

Supporting Information

for

p-Nitrophenyl carbonate promoted ring-opening reactions of DBU and DBN affording lactam carbamates

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Experimental section

General Methods. All chemicals and reagents were purchased from commercial sources and used without purification. ^1H NMR and ^{13}C NMR were recorded in CDCl_3 using TMS as internal standard on 400 and 100 MHz spectrometer, respectively. Coupling constants (J) are reported in hertz (Hz) and signal multiplicity is abbreviated as s = singlet, d = doublet, dd = doublet of doublet, dt = doublet of triplet, td = triplet of doublet, t = triplet, q = quartet, p = pentet, m = multiplet, br = broad. IR spectra were recorded on a FT-IR spectrometer, and only major peaks were reported in cm^{-1} . Optical rotations were measured on a polarimeter using sodium light (D line 589 nm). High resolution mass spectra (HRMS) were obtained by ESI (TOF) ionization. Column chromatography was performed over silica gel (100–200 mesh). Melting points were determined in capillary tubes on an electrically heated block and are uncorrected.

General procedure for the synthesis of *p*-nitrophenyl carbonate derivatives

The alcohol (0.5 g) was dissolved in dry DCM (6 mL) and cooled to 0 °C in an ice bath. Dry pyridine (2 equiv) was added and the mixture was allowed to stir for 10 min. *p*-Nitrophenyl chloroformate (1.2 equiv) dissolved in DCM (2 mL) was added stirring continued for 1.5 h at room temperature. After completion, the reaction mixture was extracted with DCM (2 × 30 mL), the organic layer washed with water, brine and dried over anhydrous Na_2SO_4 . The solvent was evaporated and the crude compound was purified by column chromatography using hexane/ethylacetate.

General procedure for the synthesis of ϵ -caprolactam and γ -lactam derived compounds

The *p*-nitrophenyl carbonate derivative (0.3 g) was dissolved in AR grade THF (5 mL) at room temperature and DBU or DBN (2 equiv) was added. The temperature of the reaction mixture was raised to 60 °C and stirring was continued for 1 h. After completion, the reaction mixture was extracted with ethyl acetate (2 × 30 mL), the organic layer washed with saturated NaHCO_3 solution, water, brine and dried over anhydrous Na_2SO_4 . The solvent was evaporated and the crude compound was purified by column chromatography.

General procedure for the synthesis of carbonates **A**, **B**, **C**

A. To an ice-cooled solution of 1-ethynylcyclohexanol (1 g) in anhydrous DCM (15 mL) was added pyridine (2 equiv) and stirred for 10 min. Phenyl chloroformate (1.5 equiv) was added, and the reaction mixture was allowed to warm to rt and stirred overnight. The reaction mixture was extracted with DCM (2 × 25 mL), the organic layer washed with saturated NaHCO_3 solution, brine and dried over anhydrous Na_2SO_4 . The concentrated crude mixture was purified by silica gel column chromatography (*n*-hexane/EtOAc) to afford compound **A**.

B. To an ice-cooled solution of 1-ethynylcyclohexanol (1 g) in anhydrous DMF (15 mL) was added NaH (2 equiv) in portions and stirred for 10 min. Subsequently, benzyl chloroformate or ethyl chloroformate (1.5 equiv) was added. The reaction mixture was allowed to warm to rt and stirred overnight. The reaction mixture was extracted with CH_2Cl_2 (2 × 25 mL), the organic layer washed with saturated NaHCO_3 solution, brine and dried over anhydrous Na_2SO_4 . The concentrated crude mixture was purified by silica gel column chromatography (*n*-hexane/EtOAc) to afford compound **B** or **C**.

Structural data of *p*-nitrophenyl carbonates **1a–7a**, **9a–17a**

Compound **1a**. ^1H NMR (400 MHz, CDCl_3) δ 8.30 – 8.26 (m, 2H), 7.44 – 7.40 (m, 2H), 2.72 (s, 1H), 2.34–2.17 (m, 2H), 2.04–1.91 (m, 2H), 1.80–1.64 (m, 4H), 1.63–1.54 (m, 1H), 1.41–1.32 (m, 1H); ^{13}C NMR (100 MHz, CDCl_3) δ 155.5, 150.0, 145.2, 125.2, 121.8, 82.0, 79.7, 75.9, 36.8, 25.0, 22.6. (Data consistent with the literature reference 19).

Compound **2a**. R_f = 0.5 (hexane/EtOAc, 80:20); white solid (86% yield), mp 73–74 °C; IR (CHCl_3) ν 3290, 1774, 1589, 1493, 1272, 1216, 773 cm^{-1} ; ^1H NMR (400 MHz, CDCl_3) δ 8.34 – 8.22 (m, 2H), 7.45 – 7.35 (m, 2H), 4.39 (t, J = 6.8 Hz, 2H), 2.70 – 2.65 (m, 2H), 2.08 (t, J = 2.7 Hz, 1H); ^{13}C NMR (100 MHz, CDCl_3) δ 155.5, 152.4, 145.6, 125.5, 121.9, 79.1, 70.8, 66.8, 19.1; HRMS (ESI): m/z [$\text{M} + \text{Na}$] $^+$ calcd for $\text{C}_{11}\text{H}_9\text{NNaO}_5$:258.0378, Found: 258.0372.

Compound **3a**. $R_f = 0.7$ (hexane/EtOAc, 80:20); thick liquid (90% yield); IR (CHCl₃) ν 1768, 1528, 1349, 1218 cm⁻¹; ¹H NMR (400 MHz, CDCl₃) δ 8.28 – 8.22 (m, 2H), 7.40 – 7.34 (m, 2H), 4.27 (t, $J = 6.7$ Hz, 2H), 1.78 – 1.70 (m, 2H), 1.45 – 1.23 (m, 14H), 0.86 (t, $J = 6.8$ Hz, 3H); ¹³C NMR (100 MHz, CDCl₃) δ 155.7, 152.6, 145.4, 125.3, 121.8, 69.7, 32.0, 29.6, 29.5, 29.4, 29.2, 28.6, 25.7, 22.7, 14.2; HRMS (ESI): m/z [M + H]⁺ calcd for C₁₇H₂₆NO₅:324.1811, Found: 324.1822.

Compound **4a**. $R_f = 0.5$ (hexane/EtOAc, 85:15); white solid (80% yield), mp 160-162 °C; $[\alpha]_D^{25} = -28.42$ (c 0.42, CH₂Cl₂); IR (CHCl₃) ν 1760, 1521, 1350, 1257 cm⁻¹; ¹H NMR (400 MHz, CDCl₃) δ 8.24 (dd, $J = 7.4, 1.8$ Hz, 2H), 7.36 (d, $J = 9.1$ Hz, 2H), 5.40 (d, $J = 3.7$ Hz, 1H), 4.66 – 4.50 (m, 1H), 2.51 – 2.38 (m, 2H), 2.05 – 1.87 (m, 4H), 1.85 – 1.65 (m, 2H), 1.60 – 1.41 (m, 6H), 1.39 – 1.21 (m, 5H), 1.20 – 1.05 (m, 7H), 1.02 (s, 3H), 0.99 – 0.92 (m, 2H), 0.90 (d, $J = 6.5$ Hz, 3H), 0.84 (dd, $J = 6.6, 1.4$ Hz, 6H), 0.66 (s, 3H); ¹³C NMR (100 MHz, CDCl₃) δ 155.7, 151.8, 145.3, 138.9, 125.3, 123.6, 121.8, 79.8, 56.7, 56.2, 50.0, 42.4, 39.8, 39.6, 37.9, 36.9, 36.6, 36.3, 35.9, 32.0, 31.9, 28.3, 28.1, 27.6, 24.4, 23.9, 22.9, 22.7, 21.1, 19.3, 18.8, 11.9; HRMS (ESI): m/z [M + Na]⁺ calcd for C₃₄H₄₉NNaO₅:574.3508, Found: 574.3512.

Compound **5a**. $R_f = 0.4$ (hexane/EtOAc, 75:25); thick liquid (79% yield); $[\alpha]_D^{25} = -24.62$ (c 0.46, CH₂Cl₂); IR (CHCl₃) ν 1757, 1698, 1526, 1201, 758 cm⁻¹; ¹H NMR (400 MHz, CDCl₃) δ 8.32 – 8.25 (m, 2H), 7.41 – 7.34 (m, 2H), 5.36 – 5.28 (m, 1H), 4.53 – 4.39 (m, 1H), 3.91 – 3.71 (m, 2H), 3.75 (s, 3H), 2.64 – 2.50 (m, 1H), 2.35 – 2.23 (m, 1H), 1.43 (d, 9H); ¹³C NMR (100 MHz, CDCl₃) δ 172.9, 172.7, 155.3, 154.1, 153.6, 151.9, 145.7, 125.5, 121.8, 81.0, 78.0, 77.3, 57.8, 57.4, 52.6, 52.4, 52.1, 52.0, 36.5, 35.6, 28.5, 28.3; HRMS (ESI): m/z [M + Na]⁺ calcd for C₁₈H₂₂N₂NaO₉:433.1222, Found: 433.1227.

Compound **6a**. $R_f = 0.4$ (hexane/EtOAc, 75:25); white solid (88% yield), mp 94-95 °C; $[\alpha]_D^{25} = +64.80$ (c 0.38, CH₂Cl₂); IR (CHCl₃) ν 1768, 1609, 1520, 1211, 1036, 740; ¹H NMR (400 MHz, CDCl₃) δ 8.31 – 8.24 (m, 2H), 7.44 – 7.30 (m, 12H), 7.25 – 7.19 (m, 2H), 6.89 – 6.83 (m, 2H), 5.04 (d, $J = 10.8$ Hz, 1H), 4.91 – 4.79 (m, 3H), 4.68 (d, $J = 12.1$ Hz, 1H), 4.62 (d, $J = 3.6$ Hz, 1H), 4.57 (d, $J = 10.8$ Hz, 1H), 4.43 (dd, $J = 11.4, 2.4$ Hz, 1H), 4.37 (dd, $J = 11.5, 4.4$ Hz, 1H), 4.04 (t, $J = 9.2$ Hz, 1H), 3.90 – 3.83 (m, 1H), 3.75 (s, 3H), 3.61 – 3.49 (m, 2H), 3.40 (s, 3H). ¹³C NMR (100 MHz, CDCl₃) δ 159.5, 155.5, 152.3, 145.4, 138.7, 138.0, 129.9, 128.6, 128.6, 128.2, 128.1, 128.0, 127.8, 125.3, 121.7, 114.0, 113.8, 98.2, 82.1, 79.8, 76.4, 75.8, 74.7, 73.5, 68.4, 67.7, 55.5, 55.3; HRMS (ESI): m/z [M + Na]⁺ calcd for C₃₆H₃₇NNaO₁₁:682.2264, Found: 682.2271.

Compound **7a**. $R_f = 0.5$ (hexane/EtOAc, 80:20); thick liquid (89% yield); $[\alpha]_D^{25} = +76.05$ (c 0.65, CH₂Cl₂); IR (CHCl₃) ν 1771, 1725, 1526, 1252, 1097, 701 cm⁻¹; ¹H NMR (400 MHz, CDCl₃) δ 8.28 – 8.22 (m, 2H), 8.01 – 7.93 (m, 4H), 7.90 – 7.85 (m, 2H), 7.53 – 7.45 (m, 2H), 7.43 – 7.33 (m, 7H), 7.29 – 7.23 (m, 2H), 6.23 (t, $J = 9.8$ Hz, 1H), 5.69 (t, $J = 9.9$ Hz, 1H), 5.33 (dt, $J = 9.9, 3.6$ Hz, 2H), 4.57 (dd, $J = 12.0, 4.6$ Hz, 1H), 4.49 (dd, $J = 12.0, 2.5$ Hz, 1H), 4.38 (ddd, $J = 10.2, 4.4, 2.6$ Hz, 1H), 3.50 (s, 3H); ¹³C NMR (100 MHz, CDCl₃) δ 165.9, 165.8, 165.5, 155.5, 152.4, 145.5, 133.7, 133.5, 133.3, 129.9, 129.9, 129.7, 129.1, 128.9, 128.7, 128.5, 128.5, 128.4, 125.3, 121.9, 97.2, 71.9, 70.2, 69.0, 67.4, 66.8, 55.9; HRMS (ESI): m/z [M + Na]⁺ calcd for C₃₅H₂₉NNaO₁₃:694.1536, Found: 694.1531.

Compound **9a**. $R_f = 0.5$ (hexane/EtOAc, 85:15); white solid (82% yield), mp 119-121 °C; IR (CHCl₃) ν 1770, 1600, 1523, 1247 cm⁻¹; ¹H NMR (400 MHz, CDCl₃) δ 8.34 – 8.27 (m, 2H), 7.50 – 7.45 (m, 2H), 7.17 (d, $J = 8.2$ Hz, 1H), 7.05 (d, $J = 2.3$ Hz, 1H), 7.00 (dd, $J = 8.2, 2.5$ Hz, 1H), 2.29 (s, 3H), 2.27 (s, 3H); ¹³C NMR (100 MHz, CDCl₃) δ 155.5, 151.4, 148.8, 145.7, 138.5, 135.3, 130.7, 125.5, 121.9, 121.7, 117.8, 20.0, 19.3; HRMS (ESI): m/z [M + H]⁺ calcd for C₁₅H₁₄NO₅:288.0872, Found: 288.0901.

Compound **10a**. $R_f = 0.6$ (hexane/EtOAc, 85:15); thick liquid (77% yield); IR (CHCl₃) ν 1763, 1525, 1447, 1200 cm⁻¹; ¹H NMR (400 MHz, CDCl₃) δ 8.31 – 8.23 (m, 2H), 7.42 – 7.35 (m, 2H), 5.48 – 5.41 (m, 1H), 5.12 – 5.05 (m, 1H), 4.80 (d, $J = 7.3$ Hz, 2H), 2.19 – 2.05 (m, 4H), 1.77 (d, $J = 0.8$ Hz, 3H), 1.68 (s, 3H), 1.61 (s, 3H); ¹³C NMR (100 MHz, CDCl₃) δ 155.8, 152.7, 145.4, 145.0, 132.2, 125.4, 123.6, 121.9, 116.8, 66.2, 39.7, 26.3, 25.8, 17.8, 16.7; HRMS (ESI): m/z [M + H]⁺ calcd for C₁₇H₂₂NO₅:320.1498, Found: 320.1502.

Compound **11a**. $R_f = 0.5$ (hexane/EtOAc, 70:30); thick liquid (77% yield); $[\alpha]_D^{25} = -37.27$ (c 0.44, CH₂Cl₂); IR (CHCl₃) ν 1770, 1526, 1213, 1069, 858 cm⁻¹; ¹H NMR (400 MHz, CDCl₃) δ 8.31 – 8.26 (m, 2H), 7.41 – 7.36 (m, 2H), 4.79 (d, $J = 5.6$ Hz, 1H), 4.66 (d, $J = 5.8$ Hz, 1H), 4.44 – 4.35 (m, 3H), 4.31 (d, $J = 9.8$ Hz, 1H), 4.09 (d, $J = 9.8$ Hz, 1H), 1.46 (s, 3H), 1.45 (s, 3H), 1.38 (s, 3H), 1.34 (s, 3H); ¹³C NMR (100 MHz, CDCl₃) δ 155.6, 152.4, 145.6, 125.5, 121.8, 113.9, 113.2, 112.1, 85.2, 82.4, 82.0, 69.9, 68.9, 26.5, 26.4, 25.2; HRMS (ESI): m/z [M + Na]⁺ calcd for C₁₉H₂₃NNaO₁₀:448.1219, Found: 448.1227.

Compound **12a**. $R_f = 0.5$ (hexane/EtOAc, 70:30); thick liquid (84% yield); $[\alpha]_D^{25} = +36.63$ (c 1.09, CH_2Cl_2); IR (CHCl_3) ν 1769, 1525, 1215, 1094, 741 cm^{-1} ; ^1H NMR (400 MHz, CDCl_3) δ 8.25 (d, $J = 5.9$ Hz, 2H), 7.48 – 7.27 (m, 17H), 5.90 – 5.75 (m, 1H), 5.10 – 4.96 (m, 3H), 4.93 – 4.86 (m, 1H), 4.84 – 4.75 (m, 2H), 4.72 – 4.65 (m, 3H), 4.62 – 4.55 (m, 1H), 4.53 – 4.46 (m, 1H), 4.06 – 3.96 (m, 2H), 3.95 – 3.82 (m, 2H), 3.76 – 3.66 (m, 1H), 3.49 – 3.37 (m, 1H), 2.17 – 2.06 (m, 2H), 1.74 – 1.61 (m, 2H); ^{13}C NMR (100 MHz, CDCl_3) δ 155.6, 152.4, 145.4, 138.3, 138.2, 138.0, 128.6, 128.5, 128.5, 128.2, 127.9, 127.9, 127.8, 125.3, 121.9, 115.1, 98.1, 80.2, 75.3, 74.7, 74.4, 72.9, 72.2, 69.9, 68.3, 67.3, 30.3, 28.6; HRMS (ESI): m/z $[\text{M} + \text{Na}]^+$ calcd for $\text{C}_{39}\text{H}_{41}\text{NNaO}_{10}$:706.2627, Found: 706.2631.

Compound **13a**. $R_f = 0.4$ (hexane/EtOAc, 80:20); thick liquid (82% yield); $[\alpha]_D^{25} = +55.64$ (c 0.61, CH_2Cl_2); IR (CHCl_3) ν 1768, 1596, 1524, 1213 cm^{-1} ; ^1H NMR (400 MHz, CDCl_3) δ 8.28 – 8.23 (m, 2H), 7.39 – 7.28 (m, 12H), 4.99 (s, 1H), 4.66 – 4.44 (m, 5H), 4.38 – 4.28 (m, 2H), 4.04 (dd, $J = 2.8, 0.8$ Hz, 1H), 3.91 (dd, $J = 6.2, 2.7$ Hz, 1H), 3.42 (s, 3H); ^{13}C NMR (100 MHz, CDCl_3) δ 155.5, 152.4, 145.5, 137.5, 137.3, 128.6, 128.2, 128.1, 128.1, 128.0, 125.4, 121.8, 107.6, 87.8, 83.3, 79.0, 72.5, 72.3, 68.3, 55.3; HRMS (ESI): m/z $[\text{M} + \text{Na}]^+$ calcd for $\text{C}_{27}\text{H}_{27}\text{NNaO}_9$:532.1583, Found: 532.1577.

Compound **14a**. $R_f = 0.5$ (hexane/EtOAc, 85:15); thick liquid (86% yield); IR (CHCl_3) ν 1764, 1525, 1252, 858 cm^{-1} ; ^1H NMR (400 MHz, CDCl_3) δ 8.31 – 8.22 (m, 2H), 7.42 – 7.33 (m, 2H), 4.27 (t, $J = 6.7$ Hz, 2H), 3.40 (t, $J = 6.8$ Hz, 2H), 1.89 – 1.80 (m, 2H), 1.79 – 1.70 (m, 2H), 1.46 – 1.37 (m, 4H), 1.30 (s, 8H); ^{13}C NMR (100 MHz, CDCl_3) δ 155.7, 152.6, 145.4, 125.4, 121.9, 69.8, 34.1, 32.9, 29.4, 29.2, 28.8, 28.6, 28.2, 25.7; HRMS (ESI): m/z $[\text{M} + \text{Na}]^+$ calcd for $\text{C}_{17}\text{H}_{24}\text{BrNNaO}_5$:424.0736, Found: 424.0737.

Compound **15a**. $R_f = 0.5$ (hexane/EtOAc, 80:20); thick liquid (83% yield); IR (CHCl_3) ν 1765, 1593, 1520, 1339, 1206, 812 cm^{-1} ; ^1H NMR (400 MHz, CDCl_3) δ 8.29 – 8.23 (m, 2H), 7.41 – 7.34 (m, 2H), 4.47 – 4.42 (m, 2H), 3.85 – 3.77 (m, 4H), 3.65 (t, $J = 5.7$ Hz, 2H); ^{13}C NMR (100 MHz, CDCl_3) δ 155.6, 152.5, 145.5, 125.4, 121.9, 71.4, 68.7, 68.1, 42.8; HRMS (ESI): m/z $[\text{M} + \text{H}]^+$ calcd for $\text{C}_{11}\text{H}_{13}\text{ClNO}_6$:290.0431, Found: 290.0440.

Compound **16a**. $R_f = 0.4$ (hexane/EtOAc, 80:20); light yellow solid (81% yield), mp 87–88 °C; IR (CHCl_3) ν 1766, 1528, 1453, 1225, 913 cm^{-1} ; ^1H NMR (400 MHz, CDCl_3) δ 8.23 (d, $J = 9.0$ Hz, 2H), 7.81 (d, $J = 7.5$ Hz, 2H), 7.68 (d, $J = 7.4$ Hz, 2H), 7.47 (t, $J = 7.4$ Hz, 2H), 7.39 (t, $J = 7.3$ Hz, 2H), 7.32 (d, $J = 9.1$ Hz, 2H), 4.62 (d, $J = 7.0$ Hz, 2H), 4.34 (t, $J = 7.0$ Hz, 1H); ^{13}C NMR (100 MHz, CDCl_3) δ 155.4, 152.3, 145.3, 142.8, 141.3, 128.1, 127.2, 125.2, 125.0, 121.7, 120.2, 70.8, 46.5; HRMS (ESI): m/z $[\text{M} + \text{Na}]^+$ calcd for $\text{C}_{21}\text{H}_{15}\text{NNaO}_5$:384.0848, Found: 384.0842.

Compound **17a**. $R_f = 0.4$ (hexane/EtOAc, 70:30); white solid (68% yield), mp 87–88 °C; $[\alpha]_D^{25} = +16.02$ (c 0.26, CH_2Cl_2); IR (CHCl_3) ν 3368, 1762, 1714, 1520, 1203, 858 cm^{-1} ; ^1H NMR (400 MHz, CDCl_3) δ 8.18 (d, $J = 9.1$ Hz, 2H), 7.36 – 7.24 (m, 7H), 5.91 (d, $J = 8.0$ Hz, 1H), 5.17 – 5.05 (m, 2H), 4.77 – 4.71 (m, 1H), 4.65 – 4.54 (m, 2H), 3.77 (s, 3H); ^{13}C NMR (100 MHz, CDCl_3) δ 169.3, 155.8, 155.2, 152.1, 145.4, 135.9, 128.5, 128.2, 128.1, 125.2, 121.6, 68.2, 67.3, 53.1, 53.1; HRMS (ESI): m/z $[\text{M} + \text{Na}]^+$ calcd for $\text{C}_{19}\text{H}_{18}\text{N}_2\text{NaO}_9$:441.0909, Found: 441.0909.

Structural data of lactam compounds **1b–7b**, **2ab** and **9b–15b**

Compound **1b**. $R_f = 0.5$ (EtOAc); thick liquid (85% yield); IR (CHCl_3) ν 3301, 1713, 1624, 1497, 1237 cm^{-1} ; ^1H NMR (400 MHz, CDCl_3) δ 5.76 (br s, 1H), 3.41 (t, $J = 6.3$ Hz, 2H), 3.33 – 3.26 (m, 2H), 3.10 (dd, $J = 12.2, 6.2$ Hz, 2H), 2.53 (s, 1H), 2.52 – 2.45 (m, 2H), 2.12 – 2.02 (m, 2H), 1.87 – 1.76 (m, 2H), 1.74 – 1.53 (m, 12H), 1.50 – 1.40 (m, 1H), 1.33 – 1.23 (m, 1H); ^{13}C NMR (100 MHz, CDCl_3) δ 176.7, 155.0, 84.7, 74.4, 73.6, 49.6, 45.3, 37.4, 37.2, 37.1, 30.0, 28.6, 27.8, 25.2, 23.5, 22.5; HRMS (ESI): m/z $[\text{M} + \text{Na}]^+$ calcd for $\text{C}_{18}\text{H}_{28}\text{N}_2\text{NaO}_3$:343.1997, Found: 343.1996.

Compound **2b**. $R_f = 0.2$ (EtOAc); thick liquid (79% yield); IR (CHCl_3) ν 3294, 1708, 1620, 1525, 1440, 1244 cm^{-1} ; ^1H NMR (400 MHz, CDCl_3) δ 5.92 (s, 1H), 4.05 (t, $J = 7.0$ Hz, 2H), 3.35 (t, $J = 6.3$ Hz, 2H), 3.28 – 3.22 (m, 2H), 3.05 (dd, $J = 12.2, 6.2$ Hz, 2H), 2.48 – 2.38 (m, 4H), 1.92 (t, $J = 2.6$ Hz, 1H), 1.70 – 1.51 (m, 8H); ^{13}C NMR (100 MHz, CDCl_3) δ 176.6, 156.2, 80.4, 69.7, 62.2, 49.5, 45.0, 37.2, 37.1, 29.9, 28.5, 27.7, 23.3, 19.3; HRMS (ESI): m/z $[\text{M} + \text{H}]^+$ calcd for $\text{C}_{14}\text{H}_{23}\text{N}_2\text{O}_3$:267.1709, Found: 267.1718.

Compound **3b**. $R_f = 0.2$ (EtOAc); white solid (88% yield), mp 68–70 °C; IR (CHCl_3) ν 3322, 1709, 1629, 1520, 1246, 731 cm^{-1} ; ^1H NMR (400 MHz, CDCl_3) δ 5.80 – 5.72 (m, 1H), 3.96 (t, $J = 6.7$ Hz, 2H), 3.39 (t, $J = 6.3$ Hz, 2H), 3.31 – 3.24 (m, 2H), 3.08 (dd, $J = 12.2, 6.2$ Hz, 2H), 2.52 – 2.44 (m, 2H), 1.75 – 1.47 (m, 10H), 1.33 – 1.14 (m, 14H), 0.83 (t, $J = 6.9$ Hz, 3H); ^{13}C NMR (100 MHz, CDCl_3) δ 176.6, 157.1, 64.8, 49.6, 45.2, 37.3, 37.2,

31.9, 30.0, 29.6, 29.4, 29.3, 29.1, 28.6, 27.9, 25.9, 23.5, 22.7, 14.1; HRMS (ESI): m/z $[M + H]^+$ calcd for $C_{20}H_{39}N_2O_3$:355.296, Found: 355.2967.

Compound **4b**. $R_f = 0.3$ (EtOAc); white solid (69% yield), mp 162-164 °C; $[\alpha]_D^{25} = -16.14$ (c 0.52, CH_2Cl_2); IR ($CHCl_3$) ν 3355, 1708, 1629, 1512, 1247, 733 cm^{-1} ; 1H NMR (400 MHz, $CDCl_3$) δ 5.74 (t, $J = 6.1$ Hz, 1H), 5.29 (d, $J = 4.9$ Hz, 1H), 4.46 – 4.34 (m, 1H), 3.38 (t, $J = 6.2$ Hz, 2H), 3.30 – 3.24 (m, 2H), 3.07 (dd, $J = 12.0$, 6.1 Hz, 2H), 2.49 – 2.44 (m, 2H), 2.32 – 2.16 (m, 2H), 1.91 (ddd, $J = 12.0$, 9.9, 2.7 Hz, 2H), 1.77 (dd, $J = 9.8$, 3.7 Hz, 3H), 1.63 (ddd, $J = 18.5$, 11.0, 5.4 Hz, 8H), 1.52 – 1.35 (m, 7H), 1.25 (ddd, $J = 23.8$, 18.3, 11.0 Hz, 4H), 1.05 (ddd, $J = 24.7$, 12.1, 6.6 Hz, 7H), 0.94 (s, 3H), 0.97 – 0.88 (m, 3H), 0.85 (d, $J = 6.5$ Hz, 3H), 0.80 (dd, $J = 6.7$, 1.7 Hz, 6H), 0.61 (s, 3H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 176.5, 156.3, 140.0, 122.2, 73.9, 56.7, 56.1, 50.0, 49.5, 45.1, 42.3, 39.7, 39.5, 38.6, 37.2, 37.0, 36.5, 36.2, 35.8, 31.9, 31.8, 30.0, 28.6, 28.2, 28.1, 28.0, 27.8, 24.3, 23.8, 23.4, 22.8, 22.6, 21.0, 19.3, 18.7, 11.8; HRMS (ESI): m/z $[M + Na]^+$ calcd for $C_{37}H_{62}N_2NaO_3$:605.4658, Found: 605.4670.

Compound **5b**. $R_f = 0.2$ (EtOAc); thick liquid (71% yield); $[\alpha]_D^{25} = -30.87$ (c 0.61, CH_2Cl_2); IR ($CHCl_3$) ν 3328, 1699, 1626, 1400, 1158, 1074 cm^{-1} ; 1H NMR (400 MHz, $CDCl_3$) δ 6.02 – 5.94 (m, 1H), 5.10 (br s, 1H), 4.30 – 4.18 (m, 1H), 3.62 (s, 3H), 3.60 – 3.40 (m, 2H), 3.38 – 3.29 (m, 2H), 3.27 – 3.19 (m, 2H), 3.08 – 2.95 (m, 2H), 2.47 – 2.38 (m, 2H), 2.33 – 2.21 (m, 1H), 2.09 – 1.97 (m, 1H), 1.69 – 1.48 (m, 8H), 1.33 (d, $J = 14.9$ Hz, 9H rotamer); ^{13}C NMR (100 MHz, $CDCl_3$) δ (rotamers) 176.7, 173.2, 172.9, 155.7, 155.5, 154.1, 153.4, 80.2, 72.6, 71.9, 57.9, 57.5, 52.4, 52.3, 52.1, 51.9, 49.5, 44.9, 37.0, 36.7, 35.7, 29.8, 28.4, 28.3, 28.1, 27.6, 27.6, 23.3; HRMS (ESI): m/z $[M + Na]^+$ calcd for $C_{21}H_{35}N_3NaO_7$:464.2372, Found: 464.2375.

Compound **6b**. $R_f = 0.2$ (EtOAc); thick liquid (82% yield); $[\alpha]_D^{25} = +37.80$ (c 0.29, CH_2Cl_2); IR ($CHCl_3$) ν 3351, 1717, 1625, 1513, 1067, 732 cm^{-1} ; 1H NMR (400 MHz, $CDCl_3$) δ 7.40 – 7.27 (m, 10H), 7.20 (d, $J = 8.6$ Hz, 2H), 6.83 (d, $J = 8.6$ Hz, 2H), 5.79 (t, $J = 6.1$ Hz, 1H), 4.99 (d, $J = 11.0$ Hz, 1H), 4.86 – 4.74 (m, 3H), 4.65 (d, $J = 12.1$ Hz, 1H), 4.58 (d, $J = 3.5$ Hz, 1H), 4.50 (d, $J = 10.3$ Hz, 1H), 4.31 (dd, $J = 11.7$, 4.4 Hz, 1H), 4.24 (dd, $J = 11.6$, 1.6 Hz, 1H), 3.97 (t, $J = 9.3$ Hz, 1H), 3.77 (s, 3H), 3.76 – 3.72 (m, 1H), 3.55 – 3.51 (m, 1H), 3.47 (t, $J = 9.5$ Hz, 1H), 3.43 – 3.37 (m, 2H), 3.35 (s, 3H), 3.32 – 3.27 (m, 2H), 3.17 – 3.08 (m, 2H), 2.54 – 2.47 (m, 2H), 1.75 – 1.58 (m, 8H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 176.7, 159.4, 156.4, 138.9, 138.2, 130.3, 129.9, 128.5, 128.4, 128.2, 128.0, 127.9, 127.6, 113.9, 98.1, 82.1, 79.9, 75.7, 74.9, 73.5, 69.1, 63.3, 55.4, 55.3, 49.6, 45.1, 37.5, 37.2, 30.0, 28.6, 28.0, 23.5; HRMS (ESI): m/z $[M + H]^+$ calcd for $C_{39}H_{51}N_2O_9$:691.3594, Found: 691.3602.

Compound **7b**. $R_f = 0.2$ (EtOAc); white solid (87% yield), mp 70-72 °C; $[\alpha]_D^{25} = +61.72$ (c 0.32, CH_2Cl_2); IR ($CHCl_3$) ν 3397, 1722, 1628, 1447, 1250, 1096, 704 cm^{-1} ; 1H NMR (400 MHz, $CDCl_3$) δ 8.00 – 7.90 (m, 4H), 7.89 – 7.84 (m, 2H), 7.53 – 7.46 (m, 2H), 7.44 – 7.33 (m, 5H), 7.31 – 7.25 (m, 2H), 6.13 (t, $J = 9.7$ Hz, 1H), 5.82 (t, $J = 6.2$ Hz, 1H), 5.60 – 5.51 (m, 1H), 5.25 (dt, $J = 10.6$, 3.6 Hz, 2H), 4.31 – 4.22 (m, 3H), 3.47 (s, 3H), 3.41 (dd, $J = 10.9$, 6.2 Hz, 2H), 3.34 – 3.28 (m, 2H), 3.15 – 3.08 (m, 2H), 2.54 – 2.50 (m, 2H), 1.75 – 1.58 (m, 8H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 176.7, 165.9, 165.9, 165.3, 156.2, 133.4, 133.2, 130.0, 130.0, 129.8, 129.3, 129.2, 129.1, 128.5, 128.4, 97.0, 72.2, 70.6, 69.4, 68.0, 63.0, 55.7, 49.7, 45.2, 37.6, 37.3, 30.1, 28.7, 27.9, 23.5; HRMS (ESI): m/z $[M + H]^+$ calcd for $C_{38}H_{43}N_2O_{11}$:703.2867, Found: 703.2888.

Compound **8b**. $R_f = 0.2-0.3$ (EtOAc); thick liquid (48% yield); IR ($CHCl_3$) ν 3364, 1727, 1627, 1448, 1251, 1096, 700 cm^{-1} ; HRMS (ESI): m/z $[M + Na]^+$ calcd for $C_{44}H_{44}N_2NaO_{12}$:815.2972, Found: 815.294.

Compound **2ab**. $R_f = 0.2$ (EtOAc); thick liquid (56% yield); IR ($CHCl_3$) ν 3289, 1705, 1657, 1532, 1251 cm^{-1} ; 1H NMR (400 MHz, $CDCl_3$) δ 5.69 (br s, 1H), 4.09 (t, $J = 6.9$ Hz, 2H), 3.31 (dt, $J = 13.0$, 6.7 Hz, 4H), 3.08 (q, $J = 6.3$ Hz, 2H), 2.51 – 2.41 (m, 2H), 2.34 (t, $J = 8.1$ Hz, 2H), 2.03 – 1.96 (m, 2H), 1.95 (t, $J = 2.6$ Hz, 1H), 1.64 (p, $J = 6.4$ Hz, 2H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 175.7, 156.3, 80.4, 69.8, 62.4, 47.3, 39.6, 37.6, 30.9, 27.0, 19.4, 18.0; HRMS (ESI): m/z $[M + Na]^+$ calcd for $C_{12}H_{18}N_2NaO_3$:261.1214, Found: 261.1220.

Compound **9b**. $R_f = 0.2$ (EtOAc); white solid (62% yield), mp 85-87 °C; IR ($CHCl_3$) ν 3306, 1727, 1660, 1533, 1492, 1232 cm^{-1} ; 1H NMR (400 MHz, $CDCl_3$) δ 7.06 (d, $J = 8.1$ Hz, 1H), 6.88 (s, 1H), 6.82 (dd, $J = 8.2$, 1.8 Hz, 1H), 6.10 (br s, 1H), 3.41 – 3.33 (m, 4H), 3.22 – 3.14 (m, 2H), 2.43 – 2.35 (m, 2H), 2.21 (s, 3H), 2.20 (s, 3H), 2.07 – 1.97 (m, 2H), 1.77 – 1.68 (m, 2H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 175.9, 155.2, 149.1, 137.6, 133.4, 130.1, 122.7, 118.8, 47.3, 39.5, 37.7, 30.9, 26.9, 19.9, 19.2, 18.0; HRMS (ESI): m/z $[M + Na]^+$ calcd for $C_{16}H_{22}N_2NaO_3$:313.1528, Found: 313.1535.

Compound **10b**. $R_f = 0.2$ (EtOAc); thick liquid (46% yield); IR ($CHCl_3$) ν 3322, 1669 (br), 1524, 1441, 1249 cm^{-1} ; 1H NMR (400 MHz, $CDCl_3$) δ 5.53 (br s, 1H), 5.35 – 5.27 (m, 1H), 5.09 – 5.03 (m, 1H), 4.54 (d, $J = 6.9$ Hz, 2H), 3.38 – 3.29 (m, 4H), 3.11 (q, $J = 6.3$ Hz, 2H), 2.37 (t, $J = 8.0$ Hz, 2H), 2.11 – 1.97 (m, 6H), 1.71 – 1.62

(m, 8H), 1.57 (s, 3H); ^{13}C NMR (100 MHz, CDCl_3) δ 175.7, 156.9, 141.5, 131.8, 123.9, 123.9, 119.1, 61.7, 47.3, 39.6, 37.6, 31.0, 29.8, 27.1, 26.4, 25.8, 18.0, 17.8, 16.5; HRMS (ESI): m/z $[\text{M} + \text{Na}]^+$ calcd for $\text{C}_{18}\text{H}_{30}\text{N}_2\text{NaO}_3$:345.2153, Found: 345.2154.

Compound **11b**. $R_f = 0.2$ (EtOAc); thick liquid (53% yield); $[\alpha]_{\text{D}}^{25} = -48.04$ (c 1.7, CH_2Cl_2); IR (CHCl_3) ν 3325, 1715, 1666, 1528, 1376, 1250, 1060, 856 cm^{-1} ; ^1H NMR (400 MHz, CDCl_3) δ 5.69 (t, $J = 5.9$ Hz, 1H), 4.70 (d, $J = 5.8$ Hz, 1H), 4.58 (d, $J = 5.8$ Hz, 1H), 4.21 (t, $J = 7.3$ Hz, 2H), 4.08 (d, $J = 7.3$ Hz, 2H), 4.00 (d, $J = 9.7$ Hz, 1H), 3.34 (d, $J = 8.7$ Hz, 2H), 3.30 (dd, $J = 7.0, 6.2$ Hz, 2H), 3.09 (dd, $J = 7.5, 6.1$ Hz, 2H), 2.35 (t, $J = 8.1$ Hz, 2H), 2.06 – 1.94 (m, 2H), 1.69 – 1.60 (m, 2H), 1.39 (s, 6H), 1.32 (s, 3H), 1.27 (s, 3H); ^{13}C NMR (100 MHz, CDCl_3) δ 175.7, 156.2, 113.6, 112.7, 111.8, 85.1, 83.1, 82.3, 69.8, 64.6, 47.3, 39.6, 37.7, 30.9, 27.0, 26.5, 26.5, 26.3, 25.2, 18.0; HRMS (ESI): m/z $[\text{M} + \text{Na}]^+$ calcd for $\text{C}_{20}\text{H}_{32}\text{N}_2\text{NaO}_8$:451.2056, Found: 451.2054.

Compound **12b**. $R_f = 0.2$ (EtOAc); thick liquid (63% yield); $[\alpha]_{\text{D}}^{25} = +19.18$ (c 0.39, CH_2Cl_2); IR (CHCl_3) ν 3328, 1716, 1670, 1522, 1249, 1090, 742 cm^{-1} ; ^1H NMR (400 MHz, CDCl_3) δ 7.41 – 7.27 (m, 15H), 5.84 – 5.71 (m, 1H), 5.52 – 5.44 (m, 1H), 5.03 – 4.94 (m, 2H), 4.92 (d, $J = 10.6$ Hz, 1H), 4.81 (s, 1H), 4.73 (d, $J = 3.1$ Hz, 2H), 4.64 – 4.58 (m, 3H), 4.38 – 4.31 (m, 2H), 3.91 (d, $J = 5.8$ Hz, 2H), 3.80 – 3.74 (m, 2H), 3.65 (dt, $J = 9.7, 6.6$ Hz, 1H), 3.39 – 3.28 (m, 5H), 3.18 – 3.09 (m, 2H), 2.37 (t, $J = 8.1$ Hz, 2H), 2.10 – 1.96 (m, 4H), 1.72 – 1.57 (m, 4H); ^{13}C NMR (100 MHz, CDCl_3) δ 175.6, 156.5, 138.5, 138.4, 138.3, 138.1, 128.5, 128.4, 128.4, 128.3, 128.0, 127.8, 127.7, 127.6, 115.0, 98.0, 80.2, 75.3, 74.7, 72.7, 72.2, 70.5, 67.1, 64.0, 47.3, 39.8, 38.0, 31.0, 30.3, 28.6, 27.3, 18.0; HRMS (ESI): m/z $[\text{M} + \text{Na}]^+$ calcd for $\text{C}_{40}\text{H}_{50}\text{N}_2\text{NaO}_8$:709.3464, Found: 709.3459.

Compound **13b**. $R_f = 0.2$ (EtOAc); thick liquid (67% yield); $[\alpha]_{\text{D}}^{25} = +41.82$ (c 1.48, CH_2Cl_2); IR (CHCl_3) ν 3340, 1718, 1669, 1455, 1257, 1106, 746 cm^{-1} ; ^1H NMR (400 MHz, CDCl_3) δ 7.36 – 7.23 (m, 10H), 5.52 (t, $J = 6.1$ Hz, 1H), 4.91 (s, 1H), 4.55 – 4.41 (m, 4H), 4.25 (dd, $J = 11.1, 3.1$ Hz, 1H), 4.21 – 4.10 (m, 2H), 3.96 (dd, $J = 2.7, 0.7$ Hz, 1H), 3.81 (dd, $J = 6.2, 2.7$ Hz, 1H), 3.36 (s, 3H), 3.35 – 3.25 (m, 4H), 3.09 (q, $J = 6.3$ Hz, 2H), 2.36 (t, $J = 8.1$ Hz, 2H), 2.03 – 1.94 (m, 2H), 1.68 – 1.59 (m, 2H); ^{13}C NMR (100 MHz, CDCl_3) δ 175.7, 156.3, 137.7, 137.5, 128.5, 128.4, 127.9, 127.9, 127.8, 107.4, 87.9, 83.5, 79.9, 72.3, 72.0, 64.4, 55.0, 47.3, 39.6, 37.8, 30.9, 27.1, 18.0; HRMS (ESI): m/z $[\text{M} + \text{Na}]^+$ calcd for $\text{C}_{28}\text{H}_{36}\text{N}_2\text{NaO}_7$:535.242, Found: 535.2417.

Compound **14b** and **14c** (reaction at 60 °C). $R_f = 0.2$ (EtOAc); thick liquid (64% yield); IR (CHCl_3) ν 3321, 1668 (br), 1594, 1252, 850 cm^{-1} ; ^1H NMR (400 MHz, CDCl_3) δ 8.20 – 8.11 (m, 2H), 6.96 – 6.85 (m, 2H), 5.62 – 5.49 (m, 2H), 4.06 – 3.93 (m, 6H), 3.41 – 3.27 (m, 10H), 3.14 – 3.03 (m, 4H), 2.41 – 2.31 (m, 4H), 2.01 (qd, $J = 7.5, 3.9$ Hz, 4H), 1.87 – 1.72 (m, 4H), 1.70 – 1.61 (m, 4H), 1.55 (s, 4H), 1.47 – 1.34 (m, 4H), 1.35 – 1.19 (m, 20H); ^{13}C NMR (100 MHz, CDCl_3) δ 175.7, 164.3, 157.0, 141.3, 126.0, 114.5, 68.9, 64.9, 47.3, 39.6, 37.5, 34.2, 32.9, 31.0, 29.7, 29.5, 29.4, 29.3, 29.1, 29.0, 28.8, 28.2, 27.0, 25.9, 18.0; HRMS (ESI) for **14b**: m/z $[\text{M} + \text{H}]^+$ calcd for $\text{C}_{18}\text{H}_{34}\text{BrN}_2\text{O}_3$:405.1753, Found: 405.1756. HRMS (ESI) for **14c**: m/z $[\text{M} + \text{H}]^+$ calcd for $\text{C}_{24}\text{H}_{38}\text{N}_3\text{O}_6$:464.2761, Found: 464.2770.

Compound **14b** and **14c** (reaction at rt). Thick liquid, (60% yield); ^1H NMR (400 MHz, CDCl_3) δ 8.22 – 8.10 (m, 1H), 6.91 (dd, $J = 7.3, 5.1$ Hz, 1H), 5.52 (br s, 2H), 4.06 – 3.94 (m, 5H), 3.41 – 3.27 (m, 11H), 3.10 (dd, $J = 12.4, 6.2$ Hz, 4H), 2.37 (t, $J = 8.1$ Hz, 4H), 2.06 – 1.96 (m, 4H), 1.87 – 1.77 (m, 4H), 1.70 – 1.62 (m, 4H), 1.61 – 1.52 (m, 4H), 1.44 – 1.36 (m, 4H), 1.26 (s, 20H); ^{13}C NMR (100 MHz, CDCl_3) δ 175.7, 164.3, 157.0, 141.4, 126.0, 114.5, 69.0, 64.9, 47.3, 39.6, 37.5, 34.1, 32.9, 31.0, 29.5, 29.4, 29.3, 29.1, 28.8, 28.2, 27.1, 25.9, 18.0;

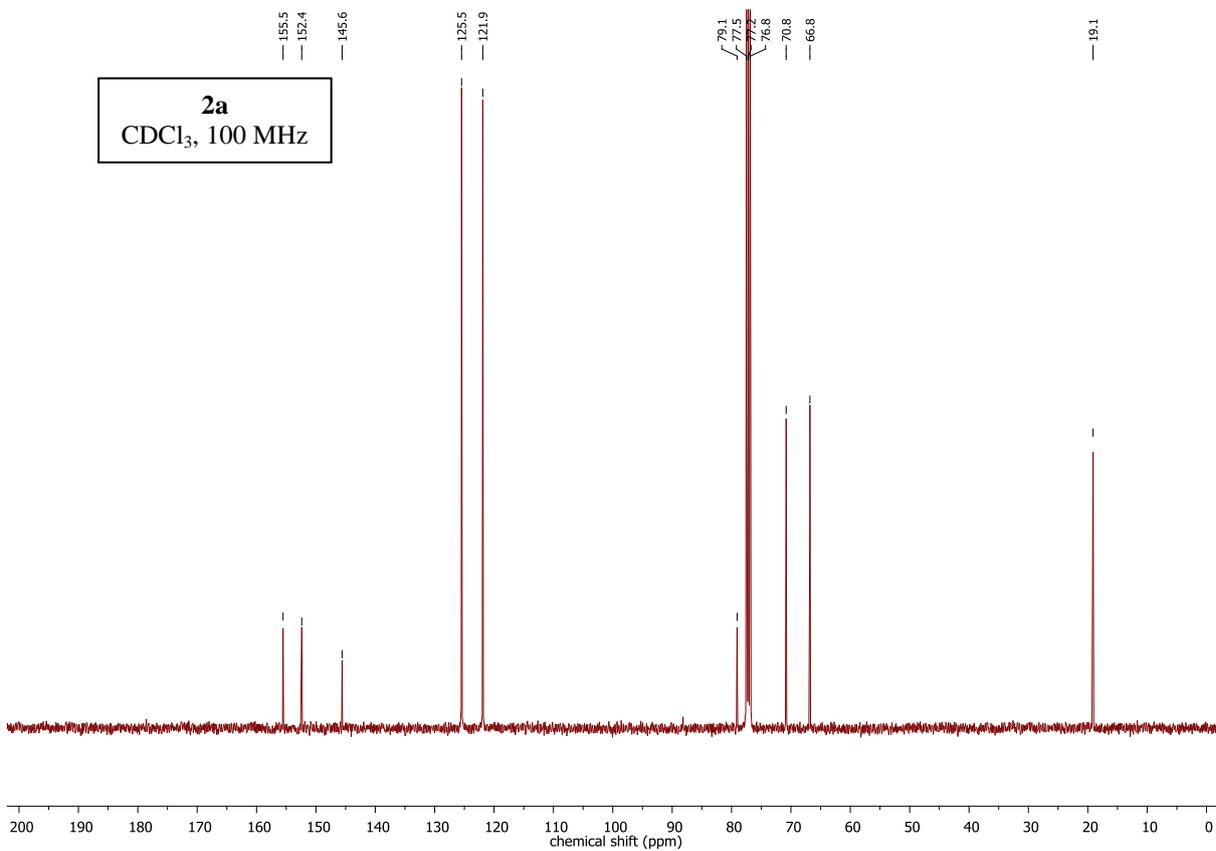
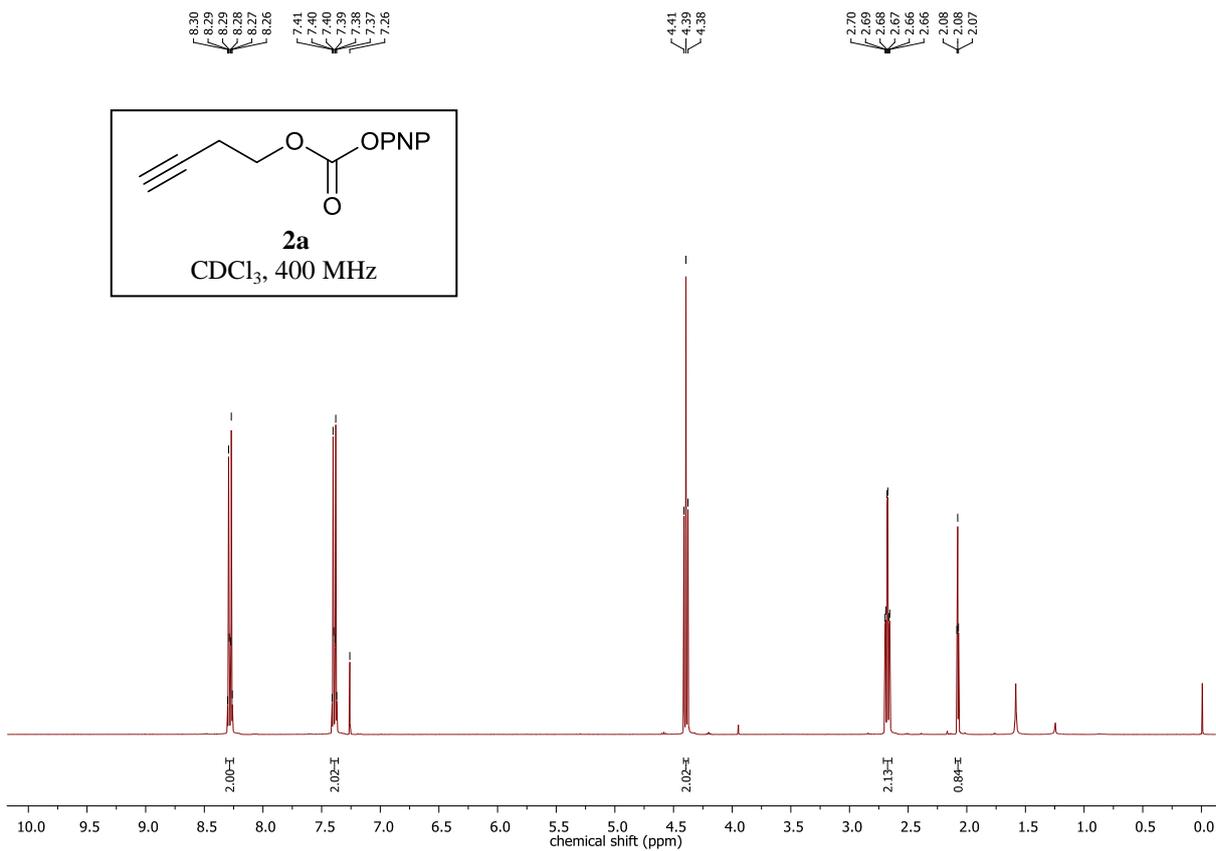
Compound **15b**. $R_f = 0.2$ (EtOAc); thick liquid (41% yield); IR (CHCl_3) ν 3340, 1671, 1592, 1522, 1210, 816 cm^{-1} ; ^1H NMR (400 MHz, CDCl_3) δ 5.63 (br s, 1H), 4.22 – 4.15 (m, 2H), 3.73 (t, $J = 6.0$ Hz, 2H), 3.70 – 3.66 (m, 2H), 3.60 (t, $J = 5.7$ Hz, 2H), 3.38 – 3.29 (m, 4H), 3.11 (q, $J = 6.3$ Hz, 2H), 2.37 (t, $J = 8.0$ Hz, 2H), 2.06 – 1.97 (m, 2H), 1.70 – 1.63 (m, 2H); ^{13}C NMR (100 MHz, CDCl_3) δ 175.7, 156.5, 71.3, 69.7, 63.8, 47.3, 42.8, 39.6, 37.7, 31.0, 27.1, 18.0; HRMS (ESI): m/z $[\text{M} + \text{Na}]^+$ calcd for $\text{C}_{12}\text{H}_{21}\text{ClN}_2\text{NaO}_4$:315.1087, Found: 315.1093.

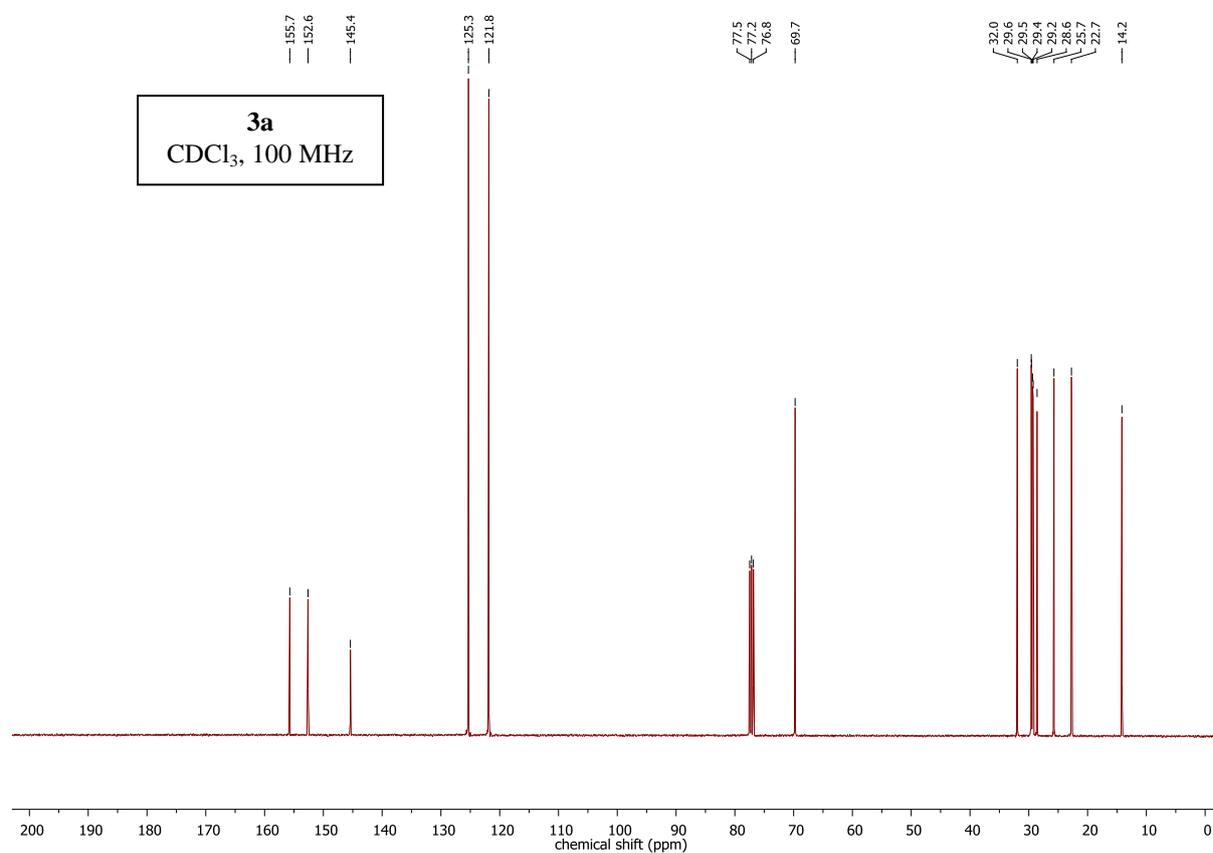
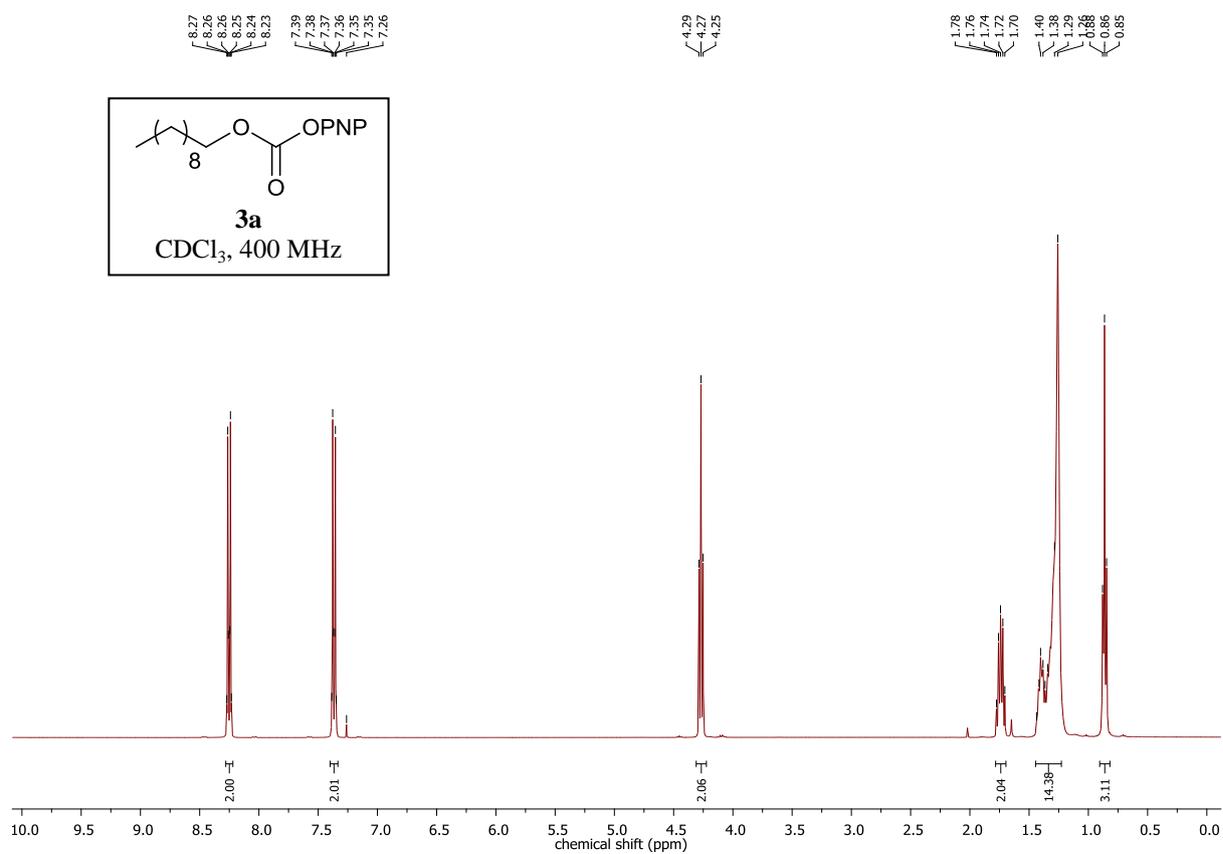
Structural data of carbonates A, B, C

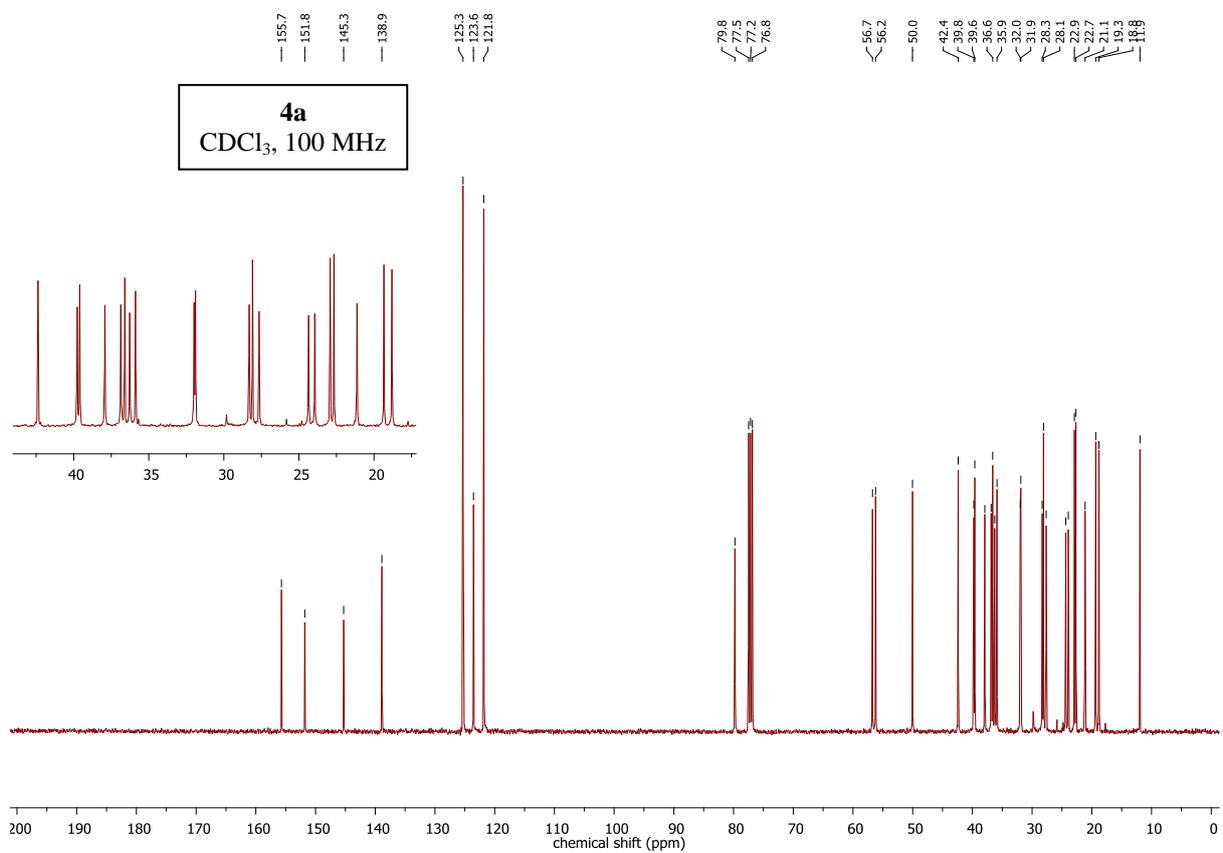
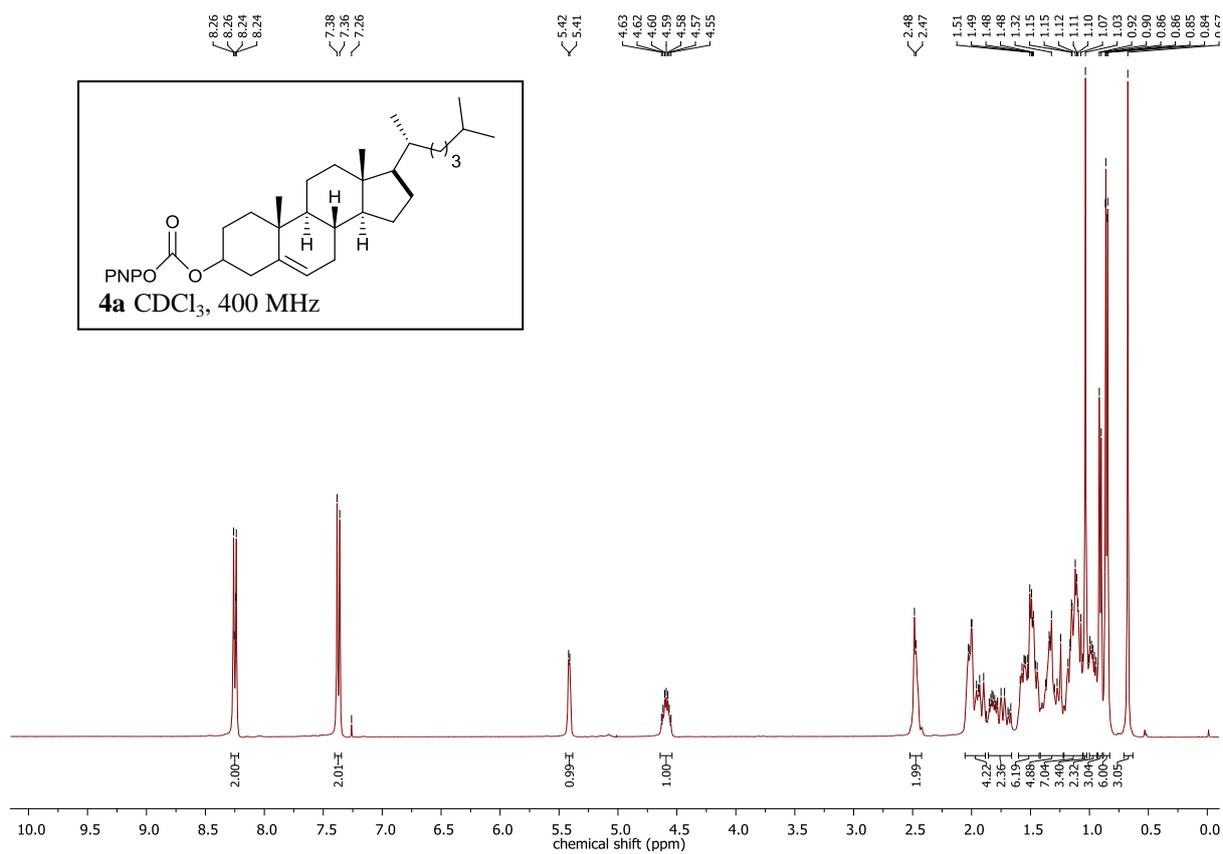
Table 3, compound (A). $R_f = 0.5$ (hexane/EtOAc, 85:15); white solid (82% yield), mp 53-54 °C; IR (CHCl_3) ν 3292, 1766, 1595, 1491, 1233, 1016 cm^{-1} ; ^1H NMR (400 MHz, CDCl_3) δ 7.43 – 7.31 (m, 2H), 7.29 – 7.15 (m, 3H), 2.64 (s, 1H), 2.26 – 2.16 (m, 2H), 2.00 – 1.89 (m, 2H), 1.76 – 1.60 (m, 4H), 1.58 – 1.50 (m, 1H), 1.42 – 1.29 (m, 1H); ^{13}C NMR (100 MHz, CDCl_3) δ 151.2, 151.1, 129.5, 126.0, 121.3, 82.6, 78.7, 75.4, 36.9, 25.1, 22.7.

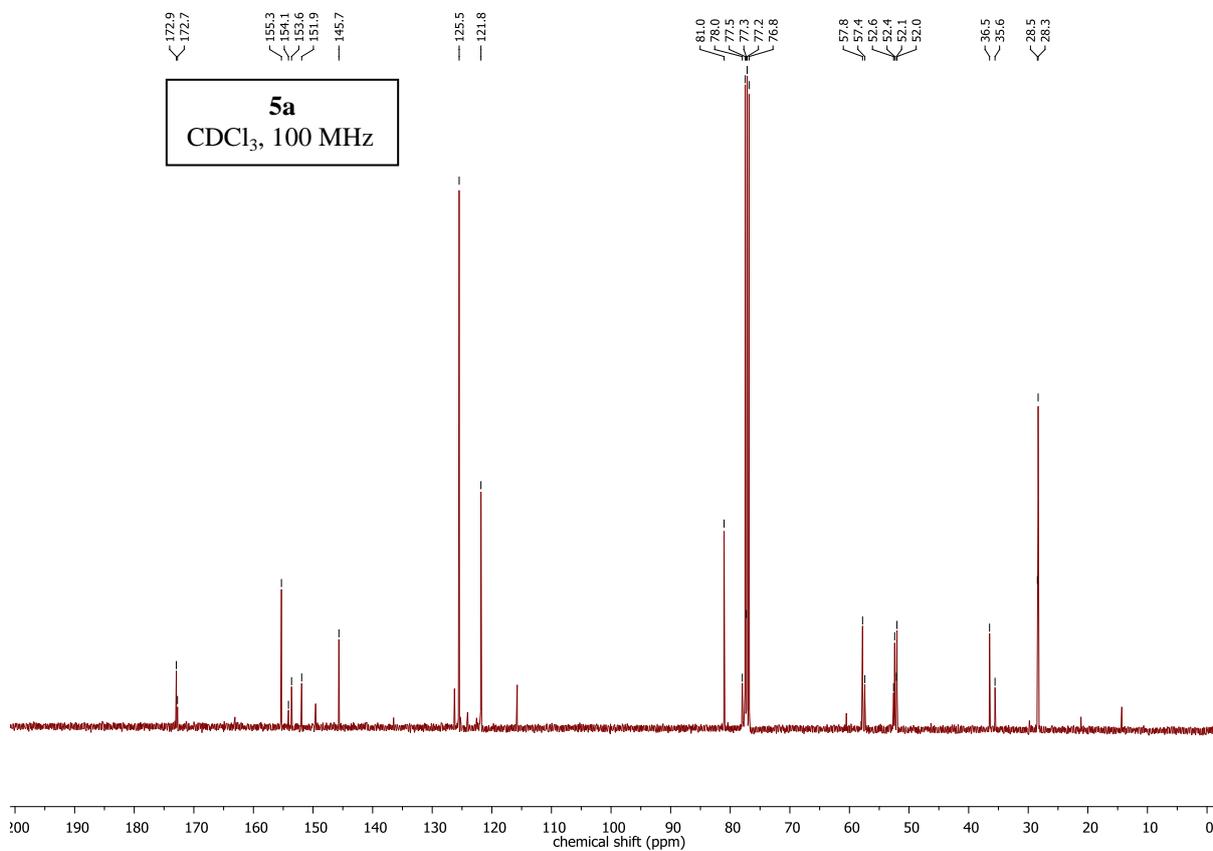
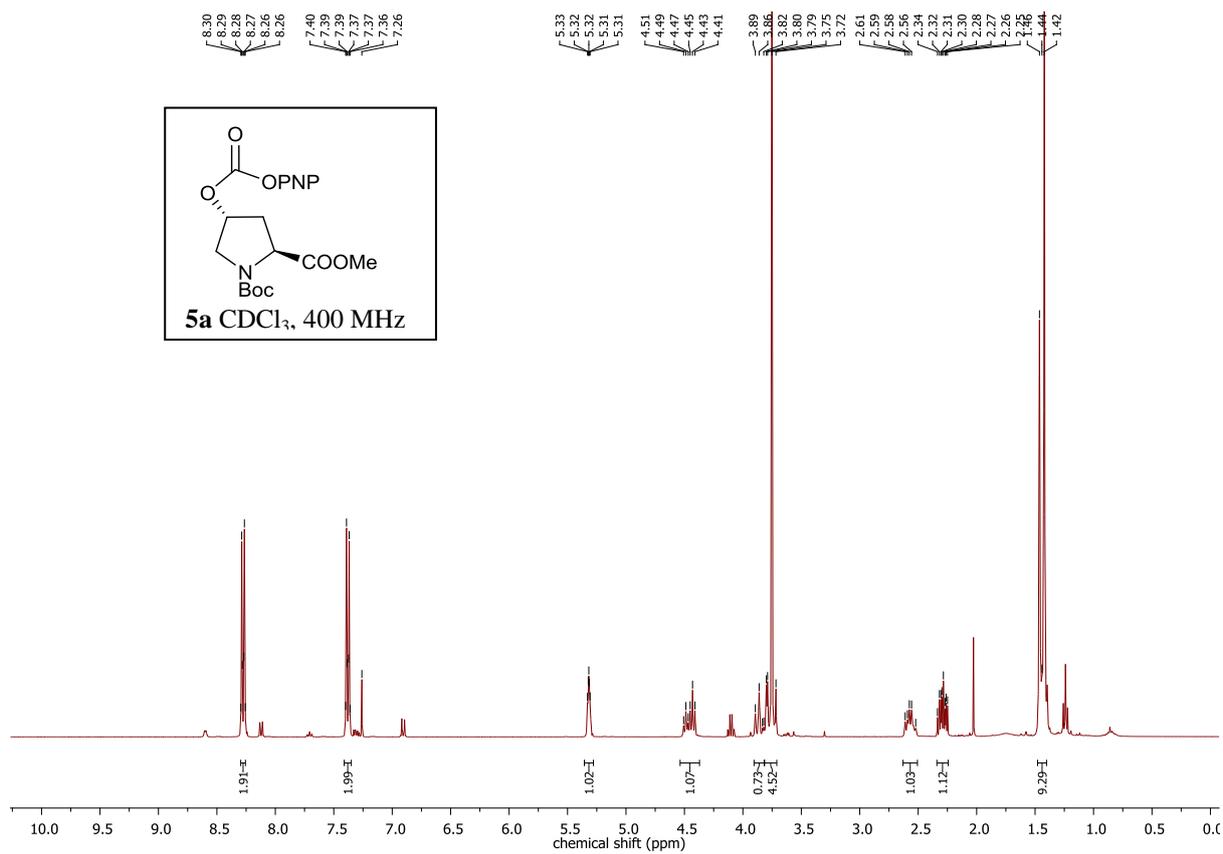
Table 3, compound **(B)**. $R_f = 0.5$ (hexane/EtOAc, 85:15); thick liquid; IR (CHCl_3) ν 3289, 1744, 1452, 1225, 912 cm^{-1} ; ^1H NMR (400 MHz, CDCl_3) δ 7.42 – 7.31 (m, 5H), 5.16 (s, 2H), 2.64 (s, 1H), 2.24 – 2.15 (m, 2H), 1.92 – 1.83 (m, 2H), 1.73 – 1.60 (m, 4H), 1.58 – 1.49 (m, 1H), 1.38 – 1.26 (m, 1H); ^{13}C NMR (100 MHz, CDCl_3) δ 155.1, 135.3, 128.6, 128.5, 128.5, 83.0, 77.7, 74.9, 69.3, 36.8, 25.0, 22.6.

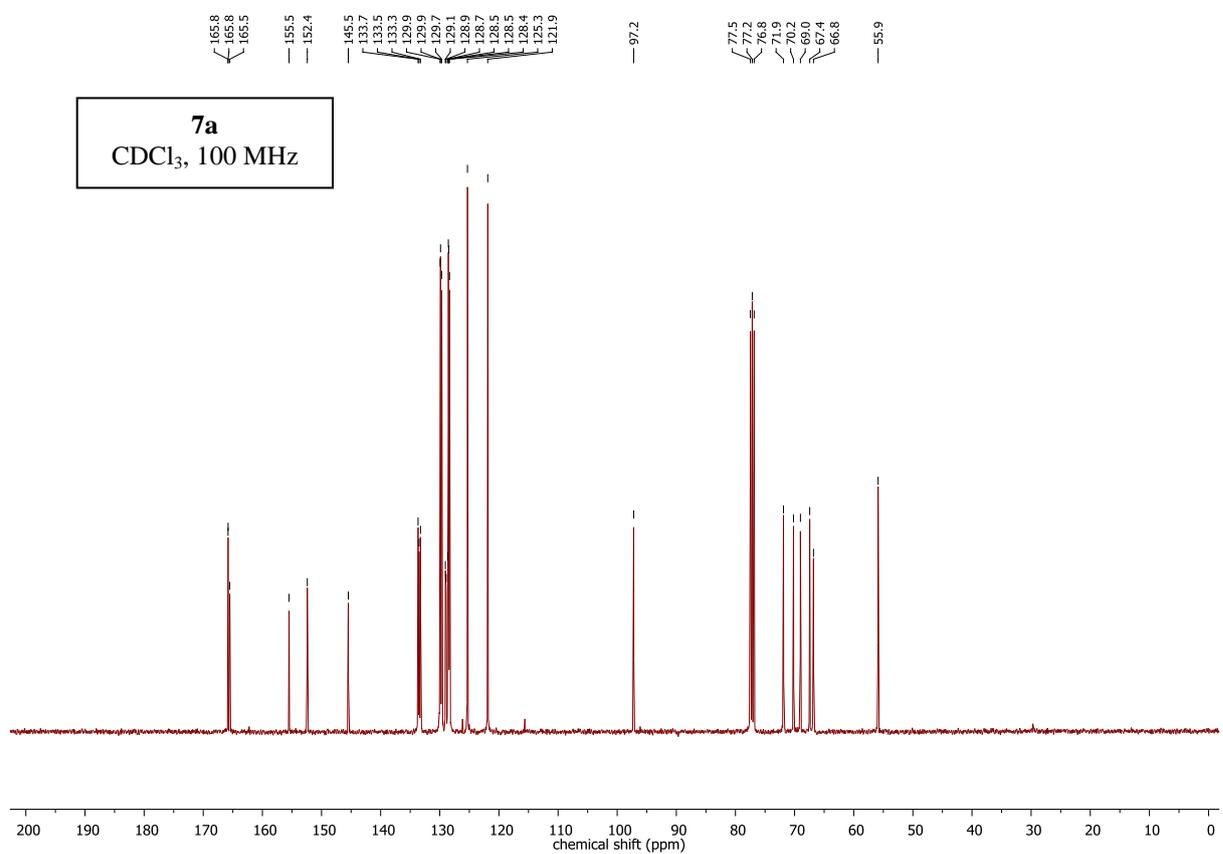
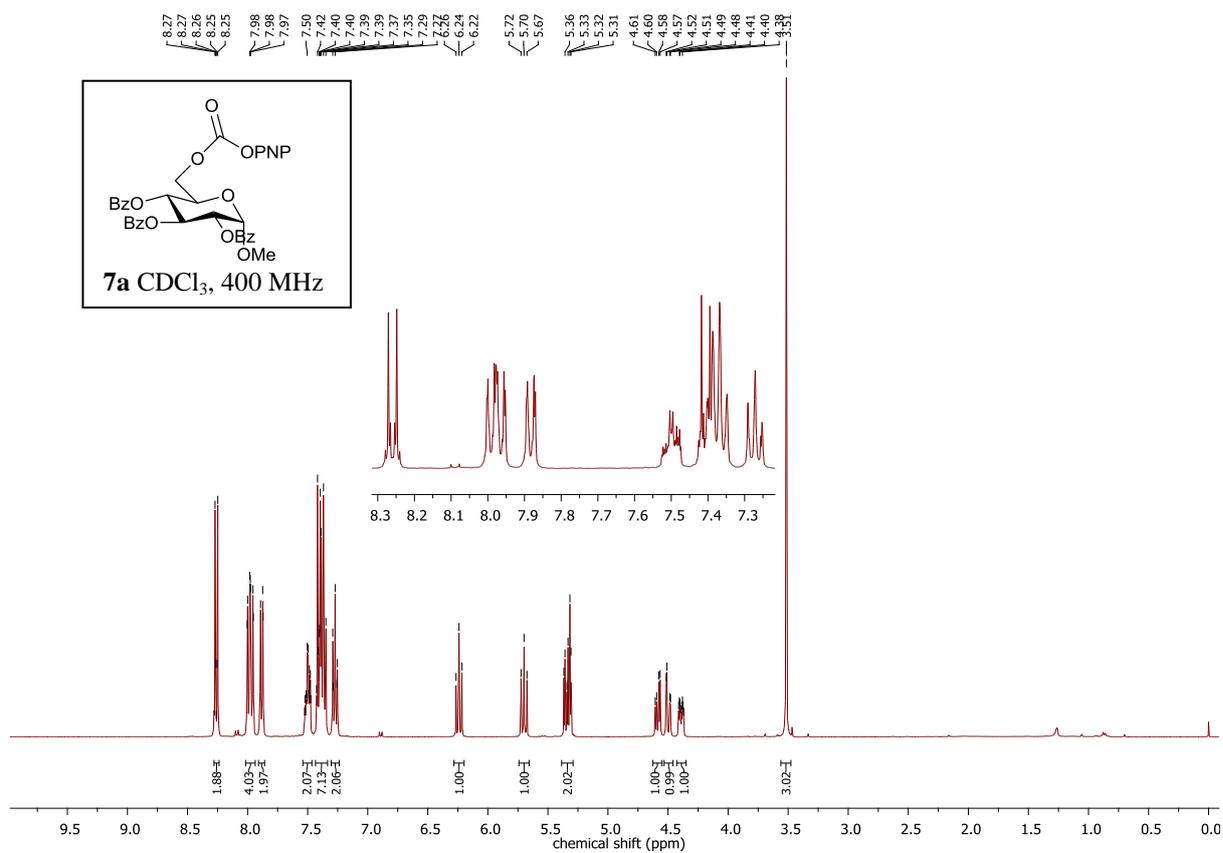
Table 3, compound **(C)**. $R_f = 0.5$ (hexane/EtOAc, 85:15); thick liquid; IR (CHCl_3) ν 3285, 1747, 1369, 1271, 1231, 1014; ^1H NMR (400 MHz, CDCl_3) δ 4.19 (t, $J = 10.7$ Hz, 2H), 2.62 (s, 1H), 2.23 – 2.12 (m, 2H), 1.92 – 1.80 (m, 2H), 1.72 – 1.59 (m, 4H), 1.58 – 1.48 (m, 1H), 1.38 – 1.26 (m, 1H), 1.30 (t, $J = 7.2$ Hz, 3H); ^{13}C NMR (100 MHz, CDCl_3) δ 153.0, 83.2, 77.4, 74.8, 63.7, 37.0, 25.1, 22.7, 14.4.

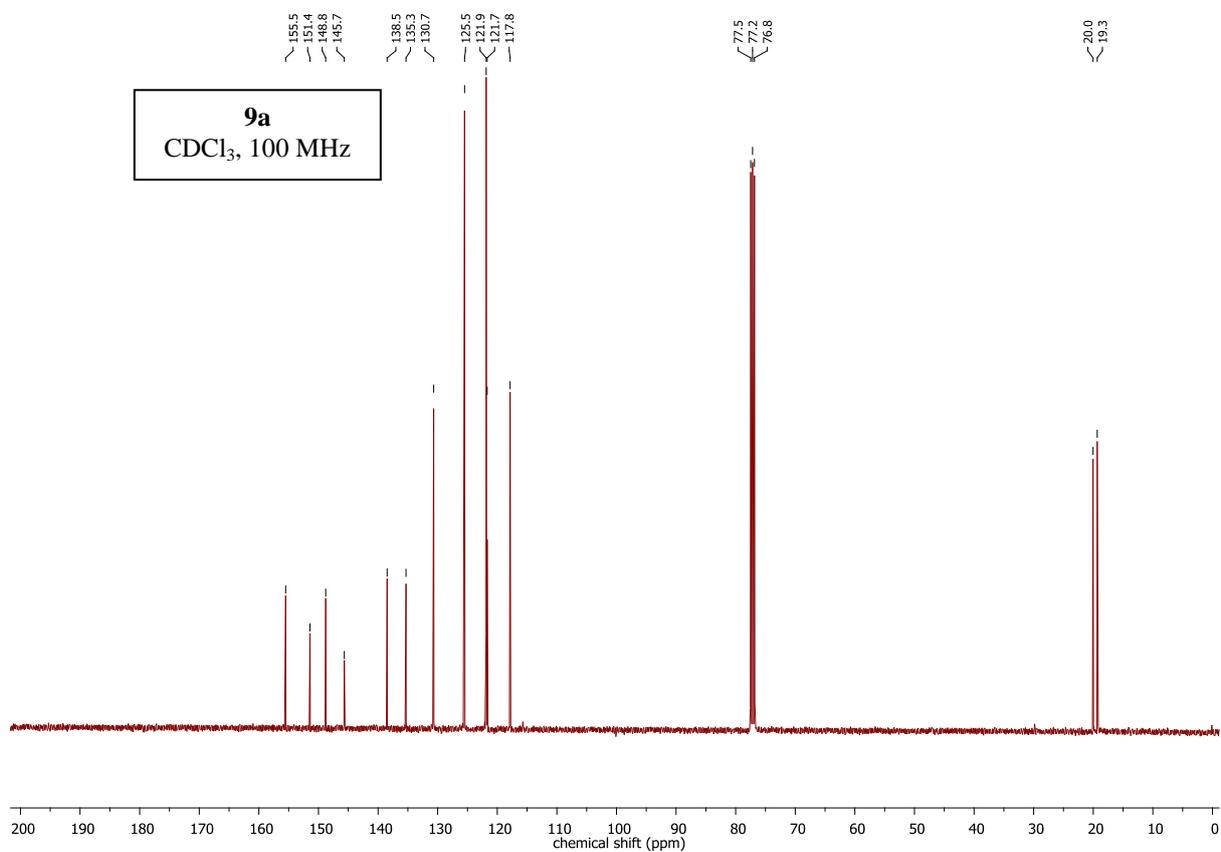
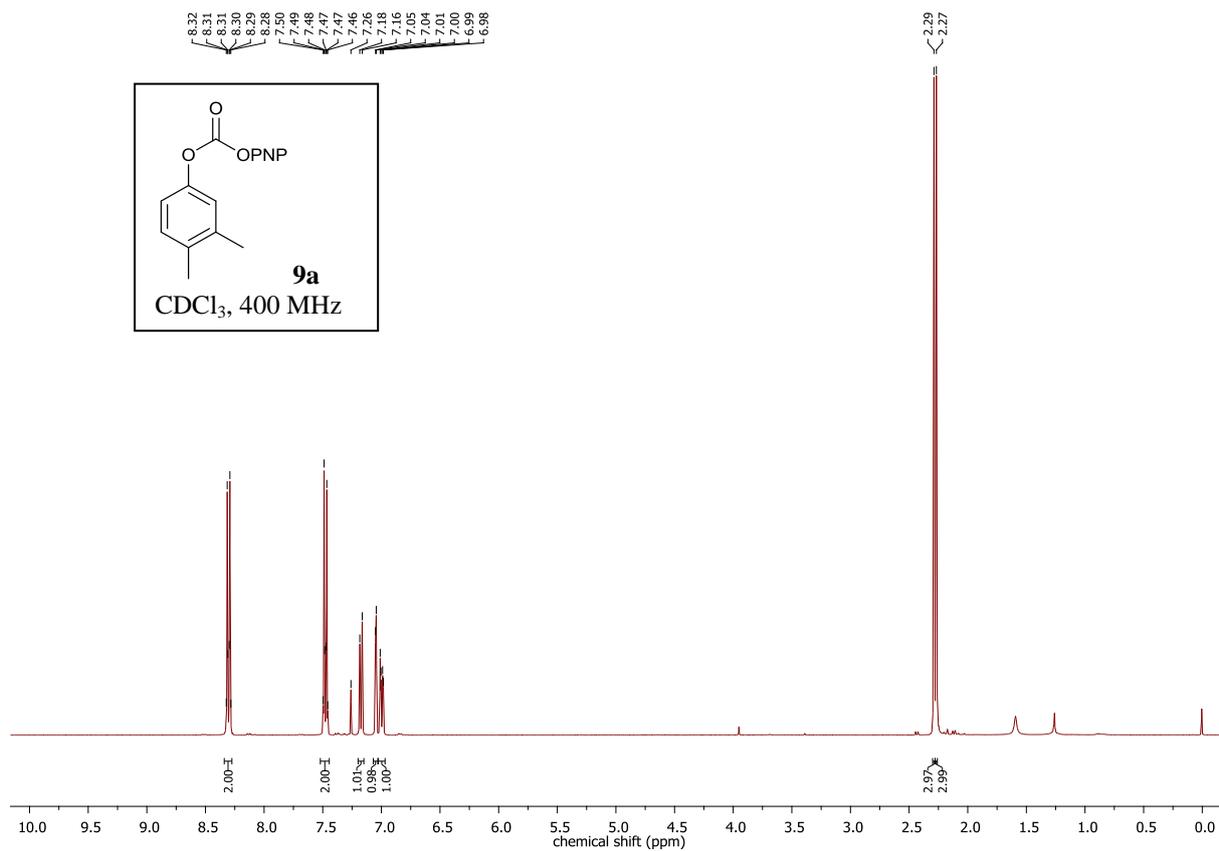


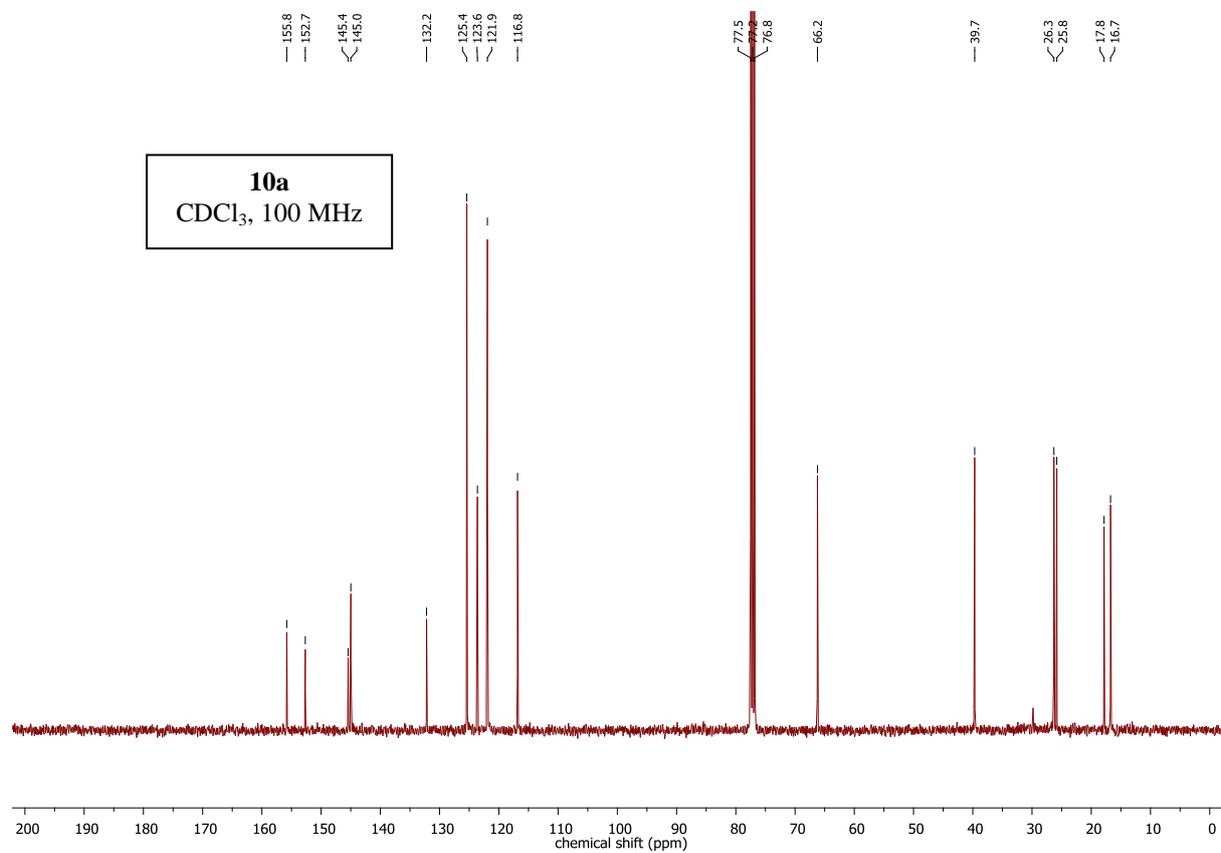
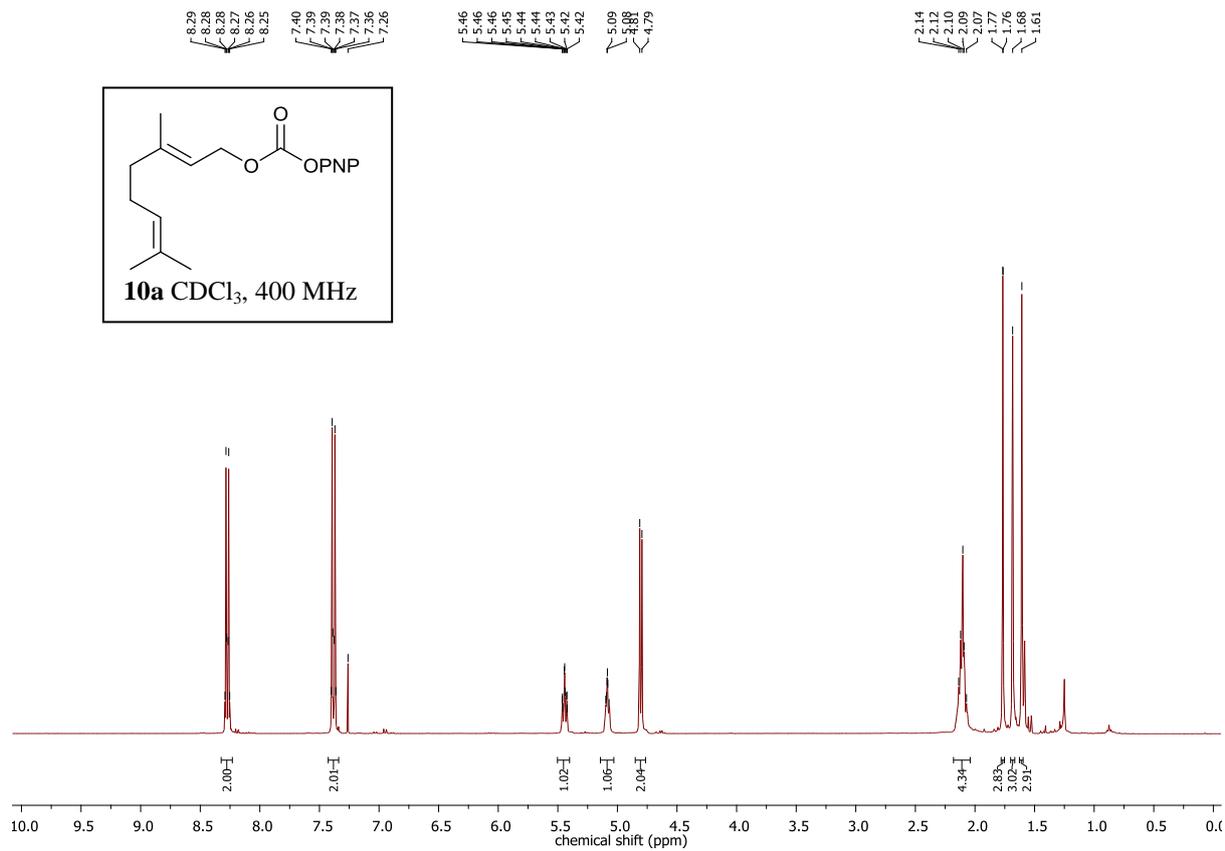


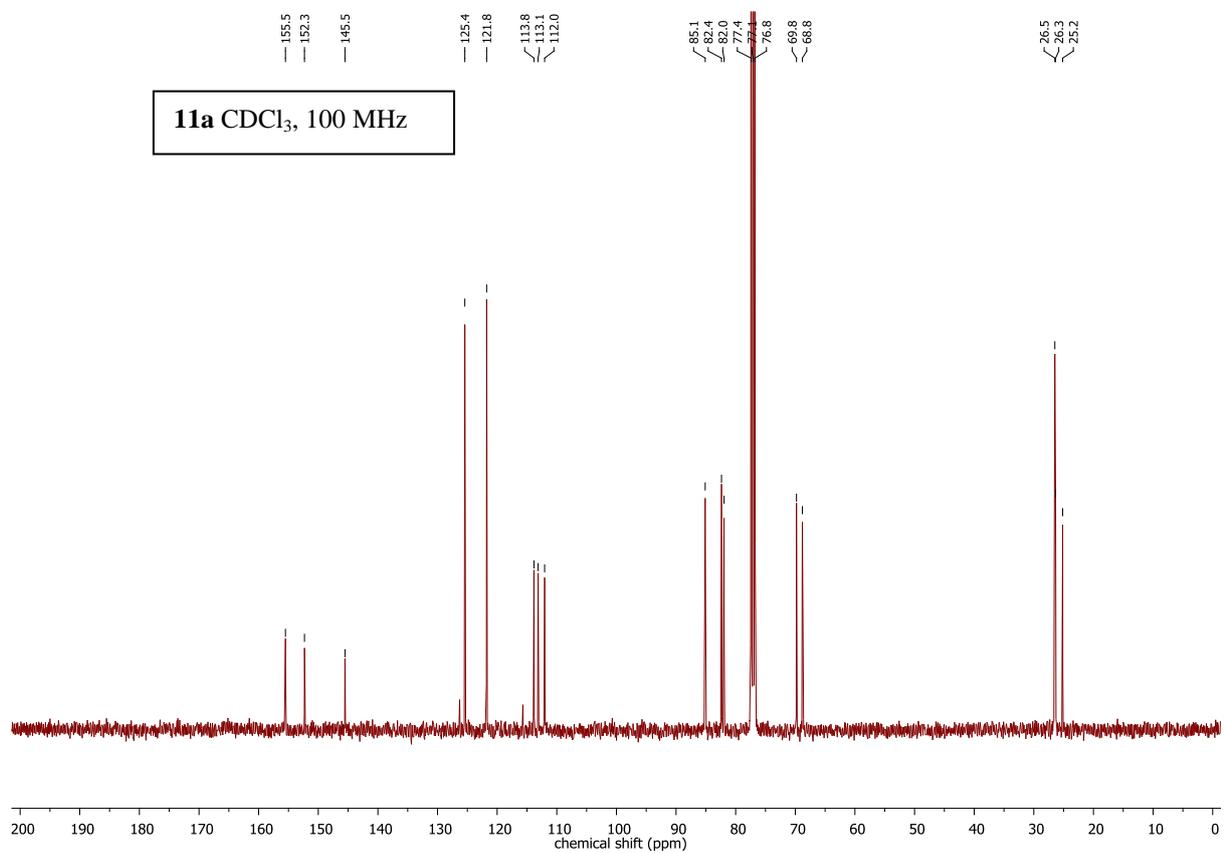
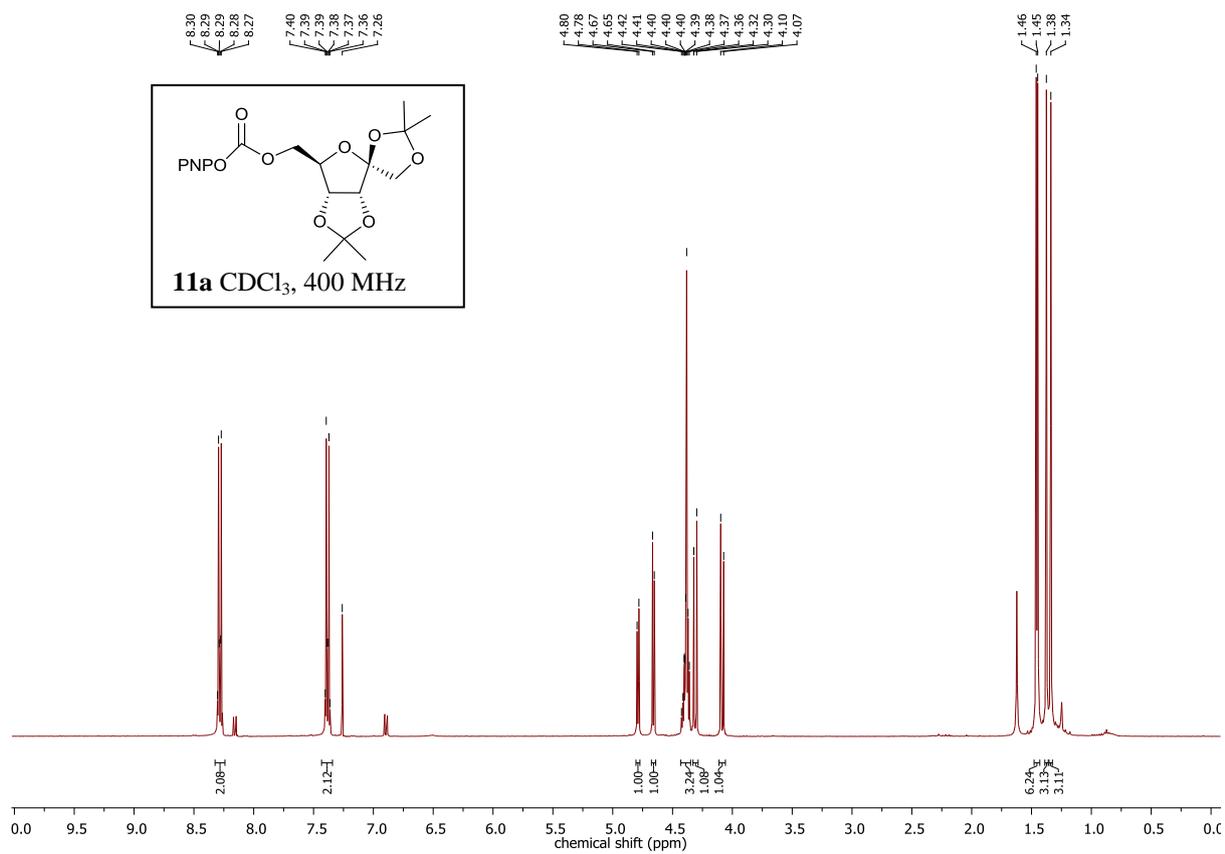


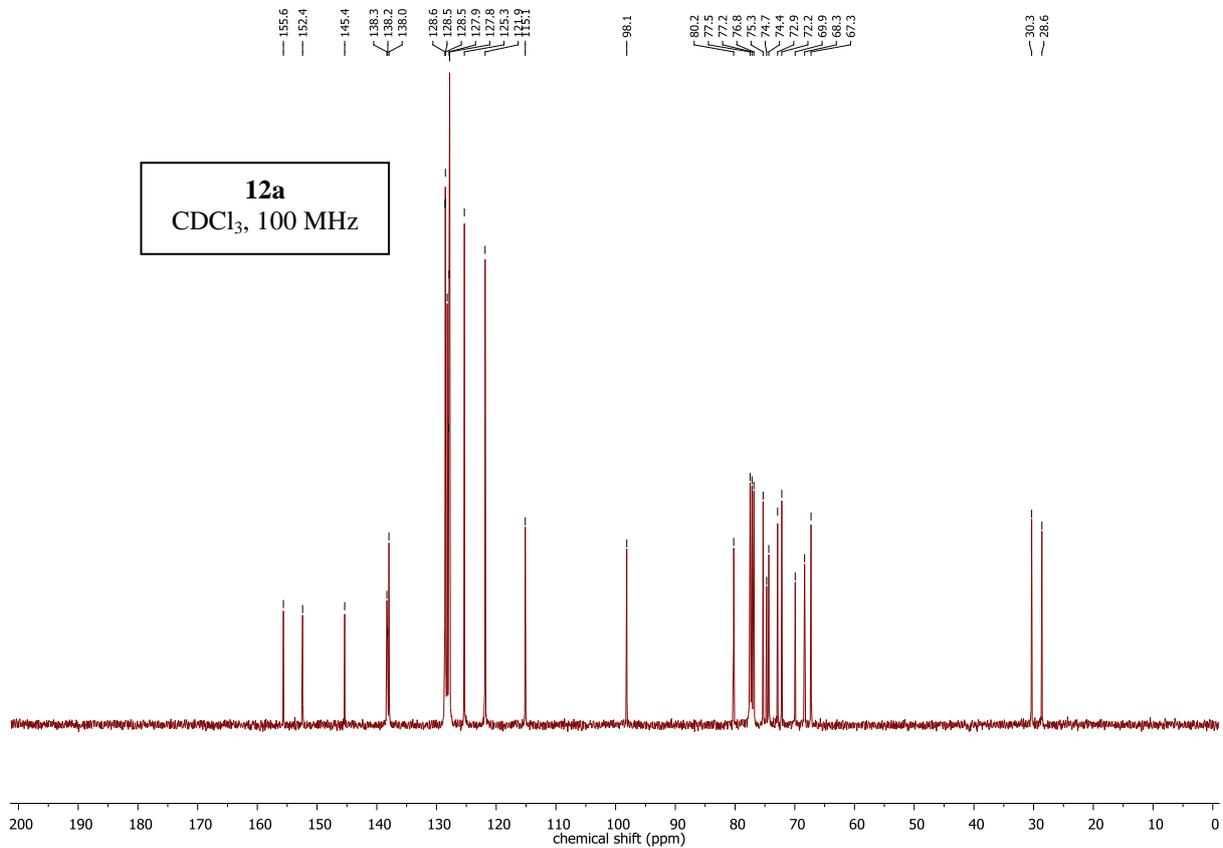
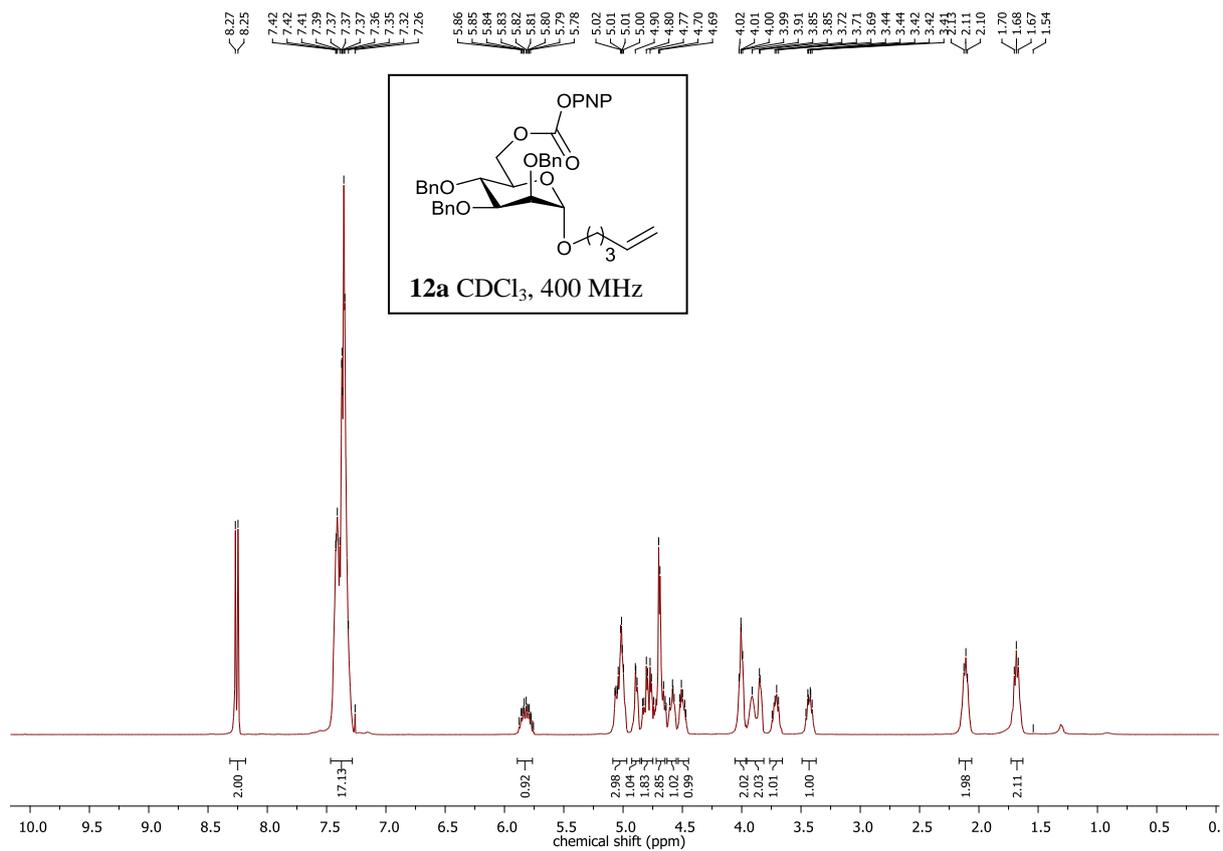


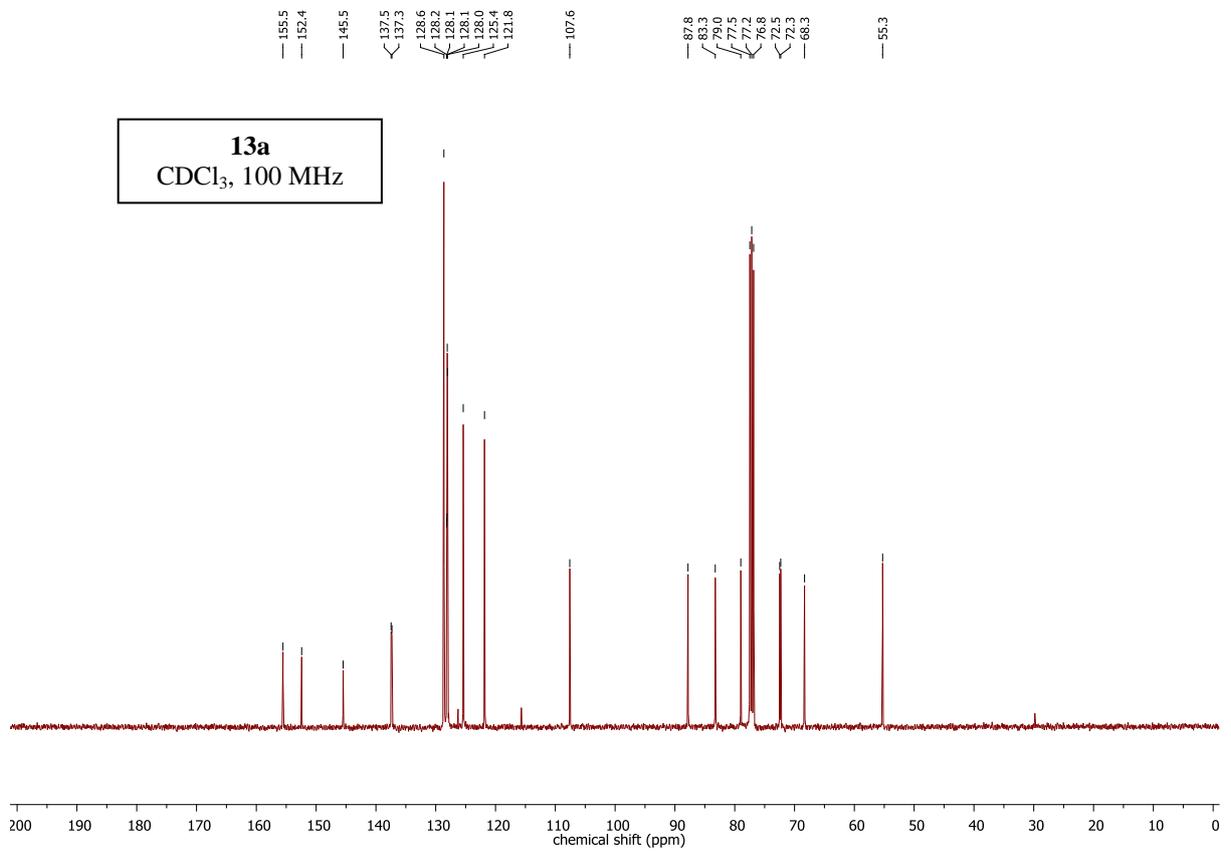
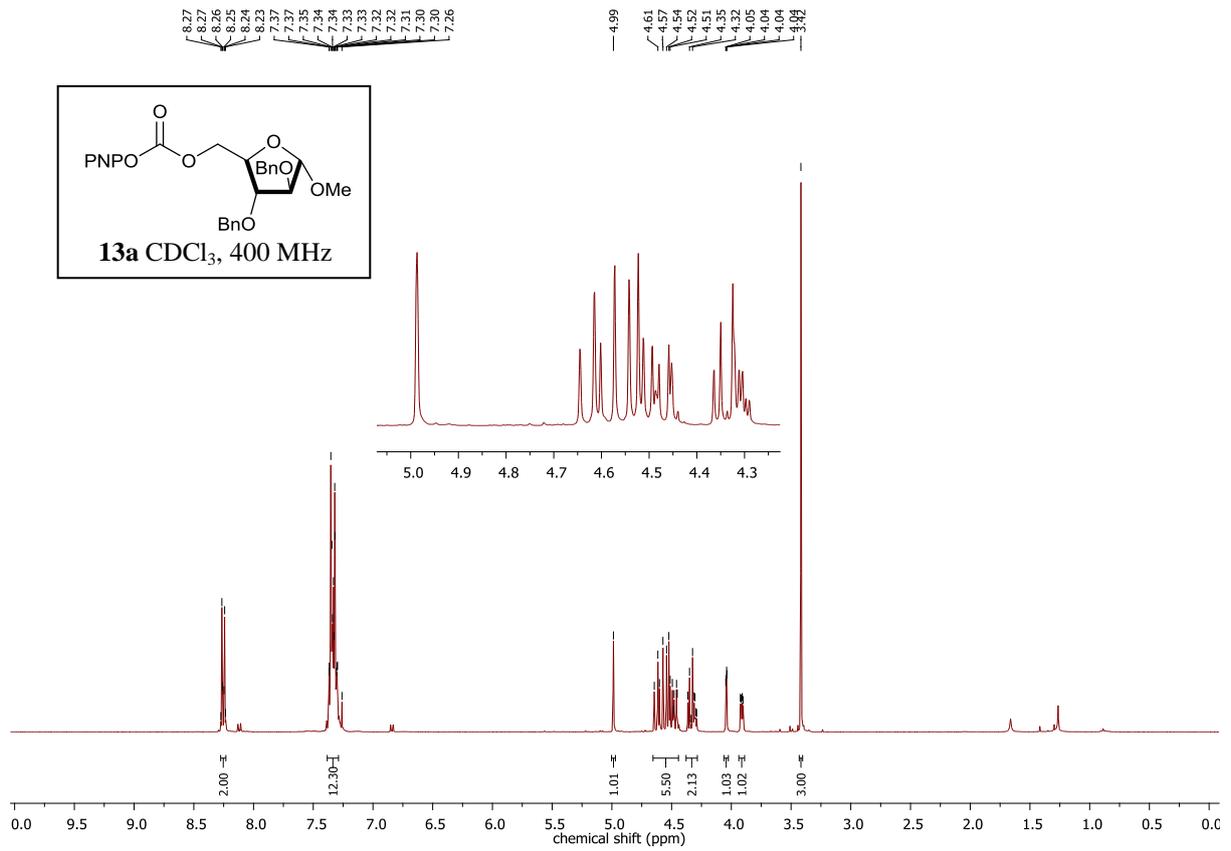












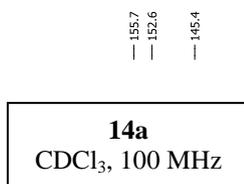
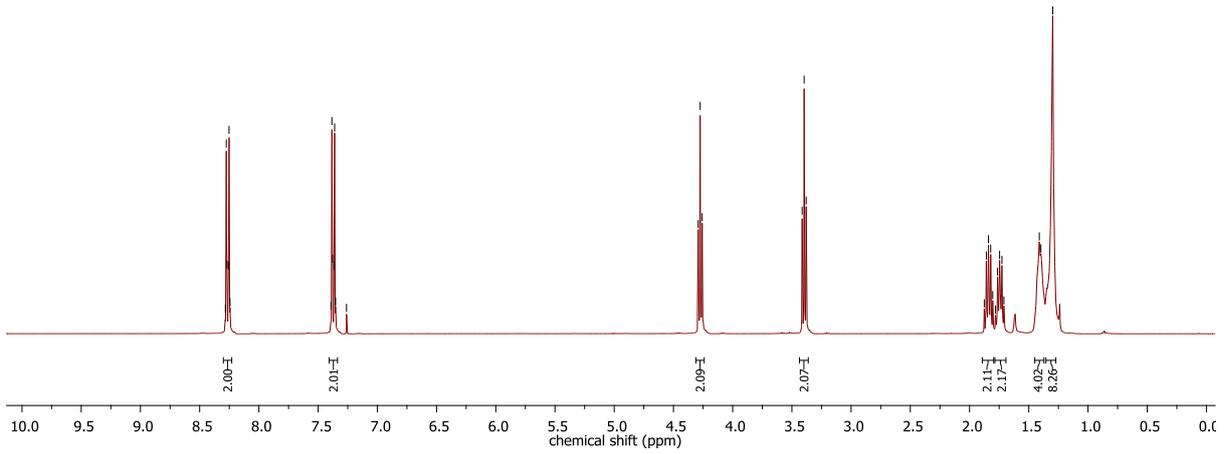
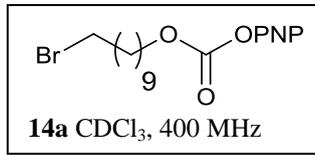
8.28
8.28
8.27
8.26
8.25
8.24

7.39
7.38
7.37
7.36
7.35
7.26

4.29
4.27
4.26

3.41
3.40
3.38

1.88
1.86
1.84
1.82
1.80
1.78
1.76
1.75
1.74
1.71
1.69
1.40
1.30

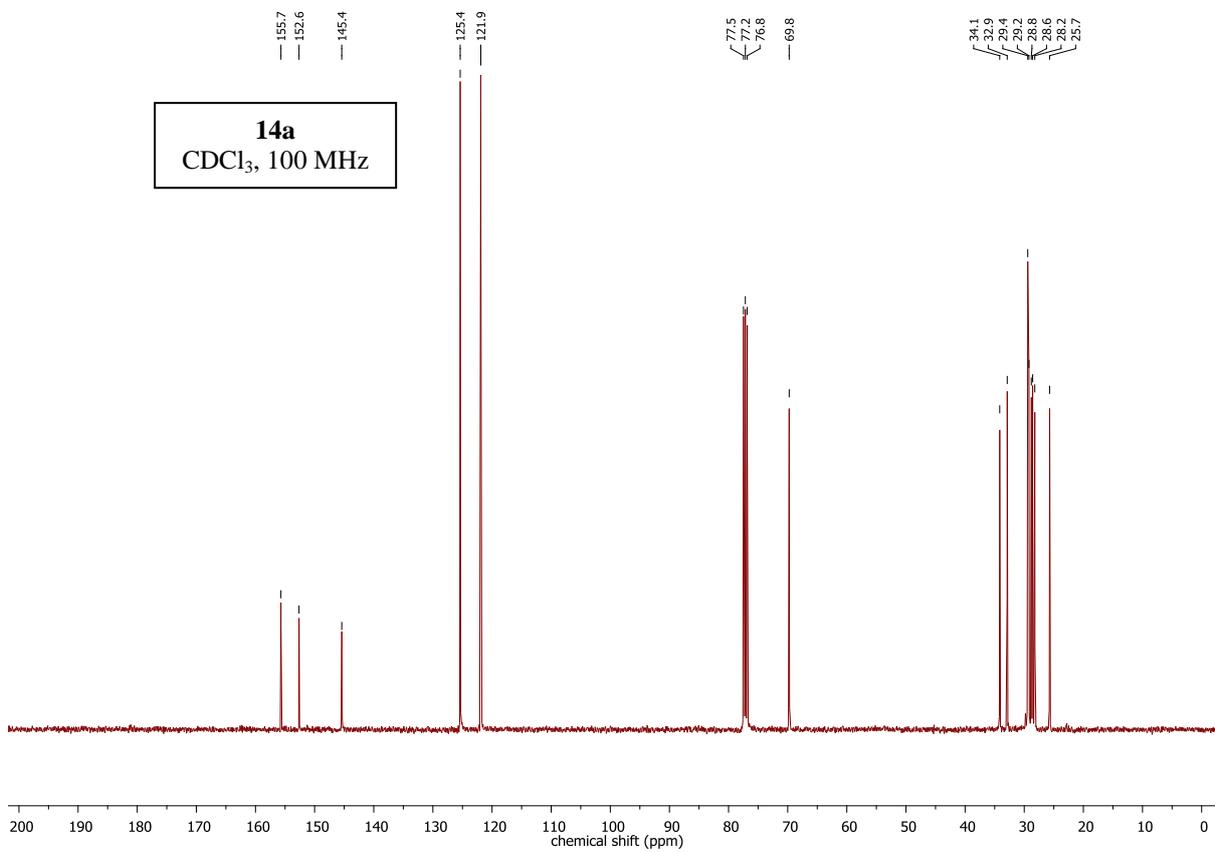


155.7
152.6
145.4

125.4
121.9

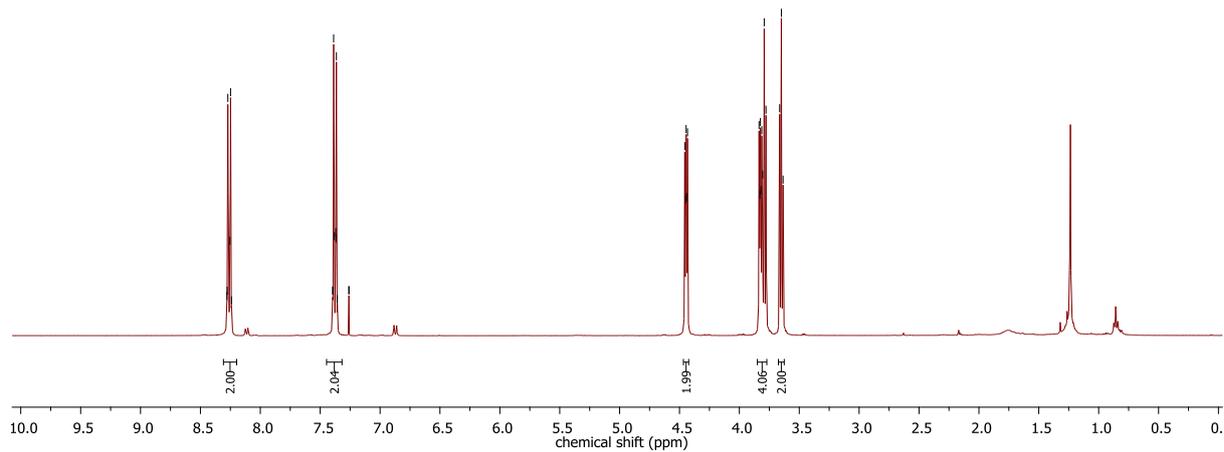
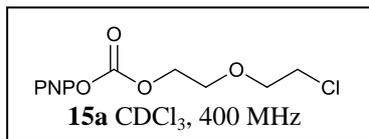
77.5
76.2
69.8

34.1
32.9
29.4
29.2
28.6
28.2
25.7

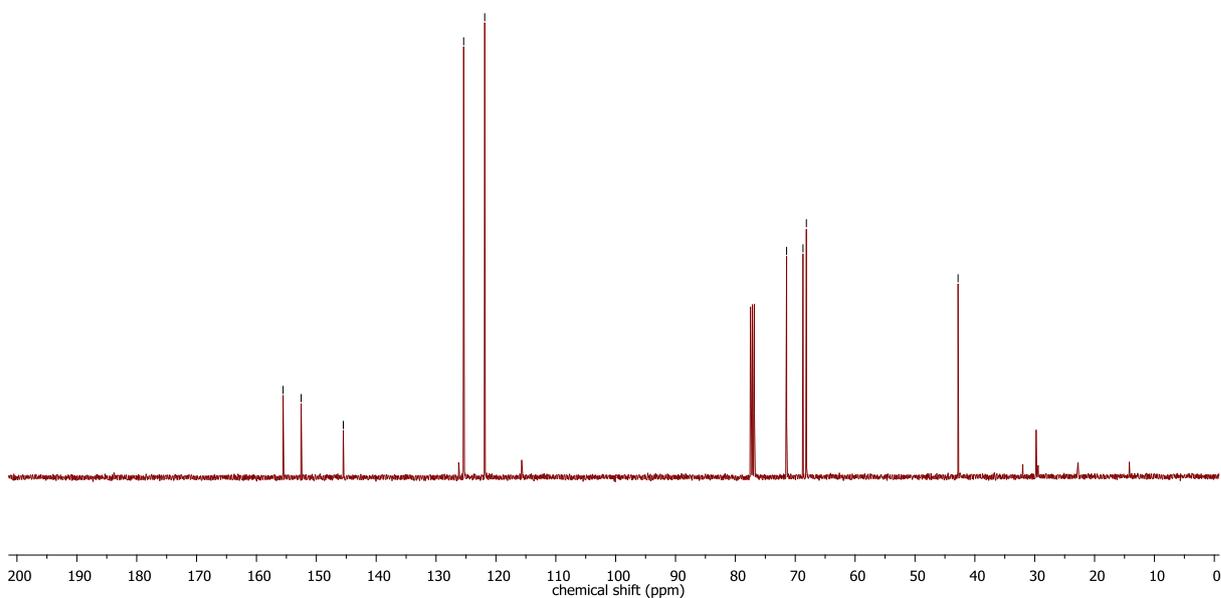
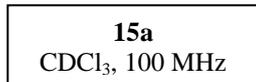


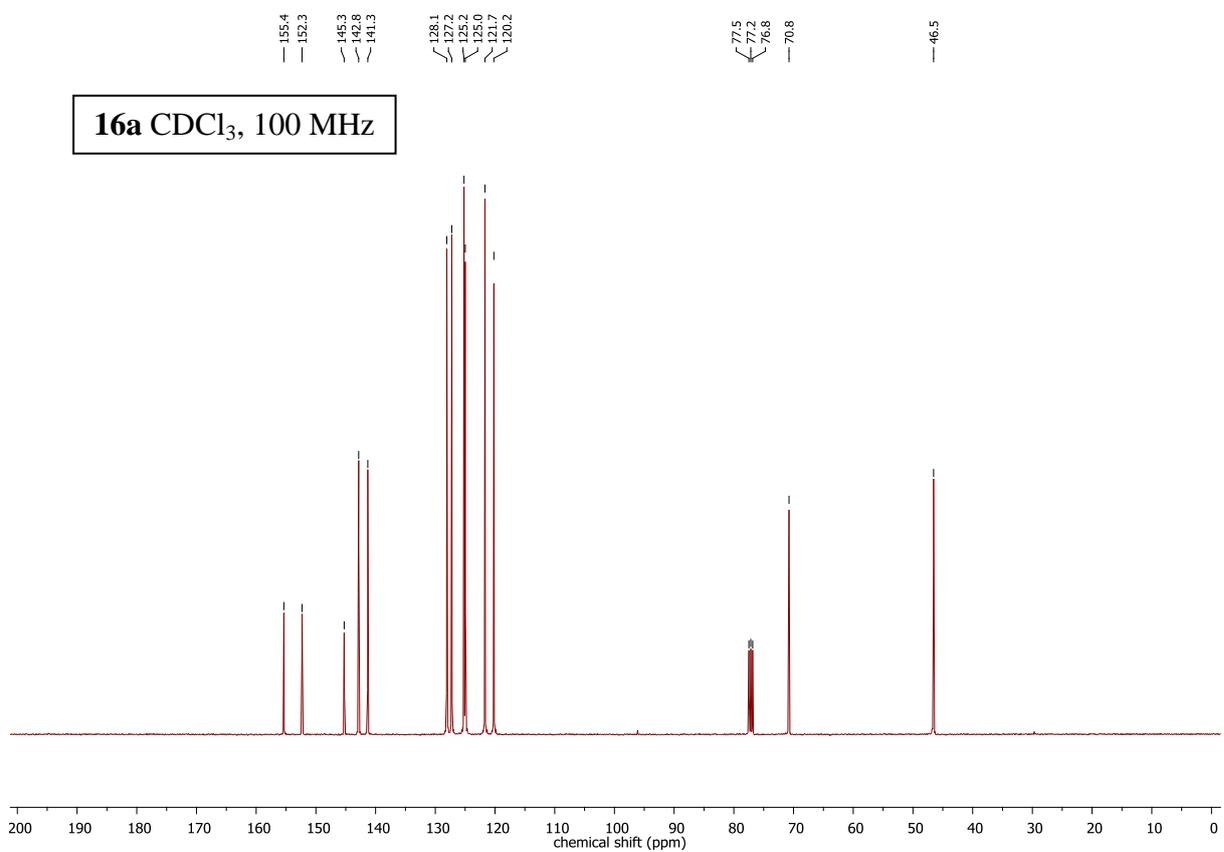
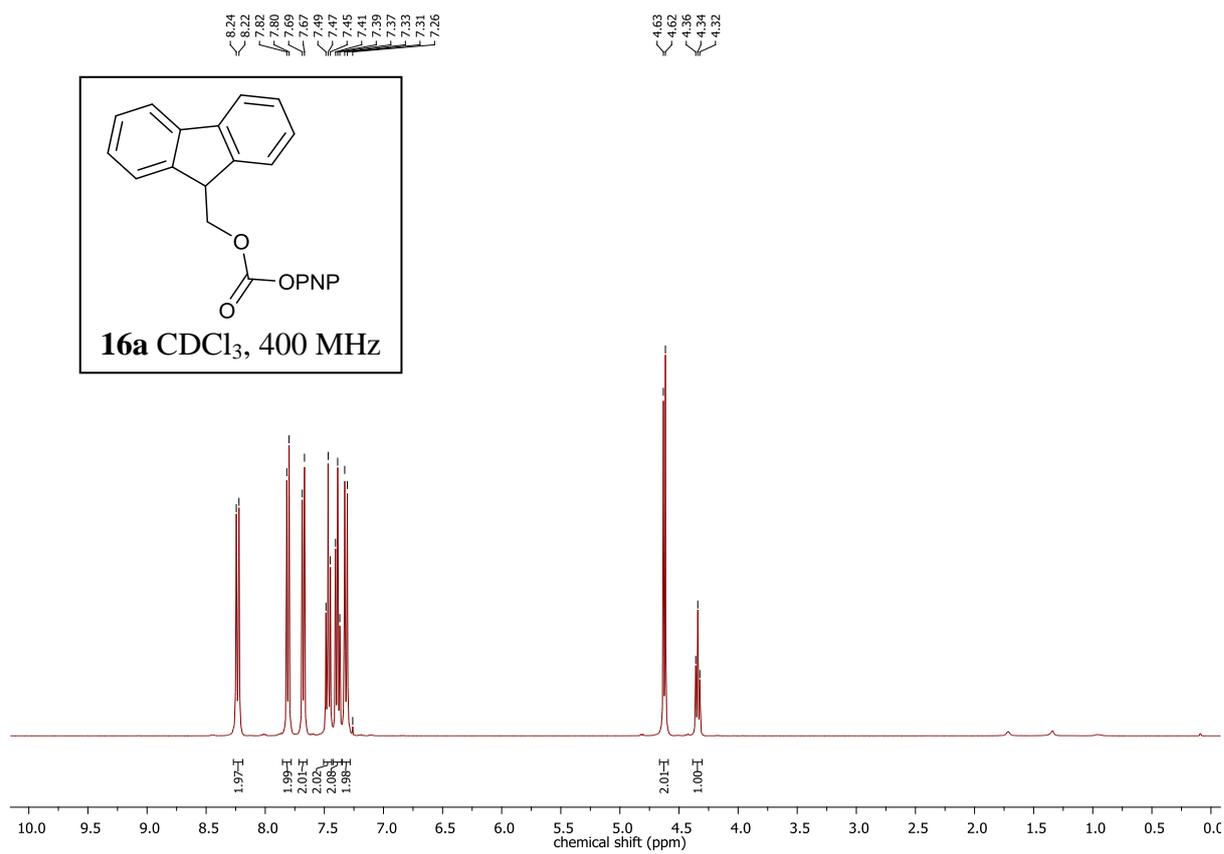
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8.25
8.24
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7.38
7.37
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7.36
7.26
7.26

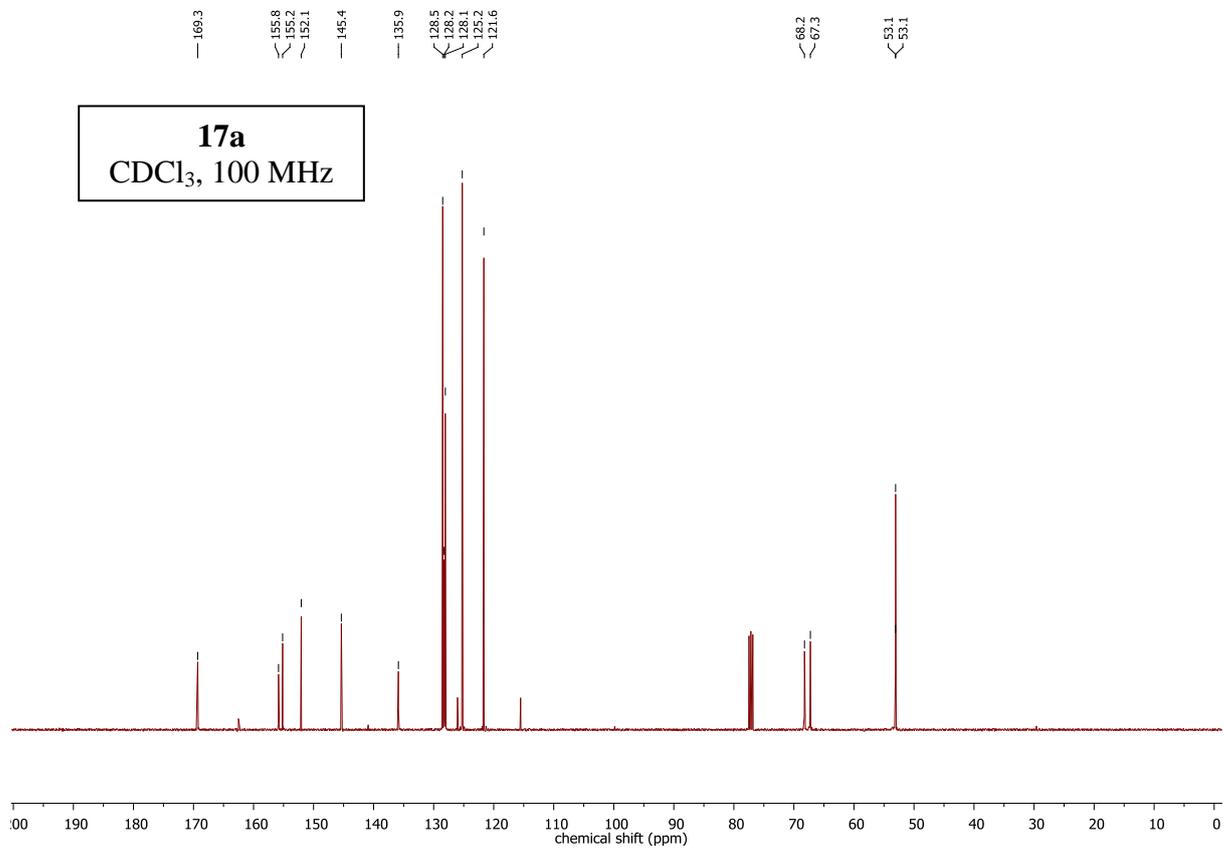
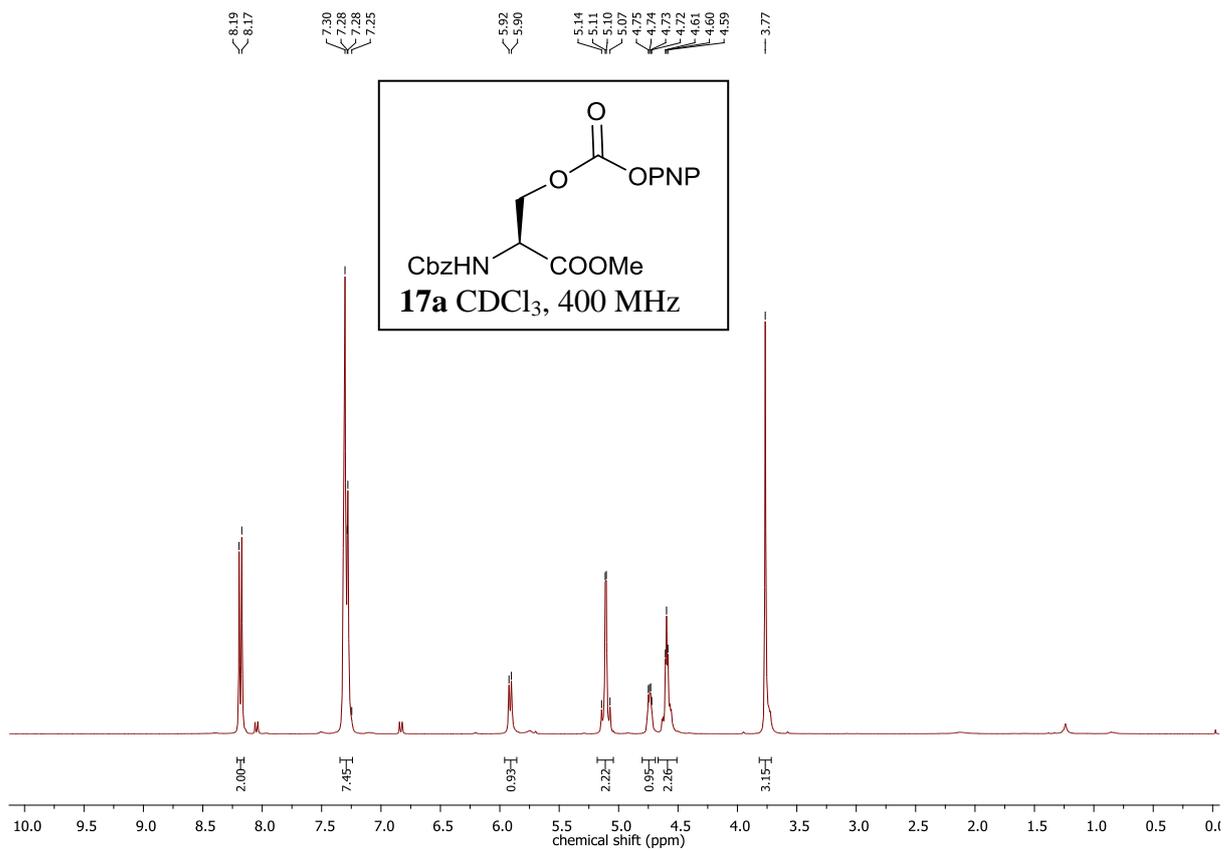
4.46
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3.82
3.81
3.81
3.79
3.66
3.65
3.64

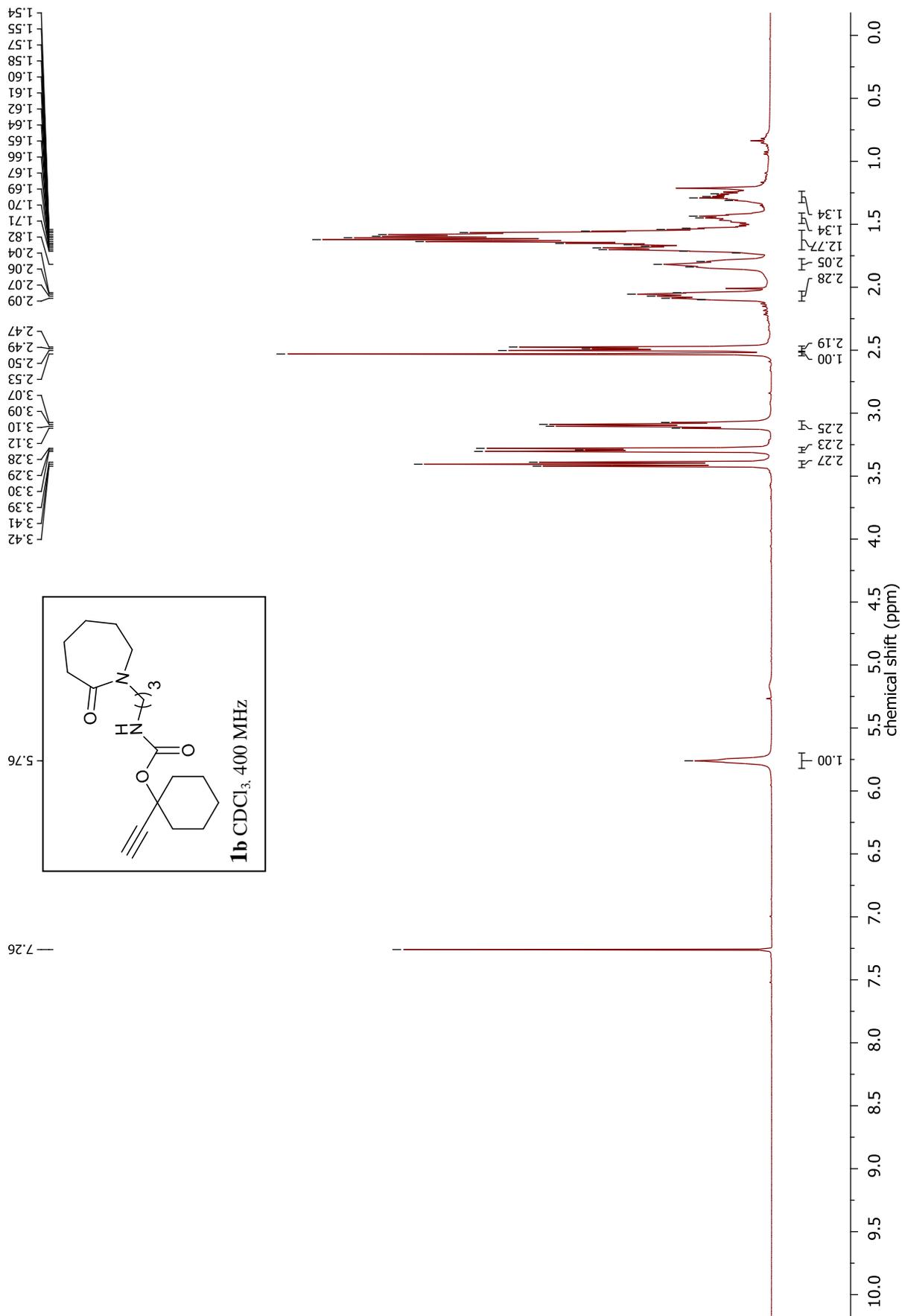


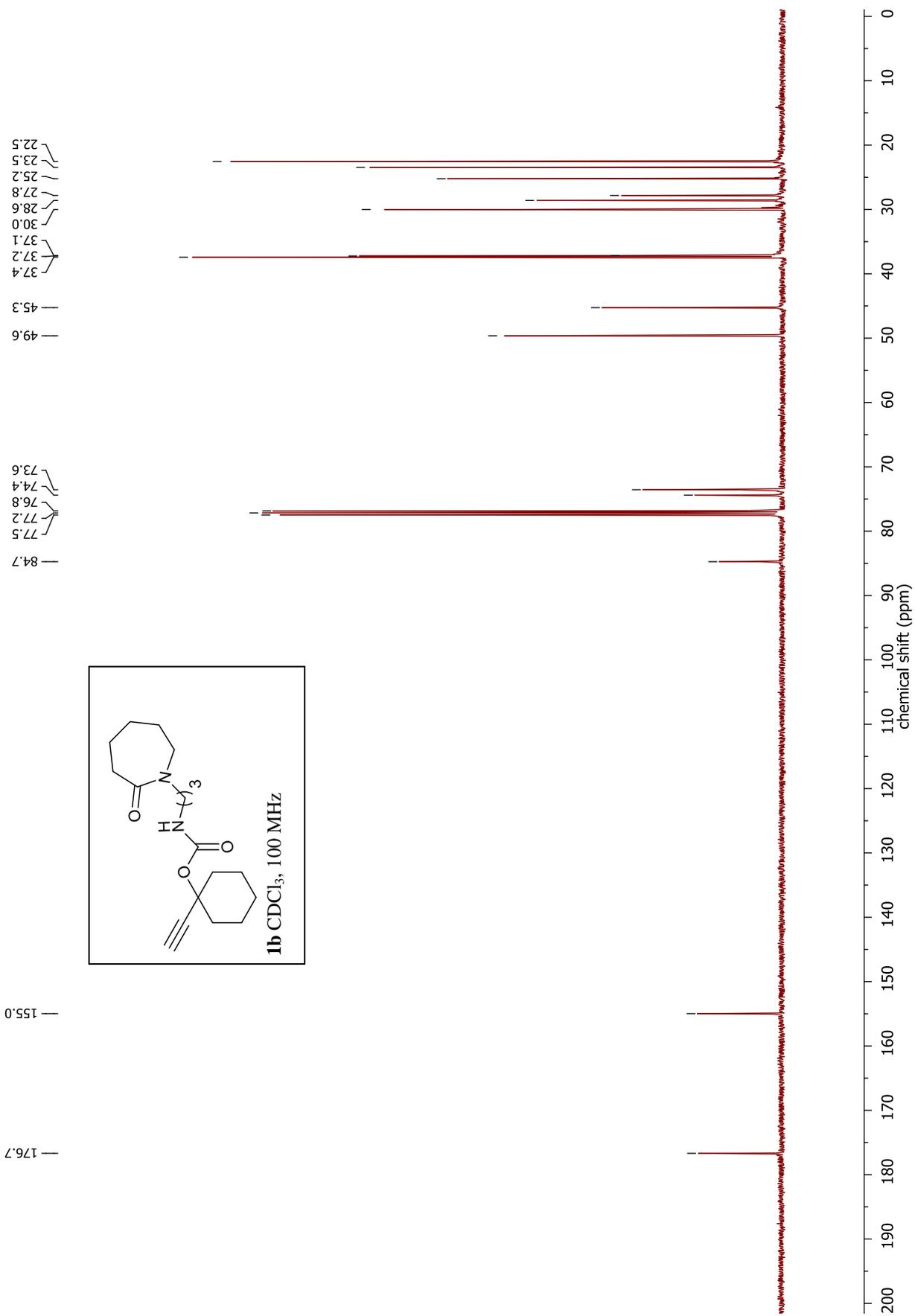
155.6
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 125.4
 121.9
 71.4
 68.7
 68.1
 42.8

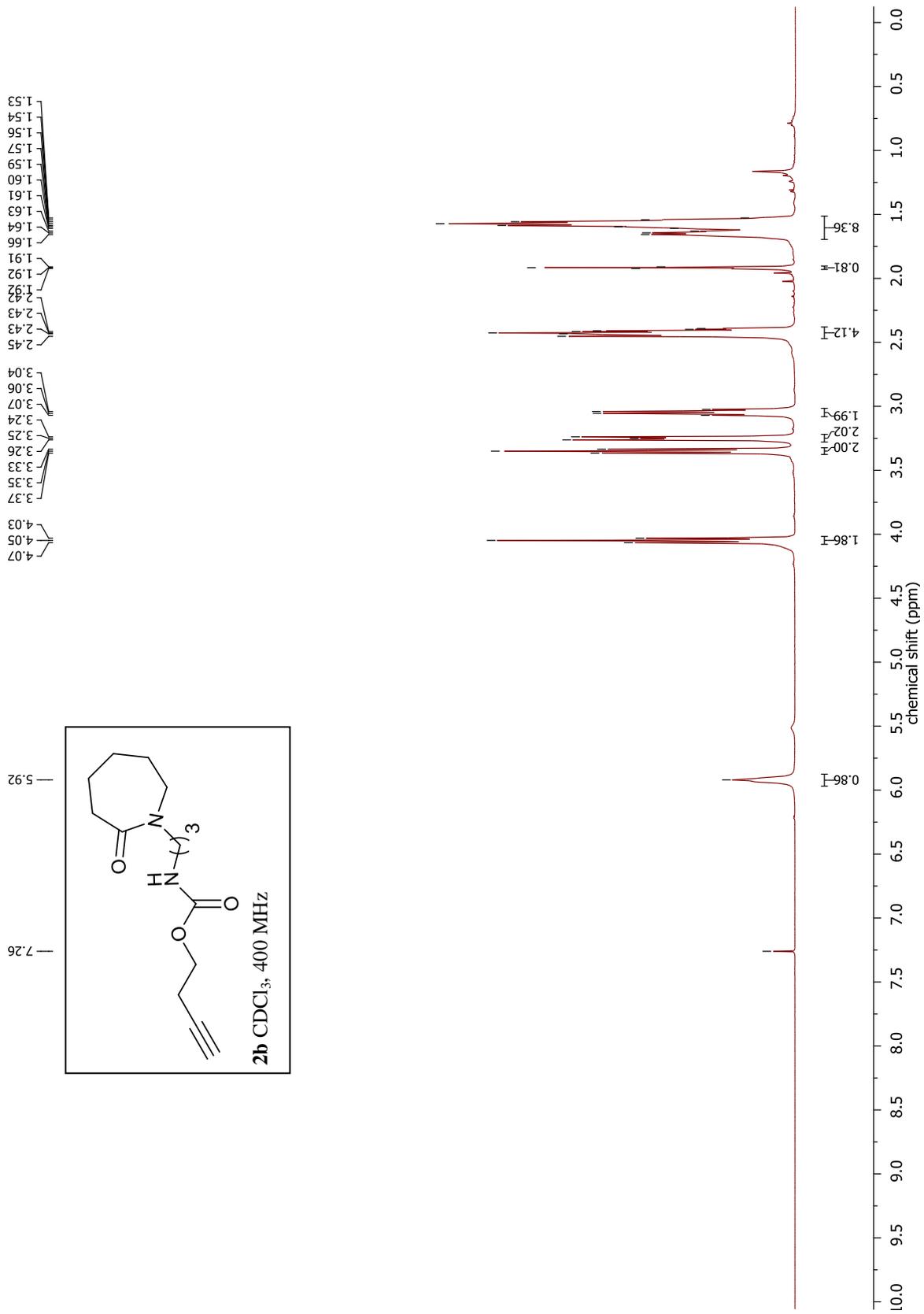












20160229-MV-CP-3

156.2

176.6

62.2

69.7

76.8

77.2

77.5

80.4

49.5

45.0

37.2

37.1

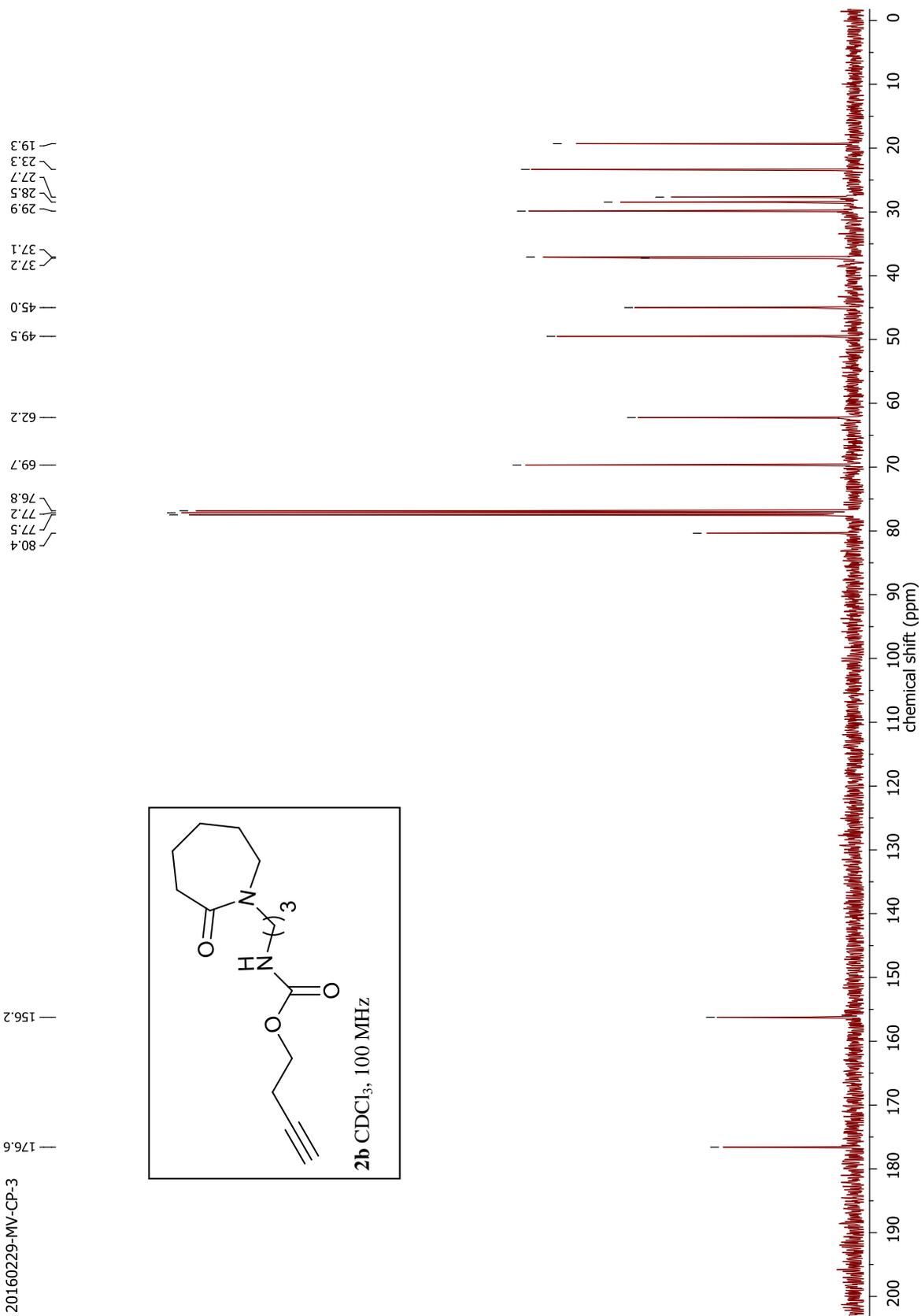
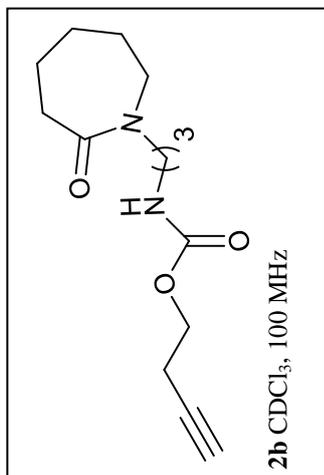
29.9

28.5

27.7

23.3

19.3



20160405-MV-CP-D6/27
MV-CP-D6

