Supplementary information

Cobalt salt-catalyzed carbocyclization reactions of α-bromo-*N*-phenylacetamide derivatives

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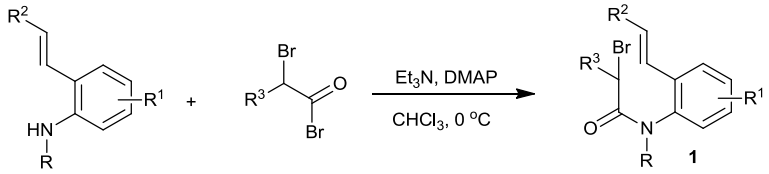
1) Experimental details and characterization data of the starting α-bromo-*N*-phenylacetamides.

A. Synthesis of α-bromo- *N*-(2-alkenylphenyl)acetamides 1:

The starting α-bromo-*N*-2-(alkenylphenyl)acetamides **1** were prepared by the reaction between 2-(alkenylphenyl)amines and α-bromoacetylbromide.



Typical procedure for the preparation of α-bromo-*N*-2-(alkenylphenyl)acetamides 1:

A solution of *N*-(2,4,6-trimethylbenzyl)-2-[(*E*)-(2-phenylethenyl)]phenylamine (1.04 g, 3.18 mmol), 2-bromoacetylbromide (1.33 g, 6.59 mmol), triethylamine (691 mg, 6.84 mmol), and DMAP (44 mg, 0.36 mmol) in chloroform (20 mL) was stirred in an ice-water bath for 1 h. The reaction mixture was then diluted with 100 mL of ethyl acetate washed with water (3 × 50 mL), dried over Na_2SO_4, and concentrated in vacuo. The residue was chromatographed over 20 g of silica gel (eluted with 1:20 ethyl acetate–hexanes) to give 1.30 g (91%) of **1a**.

2-Bromo-*N*-(2,4,6-trimethylbenzyl)-*N*-{2-[(*E*)-(2-phenylethenyl)]phenyl}acetamide 1a. Colorless crystals; mp 172–173 °C (from ethyl acetate–hexanes); yield: 91%; (Found: C, 69.58; H, 5.87; N, 3.10. Calc. for $C_{26}H_{26}BrNO$: C, 69.64; H, 5.84; N, 3.12%); ν_{max}(KBr)/cm^{-1} 2955, 1670, 1375, 1195 and 1180; δ_H(400 MHz; $CDCl_3$; Me_4Si) 1.98 (s, 6H, 2 × CH_3), 2.13 (s, 3H, CH_3), 3.55 (d, *J* = 11.0 Hz, 1H, COCH), 3.63 (d, *J* = 11.0 Hz, 1H, COCH), 4.74 (d, *J* = 14.1 Hz, 1H, NCH), 5.34(d, *J* = 14.1 Hz, 1H, NCH), 6.65 (s, 2H, 2 × ArH), 6.69 (dd, *J* = 7.7, 1.2 Hz, 1H, ArH), 6.90 (d, *J* = 16.2 Hz, 1H, CH), 7.02 (d, *J* = 16.2 Hz, 1H, CH), 7.11 (td, *J* = 7.7, 1.2 Hz, 1H, ArH), 7.27–7.41 (m, 4H, ArH), 7.41–7.47 (m , 2H, ArH) and 7.68 (dd, *J* = 7.7, 1.0 Hz, 1H, ArH); δ_C(100.6 MHz; $CDCl_3$; Me_4Si) 19.6 (2 × q), 20.8 (q), 27.4 (t), 45.4 (t), 121.8 (d), 126.0 (d), 126.8 (2 × d), 128.25 (d), 128.33 (d), 128.7 (2 × d), 128.8 (s), 129.0 (2 × d), 129.2 (d), 130.3 (d), 132.1 (d), 136.1 (s), 136.6 (s), 137.38 (s), 137.47 (s), 138.4 (2 × s) and 166.3 (s).

***N*-Benzyl-2-bromo-*N*-{2-[(*E*)-(2-phenylethenyl)]phenyl}acetamide 1b.** Colorless needles; mp 97–98 °C (from ethyl acetate–hexanes); yield: 95%; (Found: C, 67.82; H, 5.03; N, 3.43. Calc. for $C_{23}H_{20}BrNO$: C, 67.99; H, 4.96; N, 3.45%); ν_{max}(KBr)/cm^{-1} 2940, 1660, 1390, 1280 and 1205; δ_H(400 MHz; $CDCl_3$; Me_4Si) 3.59 (d, *J* = 11.4 Hz, 1H, COCH), 3.65 (d, *J* = 11.4 Hz, 1H, COCH), 4.63 (d, *J* = 13.9 Hz, 1H, NCH), 5.16 (d, *J* = 13.9 Hz, 1H, NCH), 6.80 (d, *J* = 16.3 Hz, 1H, CH), 6.96 (dd, *J* = 7.7, 0.8 Hz, 1H, ArH), 7.06 (d, *J* = 16.3 Hz, 1H, CH), 7.19–7.42 (m, 12H, ArH) and 7.74 (dd, *J* = 7.7, 0.8 Hz, 1H, ArH); δ_C(100.6 MHz; $CDCl_3$; Me_4Si) 27.5 (t), 53.4 (t), 122.2 (d), 126.3 (d), 126.7 (2 × d), 127.7 (d), 128.2 (d), 128.3 (2 × d), 128.46 (d), 128.55 (2 × d), 129.1 (d), 129.38 (2 × d), 129.41 (d), 132.0 (d), 135.3 (s), 136.0 (s), 136.3 (s), 138.4 (s) and 166.5 (s).

2-Bromo-*N*-ethyl-*N*-{2-[(*E*)-(2-phenylethenyl)]phenyl}acetamide 1c. Yellow oils; yield: 91%; ν_{max}(neat)/cm^{-1} 2975, 1660, 1400, 1310 and 1215; δ_H(400 MHz; $CDCl_3$; Me_4Si) 1.16 (t, *J* = 7.2 Hz, 3H, CH_3), 3.44 (dq, *J* = 13.9, 7.2 Hz, 1H, NCH), 3.58 (d, *J* = 11.1 Hz, 1H, COCH), 3.65 (d, *J* = 11.1 Hz, 1H, COCH), 4.11 (dq, *J* = 13.9, 7.2 Hz, 1H, NCH), 7.08 (d, *J* = 16.3 Hz, 1H, CH), 7.16 (d, *J* = 16.3 Hz, 1H, CH), 7.23 (dd, *J* = 7.7, 1.2 Hz, 1H, ArH), 7.27–7.33 (m, 1H, ArH), 7.33–7.40 (m, 3H, ArH), 7.44 (td, *J* = 7.7, 1.2 Hz, 1H, ArH), 7.47–7.52 (m, 2H, ArH) and 7.81 (dd, *J* = 7.7, 1.2 Hz, 1H, ArH); δ_C(100.6 MHz; $CDCl_3$; Me_4Si) 12.4 (q), 27.5 (t), 44.7 (t), 122.3 (d), 126.5 (d), 126.8 (2 × d), 128.4 (d), 128.6 (d), 128.8 (2 × d), 129.1 (d), 129.4 (d), 132.2 (d), 135.3 (s), 136.5 (s), 138.7 (s) and 166.4 (s); *m/z* (EI) 343.0565 (M^+ $C_{18}H_{18}BrNO$ requires 343.0572).

2-Bromo-*N*-{2-[(*E*)-(2-phenylethenyl)]phenyl}acetamide 1d. Colorless crystals; mp 155–156 °C (from ethyl acetate–hexanes); yield: 99%; (Found: C, 60.46; H, 4.55; N, 4.40; Calc. for $C_{16}H_{14}BrNO$: C, 60.78; H, 4.46; N, 4.43%); ν_{max}(KBr)/cm^{-1} 3255, 3030, 1650, 1530, 1480 and 1315; δ_H(400 MHz; $CDCl_3$; Me_4Si) 4.08 (s, 2H, $COCH_2$), 7.03 (d, *J* = 16.2 Hz, 1H, CH), 7.18 (d, *J* = 16.2 Hz, 1H, CH), 7.22 (t, *J* = 7.8 Hz, 1H, ArH), 7.27–7.34 (m, 2H, ArH), 7.34–7.42 (m, 2H, ArH), 7.49–7.54 (m, 2H, ArH), 7.56 (d, *J* = 7.8 Hz, 1H, ArH), 7.87 (d, *J* = 7.8 Hz, 1H, ArH) and 8.32 (s , 1H, NH); δ_C(100.6 MHz; $CDCl_3$; Me_4Si) 29.8 (t), 122.6 (d), 123.4 (d), 126.1 (d), 126.7 (2 × d), 127.1 (d), 128.3 (d), 128.4 (d), 128.8 (2 × d), 130.4 (s), 133.3 (d), 133.8 (s), 136.8 (s) and 163.5 (s).

2-Bromo-*N*-(2,4,6-trimethylbenzyl)-*N*-{4-methyl-2-[(*E*)-(2-phenylethenyl)]phenyl}acetamide 1e. Colorless crystals; mp 221–222 °C (from ethyl acetate–hexanes); yield: 99%; (Found: C, 69.76; H, 6.05; N, 2.97; Calc. for $C_{27}H_{28}BrNO$: C, 70.13; H, 6.10; N, 3.03%); ν_{max}(KBr)/cm^{-1} 2915, 1675, 1490, 1370 and 1185; δ_H(400 MHz; $CDCl_3$; Me_4Si) 1.99 (s, 6H, 2 × CH_3), 2.12 (s, 3H, CH_3), 2.36 (s, 3H, CH_3), 3.56 (d, *J* = 11.1 Hz, 1H, COCH), 3.62 (d, *J* = 11.1 Hz, 1H, COCH), 4.72 (d, *J* = 14.1 Hz, 1H, NCH), 5.31 (d, *J* = 14.1 Hz, 1H, NCH), 6.56 (d, *J* = 8.0 Hz, 1H, ArH), 6.65 (s, 2H, 2 × ArH), 6.85 (d, *J* = 16.2 Hz, 1H, CH), 6.90 (dd, *J* = 8.0, 1.4 Hz, 1H, ArH), 6.99 (d, *J* = 16.2 Hz, 1H, CH), 7.24–7.32 (m,

1H, ArH), 7.33–7.40 (m, 2H, ArH), 7.40–7.45 (m, 2H, ArH) and 7.47 (s, 1H, ArH); δ_C(100.6 MHz; $CDCl_3$; Me_4Si) 19.7 (2 × q), 20.8 (q), 21.3 (q), 27.5 (t), 45.4 (t), 122.0 (d), 126.4 (d), 126.8 (2 × d), 128.2 (d), 128.6 (2 × d), 128.91 (s), 128.97 (2 × d), 129.11 (d), 129.9 (d), 131.7 (d), 135.0 (s), 135.6 (s), 136.7 (s), 137.3 (s), 138.3 (2 × s), 139.1 (s) and 166.4 (s).

2-Bromo-*N*-(2,4,6-trimethylbenzyl)-*N*-{4,5-dimethyl-2-[(*E*)-(2-phenylethenyl)]phenyl}acetamide 1f. Colorless crystals; mp 221–222 °C (from ethyl acetate–hexanes); yield: 94%; (Found: C, 70.23; H, 6.36; N, 2.91; Calc. for $C_{28}H_{30}BrNO$: C, 70.58; H, 6.35; N, 2.94%); ν_{max}(KBr)/cm^{-1} 2950, 2920, 1670, 1370 and 1190; δ_H(400 MHz; $CDCl_3$; Me_4Si) 1.98 (s, 6H, 2 × CH_3), 2.08 (s, 3H, CH_3), 2.10 (s, 3H, CH_3), 2.27 (s, 3H, CH_3), 3.58 (d, *J* = 11.2 Hz, 1H, COCH), 3.63 (d, *J* = 11.2 Hz, 1H, COCH), 4.81 (d, *J* = 14.1 Hz, 1H, NCH), 5.21 (d, *J* = 14.1 Hz, 1H, NCH), 6.44 (s, 1H, ArH), 6.64 (s, 2H, 2 × ArH), 6.77 (d, *J* = 16.2 Hz, 1H, CH), 6.92 (d, *J* = 16.2 Hz, 1H, CH), 7.24–7.31 (m, 1H, ArH) and 7.32–7.42 (m, 5H, ArH); δ_C(100.6 MHz; $CDCl_3$; Me_4Si) 19.2 (q), 19.64 (q), 19.73 (2 × q), 20.8 (q), 27.7 (t), 45.5 (t), 122.0 (d), 126.67 (2 × d), 126.76 (d), 128.0 (d), 128.6 (2 × d), 128.9 (2 × d), 129.0 (s), 130.6 (d), 130.8 (d), 133.2 (s), 135.2 (s), 136.9 (s), 137.24 (s), 137.27 (s), 137.7(s), 138.4 (2 × s) and 166.4 (s).

2-Bromo-*N*-{4-fluoro-[(*E*)-(2-phenylethenyl)]phenyl}-*N*-(2,4,6-trimethylbenzyl)acetamide 1g. Colorless crystals; mp 190–191 °C (from ethyl acetate–hexanes); yield: 98%; (Found: C, 66.89; H, 5.45; N, 2.96; Calc. for $C_{26}H_{25}BrFNO$: C, 66.96; H, 5.40; N, 3.00%); ν_{max}(KBr)/cm^{-1} 2955, 1675, 1490, 1370 and 1180; δ_H(400 MHz; $CDCl_3$; Me_4Si) 2.00 (s, 6H, 2 × CH_3), 2.13 (s, 3H, CH_3), 3.53 (d, *J* = 10.9 Hz, 1H, COCH), 3.62 (d, *J* = 10.9 Hz, 1H, COCH), 4.66 (d, *J* = 14.3 Hz, 1H, NCH), 5.36 (d, *J* = 14.3 Hz, 1H, NCH), 6.64 (dd, *J* = 8.7, 5.7 Hz, 1H, ArH), 6.67 (s, 2H, 2 × ArH), 6.75–6.84 (m, 1H, ArH), 6.84 (d, *J* = 16.1 Hz, 1H, CH), 7.01 (d, *J* = 16.1 Hz, 1H, CH) and 7.29–7.48 (m, 6H, ArH); δ_C(100.6 MHz; $CDCl_3$; Me_4Si) 19.7 (2 × q), 20.8 (q), 27.0 (t), 45.4 (t), 112.2 (dd, J_{CF} = 23.1 Hz), 115.2 (dd, J_{CF} = 23.1 Hz), 120.9 (d), 127.0 (2 × d), 128.6 (s), 128.8 (3 × d), 129.1 (2 × d), 132.2 (dd, J_{CF} = 9.1 Hz), 133.4 (d+s), 136.1 (s), 137.6 (s), 138.29 (2 × s), 138.34 (s), 162.6 (sd, J_{CF} = 248.5 Hz) and 166.5 (s).

2-Bromo-*N*-{4-chloro-[(*E*)-(2-phenylethenyl)]phenyl}-*N*-(2,4,6-trimethylbenzyl)acetamide 1h. Colorless crystals; mp 224–225 °C (from ethyl acetate–hexanes); yield: 93%; (Found: C, 64.35; H, 5.23; N, 2.90; Calc. for $C_{26}H_{25}BrClNO$: C, 64.68; H, 5.22; N, 2.90%); ν_{max}(KBr)/cm^{-1} 2915, 1675, 1480, 1365 and 1195; δ_H(400 MHz; $CDCl_3$; Me_4Si) 2.00 (s, 6H, 2 × CH_3), 2.14 (s, 3H, CH_3), 3.51 (d, *J* = 10.9 Hz, 1H, COCH), 3.61 (d, *J* = 10.9 Hz, 1H, COCH), 4.67 (d, *J* = 14.2 Hz, 1H, NCH), 5.36 (d, *J* = 14.2 Hz, 1H, NCH), 6.60 (d, *J* = 8.4 Hz, 1H, ArH), 6.67 (s, 2H, 2 × ArH), 6.83 (d, *J* = 16.0 Hz, 1H, CH), 7.03 (d, *J* = 16.0 Hz, 1H, CH), 7.06 (dd, *J* = 8.4, 2.3 Hz, 1H, ArH), 7.30–7.36 (m, 1H, ArH), 7.36–7.42 (m, 2H, ArH), 7.42–7.47 (m, 2H, ArH) and 7.66 (s, *J* = 2.3 Hz, 1H, ArH); δ_C(100.6 MHz; $CDCl_3$; Me_4Si) 19.7 (2 × q), 20.8 (q), 26.9 (t), 45.3 (t), 120.6 (d), 125.8 (d), 127.0 (2 × d), 128.1 (d), 128.5 (s), 128.8 (3 × d), 129.2 (2 × d), 131.7 (d), 133.5 (d), 135.3 (s), 135.8 (s), 136.1 (s), 137.6 (s), 137.9 (s), 138.3 (2 × s) and 166.3 (s).

2-Bromo-*N*-{4-bromo-[(*E*)-(2-phenylethenyl)]phenyl}-*N*-(2,4,6-trimethylbenzyl)acetamide 1i. Colorless crystals; mp 224–225 °C (from ethyl acetate–hexanes); yield: 98%; (Found: C, 59.13; H, 4.82; N, 2.65; Calc. for $C_{26}H_{25}Br_2NO$: C, 59.22; H, 4.78; N, 2.66%); ν_{max}(KBr)/cm^{-1} 2955, 1675, 1475, 1365, 1190 and 1180; δ_H(400 MHz; $CDCl_3$; Me_4Si) 2.00 (s, 6H, 2 × CH_3), 2.14 (s, 3H, CH_3), 3.51 (d, *J* = 10.9 Hz, 1H, COCH), 3.61 (d, *J* = 10.9 Hz, 1H, COCH), 4.67 (d, *J* = 14.2 Hz, 1H, NCH), 5.35 (d, *J* = 14.2 Hz, 1H, NCH), 6.54 (d, *J* = 8.4 Hz, 1H, ArH), 6.67 (s, 2H, 2 × ArH), 6.82 (d, *J* = 16.2 Hz, 1H, CH), 7.02 (d, *J* = 16.2 Hz, 1H, CH), 7.21 (dd, *J* = 8.4, 2.2 Hz, 1H, ArH), 7.30–7.47 (m, 5H, ArH) and 7.81 (s, *J* = 2.2 Hz, 1H, ArH); δ_C(100.6 MHz; $CDCl_3$; Me_4Si) 19.7 (2 × q), 20.8 (q), 26.9 (t), 45.3 (t), 120.4 (d), 123.4 (s), 127.0 (2 × d), 128.5 (s), 128.78 (3 × d), 128.86 (d), 129.2 (2 × d), 131.1 (d), 131.9 (d), 133.5 (d), 136.1 (s), 136.3 (s), 137.6 (s), 138.19 (s), 138.25 (2 × s) and 166.2 (s).

2-Bromo-*N*-{4-methoxycarbonyl-[(*E*)-(2-phenylethenyl)]phenyl}-*N*-(2,4,6-trimethylbenzyl)acetamide 1j. Colorless crystals; mp 148–149 °C (from ethyl acetate–hexanes); yield: 99%; (Found: C, 66.33; H, 5.61; N, 2.76; Calc. for $C_{28}H_{28}BrNO_3$: C, 66.41; H, 5.57; N, 2.77%); ν_{max}(KBr)/cm^{-1} 2950, 1730, 1655, 1425, 1390 and 1300; δ_H(400 MHz; $CDCl_3$; Me_4Si) 1.98 (s, 6H, 2 × CH_3), 2.13 (s, 3H, CH_3), 3.49 (d, *J* = 10.9 Hz, 1H, COCH), 3.61 (d, *J* = 10.9 Hz, 1H, COCH), 3.95 (s, 3H, OCH_3), 4.70 (d, *J* = 14.2 Hz, 1H, NCH), 5.40 (d, *J* = 14.2 Hz, 1H, NCH), 6.65 (s, 2H, 2 × ArH), 6.75 (d, *J* = 8.2 Hz, 1H, ArH), 6.91 (d, *J* = 16.2 Hz, 1H, CH), 7.15 (d, *J* = 16.2 Hz, 1H, CH), 7.30–7.43 (m, 3H, ArH), 7.43–7.50 (m, 2H, ArH), 7.74 (dd, *J* = 8.2, 1.9 Hz, 1H, ArH) and 8.37 (d, *J* = 1.9 Hz, 1H, ArH); δ_C(100.6 MHz; $CDCl_3$; Me_4Si) 19.7 (2 × q), 20.8 (q), 26.9 (t), 45.3 (t), 52.5 (q), 120.8 (d), 127.0 (2 × d), 127.3 (d), 128.4 (s), 128.73 (d), 128.79 (3 × d), 129.2 (2 × d), 130.7 (d), 130.9 (s), 133.5 (d), 136.2 (s), 136.6 (s), 137.6 (s), 138.2 (2 × s), 141.1 (s), 165.9 (s) and 166.2 (s).

2-Bromo-*N*-(2,4,6-trimethylbenzyl)-*N*-{2-{(*E*)-[2-(4-methylphenyl)ethynyl]}phenyl}acetamide 1k. Colorless crystals; mp 171–172 °C (from ethyl acetate–hexanes); yield: 99% (98% conversion); (Found: C, 69.82; H, 6.07; N, 3.00; Calc. for $C_{27}H_{28}BrNO$: C, 70.13; H, 6.10; N, 3.03%); ν_{max}(KBr)/cm^{-1} 2915, 1660, 1425, 1395 and 1270; δ_H(400 MHz; $CDCl_3$; Me_4Si) 1.98 (s, 6H, 2 × CH_3), 2.14 (s, 3H, CH_3), 2.38 (s, 3H, CH_3), 3.55 (d, *J* = 11.1 Hz, 1H, COCH), 3.62 (d, *J* = 11.1 Hz, 1H, COCH), 4.68 (d, *J* = 14.1 Hz, 1H, NCH), 5.38 (d, *J* = 14.1 Hz, 1H, NCH), 6.65 (dd, *J* = 8.0, 1.1 Hz,

1H, ArH), 6.66 (s, 2H, 2 × ArH), 6.86 (d, *J* = 16.2 Hz, 1H, CH), 7.01 (d, *J* = 16.2 Hz, 1H, CH), 7.08 (td, *J* = 8.0, 1.1 Hz, 1H, ArH), 7.18 (d, *J* = 8.0 Hz, 2H, ArH), 7.33 (t, *J* = 8.0 Hz, 1H, ArH), 7.34 (d, *J* = 8.0 Hz, 2H, ArH) and 7.67 (d, *J* = 8.0 Hz, 1H, ArH); δ_C(100.6 MHz; $CDCl_3$; Me_4Si) 19.6 (2 × q), 20.8 (q), 21.3 (q), 27.5 (t), 45.3 (t), 120.8 (d), 125.9 (d), 126.8 (2 × d), 128.0 (d), 128.9 (s), 129.0 (2 × d), 129.2 (d), 129.4 (2 × d), 130.3 (d), 132.2 (d), 133.8 (s), 136.3 (s), 137.31 (s), 137.37 (s), 138.41 (2 × s), 138.44 (s) and 166.3 (s).

2-Bromo-*N*-{2-{(*E*)-[2-(4-methoxyphenyl)ethynyl]}phenyl}-*N*-(2,4,6-trimethylbenzyl)acetamide 1l. Colorless crystals; mp 213–214 °C (from ethyl acetate–hexanes); yield: 99%; (Found: C, 67.65; H, 5.88; N, 2.94; Calc. for $C_{27}H_{28}BrNO_2$: C, 67.78; H, 5.90; N, 2.93%); ν_{max}(KBr)/cm^{-1} 2925, 1670, 1610, 1515, 1375 and 1250; δ_H(400 MHz; $CDCl_3$; Me_4Si) 1.98 (s, 6H, 2 × CH_3), 2.14 (s, 3H, CH_3), 3.55 (d, *J* = 11.1 Hz, 1H, COCH), 3.62 (d, *J* = 11.1 Hz, 1H, COCH), 3.85 (s, 3H, OCH_3), 4.68 (d, *J* = 14.1 Hz, 1H, NCH), 5.38 (d, *J* = 14.1 Hz, 1H, NCH), 6.64 (dd, *J* = 7.7, 0.9 Hz, 1H, ArH), 6.66 (s, 2H, 2 × ArH), 6.77 (d, *J* = 16.2 Hz, 1H, CH), 6.91 (d, *J* = 8.7 Hz, 2H, 2 × ArH), 6.98 (d, *J* = 16.2 Hz, 1H, CH), 7.06 (td, *J* = 7.7, 0.9 Hz, 1H, ArH), 7.32 (t, *J* = 7.7 Hz, 1H, ArH), 7.38 (d, *J* = 8.7 Hz, 2H, 2 × ArH) and 7.65 (d, *J* = 7.7 Hz, 1H, ArH); δ_C(100.6 MHz; $CDCl_3$; Me_4Si) 19.6 (2 × q), 20.8 (q), 27.5 (t), 45.3 (t), 55.4 (q), 114.1 (2 × d), 119.5 (d), 125.7 (d), 127.8 (d), 128.2 (2 × d), 128.9 (s), 129.0 (2 × d), 129.2 (d), 129.4 (s), 130.3 (d), 131.7 (d), 136.4 (s), 137.1 (s), 137.3 (s), 138.4 (2 × s), 159.9 (s) and 166.3 (s).

2-Bromo-*N*-{2-{(*E*)-[2-(4-chlorophenyl)ethynyl]}phenyl}-*N*-(2,4,6-trimethylbenzyl)acetamide 1m. Colorless crystals; mp 175–176 °C (from ethyl acetate–hexanes); yield: 87%; (Found: C, 64.32; H, 5.18; N, 2.88; Calc. for $C_{26}H_{25}BrClNO$: C, 64.68; H, 5.22; N, 2.90%); ν_{max}(KBr)/cm^{-1} 2950, 1670, 1490, 1375 and 1180; δ_H(400 MHz; $CDCl_3$; Me_4Si) 1.97 (s, 6H, 2 × CH_3), 2.11 (s, 3H, CH_3), 3.55 (d, *J* = 11.0 Hz, 1H, COCH), 3.62 (d, *J* = 11.0 Hz, 1H, COCH), 4.82 (d, *J* = 14.1 Hz, 1H, NCH), 5.24 (d, *J* = 14.1 Hz, 1H, NCH), 6.64 (s, 2H, 2 × ArH), 6.74 (dd, *J* = 7.7, 1.0 Hz, 1H, ArH), 6.82 (d, *J* = 16.2 Hz, 1H, CH), 6.92 (d, *J* = 16.2 Hz, 1H, CH), 7.14 (td, *J* = 7.7, 1.0 Hz, 1H, ArH), 7.33 (s, 4H, ArH), 7.35 (t, *J* = 7.7 Hz, 1H, ArH) and 7.65 (d, *J* = 7.7 Hz, 1H, ArH); δ_C(100.6 MHz; $CDCl_3$; Me_4Si) 19.5 (2 × q), 20.7 (q), 27.2 (t), 45.4 (t), 122.4 (d), 125.9 (d), 127.9 (2 × d), 128.5 (d), 128.6 (s), 128.7 (2 × d), 128.9 (2 × d), 129.2 (d), 130.2 (d), 130.4 (d), 133.8 (s), 135.0 (s), 135.8 (s), 137.3 (s), 137.5 (s), 138.2 (2 × s) and 166.2 (s).

2-Bromo-*N*-{2-{(*E*)-[2-(4-cyanophenyl)ethynyl]}phenyl}-*N*-(2,4,6-trimethylbenzyl)acetamide 1n. White solids; mp 190–191 °C (from ethyl acetate–hexanes); yield: 99%; ν_{max}(neat)/cm^{-1} 2955, 2230, 1665, 1375, 1195 and 1180; δ_H(400 MHz; $CDCl_3$; Me_4Si) 1.96 (s, 6H, 2 × CH_3), 2.07 (s, 3H, CH_3), 3.56 (d, *J* = 11.0 Hz, 1H, COCH), 3.62 (d, *J* = 11.0 Hz, 1H, COCH), 4.98 (d, *J* = 14.1 Hz, 1H, NCH), 5.09 (d, *J* = 14.1 Hz, 1H, NCH), 6.59 (s, 2H, 2 × ArH), 6.85 (dd, *J* = 7.7, 1.2 Hz, 1H, ArH), 6.89 (d, *J* = 16.5 Hz, 1H, CH), 6.93 (d, *J* = 16.5 Hz, 1H, CH), 7.23 (td, *J* = 7.7, 1.2 Hz, 1H, ArH), 7.39 (td, *J* = 7.7, 1.1 Hz, 1H, ArH), 7.46 (d, *J* = 8.4 Hz, 2H, 2 × ArH), 7.64 (d, *J* = 8.4 Hz, 2H, 2 × ArH) and 7.67 (dd, *J* = 7.7, 1.1 Hz, 1H, ArH); δ_C(100.6 MHz; $CDCl_3$; Me_4Si) 19.6 (2 × q), 20.7 (q), 27.1 (t), 45.7 (t), 111.1 (s), 118.7 (s), 125.7 (d), 126.2 (d), 127.1 (2 × d), 128.5 (s), 129.0 (2 × d), 129.34 (d), 129.39 (2 × d), 130.3 (d), 132.3 (2 × d), 135.3 (s), 137.4 (s), 138.1 (s), 138.2 (2 × s), 141.0 (s) and 166.2 (s); *m/z* (EI) 472.1146 ($M^+C_{27}H_{25}BrN_2O$ requires 472.1151).

2-Bromo-*N*-(2,4,6-trimethylbenzyl)-*N*-{2-[(*E*)-(*n*-octen-1-yl)]phenyl}acetamide 1o. Colorless oils; yield: 90%; ν_{max}(neat)/cm^{-1} 2925, 1665, 1390, 1265 and 1200; δ_H(400 MHz; $CDCl_3$; Me_4Si) 0.90 (t, *J* = 6.5 Hz, 3H, CH_3), 1.20–1.50 (m, 10H, CH_2), 1.97 (s, 6H, 2 × CH_3), 2.21 (s, 3H, CH_3), 3.50 (d, *J* = 11.2 Hz, 1H, COCH), 3.58 (d, *J* = 11.2 Hz, 1H, COCH), 4.41(d, *J* = 14.1 Hz, 1H, NCH), 5.53 (d, *J* = 14.1 Hz, 1H, NCH), 6.23 (dt, *J* = 15.8, 6.2 Hz, 1H, CH), 6.30 (d, *J* = 15.8 Hz, 1H, CH), 6.47 (dd, *J* = 7.7, 1.3 Hz, 1H, ArH), 6.71 (s, 2H, 2 × ArH), 6.98 (td, *J* = 7.7, 1.3 Hz, 1H, ArH), 7.25 (td, *J* = 7.7, 1.1 Hz, 1H, ArH) and 7.50 (dd, *J* = 7.7, 1.1 Hz, 1H, ArH); δ_C(100.6 MHz; $CDCl_3$; Me_4Si) 14.1 (q), 19.6 (2 × q), 20.9 (q), 22.6 (t), 27.6 (t), 28.9 (t), 29.2 (t), 31.7 (t), 33.3 (t), 44.9 (t), 123.4 (d), 126.1 (d), 127.4 (d), 128.9 (2 × d), 129.0 (s + d), 130.1 (d), 135.9 (d), 136.4 (2 × s), 137.3 (s), 138.5 (2 × s) and 166.2 (s); *m/z* (EI) 455.1824 (M^+ $C_{26}H_{34}BrNO$ requires 455.1824).

2-Bromo-*N*-(2,4,6-trimethylbenzyl)-*N*-{2-{(*E*)-[2-(pyridin-2-yl)ethynyl]}phenyl}acetamide 1p. Yellow crystals; mp 124–125 °C (from ethyl acetate–hexanes); yield: 94% (84% conversion); (Found: C, 66.73; H, 5.63; N, 6.23; Calc. for $C_{25}H_{25}BrN_2O$: C, 66.82; H, 5.61; N, 6.23%); ν_{max}(KBr)/cm^{-1} 2920, 1670, 1460, 1375 and 1185; δ_H(400 MHz; $CDCl_3$; Me_4Si) 1.97 (s, 6H, 2 × CH_3), 2.10 (s, 3H, CH_3), 3.56 (d, *J* = 11.1 Hz, 1H, COCH), 3.65 (d, *J* = 11.1 Hz, 1H, COCH), 4.77 (d, *J* = 14.1 Hz, 1H, NCH), 5.33 (d, *J* = 14.1 Hz, 1H, NCH), 6.61 (s, 2H, 2 × ArH), 6.72 (d, *J* = 7.7 Hz, 1H, ArH), 7.07 (d, *J* = 16.1 Hz, 1H, CH), 7.15 (t, *J* = 7.7 Hz, 1H, ArH), 7.20 (dd, *J* = 6.7, 5.3 Hz, 1H, ArH), 7.32–7.43 (m, 3H, ArH), 7.64–7.76 (m, 2H, ArH) and 8.60 (d, *J* = 4.4 Hz, 1H, ArH); δ_C(100.6 MHz; $CDCl_3$; Me_4Si) 19.6 (2 × q), 20.8 (q), 27.4 (t), 45.5 (t), 121.7 (d), 122.5 (d), 126.2 (d), 126.5 (d), 128.7 (s), 128.92 (2 × d), 128.95 (d), 129.3 (d), 130.4 (d), 131.4 (d), 135.5 (s), 136.5 (d), 137.3 (s), 137.9 (s), 138.4 (2 × s), 149.4 (d), 154.9 (s) and 166.1 (s).

2-Bromo-*N*-(2,4,6-trimethylbenzyl)-*N*-{2-[(*E*)-(2-phenylethenyl)]phenyl}propioamide 1q. Colorless crystals; mp 152–153 °C (from ethyl acetate–hexanes); yield: 99%; (Found: C, 69.98; H, 6.04; N, 2.99; Calc. for $C_{27}H_{28}BrNO$: C, 70.13; H, 6.10; N, 3.03%); ν_{max}(KBr)/cm^{-1} 2920, 1655, 1450, 1390 and 1245; δ_H(400 MHz; $CDCl_3$; Me_4Si) (E form : Z form = 20 : 9) 1.70 (d, *J* = 6.7 Hz, 3H, $CH_{3\,E}$), 1.75 (d, *J* = 6.6 Hz, 3H, $CH_{3\,Z}$), 1.94 (s, 6H, 2 × $CH_{3\,Z}$), 2.00 (s, 6H, 2 ×

$CH_{3\,E}$), 2.02 (s, 3H, $CH_{3\,Z}$), 2.18 (s, 3H, $CH_{3\,E}$), 4.04 (q, *J* = 6.7 Hz, 1H, $COCH_E$), 4.30 (q, *J* = 6.6 Hz, 1H, $COCH_Z$), 4.47 (d, *J* = 14.2 Hz, 1H, NCH_E), 5.02 (s, 2H, $NCH_{2\,Z}$), 5.60 (d, *J* = 14.2 Hz, 1H, NCH_E), 6.53 (s, 2H, 2 × ArH_Z), 6.62 (dd, *J* = 7.8, 1.1 Hz, 1H, ArH_E), 6.67 (dd, *J* = 7.8, 1.2 Hz, 1H, ArH_Z), 6.70 (s, 2H, 2 × ArH_E), 6.85 (d, *J* = 16.3 Hz, 1H, CH_Z), 6.89 (d, *J* = 16.2 Hz, 1H, CH_E), 7.00 (d, *J* = 16.3 Hz, 1H, CH_Z), 7.06 (td, *J* = 7.8, 1.1 Hz, 1H, ArH_E), 7.08 (d, *J* = 16.2 Hz, 1H, CH_E), 7.14 (td, *J* = 7.8, 1.2 Hz, 1H, ArH_Z), 7.24–7.48 (m, 12H, ArH), 7.676 (dd, *J* = 7.8, 1.2 Hz, 1H, ArH_Z) and 7.685 (dd, *J* = 7.8, 1.1 Hz, 1H, ArH_E).

2-Bromo-*N*-(2,4,6-trimethylbenzyl)-*N*-{4-methyl-2-[(*E*)-(2-phenylethenyl)]phenyl}propioamide 1r. Colorless crystals; mp 156–157 °C (from ethyl acetate–hexanes); yield: 99%; (Found: C, 70.59; H, 6.40; N, 2.93; Calc. for $C_{28}H_{30}BrNO$: C, 70.58; H, 6.35; N, 2.94%); ν_{max}(KBr)/cm^{-1} 2920, 1660, 1395, 1245 and 1175; δ_H(400 MHz; $CDCl_3$; Me_4Si) (E form : Z form = 20 : 9) 1.69 (d, *J* = 6.6 Hz, 3H, $CH_{3\,E}$), 1.74 (d, *J* = 6.7 Hz, 3H, $CH_{3\,Z}$), 1.95 (s, 3H, $CH_{3\,E}$), 2.01 (s, 6H, 2 × $CH_{3\,E}$), 2.02 (s, 3H, 2 × $CH_{3\,Z}$), 2.18 (s, 3H, $CH_{3\,E}$), 2.36 (s, 9H, 3 × $CH_{3\,Z}$), 4.06 (q, *J* = 6.6 Hz, 1H, $COCH_E$), 4.32 (q, *J* = 6.6 Hz, 1H, $COCH_Z$), 4.45 (d, *J* = 14.1 Hz, 1H, NCH_E), 5.00 (s, 2H, NCH_Z), 5.57 (d, *J* = 14.1 Hz, 1H, NCH_E), 6.50 (d, *J* = 8.0 Hz, 1H, ArH_E), 6.54 (s, 2H, 2 × ArH_Z), 6.55 (d, *J* = 8.1 Hz, 1H, ArH_Z), 6.70 (s, 2H, 2 × ArH_E), 6.83 (d, *J* = 16.3 Hz, 1H, CH_Z), 6.79–6.89 (m, 1H, ArH), 6.85 (d, *J* = 16.2 Hz, 1H, CH_E), 6.91–6.96 (m, 1H, ArH), 6.96 (d, *J* = 16.3 Hz, 1H, CH_Z), 7.06 (d, *J* = 16.2 Hz, 1H, CH_E) and 7.22–7.50 (m, 12H, ArH).

2-Bromo-*N*-{4-fluoro-2-[(*E*)-(2-phenylethenyl)]phenyl}-*N*-(2,4,6-trimethylbenzyl)propioamide 1s. Colorless crystals; mp 132–133 °C (from ethyl acetate–hexanes); yield: 97%; (Found: C, 67.53; H, 5.69; N, 2.86; Calc. for $C_{27}H_{27}BrFNO$: C, 67.50; H, 5.66; N, 2.92%); ν_{max}(KBr)/cm^{-1} 2915, 1660, 1485, 1395, 1250 and 1180; δ_H(400 MHz; $CDCl_3$; Me_4Si) (E form : Z form = 5 : 2) 1.70 (d, *J* = 6.6 Hz, 3H, $CH_{3\,E}$), 1.76 (d, *J* = 6.6 Hz, 3H, $CH_{3\,Z}$), 1.96 (s, 6H, 2 × $CH_{3\,Z}$), 2.02 (s, 6H, 2 × $CH_{3\,E}$), 2.03 (s, 3H, $CH_{3\,Z}$), 2.18 (s, 3H, $CH_{3\,E}$), 4.01 (q, *J* = 6.6 Hz, 1H, $COCH_E$), 4.28 (q, *J* = 6.6 Hz, 1H, $COCH_Z$), 4.42 (d, *J* = 14.1 Hz, 1H, NCH_E), 4.94 (d, *J* = 14.1 Hz, 1H, NCH_Z), 5.05 (d, *J* = 14.1 Hz, 1H, NCH_Z), 5.60 (d, *J* = 14.1 Hz, 1H, NCH_E), 6.55–6.65 (m, 2H, ArH), 6.56 (s, 2H, 2 × ArH_Z), 6.70–6.78 (m, 1H, ArH), 6.71 (s, 2H, 2 × ArH_E), 6.79–6.89 (m, 1H, ArH), 6.79–6.89 (m, 1H, CH_Z), 6.83 (d, *J* = 16.2 Hz, 1H, CH_E), 6.95 (dd, *J* = 16.2, 1.4 Hz, 1H, CH_Z), 7.08 (d, *J* = 16.2 Hz, 1H, CH_E) and 7.26–7.48 (m, 12H, ArH).

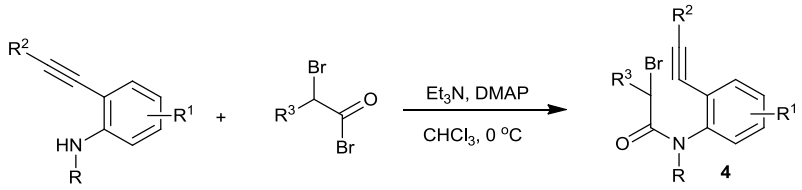
2-Bromo-*N*-(2,4,6-trimethylbenzyl)-2-phenyl-*N*-{2-[(*E*)-(2-phenylethenyl)]phenyl}acetamide 1t. Colorless crystals; mp 157–158 °C (from ethyl acetate–hexanes); yield: 99% (97% conversion); (Found: C, 73.24; H, 5.79; N, 2.69; Calc. for $C_{32}H_{30}BrNO$: C, 73.28; H, 5.77; N, 2.67%); ν_{max}(KBr)/cm^{-1} 2925, 1725, 1665, 1375 and 1170; δ_H(400 MHz; $CDCl_3$; Me_4Si) (E form : Z form = 10 : 7) 1.87 (s, 6H, 2 × $CH_{3\,Z}$), 1.95 (s, 6H, 2 × $CH_{3\,E}$), 2.04 (s, 3H, $CH_{3\,Z}$), 2.09 (s, 3H, $CH_{3\,E}$), 4.63 (d, *J* = 14.1 Hz, 1H, NCH_E), 4.87 (d, *J* = 14.2 Hz, 1H, NCH_Z), 5.16 (d, *J* = 14.2 Hz, 1H, NCH_Z), 5.20 (s, 1H, $COCH_E$), 5.27 (s, 1H, $COCH_Z$), 5.37 (d, *J* = 14.1 Hz, 1H, NCH_E), 6.29 (dd, *J* = 7.8, 1.2 Hz, 1H, ArH_Z), 6.40 (d, *J* = 16.2 Hz, 1H, CH_E), 6.53 (s, 2H, 2 × ArH_Z), 6.60 (s, 2H, 2 × ArH_E), 6.77 (dd, *J* = 7.8, 1.2 Hz, 1H, ArH_Z), 6.83 (d, *J* = 16.2 Hz, 1H, CH_E), 6.94–7.09 (m, 5H, ArH), 7.10–7.20 (m, 5H, ArH), 7.20–7.29 (m, 6H, ArH), 7.29–7.43 (m, 10H, ArH), 7.45–7.50 (m, 2H, ArH), 7.64 (d, *J* = 7.3 Hz, 1H, ArH_E) and 7.72 (d, *J* = 7.3 Hz, 1H, ArH_Z).

2-Bromo-*N*-(2,4,6-trimethylbenzyl)-*N*-{4-methyl-2-[(*E*)-(2-phenylethenyl)]phenyl}-2-phenylacetamide 1u. Colorless solids; mp 60–61 °C (from ethyl acetate–hexanes); yield: 99%; ν_{max}(neat)/cm^{-1} 2920, 1740, 1665, 1380 and 1180; δ_H(400 MHz; $CDCl_3$; Me_4Si) (E form : Z form = 4 : 3) 1.87 (s, 6H, 2 × $CH_{3\,Z}$), 1.95 (s, 6H, 2 × $CH_{3\,E}$), 2.05 (s, 3H, $CH_{3\,Z}$), 2.10 (s, 3H, $CH_{3\,E}$), 2.40 (s, 3H, $CH_{3\,Z}$), 2.41 (s, 3H, $CH_{3\,E}$), 4.61 (d, *J* = 14.1 Hz, 1H, NCH_E), 4.85 (d, *J* = 14.0 Hz, 1H, NCH_Z), 5.13 (d, *J* = 14.0 Hz, 1H, NCH_Z), 5.21 (s, 1H, $COCH_E$), 5.29 (s, 1H, $COCH_Z$), 5.34 (d, *J* = 14.1 Hz, 1H, NCH_E), 6.20 (d, *J* = 7.8 Hz, 1H, CH_Z), 6.37 (d, *J* = 16.1 Hz, 1H, CH_E), 6.54 (s, 2H, 2 × ArH_Z), 6.60 (s, 2H, 2 × ArH_E), 6.65 (d, *J* = 7.8 Hz, 1H, CH_Z), 6.82 (d, *J* = 16.1 Hz, 1H, CH_E), 6.80–6.85 (m, 1H, ArH), 6.93–7.01 (m, 2H, ArH), 7.01–7.09 (m, 2H, ArH), 7.11–7.19 (m, 4H, ArH), 7.19–7.33 (m, 5H, ArH) and 7.33–7.55 (m, 12H, ArH); *m/z* (EI) 537.1663 (M^+ $C_{33}H_{32}BrNO$ requires 537.1667).

2-Bromo-*N*-{4-fluoro-2-[(*E*)-(2-phenylethenyl)]phenyl}-*N*-(2,4,6-trimethylbenzyl)-2-phenylacetamide 1v. Colorless crystals; mp 162–163 °C (from ethyl acetate–hexanes); yield: 99%; (Found: C, 70.82; H, 5.38; N, 2.60; Calc. for $C_{32}H_{29}BrFNO$: C, 70.85; H, 5.39; N, 2.58%); ν_{max}(KBr)/cm^{-1} 2925, 1665, 1485, 1370 and 1170; δ_H(400 MHz; $CDCl_3$; Me_4Si) (E form : Z form = 10 : 7) 1.88 (s, 6H, 2 × $CH_{3\,Z}$), 1.97 (s, 6H, 2 × $CH_{3\,E}$), 2.05 (s, 3H, $CH_{3\,Z}$), 2.11 (s, 3H, $CH_{3\,E}$), 4.57 (d, *J* = 14.1 Hz, 1H, NCH_E), 4.80 (d, *J* = 14.2 Hz, 1H, NCH_Z), 5.16 (s, 1H, $COCH_E$), 5.19 (d, *J* = 14.2 Hz, 1H, NCH_Z), 5.25 (s, 1H, $COCH_Z$), 5.38 (d, *J* = 14.1 Hz, 1H, NCH_E), 6.21 (dd, *J* = 8.7, 5.4 Hz, 1H, ArH_Z), 6.35 (dd, *J* = 16.1, 1.4 Hz, 1H, ArH_E), 6.55 (s, 2H, 2 × ArH_Z), 6.63 (s, 2H, 2 × ArH_E), 6.64–6.75 (m, 2H, ArH), 6.79–6.88 (m, 2H, ArH), 6.97–7.02 (m, 2H, ArH), 7.03–7.11 (m, 2H, ArH), 7.12–7.20 (m, 4H, ArH), 7.22–7.30 (m, 4H, ArH), 7.30–7.36 (m, 4H, ArH), 7.36–7.44 (m, 6H, ArH) and 7.46–7.52 (m, 2H, ArH).

B. Synthesis of α-bromo- *N*-2-(alkynylphenyl)acetamides 4:

The starting α-bromo- *N*-2-(alkynylphenyl)acetamides **4** were prepared by the reaction between 2-(alkynylphenyl)amines and α-bromoacetylbromide.



Typical procedure for the preparation of *α*-bromo-*N*-2-(alkynylphenyl)acetamides 4: A solution of *N*-(2,4,6-trimethylbenzyl)-2-(phenylethynyl)phenylamine (1.01 g, 3.10 mmol), 2-bromoacetylbromide (1.27 g, 6.29 mmol), triethylamine (646 mg, 6.39 mmol), and DMAP (39 mg, 0.32 mmol) in chloroform (20 mL) was stirred in an ice-water bath for 1 h. After workup as described as above, the residue was chromatographed over 20 g of silica gel (eluted with 1:20 ethyl acetate–hexanes) to give **4a** (1.26 g, 91%).

2-Bromo-*N*-(2,4,6-trimethylbenzyl)-*N*-[2-(phenylethynyl)phenyl]acetamide 4a. Colorless crystals; mp 143–144 °C (from ethyl acetate–hexanes); yield: 91%; (Found: C, 69.95; H, 5.40; N, 3.12; Calc. for $C_{26}H_{24}BrNO$: C, 69.96; H, 5.42; N, 3.14%); ν_{max}(KBr)/cm^{-1} 2915, 2210, 1665, 1390 and 1270; δ_H(400 MHz; $CDCl_3$; Me_4Si) 2.02 (s, 6H, 2 × CH_3), 2.22 (s, 3H, CH_3), 3.62 (d, *J* = 11.1 Hz, 1H, COCH), 3.74 (d, *J* = 11.1 Hz, 1H, COCH), 4.42 (d, *J* = 14.2 Hz, 1H, NCH), 5.74 (d, *J* = 14.2 Hz, 1H, NCH), 6.49 (d, *J* = 7.7 Hz, 1H, ArH), 6.72 (s, 2H, 2 × ArH), 7.08 (td, *J* = 7.7, 1.4 Hz, 1H, ArH), 7.30 (td, *J* = 7.7, 1.0 Hz, 1H, ArH), 7.35–7.41 (m, 3H, ArH) and 7.54–7.60 (m, 3H, ArH); δ_C(100.6 MHz; $CDCl_3$; Me_4Si) 19.4 (2 × q), 20.9 (q), 27.5 (t), 44.5 (t), 84.4 (s), 95.4 (s), 122.2 (s), 123.4 (s), 125.8 (2 × d), 128.69 (d), 128.73 (d), 128.9 (2 × d), 129.0 (d), 129.3 (s), 130.3 (s), 131.8 (2 × d), 132.4 (d), 137.3 (s), 138.5 (2 × s), 141.0 (s) and 166.5 (s).

***N*-Benzyl-2-bromo-*N*-[2-(phenylethynyl)phenyl]acetamide 4b.** Yellow oils; yield: 94%; ν_{max}(neat)/cm^{-1} 3030, 2220, 1665 and 1495; δ_H(400 MHz; $CDCl_3$; Me_4Si) 3.70 (d, *J* = 11.4 Hz, 1H, COCH), 3.81 (d, *J* = 11.4 Hz, 1H, COCH), 4.50 (d, *J* = 14.3 Hz, 1H, NCH), 5.45 (d, *J* = 14.3 Hz, 1H, NCH), 6.99 (d, *J* = 7.8 Hz, 1H, ArH), 7.23 (s, 5H, ArH), 7.27 (td, *J* = 7.8, 1.5 Hz, 1H, ArH), 7.32–7.39 (m, 4H, ArH), 7.45–7.51 (m, 2H, ArH) and 7.59 (dd, *J* = 7.8, 1.5 Hz, 1H, ArH); δ_C(100.6 MHz; $CDCl_3$; Me_4Si) 27.8 (t), 52.9 (t), 84.8 (s), 95.6 (s), 122.2 (s), 123.0 (s), 127.6 (d), 128.4 (2 × d), 128.5 (2 × d), 128.7 (d), 129.0 (d), 129.2 (3 × d), 129.4 (d), 131.8 (2 × d), 133.0 (d), 136.5 (s), 142.3 (s) and 166.7 (s); *m/z* (EI) 403.0570 (M^+ $C_{23}H_{18}BrNO$ requires 403.0572).

2-Bromo-*N*-ethyl-*N*-[2-(phenylethynyl)phenyl]acetamide 4c. Colorless oils; yield: 96%; ν_{max}(neat)/cm^{-1} 2975, 1650, 1440, 1305 and 1205; δ_H(400 MHz; $CDCl_3$; Me_4Si) 1.18 (t, *J* = 7.0 Hz, 3H, CH_3), 3.67 (d, *J* = 11.3 Hz, 1H, COCH), 3.76 (d, *J* = 11.3 Hz, 1H, COCH), 3.81 (dq, *J* = 13.8, 7.0 Hz, 1H, NCH), 3.91 (dq, *J* = 13.8, 7.0 Hz, 1H, NCH), 7.31–7.39 (m, 4H, ArH), 7.40 (td, *J* = 7.3, 1.9 Hz, 2H, ArH), 7.46–7.52 (m, 2H, ArH) and 7.64 (dd, *J* = 7.3, 1.9 Hz, 1H, ArH); δ_C(100.6 MHz; $CDCl_3$; Me_4Si) δ = 12.7 (q), 27.8 (t), 44.9 (t), 85.1 (s), 95.5 (s), 122.2 (s), 123.4 (s), 128.51 (2 × d), 128.59 (d), 129.0 (d), 129.1 (d), 129.6 (d), 131.7 (2 × d), 133.0 (d), 142.6 (s) and 166.3 (s); *m/z* (EI) 341.0408 (M^+ $C_{18}H_{16}BrNO$ requires 341.0415).

2-Bromo-*N*-[2-(phenylethynyl)phenyl]acetamide 4d. Colorless needles; mp 131–132 °C (from ethyl acetate–hexanes); yield: 96%; (Found: C, 61.10; H, 3.88; N, 4.44; Calc. for $C_{16}H_{12}BrNO$: C, 61.17; H, 3.85; N, 4.46%); ν_{max}(KBr)/cm^{-1} 3280, 1665, 1535, 1315 and 1185; δ_H(400 MHz; $CDCl_3$; Me_4Si) 4.10 (s, 2H, $COCH_2$), 7.13 (td, *J* = 7.8, 1.0 Hz, 1H, ArH), 7.35–7.41 (m, 4H, ArH), 7.53 (dd, *J* = 7.8, 1.4 Hz, 1H, ArH), 7.56–7.62 (m, 2H, ArH), 8.41 (d, *J* = 7.8 Hz, 1H, ArH) and 9.24 (brs, 1H, NH); δ_C(100.6 MHz; $CDCl_3$; Me_4Si) 29.8 (t), 83.9 (s), 97.0 (s), 112.8 (s), 118.9 (d), 122.3 (s), 124.3 (d), 128.5 (2 × d), 128.9 (d), 129.6 (d), 131.6 (2 × d), 131.8 (d), 138.1 (s) and 163.2 (s).

2-Bromo-*N*-[4-fluoro-2-(phenylethynyl)phenyl]-*N*-(2,4,6-trimethylbenzyl)acetamide 4e. Colorless crystals; mp 124–125 °C (from ethyl acetate–hexanes); yield: 85%; (Found: C, 67.15; H, 5.00; N, 3.00; Calc. for $C_{26}H_{23}BrFNO$: C, 67.25; H, 4.99; N, 3.02%); ν_{max}(KBr)/cm^{-1} 2960, 2210, 1655, 1390 and 1195; δ_H(400 MHz; $CDCl_3$; Me_4Si) 2.04 (s, 6H, 2 × CH_3), 2.23 (s, 3H, CH_3), 3.60 (d, *J* = 10.9 Hz, 1H, COCH), 3.73 (d, *J* = 10.9 Hz, 1H, COCH), 4.38 (d, *J* = 14.2 Hz, 1H, NCH), 5.73 (d, *J* = 14.2 Hz, 1H, NCH), 6.44 (dd, *J* = 8.6, 5.3 Hz, 1H, ArH), 6.74 (s, 2H, 2 × ArH), 6.76 (td, *J* = 8.6, 2.6 Hz, 1H, ArH), 7.26 (dd, *J* = 8.6, 2.6 Hz, 1H, ArH), 7.35–7.42 (m, 3H, ArH) and 7.53–7.59 (m, 2H, ArH); δ_C(100.6 MHz; $CDCl_3$; Me_4Si) 19.4 (2 × q), 20.9 (q), 27.2 (t), 44.5 (t), 83.4 (s), 96.5 (s), 115.9 (dd, J_{CF} = 22.1 Hz), 118.8 (dd, J_{CF} = 24.1 Hz), 121.7 (s), 125.2 (sd, J_{CF} = 11.1 Hz), 128.6 (2 × d), 129.0 (2 × d), 129.4 (d), 132.0 (2 × d), 132.1 (d), 137.1 (2 × s), 137.4 (s), 138.4 (2 × s), 161.8 (sd, J_{CF} = 250.5 Hz) and 166.7 (s).

2-Bromo-*N*-[4-chloro-2-(phenylethynyl)phenyl]-*N*-(2,4,6-trimethylbenzyl)acetamide 4f. Colorless crystals; mp 137–138 °C (from ethyl acetate–hexanes); yield: 91%; (Found: C, 64.93; H, 4.93; N, 2.92; Calc. for $C_{26}H_{23}BrClNO$: C, 64.95; H, 4.82; N, 2.91%); ν_{max}(KBr)/cm^{-1} 2915, 2220, 1665, 1480 and 1270; δ_H(400 MHz; $CDCl_3$; Me_4Si) 2.04 (s, 6H, 2 × CH_3), 2.23 (s, 3H, CH_3), 3.59 (d, *J* = 10.9 Hz, 1H, COCH), 3.72 (d, *J* = 10.9 Hz, 1H, COCH), 4.38 (d, *J* = 14.2 Hz, 1H, NCH), 5.73 (d, *J* = 14.2 Hz, 1H, NCH), 6.40 (d, *J* = 8.5 Hz, 1H, ArH), 6.75 (s, 2H, 2 × ArH), 7.04 (dd, *J* = 8.5, 2.4 Hz, 1H, ArH), 7.34–7.42 (m, 3H, ArH) and 7.52–7.59 (m, 3H, ArH); δ_C(100.6 MHz; $CDCl_3$; Me_4Si) 19.5 (2 × q), 20.9 (q), 27.1

(t), 44.4 (t), 83.2 (s), 96.7 (s), 121.6 (s), 125.1 (s), 128.6 (2 × d), 128.8 (d), 128.9 (s), 129.0 (2 × d), 129.4 (d), 131.5 (d), 131.9 (3 × d), 134.6 (s), 137.5 (s), 138.4 (2 × s), 139.4 (s) and 166.5 (s).

2-Bromo-*N*-[4-bromo-2-(phenylethynyl)phenyl]-*N*-(2,4,6-trimethylbenzyl)acetamide 4g. Colorless crystals; mp 143–144 °C (from ethyl acetate–hexanes); yield: 88%; (Found: C, 59.46; H, 4.43; N, 2.64; Calc. for $C_{26}H_{23}Br_2NO$: C, 59.45; H, 4.41; N, 2.67%); ν_{max}(KBr)/cm^{-1} 2950, 2220, 1665, 1480 and 1390; δ_H(400 MHz; $CDCl_3$; Me_4Si) 2.04 (s, 6H, 2 × CH_3), 2.23 (s, 3H, CH_3), 3.59 (d, *J* = 10.9 Hz, 1H, COCH), 3.72 (d, *J* = 10.9 Hz, 1H, COCH), 4.38 (d, *J* = 14.2 Hz, 1H, NCH), 5.72 (d, *J* = 14.2 Hz, 1H, NCH), 6.33 (d, *J* = 8.5 Hz, 1H, ArH), 6.75 (s, 2H, 2 × ArH), 7.19 (dd, *J* = 8.5, 2.2 Hz, 1H, ArH), 7.35–7.42 (m, 3H, ArH), 7.52–7.59 (m, 2H, ArH) and 7.32 (d, *J* = 2.2 Hz, 1H, ArH); δ_C(100.6 MHz; $CDCl_3$; Me_4Si) 19.5 (2 × q), 20.9 (q), 27.2 (t), 44.4 (t), 83.1 (s), 96.8 (s), 121.6 (s), 122.4 (s), 125.4 (s), 128.6 (2 × d), 128.9 (s), 129.1 (2 × d), 129.5 (d), 131.7 (d), 131.8 (d), 132.0 (2 × d), 134.9 (d), 137.5 (s), 138.4 (2 × s), 139.9 (s) and 166.4 (s).

2-Bromo-*N*-[4-methoxycarbonyl-2-(phenylethynyl)phenyl]-*N*-(2,4,6-trimethylbenzyl)acetamide 4h. Colorless crystals; mp 101–102 °C (from ethyl acetate–hexanes); yield: 94%; ν_{max}(KBr)/cm^{-1} 2950, 2220, 1720, 1670 and 1265; δ_H(400 MHz; $CDCl_3$; Me_4Si) 2.03 (s, 6H, 2 × CH_3), 2.22 (s, 3H, CH_3), 3.57 (d, *J* = 11.0 Hz, 1H, COCH), 3.73 (d, *J* = 11.0 Hz, 1H, COCH), 3.93 (s, 3H, OCH_3), 4.43 (d, *J* = 14.3 Hz, 1H, NCH), 5.76 (d, *J* = 14.3 Hz, 1H, NCH), 6.56 (d, *J* = 8.3 Hz, 1H, ArH), 6.73 (s, 2H, 2 × ArH), 7.36–7.42 (m, 3H, ArH), 7.54–7.61 (m, 2H, ArH), 7.72 (dd, *J* = 8.3, 2.0 Hz, 1H, ArH) and 8.24 (d, *J* = 2.0 Hz, 1H, ArH); δ_C(100.6 MHz; $CDCl_3$; Me_4Si) 19.5 (2 × q), 20.9 (q), 27.1 (t), 44.5 (t), 52.5 (q), 83.6 (s), 96.4 (s), 121.8 (s), 124.0 (s), 128.6 (2 × d), 128.8 (s), 129.1 (2 × d), 129.4 (d), 129.5 (d), 130.53 (s), 130.59 (d), 131.9 (2 × d), 133.5 (d), 137.5 (s), 138.4 (2 × s), 144.7 (s), 165.5 (s) and 166.2 (s); *m/z* (EI) 503.1093 (M^+ $C_{28}H_{26}BrNO_3$ requires 503.1096).

2-Bromo-*N*-(2,4,6-trimethylbenzyl)-*N*-[4-methyl-2-(phenylethynyl)phenyl]acetamide 4i Colorless crystals; mp 129–130 °C (from ethyl acetate–hexanes); yield: 80%; (Found: C, 70.45; H, 5.74; N, 3.01; Calc. for $C_{27}H_{26}BrNO$: C, 70.44; H, 5.69; N, 3.04%); ν_{max}(KBr)/cm^{-1} 2950, 1665, 1500, 1390 and 1125; δ_H(400 MHz; $CDCl_3$; Me_4Si) 2.03 (s, 6H, 2 × CH_3), 2.22 (s, 3H, CH_3), 2.33 (s, 3H, CH_3), 3.62 (d, *J* = 11.0 Hz, 1H, COCH), 3.73 (d, *J* = 11.0 Hz, 1H, COCH), 4.41 (d, *J* = 14.2 Hz, 1H, NCH), 5.71 (d, *J* = 14.2 Hz, 1H, NCH), 6.37 (d, *J* = 8.2 Hz, 1H, ArH), 6.73 (s, 2H, 2 × ArH), 6.88 (dd, *J* = 8.2, 1.1 Hz, 1H, ArH), 7.34–7.42 (m, 4H, ArH) and 7.52–7.59 (m, 2H, ArH); δ_C(100.6 MHz; $CDCl_3$; Me_4Si) 19.5 (2 × q), 20.92 (q), 20.98 (q), 27.6 (t), 44.5 (t), 84.6 (s), 95.0 (s), 122.3 (s), 123.0 (s), 128.5 (2 × d), 128.87 (2 × d), 128.93 (d), 129.4 (s), 129.6 (d), 129.9 (d), 131.8 (2 × d), 132.8 (d), 137.2 (s), 138.47 (s), 138.51 (2 × s), 138.8 (s) and 166.7 (s).

2-Bromo-*N*-(2,4,6-trimethylbenzyl)-*N*-[4,5-dimethyl-2-(phenylethynyl)phenyl]acetamide 4j. Colorless crystals; mp 136–137 °C (from ethyl acetate–hexanes); yield: 95%; (Found: C, 70.81; H, 5.99; N, 2.95; Calc. for $C_{28}H_{28}BrNO$: C, 70.88; H, 5.95; N, 2.95%); ν_{max}(KBr)/cm^{-1} 2920, 1660, 1485, 1385 and 1120; δ_H(400 MHz; $CDCl_3$; Me_4Si) 2.00 (s, 3H, CH_3), 2.02 (s, 6H, 2 × CH_3), 2.217 (s, 3H, CH_3), 2.223 (s, 3H, CH_3), 3.65 (d, *J* = 11.1 Hz, 1H, COCH), 3.75 (d, *J* = 11.1 Hz, 1H, COCH), 4.43 (d, *J* = 14.1 Hz, 1H, NCH), 5.67 (d, *J* = 14.1 Hz, 1H, NCH), 6.19 (s, 2H, ArH), 6.72 (s, 2H, 2 × ArH), 7.31 (s, 1H, ArH), 7.33–7.39 (m, 3H, ArH) and 7.50–7.56 (m, 2H, ArH); δ_C(100.6 MHz; $CDCl_3$; Me_4Si) 19.3 (q), 19.4 (q), 19.5 (2 × q), 20.9 (q), 27.8 (t), 44.5 (t), 84.7 (s), 94.2 (s), 120.2 (s), 122.6 (s), 128.4 (2 × d), 128.69 (d), 128.74 (2 × d), 129.5 (s), 131.0 (d), 131.7 (2 × d), 133.1 (d), 137.1 (s), 137.3 (s), 138.0 (s), 138.5 (2 × s), 138.6 (s) and 166.6 (s).

2-Bromo-*N*-(2,4,6-trimethylbenzyl)-*N*-{2-[(4-methylphenyl)ethynyl]phenyl}acetamide 4k. Colorless crystals; mp 169–170 °C (from ethyl acetate–hexanes); yield: 91%; (Found: C, 70.45; H, 5.74; N, 3.03; Calc. for $C_{27}H_{26}BrNO$: C, 70.44; H, 5.69; N, 3.04%); ν_{max}(KBr)/cm^{-1} 2910, 2215, 1675, 1480 and 1375; δ_H(400 MHz; $CDCl_3$; Me_4Si) 2.02 (s, 6H, 2 × CH_3), 2.16 (s, 3H, CH_3), 2.38 (s, 3H, CH_3), 3.62 (d, *J* = 11.0 Hz, 1H, COCH), 3.74 (d, *J* = 11.0 Hz, 1H, COCH), 4.42 (d, *J* = 14.2 Hz, 1H, NCH), 5.73 (d, *J* = 14.2 Hz, 1H, NCH), 6.47 (d, *J* = 7.8 Hz, 1H, ArH), 6.72 (s, 2H, 2 × ArH), 7.06 (td, *J* = 7.8, 1.3 Hz, 1H, ArH), 7.18 (d, *J* = 7.9 Hz, 2H, ArH), 7.29 (td, *J* = 7.8, 1.0 Hz, 1H, ArH), 7.46 (d, *J* = 7.9 Hz, 2H, ArH) and 7.55 (dd, *J* = 7.8, 1.3 Hz, 1H, ArH); δ_C(100.6 MHz; $CDCl_3$; Me_4Si) 19.4 (2 × q), 20.9 (q), 21.6 (q), 27.6 (t), 44.5 (t), 83.8 (s), 95.7 (s), 119.1 (s), 123.6 (s), 128.5 (d), 128.6 (d), 128.9 (2 × d), 129.3 (s + 2 × d), 130.3 (s), 131.7 (2 × d), 132.3 (d), 137.2 (s), 138.5 (2 × s), 139.4 (s), 140.9 (s) and 166.5 (s).

2-Bromo-*N*-{2-[(4-methoxyphenyl)ethynyl]phenyl}-*N*-(2,4,6-trimethylbenzyl)acetamide 4l. Colorless crystals; mp 146–147 °C (from ethyl acetate–hexanes); yield: 87%; (Found: C, 68.06; H, 5.55; N, 2.91; Calc. for $C_{27}H_{26}BrNO_2$: C, 68.07; H, 5.50; N, 2.94%); ν_{max}(KBr)/cm^{-1} 2950, 2210, 1675, 1510 and 1375; δ_H(400 MHz; $CDCl_3$; Me_4Si) 2.02 (s, 6H, 2 × CH_3), 2.12 (s, 3H, CH_3), 3.62 (d, *J* = 11.1 Hz, 1H, COCH), 3.74 (d, *J* = 11.1 Hz, 1H, COCH), 3.84 (s, 3H, OCH_3), 4.40 (d, *J* = 14.2 Hz, 1H, NCH), 5.73 (d, *J* = 14.2 Hz, 1H, NCH), 6.46 (d, *J* = 7.7 Hz, 1H, ArH), 6.72 (s, 2H, 2 × ArH), 6.90 (d, *J* = 8.6 Hz, 2H, ArH), 7.04 (t, *J* = 7.7 Hz, 1H, ArH), 7.28 (t, *J* = 7.7 Hz, 1H, ArH), 7.51 (d, *J* = 8.6 Hz, 2H, ArH) and 7.53 (d, *J* = 7.7 Hz, 1H, ArH); δ_C(100.6 MHz; $CDCl_3$; Me_4Si) 19.4 (2 × q), 20.9 (q), 27.6 (t), 44.4 (t), 55.3 (q), 83.3 (s), 95.7 (s), 114.2 (2 × d), 114.3 (s), 123.8 (s), 128.3 (d), 128.6 (d), 128.9 (2 × d), 129.3 (s), 130.2 (d), 132.0 (d),

133.4 (2 × d), 137.2 (s), 138.5 (2 × s), 140.7 (s), 160.2 (s) and 166.6 (s).

2-Bromo-*N*-{2-[(4-chlorophenyl)ethynyl]phenyl}-*N*-(2,4,6-trimethylbenzyl)acetamide 4m Colorless crystals; mp 161–162 °C (from ethyl acetate–hexanes); yield: 94%; (Found: C, 64.91; H, 4.86; N, 2.90; Calc. for $C_{26}H_{23}BrClNO$: C, 64.95; H, 4.82; N, 2.91%); ν_{max}(KBr)/cm^{-1} 2950, 1675, 1490, 1370 and 1185; δ_H(400 MHz; $CDCl_3$; Me_4Si) 2.01 (s, 6H, 2 × CH_3), 2.22 (s, 3H, CH_3), 3.61 (d, *J* = 11.1 Hz, 1H, COCH), 3.72 (d, *J* = 11.1 Hz, 1H, COCH), 4.40 (d, *J* = 14.2 Hz, 1H, NCH), 5.71 (d, *J* = 14.2 Hz, 1H, NCH), 6.49 (d, *J* = 7.7 Hz, 1H, ArH), 6.72 (s, 2H, 2 × ArH), 7.10 (td, *J* = 7.7, 1.3 Hz, 1H, ArH), 7.31 (td, *J* = 7.7, 1.0 Hz, 1H, ArH), 7.35 (d, *J* = 8.5 Hz, 2H, ArH), 7.49 (d, *J* = 8.5 Hz, 2H, ArH) and 7.56 (dd, *J* = 7.7, 1.3 Hz, 1H, ArH); δ_C(100.6 MHz; $CDCl_3$; Me_4Si) 19.4 (2 × q), 20.9 (q), 27.5 (t), 44.6 (t), 85.4 (s), 94.3 (s), 120.7 (s), 123.1 (s), 128.8 (d), 128.89 (2 × d), 128.91 (2 × d), 129.0 (d), 129.1 (s), 130.3 (d), 132.4 (d), 133.0 (2 × d), 135.2 (s), 137.2 (s), 138.5 (2 × s), 141.1 (s) and 166.6(s).

2-Bromo-*N*-{2-[(4-cyanophenyl)ethynyl]phenyl}-*N*-(2,4,6-trimethylbenzyl)acetamide 4n Colorless crystals; mp 175–176 °C (from ethyl acetate–hexanes); yield: 99%; (Found: C, 68.41; H, 4.95; N, 5.90; Calc. for $C_{27}H_{23}BrN_2O$: C, 68.79; H, 4.92; N, 5.94%); ν_{max}(KBr)/cm^{-1} 2950, 2230, 1675, 1375 and 1225; δ_H(400 MHz; $CDCl_3$; Me_4Si) 2.00 (s, 6H, 2 × CH_3), 2.22 (s, 3H, CH_3), 3.60 (d, *J* = 11.1 Hz, 1H, COCH), 3.71 (d, *J* = 11.1 Hz, 1H, COCH), 4.39 (d, *J* = 14.2 Hz, 1H, NCH), 5.71 (d, *J* = 14.2 Hz, 1H, NCH), 6.52 (d, *J* = 7.8, 1.0 Hz, 1H, ArH), 6.73 (s, 2H, 2 × ArH), 7.15 (td, *J* = 7.8, 1.4 Hz, 1H, ArH), 7.35 (td, *J* = 7.8, 1.0 Hz, 1H, ArH), 7.59 (dd, *J* = 7.8, 1.4 Hz, 1H, ArH) and 7.62–7.70 (m, 4H, ArH); δ_C(100.6 MHz; $CDCl_3$; Me_4Si) 19.4 (2 × q), 20.9 (q), 27.3 (t), 44.7 (t), 88.5 (s), 93.4 (s), 112.3 (s), 118.3 (s), 122.5 (s), 127.0 (s), 128.9 (d), 128.95 (s), 128.97 (2 × d), 129.8 (d), 130.5 (d), 132.2 (2 × d), 132.3 (2 × d), 132.7 (d), 137.4 (s), 138.4 (2 × s), 141.4 (s) and 166.6(s).

2-Bromo-*N*-(2,4,6-trimethylbenzyl)-*N*-[2-(2-thienylethynyl)phenyl]acetamide 4o. Colorless crystals; mp 163–164 °C (from ethyl acetate–hexanes); yield: 89%; (Found: C, 63.73; H, 4.94; N, 3.07; Calc. for $C_{24}H_{22}BrNOS$: C, 63.72; H, 4.90; N, 3.10%); ν_{max}(KBr)/cm^{-1} 2950, 2210, 1660, 1420 and 1390; δ_H(400 MHz; $CDCl_3$; Me_4Si) 2.02 (s, 6H, 2 × CH_3), 2.22 (s, 3H, CH_3), 3.61 (d, *J* = 11.1 Hz, 1H, COCH), 3.73 (d, *J* = 11.1 Hz, 1H, COCH), 4.41 (d, *J* = 14.2 Hz, 1H, NCH), 5.70 (d, *J* = 14.2 Hz, 1H, NCH), 6.48 (d, *J* = 7.7 Hz, 1H, ArH), 6.73 (s, 2H, 2 × ArH), 7.07 (td, *J* = 7.7, 1.3 Hz, 1H, ArH), 7.23 (dd, *J* = 5.0, 1.0 Hz, 1H, ArH), 7.29 (td, *J* = 7.7, 1.0 Hz, 1H, ArH), 7.33 (dd, *J* = 5.0, 3.1 Hz, 1H, ArH), 7.54 (dd, *J* = 7.7, 1.3 Hz, 1H, ArH) and 7.62 (dd, *J* = 3.1, 1.0 Hz, 1H, ArH); δ_C(100.6 MHz; $CDCl_3$; Me_4Si) 19.4 (2 × q), 20.9 (q), 27.6 (t), 44.5 (t), 84.1 (s), 90.7 (s), 121.3 (s), 123.4 (s), 125.7 (d), 128.63 (d), 128.68 (d), 128.9 (2 × d), 129.2 (s), 129.8 (d), 130.0 (d), 130.3 (d), 132.1 (d), 137.3 (s), 138.5 (2 × s), 140.9 (s) and 166.6 (s).

2-Bromo-*N*-[2-(*n*-hexyn-1-yl)phenyl]-*N*-(2,4,6-trimethylbenzyl)acetamide 4p. Colorless crystals; mp 85–86 °C (from ethyl acetate–hexanes); yield: 95%; (Found: C, 67.66; H, 6.61; N, 3.21; Calc. for $C_{24}H_{28}BrNO$: C, 67.60; H, 6.62; N, 3.28%); ν_{max}(KBr)/cm^{-1} 2930, 1650, 1485, 1390 and 1265; δ_H(400 MHz; $CDCl_3$; Me_4Si) 0.96 (t, *J* = 7.3 Hz, 3H, CH_3), 1.47 (sextet, *J* = 7.3 Hz, 2H, CH_2), 1.55–1.65 (m, 2H, CH_2), 2.01 (s, 6H, 2 × CH_3), 2.21 (s, 3H, CH_3), 2.44 (t, *J* = 7.1 Hz, 2H, CH_2), 3.55 (d, *J* = 11.1 Hz, 1H, COCH), 3.68 (d, *J* = 11.1 Hz, 1H, COCH), 4.37 (d, *J* = 14.2 Hz, 1H, NCH), 5.05 (d, *J* = 14.2 Hz, 1H, NCH), 6.42 (d, *J* = 7.7 Hz, 1H, ArH), 6.72 (s, 2H, 2 × ArH), 7.00 (td, *J* = 7.7, 1.3 Hz, 1H, ArH), 7.22 (td, *J* = 7.7, 1.0 Hz, 1H, ArH) and 7.42 (dd, *J* = 7.7, 1.3 Hz, 1H, ArH); δ_C(100.6 MHz; $CDCl_3$; Me_4Si) 13.6 (q), 19.2 (t), 19.4 (2 × q), 20.9 (q), 22.1 (t), 27.8 (t), 30.6 (t), 44.3 (t), 75.8 (s), 97.0 (s), 124.1 (s), 128.0 (d), 128.5 (d), 128.8 (2 × d), 129.4 (s), 130.1 (d), 132.7 (d), 137.2 (s), 138.5 (2 × s), 140.8 (s) and 166.2 (s).

2-Bromo-*N*-[2-(ethyn-1-yl)phenyl]-*N*-(2,4,6-trimethylbenzyl)acetamide 4q. Colorless crystals; mp 104–105 °C (from ethyl acetate–hexanes); yield: 80%; (Found: C, 64.91; H, 5.46; N, 3.74; Calc. for $C_{20}H_{20}BrNO$: C, 64.87; H, 5.44; N, 3.78%); ν_{max}(KBr)/cm^{-1} 3285, 2955, 1660, 1390, 1205 cm^{-1}; δ_H(400 MHz; $CDCl_3$; Me_4Si) 2.01 (s, 6H, 2 × CH_3), 2.22 (s, 3H, CH_3), 3.34 (s, 1H, CH), 3.53 (d, *J* = 11.1 Hz, 1H, COCH), 3.70 (d, *J* = 11.1 Hz, 1H, COCH), 4.38 (d, *J* = 14.3 Hz, 1H, NCH), 5.70 (d, *J* = 14.3 Hz, 1H, NCH), 6.46 (dd, *J* = 7.8, 0.9 Hz, 1H, ArH), 6.72 (s, 2H, 2 × ArH), 7.10 (td, *J* = 7.8, 1.4 Hz, 1H, ArH), 7.28 (td, *J* = 7.8, 0.9 Hz, 1H, ArH) and 7.54 (dd, *J* = 7.8, 1.4 Hz, 1H, ArH); δ_C(100.6 MHz; $CDCl_3$; Me_4Si) 19.4 (2 × q), 20.9 (q), 27.4 (t), 44.4 (t), 78.8 (s), 83.2 (d), 122.2 (s), 128.7 (d), 128.9 (2 × d), 129.1 (s), 129.4 (d), 130.5 (d), 133.4 (d), 137.3 (s), 138.5 (2 × s), 141.4 (s) and 166.1 (s).

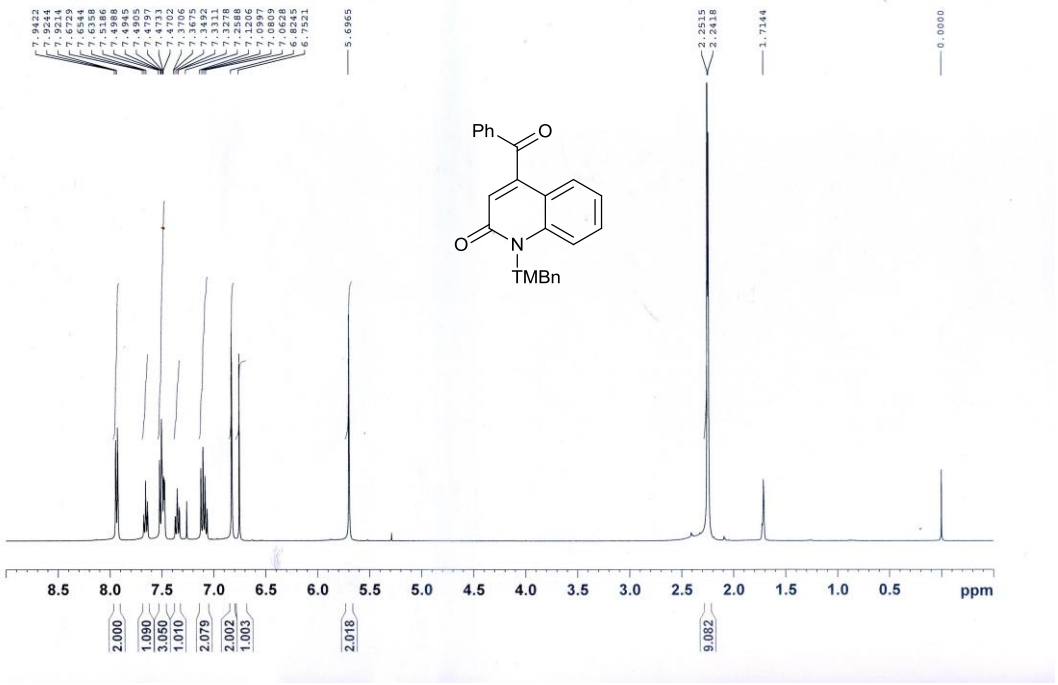
2-Bromo-*N*-(2,4,6-trimethylbenzyl)-*N*-[2-(phenylethynyl)phenyl]propioamide 4r. Colorless crystals; mp 150–151 °C (from ethyl acetate–hexanes); yield: 89%; (Found: C,70.42; H, 5.69; N, 3.00; Calc. for $C_{27}H_{26}BrNO$: C, 70.44; H, 5.69; N, 3.04%); ν_{max}(KBr)/cm^{-1} 2920, 2215, 1665, 1395 and 1235; δ_H(400 MHz; $CDCl_3$; Me_4Si) (Z form : E form = 1.2:1) 1.74 (d, *J* = 6.8 Hz, 3H, $CH_{3\,Z}$), 1.78 (d, *J* = 6.6 Hz, 3H, $CH_{3\,E}$), 2.00 (s, 6H, 2 × $CH_{3\,Z}$), 2.03 (s, 6H, 2 × $CH_{3\,E}$), 2.20 (s, 3H, $CH_{3\,Z}$), 2.22 (s, 3H, $CH_{3\,E}$), 4.15 (q, *J* = 6.6 Hz, 1H, $COCH_{\,E}$), 4.30 (q, *J* = 6.8 Hz, 1H, $COCH_{\,Z}$), 4.34 (d, *J* = 14.2 Hz, 1H, $NCH_{\,E}$), 4.58 (d, *J* = 14.3 Hz, 1H, $NCH_{\,Z}$), 5.66 (d, *J* = 14.3 Hz, 1H, $NCH_{\,Z}$), 5.80 (d, *J* = 14.2 Hz, 1H, $NCH_{\,E}$), 6.41 (d, *J* = 7.7 Hz, 1H, $ArH_{\,Z}$), 6.50 (d, *J* = 7.7 Hz, 1H, $CH_{\,E}$), 6.69 (s, 2H, 2 × $ArH_{\,Z}$), 6.73 (s, 2H, 2 × $ArH_{\,E}$), 7.08 (td, *J* = 7.7, 1.3 Hz, 2H, ArH), 7.30 (td, *J* = 7.7, 0.9 Hz, 2H, ArH), 7.34-7.42 (m, 6H, ArH) and 7.52-7.63 (m, 6H, ArH).

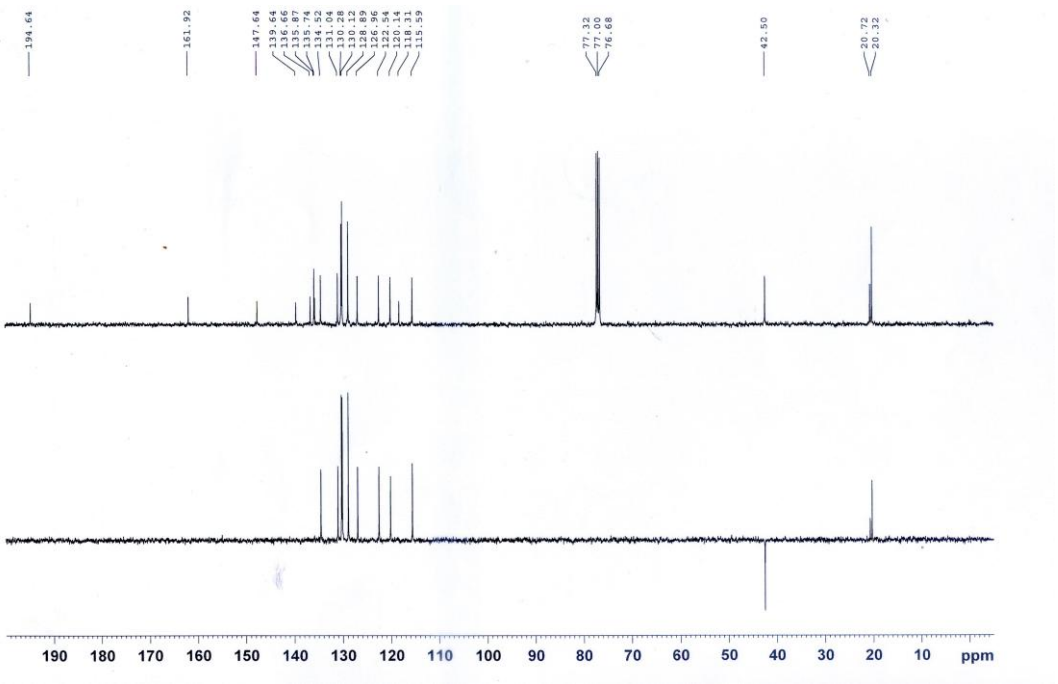
2-Bromo-*N*-(2,4,6-trimethylbenzyl)-2-phenyl-*N*-[2-(phenylethynyl)phenyl]acetamide 4s. Colorless oils; yield: 95%; ν_{max}(neat)/cm^{-1} 2920, 2220, 1675, 1455 and 1385; δ_H(400 MHz; $CDCl_3$; Me_4Si) (Z form : E form = 1.2:1) 1.85

(s, 6H, 2 × $CH_{3\,Z}$), 2.05 (s, 6H, 2 × $CH_{3\,E}$), 2.15 (s, 3H, $CH_{3\,Z}$), 2.22 (s, 3H, $CH_{3\,E}$), 4.38 (d, *J* = 14.2 Hz, 1H, NCH_{E}), 4.50 (d, *J* = 14.2 Hz, 1H, NCH_{Z}), 5.13 (s, 1H, $COCH_{E}$), 5.41 (s, 1H, $COCH_{Z}$), 5.67 (d, *J* = 14.2 Hz, 1H, NCH_{Z}), 5.75 (d, *J* = 14.2 Hz, 1H, NCH_{E}), 5.89 (d, *J* = 7.8 Hz, 1H, ArH_{Z}), 6.61 (s, 2H, 2 × ArH_{Z}), 6.62 (d, *J* = 10.9 Hz, 1H, ArH_{E}), 6.73 (s, 2H, 2 × ArH_{E}), 6.90 (t, *J* = 7.8 Hz, 1H, ArH_{Z}), 7.05–7.11 (m, 3H, ArH), 7.11–7.32 (m, 12H, ArH), 7.33–7.38 (m, 2H, ArH), 7.38–7.43 (m, 3H, ArH), 7.51–7.56 (m, 3H, ArH), 7.56–7.64 (m, 3H, ArH) and 7.65–7.71 (m, 2H, ArH); *m/z* (FAB) 521.1354 (M^+ $C_{32}H_{28}BrNO$ requires 521.1354).

2) Copies of ^{1}H and ^{13}C NMR spectra for quinolin-2(1*H*)-ones.

2a





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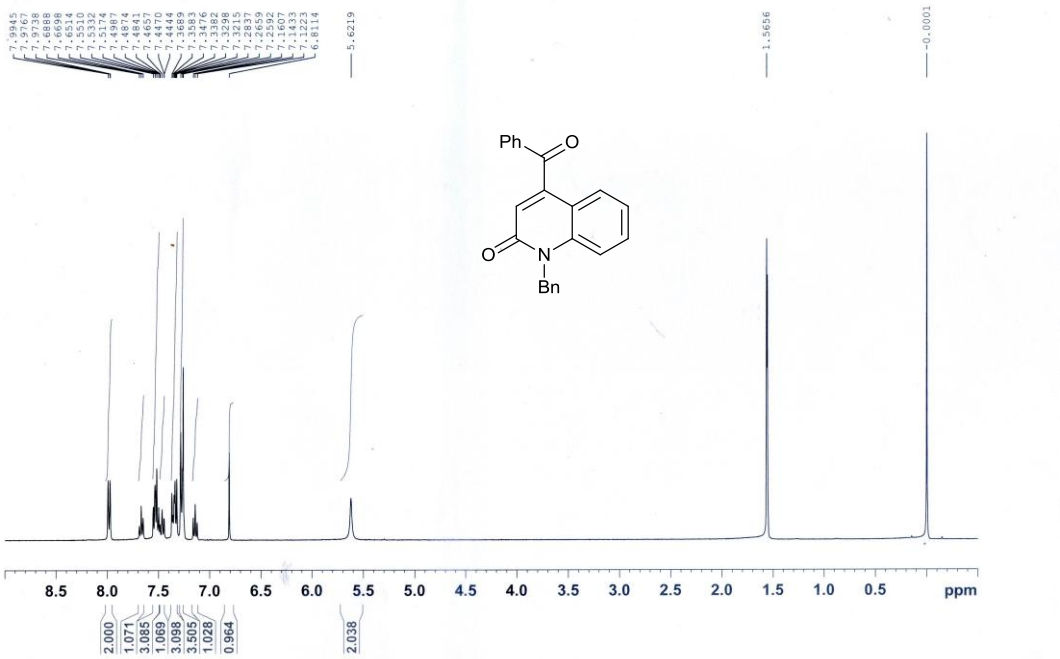
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N
Bn
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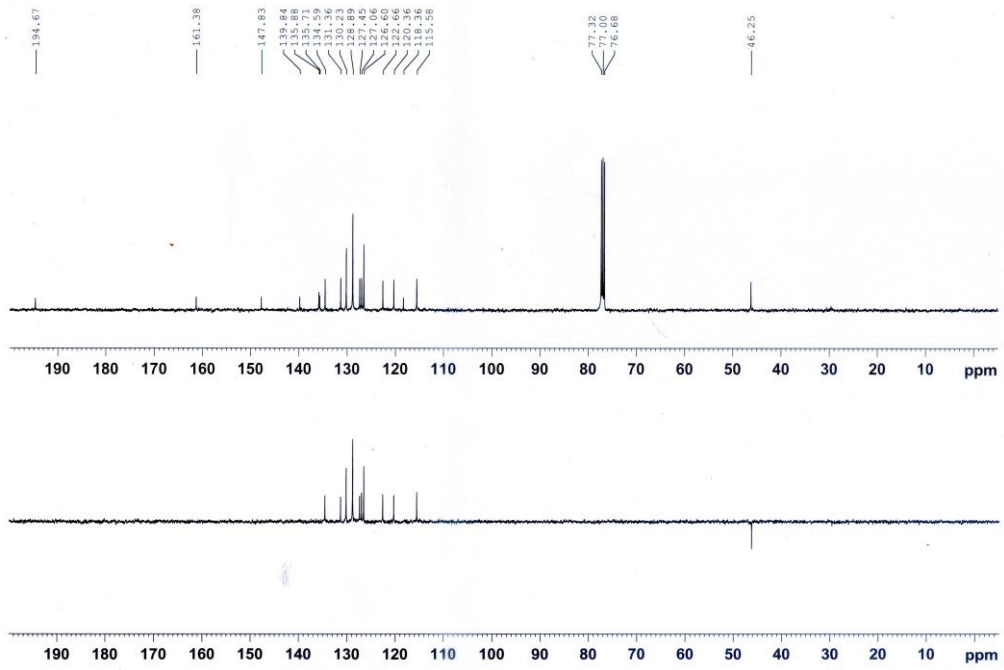
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76.68
46.25
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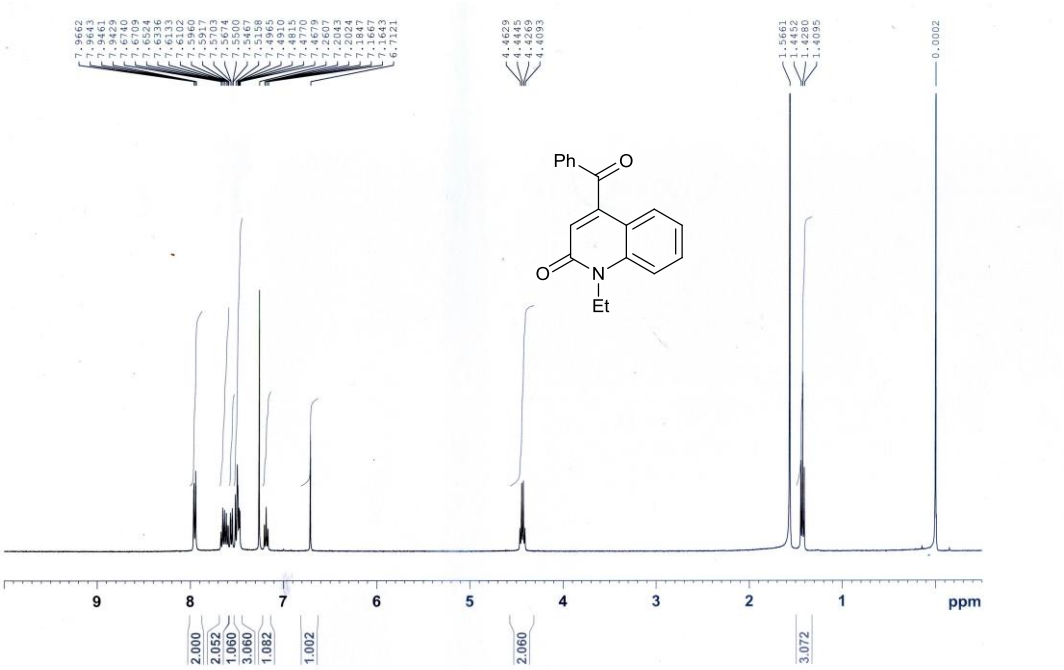
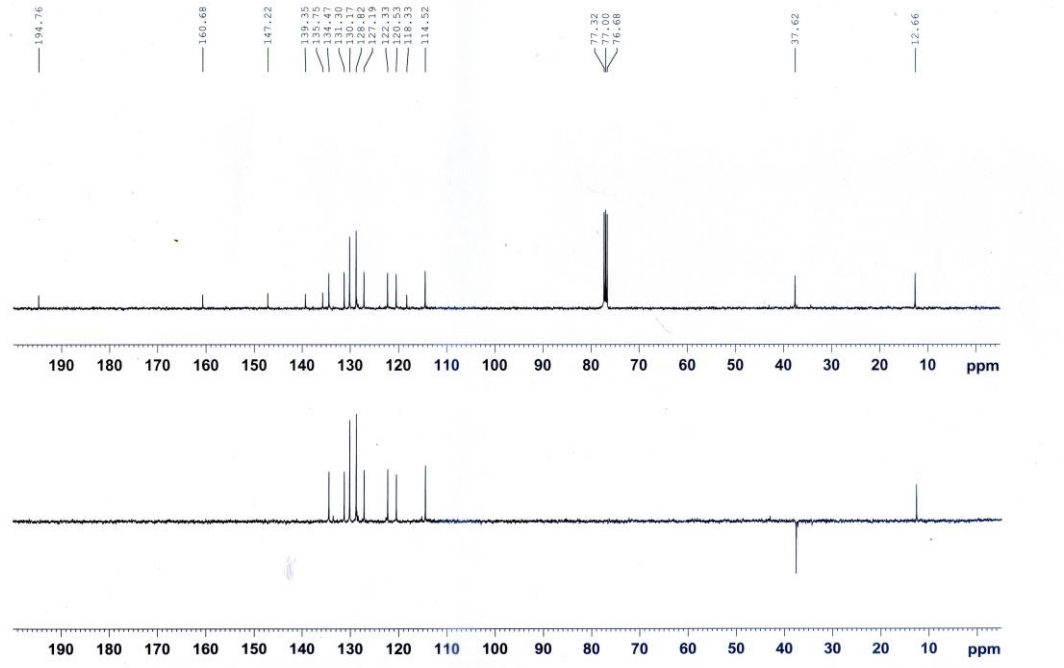
2c





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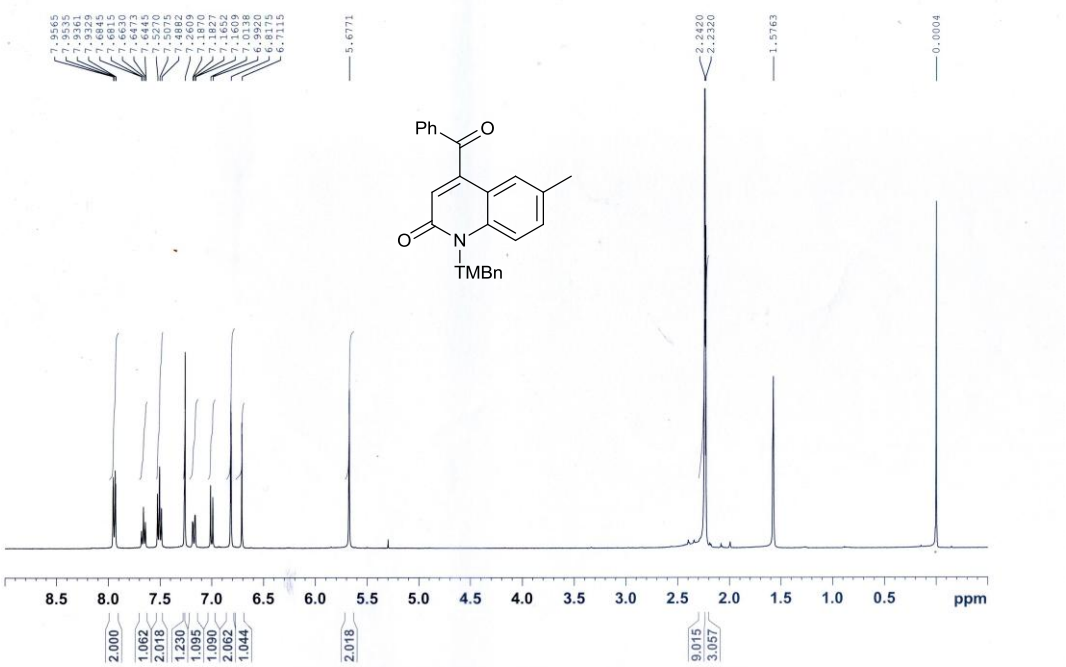
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7.4882
7.2609
7.1870
7.1827
7.1652
7.1609
7.0938
6.9320
6.8175
6.7115
5.6771
2.2420
2.2320
1.5763
0.0004
Ph
O
O
N
TMBn
8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 ppm
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2.018
1.230
1.095
1.090
2.062
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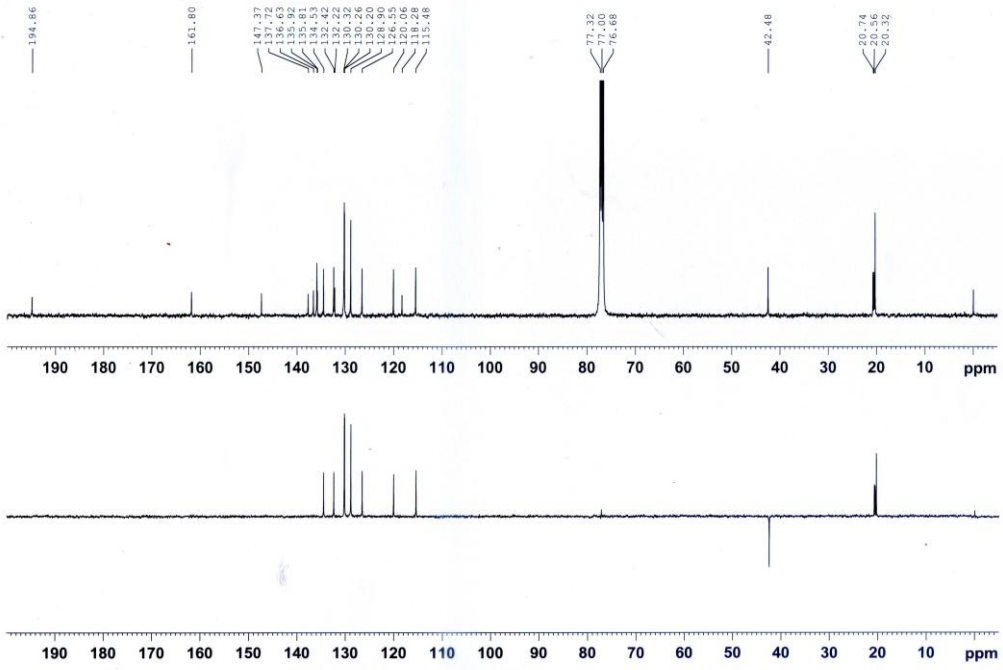
9.015
3.057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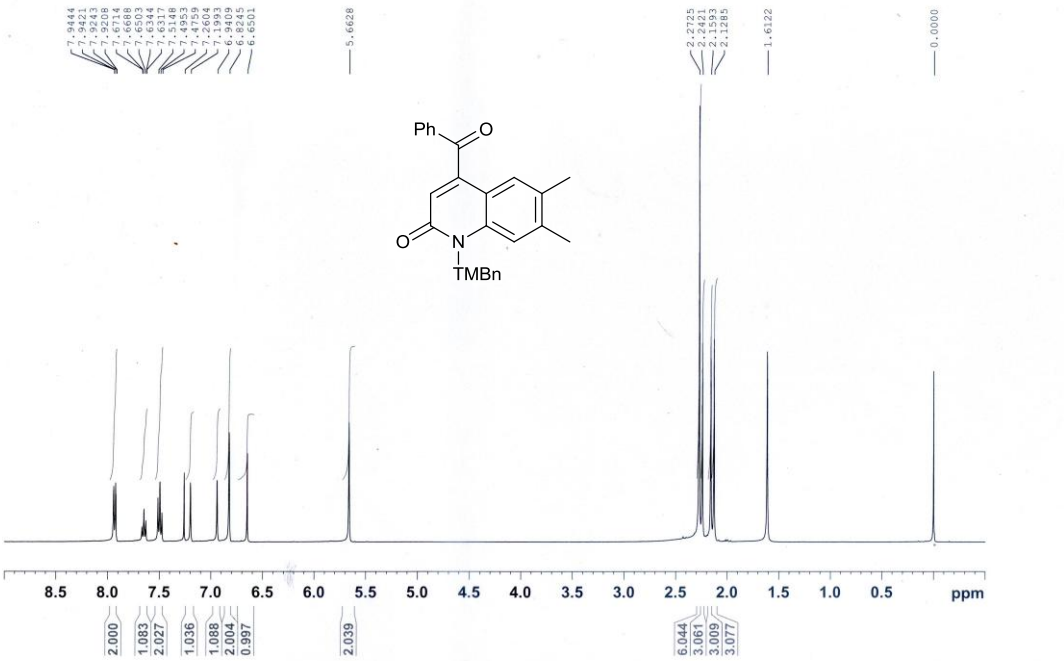
136.65
135.92
135.81
134.53
132.42
132.22
130.32
130.26
130.20
128.90
126.55
120.06
118.28
115.48
77.32
77.00
76.68
42.48
20.74
20.56
20.32
190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm
190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm

2f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7.9243
7.9208
7.6714
7.6688
7.6503
7.6344
7.6317
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7.4759
7.2604
7.1993
6.9409
6.8245
6.6501
5.6628
2.2725
2.2421
2.1593
2.1285
1.6122
0.0000
Ph
O
O
N
TMBn
8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 ppm
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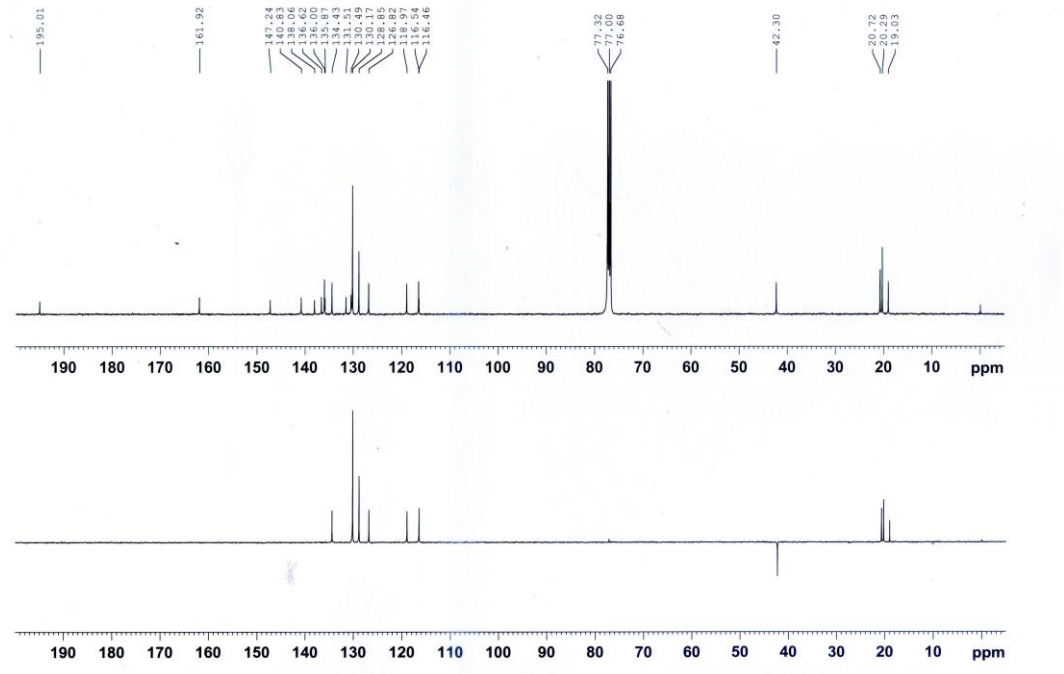
2.004
0.997
2.039
6.044
3.061
3.009
3.077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161.92
147.24
140.83
138.06
136.62
136.00
135.87
134.43
131.51
130.49
130.17
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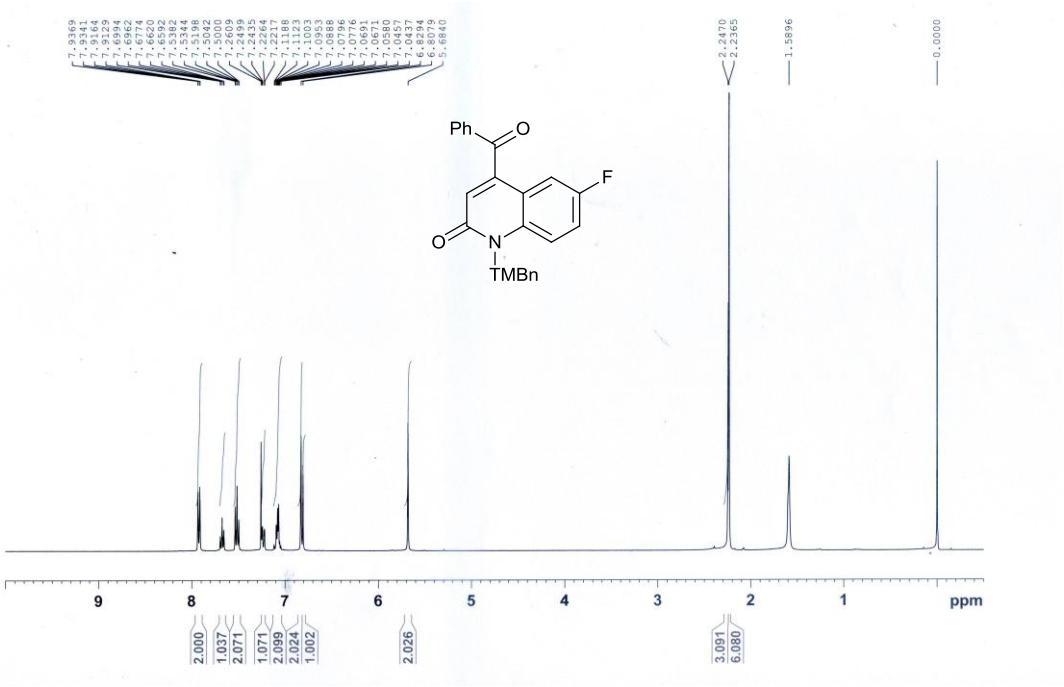
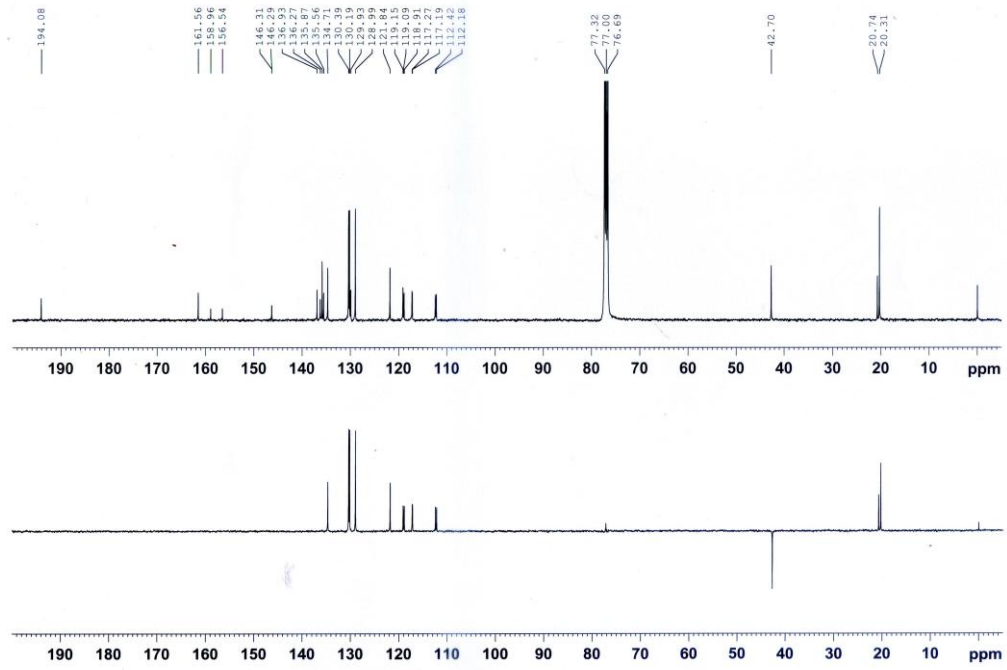
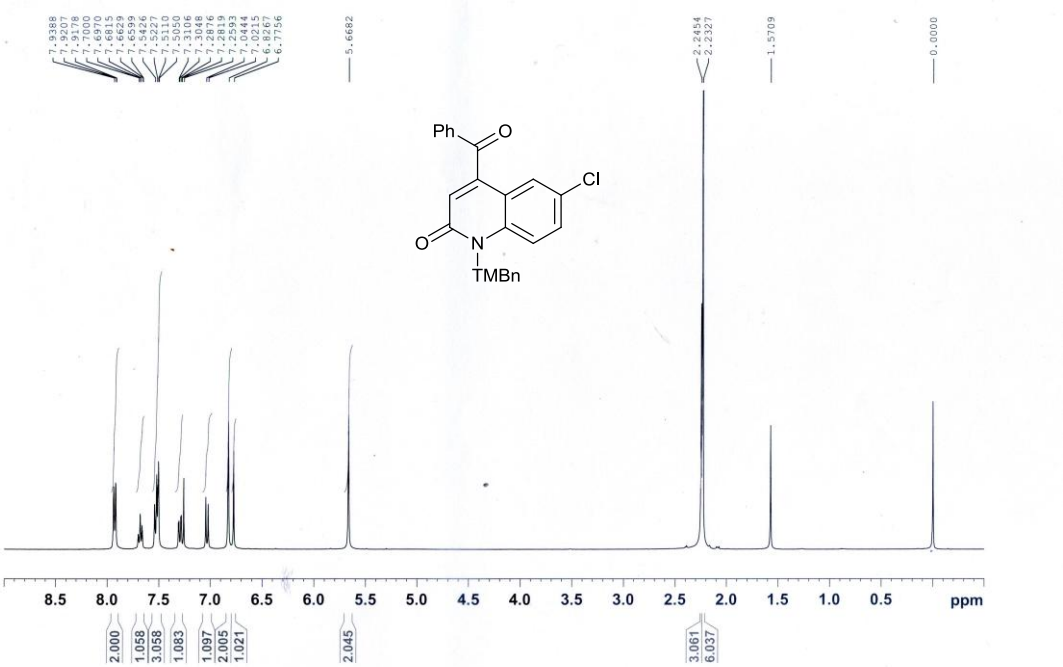
126.82
118.97
116.54
116.46
77.32
77.00
76.68
42.30
20.72
20.29
19.03
190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm
190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm

2g





2h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O
N
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7.2876
7.2819
7.2593
7.0344
7.0215
6.8267
6.7756
5.6682
2.2454
2.2327
1.5709
0.0000
8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 ppm
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3.058
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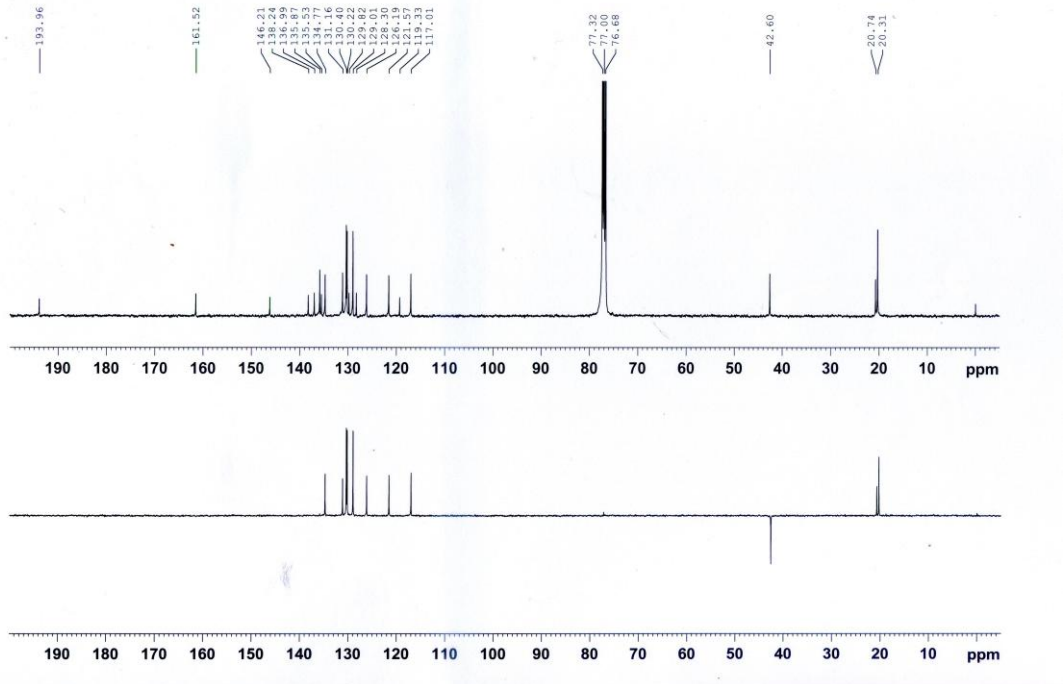
1.097
2.005
1.021
2.045
3.061
6.037


193.96
161.52
146.21
138.84
136.99
135.87
135.53
134.77
131.16
130.40
130.22
129.82
129.01
128.30
126.19
121.57
119.33
117.01
77.32
77.00
76.68
42.60
20.74
20.31
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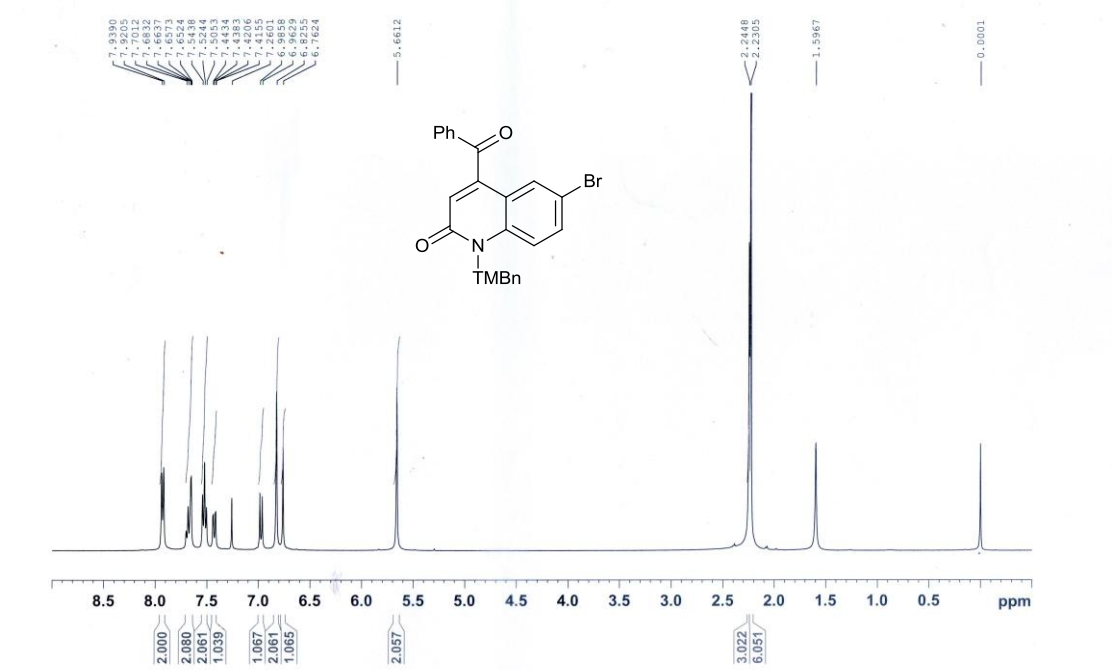
2i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7.6832
7.6637
7.6573
7.6524
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7.4338
7.4206
7.4155
7.2601
6.9858
6.8659
6.8255
6.7624
5.6612
2.2448
2.2305
1.5967
0.0001
Ph
O
Br
O
N
TMBn
8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 ppm
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2.080
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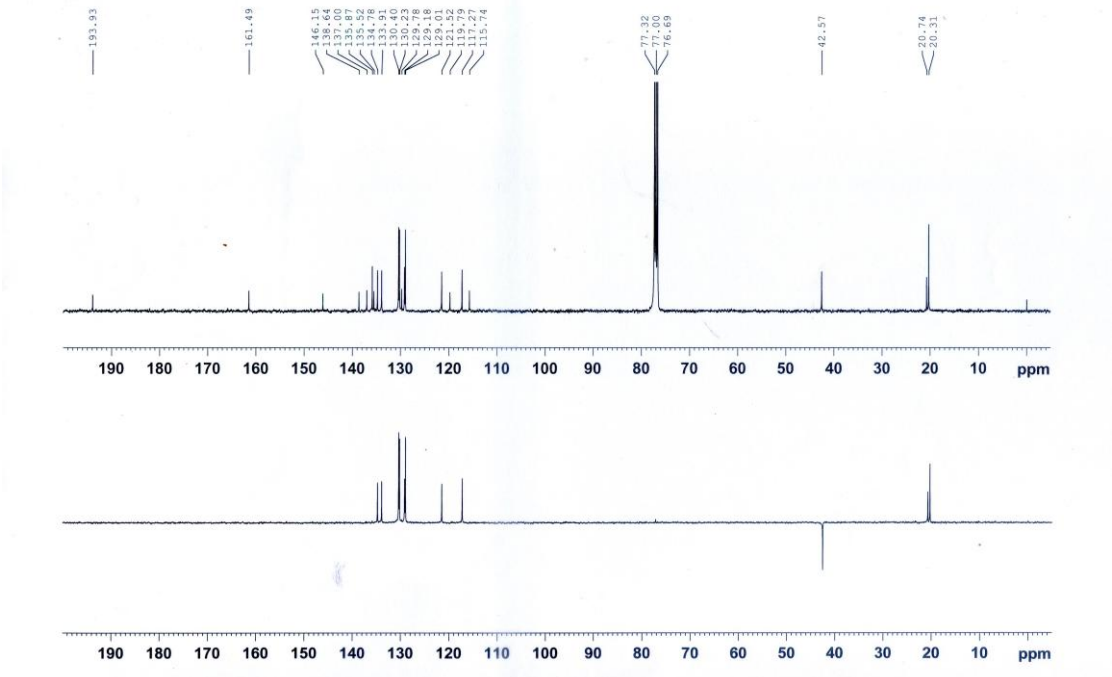
1.039
1.067
2.061
1.065
2.057
3.022
6.051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138.64
137.00
133.87
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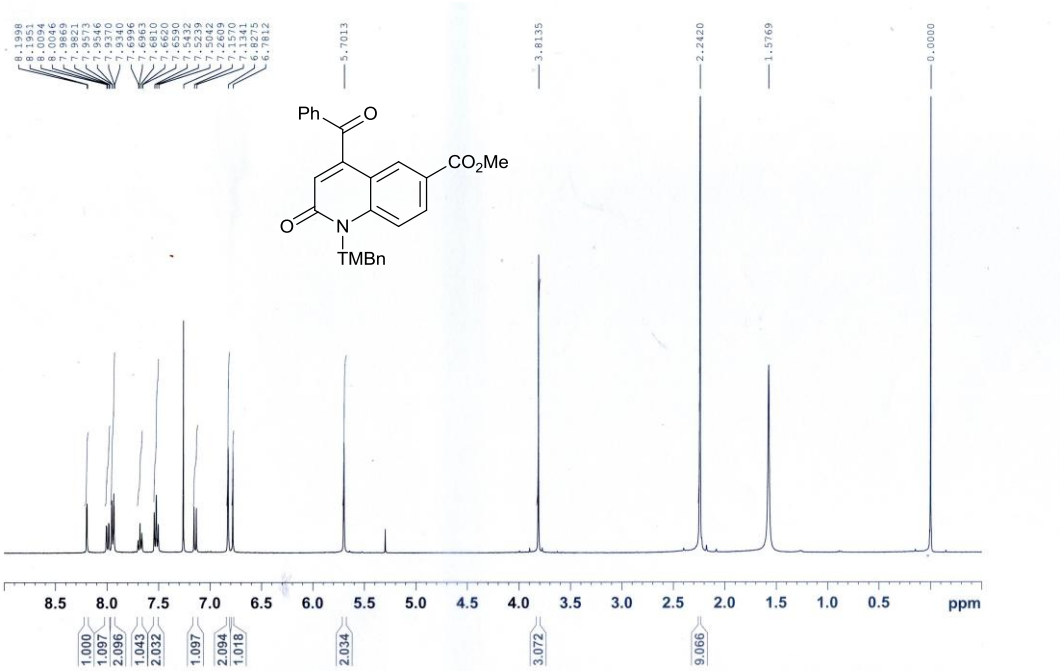
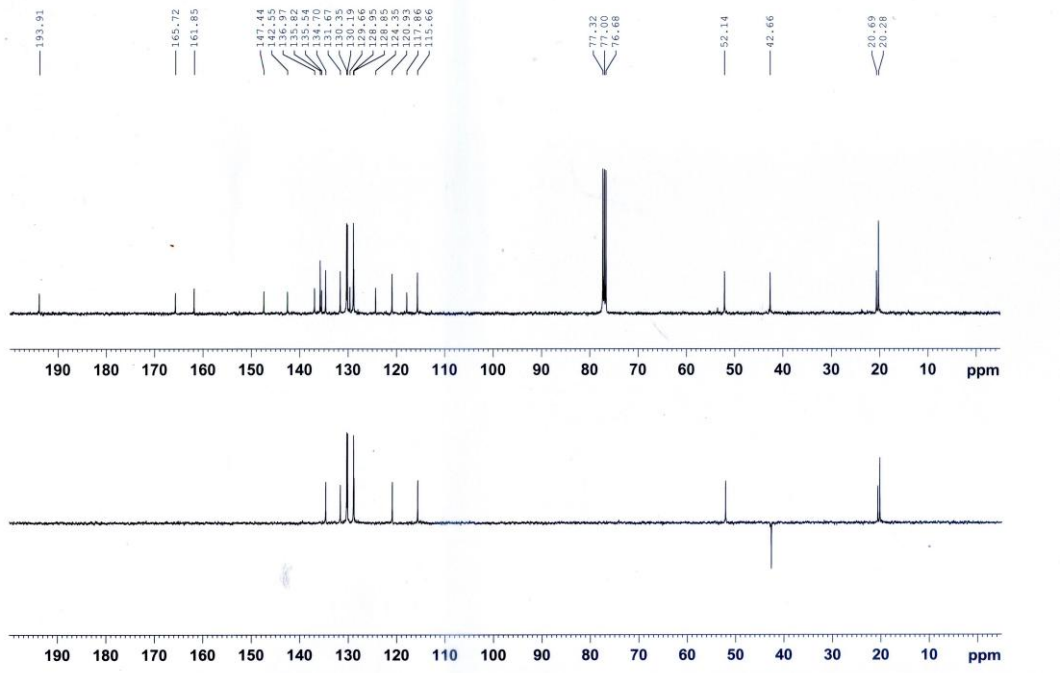
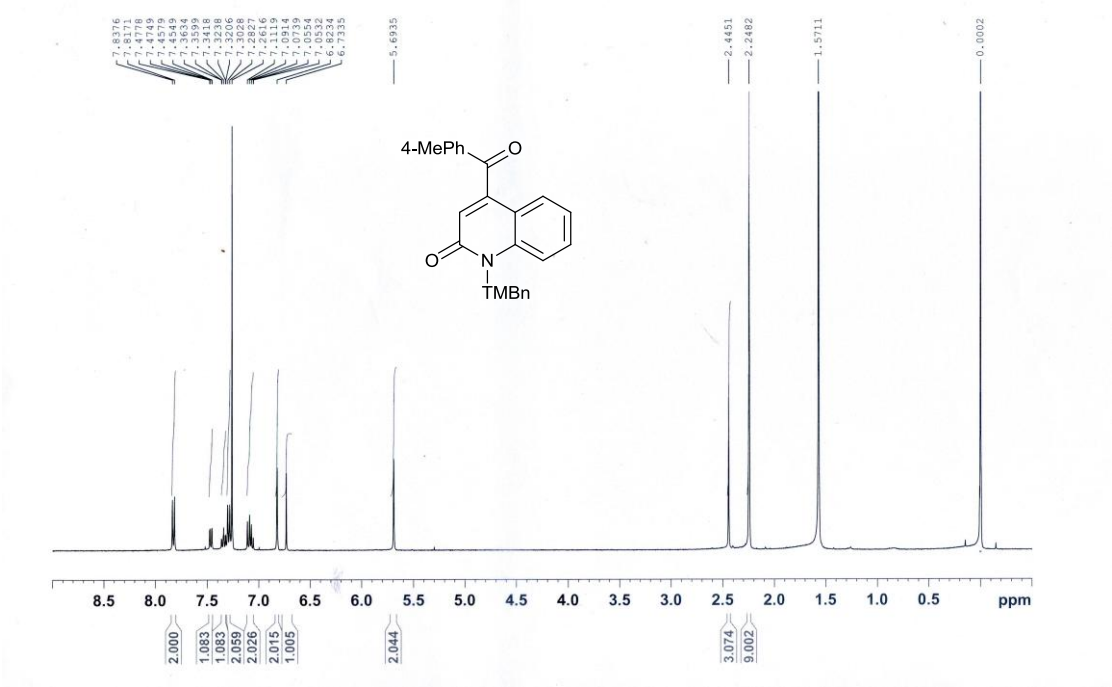
134.78
133.91
130.40
130.23
129.78
129.18
129.01
121.52
119.79
117.27
115.74
77.32
77.00
76.69
42.57
20.74
20.31
190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm
190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm

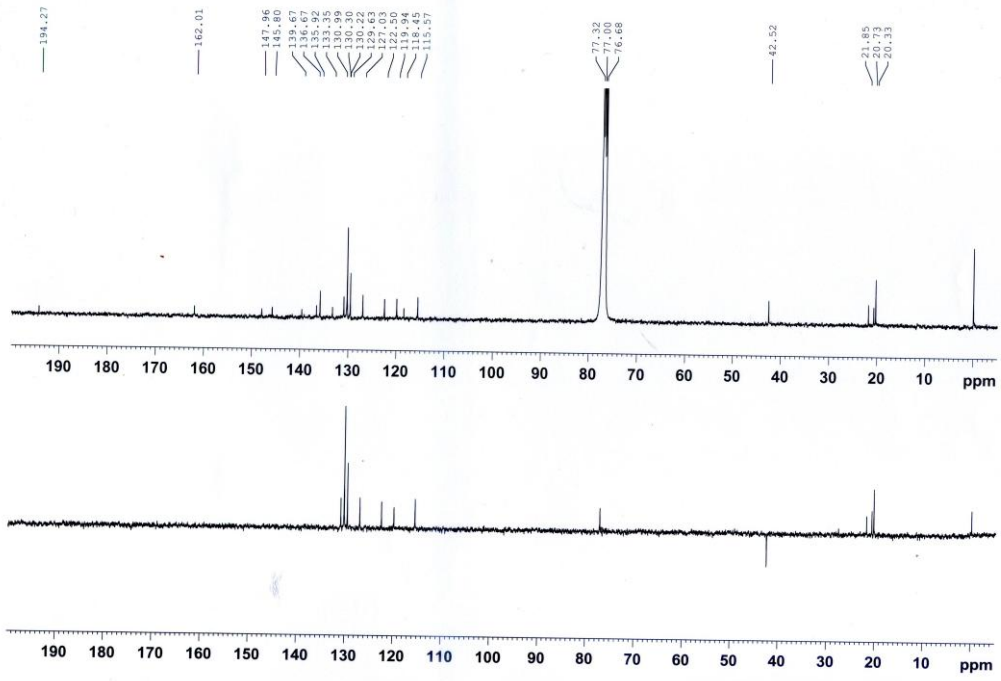
2j


Ph
O
CO2Me
O
N
TMBn
8.1998
8.1951
8.0094
8.0046
7.9869
7.9671
7.9573
7.9546
7.9370
7.9340
7.6996
7.6945
7.6810
7.6620
7.6590
7.5432
7.5239
7.5042
7.2609
7.1570
7.1341
6.8225
6.7812
5.7013
3.8135
2.2420
1.5769
0.0000
8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 ppm
1.000
1.097
2.096
1.043
2.032
1.097
2.094
1.018
2.034
3.072
9.066

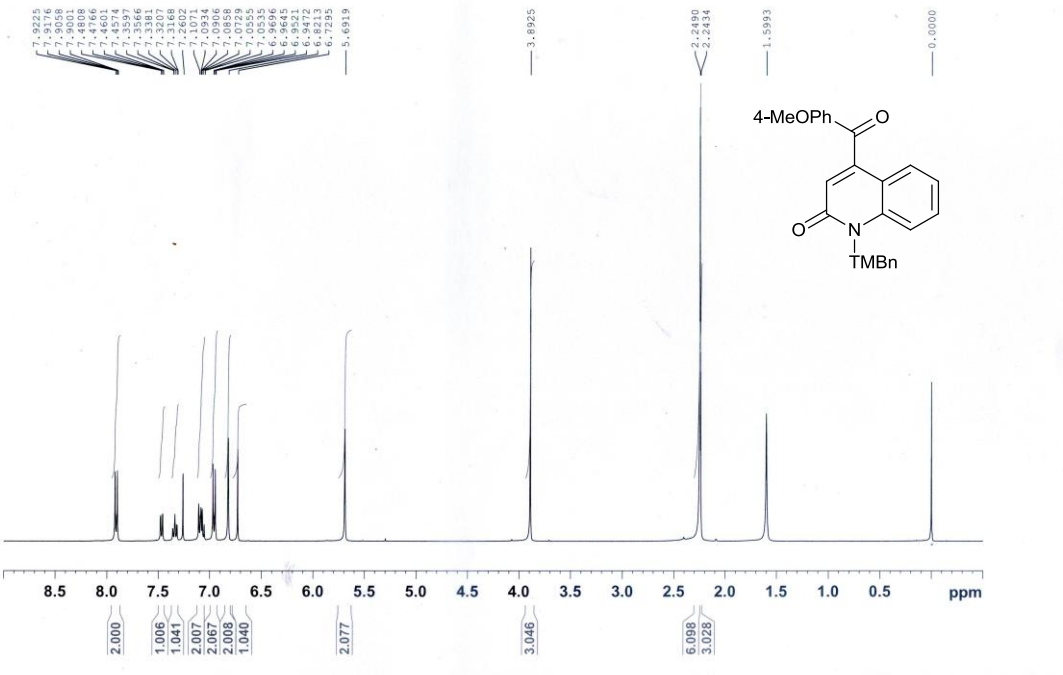

193.91
165.72
161.85
147.44
142.55
136.97
135.82
135.54
134.70
131.67
130.35
130.19
129.66
128.95
128.85
128.43
124.35
120.93
117.86
115.66
77.32
77.00
76.68
52.14
42.66
20.69
20.28
190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm
190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm

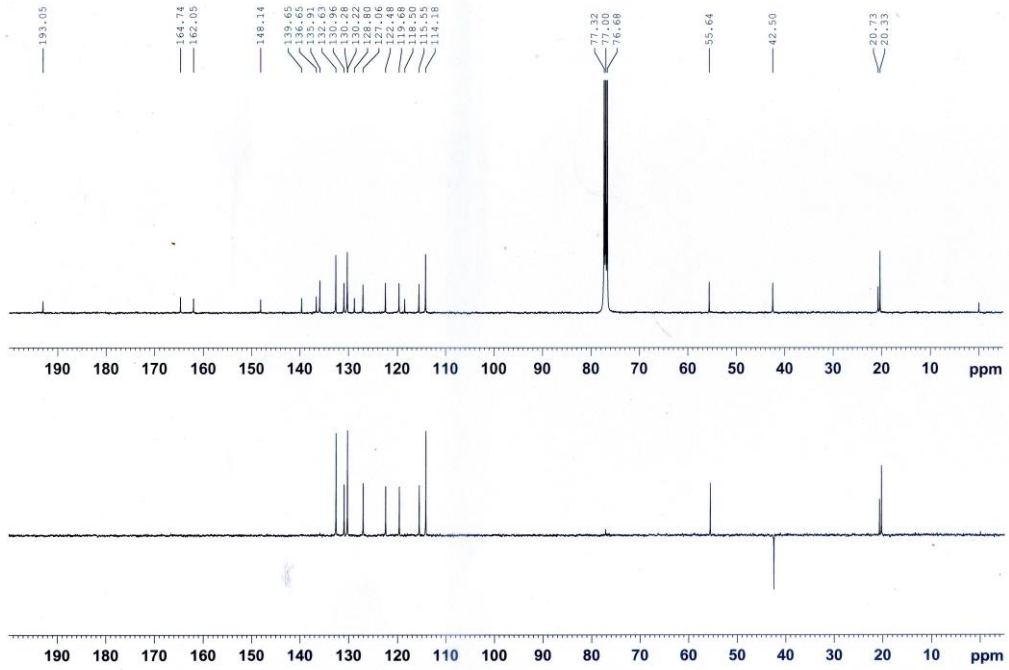
2k



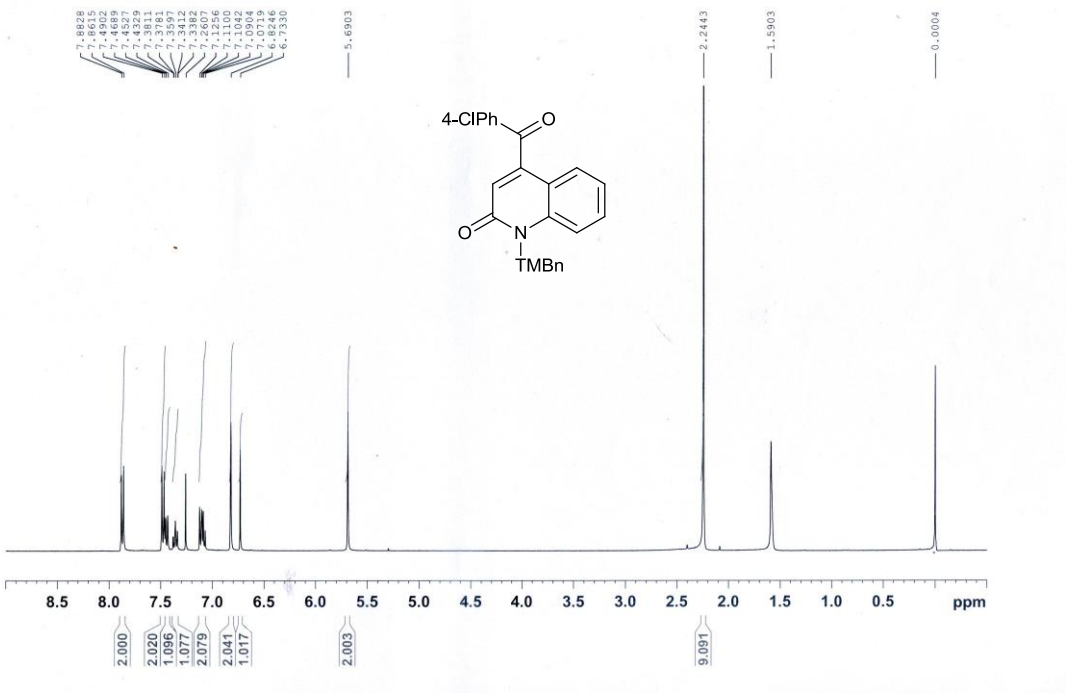


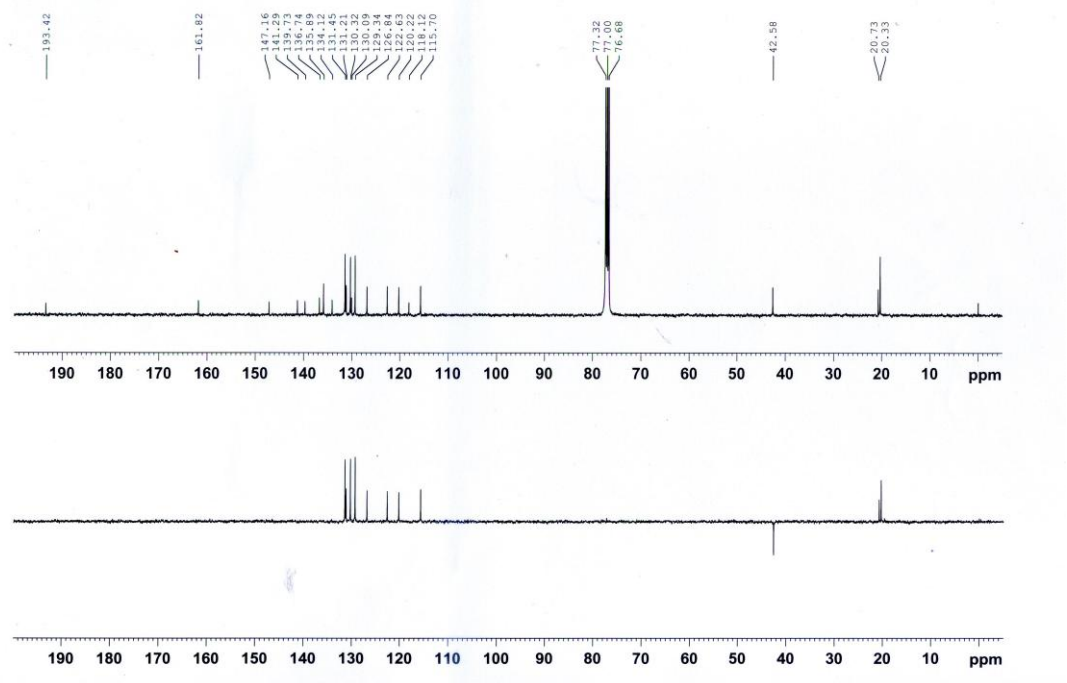
2l



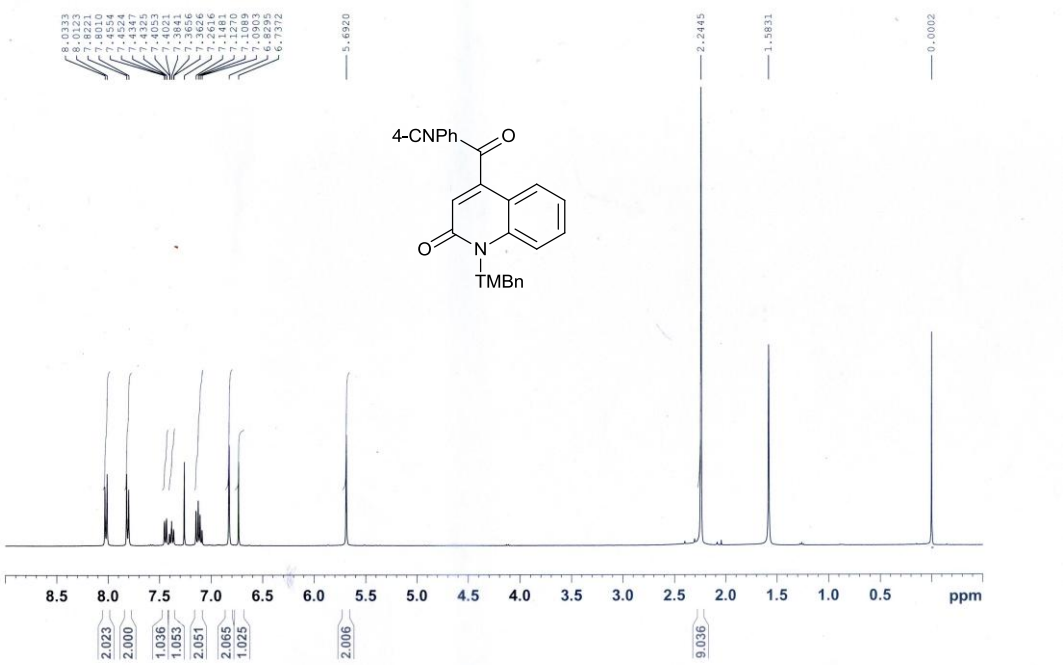


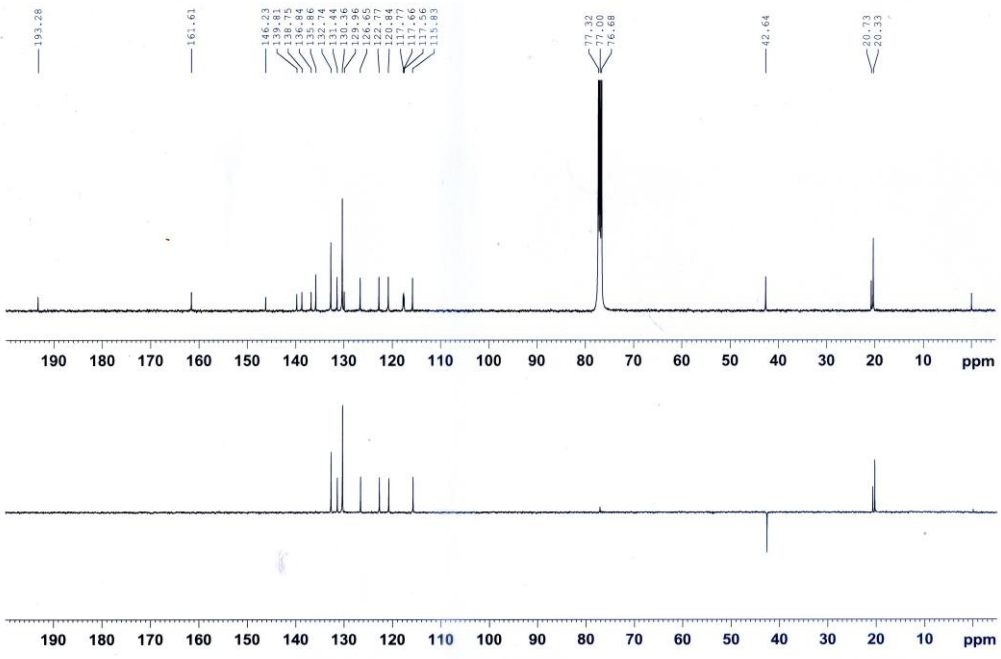
2m


7.8828
7.8615
7.4902
7.4689
7.4527
7.4329
7.4131
7.3781
7.3597
7.3412
7.3382
7.3207
7.2256
7.1100
7.1042
7.0904
7.0719
6.8246
6.7330
5.6903
2.2443
1.5903
0.0004
4-ClPh
O
O
N
TMBn
8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 ppm
2.000
2.020
1.096
1.077
2.079
2.041
1.017
2.003
9.091

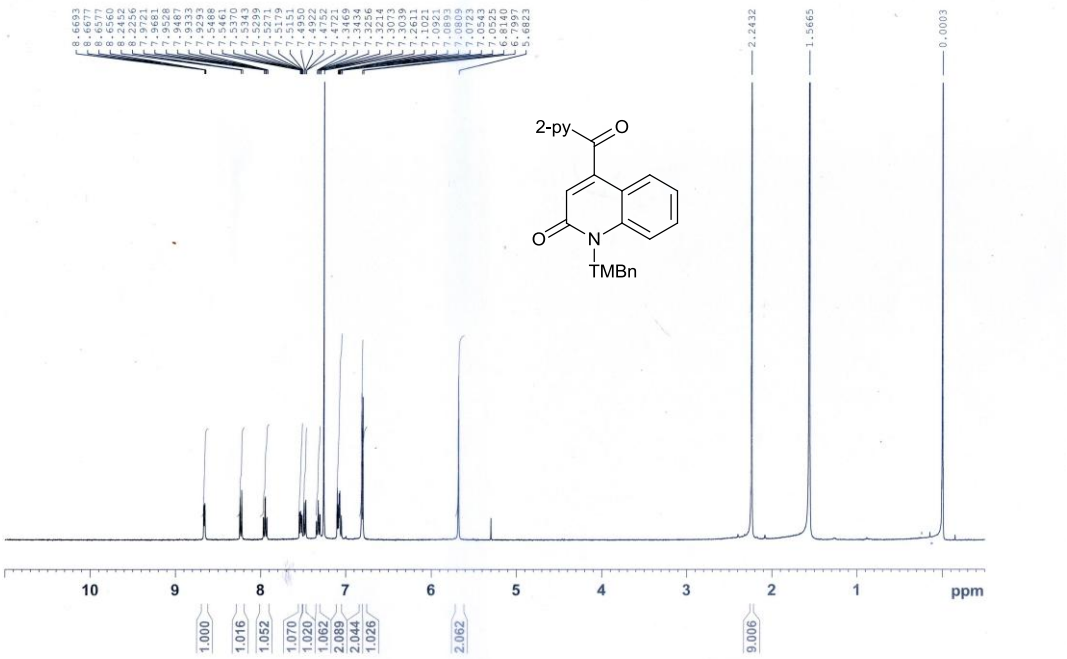

193.42
161.82
147.16
140.29
139.73
136.74
135.89
134.12
131.55
131.21
130.32
130.09
129.34
128.64
122.63
120.22
118.12
115.70
77.32
77.00
76.68
42.58
20.73
20.33
190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm
190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm

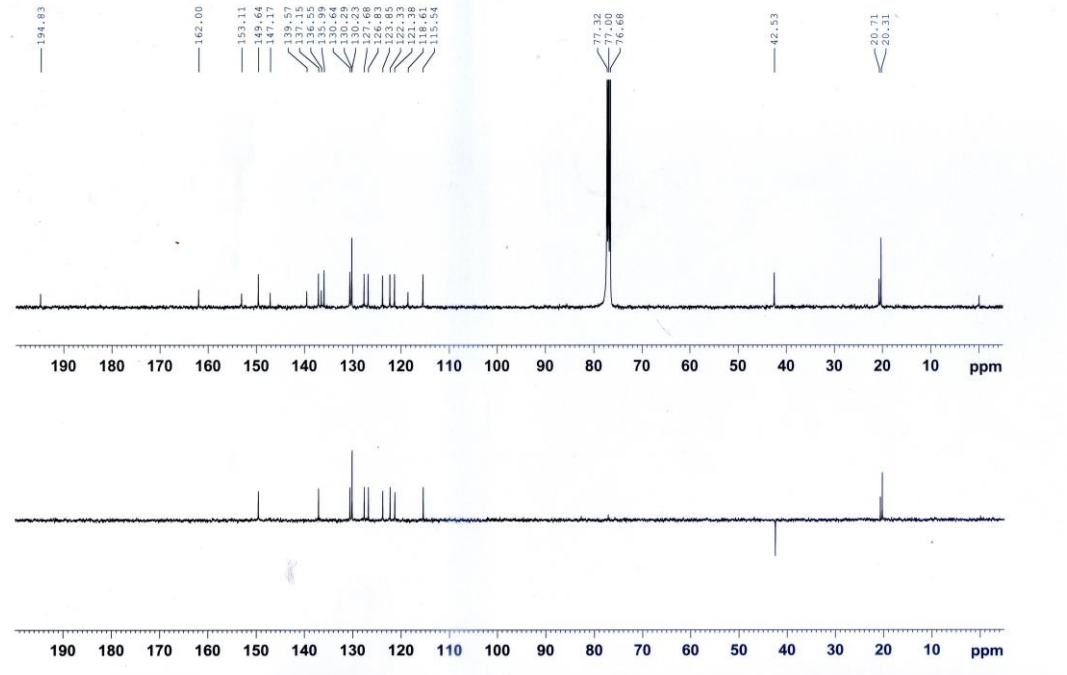
2n


8.0333
8.0223
7.8221
7.8010
7.4554
7.4524
7.4437
7.4325
7.4053
7.4021
7.3841
7.3656
7.3626
7.2616
7.1481
7.1270
7.1089
7.0903
6.8295
6.7372
5.6920
2.2445
1.5831
0.0002
4-CNPh
O
O
N
TMBn
8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 ppm
2.023
2.000
1.036
1.053
2.051
2.065
1.025
2.006
9.036

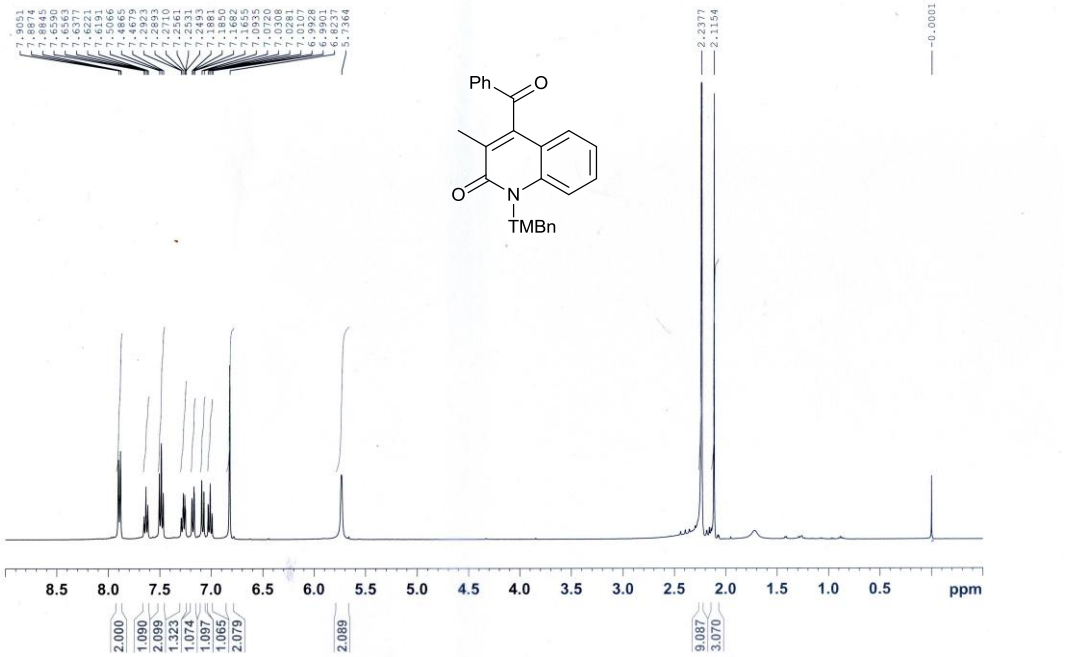

193.28
161.61
146.33
139.81
138.75
136.84
135.86
132.74
131.44
130.36
129.96
126.65
122.77
120.84
117.77
117.66
117.56
115.83
77.32
77.00
76.68
42.64
20.73
20.33
190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm
190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm

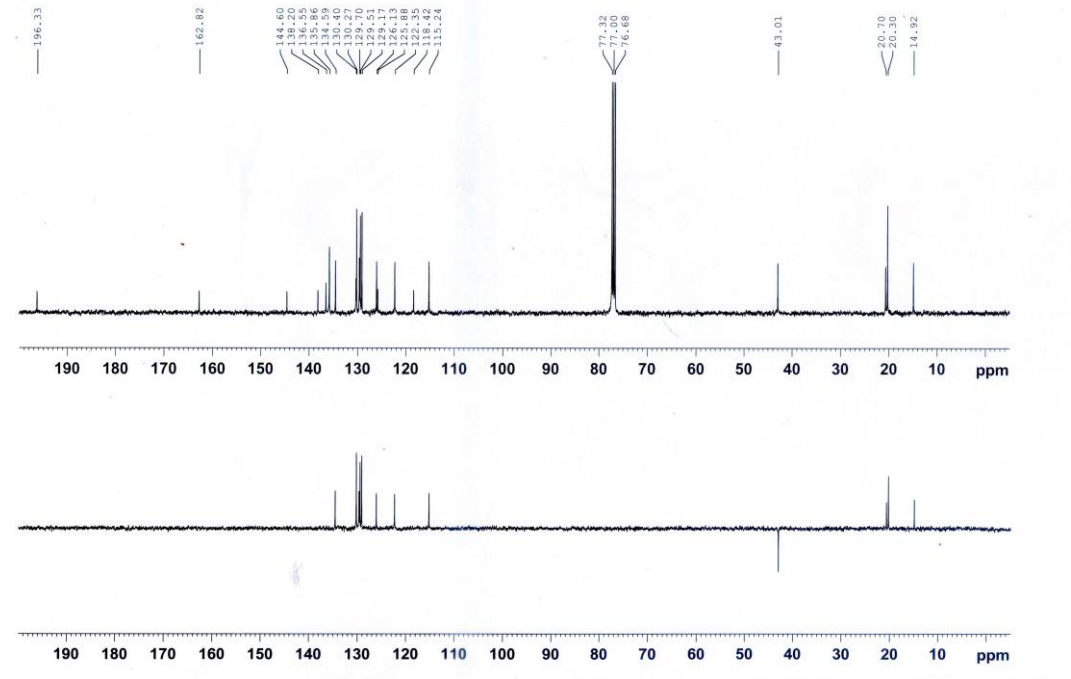
2p


2-py
O
O
N
TMBn
2.2432
1.5665
0.0003
10
9
8
7
6
5
4
3
2
1
ppm
1.000
1.016
1.052
1.070
1.020
1.062
2.089
2.044
1.026
2.062
9.006

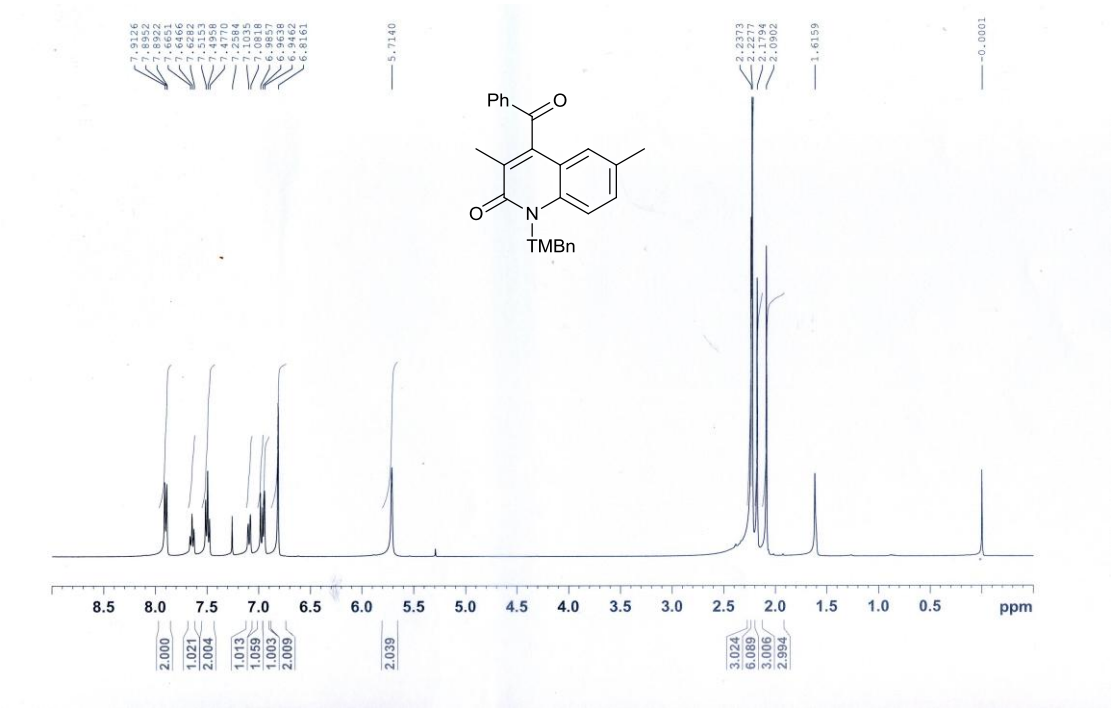

194.83
162.00
153.11
149.64
147.17
139.57
137.15
136.55
135.99
130.64
130.23
130.23
127.68
126.83
123.95
122.33
121.38
118.61
115.54
77.32
77.00
76.68
42.53
20.71
20.31
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
ppm

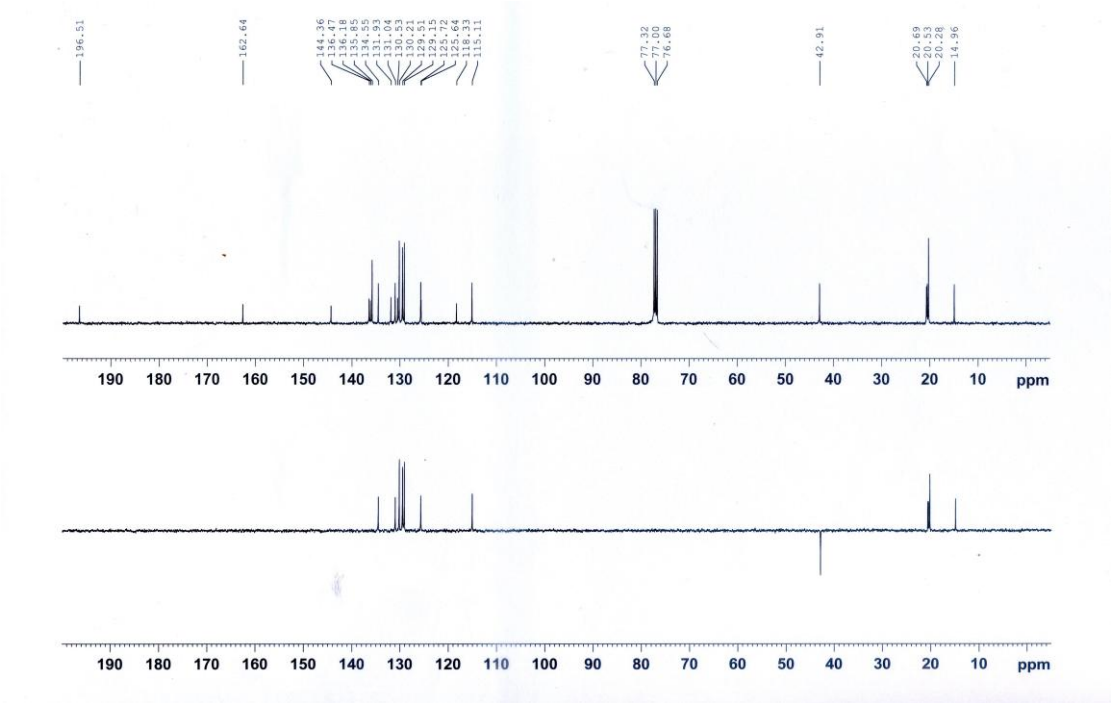
2q



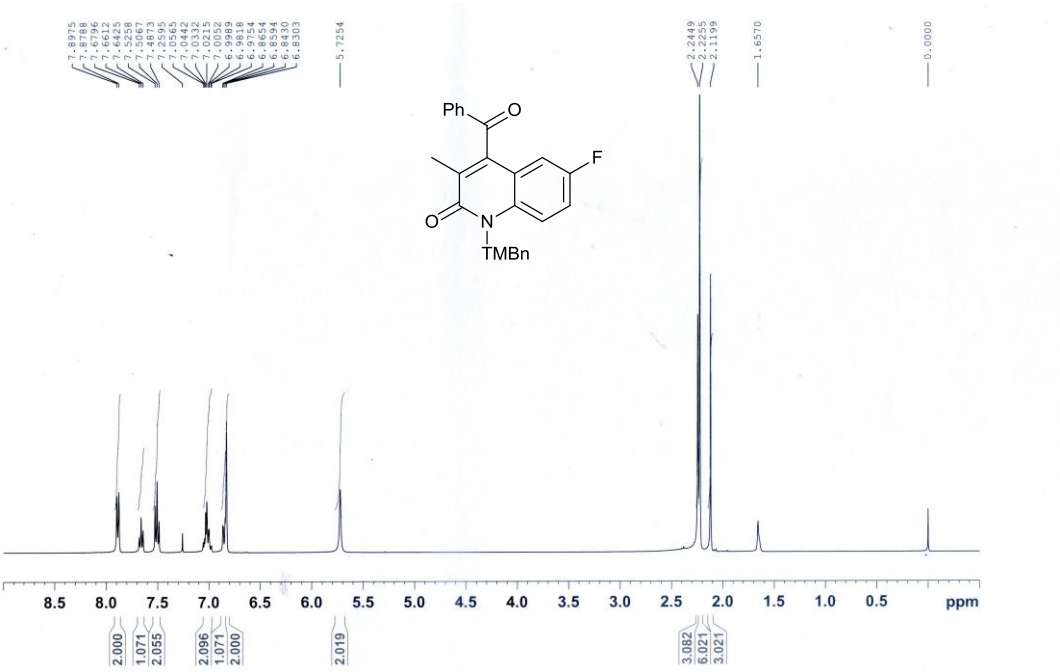


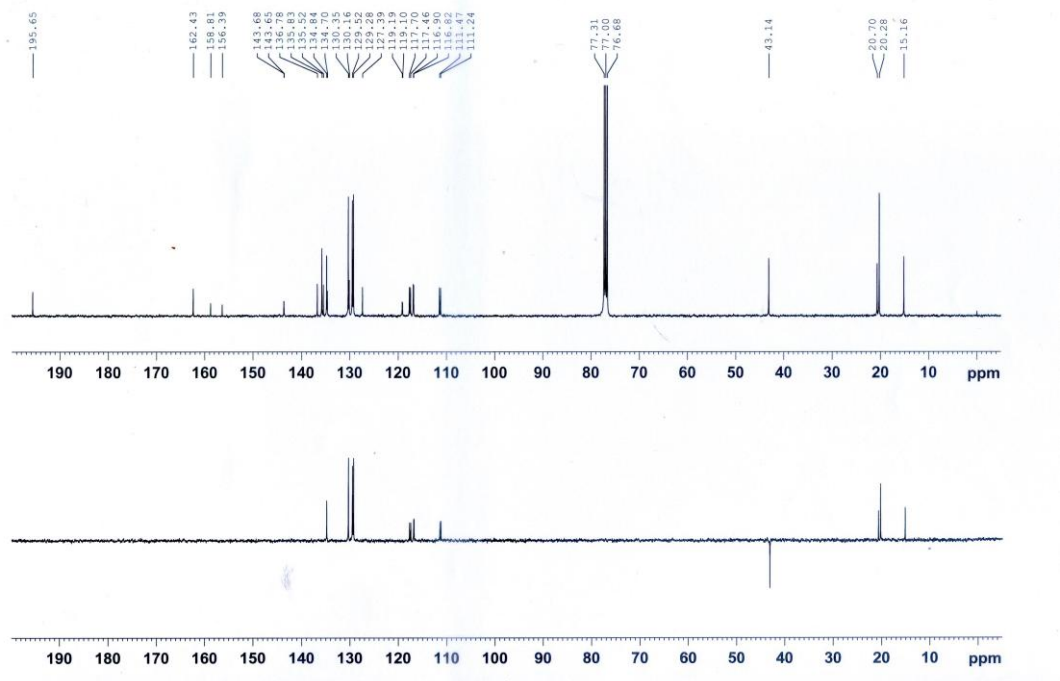
2r



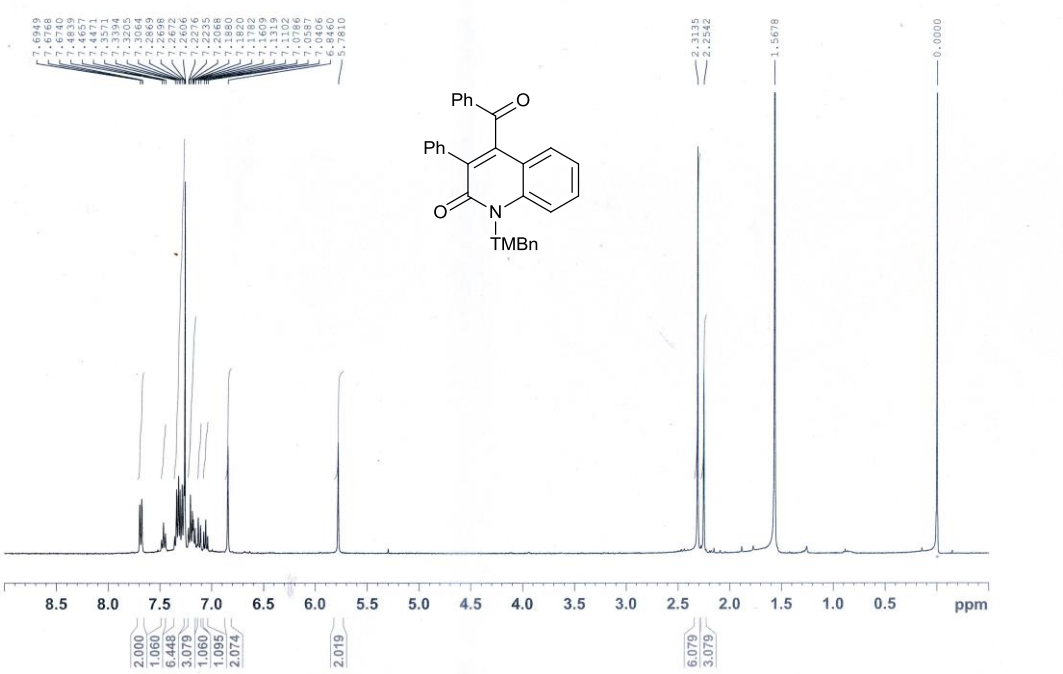


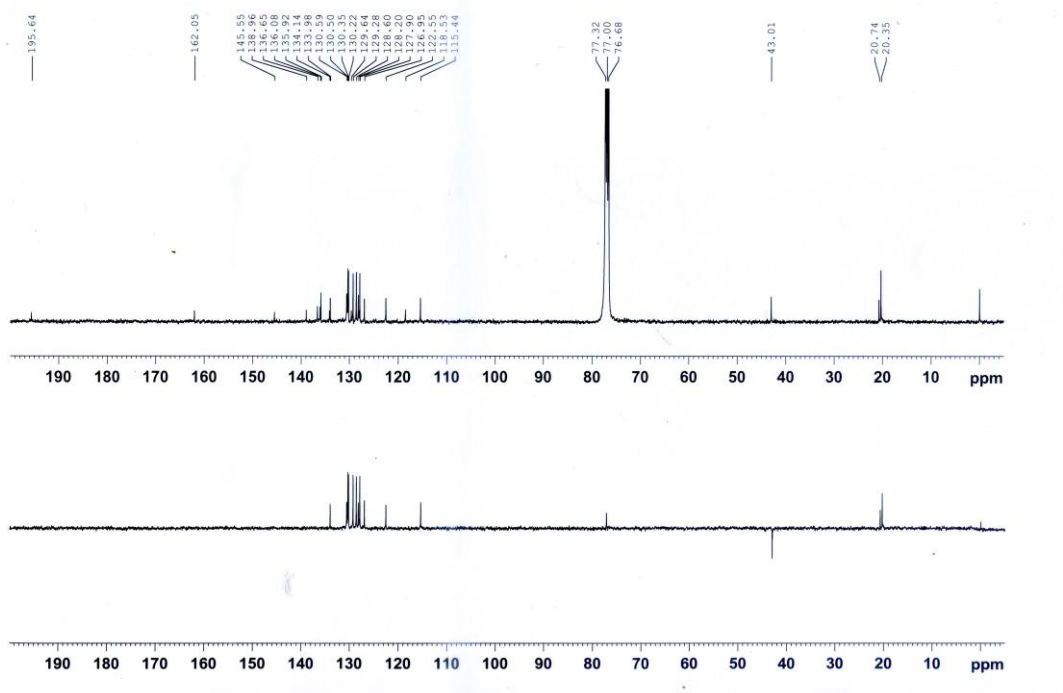
2s



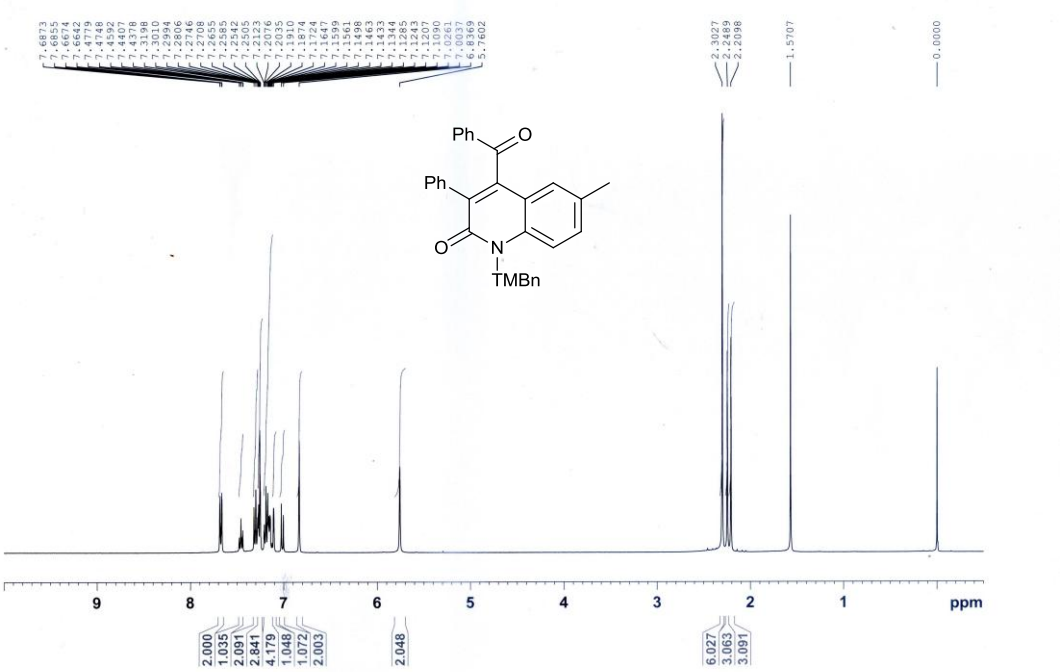


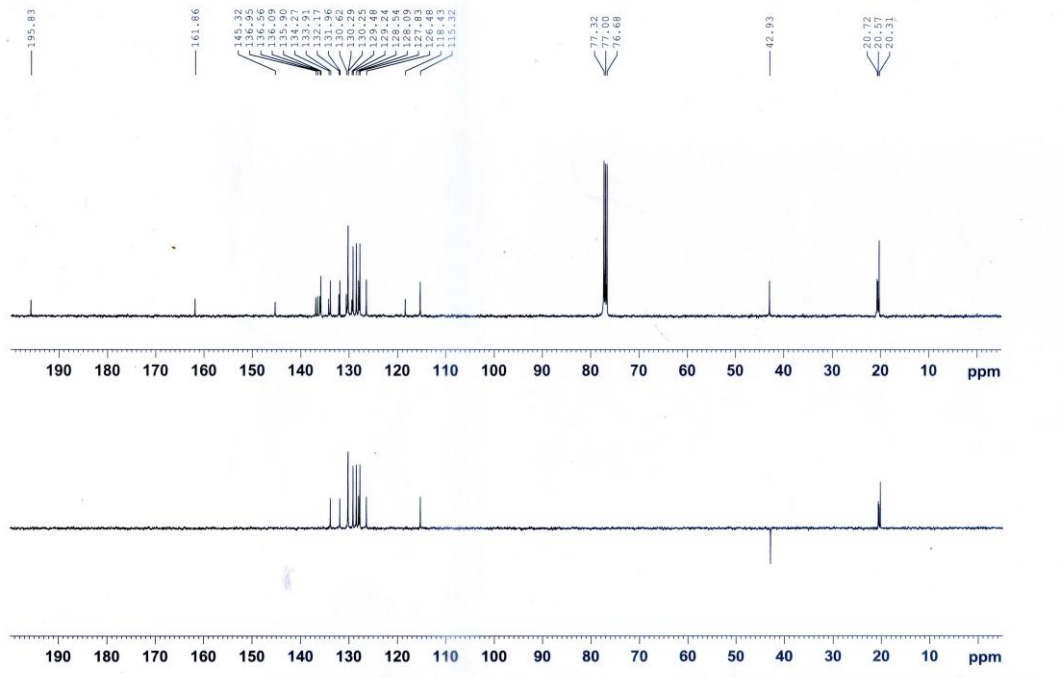
2t



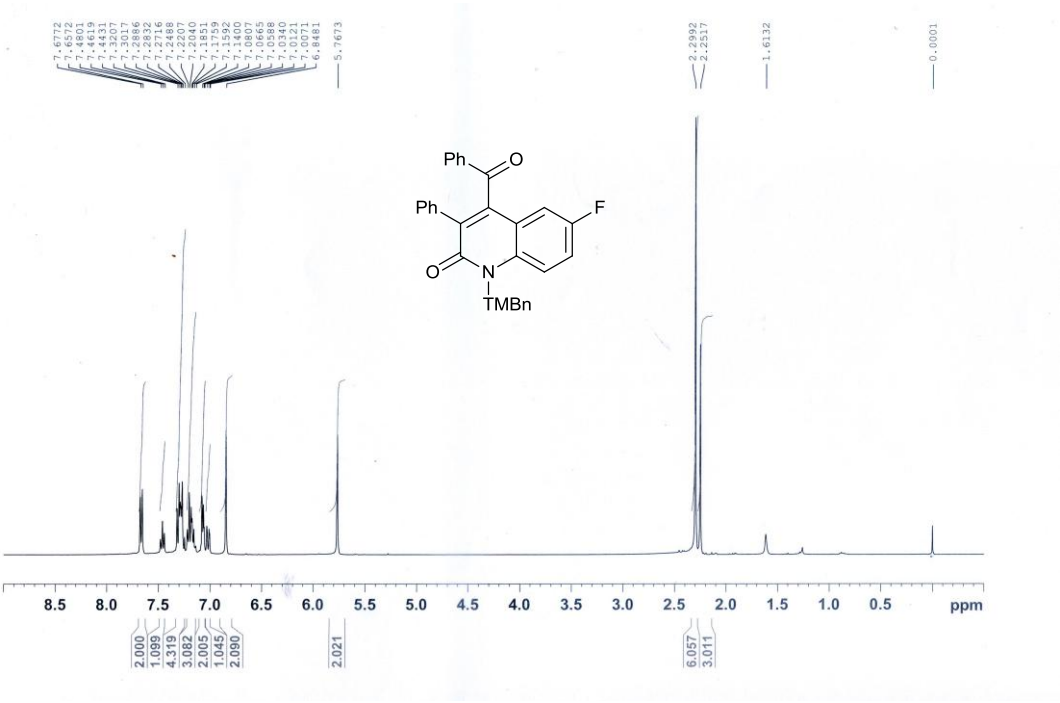


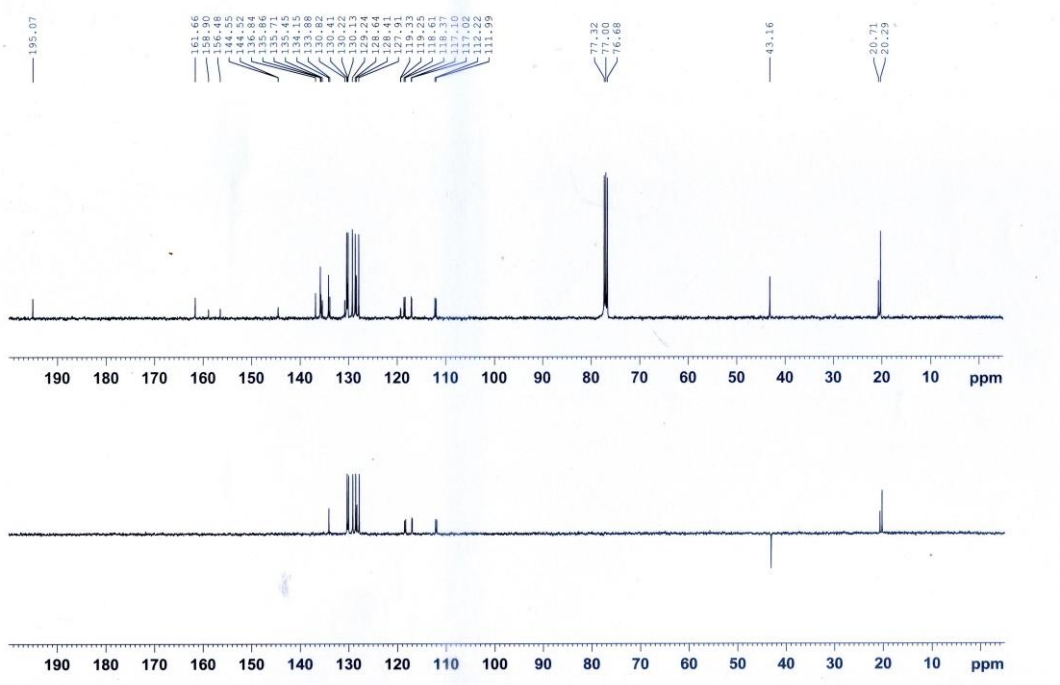
2u



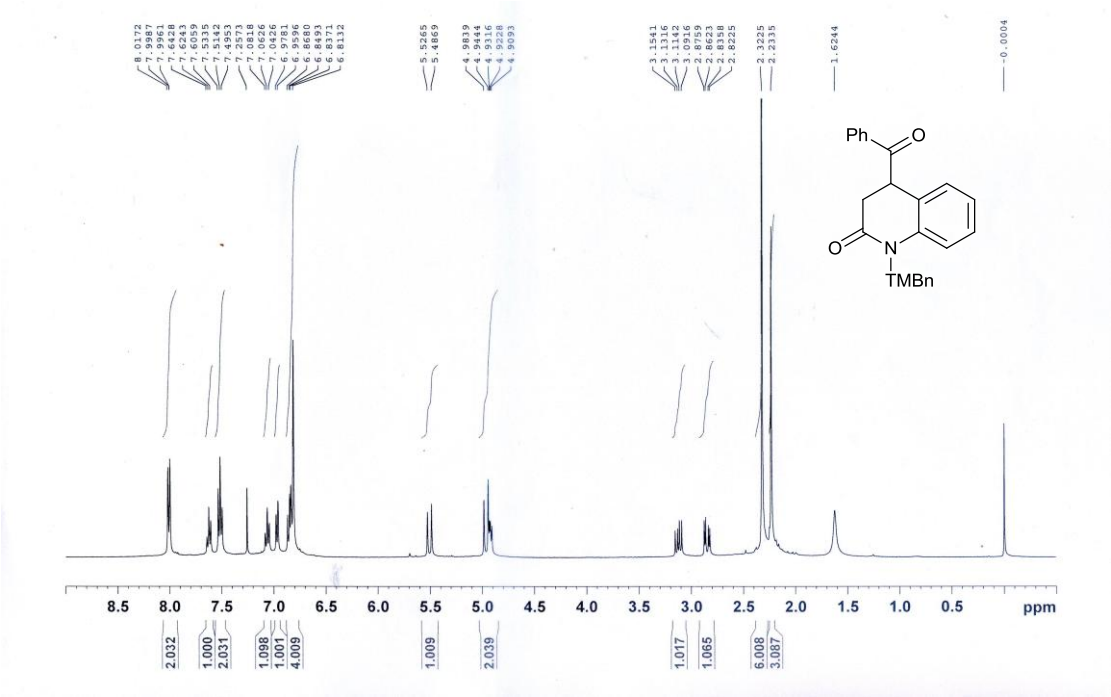


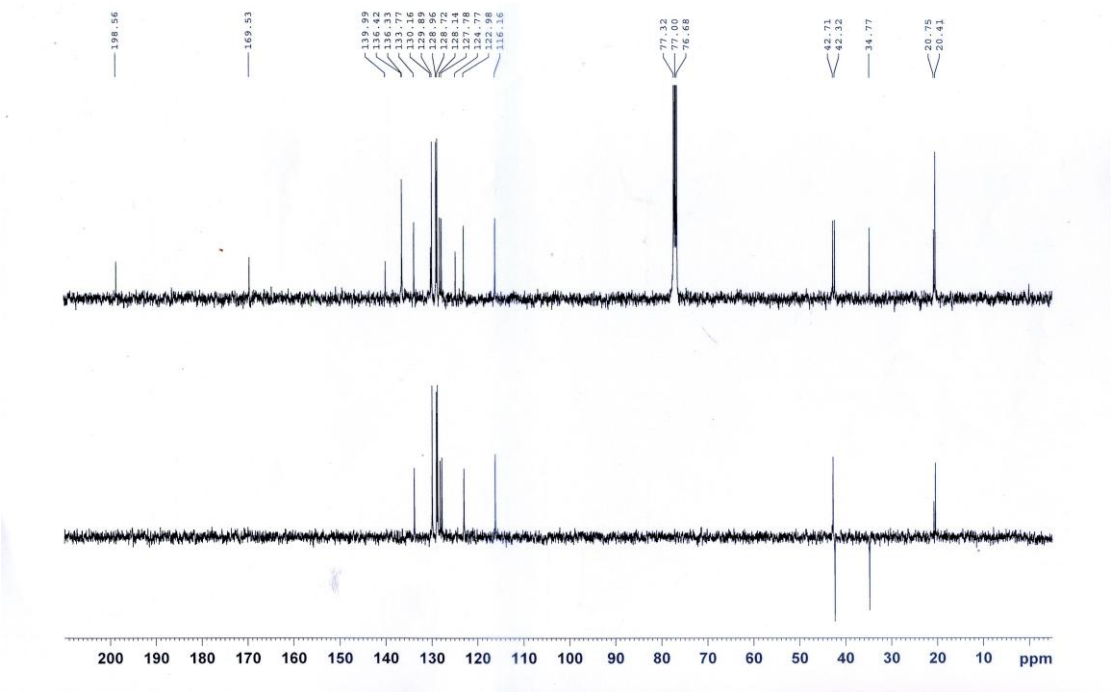
2v



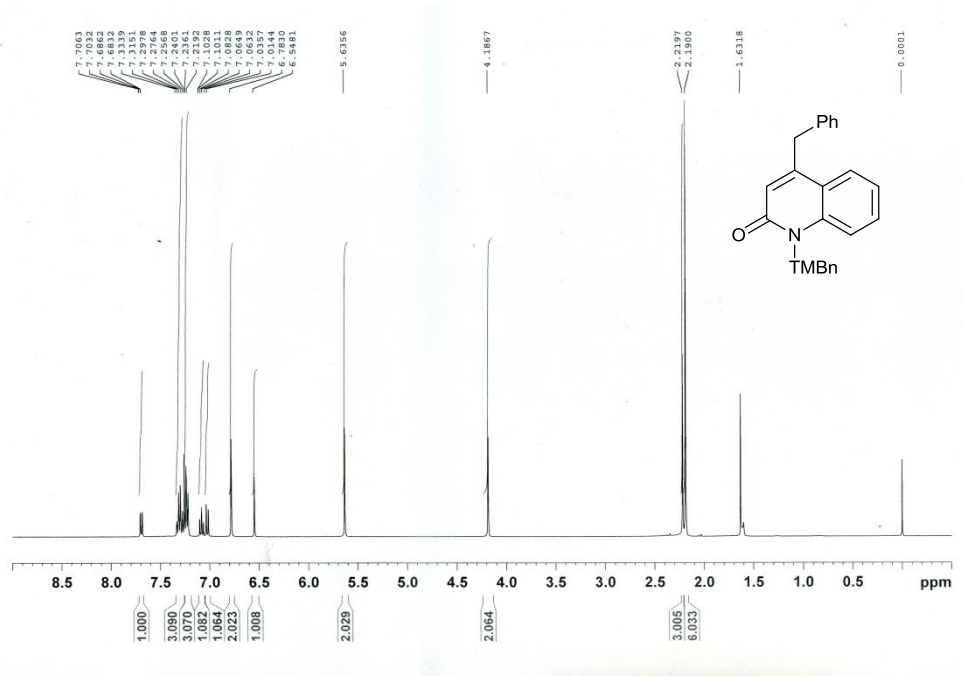


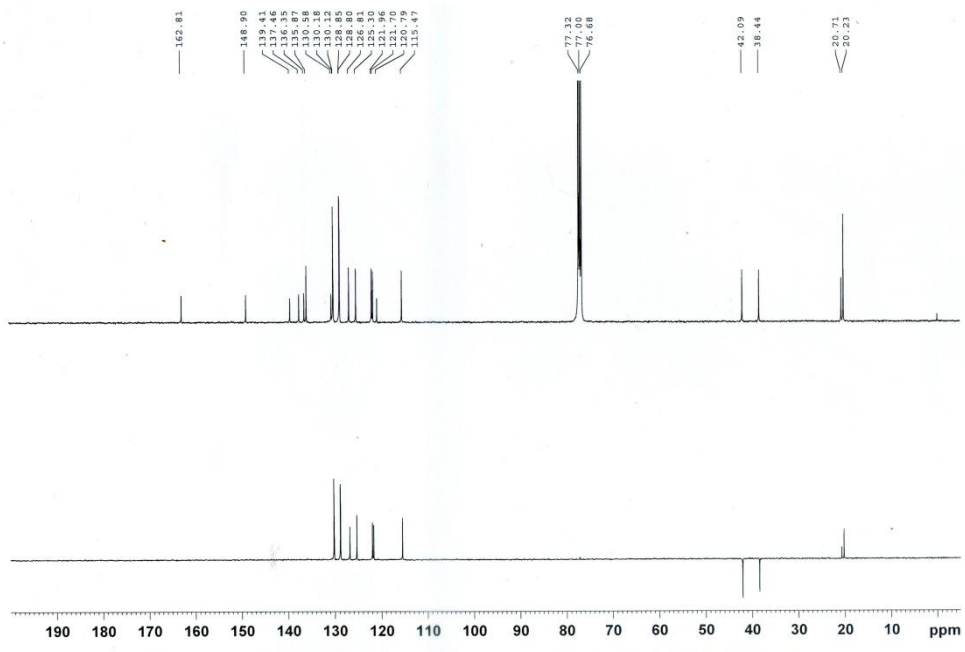
3a



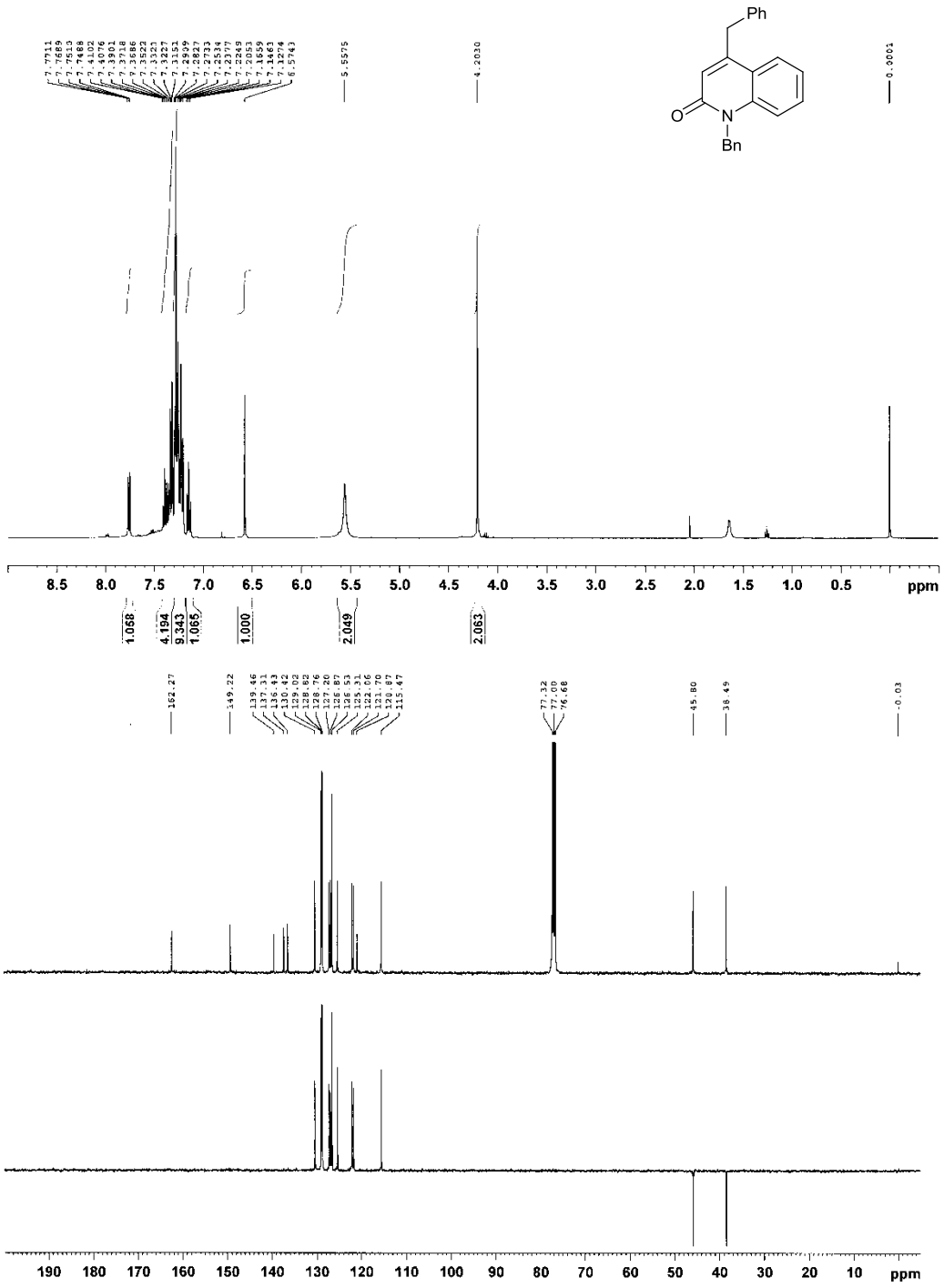


5a

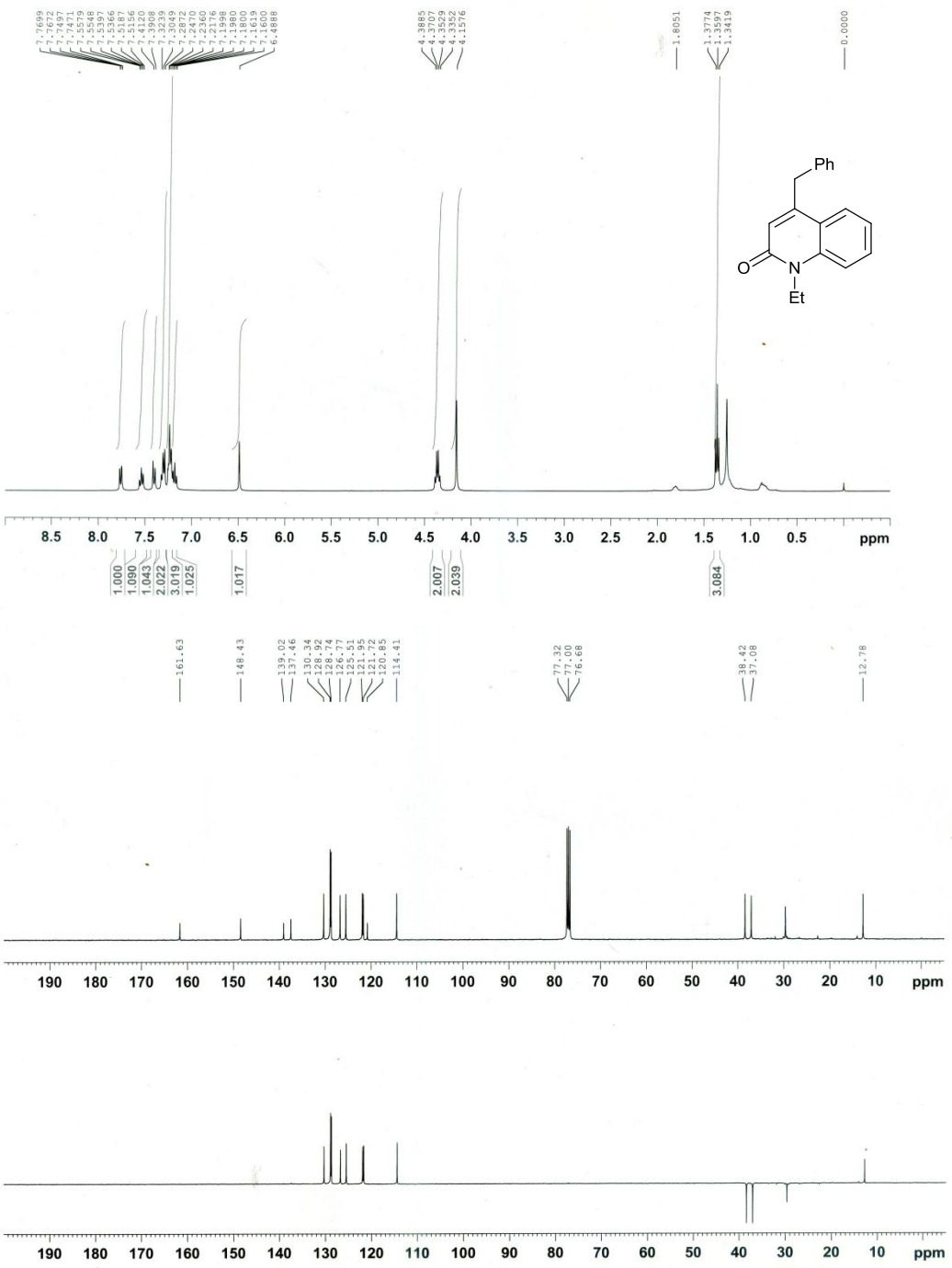

7.7063
7.7032
7.6862
7.6832
7.3139
7.3151
7.2978
7.2764
7.2668
7.2401
7.2361
7.2192
7.2028
7.1011
7.0828
7.0649
7.0493
7.0357
7.0144
6.7830
6.5481
5.6356
4.1867
2.2197
2.1900
1.6318
0.0001
Ph
O
N
TMBn
8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 ppm
1.000
3.090
3.070
1.082
1.064
2.023
1.008
2.029
2.064
3.005
6.033


162.81
148.90
139.41
137.46
136.35
135.87
131.58
130.38
130.12
128.85
128.80
126.51
125.30
121.96
121.70
120.79
115.47
77.32
77.00
76.68
42.09
38.44
20.71
20.23
190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm

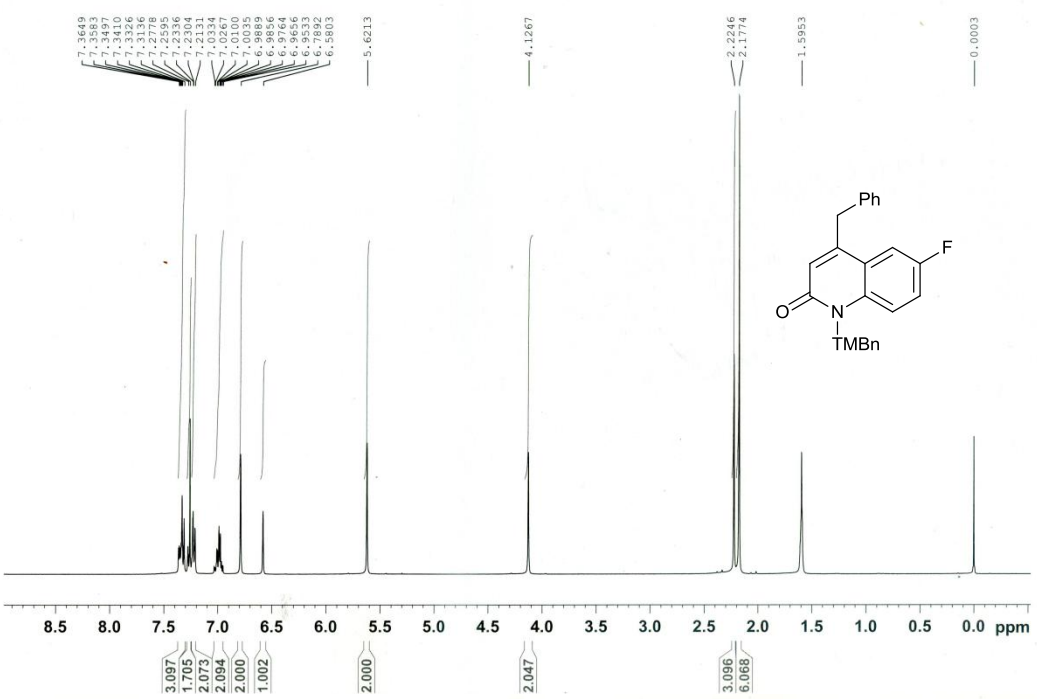
5b

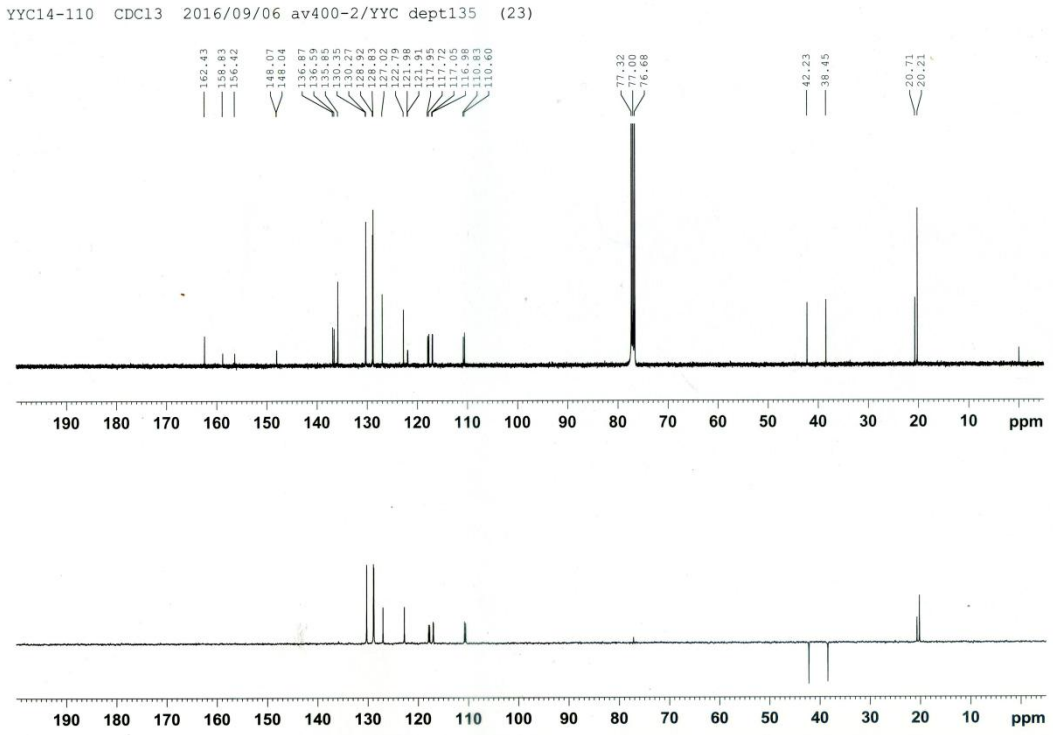


5c

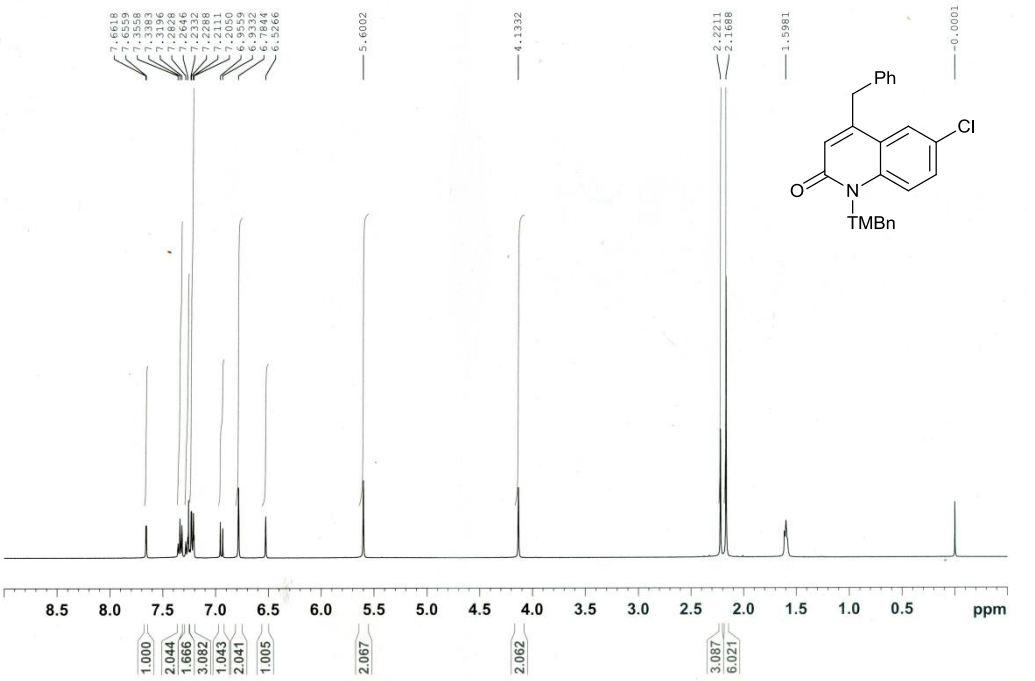


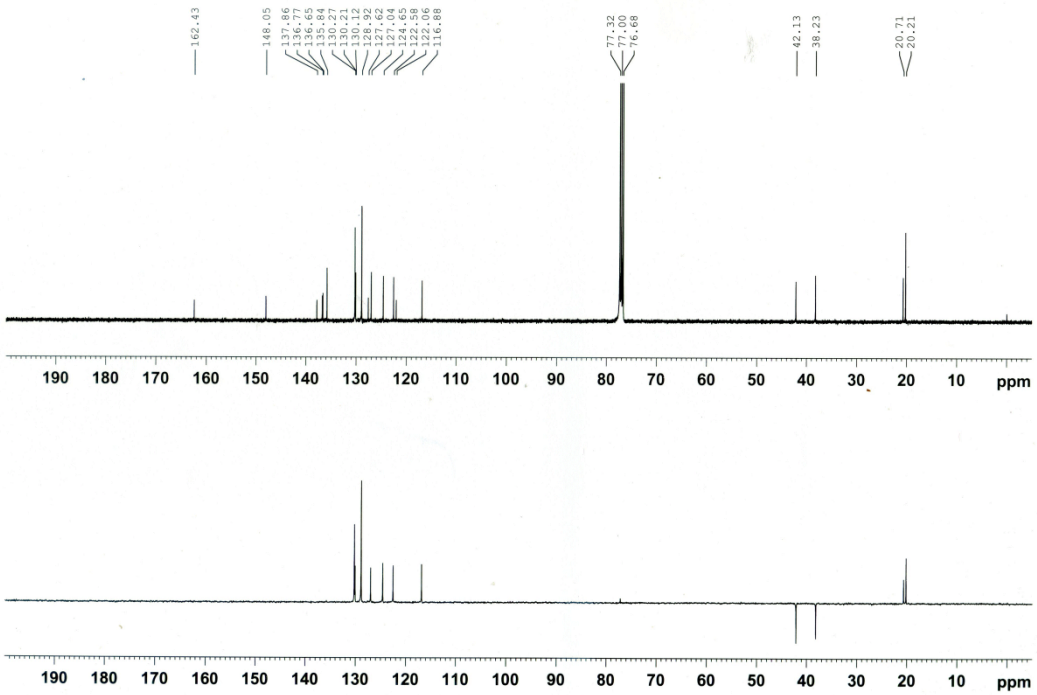
5e


7.3649
7.3583
7.3497
7.3410
7.3326
7.3136
7.2778
7.2595
7.2336
7.2304
7.2131
7.0384
7.0067
7.0100
7.0035
6.9889
6.9856
6.9764
6.9656
6.9533
6.7892
6.5803
5.6213
4.1267
2.2246
2.1774
1.5953
0.0003
Ph
F
O
N
TMBn
8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 ppm
3.097
1.705
2.073
2.094
2.000
1.002
2.000
2.047
3.096
6.068

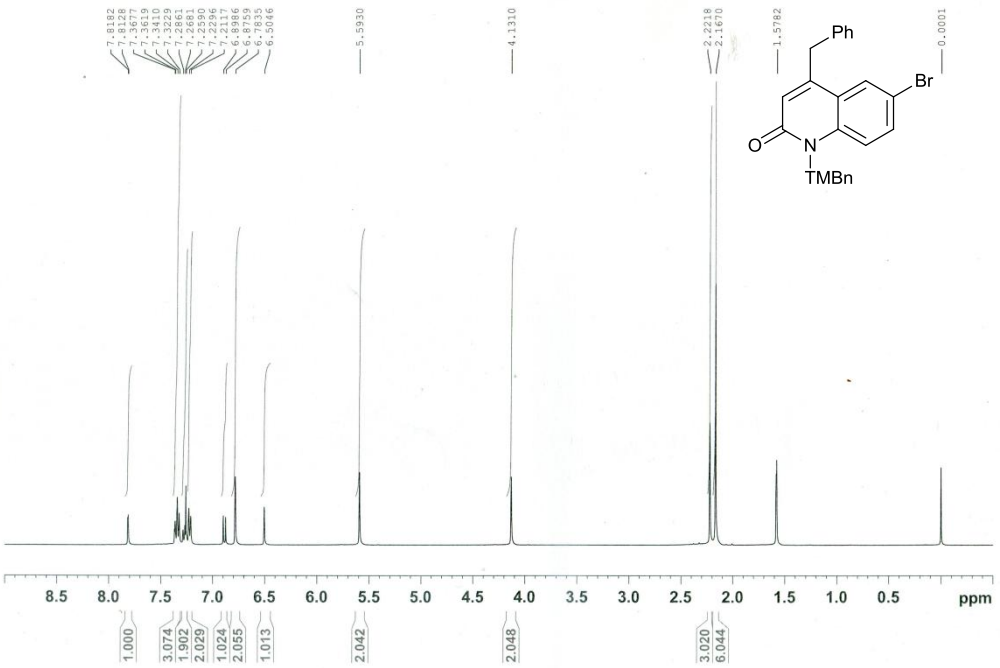

YYC14-110 CDCl3 2016/09/06 av400-2/YYC dept135 (23)
162.43
158.83
156.42
148.07
148.04
136.87
136.59
135.85
130.35
130.27
128.92
128.83
127.02
122.79
121.98
121.91
117.95
117.72
117.05
116.98
110.83
110.60
77.32
77.00
76.68
42.23
38.45
20.71
20.21
190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm

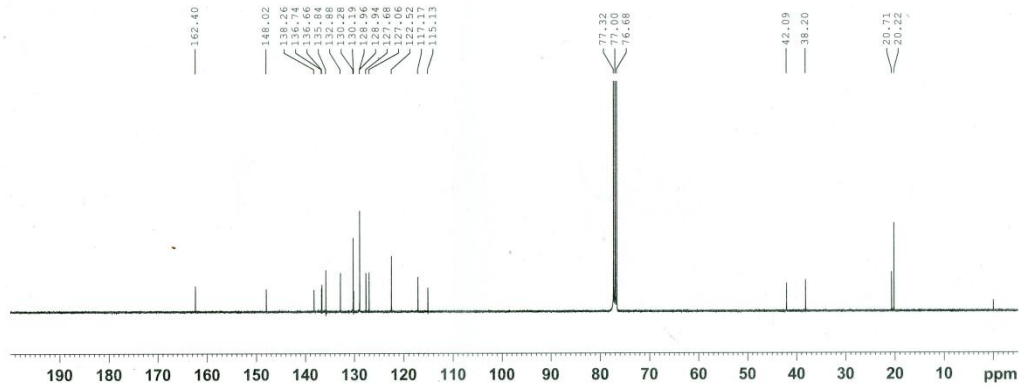
5f

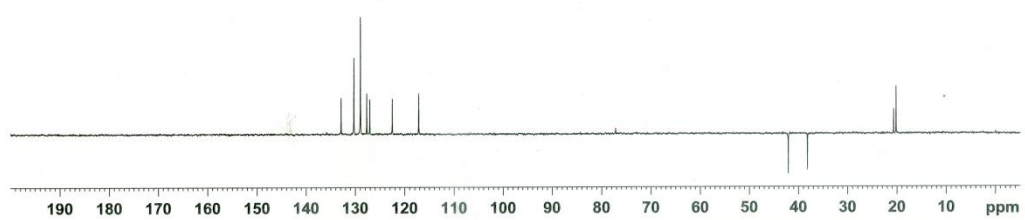

7.6618
7.6559
7.3558
7.3383
7.3196
7.2868
7.2646
7.2332
7.2288
7.2111
7.2050
6.9539
6.9332
6.7844
6.5266
5.6002
4.1332
2.2211
2.1688
1.5981
0.0001
Ph
Cl
O
N
TMBn
8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 ppm
1.000
2.044
1.666
3.082
1.043
2.041
1.005
2.067
2.062
3.087
6.021


162.43
148.05
137.86
136.77
136.45
135.84
130.27
130.21
130.12
129.82
129.62
127.04
124.65
122.58
122.06
116.88
77.32
77.00
76.68
42.13
38.23
20.71
20.21
190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm

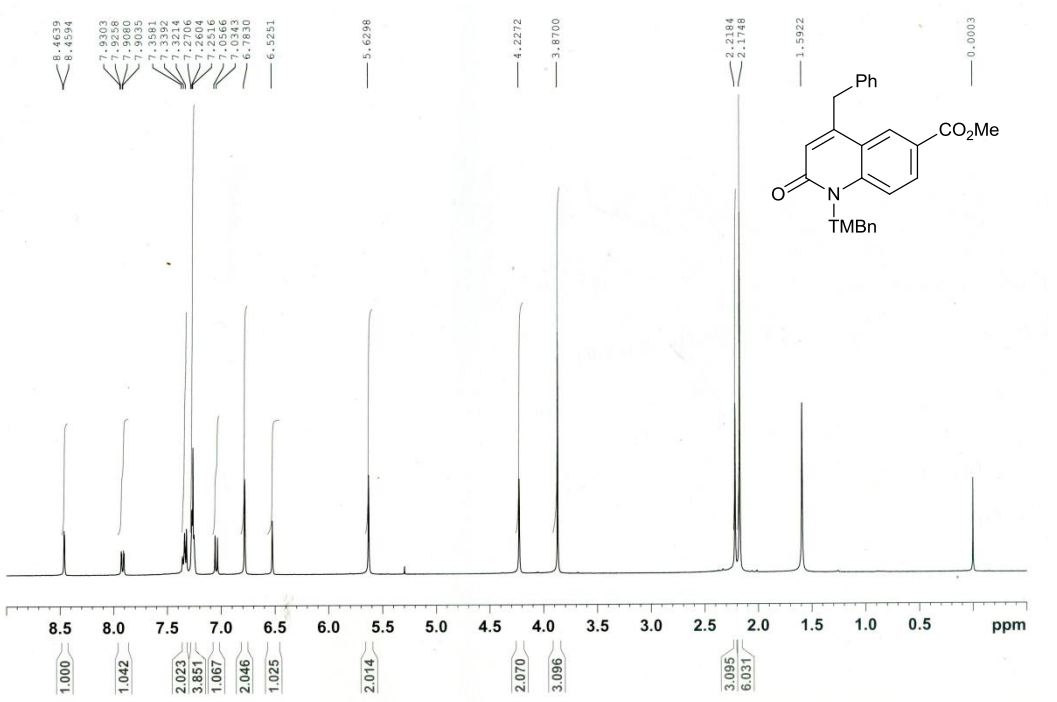
5g

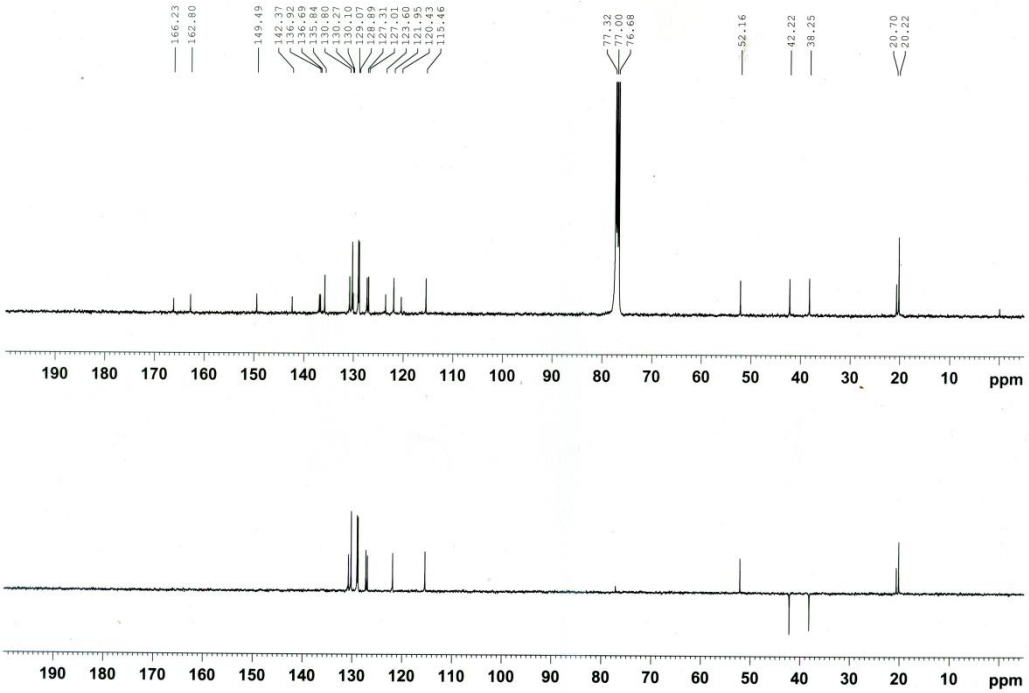

7.8182
7.8178
7.3677
7.3619
7.3410
7.3229
7.2881
7.2601
7.2590
7.2296
7.2117
6.8756
6.8756
6.7835
6.5046
5.5930
4.1310
2.2218
2.1670
1.5782
0.0001
Ph
Br
O
N
TMBn
8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 ppm
1.000
3.074
1.902
2.029
1.024
2.055
1.013
2.042
2.048
3.020
6.044


162.40
148.02
138.26
136.74
136.66
135.84
132.88
130.28
130.19
128.96
128.64
127.68
127.06
122.52
117.17
115.13
77.32
77.00
76.68
42.09
38.20
20.71
20.22
190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm

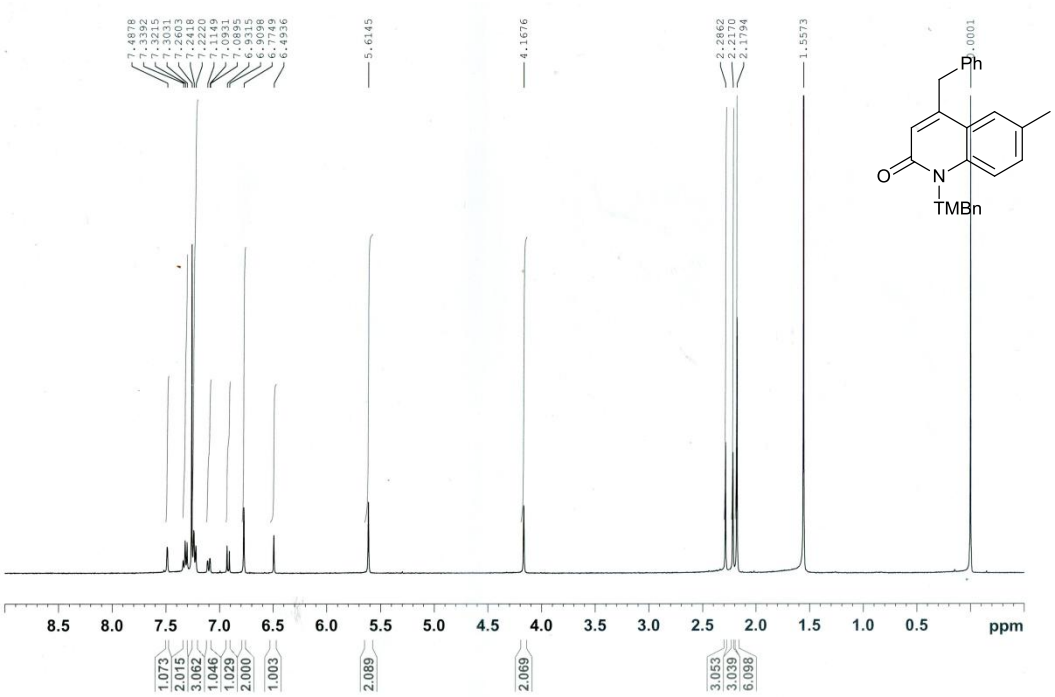

190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm

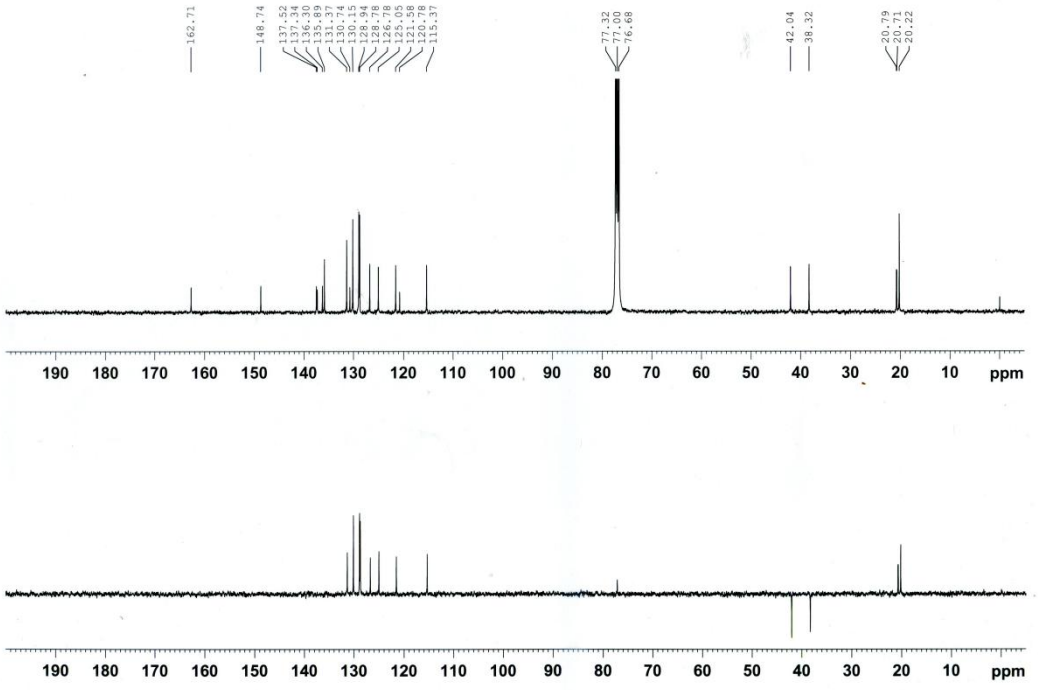
5h


8.4639
8.4594
7.9303
7.9288
7.9080
7.9035
7.3581
7.3392
7.3214
7.2766
7.2604
7.2516
7.0566
7.0343
6.7830
6.5251
5.6298
4.2272
3.8700
2.2184
2.1748
1.5922
0.0003
Ph
CO2Me
O
N
TMBn
ppm
1.000
1.042
2.023
3.851
1.067
2.046
1.025
2.014
2.070
3.096
3.095
6.031

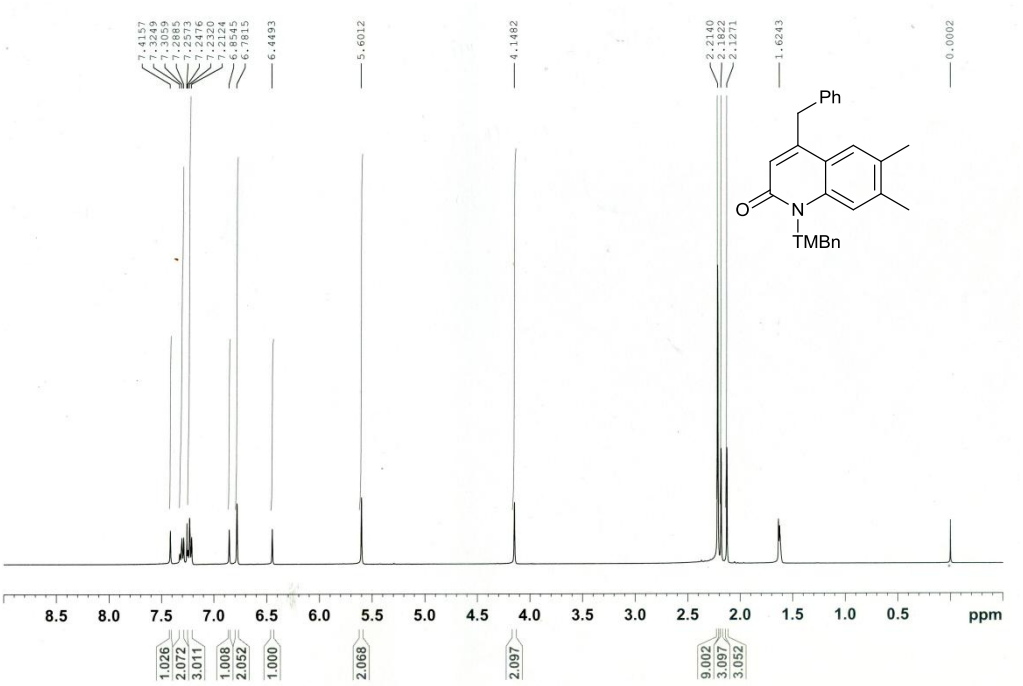

166.23
162.80
149.49
142.37
136.92
136.69
135.84
135.80
130.27
130.10
129.07
128.89
127.31
127.01
123.60
121.95
120.43
115.46
77.32
77.00
76.68
52.16
42.22
38.25
20.70
20.22
ppm

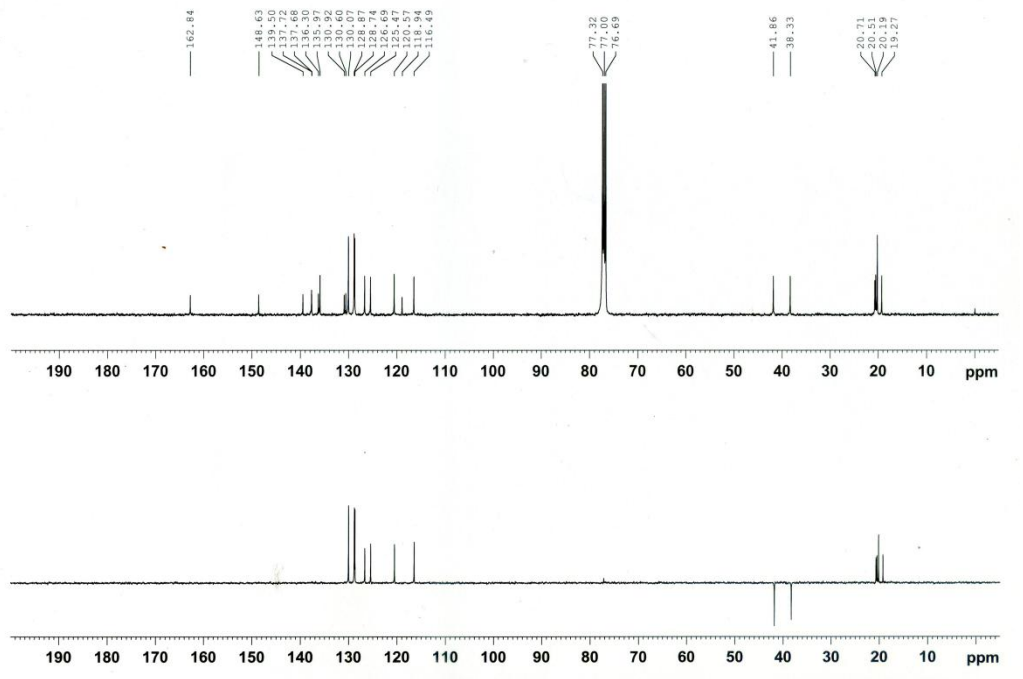
5i


7.4878
7.3392
7.3215
7.3031
7.2603
7.2418
7.2220
7.1149
7.0931
7.0895
6.9135
6.9098
6.7749
6.4936
5.6145
4.1676
2.2862
2.2170
2.1794
1.5573
1.0001
Ph
O
N
TMBn
8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 ppm
1.073
2.015
3.062
1.046
1.029
2.000
1.003
2.089
2.069
3.053
3.039
6.098

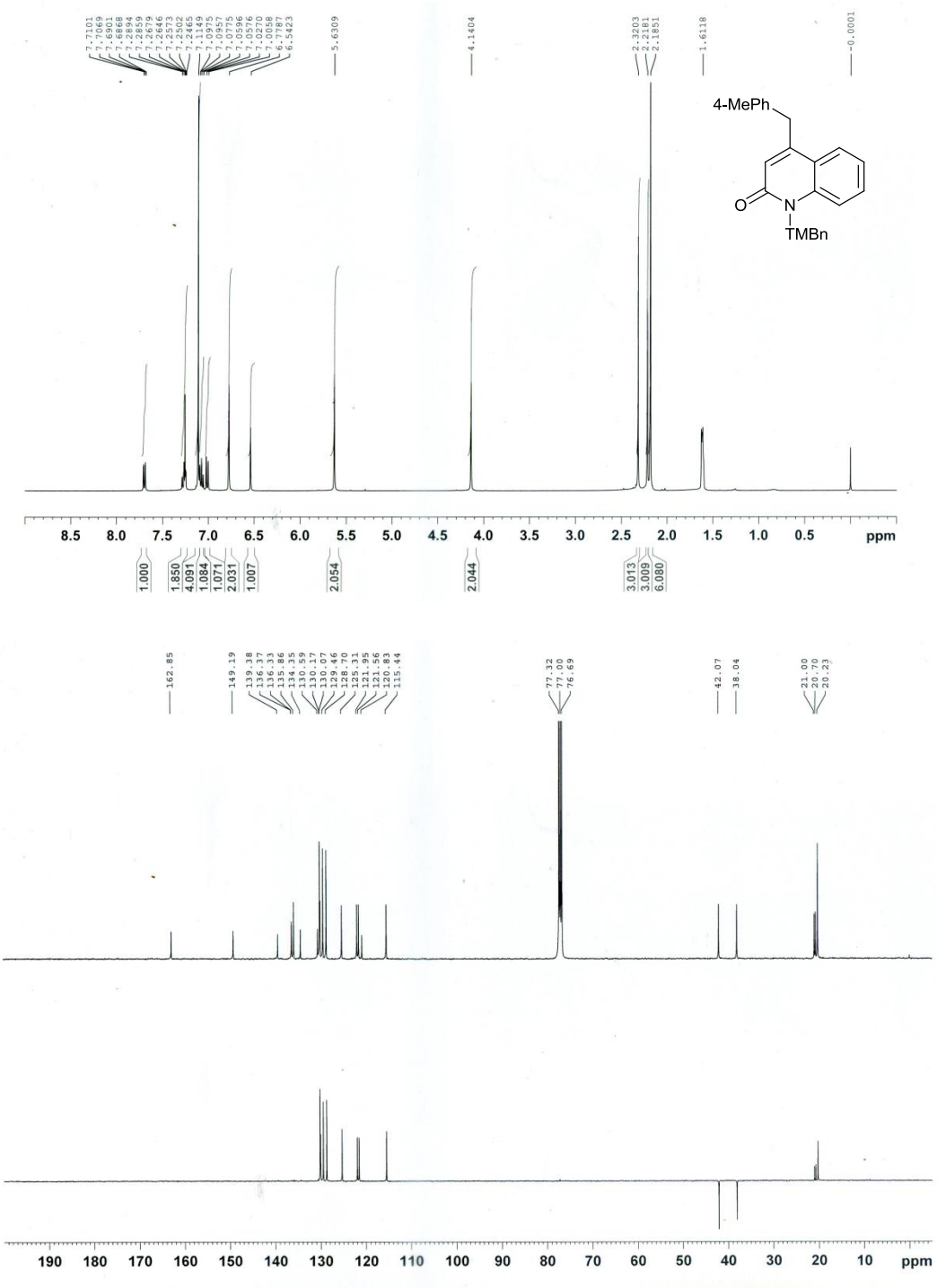

162.71
148.74
137.52
137.34
136.30
135.89
131.37
130.74
130.15
129.04
128.78
126.78
125.05
121.58
120.78
115.37
77.32
77.00
76.68
42.04
38.32
20.79
20.71
20.22
190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm

5j

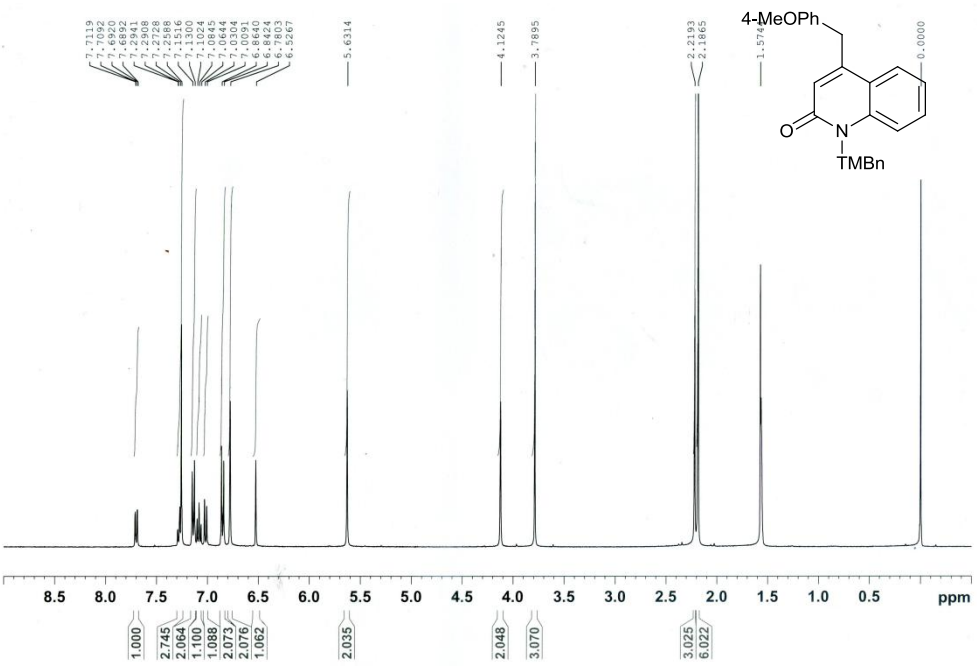

7.4157
7.3249
7.3059
7.2885
7.2373
7.2276
7.2320
7.2124
6.8545
6.7815
6.4493
5.6012
4.1482
2.2140
2.1822
2.1271
1.6243
0.0002
Ph
O
N
TMBn
8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 ppm
1.026
2.072
3.011
1.008
2.052
1.000
2.068
2.097
9.002
3.097
3.052

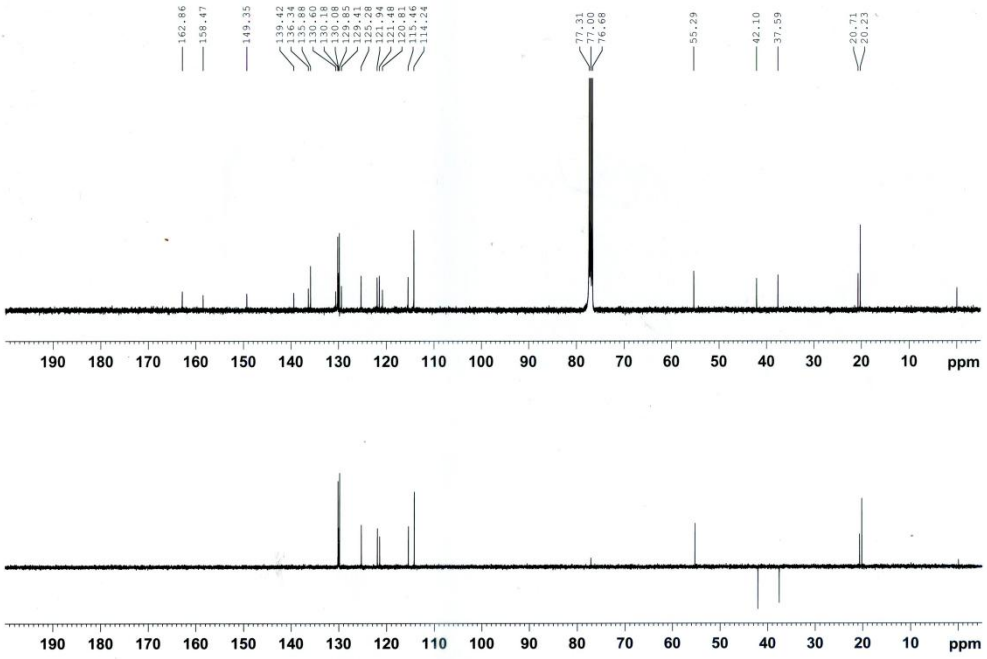

162.84
148.63
139.50
137.72
137.68
136.30
135.97
130.82
130.60
130.07
128.87
128.74
126.69
126.37
120.57
118.94
116.49
77.32
77.00
76.69
41.86
38.33
20.71
20.51
20.19
19.27
190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm

5k



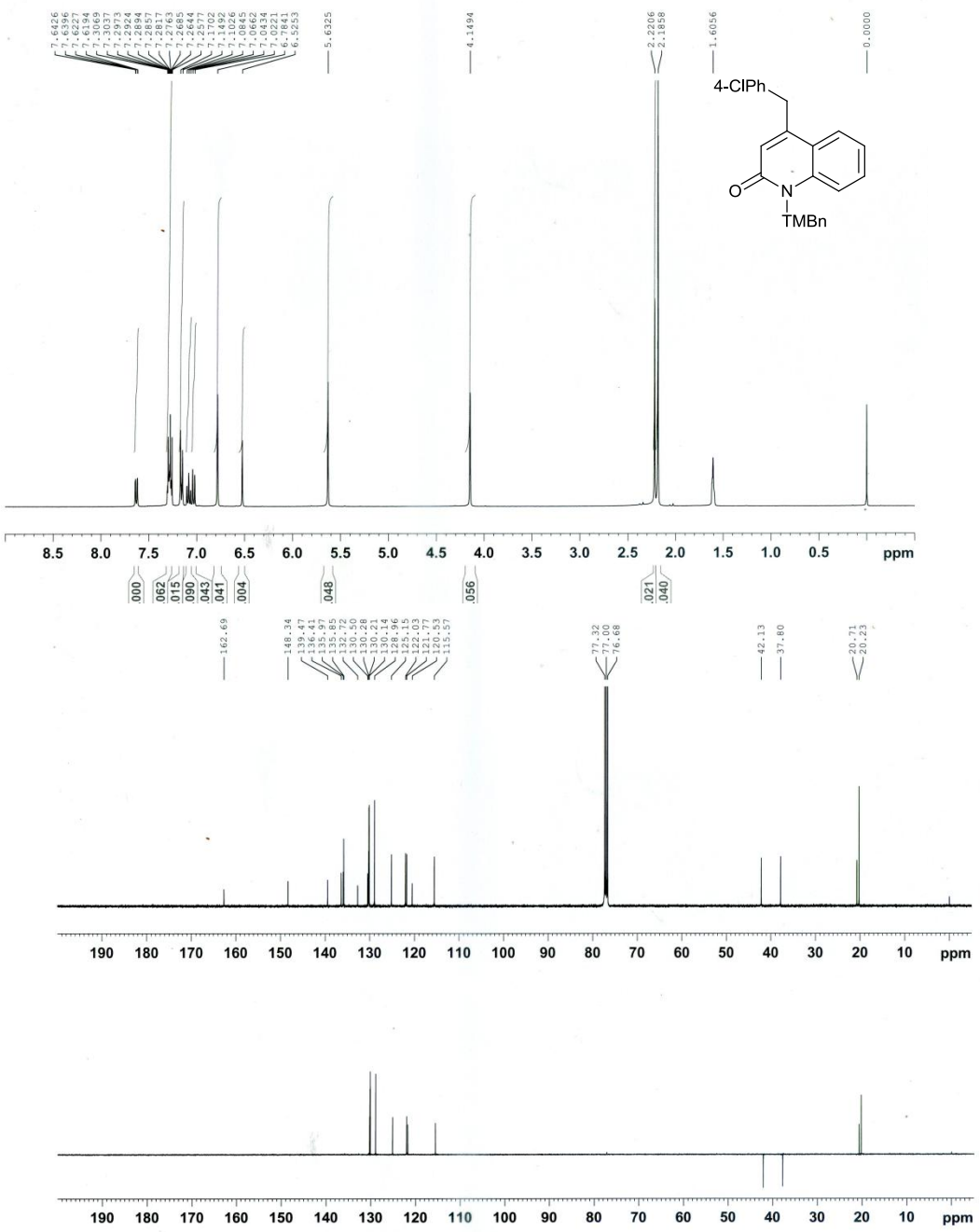
5l


7.7119
7.7092
7.6920
7.6892
7.2941
7.2908
7.2728
7.2588
7.1316
7.1300
7.1024
7.0845
7.0644
7.0004
7.0091
6.8640
6.8424
6.7803
6.5867
5.6314
4.1245
3.7895
2.2193
2.1865
1.5747
0.0000
4-MeOPh
O
N
TMBn
8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 ppm
1.000
2.745
2.064
1.100
1.088
2.073
2.076
1.062
2.035
2.048
3.070
3.025
6.022

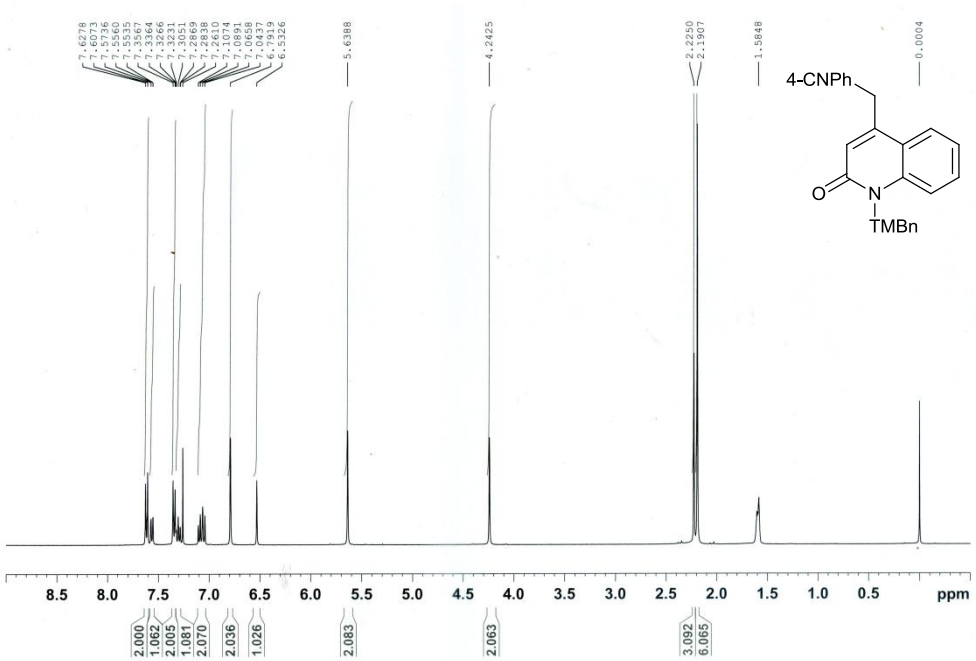

162.86
158.47
149.35
139.42
136.34
135.88
130.60
130.18
130.08
129.85
129.41
125.28
121.94
121.48
120.81
115.46
114.24
77.31
77.00
76.68
55.29
42.10
37.59
20.71
20.23
190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm

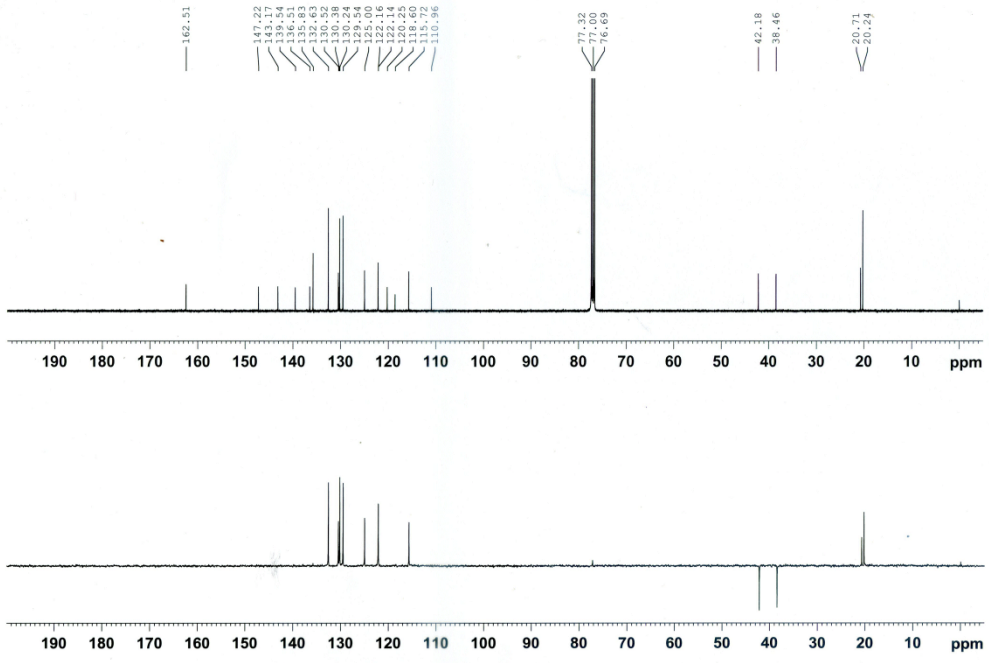
190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm

5m

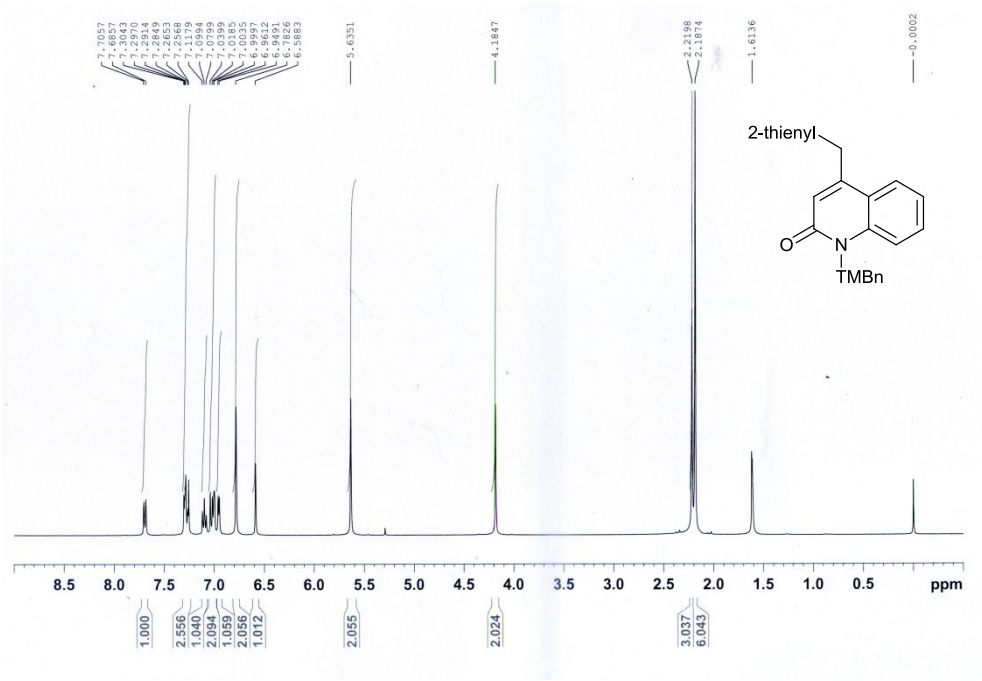


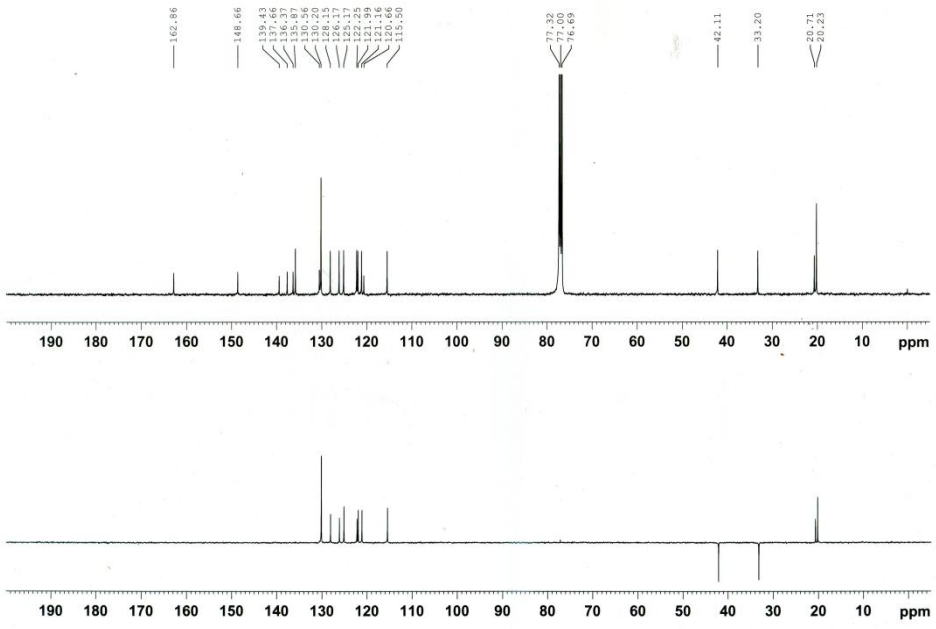
5n


7.6278
7.6073
7.5736
7.5560
7.5535
7.3567
7.3364
7.3166
7.3231
7.3051
7.2869
7.2688
7.2610
7.1074
7.0891
7.0658
7.0437
6.7919
6.5326
5.6388
4.2425
2.2250
2.1907
1.5848
0.0004
4-CNPh
O
N
TMBn
8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 ppm
2.000
1.062
2.005
1.081
2.070
2.036
1.026
2.083
2.063
3.092
6.065

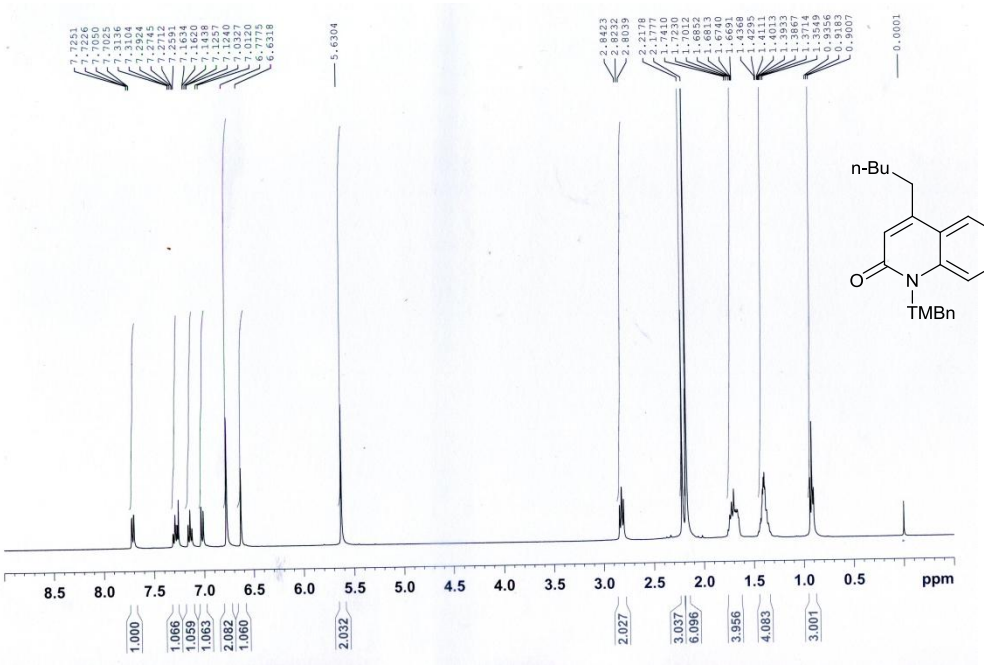

162.51
147.22
143.17
139.54
136.51
135.81
132.63
130.52
130.38
130.24
129.54
125.00
122.16
122.14
120.25
118.60
115.72
110.96
77.32
77.00
76.69
42.18
38.46
20.71
20.24
190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm

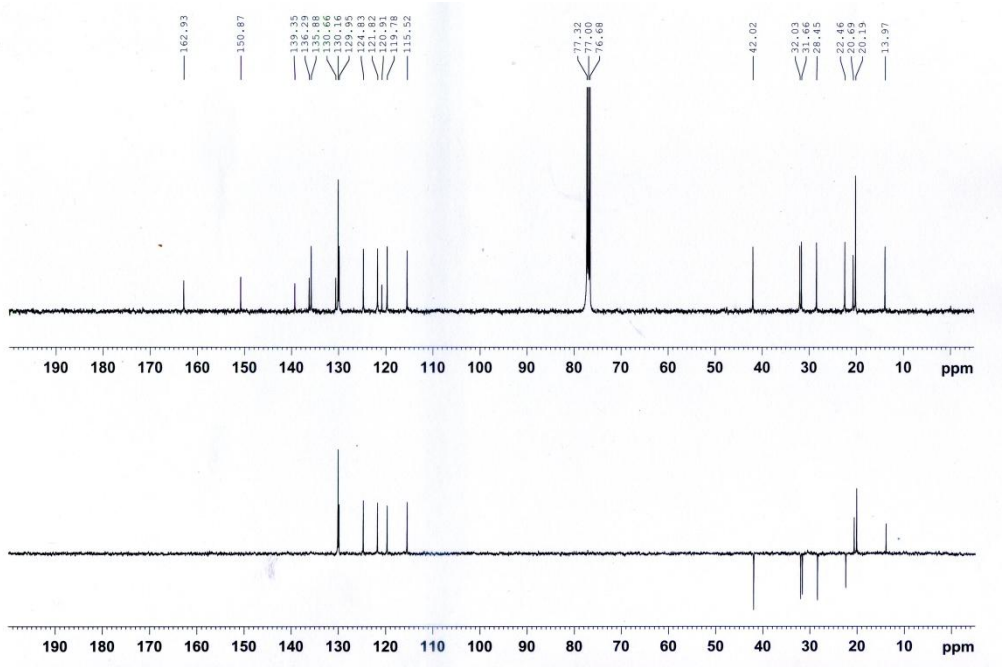
5o


7.7057
7.6857
7.3043
7.2970
7.2914
7.2849
7.2653
7.2568
7.2519
7.0994
7.0799
7.0399
7.0135
7.0035
6.9997
6.9612
6.9491
6.9396
6.5883
5.6351
4.1847
2.2198
2.1874
1.6136
-0.0002
2-thienyl
O
N
TMBn
8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 ppm
1.000
2.556
1.040
2.094
1.059
2.056
1.012
2.055
2.024
3.037
6.043

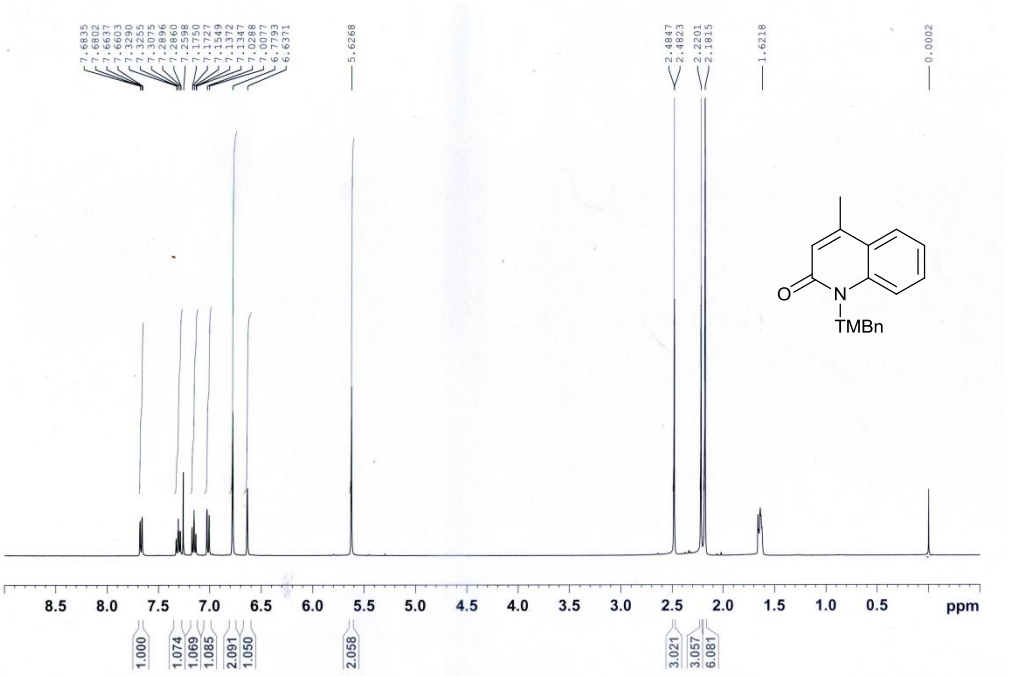

162.86
148.66
139.43
137.66
136.77
135.87
130.56
130.20
128.15
126.17
125.17
122.25
121.49
121.16
120.66
115.50
77.32
77.00
76.69
42.11
33.20
20.71
20.23
190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm

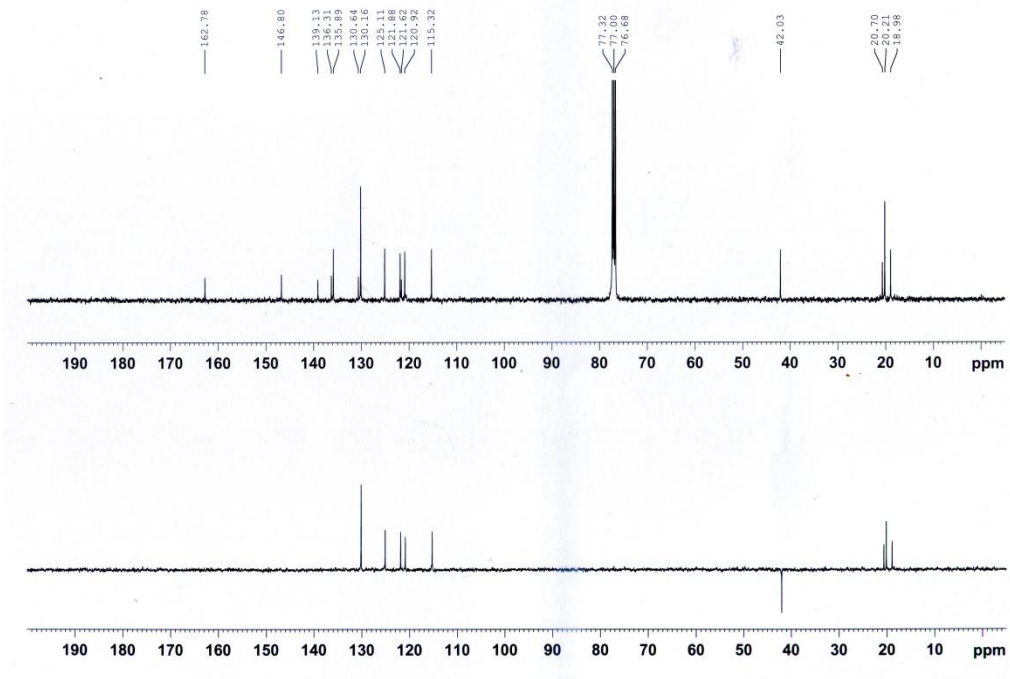
5p



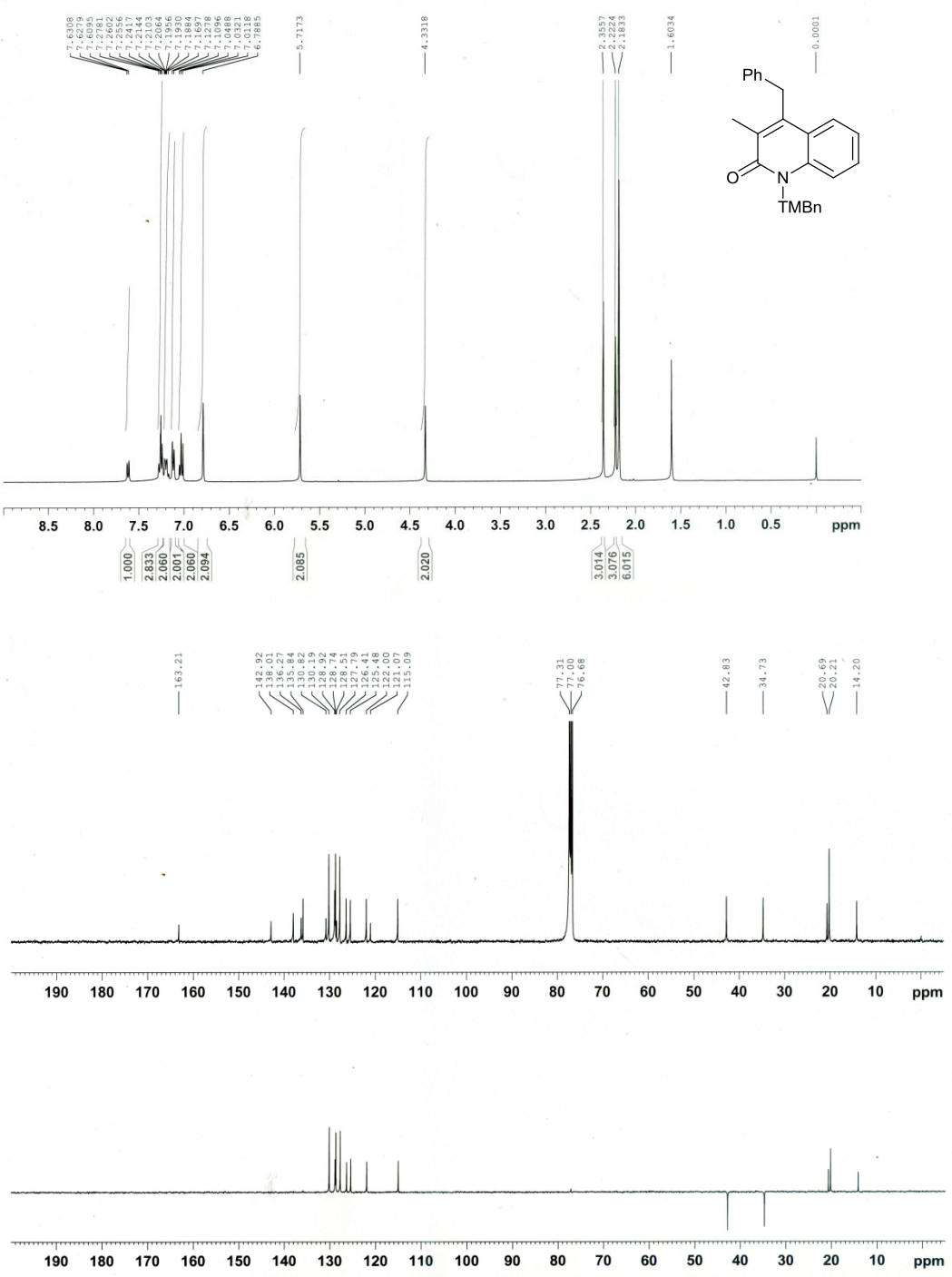


5q

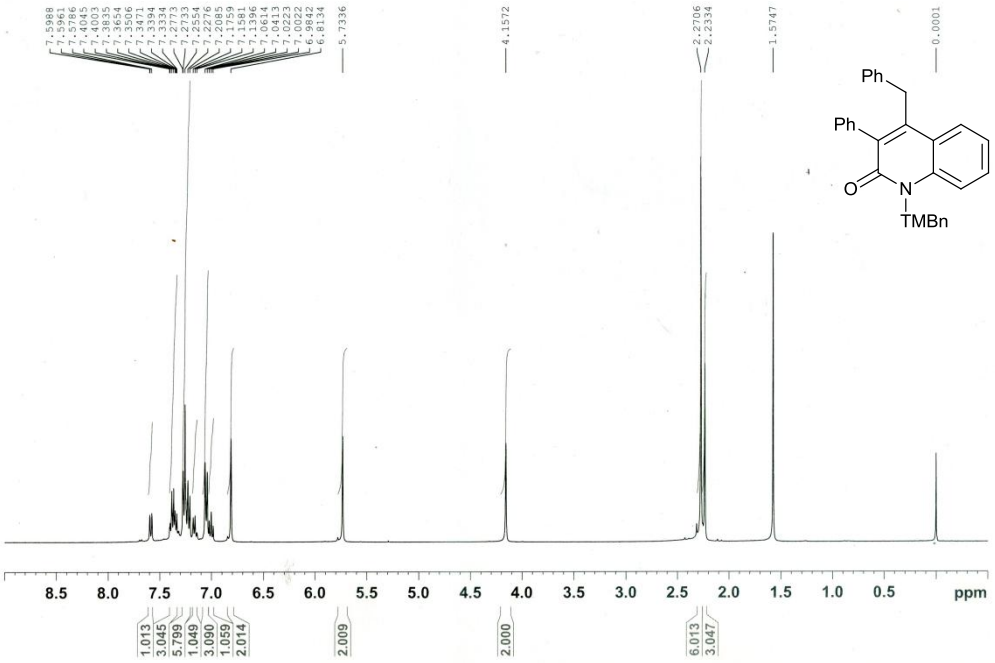

7.6835
7.6802
7.6637
7.6603
7.3290
7.3255
7.3095
7.2986
7.2860
7.2598
7.1750
7.1527
7.1549
7.1372
7.1347
7.0288
7.0077
6.7753
6.6371
5.6268
2.4847
2.4823
2.2201
2.1815
1.6218
0.0002
O
N
TMBn
8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 ppm
1.000
1.074
1.069
1.085
2.091
1.050
2.058
3.021
3.057
6.081

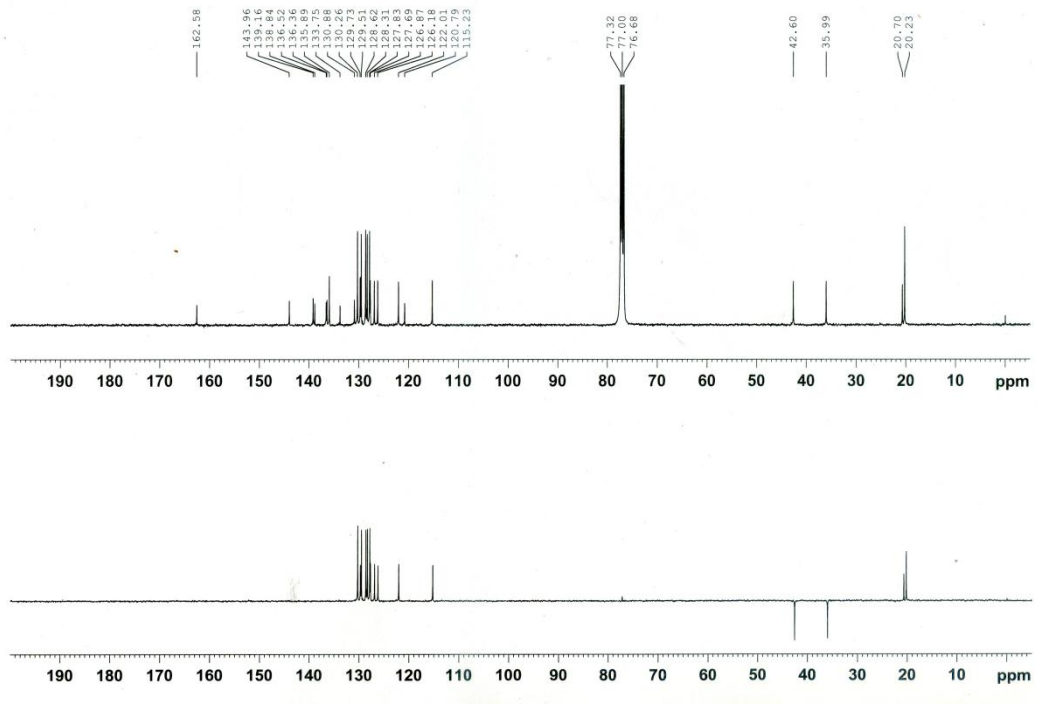

162.78
146.80
139.13
136.31
135.89
130.64
130.16
125.11
121.88
121.62
120.92
115.32
77.32
77.00
76.68
42.03
20.70
20.21
18.98
190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm

5r



5s

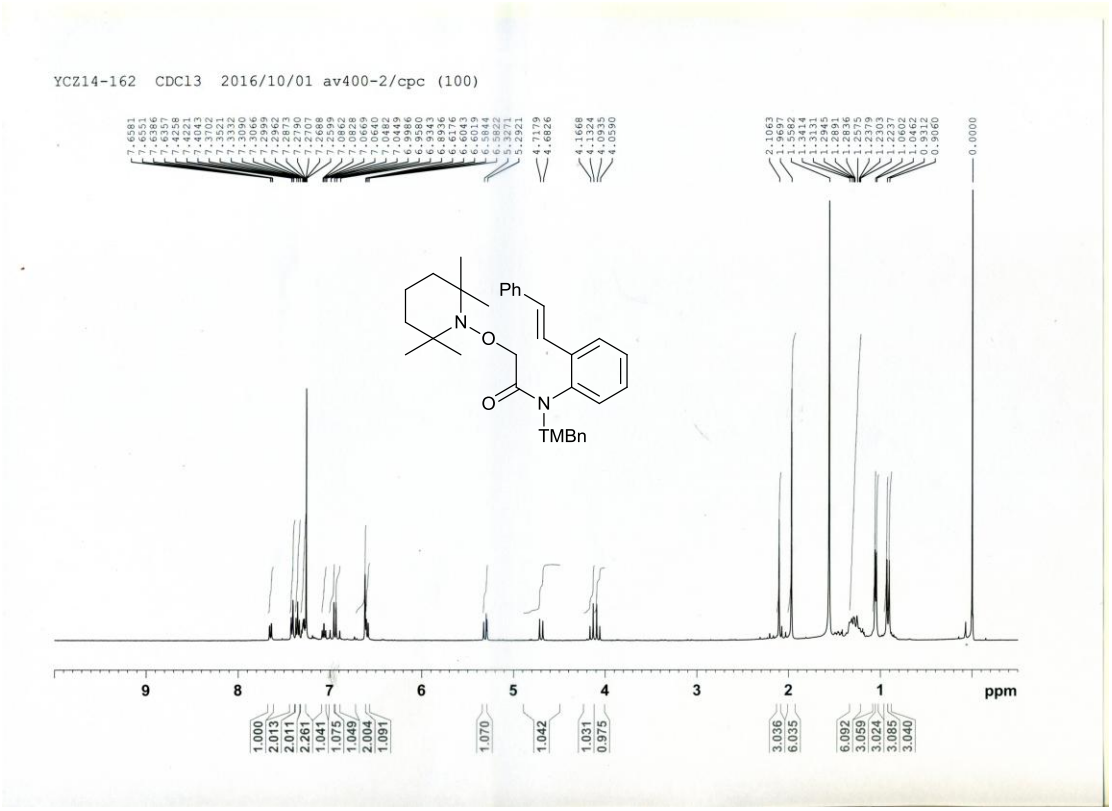

7.5988
7.5981
7.5786
7.4045
7.4003
7.3835
7.3654
7.3506
7.3471
7.3394
7.3334
7.2773
7.2733
7.2554
7.2276
7.2085
7.1759
7.1581
7.1396
7.0614
7.0413
7.0223
7.0022
6.9842
6.8134
5.7336
4.1572
2.2706
2.2334
1.5747
0.0001
Ph
Ph
O
N
TMBn
8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 ppm
1.013
3.045
5.799
1.049
3.090
1.059
2.014
2.009
2.000
6.013
3.047

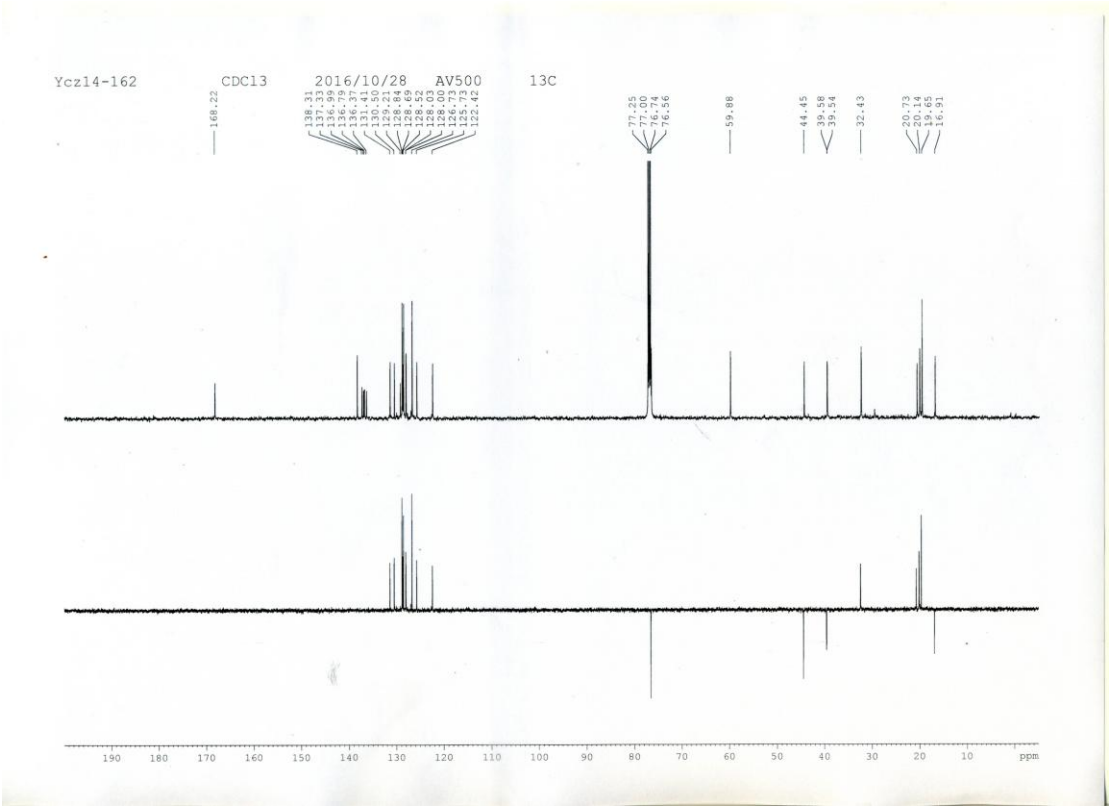

162.58
143.96
139.56
138.84
136.52
136.36
135.89
133.75
130.88
130.26
129.73
129.51
128.62
128.31
127.83
127.69
126.87
126.18
122.01
120.79
115.23
77.32
77.00
76.68
42.60
35.99
20.70
20.23
190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm

190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm

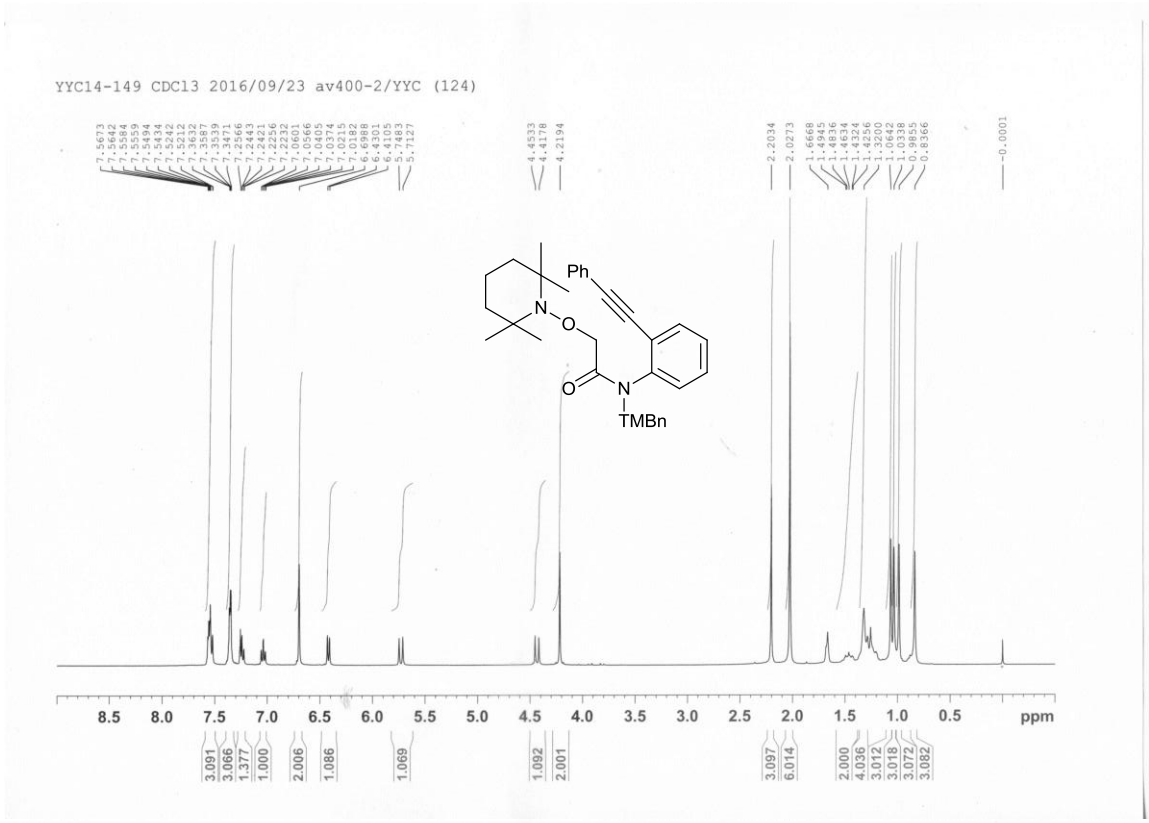
3) Copies of ^{1}H and ^{13}C NMR spectra for radical-trapping adduct.

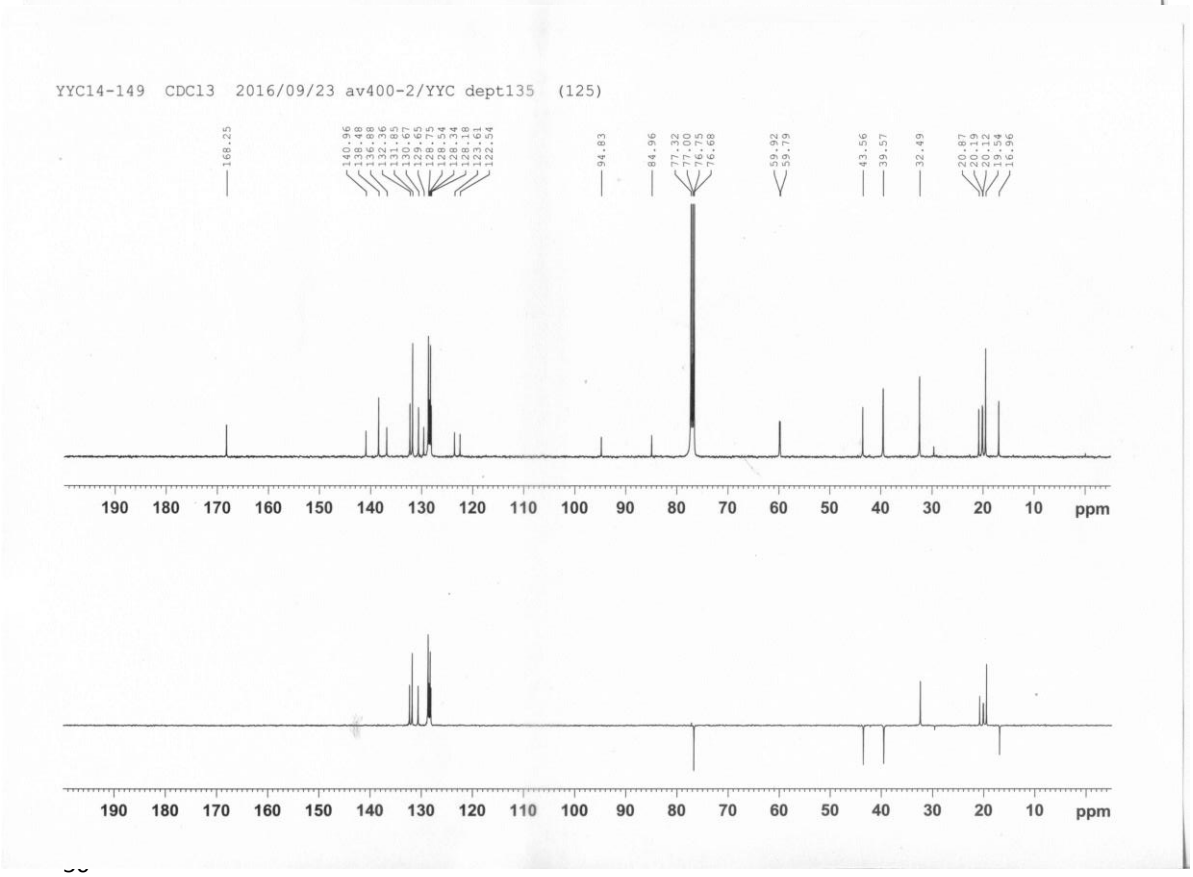
7a





8a


YYC14-149 CDCl3 2016/09/23 av400-2/YYC (124)
Ph
N
O
O
N
TMBn
ppm


YYC14-149 CDCl3 2016/09/23 av400-2/YYC dept135 (125)
ppm