BRUKER AVANCE III-400 spectrometer. Elemental analyses were performed on a BRUKER EURO EA at the Indian Institute of Technology Hyderabad. All the carboxylic acids were purchased from Sigma Aldrich, Alfa aser and Spectrochem. Pinacolborane (HBpin) was purchased from Sigma Aldrich and distilled under high vacuum prior to use.

General procedure for the synthesis of compounds (1a-1z and 3a-3d)

Carboxylic acids (0.5 mmol, 1.0 eq.) and pinacolborane (1.6 mmol, 3.2 eq.) were placed in a 25 ml Schlenk flask equipped with a magnetic stir bar inside the glove box. Then the reaction mixture was stirred at 30°C for 5 to 8 hours depends on the nature of the starting materials. The progress of the reaction was monitored by ^{1}H NMR spectroscopy using hexamethylbenzene (10 mol%) as an internal standard.

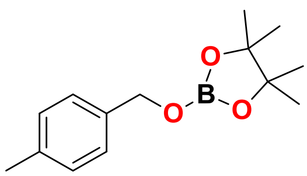
Characterization Data

2-(benzyloxy)-4,4,5,5-tetramethyl-1,3,2-dioxaborolane (1a).[1]



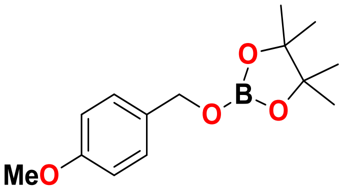
^{1}H NMR (400 MHz, $CDCl_3$): δ_H 7.36 - 7.30 (m, 4H, ArH), 7.27 - 7.23 (m, 1H, ArH), 4.92 (s, 2H, CH_2), 1.26 (s, 36H, CH_3, OBpin & pinBOBPin) ppm. ^{13}C-{^{1}H} NMR (100 MHz, $CDCl_3$): δ_C 139.2, 128.2, 127.3, 126.7, 83.0, 82.9, 66.6, 24.6, 24.5 ppm. ^{11}B{^{1}H} NMR (128.3 MHz, $CDCl_3$): δ_B 22.3 (OBpin), 21.13 (pinBOBpin) ppm. Elemental analysis: calcd. (found) for $C_{13}H_{19}BO_3$: C 66.70 (66.42); H 8.18 (8.02).

4,4,5,5-tetramethyl-2-((4-methylbenzyl)oxy)-1,3,2-dioxaborolane (1b).[2]



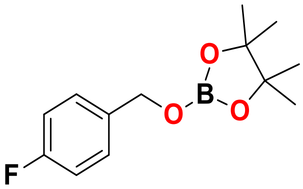
^{1}H NMR (400 MHz, $CDCl_3$): δ_H 7.22 (d, 2H, J = 8.0 MHz ArH), 7.12 (d, 2H, J = 7.9 Hz, ArH), 4.87 (s, 2H, CH_2), 2.32 (s, 3H, CH_3), 1.25 (s, 36H, CH_3, OBpin & pinBOBPin) ppm. ^{13}C-{^{1}H} NMR (100 MHz, $CDCl_3$): δ_C 136.9, 136.2, 128.9, 126.8, 83.0, 82.8, 66.5, 24.6, 24.5, 21.1 ppm. ^{11}B{^{1}H} NMR (128.3 MHz, $CDCl_3$): δ_B 22.3(OBpin), 21.1 (pinBOBpin) ppm. Elemental analysis: calcd. (found) for $C_{14}H_{21}BO_3$: C 67.77 (67.49); H 8.39 (8.65).

4,4,5,5-tetramethyl-2-((4-methoxylbenzyl)oxy)-1,3,2-dioxaborolane (1c). [3]



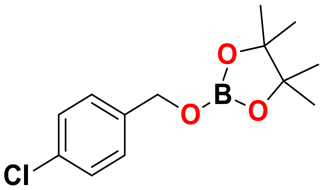
^{1}H NMR (400 MHz, $CDCl_3$): δ_H 7.27 (d, 2H, J = 8.3 Hz ArH), 6.85 (d, 2H, J = 8.4 Hz, ArH), 4.84 (s, 2H, CH_2), 3.78 (s, 3H, OCH_3), 1.25 (s, 36H, CH_3, OBpin & pinBOBPin) ppm. ^{13}C-{^{1}H} NMR (100 MHz, $CDCl_3$): δ_C 159.0, 131.4, 128.5, 113.6, 83.0, 82.8, 66.4, 55.2, 24.6, 24.5 ppm. ^{11}B{^{1}H} NMR (128.3 MHz, $CDCl_3$): δ_B 22.3(OBpin), 21.1 (pinBOBpin) ppm. Elemental analysis: calcd. (found) for $C_{14}H_{21}BO_4$: C 63.66 (63.36); H 8.01 (7.81).

4,4,5,5-tetramethyl-2-((4-flurobenzyl)oxy)-1,3,2-dioxaborolane (1d). [3]



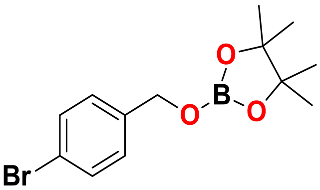
^{1}H NMR (400 MHz, $CDCl_3$): δ_H 7.33 - 7.27 (m, 2H, ArH), 7.03 - 6.98 (m, 2H, ArH), 4.87 (s, 2H, CH_2), 1.25 (s, 36H, CH_3, OBpin & pinBOBpin) ppm. ^{13}C-{^{1}H} NMR (100 MHz, $CDCl_3$): δ_C 163.4, 134.9, 128.6, 128.5, 115.1, 114.9, 83.0, 66.0, 24.5, 21.1 ppm. ^{11}B{^{1}H} NMR (128.3 MHz, $CDCl_3$): δ_B 22.3 (OBpin), 21.1 (pinBOBpin) ppm. ^{19}F{^{1}H} NMR (376.5 MHz, $CDCl_3$): δ_F -115.3. Elemental analysis: calcd. (found) for $C_{13}H_{18}BFO_3$: C 61.94 (61.72); H 7.20 (7.07).

4,4,5,5-tetramethyl-2-((4-chlorobenzyl)oxy)-1,3,2-dioxaborolane (1e).



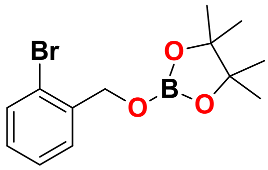
^{1}H NMR (400 MHz, $CDCl_3$): δ_H 7.28-7.27 (m, 4H, ArH), 4.87 (s, 2H, CH_2), 1.25 (s, 36H, CH_3, OBpin & pinBOBpin) ppm. ^{13}C-{^{1}H} NMR (100 MHz, $CDCl_3$): δ_C 137.7, 133.0, 128.3, 128.0, 83.0, 65.9, 24.5, 21.1 ppm. ^{11}B{^{1}H} NMR (128.3 MHz, $CDCl_3$): δ_B 22.3(OBpin), 21.1 (pinBOBpin) ppm. Elemental analysis: calcd. (found) for $C_{13}H_{18}BClO_3$: C 58.14 (57.82); H 6.76 (6.51).

4,4,5,5-tetramethyl-2-((4-Bromobenzyl)oxy)-1,3,2-dioxaborolane (1f).[3]



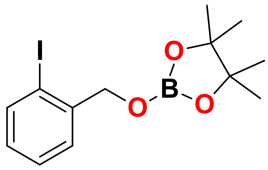
^{1}H NMR (400 MHz, $CDCl_3$): δ_H 7.46 -7.43 (m, 2H, ArH), 7.21 (d, 2H, J = 8.3 Hz, ArH), 4.86 (s, 2H, CH_2), 1.25 (s, 36H, CH_3, OBpin & pinBOBpin) ppm. ^{13}C-{^{1}H} NMR (100 MHz, $CDCl_3$): δ_C 138.2, 131.3, 128.4, 121.1, 83.0, 65.9, 24.6 ppm. ^{11}B{^{1}H} NMR (128.3 MHz, $CDCl_3$): δ_B 22.3(OBpin), 21.1 (pinBOBpin) ppm. Elemental analysis: calcd. (found) for $C_{13}H_{18}BBrO_3$: C 49.89 (49.65); H 5.80 (5.57).

4,4,5,5-tetramethyl-2-((2-Bromobenzyl)oxy)-1,3,2-dioxaborolane (1g). [1]



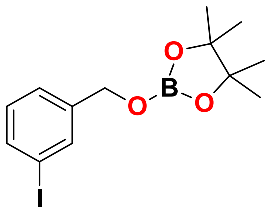
^1H NMR (400 MHz, $CDCl_3$): δ_H 7.51 (dd, 2H, J = 8.0 Hz, ArH), 7.32 - 7.28 (m, 1H, ArH), 7.14 - 7.09 (m, 1H, ArH), 4.96 (s, 2H, CH_2), 1.26 (s, 36H, CH_3, OBpin & pinBOBpin) ppm. ^{13}C-{^1H} NMR (100 MHz, $CDCl_3$): δ_C 138.3, 128.6, 127.8, 127.3, 83.1, 83.0, 66.2, 24.6 ppm. ^{11}B{^1H} NMR (128.3 MHz, $CDCl_3$): δ_B 22.3 (OBpin), 21.1 (pinBOBpin) ppm. Elemental analysis: calcd. (found) for $C_{13}H_{18}BBrO_3$: C 49.89 (49.66); H 5.80 (5.60).

4,4,5,5-tetramethyl-2-((2-iodobenzyl)oxy)-1,3,2-dioxaborolane (1h).



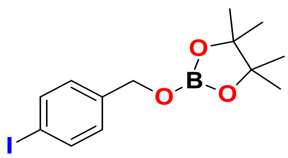
^1H NMR (400 MHz, $CDCl_3$): δ_H 7.79 (dd, 1H, J = 8.0 Hz, ArH), 7.44 (dd, 1H, J = 8.0 Hz, ArH), 7.36 -7.32 (m, 1H, ArH), 6.98 - 6.94 (m, 1H, ArH), 4.87 (s, 2H, CH_2), 1.26 (s, 36H, CH_3, OBpin & pinBOBpin) ppm. ^{13}C-{^1H} NMR (100 MHz, $CDCl_3$): δ_C 141.0, 138.8, 128.9, 128.1, 127.5, 96.2, 83.1, 83.0, 70.7, 24.6 ppm. ^{11}B{^1H} NMR (128.3 MHz, $CDCl_3$): δ_B 22.3 (OBpin), 21.1 (pinBOBpin) ppm. Elemental analysis: calcd. (found) for $C_{13}H_{18}BIO_3$: C 43.37 (43.19); H 5.04 (4.88).

4,4,5,5-tetramethyl-2-((3-iodobenzyl)oxy)-1,3,2-dioxaborolane (1i).



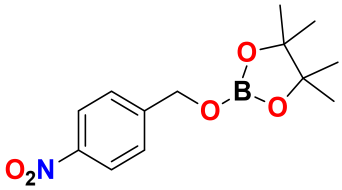
^1H NMR (400 MHz, $CDCl_3$): δ_H 7.72 (s, 1H, ArH), 7.59 (d, 1H, J = 8.0 Hz, ArH), 7.28 (d, J = 8.0 Hz, 1H, ArH), 7.05 (t, J = 8.0 Hz, ArH), 4.86 (s, 2H, CH_2), 1.26 (s, 36H, CH_3, OBpin & pinBOBpin) ppm. ^{13}C-{^1H} NMR (100 MHz, $CDCl_3$): δ_C 141.5, 136.3, 130.0, 125.8, 94.2, 83.1, 83.0, 65.6, 24.6 ppm. ^{11}B{^1H} NMR (128.3 MHz, $CDCl_3$): δ_B 22.3 (OBpin), 21.1 (pinBOBpin) ppm. Elemental analysis: calcd. (found) for $C_{13}H_{18}BIO_3$: C 43.37 (43.23); H 5.04 (4.85).).

4,4,5,5-tetramethyl-2-((4-iodobenzyl)oxy)-1,3,2-dioxaborolane (1j). [1]



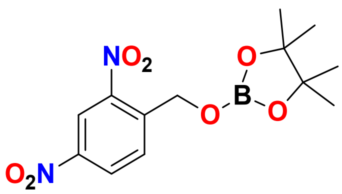
^1H NMR (400 MHz, $CDCl_3$): δ_H 7.64 (d, 2H, J = 8.0 Hz, ArH), 7.09 (d, 2H, J = 8.0 Hz ArH), 4.85 (s, 2H, CH_2), 1.26 (s, 36H, CH_3, OBpin & pinBOBpin) ppm. ^{13}C-{^1H} NMR (100 MHz, $CDCl_3$): δ_C 138.9, 137.2, 128.5, 92.6, 83.1, 83.0, 65.9, 24.5 ppm. ^{11}B{^1H} NMR (128.3 MHz, $CDCl_3$): δ_B 22.3 (OBpin), 21.1 (pinBOBpin) ppm. Elemental analysis: calcd. (found) for $C_{13}H_{18}BIO_3$: C 43.37 (43.20); H 5.04 (4.92).

4,4,5,5-tetramethyl-2-((4-Nitrobenzyl)oxy)-1,3,2-dioxaborolane (1k). [3]



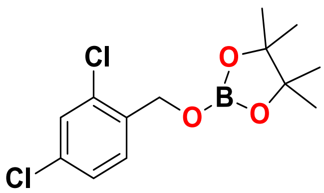
^{1}H NMR (400 MHz, $CDCl_3$): δ_H 8.19 (d, 2H, J = 8.0 Hz, ArH), 7.50 (d, 2H, J = 8.0 Hz ArH), 4.86 (s, 2H, CH_2), 1.25 (s, 36H, CH_3, OBpin & pinBOBpin) ppm. ^{13}C-{^{1}H} NMR (100 MHz, $CDCl_3$): δ_C 147.2, 146.6, 126.8, 123.5, 83.3, 83.1, 65.5, 24.6 ppm. ^{11}B{^{1}H} NMR (128.3 MHz, $CDCl_3$): δ_B 22.3 (OBpin), 21.1 (pinBOBpin) ppm. Elemental analysis: calcd. (found) for $C_{13}H_{18}BNO_5$: C 55.94 (55.79); H 6.50 (6.37); N 5.02 (4.88).

2-((2,4-dinitrobenzyl)oxy)-4,4,5,5-tetramethyl-1,3,2-dioxaborolane (1l).



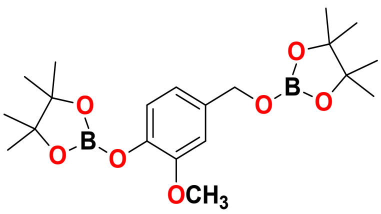
^{1}H NMR (400 MHz, $CDCl_3$): δ_H 8.96 - 8.95 (m, 1H, ArH), 8.52 (d, 2H, J = 1.8 Hz, ArH), 5.14 (s, 2H, CH_2), 1.32 (s, 12H, OBpin), 1.28 (s, 26H, CH_3, pinBOBpin) ppm. ^{13}C-{^{1}H} NMR (100 MHz, $CDCl_3$): δ_C 135.4, 133.4, 132.4, 128.8, 128.6, 127.0, 83.2, 83.1, 63.6, 24.5 ppm. ^{11}B{^{1}H} NMR (128.3 MHz, $CDCl_3$): δ_B 22.3 (OBpin), 21.1 (pinBOBpin) ppm. Elemental analysis: calcd. (found) $C_{13}H_{17}BN_2O_7$: C 48.18 (47.83); H 5.29 (5.08); N 8.64 (8.49).

2-((2,4-dichlorobenzyl)oxy)-4,4,5,5-tetramethyl-1,3,2-dioxaborolane (1m).



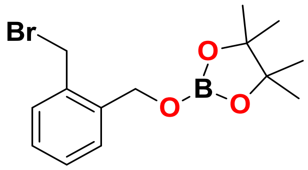
^{1}H NMR (400 MHz, $CDCl_3$): δ_H 7.45 (d, J = 8.0 Hz, 1H, ArH), 7.34 (d, 2H, J = 1.4 Hz, ArH), 7.24 (dd, J = 8.0 Hz, ArH), 4.96 (s, 2H, CH_2), 1.26 (s, 36H, CH_3, OBpin & pinBOBpin) ppm. ^{13}C-{^{1}H} NMR (100 MHz, $CDCl_3$): δ_C 135.4, 133.4, 131.9, 128.8, 128.6, 127.0, 83.2, 83.0, 63.5, 24.5 ppm. ^{11}B{^{1}H} NMR (128.3 MHz, $CDCl_3$): δ_B 22.3 (OBpin), 21.1 (pinBOBpin) ppm. Elemental analysis: calcd. (found) for $C_{13}H_{17}BCl_2O_3$: C 51.53 (51.32); H 5.66 (5.42).

2-((3-methoxy-4-((4,4,5,5-tetramethyl-1,3-dioxolan-2-yl)oxy)benzyl)oxy)-4,4,5,5-tetramethyl-1,3,2-dioxaborolane (1n).



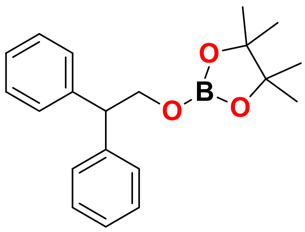
^{1}H NMR (400 MHz, $CDCl_3$): δ_H 6.99 (d, J = 8.0 Hz, 1H, ArH), 6.93 (d, 2H, J = 1.8 Hz, ArH), 6.80 (dd, J = 8.0 Hz, ArH), 4.84 (s, 2H, CH_2), 3.82 (s, 3H, OCH_3) 1.26 (s, 48H, CH_3, OBpin & pinBOBpin) ppm. ^{13}C-{^{1}H} NMR (100 MHz, $CDCl_3$): δ_C 149.9, 142.2, 134.8, 120.7, 119.1, 110.8, 83.4, 82.9, 66.5, 55.5, 24.5 ppm. ^{11}B{^{1}H} NMR (128.3 MHz, $CDCl_3$): δ_B 22.4(OBpin), 21.3 (pinBOBpin) ppm. Elemental analysis: calcd. (found) for $C_{20}H_{32}B_2O_7$: C 59.15 (58.89); H 7.94 (7.71).

2-((2-(bromomethyl)benzyl)oxy)-4,4,5,5-tetramethyl-1,3,2-dioxaborolane (1o).



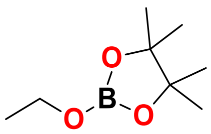
^{1}H NMR (400 MHz, $CDCl_3$): δ_H 7.36 - 7.30 (m, 4H, ArH), 4.91 (s, 2H, OCH_2), 4.48 (s, 2H, $BrCH_2$), 4.96 (s, 2H, CH_2), 1.26 (s, 36H, CH_3, OBpin & pinBOBpin) ppm. ^{13}C-{^{1}H} NMR (100 MHz, $CDCl_3$): δ_C 139.6, 136.8, 129.0, 127.0, 83.0, 66.2, 33.3, 24.5 ppm. ^{11}B{^{1}H} NMR (128.3 MHz, $CDCl_3$): δ_B 22.3 (OBpin), 21.1 (pinBOBpin) ppm. Elemental analysis: calcd. (found) for $C_{14}H_{20}BBrO_3$: C 51.42 (51.12); H 8.53 (8.65).

2-(2,2-diphenylethoxy)-4,4,5,5-tetramethyl-1,3,2-dioxaborolane (1p). [1]



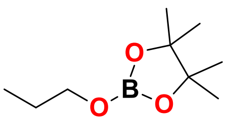
^{1}H NMR (400 MHz, $CDCl_3$): δ_H 7.28 - 7.23 (m, 8H, ArH), 7.19 - 7.14 (m, 2H, ArH), 4.40 (d, 2H, J = 8.0 Hz, CH_2), 4.22 (t, J = 8.0 Hz, 1H, CH), 1.26 (s, 24H, CH_3, pinBOBpin), 1.25 (s, 12H, CH_3, OBpin) ppm. ^{13}C-{^{1}H} NMR (100 MHz, $CDCl_3$): δ_C 141.7, 128.4, 128.3, 126.4, 83.0, 82.7, 67.8, 52.5, 24.5 ppm. ^{11}B{^{1}H} NMR (128.3 MHz, $CDCl_3$): δ_B 22.3(OBpin), 21.1 (pinBOBpin) ppm. Elemental analysis: calcd. (found) for $C_{20}H_{25}BO_3$: C 74.09 (73.83); H 7.77 (7.61).

2-ethoxy-4,4,5,5-tetramethyl-1,3,2-dioxaborolane (1q). [1]



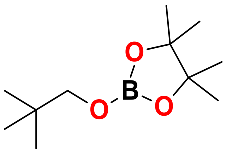
^{1}H NMR (400 MHz, $CDCl_3$): δ_H 4.40 (d, 2H, J = 8.0 Hz, CH_2), 3.88 (q, J = 8.0 Hz, 2H, CH), 1.26 (s, 36H, CH_3, OBpin & pinBOBpin), 1.13 (t, 3H, J = 8.0 Hz, CH_3) ppm. ^{13}C-{^{1}H} NMR (100 MHz, $CDCl_3$): δ_C 82.9, 82.4, 60.4, 24.5, 17.12 ppm. ^{11}B{^{1}H} NMR (128.3 MHz, $CDCl_3$): δ_B 22.0 (OBpin), 21.0 (pinBOBpin) ppm. Elemental analysis: calcd. (found) for $C_8H_{17}BO_3$: C 55.85 (55.63); H 9.96 (9.71).

4,4,5,5-tetramethyl-2-propoxy-1,3,2-dioxaborolane (1r).



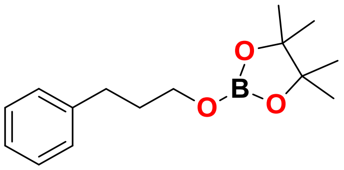
^{1}H NMR (400 MHz, $CDCl_3$): δ_H 3.79 (t, 2H, J = 6.6 Hz, CH_2), 1.57 (q, J = 7.2 Hz, 2H, CH_2), 1.26 (s, 36H, CH_3, OBpin & pinBOBpin), 0.91 (t, 3H, J = 7.4 Hz, CH_3) ppm. ^{13}C-{^{1}H} NMR (100 MHz, $CDCl_3$): δ_C 82.9, 82.4, 66.4, 24.8, 24.5, 10.0 ppm. ^{11}B{^{1}H} NMR (128.3 MHz, $CDCl_3$): δ_B 22.2 (OBpin), 21.3 (pinBOBpin) ppm. Elemental analysis: calcd. (found) for $C_9H_{19}BO_3$: C 58.10 (57.92); H 10.29 (10.11).

4,4,5,5-tetramethyl-2-(neopentyloxy)-1,3,2-dioxaborolane (1s). [1]



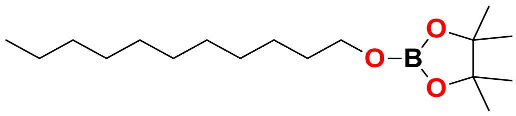
^{1}H NMR (400 MHz, $CDCl_3$): δ_H 3.50 (s, 2H, CH_2), 1.26 (s, 36H, CH_3, OBpin & pinBOBpin), 0.88 (s, 9H, CH_3) ppm. ^{13}C-{^{1}H} NMR (100 MHz, $CDCl_3$): δ_C 83.0, 82.5, 74.8, 32.2, 27.0, 24.5 ppm. ^{11}B{^{1}H} NMR (128.3 MHz, $CDCl_3$): δ_B 22.1(OBpin), 21.2 (pinBOBpin) ppm. Elemental analysis: calcd. (found) for $C_{11}H_{23}BO_3$: C 61.71 (61.65); H 10.83 (10.69).

4,4,5,5-tetramethyl-2-(3-phenylpropoxy)-1,3,2-dioxaborolane (1t).



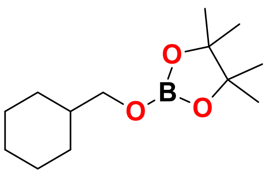
^{1}H NMR (400 MHz, $CDCl_3$): δ_H 7.28 - 7.17 (m, 5H, ArH), 3.87 (t, 2H, J = 6.0 Hz, CH_2), 2.68 (q, J = 8.0 Hz, 2H, CH_2), 1.91 - 1.84 (m, 2H, CH_2), 1.26 (s, 36H, CH_3, OBpin & pinBOBpin), 1.13 (t, 3H, J = 8.0 Hz, CH_3) ppm. ^{13}C-{^{1}H} NMR (100 MHz, $CDCl_3$): δ_C 141.8, 128.4, 128.3, 125.7, 83.1, 82.7, 64.1, 33.1, 31.9, 24.5 ppm. ^{11}B{^{1}H} NMR (128.3 MHz, $CDCl_3$): δ_B 22.2 (OBpin), 21.3 (pinBOBpin) ppm. Elemental analysis: calcd. (found) for $C_{15}H_{23}BO_3$: C 68.72 (68.56); H 8.84 (8.73).

4,4,5,5-tetramethyl-2-(undecyloxy)-1,3,2-dioxaborolane (1u).



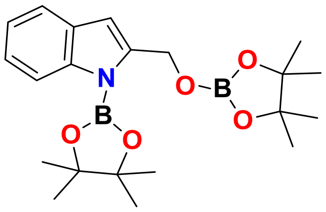
^{1}H NMR (400 MHz, $CDCl_3$): δ_H 3.84 (q, J = 3.7 Hz, 2H, OCH_2), 2.37 (d, J = 6.2 Hz, 2H, CH_2), 1.28 - 1.28 (m, 4H, CH_2), 1.26 - 1.26 (br, 48H, CH_2, CH_3, OBpin & pinBOBpin), 0.76 (t, J = 3.3 Hz, 3H, CH_3) ppm. ^{13}C-{^{1}H} NMR (100 MHz, $CDCl_3$): δ_C 83.1, 82.9, 64.8, 34.8, 32.3, 31.3, 29.5, 29.3, 28.9, 25.5, 24.7, 24.7, 23.9 ppm. ^{11}B{^{1}H} NMR (128.3 MHz, $CDCl_3$): δ_B 22.3(OBpin), 21.13 (pinBOBpin) ppm. Elemental analysis: calcd. (found) for $C_{17}H_{35}BO_3$: C 68.46 (68.23); H 11.83 (11.68).

2-(cyclohexylmethoxy)-4,4,5,5-tetramethyl-1,3,2-dioxaborolane (1v).



^{1}H NMR (400 MHz, $CDCl_3$): δ_H 3.64 (d, J = 6.3 Hz, 2H, OCH_2), 1.75 - 1.63 (m, 6H, CH_2), 1.54 - 1.42 (m, 2H, CH_2), 1.26 (s, 36H, CH_3, OBpin & pinBOBpin), 0.98 - 0.88 (m, 3H, CH_3) ppm. ^{13}C-{^{1}H} NMR (100 MHz, $CDCl_3$): δ_C 83.1, 82.9, 70.2, 39.2, 29.2, 26.4, 25.7, 24.6, 24.5, 17.9 ppm. ^{11}B{^{1}H} NMR (128.3 MHz, $CDCl_3$): δ_B 22.3(OBpin), 21.13 (pinBOBpin) ppm. Elemental analysis: calcd. (found) for $C_{13}H_{25}BO_3$: C 65.02 (64.81); H 10.49 (10.28).

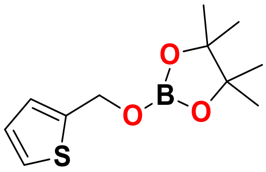
1-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)-2-(((4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2 yl)oxy)methyl)-1H-indole (1w). [1]



^{1}H NMR (400 MHz, $CDCl_3$): δ_H 7.89 (d, 1H, ArH), 7.54 (d, 1H, ArH), 4.13 (t, 2H, CH_2), 2.98 (t, 2H, CH_2) 6.94 6.92 (m, 2H, ArH), 1.36 (s, 12H, CH_3), 1.25 (s, 36H, CH_3, OBpin & pinBOBpin) ppm. ^{13}C-{^{1}H} NMR (100 MHz, $CDCl_3$): δ_C 139.5, 131.2, 126.5, 122.6, 120.9, 118.6, 116.7, 114.6, 84.1, 83.0, 82.6, 64.5, 27.5, 24.7, 24.5 ppm. ^{11}B{^{1}H} NMR (128.3 MHz, $CDCl_3$): δ_B 24.7(NBpin), 22.3 (OBpin), 21.1 (pinBOBpin) ppm. Elemental analysis: calcd. (found) for $C_{21}H_{31}B_2NO_5$: C

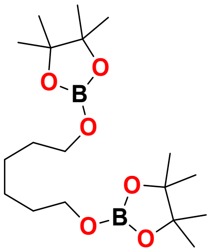
63.20 (63.09); H 7.83 (7.72).

4,4,5,5-tetramethyl-2-(thiophen-2-ylmethoxy)-1,3,2-dioxaborolane (1x). [3]



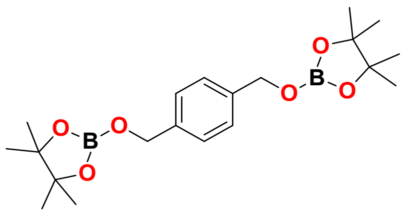
[1]H NMR (400 MHz, $CDCl_3$): δ_H 7.24 - 7.23 (m, 1H, ArH), 6.94 - 6.92 (m, 2H, ArH), 5.02 (s, 2H, CH_2), 1.26 (s, 36H, CH_3, OBpin & pinBOBpin) ppm. [13]C-{[1]H} NMR (100 MHz, $CDCl_3$): δ_C 141.9, 132.7, 126.8, 126.6, 125.8, 83.2, 83.0, 61.5, 24.5 ppm. [11]B{[1]H} NMR (128.3 MHz, $CDCl_3$): δ_B 22.3 (OBpin), 21.1 (pinBOBpin) ppm. Elemental analysis: calcd. (found) for $C_{11}H_{17}BO_3S$: C 55.02 (54.89); H 7.14 (7.01).

1,6-bis((4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)oxy)hexane (1y). [1]



[1]H NMR (400 MHz, $CDCl_3$): δ_H 3.78 (t, 4H, J = 4.0 Hz, OCH_2), 1.52 - 1.51 (m, 4H, CH_2), 1.36 - 1.32 (m, 4H, CH_2), 1.26 (s, 72H, CH_3, OBpin & pinBOBpin) ppm. [13]C-{[1]H} NMR (100 MHz, $CDCl_3$): δ_C 83.2, 82.5, 64.8, 31.3, 25.2, 24.8, 24.5 ppm. [11]B{[1]H} NMR (128.3 MHz, $CDCl_3$): δ_B 22.3(OBpin), 21.1 (pinBOBpin) ppm. Elemental analysis: calcd. (found) for $C_{18}H_{36}B_2O_6$: C 58.42 (58.19); H 9.80 (9.72).

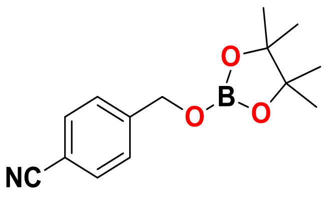
1,4-bis(((4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)oxy)methyl)benzene (1z).



[1]H NMR (400 MHz, $CDCl_3$): δ_H 7.30 (s, 4H, ArH), 4.90 (s, 2H, CH_2), 1.26 (s, 36H, CH_3, OBpin & pinBOBpin) ppm. [13]C-{[1]H} NMR (100 MHz, $CDCl_3$): δ_C 138.3, 126.6, 126.1, 83.0, 82.9, 66.4, 24.6 ppm. [11]B{[1]H} NMR (128.3 MHz, $CDCl_3$): δ_B 22.3 (OBpin), 21.13 (pinBOBpin) ppm. Elemental analysis: calcd. (found) $C_{20}H_{32}B_2O_6$: C 61.58 (61.33); H 8.27 (8.15).

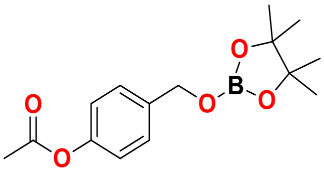
Chemo Selective Hydroboration of carboxylic acids

4-(((4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)oxy)methyl)benzonitrile (3a). [3]



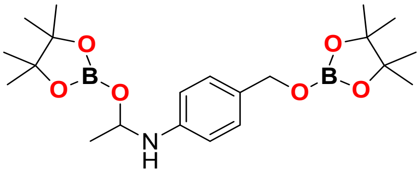
[1]H NMR (400 MHz, $CDCl_3$): δ_H 7.15 (d, 2H, J = 8.0 Hz, ArH), 7.45 (d, 2H, J = 8.0 Hz ArH), 4.98 (s, 2H, CH_2), 1.26 (s, 36H, CH_3, OBpin & pinBOBpin) ppm. [13]C-{[1]H} NMR (100 MHz, $CDCl_3$): δ_C 144.5, 132.1, 126.8, 118.8, 111.0, 83.2, 83.0, 65.7, 24.5 ppm. [11]B{[1]H} NMR (128.3 MHz, $CDCl_3$): δ_B 22.3 (OBpin), 21.1 (pinBOBpin) ppm. Elemental analysis: calcd. (found) for $C_{14}H_{18}BNO_3$: C 64.90 (64.72); H 7.00 (6.92).

4-(((4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)oxy)methyl)phenyl acetate (3b). [4]



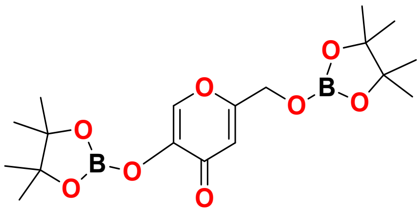
^{1}H NMR (400 MHz, $CDCl_3$): δ_H 7.35 (d, 2H, J = 8.0 Hz, ArH), 7.04 (d, 2H, J = 8.0 Hz ArH), 4.90 (s, 2H, CH_2), 2.28 (s, 3H, CH_3), 1.25 (s, 36H, CH_3, OBpin & pinBOBPin) ppm. ^{13}C-{^{1}H} NMR (100 MHz, $CDCl_3$): δ_C 169.4, 149.8, 136.8, 128.0, 127.8, 121.3, 99.9, 83.2, 83.0, 66.0, 24.5, 21.0 ppm. ^{11}B{^{1}H} NMR (128.3 MHz, $CDCl_3$): δ_B 22.3(OBpin), 21.1 (pinBOBpin) ppm. Elemental analysis: calcd. (found) for $C_{15}H_{21}BO_5$: C 61.67 (61.51); H 7.25 (7.06).

4-(((4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)oxy)methyl)-N-(1-((4,4,5,5-tetramethyl-1,3-dioxolan-2-yl)oxy)ethyl)aniline (3c).



^{1}H NMR (400 MHz, $CDCl_3$): δ_H 7.25 - 7.20 (m, 4H, ArH), 5.80 (br, 1H, NH), 5.15 (q, J = 6.4 Hz, 1H, CH), 4.82 (s, 2H, CH_2), 1.39 (d, J = 6.4 Hz, 3H, CH_3), 1.18 (s, 48H, CH_3, OBpin & pinBOBpin) ppm. ^{13}C-{^{1}H} NMR (100 MHz, $CDCl_3$): δ_C 143.7, 138.0, 126.6, 125.2, 83.0, 82.9, 82.7, 72.3, 66.4, 25.4, 24.5 ppm. ^{11}B{^{1}H} NMR (128.3 MHz, $CDCl_3$): δ_B 22.0 (OBpin), 21.1 (pinBOBpin) ppm. Elemental analysis: calcd. (found) for $C_{21}H_{35}B_2NO_6$: C 60.18 (59.77); H 8.42 (8.31); N 3.34 (3.19).

5-((4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)oxy)-2-(((4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)oxy)methyl)-4H-pyran-4-one (3d).

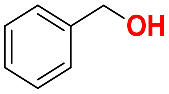


^{1}H NMR (400 MHz, $CDCl_3$): δ_H 8.01 (s, 1H, ArH), 6.99 (s, 1H, ArH), 4.90 (s, 2H, CH_2), 1.27 (s, 12H, CH_3, OBpin), 1.26 (s, 36H, CH_3, OBpin & pinBOBpin) ppm. ^{13}C-{^{1}H} NMR (100 MHz, $CDCl_3$): δ_C 176.2, 171.2, 149.8, 137.9, 103.2, 84.0, 83.0, 82.9, 62.9, 24.8 24.5 ppm. ^{11}B{^{1}H} NMR (128.3 MHz, $CDCl_3$): δ_B 22.3(OBpin), 21.13 (pinBOBpin) ppm. Elemental analysis: calcd. (found) for $C_{18}H_{28}B_2O_8$: C 54.87 (54.63); H 7.16 (7.08).

General procedure for hydrolysis of boronate esters to alcohols:

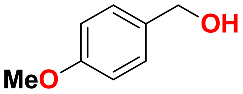
Upon completion of the reaction, the resulted boronate ester residue was refluxed with silica gel (1g) and methanol for 3 h. Then the aliquot is evaporated under vacuum and extracted with dichloromethane. The combined organic layers were dried, evaporated and purified by column chromatography over silica-gel (100-200 mesh) using ethyl acetate/hexane (1:5) mixture as eluent to obtain the pure primary alcohols (**2a-2m**).[5-6]

Benzyl alcohol (2a).



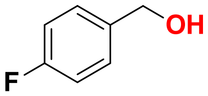
Yield: 99%. Colorless oil; ^{1}H NMR (400 MHz, $CDCl_3$): δ_H 7.39 -7.28 (m, 5H, ArH), 4.65 (s, 2H, OCH_2), 2.56 (b, 1H, OH) ppm. ^{13}C-{^{1}H} NMR (100 MHz, $CDCl_3$): δ_C 140.6, 127.7, 126.7, 126.2, 64.3 ppm. Elemental analysis: calcd. (found) for C_7H_8O: C 77.75 (77.61); H 7.46 (7.32). MS (ESI) m/z 131.1232 $(M+Na)^+$.

(4-methoxyphenyl)methanol (2b).



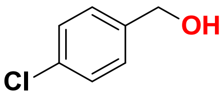
Yield: 94%. Colorless oil. ^{1}H NMR (400 MHz, $CDCl_3$): δ_H 7.20 (d, J = 8.0 Hz, 2H, ArH), 6.83 (d, J = 8.0 Hz, 2H, ArH), 4.48 (s, 2H, OCH_2), 3.76 (s, 3H, OCH_3), 2.76 (b, 1H, OH) ppm. ^{13}C-{^{1}H} NMR (100 MHz, $CDCl_3$): δ_C 159.0, 133.2, 128.6, 113.8, 64.6, 55.2 ppm. Elemental analysis: calcd. (found) for $C_8H_{10}O_2$: C 69.54 (69.49); H 7.30 (7.26). MS (ESI) m/z 138.0915 $(M+NH_4)$ + $(-H_2O)$.

(4-flurophenyl)methanol (2c).



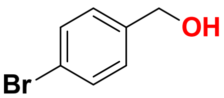
Yield: 92%. Colorless oil; ^{1}H NMR (400 MHz, $CDCl_3$): δ_H 7.24 - 7.19 (m, 2H, ArH), 6.99 - 6.95 (m, 2H, ArH), 4.47 (s, 2H, OCH_2), 3.64 (b, 1H, OH) ppm. ^{13}C-{^{1}H} NMR (100 MHz, $CDCl_3$): δ_C 163.4, 161.0, 136.5, 136.5, 128.6, 115.3, 64.0 ppm. ^{19}F-{^{1}H} NMR (376.5 MHz, $CDCl_3$): δ_F -118.7. Elemental analysis: calcd. (found) for C_7H_7FO: C 66.66 (66.51); H 5.59 (5.43).MS (ESI) m/z 109.04$(M-OH)^+$.

(4-chlorophenyl)methanol (2d).



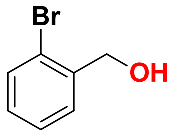
Yield: 92% white solid; ^{1}H NMR (400 MHz, $CDCl_3$): δ_H 7.31 - 7.24 (m, 4H, ArH), 4.61 (s, 2H, OCH_2), 2.13 (b, 1H, OH) ppm. ^{13}C-{^{1}H} NMR (100 MHz, $CDCl_3$): δ_C 139.7, 131.6, 128.6, 121.4, 64.3 ppm. Elemental analysis: calcd. (found) for C_7H_7ClO: C 58.97 (58.78); H 4.95 (4.73). MS (ESI) m/z 148.0009$(M+Na)^+$$(-H_2O)$.

(4-bromophenyl)methanol (2e).



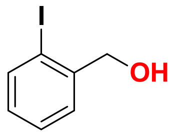
Yield: 93%. White solid; ^{1}H NMR (400 MHz, $CDCl_3$): δ_H 7.44 (d, 2H, J = 7.2 Hz, ArH), 7.17 (d, 2H, J = 7.2 Hz, ArH), 4.56 (s, 2H, OCH_2), 2.55 (b, 1H, OH) ppm. ^{13}C-{^{1}H} NMR (100 MHz, $CDCl_3$): δ_C 139.7, 131.6, 128.6, 121.4, 64.3 ppm. Elemental analysis: calcd. (found) for C_7H_7BrO: C 44.95 (44.88); H 3.77 (3.64). MS (ESI) m/z 226.9291$(M+K)^+$.

(2-bromophenyl)methanol (2f).



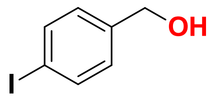
Yield: 94%. White solid; ^{1}H NMR (400 MHz, $CDCl_3$): δ_H 7.39 - 7.28 (m, 1H, ArH), 7.47 - 7.45 (m, 1H, ArH), 7.34 - 7.32 (m, 1H, ArH), 7.16 - 7.15 (m, 1H, ArH), 4.73 (s, 2H, OCH_2), 2.29 (b, 1H, OH) ppm. ^{13}C-{^{1}H} NMR (100 MHz, $CDCl_3$): δ_C 139.7, 132.5, 129.1, 128.8, 127.6, 122.5, 65.0 ppm. Elemental analysis: calcd. (found) for C_7H_7BrO: C 44.95 (44.81); H 3.77 (3.63). MS (ESI) m/z 171.9658 (M+H)+(-H_2O).

(2-iodophenyl)methanol (2g).



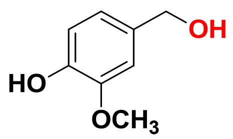
Yield: 90 % white solid; ^{1}H NMR (400 MHz, $CDCl_3$): δ_H 7.79 (dd, 1H, *J* = 7.8 Hz, ArH), 7.42 (d, 1H, *J* = 8.0 Hz, ArH), 7.33 (m, 1H, ArH), 6.97 (m, 1H, ArH), 4.63 (s, 2H, OCH_2), 2.40 (b, 1H, OH) ppm. ^{13}C-{^{1}H} NMR (100 MHz, $CDCl_3$): δ_C 142.6, 139.2, 129.2, 128.5, 128.4, 97.6, 69.2 ppm. Elemental analysis: calcd. (found) for C_7H_7IO: C 35.92 (35.73); H 3.01 (2.86). MS (ESI) m/z 217.9543 $(M+H)^+$(-H_2O).

(4-iodophenyl)methanol (2h).



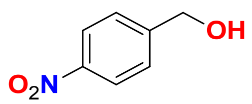
Yield: 95%, white solid; ^{1}H NMR (400 MHz, $CDCl_3$): δ_H 7.58 (d, 2H, *J* = 7.2 Hz, ArH), 7.40 (d, 2H, *J* = 7.2 Hz, ArH), 4.72 (s, 2H, OCH_2), 1.80 (b, 1H, OH) ppm. ^{13}C-{^{1}H} NMR (100 MHz, $CDCl_3$): δ_C 139.7, 131.6, 128.6, 121.4, 64.3 ppm. Elemental analysis: calcd. (found) for C_7H_7IO: C 35.92 (35.83); H 3.01 (2.90). MS (ESI) m/z 217.9540 $(M+H)^+$ (-H_2O).

4-(hydroxymethyl)-2-methoxyphenol (2i).



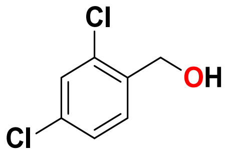
Yield: 95%, white solid; ^{1}H NMR (400 MHz, $CDCl_3$): δ_H 6.92 - 6.82 (m, 3H, ArH), 5.64 (s, 1H, OH), 4.60 (d, *J* = 5.6 Hz, 2H, OCH_2), 1.62 (b, 1H, OH) ppm. ^{13}C-{^{1}H} NMR (100 MHz, $CDCl_3$): δ_C 145.2, 132.9, 120.2, 114.2, 109.9, 65.4, 55.9 ppm. Elemental analysis: calcd. (found) for $C_8H_{10}O_3$: C 62.33 (62.23); H 6.54 (6.47). MS (ESI) m/z 176.0528 $(M+Na)^+$.

(*p*-nitrophenyl)methanol (2j).



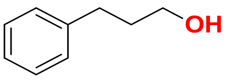
Yield: 93%. Red solid; ^{1}H NMR (400 MHz, $CDCl_3$): δ_H 8.19 - 8.15 (m, 2H, ArH), 7.53 - 7.50 (m, 2H, ArH), 4.82 (s, 2H, OCH_2), 2.56 (b, 1H, OH) ppm. ^{13}C-{^{1}H} NMR (100 MHz, $CDCl_3$): δ_C 148.3, 147.2, 128.6, 123.6, 63.9 ppm. Elemental analysis: calcd. (found) for $C_7H_7NO_3$: C 54.90 (54.79); H 4.61 (4.51); N 9.15 (9.01). MS (ESI) m/z 154.0433 $(M)^+$.

(2, 4-dichlorophenyl)methanol (2k).



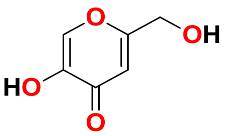
Yield: 91%, white solid; [1]H NMR (400 MHz, $CDCl_3$): δ_H 7.41 (d, *J* = 7.2 Hz, 1H, ArH), 7.36 (d, *J* = 7.2 Hz, 1H, ArH), 7.26 - 7.24 (m, 1H, ArH), 4.72 (d, *J* = 5.6 Hz, 2H, OCH_2), 2.22 (b, 1H, OH) ppm. ^{13}C-{^{1}H} NMR (100 MHz, $CDCl_3$): δ_C 136.7, 133.8, 133.1, 129.4, 127.2, 62.1 ppm. Elemental analysis: calcd. (found) for $C_7H_6Cl_2O$: C 47.49 (47.31); H 3.42 (3.32). MS (ESI) m/z 176.9784$(M)^+$.

3-phenylpropan-1-ol (2l).



Yield: 80%, White solid [1]H NMR (400 MHz, $CDCl_3$): δ_H 7.25 - 7.16 (m, 5H, ArH), 3.60 (s, 2H, OCH_2), 2.68 - 2.64 (m, 3H, OH & CH_2), 1.85 (q, *J* = 6.5 Hz, 2H, CH_2) ppm. ^{13}C-{^{1}H} NMR (100 MHz, $CDCl_3$): δ_C 141.9, 128.5, 128.4, 125.9, 62.0, 34.2, 32.1 ppm. Elemental analysis: calcd. (found) for $C_9H_{12}O$: C 78.65 (78.49); H 8.25 (8.15). MS (ESI) m/z 119.0915$(M\text{-}OH)^+$.

4-(2-hydroxyethyl)phenol (2m).



Yield: 70%, [1]H NMR (400 MHz, D_2O): δ_H 8.01 (s, 1H, CH), 6.50 (s, 1H, CH), 4.44 (2H, CH_2) ppm. ^{13}C-{^{1}H} NMR (100 MHz, D_2O): δ_C 176.6, 168.5, 144,6, 142.0, 110.56, 59.8 ppm. Elemental analysis: calcd. (found) for $C_6H_6O_4$: C 50.71 50.53); H 4.26 (4.13). MS (ESI) m/z 166.0192 $(M+Na)^+$.

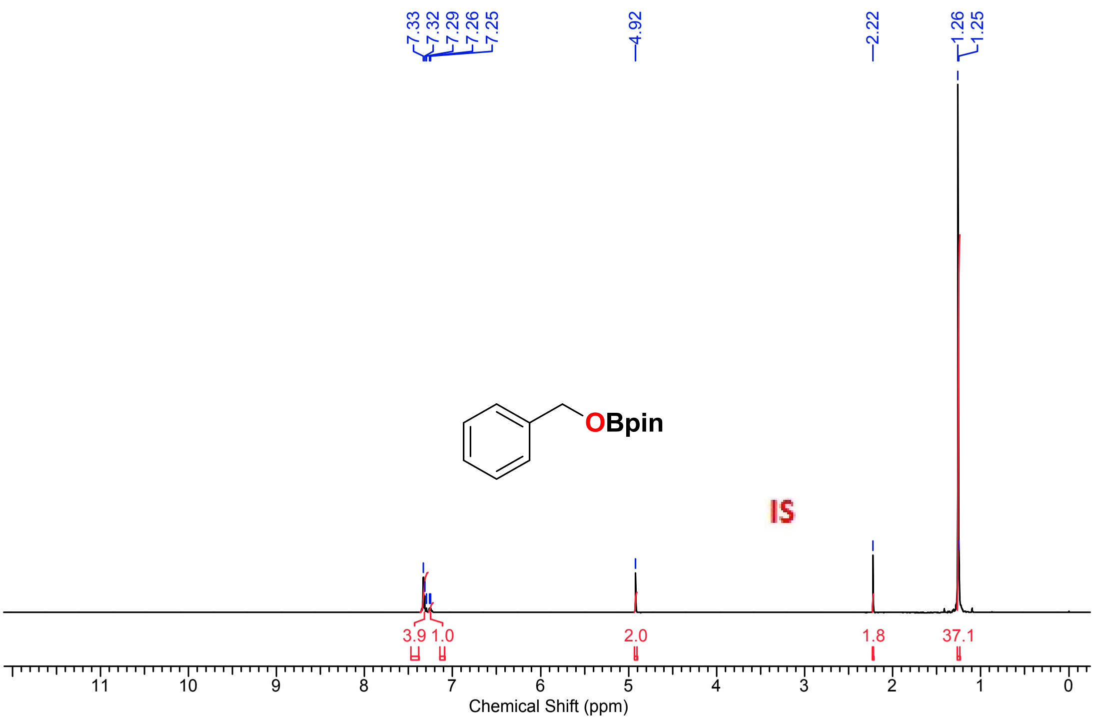


Figure FS1. ^{1}H NMR spectrum (400 MHz, 25°C, $CDCl_3$) of **1a.**

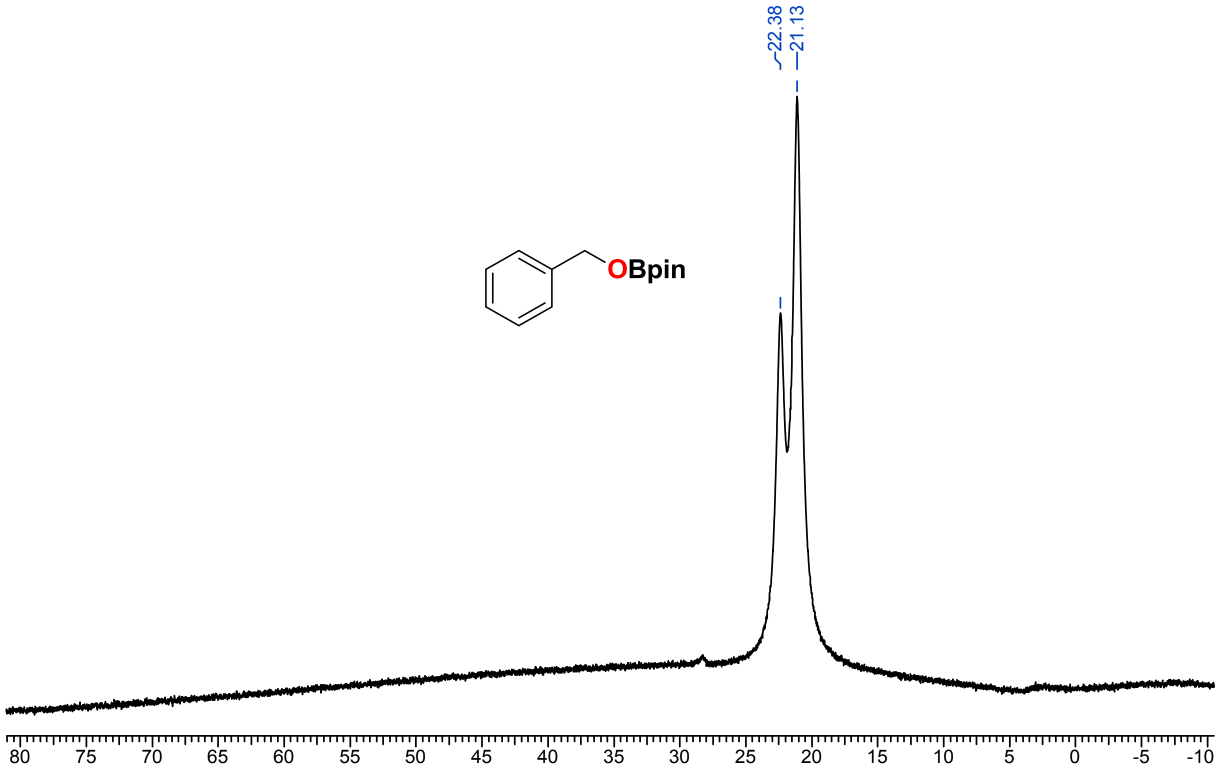


Figure FS2. ^{11}B NMR spectrum (128.4 MHz, 25°C, $CDCl_3$) of **1a.**

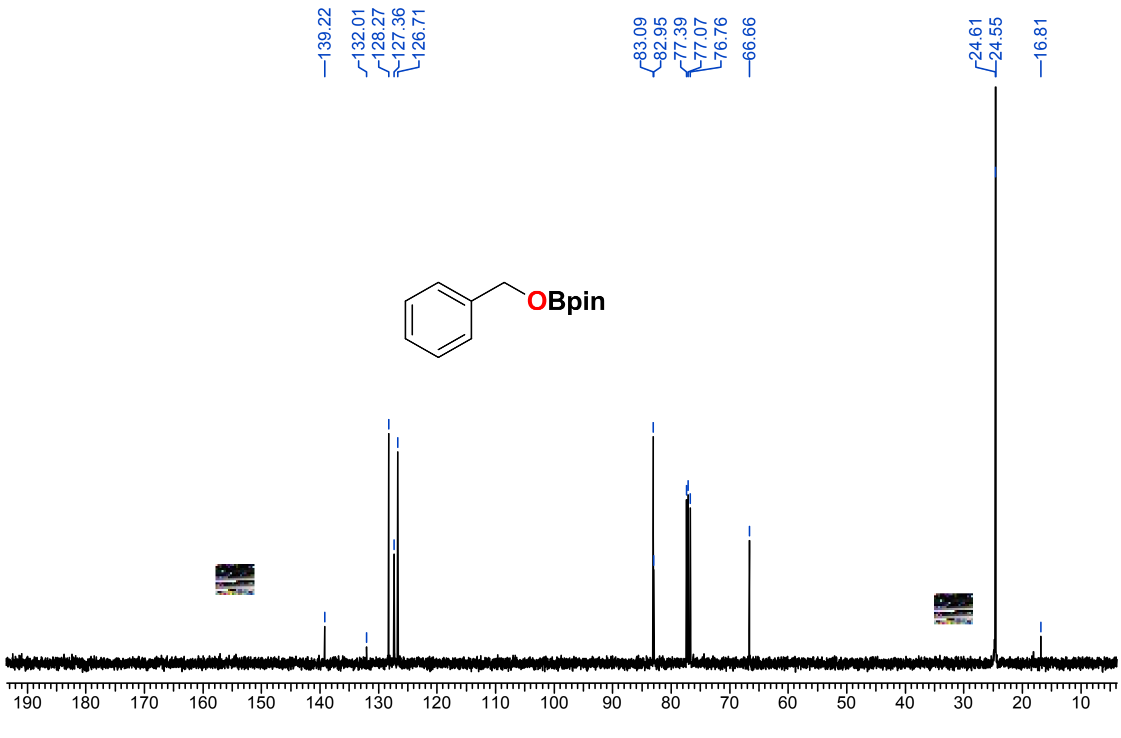


Figure FS3. ^{13}C NMR spectrum (100 MHz, 25°C, $CDCl_3$) of **1a.**

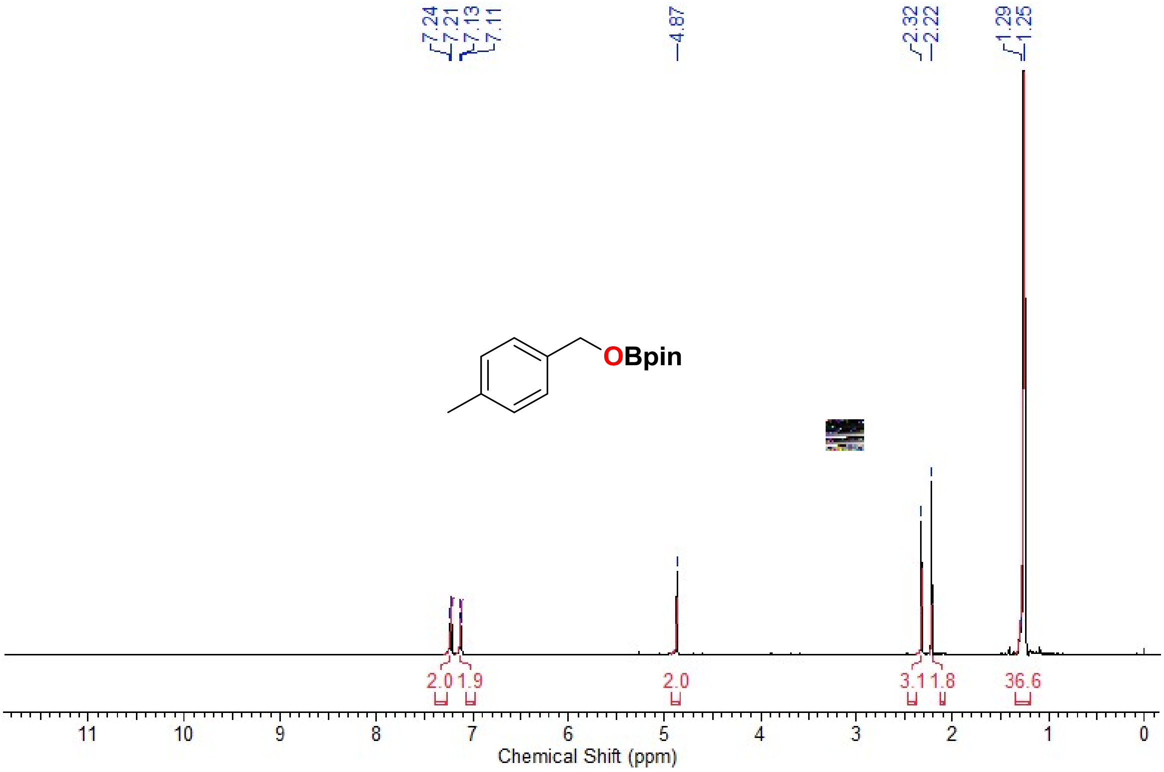


Figure FS4. ^{1}H NMR spectrum (400 MHz, 25°C, $CDCl_3$) of **1b.**

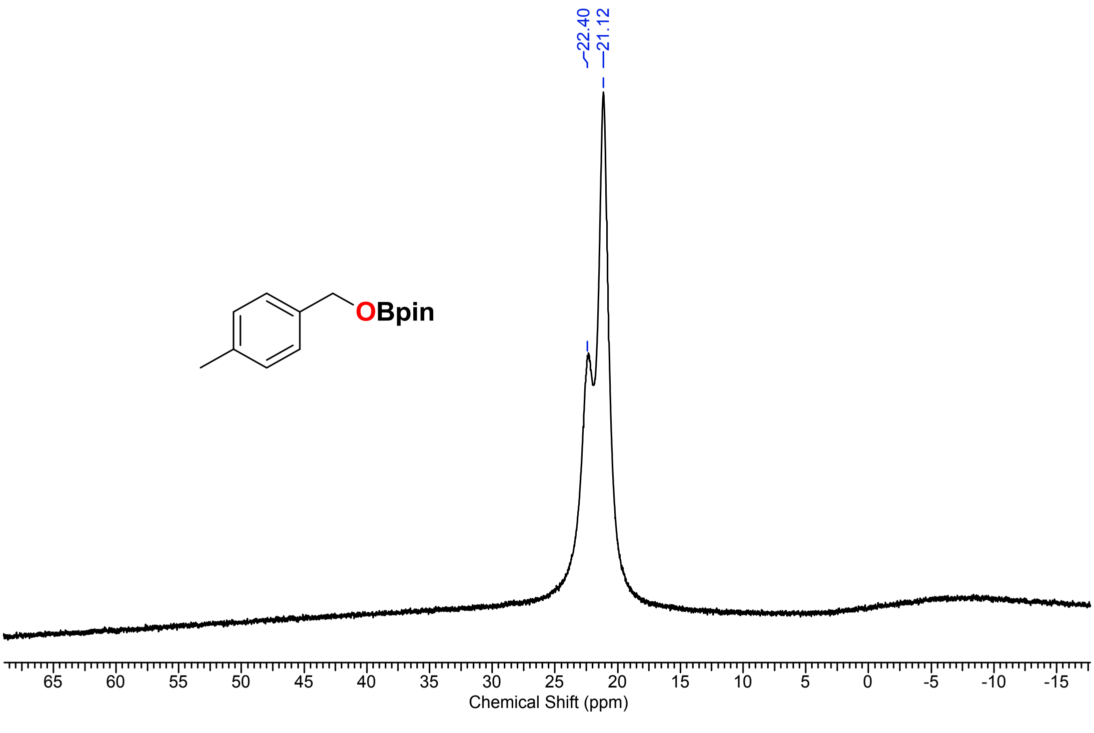


Figure S5. ^{11}B NMR spectrum (128.4 MHz, 25°C, $CDCl_3$) of **1b.**

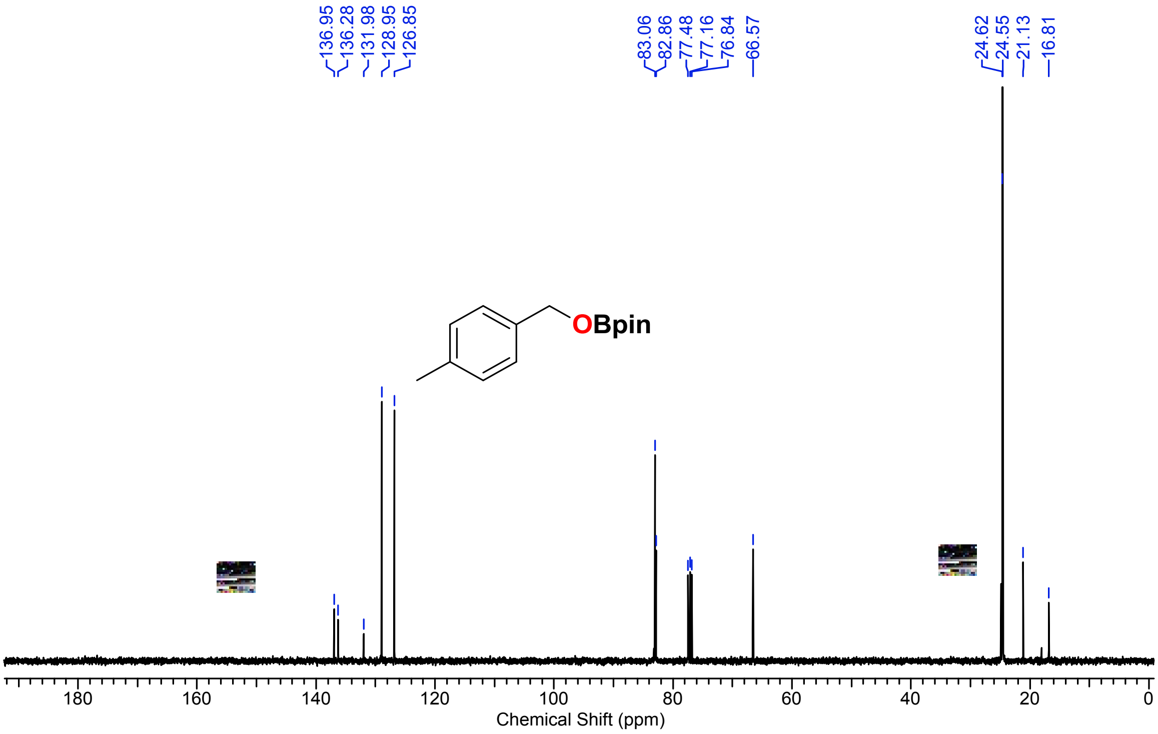


Figure FS6. ^{13}C NMR spectrum (100 MHz, 25°C, $CDCl_3$) of **1b.**

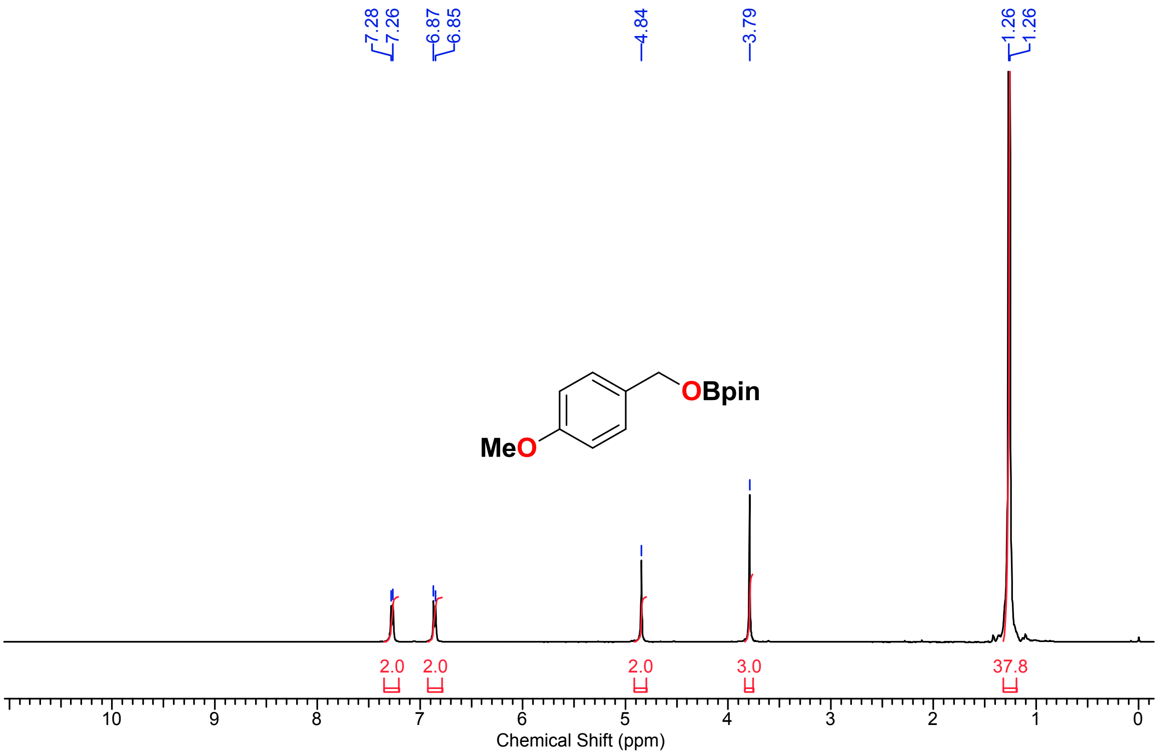


Figure FS7. ^{1}H NMR spectrum (400 MHz, 25°C, $CDCl_3$) of **1c.**

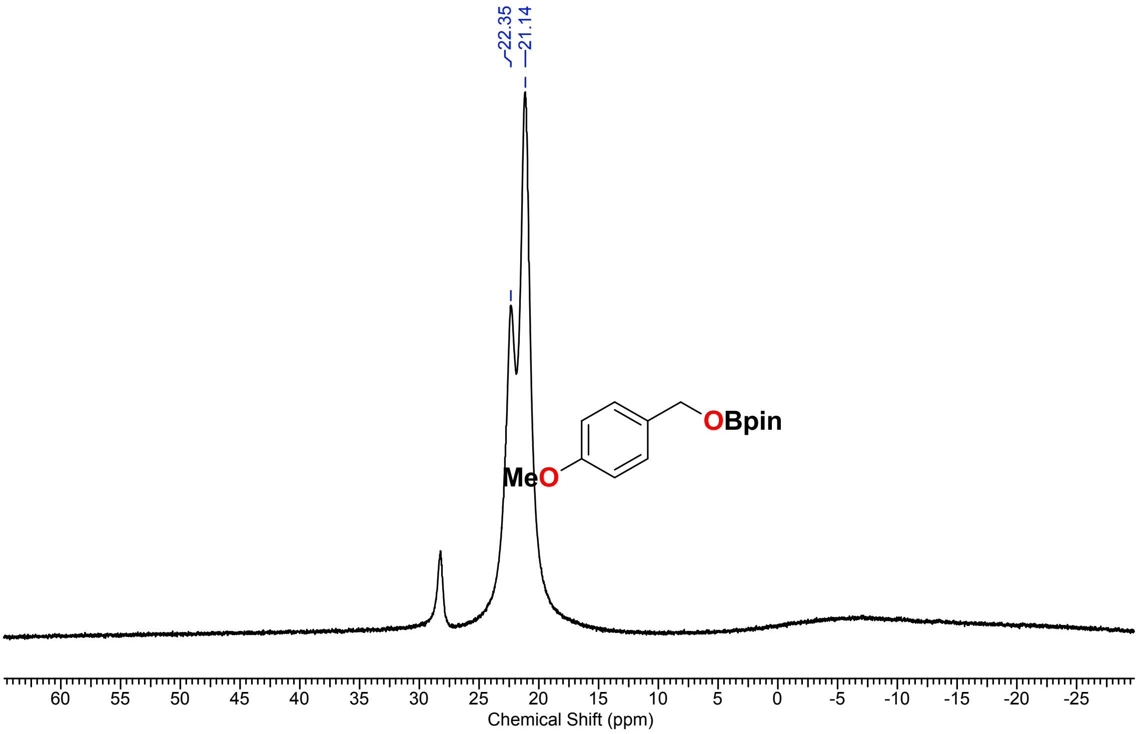


Figure FS8. ^{11}B NMR spectrum (128.4 MHz, $CDCl_3$, 25°C, $CDCl_3$) of **1c.**

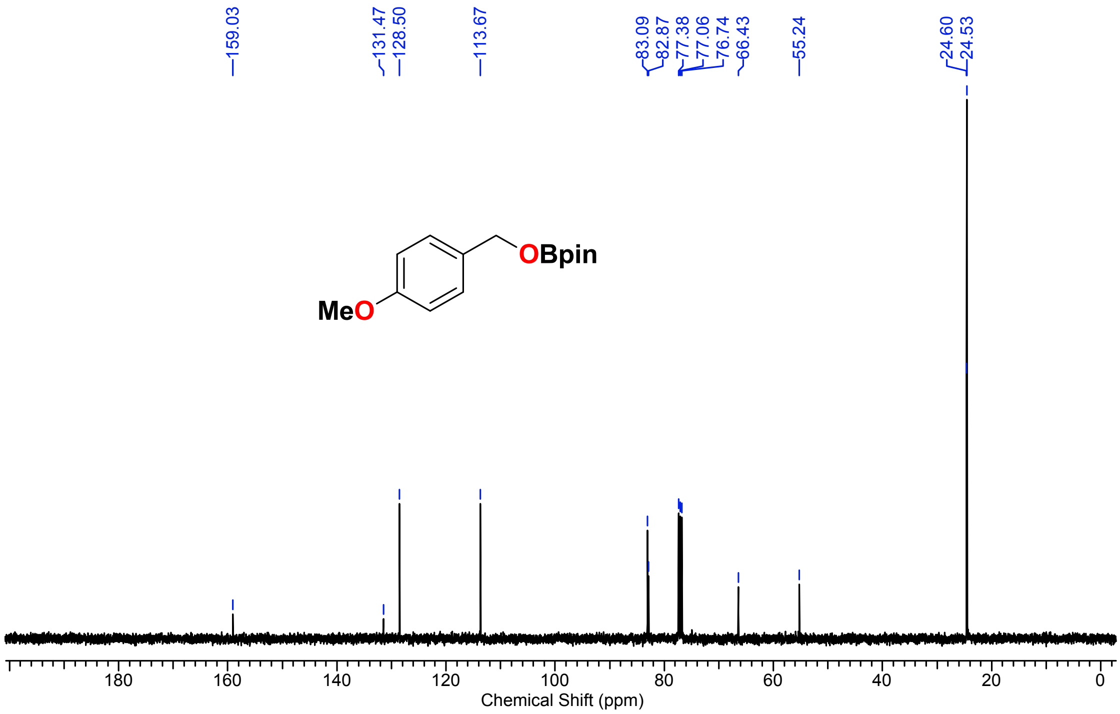


Figure FS9. ^{13}C NMR spectrum (100 MHz, 25°C, $CDCl_3$) of **1c.**

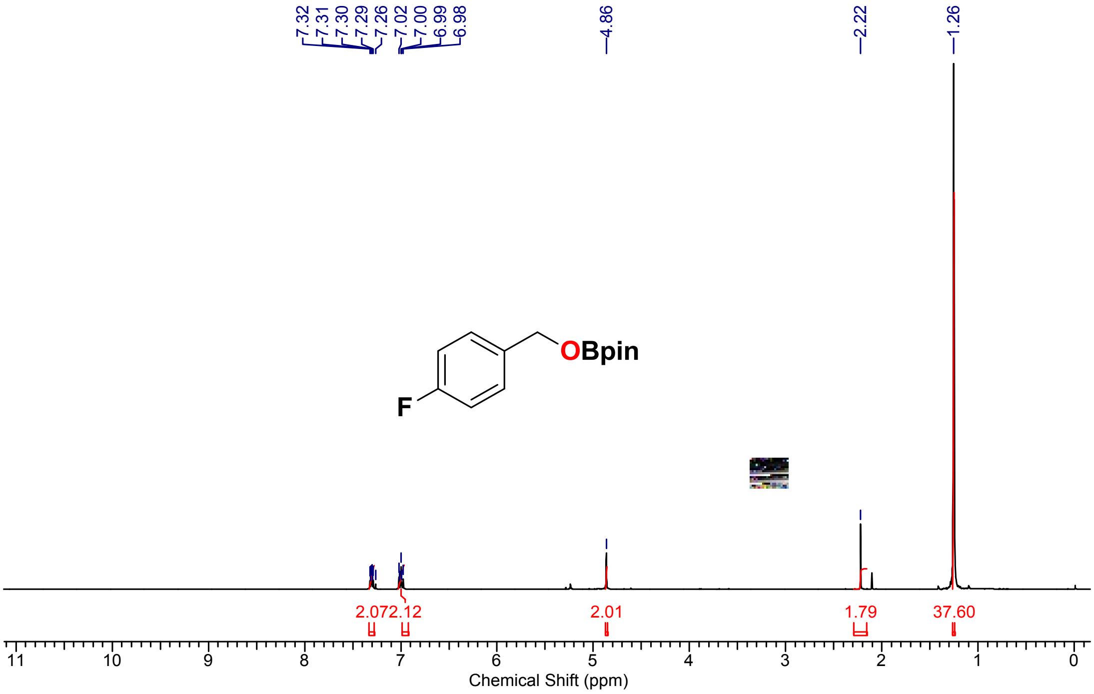


Figure FS10. ^{1}H NMR spectrum (400 MHz, 25°C, $CDCl_3$) of **1d.**

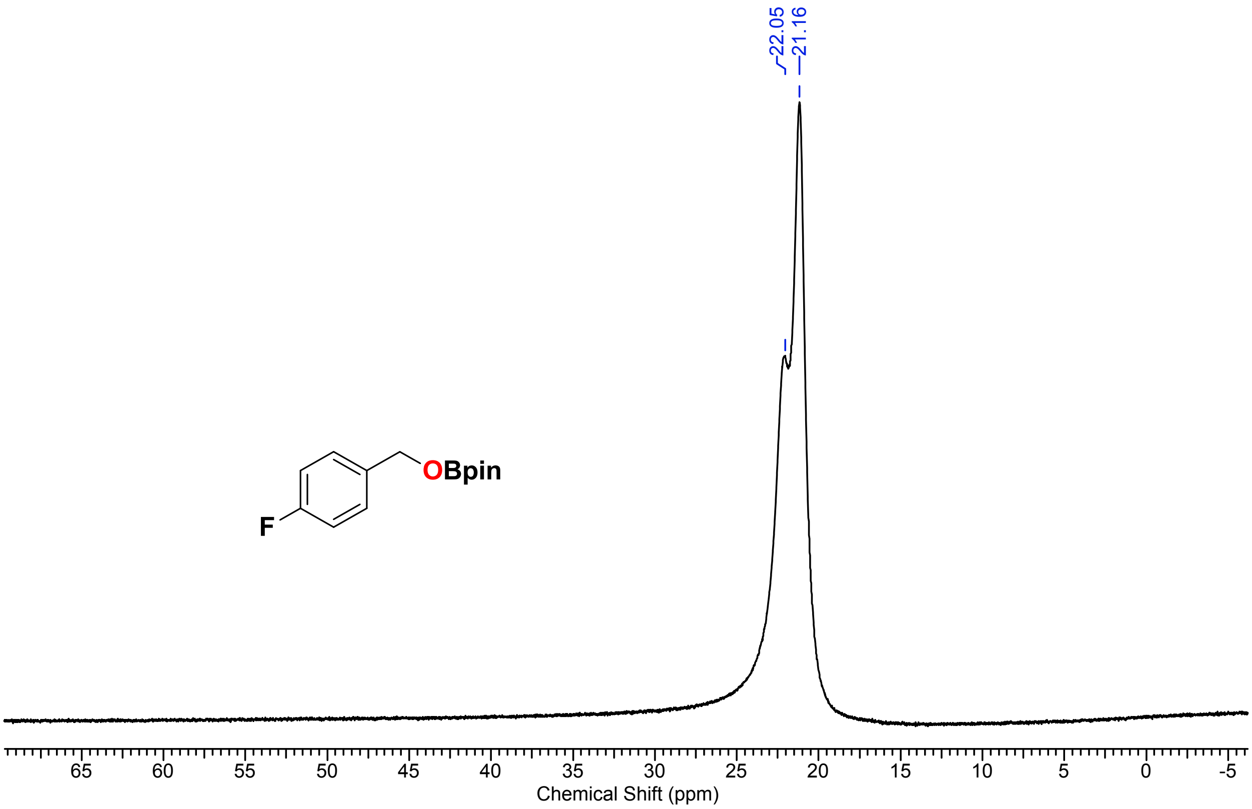
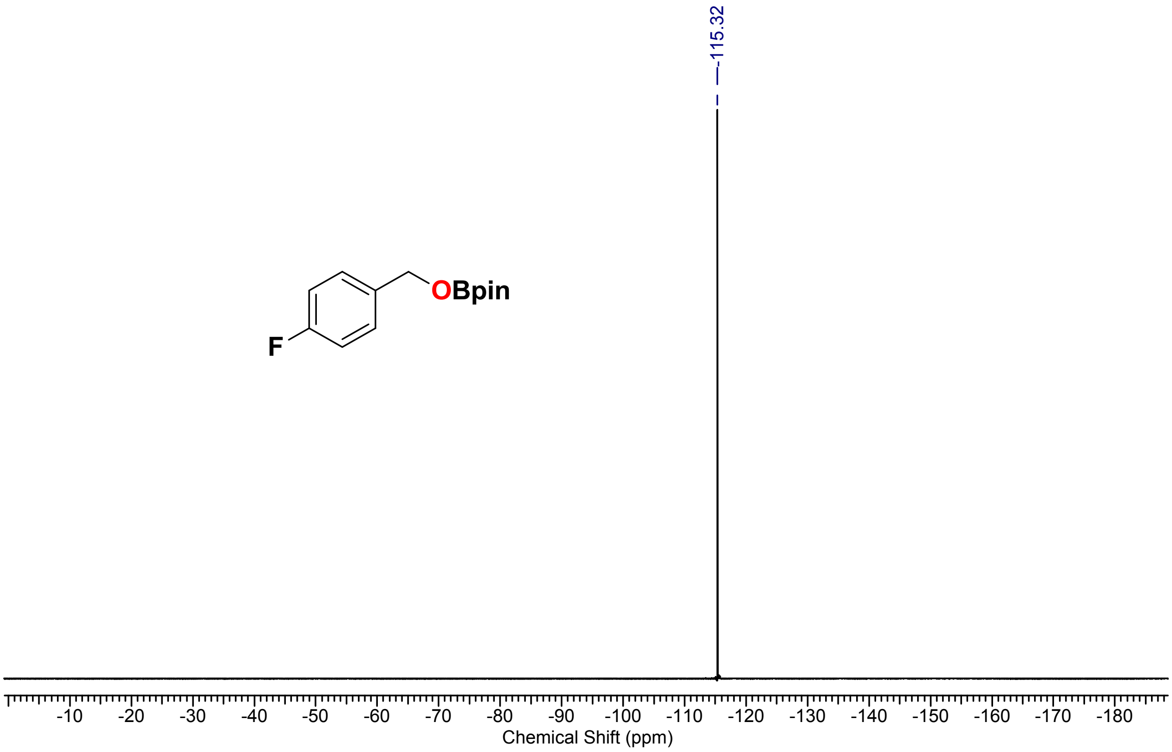


Figure S11. ^{11}B NMR spectrum (128.4 MHz, 25°C, $CDCl_3$) of **1d.**



FS12. [19]F NMR spectrum (376.5 MHz, 25°C, $CDCl_3$) of **1d.**

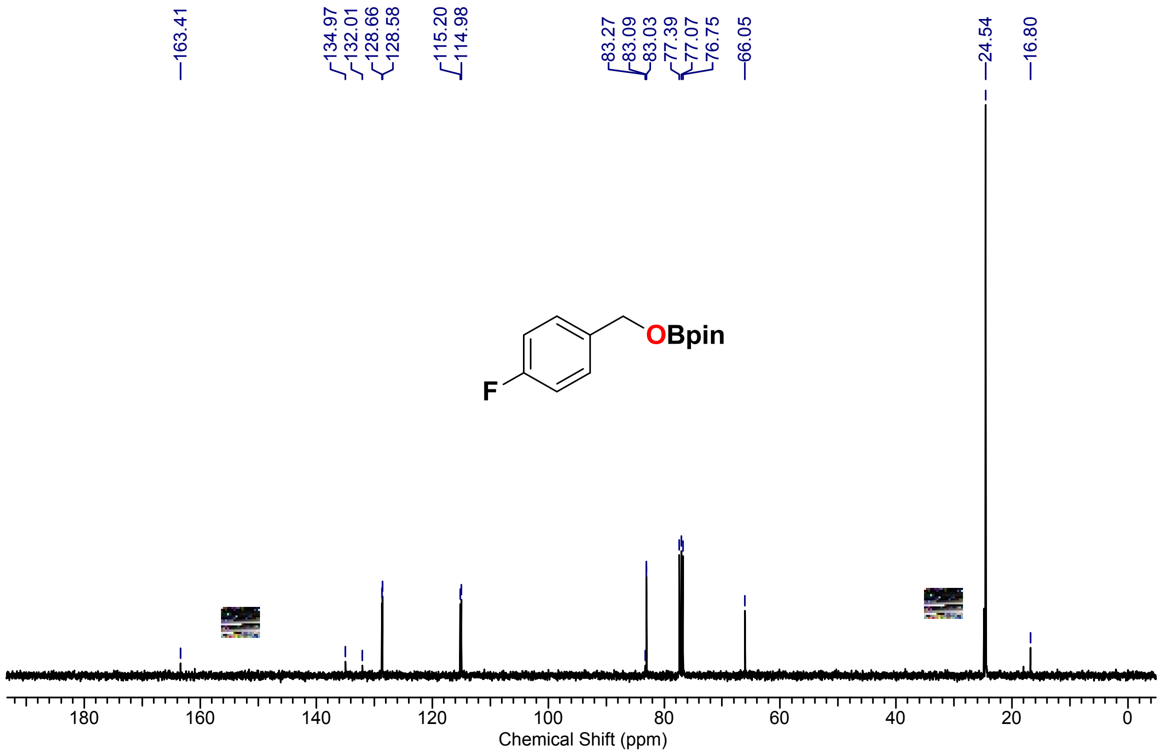


Figure FS13. [13]C NMR spectrum (100 MHz, 25°C, $CDCl_3$) of **1d.**

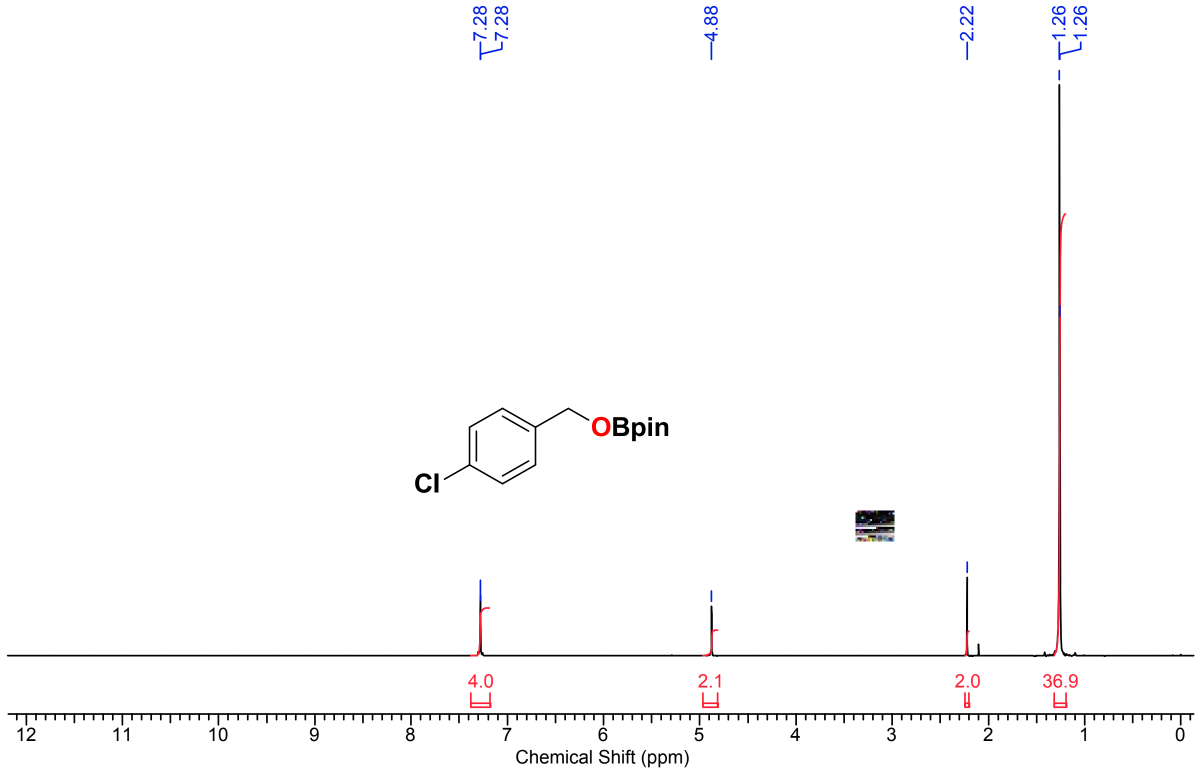


Figure FS14. ^{1}H NMR spectrum (400 MHz, 25°C, $CDCl_3$) of **1e**

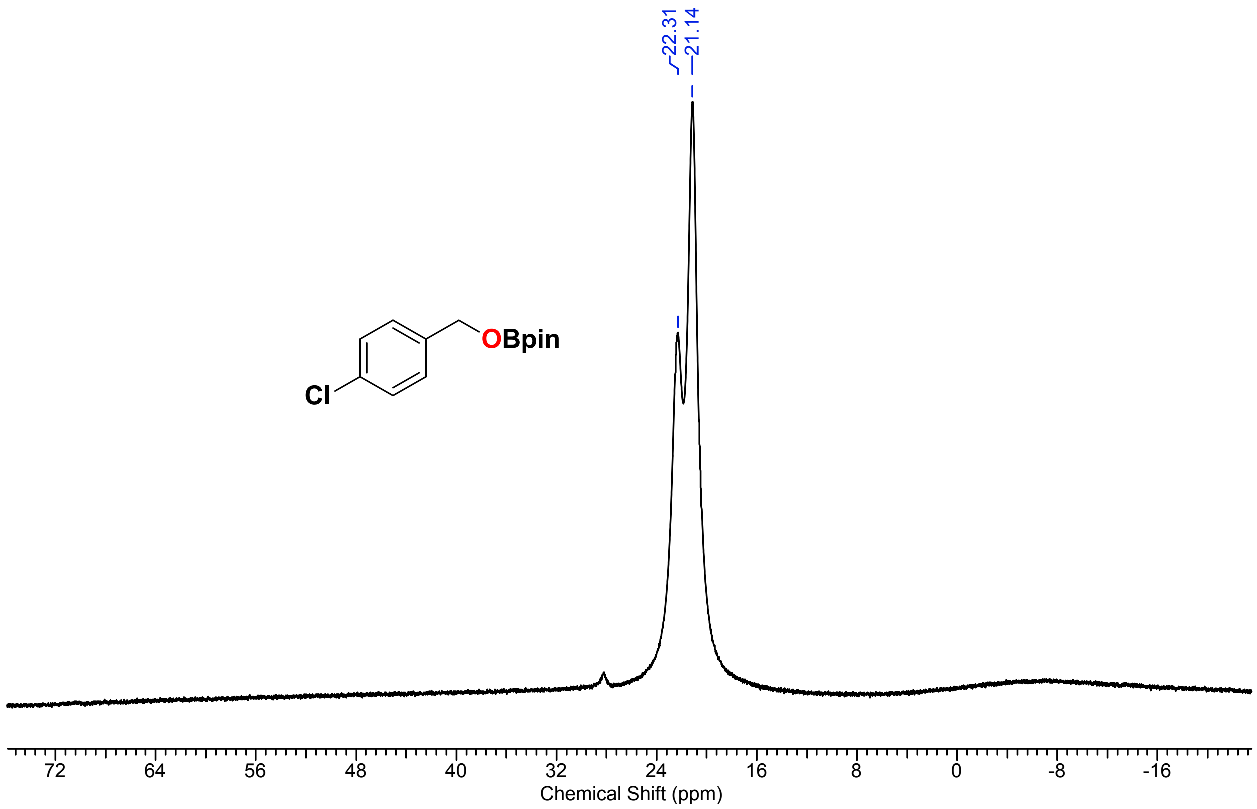


Figure S15. ^{11}B NMR spectrum (128.4 MHz, 25°C, $CDCl_3$) of **1e.**

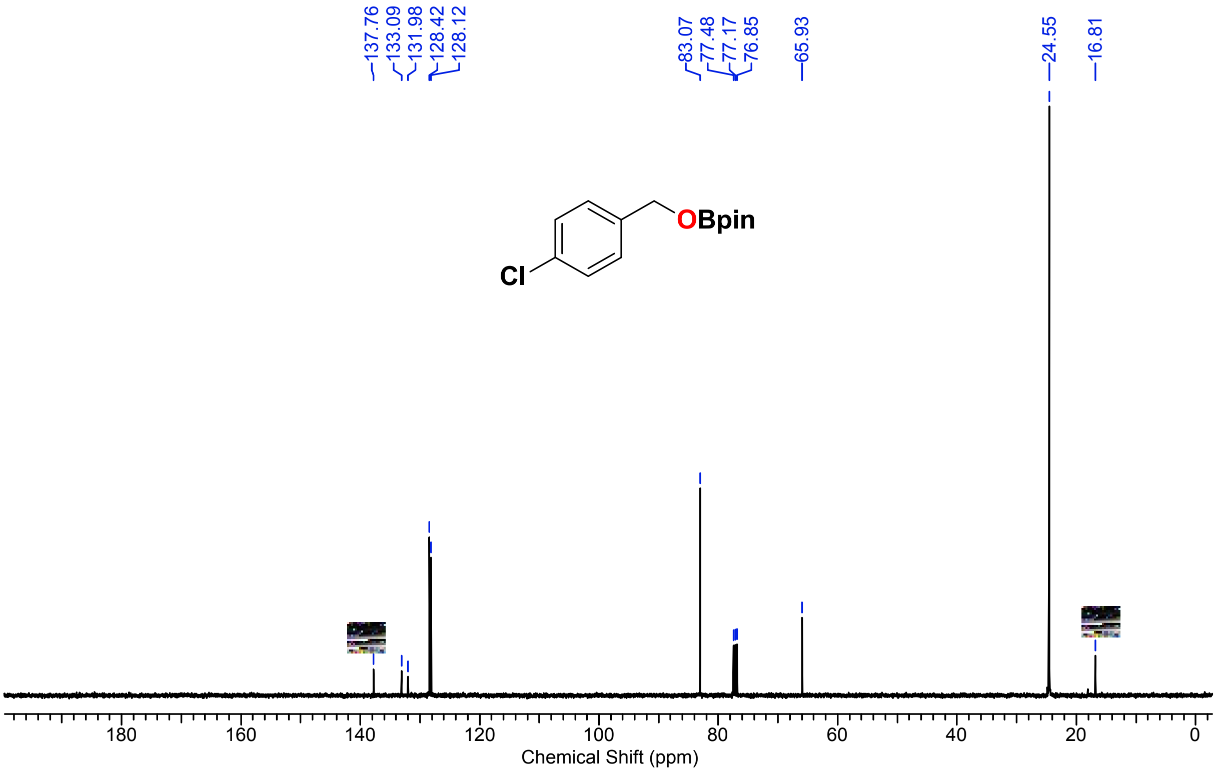


Figure S16. ^{13}C NMR spectrum (100 MHz, 25°C, $CDCl_3$) of **1e**

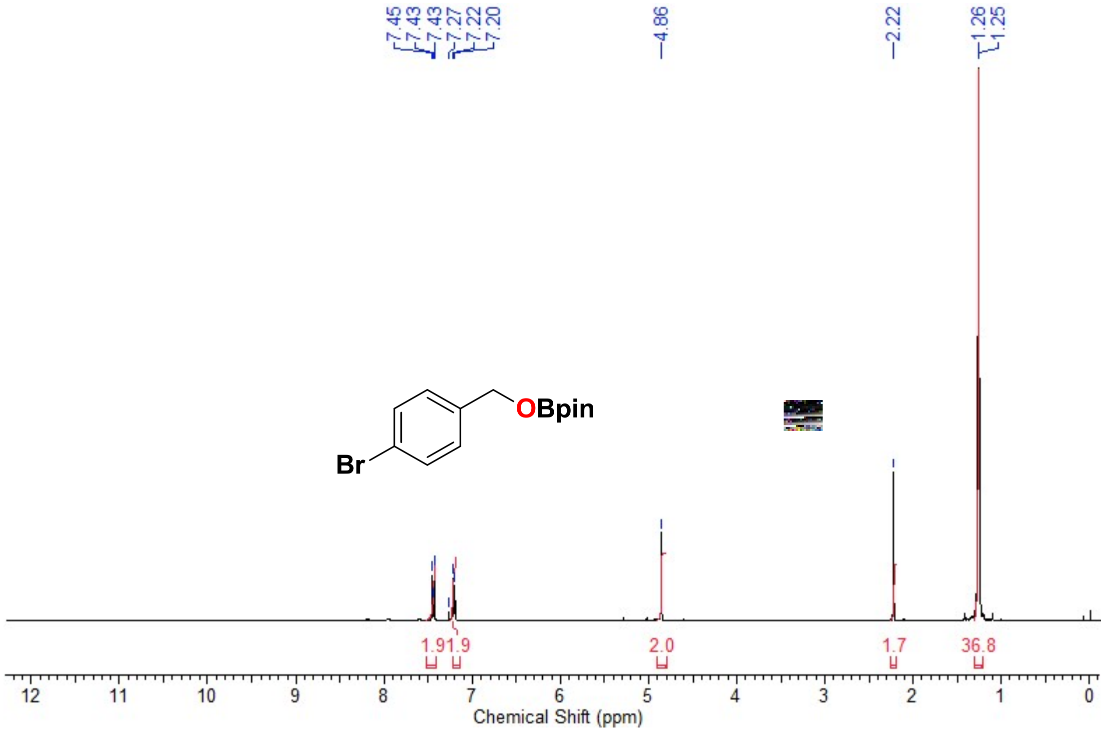


Figure FS17. ^{1}H NMR spectrum (400 MHz, 25°C, $CDCl_3$) of **1f.**

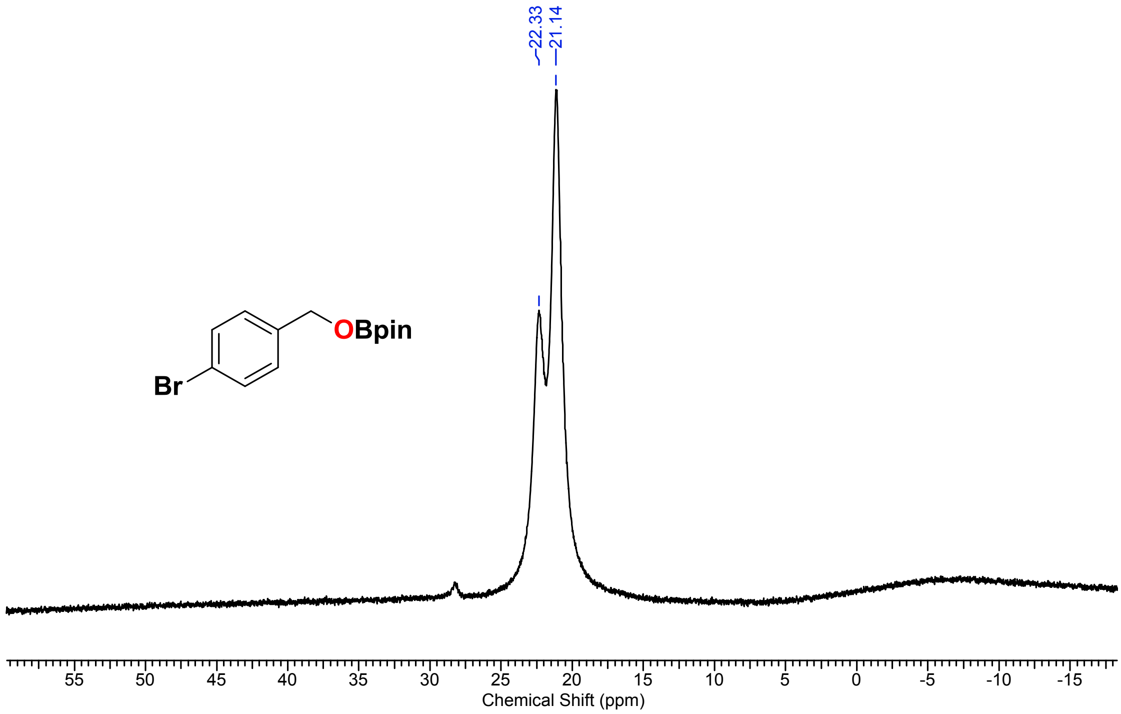


Figure S18. ^{11}B NMR spectrum (128.4 MHz, 25°C, $CDCl_3$) of **1f.**

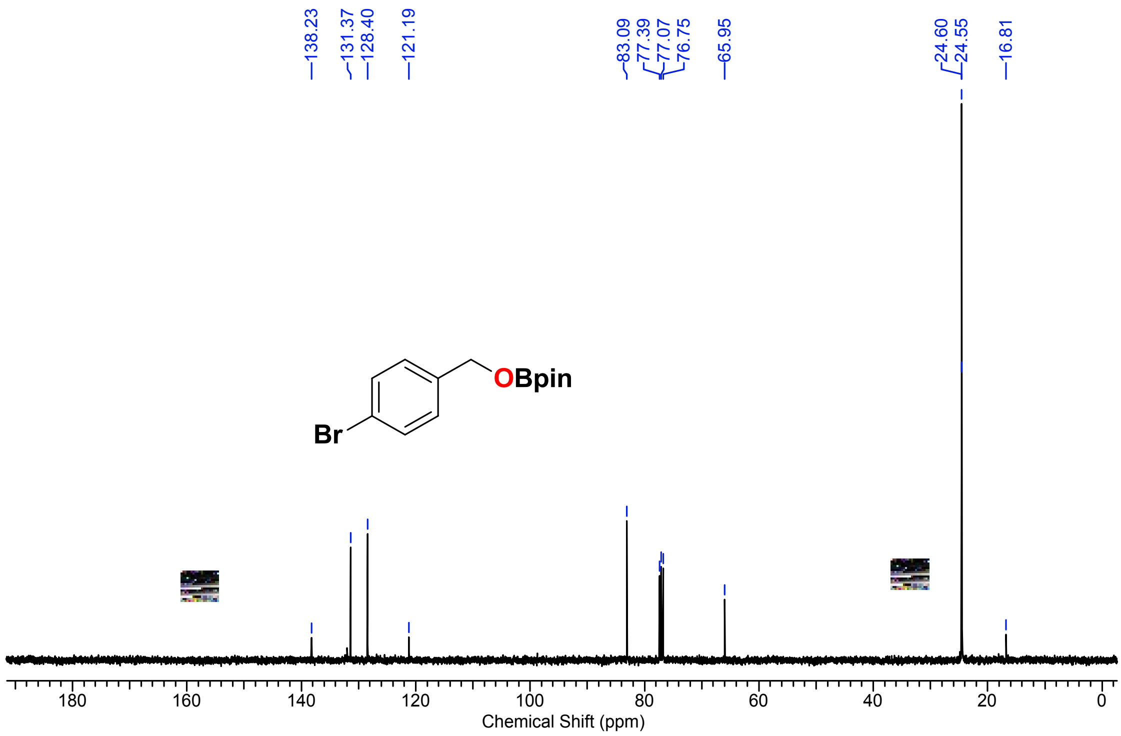


Figure FS19. ^{13}C NMR spectrum (100 MHz, 25°C, $CDCl_3$) of **1f.**

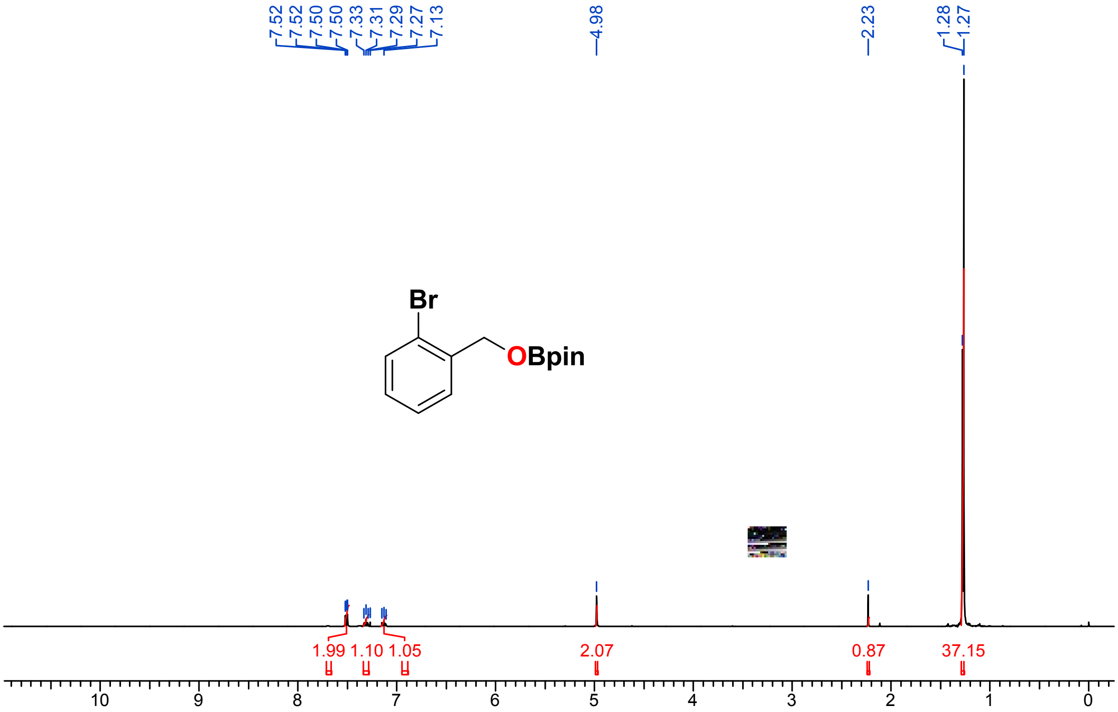


Figure FS20. ^{1}H NMR spectrum (400 MHz, 25°C, $CDCl_3$) of **1g.**

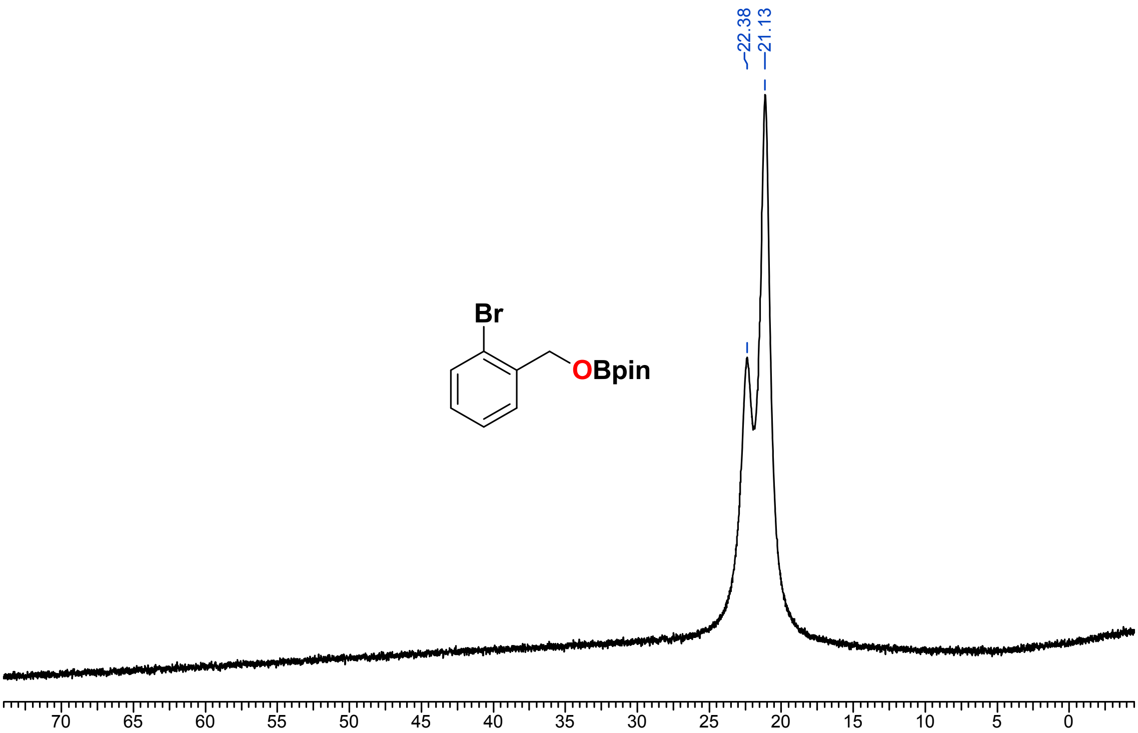


Figure S21. ^{11}B NMR spectrum (128.4 MHz, 25°C, $CDCl_3$) of **1g.**

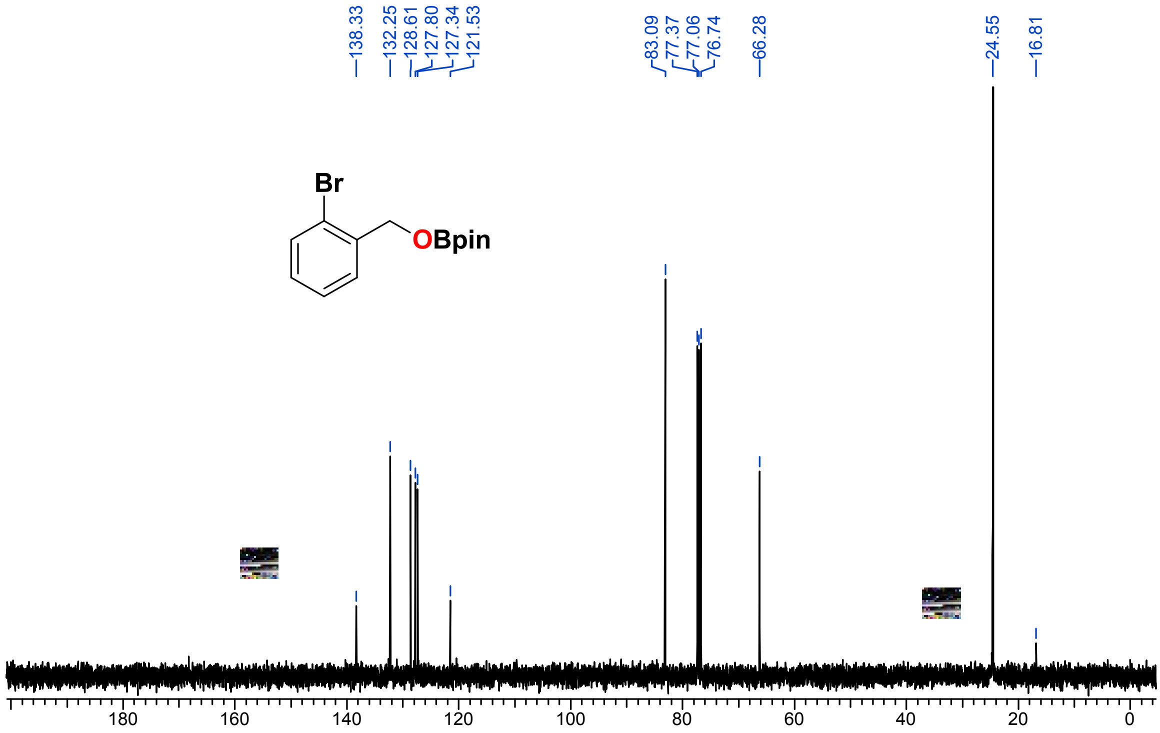


Figure FS22. ^{13}C NMR spectrum (100 MHz, 25°C, $CDCl_3$) of **1g.**

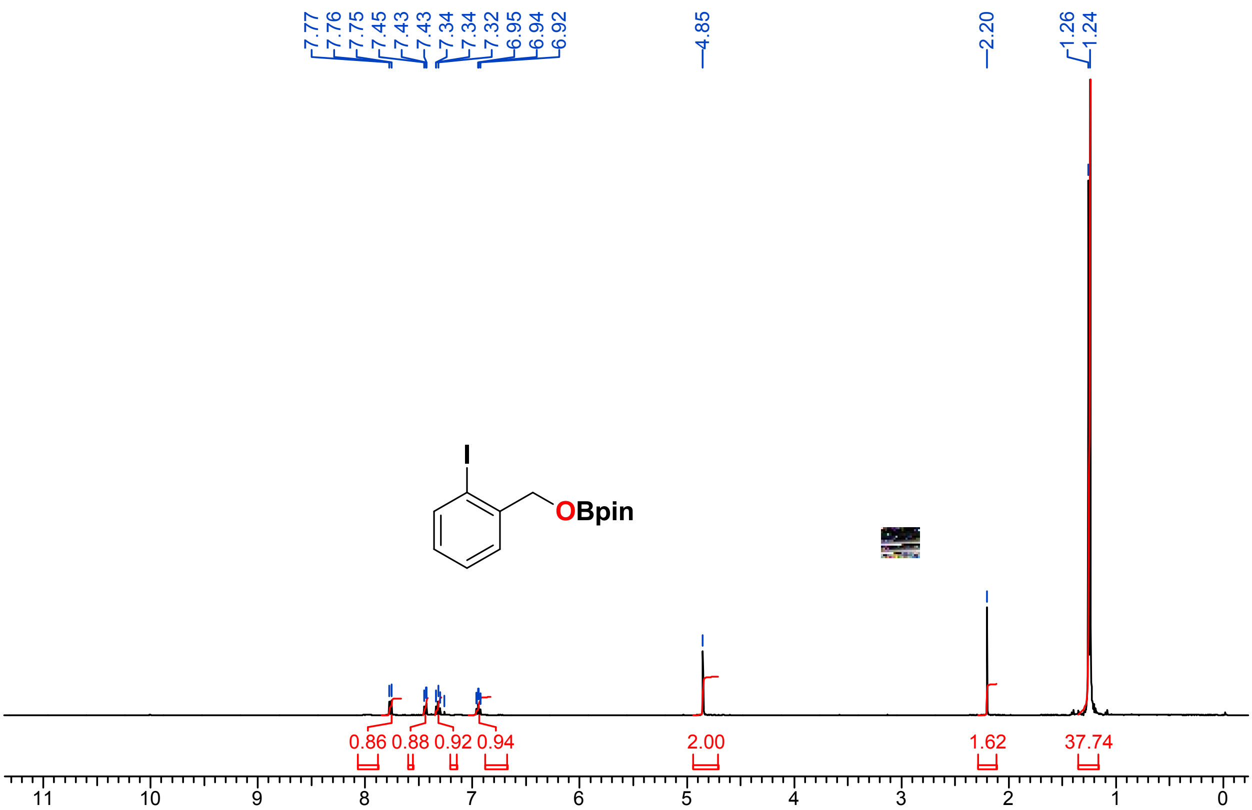


Figure FS23. ^{1}H NMR spectrum (400 MHz, 25°C, $CDCl_3$) of **1h.**

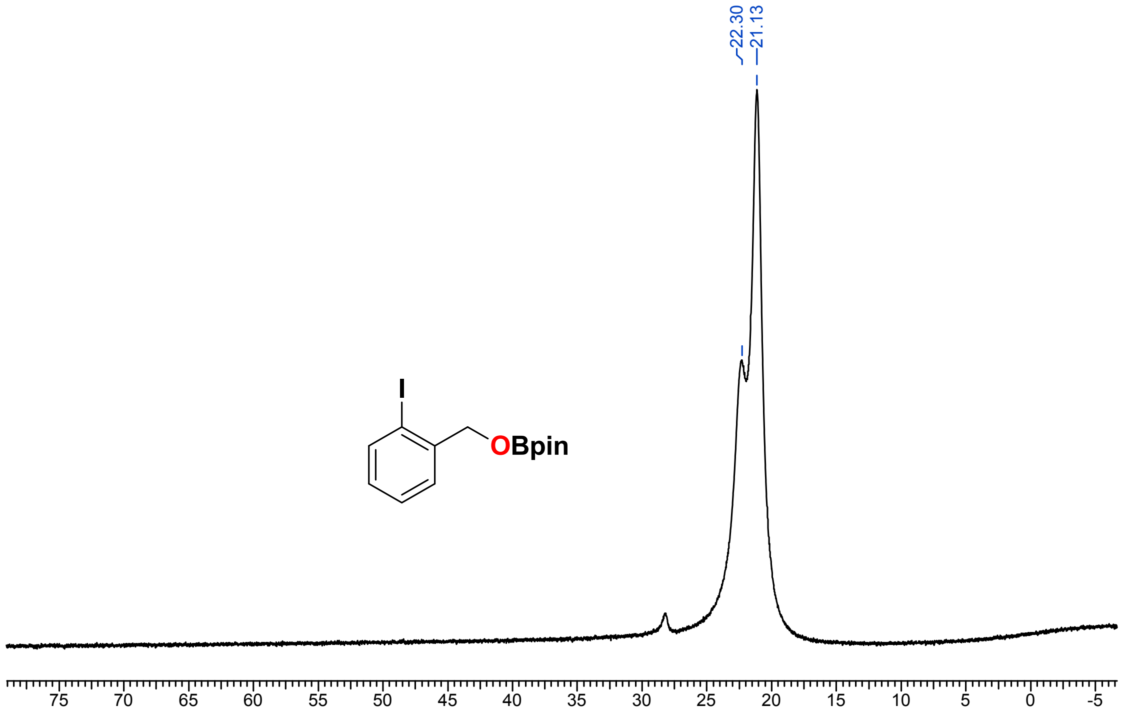


Figure S24. ^{11}B NMR spectrum (128.4 MHz, 25°C, $CDCl_3$) of **1h.**

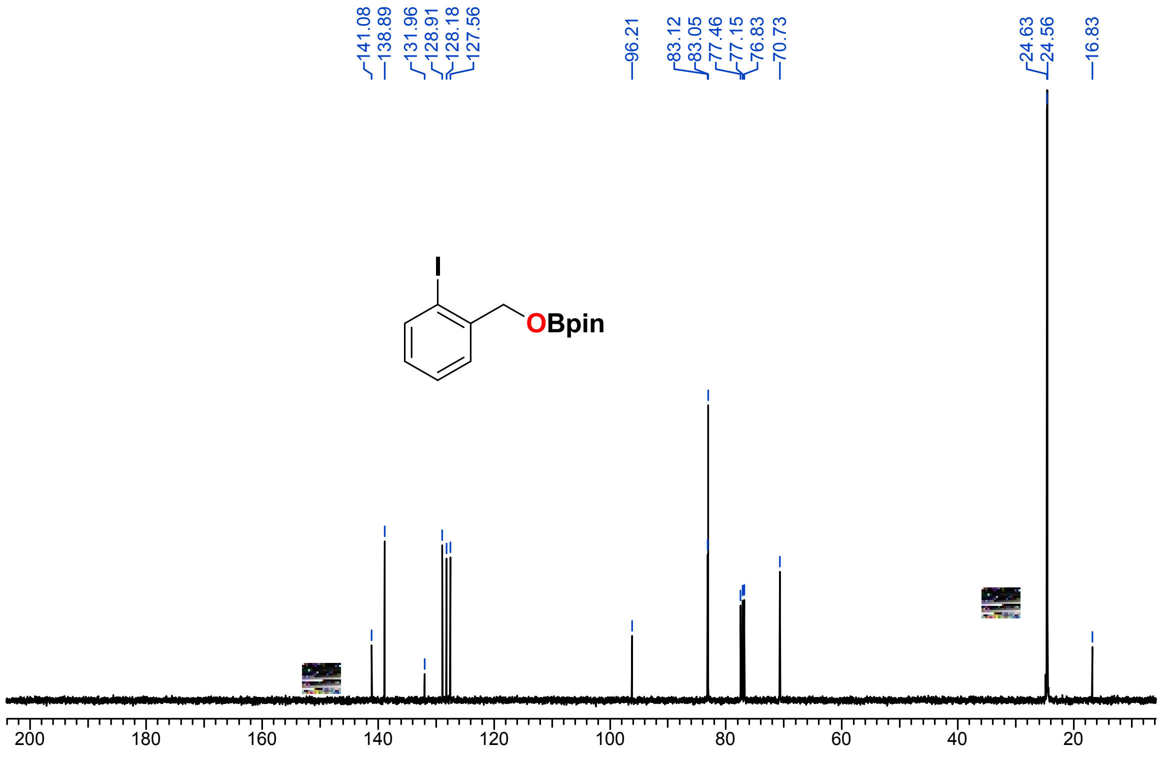


Figure FS25. ^{13}C NMR spectrum (100 MHz, 25°C, $CDCl_3$) of **1h.**

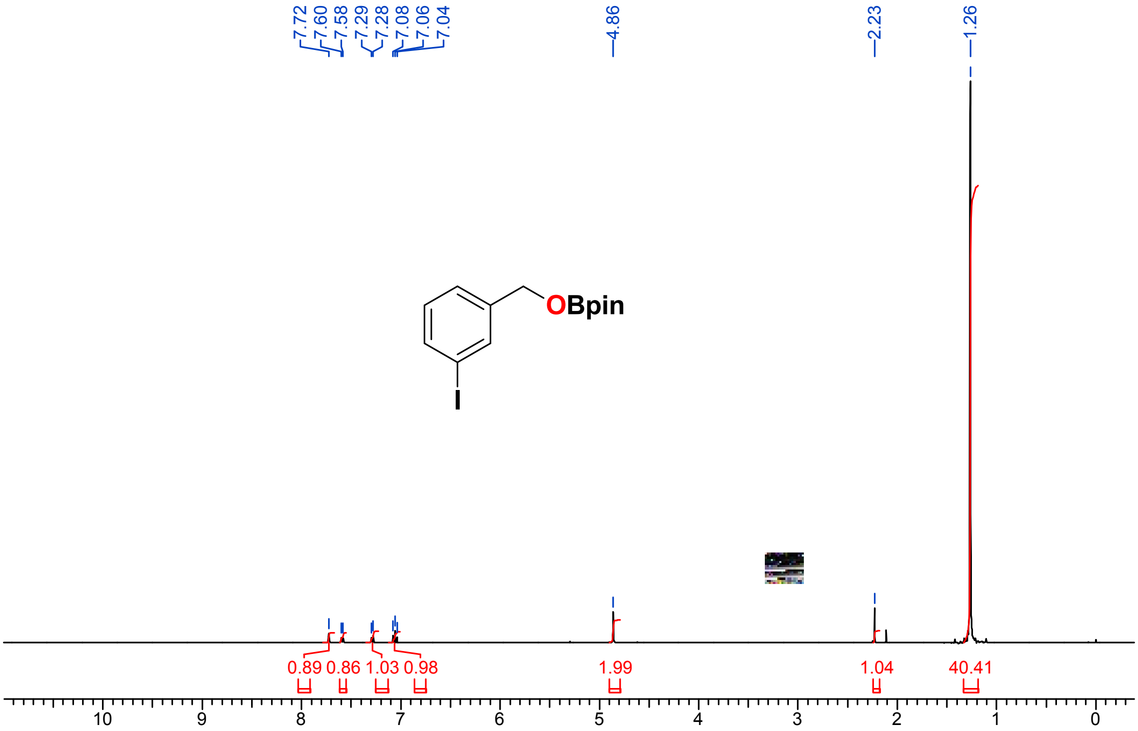


Figure FS26. ^{1}H NMR spectrum (400 MHz, 25°C, $CDCl_3$) of **1i.**

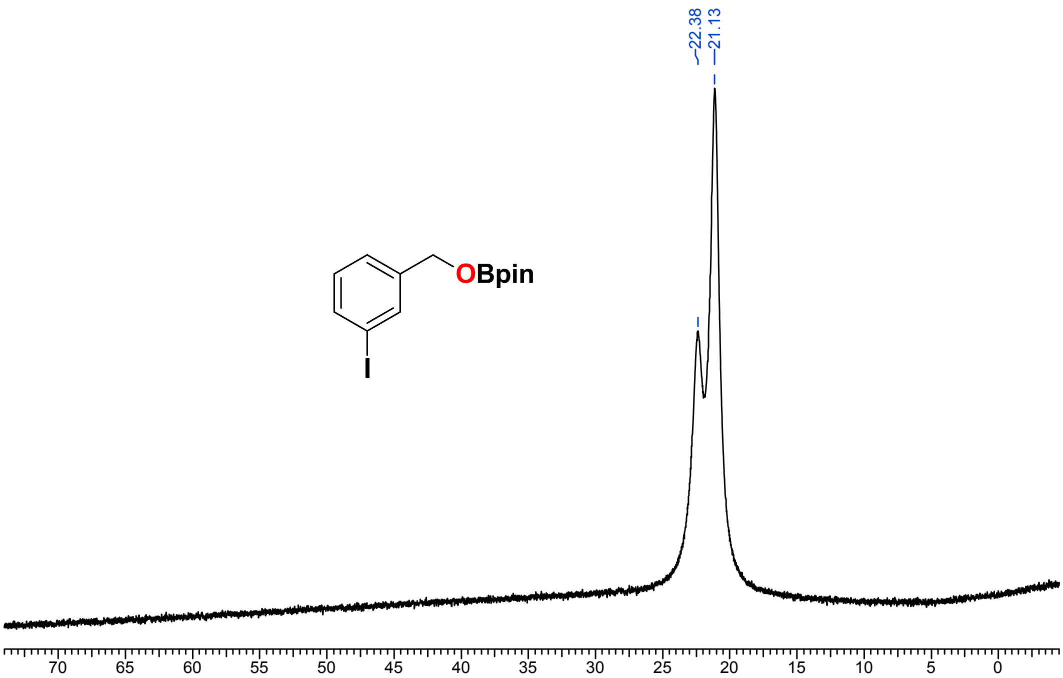


Figure FS27. ^{11}B NMR spectrum (128.4 MHz, 25°C, $CDCl_3$) of **1i.**

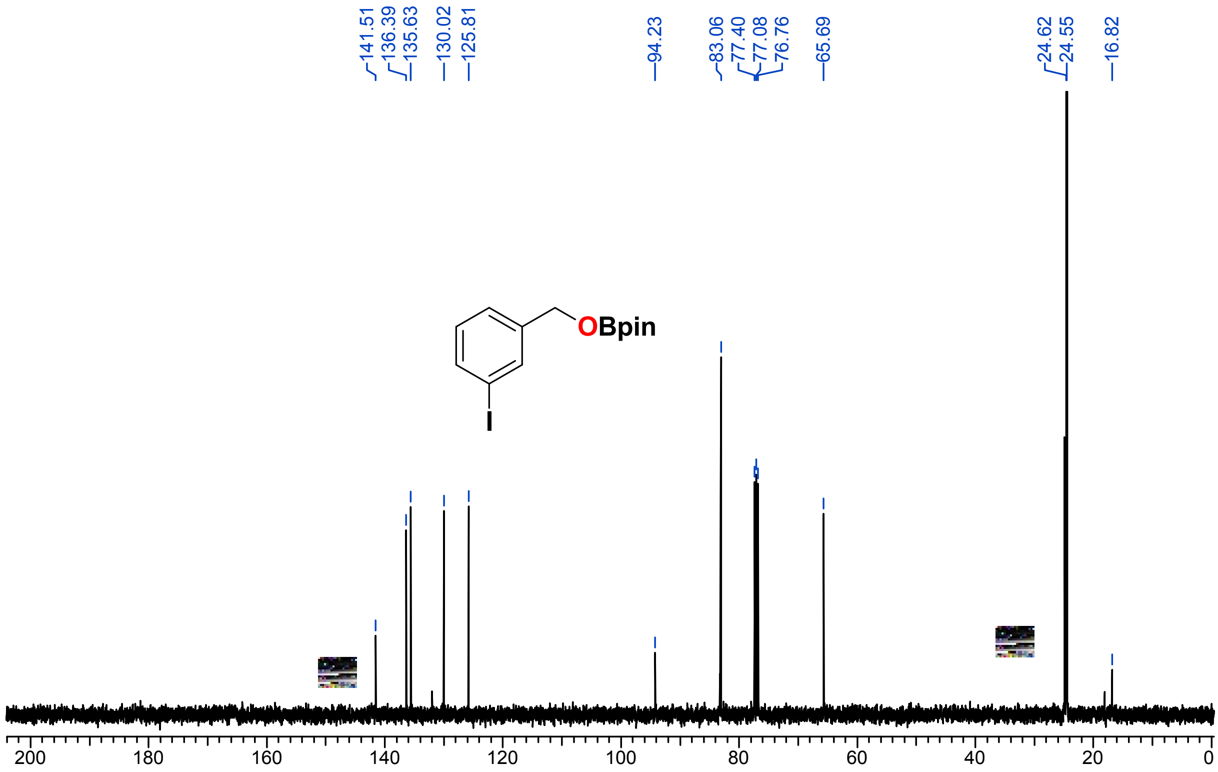


Figure FS28. ^{13}C NMR spectrum (100 MHz, 25°C, $CDCl_3$) of **1i.**

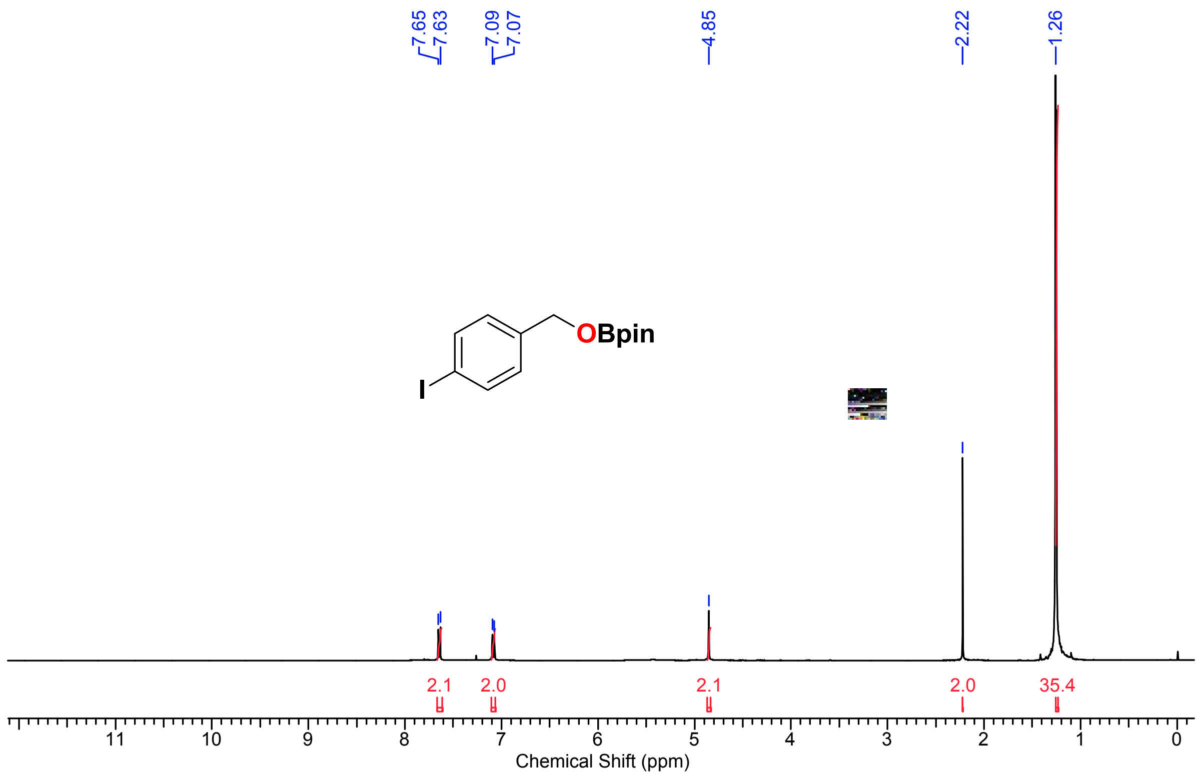


Figure FS29. ^{1}H NMR spectrum (400 MHz, 25°C, $CDCl_3$) of **1j.**

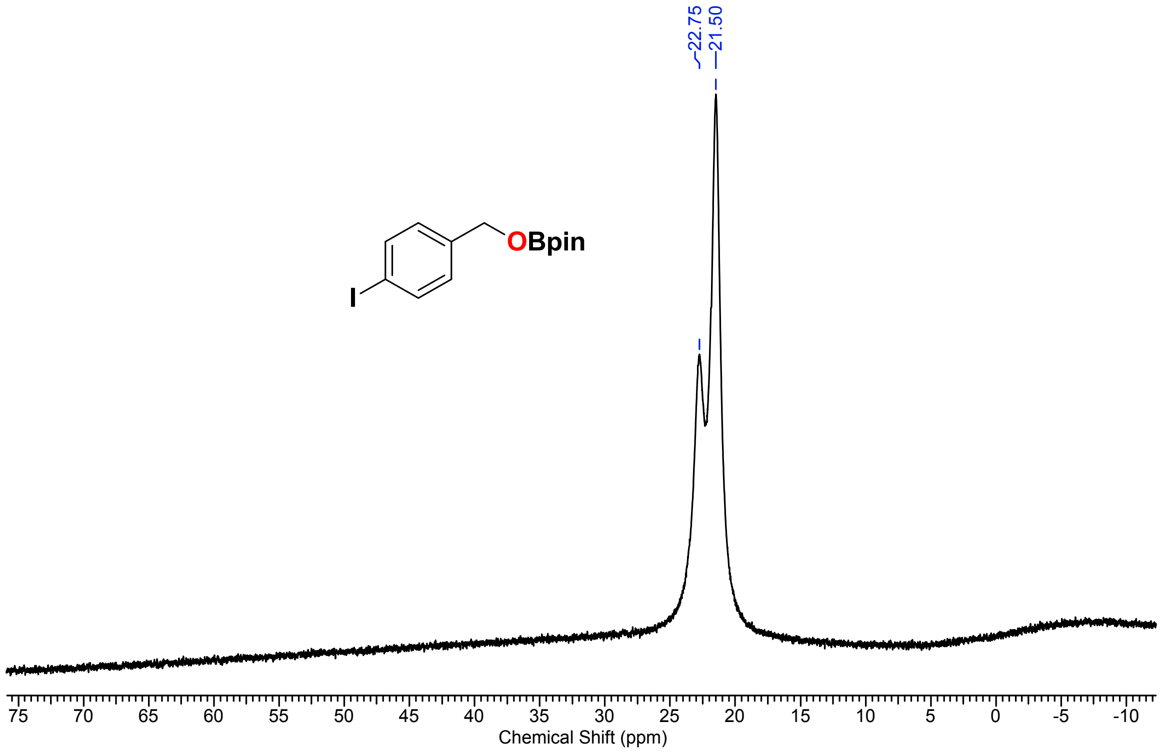


Figure FS30. ^{11}B NMR spectrum (128.4 MHz, 25°C, $CDCl_3$) of **1j.**

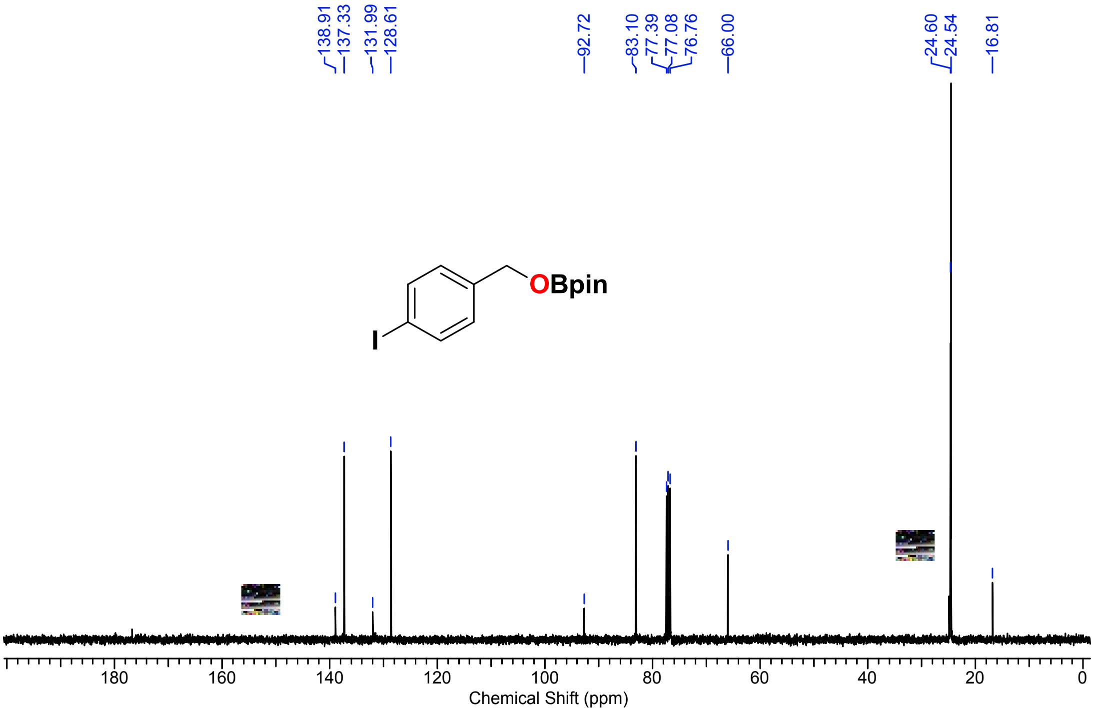


Figure FS31. ^{13}C NMR spectrum (100 MHz, 25°C, $CDCl_3$) of **1j.**

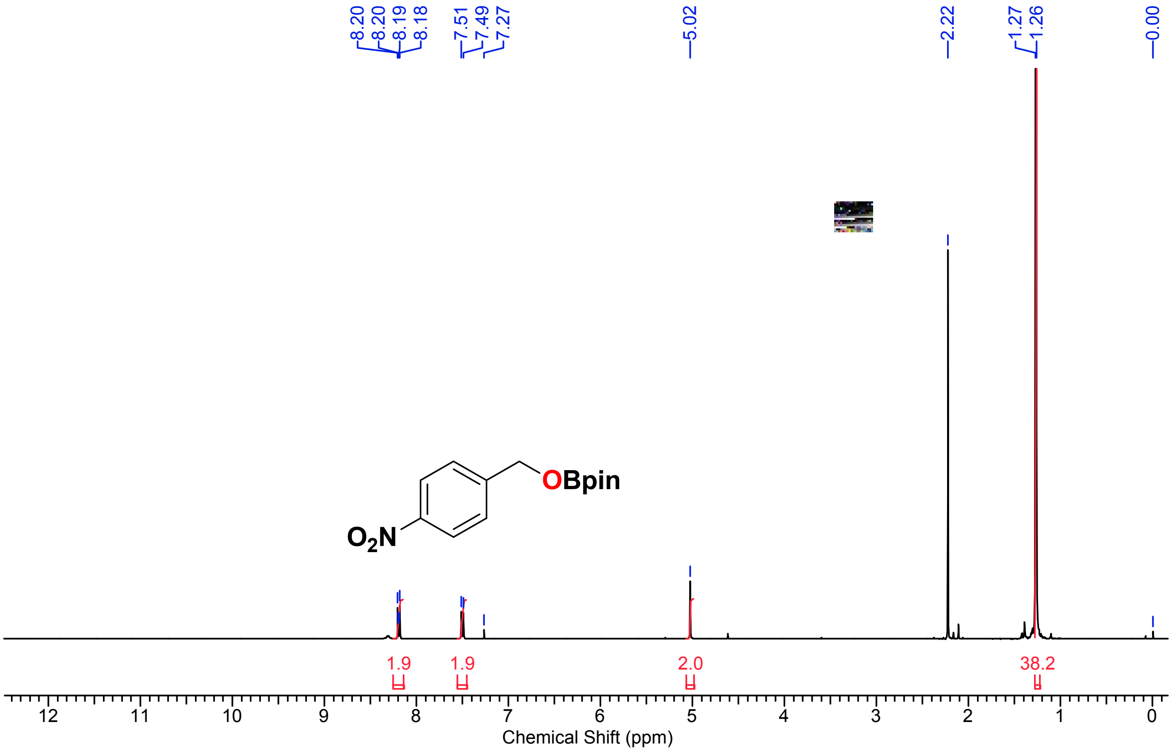


Figure FS32. ^{1}H NMR spectrum (400 MHz, 25°C, $CDCl_3$) of **1k.**

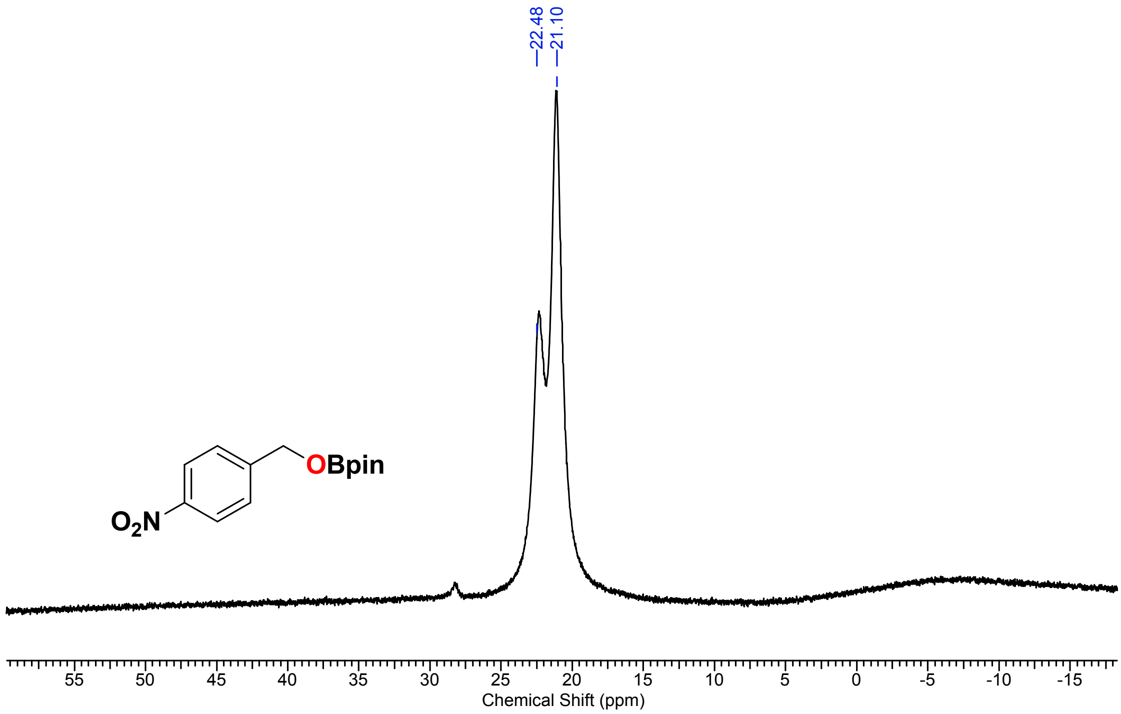


Figure S33. ^{11}B NMR spectrum (128.4 MHz, 25°C, $CDCl_3$) of **1k.**

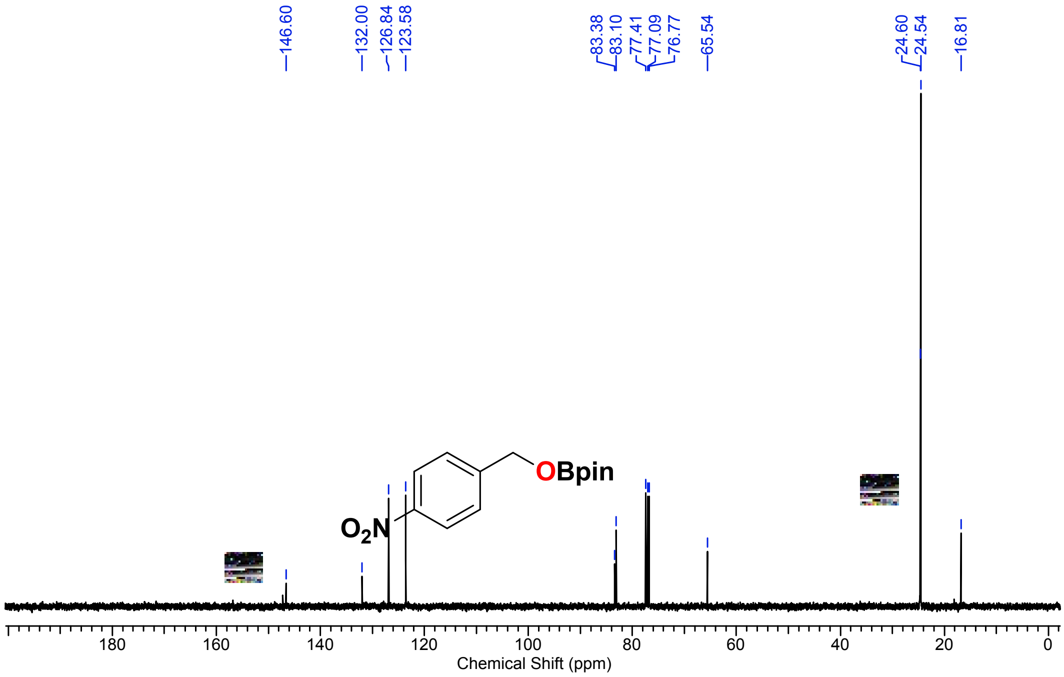


Figure FS34. ^{13}C NMR spectrum (100 MHz, 25°C, $CDCl_3$) of **1k.**

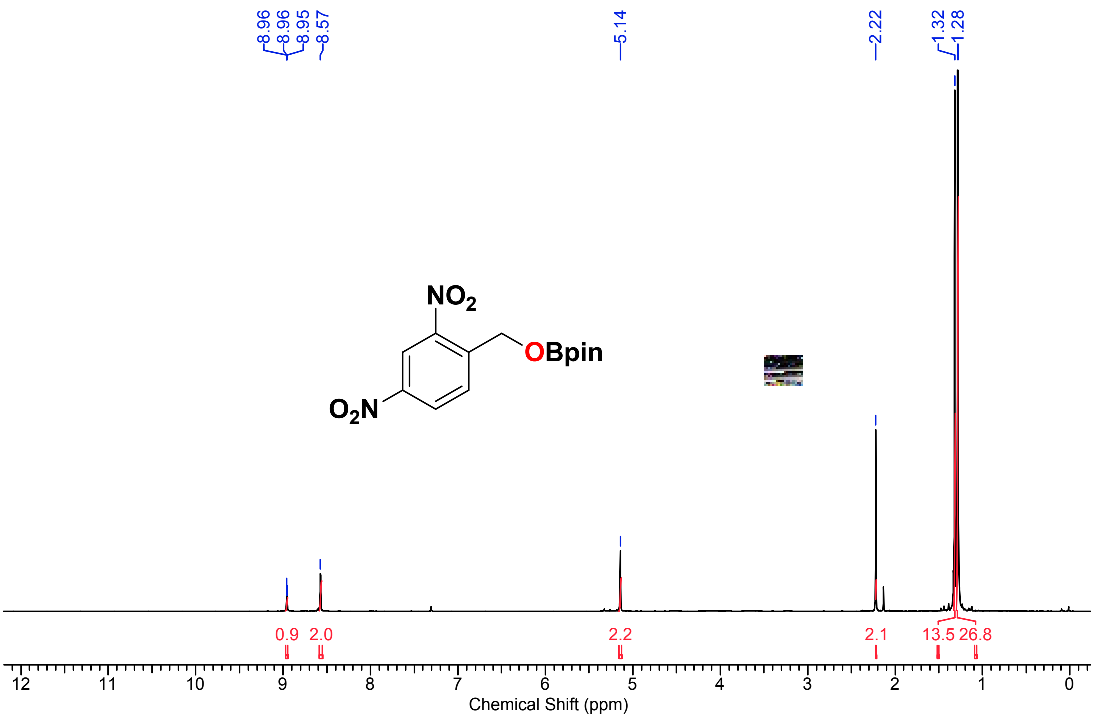


Figure FS35. ^{1}H NMR spectrum (400 MHz, 25°C, $CDCl_3$) of **1l.**

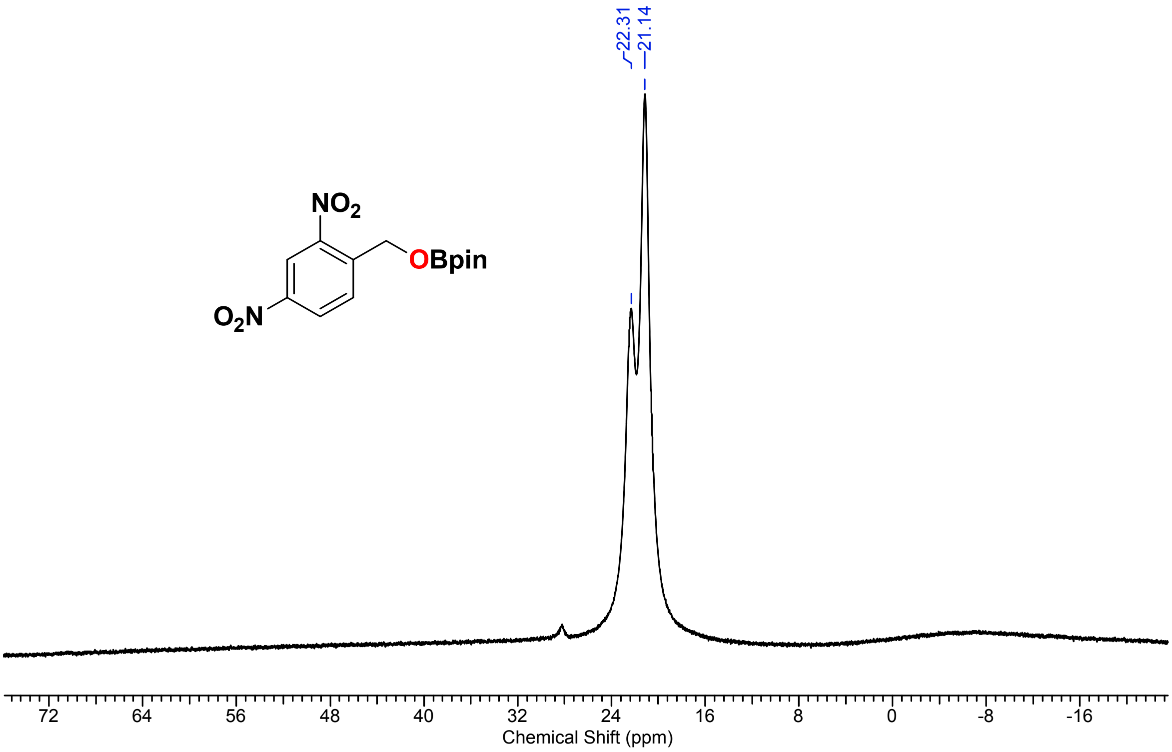


Figure S36. [11]B NMR spectrum (128.4 MHz, 25°C, $CDCl_3$) of **1l.**

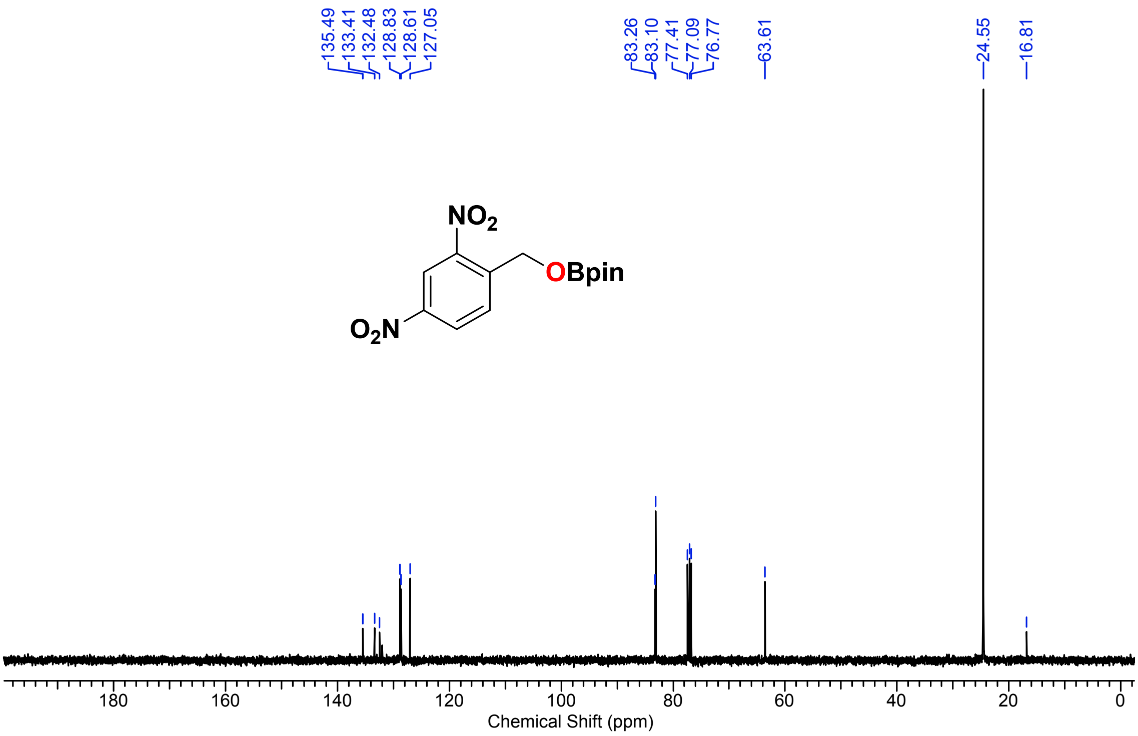


Figure FS37. [13]C NMR spectrum (100 MHz, 25°C, $CDCl_3$) of **1l.**

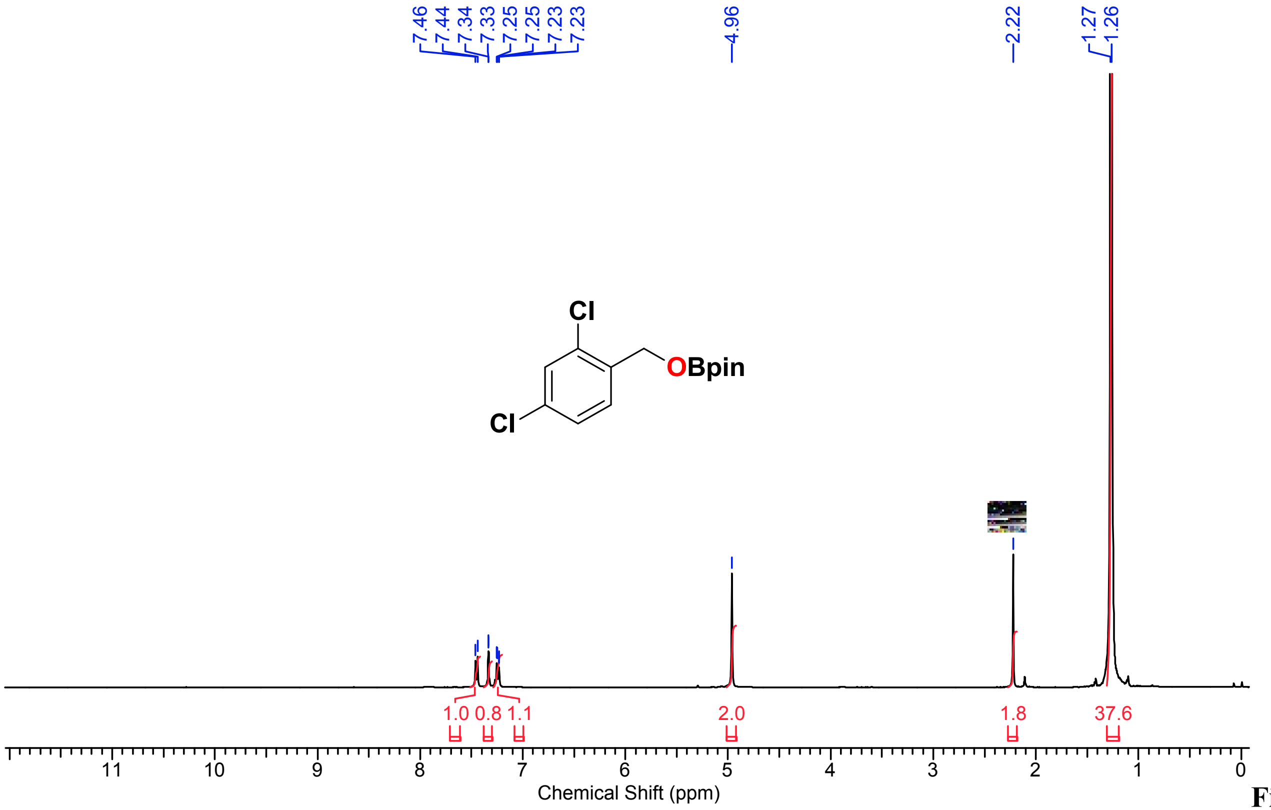


Figure FS38. ^{1}H NMR spectrum (400 MHz, 25°C, $CDCl_3$) of **1m.**

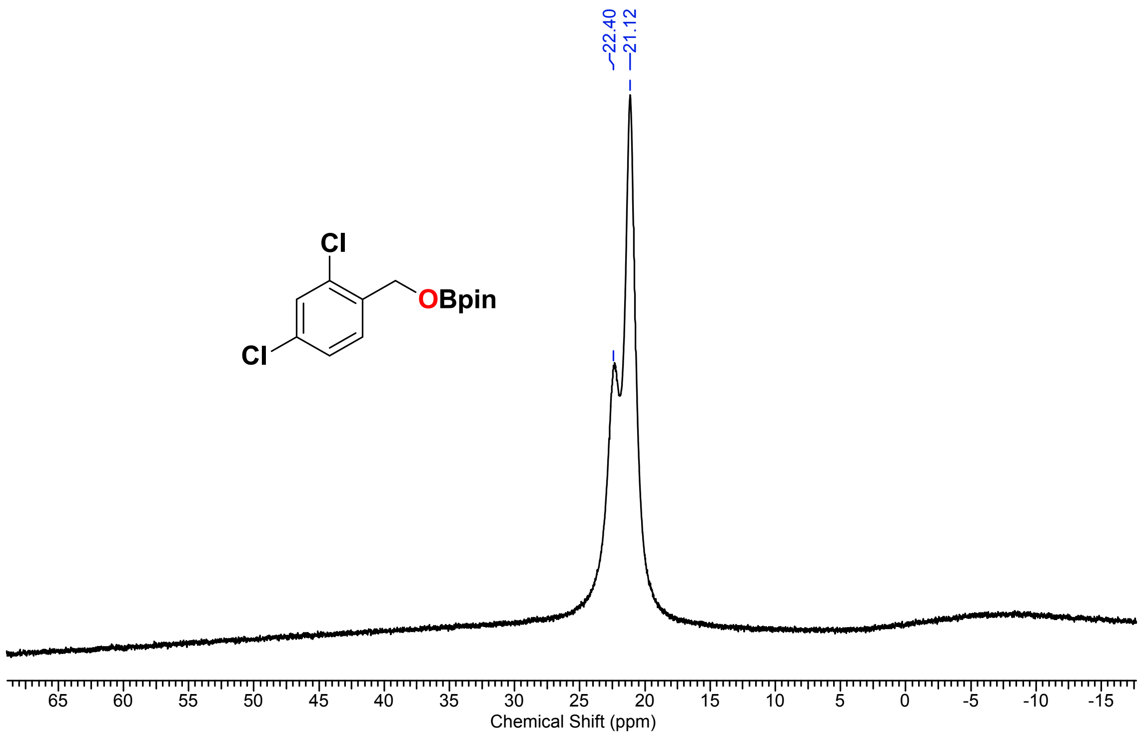


Figure S39. ^{11}B NMR spectrum (128.4 MHz, 25°C, $CDCl_3$) of **1m.**

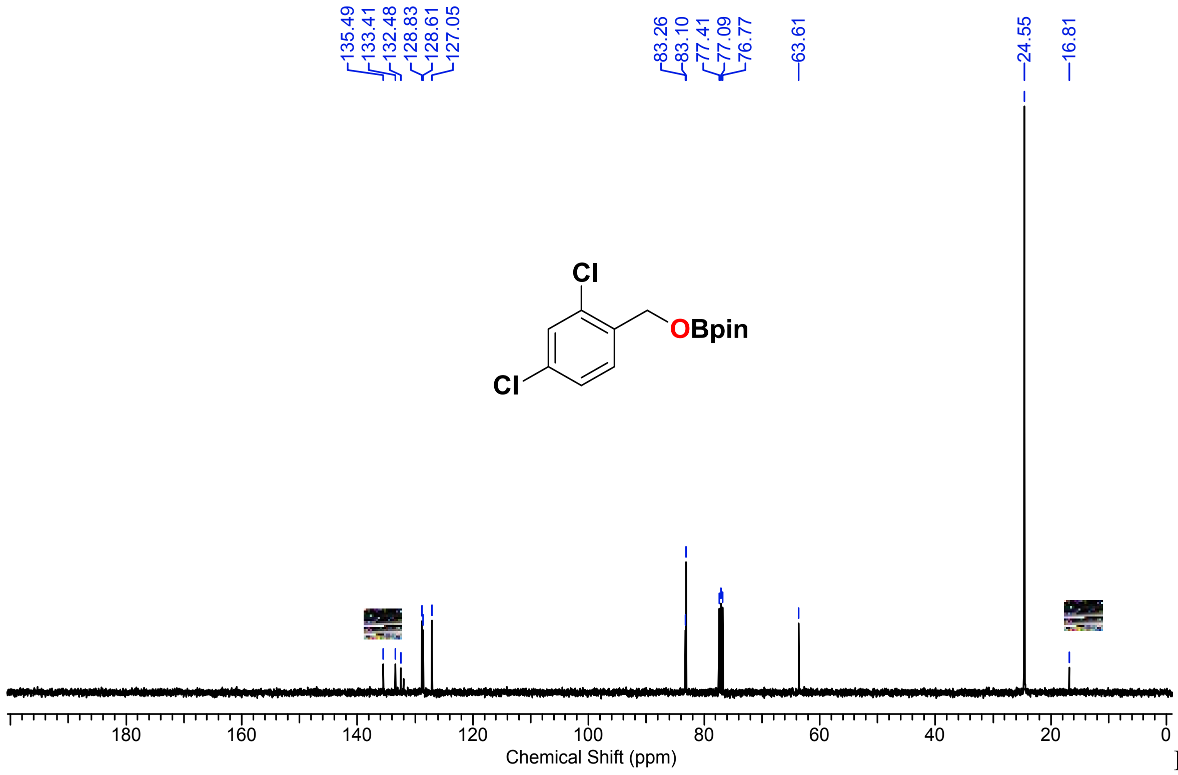


Figure FS40. ^{13}C NMR spectrum (100 MHz, 25°C, $CDCl_3$) of **1m.**

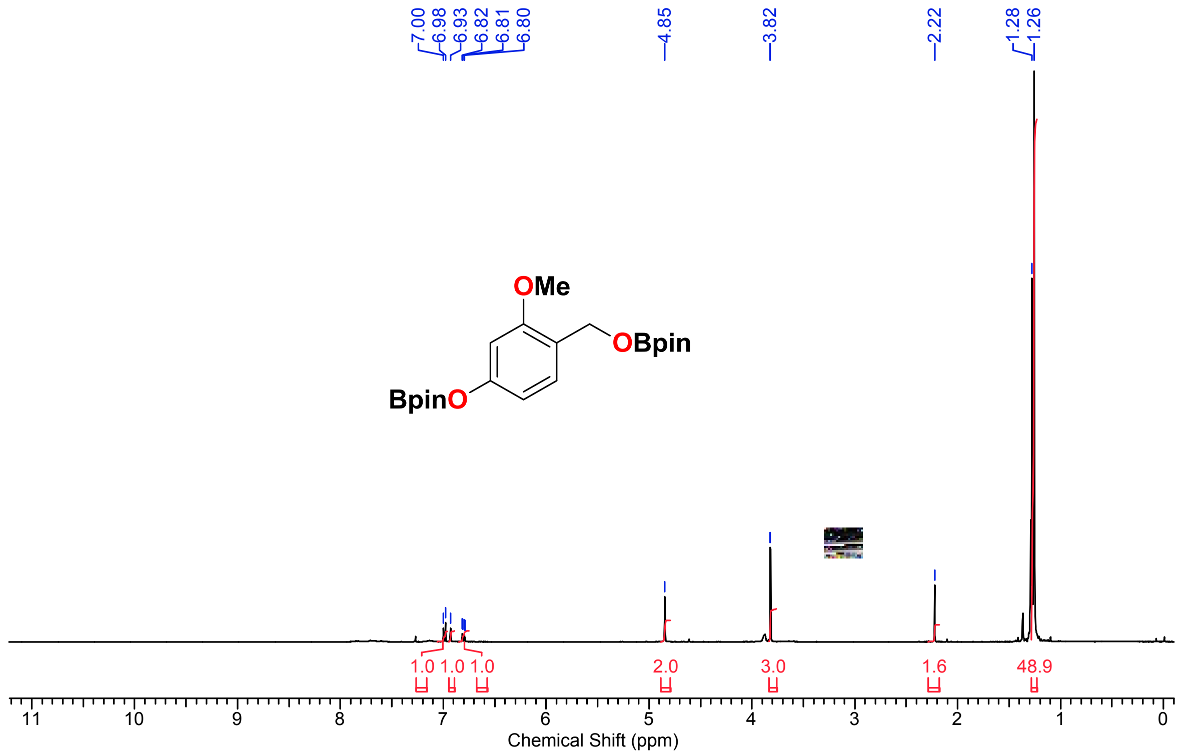


Figure FS41. ^{1}H NMR spectrum (400 MHz, 25°C, $CDCl_3$) of **1n.**

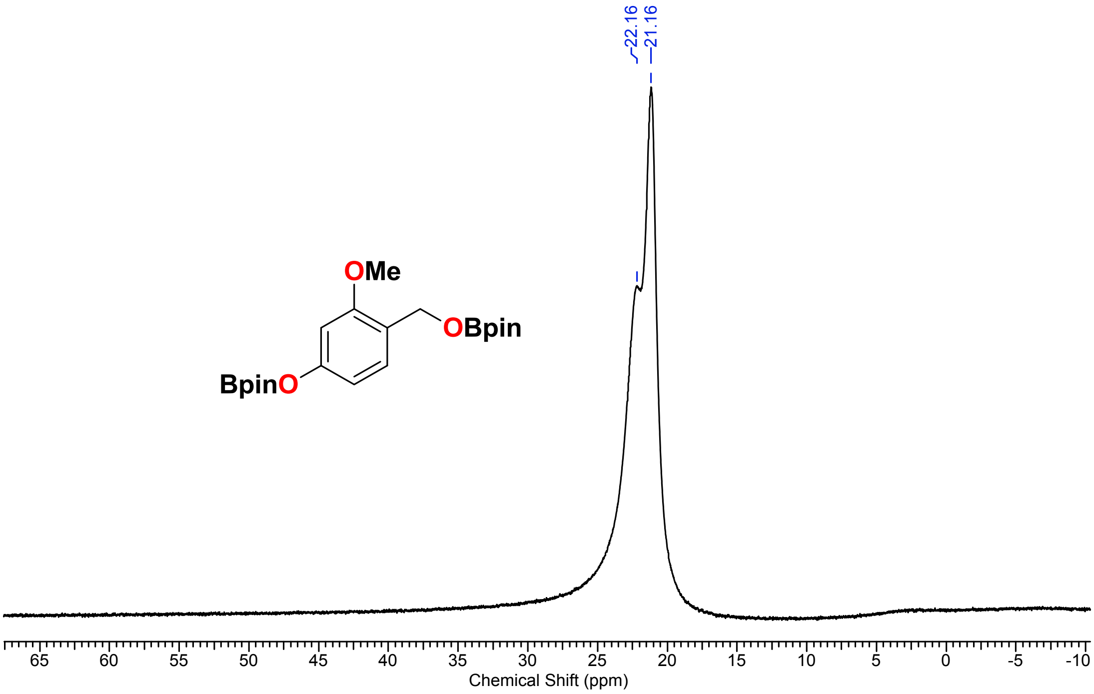


Figure S42. ^{11}B NMR spectrum (128.4 MHz, 25°C, $CDCl_3$) of **1n.**

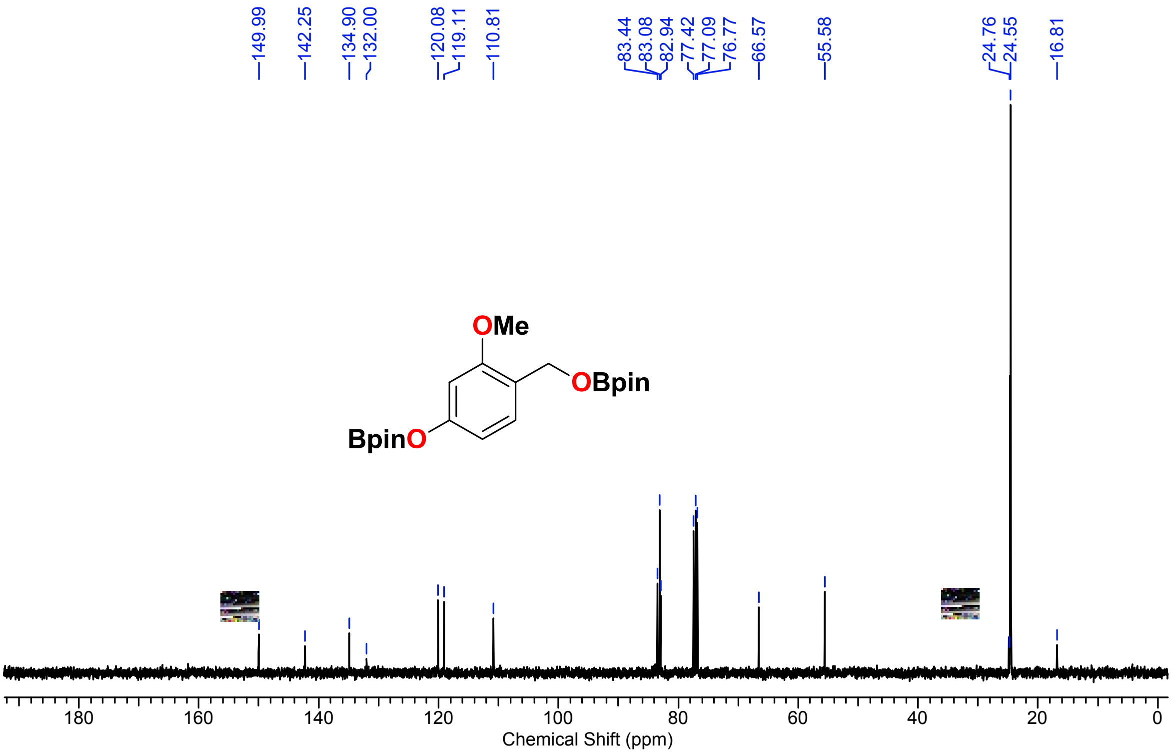


Figure FS43. ^{13}C NMR spectrum (100 MHz, 25°C, $CDCl_3$) of **1n.**

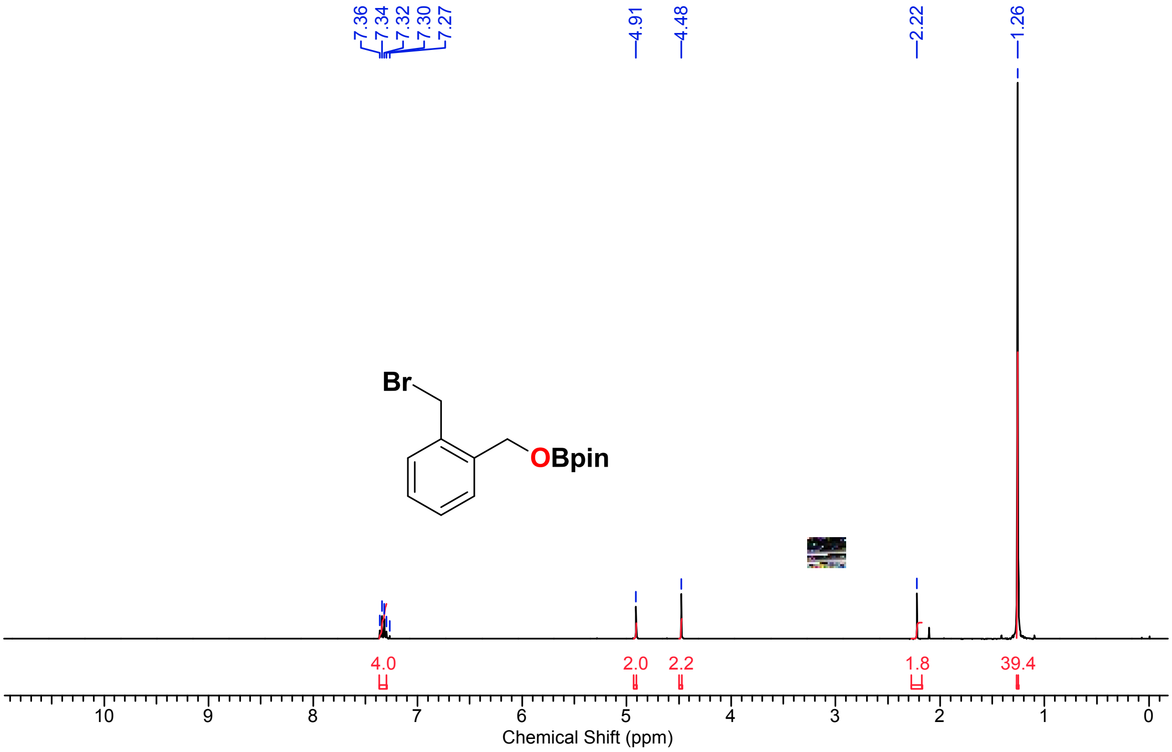


Figure FS44. ^{1}H NMR spectrum (400 MHz, 25°C, $CDCl_3$) of **1o.**

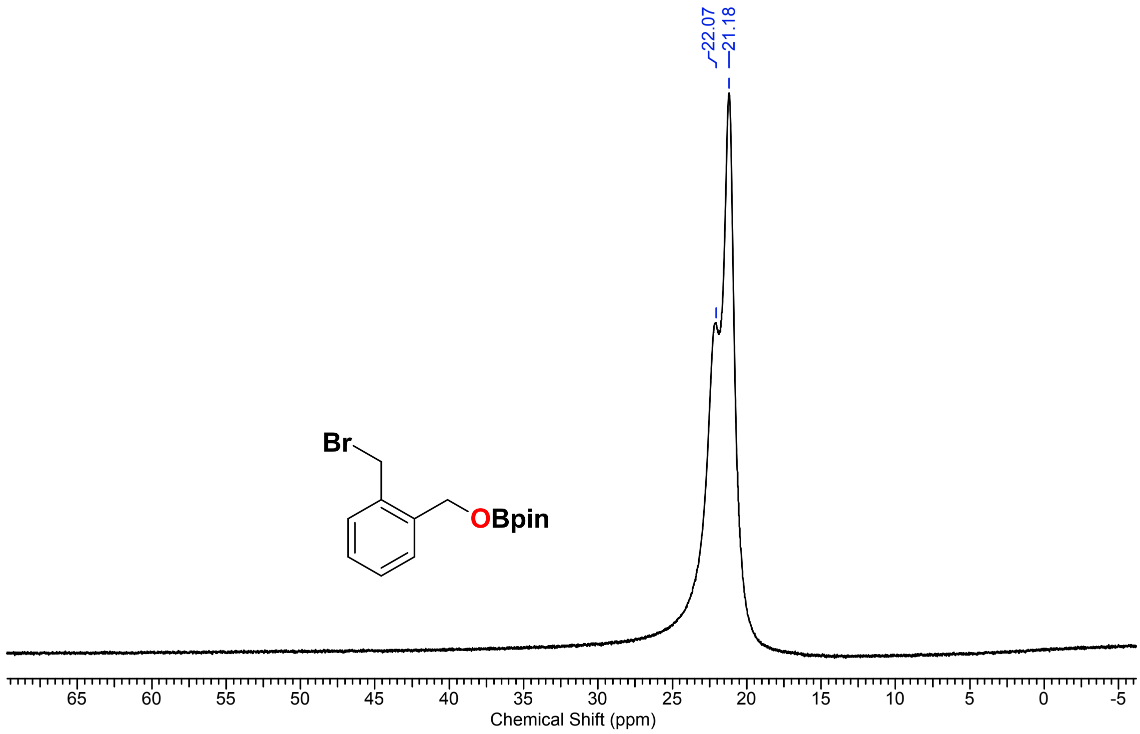


Figure S45. ^{11}B NMR spectrum (128.4 MHz, 25°C, $CDCl_3$) of **1o.**

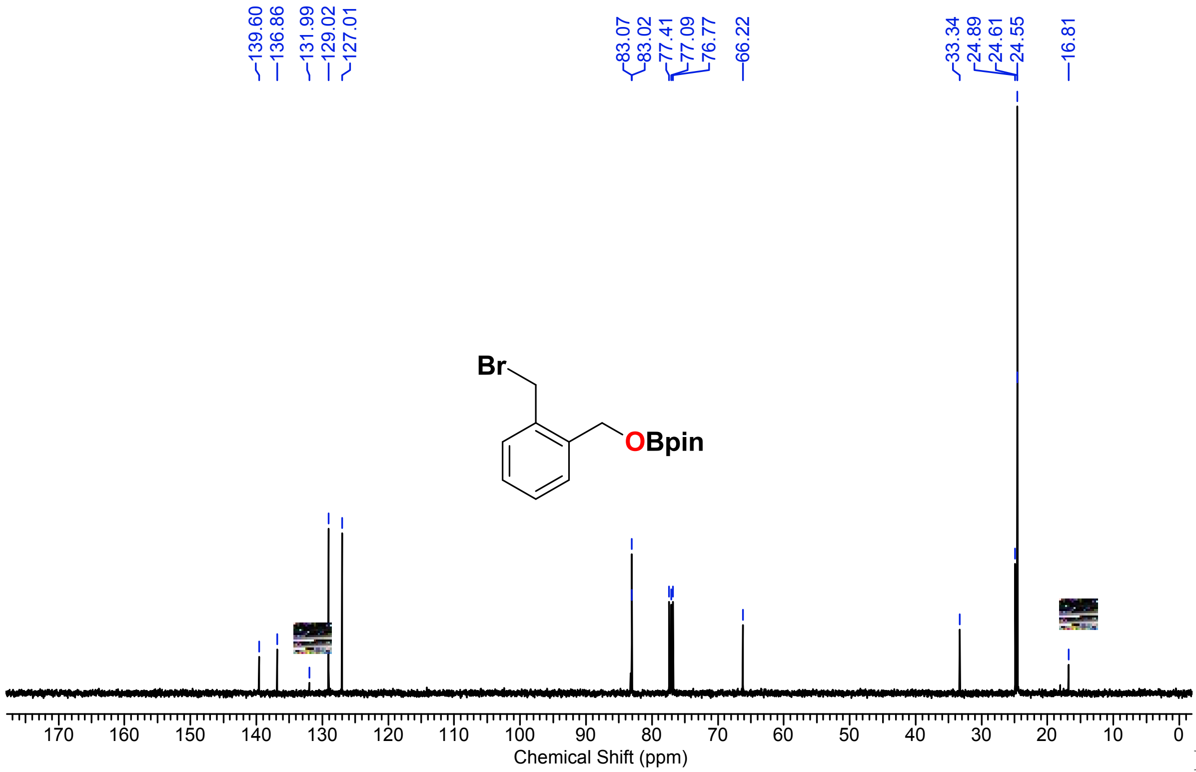


Figure FS46. ^{13}C NMR spectrum (100 MHz, 25°C, $CDCl_3$) of **1o.**

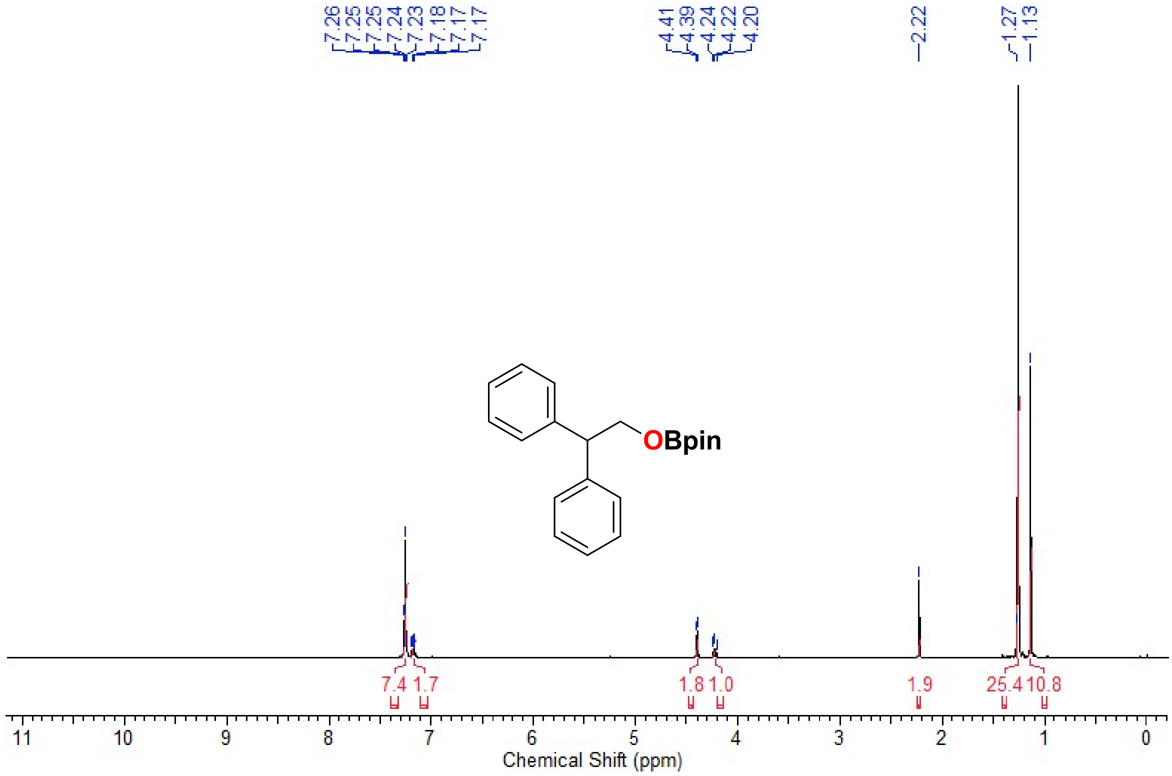


Figure FS47. ^{1}H NMR spectrum (400 MHz, 25°C, $CDCl_3$) of **1p.**

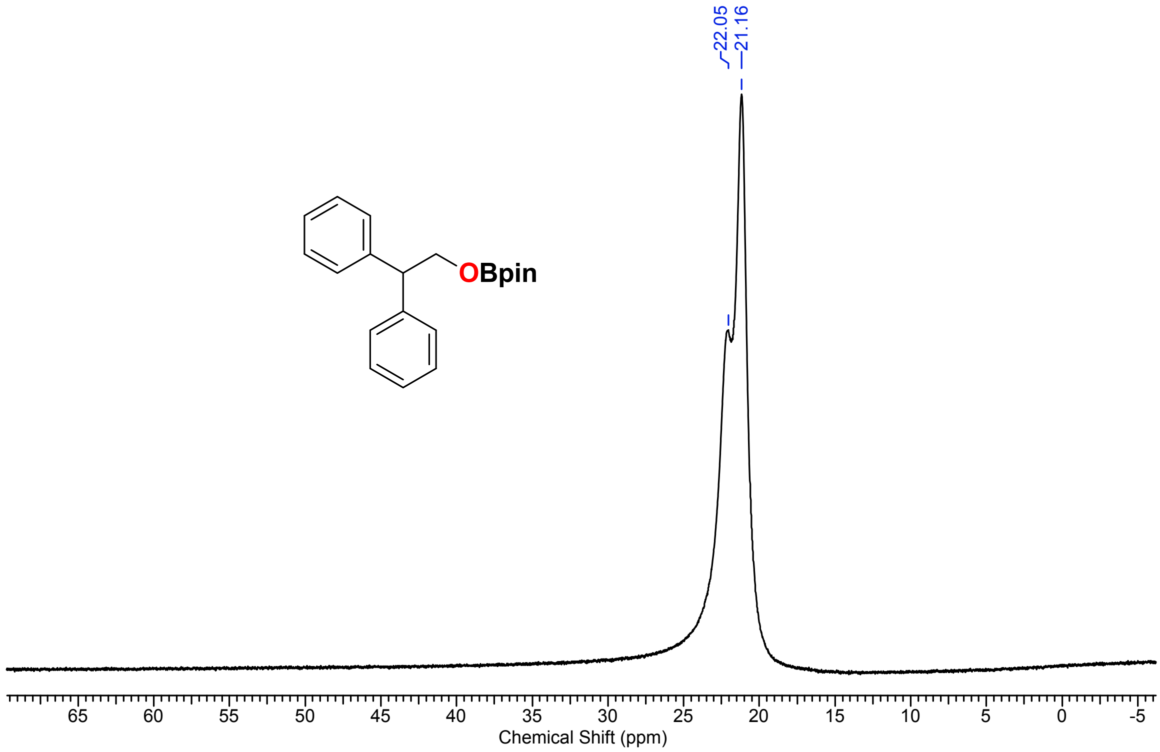


Figure S48. ^{11}B NMR spectrum (128.4 MHz, 25°C, $CDCl_3$) of **1p.**

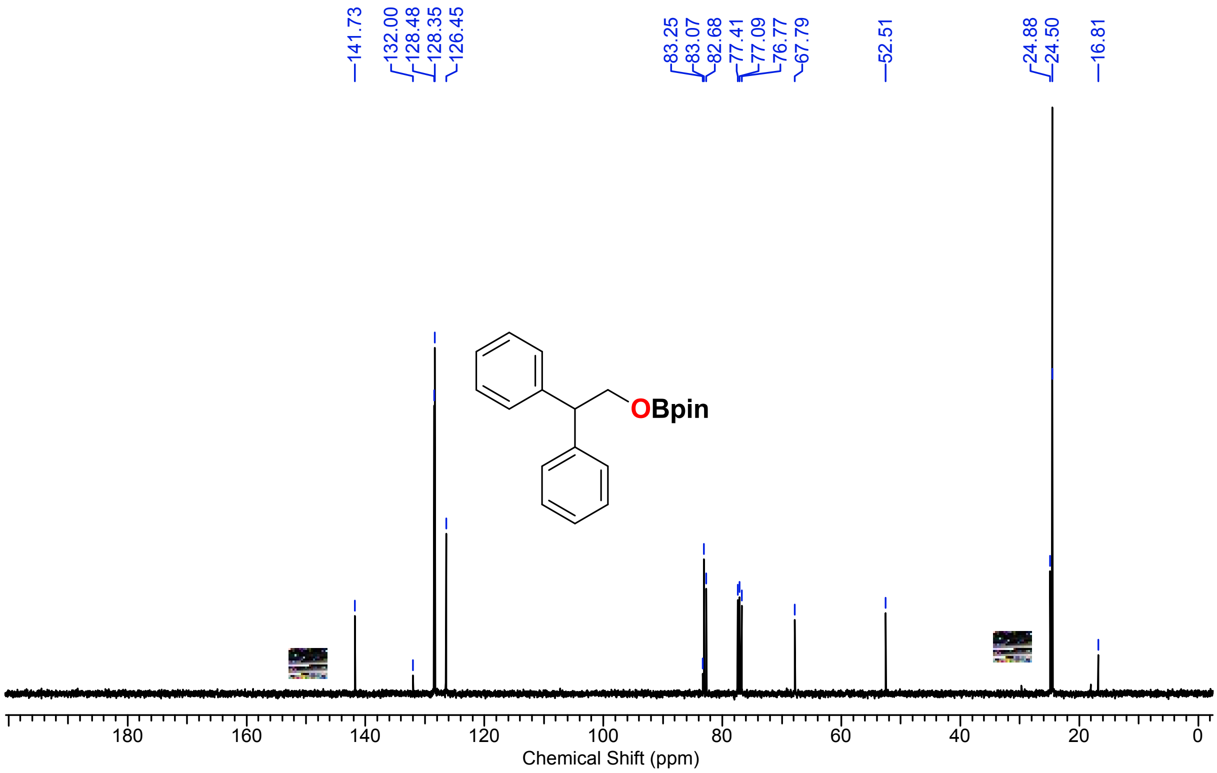


Figure FS49. ^{13}C NMR spectrum (100 MHz, 25°C, $CDCl_3$) of **1p.**

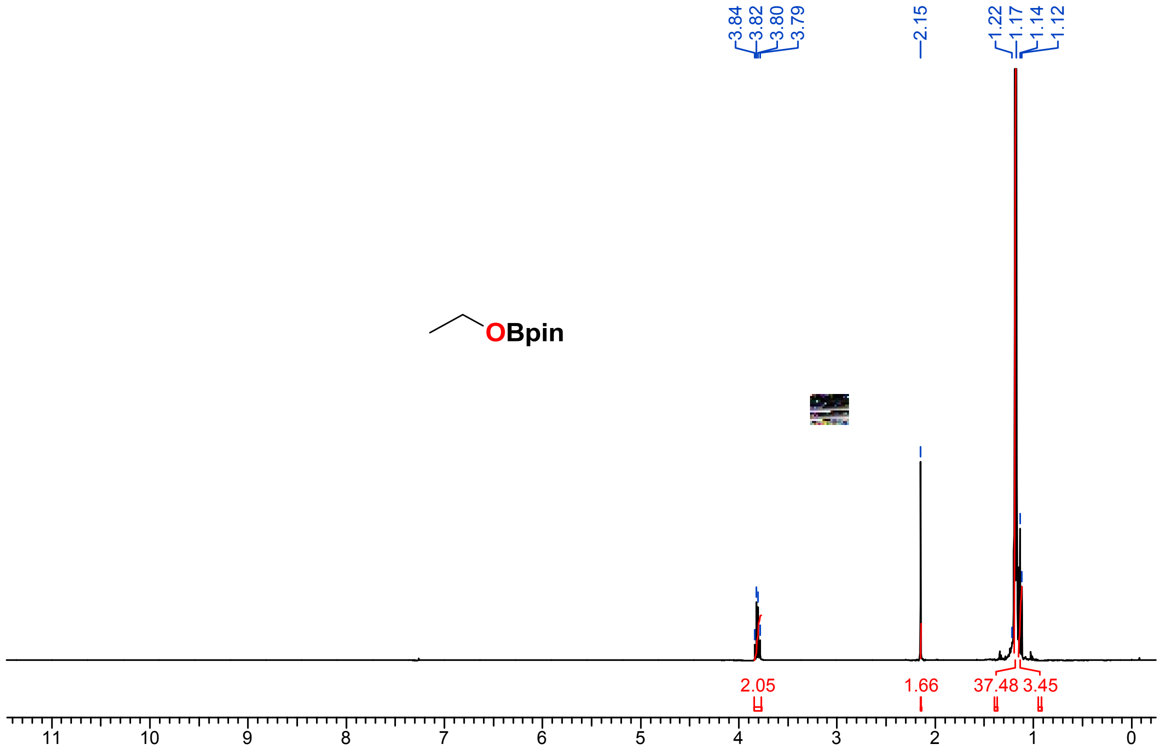


Figure FS50. ^{1}H NMR spectrum (400 MHz, 25°C, $CDCl_3$) of **1q.**

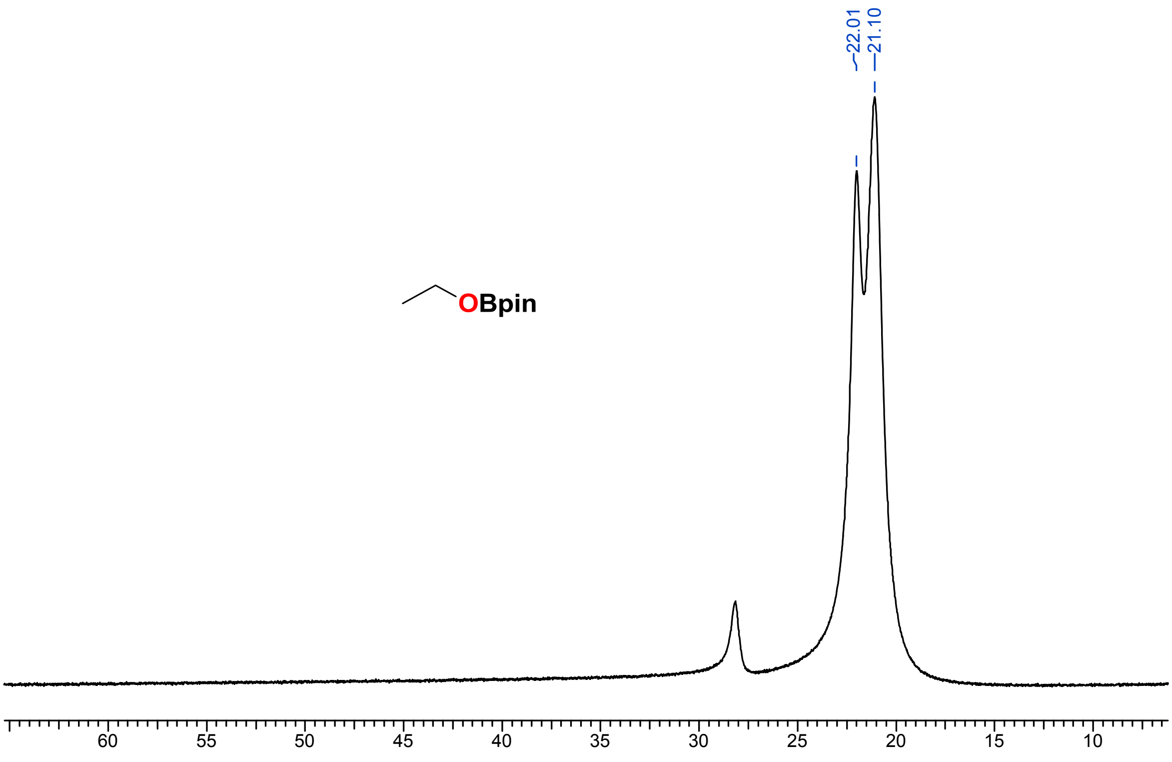


Figure S51. ^{11}B NMR spectrum (128.4 MHz, 25°C, $CDCl_3$) of **1q.**

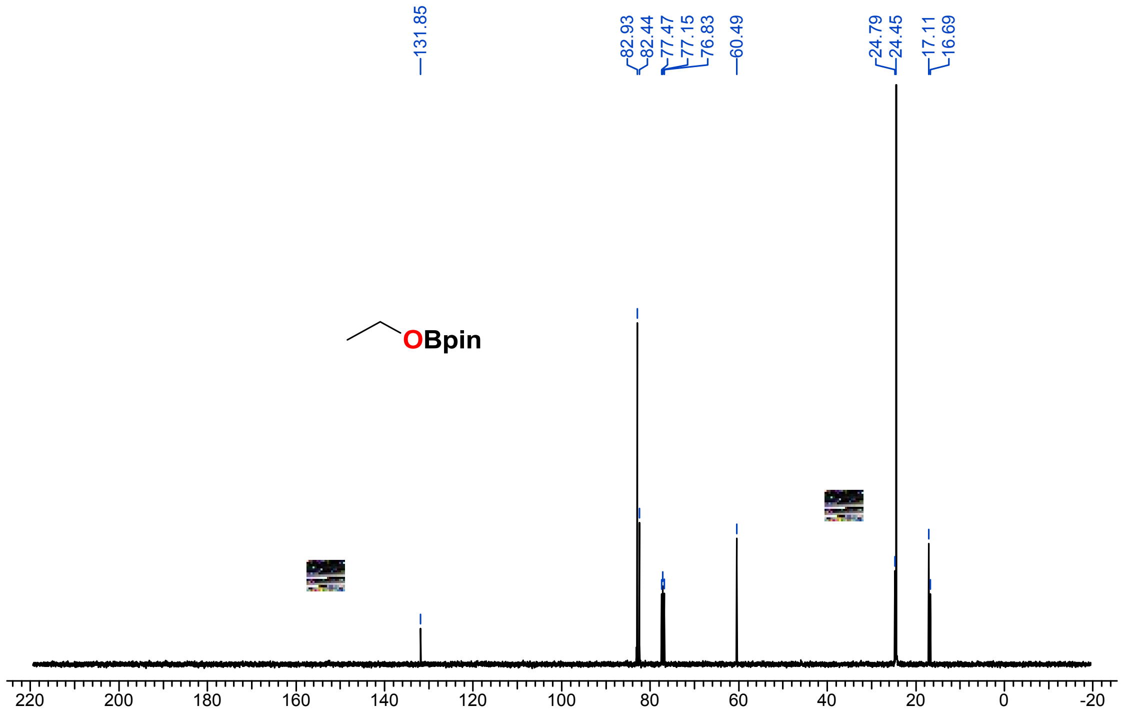


Figure S52. ^{13}C NMR spectrum (128.4 MHz, 25°C, $CDCl_3$) of **1q.**

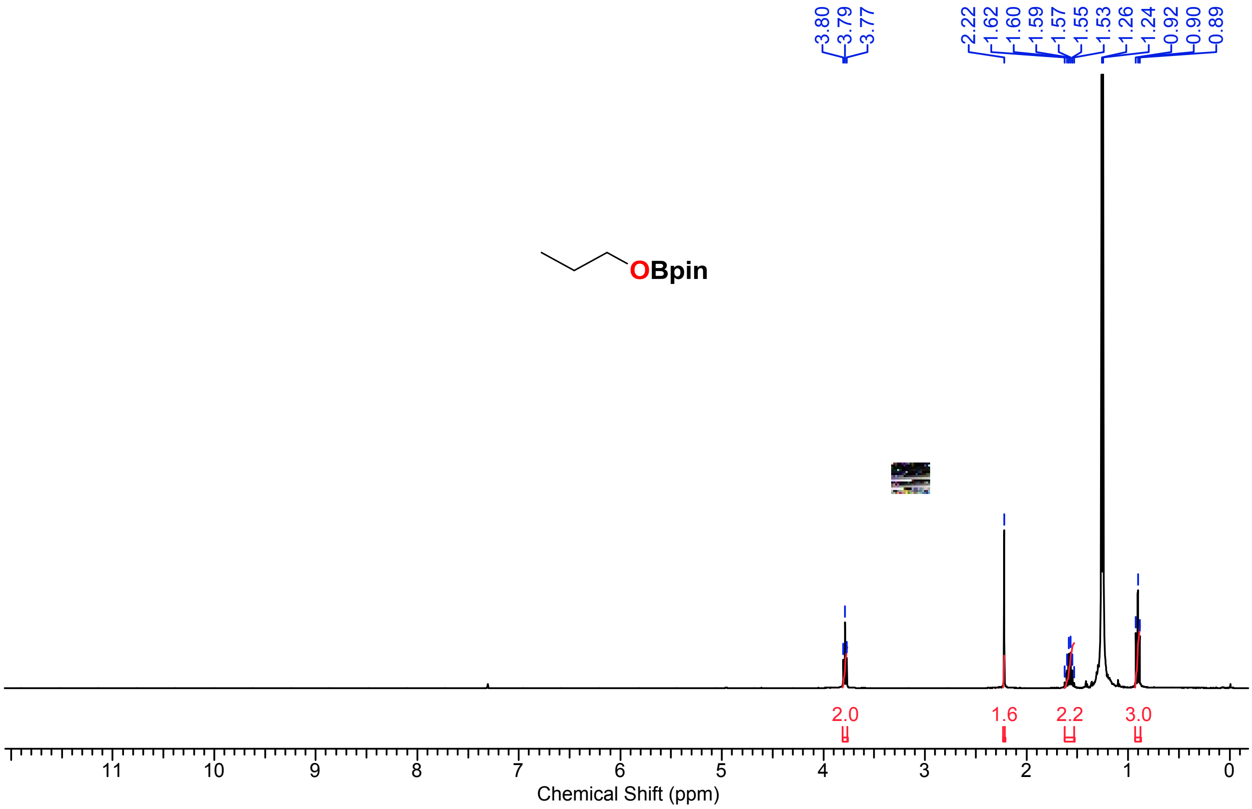


Figure FS53. ^{1}H NMR spectrum (400 MHz, 25°C, $CDCl_3$) of **1r.**

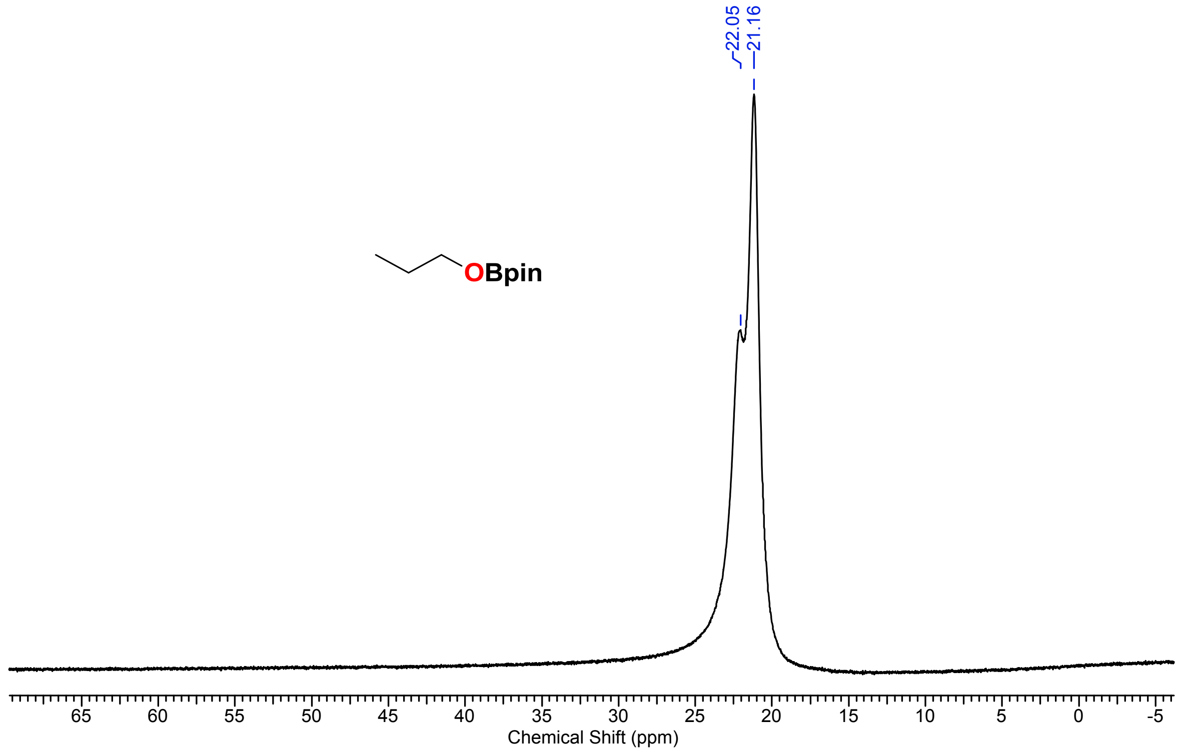


Figure FS54. ^{11}B NMR spectrum (128.4 MHz, 25°C, $CDCl_3$) of **1r.**

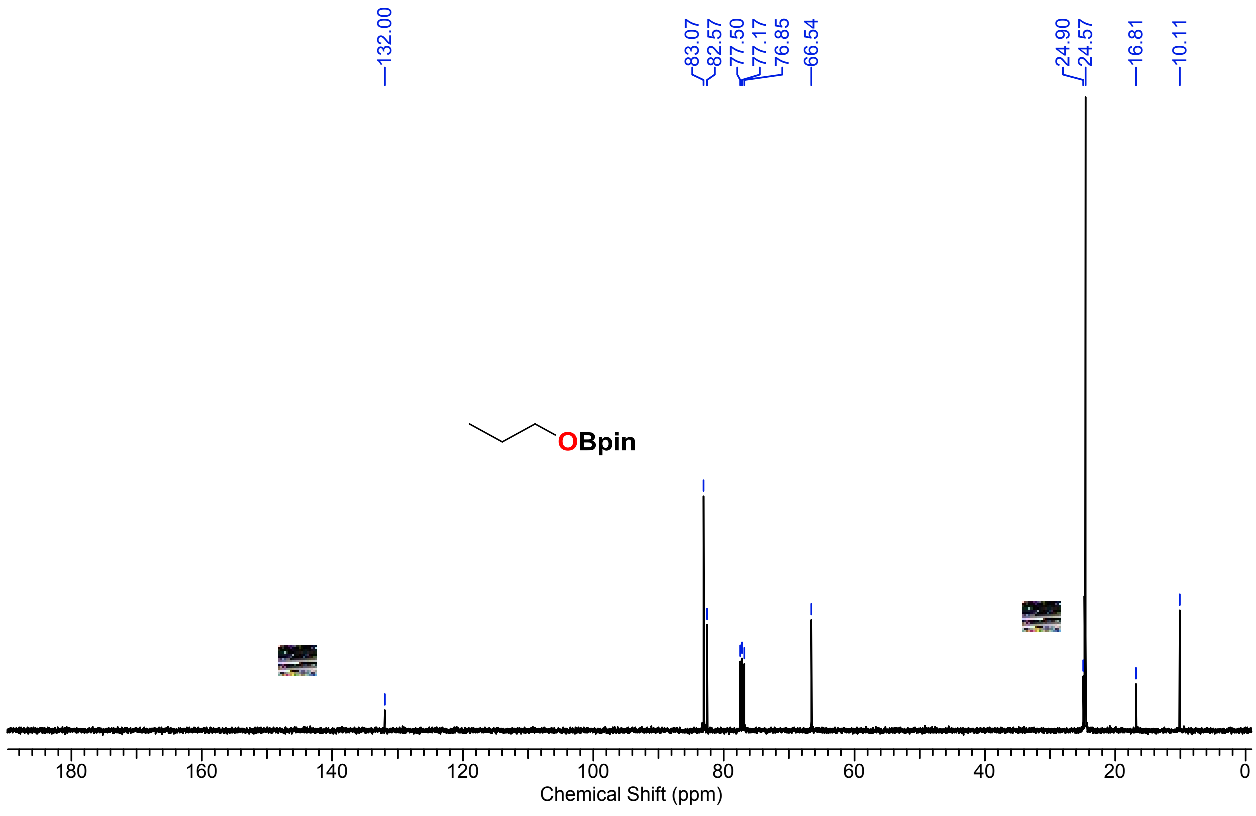


Figure S55. ^{13}C NMR spectrum (100 MHz, 25°C, $CDCl_3$) of **1r.**

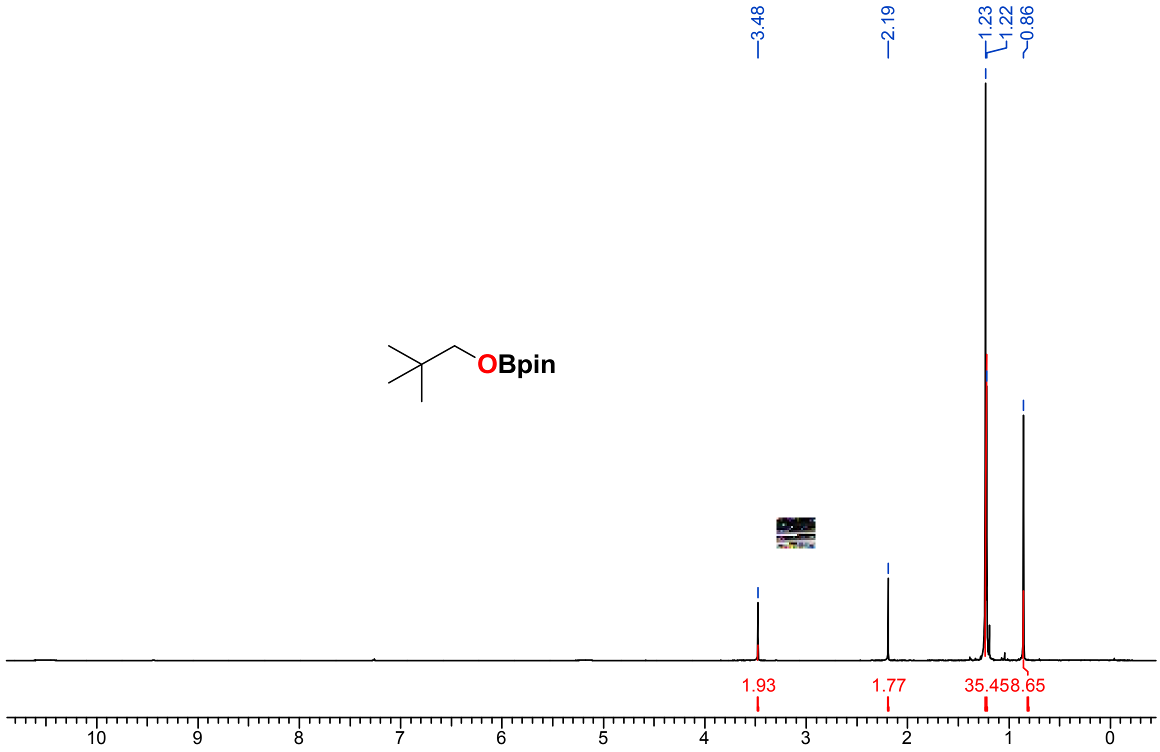


Figure FS56. ^{1}H NMR spectrum (400 MHz, 25°C, $CDCl_3$) of **1s.**

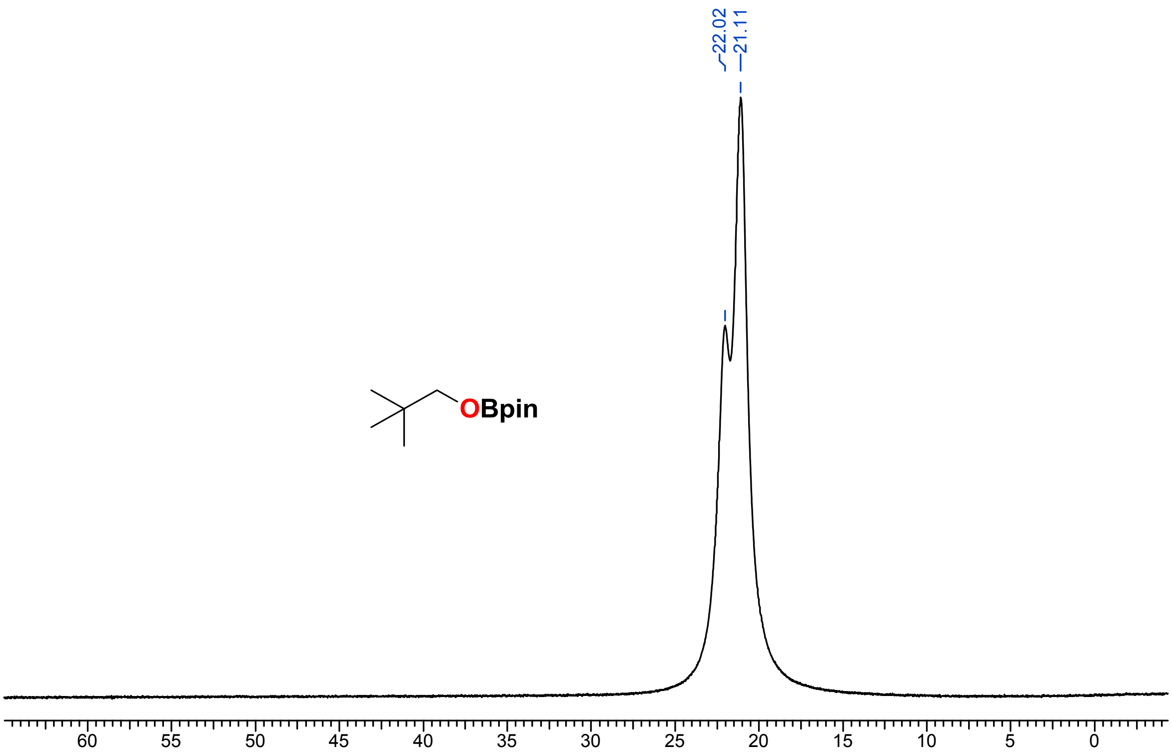


Figure S57. ^{11}B NMR spectrum (128.4 MHz, 25°C, $CDCl_3$) of **1s.**

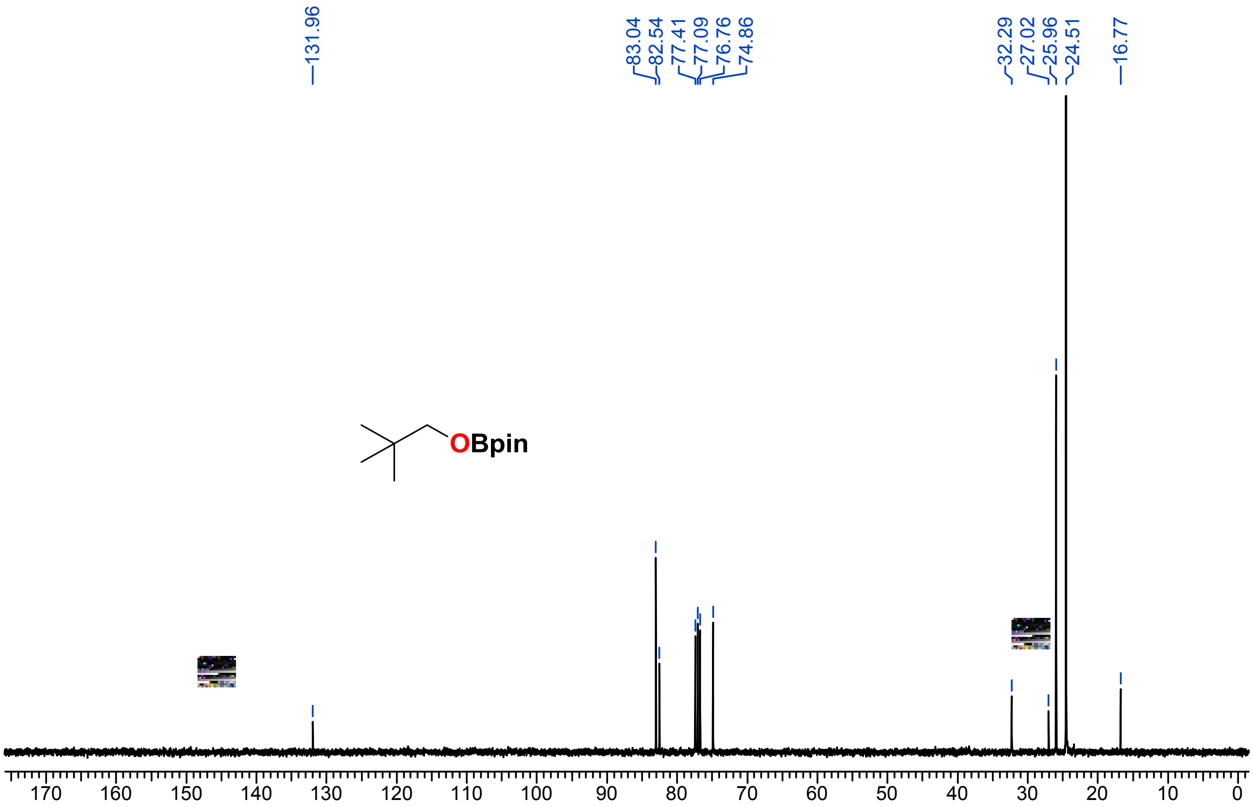


Figure S58. ^{13}C NMR spectrum (100 MHz, 25°C, $CDCl_3$) of **1s.**

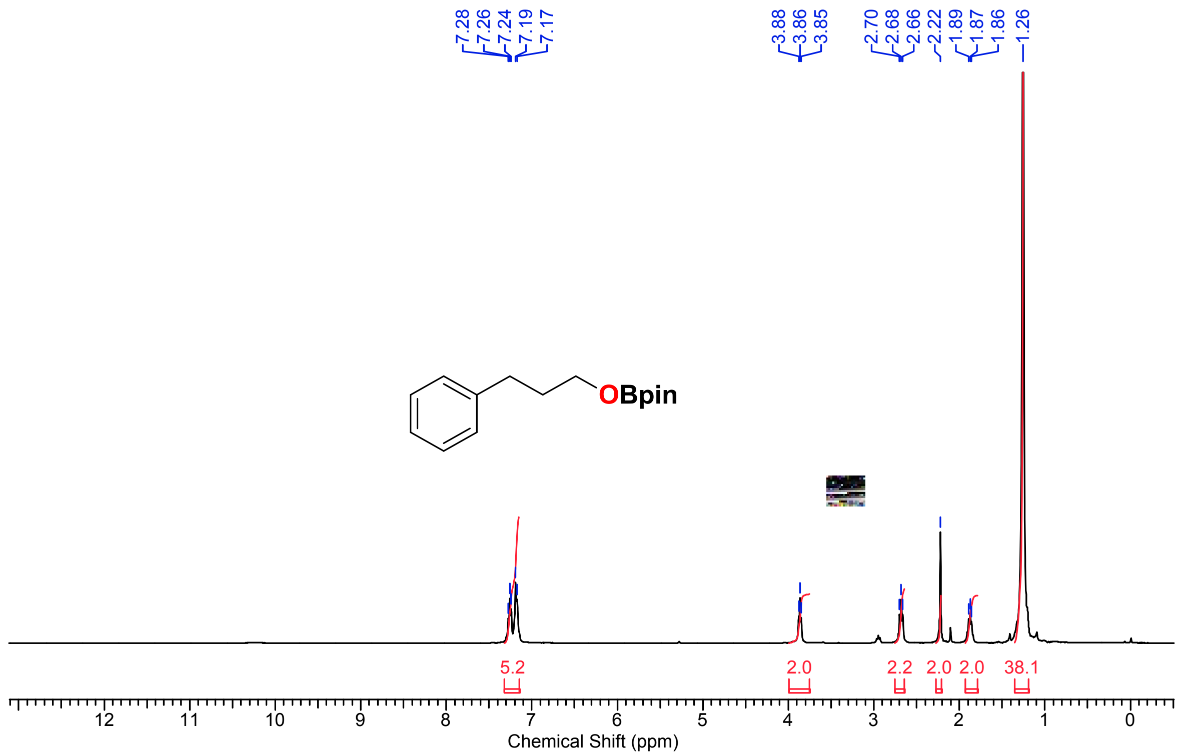


Figure FS59. ^{1}H NMR spectrum (400 MHz, 25°C, $CDCl_3$) of **1t.**

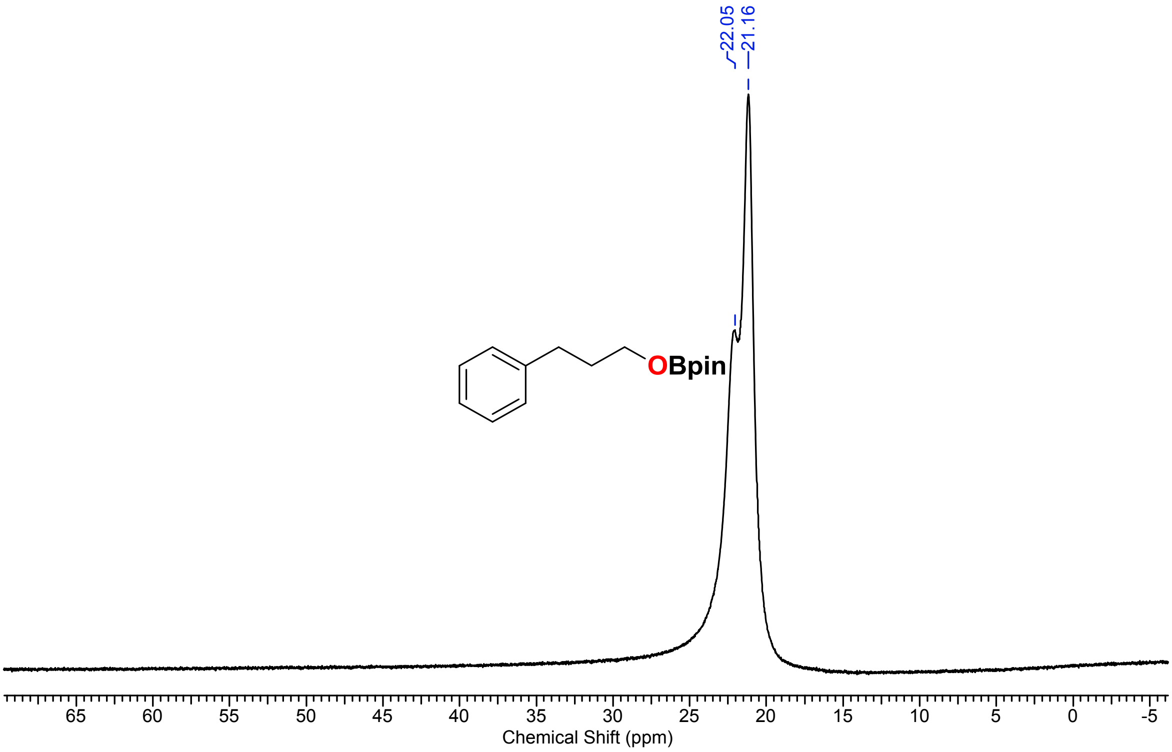


Figure S60. ^{11}B NMR spectrum (128.4 MHz, 25°C, $CDCl_3$) of **1t.**

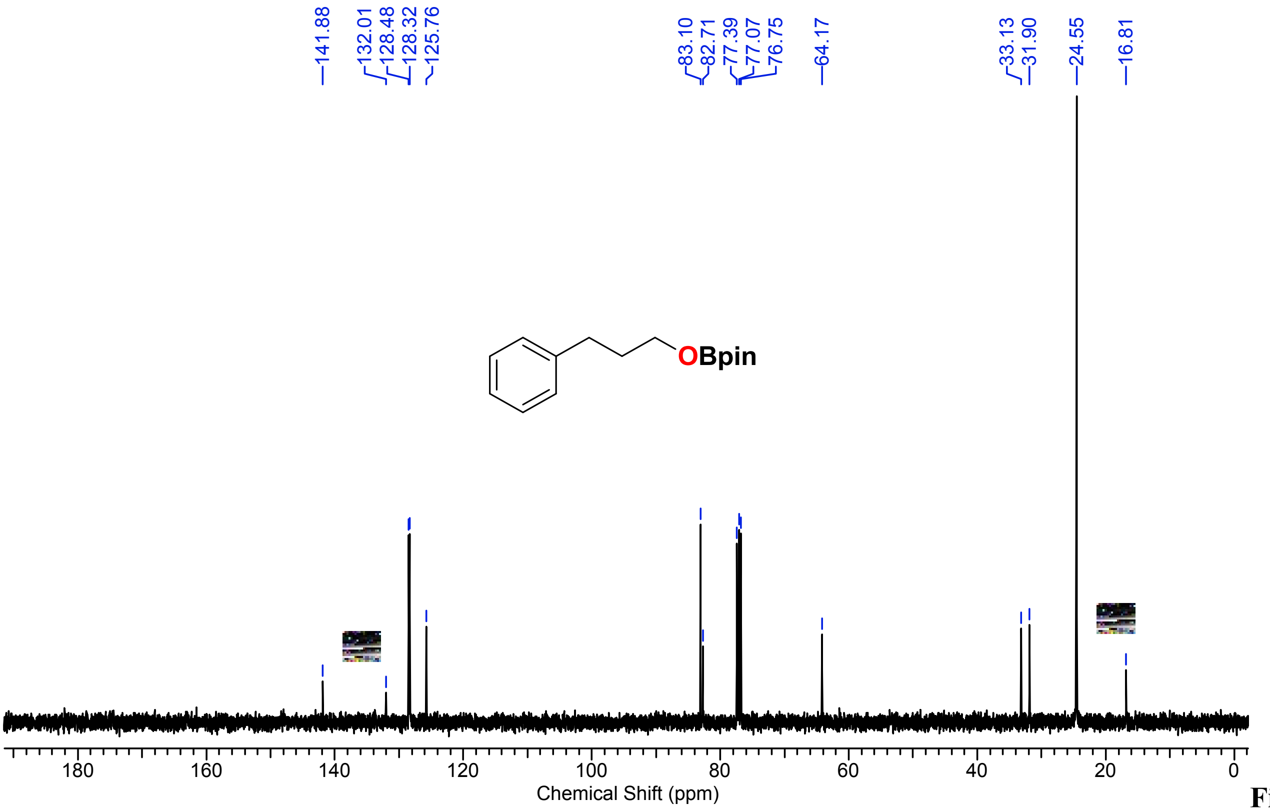


Figure S61. ^{13}C NMR spectrum (100 MHz, 25°C, $CDCl_3$) of **1t.**

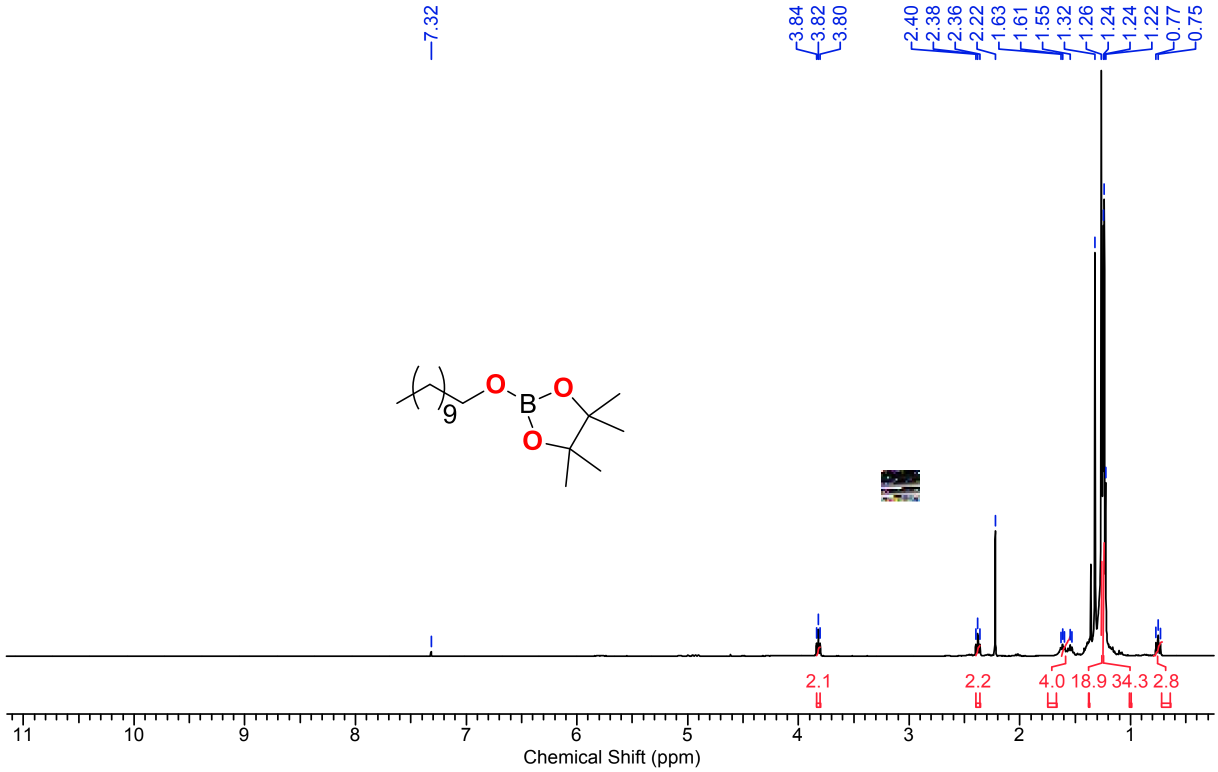


Figure FS62. ^{1}H NMR spectrum (400 MHz, 25°C, $CDCl_3$) of **1u.**

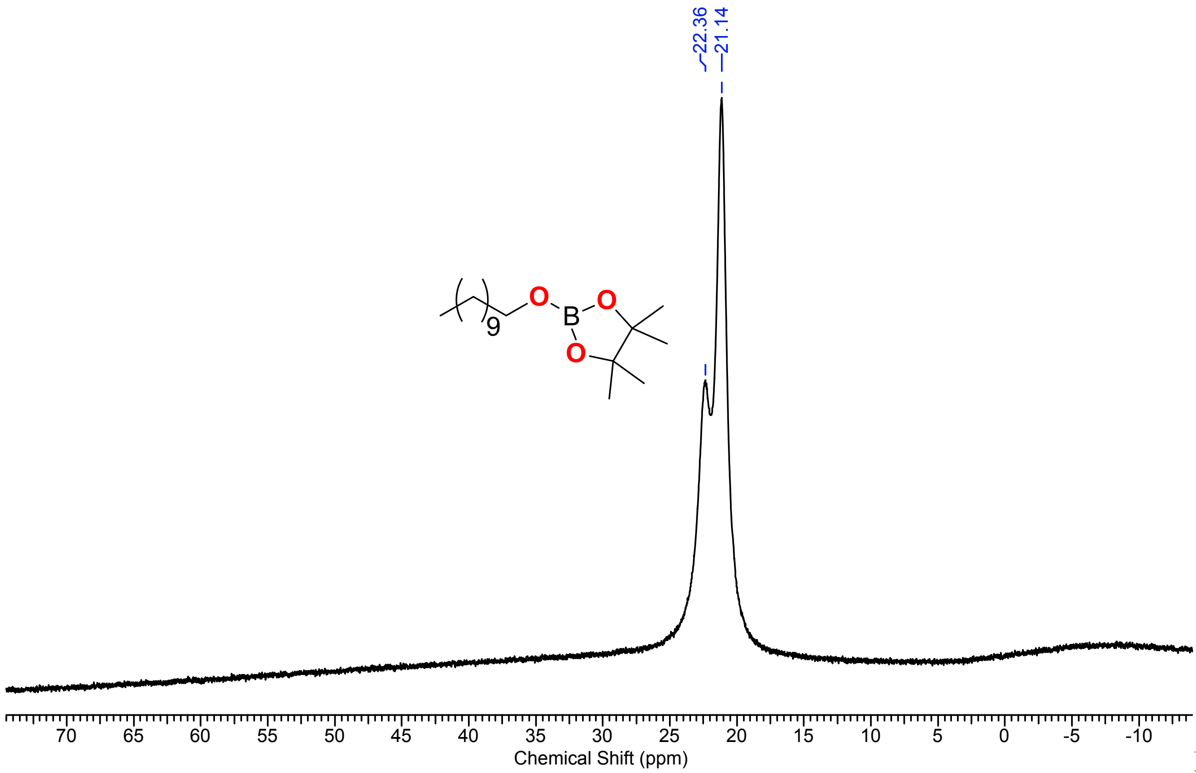


Figure FS63. ^{11}B NMR spectrum (128.4 MHz, 25°C, $CDCl_3$) of **1u.**

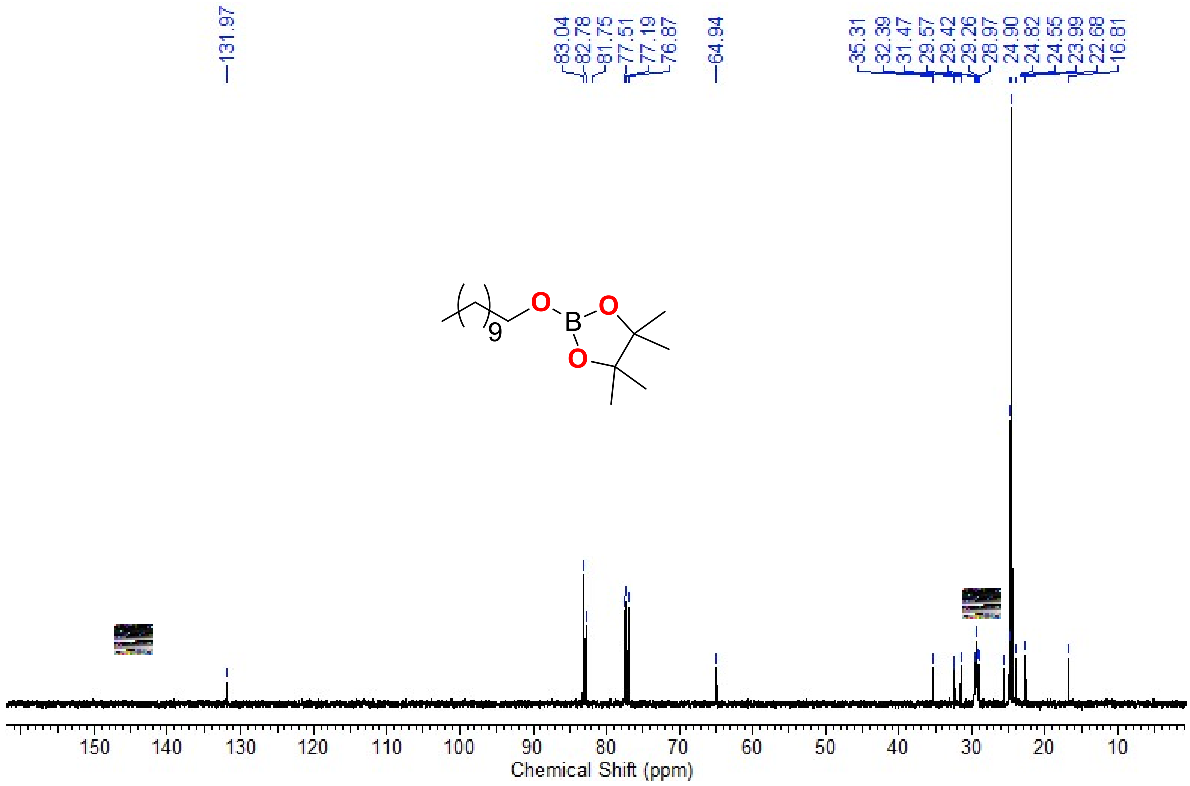


Figure S64. ^{13}C NMR spectrum (100 MHz, 25°C, $CDCl_3$) of **1u.**

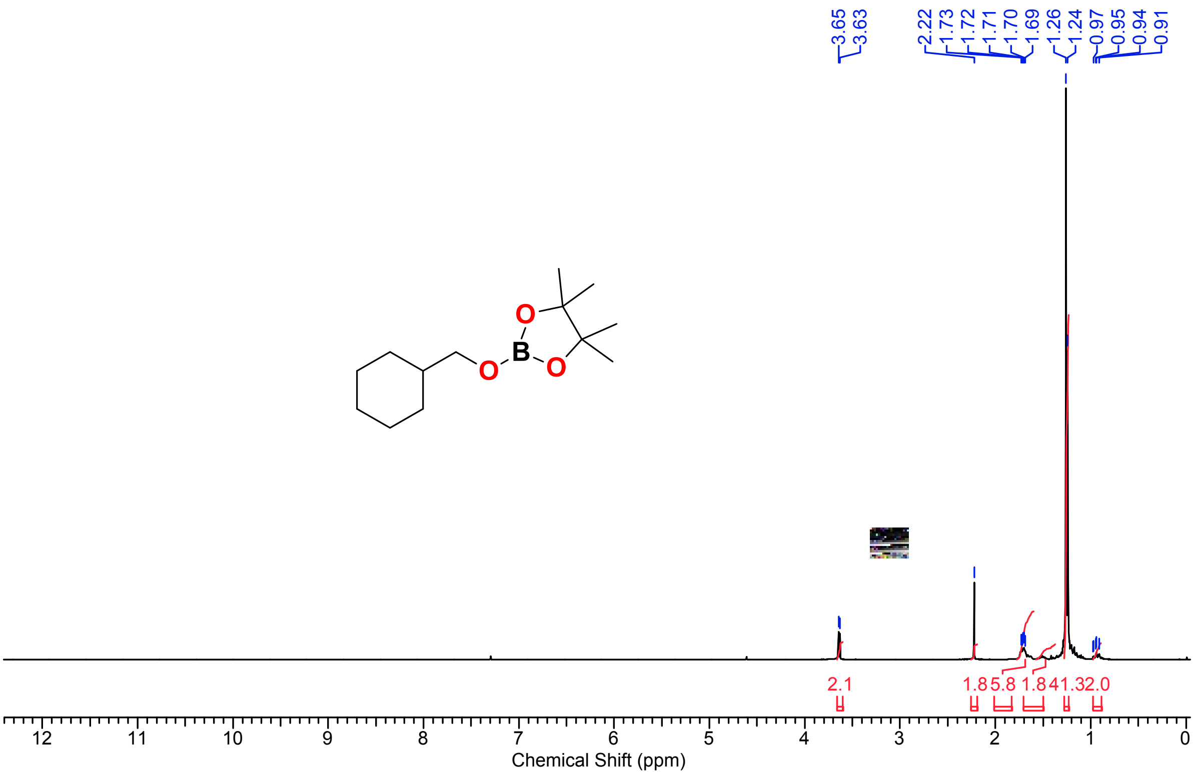


Figure FS65. ^{1}H NMR spectrum (400 MHz, 25°C, $CDCl_3$) of **1v.**

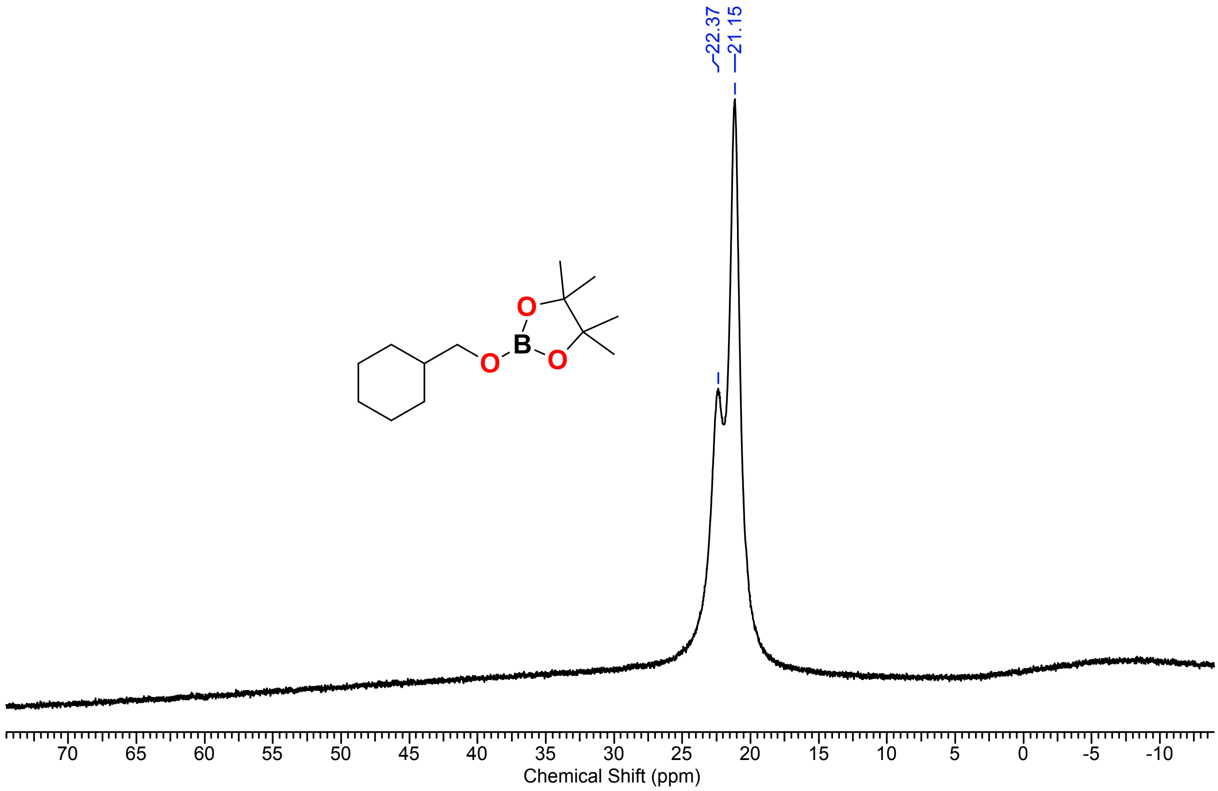


Figure FS66. ^{11}B NMR spectrum (128.4 MHz, 25°C, $CDCl_3$) of **1v.**

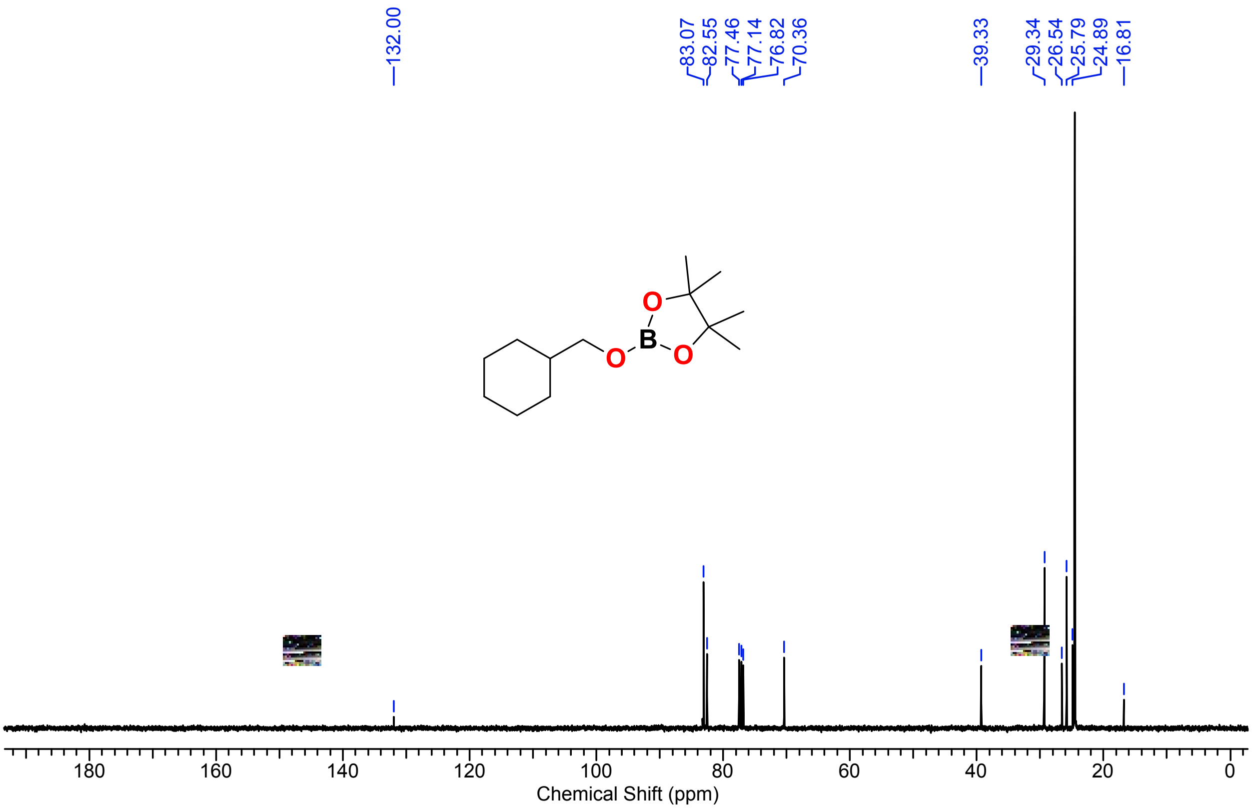


Figure S67. ^{13}C NMR spectrum (100 MHz, 25°C, $CDCl_3$) of **1v.**

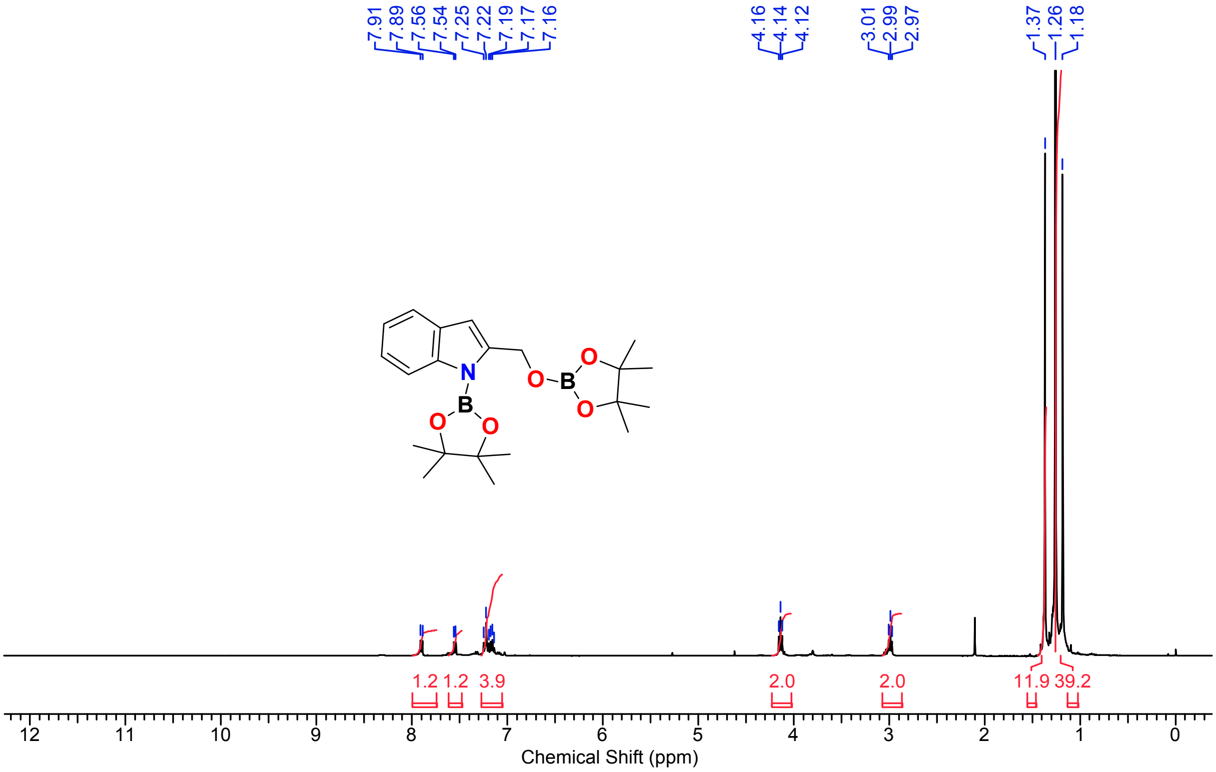


Figure FS68. [1]H NMR spectrum (400 MHz, 25°C, $CDCl_3$) of **1w.**

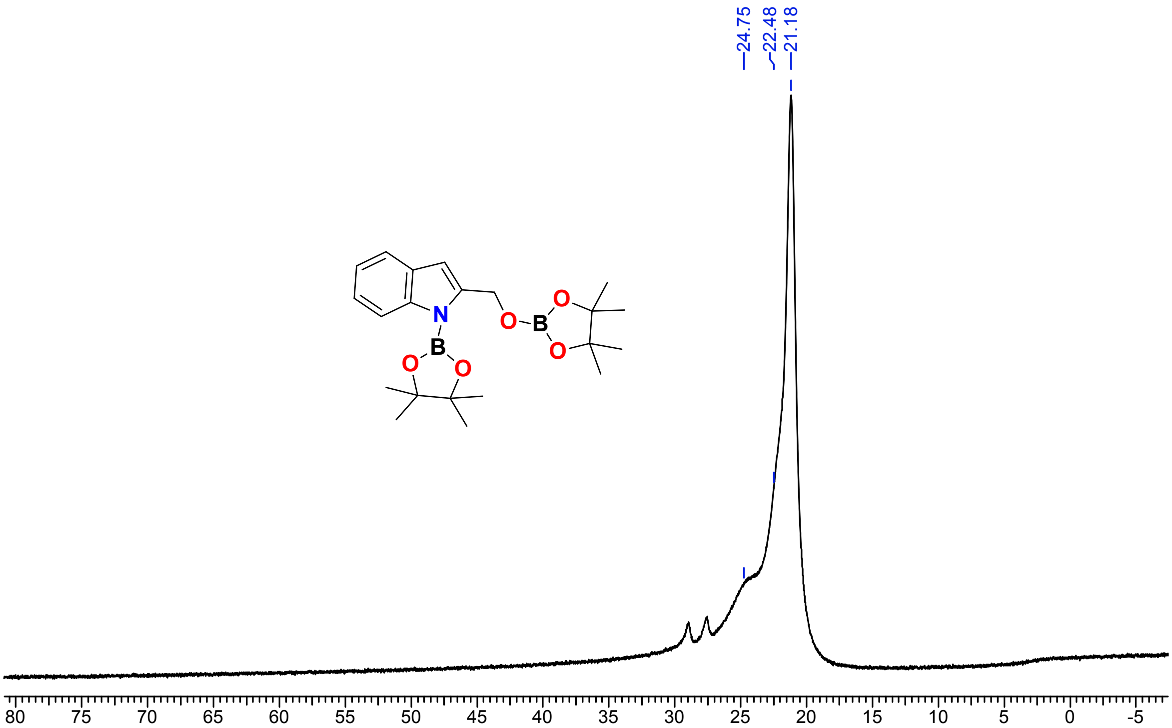


Figure FS69. [11]B NMR spectrum (128.4 MHz, 25°C, $CDCl_3$) of **1w.**

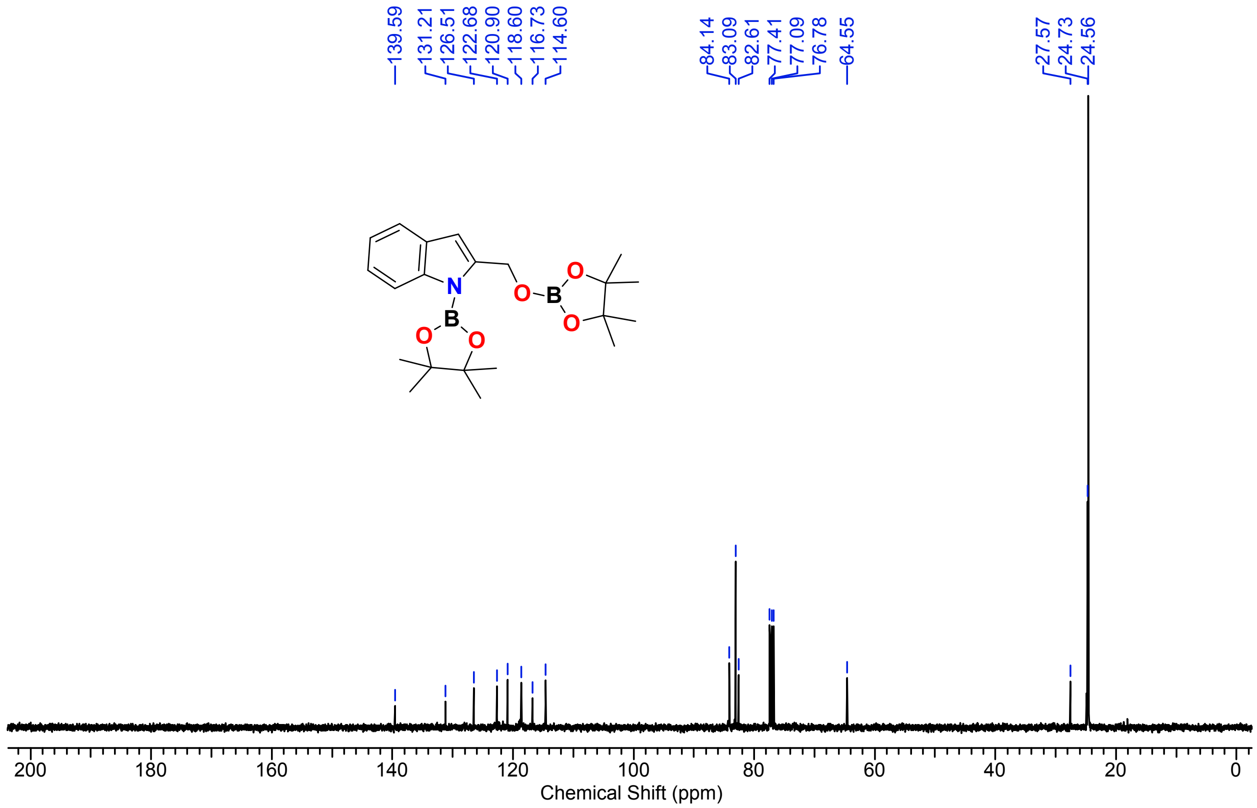


Figure S70. ^{13}C NMR spectrum (100 MHz, 25°C, $CDCl_3$) of **1w.**

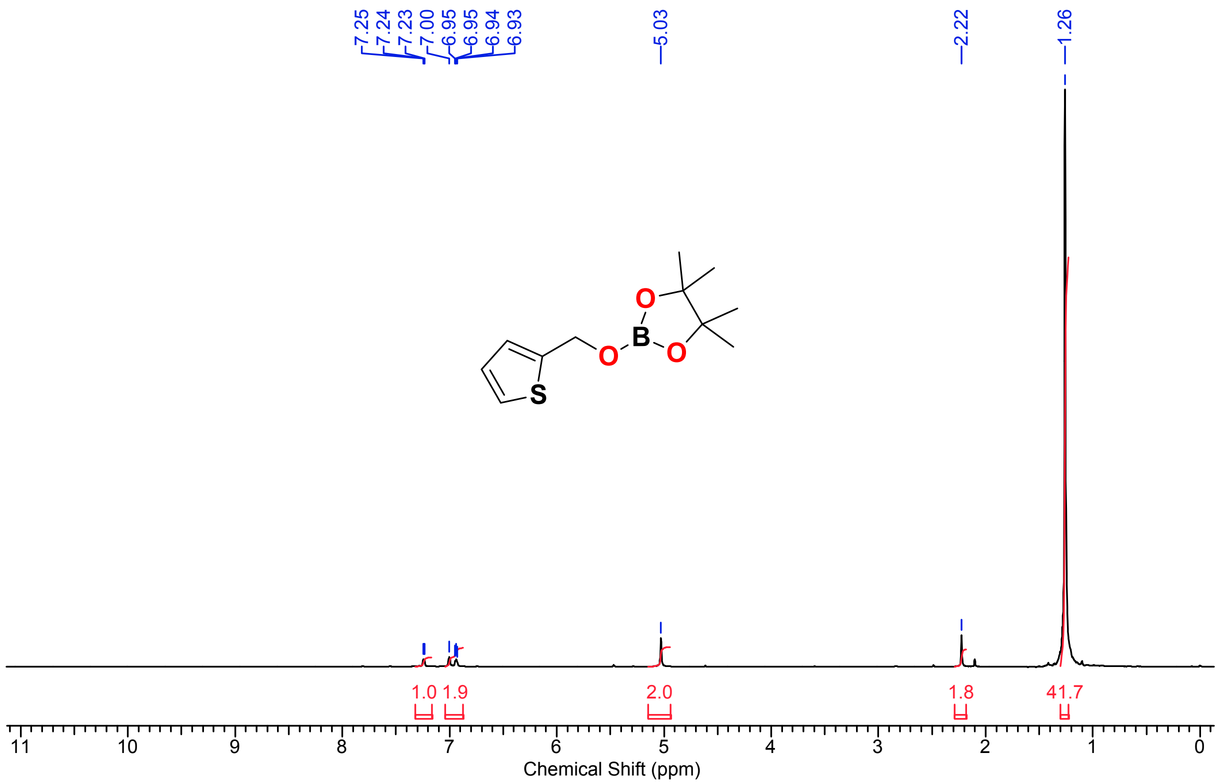


Figure FS71. ^{1}H NMR spectrum (400 MHz, 25°C, $CDCl_3$) of **1x.**

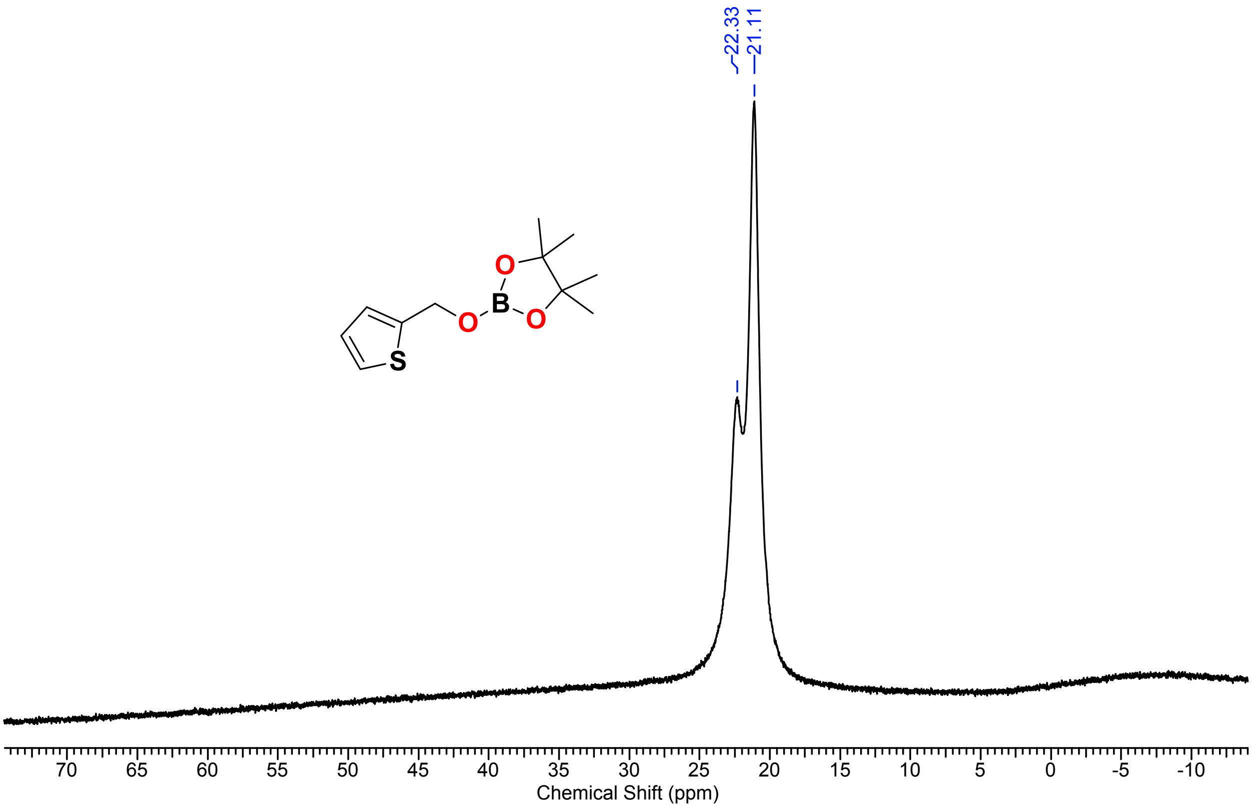


Figure FS72. ^{11}B NMR spectrum (128.4 MHz, 25°C, $CDCl_3$) of **1x.**

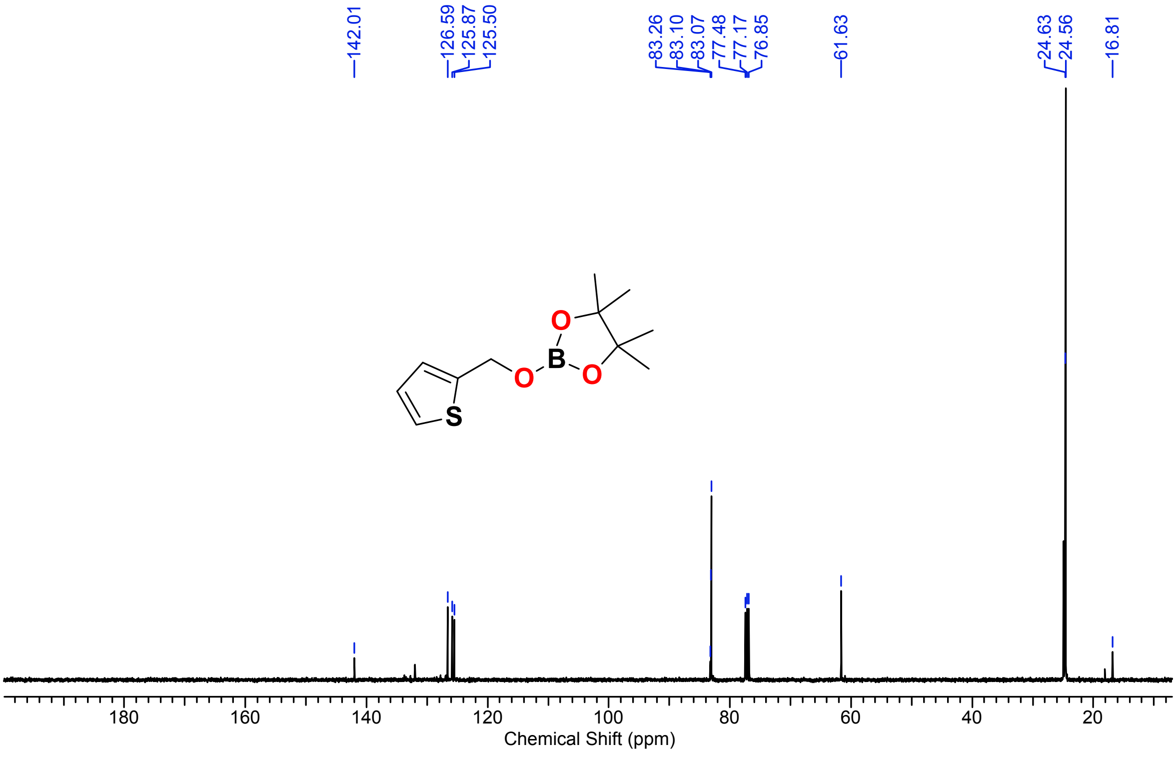


Figure S73. ^{13}C NMR spectrum (100 MHz, 25°C, $CDCl_3$) of **1x.**

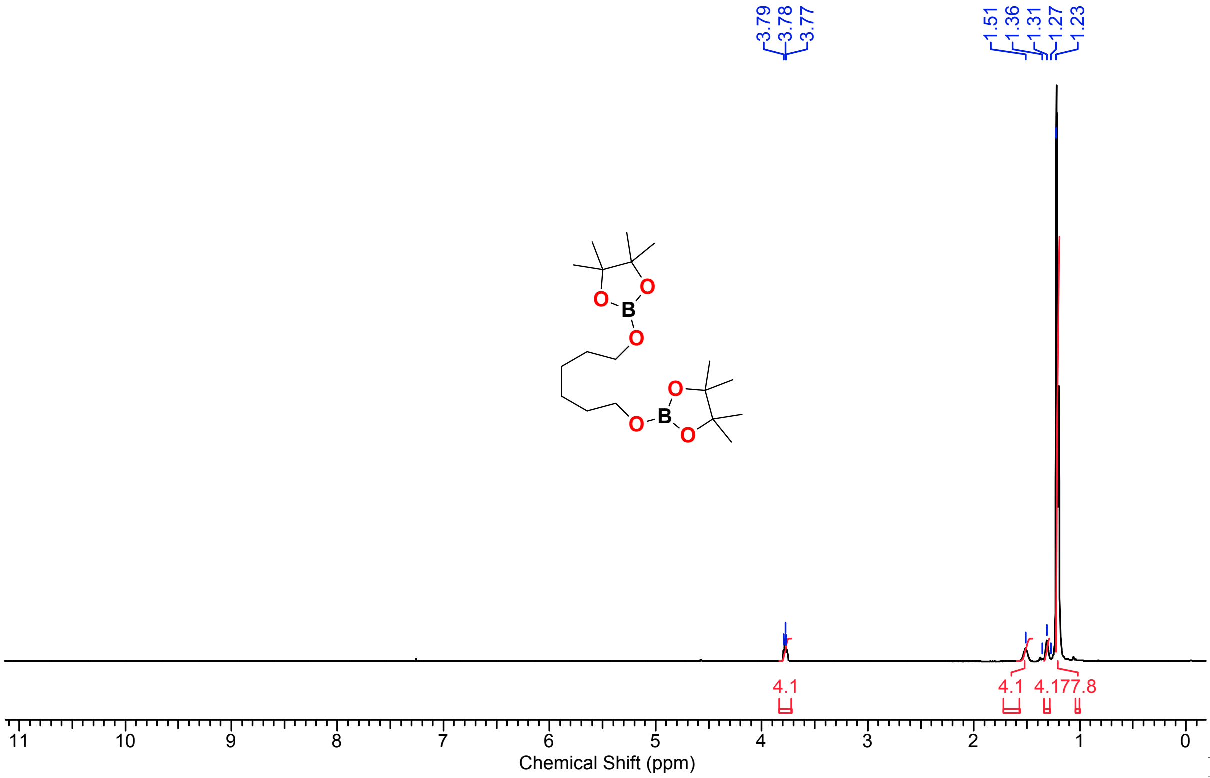


Figure FS74. ^{1}H NMR spectrum (400 MHz, 25°C, $CDCl_3$) of **1y.**

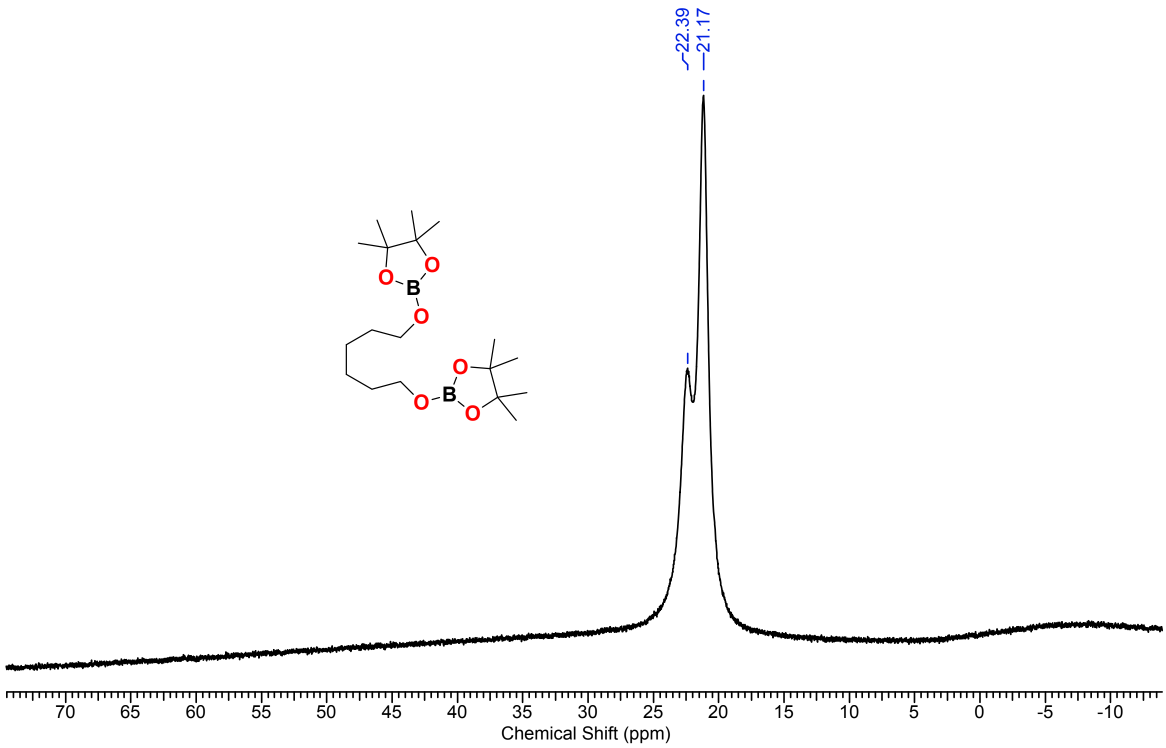


Figure FS75. ^{11}B NMR spectrum (128.4 MHz, 25°C, $CDCl_3$) of **1y.**

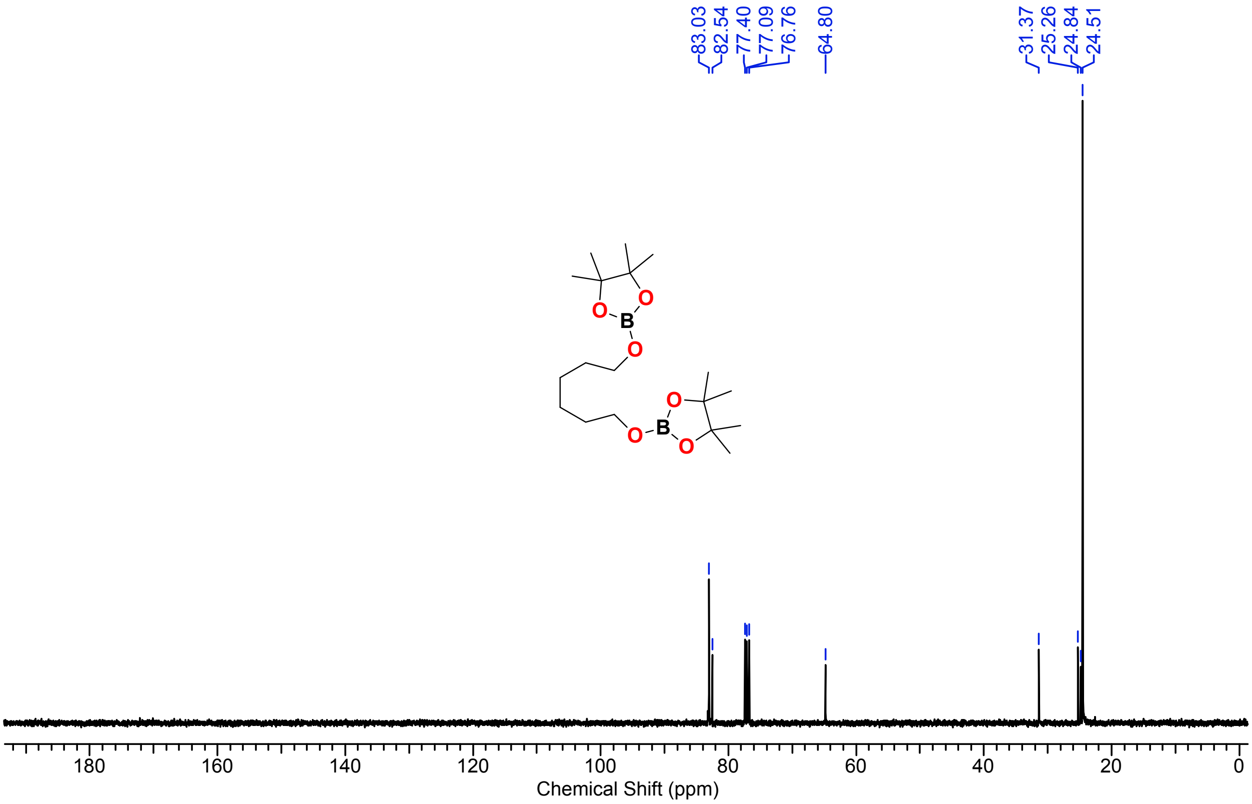


Figure S76. ^{13}C NMR spectrum (100 MHz, 25°C, $CDCl_3$) of **1y.**

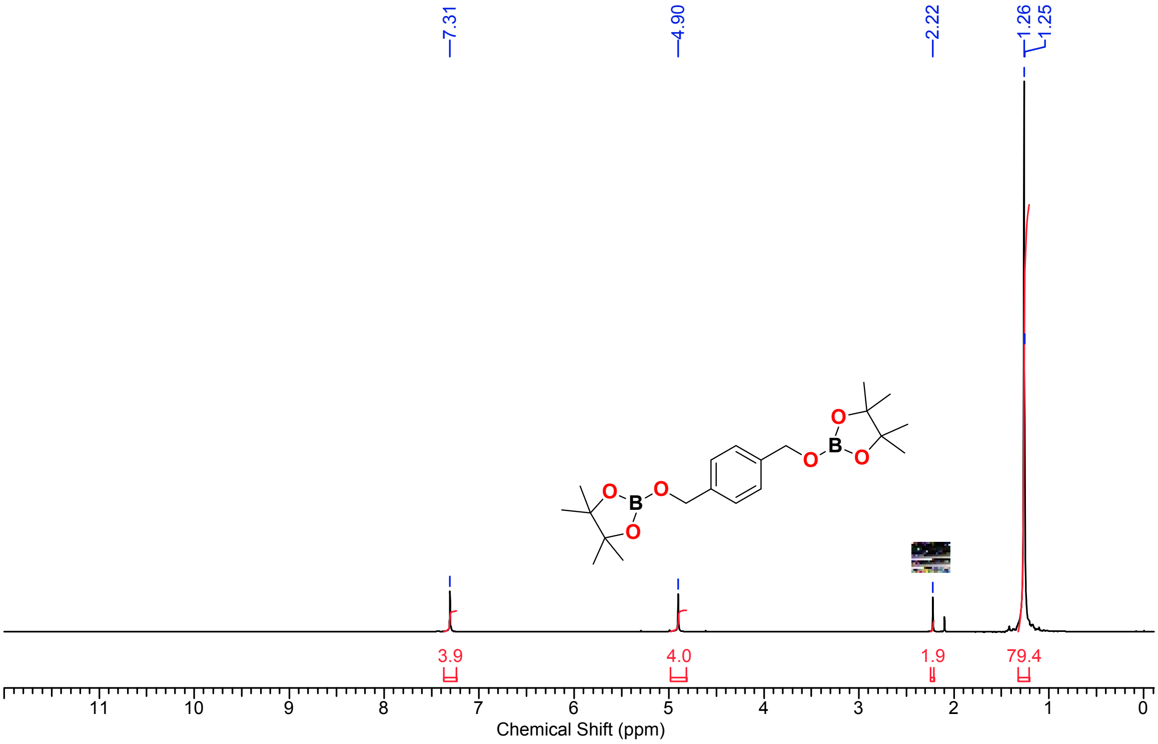


Figure FS77. ^{1}H NMR spectrum (400 MHz, 25°C, $CDCl_3$) of **1z.**

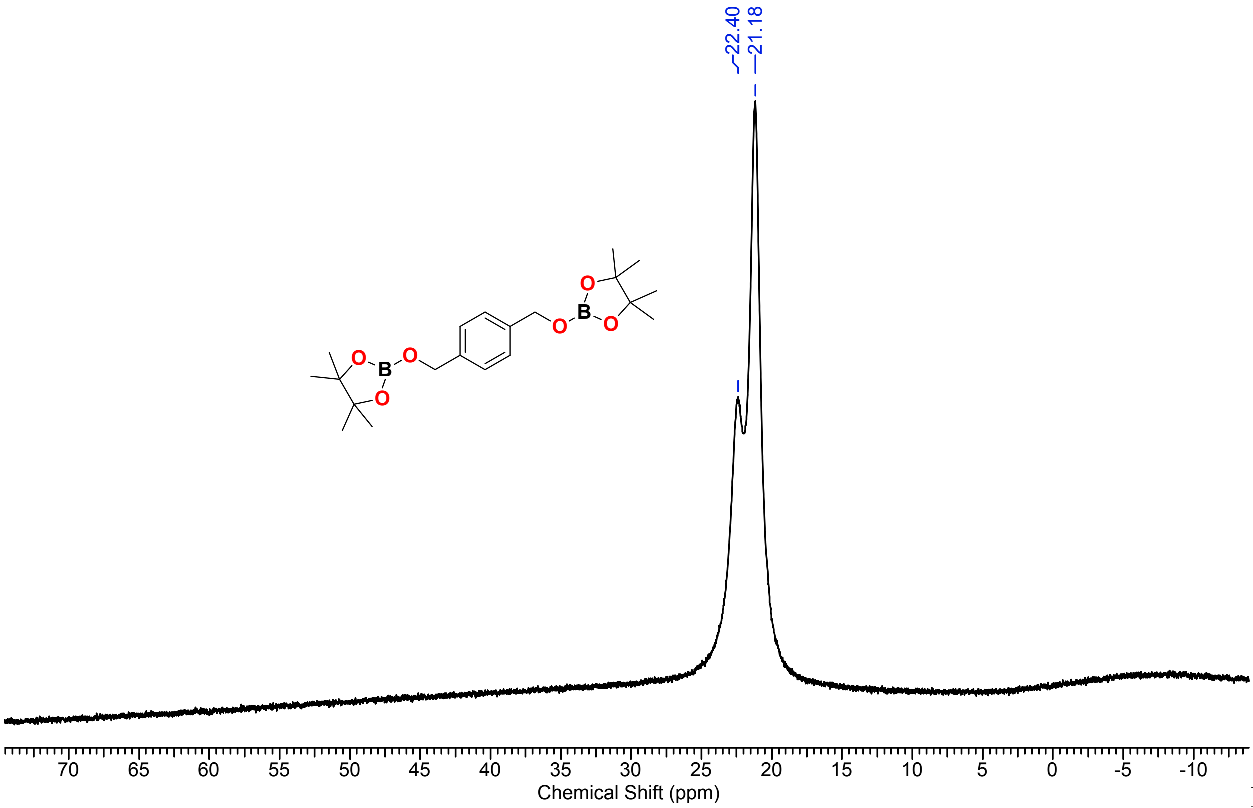


Figure FS78. ^{11}B NMR spectrum (128.4 MHz, 25°C, $CDCl_3$) of **1z.**

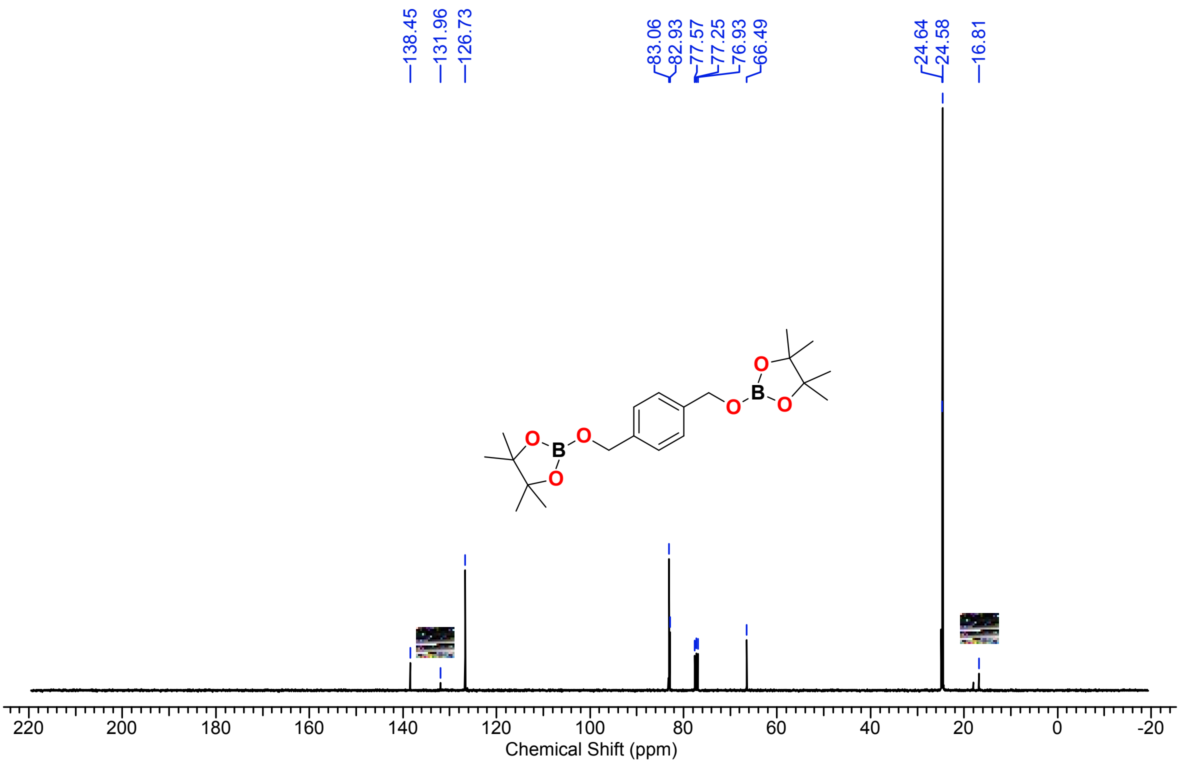


Figure S79. ^{13}C NMR spectrum (100 MHz, 25°C, $CDCl_3$) of **1z.**

General procedure for the hydrolysis of boronate esters to primary alcohols (2a-2m).

Upon completion of the reaction, the resulted boronate ester residue was refluxed with silica gel (1g) and methanol for 3 h. Then the aliquot is evaporated under vacuum and extracted with dichloromethane. The combined organic layers were dried, evaporated and purified by column chromatography over silica-gel (100-200 mesh) using ethyl acetate/hexane (1:5) mixture as eluent to obtain the pure primary alcohols (**2a-2m**).

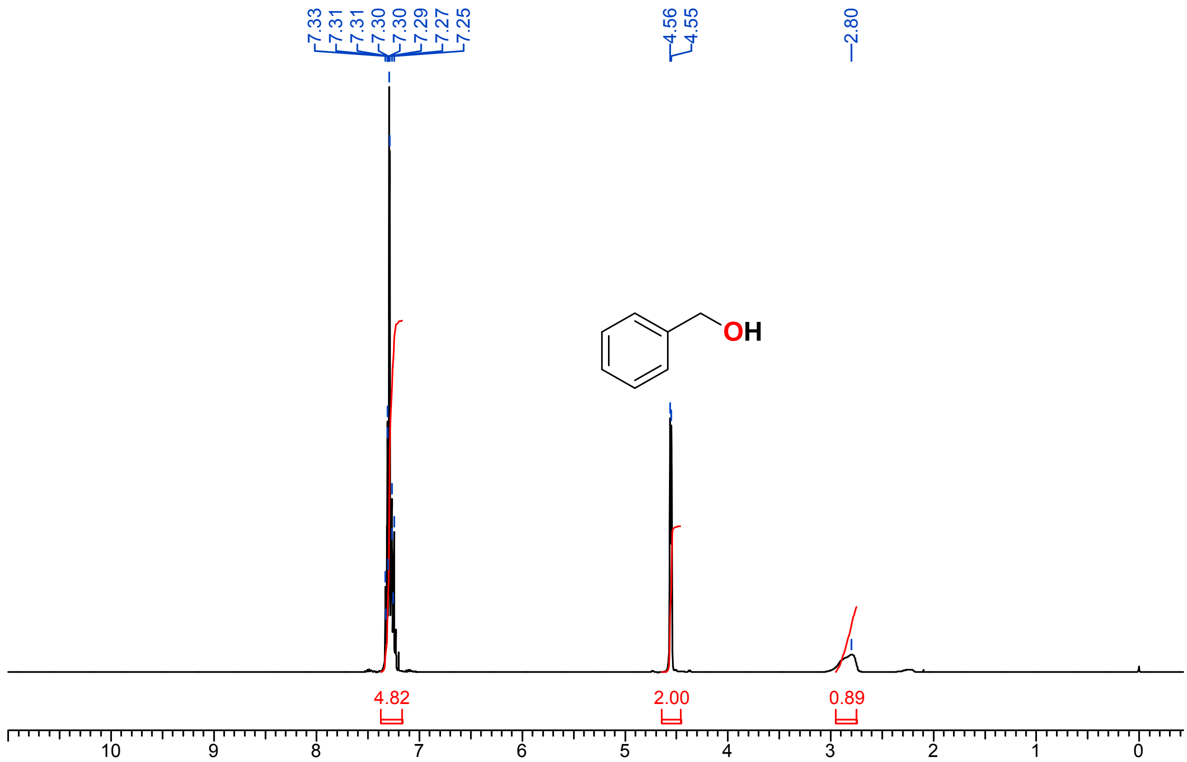


Figure FS80. ^{1}H NMR spectrum (400 MHz, 25°C, $CDCl_3$) of **2a.**

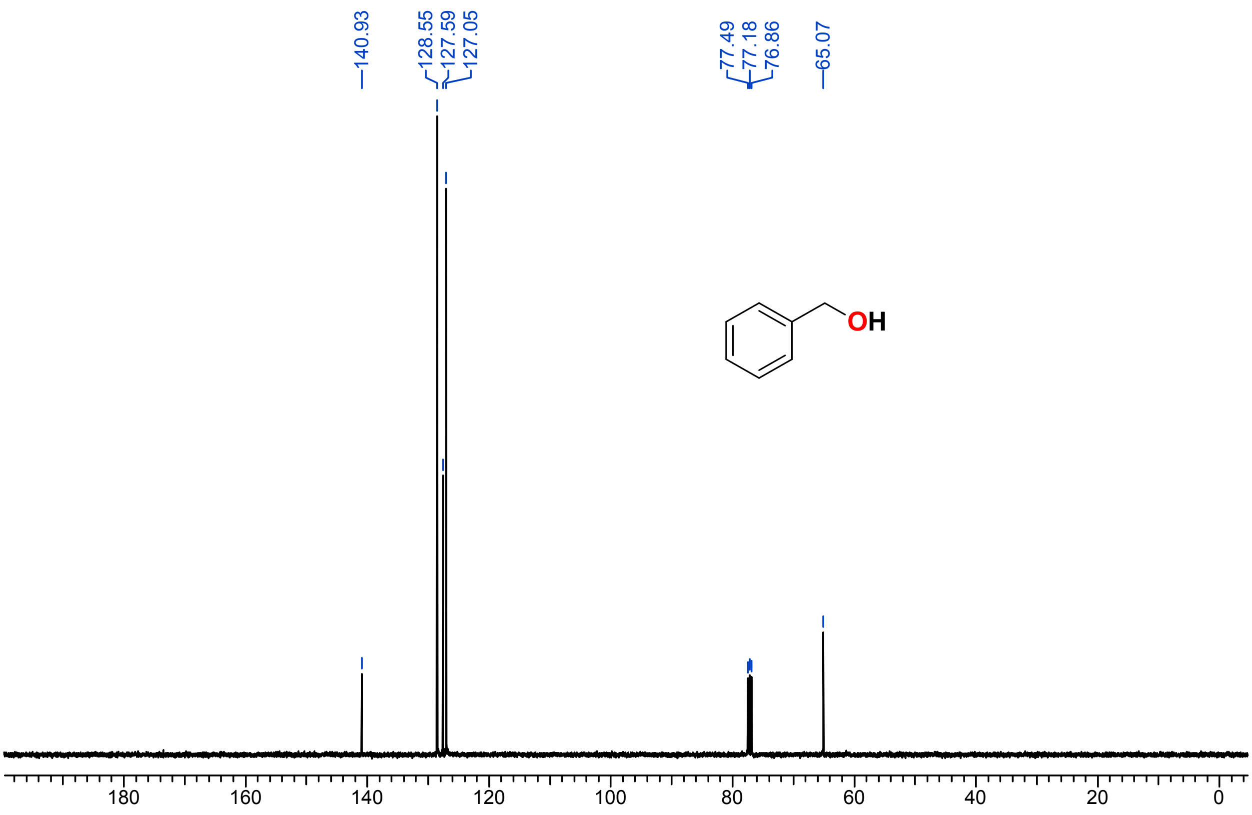


Figure S81. ^{13}C NMR spectrum (100 MHz, 25°C, $CDCl_3$) of **2a.**

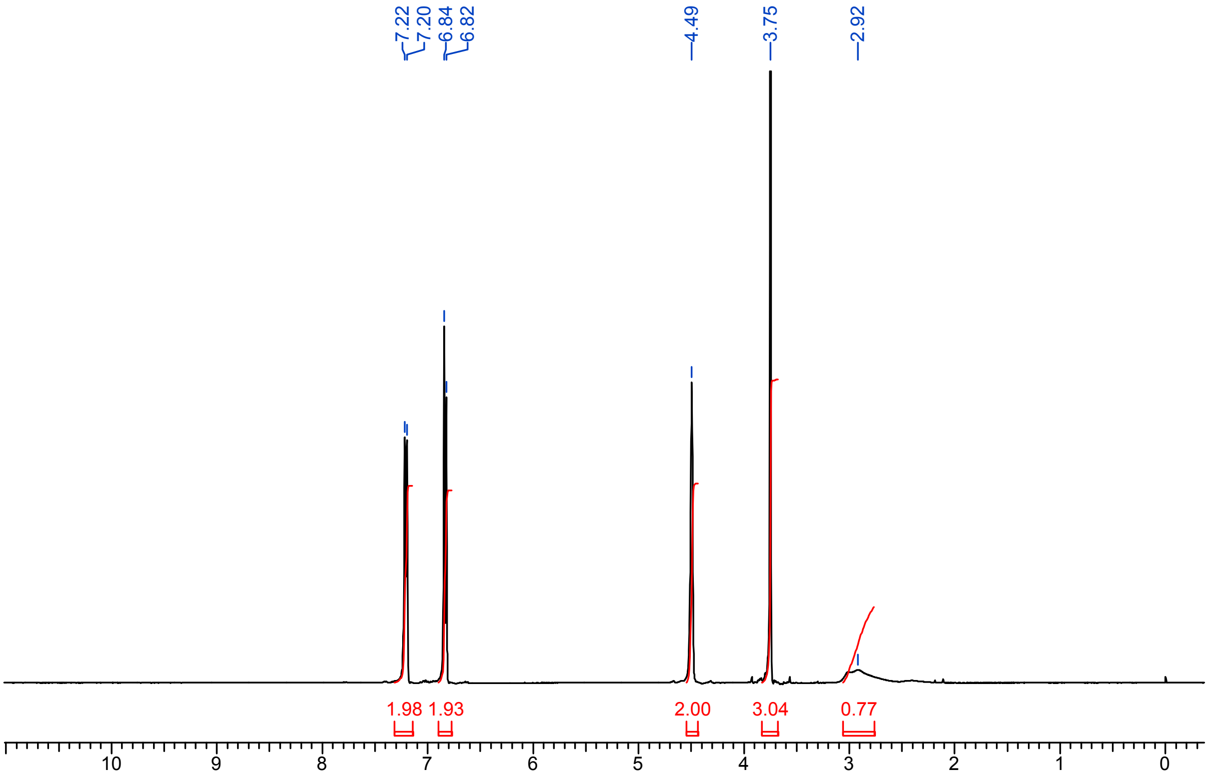


Figure FS82. ^{1}H NMR spectrum (400 MHz, 25°C, $CDCl_3$) of **2b.**

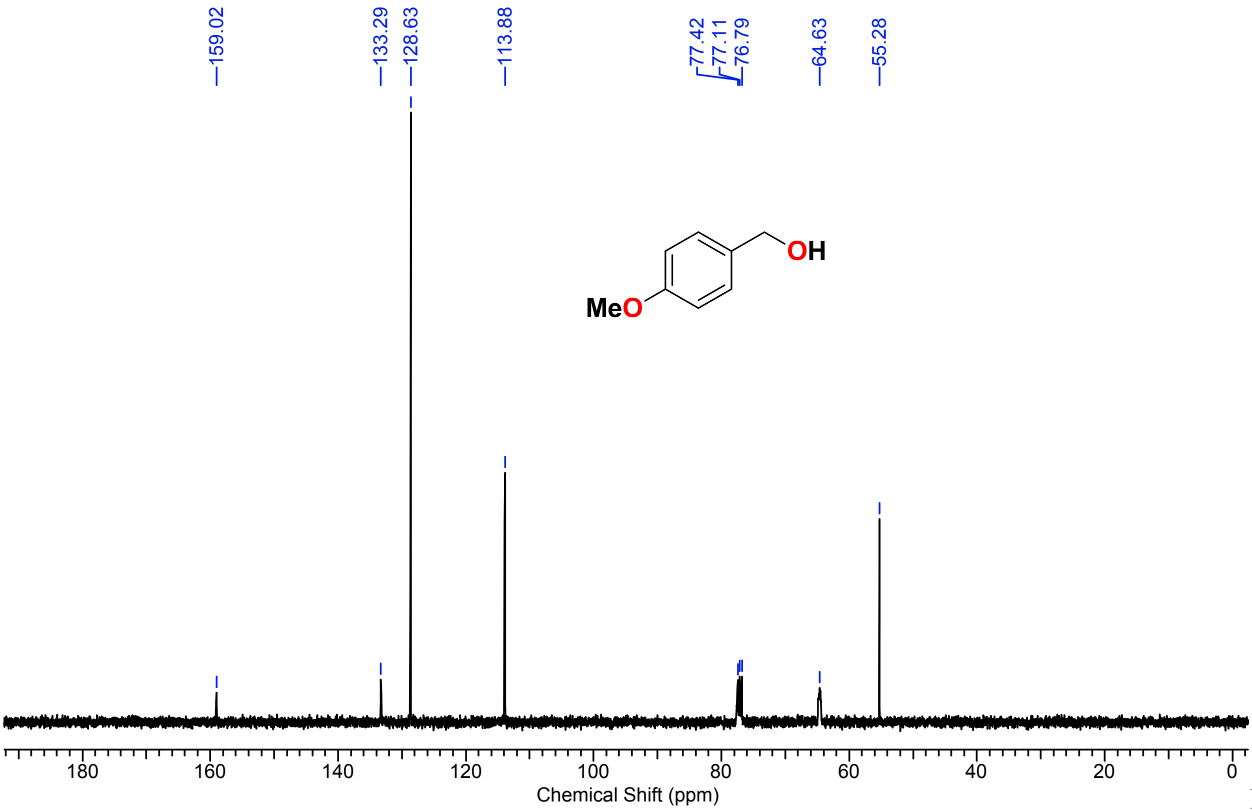


Figure S83.

^{13}C NMR spectrum (100 MHz, 25°C, $CDCl_3$) of **2b.**

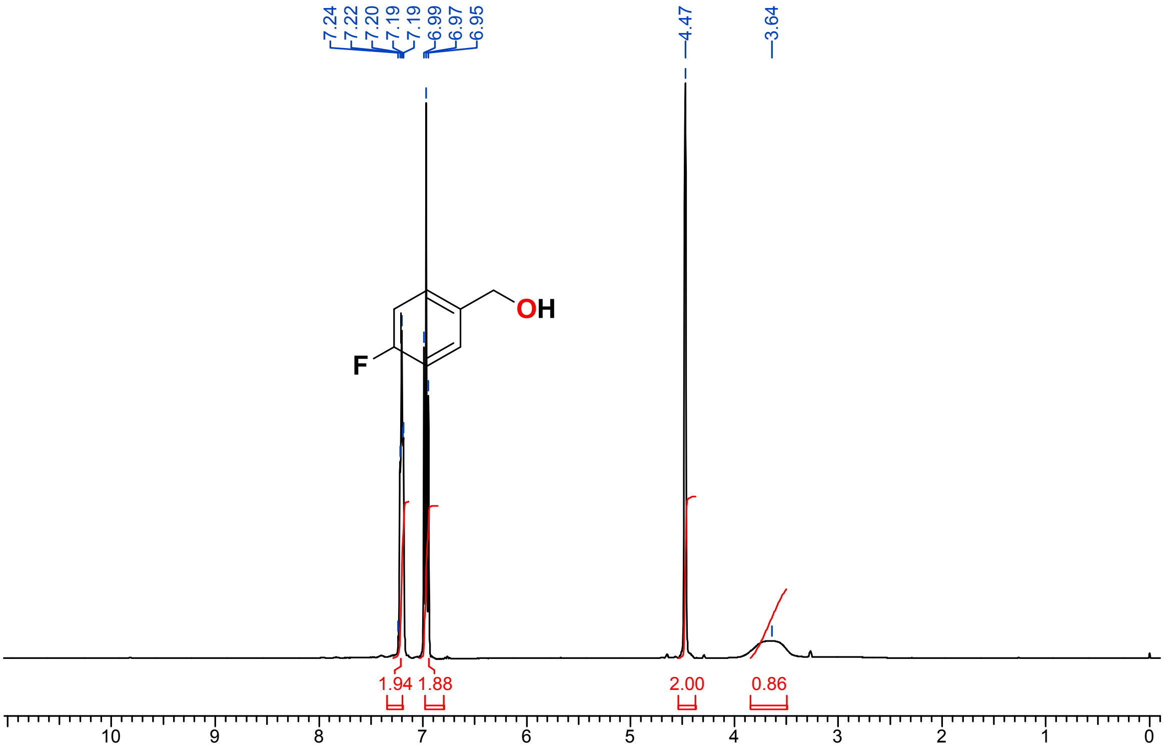


Figure FS84. [1]H NMR spectrum (400 MHz, 25°C, $CDCl_3$) of **2c.**

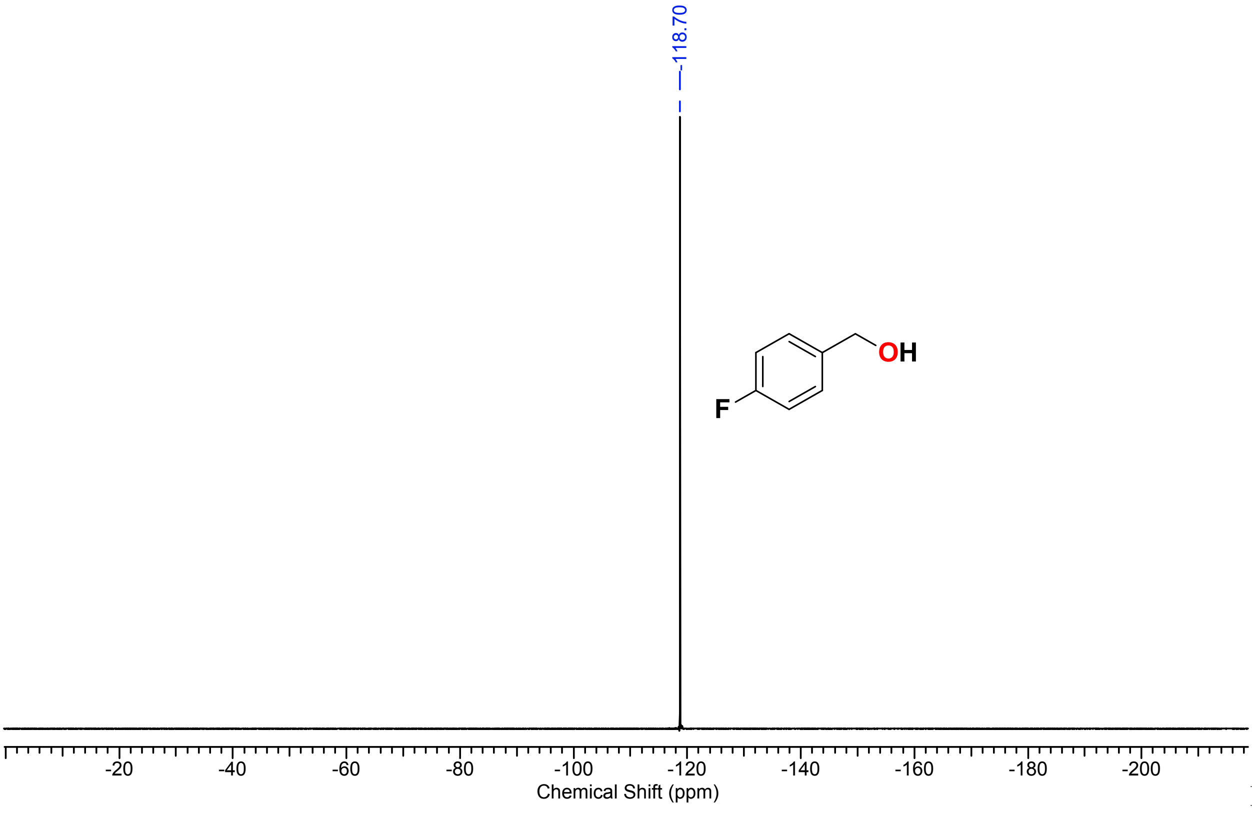


Figure S85.

[19]F NMR spectrum (100 MHz, 25°C, $CDCl_3$) of **2c.**

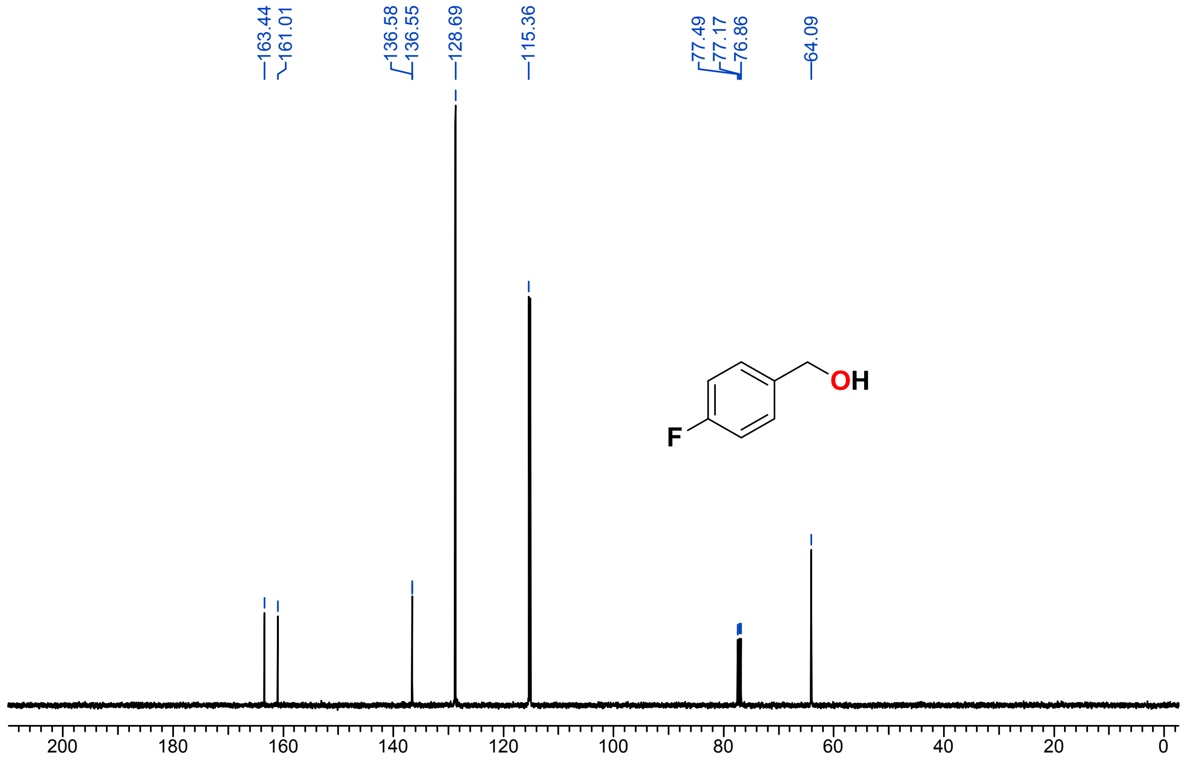


Figure S86. ^{13}C NMR spectrum (100 MHz, 25°C, $CDCl_3$) of **2c.**

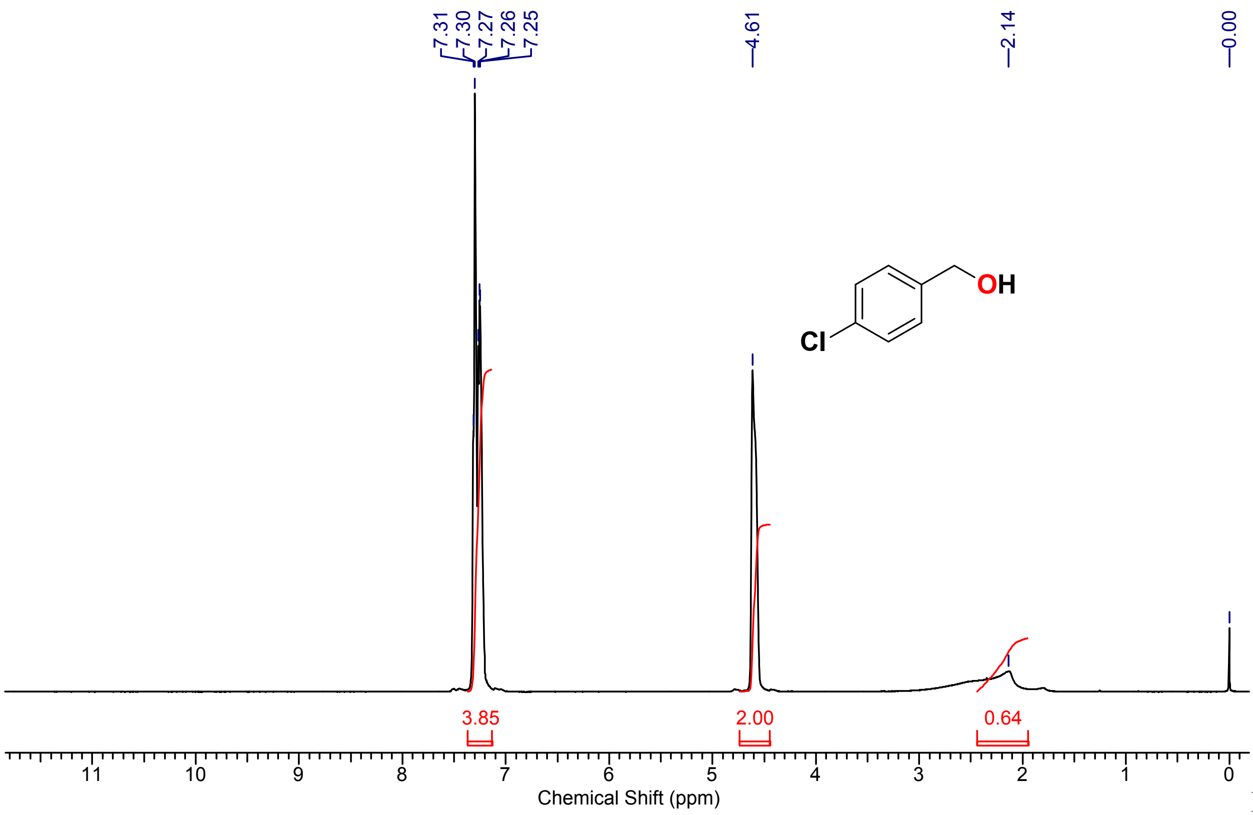


Figure FS87.

^{1}H NMR spectrum (400 MHz, 25°C, $CDCl_3$) of **2d.**

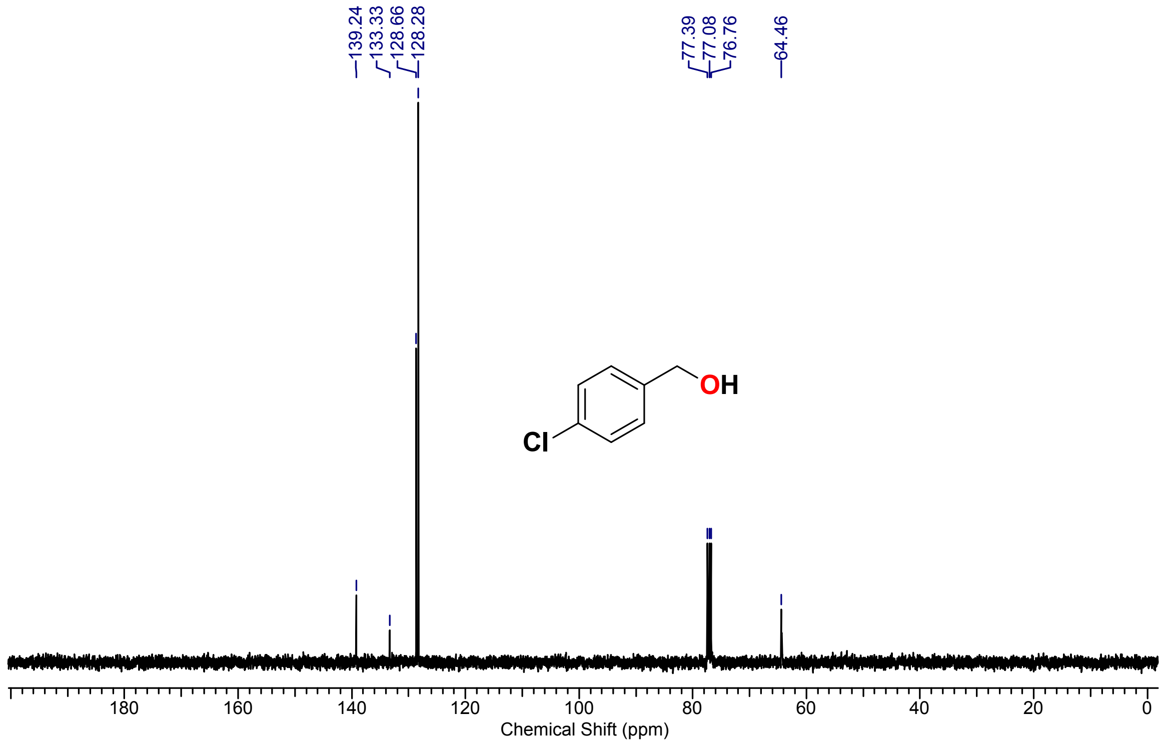


Figure S88. ^{13}C NMR spectrum (100 MHz, 25°C, $CDCl_3$) of **2d.**

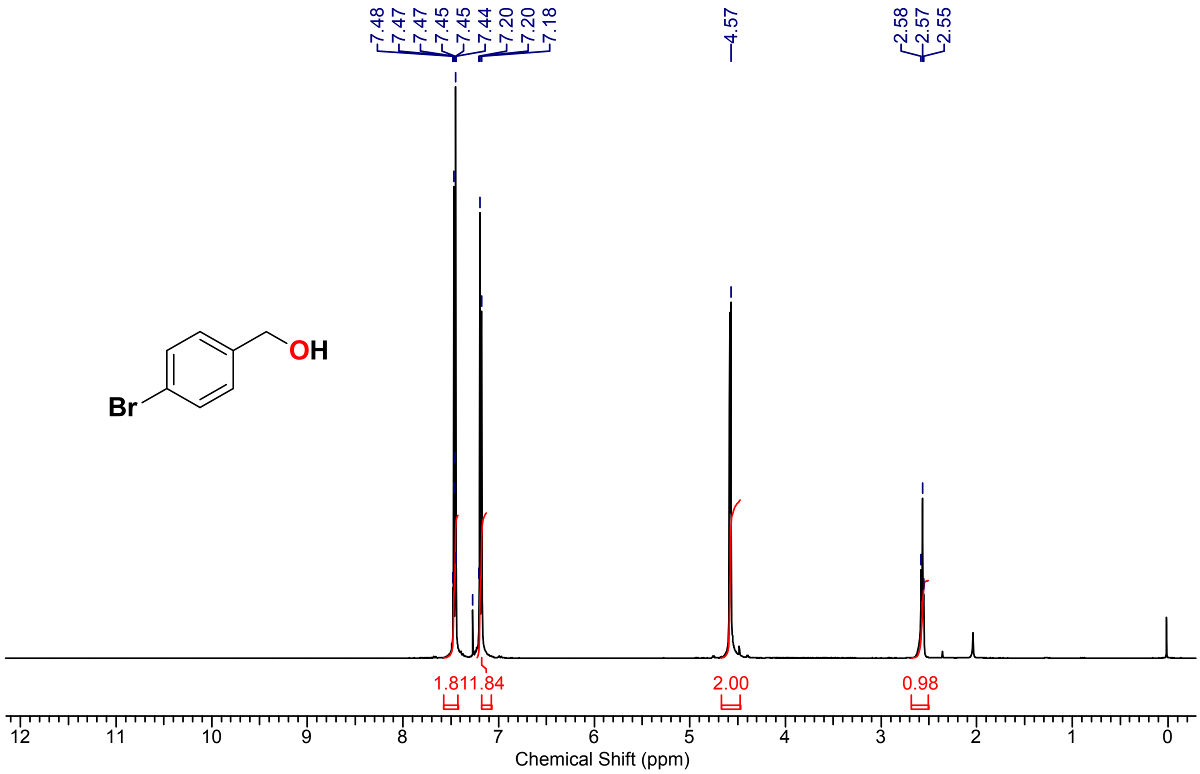


Figure FS89. ^{1}H NMR spectrum (400 MHz, 25°C, $CDCl_3$) of **2e.**

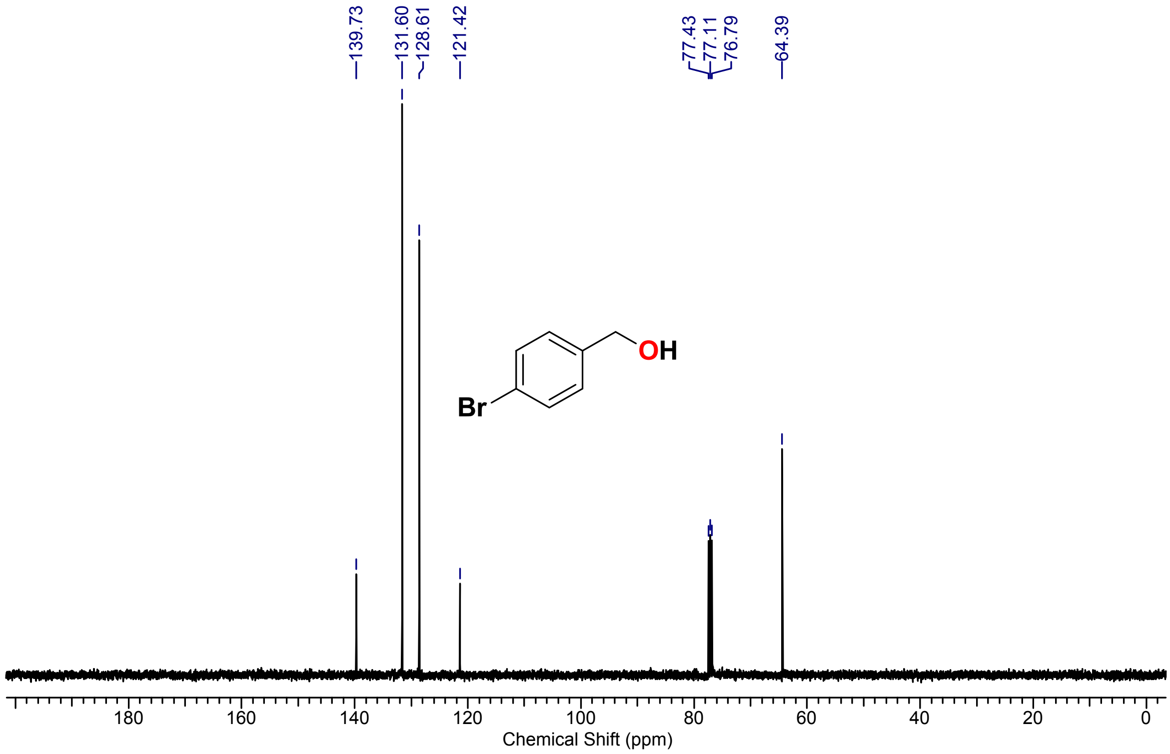


Figure S90. ^{13}C NMR spectrum (100 MHz, 25°C, $CDCl_3$) of **2e.**

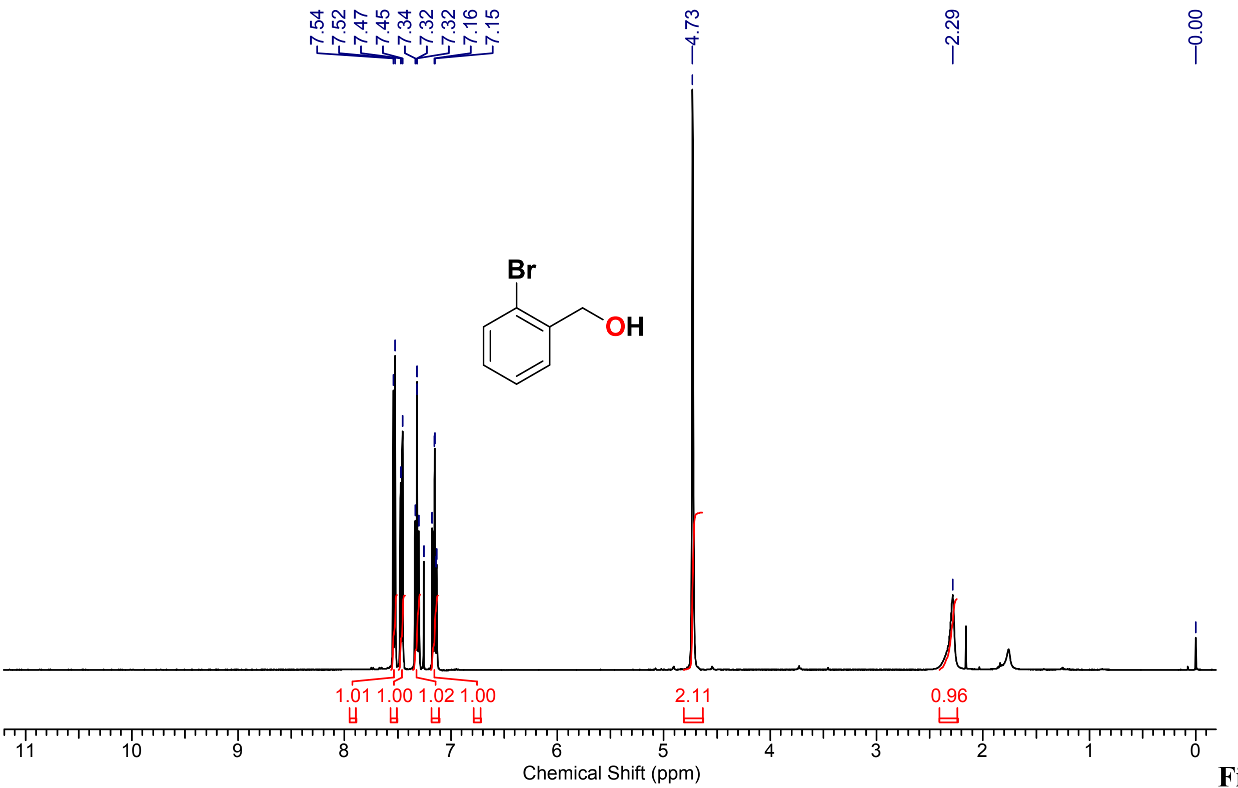


Figure FS91. ^{1}H NMR spectrum (400 MHz, 25°C, $CDCl_3$) of **2f.**

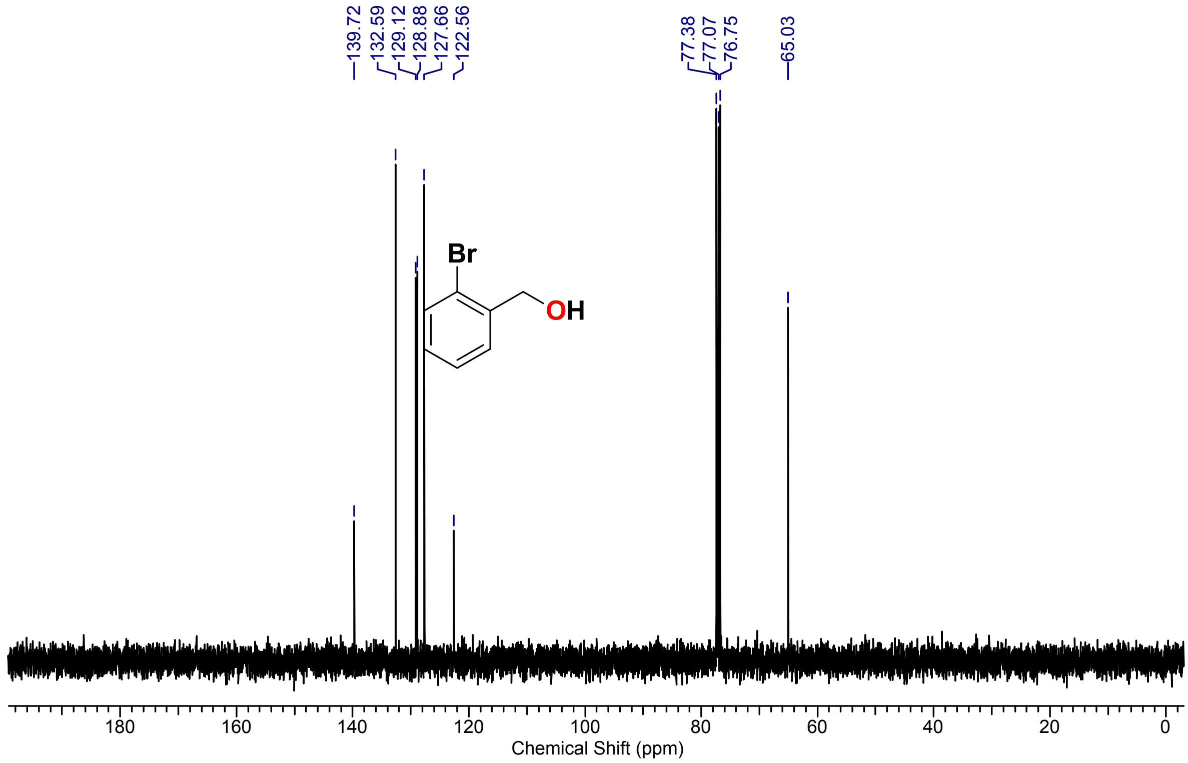


Figure S92. ^{13}C NMR spectrum (100 MHz, 25°C, $CDCl_3$) of **2f.**

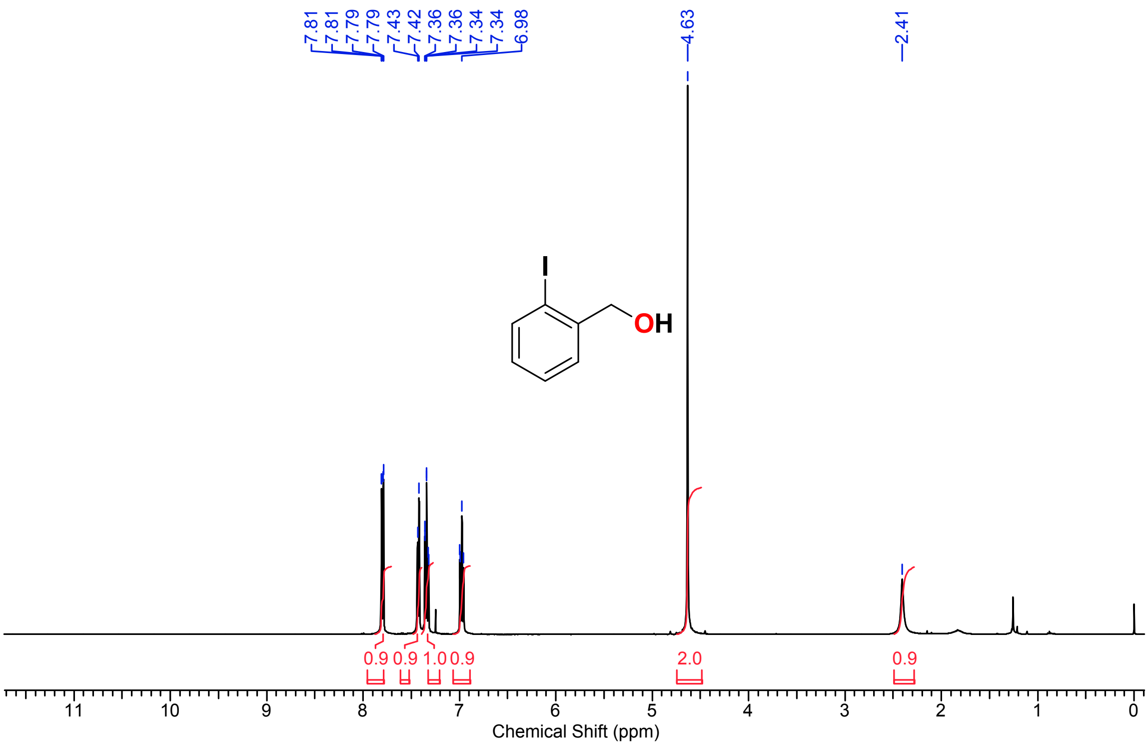


Figure FS93. ^{1}H NMR spectrum (400 MHz, 25°C, $CDCl_3$) of **2g.**

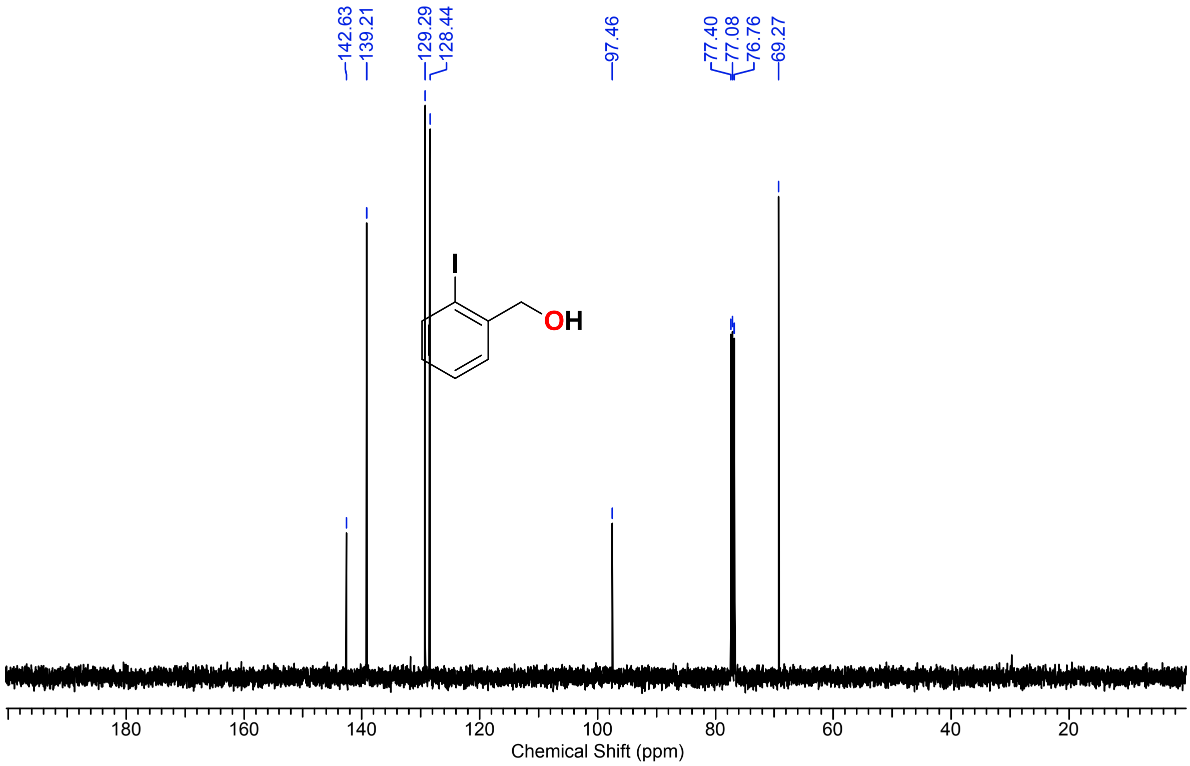


Figure S94. ^{13}C NMR spectrum (100 MHz, 25°C, $CDCl_3$) of **2g.**

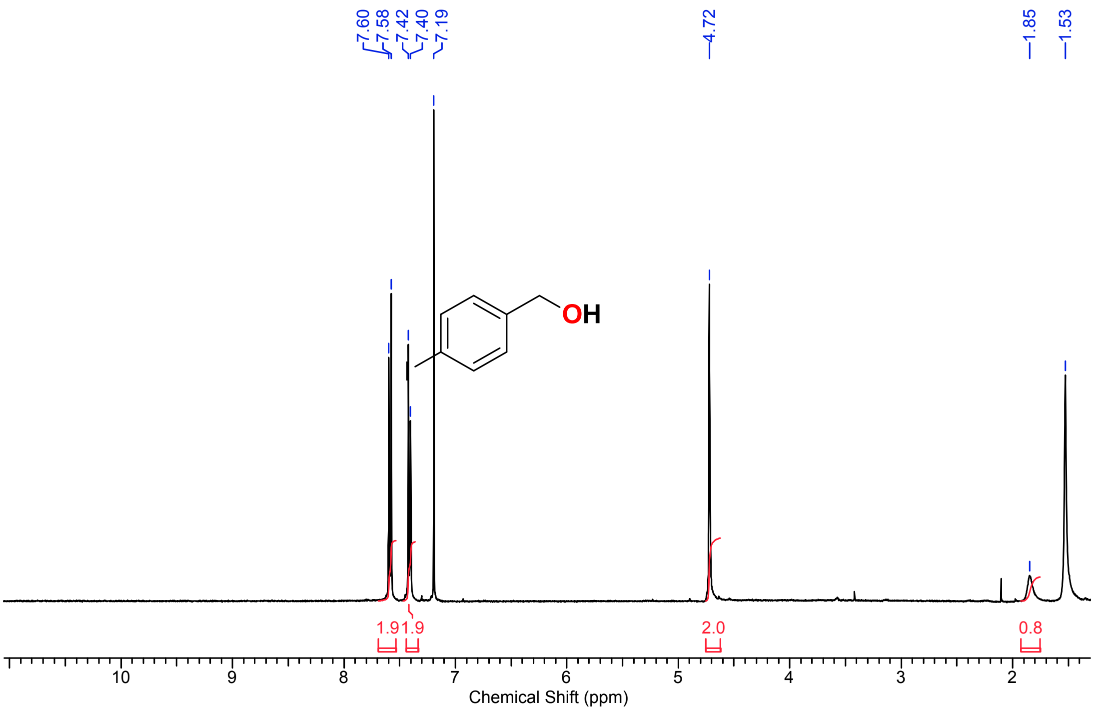


Figure FS95. ^{1}H NMR spectrum (400 MHz, 25°C, $CDCl_3$) of **2h.**

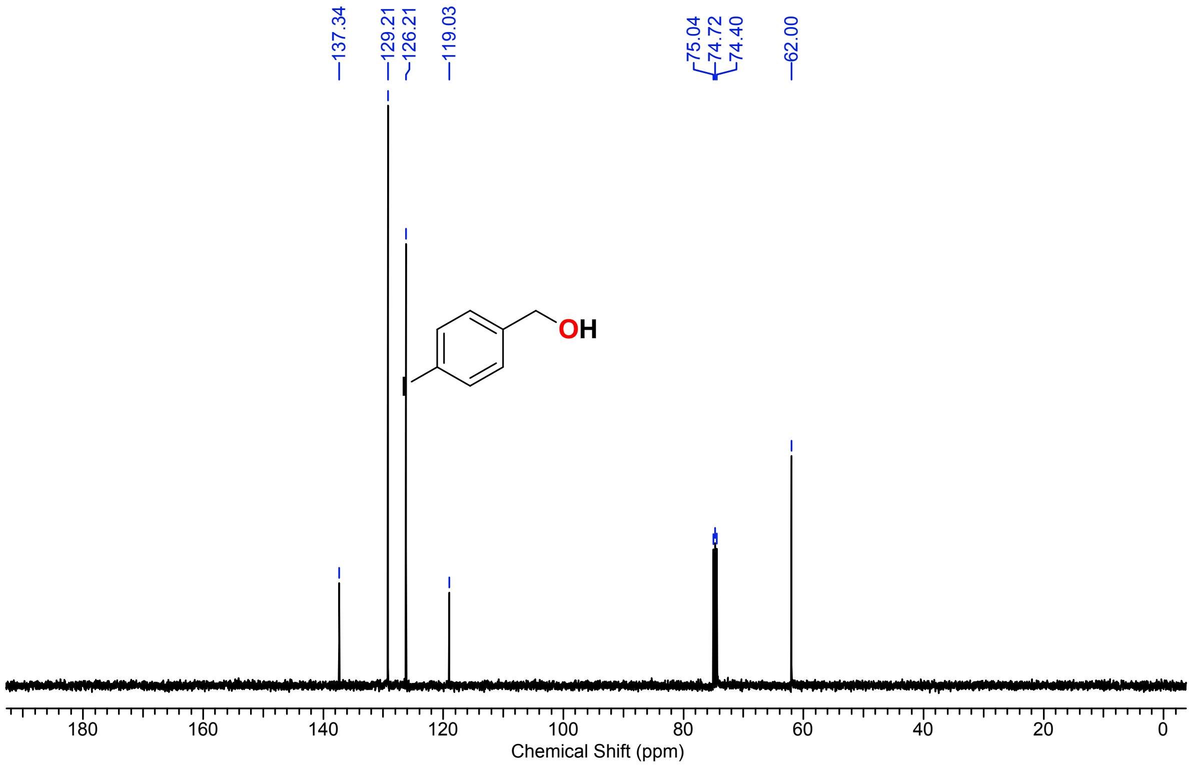


Figure S96. ^{13}C NMR spectrum (100 MHz, 25°C, $CDCl_3$) of **2h.**

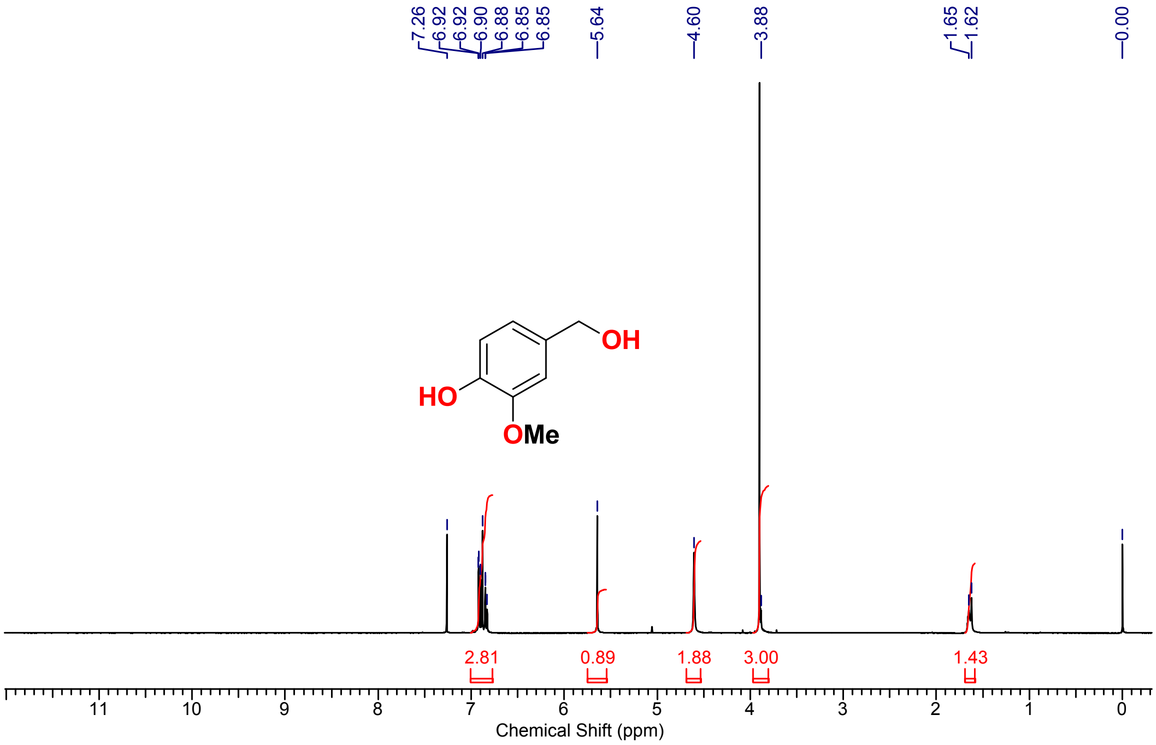


Figure FS97. ^{1}H NMR spectrum (400 MHz, 25°C, $CDCl_3$) of **2i.**

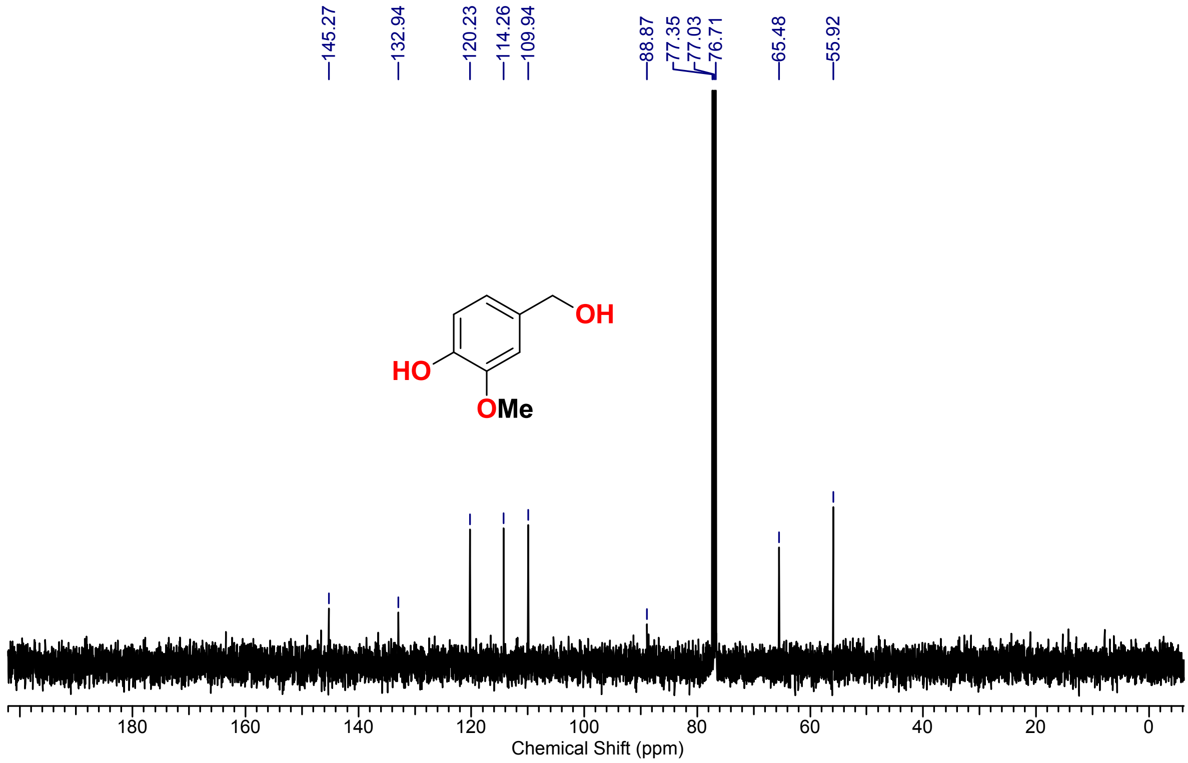


Figure S98. ^{13}C NMR spectrum (100 MHz, 25°C, $CDCl_3$) of **2i.**

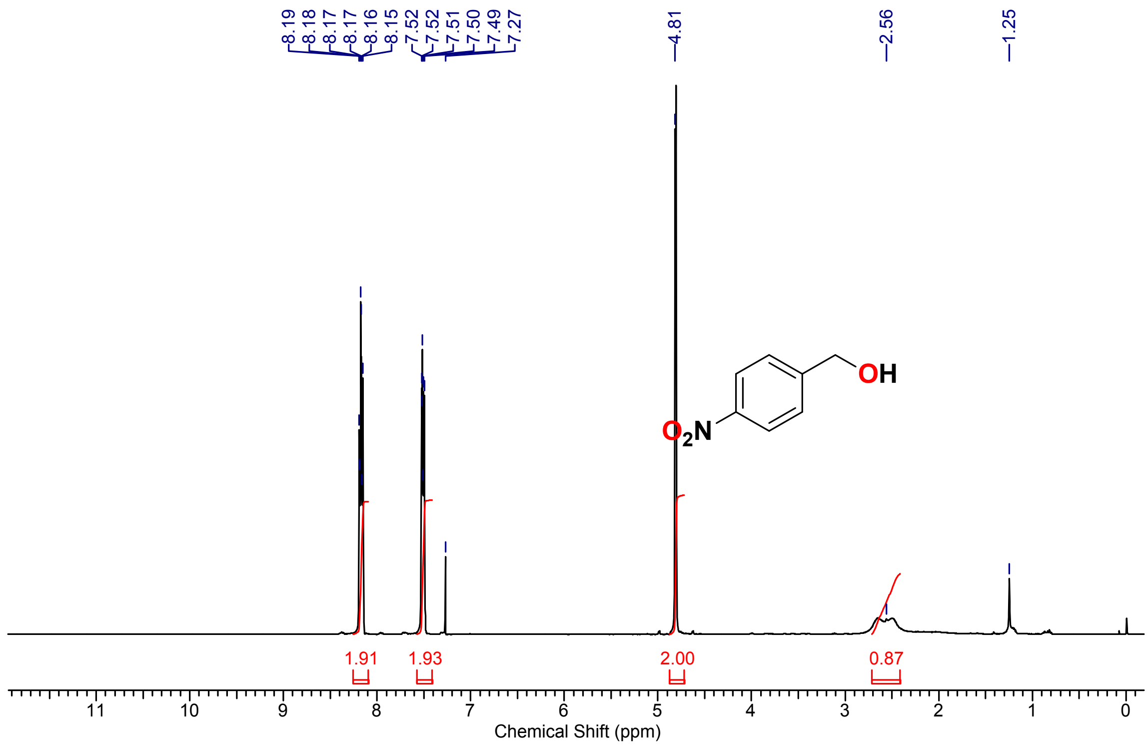


Figure FS99. ^{1}H NMR spectrum (400 MHz, 25°C, $CDCl_3$) of **2j.**

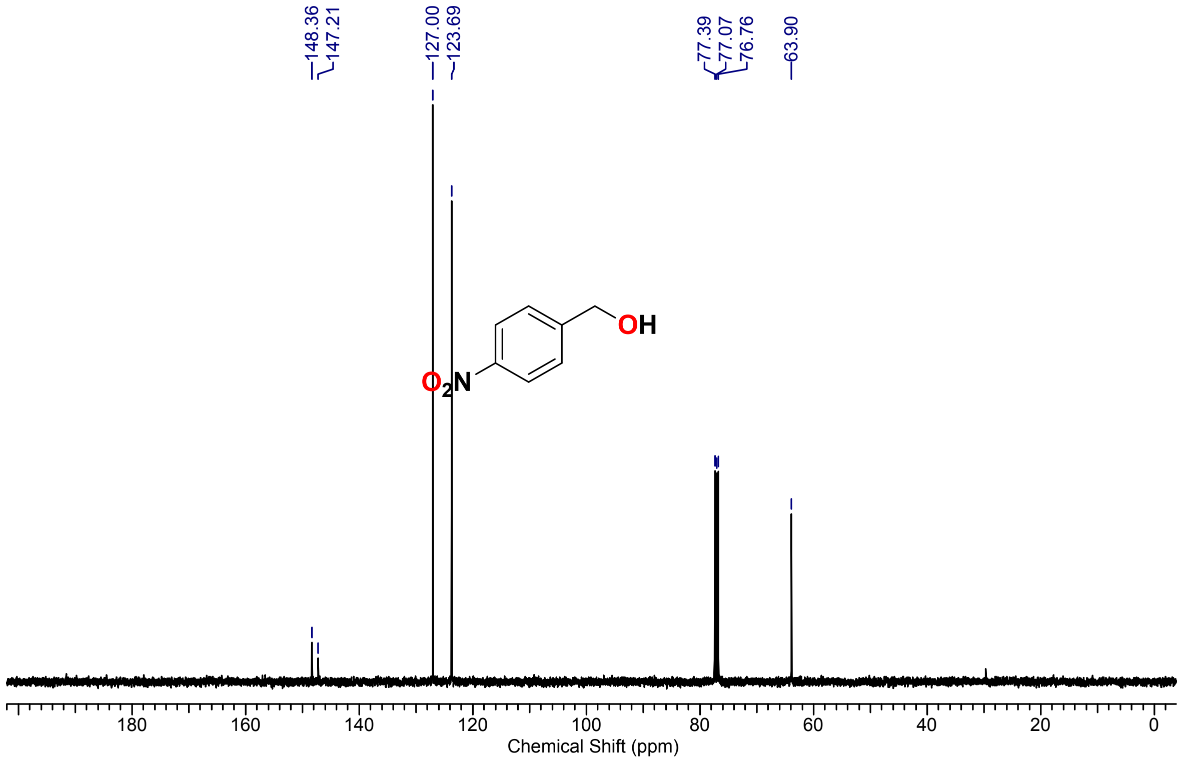


Figure S100. ^{13}C NMR spectrum (100 MHz, 25°C, $CDCl_3$) of **2j.**

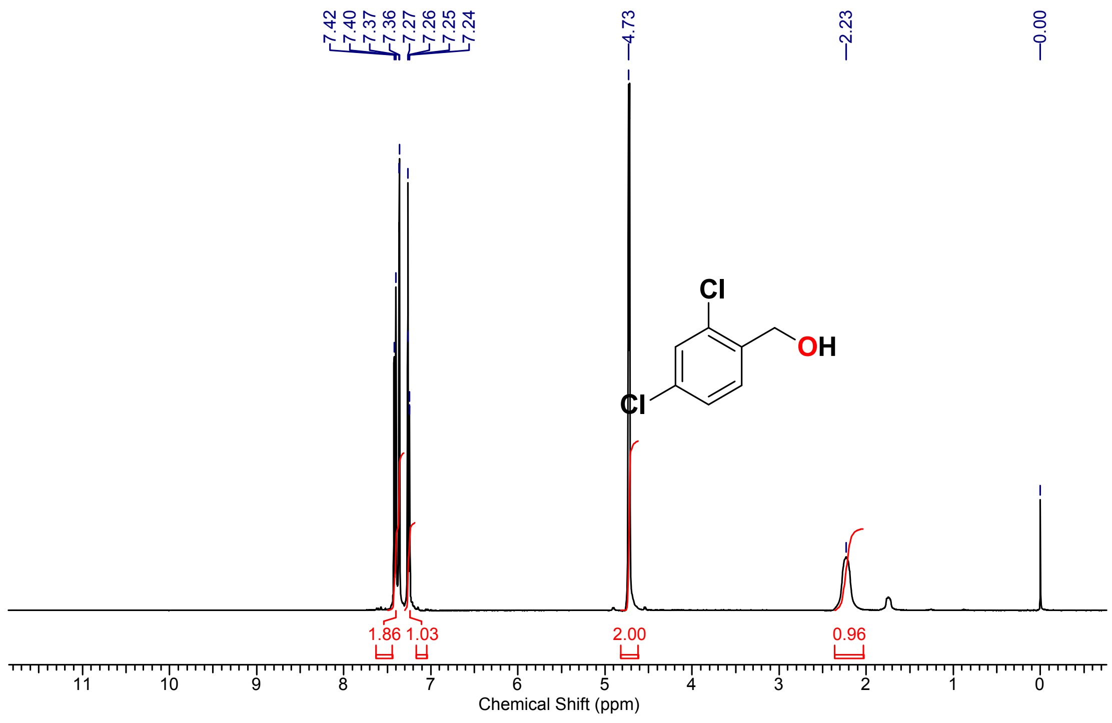


Figure FS101. ^{1}H NMR spectrum (400 MHz, 25°C, $CDCl_3$) of **2k.**

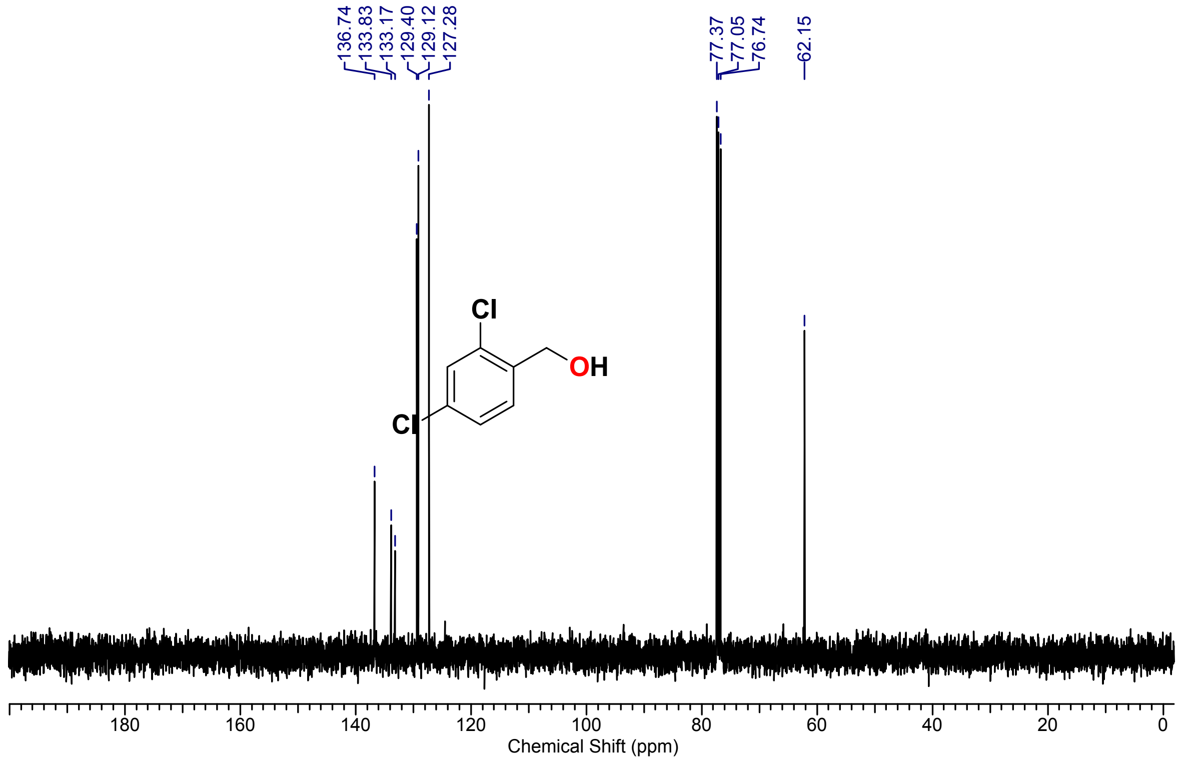


Figure S102. ^{13}C NMR spectrum (100 MHz, 25°C, $CDCl_3$) of **2k.**

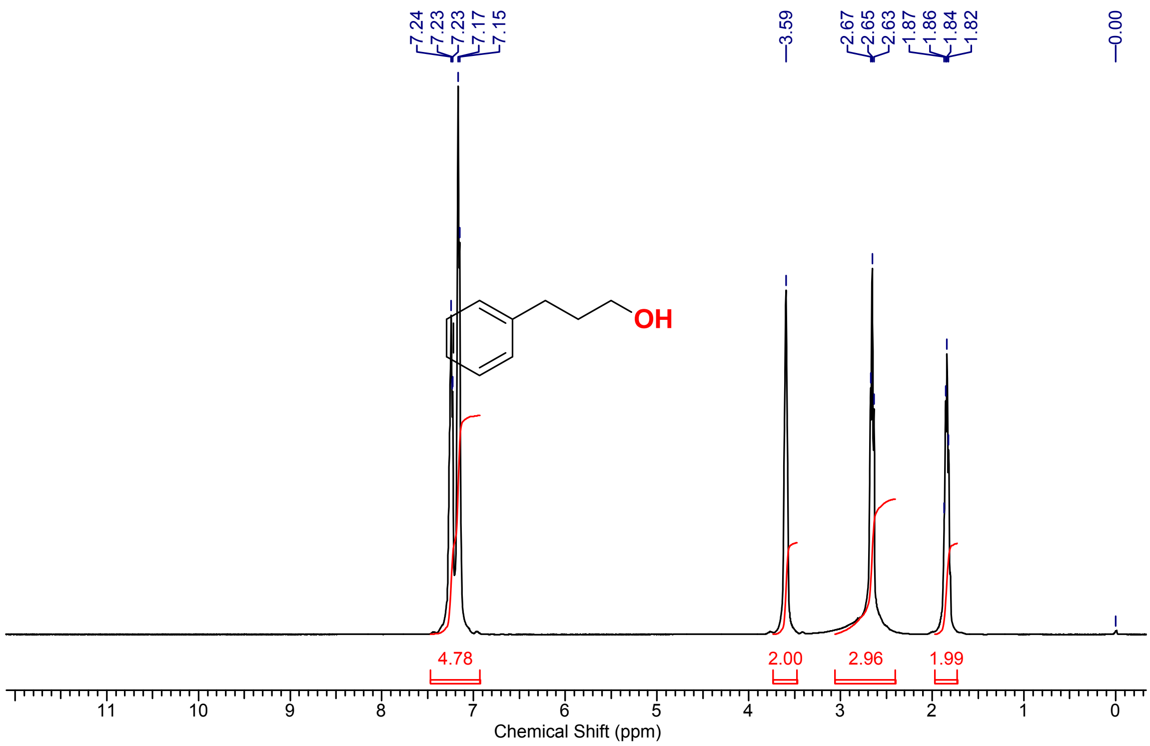


Figure FS103. ^{1}H NMR spectrum (400 MHz, 25°C, $CDCl_3$) of **2l.**

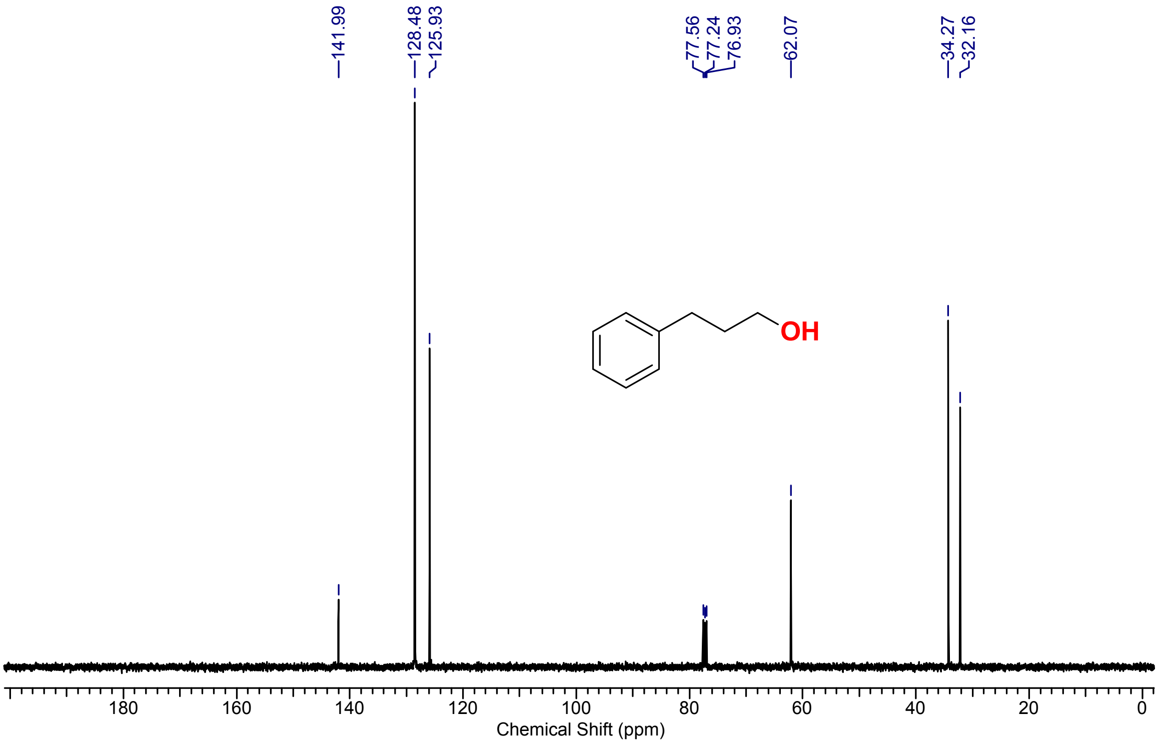


Figure S104. ^{13}C NMR spectrum (100 MHz, 25°C, $CDCl_3$) of **2l.**

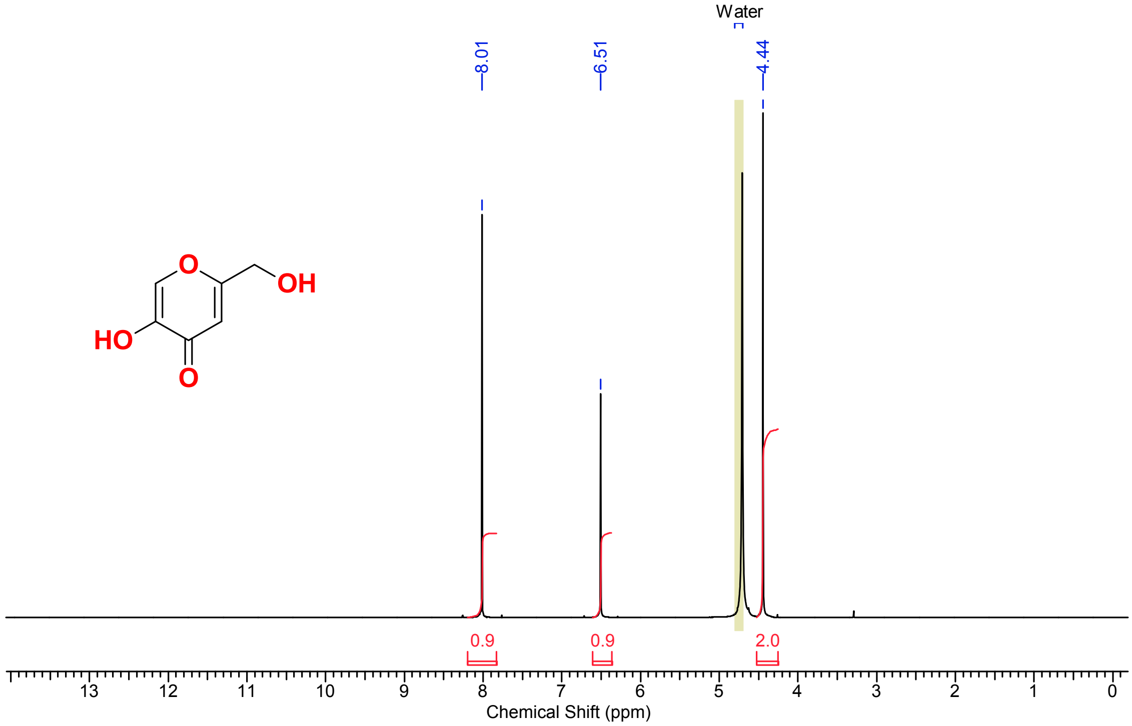


Figure FS103. ^{1}H NMR spectrum (400 MHz, 25°C, D_2O) of **2m.**

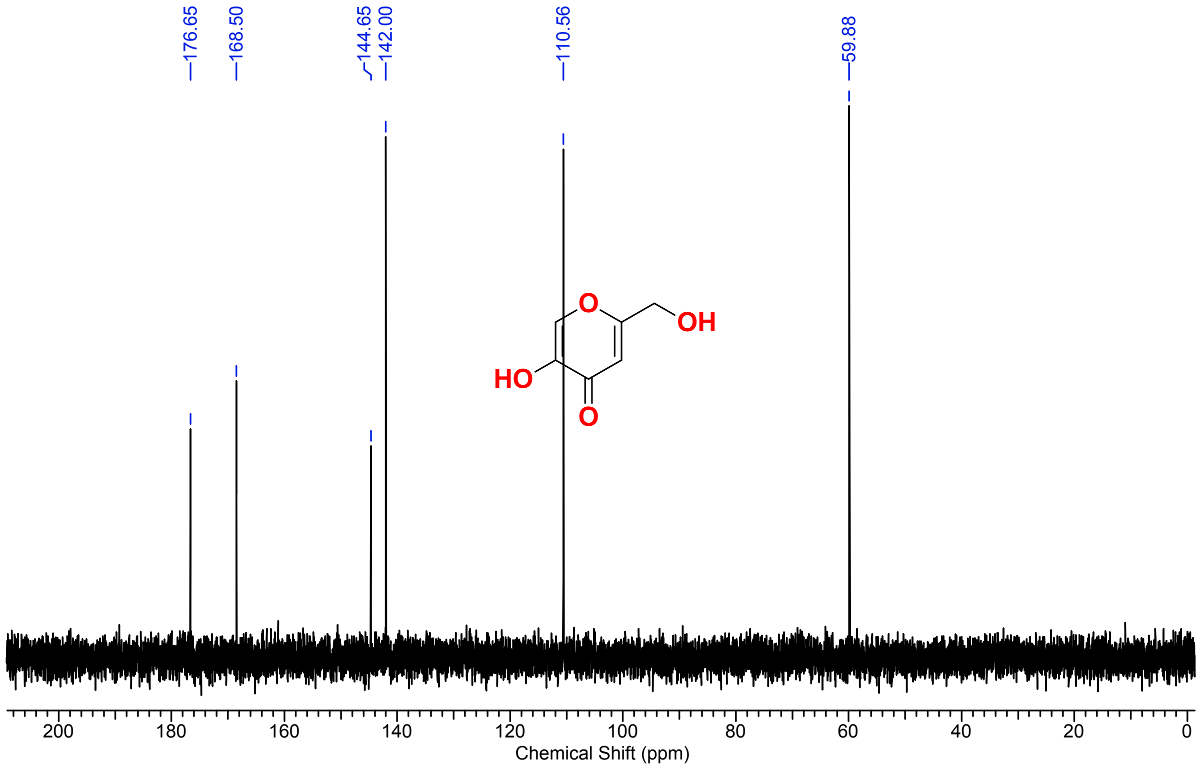


Figure S104. ^{13}C NMR spectrum (100 MHz, 25°C, D_2O) of **2m.**

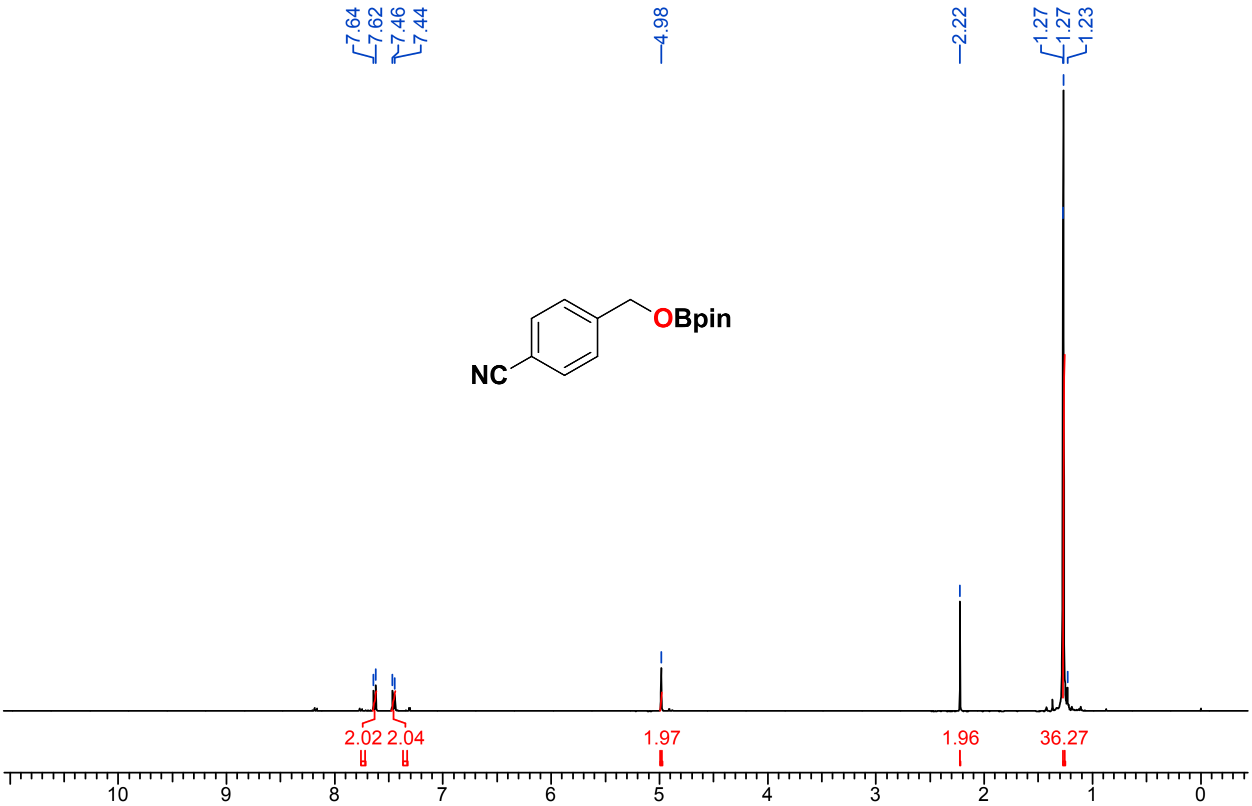


Figure FS107. ^{1}H NMR spectrum (400 MHz, 25°C, $CDCl_3$) of **3a.**

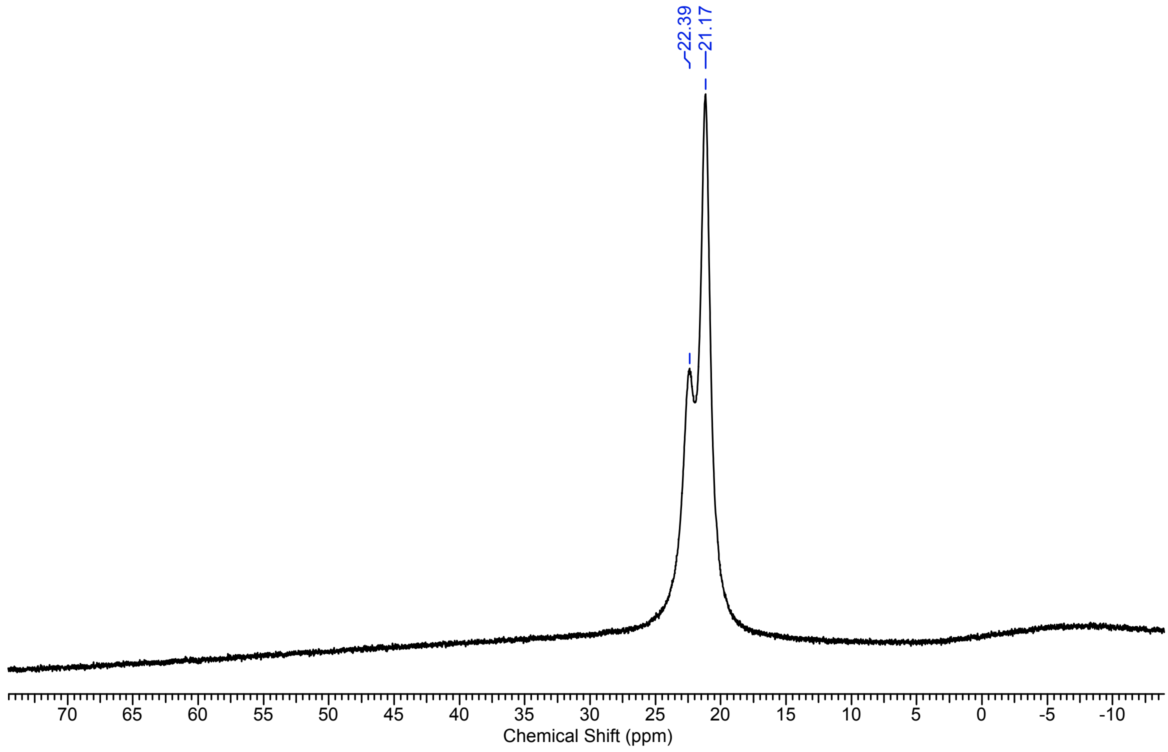


Figure FS108. ^{11}B NMR spectrum (128.4 MHz, 25°C, $CDCl_3$) of **3a.**

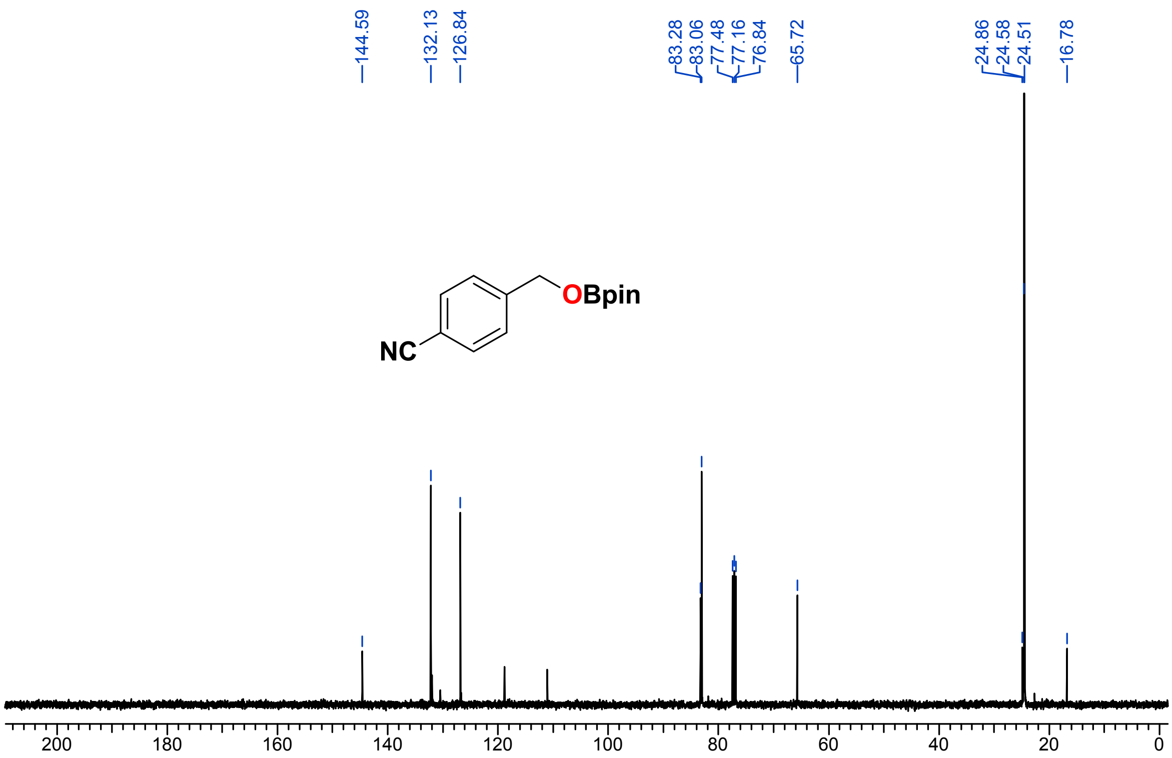


Figure S109. ^{13}C NMR spectrum (100 MHz, 25°C, $CDCl_3$) of **3a.**

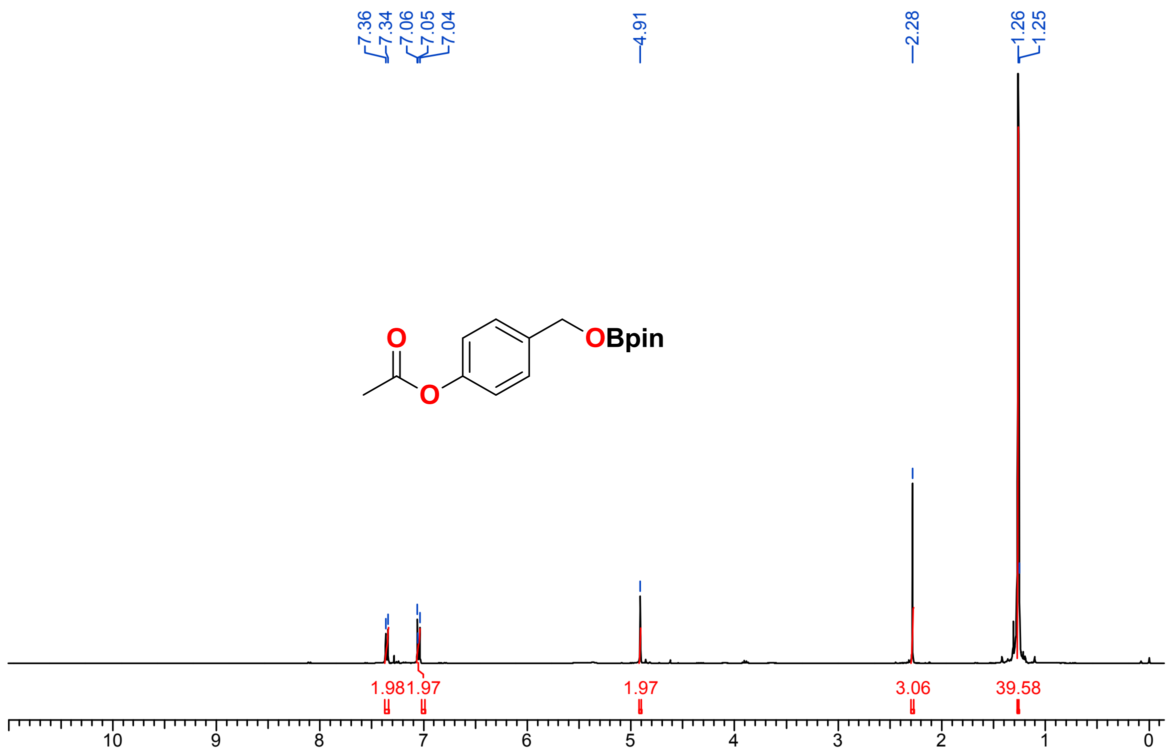


Figure FS110. ^{1}H NMR spectrum (400 MHz, 25°C, $CDCl_3$) of **3b.**

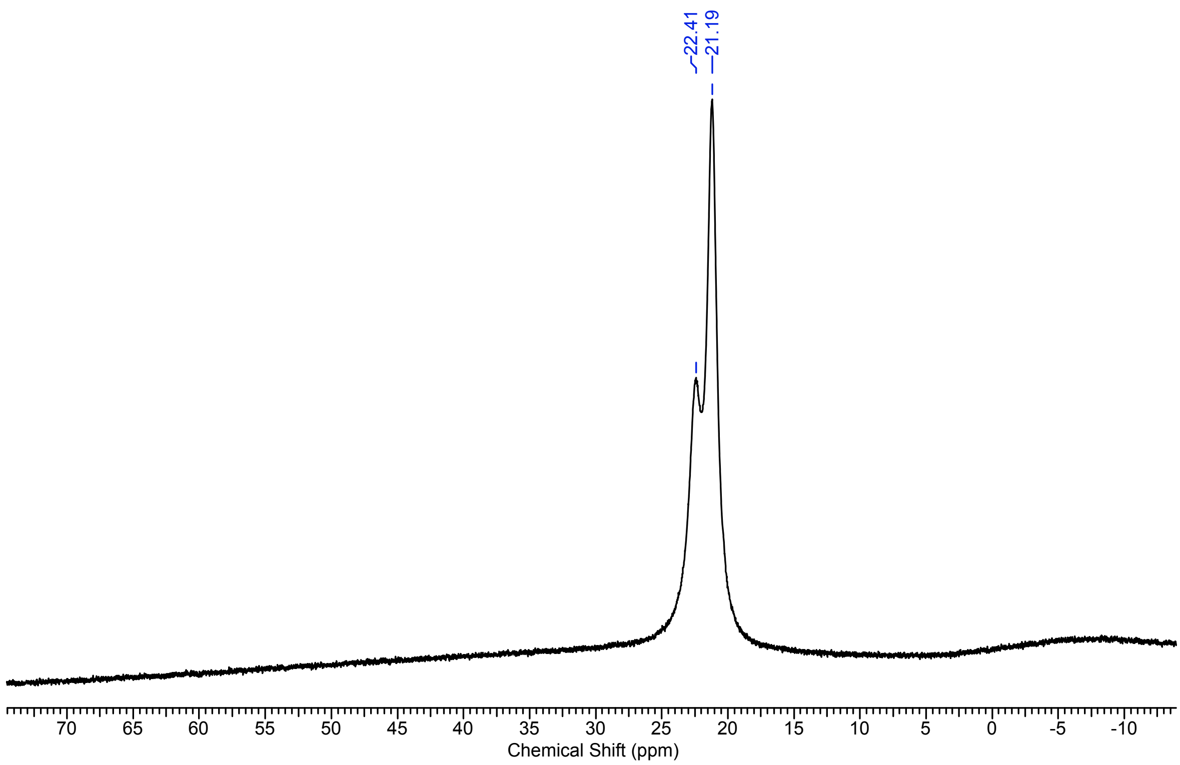


Figure FS111. ^{11}B NMR spectrum (128.4 MHz, 25°C, $CDCl_3$) of **3b.**

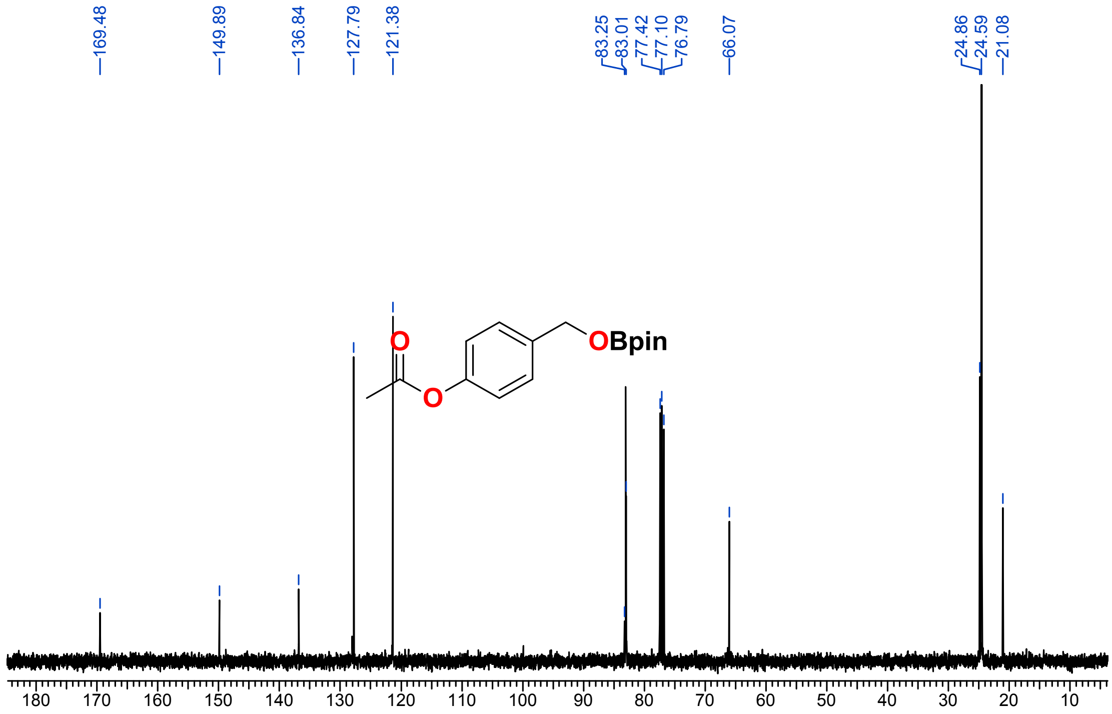


Figure S112. ^{13}C NMR spectrum (100 MHz, 25°C, $CDCl_3$) of **3b.**

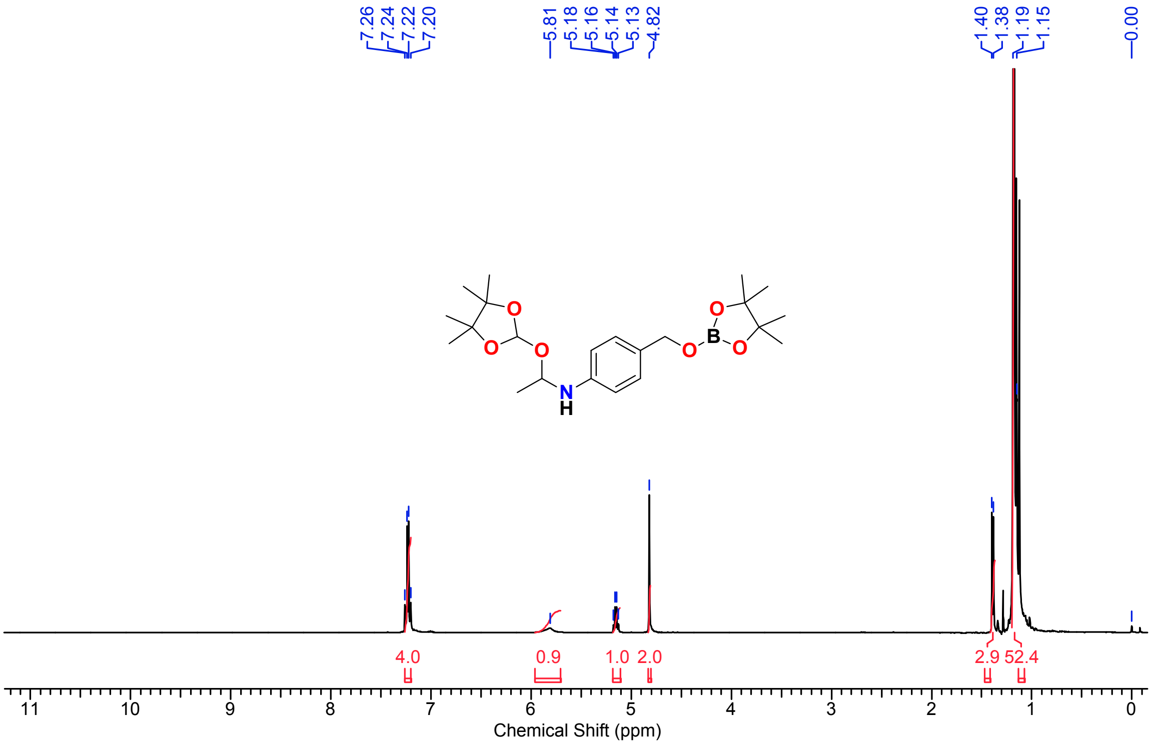


Figure FS113. ^{1}H NMR spectrum (400 MHz, 25°C, $CDCl_3$) of **3c.**

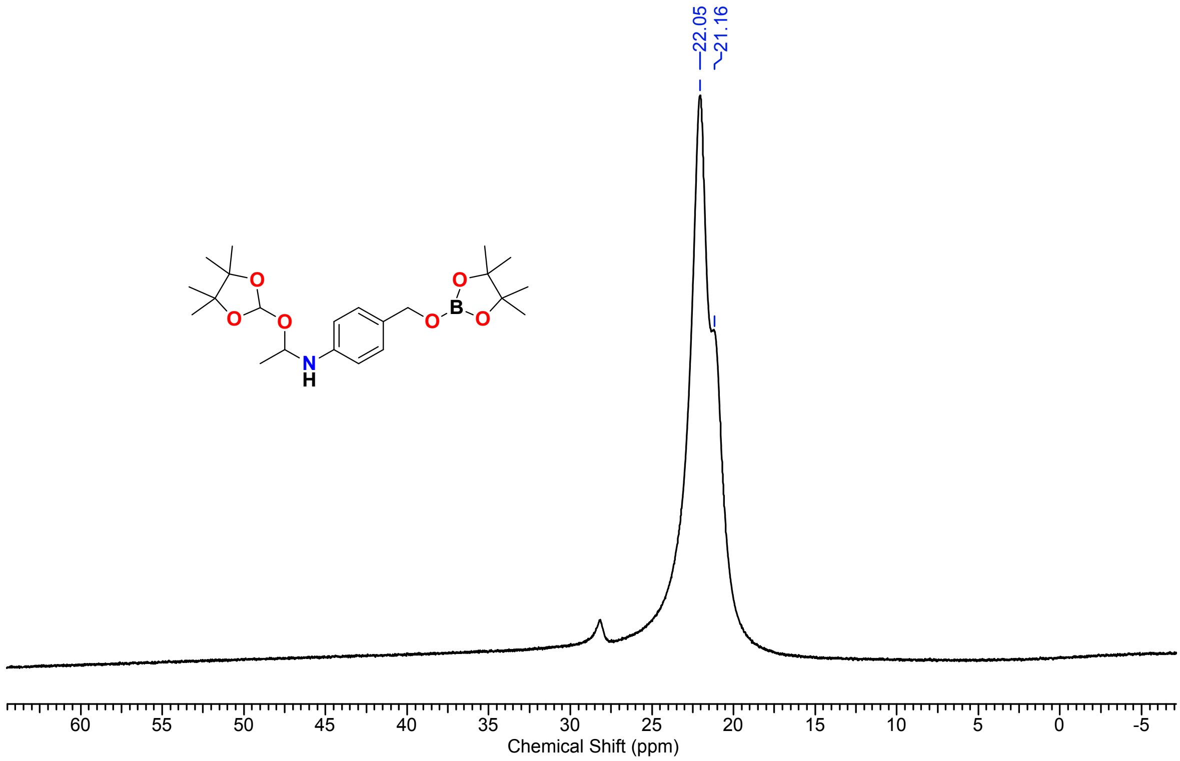


Figure FS114. ^{11}B NMR spectrum (128.4 MHz, 25°C, $CDCl_3$) of **3c.**

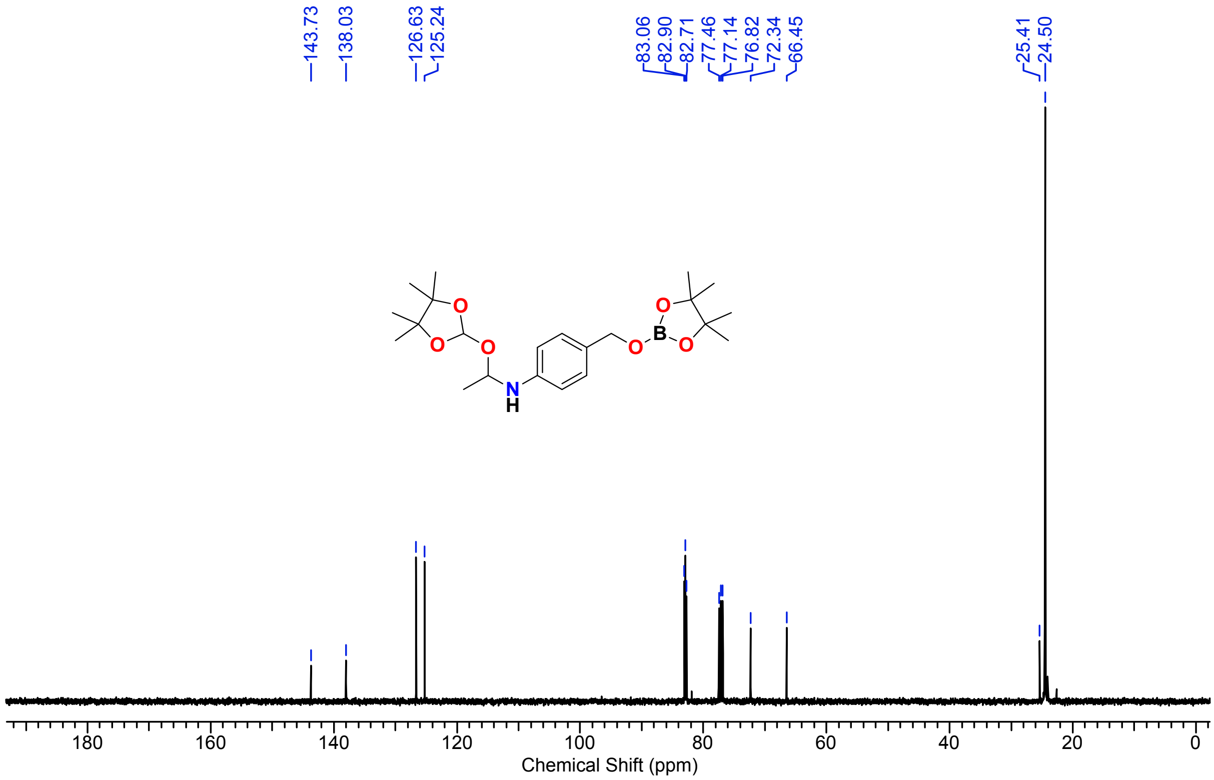


Figure S115. ^{13}C NMR spectrum (100 MHz, 25°C, $CDCl_3$) of **3c.**

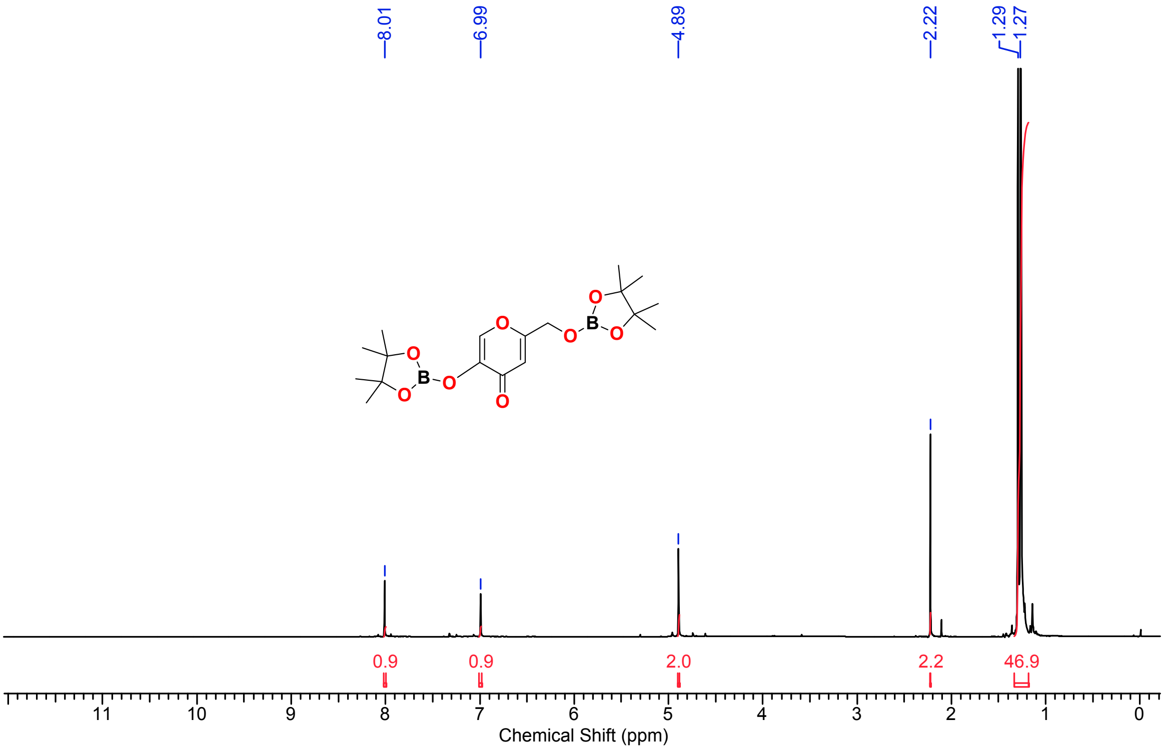


Figure FS116. ^{1}H NMR spectrum (400 MHz, 25°C, $CDCl_3$) of **3d.**

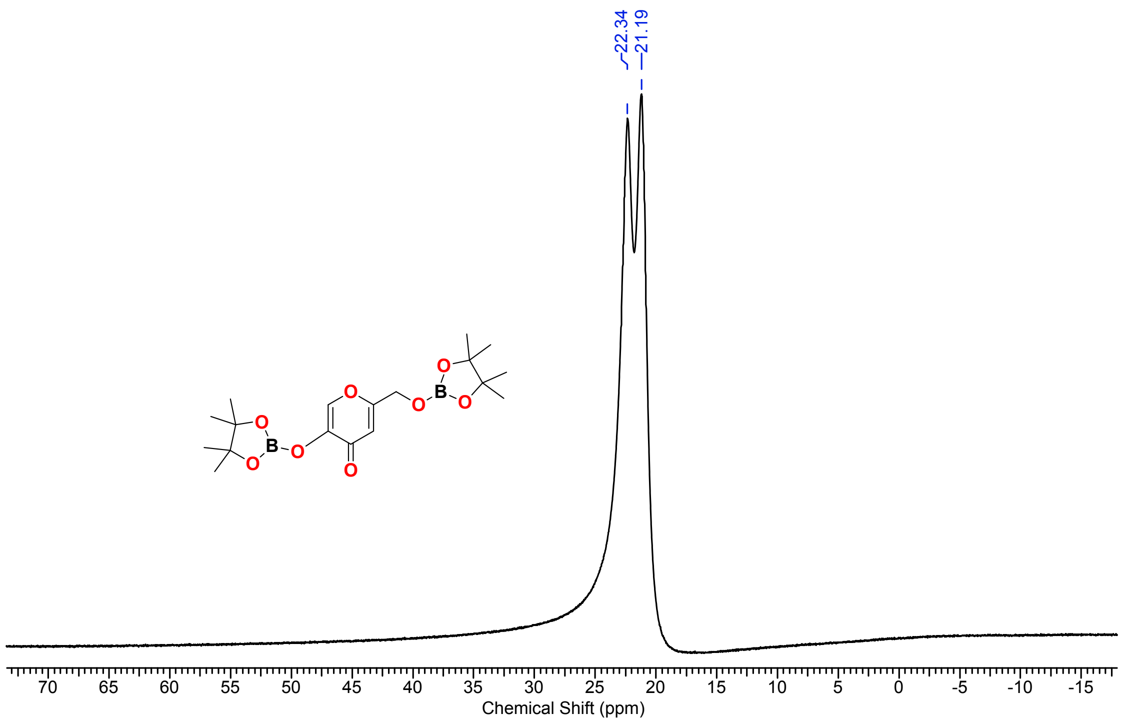


Figure FS117. ^{11}B NMR spectrum (128.4 MHz, 25°C, $CDCl_3$) of **3d.**

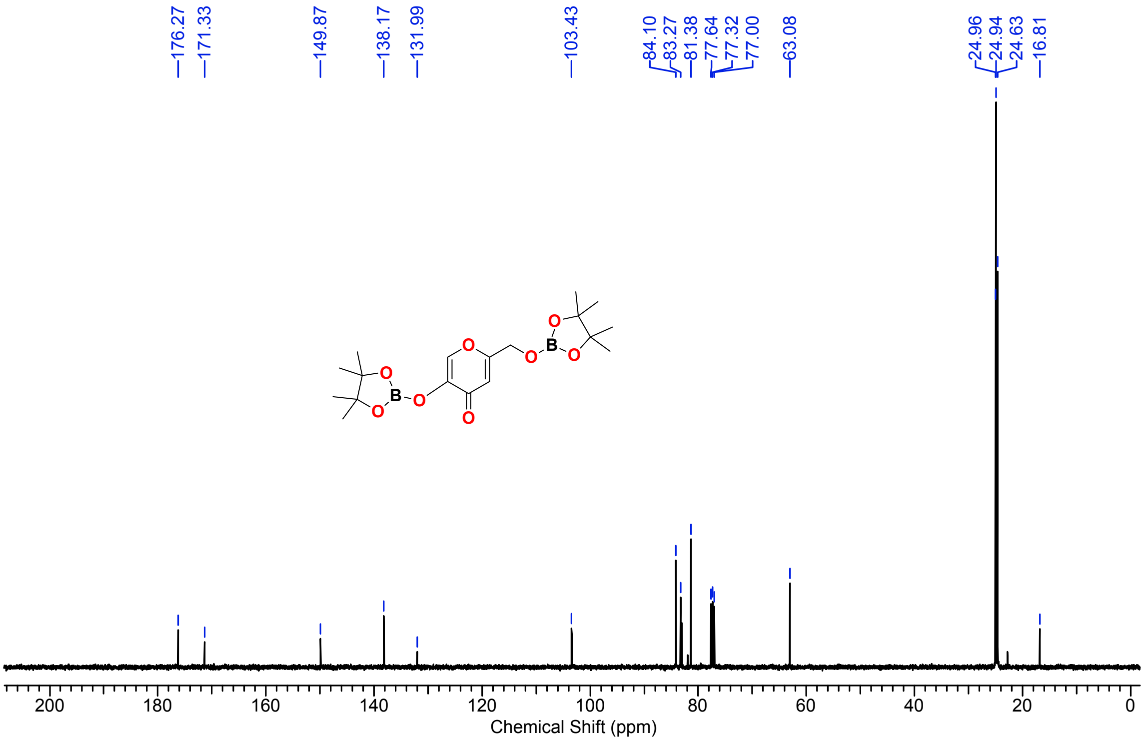


Figure FS118. ^{13}C NMR spectrum (100 MHz, 25°C, $CDCl_3$) of **3d.**

In addition, to that all reagents/reactions have to be absolutely metal free for this work we have conducted the following experiments/studies.

1. All the chemicals are purchased from Sigma Aldrich (now MERCK) which have high quality chemistry products defined by their assay value as a percent purity.
2. In case of pinacolborane, we have purchased it from Sigma Aldrich and further distilled it in vacuo for purification.
3. We have taken ^{1}H, ^{13}C NMR spectra of all the carboxylic acids and pinacolborane and are given some of them below as representative examples (Figure FS1-16). From NMR spectra it is clearly observed that all the starting materials carboxylic acids and pinacol borane are pure and does not contain any paramagnetic impurity.
4. We have analyzed our carboxylic acid samples which are used in this work using **Energy-Dispersive X-ray spectroscopy (EDS)** which is an analytical technique used for the elemental analysis or chemical characterization. The EDS spectra of 4-Acetoxybenzoic acid, 4-Cyanobenzoic acid, Diphenylacetic acid, 2-Iodobenzoic acid are given below. From each spectra it is clear that, the metal traces are absent in the respective carboxylic acid indicating the highly pure nature of the starting materials.
5. Additionally, we have analyzed some of our carboxylic acid samples using **Prodigy Inductively Coupled Plasma (ICP-OES) Spectrometer by Teledyne Leeman Labs** which is an another analytical technique used for the detection of chemical elements. We have performed this experiments with carboxylic acids such as 2-iodobenzoic acid, 4-acetoxybenzoic acid, 4-cyanobenzoic acid, cyclohexanecarboxylic acid,

diphenylacetic acid and all the data are given in the reviewer's SI. From these experiments, we have observed that the presence of any metal traces are in perts per billion (ppb) concentration which is negligible impossible to play any catalytic role in reduction.

6. Next we have conducted a NMR reaction of 4-Fluorobenzoic acid with HBpin and took the respective NMR spectrum after a certain time intervals. The 1H stack NMR spectra of progress of the reaction and conversion of product vs time of the reaction are given below. From the NMR spectra, it is confirmed that with increase in time, the concentration of the starting material decreases and the product formation rapidly took place.

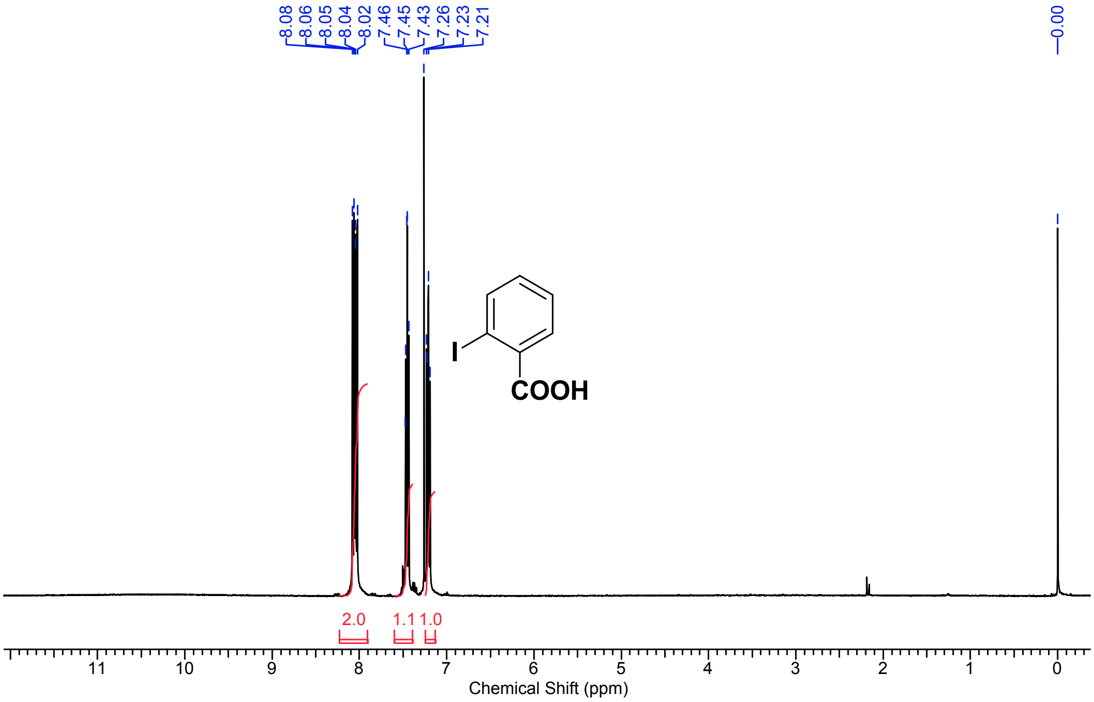


Figure FS119. ^{1}H NMR spectrum (400 MHz, 25°C, $CDCl_3$) of **2-iodo benzoic acid.** (The peak at 2.05 ppm represents the acetone.)

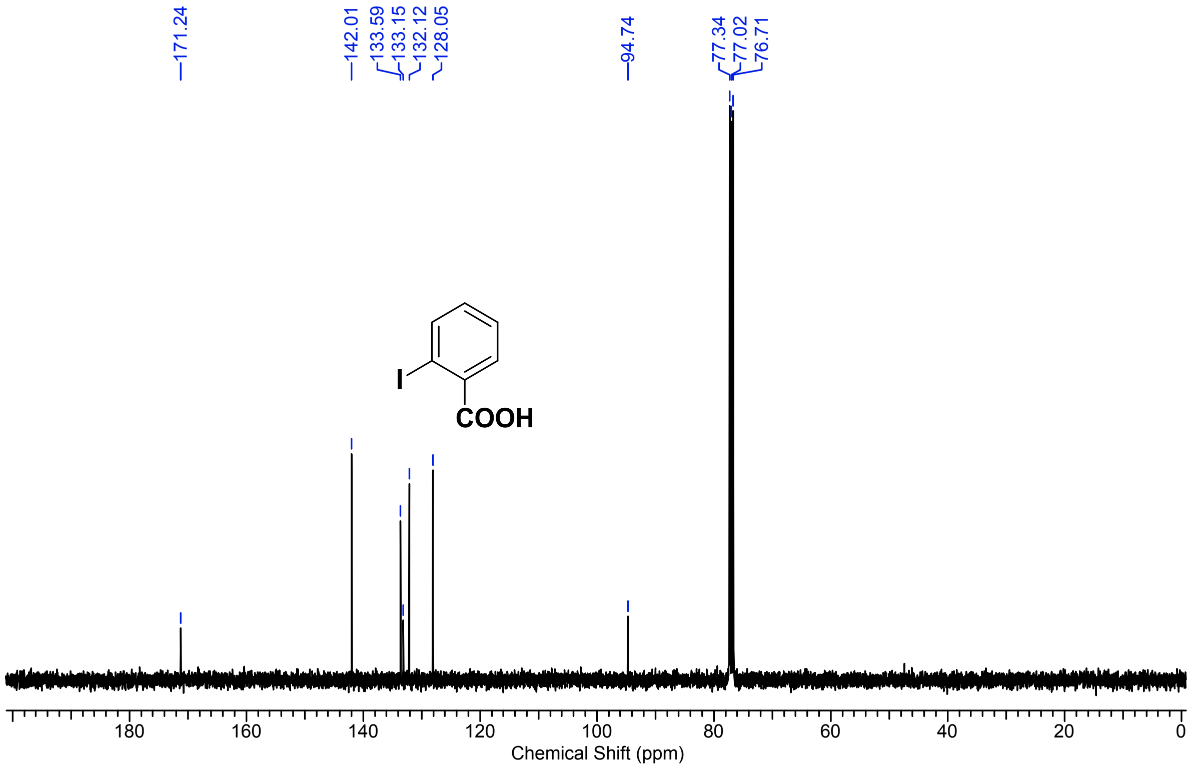


Figure FS120. ^{13}C NMR spectrum (100 MHz, 25°C, $CDCl_3$) of **2-iodo benzoic acid.**

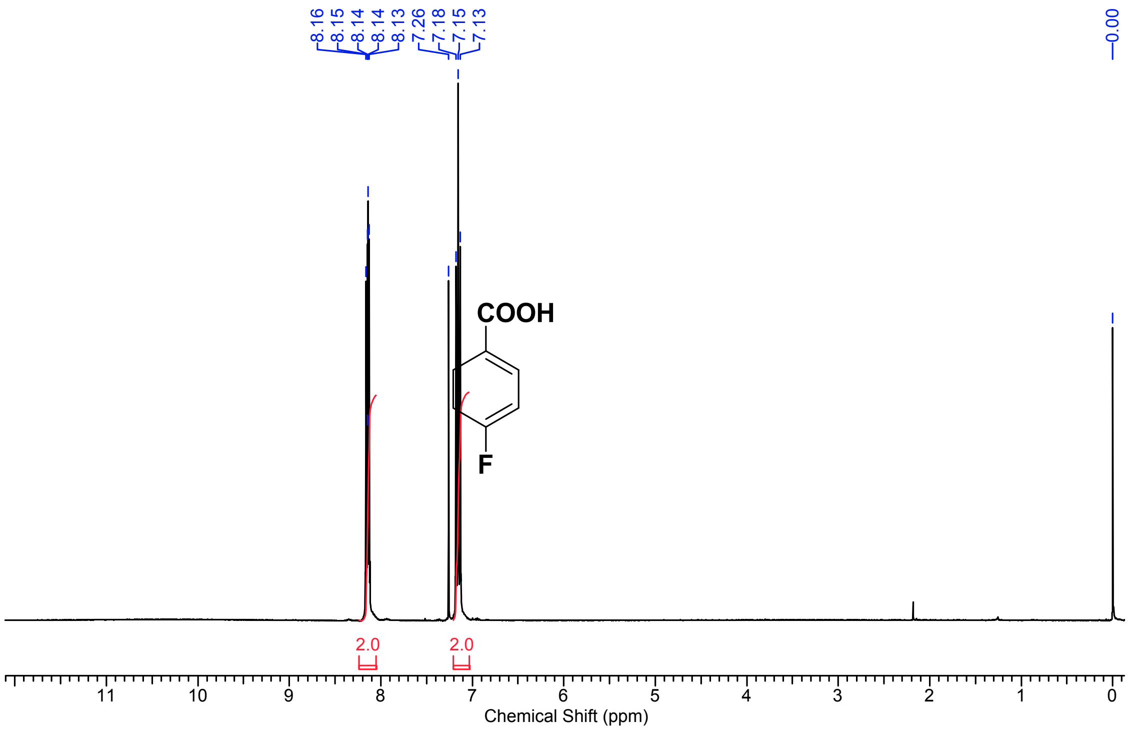
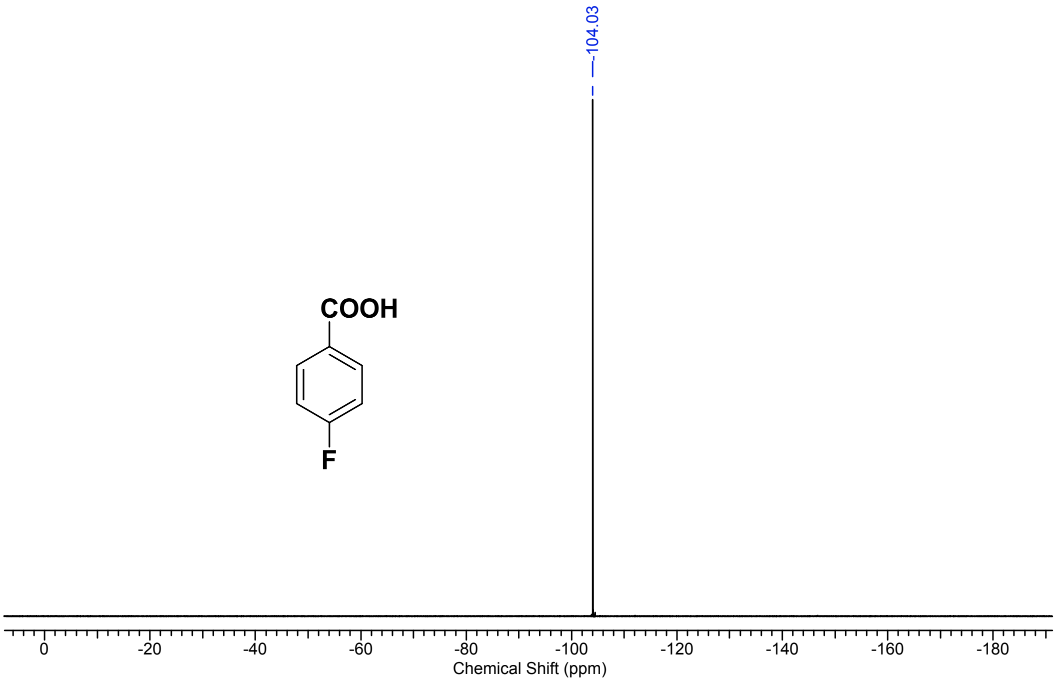


Figure FS121. ^{1}H NMR spectrum (400 MHz, 25°C, $CDCl_3$) of **4-flurobenzoic acid. .** (The peak at 2.05 ppm represents the acetone.)



FS122. ^{19}F NMR spectrum (376.5 MHz, 25°C, $CDCl_3$) of **4-flurobenzoic acid.**

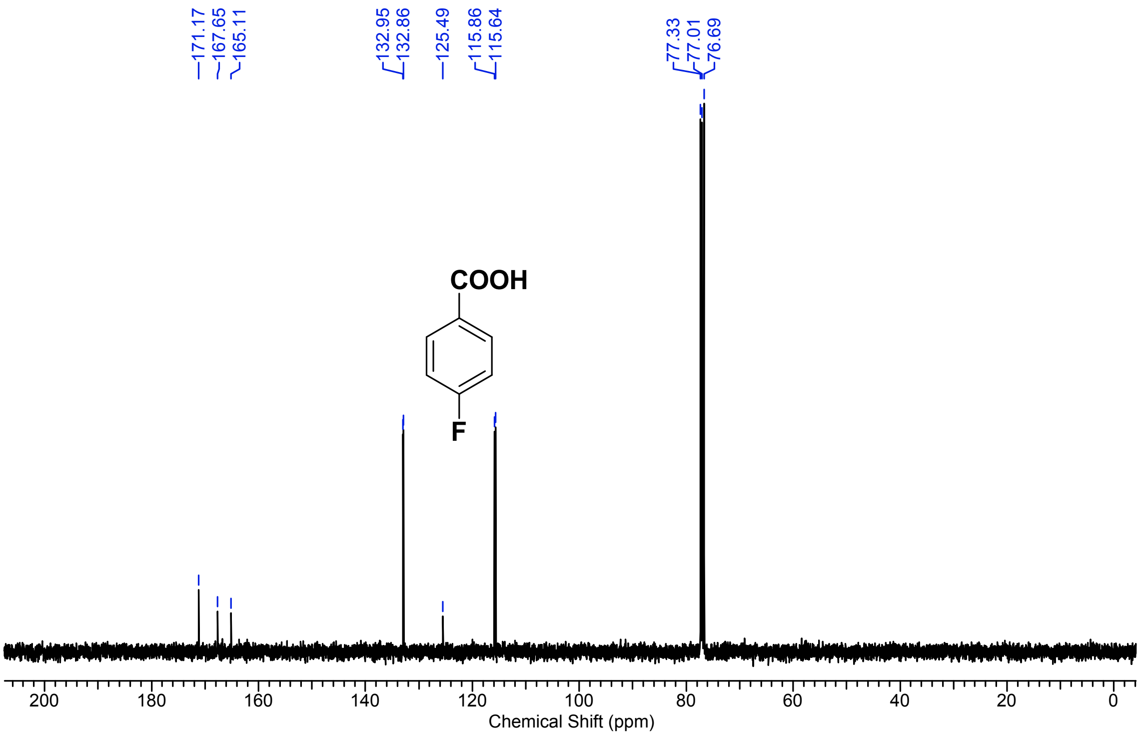


Figure FS123. ^{13}C NMR spectrum (100 MHz, 25°C, $CDCl_3$) of **4-flurobenzoic acid.**

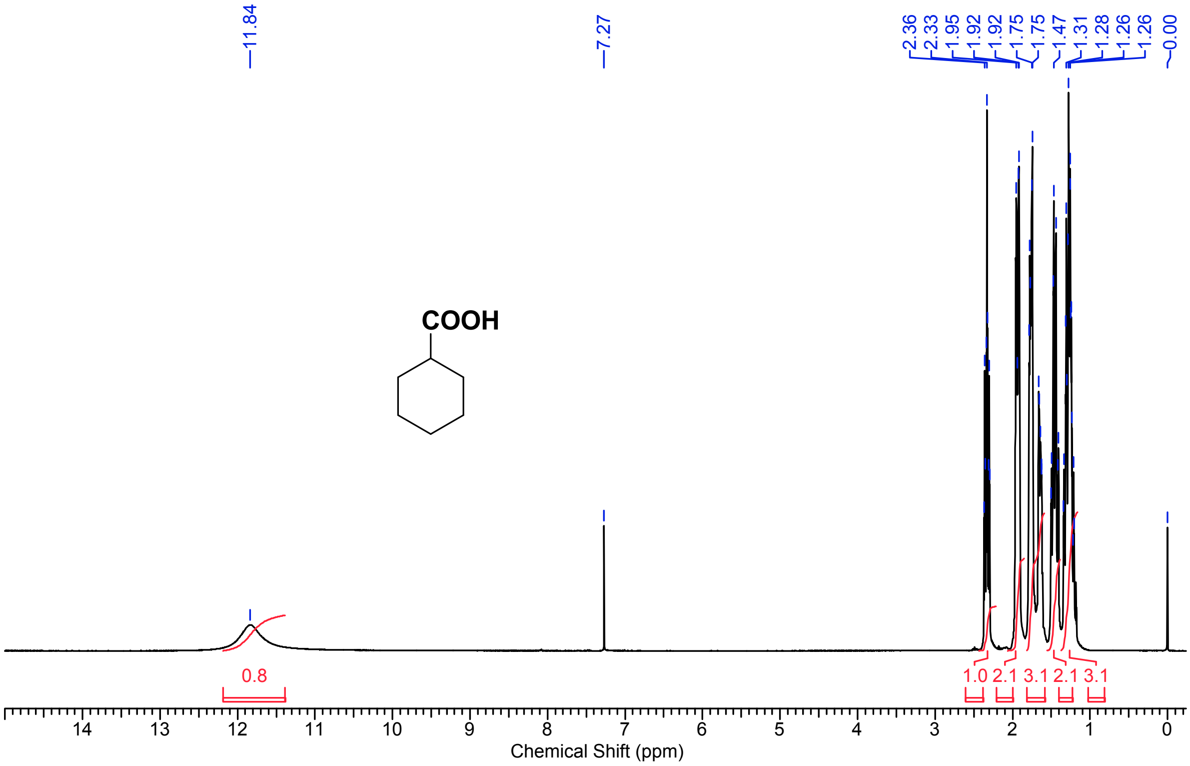


Figure FS124. ^{1}H NMR spectrum (400 MHz, 25°C, $CDCl_3$) of **cyclohexanecarboxylic acid.**

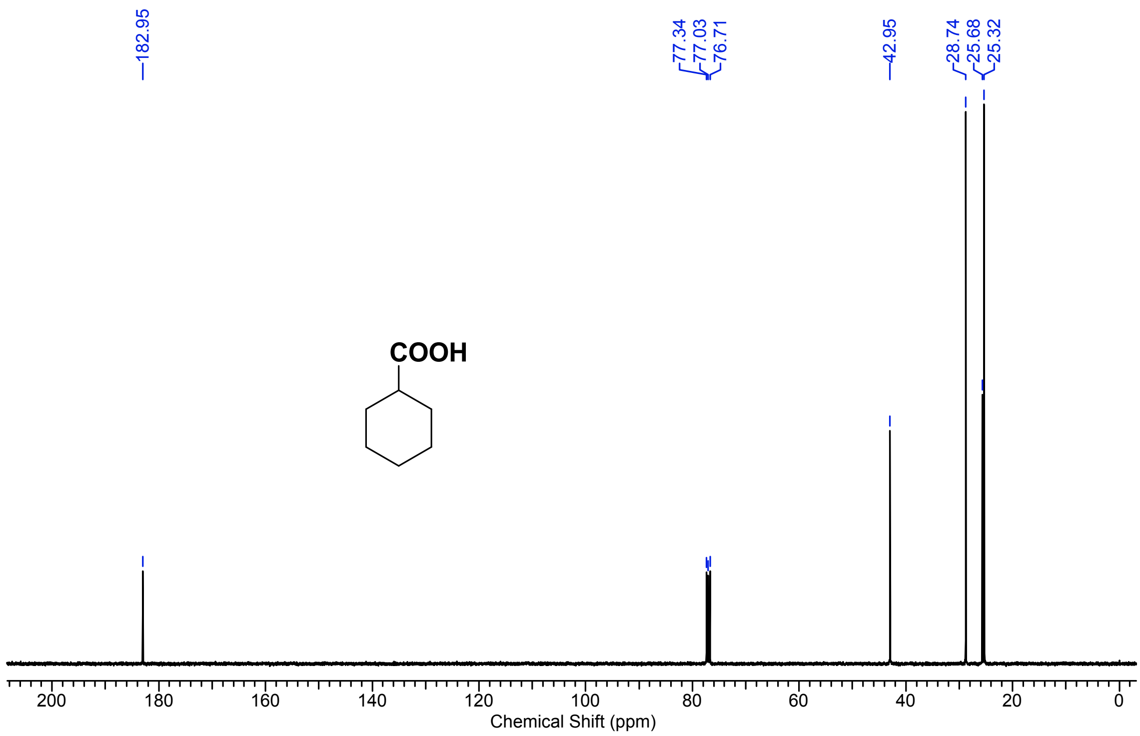


Figure FS125. ^{13}C NMR spectrum (100 MHz, 25°C, $CDCl_3$) of **cyclohexanecarboxylic acid.**

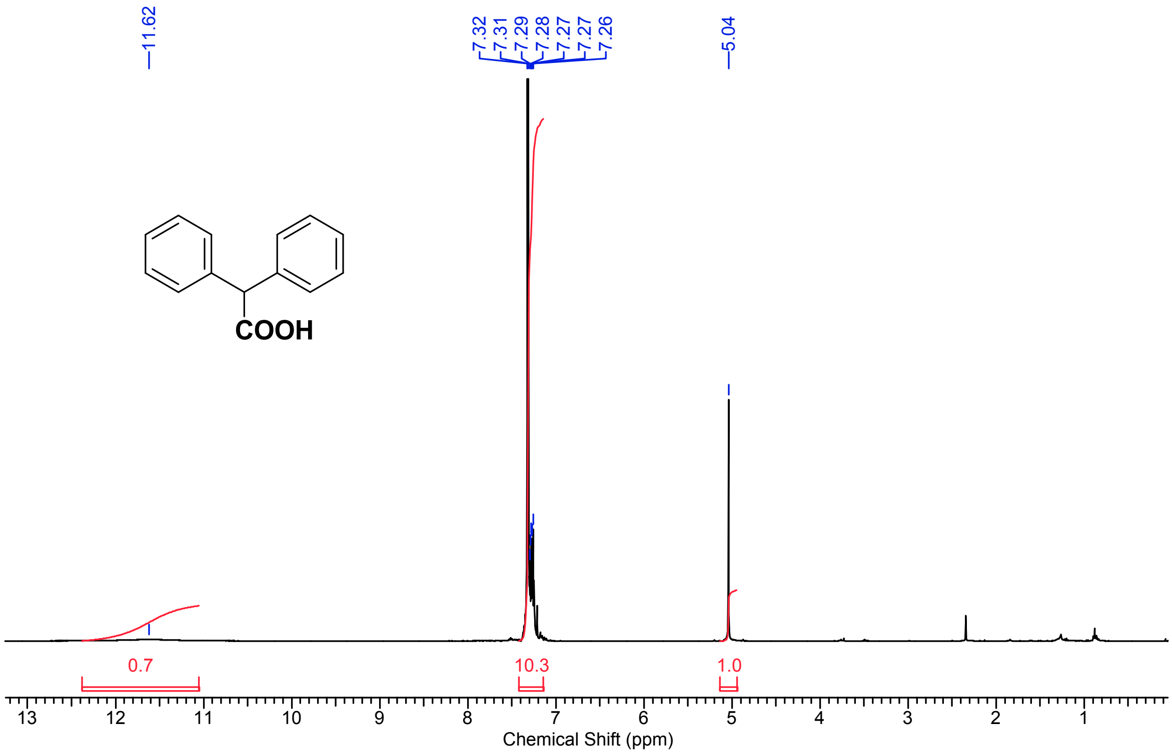


Figure F126. ¹H NMR spectrum (400 MHz, 25°C, $CDCl_3$) of **2, 2-diphenyl acetic acid. .** (The peak at 2.05 ppm represents the acetone.)

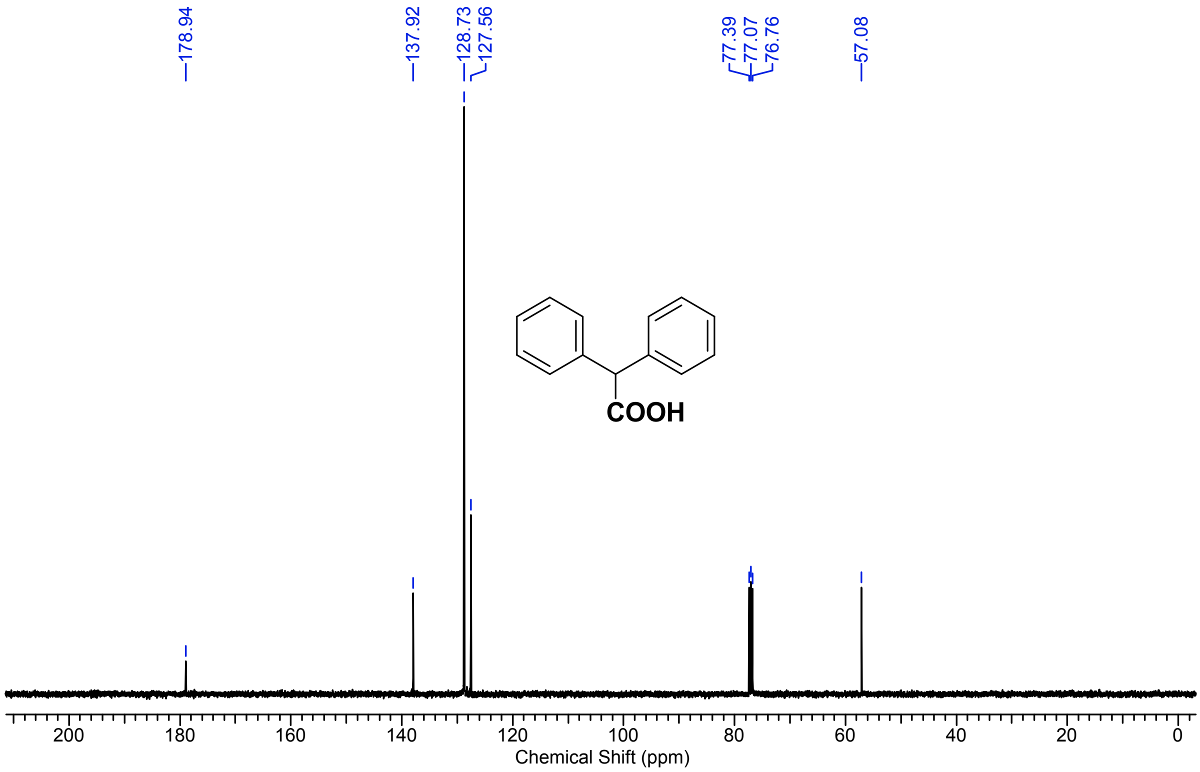


Figure FS127. ¹³C NMR spectrum (100 MHz, 25°C, $CDCl_3$) of **2, 2-diphenyl acetic acid.**

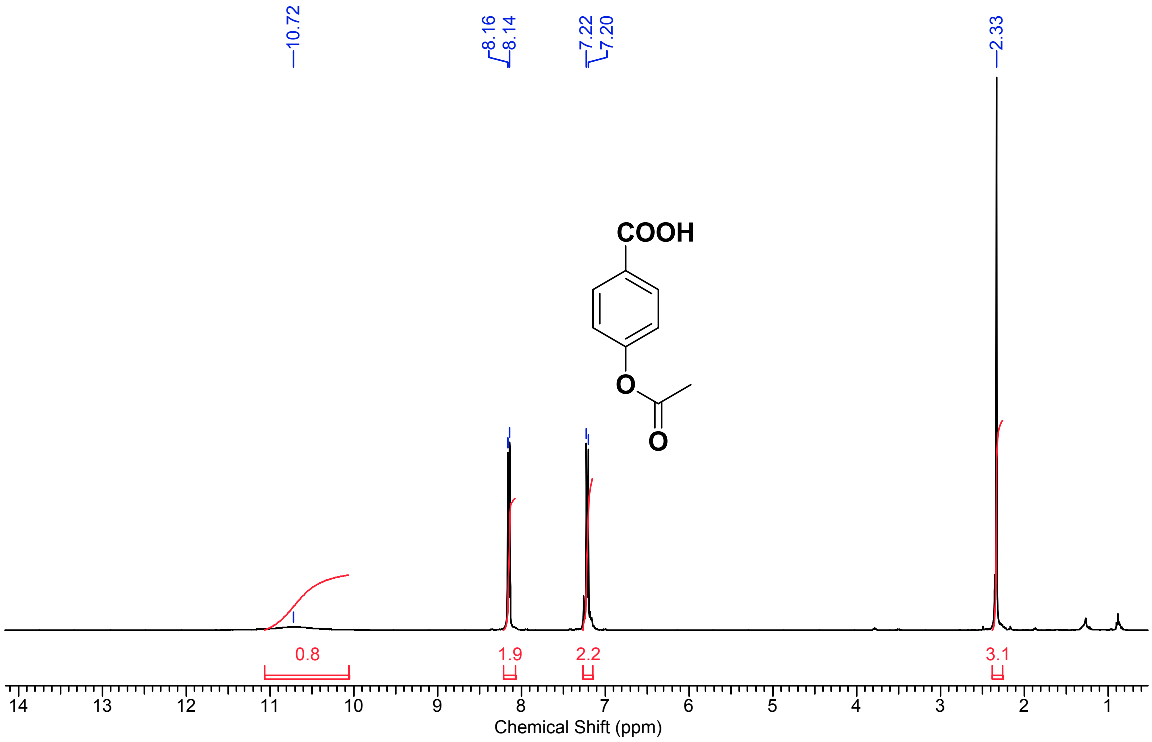


Figure FS128. ^{1}H NMR spectrum (400 MHz, 25°C, $CDCl_3$) of **4-acetoxybenzoic acid.**

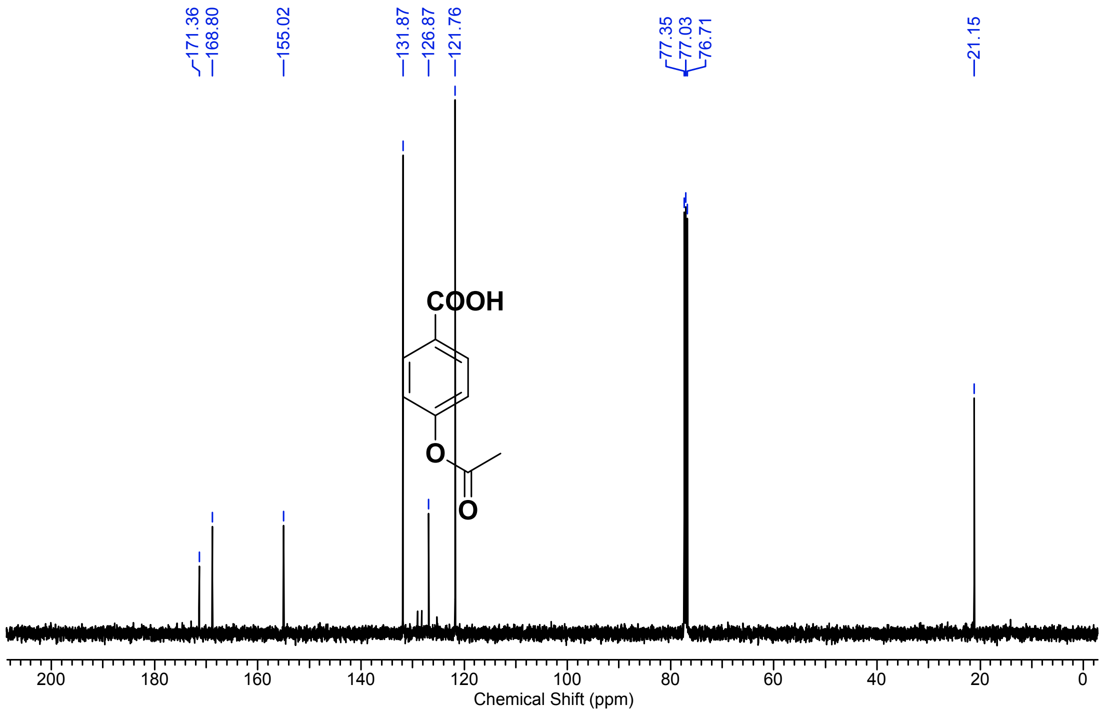


Figure FS129. ^{13}C NMR spectrum (100 MHz, 25°C, $CDCl_3$) of **4-acetoxybenzoic acid.**

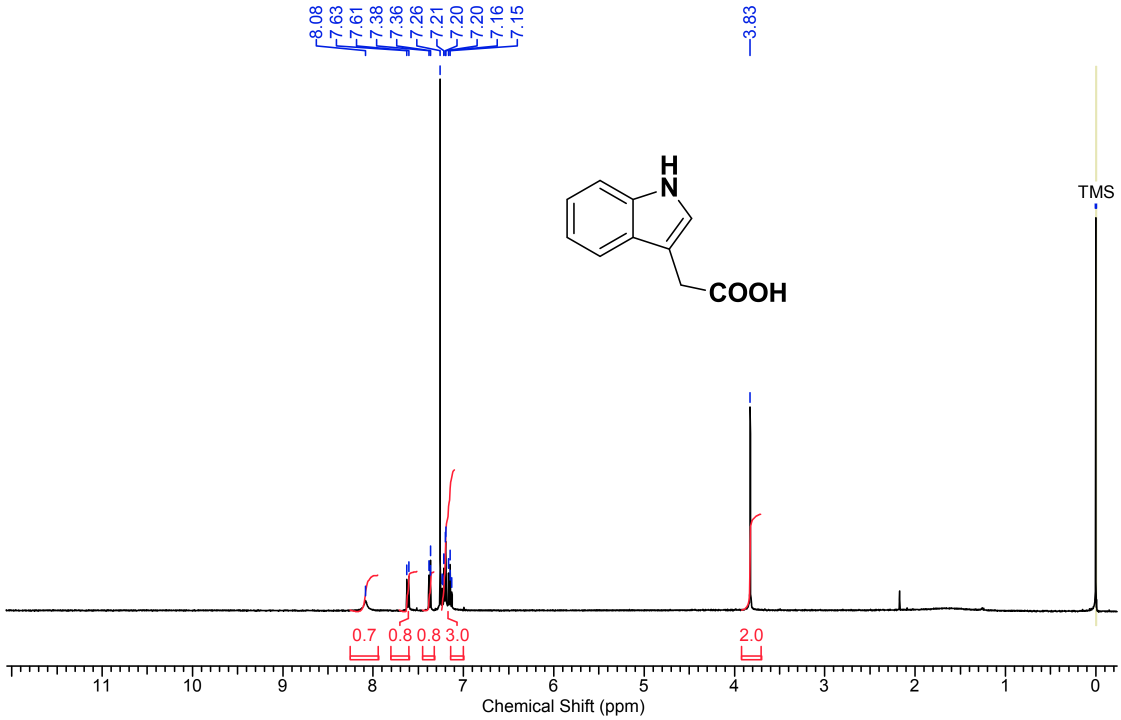


Figure FS130. [1]H NMR spectrum (400 MHz, 25°C, $CDCl_3$) of **indole 3-acetic acid. .** (The peak at 2.05 ppm represents the acetone.)

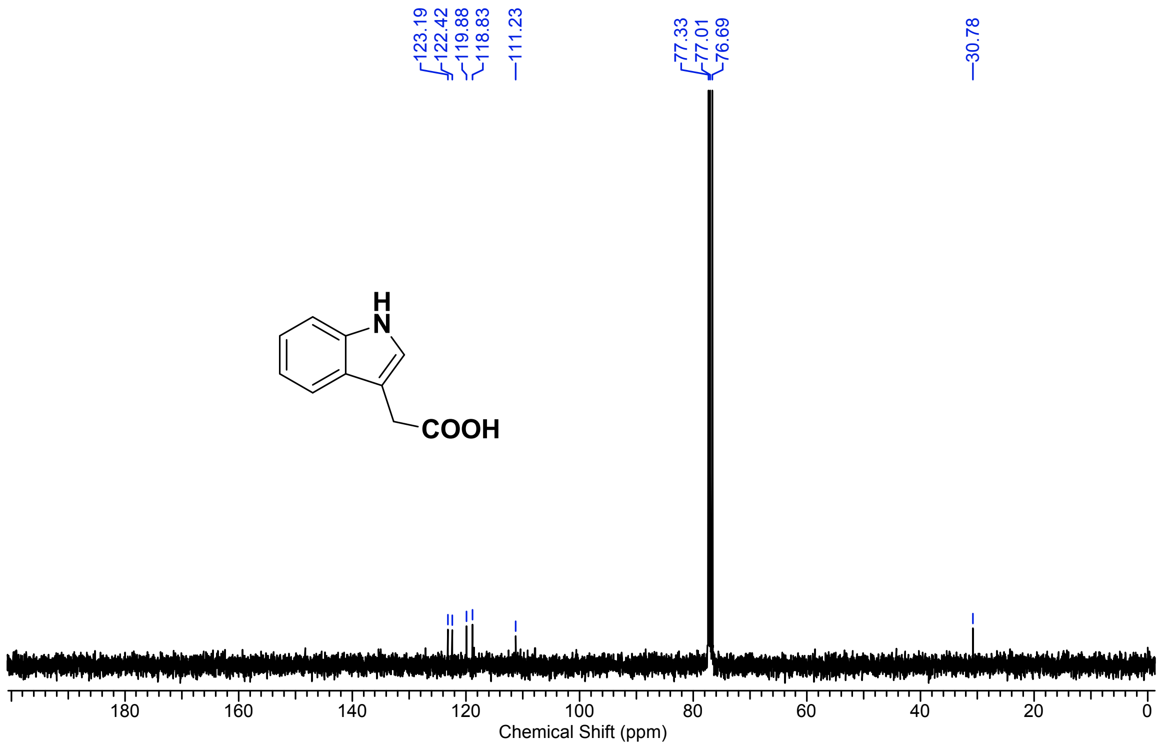


Figure FS131. [13]C NMR spectrum (100 MHz, 25°C, $CDCl_3$) of **indole 3-acetic acid.**

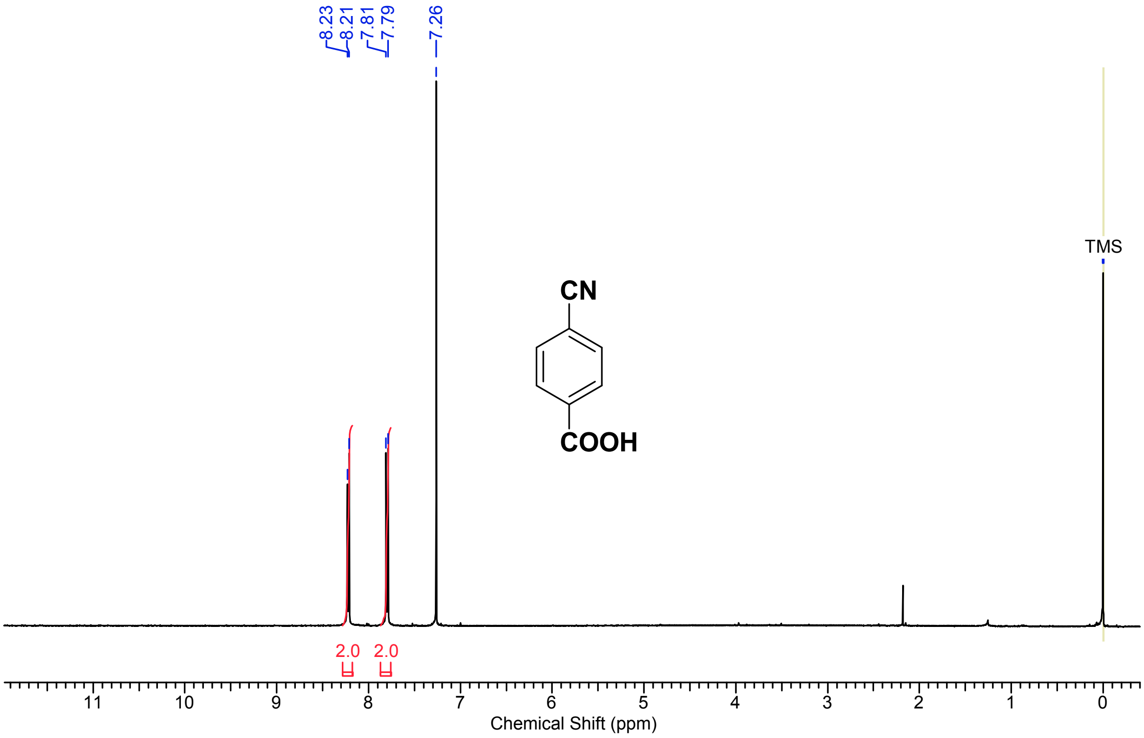


Figure FS132. ^{1}H NMR spectrum (400 MHz, 25°C, $CDCl_3$) of **4-cyanobenzoic acid. .** (The peak at 2.05 ppm represents the acetone.)

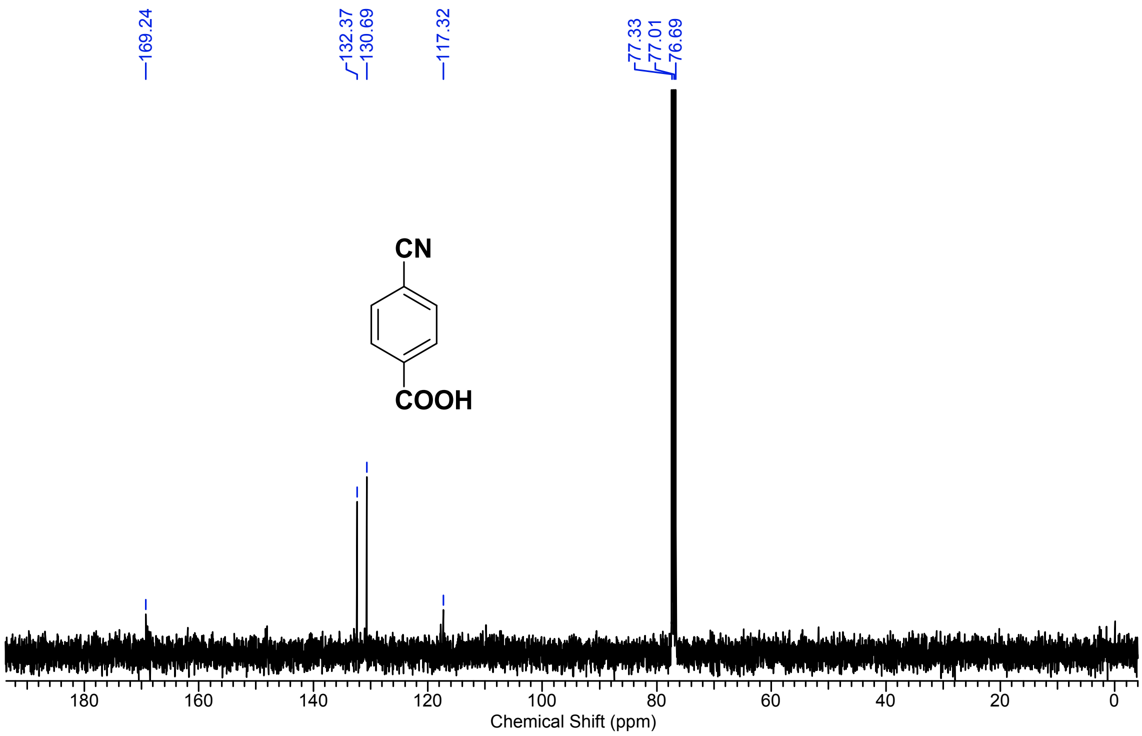


Figure FS133. ^{13}C NMR spectrum (100 MHz, 25°C, $CDCl_3$) of **4-cyanobenzoic acid.**

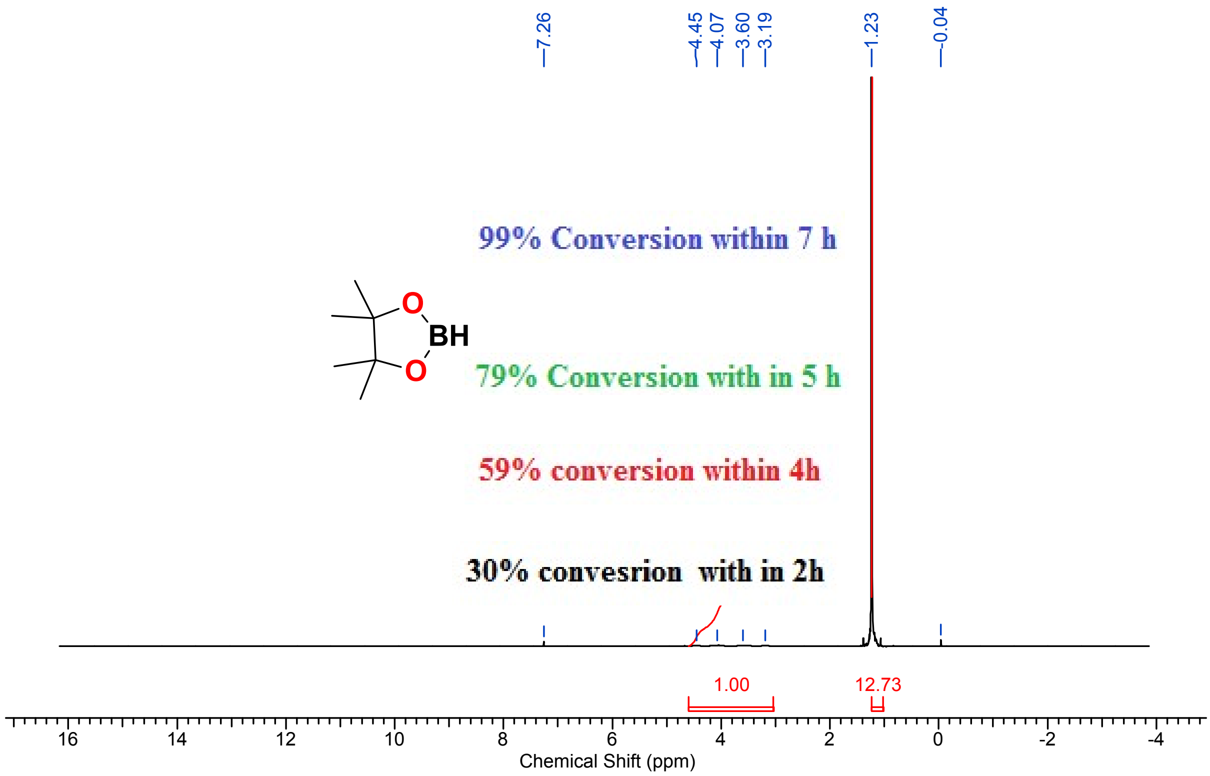


Figure FS134. ^{1}H NMR spectrum (400 MHz, 25°C, $CDCl_3$) of **HBpin.**

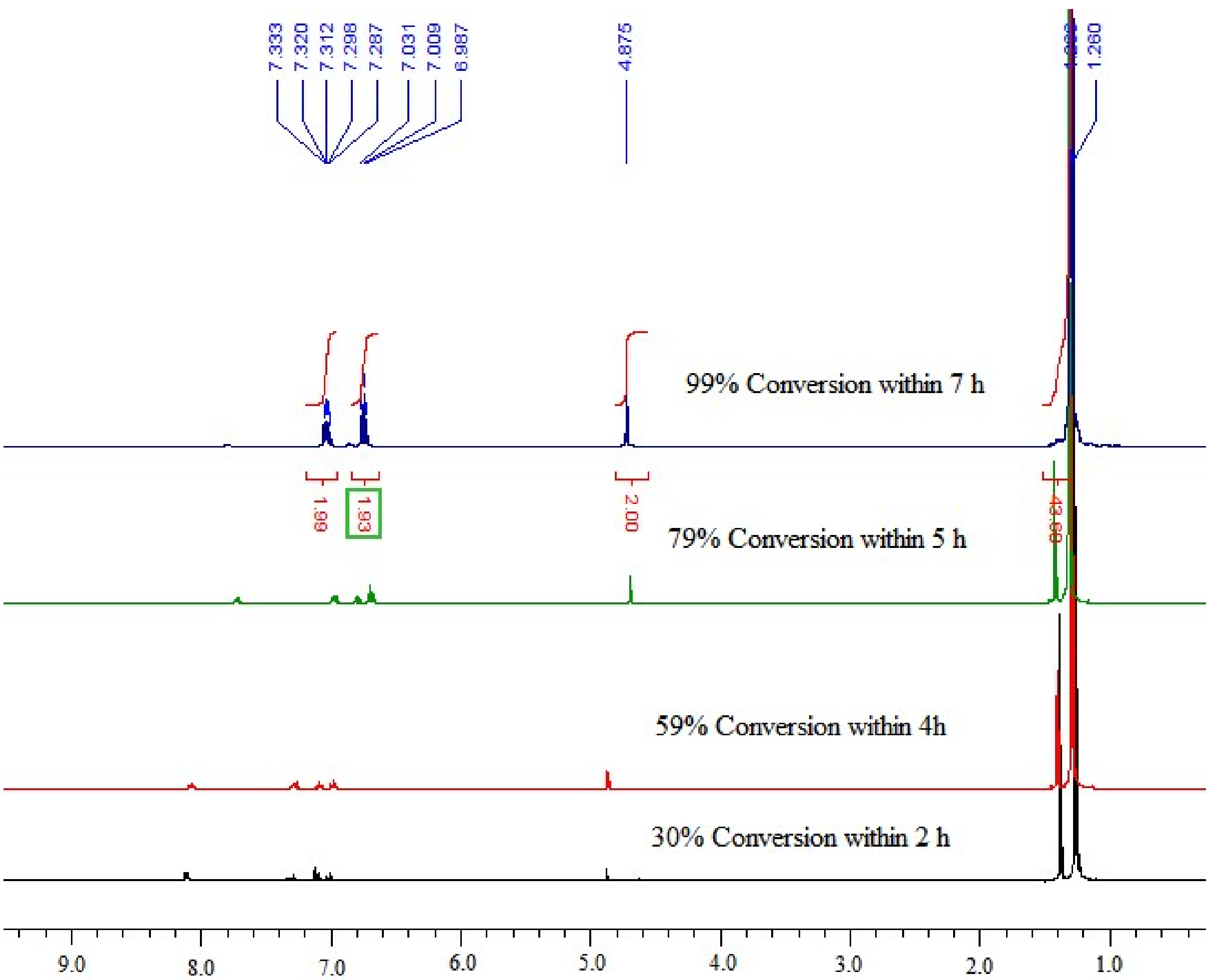


Figure FS135. The ^{1}H NMR spectrum (400 MHz, 25°C, $CDCl_3$) of the reaction mixture between 4-Flurobenzoic acid and HBpin with different interval of times.

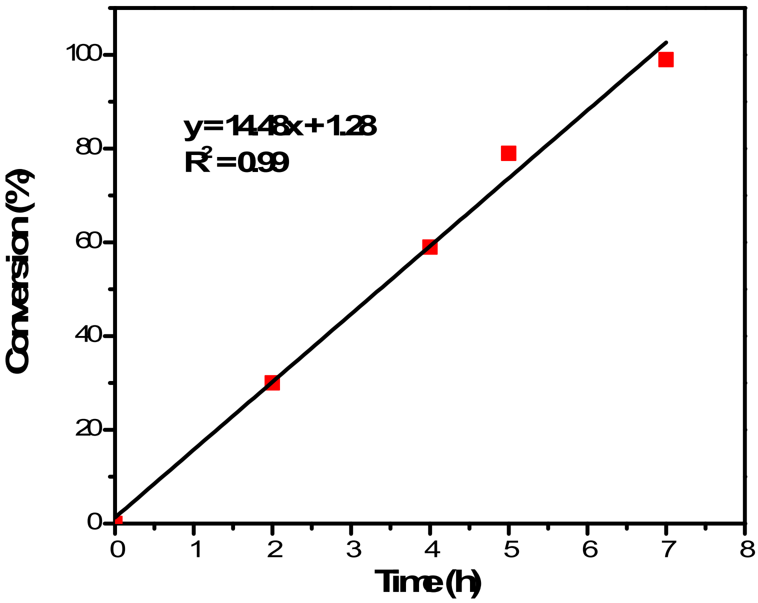


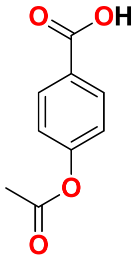
Figure FS136. Linear plot for the conversion of product vs time of the reaction mixture between 4-Flurobenzoic acid and HBpin with different interval of times.

Kiran

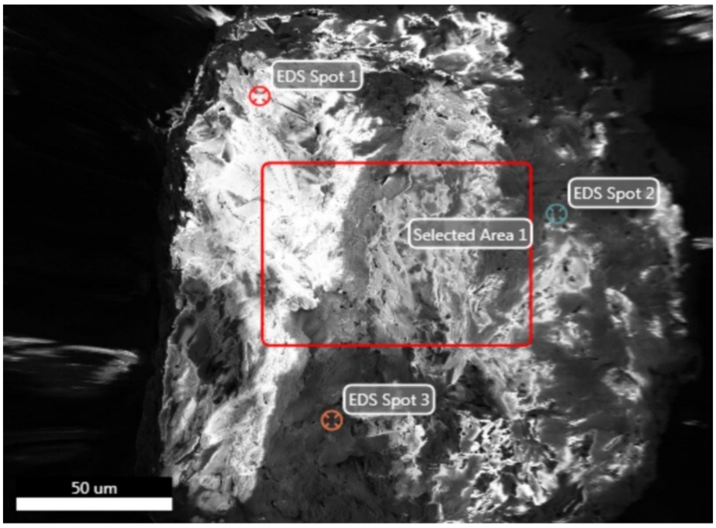
Author: eds users

Creation: 11/27/2018 10:25:45 AM

Sample Name: TKP AHN ACO(4-Acetoxybenzoic acid)



Area 1

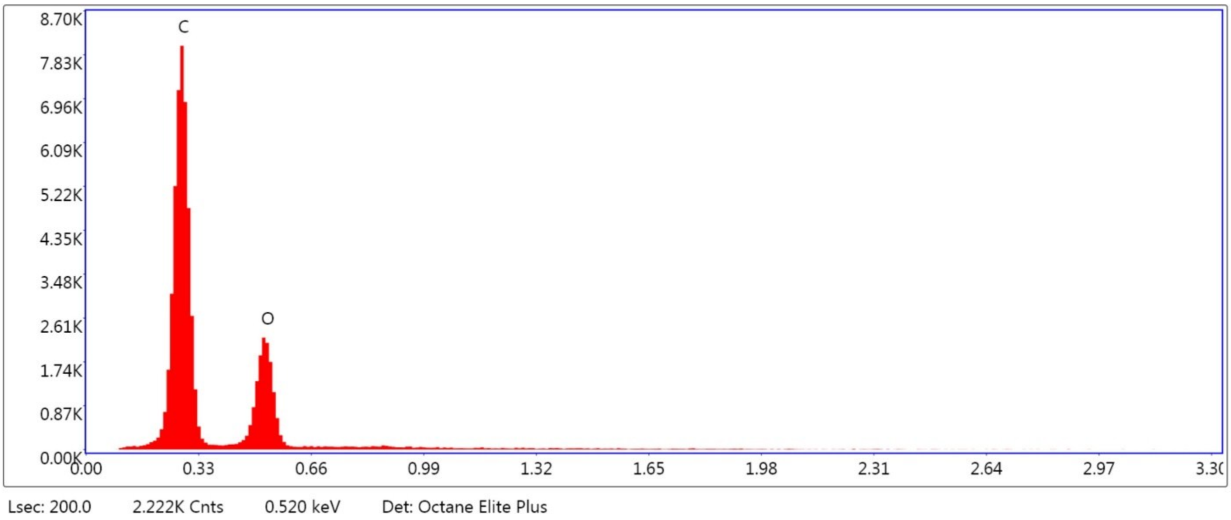


Notes:

EDS Spot 1

kV: 5	Mag:500	Takeoff: 40.4	Live Time(s): 200	Amp Time(µs):3.84	Resolution:(eV)125.5

EDS Spot 1 - Det 2



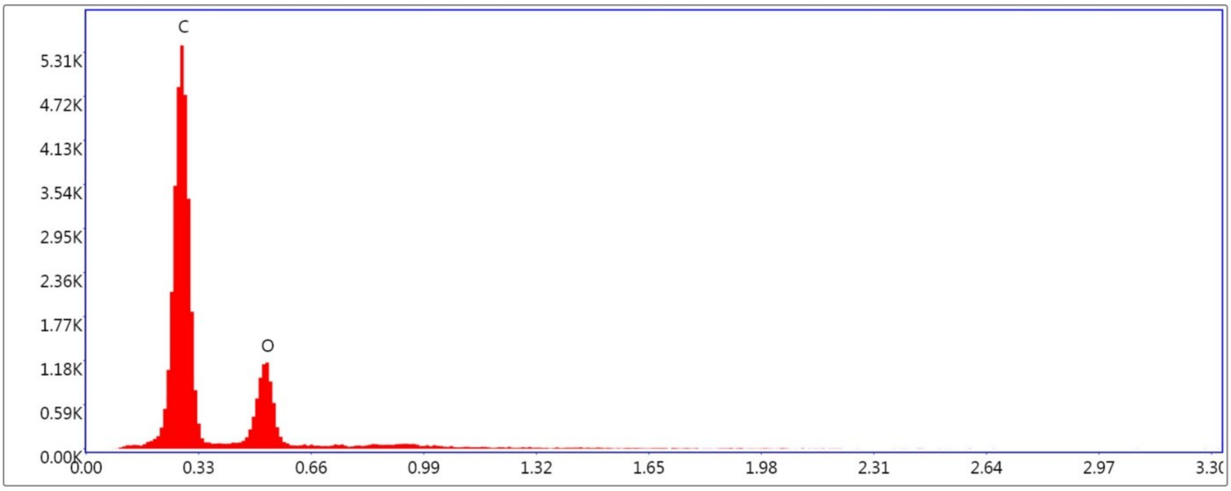
eZAF Smart Quant Results

Element	Weight %	Atomic %	Net Int.	Error %	Kratio	Z	A	F
C K	77.1	81.8	226.4	4.5	0.7543	1.0159	0.9632	1.0000
O K	22.9	18.2	56.7	8.8	0.1533	0.9464	0.7070	1.0000

EDS Spot 2

kV: 5 | Mag:500 | Takeoff: 40.4 | Live Time(s): 200 | Amp Time(µs):3.84 | Resolution:(eV)125.5

EDS Spot 2 - Det 2



Lsec: 200.0 1.131K Cnts 0.520 keV Det: Octane Elite Plus

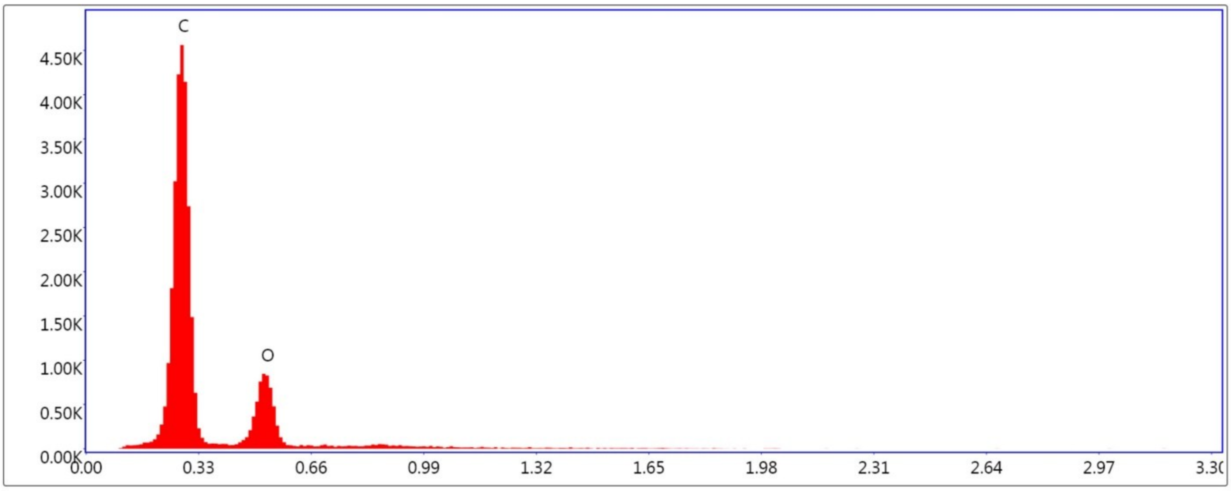
eZAF Smart Quant Results

Element	Weight %	Atomic %	Net Int.	Error %	Kratio	Z	A	F
C K	82.7	86.4	154.7	4.6	0.8131	1.0120	0.9720	1.0000
O K	17.3	13.6	26.5	10.5	0.1130	0.9427	0.6911	1.0000

EDS Spot 3

kV: 5	Mag:500	Takeoff: 40.4	Live Time(s): 200	Amp Time(µs):3.84	Resolution:(eV)125.5

EDS Spot 3 - Det 2



Lsec: 200.0 846 Cnts 0.520 keV Det: Octane Elite Plus

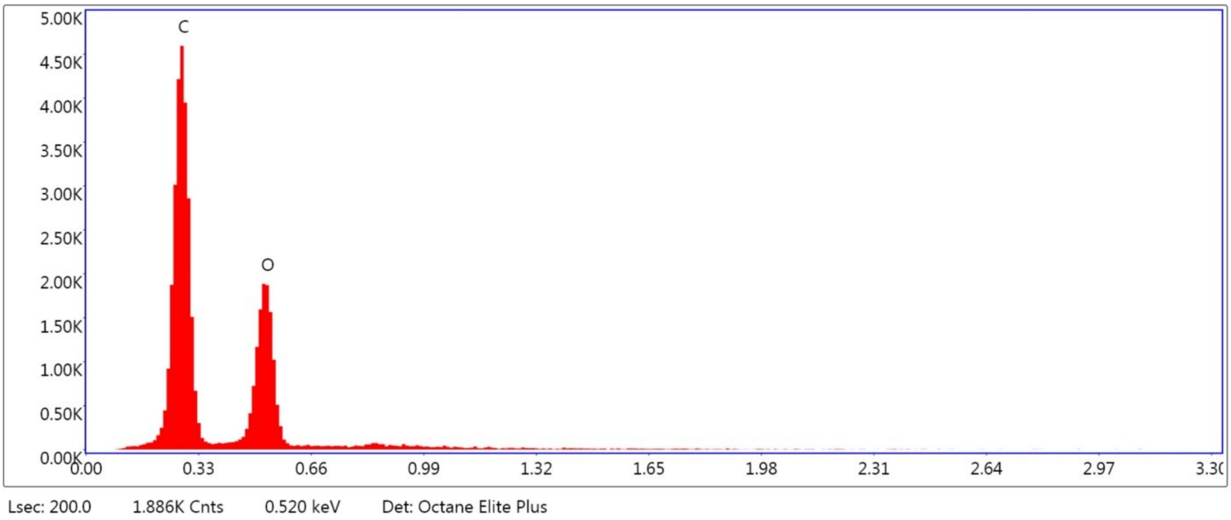
eZAF Smart Quant Results

Element	Weight %	Atomic %	Net Int.	Error %	Kratio	Z	A	F
C K	83.6	87.1	132.8	4.6	0.8227	1.0113	0.9735	1.0000
O K	16.4	12.9	21.2	10.4	0.1066	0.9421	0.6886	1.0000

Selected Area 1

kV: 5	Mag:500	Takeoff: 40.4	Live Time(s): 200	Amp Time(µs):3.84	Resolution:(eV)125.5

Selected Area 1 - Det 2



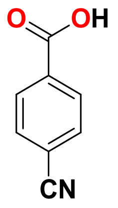
eZAF Smart Quant Results

Element	Weight %	Atomic %	Net Int.	Error %	Kratio	Z	A	F
C K	67.6	73.6	130.5	4.8	0.6561	1.0226	0.9486	1.0000
O K	32.4	26.4	55.5	7.9	0.2266	0.9527	0.7352	1.0000

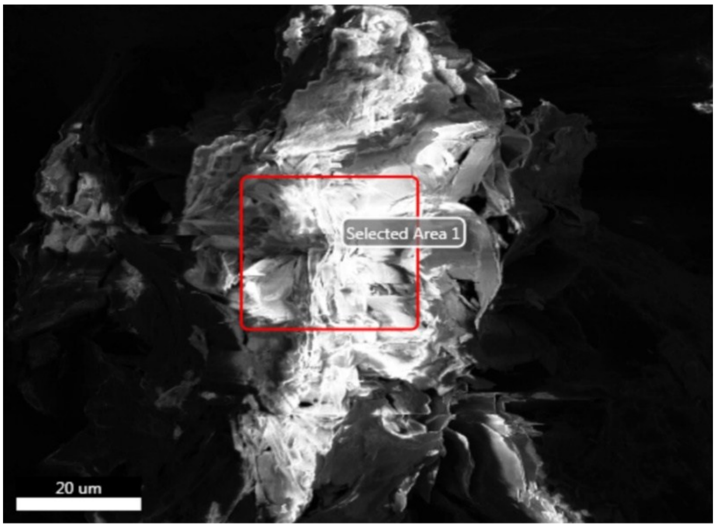
Author: eds users

Creation: 11/27/2018 9:44:54 AM

Sample Name: TKP AHN CN(4-Cyanobenzoic acid)



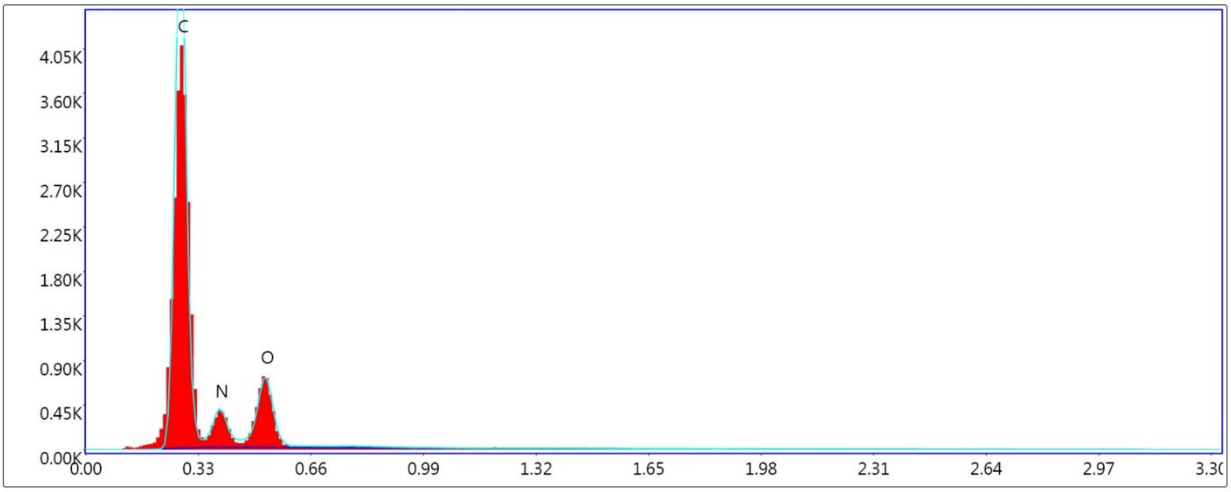
Area 1



Notes:

kV: 5	Mag:1000	Takeoff: 40.6	Live Time(s): 200	Amp Time(µs):3.84	Resolution:(eV)125.5

Selected Area 1 - Det 2



Lsec: 200.0 381 Cnts 0.400 keV Det: Octane Elite Plus

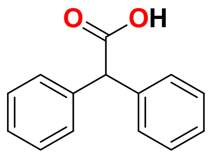
eZAF Smart Quant Results

Element	Weight %	Atomic %	Net Int.	Error %	Kratio	Z	A	F
C K	78.8	82.3	120.9	4.6	0.7770	1.0117	0.9747	1.0000
N K	9.3	8.3	6.8	19.4	0.0445	0.9742	0.4931	1.0000
O K	11.9	9.4	14.3	13.5	0.0749	0.9425	0.6661	1.0000

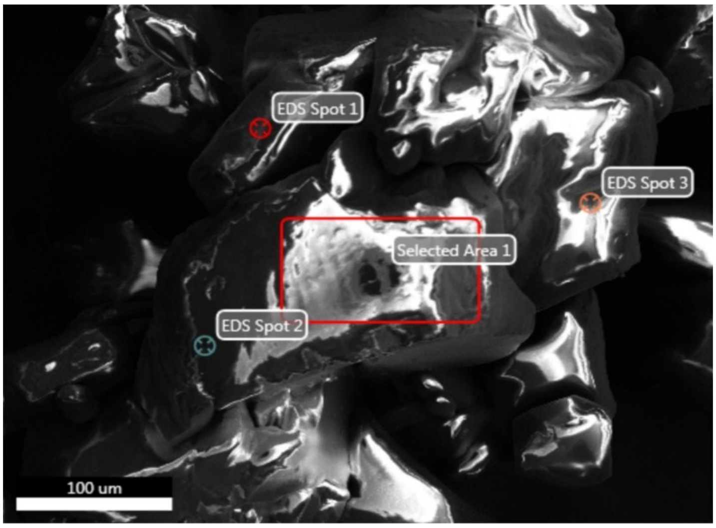
Author: eds users

Creation: 11/27/2018 10:59:27 AM

Sample Name: TKP AHN CPH (Diphenylacetic acid)



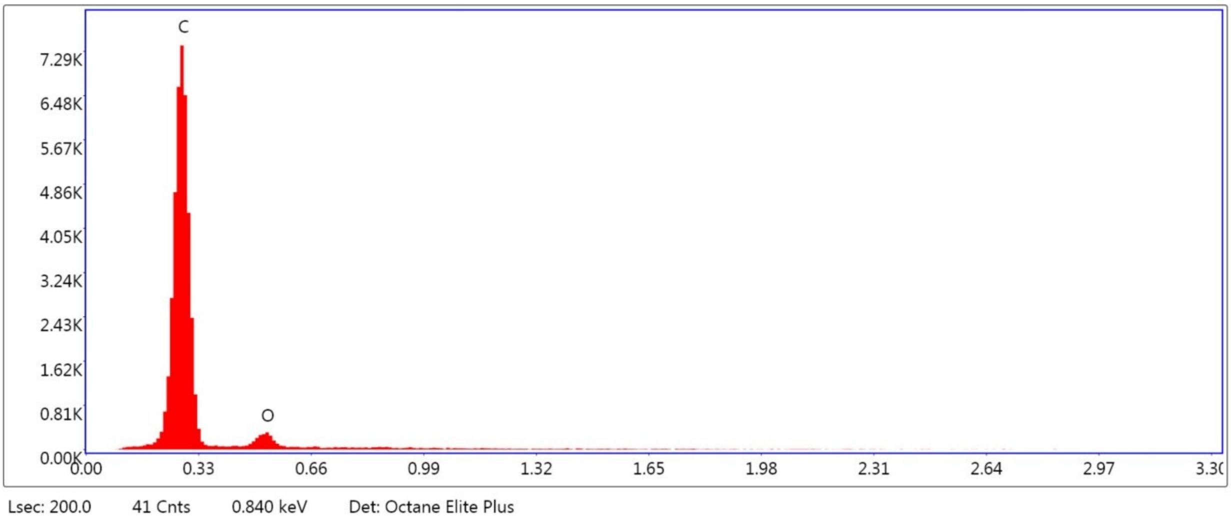
Area 1



Notes:

kV: 5	Mag:250	Takeoff: 40.6	Live Time(s): 200	Amp Time(µs):3.84	Resolution:(eV)125.5

EDS Spot 1 - Det 2

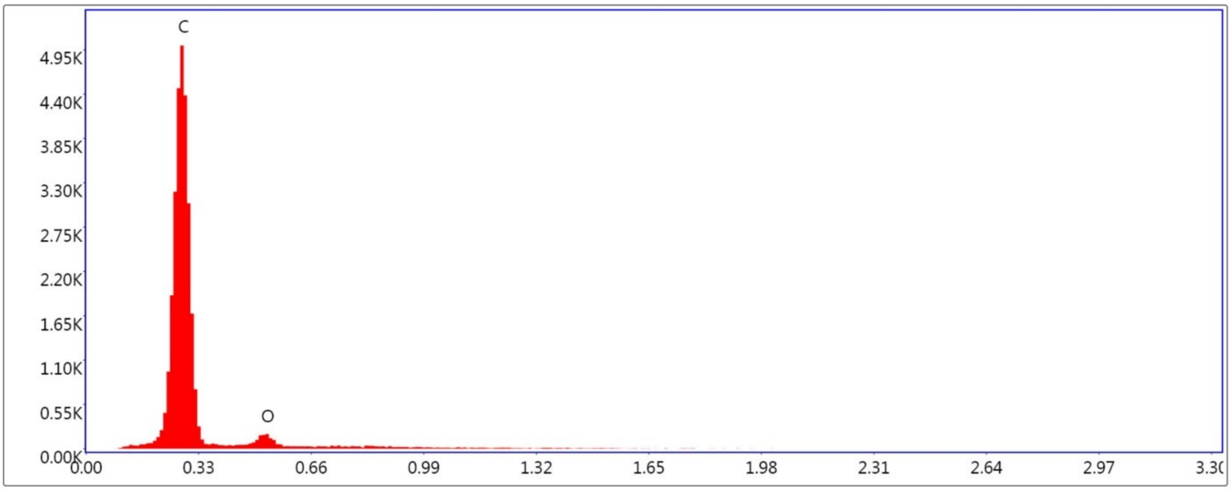


eZAF Smart Quant Results

Element	Weight %	Atomic %	Net Int.	Error %	Kratio	Z	A	F
C K	95.6	96.6	202.1	4.2	0.9516	1.0030	0.9928	1.0000
O K	4.4	3.4	7.1	13.7	0.0273	0.9343	0.6576	1.0000

kV: 5	Mag:250	Takeoff: 40.6	Live Time(s): 200	Amp Time(µs):3.84	Resolution:(eV)125.5

EDS Spot 2 - Det 2



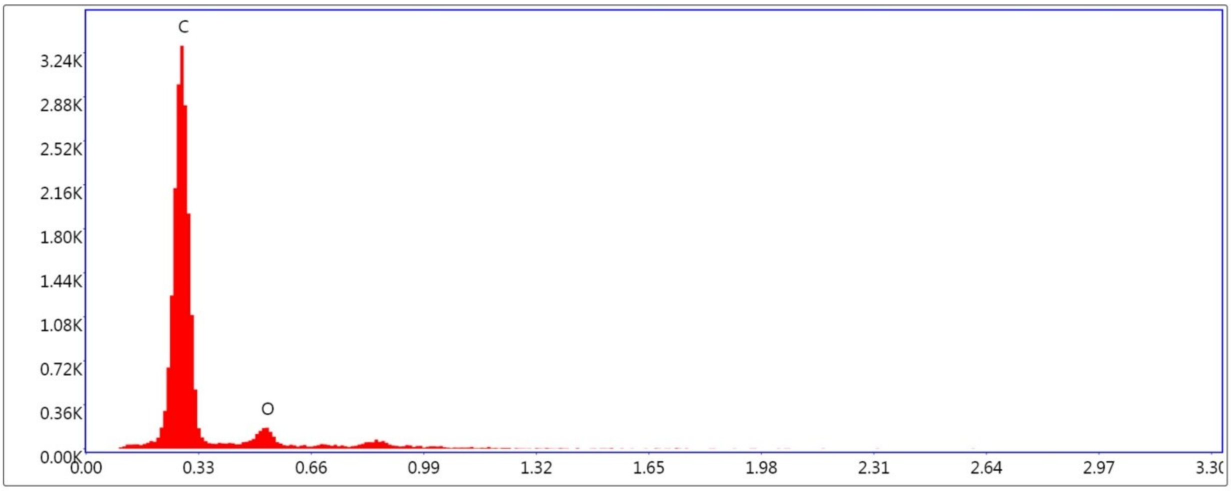
Lsec: 200.0 35 Cnts 0.840 keV Det: Octane Elite Plus

eZAF Smart Quant Results

Element	Weight %	Atomic %	Net Int.	Error %	Kratio	Z	A	F
C K	94.5	95.8	133.1	4.3	0.9402	1.0038	0.9911	1.0000
O K	5.5	4.2	5.9	10.6	0.0339	0.9350	0.6603	1.0000

kV: 5	Mag:250	Takeoff: 40.6	Live Time(s): 200	Amp Time(µs):3.84	Resolution:(eV)125.5

EDS Spot 3 - Det 2



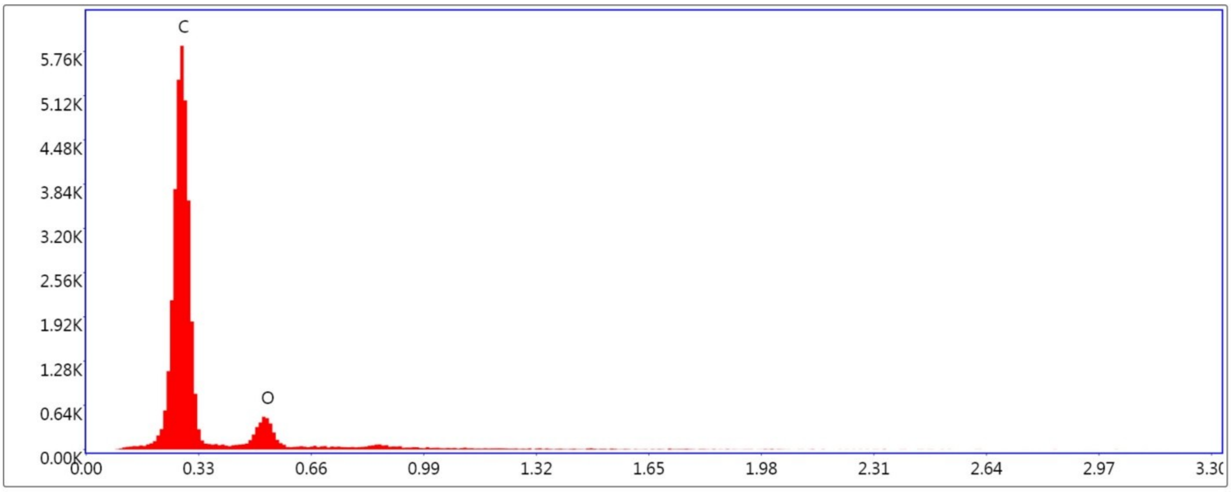
Lsec: 200.0 53 Cnts 0.840 keV Det: Octane Elite Plus

eZAF Smart Quant Results

Element	Weight %	Atomic %	Net Int.	Error %	Kratio	Z	A	F
C K	95.8	96.8	99.5	4.5	0.9542	1.0029	0.9932	1.0000
O K	4.2	3.2	3.3	22.3	0.0257	0.9341	0.6570	1.0000

kV: 5	Mag:250	Takeoff: 40.6	Live Time(s): 200	Amp Time(µs):3.84	Resolution:(eV)125.5

Selected Area 1 - Det 2



Lsec: 200.0 61 Cnts 0.840 keV Det: Octane Elite Plus

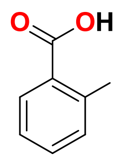
eZAF Smart Quant Results

Element	Weight %	Atomic %	Net Int.	Error %	Kratio	Z	A	F
C K	94.2	95.6	173.5	4.3	0.9371	1.0040	0.9906	1.0000
O K	5.8	4.4	8.1	17.0	0.0357	0.9352	0.6610	1.0000

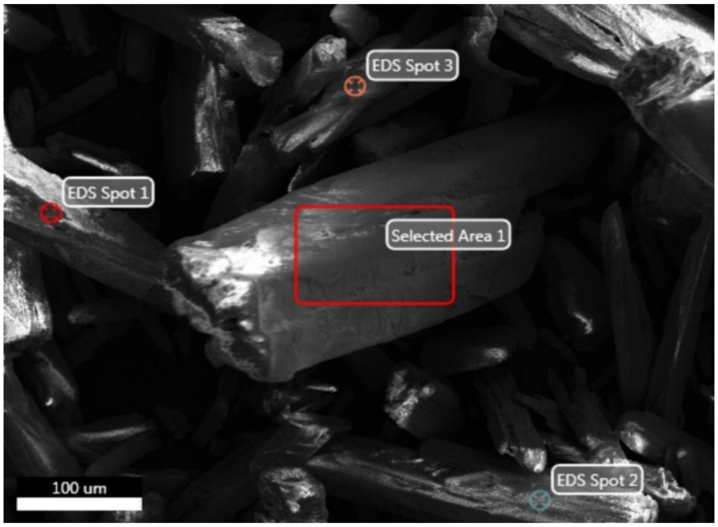
Author: eds users

Creation: 11/27/2018 10:38:32 AM

Sample Name: TKP AHN IO(2-Iodobenzoic acid)



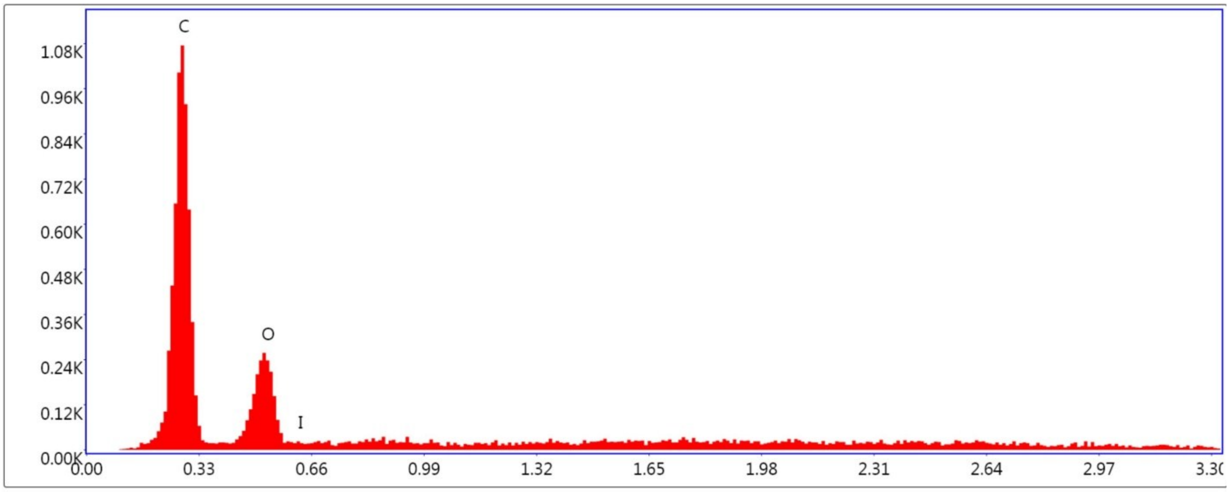
Area 1



Notes:

kV: 5	Mag:200	Takeoff: 40.4	Live Time(s): 200	Amp Time(µs):3.84	Resolution:(eV)125.

EDS Spot 1 - Det 2



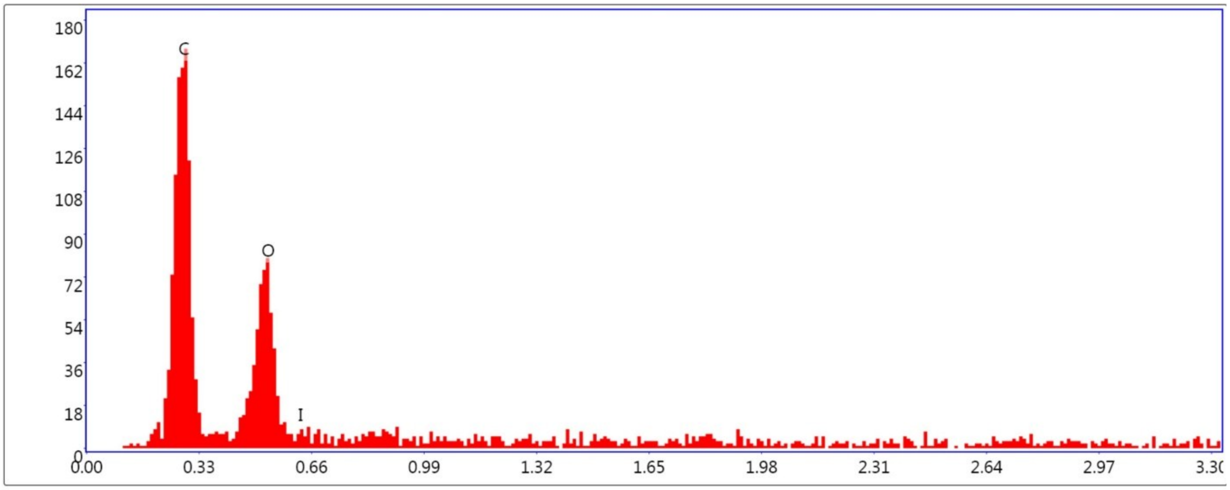
Lsec: 200.0 258 Cnts 0.520 keV Det: Octane Elite Plus

eZAF Smart Quant Results

Element	Weight %	Atomic %	Net Int.	Error %	Kratio	Z	A	F
C K	79.8	84.2	27.9	5.4	0.7835	1.0153	0.9674	1.0000
I M	0.3	0.0	0.0	18.9	0.0014	0.5219	0.9901	1.0000
O K	19.9	15.8	5.8	10.7	0.1319	0.9459	0.6989	1.0000

kV: 5	Mag:200	Takeoff: 40.4	Live Time(s): 200	Amp Time(µs):3.84	Resolution:(eV)125.5

EDS Spot 3 - Det 2



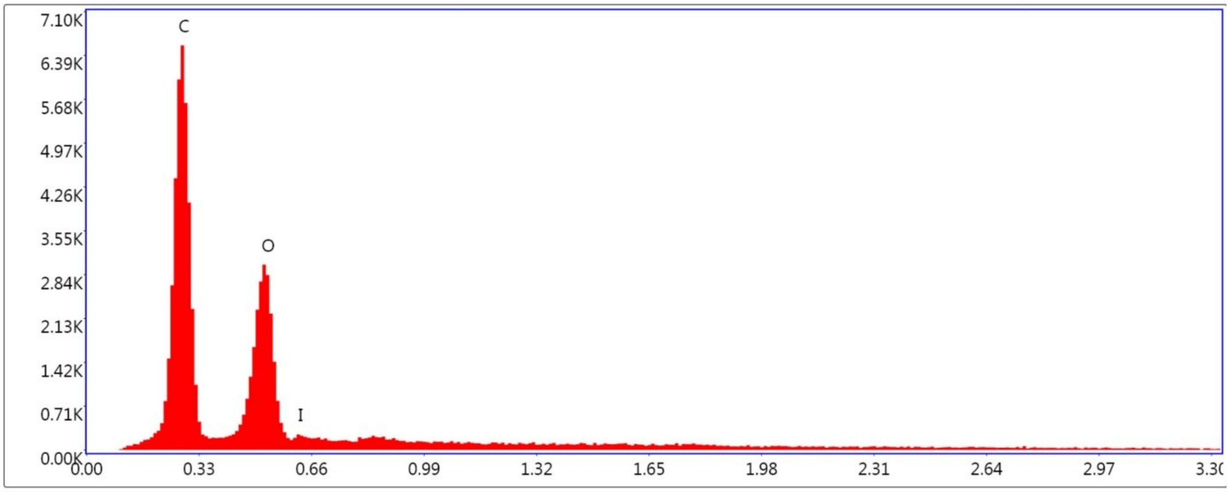
Lsec: 200.0 75 Cnts 0.520 keV Det: Octane Elite Plus

eZAF Smart Quant Results

Element	Weight %	Atomic %	Net Int.	Error %	Kratio	Z	A	F
C K	68.8	77.1	5.2	8.1	0.6815	1.0424	0.9498	1.0000
I M	4.4	0.5	0.0	41.5	0.0230	0.5365	0.9722	1.0000
O K	26.8	22.5	1.8	16.9	0.1890	0.9721	0.7269	1.0000

kV: 5	Mag:200	Takeoff: 40.4	Live Time(s): 200	Amp Time(µs):3.84	Resolution:(eV)125.5

Selected Area 1 - Det 2



Lsec: 200.0 3.002K Cnts 0.520 keV Det: Octane Elite Plus

eZAF Smart Quant Results

Element	Weight %	Atomic %	Net Int.	Error %	Kratio	Z	A	F
C K	69.5	75.7	182.5	4.7	0.6782	1.0252	0.9514	1.0000
I M	0.9	0.1	0.2	10.2	0.0044	0.5271	0.9681	1.0000
O K	29.6	24.2	68.2	8.0	0.2060	0.9553	0.7284	1.0000

IPC-OES data for 2-Iodobenzoic acid

Line	Intensity	Conc.	Units
Fe 259.940	1873	0.6259	ppb
Mn 257.610	3189	0.2609	ppb
As 197.262	325	53.151	ppb
Pb 283.30	166	15.2861	ppb
Ni 231.604	80	3.1418	ppb
Zn 213.856	4068	9.5471	ppb
Fe 259.941	1765.733	15.20718	ppb
Mn 257.611	1808.276	15.64672	ppb
As 197.263	1850.819	16.08625	ppb

IPC-OES data for 4-Acetoxybenzoic acid

Line	Intensity	Con	units
Fe 259.940	2286	0.1259	ppb
Mn 257.610	3713	0.5649	ppb
As 197.262	329	54.0208	ppb
Pb 283.30	31	5.6912	ppb
Ni 231.604	31	4.6593	ppb
Zn 213.856	6862	23.6262	ppb
Ba 455.403	89950	1.9876	ppb
Cd 228.80	591	0.2389	ppb
K 766.941	832961	58.0912	ppb

IPC-OES data for 4-Cyanobenzoic acid

Line	Intensity	Con	units
Fe 259.940	2438	0.4628	ppb
Mn 257.610	2454	0.2457	ppb
As 197.262	177	20.9685	ppb
Pb 220.353	-214	1.2929	ppb
Ni 231.604	54	0.3456	ppb
Zn 213.856	6140	19.988	ppb
Ba 455.403	41766	0.6788	ppb
Ca 317.933	71076	1.8788	ppb
Al 308.215	196	1.2769	ppb
K 766.491	1326650	118.621	ppb

IPC-OES data for Cyclohexanecarboxylic acid

Line	Intensity	Con	units
Fe 259.940	2432	0.9872	ppb
Mn 257.610	2873	0.7879	ppb
As 197.262	231	32.7107	ppb
Pb 220.353	206	22.7294	ppb
Ni 231.604	122	13.3601	ppb
Zn 213.856	4819	13.3314	ppb
Ba 455.403	41766	0.3268	ppb
Ca 317.933	71076	1.8788	ppb
Al 308.215	196	1.2769	ppb
Cd 228.80	858	0.485	ppb
K 766.941	768586	50.117	ppb

IPC-OES data for Diphenylacetic acid

Line	Intensity	Con	units
Fe 259.940	2008	0.7923	ppb
Mn 257.610	1468	0.3754	ppb
As 197.262	200	25.9698	ppb
Pb 283.30	61	8.5246	ppb
Ni 231.604	94	6.5479	ppb
Zn 213.856	1941	7.4225	ppb
Ba 455.403	8940	0.6821	ppb
K 766.941	-919713	68.6683	ppb

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