Electronic Supplementary Material (ESI) for RSC Advances.

Access to *N*-Unprotected 2-Amide-Substituted Indoles from Ugi Adducts via Palladium-Catalyzed Intramolecular cyclization of *o*-Iodoanilines Bearing Furan Rings

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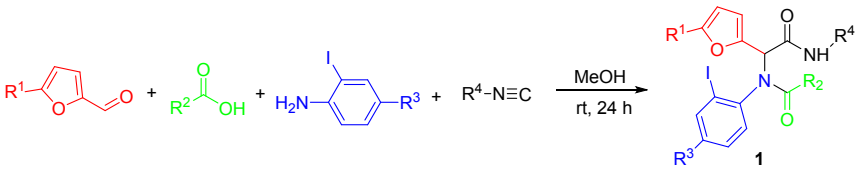
Experimental Section

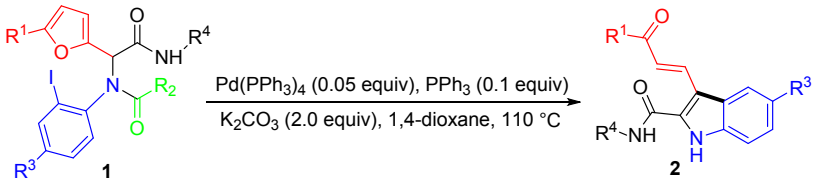
Unless specified otherwise, all experiments were performed under N_2 atmosphere. All reagents and starting materials were purchased from commercial suppliers and used as received. Fourier transform IR spectra were obtained with thin film samples or KBr pellets on a Bruker Vector 22 spectrometer, and data are expressed in cm^{-1}. ^1H and ^{13}C NMR spectra were recorded on a Bruker AVANCE III 400 instrument (at 400 and 100 MHz, respectively) in $CDCl_3$. Chemical shifts are reported in ppm downfield from tetramethylsilane. Mass spectrometry was performed on a Bruker Agilent1100/Esquire HCT PLUS mass spectrometer. High-resolution mass spectra were recorded on a time-of-flight analyzer using an electrospray ionization source in the positive mode. Column chromatography was performed on silica gel (100–200 mesh) with mixtures of petroleum ether and ethyl acetate as eluents.

General procedure for the preparation of 1



Furfural (5 mmol), acid (5 mmol), and isocyanide (5 mmol) were successively added to a solution of aniline (5 mmol) and MeOH (5 mL). The mixture was stirred at room temperature under N_2 until TLC indicated the disappearance of the starting material (48 h). Then the solvent was removed under reduced pressure, and the residue was partitioned between EtOAc (10 mL) and brine (30 mL). The organic layer was collected, and the aqueous layer was extracted with three portions of EtOAc. The combined organic layers were dried over Na_2SO_4 and then filtered, and the filtrate was concentrated under reduced pressure. The residue was purified by flash chromatography on silica gel (5:1 petroleum ether/EtOAc) to give **1**.

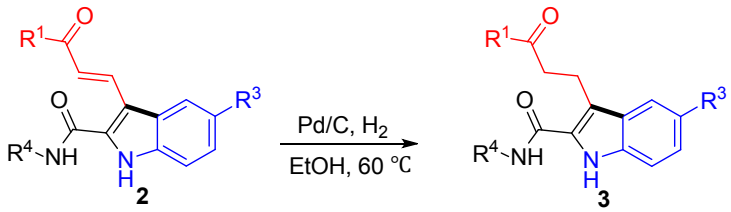
General procedure for the preparation of 2



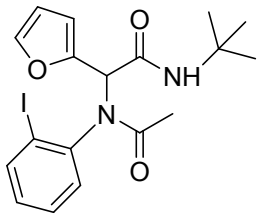
To a stirred solution of **1** (0.2 mmol) in dry 1,4-dioxane (2 mL) in a Schlenk flask under nitrogen

were added $Pd(PPh_3)_4$ (0.011 mg, 0.01 mmol, 5 mol %), PPh_3 (0.0053 mg, 0.02 mmol, 10 mol %), and K_2CO_3 (55 mg, 0.4 mmol, 2 equiv) successively in that order. After being stirred at room temperature for 12 h, the reaction mixture was carefully concentrated under reduced pressure. Then EtOAc (5 mL) and H_2O (10 mL) were added, the phases were separated, and the organic phase was washed with H_2O (2 × 10 mL), dried over Na_2SO_4, and filtered. The filtrate was carefully concentrated under reduced pressure, and the residue was purified by flash chromatography on silica gel (3:1 petroleum ether/EtOAc) to give **2**.

General procedure for the preparation of 3

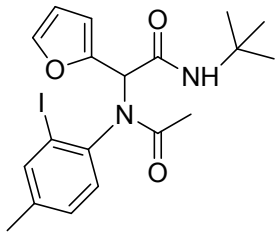


A 25-mL oven-dried flask was charged with **2** (0.33 mmol), Pd/C (105 mg, 0.099 mmol, 10 wt %), and EtOH (3.0 mL). The flask was evacuated and refilled with H_2 from a balloon. The mixture was stirred at 60 °C overnight and filtered through a pad of Celite, which was then washed with ethyl acetate (3 × 5 mL); the combined liquids were dried over Na_2SO_4 and then filtered. The filtrate was concentrated, and the residue was purified by flash chromatography on silica gel (5:1 petroleum ether/EtOAc) to give **3**.

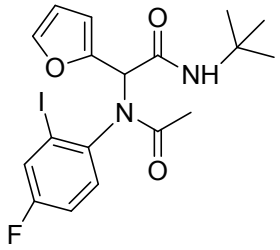


N-(tert-Butyl)-2-(furan-2-yl)-2-(N-(2-iodophenyl)acetamido)acetamide (**1a,** dr = 4/1). White solid (1.1 g, 50%); mp 168-169 °C; IR (KBr) *v* 3331, 2976, 1656, 1543, 1466, 1376, 673, 572 cm^{-1}; ^1H NMR (400 MHz, $CDCl_3$) δ 7.85 (d, J = 7.7 Hz, 1H), 7.72 (d, J = 7.8 Hz, 0.8H), 7.44 (d, J = 7.8 Hz, 0.2H), 7.35 (t, J = 7.9 Hz, 1H), 7.29 (s, 0.2H), 7.19 (s, 0.8H), 7.02 (t, J = 7.6 Hz, 0.2H), 6.96 (t, J = 7.6 Hz, 0.8H), 6.64 (s, 0.2H), 6.36 (s, 0.2H), 6.14 (s, 1H), 6.13 (s, 0.8H), 6.03 (s, 0.8H), 5.97 (s, 0.8H), 5.24 (s, 0.2H), 1.87 (s, 3H), 1.37 (s, 9H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 170.8, 166.9, 146.8, 142.9, 142.6, 139.2, 131.8, 129.8, 129.2, 112.4, 110.6, 103.1, 59.2, 51.7, 28.6, 23.3; HRMS (ESI) m/z calcd for

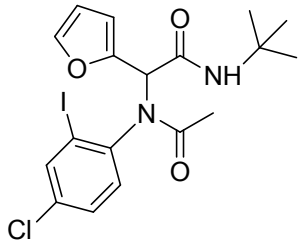
$C_{18}H_{22}IN_2O_3$ $[M+H]^+$ 441.0670, Found 441.0674.



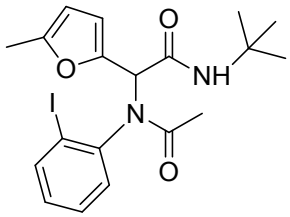
N-(tert-Butyl)-2-(furan-2-yl)-2-(N-(2-iodo-4-methylphenyl)acetamido)acetamide (**1b**). White syrup (1.2 g, 45%); IR (KBr) *v* 3331, 3073, 1653, 1376, 673, 579 cm^{-1}; ^1H NMR (400 MHz, $CDCl_3$) δ 7.66 (d, J = 8.0 Hz, 1H), 7.55 (d, J = 1.2 Hz, 1H), 7.22 (d, J = 1.1 Hz, 1H), 7.14 (dd, J = 8.0, 1.4 Hz, 1H), 6.18 - 6.15 (m, 1H), 6.10 (d, J = 3.3 Hz, 1H), 6.01 (s, 1H), 5.89 (br, 1H), 2.28 (s, 3H), 1.86 (s, 3H), 1.36 (s, 9H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 171.1, 166.9, 153.3, 147.0, 142.8, 140.2, 139.6, 131.0, 130.1, 112.4, 110.6, 102.8, 59.2, 51.7, 28.6, 23.2, 20.5. HRMS (ESI) m/z calcd for $C_{19}H_{24}IN_2O_3$ $[M+H]^+$ 455.0826, Found 455.0829.



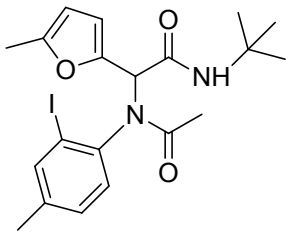
N-(tert-Butyl)-2-(N-(4-fluoro-2-iodophenyl)acetamido)-2-(furan-2-yl)acetamide (**1c**). White solid (1.19 g, 52%); mp 147-150 °C; IR (KBr) *v* 3335, 3097, 2971, 1657, 1546, 1480, 1377, 743, 584 cm^{-1}; ^{1}HNMR (400 MHz, $CDCl_3$) δ 7.95-7.86 (m, 1H), 7.43-7.35 (m, 1H), 7.20 (s, 1H), 7.09-7.01 (m, 1H), 6.63 (br, 0.1H), 6.36 (br, 0.1H), 6.15 (br, 1.9H), 6.03 (br, 0.9H), 5.85 (br, 0.9H), 5.25 (br, 0.1H), 1.86 (s, 3H), 1.35 (s, 9H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 170.8, 166.8, 161.2 (d, $J_{C\text{-}F}$ = 250.0 Hz), 146.7, 143.1, 139.2, 132.7 (d, $J_{C\text{-}F}$ = 8.0 Hz), 126.1, 125.8, 116.1 (d, $J_{C\text{-}F}$ = 22.0 Hz), 112.6, 110.6, 103.0, 102.9, 59.0, 51.8, 28.6, 23.2; HRMS (ESI) m/z calcd for $C_{18}H_{21}FIN_2O_3$ $[M+H]^+$ 459.0575, Found 459.0576.



N-(tert-Butyl)-2-(N-(4-chloro-2-iodophenyl)acetamido)-2-(furan-2-yl)acetamide (**1d,** dr = 9/1). White solid (1.0 g, 41%); mp 189.9-199.4 °C; IR (KBr) ν 3465, 3096, 1647, 1550, 1378, 671, 579 cm^{-1}; ^1H NMR (400 MHz, $CDCl_3$) δ 7.85 (d, J = 8.4 Hz, 1H), 7.70 (s, 0.9H), 7.39 (s, 0.1H), 7.34 – 7.31 (m, 1H), 7.27 (s, 0.1H), 7.21 (s, 0.9H), 6.63 (s, 0.1H), 6.37 (s, 0.1H), 6.20 - 6.07 (m, 1.9H), 6.03 (s, 0.9H), 5.73 (s, 0.9H), 5.23 (s, 0.21H), 1.87 (s, 3H), 1.86 (s, 2.7H), 1.85 (s, 0.3H), 1.35 (s, 9H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 170.5, 166.8, 143.2, 141.7, 138.5, 134.7, 132.4, 129.4, 112.7, 110.7, 103.4, 59.0, 51.8, 28.6, 23.2; HRMS (ESI) m/z calcd for $C_{18}H_{21}ClIN_2O_3$ $[M+H]^+$475.0280, Found 475.0286.

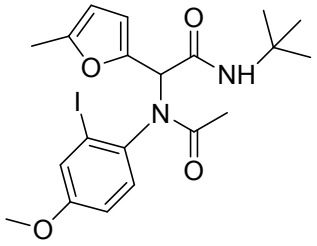


N-(tert-Butyl)-2-(N-(2-iodophenyl)acetamido)-2-(5-methylfuran-2-yl)acetamide (**1e**). White solid (0.95 g, 42%); mp 145.7-146.3 °C; IR (KBr) *v* 3328, 3073, 2976, 1659, 1548, 1377, 1124, 672, 571 cm^{-1}; ^1H NMR (400 MHz, $CDCl_3$) δ 7.84 (d, J = 7.9 Hz, 1H), 7.72 (d, J = 7.9 Hz, 1H), 7.33 (t, J = 7.6 Hz, 1H), 6.94 (t, J = 7.6 Hz, 1H), 6.01 – 5.93 (m, 2H), 5.82 (s, 1H), 5.69 (d, J = 2.3 Hz, 1H), 2.09 (s, 3H), 1.87 (s, 3H), 1.36 (s, 9H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 170.7, 167.0, 152.7, 144.9, 143.1, 139.1, 131.9, 129.6, 129.0, 113.3, 106.4, 103.1, 59.3, 51.6, 28.6, 23.3, 13.3; HRMS (ESI) m/z calcd for $C_{19}H_{24}IN_2O_3$ $[M+H]^+$ 455.0826, Found 455.0829.

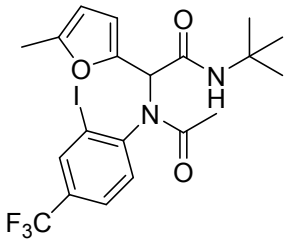


N-(tert-Butyl)-2-(N-(2-iodo-4-methylphenyl)acetamido)-2-(5-methylfuran-2-yl)acetamide (**1f**). White solid (1.05 g, 45%); mp 174-175 °C; IR (KBr) *v* 3327, 3069, 2972, 1689, 1547, 1378, 1150, 671,

569 cm^{-1}; ^1H NMR (400 MHz, $CDCl_3$) δ 7.67 (d, J = 8.1 Hz, 1H), 7.55 (s, 1H), 7.13 (d, J = 8.0 Hz, 1H), 5.97-5.93 (m, 3H), 5.71 (s, 1H), 2.27 (s, 3H), 2.12 (s, 3H), 1.86 (s, 3H), 1.36 (s, 9H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 171.6, 167.1, 152.6, 145.0, 140.3, 140.0, 139.5, 131.1, 129.9, 113.2, 106.5, 102.8, 59.2, 51.6, 28.6, 23.3, 20.5, 13.4; HRMS (ESI) m/z calcd for $C_{20}H_{26}IN_2O_3$ $[M+H]^+$ 469.0983, Found 469.0991.

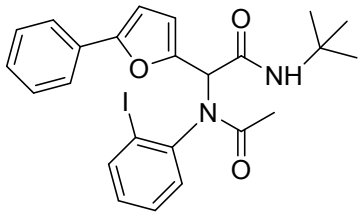


N-(tert-Butyl)-2-(N-(2-iodo-4-methoxyphenyl)acetamido)-2-(5-methylfuran-2-yl)acetamide (**1g**). Yellow syrup (0.97 g, 40%); IR (KBr) ν 3353, 2929, 1653, 1316, 672, 574 cm^{-1}; ^1H NMR (400 MHz, $CDCl_3$) δ 7.54 (d, J = 8.8 Hz, 1H), 7.45 (d, J = 2.2 Hz, 1H), 6.57 (dd, J = 8.8, 2.8 Hz, 1H), 6.06 – 5.94 (m, 2H), 5.84 (s, 1H), 5.72 (s, 1H), 3.79 (s, 3H), 2.11 (s, 3H), 1.90 (s, 3H), 1.36 (s, 9H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 170.6, 167.0, 160.5, 152.6, 145.0, 143.9, 139.0, 116.9, 116.7, 113.1, 106.5, 91.4, 59.2, 55.6, 51.6, 28.6, 23.1, 13.3; HRMS (ESI) m/z calcd for $C_{20}H_{26}IN_2O_4$ $[M+H]^+$ 485.0932, Found 485.0937.

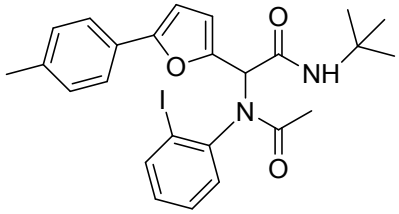


N-(tert-Butyl)-2-(N-(2-iodo-4-(trifluoromethyl)phenyl)acetamido)-2-(5-methylfuran-2-yl)acetamide (**1h**, dr = 1/1). White solid (1.0 g, 40%); mp 165-166 °C; IR (KBr) ν 442, 3073, 1553, 1376, 673, 574 cm^{-1}; ^1H NMR (400 MHz, $CDCl_3$) δ 8.07 (d, J = 8.1 Hz, 0.5 H), 7.95 (s, 1H), 7.59 (d, J = 8.1 Hz, 0.5H), 6.33 (d, J = 2.4 Hz, 0.5H), 6.16 (br, 1H), 6.01 (s, 1H), 5.95 (d, J = 2.3 Hz, 0.5H), 5.70 – 5.60 (m, 1H), 5.34 – 5.18 (m, 1H), 2.27 (s, 1.5H), 2.06 (s, 1.5H), 2.00 (s, 1.5H), 1.87 (s, 1.5H), 1.35 (s, 9H); ^{13}C NMR (126 MHz, $CDCl_3$) δ 173.0 (170.1), (167.6) 166.8, 153.2 (151.7), 148.9, (146.4)144.3, 136.0, 132.5, 131.2 (q, $J_{C\text{-}F}$ = 34.0 Hz), 126.0 (q, $J_{C\text{-}F}$ = 3.0 Hz), 113.7, 110.1, 106.8

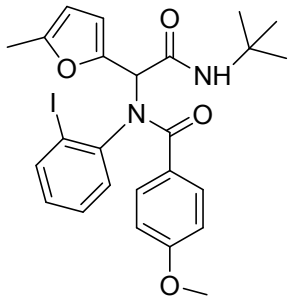
(106.5), 103.3, 59.1, 58.4, 51.8, 51.5, 29.4, 28.6, 28.5, 25.8, 23.3, 18.4, 13.5, 13.3; HRMS (ESI) m/z calcd for $C_{20}H_{23}F_3IN_2O_3$ $[M+H]^+$ 523.0700, Found 523.0709.



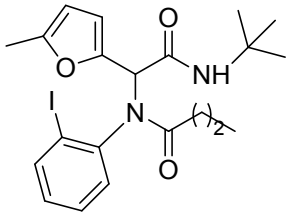
N-(tert-Butyl)-2-(N-(2-iodophenyl)acetamido)-2-(5-phenylfuran-2-yl)acetamide (**1i**). White solid (1.18, 46%); mp 154-155 °C; IR (KBr) ν 3439, 1649, 1535, 1374, 1162, 630, 574 cm^{-1}; ^1H NMR (400 MHz, $CDCl_3$) δ 7.96 – 7.86 (m, 1H), 7.66 (t, J = 8.6 Hz, 1H), 7.55 – 7.46 (m, 2H), 7.38 – 7.28 (m, 3H), 7.25 – 7.18 (m, 1H), 6.95 – 6.84 (m, 1H), 6.40 – 6.33 (m, 1H), 6.20 (s, 1H), 6.13 (s, 1H), 6.06 – 5.84 (m, 1H), 1.90 (s, 3H), 1.37 (s, 9H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 170.8, 166.9, 154.3, 146.3, 142.9, 139.3, 131.8, 130.2, 129.9, 129.2, 128.6, 127.6, 123.8, 114.6, 105.7, 103.3, 59.2, 51.7, 28.6, 23.4; HRMS (ESI) m/z calcd for $C_{24}H_{26}IN_2O_3$ $[M+H]^+$ 517.0983, Found 517.0958.



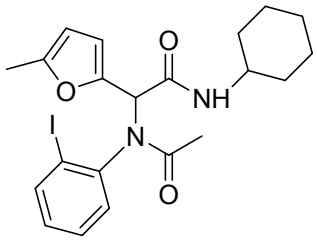
N-(tert-Butyl)-2-(N-(2-iodophenyl)acetamido)-2-(5-(p-tolyl)furan-2-yl)acetamide (**1j,** dr = 22/3). White solid (0.87, 33%); mp 188.7-189.6 °C; IR (KBr) ν 3332, 3066, 2970, 1657, 1547, 1313, 669, 571 cm^{-1}; ^1H NMR (400 MHz, $CDCl_3$) δ 7.92 (d, J = 7.9 Hz, 1H), 7.68 (d, J = 7.8 Hz, 0.88H), 7.58-7.49 (m, 0.24H), 7.42 (d, J = 7.8 Hz, 1.88H), 7.36 (t, J = 7.4 Hz, 1H), 7.21-7.12 (m, 2H), 7.02 (t, J = 7.4 Hz, 0.12H), 6.92 (t, J = 7.5 Hz, 0.88H), 6.71 (s, 0.12H), 6.56 (s, 0.12H), 6.39 (s, 0.12H), 6.33 (s, 0.88H), 6.21 (s, 0.88H), 6.14 (s, 0.88H), 5.90 (s, 0.88H), 5.29 (s, 0.12H), 2.37 (s, 0.36H), 2.35 (s, 2.64H), 1.91 (s, 2.64H), 1.88 (s, 0.36H), 1.39 (s, 9H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 170.8, 166.9, 154.5, 145.8, 142.9, 139.3, 137.5, 131.8, 129.8, 129.3, 129.1, 127.6, 123.8, 114.5, 105.0, 103.3, 59.2, 51.7, 28.6, 23.4, 21.3; HRMS (ESI) m/z calcd for $C_{25}H_{28}IN_2O_3$ $[M+H]^+$ 531.1139, Found 531.1138.



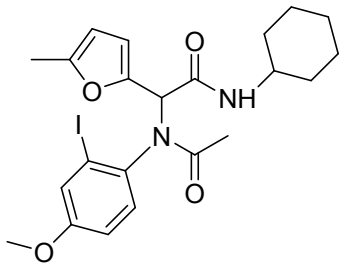
N-(2-(tert-Butylamino)-1-(5-methylfuran-2-yl)-2-oxoethyl)-N-(2-iodophenyl)-4-methoxybenzamide (**1k,** dr = 4/1). Yellow syrup (1.46 g, 55%); IR (KBr) *v* 3334, 3066, 2966, 1631, 1514, 1360, 1251, 1174, 631, 587 cm^{-1}; ^1H NMR (400 MHz, $CDCl_3$) δ 7.87 (d, *J* = 7.9 Hz, 0.8H), 7.68 (d, *J* = 7.9 Hz, 0.2H), 7.50 (d, *J* = 7.7 Hz, 0.8H), 7.43 (d, *J* = 7.9 Hz, 0.2H), 7.37 (t, *J* = 8.7 Hz, 2H), 7.27 – 7.23 (m, 1H), 6.87 (t, *J* = 7.6 Hz, 0.2H), 6.79 (t, *J* = 7.5 Hz, 0.8H), 6.62 (d, *J* = 7.9 Hz, 2H), 6.42 (br, 0.2H), 6.19 (br, 0.8H), 6.15 – 6.02 (s, 1.80H), 5.97 (br, 0.2H), 5.70 (s, 0.8H), 5.34 (s, 0.2H), 3.70 (s, 3H), 2.28 (s, 0.6H), 2.08 (s, 2.4H), 1.39 (s, 7.2H), 1.36 (s, 1.8H); ^{13}C NMR (101 MHz, $CDCl_3$) *δ* 169.9, 167.0, 160.6, 152.8, 145.1, 139.1, 132.5, 131.1, 129.1, 128.2, 128.1, 113.3, 112.7, 112.6, 106.4, 102.9, 60.5, 55.1, 51.7, 28.7, 13.4; HRMS (ESI) m/z calcd for $C_{25}H_{28}IN_2O_4$ $[M+H]^+$ 547.1088, Found 547.1096.



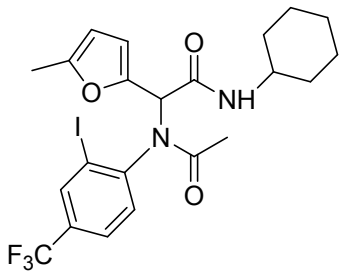
N-(2-(tert-Butylamino)-1-(5-methylfuran-2-yl)-2-oxoethyl)-N-(2-iodophenyl)butyramide (**1l,** dr = 43/7). Yellow syrup (0.75 g, 32%); IR (KBr) *v* 3453, 2967, 1647, 1550, 1390, 1226, 1159, 671, 575 cm^{-1}; ^1H NMR (400 MHz, $CDCl_3$) *δ* 7.84 (d, *J* = 7.9 Hz, 1H), 7.76-7.68 (m, 0.86H), 7.47-7.41 (m, 0.14H), 7.38-7.30 (m, 1H), 7.06-6.90 (m, 1H), 6.49 (s, 0.14H), 6.39 (s, 0.14H), 6.20 (s, 0.86H), 6.03 (s, 0.86H), 5.95 (s, 0.86H), 5.91 (s, 0.14H), 5.67 (s, 0.86H), 5.13 (s, 0.14H), 2.24 (s, 0.42H), 2.09 (s, 2.58H), 2.05-1.90 (m, 2H), 1.66-1.55 (m, 2H), 1.37 (s, 9H), 0.87-0.80 (m, 3H); ^{13}C NMR (101 MHz, $CDCl_3$) *δ* 173.2, 167.3, 152.4, 145.0, 142.6, 139.0, 132.1, 129.6, 128.9, 113.2, 106.4, 103.6, 59.3, 51.5, 37.0, 28.6, 18.4, 13.8, 13.4; HRMS (ESI) m/z calcd for $C_{21}H_{28}IN_2O_3$ $[M+H]^+$ 483.1139, Found 483.1146.



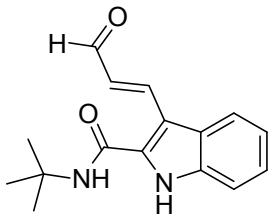
N-Cyclohexyl-2-(N-(2-iodophenyl)acetamido)-2-(5-methylfuran-2-yl)acetamide (**1m,** dr = 9/1). White solid (1.36, 57%); mp 148-151 °C; IR (KBr) *v* 3433, 2929, 2853, 2376, 1657, 1551, 1377, 1225, 631, 571 cm^{-1}; ^1H NMR (400 MHz, $CDCl_3$) δ 7.88 (d, J = 7.9 Hz, 1H), 7.72 (d, J = 7.9 Hz, 0.9H), 7.43 (d, J = 7.8 Hz, 0.1H), 7.34 (t, J = 7.6 Hz, 1H), 7.02 (t, J = 7.6 Hz, 0.1H), 6.96 (t, J = 7.6 Hz, 0.9H), 6.40 (d, J = 8.1 Hz, 0.1H), 6.07 (s, 0.9H), 6.05 – 5.88 (m, 2H), 5.69 (s, 0.9H), 5.25 (s, 0.1H), 3.87-3.75 (m, 1H), 2.26 (s, 0.4H), 2.09 (s, 2.6H), 2.03-1.95 (m, 1H), 1.87 (s, 4H), 1.74 – 1.56 (m, 3H), 1.42 – 1.29 (m, 2H), 1.26 – 1.06 (m, 3H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 170.8, 167.0, 152.7, 144.7, 143.0, 139.1, 131.9, 129.7, 129.1, 113.4, 106.4, 103.1, 58.9, 48.9, 32.7, 25.5, 24.8, 23.3, 13.4. HRMS (ESI) m/z calcd for $C_{21}H_{26}IN_2O_3$ $[M+H]^+$ 481.0983, Found 481.0988.



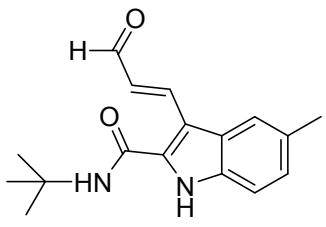
N-Cyclohexyl-2-(N-(2-iodo-4-methoxyphenyl)acetamido)-2-(5-methylfuran-2-yl)acetamide (**1n,** dr = 4/1). White solid (1.35, 53%); mp 154-155 °C; IR (KBr) *v* 3465, 3245, 2854, 2376, 1656, 1316, 1130, 672, 574 cm^{-1}; ^1H NMR (400 MHz, $CDCl_3$) δ 7.60 – 7.48 (m, 1.8H), 7.02 (br, 0.2H), 6.61 – 6.53 (m, 1H), 6.36 (s, 0.2H), 6.08 – 5.88 (m, 2.8H), 5.70 (s, 0.8H), 5.24 (s, 0.2H), 3.79 (s, 3H), 2.26 (s, 1H), 2.17-2.02 (m, 3H), 2.01-1.94 (m, 1H), 1.91-1.83 (m, 4H), 1.72 – 1.56 (m, 3H), 1.39 – 1.30 (m, 2H), 1.24 – 1.09 (m, 3H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 170.7, 167.1, 160.5, 152.8, 144.8, 143.9, 139.1, 117.0, 116.7, 113.2, 106.5, 91.3, 59.0, 55.7, 48.8, 32.8, 25.5, 24.7, 23.2, 13.4; HRMS (ESI) m/z calcd for $C_{22}H_{28}IN_2O_4$ $[M+H]^+$ 511.1088, Found 511.1094.



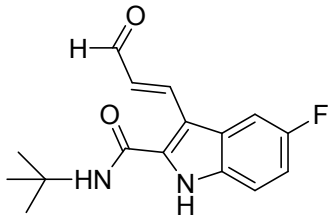
N-Cyclohexyl-2-(N-(2-iodo-4-(trifluoromethyl)phenyl)acetamido)-2-(5-methylfuran-2-yl)acetamide (1o, dr = 4/1). White solid (1.15, 42%); mp 168-169 °C; IR (KBr) *v* 3445, 2854, 1552, 1376, 1167, 672, 574 cm^{-1}; ^1H NMR (400 MHz, $CDCl_3$) δ 8.11 (d, J = 8.5 Hz, 1H), 7.96 (s, 0.8H), 7.60 (d, J = 7.5 Hz, 1H), 7.28 (s, 0.2H), 6.54 (s, 0.2H), 6.28 (d, J = 7.0 Hz, 0.2H), 6.11 (s, 0.8H), 6.03 (s, 0.8H), 5.96 (s, 0.2H), 5.78 (d, J = 7.0 Hz, 0.8H), 5.70 (s, 0.8H), 5.25 (s, 0.2H), 3.86 – 3.74 (m, 1H), 2.28 (s, 0.6H), 2.05 (s, 2.4H), 1.98 (d, J = 6.8 Hz, 1H), 1.91 – 1.82 (m, 4H), 1.71 – 1.56 (m, 3H), 1.42 – 1.31 (m, 2H), 1.23 – 1.06 (m, 3H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 170.1, 166.8, 153.3, 146.5, 144.1, 136.0, 132.5, 132.0 (q, $J_{C\text{-}F}$ = 32.0 Hz), 126.0 (q, $J_{C\text{-}F}$ = 4.0 Hz), 123.9, 113.9, 106.5, 103.2, 58.7, 49.1, 32.7, 25.5, 24.8, 23.3, 13.3; HRMS (ESI) m/z calcd for $C_{22}H_{24}F_3IN_2NaO_3$ $[M+Na]^+$ 571.0676, Found 571.0682.



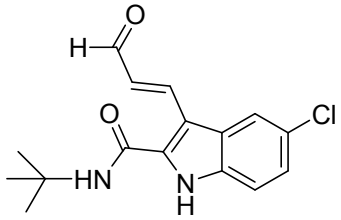
(E)-N-(tert-Butyl)-3-(3-oxoprop-1-en-1-yl)-1H-indole-2-carboxamide (**2a**). Brown syrup (35.6 mg, 66%); IR (KBr) *v* 3162, 1670, 1166, 825, 766 cm^{-1}; ^1H NMR (400 MHz, DMSO) δ 12.26 (br, 1H), 9.61 (d, J = 7.7 Hz, 1H), 8.39 (d, J = 16.1 Hz, 1H), 8.06 – 7.94 (m, 2H), 7.54 (d, J = 8.1 Hz, 1H), 7.35 (t, J = 7.6 Hz, 1H), 7.25 (t, J = 7.5 Hz, 1H), 6.80 (dd, J = 16.1, 7.7 Hz, 1H), 1.45 (s, 9H); ^{13}C NMR (101 MHz, DMSO) δ 194.7, 161.0, 147.2, 136.2, 135.9, 126.1, 125.3, 124.9, 122.6, 121.6, 113.3, 112.8, 52.0, 28.94; HRMS (ESI) m/z calcd for $C_{16}H_{18}N_2NaO_2$ $[M+Na]^+$ 293.1260, Found 293.1255.



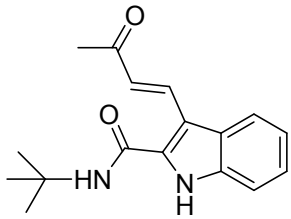
(E)-N-(tert-Butyl)-5-methyl-3-(3-oxoprop-1-en-1-yl)-1H-indole-2-carboxamide (**2b**). White solid (35.8 mg, 63%); mp 136-139 °C; IR (KBr) *v* 3163, 1672, 992, 766 cm^{-1}; ^1H NMR (400 MHz, DMSO) δ 9.58 (d, J = 7.8 Hz, 1H), 8.40 (d, J = 16.1 Hz, 1H), 8.07 (s, 1H), 7.77 (s, 1H), 7.42 (d, J = 8.3 Hz, 1H), 7.16 (d, J = 8.3 Hz, 1H), 6.80 (dd, J = 16.1, 7.8 Hz, 1H), 2.45 (s, 3H), 1.43 (s, 9H); ^{13}C NMR (101 MHz, DMSO) δ 194.8, 161.1, 147.7, 135.9, 134.7, 131.6, 126.6, 125.7, 121.2, 113.1, 112.4, 51.9, 28.9, 21.7; HRMS (ESI) m/z calcd for $C_{17}H_{20}N_2NaO_2$ $[M+Na]^+$ 307.1417, Found 307.1422.



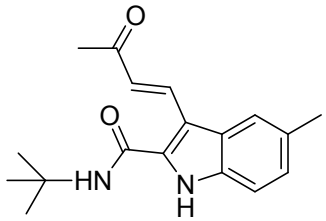
(E)-N-(tert-Butyl)-5-fluoro-3-(3-oxoprop-1-en-1-yl)-1H-indole-2-carboxamide (**2c**). Orange syrup (26 mg, 45%); IR (KBr) ν 3398, 1653, 995, 825 cm^{-1}; ^1H NMR (400 MHz, DMSO) δ 9.59 (d, J = 7.7 Hz, 1H), 8.31 (d, J = 16.1 Hz, 1H), 8.13 (s, 1H), 7.76 (dd, J = 10.2, 2.3 Hz, 1H), 7.54 (dd, J = 8.9, 4.7 Hz, 1H), 7.26- 7.15(m, 1H), 6.77 (dd, J = 16.1, 7.7 Hz, 1H), 1.44 (s, 9H); ^{13}C NMR (101 MHz, DMSO) δ 194.8, 163.1 (d, $J_{C\text{-}F}$ = 250.0 Hz), 160.9, 146.8, 137.7, 133.0, 130.8 (d, $J_{C\text{-}F}$ = 12 Hz), 125.7 (d, $J_{C\text{-}F}$ = 3.0 Hz), 114.8, 113.3 (d, $J_{C\text{-}F}$ = 26.0 Hz), 112.5, 106.8, 52.0, 28.9; HRMS (ESI) m/z calcd for $C_{16}H_{17}FN_2NaO_2$ $[M+Na]+$ 311.1166, Found 311.1165.



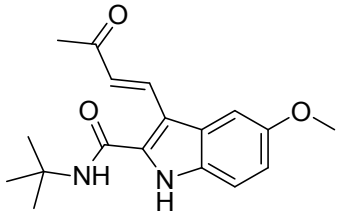
(E)-N-(tert-Butyl)-5-chloro-3-(3-oxoprop-1-en-1-yl)-1H-indole-2-carboxamide (**2d**). White solid (38.9 mg, 64%); mp 126-127 °C; IR (KBr) *v* 3360, 2253, 2126, 1651, 995, 766 cm^{-1}; ^1H NMR (400 MHz, DMSO) δ 9.60 (d, J = 7.6 Hz, 1H), 8.28 (d, J = 16.2 Hz, 1H), 8.15 (s, 1H), 7.99 (s, 1H), 7.54 (d, J = 8.7 Hz, 1H), 7.34 (d, J = 8.7 Hz, 1H), 6.77 (dd, J = 16.1, 7.7 Hz, 1H), 1.43 (s, 9H); ^{13}C NMR (101 MHz, DMSO) δ 194.9, 160.7, 146.4, 137.3, 134.7, 127.1, 126.4, 126.3, 125.0, 120.7, 115.0, 112.0, 52.0, 28.8; HRMS (ESI) m/z calcd for $C_{16}H_{17}ClN_2NaO_2$ $[M+Na]^+$ 327.0871, Found 327.0870.



(E)-N-(tert-Butyl)-3-(3-oxobut-1-en-1-yl)-1H-indole-2-carboxamide (**2e**). White solid (43.7 mg, 77%); mp 120-123 °C; IR (KBr) *v* 3404, 1654, 993, 766 cm^{-1}; ^{1}H NMR (400 MHz, DMSO) δ 12.17 (s, 1H), 8.40 (d, J = 16.5 Hz, 1H), 8.02 (d, J = 7.4 Hz, 2H), 7.54 (d, J = 8.1 Hz, 1H), 7.39-7.30 (m, 1H), 7.28-7.21 (m, 1H), 6.87 (d, J = 16.5 Hz, 1H), 2.35 (s, 3H), 1.47 (s, 9H); ^{13}C NMR (101 MHz, DMSO) δ 198.1, 161.2, 137.7, 136.3, 135.8, 125.3, 124.8, 124.7, 122.2, 121.8, 113.2, 112.6, 51.9, 29.0, 27.7; HRMS (ESI) *m/z* calcd for $C_{17}H_{20}N_2NaO_2$ $[M+Na]^+$ 307.1417, Found 307.1420.

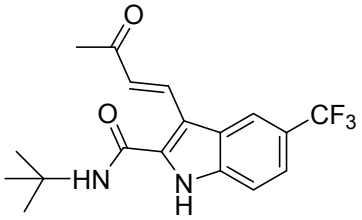


(E)-N-(tert-Butyl)-5-methyl-3-(3-oxobut-1-en-1-yl)-1H-indole-2-carboxamide (**2f**). Brown syrup (37.5 mg, 63%); IR (KBr) *v* 3447, 2255, 2128, 1643, 994, 765 cm^{-1}; ^{1}H NMR (400 MHz, DMSO) δ 12.08 (s, 1H), 8.34 (d, J = 16.5 Hz, 1H), 7.99 (s, 1H), 7.78 (s, 1H), 7.39 (d, J = 8.3 Hz, 1H), 7.15 (d, J = 8.3 Hz, 1H), 6.82 (d, J = 16.5 Hz, 1H), 2.45 (s, 3H), 2.32 (s, 3H), 1.43 (s, 9H); ^{13}C NMR (101 MHz, DMSO) δ 198.2, 161.2, 138.0, 135.8, 134.6, 131.2, 126.4, 125.6, 124.4, 121.3, 112.9, 112.1, 51.8, 29.0, 27.7, 21.8; HRMS (ESI) m/z calcd for $C_{18}H_{22}N_2NaO_2$ $[M+Na]+$ 321.1573, Found 321.1577.

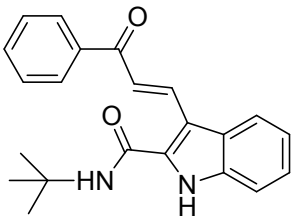


(E)-N-(tert-Butyl)-5-methoxy-3-(3-oxobut-1-en-1-yl)-1H-indole-2-carboxamide (**2g**). Syrup (43.9 mg, 70%); IR (KBr) *v* 3431, 1646, 993, 765 cm^{-1}; ^{1}H NMR (400 MHz, DMSO) δ 11.96 (s, 1H), 8.32 (d, J = 16.5 Hz, 1H), 7.88 (d, J = 9.2 Hz, 2H), 6.93 (s, 1H), 6.87 (d, J = 8.9 Hz, 1H), 6.79 (d, J = 16.5 Hz, 1H), 3.82 (s, 3H), 2.31 (s, 3H), 1.43 (s, 9H); ^{13}C NMR (101 MHz, DMSO) δ 198.2, 161.1, 157.8, 137.7,

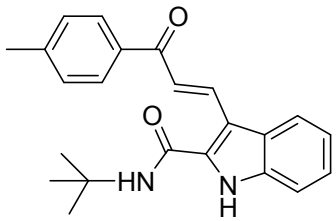
137.4, 134.7, 124.6, 122.7, 119.4, 113.0, 112.5, 95.5, 55.7, 51.8, 29.0, 27.7; HRMS (ESI) *m/z* calcd for $C_{18}H_{23}N_2O_3$ $[M+H]^+$ 315.1703, Found 315.1704.



(E)-N-(tert-Butyl)-3-(3-oxobut-1-en-1-yl)-5-(trifluoromethyl)-1H-indole-2-carboxamide (**2h**). Brown syrup (42.4 mg, 60%); IR (KBr) *v* 3417, 1648, 993, 826, 766 cm^{-1}; ^1H NMR (400 MHz, DMSO) δ 12.57 (s, 1H), 8.34 – 8.13 (m, 3H), 7.71 (d, J = 8.6 Hz, 1H), 7.62 (d, J = 8.6 Hz, 1H), 6.86 (d, J = 16.6 Hz, 1H), 2.36 (s, 3H), 1.46 (s, 9H); ^{13}C NMR (101 MHz, DMSO) δ 198.1, 160.8, 137.8, 136.3, 127.0, 125.8 (q, $J_{C\text{-}F}$ = 4.0 Hz), 124.7 (q, $J_{C\text{-}F}$ = 270.0 Hz), 122.9, 122.6, 121.0, 119.0, 114.1, 112.8, 52.0, 28.9, 27.8; HRMS (ESI) m/z calcd for $C_{18}H_{19}F_3N_2NaO_2$ $[M+H]^+$ 375.1291, Found 375.1297.

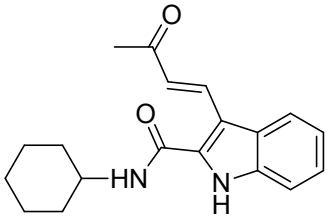


(E)-N-(tert-Butyl)-3-(3-oxo-3-phenylprop-1-en-1-yl)-1H-indole-2-carboxamide (**2i**). Brown solid (46.4 mg, 67%); mp 113-114.9; IR (KBr) *v* 3269, 1651, 995,825, 766 cm^{-1}; ^1H NMR (400 MHz, DMSO) δ 12.26 (s, 1H), 8.56 (d, J = 15.8 Hz, 1H), 8.20 (d, J = 7.8 Hz, 1H), 8.16 – 8.07 (m, 3H), 7.72 (d, J = 15.9 Hz, 1H), 7.65 (d, J = 6.6 Hz, 1H), 7.61 – 7.53 (m, 3H), 7.36 (t, J = 7.4 Hz, 1H), 7.30 (t, J = 7.3 Hz, 1H), 1.44 (s, 9H); ^{13}C NMR (101 MHz, DMSO) δ 190.0, 161.2, 139.3, 138.8, 137.1, 136.3, 133.0, 129.2, 128.7, 125.4, 124.8, 122.4, 122.2, 118.9, 113.3, 113.0, 51.9, 28.9; HRMS (ESI) m/z calcd for $C_{22}H_{22}N_2NaO_2$ $[M+Na]^+$ 369.1573, Found 369.1577.

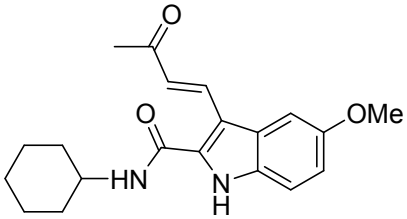


(E)-N-(tert-Butyl)-3-(3-oxo-3-(p-tolyl)prop-1-en-1-yl)-1H-indole-2-carboxamide (**2j**). Yellow solid

(51.8 mg, 72%); mp 189-190; IR (KBr) ν 3246, 1656, 994, 825 cm^{-1}; ^1H NMR (400 MHz, DMSO) δ 12.23 (s, 1H), 8.54 (d, J = 15.8 Hz, 1H), 8.19 (d, J = 7.8 Hz, 1H), 8.13 – 7.98 (m, 3H), 7.71 (d, J = 15.8 Hz, 1H), 7.54 (d, J = 7.9 Hz, 1H), 7.40-7.33 (m, 3H), 7.30 (t, J = 7.3 Hz, 1H), 2.42 (s, 3H), 1.45 (s, 9H); ^{13}C NMR (101 MHz, DMSO) δ 189.4, 161.2, 143.3, 138.8, 136.8, 136.3, 129.8, 128.8, 125.4, 124.8, 122.4, 122.1, 118.9, 113.2, 113.1, 51.9, 28.9, 21.7; HRMS (ESI) m/z calcd for $C_{23}H_{24}N_2NaO_2$ $[M+Na]^+$ 383.1730, Found 383.1728.

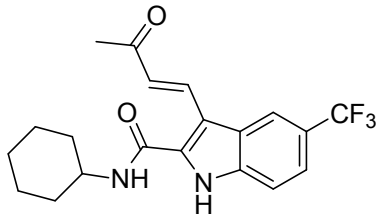


(E)-N-Cyclohexyl-3-(3-oxobut-1-en-1-yl)-1H-indole-2-carboxamide (**2m**). Yellow solid (31 mg, 50%); IR (KBr) ν 3245, 2250, 2122, 1651, 994, 825 cm^{-1}; ^1H NMR (400 MHz, $CDCl_3$) δ 8.00 – 7.93 (m, 2H), 7.64 (d, J = 8.1 Hz, 1H), 7.50 – 7.41 (m, 2H), 7.35 (t, J = 7.7 Hz, 1H), 4.88 (br, 1H), 4.59 (br, 1H), 4.01–3.94(m, 1H), 2.42 (s, 3H), 2.38 – 2.22 (m, 3H), 1.97 – 1.86 (m, 4H), 1.95 – 1.71 (m 1H), 1.47 – 1.37 (m, 2H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 199.0, 158.5, 138.7, 132.1, 131.5, 131.4, 128.9, 128.4, 126.6, 123.4, 122.6, 112.1, 112.0, 53.6, 29.6, 28.2, 26.2, 25.2; HRMS (ESI) m/z calcd for $C_{19}H_{22}N_2NaO_2$ $[M+Na]^+$ 333.1573, Found 333.1576.

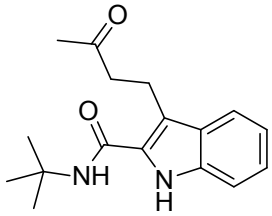


(E)-N-Cyclohexyl-5-methoxy-3-(3-oxobut-1-en-1-yl)-1H-indole-2-carboxamide (**2n**). Yellow solid (41.5 mg, 61%); IR (KBr) ν 3431, 2256, 1656, 994, 766 cm^{-1}; ^1H NMR (400 MHz, $CDCl_3$) δ 7.91 (d, J = 16.2 Hz, 1H), 7.84 (d, J = 8.9 Hz, 1H), 7.39 (d, J = 16.0 Hz, 1H), 7.02 (s, 1H), 6.97 (d, J = 8.9 Hz, 1H), 4.73 (d, J = 3.8 Hz, 1H), 4.56 (d, J = 3.7 Hz, 1H), 3.92 (s, 4H), 2.42 (s, 3H), 2.28 (q, J = 25.4, 12.5 Hz, 2H), 1.99 – 1.85 (m, 4H), 1.74 (br, 3H), 1.40 (q, J = 26.2, 12.9 Hz, 2H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 199.0, 159.6, 158.5, 138.8, 133.1, 131.6, 128.9, 127.5, 125.2, 123.3, 112.7, 112.4, 96.0, 75.2, 55.8, 53.6, 29.6, 28.1, 26.2, 25.2; HRMS (ESI) m/z calcd for $C_{20}H_{24}N_2NaO_3$ $[M+Na]^+$ 363.1679, Found

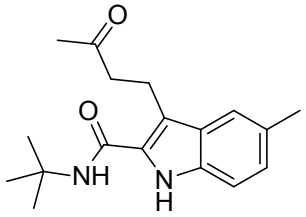
363.1680.



(E)-N-Cyclohexyl-3-(3-oxobut-1-en-1-yl)-5-(trifluoromethyl)-1H-indole-2-carboxamide (**2o**). Yellow syrup (46.9 mg, 62%); IR (KBr) *v* 3246, 1670, 995, 766 cm^{-1}; ^1H NMR (400 MHz, $CDCl_3$) δ 8.04 (d, J = 8.2 Hz, 1H), 7.88 (s, 1H), 7.53 (d, J = 8.2 Hz, 1H), 6.04 (s, 1H), 5.96 (s, 1H), 5.75 (s, 1H), 5.63 (s, 1H), 3.82-3.64 (m, 1H), 2.21 (s, 1H), 1.98 (s, 3H), 1.91 (d, J = 10.9 Hz, 1H), 1.80-1.76 (m, 3H), 1.64-1.50 (m, 3H), 1.20-1.73 (m, 2H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 170.1, 166.8, 153.3, 146.5, 144.1, 136.0, 131.2 (q, $J_{C\text{-}F}$ = 32.0 Hz), 126.0 (q, $J_{C\text{-}F}$ = 4.0 Hz), 122.5 (q, $J_{C\text{-}F}$ = 271.0 Hz), 113.9, 106.5, 103.2, 100.0, 58.7, 49.1, 32.8, 29.7, 25.5, 24.8, 23.3, 13.3; HRMS (ESI) m/z calcd for $C_{20}H_{22}F_3N_2O_2$ $[M+H]^+$ 379.1628, Found 379.1622.

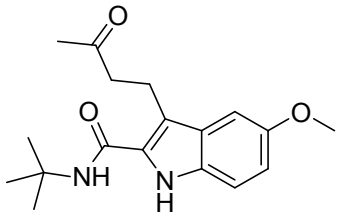


N-(tert-Butyl)-3-(3-oxobutyl)-1H-indole-2-carboxamide (**3e**). Yellow solid (63 mg, 67%) mp 115.7-116.3; IR (KBr) *v* 3273, 2967, 1627, 734, 631 cm^{-1}; ^1H NMR (400 MHz, $CDCl_3$) δ 9.76 (br, 1H), 8.35 (br, 1H), 7.53 (d, J = 8.0 Hz, 1H), 7.40 (d, J = 8.2 Hz, 1H), 7.21 (t, J = 7.4 Hz, 1H), 7.07 (t, J = 7.5 Hz, 1H), 3.22 – 3.15 (m, 2H), 3.08 – 3.02 (m, 2H), 2.05 (s, 3H), 1.58 (s, 9H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 209.8, 162.3, 135.6, 129.8, 127.8, 123.8, 119.5, 119.5, 113.5, 112.1, 51.9, 43.3, 30.0, 29.0, 18.9; HRMS (ESI) m/z calcd for $C_{17}H_{23}N_2O_2$ $[M+H]^+$ 287.1754, Found 287.1753.

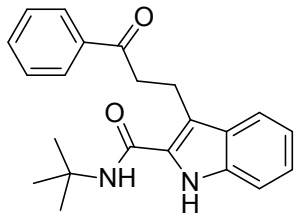


N-(tert-Butyl)-5-methyl-3-(3-oxobutyl)-1H-indole-2-carboxamide (**3f**). White solid (68.3 mg, 69%);

mp 156.8-157.3; IR (KBr) *v* 3272, 2960, 1701, 814, 728 cm^{-1}; ^1H NMR (400 MHz, $CDCl_3$) δ 9.11 (s, 1H), 8.40 (s, 1H), 7.31 (s, 1H), 7.26 (s, 1H), 7.07 (d, J = 8.3 Hz, 1H), 3.20 – 3.12 (m, 2H), 3.12 – 3.06 (m, 2H), 2.45 (s, 3H), 2.09 (s, 3H), 1.56 (s, 9H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 209.9, 162.2, 133.6, 129.8, 128.9, 128.1, 125.8, 119.1, 112.9, 111.6, 51.8, 43.3, 30.1, 29.0, 21.6, 18.8; HRMS (ESI) m/z calcd for $C_{18}H_{24}N_2NaO_2$ $[M+Na]^+$ 323.1730, Found 323.1729.



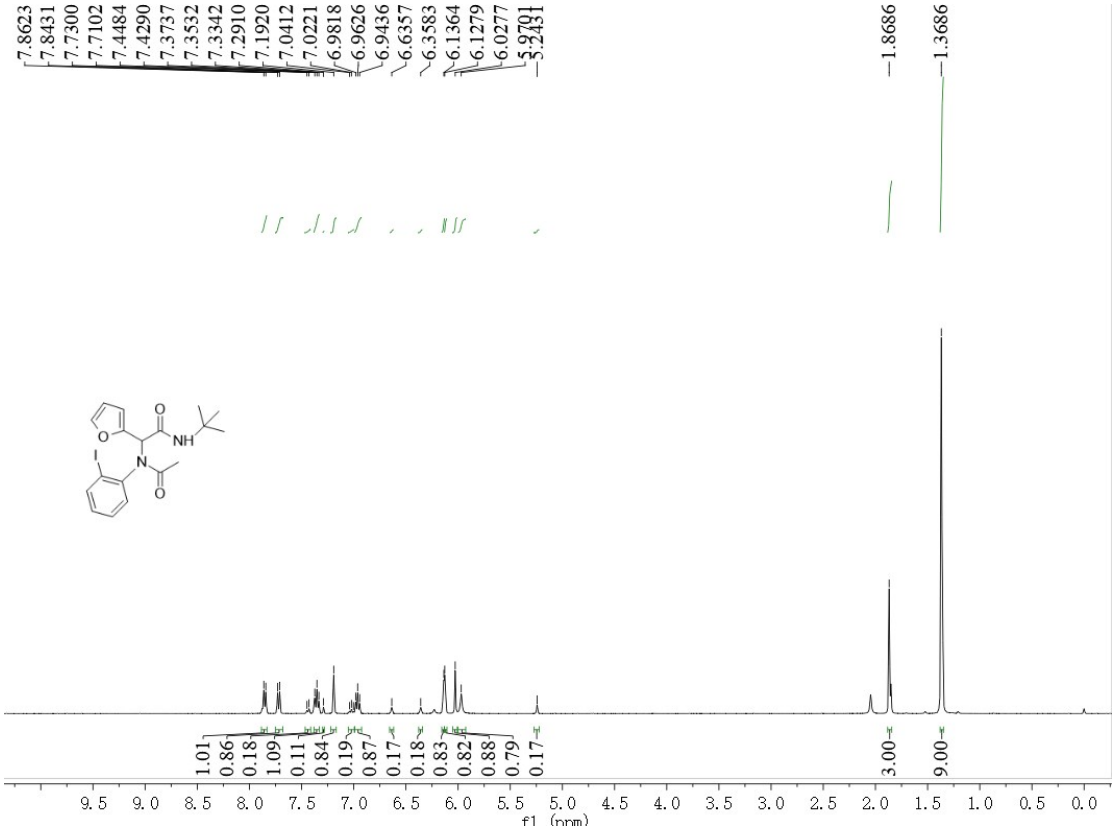
N-(tert-Butyl)-5-methoxy-3-(3-oxobutyl)-1H-indole-2-carboxamide (**3g**). Orange solid (67.8 mg, 65%); mp 152.9-153.8; IR (KBr) *v* 3270, 2962, 1621, 728, 622 cm^{-1}; ^1H NMR (400 MHz, $CDCl_3$) δ 10.04 (s, 1H), 8.34 (s, 1H), 7.39 (d, J = 8.7 Hz, 1H), 6.92 (s, 1H), 6.75 (d, J = 8.7 Hz, 1H), 3.82 (s, 3H), 3.19 – 3.13 (m, 2H), 3.09 – 3.02 (m, 2H), 2.07 (s, 3H), 1.60 (s, 9H);^{13}C NMR (101 MHz, $CDCl_3$) δ 209.9, 162.5, 157.8, 136.6, 128.6, 122.0, 120.3, 114.0, 110.8, 94.3, 55.5, 51.8, 43.4, 30.1, 29.1, 18.9; HRMS (ESI) m/z calcd for $C_{18}H_{25}N_2O_3$ $[M+H]^+$ 317.1860, Found 317.1858.

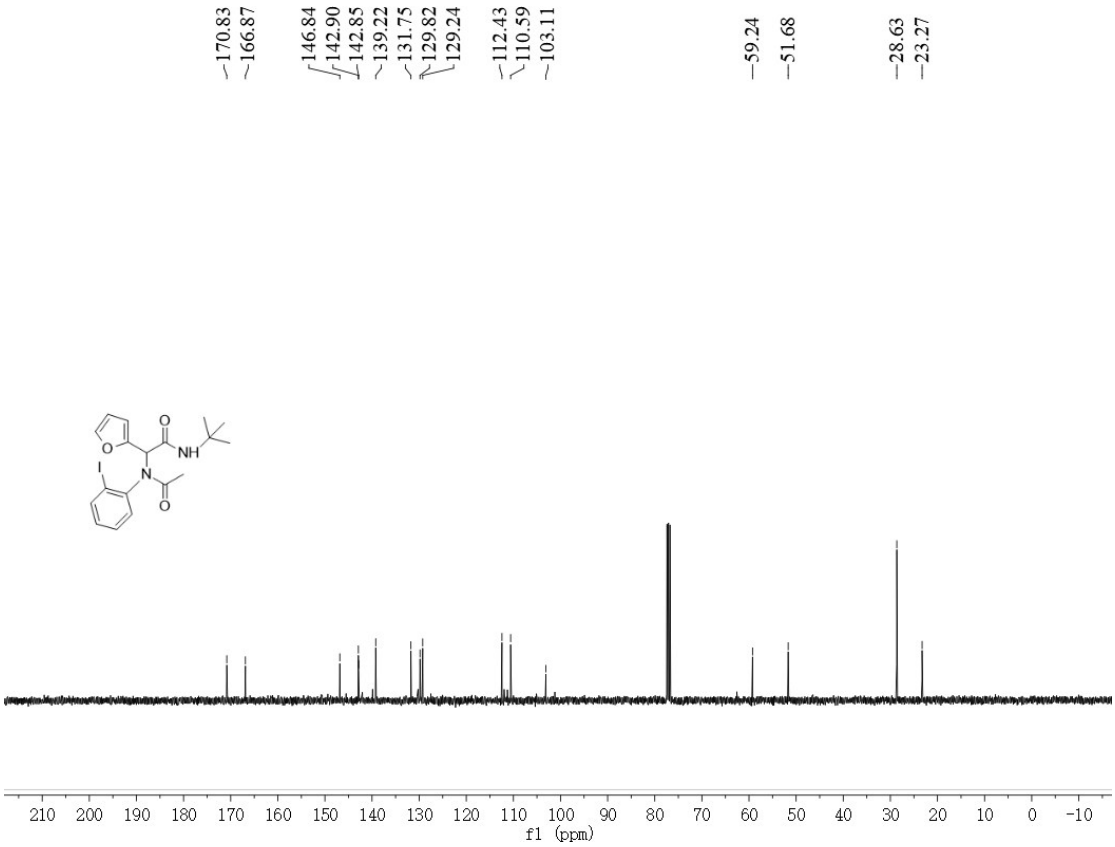


N-(tert-Butyl)-3-(3-oxo-3-phenylpropyl)-1H-indole-2-carboxamide (**3i**). Yellow solid (68.9 mg, 60%); mp 137.6-140.1; IR (KBr) *v* 3275, 2960, 1620, 734, 621 cm^{-1}; ^1H NMR (400 MHz, $CDCl_3$) δ 9.27 (s, 1H), 8.67 (s, 1H), 7.92 (d, J = 7.2 Hz, 2H), 7.64 (d, J = 7.8 Hz, 1H), 7.53 (t, J = 7.3 Hz, 1H), 7.43-7.35 (m, 3H), 7.24 (d, J = 8.1 Hz, 1H), 7.11 (t, J = 7.2 Hz, 1H), 3.66 –3.58 (m, 2H), 3.45-3.37 (m, 2H), 1.62 (s, 9H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 200.56, 162.23, 136.47, 135.26, 133.51, 129.79, 128.60, 128.12, 127.95, 123.89, 119.65, 119.59, 113.64, 111.96, 51.93, 38.29, 29.05, 19.08; HRMS (ESI) m/z calcd for $C_{22}H_{24}N_2NaO_2$ $[M+Na]^+$ 371.1730, Found 371.1726.

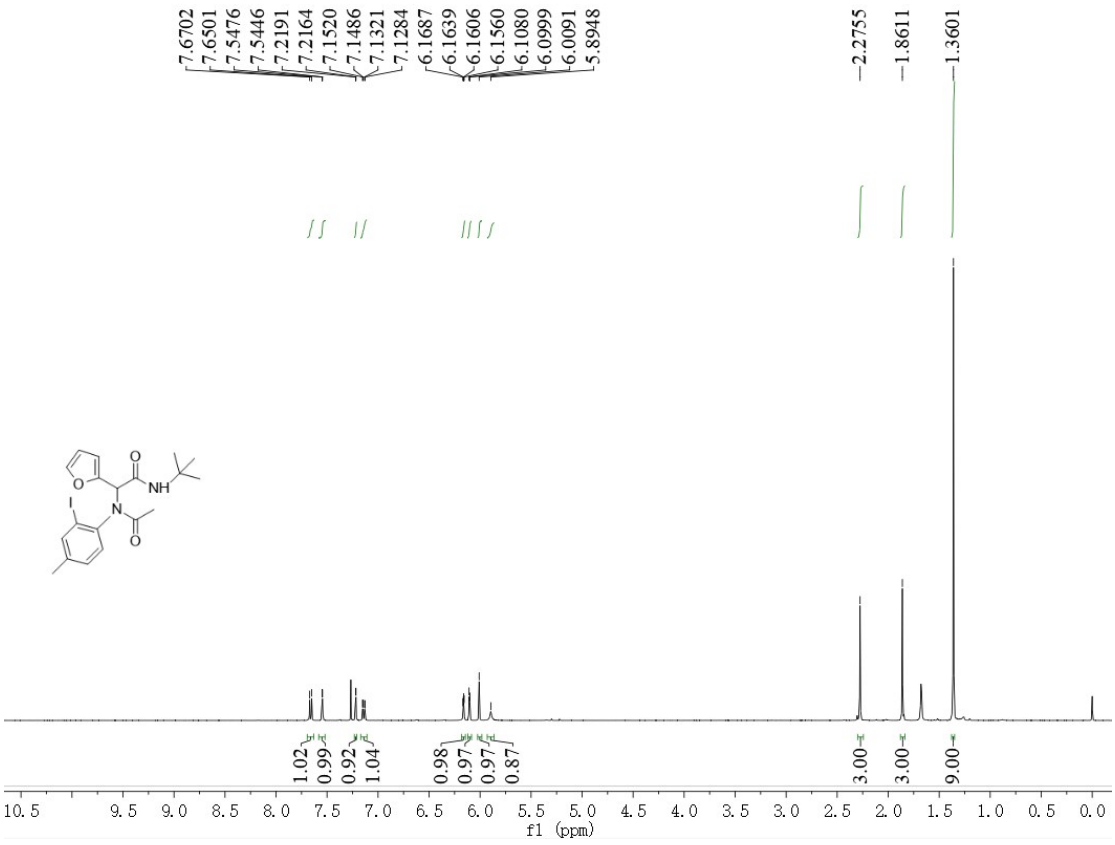
^{1}H and ^{13}C NMR spectra of all products

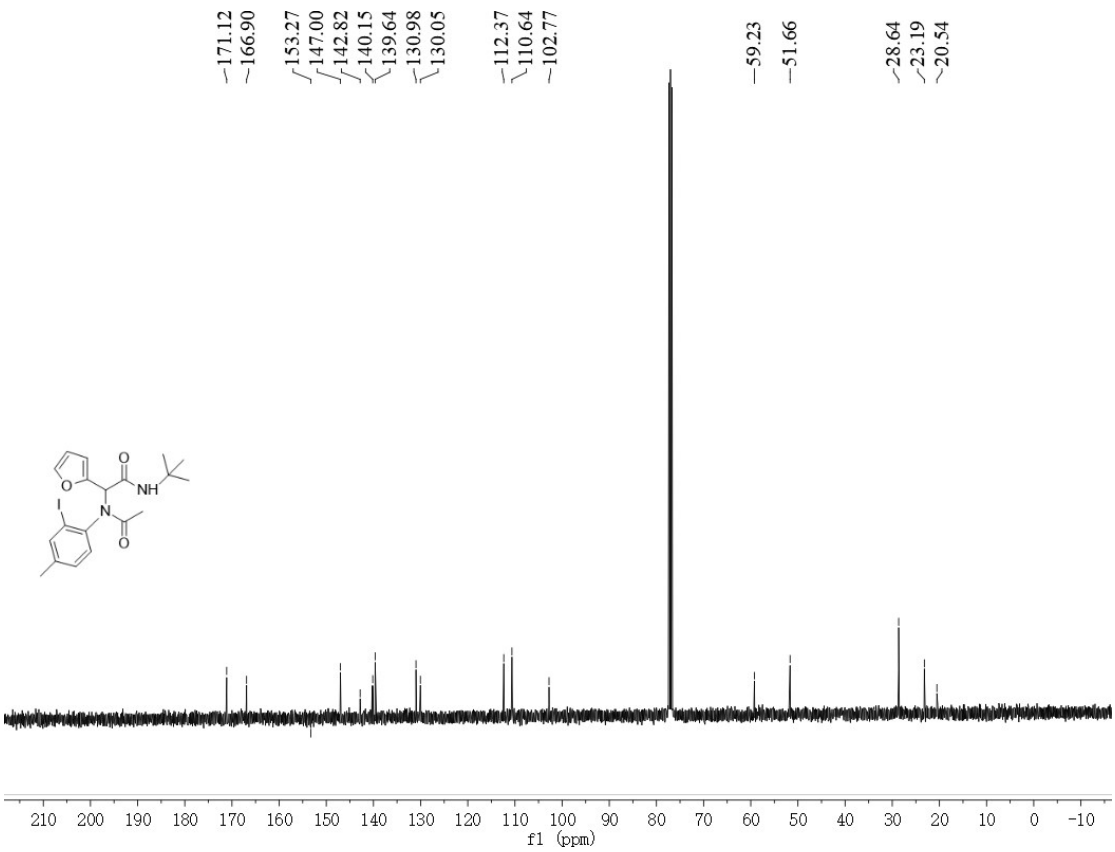
N-(tert-butyl)-2-(furan-2-yl)-2-(N-(2-iodophenyl)acetamido)acetamide (1a)



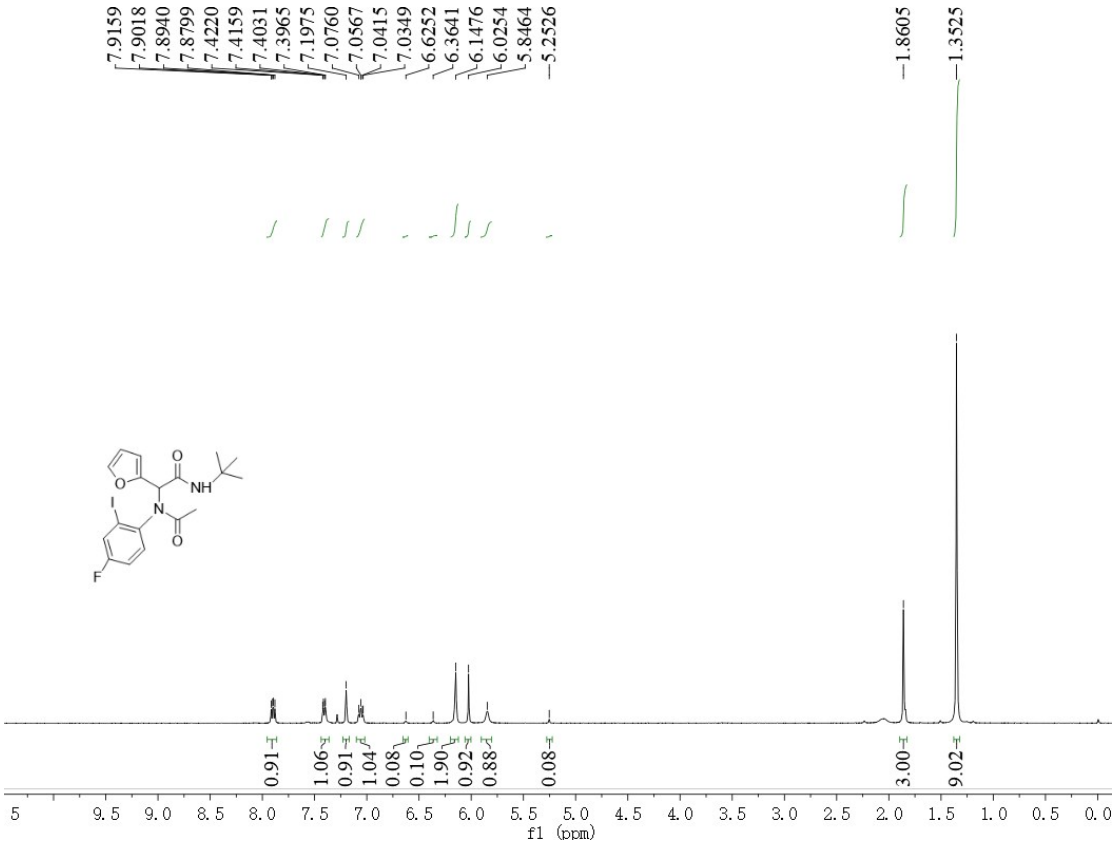


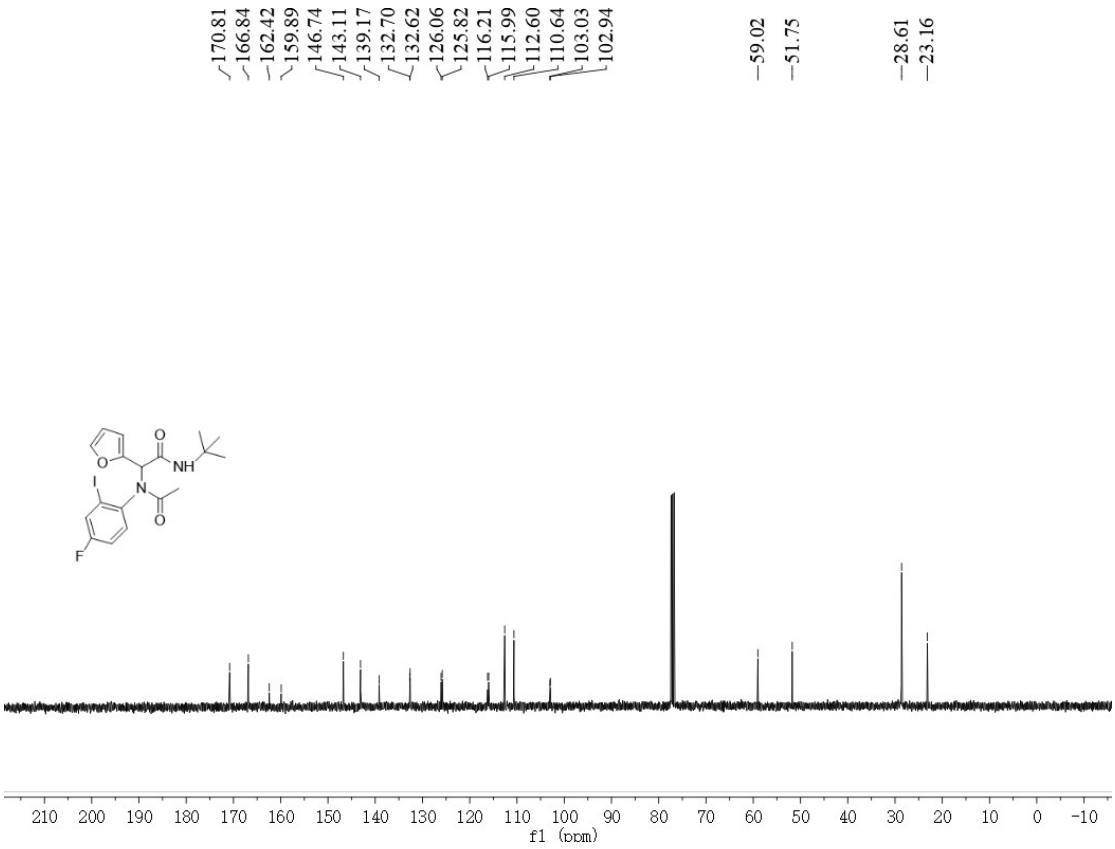
N-(tert-butyl)-2-(furan-2-yl)-2-(N-(2-iodo-4-methylphenyl)acetamido)acetamide (1b)



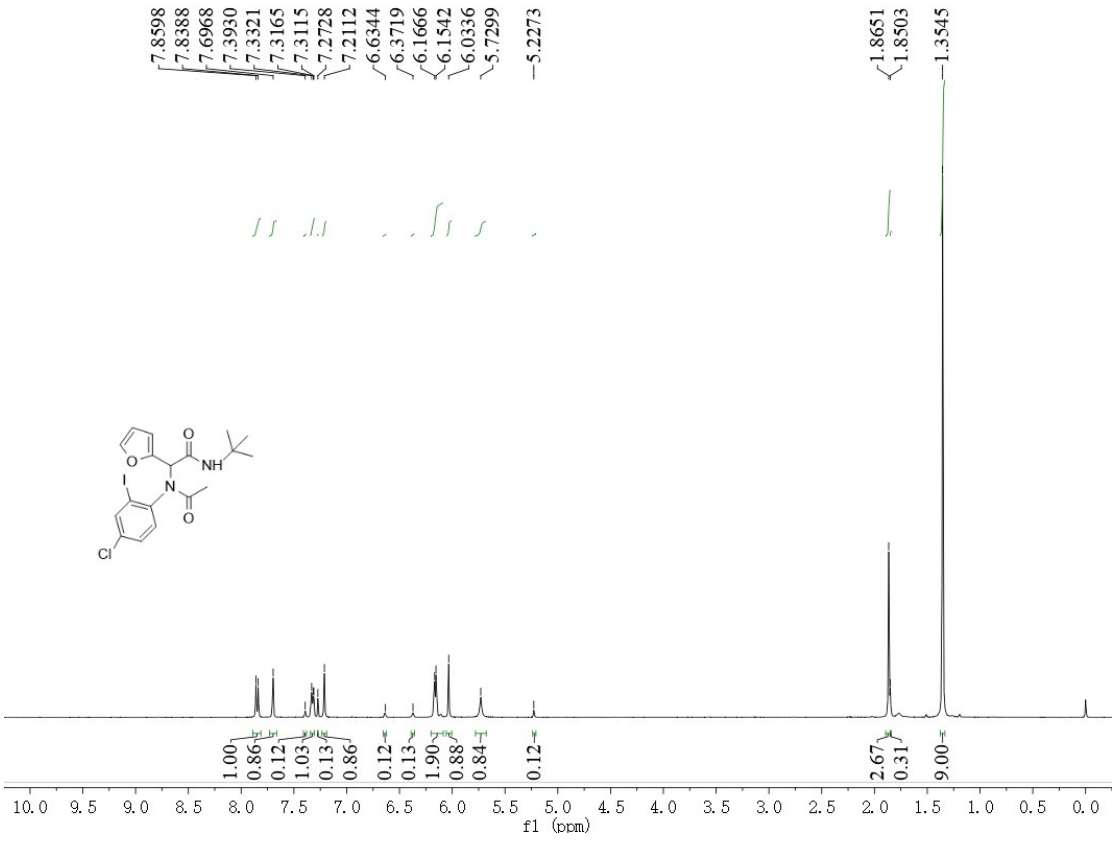


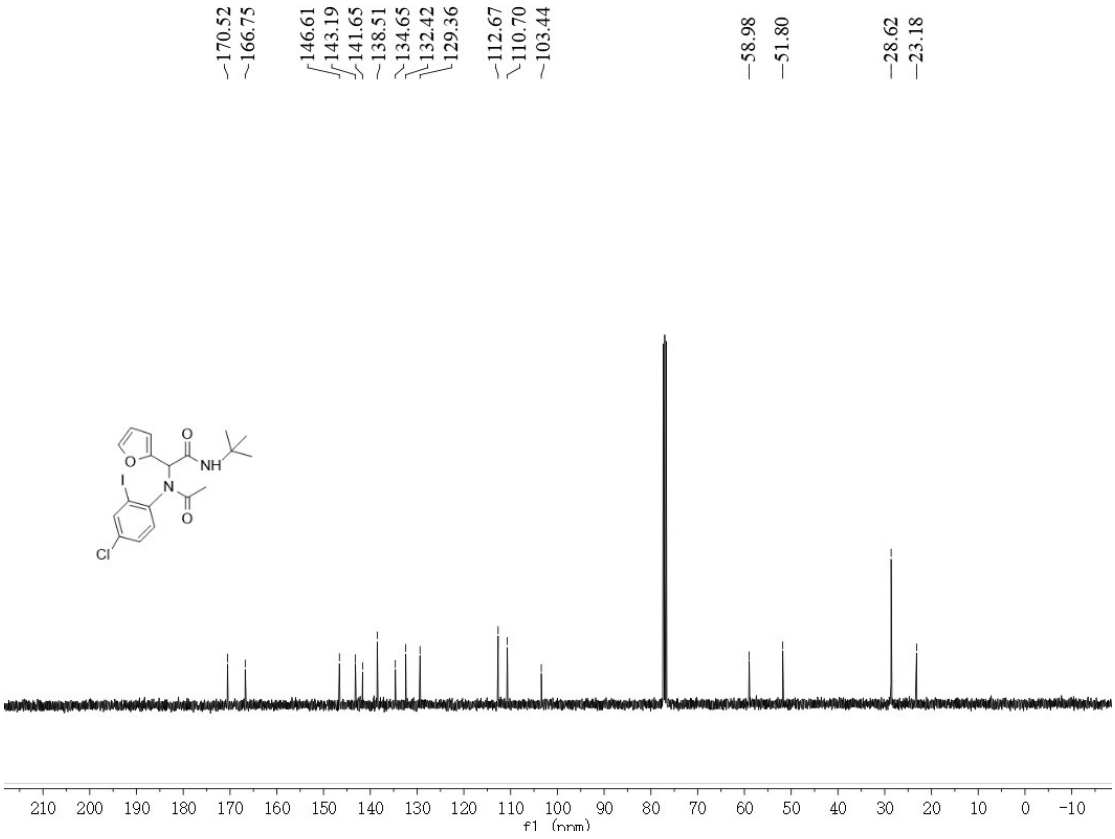
N-(tert-butyl)-2-(N-(4-fluoro-2-iodophenyl)acetamido)-2-(furan-2-yl)acetamide (1c)



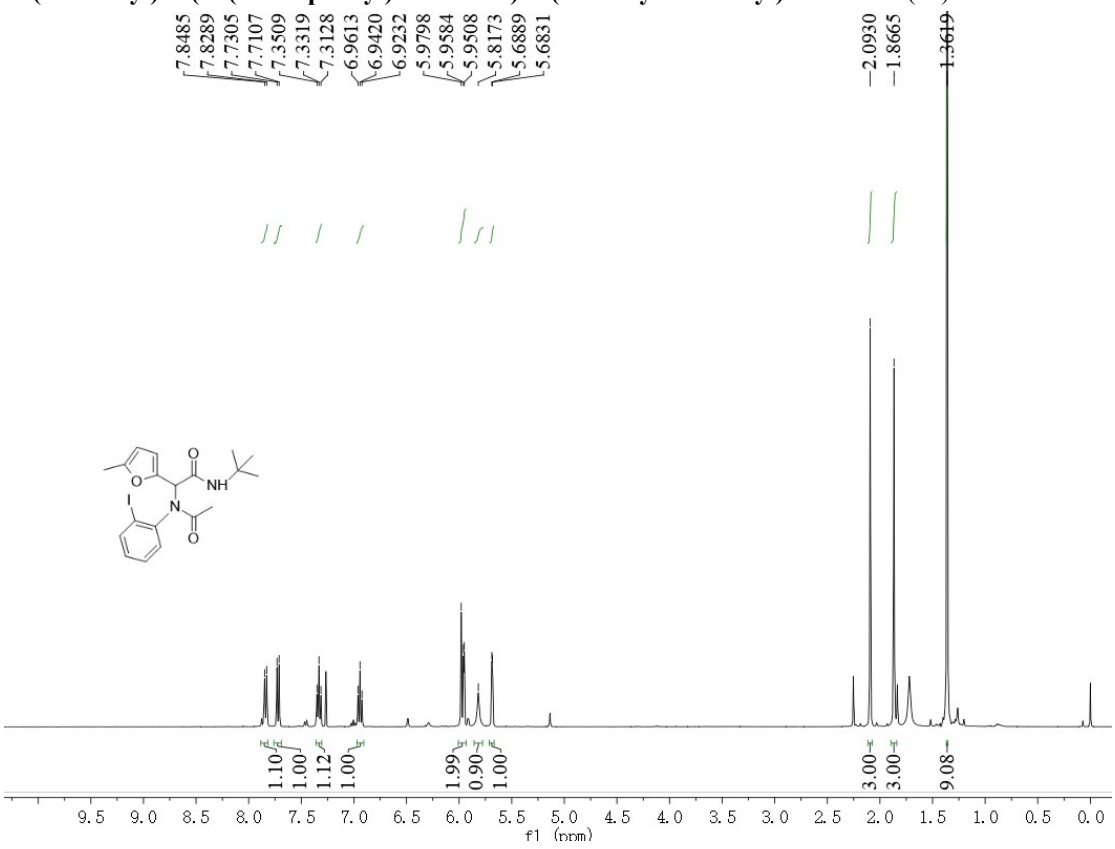


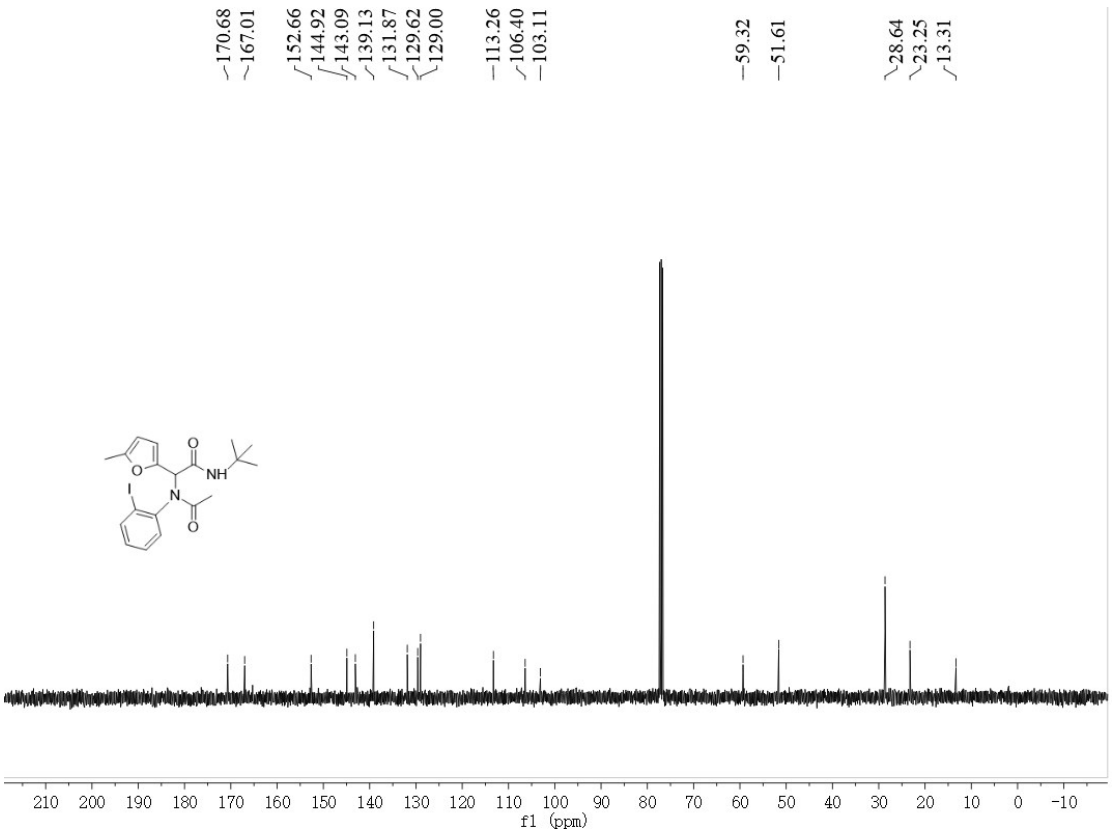
N-(tert-butyl)-2-(N-(4-chloro-2-iodophenyl)acetamido)-2-(furan-2-yl)acetamide (1d)



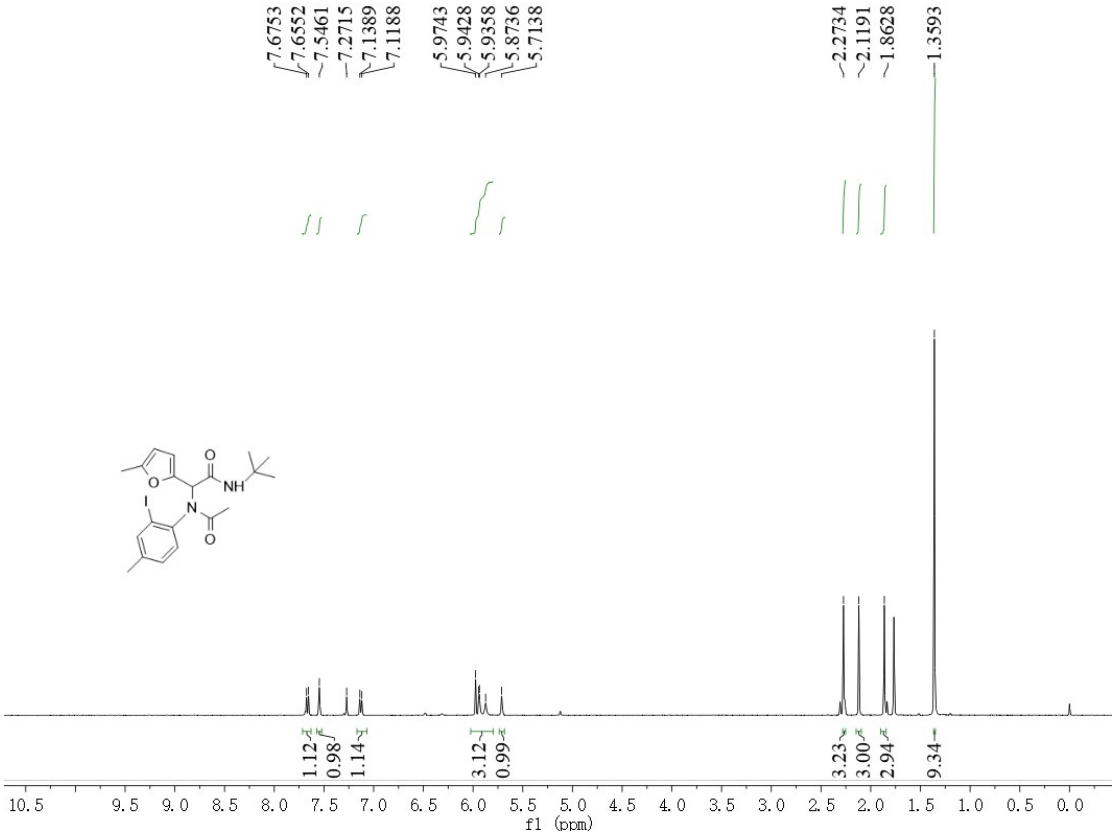


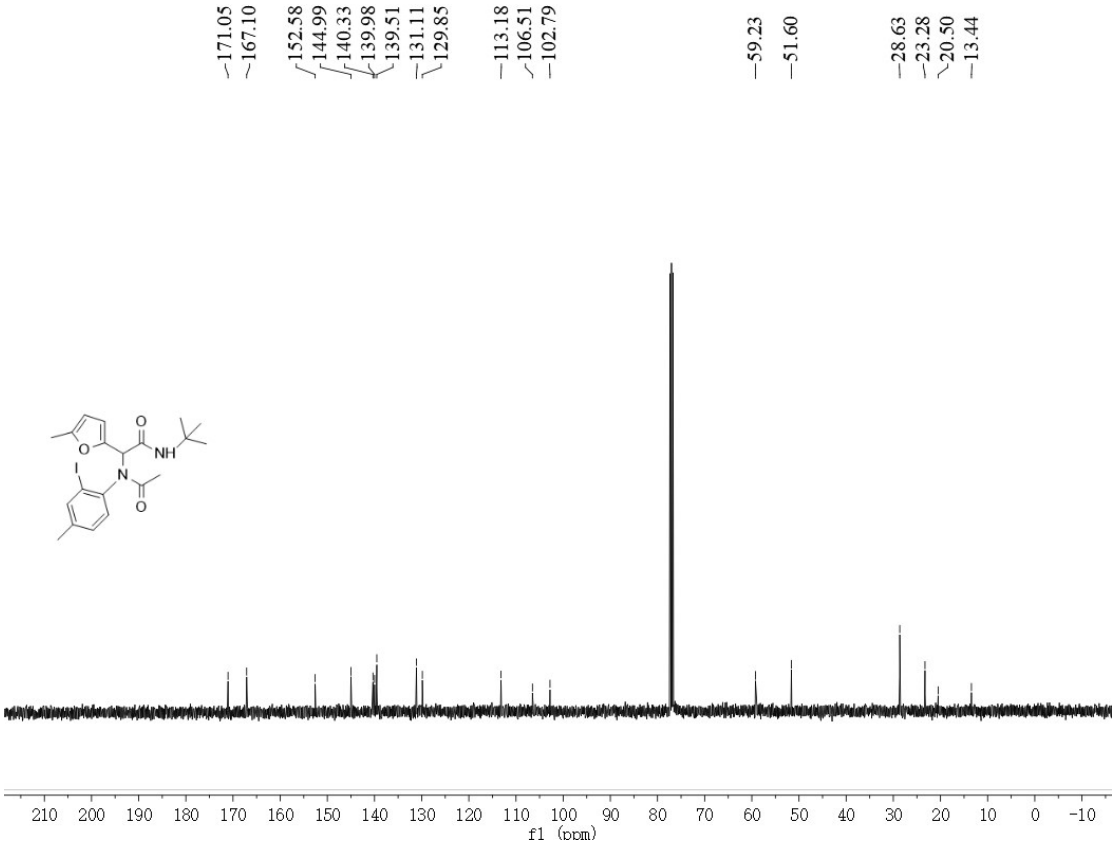
N-(tert-butyl)-2-(N-(2-iodophenyl)acetamido)-2-(5-methylfuran-2-yl)acetamide (1e)



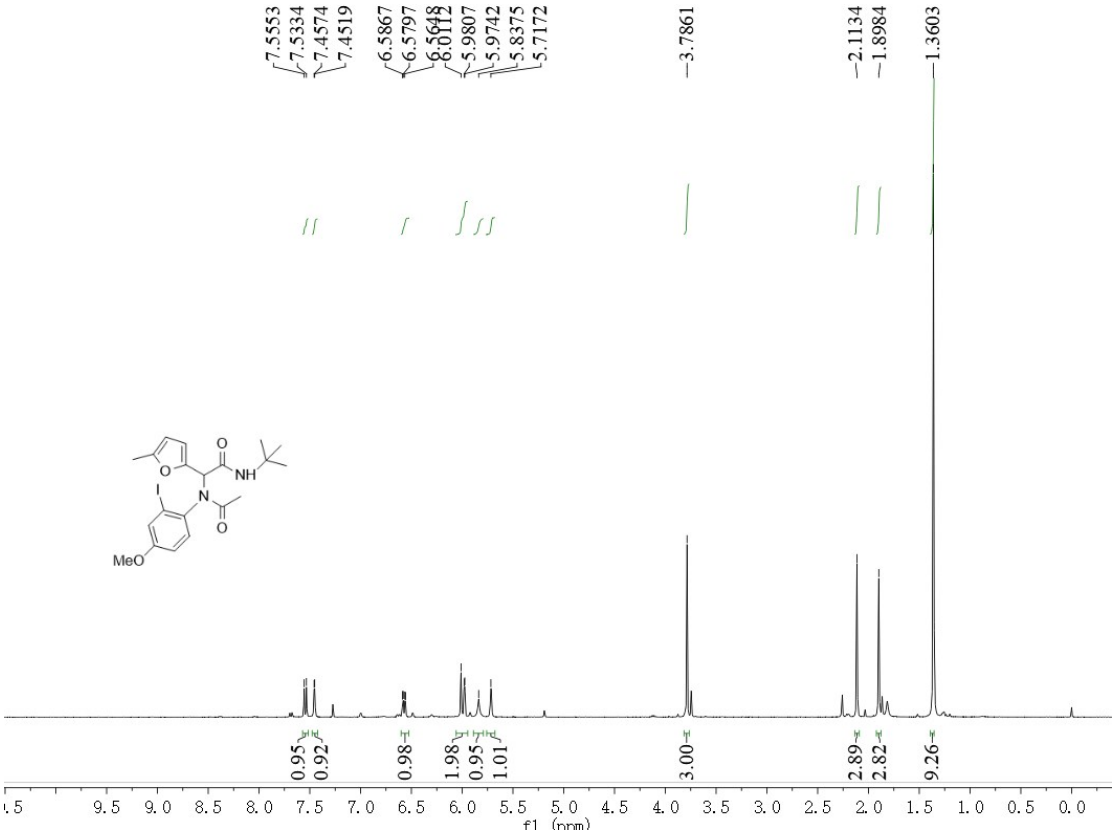


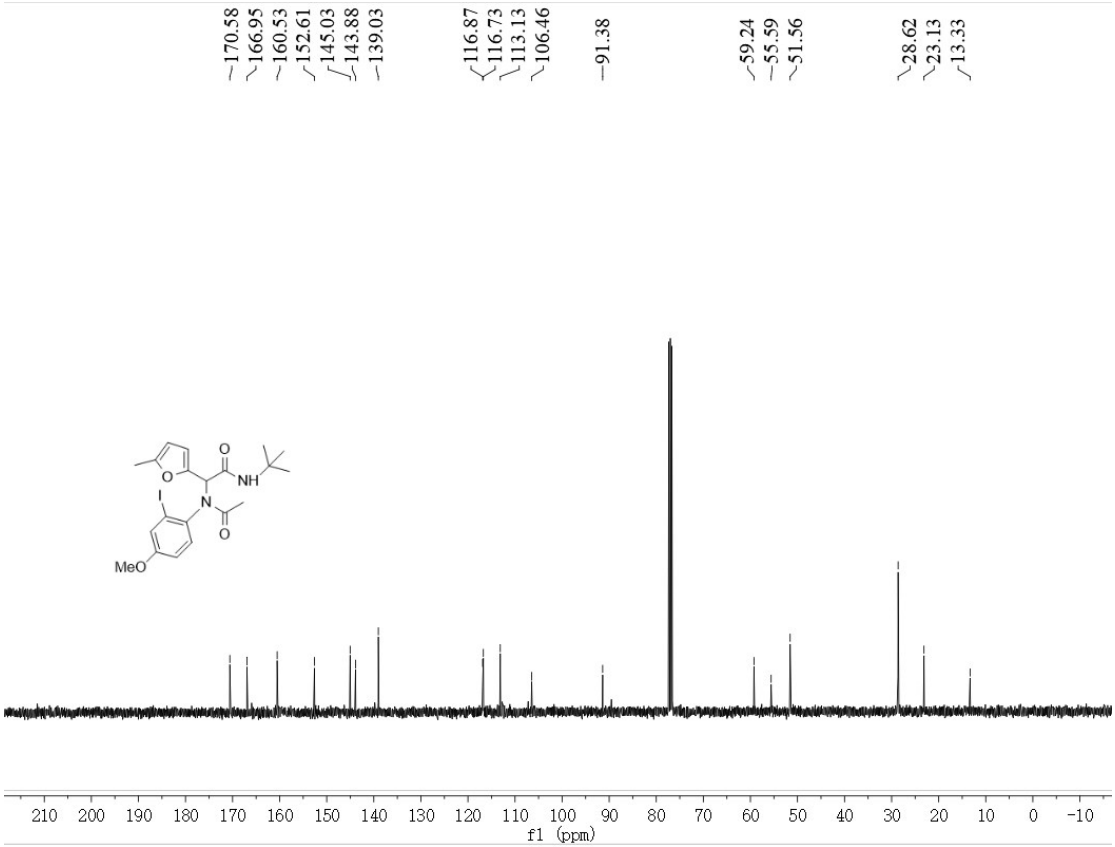
N-(tert-butyl)-2-(N-(2-iodo-4-methylphenyl)acetamido)-2-(5-methylfuran-2-yl)acetamide (1f)



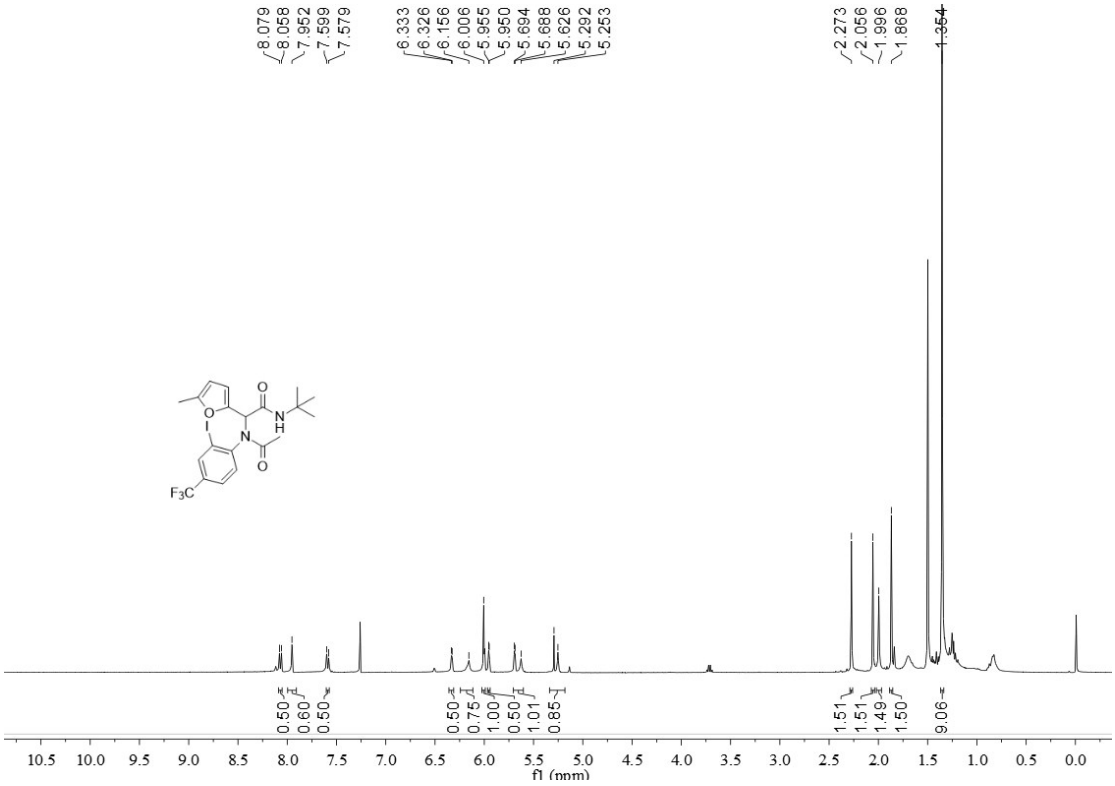


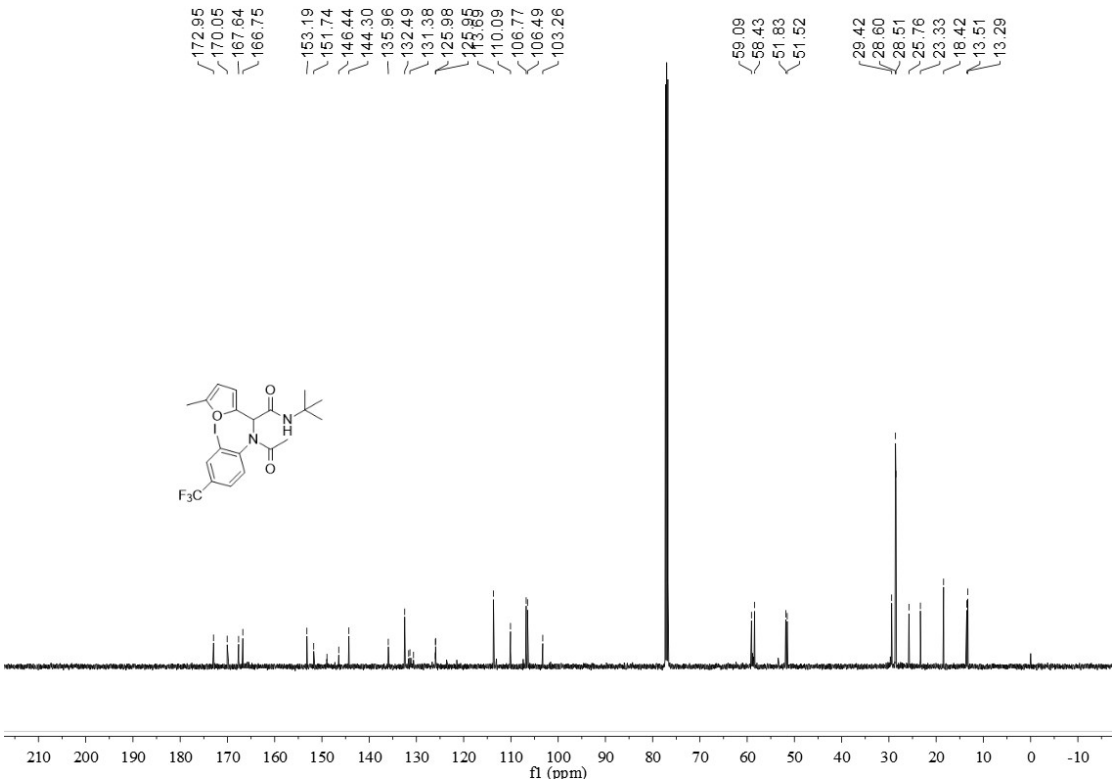
N-(tert-butyl)-2-(N-(2-iodo-4-methoxyphenyl)acetamido)-2-(5-methylfuran-2-yl)acetamide (1g)



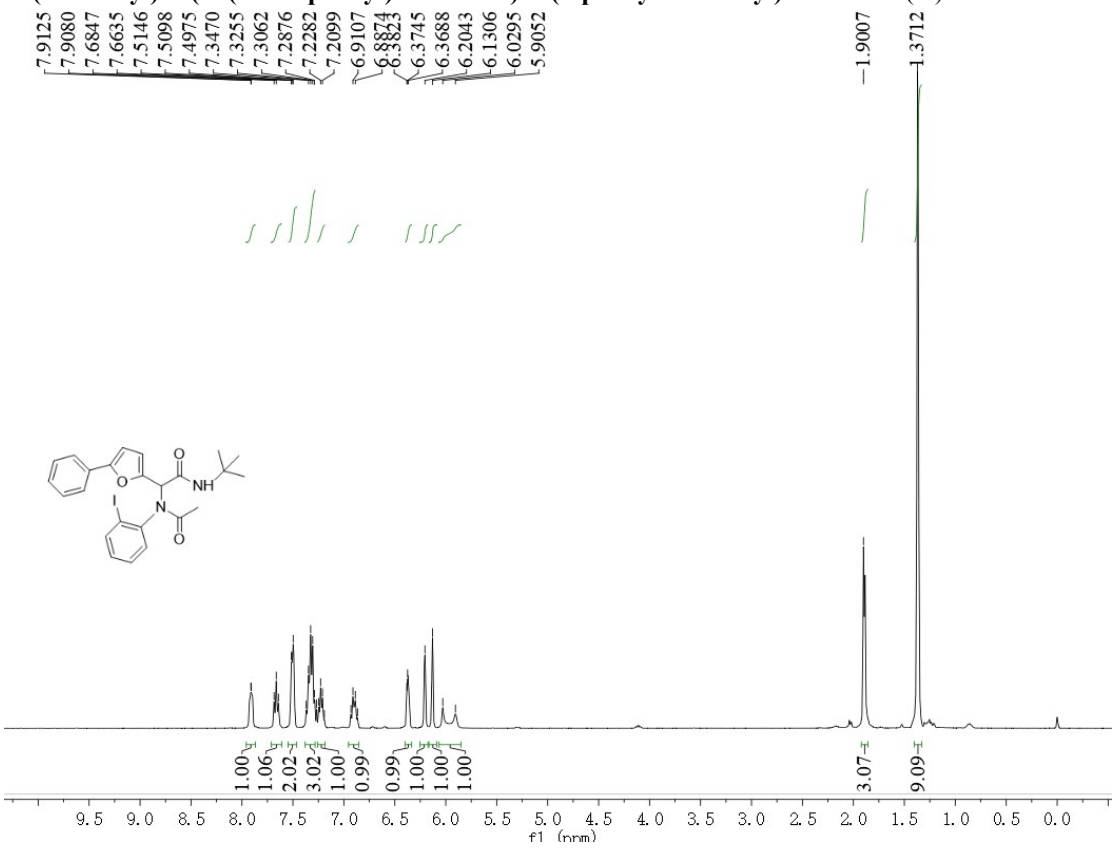


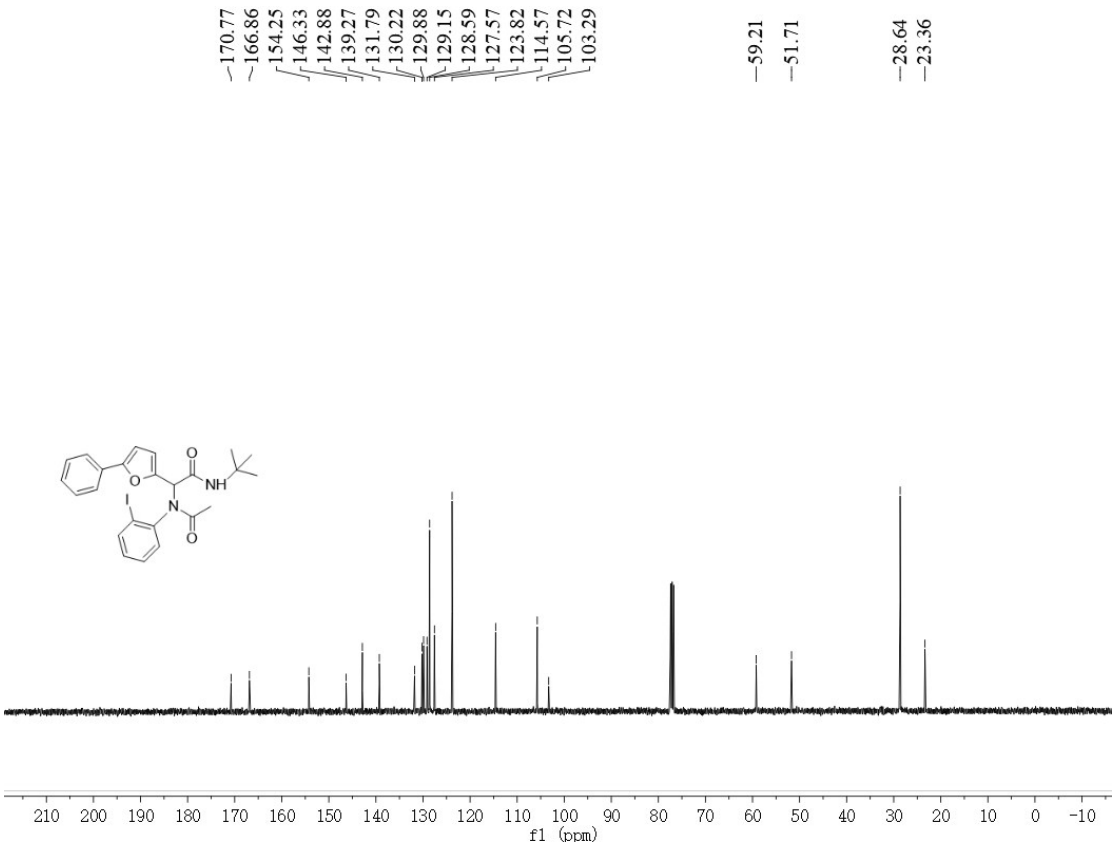
N-(tert-butyl)-2-(N-(2-iodo-4-(trifluoromethyl)phenyl)acetamido)-2-(5-methylfuran-2-yl)acetamide (1h)



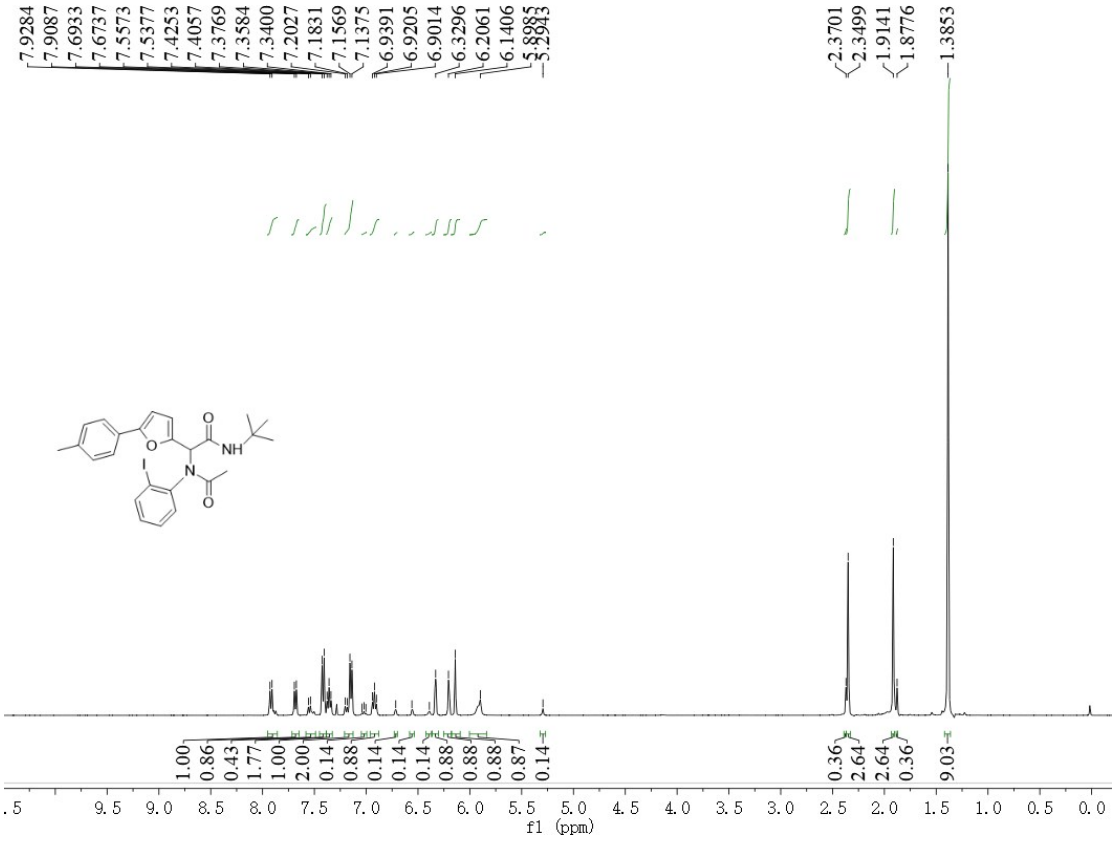


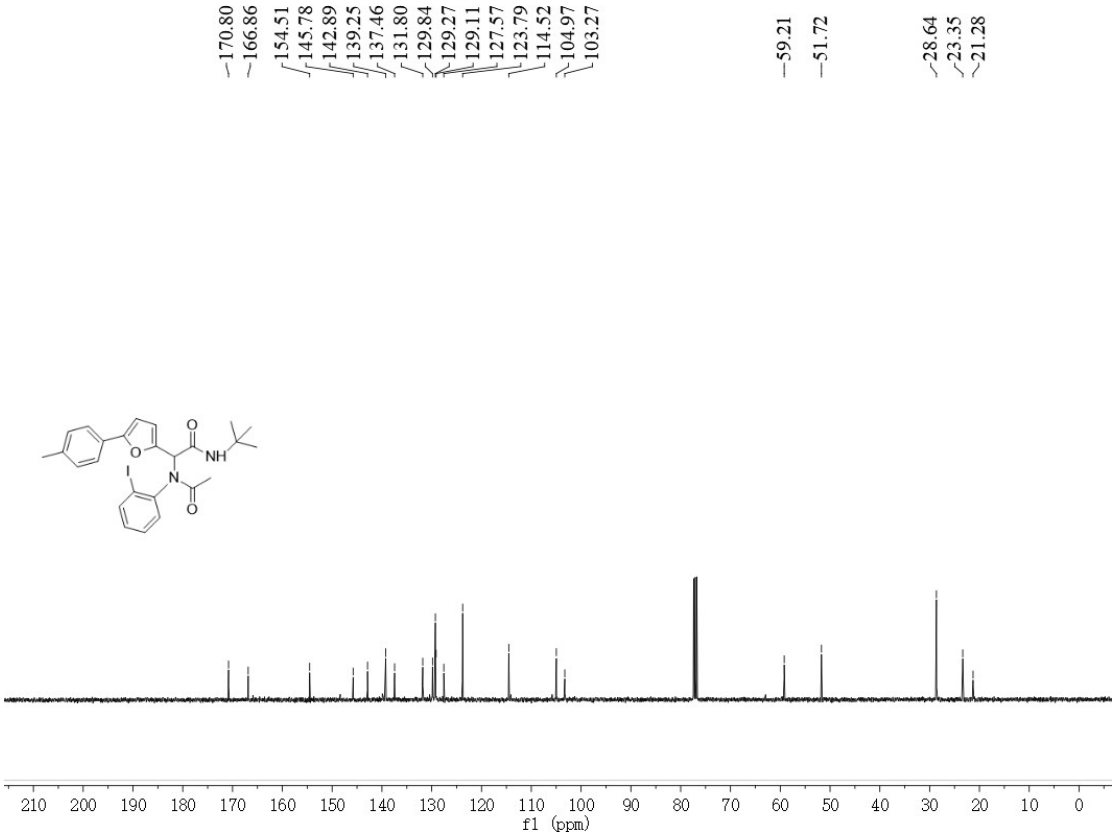
N-(tert-butyl)-2-(N-(2-iodophenyl)acetamido)-2-(5-phenylfuran-2-yl)acetamide (1i)



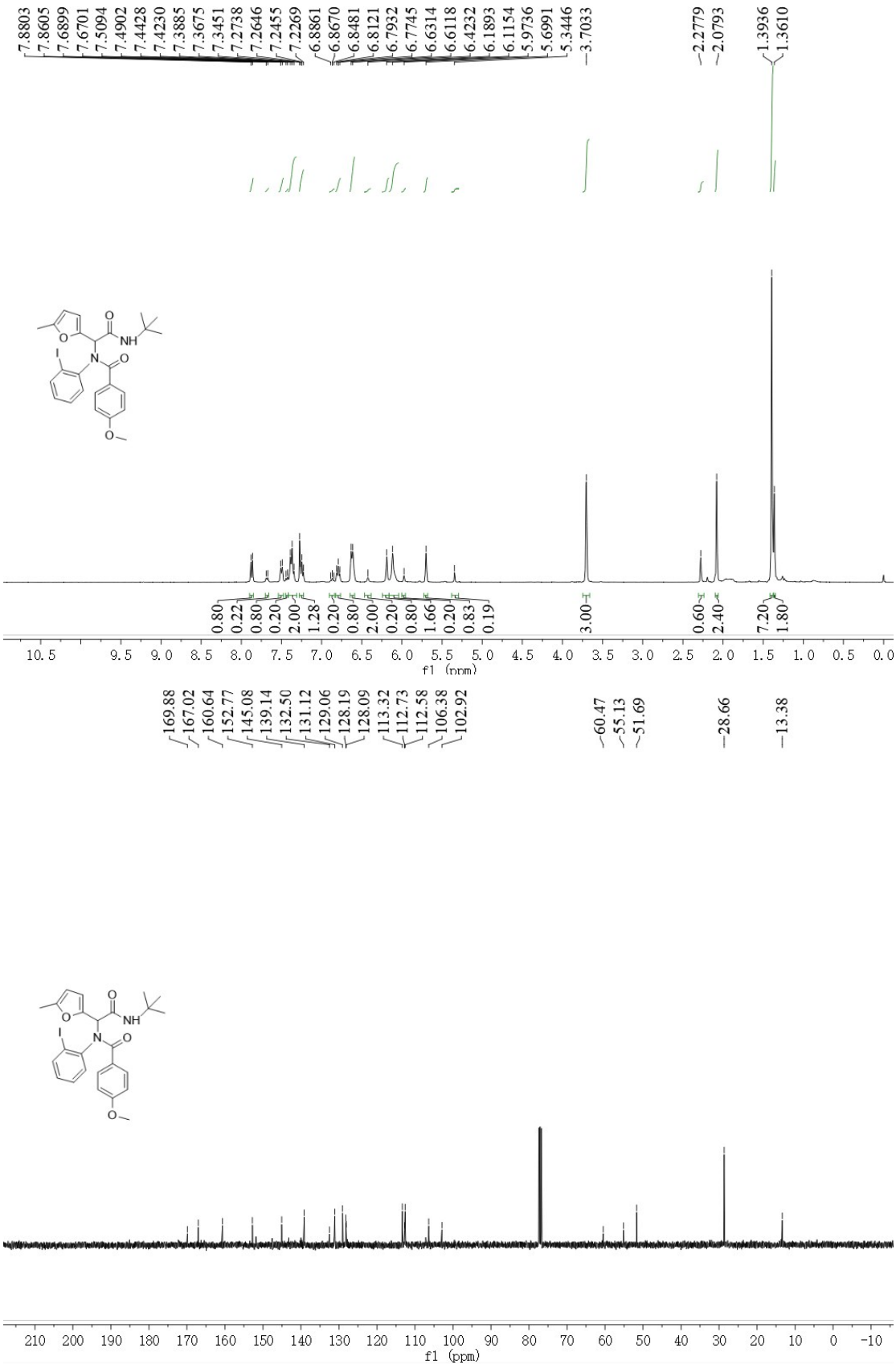


N-(tert-butyl)-2-(N-(2-iodophenyl)acetamido)-2-(5-(p-tolyl)furan-2-yl)acetamide (1j)

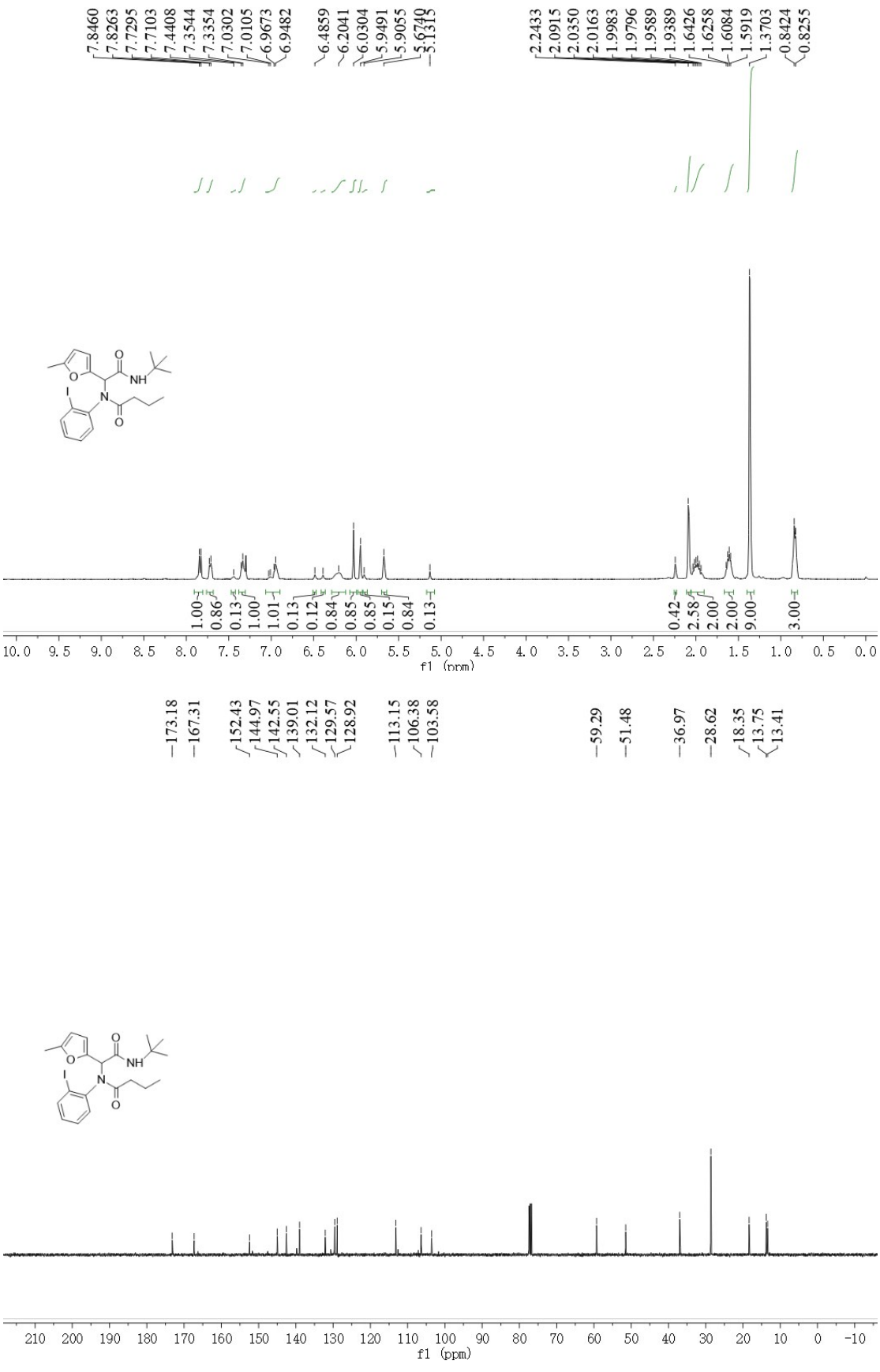




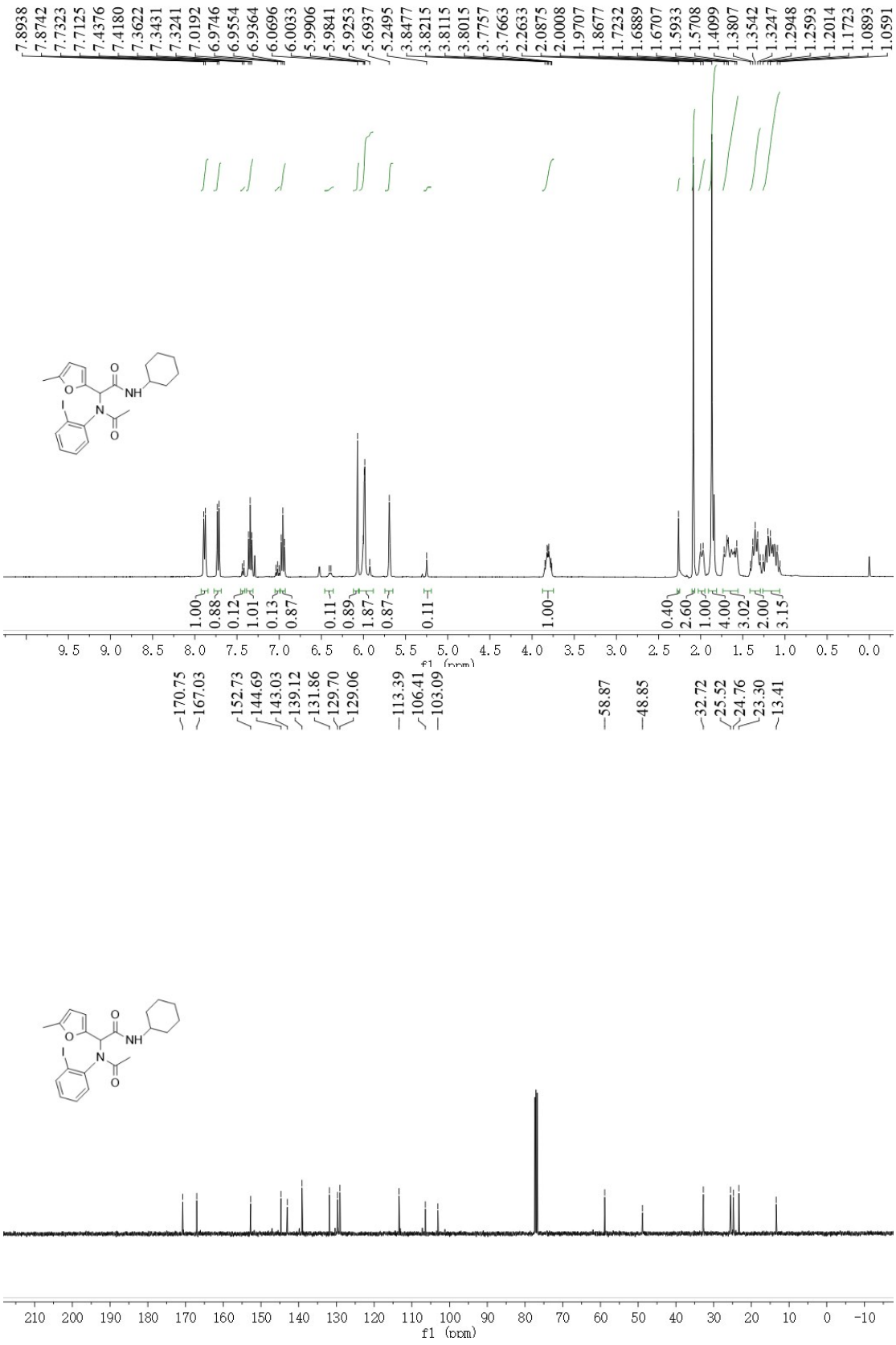
N-(2-(tert-butylamino)-1-(5-methylfuran-2-yl)-2-oxoethyl)-N-(2-iodophenyl)-4-methoxybenzamide (1k)



N-(2-(tert-butylamino)-1-(5-methylfuran-2-yl)-2-oxoethyl)-N-(2-iodophenyl)butyramide (1l)



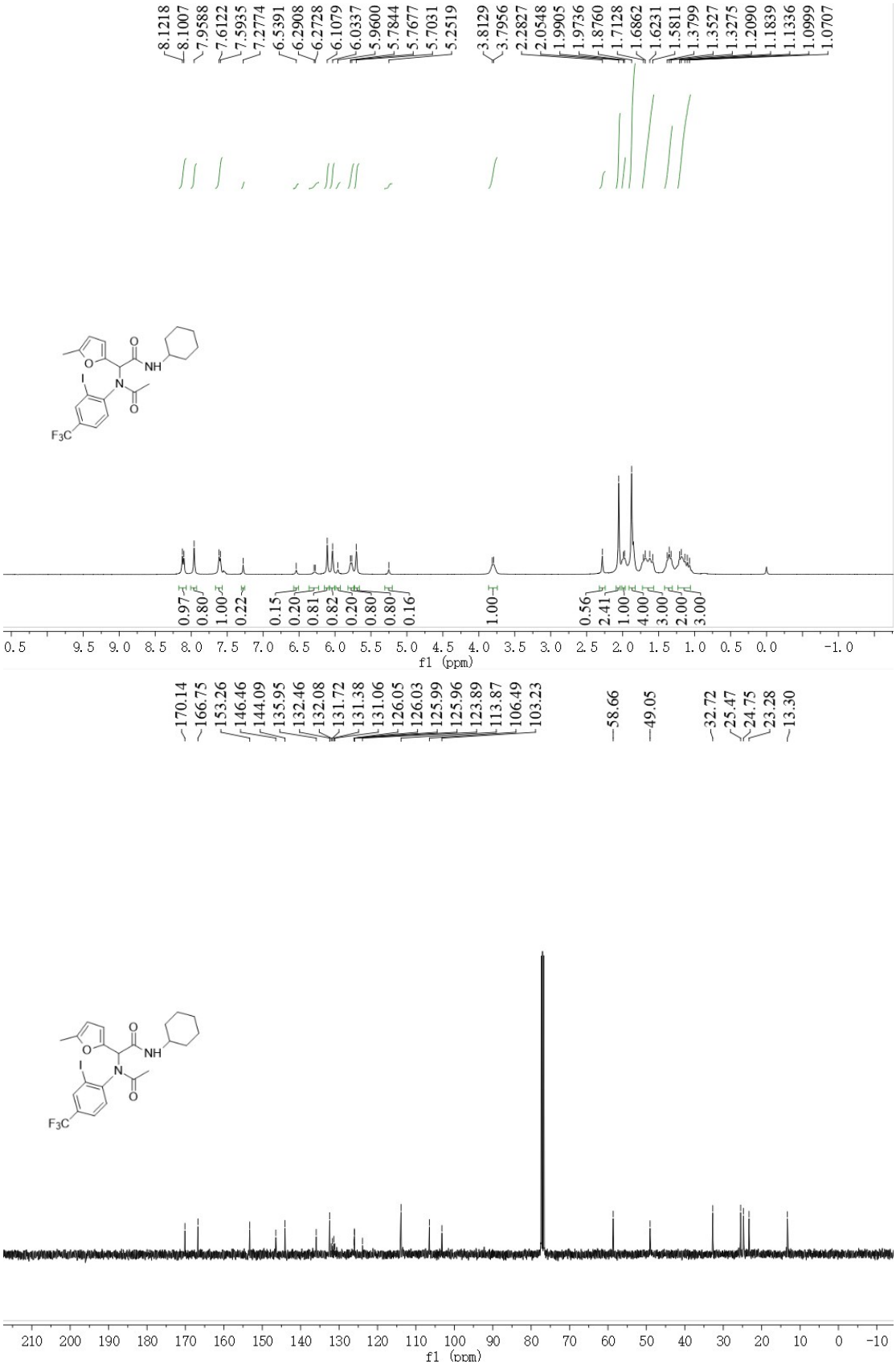
N-cyclohexyl-2-(N-(2-iodophenyl)acetamido)-2-(5-methylfuran-2-yl)acetamide (1m)



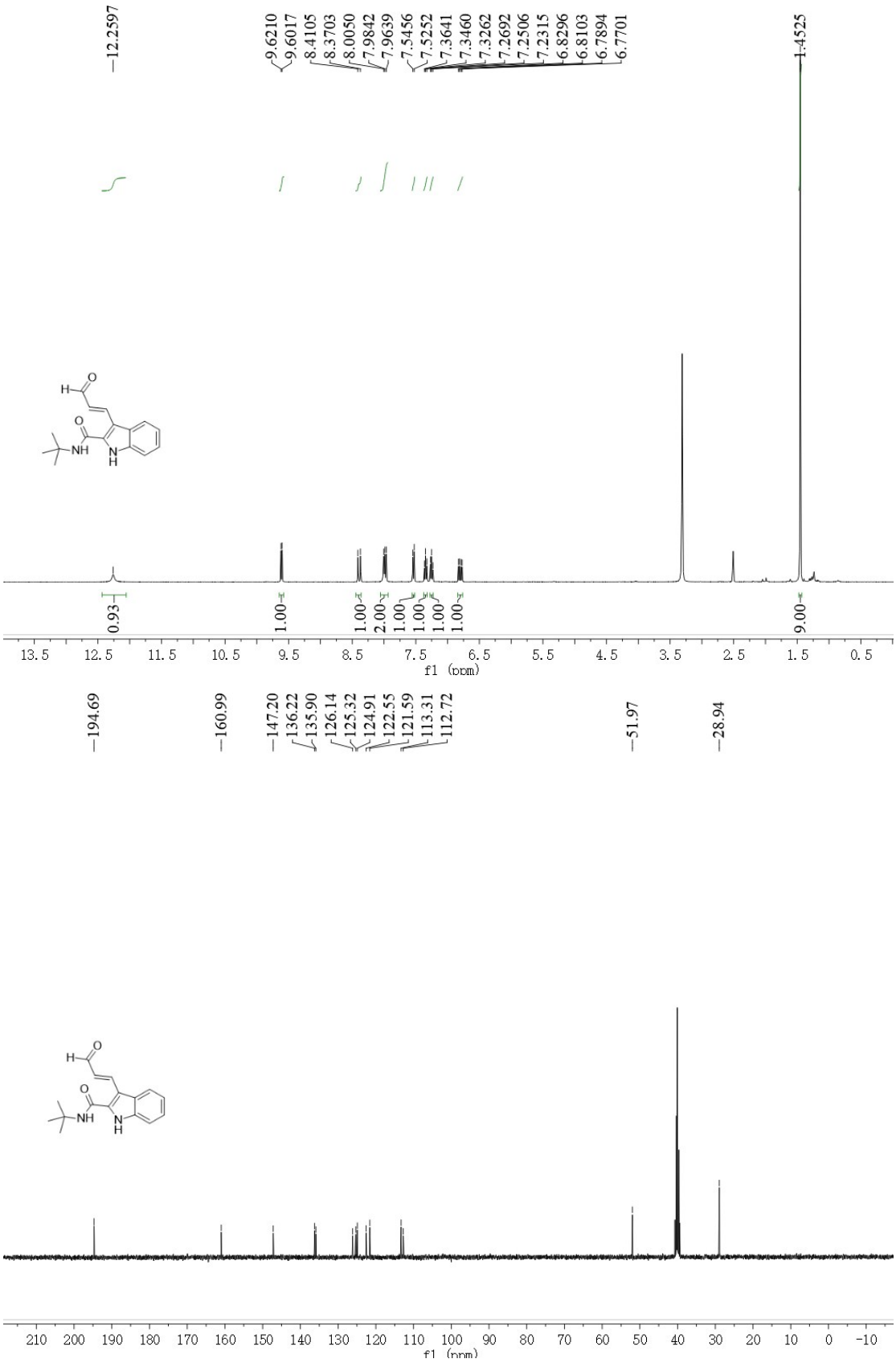
N-cyclohexyl-2-(N-(2-iodo-4-methoxyphenyl)acetamido)-2-(5-methylfuran-2-yl)acetamide (1n)

N-cyclohexyl-2-(N-(2-iodo-4-(trifluoromethyl)phenyl)acetamido)-2-(5-methylfuran-2-

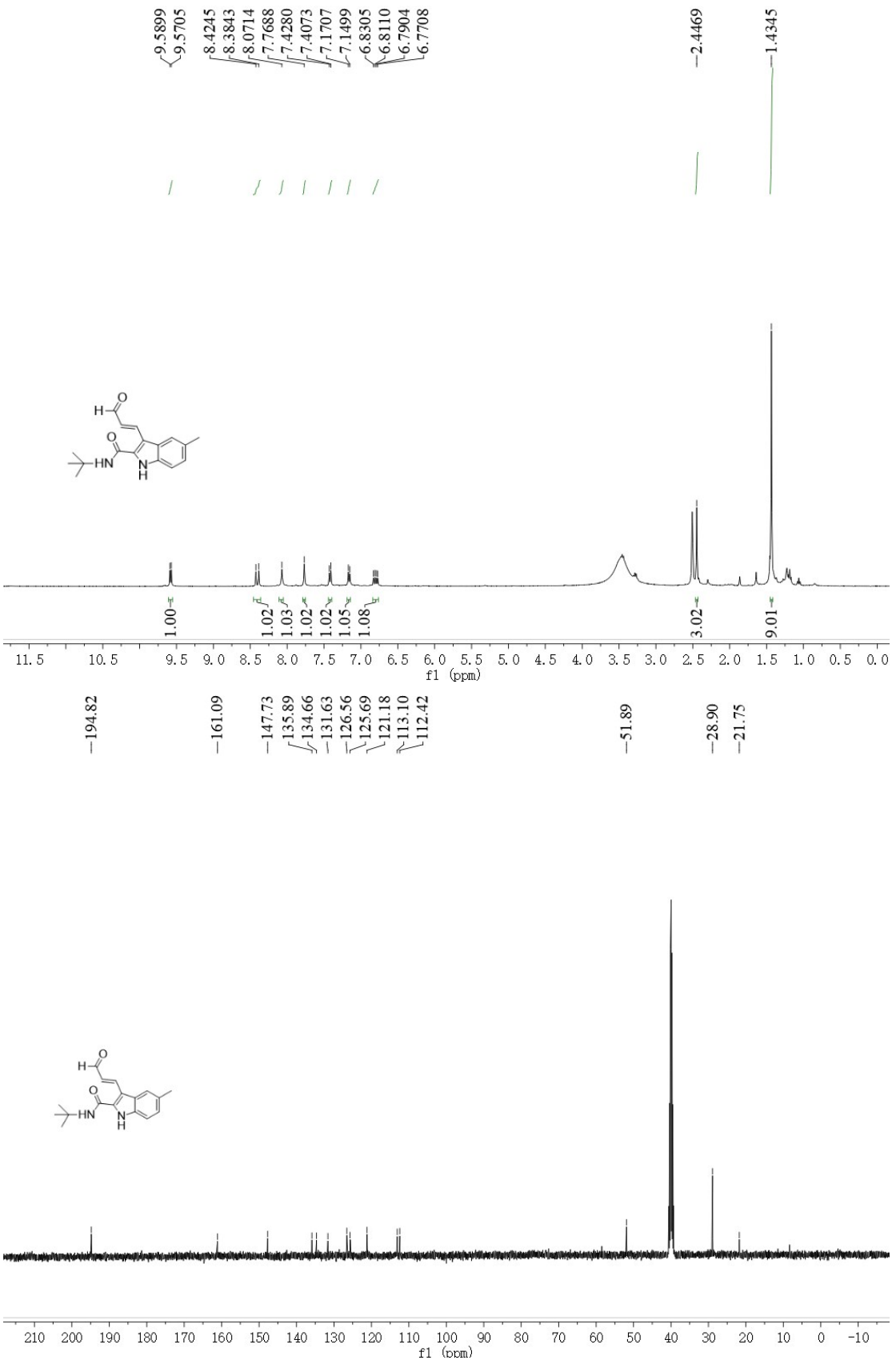
yl)acetamide (1o)



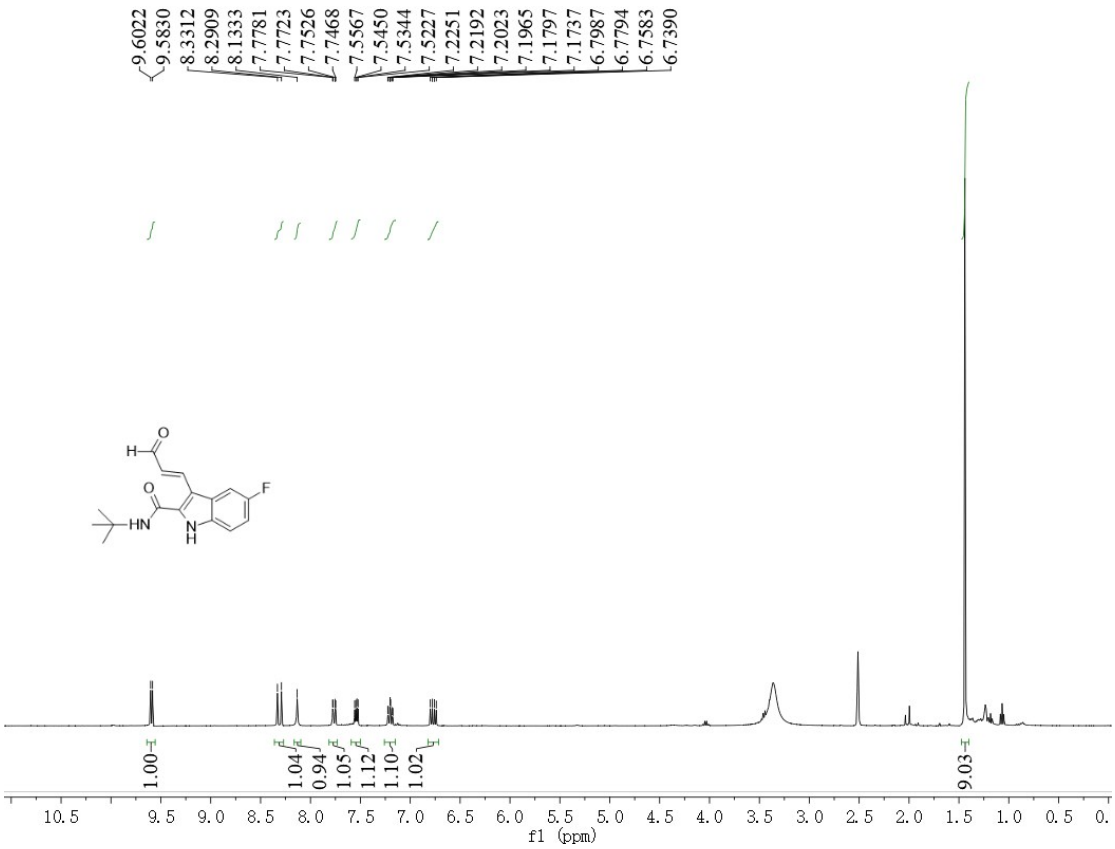
(E)-N-(tert-butyl)-3-(3-oxoprop-1-en-1-yl)-1H-indole-2-carboxamide (2a)

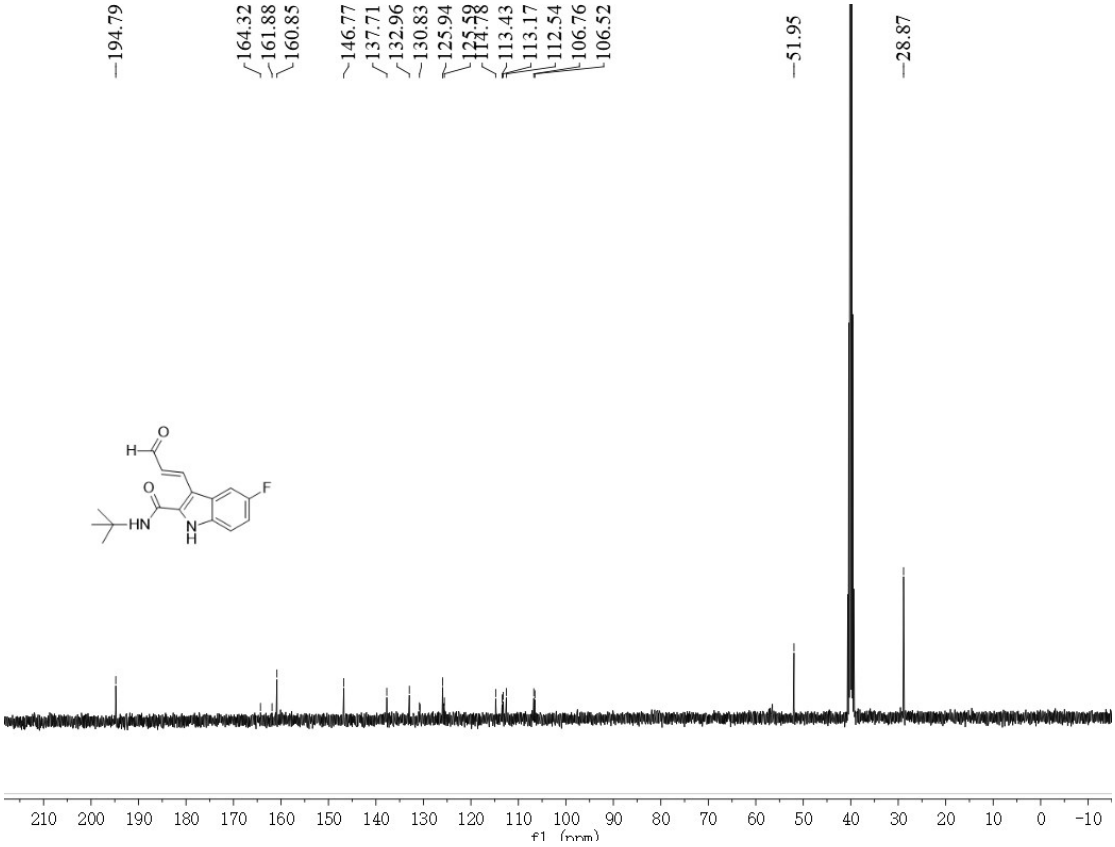


(E)-N-(tert-butyl)-5-methyl-3-(3-oxoprop-1-en-1-yl)-1H-indole-2-carboxamide (2b)

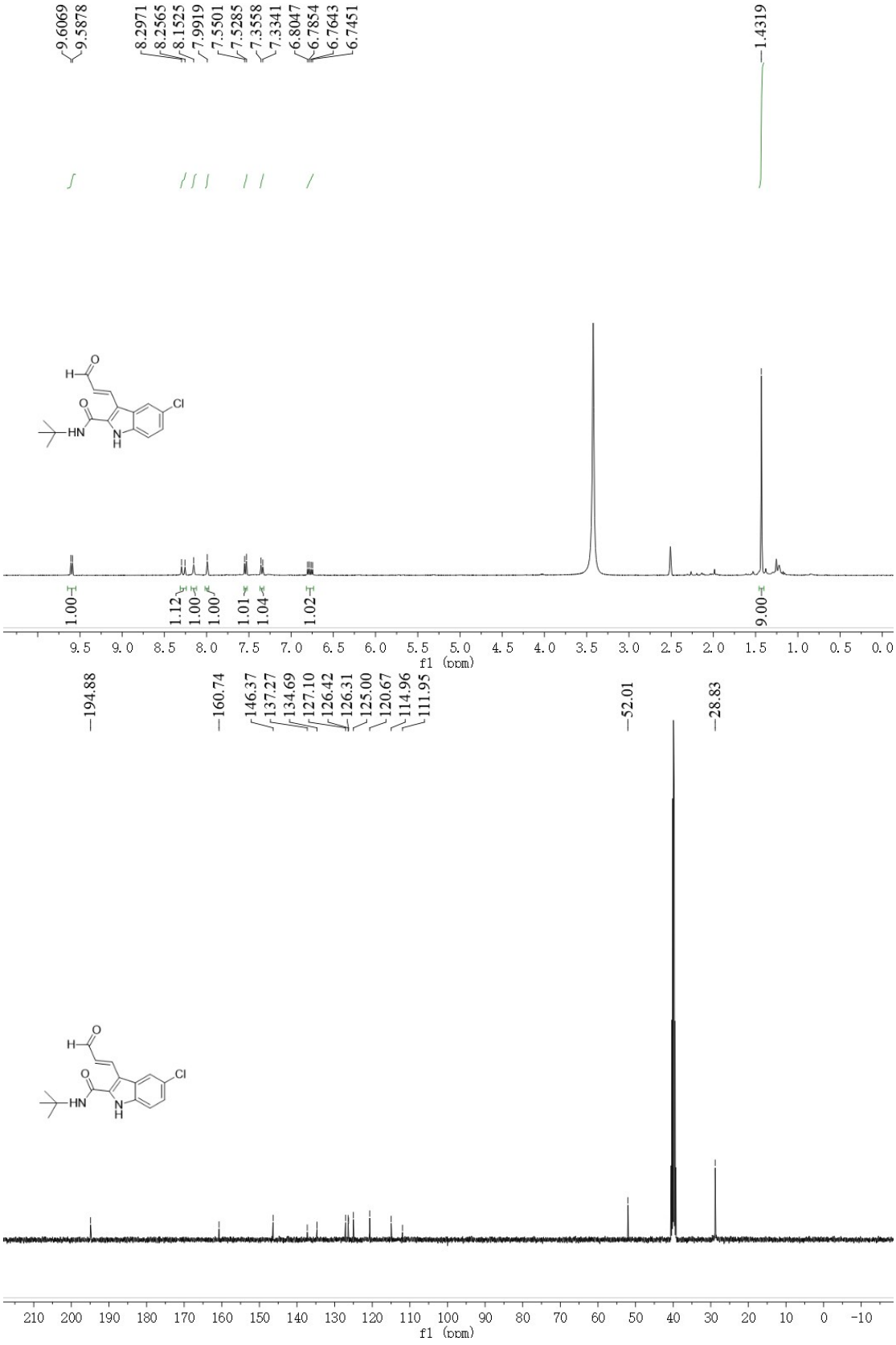


(E)-N-(tert-butyl)-5-fluoro-3-(3-oxoprop-1-en-1-yl)-1H-indole-2-carboxamide (2c)

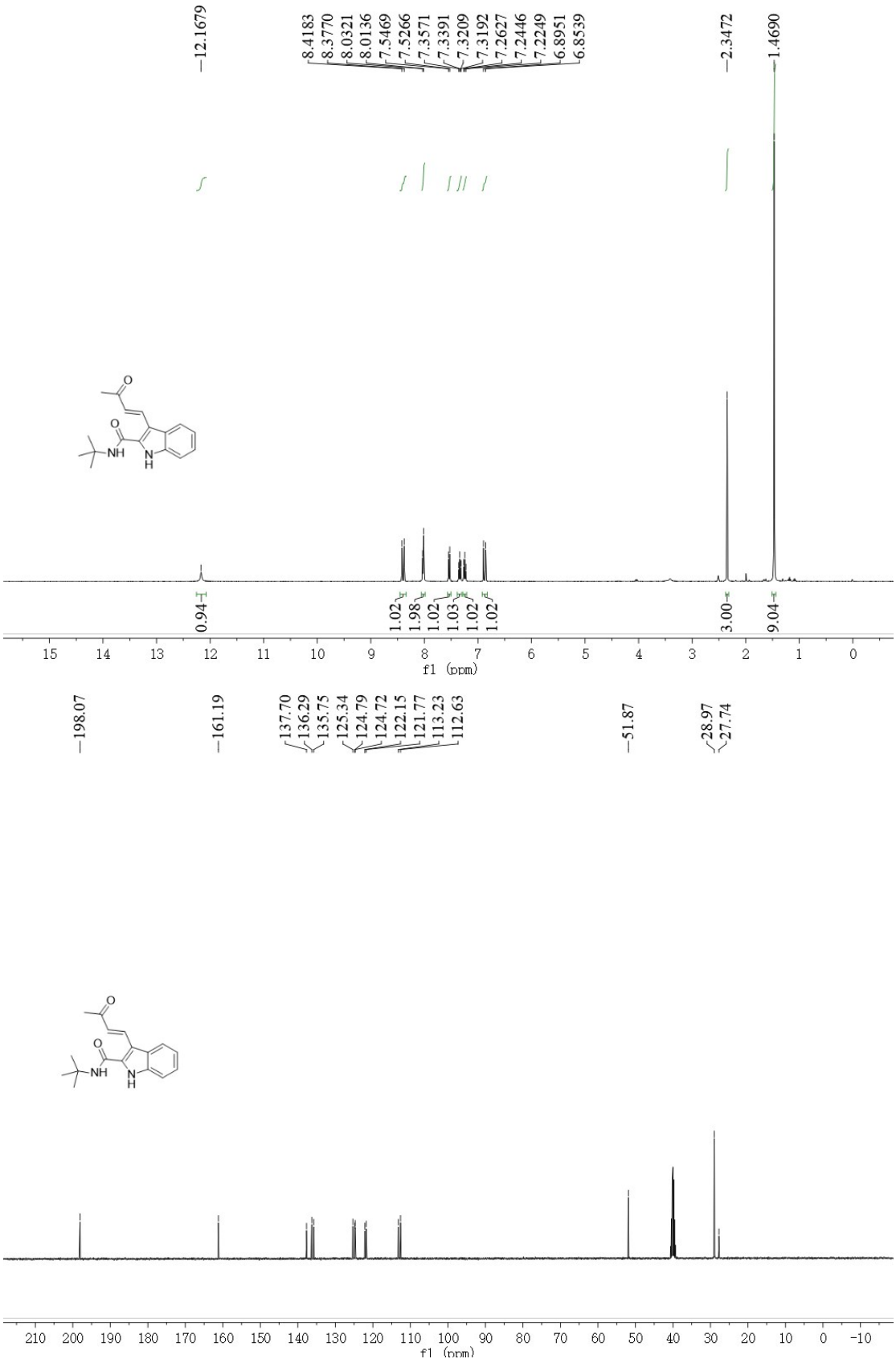




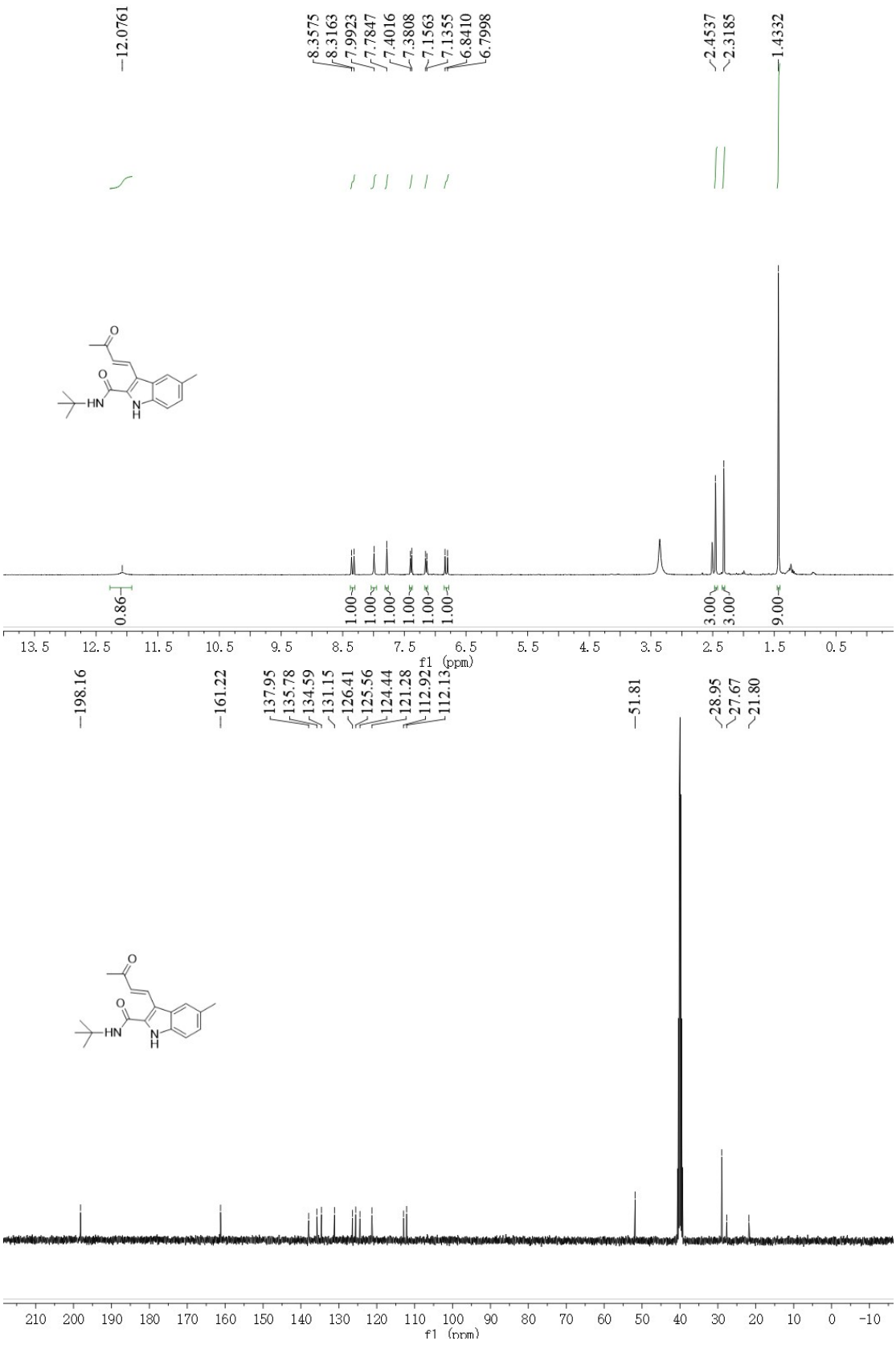
(E)-N-(tert-butyl)-5-chloro-3-(3-oxoprop-1-en-1-yl)-1H-indole-2-carboxamide (2d)



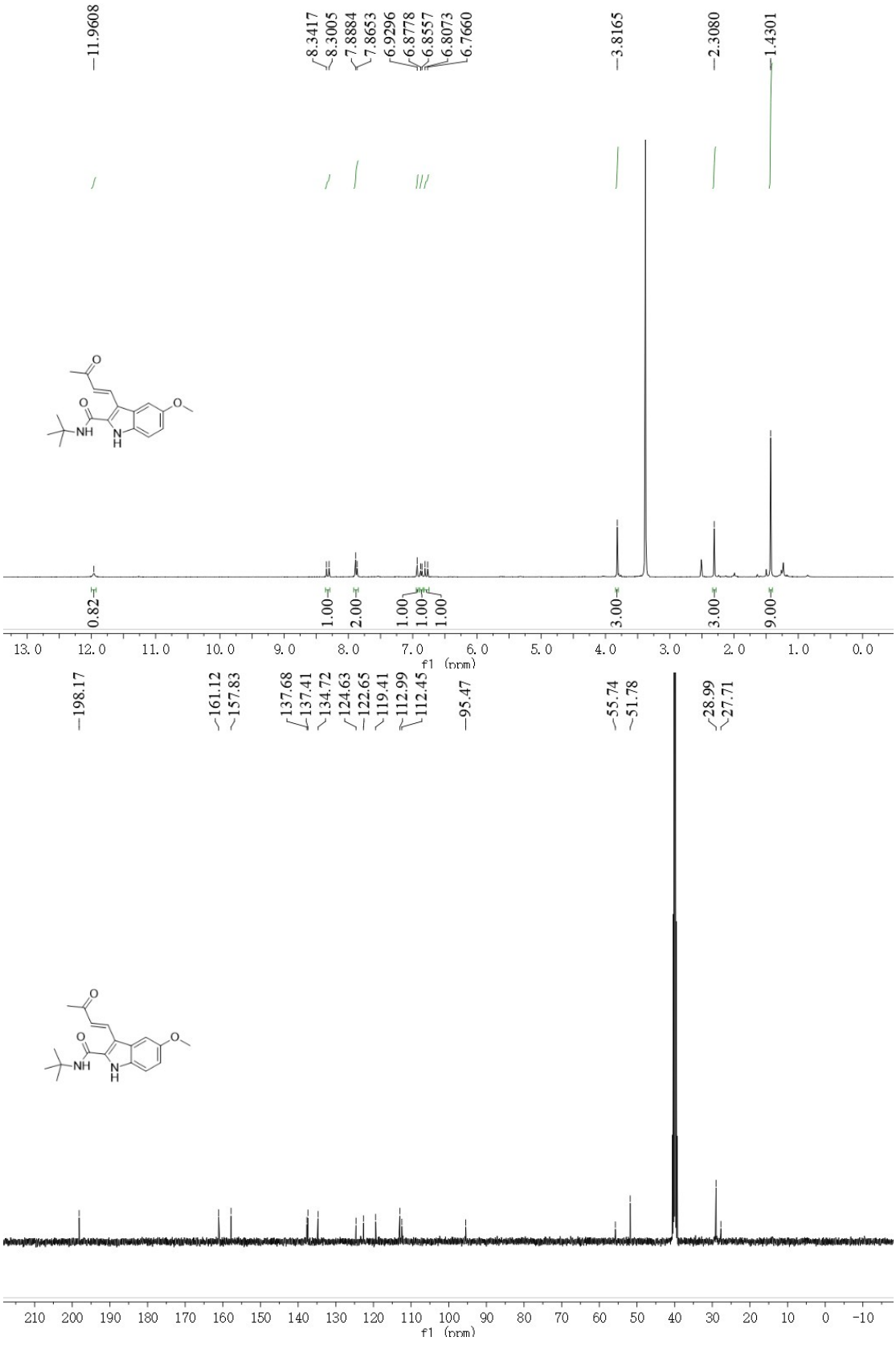
(E)-N-(tert-butyl)-3-(3-oxobut-1-en-1-yl)-1H-indole-2-carboxamide (2e)



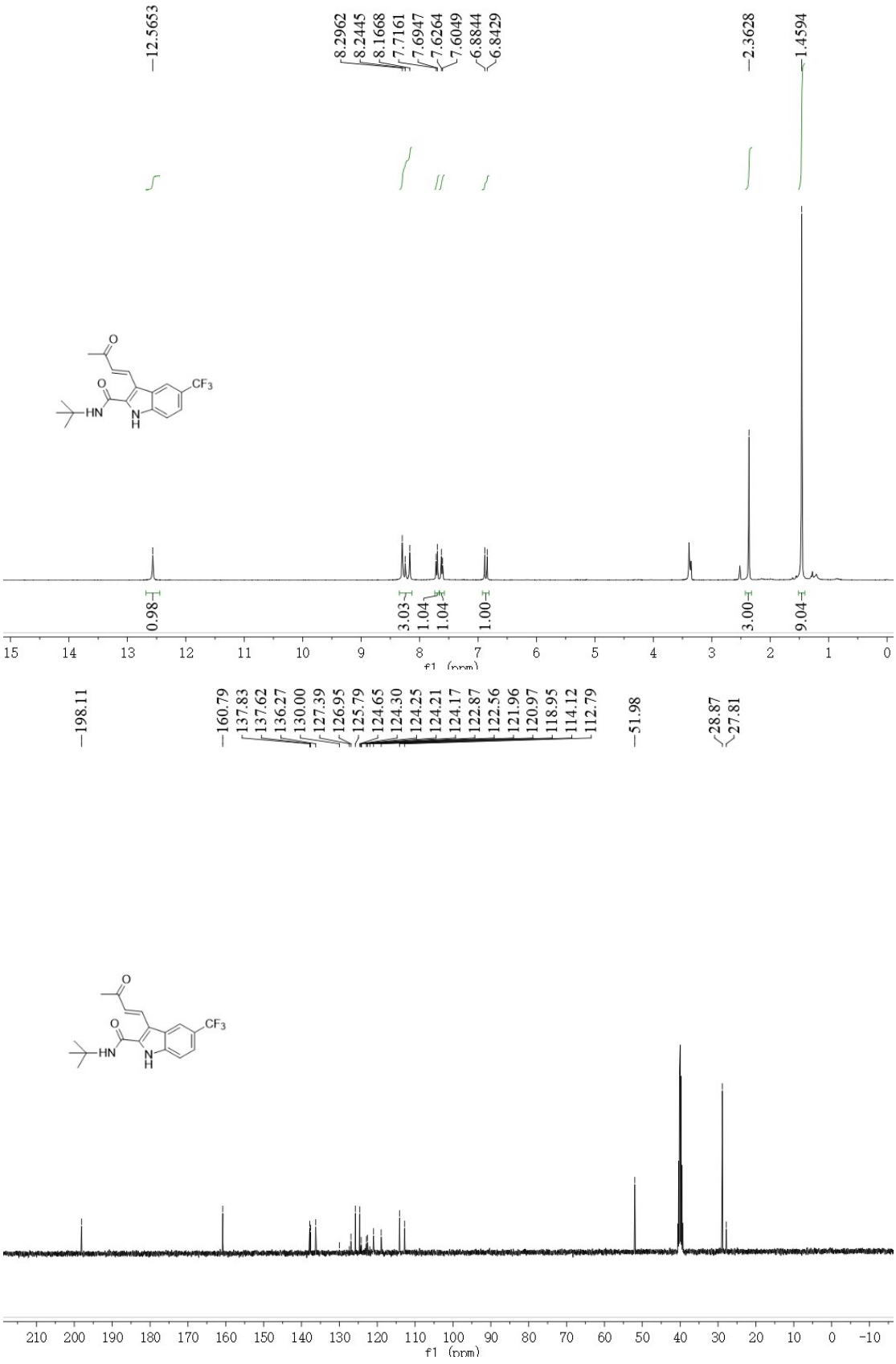
(E)-N-(tert-butyl)-5-methyl-3-(3-oxobut-1-en-1-yl)-1H-indole-2-carboxamide (2f)



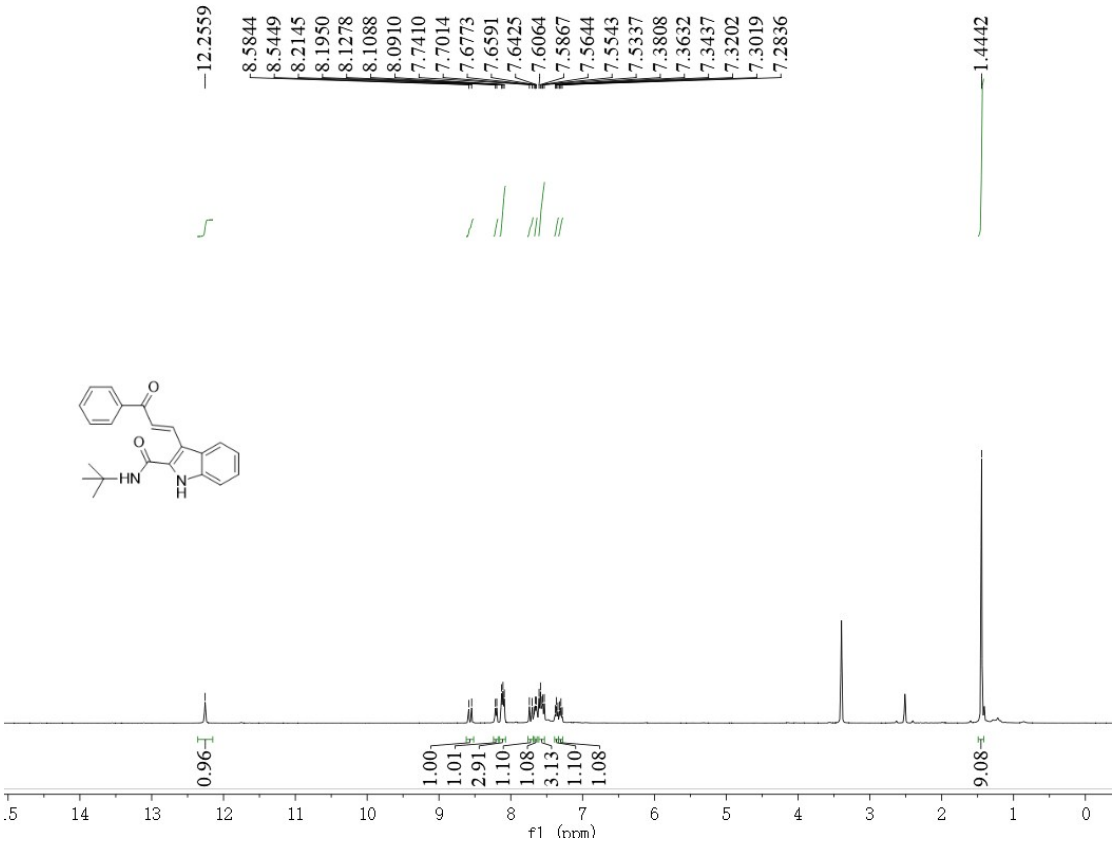
(E)-N-(tert-butyl)-5-methoxy-3-(3-oxobut-1-en-1-yl)-1H-indole-2-carboxamide (2g)

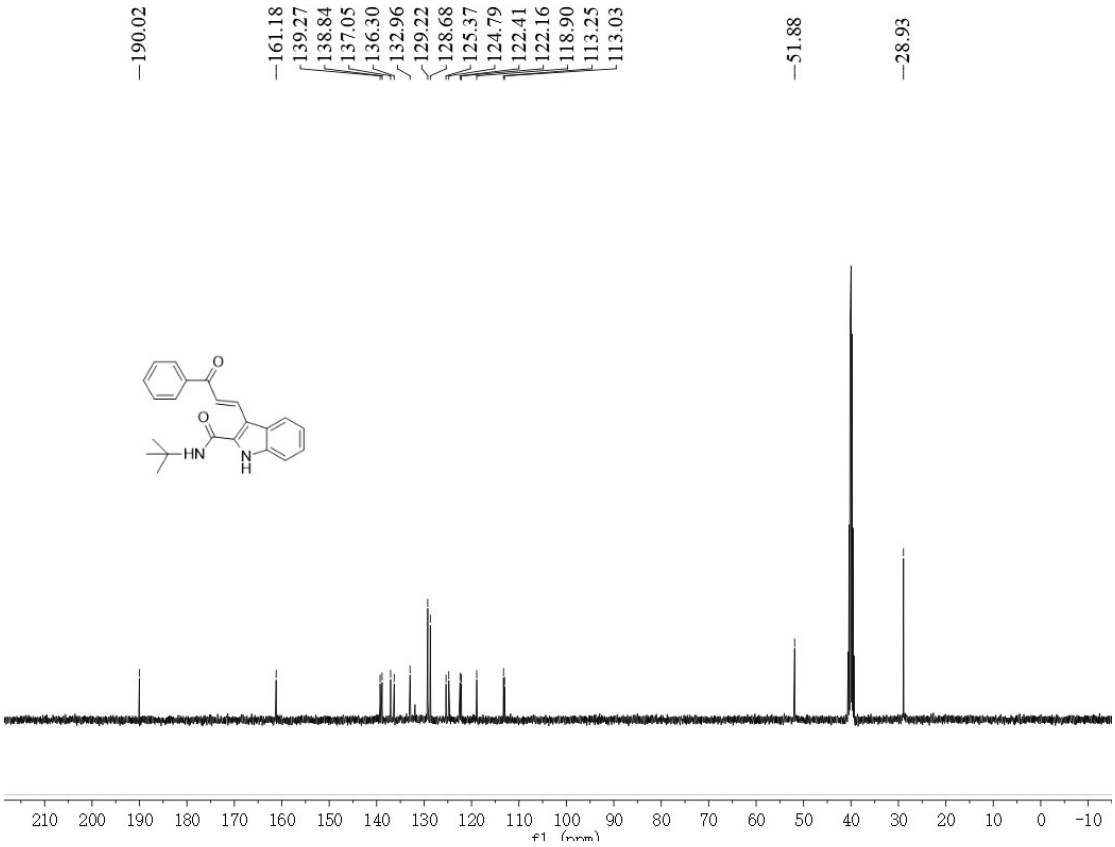


(E)-N-(tert-butyl)-3-(3-oxobut-1-en-1-yl)-5-(trifluoromethyl)-1H-indole-2-carboxamide (2h)

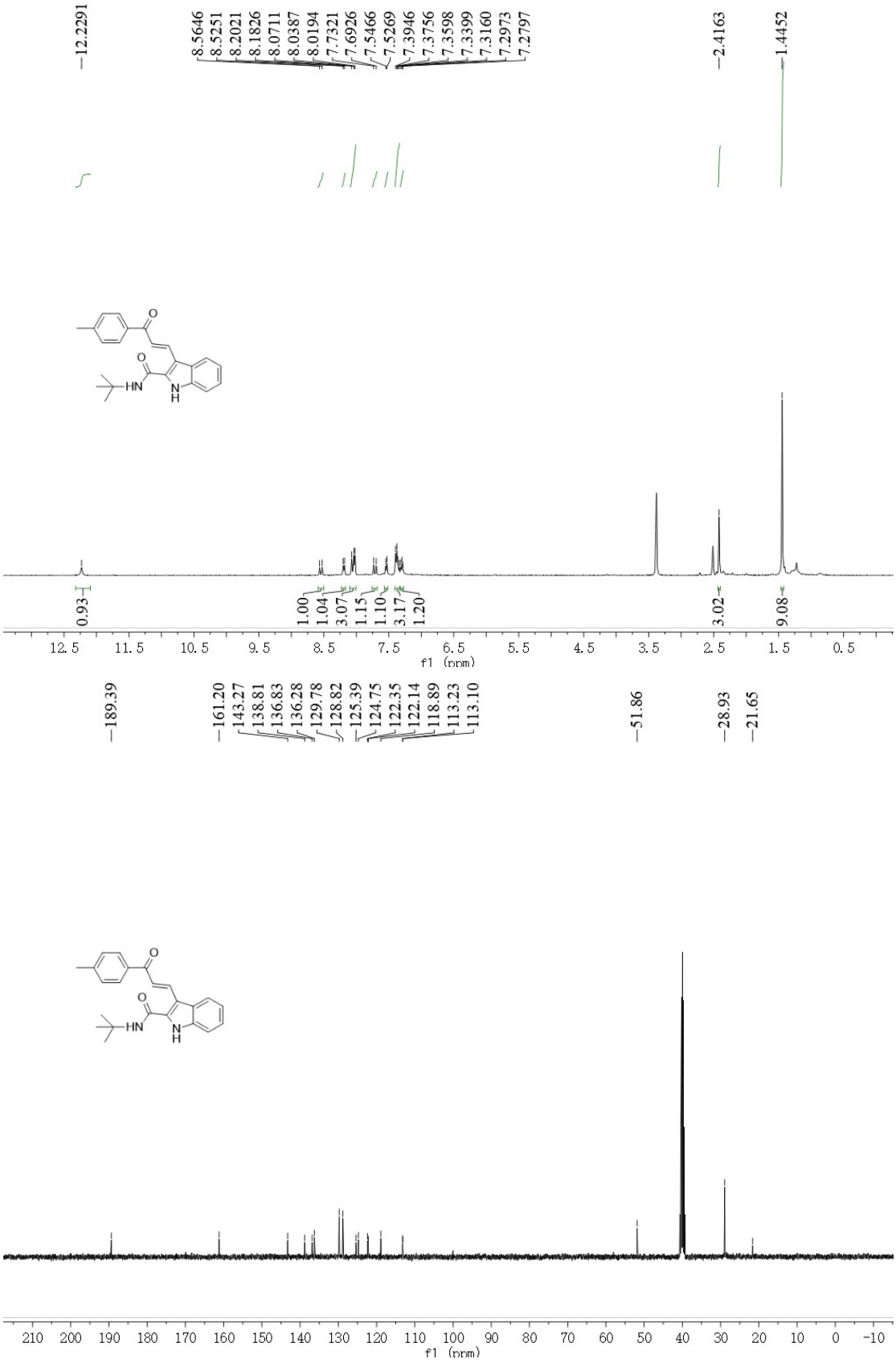


(E)-N-(tert-butyl)-3-(3-oxo-3-phenylprop-1-en-1-yl)-1H-indole-2-carboxamide (2i)

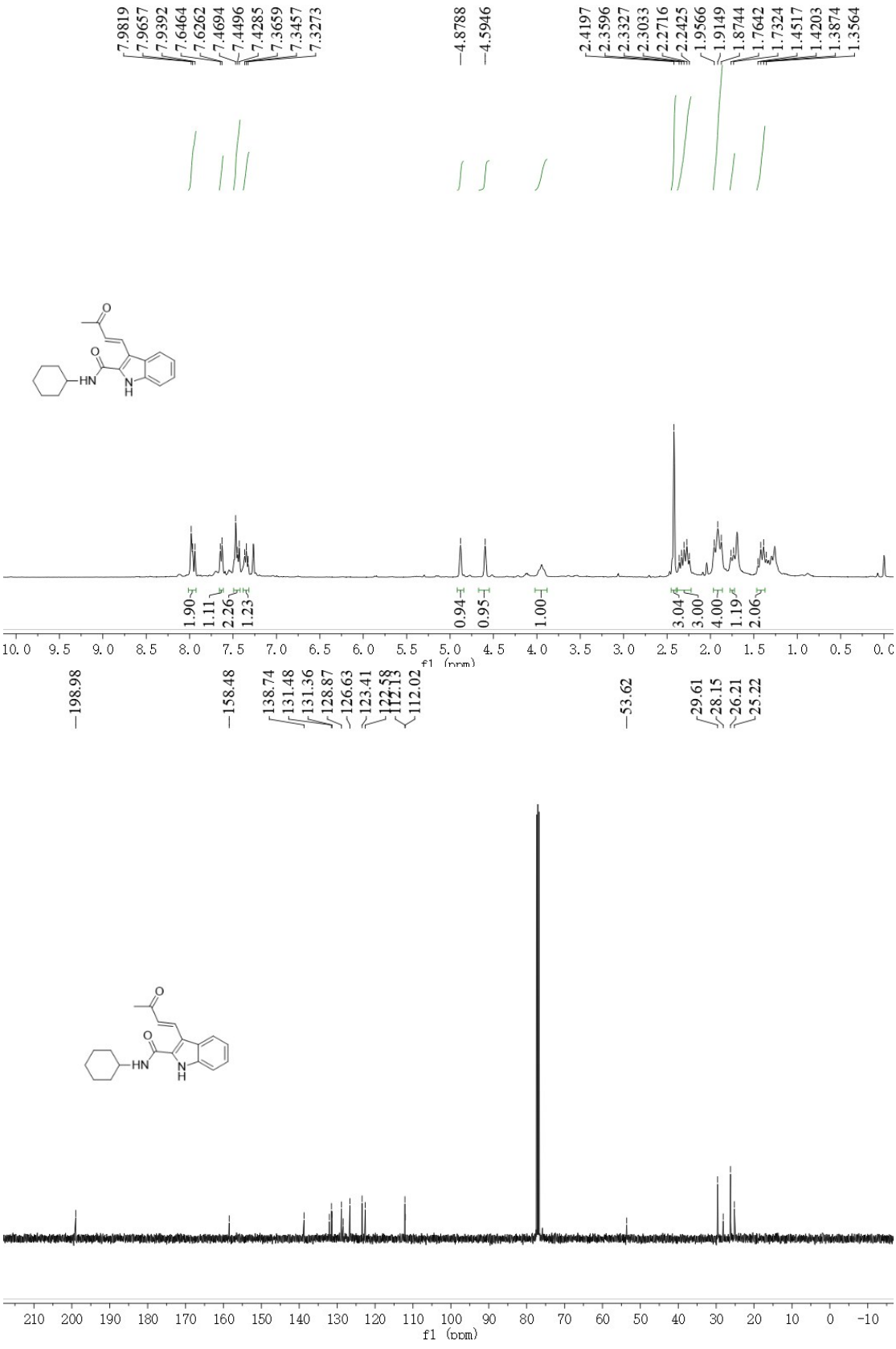




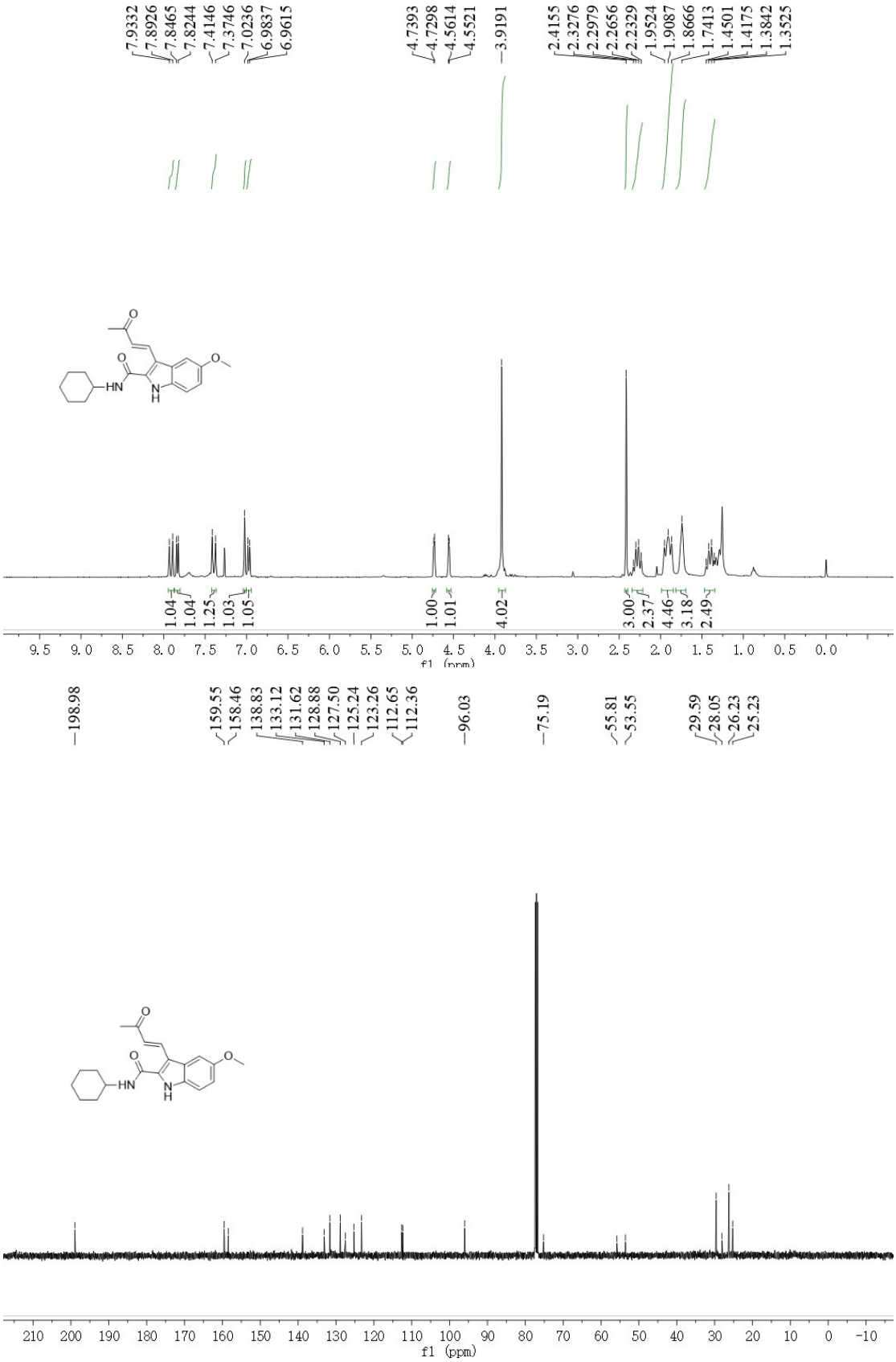
(E)-N-(tert-butyl)-3-(3-oxo-3-(p-tolyl)prop-1-en-1-yl)-1H-indole-2-carboxamide (2j)



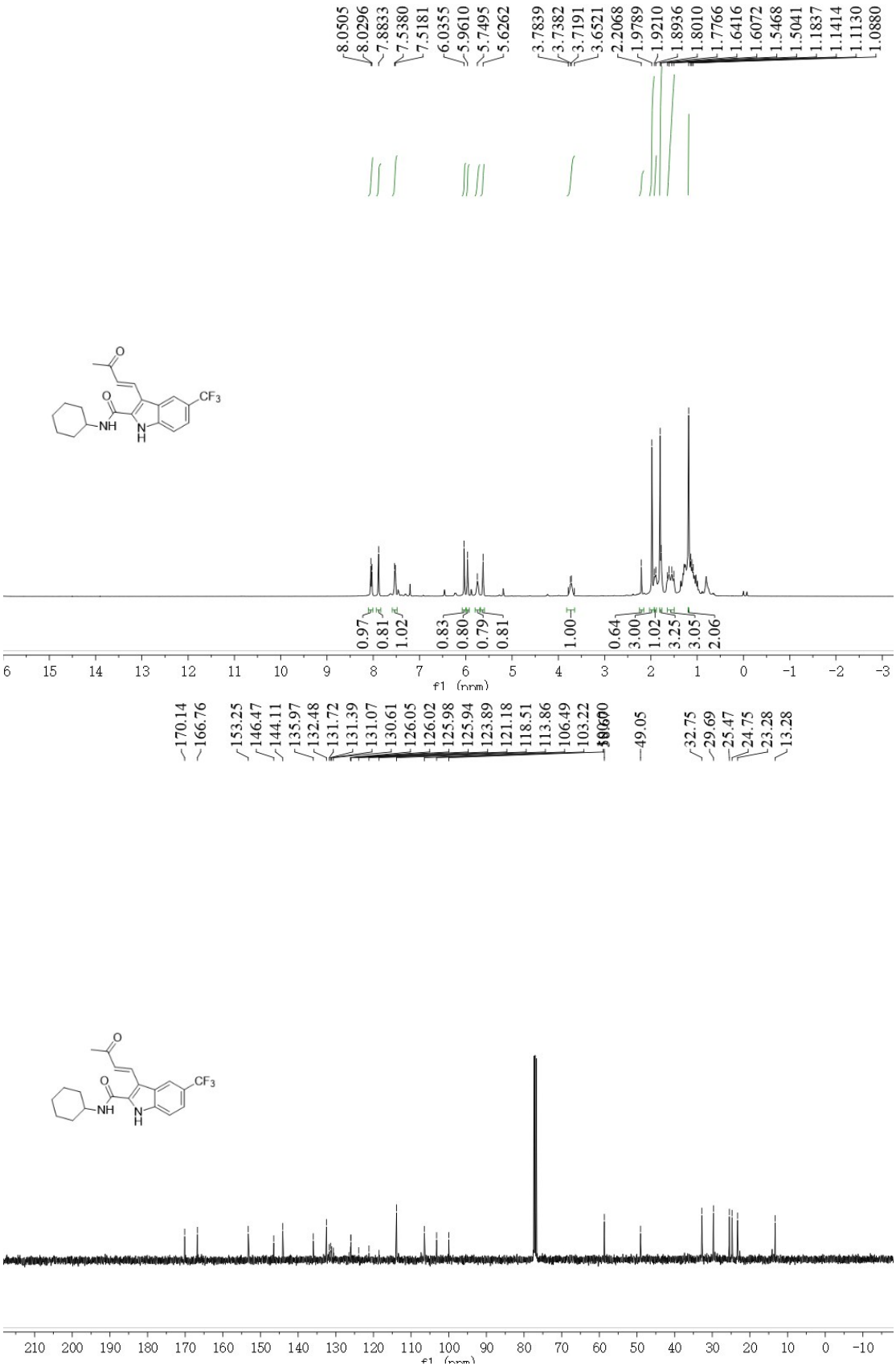
(E)-N-cyclohexyl-3-(3-oxobut-1-en-1-yl)-1H-indole-2-carboxamide (2m)



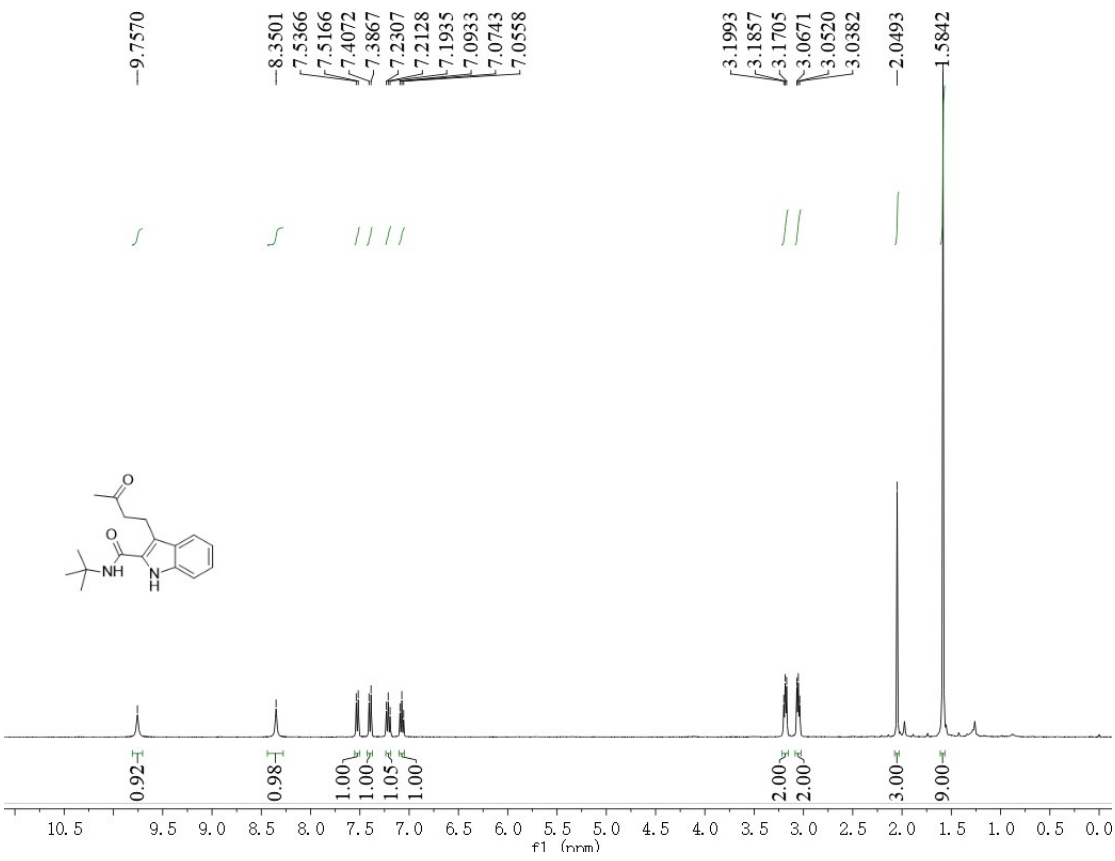
(E)-N-cyclohexyl-5-methoxy-3-(3-oxobut-1-en-1-yl)-1H-indole-2-carboxamide (2n)

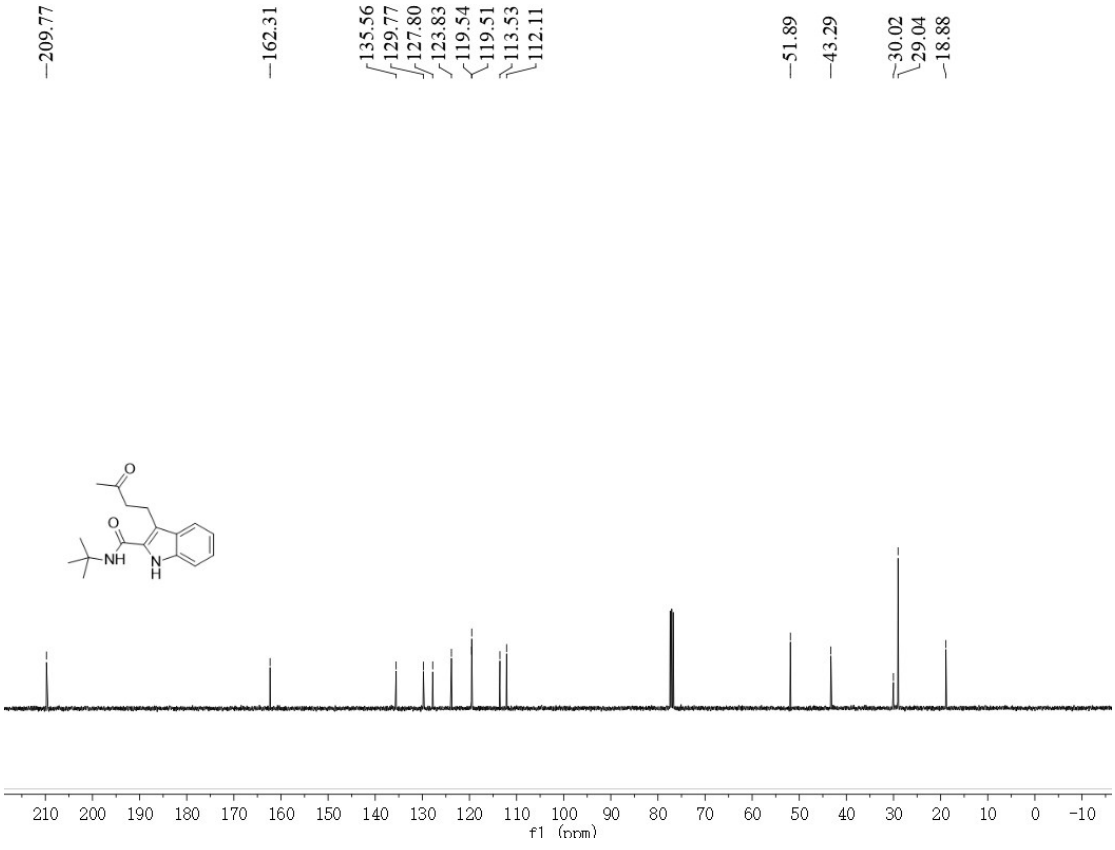


(E)-N-cyclohexyl-3-(3-oxobut-1-en-1-yl)-5-(trifluoromethyl)-1H-indole-2-carboxamide (2o)

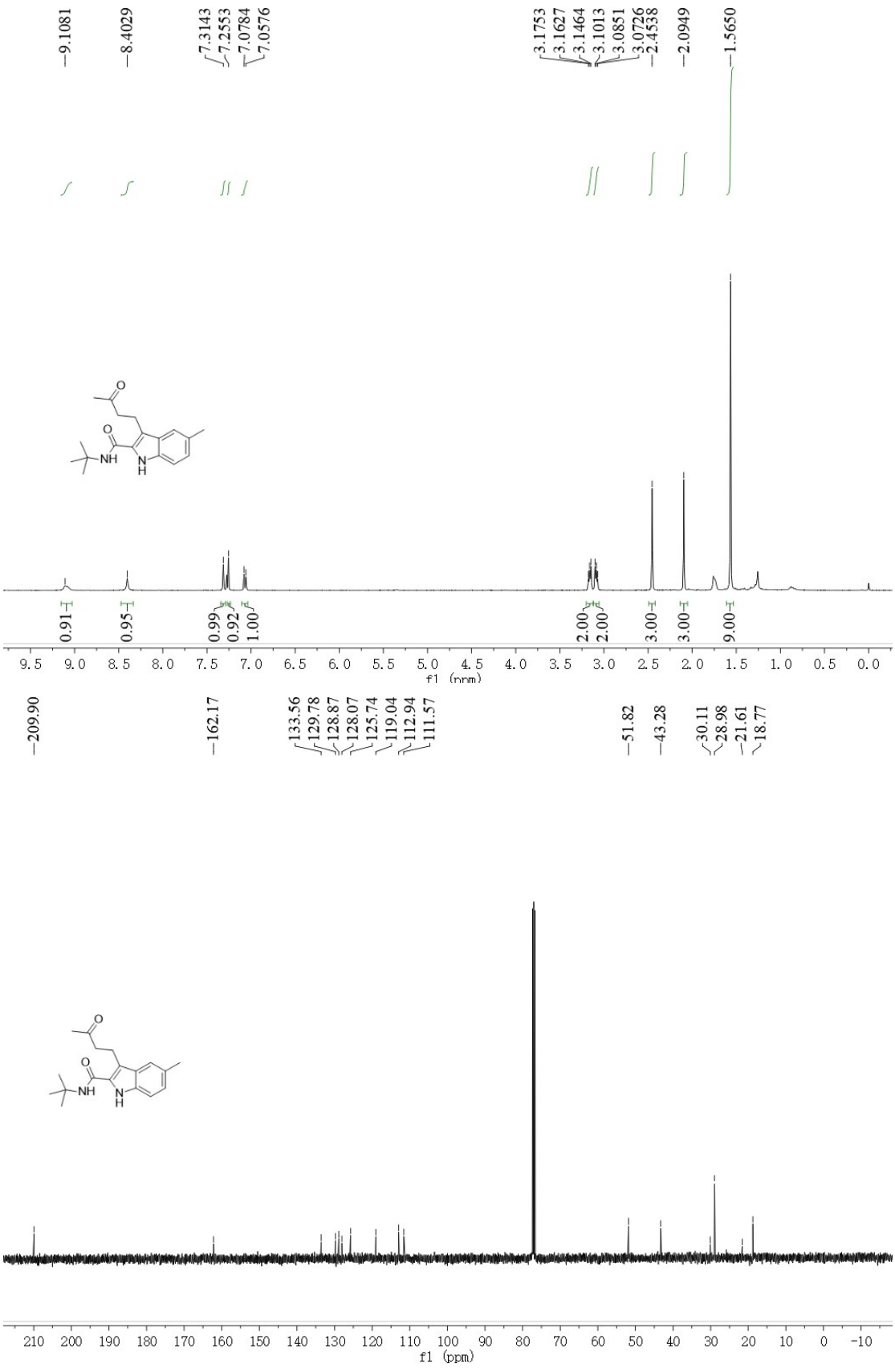


N-(tert-butyl)-3-(3-oxobutyl)-1H-indole-2-carboxamide (3e)

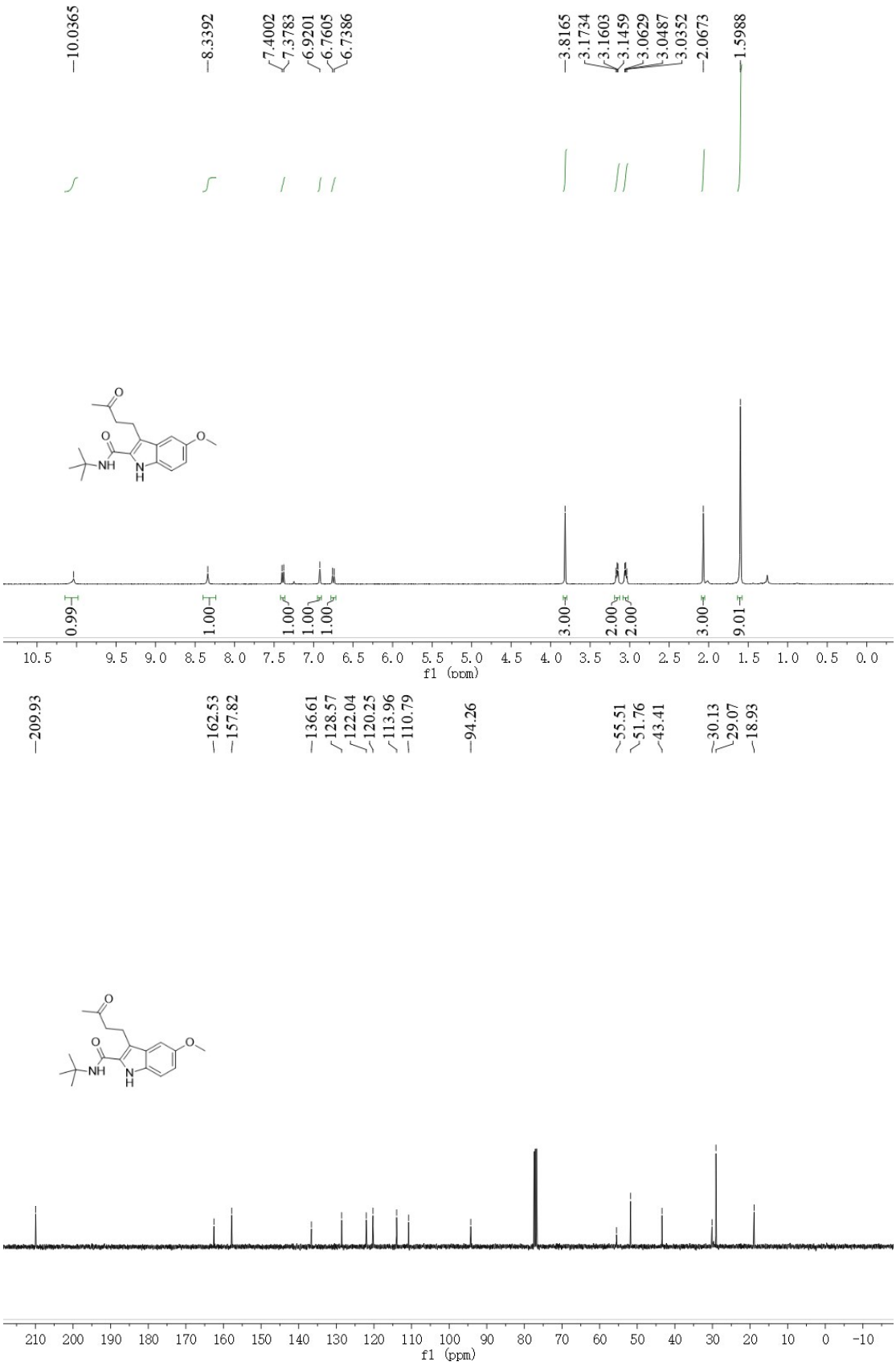




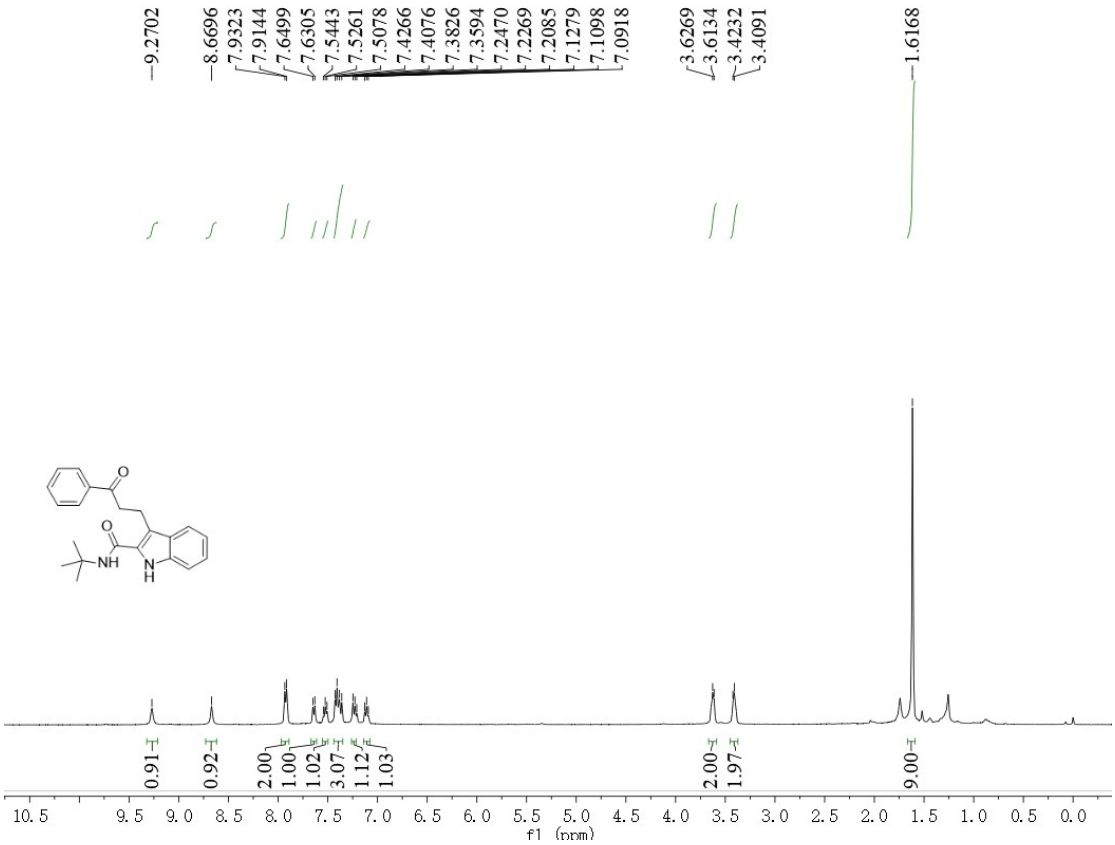
N-(tert-butyl)-5-methyl-3-(3-oxobutyl)-1H-indole-2-carboxamide (3f)

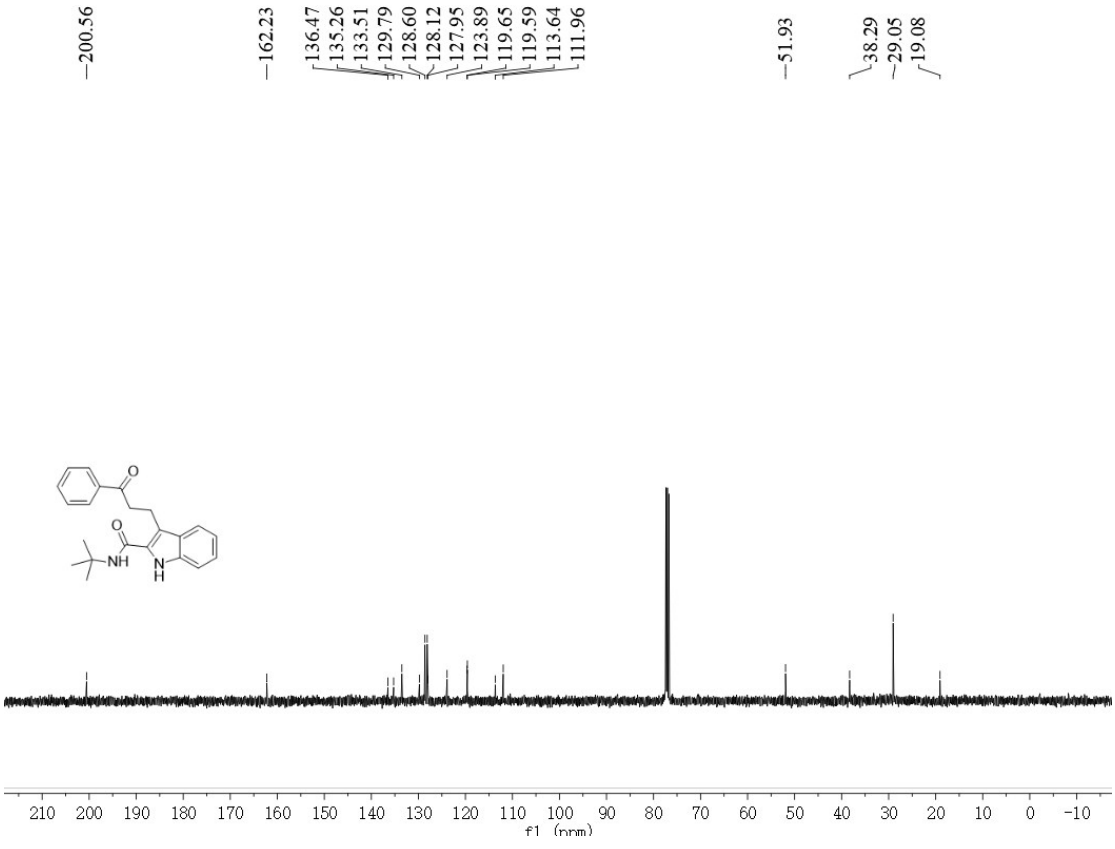


N-(tert-butyl)-5-methoxy-3-(3-oxobutyl)-1H-indole-2-carboxamide (3g)

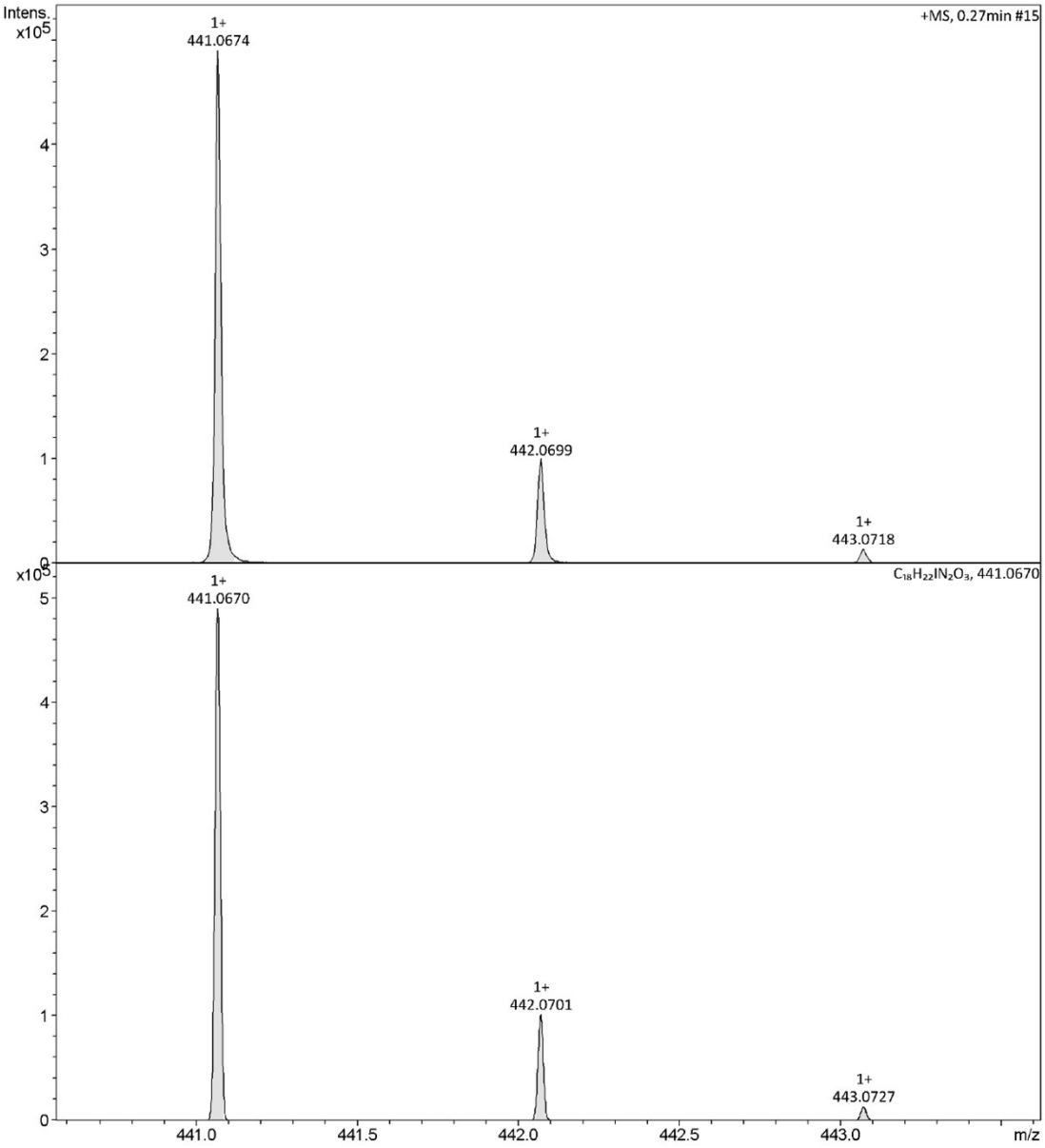


N-(tert-butyl)-3-(3-oxo-3-phenylpropyl)-1H-indole-2-carboxamide (3i)

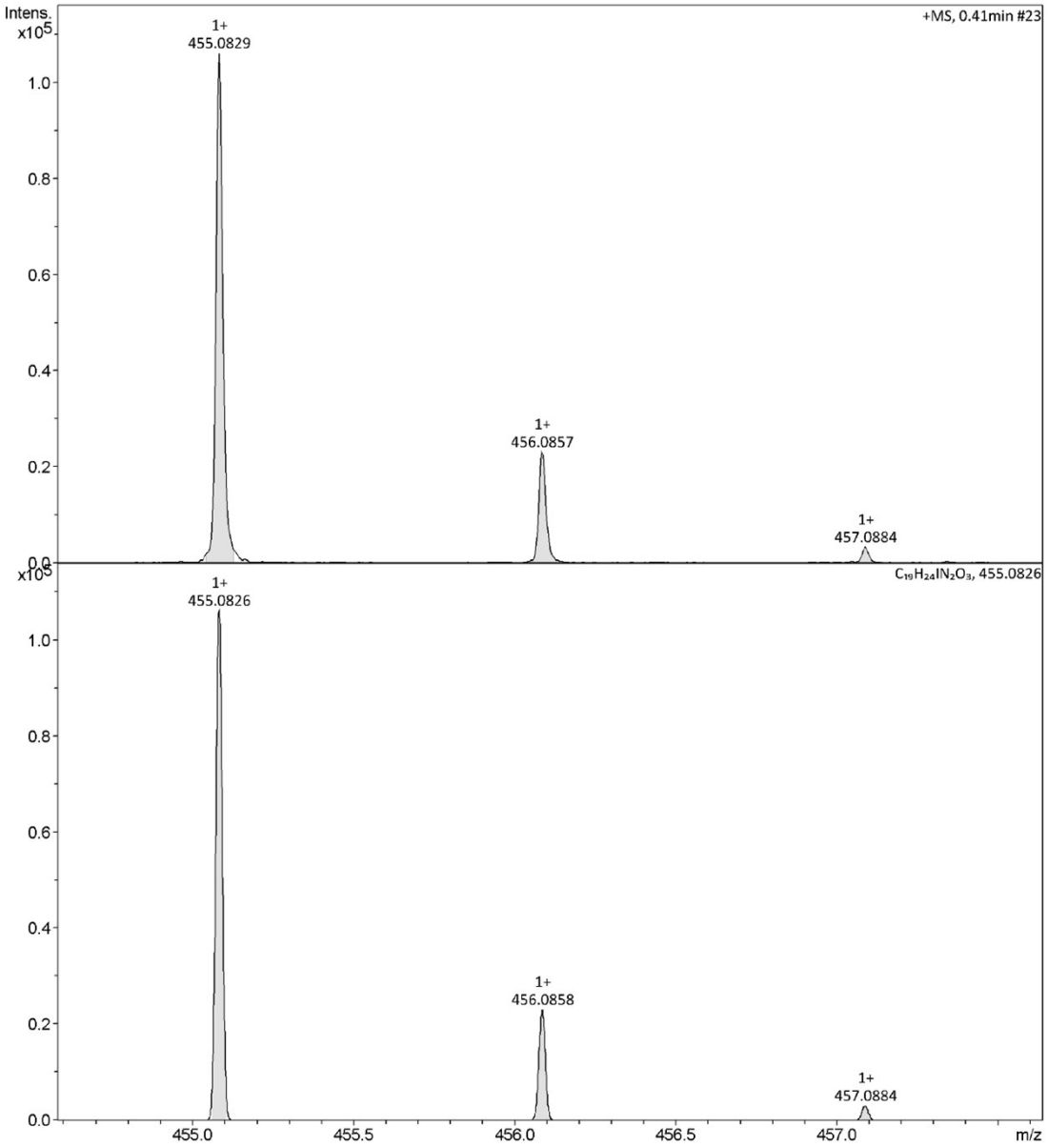




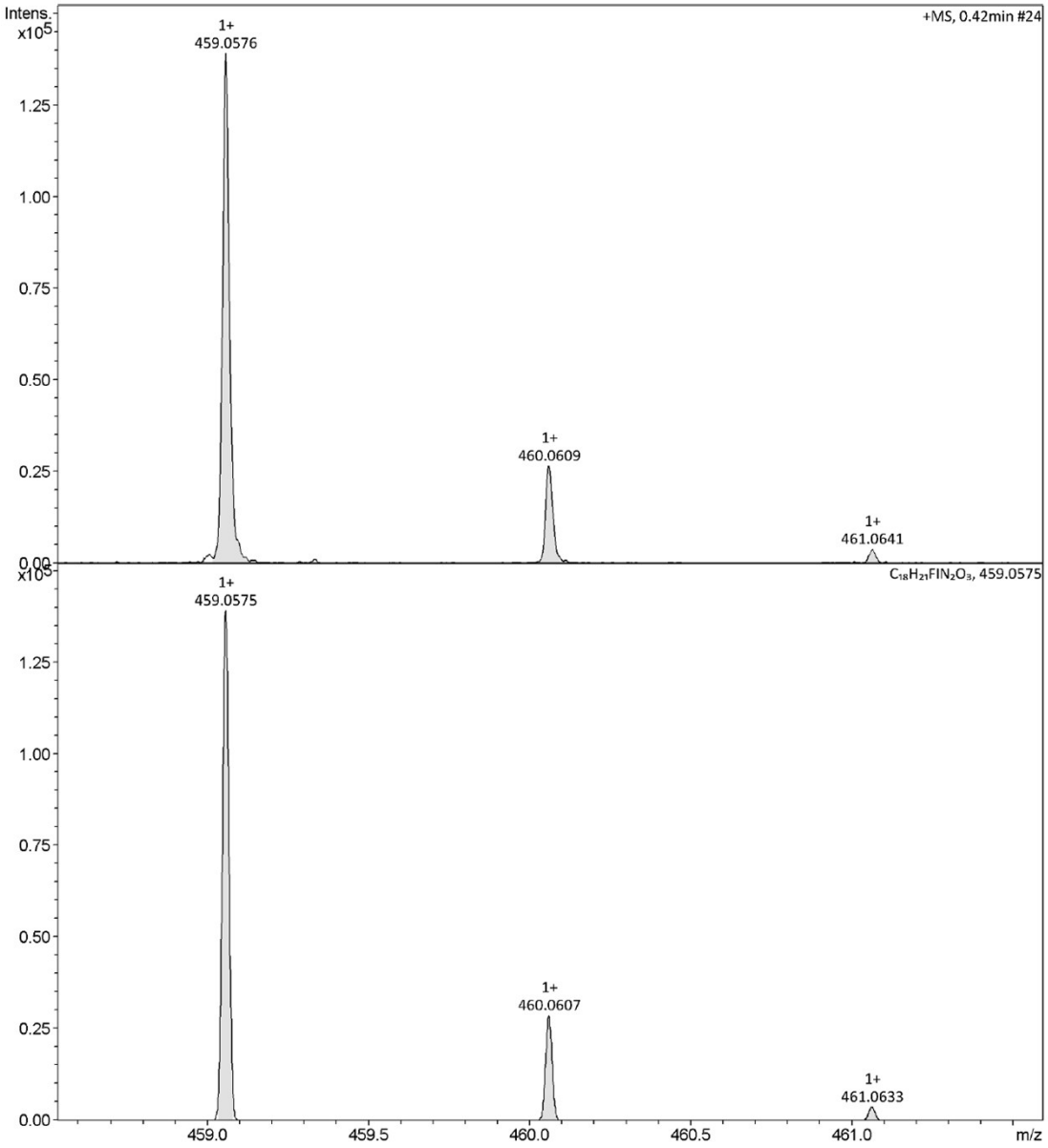
HRMS spectra of all products



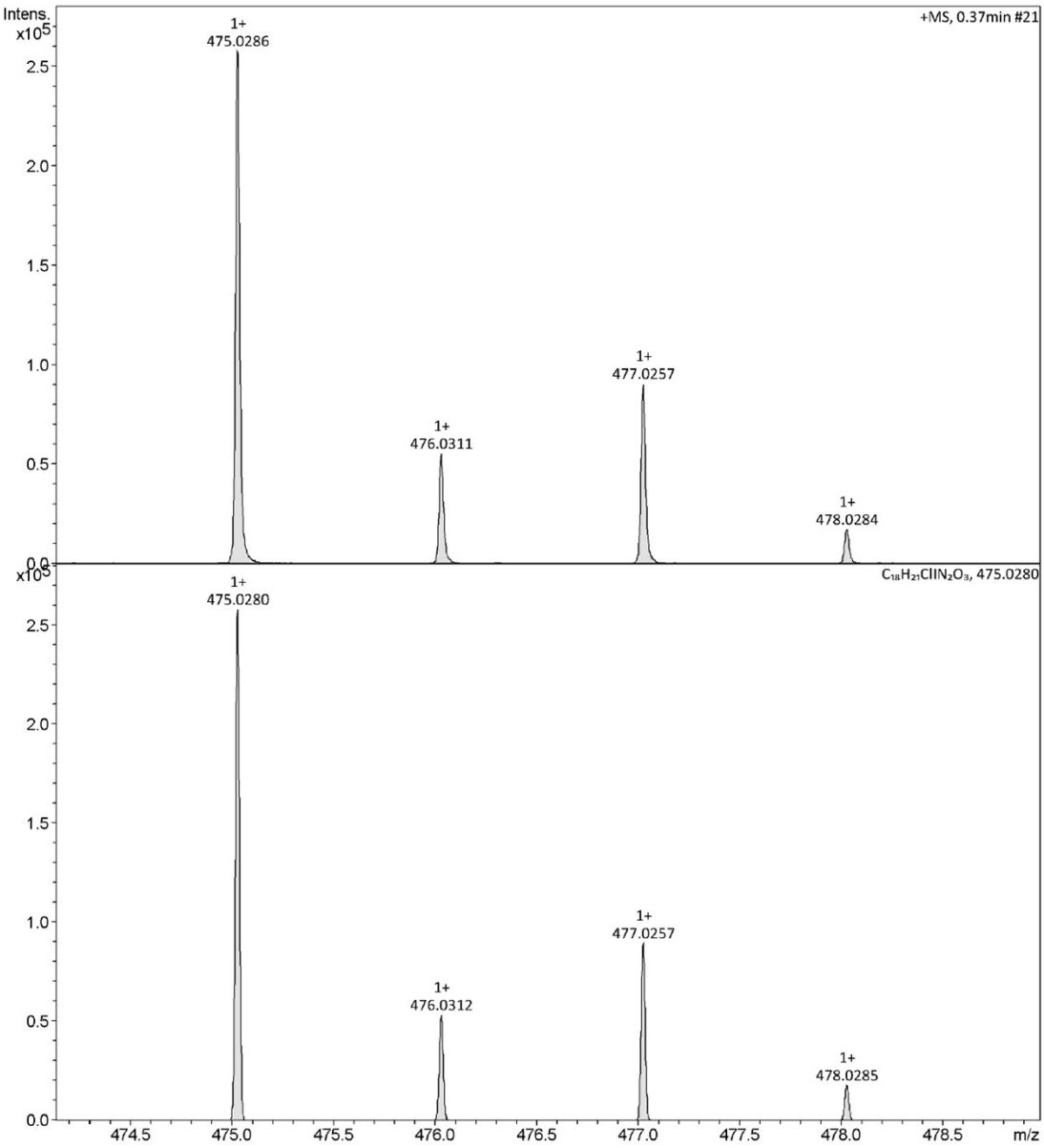
HRMS spectrum of **1a**



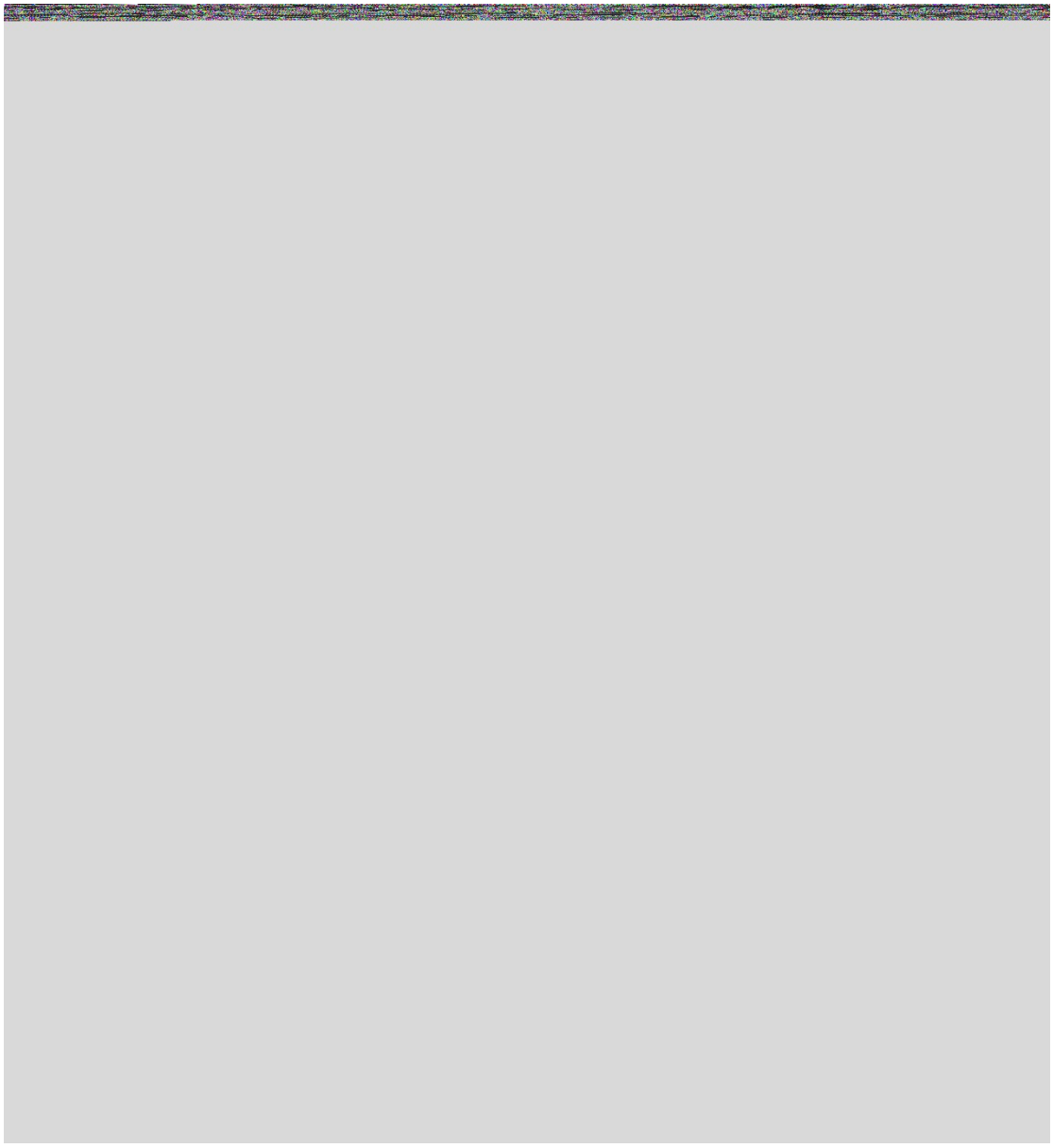
HRMS spectrum of **1b**



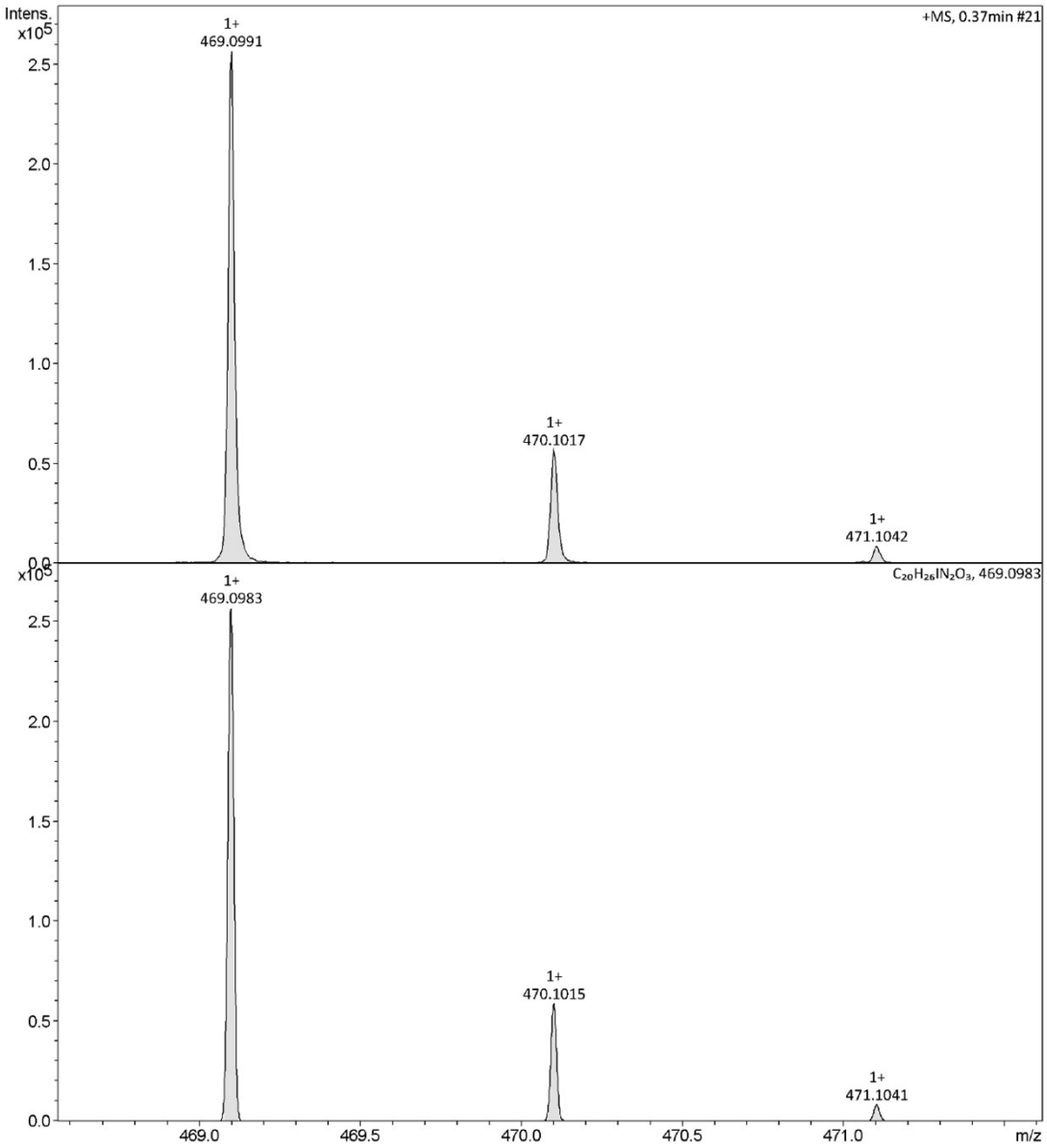
HRMS spectrum of **1c**



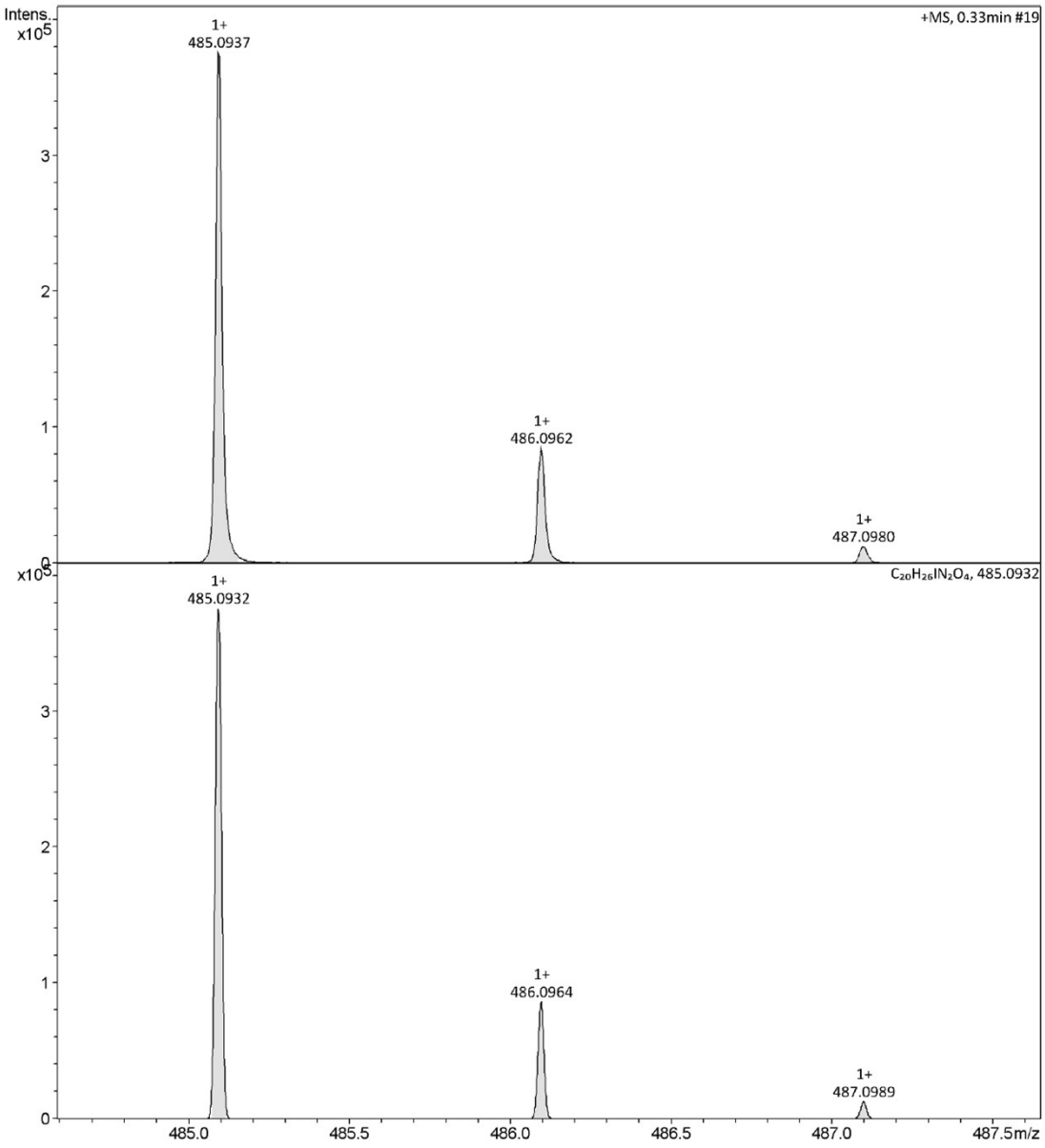
HRMS spectrum of **1d**



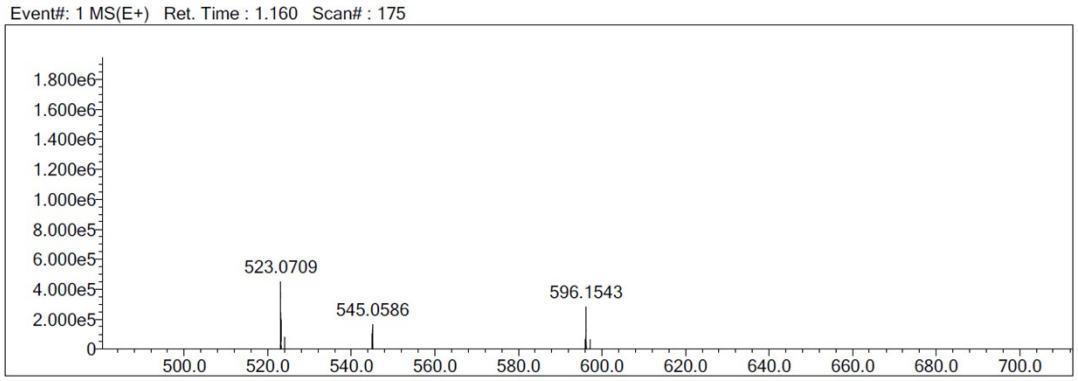
HRMS spectrum of **1e**

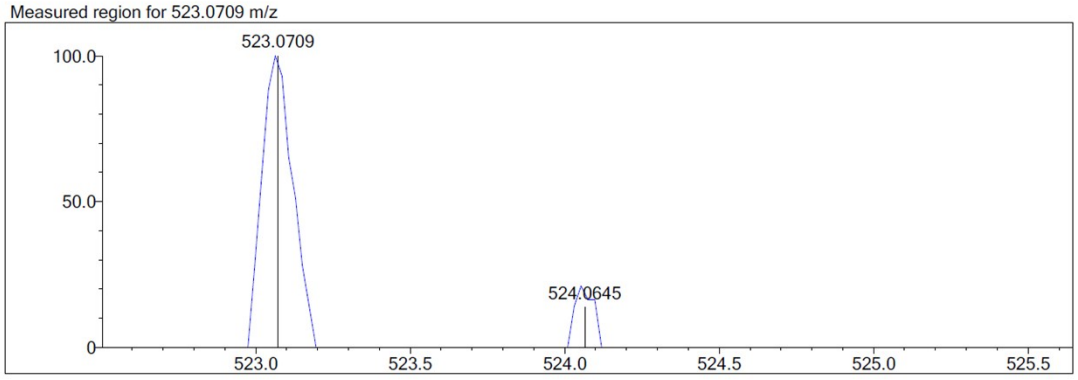


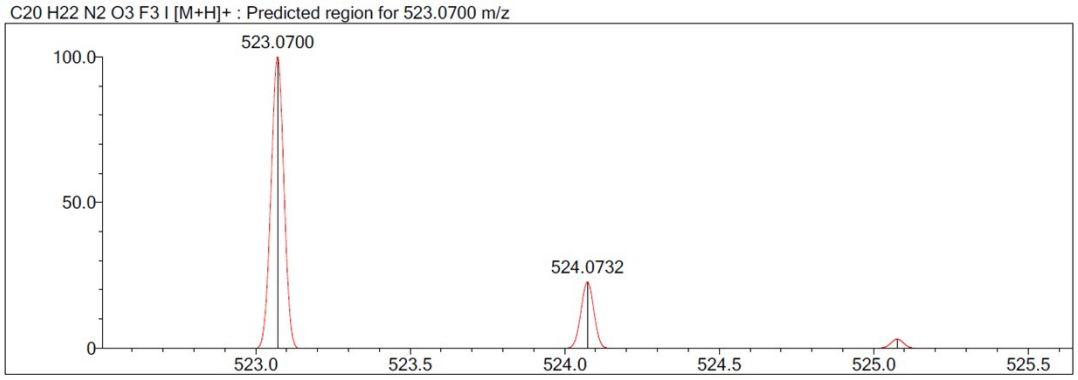
HRMS spectrum of **1f**



HRMS spectrum of **1g**

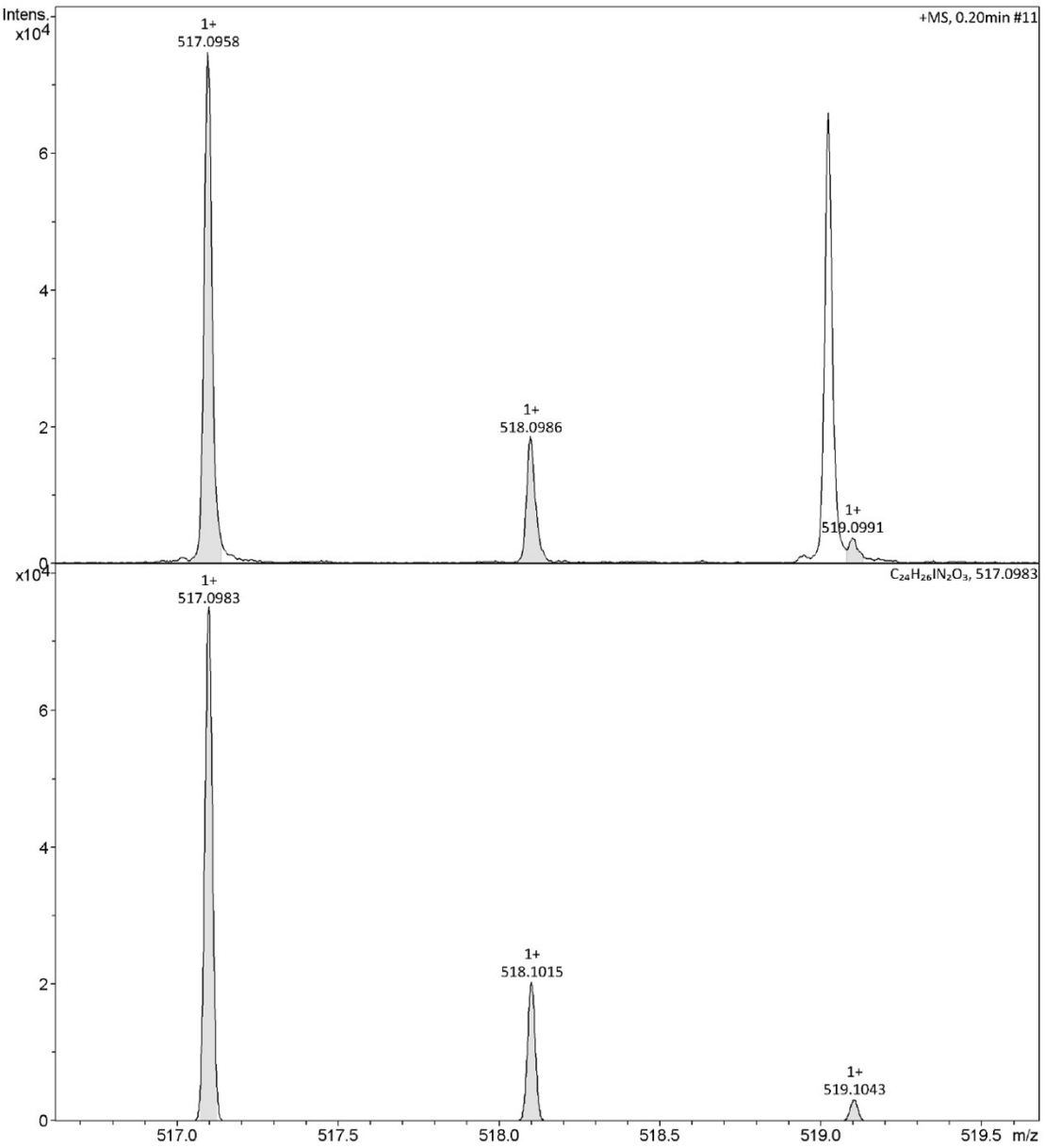




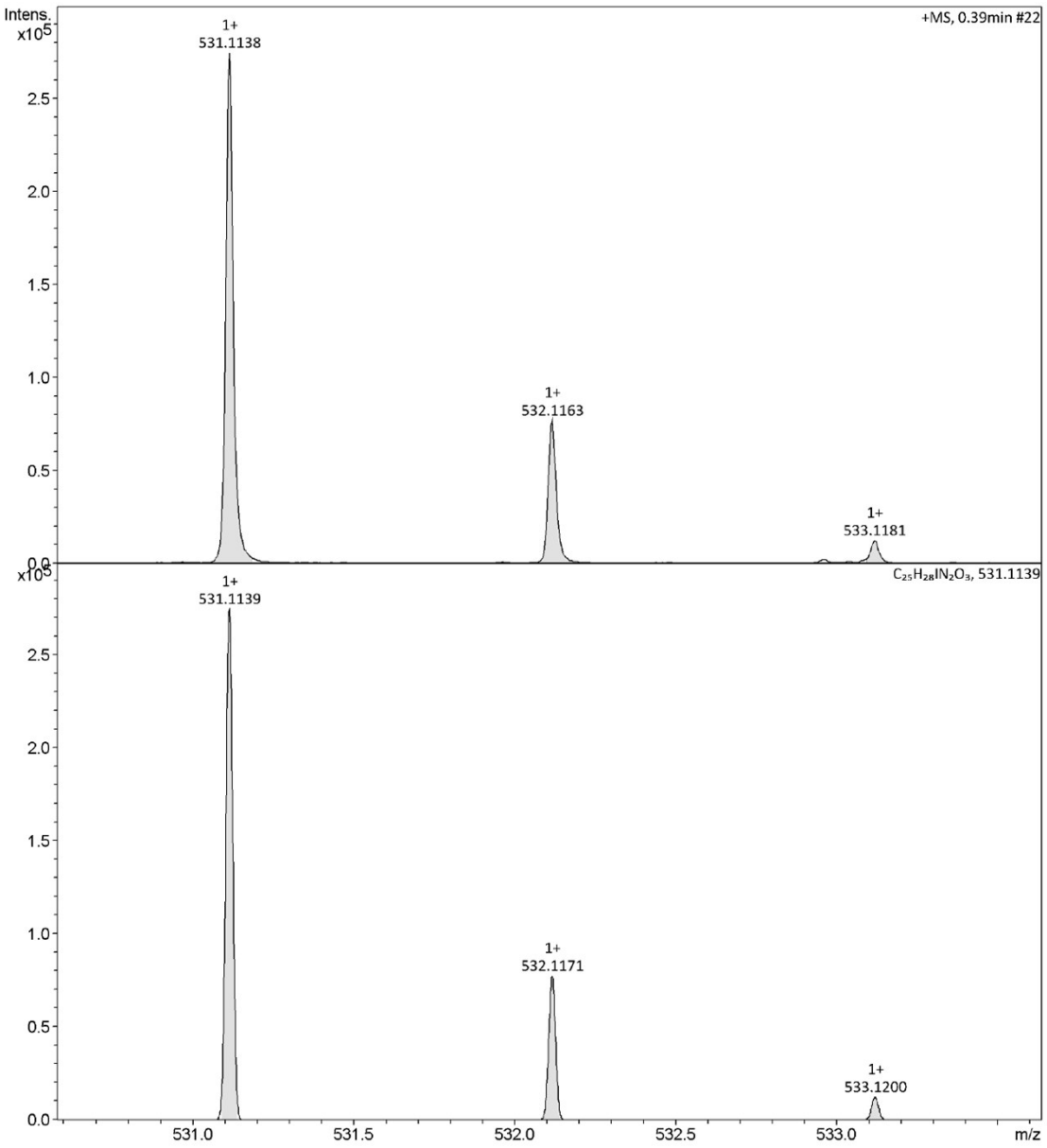


Rank	Score	Formula (M)	Ion	Meas. m/z	Pred. m/z	Df. (mDa)	Df. (ppm)	Iso	DBE
1	46.85	C20 H22 N2 O3 F3 I	[M+H]+	523.0709	523.0700	0.9	1.72	47.71	10.0

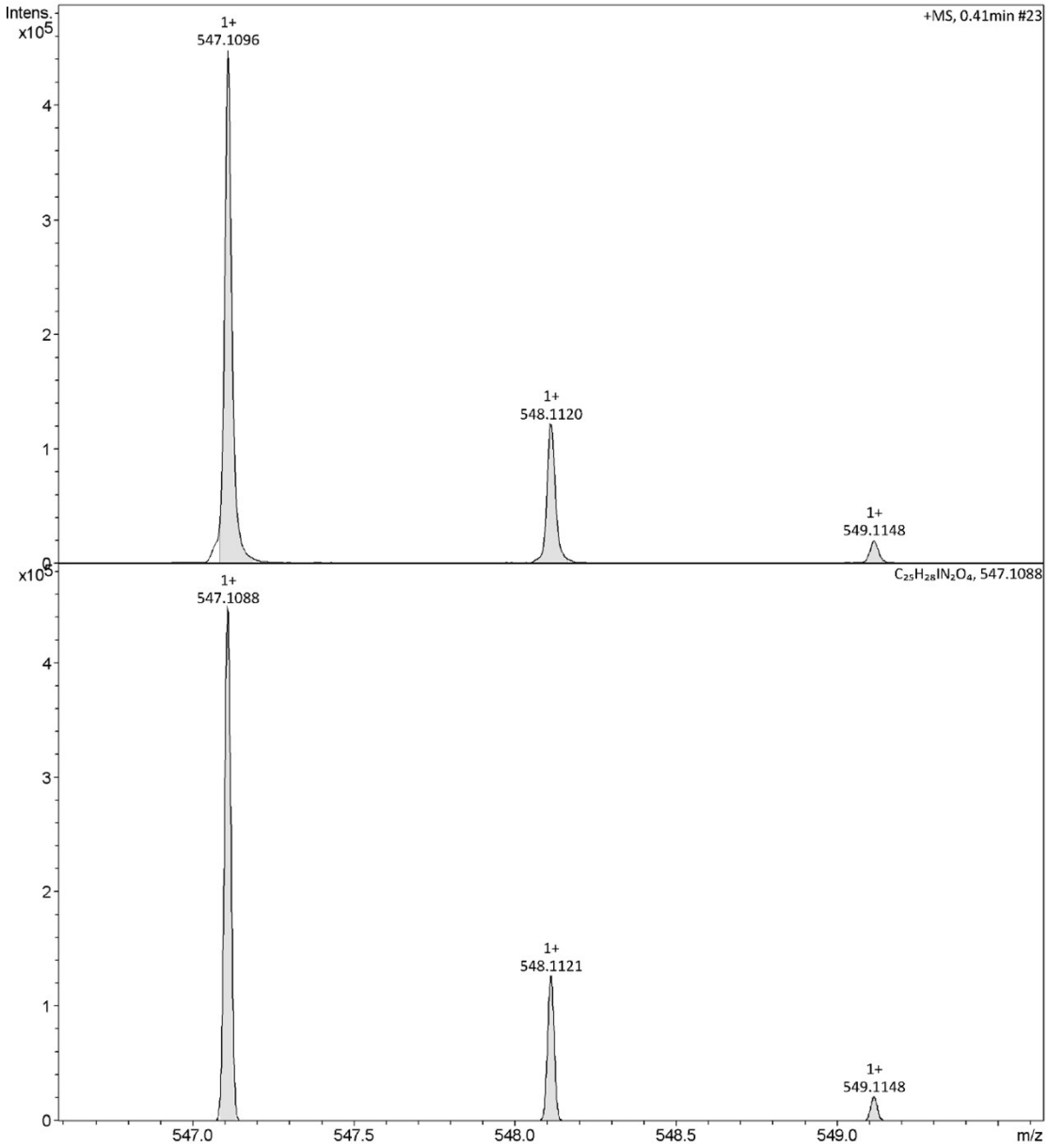
HRMS spectrum of **1h**



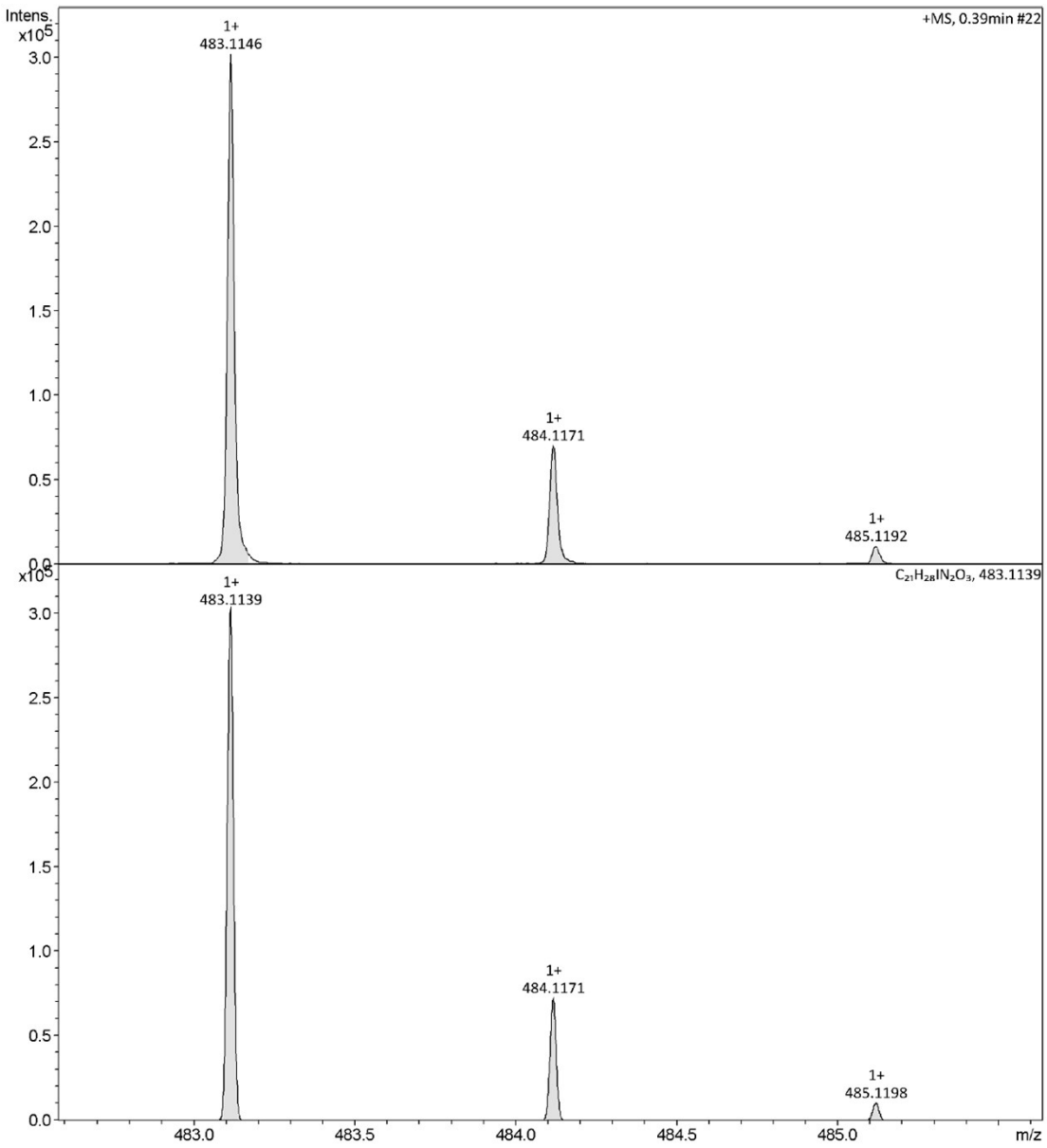
HRMS spectrum of **1i**



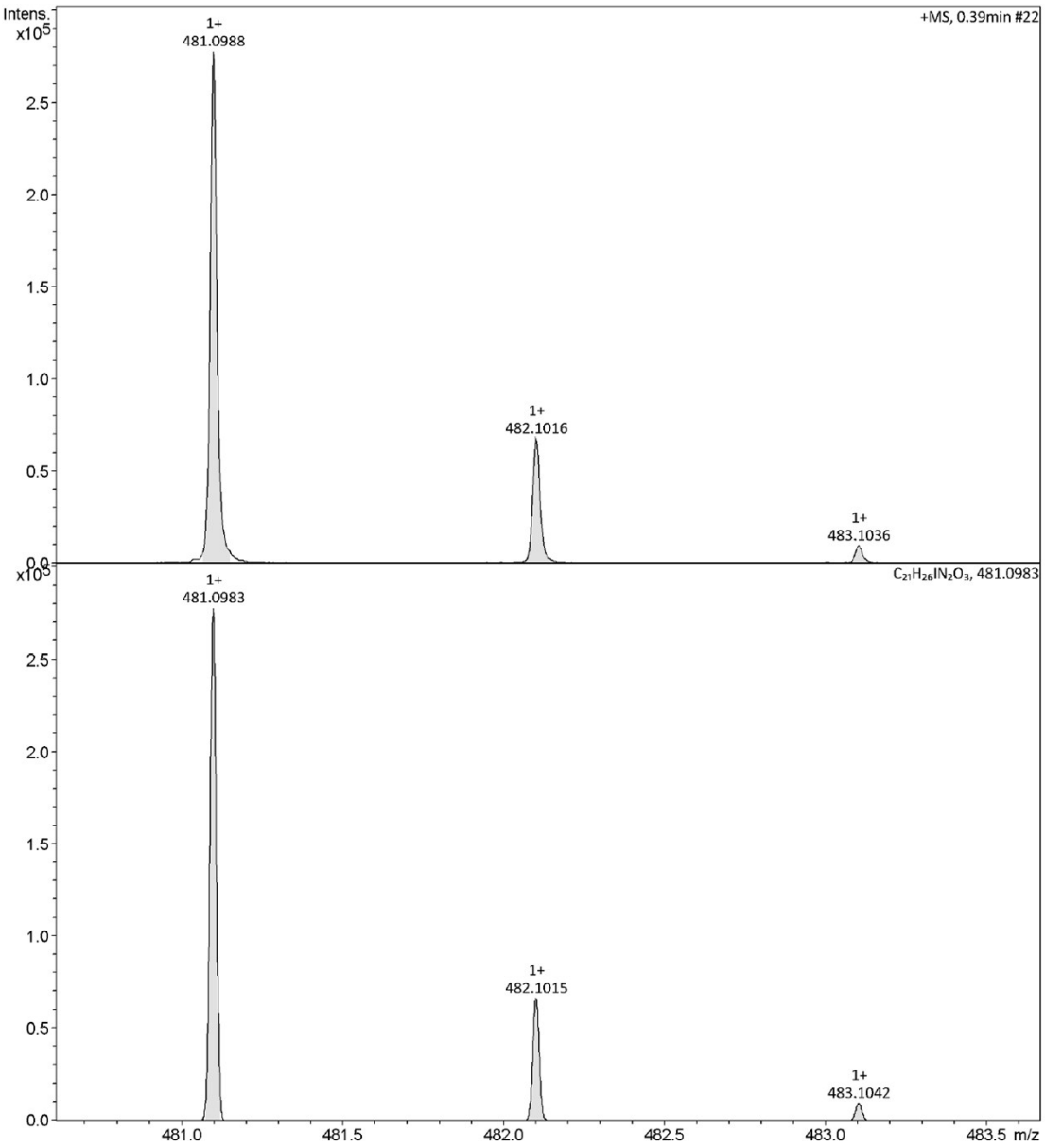
HRMS spectrum of **1j**



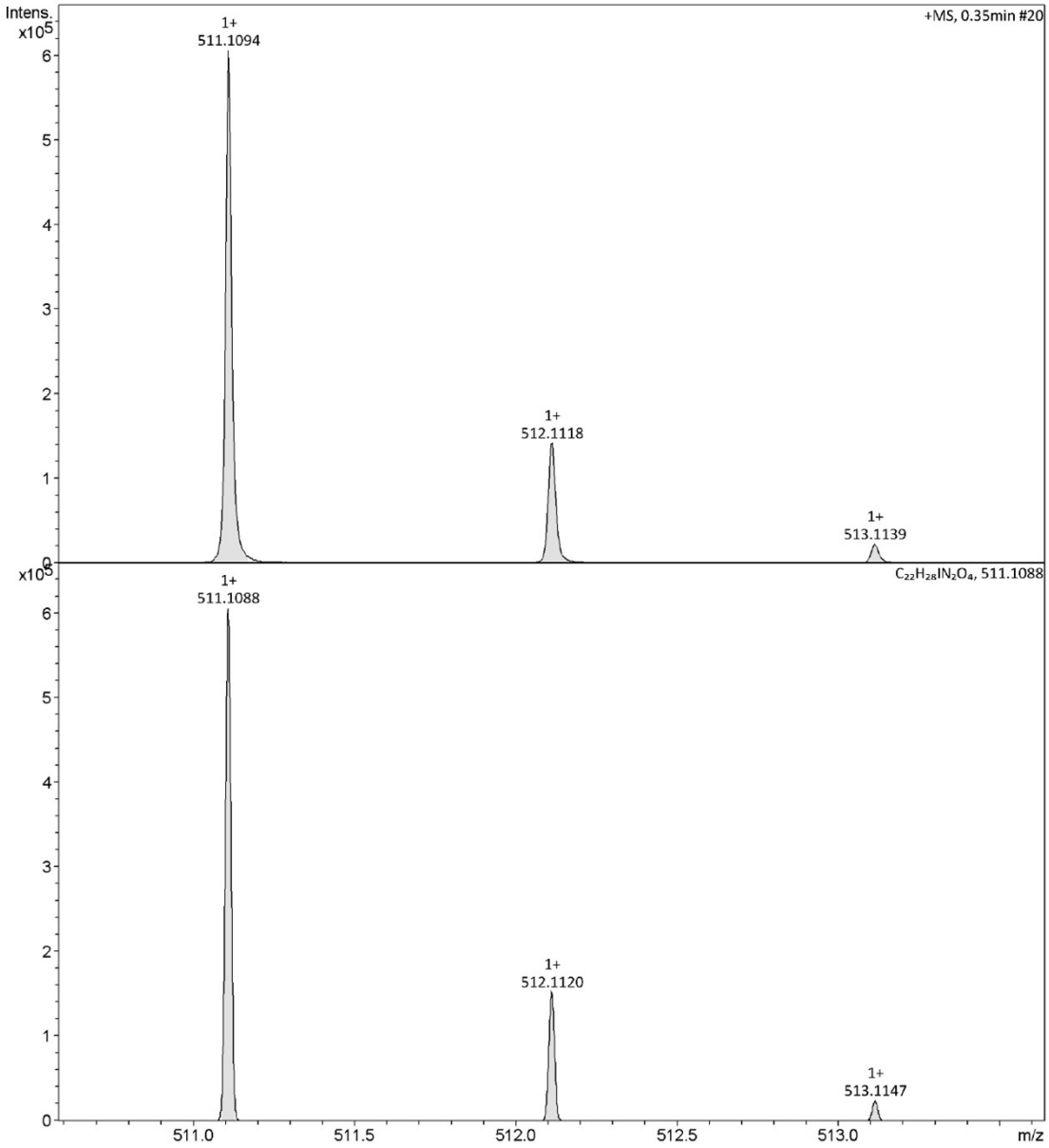
HRMS spectrum of **1k**



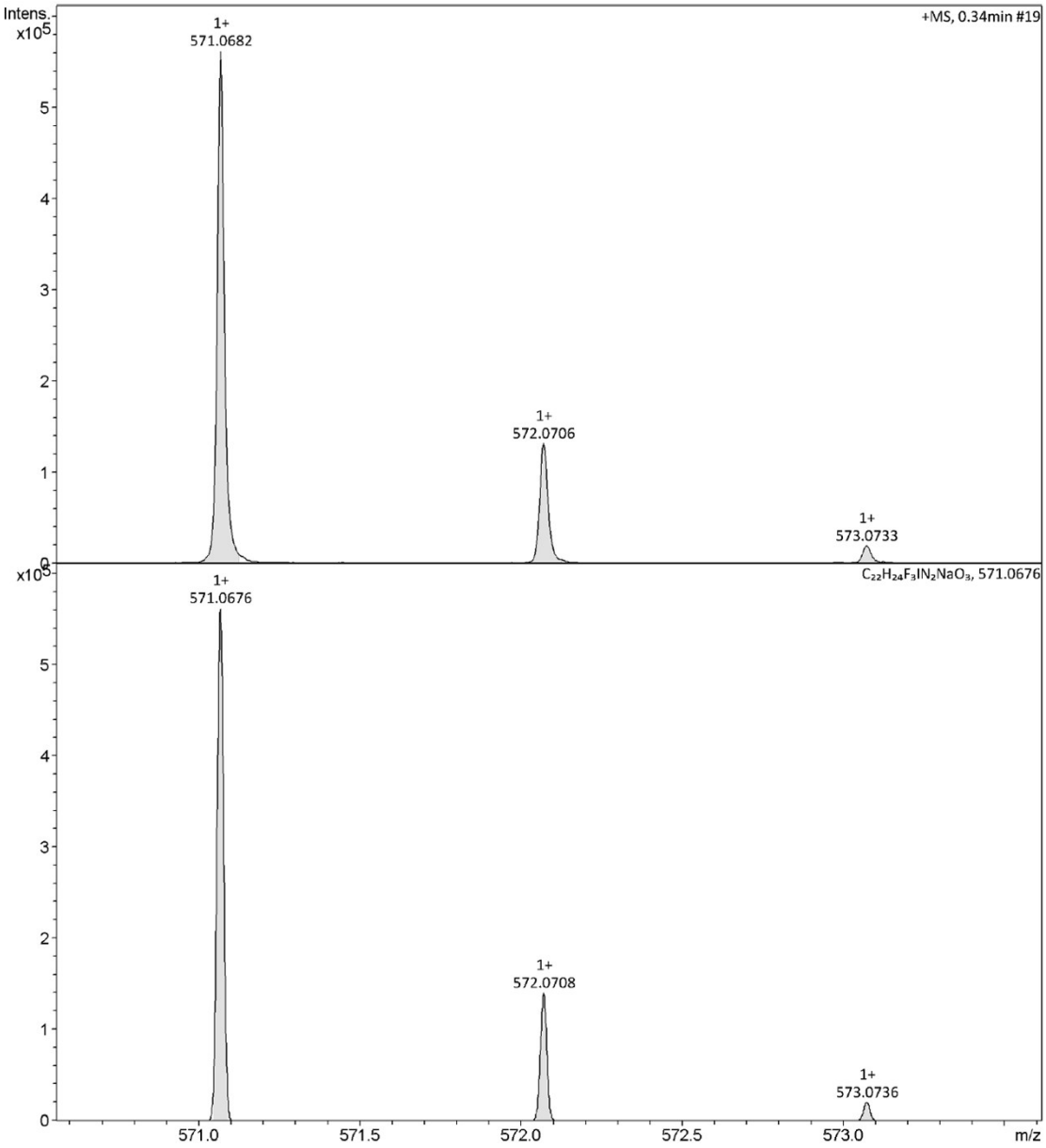
HRMS spectrum of **1l**



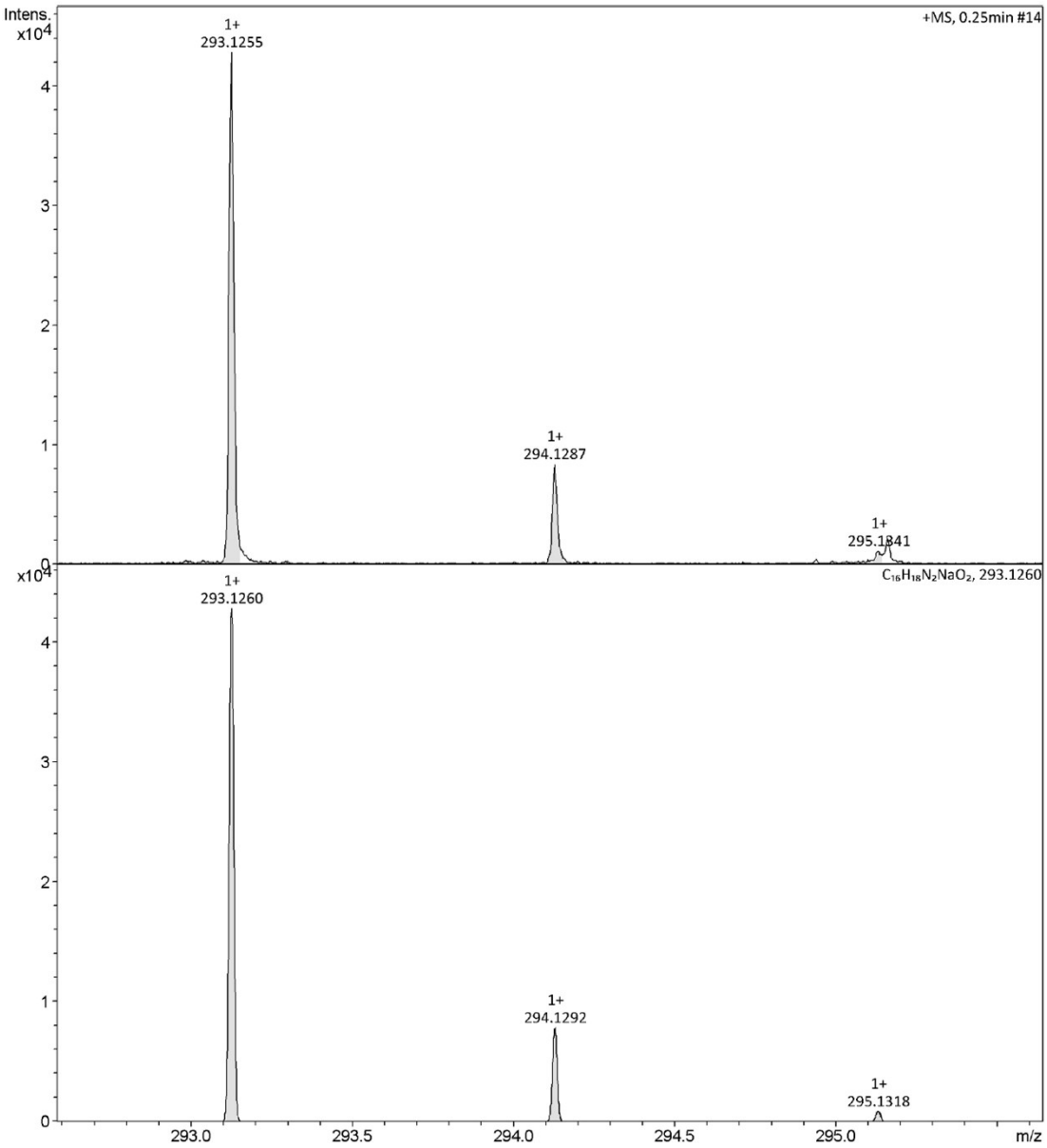
HRMS spectrum of **1m**



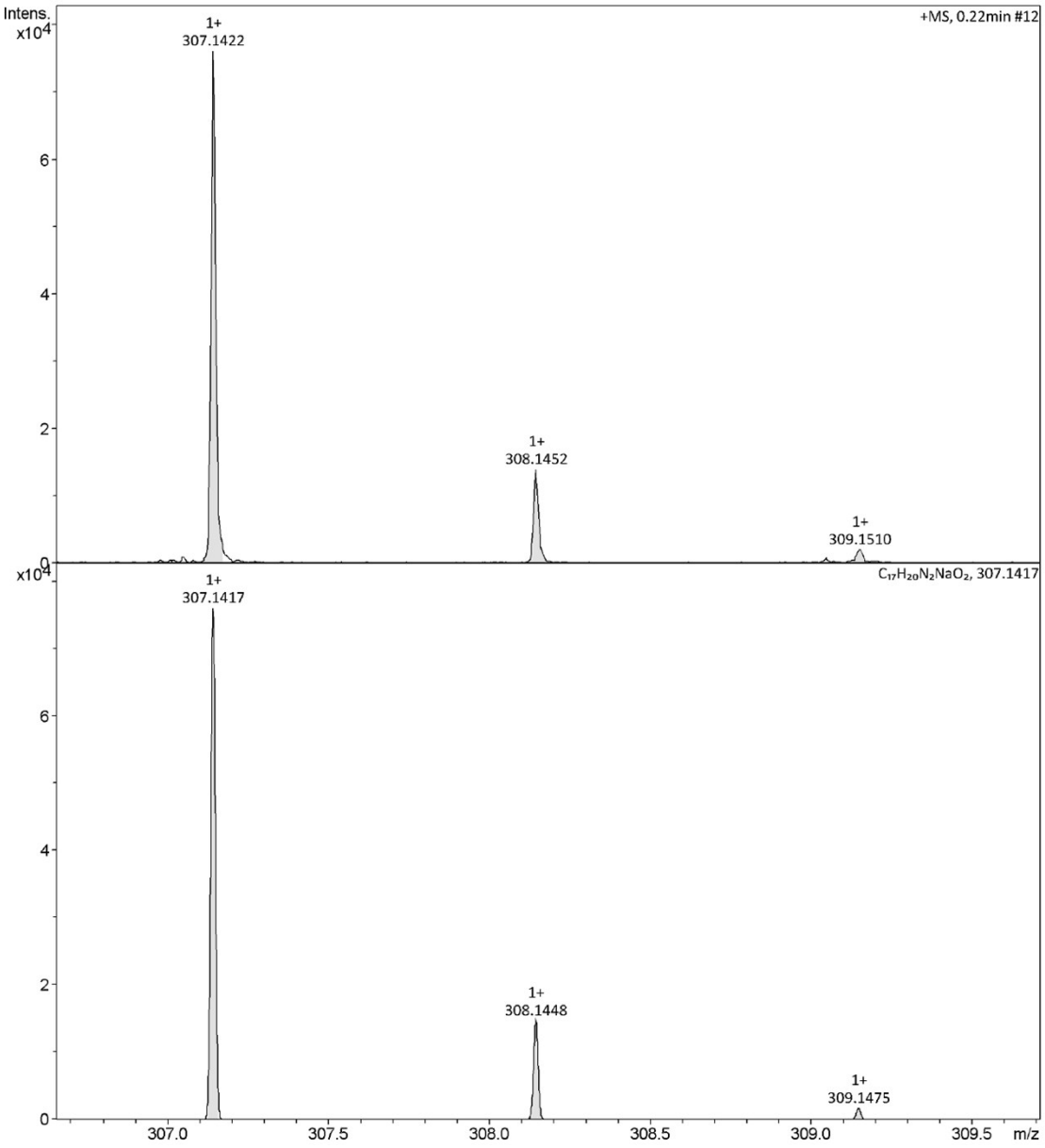
HRMS spectrum of **1n**



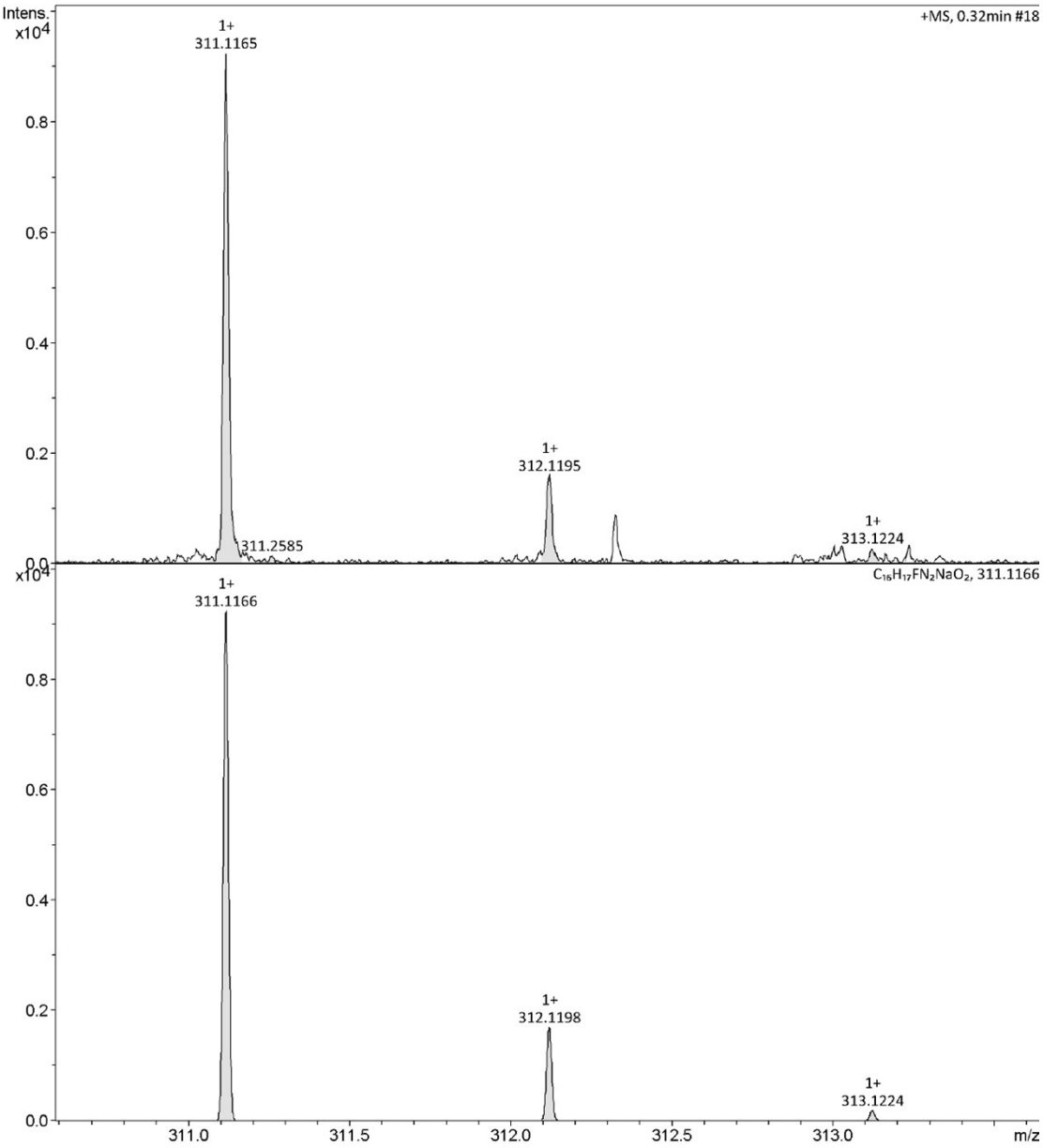
HRMS spectrum of **1o**



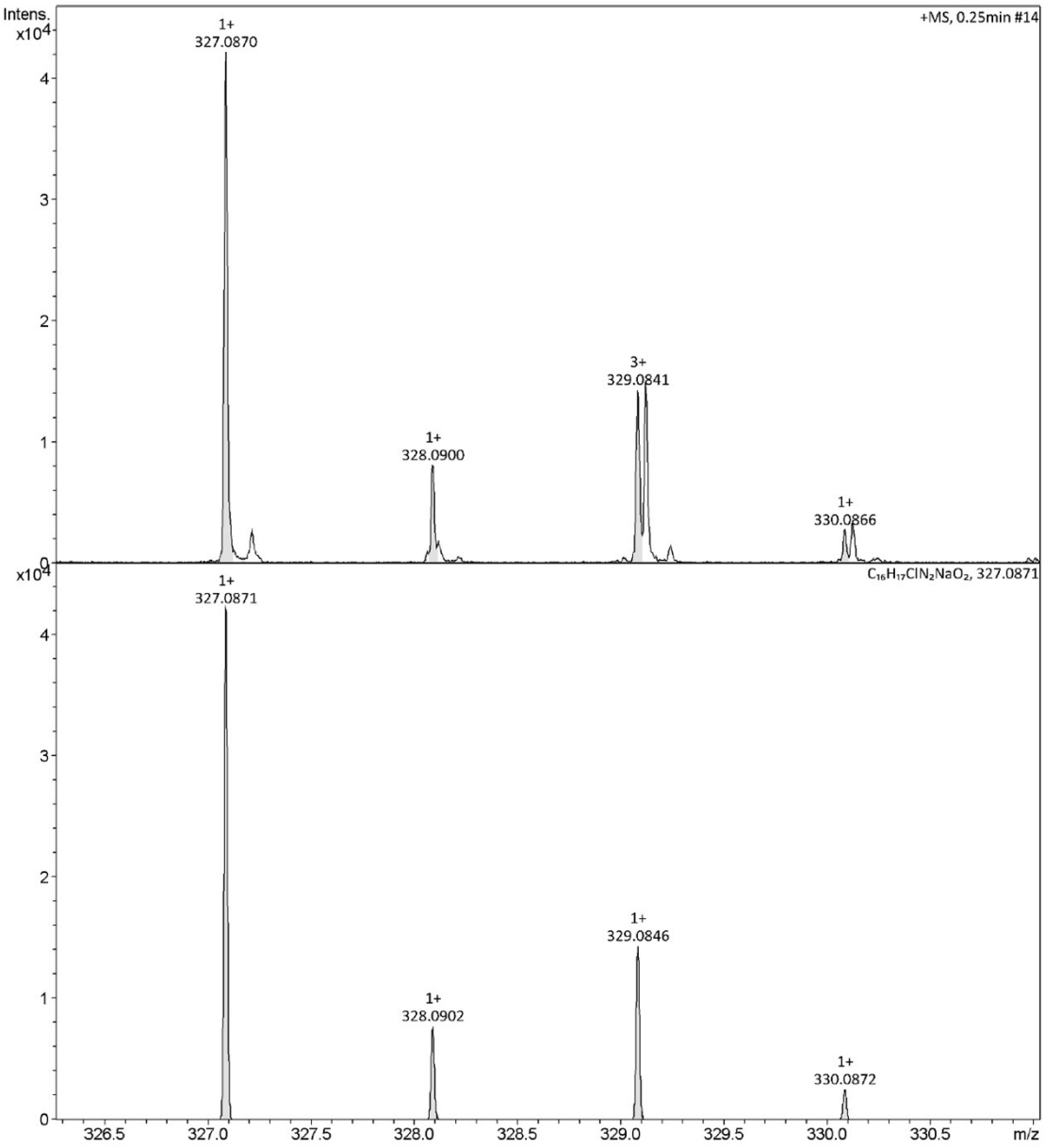
HRMS spectrum of **2a**



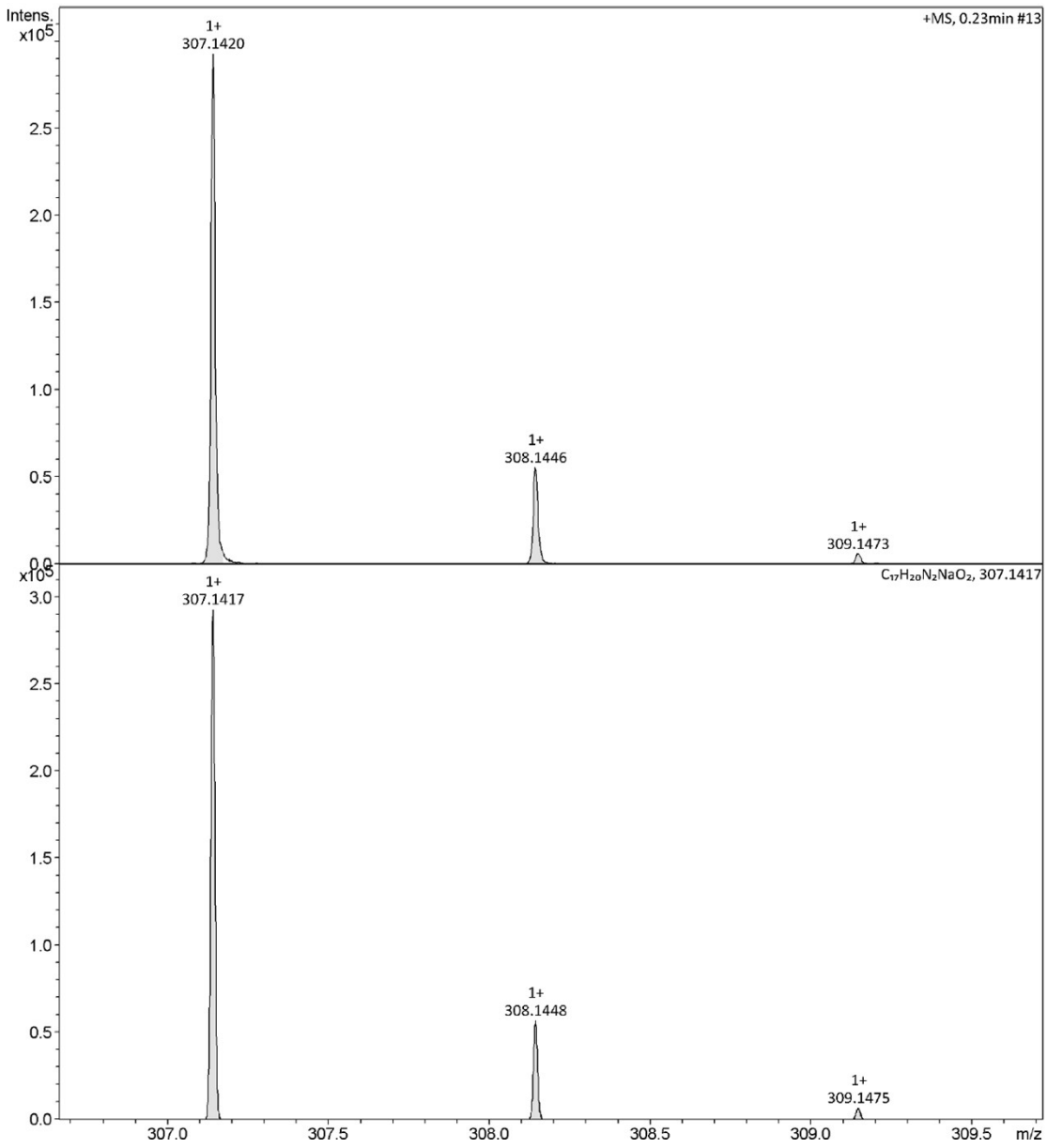
HRMS spectrum of **2b**



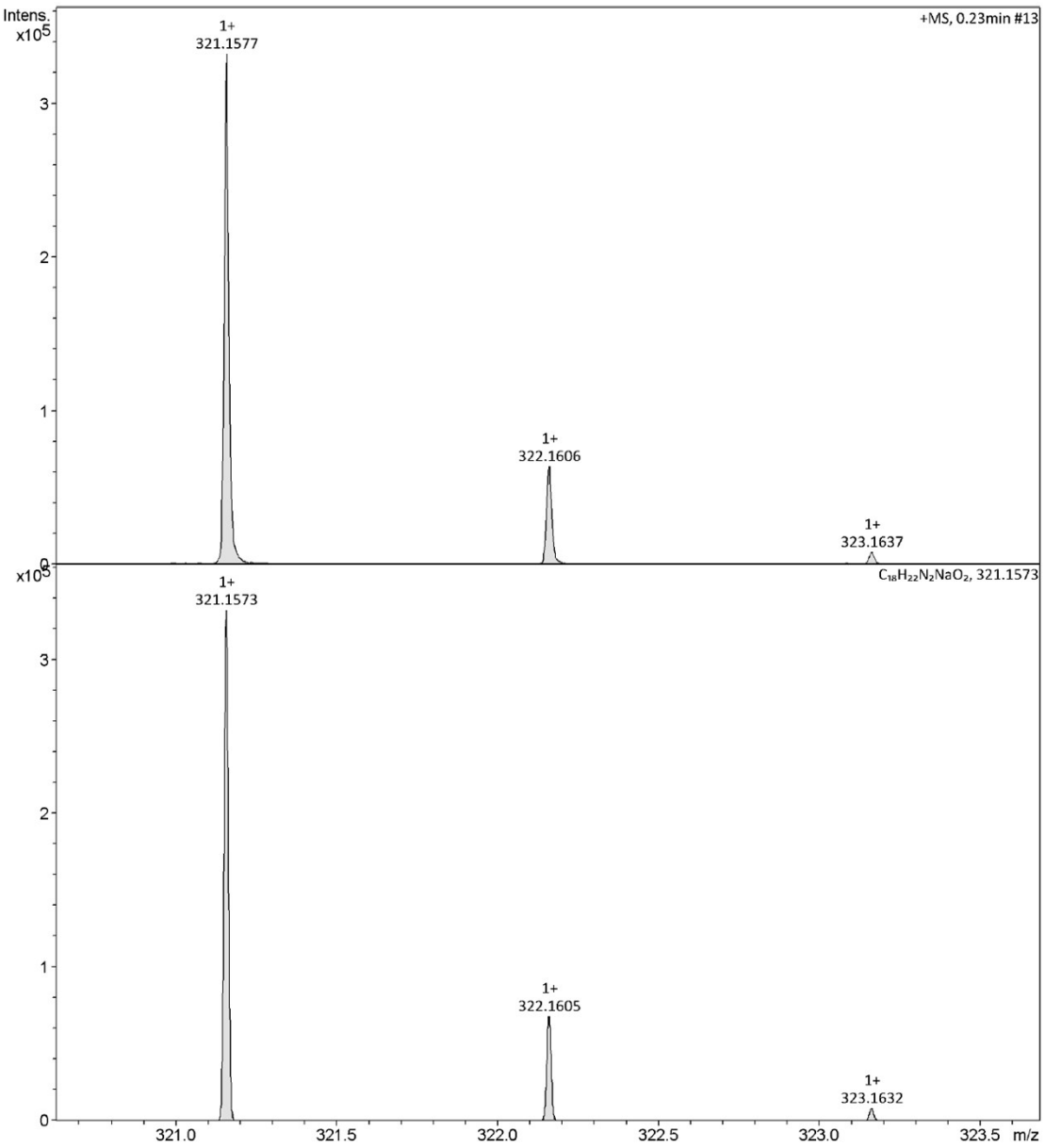
HRMS spectrum of **2c**



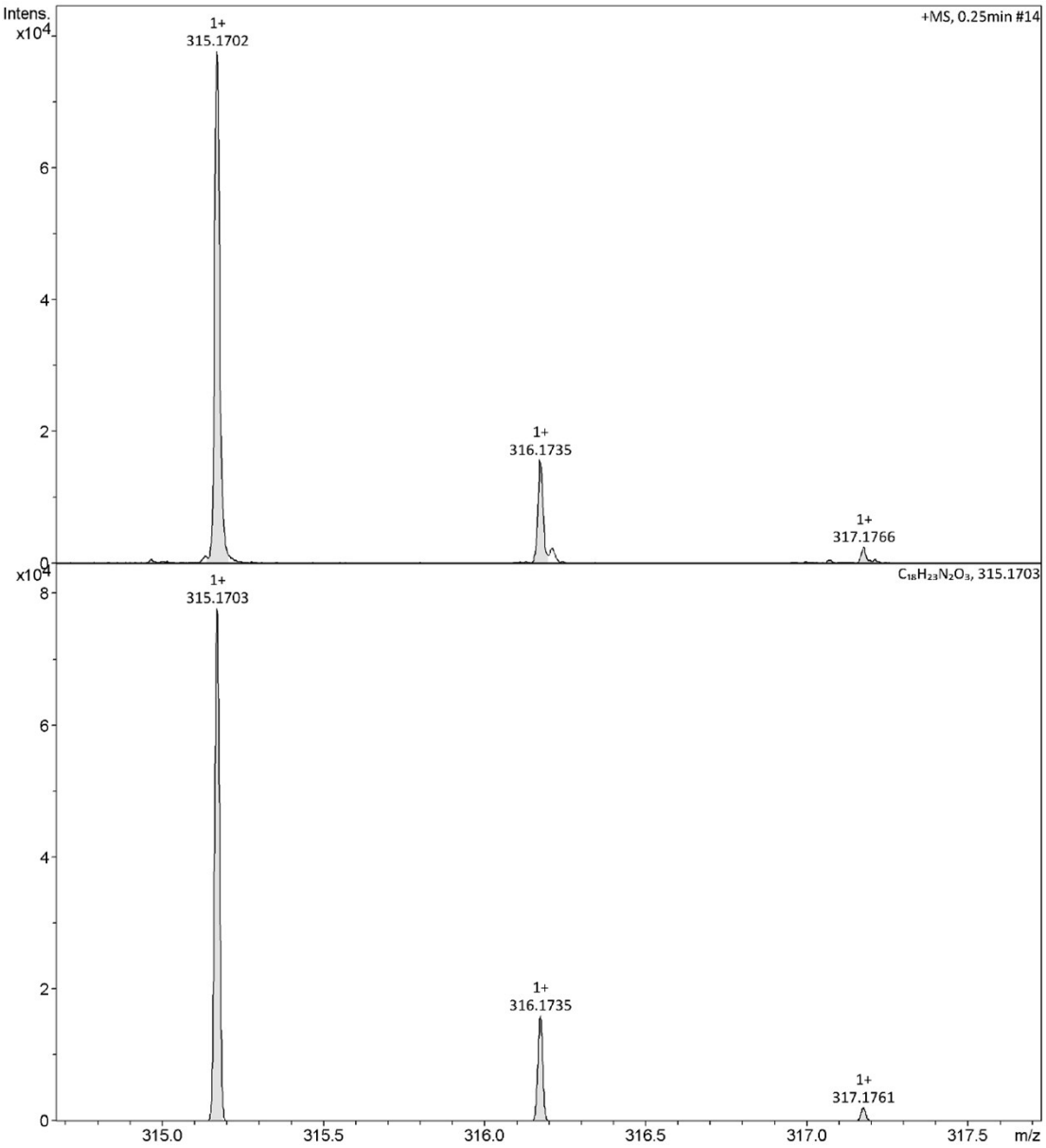
HRMS spectrum of **2d**



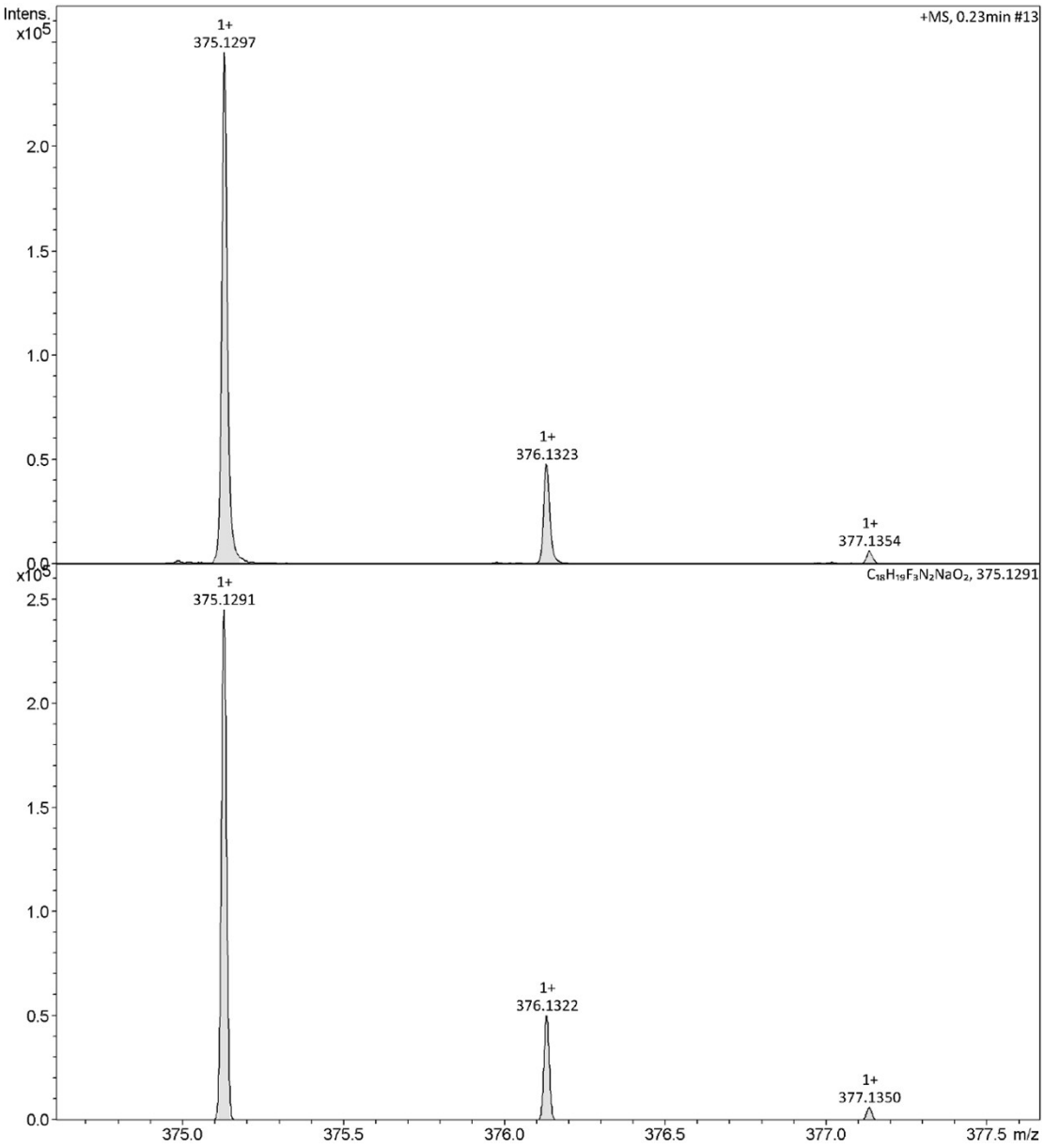
HRMS spectrum of **2e**



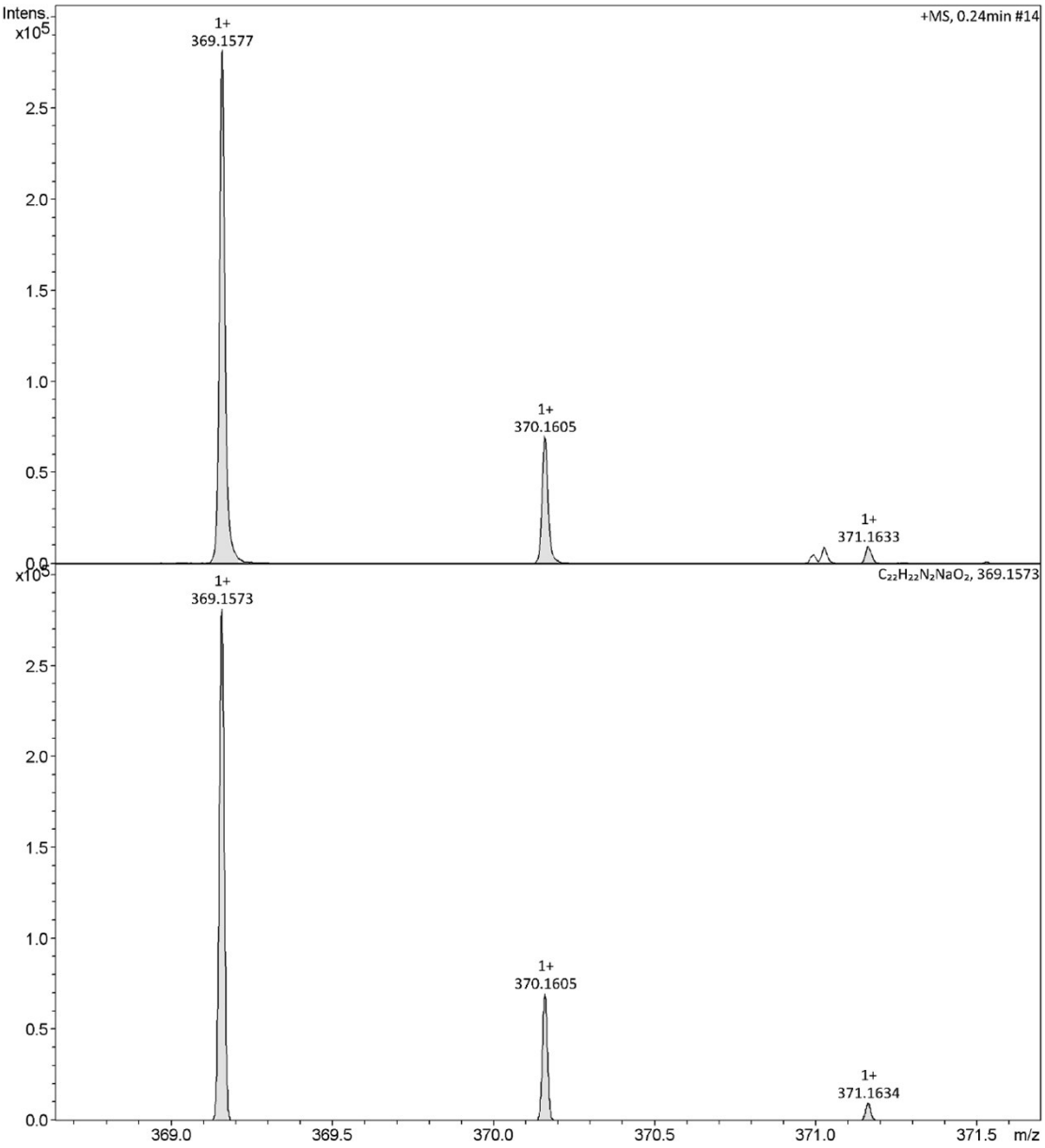
HRMS spectrum of **2f**



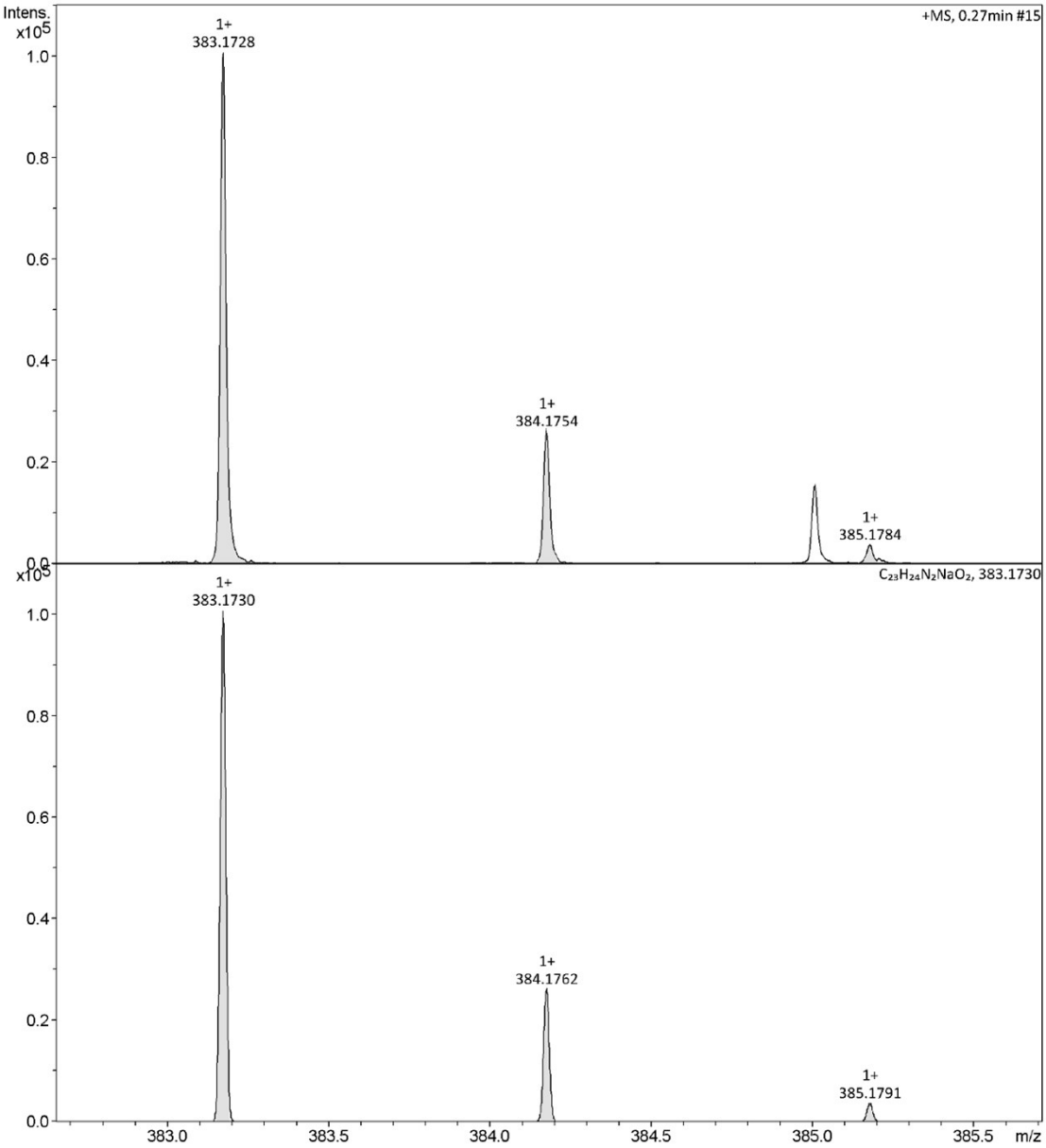
HRMS spectrum of **2g**



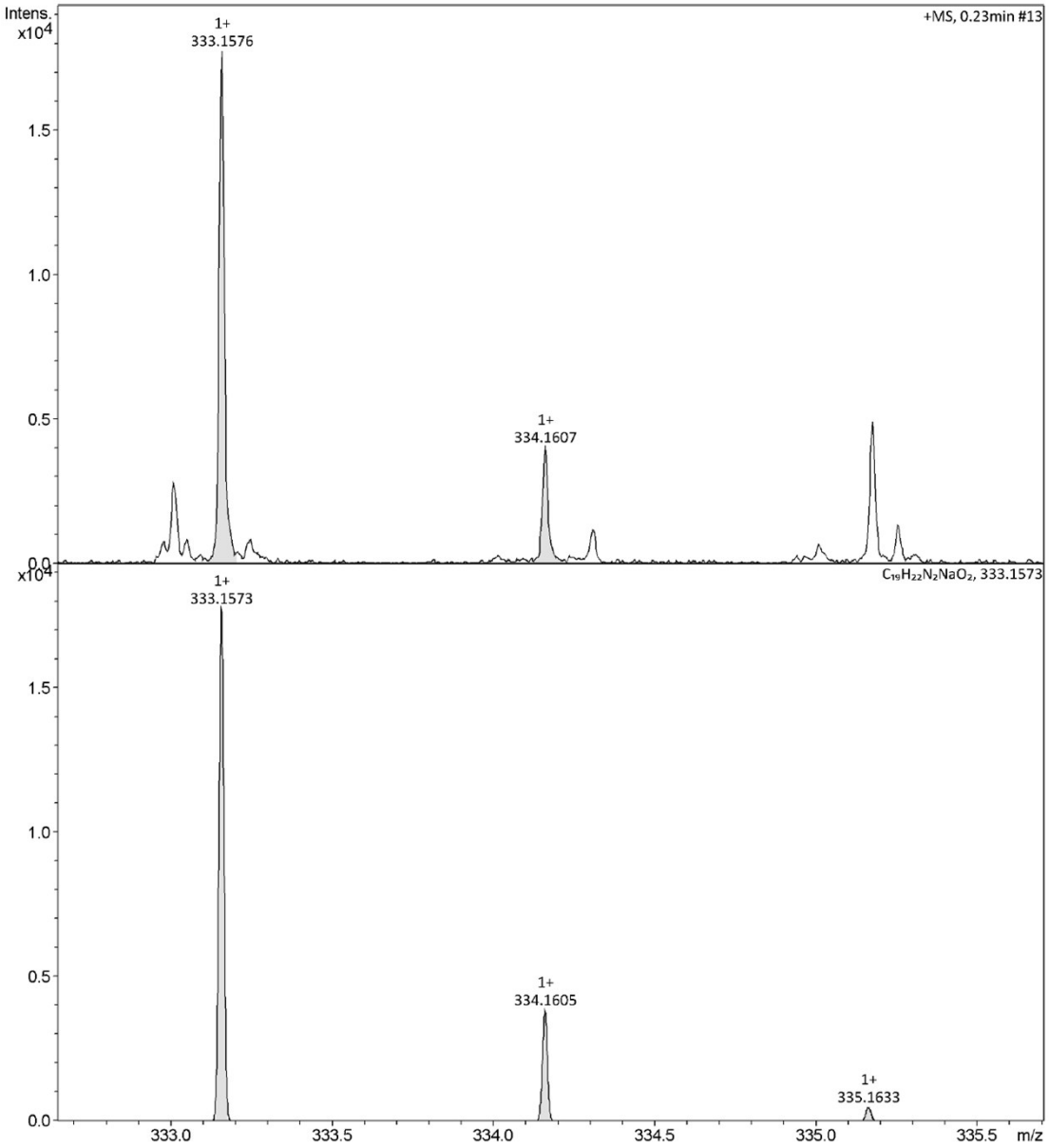
HRMS spectrum of **2h**



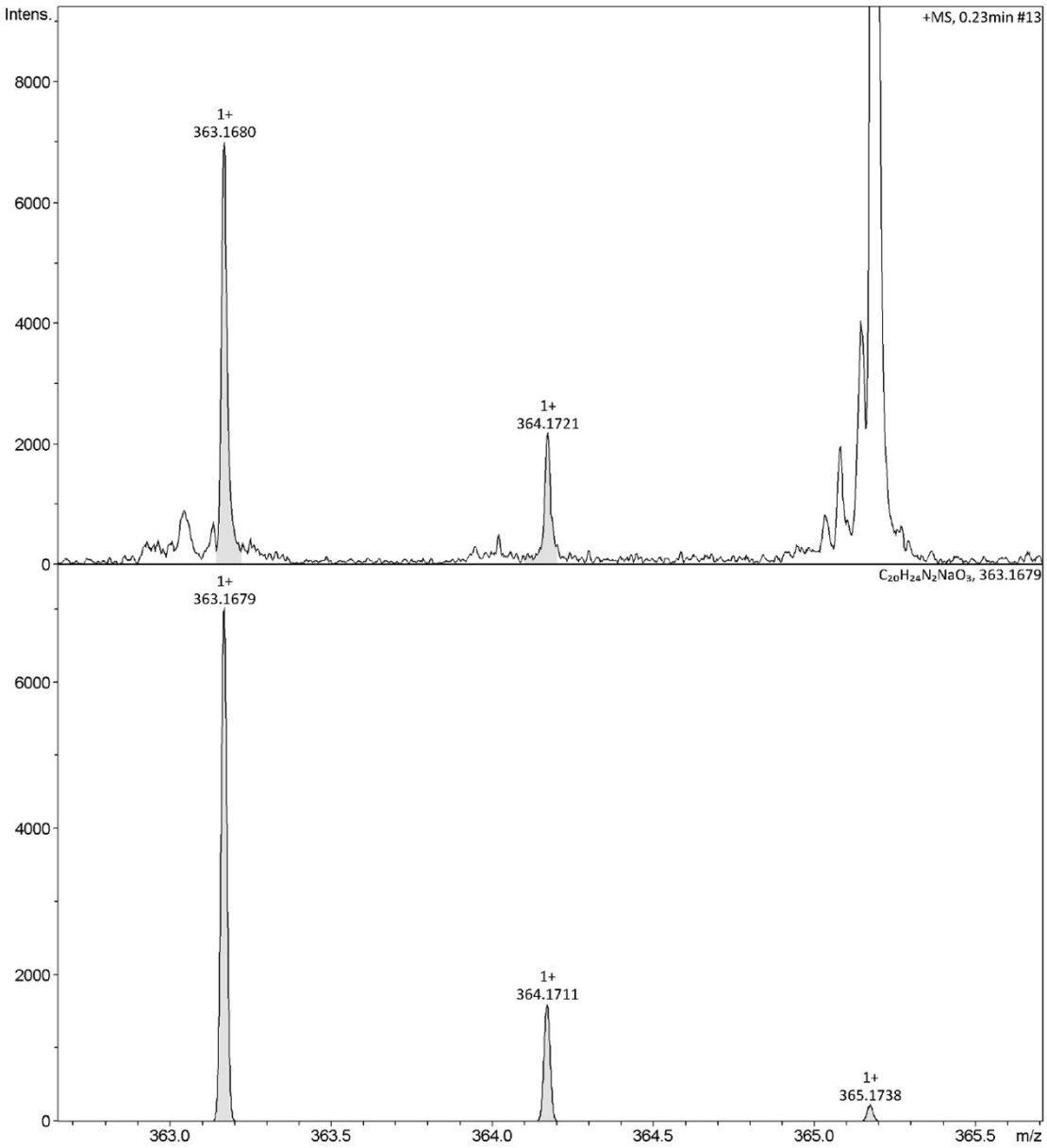
HRMS spectrum of **2i**



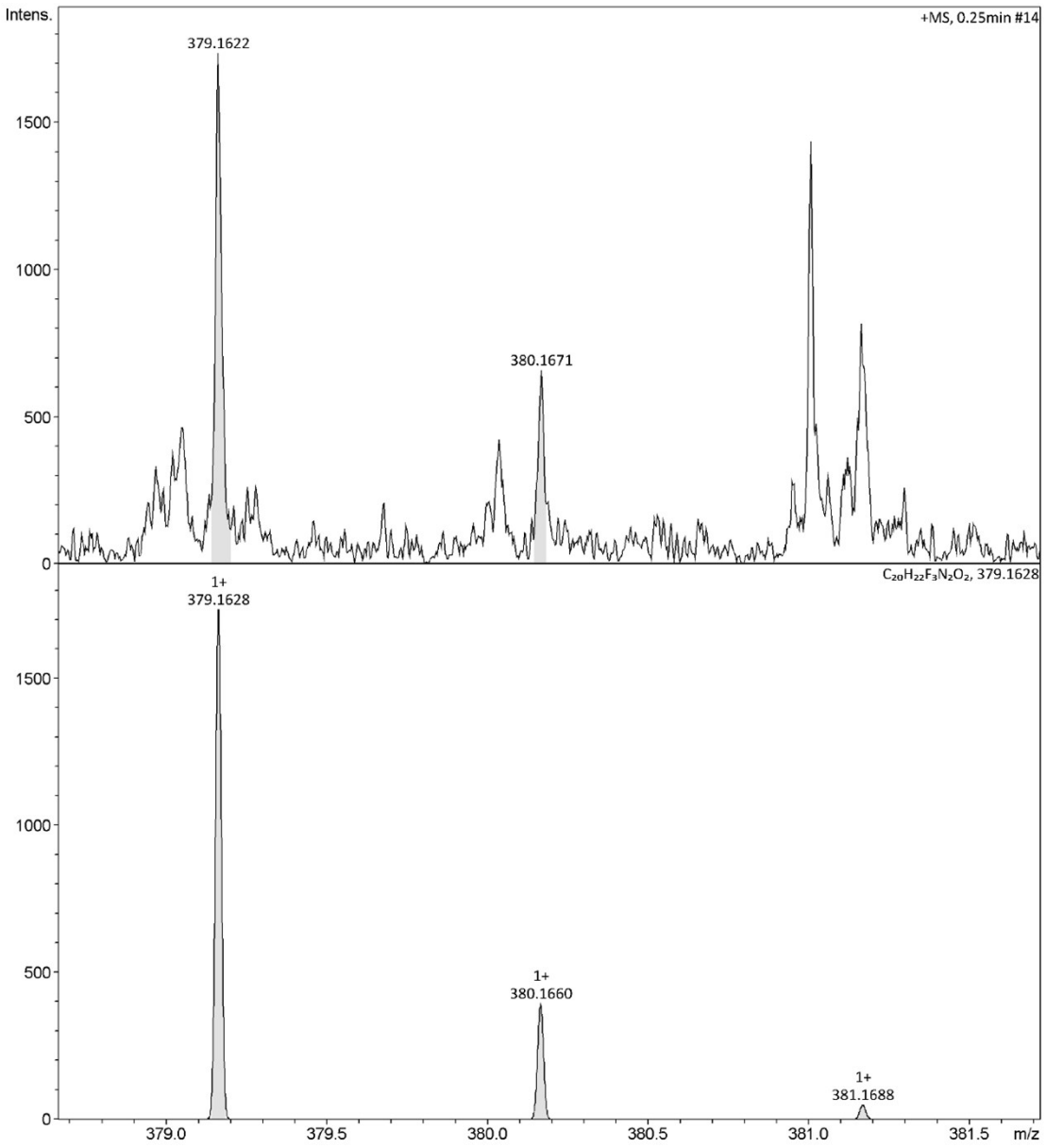
HRMS spectrum of **2j**



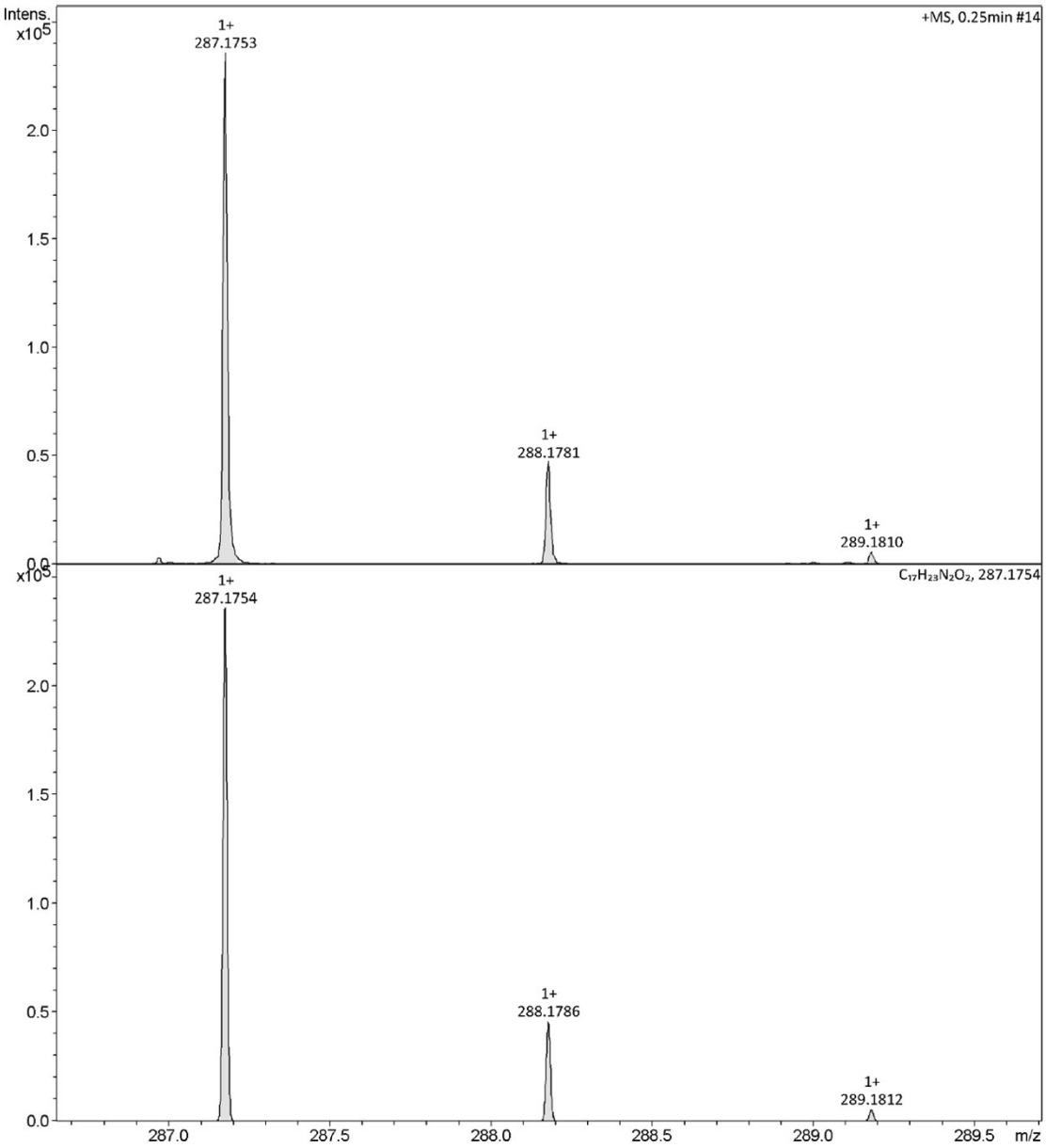
HRMS spectrum of **2m**



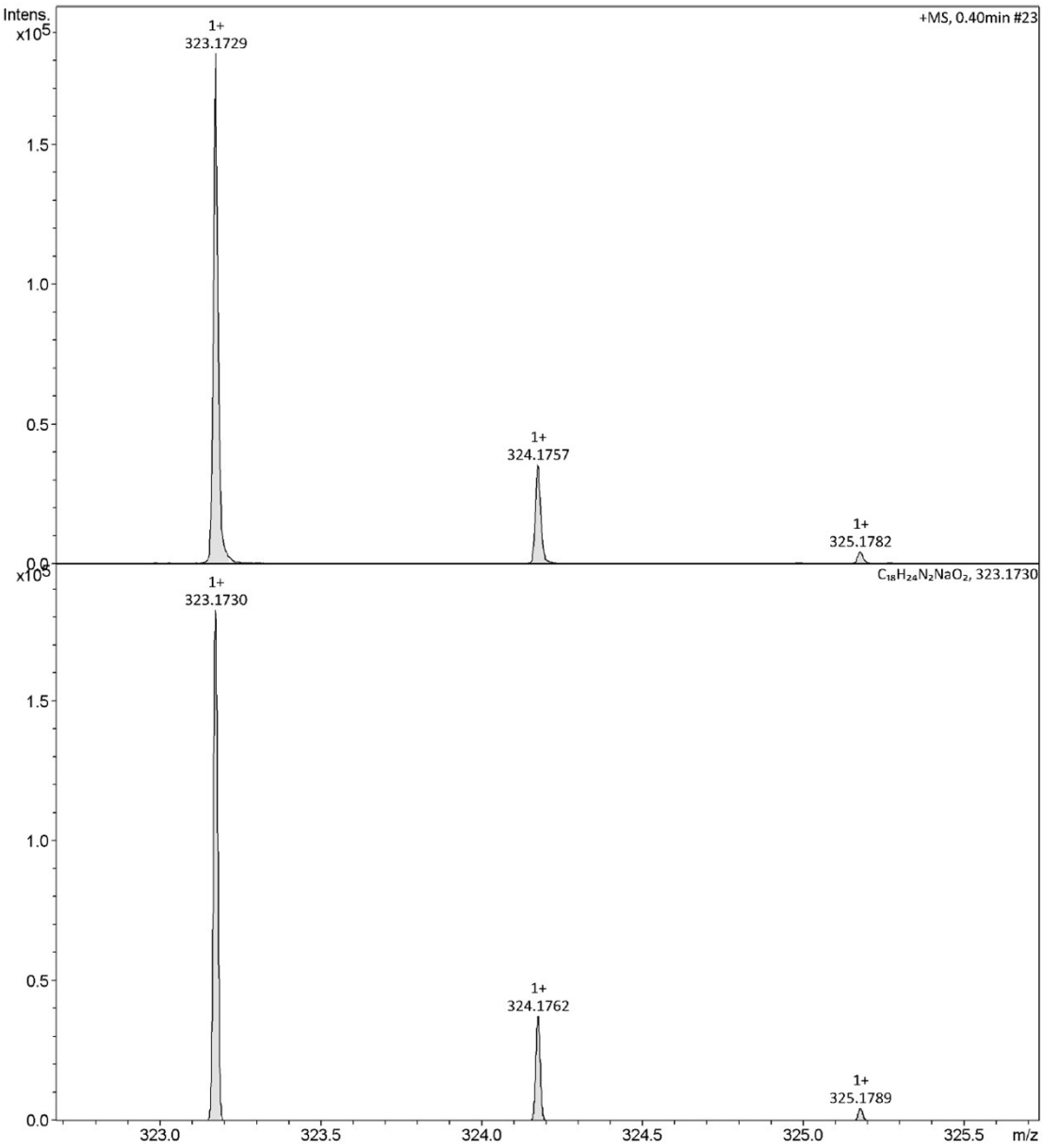
HRMS spectrum of **2n**



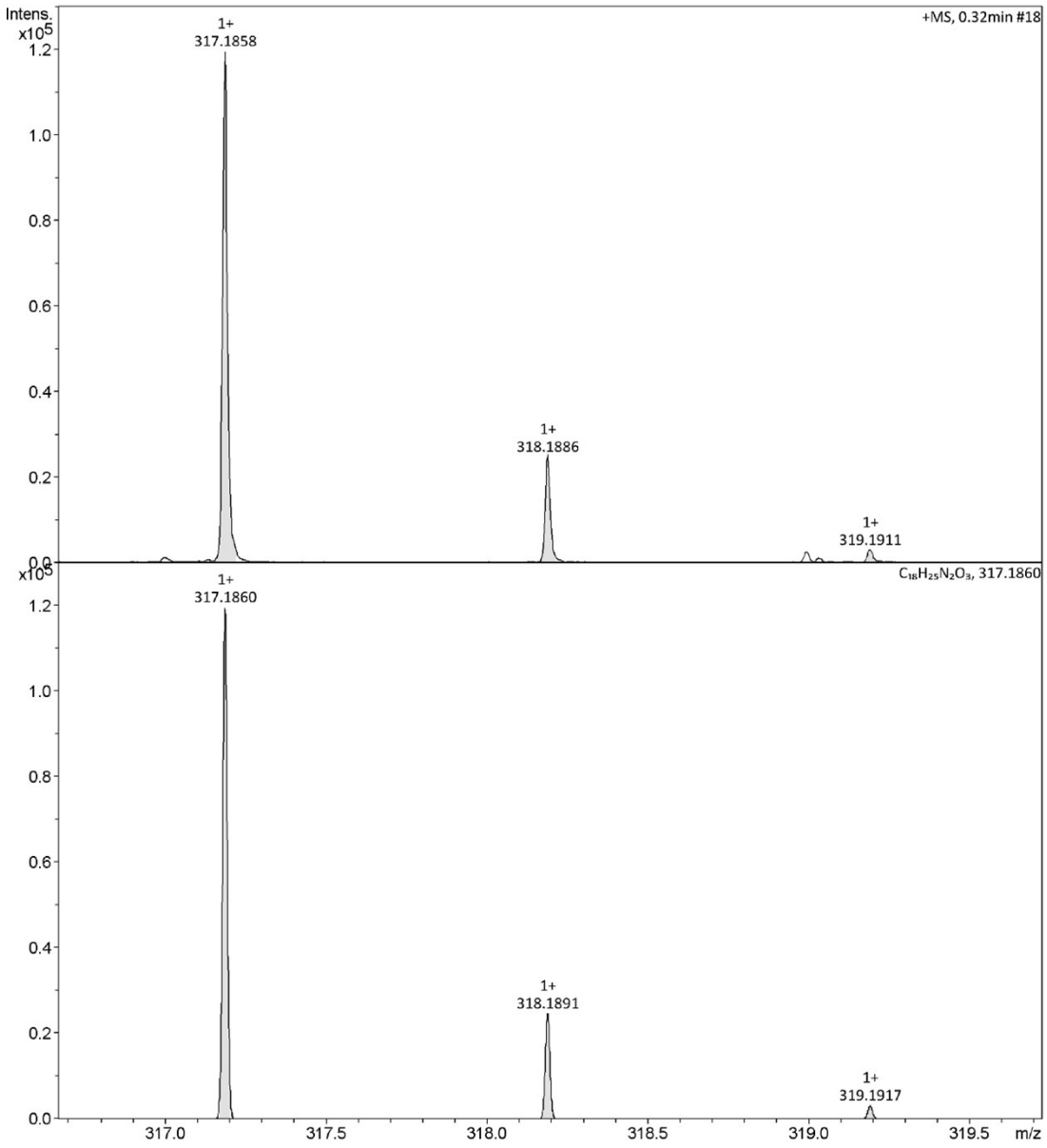
HRMS spectrum of **2o**



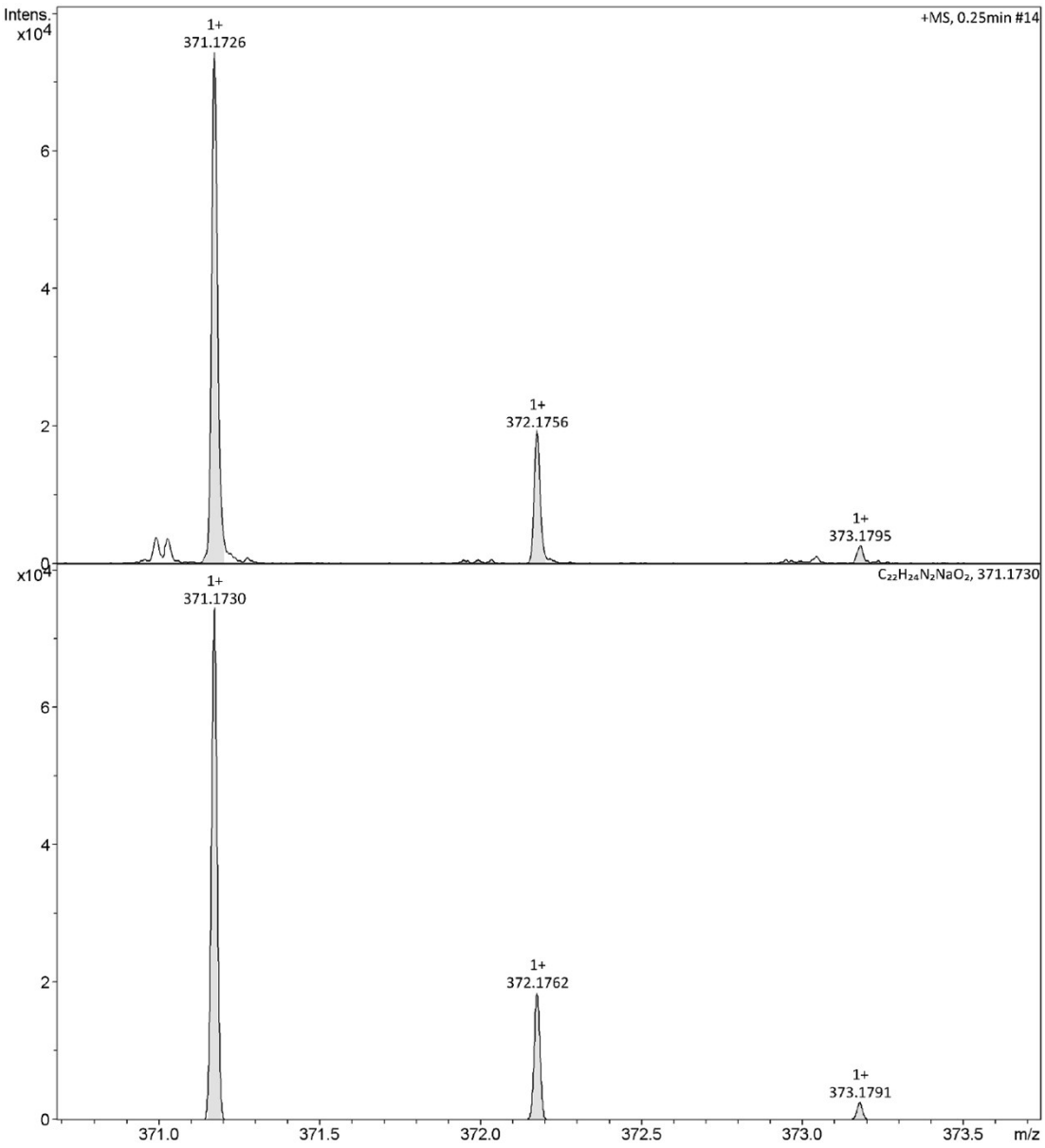
HRMS spectrum of **3e**



HRMS spectrum of **3f**



HRMS spectrum of **3g**



HRMS spectrum of **3i**