Supporting Information for

Photocatalyzed Csp^3-Csp^3 cross-dehydrogenative coupling of *N*-Boc-tetrahydroisoquinolines with α,β-unsaturated ketones

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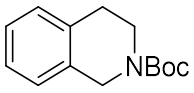
1. General information

All dry reactions were carried out under argon. Unless otherwise noted, all commercial reagents and solvents were used as received without further purification. The progress of the reactions was monitored by TLC with silica gel plates (GF254), and the visualization was carried out under UV light. Melting points (m. p.) were measured on electrothermal digital melting point apparatus and were uncorrected. The ^{1}H and the ^{13}C NMR spectroscopic data were recorded with a Varian Unity Inova-400 spectrometer or Bruker Ascend 400 (400 MHz and 600 MHz) spectrometer (^{1}H and ^{13}C NMR at 400 and 100 MHz, respectively). Spectra were referenced internally to the residual proton resonance in $CDCl_3$ (δ 7.26 ppm), or with tetramethylsilane (TMS, δ 0.00 ppm) as the internal standard. Chemical shifts (δ) were reported as part per million (ppm) in δ scale downfield from TMS. Multiplicities are reported as follows: s = singlet, d = doublet, t = triplet, m = multiplet, br. s = broad singlet. Infrared (IR) data were recorded as films on potassium bromide plates on a Bruker Invenio-R FT-IR spectrometer. Absorbance frequencies are reported in reciprocal centimeters (cm^{-1}). High resolution mass spectra were acquired on a Bruker Daltonics MicroTof-QII mass spectrometer.

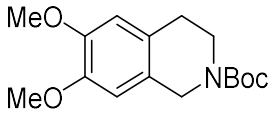
2.Synthesis and characterization of substrates

2.1 Preparation of *N*-Boc-THIQs



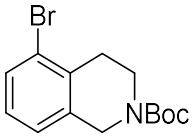
1a

***tert*-butyl 3,4-dihydroisoquinoline-2(1*H*)-carboxylate (1a):** was prepared according to a published procedure; spectral data were in agreement with literature values.[1] ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.19-7.10 (m, 4H), 4.58 (s, 2H), 3.65 (t, *J* = 5.7 Hz, 2H), 2.84 (t, *J* = 5.7 Hz, 2H), 1.50 (s, 9H);^{13}C NMR (100 MHz, $CDCl_3$) δ 154.9, 134.8, 133.7, 128.7, 126.3, 126.2, 79.7, 45.9, 40.7, 29.0, 28.5; HRMS (ESI) m/z calculated for $C_{14}H_{20}NO_2$ $[M+H]^+$: 234.1489; found: 234.1488.



1b

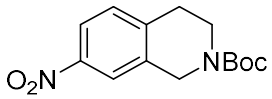
***tert*-butyl 6,7-dimethoxy-3,4-dihydroisoquinoline-2(1*H*)-carboxylate (1b):** was prepared according to a published procedure; spectral data were in agreement with literature values.[1] m. p. = 108-109 °C; ^{1}H NMR (400 MHz, $CDCl_3$) δ 6.60 (s, 1H), 6.57 (s, 1H), 4.48 (s, 2H), 3.84 (s, 6H), 3.66-3.55 (m, 2H), 2.68-2.78 (m, 2H), 1.48 (s, 9H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 154.9, 147.6, 147.5, 126.5, 125.3, 111.5, 109.1, 79.7, 55.94, 55.91, 45.6, 40.7, 28.5, 28.3; HRMS (ESI) m/z calculated for $C_{16}H_{23}NNaO_4^+$ $[M+Na]^+$: 316.1519; found: 316.1518.



1c

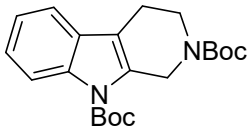
***tert*-butyl 5-bromo-3,4-dihydroisoquinoline-2(1*H*)-carboxylate (1c):** was prepared according to a published procedure.[2] m. p. = 80-81 °C; ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.44-7.42 (m, 1H), 7.06-7.05 (m, 2H), 4.57 (s, 2H), 3.66 (t, *J* = 6.0 Hz, 2H), 2.85 (t, *J* = 6.0 Hz, 2H), 1.49 (s, 9H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 154.7, 136.4, 134.5,

130.4, 127.4, 125.5, 80.0, 45.8, 41.7, 29.6, 28.5; HRMS (ESI) m/z calculated for $C_{14}H_{18}BrNNaO_2^+$ $[M+Na]^+$: 334.0413; found: 334.0412.



1d

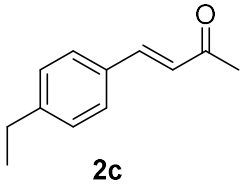
tert-butyl 7-nitro-3,4-dihydroisoquinoline-2(1H)-carboxylate (1d) was prepared according to the following procedure: The mixture of 1,2,3,4-tetrahydro-7-nitroisoquinoline (1.0 g, 5.61mmol), 1,4-dioxane (15mL), H_2O (7.5 mL) and 1M NaOH (4.8 mL) was cooled in an ice-bath, and di-tert-butyl dicarbonate (1.12 g, 5.13mmol) was added. The mixture was stirred at room temperature for 2.5 h, acidified with a 1M HCI solution to pH 2-3, and then extracted with EtOAc. The organic layer was dried over $MgSO_4$ and filtered. The residue was purified by flash column chromatography (1:20=EtOAc/petroleum ether; R_f=0.30) to give the title compound (1.5g, 98% yield) as a white soild. m. p. = 75-76 °C; ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.01 (d, J = 8.2 Hz, 1H), 7.98 (s, 1H), 7.28 (d, J = 8.2 Hz, 1H), 4.65 (s, 2H), 3.68 (t, J = 5.8 Hz, 2H), 2.92 (t, J = 5.8 Hz, 2H), 1.49 (s, 9H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 154.6, 146.4, 142.5, 135.2, 129.7, 121.4, 121.2, 80.3, 45.7, 40.0, 29.1, 28.3; HRMS (ESI) m/z calculated for $C_{14}H_{18}N_2NaO_4$[M+Na]$^+$: 301.1159; found: 301.1161.



1e

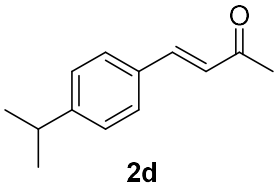
di-*tert*-butyl 3,4-dihydro-1*H*-pyrido[3,4-*b*]indole-2,9-dicarboxylate (1d): was prepared according to a published procedure; spectral data were in agreement with literature values.[3] m. p. = 127-128 °C; ^{1}H NMR (600 MHz, $CDCl_3$) δ 8.19 (d, J = 5.6 Hz, 1H), 7.40 (d, J = 4.4 Hz, 1H), 7.29-7.21 (m, 2H), 4.80 (s, 2H), 3.73 (s, 2H), 2.73 (s, 2H), 1.67 (s, 9H), 1.50 (s, 9H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 154.9, 149.9, 135.8, 131.8, 131.2, 128.8, 123.9, 122.6, 117.6, 115.4, 83.8, 79.9, 44.4, 40.1, 28.4, 28.2, 21.1; HRMS (ESI) m/z calculated for $C_{21}H_{29}N_2O_4^+$ $[M+H]^+$: 373.2122; found:373.2119.

2.2 Preparation of α,β-unsaturated ketones



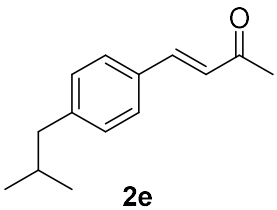
2c

(*E*)-4-(4-ethylphenyl)but-3-en-2-one (2c): was prepared according to a published procedure.[4] ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.51-7.45 (m, 3H), 7.22 (d, *J* = 8.0 Hz, 2H), 6.68 (d, *J* = 16.2 Hz, 1H), 2.66 (q, *J* = 7.6 Hz, 2H), 2.36 (s, 3H), 1.24 (t, *J* = 7.6 Hz, 3H).; ^{13}C NMR (100 MHz, $CDCl_3$) δ 198.5, 147.3, 143.6, 131.9, 128.6, 128.4, 126.3, 28.8, 27.4, 15.3; HRMS (ESI) m/z calculated for $C_{12}H_{14}ONa^+$ $[M+Na]^+$: 197.0937; found: 197.0937.



2d

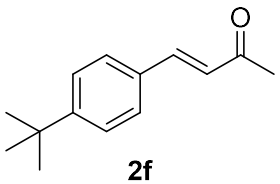
(*E*)-4-(4-isopropylphenyl)but-3-en-2-one (2e): was prepared according to a published procedure;[4] spectral data were in agreement with literature values.[5] ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.50 (d, *J* = 16.3 Hz, 1H), 7.47 (d, *J* = 8.4 Hz, 2H),7.25 (d, *J* = 8.4 Hz, 2H), 6.68 (d, *J* = 16.3 Hz, 1H), 2.92 (septet, *J* = 6.9 Hz 1H), 2.36 (s, 3H), 1.25 (d, *J* = 6.9 Hz, 6H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 198.5, 151.9, 143.5, 132.0, 128.4, 127.1, 126.3, 34.1, 27.4, 23.7; HRMS (ESI) m/z calculated for $C_{13}H_{17}O^+$ $[M+H]^+$: 189.1274; found: 189.1273.



2e

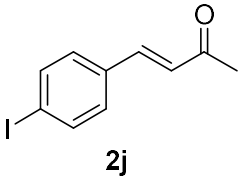
(*E*)-4-(4-isobutylphenyl)but-3-en-2-one (2e): was prepared according to a published procedure.[4] ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.49 (d, *J* = 16.3 Hz, 1H), 7.44 (d, *J* = 8.1 Hz, 2H), 7.16 (d, *J* = 8.1 Hz, 2H), 6.67 (d, *J* = 16.3 Hz, 1H), 2.48 (d, *J* = 7.2 Hz, 2H), 2.35 (s, 3H), 1.87 (septet, *J* = 6.8 Hz, 1H), 0.90 (d, *J* = 6.6 Hz, 6H); ^{13}C NMR (100

MHz, $CDCl_3$) δ 198.4, 144.8, 143.6, 131.9, 129.8, 128.2, 126.3, 45.3, 30.2, 27.4, 22.3; HRMS (ESI) m/z calculated for $C_{14}H_{19}O^+$ $[M+H]^+$: 203.1430; found: 203.1430.



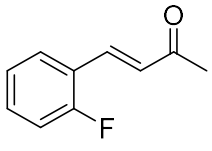
2f

(*E*)-4-(4-(*tert*-butyl)phenyl)but-3-en-2-one (2g): was prepared according to a published procedure;[4] spectral data were in agreement with literature values.[6] m. p. = 45-46 °C; ^1H NMR (400 MHz, $CDCl_3$) δ 7.50 (d, *J* = 16.3 Hz, 1H), 7.48 (d, *J* = 8.5 Hz, 2H), 7.42 (d, *J* = 8.5 Hz, 2H), 6.69 (d, *J* = 16.3 Hz, 1H), 2.37 (s, 3H), 1.33 (s, 9H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 198.6, 154.2, 143.5, 131.7, 128.2, 126.5, 126.0, 34.9, 31.2, 27.5; HRMS (ESI) m/z calculated for $C_{14}H_{18}ONa^+$ $[M+Na]^+$: 225.1250; found: 225.1250.



2j

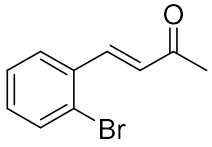
(*E*)-4-(4-iodophenyl)but-3-en-2-one (2j): was prepared according to a published procedure.[4] m. p. = 105-106 °C; ^1H NMR (400 MHz, $CDCl_3$) δ 7.74 (d, *J* = 8.4 Hz, 2H), 7.42 (d, *J* = 16.3 Hz, 1H), 7.26 (d, *J* = 8.3 Hz, 2H), 6.71 (d, *J* = 16.3 Hz, 1H), 2.38 (s, 3H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 198.2, 142.2, 138.3, 134.0, 129.8, 127.7, 96.9, 27.8; HRMS (ESI) m/z calculated for $C_{10}H_{10}IO^+$ $[M+H]^+$: 272.9771; found: 272.9771.



2m

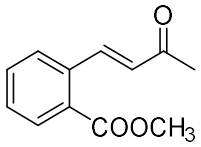
(*E*)-4-(2-fluorophenyl)but-3-en-2-one (2m): was prepared according to a published procedure; [4] spectral data were in agreement with literature values.[7] ^1H NMR (400 MHz, $CDCl_3$) δ 7.66 (d, *J* = 16.5 Hz, 1H), 7.56 (td, *J* = 7.6, 1.7 Hz, 1H), 7.39-7.34 (m, 1H), 7.17 (td, *J* = 7.6, 0.8 Hz, 1H), 7.12-7.07 (m, 1H), 6.77 (d, *J* = 16.5 Hz, 1H), 2.39

(s, 3H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 198.5, 161.4 (d, *J* = 253.0 Hz), 135.7 (d, *J* = 4.0 Hz), 132.0 (d, *J* = 8.0 Hz), 129.3 (d, *J* = 6.0 Hz), 128.7 (d, *J* = 2.0 Hz), 124.6 (d, *J* = 4.0 Hz), 122.5 (d, *J* = 12.0 Hz), 116.3 (d, *J* = 21.0 Hz), 27.5; HRMS (ESI) m/z calculated for $C_{10}H_9FONa^+$ $[M+Na]^+$: 187.0530; found: 187.0528.



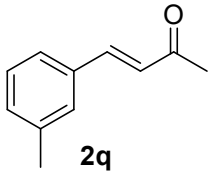
2o

(*E*)-4-(2-bromophenyl)but-3-en-2-one (2o): was prepared according to a published procedure; [4] spectral data were in agreement with literature values.[8] ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.86 (d, *J* = 16.3 Hz, 1H), 7.59 (dd, *J* = 8.1, 1.2 Hz, 2H), 7.33-7.29 (m, 1H), 7.23-7.19 (m, 1H), 6.59 (d, *J* = 16.3 Hz, 1H), 2.39 (s, 3H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 198.2, 141.8, 134.4, 133.4, 131.4, 129.8, 127.83, 127.75, 125.6, 27.2; HRMS (ESI) m/z calculated for $C_{10}H_{10}BrO^+$ $[M+H]^+$: 223.9837; found: 223.9833.



2p

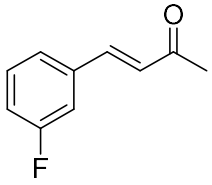
methyl (*E*)-2-(3-oxobut-1-en-1-yl)benzoate (2p): was prepared according to a published procedure; spectral data were in agreement with literature values.[9] ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.35 (d, *J* = 16.3 Hz, 1H), 7.96 (d, *J* = 7.0 Hz, 1H), 7.58-7.48 (m, 2H), 7.43-7.38 (m, 1H), 6.48 (d, *J* = 16.3 Hz, 1H), 3.89 (s, 3H), 2.38 (s, 3H); ^{13}C NMR (100 MHz, $CDCl_3$) 198.5, 166.8, 142.6, 136.4, 132.3, 130.7, 130.0, 129.9, 129.3, 127.6, 52.1, 26.6; HRMS (ESI) m/z calculated for $C_{12}H_{13}O_3^+$ $[M+H]^+$: 205.0859; found: 205.0856.



2q

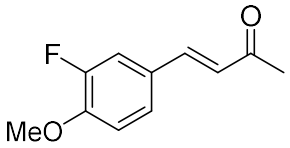
(*E*)-4-(*m*-tolyl)but-3-en-2-one (2q): was prepared according to a published procedure; [4] spectral data were in agreement with literature values.[5] ^{1}H NMR (400 MHz,

$CDCl_3$) δ 7.47 (d, *J* = 16.3 Hz, 1H), 7.33(d, *J* = 6.6 Hz, 1H),, 7.27-7.25 (m, 1H), 7.19 (d, *J* = 7.4 Hz, 1H), 6.69 (d, *J* = 16.3 Hz, 1H), 2.36 (s, 6H);^{13}C NMR (100 MHz, $CDCl_3$) δ 198.4, 143.6, 138.6, 134.3, 131.3, 128.9, 128.8, 126.9, 125.4, 27.4, 21.2; HRMS (ESI) m/z calculated for $C_{11}H_{12}ONa^+$ $[M+Na]^+$: 183.0780; found:183.0786.



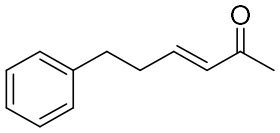
2r

(*E*)-4-(3-fluorophenyl)but-3-en-2-one (2r): was prepared according to a published procedure; [4] spectral data were in agreement with literature values.[5] ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.45 (d, *J* = 16.3 Hz,1H), 7.38-7.28 (m, 2H), 7.23-7.20 (m, 1H), 7.10-7.06 (m, 1H), 6.68 (d, *J* = 16.3 Hz, 1H), 2.37 (s, 3H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 198.1, 163.1 (d, *J*= 245.0 Hz), 141.9 (d, *J*= 3.0 Hz), 136.7 (d, *J*= 8.0 Hz), 130.6 (d, *J*= 8.0 Hz), 128.2, 124.3 (d, *J*= 3.0 Hz), 117.4 (d, *J*= 21.0 Hz), 114.5 (d, *J*= 22.0 Hz), 27.8; HRMS (ESI) m/z calculated for $C_{10}H_9FONa^+$ $[M+Na]^+$: 187.0530; found: 187.0530.



2t

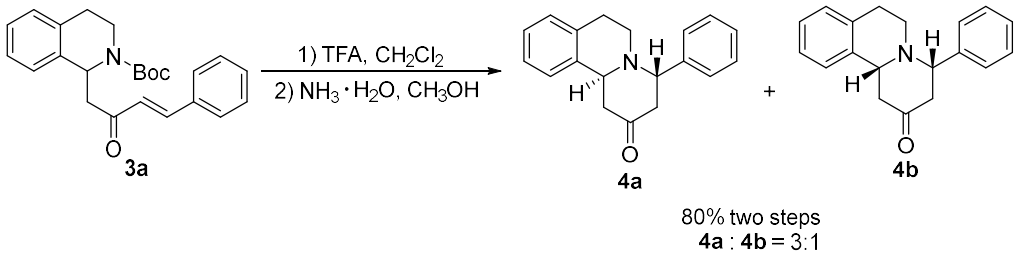
(*E*)-4-(2-fluoro-4-methoxyphenyl)but-3-en-2-one (2t): was prepared according to a published procedure;[4] spectral data were in agreement with literature values.[10] m. p. = 89-90 ºC; ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.41 (d, *J* = 16.2 Hz, 1H), 7.31-7.25 (m, 2H), 6.96 (t, *J* = 8.4 Hz, 1H), 6.58 (d, *J* = 16.2 Hz, 1H), 3.92 (s, 3H), 2.36 (s, 3H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 198.1, 152.5 (d, *J*= 246.0 Hz), 149.7 (d, *J*= 10.0 Hz), 142.1 (d, *J*= 3.0 Hz), 127.7 (d, *J*= 7.0 Hz), 126.1, 125.7 (d, *J*= 4.0 Hz), 114.9 (d, *J*= 19.0 Hz), 113.3 (d, *J* = 3.0 Hz), 56.3, 27.7; HRMS (ESI) m/z calculated for $C_{11}H_{12}FO_2^+$ $[M+H]^+$: 195.0816; found: 195.0816.



2w

(*E*)-6-phenylhex-3-en-2-one (2w): was prepared according to a published procedure; [4] spectral data were in agreement with literature values.[11] ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.32-7.28 (m, 2H), 7.23-7.18 (m, 3H), 6.86-6.78 (m, 1H), 6.10 (d, *J* = 16.0 Hz, 1H), 2.79 (t, *J* = 7.7 Hz, 2H), 2.55 (td, *J* = 7.6, 3.7 Hz, 2H), 2.22 (s, 3H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 198.6, 147.1, 140.7, 131.7, 128.5, 128.3, 126.3, 34.4, 34.1, 26.9; HRMS (ESI) m/z calculated for $C_{12}H_{15}O^+$ $[M+H]^+$: 175.1117; found: 175.1116; All data were in agreement with those reported.

3. Synthesis and characterization of benzo[*a*]quinolizidines



4a and **4b** was prepared according to a published procedure; The spectral data were in agreement with literature values.[12]

(4*S*,11b*S*)-4-Phenyl-1,3,4,6,7,11*b*-hexahydro-2*H*-pyrido[2,1-*α*]isoquinolin-2-one (4a): Orange gum; ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.34-7.28 (m, 4H), 7.25-7.20 (m, 1H), 7.11-7.06 (m, 3H), 6.96-6.94 (m, 1H), 4.40 (t, *J* = 5.0 Hz, 1H), 4.14 (dd, *J* = 9.8, 3.9 Hz, 1H), 3.27-3.21 (m, 1H), 3.02-2.66 (m, 7H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 208.7, 139.4, 136.8, 134.0, 129.0, 128.3, 128.1, 127.5, 126.4, 126.1, 126.0, 63.8, 54.4, 46.8, 46.2, 43.7, 29.0; IR (thin film): 2913, 1709, 1494, 1452, 1331, 1249, 1141, 1111, 754, 702, 622cm^{-1}; HRMS (ESI) m/z calculated for $C_{19}H_{19}NONa^{+}$ $[M+Na]^{+}$: 300.1359; found: 300.1362.

(4*R*,11b*R*)-4-Phenyl-1,3,4,6,7,11b-hexahydro-2*H*-pyrido[2,1-*α*]isoquinolin-2-one (4b): Orange solid; m. p. = 102-103 ºC; ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.42-7.29 (m, 5H), 7.21-7.06 (m, 4H), 3.85 (d, *J* = 10.4 Hz, 1H), 3.63 (dd, *J* = 11.6, 3.6 Hz, 1H), 3.09-2.96 (m, 3H), 2.77-2.56 (m, 4H), 2.24-2.17 (m, 1H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 207.5, 142.4, 137.1, 135.0, 129.03, 128.98, 127.9, 127.3, 126.6, 126.2, 125.0, 68.4, 62.5, 50.0, 47.6, 47.2, 29.9; IR (thin film): 2921, 2801, 1718, 1494, 1454, 1335, 1308, 1253, 1150, 1111, 1045, 1029, 761, 743, 702cm^{-1}; HRMS (ESI) m/z calculated for $C_{19}H_{19}NONa^{+}$ $[M+Na]^{+}$: 300.1359; found: 300.1366.

4. Reference

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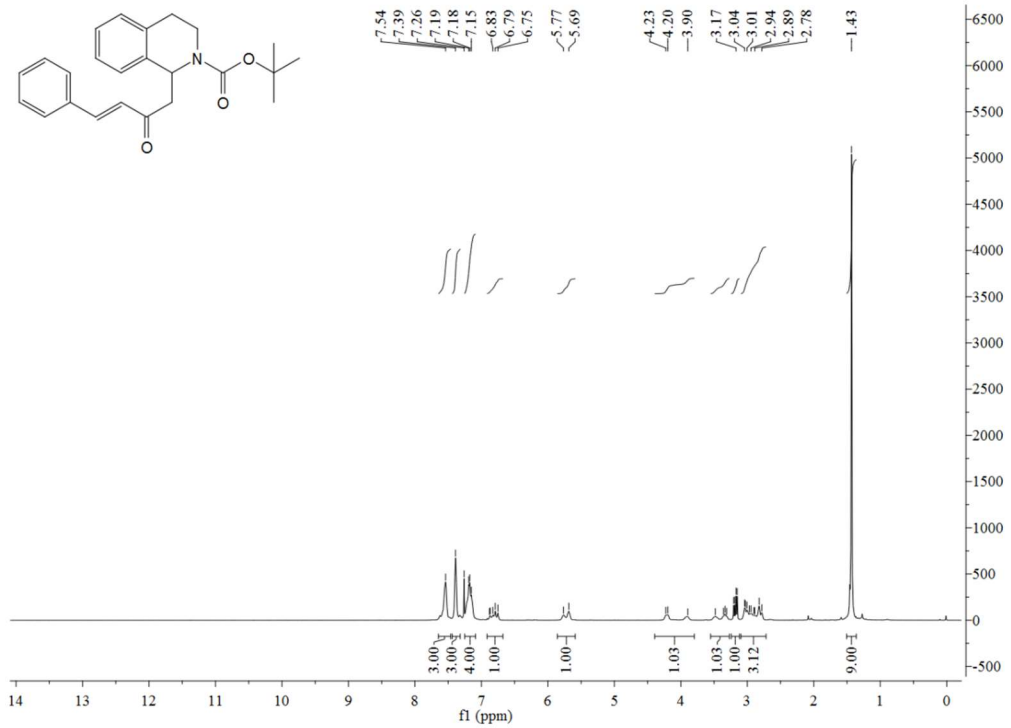
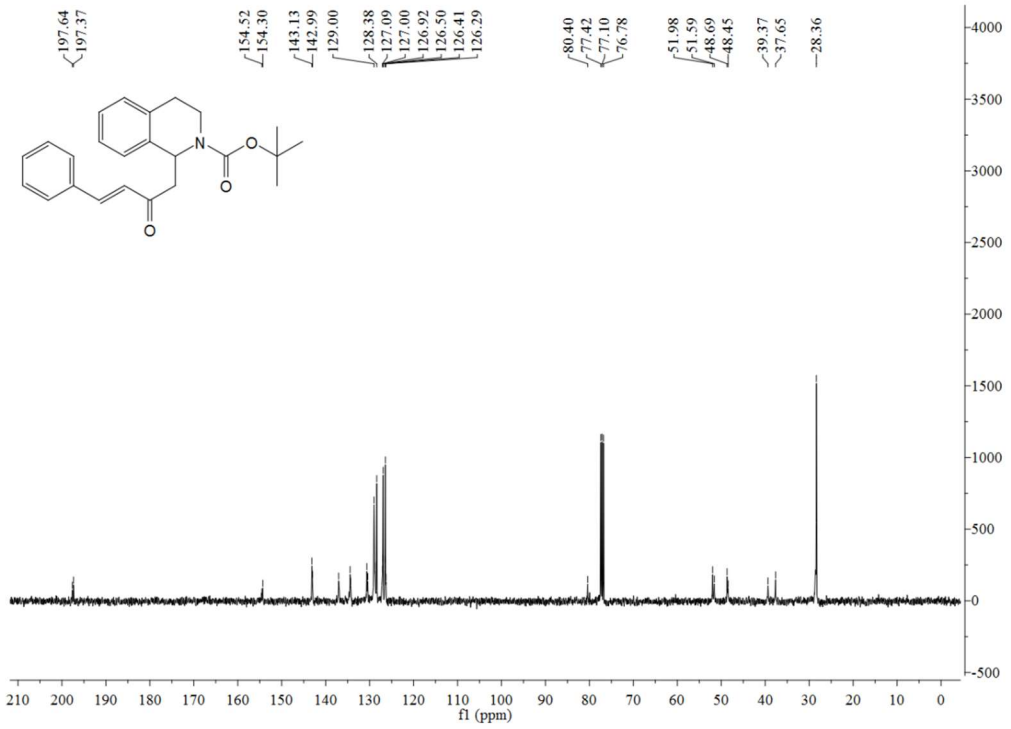
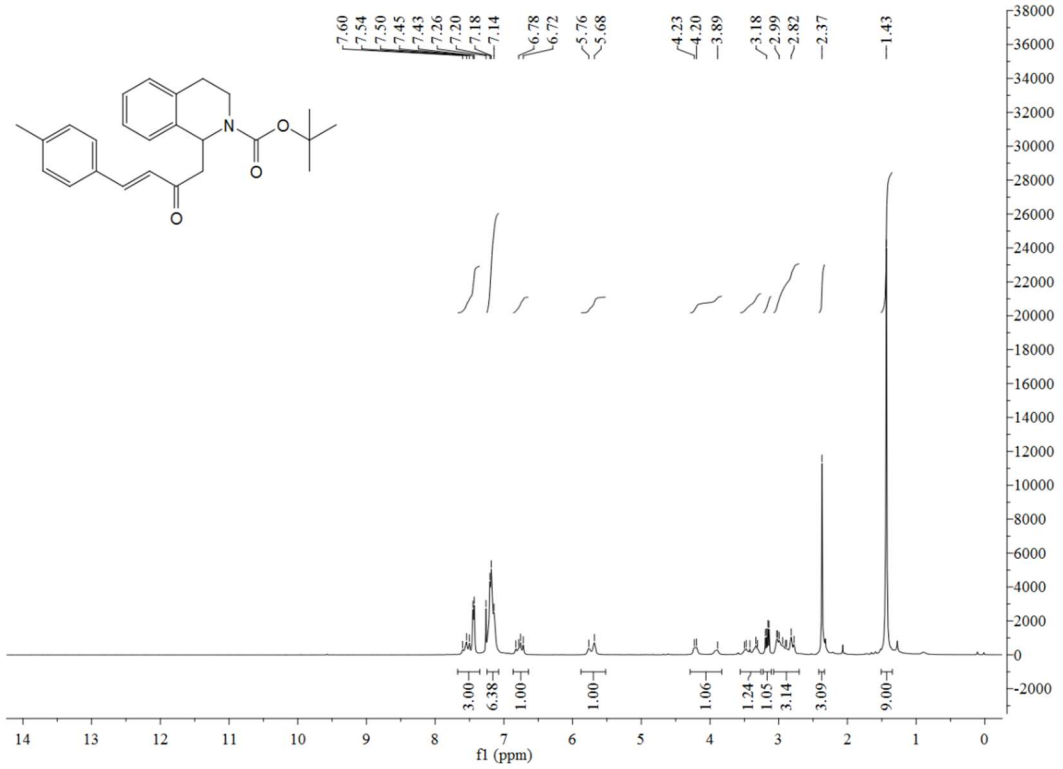
5. ^{1}H NMR and ^{13}C NMR Spectra for Products

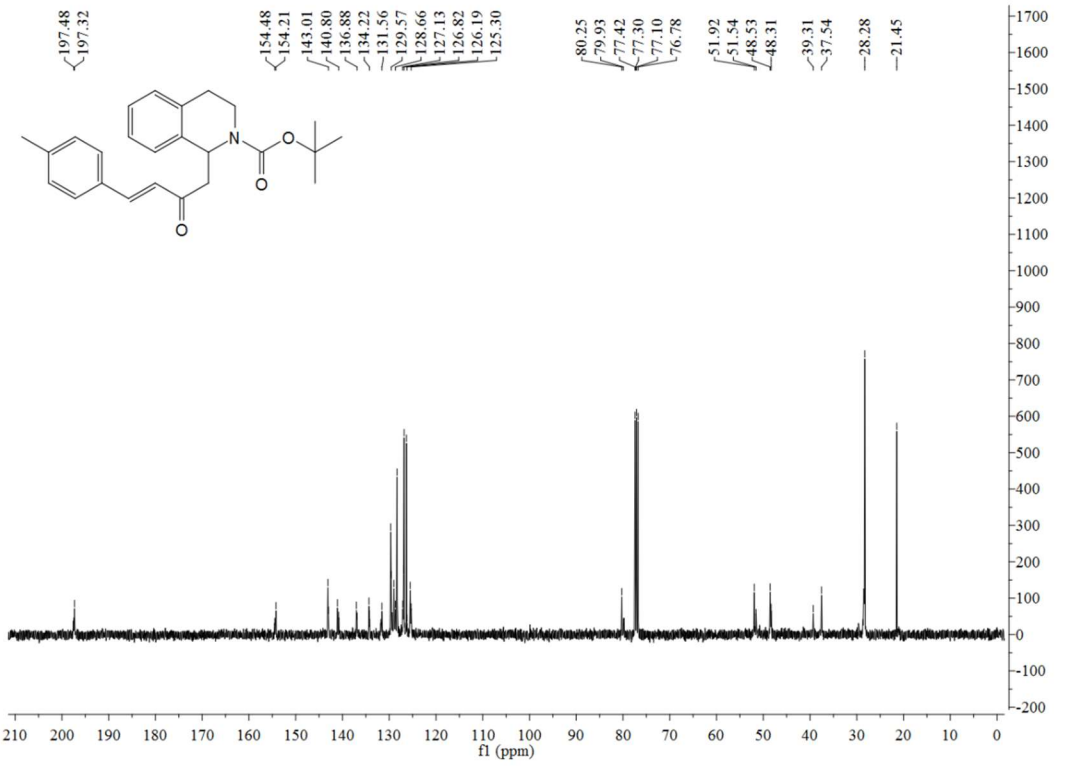
tert-butyl(_E_)-1-(2-oxo-4-phenylbut-3-en-1-yl)-3,4-dihydroisoquinoline-2(1_H_)-carboxylate (3aa):



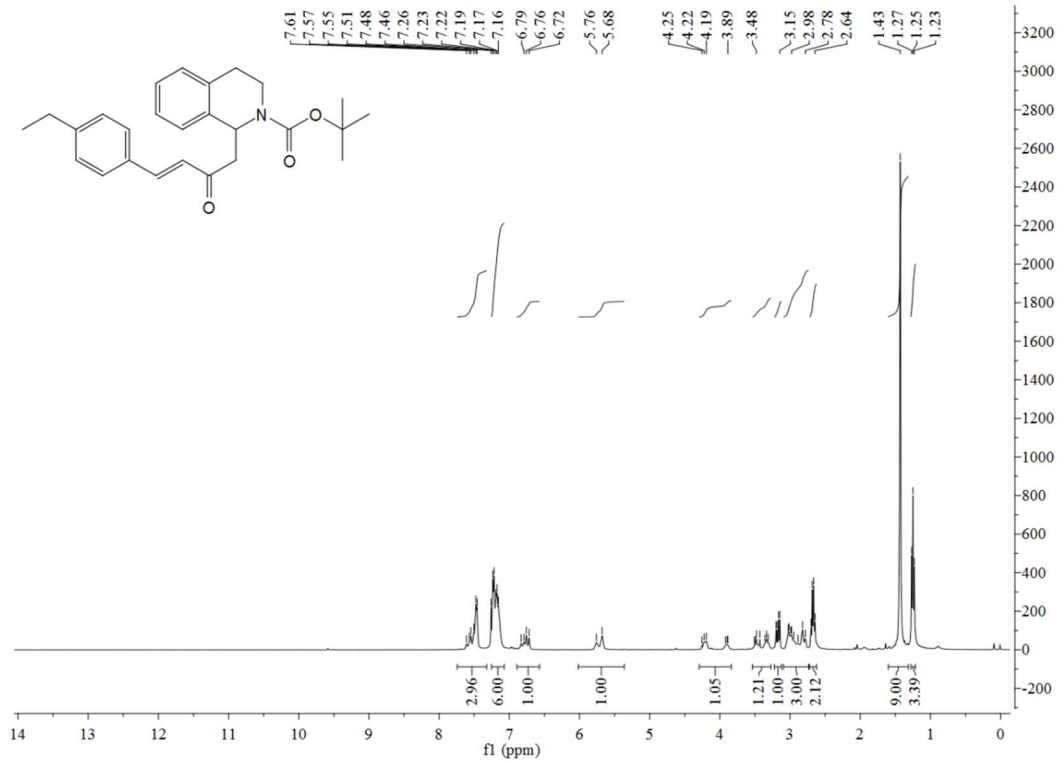


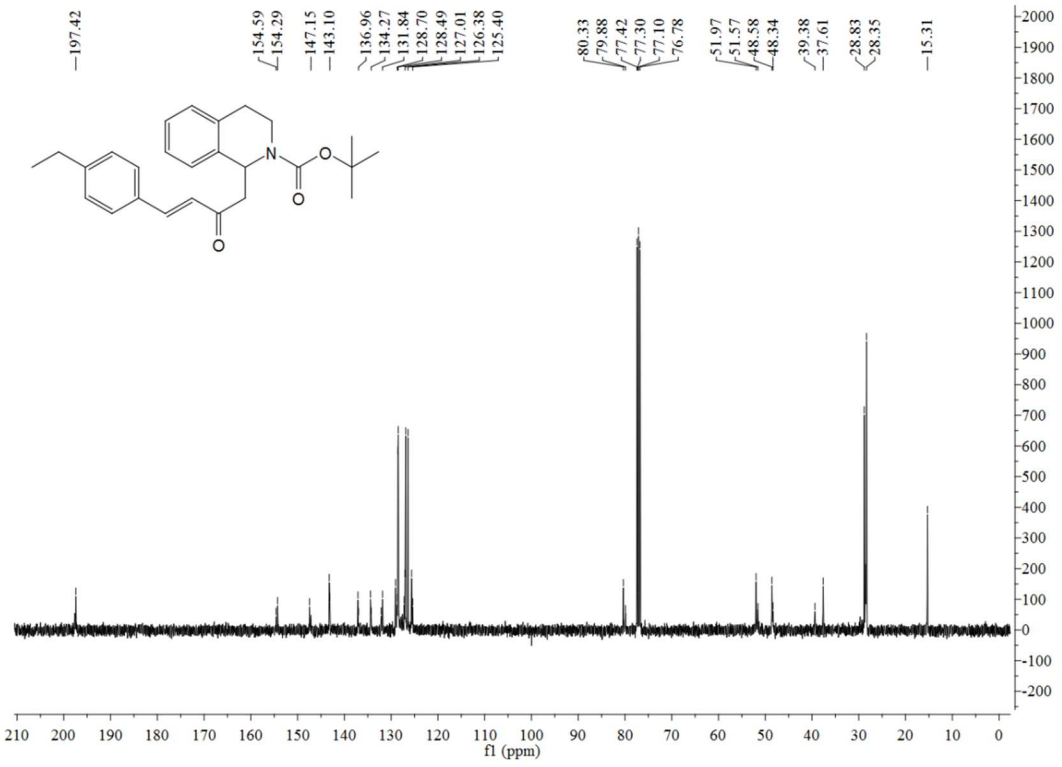
***tert*-butyl(*E*)-1-(4-(4-chlorophenyl)-2-oxobut-3-en-1-yl)-3,4-dihydroisoquinoline-2 (1*H*)-carboxylate (3ab):**



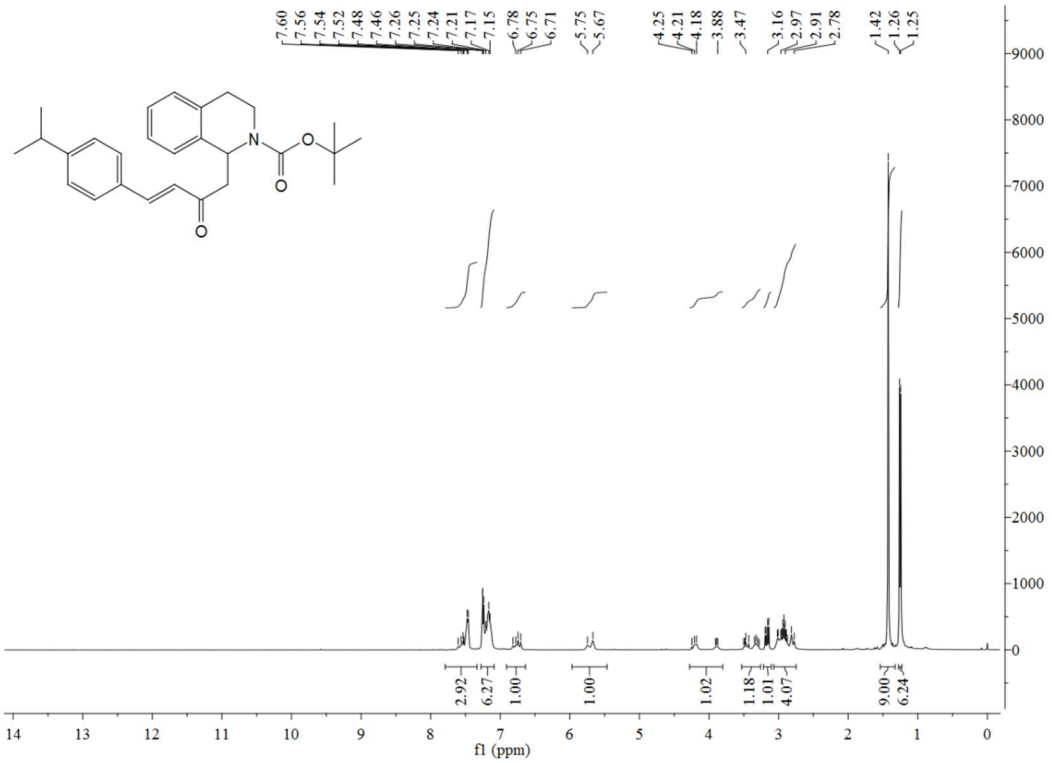


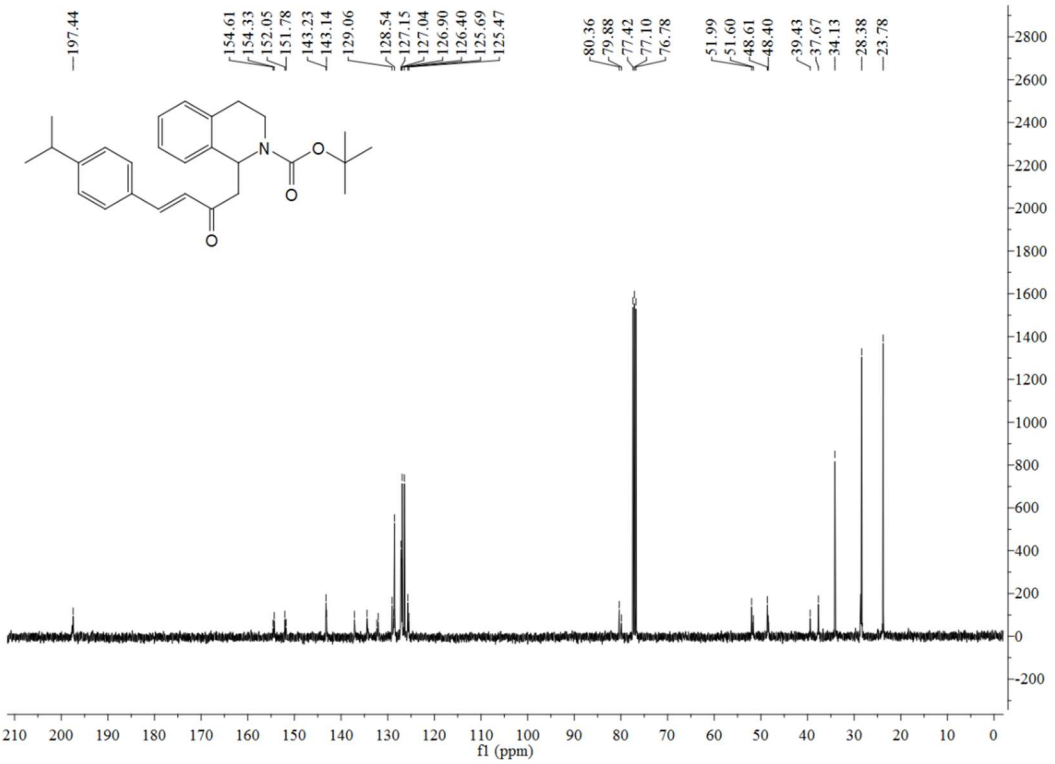
***tert*-butyl(*E*)-1-(4-(4-ethylphenyl)-2-oxobut-3-en-1-yl)-3,4-dihydroisoquinoline-2(1*H*)-carboxylate (3ac):**



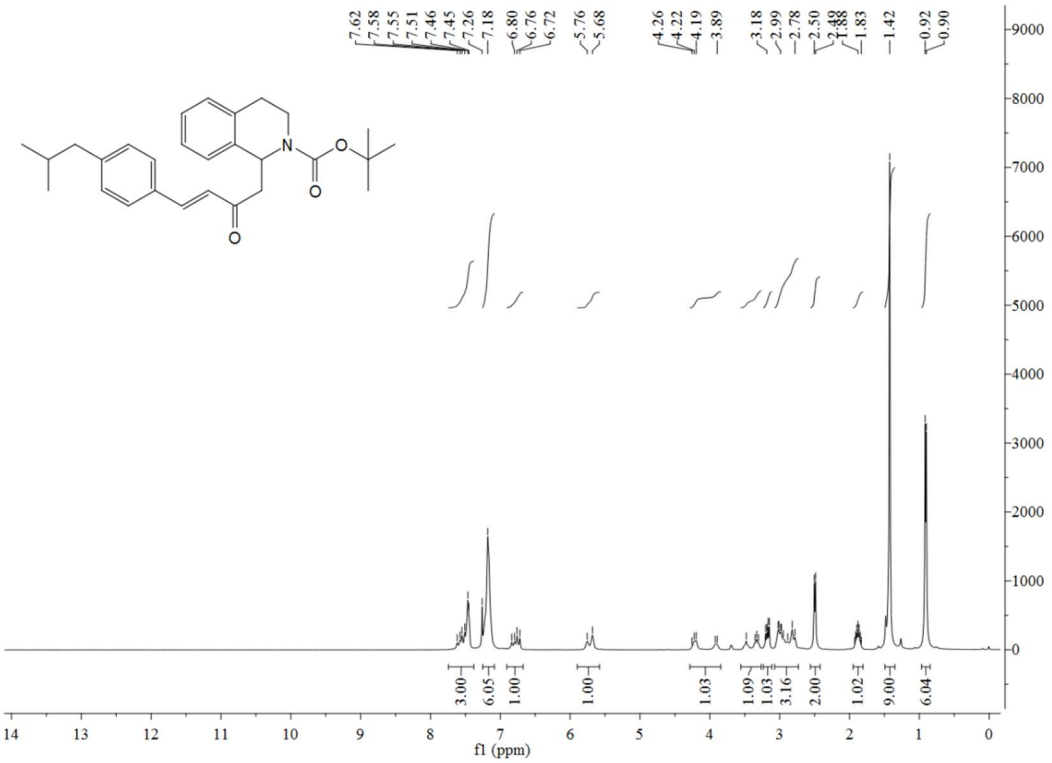


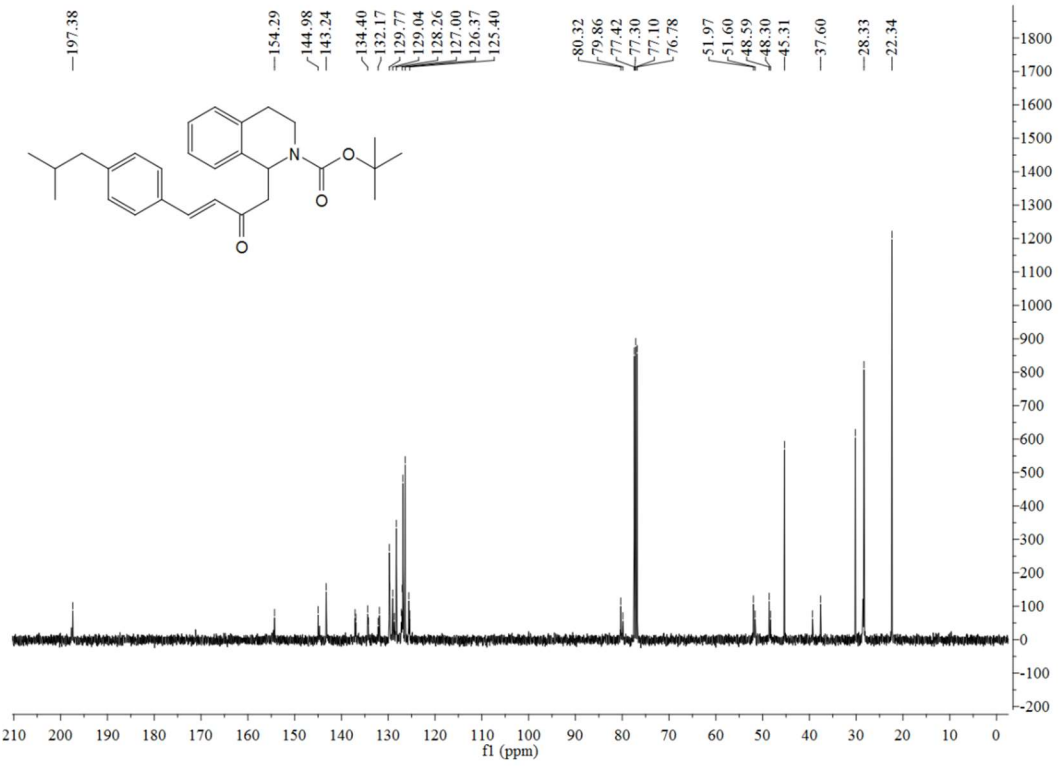
***tert*-butyl(*E*)-1-(4-(4-isopropylphenyl)-2-oxobut-3-en-1-yl)-3,4-dihydroisoquinolin e-2(1*H*)-carboxylate (3ad):**



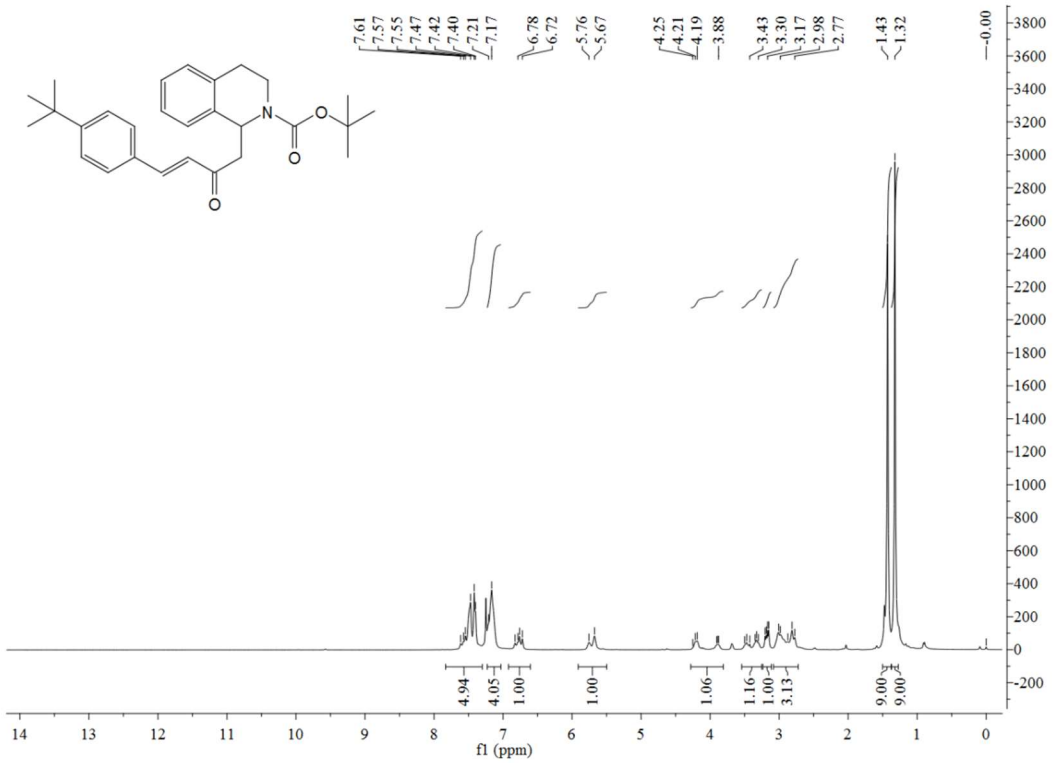


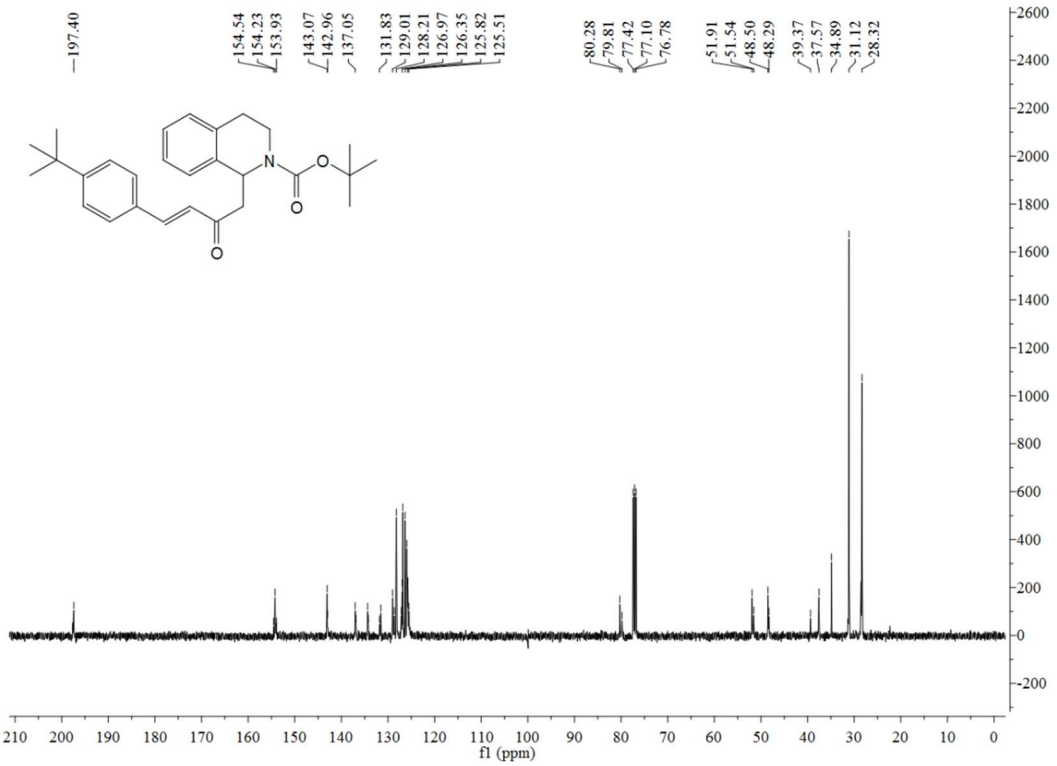
***tert*-butyl(*E*)-1-(4-(4-isobutylphenyl)-2-oxobut-3-en-1-yl)-3,4-dihydroisoquinoline -2(1*H*)-carboxylate (3ae):**



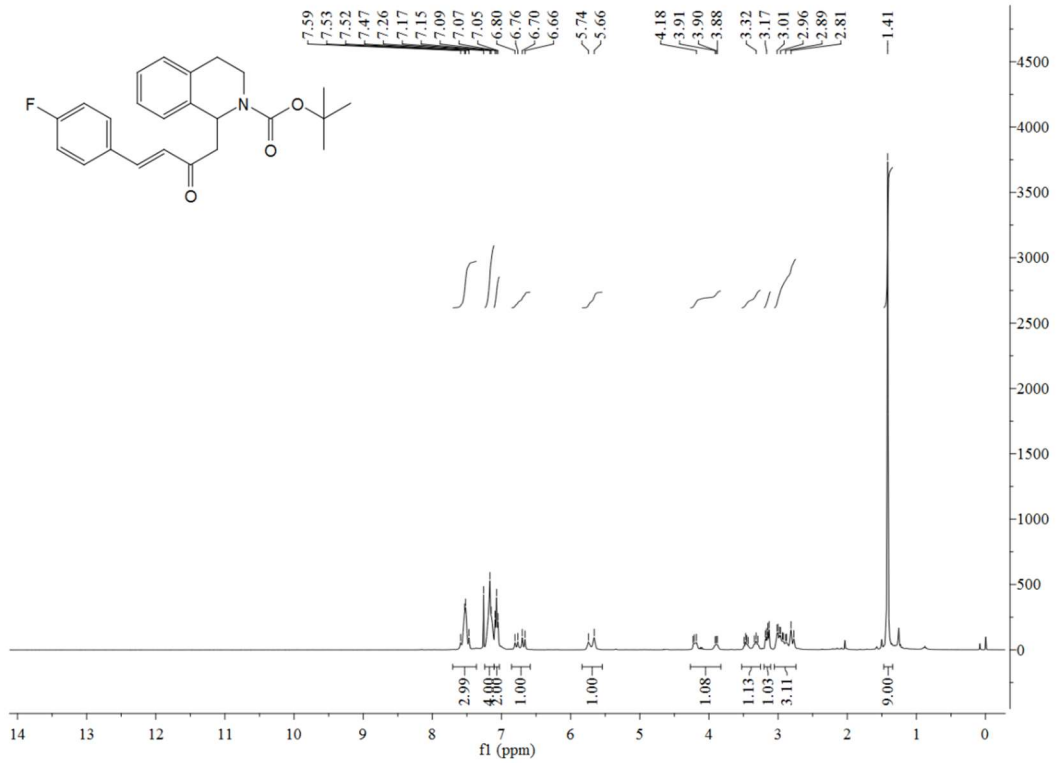


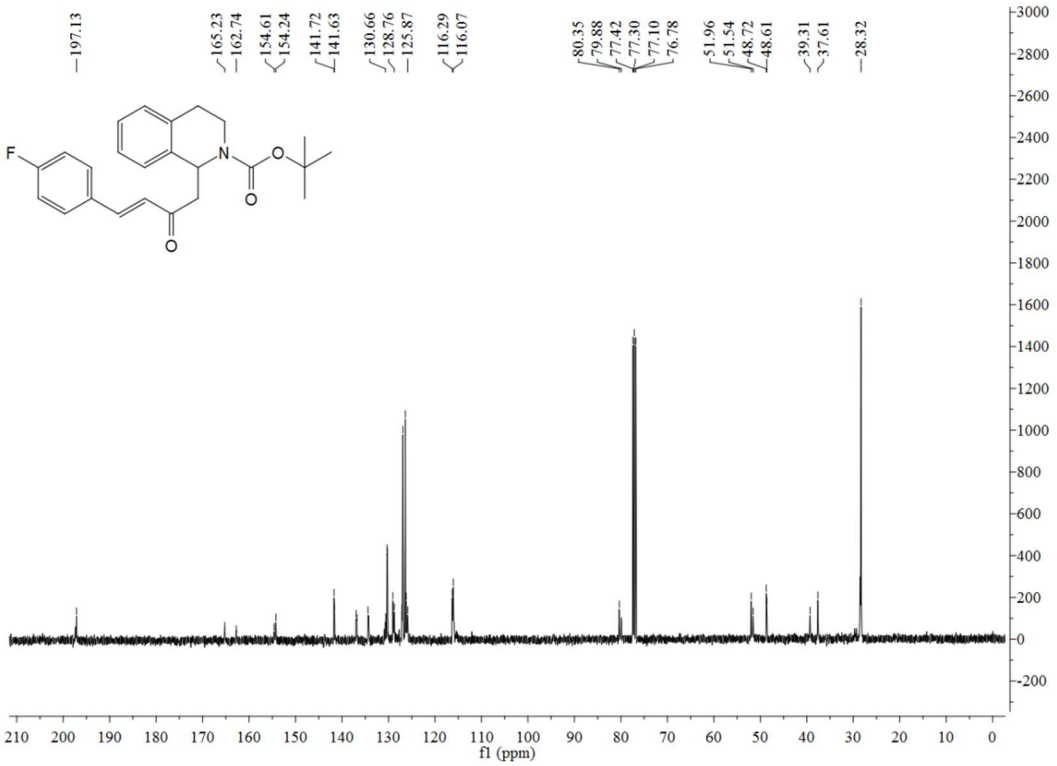
tert-butyl(_E_)-1-(4-(4-(tert-butyl)phenyl)-2-oxobut-3-en-1-yl)-3,4-dihydroisoquinoline-2(1_H_)-carboxylate (3af):



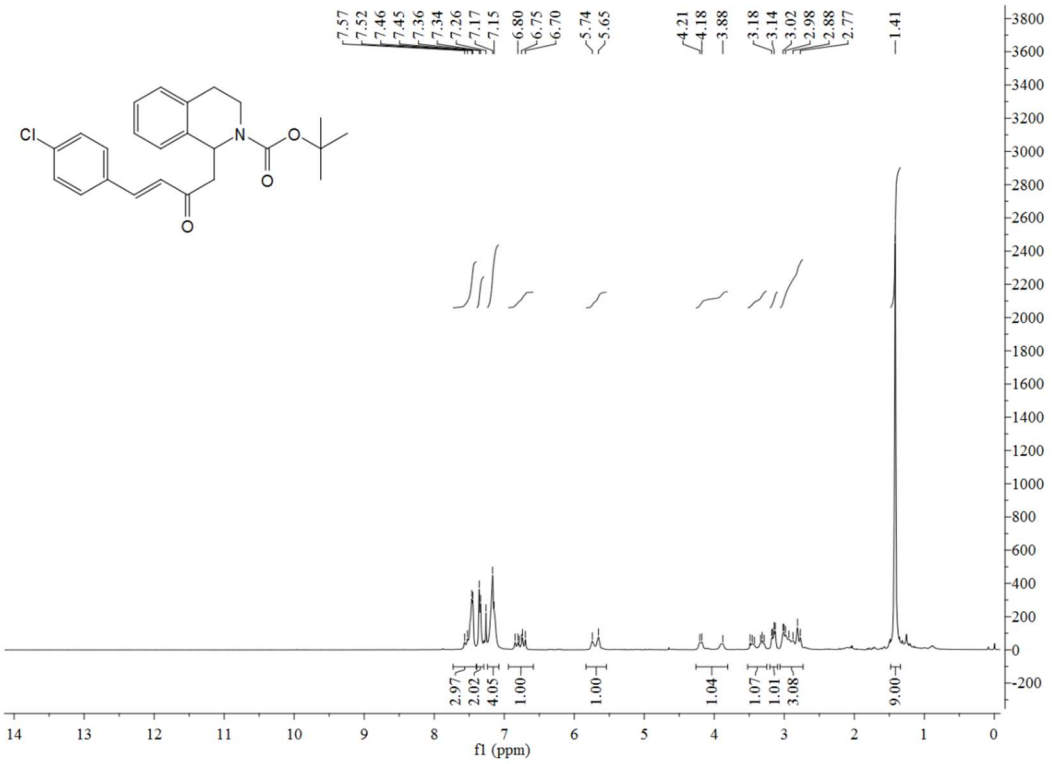


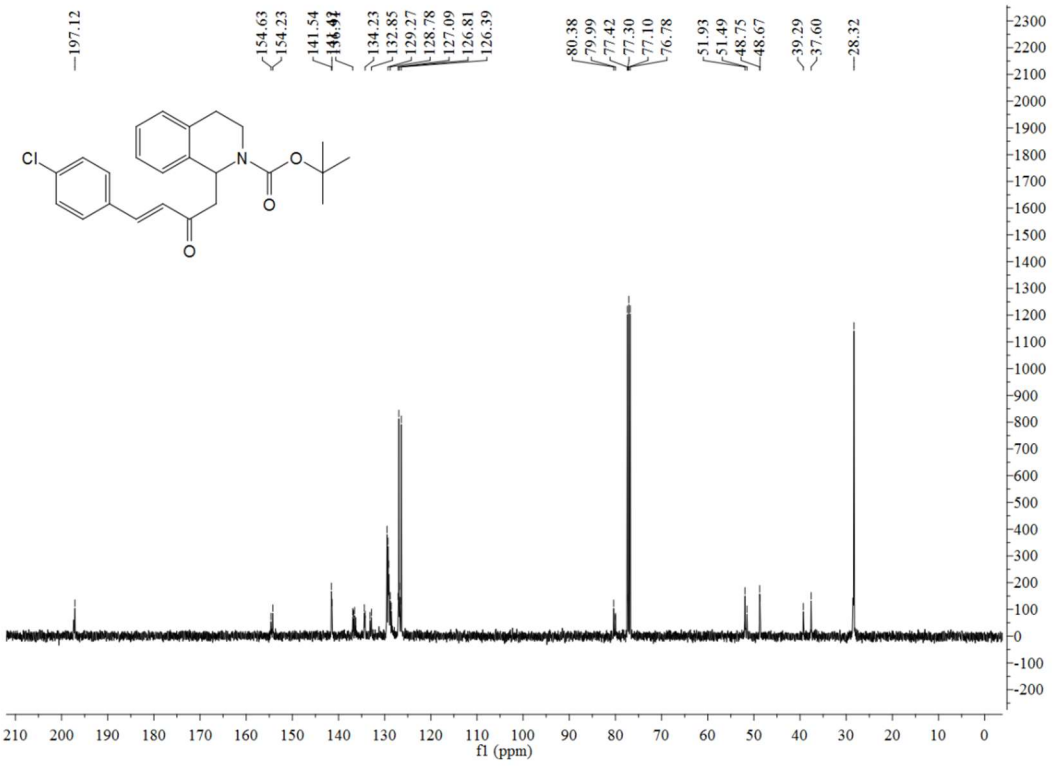
***tert*-butyl(*E*)-1-(4-(4-fluorophenyl)-2-oxobut-3-en-1-yl)-3,4-dihydroisoquinoline-2 (1*H*)-carboxylate (3ag):**



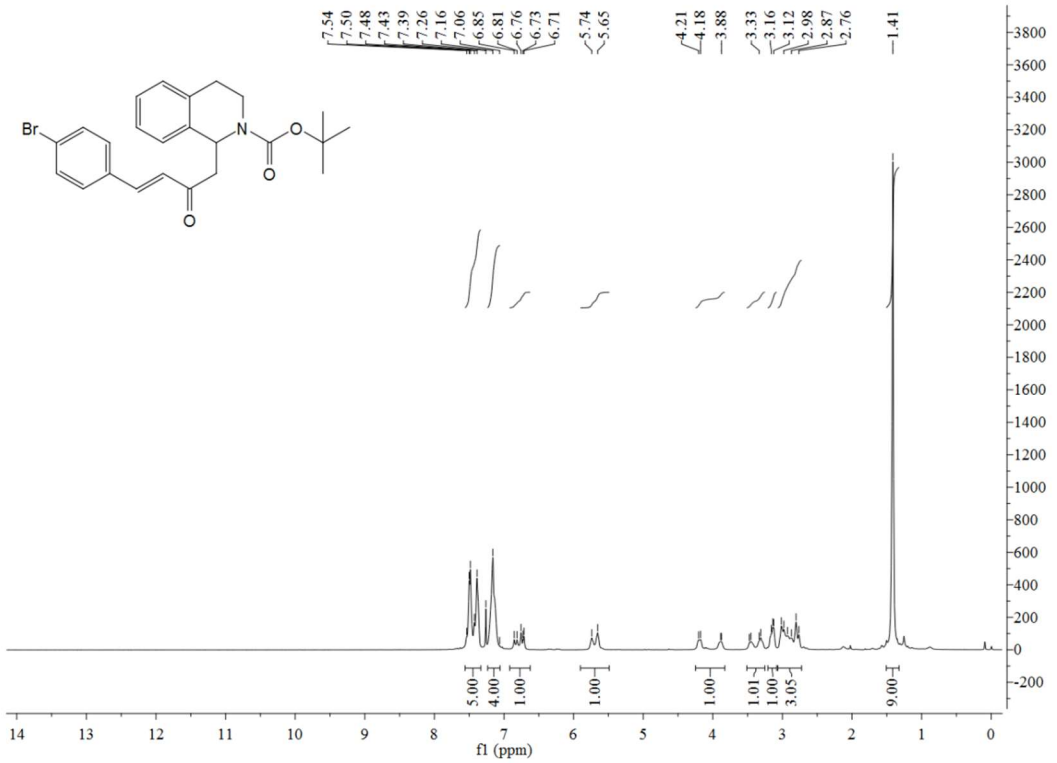


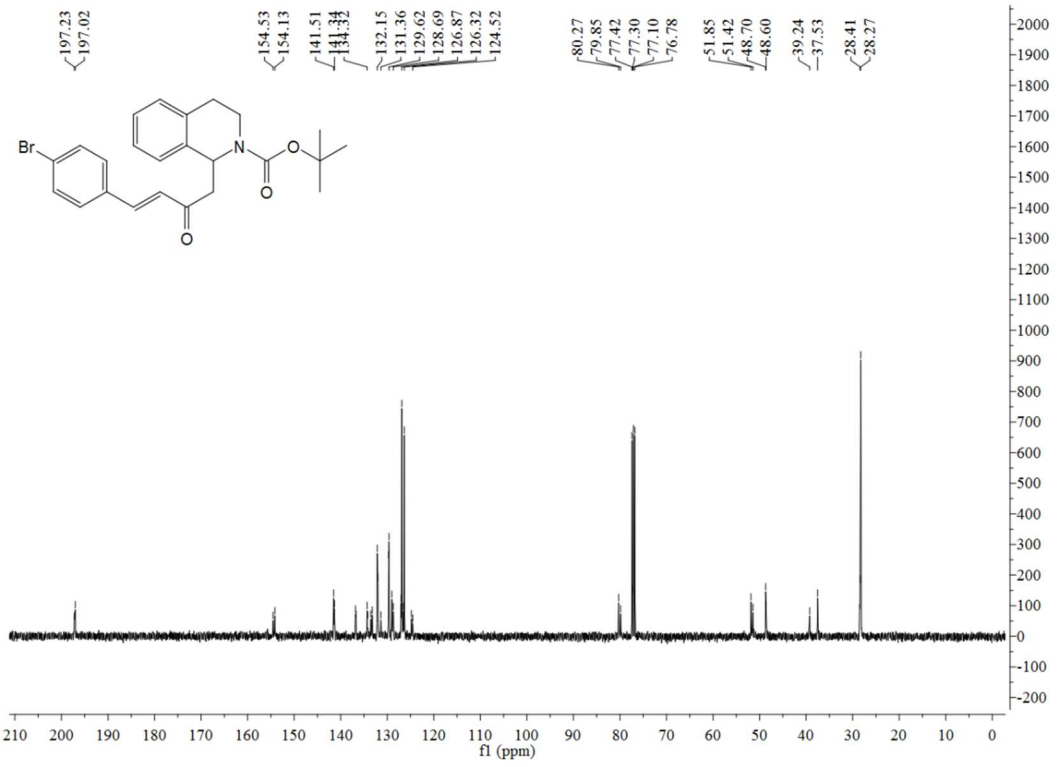
***tert*-butyl(*E*)-1-(4-(4-chlorophenyl)-2-oxobut-3-en-1-yl)-3,4-dihydroisoquinoline-2 (1*H*)-carboxylate (3ah):**



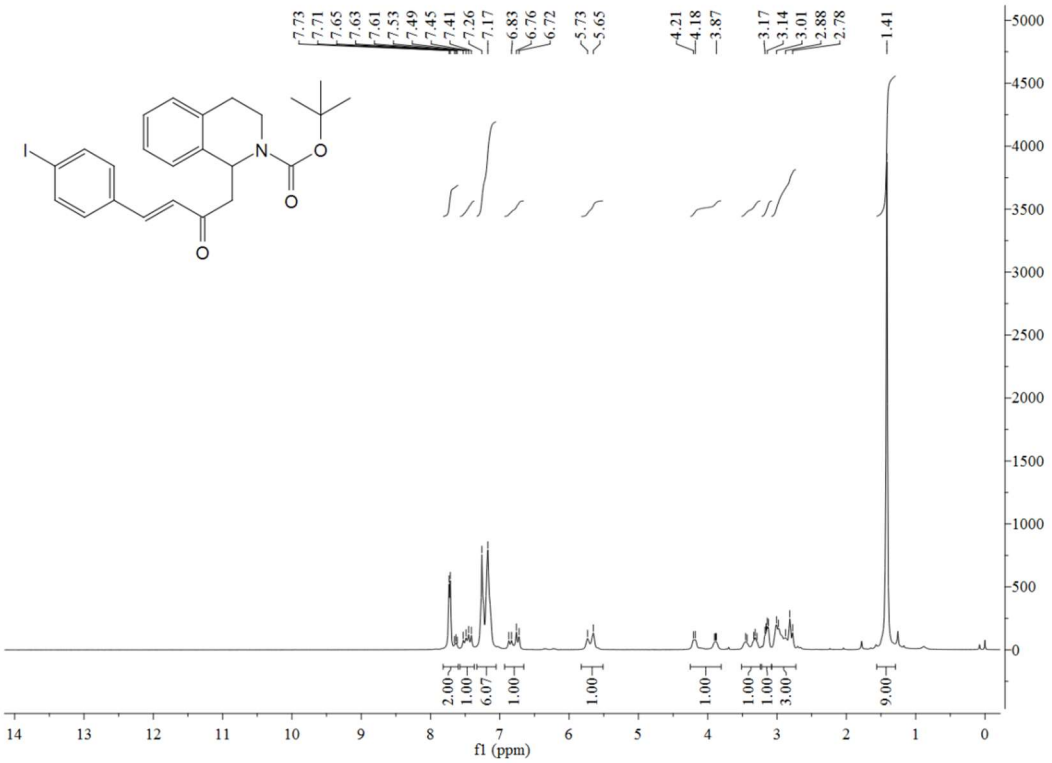


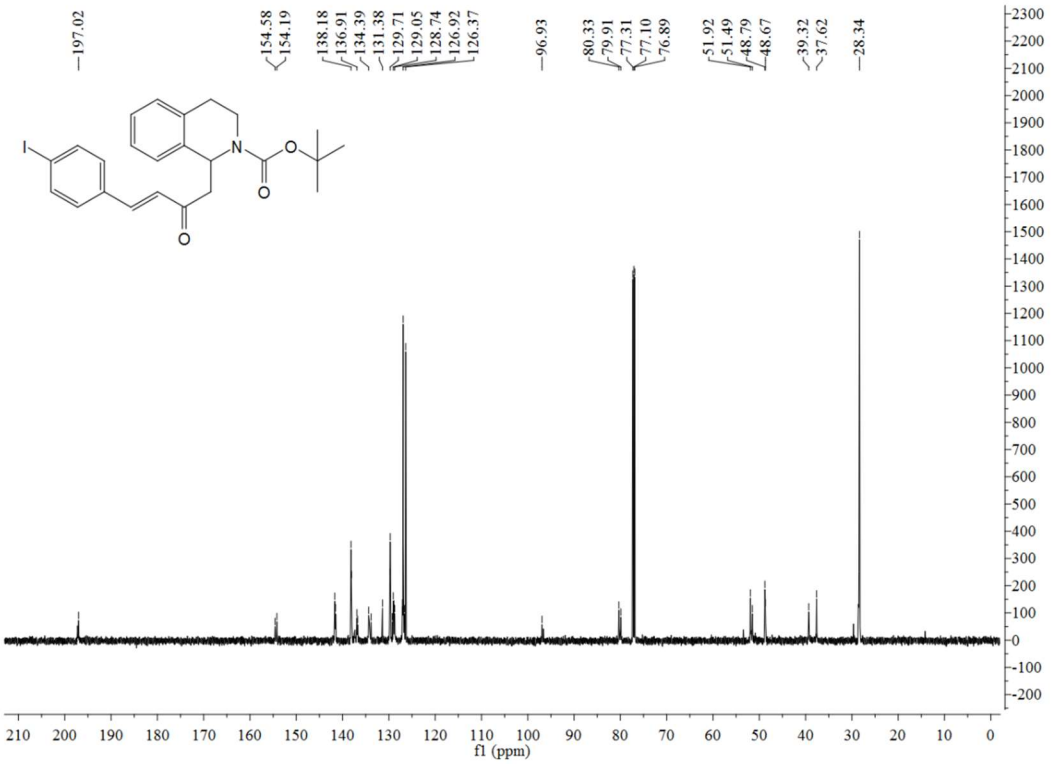
***t*ert-butyl(*E*)-1-(4-(4-bromophenyl)-2-oxobut-3-en-1-yl)-3,4-dihydroisoquinoline-2(1*H*)-carboxylate (3ai):**



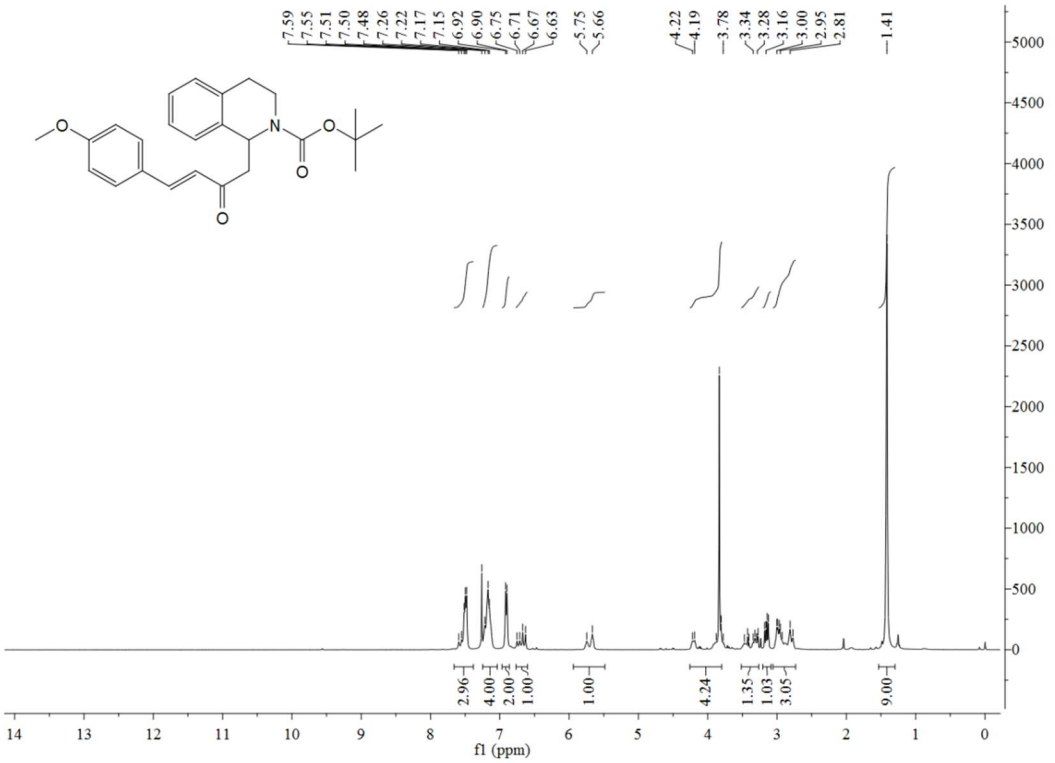


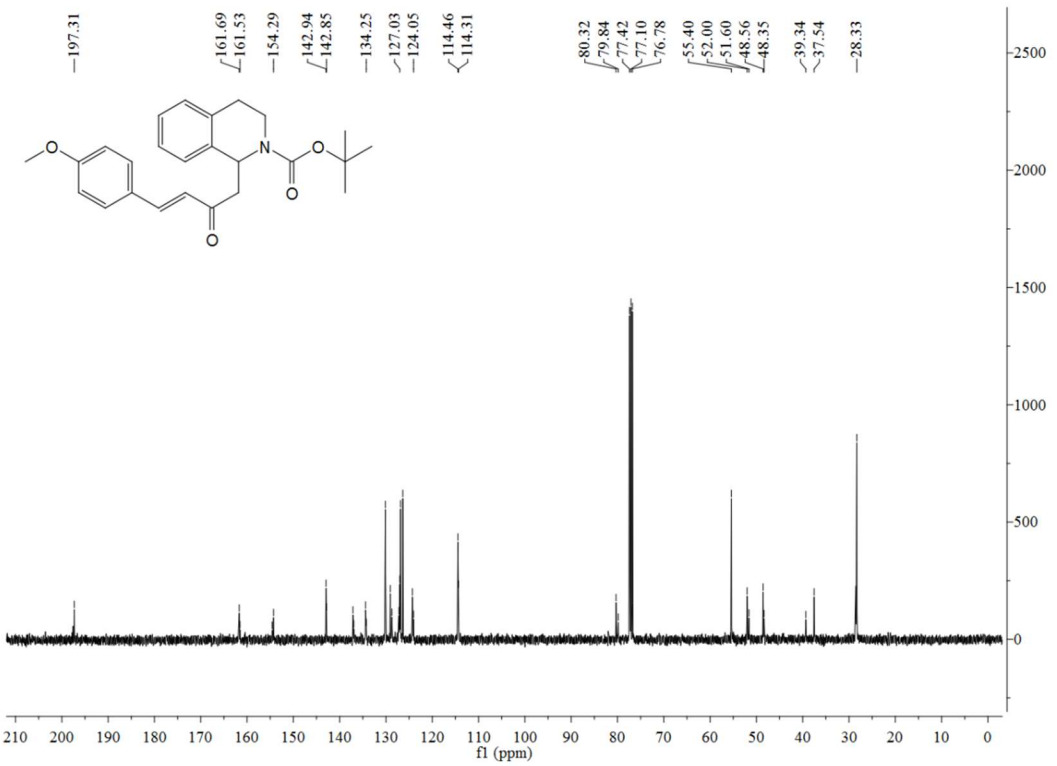
***tert*-butyl(*E*)-1-(4-(4-iodophenyl)-2-oxobut-3-en-1-yl)-3,4-dihydroisoquinoline-2(1*H*)-carboxylate (3aj):**



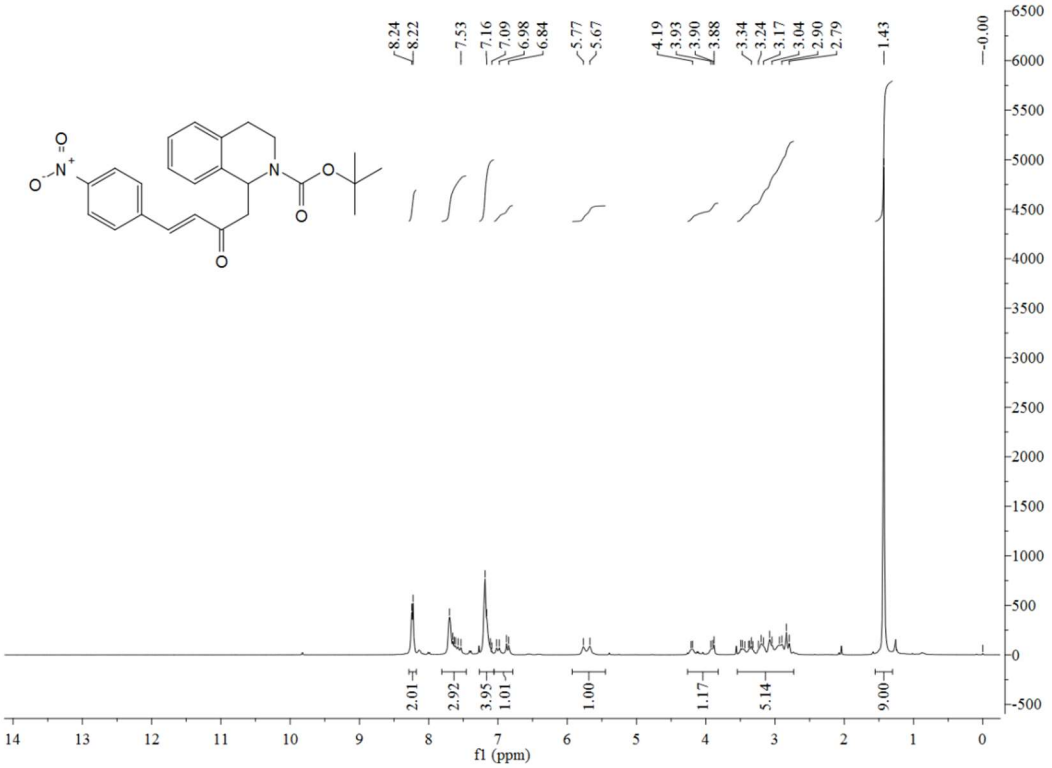


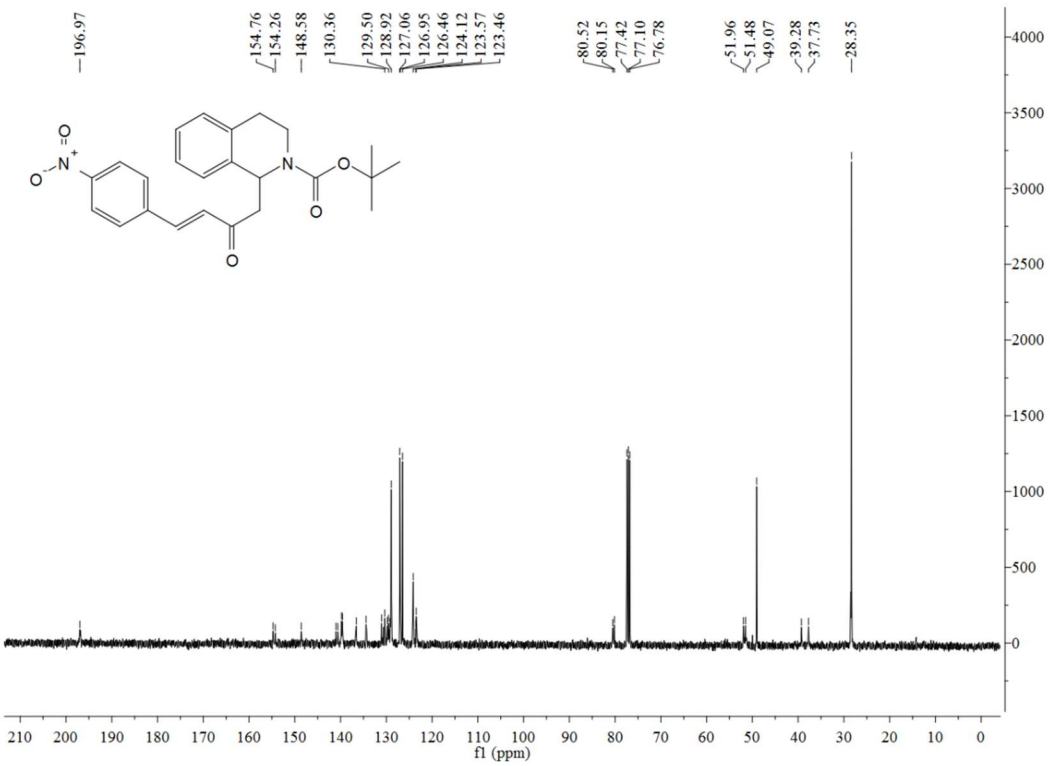
***tert*-butyl(*E*)-1-(4-(4-methoxyphenyl)-2-oxobut-3-en-1-yl)-3,4-dihydroisoquinolin e-2(1*H*)-carboxylate (3ak):**



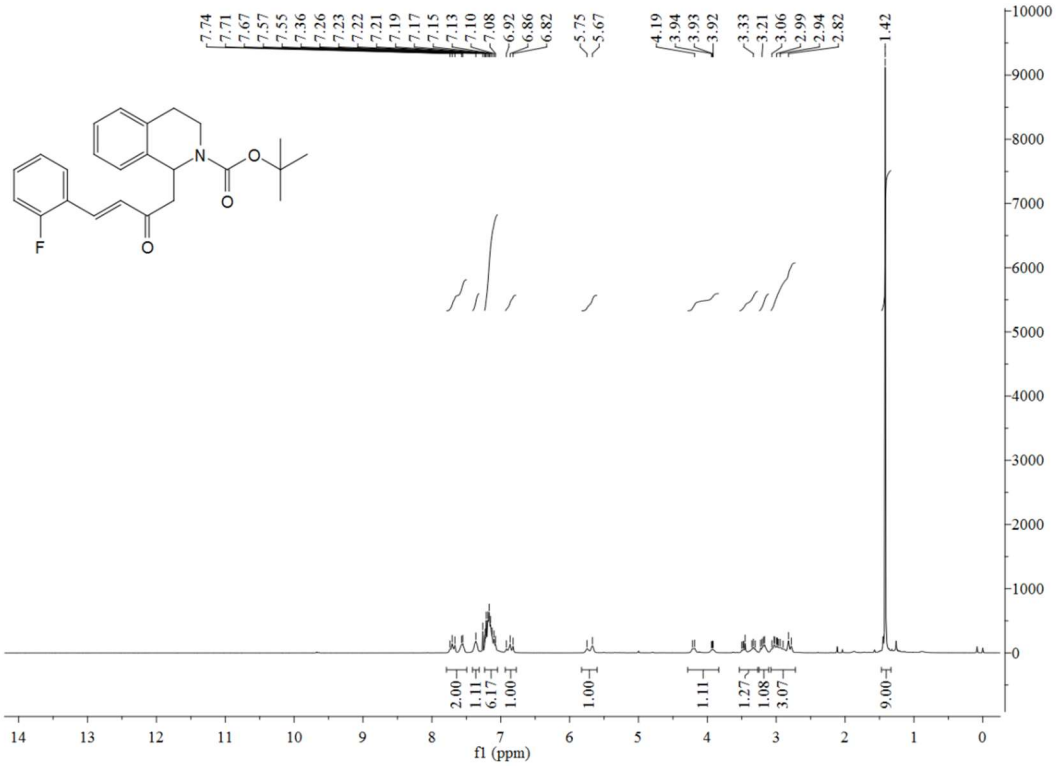


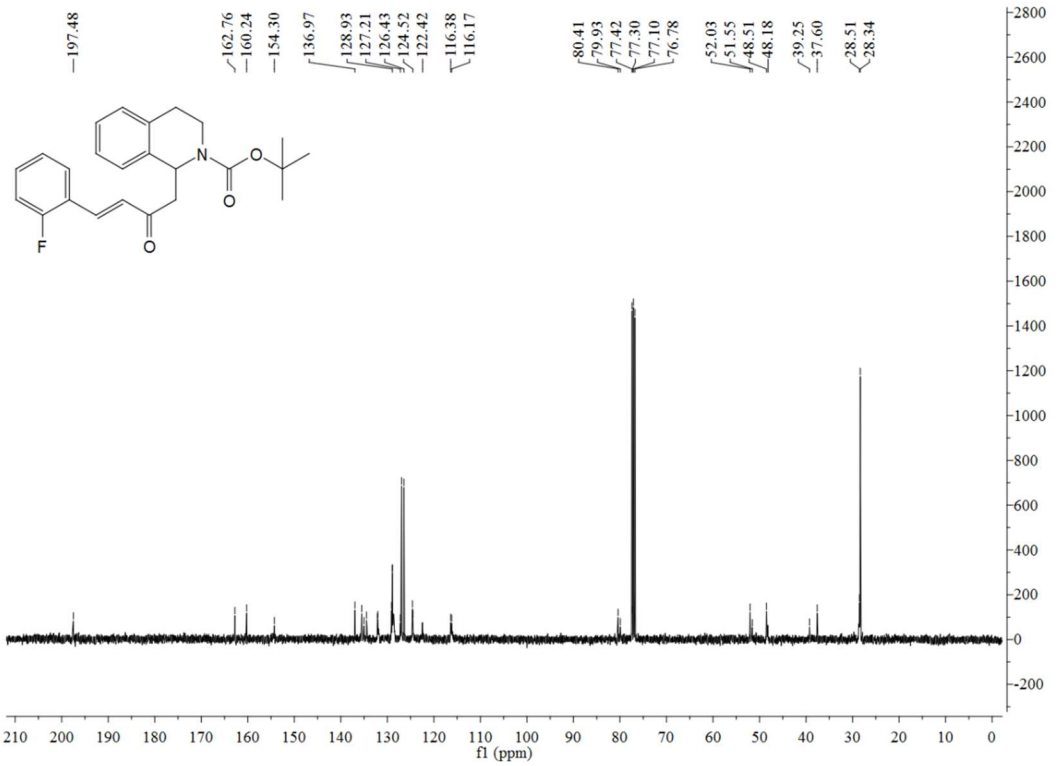
***tert*-butyl(*E*)-1-(4-(4-nitrophenyl)-2-oxobut-3-en-1-yl)-3,4-dihydroisoquinoline-2(1*H*)-carboxylate (3al):**



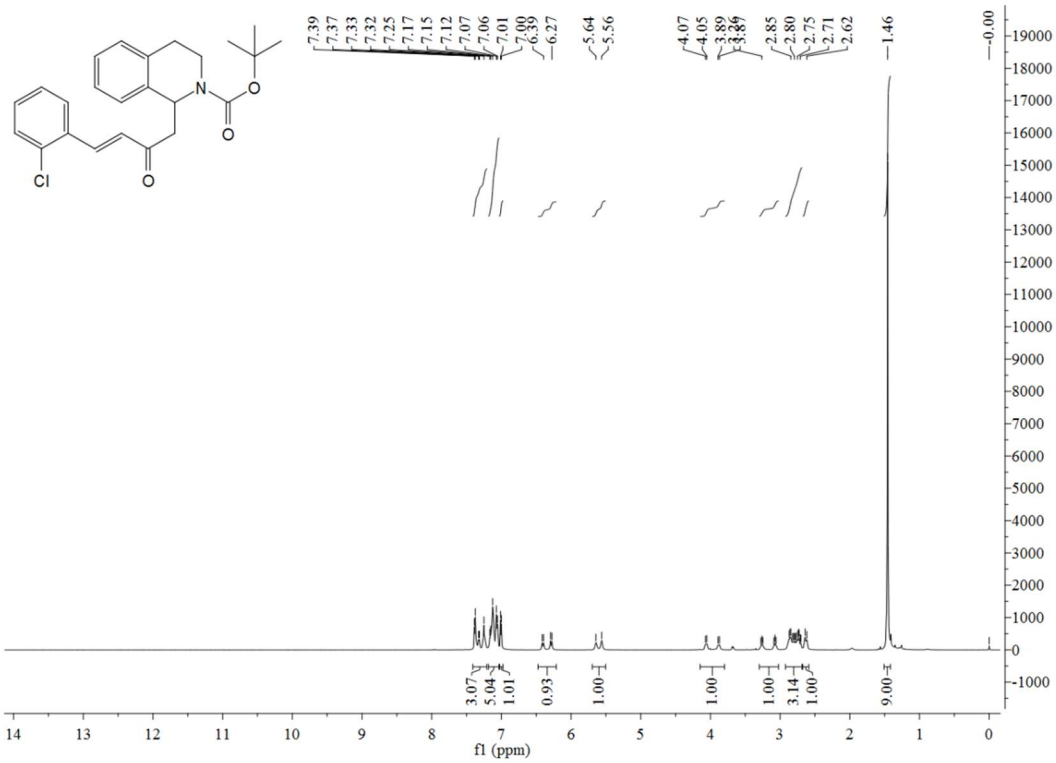


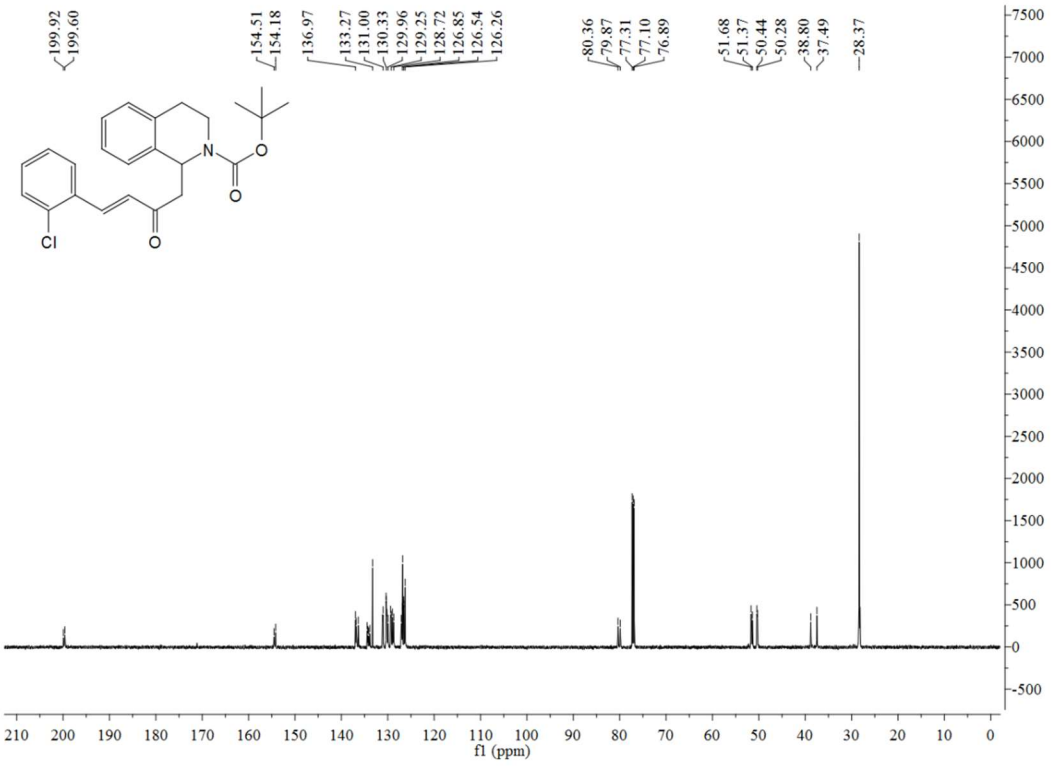
***tert*-butyl(*E*)-1-(4-(2-fluorophenyl)-2-oxobut-3-en-1-yl)-3,4-dihydroisoquinoline-2 (1*H*)-carboxylate (3am):**



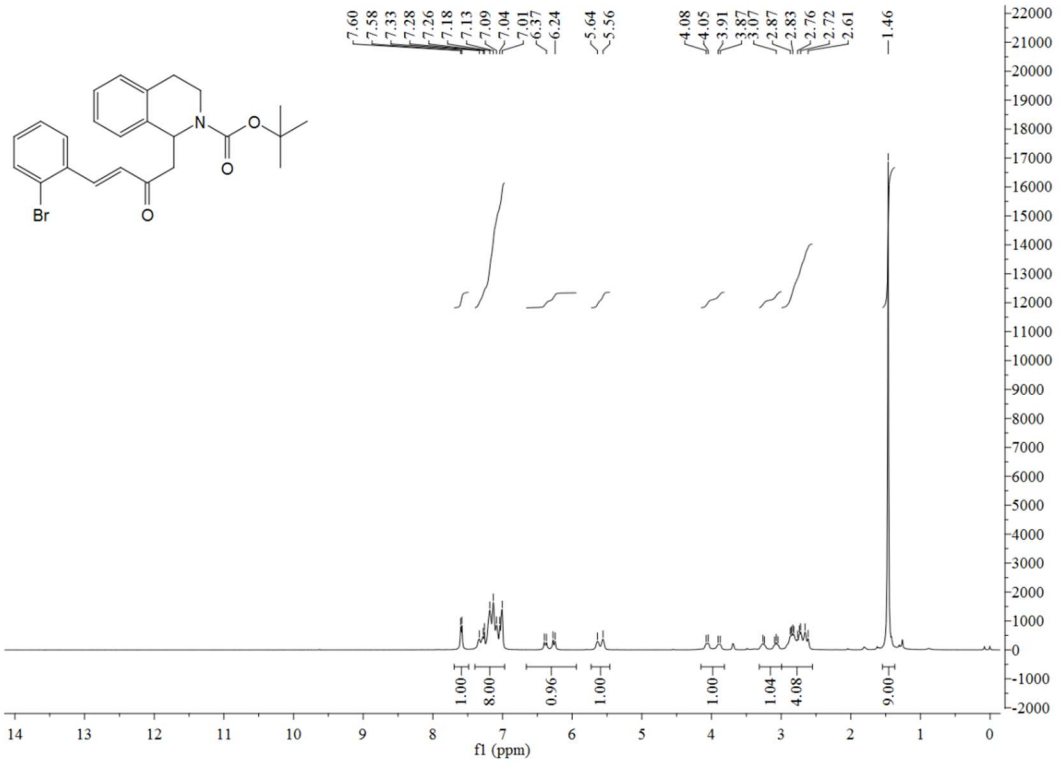


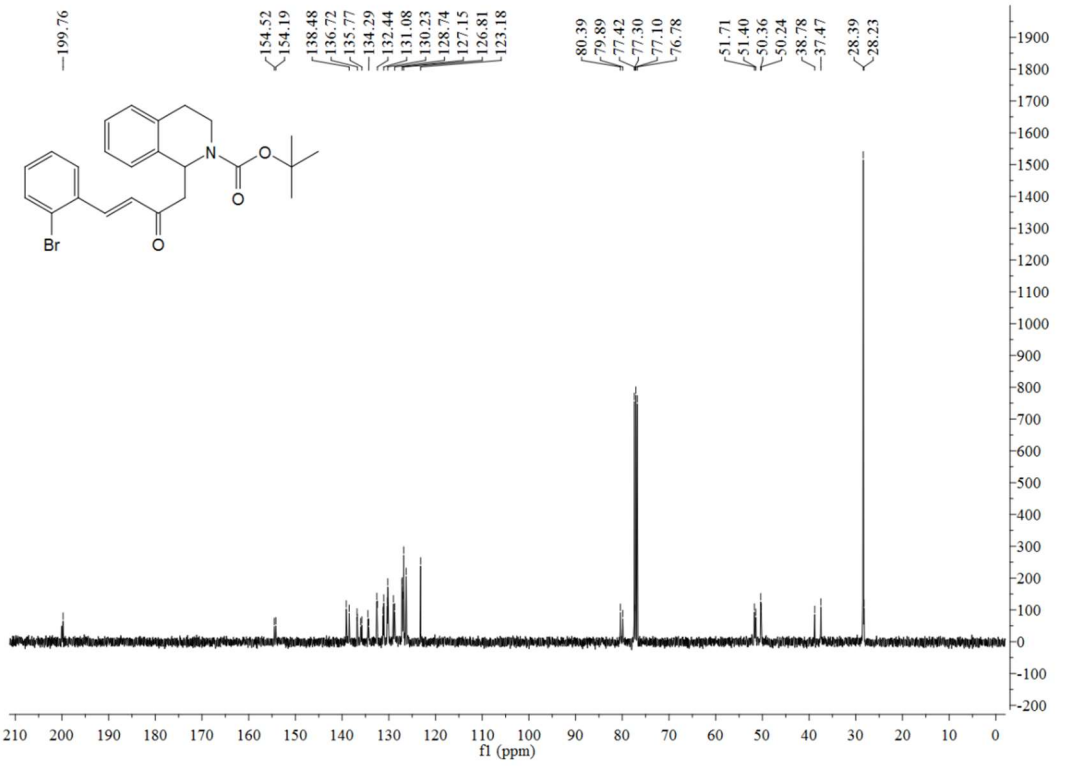
***tert*-butyl(*E*)-1-(4-(2-chlorophenyl)-2-oxobut-3-en-1-yl)-3,4-dihydroisoquinoline-2 (1*H*)-carboxylate (3an):**



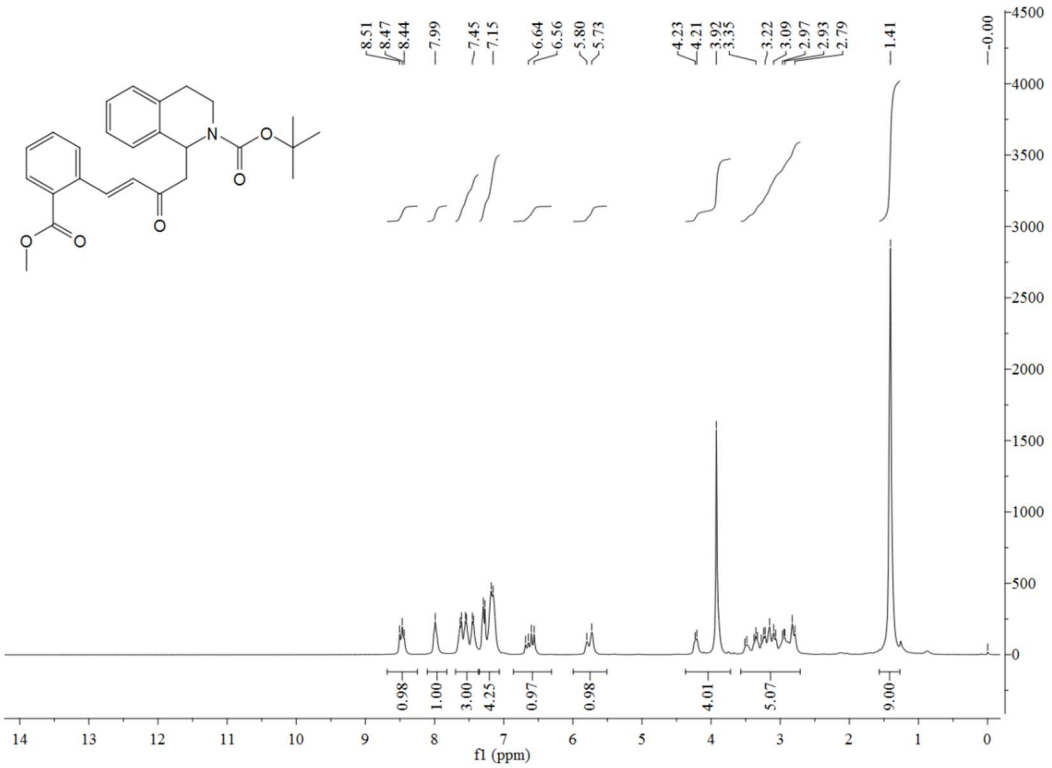


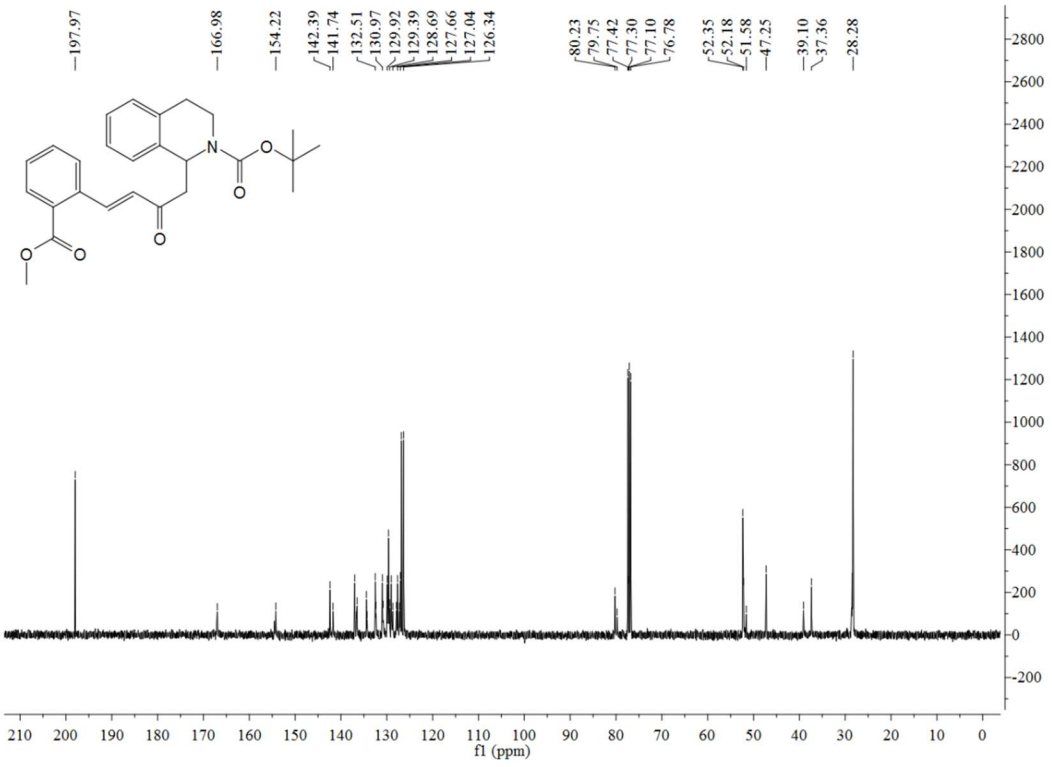
***tert*-butyl(*E*)-1-(4-(2-bromophenyl)-2-oxobut-3-en-1-yl)-3,4-dihydroisoquinoline-2(1*H*)-carboxylate (3ao):**



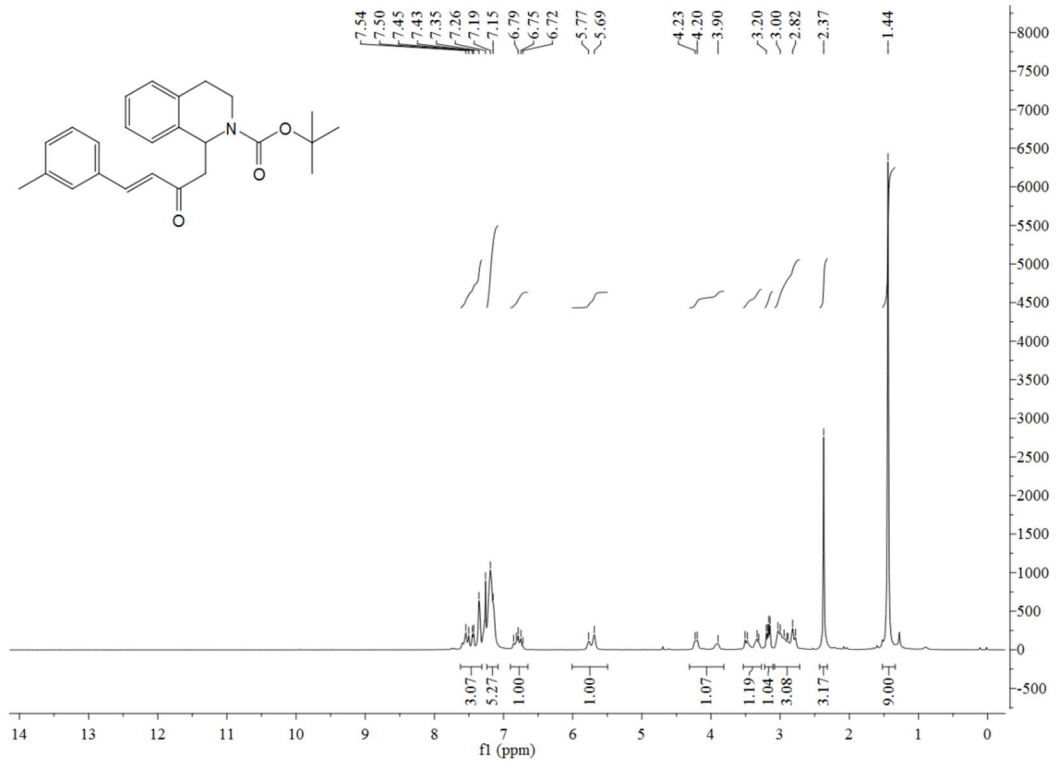


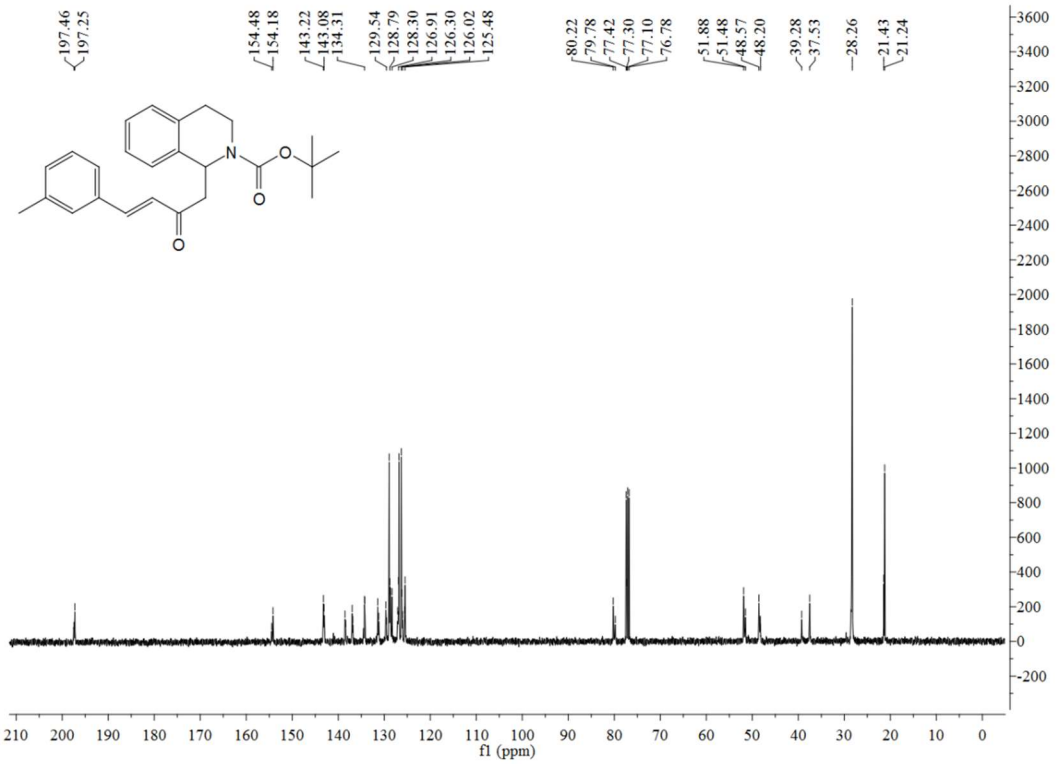
***tert*-butyl(*E*)-1-(4-(2-(methoxycarbonyl)phenyl)-2-oxobut-3-en-1-yl)-3,4-dihydroi soquinoline-2(1*H*)-carboxylate (3ap):**



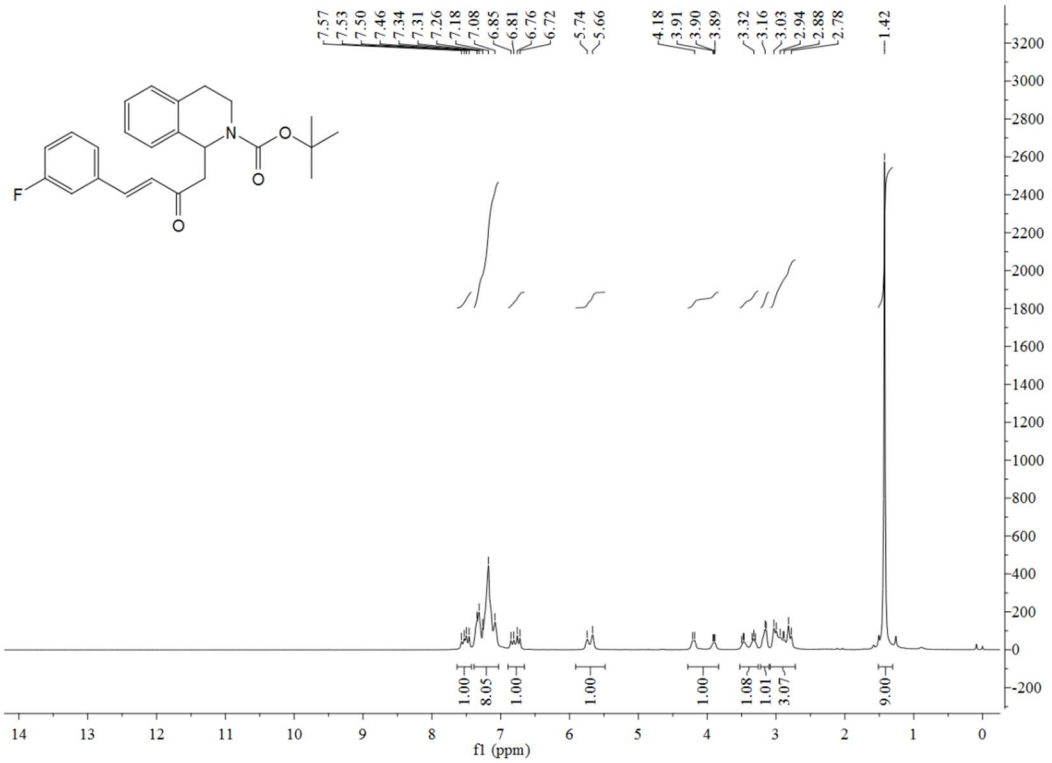


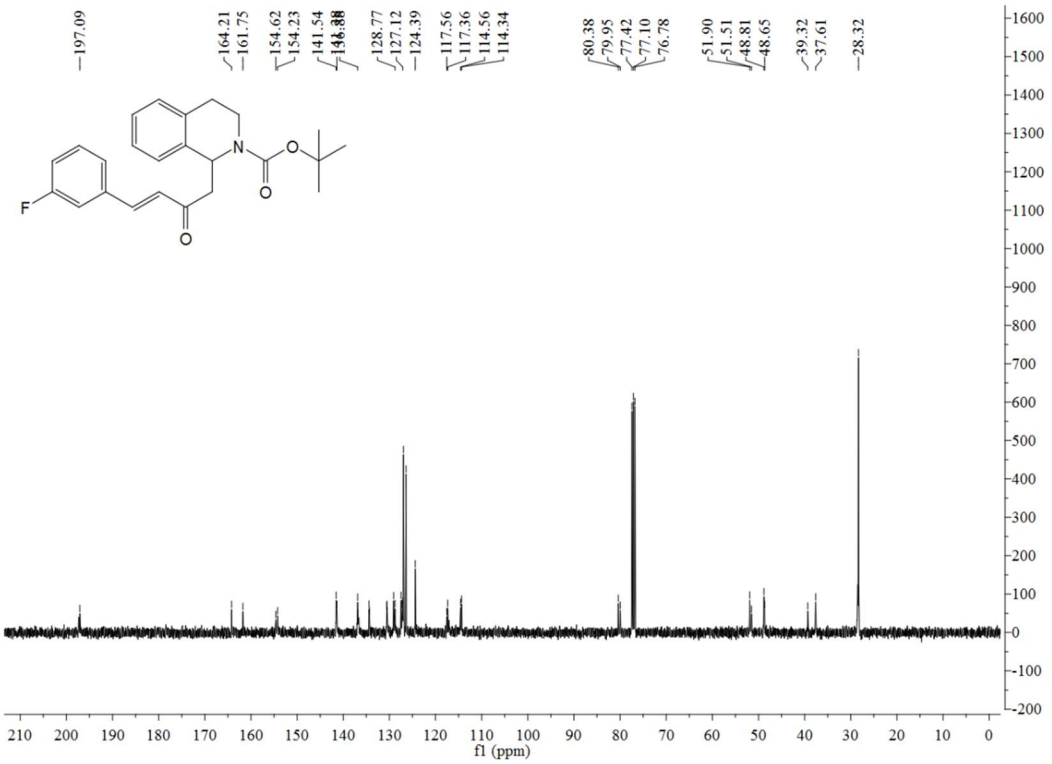
***tert*-butyl(*E*)-1-(2-oxo-4-(m-tolyl)but-3-en-1-yl)-3,4-dihydroisoquinoline-2(1*H*)-carboxylate (3aq):**



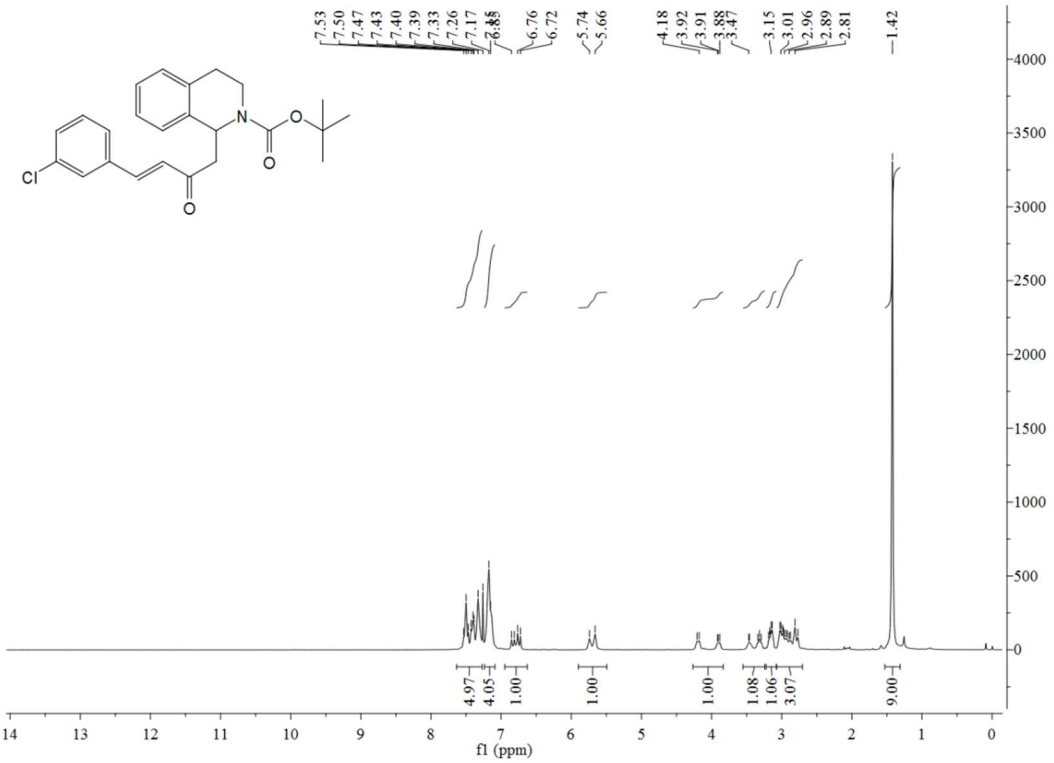


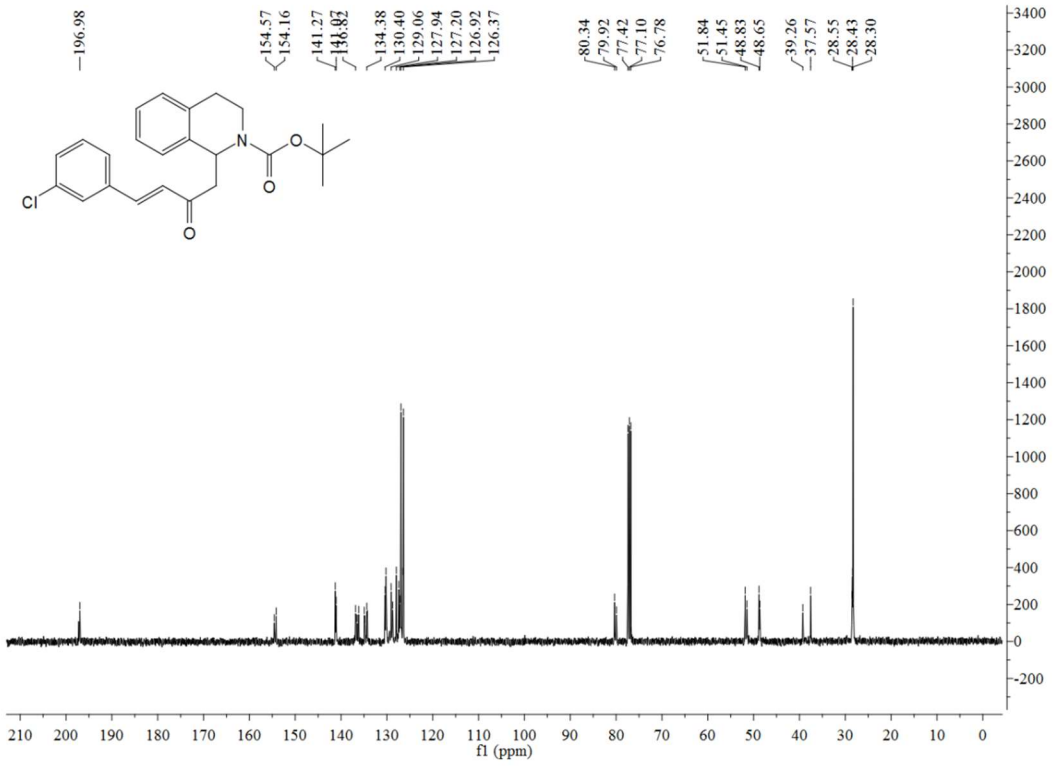
***tert*-butyl(*E*)-1-(4-(3-fluorophenyl)-2-oxobut-3-en-1-yl)-3,4-dihydroisoquinoline-2 (1*H*)-carboxylate (3ar):**



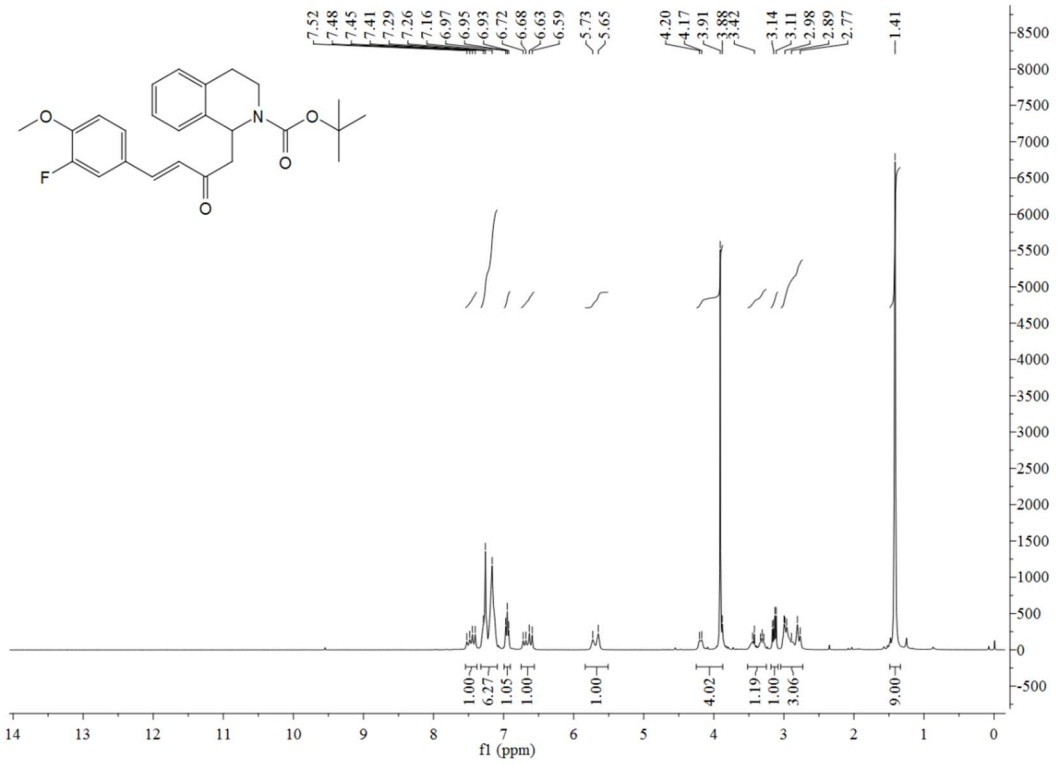


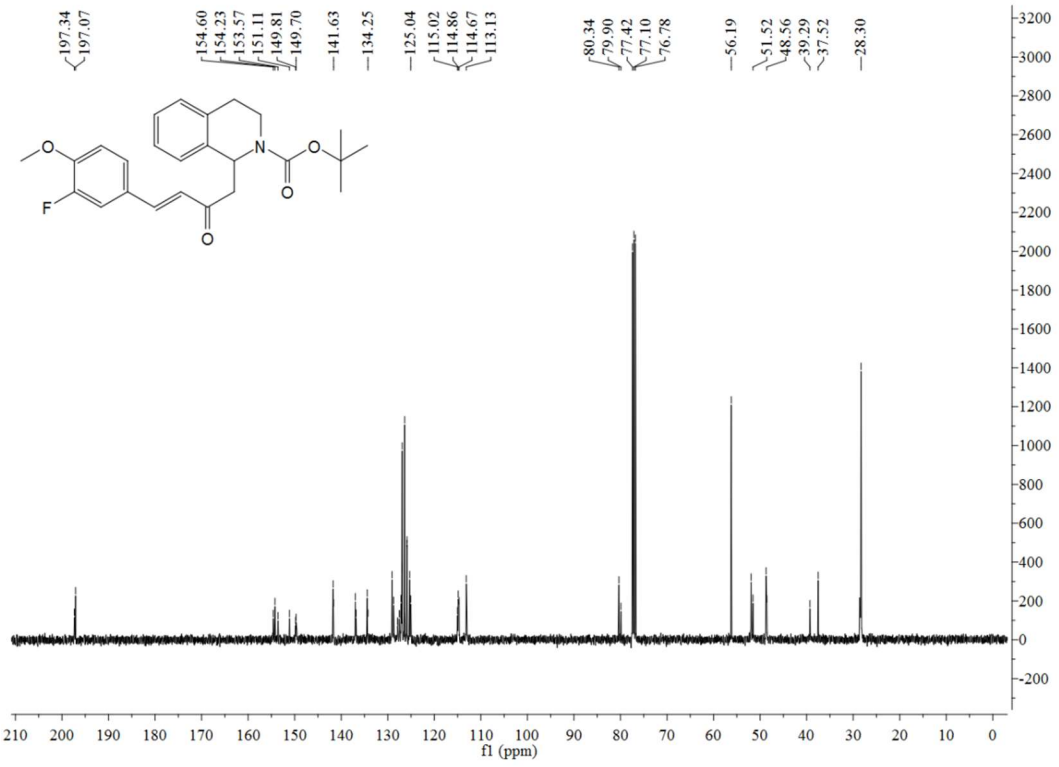
***tert*-butyl(*E*)-1-(4-(3-chlorophenyl)-2-oxobut-3-en-1-yl)-3,4-dihydroisoquinoline-2 (1*H*)-carboxylate (3as):**



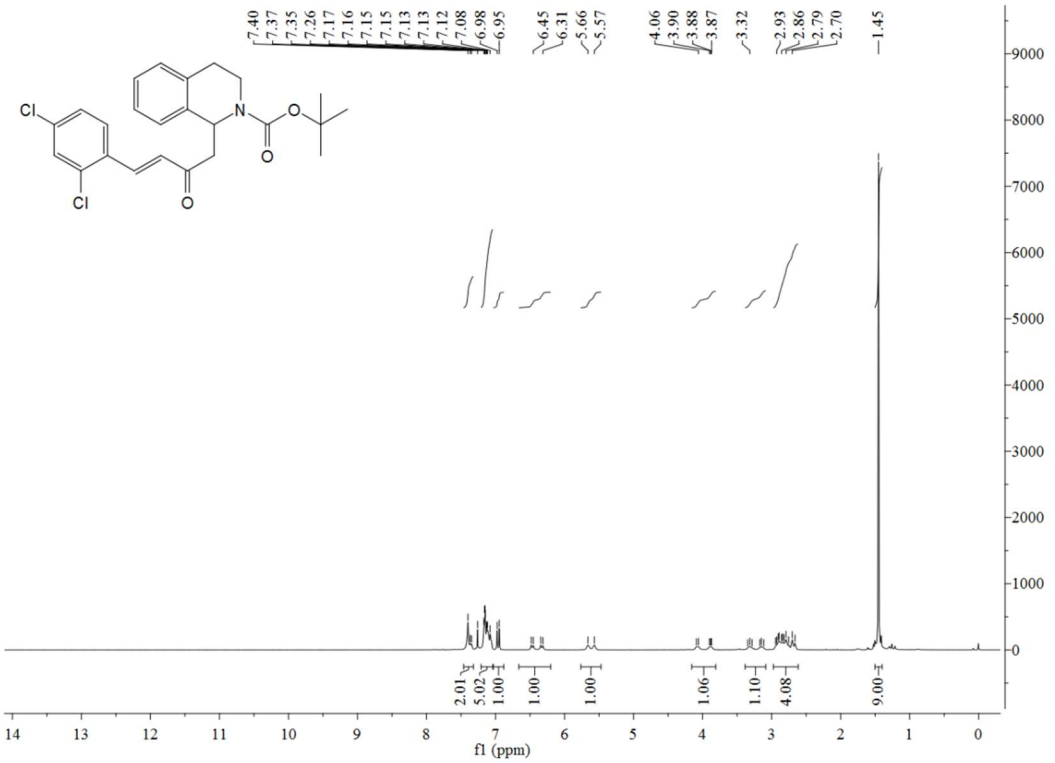


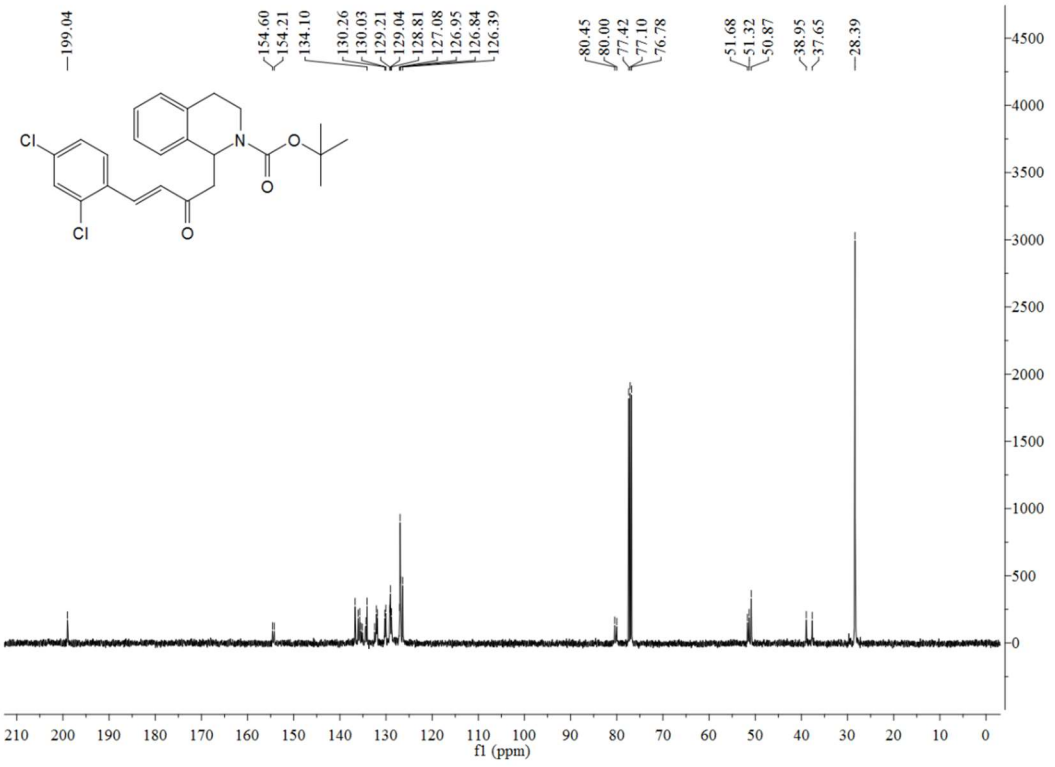
***tert*-butyl(*E*)-1-(4-(3-fluoro-4-methoxyphenyl)-2-oxobut-3-en-1-yl)-3,4-dihydroiso quinoline-2(1*H*)-carboxylate (3at):**



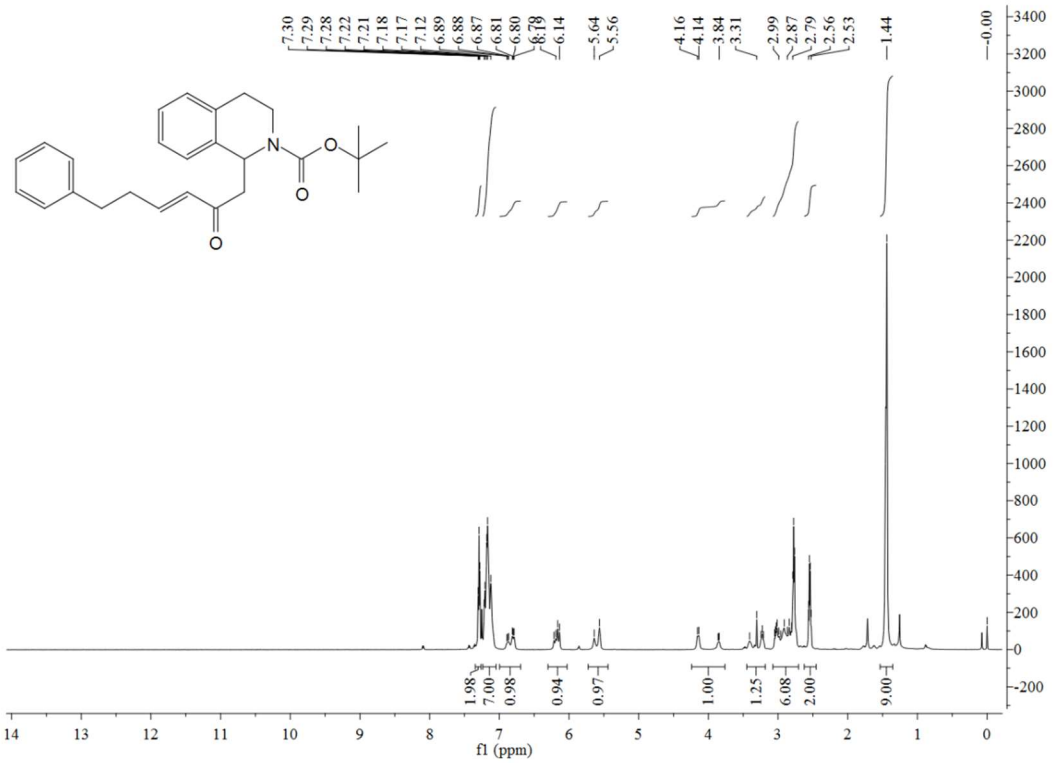


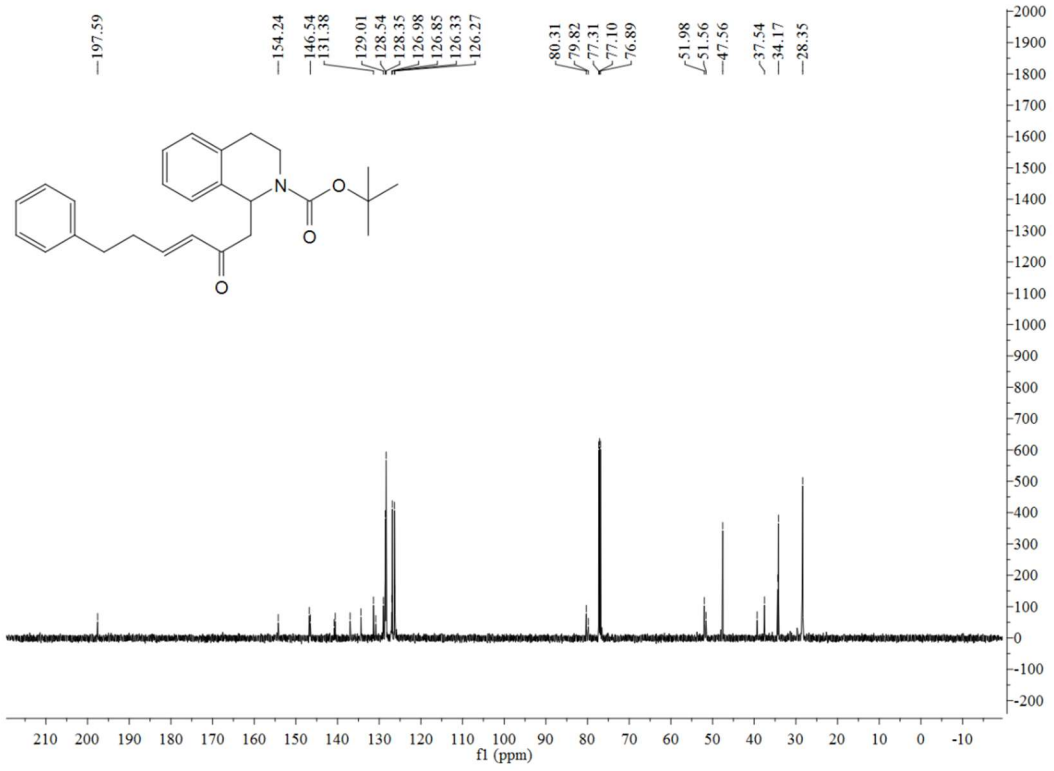
***tert*-butyl(*E*)-1-(4-(2,4-dichlorophenyl)-2-oxobut-3-en-1-yl)-3,4-dihydroisoquinoli ne-2(1*H*)-carboxylate (3au):**



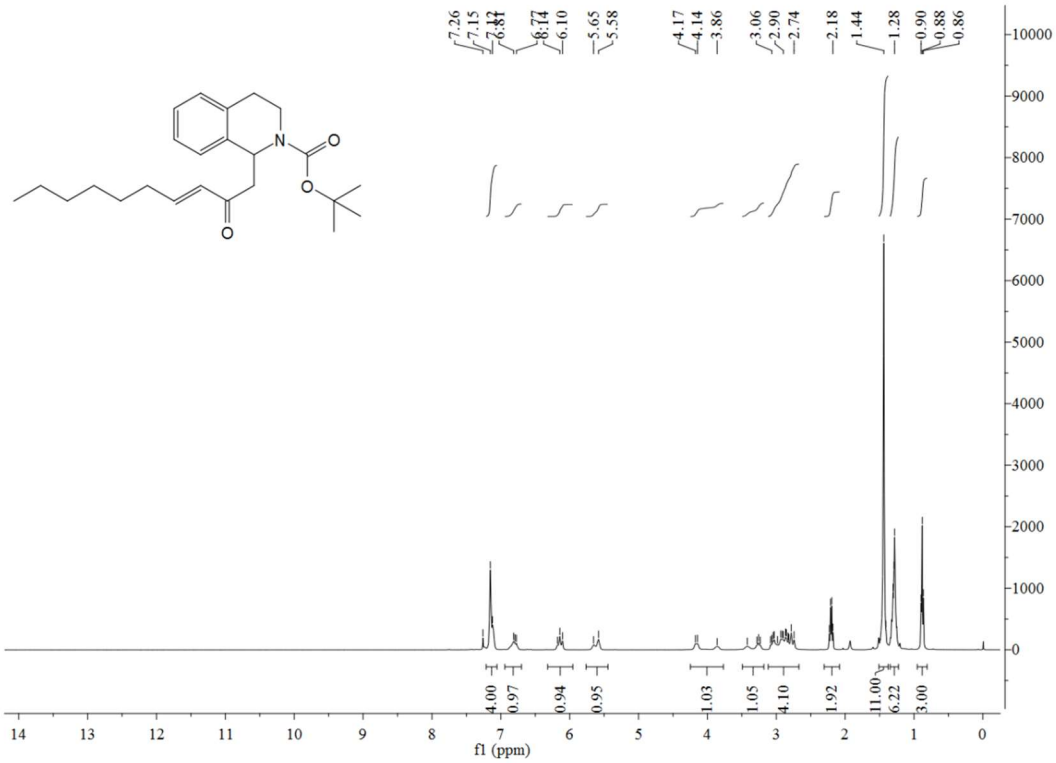


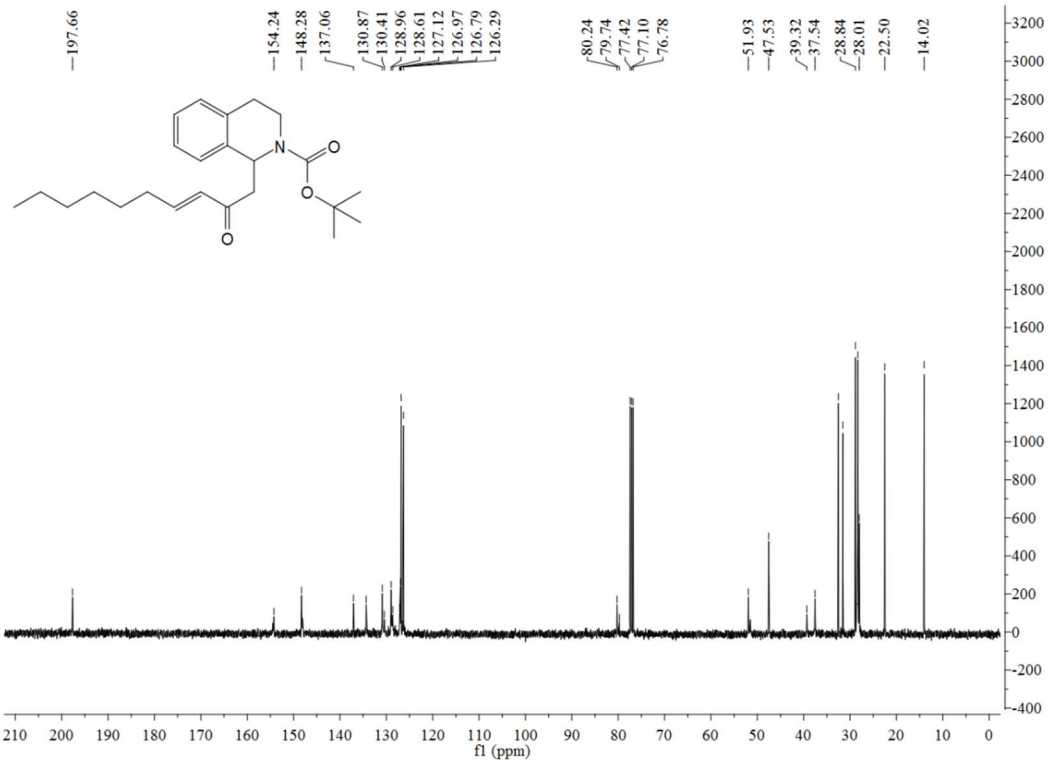
***tert*-butyl(*E*)-1-(2-oxo-6-phenylhex-3-en-1-yl)-3,4-dihydroisoquinoline-2(1*H*)-carboxylate (3av):**



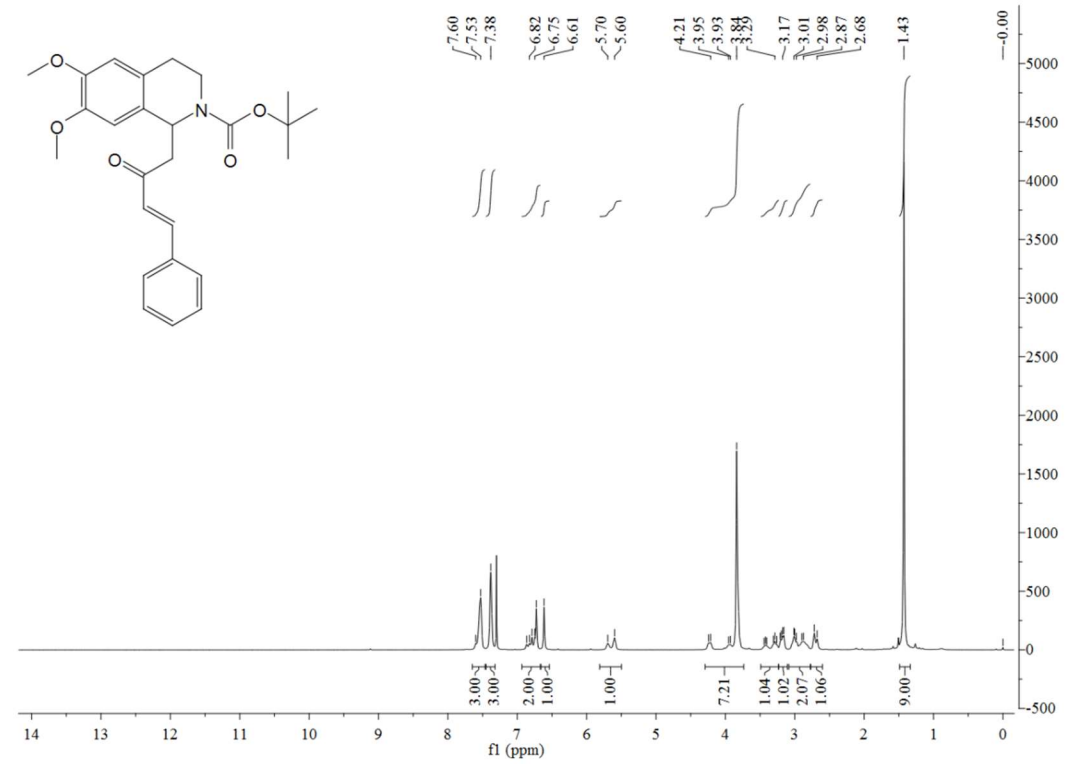


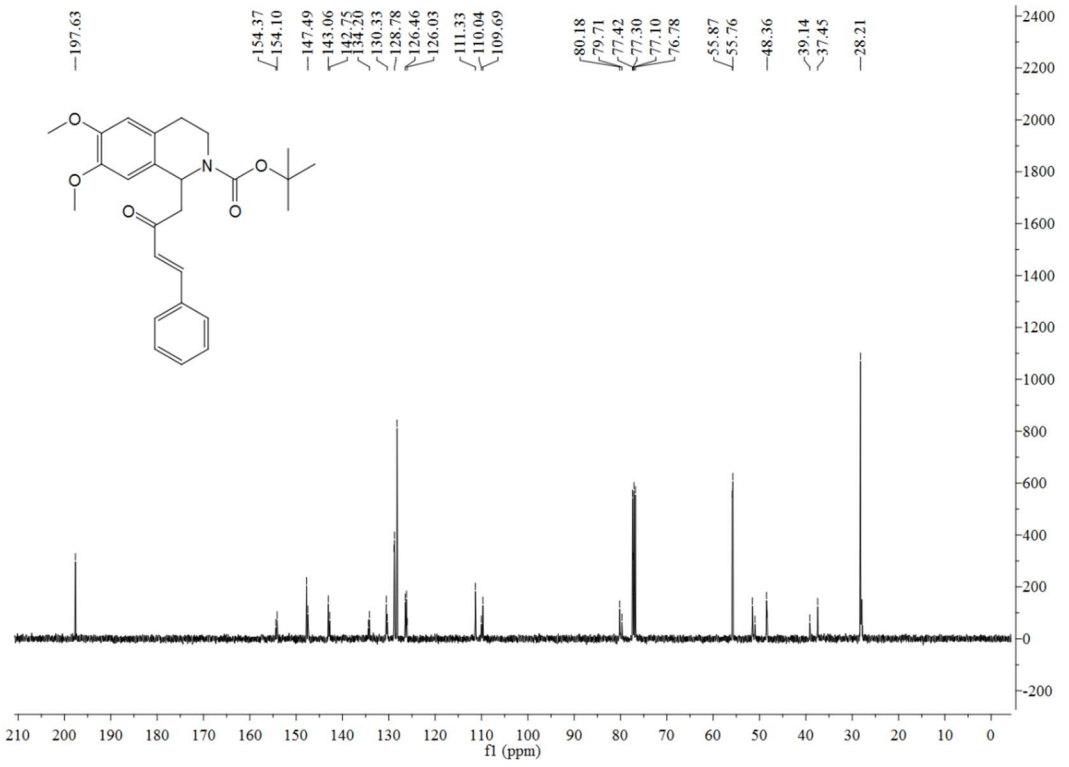
***tert*-butyl(*E*)-1-(2-oxodec-3-en-1-yl)-3,4-dihydroisoquinoline-2(1*H*)-carboxylate (3aw):**



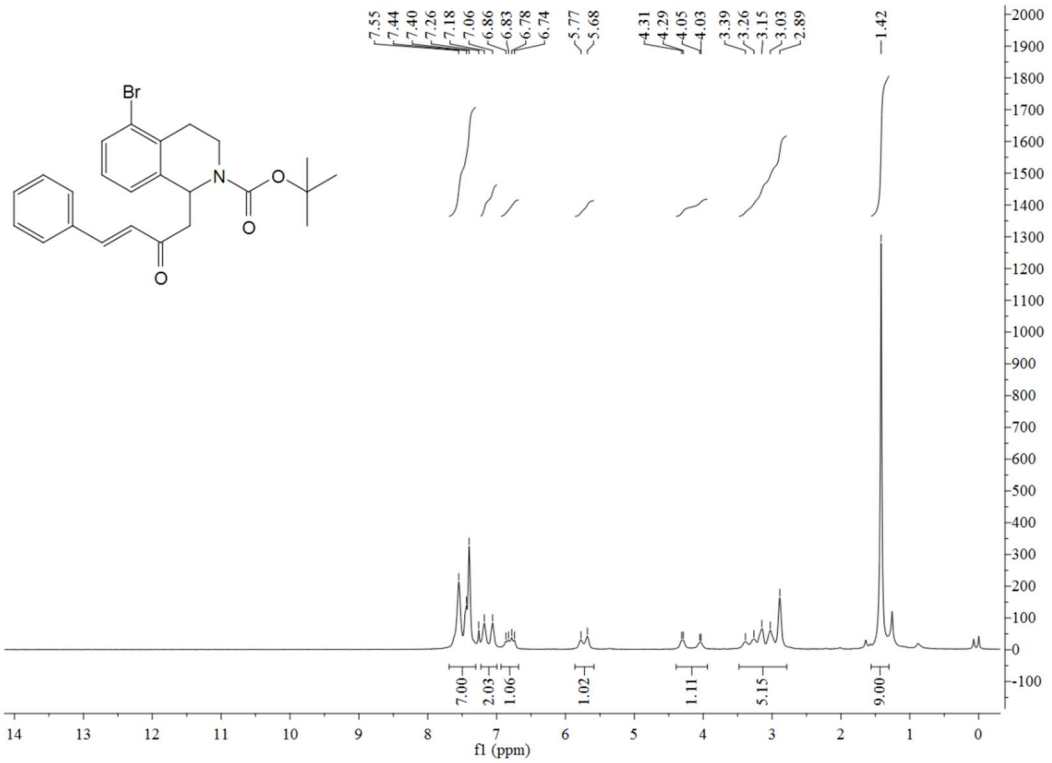


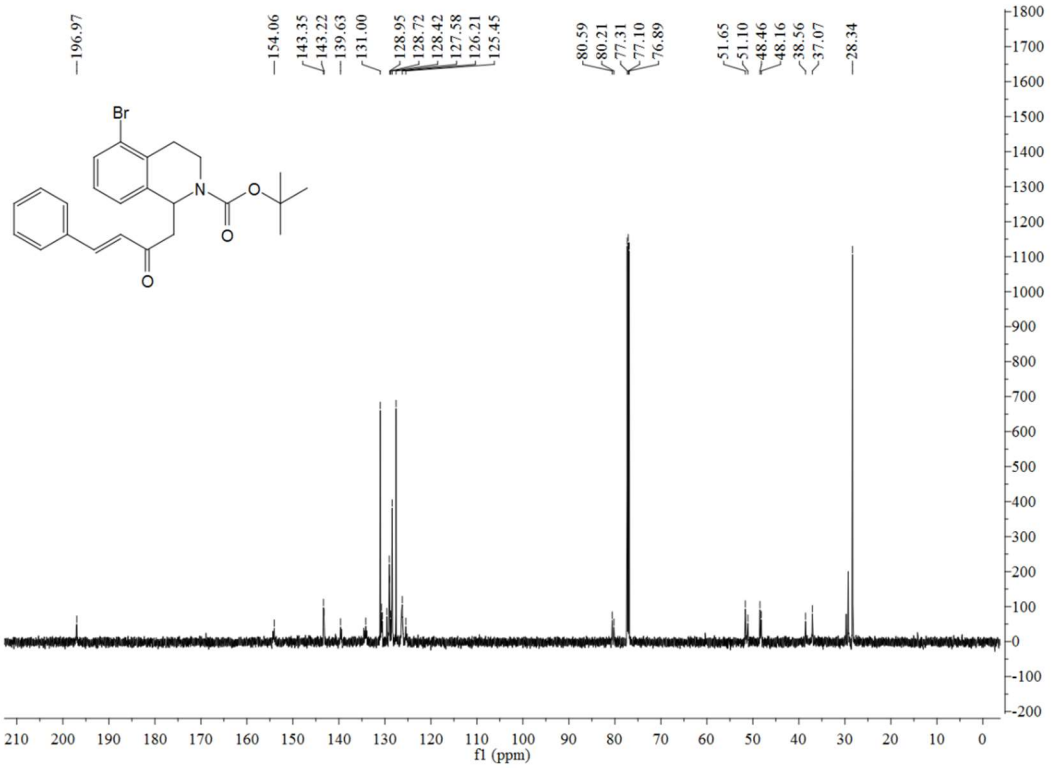
***tert*-butyl(*E*)-6,7-dimethoxy-1-(2-oxo-4-phenylbut-3-en-1-yl)-3,4-dihydroisoquinoline-2(1*H*)-carboxylate (3ba):**



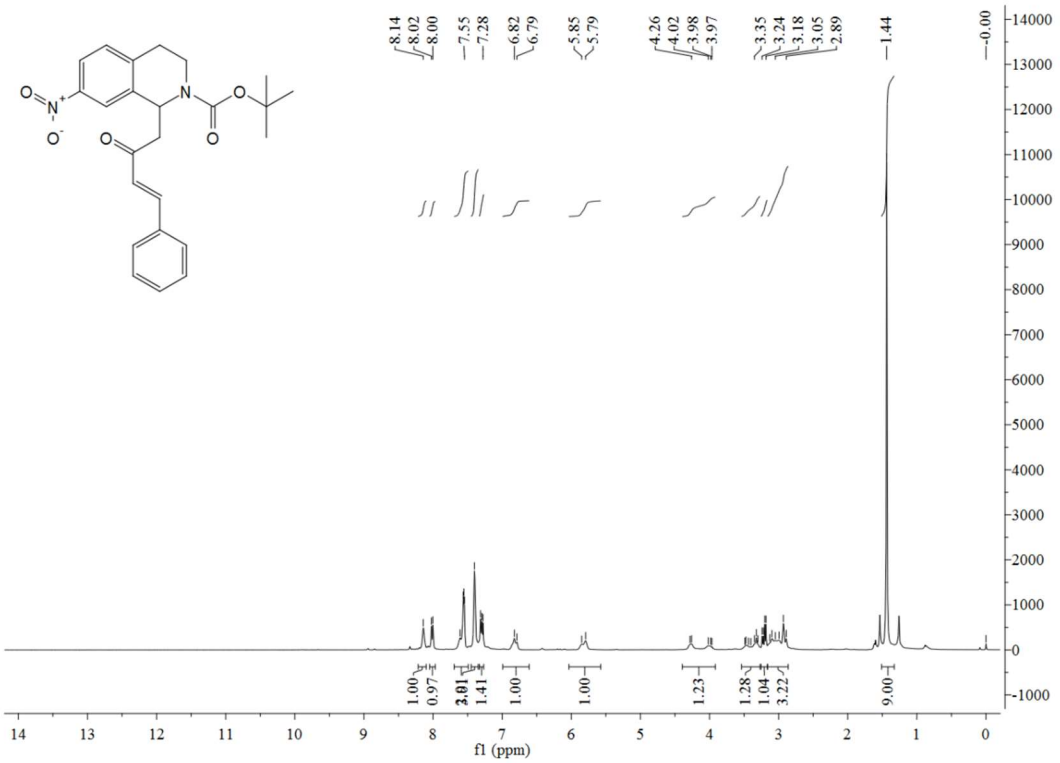


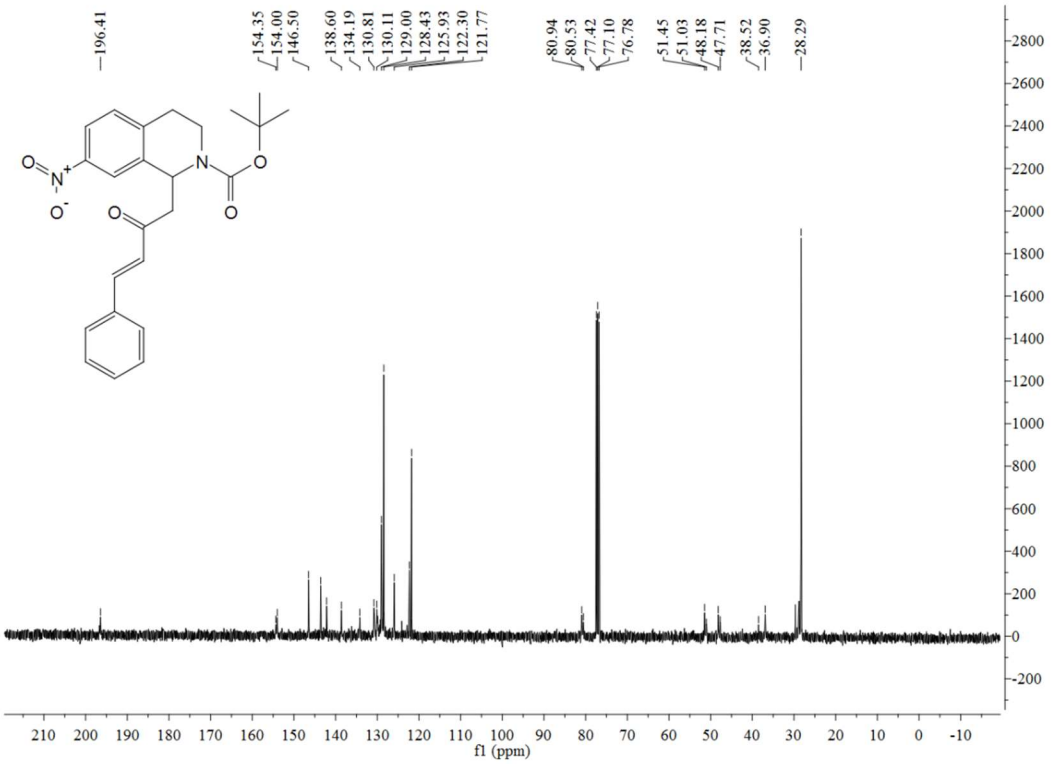
tert-butyl(_E_)-5-bromo-1-(2-oxo-4-phenylbut-3-en-1-yl)-3,4-dihydroisoquinoline-2 (1_H_)-carboxylate (3ca):



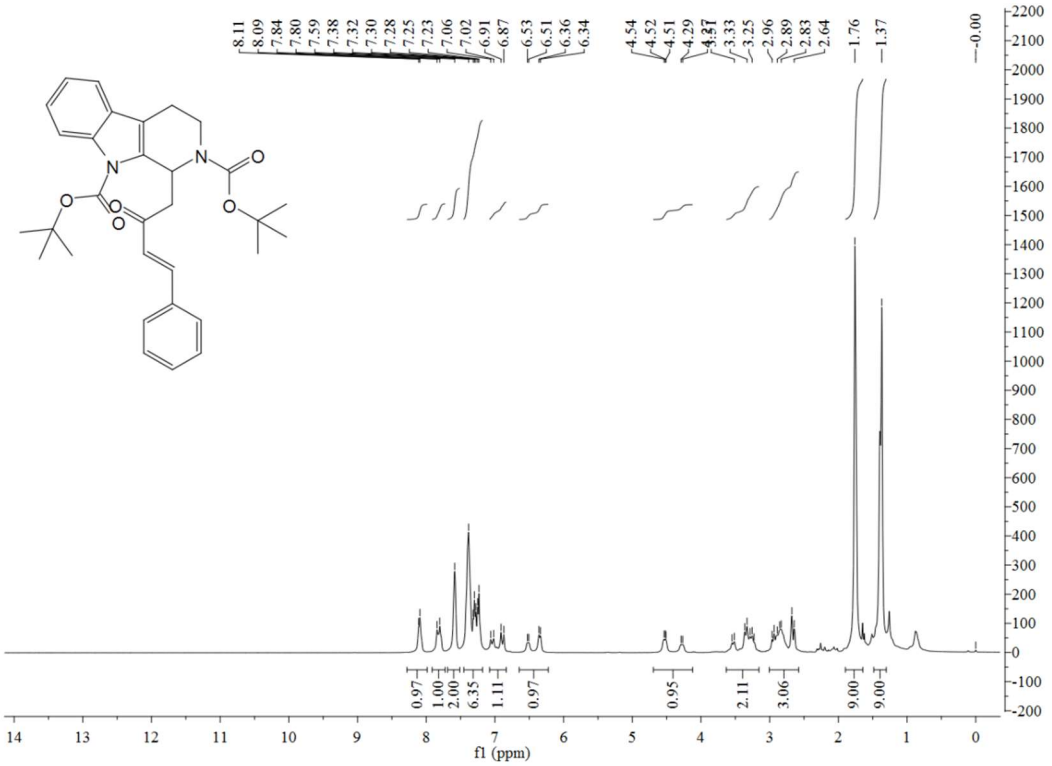


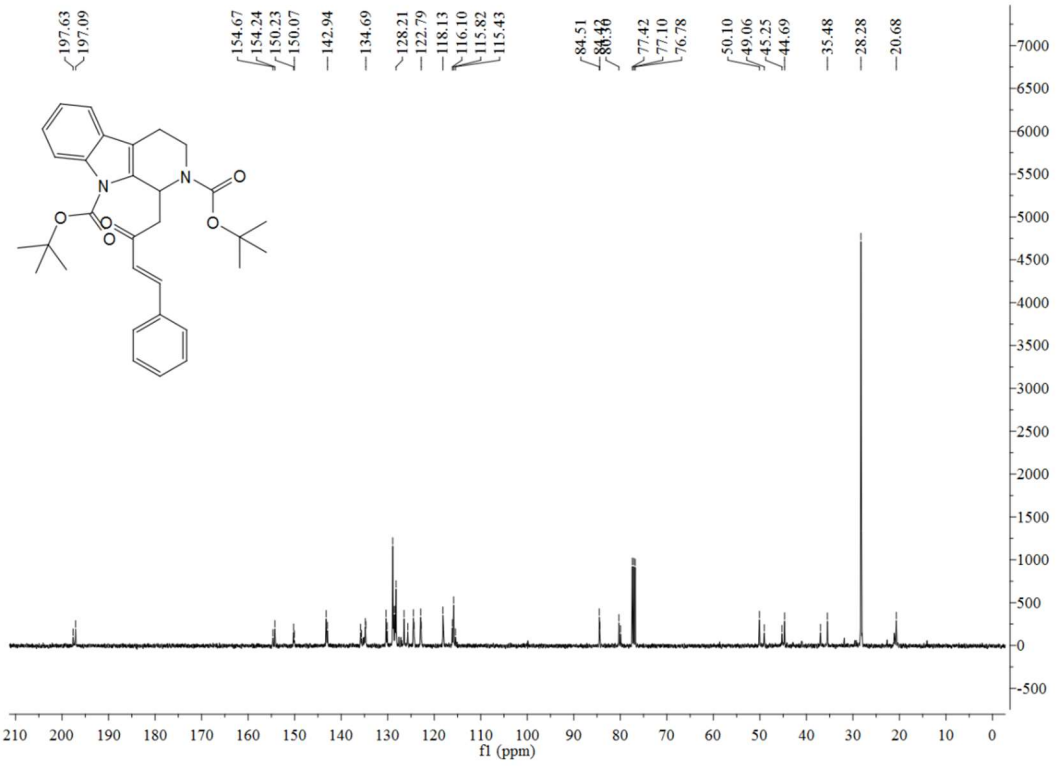
***tert*-butyl(*E*)-7-nitro-1-(2-oxo-4-phenylbut-3-en-1-yl)-3,4-dihydroisoquinoline-2(1*H*)-carboxylate(3da):**



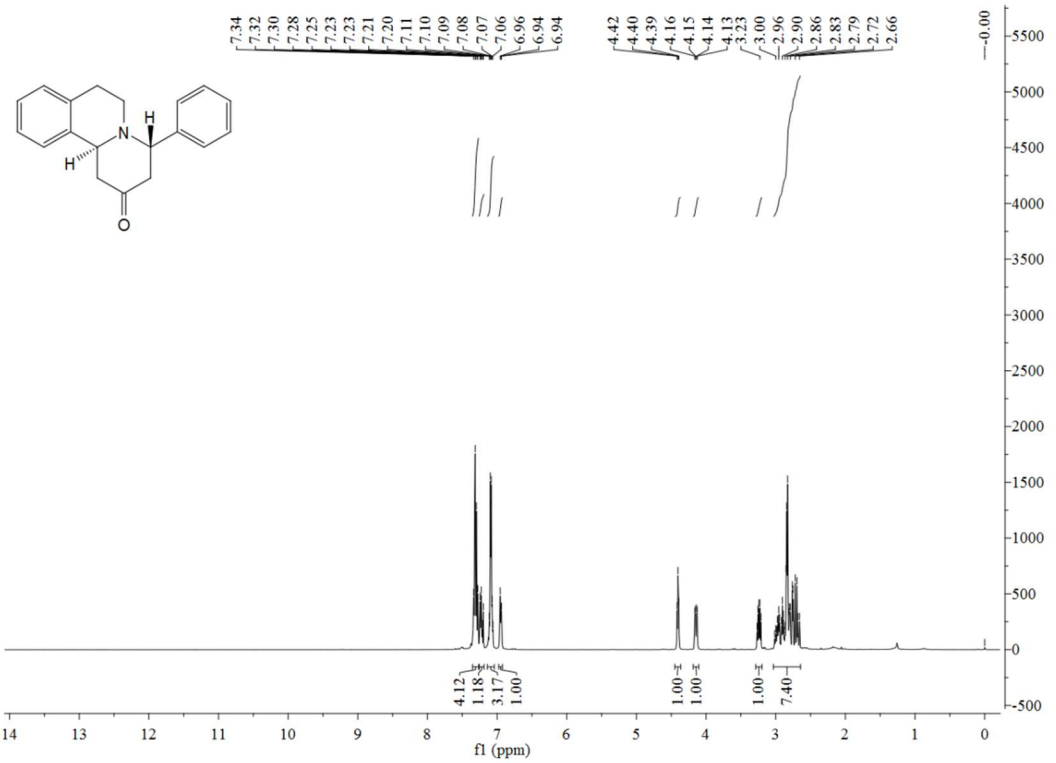


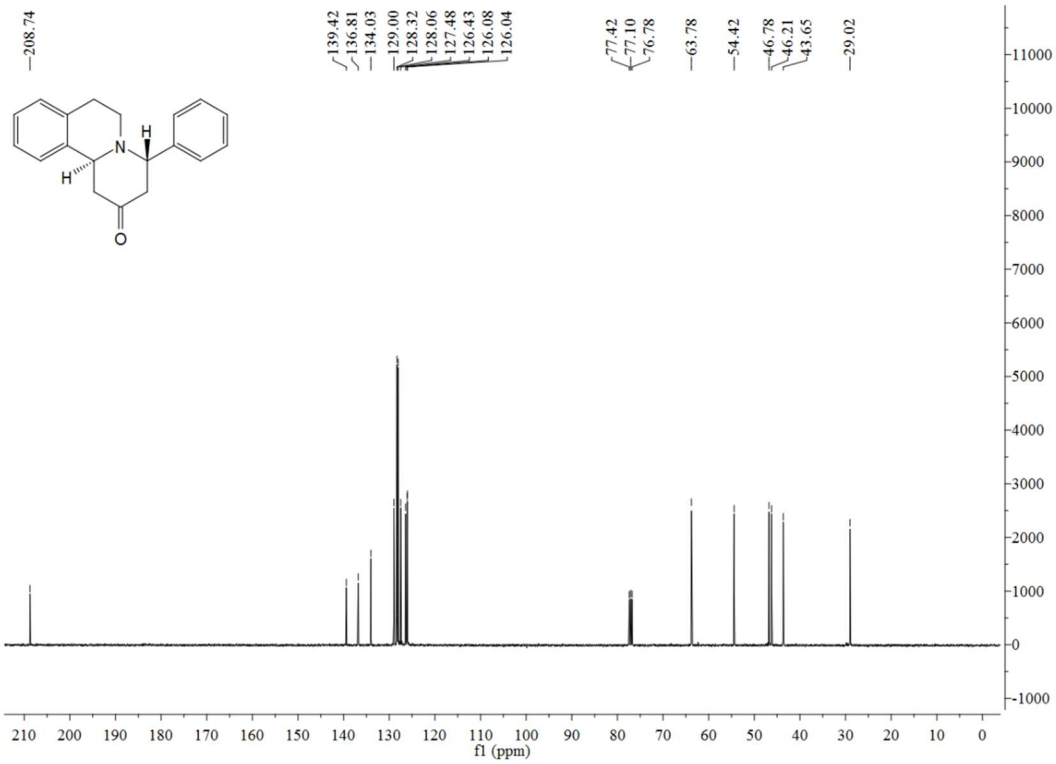
di-*tert*-butyl(*E*)-1-(2-methylene-4-phenylbut-3-en-1-ylj)-3,4-dihydro-1*H*-pyrido[3, 4-*b*]indole-2,9-dicarboxylate (3ea):





(4*S*,11b*S*)-4-Phenyl-1,3,4,6,7,11b-hexahydro-2*H*-pyrido[2,1-*α*]isoquinolin-2-one (4a):





(4*R*,11b*R*)-4-Phenyl-1,3,4,6,7,11b-hexahydro-2*H*-pyrido[2,1-*α*]isoquinolin-2-one (4b):