Supporting Information

Transition Metal-free Regioselective Synthesis of 2-Arylquinolines, Benzo[*h*]quinolines, Pyrido[2,3-*c*]carbazoles and Estimation of Their Photophysical Properties

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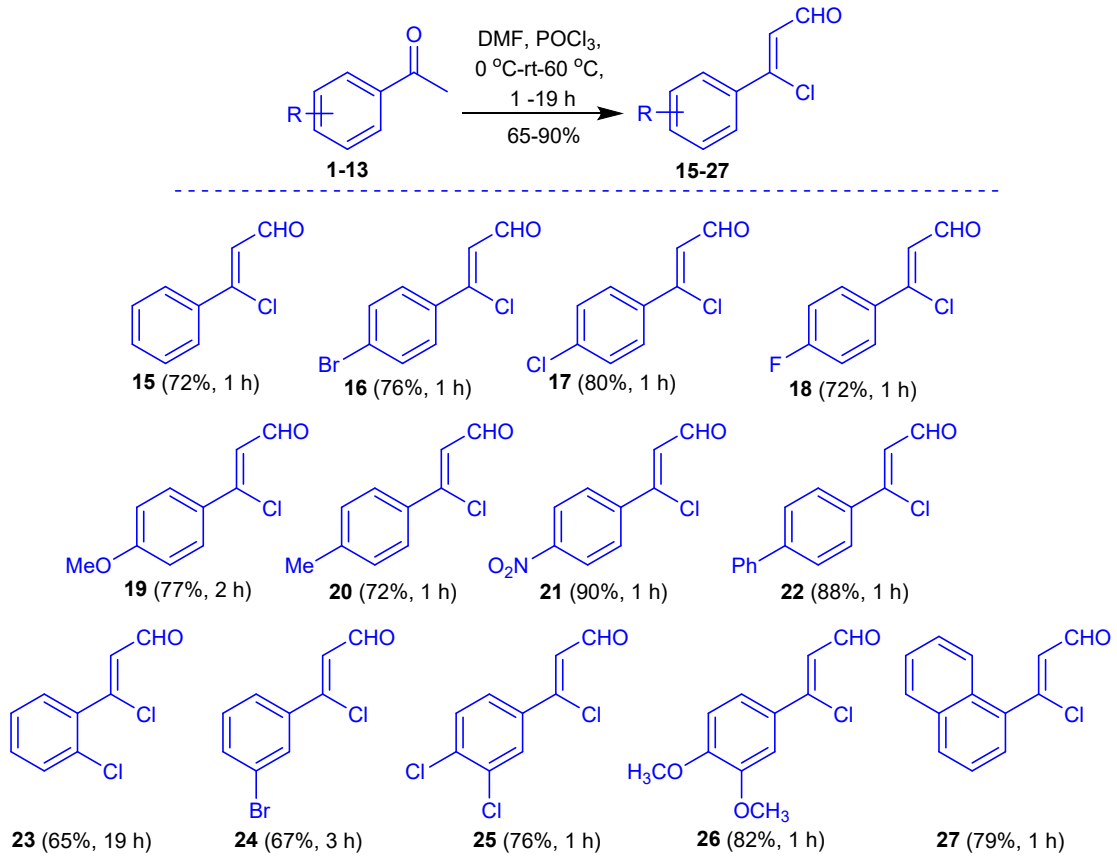
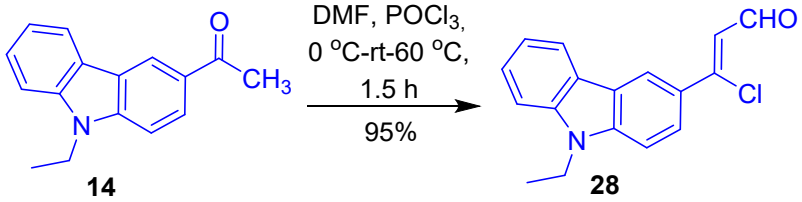
1. Synthesis of β-Chlorovinyl Aldehydes from various Acetophenones



Scheme S1. Synthesis of β-Chlorovinyl Aldehydes from various Acetophenones



Scheme S2. Synthesis of (*Z*)-3-chloro-3-(9-ethyl-9*H*-carbazol-3-yl)acrylaldehyde 28 from 3-acetyl carbazole (14)

2. Experimental data

6,7-Dimethoxy-4-phenylquinoline (**15a**): Yield = 95% (0.223 g from 0.10 g) as a yellow solid; m.p. 170-172 °C; R_f = 0.72 (hexane/EtOAc, 90:10, v/v); IR (Neat): v_{max} $(cm)^{-1}$ = 1620 (C=N); ^{1}H NMR (600 MHz, $CDCl_3$) δ = 4.03 (s, 3H, -OCH_3), 4.06 (s, 3H, -OCH_3) 7.06 (s, 1H, ArH), 7.41-7.44 (m, 1H, ArH), 7.50-7.52 (m, 3H, ArH), 7.73 (d, *J* = 8.4 Hz, 1H, ArH), 8.15 (d, *J* = 2.4 Hz, 1H ArH), 8.09-8.11 (m, 2H, ArH) ppm; ^{13}C NMR (151 MHz, $CDCl_3$) δ = 56.2, 56.3, 105.0, 108.5, 117.4, 122.8, 127.4, 128.9, 128.9, 135.0, 140.1, 145.4, 149.8, 152.7, 155.5 ppm; HRMS (ESI) m/z: calcd. for $C_{17}H_{15}NO_2$ [M + H^+]: 266.1176, found: 266.1180.

2-(4-Bromophenyl)-6,7-dimethoxyquinoline (**16a**): Yield = 78% (0.13 g from 0.10 g) as a dark yellow solid; m.p. 192-194 °C; R_f = 0.25 (hexane/EtOAc, 95:5, v/v); IR (Neat): v_{max} $(cm)^{-1}$ = 1615(C=N); ^{1}H NMR (600 MHz, $CDCl_3$) δ = 4.03 (s, 3H, -OCH_3), 4.06 (s, 3H, -OCH_3), 7.15 (s, 1H, ArH), 7.57 (s, 1H, ArH), 7.62-7.63 (m, 2H, ArH), 7.78 (d, *J* = 8.4 Hz, 1H, ArH), 7.98-8.01 (m, 2H, ArH), 8.06 (d, *J* = 8.4 Hz, 1H, ArH) ppm; ^{13}C NMR (151 MHz, $CDCl_3$) δ = 56.2, 56.3, 105.0, 108.4, 116.9, 123.0, 123.42, 128.9, 132.0, 135.2, 138.9, 150.0, 152.9, 154.1 ppm; HRMS (ESI) m/z: calcd. for $C_{17}H_{14}BrNO_2$ [M + H^+]: 344.0281, found: 344.0284.

2-(4-Chlorophenyl)-6,7-dimethoxyquinoline (17a): Yield = 93% (0.140 g from 0.10 g) as a white solid; m.p. 150-152 °C; R_f = 0.54 (hexane/EtOAc, 80:20, v/v); IR (Neat): v_{max} $(cm)^{-1}$ = 1625 (C=N); ^{1}H NMR (600 MHz, $CDCl_3$) *δ* = 4.03 (s, 3H, -*OCH*$_3$), 4.06 (s, 3H, -*OCH*$_3$), 7.07 (s, 1H, ArH), 7.47 (d, J = 6.7 Hz, 3H, ArH), 7.70 (d, J = 8.4 Hz, 1H, ArH), 8.06 (d, J = 8.5 Hz, 3H, ArH) ppm; ^{13}C NMR (150 MHz, $CDCl_3$) *δ* = 56.2, 56.3, 105.0, 108.4, 117.0, 122.9, 128.6, 129.1, 135.1, 135.2, 138.5, 145.4, 150.0, 152.8, 154.1 ppm; HRMS (ESI) m/z: calcd. for $C_{17}H_{14}ClNO_2$ [M+H^+]: 300.0786; found 300.0790**.**

2-(4-Fluorophenyl)-6,7-dimethoxyquinoline (**18a**): Yield = 76% (0.088 g from 0.05 g) as a dark yellow solid; m.p. 122-124 °C; R_f = 0.67 (hexane/EtOAc, 80:20, v/v); IR (Neat): vmax (cm)-1 = 1617 (C=N); ^{1}H NMR (600 MHz, $CDCl_3$) δ = 4.03 (s, 3H, -OCH_3), 4.06 (s, 3H, -OCH_3), 7.06 (s, 1H, ArH), 7.19 (t, *J* = 8.7 Hz, 2H, ArH), 7.49 (s, 1H, ArH), 7.68 (d, *J* = 8.4 Hz, 1H, ArH), 8.06 (d, *J* = 8.5 Hz, 1H, ArH), δ 8.09(d, *J* =, 5.5 Hz, 1H, ArH), 8.10 (d, *J* = 5.5 Hz, 1H, ArH) .ppm; ^{13}C NMR (151 MHz, $CDCl_3$) δ = 56.2, 56.3, 105.0, 108.3, 115.7, 108.3, 115.7, 115.9 ($J_{C,F}$ = 21.4 Hz), 117.1, 122.8, 129.1, 129.2 ($J_{C,F}$ = 8.1 Hz), 135.2, 145.3, 149.9, 152.9, 154.4, 162.8, 164.5 ($J_{C,F}$ = 246.7 Hz) ppm; HRMS (ESI) m/z: calcd. For $C_{17}H_{14}FNO_2$ [M + H+]: 284.1081found 284.1085.

6,7-Dimethoxy-2-(4-methoxyphenyl)quinoline (**19a**): Yield = 60% (0.11 g from 0.10 g) as an orange solid; m.p. 224-226 °C; R_f = 0.46 (hexane/EtOAc, 70:30, v/v); IR (Neat): v_{max} $(cm)^{-1}$ = 1595(C=N); ^{1}H NMR (600 MHz, $CDCl_3$) δ = 3.86 (s, 3H, -OC*H*$_3$), 4.01 (s, 3H, -OC*H*$_3$), 4.04 (s, 3H, -OC*H*$_3$), 7.02 (t, *J* = 6.6 Hz, 3H, ArH), 7.46 (s, 1H, ArH), 7.67 (d, *J* = 8.4 Hz, 1H, ArH), 8.01 (d, *J* = 8.4 Hz, 1H, ArH), 8.05-8.07 (m, 2H, ArH) ppm; ^{13}C NMR (150 MHz, $CDCl_3$) δ = 55.5, 56.2, 56.3, 105.2, 108.4, 114.3, 117.0, 122.5, 128.5, 132.9, 135.0, 145.4, 149.7, 152.7, 152.2, 160.9 ppm; HRMS (ESI) m/z: calcd. for $C_{18}H_{17}NO_3$ [M + H^+]: 296.1281, found: 296.1285.

6,7-Dimethoxy-2-(p-tolyl)quinoline (**20a**): Yield **=** 71% (0.075 g from 0.10 g) as a white solid; m.p. 130-132 °C; R_f = 0.63 (hexane/EtOAc, 70:30, v/v); IR (Neat): v_{max} $(cm)^{-1}$ = 1615(C=N); ^{1}H NMR (600 MHz, $CDCl_3$) δ = 2.42 (s, 3H, -C*H*$_3$), 4.02 (s, 3H, -OC*H*$_3$), 4.08 (s, 3H, -OC*H*$_3$), 7.26 (s, 1H, ArH), 7.06 (s, 1H, ArH), 7.31 (d, *J* = 6.6 Hz, 2H, ArH), 7.50 (s, 1H, ArH), 7.70-7.73 (m, 1H, ArH), 8.01-8.04 (m, 2H, ArH) ppm; ^{13}C NMR (150 MHz, $CDCl_3$) δ = 21.4, 56.0, 56.3, 106.1, 108.5, 108.5, 108.5, 117.3, 122.7, 127.3, 129.6, 129.7, 135.0, 137.3, 139.0, 145.3, 149.7, 152.7, 155.5 ppm; HRMS (ESI) m/z: calcd. for $C_{18}H_{17}NO_2$ [M + H^+]: 264.1383, found: 264.1387.

6,7-Dimethoxy-2-(4-nitrophenyl)quinoline (21a): Yield = 89% (0.130 g from 0.10 g) as a yellow solid; m.p. 148-150 °C; R_f = 0.28(hexane/EtOAc, 80:20, v/v); IR (neat): v_{max} $(cm)^{-1}$ = 1610 (C=N); ^{1}H NMR (600 MHz, $CDCl_3$) *δ* = 4.05 (s, 3H, -*OCH*$_3$), 4.08 (s, 3H, -*OCH*$_3$), 7.09 (s, 1H, ArH), 7.49 (s, 1H, ArH), 7.78 (d, *J* = 8.4 Hz, 1H, ArH), 8.12 (d, *J* = 8.4 Hz, 1H, ArH), 8.30 (d, *J* = 8.9 Hz, 2H, ArH), 8.35 (d, *J* = 8.9 Hz, 2H, ArH) ppm; ^{13}C NMR (150 MHz, $CDCl_3$) *δ* = 56.3, 56.4, 104.9, 108.4, 117.3, 123.6, 124.2, 128.0, 135.4, 145.6, 146.0, 148.1, 150.6, 152.6, 153.2 ppm; HRMS (ESI) m/z: calcd. for $C_{17}H_{14}N_2O_4$ [M+H^+]: 311.1026; found 311.1030**.**

2-([1,1'-Biphenyl]-4-yl)-6,7-dimethoxyquinoline (22a): Yield = 77% (0.109 g from 0.10 g) as a light yellow solid; m.p. 174-176 °C; R_f = 0.37 (hexane/EtOAc, 80:20, v/v); IR (neat): v_{max} $(cm)^{-1}$ = 1635 (C=N); ^{1}H NMR (600 MHz, $CDCl_3$) *δ* = 4.04 (s, 3H, -*OCH*$_3$), 4.07 (s, 3H, -*OCH*$_3$), 7.07 (s, 1H, ArH), 7.37 (t, J = 7.4 Hz, 1H, ArH), 7.46 (d, J = 7.8 Hz, 2H, ArH), 7.52 (s, 1H, ArH), 7.68 (d, J = 7.0 Hz, 2H, ArH), 7.75 (d, J = 8.3 Hz, 2H, ArH), 7.78 (d, J = 8.4 Hz, 1H, ArH), 8.07 (d, J = 8.5 Hz, 1H, ArH), 8.20 (d, J = 8.2 Hz, 2H, ArH) ppm; ^{13}C NMR (150 MHz, $CDCl_3$) *δ* = 56.2, 56.3, 105.1, 108.5, 117.3, 122.9, 127.2, 127.6, 127.8, 129.0, 135.1, 139.0, 140.8, 141.7, 145.5, 149.8, 152.7, 155.0 ppm; HRMS (ESI) m/z: calcd. for $C_{23}H_{19}NO_2$ [M+H^+]: 342.1489; found 342.1493**.**

6-Phenyl-[1,3]dioxolo[4,5-*g*]quinoline (**15b**): Yield = 65% (0.097 g from 0.10 g) as a light yellow solid; m.p. 112-114 °C; R_f = 0.56 (hexane/EtOAc, 90:10, v/v); IR (neat): ν_{max} $(cm)^{-1}$ = 1615 (C=N); ^{1}H NMR (600 MHz, $CDCl_3$) δ = 6.11 (s, 2H, -OCH_2O-), 7.07 (s, 1H, ArH), 7.43 (t, *J* = 7.3 Hz, 1H, ArH), 7.46 (s, 1H, ArH), 7.51 (t, *J* = 7.6 Hz, 2H, ArH), 7.72 (d, *J* = 8.5 Hz, 1H, ArH), 8.02 (d, *J* = 7.8 Hz, 1H, ArH), 8.10 (d, *J* = 1.1 Hz, 1H, ArH), 8.11 (d, *J* = 1.4 Hz, 1H, ArH) ppm; ^{13}C NMR (151 MHz, $CDCl_3$) δ = 101.8, 102.7, 106.3, 117.4, 124.3, 127.4, 128.9, 129.0, 135.7, 139.9, 146.7, 147.9, 151.0, 155.5 ppm; HRMS (ESI) *m/z*: calcd. for $C_{16}H_{11}NO_2$ [M + H^+]: 250.0863, found 250.0867.

6-(4-Bromophenyl)-[1,3]dioxolo[4,5-*g*]quinoline (**16b**): Yield = 68% (0.107 g from 0.10 g) as a white solid; m.p. 200-202 °C; R_f = 0.78 (hexane/EtOAc, 95:5, v/v); IR (KBr): ν_{max} $(cm)^{-1}$ = 1615 (C=N); ^{1}H NMR (600 MHz, $CDCl_3$) δ = 6.22 (s, 2H, -OCH_2O), 7.36 (s, 1H, ArH), 7.39 (s, 1H, ArH), 7.70-7.71 (m, 2H, ArH), 7.71 (d, *J* = 8.5 Hz, 1H, ArH), 8.10-8.16 (d, *J* = 9.0 Hz, 2H, ArH), 8.24 (d, *J* = 8.4 Hz, 1H, ArH) ppm; ^{13}C NMR (151 MHz, $CDCl_3$) δ = 1.2, 53.7, 56.1, 56.3, 105.0, 108.4, 117.0, 123.0, 128.6, 129.2, 135.1, 135.3, 138.5, 145.3, 150.0, 152.9, 154.1 ppm; HRMS (ESI) m/z: calcd. for $C_{16}H_{10}BrNO_2$ [M + H^+]: 327.9968, found: 327.9972.

8-(4-Chlorophenyl)-[1,3]dioxolo[4,5-*g*]quinolone (**17b**): Yield = 41%, (0.07 g from 0.10 g) as a white solid; m.p. 224-226 °C; R_f = 0.63 (hexane/EtOAc, 70:30, v/v); IR (KBr): ν_{max} $(cm)^{-1}$ = 1613(C=N); ^{1}H NMR (600 MHz, $CDCl_3$) δ = 6.10 (s, 2H, -OCH_2O), 7.04 (s, 1H, ArH), 7.24 (s, 1H, ArH), 7.41 (s, 1H, ArH), 7.45 (d, *J* = 6.7 Hz, 1H, ArH), 7.66 (d, *J* = 8.5 Hz, 1H, ArH), 7.99 (d, *J* = 8.5 Hz, 1H, ArH), 8.05 (d, *J* = 7.2 Hz, 2H, ArH) ppm; ^{13}C NMR (150 MHz, $CDCl_3$) δ = 0.1, 101.9, 102.7, 106.3, 116,9, 119.9, 124.4, 128.6, 129.1, 135.2, 135.8, 138.3, 146.7, 148.0, 151.1, 154.1 ppm; HRMS (ESI) m/z: calcd. for $C_{16}H_{10}ClNO_2$ [M + H^+]: 283.0400, found: 283.0404.

6-(4-Fluorophenyl)-[1,3]dioxolo[4,5-*g*]quinoline (**18b**): Yield = 40%, (0.07 g from 0.10 g) as a yellow solid; m.p. 192-194 °C; R_f = 0.85 (hexane/EtOAc, 70:30, v/v); IR (KBr): ν_{max} $(cm)^{-1}$ = 1661(C=N); ^{1}H NMR (600 MHz, $CDCl_3$) δ = 6.11 (s, 2H, -OCH_2O), 7.66 (d, *J* = 8.5 Hz, 1H, ArH), 8.01 (d, *J* = 8.5 Hz, 1H, ArH), 8.08-8.10 (m, 2H, ArH), 7.06 (s, 1H, ArH), 7.16-7.19 (m, 2H, ArH), 7.43 (s, 1H, ArH) ppm; ^{13}C NMR (151 MHz, $CDCl_3$) δ = 101.8, 102.8, 106.2, 115.7, 115.9 ($J_{C,F}$ = 21.5 Hz) 116.0, 117.0, 124.2, 129.2 ($J_{C,F}$ = 8.3 Hz), 136.7, 136.0, 146.8, 147.9, 151.2, 154.5, 163.0, 164.5 ($J_{C,F}$ = 246.9 Hz) ppm; HRMS (ESI) m/z: calcd. for $C_{16}H_{10}FNO_2$ [M + H^+]: 268.0768, found: 268.0772.

6-(4-Methoxyphenyl)-[1,3]dioxolo[4,5-*g*]quinoline (**19b**): Yield = 88% (0.154.g from 0.10 g) as a yellow solid; m.p. 223-225 ^{o}C; R_f = 0.75 (hexane/EtOAc, 70:30, v/v); IR (KBr): v_{max} $(cm)^{-1}$ = 1648(C=N); ^{1}H NMR (600 MHz, $CDCl_3$) δ = 3.86(s, 3H, -OCH_3), 6.08 (s, 2H, -OCH_2O), 7.02 (t, *J* = 7.5 Hz, 3H, ArH), 7.41 (s, 1H, ArH), 7.65 (d, *J* = 8.5 Hz, 1H, ArH), 7.96 (d, *J* = 8.6 Hz, 1H, ArH), 8.05 (d, *J* = 8.8 Hz, ArH) ppm; ^{13}C NMR (151 MHz, $CDCl_3$) δ = 1.2, 55.5, 101.7, 102.7, 106.2, 114.3, 117.0, 123.8, 128.6, 132.5, 135.5, 146.75, 147.6, 151.0, 155.1, 160.6 ppm; HRMS (ESI) m/z: calcd. for $C_{17}H_{13}NO_3$ [M + H^+]: 280.0968, found: 280.0972.

6-(*p*-Tolyl)-[1,3]dioxolo[4,5-*g*]quinoline (**20b**): Yield = 85% (0.094 g from 0.10 g) as a grey solid; m.p. 180-182 ^{o}C; R_f = 0.41 (hexane/EtOAc, 95:5, v/v); IR (KBr): v_{max} $(cm)^{-1}$ = 1613 (C=N); ^{1}H NMR (600 MHz, $CDCl_3$) δ = 2.4 (s, 3H, -CH_3), 6.1 (s, 2H, -OCH_2O), 7.05 (s, 1H, ArH), 7.26-7.27 (m, 1H, ArH), 7.31 (d, *J* = 7.2 Hz, 2H, ArH), 7.45 (s, 1H, ArH), 7.69-7.71 (m, 1H, ArH), 8.0 (t, *J* = 6.6 Hz, 2H, ArH) ppm; ^{13}C NMR (150 MHz, $CDCl_3$) δ = 21.4, 101.7, 102.7, 102.7, 106.3, 106.3, 117.2, 124.1, 127.2, 129.6, 135.6, 137.1, 139.0, 146.7, 147.7, 150.9, 155.4 ppm; HRMS (ESI) m/z: calcd. for $C_{17}H_{13}NO_2$ [M + H^+]: 264.1019, found: 264.1023.

6-([1,1'-Biphenyl]-4-yl)-[1,3]dioxolo[4,5-g]quinoline (22b): Yield = 69% (0.093 g from 0.10 g) as a white solid; m.p. 202-204 ^{o}C; R_f = 0.54 (hexane/EtOAc, 80:20, v/v); IR (neat): v_{max} $(cm)^{-1}$ = 1600 (C=N); ^{1}H NMR (600 MHz, $CDCl_3$) δ = 6.12 (s, 2H, -OCH_2O), 7.08 (s, 1H, ArH), 7.36 – 7.39 (m, 1H, ArH), 7.47 (d, J = 6.7 Hz, 3H, ArH), 7.68 (d, J = 7.7 Hz, 2H, ArH), 7.75 (d, J = 8.3 Hz, 2H, ArH), 7.77 (d, J = 8.5 Hz, 1H, ArH), 8.04 (d, J = 8.4 Hz, 1H, ArH), 8.20 (d, J = 8.3 Hz, 2H, ArH) ppm; ^{13}C NMR (150 MHz, $CDCl_3$) δ = 101.8, 102.7, 106.3, 117.3, 124.3, 127.3, 127.6, 127.8, 129.0, 135.7, 138.8, 140.8, 141.8, 147.9, 151.0 ppm; HRMS (ESI) m/z: calcd. for $C_{22}H_{15}NO_2$ [M+H^+]: 326.1176; found 326.1180**.**

7-Phenyl-2,3-dihydro-[1,4]dioxino[2,3-g]quinoline (15c): Yield = 66% (0.105 g from 0.10 g) as an off white solid; m.p. 146-148 ^{o}C; R_f = 0.71 (hexane/EtOAc, 80:20, v/v); IR (neat): v_{max} $(cm)^{-1}$ = 1625 (C=N); ^{1}H NMR (600 MHz, $CDCl_3$) δ = 4.40 (s, 4H, -OCH_2CH_2O-), 7.22 (s, 1H, ArH), 7.44 (t, J = 7.3 Hz, 1H, ArH), 7.51 (t, J = 7.8 Hz, 2H, ArH), 7.62 (s, 1H, ArH), 7.71 (d, J = 8.5 Hz, 1H, ArH), 8.03 (d, J = 8.6 Hz, 1H, ArH), 8.11 (d, J = 8.3 Hz, 2H, ArH) ppm; ^{13}C NMR (150 MHz, $CDCl_3$) δ = 64.5, 111.7, 114.6, 117.6, 123.3, 127.5, 128.9, 129.1, 135.3, 140.1, 144.3, 144.9, 147.1, 156.0 ppm; HRMS (ESI) m/z: calcd. for $C_{17}H_{13}NO_2$ [M+H^+]: 264.1019; found 264.1023.

(4-Bromophenyl)-2,3-dihydro-[1,4]dioxino[2,3-*g*]quinoline) (**16c**): Yield = 46% (0.103 g from 0.10 g) as a light yellow solid; m.p. 182-184 ^{o}C; R_f = 0.67 (hexane/EtOAc, 70:30, v/v); IR (neat): vmax (cm)$^{-1}$ = 1628 (C=N) ; ^{1}H NMR (600 MHz, $CDCl_3$) δ = 4.39 (d, *J* = 2.1 Hz, 4H, -OC*H*$_2$C*H*$_2$O-), 7.21 (s, 1H, ArH), 7.58 (s, 1H, ArH), 7.62 (d, *J* = 8.5 Hz, 2H, ArH), 7.65 (d, *J* = 8.6 Hz, 1H, ArH), 7.99 (d, *J* = 8.6 Hz, 2H, ArH), 8.02 (d, *J* = 8.3 Hz, 1H, ArH) ppm; ^{13}C NMR (151 MHz, $CDCl_3$) δ = 64.5, 64.6, 111.7, 114.6, 117.1, 122.2, 122.8, 123.4, 123.6, 129.0, 132.0, 135.4, 138.9, 144.5, 144.9, 147.3, 154.6 ppm; HRMS (ESI) m/z: calcd. for $C_{17}H_{12}BrNO_2$ [M + H+]: 342.0124 found 342.0128**.**

7-(4-Chlorophenyl)-2,3-dihydro-[1,4]dioxino[2,3-g]quinoline (17c): Yield = 74% (0.110 g from 0.10 g) as an off white solid; m.p. 168-170 ^{o}C; R_f = 0.6 (hexane/EtOAc, 80:20, v/v); IR (neat): ν_{max} (cm)$^{-1}$ = 1625 (C=N); ^{1}H NMR (600 MHz, $CDCl_3$) δ = 4.39 (d, J = 2.1 Hz, 4H, -*OCH*$_2$*CH*$_2$*O*-), 7.21 (s, 1H, ArH), 7.47 (d, J = 8.5 Hz, 2H, ArH), 7.58 (s, 1H, ArH), 7.66 (d, J = 8.5 Hz, 1H, ArH), 8.02 (d, J = 8.6 Hz, 1H, ArH), 8.06 (d, J = 8.5 Hz, 2H, ArH) ppm; ^{13}C NMR (150 MHz, $CDCl_3$) δ = 64.5, 111.7, 114.6, 117.1, 123.4, 128.7, 129.0, 129.1, 135.2, 135.4, 138.5, 144.5, 144.9, 147.3, 154.6 ppm; HRMS (ESI) m/z: calcd. for $C_{17}H_{12}ClNO_2$ [M+H^{+}]: 298.0629; found 298.0633**.**

7-(4-Methoxyphenyl)-2,3-dihydro-[1,4]dioxino[2,3-*g*]quinoline (**19c**): Yield = 88% (0.041 g from 0.10 g) as a light yellow solid; m.p. 132-134 ^{o}C; R_f = 0.48 (hexane/EtOAc, 70:30, v/v); IR (neat): vmax (cm)-1 = 1624 (C=N); ^{1}H NMR (600 MHz, $CDCl_3$) δ = 3.88 (s, 3H, -OC*H*$_3$), 4.40 – 4.38 (m, 2H, -OC*H*$_2$CH$_2$O-), 4.46 – 4.43 (m, 2H, -OCH$_2$C*H*$_2$O-*),* 7.03 (d, *J* = 8.8 Hz, 2H, ArH), 7.30 (d, *J* = 9.1 Hz, 1H, ArH), 7.66 (d, *J* = 9.1 Hz, 1H, ArH), 7.78 (d, *J* = 8.8 Hz, 1H, ArH), 8.10 (d, *J* = 8.8 Hz, 2H, ArH), 8.39 (d, *J* = 8.8 Hz, 1H, ArH),ppm; ^{13}C NMR (151 MHz, $CDCl_3$) δ = 55.5, 64.5, 111.7, 114.3, 114.5, 117.2, 118.0, 121.8, 122.6, 123.0, 128.7, 129.6, 132.7, 135.2, 144.0, 144.9, 147.0, 155.6, 160.7 ppm; HRMS (ESI) m/z: calcd. for $C_{18}H_{15}NO_3$ [M + H+]: 294.1125, found 294.1129.

7-(*p*-Tolyl)-2,3-dihydro-[1,4]dioxino[2,3-g]quinoline (20c): Yield = 85% (0.130 g from 0.10 g) as a light brown solid; m.p. 70-72 ^{o}C; R_f = 0.5 (hexane/EtOAc, 80:20, v/v); IR (neat): ν_{max} (cm)$^{-1}$ = 1620 (C=N); ^{1}H NMR (600 MHz, $CDCl_3$) δ = 2.42 (s, 3H, -*CH*$_3$), 4.38 (d, J = 2.9 Hz, 4H, -*OCH*$_2$*CH*$_2$*O*-), 7.20 (s, 1H, ArH), 7.31 (d, J = 7.8 Hz, 2H, ArH), 7.59 (s, 1H, ArH), 7.68 (d, J = 8.5 Hz, 1H, ArH), 8.00 (dd, J = 3.5, 8.3 Hz, 3H, ArH) ppm; ^{13}C NMR (150 MHz, $CDCl_3$) δ = 21.5,

64.6, 111.7, 114.6, 117.5, 123.2, 127.4, 129.6, 135.2, 137.3, 139.1, 144.2, 144.9, 147.1, 156.0ppm; HRMS (ESI) m/z: calcd. for $C_{18}H_{15}NO_2$ [M+H$^+$]: 278.1176; found 278.1180**.**

5,7-Dimethoxy-2-phenylquinoline (**15d**): Yield **=** 43% (0.066 g from 0.10 g) as a yellow oily; R_f = 0.56 (hexane/EtOAc, 90:10, v/v); ; m.p. 112-114 ^{o}C; IR (neat): ν_{max} (cm)$^{-1}$ = 1623 (C=N); ^{1}H NMR (600 MHz, $CDCl_3$) δ = 3.96 (s, 6H, (-OCH_3)$_2$), 6.50 (d, *J* = 2.2 Hz, 1H, ArH), 7.11 (d, *J* = 2.2 Hz, 1H, ArH), 7.45 (t, *J* = 7.3 Hz, 1H, ArH), 7.51 (t, *J* = 7.4 Hz, 2H, ArH), 7.68 (d, *J* = 8.6 Hz, 1H, ArH), 8.13 (d, *J* = 7.7 Hz, 2H, ArH), 8.47 (d, *J* = 8.6 Hz, 1H, ArH) ppm; ^{13}C NMR (151 MHz, $CDCl_3$) δ = 55.7, 55.8, 98.0, 100.1, 115.7, 116.0, 127.6, 128.8, 129.0, 129.3, 129.6, 131.5, 140.0, 150.5, 156.1, 158.1, 161.5 ppm; HRMS (ESI) *m/z*: calcd. for $C_{17}H_{15}NO_2$ [M + H$^+$]: 266.1176, found 266.1180.

2-(4-Bromophenyl)-5,7-dimethoxyquinoline (**16d**): Yield = 53%, (0.127 g from 0.10 g) as a white solid; m.p; 140-142 ^{o}C; R_f = 0.9 (hexane/EtOAc, 90:10, v/v); IR (KBr): ν_{max} (cm)$^{-1}$ = 1568 (C=N); ^{1}H NMR (600 MHz, $CDCl_3$) δ = 3.96 (s, 3H, -OCH_3), 3.98 (s, 3H, -OCH_3), 6.51 (s, 1H, ArH), 7.07 (s, 1H, ArH), 7.63 (t, *J* = 8.8 Hz, 3H, ArH), 8.01 (d, *J* = 8.9 Hz, 2H, ArH), 8.48 (d, *J* = 8.6 Hz, 1H, ArH) ppm; ^{13}C NMR (150 MHz, $CDCl_3$) δ = 54.1, 55.9, 55.9, 98.4, 100.0, 115.7, 115.7, 116.0, 123.8, 129.3, 131.9, 132.0, 138.8, 150.7, 156.1, 156.0, 161.7 ppm; HRMS (ESI) m/z: calcd. for $C_{17}H_{14}BrNO_2$ [M + H$^+$]: 344.0281, found: 344.0285.

2-(4-Chlorophenyl)-5,7-dimethoxyquinoline (**17d**): Yield = 49% (0.073 g from 0.10 g) as a green solid; m.p. 220-222 ^{o}C; R_f = 0.45 (hexane/EtOAc, 90:10, v/v); IR (neat): vmax (cm)-1 = 1616 (C=N); ^{1}H NMR (600 MHz, $CDCl_3$) δ = 3.98 (s, 3H, -OCH_3), 4.06 (s, 3H, -OCH_3), 6.76 (d, *J* = 8.4 Hz, 1H, ArH), 6.97 (d, *J* = 8.5 Hz, 1H, ArH), 7.47 (d, *J* = 8.6 Hz, 2H, ArH), 7.86 (d, *J* = 8.8 Hz, 1H, ArH), 8.15 (d, *J* = 8.7 Hz, 2H, ArH), 8.61 (d, *J* = 8.7 Hz, 1H, ArH), ppm; ^{13}C NMR (151 MHz, $CDCl_3$) δ = 55.9, 55.9, 56.5, 103.9, 108.0, 118.2, 120.7, 129.0, 129.1, 132.1, 135.5, 138.2, 140.6, 148.9, 149.7, 155.4 ppm; HRMS (ESI) m/z: calcd. for $C_{17}H_{14}ClNO_2$[M + H+]: 300.0786, found 300.0790.

2-(4-Fluorophenyl)-5,7-dimethoxyquinoline (**18d**): Yield = 48% (0.095 g from 0.10 g) as an off white solid; m.p. 162-164 ^{o}C; R_f = 0.46(hexane/EtOAc, 90:10, v/v); IR (neat): vmax (cm)-1 = 1599 (C=N); ^{1}H NMR (600 MHz, $CDCl_3$) δ = 4.16 (s, , 6H, -OCH_3) , 6.69 (s, 1H, ArH), 7.38 (t, *J* = 8.6 Hz, 2H, ArH), 7.45 (s, 1H, ArH), 7.83 (d, *J* = 8.6 Hz, 1H, ArH), 8.34 – 8.27 (m, 2H ArH), 8.67 (d, *J* = 8.6 Hz, 1H, ArH) ppm; ^{13}C NMR (151 MHz, $CDCl_3$) δ = 55.8, 55.9, 98.1, 100.1, 115.7 ($J_{C,F}$ = 5.8 Hz), 115.9, 129.4, 129.5 ($J_{C,F}$ = 8.2 Hz), 131.7, 136.1, 150.5, 156.1, 157.1, 161.7,

163.0, 164.7 ($J_{C,F}$ = 247.4 Hz) ppm; HRMS (ESI) m/z: calcd. for $C_{17}H_{14}FNO_2$[M + H+]: 284.1081, Found 284.1085.

5,7-Dimethoxy-2-(*p*-tolyl)quinoline (**20d**): Yield **=** 41% (0.075 g from 0.10 g) as a light yellow solid; m.p. 102-104 ^oC; R_f = 0.56 (hexane/EtOAc, 90:10, v/v); IR (neat): ν_{max} $(cm)^{-1}$ = 1624 (C=N); ^1H NMR (600 MHz, $CDCl_3$) δ = 2.43 (s, 3H, -CH_3) 3.96 (s, 3H, -OCH_3), 3.98 (s, 3H, -OCH_3), 6.49 (d, *J* = 2.2 Hz, 1H, ArH), 7.09 (d, *J* = 1.9 Hz, 1H, ArH), 7.32 (d, *J* = 8.4 Hz, 2H, ArH), 7.67 (d, *J* = 8.6 Hz, 1H, ArH), 8.03 (d, *J* = 8.2 Hz, 2H, ArH), 8.46 (d, *J* = 8.6 Hz, 1H, ArH) ppm; ^{13}C NMR (151 MHz, $CDCl_3$) δ = 21.4, 55.7, 55.9, 97.9, 100.2, 115.6, 115.9, 127.5, 129.6, 131.4, 137.2, 139.2, 150.6, 156.1, 158.1, 161.5 ppm; HRMS (ESI) *m/z*: calcd. for $C_{18}H_{17}NO_2$ [M + H^+]: 280.1332, found 280.1336.

5,8-Dimethoxy-2-phenylquinoline (**15e**): Yield **=** 51% (0.084 g from 0.10 g) as a brown oily; R_f = 0.28 (hexane/EtOAc, 90:10, v/v); ; m.p. 112-114 ^oC; IR (neat): ν_{max} $(cm)^{-1}$ = 1620 (C=N); ^1H NMR (600 MHz, $CDCl_3$) δ = 3.98 (s, 3H, -OCH_3), 4.07 (s, 3H, -OCH_3), 6.75 (d, *J* = 8.4 Hz, 1H, ArH), 6.96 (d, *J* = 8.5 Hz, 1H, ArH), 7.44 (d, *J* = 7.3 Hz, 1H, ArH), 7.51 (d, *J* = 7.6 Hz, 2H, ArH), 7.91 (d, *J* = 8.4 Hz, 1H, ArH), 8.20 (d, *J* = 7.1 Hz, 2H, ArH), 8.62 (d, *J* = 8.7 Hz, 1H, ArH) ppm; ^{13}C NMR (151 MHz, $CDCl_3$) δ = 55.9, 56.5, 103.7, 107.9, 118.7, 120.6, 127.5, 127.8, 128.5, 128.9, 129.3, 131.8, 139.8, 140.7, 148.9, 149.8, 156.7 ppm; HRMS (ESI) *m/z*: calcd. for $C_{17}H_{15}NO_2$ [M + H^+]: 266.1176, found 266.1180.

2-(4-Bromophenyl)-5,8-dimethoxyquinoline (**16e**): Yield = 37% (0.078 g from 0.150 g) as a yellow solid; m.p. 134-136 ^oC; R_f = 0.56 hexane/EtOAc, 90:10, v/v); IR (neat): vmax $(cm)^{-1}$ = 1603 (C=N); ^1H NMR (600 MHz, $CDCl_3$) δ = 3.98 (s, 3H, -OCH_3), 4.06 (s, 3H,-OCH_3), 6.76 (d, *J* = 8.4 Hz, 1H, ArH), 6.97 (d, *J* = 8.5 Hz, 1H ArH), 7.63 (d, *J* = 8.5 Hz, 2H ArH), 7.86 (d, *J* = 8.8 Hz, 1H, ArH), 8.08 (d, *J* = 8.5 Hz, 2H, ArH), δ 8.61 (d, *J* = 8.8 Hz, 1H, ArH) ppm; ^{13}C NMR (151 MHz, $CDCl_3$) δ = 55.9, 56.5, 103.9, 108.0, 118.2, 120.7, 123.9, 129.3, 132.0, 132.1, 138.7, 140.6, 148.9, 149.7, 155.4 ppm; HRMS (ESI) m/z: calcd. for $C_{17}H_{14}BrNO_2$ [M + H+]: 344.0281, found 344.0285.

2-(4-Fluorophenyl)-5,8-dimethoxyquinoline (18e): Yield = 30% (0.060 g from 0.10 g) as a brown solid; m.p. =152-154 ^oC; R_f = 0.56 (hexane/EtOAc, 90:10, v/v); IR (neat): vmax (cm)-1 = 1713 (C=N); ^1H NMR (600 MHz, $CDCl_3$) δ = 3.98 (s, 3H, -OCH_3), 4.06 (s, 3H, -OCH_3), 6.75 (d, *J* = 8.5 Hz, 1H ArH), 6.96 (d, *J* = 8.4 Hz, 1H ArH), 7.18 (t, *J* = 8.1 Hz, 2H, ArH), 7.85 (d, *J* = 8.8 Hz, 1H,ArH), 8.21 – 8.16 (m, 2H, ArH), 8.60 (d, *J* = 8.8 Hz, 1H ArH) ppm; ^{13}C NMR (151 MHz,

$CDCl_3$) δ = 55.9, 56.5, 103.7, 107.9, 115.7, 115.8 ($J_{C,F}$ = 21.5 Hz), 118.3, 120.5, 129.6, 129.7 ($J_{C,F}$ = 8.5 Hz), 132.0, 136.0, 140.6, 148.9, 149.7, 155.6, 163.1, 164.7 ($J_{C,F}$ = 247.1 Hz) ppm; HRMS (ESI) m/z: calcd. For $C_{17}H_{14}FNO_2$ [M + H+]: 284.1081, found 284.1085.

6-(4-Bromophenyl)-2,3-dimethylnaphthalene (**16f**): Yield = 36% (0.10 g from 0.10 g) as a light yellow solid; m.p. 182-184 °C; R_f = 0.75 (hexane/EtOAc, 95:05, v/v); IR (neat): vmax $(cm)^{-1}$ = 1628 (C=N); ^{1}H NMR (600 MHz, $CDCl_3$) δ = 2.45 (s, 3H, -C*H*$_3$), 2.48 (s, 3H, -C*H*$_3$), 7.55 (s, 1H, ArH), 7.63 (d, *J* = 8.5 Hz, 2H, ArH), 7.73 (d, *J* = 8.6 Hz, 1H, ArH), 7.91 (s, 1H, ArH), 8.02 (d, *J* = 8.5 Hz, 2H, ArH), 8.09 (d, *J* = 8.5 Hz, 1H, ArH) ppm; ^{13}C NMR (151 MHz, $CDCl_3$) δ = 20.1, 20.5, 20.6, 76.9, 77.1, 77.3, 117.8, 118.0, 123.6, 126.0, 126.8, 129.1, 129.1, 131.9,132.0, 133.1, 135.9, 136.6, 138.9, 140.2, 147.5, 155.2 ppm; HRMS (ESI) m/z: calcd. for $C_{18}H_{15}Br$ [M + H+]: 312.0382, found 312.0386**.**

2-(2-Chlorophenyl)-6,7-dimethoxyquinoline (**23a**): Yield **=** 52% (0.097 g from 0.10 g) as a yellow solid; m.p. 136-138 °C; R_f = 0.2 (hexane/EtOAc, 90:10, v/v); IR (neat): v_{max} $(cm)^{-1}$ = 1624 (C=N); ^{1}H NMR (600 MHz, $CDCl_3$) *δ* = 4.04 (s, 6H, (-OC*H*$_3$)$_2$), 7.10 (s, 1H, ArH), 7.34 – 7.41 (m, 2H, ArH), 7.49 – 7.41 (m, 2H, ArH), 7.60 (d, *J* = 8.3 Hz, 1H, ArH), 7.67 (d, *J* = 7.5 Hz, 1H, ArH), 8.06 (d, *J* = 8.3 Hz, 1H, ArH) ppm; ^{13}C NMR (151 MHz, $CDCl_3$) *δ* = 56.2, 56.3, 105.1, 108.4, 121.1, 122.9, 127.2, 129.7, 130.2, 131.7, 132.5, 134.0, 140.0, 145.1, 150.2, 152.8, 155.3 ppm; HRMS (ESI) *m/z*: calcd. for $C_{17}H_{14}ClNO_2$ [M + H^+]: 300.0786, found 300.0790.

2-(3-Bromophenyl)-6,7-dimethoxyquinoline (**24a**): Yield **=** 68% (0.112 g from 0.05 g) as a yellow solid; m.p. 154-156 °C; R_f = 0.32 (hexane/EtOAc, 90:10, v/v); IR (neat): v_{max} $(cm)^{-1}$ = 1620 (C=N); ^{1}H NMR (600 MHz, $CDCl_3$) *δ* = 4.03 (s, 3H, -OC*H*$_3$), 4.07 (s, 3H, -OC*H*$_3$), 7.07 (s, 1H, ArH), 7.37 (t, *J* = 7.8 Hz, 1H, ArH), 7.49 (s, 1H, ArH), 7.54 – 7.56 (m, 1H, ArH), 7.70 (d, *J* = 8.5 Hz, 1H, ArH), 8.02 (d, *J* = 7.9 Hz, 1H, ArH), 8.07 (d, *J* = 8.4 Hz, 1H, ArH), 8.31 (t, *J* = 1.8 Hz, 1H, ArH), ppm; ^{13}C NMR (151 MHz, $CDCl_3$) *δ* = 56.22, 56.34, 105.0, 108.5, 117.1, 123.1, 123.2, 125.8, 130.4, 130.5, 131.9, 135.2, 142.2, 145.4, 150.1, 152.9, 153.8, ppm; HRMS (ESI) *m/z*: calcd. for $C_{17}H_{14}BrNO_2$ [M + H^+]: 344.0281, found 344.0285.

2-(3,4-Dichlorophenyl)-6,7-dimethoxyquinoline (25a): Yield = 86% (0.122 g from 0.10 g) as a white solid; m.p. 176-178 °C; R_f = 0.52 (hexane/EtOAc, 80:20, v/v); IR (neat): v_{max} $(cm)^{-1}$ = 1635 (C=N); ^{1}H NMR (600 MHz, $CDCl_3$) *δ* = 4.03 (s, 3H, OCH_3), 4.07 (s, 3H, OCH_3), 7.06 (s, 1H, ArH), 7.47 (s, 1H, ArH), 7.56 (d, J = 9.2 Hz, 1H, ArH), 7.68 (d, J = 7.6 Hz, 1H, ArH), 7.94 (d, J = 8.5 Hz, 1H, ArH), 8.07 (d, J = 8.4 Hz, 1H, ArH), 8.26 (s, 1H, ArH) ppm; ^{13}C NMR (150 MHz,

$CDCl_3$) δ = 56.2, 56.3, 105.0, 108.4, 116.8, 123.2, 126.4, 129.2, 130.8, 133.1, 133.2, 135.3, 140.0, 145.4, 150.2, 152.7, 153.0 ppm; HRMS (ESI) m/z: calcd. for $C_{17}H_{13}Cl_2NO_2$ [M+H$^+$]: 334.0396; found 334.0391**.**

2-(3,4-Dimethoxyphenyl)-6,7-dimethoxyquinoline (**26a**): Yield **=** 34% (0.068 g from 0.10 g) as a light brown solid; m.p. 176-178 ^oC; R_f = 0.56 (hexane/EtOAc, 90:10, v/v); IR (neat): v_{max} $(cm)^{-1}$ = 1600 (C=N); ^1H NMR (600 MHz, $CDCl_3$) δ = 3.96 (s, 3H, -OCH_3), 4.03 (s, 3H, -OCH_3), 4.05 (s, 3H, -OCH_3), 4.07 (s, 3H, -OCH_3), 6.99 (d, *J* = 8.3 Hz, 1H, ArH), 7.06 (s, 1H, ArH), 7.51 (s, 1H, ArH), 7.62 (d, *J* = 8.3 Hz, 1H, ArH), 7.71 (d, *J* = 8.4 Hz, 1H, ArH), 7.82 (s, 1H, ArH), 8.03 (d, *J* = 8.4 Hz, 1H, ArH) ppm; ^{13}C NMR (151 MHz, $CDCl_3$) δ = 56.1, 56.3, 105.1, 108.3, 110.0, 111.2, 117.0, 119.9, 122.5, 133.0, 135.0, 145.2, 149.5, 149.6, 150.6, 152.7, 155.0 ppm; HRMS (ESI) *m/z*: calcd. for $C_{19}H_{19}NO_4$ [M + H$^+$]: 326.1387, found 326.1391.

6,7-Dimethoxy-2-(naphthalen-2-yl)quinoline (**27a**): Yield = 95% (0.196 g from 0.10 g) as a yellow solid; m.p. 138-140 ^oC; R_f = 0.68 (hexane/EtOAc, 90:10, v/v); IR (neat): vmax (cm)-1 = 1618 (C=N); ^1H NMR (600 MHz, $CDCl_3$) δ = 1.52 (t, *J* = 7.3 Hz, 3H, -CH_3), 4.54 (q, *J* = 7.3 Hz, 2H, -CH_2), 7.41 (t, *J* = 7.5 Hz, 1H, ArH), 7.51 (d, *J* = 8.2 Hz, 2H, ArH), 7.54 (t, J=7.6Hz, 1H, ArH), 7.60 (d, *J* = 8.2 Hz, 1H, ArH), 7.90 (d, *J* = 9.1 Hz, 1H, ArH), 8.02 (d, *J* = 8.6 Hz, 1H, ArH), 8.17 (d, *J* = 8.5 Hz, 2H, ArH), 8.22 (d, *J* = 9.1 Hz, 1H, ArH), 8.52 (d, *J* = 7.9 Hz, 1H, ArH), 9.12 (d, *J* = 8.6 Hz, 1H, ArH) . ppm; ^{13}C NMR (151 MHz, $CDCl_3$) δ = 14.5, 37.9, 109.6, 114.3, 114.5, 118.7, 120.1, 121.9, 123.5, 124.0, 124.7, 128.6, 128.7, 129.0, 131.9, 135.0, 137.2, 138.5, 139.3, 144.8 ppm; HRMS (ESI) m/z: calcd. for $C_{21}H_{17}NO_2$[M + H+]: 316.1332, found 316.1336.

6-(3,4-Dimethoxyphenyl)-[1,3]dioxolo[4,5-*g*]quinoline (**26b**): Yield = 69%, (0.136 g from 0.10 g) as a yellow solid; m.p; 160-162 ^oC; R_f = 0.5 (hexane/EtOAc, 70:30, v/v); IR (KBr): v_{max} $(cm)^{-1}$ = 1595 (C=N); ^1H NMR (600 MHz, $CDCl_3$) δ = 3.95 (d, *J* = 1.8 Hz, 3H, -OCH_3), 4.03 (d, *J*= 1.2 Hz, 3H, -OCH_3), 6.10 (d, *J* = 1.8 Hz, 2H, -OCH_2O-), 6.95-6.98 (m, 1H, ArH), 7.05 (d, *J* = 1.8 Hz, 1H, ArH), 7.44 (s, 1H, ArH), 7.59-7.61 (m, 1H, ArH), 7.79 (s, 1H, ArH), 7.98 (d, *J* = 6.6 Hz, 1H, ArH) ppm; ^{13}C NMR (151 MHz, $CDCl_3$) δ = 56.1, 101.9, 102.7, 106.2, 110.5, 111.2, 117.0, 120.0, 123.9, 132.9, 135,7, 146.6, 147.6, 149.6, 150.2, 150.9, 155.0 ppm; HRMS (ESI) m/z: calcd. for $C_{18}H_{15}NO_4$ [M + H$^+$]: 310.1074, found: 310.1079.

6-(Naphthalen-1-yl)-[1,3]dioxolo[4,5-g]quinoline (27b) Yield = 67% (0.147 g from 0.100 g) as a brown solid; m.p 142-144 ^oC; R_f = 0.55 (hexane/EtOAc, 80:20, v/v); IR (neat): vmax (cm)-1 = 1613 (C=N); ^{1}HNMR (600 MHz, $CDCl_3$) δ = 6.14 (s, 2H, -OCH_2O), 7.15 (s, 1H, ArH), 7.45-

7.47 (m, 1H, ArH), 7.49– 7.52 (m, 2H, ArH), 7.55 (d, *J* = 8.3 Hz, 1H, ArH), 7.57-7.59 (m, 1H, ArH), 7.92(d, J = 4.3Hz, 1H, ArH), 7.93(d, J = 5.0Hz, 1H, ArH), 8.09 (d, J = 8.3Hz, 1H, ArH), 8.12 (d, J = 8.5Hz, 1H, ArH) . ppm; ^{13}CNMR (151 MHz, $CDCl_3$) δ = 101.9, 102.7, 106.3, 121.7, 124.1, 125.5, 125.9, 126.0, 126.6, 127.7, 128.5, 129.0, 131.4, 134.1, 135.2, 138.9, 146.5, 148.1, 151.1, 157.3 ppm; HRMS (ESI) m/z: calcd. for $C_{20}H_{13}NO_2$[M + H+]:300.1019, found 300.1023.

7-(3,4-Dimethoxyphenyl)-2,3-dihydro-[1,4]dioxino[2,3-*g*]quinoline (**26c**): Yield = 43% (0.103 g from 0.10 g) as a light yellow solid; m.p. 128-130 ^{o}C; R_f = 0.67 (hexane/EtOAc, 70:30, v/v); IR (neat): vmax $(cm)^{-1}$ = 1618 (C=N); ^{1}H NMR (600 MHz, $CDCl_3$) δ = 3.95 (s, 3H, -OC*H*$_3$), 4.04 (s, 3H, -OC*H*$_3$), 4.38 (d, *J* = 2.6 Hz, 4H, -OC*H*$_2$C*H*$_2$O-), 6.98 (d, *J* = 8.3 Hz, 1H, ArH), 7.19 (s, 1H, ArH), 7.62 – 7.58 (m, 2H, ArH), 7.67 (d, *J* = 8.6 Hz, 1H, ArH), 7.81 (s, 1H, ArH), 7.98 (d, *J* = 8.6 Hz, 1H, ArH) ppm; ^{13}C NMR (151 MHz, $CDCl_3$) δ = 56.1, 64.5, 110.4, 111.1, 111.7, 114.4, 117.2, 120.0, 123.0, 133.0, 135.2, 144.1, 144.8, 147.1, 149.4, 150.2, 155.5 ppm; HRMS (ESI) m/z: calcd. for $C_{19}H_{17}NO_4$ [M + H+]: 324.1230, found 324.1234.

2-(3,4-Dimethoxyphenyl)-5,7-dimethoxyquinoline (26d): Yield = 47% (0.068 g from 0.10 g) as a light yellow solid; m.p. 138-140 ^{o}C; R_f = 0.56 (hexane/EtOAc, 90:10, v/v); IR (neat): ν_{max} $(cm)^{-1}$ = 1619 (C=N); ^{1}H NMR (600 MHz, $CDCl_3$) *δ* = 3.96 (s, 3H, -OC*H*$_3$), 3.97 (s, 3H, -OC*H*$_3$), 3.98 (s, 3H, -OC*H*$_3$), 4.05 (s, 3H, -OC*H*$_3$), 6.49 (d, *J* = 2.2 Hz, 1H, ArH), 6.99 (d, *J* = 8.3 Hz, 1H, ArH), 7.10 (d, *J* = 2.3 Hz, 1H, ArH), 7.64 (d, *J* = 2.0 Hz, 1H, ArH), 7.66 (d, *J* = 8.8 Hz, 1H, ArH), 7.83 (d, *J* = 2.1 Hz, 1H, ArH), 8.45 (d, *J* = 8.6 Hz, 1H, ArH) ppm; ^{13}C NMR (151 MHz, $CDCl_3$) *δ* = 55.7, 55.8, 56.1, 56.1, 97.9, 100.0, 110.5, 111.2, 115.4, 115.6, 120.3, 131.4, 132.8, 149.4, 150.4, 150.5, 156.1, 157.2, 161.2 ppm; HRMS (ESI) *m/z*: calcd. for $C_{19}H_{19}NO_4$ [M + H^+]: 326.1387, found 326.1391.

2-(3,4-Dimethoxyphenyl)-5,8-dimethoxyquinoline (**26e**), Yield = 24% (0.034 g from 0.10 g) as a brown oily; R_f = 0.56 (hexane/EtOAc, 90:10, v/v); IR (neat): ν_{max} $(cm)^{-1}$ = 1624 (C=N); ^{1}H NMR (600 MHz, $CDCl_3$) *δ* = 3.94 (s, 3H, -OC*H*$_3$), 3.96 (s, 3H, -OC*H*$_3$), 4.04 (s, 3H, -OC*H*$_3$), 4.06 (s, 3H, -OC*H*$_3$), 6.72 (d, *J* = 8.4 Hz, 1H, ArH), 6.95 (d, *J* = 8.4 Hz, 1H, ArH), 6.97 (d, *J* = 8.4 Hz, 1H, ArH), 7.69 (dd, J_1 = 8.3 Hz, J_2 = 2.1 Hz, 1H, ArH), 7.86 (d, *J* = 8.9 Hz, 2H, ArH), 8.56 (d, *J* = 8.8 Hz, 1H, ArH) ppm; ^{13}C NMR (151 MHz, $CDCl_3$) *δ* = 55.8, 56.0, 56.1, 56.2, 103.4, 110.2, 110.7, 111.1, 118.3, 120.3, 120.6, 131.7, 132.7, 140.5, 148.9, 149.4, 149.6, 150.4, 156.3 ppm; HRMS (ESI) *m/z*: calcd. for $C_{19}H_{19}NO_4$ [M + H^+]: 326.1387, found 326.1391.

2-Phenylbenzo[*h*]quinoline (**15g**), Yield **=** 45% (0.08 g from 0.10 g) as a brown solid; m.p. 64-66 ^{o}C; R_f = 0.69 (hexane/EtOAc, 95:5, v/v); IR (neat): ν_{max} (cm)$^{-1}$ = 1600 (C=N); ^{1}H NMR (600 MHz, $CDCl_3$) δ = 7.46 – 7.40 (m, 1H, ArH), 7.57 (t, *J* = 7.7 Hz, 2H, ArH), 7.70 – 7.72 (m, 2H, ArH), 7.75 – 7.77 (m, 1H, ArH), 7.80 (d, *J* = 8.7 Hz, 1H, ArH), 7.92 (d, *J* = 7.9 Hz, 1H, ArH), 8.02 (d, *J* = 8.3 Hz, 1H, ArH), 8.24 (d, *J* = 8.3 Hz, 1H, ArH), 8.36 (d, *J* = 7.1 Hz, 2H, ArH), 9.51 (d, *J* = 8.1 Hz, 1H) ppm; ^{13}C NMR (151 MHz, $CDCl_3$) δ = 119.0, 124.9, 125.2, 125.3, 127.0, 127.3, 127.6, 127.9, 128.3, 128.8, 129.0, 129.3, 131.0, 134.0, 136.7, 139.9, 146.4, 155.7 ppm; HRMS (ESI) *m/z*: calcd. for $C_{19}H_{13}N$ [M + H^{+}]: 256.1121, found 256.1125.

2-(4-Bromophenyl)benzo[*h*]quinoline (**16g**), Yield **=** 60% (0.08 g from 0.10 g) as a brown solid; m.p.96-98 ^{o}C; R_f = 0.77 (hexane/EtOAc, 95:5, v/v); IR (neat): ν_{max} (cm)$^{-1}$ = 1631 (C=N); ^{1}H NMR (600 MHz, $CDCl_3$) δ = 7.69 (t, *J* = 8.4 Hz, 3H, ArH), 7.72 (d, *J* = 6.5 Hz, 1H, ArH), 7.76 (t, *J* = 6.8 Hz, 1H ArH), 7.81 (d, *J* = 8.8 Hz, 1H, ArH), 7.92 (d, *J* = 7.8 Hz, 1H, ArH), 7.97 (d, *J* = 8.3 Hz, 1H, ArH), 8.22 (d, *J* = 8.5 Hz, 3H, ArH), 9.45 (d, *J* = 8.1 Hz, 1H, ArH) ppm; ^{13}C NMR (151 MHz, $CDCl_3$) δ = 118.6, 123.8, 124.7, 125.0, 125.8, 125.4, 127.9, 129.0, 129.2, 131.8, 132.0, 132.1, 134.0, 136.7, 136.9, 138.8, 146.4, 154.4 ppm; HRMS (ESI) *m/z*: calcd. for $C_{19}H_{12}BrN$ [M + H^{+}]: 334.0226, found: 334.0230.

2-(4-Chlorophenyl)benzo[*h*]quinoline (**17g**), Yield **=** 48% (0.096 g from 0.10 g) as a brown solid; m.p. 100-102 ^{o}C; R_f = 0.76 (hexane/EtOAc, 95:5, v/v); IR (neat): ν_{max} (cm)$^{-1}$ = 1632 (C=N); ^{1}H NMR (600 MHz, $CDCl_3$) δ = 7.53 (d, *J* = 8.5 Hz, 2H, ArH), 7.71 (t, *J* = 8.8 Hz, 2H, ArH), 7.76 (t, *J* = 7.6 Hz, 1H, ArH), 7.81 (d, *J* = 8.8 Hz, 1H, ArH), 7.92 (d, *J* = 7.9 Hz, 1H, ArH), 7.97 (d, *J* = 8.3 Hz, 1H, ArH), 8.23 (d, *J* = 8.3 Hz, 1H, ArH), 8.29 (d, *J* = 8.5 Hz, 2H, ArH), 9.46 (d, *J* = 8.1 Hz, 1H, ArH) ppm; ^{13}C NMR (151 MHz, $CDCl_3$) δ = 118.6, 124.8, 125.1, 125.4, 127.1, 127.8, 128.0, 128.4, 128.7, 129.1, 131.8, 134.0, 135.5, 136.7, 136.8, 138.3, 146.4, 154.3 ppm; HRMS (ESI) *m/z*: calcd. for $C_{19}H_{12}ClN$ [M + H^{+}]: 290.0731, found 290.0736.

2-(4-Fluorophenyl)benzo[*h*]quinoline (**18g**), Yield **=** 50% (0.096 g from 0.10 g) as an off white solid; m.p. 98-100 ^{o}C; R_f = 0.66 (hexane/EtOAc, 95:5, v/v); IR (neat): ν_{max} (cm)$^{-1}$ = 1623 (C=N); ^{1}H NMR (600 MHz, $CDCl_3$) δ = 7.24 (d, *J* = 8.6 Hz, 2H, ArH), 7.71 (t, *J* = 8.0 Hz, 2H, ArH), 7.76 (t, *J* = 6.8 Hz, 2H, ArH), 7.80 (d, *J* = 8.7 Hz, 1H, ArH), 7.92 (d, *J* = 7.2 Hz, 1H, ArH), 7.97 (d, *J* = 8.3 Hz, 1H, ArH), 8.23 (d, *J* = 8.3 Hz, 1H, ArH), 8.33 (d, *J* = 5.5 Hz, 1H, ArH), 8.35 (d, *J* = 5.5 Hz, 1H, ArH), 9.46 (d, *J* = 8.1 Hz, 1H, ArH) ppm; ^{13}CNMR (151 MHz, $CDCl_3$) δ = 115.8, 115.9 ($J_{C,F}$ = 21.5 Hz), 118.6, 124.8, 125.2, 127.0 127.6, 127.9, 128.4, 129.3, 129.4 ($J_{C,F}$ = 8.4 Hz), 131.8,

134.0, 136.0, 136.8, 146.3, 154.6, 163.1, 164.7 ($J_{C,F}$ = 247.3 Hz) ppm; HRMS (ESI) *m/z*: calcd. for $C_{19}H_{12}FN$ [M + H^+]: 274.1027, found 274.1032.

2-(4-Methoxyphenyl)benzo[*h*]quinoline (**19g**), Yield **=** 40% (0.080 g from 0.10 g) as off white solid; m.p.116-118 ^oC; R_f = 0.52 (hexane/EtOAc, 95:5, v/v); IR (neat): ν_{max} $(cm)^{-1}$ = 1590 (C=N); ^1H NMR (600 MHz, $CDCl_3$) δ = 3.92 (s, 3H, -OCH_3), 7.09 (d, *J* = 8.8 Hz, 2H, ArH), 7.69 (t, *J* = 7.4 Hz, 2H, ArH), 7.75 (t, *J* = 6.8 Hz, 1H, ArH), 7.78 (d, *J* = 8.7 Hz, 1H, ArH), 7.91 (d, *J* = 6.5 Hz, 1H, ArH), 7.96 (d, *J* = 8.4 Hz, 1H, ArH), 8.20 (d, *J* = 8.3 Hz, 1H, ArH), 8.32 (d, *J* = 8.7 Hz, 2H, ArH), 9.49 (d, *J* = 8.1 Hz, 1H, ArH) ppm; ^{13}C NMR (151 MHz, $CDCl_3$) δ = 55.5, 114.3, 118.4, 124.8, 125.3, 126.9, 127.1, 127.9, 128.2, 128.9, 131.9, 132.6, 134.0, 136.5, 146.3, 153.3, 160.9 ppm; HRMS (ESI) *m/z*: calcd. for $C_{20}H_{15}NO$ [M + H^+]: 286.1226, found 286.1230.

2-([1,1'-Biphenyl]-4-yl)benzo[*h*]quinoline (22g). Yield = 66% (0.090 g from 0.10 g) as a yellow solid; m.p. 138-140 ^oC; Rf = 0.71 (hexane/EtOAc, 80:20, v/v); IR (neat): vmax $(cm)^{-1}$ = 1635 (C=N); ^1H NMR (600 MHz, CHLOROFORM-*D*) δ = 7.41 (t, *J* = 7.4 Hz, 1H, ArH), 7.50 (t, *J* = 7.6 Hz, 2H, ArH), 7.71 – 7.74 (m, 4H, ArH), 7.77 (d, *J* = 8.2 Hz, 1H, ArH), 7.79 – 7.82 (m, 3H, ArH), 7.93 (d, *J* = 7.8 Hz, 1H, ArH), 8.06 (d, *J* = 8.2 Hz, 1H, ArH), 8.24 (d, *J* = 8.2 Hz, 1H, ArH), 8.44 (d, *J* = 8.1 Hz, 2H, ArH), 9.54 (d, *J* = 8.1 Hz, 1H, ArH) ppm; ^{13}C NMR (150 MHz, CHLOROFORM-*D*) δ 118.9, 124.9, 125.2, 125.3, 127.0, 127.3, 127.6, 127.7, 127.9, 128.0, 128.3, 129.0, 132.0, 134.0, 136.7, 138.8, 140.8, 142.1, 146.4, 155.2 ppm; HRMS (ESI) m/z: calcd. for $C_{25}H_{17}N$ [M+H^+]: 332.1434; found 332.1438**.**

2-(3,4-Dichlorophenyl)benzo[*h*]quinoline (25g). Yield = 56% (0.077 g from 0.10 g) as a light brown solid; m.p. 145-147 ^oC; R_f = 0.48 (hexane/EtOAc, 80:20, v/v); IR (neat): ν_{max} $(cm)^{-1}$ = 1624 (C=N); ^1H NMR (600 MHz, $CDCl_3$) δ = 7.61 (d, J = 8.3 Hz, 1H, ArH), 7.70 (d, J = 8.7 Hz, 1H, ArH), 7.73 (d, J = 6.6 Hz, 1H, ArH), 7.76 – 7.80 (m, 1H, ArH), 7.82 (d, J = 8.7 Hz, 1H, ArH), 7.91 – 7.94 (m, 1H, ArH), 7.95 (d, 1H, ArH), 8.14 (dd, J = 8.3, 2.2 Hz, 1H, ArH), 8.24 (d, J = 8.3 Hz, 1H, ArH), 8.46 (d, J = 2.1 Hz, 1H, ArH), 9.44 (d, J = 8.2 Hz, 1H, ArH) ppm; ^{13}C NMR (150 MHz, $CDCl_3$) δ = 118.5, 124.8, 125.1, 125.7, 126.5, 127.3, 128.0, 128.2, 128.6, 129.4, 130.8, 131.7, 133.2, 133.5, 134.1, 136.9, 139.8, 146.4, 153.0 ppm; HRMS (ESI) m/z: calcd. for $C_{19}H_{11}Cl_2N$ [M+H^+]: 324.0341; found 324.0345**.**

2-(3,4-Dimethoxyphenyl)benzo[*h*]quinoline (**26g**), Yield = 54% (0.080 g from 0.10 g) as a yellow solid; m.p. 110-112 ^oC; R_f = 0.43 (hexane/EtOAc, 90:10, v/v); IR (neat): ν_{max} $(cm)^{-1}$ = 1590 (C=N); ^1H NMR (600 MHz, $CDCl_3$) δ = 3.99 (s, 3H, -OCH_3), 4.11 (s, 3H, OCH_3), 7.04 (d, *J* =

8.3 Hz, 1H, ArH), 7.70 (t, *J* = 8.1 Hz, 2H, ArH), 7.75 (t, *J* = 6.8 Hz, 1H, ArH), 7.78 (d, *J* = 8.8 Hz, 1H, ArH), 7.82 (dd, J_1 = 8.3, J_2 = 2.1 Hz, 1H, ArH), 7.92 (d, *J* = 7.8 Hz, 1H, ArH), 7.97 (d, *J* = 8.3 Hz, 1H, ArH), 8.07 (s, 1H, ArH), 8.20 (d, *J* = 8.3 Hz, 1H, ArH), 9.46 (d, *J* = 8.2 Hz, 1H) ppm; ^{13}C NMR (151 MHz, $CDCl_3$) δ = 56.2, 110.6, 111.3, 118.6, 120.2, 124.7, 125.0, 125.2, 127.0, 127.2, 127.9, 128.2, 131.9, 132.9, 134.1, 136.6, 146.2, 149.5, 150.5, 155.3 ppm; HRMS (ESI) *m/z*: calcd. for $C_{21}H_{17}NO_2$ [M + H^+]: 316.1332, found 316.1336.

2-(4-Chlorophenyl)-10-ethyl-5*a*,10*a*-dihydro-10*H*-pyrido[2,3-*b*]carbazole (**17h**), Yield = 33% (0.031 g from 0.05 g) as a yellow solid; m.p. 182-184 ^{o}C; R_f = 0.68 (hexane/EtOAc, 90:10, v/v); IR (neat): vmax (cm)-1 = 1629 (C=N); ^{1}H NMR (600 MHz, $CDCl_3$) δ = 1.52 (t, *J* = 7.3 Hz, 3H, -NCH_2CH_3), 4.54 (q, *J* = 7.3 Hz, 2H, -NCH_2CH_3), 7.41 (t, *J* = 7.5 Hz, 1H, ArH), 7.51 (d, *J* = 8.2 Hz, 2H, ArH), 7.54 (t, J=7.6Hz, 1H, ArH), 7.60 (d, *J* = 8.2 Hz, 1H, ArH), 7.90 (d, *J* = 9.1 Hz, 1H, ArH), 8.02 (d, *J* = 8.6 Hz, 1H, ArH), 8.17 (d, *J* = 8.5 Hz, 2H, ArH), 8.22 (d, *J* = 9.1 Hz, 1H, ArH), 8.52 (d, *J* = 7.9 Hz, 1H, ArH), 9.12 (d, *J* = 8.6 Hz, 1H, ArH) . ppm; ^{13}C NMR (151 MHz, $CDCl_3$) δ = 14.5, 37.9, 109.6, 114.3, 114.5, 118.7, 120.1, 121.9, 123.5, 124.0, 124.7, 128.6, 128.7, 129.0, 131.9, 135.0, 137.2, 138.5, 139.3, 144.8 ppm; HRMS (ESI) m/z: calcd. for $C_{23}H_{19}ClN_2$ [M + H+]:357.1153, found 357.1158.

7-Ethyl-3-(4-fluorophenyl)-7*H*-pyrido[2,3-*c*]carbazole (**18h**), Yield **=** 42% (0.068 g from 0.10 g) as a yellow solid; m.p. 188-190 ^{o}C; R_f = 0.69 (hexane/EtOAc, 90:10, v/v); IR (neat): ν_{max} $(cm)^{-1}$ = 1627 (C=N); ^{1}H NMR (600 MHz, $CDCl_3$) δ = 1.53 (t, *J* = 7.3 Hz, 3H, -NCH_2CH_3), 4.55 (q, *J* = 7.3 Hz, 2H, -NCH_2CH_3), 7.23 (t, *J* = 8.6 Hz, 2H, ArH), 7.41 (t, *J* = 7.4 Hz, 1H, ArH), 7.54 (t, *J* = 7.6 Hz, 1H, ArH), 7.60 (d, *J* = 8.2 Hz, 1H, ArH), 7.91 (d, *J* = 9.0 Hz, 1H, ArH), 8.01 (d, *J* = 8.6 Hz, 1H, ArH), 8.23 – 8.20 (m, 3H, ArH), 8.53 (d, *J* = 7.9 Hz, 1H, ArH), 9.12 (d, *J* = 8.7 Hz, 1H, ArH) ppm; ^{13}C NMR (151 MHz, $CDCl_3$) δ = 14.6, 37.9, 109.7, 114.3, 114.5, 115.8, 115.9 ($J_{C,F}$ = 21.4 Hz), 118.8, 120.1, 121.7, 121.9, 123.5, 123.9, 124.8, 128.6, 129.1, 129.2 ($J_{C,F}$ = 8.1 Hz), 132.0, 136.3, 137.2, 139.3, 144.8, 152.7, 162.8, 164.4 ($J_{C,F}$ = 246.5 Hz) ppm; HRMS (ESI) *m/z*: calcd. for $C_{23}H_{17}FN_2$ [M + H^+]: 341.1449, found 341.1445.

3-(3-Bromophenyl)-7-ethyl-7*H*-pyrido[2,3-*c*]carbazole (**24h**), Yield **=** 51% (0.043 g from 0.05 g) as a yellow solid; m.p. 142-144 ^{o}C; R_f = 0.53 (hexane/EtOAc, 80:20, v/v); IR (neat): ν_{max} $(cm)^{-1}$ = 1629 (C=N); ^{1}H NMR (600 MHz, $CDCl_3$) δ = 1.52 (t, *J* = 7.3 Hz, 3H, -NCH_2CH_3), 4.54 (q, *J* = 7.3 Hz, 2H, -NCH_2CH_3), 7.39 – 7.42 (m, 2H, ArH), 7.54 (t, *J* = 7.6 Hz, 1H, ArH), 7.59 (dd, J_1 = 13.7 Hz, J_2 = 8.2 Hz, 2H, ArH), 7.91 (d, *J* = 9.1 Hz, 1H, ArH), 8.01 (d, *J* = 8.7 Hz, 1H, ArH), 8.12

(d, *J* = 7.7 Hz, 1H, ArH), 8.23 (d, *J* = 9.1 Hz, 1H, ArH), 8.42 (s, 1H, ArH), 8.52 (d, *J* = 7.9 Hz, 1H, ArH), 9.12 (d, *J* = 8.8 Hz, 1H, ArH) ppm; ^{13}C NMR (151 MHz, $CDCl_3$) *δ* = 14.6, 37.9, 109.7, 114.4, 114.5, 118.9, 120.2, 121.9, 123.3, 123.5, 124.2, 124.8, 125.9, 128.7, 130.4, 130.4, 131.8, 132.0, 137.3, 139.3, 142.2, 144.8, 152.0 ppm; HRMS (ESI) *m/z*: calcd. for $C_{23}H_{17}BrN_2$ [M + H^+]: 401.0648, found 401.0644.

3-(6,7-Dimethoxyquinolin-2-yl)-9-ethyl-9*H*-carbazole (**28a**), Yield = 62% (0.078 g from 0.05 g) as a green solid; m.p. = 178-180 °C; R_f = 0.6 (hexane/EtOAc, 70:30, v/v); IR (neat): vmax (cm)-1 = 1591 (C=N); ^{1}H NMR (600 MHz, $CDCl_3$) δ = 1.47 (t, *J* = 7.3 Hz, 3H, -NCH_2CH_3), 4.04 (s, 3H, -OCH_3), 4.09 (s, 3H, -OCH_3), 4.41 (q, *J* = 7.3 Hz, 2H, -NCH_2CH_3), 7.07 (s, 1H, ArH), 7.28 (d, J = 7.4, 1H, ArH), 7.44 (d, *J* = 8.2 Hz, 1H, ArH), 7.50 (dd, *J* = 14.5, 7.8 Hz, 2H, ArH), 7.58 (s, 1H, ArH), 7.88 (d, *J* = 8.5 Hz, 1H, ArH), 8.06 (d, *J* = 8.4 Hz, 1H, ArH), 8.23 (d, *J* = 7.7 Hz, 1H, ArH), 8.28 (d, *J* = 8.5 Hz, 1H, ArH), 8.89 (s, 1H, ArH) ppm; ^{13}C NMR (151 MHz, CHLOROFORM-D) δ = 13.9, 37.8, 56.1, 56.3, 105.2, 108.4, 108.7, 117.5, 119.2, 119.6, 120.8, 122.4, 123.5, 123.6, 125.3, 125.9, 131.0, 135.0, 140.6, 140.7, 145.4, 149.4, 152.6, 156.4· ppm; HRMS (ESI) m/z: calcd. for $C_{25}H_{22}N_2O_2$[M + H+]:383.1754, found 383.1759.

6-(9-Ethyl-9H-carbazol-3-yl)-[1,3]dioxolo[4,5-*g*]quinoline (**28b**), Yield = 56% (0.065g from 0.10 g) as a yellow solid; m.p. =178-180 °C; R_f = 0.69 (hexane/EtOAc, 90:10, v/v); IR (neat): vmax (cm)-1 = 1628 (C=N); ^{1}HNMR (600 MHz, $CDCl_3$) δ = 1.47 (t, J=7.2 Hz, 3H, -NCH_2CH_3), 4.42 (q, *J* = 7.3 Hz, 2H, -NCH_2CH_3), 6.11 (d, *J* = 1.6 Hz, 2H, -OCH_2O-), 7.08 (s, 1H, ArH), 7.28 (d, *J* = 7.4 Hz, 1H, ArH), 7.44 (d, *J* = 8.2 Hz, 1H, ArH), 7.52– 7.48 (m, 3H, ArH), 7.87 (d, *J* = 8.5 Hz, 1H, ArH), 8.03 (d, *J* = 8.3 Hz, 1H, ArH), 8.22 (d, *J* = 7.7 Hz, 1H, ArH), 8.28 (d, *J* = 8.5 Hz, 1H, ArH), 8.87 (s, 1H, ArH), . ppm; ^{13}CNMR (151 MHz, $CDCl_3$) δ = 14.0, 37.8, 76.9, 77.4, 101.7, 102.8, 106.2 108.8, 117.5, 119.3, 119.7, 120.9, 123.5, 123.6, 123.7, 125.4, 126.0, 130.9, 135.6, 140.6, 140.7, 140.7, 146.7, 147.4, 150.9, 156.3. ppm; HRMS (ESI) m/z: calcd. for $C_{24}H_{18}N_2O_2$[M + H+]:367.1441, found 367.1445.

2-(9-Ethyl-9*H*-carbazol-3-yl)benzo[*g*]quinoline (**28g**), Yield = 51% (0.065g from 0.10 g) as a dark yellow solid; m.p. 100-102 °C; R_f = 0.88 (hexane/EtOAc, 70:30, v/v); IR (neat): vmax (cm)-1 = 1625 (C=N); ^{1}H NMR (600 MHz, $CDCl_3$) δ = 1.50 (t, *J* = 7.3 Hz, 3H, -NCH_2CH_3), 4.45 (q, *J* = 7.3 Hz, 2H, -NCH_2CH_3), 7.31 (t, *J* = 7.3 Hz, 1H, ArH), 7.47 (d, *J* = 8.2 Hz, 1H, ArH), 7.53 – 7.51 (m, 1H, ArH), 7.58 (d, *J* = 8.5 Hz, 1H, ArH), 7.72 (s, 1H, ArH), 7.73 (s, 1H, ArH), 7.78 (s,

1H, ArH), 7.81 – 7.79 (m, 1H, ArH), 7.93 (dd, *J* = 7.9, 1.3 Hz, 1H, ArH), 8.16 (d, *J* = 8.3 Hz, 1H, ArH), ArH), 9.07 (d, *J* = 1.7 Hz, 1H, ArH), 9.59 (d, *J* = 9.4 Hz, 1H, ArH), ppm; ^{13}C NMR (151 MHz, $CDCl_3$) δ = 55.9, 55.9, 56.5, 103.9, 108.0, 118.2, 120.7, 129.0, 129.1, 132.1, 135.5, 138.2, 140.6, 148.9, 149.7, 155.4 ppm; HRMS (ESI) m/z: calcd. for $C_{27}H_{20}N_2$ [M + H^+]: 373.1699, found 373.1694.

3. ^{1}H and ^{13}C NMR Spectra of Synthesized Compounds

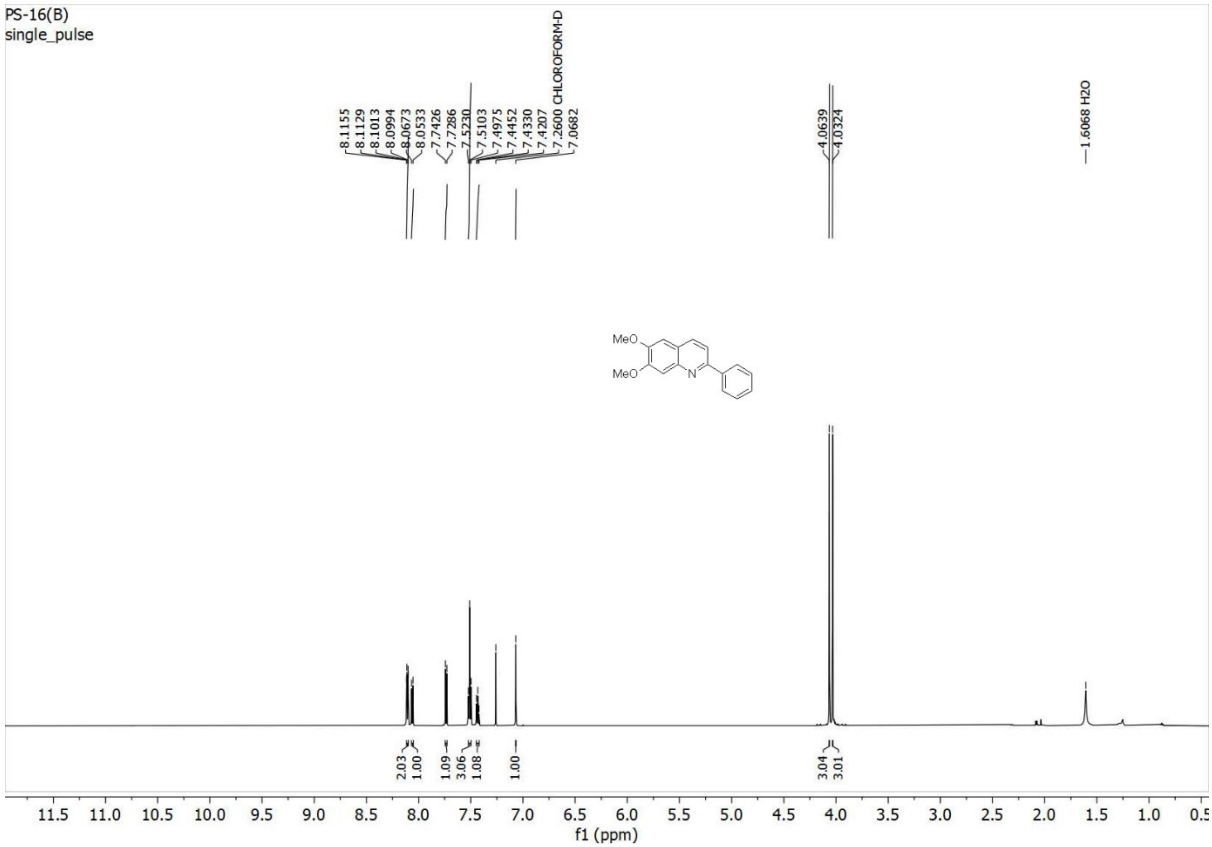


Figure S1. ^{1}H NMR Spectrum of **15a** in $CDCl_3$.

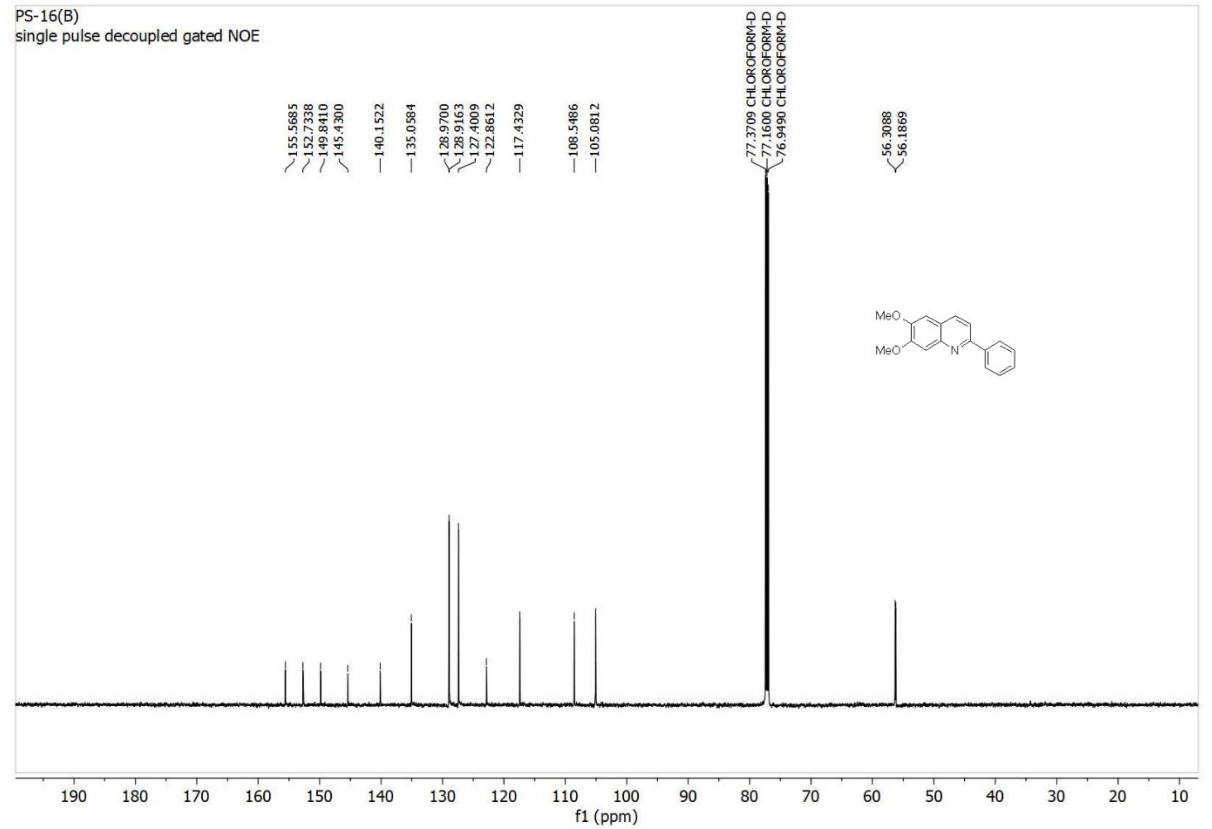


Figure S2. ^{13}C NMR Spectrum of **15a** in $CDCl_3$.

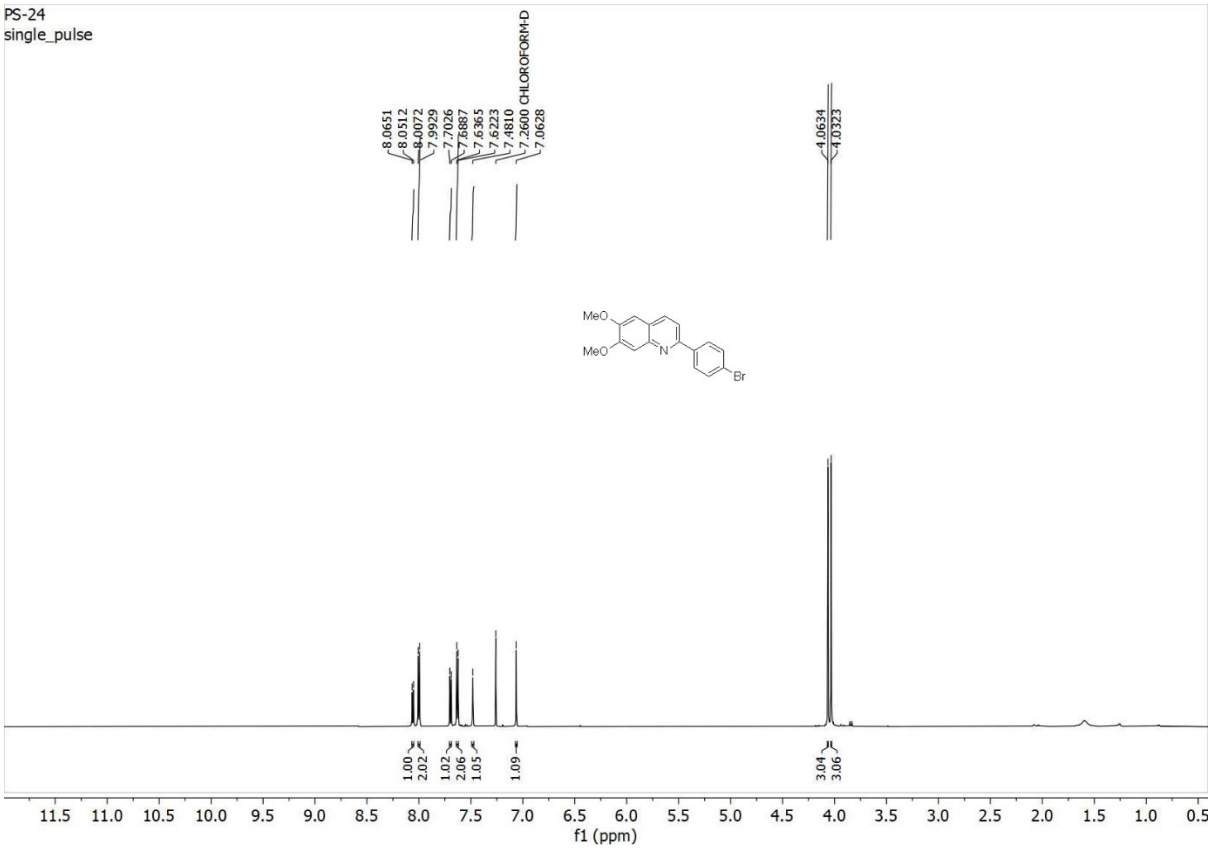


Figure S3. ^{1}H NMR Spectrum of **16a** in $CDCl_3$.

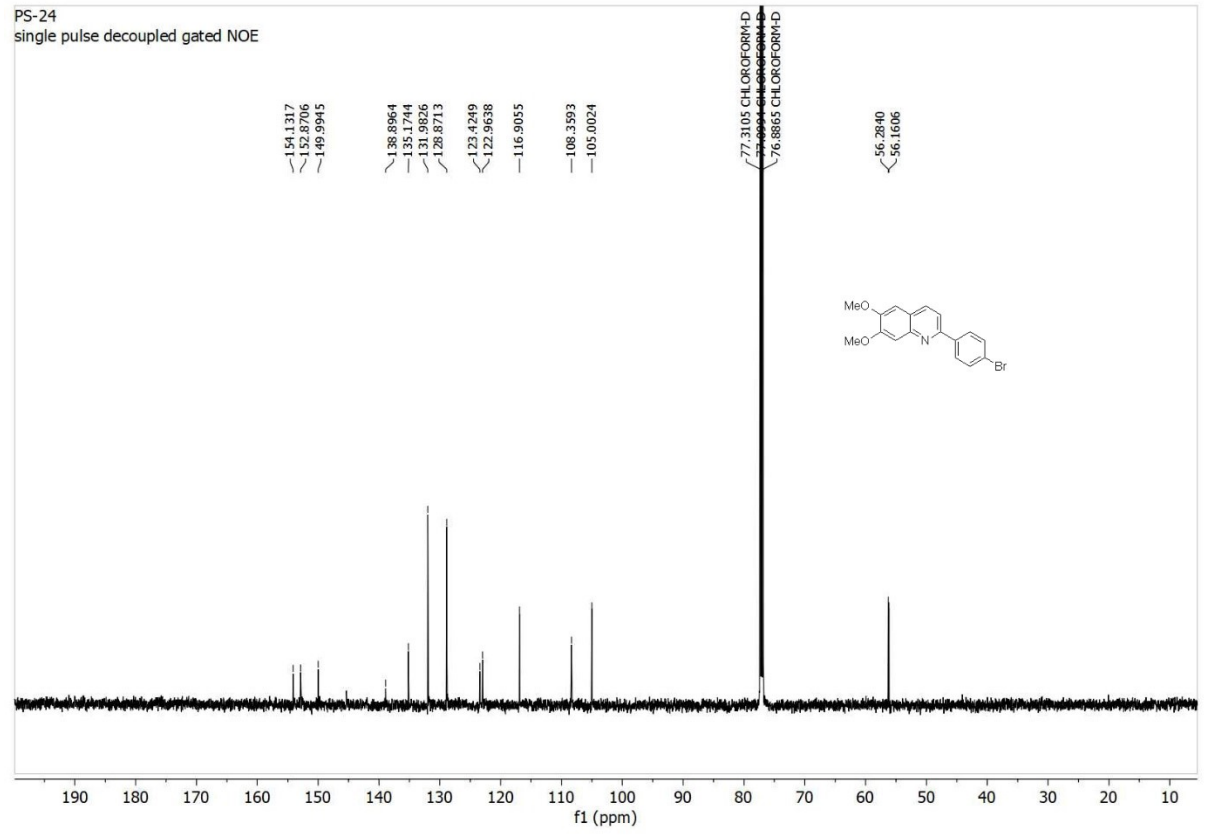


Figure S4. ^{13}C NMR Spectrum of **16a** in $CDCl_3$.

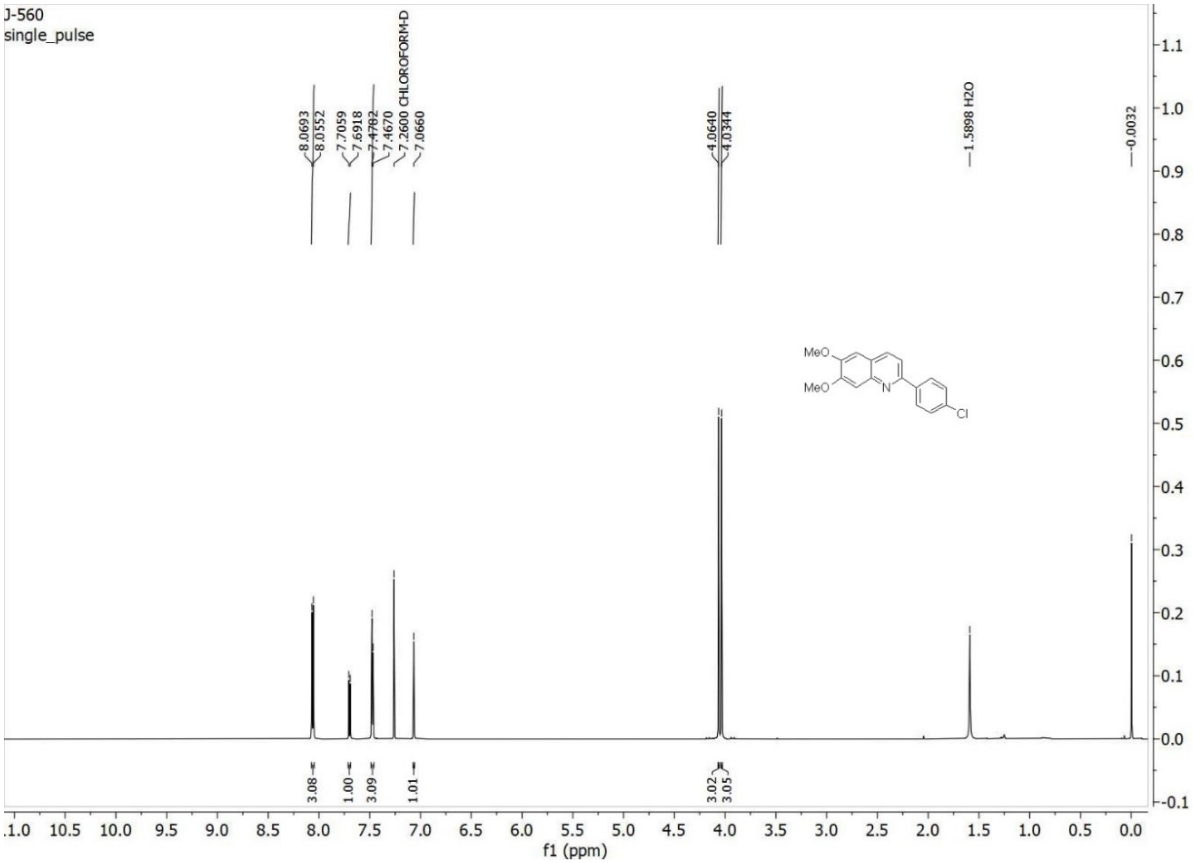


Figure S5. ^{1}H NMR Spectrum of **17a** in $CDCl_3$.

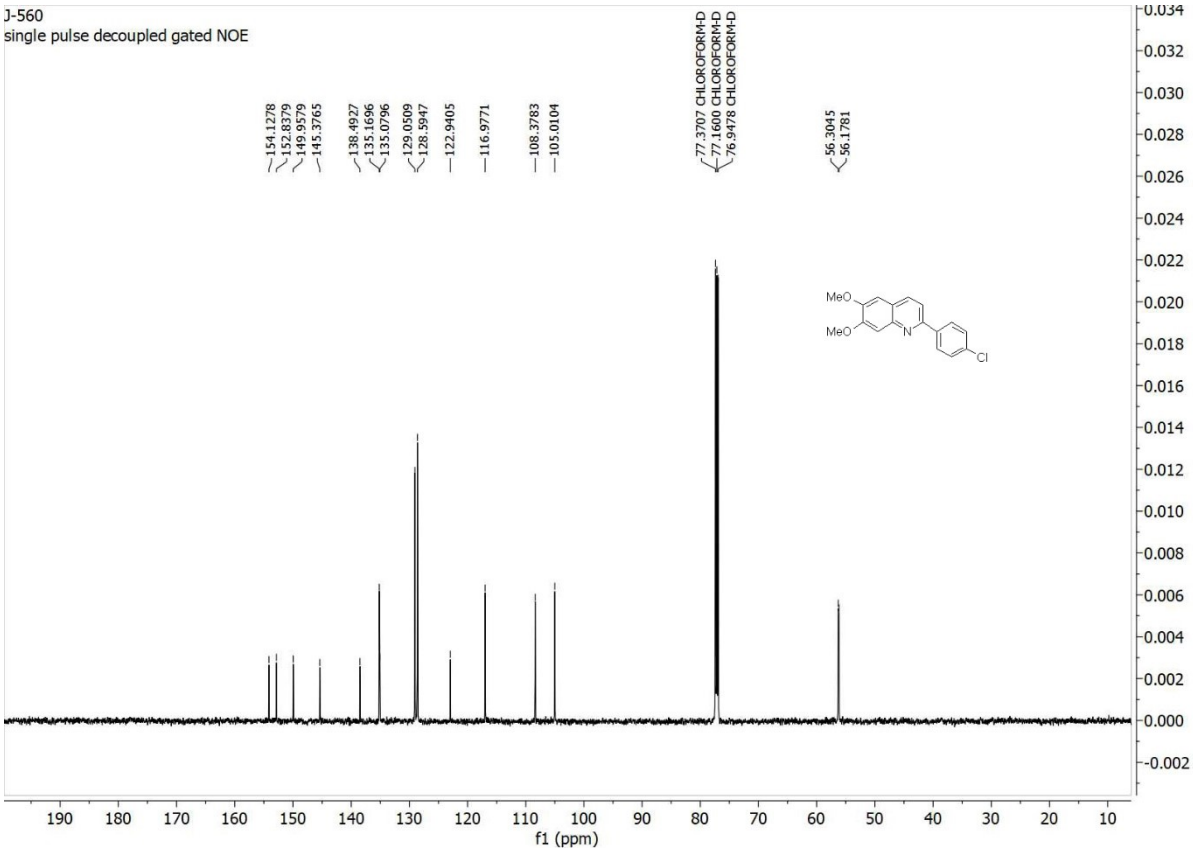


Figure S6. ^{13}C NMR Spectrum of **17a** in $CDCl_3$.

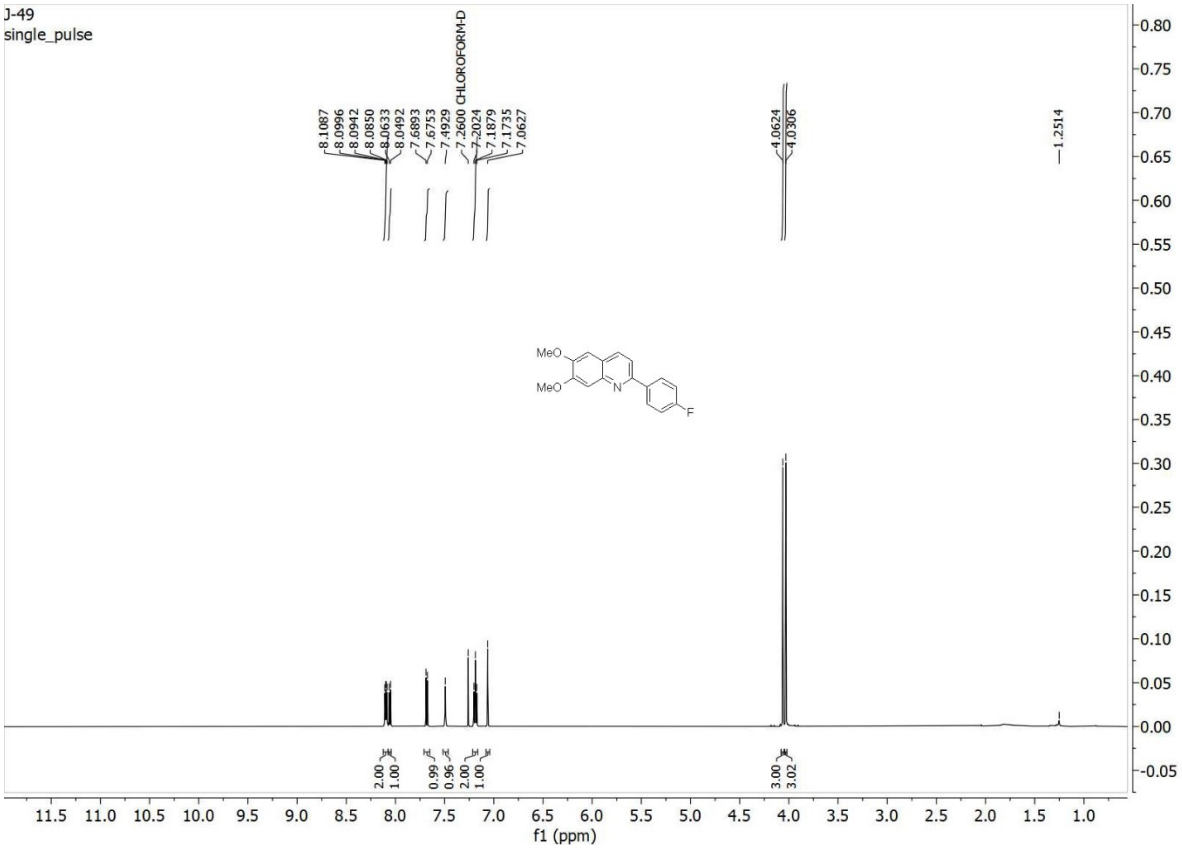


Figure S7. ^{1}H NMR Spectrum of **18a** in $CDCl_3$.

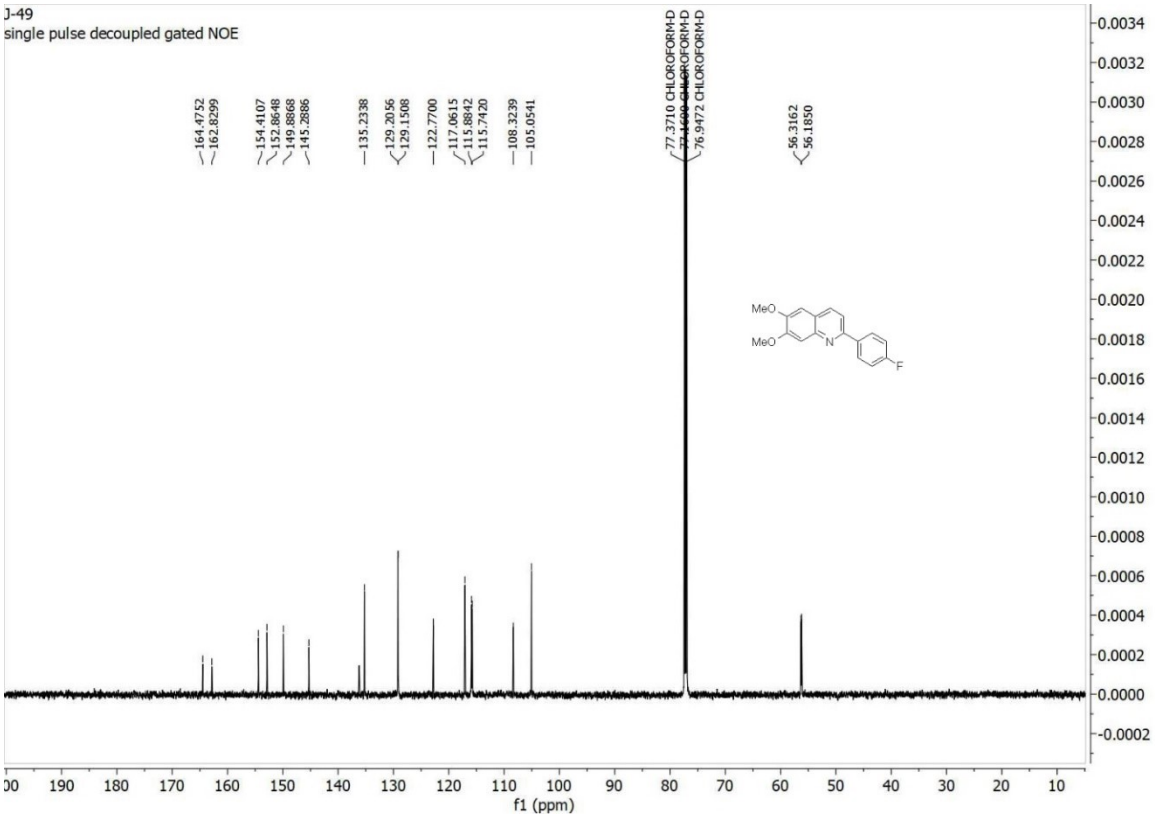


Figure S8. ^{13}C NMR Spectrum of **18a** in $CDCl_3$.

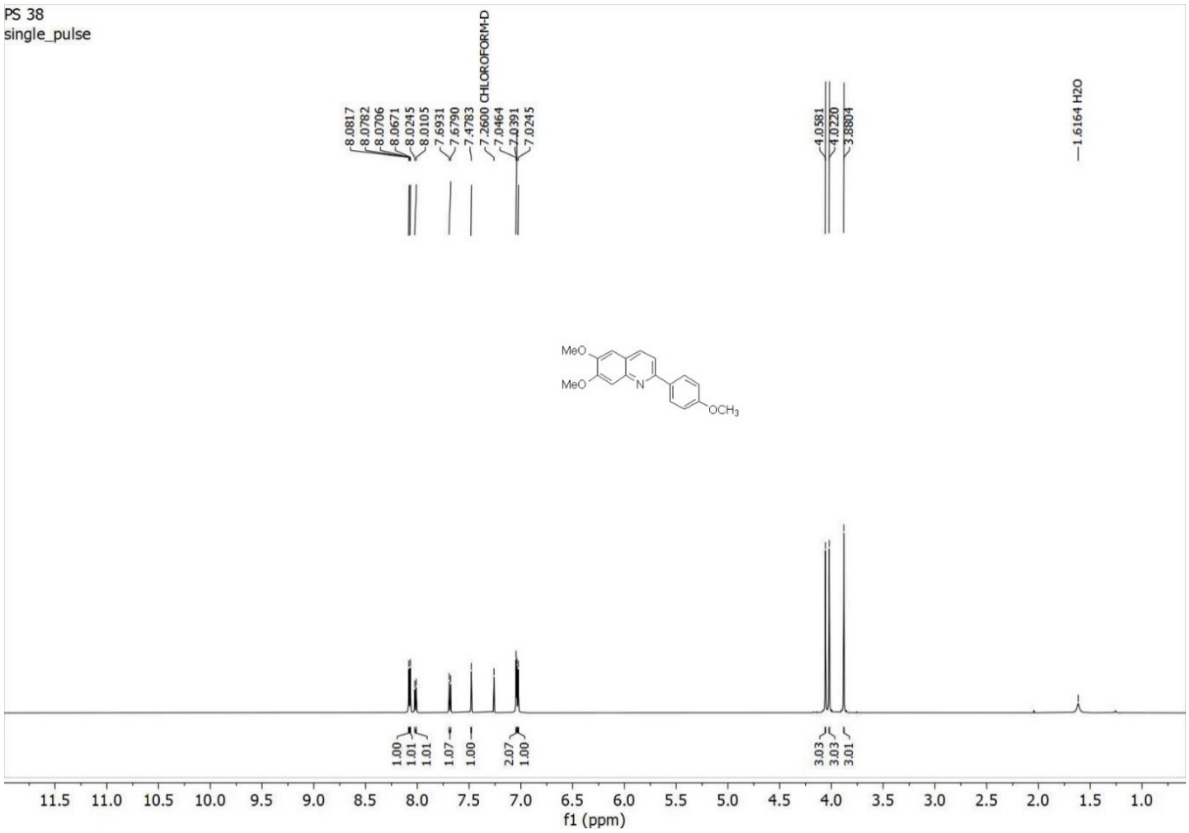


Figure S9. ^{1}H NMR Spectrum of **19a** in $CDCl_3$.

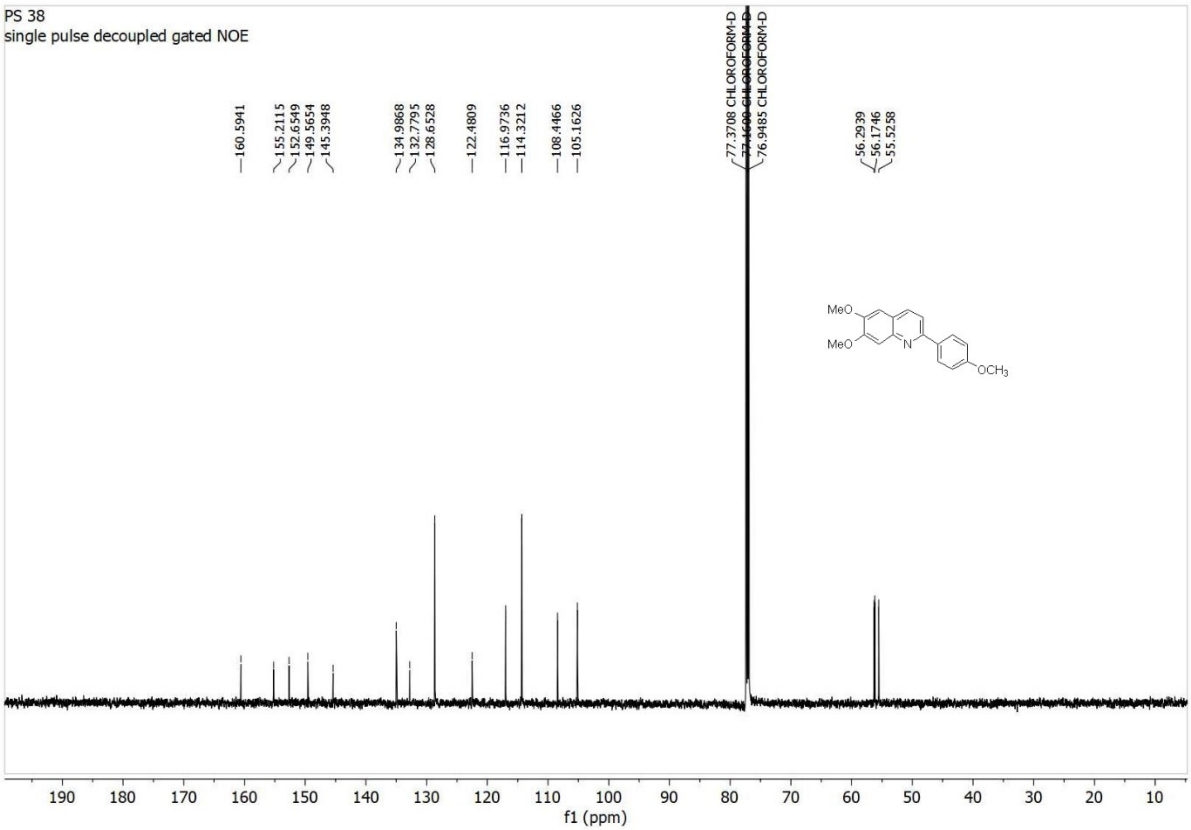


Figure S10. ^{13}C NMR Spectrum of **19a** in $CDCl_3$.

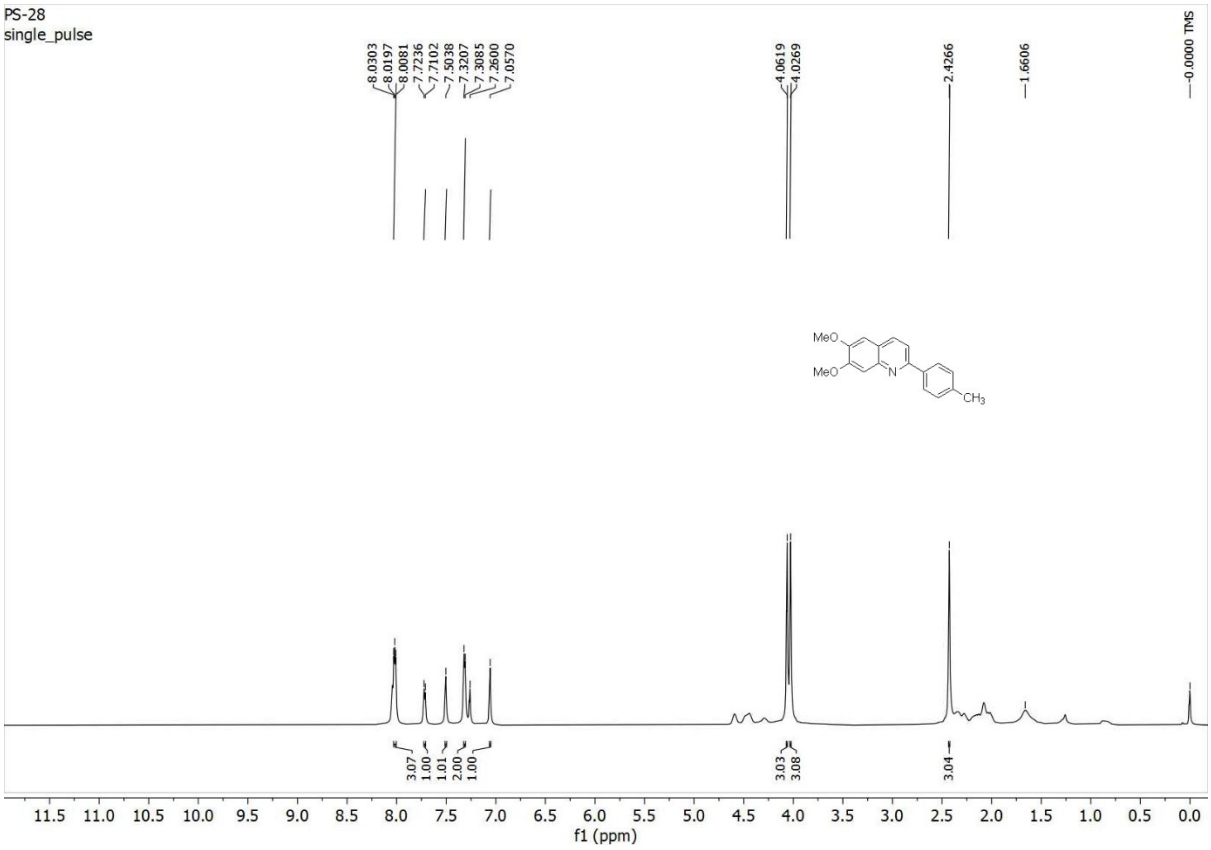


Figure S11. ^{1}H NMR Spectrum of **20a** in $CDCl_3$.

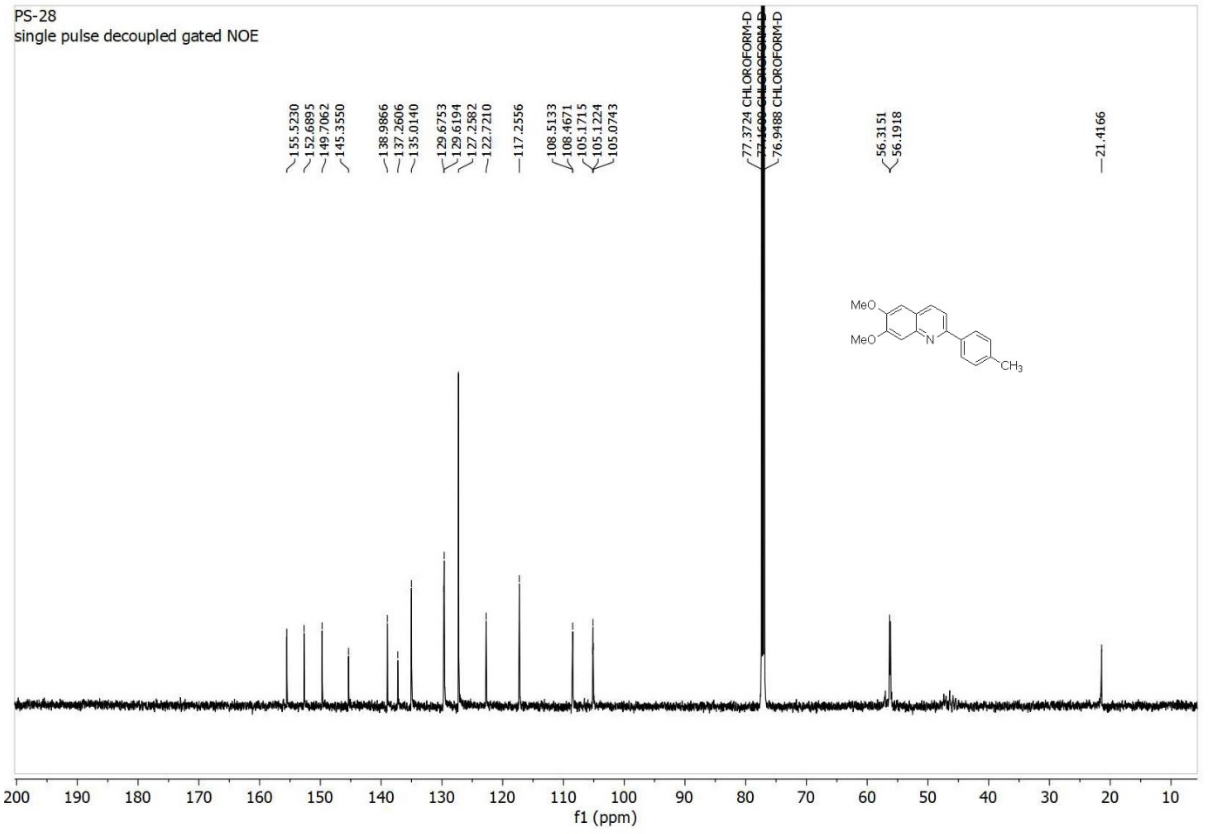


Figure S12. ^{13}C NMR Spectrum of **20a** in $CDCl_3$.

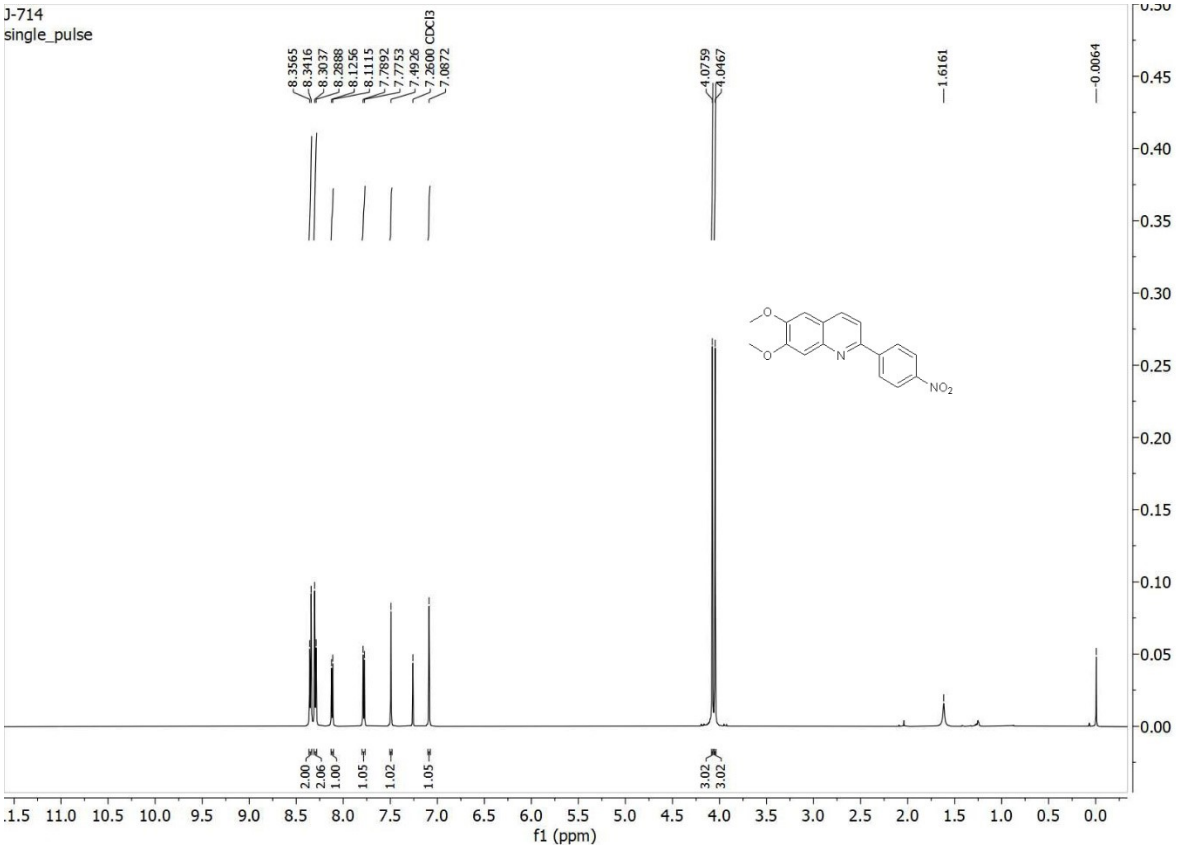


Figure S13. ^{1}H NMR Spectrum of **21a** in $CDCl_3$.

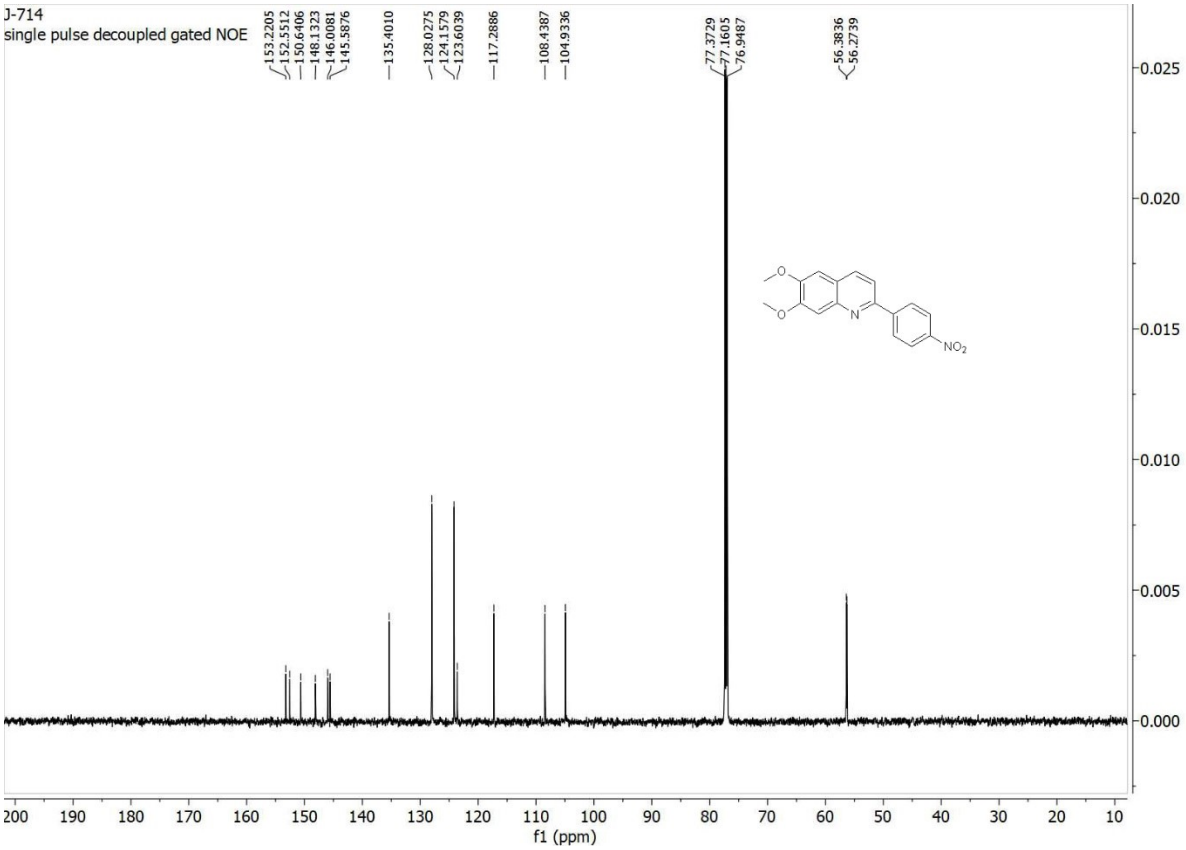


Figure S14. ^{13}C NMR Spectrum of **21a** in $CDCl_3$.

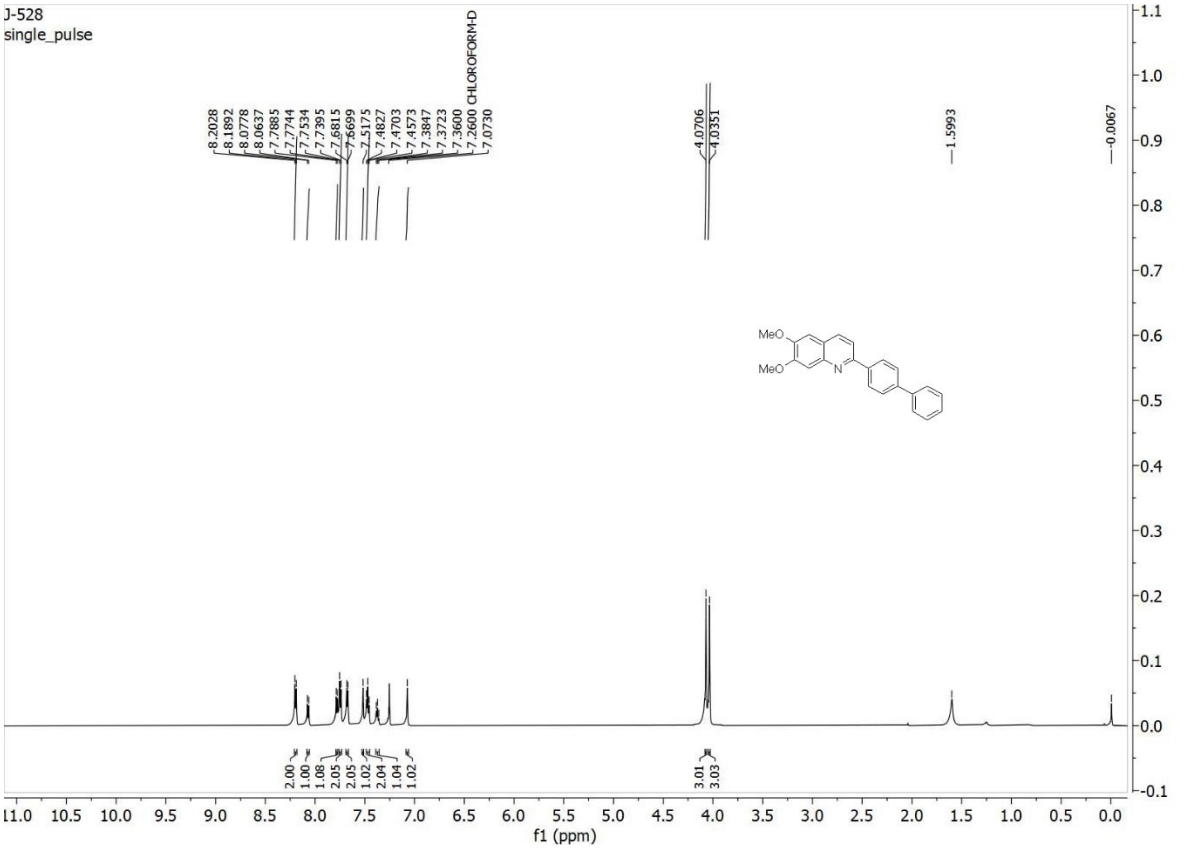


Figure S15. ^{1}H NMR Spectrum of **22a** in $CDCl_3$.

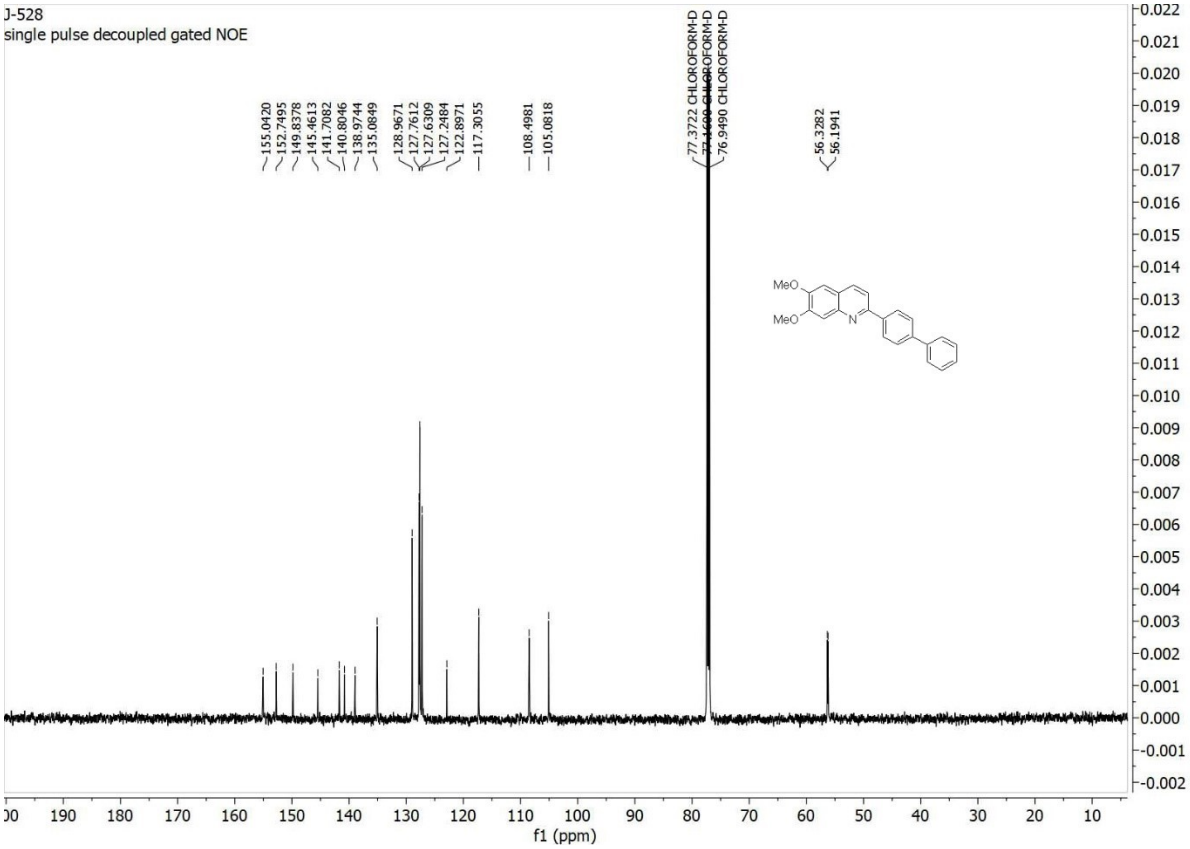


Figure S16. ^{1}H NMR Spectrum of **22a** in $CDCl_3$.

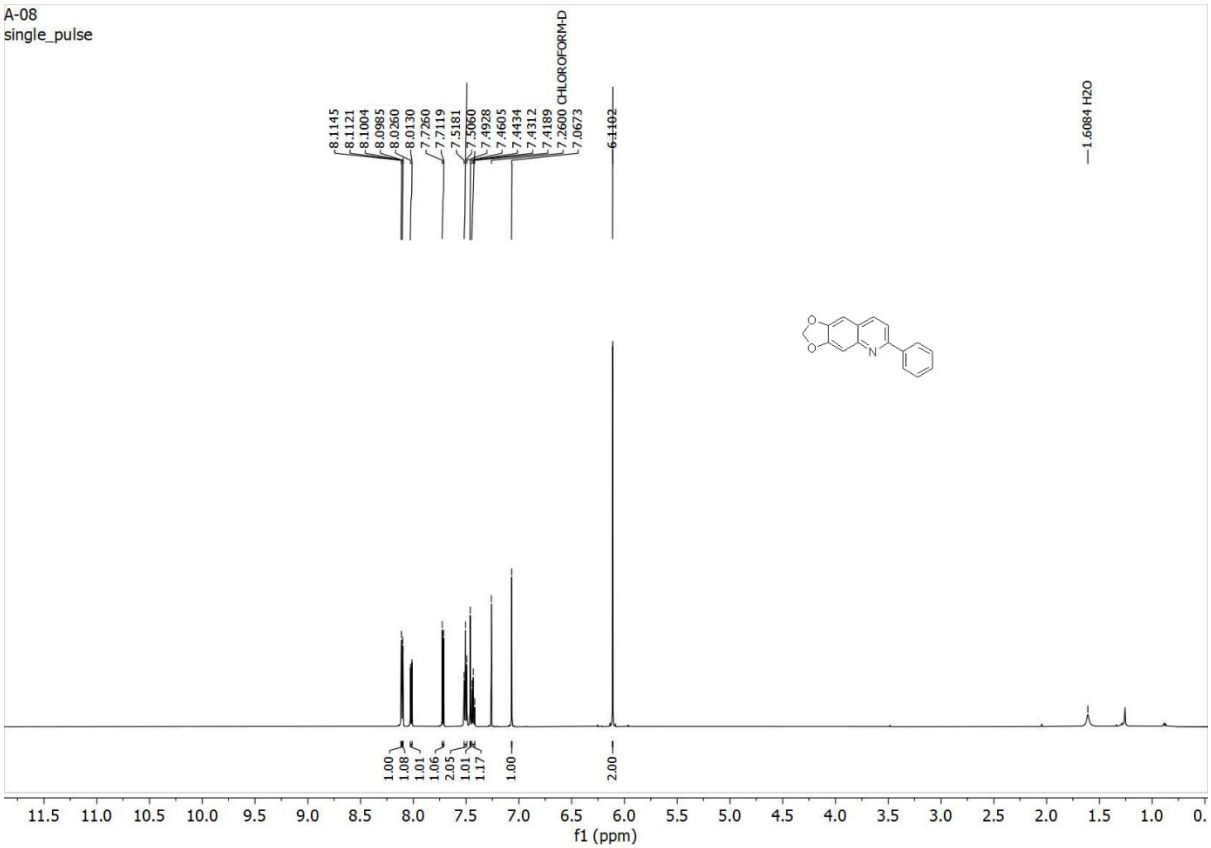


Figure S17. ^{1}H NMR Spectrum of **15b** in $CDCl_3$.

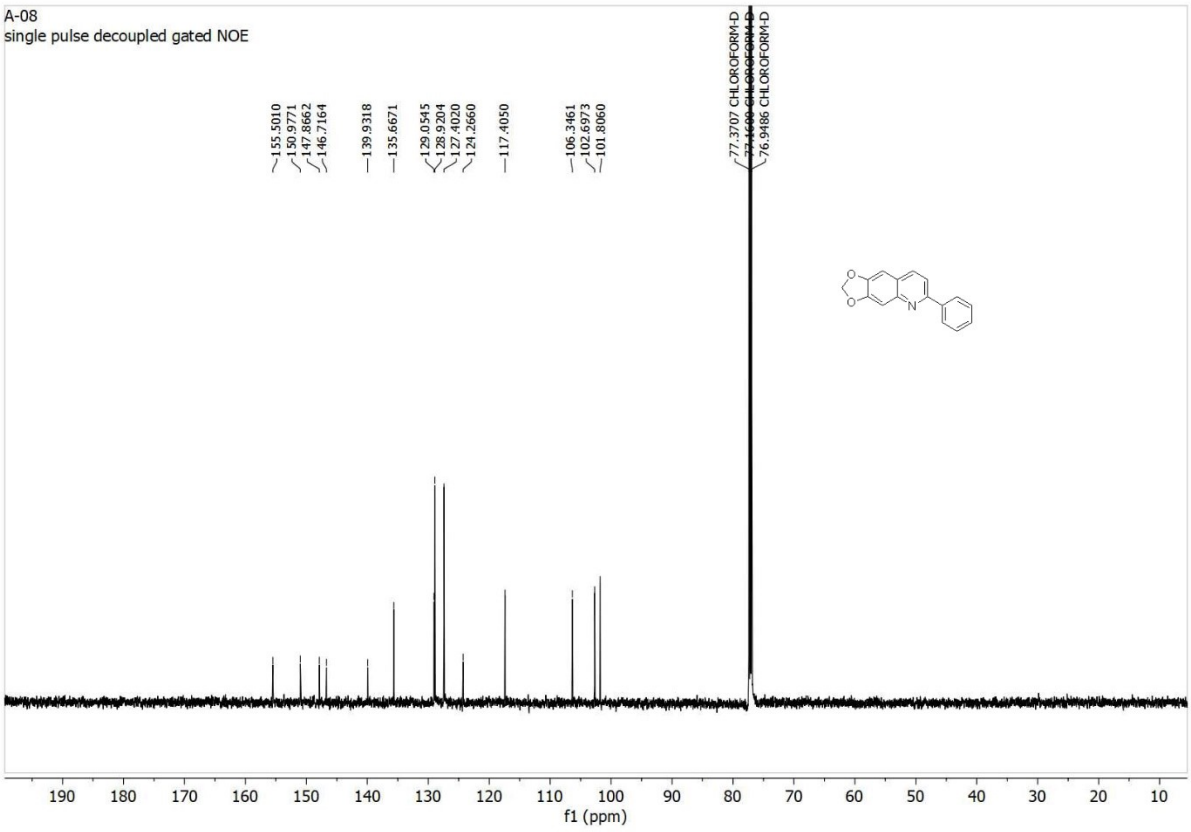


Figure S18. ^{13}C NMR Spectrum of **15b** in $CDCl_3$.

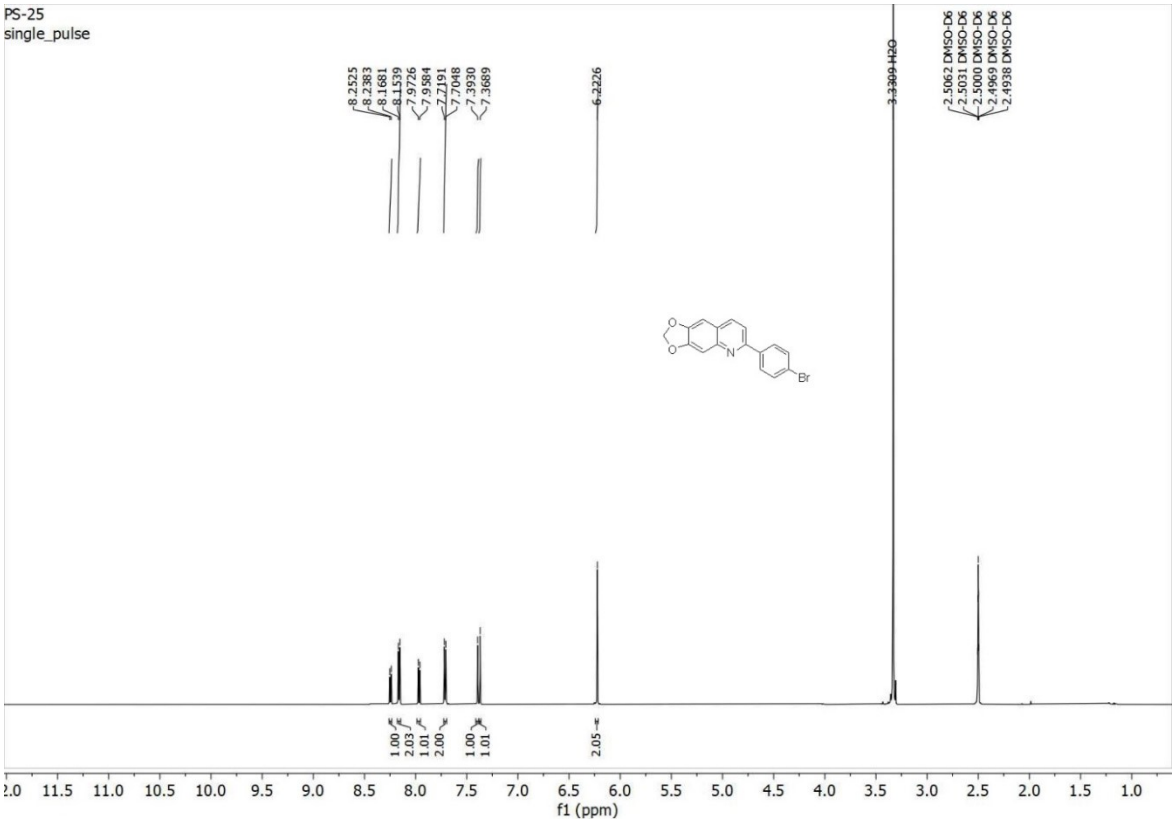


Figure S19. ^{1}H NMR Spectrum of **16b** in $CDCl_3$.

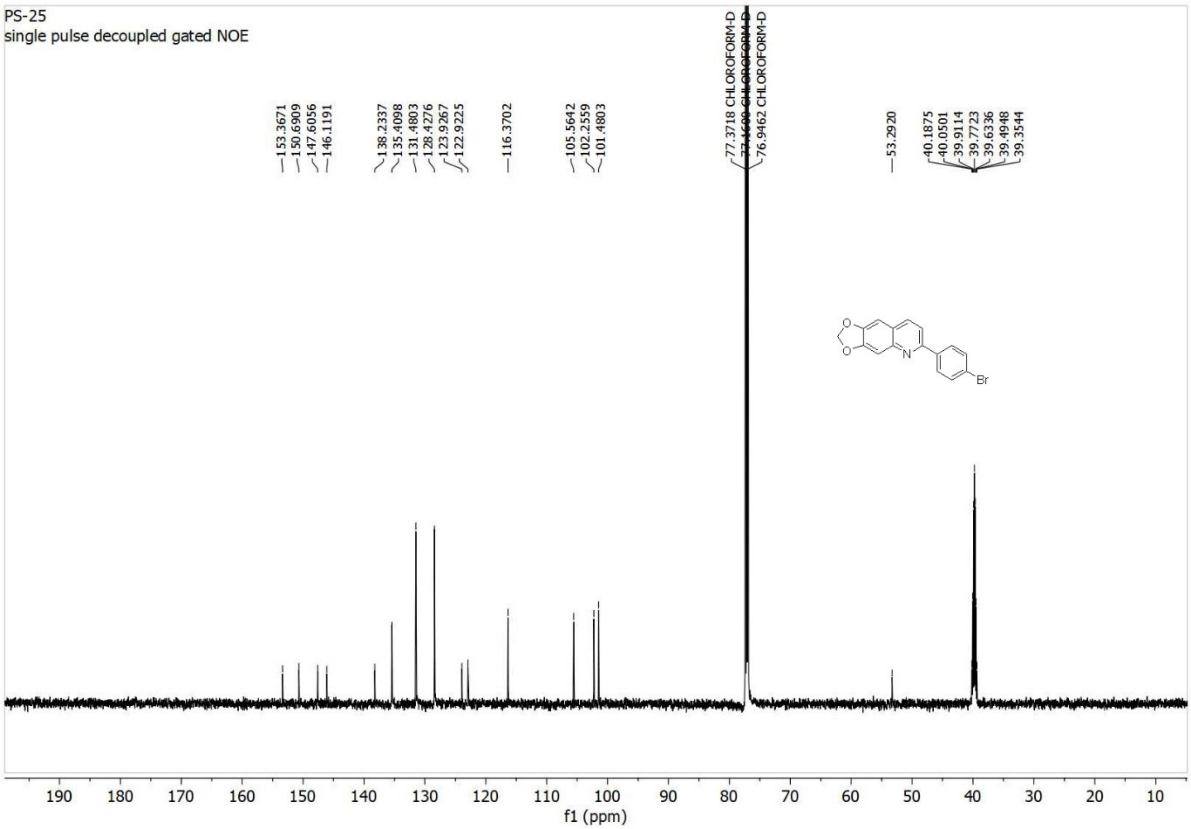


Figure S20. ^{13}C NMR Spectrum of **16b** in $CDCl_3$.

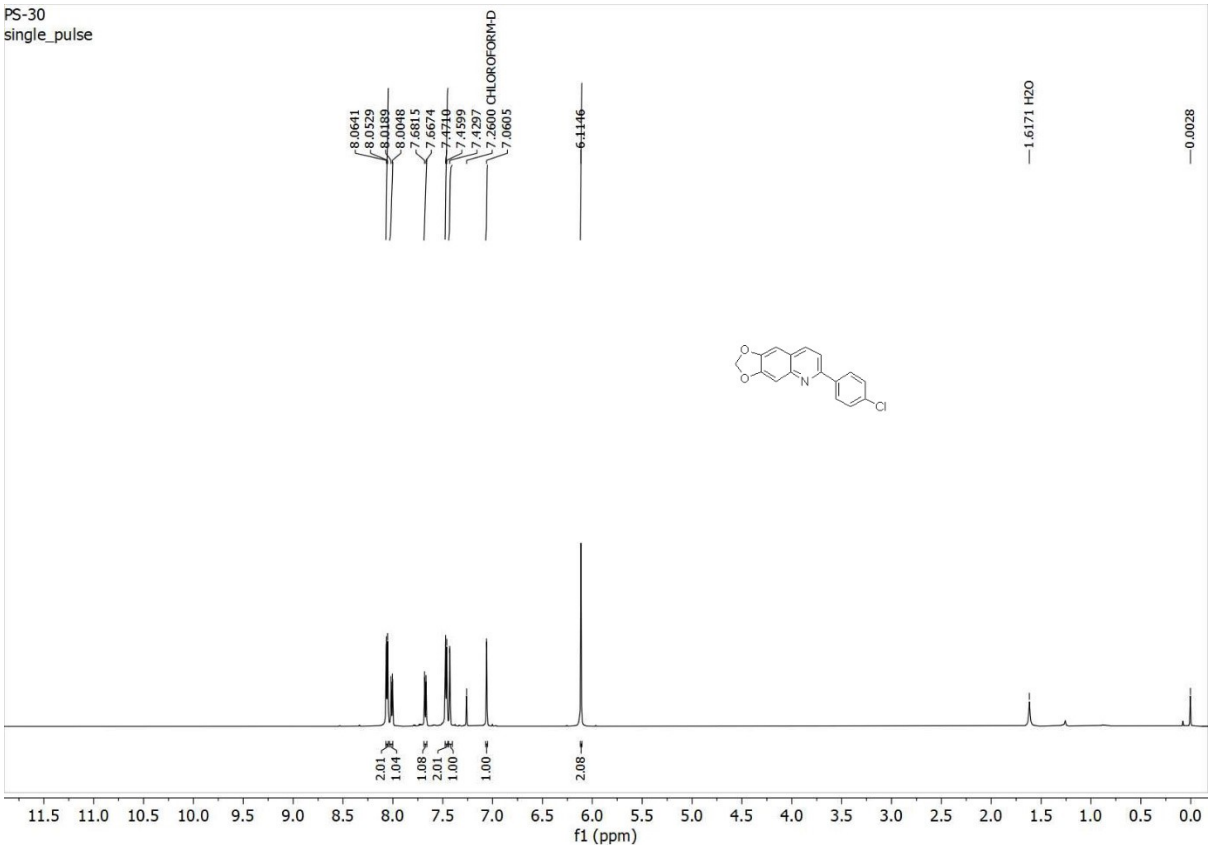


Figure S21. ^{1}H NMR Spectrum of **17b** in $CDCl_3$.

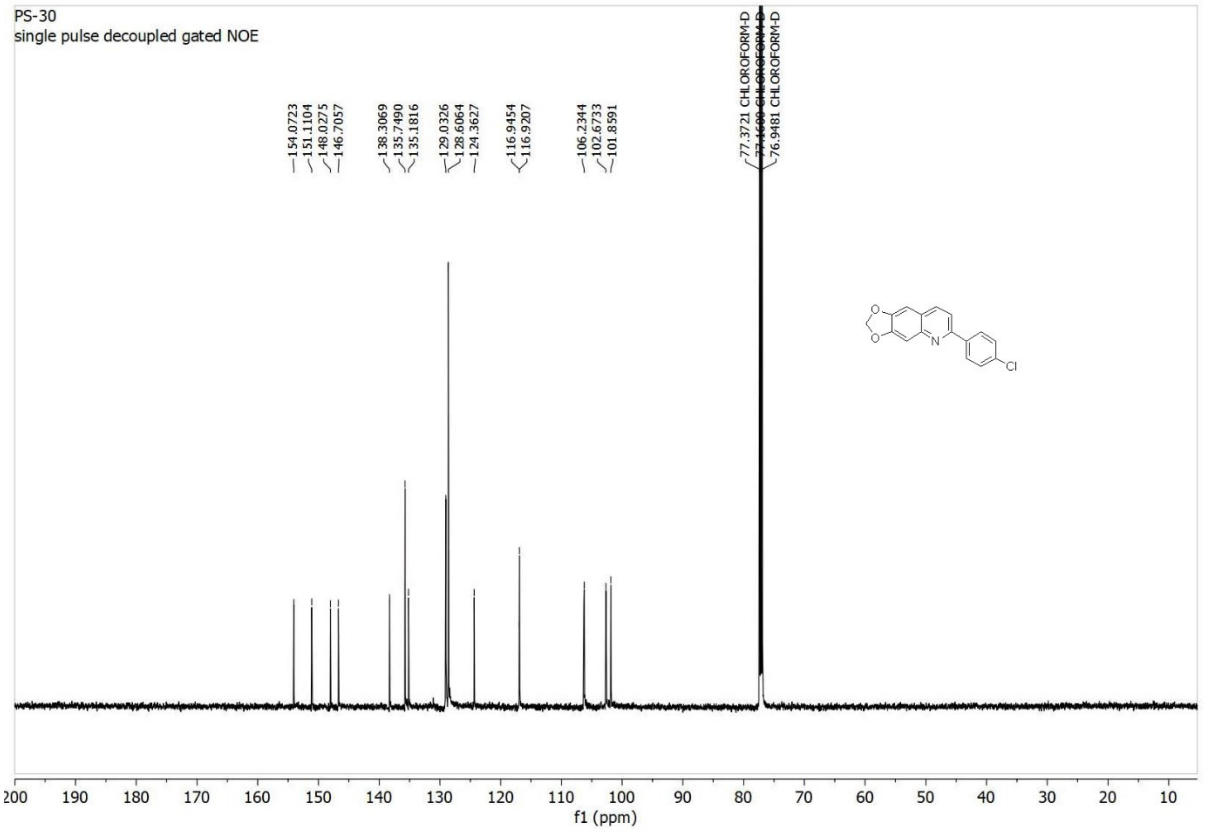


Figure S22. ^{13}C NMR Spectrum of **17b** in $CDCl_3$.

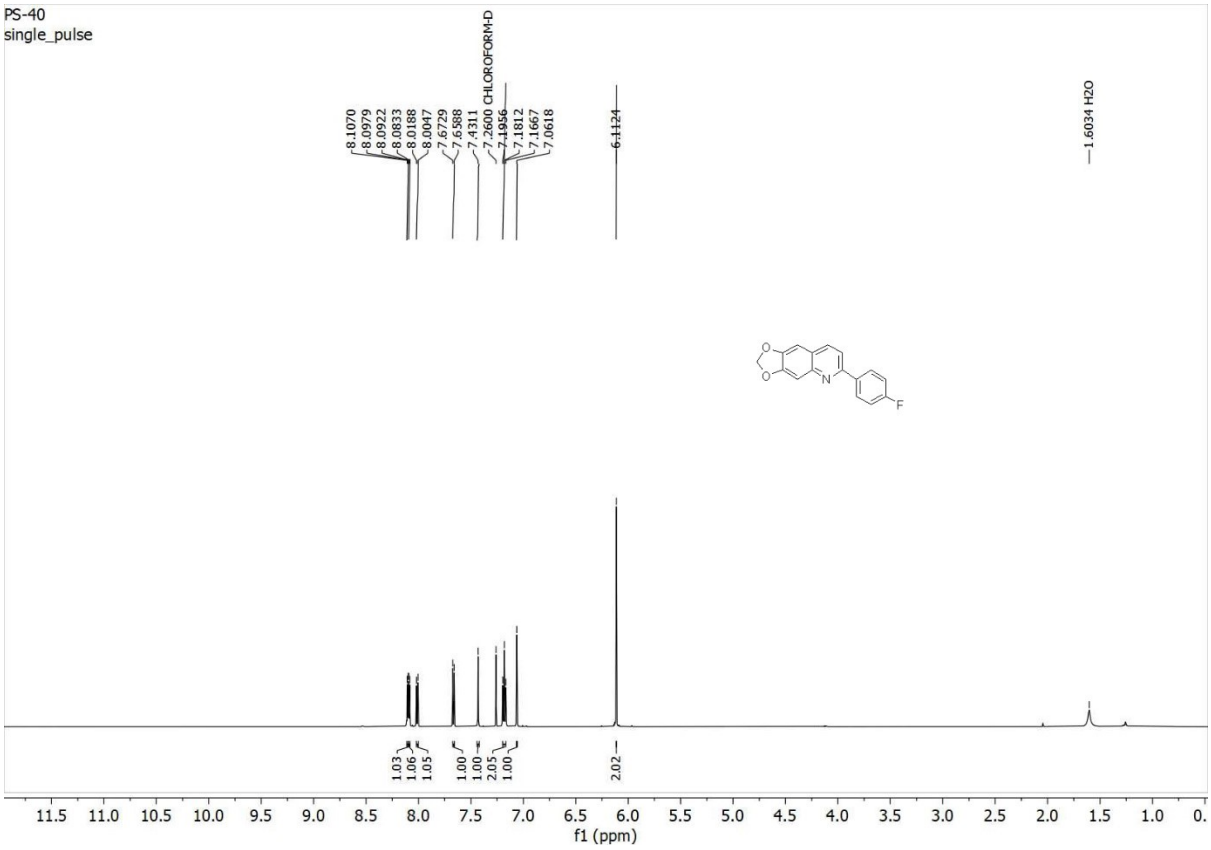


Figure S23. ^{1}H NMR Spectrum of **18b** in $CDCl_3$.

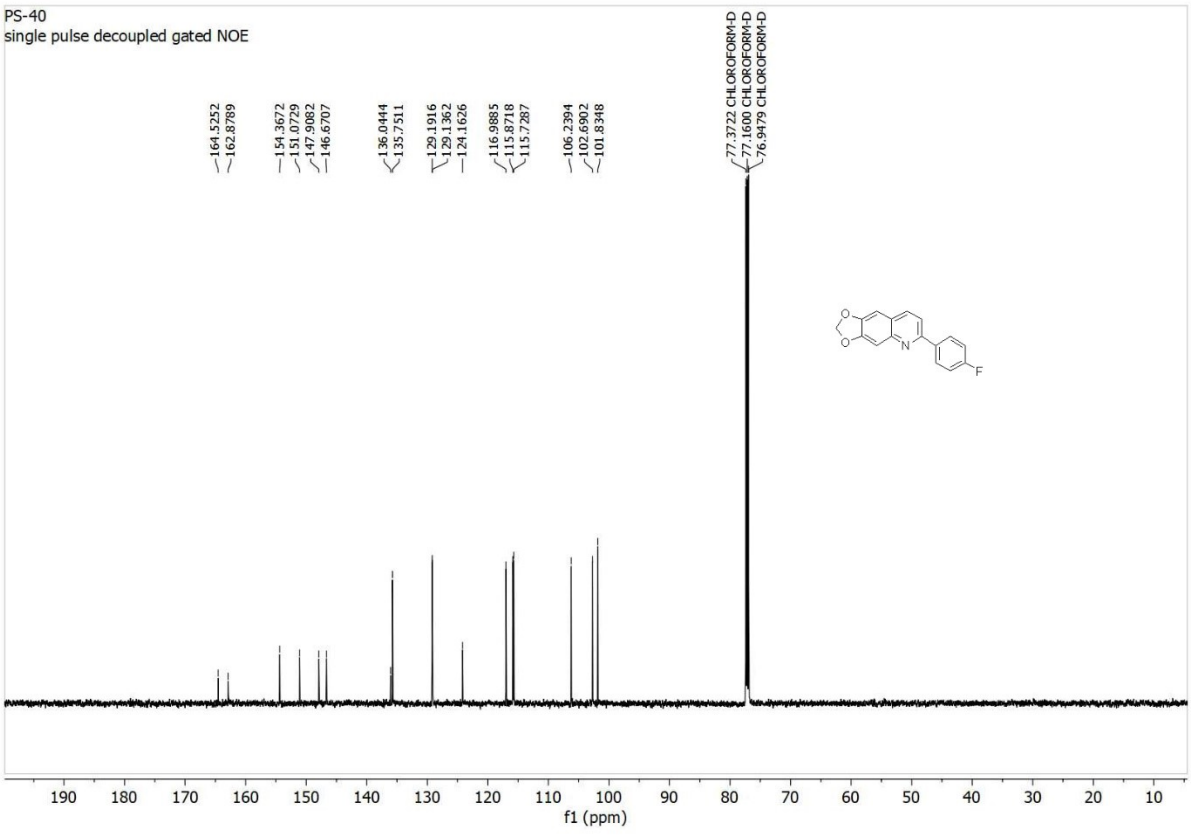


Figure S24. ^{13}C NMR Spectrum of **18b** in $CDCl_3$.

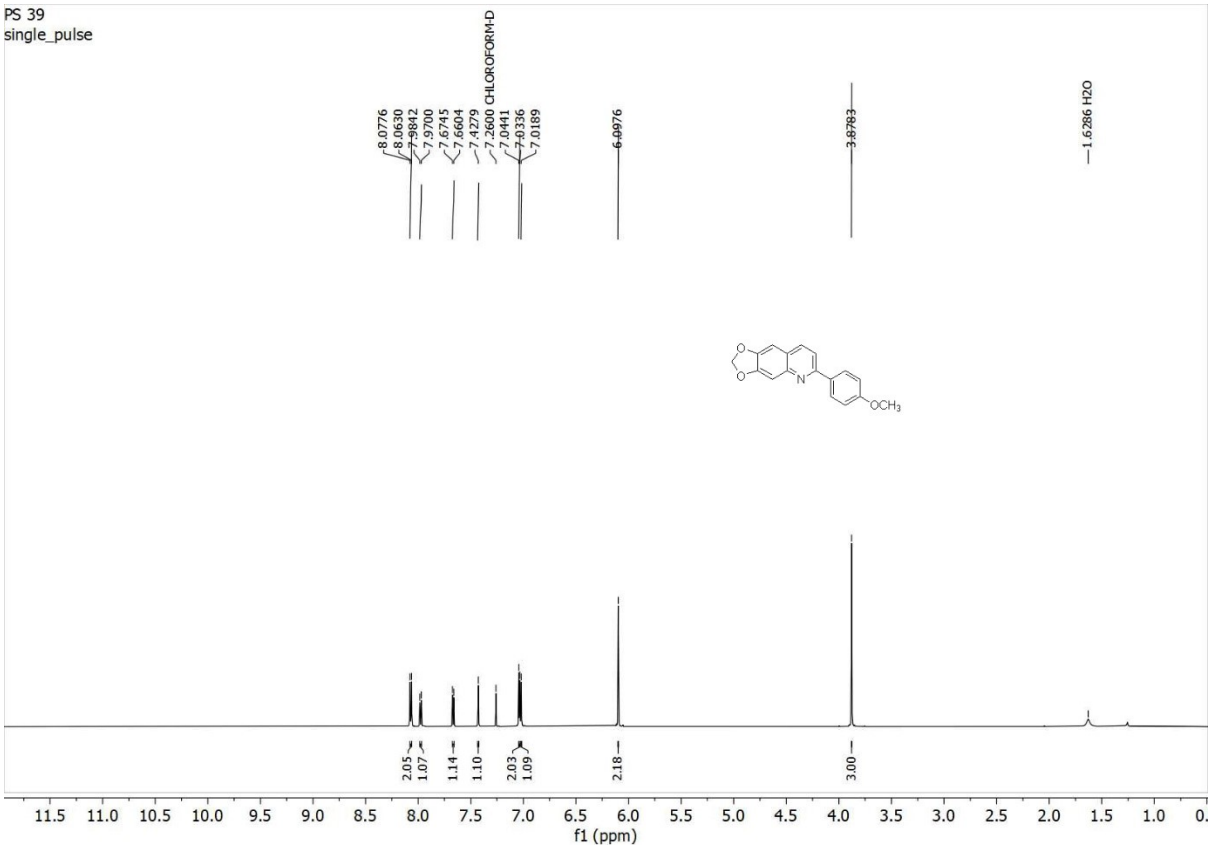


Figure S25. ^{1}H NMR Spectrum of **19b** in $CDCl_3$.

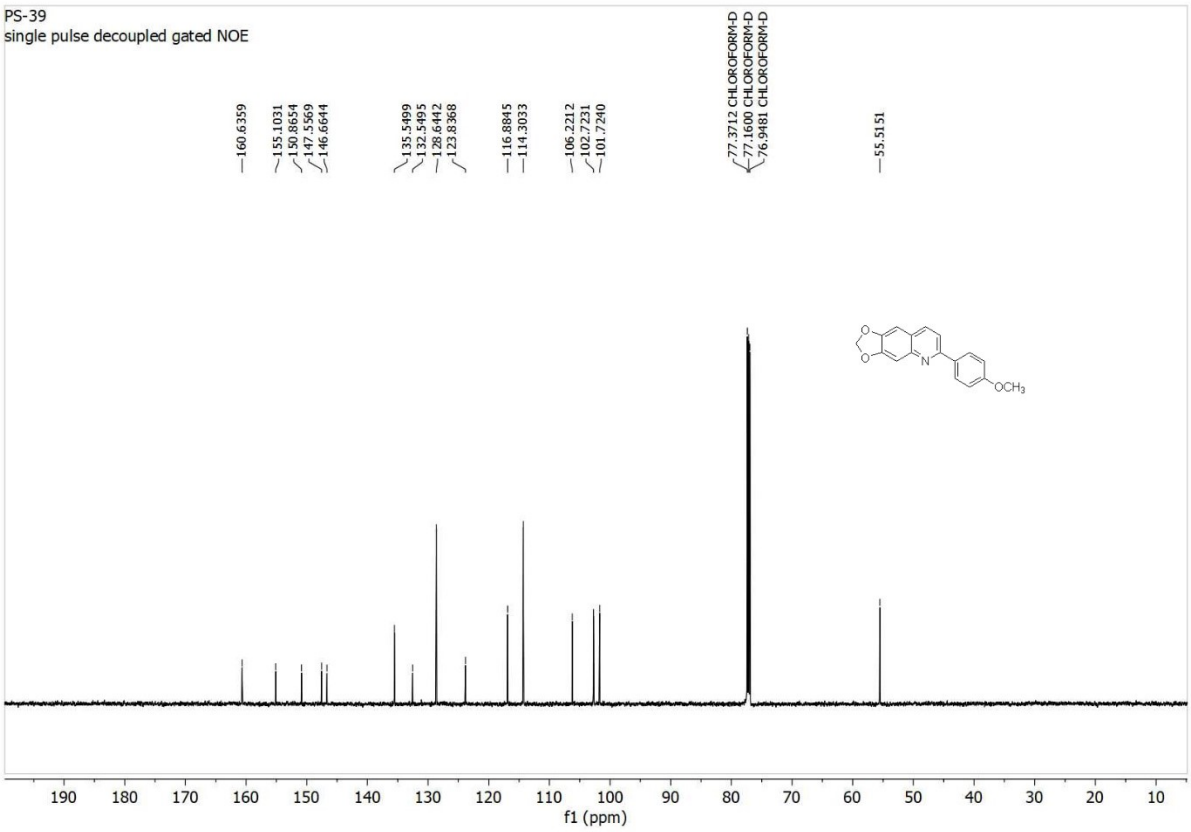


Figure S26. ^{13}C NMR Spectrum of **19b** in $CDCl_3$.

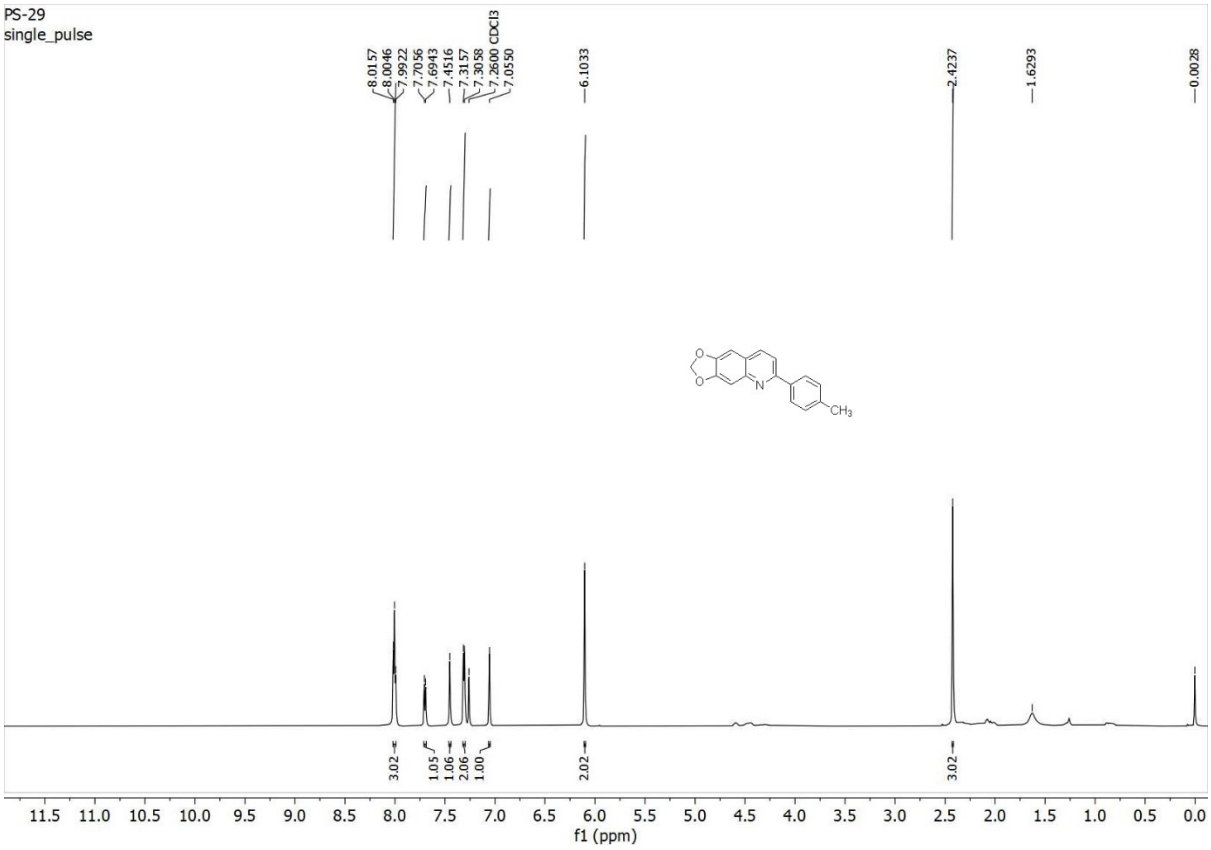


Figure S27. ^{1}H NMR Spectrum of **20b** in $CDCl_3$.

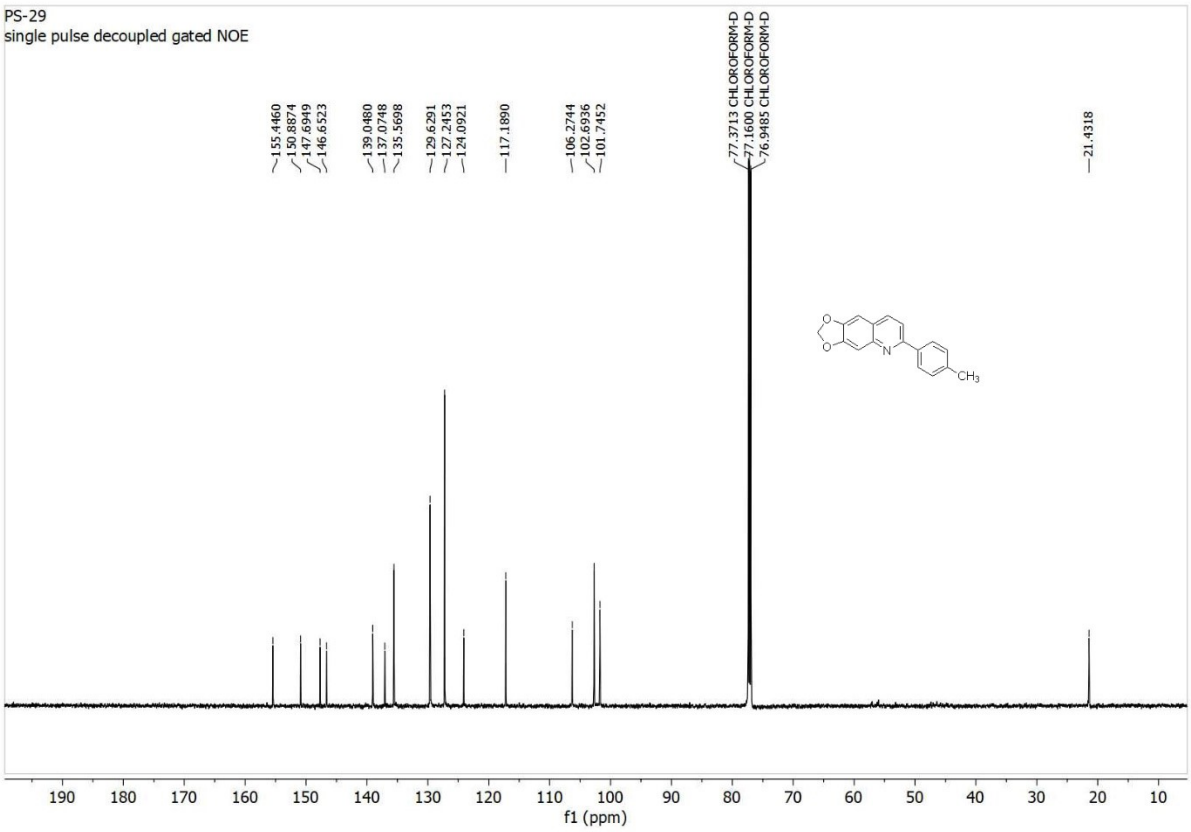


Figure S28. ^{13}C NMR Spectrum of **20b** in $CDCl_3$.

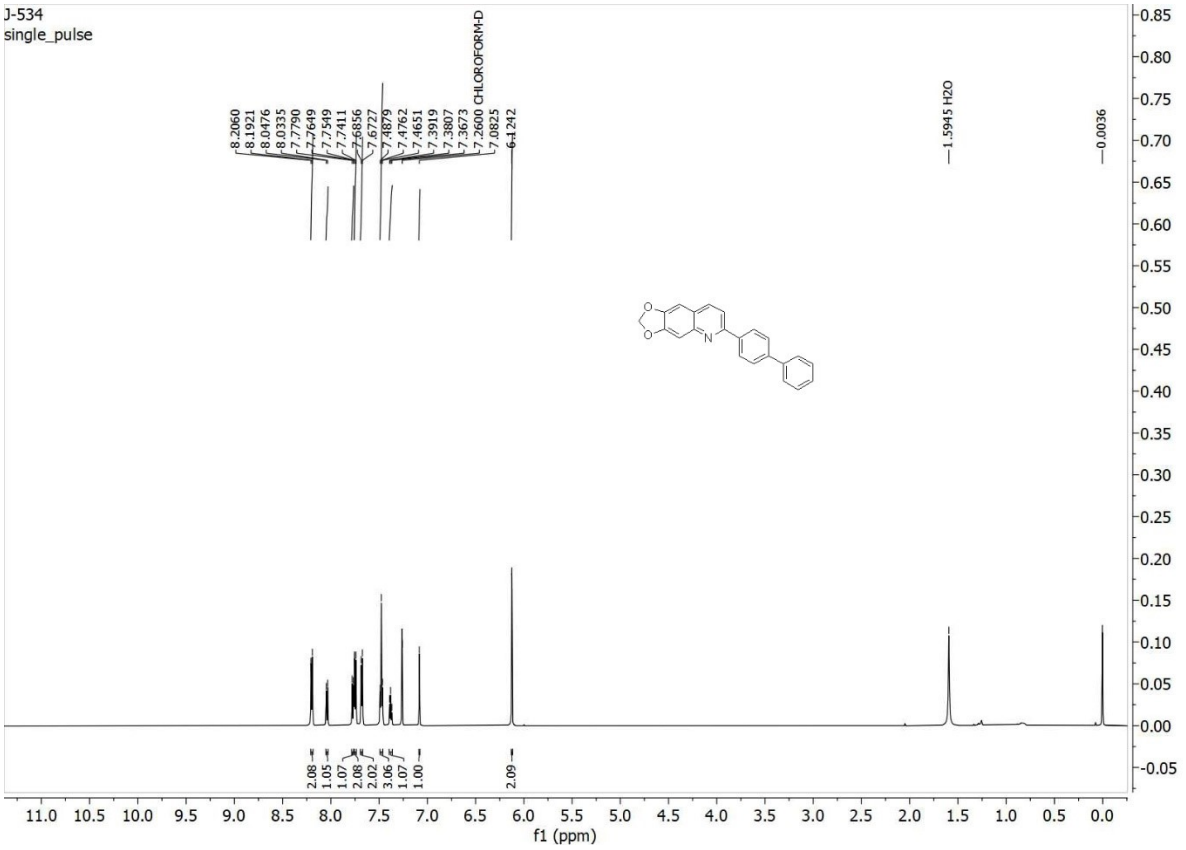


Figure S29. ^{1}H NMR Spectrum of **22b** in $CDCl_3$.

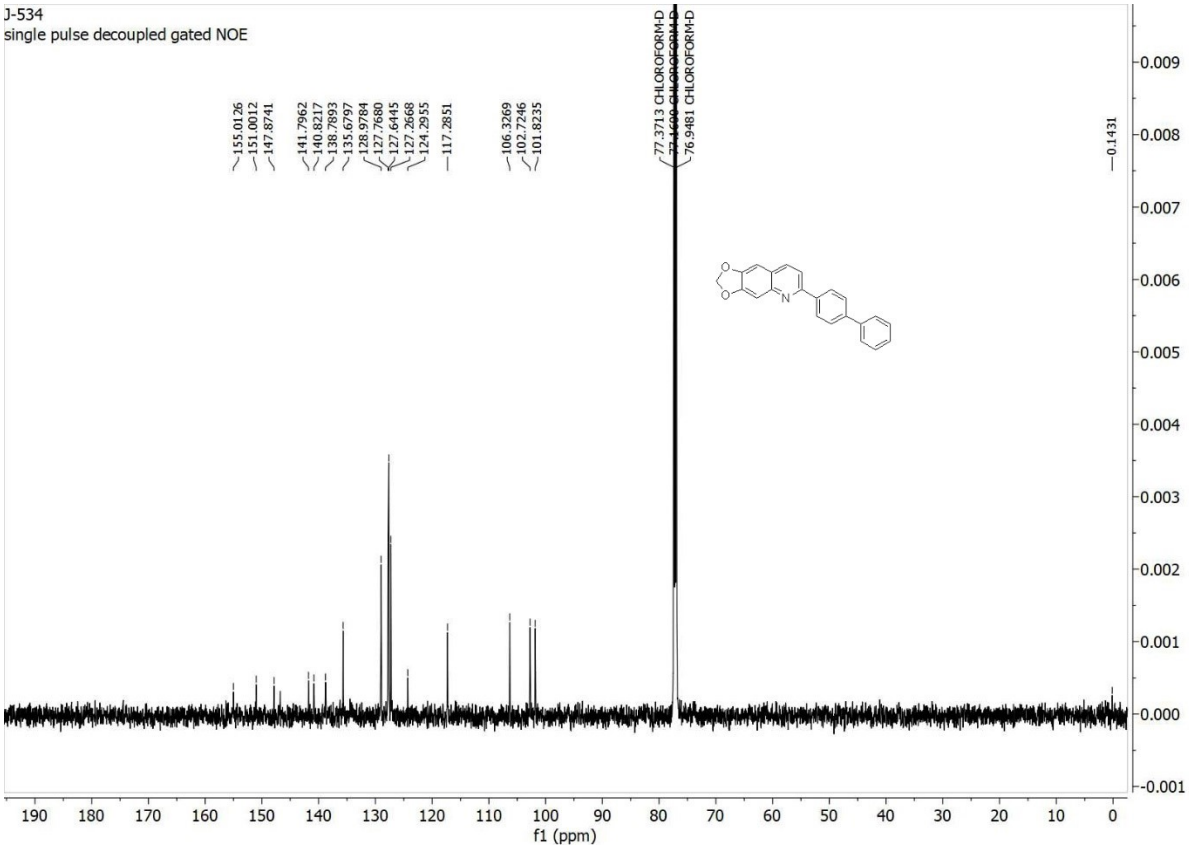


Figure S30. ^{13}C NMR Spectrum of **22b** in $CDCl_3$.

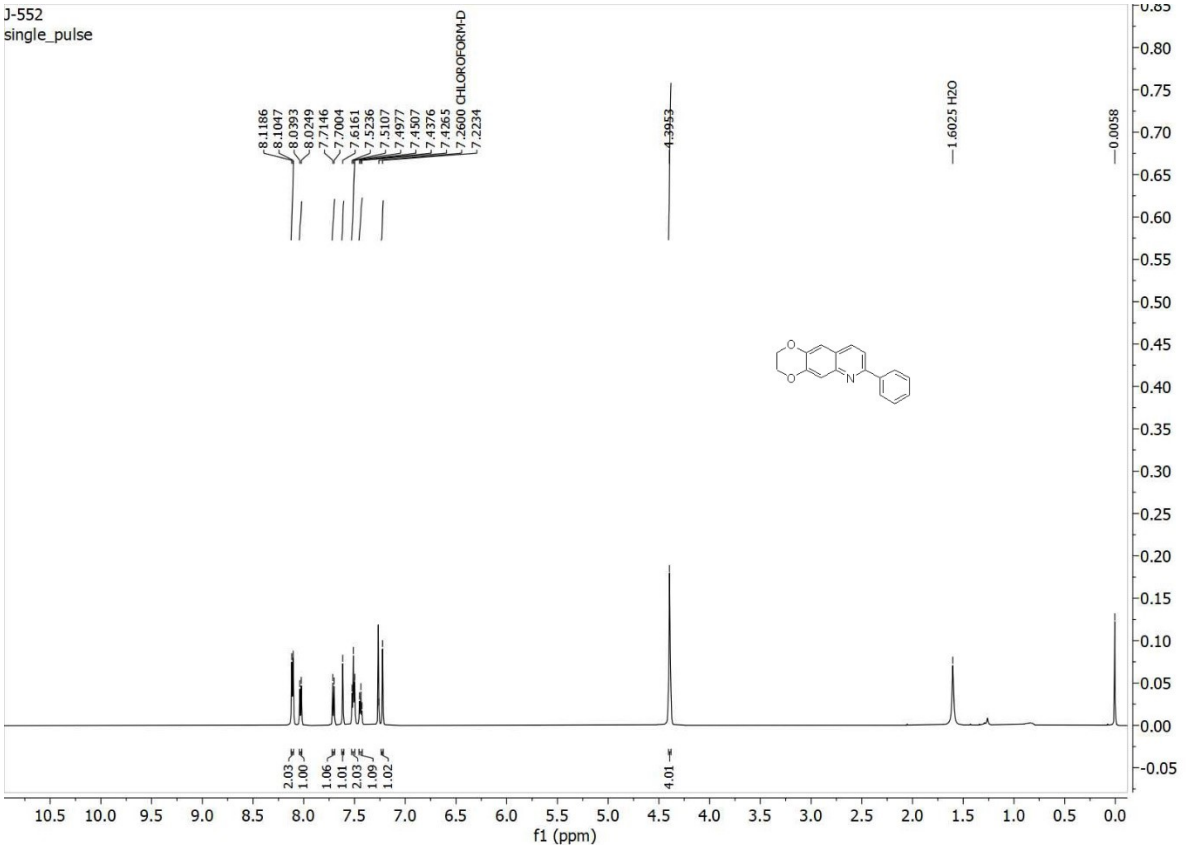


Figure S31. ^{1}H NMR Spectrum of **15c** in $CDCl_3$.

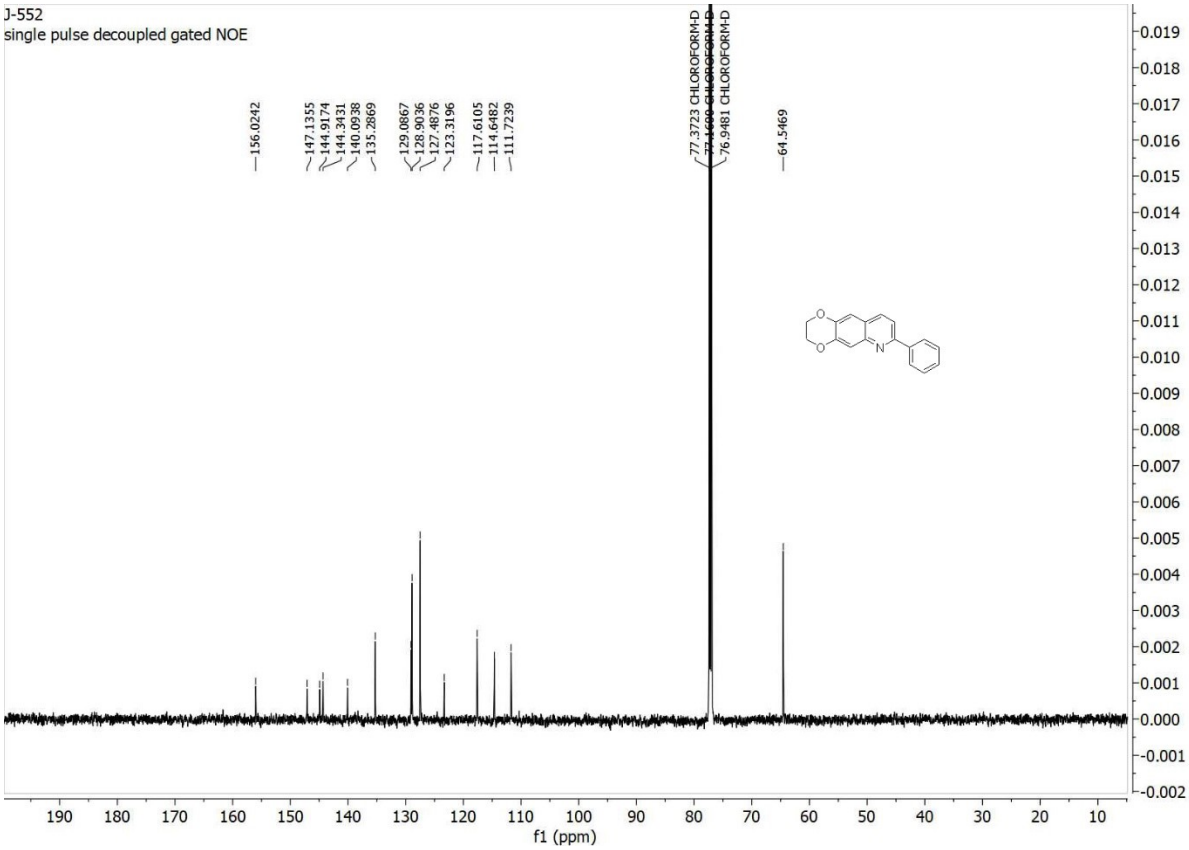


Figure S32. ^{13}C NMR Spectrum of **15c** in $CDCl_3$.

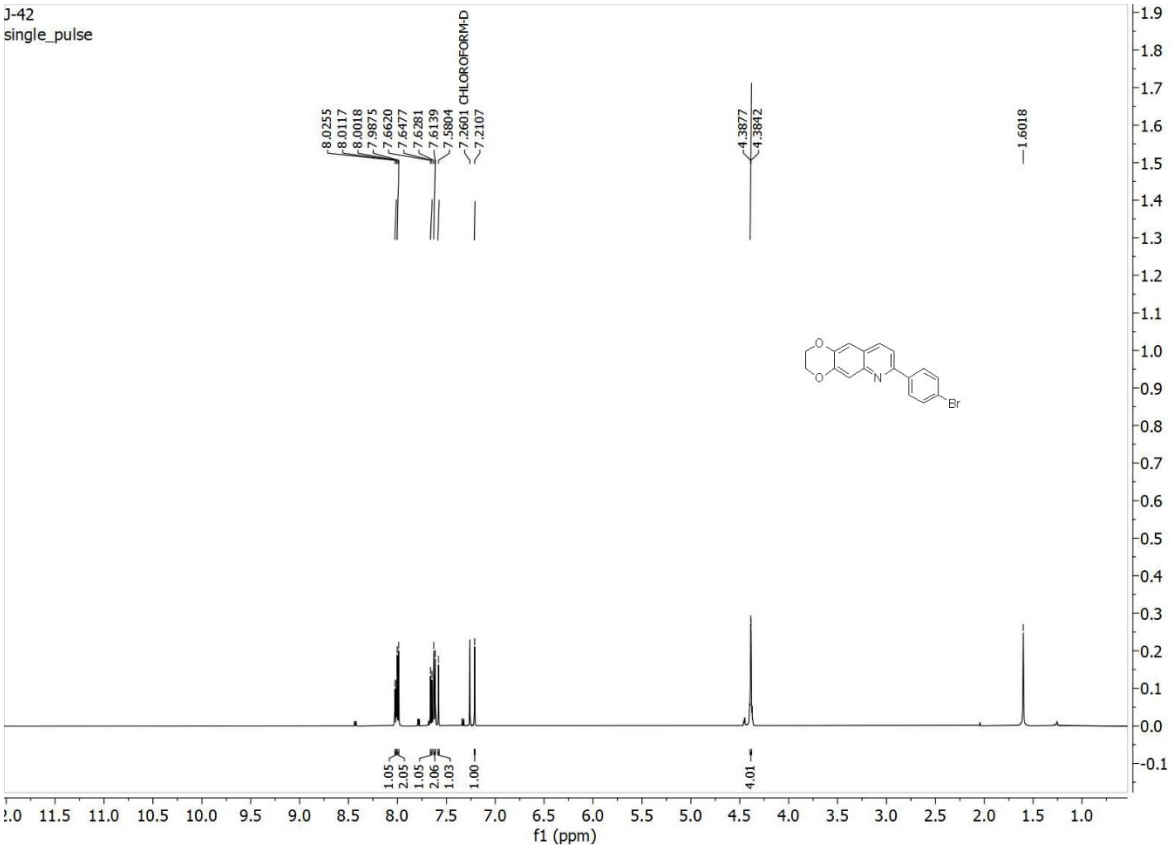


Figure S33. ^{1}H NMR Spectrum of **16c** in $CDCl_3$.

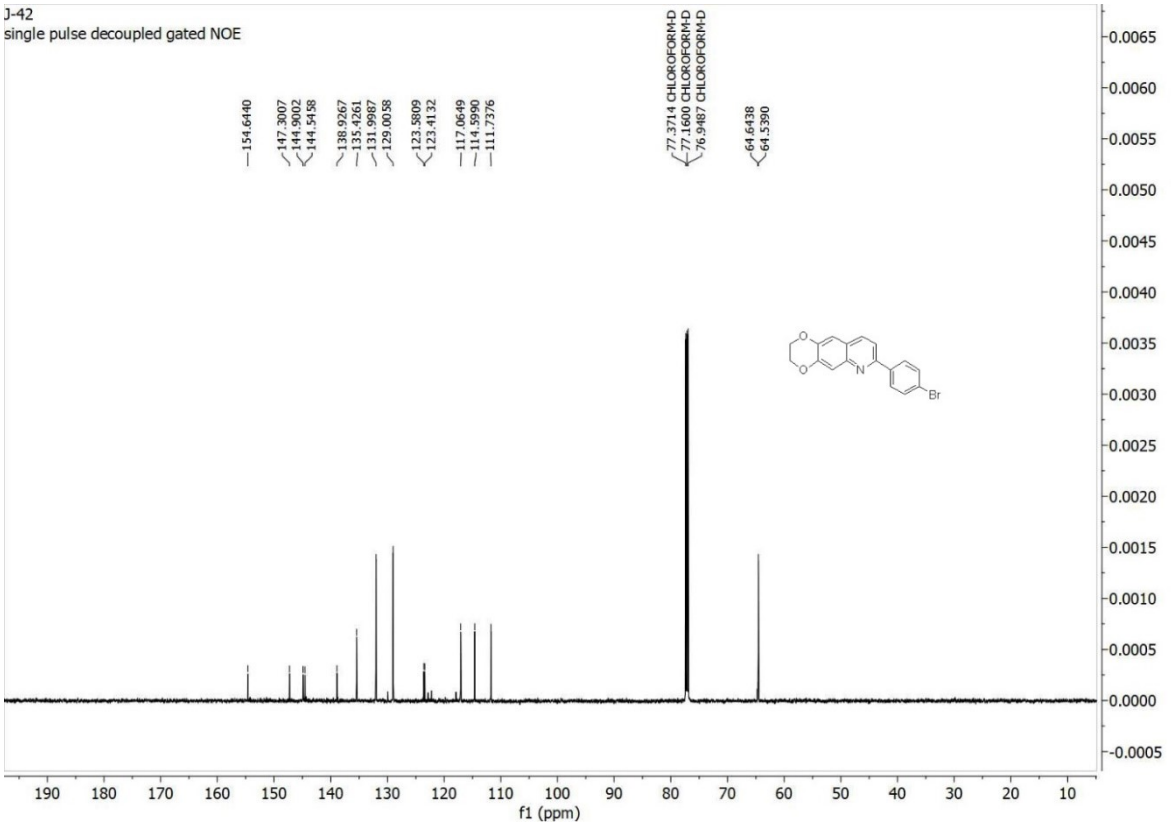


Figure S34. ^{13}C NMR Spectrum of **16c** in $CDCl_3$.

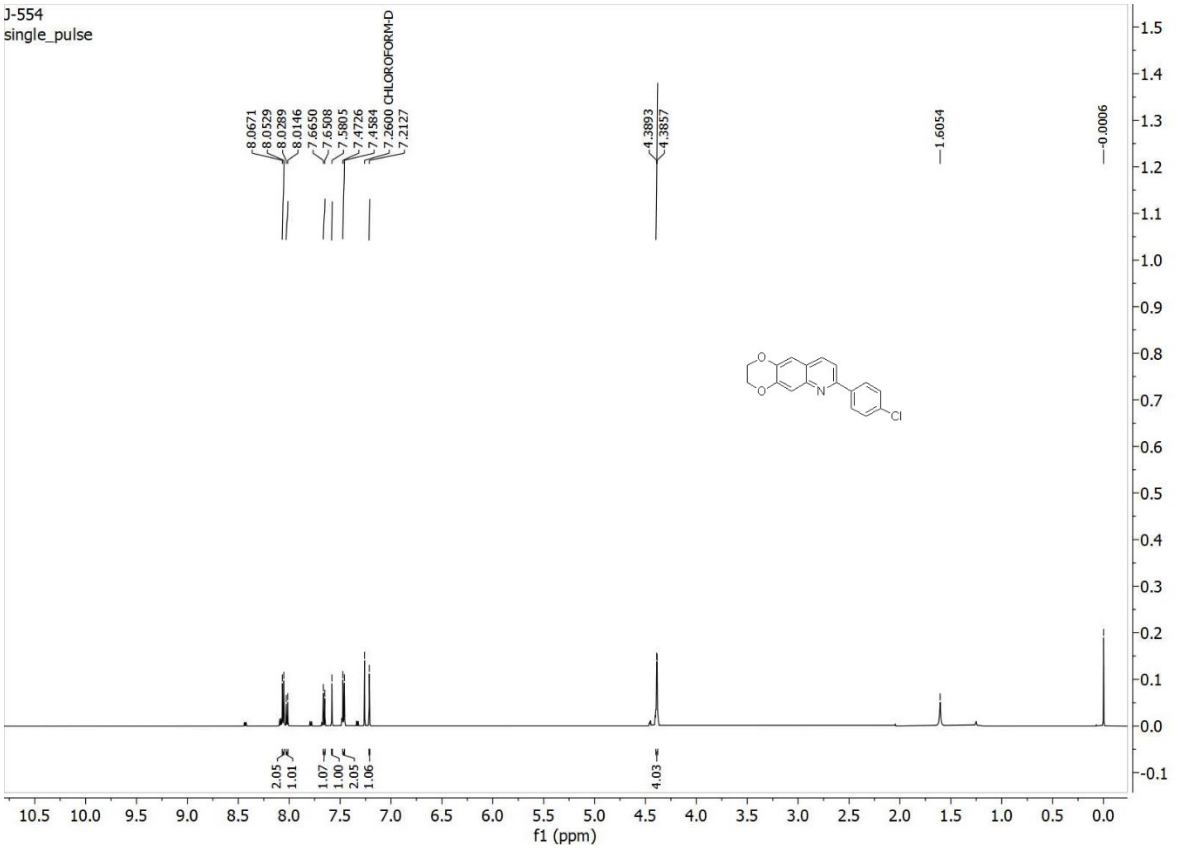


Figure S35. ^{1}H NMR Spectrum of **17c** in $CDCl_3$.

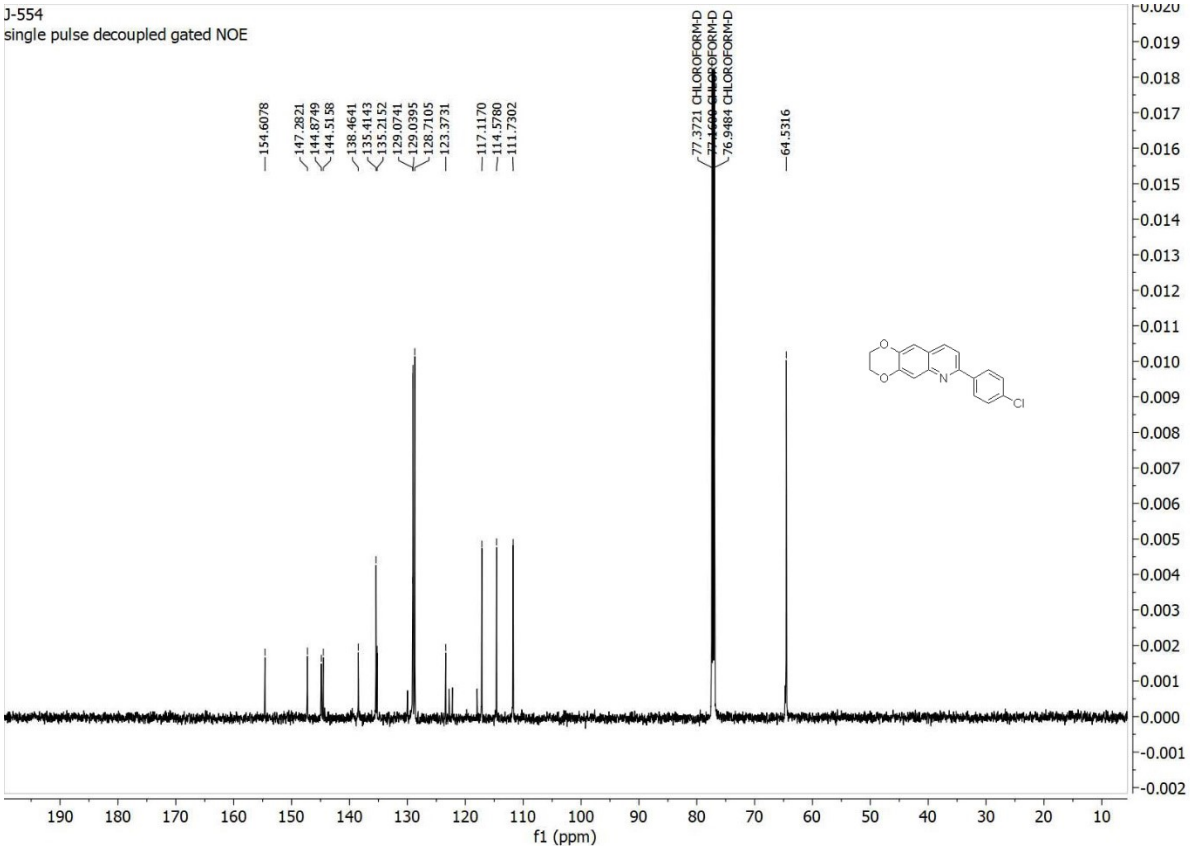


Figure S36. ^{13}C NMR Spectrum of **17c** in $CDCl_3$.

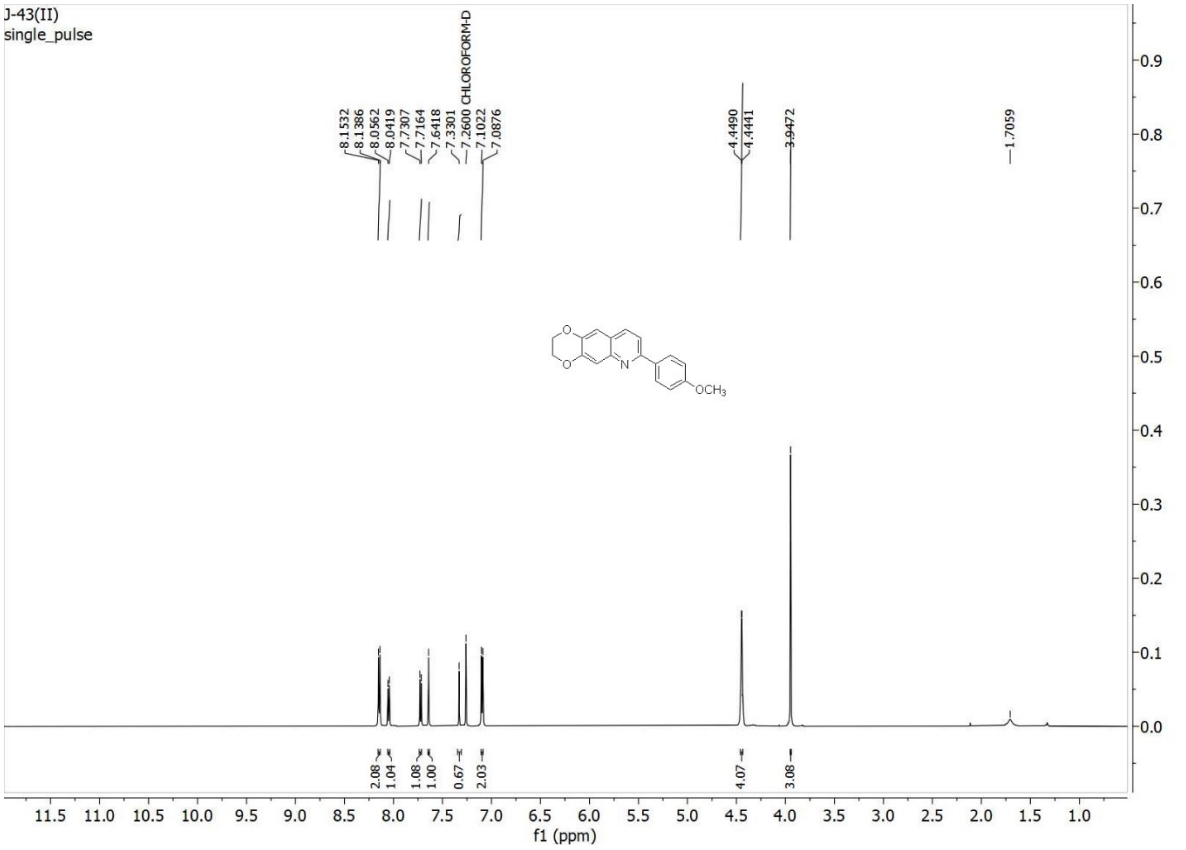


Figure S37. ^{1}H NMR Spectrum of **19c** in $CDCl_3$.

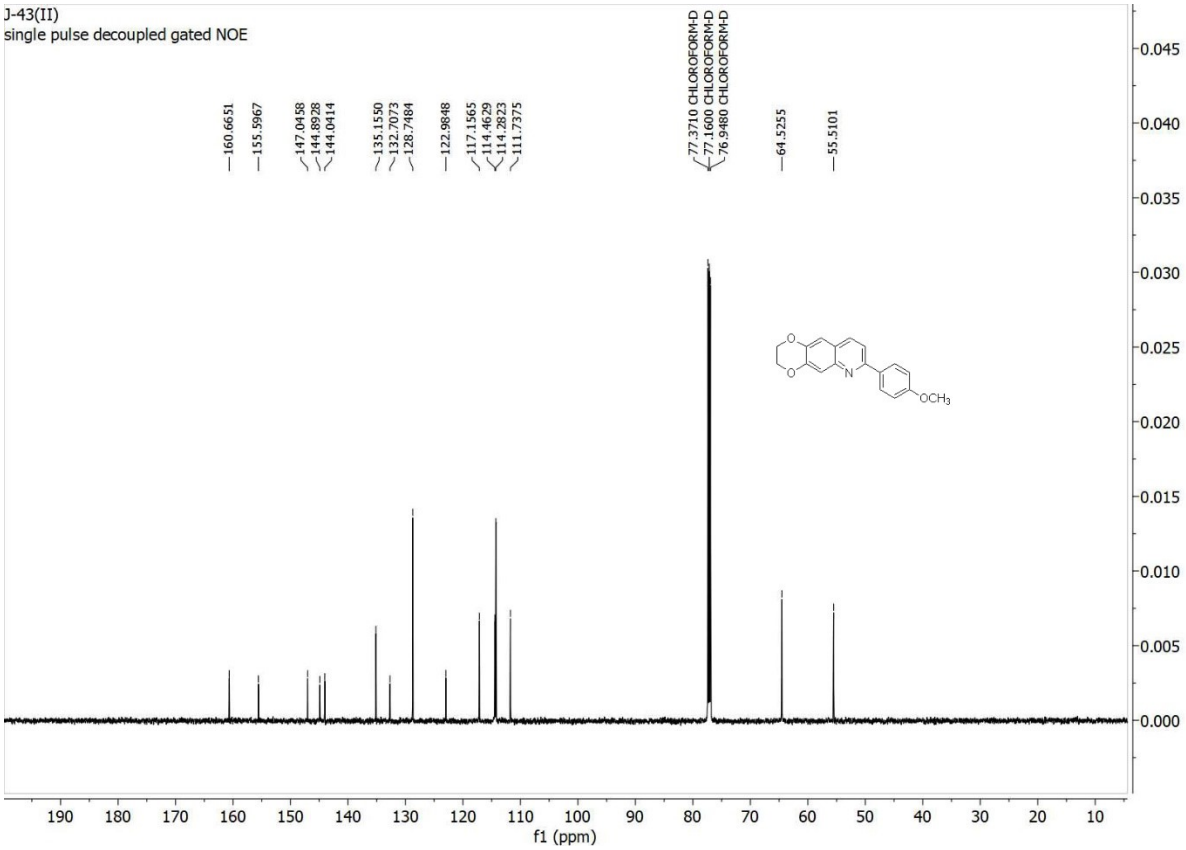


Figure S38. ^{13}C NMR Spectrum of **19c** in $CDCl_3$.

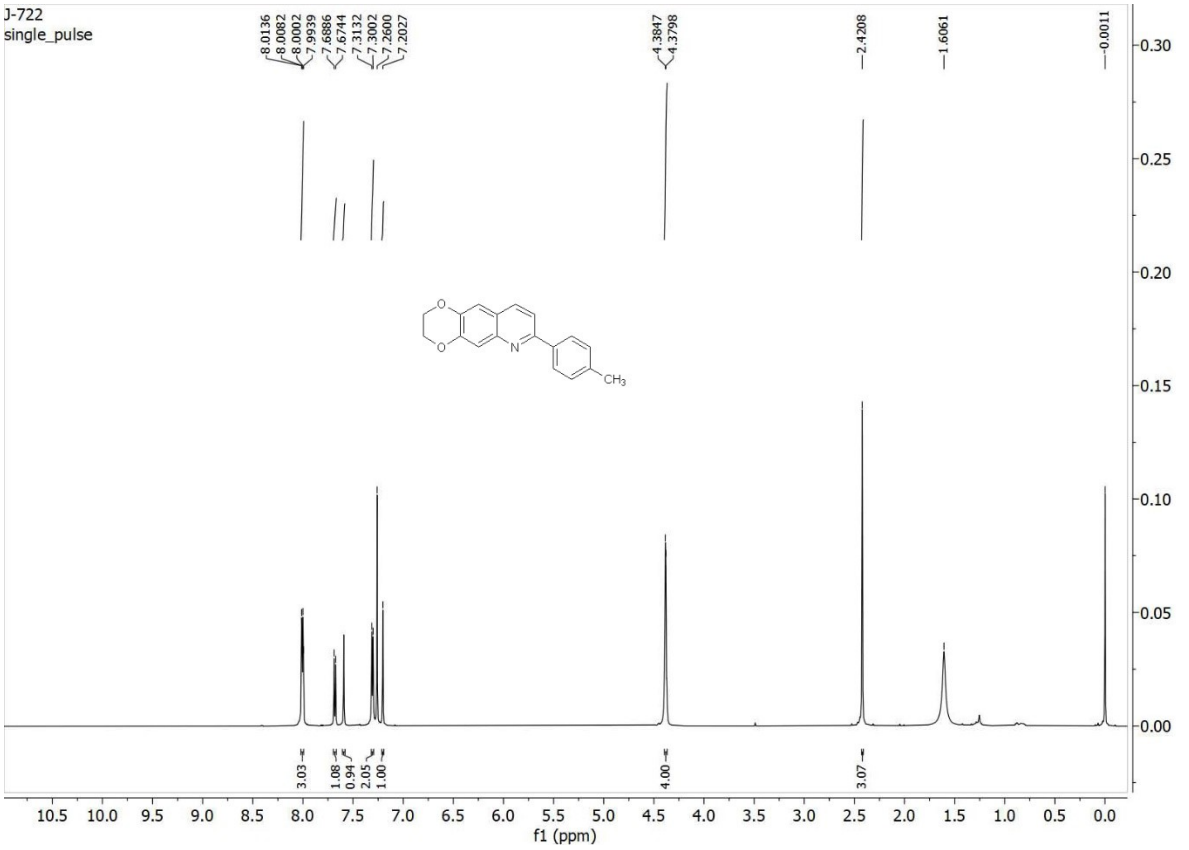


Figure S39. ^{1}H NMR Spectrum of **20c** in $CDCl_3$.

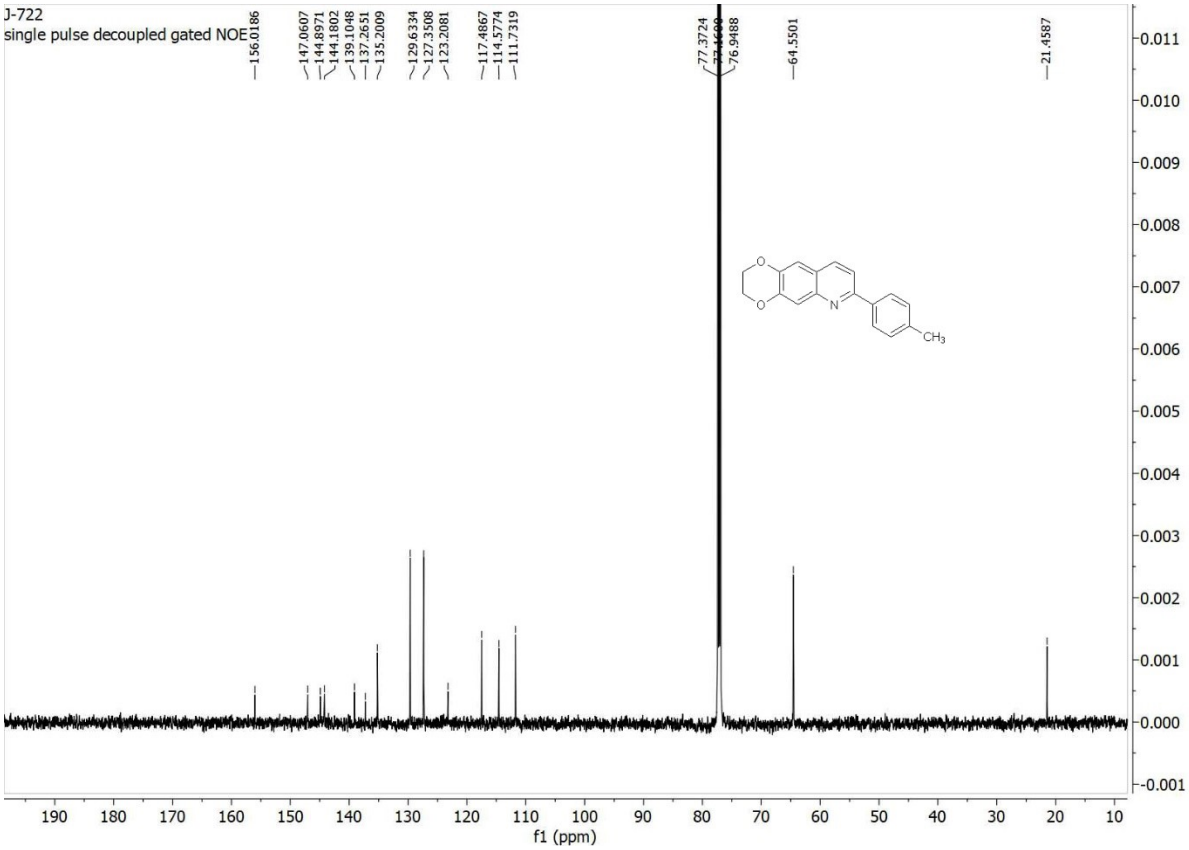


Figure S40. ^{13}C NMR Spectrum of **20c** in $CDCl_3$.

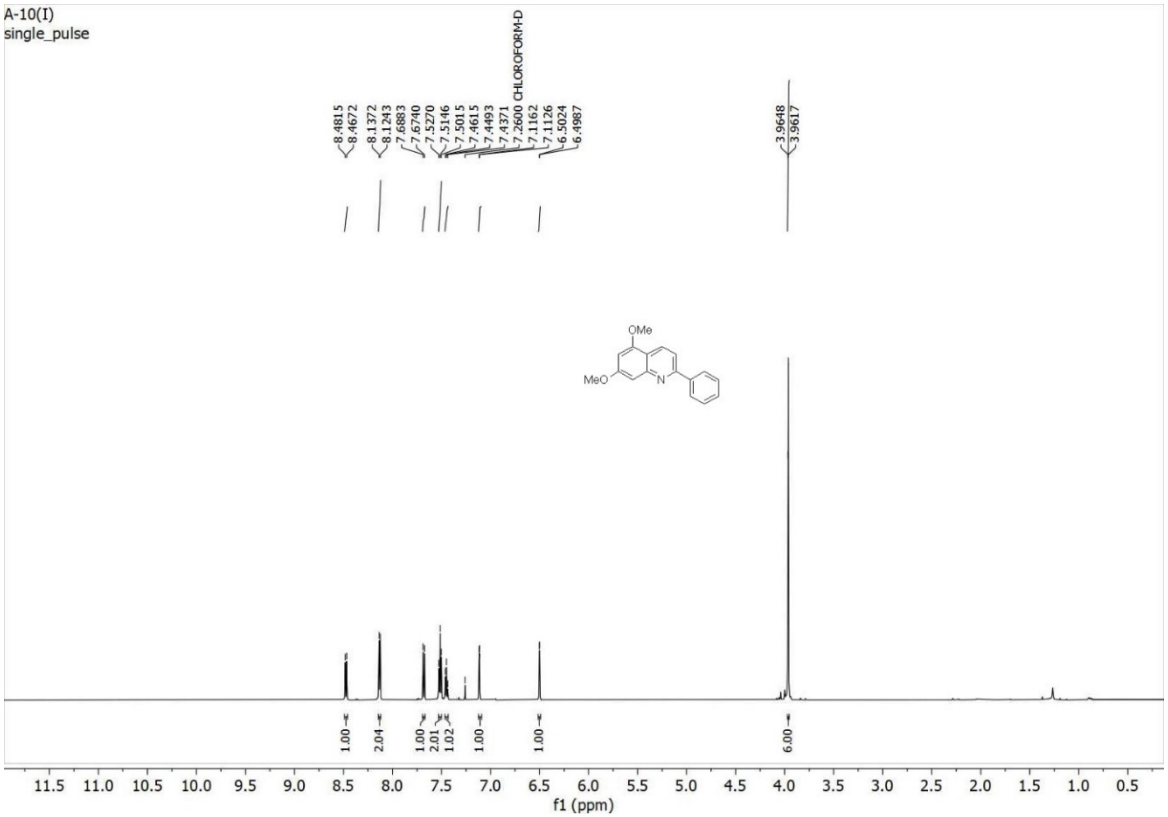


Figure S41. ^{1}H NMR Spectrum of **15d** in $CDCl_3$.

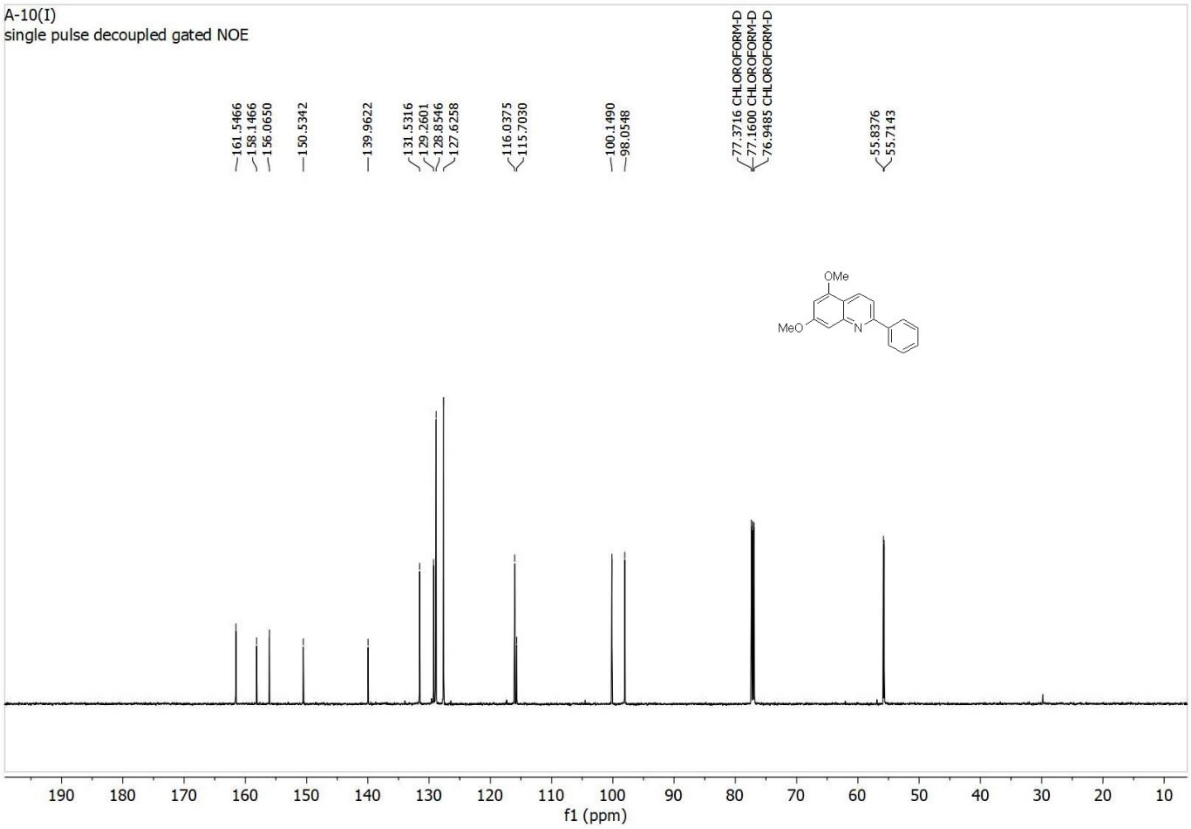


Figure S42. ^{13}C NMR Spectrum of **15d** in $CDCl_3$.

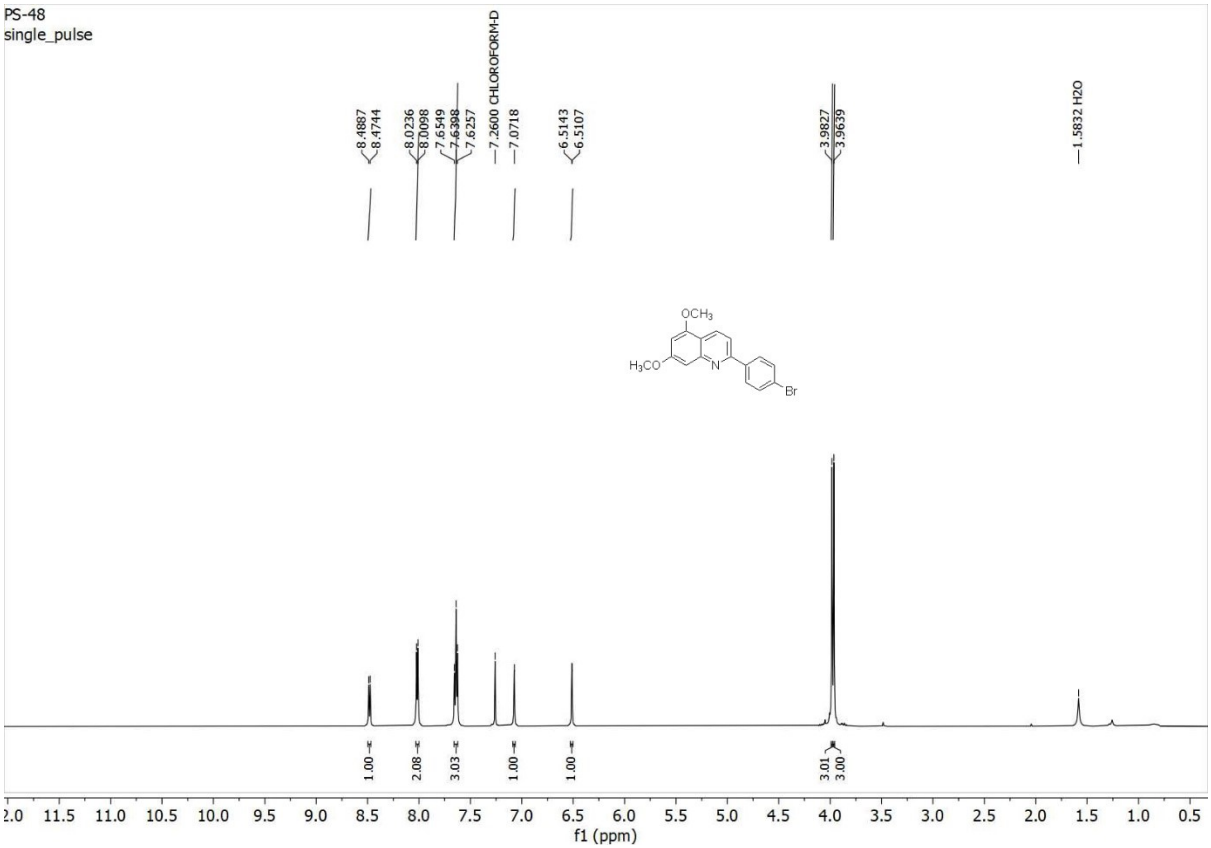


Figure S43. ^{1}H NMR Spectrum of **16d** in $CDCl_3$.

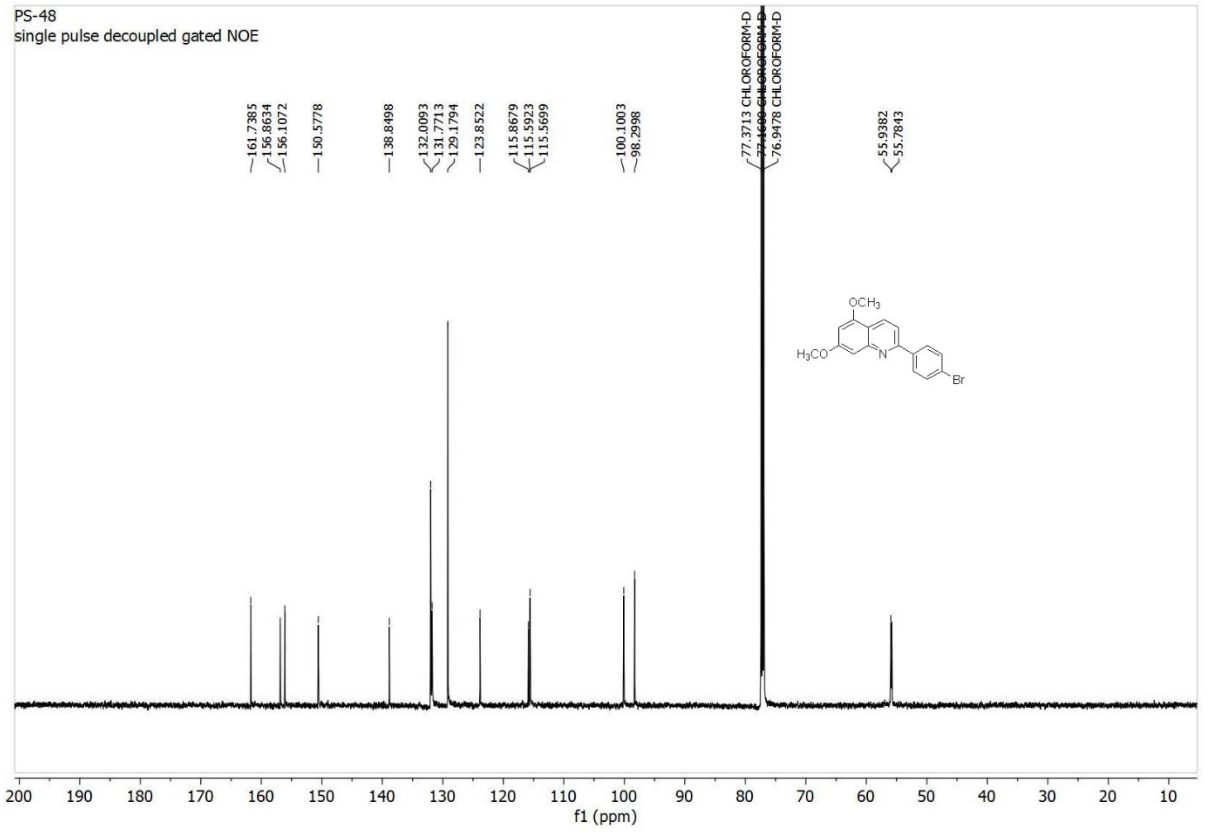


Figure S44. ^{13}C NMR Spectrum of **16d** in $CDCl_3$.

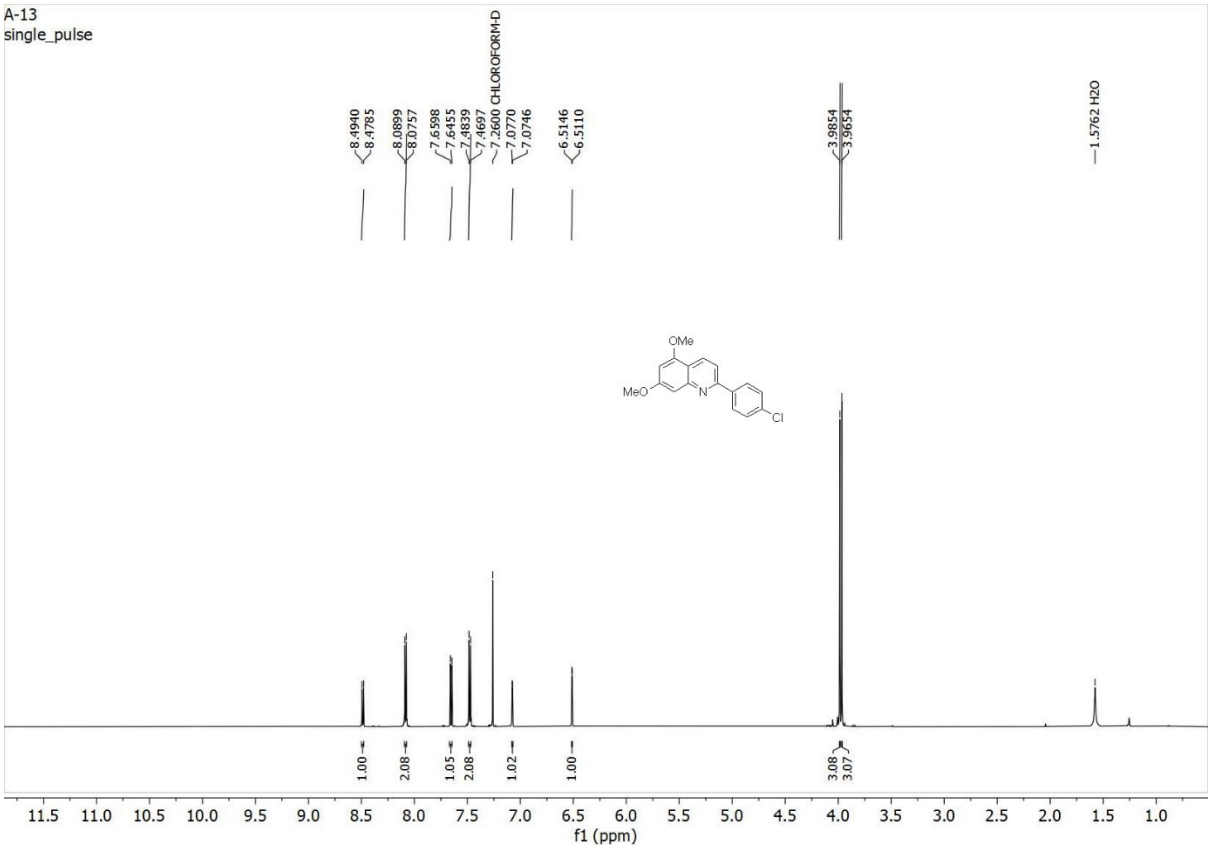


Figure S45. ^{1}H NMR Spectrum of **17d** in $CDCl_3$.

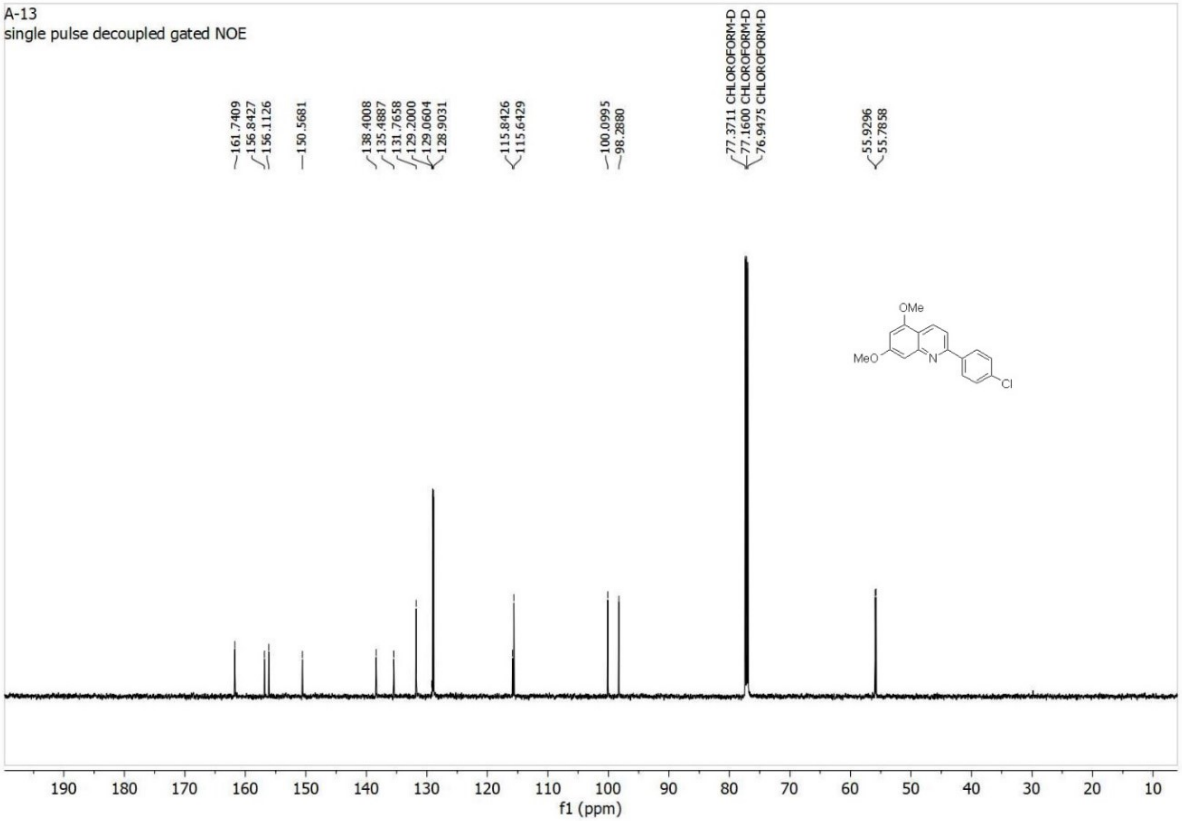


Figure S46. ^{13}C NMR Spectrum of **17d** in $CDCl_3$.

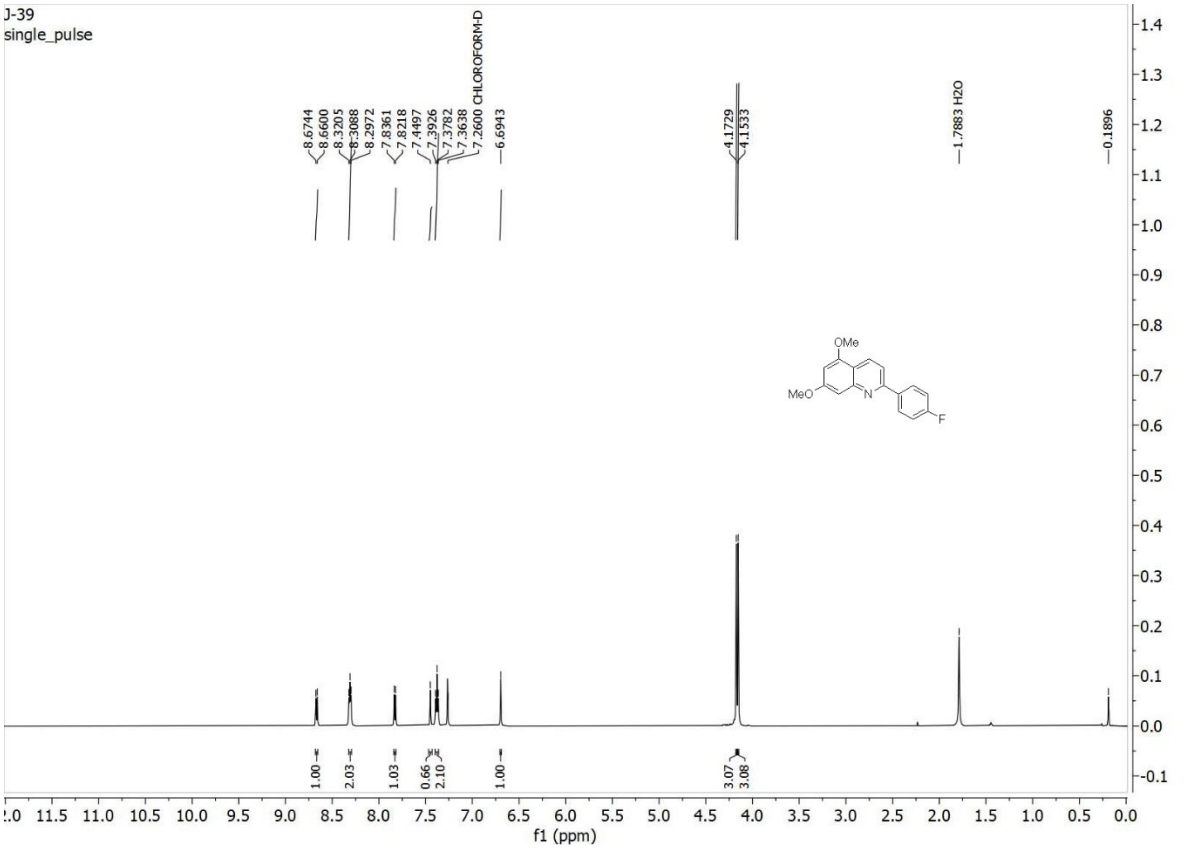


Figure S47. ^{1}H NMR Spectrum of **18d** in $CDCl_3$.

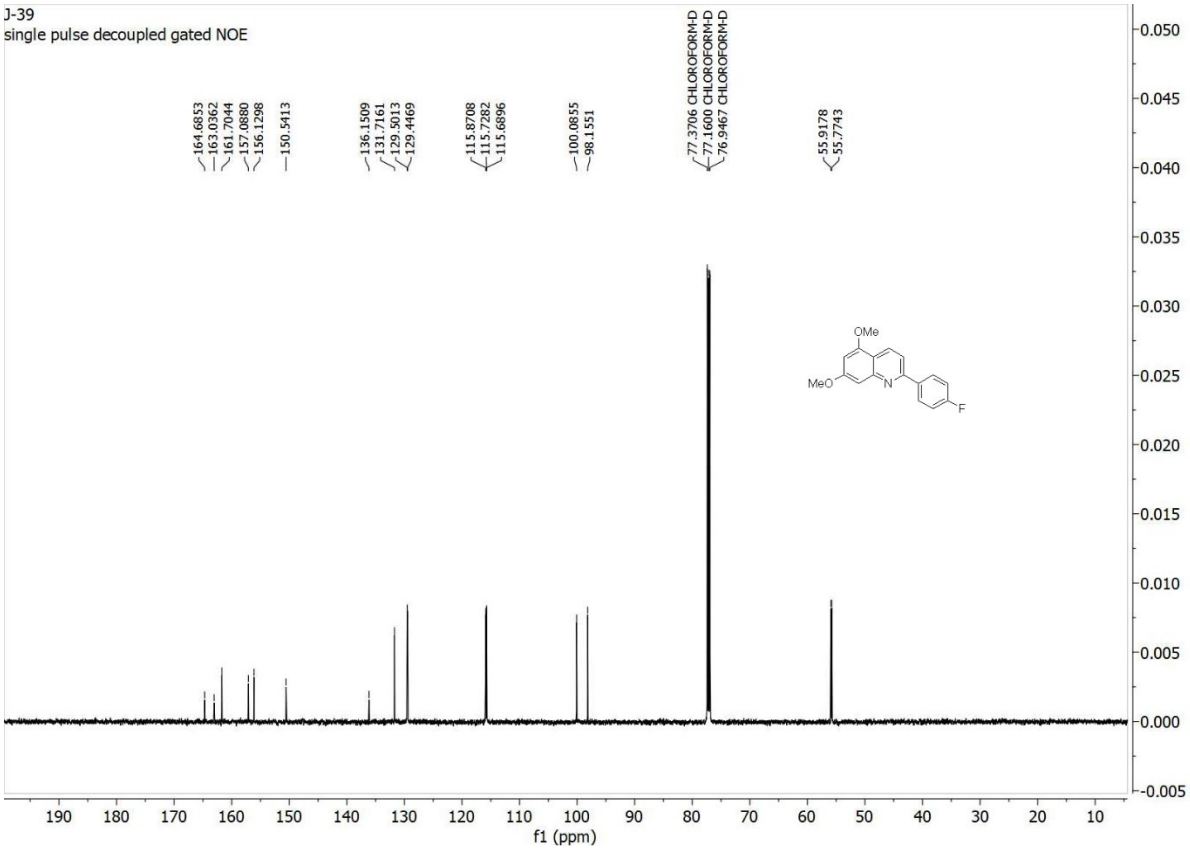


Figure S48. ^{13}C NMR Spectrum of **18d** in $CDCl_3$.

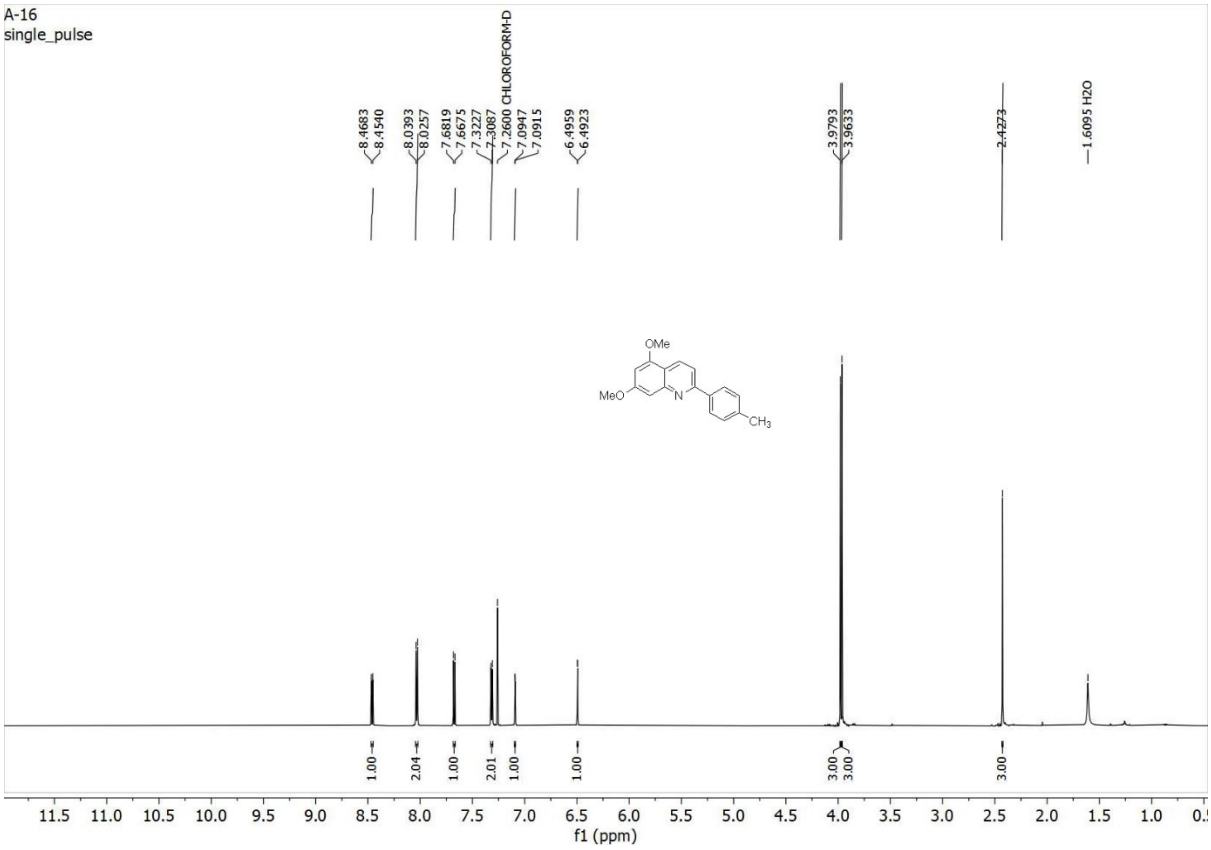


Figure S49. ^{1}H NMR Spectrum of **20d** in $CDCl_3$.

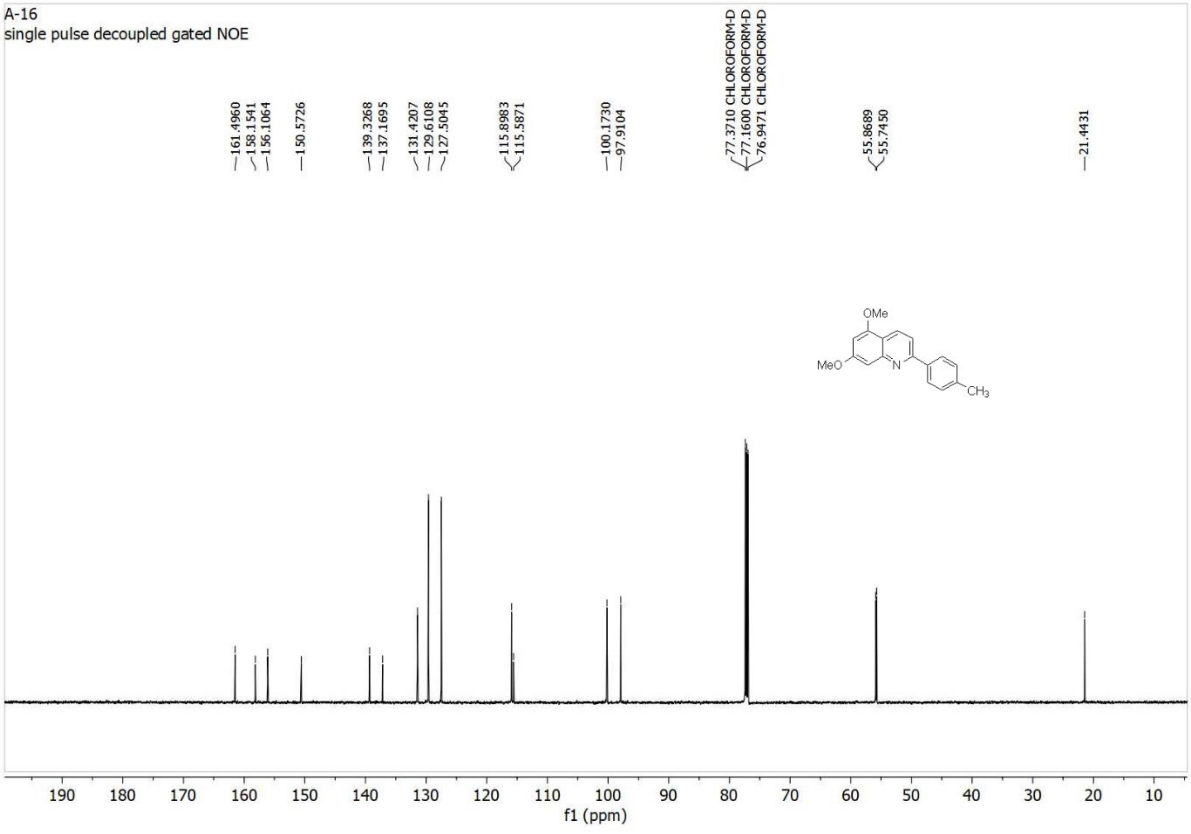


Figure S50. ^{13}C NMR Spectrum of **20d** in $CDCl_3$.

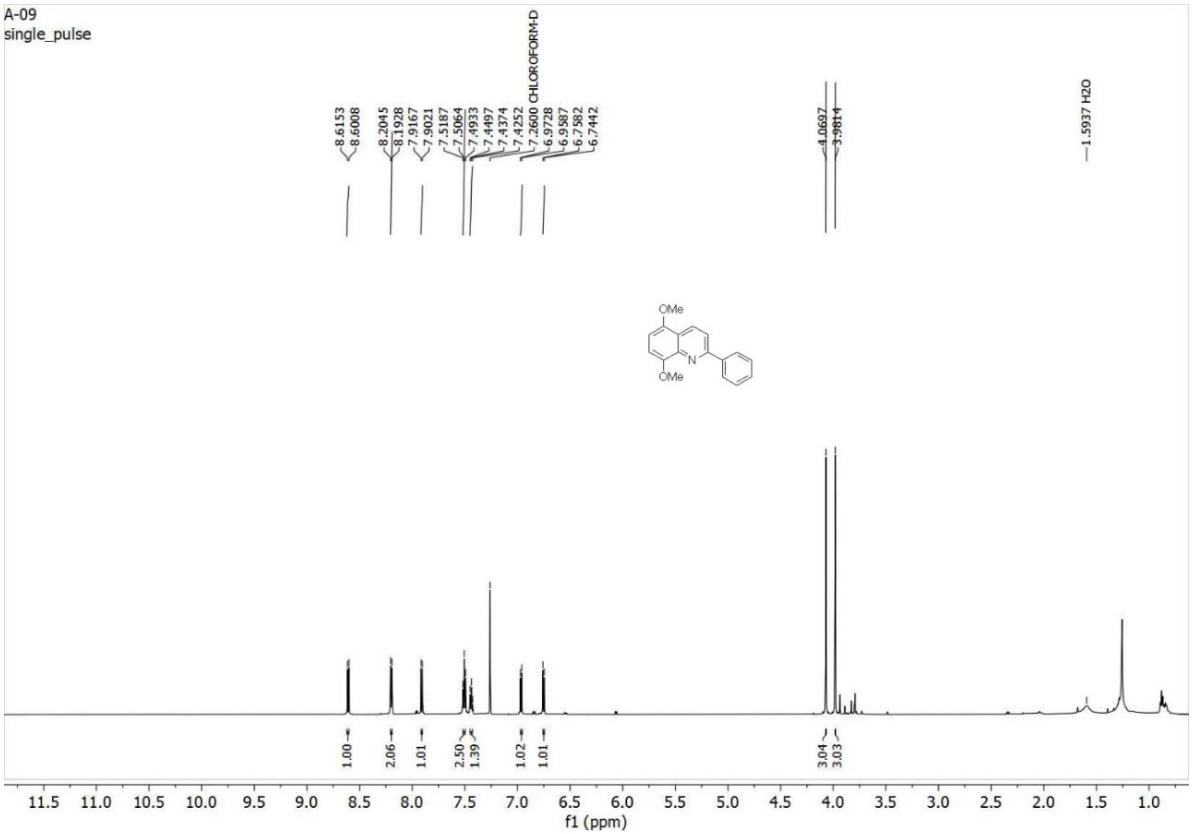


Figure S51. ^{1}H NMR Spectrum of **15e** in $CDCl_3$.

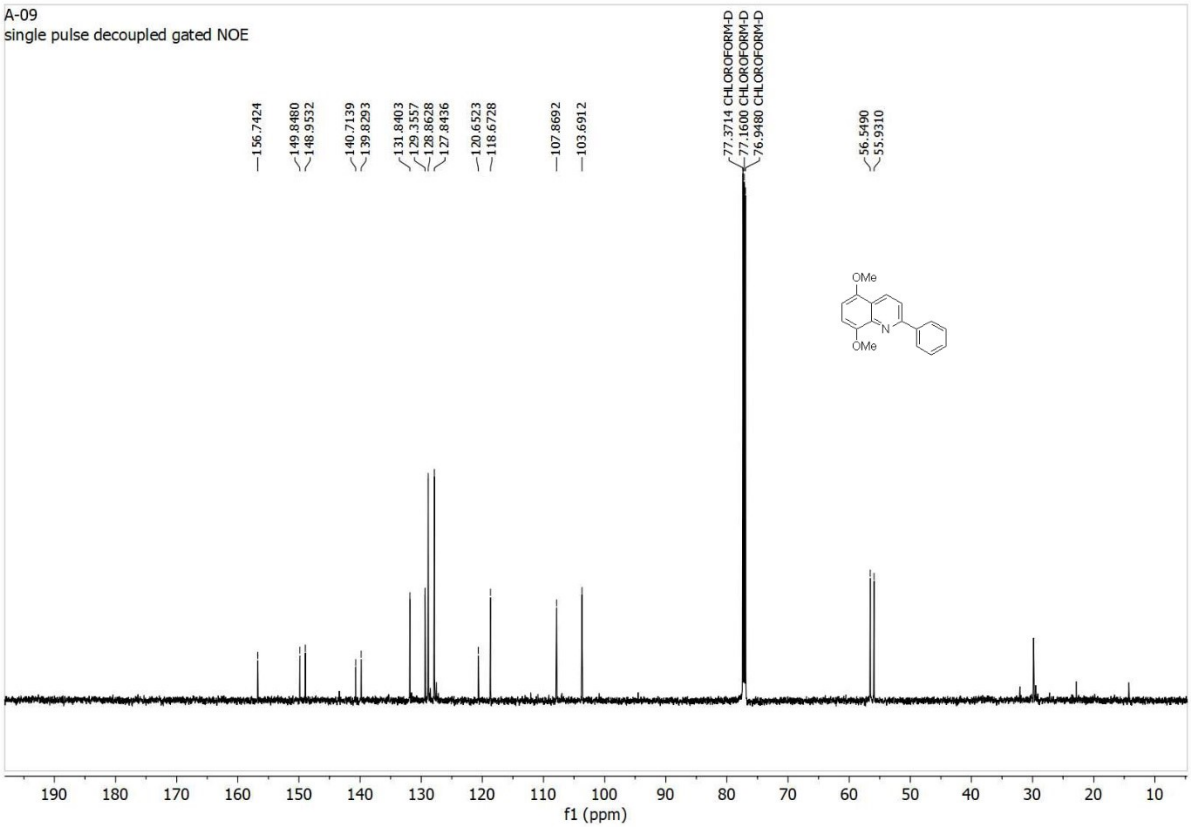


Figure S52. ^{13}C NMR Spectrum of **15e** in $CDCl_3$.

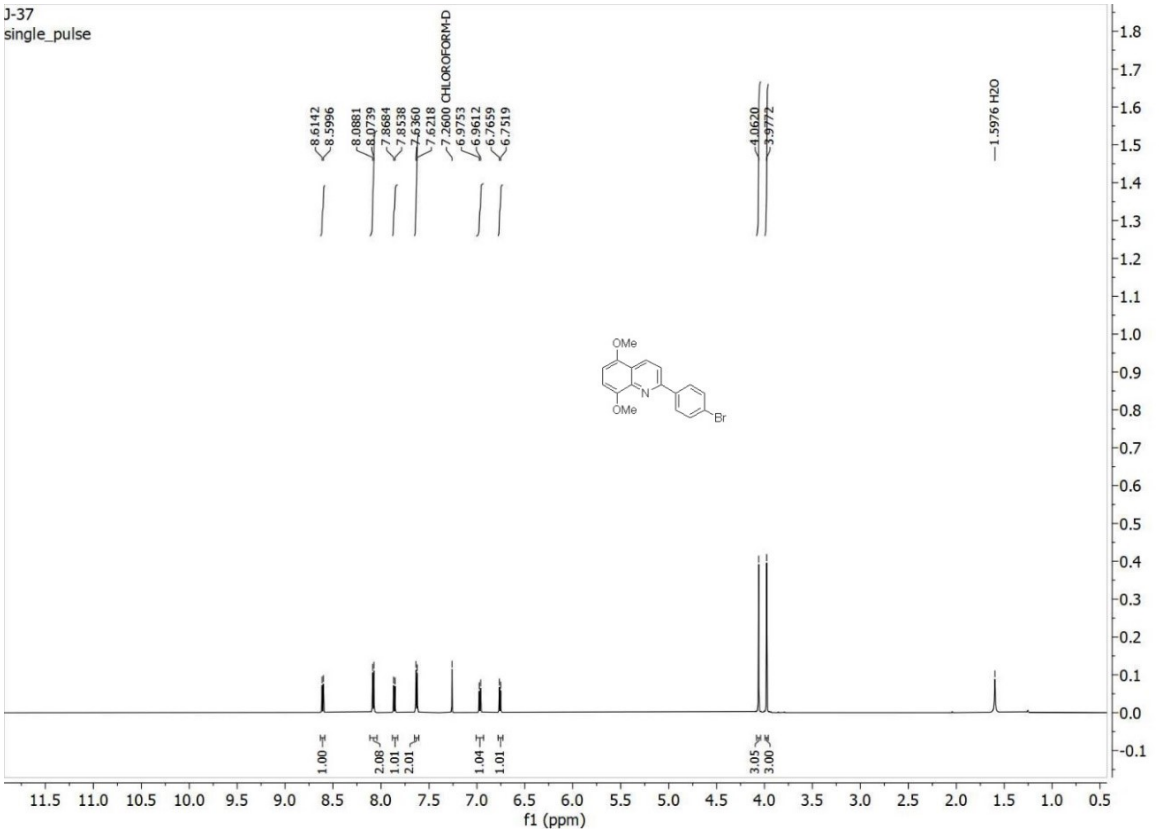


Figure S53. ^{1}H NMR Spectrum of **16e** in $CDCl_3$.

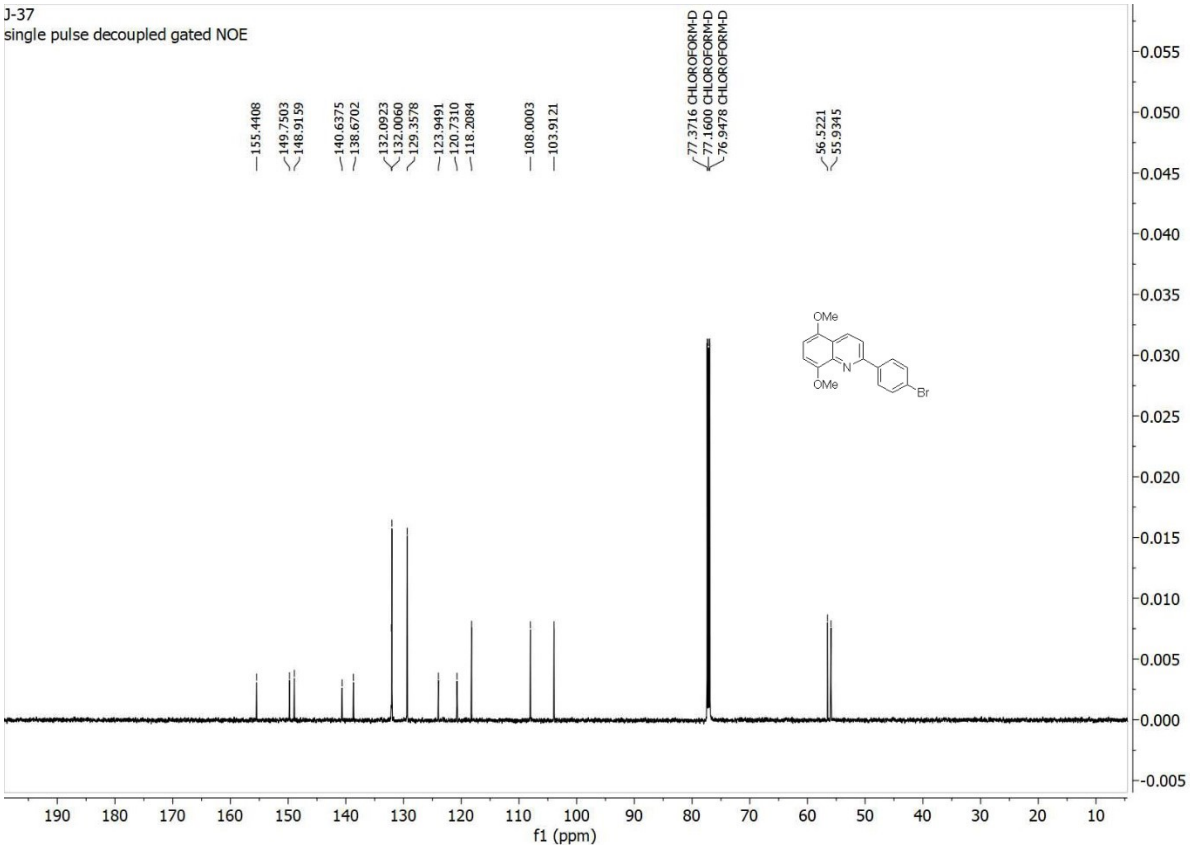


Figure S54. ^{13}C NMR Spectrum of **16e** in $CDCl_3$.

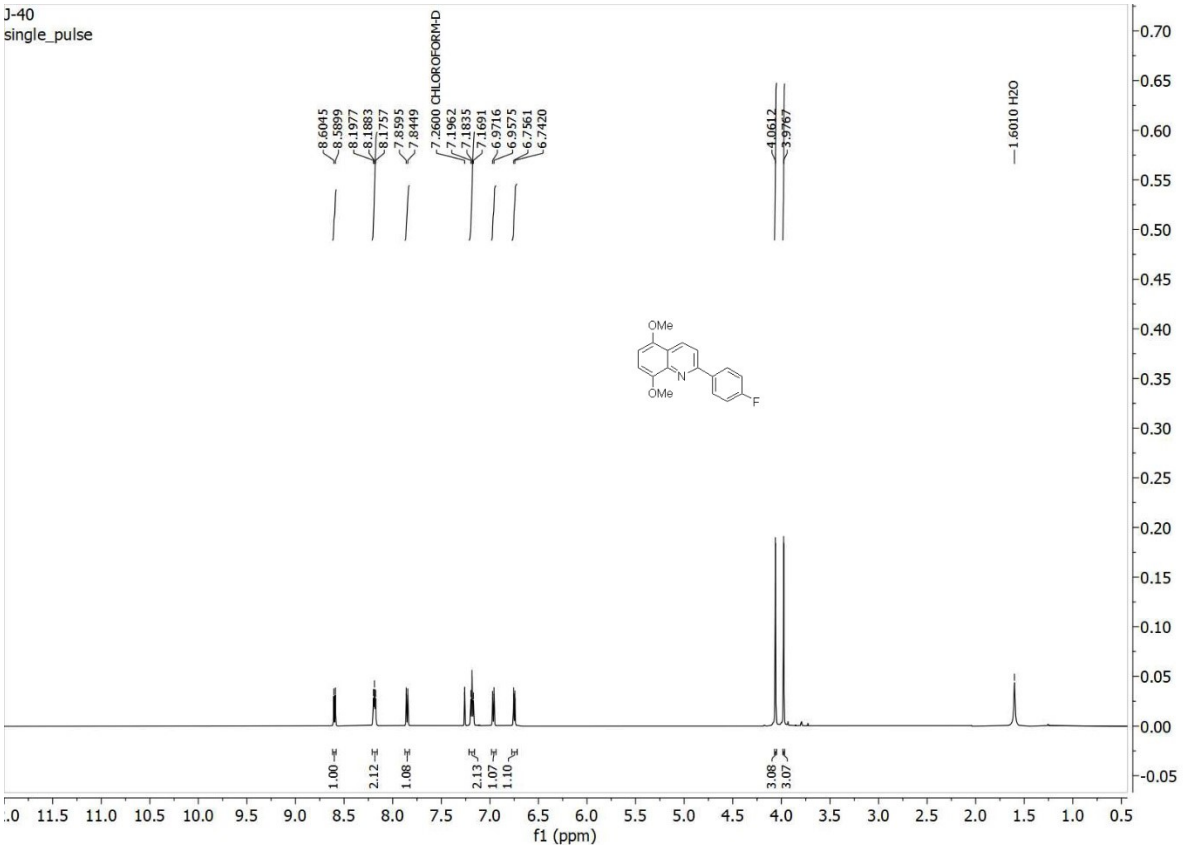


Figure S55. ^{1}H NMR Spectrum of **18e** in $CDCl_3$.

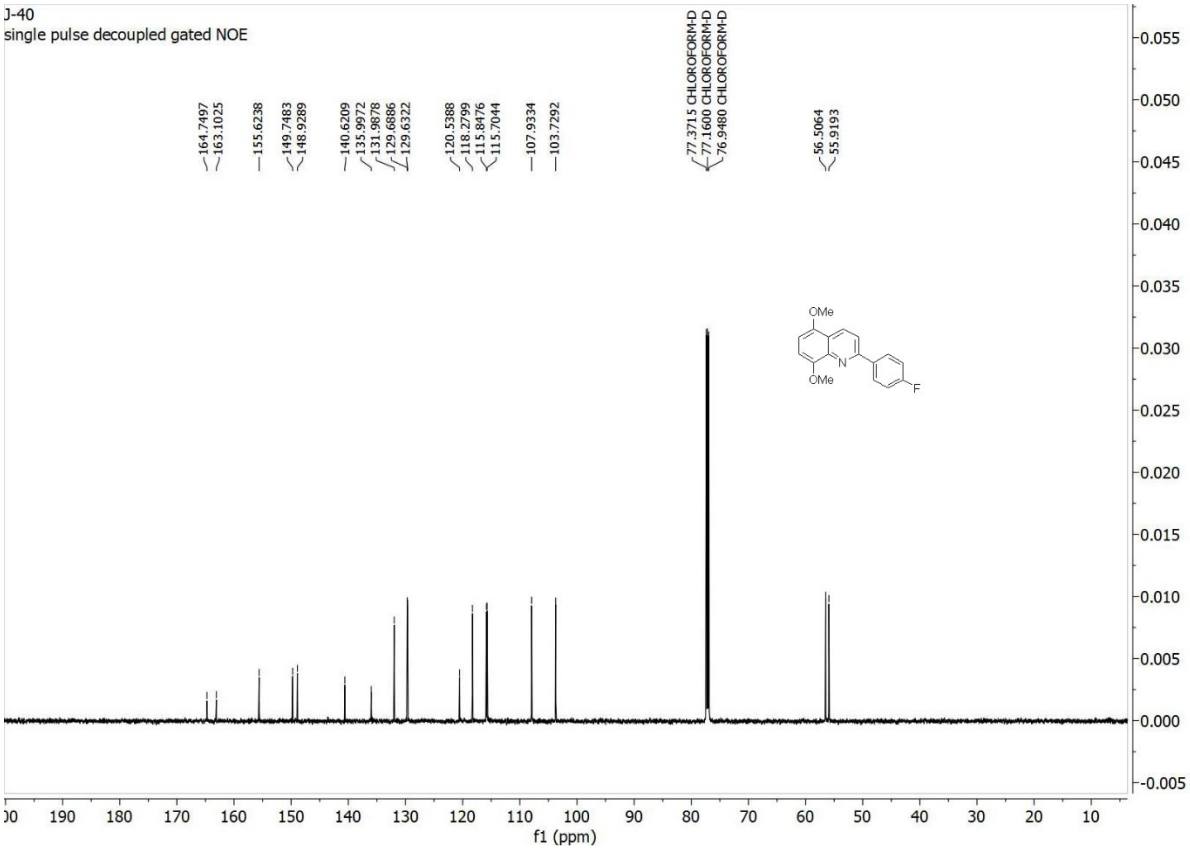


Figure S56. ^{13}C NMR Spectrum of **18e** in $CDCl_3$.

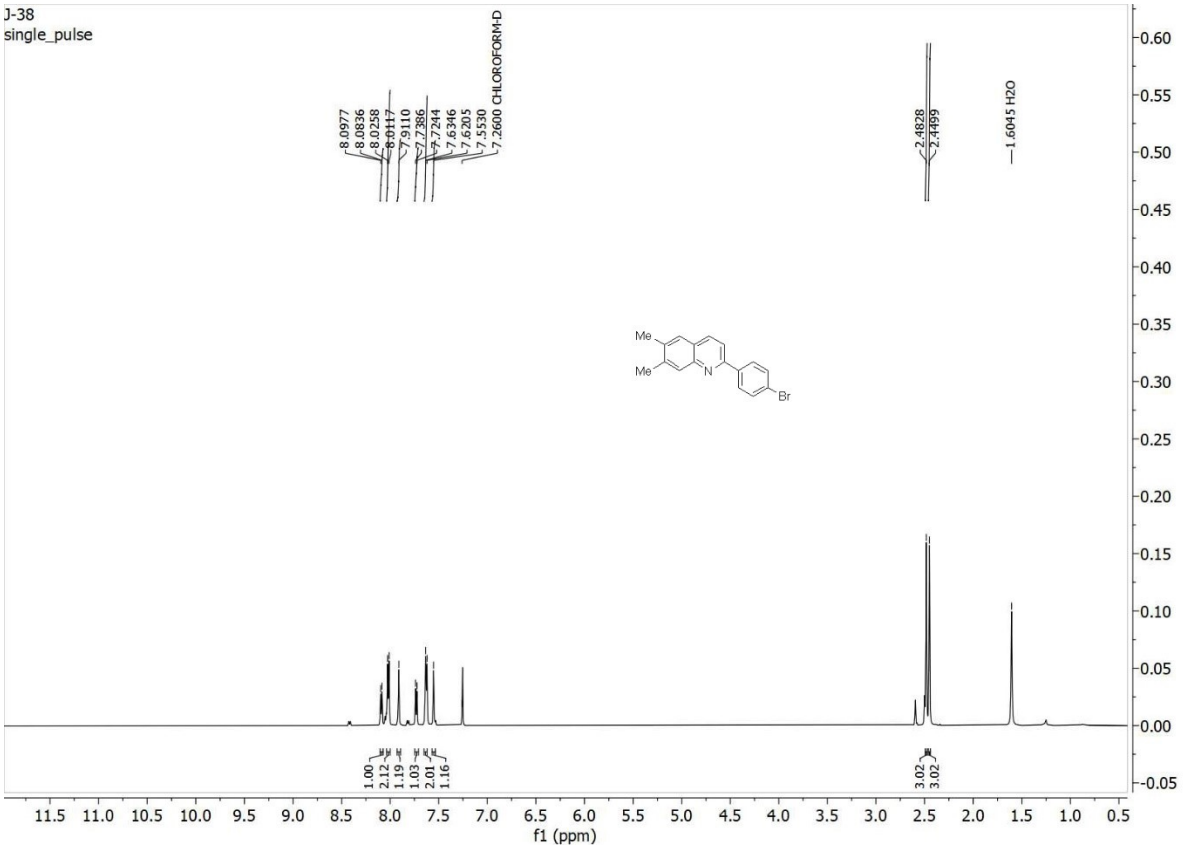


Figure S57. ^{1}H NMR Spectrum of **16f** in $CDCl_3$.

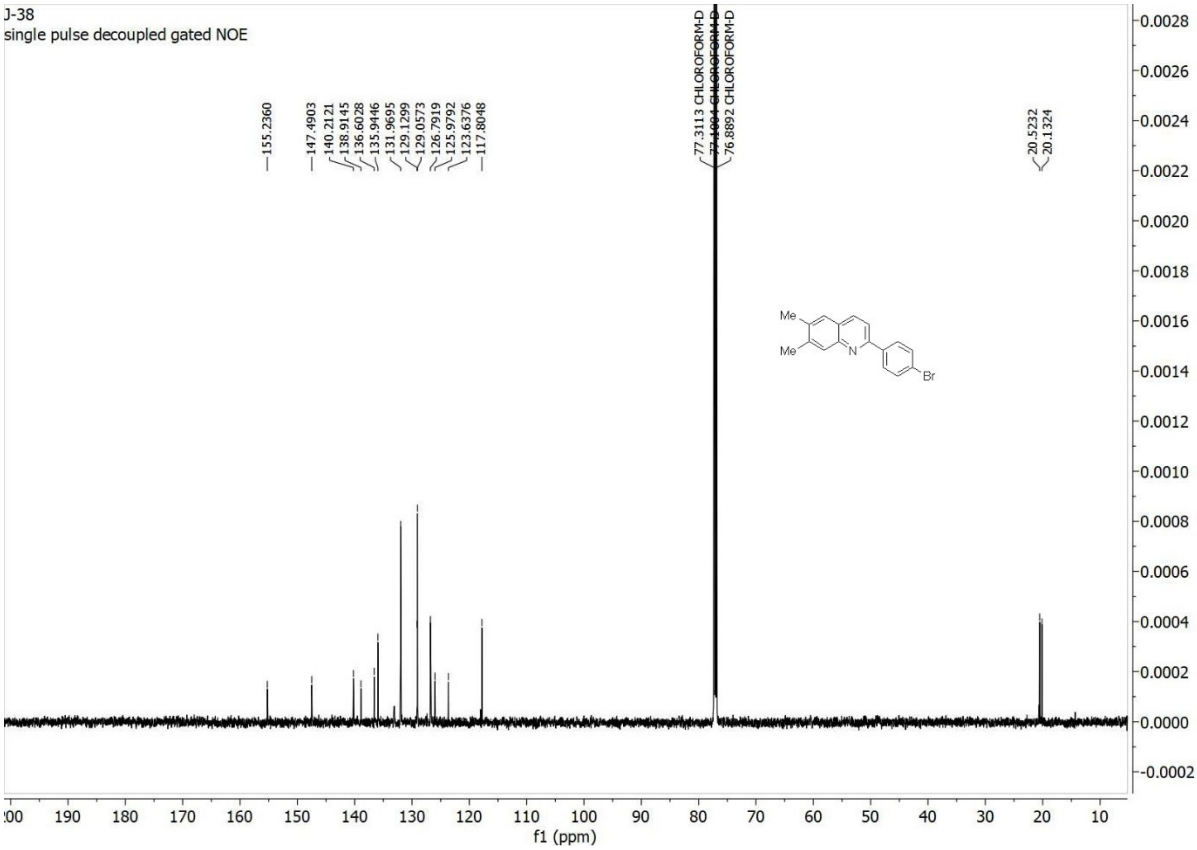


Figure S58. ^{13}C NMR Spectrum of **16f** in $CDCl_3$.

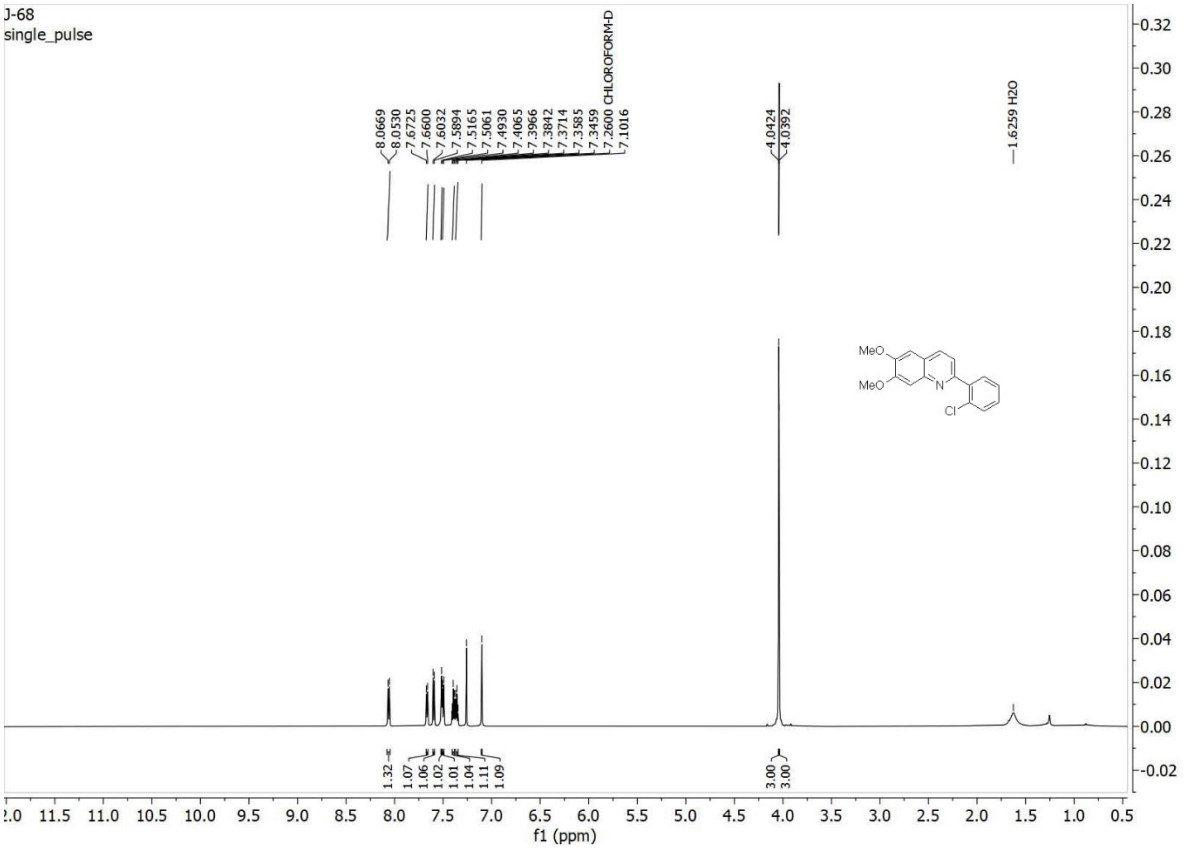


Figure S59. ^{1}H NMR Spectrum of **23a** in $CDCl_3$.

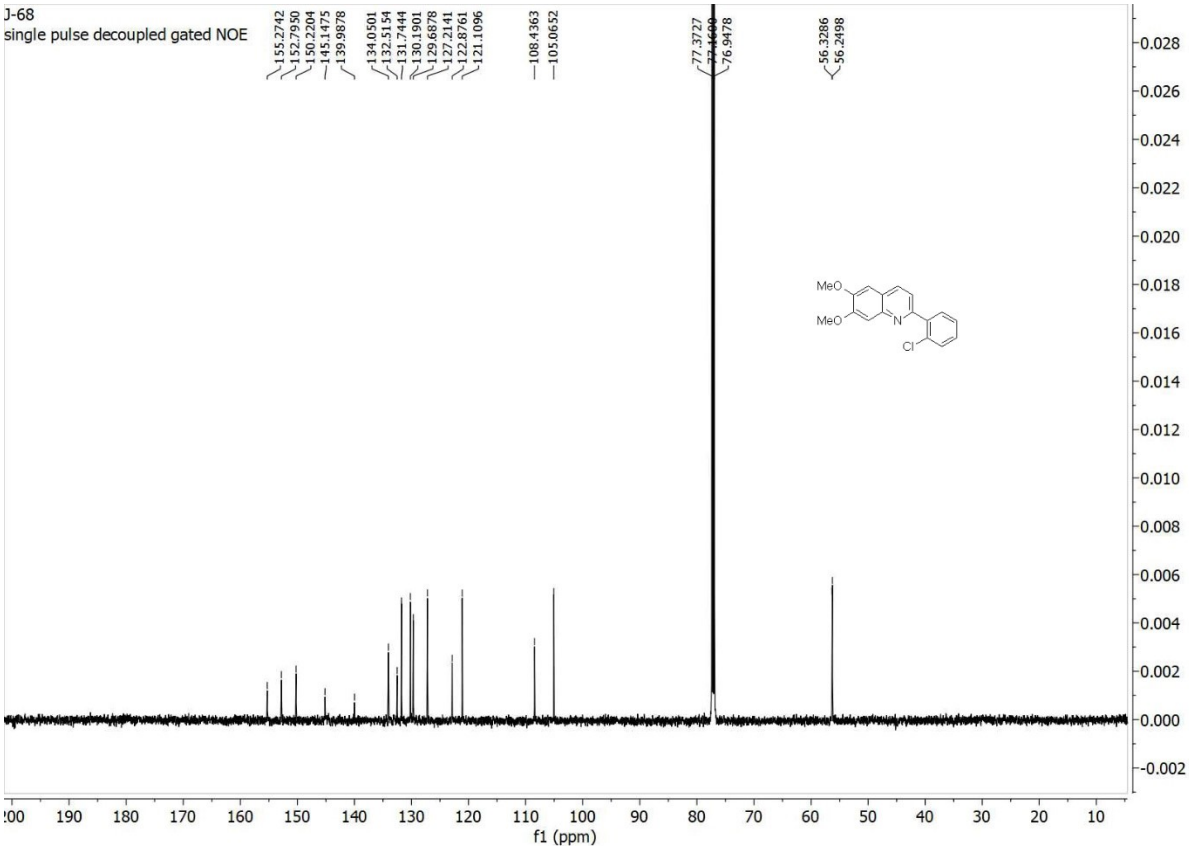


Figure S60. ^{13}C NMR Spectrum of **23a** in $CDCl_3$.

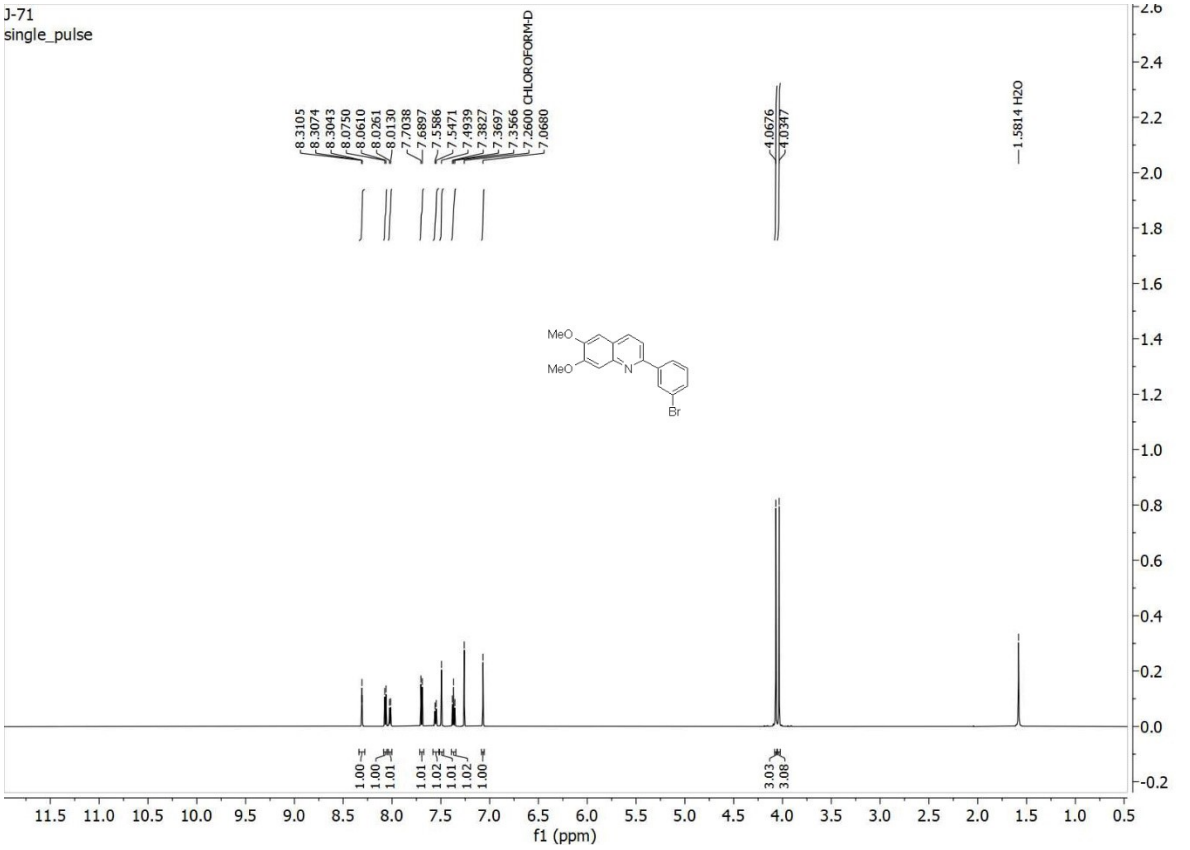


Figure S61. ^{1}H NMR Spectrum of **24a** in $CDCl_3$.

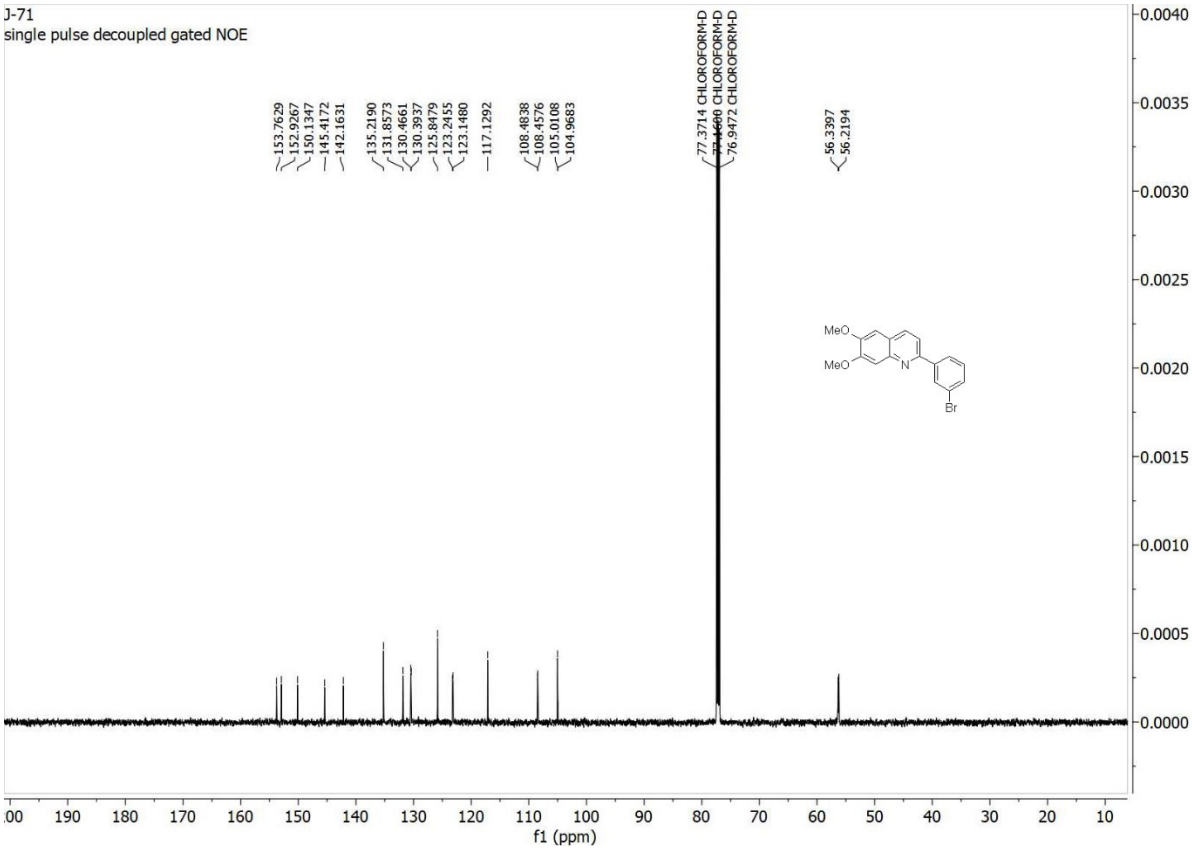


Figure S62. ^{13}C NMR Spectrum of **24a** in $CDCl_3$.

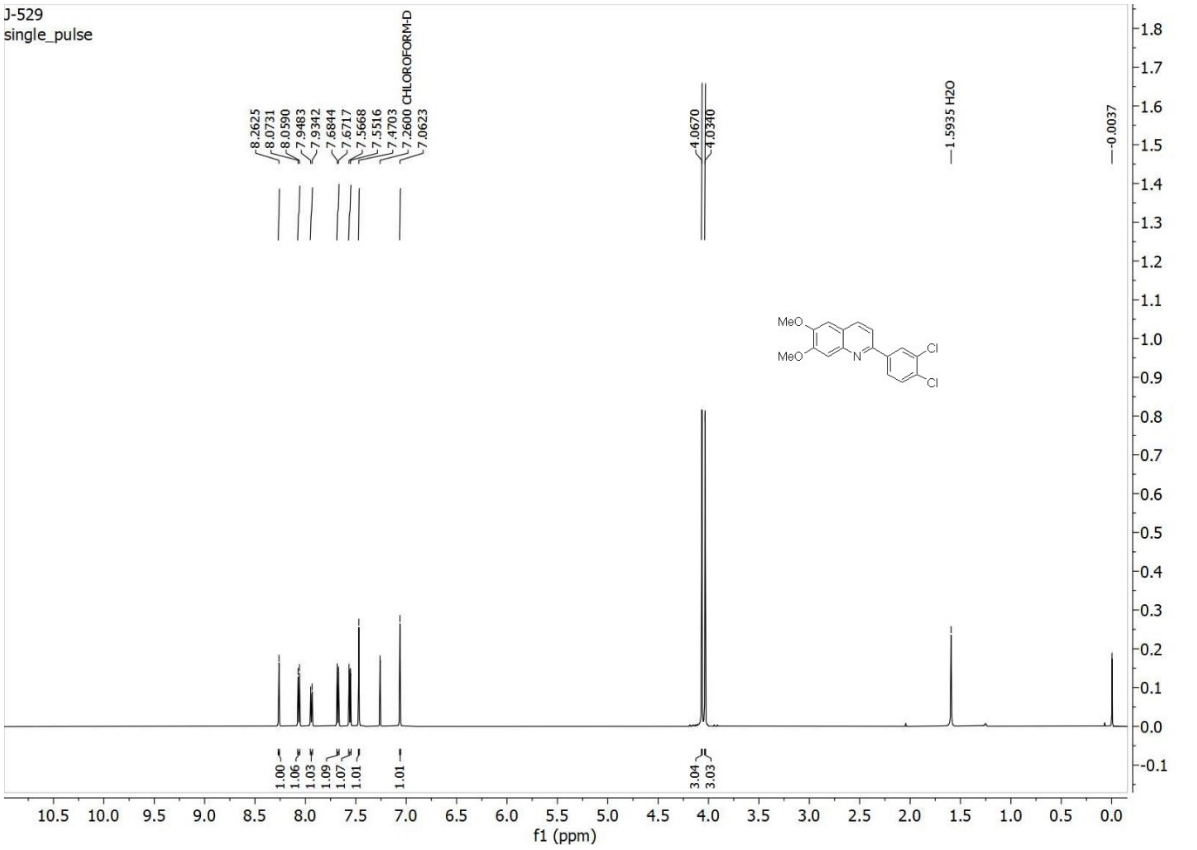


Figure S63. ^{1}H NMR Spectrum of **25a** in $CDCl_3$.

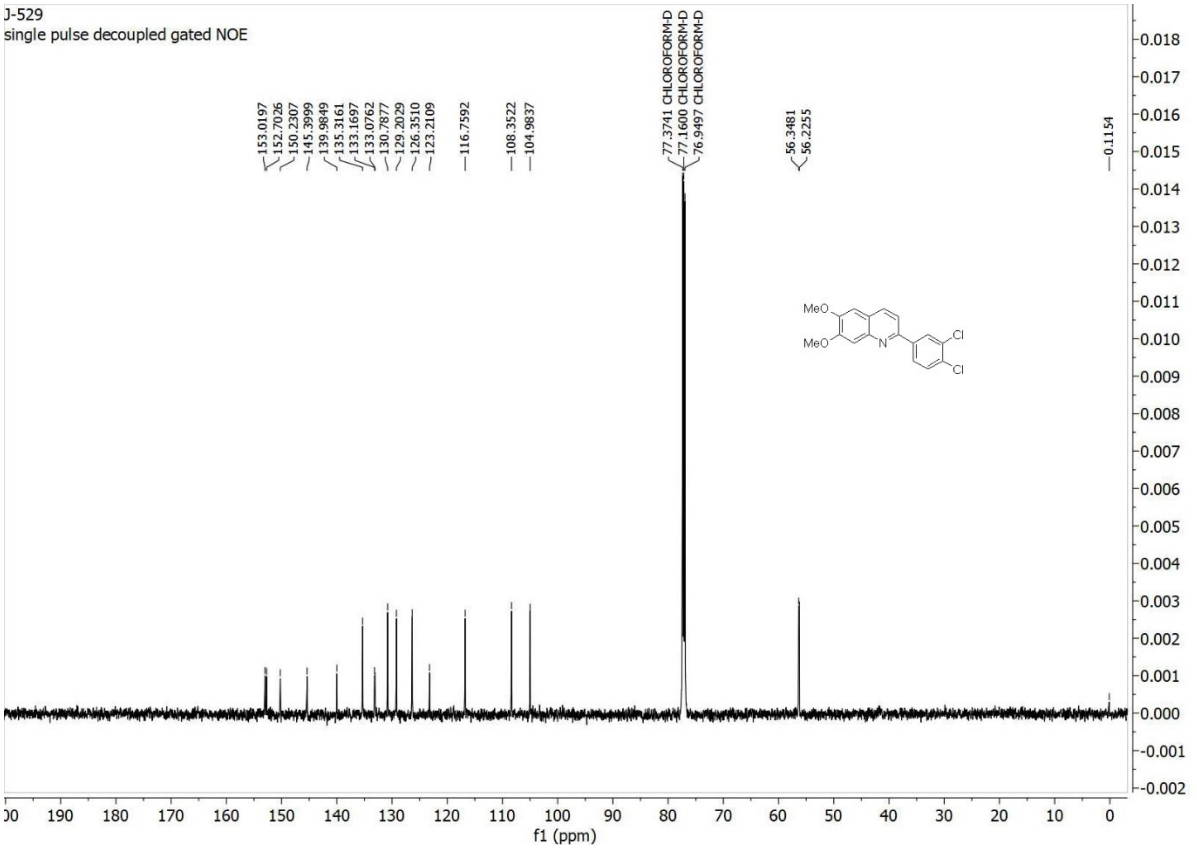


Figure S64. ^{13}C NMR Spectrum of **25a** in $CDCl_3$.

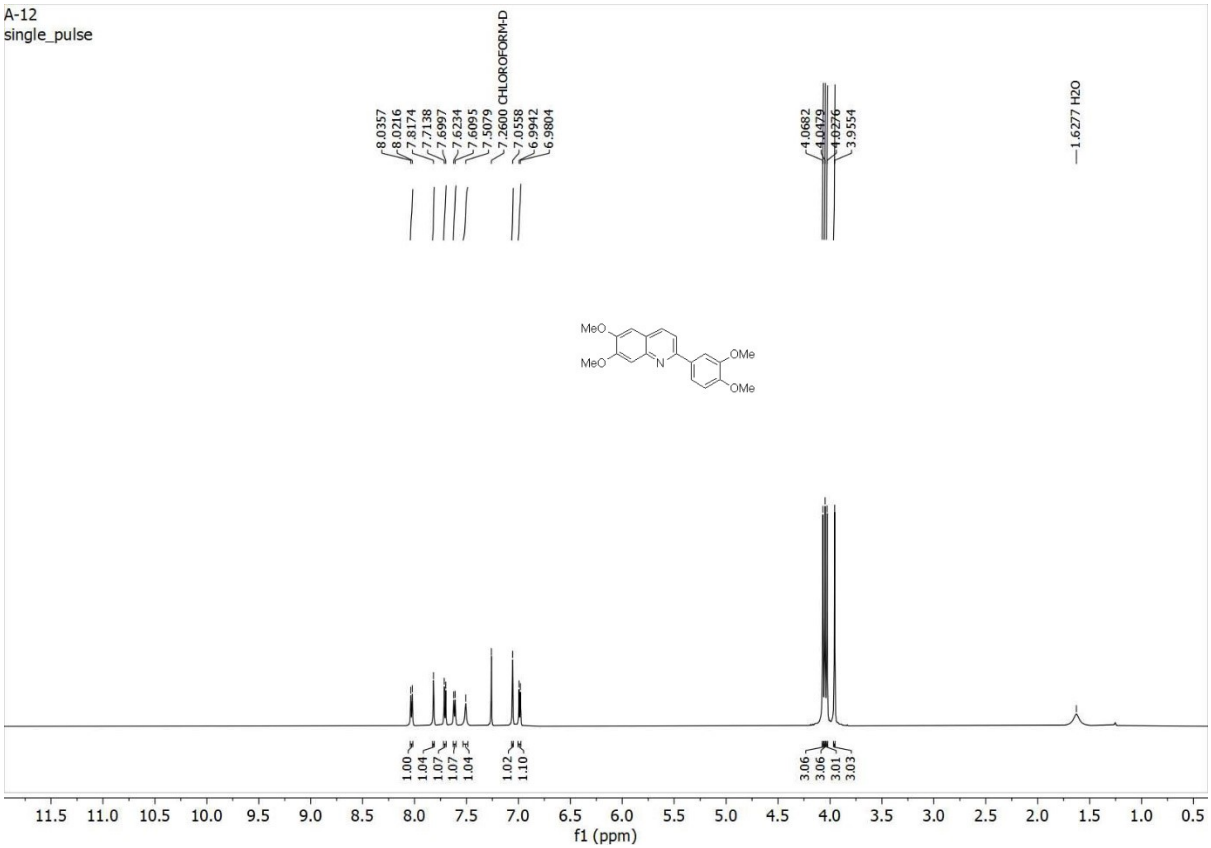


Figure S65. ^{1}H NMR Spectrum of **26a** in $CDCl_3$.

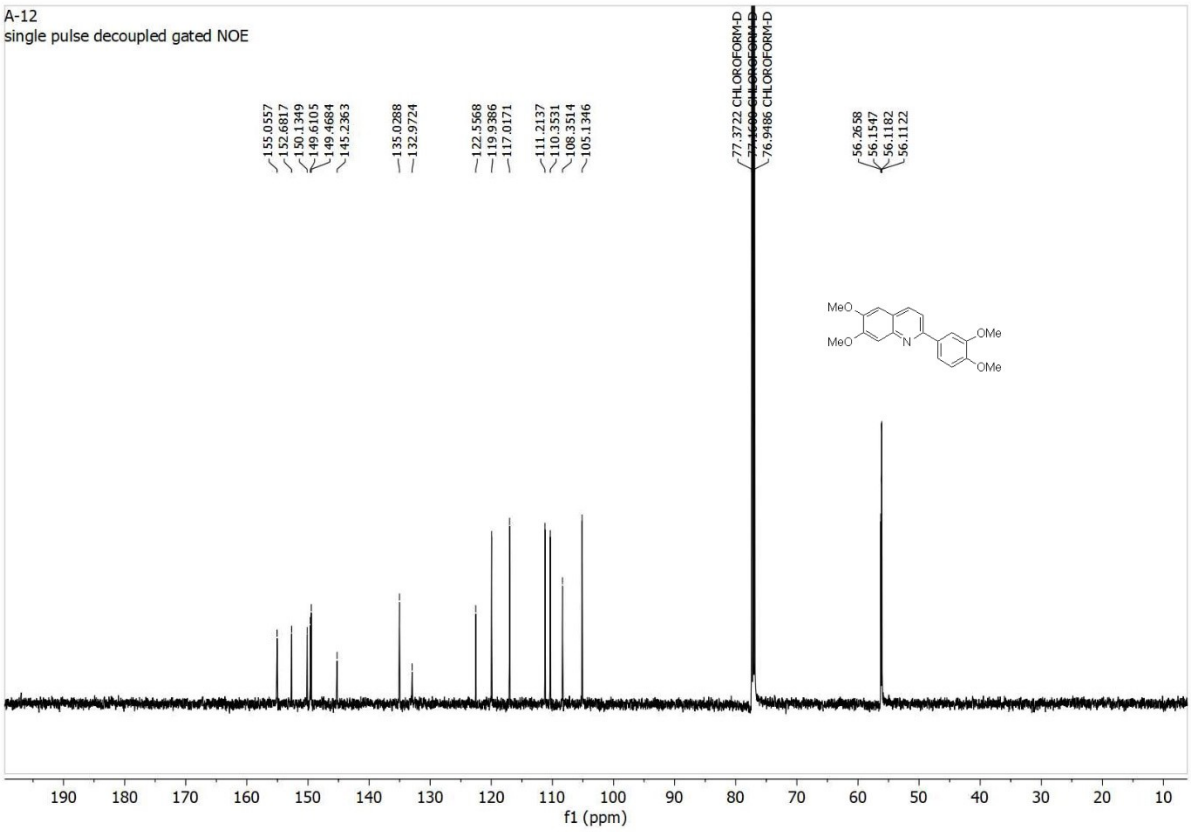


Figure S66. ^{13}C NMR Spectrum of **26a** in $CDCl_3$.

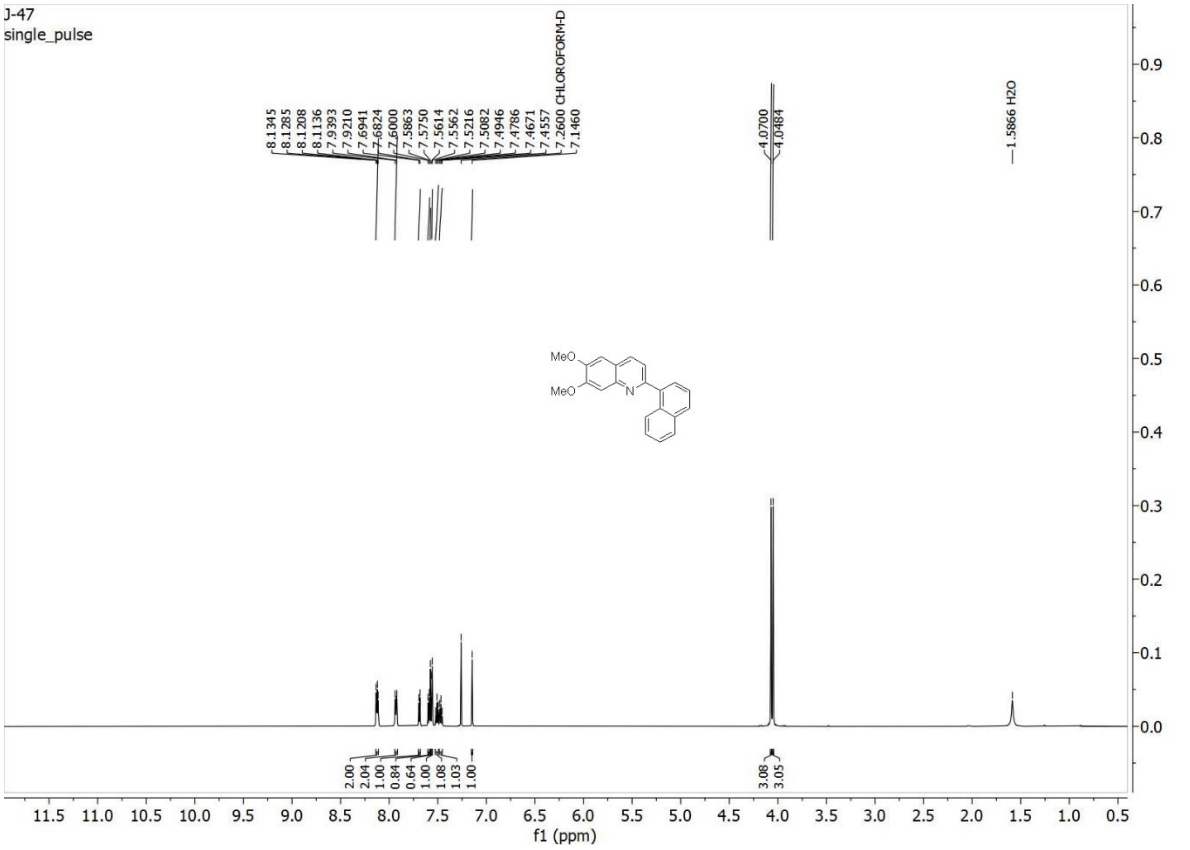


Figure S67. ^{1}H NMR Spectrum of **27a** in $CDCl_3$.

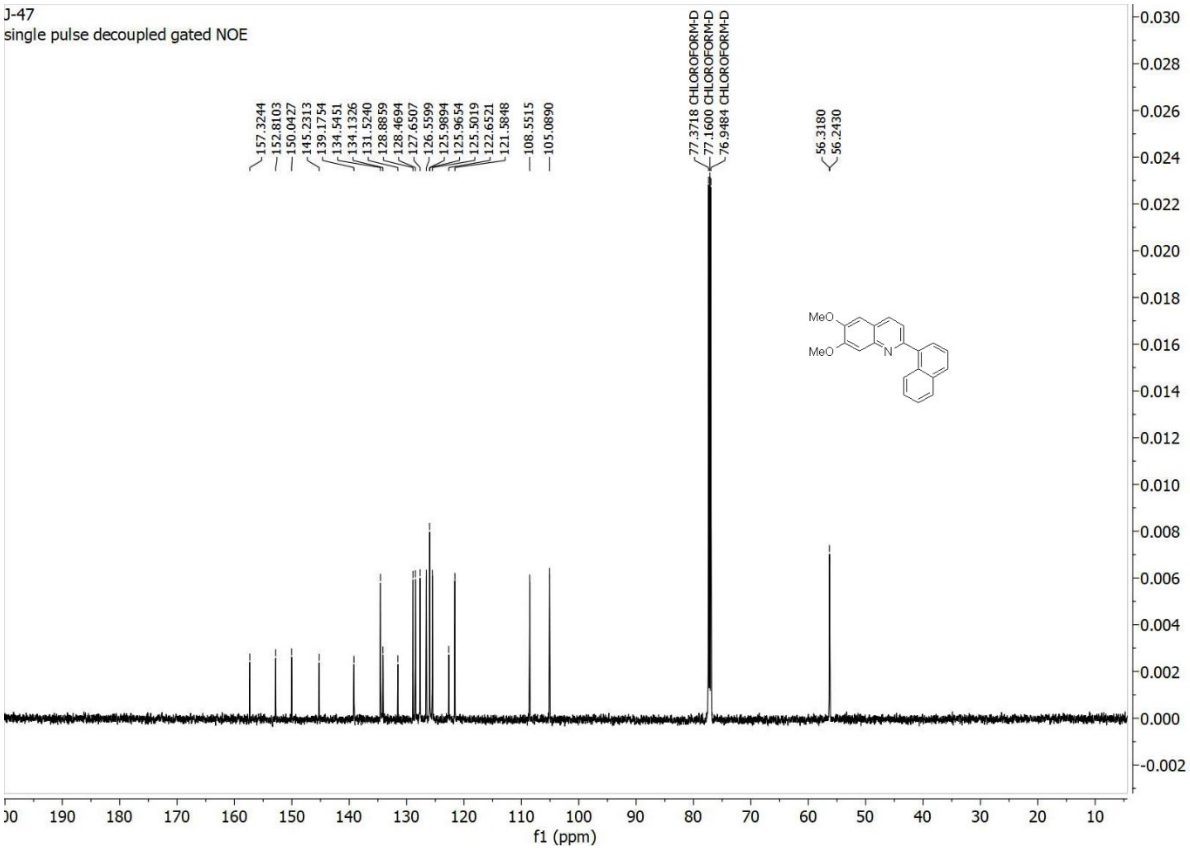


Figure S68. ^{13}C NMR Spectrum of **27a** in $CDCl_3$.

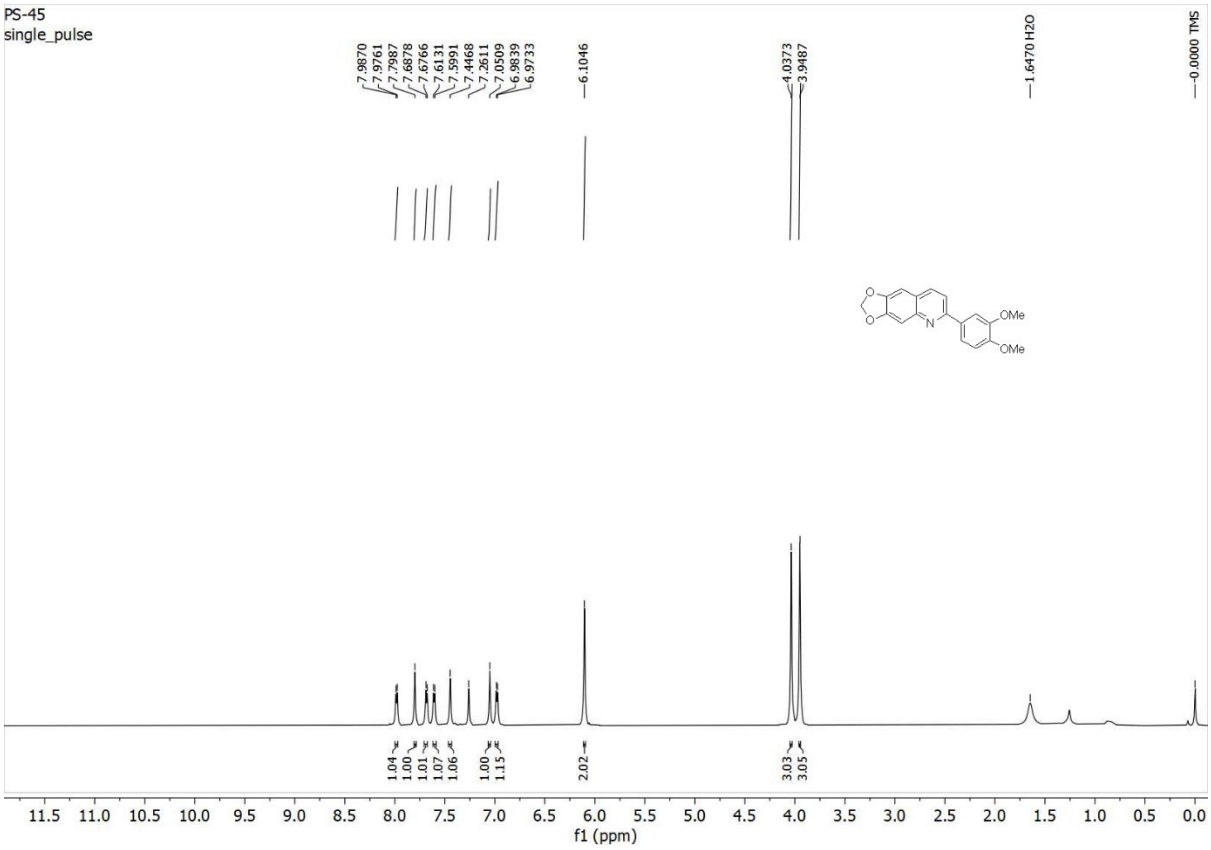


Figure S69. ^{1}H NMR Spectrum of **26b** in $CDCl_3$.

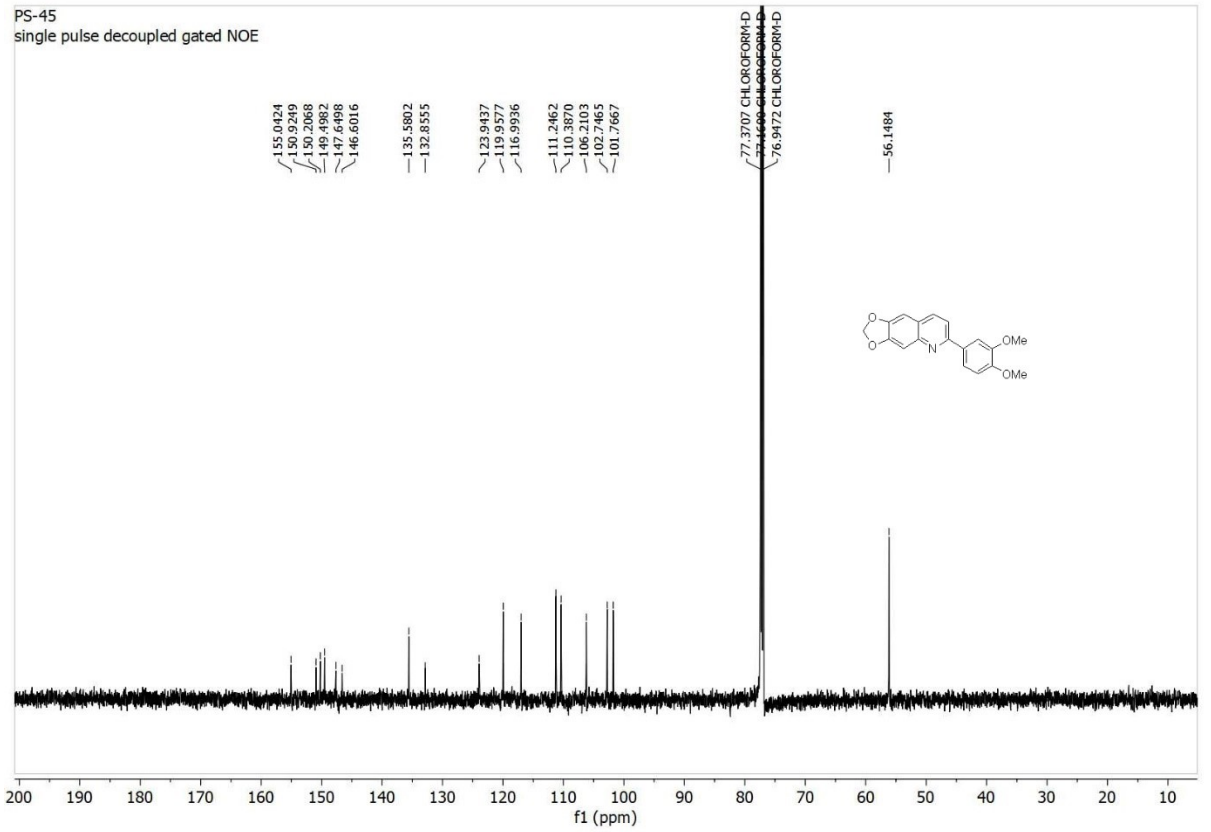


Figure S70. ^{13}C NMR Spectrum of **26b** in $CDCl_3$.

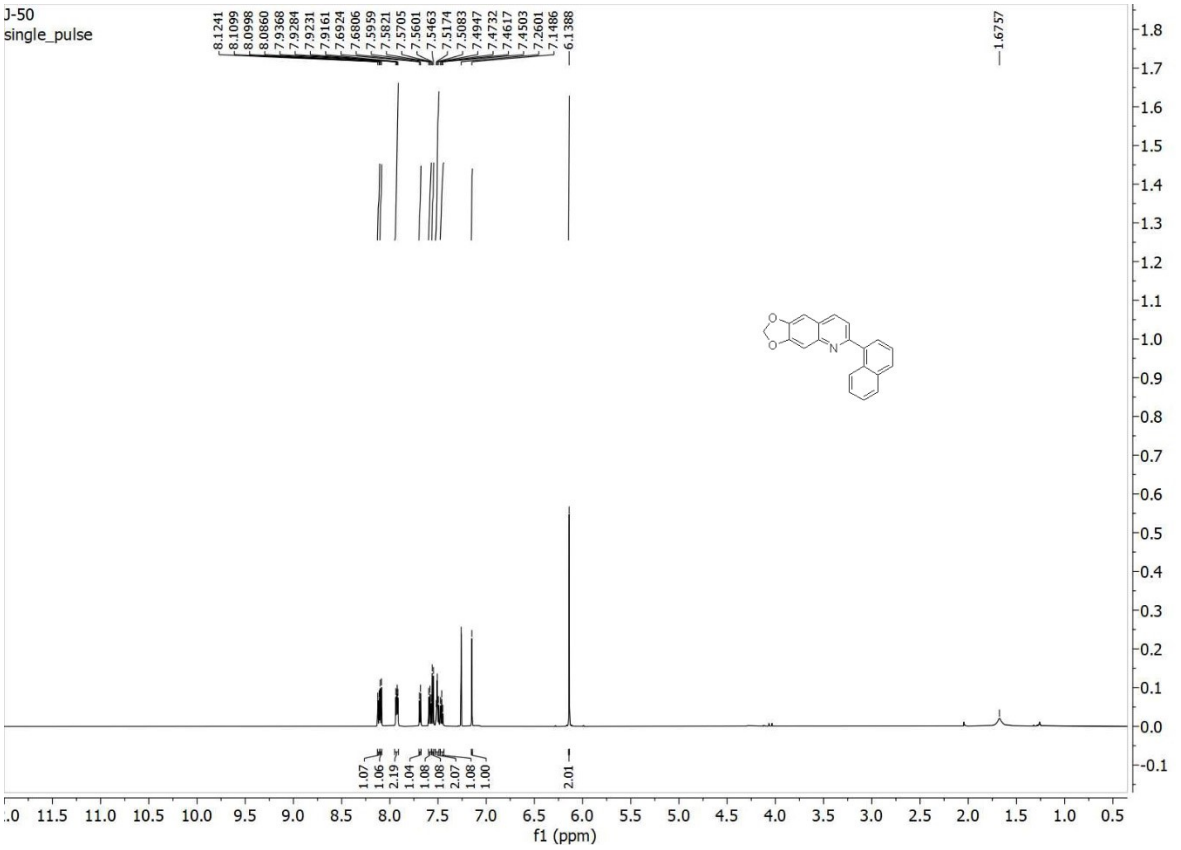


Figure S71. ^{1}H NMR Spectrum of **27b** in $CDCl_3$.

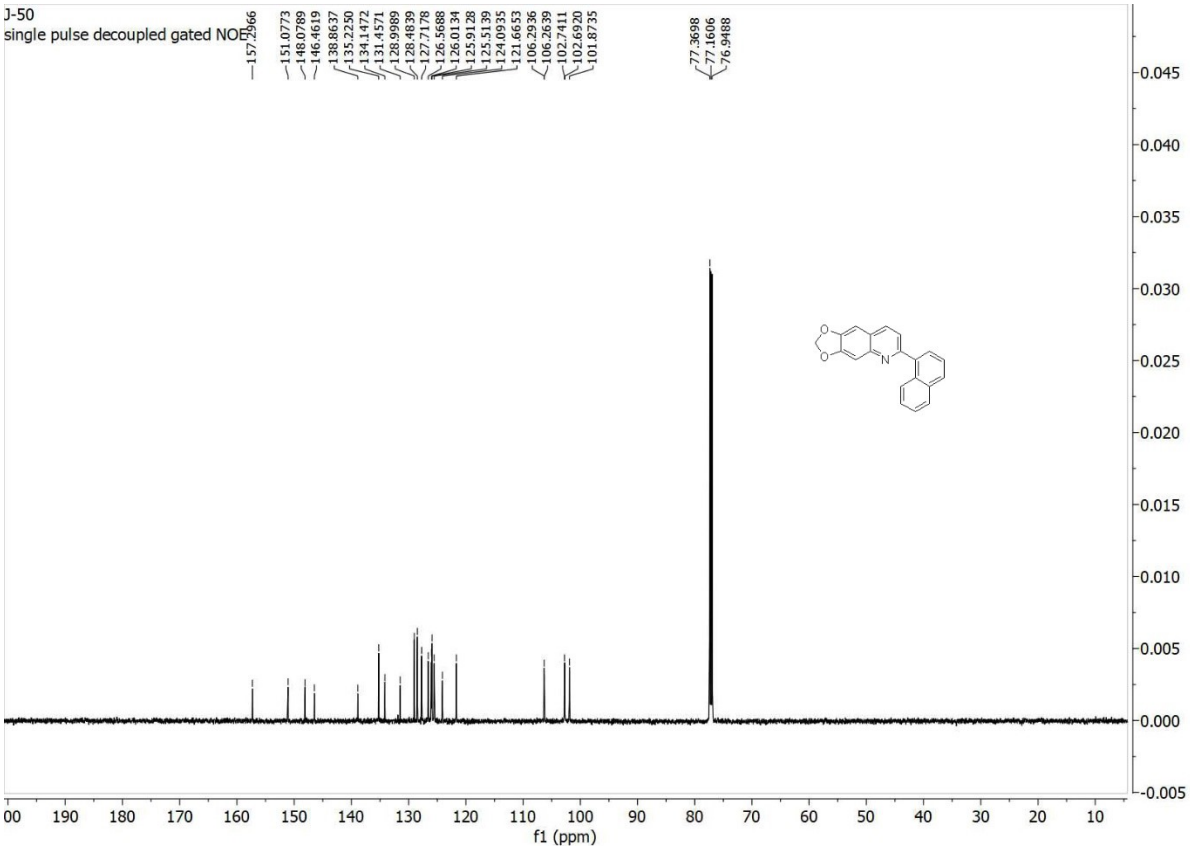


Figure S72. ^{13}C NMR Spectrum of **27b** in $CDCl_3$.

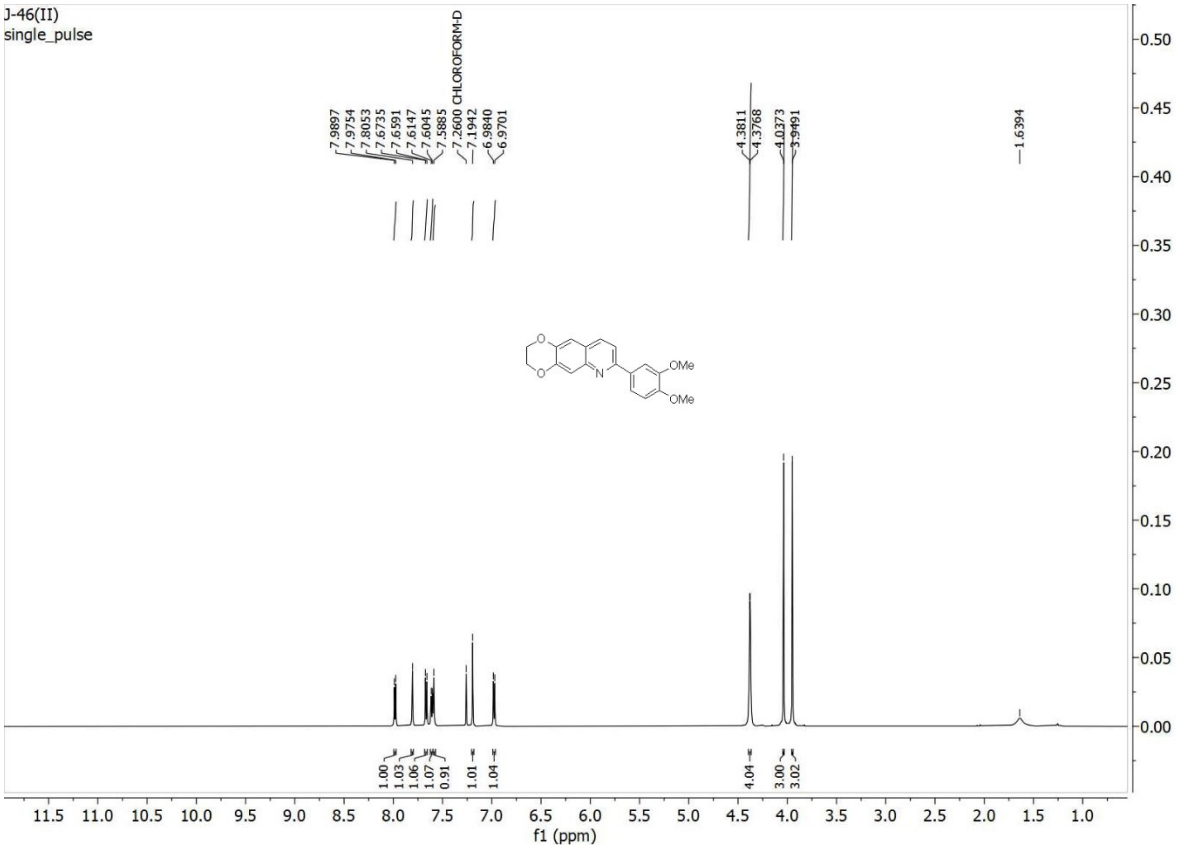


Figure S73. ^{1}H NMR Spectrum of **26c** in $CDCl_3$.

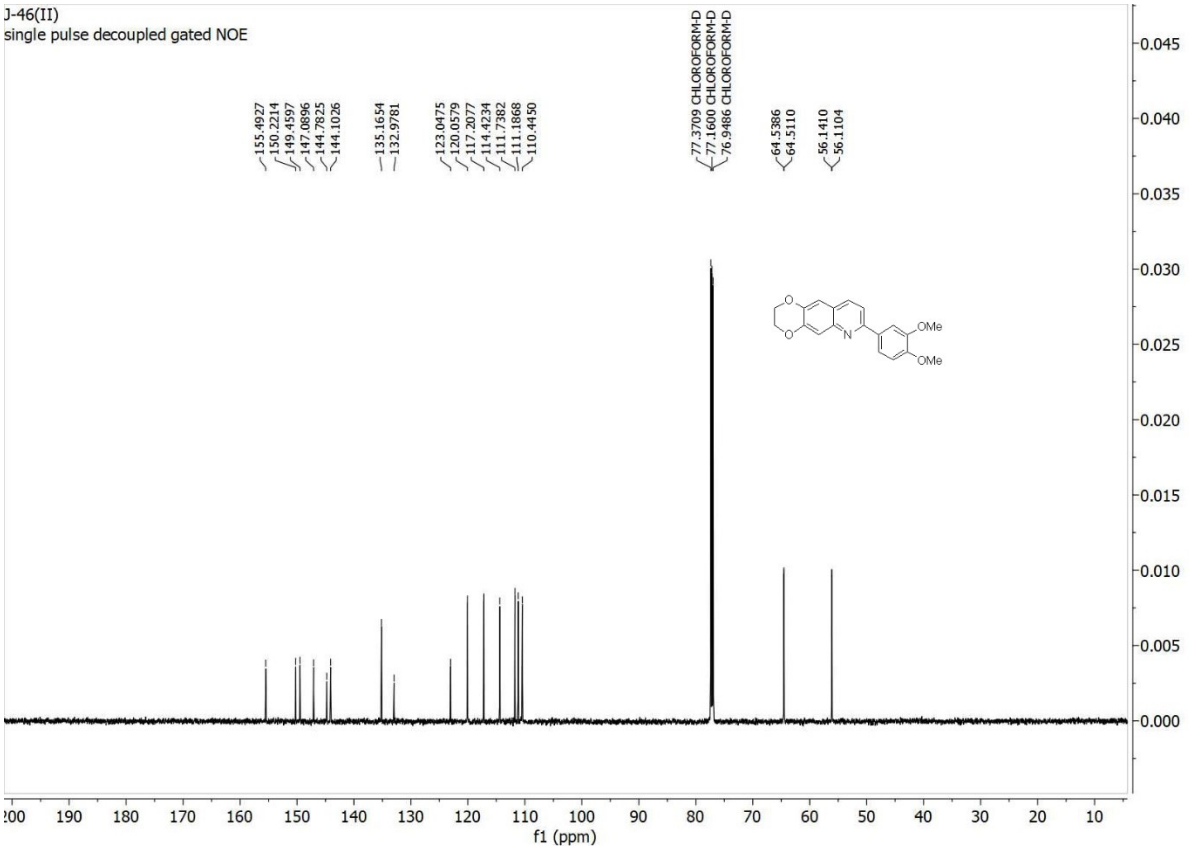


Figure S74. ^{13}C NMR Spectrum of **26c** in $CDCl_3$.

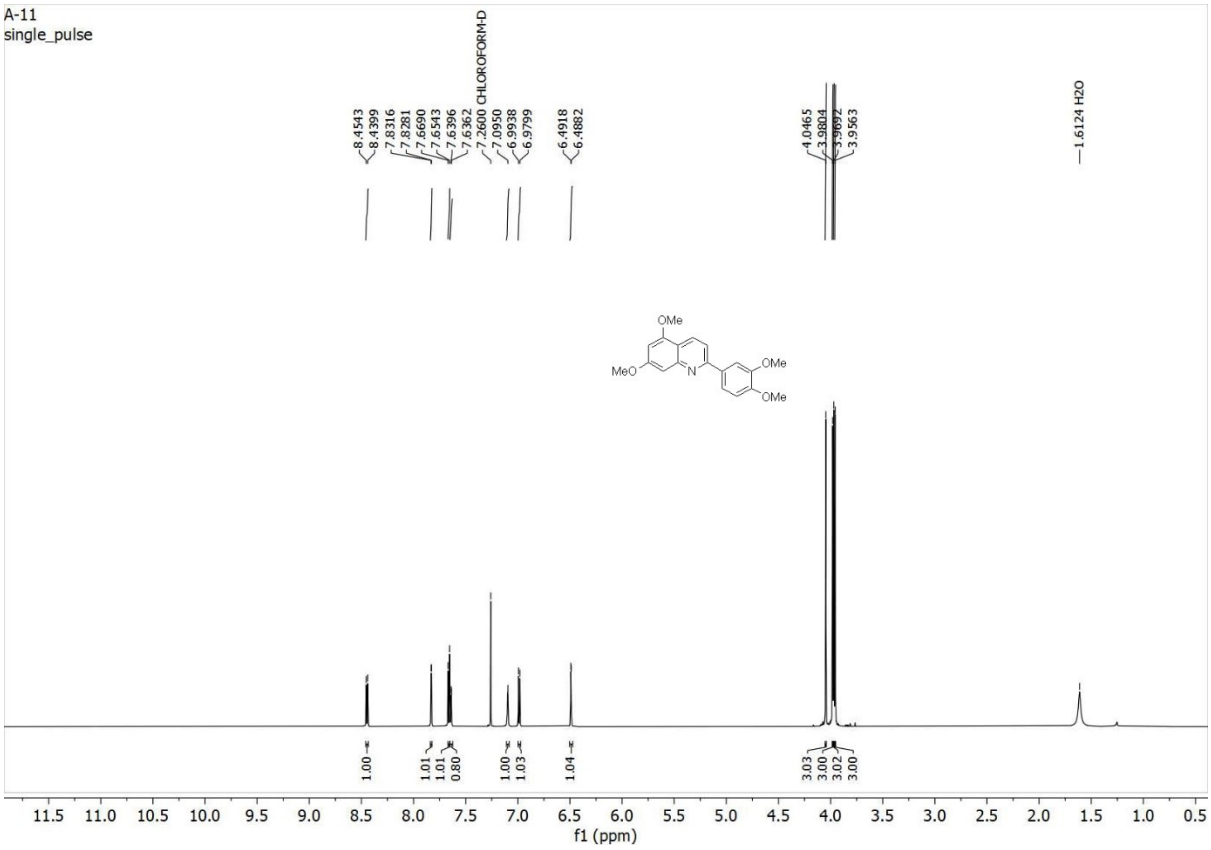


Figure S75. ^{1}H NMR Spectrum of **26d** in $CDCl_3$.

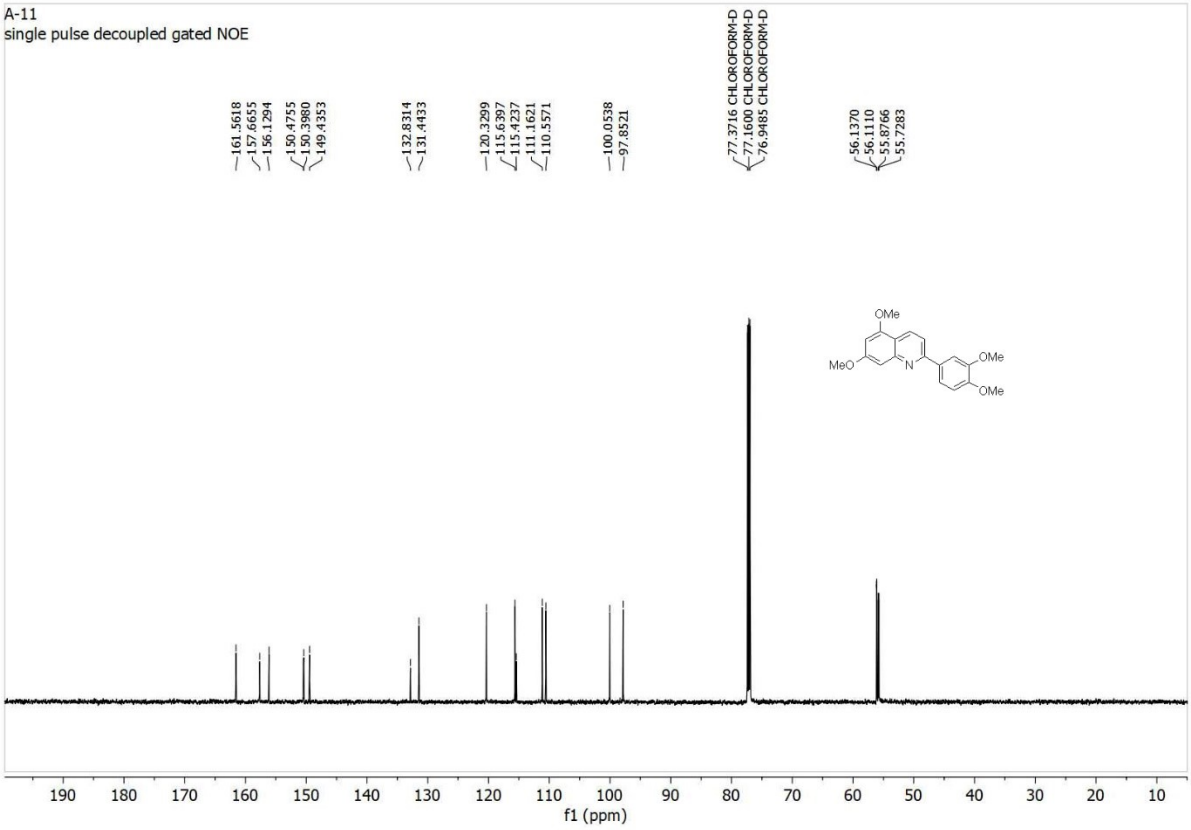


Figure S76. ^{13}C NMR Spectrum of **26d** in $CDCl_3$.

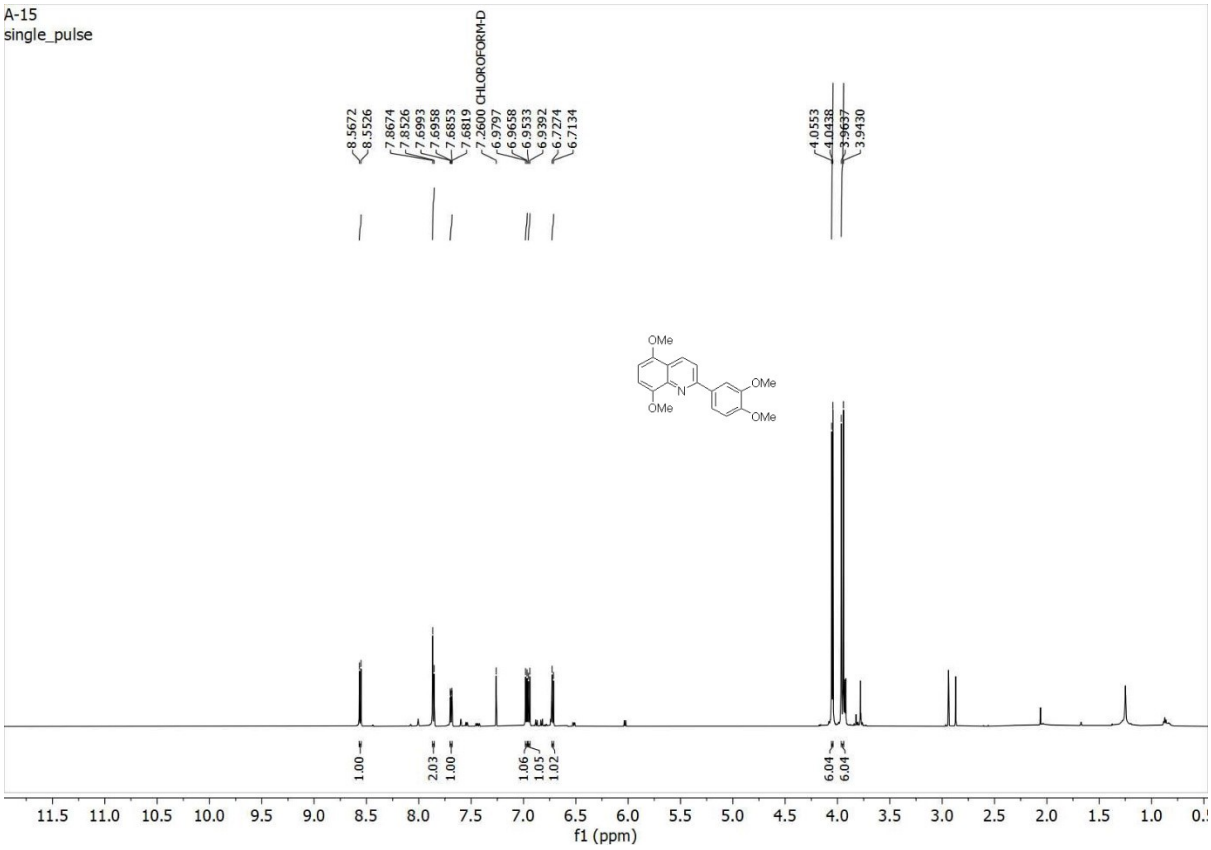


Figure S77. ^{1}H NMR Spectrum of **26e** in $CDCl_3$.

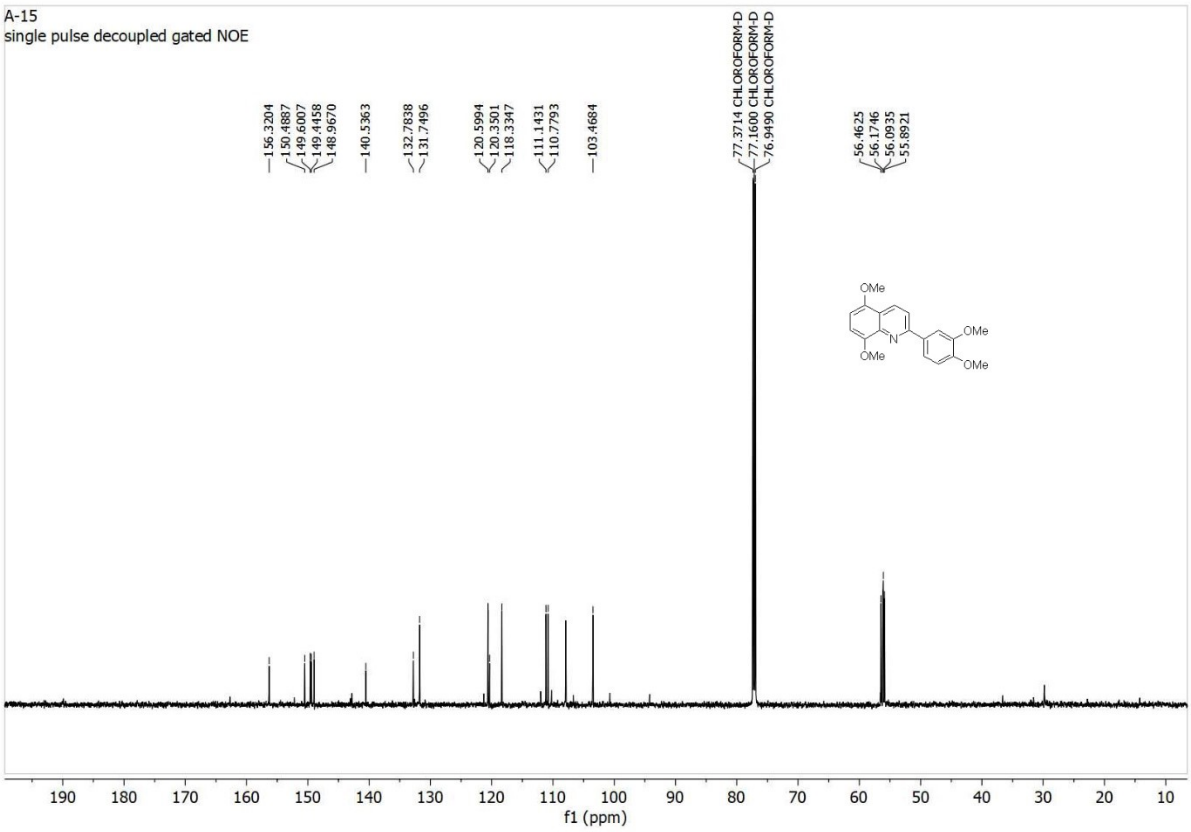


Figure S78. ^{13}C NMR Spectrum of **26e** in $CDCl_3$.

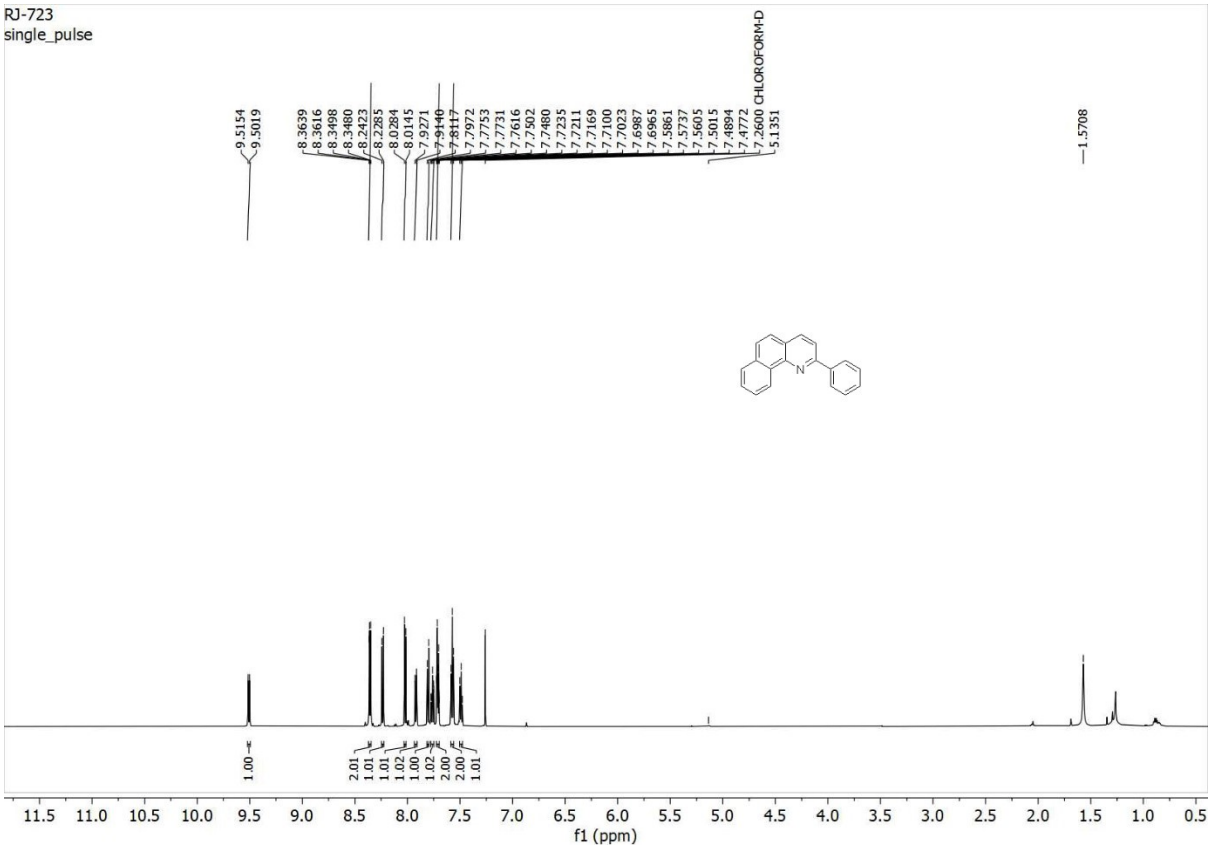


Figure S79. ^{1}H NMR Spectrum of **15g** in $CDCl_3$.

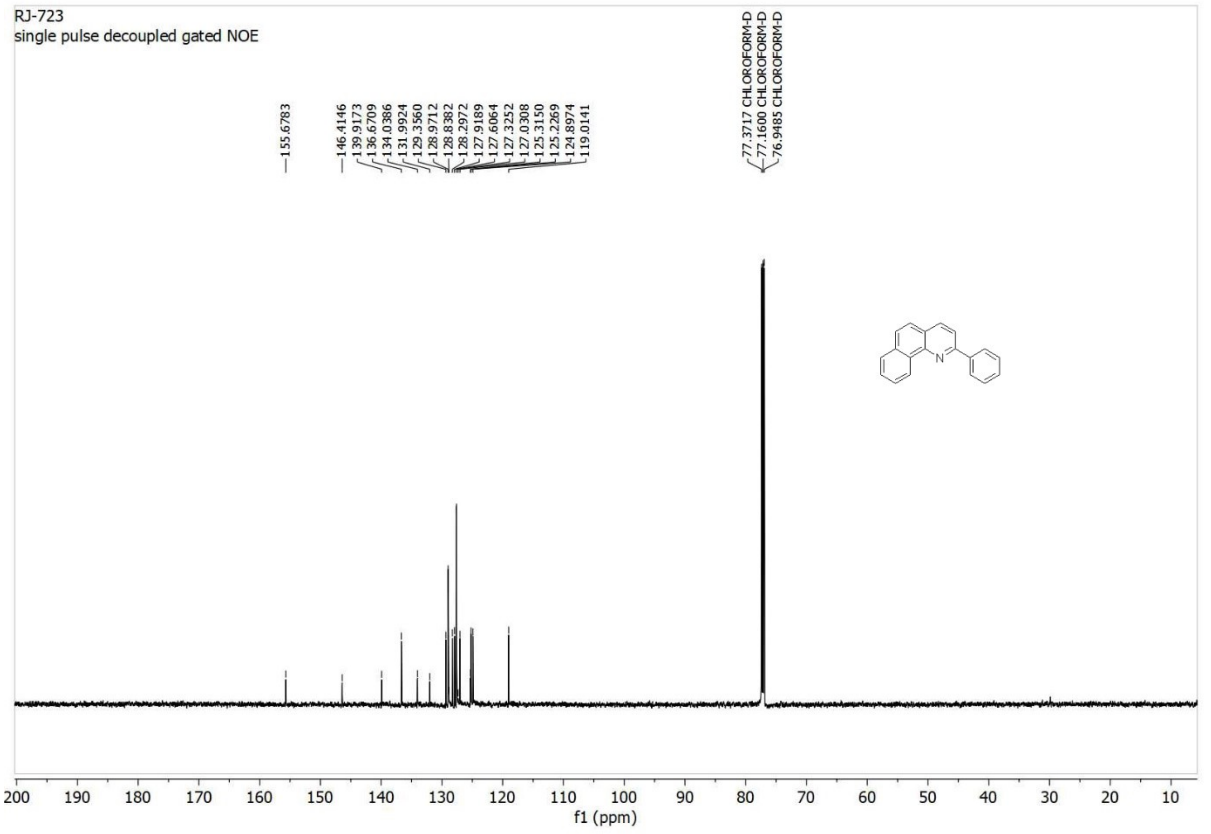


Figure S80. ^{13}C NMR Spectrum of **15g** in $CDCl_3$.

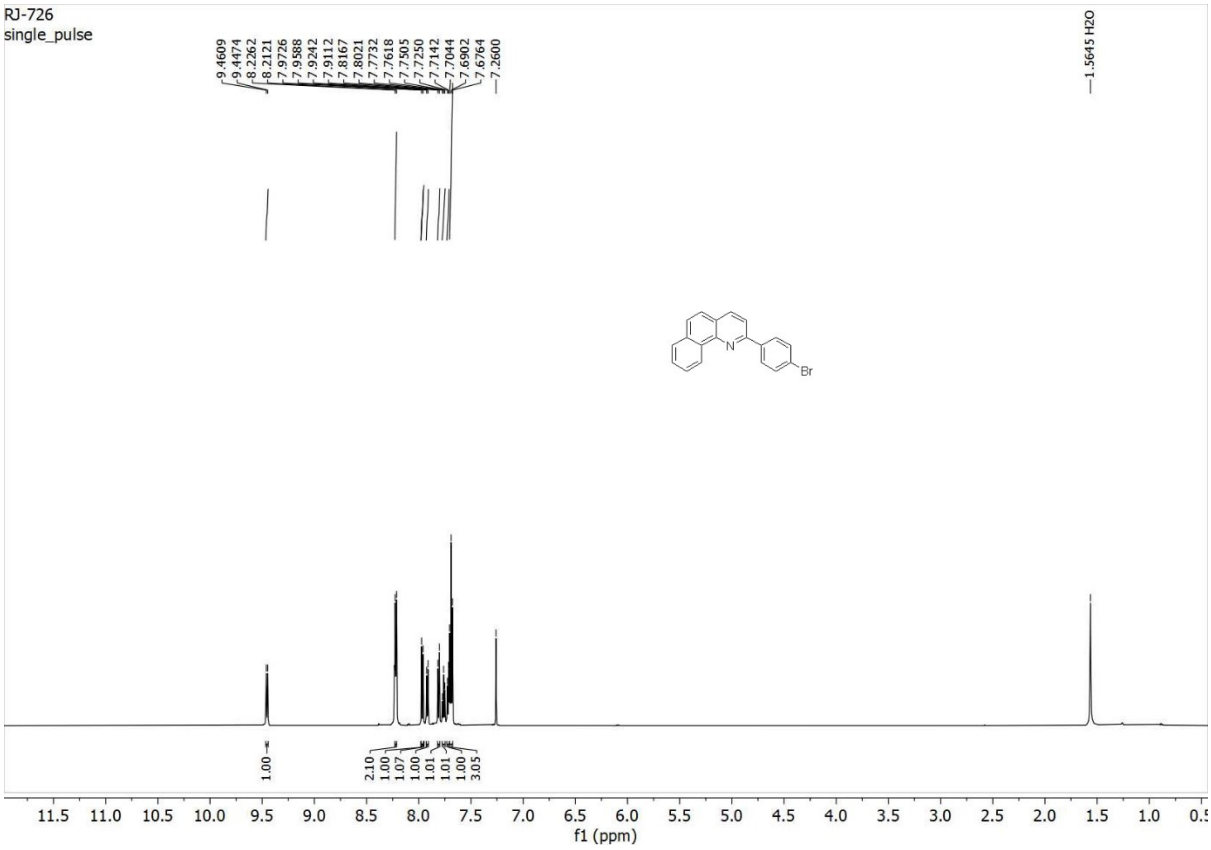


Figure S81. ^{1}H NMR Spectrum of **16g** in $CDCl_3$.

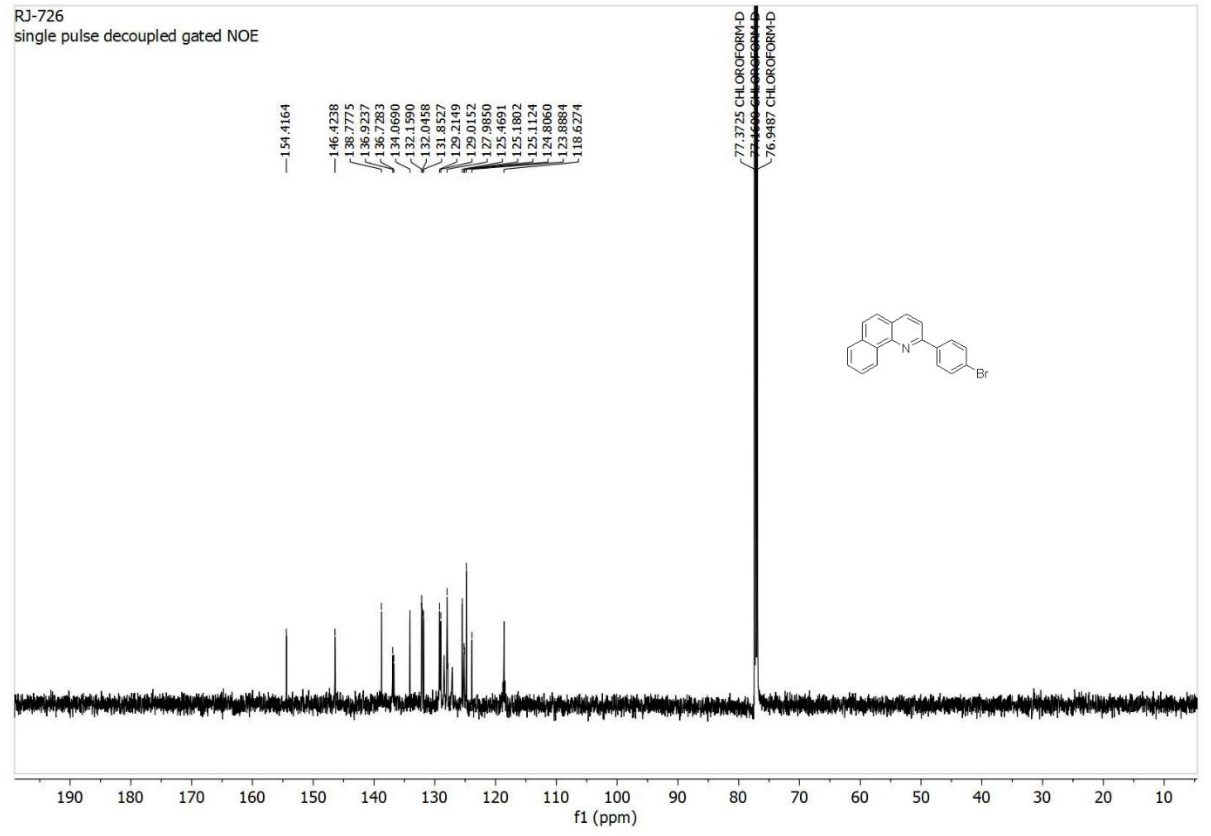


Figure S82. ^{13}C NMR Spectrum of **16g** in $CDCl_3$.

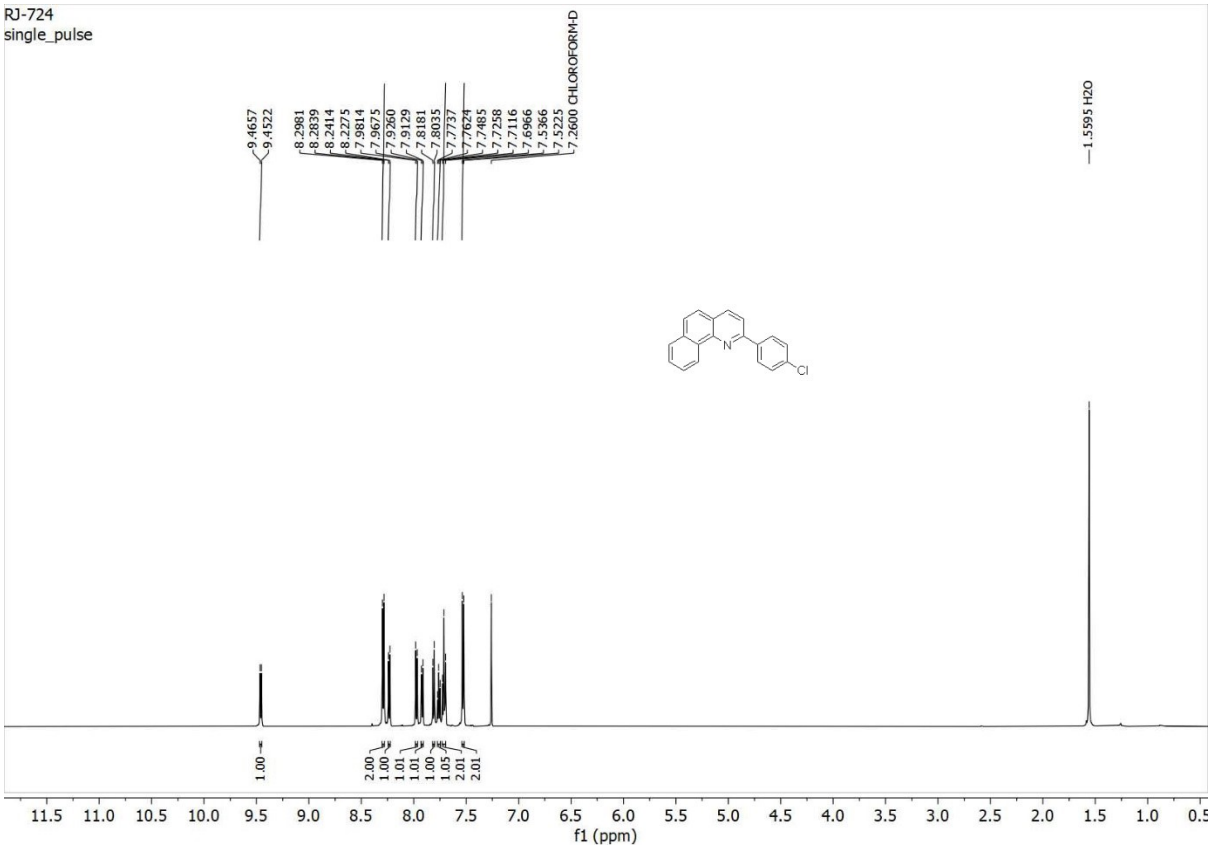


Figure S83. ^{1}H NMR Spectrum of **17g** in $CDCl_3$.

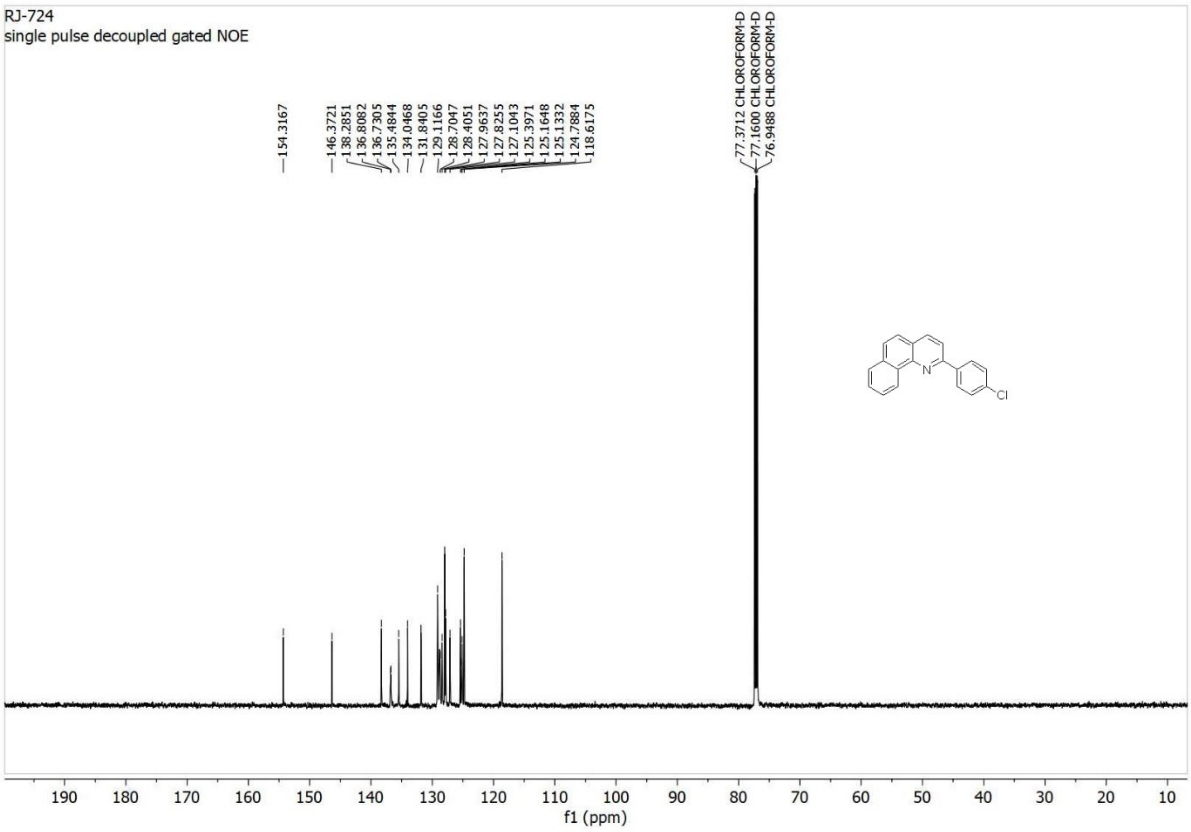


Figure S84. ^{13}C NMR Spectrum of **17g** in $CDCl_3$.

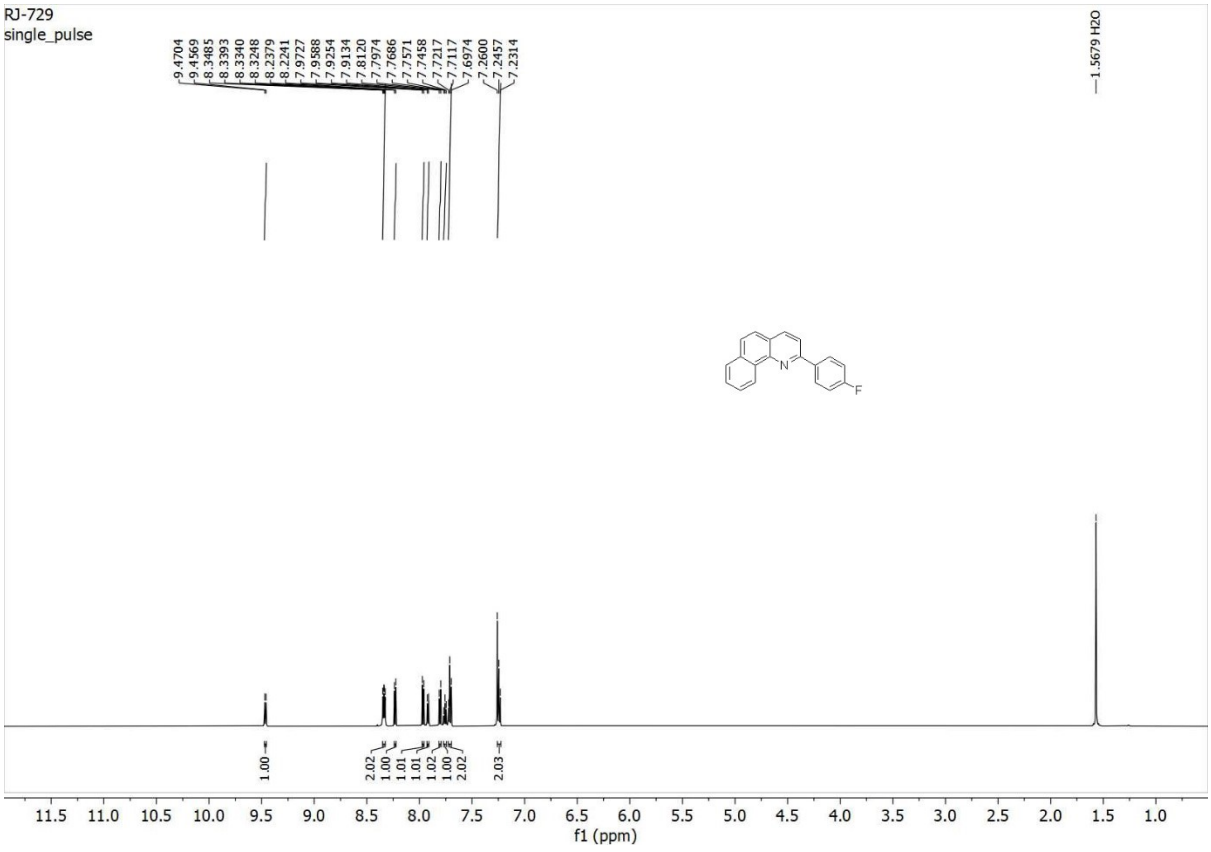


Figure S85. ^{1}H NMR Spectrum of **18g** in $CDCl_3$

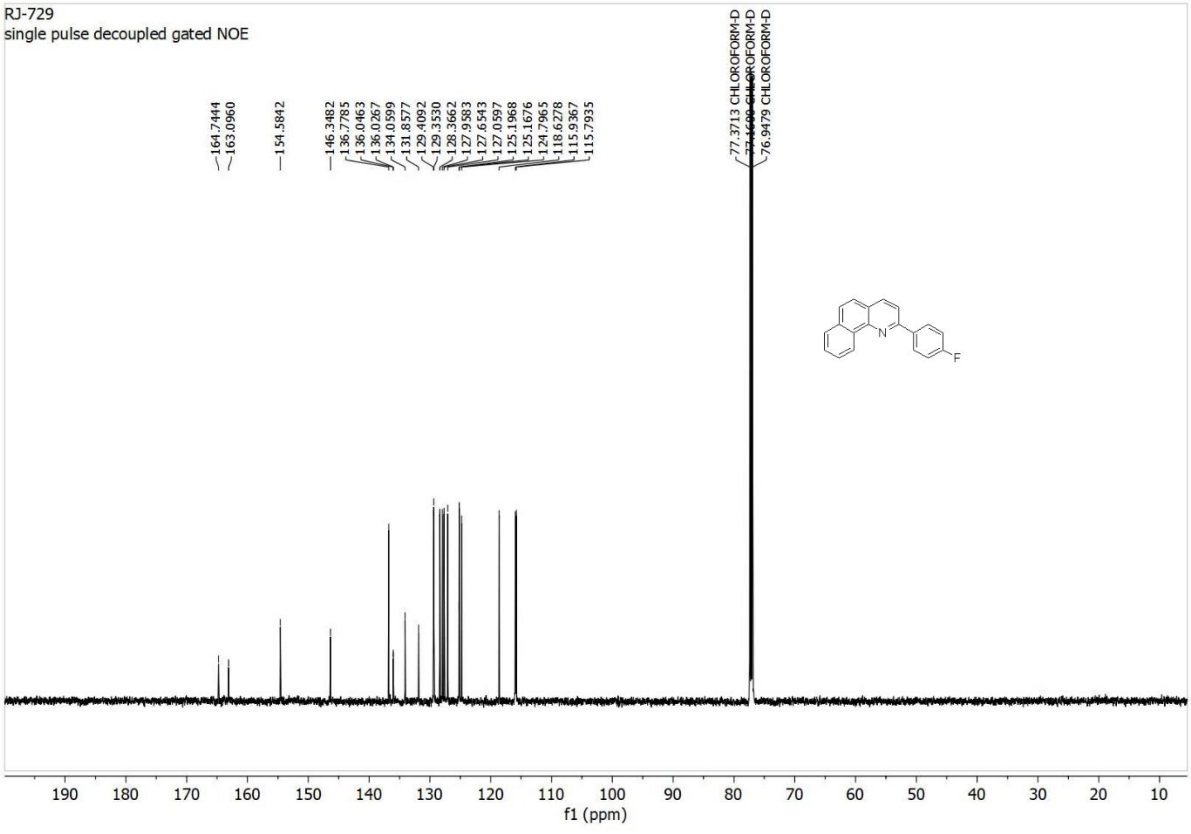


Figure S86. ^{13}C NMR Spectrum of **18g** in $CDCl_3$.

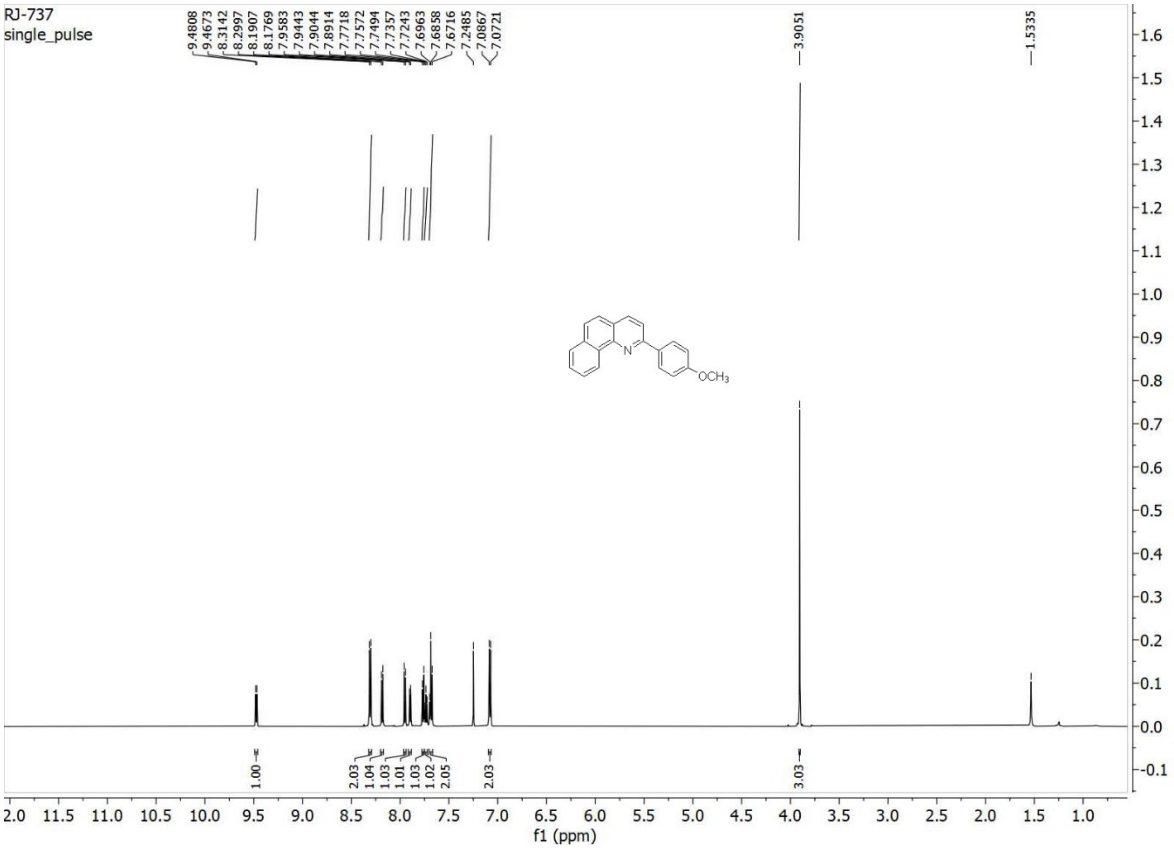


Figure S87. ^{13}C NMR Spectrum of **19g** in $CDCl_3$.

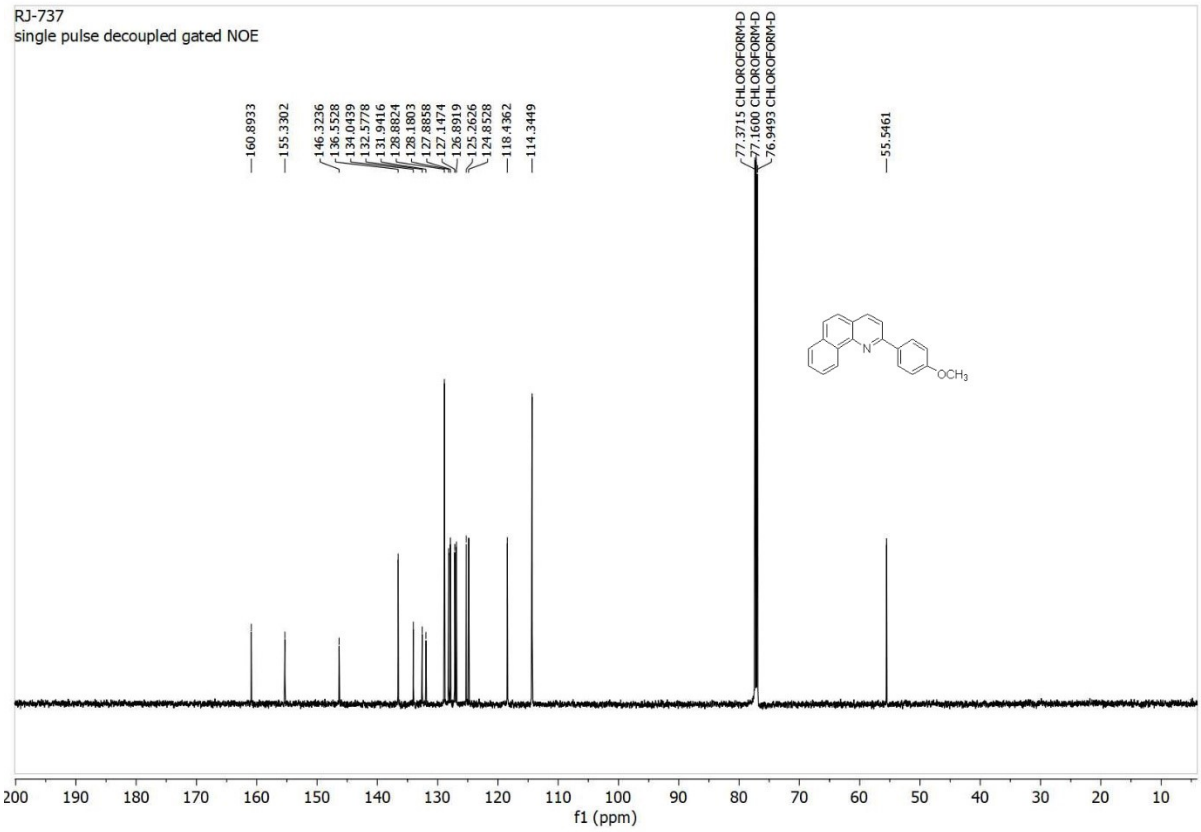


Figure S88. ^{1}H NMR Spectrum of **19g** in $CDCl_3$.

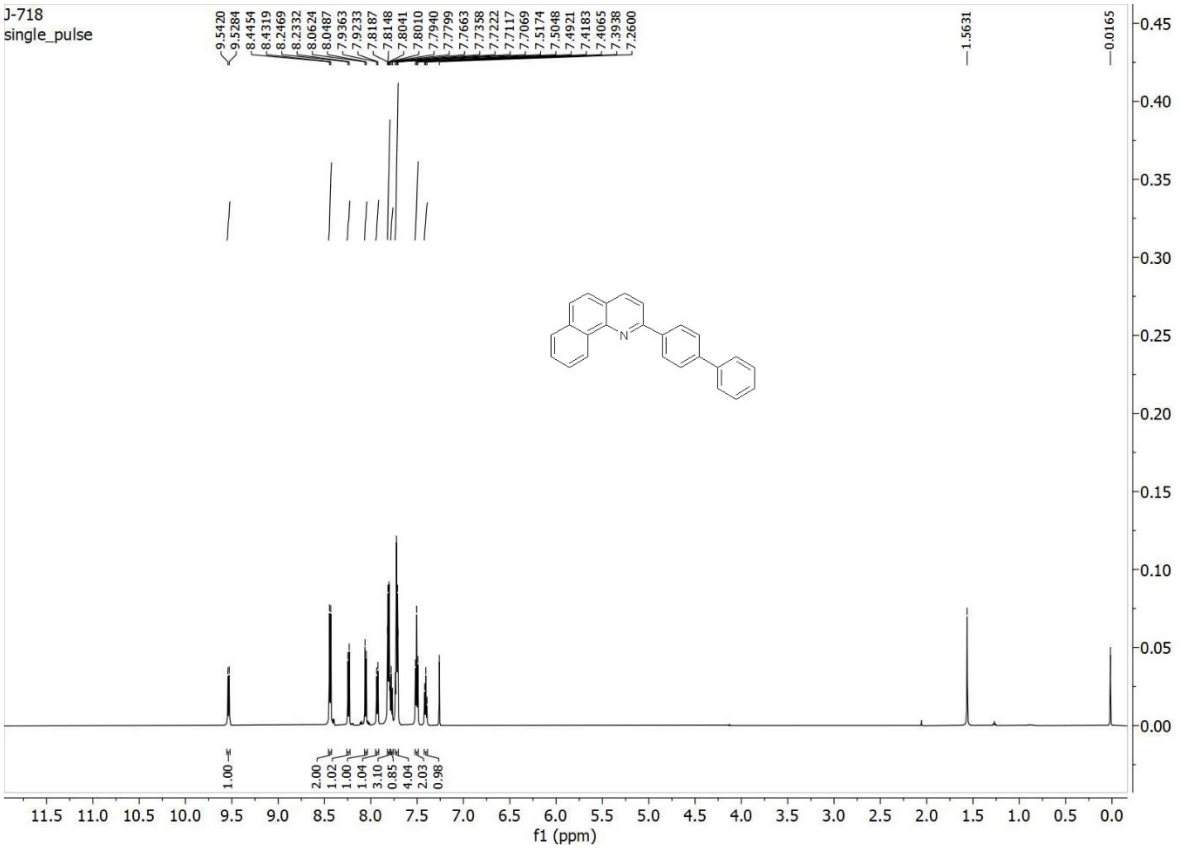


Figure S89. ^{1}H NMR Spectrum of **22g** in $CDCl_3$.

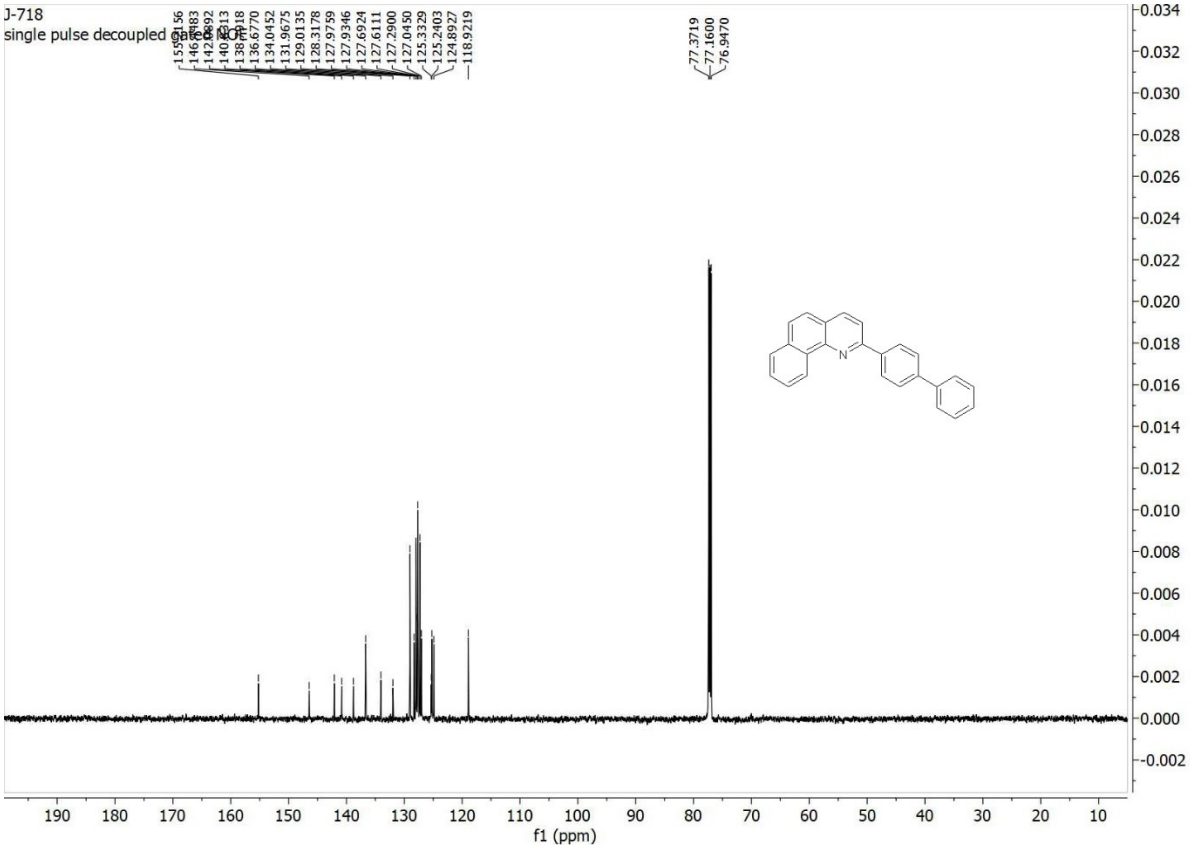


Figure S90. ^{13}C NMR Spectrum of **22g** in $CDCl_3$.

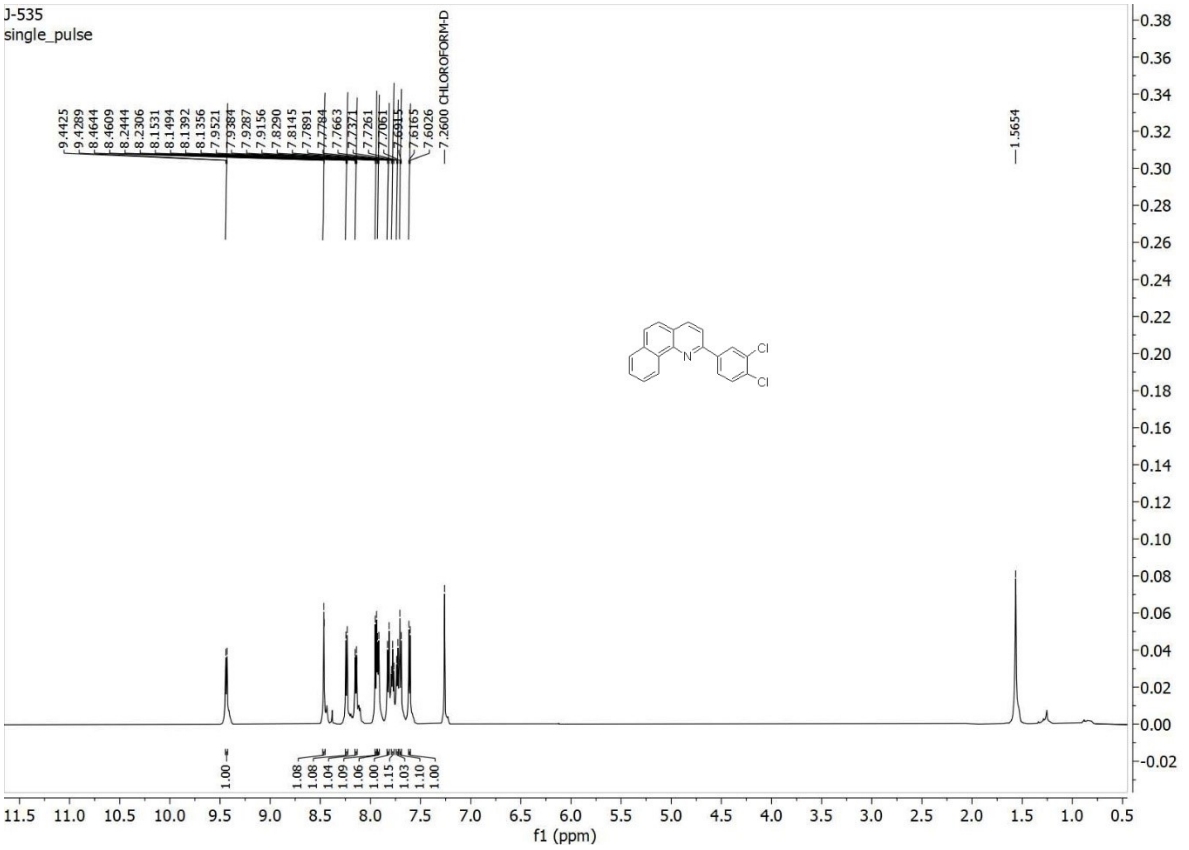


Figure S91. ^{1}H NMR Spectrum of **25g** in $CDCl_3$.

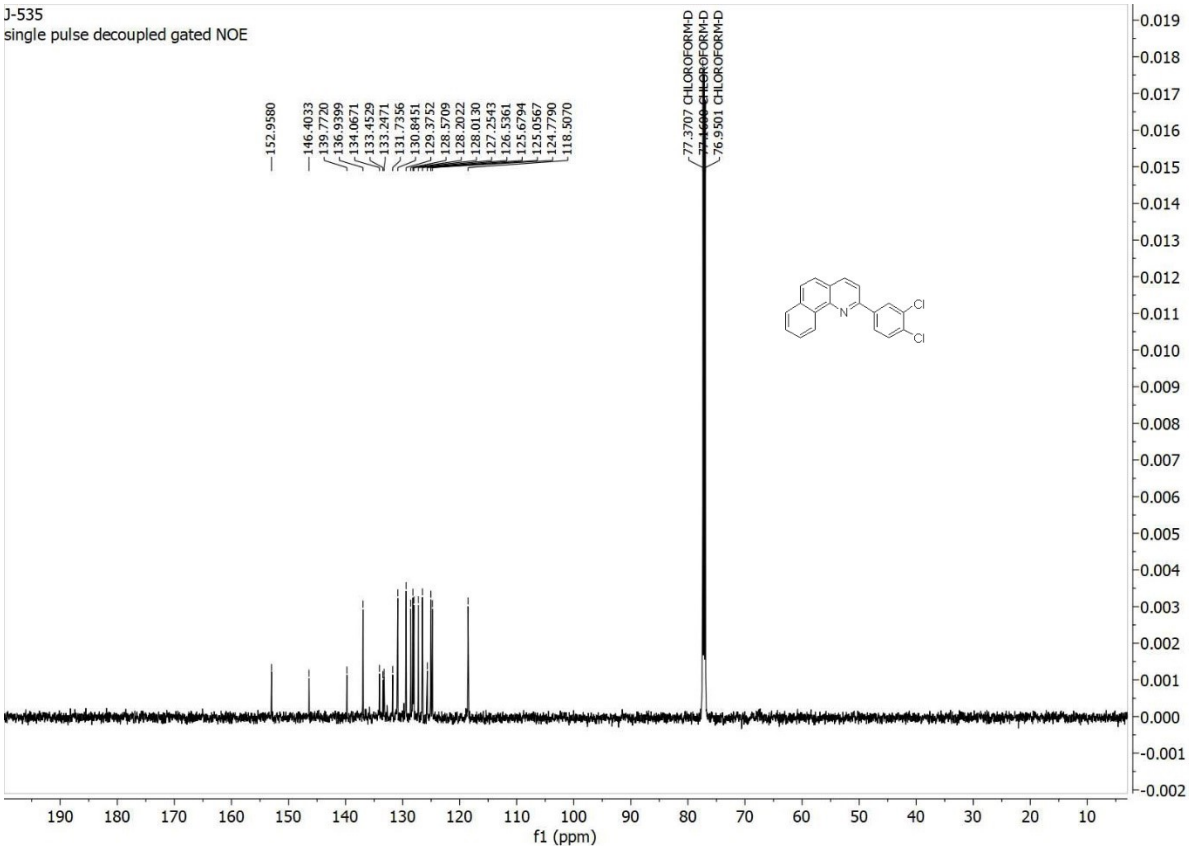


Figure S92. ^{13}C NMR Spectrum of **25g** in $CDCl_3$.

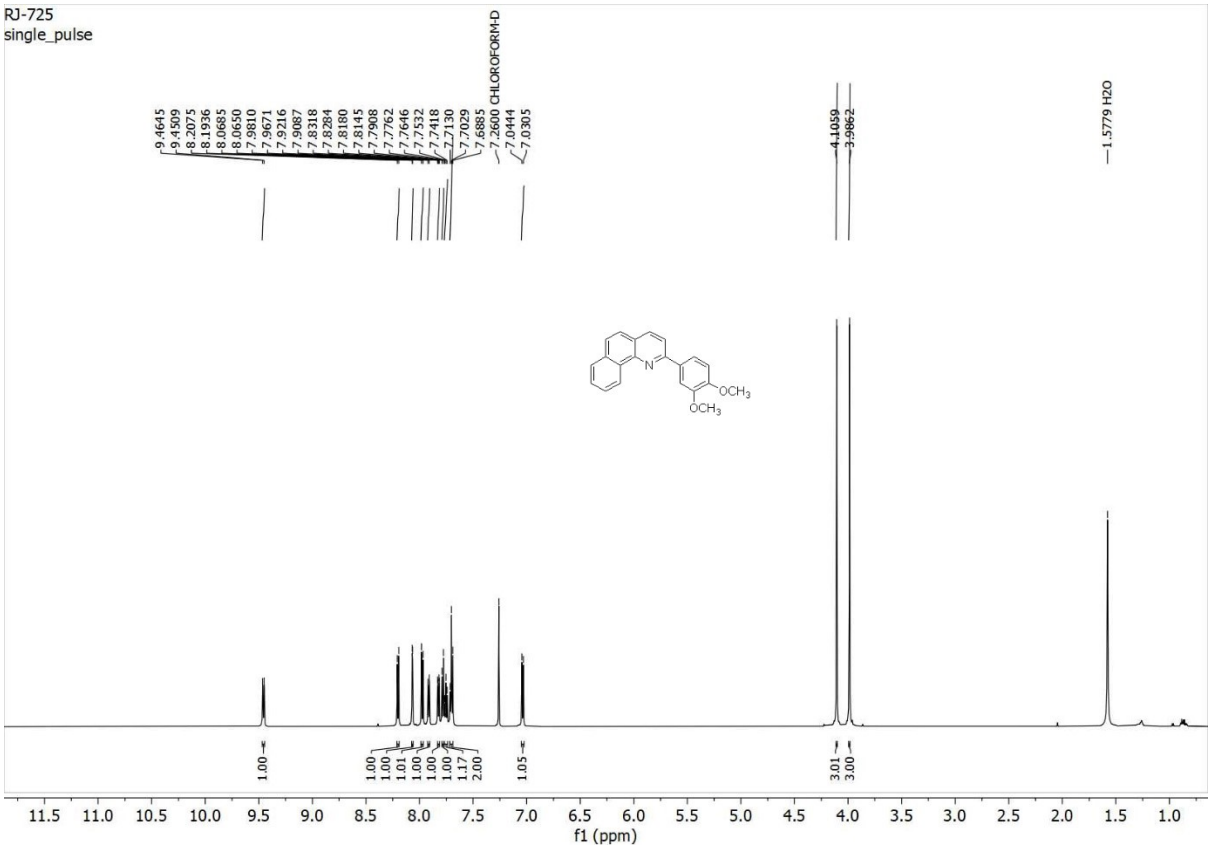


Figure S93. ^{1}H NMR Spectrum of **26g** in $CDCl_3$.

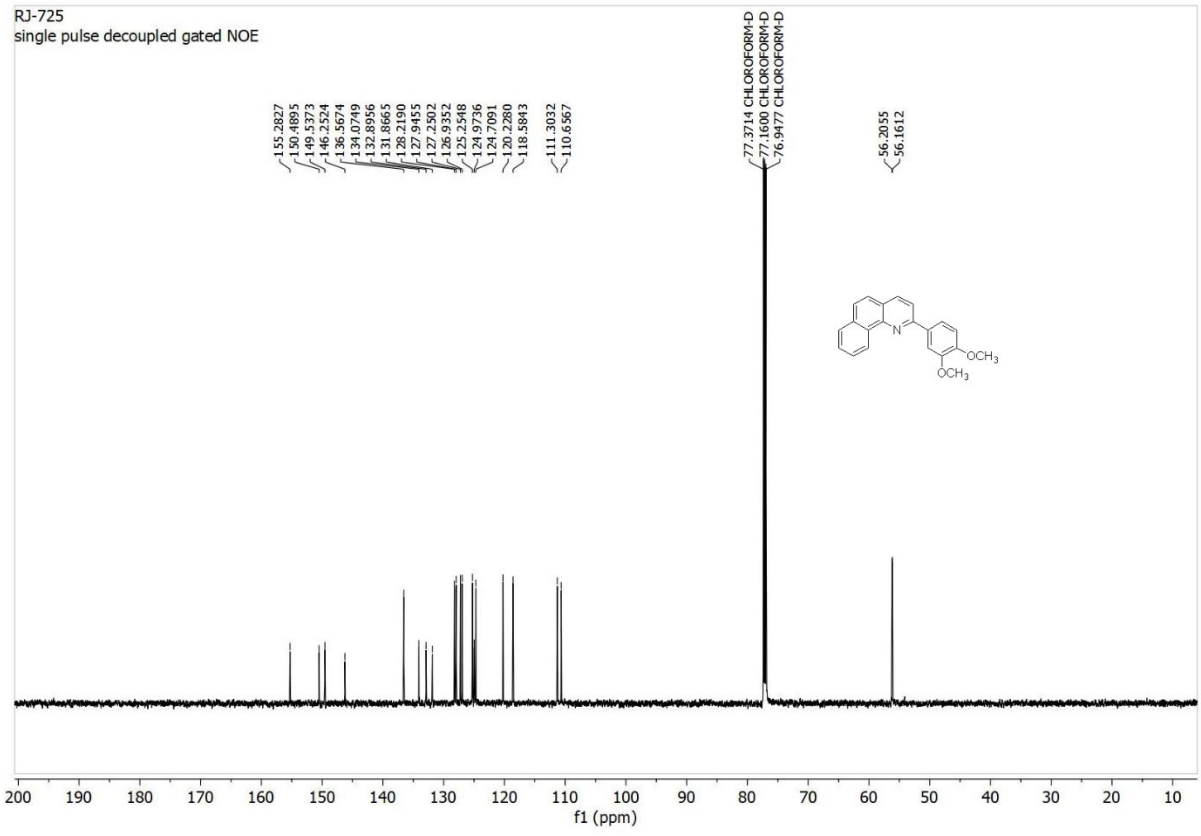


Figure S94. ^{13}C NMR Spectrum of **26g** in $CDCl_3$.

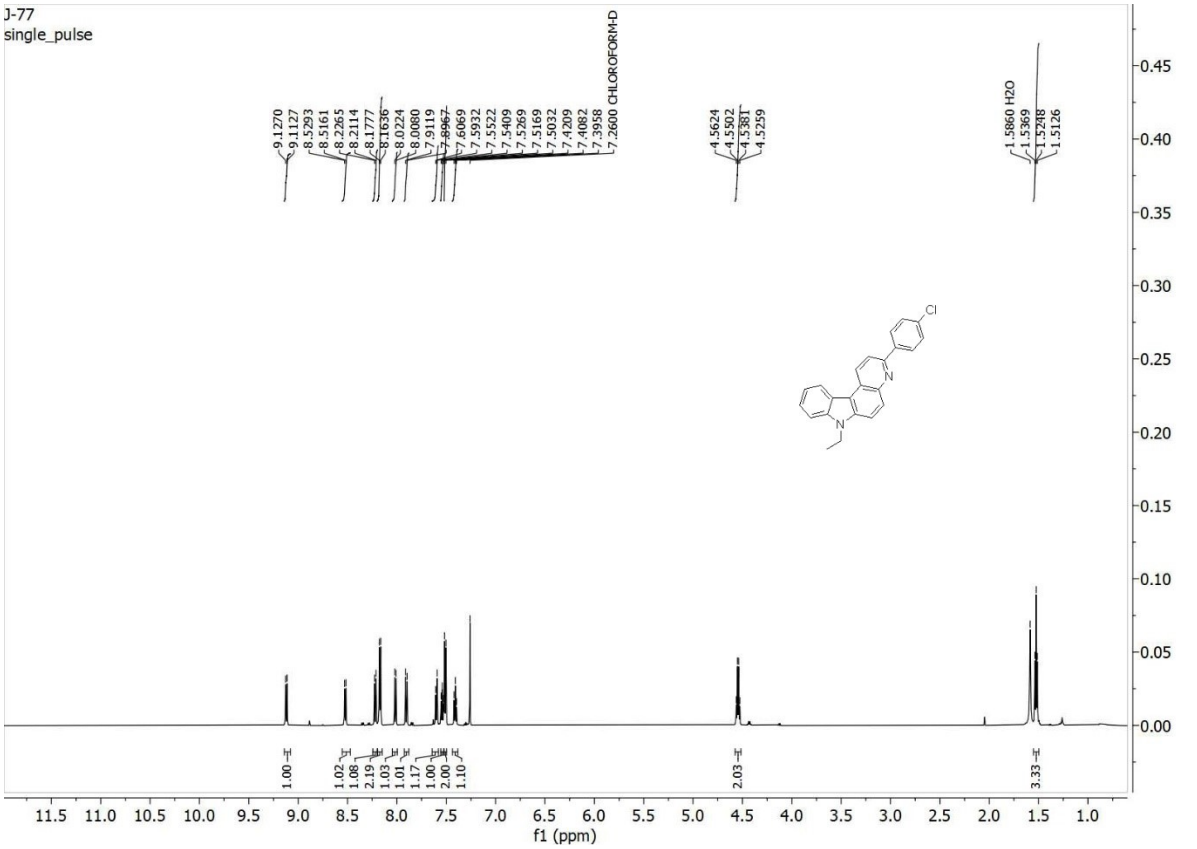


Figure S95. ^{1}H NMR Spectrum of **17h** in $CDCl_3$.

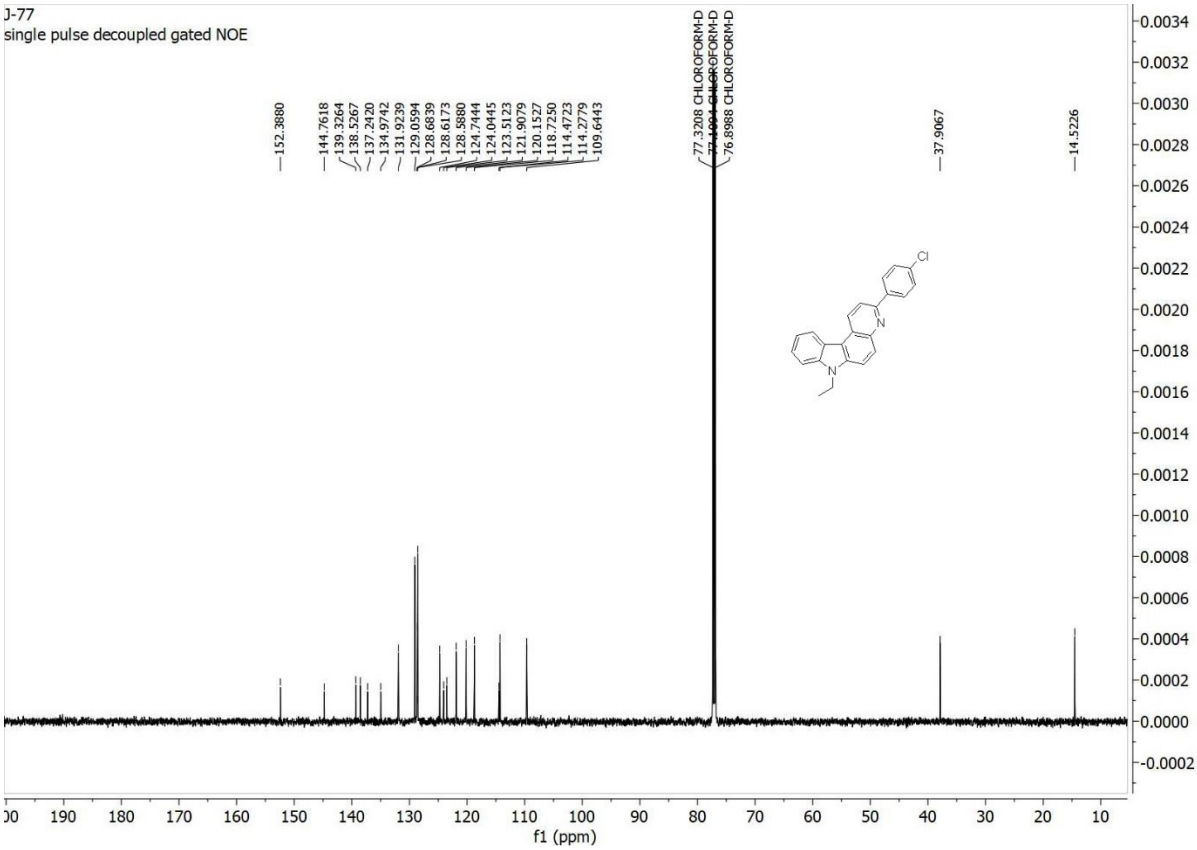


Figure S96. ^{13}C NMR Spectrum of **17h** in $CDCl_3$.

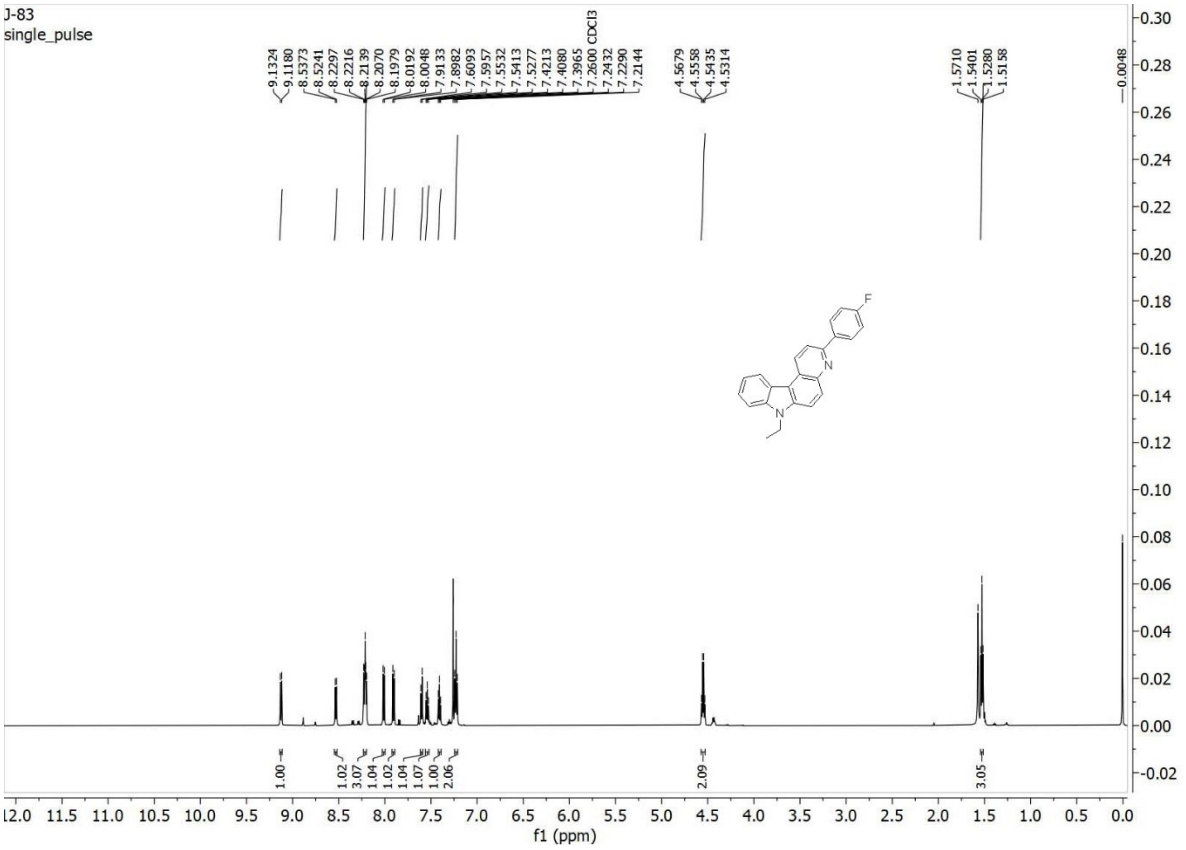


Figure S97. ^{1}H NMR Spectrum of **18h** in $CDCl_3$.

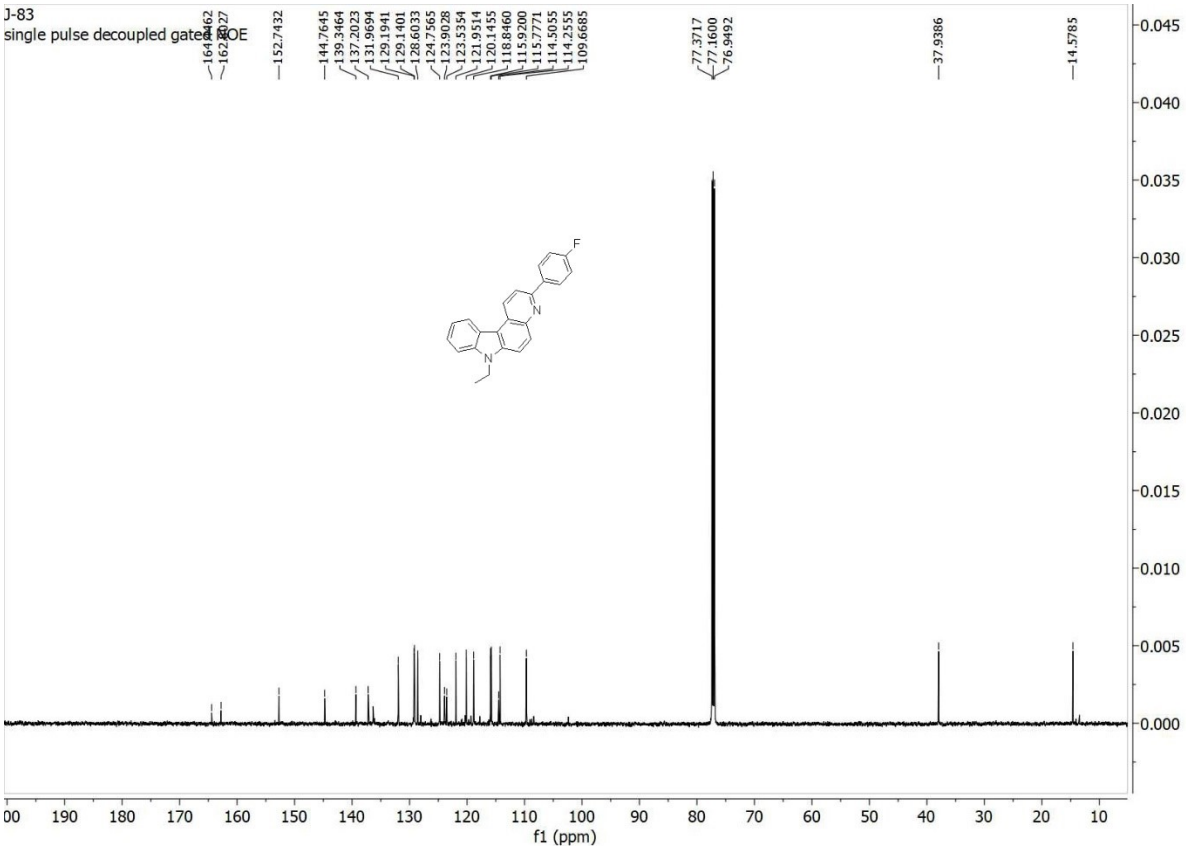


Figure S98. ^{13}C NMR Spectrum of **18h** in $CDCl_3$.

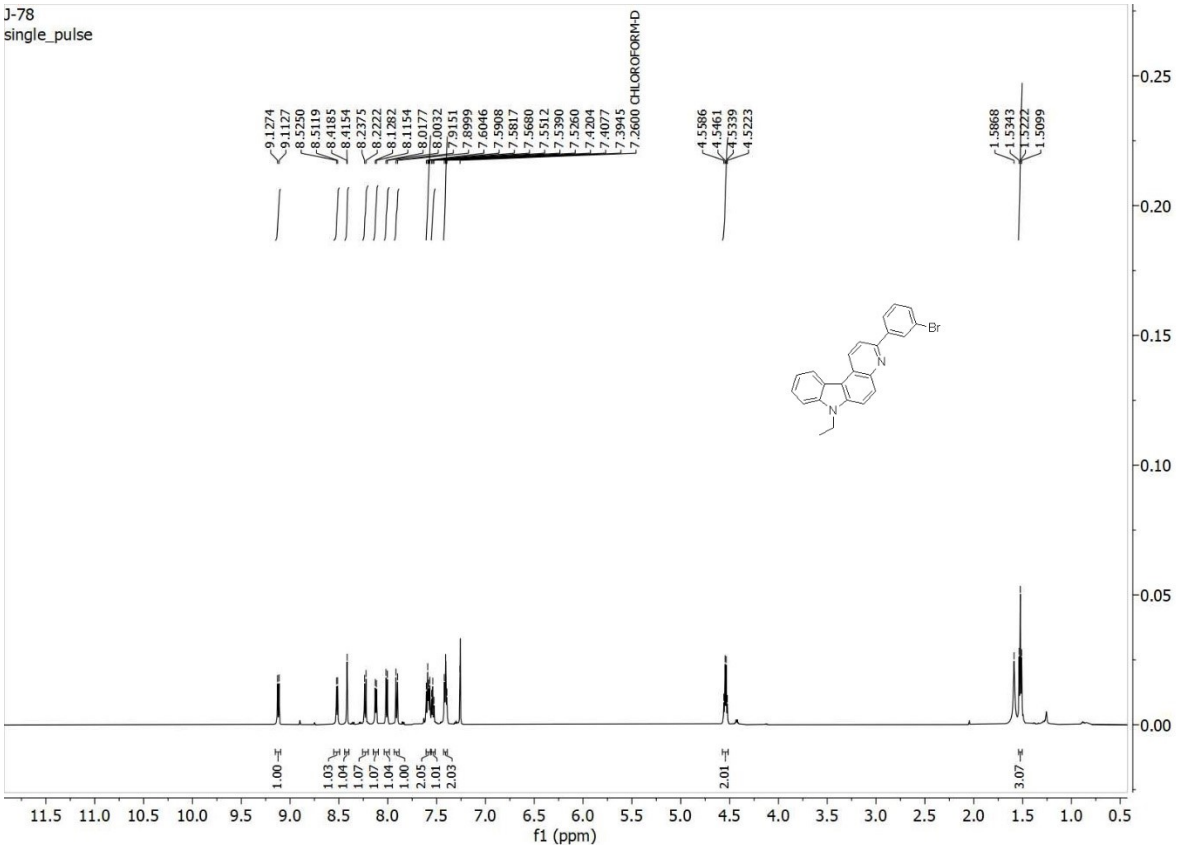


Figure S99. ^{1}H NMR Spectrum of **24h** in $CDCl_3$.

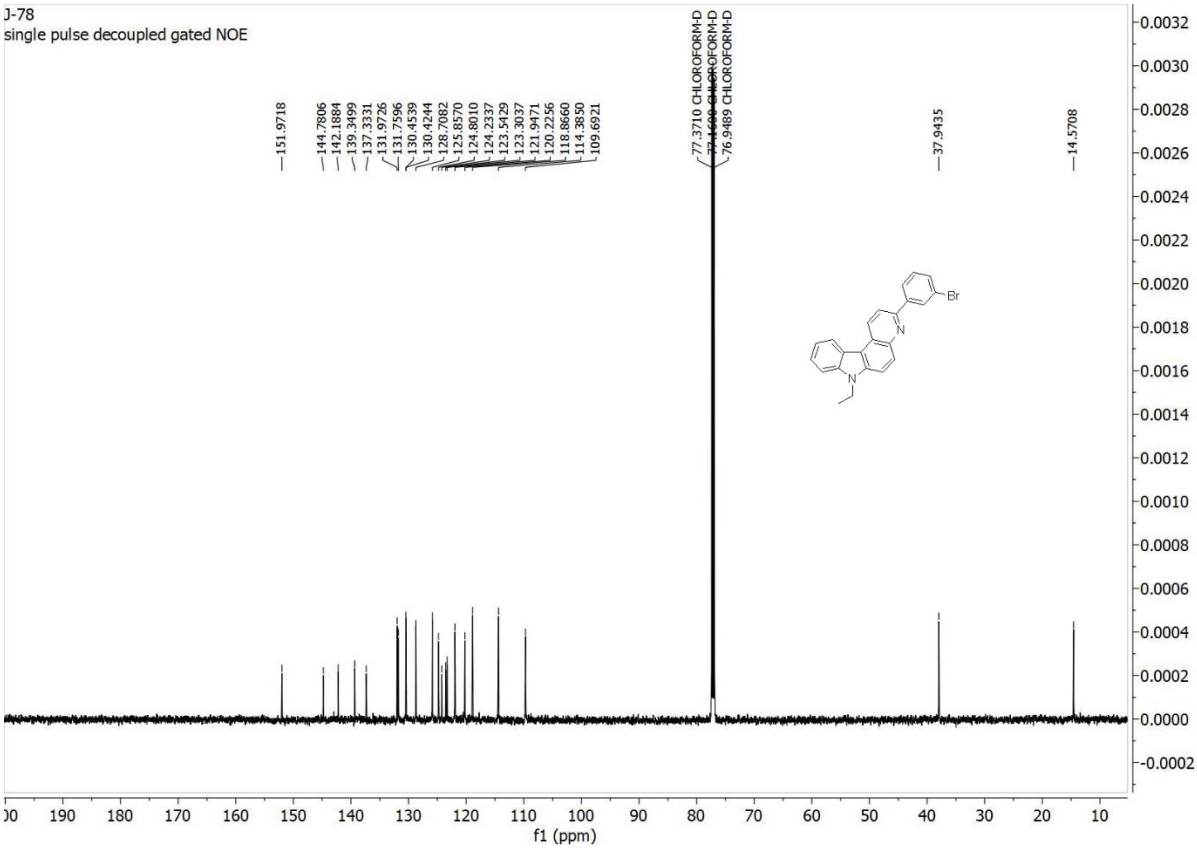


Figure S100. ^{13}C NMR Spectrum of **24h** in $CDCl_3$.

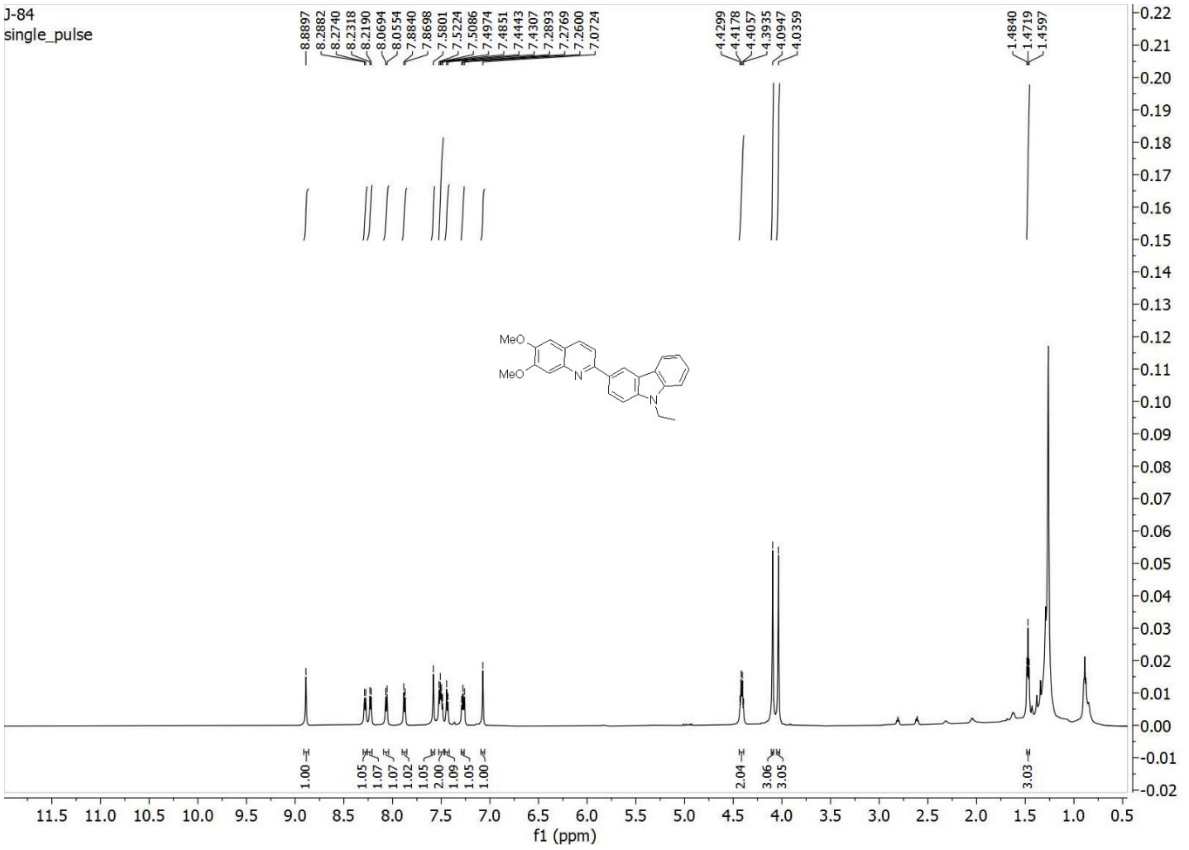


Figure S101. ^{1}H NMR Spectrum of **28a** in $CDCl_3$.

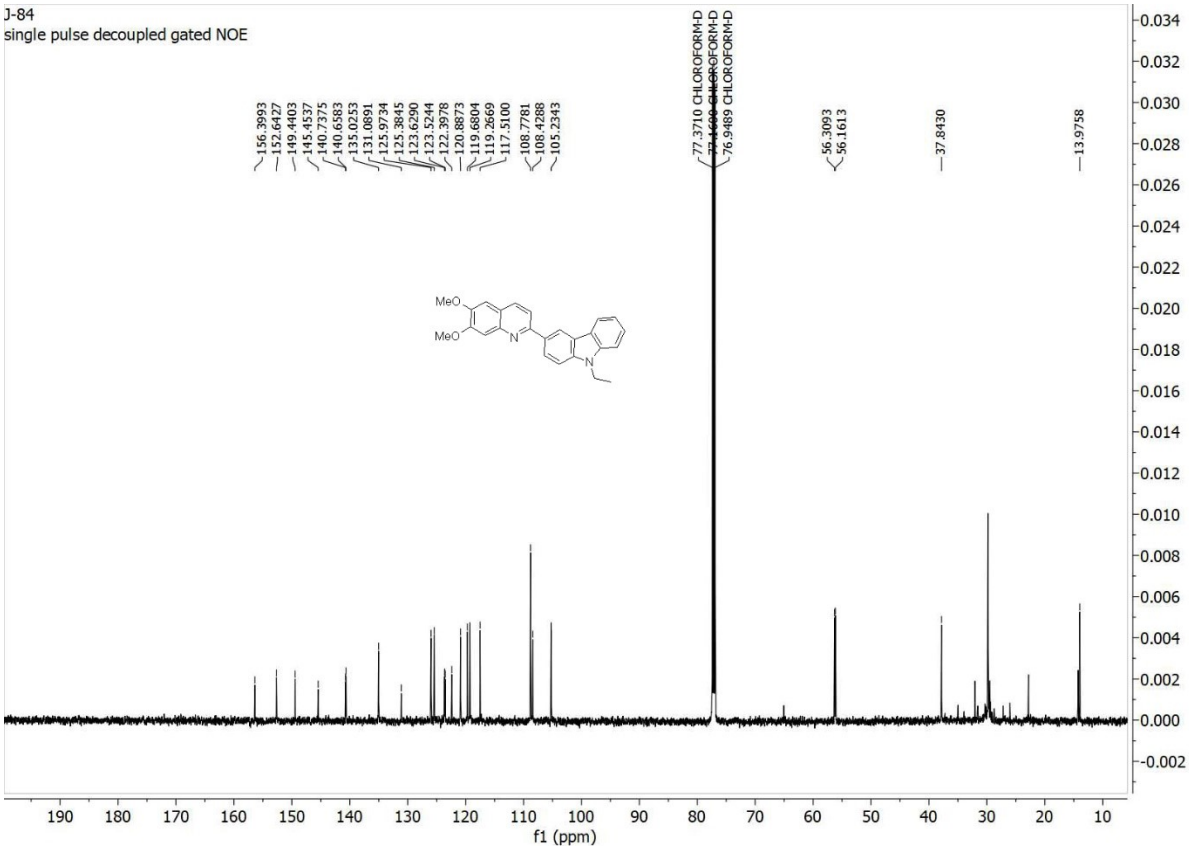


Figure S102. ^{13}C NMR Spectrum of **28a** in $CDCl_3$.

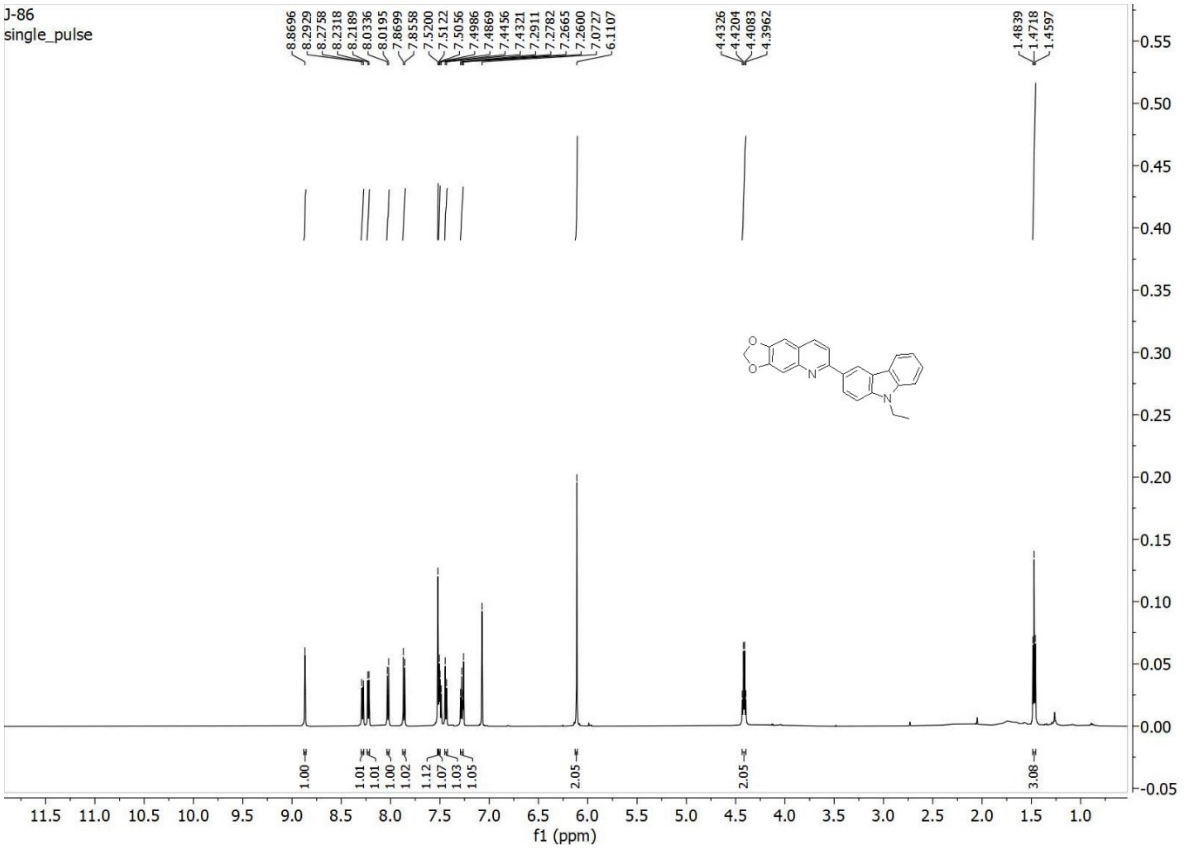


Figure S103. ^{1}H NMR Spectrum of **28b** in $CDCl_3$.

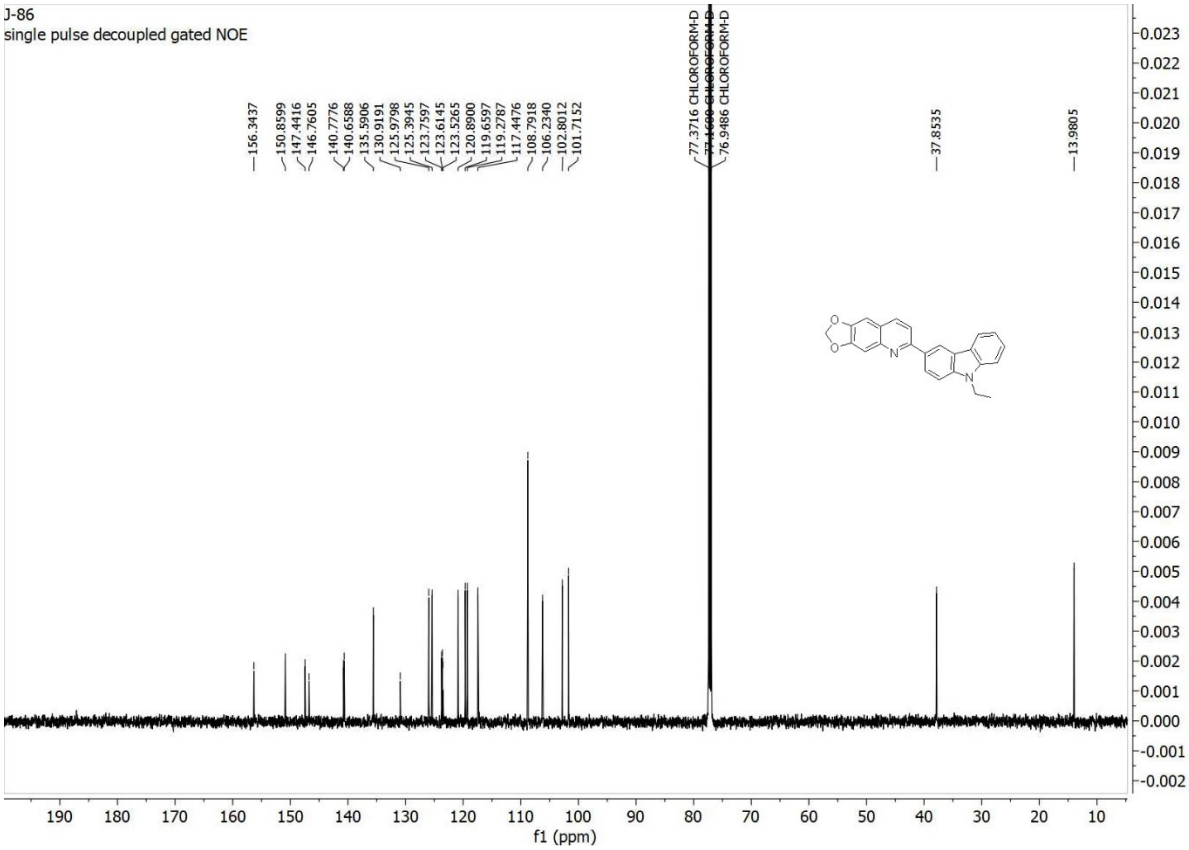


Figure S104. ^{13}C NMR Spectrum of **28b** in $CDCl_3$.

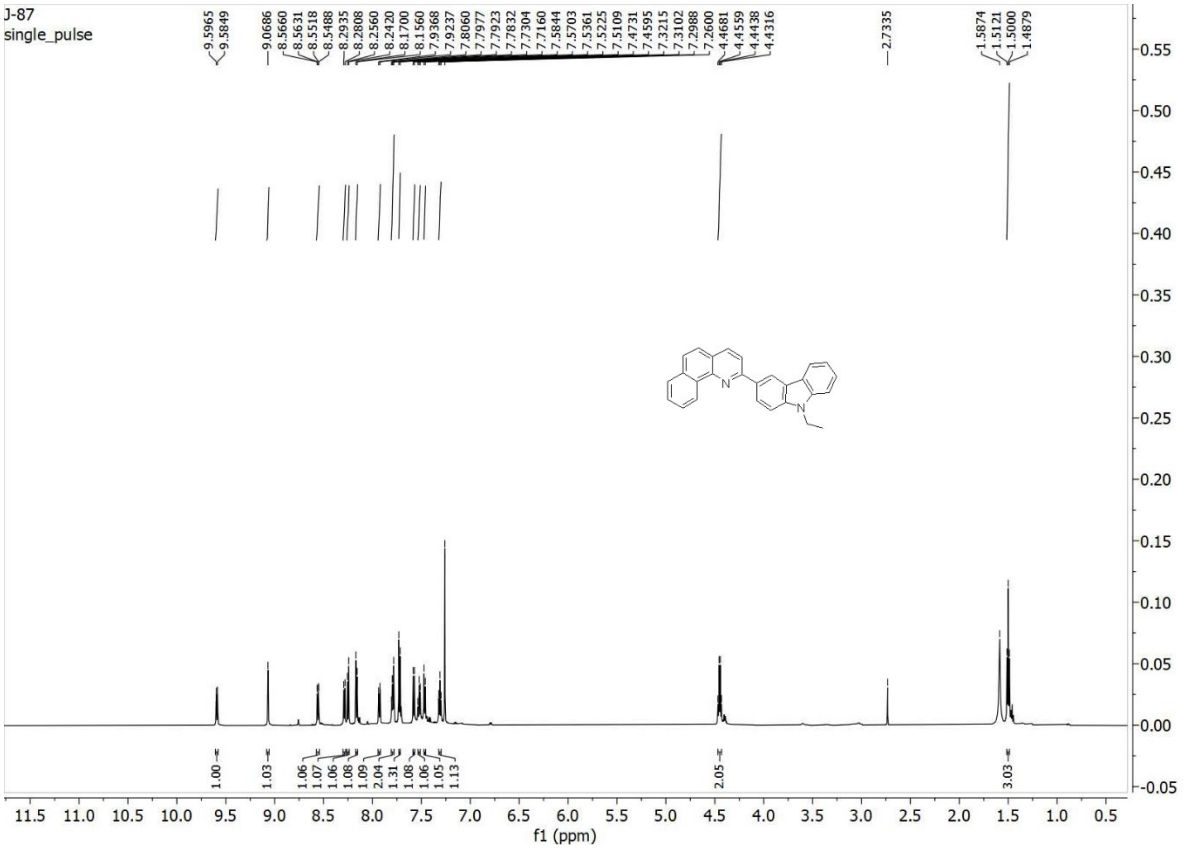


Figure S105. ^{1}H NMR Spectrum of **28g** in $CDCl_3$.

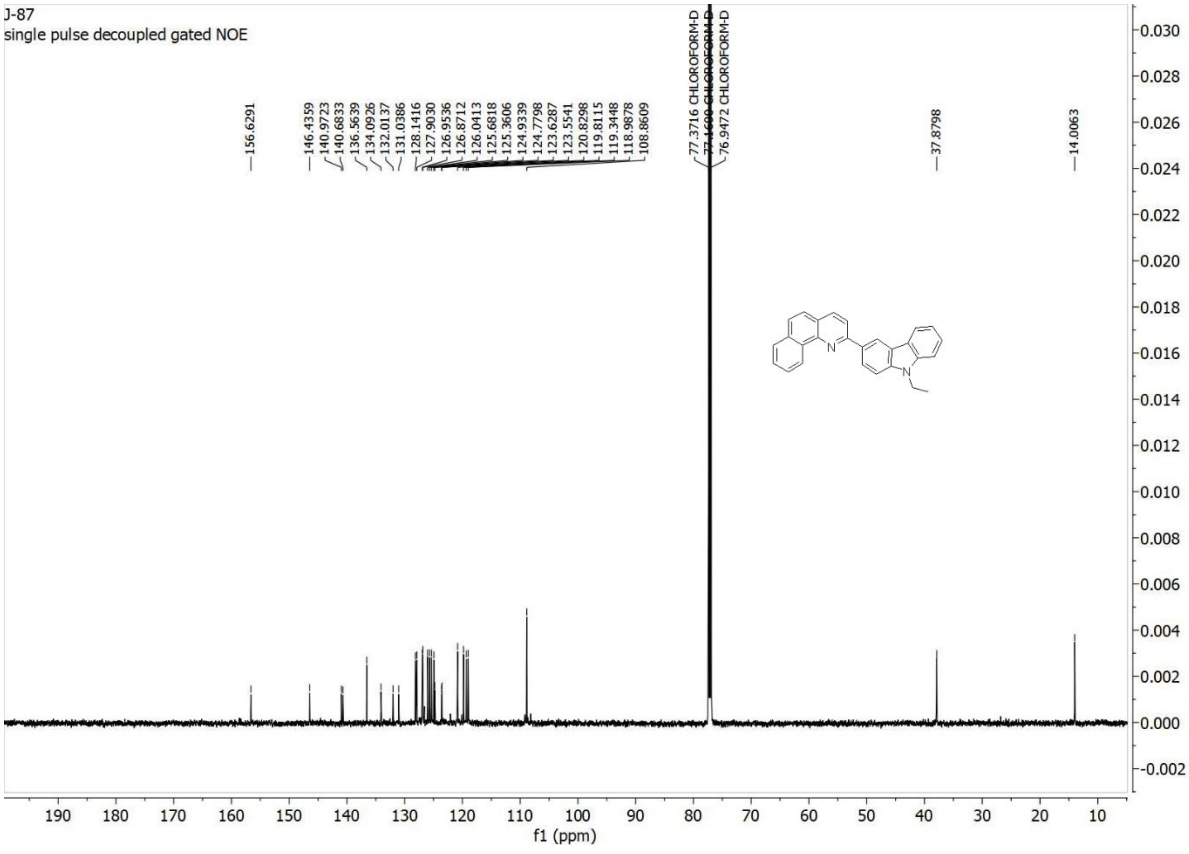


Figure S106. ^{13}C NMR Spectrum of **28g** in $CDCl_3$.

4. Photophysical data of synthesised compounds

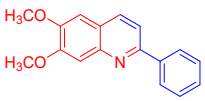
The fluorescent quantum yield (Φ_F) was measured relative to quinine sulfate (Φ_F = 0.546) (0.1 M H_2SO_4 at 350 nm excitation) as a reference compound. For the measurement of UV-Vis absorption and fluorescence emission of samples, stock solution (1.0 mM) was prepared in $CHCl_3$ and diluted to final concentration (2.0 µM) using $CHCl_3$. These quantum yields (QY) were calculated by using the equation as follows:

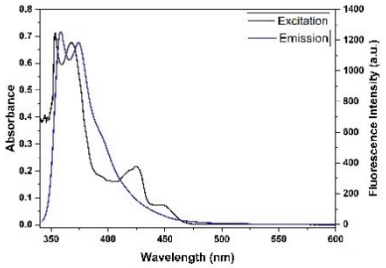
$$\Phi_S = \Phi_R \times \frac{I_S}{I_R} \times \frac{A_R}{A_S} \times \frac{\eta_S^{\,2}}{\eta_R^{\,2}}$$

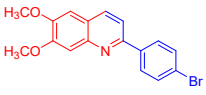
$$R - \text{Reference}; S - \text{Sample}$$

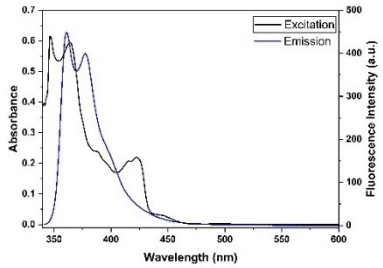
Where Φ is the quantum yields, η is the refractive index of the solvent, I is the integrated fluorescence intensity and A is the absorbance.

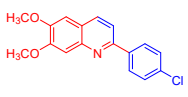
Figure S107. Photophysical properties and graphical data of quinoline-2-carboxylate derivatives:

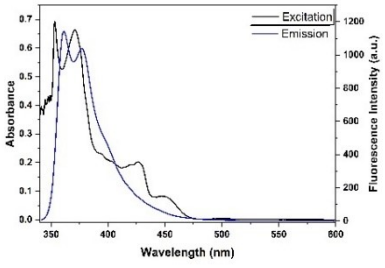
15a	UV-Vis	Fluorescence		Φ_F
	λ_{Ex} (nm)	λ_{Em} (nm)	Intensity	
	330	359	1253	0.20

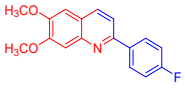


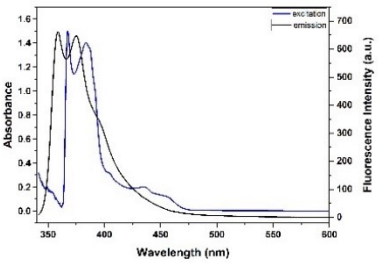
16a	UV-Vis	Fluorescence		Φ_F
	λ_{Ex} (nm)	λ_{Em} (nm)	Intensity	
	330	361	448	0.06

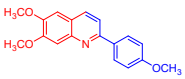


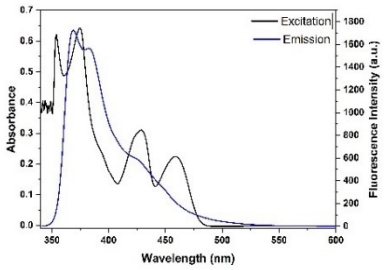
17a	UV-Vis	Fluorescence		Φ_F
	λ_{Ex} (nm)	λ_{Em} (nm)	Intensity	
	330	361	1142	0.19

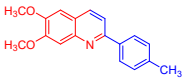


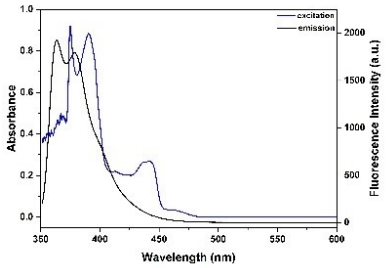
18a	UV-Vis	Fluorescence		Φ_F
	λ_{Ex} (nm)	λ_{Em} (nm)	Intensity	
	330	359	662	0.08

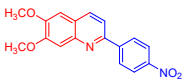


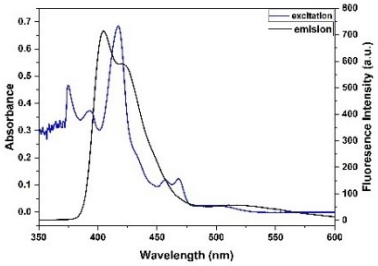
19a	UV-Vis	Fluorescence		Φ_F
	λ_{Ex} (nm)	λ_{Em} (nm)	Intensity	
	330	368	1719	0.24

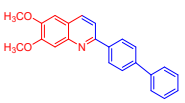


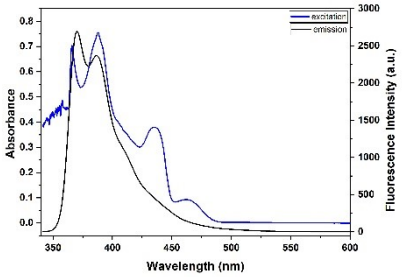
20a	UV-Vis	Fluorescence		Φ_F
	λ_{Ex} (nm)	λ_{Em} (nm)	Intensity	
	330	369	2026	0.22

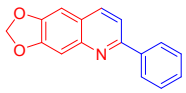


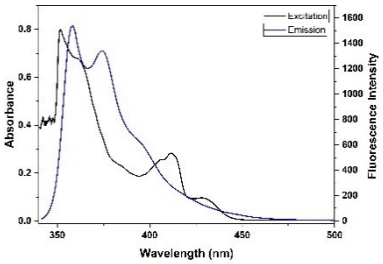
21a	UV-Vis	Fluorescence		Φ_F
	λ_{Ex} (nm)	λ_{Em} (nm)	Intensity	
	330	406	713	0.25

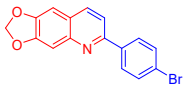


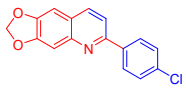
22a	UV-Vis	Fluorescence		Φ_F
	λ_{Ex} (nm)	λ_{Em} (nm)	Intensity	
	330	370	2689	0.26

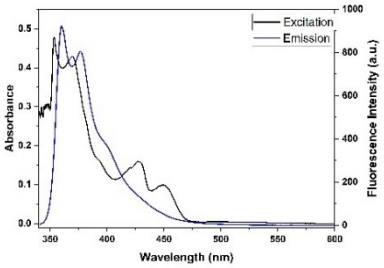


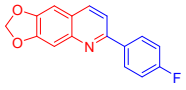
15b	UV-Vis	Fluorescence		Φ_F
	λ_{Ex} (nm)	λ_{Em} (nm)	Intensity	
	330	358	1540	0.18

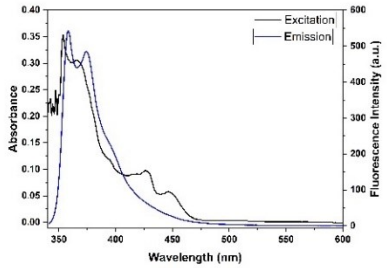


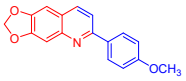
16b	UV-Vis	Fluorescence		Φ_F
	λ_{Ex} (nm)	λ_{Em} (nm)	Intensity	
	330	361	448	0.06

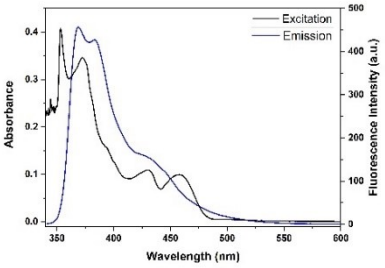
17b	UV-Vis	Fluorescence		Φ_F
	λ_{Ex} (nm)	λ_{Em} (nm)	Intensity	
	330	360	922	0.20

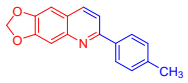


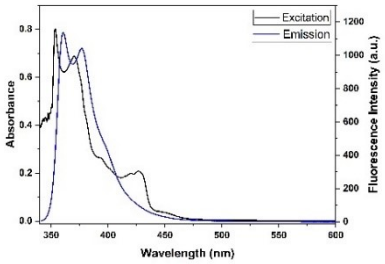
18b	UV-Vis	Fluorescence		Φ_F
	λ_{Ex} (nm)	λ_{Em} (nm)	Intensity	
	330	358	542	0.19

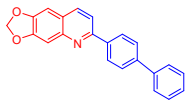


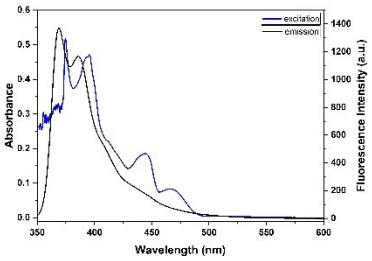
19b	UV-Vis	Fluorescence		Φ_F
	λ_{Ex} (nm)	λ_{Em} (nm)	Intensity	
	330	369	457	0. 19

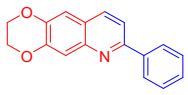


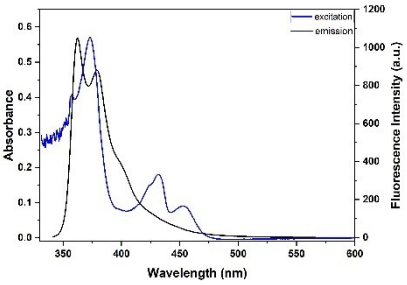
20b	UV-Vis	Fluorescence		Φ_F
	λ_{Ex} (nm)	λ_{Em} (nm)	Intensity	
	330	361	1134	0.18



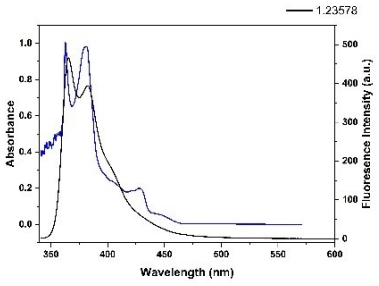
22b	UV-Vis	Fluorescence		Φ_F
	λ_{Ex} (nm)	λ_{Em} (nm)	Intensity	
	330	369	1370	0.26

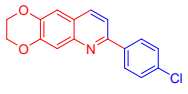


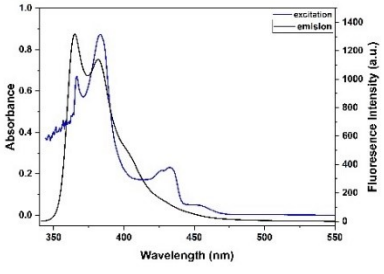
15c	UV-Vis	Fluorescence		Φ_F
	λ_{Ex} (nm)	λ_{Em} (nm)	Intensity	
	330	361	1046	0.18

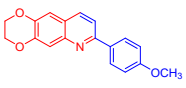


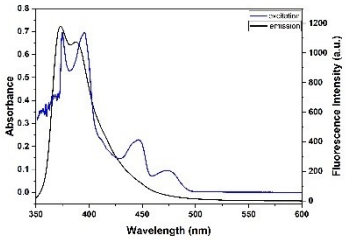
16c	UV-Vis	Fluorescence		Φ_F
	λ_{Ex} (nm)	λ_{Em} (nm)	Intensity	
	330	365	465	0.08

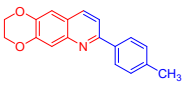


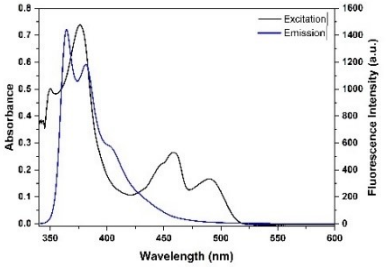
17c	UV-Vis	Fluorescence		Φ_F
	λ_{Ex} (nm)	λ_{Em} (nm)	Intensity	
	330	365	1318	0.18

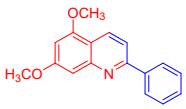


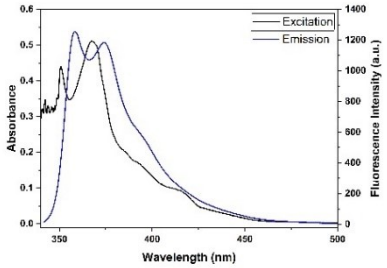
19c	UV-Vis	Fluorescence		Φ_F
	λ_{Ex} (nm)	λ_{Em} (nm)	Intensity	
	330	373	1179	0.20

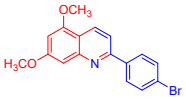


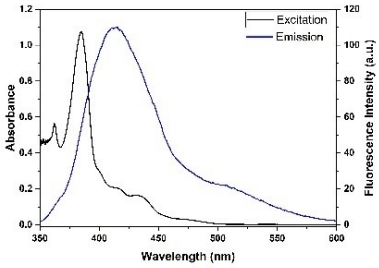
20c	UV-Vis	Fluorescence		Φ_F
	λ_{Ex} (nm)	λ_{Em} (nm)	Intensity	
	330	364	1431	0.18



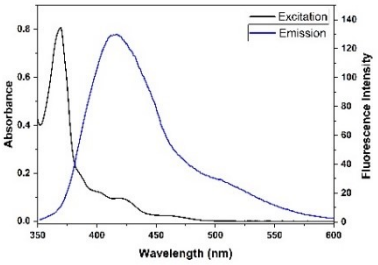
15d	UV-Vis	Fluorescence		Φ_F
	λ_{Ex} (nm)	λ_{Em} (nm)	Intensity	
	330	360	1250	0.20



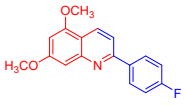
16d	UV-Vis	Fluorescence		Φ_F
	λ_{Ex} (nm)	λ_{Em} (nm)	Intensity	
	330	414	109	0.04

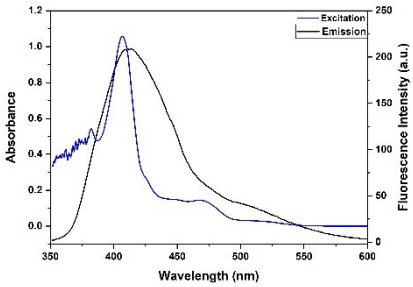


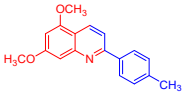
17d	UV-Vis	Fluorescence		Φ_F
	λ_{Ex} (nm)	λ_{Em} (nm)	Intensity	

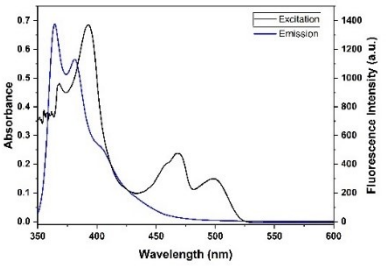


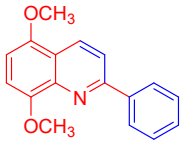
	330	416	129	0.09

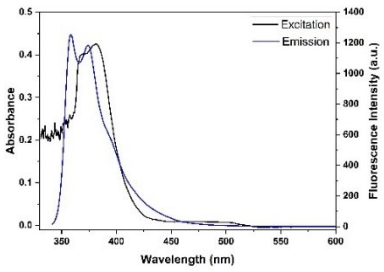
18d	UV-Vis	Fluorescence		Φ_F
	λ_{Ex} (nm)	λ_{Em} (nm)	Intensity	
	330	412	208	0.09

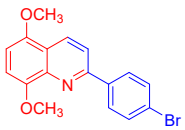


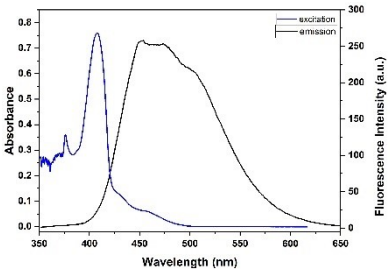
20d	UV-Vis	Fluorescence		Φ_F
	λ_{Ex} (nm)	λ_{Em} (nm)	Intensity	
	330	364	1373	0.19

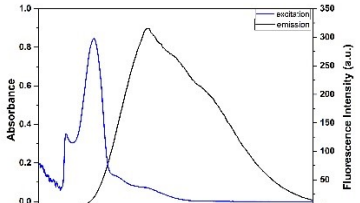


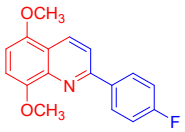
15e	UV-Vis	Fluorescence		Φ_F
	λ_{Ex} (nm)	λ_{Em} (nm)	Intensity	
	330	358	1251	0.20

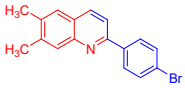


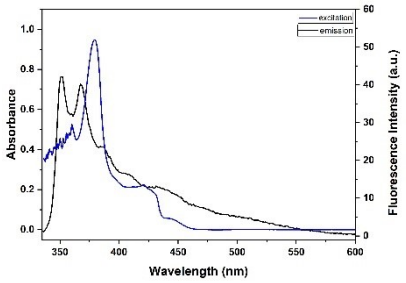
16e	UV-Vis	Fluorescence		Φ_F
	λ_{Ex} (nm)	λ_{Em} (nm)	Intensity	
	330	453	257	0.06

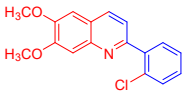


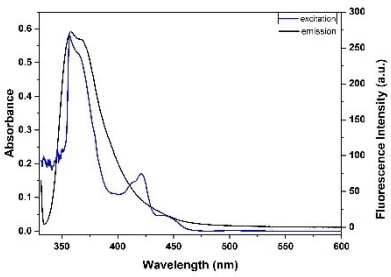


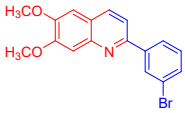
18e	UV-Vis	Fluorescence		Φ_F
	λ_{Ex} (nm)	λ_{Em} (nm)	Intensity	
	330	450	316	0.33

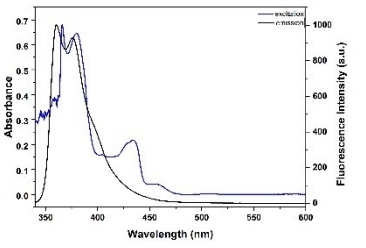
16f	UV-Vis	Fluorescence		Φ_F
	λ_{Ex} (nm)	λ_{Em} (nm)	Intensity	
	330	351	42	0.01

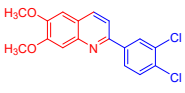


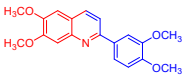
23a	UV-Vis	Fluorescence		Φ_F
	λ_{Ex} (nm)	λ_{Em} (nm)	Intensity	
	330	358	272	0.06

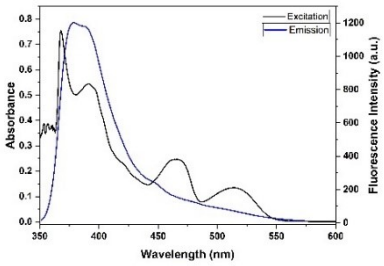


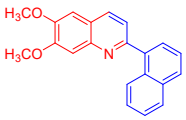
24a	UV-Vis	Fluorescence		Φ_F
	λ_{Ex} (nm)	λ_{Em} (nm)	Intensity	
	330	360	1008	0.16

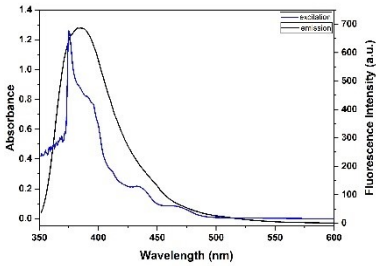


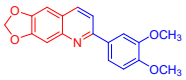
25a	UV-Vis	Fluorescence		Φ_F
	λ_{Ex} (nm)	λ_{Em} (nm)	Intensity	
	330	363	1916	0.25

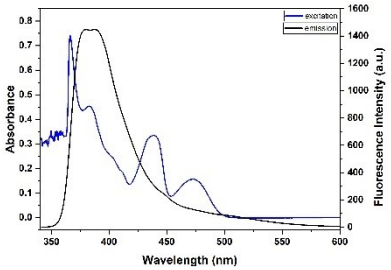
26a	UV-Vis	Fluorescence		Φ_F
	λ_{Ex} (nm)	λ_{Em} (nm)	Intensity	
	330	379	1200	0.23

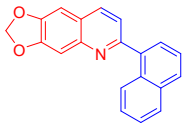


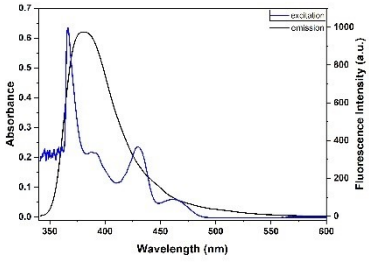
27a	UV-Vis	Fluorescence		Φ_F
	λ_{Ex} (nm)	λ_{Em} (nm)	Intensity	
	330	385	686	0.15

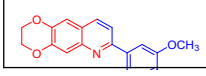


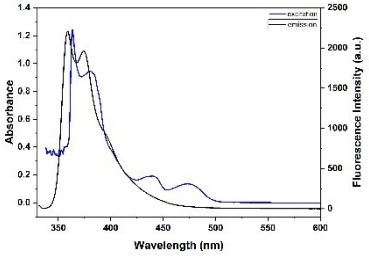
26b	UV-Vis	Fluorescence		Φ_F
	λ_{Ex} (nm)	λ_{Em} (nm)	Intensity	
	330	386	1448	0.20



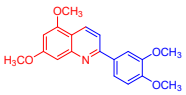
27b	UV-Vis	Fluorescence		Φ_F
	λ_{Ex} (nm)	λ_{Em} (nm)	Intensity	
	330	381	974	0.19

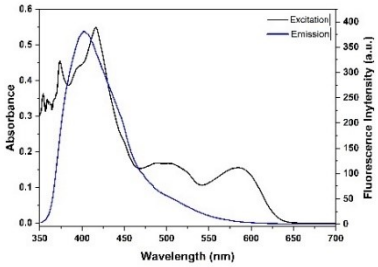


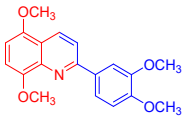
26c	UV-Vis	Fluorescence		Φ_F
	λ_{Ex} (nm)	λ_{Em} (nm)	Intensity	

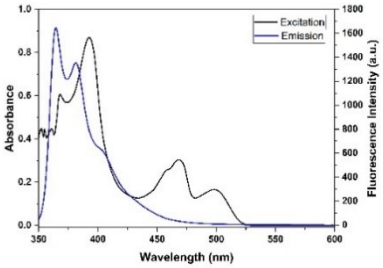


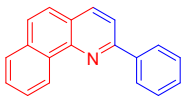
	330	358	2206	0.22

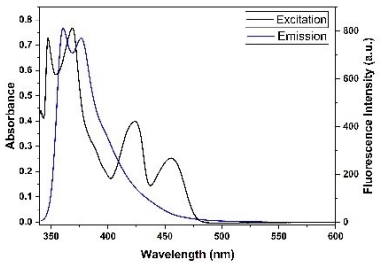
26d	UV-Vis	Fluorescence		Φ_F
	λ_{Ex} (nm)	λ_{Em} (nm)	Intensity	
	330	402	382	0.15

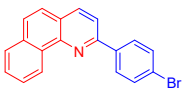


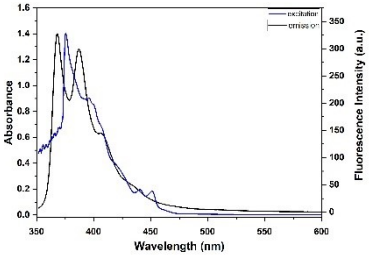
26e	UV-Vis	Fluorescence		Φ_F
	λ_{Ex} (nm)	λ_{Em} (nm)	Intensity	
	330	364	1635	0.17



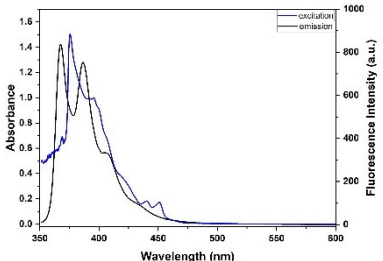
15g	UV-Vis	Fluorescence		Φ_F
	λ_{Ex} (nm)	λ_{Em} (nm)	Intensity	
	330	365	832	0.16

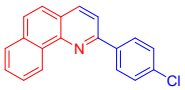


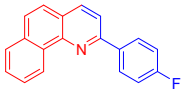
16g	UV-Vis	Fluorescence		Φ_F
	λ_{Ex} (nm)	λ_{Em} (nm)	Intensity	
	330	367	326	0.05

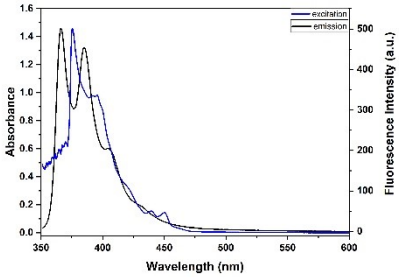


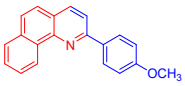
17g	UV-Vis	Fluorescence	Φ_F

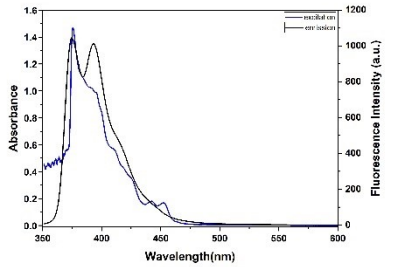


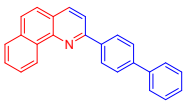
	λ_{Ex} (nm)	λ_{Em} (nm)	Intensity	
	330	367	833	0.14

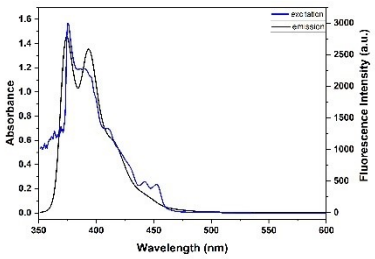
18g	UV-Vis	Fluorescence		Φ_F
	λ_{Ex} (nm)	λ_{Em} (nm)	Intensity	
	330	365	505	0.10

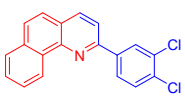


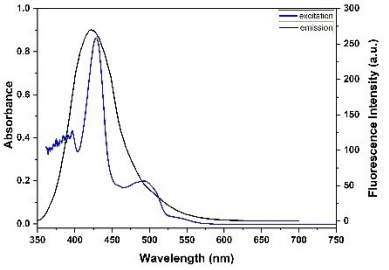
19g	UV-Vis	Fluorescence		Φ_F
	λ_{Ex} (nm)	λ_{Em} (nm)	Intensity	
	330	374	1043	0.21

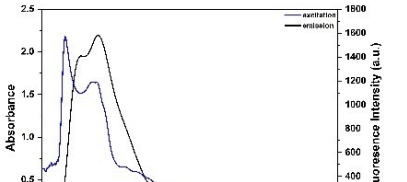


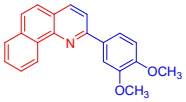
22g	UV-Vis	Fluorescence		Φ_F
	λ_{Ex} (nm)	λ_{Em} (nm)	Intensity	
	330	374	2784	0.34

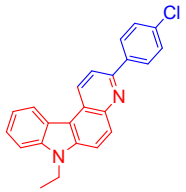


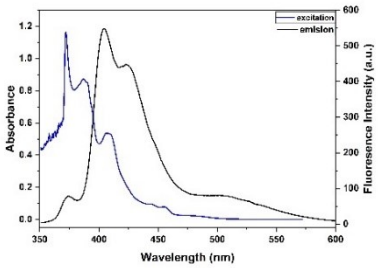
25g	UV-Vis	Fluorescence		Φ_F
	λ_{Ex} (nm)	λ_{Em} (nm)	Intensity	
	330	422	270	0.09

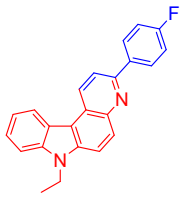


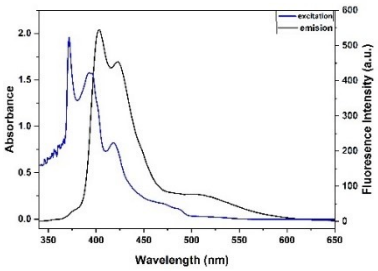


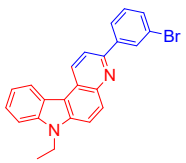
26g	UV-Vis	Fluorescence		Φ_F
	λ_{Ex} (nm)	λ_{Em} (nm)	Intensity	
	330	399	1582	0.20

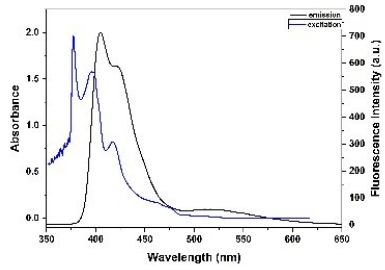
17h		UV-Vis	Fluorescence		Φ_F
		λ_{Ex} (nm)	λ_{Em} (nm)	Intensity	
		330	404	547	0.28



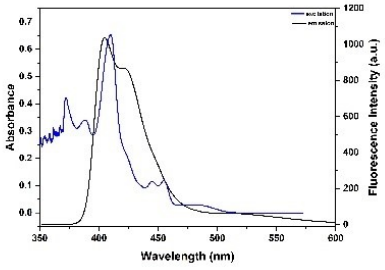
18h	UV-Vis	Fluorescence		Φ_F
	λ_{Ex} (nm)	λ_{Em} (nm)	Intensity	
	330	403	545	0.14

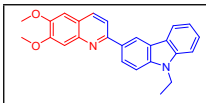


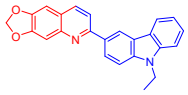
24h	UV-Vis	Fluorescence		Φ_F
	λ_{Ex} (nm)	λ_{Em} (nm)	Intensity	
	330	406	713	0.25

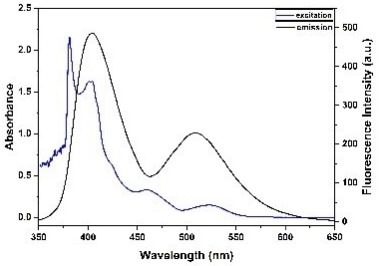


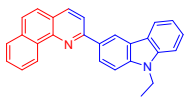
28a	UV-Vis	Fluorescence		Φ_F
	λ_{Ex} (nm)	λ_{Em}	Inten	



		(nm)	sity	
	330	405	1031	0.36

28b	UV-Vis	Fluorescence		Φ_F
	λ_{Ex} (nm)	λ_{Em} (nm)	Intensity	
	330	404	485	0.11



28g	UV-Vis	Fluorescence		Φ_F
	λ_{Ex} (nm)	λ_{Em} (nm)	Intensity	
	330	409	1716	0.27