Iodine-catalyzed transformation of aryl-substituted alcohols under solvent-free and highly concentrated reaction conditions

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Supporting Information

Characterization of known products and copies of ^{1}H and ^{13}C NMR spectra (up to product 4e)

Characterization of known compounds

Bis(1-phenylethyl) ether[1] **2a**

Reaction conditions: 1 mmol (122 mg) **1a**, 0.03 mmol (8 mg) I_2, 16 h, 55 °C; column chromatography (SiO_2, hexane); 92 mg (81%), colorless oil as a mixture of isomers in ratio 1/3.2; IR (neat): 3064, 3030, 2856, 1495, 1452, 1360, 1095, 1071, 1024, 736, 697 cm^{-1}; ^1H NMR (300 MHz, $CDCl_3$): δ 7.33–7.02 (m, 20H), 4.49 (q, *J* = 6.4 Hz, 2H), 4.19 (q, *J* = 6.5 Hz, 2H): (major isomer), 1.44 (d, *J* = 6.4 Hz, 6H), 1.35 (*J* = 6.5 Hz, 6H): (major isomer); MS (EI): 107 $(M - PhCH_2)^+$ (15%), 92 (100).

Bis(1,2-diphenylethyl) ether[2] **2b**

Reaction conditions: 2 mmol (397 mg) **1b**, 0.06 mmol (15 mg) I_2, 140 h, 25 °C; column chromatography (SiO_2, petroleum ether), 261 mg (69%), coloroless solid as a mixture of stereoisomers in ratio 1/0.2. Stereoisomers were separated by preparative chromatography (SiO_2, petroleum ether/*t*-butyl methyl ether = 96/4). The minor isomer with lower R_f was a viscous colorless oil: IR (neat): 3062, 3028, 2918, 1601, 1493, 1450, 1067, 1026, 754, 698 cm^{-1}; ^1H NMR (300 MHz, $CDCl_3$): δ 7.20–7.13 (m, 12H),7.05–7.02 (m, 4H), 6.96–6.93 (m, 4H), 4.40 (dd, *J* = 7.1 Hz, *J* = 5.9 Hz, 2H), 3.02 (dd, *J* = 13.5 Hz, *J* = 7.1 Hz, 2H), 2.82 (dd, *J* = 13.5 Hz, *J* = 5.9 Hz, 2H); ^{13}C NMR (75 MHz, $CDCl_3$): δ 142.3, 138.4, 129.7, 128.0, 127.9, 127.1, 126.8, 126.0, 81.4, 44.3; MS *m/z* (EI): 287 $(M - CH_2Ph)^+$ (23%), 181 (100), 166 (19), 103 (33), 91 (30), 77 (20).

The major isomer with higher R_f was a colorless solid, mp 131.5–132.4 °C (lit. 129.5–130.5); IR (KBr): 3059, 3028, 2920, 2867, 1494, 1452, 1088, 756, 698 cm^{-1}; ^1H NMR (300 MHz, $CDCl_3$): δ 7.24–7.03 (m, 12H), 7.06–7.03 (m, 4H), 6.82–6.80 (m, 4H), 4.21, (dd, *J* = 8.4 Hz, *J* = 5.0 Hz, 2H), 2.95 (dd, *J* = 13.5 Hz, *J* = 8.4

Hz, 2H), 2.77 (dd, *J* = 13.5 Hz, *J* = 5.0 Hz, 2H); ^{13}C NMR (75 MHz, $CDCl_3$): δ 141.8, 138.6, 129.9, 128.0, 127.8, 127.2, 126.9, 126.0, 79.5, 45.4; MS *m/z* (EI): 287 $(M - CH_2Ph)^+$ (24%), 181 (100).

Bis[1-(4-methoxyphenyl)ethyl] ether[3] **2h**

Reaction conditions: 1 mmol (152 mg) **1h**, 3 mmol (255 mg) CH_2Cl_2, 0.03 mmol (8 mg) I_2, 15 min, 25 °C; column chromatography (SiO_2, petroleum ether), 129 mg (90%), colorless oil as a mixture of stereoisomers in ratio 1/2.9. Stereoisomers were separated by preparative chromatography (SiO_2, petroleum ether/*tert*-butyl methyl ether = 96/4). The minor isomer with lower R_f was a colorless oily product: IR (neat): 2970, 2835, 1612, 1513, 1290, 1245, 1175, 1088, 1036, 831 cm^{-1}; ^{1}H NMR (300 MHz, $CDCl_3$): δ 7.19 (d, *J* = 8.7 Hz, 4H), 6.82 (d, *J* = 8.7 Hz, 4H), 4.46 (q, *J* = 6.4 Hz, 2H), 3.79 (s, 6H), 1.43 (d, *J* = 6.4 Hz, 6H); ^{13}C NMR (75 MHz, $CDCl_3$): δ 158.7, 136.4, 127.4, 113.6, 73.7, 55.2, 22.8; MS *m/z* (EI): 286 (M^+, 1%), 135 (100), 105 (15), 91 (17), 57 (20).

The major isomer with higher R_f was an oily product: IR (neat): 2971, 2834, 1611, 1510, 1287, 1244, 1171, 1086, 1036, 831 cm^{-1}; ^{1}H NMR (300 MHz, $CDCl_3$): δ 7.19 (d, *J* = 8.7 Hz, 4H), 6.89 (d, *J* = 8.7, 4H), 4.18 (q, *J* = 6.5 Hz, 2H), 3.82 (s, 6H), 1.34 (d, *J* = 6.5 Hz, 6H); ^{13}C NMR (75 MHz, $CDCl_3$): δ 158.9, 136.2, 127.5, 113.8, 73.7, 55.2, 24.6; MS *m/z* (EI): 286 (M^+, 1%), 135 (100), 105 (15), 91 (15), 57 (20).

Bis[2-phenyl-1-(4-methoxyphenyl)ethyl] ether[2] **2i**

Reaction conditions: 1 mmol (228 mg) **1i**, 3 mmol (255 mg) CH_2Cl_2, 0.03 mmol (8 mg) I_2, 1 h, 25 °C; crystallization (petroleum ether/CH_2Cl_2 = 8/1), 200 mg (91%), colorless solid, mp 149.2–151.2 °C (lit. 148–149 °C); IR (KBr): 2915, 1609, 1509, 1244, 1072, 1028, 833, 802, 738, 698 cm^{-1}; ^{1}H NMR (300 MHz, $CDCl_3$): δ 7.23–7.19 (m, 6H), 7.05–7.01 (m, 4H), 6.73 (d, *J* = 8.8 Hz, 4H), 6.67 (d, *J* = 8.8 Hz, 4H), 4.15 (dd, *J* = 8.2 Hz, *J* = 5.2 Hz, 2H), 3.78 (s, 6H), 2.93 (dd, *J* = 13.6 Hz, *J*

= 8.2 Hz, 2H), 2.74 (dd, *J* = 13.6 Hz, *J* = 5.2 Hz, 2H); ^{13}C NMR (125 MHz, $CDCl_3$): δ 158.7, 138.8, 133.9, 129.9, 128.0, 127.8, 125.9, 113.4, 78.7, 55.1, 45.4; MS *m/z* (EI): 347 $(M - CH_2Ph)^+$ (2%), 211 (100), 91 (12).

Bis(4-methoxybenzyl) ether[4] **2m**

Reaction conditions: 1 mmol (138 mg) **1m**, 3 mmol (255 mg) CH_2Cl_2, 0.03 mmol (8 mg) I_2, 200 min, 25 °C; column chromatography (SiO_2, petroleum ether/CH_2Cl_2); 67 mg (52%), colorless solid; mp 37.8–38.9 °C (lit. 37–38); IR (KBr): 2843, 1611, 1514, 1458, 1350, 1302, 1248, 1174, 1059, 1028, 995, 835, 813 cm^{-1}; ^{1}H NMR (300 MHz, $CDCl_3$): δ 7.28 (d, *J* = 8.7 Hz, 4H), 6.88 (d, *J* = 8.7 Hz, 4H), 4.46 (s, 4H), 3.81 (s, 6H); MS (EI): 258 $(M)^+$ (18%) , 150 (26), 137 (10), 121 (100), 77 (16).

Bis[1-(3-Methoxyphenyl)ethyl] ether[5] **2q**

Reaction conditions: 1 mmol (152 mg) **1q**, 0.03 mmol (8 mg) I_2, 10 h, 55 °C; column chromatography (SiO_2, petroleum ether/CH_2Cl_2); 106 mg (74%), colorless oil as a mixture of isomers in a ratio 1/2.1; IR (neat): 2972, 2929, 2834, 1601, 1486, 1445, 1317, 1279, 1257, 1157, 1094, 1045, 877, 783, 701 cm^{-1}; ^{1}H NMR (300 MHz, $CDCl_3$): δ 7.29–7.08 (m, 4H), 6.86–6.65 (m, 12H), 4.46 (q, *J* = 6.4 Hz, 2H), 4.19 (q, *J* = 6.5 Hz, 2H), 3.80 (s, 3H), 3.72 (s, 3H), 1.43 (d, *J* = 6.4 Hz, 6H), 1.35 (d, *J* = 6.5 Hz, 6H); ^{13}C NMR (125 MHz, $CDCl_3$): δ 159.8, 159.5, 145.9, 145.9, 129.4, 129.2, 118.7, 118.6, 112.7, 112.7, 111.6, 74.6, 74.5, 55.2, 55.1, 24.7, 23.0; MS (EI): 286 $(M)^+$ (<1%), 136 (100), 121 (15), 105 (20), 91 (20), 77 (23).

Bis[1-(4-Chlorophenyl)ethyl] ether[6] **2r**

Reaction conditions: 1 mmol (157 mg) **1r**, 0.03 mmol (8 mg) I_2, 18 h, 55 °C; column chromatography (SiO_2, petroleum ether); 140 mg (95%), colorless solid as a mixture of isomers *meso*/*dl* = 1/2.6); mp 54.0–57.0 °C (lit. 67–68.5 (*dl*)); IR (neat): 2977, 2928, 2889, 1595, 1487, 1410, 1371, 1292, 1204, 1090, 1014, 949, 826, 783, 722 cm^{-1}; ^1H NMR (300 MHz, $CDCl_3$): δ 7.33–7.10 (m, 16H), 4.42 (q, *J* = 6.4 Hz, 2H), 4.12 (q, *J* = 6.5 Hz, 2H), 1.40 (d, *J* = 6.4 Hz, 6H), 1.31 (*J* = 6.5 Hz, 6H); ^{13}C NMR (75 MHz, $CDCl_3$): δ 142.6, 142.4, 133.1, 132.9, 128.7, 128.4, 127.6, 127.5, 74.1, 24.5, 23.1; MS (EI): 294 $(M)^+$ (<1%), 139 (100), 103 (25); HRMS: Calcd for $C_{16}H_{16}Cl_2O$: 294.0578; found: 294.0583.

(*E*)-Stilbene[7] **3b**

Reaction conditions: 2 mmol (397 mg) **1b**, 0.06 mmol (15 mg) I_2, 140 h, 25 °C; column chromatography (SiO_2, petroleum ether); 61 mg (17%) white solid; mp 122.5–124.0 °C (lit. 123–124); IR (neat): 1595, 1491, 1447, 1069, 961, 762, 691 cm^{-1}; ^1H NMR (300 MHz, $CDCl_3$): δ 7.56–7.46 (m, 4H), 7.41–7.31 (m, 4H), 7.30–7.20 (m, 2H), 7.11 (s, 2H), MS (EI): 180 $(M)^+$ (24%), 165 (29).

(*E*)-1,2-Diphenylpropene[8] **3c**

Reaction conditions: 1 mmol (212 mg) **1c**, 0.03 mmol (8 mg) I_2, 20 h, 25 °C; column chromatography (SiO_2, petroleum ether); 179 mg (92%), colorless solid; mp 75.7–77.5 °C (lit. 78.5–80); IR (neat): 1593, 1487, 1444, 1074, 1022, 918, 866, 756, 739, 697 cm^{-1}; ^1H NMR (300 MHz, $CDCl_3$): δ 7.56–7.47 (m, 2H), 7.42–7.32 (m, 6H), 7.32–7.21 (m, 2H), 6.84 (d, *J* = 0.7 Hz, 1H), 2.28 (d, *J* = 0.7 Hz, 3H); MS (EI): 194 $(M)^+$ (99%), 179 (100), 165 (27), 115 (30), 103 (15).

1,1-Diphenylethene[9] **3d**

Reaction conditions: 1 mmol (198 mg) **1d**, 0.03 mmol (8 mg) I_2, 10 min, 55 °C; column chromatography (SiO_2, petroleum ether); 169 mg (94%), colorless oil; ^{1}H NMR (300 MHz, $CDCl_3$): δ 7.39–7.27 (m, 10H), 5.46 (s, 2H); IR (neat): 3080, 3056, 3025, 1607, 1572, 1491, 1444, 1328, 1027, 899, 773, 698 cm^{-1}.

1,1-Diphenylpropene[9] **3e**

Reaction conditions: 1 mmol (212 mg) **1e**, 0.03 mmol (8 mg) I_2, 3 h, 55 °C; column chromatography (SiO_2, petroleum ether); 179 mg (92%), colorless solid; mp 47.7–48.5 °C (lit. 49–50); IR (neat): 3055, 3023, 2910, 2855, 1597, 1494, 1441, 1355, 1073, 1032, 840, 757, 699, 631 cm^{-1}; ^{1}H NMR (300 MHz, $CDCl_3$): δ 7.42–7.12 (m, 10H), 6.17 (q, *J* = 7.0 Hz, 1H), 1.76 (d, *J* = 7 Hz, 3H); MS (EI): 194 $(M)^+$ (100%), 179 (30), 178 (29), 115 (29).

2-Bromo-1,1-diphenylethene[10] **3f**

Reaction conditions: 1 mmol (277 mg) **1f**, 0.03 mmol (8 mg) I_2, 96 h, 55 °C; column chromatography (SiO_2, petroleum ether); 233 mg (90%), colorless solid; mp 40.1–40.5 °C (lit. 41–42); IR (neat): 3057, 3023, 1589, 1493, 1442, 1326, 1218, 1075, 1030, 933, 763, 739, 696, 611 cm^{-1}; ^{1}H NMR (300 MHz, $CDCl_3$): δ 7.47–7.14 (m, 10H), 6.77 (s, 1H); MS (EI): 258 $(M)^+$ (55), 179 (100), 178 (90), 152 (17), 151 (18), 89 (19), 76 (21).

2-Fluoro-1,1-diphenylethene[11] **3g**

Reaction conditions: 1 mmol (216 mg) **1g**, 0.03 mmol (8 mg) I_2, 192 h, 55 °C; column chromatography (SiO_2, petroleum ether); 105 mg (53%), colorless oil; IR (neat): 3081, 3057, 3025, 1637, 1495, 1443, 1177, 1088, 1030, 932, 827, 763, 729, 696, 655 cm^{-1}; ^{1}H NMR (300 MHz, $CDCl_3$): δ 7.35–7.17 (m, 10H), 6.92 (d, *J* = 83.3 Hz, 1H).

(*E*)-4-Methoxystilbene[12] **3i**

Reaction conditions: 1 mmol (228 mg) **1i**, 0.03 mmol (8 mg) I_2, 230 min, 25 °C; column chromatography (SiO_2, petroleum ether); 42 mg (20%), colorless solid; mp 132.5–133.4 °C (lit. 134–136); IR (neat): 1599, 1510, 1250, 1179, 1031, 964, 813, 750, 689, 538 cm^{-1}; ^1H NMR (300 MHz, $CDCl_3$): δ 7.49–7.36 (m, 4H), 7.34–7.25 (m, 2H), 7.22–7.14 (m, 1H), 7.02 (d, *J* = 16.3 Hz, 1H), 6.92 (d, *J* = 16.3 Hz, 1H), 6.84 (d, *J* = 8.7 Hz, 2H), 3.81 (s, 3H); MS (EI): 210 $(M)^+$ (100%), 195 (17), 165 (23), 152 (15).

1-(4-Methoxyphenyl)-1-phenylethene[12] **3j**

Reaction conditions: 1 mmol (228 mg) **1j**, 0.03 mmol (8 mg) I_2, 5 min, 25 °C; column chromatography (SiO_2, hexane); 185 mg (88%), colorless solid; mp 72.6–73.5 °C (lit. 73–75); IR (neat): 2952, 2833, 1603, 1506, 1290, 1248, 1179, 1026, 901, 839, 781, 704 cm^{-1}; ^1H NMR (300 MHz, $CDCl_3$): δ 7.37–7.23 (m, 7H), 6.86 (d, *J* = 8.7 Hz, 2H), 5.40 (d, *J* = 1.1 Hz, 1H), 5.35 (d, *J* = 1.1 Hz, 1H), 3.83 (s, 3H); MS (EI): 210 $(M)^+$ (100%), 195 (40), 165 (26), 152 (18).

1-(2-Methoxyphenyl)-1-phenylethene[13] **3k**

Reaction conditions: 1 mmol (228 mg) **1k**, 0.03 mmol (8 mg) I_2, 15 min, 25 °C; column chromatography (SiO_2, hexane); 189 mg (90%), colorless oil; IR (neat): 3056, 3024, 2951, 2834, 1598, 1490, 1460, 1267, 1242, 1181, 1111, 1027, 902, 780, 754, 706 cm^{-1}; ^1H NMR (300 MHz, $CDCl_3$): δ 7.37–7.19 (m, 7H), 7.02–6.94 (m, 1H), 6.94–6.87 (m, 1H), 5.72 (d, *J* = 1.4 Hz, 1H), 5.32 (d, *J* = 1.4 Hz, 1H), 3.63 (s, 3H); MS (EI): 210 $(M)^+$ (40%), 195 (100), 167 (82), 152 (25).

1,1-Bis-(4-Methoxyphenyl)-2-phenylethene[14] **3l**

Reaction conditions: 1 mmol (334 mg) **1l**, 3 mmol (255 mg) CH_2Cl_2, 0.03 mmol (8 mg) I_2, 200 min, 25 °C; column chromatography (SiO_2, hexane); 282 mg (89%), viscous colorless oil; IR (neat): 3000, 2954, 2834, 1601, 1505, 1244, 1173, 1033, 832, 754, 696 cm^{-1}; ^1H NMR (300 MHz, $CDCl_3$): δ 7.27–7.24 (m, 2H),

7.13–7.03 (m, 7H), 6.86–6.83 (m, 5H), 3.83 (s, 3H), 3.81 (s, 3H); MS *m/z* (EI): 316 (M^+, 100%), 224 (16), 210 (36), 195 (88), 167 (72), 166 (69), 152 (21), 128 (15), 91 (16), 84 (50).

(*E*)-2-(4-Methoxyphenyl)-1-phenyl-1-propene[15] **3na**

Reaction conditions: 1 mmol (242 mg) **1n**, 0.03 mmol (8 mg) I_2, 0.5 h, 25 °C; column chromatography (SiO_2, petroleum ether); 70 mg (31%), colorless solid; mp 100.6–101.4 °C (lit. 95–98); IR (neat): 2951, 2913, 2835, 1601, 1510, 1441, 1383, 1254, 1179, 1119, 1026, 918, 870, 827, 754, 719, 696, 615 cm^{-1}; ^1H NMR (300 MHz, $CDCl_3$): δ 7.47 (d, *J* = 8.8 Hz, 2H), 7.39–7.17 (m, 5H), 6.91 (d, *J* = 8.8 Hz, 2H), 6.78 (q, *J* = 1.2 Hz, 1H), 3.84 (s, 3H), 2.25 (d, *J* = 1.2 Hz, 3H); MS (EI): 224 $(M)^+$ (100%), 209 (18), 165 (22).

2-(4-Methoxyphenyl)-3-phenyl-1-propene[15] **3nb**

Reaction conditions: 1 mmol (242 mg) **1n**, 3 mmol (180 mg) *i*-PrOH, 0.03 mmol (8 mg) I_2, 0.5 h, 25 °C; preparative chromatography (Al_2O_3, hexane); 36 mg (16%), colorless solid; mp 45.0–46.3 °C; IR (neat): 3027, 2835, 1606, 1512, 1248, 1180, 1033, 893, 835, 714, 700 cm^{-1}; ^1H NMR (300 MHz, $CDCl_3$): δ 7.37 (d, *J* = 8.8 Hz, 2H), 7.26–7.23 (m, 5H), 6.81 (d, *J* = 8.8 Hz, 2H), 5.42 (d, *J* = 1.2 Hz, 1H), 4.94 (d, *J* = 1.2 Hz, 1H), 3.81 (s, 2H), 3.78 (s, 3H); ^{13}C NMR (75 MHz, $CDCl_3$): δ 159.0, 146.1, 139.7, 133.2, 128.8, 128.3, 127.2, 126.0, 113.6, 112.9, 55.2, 41.7; MS *m/z* (EI): 224 (M^+, 53%), 133 (100).

9-Ethyl-9*H*-xanthen-9-ol[16] **4e**

Reaction conditions: 20 mmol (3.92 g) **11a**, 120 mmol (2.76 g) Na, 60 mmol (9.36 g) EtI, 40 mL toluene, 1 h, reflux; column chromatography (basic Al_2O_3, petroleum ether), white solid (70%), mp 94.2–96.0 °C (lit. 96–97 °C); IR (KBr): 3300, 2965, 1603, 1576, 1476, 1448, 1321, 1263,

1237, 1055, 1011, 903, 754 cm^{-1}; ^{1}H NMR (300 MHz, $CDCl_3$): δ 7.67–7.64 (m, 2H), 7.32–7.25 (m, 2H), 7.18–7.08 (m, 4H), 2.44 (s, 1H), 2.00 (q, *J* = 7.5 Hz, 2H), 0.48 (t, *J* = 7.5 Hz, 3H); ^{13}C NMR (75 MHz, $CDCl_3$): δ 150.4, 128.7, 126.5, 126.4, 123.4, 115.9, 70.0, 39.4, 8.5; MS *m/z* (EI): 225 ($M^+ - H$, 1%), 197 (100).

9-Ethylidene-9*H*-fluorene[17] **5a**

Reaction conditions: 1 mmol (210 mg) **4a**, 3 mmol (255 mg) CH_2Cl_2, 0.03 mmol (8 mg) I_2, 23 h, 25 °C; column chromatography (SiO_2, petroleum ether); 181 mg (94%), colorless solid; mp 102.8–103.6 °C (lit. 102–104 °C); IR (neat): 1645, 1441, 1346, 1290, 1154, 934, 830, 775, 727, 617 cm^{-1}; ^{1}H NMR (300 MHz, $CDCl_3$): δ 7.93–7.83 (m, 1H), 7.78–7.72 (m, 1H), 7.72–7.67 (m, 1H), 7.67–7.59 (m, 1H), 7.40–7.20 (m, 4H), 6.84 (q, *J* = 7.6 Hz, 1H), 2.39 (d, J = 7.6 Hz, 3H); ^{13}C NMR (75 MHz, $CDCl_3$): δ 140.7, 139.3, 138.5, 137.7, 136.6, 127.6, 127.3, 126.8, 126.8, 125.0, 124.8, 119.8, 119.6, 119.4, 15.3; MS (EI): 192 $(M)^+$ (100%), 165 (35).

5-Ethylidene-10,11-dihydro-5*H*-dibenzo[a,d]cycloheptene[18] **5c**

Reaction conditions: 1 mmol (238 mg) **4c**, 3 mmol (255 mg) CH_2Cl_2, 0.03 mmol (8 mg) I_2, 2.5 h, 25 °C; column chromatography (SiO_2, petroleum ether); 205 mg (93%), colorless viscous oil; IR (neat): 3060, 3016, 2913, 2855, 1483, 1441, 1358, 1161, 942, 887, 840, 750, 633 cm^{-1}; ^{1}H NMR (300 MHz, $CDCl_3$): δ 7.30–7.23 (m, 1H), 7.23–7.08 (m, 6H), 7.07–6.99 (m, 1H), 5.94 (q, *J* = 7.0 Hz, 1H), 3.72–2.49 (m, 4H), 1.74 (d, *J* = 7.0 Hz, 3H); ^{13}C NMR (75 MHz, $CDCl_3$): δ 143.1, 141.7, 139.9, 139.4, 137.1, 129.8, 128.6, 128.5, 128.1, 127.2, 126.9, 126.0, 126.0, 125.6, 33.7, 32.1, 15.3; MS (EI): 220 $(M)^+$ (100%), 205 (70), 191 (20), 178 (21).

5-Benzylidene-10,11-dihydro-5*H*-dibenzo[a,d]cycloheptene[19] **5d**

Reaction conditions: 1 mmol (300 mg) **4d**, 3 mmol (255 mg) CH_2Cl_2, 0.03 mmol (8 mg) I_2, 2.5 h, 25 °C; column chromatography (SiO_2, petroleum ether), 257 mg (91%), colorless solid, mp 83.5–84.7 °C (lit. 85–87 °C); IR (KBr): 2876, 1485, 1442, 1356, 1261, 1155, 1027, 912, 869, 758, 692 cm^{-1}; ^1H NMR (300 MHz, $CDCl_3$): δ 7.49–7.46 (m, 1H), 7.27–7.00 (m, 12H), 6.78 (s, 1H), 3.82–2.44 (m, 4H); ^{13}C NMR (125 MHz, $CDCl_3$): δ 143.7, 141.7, 140.4, 139.0, 137.6, 137.2, 130.1, 129.8, 129.2, 128.3, 128.2, 127.9, 127.9, 127.7, 127.3, 126.6, 126.4, 126.1, 33.5, 32.1; MS *m/z* (EI): 282 (M^+, 100%), 267 (20), 191 (35), 69 (28), 57 (31).

9-Ethylidene-9*H*-xanthene[20] **5e**

Reaction conditions: 1 mmol (226 mg) **4e**, 3 mmol (255 mg) CH_2Cl_2, 0.03 mmol (8 mg) I_2, 1 h, 25 °C; decomposition on SiO_2 and on Al_2O_3, 204 mg (98%), yellow oil; IR (neat): 3035, 2940, 2858, 1599, 1478, 1450, 1303, 1258, 1210, 814, 760 cm^{-1}; ^1H NMR (300 MHz, $CDCl_3$): δ 7.57–7.54 (m, 1H), 7.48–7.45 (m, 1H), 7.27–7.02 (m, 6H), 6.00 (q, *J* = 7.5 Hz, 1H), 2.13 (d, *J* = 7.5 Hz, 3H); MS *m/z* (EI): 207 ($M^+ - 1$, 100%), 89 (21), 76 (40).

9-Benzylidene-9*H*-xanthene[21] **5f**

Reaction conditions: 1 mmol (288 mg) **4f**, 3 mmol (255 mg) CH_2Cl_2, 0.03 mmol (8 mg) I_2, 30 min, 25 °C; column chromatography (SiO_2, hexane), 259 mg (96%), yellow solid, mp 112.0–114.0 °C (lit. 108–110 °C); IR (neat): 3058, 1620, 1593, 1476, 1451, 1252, 1207, 1140, 1101, 940, 835, 755, 695 cm^{-1}; ^1H NMR (300 MHz, $CDCl_3$): δ 7.80–7.71 (m, 1H), 7.40–7.11 (m, 11H), 6.94 (s, 1H), 6.84–6.75 (m, 1H); MS (EI): 270 $(M)^+$ (100%), 239 (16), 134 (15).

1-(4-Methoxyphenyl)-1-methoxyethane[22] **6ha**

Reaction conditions: 1 mmol (152 mg) **1h**, 3 mmol (96 mg) MeOH, 0.03 mmol (8 mg) I_2, 3 h, 25 °C; column chromatography (SiO_2, petroleum ether), 145 mg (87%), colorless oil; IR (neat): 2975, 2931, 2836, 2819, 1612, 1512, 1444, 1371, 1288, 1247, 1174, 1106, 1084, 1037, 832, 809 cm^{-1}; ^1H NMR (300 MHz,

$CDCl_3$): δ 7.23 (d, *J* = 8.6 Hz, 2H), 6.88 (d, *J* = 8.7 Hz, 2H), 4.25 (q, *J* = 6.4 Hz, 1H), 3.81 (s, 3H), 3.20 (s, 3H), 1.42 (d, *J* = 6.4 Hz, 3H); MS (EI): 166 $(M)^+$ (11%), 151 (100), 135 (36).

1-(4-Methoxyphenyl)ethyl ethyl ether[23] **6hb**

Reaction conditions: 1 mmol (152 mg) **1h**, 3 mmol (138 mg) EtOH, 0.03 mmol (8 mg) I_2, 25 h, 25 °C; column chromatography (SiO_2, petroleum ether), 137 mg (76%), colorless oil; IR (neat): 2974, 2930, 1612, 1512, 1300, 1287, 1245, 1174, 1098, 1037, 832, 810 cm^{-1}; ^1H NMR (300 MHz, $CDCl_3$): δ 7.24 (d, *J* = 8.6 Hz, 2H), 6.88 (d, *J* = 8.7 Hz, 2H), 4.36 (q, *J* = 6.5 Hz, 1H), 3.80 (s, 3H), 3.33 (q, *J* = 7.0 Hz, 2H), 1.42 (d, *J* = 6.5 Hz, 3H), 1.17 (t, *J* = 7.0 Hz, 3H); MS (EI): 180 $(M)^+$ (17%), 165 (100), 137 (75), 135 (54), 109 (25), 105 (15), 77 (15).

1-(1-Isopropoxyethyl)-4-methoxybenzene[24] **6hc**

Reaction conditions: 1 mmol (152 mg) **1h**, 3 mmol (180 mg) *i*-PrOH, 0.03 mmol (8 mg) I_2, 25 h, 25 °C; column chromatography (SiO_2, petroleum ether), 105 mg (54%), colorless oil; IR (neat): 2972, 2930, 2835, 1613, 1511, 1464, 1368, 1245, 1173, 1088, 1038, 832 cm^{-1}; ^1H NMR (300 MHz, $CDCl_3$): δ 7.24 (d, *J* = 8.7 Hz, 2H), 6.87 (d, *J* = 8.7 Hz), 4.48 (q, *J* = 6.5 Hz, 1H), 3.80 (s, 3H), 3.47 (septet, *J* = 6.1 Hz, 1H), 1.39 (d, *J* = 6.5 Hz, 3H), 1.14 (d, *J* = 6.1 Hz, 3H), 1.08 (d, *J* = 6.1 Hz, 3H); MS (EI): 194 $(M)^+$ (10%), 179 (39), 137 (100), 135 (43), 109 (16).

1-(4-Methoxyphenyl)ethyl trifluoroethyl ether[25] **6hd**

Reaction conditions: 1 mmol (152 mg) **1h**, 3 mmol (300 mg) CF_3CH_2OH, 0.03 mmol (8 mg) I_2, 2.5 h, 25 °C; column chromatography (SiO_2, petroleum ether), 199 mg (85%), colorless oil (85%); IR (neat): 2980, 2936, 2839, 1613, 1514, 1279, 1247, 1173, 1037, 967, 833 cm^{-1}; ^1H NMR (300 MHz, $CDCl_3$): δ 7.24 (d, *J* =

8.7 Hz, 2H), 6.90 (d, *J* = 8.7 Hz, 2H), 4.53 (q, *J* = 6.4 Hz, 1H), 3.81 (s, 3H), 3.71–3.53 (m, 2H), 1.48 (d, *J* = 6.4 Hz, 3H); ^{13}C NMR (75 MHz, $CDCl_3$): δ 159.5, 133.7, 127.6, 124.2 (q, *J* = 279 Hz), 114.1, 79.0, 65.5 (q, *J* = 34 Hz), 55.3, 23.7; MS *m/z* (EI): 234 (M^+, 28%), 219 (100), 135 (71).

1-(4-Methoxyphenyl)ethyl acetate[26] **6he**

Reaction conditions: 1 mmol (152 mg) **1h**, 3 mmol (180 mg) acetic acid, 0.03 mmol (8 mg) I_2, 6 h, 25 °C; column chromatography (SiO_2, petroleum ether/CH_2Cl_2), 113 mg (58%), colorless oil; IR (neat): 2979, 2935, 2837, 1736, 1613, 1514, 1459, 1371, 1296, 1241, 1177, 1061, 1034, 944, 831 cm^{-1}; ^{1}H NMR (300 MHz, $CDCl_3$): δ 7.29 (d, *J* = 8.7 Hz, 2H), 6.88 (d, *J* = 8.7 Hz, 2H), 5.85 (q, *J* = 6.6 Hz, 1H), 3.80 (s, 3H), 2.04 (s, 3H), 1.52 (d, *J* = 6.8 Hz, 3H); MS (EI): 194 $(M)^+$ (27%), 135 (100), 121 (21), 91 (20), 77 (17).

1-Methoxy-1-(4-methoxyphenyl)-2-phenylethane[27] **6ia**

Reaction conditions: 1 mmol (228 mg) **1i**, 3 mmol (96 mg) MeOH, 0.03 mmol (8 mg) I_2, 20 h, 25 °C; column chromatography (SiO_2, petroleum ether), 199 mg (82%), colorless solid, mp 46.5–47.1 °C (lit. 46–47 °C); IR (neat): 3028, 2932, 1611, 1511, 1454, 1300, 1247, 1173, 1097, 1034, 831, 737, 699 cm^{-1}; ^{1}H NMR (300 MHz, $CDCl_3$): δ 7.20–6.95 (m, 7H), 6.77 (d, *J* = 8.7 Hz, 2H), 4.18 (dd, *J* = 7.2 Hz, *J* = 6.1 Hz, 1H), 3.78 (s, 3H), 3.12 (s, 3H), 3.05 (dd, *J* = 13.6 Hz, *J* = 7.2 Hz, 1H), 2.79 (dd, *J* = 13.6 Hz, *J* = 6.1 Hz, 1H); ^{13}C NMR (75 MHz, $CDCl_3$): δ 159.0, 138.5, 133.6, 129.4, 128.0, 128.0, 126.0, 113.6, 84.6, 56.5, 55.2, 44.7; MS (EI): 241 $(M - 1)^+$ (<1%), 227 (<1), 211 (3), 151 (100), 135 (16), 91 (10).

4-Methoxybenzyl methyl ether[28] **6ma**

Reaction conditions: 1 mmol (138 mg) **1m**, 3 mmol (96 mg) MeOH, 0.03 mmol (8 mg) I_2, 8 h, 55 °C; column chromatography (SiO_2, petroleum ether), 140 mg (92%), colorless oil; IR (neat): 2932, 2836, 1612, 1513, 1462, 1381, 1302, 1248, 1174, 1097, 1035, 819 cm^{-1}; ^1H NMR (300 MHz, $CDCl_3$): δ 7.26 (d, *J* = 8.6 Hz, 2H), 6.88 (d, *J* = 8.6 Hz, 2H), 4.39 (s, 2H), 3.81 (s, 3H), 3.36 (s, 3H); MS (EI): 152 $(M)^+$ (30%), 121 (100), 77 (15).

Ethyl 4-methoxybenzyl ether[29] **6mb**

Reaction conditions: 1 mmol (138 mg) **1m**, 3 mmol (138 mg) EtOH, 0.03 mmol (8 mg) I_2, 8 h, 55 °C; column chromatography (SiO_2, petroleum ether), 145 mg (87%), colorless oil; IR (neat): 2974, 2934, 2863, 2838, 1612, 1512, 1462, 1373, 1352, 1302, 1248, 1173, 1097, 1036, 822 cm^{-1}; ^1H NMR (300 MHz, $CDCl_3$): δ 7.27 (d, *J* = 8.6 Hz, 2H), 6.88 (d, *J* = 8.6 Hz, 2H), 4.44 (s, 2H), 3.80 (s, 3H), 3.51 (q, *J* = 7.0 Hz, 2H), 1.23 (t, *J* = 7.0 Hz, 3H); MS (EI): 166 $(M)^+$ (27%), 121 (100), 77 (15).

1-Isopropoxymethyl-4-methoxybenzene[30] **6mc**

Reaction conditions: 1 mmol (138 mg) **1m**, 3 mmol (180 mg) *i*-PrOH, 0.03 mmol (8 mg) I_2, 8 h, 55 °C; column chromatography (SiO_2, petroleum ether), 121 mg (67%), colorless oil; IR (neat): 2971, 1612, 1512, 1300, 1464, 1248, 1172, 1126, 1037, 820 cm^{-1}; ^1H NMR (300 MHz, $CDCl_3$): δ 7.27 (d, *J* = 8.6 Hz, 2H), 6.87 (d, *J* = 8.6 Hz, 2H), 4.44 (s, 2H), 3.80 (s, 3H), 3.66 (septet, *J* = 6.1 Hz, 1H), 1.20 (d, *J* = 6.1 Hz, 6H); MS *m/z* (EI): 180 (M^+, 21%), 137 (18), 121 (100), 109 (18).

1-(4-Methoxyphenyl)ethyl formate[31] **7ha**

Reaction conditions: 1 mmol (152 mg) **1h**, 3 mmol (138 mg) formic acid, 0.03 mmol (8 mg) I_2, 30 min, 25 °C; column chromatography (SiO_2, petroleum ether), 142 mg (79%), colorless oil; IR (neat): 2981, 2934, 2837, 1721, 1612, 1514, 1459, 1249, 1171, 1034, 831 cm^{-1}; ^1H NMR (300 MHz, $CDCl_3$): δ 8.06 (s,

1H), 7.31 (d, *J* = 8.7 Hz, 2H), 6.89 (d, *J* = 8.7 Hz, 2H), 5.98 (q, *J* = 6.6 Hz, 1H), 3.81 (s, 3H), 1.57 (d, *J* = 6.6 Hz, 3H); MS *m/z* (EI): 180 (M^+, 30%), 135 (100), 134 (46), 121 (25), 119 (15), 105 (21), 91 (18), 77 (15); HRMS: Calcd for $C_{10}H_{12}O_3$ 180.0786; found 180.0791.

Bis(4-methoxyphenyl)methane[32] **8**

Reaction conditions: 1 mmol (138 mg) **1m**, 3 mmol (255 mg) CH_2Cl_2, 0.03 mmol (8 mg) I_2, 200 min, 25 °C; column chromatography (SiO_2, petroleum ether), 15 mg (13%), white solid, mp 48.0–49.2 °C (lit. 51–52 °C); IR (neat): 2959, 2906, 2837, 1609, 1584, 1457, 1509, 1298, 1246, 1176, 1105, 1027, 809 cm^{-1}; ^1H NMR (300 MHz, $CDCl_3$): δ 7.07 (d, *J* = 8.7 Hz, 4H), 6.81 (d, *J* = 8.7 Hz, 4H), 3.86 (s, 2H), 3.77 (s, 6H); ^{13}C NMR (75 MHz, $CDCl_3$): δ 157.9, 133.7, 129.7, 113.9, 55.3, 40.1; MS (EI): 228 $(M)^+$ (100%), 197 (68), 121 (33).

9*H*-Xanthene-9-on[33] **11a**

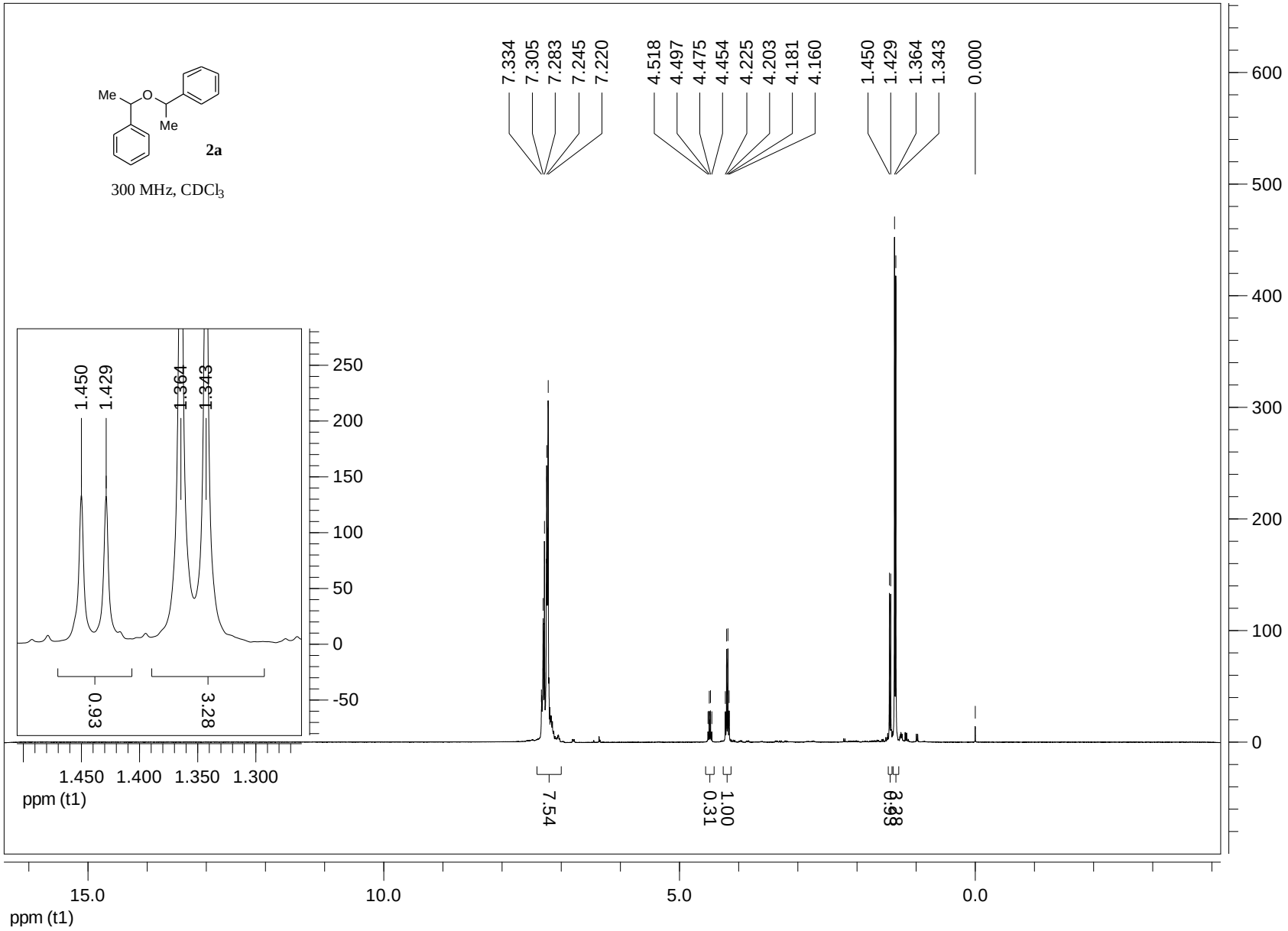
Reaction conditions: 1 mmol (198 mg) **10**, 0.03 mmol (8 mg) I_2, 15 min, 25 °C; column chromatography (SiO_2, petroleum ether), 82 mg (84%), white solid, mp 174.9–175.4 °C (lit. 172–174 °C); IR (neat): 1656, 1607, 1456, 1332, 1236, 1210, 1146, 1097, 1023, 930, 880, 804, 759, 667, 623 cm^{-1}; ^1H NMR (300 MHz, $CDCl_3$): δ 8.39–8.26 (m, 2H), 7.75–7.63 (m, 2H), 7.51–7.42 (m, 2H), 7.41–7.31 (m, 2H);

9*H*-Xanthene[33] **11b**

Reaction conditions: 1 mmol (198 mg) **10**, 0.03 mmol (8 mg) I_2, 15 min, 25 °C; column chromatography (SiO_2, petroleum ether), 89 mg (98%), colorless solid, mp 100.8–101.4 °C (lit. 101–102 °C); IR (neat): 1598, 1574, 1483, 1454, 1302, 1265, 1213, 1187, 1115, 1090, 1030, 966, 925, 891, 860, 747, 694 cm^{-1}; ^1H NMR (300 MHz, $CDCl_3$): δ 7.20–7.07 (m, 4H), 7.04–6.93 (m, 4H), 4.05 (s, 2H).

9-Methoxy-9*H*-xanthene[34] **11c**

Reaction conditions: 1 mmol (198 mg) **10**, 3 mmol (96 mg) MeOH, 0.03 mmol (8 mg) I_2, 5 min, 25 °C; decomposition on SiO_2 and on Al_2O_3, 180 mg (85%), colorless oil; IR (neat): 3043, 2933, 2816, 1605, 1576, 1479, 1459, 1256, 1061, 904, 753 cm^{-1}; ^1H NMR (300 MHz, $CDCl_3$): δ 7.49–7.46 (m, 2H), 7.34–7.29 (m, 2H), 7.14–7.10 (m, 4H), 5.74 (s, 1H), 2.86 (s, 3H); ^{13}C NMR (75 MHz, $CDCl_3$): δ 152.5, 130.0, 129.6, 123.2, 119.6, 116.6, 70.8, 51.5; MS *m/z* (EI): 211 (M^+ − H, 20%), 196 (18), 181 (100), 152 (16).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7.220
4.518
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4.454
4.225
4.203
4.181
4.160
1.450
1.429
1.364
1.343
0.000
1.450
1.429
1.364
1.343
0.93
3.28
1.450 1.400 1.350 1.300
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3.38
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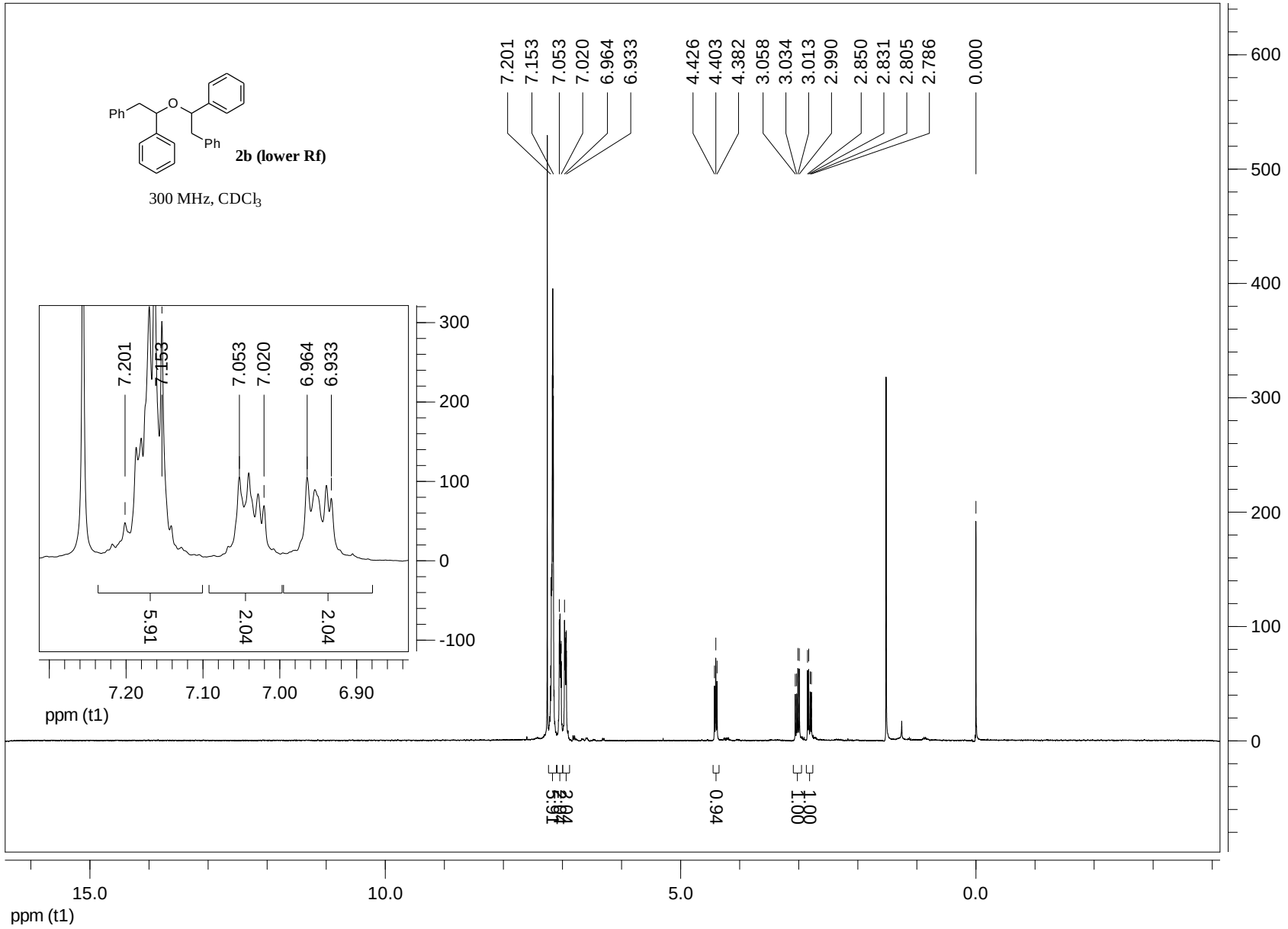
10.0
5.0
0.0
ppm (t1)


Ph
O
Ph
2b (lower Rf)
300 MHz, CDCl3
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7.053
7.020
6.964
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4.426
4.403
4.382
3.058
3.034
3.013
2.990
2.850
2.831
2.805
2.786
0.000
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2.04
0.94
1.00
1.00
ppm (t1)
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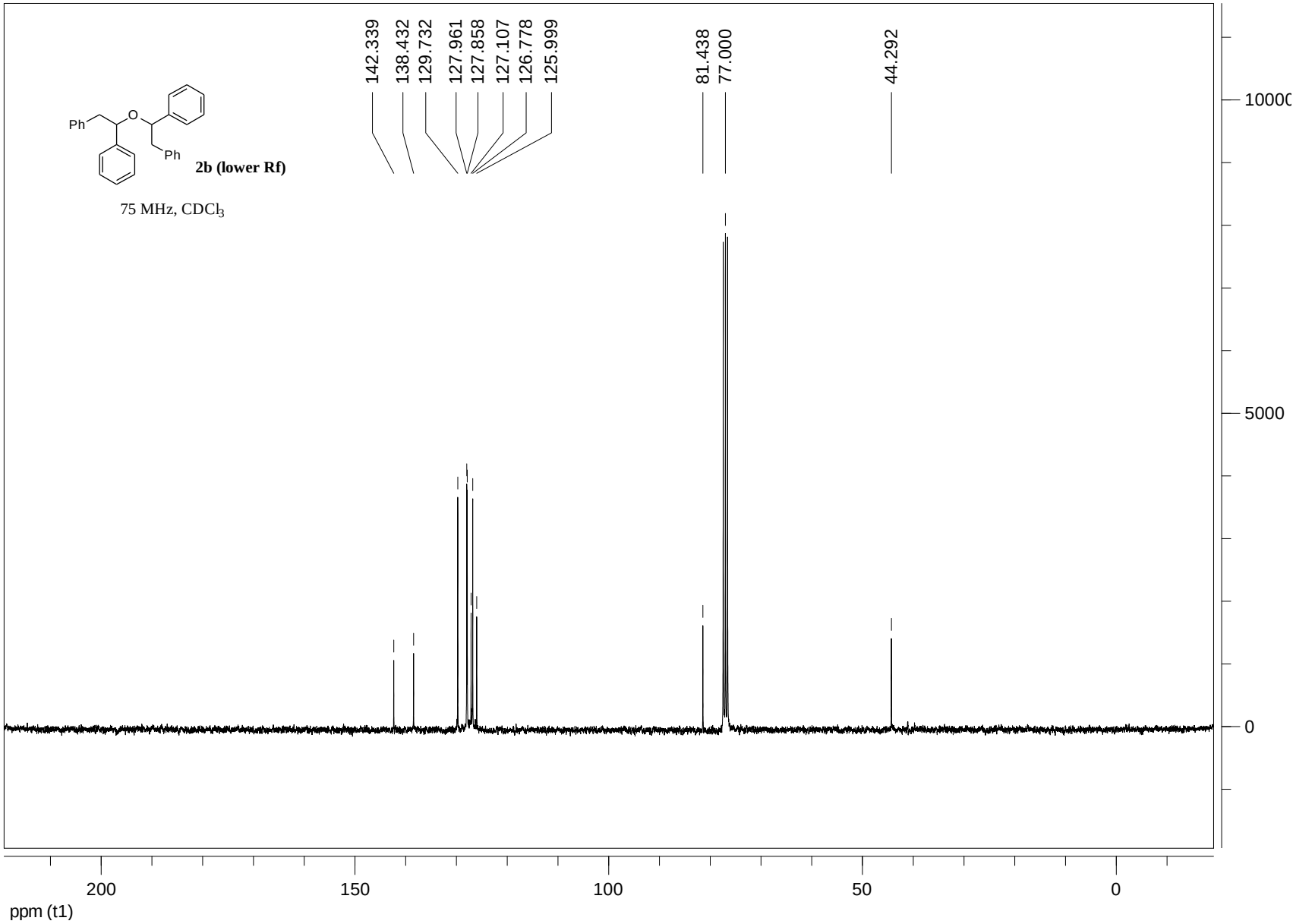
10.0
5.0
0.0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127.107
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125.999
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77.000
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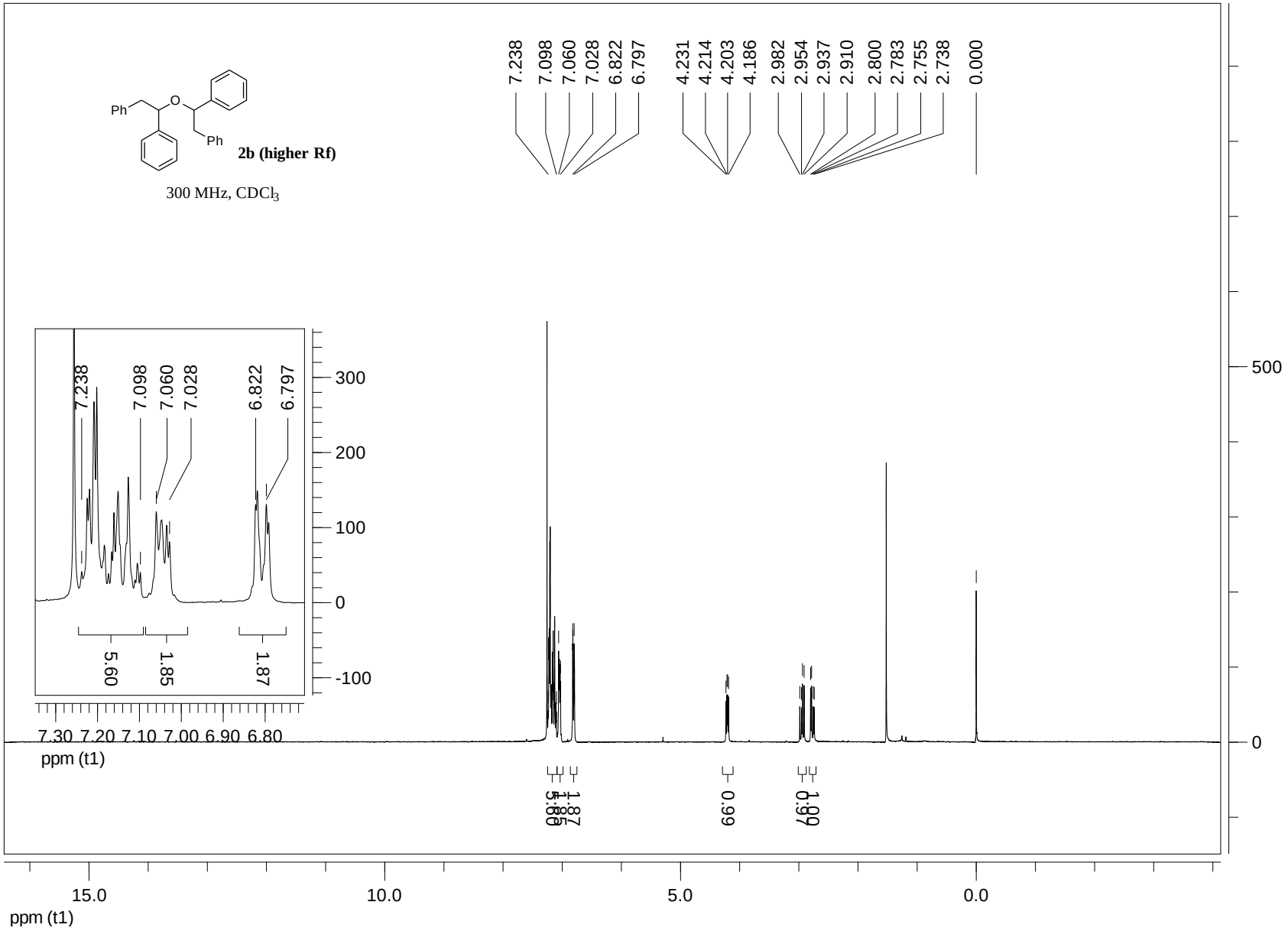
Ph
2b (lower Rf)
75 MHz, CDCl3
10000
5000
0
200
150
100
50
0
ppm (t1)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Ph
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4.214
4.203
4.186
2.982
2.954
2.937
2.910
2.800
2.783
2.755
2.738
0.000
5.90
1.85
1.87
0.99
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ppm (t1)
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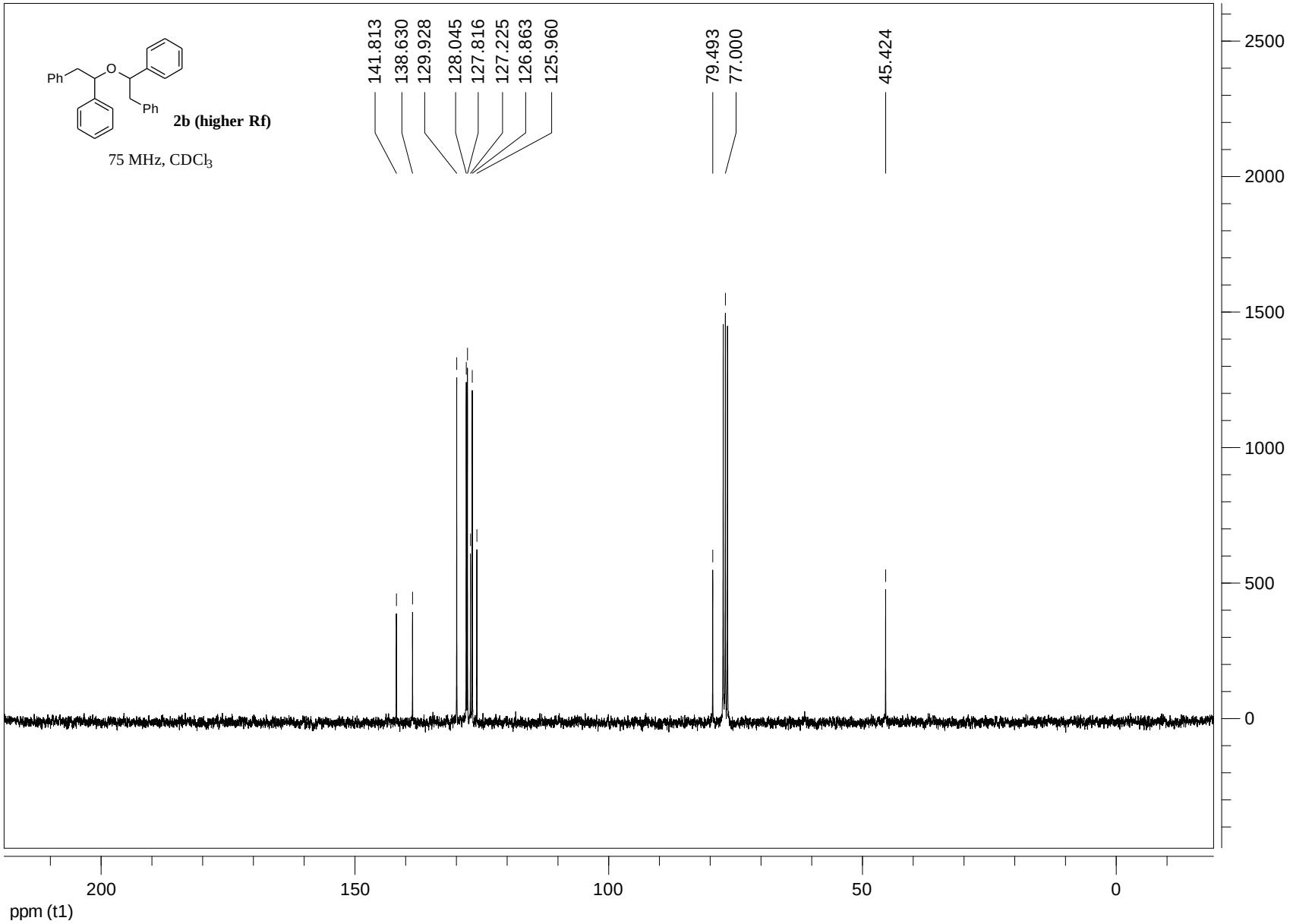
10.0
5.0
0.0
ppm (t1)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Ph
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500
0
200
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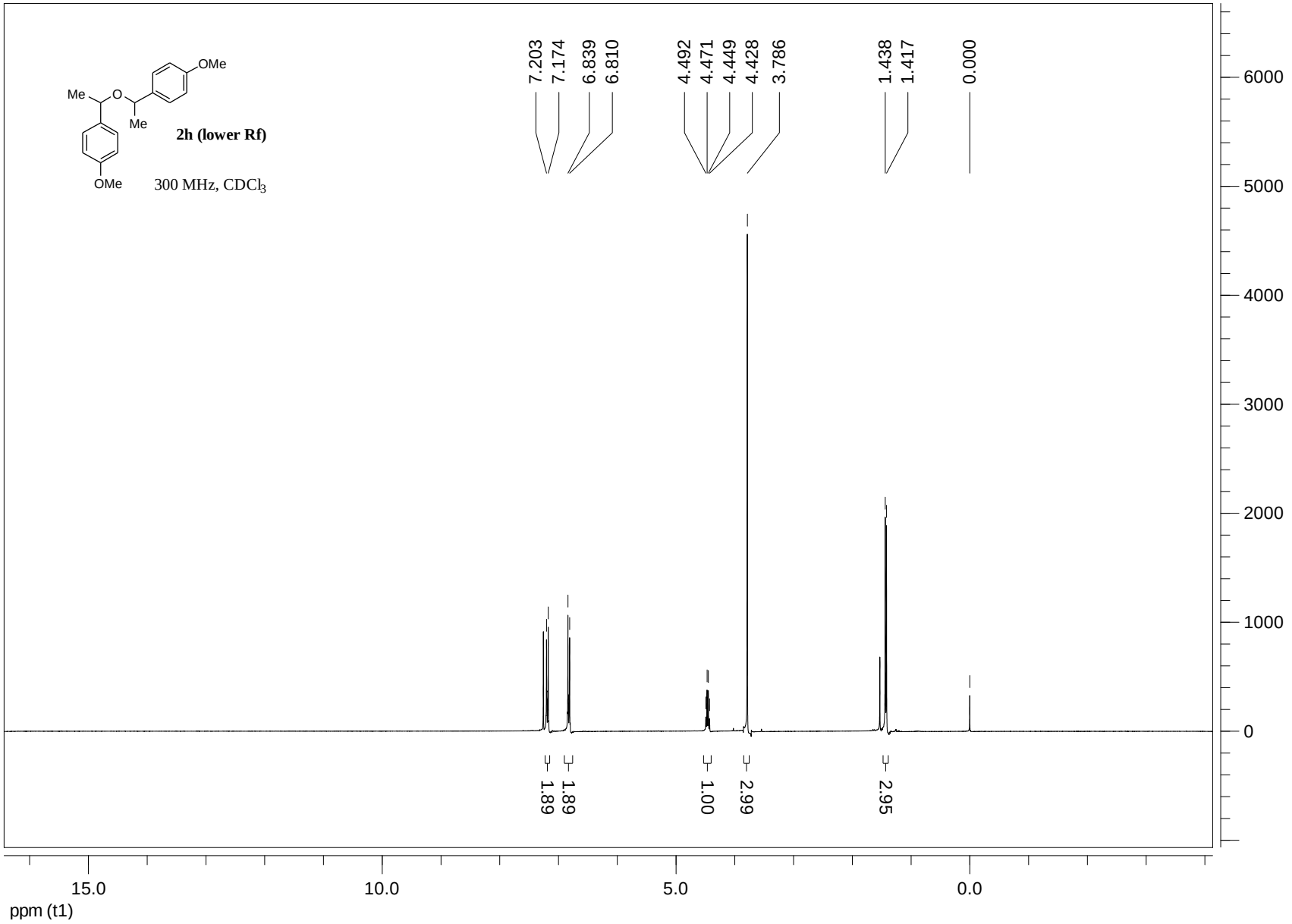
100
50
0
ppm (t1)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Me
O
Me
OMe
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4.449
4.428
3.786
1.438
1.417
0.000
1.89
1.89
1.00
2.99
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5000
4000
3000
2000
1000
0
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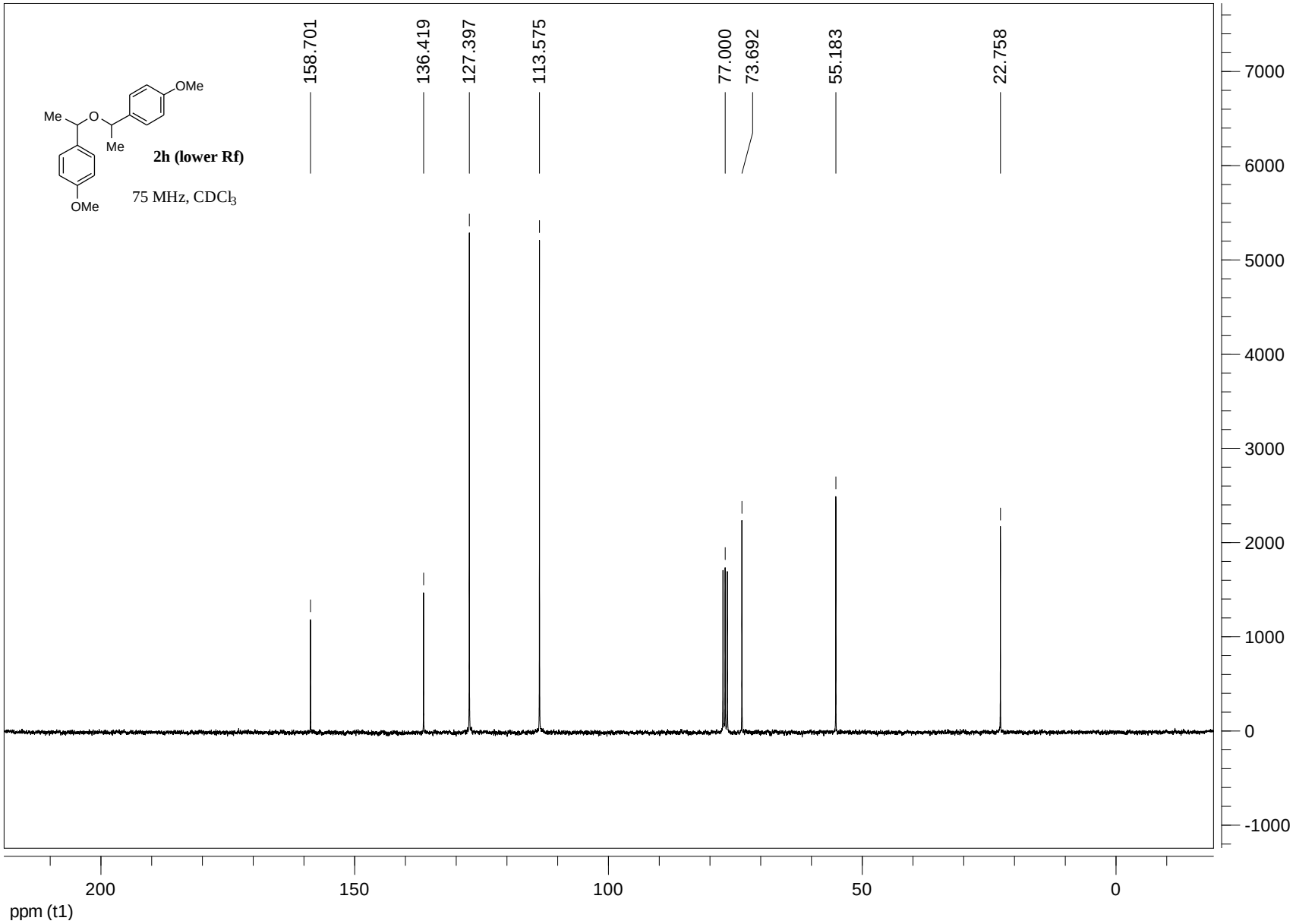
10.0
5.0
0.0
ppm (t1)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O
Me
OMe
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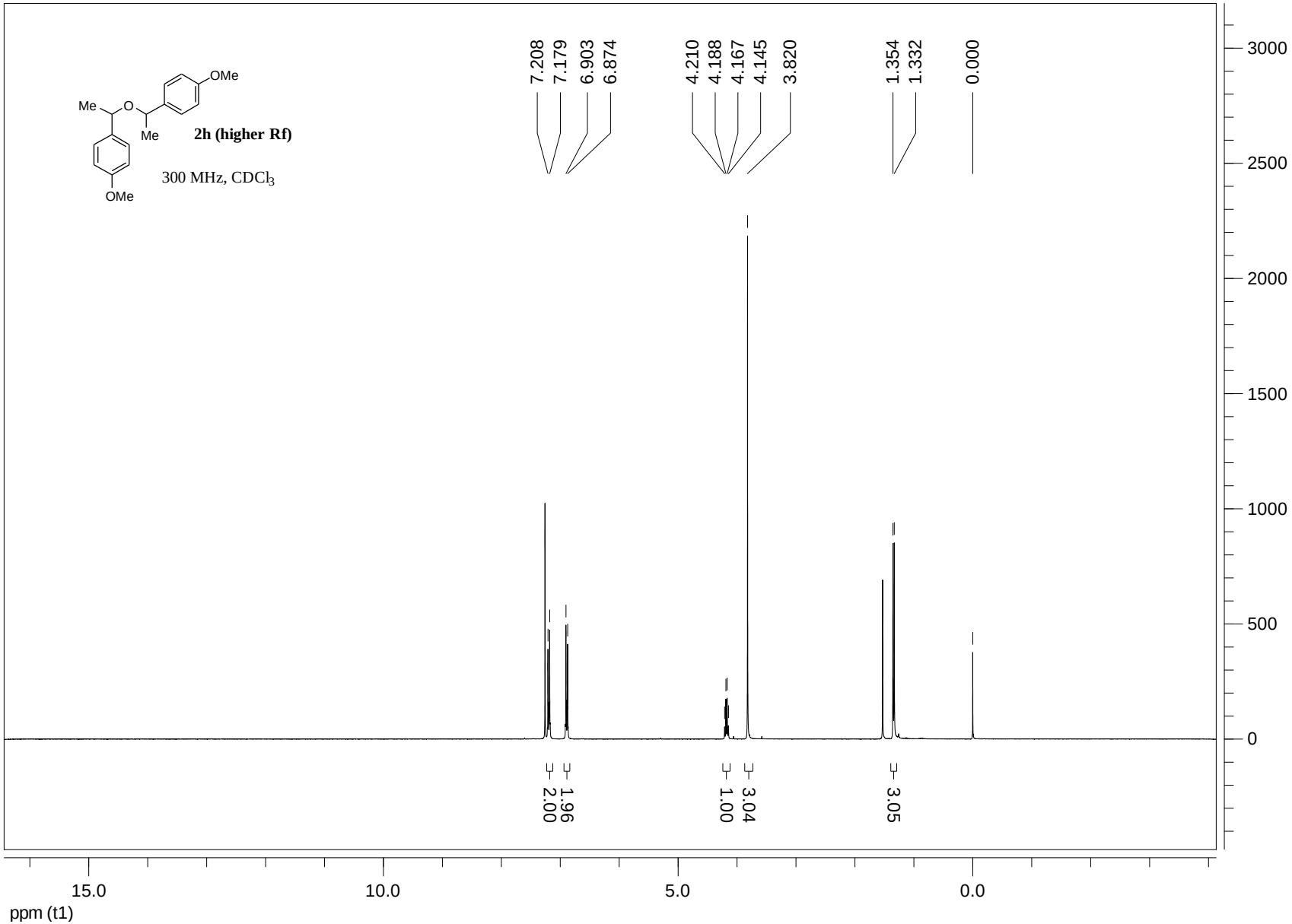
6000
5000
4000
3000
2000
1000
0
-1000
200
150
100
50
0
ppm (t1)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Me
O
Me
OMe
2h (higher Rf)
300 MHz, CDCl3
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4.188
4.167
4.145
3.820
1.354
1.332
0.000
2.00
1.96
1.00
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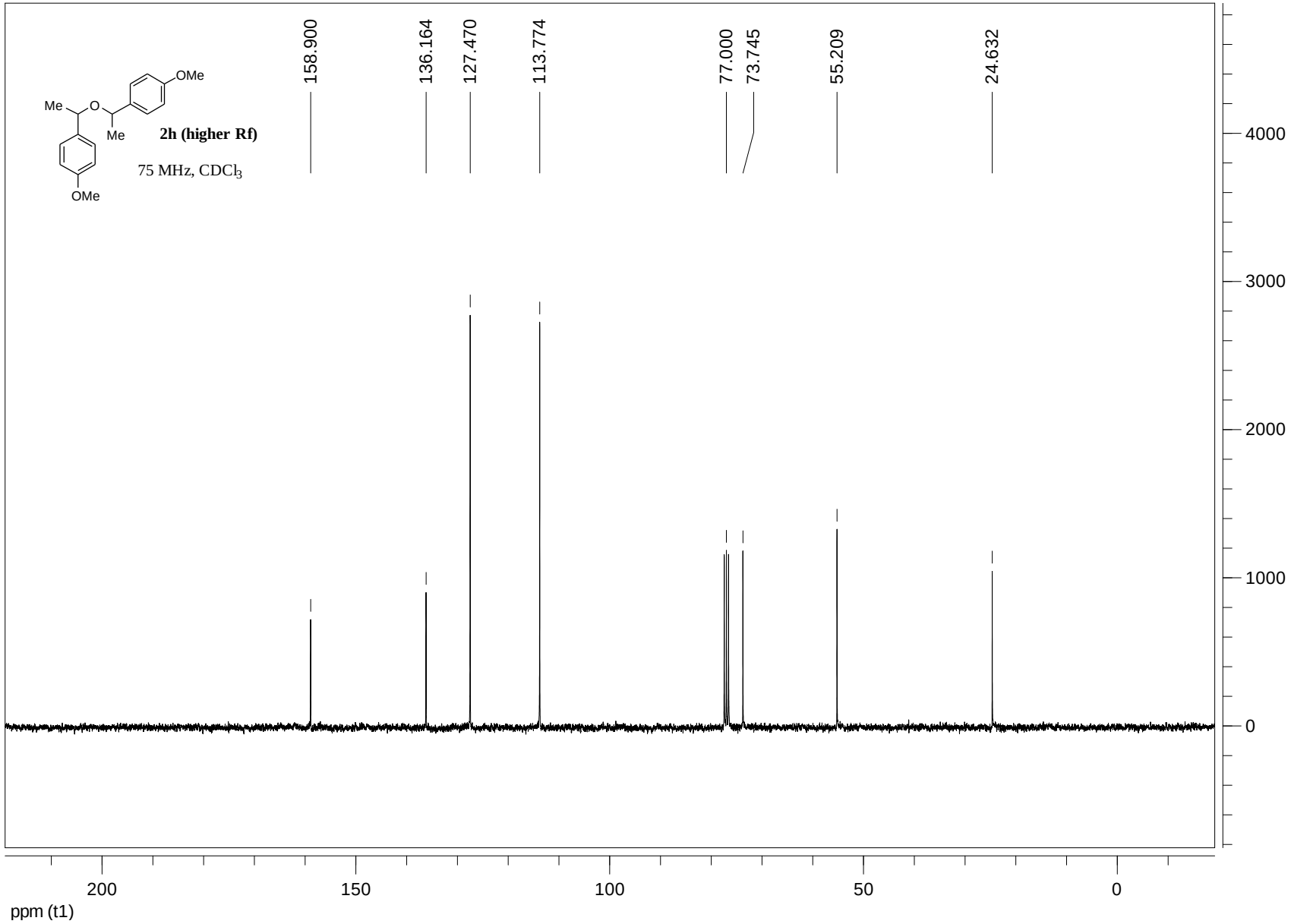
3000
2500
2000
1500
1000
500
0
15.0
10.0
5.0
0.0
ppm (t1)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Me
O
Me
OMe
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75 MHz, CDCl3
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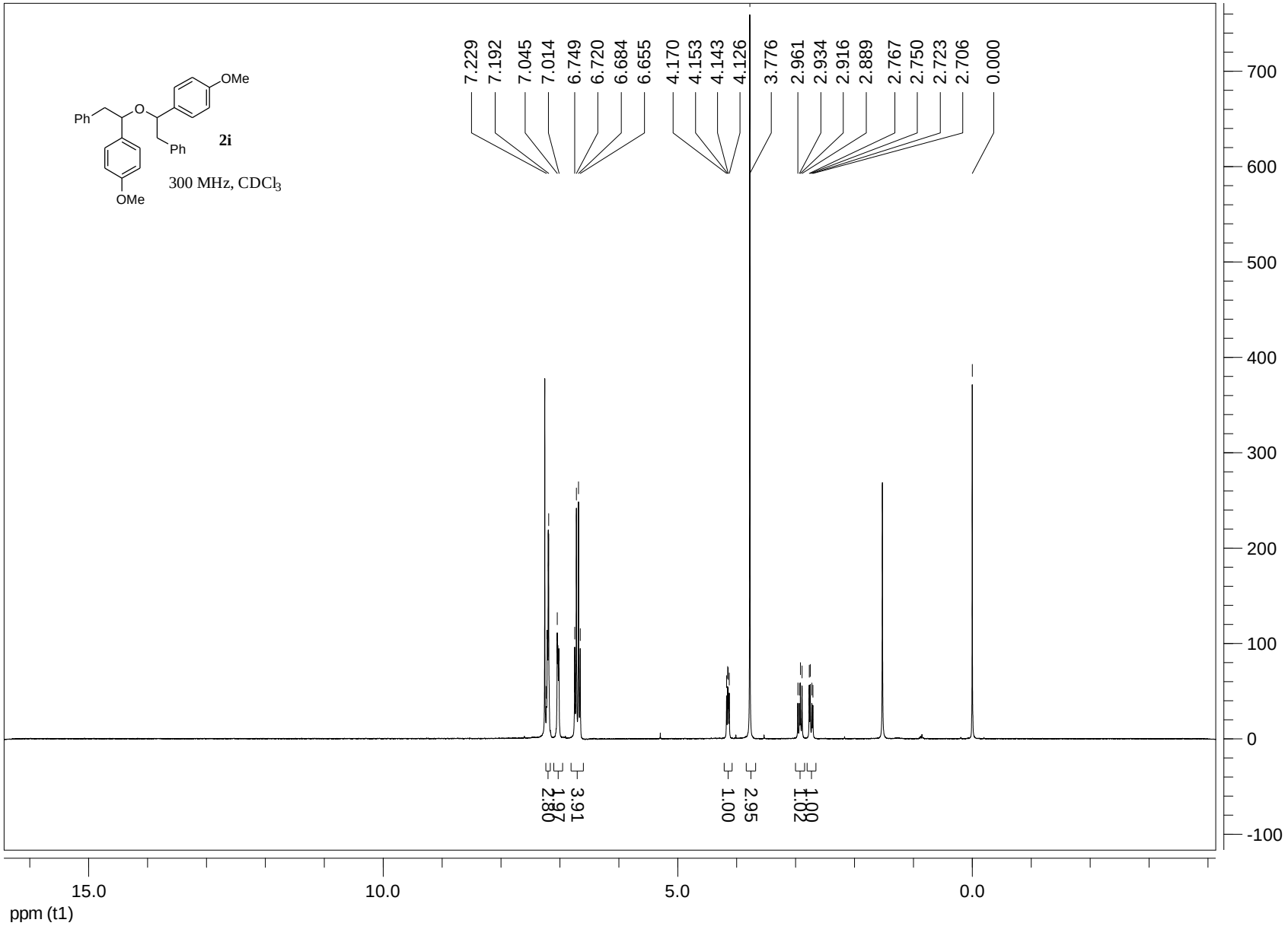
2000
1000
0
200
150
100
50
0
ppm (t1)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O
Ph
2i
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4.143
4.126
3.776
2.961
2.934
2.916
2.889
2.767
2.750
2.723
2.706
0.000
2.80
1.97
3.91
1.00
2.95
1.02
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500
400
300
200
100
0
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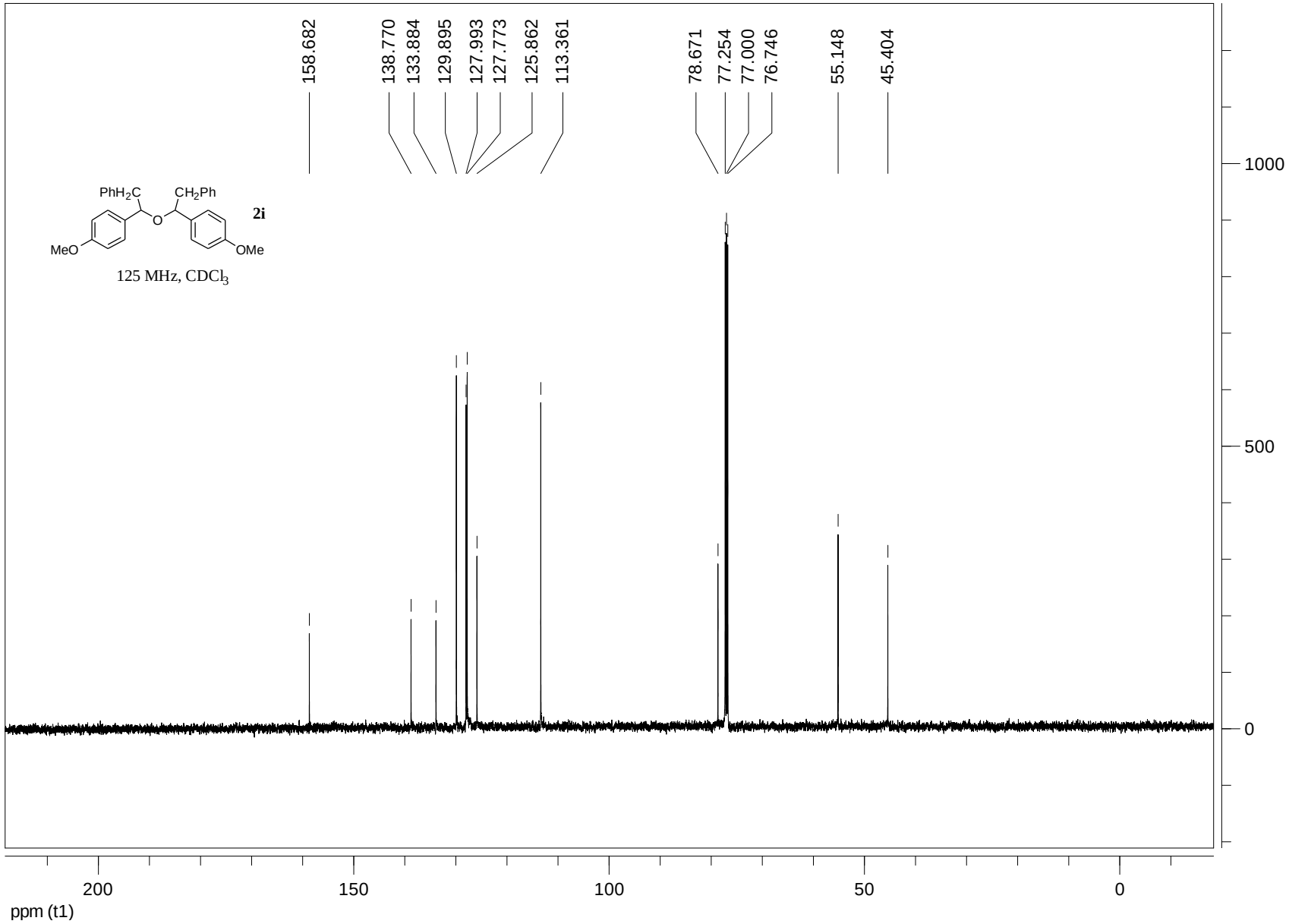
5.0
0.0
ppm (t1)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45.404
PhH2C
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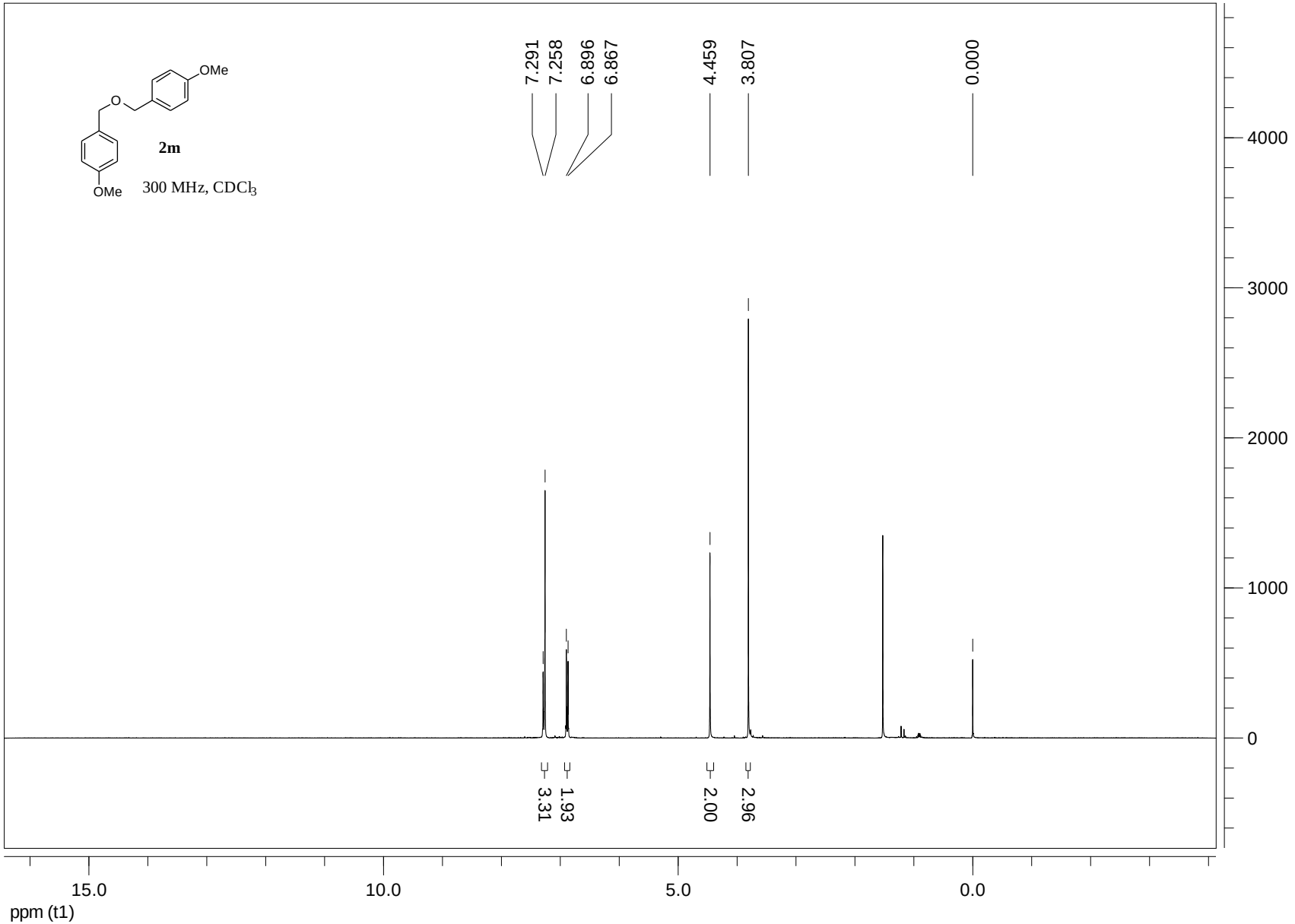
200
150
100
50
0
ppm (t1)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2.96
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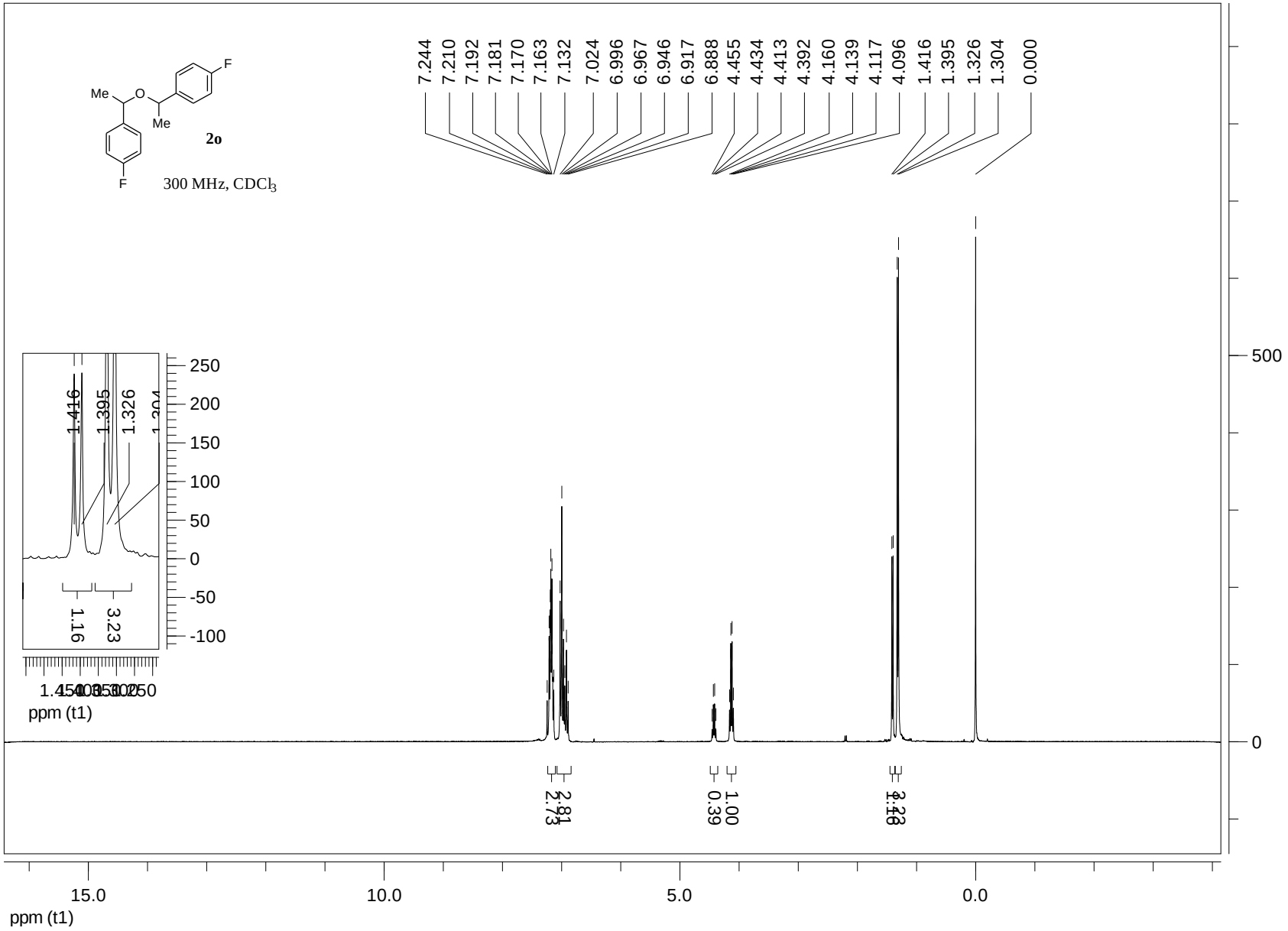
3000
2000
1000
0
15.0
10.0
5.0
0.0
ppm (t1)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Me
F
F
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4.455
4.434
4.413
4.392
4.160
4.139
4.117
4.096
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1.395
1.326
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1.395
1.326
1.16
3.23
250
200
150
100
50
0
-50
-100
ppm (t1)
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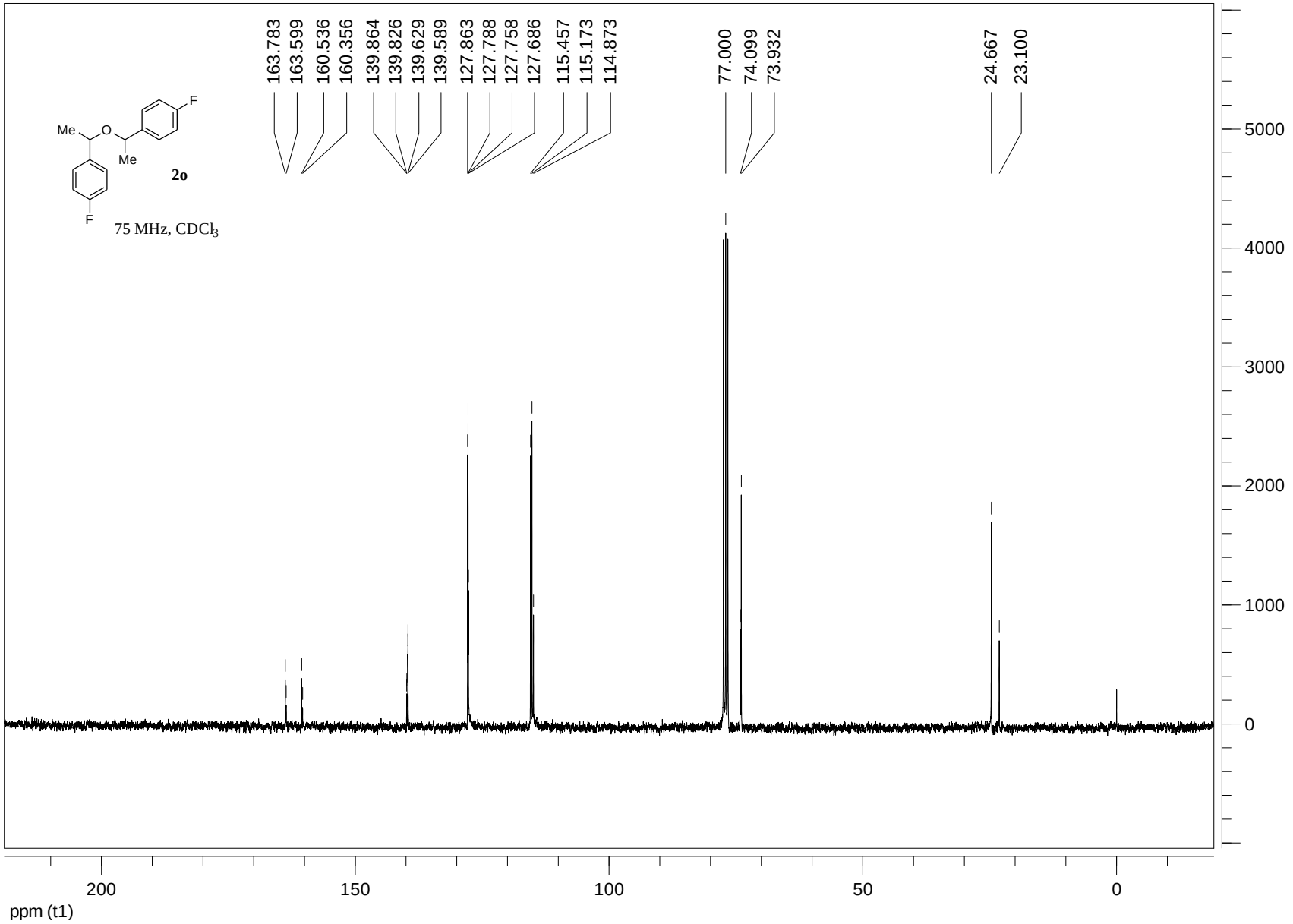
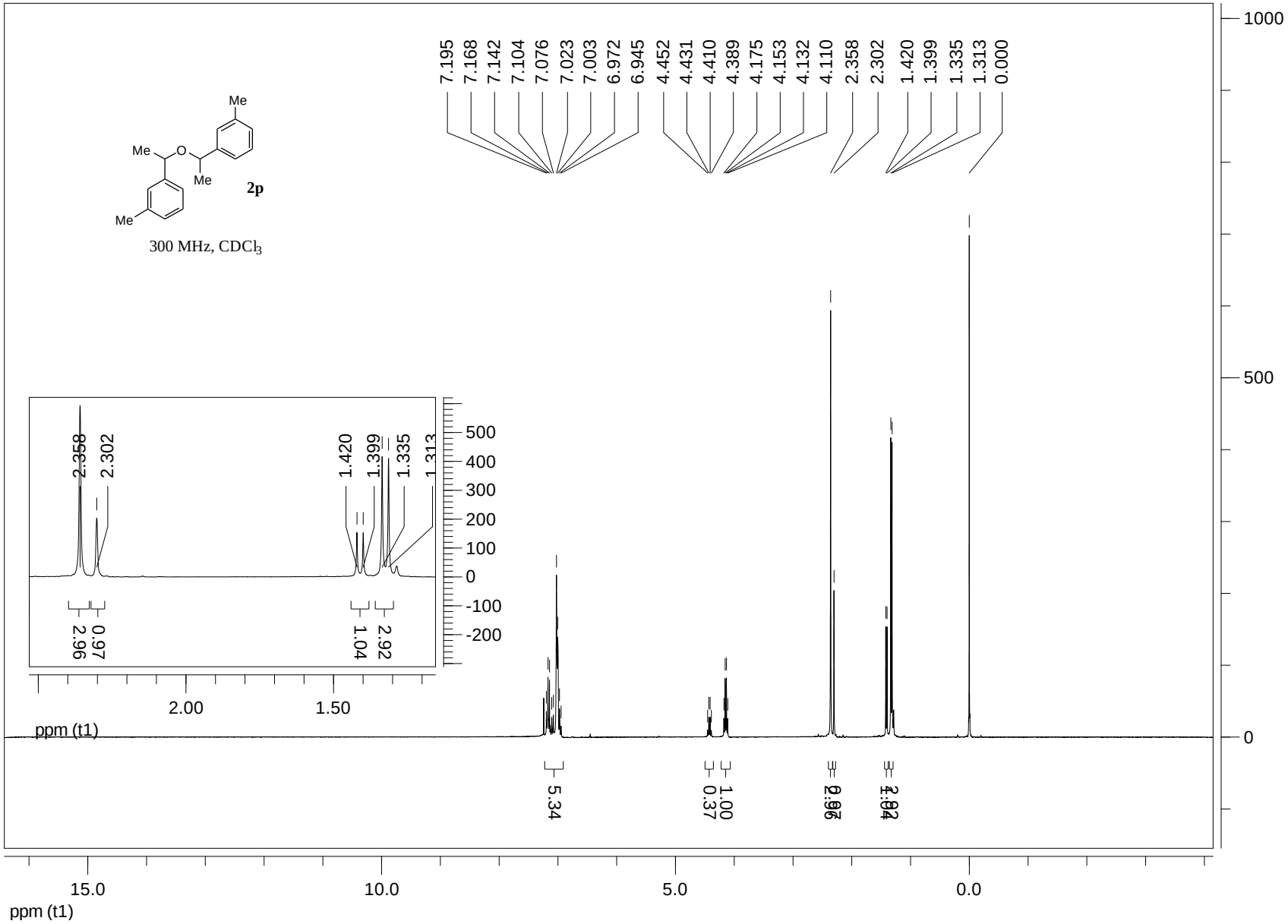
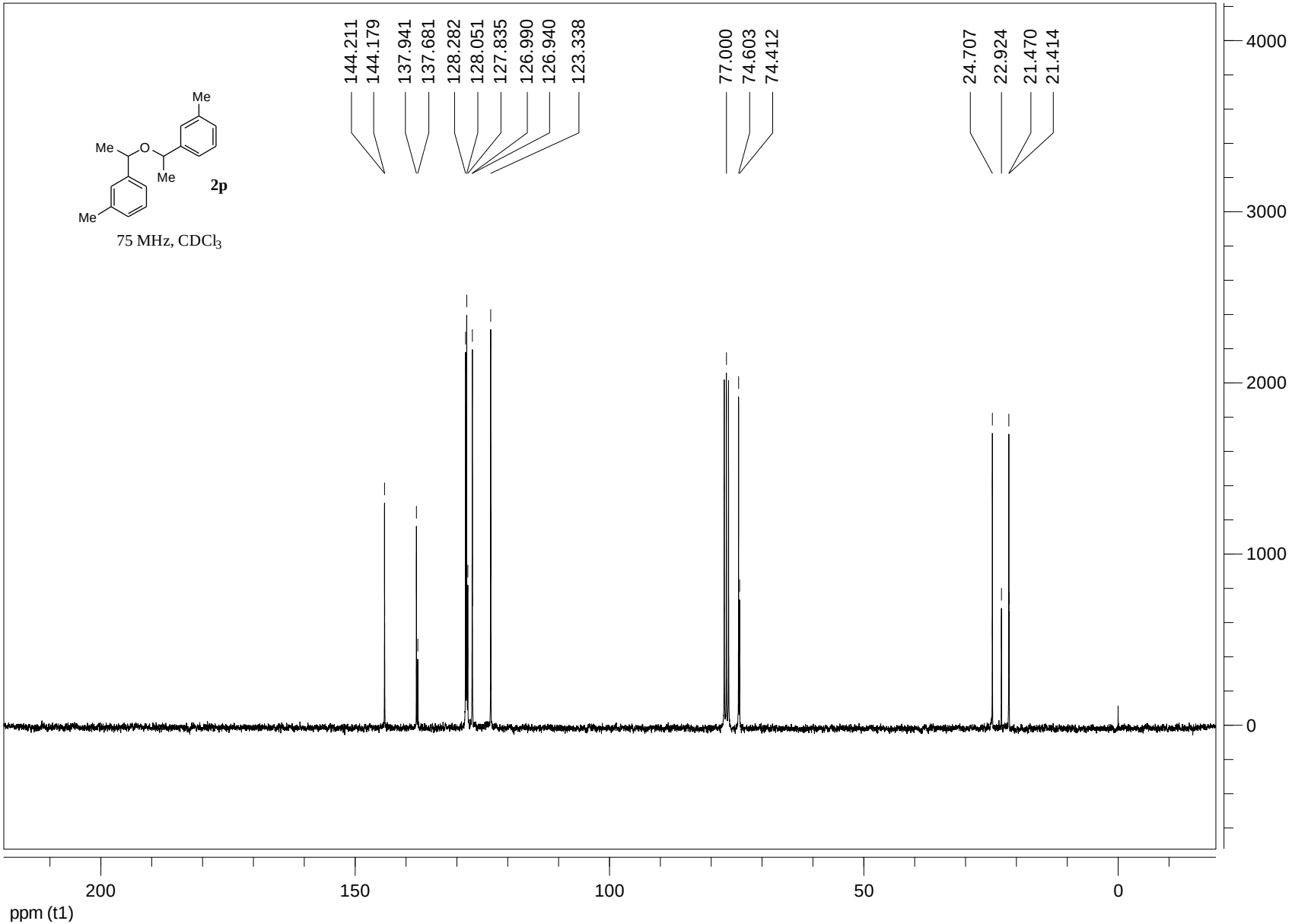
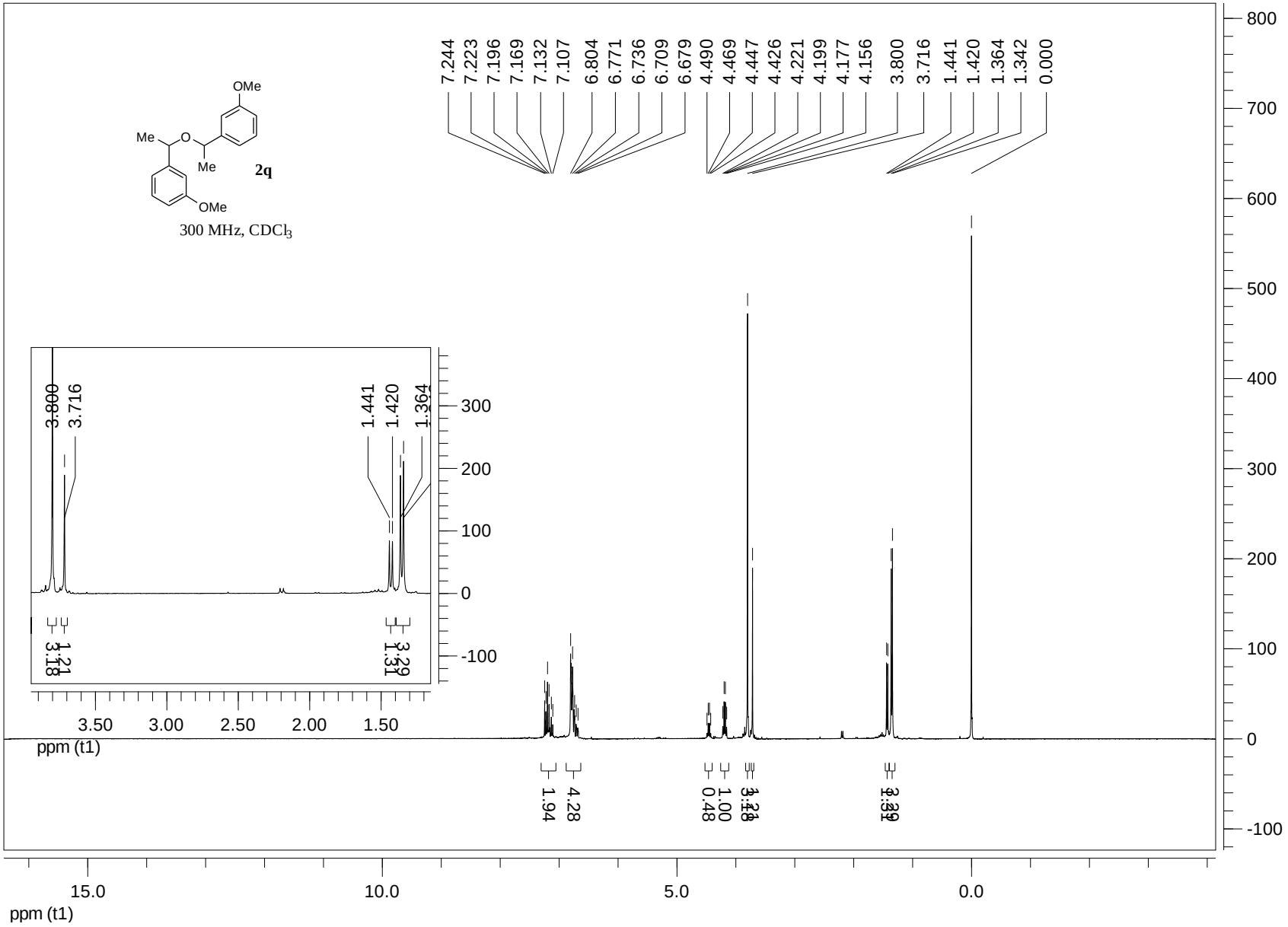
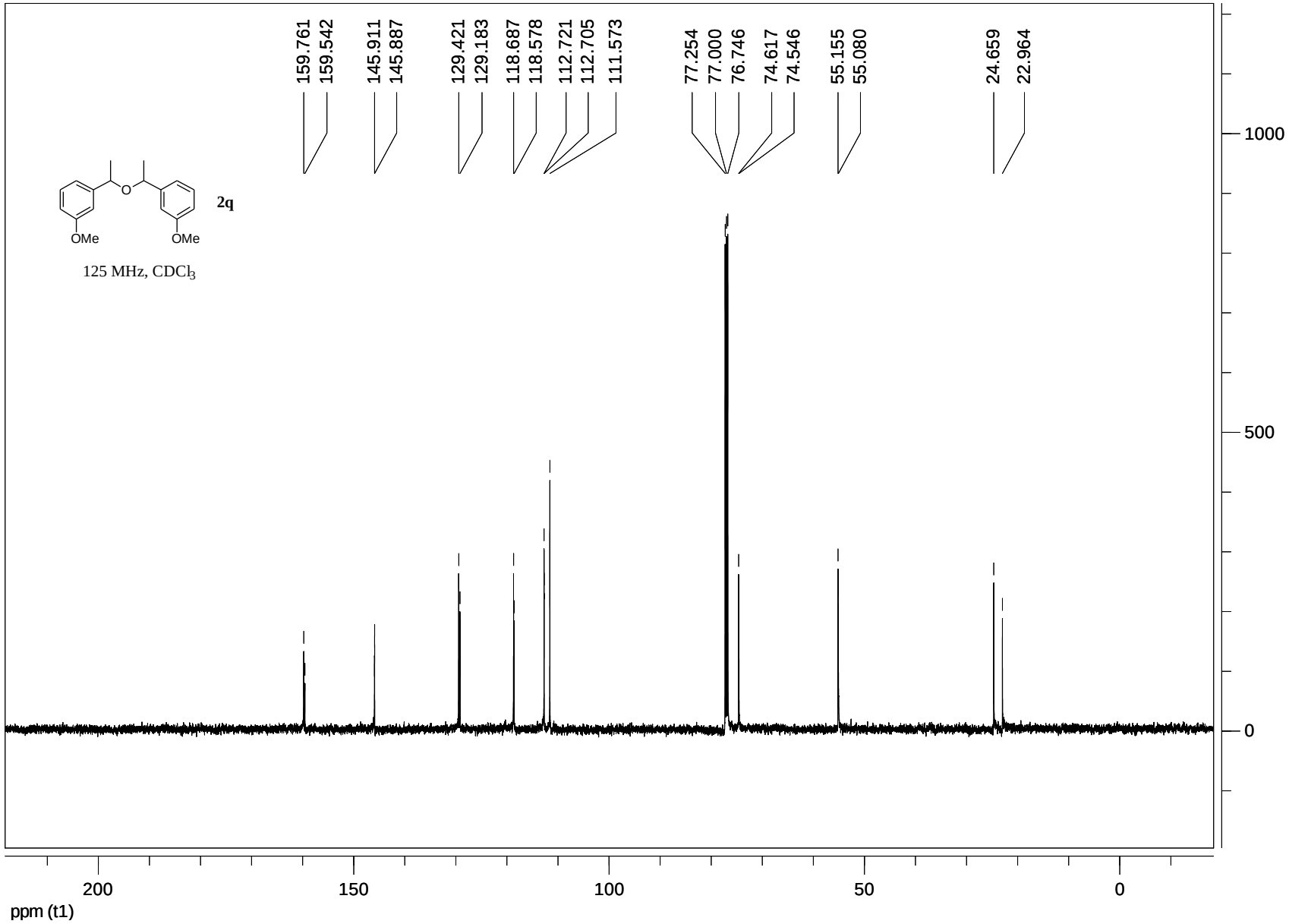
ppm (t1)

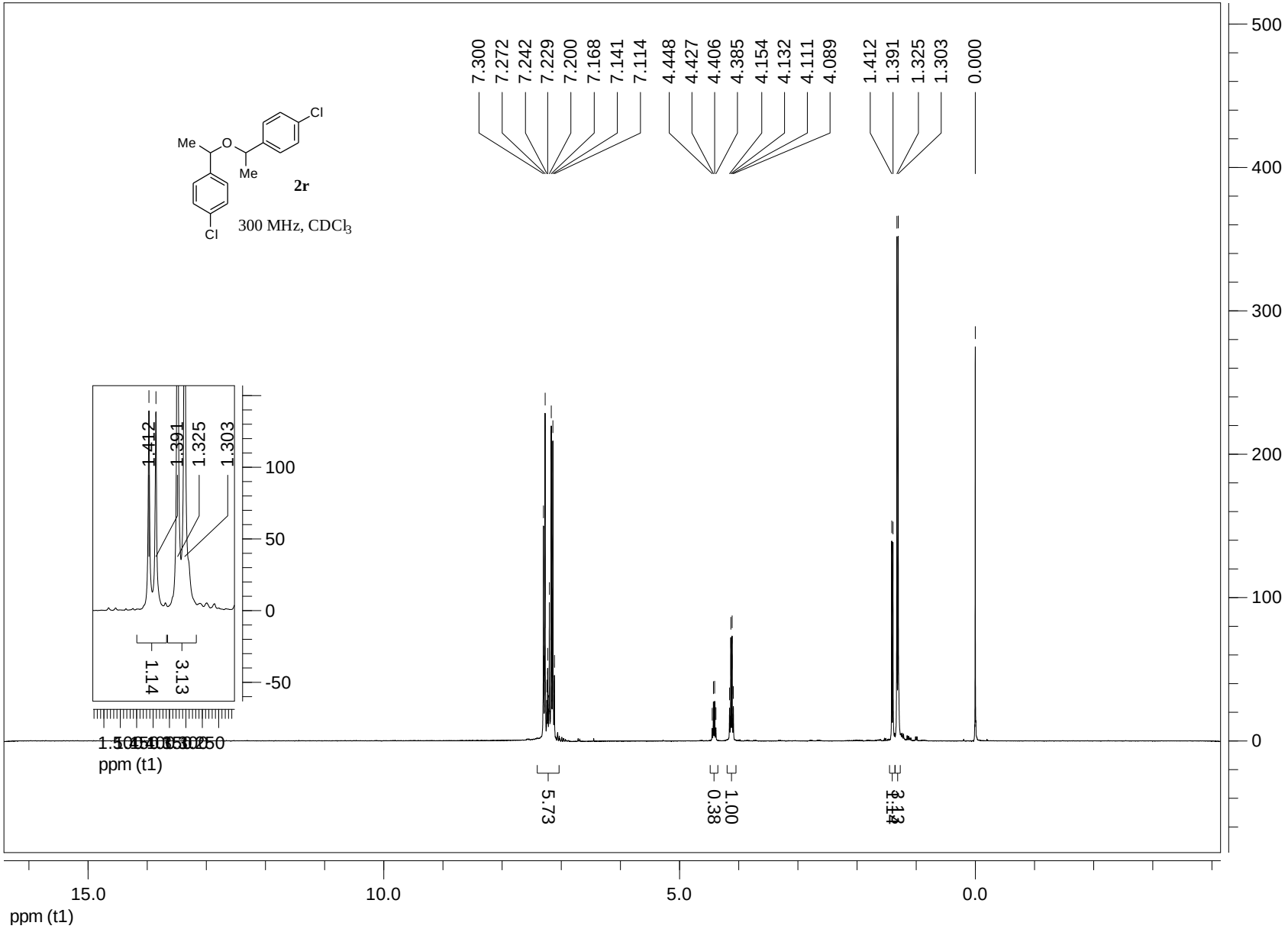

163.783
163.599
160.536
160.356
139.864
139.826
139.629
139.589
127.863
127.788
127.758
127.686
115.457
115.173
114.873
77.000
74.099
73.932
24.667
23.100
Me
O
Me
F
F
2o
75 MHz, CDCl3
5000
4000
3000
2000
1000
0
200
150
100
50
0
ppm (t1)

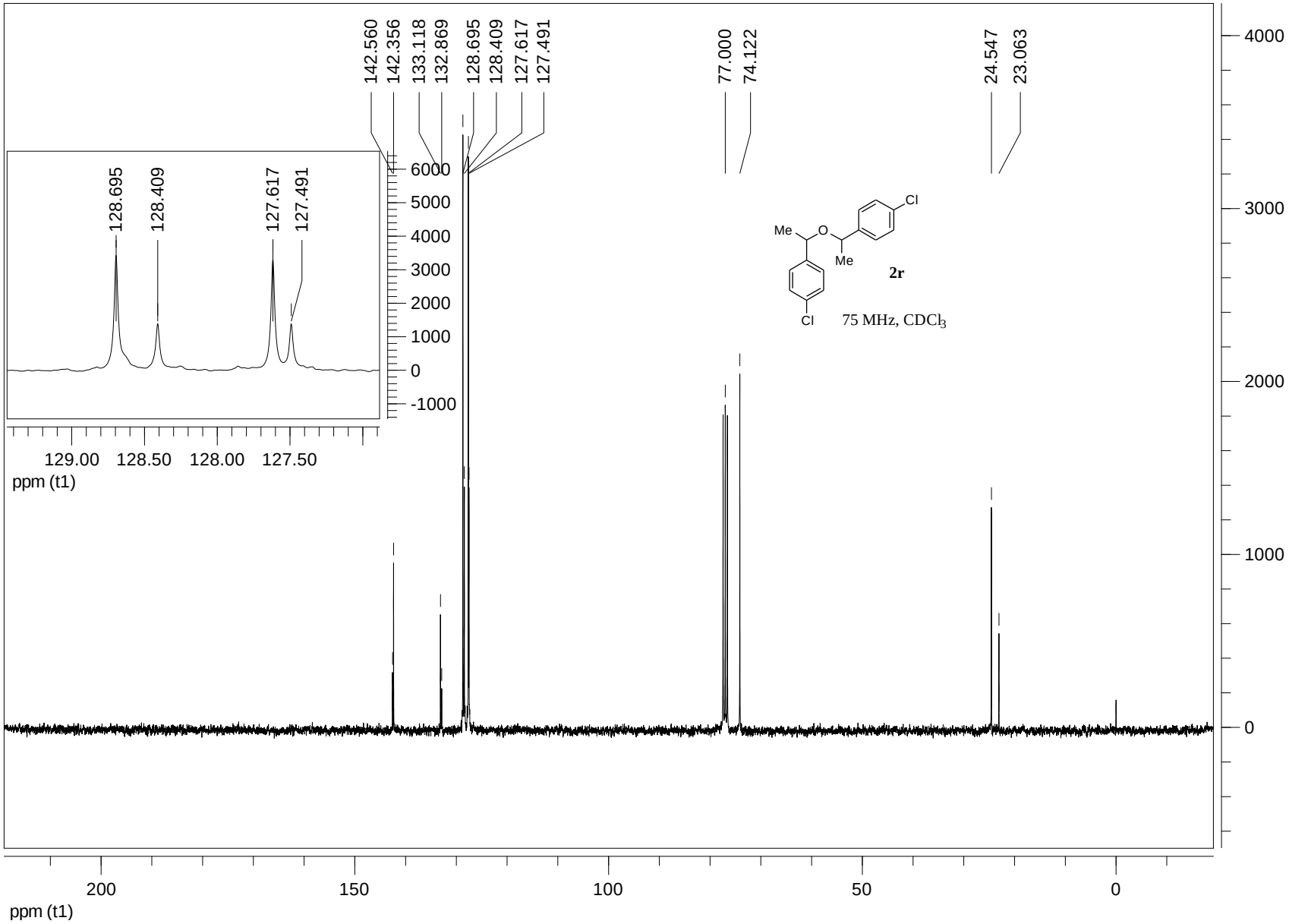

7.195
7.168
7.142
7.104
7.076
7.023
7.003
6.972
6.945
4.452
4.431
4.410
4.389
4.175
4.153
4.132
4.110
2.358
2.302
1.420
1.399
1.335
1.313
0.000
Me
Me
O
Me
Me
Me
2p
300 MHz, CDCl3
1000
500
0
2.358
2.302
1.420
1.399
1.335
1.313
500
400
300
200
100
0
-100
-200
2.96
0.97
1.04
2.92
2.00
1.50
ppm (t1)
5.34
1.00
0.37
2.96
2.92
15.0
10.0
5.0
0.0
ppm (t1)

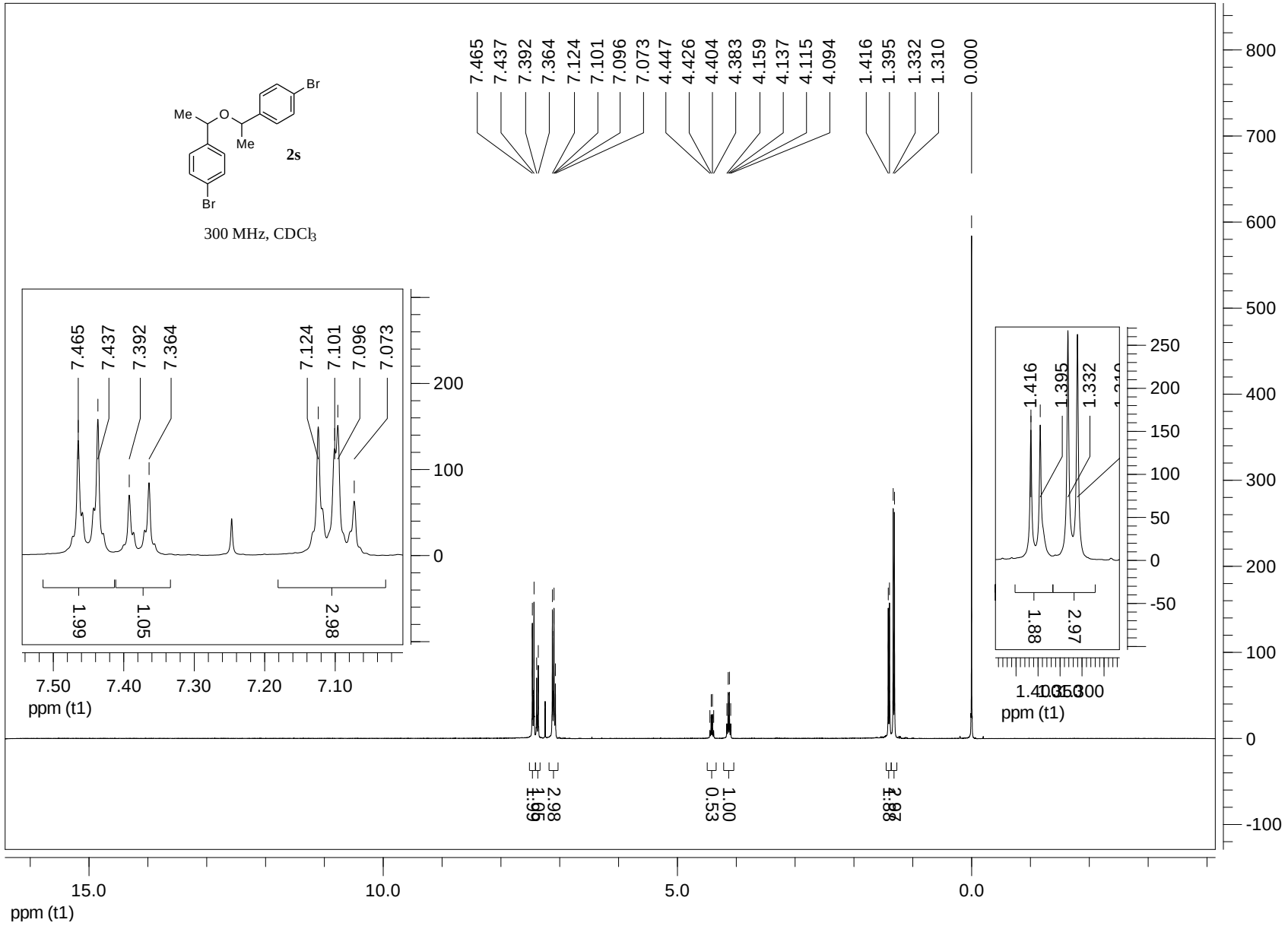

144.211
144.179
137.941
137.681
128.282
128.051
127.835
126.990
126.940
123.338
77.000
74.603
74.412
24.707
22.924
21.470
21.414
Me
Me
O
Me
Me
2p
75 MHz, CDCl3
4000
3000
2000
1000
0
200
150
100
50
0
ppm (t1)

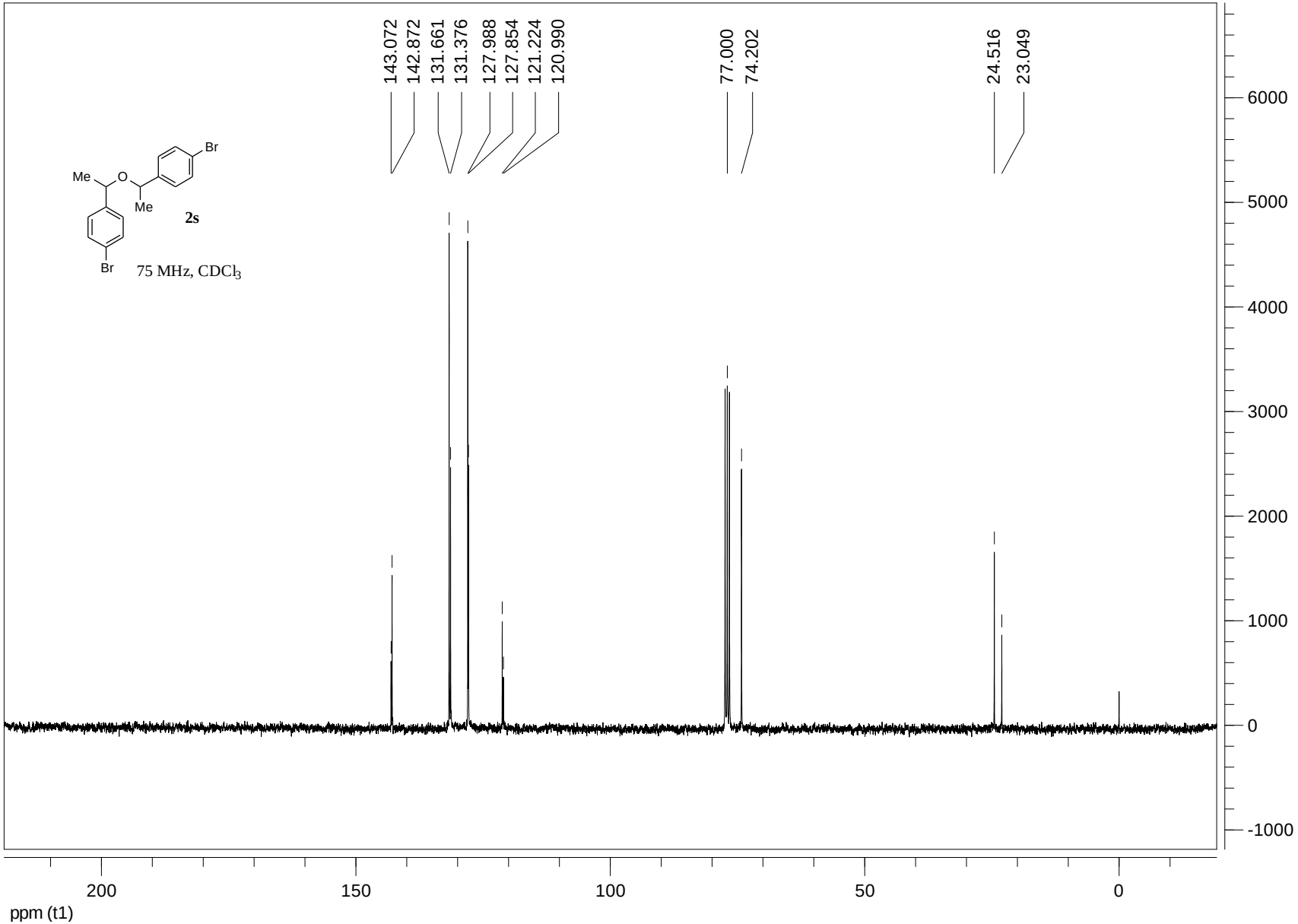

OMe
Me
O
Me
Me
OMe
2q
300 MHz, CDCl3
7.244
7.223
7.196
7.169
7.132
7.107
6.804
6.771
6.736
6.709
6.679
4.490
4.469
4.447
4.426
4.221
4.199
4.177
4.156
3.800
3.716
1.441
1.420
1.364
1.342
0.000
3.800
3.716
1.441
1.420
1.364
3.18
1.21
3.29
1.31
1.94
4.28
0.48
1.00
3.21
3.18
3.39
3.37
ppm (t1)
ppm (t1)

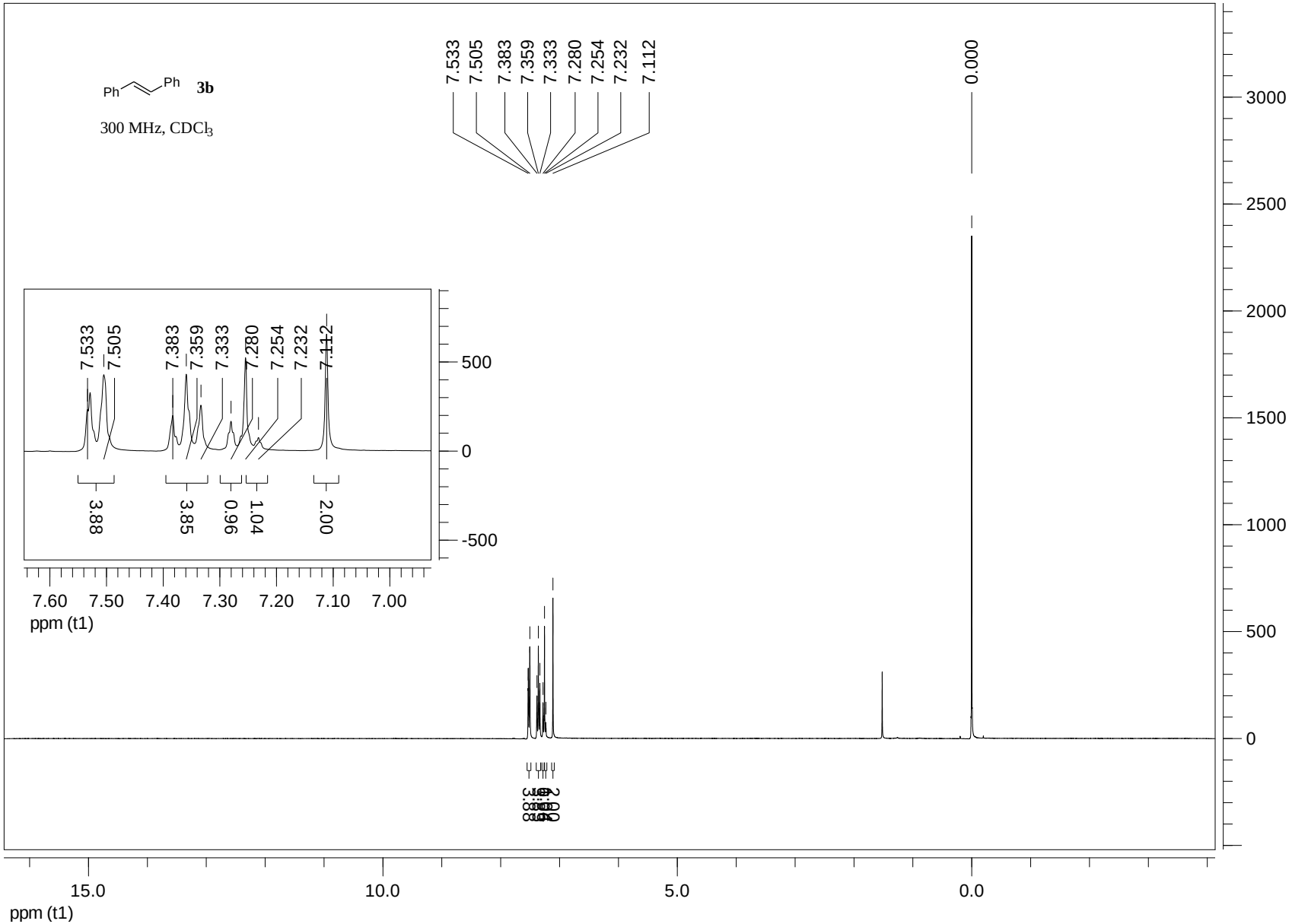

159.761
159.542
145.911
145.887
129.421
129.183
118.687
118.578
112.721
112.705
111.573
77.254
77.000
76.746
74.617
74.546
55.155
55.080
24.659
22.964
2q
OMe
OMe
125 MHz, CDCl3
1000
500
0
200
150
100
50
0
ppm (t1)

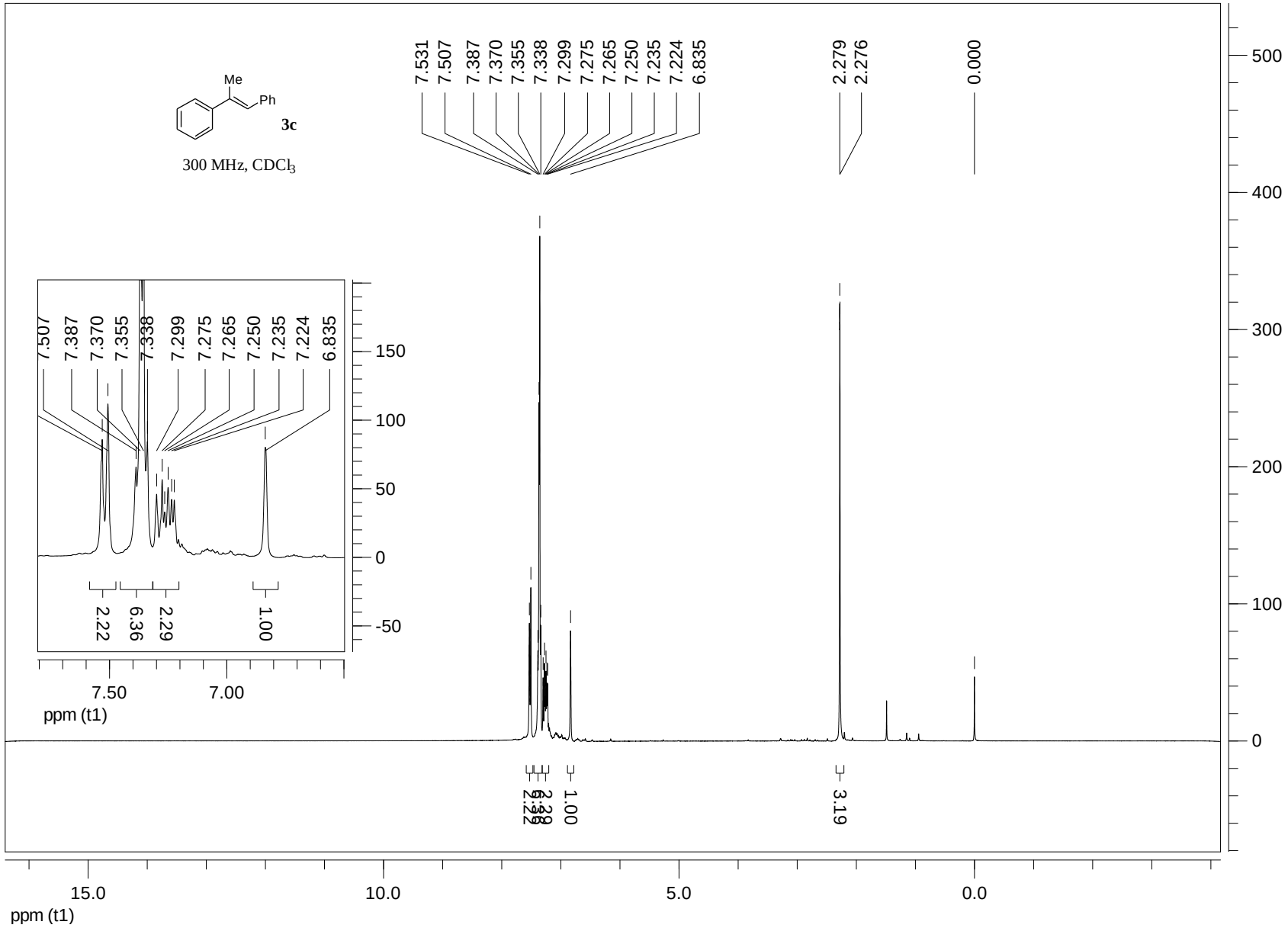

Me
O
Me
Cl
Cl
2r
300 MHz, CDCl3
7.300
7.272
7.242
7.229
7.200
7.168
7.141
7.114
4.448
4.427
4.406
4.385
4.154
4.132
4.111
4.089
1.412
1.391
1.325
1.303
0.000
5.73
1.00
0.38
3.13
1.14
ppm (t1)
15.0
10.0
5.0
0.0

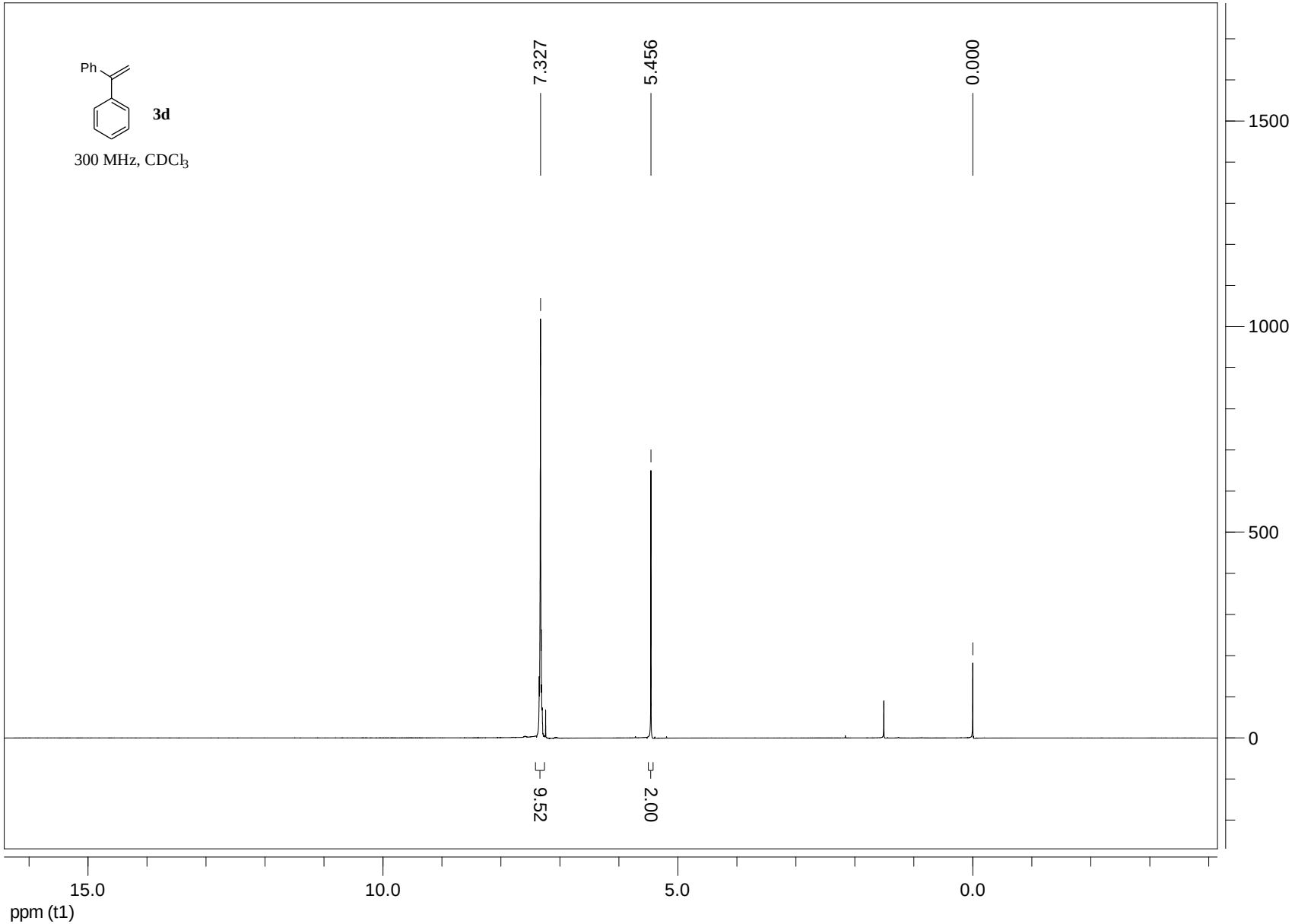

142.560
142.356
133.118
132.869
128.695
128.409
127.617
127.491
77.000
74.122
24.547
23.063
128.695
128.409
127.617
127.491
129.00
128.50
128.00
127.50
ppm (t1)
6000
5000
4000
3000
2000
1000
0
-1000
4000
3000
2000
1000
0
Me
O
Me
Cl
Cl
2r
75 MHz, CDCl3
200
150
100
50
0
ppm (t1)

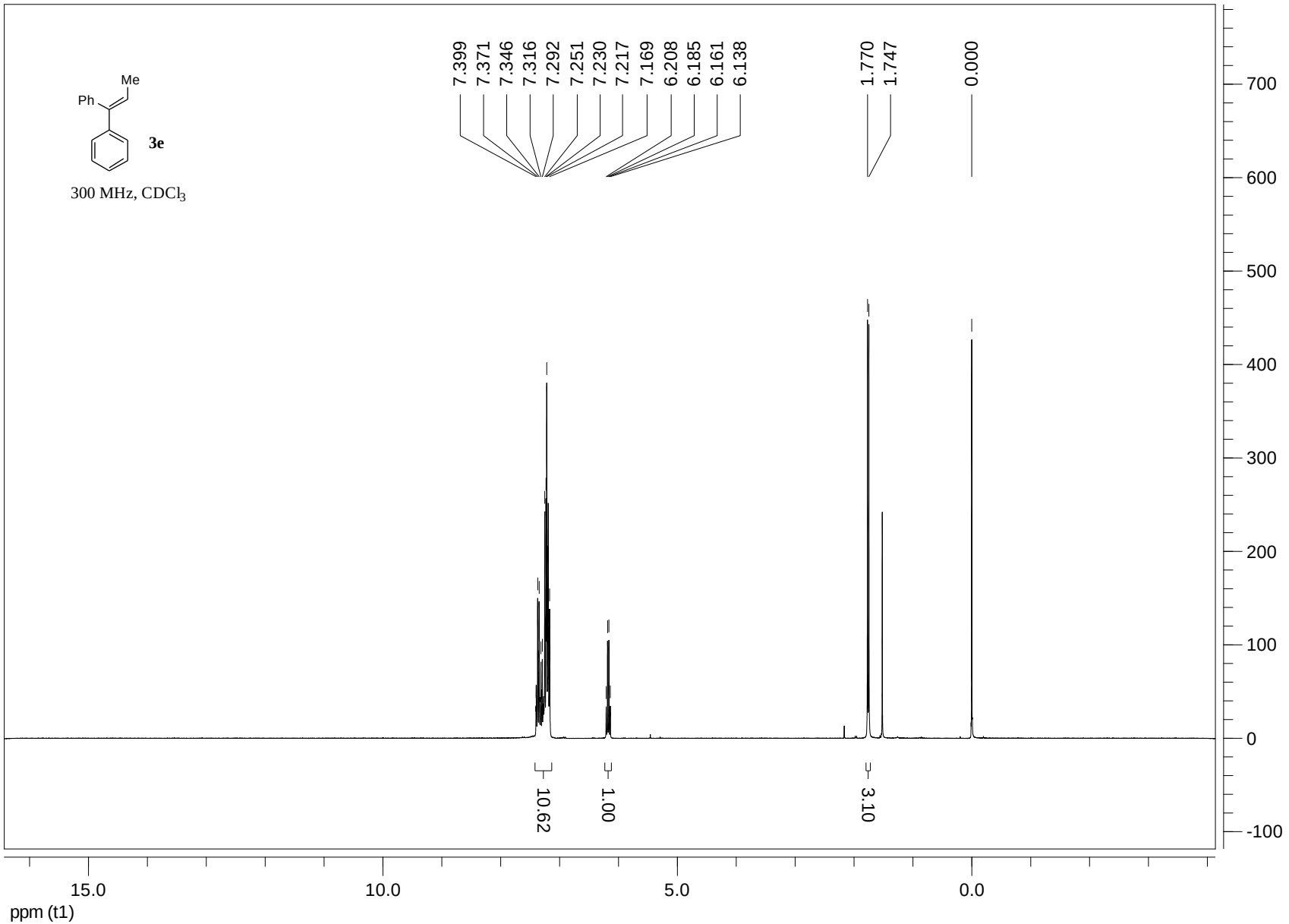

Me
O
Me
Br
Br
2s
300 MHz, CDCl3
7.465
7.437
7.392
7.364
7.124
7.101
7.096
7.073
4.447
4.426
4.404
4.383
4.159
4.137
4.115
4.094
1.416
1.395
1.332
1.310
0.000
1.99
1.05
2.98
1.88
2.97
ppm (t1)

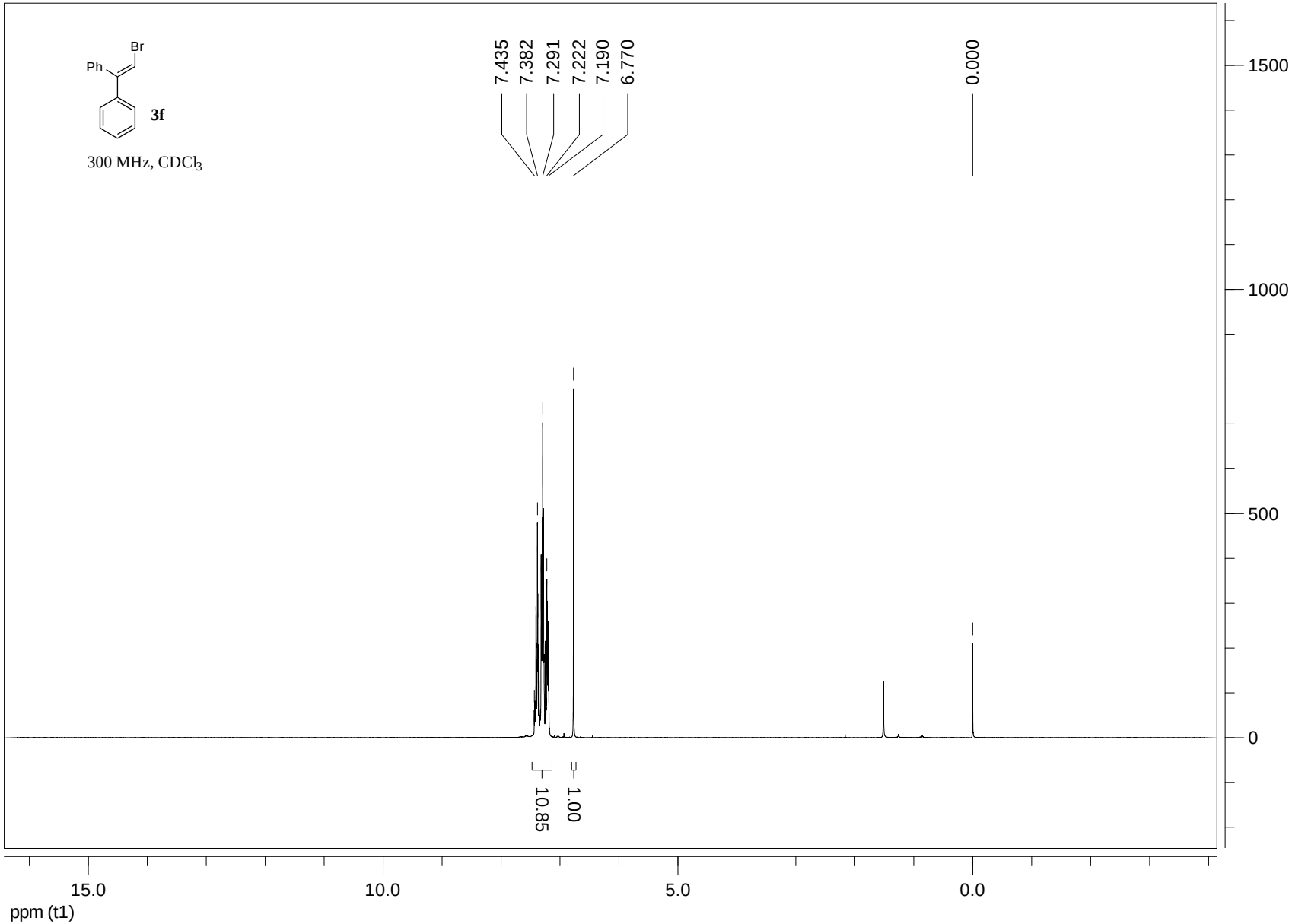

143.072
142.872
131.661
131.376
127.988
127.854
121.224
120.990
77.000
74.202
24.516
23.049
Me
O
Me
Br
Br
2s
75 MHz, CDCl3
6000
5000
4000
3000
2000
1000
0
-1000
200
150
100
50
0
ppm (t1)

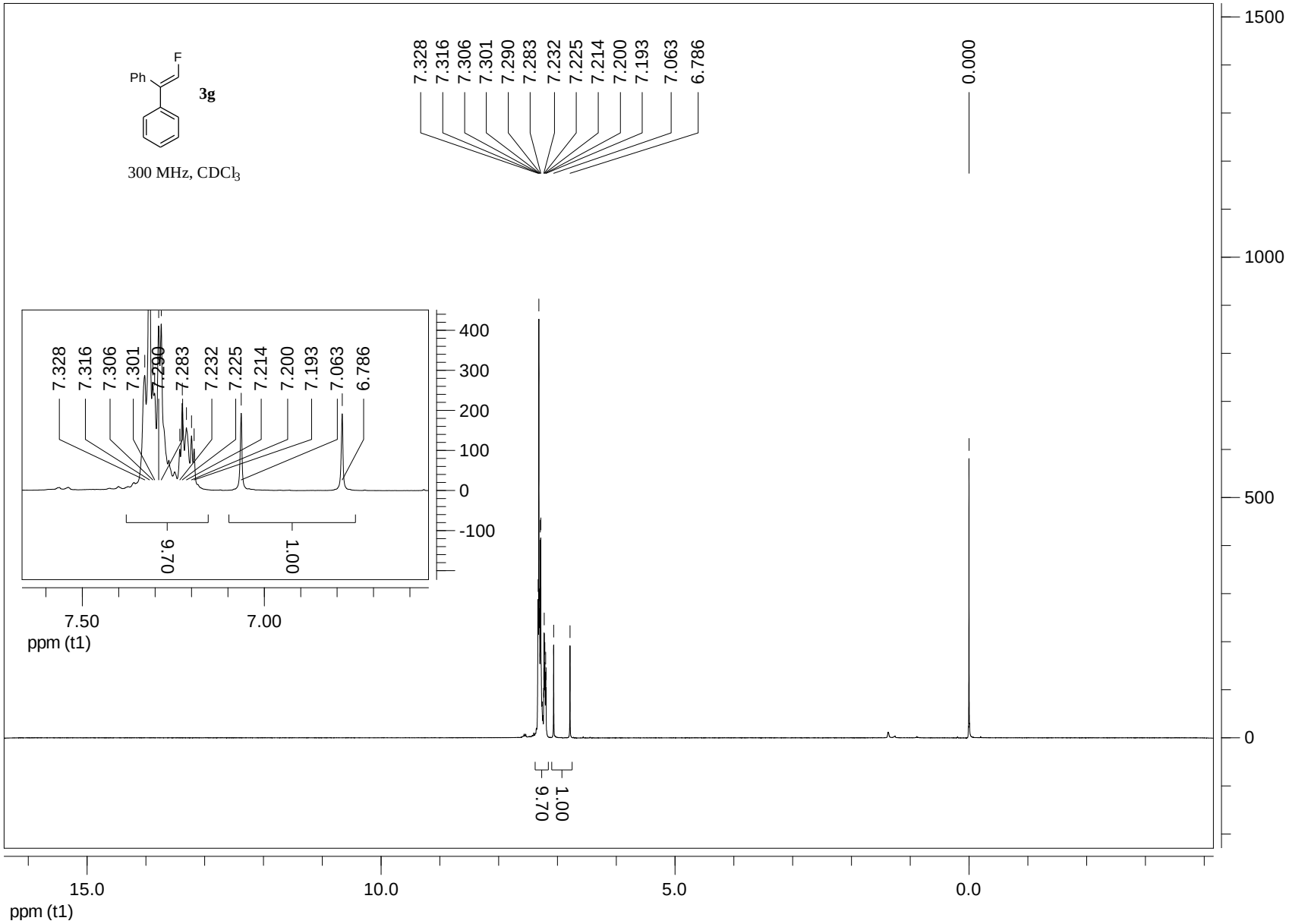

Ph
Ph
3b
300 MHz, CDCl3
7.533
7.505
7.383
7.359
7.333
7.280
7.254
7.232
7.112
0.000
3.88
3.85
0.96
1.04
2.00
ppm (t1)
ppm (t1)

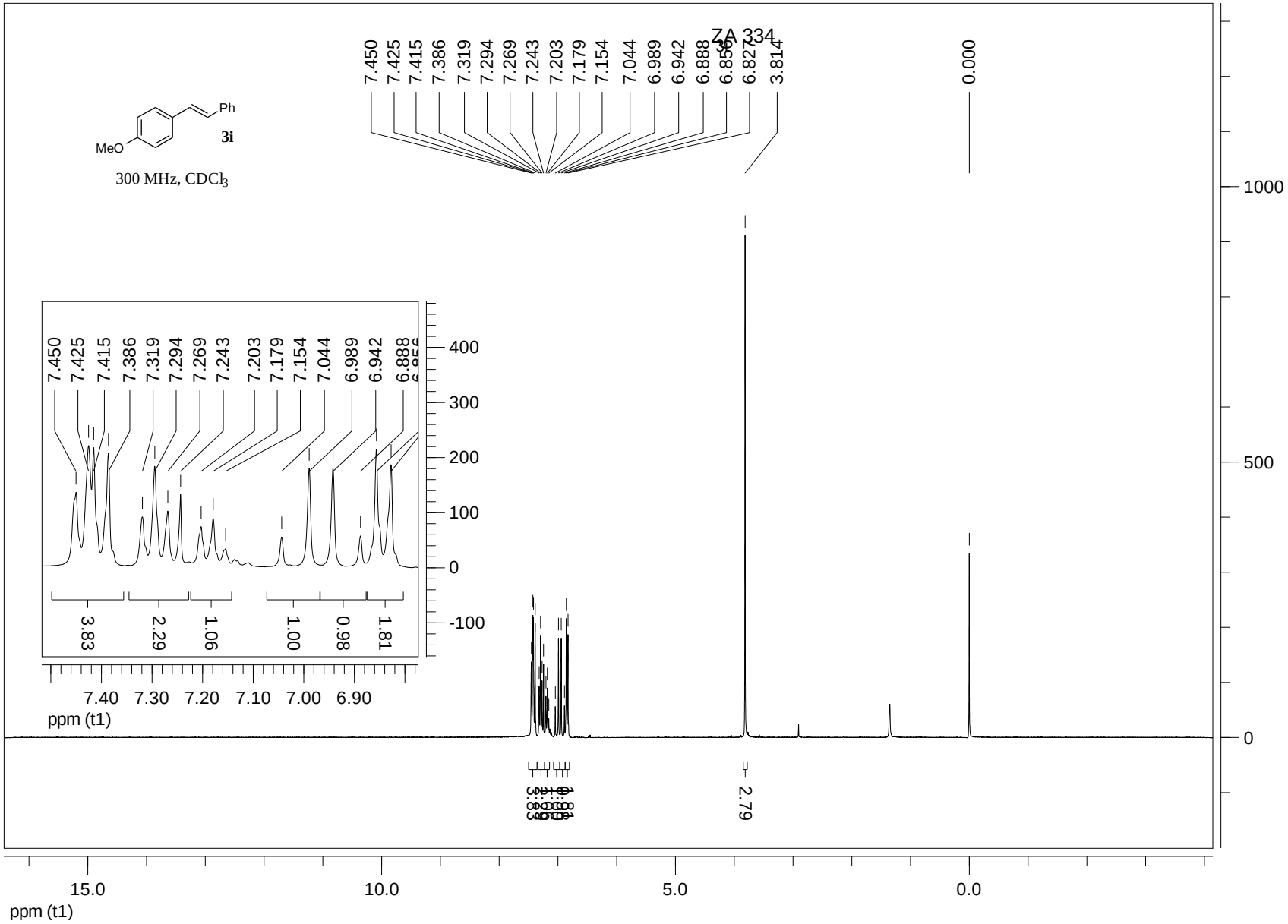

Me
Ph
3c
300 MHz, CDCl3
7.531
7.507
7.387
7.370
7.355
7.338
7.299
7.275
7.265
7.250
7.235
7.224
6.835
2.279
2.276
0.000
2.22
6.36
2.29
1.00
3.19
ppm (t1)

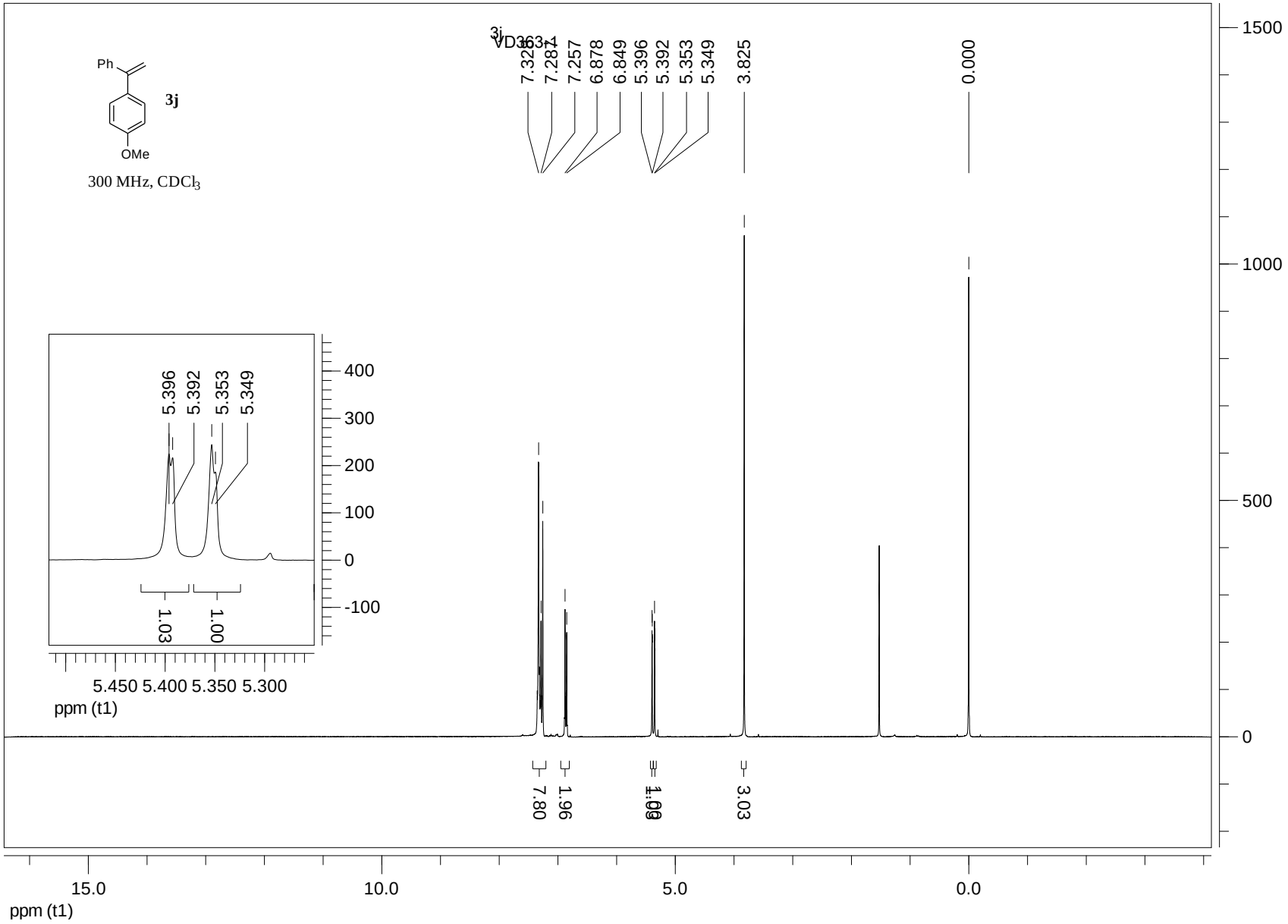

Ph
3d
300 MHz, CDCl3
7.327
5.456
0.000
1500
1000
500
0
9.52
2.00
15.0
10.0
5.0
0.0
ppm (t1)

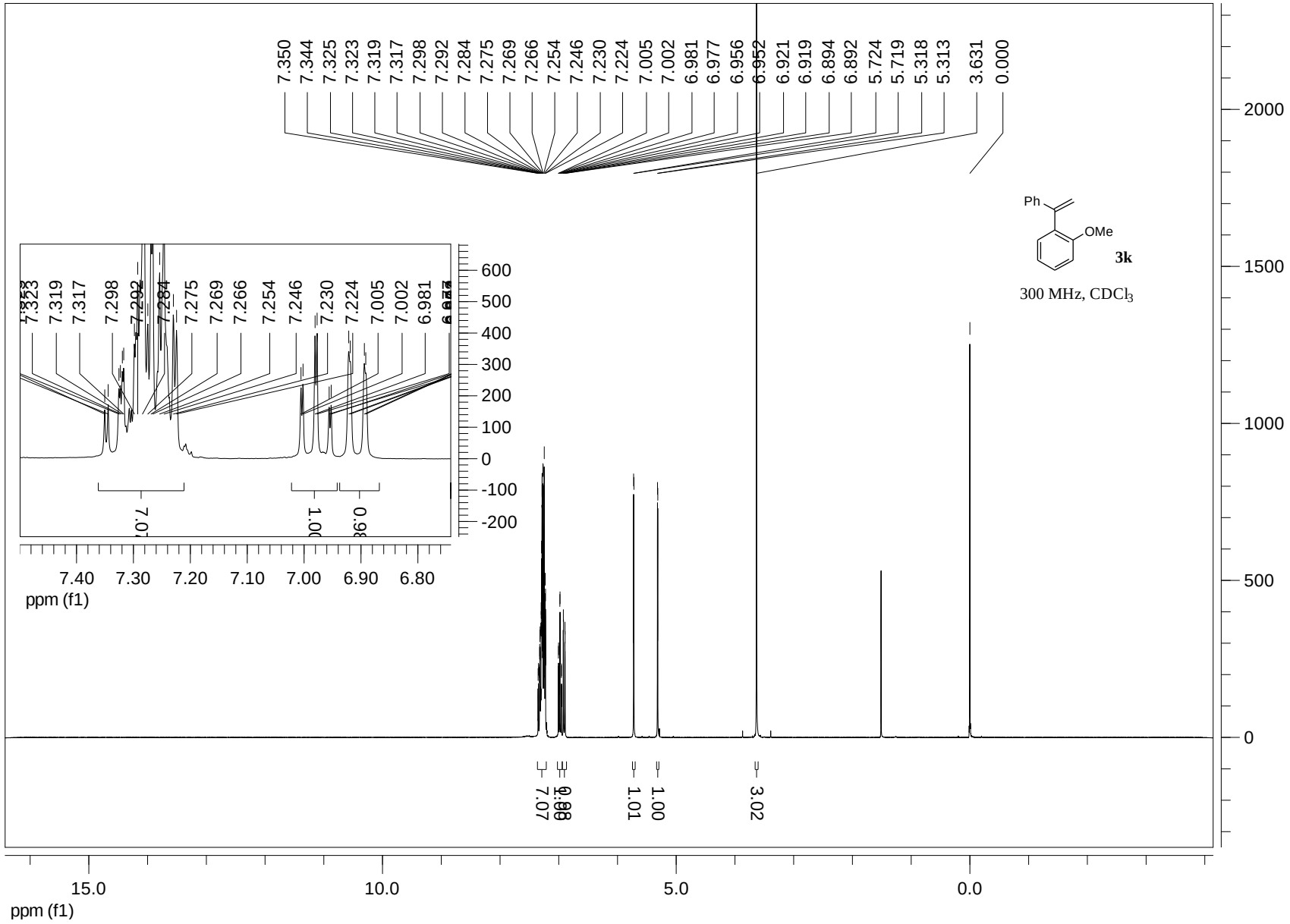

Me
Ph
3e
300 MHz, CDCl3
7.399
7.371
7.346
7.316
7.292
7.251
7.230
7.217
7.169
6.208
6.185
6.161
6.138
1.770
1.747
0.000
10.92
1.00
3.10
700
600
500
400
300
200
100
0
-100
15.0
10.0
5.0
0.0
ppm (t1)

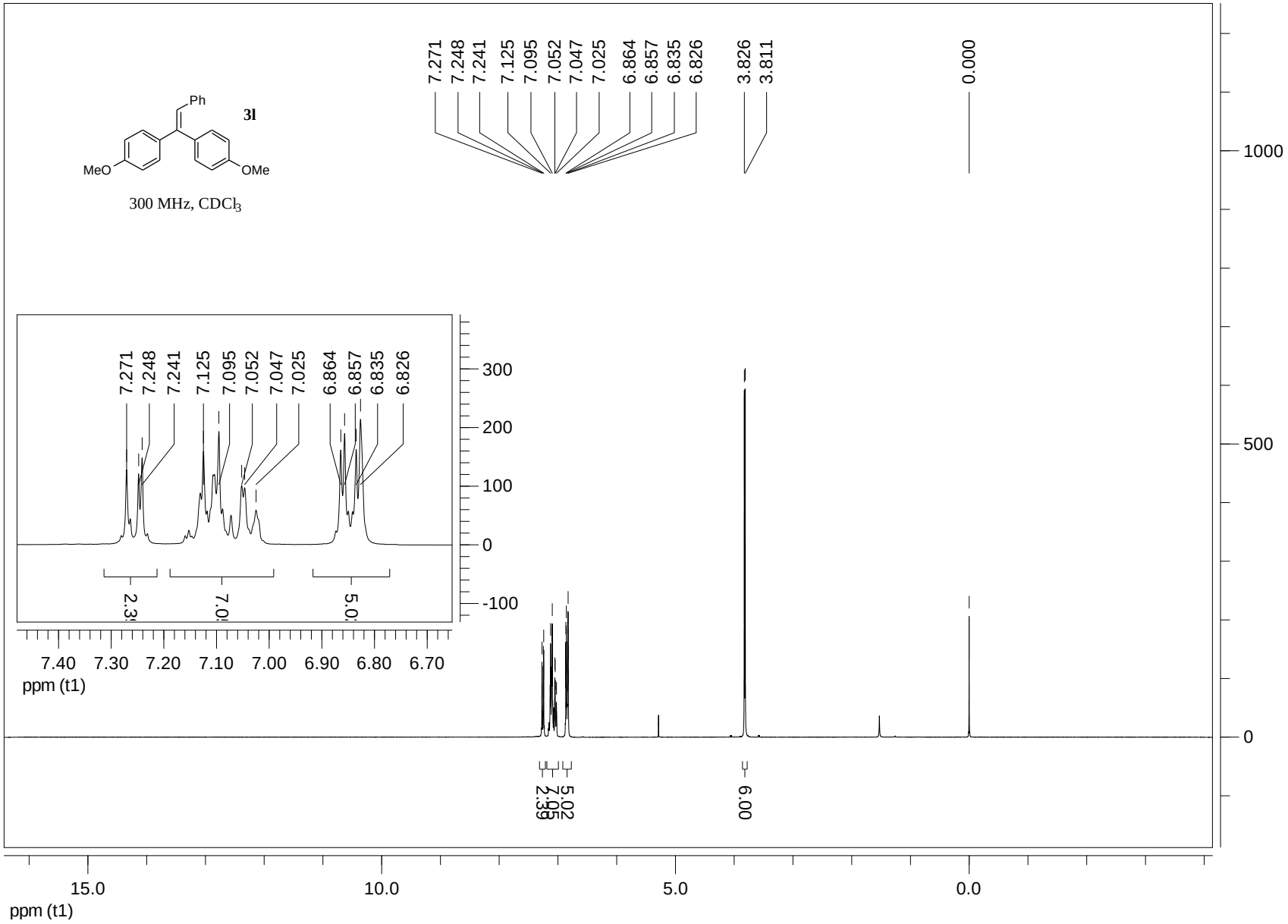

Br
Ph
3f
300 MHz, CDCl3
7.435
7.382
7.291
7.222
7.190
6.770
0.000
1500
1000
500
0
10.85
1.00
15.0
10.0
5.0
0.0
ppm (t1)

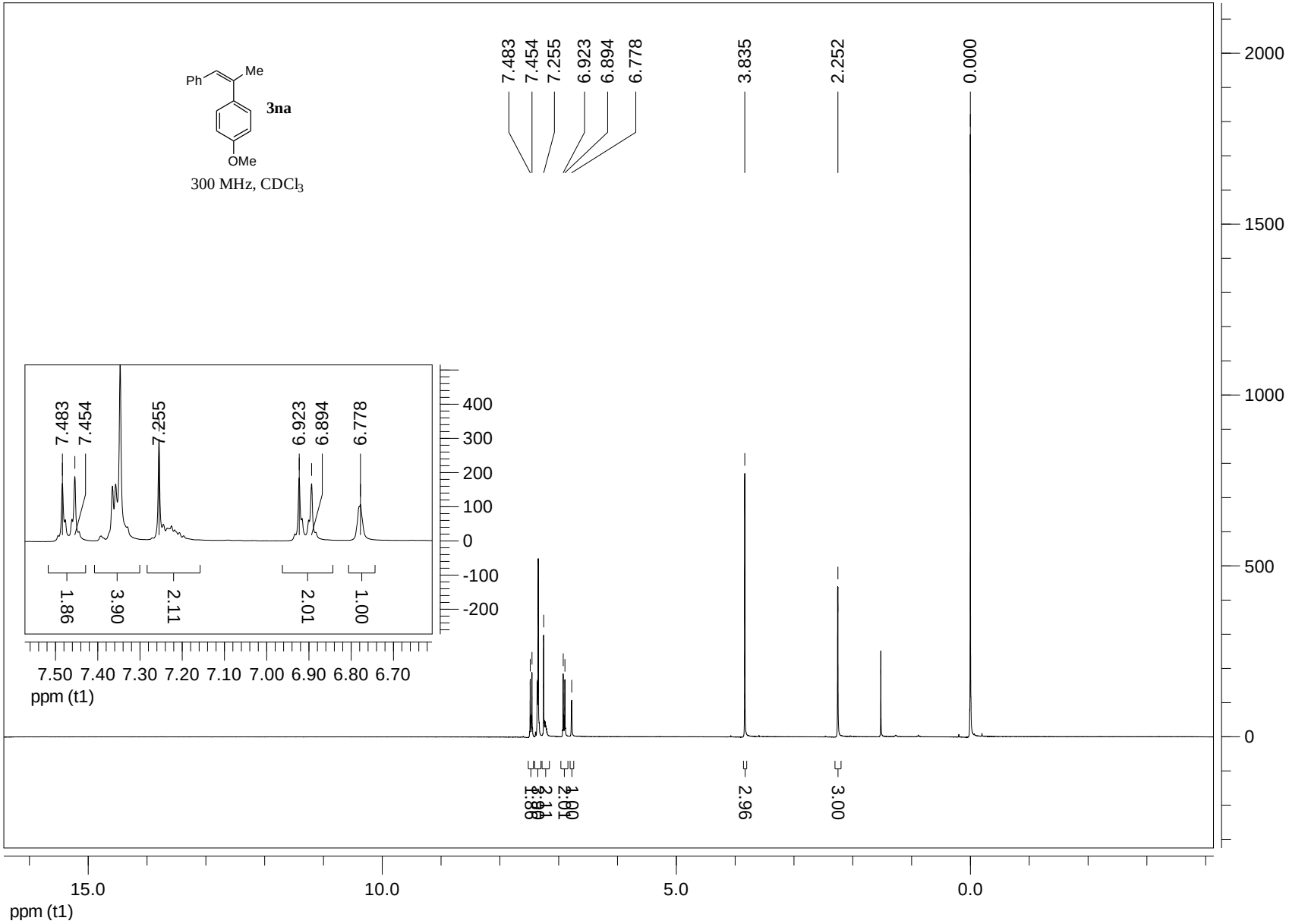

Ph
F
3g
300 MHz, CDCl3
7.328
7.316
7.306
7.301
7.290
7.283
7.232
7.225
7.214
7.200
7.193
7.063
6.786
0.000
9.70
1.00
7.50
7.00
ppm (t1)
15.0
10.0
5.0
0.0
ppm (t1)

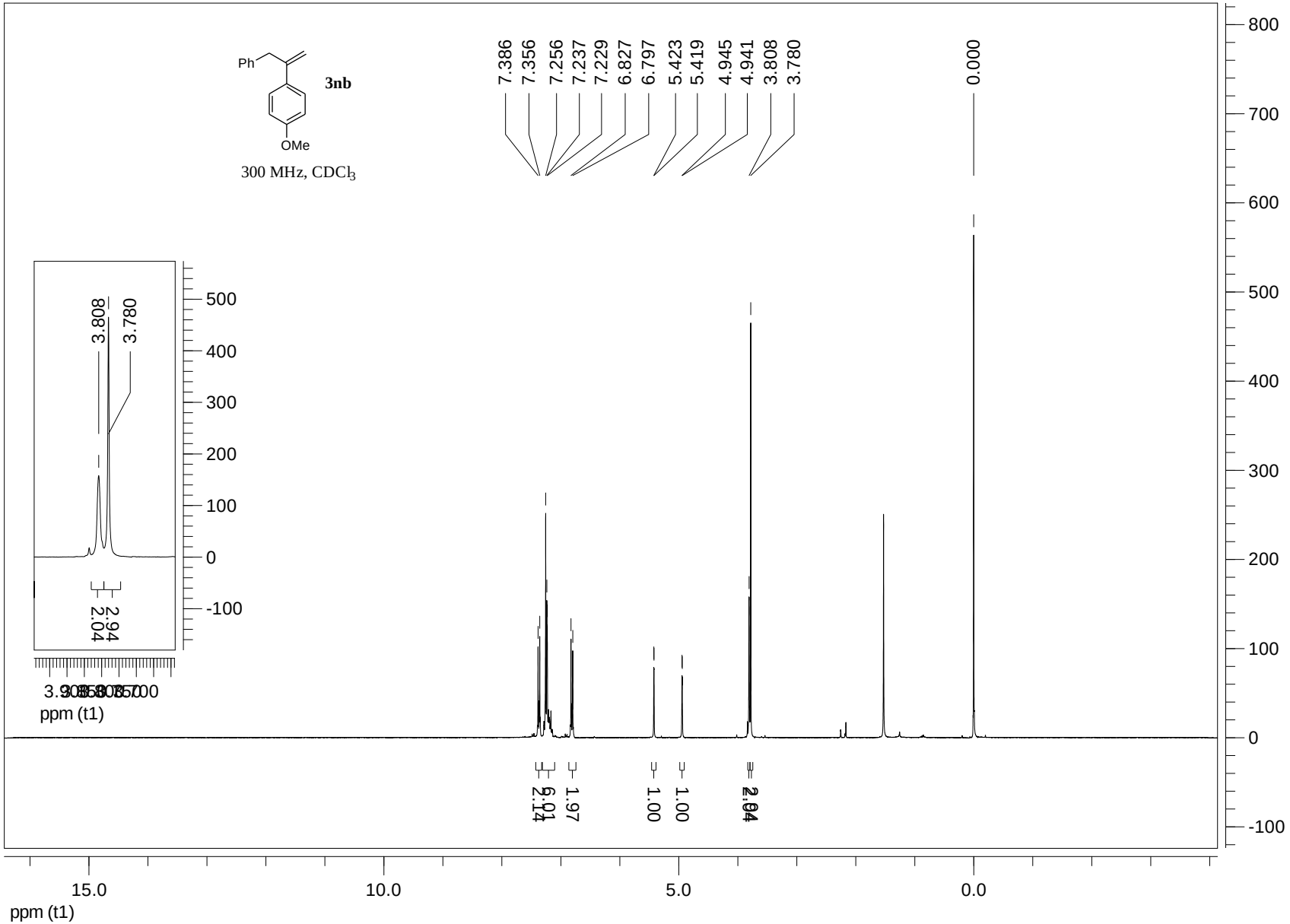

ZA 334
Ph
MeO
3i
300 MHz, CDCl3
7.450
7.425
7.415
7.386
7.319
7.294
7.269
7.243
7.203
7.179
7.154
7.044
6.989
6.942
6.888
6.856
6.827
3.814
0.000
2.79
3.83
2.29
1.06
1.00
0.98
1.81
ppm (t1)
ppm (t1)

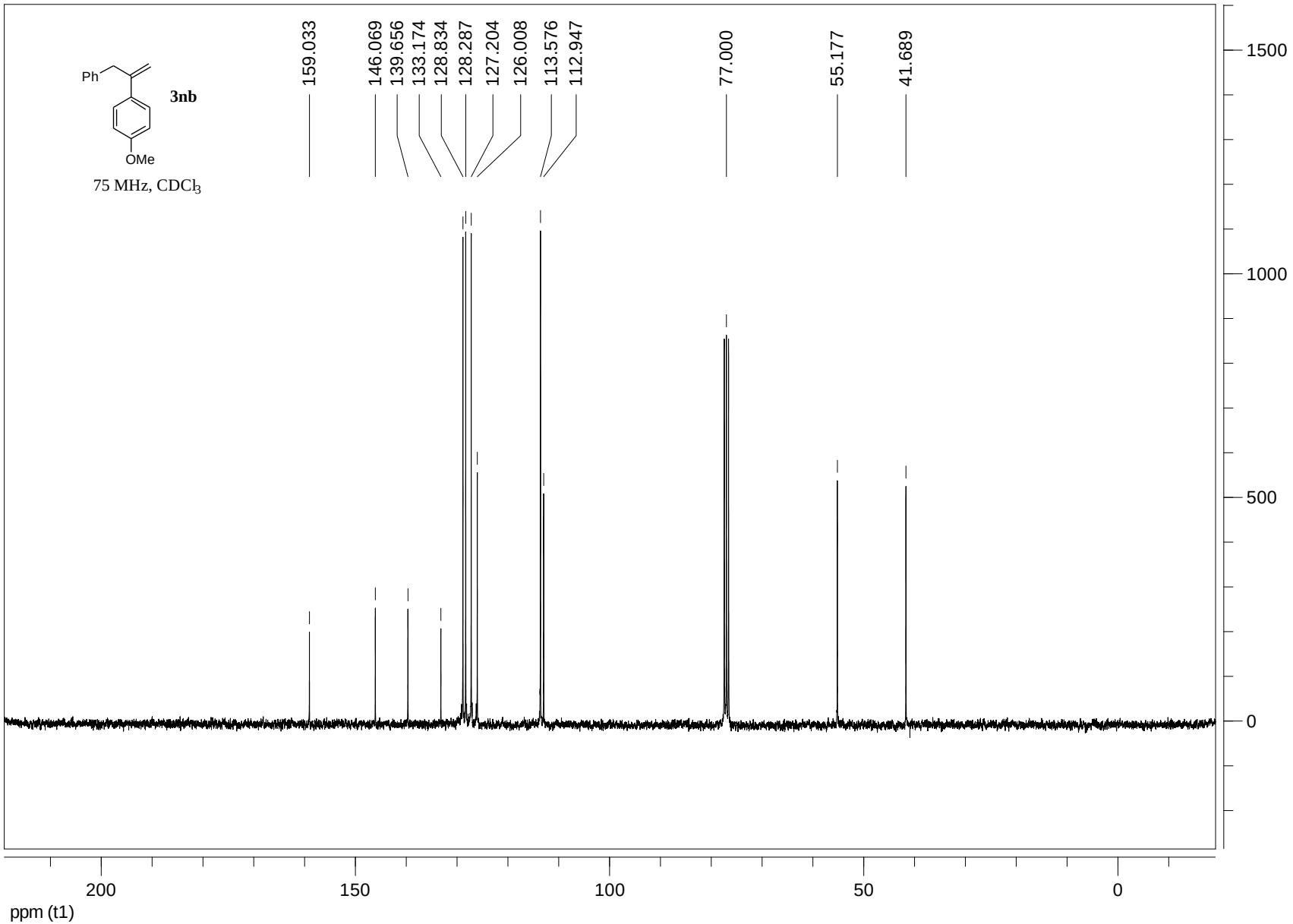

Ph
3j
OMe
300 MHz, CDCl3
3j
VD363-1
7.325
7.287
7.257
6.878
6.849
5.396
5.392
5.353
5.349
3.825
0.000
1.03
1.00
7.80
1.96
3.03
ppm (t1)
ppm (t1)

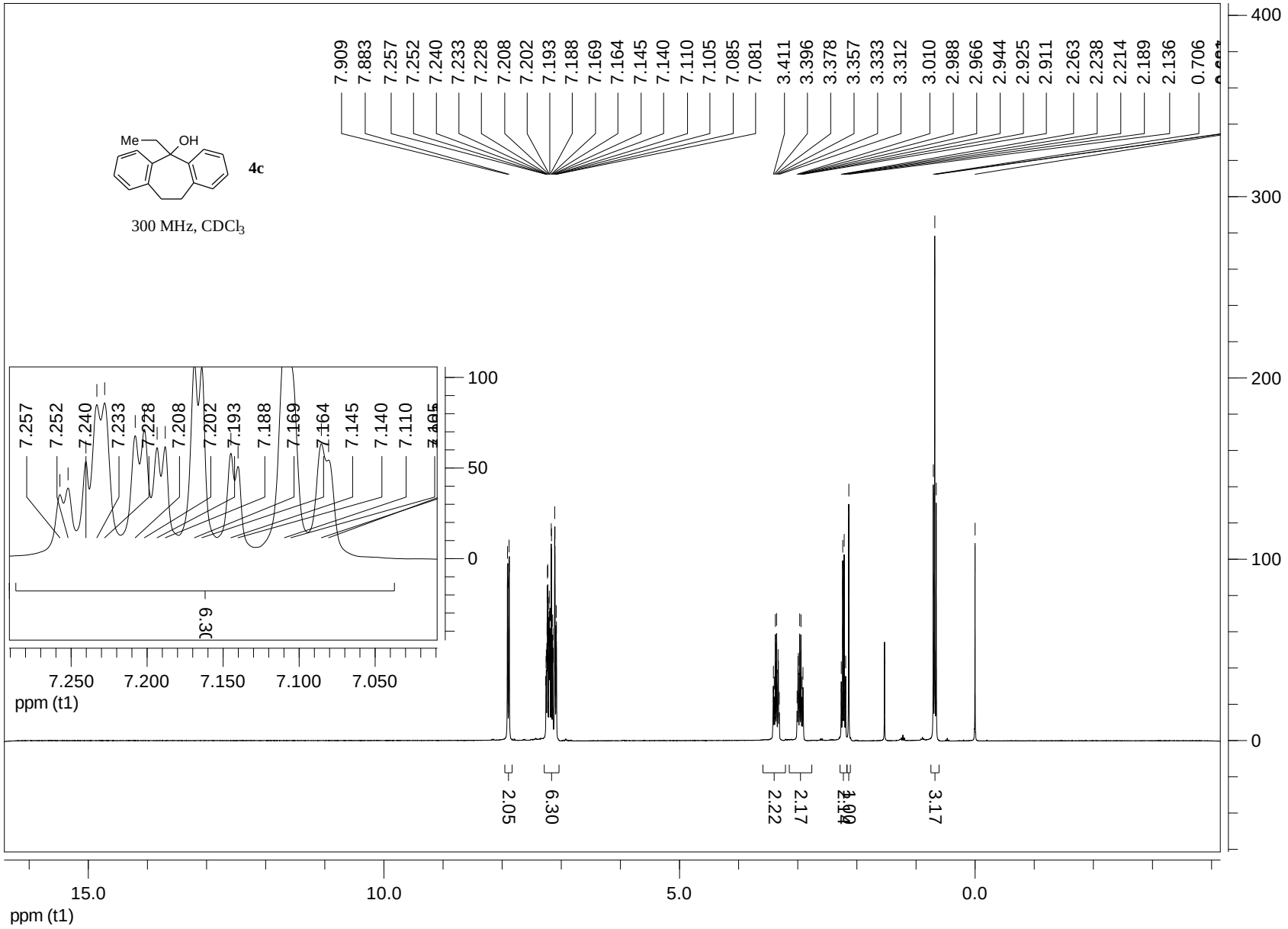

7.350
7.344
7.325
7.323
7.319
7.317
7.298
7.292
7.284
7.275
7.269
7.266
7.254
7.246
7.230
7.224
7.005
7.002
6.981
6.977
6.956
6.952
6.921
6.919
6.894
6.892
5.724
5.719
5.318
5.313
3.631
0.000
Ph
OMe
3k
300 MHz, CDCl3
ppm (f1)
7.07
1.00
0.98
1.01
1.00
3.02
15.0
10.0
5.0
0.0
ppm (f1)

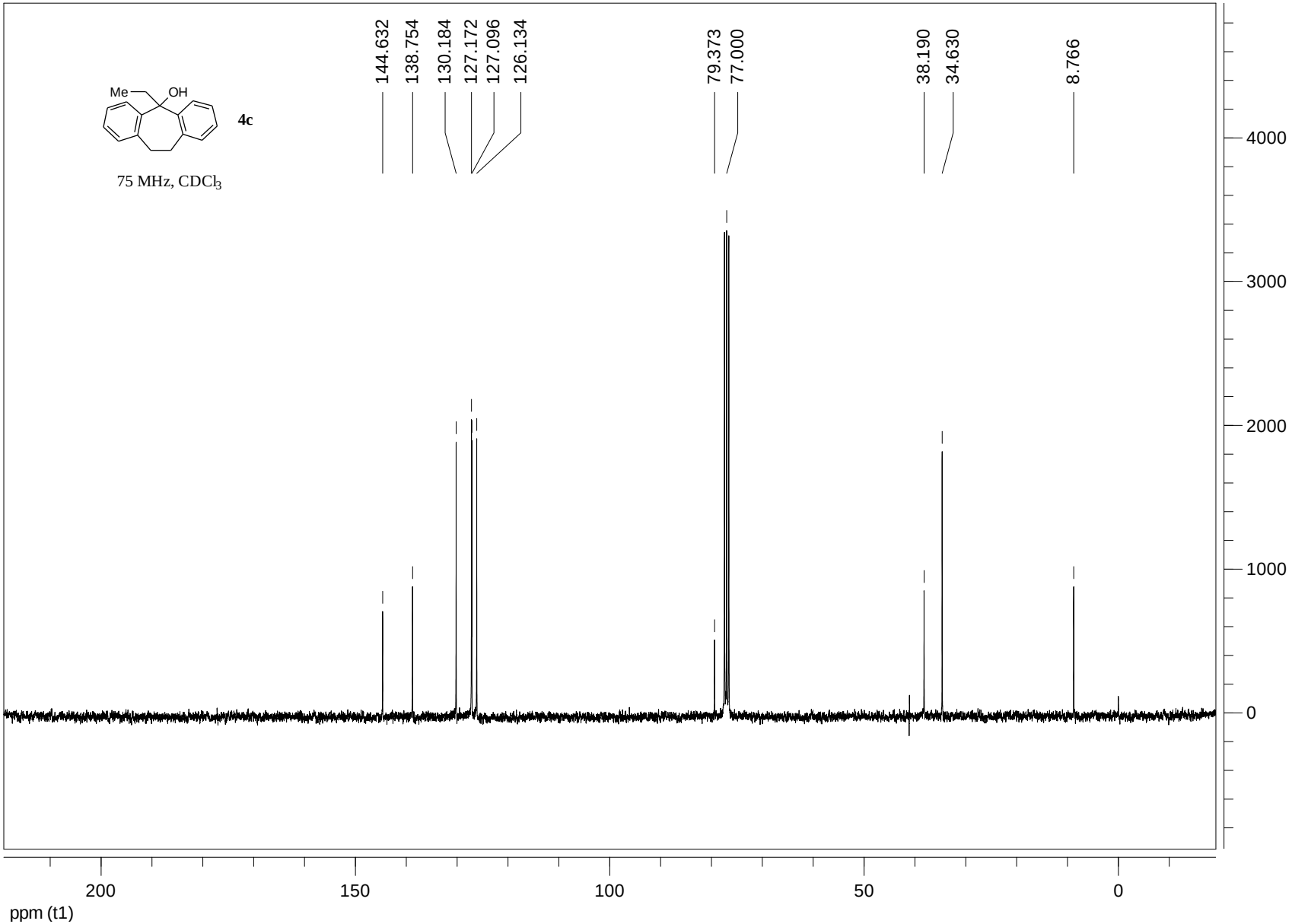

Ph
3l
MeO
OMe
300 MHz, CDCl3
7.271
7.248
7.241
7.125
7.095
7.052
7.047
7.025
6.864
6.857
6.835
6.826
3.826
3.811
0.000
2.31
7.01
5.01
2.03
2.05
5.02
6.00
ppm (t1)
ppm (t1)

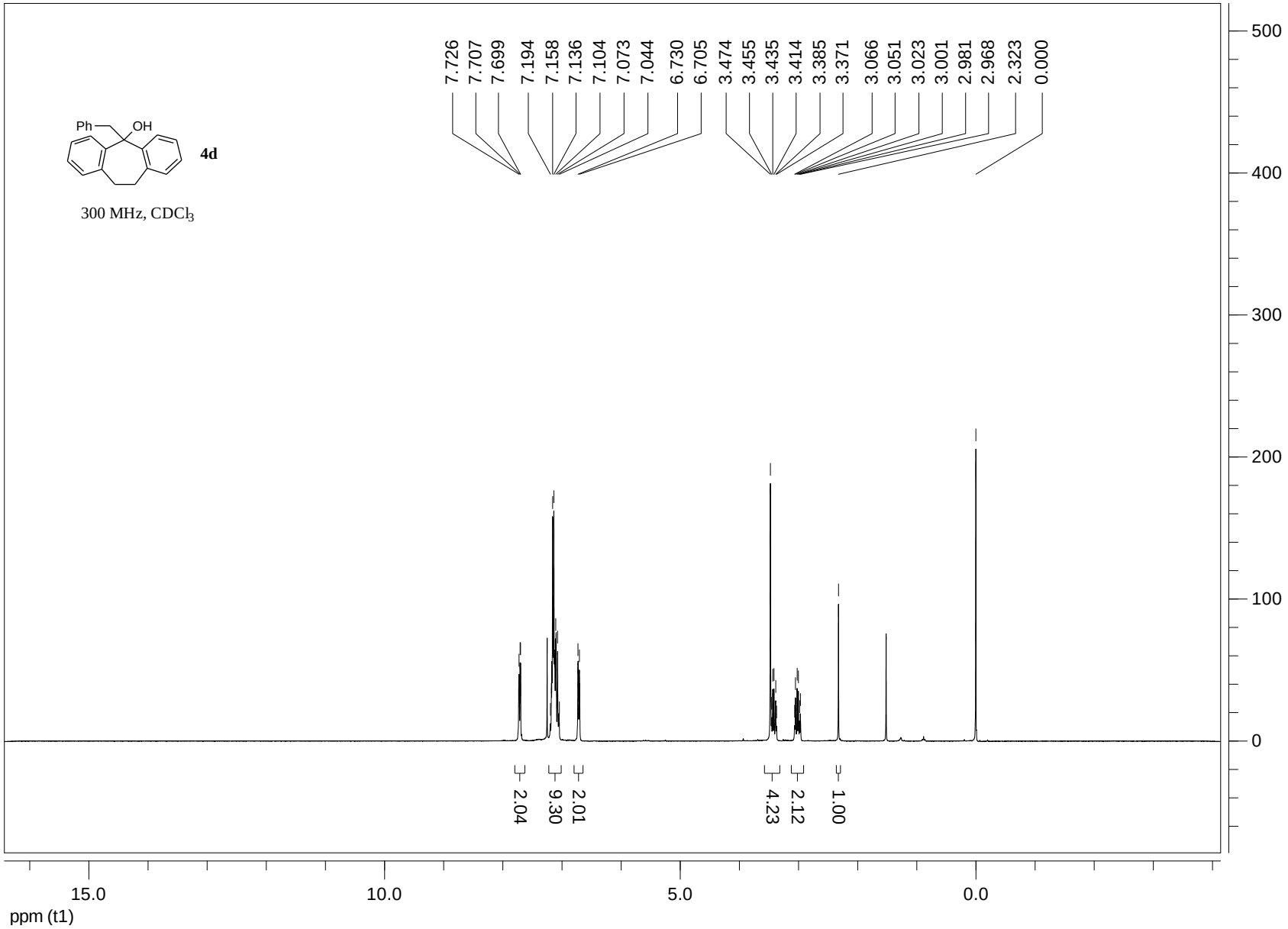

Ph
Me
OMe
3na
300 MHz, CDCl3
7.483
7.454
7.255
6.923
6.894
6.778
3.835
2.252
0.000
1.86
3.90
2.11
2.01
1.00
2.96
3.00
7.50 7.40 7.30 7.20 7.10 7.00 6.90 6.80 6.70
ppm (t1)
15.0
10.0
5.0
0.0
ppm (t1)

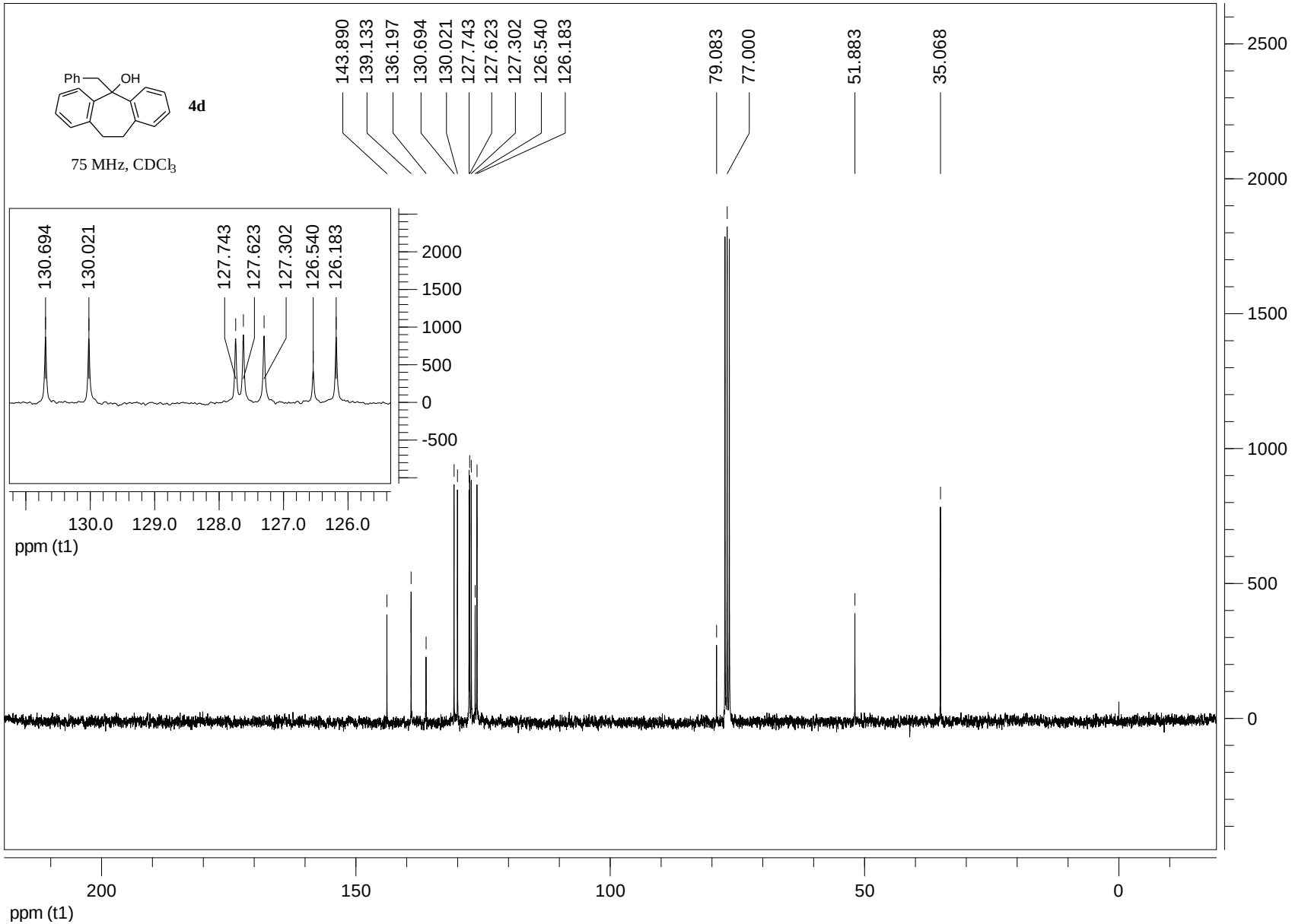

Ph
OMe
3nb
300 MHz, CDCl3
7.386
7.356
7.256
7.237
7.229
6.827
6.797
5.423
5.419
4.945
4.941
3.808
3.780
0.000
2.14
6.01
1.97
1.00
1.00
2.04
2.94
2.04
ppm (t1)
15.0
10.0
5.0
0.0
ppm (t1)

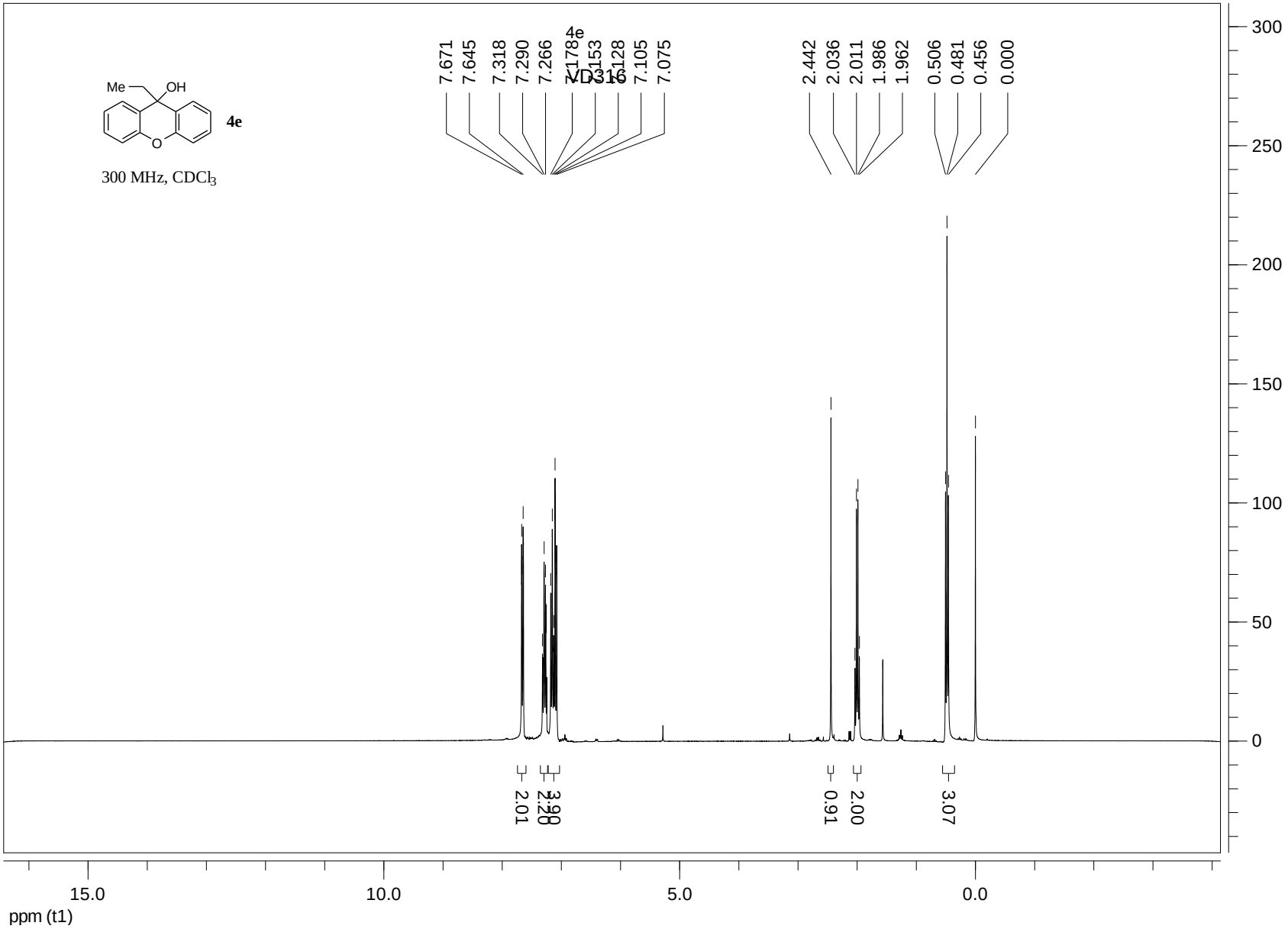

Ph
OMe
3nb
75 MHz, CDCl3
159.033
146.069
139.656
133.174
128.834
128.287
127.204
126.008
113.576
112.947
77.000
55.177
41.689
1500
1000
500
0
200
150
100
50
0
ppm (t1)


Me
OH
4c
300 MHz, CDCl3
7.909
7.883
7.257
7.252
7.240
7.233
7.228
7.208
7.202
7.193
7.188
7.169
7.164
7.145
7.140
7.110
7.105
7.085
7.081
3.411
3.396
3.378
3.357
3.333
3.312
3.010
2.988
2.966
2.944
2.925
2.911
2.263
2.238
2.214
2.189
2.136
0.706
6.30
7.250
7.200
7.150
7.100
7.050
ppm (t1)
2.05
6.30
2.22
2.17
3.17
15.0
10.0
5.0
0.0
ppm (t1)


Me
OH
4c
75 MHz, CDCl3
144.632
138.754
130.184
127.172
127.096
126.134
79.373
77.000
38.190
34.630
8.766
4000
3000
2000
1000
0
200
150
100
50
0
ppm (t1)


Ph
OH
4d
300 MHz, CDCl3
7.726
7.707
7.699
7.194
7.158
7.136
7.104
7.073
7.044
6.730
6.705
3.474
3.455
3.435
3.414
3.385
3.371
3.066
3.051
3.023
3.001
2.981
2.968
2.323
0.000
2.04
9.30
2.01
4.23
2.12
1.00
500
400
300
200
100
0
15.0
10.0
5.0
0.0
ppm (t1)


Ph
OH
4d
75 MHz, CDCl3
143.890
139.133
136.197
130.694
130.021
127.743
127.623
127.302
126.540
126.183
79.083
77.000
51.883
35.068
2500
2000
1500
1000
500
0
200
150
100
50
0
ppm (t1)
130.694
130.021
127.743
127.623
127.302
126.540
126.183
2000
1500
1000
500
0
-500
130.0
129.0
128.0
127.0
126.0
ppm (t1)


Me
OH
O
4e
300 MHz, CDCl3
4e
VD316
7.671
7.645
7.318
7.290
7.266
7.178
7.153
7.128
7.105
7.075
2.442
2.036
2.011
1.986
1.962
0.506
0.481
0.456
0.000
2.01
2.20
3.00
0.91
2.00
3.07
300
250
200
150
100
50
0
15.0
10.0
5.0
0.0
ppm (t1)

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