Expeditious and Environmentally Benign Synthesis of imidazo[4,5,1-*ij*]quinolines via sequential Povarov reaction/reductive cyclization

Laura A. Heredia-Parra[a] *Mónica C. Ávila-Murillo**[b] *and Cristian Ochoa-Puentes**[a]

[a] Laboratorio de Síntesis Orgánica Sostenible, Departamento de Química, Universidad Nacional de Colombia–Sede Bogotá, Carrera 45 # 26-85, A.A 5997, Bogotá, Colombia.

[b] Grupo de Investigación en Química de Productos Naturales Vegetales Bioactivos, Departamento de Química, Universidad Nacional de Colombia–Sede Bogotá, Carrera 45 # 26-85, A.A 5997, Bogotá, Colombia.

Correspondence: cochoapu@unal.edu.co (C. ochoa-Puentes), mcavilam@unal.edu.co (M. Ávila-Murillo)

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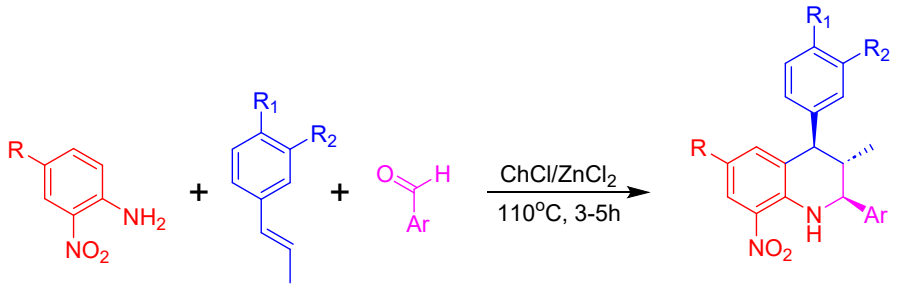
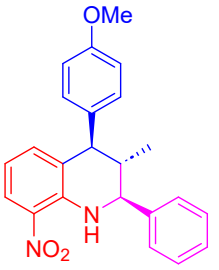
DES preparation. The DES was formed by mixing the components in the respective molar ratio in a glass vial. The mixture was heated up to 80 °C until a homogeneous, colourless liquid was obtained.

General procedure for the synthesis of 8-nitrotetrahydroquinolines 4a-4p. 0.8 g of ChCl/zinc chloride DES (1:2) was heated to 80 °C to obtain a clear melt. To this melt a mixture of substituted aniline (1 mmol), aromatic aldehyde (1.1 mmol) and *trans*-anethole (or *trans*-isoeugenol, 1.1 mmol) was added and the reaction was stirred at 110 °C. After completion of the reaction (monitored by TLC), the reaction mixture was quenched by adding water while still hot, cooled to room temperature and the crude solid was filtered, washed with water, and purified by column chromatography on silica gel (60–120 mesh) using a mixture of petroleum ether–ethyl acetate as eluent to afford the 8-nitrotetrahydroquinoline derivatives.

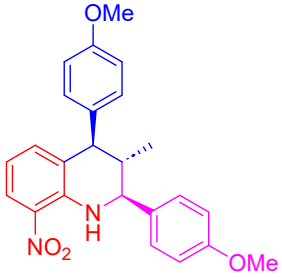
General procedure for the synthesis of imidazo[4,5,1-*ij*]quinolines 5a-5ac. A 10 mL microwave vial was charged with 0.26 mmol of 8-nitrotetrahydroquinoline, 0.34 mmol of aldehyde and 3 mL of EtOH/H_2O (3:1). To this mixture, 226.3 mg (1.3 mmol) of $Na_2S_2O_4$ was added and the vial was heated at 110°C during 15 minutes in the microwave reactor. After completion of the reaction (monitored by TLC), the solvent was evaporated, NH_4OH was added (pH=8) and the crude product was extracted (3x10 mL, AcOEt) and purified by column chromatography on silica gel (60–120 mesh) using a mixture of petroleum ether–ethyl acetate as eluent to afford the corresponding imidazo[4,5,1-*ij*]quinolines.

Characterization data for 8-nitrotetrahydroquinolines 4a-4p.





4a, 80%



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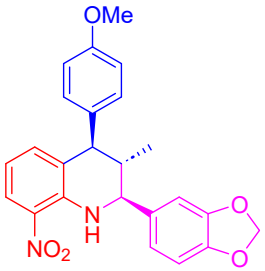
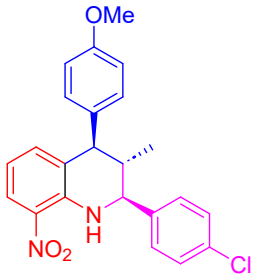
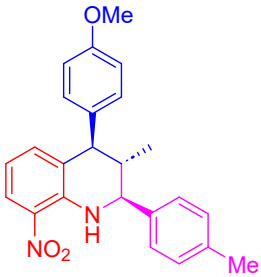


4c, 75%



4d, 100%



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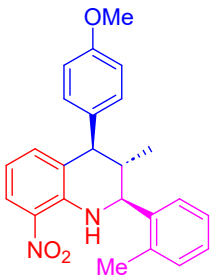

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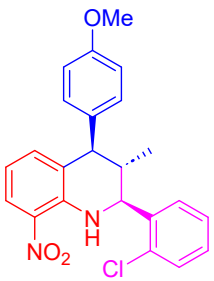
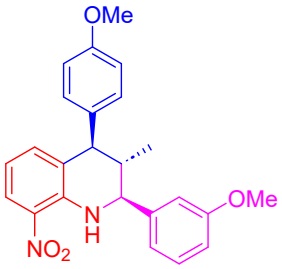
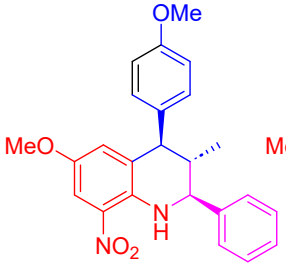


4g, 92%



4h, 90%



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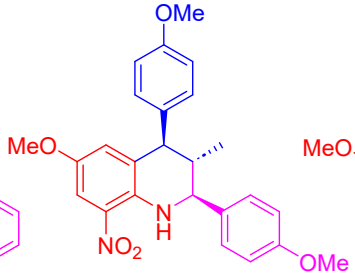

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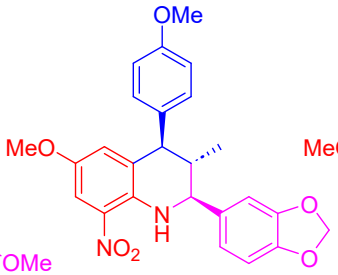

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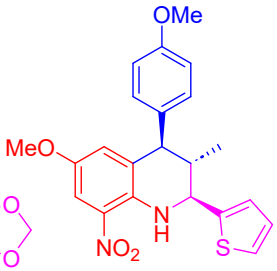

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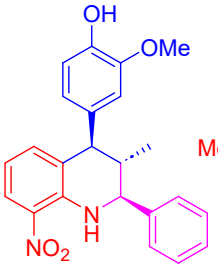

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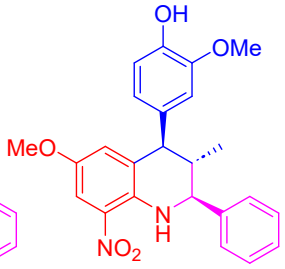

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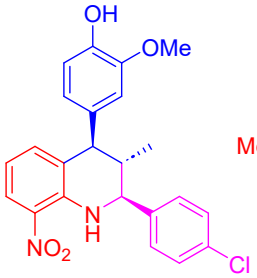
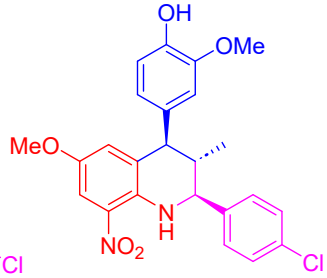


4o, 53%



4p,79%

***Cis*-4-(4-methoxyphenyl)-3-methyl-8-nitro-2-phenyl-1,2,3,4-tetrahydroquinoline (4a)**. Light yellow solid (299 mg, 0.8 mmol, 80%); R_f [P.E-AcOEt 6:1] = 0.55; mp 155 - 157 °C; IR (ATR) ν_{max} = 3327, 2924, 1604, 1495, 1574, 1335, 1249 cm^{-1}; NMR ^1H (400 MHz, $CDCl_3$) δ (ppm): 8.50 (s, 1H, N-H), 8.01 (d, *J* = 8.6 Hz, 1H, 7-H), 7.44 – 7.35 (m, 5H, H-2',3',4',5',6'), 7.10 (d, *J* = 8.6 Hz, 2H, H-3'',5''), 6.91 (d, *J* = 8.7 Hz, 2H, H-2'',6''), 6.75 (d, *J* = 7.2 Hz, 1H, H-5), 6.44 (dd, *J* = 8.6, 7.3 Hz, 1H, H-6), 4.32 (d, *J* = 10.2 Hz, 1H, H-2), 3.83 (s, 3H, 4''-OCH_3), 3.74 (d, *J* = 11.4 Hz, 1H, H-4), 2.20 – 2.10 (m, 1H, H-3), 0.60 (d, *J* = 6.5 Hz, 3H, 3-CH_3) ; NMR ^{13}C (100 MHz, $CDCl_3$) δ (ppm): 158.6, 143.1, 141.2, 136.0, 134.3, 130.8, 130.2, 129.7, 128.9, 128.5, 127.6, 124.8, 114.7, 114.2, 63.4, 55.2, 51.2, 39.2, 16.4. HRMS (APCI-Q-TOF) m/z calc. for $C_{23}H_{23}N_2O_3$ $[M+H]^+$: 375.1708, found: 375.1704.

***Cis*-2,4-bis(4-methoxyphenyl)-3-methyl-8-nitro-1,2,3,4-tetrahydroquinoline (4b).** Yellow solid (332 mg, 0,82 mmol, 82%); R_f[hexane-AcOEt 6:1]: 0.42; mp 174 - 176 °C; IR (ATR) ν_{max} = 3372, 2944, 1607, 1577, 1486, 1333, 1244, 1031 cm^{-1}; NMR ^1H (400 MHz, $CDCl_3$) δ (ppm): 8.44 (s, 1H, N-H), 8.00 (d, *J* = 9.8, 1H, H-7), 7.33 (d, *J* = 8.7, 2H, H-Ar), 7.09 (d, *J* = 8.7, 2H, H-Ar), 6.91 (dd, *J* = 10.5, 8.6, 4H, H-Ar), 6.73 (d, *J* = 7.4. 1H, H-5), 6.42 (dd, *J* = 8.6, 7.3, 1H, H-6), 4.27 (d, *J* = 10.1, 1H, H-2), 3.83 (s, 3H, OCH_3), 3.82 (s, 3H, OCH_3), 3.72 (d, *J* = 11.4, 1H, H-4), 2.11 (m, 1H, H-3), 0.59 (d, *J* = 6.5, 3H, 3-CH_3); NMR ^{13}C (100 MHz, $CDCl_3$) δ (ppm): 159.7, 158.6, 143.2, 136.0, 134.5, 133.2, 130.8, 130.2, 129.7, 128.7, 124.8, 114.7, 114.3, 114.3, 62.8, 55.4, 55.3, 51.3, 39.3, 16.4; HRMS (APCI-Q-TOF) m/z calc. for $C_{24}H_{25}N_2O_4$ $[M+H]^+$: 405.1814, found 405.1822.

***Cis*-2-(benzo[*d*][1,3]dioxol-5-yl)-4-(4-methoxyphenyl)-3-methyl-8-nitro-1,2,3,4-tetrahydroquinoline (4c).** Orange solid (313 mg, 0.75 mmol, 75%); R_f[hexane-AcOEt 6:1]: 0.42;

mp 156 - 158 °C; IR (ATR) v_{max} = 3349, 2948, 1610, 1573, 1488, 1331, 1243, 1037 cm^{-1}; NMR ^{1}H (400 MHz, $CDCl_3$) δ (ppm): 8.42 (s, 1H, NH), 8.00 (d, *J* = 8.5 Hz, 1H, H-7), 7.08 (d, *J* = 8.8 Hz, 2H, H-Ar), 6.91 (m, 2H, H-Ar), 6.89 (s, 1H, H-Ar), 6.87 (d, *J* = 8.0 Hz, 1H, H-Ar), 6.81 (d, *J* = 7.9 Hz, 1H, H-Ar), 6.73 (d, *J* = 7.4 Hz, 1H, H-5), 6.43 (dd, *J* = 8.5, 7.4 Hz, 1H, H-6), 5.99 (s, 2H, OCH_2O), 4.23 (d, *J* = 10.1 Hz, 1H, H-2), 3.82 (s, 3H, 4"-OCH_3), 3.70 (d, *J* = 11.5 Hz, 1H, H-4), 2.13 – 2.05 (m, 1H, H-3), 0.60 (d, *J* = 6.5 Hz, 3H, 3-CH_3); NMR ^{13}C (100 MHz, $CDCl_3$) δ (ppm): 158.6, 148.3, 147.7, 143.0, 136.1, 135.0, 134.4, 130.9, 130.2, 129.7, 124.8, 121.4, 114.8, 114.3, 108.4, 107.4, 101.3, 63.2, 55.3, 51.2, 39.3, 16.4.; HRMS (APCI-Q-TOF) m/z calc. for $C_{24}H_{23}N_2O_5$ $[M+H]^+$: 419.1607, found 419.1605.

***Cis*-2-(4-chlorophenyl)-4-(4-methoxyphenyl)-3-methyl-8-nitro-1,2,3,4-tetrahydroquinoline (4d).** Dark yellow solid (408 mg, 1 mmol, 100%); R_f[hexane-AcOEt 6:1]: 0.52; mp 176 – 178 °C; IR (ATR) v_{max} = 3343, 2949, 1608, 1570, 1482, 1332, 1251, 1036, 739 cm^{-1}; NMR ^{1}H (400 MHz, $CDCl_3$) δ (ppm): 8.41 (s, 1H, NH), 8.01 (d, *J* = 8.6 Hz, 1H, H-Ar), 7.42 – 7.33 (m, 4H, H-Ar), 7.08 (d, *J* = 8.6 Hz, 2H, H-Ar), 6.90 (d, *J* = 8.7 Hz, 2H, H-Ar), 6.75 (d, *J* = 7.2 Hz, 1H, H-5), 6.45 (dd, *J* = 8.7, 7.3 Hz, 1H, H-6), 4.31 (d, *J* = 10.0 Hz, 1H, H-2), 3.82 (s, 4H, 4''-OCH_3), 3.72 (d, *J* = 11.4 Hz, 1H, H-4), 2.16 – 2.05 (m, 1H, H-3), 0.59 (d, *J* = 6.5 Hz, 3H, 3-CH_3); NMR ^{13}C (100 MHz, $CDCl_3$) δ (ppm): 158.7, 142.9, 139.8, 136.2, 134.3, 134.2, 131.1, 130.2, 129.6, 129.2, 129.0, 128.1, 124.9, 115.0, 114.3, 62.8, 55.3, 51.1, 39.3, 16.3; HRMS (APCI-Q-TOF) m/z calc. for $C_{22}H_{22}ClN_2O_3$ $[M+H]^+$: 409.1319, found 409.1331.

***Cis*-2-(4-methylphenyl)-4-(4-methoxyphenyl)-3-methyl-8-nitro-1,2,3,4-tetrahydroquinoline (4e).** Orange solid (380 mg, 0.98 mmol, 98%); R_f[hexane-AcOEt 6:1]: 0.55; mp 139 - 141 °C; IR (ATR) v_{max} = 3357, 2963, 1607, 1572, 1508, 1312, 1244, 1032 cm^{-1}; NMR ^{1}H (400 MHz, $CDCl_3$) δ (ppm): 8.46 (s, 1H, NH), 8.00 (d, *J* = 8.5 Hz, 1H, H-7), 7.30 (d, *J* = 8.0 Hz, 2H, H-Ar), 7.20 (d,

J = 8.1 Hz, 2H, H-Ar), 7.09 (d, *J* = 8.8 Hz, 2H, H-Ar), 6.90 (d, *J* = 8.8 Hz, 2H, H-Ar), 6.73 (d, *J* = 7.8 Hz, 1H, H-5), 6.42 (dd, *J* = 8.7, 7.3 Hz, 1H, H-6), 4.28 (d, *J* = 10.3 Hz, 1H, H-2), 3.82 (s, 3H, 4''-OCH_3), 3.72 (d, *J* = 11.6 Hz, 1H, H-4), 2.38 (s, 3H, 3'-CH_3), 2.23 – 2.03 (m, 1H, H-3), 0.59 (d, *J* = 6.5 Hz, 3H, 3-CH_3); NMR ^{13}C (100 MHz, $CDCl_3$) δ (ppm): 158.6, 143.2, 138.2, 138.2, 136.0, 134.5, 130.8, 130.2, 129.7, 129.6, 127.5, 124.8, 114.7, 114.3, 63.2, 55.3, 51.3, 39.2, 21.2, 16.4; HRMS (APCI-Q-TOF) m/z calc. for $C_{24}H_{25}N_2O_3$ $[M+H]^+$: 389.1865, found 389.1861.

***Cis*-2-(2-methylphenyl)-4-(4-methoxyphenyl)-3-methyl-8-nitro-1,2,3,4-tetrahydroquinoline (4f).** Orange solid (376 mg, 0.97 mmol, 97%); R_f[hexane-AcOEt 6:1]: 0.55; mp 145 - 147 °C; IR (ATR) v_{max} = 3360, 2950, 1609, 1570, 1508, 1339, 1248, 1032 cm^{-1}; NMR ^1H (400 MHz, $CDCl_3$) δ (ppm): 8.37 (s, 1H, NH), 8.01 (d, *J* = 8.6 Hz, 1H, H-7), 7.45 (d, *J* = 7.6 Hz, 1H, H-Ar), 7.26 – 7.18 (m, 4H, H-Ar), 7.10 (d, *J* = 8.8 Hz, 2H, H-Ar), 6.90 (d, *J* = 8.8 Hz, 2H, H-Ar), 6.75 (d, *J* = 7.4 Hz, 1H, H-5), 6.43 (dd, *J* = 8.5, 7.3 Hz, 1H, H-6), 4.69 (d, *J* = 10.4 Hz, 1H, H-2), 3.83 (s, 3H, 4''-OCH_3), 3.77 (d, *J* = 11.1 Hz, 1H, H-4), 2.43 (s, 3H, 3'-CH_3), 2.16 – 2.07 (m, 1H, H-3), 0.61 (d, *J* = 6.5 Hz, 3H, 3-CH_3); NMR ^{13}C (100 MHz, $CDCl_3$) δ (ppm): δ 158.6, 143.2, 138.2, 138.2, 136.0, 134.5, 130.8, 130.2, 129.7, 129.6, 127.5, 124.8, 114.7, 114.3, 63.2, 55.3, 51.3, 39.2, 21.2, 16.4; HRMS (APCI-Q-TOF) m/z calc. for $C_{24}H_{25}N_2O_3$ $[M+H]^+$: 389.1865, found 389.1866.

***Cis*-2-(2-chlorophenyl)-4-(4-methoxyphenyl)-3-methyl-8-nitro-1,2,3,4-tetrahydroquinoline (4g).** Orange solid (376 mg, 0.92 mmol, 92%); R_f[hexane-AcOEt 6:1]: 0.55; mp 140 - 142 °C; IR (ATR) v_{max} = 3355, 2956, 1606, 1568, 1511, 1310, 1249, 1034, 736 cm^{-1}; NMR ^1H (400 MHz, $CDCl_3$) δ (ppm): 8.38 (s, 1H, NH), 8.01 (d, *J* = 8.1 Hz, 1H, H-7), 7.56 (d, *J* = 5.6 Hz, 1H, H-Ar), 7.42 (dd, *J* = 7.9, 1.5 Hz, 1H, H-Ar), 7.36 – 7.32 (m, 1H, H-Ar), 7.29 (dd, *J* = 7.8, 1.8 Hz, 1H, H-Ar), 7.10 (d, *J* = 8.8 Hz, 2H, H-Ar), 6.90 (d, *J* = 8.8 Hz, 2H, H-Ar), 6.77 (d, *J* = 7.3 Hz, 1H, H-5), 6.46 (dd, *J* = 8.7, 7.3 Hz, 1H, H-6), 5.03 (d, *J* = 9.4 Hz, 1H, H-2), 3.83 (s, 3H, 4''-OCH_3), 3.80 (d,

J = 11.2 Hz, 2H, H-4), 2.31 – 2.13 (m, 1H, H-3), 0.66 (d, *J* = 6.6 Hz, 3H, 3-CH_3); NMR ^{13}C (100 MHz, $CDCl_3$) δ (ppm): 158.7, 143.2, 138.7, 136.2, 134.2, 131.1, 130.2, 129.9, 129.6, 129.4, 127.9, 124.9, 115.0, 114.3, 55.3, 51.1, 15.7; HRMS (APCI-Q-TOF) m/z calc. for $C_{23}H_{22}ClN_2O_3$ $[M+H]^+$: 409.1319, found 409.1325.

***Cis*-2-(3-methoxyphenyl)-4-(4-methoxyphenyl)-3-methyl-8-nitro-1,2,3,4-tetrahydroquinoline (4h).** Light orange solid (363 mg, 0.9 mmol, 90%); R_f[hexane-AcOEt 6:1]: 0.47; mp 152 - 154 °C; IR (ATR) v_{max} = 3339, 2931, 1604, 1504, 1331, 1246, 1031 cm^{-1}; NMR ^1H (400 MHz, $CDCl_3$) δ (ppm): 8.48 (s, 1H, NH), 8.01 (d, *J* = 8.1 Hz, 1H, H-7), 7.31 (t, *J* = 7.9 Hz, 1H, H-Ar), 7.09 (d, *J* = 8.8 Hz, 2H, H-Ar), 7.00 (d, *J* = 7.7 Hz, 1H, H-Ar), 6.96 (bs, 1H, H-Ar), 6.90 (d, *J* = 8.9 Hz, 4H, H-Ar), 6.74 (d, *J* = 7.2 Hz, 1H, H-5), 6.43 (dd, *J* = 8.7, 7.2 Hz, 1H, H-6), 4.29 (d, *J* = 10.1 Hz, 1H, H-2), 3.83 (s, 3H, OCH_3), 3.82 (s, 3H, OCH_3), 3.72 (d, *J* = 11.4 Hz, 1H, H-4), 2.14 (m, 1H, H-3), 0.61 (d, *J* = 6.4 Hz, 3H, 3-CH_3); NMR ^{13}C (100 MHz, $CDCl_3$) δ (ppm): 160.0, 158.6, 143.1, 142.8, 136.1, 134.4, 130.9, 130.2, 129.9, 129.7, 124.8, 120.1, 114.8, 114.3, 113.7, 113.3, 63.4, 55.3, 55.3, 51.2, 39.1 16.4; HRMS (APCI-Q-TOF) m/z calc. for $C_{24}H_{25}N_2O_4$ $[M+H]^+$: 405.1814, found 405.1822.

***Cis*-4-(4-methoxyphenyl)-3-methyl-6-methoxy-2-phenyl-8-nitro-1,2,3,4-tetrahydroquinoline (4i).** Red solid (404 mg, 1 mmol, 100%); R_f [hexane-AcOEt 6:1] = 0.47; mp 132 - 134 °C; IR (ATR) v_{max} = 3323, 2923, 1614, 1506, 1578, 1318, 1246, 1033 cm^{-1}; NMR ^1H (400 MHz, $CDCl_3$) δ (ppm): 8.52 (s, 1H, N-H), 7.43 (d, *J* = 2.9, 1H, H-7), 7.41 – 7.35 (m, H-2'-H-6'), 7.08 (d, *J* = 8.8 Hz, 2H, H-2'', H-6''), 6.89 (d, *J* = 8.6 Hz, 2H, . H-3'', H-5''), 6.48 (bs, 1H, H-5), 4.31 (d, *J* = 10.1 Hz, 1H, H-2), 3.82 (s, 3H, OCH_3), 3.72 (d, *J* = 11.0 Hz, 1H, H-4), 3.69 (s, 3H, OCH_3), 2.20 – 2.13 (m, 1H, H-3), 0.58 (d, *J* = 6.5 Hz, 3H, 3-CH_3); NMR ^{13}C (100 MHz, $CDCl_3$) δ (ppm): 158.8, 149.0,

141.3, 139.5, 134.0, 131.8, 130.2, 129.7, 127.8, 127.7, 114.4, 104.3, 63.5, 55.6, 55.3, 51.3, 39.4, 16.4; HRMS (APCI-Q-TOF) m/z calc. for $C_{24}H_{25}N_2O_4$ $[M+H]^+$: 405.1814, found 405.1827.

***Cis*-6-methoxy-2,4-bis(4-methoxyphenyl)-3-methyl-8-nitro-1,2,3,4-tetrahydroquinoline (4j).** Red solid (395 mg, 0.91 mmol, 91%); R_f [hexane-AcOEt 3:1]: 0.47; mp 134 - 136 °C; IR (ATR) ν_{max} = 3339, 2931, 1606, 1579, 1503, 1331, 1244, 1036 cm^{-1}; NMR ^1H (400 MHz, $CDCl_3$) δ (ppm): 8.47 (s, 1H, NH), 7.43 (d, *J* = 3.1 Hz, 1H, H-7), 7.32 (d, *J* = 8.8 Hz, 2H, H-Ar), 7.08 (d, *J* = 8.8 Hz, 2H, H-Ar), 6.92 (d, *J* = 8.7 Hz, 2H), 6.89 (d, *J* = 8.8 Hz, 2H, H-Ar), 6.47 (bs = 1H, H-5), 4.26 (d, *J* = 10.1 Hz, 1H, H-2), 3.83 (s, 3H, OCH_3), 3.82 (s, 3H, OCH_3), 3.81 (d, *J* = 11.2 Hz, H-4), 3.68 (s, 3H, OCH_3), 2.18 – 2.07 (m, 1H, H-3), 0.58 (d, *J* = 6.5 Hz, 3H; 3-CH_3); NMR ^{13}C (100 MHz, $CDCl_3$) δ (ppm): 159.7, 158.7, 148.9, 139.5, 134.0, 133.3, 131.8, 130.2, 129.7, 129.4, 128.9, 128.7, 127.8, 114.5, 114.4, 114.3, 62.9, 55.6, 55.3, 55.3, 39.4, 16.4; HRMS (APCI-Q-TOF) m/z calc. for $C_{25}H_{27}N_2O_5$ $[M+H]^+$: 435.1220, found 435.1938.

***Cis*-2-(benzo[*d*][1,3]dioxol-5-yl)-6-methoxy-4-(4-methoxyphenyl)-3-methyl-8-nitro-1,2,3,4-tetrahydroquinoline (4k).** Dark red solid (372 mg, 0.84 mmol, 84%); R_f [hexane-AcOEt 3:1]: 0.45; mp 152 - 154 °C; IR (ATR) ν_{max} = 3323, 2923, 1607, 1579, 1503, 1316, 1246, 1039 cm^{-1}; NMR ^1H (400 MHz, $CDCl_3$) δ (ppm): 8.43 (s, 1H, NH), 7.43 (d, *J* = 2.9. 1H, H-7), 7.07 (d, *J* = 8.8 Hz, 2H, H-Ar), 6.91 – 6.88 (m, 3H, H-Ar), 6.87 – 6.85 (m, 1H, H-Ar), 6.80 (d, *J* = 8.0 Hz, 1H, H-Ar), 6.47 (bs, 1H, H-5), 5.99 (s, 2H, OCH_2O), 4.22 (d, *J* = 10.1 Hz, 1H, H-2), 3.82 (s, 3H, OCH_3), 3.79 (d, *J* = 11.1 Hz, 1H, H-4), 3.68 (s, 3H, OCH_3), 2.14 – 2.07 (m, 1H, H-3), 0.60 (d, *J* = 6.6 Hz, 3H, 3-CH_3); NMR ^{13}C (100 MHz, $CDCl_3$) δ (ppm): 158.7, 148.9, 148.2, 147.7, 139.4, 135.1, 133.9,

131.7, 130.1, 129.8, 127.7, 121.4, 114.4, 108.3, 107.5, 104.3, 101.3, 63.3, 55.6, 55.3, 51.3, 39.4, 16.4; HRMS (APCI-Q-TOF) m/z calc. for $C_{25}H_{25}N_2O_6$ $[M+H]^+$: 449.1712, found 449.1731.

***Cis*-4-(4-methoxyphenyl)-3-methyl-6-methoxy-8-nitro-2-(thiophen-2-yl)-1,2,3,4-tetrahydroquinoline (4l).** Red solid (254 mg, 0.60 mmol, 62%); R_f[hexane-AcOEt 5:1]: 0.42; mp 135 - 137 °C; NMR ^{1}H (400 MHz, $CDCl_3$) δ (ppm): 8.51 (s, 1H, NH), 7.43 (dd, *J*=3.1. 0.9. 1H, H-7), 7.32 (d, *J*=6.8. 1H, H-Ar), 7.12 (dd, *J*=3.5. 1.3. 1H, H-Ar), 7.08 (d, *J*=8.7. 2H, H-Ar), 7.01 – 6.98 (m, 1H, H-Ar), 6.90 (d, *J*=8.8. 2H, H-Ar), 6.47 (bs, 1H, H-5), 4.65 (d, *J*=10.1. 1H, H-2), 3.82 (s, 3H, OCH_3), 3.71 (d, *J*=11.4. 1H, H-4), 3.68 (s, 3H, OCH_3), 2.18 (m, 1H, H-3), 0.67 (d, *J*=6.5. 3H, 3-CH_3); NMR ^{13}C (100 MHz, $CDCl_3$) δ (ppm): 158.7, 149.1, 144.7, 138.5, 133.8, 131.5, 130.2, 130.1, 127.7, 126.7, 126.4, 125.5, 114.4, 104.5, 58.8, 55.6, 55.3, 51.3, 40.5, 16.6; HRMS (APCI-Q-TOF) m/z calc. for $C_{22}H_{23}N_2O_4S$ $[M+H]^+$: 411.1378, found 411.1385.

***Cis*-4-(4-hydroxy-3-methoxyphenyl)-3-methyl-2-phenyl-8-nitro-1,2,3,4-tetrahydroquinoline (4m).** Red solid (185 mg, 0.44 mmol, 88%); R_f[hexane-AcOEt 3:1]: 0.47; mp 199 - 201 °C; NMR ^{1}H (400 MHz, $CDCl_3$) δ (ppm): 8.49 (s, 1H, NH), 8.01 (d, *J* = 8.6, 1H, H-7), 7.43 – 7.36 (m, 5H, H-Ar), 6.91 (d, *J*=8.0, 1H, H-Ar), 6.78 (d, *J* = 7.3, 1H, H-Ar), 6.72 (dd, *J* = 8.1, 2.0. 1H, H-Ar), 6.60 (d, *J* = 1.9, 1H, H-Ar), 6.45 (dd, *J* = 8.7, 7.3, 1H, H-6), 5.62 (s, 1H, OH), 4.32 (d, *J* = 10.1, 1H, H-2), 3.85 (s, 3H, 3''-OCH_3), 3.71 (d, *J* = 11.5, 1H, H-4), 2.16 – 2.11 (m, 1H, H-3), 0.61 (d, *J* = 6.4, 3H, 3-CH_3); NMR ^{13}C (100 MHz, $CDCl_3$) δ (ppm): 147.1, 144.7, 143.1, 141.2, 136.1, 134.1, 130.9, 129.5, 129.0, 128.5, 127.7, 124.9, 122.6, 114.8, 114.5, 110.7, 63.4, 56.0, 51.8, 39.2,16.4; HRMS (APCI-Q-TOF) m/z calc. for $C_{23}H_{23}N_2O_4$ $[M+H]^+$: 391.1658, found 391.1649.

***Cis*-4-(4-hydroxy-3-methoxyphenyl)-3-methyl-6-methoxy-2-phenyl-8-nitro-1,2,3,4-tetrahydroquinoline (4n).** Red solid (218 mg, 0.52 mmol, 52%); R_f [hexane-AcOEt 3:1]: 0.42;

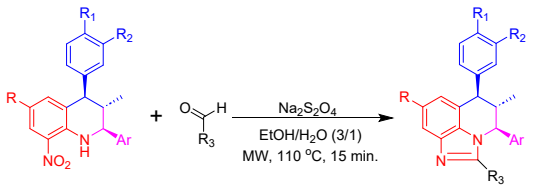
mp 197 - 199 °C; NMR ^{1}H (400 MHz, $CDCl_3$) δ (ppm): 8.51 (s, 1H, NH), 7.44 (dd, *J*=3.1, 1.0, 1H, H-7), 7.42 – 7.35 (m, 5H, H-Ar), 6.90 (d, *J* = 8.0, 1H, H-Ar), 6.71 (dd, *J* = 8.1, 2.0. 1H, H-Ar), 6.60 (d, *J* = 2.0. 1H, H-5), 6.50(bs, 1H, H-Ar), 5.61 (s, 1H, OH), 4.31 (d, *J* = 10.1, 1H, H-2), 3.85 (s, 3H, OCH_3), 3.70 (s, 3H, OCH_3), 3.66 (d, *J* = 11.2, 1H, H-4), 2.18 – 2.11 (m, 1H, H-3), 0.60 (d, *J* = 6.5, 3H, 3-CH_3); NMR ^{13}C (100 MHz, $CDCl_3$) δ (ppm): 149.0, 147.1, 144.8, 141.3, 139.4, 133.6, 131.6, 129.8, 128.9, 128.5, 127.7, 127.7, 122.6, 114.6, 110.7, 104.3, 63.5, 56.0, 55.6, 51.9, 39.3, 16.4; HRMS (APCI-Q-TOF) m/z calc. for $C_{24}H_{25}N_2O_5$ $[M+H]^+$: 421.1763, found 421.1755.

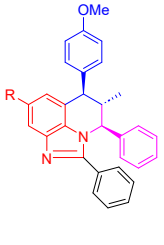
***Cis*-2-(4-chlorophenyl)-4-(4-hydroxy-3-methoxyphenyl)-3-methyl-8-nitro-1,2,3,4-tetrahydroquinoline (4o).** Orange solid (112.6 mg, 0.26 mmol, 53%); R_f [hexane-AcOEt 3:1]: 0.47; mp 195 - 197 °C; NMR ^{1}H (400 MHz, $CDCl_3$) δ (ppm): 8.42 (s, 1H, NH), 8.00 (d, *J* = 8.6, 1H, H-7), 7.38 (s, 4H, H-Ar), 6.91 (d, *J* = 8.1, 1H, H-Ar), 6.79 (d, *J* = 7.3, 1H, H-Ar), 6.71 (dd, *J* = 8.1, 2.0, 1H, H-Ar), 6.60 (d, *J* = 2.0, 1H, H-Ar), 6.46 (dd, *J* = 8.7, 7.2, 1H, H-6), 5.64 (s, 1H, OH), 4.31 (d, *J* = 10.1, 1H, H-2), 3.85 (s, 3H, OCH_3), 3.70 (d, *J* = 11.5, 1H, H-4), 2.09 (m, 1H, H-3), 0.61 (d, *J* = 6.5, 3H, 3-CH_3); NMR ^{13}C (100 MHz, $CDCl_3$) δ (ppm): 147.1, 144.7, 142.8, 139.8, 136.2, 134.2, 133.9, 131.0, 129.4, 129.2, 129.0, 124.9, 122.6, 115.1, 114.5, 110.7, 62.8, 56.0, 51.7, 39.2, 16.4; HRMS (APCI-Q-TOF) m/z calc. for $C_{23}H_{22}ClN_2O_4$ $[M+H]^+$: 425.1268, found 425.1257.

***Cis*-2-(4-chlorophenyl)-4-(4-hydroxy-3-methoxyphenyl)-3-methyl-6-methoxy-8-nitro-1,2,3,4-tetrahydroquinoline (4p).** Red solid (395 mg, 0.78 mmol, 79%); R_f [hexane-AcOEt 3:1]: 0.4; mp 193 - 195 °C; NMR ^{1}H (400 MHz, $CDCl_3$) δ (ppm): 8.43 (s, 1H, NH), 7.44 (d, *J* = 2.2, 1H, H-7), 7.37 (m, 4H, H-Ar), 7.26 (s, 1H, H-Ar), 6.90 (d, *J* = 8.0. 1H, H-Ar), 6.70 (dd, *J* = 8.1, 2.0. 1H, H-Ar), 6.58 (d, *J* = 1.9, 1H, H-Ar), 6.52 (dd, *J* = 3.6. 1.6. 1H, H-5), 5.60 (s, 1H, OH), 4.29

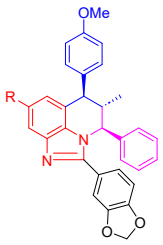
(d, J = 10.1. 1H, H-2), 3.85 (s, 3H, OCH_3), 3.69 (s, 3H, OCH_3), 3.67 (d, J = 11.4. 1H, H4), 2.10 (m, 1H, H-3), 0.60 (d, J = 6.5. 3H, 3-CH_3); NMR ^{13}C (100 MHz, $CDCl_3$) δ (ppm): 149.1, 147.1, 144.8, 139.8, 139.1, 134.2, 133.4, 131.4, 131.0, 129.2, 129.0, 127.7, 122.5, 114.6, 104.4, 62.9, 56.0, 55.6, 51.8, 39.4, 16.4; HRMS (APCI-Q-TOF) m/z calc. for $C_{24}H_{24}ClN_2O_5$ $[M+H]^+$: 455.1373, found 455.1362.

Characterization data for imidazo[4,5,1-*ij*]quinolines 5a-5ac.

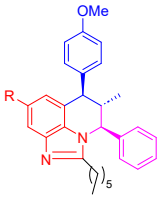




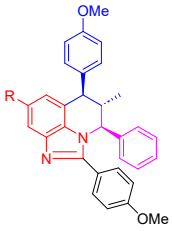
5a, R=H, 80% (64%)
5b, R=OMe, 70% (70%)



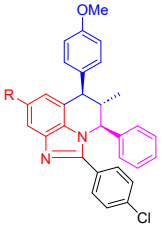
5c, R=H, 63% (44%)
5d, R=OMe, 65% (65%)



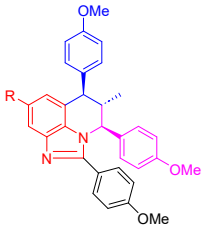
5e, R=H, 41% (29%)
5f, R=OMe, 43% (43%)



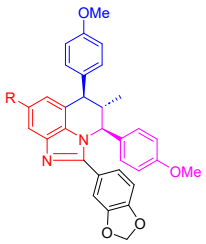
5g, R=H, 53% (37%)
5h, R=OMe, 55% (55%)



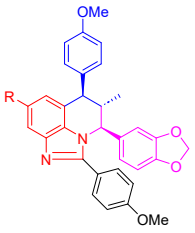
5i, R=H, 61% (43%)
5j, R=OMe, 62% (62%)



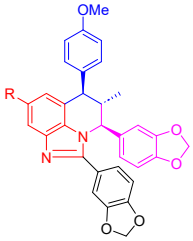
5k, R=H, 65% (53%)
5l, R=OMe, 70% (64%)



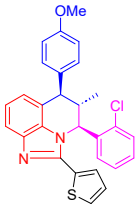
5m, R=H, 59% (48%)
5n, R=OMe, 65% (59%)



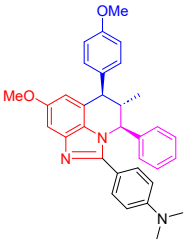
5o, R=H, 68% (51%)
5p, R=OMe, 78% (66%)



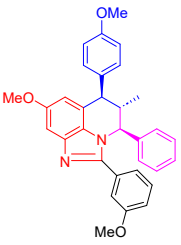
5q, R=H, 50% (38%)
5r, R=OMe, 57% (48%)



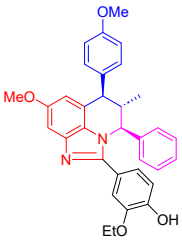
5s, 60% (54%)



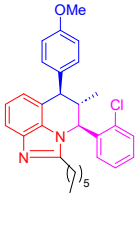
5t, 57% (57%)



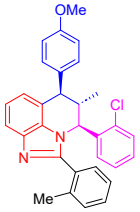
5u, 66% (66%)



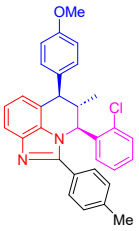
5v, 51% (51%)



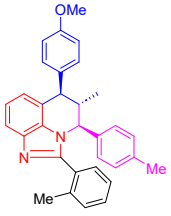
5w, 52% (48%)



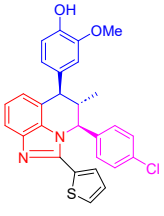
5x, 51% (47%)



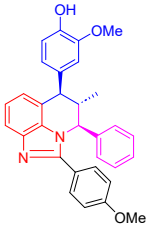
5y, 54% (50%)



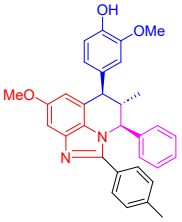
5z, 55% (54%)



5aa, 11% (6%)



5ab, R=H, 23% (20%)



5ac, R=H, 22% (11%)

***Cis*-6-(4-methoxyphenyl)-5-methyl-2,4-diphenyl-5,6-dihydro-4*H*-imidazo[4,5,1-*ij*]quinoline (5a)**. White solid (91.6 mg, 0.21 mmol, 80%); R*f* [P.E-AcOEt 2:1] = 0.41; mp 224 – 226 °C; IR (ATR) ν_{max} = 2991, 1604, 1506, 1250, 1029, 767, 746 cm^{-1}; NMR ^{1}H (400 MHz, $CDCl_3$) δ (ppm): 7.72 (d, *J* = 8.1 Hz, 1H, 9-H), 7.44 (dd, *J* = 7.6, 1.8 Hz, 2H, H-Ar), 7.24 – 7.20 (m, 1H, 8-H), 7.19 – 7.14 (m, 3H, H-Ar), 7.07 (d, *J* = 8.6 Hz, 2H, H-3'',5''), 6.98 – 6.93 (m, 3H, H-Ar), 6.83 (dd, *J* = 7.3, 2.1 Hz, 2H, H-Ar), 6.79 (d, *J* = 8.7 Hz, 2H, H-2'',6''), 6.71 (d, *J* = 7.3 Hz, 1H, H-7), 5.33 (d, *J* = 8.0 Hz, 1H, H-4), 4.07 (d, *J* = 9.0 Hz, 1H, H-6), 3.79 (s, 3H, 4''-OCH_3), 2.66 – 2.58 (m, 1H, H-5), 0.88 (d, *J* = 6.6 Hz, 3H, 5-CH_3); NMR ^{13}C (100 MHz, $CDCl_3$) δ (ppm): 158.3, 152.8, 140.9, 139.8, 134.2, 133.2, 131.2 , 130.0, 128.9, 128.9, 128.1, 127.8, 127.7, 127.5, 125.8, 122.5, 120.8, 117.2, 113.9, 65.7, 55.3, 47.9, 45.1, 17.7. HRMS (APCI-Q-TOF) m/z calc. for $C_{30}H_{27}N_2O$ $[M+H]^+$: 431.2195, found: 431.2123

***Cis*-8-methoxy-6-(4-methoxyphenyl)-5-methyl-2.4-diphenyl-5,6-dihydro-4*H*-imidazo[4,5,1-*ij*]quinoline (5b).** White solid (79.7 mg, 0.17 mmol, 70 %); R_f [hexane-AcOEt 1:1] = 0.47; mp 227 - 229 °C; IR (ATR) ν_{max} = 2973, 1603 y 1512, 1242, 1025, 755, 723 cm^{-1}; NMR ^{1}H (400 MHz, $CDCl_3$) δ (ppm): 7.43 (dd, *J* = 7.6. 1.9 Hz, 2H, H-Ar), 7.20 (d, *J* = 2.9 Hz, 1H, H-9), 7.15 (d, *J* = 7.4 Hz, 3H, H-Ar), 7.05 (d, *J* = 8.8 Hz, 2H, H-2'',6''), 6.96 – 6.93 (m, 3H, H-Ar), 6.83 (dd, *J* = 7.5. 2.1 Hz, 2H, H-Ar), 6.77 (d, *J* = 8.6 Hz, 2H, H-3'',5''), 6.40 (bs, 1H, H-7), 5.31 (d, *J* = 7.9 Hz, 1H, H-4), 4.03 (d, *J* = 8.4 Hz, 1H, H-6), 3.82 (s, 3H, 8-OCH_3), 3.78 (s, 3H, 4''-OCH_3), 2.62 (m, 1H, H-5), 0.88 (d, *J* = 6.8 Hz, 3H, 5-CH_3); NMR ^{13}C (100 MHz, $CDCl_3$) δ (ppm): 158.3, 157.0, 152.7, 141.1, 139.6, 132.9, 131.0, 129.9, 129.0, 128.9, 128.8, 128.1, 127.8, 127.7, 127.5, 126.3, 113.9, 111.4, 99.3, 65.6, 55.9, 55.3, 47.8, 45.2, 17.7; HRMS (ESI-Q-TOF) m/z calc. for $C_{31}H_{29}N_2O$ $[M+H]^+$: 461.2229, found 461.2219.

***Cis*-2-(benzo[*d*][1,3]dioxol-5-yl)-6-(4-methoxyphenyl)-5-methyl-4-phenyl-5,6-dihydro-4*H*-imidazo[4,5,1-*ij*]quinoline (5c).** Yellowish white solid (79.8 mg, 0.16 mmol, 63%); R_f [hexane-AcOEt 1:1] = 0.55; mp 194 - 196 °C; IR (ATR) v_{max} = 2950. 1603. 1508. 1468. 1250. 1032. 747. 698 cm^{-1}; NMR ^1H (400 MHz, $CDCl_3$) δ (ppm): 7.69 (d, *J* = 8.1 Hz, 1H, H-9), 7.23 – 7.19 (m, 1H, H-Ar), 7.05 (d, *J* = 8.7 Hz, 2H, H-Ar), 7.00 (dd, *J* = 5.1, 2.1 Hz, 3H, H-Ar), 6.94 (dd, *J* = 8.1, 1.8 Hz, 1H, H-Ar), 6.91 (d, *J* = 1.6 Hz, 1H, H-Ar), 6.83 (dd, *J* = 4.8, 2.9 Hz, 2H, H-Ar), 6.78 (d, *J* = 8.8 Hz, 2H, H-Ar), 6.70 (d, *J* = 7.3 Hz, 1H, H-Ar), 6.59 (d, *J* = 8.0 Hz, 1H, H-Ar), 5.88 (s, 2H, OCH_2O), 5.28 (d, *J* = 7.9 Hz, 1H, H-4), 4.04 (d, *J* = 8.8 Hz, 1H, H-6), 3.78 (s, 3H, 4''-OCH_3), 2.65 – 2.57 (m, 1H, H-5), 0.88 (d, *J* = 6.7 Hz, 3H, 5-CH_3); NMR ^{13}C (100 MHz, $CDCl_3$) δ (ppm): 158.3, 152.5, 148.1, 147.0, 140.7, 139.8, 134.1, 133.3, 130.0, 128.1, 127.6, 127.5, 125.6, 125.0, 123.4, 122.5, 120.7, 117.0, 113.8, 109.4, 107.8, 101.2, 65.6, 55.3, 47.8, 45.1, 17.8; HRMS (ESI-Q-TOF) m/z calc. for $C_{31}H_{26}N_2O_3$ $[M+H]^+$: 475.2021, found 475.2007.

***Cis*-2-(benzo[*d*][1,3]dioxol-5-yl)-8-methoxy-6-(4-methoxyphenyl)-5-methyl-4-phenyl-5,6-dihydro-4*H*-imidazo[4,5,1-*ij*]quinoline (5d).** Yellowish white solid (81 mg, 0.16 mmol, 65%); R_f [hexane-AcOEt 1:1]: 0.37; mp 199 – 201 °C; IR (ATR) v_{max} = 2962. 1603. 1480. 1431. 1248. 1030. 727 cm^{-1}; NMR ^1H (400 MHz, $CDCl_3$) δ (ppm): 7.16 (d, *J* = 2.2 Hz, 1H, H-Ar), 7.03 (d, *J* = 8.8 Hz, 2H, H-Ar), 7.00 (dd, *J* = 5.1, 2.1 Hz, 3H, H-Ar), 6.93 (dd, *J* = 8.1, 1.7 Hz, 1H, H-Ar), 6.89 (d, *J* = 1.7 Hz, 1H, H-Ar), 6.84 – 6.82 (m, 2H, H-Ar), 6.76 (d, *J* = 8.8 Hz, 2H, H-Ar), 6.58 (d, *J* = 8.1 Hz, 1H H-Ar), 6.38 (bs, 1H, H-Ar), 5.88 (d, *J* = 2.7 Hz, 2H, OCH_2O), 5.26 (d, *J* = 7.8 Hz, 1H, H-4), 4.02 (d, *J* = 8.7 Hz, 1H, H-6), 3.81 (s, 3H, OCH_3), 3.77 (s, 3H, OCH_3), 2.62 (m, 1H, H-5), 0.88 (d, *J* = 6.6 Hz, 3H, 5-CH_3); NMR ^{13}C (100 MHz, $CDCl_3$) δ (ppm): 158.3, 157.0, 152.4, 148.0, 146.9, 139.6, 132.9, 129.9, 128.1, 127.6, 127.5, 126.2, 123.3, 113.9, 111.2, 109.3, 107.8, 101.2,

99.3, 65.6, 55.9, 55.3, 47.8, 45.1, 17.8; HRMS (ESI-Q-TOF) m/z calc. for $C_{32}H_{29}N_2O_4$ $[M+H]^+$: 505.2127, found 505.2108.

***Cis*-2-(hexyl)-6-(4-methoxyphenyl)-5-methyl-4-phenyl-5,6-dihydro-4*H*-imidazo[4,5,1-*ij*]quinoline (5e).** White solid (48 mg, 0.10 mmol, 41%); R_f[hexane-AcOEt 2:1] = 0.51; mp 162 - 164 °C; IR (ATR) v_{max} = 2960. 2927. 1603. 1504. 1244. 1030. 752. 749 cm^{-1}; NMR ^1H (400 MHz, $CDCl_3$) δ (ppm): 7.57 (d, *J* = 8.1 Hz, 1H, H-9), 7.34 (m, 3H, H-Ar), 7.25 – 7.20 (m, 2H, H-Ar), 7.14 – 7.08 (m, 3H, H-Ar), 6.85 (d, *J* = 8.8 Hz, 2H, H-Ar), 6.56 (d, *J* = 7.4 Hz, 1H, H-Ar), 4.95 (d, *J* = 9.1 Hz, 1H, H-4), 3.95 (d, *J* = 10.1 Hz, 1H, H-6), 3.80 (s, 3H, 4''-OCH_3), 2.62 – 2.52 (m, 1H, H-5), 2.30 – 2.19 (m, 1H), 1.95 (ddd, *J* = 15.3, 10.1, 5.6 Hz, 1H), 1.63 – 1.48 (m, 2H), 1.28 – 1.16 (m, 3H), 1.15 – 1.05 (m, 3H), 0.83 (t, *J* = 7.2 Hz, 3H), 0.79 (d, *J* = 6.6 Hz, 3H, 5-CH_3); NMR ^{13}C (100 MHz, $CDCl_3$) δ (ppm): 158.5, 155.3, 140.1, 139.7, 133.7, 133.4, 130.2, 128.9, 128.5, 127.9, 125.5, 121.9, 119.8, 116.3, 113.9, 65.3, 55.3, 48.5, 44.8, 31.4, 29.1, 29.0, 27.6, 22.5, 16.9, 14.1; HRMS (ESI-Q-TOF) m/z calc. for $C_{30}H_{35}N_2O$ $[M+H]^+$: 439.2746, found 439.2749.

***Cis*-2-(hexyl)-8-methoxy-6-(4-methoxyphenyl)-5-methyl-4-phenyl-5,6-dihydro-4*H*-imidazo[4,5,1-*ij*]quinoline (5f).** White solid (49.8 mg, 0.10 mmol, 43%); R_f[hexane-AcOEt 2:1] = 0.33; mp 187 - 189 °C; IR (ATR) v_{max} = 2961. 2920. 1603. 1507. 1141. 1248. 1027. 824 cm^{-1}; NMR ^1H (400 MHz, $CDCl_3$) δ (ppm): 7.34 (dd, *J* = 5.1, 2.1 Hz, 3H, H-Ar), 7.23 (dd, *J* = 7.3, 2.4 Hz, 2H, H-Ar), 7.11 (d, *J* = 8.8 Hz, 2H, H-Ar), 7.07 (d, *J* = 3.0 Hz, 1H, H-Ar), 6.84 (d, *J* = 8.8 Hz, 2H, H-Ar), 6.23 (bs, 1H, H-Ar), 4.91 (d, *J* = 9.1 Hz, 1H, H-4), 3.89 (d, *J* = 10.0 Hz, 1H, H-6), 3.80 (s, 3H OCH_3), 3.77 (s, 3H, OCH_3), 2.58 – 2.52 (m, 1H, H-5), 2.24 – 2.15 (m, 1H), 1.92 (m, 1H), 1.59 – 1.47 (m, 2H), 1.27 – 1.15 (m, 3H), 1.13 – 1.03 (m, 3H), 0.83 (t, *J* = 7.2 Hz, 3H), 0.77 (d, *J* = 6.6 Hz, 3H, 5-CH_3); NMR ^{13}C (100 MHz, $CDCl_3$) δ ppm: 158.5, 156.5, 155.3, 139.7, 133.1, 130.1, 128.9, 128.6, 128.5, 126.0, 114.0, 109.9, 99.0, 65.2, 55.9, 55.3, 48.6, 44.9, 31.4, 29.0, 29.0,

27.7, 22.5, 16.8, 14.1; HRMS (ESI-Q-TOF) m/z calc. for $C_{31}H_{37}N_2O_2$ $[M+H]^+$: 469.2855, found 469.2850.

***Cis*-2.6-bis(4-methoxyphenyl)-5-methyl-4-phenyl-5,6-dihydro-4*H*-imidazo[4,5,1-*ij*]quinoline (5g).** White solid (65.2 mg, 0.14 mmol, 53%); R_f[hexane-AcOEt 1:1] = 0.47; mp 209 - 211 °C; IR (ATR) ν_{max} = 2944. 1606. 1504. 1245. 1025. 842. 748. 692 cm^{-1}; NMR ^1H (400 MHz, $CDCl_3$) δ (ppm): 7.71 (d, *J* = 8.1 Hz, 1H, H-9), 7.41 (d, *J* = 8.9 Hz, 2H, H-Ar), 7.21 (dd, *J* = 8;1, 7;4 Hz 1H, H-Ar), 7.02 (d, *J* = 8.8 Hz, 2H, H-Ar), 6.97 – 6.94 (m, 3H, H-Ar), 6.80 (dd, *J* = 7.2. 2.3 Hz, 2H, H-Ar), 6.75 (d, *J* = 8.9 Hz, 2H, H-Ar), 6.72 (d, *J* = 7.4 Hz, 1H, H-Ar), 6.69 (d, *J* = 8.9 Hz, 2H, H-Ar), 5.32 (d, *J* = 7.5 Hz, 1H, H-4), 4.06 (d, *J* = 8.1 Hz, 1H, H-6), 3.77 (s, 3H, OCH_3), 3.74 (s, 3H, OCH_3), 2.70 – 2.64 (m, 1H, H-5), 0.91 (d, *J* = 6.8 Hz, 3H, 5-CH_3); NMR ^{13}C (100 MHz, $CDCl_3$) δ (ppm): 160.1, 158.3, 152.9, 141.0, 140.0, 134.1, 133.5, 130.4, 130.0, 128.2, 127.6, 127.5, 125.3, 123.6, 122.5, 120.8, 117.1, 113.8, 113.4, 65.4, 55.4, 47.7, 45.1, 18.2; HRMS (ESI-Q-TOF) m/z calc. for $C_{31}H_{28}N_2O_2$ $[M+H]^+$: 461.2229, found 461.2224.

***Cis*-8-methoxy-2,6-bis(4-methoxyphenyl)-5-methyl-4-phenyl-5,6-dihydro-4*H*-imidazo[4,5,1-*ij*]quinoline (5h).** White solid (66.7 mg, 0.13 mmol, 55%); R_f[hexane-AcOEt 1:2] = 0.47; mp 198 - 200 °C; IR (ATR) ν_{max} = 2952. 1603. 1512. 1245. 1028. 727 cm^{-1}; NMR ^1H (400 MHz, $CDCl_3$) δ (ppm): 7.39 (d, *J* = 8.4 Hz, 2H, H-Ar), 7.19 (d, *J* = 2.3 Hz, 1H, H-Ar), 7.00 (d, *J* = 8.7 Hz, 2H, H-Ar), 6.97 – 6.92 (m, 3H, H-Ar), 6.82 – 6.78 (m, 2H, H-Ar), 6.73 (d, *J* = 8.7 Hz, 2H, H-Ar), 6.67 (d, *J* = 8.9 Hz, 2H, H-Ar), 6.40 (bs, 1H, H-Ar), 5.30 (d, *J* = 7.3 Hz, 1H, H-4), 4.01 (d, *J* = 8.2 Hz, 1H, H-6), 3.82 (s, 3H, OCH_3), 3.76 (s, 3H, OCH_3), 3.73 (s, 3H, OCH_3), 2.66 (m, 1H, H-5), 0.90 (d, *J* = 6.7 Hz, 3H, 5-CH_3); NMR ^{13}C (100 MHz, $CDCl_3$) δ (ppm): 160.0, 158.2, 156.9, 152.8,

141.3, 139.8, 133.1, 130.2, 129.9, 128.8, 127.5, 127.4, 125.8, 123.5, 113.8, 113.3, 111.1, 99.3, 65.3, 55.9, 55.3, 55.2, 47.6, 45.1, 18.1; HRMS (ESI-Q-TOF) m/z calc. for $C_{32}H_{31}N_2O_3$ $[M+H]^+$: 491.2334, found 491.2305.

***Cis*-2-(4-chlorophenyl)-6-(4-methoxyphenyl)-5-methyl-4-phenyl-5,6-dihydro-4*H*-imidazo[4,5,1-*ij*]quinoline (5i).** White solid (75.8 mg, 0.16 mmol, 61%); R_f[hexane-AcOEt 2:1] = 0.53; mp 211 – 213 °C; IR (ATR) v_{max} = 2942. 1605. 1509. 1248. 1028. 829. 750. 702 cm^{-1}; NMR ^1H (400 MHz, $CDCl_3$) δ (ppm): 7.72 (d, *J* = 8.2 Hz, 1H, H-9), 7.36 (d, *J* = 8.6 Hz, 2H, H-Ar), 7.22 (t, *J* = 7.8 Hz, 1H, H-Ar), 7.11 (d, *J* = 8.6 Hz, 2H, H-Ar), 7.07 (d, *J* = 8.8 Hz, 2H, H-Ar), 7.01 – 6.98 (m, 3H, H-Ar), 6.85 – 6.80 (m, 4H, H-Ar), 6.71 (d, *J* = 7.4 Hz, 1H, H-Ar), 5.26 (d, *J* = 8.3 Hz, 1H, H-4), 4.04 (d, *J* = 9.2 Hz, 1H, H-6), 3.79 (s, 3H, 4''-OCH_3), 2.58 (m, 1H, H-5), 0.86 (d, *J* = 6.6 Hz, 3H, 5-CH_3); NMR ^{13}C (100 MHz, $CDCl_3$) δ (ppm): 158.4, 151.6, 140.7, 139.5, 135.0, 134.2, 133.0, 130.2, 130.0, 129.6, 128.2, 128.0, 127.8, 126.0, 122.8, 121.0, 117.2, 113.9, 65.9, 55.3, 47.9, 45.1, 17.5; HRMS (ESI-Q-TOF) m/z calc. for $C_{31}H_{26}ClN_2O$ $[M+H]^+$: 465.1733, found 465.1727.

***Cis*-2-(chlorophenyl)-8-methoxy-6-(4-methoxyphenyl)-5-methyl-4-phenyl-5,6-dihydro-4*H*-imidazo[4,5,1-*ij*]quinoline (5j).** Solid light brown (75.8 mg, 0.15 mmol, 62%); R_f[hexane-AcOEt 2:1] = 0.41; mp 224 - 226 °C; IR (ATR) v_{max} = 2931. 1606. 1508. 1245. 1035. 828. 698. 664 cm^{-1}; NMR ^1H (400 MHz, $CDCl_3$) δ (ppm): 7.36 (d, *J* = 8.6 Hz, 2H, H-Ar), 7.17 (s, 1H, H-Ar), 7.11 (d, *J* = 8.4 Hz, 2H, H-Ar), 7.05 (d, *J* = 8.7 Hz, 2H, H-Ar), 7.00 - 6.99 (m, 3H, H-Ar), 6.84 (bs, 2H, H-Ar), 6.79 (d, *J* = 7.8 Hz, 2H, H-Ar), 6.39 (bs, 1H, H-Ar), 5.26 (d, *J* = 7.9 Hz, 1H, H-4), 4.02 (d, *J* = 9.0 Hz, 1H, H-6), 3.82 (s, 3H, OCH_3), 3.78 (s, 3H, OCH_3), 2.62 (m, 1H, H-5), 0.87 (d, *J* = 6.6 Hz, 3H, 5-CH_3); NMR ^{13}C (100 MHz, $CDCl_3$) δ (ppm): 158.4, 157.1, 151.5, 139.5, 134.8, 132.7,

130.1, 129.9, 129.0, 128.2, 128.0, 127.7, 126.5, 113.9, 111.6, 99.4, 65.8, 55.9, 55.3, 47.9, 45.2, 17.6; HRMS (APCI-Q-TOF) m/z calc. for $C_{31}H_{28}ClN_2O_2$ $[M+H]^+$: 495.1839, found 495.1838.

***Cis*-2,4,6-tris(4-methoxyphenyl)-5-methyl-5,6-dihydro-4*H*-imidazo[4,5,1-*ij*]quinoline (5k).** Pale yellow solid (78.8 mg, 0.16 mmol, 65%); R_f [hexane-AcOEt 1:1] = 0.38; mp 207 – 209 °C; NMR ^{1}H (400 MHz, $CDCl_3$) δ (ppm): 7.70 (d, *J* = 8.1 Hz, 1H, H-Ar), 7.41 (d, *J* = 8.9 Hz, 2H, H-Ar), 7.23 – 7.18 (m, 1H, H-Ar), 6.99 (d, *J* = 8.8 Hz, 2H, H-Ar), 6.74 (d, *J* = 8.8 Hz, 2H, H-Ar), 6.72 – 6.66 (m, 5H, H-Ar), 6.47 (d, *J* = 8.8 Hz, 2H, H-Ar), 5.28 (d, *J* = 7.4 Hz, 1H, H-4), 4.04 (d, *J* = 7.9 Hz, 1H, H-6), 3.76 (s, 3H, OCH_3), 3.74 (s, 3H, OCH_3), 3.63 (s, 3H, OCH_3), 2.68 – 2.60 (m, 1H, H-5), 0.89 (d, *J* = 6.6 Hz, 3H, 5-CH_3); NMR ^{13}C (100 MHz, $CDCl_3$) δ (ppm): 160.1, 158.7, 158.2, 152.8, 140.8, 133.9, 133.6, 131.9, 130.3, 129.9, 128.6, 125.2, 123.5, 122.5, 120.8, 116.9, 113.7, 113.5, 113.4, 64.8, 55.2, 47.5, 45.0, 18.1; HRMS (ESI-Q-TOF) m/z calc. for $C_{32}H_{31}N_2O_3$ $[M+H]^+$: 491.2334, found 491.2344.

***Cis*-8-methoxy-2,4,6-tris(4-methoxyphenyl)-5-methyl-4-phenyl-5,6-dihydro-4*H*-imidazo[4,5,1-*ij*]quinoline (5l).** Solid light brown (99.4 mg, 0.19 mmol, 70%); R_f[hexane-AcOEt 2:1] = 0.52; mp 162 - 164 °C; NMR ^{1}H (400 MHz, $CDCl_3$) δ (ppm): 7.41 (d, *J* = 8.8 Hz, 2H, H-Ar), 7.19 (d, *J* = 2.3 Hz, 1H, H-Ar), 6.98 (d, *J* = 8.7 Hz, 2H, H-Ar), 6.73 (d, *J* = 8.7 Hz, 2H, H-Ar), 6.69 (dd, *J* = 8.8, 2.3 Hz, 4H, H-Ar), 6.48 (d, *J* = 8.8 Hz, 2H, H-Ar), 6.40 (bs, 1H, H-Ar), 5.27 (d, *J* = 7.3 Hz, 1H, H-4), 4.01 (d, *J* = 8.2 Hz, 1H, H-6), 3.82 (s, 3H, OCH_3), 3.76 (s, 3H, OCH_3), 3.74 (s, 3H, OCH_3), 3.64 (s, 3H, OCH_3), 2.64 (m, 1H, H-5), 0.89 (d, *J* = 6.7 Hz, 3H, 5-CH_3); NMR ^{13}C (100 MHz, $CDCl_3$) δ (ppm): 160.1, 158.7, 158.2, 157.0, 152.5, 133.2, 131.7, 130.3, 129.8,

128.6, 125.9, 113.8, 113.6, 113.4, 111.3, 99.1, 64.8, 56.0, 55.3, 55.2, 47.5, 45.1, 18.2; HRMS (APCI-Q-TOF) m/z calc. for $C_{33}H_{33}N_2O_4$ $[M+H]^+$: 521.2440, found 521.2446.

***Cis*-2-(benzo[*d*][1,3]dioxol-5-yl)-4,6-bis(4-methoxyphenyl)-5-methyl-5,6-dihydro-4*H*-imidazo[4,5,1-*ij*]quinoline (5m).** Light yellow solid (73.5 mg, 0.18 mmol, 59%); R_f [hexane-AcOEt 1:1] = 0.43; mp 150 - 152 °C; NMR ^{1}H (400 MHz, $CDCl_3$) δ (ppm): 7.71 (d, *J* = 8.1 Hz, 1H, H-Ar), 7.25 – 7.20 (m, 1H, H-Ar), 7.05 (d, *J* = 8.8 Hz, 2H, H-Ar), 6.97 (dd, *J* = 8.1, 1.8 Hz, 1H, H-Ar), 6.92 (d, *J* = 1.6 Hz, 1H, H-Ar), 6.80 (d, *J* = 8.8 Hz, 2H, H-Ar), 6.74 (t, *J* = 8.6 Hz, 3H, H-Ar), 6.63 (d, *J* = 8.0 Hz, 1H, H-Ar), 6.55 (d, *J* = 8.9 Hz, 2H, H-Ar), 5.91 (s, 2H, OCH_2O), 5.25 (d, *J* = 7.9 Hz, 1H, H-4), 4.05 (d, *J* = 8.9 Hz, 1H, H-6), 3.80 (s, 3H, OCH_3), 3.68 (s, 3H, OCH_3), 2.61 (m, 1H, H-5), 0.89 (d, *J* = 6.8 Hz, 3H, 5-CH_3); NMR ^{13}C (100 MHz, $CDCl_3$) δ (ppm): 158.8, 158.3, 152.4, 148.1, 147.0, 140.5, 133.9, 133.4, 131.7, 129.9, 128.8, 126.0, 125.6, 124.9, 123.5, 122.6, 120.8, 117.0, 113.8, 113.6, 109.5, 107.8, 101.2, 65.1, 55.3, 47.8, 45.1, 17.7; HRMS (ESI-Q-TOF) m/z calc. for $C_{32}H_{29}N_2O_4$ $[M+H]^+$: 505.2127, found 505.2136.

***Cis*-2-(benzo[*d*][1,3]dioxol-5-yl)-8-methoxy-4,6-bis(4-methoxyphenyl)-5-methyl-5,6-dihydro-4*H*-imidazo[4,5,1-*ij*]quinoline (5n).** Solid light brown (98.4mg, 0.18 mmol, 65%); R_f [hexane-AcOEt 2:1] = 0.52; mp 163 - 165 °C; NMR ^{1}H (400 MHz, $CDCl_3$) δ (ppm): 7.17 (d, *J* = 2.3 Hz, 1H, H-Ar), 7.01 (d, *J* = 8.7 Hz, 2H, H-Ar), 6.95 (dd, *J* = 8.1, 1.8 Hz, 1H, H-Ar), 6.90 (d, *J* = 1.7 Hz, 1H, H-Ar), 6.76 (d, *J* = 8.7 Hz, 2H, H-Ar), 6.73 (d, *J* = 8.7 Hz, 2H, H-Ar), 6.61 (d, *J* = 8.1 Hz, 1H, H-Ar), 6.52 (d, *J* = 8.9 Hz, 2H, H-Ar), 6.37 (bs, 1H, H-Ar), 5.89 (s, 2H, OCH_2O), 5.21 (d, *J* = 7.8 Hz, 1H, H-4), 3.99 (d, *J* = 8.7 Hz, 1H, H-6), 3.81 (s, 3H, OCH_3), 3.77 (s, 3H, OCH_3), 3.66 (s, 3H, OCH_3), 2.63 – 2.54 (m, 1H, H-5), 0.86 (d, *J* = 6.7 Hz, 3H, 5-CH_3); NMR ^{13}C (100

MHz, $CDCl_3$) δ (ppm): δ 158.8, 158.3, 157.0, 152.2, 148.1, 147.0, 133.0, 131.6, 129.9, 128.7, 128.7, 126.2, 124.7, 123.4, 113.9, 113.5, 111.3, 109.4, 107.8, 101.2, 99.1, 65.1, 56.0, 55.3, 47.8, 45.1, 17.8; HRMS (ESI-Q-TOF) m/z calc. for $C_{33}H_{31}N_2O_5$ $[M+H]^+$: 535.2233, found 535.2226.

***Cis*-4-(benzo[*d*][1,3]dioxol-5-yl)-2,6-bis(4-methoxyphenyl)-5-methyl-5,6-dihydro-4*H*-imidazo[4,5,1-*ij*]quinoline (5o).** White solid (86.8 mg, 0.16 mmol, 68%), R_f[hexane-AcOEt 1:1] = 0.41. mp 246 - 248 °C. NMR ^1H (400 MHz, $CDCl_3$) δ (ppm): 7.71 (d, *J* = 8.1 Hz, 1H, H-Ar), 7.47 (d, *J* = 8.9 Hz, 2H, H-Ar), 7.25 – 7.20 (m, 1H, H-Ar), 6.98 (d, *J* = 8.7 Hz, 2H, H-Ar), 6.80 – 6.70 (m, 6H, H-Ar), 6.40 (d, *J* = 8.1 Hz, 1H, H-Ar), 6.26 (dd, *J* = 8.2, 1.9 Hz, 1H, H-Ar), 6.18 (d, *J* = 1.9 Hz, 1H, H-Ar), 5.76 (s, 2H, OCH_2O), 5.27 (d, *J* = 6.9 Hz, 1H, H-4), 4.07 (d, *J* = 7.6 Hz, 1H, H-6), 3.78 (s, 3H, OCH_3), 3.77 (s, 3H, OCH_3), 2.71 (m, 1H, H-5), 0.93 (d, *J* = 6.7 Hz, 3H, 5-CH_3), NMR ^{13}C (100 MHz, $CDCl_3$) δ (ppm): 160.2, 158.1, 152.7, 147.4, 146.6, 140.9, 133.7, 130.4, 129.7, 126.0, 124.7, 123.4, 122.6, 121.1, 117.1, 113.6, 113.5, 107.7, 100.9, 64.8, 55.3, 55.2, 47.3, 44.8. 18.5. HRMS (ESI-Q-TOF) m/z calc. for $C_{32}H_{29}N_2O_4$ $[M+H]^+$: 505.2127, found 505.2137.

***Cis*-4-(benzo[*d*][1,3]dioxol-5-yl)-8-methoxy-2,6-bis(4-methoxyphenyl)-5-methyl-5,6-dihydro-4*H*-imidazo[4,5,1-*ij*]quinoline (5p).** Solid light brown (92.6 mg, 0.17 mmol, 78%); R_f [hexane-AcOEt 2:1] = 0.45; mp 194 - 196 °C; NMR ^1H (400 MHz, $CDCl_3$) δ (ppm): 7.45 (d, *J* = 8.9 Hz, 2H, H-Ar), 7.20 (d, *J* = 2.7 Hz, 1H, H-Ar), 6.96 (d, *J* = 8.7 Hz, 2H, H-Ar), 6.73 (dd, *J* = 11.7, 8.8 Hz, 4H, H-Ar), 6.45 (s, 1H, H-Ar), 6.39 (d, *J* = 8.0 Hz, 1H, H-Ar), 6.26 (d, *J* = 8.1 Hz, 1H, H-Ar), 6.18 (bs, 1H, H-Ar), 5.75 (s, 2H, OCH_2O), 5.23 (d, *J* = 6.8 Hz, 1H, H-4), 4.00 (d, *J* = 7.3 Hz, 1H, H-6), 3.83 (s, 3H, OCH_3), 3.77 (s, 3H, OCH_3), 3.76 (s, 3H, OCH_3), 2.69 (m, 1H, H-5), 0.91 (d, *J* = 6.7 Hz, 3H, 5-CH_3); NMR ^{13}C (100 MHz, $CDCl_3$) δ (ppm): 160.1, 158.1, 157.0,

152.7, 147.4, 146.6, 141.4, 133.6, 133.3, 130.3, 129.7, 128.5, 125.2, 123.4, 121.1, 113.7, 113.4, 111.4, 107.7, 107.6, 100.9, 99.5, 64.7, 55.9, 55.3, 47.3, 44.9, 18.5; HRMS (ESI-Q-TOF) m/z calc. for $C_{33}H_{31}N_2O_5$ $[M+H]^+$: 535.2233, found 535.2234.

***Cis*-2,4-bis(benzo[*d*][1,3]dioxol-5-yl)-6-(4-methoxyphenyl)-5-methyl-5,6-dihydro-4*H*-imidazo[4,5,1-*ij*]quinoline (5q).** Light yellow solid (65 mg, 0.11 mmol, 50 %); R_f[hexane-AcOEt 1:1] = 0.46; mp 208 - 210 °C; NMR ^{1}H (400 MHz, $CDCl_3$) δ (ppm): 7.68 (d, *J* = 8.2 Hz, 1H, H-Ar), 7.21 (s, 1H, H-Ar), 7.06 – 6.95 (m, 5H, H-Ar), 6.77 (d, *J* = 8.7 Hz, 2H, H-Ar), 6.67 (d, *J* = 8.1 Hz, 1H, H-Ar), 6.44 (d, *J* = 8.0 Hz, 1H, H-Ar), 6.30 (dd, *J* = 8.0, 1.9 Hz, 1H, H-Ar), 6.21 (d, *J* = 1.9 Hz, 1H, H-Ar), 5.93 (d, *J* = 2.2 Hz, 2H, OCH_2O), 5.79 (d, *J* = 1.2 Hz, 2H, OCH_2O), 5.23 (d, *J* = 7.4 Hz, 1H, H-4), 4.06 (d, *J* = 8.3 Hz, 1H, H-6), 3.78 (s, 3H, OCH_3), 2.66 (m, 1H, H-5), 0.91 (d, *J* = 6.7 Hz,. 3H, 5-CH_3); NMR ^{13}C (100 MHz, $CDCl_3$) δ (ppm): 158.2, 152.3, 148.2, 147.4, 147.0, 146.7, 133.7, 133.5, 133.4, 129.8, 125.0, 124.8, 123.4, 122.6, 121.4, 121.1, 117.0, 113.7, 109.4, 107.8, 107.6, 107.5, 101.2, 101.0, 65.0, 55.2, 47.4, 44.8, 18.1; HRMS (ESI-Q-TOF) m/z calc. for $C_{32}H_{27}N_2O_5$ $[M+H]^+$: 519.1920, found 519.1931.

***Cis*-2,4-bis(benzo[*d*][1,3]dioxol-5-yl)-6-(4-methoxyphenyl)-8-methoxy-5-methyl-5,6-dihydro-4*H*-imidazo[4,5,1-*ij*]quinoline (5r).** Solid light brown (69.4 mg, 0.15 mmol, 57%); R_f [hexane-AcOEt 2:1] = 0.52; mp 199 - 201 °C; NMR ^{1}H (400 MHz, $CDCl_3$) δ (ppm): 7.17 (d, *J* = 1.3 Hz, 1H, H-Ar), 7.01 – 6.96 (m, 4H, H-Ar), 6.75 (d, *J* = 8.8 Hz, 2H, H-Ar), 6.66 (d, *J* = 8.1 Hz, 1H, H-Ar), 6.45 – 6.41 (m, 2H, H-Ar), 6.30 (dd, *J* = 8.1, 1.9 Hz, 1H, H-Ar), 6.21 (d, *J* = 1.8 Hz, 1H, H-Ar), 5.94 – 5.91 (d, *J* = 1.4 Hz, 1H, OCH_2O), 5.78 (d, *J* = 1.4 Hz, 1H, OCH_2O), 5.20 (d, *J* = 7.2 Hz, 1H, H-4), 4.01 (d, *J* = 8.0 Hz, 1H, H-6), 3.82 (s, 3H, OCH_3), 3.77 (s, 3H, OCH_3), 2.68 –

2.61 (m, 1H, H-5), 0.90 (d, J = 6.8 Hz, 3H, 5-CH_3); NMR ^{13}C (100 MHz, $CDCl_3$) δ (ppm): 158.2, 156.9, 152.3, 148.1, 147.4, 147.0, 146.6, 141.2, 133.5, 133.1, 129.7, 128.5, 125.5, 124.9, 123.3, 121.4, 113.7, 111.4, 109.3, 107.8, 107.6, 107.5, 101.2, 101.0, 99.4, 64.9, 55.9, 55.2, 47.4, 44.8, 18.1; HRMS (ESI-Q-TOF) m/z calc. for $C_{33}H_{29}N_2O_6$ $[M+H]^+$: 549.2025, found 549.2029.

***Cis*-4-(2-chlorophenyl)-6-(4-methoxyphenyl)-5-methyl-2-(thiophen-2-yl)-5,6-dihydro-4*H*-imidazo[4,5,1-*ij*]quinoline (5s).** Light yellow solid (62.3 mg, 0.14 mmol, 60 %); R_f [hexane-AcOEt 2:1] = 0.55; mp 228 - 230 °C; NMR ^1H (400 MHz, $CDCl_3$) δ (ppm): 7.79 (d, J=8.0 Hz, 1H, H-Ar), 7.37 – 7.33 (m, 1H, H-Ar), 7.31 (dd, J=5.1, 1.1 Hz, 1H, H-Ar), 7.17 (dd, J=8.0, 1.3 Hz, 1H, H-Ar), 7.06 (d, J=7.3 Hz, 1H, H-Ar), 7.00 (dd, J=3.8, 1.2 Hz, 1H, H-Ar), 6.91 (dd, J=5.1, 3.7 Hz, 1H, H-Ar), 6.89 – 6.85 (m, 1H, H-Ar), 6.81 (d, J=9.0 Hz, 2H, H-Ar), 6.59 (td, J=7.6, 1.3 Hz, 1H, H-Ar), 6.51 (d, J=8.8 Hz, 2H, H-Ar), 6.09 (dd, J=7.9, 1.7 Hz, 1H, H-Ar), 5.86 (d, J=3.4 Hz, 1H, H-4), 4.20 (d, J=4.0 Hz, 1H, H-6), 3.66 (s, 3H, OCH_3), 3.32 (m, 1H, H-5), 1.15 (d, J=7.0 Hz, 3H, 5-CH_3); NMR ^{13}C (100 MHz, $CDCl_3$) δ (ppm): 157.8, 146.9, 141.5, 136.8, 133.8, 133.1, 132.4, 131.7, 129.2, 128.9, 128.4, 128.3, 127.8, 127.2, 126.7, 123.2, 123.1, 122.4, 117.6, 113.4, 60.6, 55.3, 45.4, 41.0, 20.5; HRMS (APCI-Q-TOF) m/z calc. for $C_{28}H_{24}ClN_2OS$ $[M+H]^+$: 471,1298, found 471,1301.

***Cis*-8-methoxy-6-(4-methoxyphenyl)-5-methyl-4-phenyl-5,6-dihydro-4*H*-imidazo[4,5,1-*ij*]quinolin-2-yl)-*N,N*-dimethylaniline (5t).** Yellowish white solid (66 mg, 0.14 mmol, 57%); R_f [hexane-AcOEt 2:1] = 0.42; mp 210 - 212 °C; IR (ATR) ν_{max} = 2927. 1609. 1508. 1235. 1133. 1035. 811 cm^{-1}; NMR ^1H (400 MHz, $CDCl_3$) δ (ppm): 7.43 (d, J = 8.9 Hz, 2H, H-Ar), 7.22 (d, J = 2.3 Hz, 1H, H-Ar), 6.95 – 6.87 (m, 5H, H-Ar), 6.74 (dd, J = 7.5, 2.2 Hz, 2H, H-Ar), 6.62 (d, J =

8.7 Hz, 2H, H-Ar), 6.50 (d, *J* = 8.9 Hz, 2H, H-Ar), 6.46 (bs, 1H, H-Ar), 5.40 (d, *J* = 5.9 Hz, 1H, H-4), 4.03 (d, *J* = 6.5 Hz, 1H, H-6), 3.84 (s, 3H, OCH_3), 3.72 (s, 3H, OCH_3), 2.90 (s, 6H, N-$(CH_3)_2$), 2.83 (m, 1H, H-5), 0.99 (d, *J* = 6.8 Hz, 3H, 5-CH_3); NMR ^{13}C (100 MHz, $CDCl_3$) δ (ppm157.9, 156.8, 153.7, 150.7, 141.6, 140.0, 133.6, 129.7, 129.7, 128.5, 128.0, 127.1, 127.1, 114.0, 124.6, 118.1, 113.5, 111.4, 110.9, 99.4, 64.6, 55.9, 55.3, 47.0, 44.8, 40.2, 19.2; HRMS (APCI-Q-TOF) m/z calc. for $C_{33}H_{34}N_3O_2$ $[M+H]^+$: 504.2651, found 504.2660.

***Cis*-8-methoxy-2-(3-methoxyphenyl)-6-(4-methoxyphenyl)-5-methyl-4-phenyl-5,6-dihydro-4*H*-imidazo[4,5,1-*ij*]quinoline (5u).** Solid light brown (80.3 mg, 0.16 mmol, 66%); R_f [hexane-AcOEt 1:1] = 0.41; mp 144 - 146 °C; NMR ^1H (400 MHz, $CDCl_3$): 7.22 (d, *J* = 3.0 Hz, 1H, H-Ar), 7.06 – 7.05 (m, 1H, H-Ar), 7.01 (d, *J* = 8.6 Hz, 2H, H-Ar), 6.95 (m, 5H, H-Ar), 6.84 – 6.77 (m, 3H, H-Ar), 6.74 (d, *J* = 8.7 Hz, 3H, H-Ar), 6.44 (bs, 1H, H-Ar), 5.31 (d, *J* = 7.4 Hz, 1H, H-4), 4.04 (d, *J* = 8.3 Hz, 1H, H-6), 3.83 (s, 3H, OCH_3), 3.76 (s, 3H, OCH_3), 3.65 (s, 3H, OCH_3), 2.72 – 2.64 (m, 1H, H-5), 0.90 (d, *J* = 6.7 Hz, 3H, 5-CH_3); NMR ^{13}C (100 MHz, $CDCl_3$) δ (ppm): 158.9, 158.3, 157.1, 152.5, 141.0, 139.7, 132.9, 132.0, 129.8, 129.0, 128.7, 128.1, 127.5, 127.4, 126.0, 121.5, 115.5, 113.8, 113.7, 111.7, 99.4, 65.4, 56.0, 55.3, 55.2, 47.6, 45.0, 18.1; HRMS (APCI-Q-TOF) m/z calc. for $C_{32}H_{31}N_2O_3$ $[M+H]^+$: 491.2334, found 491.2354.

***Cis*-8-methoxy-6-(4-methoxyphenyl)-5-methyl-4-phenyl-2-(3-etoxy-4-hydroxyphenyl)-5,6-dihydro-4*H*-imidazo[4,5,1-*ij*]quinoline (5v).** Yellowish white solid (65.8mg, 0.12 mmol, 51%); R_f[hexane-AcOEt 2:1] = 0.42; mp 182 - 184 °C; IR (ATR) v_{max} = 2991. 1604. 1501. 1430. 1252. 1135. 1035. 823 cm^{-1}; NMR ^1H (400 MHz, $CDCl_3$) δ (ppm): 7.26 (s, 1H, H-Ar), 7.21 (d, *J* = 2.2 Hz, 1H, H-Ar), 6.98 (m, 2H, H-Ar), 6.97 – 6.93 (m, 5H, H-Ar), 6.79 – 6.75 (m, 2H, H-Ar), 6.72

(d, *J* = 8.8 Hz, 1H, H-Ar), 6.68 (d, *J* = 8.8 Hz, 2H, H-Ar), 6.47 (bs, 1H, H-Ar), 5.32 (d, *J* = 6.6 Hz, 1H, H-4), 4.04 (d, *J* = 7.2 Hz, 1H, H-6), 3.87 (q. *J* = 7.0 Hz, 2H, CH_2), 3.84 (s, 3H, OCH_3), 3.74 (s, 3H, OCH_3), 2.77 (m, 1H, H-5), 1.31 (t, *J* = 7.0 Hz, 3H, CH_3), 0.94 (d, *J* = 6.8 Hz, 3H, 5-CH_3); NMR ^{13}C (100 MHz, $CDCl_3$) δ (ppm): 158.1, 157.0, 152.9, 146.7, 145.3, 140.0, 133.2, 129.7, 128.5, 128.0, 127.2, 125.2, 122.5, 113.9, 113.7, 112.2, 111.5, 99.5, 64.9, 64.3, 56.0, 55.3, 47.2, 44.8, 18.8, 14.7; HRMS (APCI-Q-TOF) m/z calc. for $C_{33}H_{33}N_2O_4$ $[M+H]^+$: 521.2440, found 521.2440.

***Cis*-2-(hexyl)-6-(4-methoxyphenyl)-2-(chlorophenyl)-4-phenyl-5-methyl-5,6-dihydro-4*H*-imidazo[4,5,1-*ij*]quinoline (5w).** yellowish white solid (60.3 mg, 0.14 mmol, 52%); R_f [hexane-AcOEt 2:1] = 0.52; mp 145- 146 °C; NMR ^1H (400 MHz, $CDCl_3$) δ (ppm): 7.63 (d, *J*=8.1 Hz 1H, H-Ar), 7.41 (dd, *J*=8.1, 1.3 Hz, 1H, H-Ar), 7.19 (d, *J*=7.6 Hz, 2H, H-Ar), 7.11 – 7.08 (m, 1H, H-Ar), 7.06 (d, *J*=8.7, Hz, 2H, H-Ar), 6.81 (d, *J*=1.7 Hz, 1H, H-Ar), 6.78 (d, *J*=8.8 Hz, 2H, H-Ar), 6.72 (dt, *J*=7.4, 1.0 Hz 1H, H-Ar), 5.67 (d, *J*=7.5 Hz, 1H, H-4), 4.07 (d, *J*=8.5 Hz, 1H, H-6), 3.79 (s, 3H, OCH_3), 2.85 – 2.76 (m, 1H, H-5), 2.32 – 2.22 (m, 1H), 2.16 – 2.07 (m, 1H), 1.70 – 1.55 (m, 2H), 1.28 – 1.23 (m, 2H), 1.20 – 1.14 (m, 4H), 0.95 (d, *J*=6.7 Hz, 3H, 5-CH_3), 0.84 (t, *J*=7.2 Hz, 3H, CH_3); NMR ^{13}C (100 MHz, $CDCl_3$) δ (ppm158.4, 154.9, 140.4, 137.5, 133.7, 133.4, 129.8, 129.6, 129.2, 128.4, 127.5, 124.3, 122.1, 120.5, 116.6, 113.8, 59.6, 55.3, 47.6, 44.1, 31.3, 29.1, 28.5, 27.3, 22.5, 17.1, 14.0; HRMS (APCI-Q-TOF) m/z calc. for $C_{30}H_{34}ClN_2O[M+H]^+$: 473.2359, found 473.2349

***Cis*-4-(2-chlorophenyl)-6-(4-methoxyphenyl)-2-(2-methylphenyl)-5-methyl-5,6-dihydro-4*H*-imidazo[4,5,1-*ij*]quinoline (5x).** yellowish white solid (60.3 mg, 0.12 mmol, 51%); R_f [hexane-

AcOEt 2:1] = 0.52; mp 180- 182 °C; NMR ^{1}H (400 MHz, $CDCl_3$) δ (ppm): 7.70 (d, *J*=8.1 Hz, 1H, H-Ar), 7.22 (d, *J*=7.3 Hz, 1H, H-Ar), 7.18 (d, *J*=8.9 Hz, 2H, H-Ar), 7.06 (ddd, *J*=6.9, 4.8, 1.8 Hz, 2H, H-Ar), 7.00 – 6.95 (m, 3H), 6.92 – 6.87 (m, 5H), 6.68 (dt, *J*=7.4, 1.1 Hz, 1H), 5.75 (d, *J*=9.3 Hz, 1H, H-4), 4.11 (d, *J*=10.3 Hz, 1H, H6), 3.82 (s, 3H, OCH_3), 2.59 (m, 1H, H-5), 2.20 (s, 3H, CH_3), 0.82 (d, *J*=6.6 Hz, 3H, 5-CH_3); NMR ^{13}C (100 MHz, $CDCl_3$) δ (ppm): 158.6, 151.8, 140.5, 137.9, 136.9, 134.3, 133.6, 132.9, 130.6, 130.2, 129.8, 129.5, 129.0, 128.9, 128.7, 127.6, 126.9, 126.0, 125.0, 122.5, 122.3, 120.4, 117.2, 114.1, 60.3, 55.3, 48.5, 45.4, 20.0, 15.8; HRMS (APCI-Q-TOF) m/z calc. for $C_{31}H_{28}ClN_2O$ $[M+H]^+$: 479.1890, found 479.1888.

***Cis*-4-(2-chlorophenyl)-6-(4-methoxyphenyl)-2-(4-methylphenyl)-5-methyl-5,6-dihydro-4*H*-imidazo[4,5,1-*ij*]quinoline (5y).** yellowish white solid (63.4 mg, 0.15 mmol, 54%); R_f [hexane-AcOEt 2:1] = 0.6; mp 222 - 224 °C; NMR ^{1}H (400 MHz, $CDCl_3$) δ (ppm): 7.75 (d, *J*=8.1 Hz, 1H, H-Ar), 7.39 (d, *J*=8.3 Hz, 2H, H-Ar), 7.24 (d, *J*=8.1 Hz, 1H, H-Ar), 7.08 – 7.01 (m, 5H, H-Ar), 6.87 (td, *J*=7.7, 1.7 HZ, 1H, H-Ar), 6.80 – 6.73 (m, 4H, H-Ar), 6.50 (dd, *J*=7.8, 1.7 Hz, 1H, H-Ar), 5.89 (d, *J*=7.1 Hz, 1H, H-4), 4.14 (d, *J*=7.9 Hz, 1H, H-6), 3.76 (s, 3H, OCH_3), 2.80 (m, 1H, H-5), 2.27 (s, 3H, CH_3), 0.95 (d, *J*=6.7 Hz, 3H, 5-CH_3); NMR ^{13}C (100 MHz, $CDCl_3$) δ (ppm): 158.3, 152.5, 140.8, 139.2, 137.8, 133.9, 133.4, 133.1, 130.0, 129.7, 129.0, 128.7, 128.6, 128.4, 128.2, 127.8, 127.0, 124.9, 122.7, 121.3, 117.2, 113.8, 60.9, 55.3, 47.3, 44.2, 21.3, 17.5; HRMS (APCI-Q-TOF) m/z calc. for $C_{31}H_{28}ClN_2O$ $[M+H]^+$: 479.1890, found 479.1878.

***Cis*-6-(4-methoxyphenyl)-5-methyl-2-(2-methylphenyl)-4-(4-methylphenyl)-5,6-dihydro-4*H*-imidazo[4,5,1-*ij*]quinoline (5z).** Light yellow solid (64.8 mg, 0.14 mmol, 55%); R_f [hexane-AcOEt 2:1] = 0.52; mp 168 - 170 °C; NMR ^{1}H (400 MHz, $CDCl_3$) δ (ppm):7.66 (dt, *J*=8.1, 1.0

Hz, 1H, H-Ar), 7.20 – 7.15 (m, 3H, H-Ar), 7.07 – 7.03 (m, 1H, H-Ar), 6.99 – 6.96 (m, 1H, H-Ar), 6.94 – 6.88 (m, 4H, H-Ar), 6.74 (s, 4H, H-Ar), 6.64 (dt, *J*=7.4, 1.0 Hz, 1H, H-Ar), 4.98 (d, *J*=9.4 Hz, 1H, H-4), 4.04 (d, *J*=10.4 Hz, 1H, H-6), 3.82 (s, 3H, OCH_3), 2.60 – 2.52 (m, 1H, H-5), 2.15 (s, 3H, CH_3), 2.13 (s, 3H, CH_3), 0.75 (d, *J*=6.6 Hz, 3H, 5-CH_3); NMR ^{13}C (100 MHz, $CDCl_3$) δ (ppm): 158.6, 152.4, 140.4, 137.2, 136.9, 136.3, 133.6, 133.2, 131.3, 130.2, 130.0, 129.5, 128.6, 128.6, 127.5, 124.7, 122.2, 120.1, 117.0, 114.0, 65.5, 55.3, 48.7, 44.6, 20.9, 20.0, 16.7; HRMS (APCI-Q-TOF) m/z calc. for $C_{32}H_{31}N_2O$ $[M+H]^+$: 459.2436, found 459.2425.

***Cis*-6-(4-hydroxy-3-methoxyphenyl)-4-(4-chlorophenyl)-2-(thiophen-2-yl)-5-methyl-5,6-dihydro-4*H* imidazo[4,5,1-*ij*]quinoline (5aa).** White solid (12.4 mg, 0.03 mmol, 11%); R_f [hexane-AcOEt 2:1] = 0.35; mp > 250 °C; NMR ^1H (400 MHz, $CDCl_3$) δ (ppm): 7.76 (d, *J*=8.1 Hz, 1H, H-Ar), 7.34 (dd, *J*=5.1 Hz, 1.2. 1H, H-Ar), 7.33 – 7.28 (m, 2H, H-Ar), 7.03 (dd, *J*=3.7, 1.1 Hz, 1H, H-Ar), 6.97 (d, *J*=7.3 Hz, 1H, H-Ar), 6.94 – 6.90 (m, 3H, H-Ar), 6.63 (t, *J*=8.4 Hz, 3H, H-Ar), 6.42 (dd, *J*=8.3, 2.7 Hz, 1H, H-Ar), 6.23 (d, *J*=2.2 Hz, 1H, OH), 5.51 (d, *J*=4.4 Hz, 1H, H-4), 4.13 (d, *J*=4.5 Hz, 1H, H-6), 3.64 (s, 3H, OCH_3), 3.02 (m, 1H, H-5), 1.10 (d, *J*=7.0 Hz, 3H, 5-CH_3); NMR ^{13}C (100 MHz, $CDCl_3$) δ (ppm): 147.2, 145.9, 144.1, 141.4, 138.0, 133.7, 133.0, 132.9, 132.2, 128.4, 128.2, 127.8, 127.6, 123.3, 122.9, 122.6, 121.5, 117.6, 113.8, 110.6, 63.2, 55.7, 46.5, 44.3, 20.3; HRMS (APCI-Q-TOF) m/z calc. for $C_{28}H_{24}ClN_2OS$ $[M+H]^+$: 487.1247, found 487.1259.

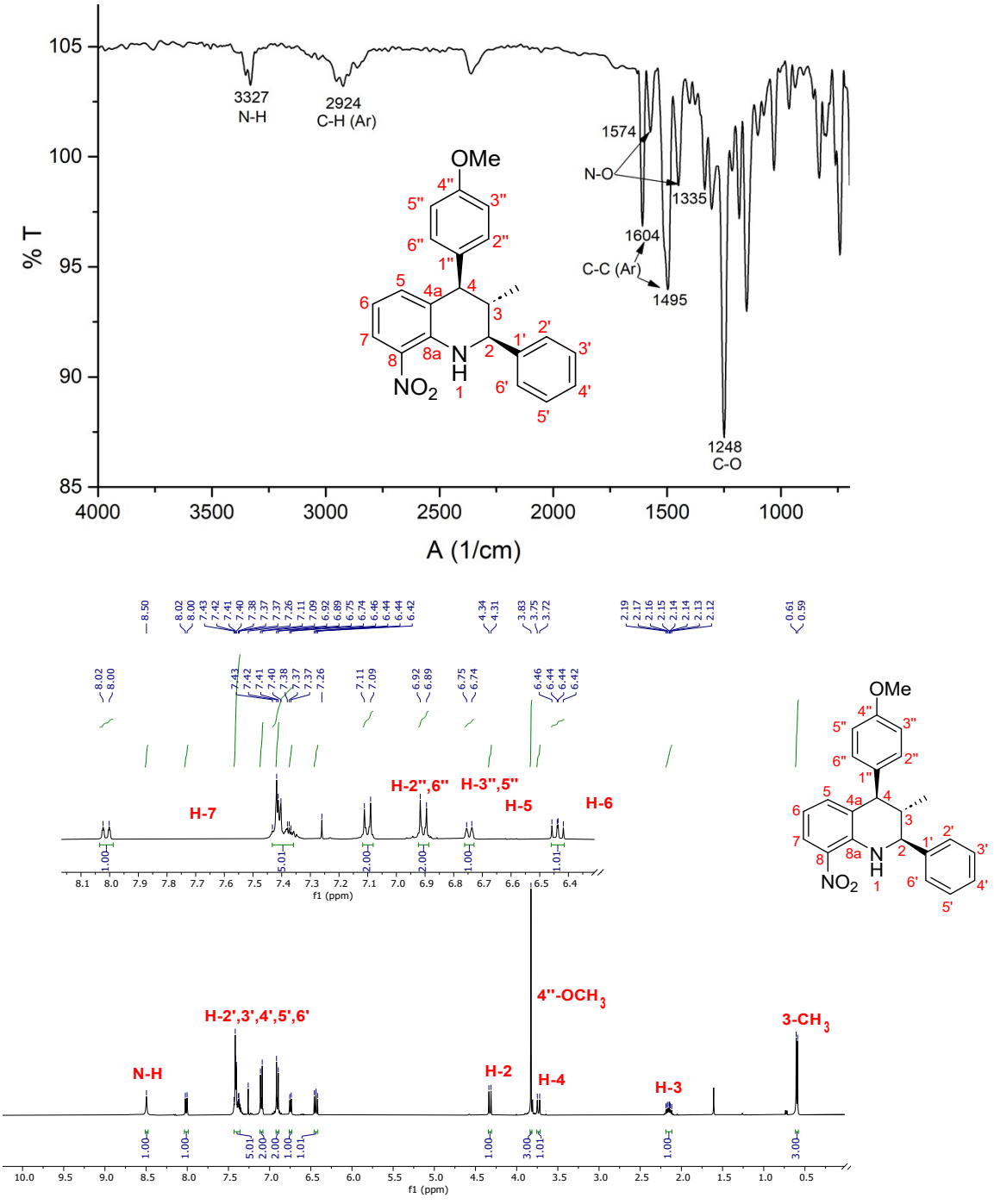
***Cis*-6-(4-hydroxy-3-methoxyphenyl)-2-(4-methoxyphenyl)-4-phenyl-5-methyl-5,6-dihydro-4*H* imidazo[4,5,1-*ij*]quinoline (5ab).** Light yellow solid (29 mg, 0.06 mmol, 23%); R_f [hexane-

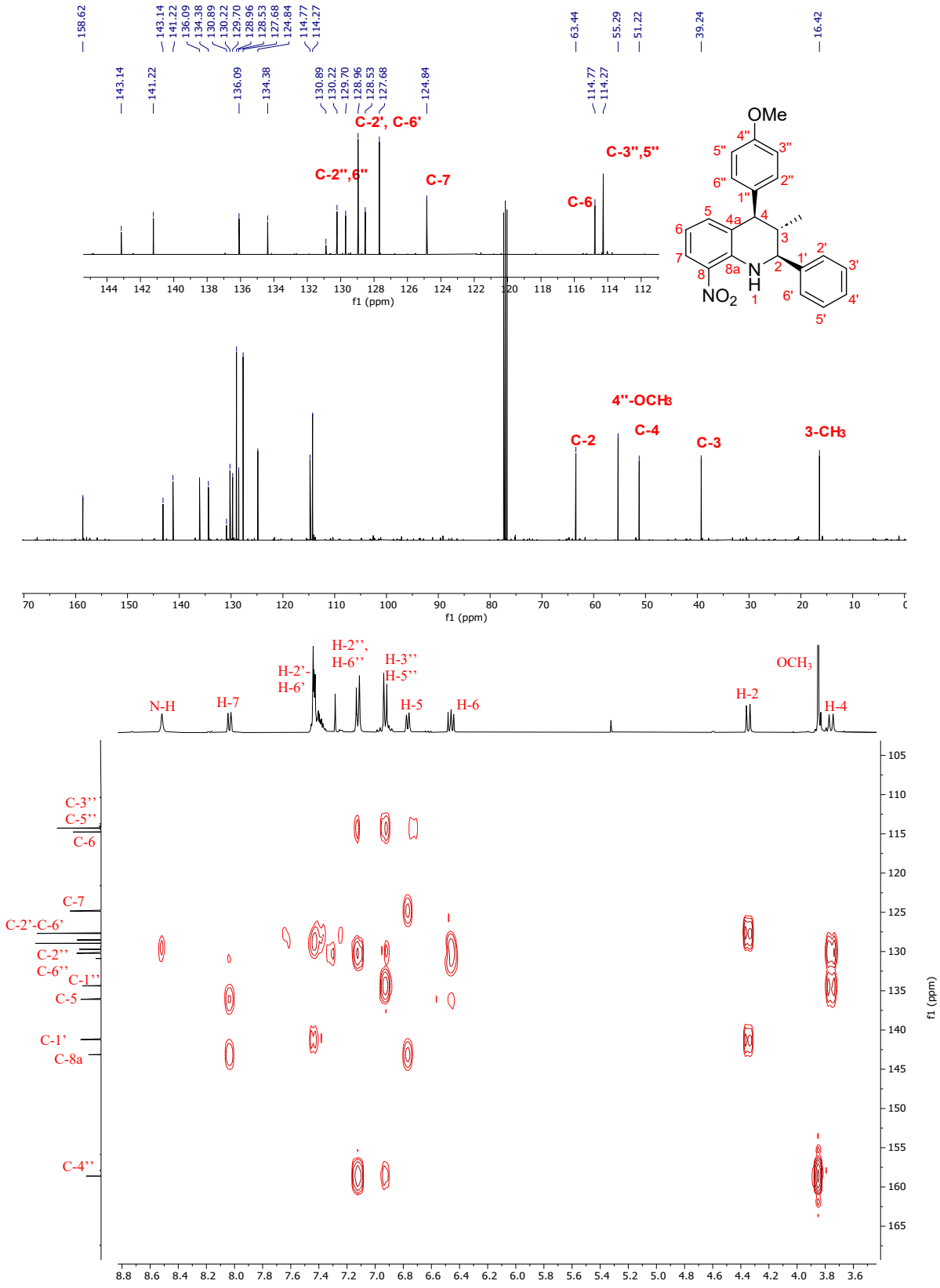
AcOEt 1:1] = 0.37; mp > 250 °C; NMR ^{1}H (400 MHz, $CDCl_3$) δ (ppm): 7.70 (d, *J*=8.2 Hz, 1H, H-Ar), 7.42 (d, *J*=8.9 Hz, 2H, H-Ar), 7.24 – 7.20 (m, 1H, H-Ar), 6.98 – 6.95 (m, 3H, H-Ar), 6.83 – 6.74 (m, 4H, H-Ar), 6.70 (d, *J*=9.0 Hz, 2H, H-Ar), 6.66 (dd, *J*=8.2, 2.0 Hz, 1H, H-Ar), 6.51 (d, *J*=2.1 Hz, 1H, H-Ar), 5.57 (d, *J*=4.7 Hz, 1H, OH), 5.34 (d, *J*=7.4 Hz, 1H, H-4), 4.06 (d, *J*=8.1 Hz, 1H, H-6), 3.75 (s, 3H, OCH_3), 3.74 (s, 3H, OCH_3), 2.69 (m 1H, H-5), 0.93 (d, *J*=6.6 Hz, 3H, 5-CH_3); NMR ^{13}C (100 MHz, $CDCl_3$) δ (ppm): 160.7, 160.1, 152.8, 146.3, 144.2, 139.9, 133.9, 133.3, 130.3, 128.1, 127.5, 127.4, 125.0, 123.4, 122.5, 122.2, 120.9, 120.8, 117.1, 114.1, 113.4, 110.8, 65.3, 55.9, 55.3, 48.0, 45.0, 18.2; HRMS (APCI-Q-TOF) m/z calc. for $C_{31}H_{29}N_2O_3$ $[M+H]^+$: 477.2178, found 477.2188.

***Cis*-6-(4-hydroxy-3-methoxyphenyl)-2-(4-methylphenyl)-4-phenyl-5-methyl-8-methoxy-5,6-dihydro-4*H* imidazo[4,5,1-*ij*]quinoline (5ac).** Solid light brown (25.6 mg, 0.06 mmol, 22%); R_f [hexane-AcOEt 1:1] = 0.4; mp > 250 °C; NMR ^{1}H (400 MHz, $CDCl_3$) δ (ppm): 7.36 (d, *J*=8.3 Hz, 2H, H-Ar), 7.21 (d, *J*=2.4 Hz, 1H, H-Ar), 6.99 – 6.94 (m, 5H, H-Ar), 6.82 – 6.78 (m, 2H, H-Ar), 6.76 (d, *J*=8.1 Hz, 1H, H-Ar), 6.64 (dd, *J*=8.2, 2.0 Hz, 1H, H-Ar), 6.49 (d, *J*=2.2 Hz, 1H, H-Ar), 6.45 (bs, 1H, H-Ar), 5.51 (s, 1H, H-Ar), 5.34 (d, *J*=7.3 Hz, 1H, OH), 4.02 (d, *J*=8.3 Hz, 1H, H-6), 3.84 (s, 3H, OCH_3), 3.74 (s, 3H, OCH_3), 2.69 (m, 1H, H-5), 2.25 (s, 3H, CH_3), 0.93 (d, *J*=6.7 Hz, 3H, 5-CH_3); NMR ^{13}C (100 MHz, $CDCl_3$) δ (ppm): 156.9, 153.0, 146.3, 144.2, 139.8, 138.9, 132.9, 128.7, 128.6, 128.0, 127.4, 127.3, 125.6, 122.1, 114.1, 111.3, 110.7, 99.5, 65.2, 56.0, 55.9, 48.0, 45.0, 21.3, 18.3; HRMS (APCI-Q-TOF) m/z calc. for $C_{32}H_{31}N_2O_3$ $[M+H]^+$: 491.2334, found 491.2347.

Copies of IR, ^{1}H NMR, ^{13}C NMR, APT, HMBC, HSQC and HRMS of 8-nitrotetrahydroquinolines 4a-4p.

Figure 1. IR, ^{1}H NMR, ^{13}C NMR, HMBC, HSQC and HRMS spectra of ***Cis*-4-(4-methoxyphenyl)-3-methyl-8-nitro-2-phenyl-1,2,3,4-tetrahydroquinoline (4a)**

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129.70
128.96
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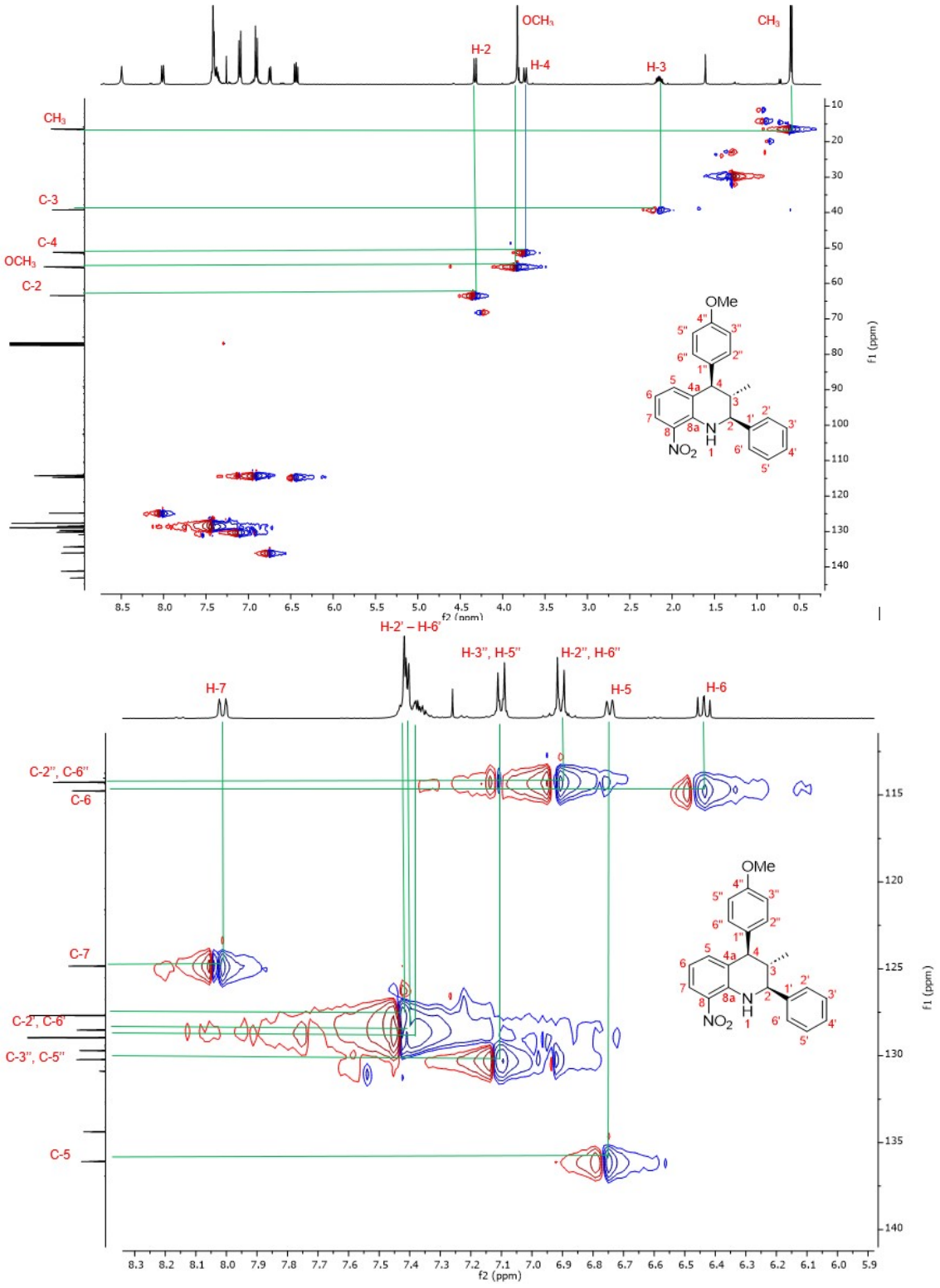
114.77
114.27
63.44
55.29
51.22
39.24
16.42
C-2', C-6'
C-3'',5''
C-2'',6''
C-7
C-6
f1 (ppm)
OMe
NO2
4''-OCH3
C-4
C-2
C-3
3-CH3
f1 (ppm)
N-H
H-7
H-2'-
H-6'
H-2'',
H-6''
H-3''
H-5''
H-5
H-6
H-2
OCH3
H-4
C-3''
C-5''
C-6
C-7
C-2'-C-6'
C-2''
C-6''
C-1''
C-5
C-1'
C-8a
C-4''
f1 (ppm)


OCH3
CH3
H-2
H-4
H-3
CH3
C-3
C-4
OCH3
C-2
OMe
NO2
f1 (ppm)
f2 (ppm)
H-2' – H-6'
H-3'', H-5''
H-2'', H-6''
H-7
H-5
H-6
C-2'', C-6''
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C-7
C-2', C-6'
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C-5
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f1 (ppm)
f2 (ppm)

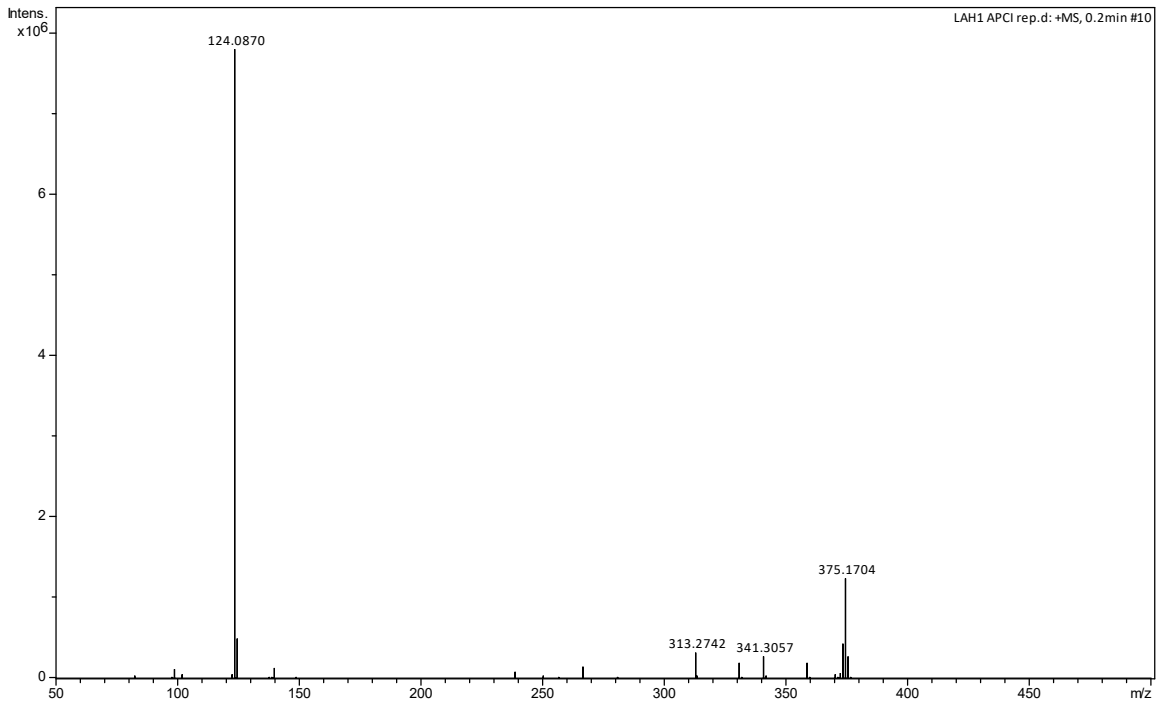
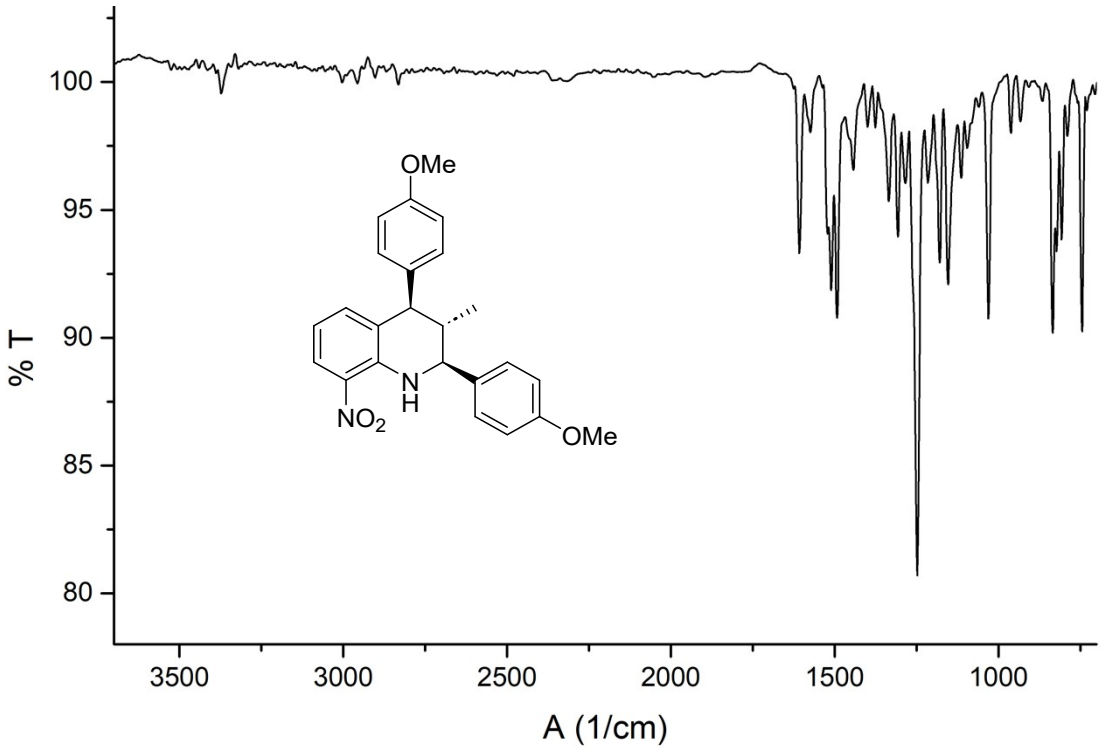
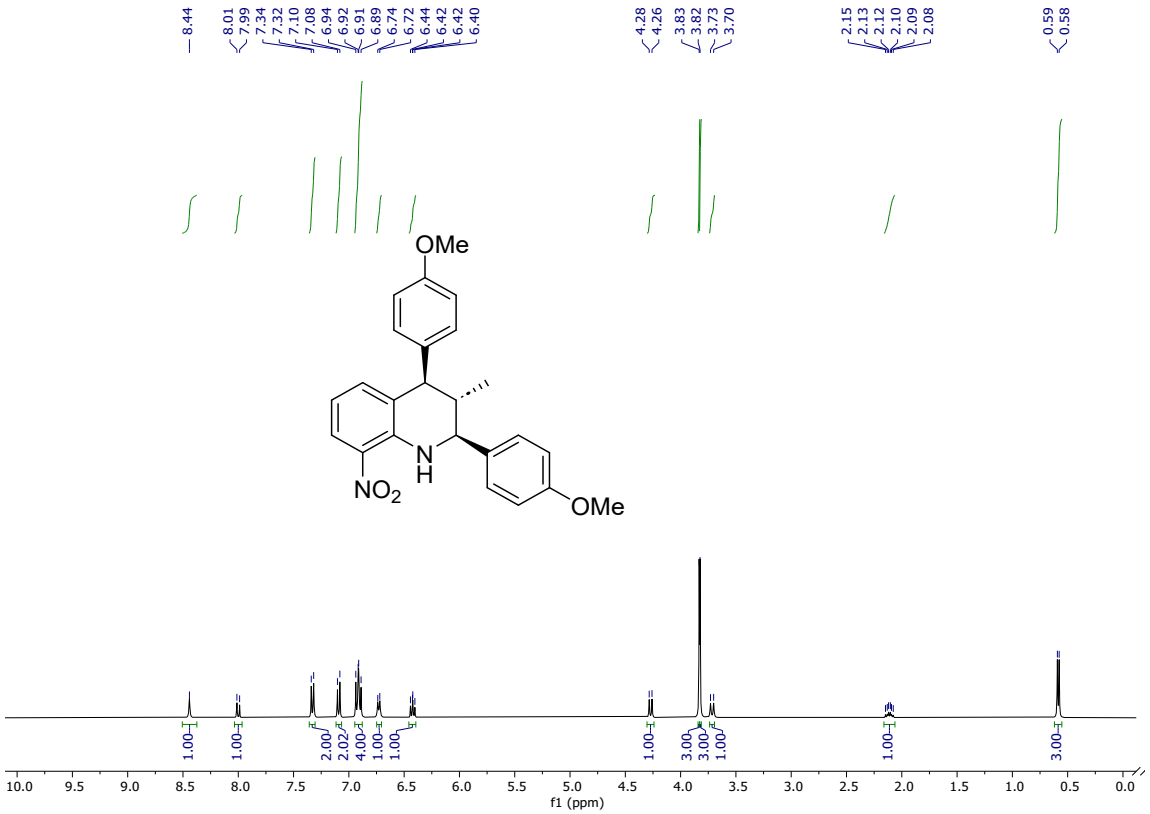


Figure 2. IR, ^{1}H NMR, APT, and HRMS spectra of ***Cis*-2,4-bis(4-methoxyphenyl)-3-methyl-8-nitro-1,2,3,4-tetrahydroquinoline (4b).**

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8.01
7.99
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7.32
7.10
7.08
6.94
6.92
6.91
6.89
6.74
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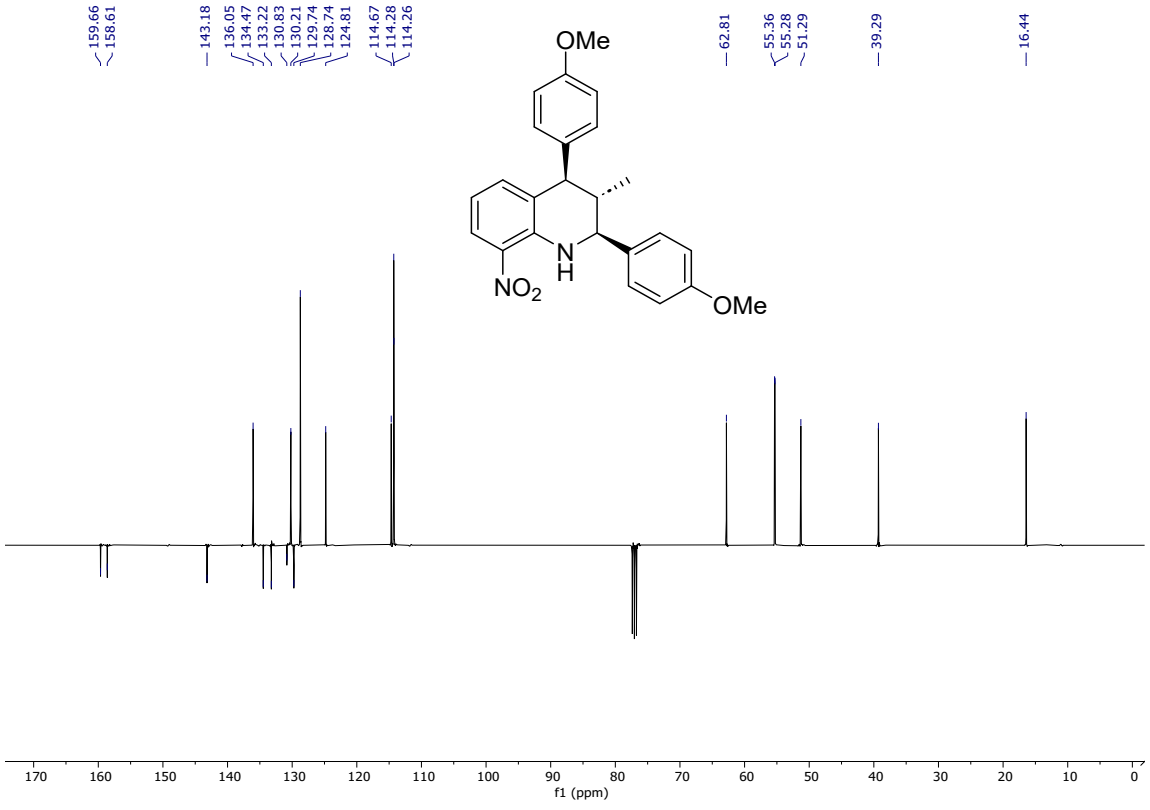
6.44
6.42
6.40
4.28
4.26
3.83
3.82
3.73
3.70
2.15
2.13
2.12
2.10
2.09
2.08
0.59
0.58
OMe
N
H
NO2
OMe
1.00
1.00
2.00
2.02
4.00
1.00
1.00
1.00
3.00
3.00
1.00
1.00
3.00
f1 (ppm)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136.05
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130.83
130.21
129.74
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16.44
OMe
N
H
NO2
OMe
f1 (ppm)

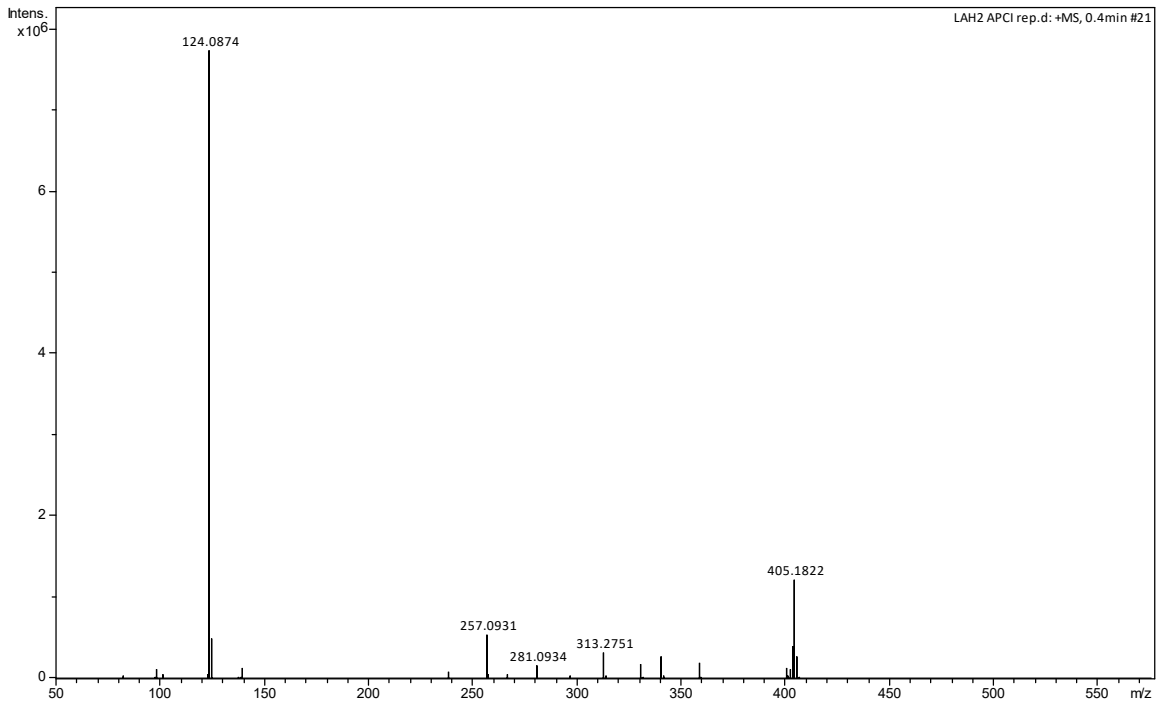
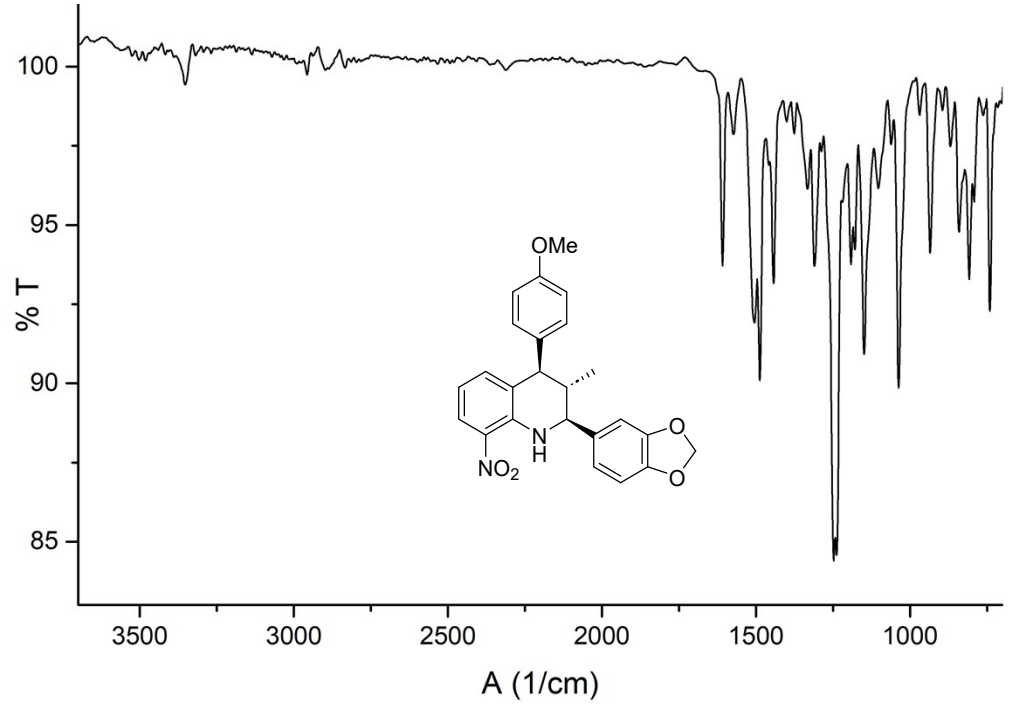
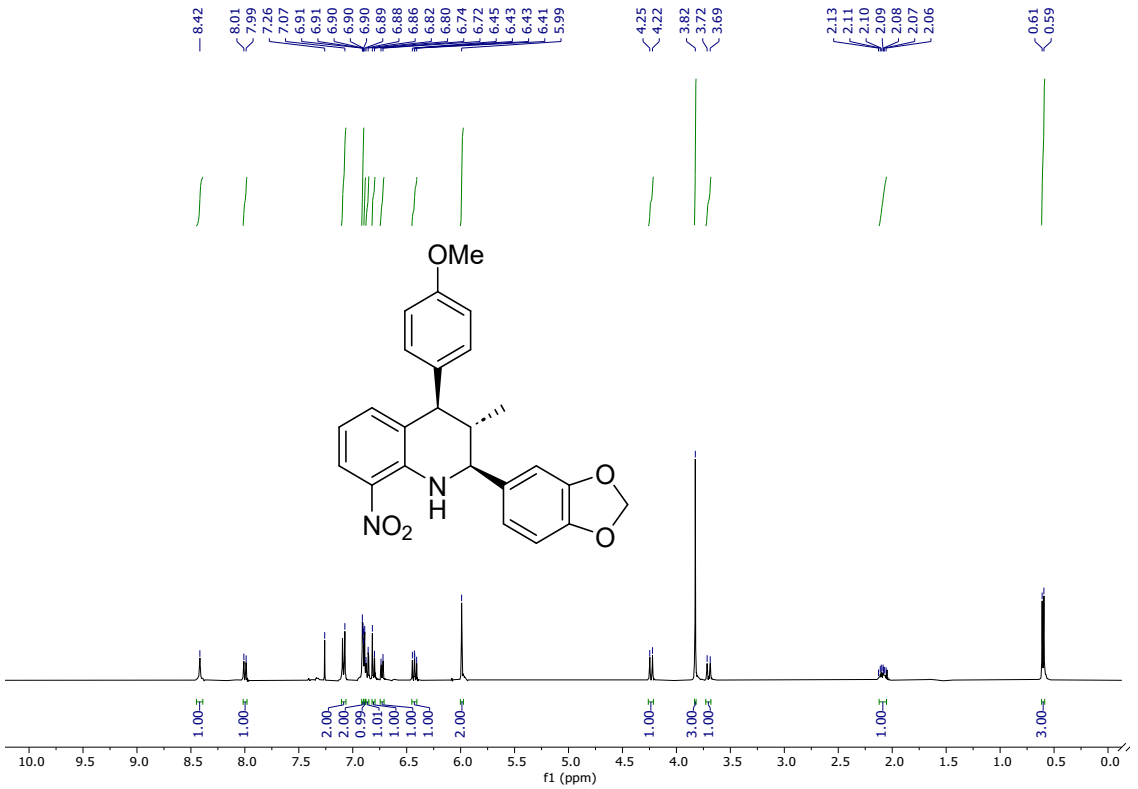


Figure 3. IR, ^{1}H NMR, ^{13}C NMR and HRMS spectra of ***Cis*-2-(benzo[*d*][1,3]dioxol-5-yl)-4-(4-methoxyphenyl)-3-methyl-8-nitro-1,2,3,4-tetrahydroquinoline (4c).**

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4.22
3.82
3.72
3.69
2.13
2.11
2.10
2.09
2.08
2.07
2.06
0.61
0.59
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N
H
NO2
O
O
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1.00
2.00
2.00
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1.00
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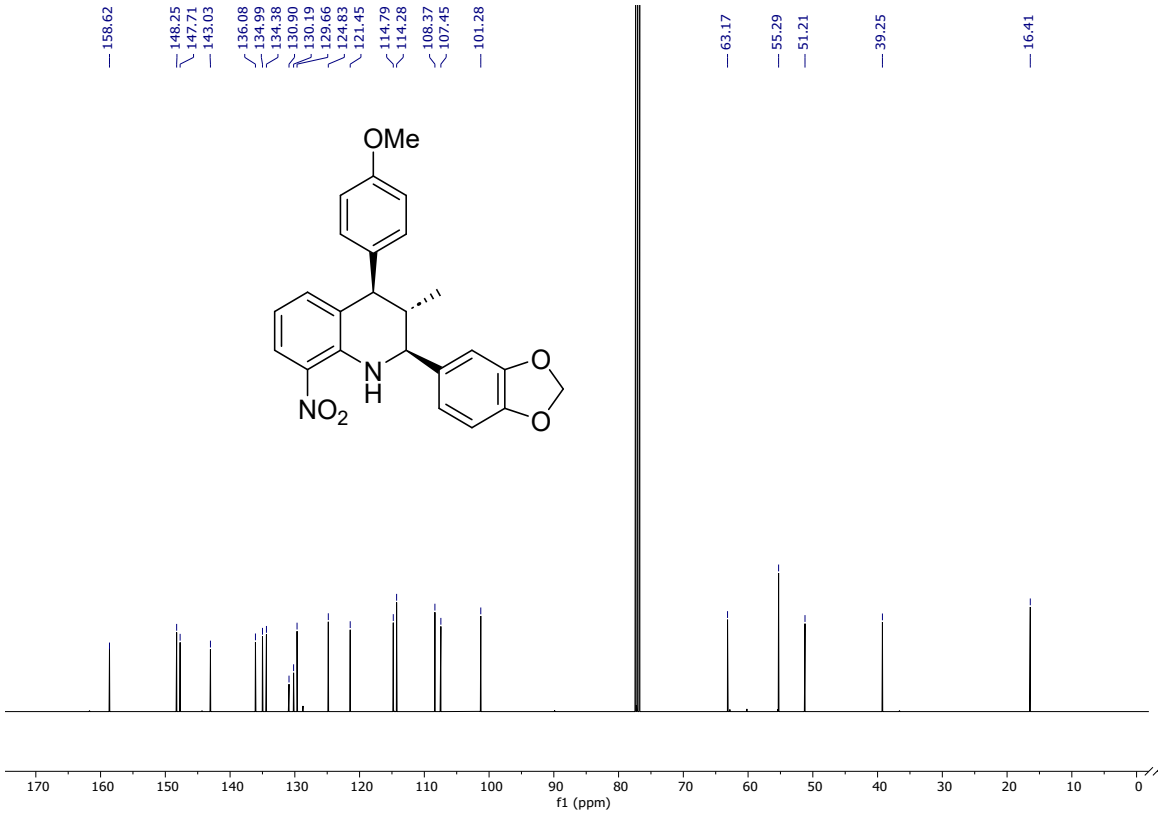
2.00
1.00
3.00
1.00
1.00
3.00
f1 (ppm)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136.08
134.99
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124.83
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114.28
108.37
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39.25
16.41
OMe
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H
NO2
O
O
f1 (ppm)

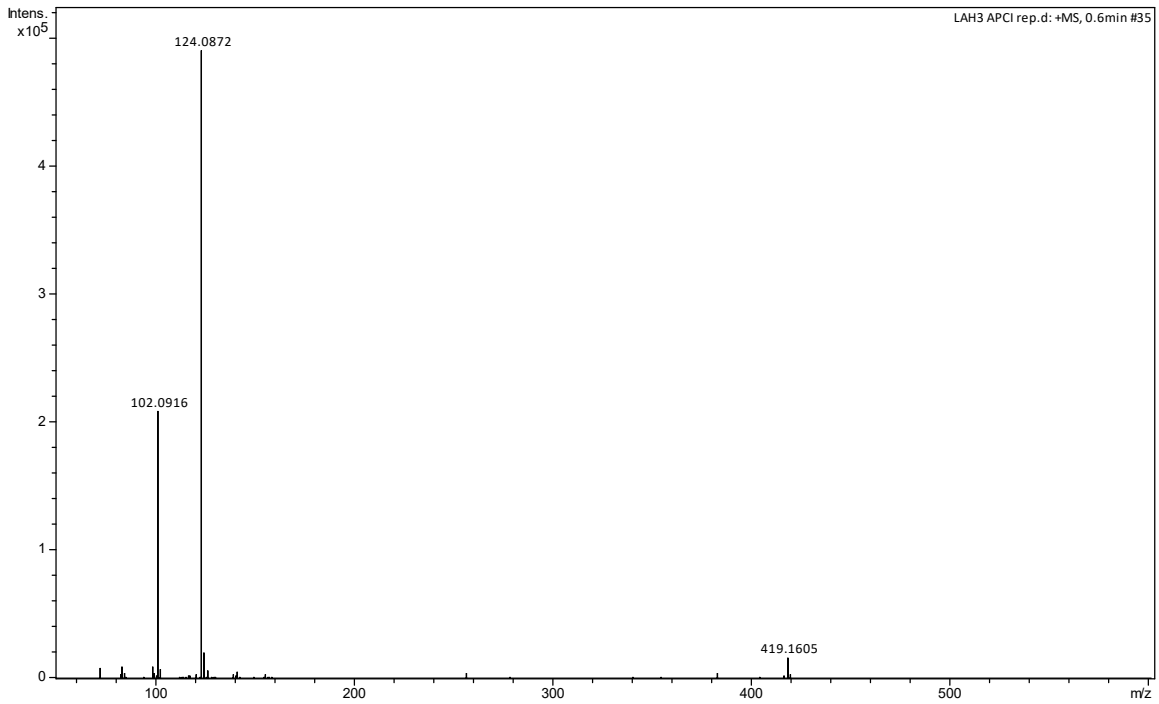
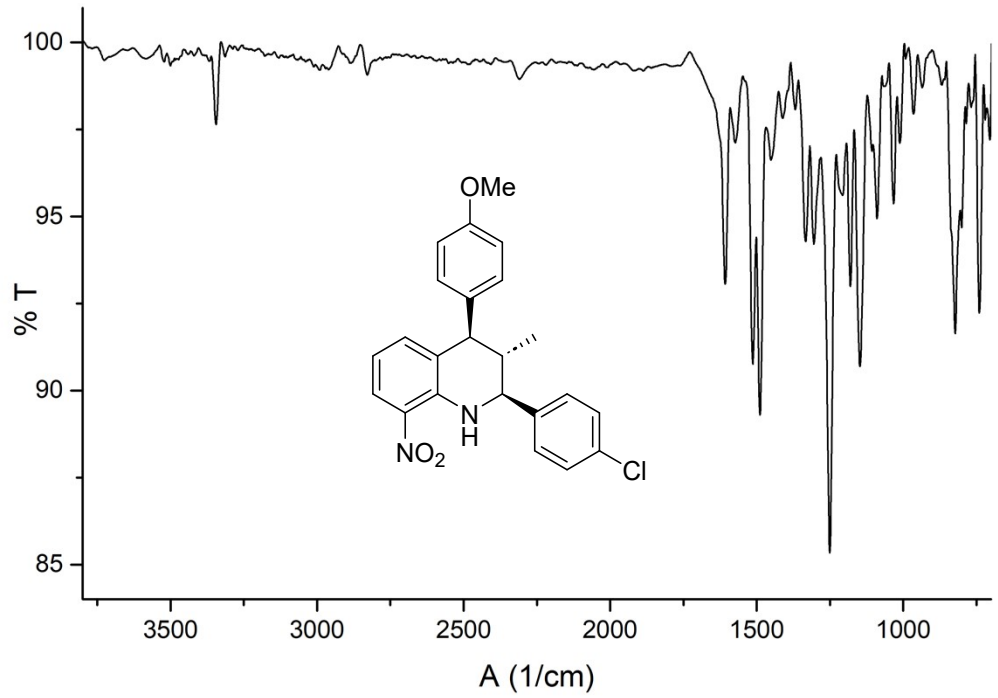
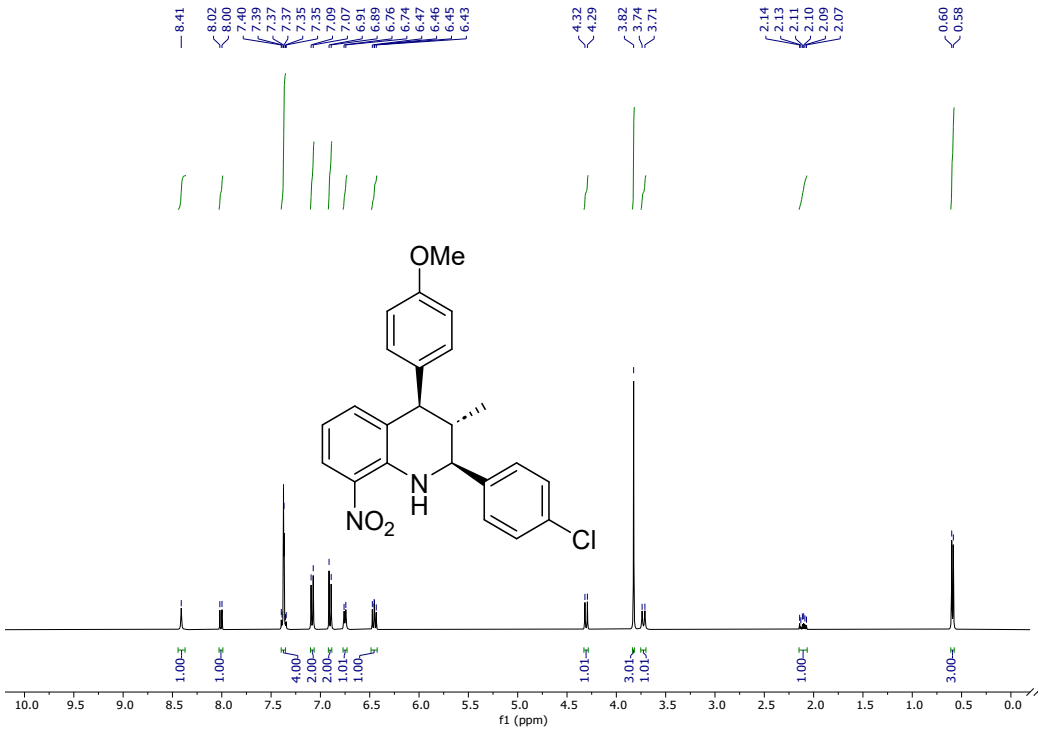


Figure 4. IR, ^{1}H NMR, ^{13}C NMR and HRMS spectra of ***Cis*-2-(4-chlorophenyl)-4-(4-methoxyphenyl)-3-methyl-8-nitro-1,2,3,4-tetrahydroquinoline (4d).**

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7.37
7.37
7.35
7.35
7.09
7.07
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6.74
6.47
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6.43
4.32
4.29
3.82
3.74
3.71
2.14
2.13
2.11
2.10
2.09
2.07
0.60
0.58
OMe
N
H
NO2
Cl
1.00
1.00
4.00
2.00
2.00
1.01
1.00
1.01
3.01
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3.00
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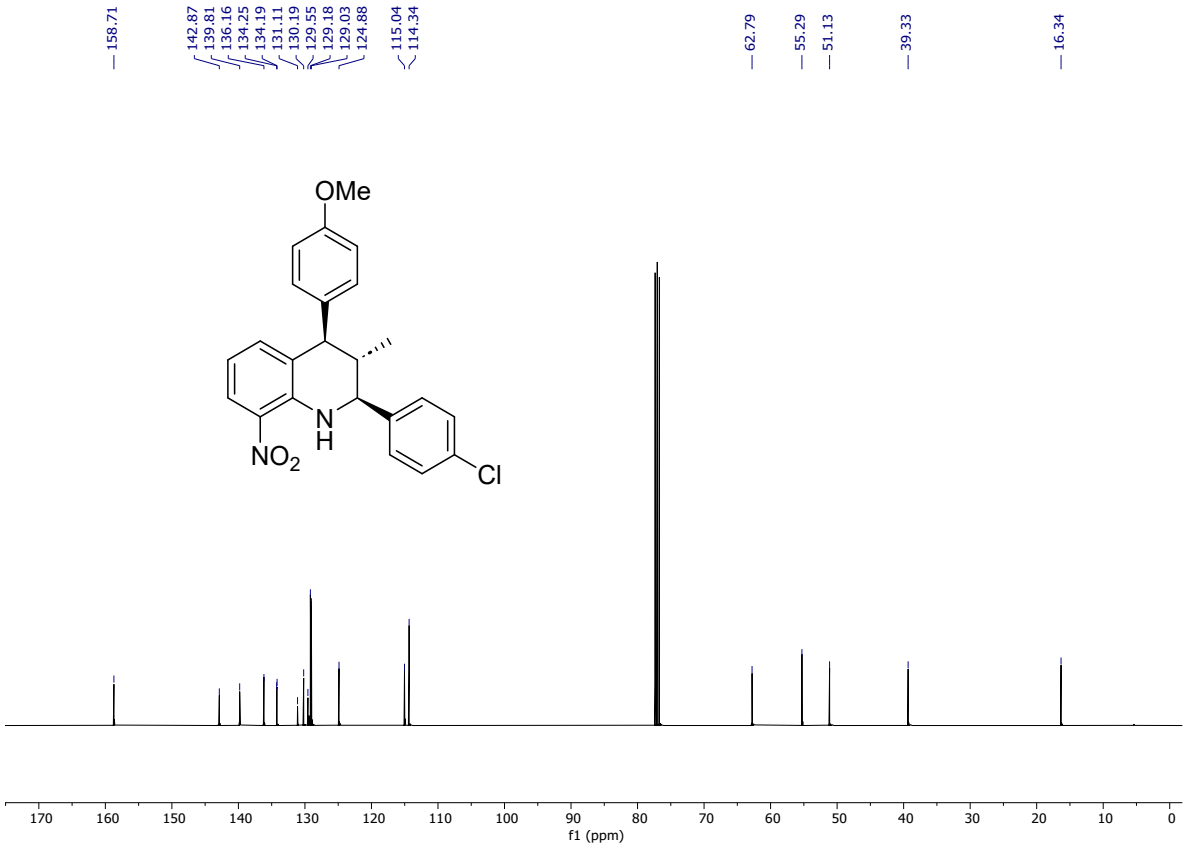
f1 (ppm)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62.79
55.29
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16.34
OMe
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H
NO2
Cl
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f1 (ppm)

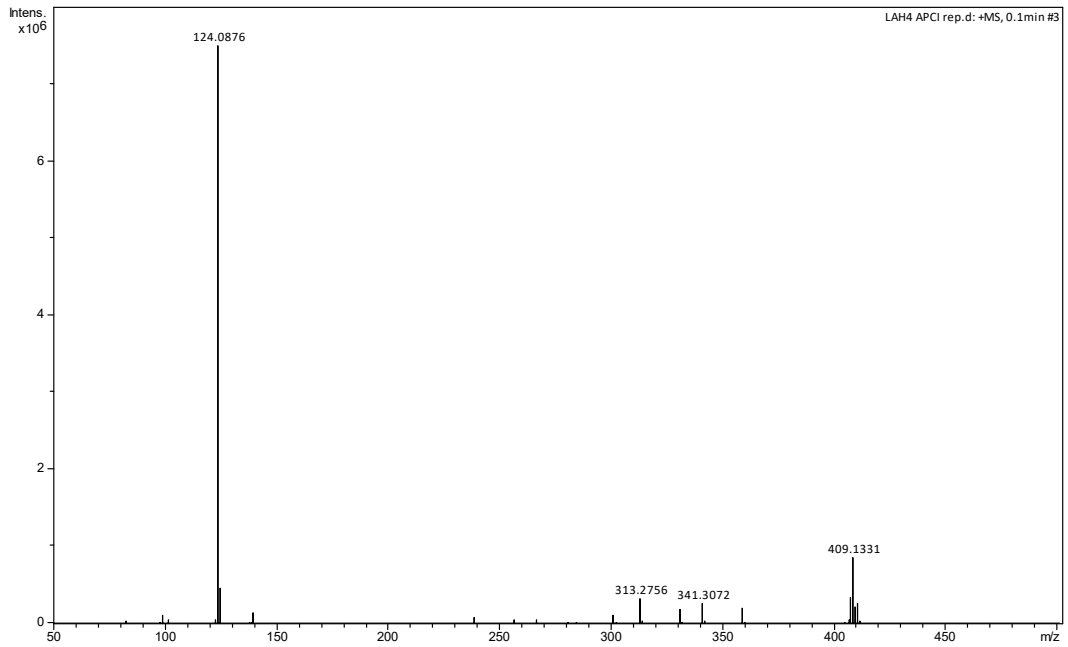
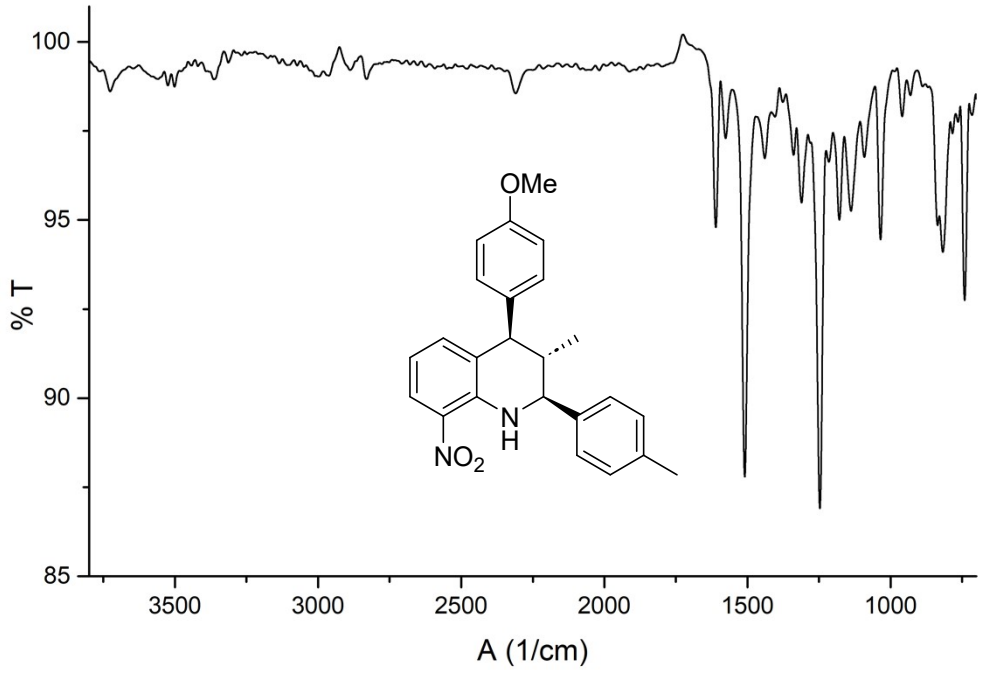
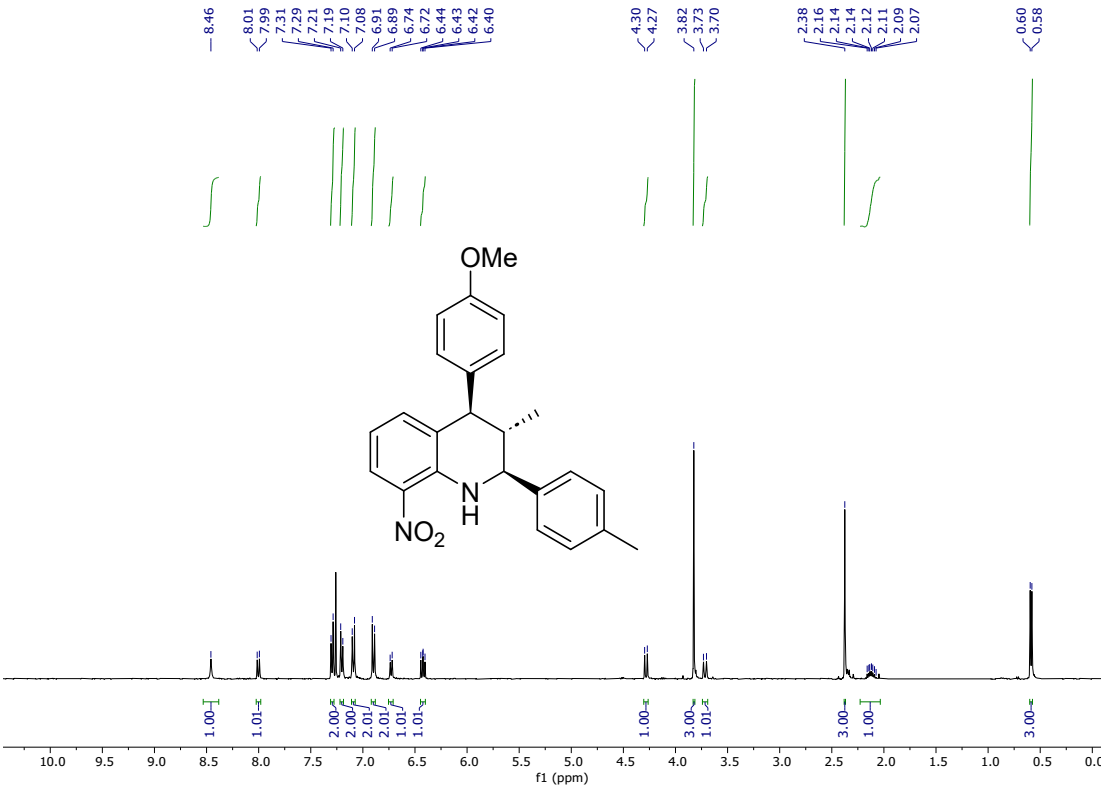


Figure 5. IR, ^{1}H NMR, APT and HRMS spectra of ***Cis*-2-(4-methylphenyl)-4-(4-methoxyphenyl)-3-methyl-8-nitro-1,2,3,4-tetrahydroquinoline (4e).**

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7.10
7.08
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6.89
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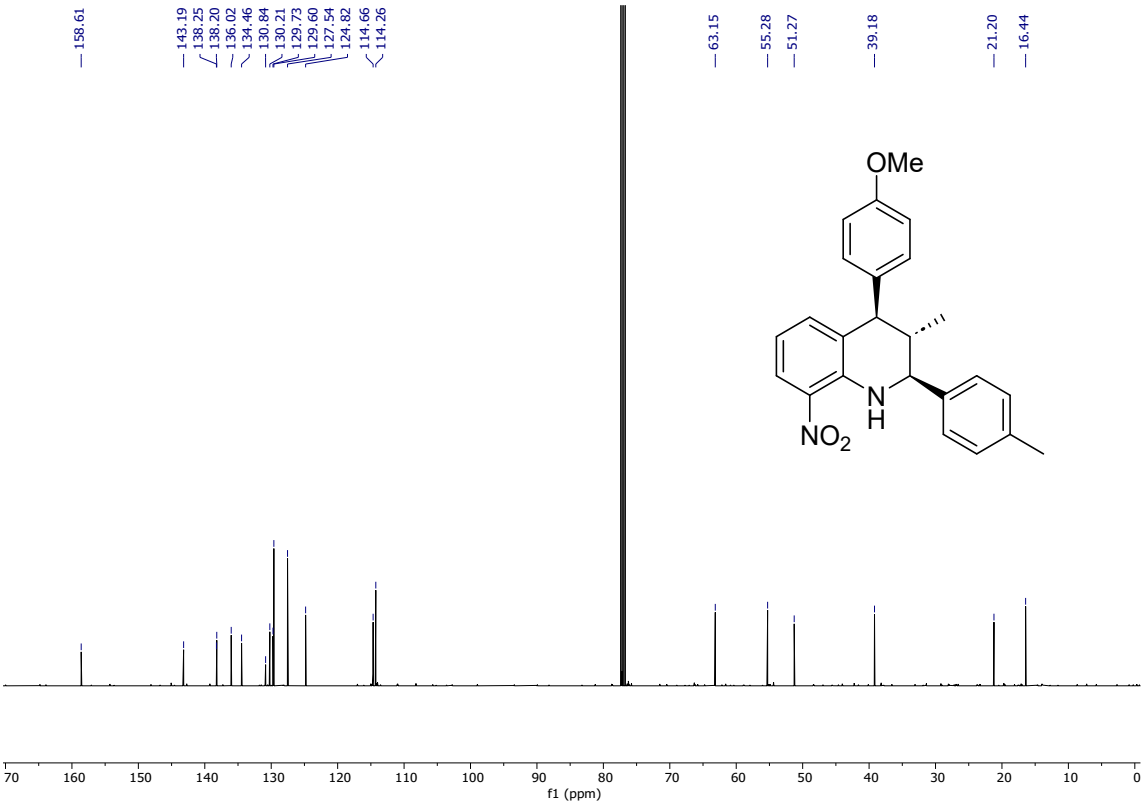
6.44
6.43
6.42
6.40
4.30
4.27
3.82
3.73
3.70
2.38
2.16
2.14
2.14
2.12
2.11
2.09
2.07
0.60
0.58
OMe
N
H
NO2
1.00
1.01
2.00
2.00
2.01
2.01
1.01
1.00
3.00
1.01
3.00
1.00
3.00
f1 (ppm)


158.61
143.19
138.25
138.20
136.02
134.46
130.84
130.21
129.73
129.60
127.54
124.82
114.66
114.26
63.15
55.28
51.27
39.18
21.20
16.44
OMe
N
H
NO2
f1 (ppm)

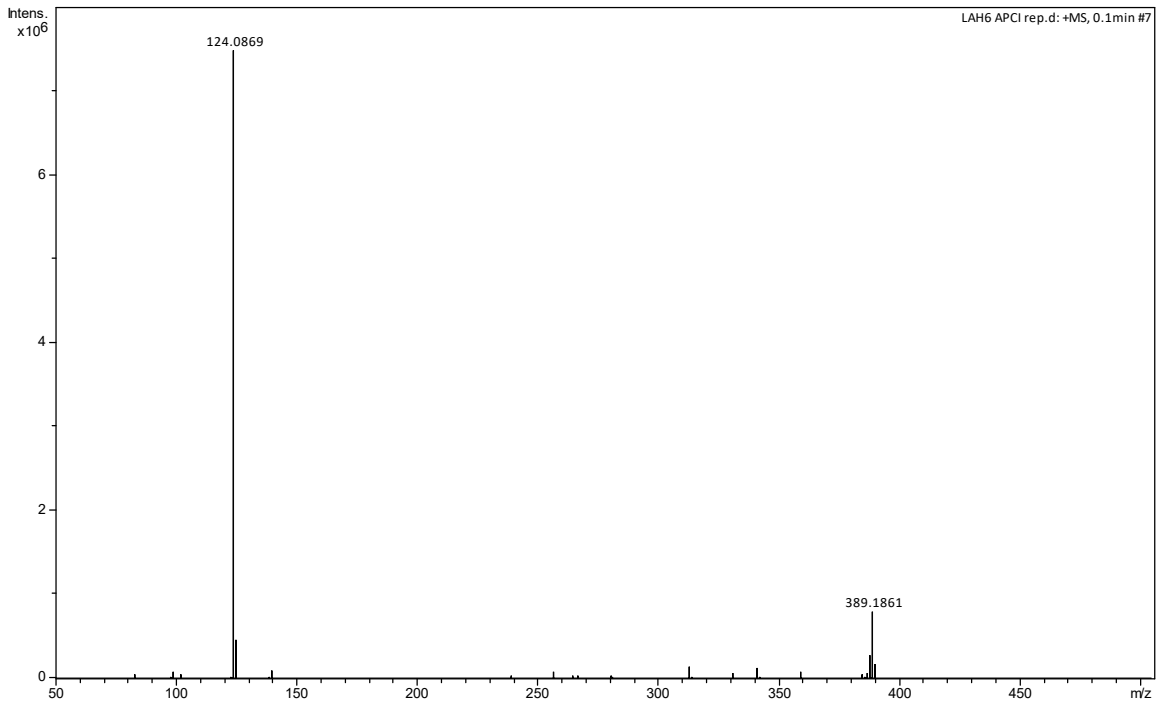
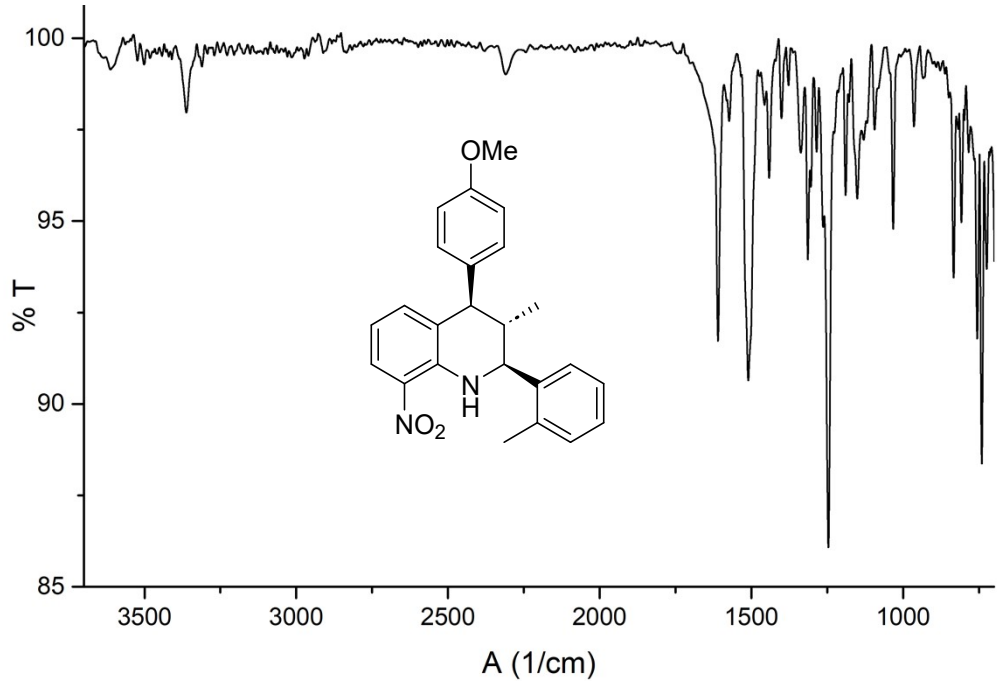
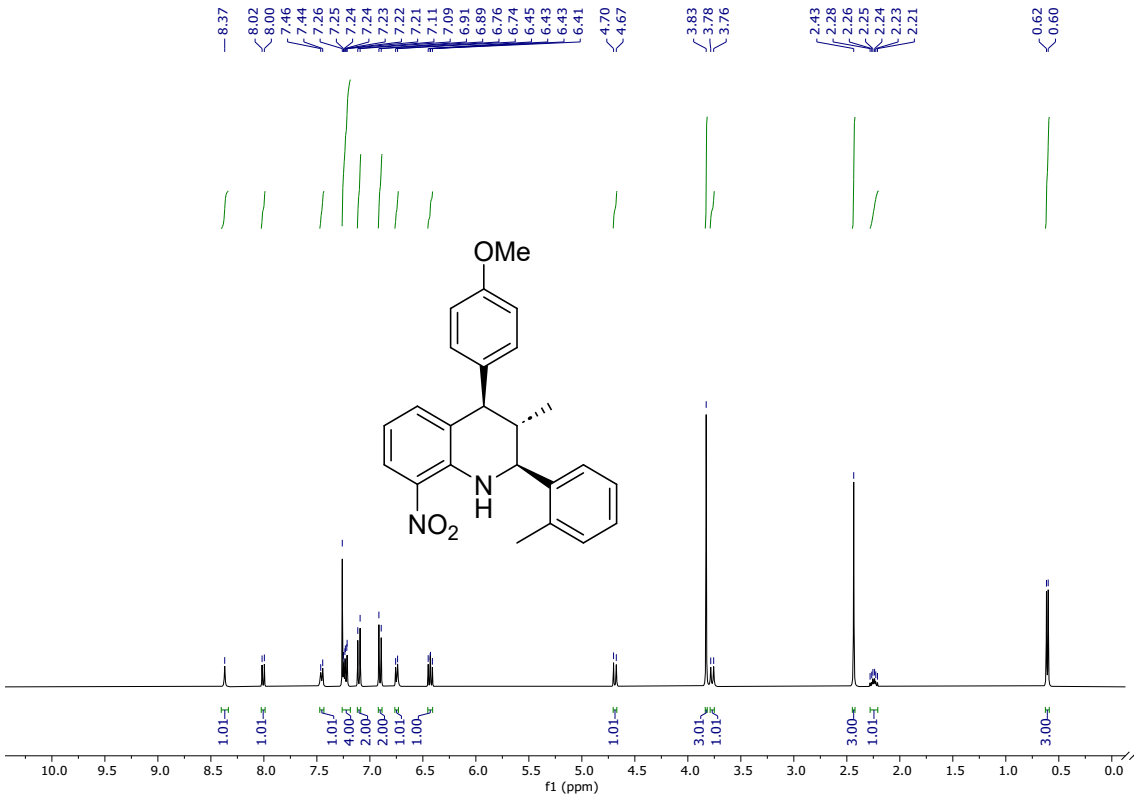
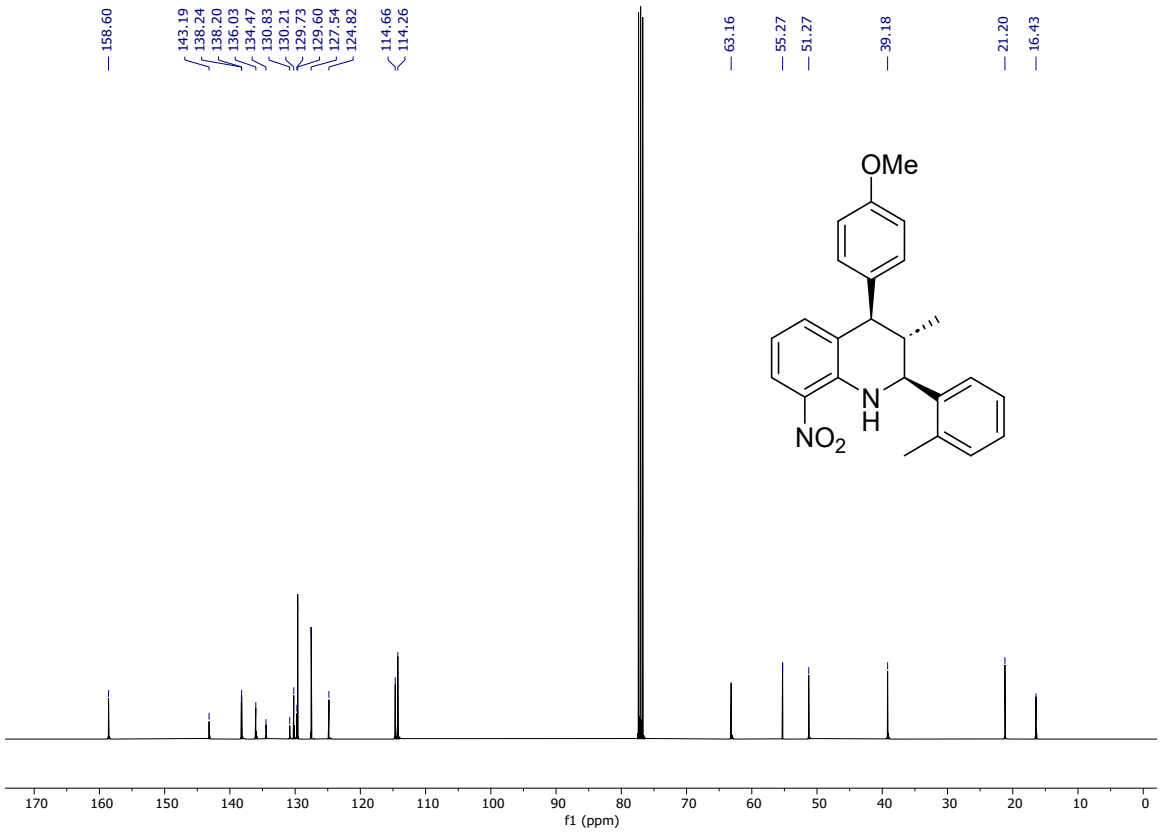


Figure 6. IR, ^{1}H NMR, ^{13}C NMR and HRMS spectra of ***Cis*-2-(2-methylphenyl)-4-(4-methoxyphenyl)-3-methyl-8-nitro-1,2,3,4-tetrahydroquinoline (4f).**




8.37
8.02
8.00
7.46
7.44
7.26
7.25
7.24
7.24
7.23
7.22
7.21
7.11
7.09
6.91
6.89
6.76
6.74
6.45
6.43
6.43
6.41
4.70
4.67
3.83
3.78
3.76
2.43
2.28
2.26
2.25
2.24
2.23
2.21
0.62
0.60
OMe
N
H
NO2
1.01
1.01
1.01
4.00
2.00
2.00
1.01
1.00
1.01
3.01
1.01
3.00
1.01
3.00
f1 (ppm)


158.60
143.19
138.24
138.20
136.03
134.47
130.83
130.21
129.73
129.60
127.54
124.82
114.66
114.26
63.16
55.27
51.27
39.18
21.20
16.43
OMe
N
H
NO2
f1 (ppm)

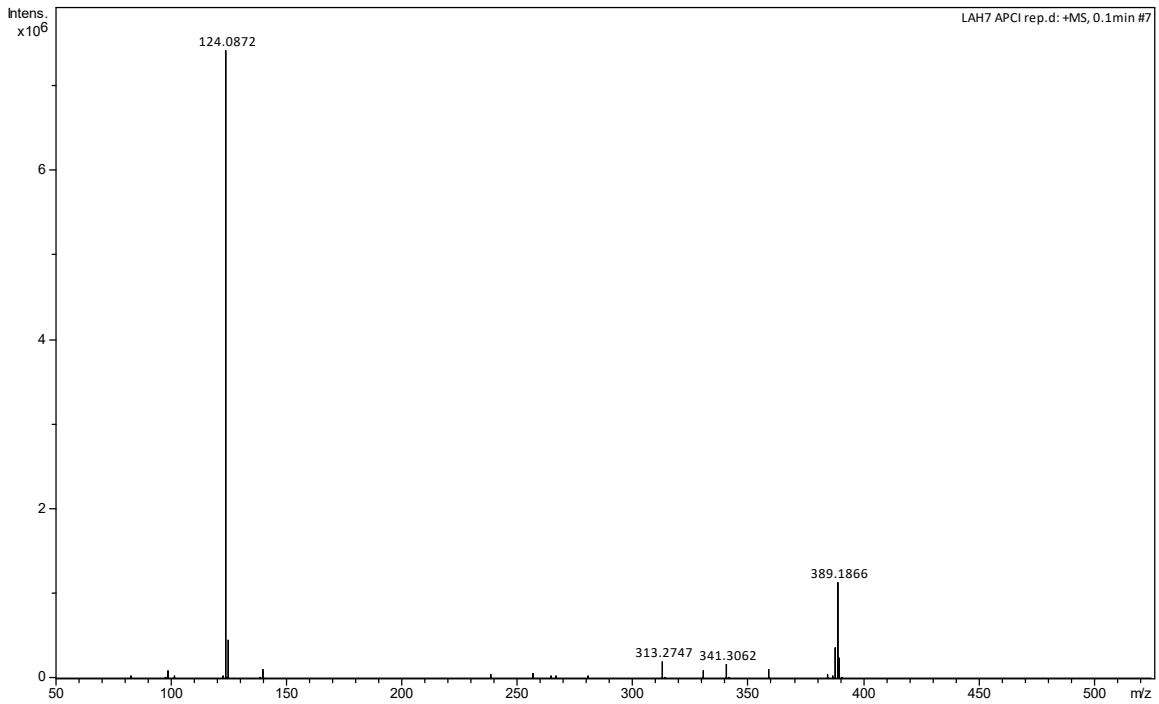
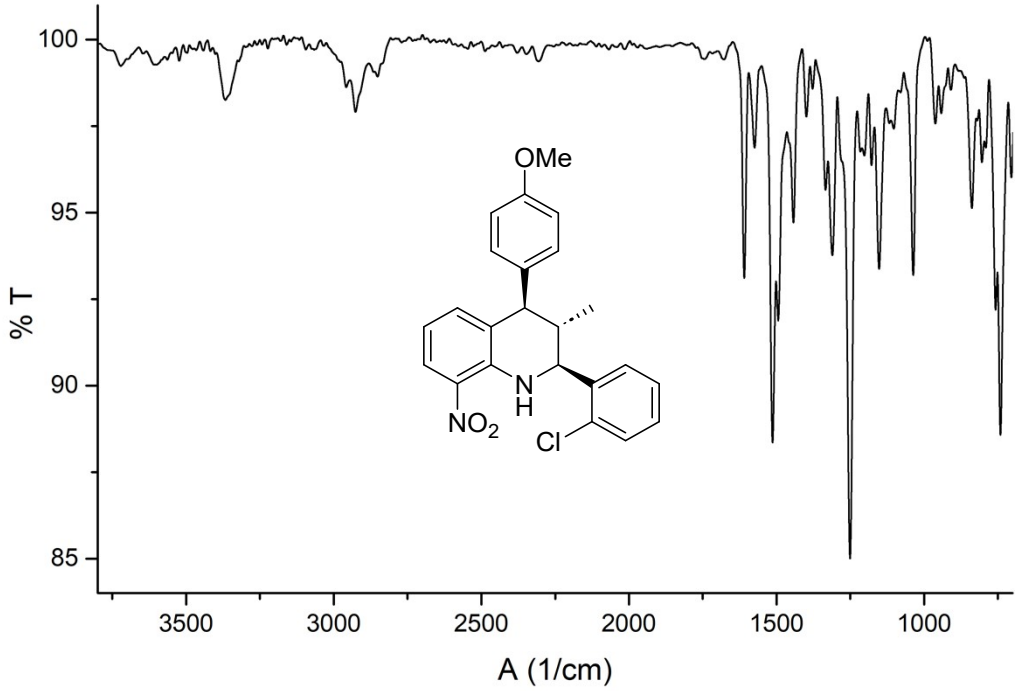
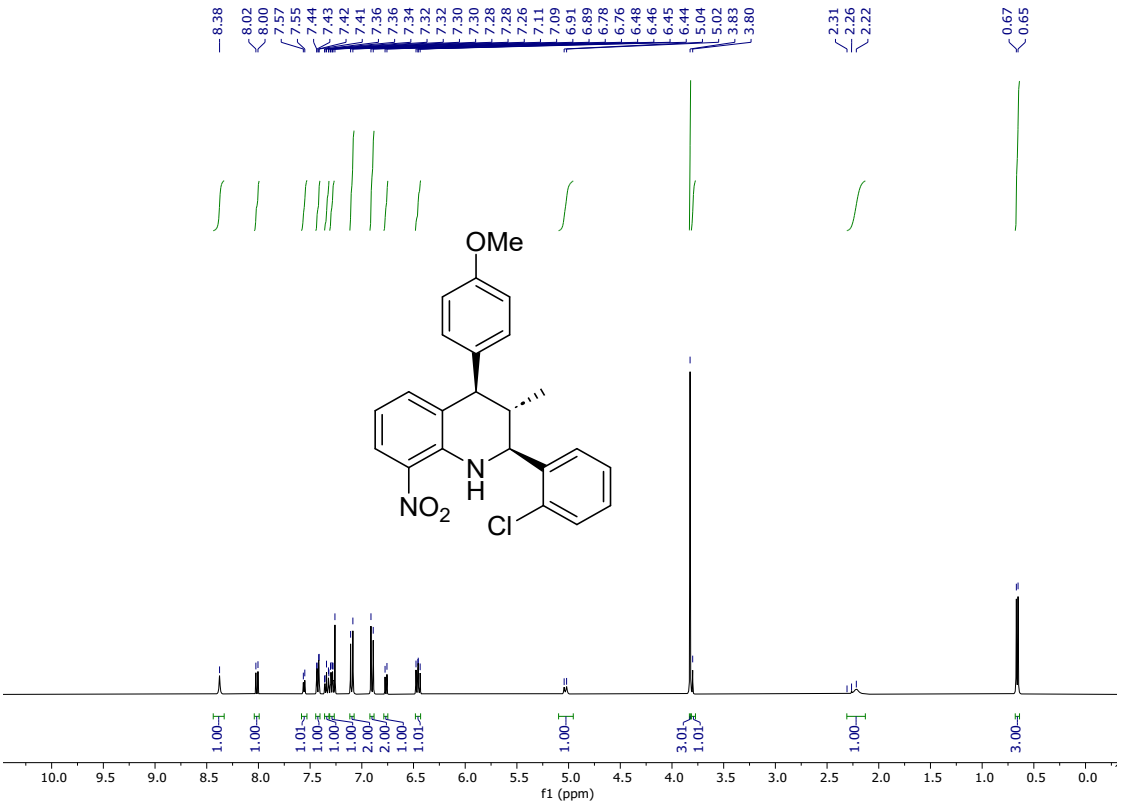
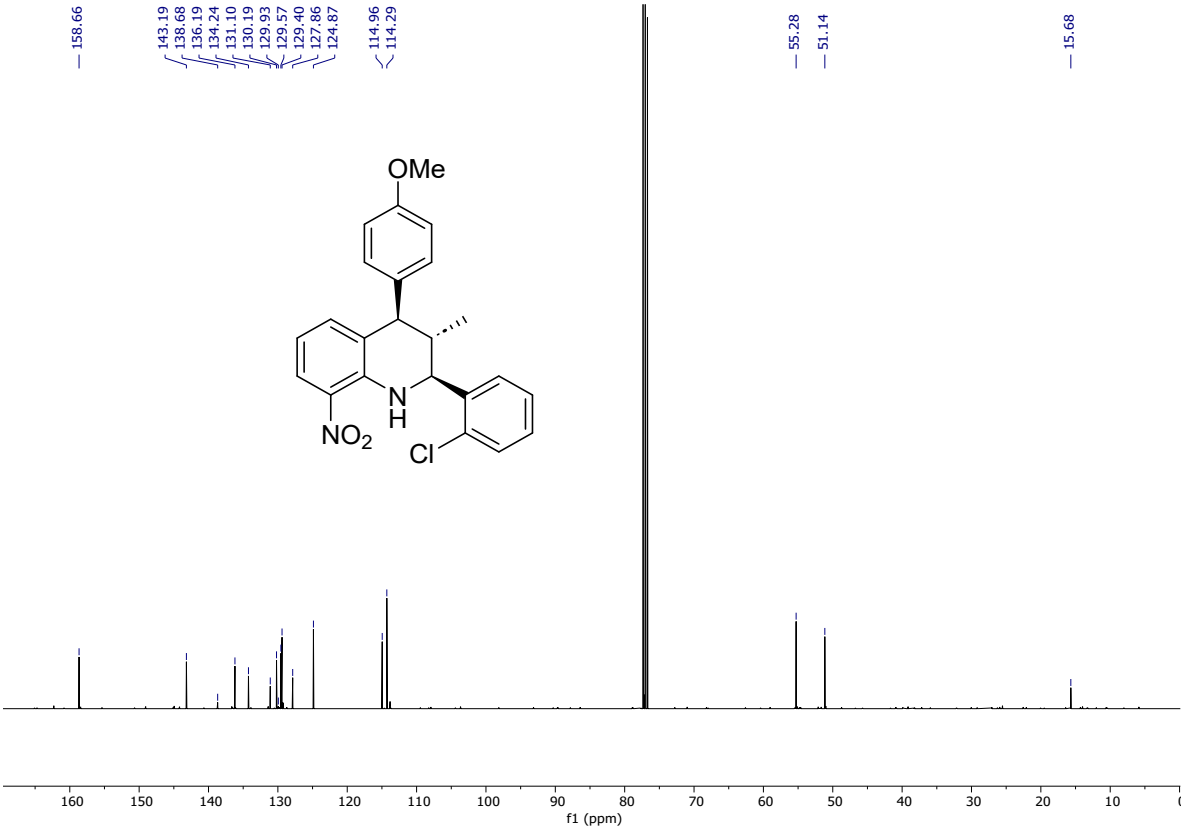


Figure 7. IR spectra , ^{1}H NMR spectra, ^{13}C spectra and HRMS spectra of ***Cis*-2-(2-chlorophenyl)-4-(4-methoxyphenyl)-3-methyl-8-nitro-1,2,3,4-tetrahydroquinoline (4g).**




8.38
8.02
8.00
7.57
7.55
7.44
7.43
7.42
7.41
7.36
7.36
7.34
7.32
7.32
7.30
7.30
7.28
7.28
7.26
7.11
7.09
6.91
6.89
6.78
6.76
6.48
6.46
6.45
6.44
5.04
5.02
3.83
3.80
2.31
2.26
2.22
0.67
0.65
OMe
N
H
NO2
Cl
1.00
1.00
1.01
1.00
1.00
2.00
2.00
1.00
1.01
1.00
3.01
1.01
1.00
3.00
f1 (ppm)


158.66
143.19
138.68
136.19
134.24
131.10
130.19
129.93
129.57
129.40
127.86
124.87
114.96
114.29
55.28
51.14
15.68
OMe
N
H
NO2
Cl
f1 (ppm)

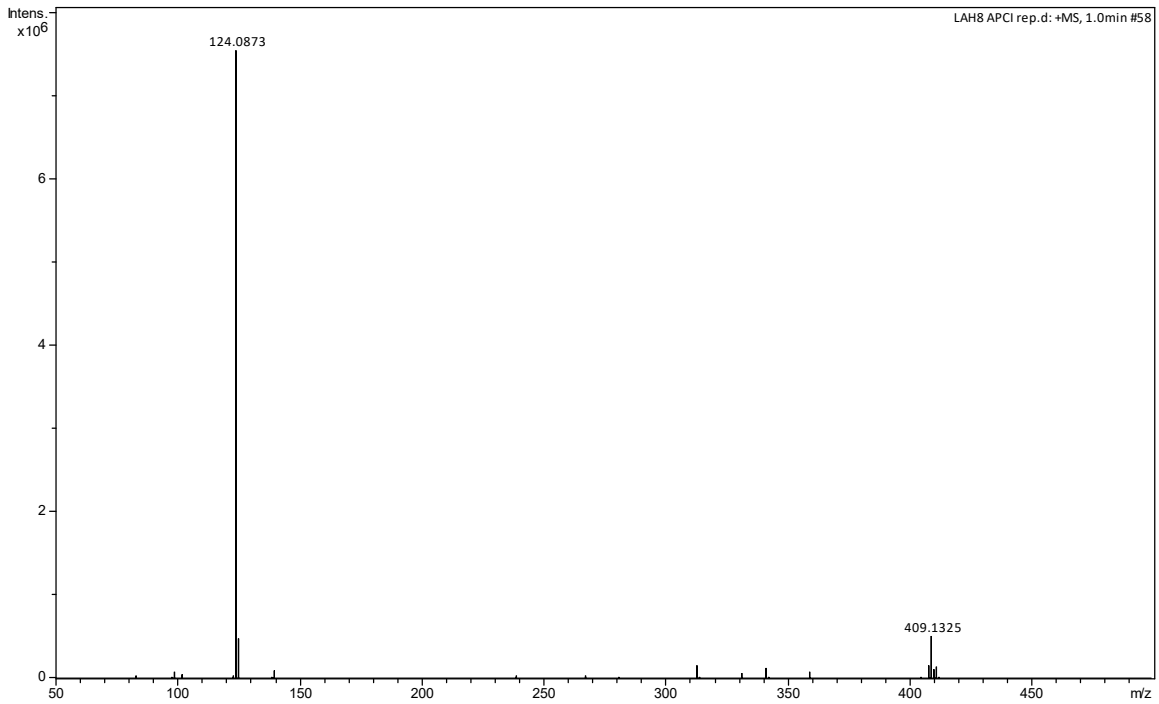
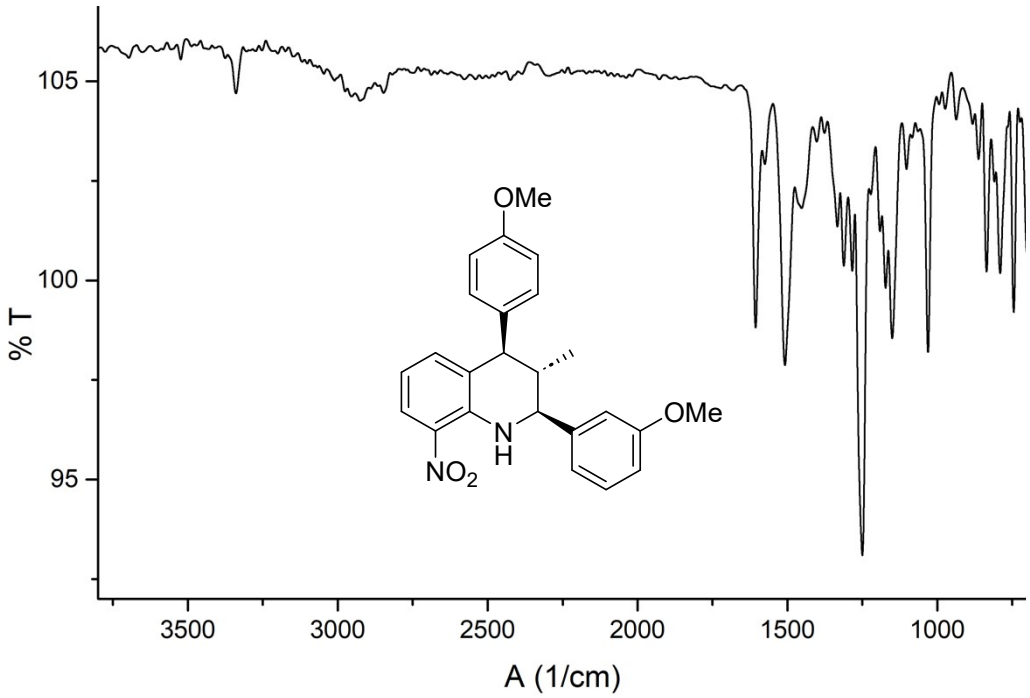
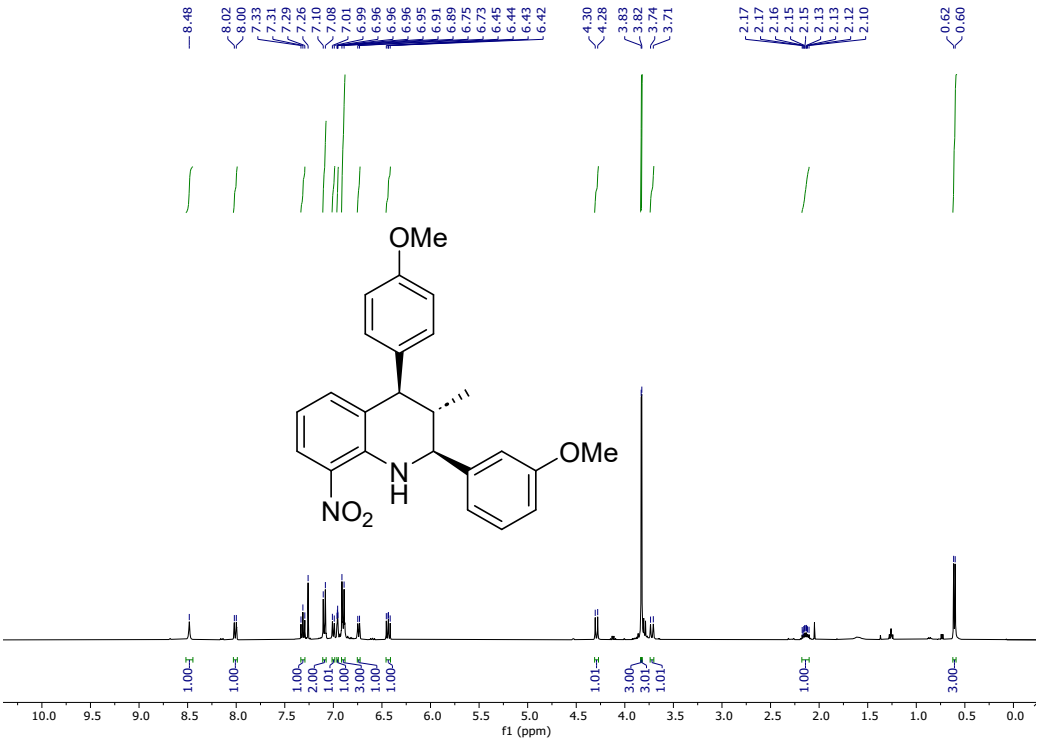
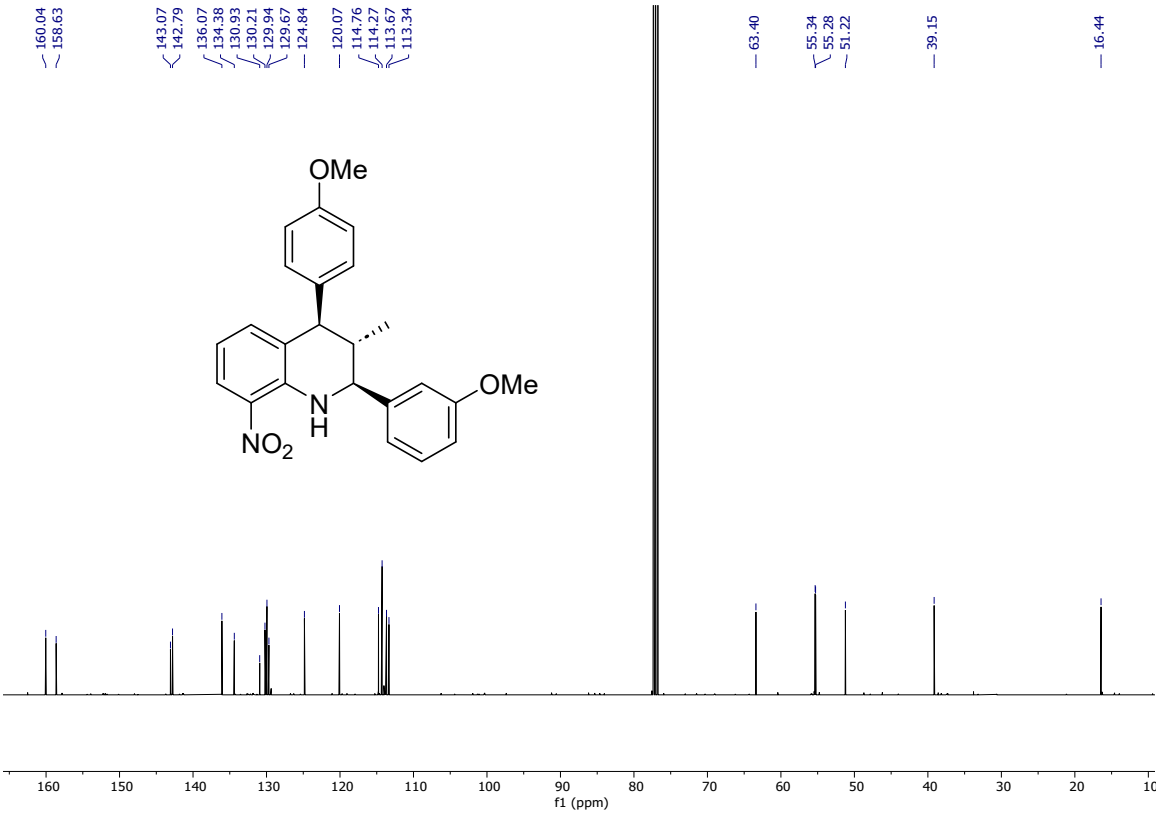


Figure 8. IR, ^{1}H NMR, ^{13}C NMR and HRMS spectra of ***Cis*-2-(3-methoxyphenyl)-4-(4-methoxyphenyl)-3-methyl-8-nitro-1,2,3,4-tetrahydroquinoline (4h).**




8.48
8.02
8.00
7.33
7.31
7.29
7.26
7.10
7.08
7.01
6.99
6.96
6.96
6.96
6.95
6.91
6.89
6.75
6.73
6.45
6.44
6.43
6.42
4.30
4.28
3.83
3.82
3.74
3.71
2.17
2.17
2.16
2.15
2.15
2.13
2.13
2.12
2.10
0.62
0.60
OMe
OMe
N
H
NO2
1.00
1.00
1.00
2.00
1.01
1.00
3.00
1.00
1.00
1.01
3.00
3.01
1.01
1.00
3.00
f1 (ppm)


160.04
158.63
143.07
142.79
136.07
134.38
130.93
130.21
129.94
129.67
124.84
120.07
114.76
114.27
113.67
113.34
63.40
55.34
55.28
51.22
39.15
16.44
OMe
OMe
N
H
NO2
f1 (ppm)

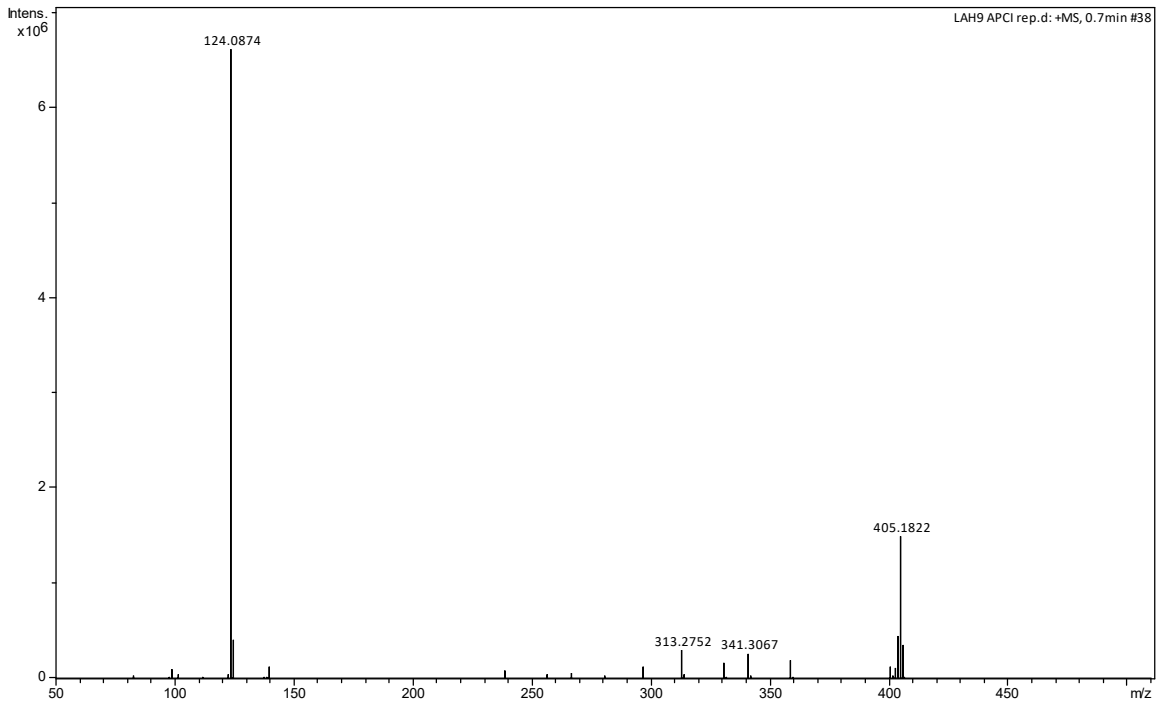
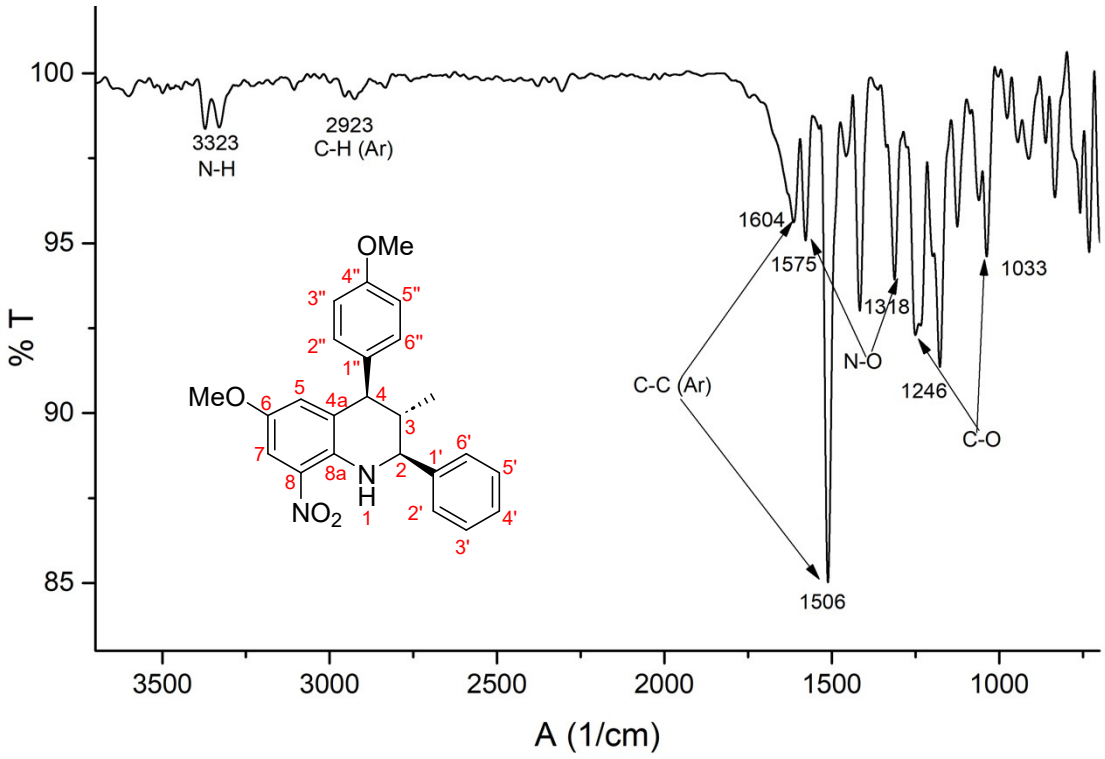
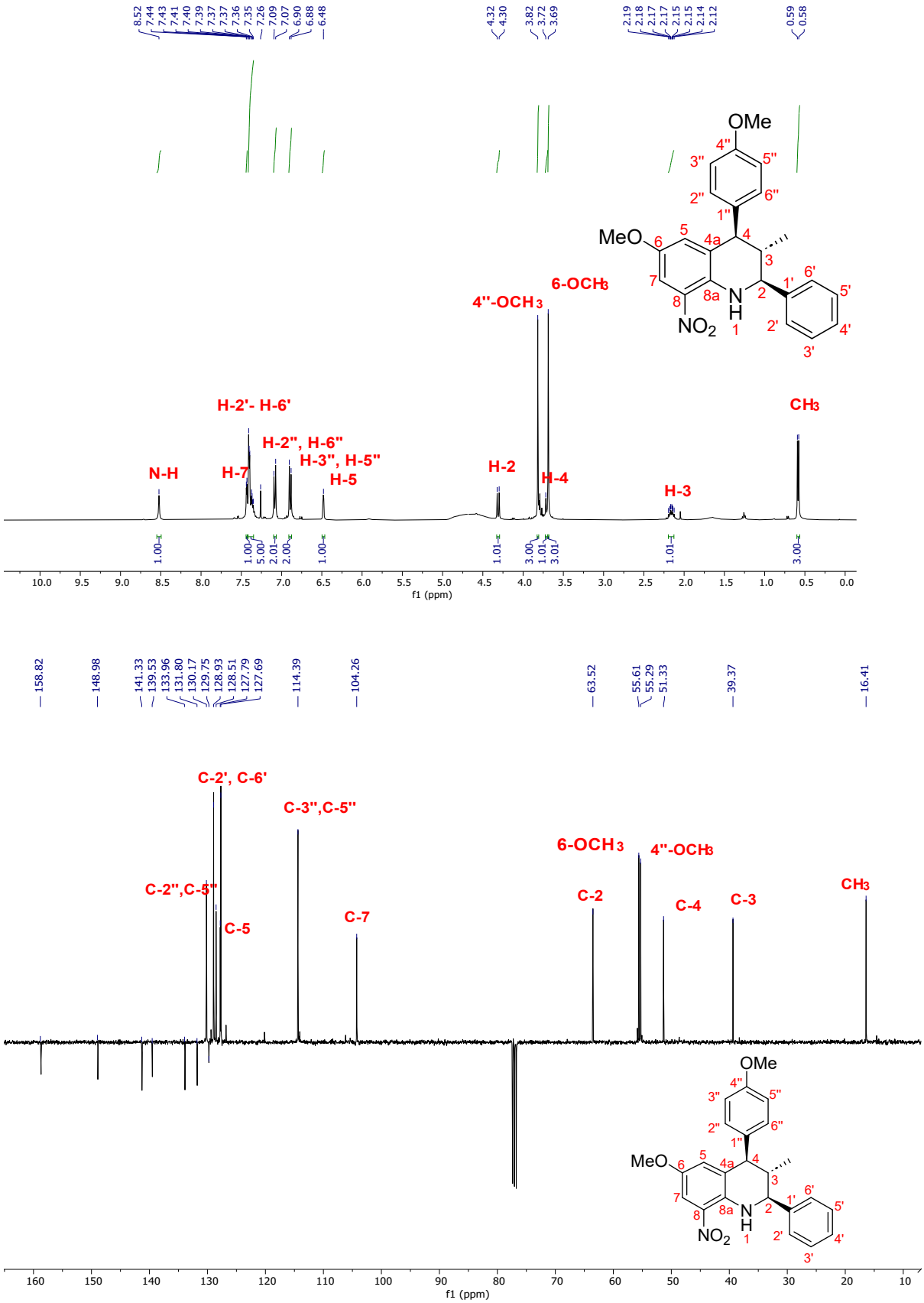
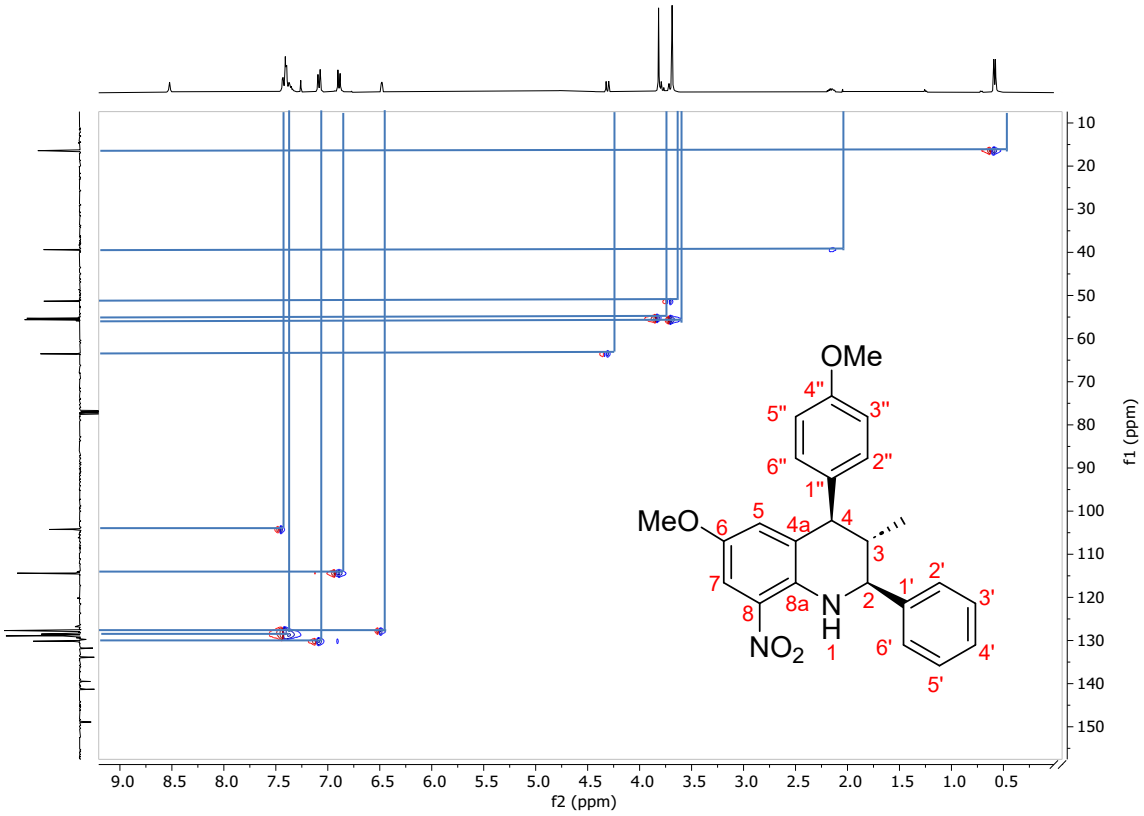


Figure 9. IR, ^{1}H NMR, APT, HSQC and HRMS spectra of ***Cis*-4-(4-methoxyphenyl)-3-methyl-6-methoxy-2-phenyl-8-nitro-1,2,3,4-tetrahydroquinoline (4i).**




8.52
7.44
7.43
7.41
7.40
7.39
7.37
7.37
7.36
7.35
7.26
7.09
7.07
6.90
6.88
6.48
4.32
4.30
3.82
3.72
3.69
2.19
2.18
2.17
2.17
2.15
2.15
2.14
2.12
0.59
0.58
OMe
4''
3''
5''
2''
6''
1''
MeO
6
5
4a
4
3
7
6'
1'
5'
8
8a
N
H
2
1
2'
4'
NO2
3'
6-OCH3
4''-OCH3
H-2'- H-6'
H-2", H-6"
H-3", H-5"
N-H
H-7
H-5
H-2
H-4
H-3
CH3
1.00
1.00
5.00
2.01
2.00
1.00
1.01
3.00
1.01
3.01
1.01
3.00
10.0
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
f1 (ppm)
158.82
148.98
141.33
139.53
133.96
131.80
130.17
129.75
128.93
128.51
127.79
127.69
114.39
104.26
63.52
55.61
55.29
51.33
39.37
16.41
C-2', C-6'
C-3'',C-5''
C-2'',C-5''
C-5
C-7
6-OCH3
4''-OCH3
C-2
C-4
C-3
CH3
OMe
4''
3''
5''
2''
6''
1''
MeO
6
5
4a
4
3
7
6'
1'
5'
8
8a
N
H
2
1
2'
4'
NO2
3'
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
f1 (ppm)


f2 (ppm)
f1 (ppm)
OMe
MeO
NO2
N
H

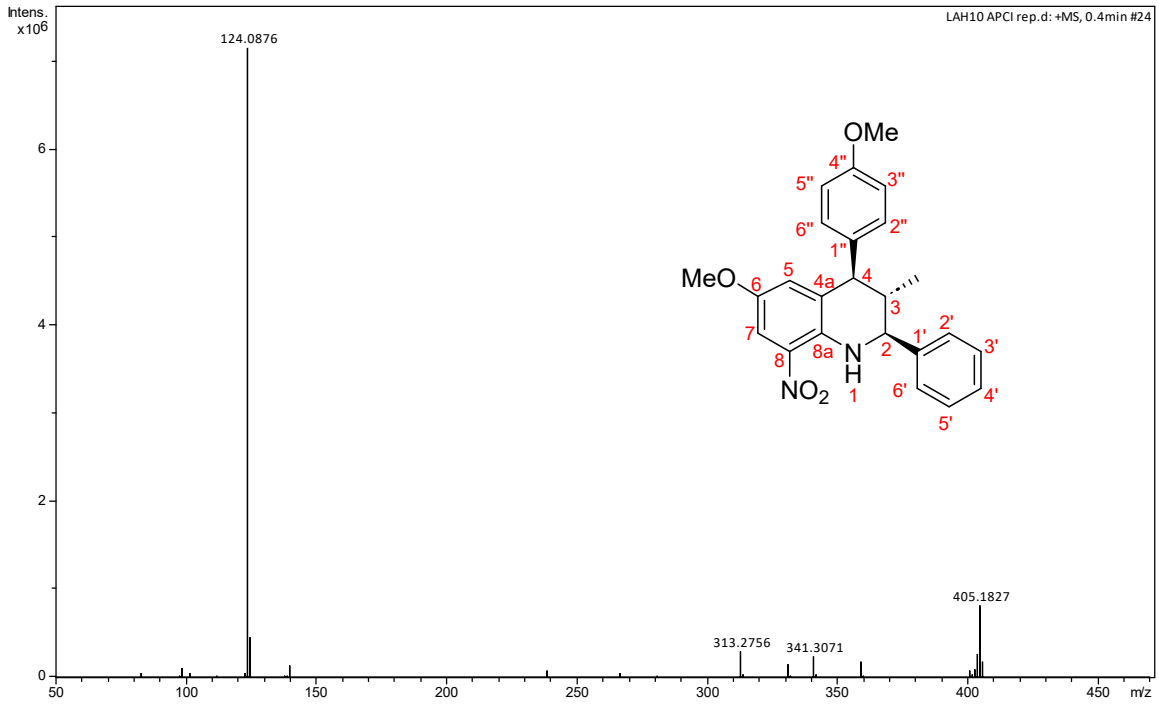
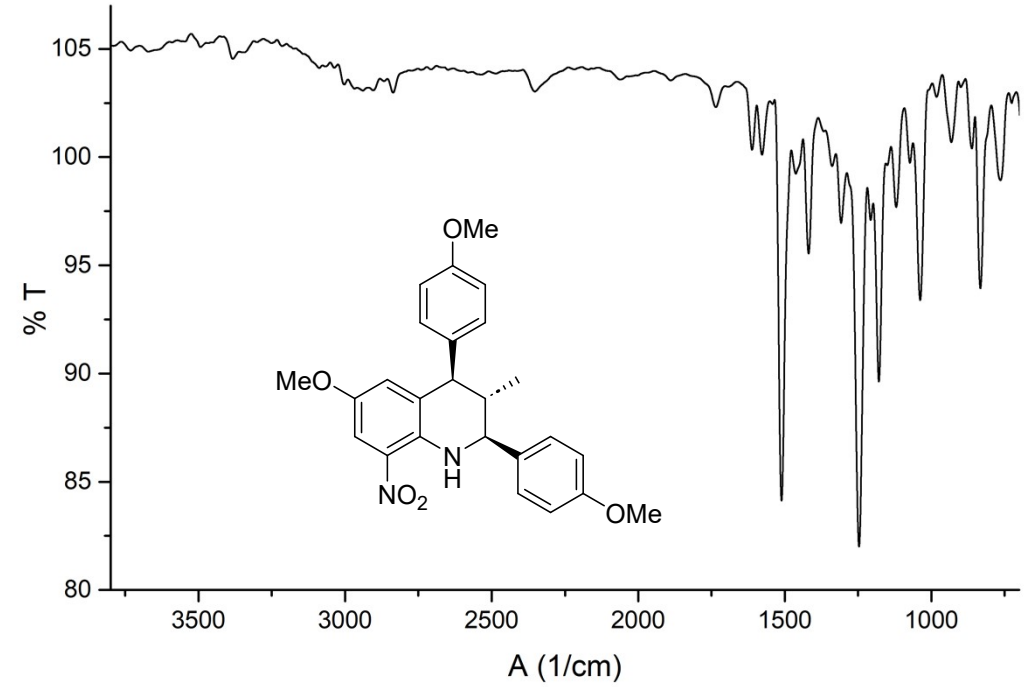
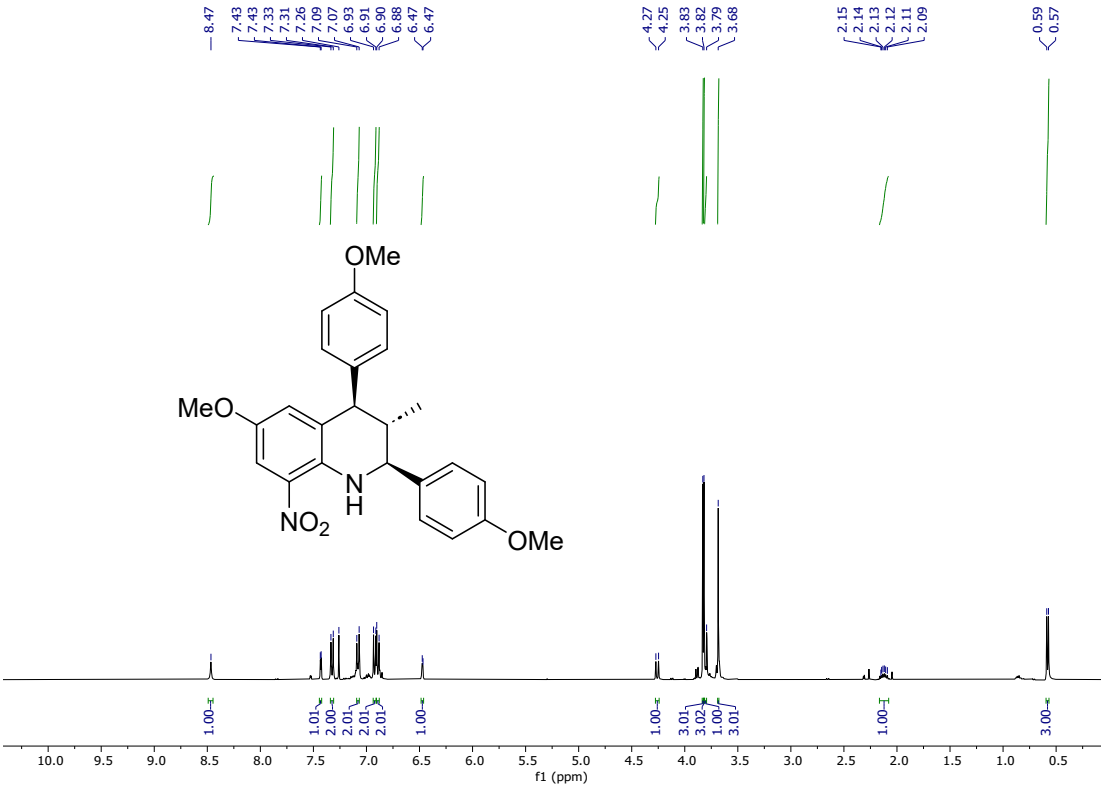
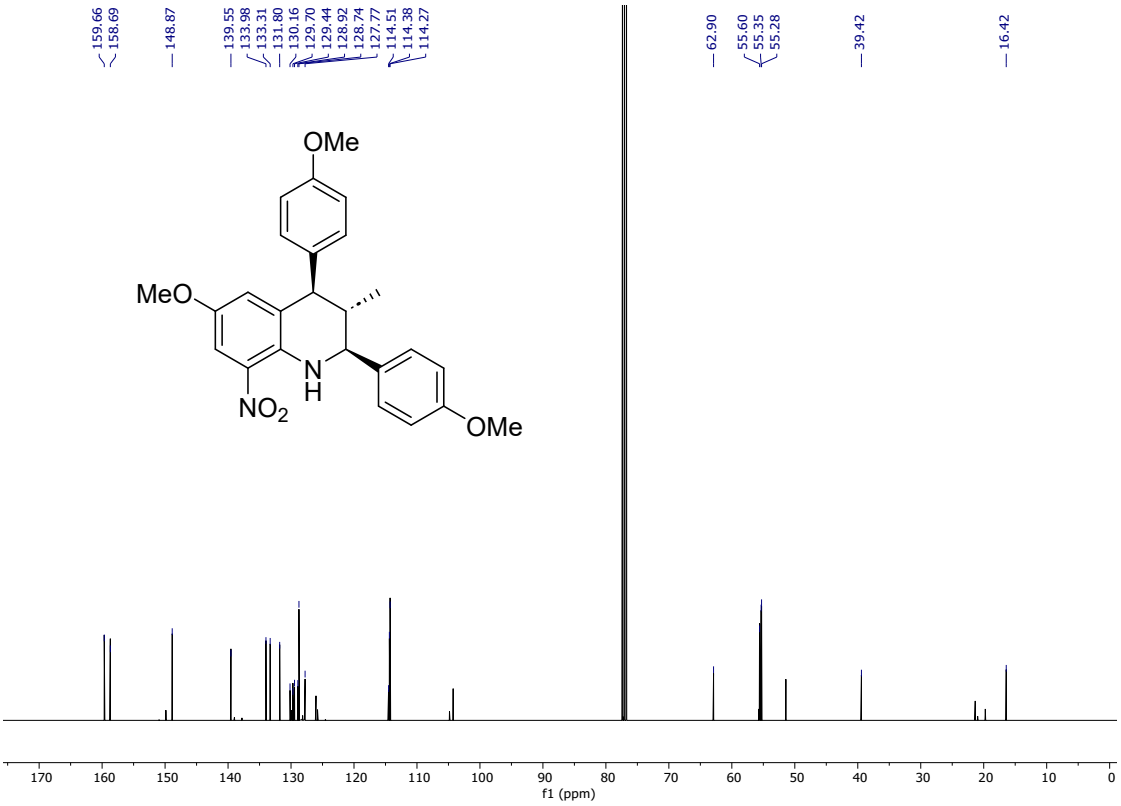

Intens.
x10^6
LAH10 APCI rep.d: +MS, 0.4min #24
124.0876
313.2756
341.3071
405.1827
m/z
OMe
MeO
NO2
N
H

Figure 10. IR, ^{1}H NMR, ^{13}C NMR and HRMS spectra of ***Cis*-6-methoxy-2,4-bis(4-methoxyphenyl)-3-methyl-8-nitro-1,2,3,4-tetrahydroquinoline (4j).**






159.66
158.69
148.87
139.55
133.98
133.31
131.80
130.16
129.70
129.44
128.92
128.74
127.77
114.51
114.38
114.27
62.90
55.60
55.35
55.28
39.42
16.42
OMe
MeO
N
H
NO2
OMe
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
f1 (ppm)

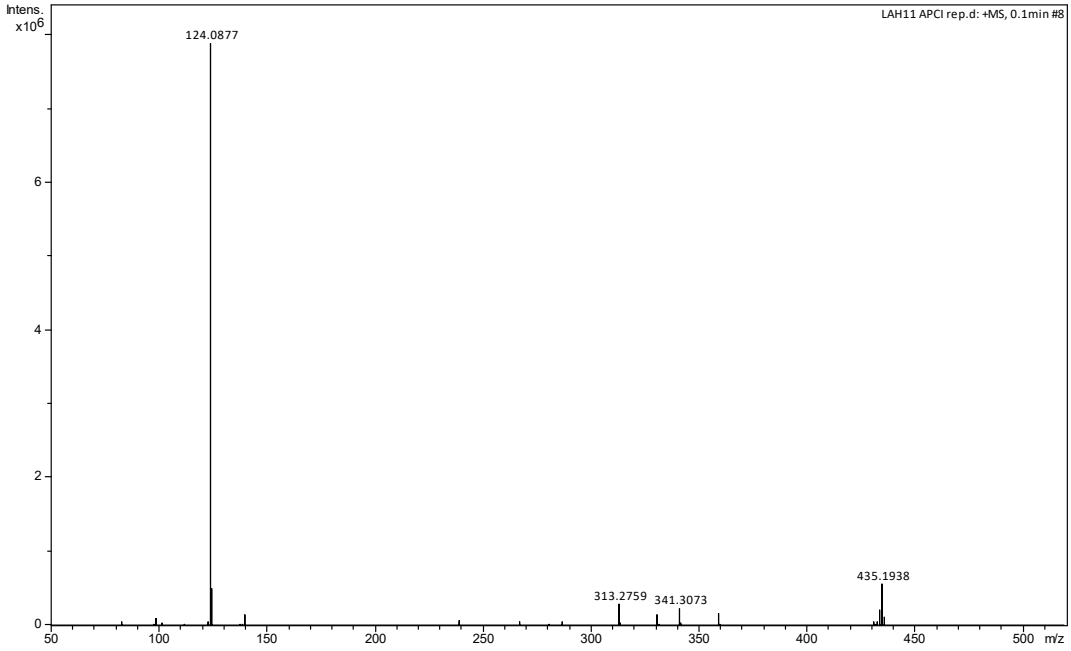
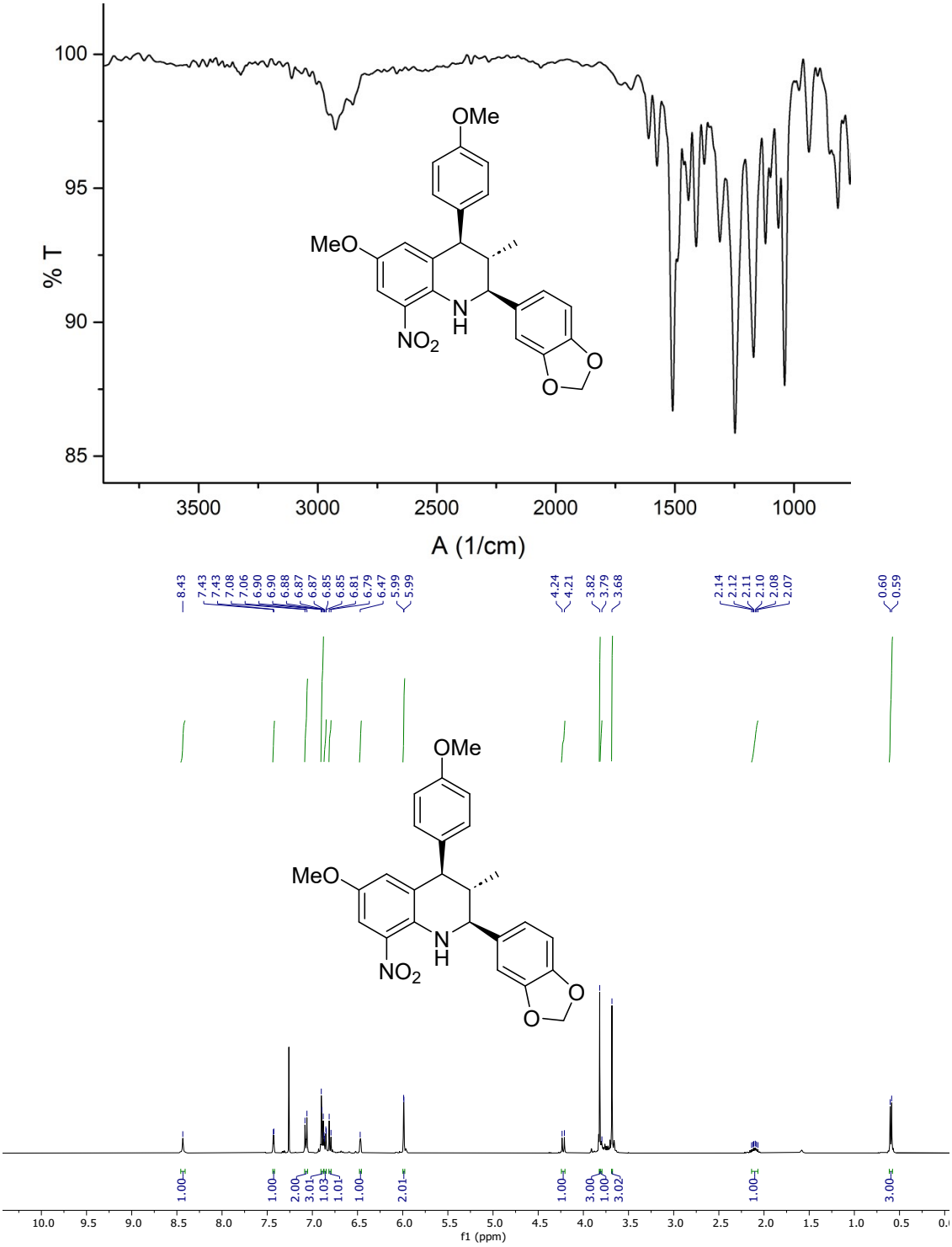
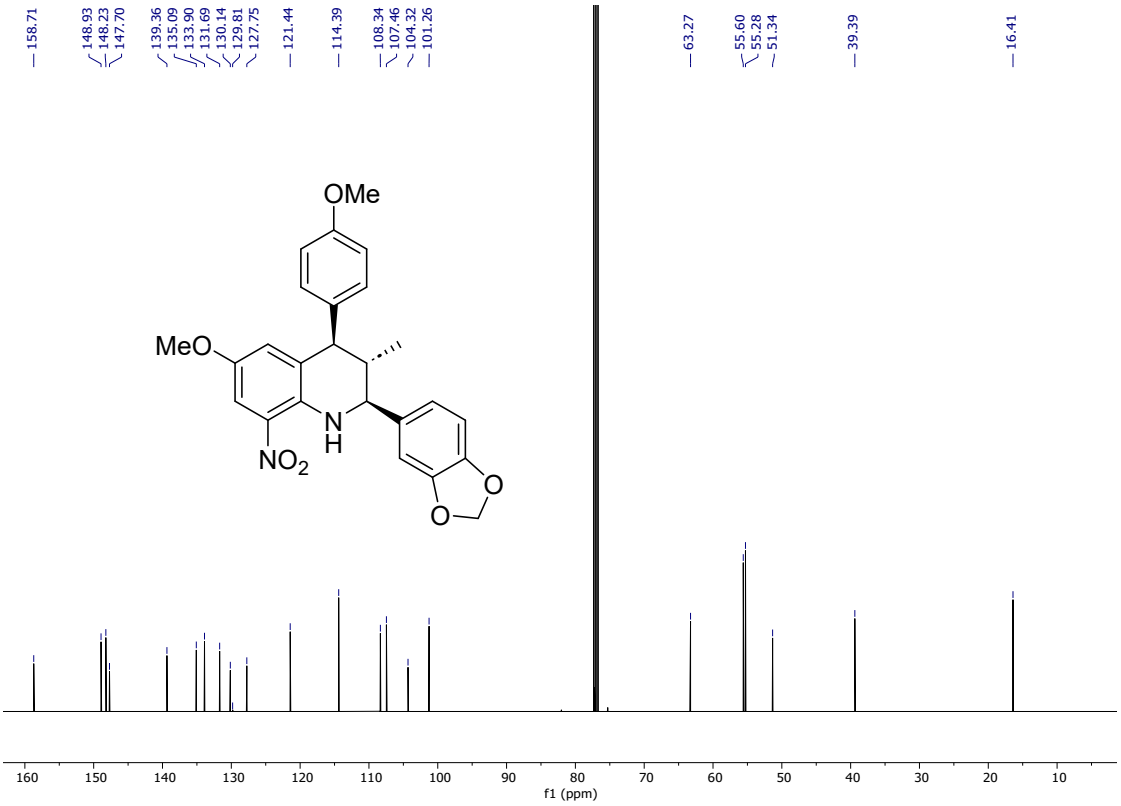

Intens.
x10^6
LAH11 APCI rep.d: +MS, 0.1min #8
124.0877
313.2759
341.3073
435.1938
6
4
2
0
50
100
150
200
250
300
350
400
450
500
m/z

Figure 11. IR, ^{1}H NMR, ^{13}C NMR and HRMS spectra of ***Cis*-2-(benzo[*d*][1,3]dioxol-5-yl)-6-methoxy-4-(4-methoxyphenyl)-3-methyl-8-nitro-1,2,3,4-tetrahydroquinoline (4k).**




158.71
148.93
148.23
147.70
139.36
135.09
133.90
131.69
130.14
129.81
127.75
121.44
114.39
108.34
107.46
104.32
101.26
63.27
55.60
55.28
51.34
39.39
16.41
OMe
MeO
N
H
NO2
O
O
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
f1 (ppm)

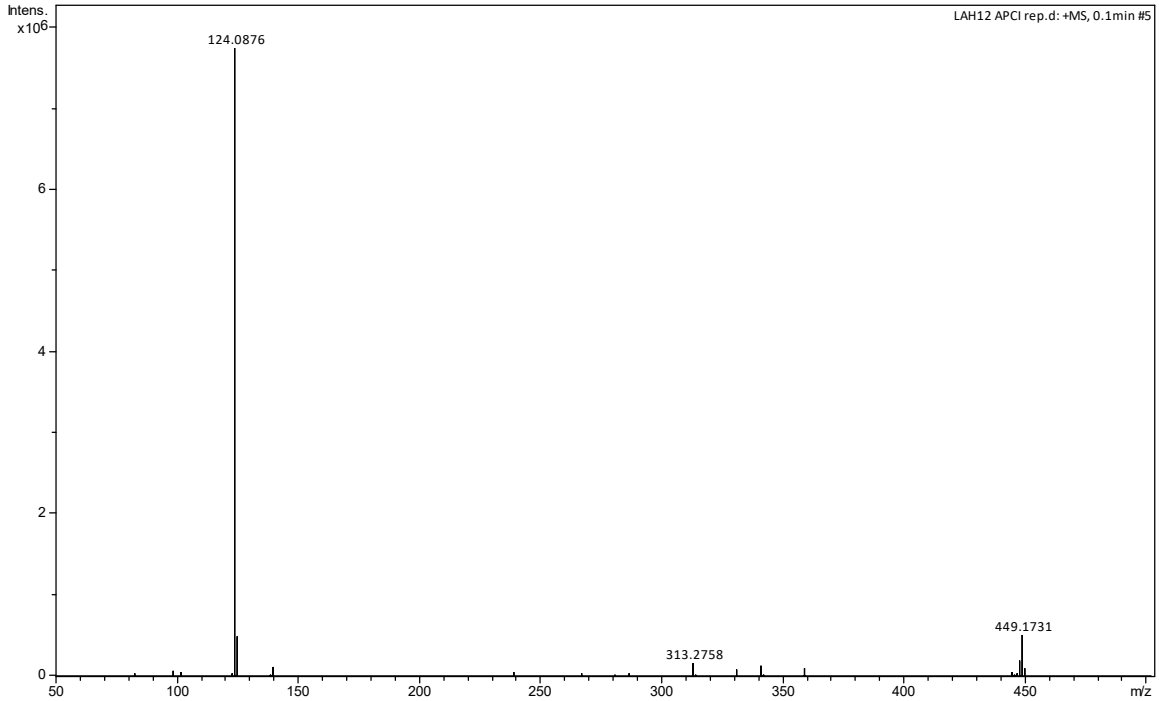
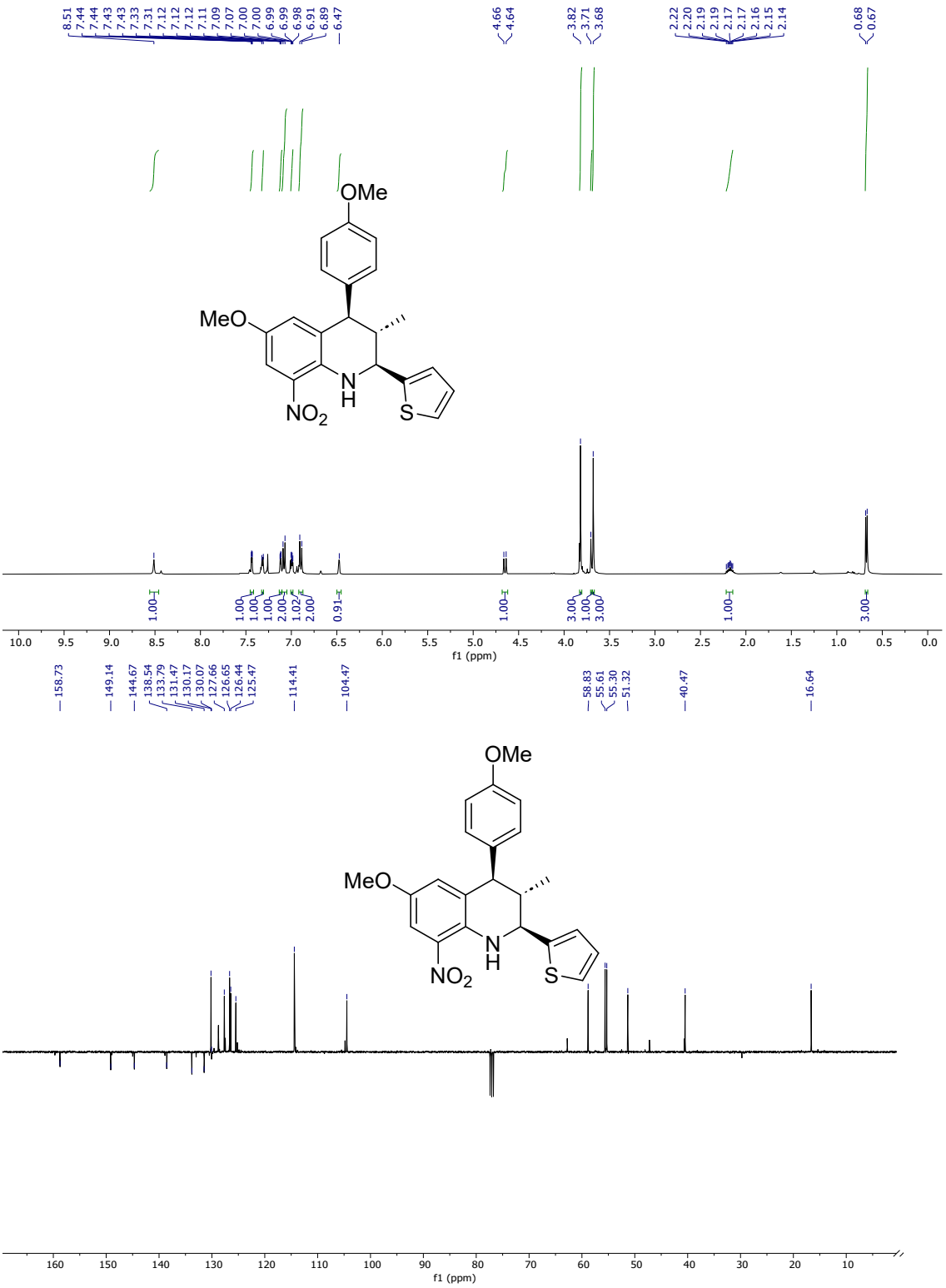

Intens.
x10^6
LAH12 APCI rep.d: +MS, 0.1min #5
124.0876
313.2758
449.1731
6
4
2
0
50
100
150
200
250
300
350
400
450
m/z

Figure 12. ^{1}H NMR, APT and HRMS spectra of ***Cis*-4-(4-methoxyphenyl)-3-methyl-6-methoxy-8-nitro-2-(thiophen-2-yl)-1,2,3,4-tetrahydroquinoline (4l).**



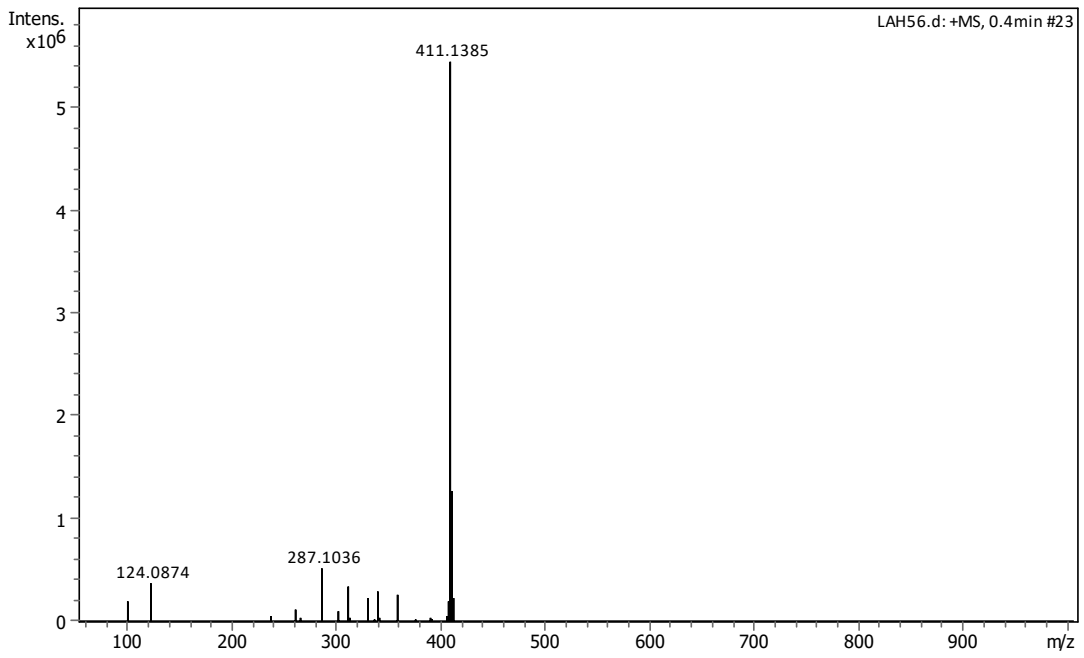
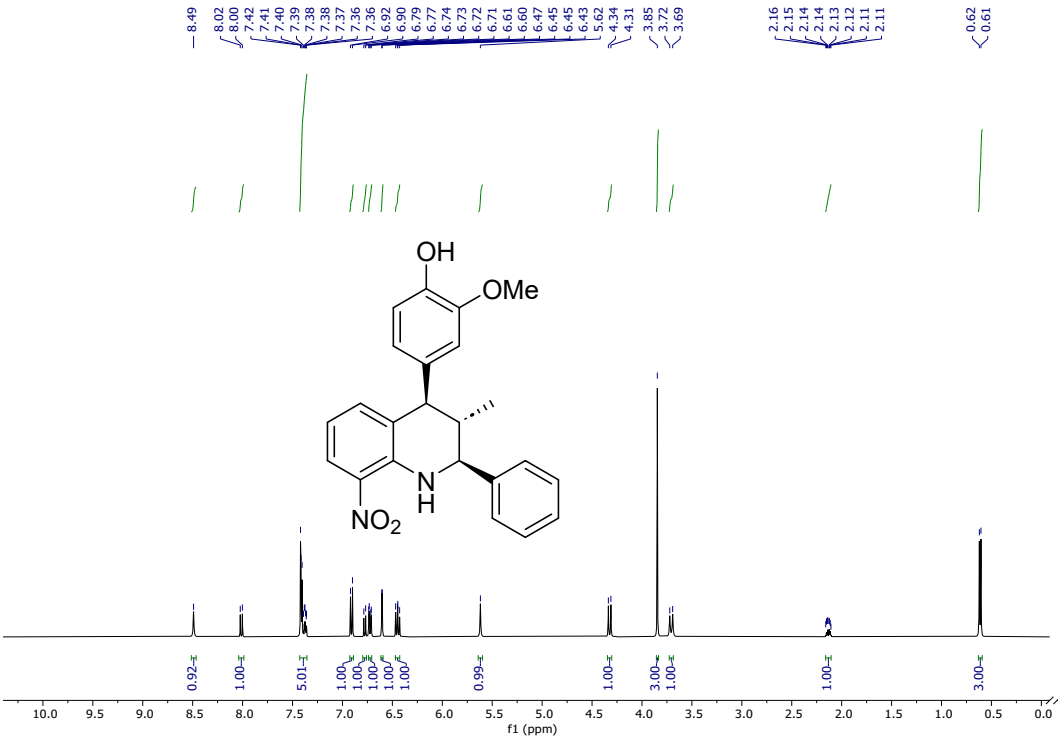
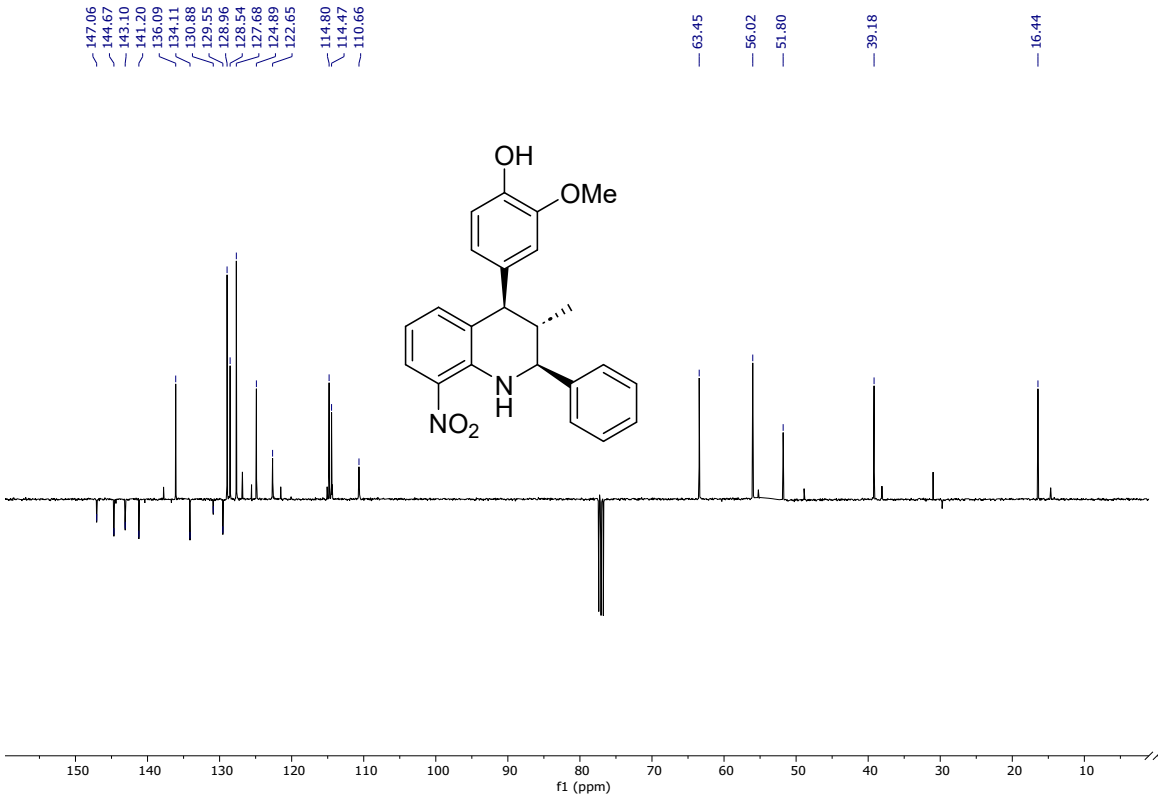


Figure 13. ^{1}H NMR, APT and HRMS spectra of ***Cis*-4-(4-hydroxy-3-methoxyphenyl)-3-methyl-2-phenyl-8-nitro-1,2,3,4-tetrahydroquinoline (4m).**




147.06
144.67
143.10
141.20
136.09
134.11
130.88
129.55
128.96
128.54
127.68
124.89
122.65
114.80
114.47
110.66
63.45
56.02
51.80
39.18
16.44
OH
OMe
N
H
NO2
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
f1 (ppm)

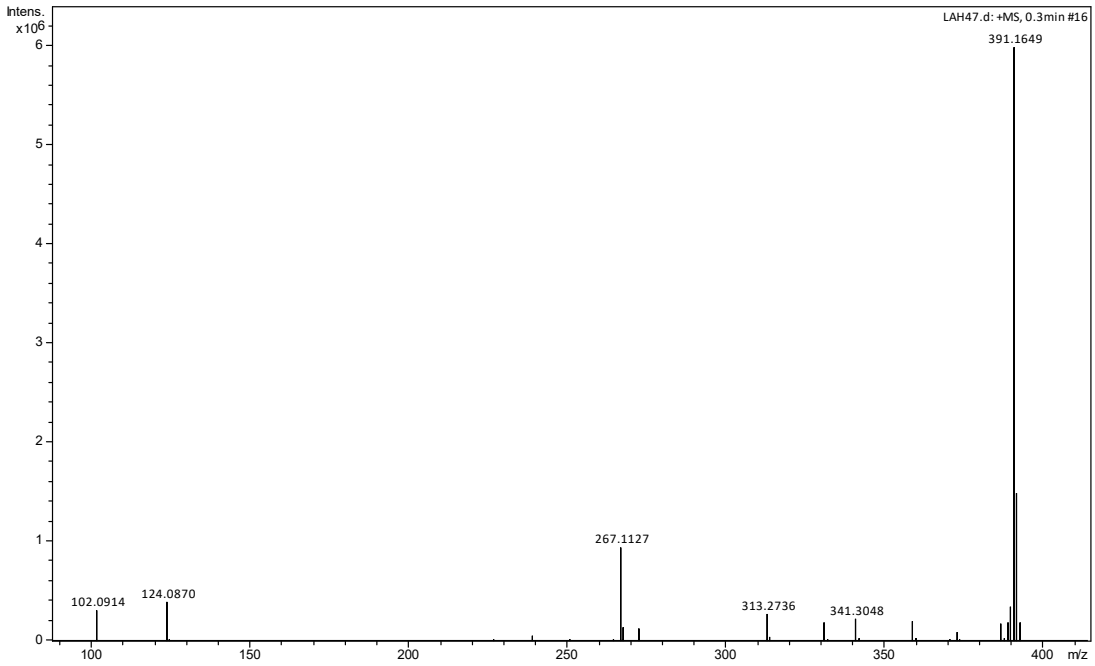
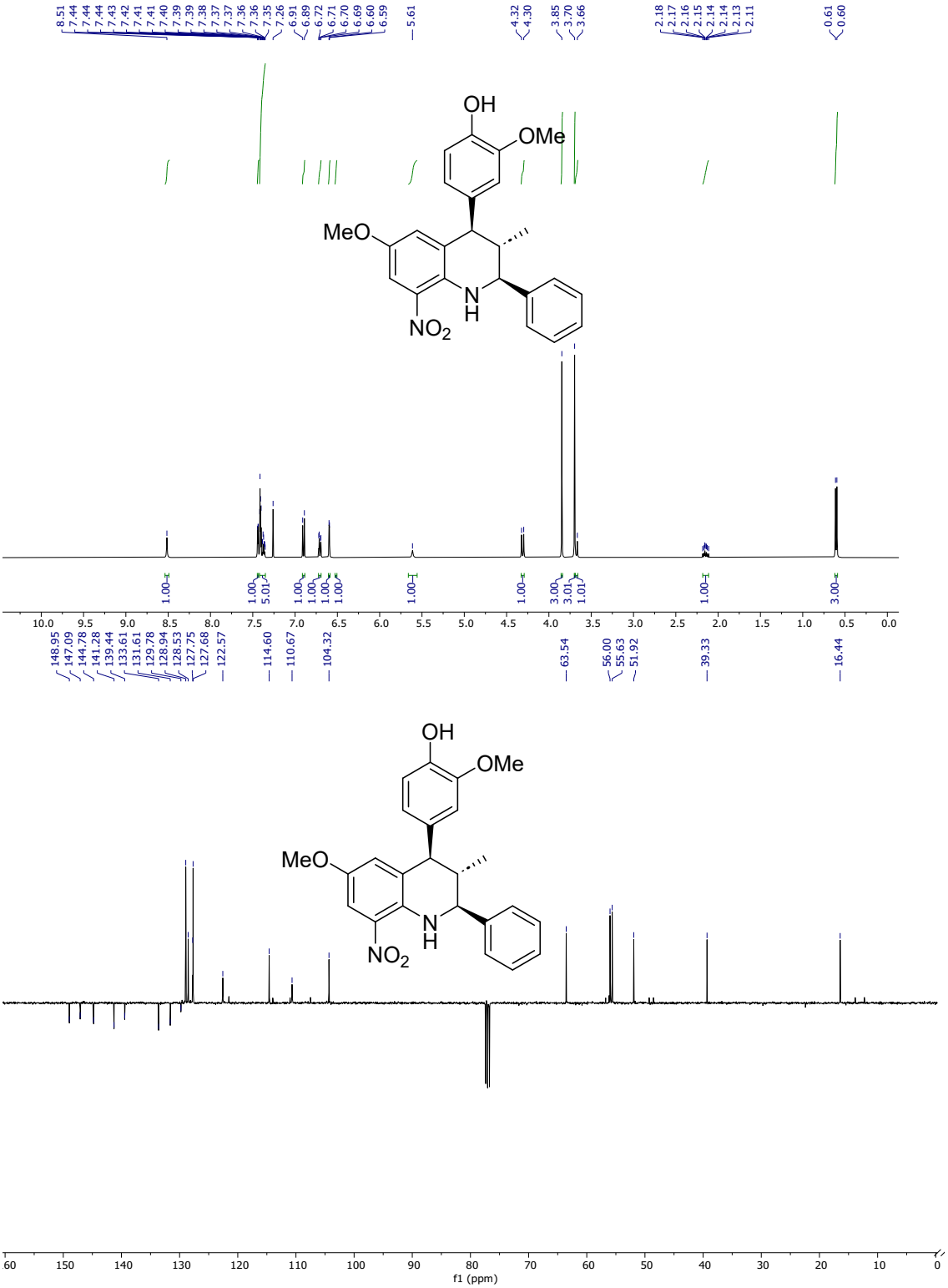

Intens.
x10^6
LAH47.d: +MS, 0.3min #16
391.1649
267.1127
102.0914
124.0870
313.2736
341.3048
m/z

Figure 14. ^{1}H NMR, APT and HRMS spectra of ***Cis*-4-(4-hydroxy-3-methoxyphenyl)-3-methyl-6-methoxy-2-phenyl-8-nitro-1,2,3,4-tetrahydroquinoline (4n).**



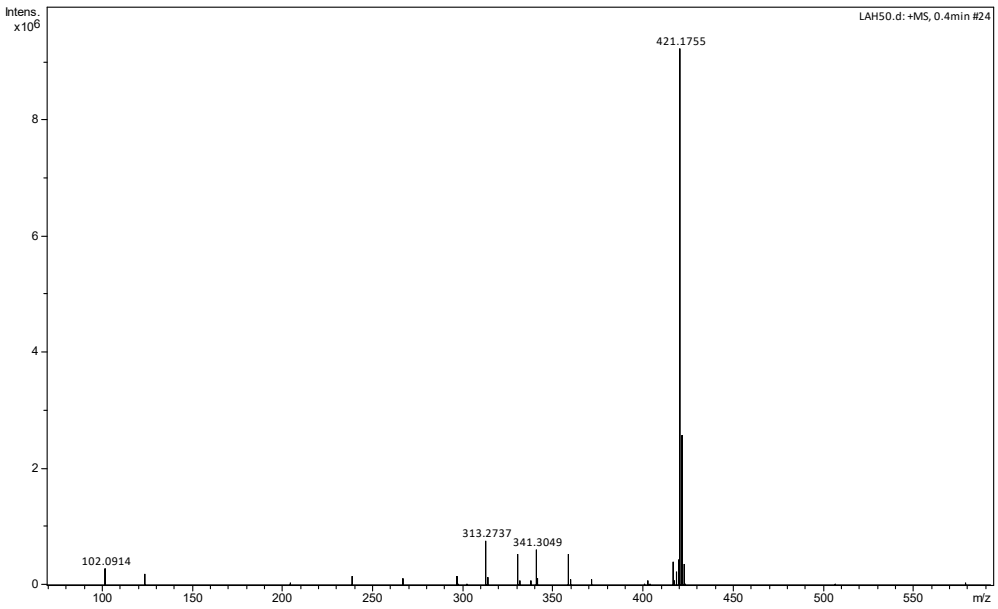
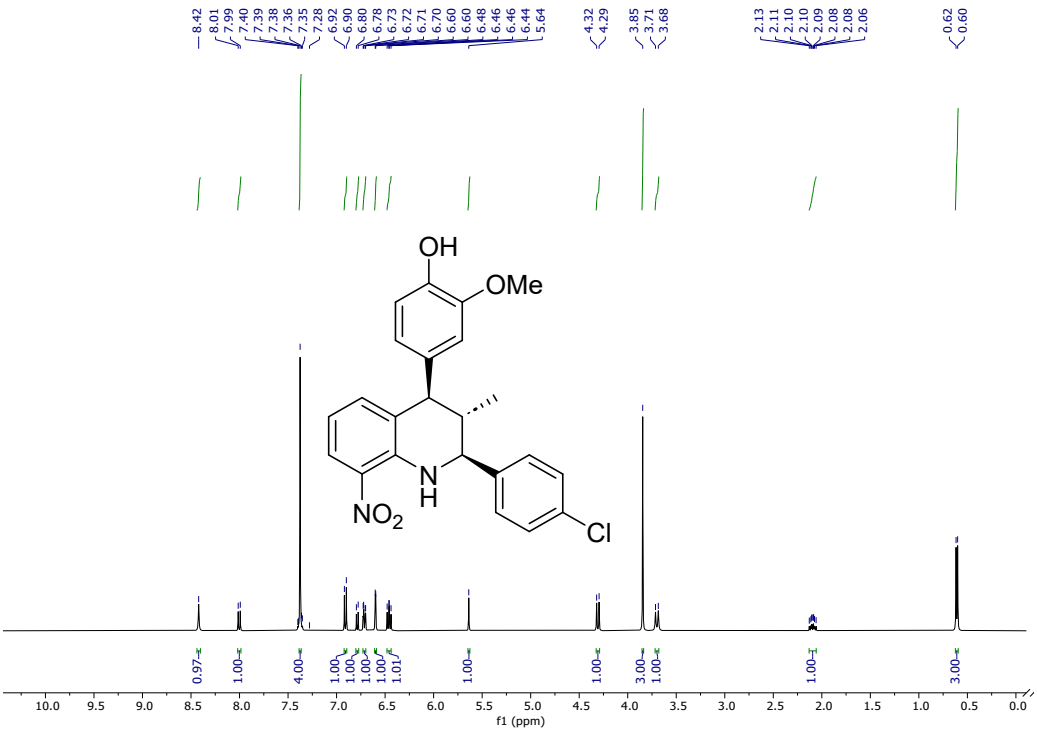
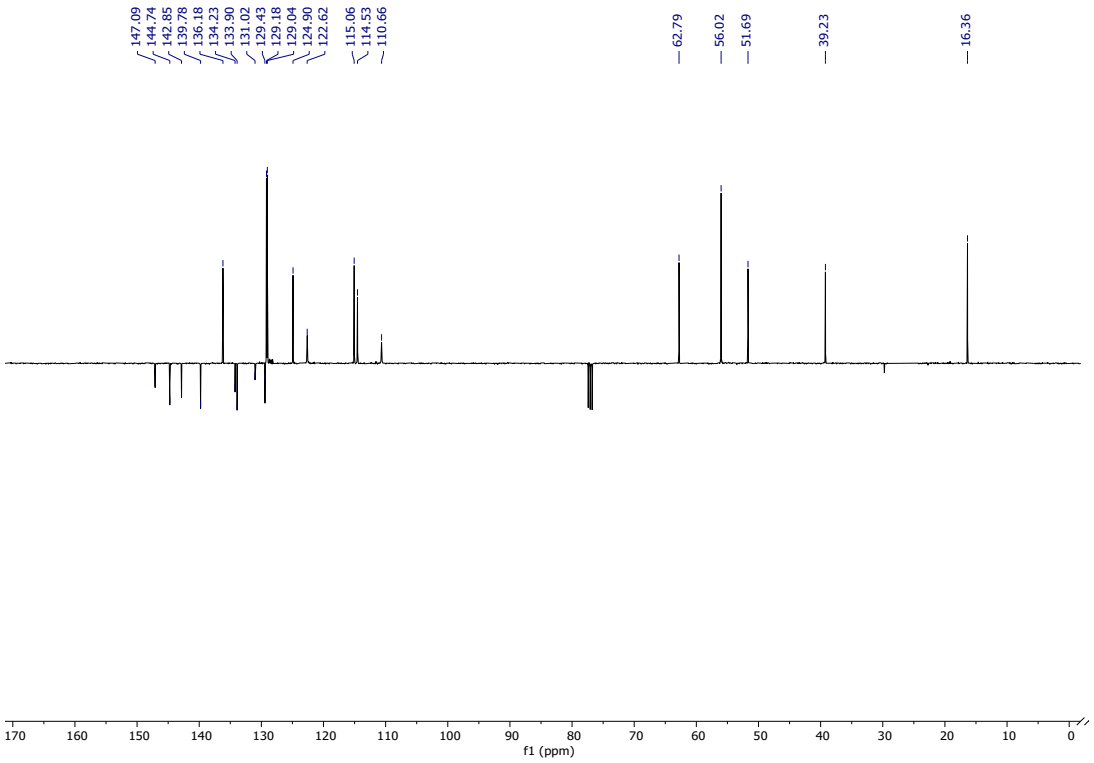


Figure 15. ^{1}H NMR, APT and HRMS spectra of ***Cis*-2-(4-chlorophenyl)-4-(4-hydroxy-3-methoxyphenyl)-3-methyl-8-nitro-1,2,3,4-tetrahydroquinoline (4o).**




147.09
144.74
142.85
139.78
136.18
134.23
133.90
131.02
129.43
129.18
129.04
124.90
122.62
115.06
114.53
110.66
62.79
56.02
51.69
39.23
16.36
170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0
f1 (ppm)

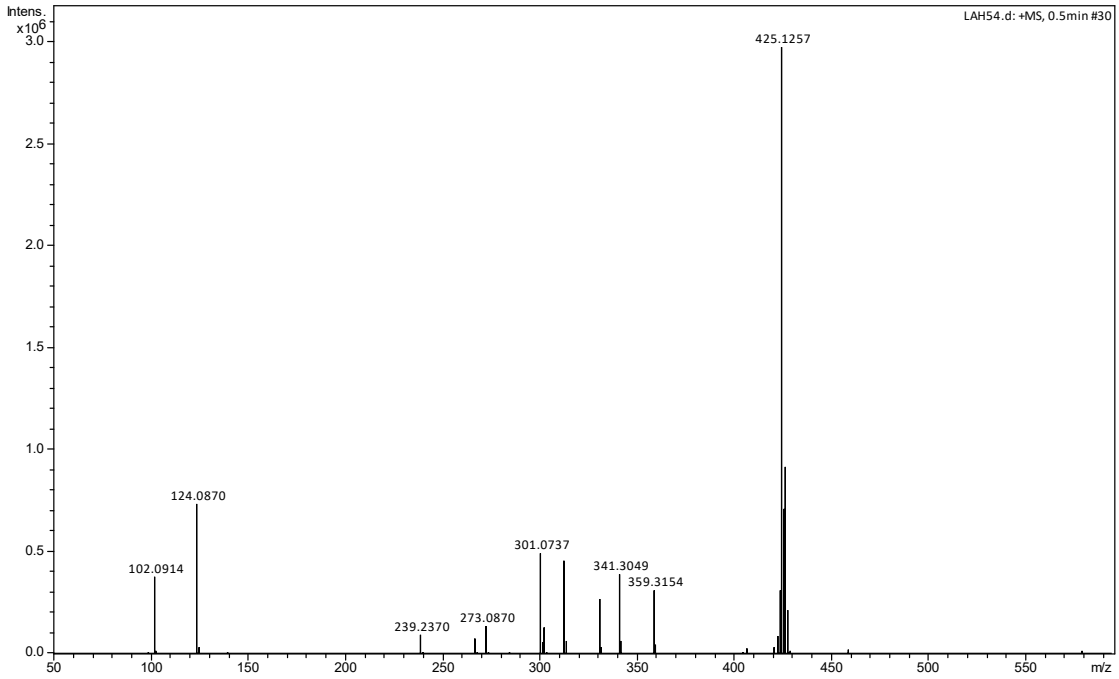
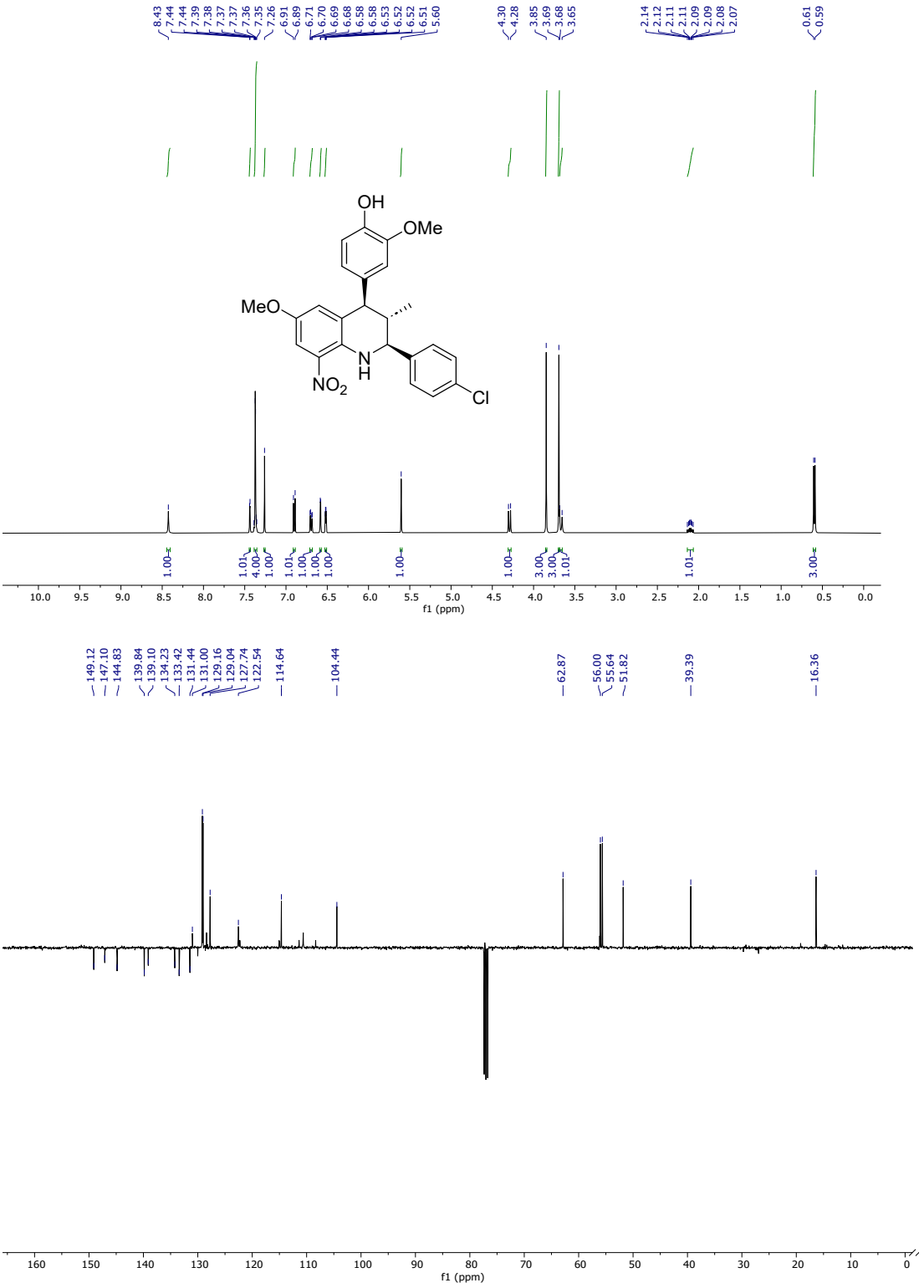
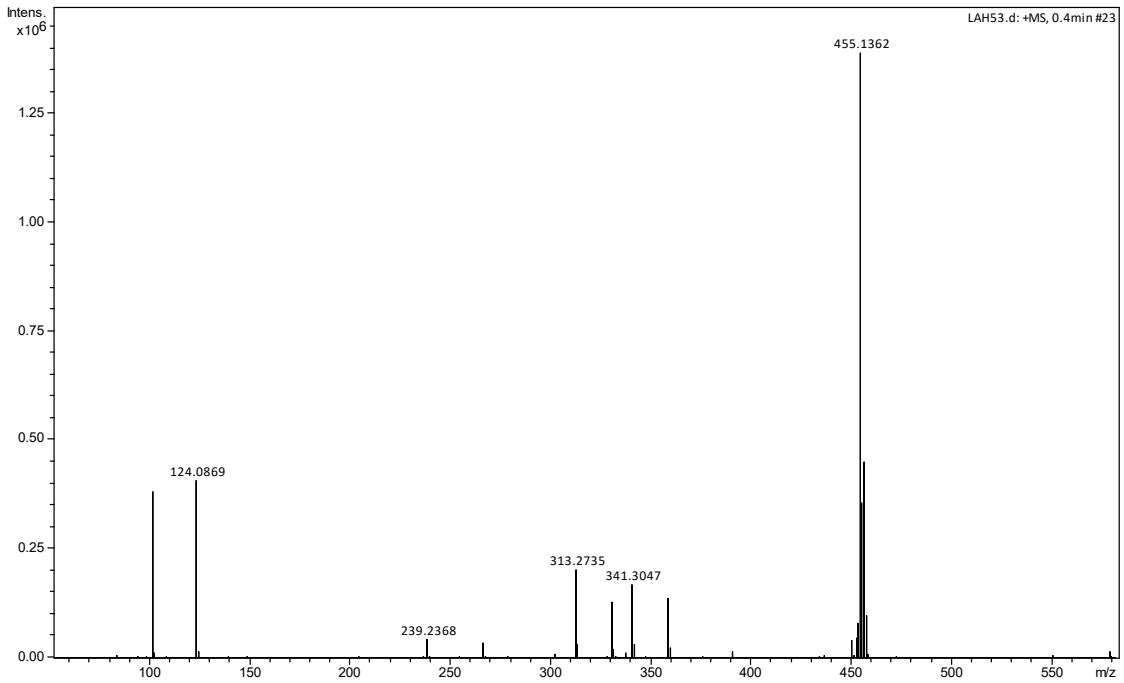

Intens.
x10^6
3.0
2.5
2.0
1.5
1.0
0.5
0.0
LAH54.d: +MS, 0.5min #30
425.1257
124.0870
102.0914
301.0737
341.3049
359.3154
239.2370
273.0870
50 100 150 200 250 300 350 400 450 500 550 m/z

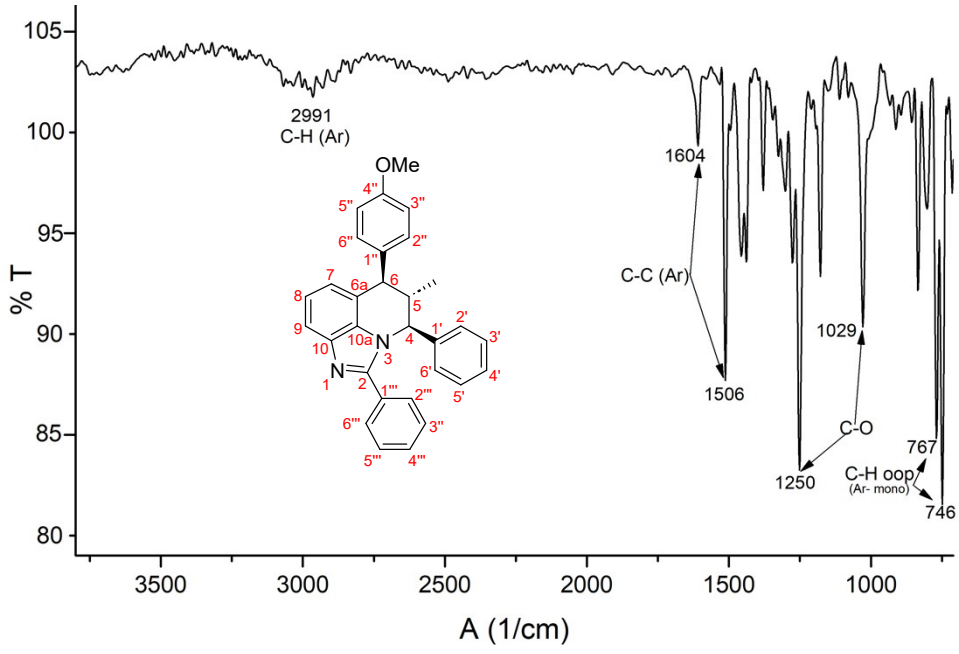
Figure 16. ^{1}H NMR, APT and HRMS spectra of ***Cis*-2-(4-chlorophenyl)-4-(4-hydroxy-3-methoxyphenyl)-3-methyl-6-methoxy-8-nitro-1,2,3,4-tetrahydroquinoline (4p).**

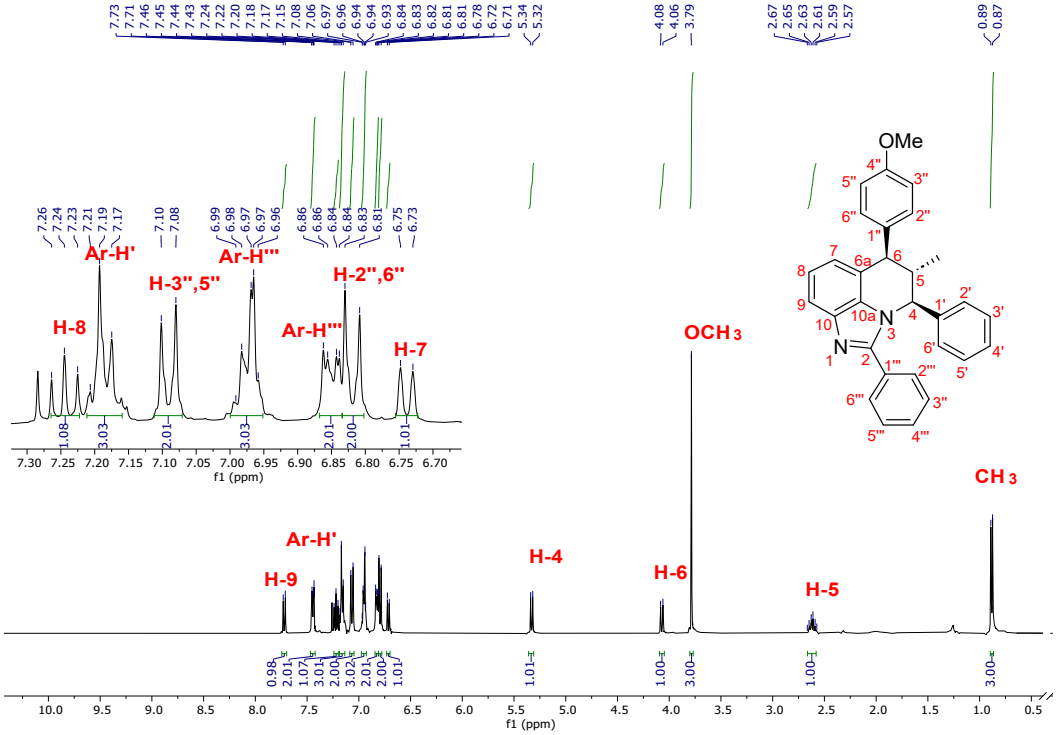


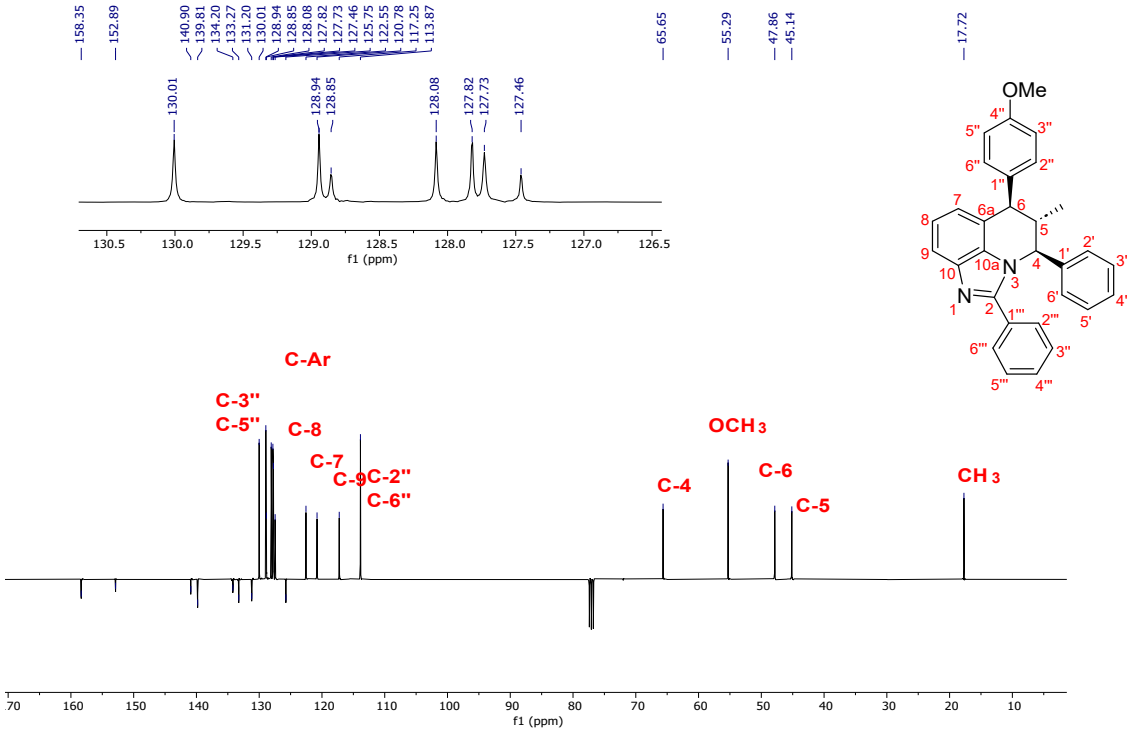


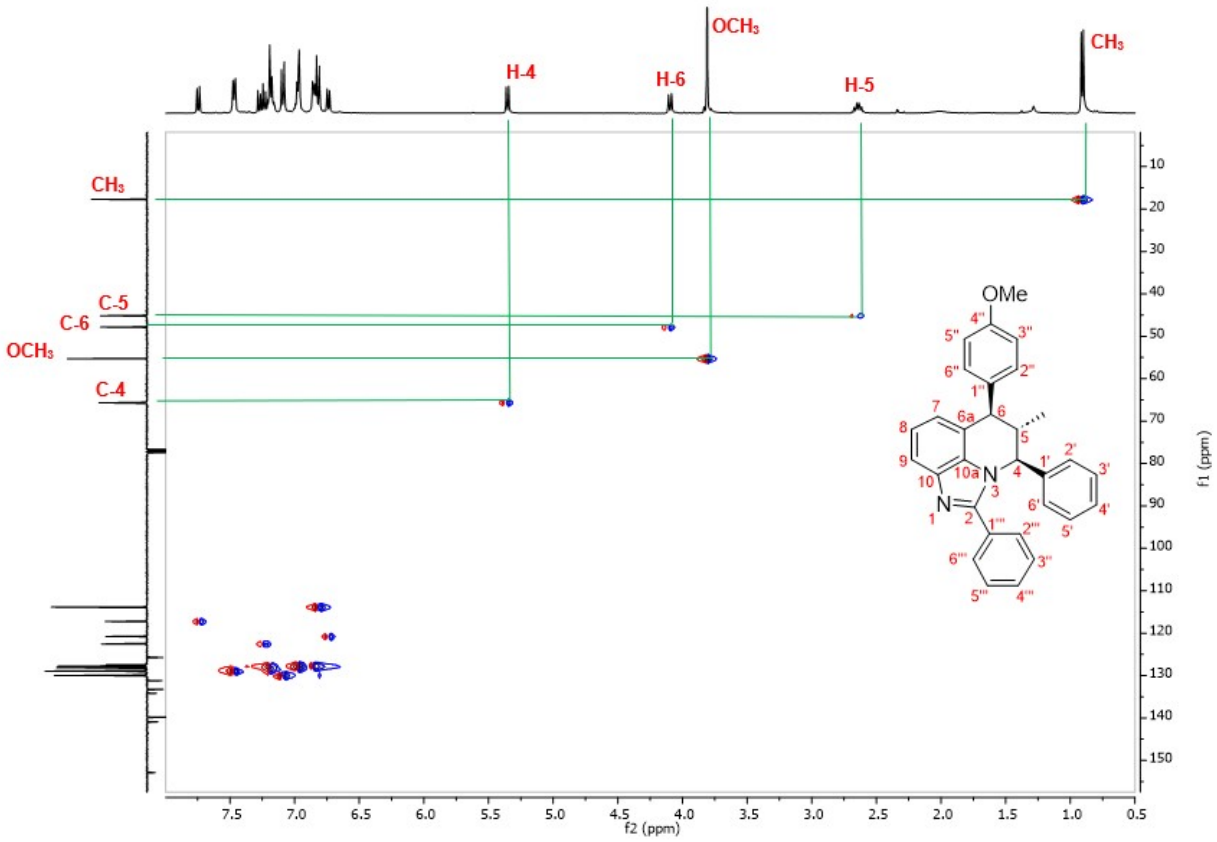
Copies of IR, 1H NMR, ^{13}C NMR , HSQC and HRMS of imidazo[4,5,1-*ij*]quinolines 5a-5ac

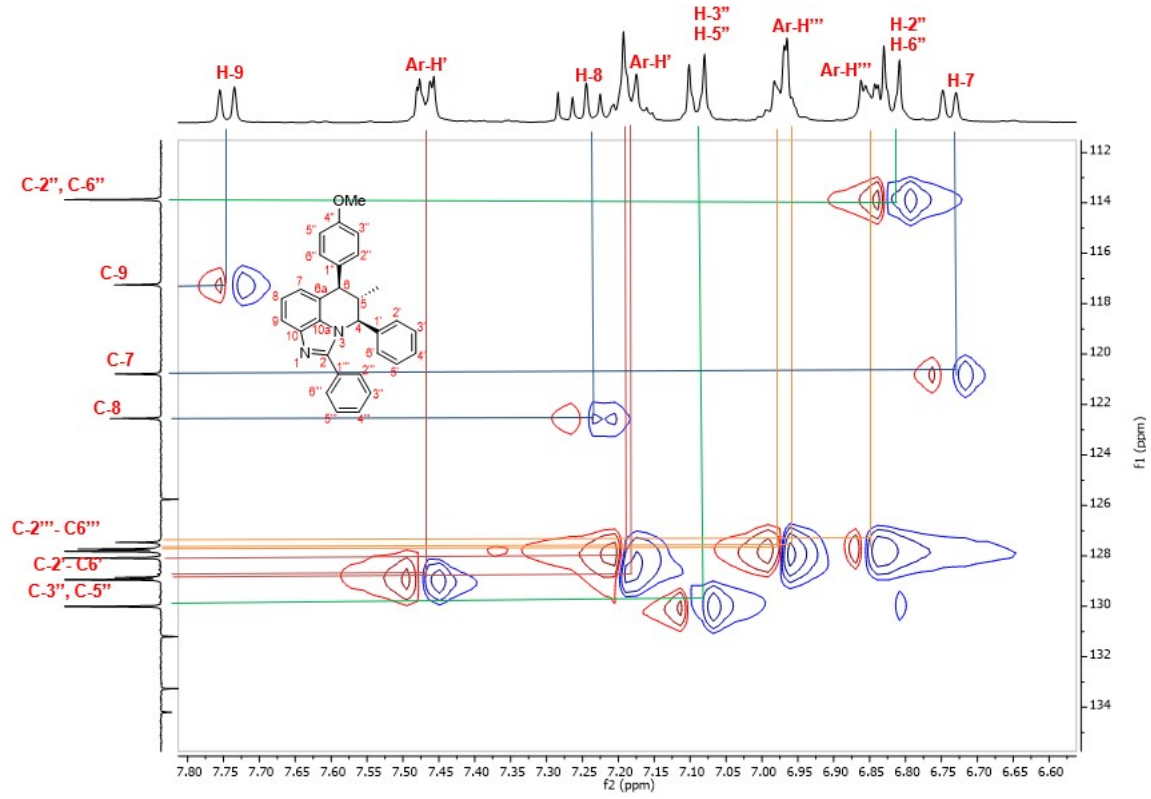
Figure 17. IR, ^{1}H NMR, APT, HSQC and HRMS spectra of ***Cis*-6-(4-methoxyphenyl)-5-methyl-2,4-diphenyl-5,6-dihydro-4*H*-imidazo[4,5,1-*ij*]quinoline (5a)**.




Ar-H'
H-3",5"
H-8
Ar-H'''
H-2",6"
Ar-H'''
H-7
OCH3
CH3
Ar-H'
H-9
H-4
H-6
H-5
f1 (ppm)


C-Ar
C-3"
C-5"
C-8
C-7
C-9
C-2"
C-6"
C-4
OCH3
C-6
C-5
CH3
f1 (ppm)


OCH3
CH3
H-4
H-6
H-5
CH3
C-5
C-6
OCH3
C-4
OMe
f2 (ppm)
f1 (ppm)


H-3"
H-5"
Ar-H'''
H-2"
H-6"
H-9
Ar-H'
H-8
Ar-H'
Ar-H'''
H-7
C-2", C-6"
C-9
C-7
C-8
C-2'''- C6'''
C-2'- C6'
C-3", C-5"
OMe
f2 (ppm)
f1 (ppm)

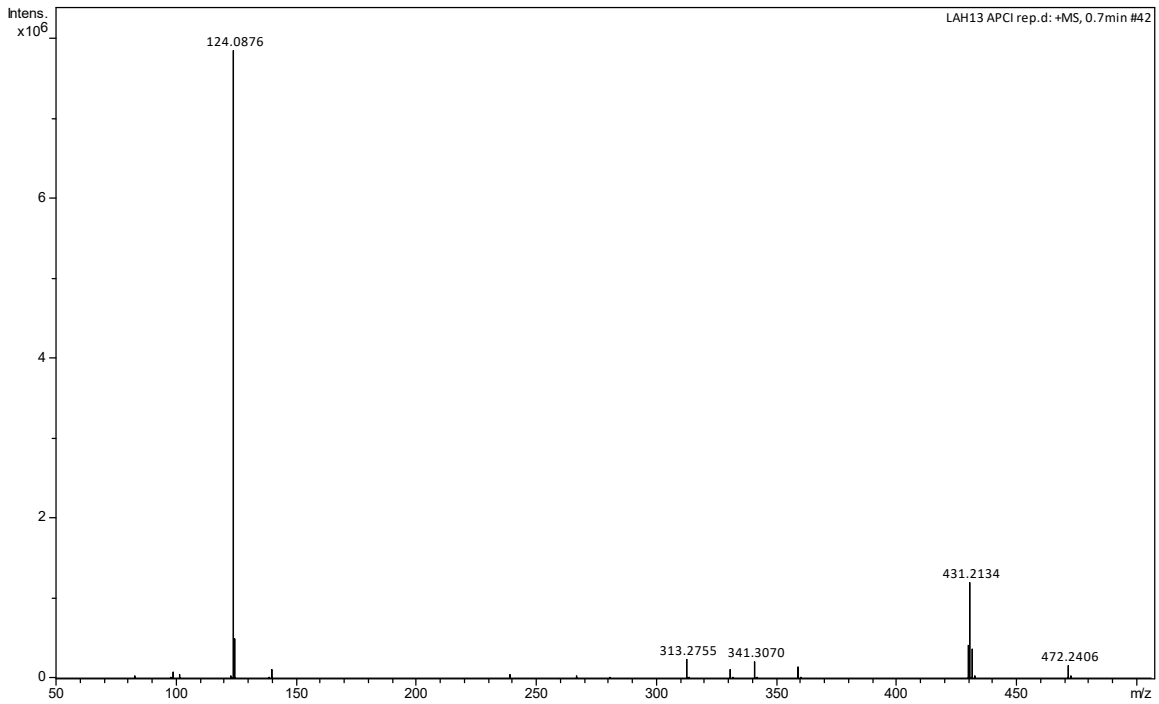
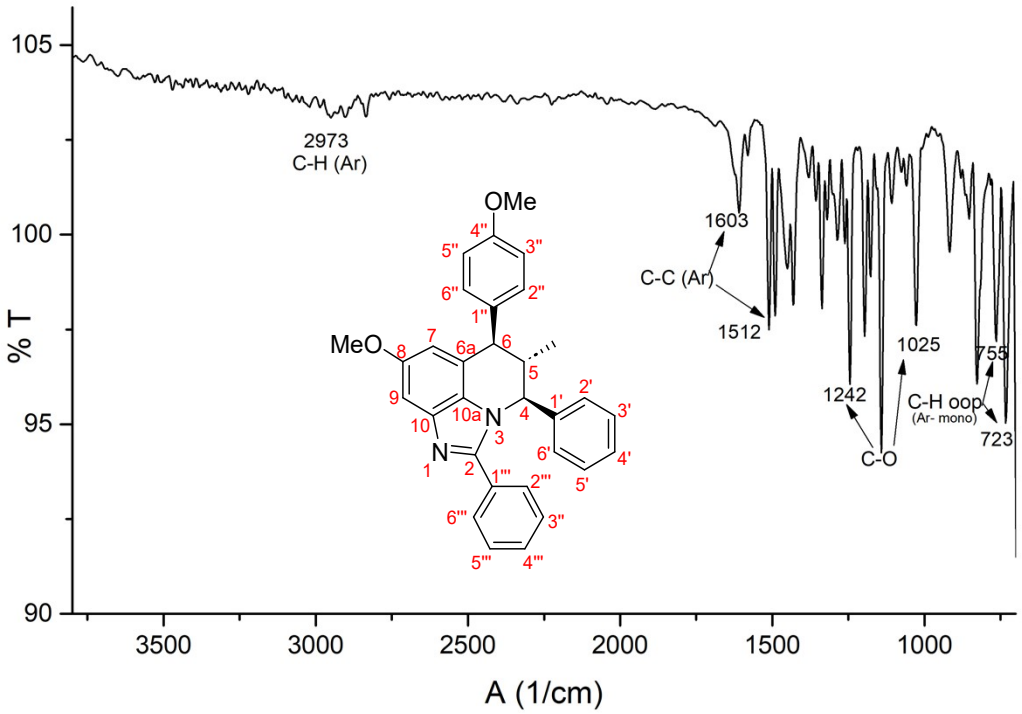
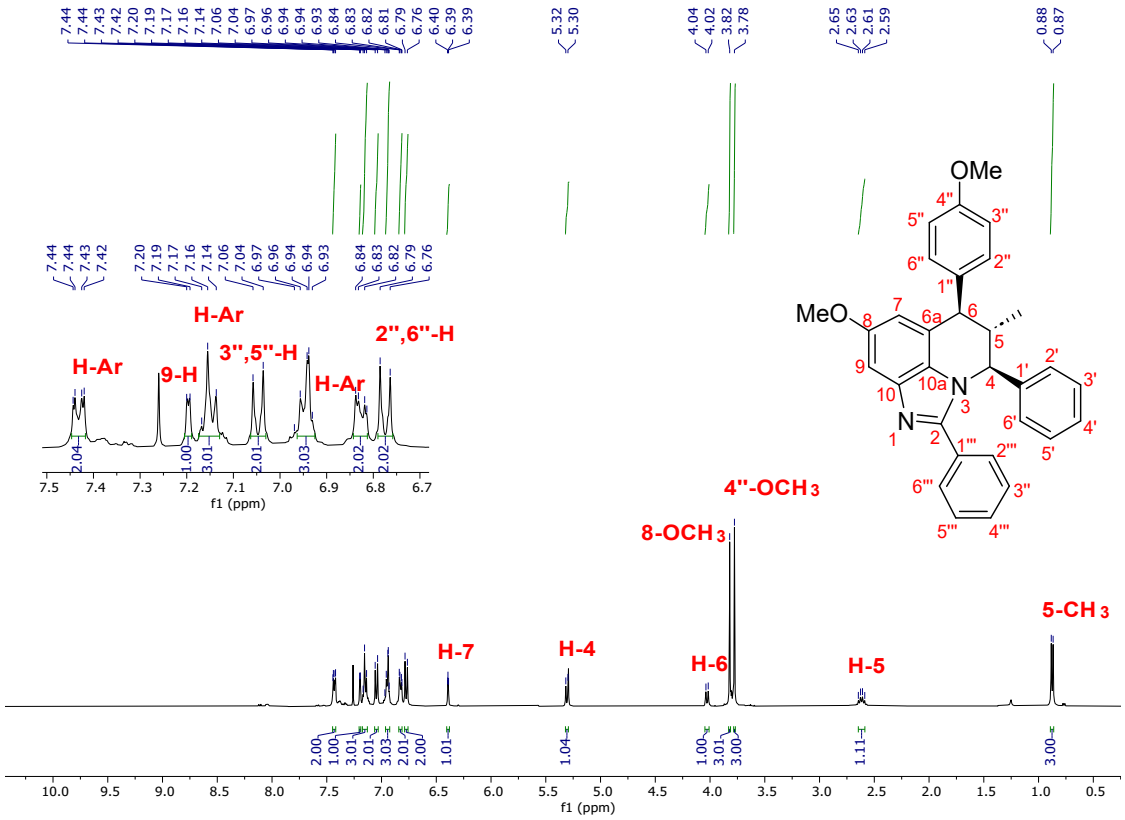
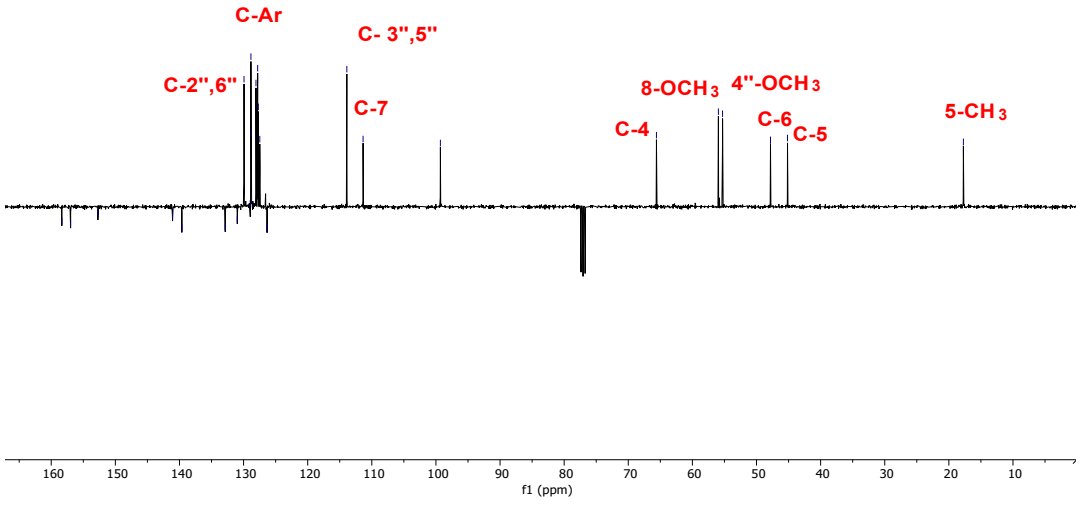
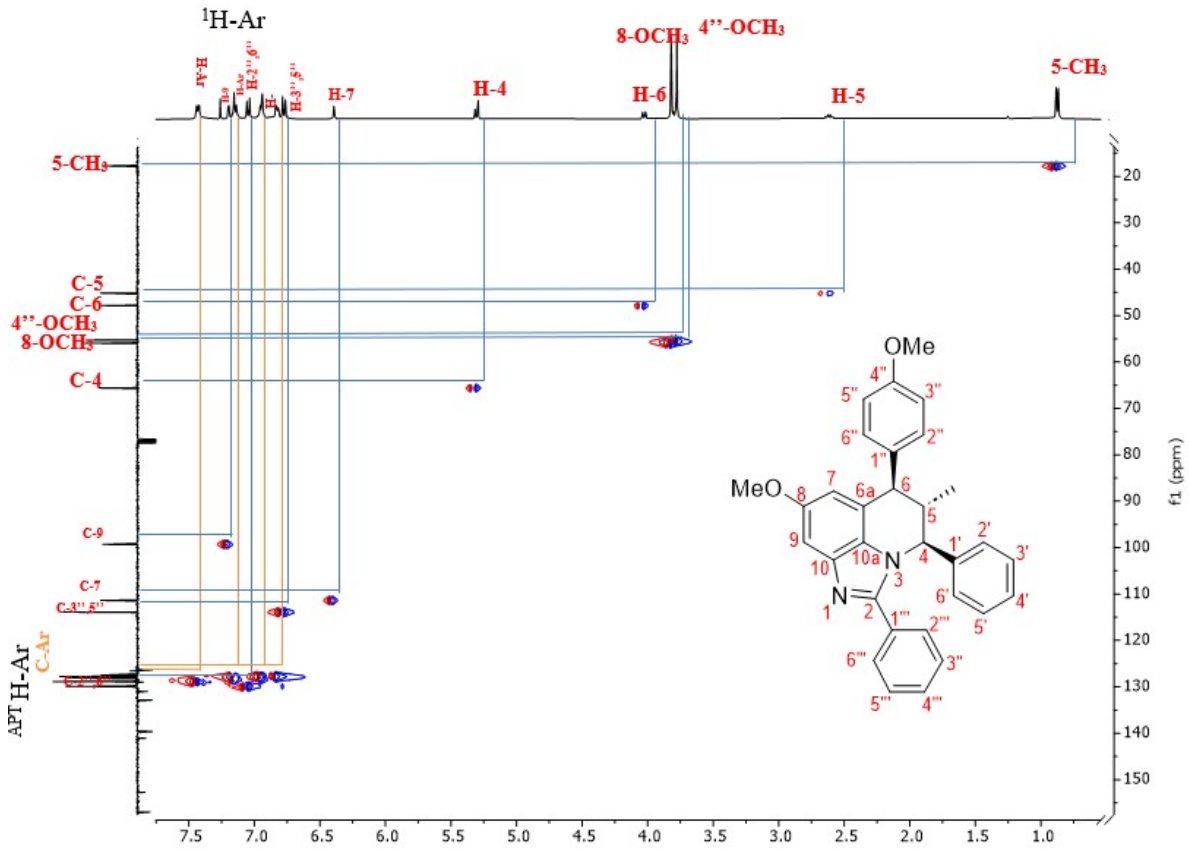


Figure 18. IR, ^{1}H NMR, APT, HSQC and HRMS spectra of ***Cis*-8-methoxy-6-(4-methoxyphenyl)-5-methyl-2.4-diphenyl-5,6-dihydro-4*H*-imidazo[4,5,1-*ij*]quinoline (5b).**




H-Ar
9-H
3'',5''-H
2'',6''-H
H-Ar
H-Ar
f1 (ppm)
OMe
MeO
4''-OCH3
8-OCH3
5-CH3
H-7
H-4
H-6
H-5
f1 (ppm)


C-Ar
C- 3'',5''
C-2'',6''
C-7
C-4
8-OCH3
4''-OCH3
C-6
C-5
5-CH3
f1 (ppm)


^{1}H-Ar
8-OCH$_3$
4''-OCH$_3$
5-CH$_3$
H-7
H-4
H-6
H-5
5-CH$_3$
C-5
C-6
4''-OCH$_3$
8-OCH$_3$
C-4
C-9
C-7
C-3'' 5''
APT
H-Ar
C-Ar
f1 (ppm)
OMe
MeO
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0

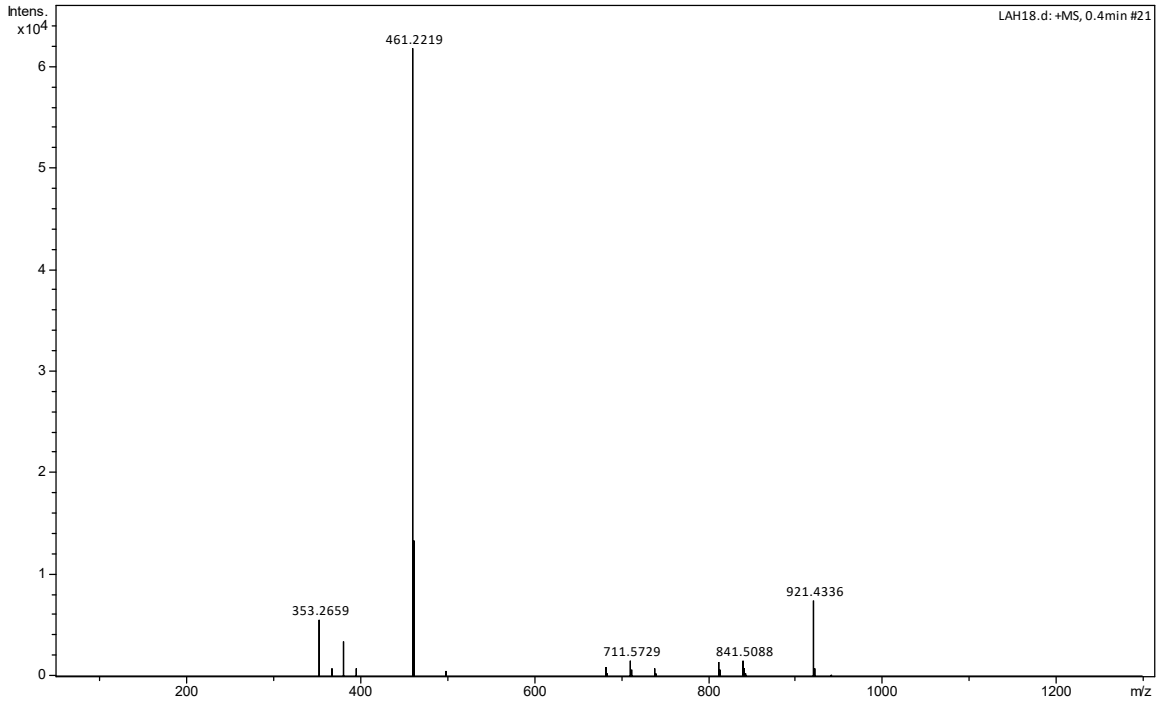
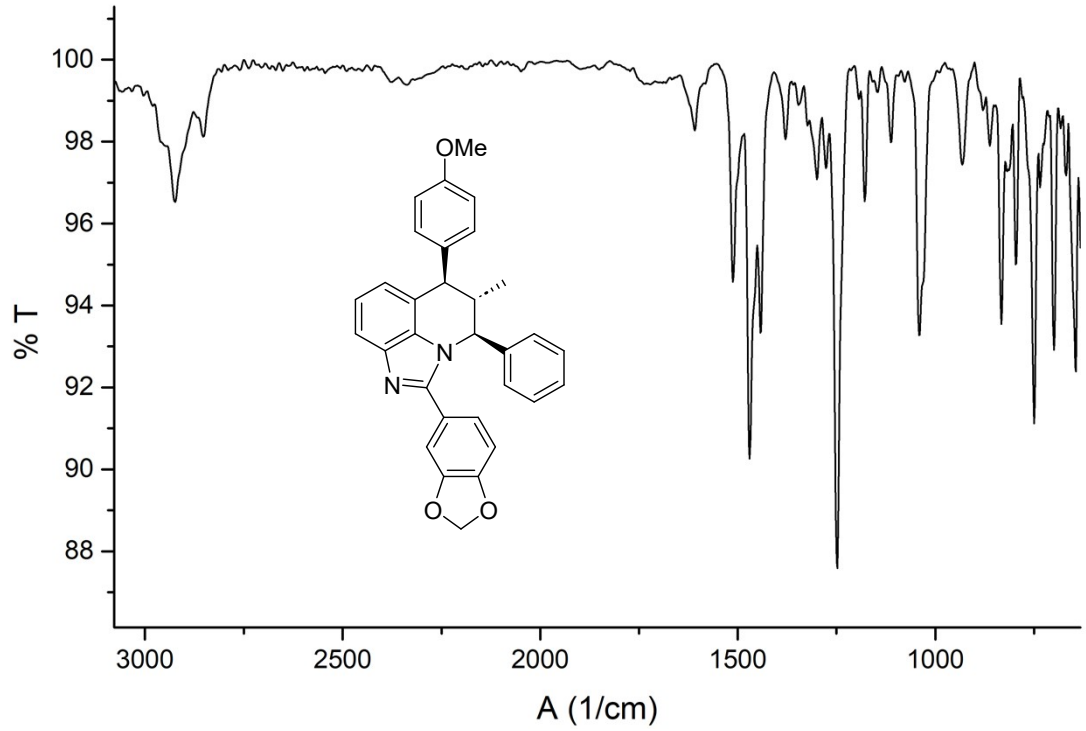
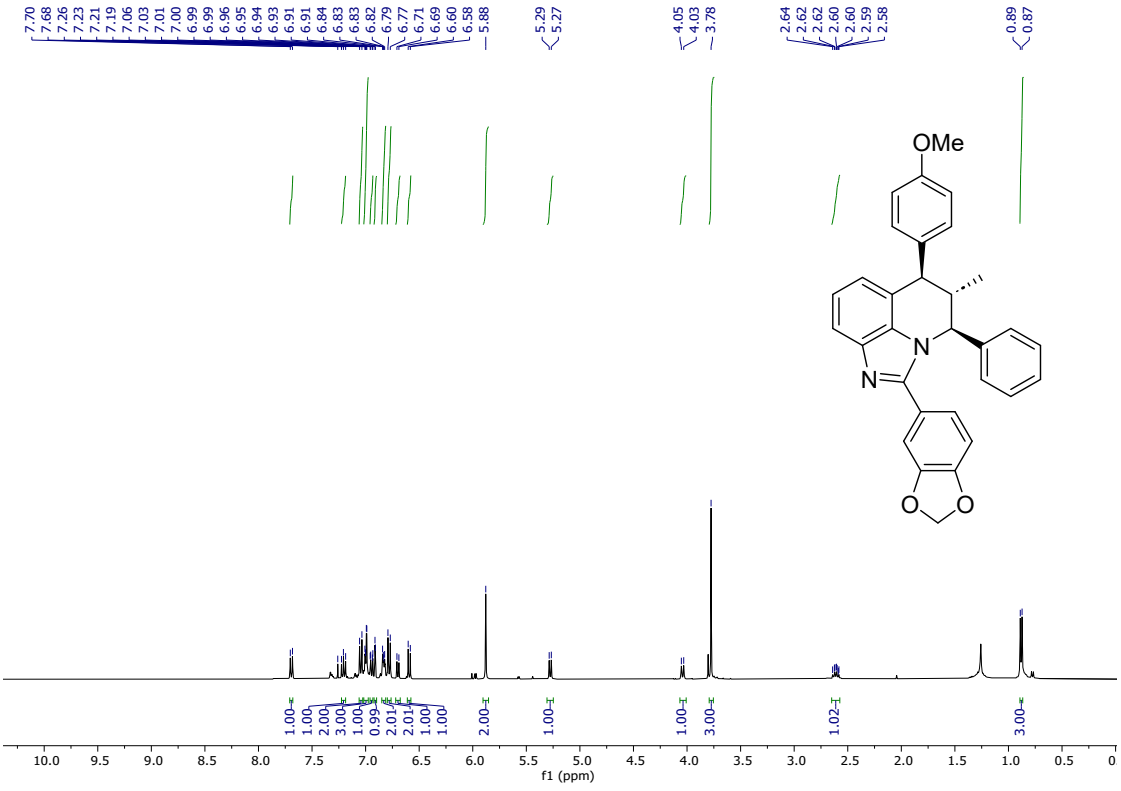
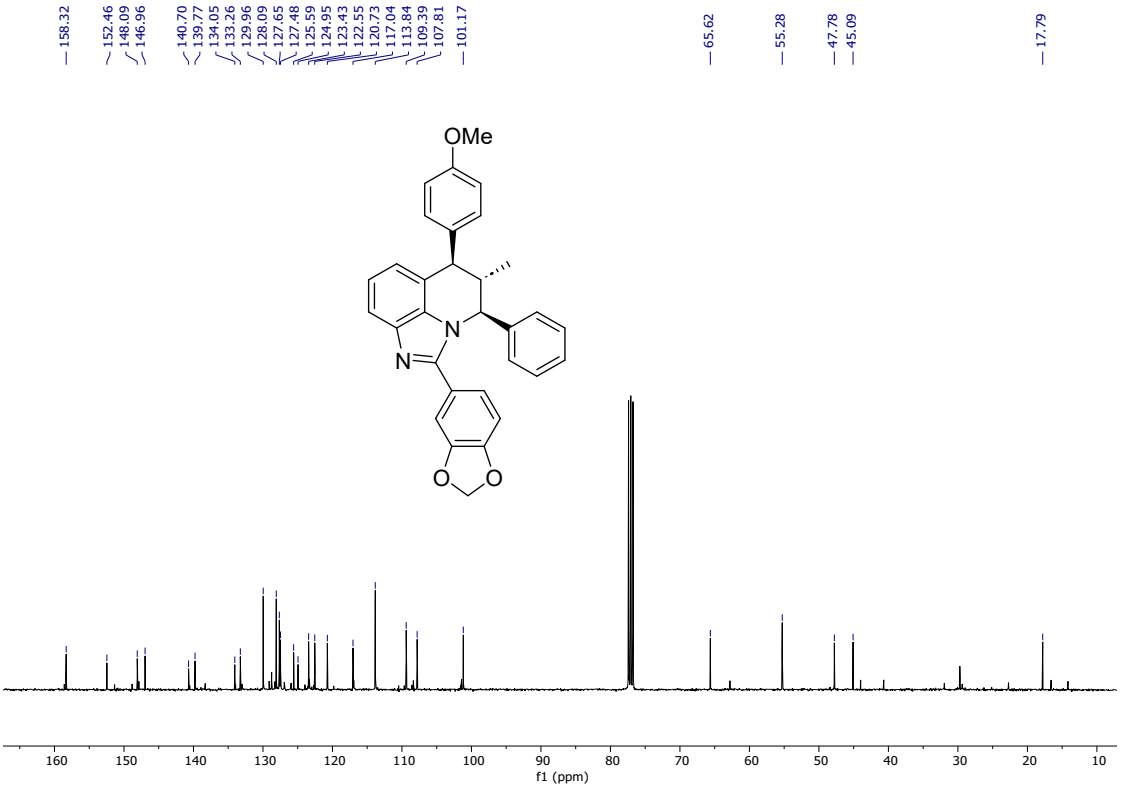

Intens.
x10^4
LAH18.d: +MS, 0.4min #21
461.2219
353.2659
711.5729
841.5088
921.4336
m/z
200
400
600
800
1000
1200

Figure 19. IR, ^{1}H NMR, ^{13}C NMR and HRMS spectra of ***Cis*-2-(benzo[*d*][1,3]dioxol-5-yl)-6-(4-methoxyphenyl)-5-methyl-4-phenyl-5,6-dihydro-4*H*-imidazo[4,5,1-*ij*]quinoline (5c).**






158.32
152.46
148.09
146.96
140.70
139.77
134.05
133.26
129.96
128.09
127.65
127.48
125.59
124.95
123.43
122.55
120.73
117.04
113.84
109.39
107.81
101.17
65.62
55.28
47.78
45.09
17.79
OMe
N
N
O
O
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
f1 (ppm)

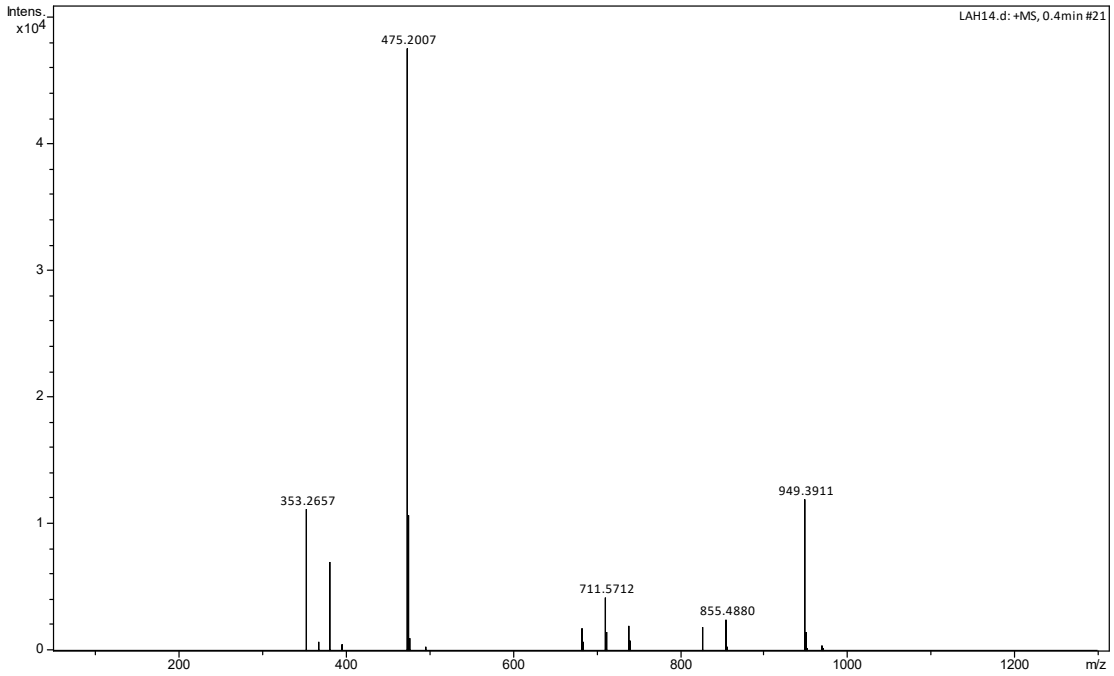
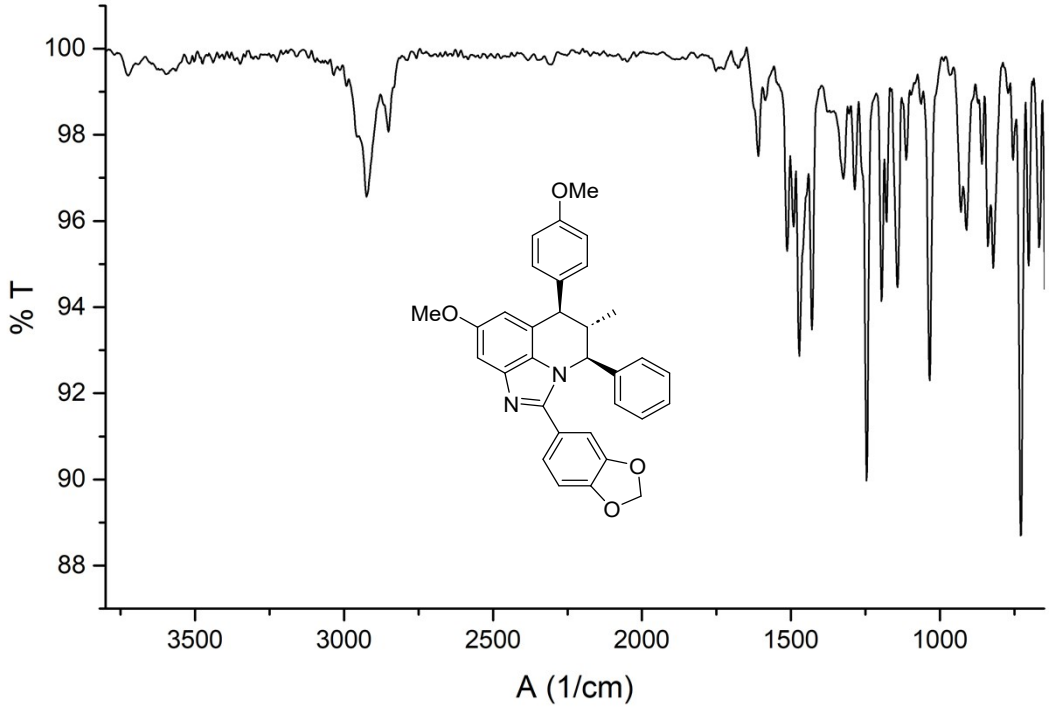
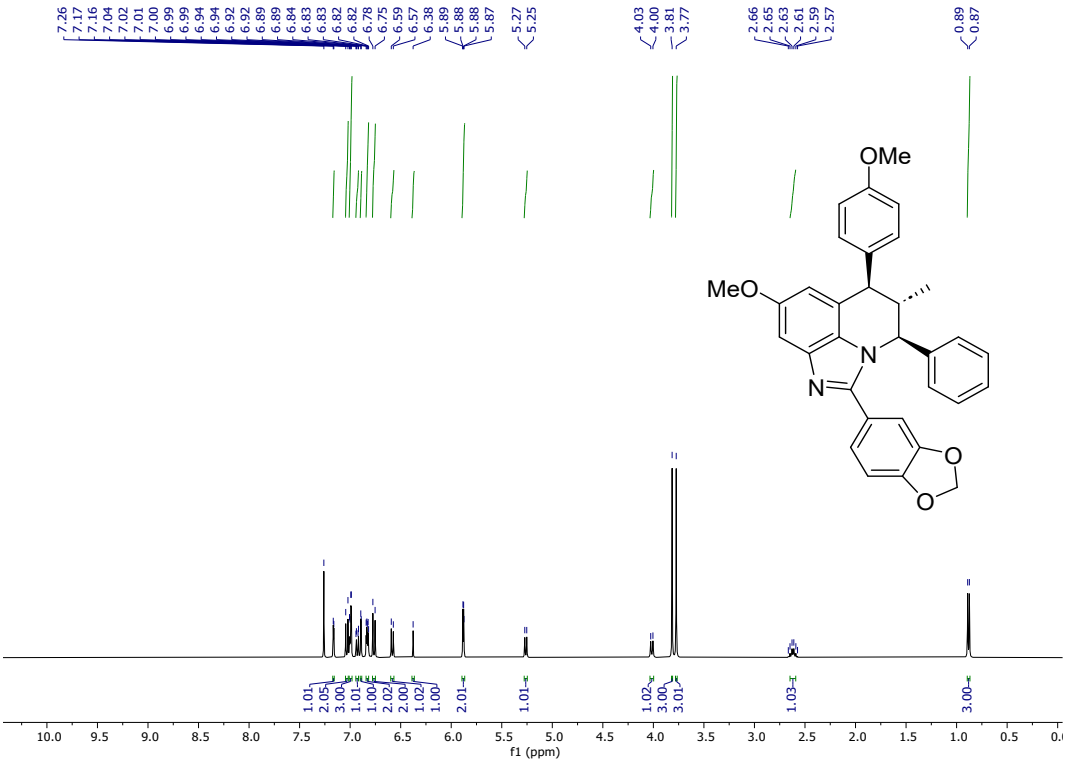
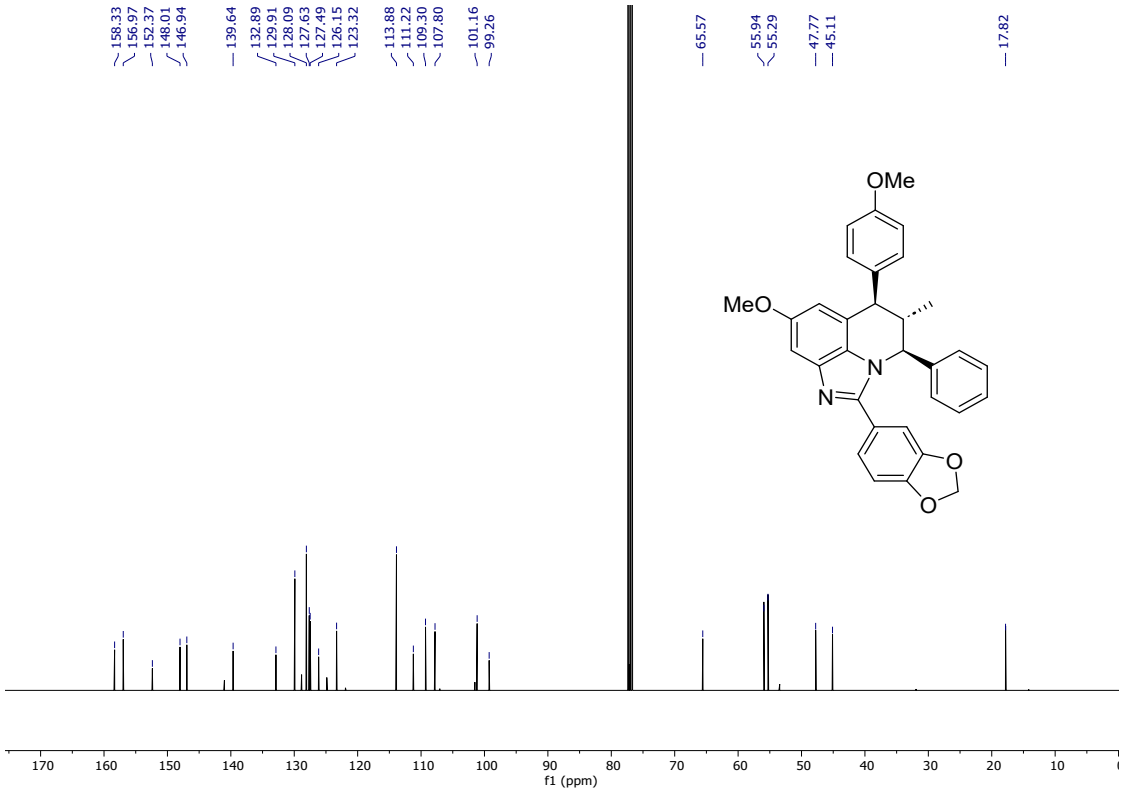

Intens.
x10^4
LAH14.d: +MS, 0.4min #21
475.2007
353.2657
711.5712
855.4880
949.3911
0
1
2
3
4
200
400
600
800
1000
1200
m/z

Figure 20. IR, ^{1}H NMR, ^{13}C NMR and HRMS spectra of ***Cis*-2-(benzo[*d*][1,3]dioxol-5-yl)-8-methoxy-6-(4-methoxyphenyl)-5-methyl-4-phenyl-5,6-dihydro-4*H*-imidazo[4,5,1-*ij*]quinoline (5d).**






158.33
156.97
152.37
148.01
146.94
139.64
132.89
129.91
128.09
127.63
127.49
126.15
123.32
113.88
111.22
109.30
107.80
101.16
99.26
65.57
55.94
55.29
47.77
45.11
17.82
OMe
MeO
N
N
O
O
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
f1 (ppm)

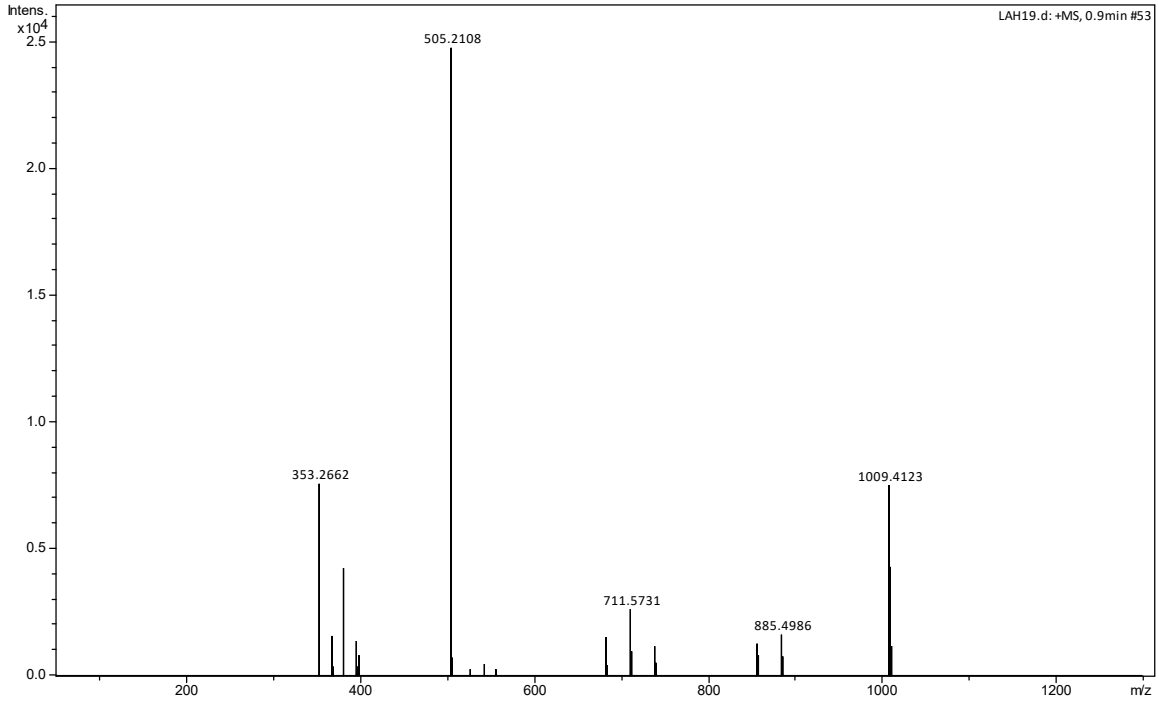
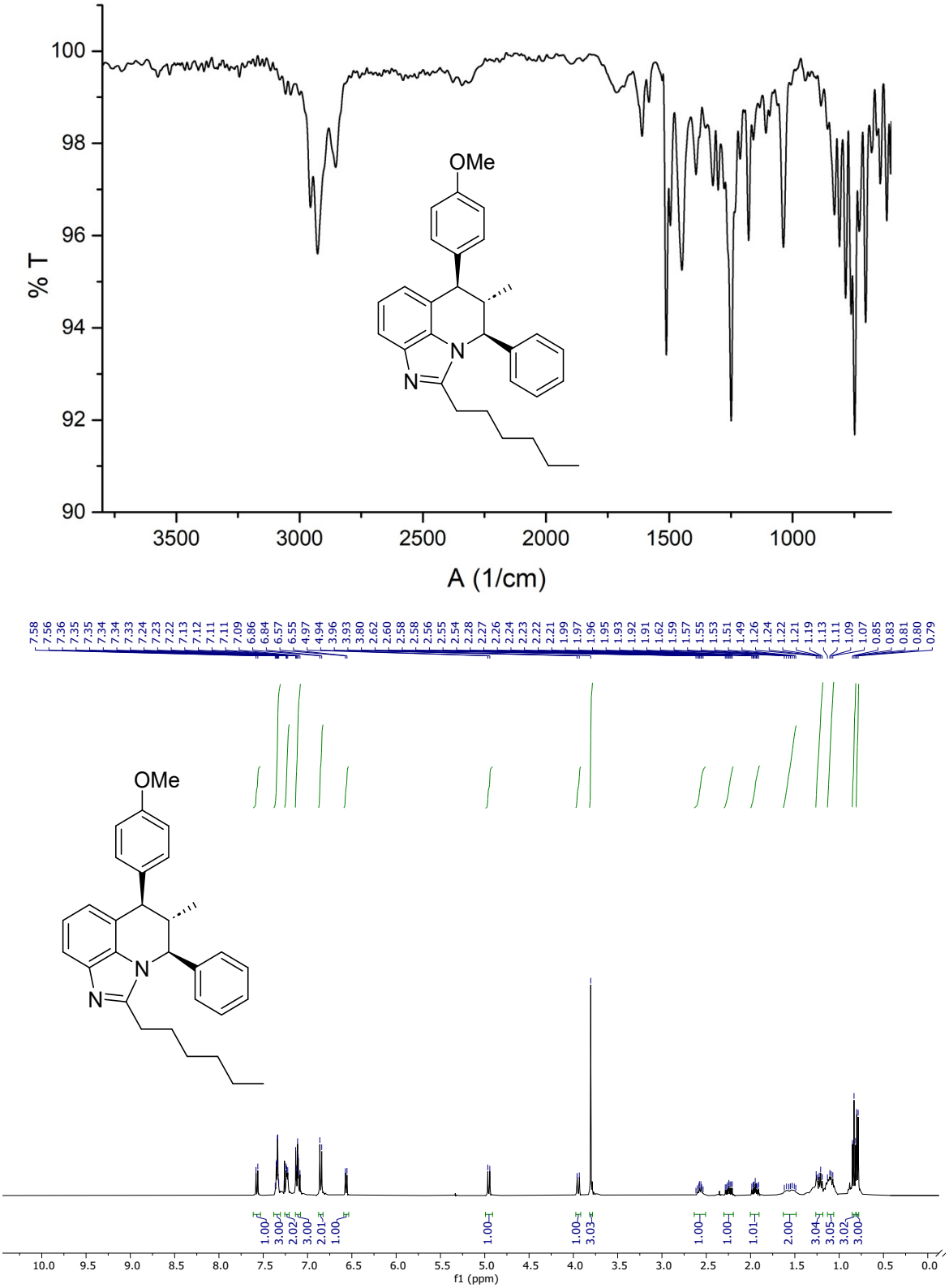
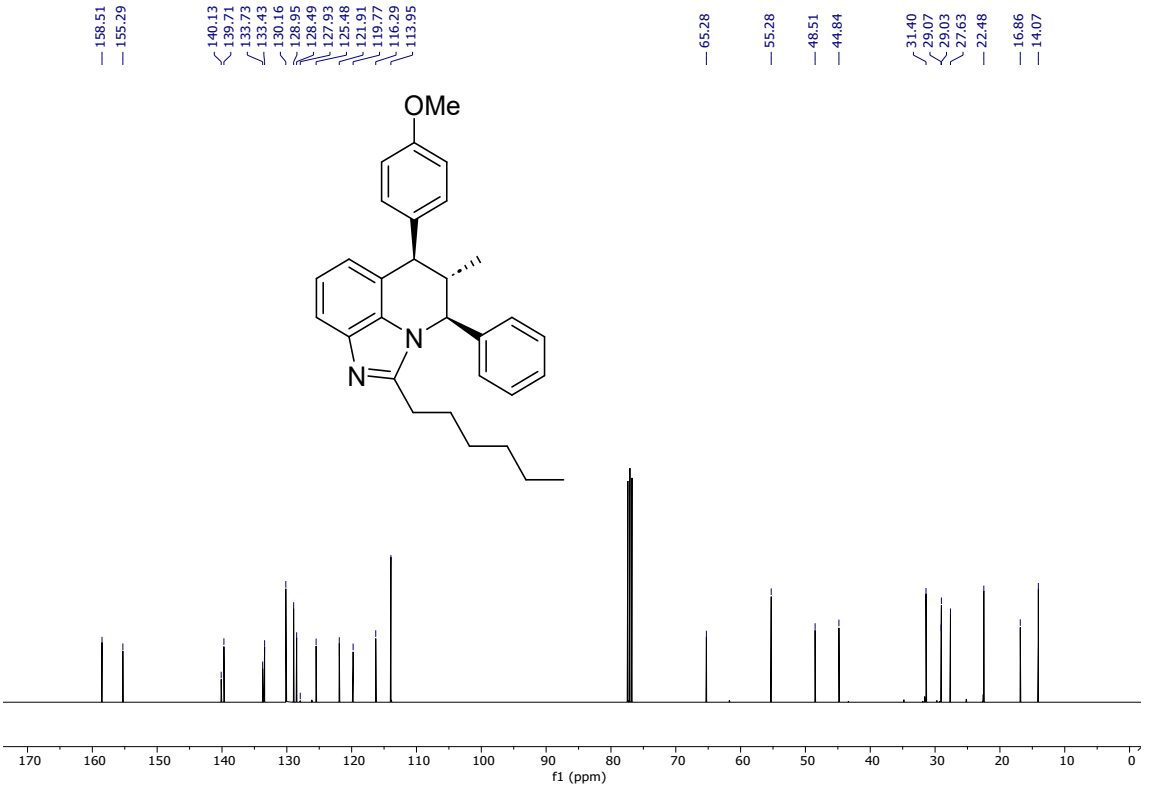

Intens.
x10^4
LAH19.d: +MS, 0.9min #53
505.2108
353.2662
711.5731
885.4986
1009.4123
2.5
2.0
1.5
1.0
0.5
0.0
200
400
600
800
1000
1200
m/z

Figure 21. IR, ^{1}H NMR, ^{13}C NMR and HRMS spectra of ***Cis*-2-(hexyl)-6-(4-methoxyphenyl)-5-methyl-4-phenyl-5,6-dihydro-4*H*-imidazo[4,5,1-*ij*]quinoline (5e).**




158.51
155.29
140.13
139.71
133.73
133.43
130.16
128.95
128.49
127.93
125.48
121.91
119.77
116.29
113.95
65.28
55.28
48.51
44.84
31.40
29.07
29.03
27.63
22.48
16.86
14.07
OMe
N
N
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
f1 (ppm)

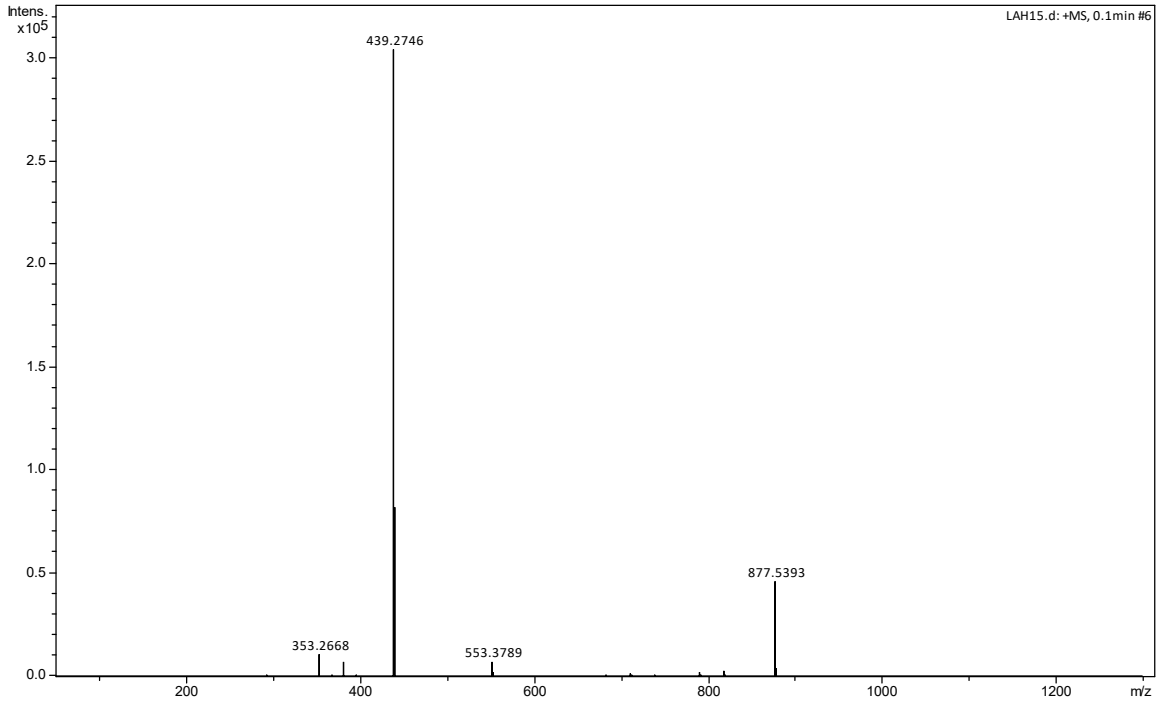
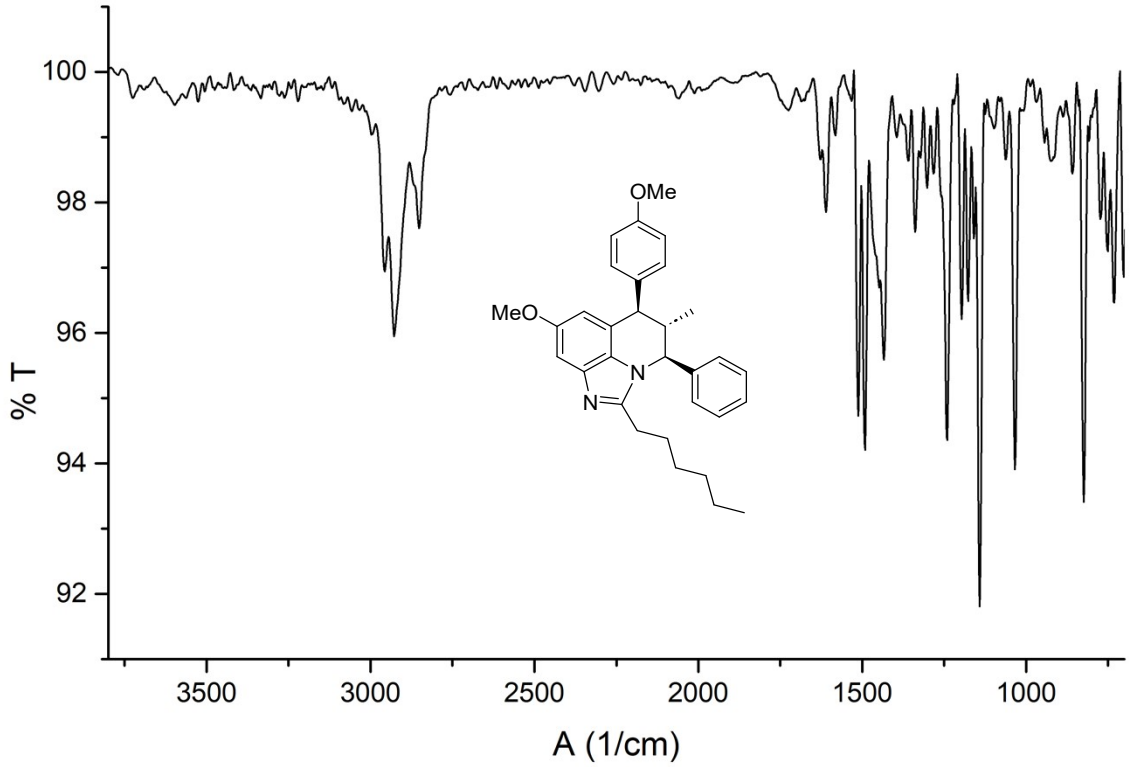
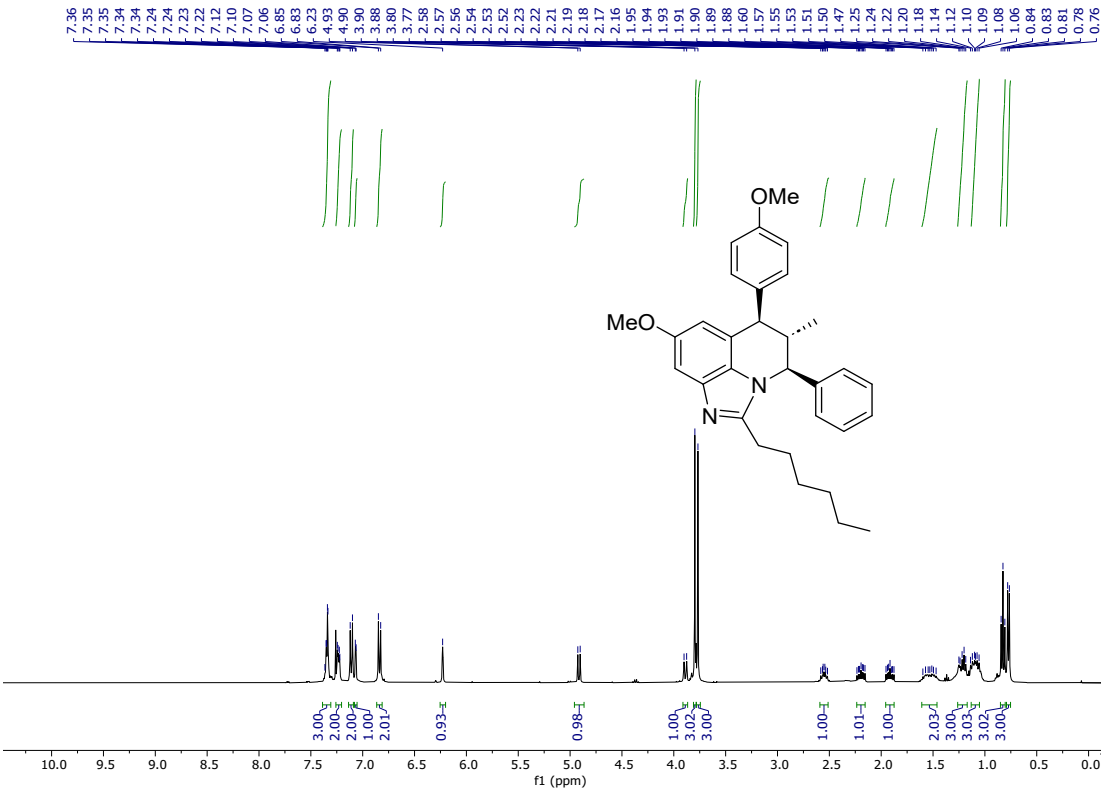
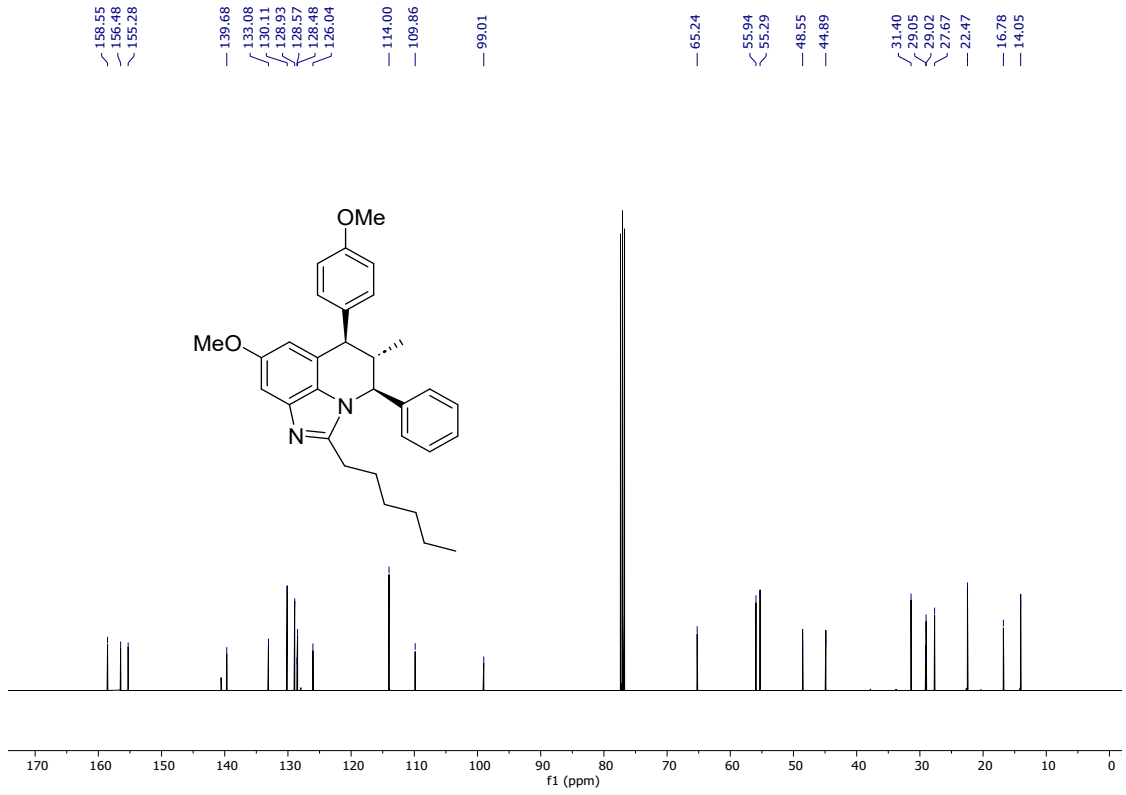

Intens.
x10^5
LAH15.d: +MS, 0.1min #6
439.2746
877.5393
353.2668
553.3789
3.0
2.5
2.0
1.5
1.0
0.5
0.0
200
400
600
800
1000
1200
m/z

Figure 22. IR, ^{1}H NMR, ^{13}C NMR and HRMS spectra of ***Cis*-2-(hexyl)-8-methoxy-6-(4-methoxyphenyl)-5-methyl-4-phenyl-5,6-dihydro-4*H*-imidazo[4,5,1-*ij*]quinoline (5f).**






158.55
156.48
155.28
139.68
133.08
130.11
128.93
128.57
128.48
126.04
114.00
109.86
99.01
65.24
55.94
55.29
48.55
44.89
31.40
29.05
29.02
27.67
22.47
16.78
14.05
OMe
MeO
N
N
170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0
f1 (ppm)

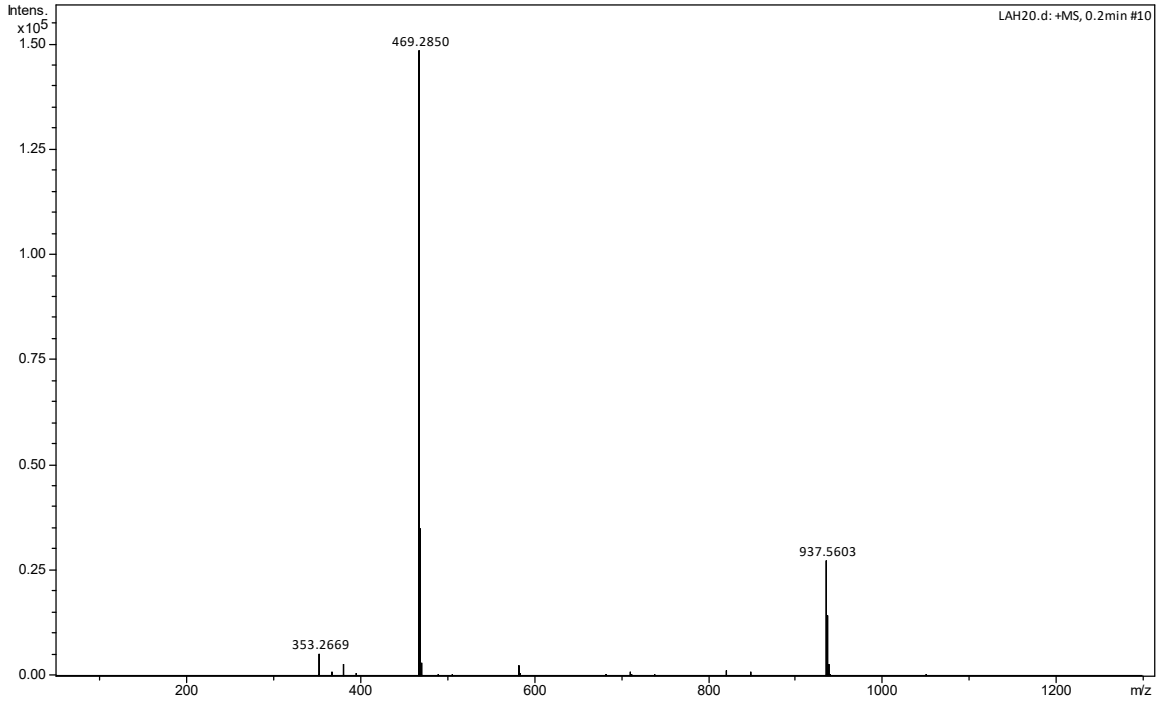
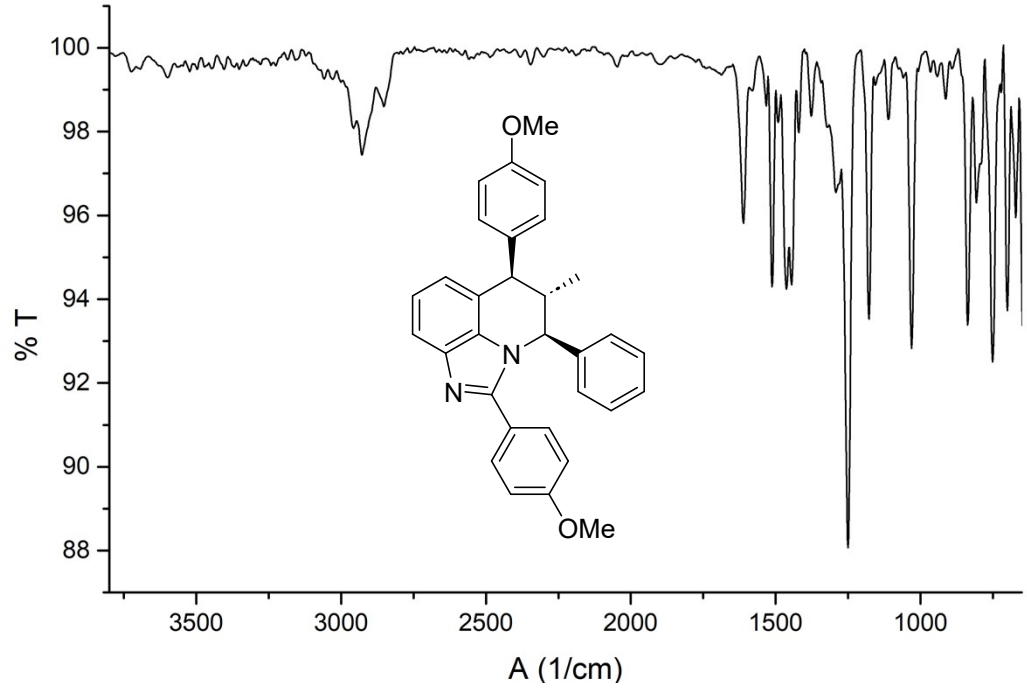
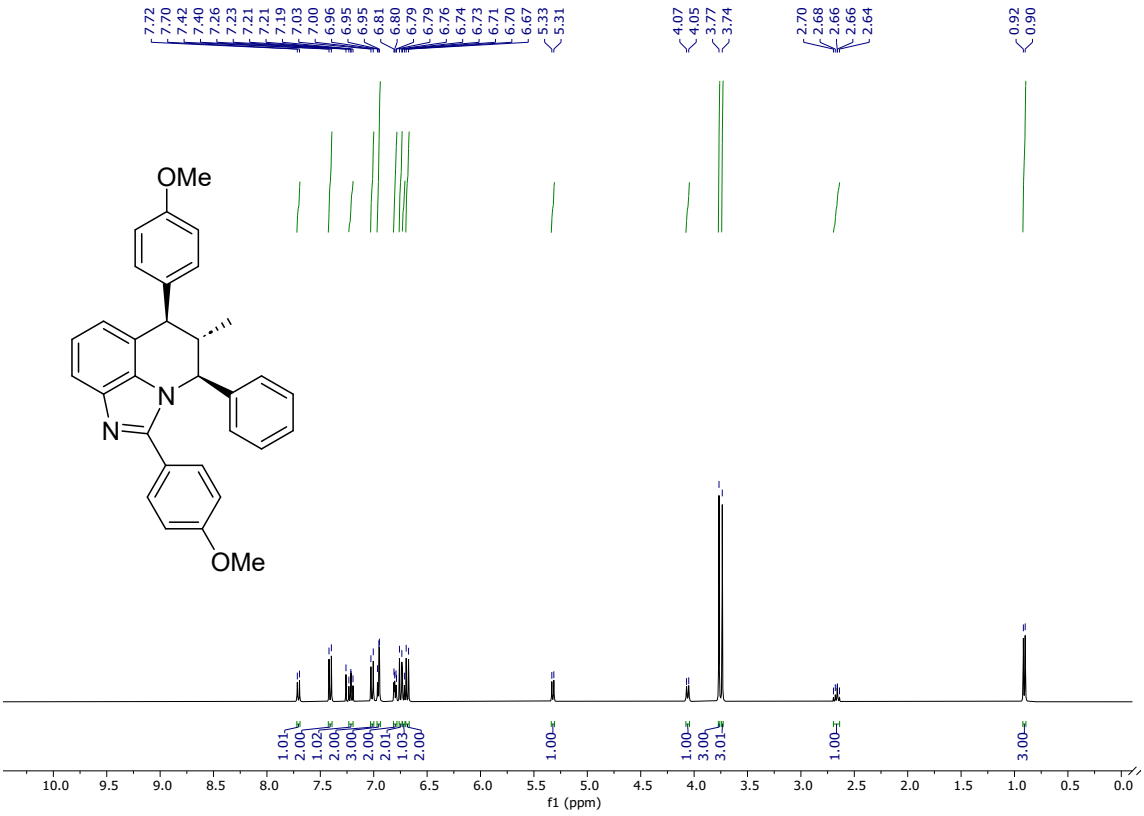
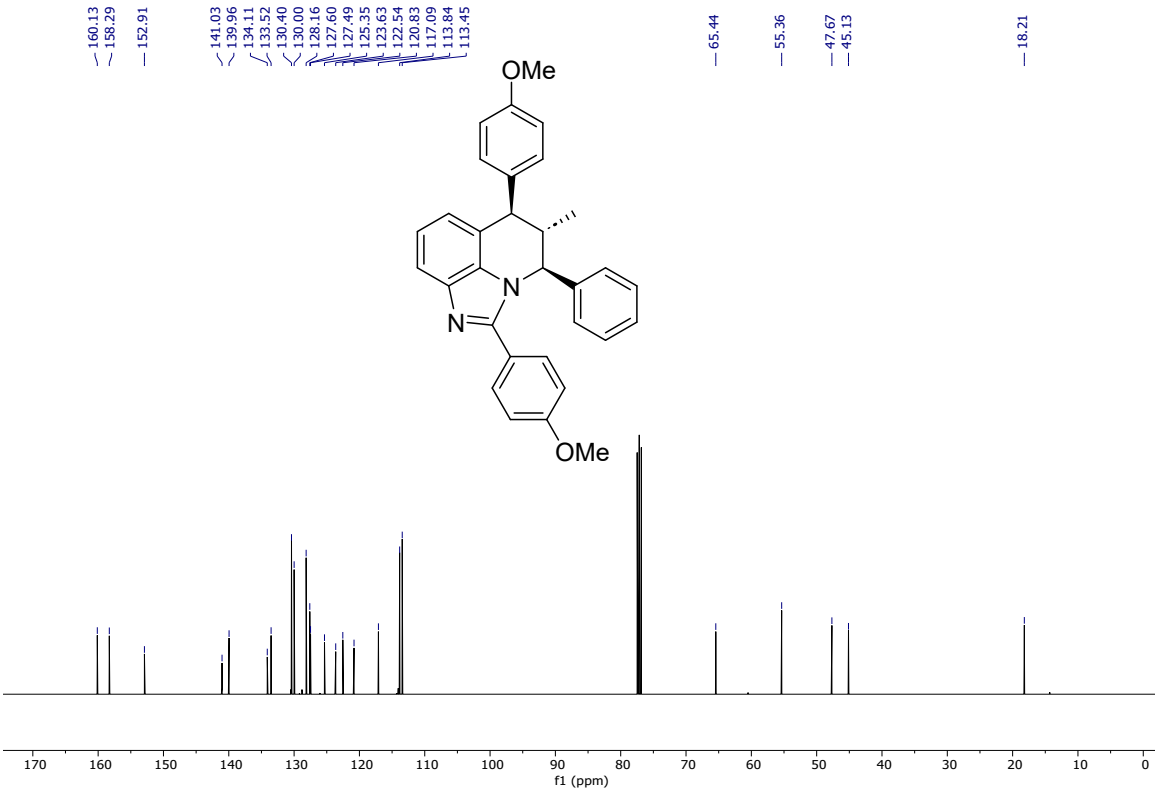

Intens.
x10^5
1.50
1.25
1.00
0.75
0.50
0.25
0.00
LAH20.d: +MS, 0.2min #10
469.2850
937.5603
353.2669
200 400 600 800 1000 1200 m/z

Figure 23. IR, ^{1}H NMR, ^{13}C NMR and HRMS spectra of ***Cis*-2.6-bis(4-methoxyphenyl)-5-methyl-4-phenyl-5,6-dihydro-4*H*-imidazo[4,5,1-*ij*]quinoline (5g).**






160.13
158.29
152.91
141.03
139.96
134.11
133.52
130.40
130.00
128.16
127.60
127.49
125.35
123.63
122.54
120.83
117.09
113.84
113.45
65.44
55.36
47.67
45.13
18.21
OMe
N
N
OMe
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
f1 (ppm)

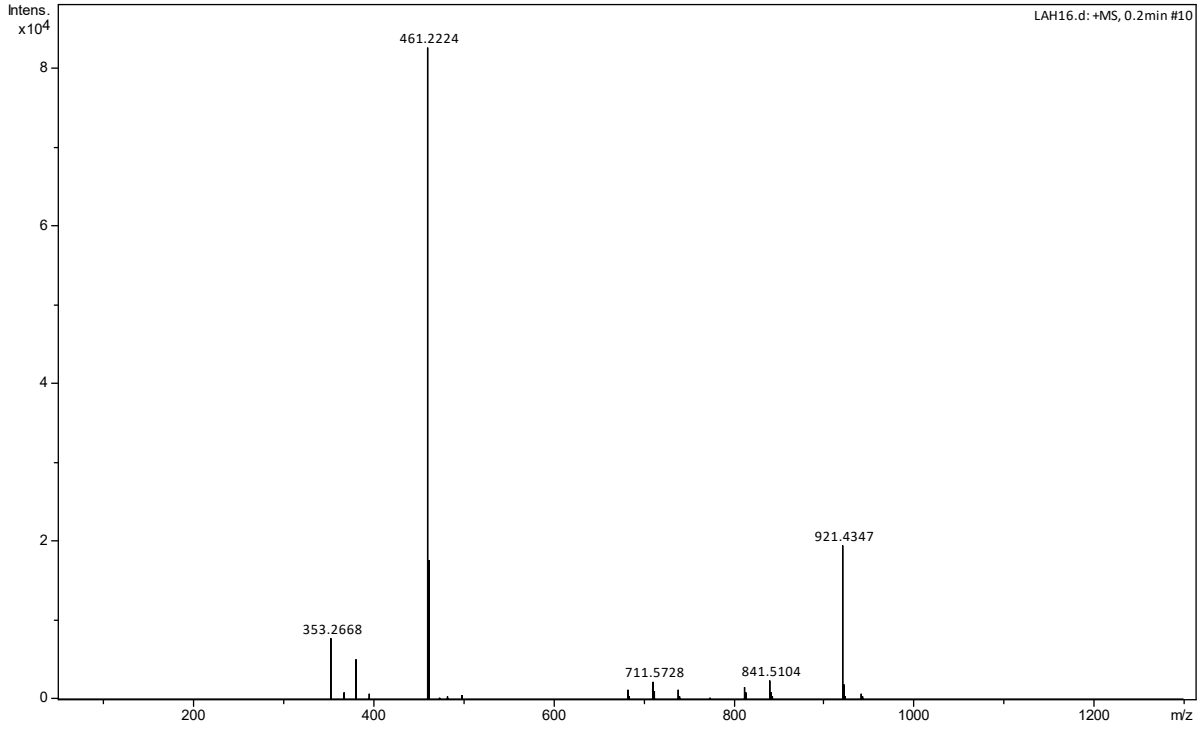
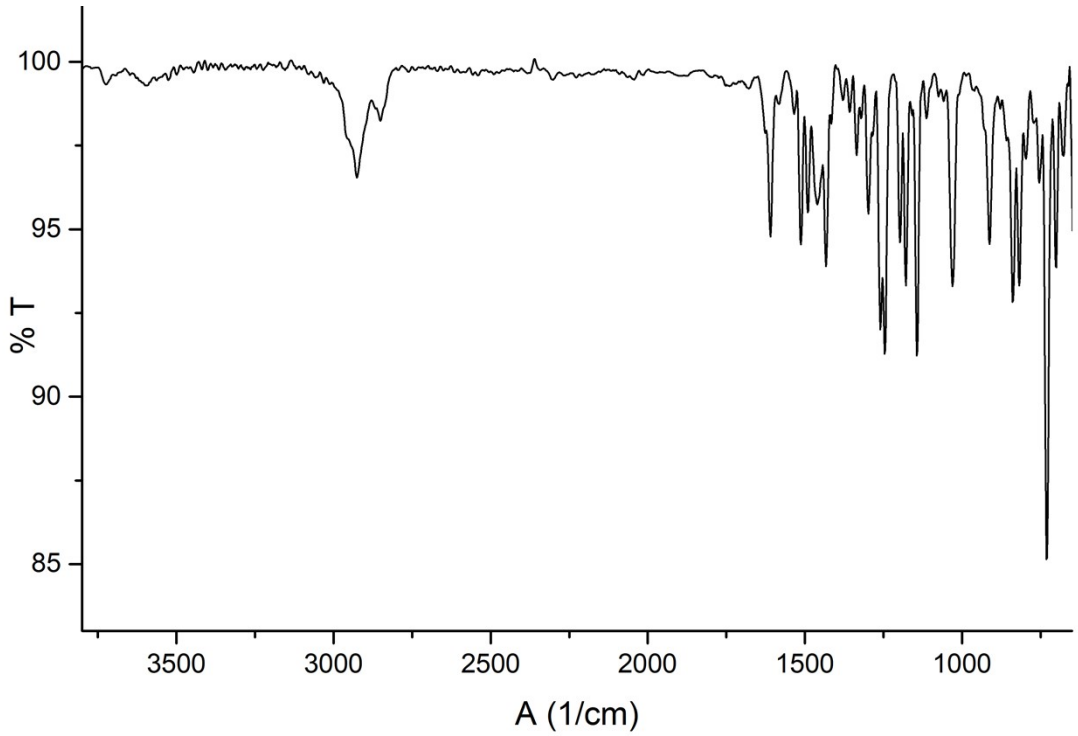
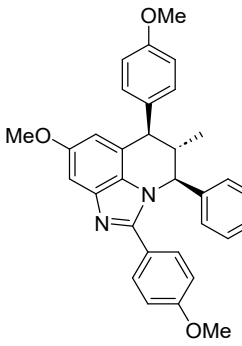
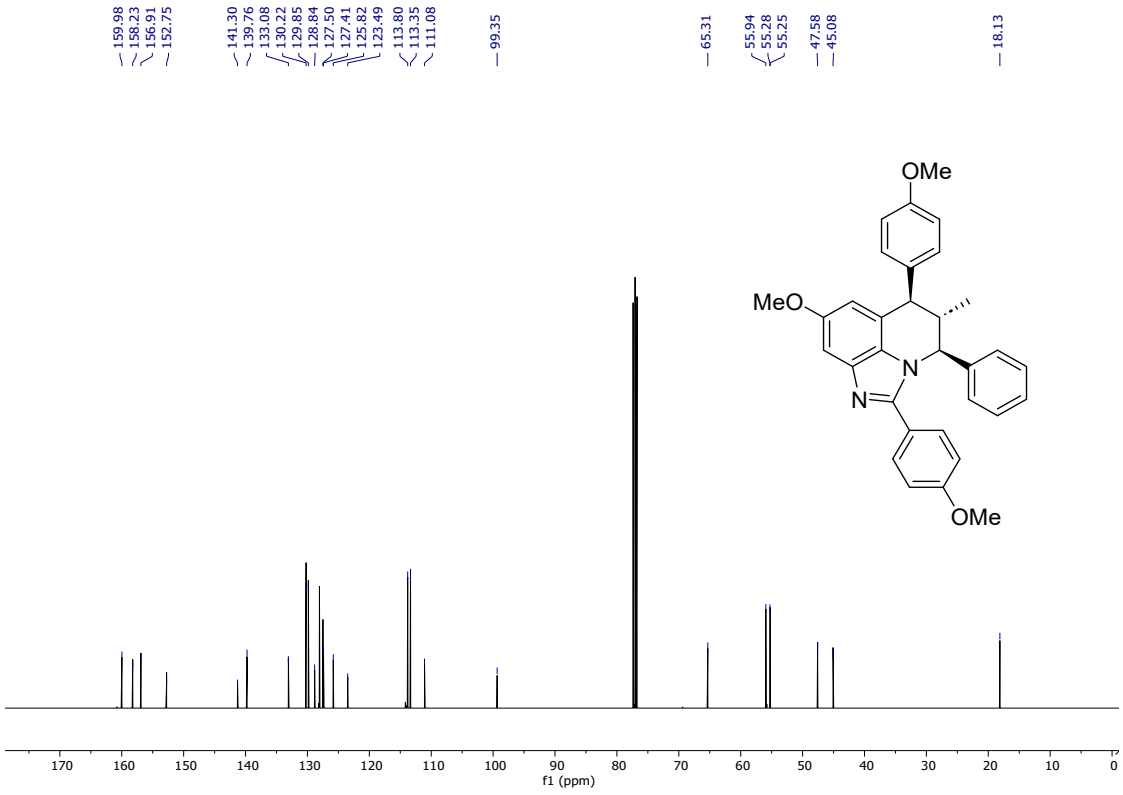

Intens.
x10^4
LAH16.d: +MS, 0.2min #10
461.2224
921.4347
353.2668
711.5728
841.5104
8
6
4
2
0
200
400
600
800
1000
1200
m/z

Figure 24. IR, ^{1}H NMR, ^{13}C NMR and HRMS spectra of ***Cis*-8-methoxy-2,6-bis(4-methoxyphenyl)-5-methyl-4-phenyl-5,6-dihydro-4*H*-imidazo[4,5,1-*ij*]quinoline (5h).**






159.98
158.23
156.91
152.75
141.30
139.76
133.08
130.22
129.85
128.84
127.50
127.41
125.82
123.49
113.80
113.35
111.08
99.35
65.31
55.94
55.28
55.25
47.58
45.08
18.13
OMe
MeO
N
N
OMe
f1 (ppm)

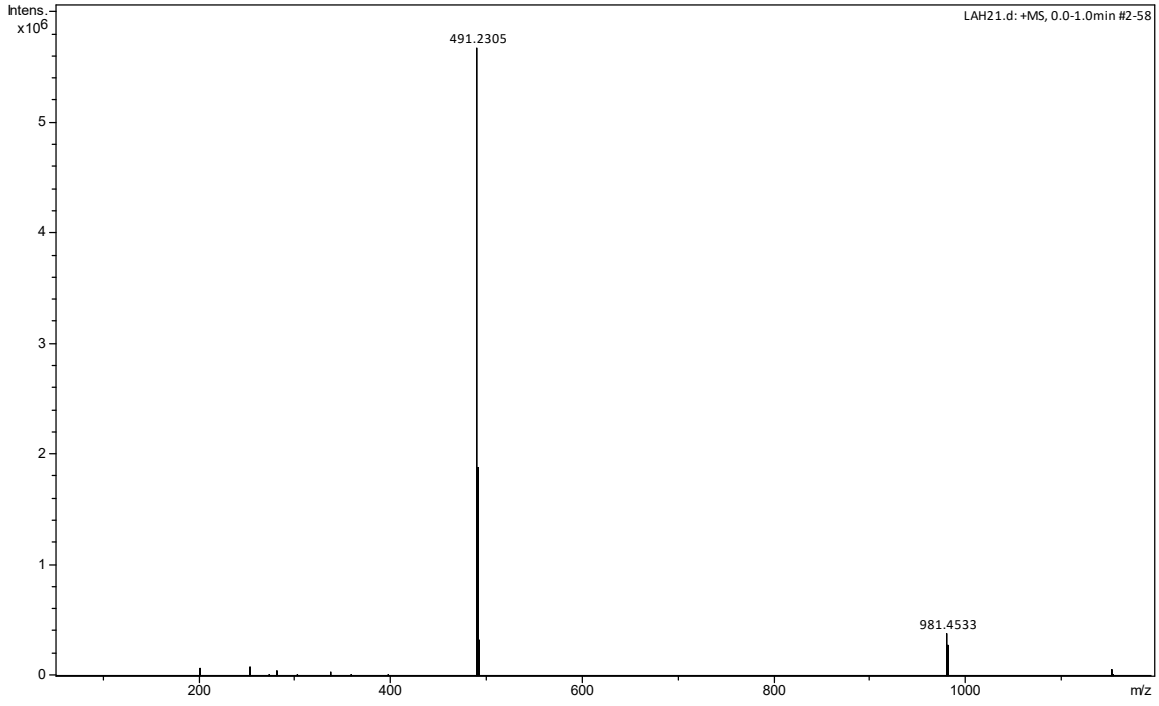
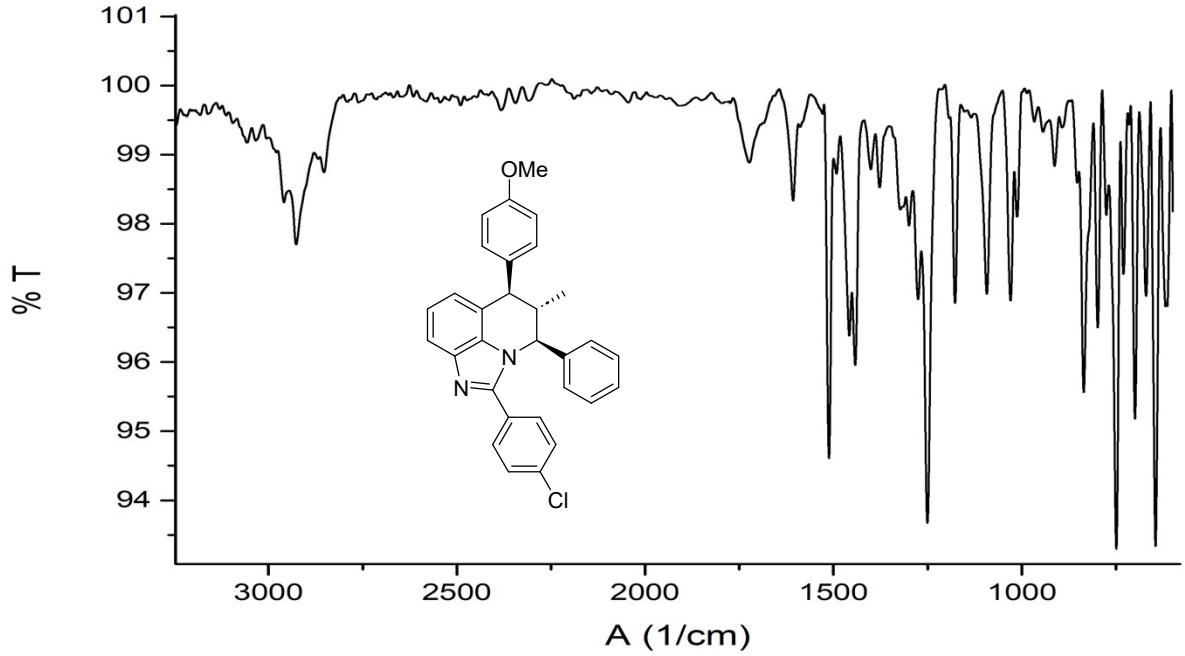
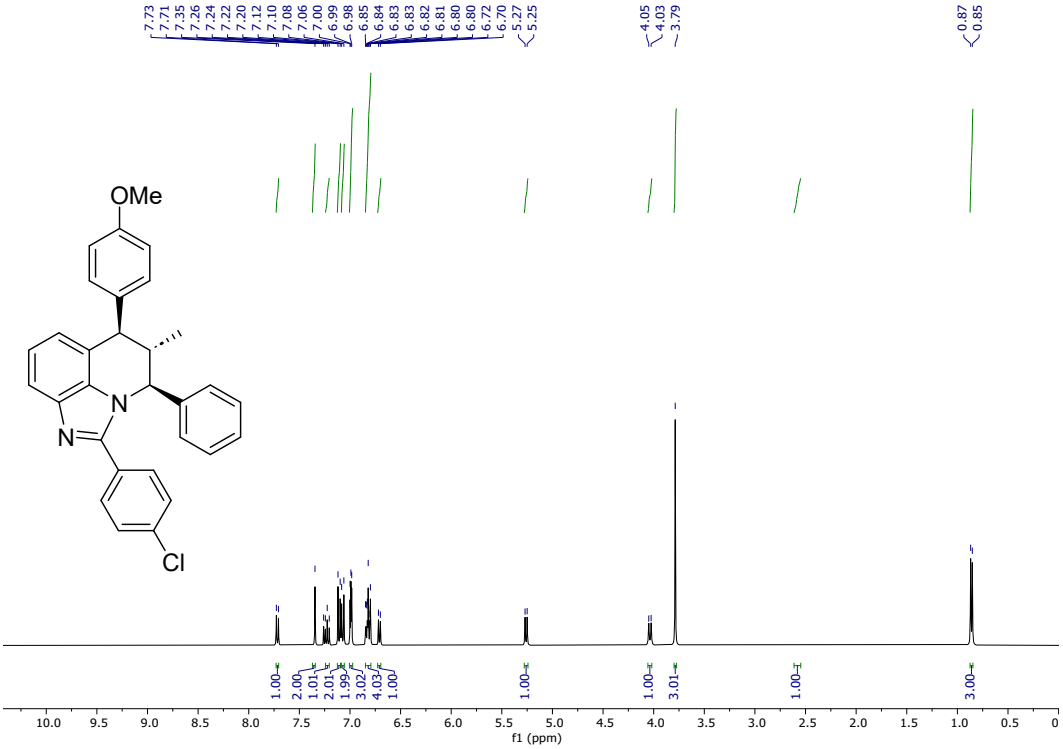
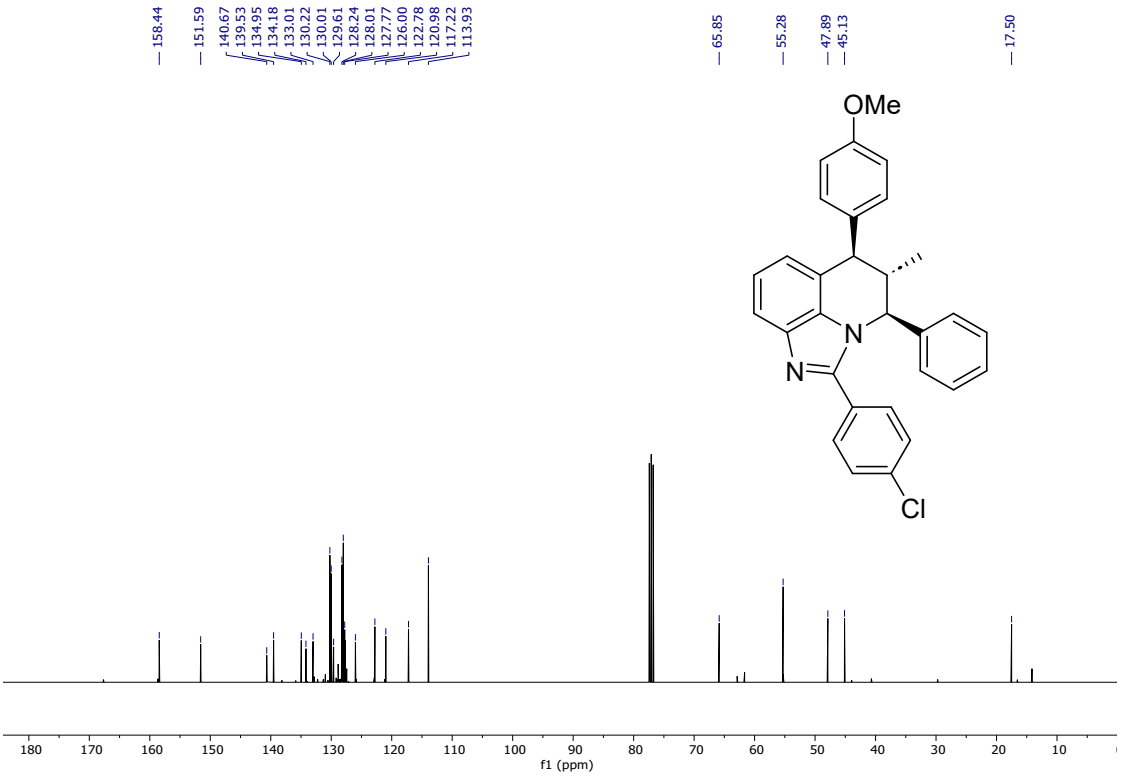

Intens.
x10^6
LAH21.d: +MS, 0.0-1.0min #2-58
491.2305
981.4533
m/z

Figure 25. IR, ^{1}H NMR, ^{13}C NMR and HRMS spectra of ***Cis*-2-(4-chlorophenyl)-6-(4-methoxyphenyl)-5-methyl-4-phenyl-5,6-dihydro-4*H*-imidazo[4,5,1-*ij*]quinoline (5i).**






158.44
151.59
140.67
139.53
134.95
134.18
133.01
130.22
130.01
129.61
128.24
128.01
127.77
126.00
122.78
120.98
117.22
113.93
65.85
55.28
47.89
45.13
17.50
OMe
N
N
Cl
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
f1 (ppm)

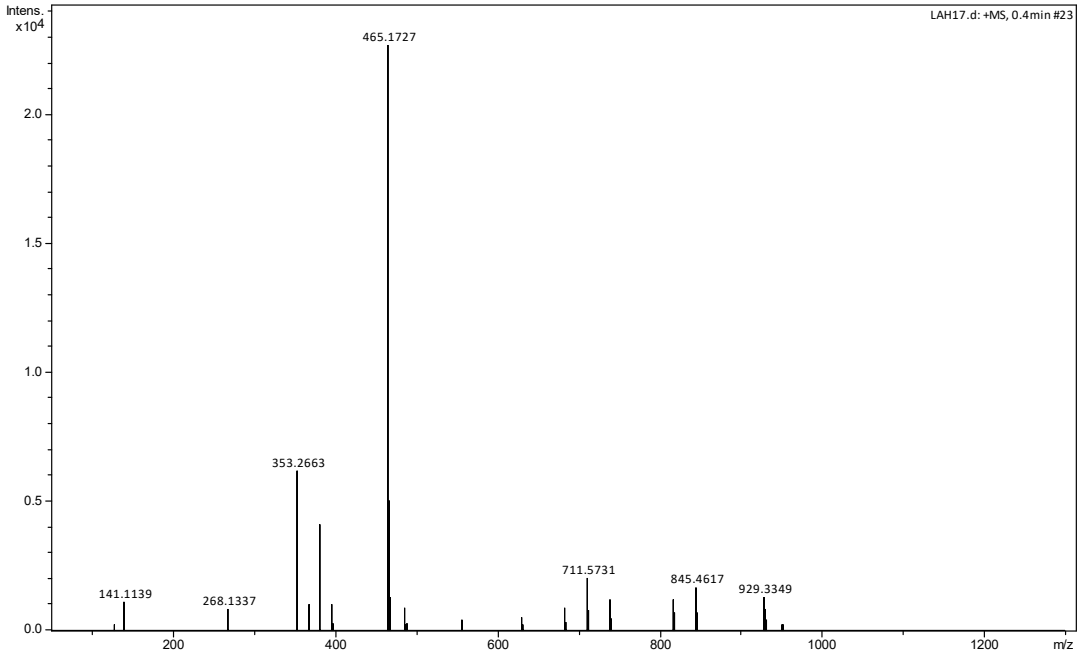
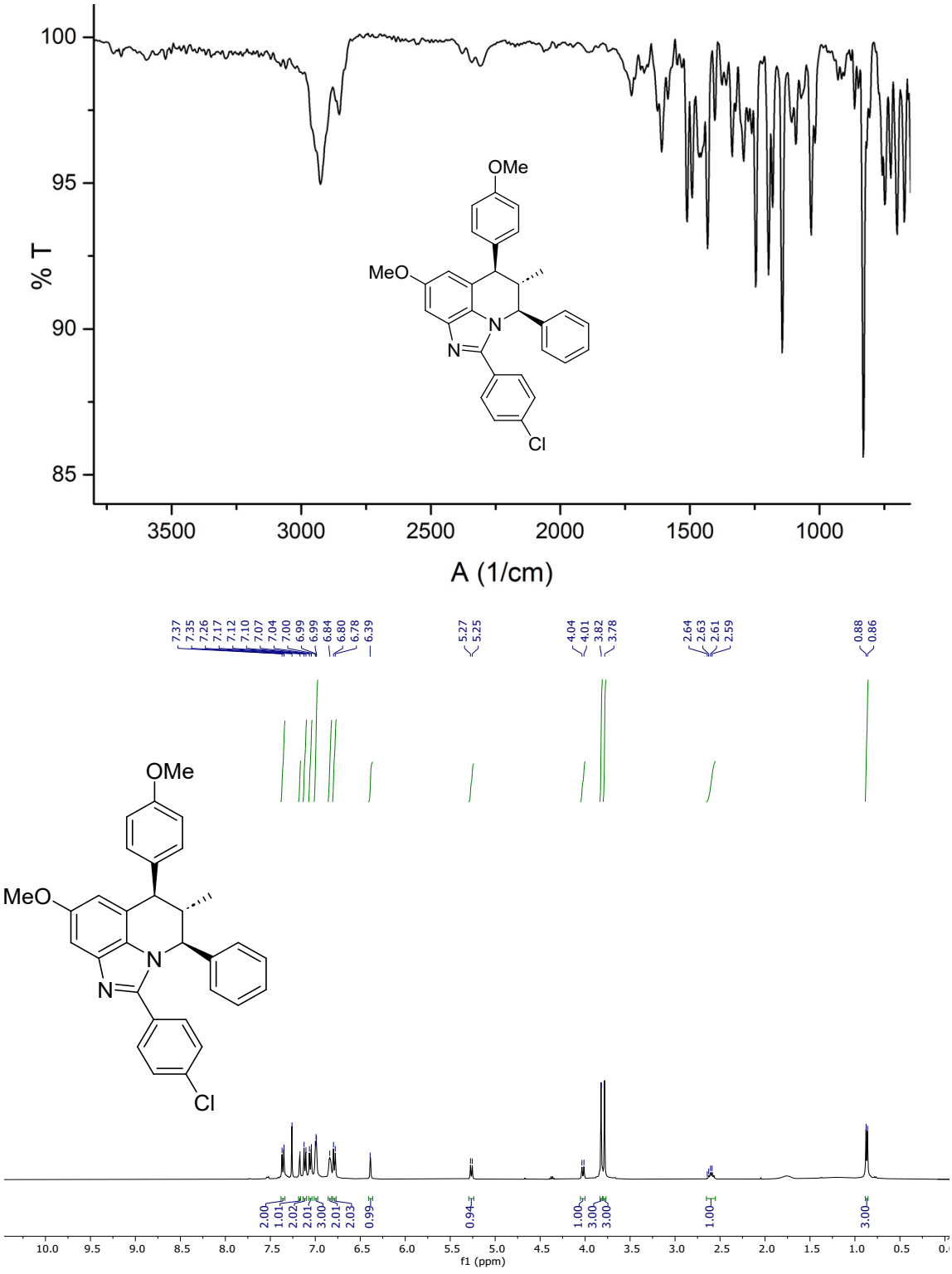
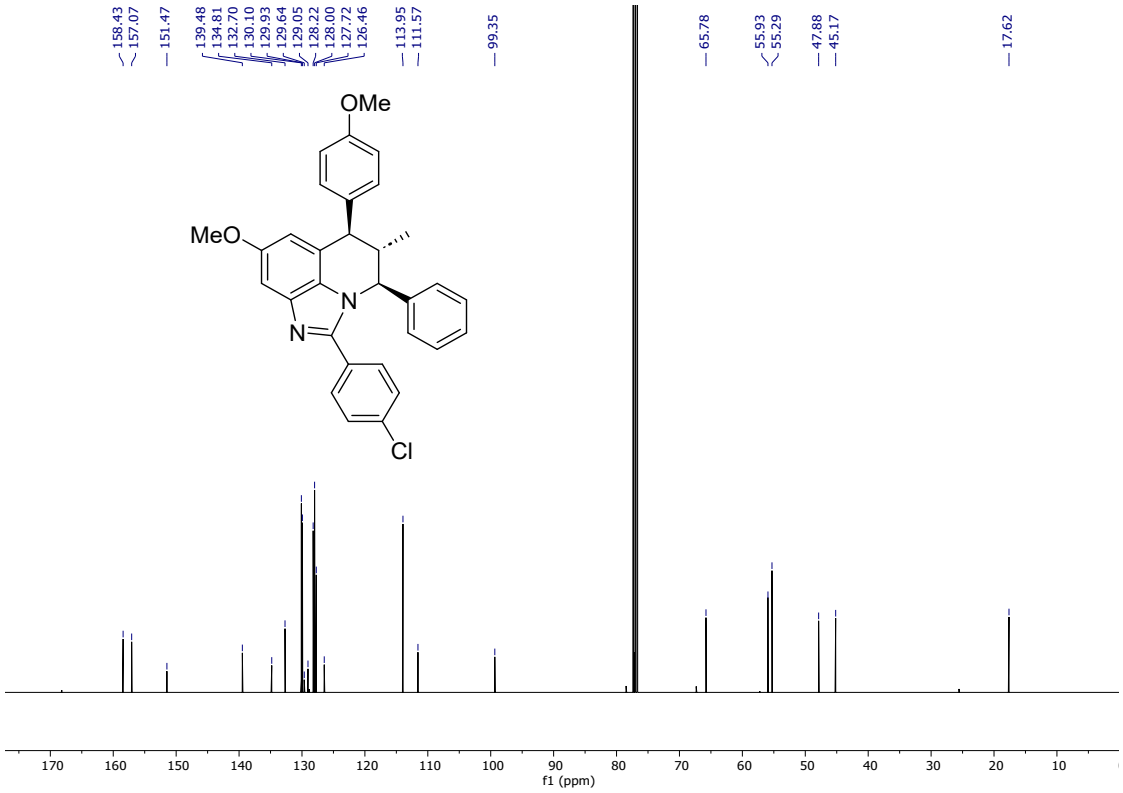

Intens.
x10^4
LAH17.d: +MS, 0.4min #23
465.1727
353.2663
141.1139
268.1337
711.5731
845.4617
929.3349
2.0
1.5
1.0
0.5
0.0
200
400
600
800
1000
1200
m/z

Figure 26. IR, ^{1}H NMR, ^{13}C NMR and HRMS spectra of ***Cis*-2-(chlorophenyl)-8-methoxy-6-(4-methoxyphenyl)-5-methyl-4-phenyl-5,6-dihydro-4*H*-imidazo[4,5,1-*ij*]quinoline (5j).**




158.43
157.07
151.47
139.48
134.81
132.70
130.10
129.93
129.64
129.05
128.22
128.00
127.72
126.46
113.95
111.57
99.35
65.78
55.93
55.29
47.88
45.17
17.62
OMe
MeO
N
N
Cl
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
f1 (ppm)

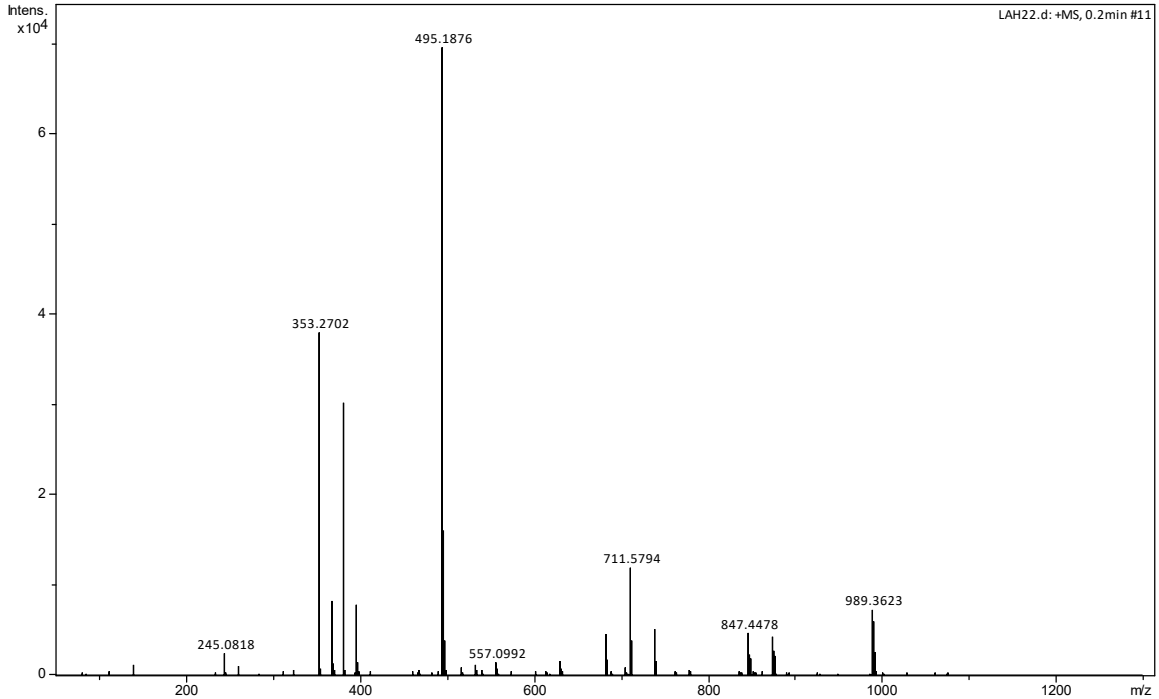
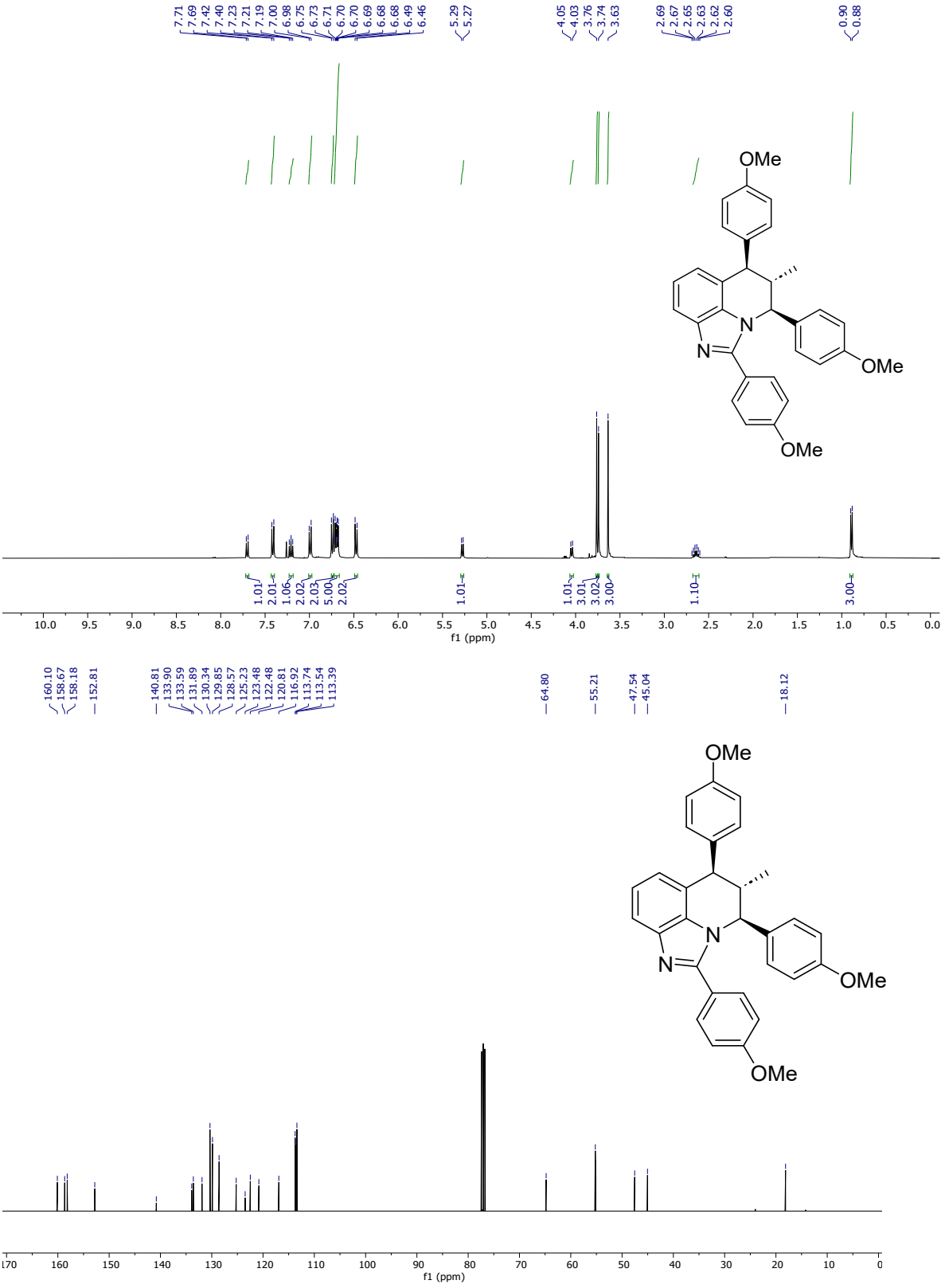

Intens.
x10^4
LAH22.d: +MS, 0.2min #11
495.1876
353.2702
711.5794
989.3623
847.4478
245.0818
557.0992
6
4
2
0
200
400
600
800
1000
1200
m/z

Figure 27. ^{1}H NMR, ^{13}C NMR and HRMS spectra of ***Cis*-2,4,6-tris(4-methoxyphenyl)-5-methyl-5,6-dihydro-4*H*-imidazo[4,5,1-*ij*]quinoline (5k).**



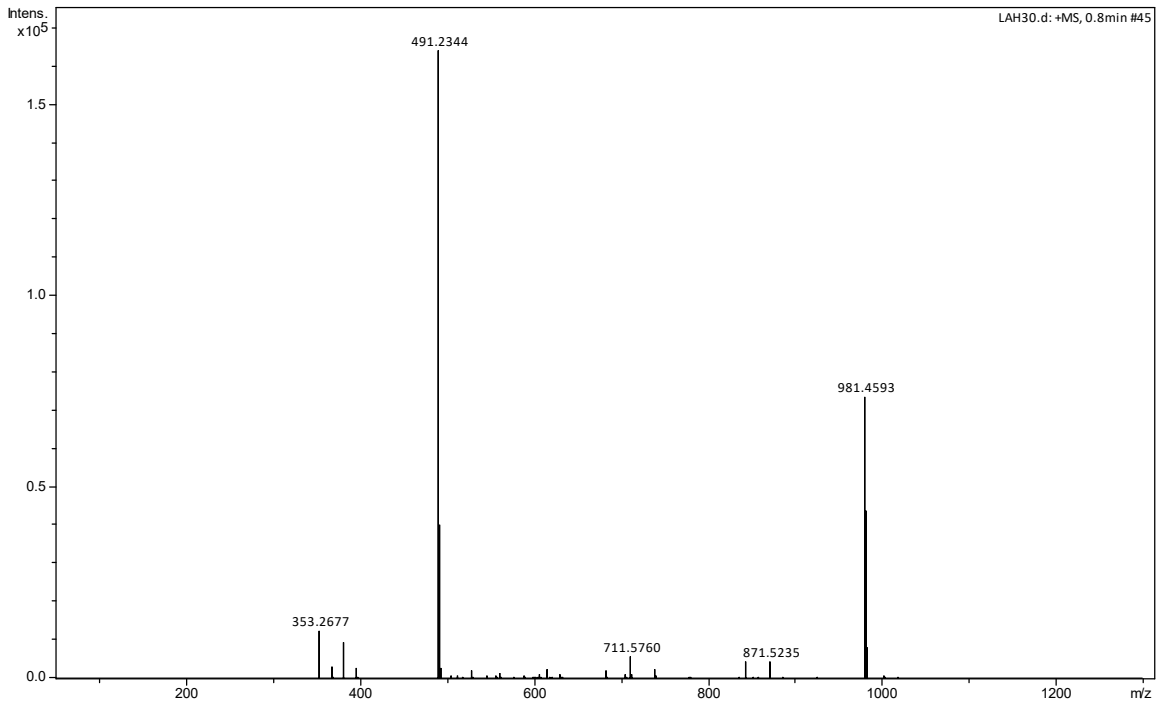
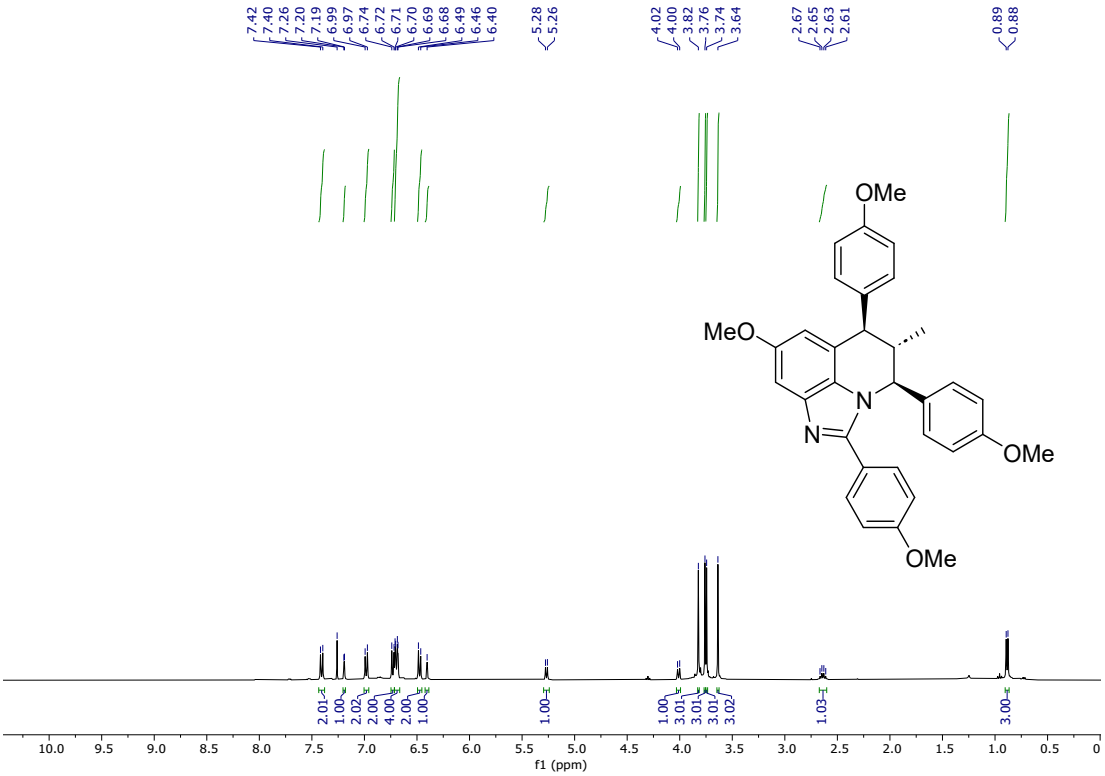
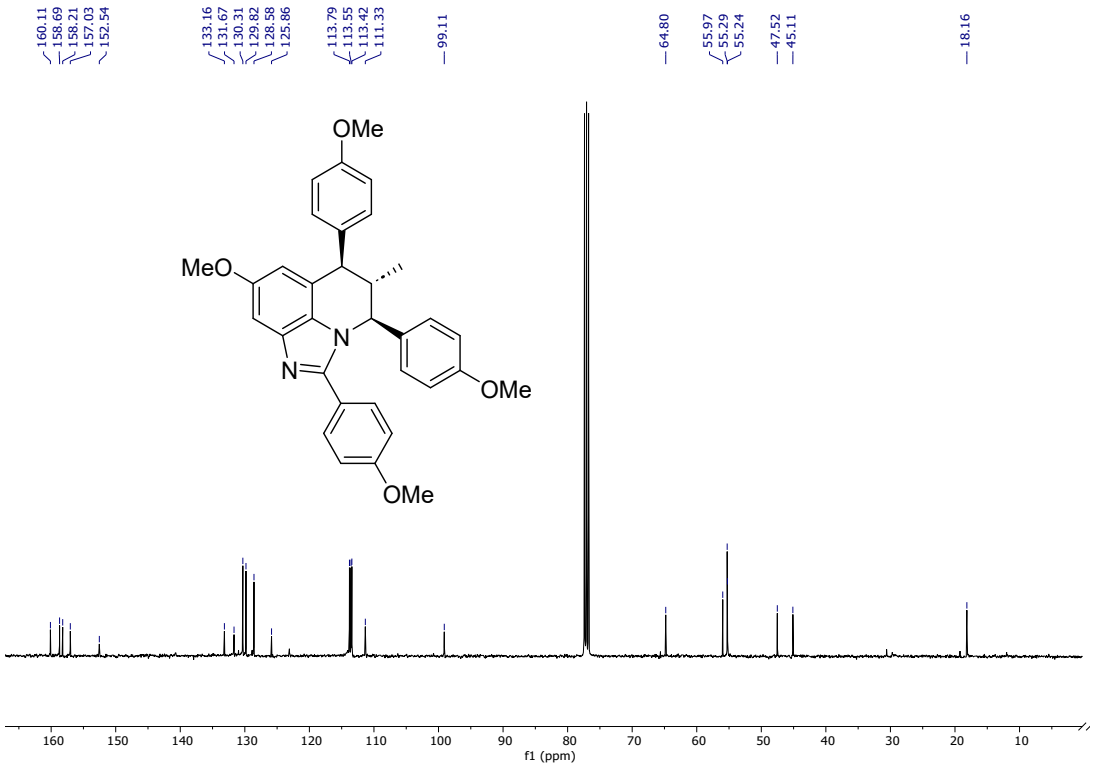


Figure 28. ^{1}H NMR, ^{13}C NMR and HRMS spectra of ***Cis*-8-methoxy-2,4,6-tris(4-methoxyphenyl)-5-methyl-4-phenyl-5,6-dihydro-4*H*-imidazo[4,5,1-*ij*]quinoline (5l).**




160.11
158.69
158.21
157.03
152.54
133.16
131.67
130.31
129.82
128.58
125.86
113.79
113.55
113.42
111.33
99.11
64.80
55.97
55.29
55.24
47.52
45.11
18.16
OMe
MeO
N
N
OMe
OMe
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
f1 (ppm)

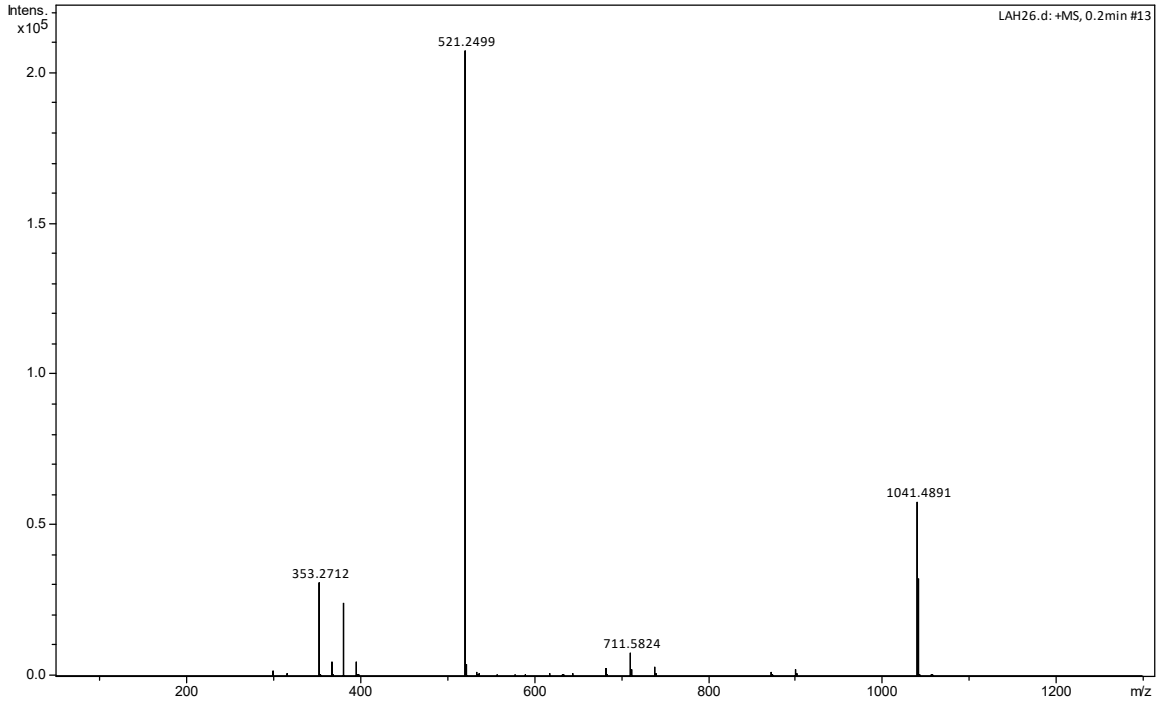
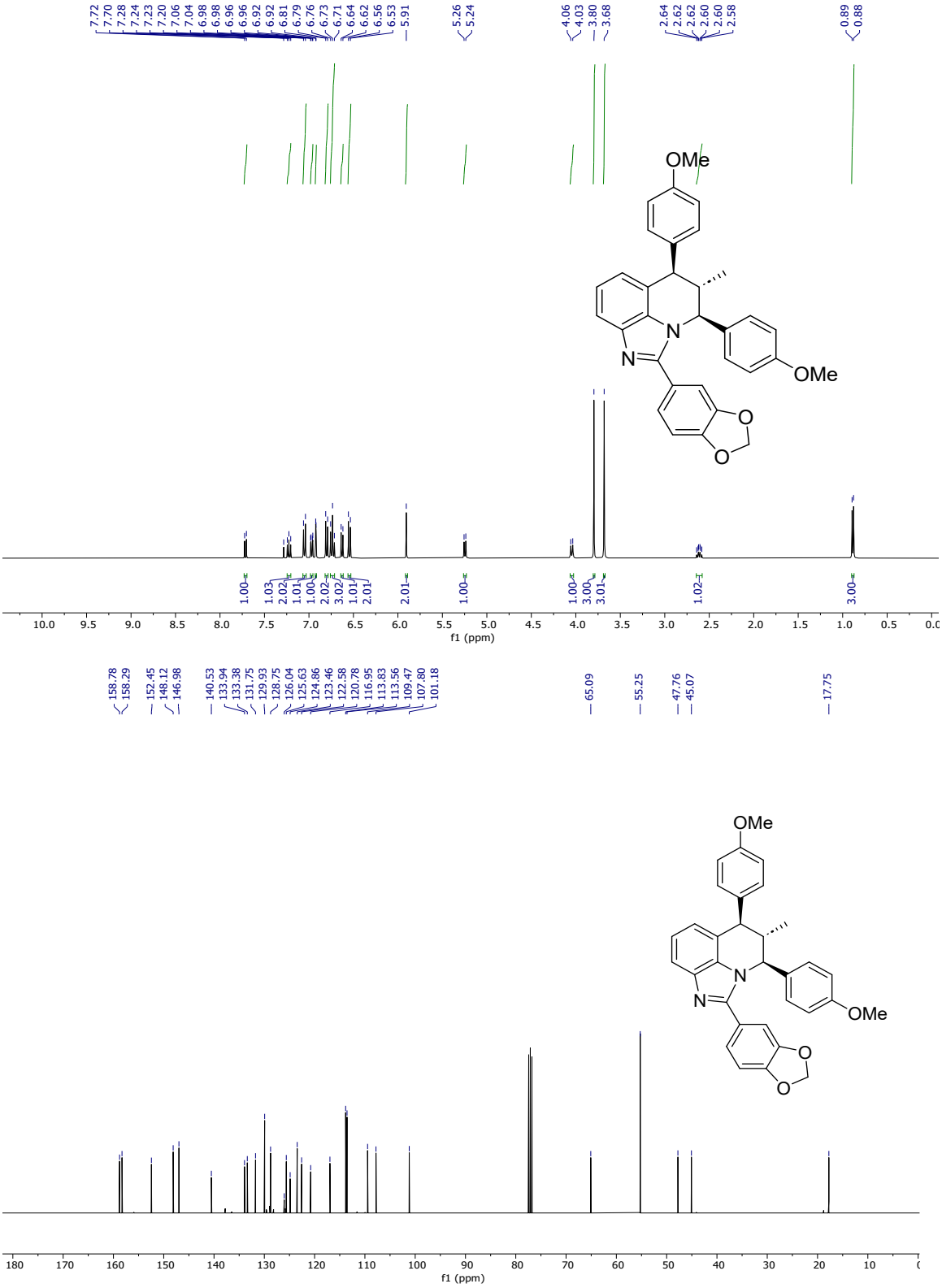

Intens.
x10^5
LAH26.d: +MS, 0.2min #13
521.2499
1041.4891
353.2712
711.5824
2.0
1.5
1.0
0.5
0.0
200
400
600
800
1000
1200
m/z

Figure 29. ^{1}H NMR, ^{13}C NMR and HRMS spectra of ***Cis*-2-(benzo[*d*][1,3]dioxol-5-yl)-4,6-bis(4-methoxyphenyl)-5-methyl-5,6-dihydro-4*H*-imidazo[4,5,1-*ij*]quinoline (5m).**



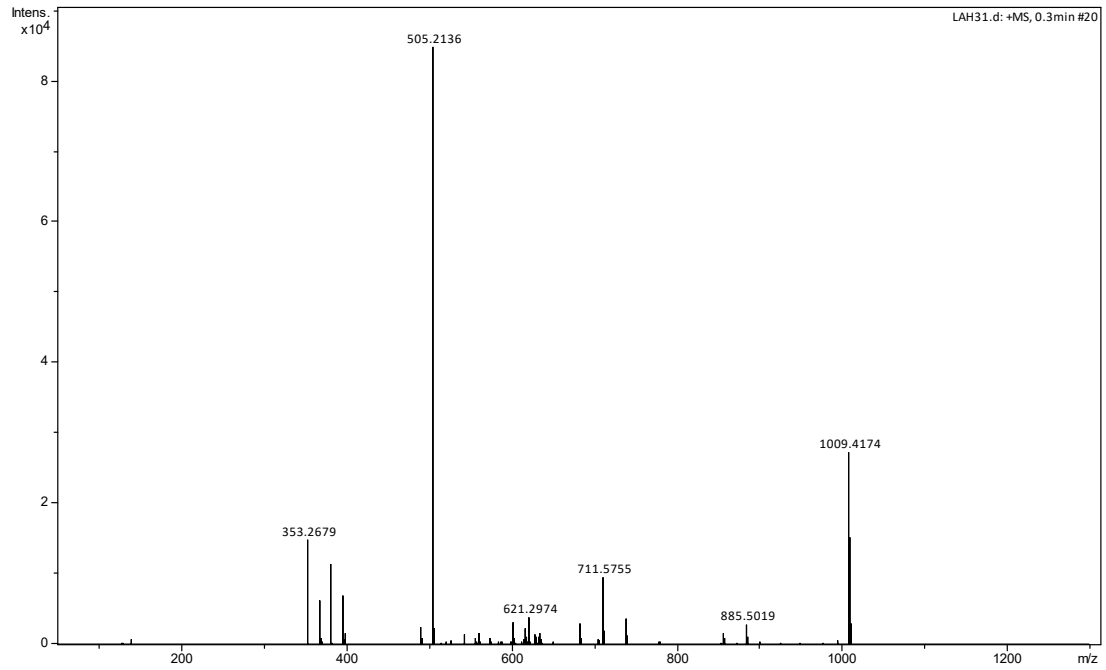
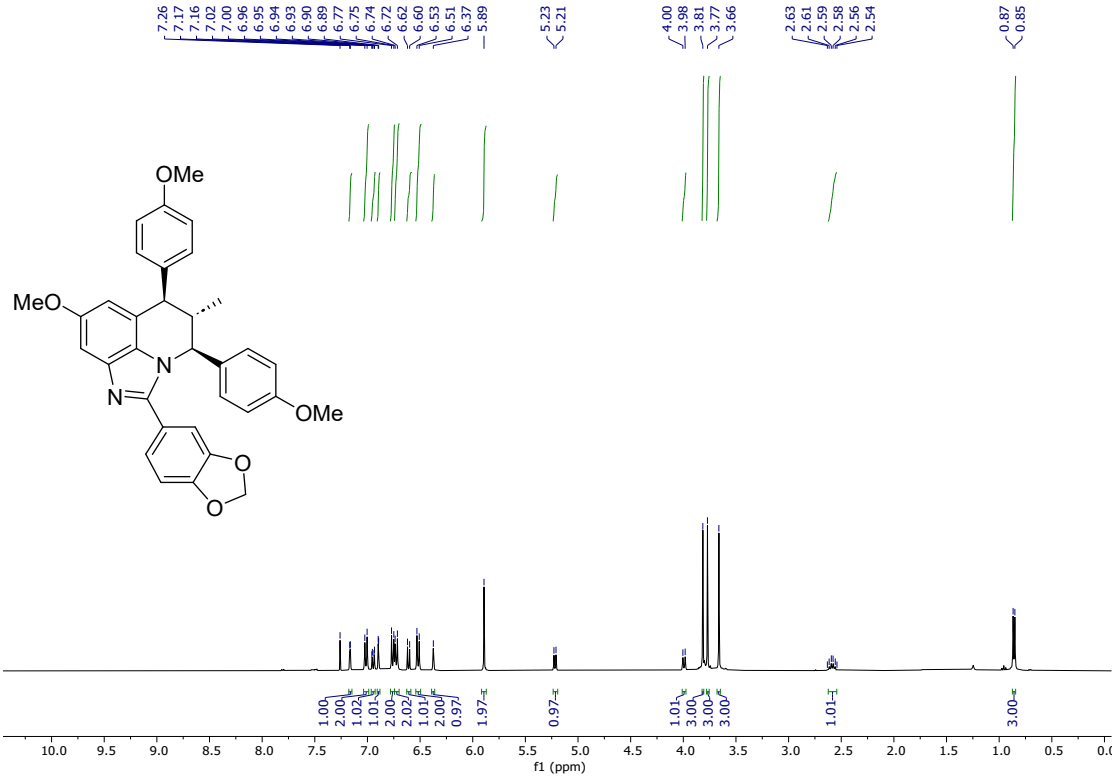
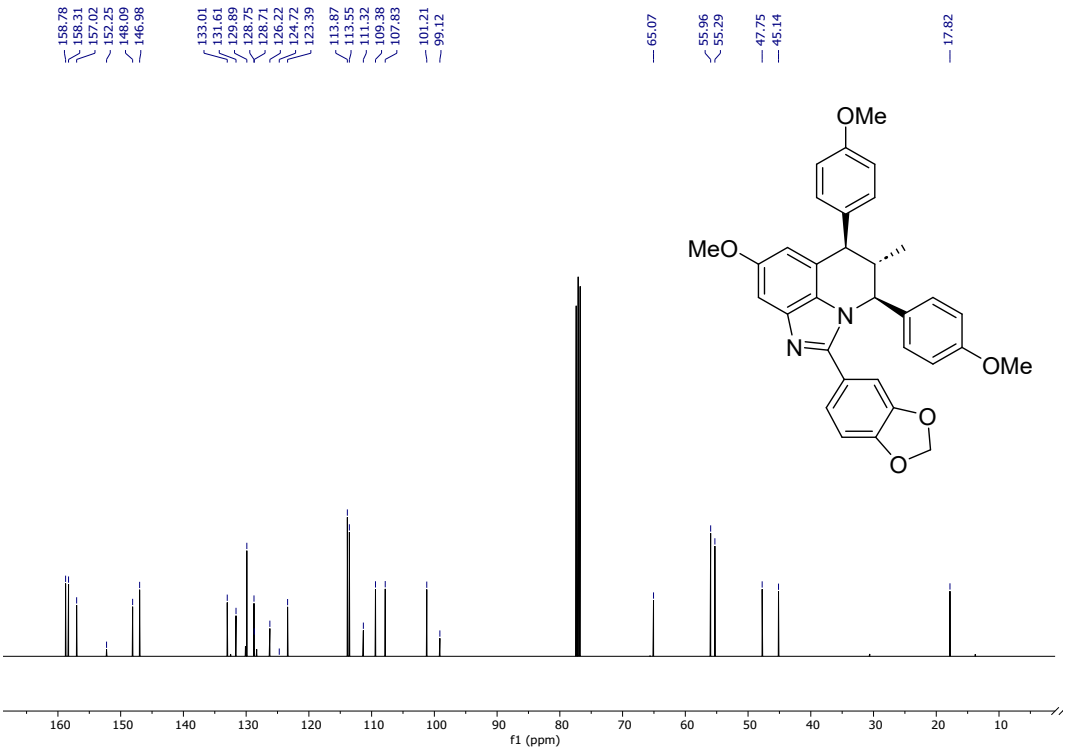


Figure 30. ^{1}H NMR, ^{13}C NMR and HRMS spectra of ***Cis*-2-(benzo[*d*][1,3]dioxol-5-yl)-8-methoxy-4,6-bis(4-methoxyphenyl)-5-methyl-5,6-dihydro-4*H*-imidazo[4,5,1-*ij*]quinoline (5n).**




158.78
158.31
157.02
152.25
148.09
146.98
133.01
131.61
129.89
128.75
128.71
126.22
124.72
123.39
113.87
113.55
111.32
109.38
107.83
101.21
99.12
65.07
55.96
55.29
47.75
45.14
17.82
OMe
MeO
N
N
OMe
O
O
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
f1 (ppm)

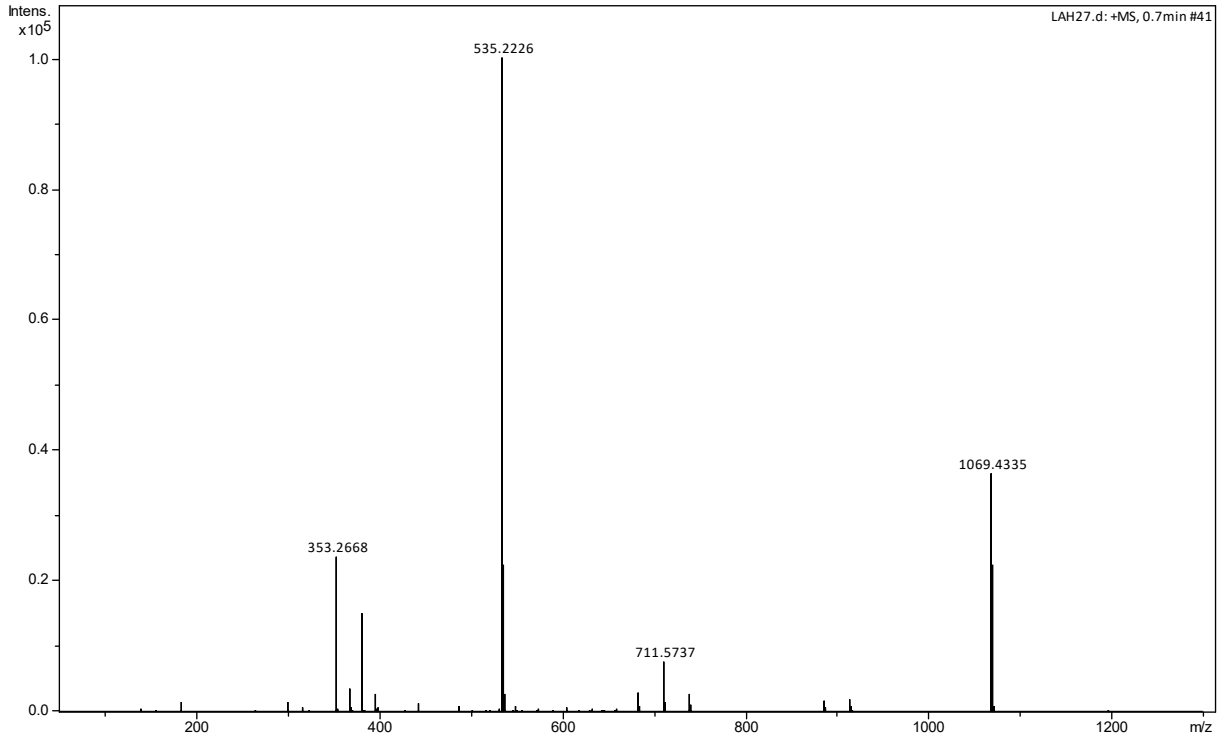
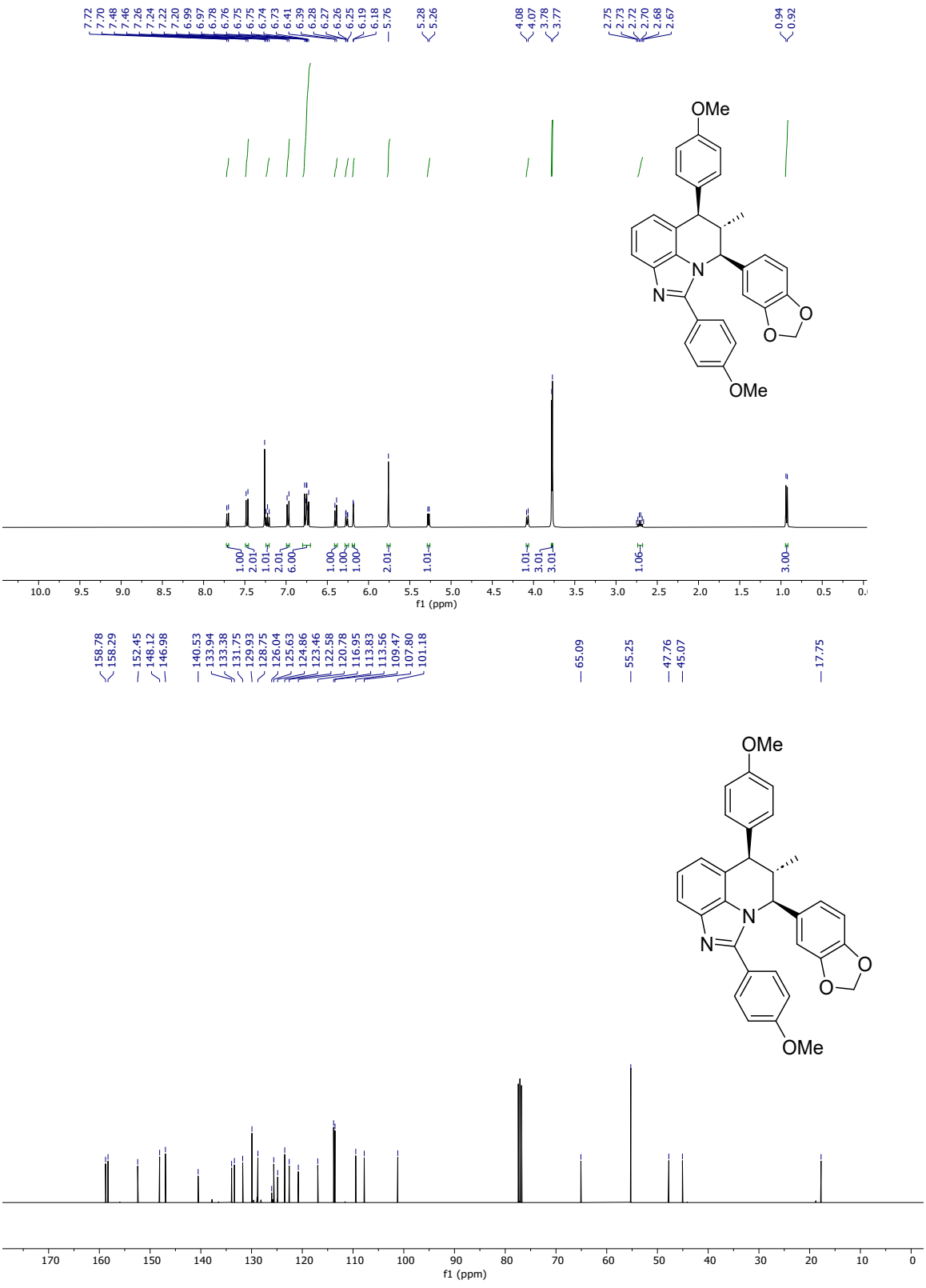

Intens.
x10^5
LAH27.d: +MS, 0.7min #41
535.2226
1069.4335
353.2668
711.5737
1.0
0.8
0.6
0.4
0.2
0.0
200
400
600
800
1000
1200
m/z

Figure 31. ^{1}H NMR, ^{13}C NMR and HRMS spectra of ***Cis*-4-(benzo[*d*][1,3]dioxol-5-yl)-2,6-bis(4-methoxyphenyl)-5-methyl-5,6-dihydro-4*H*-imidazo[4,5,1-*ij*]quinoline (5o).**



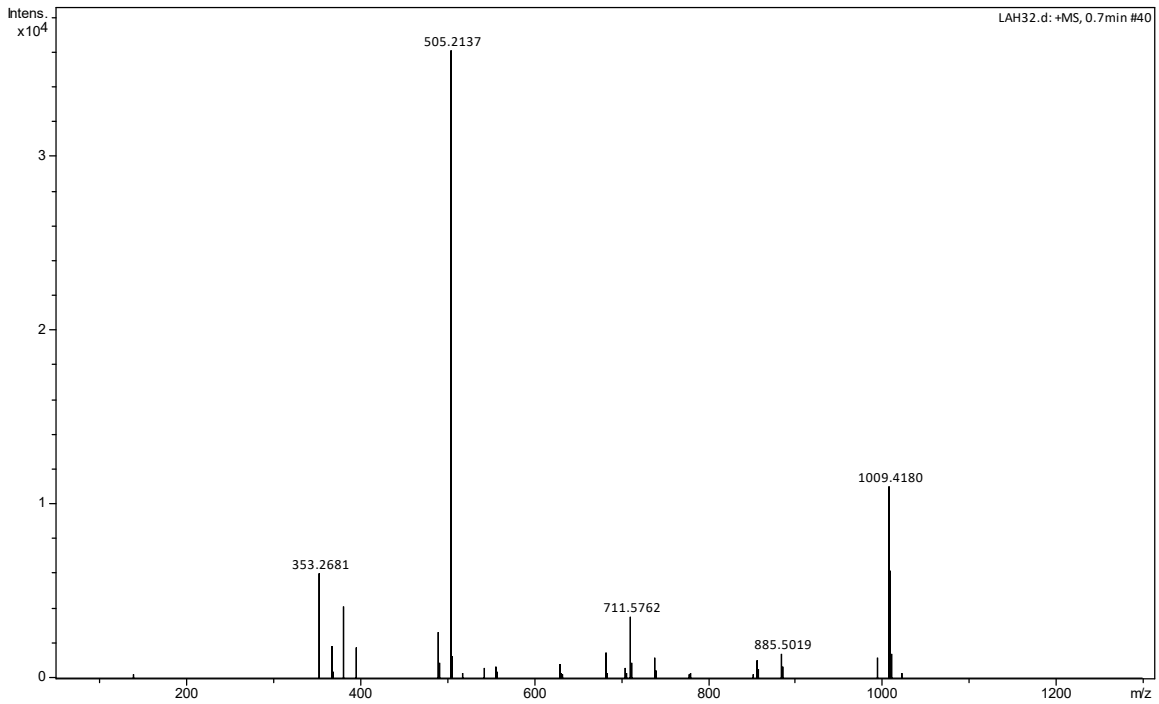
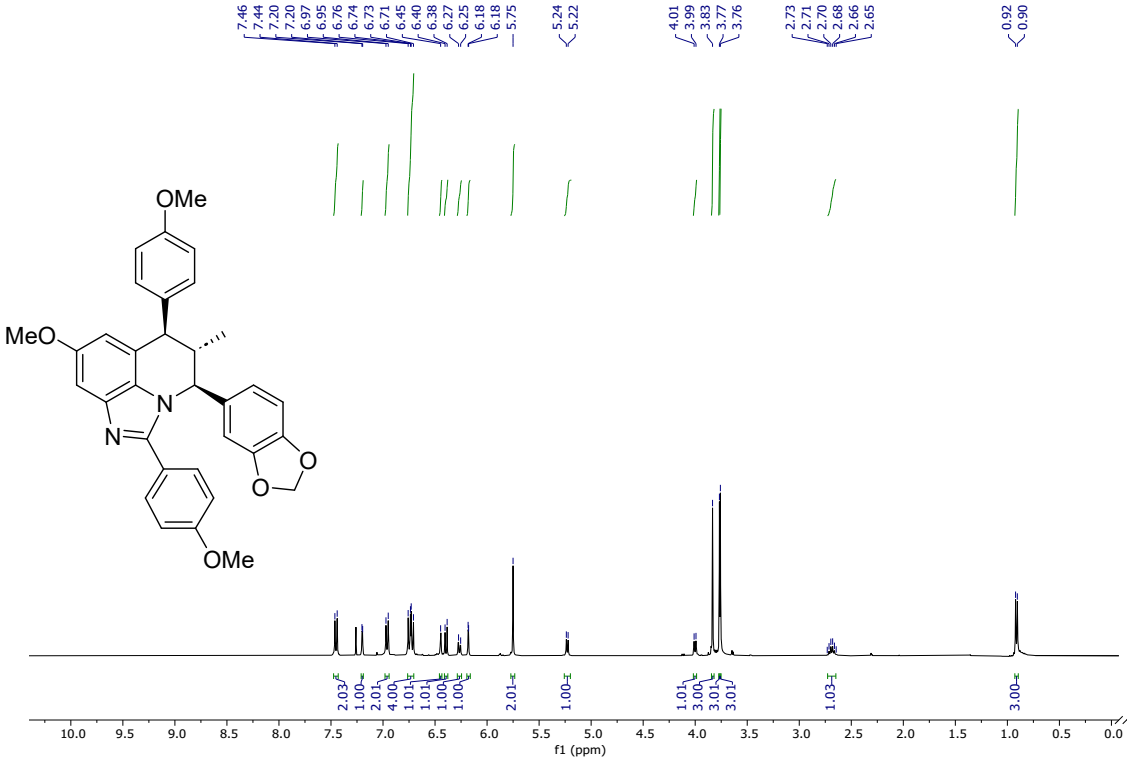
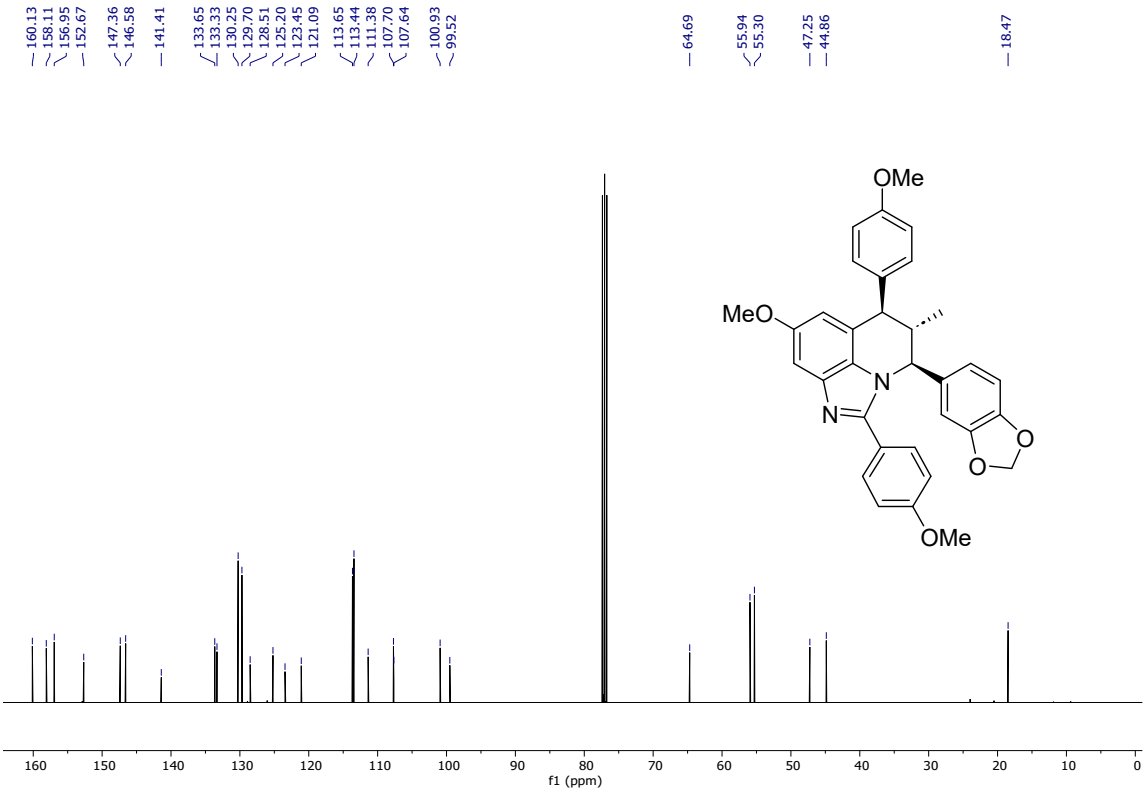


Figure 32. ^{1}H NMR, ^{13}C NMR and HRMS spectra of ***Cis*-4-(benzo[*d*][1,3]dioxol-5-yl)-8-methoxy-2,6-bis(4-methoxyphenyl)-5-methyl-5,6-dihydro-4*H*-imidazo[4,5,1-*ij*]quinoline (5p).**




160.13
158.11
156.95
152.67
147.36
146.58
141.41
133.65
133.33
130.25
129.70
128.51
125.20
123.45
121.09
113.65
113.44
111.38
107.70
107.64
100.93
99.52
64.69
55.94
55.30
47.25
44.86
18.47
OMe
MeO
N
N
O
O
OMe
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
f1 (ppm)

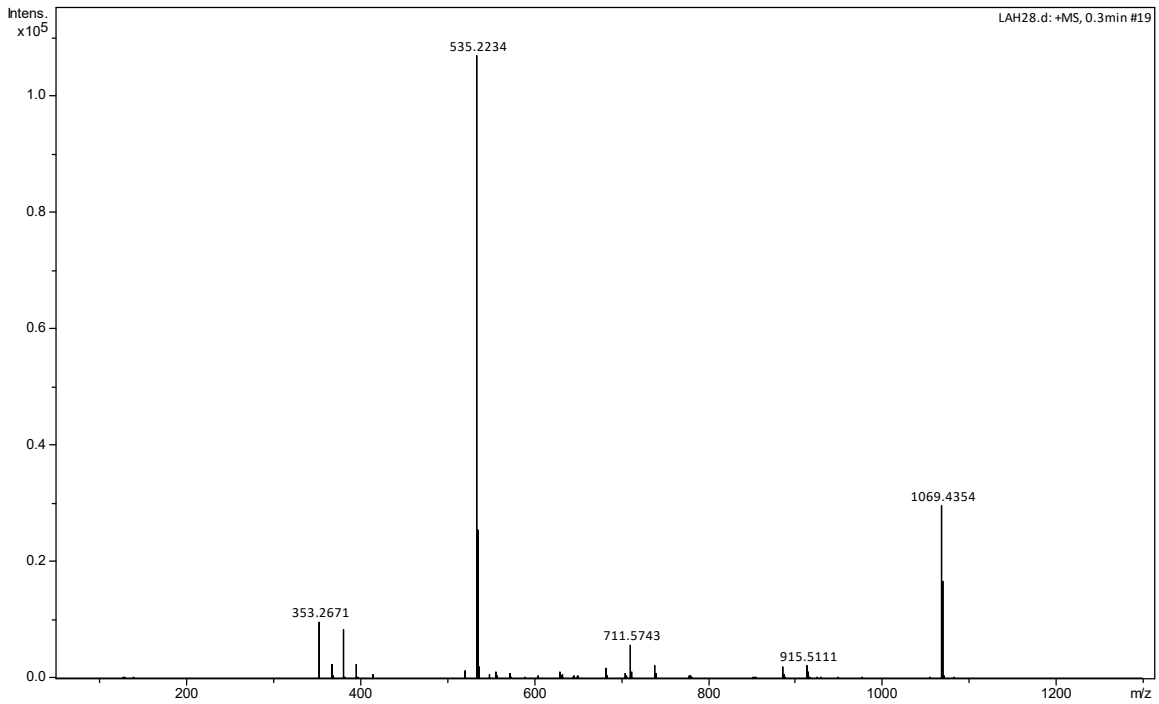
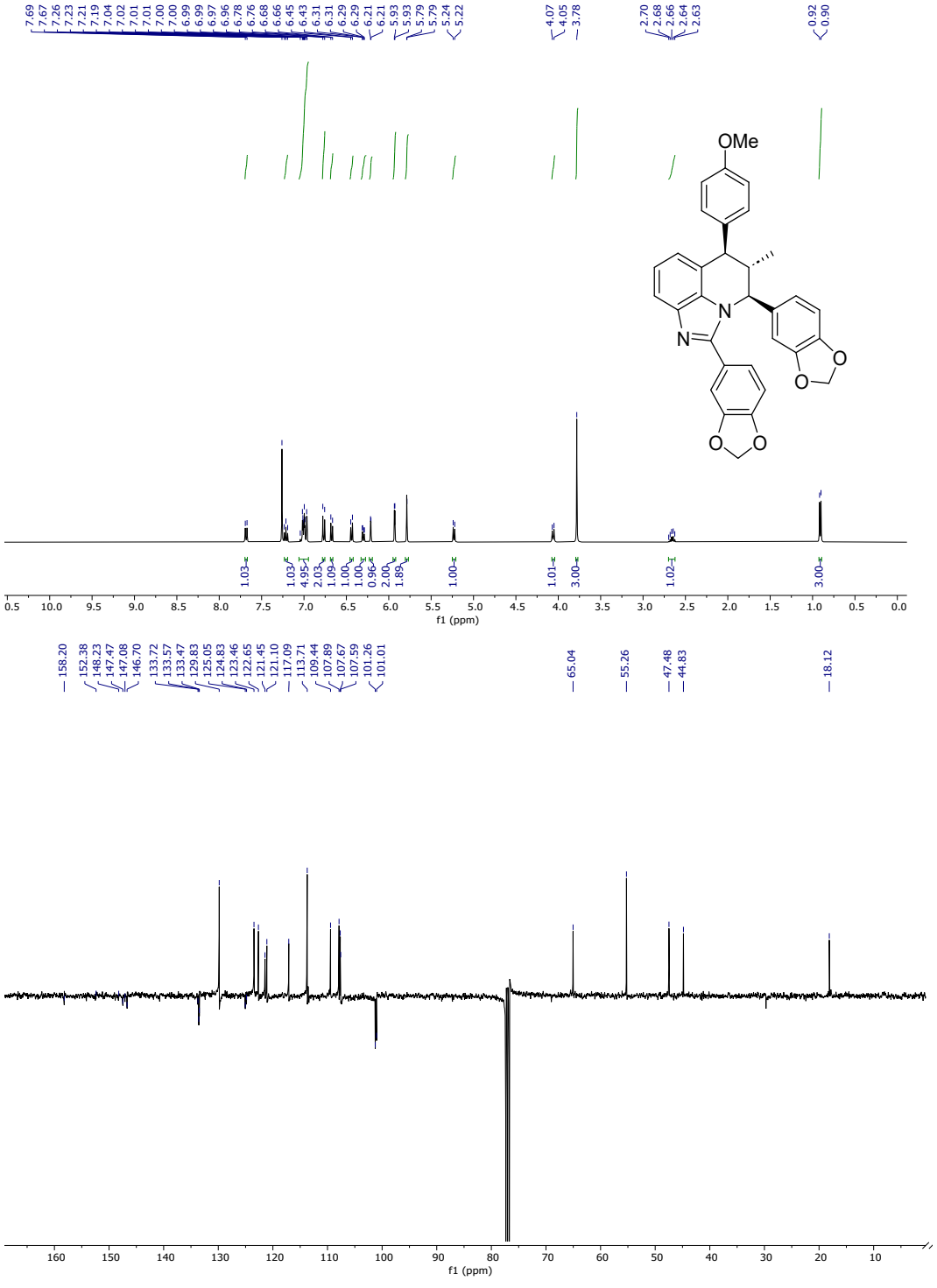

Intens.
x10^5
LAH28.d: +MS, 0.3min #19
535.2234
1069.4354
353.2671
711.5743
915.5111
1.0
0.8
0.6
0.4
0.2
0.0
200
400
600
800
1000
1200
m/z

Figure 33. ^{1}H NMR spectra, APT spectra and HRMS spectra of ***Cis*-2,4-bis(benzo[*d*][1,3]dioxol-5-yl)-6-(4-methoxyphenyl)-5-methyl-5,6-dihydro-4*H*-imidazo[4,5,1-*ij*]quinoline (5q).**



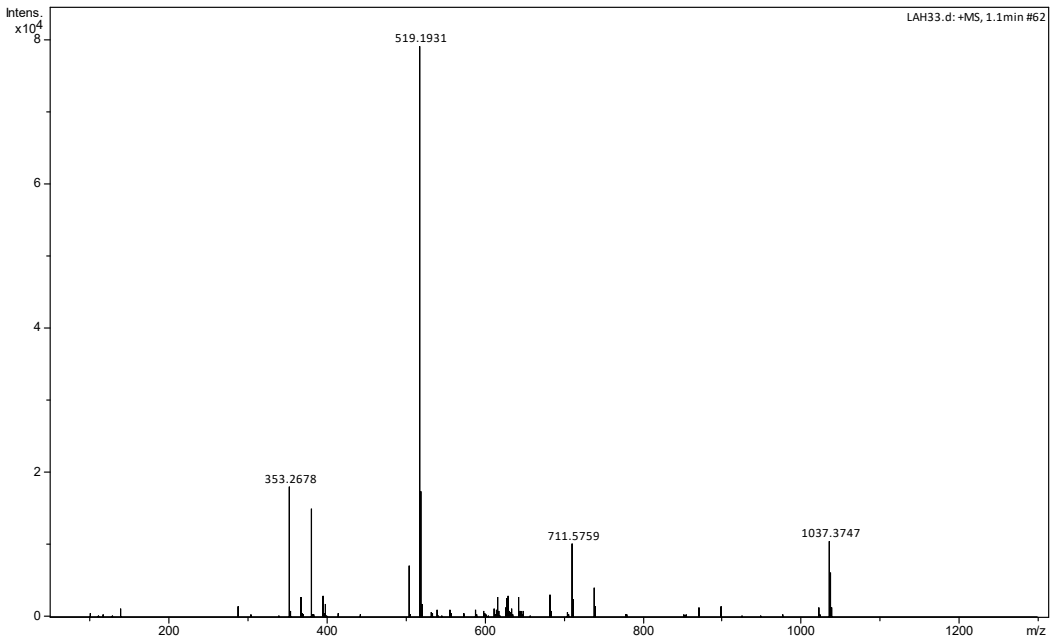
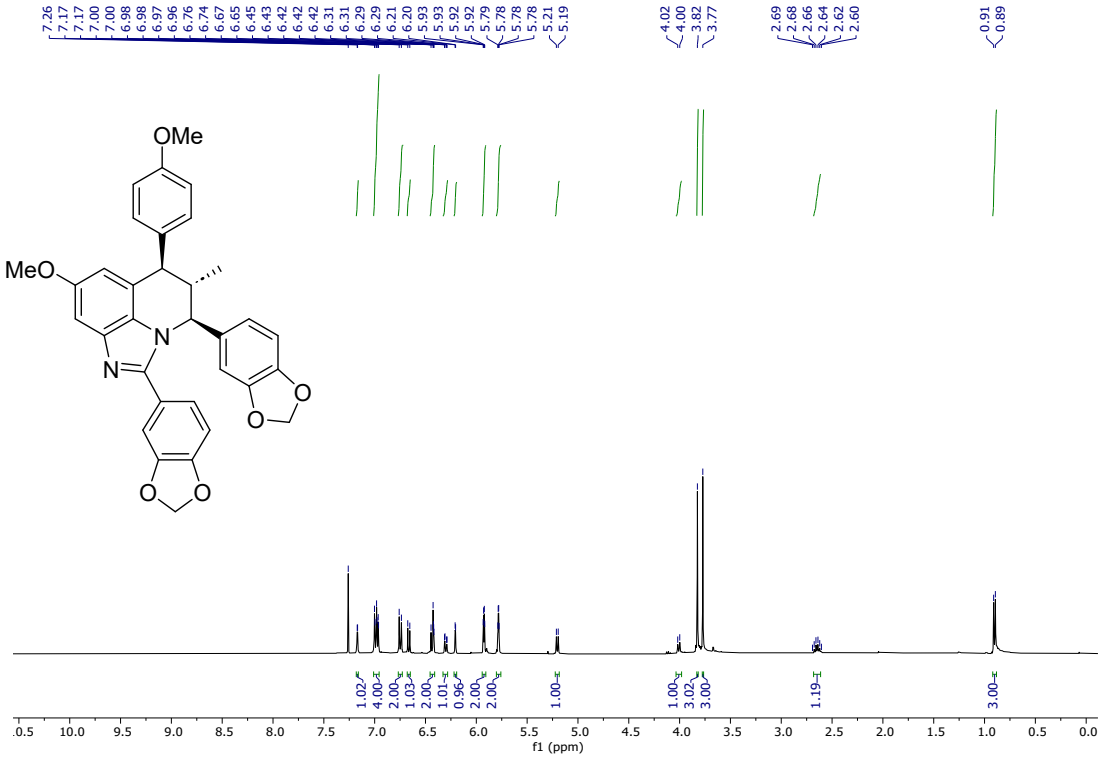
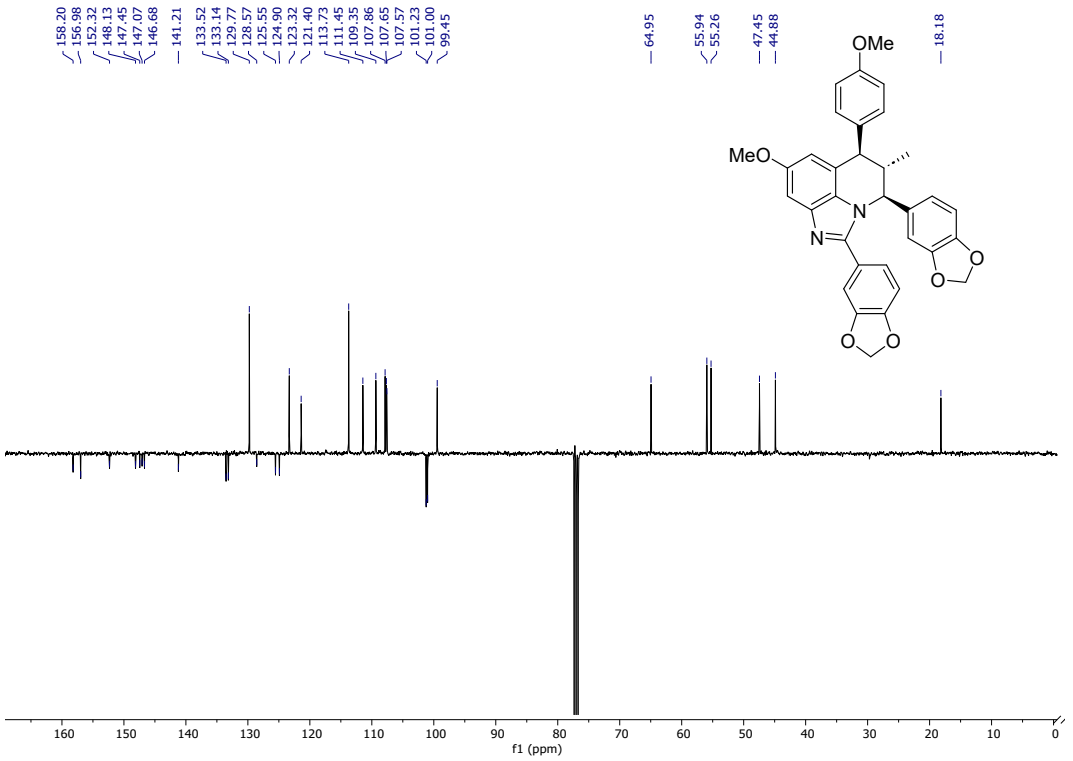


Figure 34. ^{1}H NMR, APT and HRMS spectra of ***Cis*-2,4-bis(benzo[*d*][1,3]dioxol-5-yl)-6-(4-methoxyphenyl)-8-methoxy-5-methyl-5,6-dihydro-4*H*-imidazo[4,5,1-*ij*]quinoline (5r).**




158.20
156.98
152.32
148.13
147.45
147.07
146.68
141.21
133.52
133.14
129.77
128.57
125.55
124.90
123.32
121.40
113.73
111.45
109.35
107.86
107.65
107.57
101.23
101.00
99.45
64.95
55.94
55.26
47.45
44.88
18.18
OMe
MeO
N
N
O
O
O
O
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
f1 (ppm)

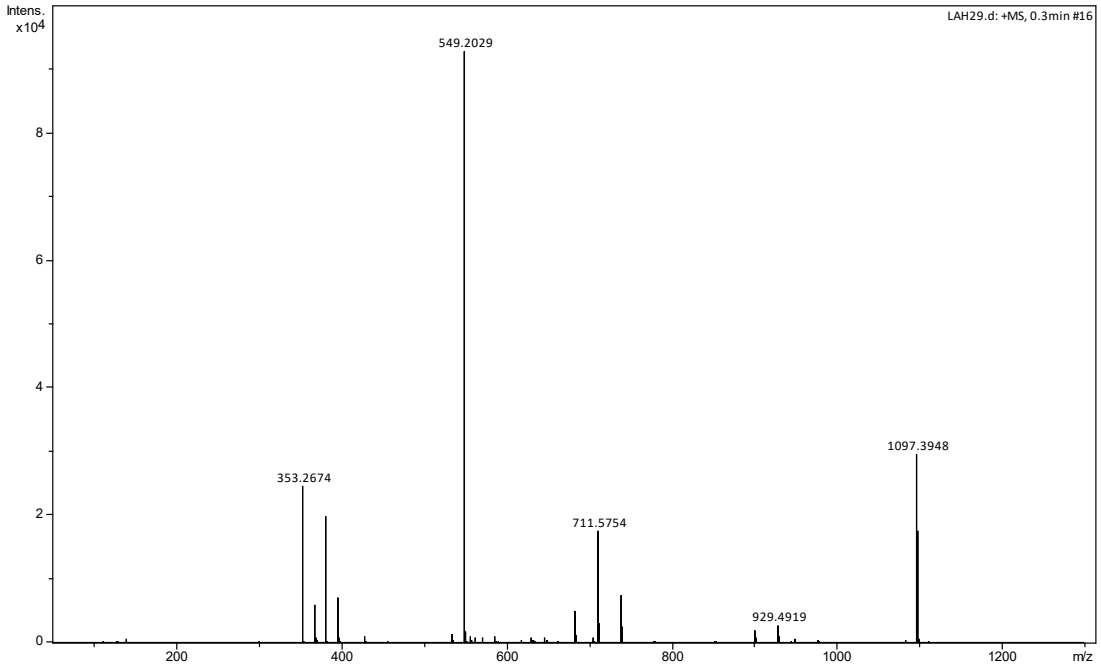
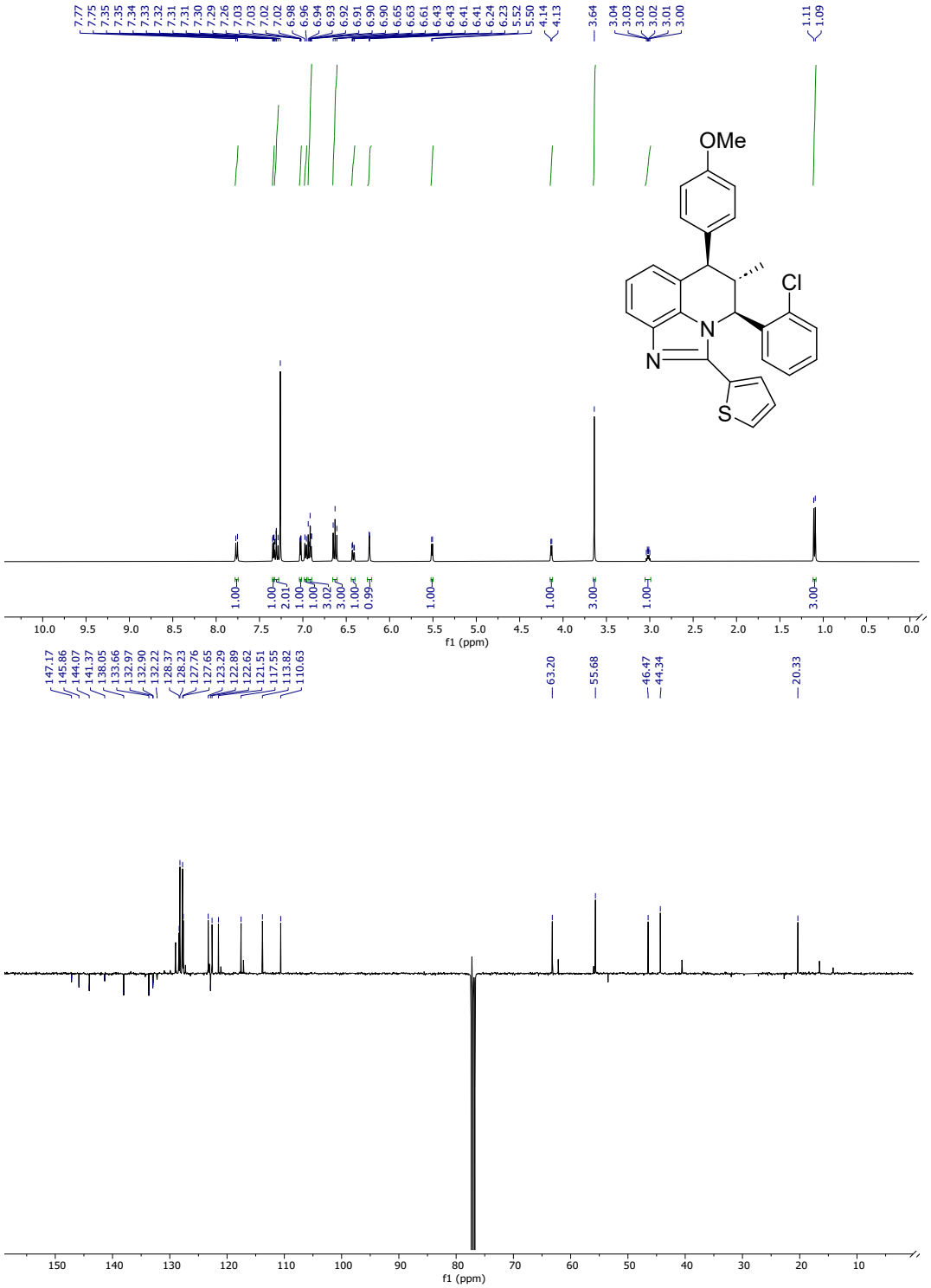

Intens.
x10^4
LAH29.d: +MS, 0.3min #16
549.2029
1097.3948
353.2674
711.5754
929.4919
8
6
4
2
0
200
400
600
800
1000
1200
m/z

Figure 35. ^{1}H NMR, APT and HRMS spectra of ***Cis*-4-(2-chlorophenyl)-6-(4-methoxyphenyl)-5-methyl-2-(thiophen-2-yl)-5,6-dihydro-4*H*-imidazo[4,5,1-*ij*]quinoline (5s).**



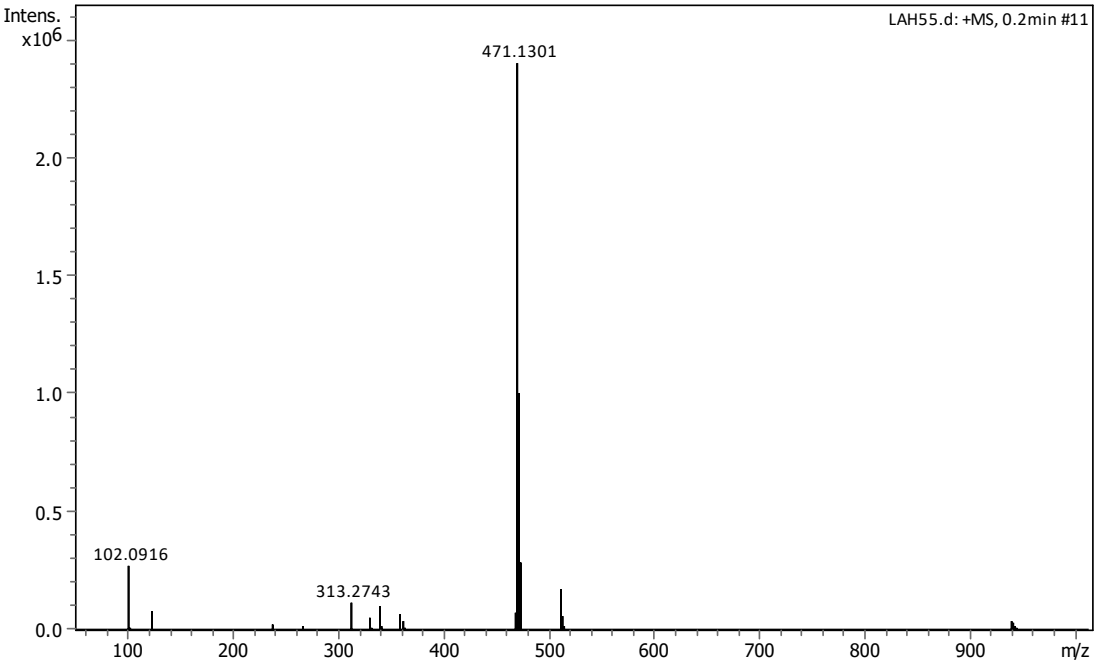
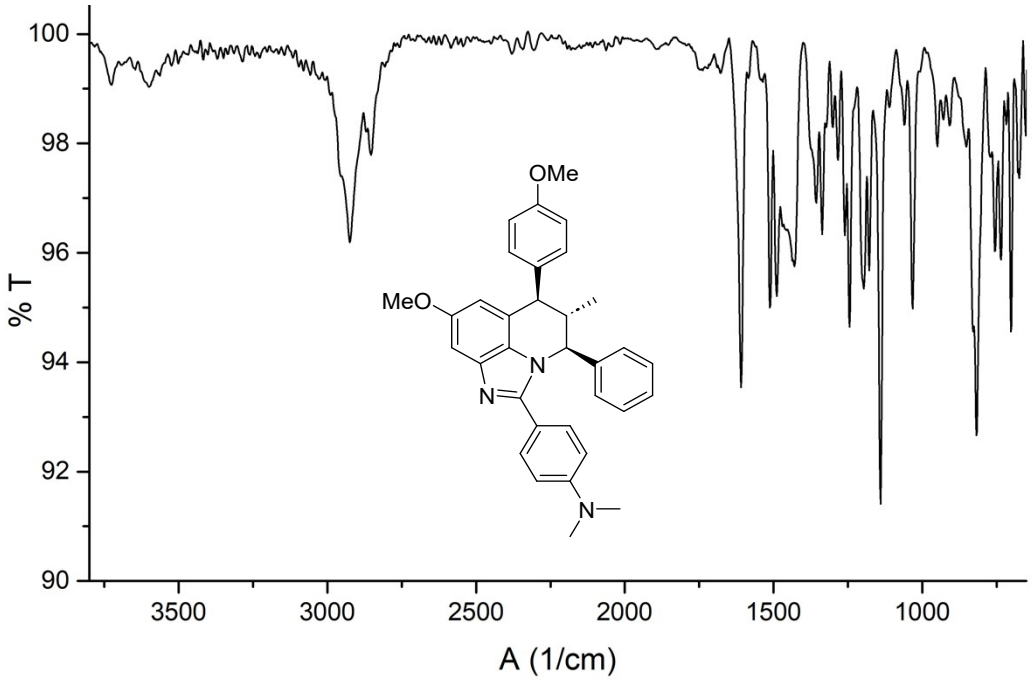
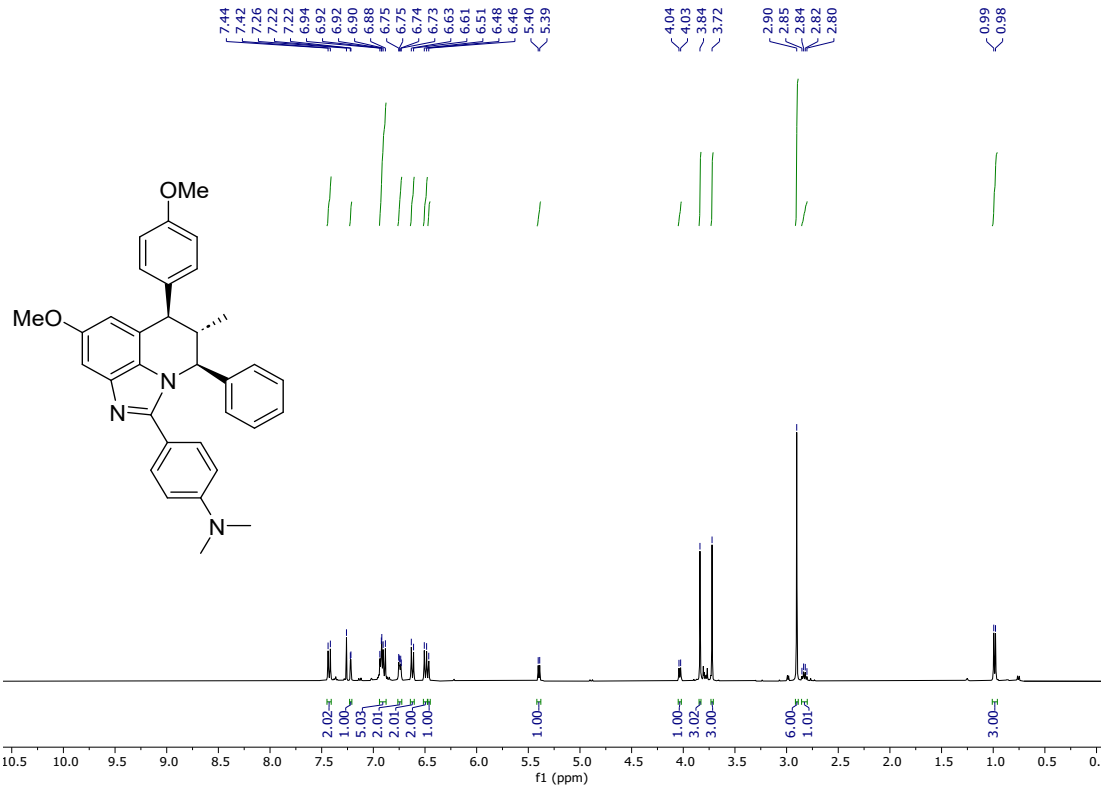
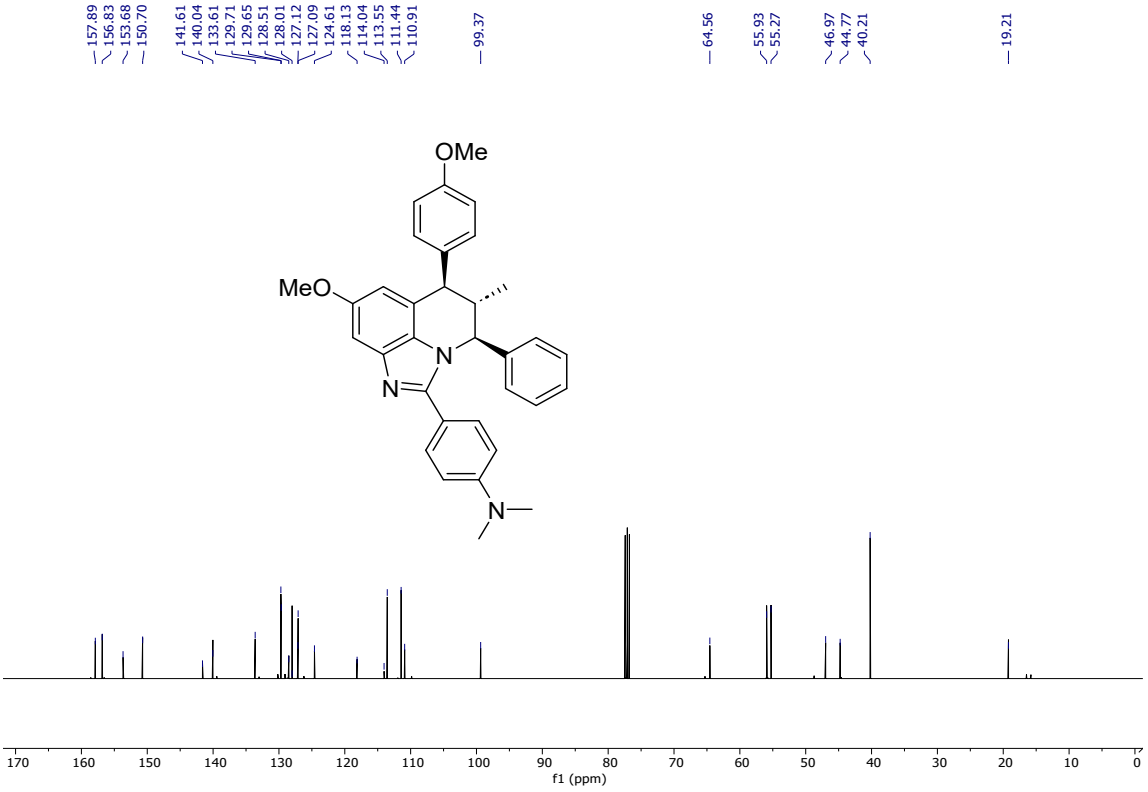


Figure 36. IR, ^{1}H NMR, ^{13}C NMR and HRMS spectra of ***Cis*-8-methoxy-6-(4-methoxyphenyl)-5-methyl-4-phenyl-5,6-dihydro-4*H*-imidazo[4,5,1-*ij*]quinolin-2-yl)-*N*,*N*-dimethylaniline (5t).**




7.44
7.42
7.26
7.22
7.22
6.94
6.92
6.92
6.90
6.88
6.75
6.75
6.74
6.73
6.63
6.61
6.51
6.48
6.46
5.40
5.39
4.04
4.03
3.84
3.72
2.90
2.85
2.84
2.82
2.80
0.99
0.98
OMe
MeO
N
N
N
2.02
1.00
5.03
2.01
2.01
2.00
1.00
1.00
1.00
3.02
3.00
6.00
1.01
3.00
10.5 10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.
f1 (ppm)


157.89
156.83
153.68
150.70
141.61
140.04
133.61
129.71
129.65
128.51
128.01
127.12
127.09
124.61
118.13
114.04
113.55
111.44
110.91
99.37
64.56
55.93
55.27
46.97
44.77
40.21
19.21
OMe
MeO
N
N
N
170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0
f1 (ppm)

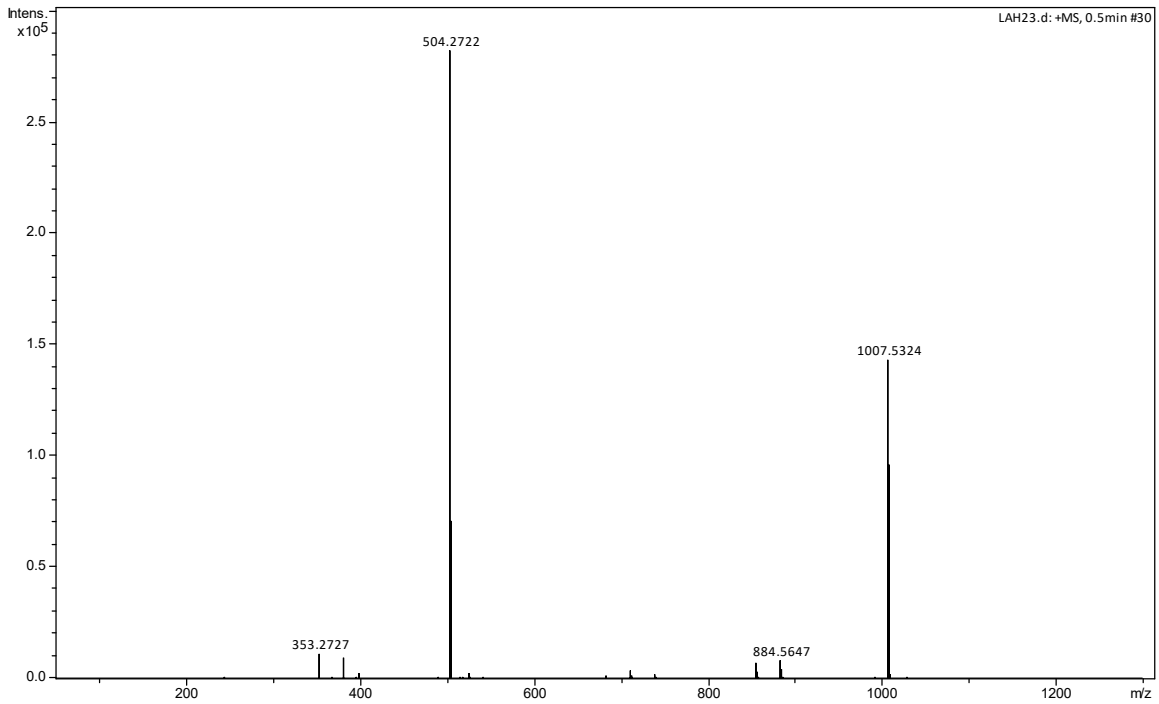
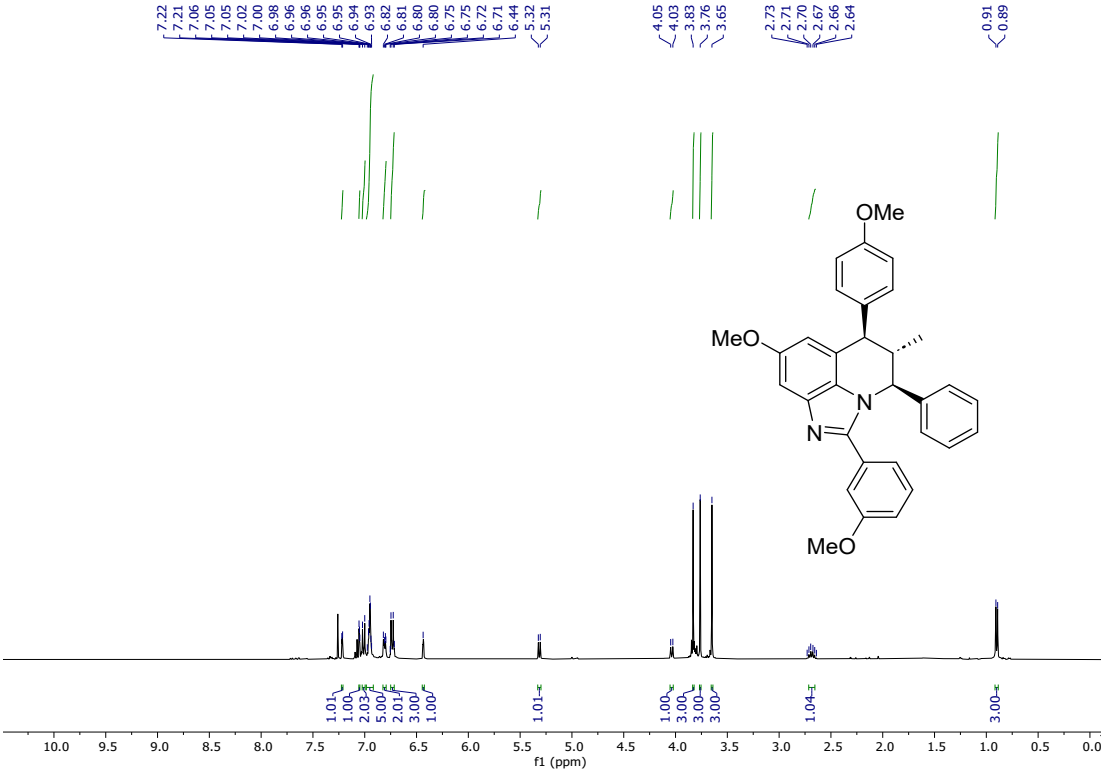
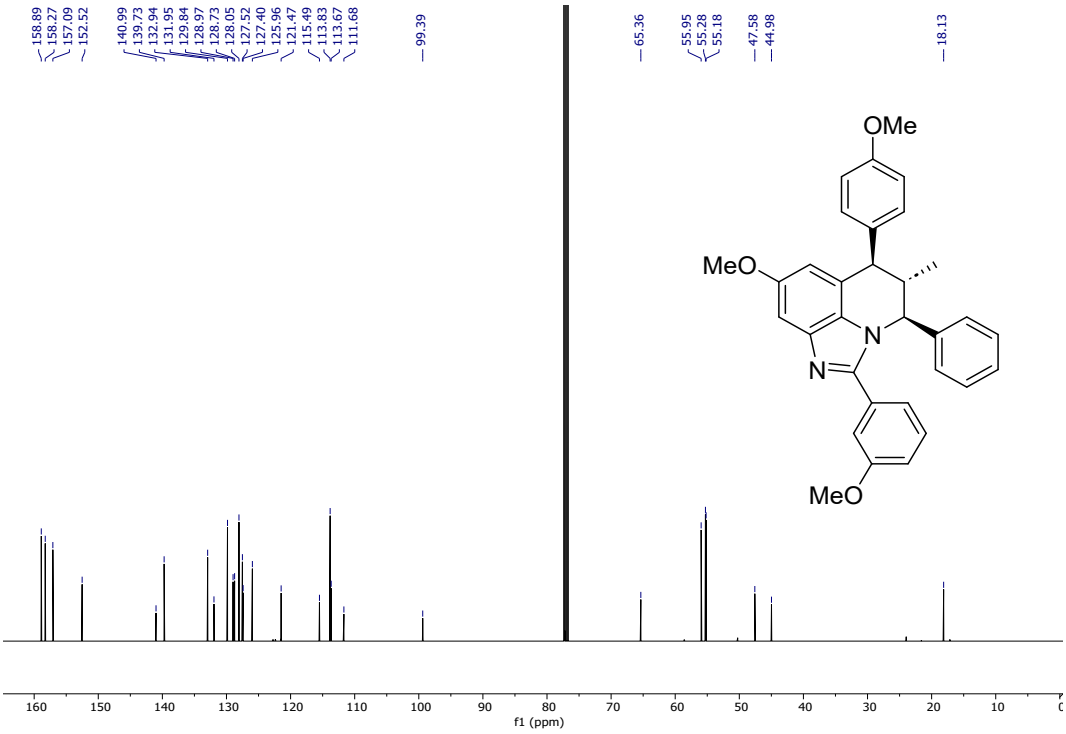


Figure 37. ^{1}H NMR, ^{13}C NMR and HRMS spectra of ***Cis*-8-methoxy-2-(3-methoxyphenyl)-6-(4-methoxyphenyl)-5-methyl-4-phenyl-5,6-dihydro-4*H*-imidazo[4,5,1-*ij*]quinoline (5u).**




158.89
158.27
157.09
152.52
140.99
139.73
132.94
131.95
129.84
128.97
128.73
128.05
127.52
127.40
125.96
121.47
115.49
113.83
113.67
111.68
99.39
65.36
55.95
55.28
55.18
47.58
44.98
18.13
OMe
MeO
N
N
MeO
f1 (ppm)

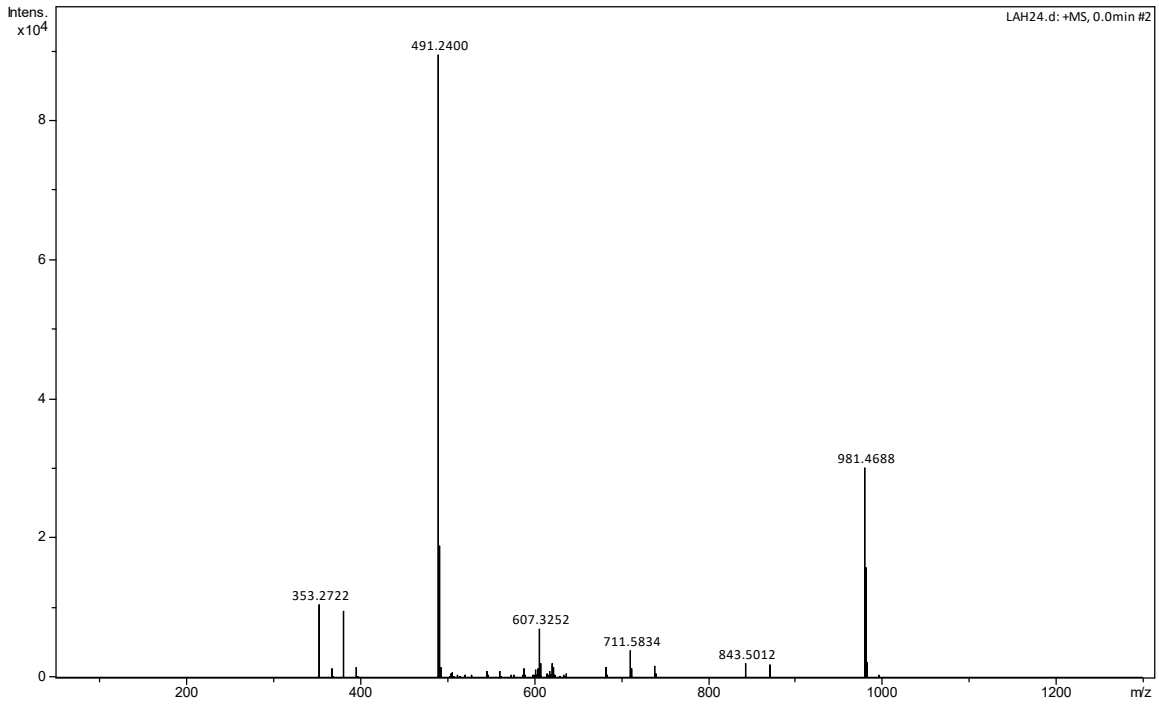
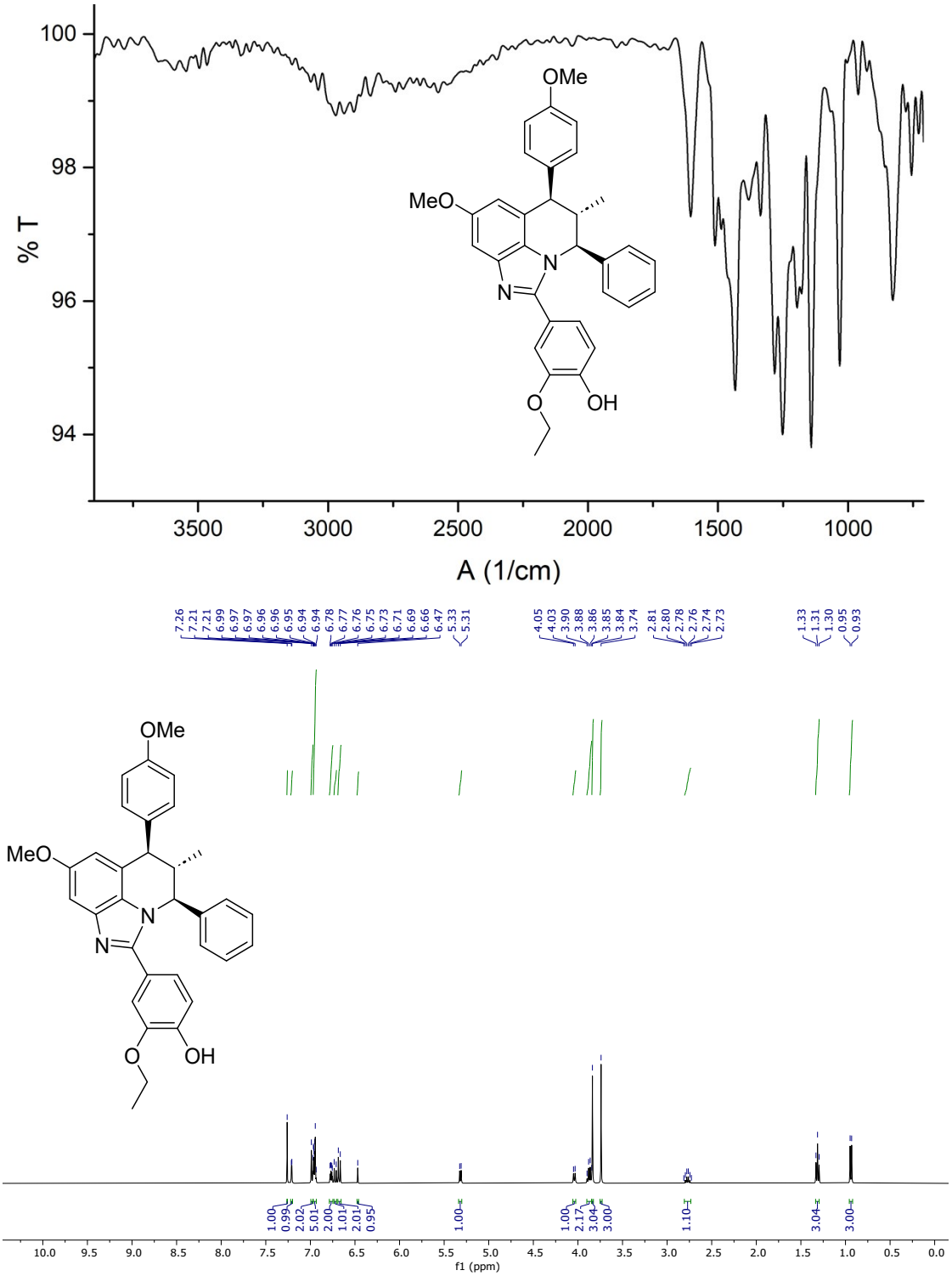
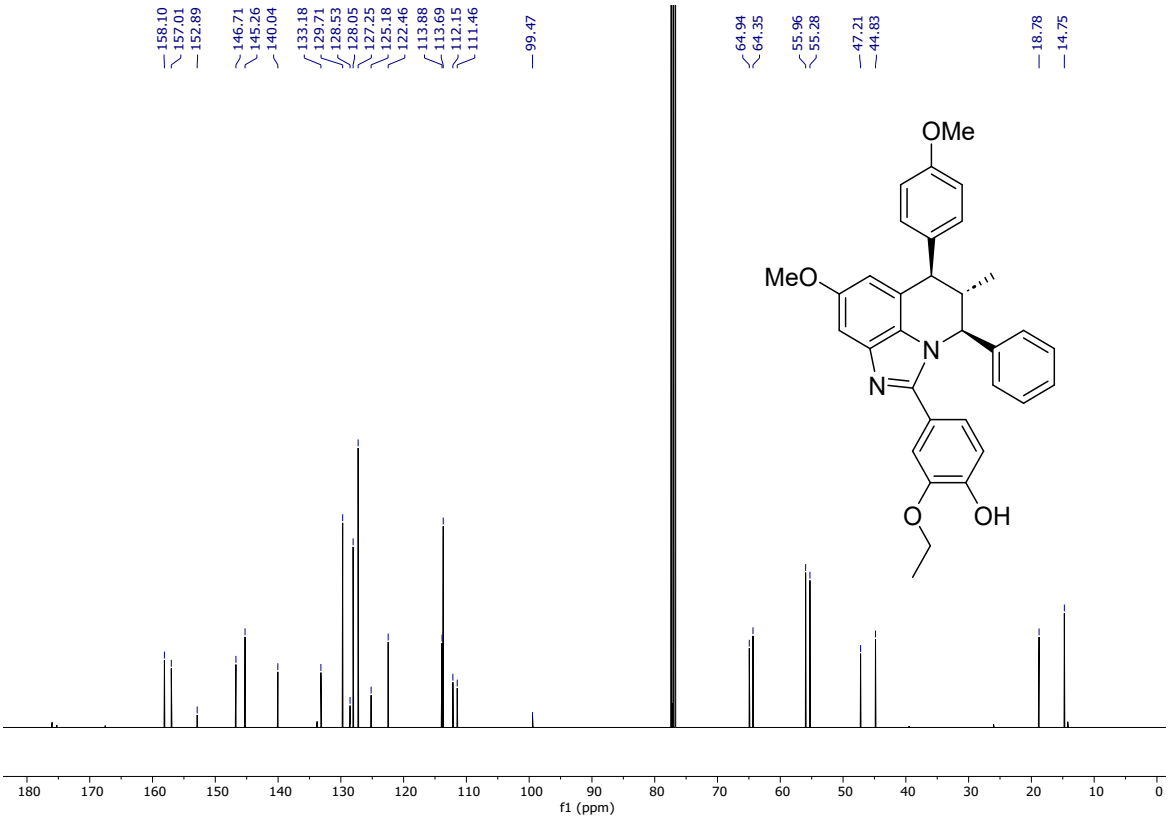

Intens.
x10^4
LAH24.d: +MS, 0.0min #2
491.2400
981.4688
353.2722
607.3252
711.5834
843.5012
m/z

Figure 38. IR, ^{1}H NMR, ^{13}C NMR and HRMS spectra of ***Cis*-8-methoxy-6-(4-methoxyphenyl)-5-methyl-4-phenyl-2-(3-etoxy-4-hydroxyphenyl)-5,6-dihydro-4*H*-imidazo[4,5,1-*ij*]quinoline (5v).**




158.10
157.01
152.89
146.71
145.26
140.04
133.18
129.71
128.53
128.05
127.25
125.18
122.46
113.88
113.69
112.15
111.46
99.47
64.94
64.35
55.96
55.28
47.21
44.83
18.78
14.75
OMe
MeO
N
N
O
OH
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
f1 (ppm)

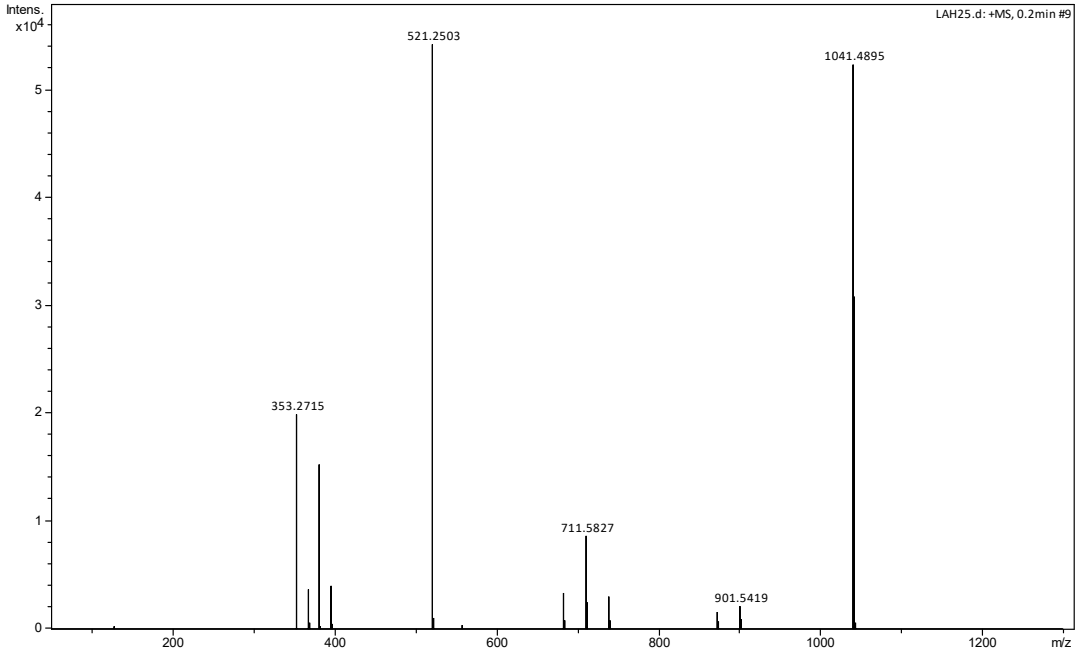
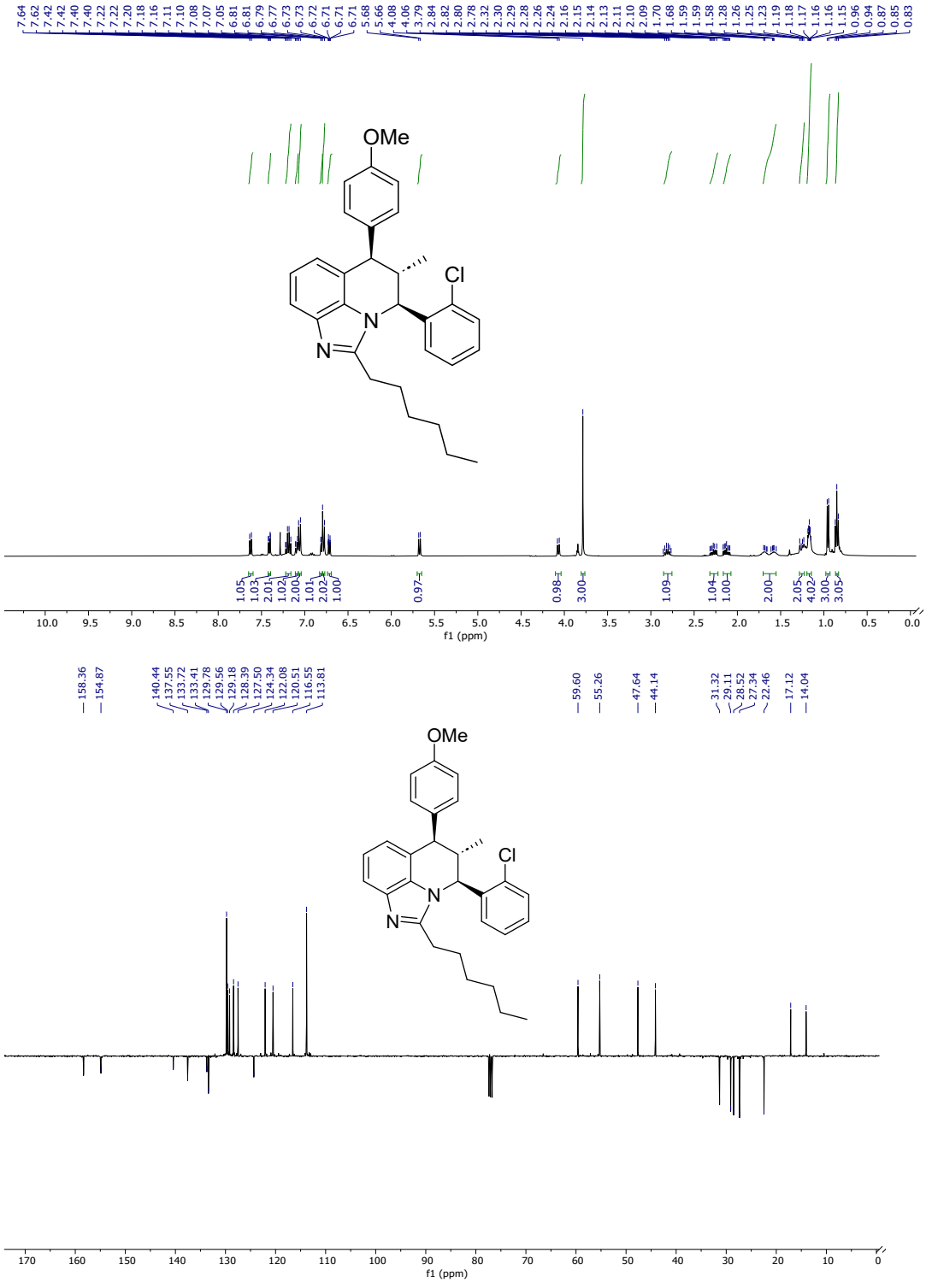

Intens.
x10^4
LAH25.d: +MS, 0.2min #9
521.2503
1041.4895
353.2715
711.5827
901.5419
0
1
2
3
4
5
200
400
600
800
1000
1200
m/z

Figure 39. ^{1}H NMR, APT and HRMS spectra of ***Cis*-2-(hexyl)-6-(4-methoxyphenyl)-2-(chlorophenyl)-4-phenyl-5-methyl-5,6-dihydro-4*H*-imidazo[4,5,1-*ij*]quinoline (5w).**



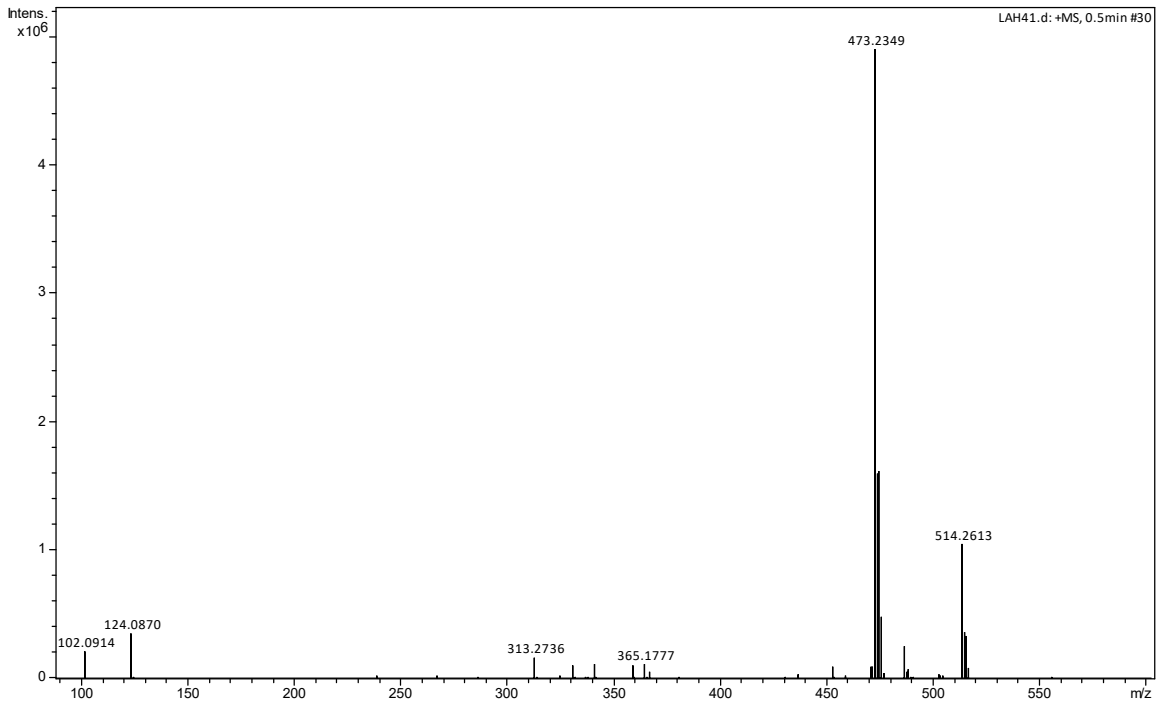
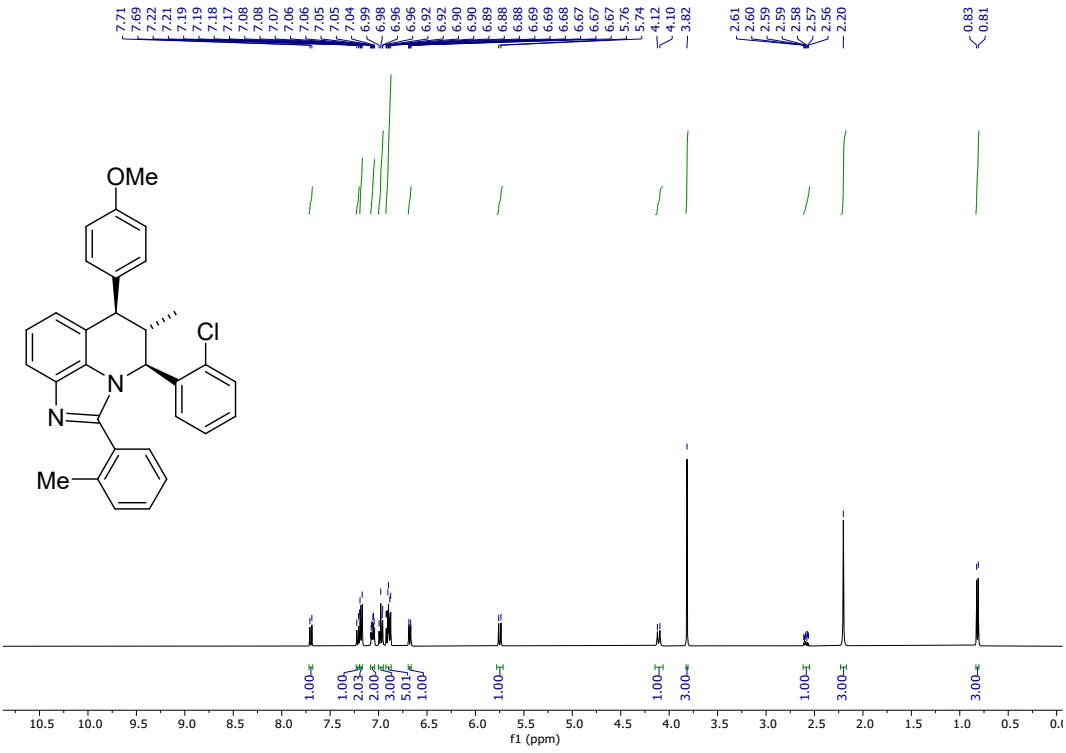
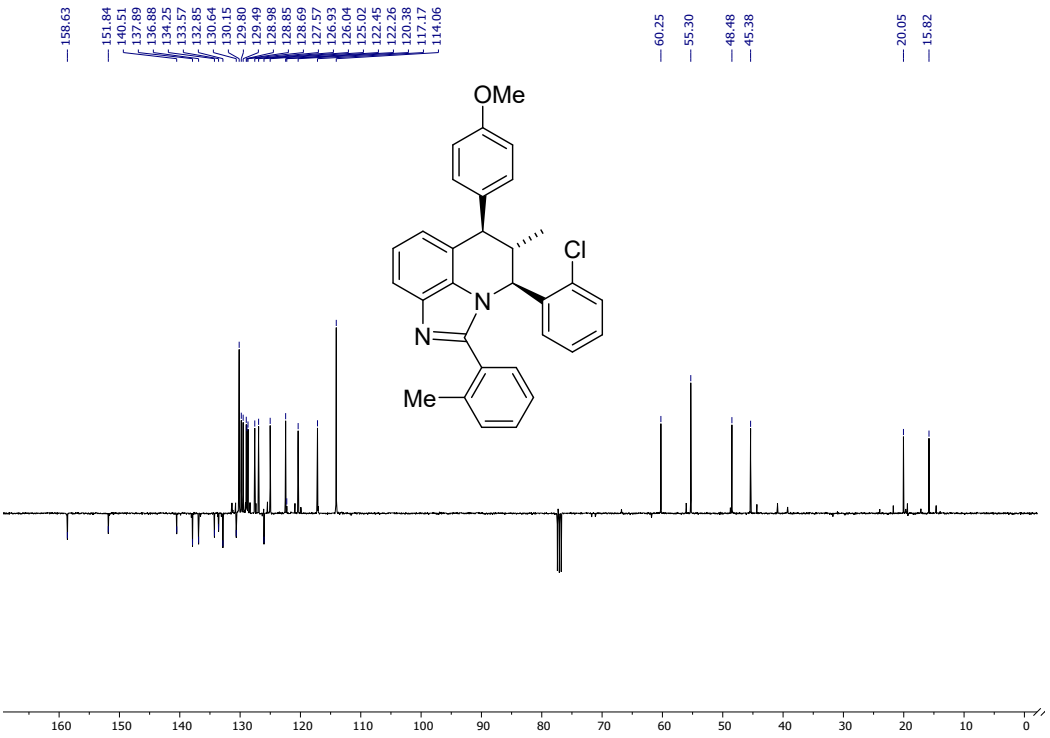


Figure 40. ^{1}H NMR, APT and HRMS spectra of ***Cis*-4-(2-chlorophenyl)-6-(4-methoxyphenyl)-2-(2-methylphenyl)-5-methyl-5,6-dihydro-4*H*-imidazo[4,5,1-*ij*]quinoline (5x).**




158.63
151.84
140.51
137.89
136.88
134.25
133.57
132.85
130.64
130.15
129.80
129.49
128.98
128.85
128.69
127.57
126.93
126.04
125.02
122.45
122.26
120.38
117.17
114.06
60.25
55.30
48.48
45.38
20.05
15.82
OMe
Cl
N
N
Me
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0

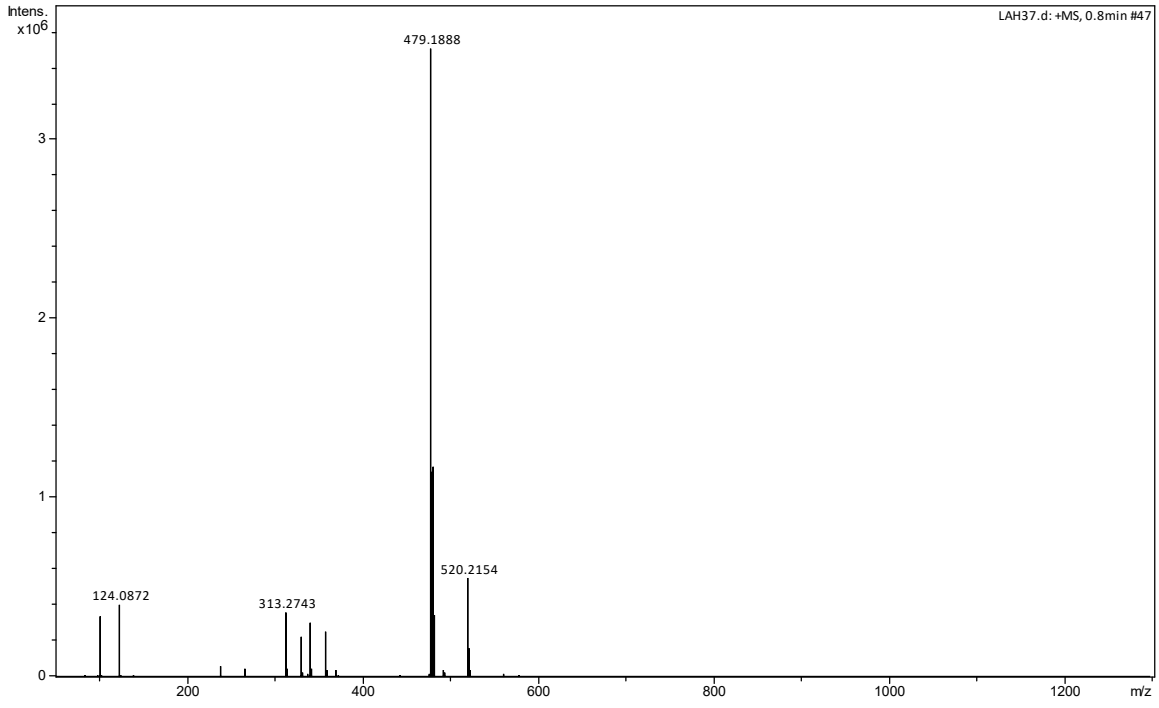
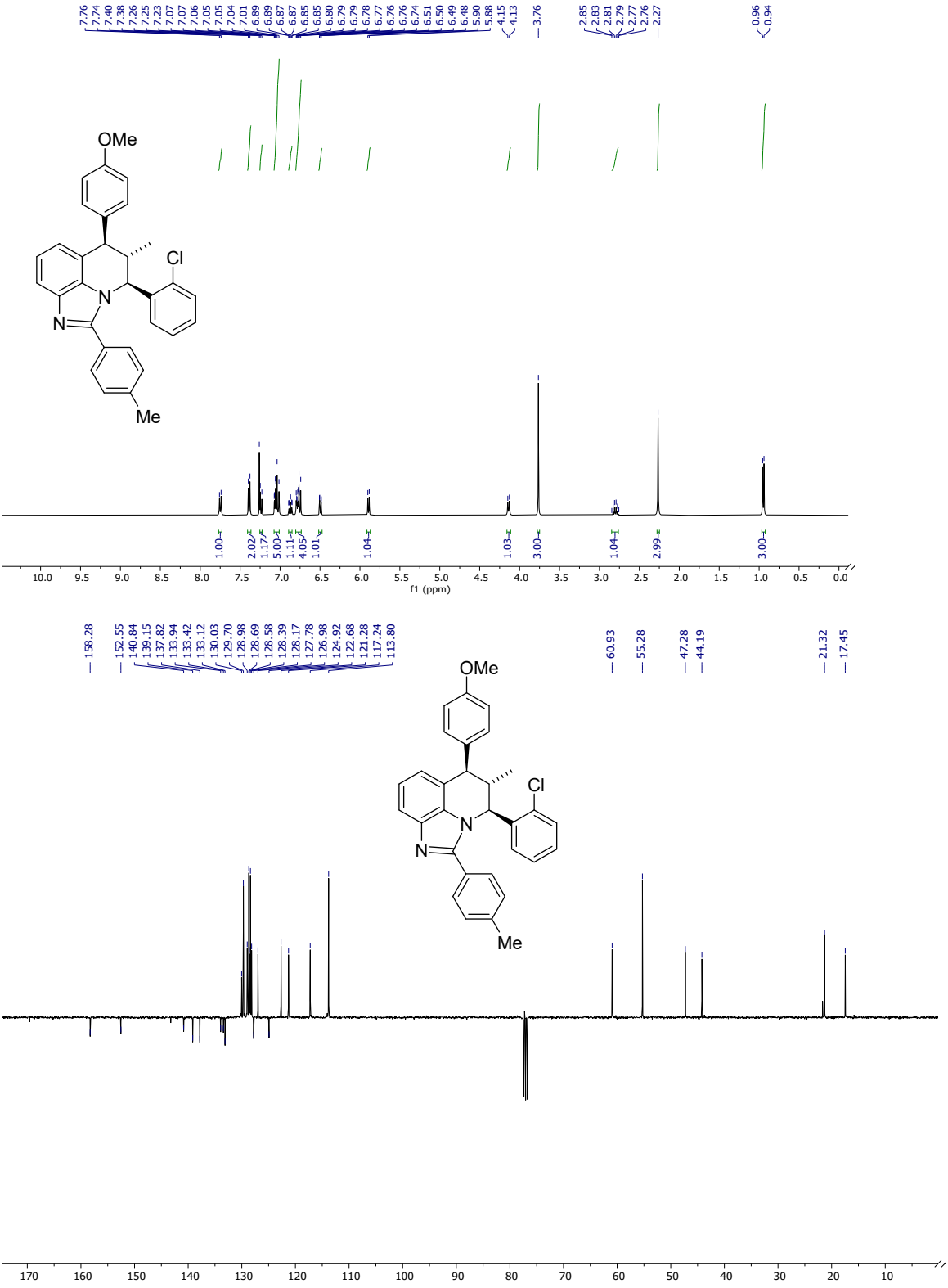

Intens.
x10^6
LAH37.d: +MS, 0.8min #47
479.1888
520.2154
124.0872
313.2743
3
2
1
0
200
400
600
800
1000
1200
m/z

Figure 41. ^{1}H NMR, APT and HRMS spectra of ***Cis*-4-(2-chlorophenyl)-6-(4-methoxyphenyl)-2-(4-methylphenyl)-5-methyl-5,6-dihydro-4*H*-imidazo[4,5,1-*ij*]quinoline (5y).**



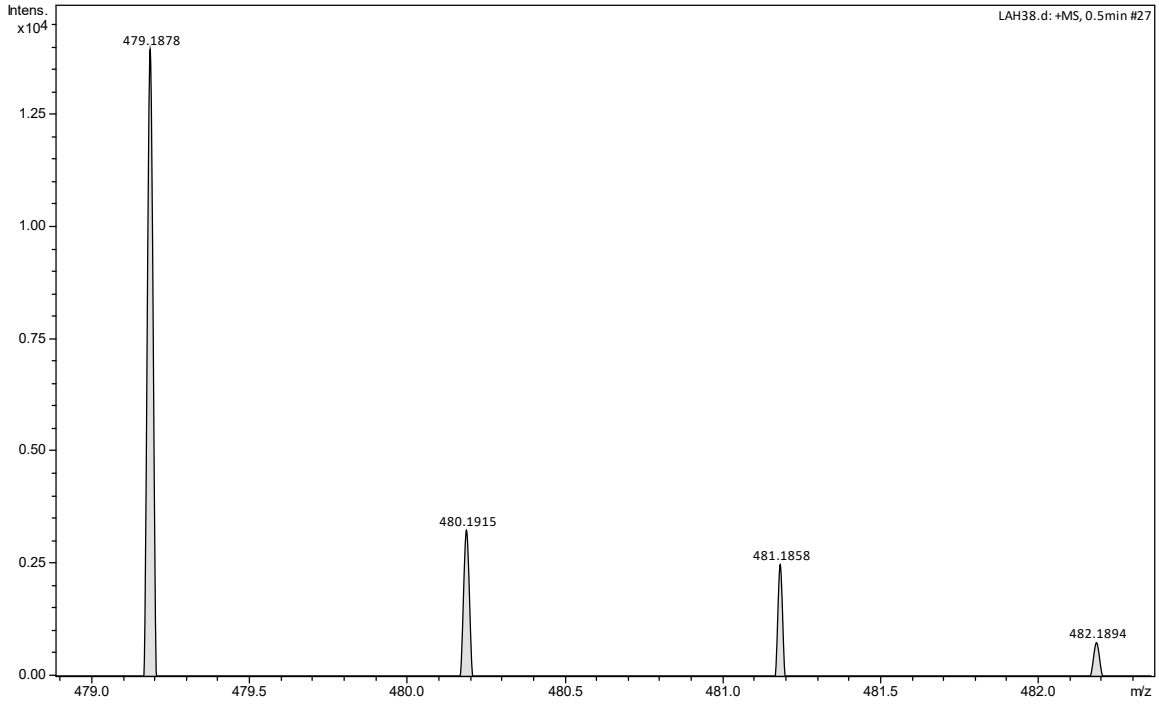
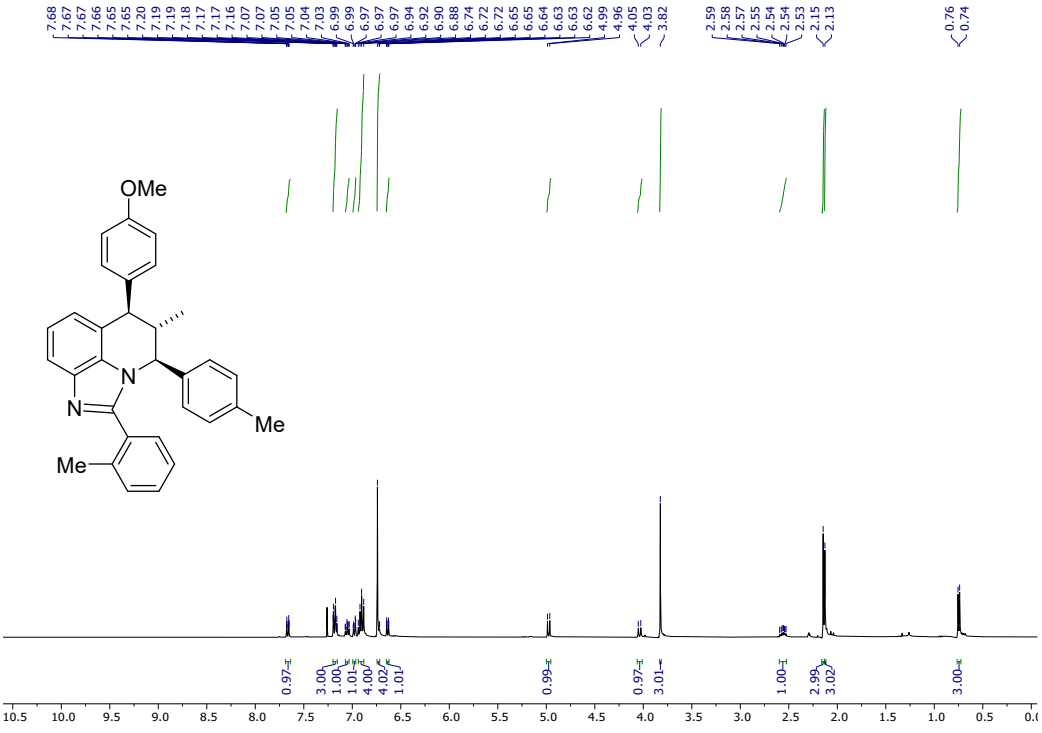
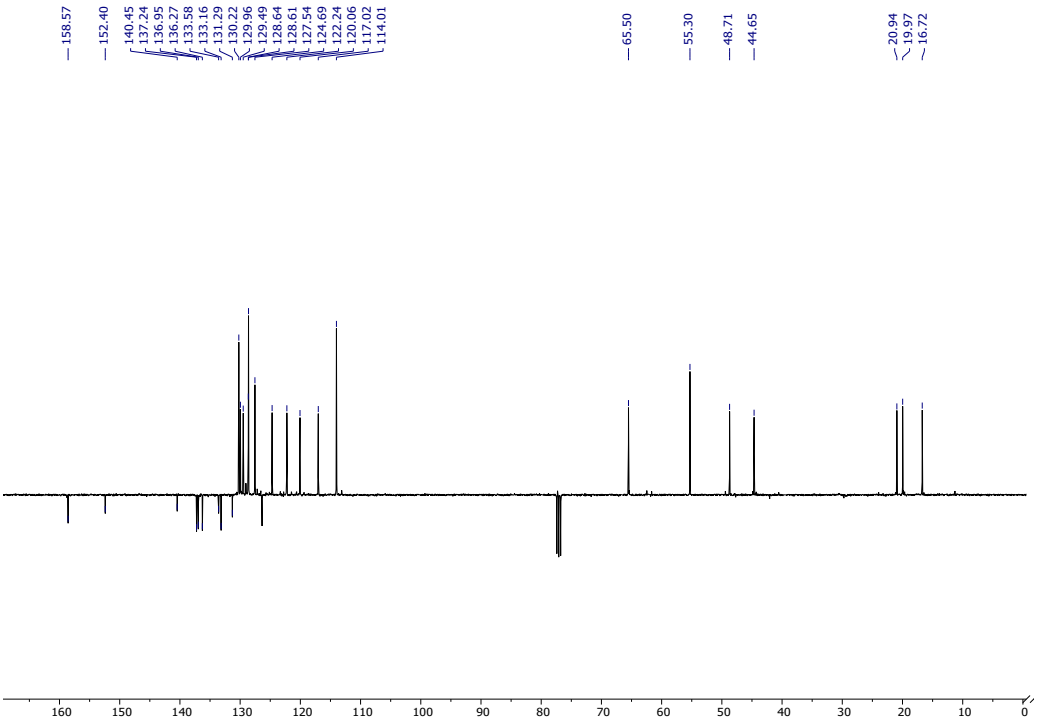


Figure 42. ^{1}H NMR, APT and HRMS spectra of ***Cis*-6-(4-methoxyphenyl)-5-methyl-2-(2-methylphenyl)-4-(4-methylphenyl)-5,6-dihydro-4*H* imidazo[4,5,1-*ij*]quinoline (5z).**




158.57
152.40
140.45
137.24
136.95
136.27
133.58
133.16
131.29
130.22
129.96
129.49
128.64
128.61
127.54
124.69
122.24
120.06
117.02
114.01
65.50
55.30
48.71
44.65
20.94
19.97
16.72
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0

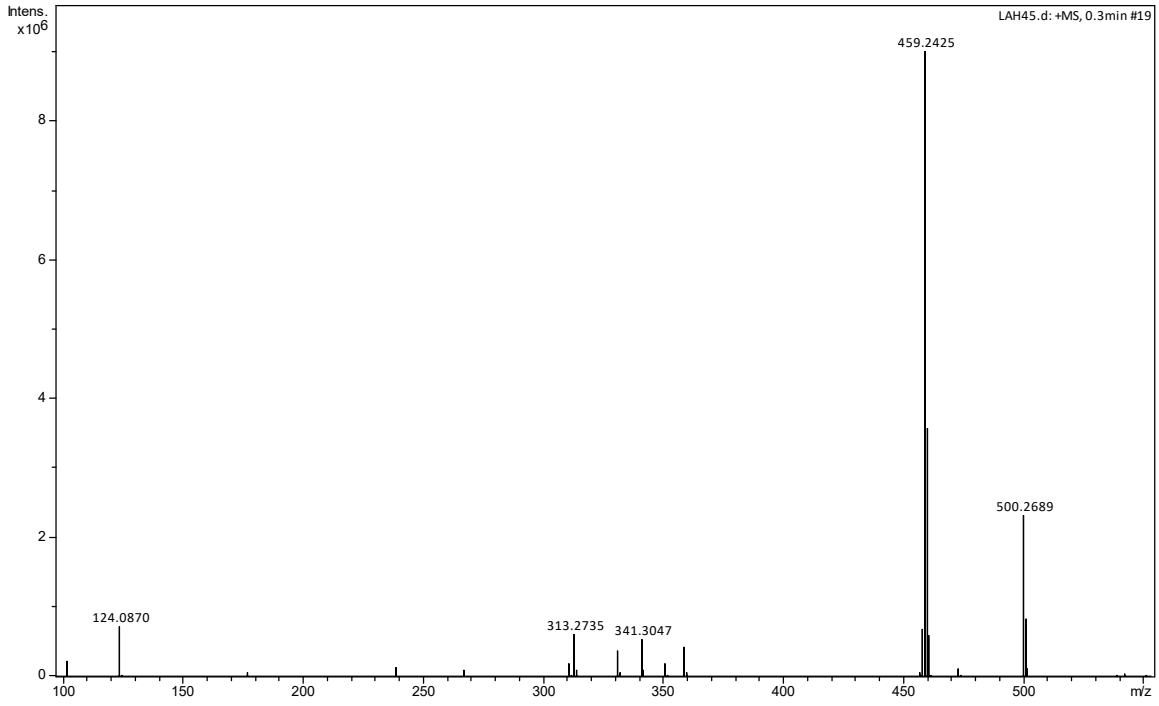
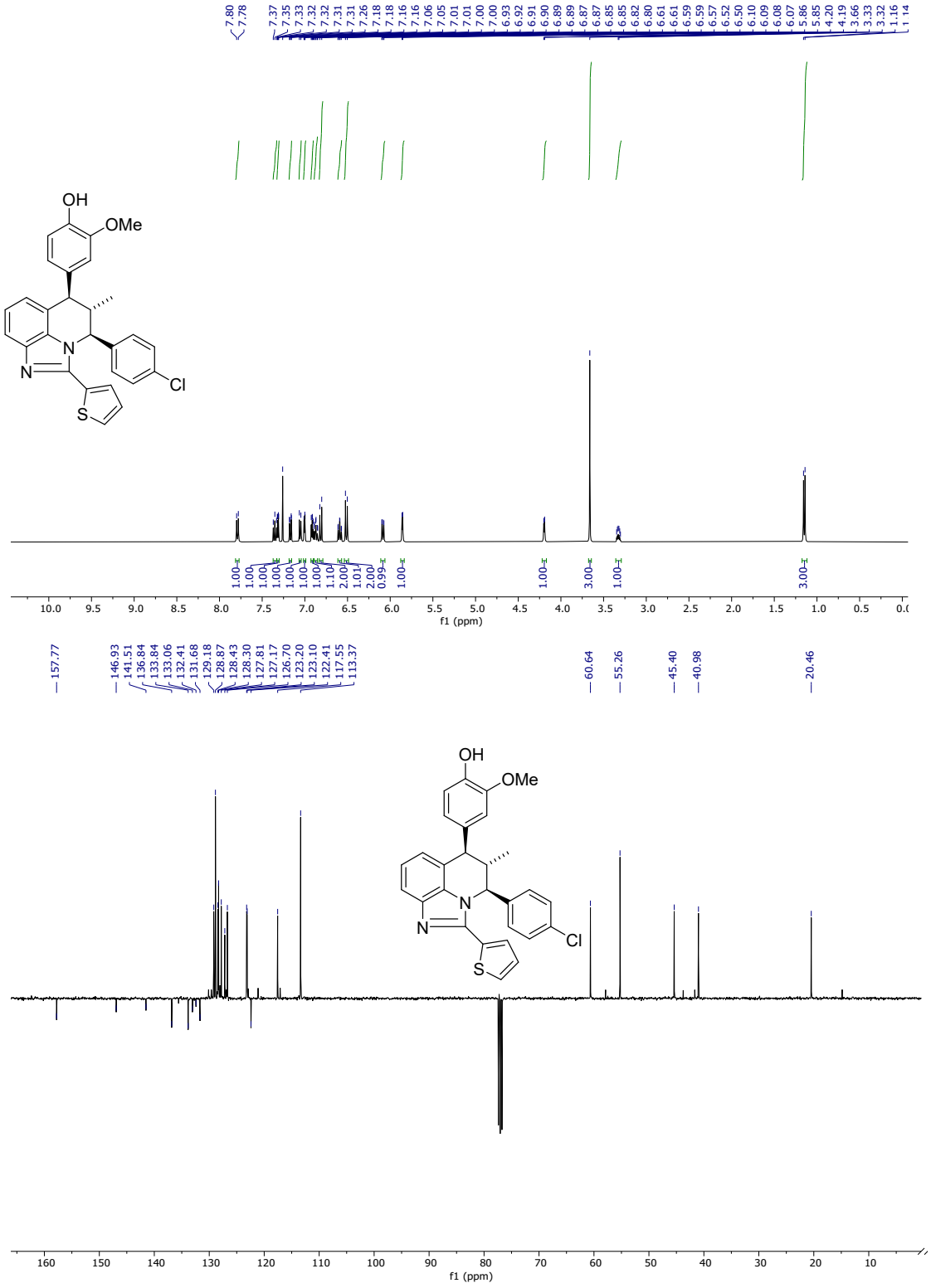

Intens.
x10^6
LAH45.d: +MS, 0.3min #19
459.2425
500.2689
124.0870
313.2735
341.3047
8
6
4
2
0
100
150
200
250
300
350
400
450
500
m/z

Figure 43. ^{1}H NMR, APT and HRMS spectra of ***Cis*-6-(4-hydroxy-3-methoxyphenyl)-4-(4-chlorophenyl)-2-(thiophen-2-yl)-5-methyl-5,6-dihydro-4*H* imidazo[4,5,1-*ij*]quinoline (5aa).**



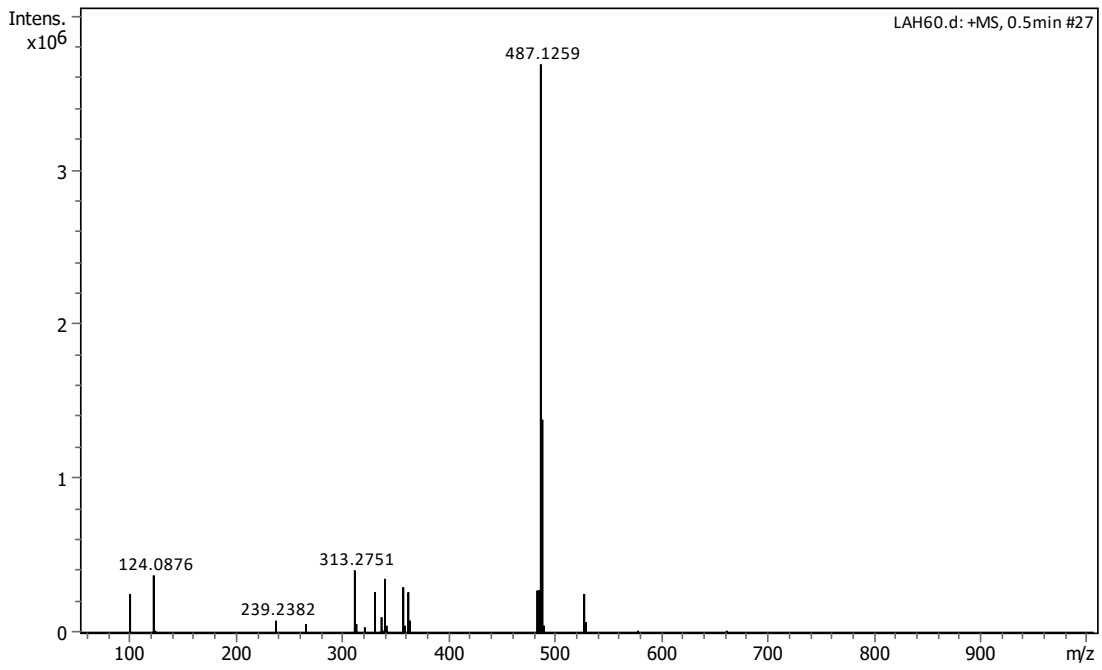
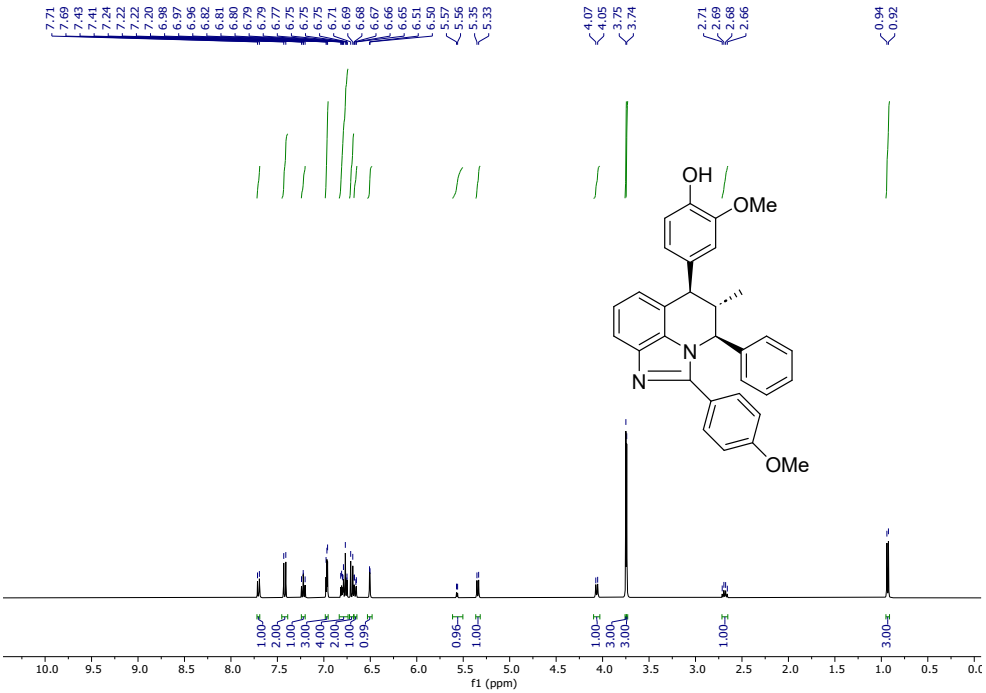
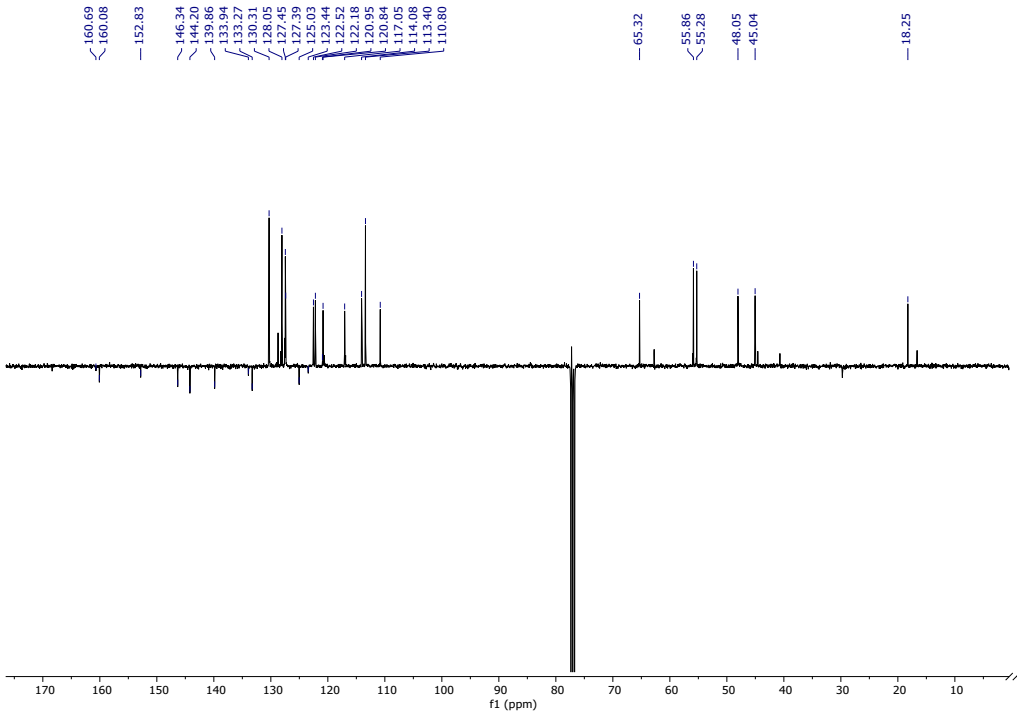


Figure 44. ^{1}H NMR, APT and HRMS spectra of ***Cis*-6-(4-hydroxy-3-methoxyphenyl)-2-(4-methoxyphenyl)-4-phenyl-5-methyl-5,6-dihydro-4*H* imidazo[4,5,1-*ij*]quinoline (5ab).**




160.69
160.08
152.83
146.34
144.20
139.86
133.94
133.27
130.31
128.05
127.45
127.39
125.03
123.44
122.52
122.18
120.95
120.84
117.05
114.08
113.40
110.80
65.32
55.86
55.28
48.05
45.04
18.25
170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10
f1 (ppm)

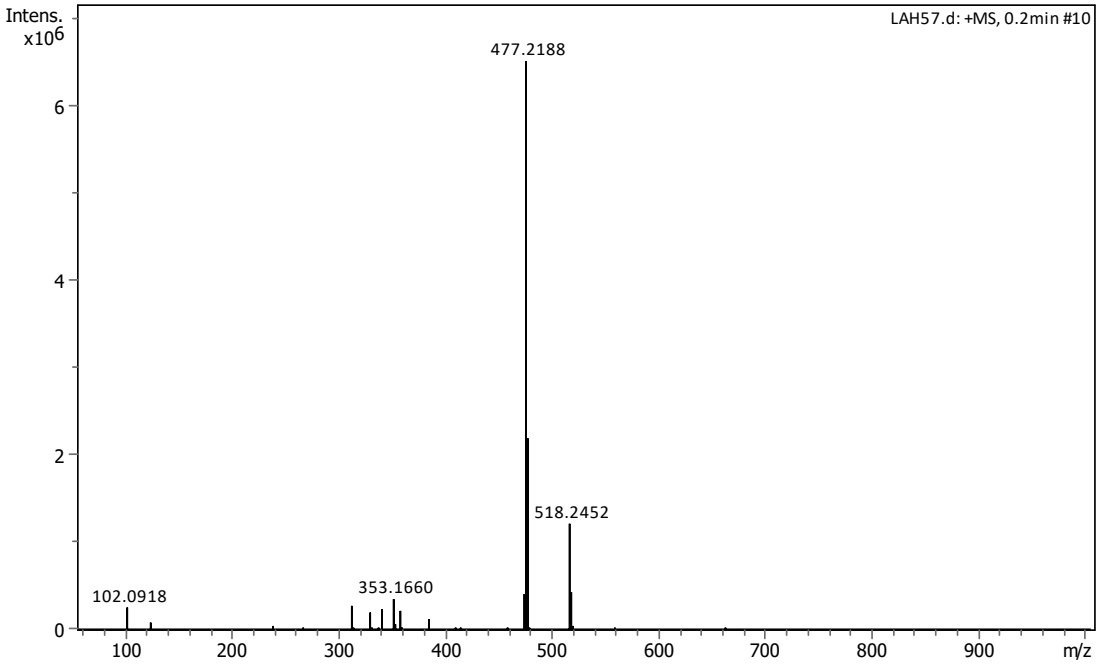
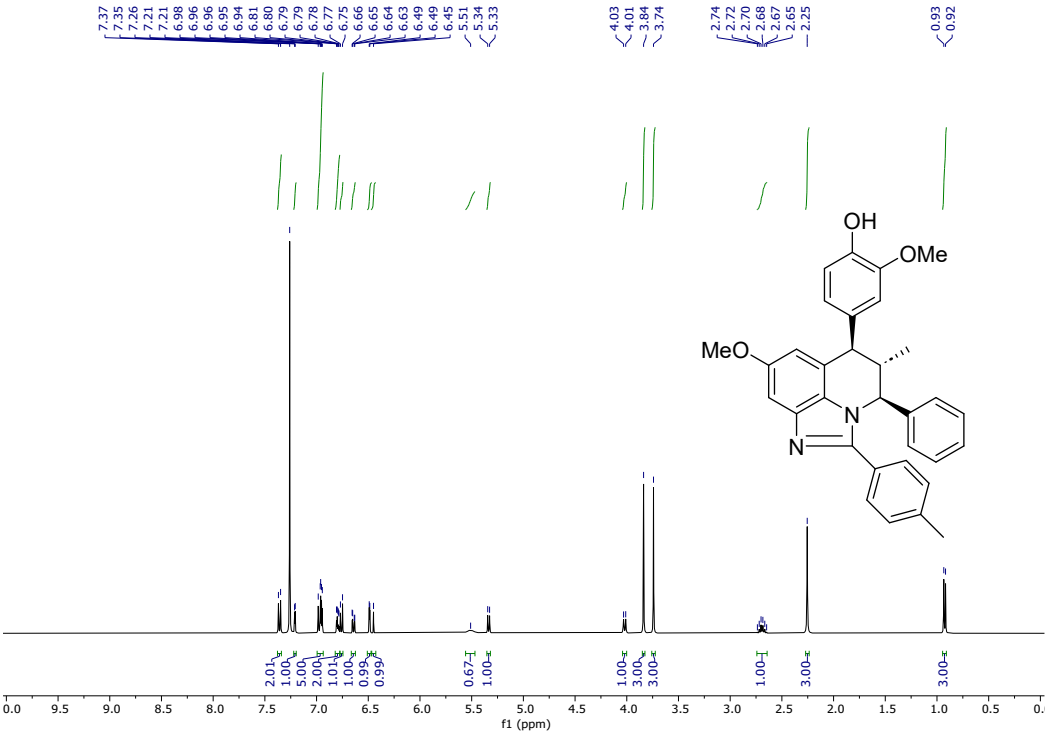
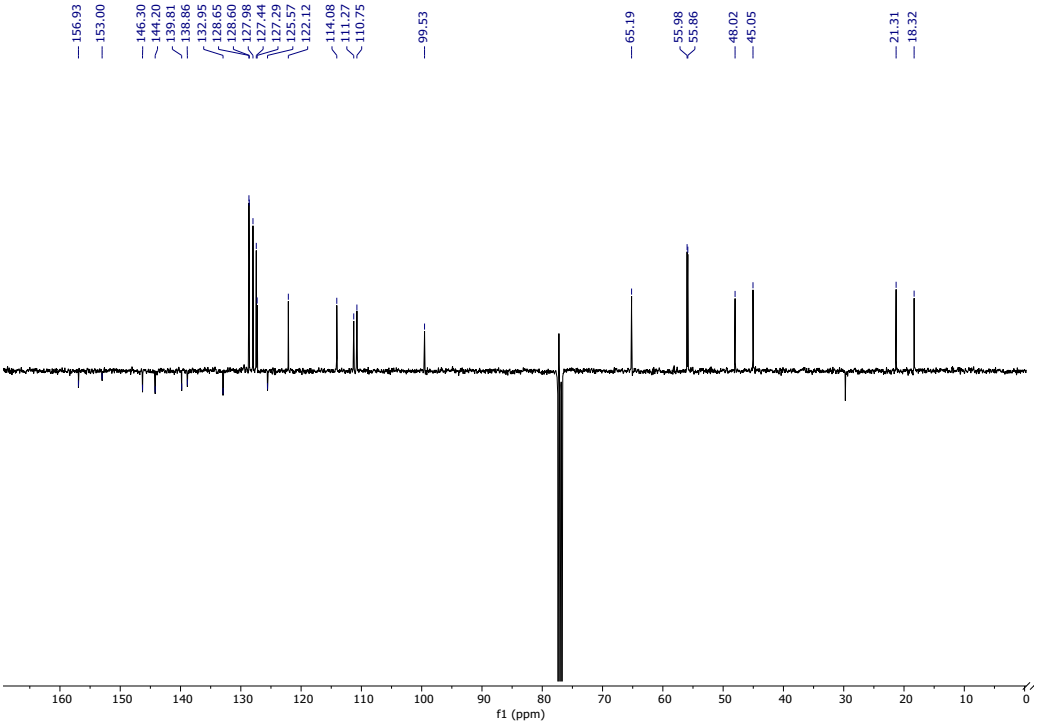
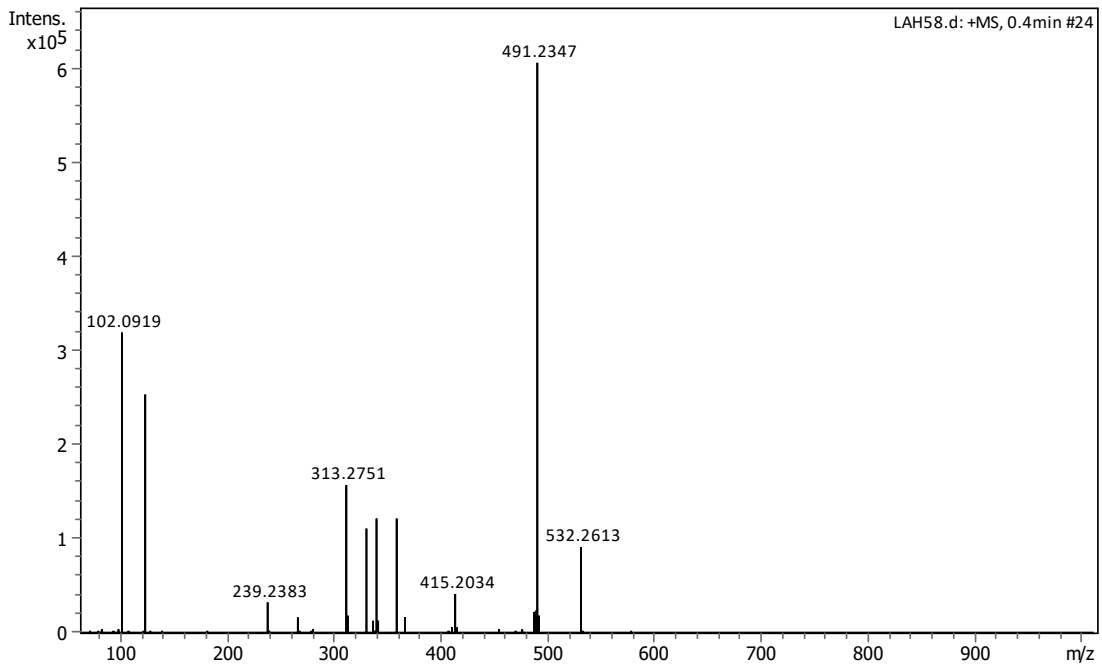

Intens.
x10^6
LAH57.d: +MS, 0.2min #10
477.2188
518.2452
353.1660
102.0918
0
2
4
6
100 200 300 400 500 600 700 800 900
m/z

Figure 45. ^{1}H NMR, APT and HRMS spectra of ***Cis*-6-(4-hydroxy-3-methoxyphenyl)-2-(4-methylphenyl)-4-phenyl-5-methyl-8-methoxy-5,6-dihydro-4*H* imidazo[4,5,1-*ij*]quinoline (5ac).**

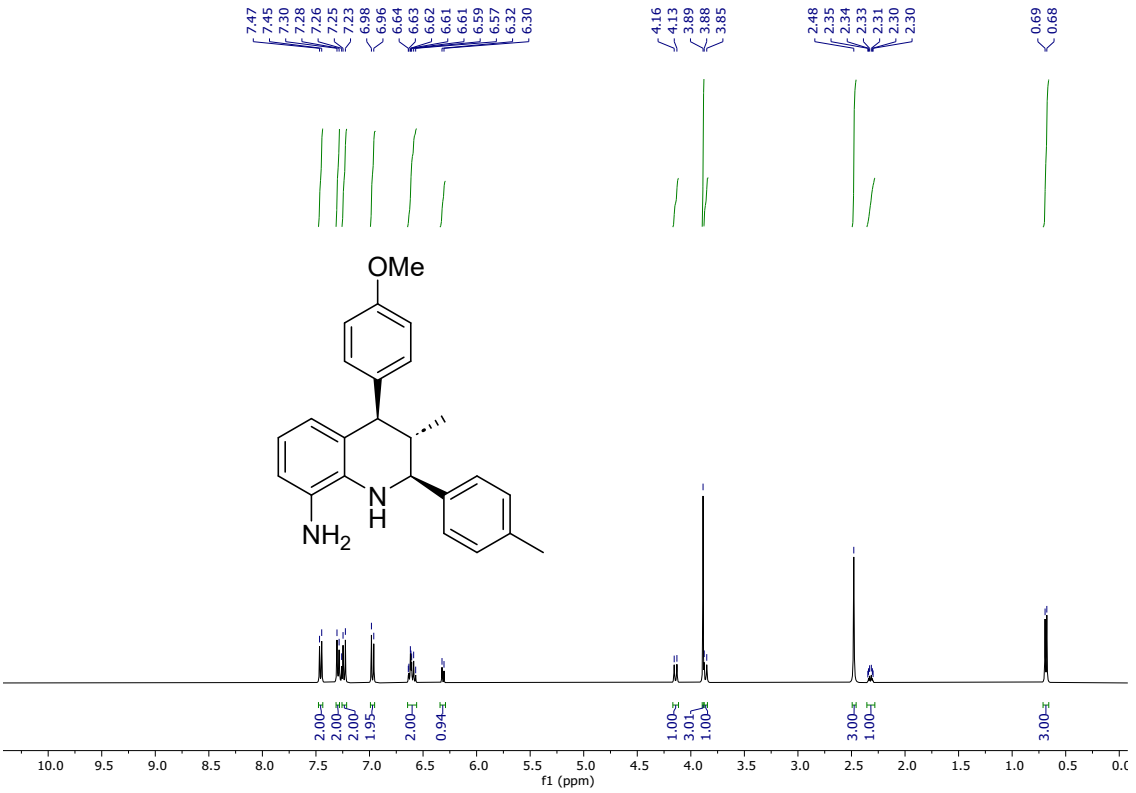


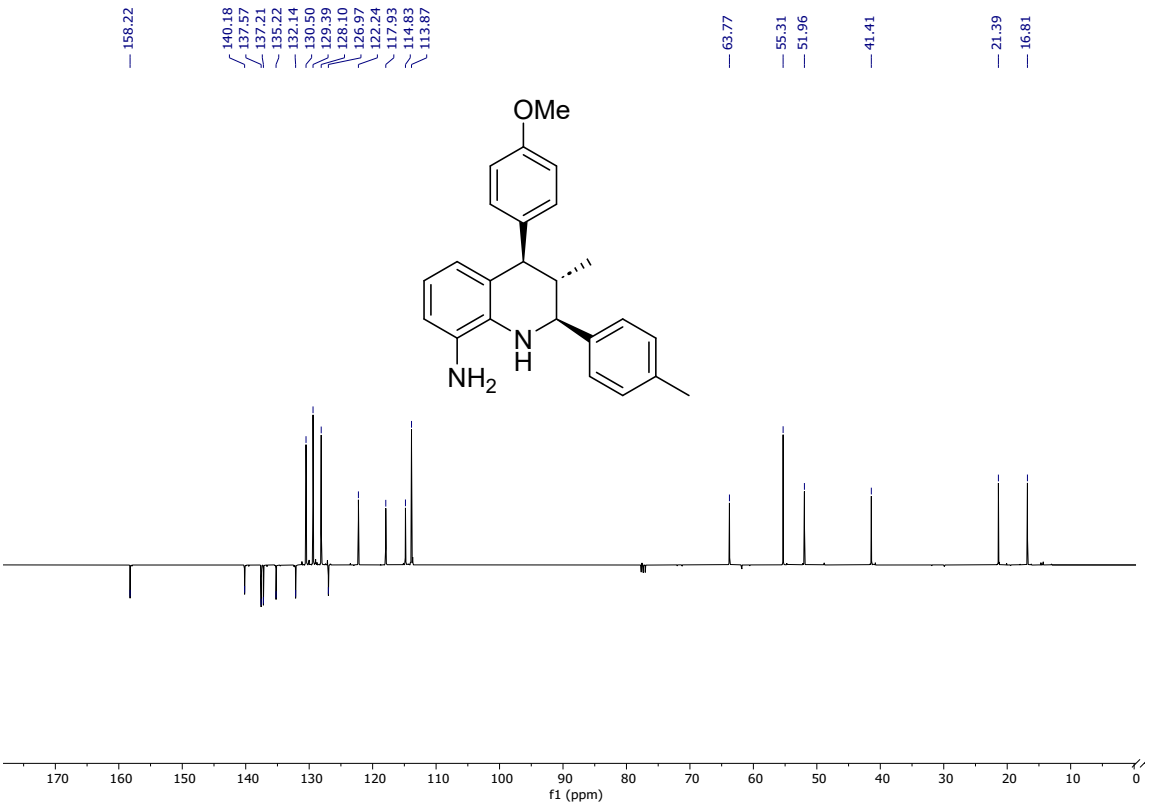




***Cis*-2-(4-methylphenyl)-4-(4-methoxyphenyl)-3-methyl-8-amine-1,2,3,4-tetrahydroquinoline (6).** Dark green solid. (212.4 mg, 0.59 mmol, 72%); NMR ^{1}H (400 MHz, $CDCl_3$) δ (ppm): 7.46 (d, *J*=8.1 Hz, 2H), 7.29 (d, *J*=7.9 Hz, 2H), 7.24 (d, *J*=8.8 Hz, 2H), 6.64 – 6.56 (m, 2H), 6.31 (d, *J*=7.4 Hz, 1H), 4.14 (d, *J*=10.1 Hz, 1H), 3.89 (s, 3H), 3.86 (d, *J*=9.5 Hz, 1H), 2.48 (s, 3H), 2.36 – 2.28 (m, 1H), 0.68 (d, *J*=6.6 Hz, 3H); NMR ^{13}C (100 MHz, $CDCl_3$) δ (ppm): 158.2, 140.2, 137.6, 137.2, 135.2, 132.1, 130.5, 129.4, 128.1, 127.0, 122.2, 117.9, 114.8, 113.9, 63.8, 55.3, 52.0, 41.4, 21.4, 16.8.

Figure 46. ^{1}H y APT NMR of ***Cis*-2-(4-methylphenyl)-4-(4-methoxyphenyl)-3-methyl-8-amine-1,2,3,4-tetrahydroquinoline (6).**


7.47
7.45
7.30
7.28
7.26
7.25
7.23
6.98
6.96
6.64
6.63
6.62
6.61
6.61
6.59
6.57
6.32
6.30
4.16
4.13
3.89
3.88
3.85
2.48
2.35
2.34
2.33
2.31
2.30
2.30
0.69
0.68
OMe
N
H
NH2
2.00
2.00
2.00
1.95
2.00
0.94
1.00
3.01
1.00
3.00
1.00
3.00
f1 (ppm)


158.22
140.18
137.57
137.21
135.22
132.14
130.50
129.39
128.10
126.97
122.24
117.93
114.83
113.87
63.77
55.31
51.96
41.41
21.39
16.81
OMe
N
H
NH2
f1 (ppm)

Microplate DPPH scavenging assay: 195 μL of DPPH radical solution in methanol (0.1 M) were added to 5 μL of solutions (200 μM) of the selected tetrahydroquinolines. The absorbance was measured at 517 nm at 0, 10 and 30 min. Ascorbic acid (200 μM) and gallic acid (200 μM) were used as positive controls. Each measurement was made at least in triplicate, and the radical scavenging activity (%) was calculated in comparison with ascorbic acid as follow:

Radical scavenging activity (RSA (%))

$$Rsa\ (\%) = \frac{Absorbance\ of\ control - absorbance\ of\ test\ sample}{Absorbance\ of\ control} x100$$