

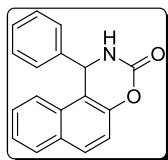
Supporting Information

Micelle promoted supramolecular carbohydrate scaffold-catalyzed multicomponent synthesis of 1,2-dihydro-1-aryl-3H-naphtho[1,2-e][1,3]oxazin-3-one and amidoalkyl naphthols derivatives in aqueous medium

General Considerations.

1. Reagent grade solvents were used for extraction and flash chromatography. All the reagents and chemicals were purchased from Sigma–Aldrich Chemical Co, Lancaster and were used directly without further purification. Whereas starch and cellulose were purchased from Merck. The progress of reactions was checked by analytical thin-layer chromatography (TLC, Merck silica gel 60 F-254 plates). The plates were visualized first with UV illumination followed by iodine. Flash column chromatography was performed using silica gel (230-400 mesh). The solvent compositions reported for all chromatographic separations are on a volume/volume (v/v) basis. ¹H-NMR spectra were recorded at 200 MHz and are reported in parts per million (ppm) on the δ scale relative to tetramethylsilane as an internal standard. ¹³C-NMR spectra were recorded at 50 MHz and are reported in parts per million (ppm) on the δ scale relative to CDCl₃+ DMSO-d₆/DMSO-d₆ (40.0). Mass spectra were obtained using JEOL SX-102 (ESI) instrument. Melting points were determined on a Mel Temp II melting point apparatus and are uncorrected.
2. **Preparation of cellulose or starch sulfuric acid:** To a magnetically stirred mixture of 5.0 g of starch (Merck) or 5.0 g of cellulose (DEAE for column chromatography, Merck) in 20 ml of n-hexane, 1.0 g of chlorosulfonic acid (9 mmol) was added dropwise at 0°C over 2 h. HCl gas escaped from the reaction vessel immediately. After the addition was complete, the mixture was stirred for 2 h. After that, the mixture was filtered and washed with 30 ml of acetonitrile (2 times), and dried under vacuum at room temperature to obtain 5.47 g cellulose sulfuric acid (CellSA) as white powder or 5.06 g starch sulfuric acid (StarSA) as cream powder.
3. **General procedure for the synthesis of compound (4).** In a typical experiment, the aldehyde (2 mmol), urea/thiourea/amide (3.0 mmol), (α , or β) naphthol (2 mmol), cellulose sulfuric acid (0.05 g), and SDS (20 mol %) were taken in 5 mL water. the reaction mixture was vigorous stirred at 80 °C till the completion of the reaction (monitored by TLC). After completion the reaction mixture was extracted with ethyl acetate and filtered the solid catalyst for reused and the organic phase dried over sodium sulphate and evaporated under vacuum to give crude product, which was purified either by column chromatography using ethyl acetate:hexane (silica gel, 230-400 mesh) as an eluent or by recrystallization from ethanol to afford the corresponding product.

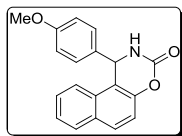
1-phenyl-1H-naphtho[1,2-e][1,3]oxazin-3(2H)-one (4a).



White solid; mp: 219-222^oC; ¹H NMR (200 MHz, DMSO-d₆) δ 6.21 (d, 1H, J = 4.5 Hz), 7.12 (d, 1H, J = 7.86 Hz), 7.23-7.38 (m, 7H), 7.61 (d, 1H, J = 8.6 Hz), 7.69-7.74 (m, 1H), 8.05-8.10 (m, 1H), 8.94 (br, s, 1H), ¹³C NMR (50 MHz, DMSO-d₆): 155.05, 149.15, 142.86, 132.03, 131.46, 128.73, 128.13, 127.33, 127.18, 127.03, 126.60, 125.78, 125.69, 119.77,

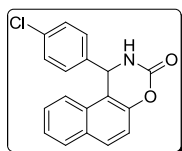
115.82, 53.66; ESIMS: m/z 276 (M+H); IR (KBr): 3323, 1711, 1452. 753 cm^{-1} ; Analysis calculated for $\text{C}_{18}\text{H}_{13}\text{NO}_2$: C, 78.53; H, 4.76; N, 5.09; found: C, 78.62; H, 4.69; N, 5.01 %.

1-(4-methoxyphenyl)-1H-naphtho[1,2-e][1,3]oxazin-3(2H)-one (4b).



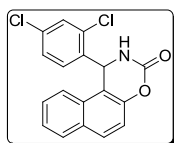
White solid; mp: 185-187^oC; ¹H NMR (200 MHz, DMSO-*d*₆) δ 3.70 (s, 3H), 6.15 (d, 1H, $J= 4.7$ Hz), 6.90 (d, 2H, $J= 7.95$ Hz), 7.10-7.21 (m, 3H), 7.37-7.44 (m, 2H), 7.63 (d, 1H, $J= 8.25$ Hz), 7.72-7.76 (m, 1H), 8.07-8.12 (m, 1H) 8.53 (br, s, 1H); **¹³C NMR (50 MHz, DMSO-*d*₆):** 158.50, 155.05, 149.15, 132.62, 132.03, 131.46, 129.08, 127.33, 127.03, 126.60, 125.78, 125.69, 119.77, 115.82, 113.63, 56.04, 53.66.; ESIMS: m/z 306 (M+H); IR(KBr): 3334, 1705, 1437, 749 cm^{-1} ; Analysis calculated for $\text{C}_{19}\text{H}_{15}\text{NO}_3$: C, 74.74; H, 4.95; N, 4.59 ; found: C, 74.81; H, 4.84; N, 4.63 %.

1-(4-chlorophenyl)-1H-naphtho[1,2-e][1,3]oxazin-3(2H)-one (4c).



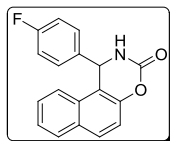
White solid; mp: 209-212^oC; ¹H NMR (200 MHz, DMSO-*d*₆) δ 5.97 (d, 1H, $J= 4.17$ Hz), 6.88 (d, 1H, $J= 8.9$ Hz), 7.04-7.15 (m, 6H), 7.37 (d, 1H, $J= 7.4$ Hz), 7.46-7.50 (m, 1H), 7.81-7.86 (m, 1H), 9.05 (br, s, 1H); **¹³C NMR (50 MHz, DMSO-*d*₆):** 155.05, 149.15, 140.56, 133.31, 132.03, 131.46, 129.86, 129.11, 127.33, 127.03, 126.60, 125.78, 125.69, 119.77, 115.82, 53.66; ESIMS: m/z 310 (M+H); IR (KBr): 3330, 1708, 1448, 747 cm^{-1} ; Analysis calculated for $\text{C}_{18}\text{H}_{12}\text{ClNO}_2$: C, 69.80; H, 3.90; N, 4.52 ; found: C, 69.91; H, 3.86; N, 4.64 %.

1-(2,4-dichlorophenyl)-1H-naphtho[1,2-e][1,3]oxazin-3(2H)-one (4d).



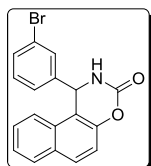
White solid; mp: 214-217^oC; ¹H NMR (200 MHz, DMSO-*d*₆) δ 6.09 (d, 1H, $J= 4.9$ Hz), 6.76-6.90 (m, 3H), 6.95-7.10 (m, 2H), 7.21-7.23 (m, 1H), 7.29-7.42 (m, 2H), 7.84-7.89 (m, 1H), 9.23 (br, s, 1H); **¹³C NMR (50 MHz, DMSO-*d*₆):** 155.09, 148.54, 138.04, 136.11, 135.08, 132.03, 131.46, 130.57, 127.80, 127.33, 127.03, 126.60, 126.30, 125.69, 119.34, 114.65, 49.28; ESIMS: m/z 355 (M+H); IR(KBr): 3329, 1715, 1442, 755 cm^{-1} ; Analysis calculated for $\text{C}_{18}\text{H}_{11}\text{Cl}_2\text{NO}_2$: C, 81.56; H, 5.42; N, 3.96; found: C, 81.69; H, 5.42; N, 3.90 %.

1-(4-fluorophenyl)-1H-naphtho[1,2-e][1,3]oxazin-3(2H)-one (4e).



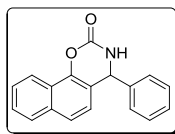
White solid; mp: 206-208^oC; ¹H NMR (200 MHz, DMSO-*d*₆) δ 6.21 (d, 1H, *J*= 4.4 Hz), 6.97-7.10 (m 2H), 7.14-7.24 (m, 3H), 7.33-7.42 (m, 2H), 7.63 (d, 1H, *J*= 8.5 Hz), 7.72-7.76 (m, 1H), 8.07-8.12 (m, 1H), 9.68 (br, s, 1H); **¹³C NMR (50 MHz, DMSO-*d*₆)**:162.10, 155.05, 149.15, 137.38, 132.03, 131.46, 130.58, 127.33, 127.03, 126.60, 125.78, 125.69, 119.77, 115.82, 114.58, 53.66; ESIMS: *m/z* 294 (M+H); IR (KBr): 3334, 1714, 1444, 747 cm⁻¹; Analysis calculated for C₁₈H₁₂FNO₂: C, 73.71; H, 4.12; N, 4.78 ; found: C, 73.83; H, 4.02; N, 4.89 %.

1-(3-bromophenyl)-1H-naphtho[1,2-e][1,3]oxazin-3(2H)-one(4f).



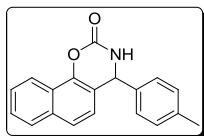
White solid; mp: 225-227^oC; ¹H NMR (200 MHz, DMSO-*d*₆) δ 6.09 (d, 1H, *J*= 4.1 Hz), 7.00-7.11 (m, 2H), 7.22-7.27 (m, 4H), 7.44-7.48 (m, 2H), 7.57-7.61 (m, 1H), 8.00-8.05 (m, 1H), 9.69 (br, s, 1H); **¹³C NMR (50 MHz, DMSO-*d*₆)**:155.07, 149.15, 148.03, 132.10, 132.03, 131.46, 131.04, 129.47, 127.33, 127.03, 126.60, 126.31, 125.78, 125.69, 122.35, 119.77, 115.82, 53.40; ESIMS: *m/z* 354 (M+H); IR (KBr): 3329, 1703, 1457, 756 cm⁻¹; Analysis calculated for C₁₈H₁₂BrNO₂: C, 61.04; H, 3.41; N, 3.95 ; found: C, 61.13; H, 3.49; N, 3.84 %.

4-phenyl-3,4-dihydro-2H-naphtho[2,1-e][1,3]oxazin-2-one(4g).



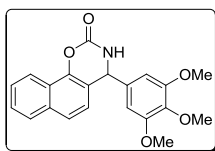
White solid; mp: 200-202^oC; ¹H NMR (200 MHz, DMSO-*d*₆) δ 5.90 (d, 1H, *J*= 4.4 Hz), 7.16-7.21 (m, 1H), 7.27-7.34 (m, 5H), 7.50-7.66 (m, 3H), 7.74-7.79 (m, 1H), 7.98 (d, 1H, *J*= 7.4 Hz), 8.23 (br, s, 1H); **¹³C NMR (50 MHz, DMSO-*d*₆)**:156.10, 148.20, 142.11, 134.10, 128.73, 128.36, 128.22, 127.29, 127.11, 125.17, 124.89, 124.02, 121.68, 121.11, 117.23, 53.40; ESIMS: *m/z* 276 (M+H); IR (KBr): 3339, 1717, 1447, 758 cm⁻¹; Analysis calculated for C₁₈H₁₃NO₂:C, 78.53; H, 4.76; N, 5.09; found: C, 78.63; H, 4.69; N, 4.95 %.

4-p-tolyl-3,4-dihydro-2H-naphtho[2,1-e][1,3]oxazin-2-one (4h).



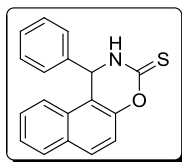
White solid; mp: 212-215⁰C; ¹H NMR (200 MHz, DMSO-d₆) δ 2.25 (s, 3H), 5.92 (d, 1H, *J*= 4.7 Hz), 7.11-7.29 (m, 5H), 7.49-7.67 (m, 3H), 7.47-7.78 (m, 1H), 7.98 (d, 1H, *J*= 7.9 Hz), 8.41 (br, s, 1H); ¹³C NMR (50 MHz, DMSO-d₆):156.13, 148.20, 139.57, 137.94, 134.10, 129.77, 128.27, 128.22, 127.11, 125.17, 124.89, 124.02, 121.68, 121.11, 117.23, 53.40, 21.13; ESIMS: *m/z* 290 (M+H); IR (KBr): 3318, 1719, 1442, 751 cm⁻¹; Analysis calculated for C₁₉H₁₅NO₂: C, 78.87; H, 5.23; N, 4.84; found: C, 78.79; H, 5.31; N, 4.91 %.

4-(3,4,5-trimethoxyphenyl)-3,4-dihydro-2H-naphtho[2,1-e][1,3]oxazin-2-one (4i).



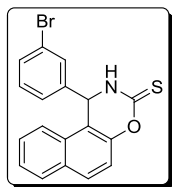
White solid; mp: 230-233⁰C; ¹H NMR (200 MHz, DMSO-d₆) δ 3.77 (s, 3H), 3.83 (s, 3H), 6.01 (d, 1H, *J*= 4.8 Hz), 6.44 (s, 2H), 7.38 (d, 1H, *J*= 8.4 Hz), 7.50-7.64 (m, 3H), 7.74-7.78 (m, 1H), 7.90-7.98 (m, 2H); ¹³C NMR (50 MHz, DMSO-d₆):156.10, 154.29, 148.20, 139.99, 136.39, 134.10, 128.22, 127.11, 125.17, 124.89, 124.02, 121.68, 121.11, 117.23, 106.81, 60.65, 56.79, 52.67; ESIMS: *m/z* 366 (M+H); IR (KBr): 3335, 1714, 1445, 756 cm⁻¹; Analysis calculated for C₂₁H₁₉NO₅: C, 69.03; H, 5.24; N, 3.83 %; found: C, 69.11; H, 5.29; N, 3.71 %.

1-phenyl-1H-naphtho[1,2-e][1,3]oxazine-3(2H)-thione(4j).



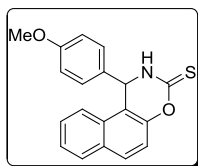
White semi solid; ¹H NMR (200 MHz, DMSO-d₆) δ 6.94 (s, 1H), 6.29-6.27 (m, 5H), 7.45 (d, 1H, *J*=8.7 Hz), 7.60-7.66 (m, 3H), 7.76-7.80 (m, 1H), 7.87-7.92 (m, 1H), 8.97 (br, s, 1H); ¹³C NMR (50 MHz, DMSO-d₆): 187.43, 149.09, 142.86, 132.03, 131.46, 128.73, 128.13, 127.33, 127.18, 127.03, 126.60, 126.10, 125.69, 121.76, 116.06, 56.69; ESIMS: *m/z* 292 (M+H); IR (KBr): 3062, 2923, 1630, 1602, 1506, 1460, 750 cm⁻¹; Analysis calculated for C₁₈H₁₃NOS: C, 74.20; H, 4.50; N, 4.81 %; found: C, 74.38; H, 4.69; N, 4.77 %;

1-(3-bromophenyl)-1H-naphtho[1,2-e][1,3]oxazine-3(2H)-thione (4k).



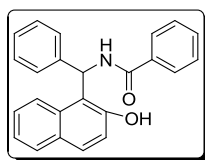
White semi solid; $^1\text{H NMR}$ (200 MHz, DMSO-d_6) δ 6.39 (s, 1H), 6.77-6.79 (m, 2H), 6.89 (d, 1H, $J=8.6$ Hz), 7.03-7.08 (m, 4H), 7.16-7.23 (m, 2H), 7.30-7.35 (m, 1H), 8.40 (br, s, 1H); $^{13}\text{C NMR}$ (50 MHz, DMSO-d_6): 187.48, 149.12, 148.03, 132.10, 132.08, 131.46, 131.04, 129.47, 127.33, 127.03, 126.59, 126.31, 126.10, 125.69, 122.35, 121.79, 116.10, 56.48; ESIMS: m/z 369 (M+H); IR (KBr): 3059, 2927, 1628, 1608, 1511, 1463, 754 cm^{-1} ; Analysis calculated for $\text{C}_{18}\text{H}_{12}\text{BrNOS}$: C, 58.39; H, 3.27; N, 3.78 %; found: C, 58.47; H, 3.35; N, 3.82 %.

1-(4-methoxyphenyl)-1H-naphtho[1,2-e][1,3]oxazine-3(2H)-thione (4l).



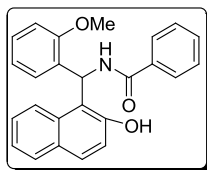
White semi solid; $^1\text{H NMR}$ (200 MHz, DMSO-d_6) δ 3.78 (s, 3H), 5.84 (s, 1H), 6.87 (d, 2H, $J = 7.5$ Hz), 7.20-7.39 (m, 4H), 7.50 (s, 2H), 7.64-8.01 (m, 2H), 8.63 (br, s, 1H); $^{13}\text{C NMR}$ (50 MHz, $\text{CDCl}_3+\text{DMSO-d}_6$): 187.40, 158.50, 149.04, 132.62, 132.03, 131.46, 129.08, 127.37, 127.03, 126.60, 126.10, 125.69, 121.76, 116.06, 113.63, 56.69, 56.04; ESIMS: m/z 322 (M+H); IR (KBr): 3069, 2930, 1634, 1610, 1501, 1468, 752 cm^{-1} ; Analysis calculated for $\text{C}_{19}\text{H}_{15}\text{NO}_2\text{S}$: C, 71.00; H, 4.70 %; N, 4.36; found: C, 71.14; H, 4.63; N, 4.27 %.

N-((2-hydroxynaphthalen-1-yl)(phenyl)methyl)benzamide(4m).



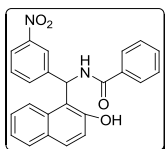
White solid; mp: 233-236 $^{\circ}$ C; $^1\text{H NMR}$ (200 MHz, DMSO-d_6) δ 6.89 (s, 1H), 7.08 (d, 1H, $J=7.3$ Hz), 7.25-7.32 (m, 4H), 7.35-7.45 (m, 6H), 7.64 (d, 1H, $J=7.3$ Hz), 7.79 (d, 1H, $J=6.9$ Hz), 7.84-7.89 (m, 2H), 8.09-8.14 (m, 1H) 9.56 (br, s, 1H); $^{13}\text{C NMR}$ (50 MHz, $\text{CDCl}_3+\text{DMSO-d}_6$): 167.30, 155.13, 142.59, 135.39, 132.59, 131.44, 130.27, 128.53, 128.42, 128.08, 127.98, 127.36, 126.99, 126.88, 126.56, 122.55, 117.26, 62.66; ESIMS: m/z 354 (M+H); IR (KBr): 3375, 1632, 1530, 1477, 749 cm^{-1} ; Analysis calculated for $\text{C}_{24}\text{H}_{19}\text{NO}_2$: C, 81.56; H, 5.42; N, 3.96; found: C, 81.67; H, 5.51; N, 3.83 %.

N-((2-hydroxynaphthalen-1-yl)(2-methoxyphenyl)methyl)benzamide (4n).



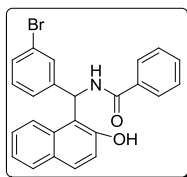
White solid; mp: 270⁰C; ¹H NMR (200 MHz, DMSO-d₆) δ 4.34 (s, 3H), 6.85 (s, 1H), 7.52-7.83 (m, 3H), 7.90-8.20 (m, 8H), 8.28-8.71 (m, 4H), 10.15 (br, s, 1H); ¹³C NMR (50 MHz, CDCl₃+DMSO-d₆): 167.32, 159.83, 154.83, 135.39, 132.59, 131.44, 130.27, 130.22, 129.59, 128.67, 128.42, 128.24, 128.08, 127.26, 126.99, 126.88, 126.56, 122.52, 120.83, 115.79, 111.95, 57.06, 56.79; ESIMS: m/z 384 (M+H); IR (KBr): 3382, 1638, 1534, 1479, 751; Analysis calculated for C₂₅H₂₁NO₃: C, 78.31; H, 5.52; N, 3.65; found: C, 78.41; H, 5.48; N, 3.57%.

N-((2-hydroxynaphthalen-1-yl)(3-nitrophenyl)methyl)benzamide(4o).



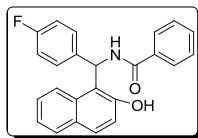
Yellow solid mp: 242-245; ¹H NMR (200 MHz, DMSO-d₆) δ 6.82 (s, 1H), 7.06 (d, 1H, J=7.3 Hz), 7.19-7.39 (m, 5H), 7.46-7.59 (m, 2H), 7.70-7.82 (m, 4H), 8.03-8.14 (m, 2H), 8.29 (s, 1H), 9.73 (br, s, 1H); ¹³C NMR (50 MHz, CDCl₃+DMSO-d₆): 167.35, 155.13, 150.12, 143.61, 135.39, 135.07, 132.59, 131.44, 130.27, 129.34, 128.42, 128.08, 127.26, 126.99, 126.88, 126.56, 124.48, 124.41, 122.55, 117.26, 63.38; ESIMS: m/z 399 (M+H); IR (KBr): 3381, 1635, 1528, 1469, 756 cm⁻¹; Analysis calculated for C₂₄H₁₈N₂O₄: C, 72.35; H, 4.55; N, 7.03; found: C, 72.28; H, 4.63; N, 7.13 %.

N-((3-bromophenyl)(2-hydroxynaphthalen-1-yl)methyl)benzamide(4p).



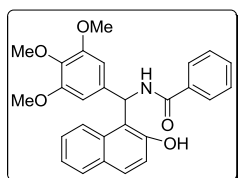
Yellow solid; mp: 190-192⁰C; ¹H NMR (200 MHz, DMSO-d₆) δ 6.84 (s, 1H), 7.11 (d, 1H, J=7.6 Hz), 7.18-7.32 (m, 2H), 7.34-7.45 (m, 5H), 7.58-7.64 (m, 2H), 7.75-7.89 (m, 3H), 8.15-8.20 (m, 1H), 9.86 (br, s, 1H); ¹³C NMR (50 MHz, CDCl₃+DMSO-d₆): 167.30, 155.13, 147.88, 135.39, 132.59, 132.42, 131.44, 131.13, 130.27, 129.53, 128.42, 128.08, 127.26, 126.99, 126.88, 126.56, 126.23, 122.55, 121.61, 117.26, 63.38; ESIMS: m/z 432 (M+H); IR (KBr): 3389, 1638, 1533, 1479, 747 cm⁻¹; Analysis calculated for C₂₄H₁₈BrNO₂: C, 66.68; H, 4.20; N, 3.24; found: C, 66.75; H, 4.23; N, 3.31%.

N-((4-fluorophenyl)(2-hydroxynaphthalen-1-yl)methyl)benzamide(4q).



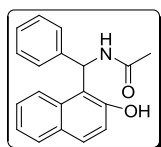
White solid; mp: 183-187^oC; ¹H NMR (300 MHz, DMSO-*d*₆) δ 6.89 (s, 1H), 6.98 (m, 3H), 7.22-7.31 (m, 3H), 7.34-7.47 (m, 4H), 7.64 (d, 1H, *J*=7.6 Hz), 7.79 (d, 1H, *J*=7.4 Hz), 7.84-7.89 (m, 2H), 8.09-8.14 (m, 1H), 9.77 (br, s, 1H) **¹³C NMR (50 MHz, CDCl₃+DMSO-*d*₆):** 167.38, 162.52, 155.13, 137.17, 135.39, 132.59, 131.44, 130.27, 130.26, 128.42, 128.08, 127.26, 126.99, 126.88, 126.56, 122.55, 117.26, 114.42, 62.66; ESIMS: *m/z* 272 (M+H). IR (KBr): 3382, 1641, 1531, 1473, 749 cm⁻¹; Analysis calculated for C₂₄H₁₈FNO₂: C, 77.61; H, 4.88; N, 3.77%; found: C, 77.73; H, 4.78; N, 3.82 %.

N-((2-hydroxynaphthalen-1-yl)(3,4,5-trimethoxyphenyl)methyl)benzamide(4r).



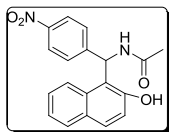
White solid; mp: 242-245^oC; ¹H NMR (200 MHz, DMSO-*d*₆) δ 4.52 (s, 9H), 6.91 (s, 1H), 7.40 (s, 2H), 7.90-8.18 (m, 7H), 8.36-8.67 (m, 4H), 10.29 (s, 1H), 10.29, (s, 1H), 10.45 (br, s, 1H); **¹³C NMR (50 MHz, DMSO-*d*₆):**167.30, 155.13, 153.73, 139.60, 136.20, 135.39, 132.59, 131.44, 130.27, 128.42, 128.08, 127.26, 126.99, 126.88, 126.56, 122.55, 117.26, 106.72, 63.59, 60.65, 56.79; ESIMS: *m/z* 444 (M+H); IR (KBr): 3398, 1636, 1525, 1474, 752cm⁻¹; Analysis calculated for C₂₇H₂₅NO₅: C, 73.12; H, 5.68; N, 3.16 %; found: C, 73.20; H, 5.74; N, 3.09 %.

N-((2-hydroxynaphthalen-1-yl)(phenyl)methyl)acetamide(4s).



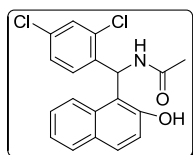
White solid; mp: 243-246^oC; ¹H NMR (200 MHz, DMSO-*d*₆) δ 1.89 (s, 3H), 6.77 (s, 1H), 7.02 (d, 1H, *J*=7.1 Hz), 7.20-7.38 (m, 7H), 7.64 (d, 1H, *J*=7.1 Hz), 7.79 (d, 1H, *J*=7.4 Hz), 8.06 (d, 1H, *J*=7.7 Hz), 8.61 (br, s, 1H); **¹³C NMR (50 MHz, CDCl₃+DMSO-*d*₆):** 169.25, 155.13, 142.59, 132.59, 130.27, 128.53, 128.08, 127.98, 127.36, 127.26, 126.99, 126.88, 126.56, 122.55, 117.26, 60.00, 22.75; ESIMS: *m/z* 292 (M+H); IR (KBr): 3384, 1640, 1537, 1469, 753 cm⁻¹; Analysis calculated for C₁₉H₁₇NO₂: C, 78.33; H, 5.88; N, 4.81 %; found: C, 78.49; H, 5.76; N, 4.92 %.

N-((2-hydroxynaphthalen-1-yl)(4-nitrophenyl)methyl)acetamide(4t).



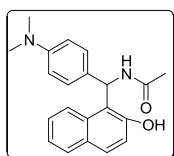
Yellow solid; mp: 238-241; ¹H NMR (200 MHz, DMSO-d₆) δ 1.87 (s, 3H), 6.81 (s, 1H), 7.02 (d, 1H, *J*=7.2 Hz), 7.24-7.42 (m, 2H), 7.57-7.64 (m, 3H), 7.79 (d, 1H, *J*=6.8 Hz), 8.06 (d, 1H, *J*=6.8 Hz), 8.16 (d, 1H, *J*=8.5 Hz), 8.68 (br, s, 1H); **¹³C NMR (50 MHz, CDCl₃+DMSO-d₆):**169.25, 155.13, 149.77, 148.09, 132.59, 130.27, 128.41, 128.08, 127.26, 126.99, 126.88, 126.56, 123.96, 122.55, 117.26, 60.00, 22.75; ESIMS: *m/z* 337 (M+H); IR (KBr): 3388, 1635, 1533, 1476, 757cm⁻¹; Analysis calculated for C₁₉H₁₆N₂O₄: C, 67.85; H, 4.79; N, 8.33; found: C, 67.93; H, 4.88; N, 8.39 %.

N-((2,4-dichlorophenyl)(2-hydroxynaphthalen-1-yl)methyl)acetamide (4u).



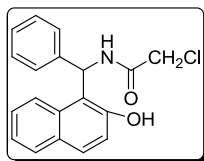
White solid 208-210; ¹H NMR (200 MHz, DMSO-d₆) δ 1.85 (s, 3H), 6.87 (s, 1H), 7.06 (d, 1H, *J*=7.1 Hz), 7.22-7.32 (m, 3H), 7.38-7.46 (m, 1H), 7.61 (s, 1H), 7.72 (d, 1H, *J*=7.6 Hz), 7.83 (d, 1H, *J*=7.3 Hz), 8.17 (d, 1H, *J*=7.8 Hz), 8.74 (br, s, 1H); **¹³C NMR (50 MHz, DMSO-d₆):**169.28, 154.83, 138.08, 135.46, 134.52, 132.59, 131.30, 130.51, 130.27, 128.67, 127.95, 127.26, 126.99, 126.88, 126.56, 122.52, 115.79, 56.89, 22.75; ESIMS: *m/z* 360 (M+H); IR (KBr): 3402, 1638, 1528, 1474, 747 cm⁻¹; Analysis calculated for C₁₉H₁₅Cl₂NO₂: C, 63.35; H, 4.20; N, 3.89; found: C, 63.47; H, 4.11; N, 3.78 %.

N-((4-(dimethylamino)phenyl)(2-hydroxynaphthalen-1-yl)methyl)acetamide (4v).



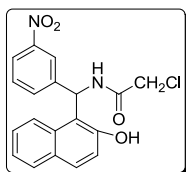
White solid; mp: 212-215⁰C; ¹H NMR (200 MHz, DMSO-d₆) δ 2.38 (s, 3H), 3.22 (s, 6H), 6.50 (s, 1H), 6.96 (d, 2H, *J*=12.4 Hz), 7.27 (d, 2H, *J*=12.4 Hz), 7.51-7.85 (m, 4H), 7.95-8.21 (m, 3H); **¹³C NMR (50 MHz, DMSO-d₆):** 169.25, 155.13, 150.87, 132.59, 131.21, 130.27, 128.08, 127.71, 127.26, 126.99, 126.88, 126.56, 122.55, 117.26, 112.01, 60.00, 41.91, 22.75; ESIMS: *m/z* 335(M+H). IR (KBr): 3392, 1636, 1527, 1465, 747 cm⁻¹; Analysis calculated for C₂₁H₂₂N₂O₂: C, 75.42; H, 6.63; N, 8.38; found: C, 75.31; H, 6.69; N, 8.24;%.

2-chloro-N-((2-hydroxynaphthalen-1-yl)(phenyl)methyl)acetamide(4w).



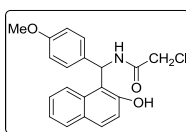
white solid; mp: 208-210⁰C; ¹H NMR (200 MHz, DMSO-d₆) δ 4.13 (s, 2H), 6.73 (s, 1H), 7.03 (d, 1H, *J*=7.6 Hz), 7.21-7.42 (m, 7H), 7.64 (d, 1H, *J*=7.6 Hz), 7.79 (d, 1H, *J*=7.4 Hz), 8.12 (d, 1H, *J*=7.5 Hz), 8.96 (br, s, 1H); **¹³C NMR (50 MHz, CDCl₃+DMSO-d₆):** 165.82, 155.13, 142.59, 132.59, 130.27, 128.53, 128.53, 128.08, 127.98, 127.36, 126.99, 126.88, 126.56, 122.55, 117.26, 60.31, 42.39.; ESIMS: *m/z* 326 (M+H). IR (KBr): 3386, 1637, 1534, 1479, 757cm⁻¹; Analysis calculated for C₁₉H₁₆ClNO₂: C, 70.05; H, 4.95; N, 4.30; found: C, 70.18; H, 4.86; N, 4.24 %.

2-chloro-N-((2-hydroxynaphthalen-1-yl)(3-nitrophenyl)methyl)acetamide (4x).



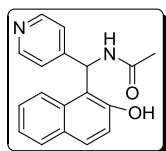
yellow solid; mp: 220-222⁰C; ¹H NMR (200 MHz, DMSO-d₆) δ 4.13 (s, 2H), 6.73 (s, 1H), 7.09 (d, 1H, *J*=7.4 Hz), 7.24-7.42 (m, 2H), 7.49-7.64 (m, 2H), 7.75-7.83 (m, 2H), 8.09-8.20 (m, 2H), 8.35 (s, 1H), 9.17 (br, s, 1H); **¹³C NMR (50 MHz, CDCl₃+DMSO-d₆):** 165.82, 155.13, 150.12, 143.61, 135.07, 132.59, 130.27, 129.34, 128.08, 127.26, 126.99, 126.88, 126.56, 124.48, 124.41, 122.55, 117.26, 60.97, 42.39; ESIMS: *m/z* 371 (M+H). IR (KBr): 3379, 1639, 1538, 1465, 751cm⁻¹; Analysis calculated for C₁₉H₁₅ClN₂O₄: C, 61.55; H, 4.08; N, 7.56; found: C, 61.62; H, 4.11; N, 7.63 %.

2-chloro-N-((2-hydroxynaphthalen-1-yl)(4-methoxyphenyl)methyl)acetamide (4y).



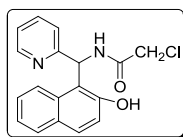
white solid; mp: 178-181⁰C; ¹H NMR (200 MHz, DMSO-d₆) δ 3.40 (s, 3H), 3.83 (s, 2H), 6.41 (s, 1H), 6.53 (d, 2H, *J*=8.1 Hz), 6.73 (d, 1H, *J*=7.0 Hz), 6.93-7.12 (m, 4H), 7.34 (d, 1H, *J*=7.7 Hz), 7.48 (d, 1H, *J*=7.8 Hz), 7.82 (d, 1H, *J*=7.5 Hz), 8.55 (br, s, 1H); **¹³C NMR (50 MHz, DMSO-d₆):** 165.82, 159.11, 155.13, 132.61, 132.59, 130.27, 128.63, 128.08, 127.26, 126.99, 126.88, 126.56, 122.55, 117.26, 113.42, 60.31, 56.04, 42.39; ESIMS: *m/z* 356 (M+H). IR (KBr): 3384, 1636, 1541, 1485, 753cm⁻¹; Analysis calculated for C₂₀H₁₈ClNO₃: C, 67.51; H, 5.10; N, 3.94; found: C, 67.47; H, 5.18; N, 3.91 %.

N-((2-hydroxynaphthalen-1-yl)(pyridin-4-yl)methyl)acetamide (4z).



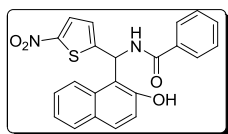
Brown solid; mp: 218-223^oC; ¹H NMR (200 MHz, DMSO-*d*₆) δ 1.80 (s, 3H), 6.66 (s, 1H), 6.94 (d, 1H, *J*=6.8 Hz), 7.15-7.37 (m, 4H), 7.56(d, 1H, *J*=7.4 Hz), 7.70 (d, 1H, *J*=7.8 Hz), 7.97 (d, 1H, *J*=7.1 Hz), 8.35 (d, 2H, *J*=5.8 Hz), 8.54 (br, s, 1H); ¹³C NMR (50 MHz, DMSO-*d*₆): 168.25, 155.13, 151.68, 150.81, 132.59, 130.27, 128.08, 127.26, 126.99, 126.88, 126.56, 124.58, 122.55, 117.26, 60.00, 22.75; ESIMS: *m/z* 293 (M+H). IR (KBr): 3391, 1638, 1534, 1468, 753cm⁻¹; Analysis calculated for C₁₈H₁₆N₂O₂: C, 73.95; H, 5.52; N, 9.58; found: C, C, 73.85; H, 5.61; N, 9.52 %.

2-chloro-N-((2-hydroxynaphthalen-1-yl)(pyridin-2-yl)methyl)acetamide (4z').



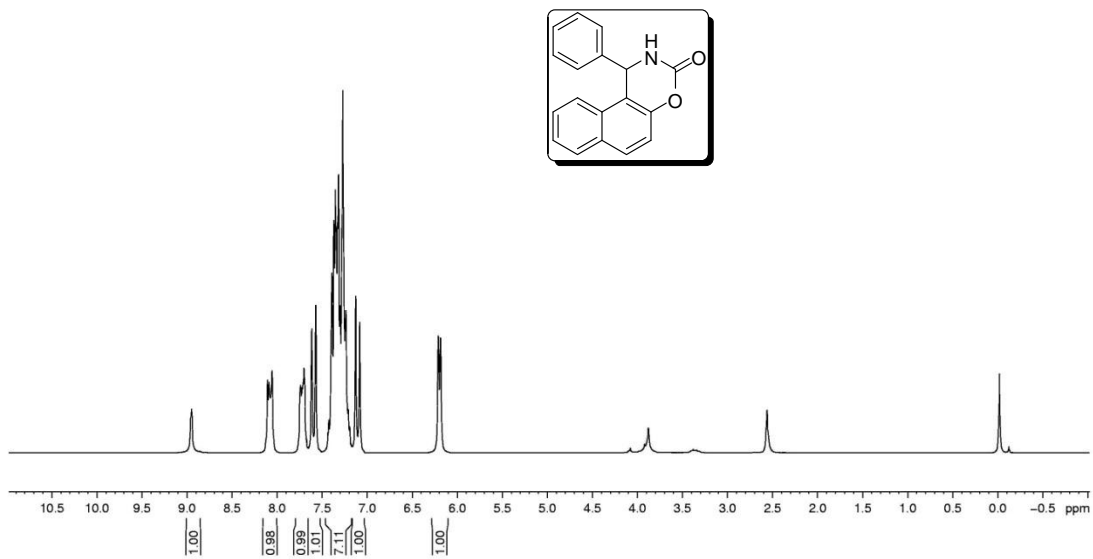
Brown solid; mp: 204-206^oC; ¹H NMR (200 MHz, DMSO-*d*₆) δ 4.13 (s, 2H), 6.86 (s, 1H), 7.12 (d, 1H, *J*=7.2 Hz), 7.24-7.48 (m, 4H), 7.61-7.78 (m, 3H), 8.09 (d, 1H, *J*=7.6 Hz), 8.55 (d, 1H, *J*= 4.1 Hz), 9.12 (br, s, 1H); ¹³C NMR (50 MHz, DMSO-*d*₆): 165.82, 163.71, 156.22, 145.73, 138.32, 132.59, 130.27, 127.26, 126.99, 126.88, 126.61, 126.56, 126.25, 123.18, 121.40, 116.70, 62.47, 42.39; ESIMS: *m/z* 327 (M+H). IR (KBr): 3395, 1627, 1537, 1467, 748 cm⁻¹; Analysis calculated for C₁₈H₁₅ClN₂O₂: C, C, 66.16; H, 4.63; N, 8.57; found: C, 66.25; H, 4.54; N, 8.67 %.

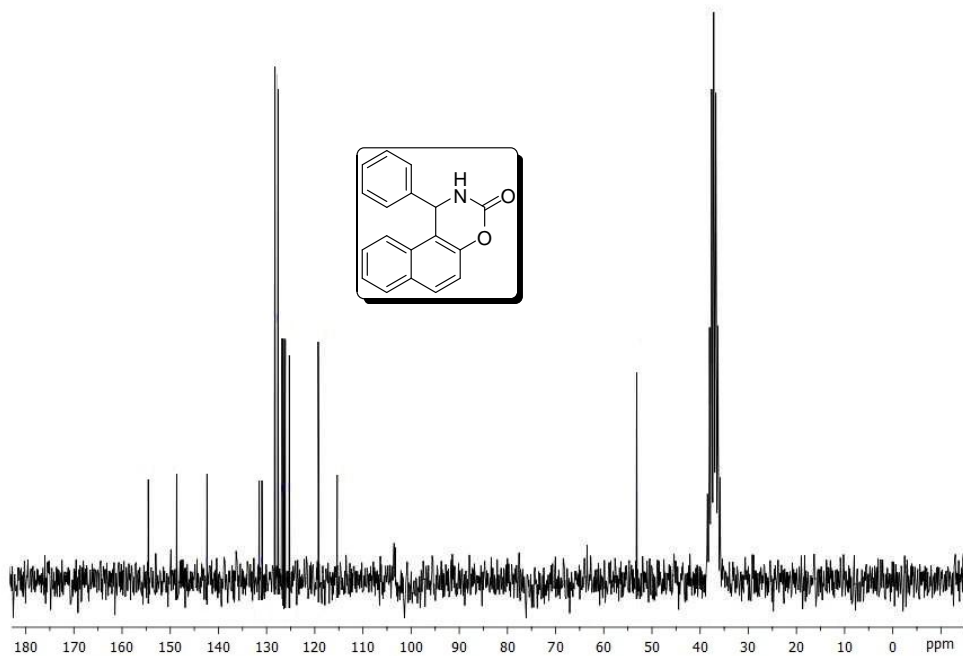
N-((2-hydroxynaphthalen-1-yl)(5-nitrothiophen-2-yl)methyl)benzamide (4z'').

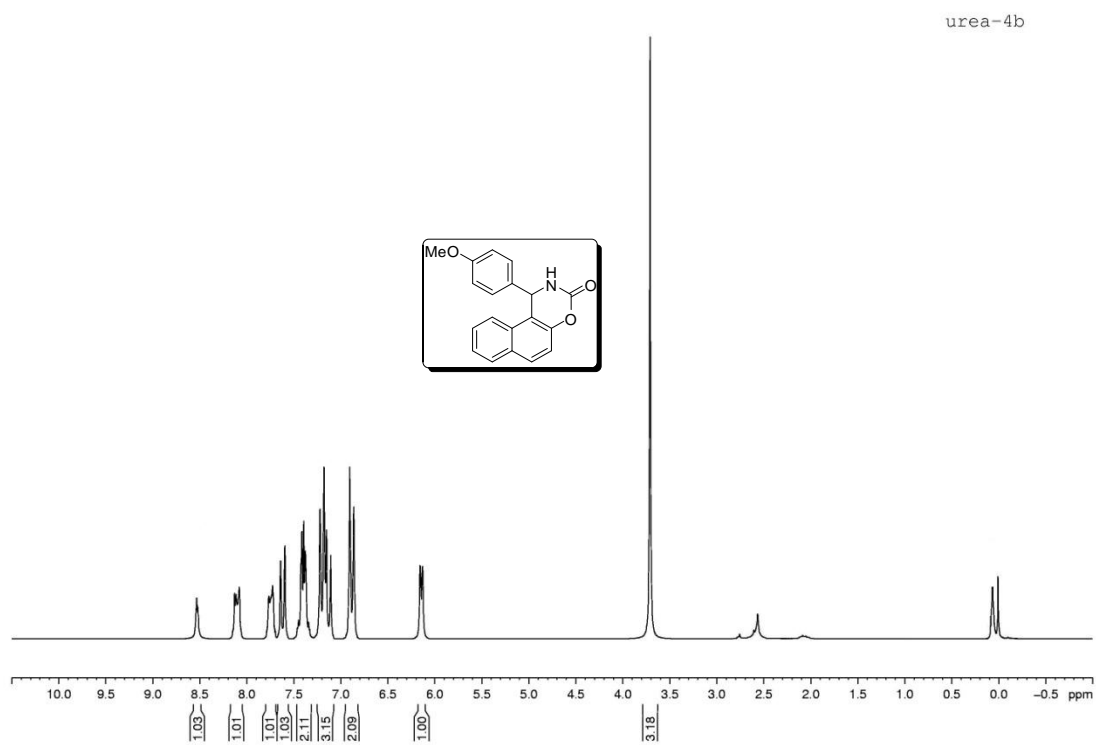


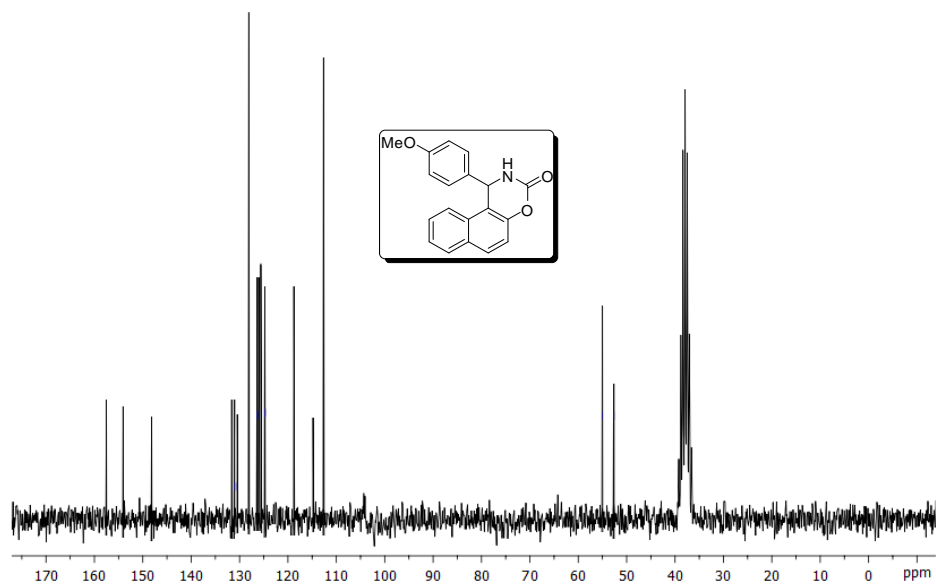
yellow solid; mp: 189-192^oC; ¹H NMR (200 MHz, DMSO-*d*₆) δ 6.96 (s, 1H), 7.12 (d, 1H, *J*=7.0 Hz), 7.24-7.45 (m, 4H), 7.72 (d, 1H, *J*=7.5 Hz), 7.78-7.89 (m, 3H), 8.03 (d, 1H, *J*=4.5 Hz), 8.22 (d, 1H, *J*=7.5 Hz), 9.83 (br, s, 1H); ¹³C NMR (50 MHz, DMSO-*d*₆): 167.35, 158.54, 153.97, 152.88, 135.39, 132.59, 131.44, 130.27, 129.75, 128.42, 128.08, 128.00, 127.26, 126.99, 126.88, 126.56, 123.13, 119.80, 119.52, 62.11; ESIMS: *m/z* 348 (M+H). IR (KBr): 3410, 1641, 1546, 1483, 757cm⁻¹; Analysis calculated for C₂₂H₁₆N₂O₄S: C, 65.33; H, 3.99; N, 6.93; found: C, 65.42; H, 3.81; N, 6.88.

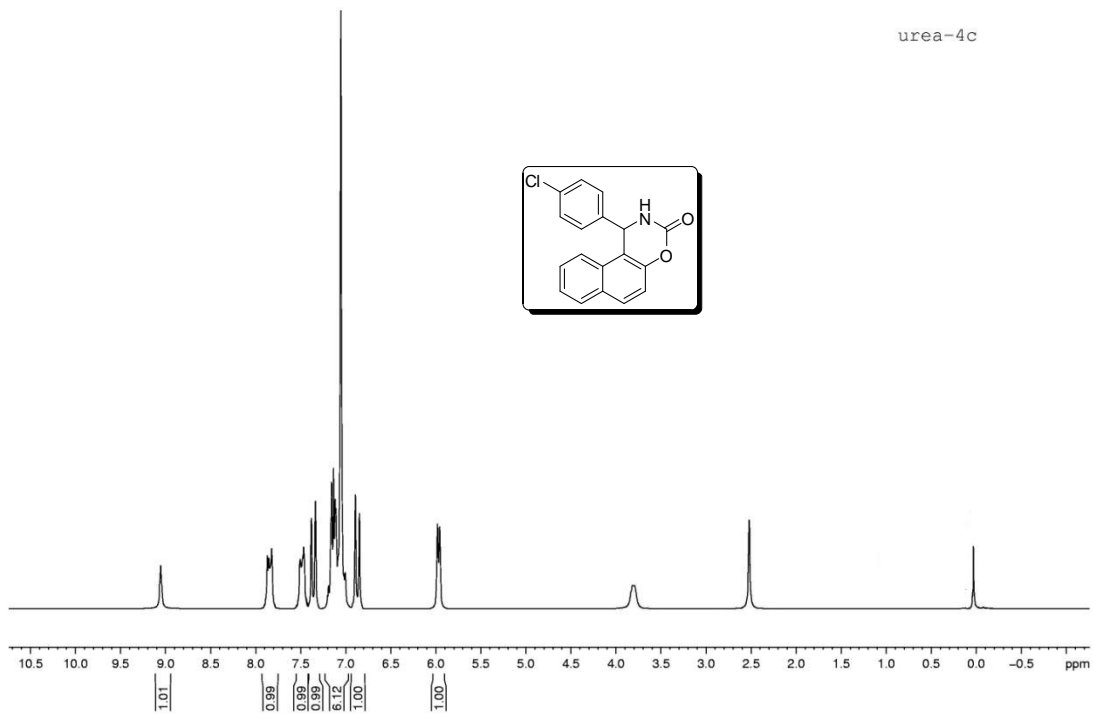
urea-4a

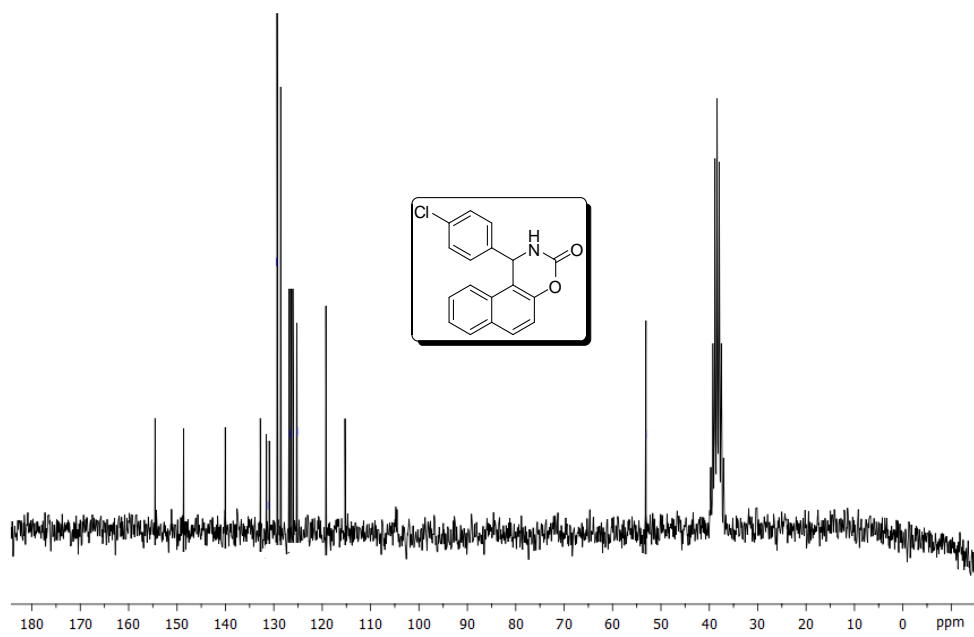




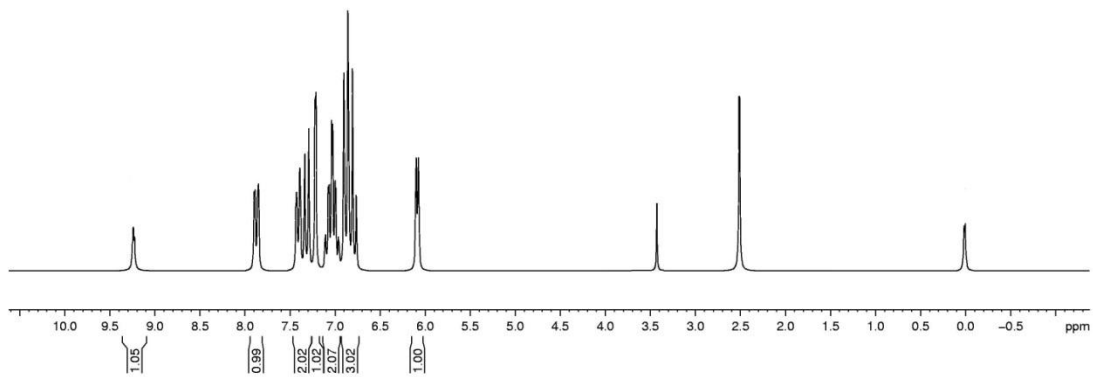
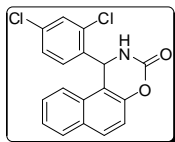


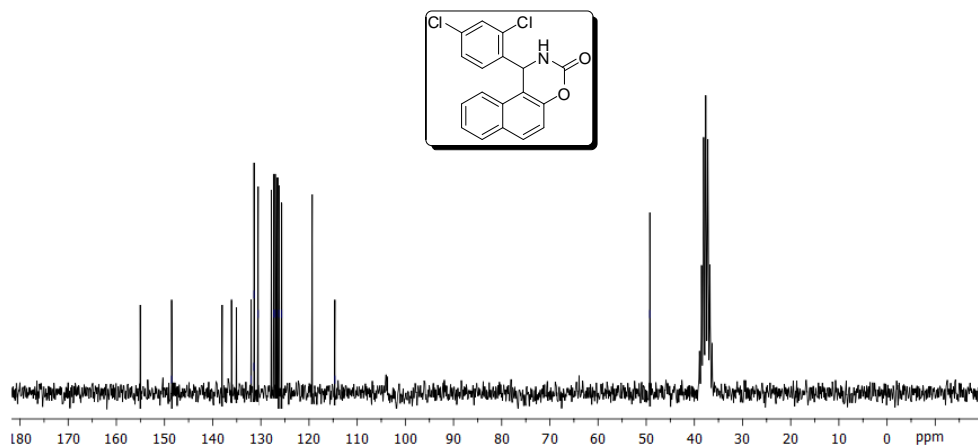




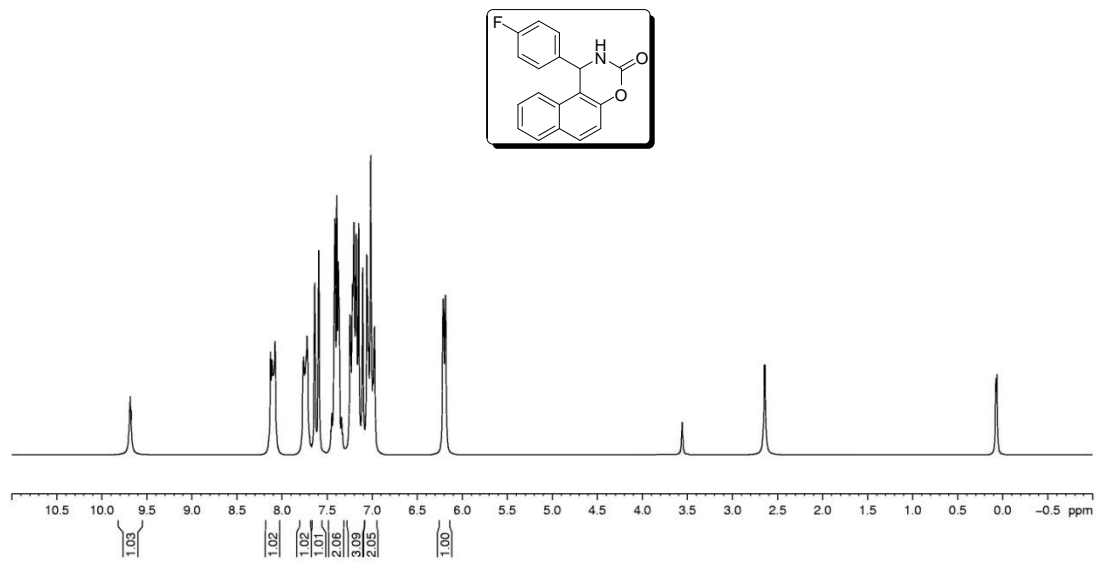


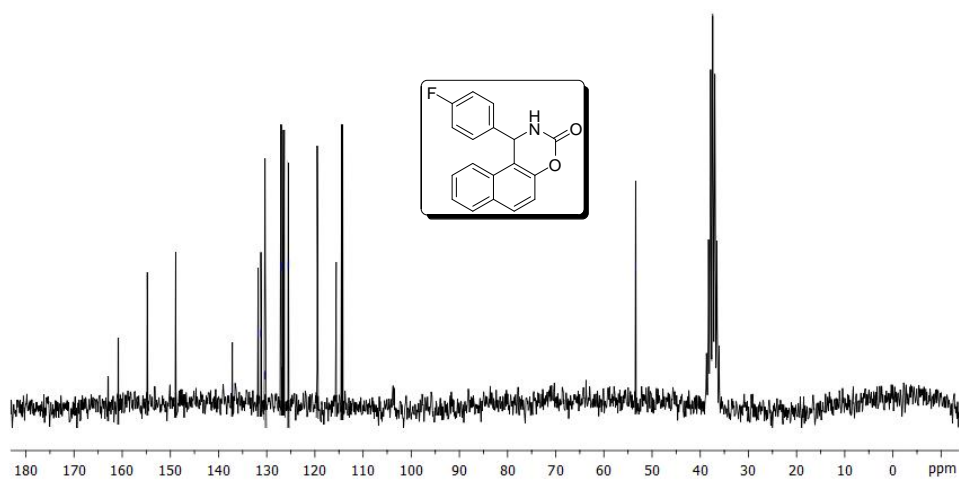
urea-4d

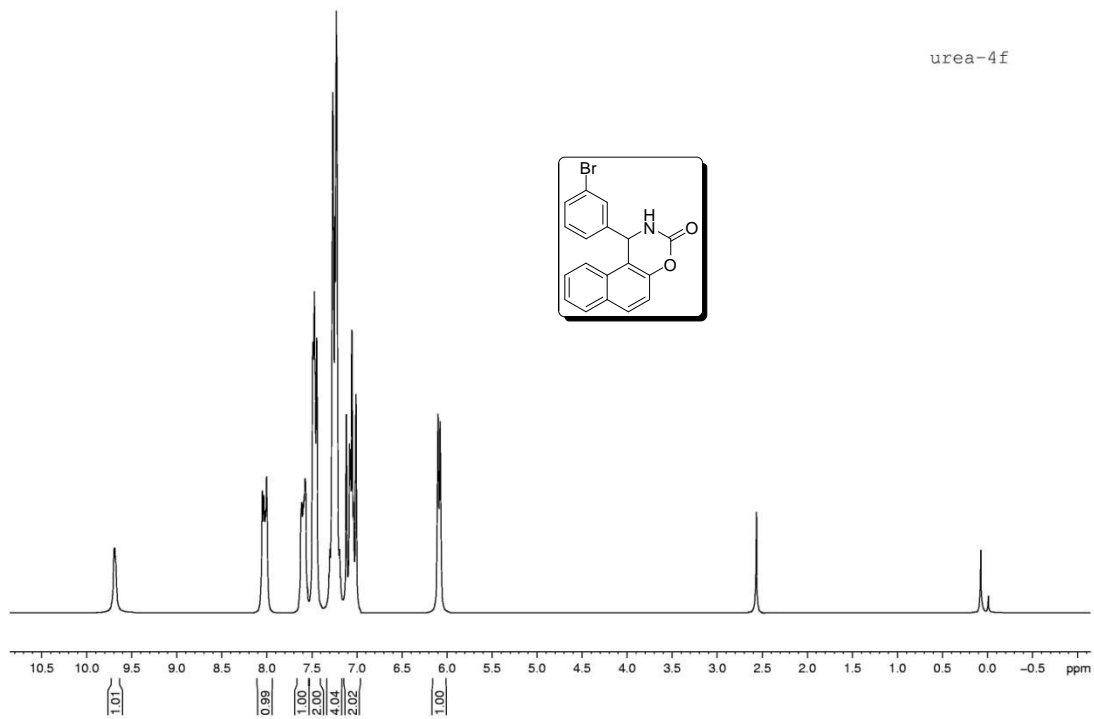


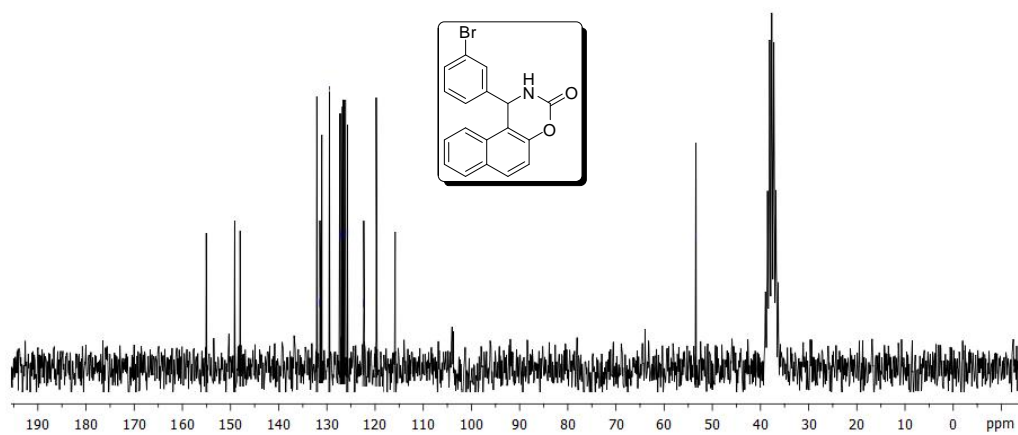


urea-4e

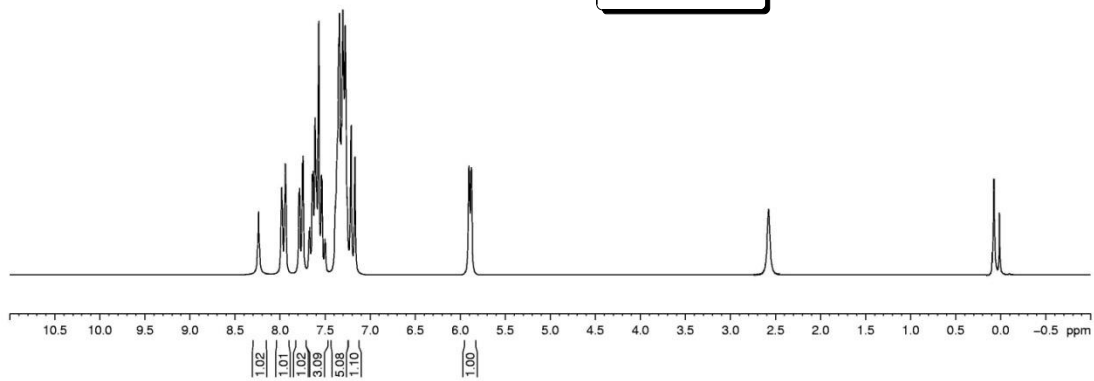
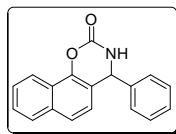


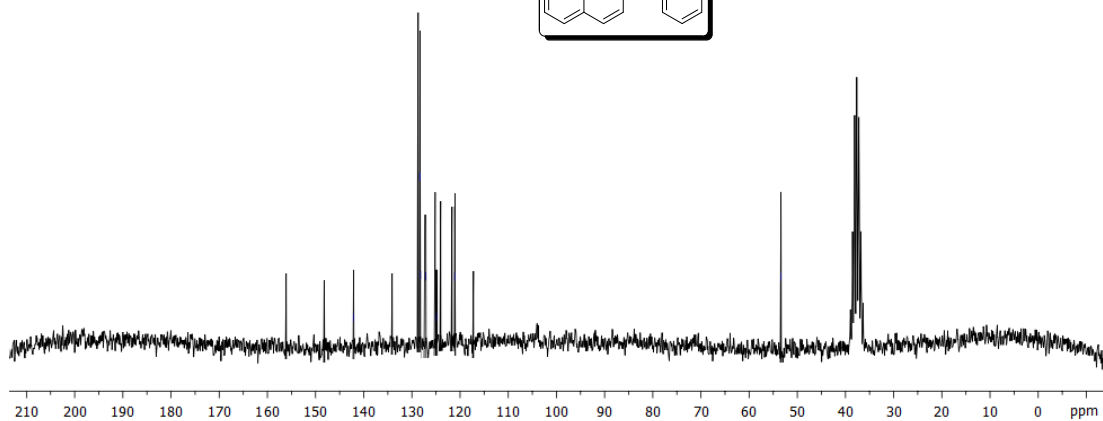
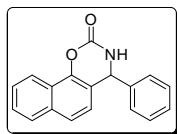


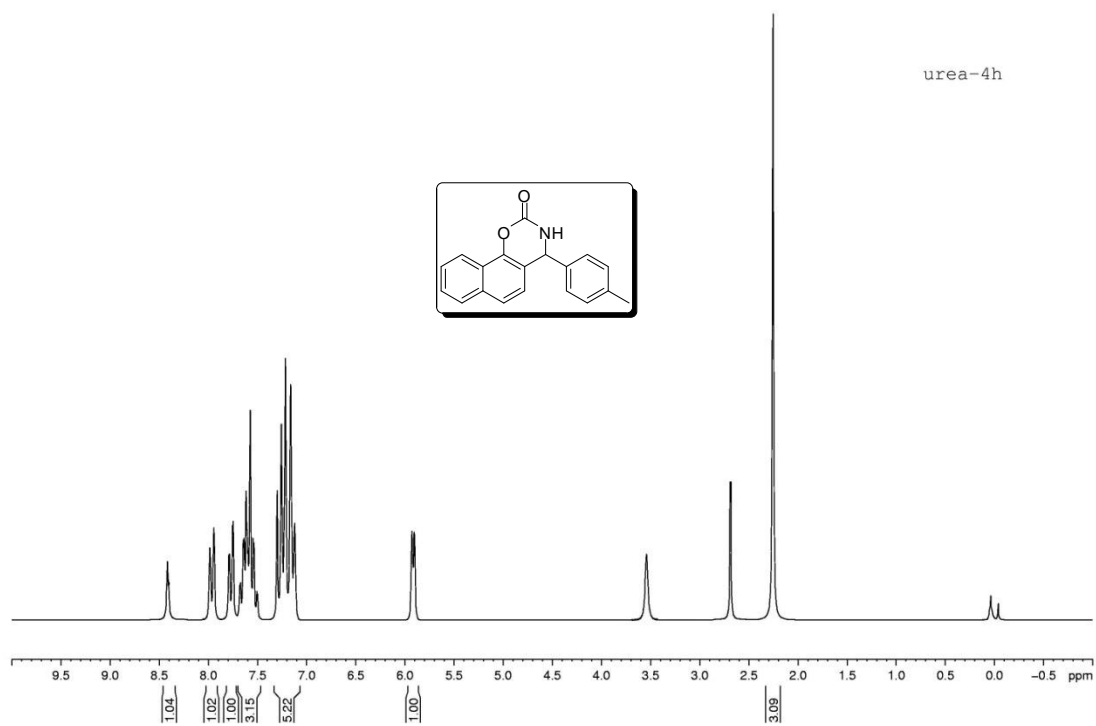




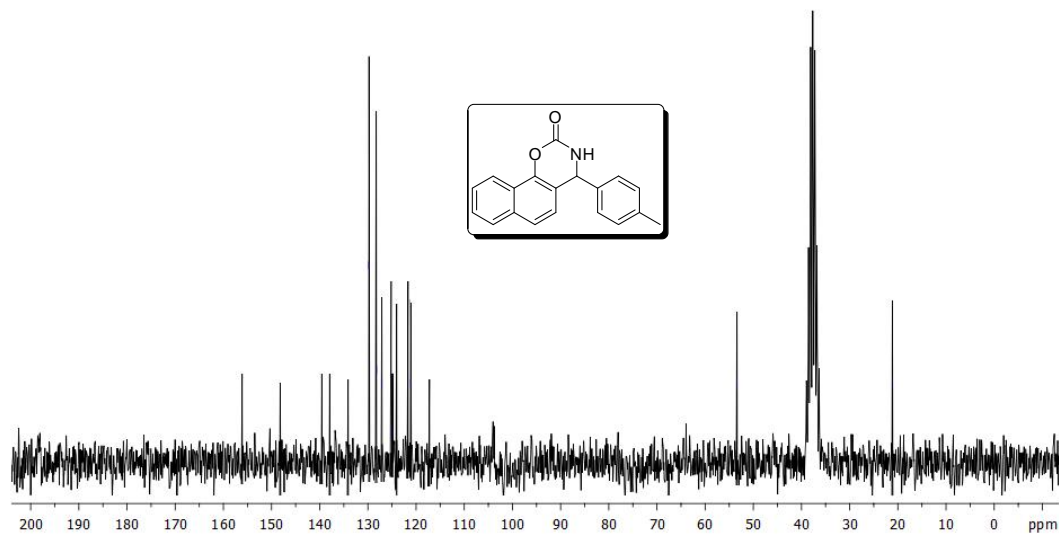
mkg-4g

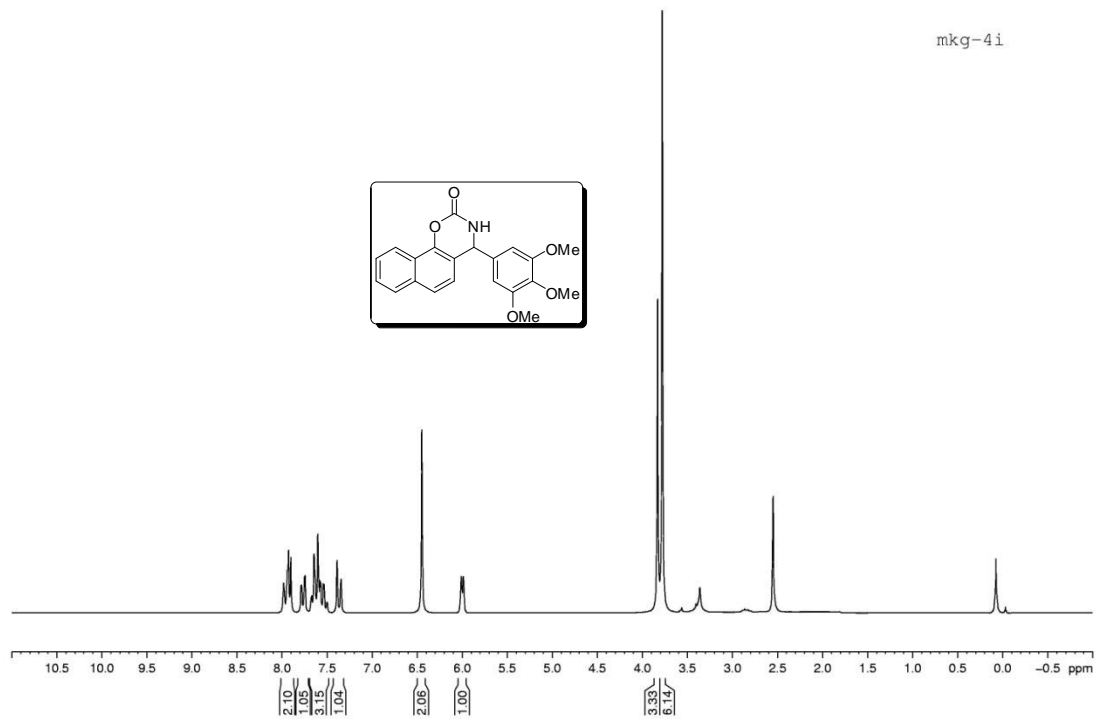


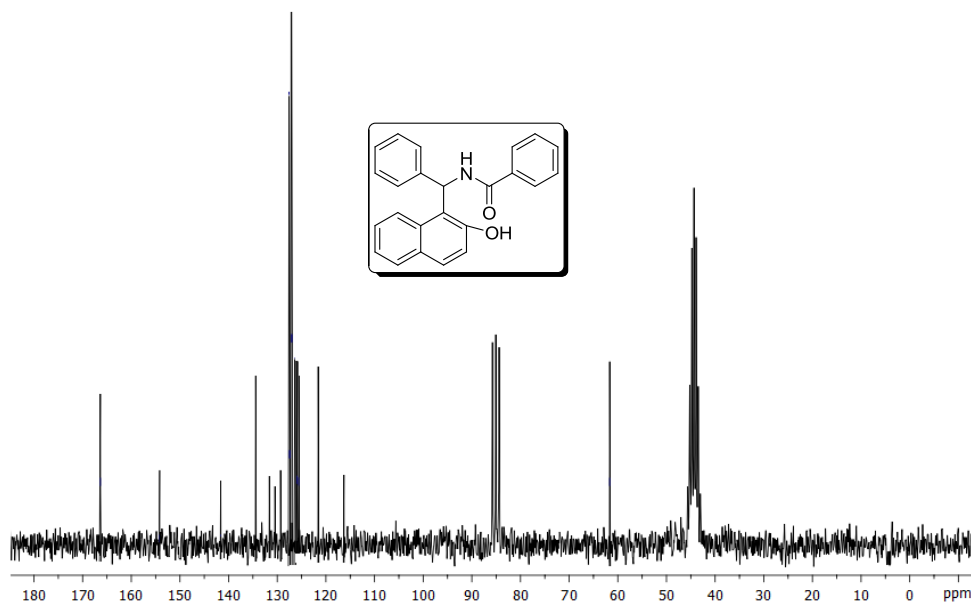


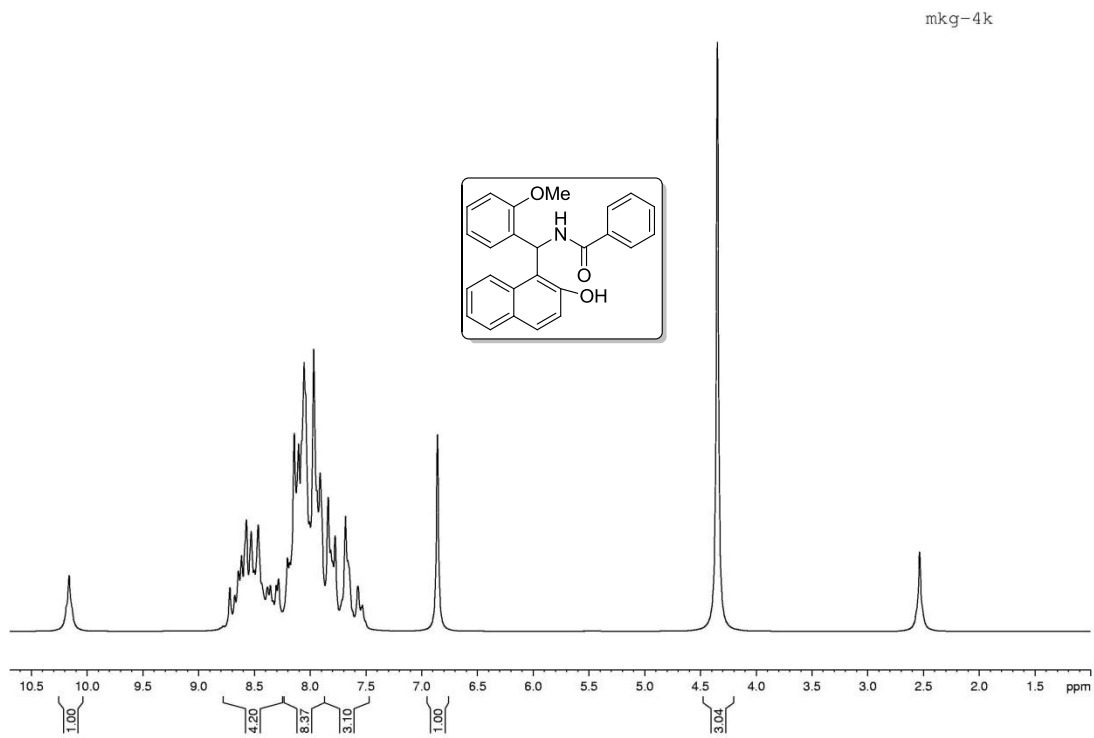


urea-4h

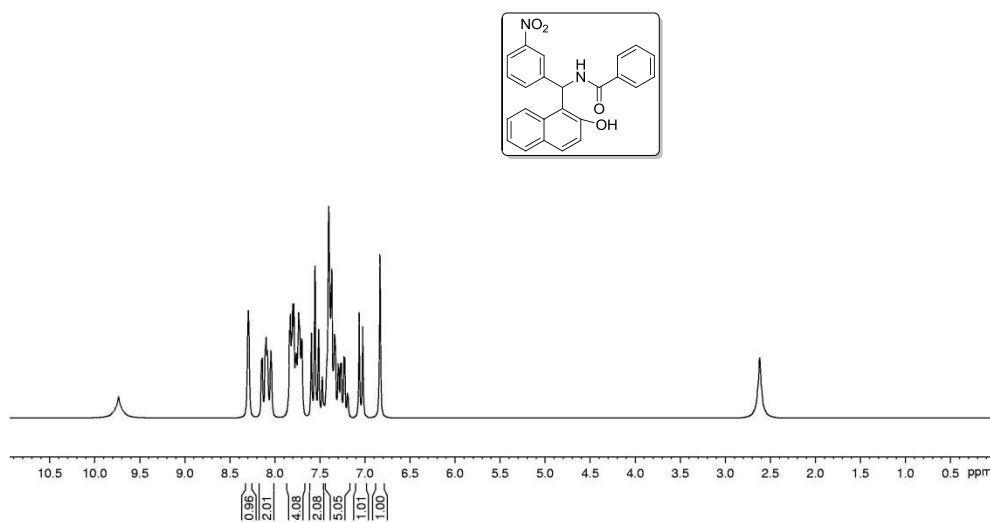


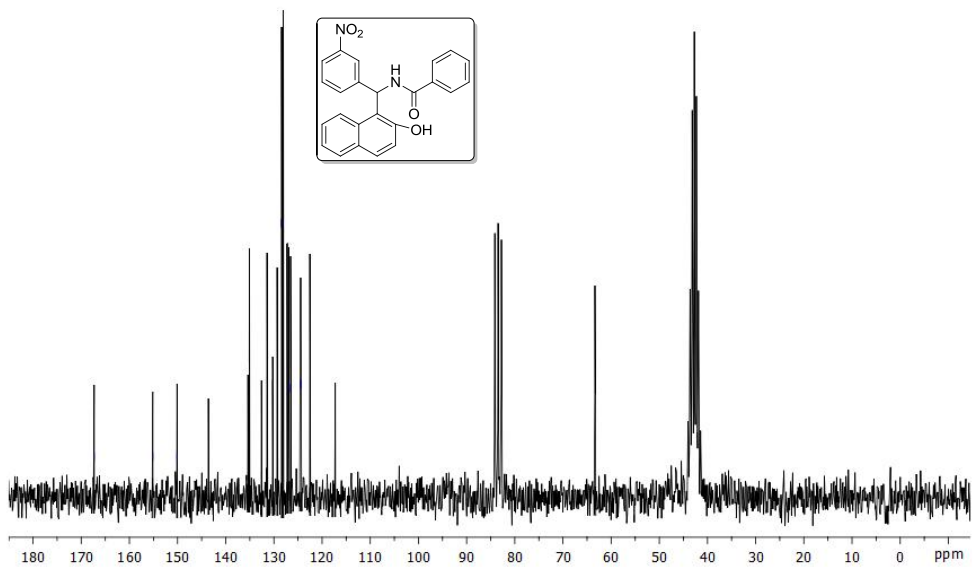




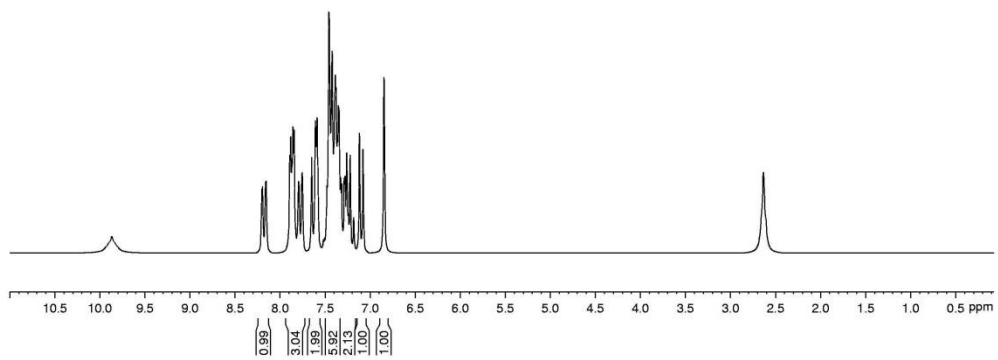
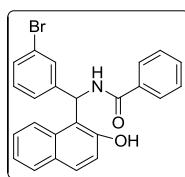


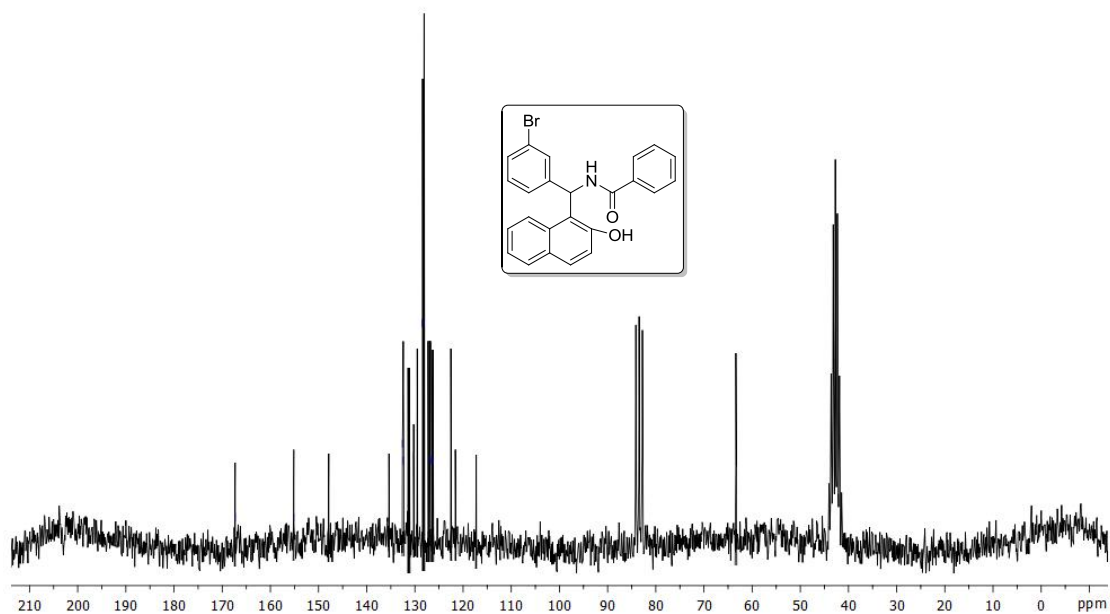
mkq-41



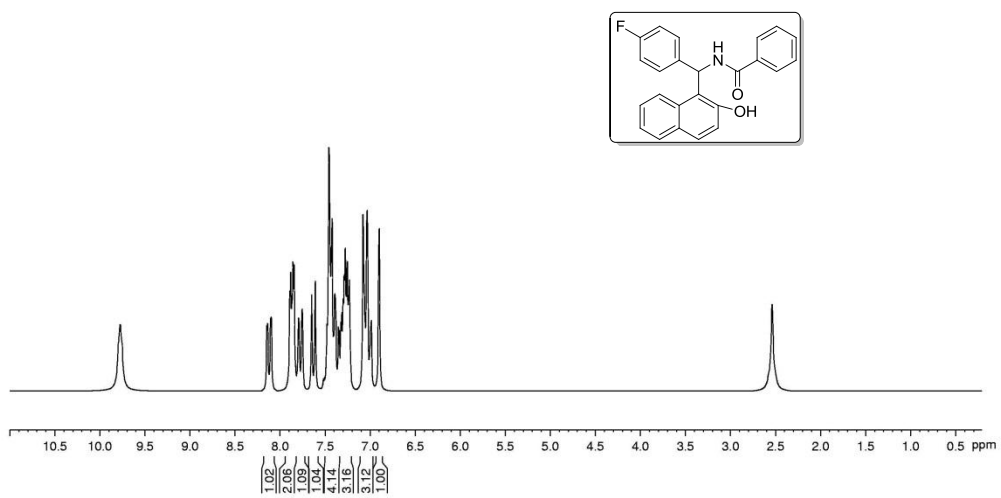


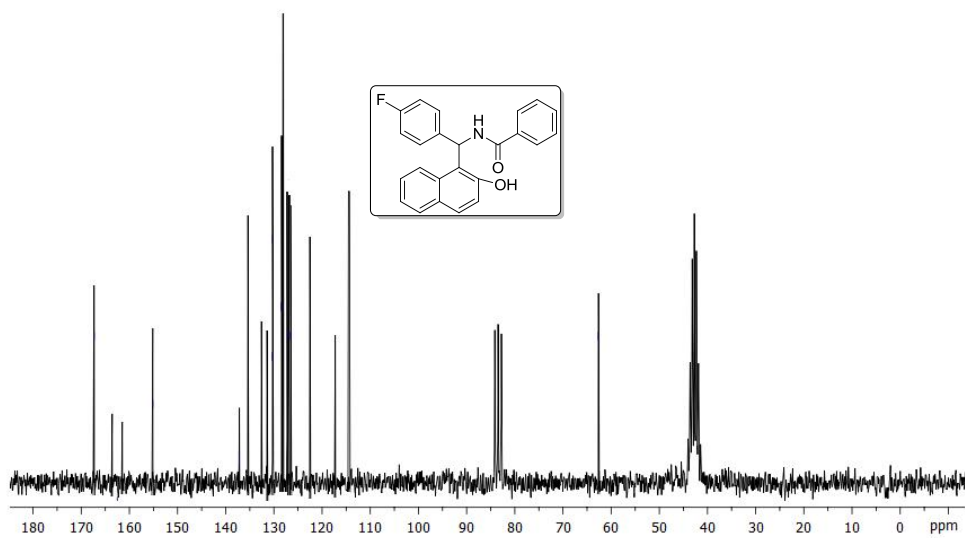
mkg-4m

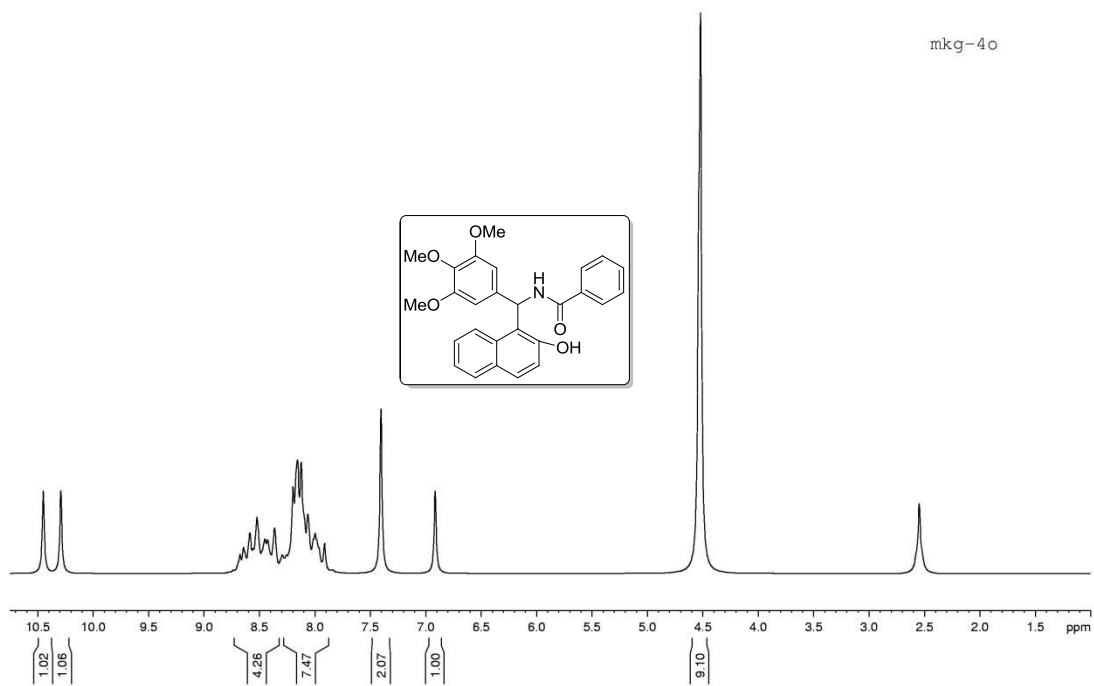


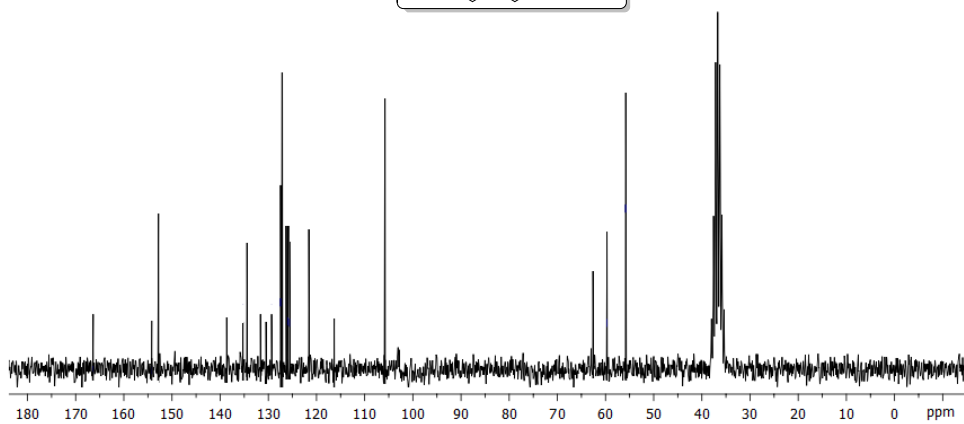
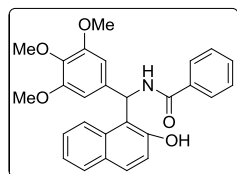


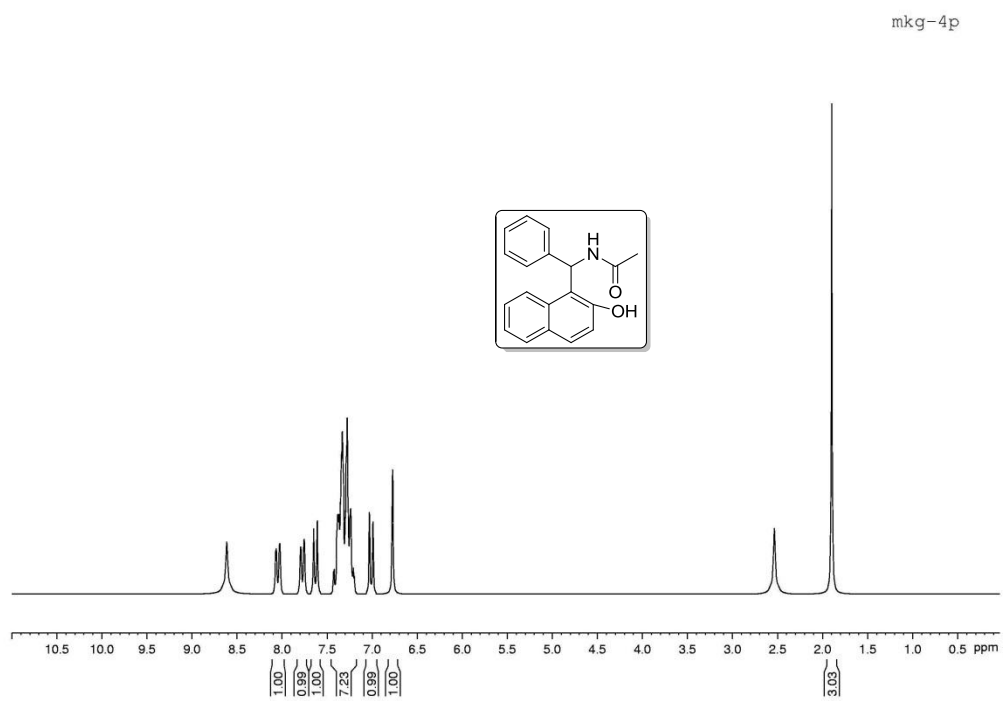
mkg-4n

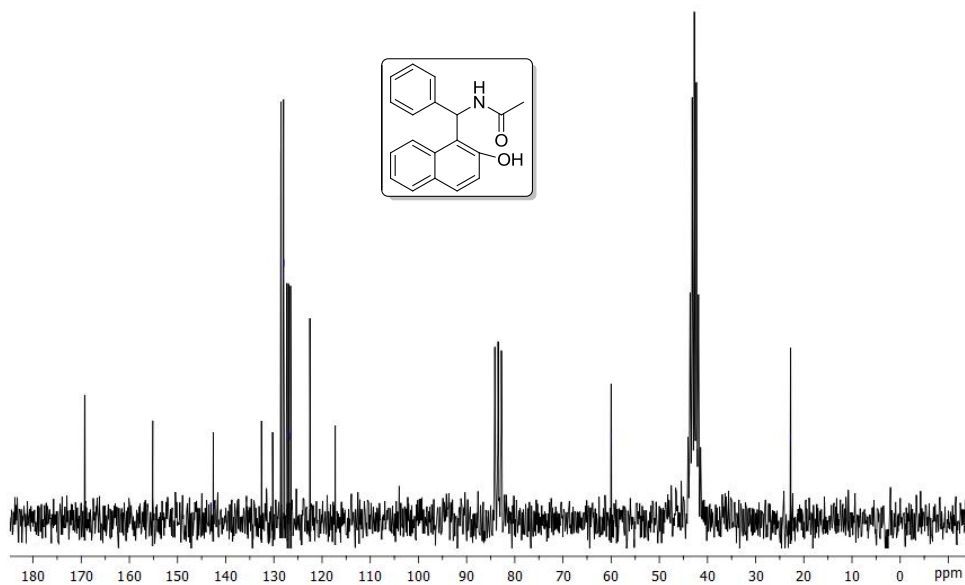


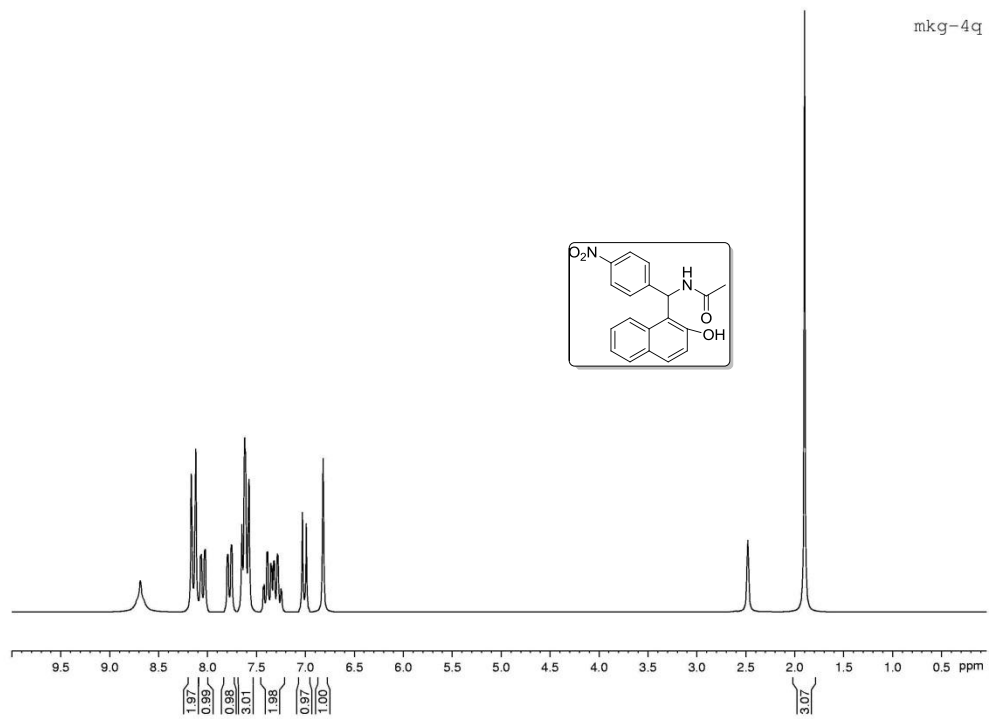


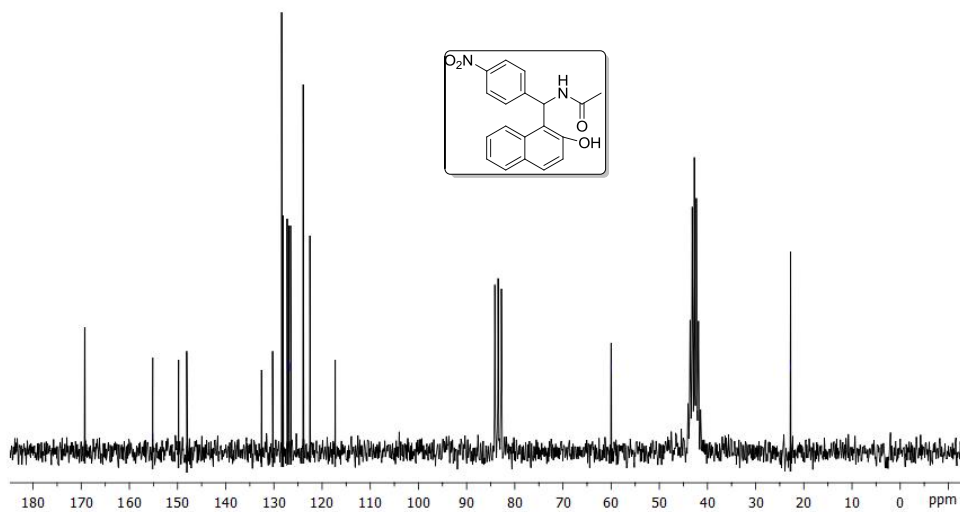




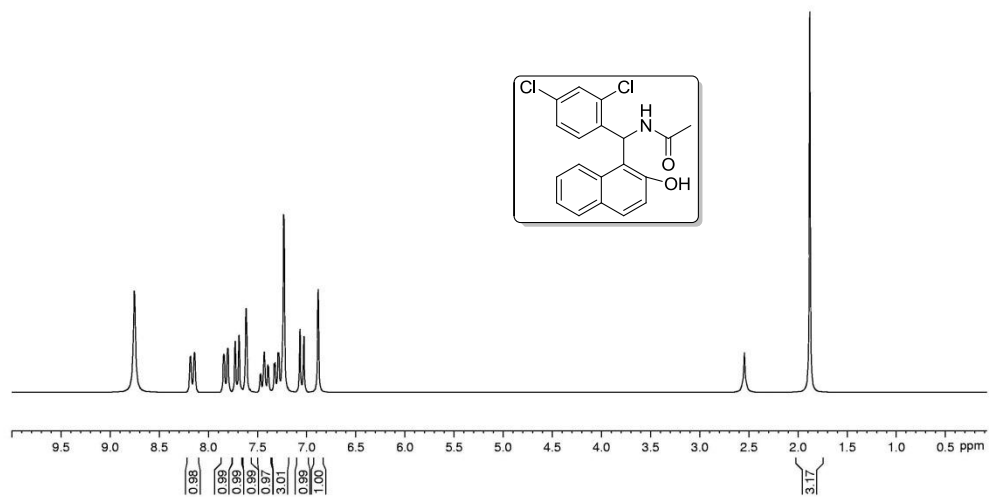


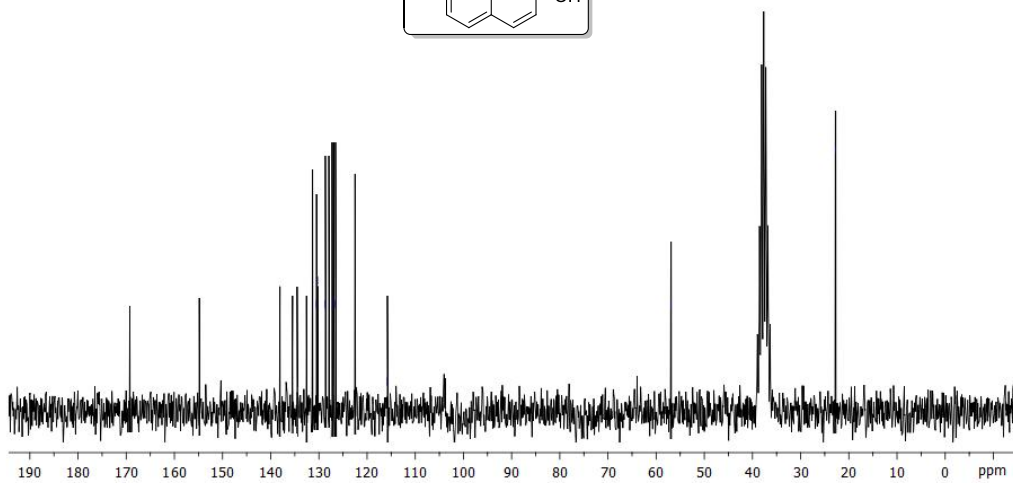
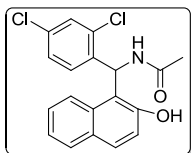




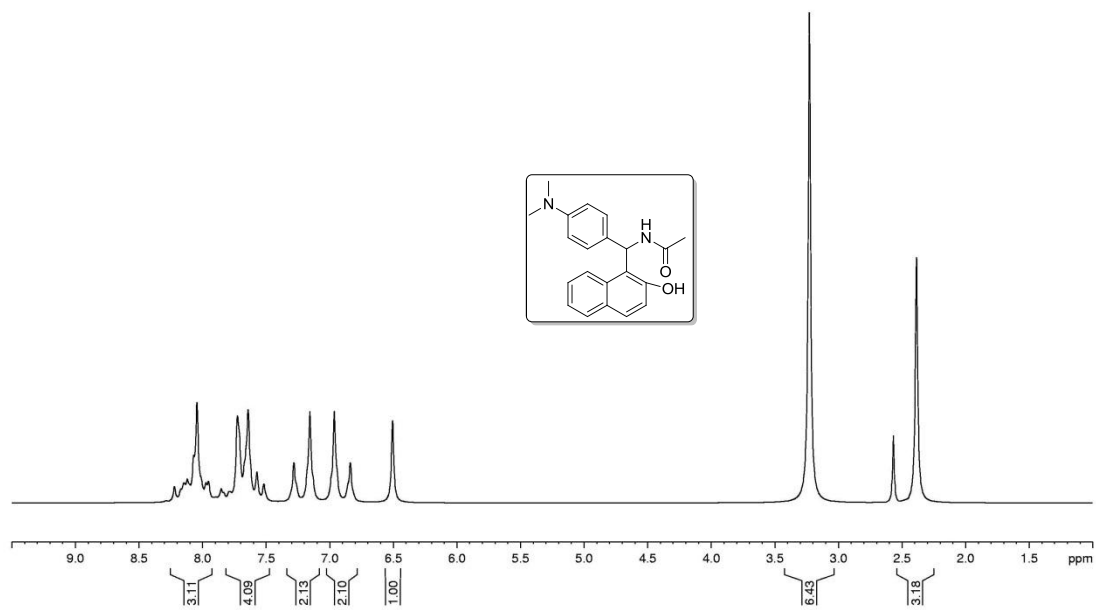


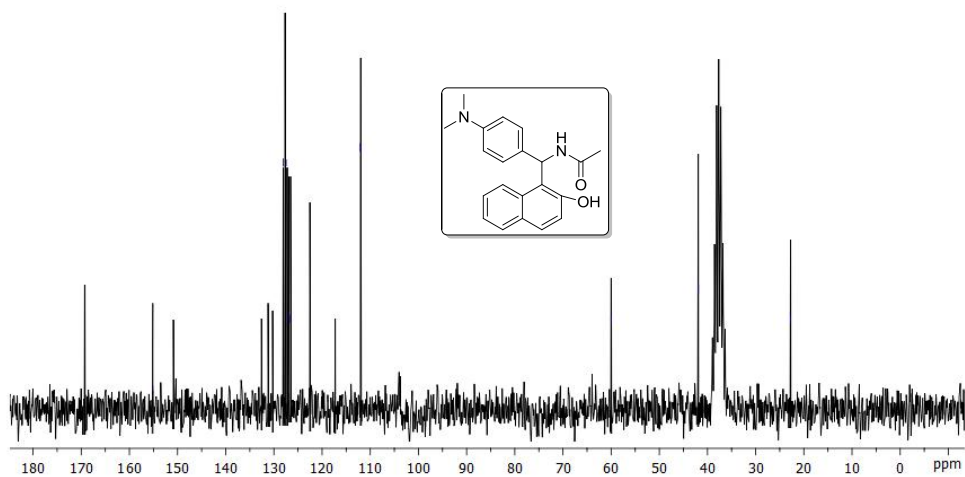
mkg-4r



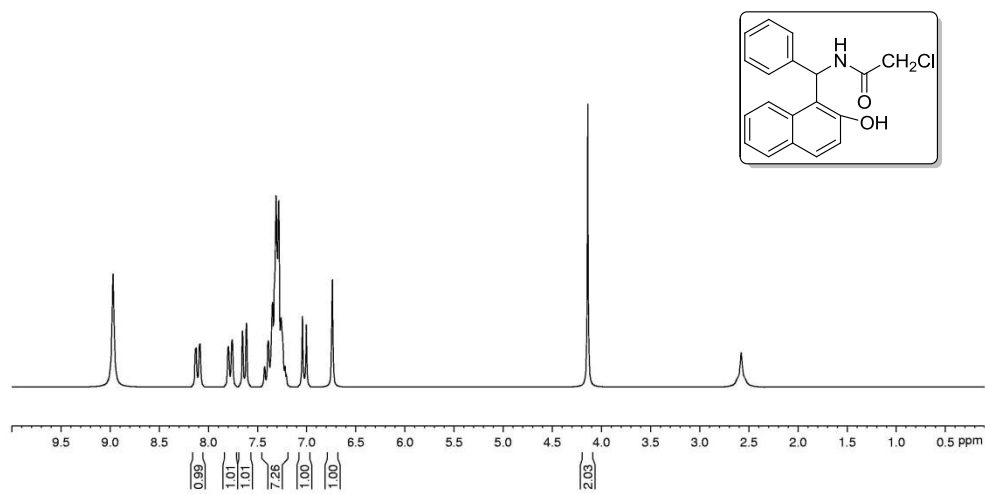


mkg-4s

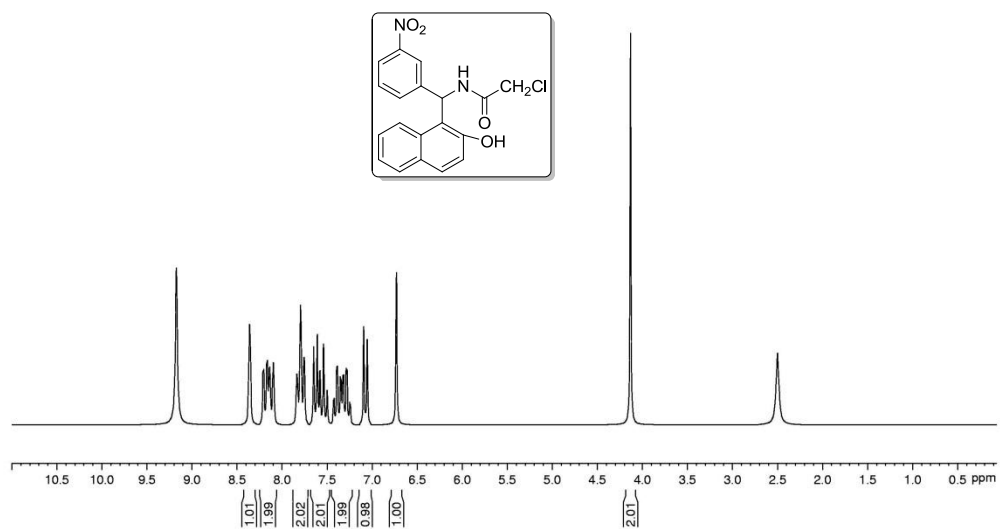


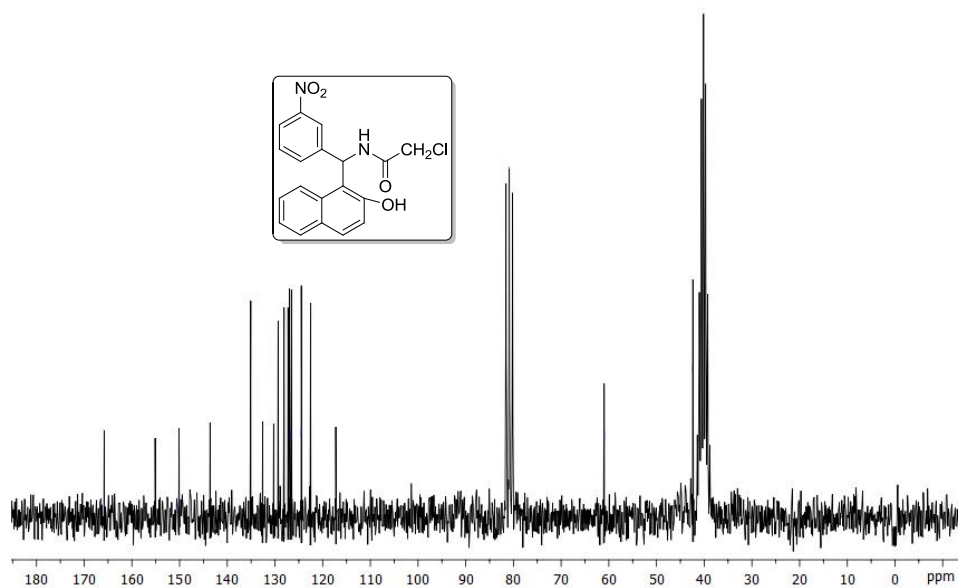


mkq-4t

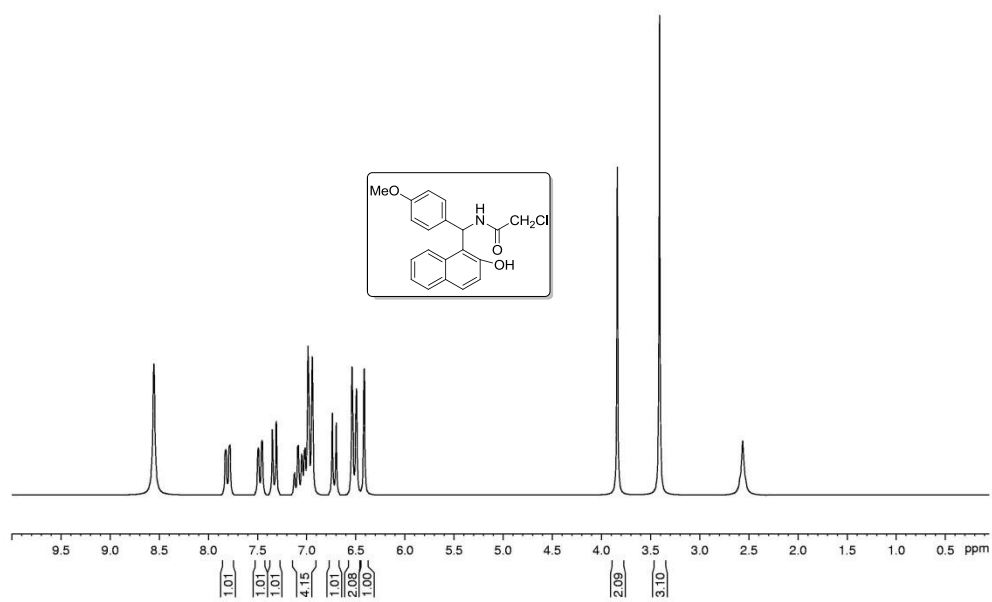


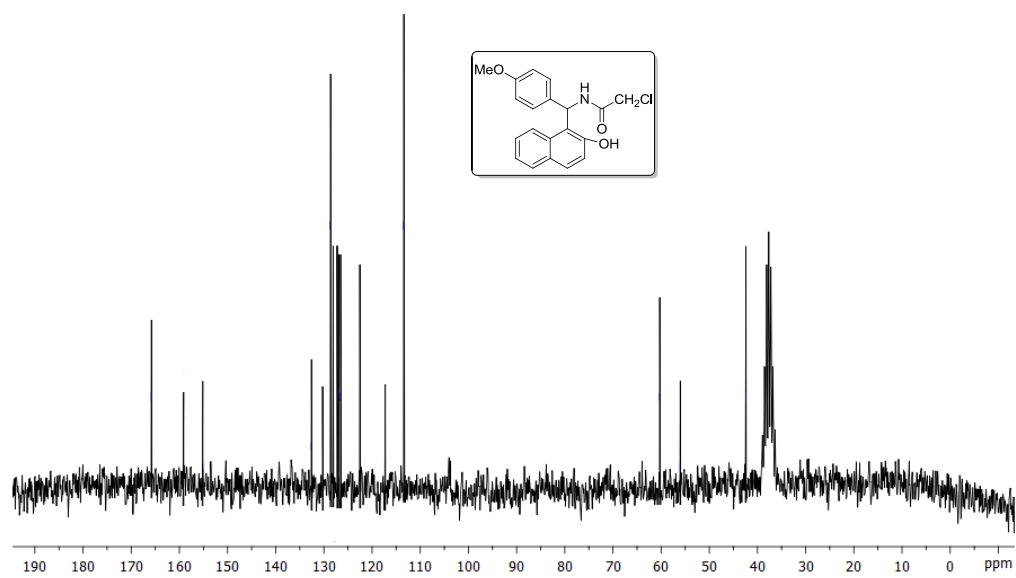
mkg-4u



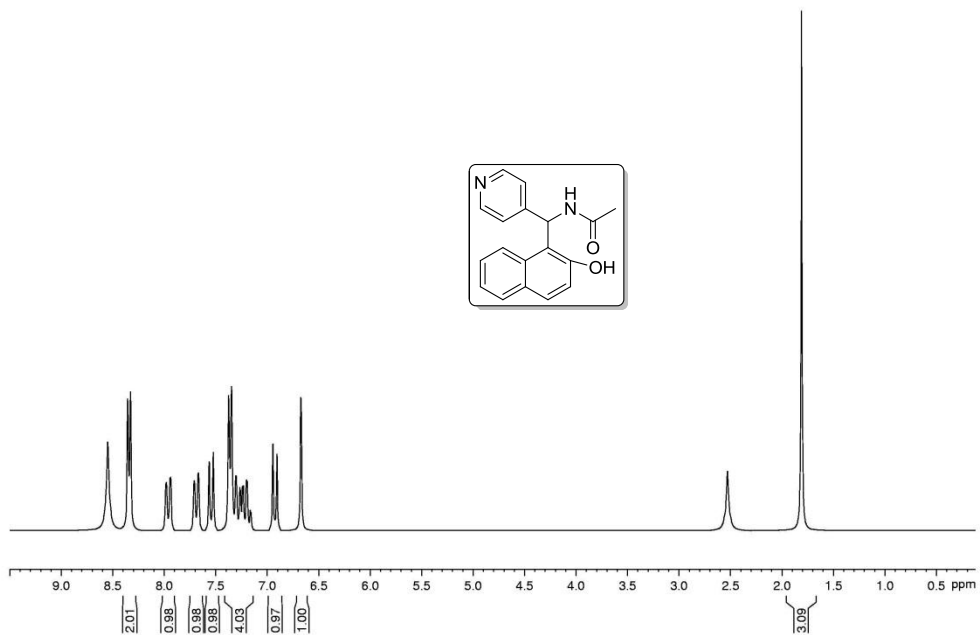


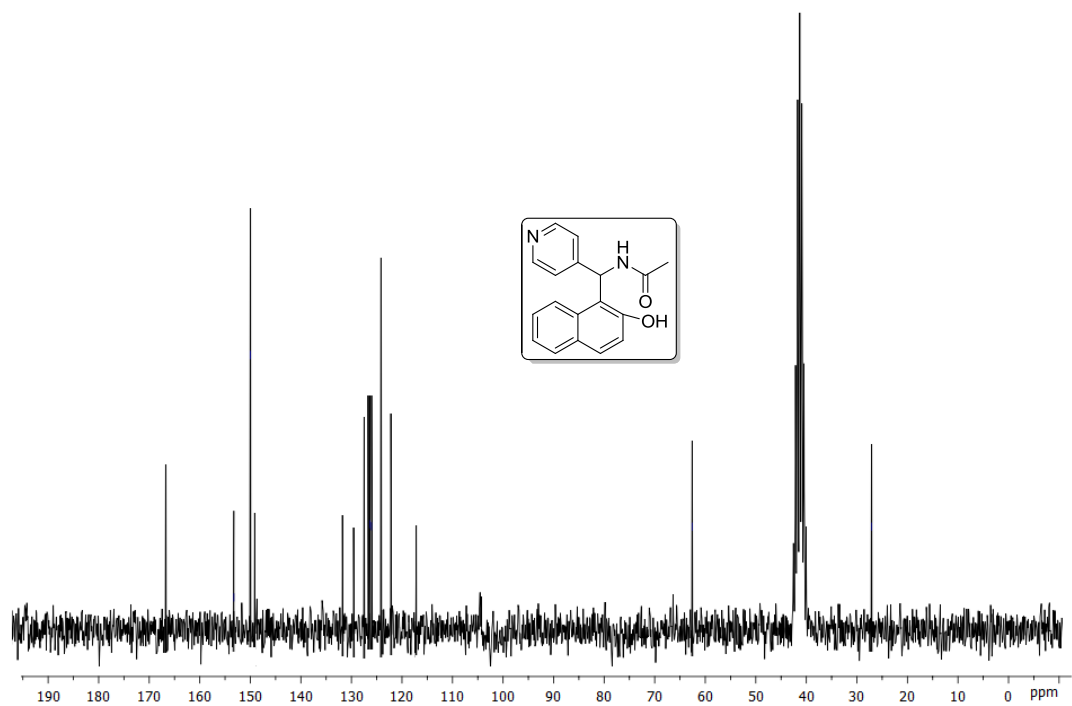
mkg-4v



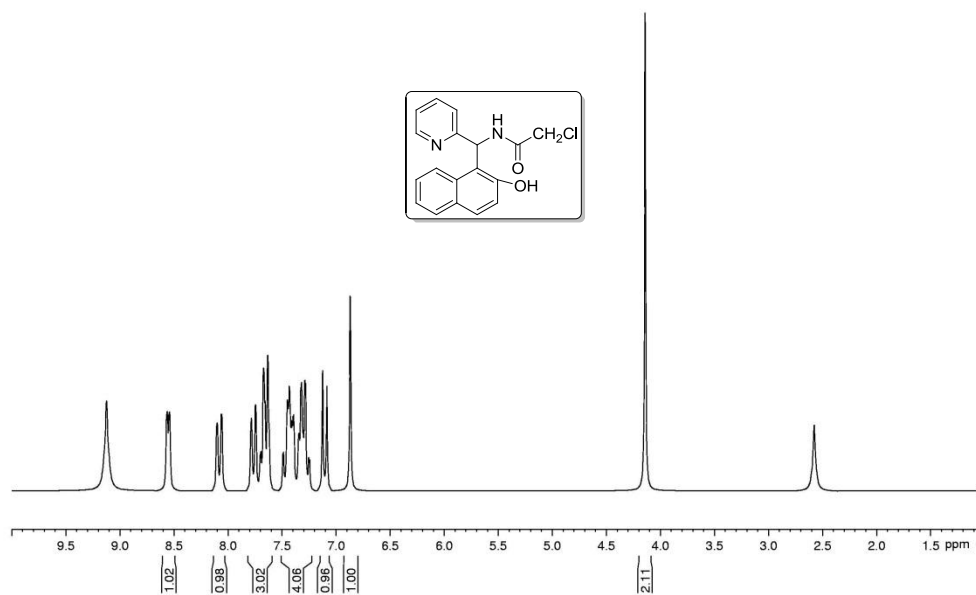


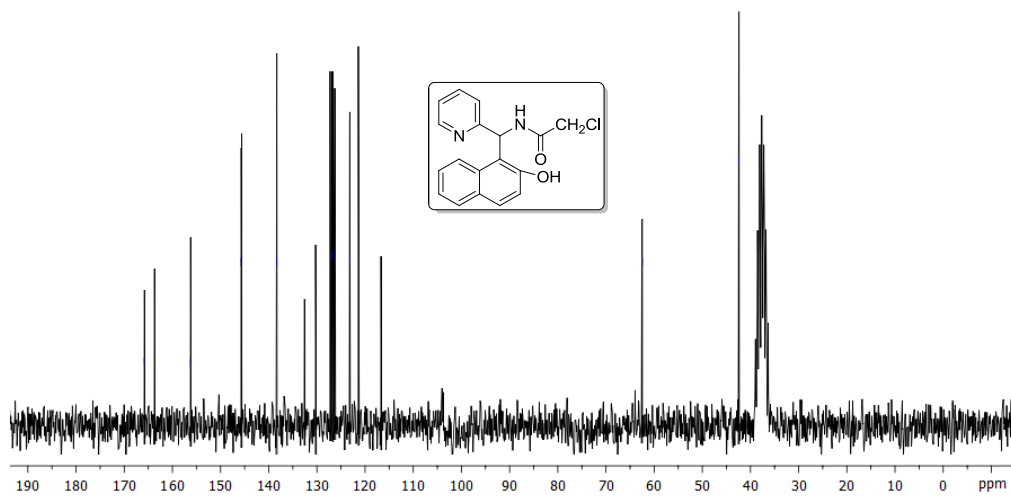
mkg-4w





mkg-4x





mkg-4y

