Electronic Supplementary Material (ESI) for Organic Chemistry Frontiers.

Supporting Information

Selective Construction of Spiro[indoline-3,5'-pyrrolo[3,4-*b*]azepine] and Spiro[indoline-3,3'-pyrrole] via [4+3]/[3+2] Cycloaddition Reaction of *α,β*-Unsaturated Aldimines and MBH Adducts of Isatins

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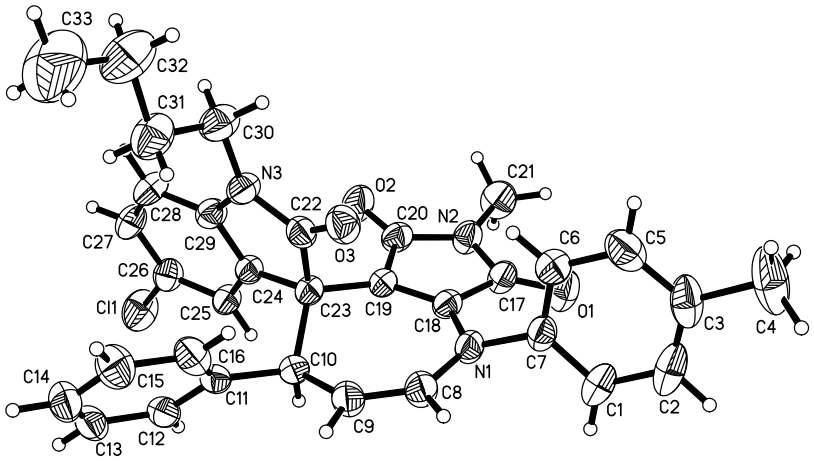


Fig. S1 ORTEP drawing (30%) of the crystal structure of **3e**

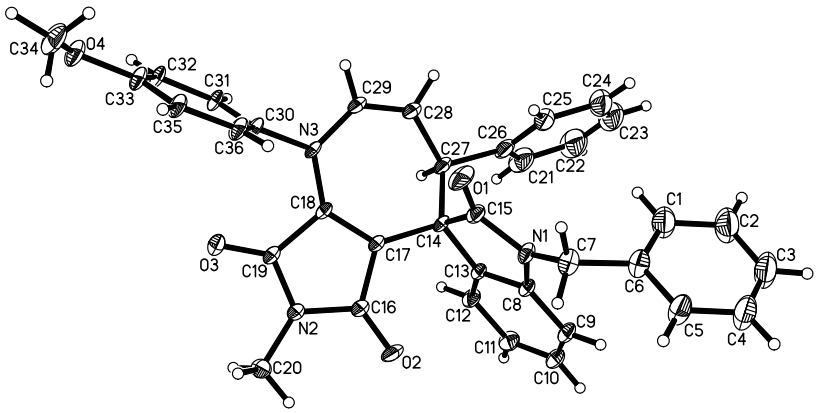


Fig. S2 ORTEP drawing (30%) of the crystal structure of **3g**

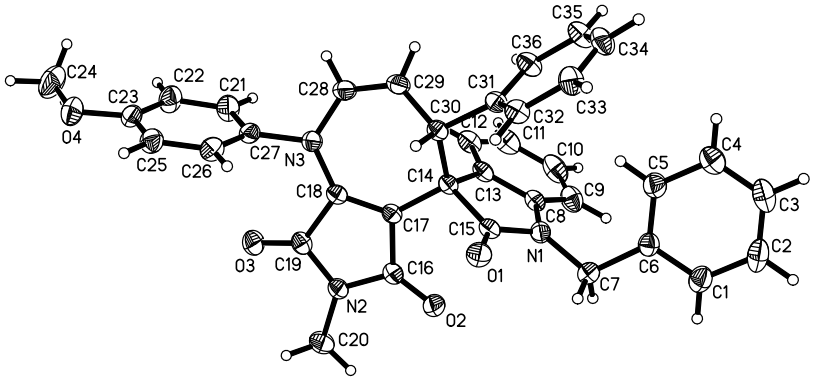


Fig. S3 ORTEP drawing (30%) of the crystal structure of **3g'**

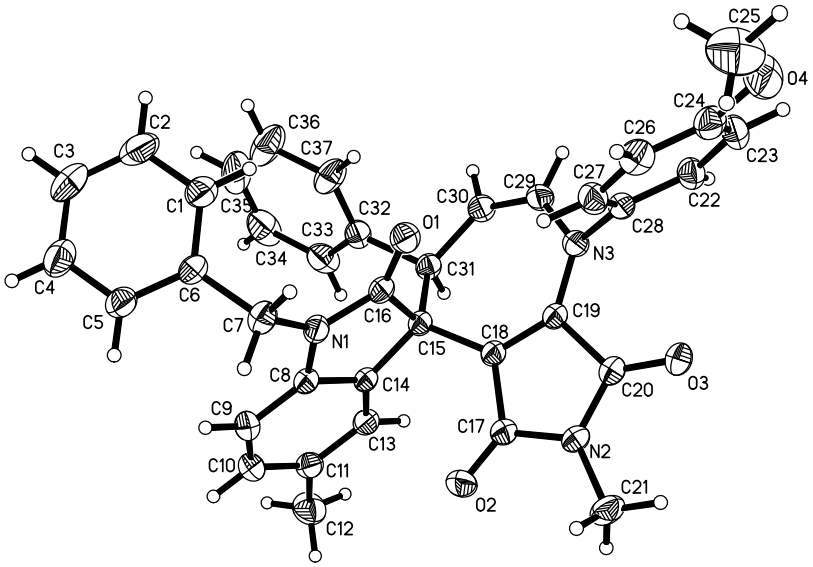


Fig. S4 ORTEP drawing (30%) of the crystal structure of **3h**

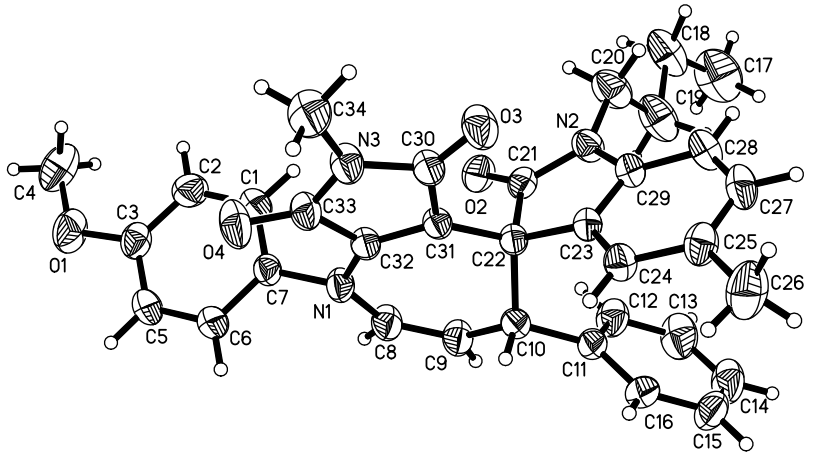


Fig. s5 ORTEP drawing (30%) of the crystal structure of **3j**

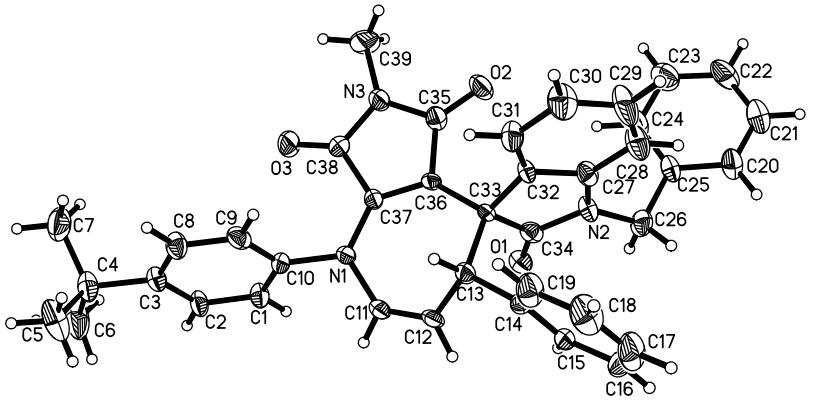


Fig. s6 ORTEP drawing (30%) of the crystal structure of **3k**

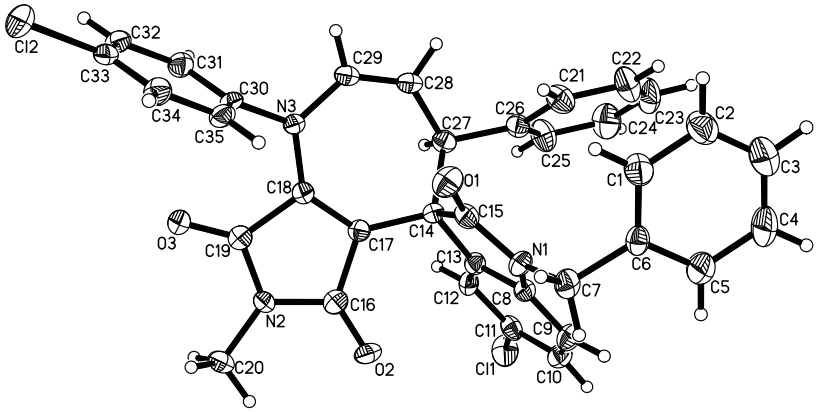


Fig. s7 ORTEP drawing (30%) of the crystal structure of **3m**

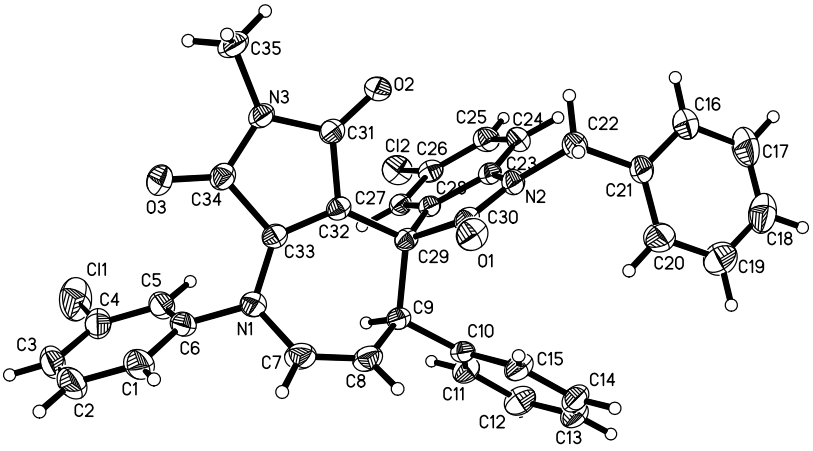


Fig. s8 ORTEP drawing (30%) of the crystal structure of **3n**

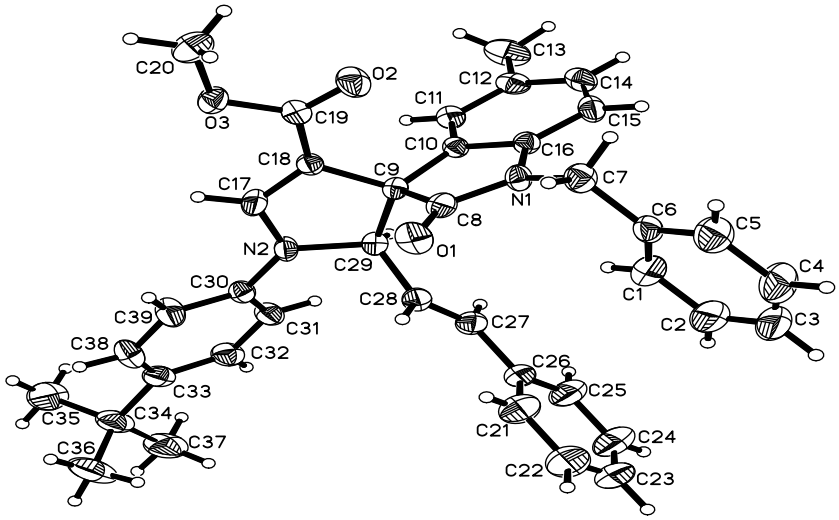


Fig. s9 ORTEP drawing (30%) of the crystal structure of **6d**

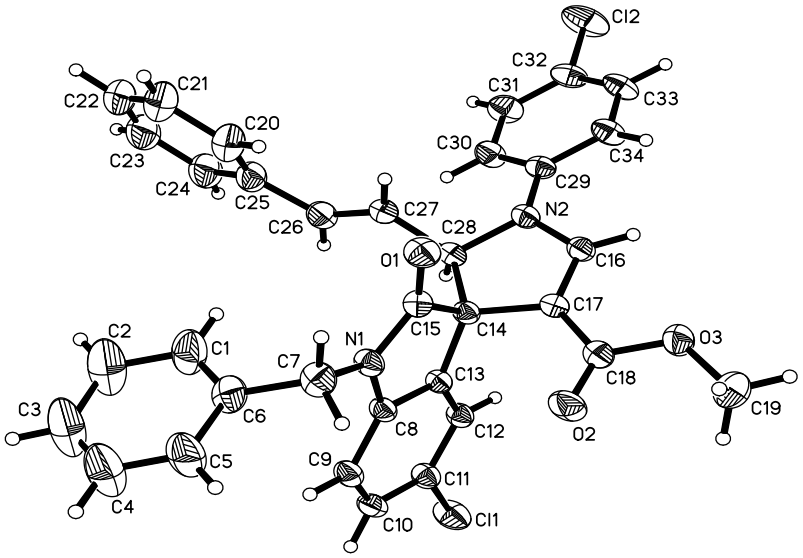


Fig. s10 ORTEP drawing (30%) of the crystal structure of **6g**

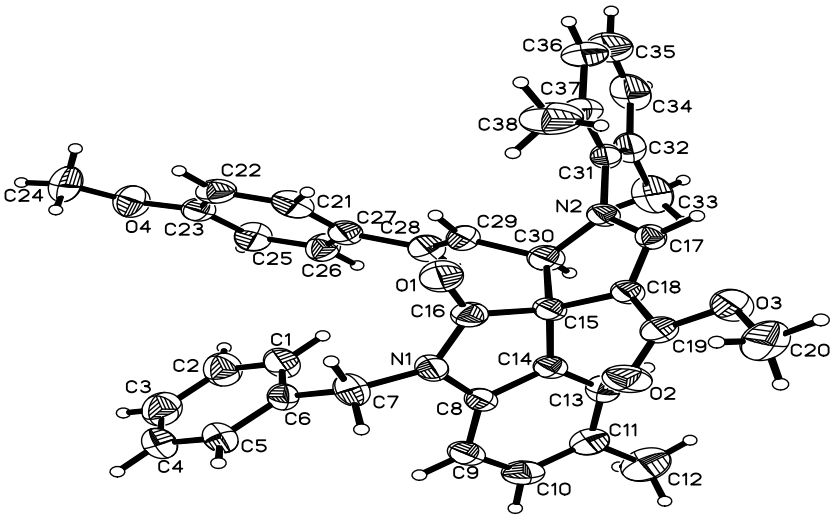


Fig. s11 ORTEP drawing (30%) of the crystal structure of **6k**

Table S1 The single crystal date of compounds **3e, 3g, 3g'**

Phase	**3e**	**3g**	**3g'**
Empirical formula	$C_{33}H_{30}ClN_3O_3$	$C_{36}H_{29}N_3O_4$	$C_{36}H_{29}N_3O_4$
Formula weight	552.05	567.62	567.62
Temperature/K	296(2) K	296(2) K	296(2) K
Wavelength/ Å	0.71073	0.71073	0.71073
Crystal system	Monoclinic	Monoclinic	Triclinic
Space group	P2(1)/n	P2(1)/c	P-1
a /Å	13.3537(11)	17.418(5)	11.262(3)
b / Å	9.0059(7)	9.262(3)	12.483(4)
c / Å	24.4471(19)	18.010(5)	13.478(4)
α (°)	90	90	66.218(9)
β (°)	105.317(2)	98.824(7)	84.506(9)
γ (°)	90	90	67.262(8)
V (Å ^{3})	2835.6(4)	2871.1(13)	1595.3(9)
Z	4	4	2
Calculated density (g·cm^{-3})	1.293	1.313	1.182
Absorption coefficient (mm^{-1})	0.174	0.087	0.078
F(000)	1160	1192	596
θ range / (°)	2.421 to 26.000	2.289 to 25.000	3.002 to 25.999
Limiting indices	-16<=h<=16, -10<=k<=11, -30<=l<=30	-20<=h<=20, -11<=k<=10, -21<=l<=20	-13<=h<=13, -15<=k<=15, -16<=l<=16
Reflections collected/unique	37162 / 5568 [R(int) = 0.0762]	18110 / 4982 [R(int) = 0.1131]	21555 / 6208 [R(int) = 0.0496]
Completeness to theta	99.9 %	98.8 %	98.8 %
Max. and min. transmission	0.7456 and 0.6871	0.7456 and 0.3679	0.7456 and 0.6396
Refinement method	Full-matrix least-squares on F^2	Full-matrix least-squares on F^2	Full-matrix least-squares on F^2
Data/restraints/parameters	5568 / 28 / 364	4982 / 609 / 455	6208 / 0 / 390
Goodness-of-fit on F^2	1.013	1.045	1.031
Final *R* indices[I>2sigma(I)]	R1 = 0.0635, wR2 = 0.1472	R1 = 0.1145, wR2 = 0.2933	R1 = 0.0515, wR2 = 0.1163
R indices (all data)	R1 = 0.1538, wR2 = 0.1855	R1 = 0.1793, wR2 = 0.3221	R1 = 0.0990, wR2 = 0.1348
Largest diff. peak and hole /(e ·Å^{-3})	0.346 and -0.338	0.273 and -0.321	0.197 and -0.193

Table S2 The single crystal date of compounds **3h, 3j, 3k**

Phase	**3h**	**3j**	**3k**
Empirical formula	$C_{37}H_{31}N_3O_4$	$C_{34}H_{33}N_3O_4$	$C_{39}H_{35}N_3O_3$
Formula weight	581.65	547.63	593.70
Temperature/K	296(2) K	296(2) K	296(2) K
Wavelength/ Å	0.71073	0.71073	0.71073
Crystal system	Triclinic	Monoclinic	Monoclinic
Space group	P-1	P2(1)/n	P2(1)/c
a /Å	8.9086(4)	13.6892(12)	12.170(3)
b / Å	13.0844(5)	9.2534(9)	20.468(4)
c / Å	13.9872(5)	24.022(2)	26.223(6)
α (°)	68.3519(11)	90	90
β (°)	79.9344(12)	104.263(3)	93.494(5)
γ (°)	88.3197(13)	90	90
V (Å ^{3})	1490.98(10)	2949.1(5)	6520(3)
Z	2	4	8
Calculated density (g·cm^{-3})	1.296	1.233	1.210
Absorption coefficient (mm^{-1})	0.085	0.081	0.077
F(000)	612	1160	2512
θ range / (°)	2.574 to 25.999	2.684 to 25.999	1.676 to 25.000
Limiting indices	-10<=h<=10, -16<=k<=16, -16<=l<=17	-16<=h<=15, -11<=k<=11, -29<=l<=29	-14<=h<=14, -24<=k<=24, -31<=l<=29
Reflections collected/unique	21201 / 5797 [R(int) = 0.0325]	40435 / 5778 [R(int) = 0.0678]	53873 / 11478 [R(int) = 0.3024]
Completeness to theta	99.1 %	99.3 %	99.9 %
Max. and min. transmission	0.7456 and 0.7047	0.7456 and 0.6580	0.7456 and 0.6297
Refinement method	Full-matrix least-squares on F^2	Full-matrix least-squares on F^2	Full-matrix least-squares on F^2
Data/restraints/parameters	5797 / 0 / 400	5778 / 72 / 394	11478 / 0 / 819
Goodness-of-fit on F^2	1.029	1.030	0.872
Final *R* indices[I>2sigma(I)]	R1 = 0.0476, wR2 = 0.1118	R1 = 0.0603, wR2 = 0.1238	R1 = 0.0935, wR2 = 0.1344
R indices (all data)	R1 = 0.0741, wR2 = 0.1252	R1 = 0.1303, wR2 = 0.1527	R1 = 0.3359, wR2 = 0.1756
Largest diff. peak and hole /(e ·Å^{-3})	0.180 and -0.198	0.222 and -0.257	0.225 and -0.222

Table S3 The single crystal date of compounds **3m, 3n, 6d**

Phase	**3m**	**3n**	**6d**
Empirical formula	$C_{35}H_{25}Cl_2N_3O_3$	$C_{35}H_{25}Cl_2N_3O_3$	$C_{39}H_{38}N_2O_3$
Formula weight	606.48	606.48	582.7
Temperature/K	296(2) K	296(2) K	296(2) K
Wavelength/ Å	0.71073	0.71073	0.71073
Crystal system	Monoclinic	Triclinic	Monoclinic
Space group	P2(1)/n	P-1	P2/n
a /Å	18.3180(15)	9.1967(9)	20.948(2)
b / Å	9.2296(7)	10.8849(11)	6.4429(6)
c / Å	34.735(3)	16.9182(16)	24.542(2)
α (°)	90	72.099(3)	90
β (°)	97.205(2)	88.525(3)	92.486(3)
γ (°)	90	70.068(3)	90
V (Å ^{3})	5826.2(8)	1509.2(3)	3309.1(5)
Z	8	2	4
Calculated density (g·cm^{-3})	1.383	1.335	1.170
Absorption coefficient (mm^{-1})	0.265	0.256	0.074
F(000)	2512	628	1240
θ range / (°)	1.199 to 25.000	1.270 to 26.000	2.504 to 25.000
Limiting indices	-21<=h<=21, -10<=k<=10, -41<=l<=40	-11<=h<=11, -13<=k<=13, -20<=l<=20	-24<=h<=21, -7<=k<=7, -29<=l<=29
Reflections collected/unique	58255 / 10238 [R(int) = 0.1603]	21424 / 5915 [R(int) = 0.0305]	28096 / 5829 [R(int) = 0.1464]
Completeness to theta	99.9 %	99.5 %	99.9 %
Max. and min. transmission	0.7456 and 0.6518	0.7455 and 0.6880	0.7456 and 0.6924
Refinement method	Full-matrix least-squares on F^2	Full-matrix least-squares on F^2	Full-matrix least-squares on F^2
Data/restraints/parameters	10238 / 0 / 777	5915 / 0 / 389	5829 / 85 / 433
Goodness-of-fit on F^2	0.896	1.011	0.932
Final *R* indices[I>2sigma(I)]	R1 = 0.0660, wR2 = 0.1115	R1 = 0.0455, wR2 = 0.1079	R1 = 0.0699, wR2 = 0.1185
R indices (all data)	R1 = 0.2153, wR2 = 0.1380	R1 = 0.0692, wR2 = 0.1211	R1 = 0.2201, wR2 = 0.1447
Largest diff. peak and hole /(e ·Å^{-3})	0.235 and -0.265	0.208 and -0.322	0.168 and -0.193

Table S4 The single crystal date of compounds **6g**，**6k**

Phase	**6g**	**6k**
Empirical formula	$C_{34}H_{26}Cl_2N_2O_3$	$C_{38}H_{36}N_2O_4$
Formula weight	581.47	584.69
Temperature/K	296(2) K	296(2) K
Wavelength/ Å	0.71073	0.71073
Crystal system	Triclinic	Monoclinic
Space group	P-1	P2(1)/n
a /Å	9.7184(14)	13.0507(7)
b / Å	12.5333(18)	11.5992(6)
c / Å	14.973(2)	21.3575(10)
α (°)	99.526(5)	90
β (°)	106.553(4)	91.006(2)
γ (°)	108.581(4)	90
V (Å ^{3})	1589.8(4)	3232.6(3)
Z	2	4
Calculated density (g·cm^{-3})	1.215	1.201
Absorption coefficient (mm^{-1})	0.239	0.078
F(000)	604	1240
θ range / (°)	2.297 to 24.999	2.349 to 24.999
Limiting indices	-11<=h<=11, -14<=k<=14, -17<=l<=17	-15<=h<=15, -13<=k<=13, -25<=l<=25
Reflections collected/unique	20731 / 5540 [R(int) = 0.0689]	28015 / 5663 [R(int) = 0.0461]
Completeness to theta	99.0 %	99.5 %
Max. and min. transmission	0.7456 and 0.6434	0.7456 and 0.6889
Refinement method	Full-matrix least-squares on F^2	Full-matrix least-squares on F^2
Data/restraints/parameters	5540 / 103 / 371	5663 / 0 / 402
Goodness-of-fit on F^2	1.069	1.012
Final *R* indices[I>2sigma(I)]	R1 = 0.0662, wR2 = 0.1790	R1 = 0.0756, wR2 = 0.1887
R indices (all data)	R1 = 0.1137, wR2 = 0.1966	R1 = 0.1233, wR2 = 0.2066
Largest diff. peak and hole /(e ·Å^{-3})	0.287 and -0.308	0.618 and -0.294

Experimental section

1. General procedure for the reactions of *α,ß*-unsaturated aldimines and MBH maleimides of isatins: A mixture of *a,ß*-unsaturated *N*-arylaldimine (0.10 mmol), MBH maleimide of isatin (0.10 mmol), and DABCO (20 mmol%) in CH_3CN (10.0 mL) was stirred at 50 °C for 16 hours. After removing the solvent by rotatory evaporation, the resulting residue was purified by column chromatography on silica gel with ethyl acetate, dichloromethane and petroleum ether (V/V/V = 1:10:10) as eluent to afford the desired products **3a-3v** and minor isomers **3g'** and **3i'**.

***cis*-1-Benzyl-5-chloro-7'-methyl-4'-phenyl-1'-(*p*-tolyl)-1',4'-dihydro-6'*H*-spiro[indoline-3,5'-pyrrolo[3,4-*b*]azepine]-2,6',8'(7'*H*)-trione (3a):** ethyl acetate, dichloromethane and petroleum ether (V/V/V = 1:10:10) as eluent, yellow solid, 0.526 g, 90%, m.p. 182-184 °C; ^{1}H NMR (400 MHz, $CDCl_3$) δ: 7.30-7.26 (m, 5H), 7.24 (t, J = 6.4 Hz, 2H), 7.17-7.15 (m, 2H), 7.11-7.07 (m, 2H), 7.05-7.01 (m, 2H), 6.97-6.94 (m, 3H), 6.54 (dd, J_1 = 8.8 Hz, J_2 = 2.0 Hz, 1H), 6.23 (d, J = 8.4 Hz, 1H), 5.61 (dd, J_1 = 8.8 Hz, J_2 = 2.0 Hz, 1H), 4.97 (d, J = 16.0 Hz, 1H), 4.49 (d, J = 16.0 Hz, 1H), 3.97 (dd, J_1 = 5.6 Hz, J_2 = 2.0 Hz, 1H), 2.77 (s, 3H), 2.43 (s, 3H); ^{13}C{^{1}H} NMR (100 MHz, $CDCl_3$) δ: 176.2, 168.8, 165.6, 141.5, 141.1, 140.5, 138.0, 138.0, 135.0, 134.9, 133.6, 130.2, 128.9, 128.7, 128.0, 127.8, 127.6, 127.4, 127.1, 126.0, 123.6, 115.5, 109.7, 106.3, 58.0, 50.6, 44.3, 23.6, 21.3; IR(KBr) υ: 3746, 3028, 1761, 1709, 1648, 1611, 1487, 1468, 1451, 1380, 1348, 1270, 1221, 1176, 1130, 1102, 1084, 1041, 1030, 1009, 947, 862, 841, 811, 779, 754 cm^{-1}; MS (*m*/*z*): HRMS (ESI-TOF) Calcd. For $C_{36}H_{28}ClN_3NaO_3$ ([M+Na]$^+$): 608.1711, found: 608.1735.

***cis*-1-Benzyl-7'-methyl-1',4'-diphenyl-1',4'-dihydro-6'*H*-spiro[indoline-3,5'-pyrrolo[3,4-*b*]azepine]-2,6',8'(7'*H*)-trione (3b):** ethyl acetate, dichloromethane and petroleum ether (V/V/V = 1:10:10) as eluent, yellow solid, 0.462 g, 86%, m.p. 258-260 °C; ^{1}H NMR (400 MHz, $CDCl_3$) δ: 7.45 (d, J = 8.8 Hz, 2H), 7.33-7.28 (m, 4H), 7.23 (d, J = 6.8 Hz, 1H), 7.18 (d, J = 7.6 Hz, 2H), 7.13 (d, J = 6.8 Hz, 1H), 7.08-6.93 (m, 8H), 6.52 (dd, J_1 = 8.8 Hz, J_2 = 2.0 Hz, 1H), 6.35 (d, J = 7.6 Hz, 1H), 5.66 (dd, J_1 = 9.2 Hz, J_2 = 3.6 Hz, 1H), 4.96 (d, J = 16.0 Hz, 1H), 4.54 (d, J = 16.0 Hz, 1H), 4.01-4.00 (m, 1H), 2.76 (s, 3H); ^{13}C{^{1}H} NMR (100 MHz, $CDCl_3$) δ: 176.4, 168.66, 165.8, 142.7, 141.9, 140.7, 138.1, 135.4, 134.0, 133.7, 131.8, 129.7, 129.0, 128.6, 128.3, 127.7, 127.5, 127.3, 127.2, 127.0, 123.2, 122.3, 116.4, 108.9, 108.38, 57.9, 50.6, 44.3, 23.6; IR(KBr) υ: 3746, 3028, 1760, 1709, 1648, 1611, 1487, 1468, 1451, 1380, 1347, 1270, 1221, 1176, 1130, 1101, 1083, 1041, 1030, 1008, 947, 862, 841, 811, 779, 754 cm^{-1}; MS (*m*/*z*): HRMS (ESI-TOF) Calcd.

For $C_{35}H_{27}N_3NaO_3$ ([M+Na]$^+$): 560.1945, found: 560.1960.

***cis*-1-Benzyl-7'-methyl-4'-phenyl-1'-(*p*-tolyl)-1',4'-dihydro-6'*H*-spiro[indoline-3,5'-pyrrolo[3,4-*b*]azepine]-2,6',8'(7'*H*)-trione (3c):** ethyl acetate, dichloromethane and petroleum ether (V/V/V = 1:10:10) as eluent, yellow solid, 0.479 g, 87%, m.p. 240-242 ^{o}C; ^{1}H NMR (400 MHz, $CDCl_3$) δ: 7.28 (s, 5H), 7.20-7.13 (m, 4H), 7.05-6.96 (m, 8H), 6.54 (d, *J* = 8.8 Hz, 1H), 6.35 (d, *J* = 7.2 Hz, 1H), 5.62 (s, 1H), 4.96 (d, *J* = 16.0 Hz, 1H), 4.56 (d, *J* = 16.0 Hz, 1H), 4.00 (s, 1H), 2.75 (s, 3H), 2.43 (s, 3H); ^{13}C{^{1}H} NMR (100 MHz, $CDCl_3$) δ: 176.6, 168.9, 165.9, 142.0, 141.8, 141.0, 138.4, 137.9, 135.5, 134.6, 132.1, 130.2, 129.0, 128.6, 128.2, 127.7, 127.3, 127.3, 1267.0, 126.0, 123.2, 122.3, 115.8, 108.8, 107.3, 58.0, 50.8, 44.3, 23.5, 21.3; IR(KBr) υ: 3726, 1903, 1854, 1819, 1773, 1758, 1734, 1734, 1710, 1700, 1676, 1653, 1611, 1560, 1546, 1491, 1467, 1449, 1380, 1350, 1175, 1009, 948, 811, 751 cm^{-1}; MS (*m*/*z*): HRMS (ESI-TOF) Calcd. For $C_{36}H_{29}N_3NaO_3$ ([M+Na]$^+$): 574.2101, found: 574.2114.

***cis*-1-Butyl-5,7'-dimethyl-4'-phenyl-1'-(*p*-tolyl)-1',4'-dihydro-6'*H*-spiro[indoline-3,5'-pyrrolo[3,4-*b*]azepine]-2,6',8'(7'*H*)-trione (3d):** ethyl acetate, dichloromethane and petroleum ether (V/V/V = 1:10:10) as eluent, yellow solid, 0.398 g, 75%, m.p. 212-214 ^{o}C; ^{1}H NMR (400 MHz, $CDCl_3$) δ: 7.28 (d, *J* = 9.2 Hz, 3H), 7.24 (d, *J* = 5.2 Hz, 1H), 7.04-7.00 (m, 3H), 6.96-6.94 (m, 2H), 6.91 (s, 1H), 6.89 (d, *J* = 8.0 Hz, 1H), 6.52 (d, *J* = 9.2 Hz, 1H), 6.38 (d, *J* = 8.0 Hz, 1H), 5.60 (dd, J_1 = 9.2 Hz, J_2 = 3.6 Hz, 1H), 3.93-3.91 (m, 1H), 3.61-3.54 (m, 1H), 3.46-3.39 (m, 1H), 2.72 (s, 3H), 2.42 (s, 3H), 2.32 (s, 3H), 1.54-11.45 (m, 2H), 1.36-1.29 (m, 2H), 0.92 (t, *J* = 7.2 Hz, 3H); ^{13}C{^{1}H} NMR (100 MHz, $CDCl_3$) δ:176.2, 168.8, 167.0, 141.8, 140.9, 139.8, 138.5, 137.8, 134.5, 132.2, 131.3, 130.1, 129.1, 128.4, 127.5, 126.8, 126.0, 124.0, 115.9, 107.6, 107.6, 57.9, 50.6, 40.3, 29.2, 23.5, 21.2, 20.2, 13.7; IR(KBr) υ: 3726, 1704, 1603, 1504, 1439, 1386, 1357, 1256, 1202, 1132, 814, 757 cm^{-1}; MS (*m*/*z*): HRMS (ESI-TOF) Calcd. For $C_{34}H_{34}N_3O_3$ ([M+H]$^+$): 532.2595, found: 532.2615.

***cis*-1-Butyl-5-chloro-7'-methyl-4'-phenyl-1'-(*p*-tolyl)-1',4'-dihydro-6'*H*-spiro[indoline-3,5'-pyrrolo[3,4-*b*]azepine]-2,6',8'(7'*H*)-trione (3e):** ethyl acetate, dichloromethane and petroleum ether (V/V/V = 1:10:10) as eluent, yellow solid, 0.441 g, 80%, m.p. 238-240 ^{o}C; ^{1}H NMR (400 MHz, $CDCl_3$) δ: 7.28 (d, *J* = 8.4 Hz, 3H), 7.24 (s, 1H), 7.09-7.06 (m, 5H), 6.97-6.95 (m, 2H), 6.52 (d, *J* = 8.8 Hz, 1H), 6.41 (d, *J* = 8.0 Hz, 1H), 5.57 (dd, J_1 = 8.8 Hz, J_2 = 3.6 Hz, 1H), 3.92 (dd, J_1 = 5.2 Hz, J_2 = 2.0 Hz, 1H), 3.62-3.55 (m, 1H), 3.45-3.38 (m, 1H), 2.74 (s, 3H), 2.43 (s, 3H), 1.55-11.44

(m, 2H), 1.37-1.29 (m, 2H), 0.92 (t, J = 7.2 Hz, 3H); $^{13}C\{^{1}H\}$ NMR (100 MHz, $CDCl_3$) δ: 175.9, 168.7, 165.6, 141.6, 141.1, 140.8, 138.0, 137.9, 134.7, 133.7, 130.2, 128.9, 127.9, 127.7, 127.3, 127.1, 126.0, 123.6, 115.4, 108.7, 106.4, 57.8, 50.6, 40.4, 29.1, 23.5, 21.2, 20.2, 13.7; IR(KBr) υ: 1712, 1698, 1661, 1607, 1508, 1488, 1439, 1386, 1349, 1256, 1113, 815, 757 cm^{-1}; MS (*m*/*z*): HRMS (ESI-TOF) Calcd. For $C_{33}H_{30}ClN_3NaO5_6$ ($[M+Na]^+$): 574.1868, found: 574.1896.

***cis*-1-Benzyl-6-chloro-7'-methyl-4'-phenyl-1'-(*p*-tolyl)-1',4'-dihydro-6'*H*-spiro[indoline-3,5'-*p*yrrolo[3,4-*b*]azepine]-2,6',8'(7'*H*)-trione (3f):** ethyl acetate, dichloromethane and petroleum ether (V/V/V = 1:10:10) as eluent, yellow solid, 0.521 g, 89%, m.p. 230-232 °C; ^{1}H NMR (400 MHz, $CDCl_3$) δ: 7.32-7.27 (m, 6H), 7.24 (s, 1H), 7.18 (d, J = 7.6 Hz, 2H), 7.10-7.00 (m, 4H), 6.94 (t, J = 8.4 Hz, 1H), 6.52 (dd, J_1 = 8.8 Hz, J_2 = 2.0 Hz, 1H), 6.35 (s, 1H), 5.58 (dd, J_1 = 8.8 Hz, J_2 = 3.6 Hz, 1H), 4.93 (d, J = 16.0 Hz, 1H), 4.51 (d, J = 16.0 Hz, 1H), 3.96 (dd, J_1 = 5.6 Hz, J_2 = 2.0 Hz, 1H), 2.76 (s, 3H), 2.43 (s, 3H); $^{13}C\{^{1}H\}$ NMR (100 MHz, $CDCl_3$) δ: 176.6, 168.8, 165.7, 143.1, 141.6, 141.1, 138.1, 138.0, 134.9, 134.7, 133.7, 130.5, 130.2, 128.9, 128.7, 127.8, 127.5, 127.2, 126.0, 124.0, 122.2, 115.5, 109.5, 109.4, 106.5, 57.6, 50.7, 44.4, 23.5, 21.2; IR(KBr) υ: 1760, 1704, 1607, 1507, 1489, 1441, 1373, 1253, 1171, 1110, 1071, 1014, 814, 753 cm^{-1}; MS (*m*/*z*): HRMS (ESI-TOF) Calcd. For $C_{36}H_{28}ClN_3NaO_3$ ($[M+Na]^+$): 608.1711, found: 608.1711.

***cis*-1-Benzyl-1'-(4-methoxyphenyl)-7'-methyl-4'-phenyl-1',4'-dihydro-6'*H*-spiro[indoline-3,5'-pyrrolo[3,4-*b*]azepine]-2,6',8'(7'*H*)-trione (3g):** ethyl acetate, dichloromethane and petroleum ether (V/V/V = 1:10:10) as eluent, yellow solid, 0.431 g, 76%, m.p. 204-206 °C; ^{1}H NMR (400 MHz, $CDCl_3$) δ: 7.30-7.28 (m, 3H), 7.23 (s, 1H), 7.19 (d, J = 7.2 Hz, 2H), 7.13 (d, J = 7.2 Hz, 1H), 7.07-6.93 (m, 10H), 6.47 (dd, J_1 = 8.8 Hz, J_2 = 1.6 Hz, 1H), 6.35 (d, J = 8.0 Hz, 1H), 5.59 (dd, J_1 = 8.8 Hz, J_2 = 5.2 Hz, 1H), 4.96 (d, J = 16.0 Hz, 1H), 4.56 (d, J = 16.0 Hz, 1H), 3.98 (d, J = 5.2 Hz, 1H), 3.86 (s, 3H), 2.75 (s, 3H); $^{13}C\{^{1}H\}$ NMR (100 MHz, $CDCl_3$) δ: 176.6, 168.9, 165.9, 159.1, 141.9, 141.0, 138.4, 137.1, 135.5, 134.8, 132.1, 129.0, 128.6, 128.1, 127.6, 127.5, 127.3, 127.2, 126.9, 123.2, 122.3, 115.5, 114.6, 108.8, 106.7, 58.1, 55.5, 50.8, 44.2, 23.5; IR(KBr) υ: 1762, 1704, 1620, 1507, 1437, 1386, 1333, 1245, 1169, 1080, 1008, 840, 809 cm^{-1}; MS (*m*/*z*): HRMS (ESI-TOF) Calcd. For $C_{36}H_{29}N_3NaO_4$ ($[M+Na]^+$): 590.2050, found: 590.2084.

***trans*-1-Benzyl-1'-(4-methoxyphenyl)-7'-methyl-4'-phenyl-1',4'-dihydro-6'*H*-spiro[indoline-3,5'-pyrrolo[3,4-*b*]azepine]-2,6',8'(7'*H*)-trione (3g'):** ethyl acetate, dichloromethane and petroleum ether (V/V/V = 1:10:10) as eluent, yellow solid, 0.034 g, 6%, m.p. 213-215 °C; ^{1}H

NMR (400 MHz, $CDCl_3$) δ: 7.38 (d, *J* = 7.2 Hz, 1H), 7.29 (d, *J* = 8.4 Hz, 2H), 7.23 (d, *J* = 7.2 Hz, 1H), 7.15-7.06 (m, 2H), 7.00 (d, *J* = 8.8 Hz, 2H), 6.78 (d, *J* = 7.6 Hz, 2H), 6.62-6.61 (m, 2H), 6.40 (dd, J_1 = 9.2 Hz, J_2 = 2.4 Hz, 1H), 6.33 (d, *J* = 7.6 Hz, 1H), 5.36 (dd, J_1 = 9.2 Hz, J_2 = 5.2 Hz, 1H), 4.73 (d, *J* = 16.4 Hz, 1H), 4.49 (d, *J* = 16.4 Hz, 1H), 4.34 (dd, J_1 = 4.8 Hz, J_2 = 2.0 Hz, 1H), 3.87 (s, 3H), 2.81 (s, 3H); $^{13}C\{^1H\}$ NMR (150 MHz, $CDCl_3$) δ: 174.8, 168.9, 165.9, 159.2, 144.7, 140.5, 138.5, 136.9, 135.4, 132.3, 129.1, 128.5, 128.0, 127.8, 127.4, 126.9, 126.5, 124.7, 122.1, 115.9, 114.6, 108.9, 57.0, 55.5, 49.4, 44.0, 29.7, 29.3, 27.2, 23.6, 22.7; IR(KBr) υ: 1761, 1703, 1618, 1506, 1438, 1384, 1313, 1225, 1167, 1081, 1007, 841, 806 cm^{-1}; MS (*m*/*z*): HRMS (ESI-TOF) Calcd. For $C_{36}H_{29}N_3NaO_4$ ($[M+Na]^+$): 590.2050, found: 590.2086.

***cis*-1-Benzyl-1'-(4-methoxyphenyl)-5,7'-dimethyl-4'-phenyl-1',4'-dihydro-6'*H*-spiro[indoline-3,5'-pyrrolo[3,4-*b*]azepine]-2,6',8'(7'*H*)-trione (3h):** ethyl acetate, dichloromethane and petroleum ether (V/V/V = 1:10:10) as eluent, yellow solid, 0.482 g, 83%, m.p. 203-205 °C; ^1H NMR (400 MHz, $CDCl_3$) δ: 7.30 (d, *J* = 8.4 Hz, 2H), 7.25-7.22 (m, 2H), 7.18 (d, *J* = 7.6 Hz, 2H), 7.08-6.94 (m, 9H), 6.79 (d, *J* = 8.0 Hz, 1H), 6.49 (d, *J* = 8.8 Hz, 1H), 6.22 (d, *J* = 8.0 Hz, 1H), 5.60 (dd, J_1 = 8.0 Hz, J_2 = 5.6 Hz, 1H), 4.96 (d, *J* = 16.0 Hz, 1H), 4.51 (d, *J* = 16.0 Hz, 1H), 3.96 (d, *J* = 4.8 Hz, 1H), 3.86 (s, 3H), 2.76 (s, 3H), 2.29 (s, 3H); $^{13}C\{^1H\}$ NMR (100 MHz, $CDCl_3$) δ: 176.6, 168.9, 166.0, 159.0, 140.9, 139.5, 138.5, 137.1, 135.6, 134.9, 132.2, 131.6, 129.0, 128.6, 128.4, 127.6, 127.5, 127.2, 127.1, 126.9, 123.9, 115.8, 114.6, 108.5, 107.0, 58.2, 55.5, 50.7, 44.2, 23.5, 21.3; IR(KBr) υ: 1764, 1702, 1620, 1508, 1437, 1386, 1336, 1301, 1246, 1187, 1119, 1081, 1011, 839, 809, 769, 751 cm^{-1}; MS (*m*/*z*): HRMS (ESI-TOF) Calcd. For $C_{37}H_{32}N_3O_4$ ($[M+H]^+$): 582.2387, found: 582.2402.

***cis*-1-Benzyl-5-chloro-1'-(4-methoxyphenyl)-7'-methyl-4'-phenyl-1',4'-dihydro-6'*H*-spiro[indoline-3,5'-pyrrolo[3,4-*b*]azepine]-2,6',8'(7'*H*)-trione (3i):** ethyl acetate, dichloromethane and petroleum ether (V/V/V = 1:10:10) as eluent, yellow solid, 0.481 g, 80%, m.p. 199-201 °C; ^1H NMR (400 MHz, $CDCl_3$) δ: 7.29 (d, *J* = 8.4 Hz, 3H), 7.23 (d, *J* = 7.2 Hz, 1H), 7.16 (d, *J* = 7.2 Hz, 2H), 7.11-6,95 (m, 10H), 6.50 (d, *J* = 8.8 Hz, 1H), 6.24 (d, *J* = 8.4 Hz, 1H), 5.59 (dd, J_1 = 8.8 Hz, J_2 = 5.2 Hz, 1H), 4.98 (d, *J* = 16.0 Hz, 1H), 4.49 (d, *J* = 16.0 Hz, 1H), 3.96 (d, *J* = 3.6 Hz, 1H), 3.87 (s, 3H), 2.78 (s, 3H); $^{13}C\{^1H\}$ NMR (100 MHz, $CDCl_3$) δ: 176.3, 168.8, 165.7, 159.2, 141.1, 140.5, 138.0, 136.9, 135.1, 135.0, 133.7, 129.0, 128.7, 128.0, 127.8, 127.7, 127.5, 127.5, 127.1, 123.6, 115.3, 114.6, 109.7, 105.9, 58.0, 55.5, 50.7, 44.3, 23.6; IR(KBr) υ: 1761, 1701, 1629, 1506,

1435, 1381, 1335, 1309, 1242, 1189, 1110, 1084, 1014, 840, 801, 764, 752 cm^{-1}; MS (*m*/*z*): HRMS (ESI-TOF) Calcd. For $C_{36}H_{28}ClN_3NaO_4$ ($[M+Na]^+$): 624.1661, found: 624.1660.

***trans*-1-Benzyl-5-chloro-1'-(4-methoxyphenyl)-7'-methyl-4'-phenyl-1',4'-dihydro-6'*H*-spiro[indoline-3,5'-pyrrolo[3,4-*b*]azepine]-2,6',8'(7'*H*)-trione (3i'):** ethyl acetate, dichloromethane and petroleum ether (V/V/V = 1:10:10) as eluent, yellow solid, 0.030 g, 5%, m.p. 219-221 °C; ^1H NMR (400 MHz, $CDCl_3$) δ: 7.35 (s, 1H), 7.30 (d, *J* = 8.0 Hz, 2H), 7.15-7.07 (m, 6H), 7.01 (d, *J* = 6.8 Hz, 2H), 6.82 (d, *J* = 7.6 Hz, 2H), 6.60 (d, *J* = 6.4 Hz, 2H), 6.44 (d, *J* = 8.8 Hz, 1H), 6.24 (d, *J* = 8.4 Hz, 1H), 5.39 (dd, J_1 = 9.2 Hz, J_2 = 5.2 Hz, 1H), 4.71 (d, *J* = 16.0 Hz, 1H), 4.46 (d, *J* = 16.0 Hz, 1H), 4.34 (s, 1H), 3.87 (s, 3H), 2.81 (s, 3H); $^{13}C\{^1H\}$ NMR (100 MHz, $CDCl_3$) δ: 174.4, 168.9, 165.6, 159.3, 143.3, 140.6, 138.0, 136.6, 135.1, 134.9, 134.1, 129.1, 128.6, 128.4, 128.2, 127.8, 127.6, 127.4, 127.1, 126.5, 125.0, 115.7, 114.7, 110.2, 108.0, 57.2, 55.5, 49.3, 44.1, 23.6; IR(KBr) υ: 1766, 1709, 1639, 1508, 1435, 1381, 1335, 1319, 1241, 1180, 1119, 1081, 1016, 849, 798, 764, 758 cm^{-1}; MS (*m*/*z*): HRMS (ESI-TOF) Calcd. For $C_{36}H_{28}ClN_3NaO_4$ ($[M+Na]^+$): 624.1661, found: 624.1666.

***cis*-1-Butyl-1'-(4-methoxyphenyl)-5,7'-dimethyl-4'-phenyl-1',4'-dihydro-6'*H*-spiro[indoline-3,5'-pyrrolo[3,4-*b*]azepine]-2,6',8'(7'*H*)-trione (3j):** ethyl acetate, dichloromethane and petroleum ether (V/V/V = 1:10:10) as eluent, yellow solid, 0.394 g, 72%, m.p. 201-203 °C; ^1H NMR (400 MHz, $CDCl_3$) δ: 7.29 (d, *J* = 8.8 Hz, 2H), 7.04-6.94 (m, 7H), 6.89 (d, *J* = 11.6 Hz, 2H), 6.47 (dd, J_1 = 8.8 Hz, J_2 = 2.0 Hz, 1H), 6.38 (d, *J* = 7.6 Hz, 1H), 5.58 (dd, J_1 = 8.8 Hz, J_2 = 3.6 Hz, 1H), 3.91 (dd, J_1 = 5.6 Hz, J_2 = 2.4 Hz, 1H), 3.68 (s, 3H), 3.61-3.54 (m, 1H), 3.46-3.39 (m, 1H), 2.73 (s, 3H),2.32 (s, 3H), 1.54-1.47 (m, 2H), 1.34-1.29 (m, 2H), 0.92 (t, *J* = 7.2 Hz, 3H); $^{13}C\{^1H\}$ NMR (100 MHz, $CDCl_3$) δ: 176.2, 168.8, 166.0, 159.0, 140.9, 139.8, 138.6, 137.2, 134.7, 132.3, 131.2, 129.1, 128.4, 127.5, 127.4, 126.8, 124.0, 115.7, 114.5, 107.6, 107.1, 58.0, 55.5, 50.6, 40.2, 29.2, 23.5, 21.3, 20.2, 13.7; IR(KBr) υ: 2934, 1763, 1701, 1654, 1604, 1561, 1508, 1438, 1383, 1357, 1299, 1245, 1197, 1168, 1131, 1106, 1032, 1008, 835, 813, 772, 757 cm^{-1}; MS (*m*/*z*): HRMS (ESI-TOF) Calcd. For $C_{34}H_{34}N_3O_4$ ($[M+H]^+$): 548.2544, found: 548.2566.

***cis*-1-Benzyl-1'-(4-(tert-butyl)phenyl)-7'-methyl-4'-phenyl-1',4'-dihydro-6'*H*-spiro[indoline-3,5'-pyrrolo[3,4-*b*]azepine]-2,6',8'(7'*H*)-trione (3k):** ethyl acetate, dichloromethane and petroleum ether (V/V/V = 1:10:10) as eluent, yellow solid, 0.498 g, 84%, m.p. 199-201 °C; ^1H NMR (400 MHz, $CDCl_3$) δ: 7.48 (d, *J* = 7.2 Hz, 2H), 7.28 (s, 3H), 7.25-7.15 (m, 5H), 7.05-6.96 (m, 7H), 6.56

(d, *J* = 7.2 Hz, 1H), 6.35 (d, *J* = 5.6 Hz, 1H), 4.96 (d, *J* = 16.0 Hz, 1H), 4.56 (d, *J* = 16.0 Hz, 1H), 4.00 (s, 1H), 2.76 (s, 3H), 1.38 (s, 9H); $^{13}C\{^{1}H\}$ NMR (100 MHz, $CDCl_3$) δ: 176.6, 168.9, 165.9, 150.9, 141.9, 141.6, 141.0, 138.4, 135.5, 134.8, 132.1, 129.0, 128.6, 128.1, 127.6, 127.3, 127.2, 126.9, 126.4, 125.6, 123.1, 122.3, 115.9, 108.8, 107.4, 58.0, 50.7, 44.3, 34.7, 31.4, 23.6; IR(KBr) υ: 1764, 1701, 1604, 1561, 1493, 1438, 1379, 1269, 1172, 839, 758 cm^{-1}; MS (*m*/*z*): HRMS (ESI-TOF) Calcd. For $C_{39}H_{36}N_3O_3$ ($[M+H]^+$): 594.2751, found: 594.2746.

***cis*-1-Benzyl-1'-(4-chlorophenyl)-7'-methyl-4'-phenyl-1',4'-dihydro-6'*H*-spiro[indoline-3,5'-pyrrolo[3,4-*b*]azepine]-2,6',8'(7'*H*)-trione (3l):** ethyl acetate, dichloromethane and petroleum ether (V/V/V = 1:10:10) as eluent, yellow solid, 0.423 g, 74%, m.p. 211-213 °C; ^{1}H NMR (400 MHz, $CDCl_3$) δ: 7.51-7.47 (m, 2H), 7.44-7.38 (m, 3H), 7.30-7.26 (m, 1H), 7.25-7.24 (m, 1H), 7.20-7.18 (m, 2H), 7.15-7.13 (m, 1H), 7.08-7.03 (m, 1H), 7.01-6.94 (m, 6H), 6.58 (dd, J_1 = 8.8 Hz, J_2 = 1.6 Hz, 1H), 6.35 (dd, J_1 = 7.2 Hz, J_2 = 2.4 Hz, 1H), 5.64 (dd, J_1 = 8.8 Hz, J_2 = 5.2 Hz, 1H), 4.96 (d, *J* = 16.0 Hz, 1H), 4.55 (d, *J* = 16.0 Hz, 1H), 4.01 (dd, J_1 = 5.2 Hz, J_2 = 2.0 Hz, 1H), 2.75 (s, 3H); $^{13}C\{^{1}H\}$ NMR (100 MHz, $CDCl_3$) δ: 176.5, 168.8, 165.8, 144.2, 142.0, 141.0, 138.3, 135.5, 134.5, 132.0, 129.5, 129.0, 128.6, 128.2, 127.9, 127.7, 127.3, 127.3, 127.0, 126.2, 123.2, 122.3, 116.0, 108.9, 107.8, 58.0, 50.7, 44.3, 23.5; IR(KBr) υ: 1764, 1703, 1609, 1490, 1467, 1453, 1435, 1380, 1353, 1263, 1173, 1134, 1074, 1031, 1010, 783, 774, 751 cm^{-1}; MS (*m*/*z*): HRMS (ESI-TOF) Calcd. For $C_{35}H_{26}ClN_3NaO_3$ ($[M+Na]^+$): 594.1555, found: 594.1571.

***cis*-1-Benzyl-5-chloro-1'-(4-chlorophenyl)-7'-methyl-4'-phenyl-1',4'-dihydro-6'*H*-spiro[indoline-3,5'-pyrrolo[3,4-*b*]azepine]-2,6',8'(7'*H*)-trione (3m):** ethyl acetate, dichloromethane and petroleum ether (V/V/V = 1:10:10) as eluent, yellow solid, 0.563 g, 93%, m.p. 228-230 °C; ^{1}H NMR (400 MHz, $CDCl_3$) δ: 7.45 (d, *J* = 8.4 Hz, 2H), 7.33-7.28 (m, 4H), 7.23 (d, *J* = 6.4 Hz, 1H), 7.15 (d, *J* = 7.2 Hz, 2H), 7.11 (s, 1H), 7.07 (d, *J* = 6.8 Hz, 1H), 7.03 (t, *J* = 7.2 Hz, 2H), 6.95 (d, *J* = 5.6 Hz, 3H), 6.51 (d, *J* = 9.2 Hz, 1H), 6.24 (d, *J* = 9.2 Hz, 1H), 5.66 (dd, J_1 = 8.8 Hz, J_2 = 5.2 Hz, 1H), 4.97 (d, *J* = 16.0 Hz, 1H), 4.47 (d, *J* = 16.0 Hz, 1H), 3.98 (d, *J* = 3.6 Hz, 1H), 2.78 (s, 3H); $^{13}C\{^{1}H\}$ NMR (100 MHz, $CDCl_3$) δ: 176.1, 168.6, 165.6, 142.5, 140.8, 140.6, 137.7, 134.9, 134.3, 133.8, 133.4, 129.8, 129.0, 128.7, 128.2, 127.9, 127.7, 127.6, 127.5, 127.3, 127.2, 123.6, 116.2, 109.9, 107.5, 57.9, 50.6, 44.4, 23.7; IR(KBr) υ: 1707, 1650 1616, 1486, 1447, 1387, 1331, 1268, 1167, 1120, 1100, 1080, 1013, 963, 842, 805, 756 cm^{-1}; MS (*m*/*z*): HRMS (ESI-TOF) Calcd. For $C_{35}H_{25}Cl_2N_3NaO_3$ ($[M+Na]^+$): 628.1165, found: 628.1173.

***cis*-1-Benzyl-5-chloro-1'-(3-chlorophenyl)-7'-methyl-4'-phenyl-1',4'-dihydro-6'*H*-spiro[indoline-3,5'-pyrrolo[3,4-*b*]azepine]-2,6',8'(7'*H*)-trione (3n):** ethyl acetate, dichloromethane and petroleum ether (V/V/V = 1:10:10) as eluent, yellow solid, 0.502 g, 83%, m.p. 219-221 ^{o}C; ^{1}H NMR (400 MHz, $CDCl_3$) δ: 7.44-7.39 (m, 3H), 7.30-7.26 (m, 3H), 7.23 (d, *J* = 5.2 Hz, 1H), 7.16-7.14 (m, 2H), 7.12 (d, *J* = 2.0 Hz, 1H), 7.08 (d, *J* = 7.2 Hz, 1H), 7.03 (t, *J* = 7.6 Hz, 2H), 6.97-6..94 (m, 3H), 6.56 (dd, J_1 = 8.8 Hz, J_2 = 2.0 Hz, 1H), 6.24 (d, *J* = 8.0 Hz, 1H), 5.66 (dd, J_1 = 9.2 Hz, J_2 = 5.6 Hz, 1H), 4.98 (d, *J* = 16.0 Hz, 1H), 4.47 (d, *J* = 16.0 Hz, 1H), 3.99-3.97 (m, 1H), 2.79 (s, 3H); ^{13}C{^{1}H} NMR (100 MHz, $CDCl_3$) δ: 176.0, 168.6, 165.4, 144.9, 140.78, 140.6, 137.6, 135.0, 134.9, 134.2, 133.3, 130.5, 128.9, 128.7, 128.2, 127.9, 127.7, 127.5, 127.2, 127.1, 126.6, 124.4, 123.6, 116.4, 109.8, 108.0, 63.8, 57.8 , 50.5, 44.3, 23.6; IR(KBr) υ:1705, 1657, 1589, 1485, 1454, 1378, 1244, 1171, 990, 817, 758 cm^{-1}; MS (*m*/*z*): HRMS (ESI-TOF) Calcd. For $C_{35}H_{26}Cl_2N_3O_3$ ([M+H]$^{+}$): 606.1346, found: 606.1361.

***cis*-1-Benzyl-1'-(4-bromophenyl)-5-chloro-7'-methyl-4'-phenyl-1',4'-dihydro-6'*H*-spiro[indoline-3,5'-pyrrolo[3,4-*b*]azepine]-2,6',8'(7'*H*)-trione (3o):** ethyl acetate, dichloromethane and petroleum ether (V/V/V = 1:10:10) as eluent, yellow solid, 0.493 g, 76%, m.p. 234-236 ^{o}C; ^{1}H NMR (400 MHz, $CDCl_3$) δ: 7.61 (d, *J* = 8.8 Hz, 2H), 7.30-7.27 (m, 3H), 7.23 (d, *J* = 10.0 Hz, 2H), 7.14 (d, *J* = 6.8 Hz, 2H), 7.11 (s, 1H), 7.08 (d, *J* = 7.2 Hz, 1H), 7.03 (t, *J* = 7.6 Hz, 2H), 6.97-6..94 (m, 3H), 6.53 (dd, J_1 = 8.8 Hz, J_2 = 2.0 Hz, 1H), 6.24 (d, *J* = 8.4 Hz, 1H), 5.65 (dd, J_1 = 8.8 Hz, J_2 = 5.2 Hz, 1H), 4.97 (d, *J* = 16.0 Hz, 1H), 4.47 (d, *J* = 16.0 Hz, 1H), 3.97 (dd, J_1 = 5.2 Hz, J_2 = 2.0 Hz, 1H), 2.78 (s, 3H); ^{13}C{^{1}H} NMR (100 MHz, $CDCl_3$) δ: 176.0, 168.6, 165.6, 143.0, 140.8, 140.5, 137.7, 134.9, 134.2, 133.3, 132.8, 128.9, 128.7, 128.1, 127.9, 127.8, 127.7, 127.5, 127.2, 127.1, 123.6, 121.7, 116.2, 107.6, 57.9, 50.6, 44.3, 23.6; IR(KBr) υ: 1760, 1712, 1612, 1485, 1454 1380, 1331, 1267, 1172, 1119, 1078, 1009, 839, 813, 757 cm^{-1}; MS (*m*/*z*): HRMS (ESI-TOF) Calcd. For $C_{35}H_{26}BrClN_3NaO_3$ ([M+Na]$^{+}$): 672.0660, found: 672.0668.

***cis*-1-Benzyl-1'-mesityl-7'-methyl-4'-phenyl-1',4'-dihydro-6'*H*-spiro[indoline-3,5'-pyrrolo[3,4-*b*]azepine]-2,6',8'(7'*H*)-trione (3p):** ethyl acetate, dichloromethane and petroleum ether (V/V/V = 1:10:10) as eluent, yellow solid, 0.504 g, 87%, m.p. 223-225 ^{o}C; ^{1}H NMR (400 MHz, $CDCl_3$) δ: 7.29-7.27 (m, 2H), 7.23 (d, *J* = 5.2 Hz, 1H), 7.19 (d, *J* = 6.8 Hz, 2H), 7.09 (d, *J* = 7.2 Hz, 1H), 7.06-6.93 (m, 9H), 6.36 (d, *J* = 7.2 Hz, 1H), 6.12 (dd, J_1 = 9.2 Hz, J_2 = 2.4 Hz, 1H), 5.61 (dd, J_1 = 9.2 Hz, J_2 = 4.8 Hz, 1H), 4.94 (d, *J* = 16.0 Hz, 1H), 4.56 (d, *J* = 16.0 Hz, 1H), 3.97 (dd, J_1 = 5.2

Hz, J_2 = 2.4 Hz, 1H), 2.76 (s, 3H), 2.35 (s, 3H), 2.32 (s, 3H), 2.26 (s, 3H); $^{13}C\{^1H\}$ NMR (100 MHz, $CDCl_3$) δ: 176.4, 168.9, 165.5, 142.0, 141.0, 139.9, 139.6, 138.8, 138.1, 135.5, 134.9, 134.5, 132.1, 129.6, 129.2, 129.0, 128.6, 128.0, 127.6, 127.3, 126.8, 123.2, 122.1, 116.1, 105.5, 58.1, 51.3, 51.3, 44.2, 23.5, 21.1, 17.9, 17.7; IR(KBr) υ: 1762, 1717, 1598, 1492, 1438, 1378, 1177, 1011, 851, 753 cm^{-1}; MS (*m*/*z*): HRMS (ESI-TOF) Calcd. For $C_{38}H_{33}N_3NaO_3$ ($[M+Na]^+$): 602.2414, found: 602.2412.

***cis*-1-Benzyl-4'-(4-methoxyphenyl)-7'-methyl-1'-(*p*-tolyl)-1',4'-dihydro-6'*H*-spiro[indoline-3,5'-pyrrolo[3,4-*b*]azepine]-2,6',8'(7'*H*)-trione (3q):** ethyl acetate, dichloromethane and petroleum ether (V/V/V = 1:10:10) as eluent, yellow solid, 0.523 g, 90%, m.p. 226-228 °C; ^1H NMR (400 MHz, $CDCl_3$) δ: 7.30-7.26 (m, 5H), 7.25-7.24 (m, 2H), 7.20-7.18 (m, 2H), 7.13-7.11 (m, 1H), 7.04-6.96 (m, 2H), 6.85 (d, *J* = 8.8 Hz, 2H), 6.53-6.49 (m, 3H), 6.39 (d, *J* = 8.0 Hz, 1H), 5.58 (dd, J_1 = 8.8 Hz, J_2 = 5.2 Hz, 1H), 4.93 (d, *J* = 16.0 Hz, 1H), 4.62 (d, *J* = 16.0 Hz, 1H), 3.95 (d, *J* = 2.0 Hz, 1H), 3.68 (s, 3H), 2.75 (s, 3H), 2.43 (s, 3H); $^{13}C\{^1H\}$ NMR (100 MHz, $CDCl_3$) δ: 176.7, 168.9, 165.9, 158.4, 142.0, 141.8, 140.9, 137.8, 135.5, 134.3, 132.3, 130.5, 130.1, 130.0, 128.6, 128.1, 127.3, 127.3, 126.0, 123.1, 122.2, 116.1, 113.0, 108.9, 107.2, 58.1, 55.1, 49.8, 49.8, 44.2, 23.5, 21.2; IR(KBr) υ: 1759, 1712, 1651, 1611, 1513, 1489, 1468, 1445, 1381, 1347, 1304, 1251, 1174, 1129, 1103, 1038, 1009, 822 cm^{-1}; MS (*m*/*z*): HRMS (ESI-TOF) Calcd. For $C_{37}H_{32}N_3O_4$ ($[M+H]^+$): 582.2387, found: 582.2408.

***cis*-1-Benzyl-5-chloro-4'-(4-methoxyphenyl)-7'-methyl-1'-(4-nitrophenyl)-1',4'-dihydro-6'*H*-spiro[indoline-3,5'-pyrrolo[3,4-*b*]azepine]-2,6',8'(7'*H*)-trione (3r):** ethyl acetate, dichloromethane and petroleum ether (V/V/V = 1:10:10) as eluent, yellow solid, 0.433 g, 67%, m.p. 234-236 °C; ^1H NMR (400 MHz, $CDCl_3$) δ: 8.34 (d, *J* = 8.8 Hz, 2H), 7.49 (d, *J* = 8.8 Hz, 2H), 7.30-7.27 (m, 3H), 7.14 (d, *J* = 8.4 Hz, 3H), 7.00 (d, *J* = 9.6 Hz, 1H), 6.86 (d, *J* = 8.4 Hz, 2H), 6.74 (d, *J* = 8.4 Hz, 1H), 6.55 (d, *J* = 8.4 Hz, 2H), 6.27 (d, *J* = 8.4 Hz, 1H), 5.80 (dd, J_1 = 8.4 Hz, J_2 = 5.2 Hz, 1H), 4.95 (d, *J* = 16.0 Hz, 1H), 4.52 (d, *J* = 16.0 Hz, 1H), 4.01 (d, *J* = 6.0 Hz, 1H), 3.70 (s, 3H), 2.81 (s, 3H); $^{13}C\{^1H\}$ NMR (100 MHz, $CDCl_3$) δ: 175.8, 168.5, 165.4, 142.9, 140.7, 140.5, 136.3, 134.8, 133.2, 133.1, 132.8, 130.3, 128.7, 128.4, 128.1, 127.8, 127.6, 127.3, 123.5, 121.6, 115.4, 110.1, 107.4, 61.5, 57.7, 55.7, 49.7, 29.7, 23.6; IR(KBr) υ: 1705, 1590, 1516, 1488, 1434, 1341, 1251, 1177 cm^{-1}; MS (*m*/*z*): HRMS (ESI-TOF) Calcd. For $C_{36}H_{27}ClN_4NaO_6$ ($[M+Na]^+$): 669.1511, found: 669.1541.

***cis*-1-Benzyl-5-chloro-1'-(2,6-dimethylphenyl)-4'-(4-methoxyphenyl)-7'-methyl-1',4'-dihydro-6'*H*-spiro[indoline-3,5'-pyrrolo[3,4-*b*]azepine]-2,6',8'(7'*H*)-trione (3s):** ethyl acetate, dichloromethane and petroleum ether (V/V/V = 1:10:10) as eluent, yellow solid, 0.554 g, 88%, m.p. 249-251 °C; ^{1}H NMR (400 MHz, $CDCl_3$) δ: 7.31-7.27 (m, 3H), 7.24 (s, 1H), 7.19-7.16 (m, 4H), 7.06 (d, J = 2.0 Hz, 1H), 6.98 (dd, J_1 = 8.4 Hz, J_2 = 2.0 Hz, 1H), 6.86 (d, J = 8.4 Hz, 2H), 6.53 (d, J = 8.8 Hz, 2H), 6.29 (d, J = 8.4 Hz, 1H), 6.12 (dd, J_1 = 9.2 Hz, J_2 = 2.0 Hz, 1H), 5.57 (dd, J_1 = 9.2 Hz, J_2 = 4.4 Hz, 1H), 4.93 (d, J = 16.0 Hz, 1H), 4.55 (d, J = 16.0 Hz, 1H), 3.91 (dd, J_1 = 4.8 Hz, J_2 = 1.6 Hz, 1H), 3.70 (s, 3H), 2.78 (s, 3H), 2.35 (s, 3H), 2.29 (s, 3H); ^{13}C{^{1}H} NMR (100 MHz, $CDCl_3$) δ: 176.1, 168.9, 165.3, 158.5, 141.9, 140.9, 140.6, 135.3, 135.1, 134.8, 133.8, 130.4, 130.0, 128.9, 128.7, 128.5, 127.9, 127.6, 127.4, 127.3, 123.5, 116.3, 113.1, 109.9, 104.7, 58.1, 55.1, 55.1, 50.3, 44.3, 23.6, 17.9, 17.9; IR(KBr) υ: 1709, 1610, 1515, 1483, 1380, 1255, 1170 cm^{-1}; MS (*m*/*z*): HRMS (ESI-TOF) Calcd. For $C_{38}H_{32}ClN_3NaO_4$ ([M+Na]$^+$): 652.1974, found: 652.1993.

***cis*-1-Benzyl-1'-(4-bromophenyl)-5-chloro-4'-(4-chlorophenyl)-7'-methyl-1',4'-dihydro-6'*H*-spiro[indoline-3,5'-pyrrolo[3,4-*b*]azepine]-2,6',8'(7'*H*)-trione (3t):** ethyl acetate, dichloromethane and petroleum ether (V/V/V = 1:10:10) as eluent, yellow solid, 0.546 g, 80%, m.p. 262-264 °C; ^{1}H NMR (400 MHz, $CDCl_3$) δ: 7.60 (d, J = 6.8 Hz, 2H),7.32-7.29 (m, 4H), 7.23 (s, 1H), 7.13 (d, J = 7.6 Hz, 2H), 7.10 (s, 1H), 7.02 (d, J = 8.0 Hz, 1H), 6.96 (d, J = 6.8 Hz, 2H), 6.86 (d, J = 6.8 Hz, 2H), 6.51 (d, J = 9.2 Hz, 1H), 6.34 (d, J = 8.4 Hz, 1H), 5.55-5.51 (m, 1H), 4.90 (d, J = 16.0 Hz, 1H), 4.58 (d, J = 16.0 Hz, 1H), 3.95-3.94 (m, 1H), 2.78 (s, 3H); ^{13}C{^{1}H} NMR (100 MHz, $CDCl_3$) δ: 175.8, 168.5, 165.4, 142.9, 140.7, 140.5, 136.3, 134.8, 134.4, 133.2, 133.1, 132.8, 130.2, 128.7, 128.4, 128.1, 127.8, 127.6, 127.3, 123.5, 121.9, 115.4, 110.1, 107.4, 61.5, 57.7, 49.7, 23.6; IR(KBr) υ: 3726, 1709, 1611, 1484, 1445, 1379, 1337 1171, 1009, 814 cm^{-1}; MS (*m*/*z*): HRMS (ESI-TOF) Calcd. For $C_{35}H_{25}BrCl_2N_3O_3$ ([M+H]$^+$): 684.0451, found: 684.0447.

***cis*-1-Benzyl-5-chloro-4'-(4-chlorophenyl)-7'-methyl-1'-(*o*-tolyl)-1',4'-dihydro-6'*H*-spiro[indoline-3,5'-pyrrolo[3,4-*b*]azepine]-2,6',8'(7'*H*)-trione (3u):** ethyl acetate, dichloromethane and petroleum ether (V/V/V = 1:10:10) as eluent, yellow solid, 0.551 g, 89%, m.p. 247-249 °C; ^{1}H NMR (400 MHz, $CDCl_3$) δ: 7.40-7.27 (m, 7H), 7.15 (d, J = 8.0 Hz, 2H), 7.07 (s, 1H), 7.02 (dd, J_1 = 8.4 Hz, J_2 = 2.0 Hz, 1H), 6.97 (d, J = 8.0 Hz, 2H), 6.87 (d, J = 8.4 Hz, 2H), 6.36 (d, J = 8.4 Hz, 1H), 6.25 (d, J = 8.8 Hz, 1H), 5.49 (s, 1H), 4.90 (d, J = 16.0 Hz, 1H), 4.60 (d, J = 16.0 Hz, 1H), 3.94 (s, 1H), 2.77 (s, 3H), 2.38 (s, 3H); ^{13}C{^{1}H} NMR (100 MHz, $CDCl_3$) δ: 175.8, 168.7, 165.3,

140.5, 134.9, 133.4, 133.1, 130.3, 128.7, 128.3, 128.0, 127.8, 127.6, 127.3, 123.5, 114.8, 111.0, 105.1, 57.9, 55.4, 50.2, 44.4, 23.6, 17.7; IR(KBr) υ: 1712, 1615, 1489, 1439, 1380, 1337, 1166, 1014, 836, 807, 742 cm^{-1}; MS (*m*/*z*): HRMS (ESI-TOF) Calcd. For $C_{36}H_{28}Cl_2N_3O_3$ ($[M+H]^+$): 620.1502, found: 620.1508.

***cis*-1-Benzyl-5-chloro-4'-(4-methoxyphenyl)-7'-methyl-1'-(naphthalen-1-yl)-1',4'-dihydro-6'*H*-spiro[indoline-3,5'-pyrrolo[3,4-*b*]azepine]-2,6',8'(7'*H*)-trione (3v):** ethyl acetate, dichloromethane and petroleum ether (V/V/V = 1:10:10) as eluent, yellow solid, 0.534 g, 82%, m.p. 230-232 °C; ^1H NMR (400 MHz, $CDCl_3$) δ: 7.97-7.92 (m, 3H), 7.66-7.56 (m, 4H), 7.32-7.27 (m, 3H), 7.20-7.15 (m, 3H), 7.02-6.98 (m, 1H), 6.94-6.89 (m, 2H), 6.58-6.43 (m, 3H), 6.30 (d, *J* = 7.6 Hz, 1H), 5.57 (s, 1H), 4.98 (d, *J* = 16.0 Hz, 1H), 4.58 (d, *J* = 16.0 Hz, 1H), 4.07 (s, 1H), 3.70 (s, 3H), 2.69 (s, 3H); $^{13}C\{^1H\}$ NMR (150 MHz, $CDCl_3$) δ: 176.3, 168.9, 168.8, 165.2, 158.6, 141.7, 140.7, 140.5, 135.1, 134.7, 134.6, 133.7, 130.3, 130.1, 129.2, 128.9, 128.7, 127.9, 127.8, 127.7, 127.5, 127.3, 126.7, 125.8, 125.4, 125.2, 124.2, 123.6, 122.3, 121.3, 115.6, 115.2, 113.2, 109.9, 58.2, 55.2, 50.3, 44.4, 23.6; IR(KBr) υ: 1703, 1594, 1513, 1485, 1440, 1381, 1328, 1244, 1168, 810, 778 cm^{-1}; MS (*m*/*z*): HRMS (ESI-TOF) Calcd. For $C_{40}H_{31}ClN_3O_4$ ($[M+H]^+$): 652.1998, found: 652.1980.

***cis*-1-benzyl-5-chloro-4'-(2-methoxyphenyl)-7'-methyl-1'-(thiazol-2-yl)-1',4'-dihydro-6'*H*-spiro[indoline-3,5'-pyrrolo[3,4-*b*]azepine]-2,6',8'(7'*H*)-trione (3w):** ethyl acetate, dichloromethane and petroleum ether (V/V/V = 1:10:10) as eluent, yellow solid, 0.498 g, 82%, m.p. 229-231 °C; ^1H NMR (400 MHz, $CDCl_3$) δ: 8.34 (d, *J* = 7.6 Hz, 1H), 7.20 (d, *J* = 7.2 Hz, 3H), 7.13-7.09 (m, 4H), 6.98-6.89 (m, 3H), 6.84-6.79 (m, 2H), 6.52 (d, *J* = 8.4 Hz, 1H), 6.37 (d, *J* = 7.2 Hz, 1H), 5.84 (dd, J_1 = 16.0 Hz, J_2 = 8.0 Hz, 1H), 5.02 (d, *J* = 16.0 Hz, 1H), 4.71 (d, *J* = 16.0 Hz, 1H), 4.57 (d, *J* = 8.0 Hz, 1H), 3.66 (s, 3H), 2.98 (s, 3H); $^{13}C\{^1H\}$ NMR (100 MHz, $CDCl_3$) δ: 172.8, 167.3, 165.6, 157.3, 157.0, 143.0, 135.6, 134.9, 131.8, 129.7, 128.9, 128.7, 128.6, 127.8, 127.4, 127.3, 127.1, 125.7, 125.5, 125.3, 122.5, 120.5, 115.4, 110.9, 110.2, 106.8, 65.6, 58.2, 55.3, 44.6, 24.2; IR(KBr) υ: 3121, 2834, 1709, 1656, 1612, 1486, 1455, 1369, 1341, 1247, 1215, 1194, 1085, 977, 831, 759 cm^{-1}; MS (*m*/*z*): HRMS (ESI-TOF) Calcd. For $C_{33}H_{25}ClN_4NaO_4S$ ($[M+Na]^+$): 631.1177, found: 631.1151.

***cis*-1'-(benzo[*d*]thiazol-2-yl)-1-benzyl-5-chloro-7'-methyl-4'-phenyl-1',4'-dihydro-6'*H*-spiro[indoline-3,5'-pyrrolo[3,4-*b*]azepine]-2,6',8'(7'*H*)-trione (3x):** ethyl acetate, dichloromethane and

petroleum ether (V/V/V = 1:10:10) as eluent, yellow solid, 0.458 g, 73%, m.p. 214-216 °C; ^{1}H NMR (400 MHz, $CDCl_3$) δ: 7.92 (d, *J* = 8.0 Hz, 1H), 7.82 (d, *J* = 8.4 Hz, 1H), 7.49 (d, *J* = 8.0 Hz, 1H), 7.37 (d, *J* = 8.0 Hz, 1H), 7.30-7.27 (m, 3H), 7.14-6.96 (m, 10H), 6.21 (d, *J* = 8.4 Hz, 1H), 6.11 (t, *J* = 7.2 Hz, 1H), 4.98 (d, *J* = 16.0 Hz, 1H), 4.44 (d, *J* = 16.0 Hz, 1H), 4.26 (d, *J* = 5.2 Hz, 1H), 2.89 (s, 3H); ^{13}C{^{1}H} NMR (100 MHz, $CDCl_3$) δ: 175.2, 168.2, 164.6, 161.8, 150.2, 141.3, 140.9, 136.0, 134.7, 133.5, 133.1, 132.3, 128.9, 128.7, 128.0, 127.9, 127.6, 127.1, 126.7, 125.0, 123.7, 122.5, 122.5, 121.5, 118.8, 110.1, 56.4, 49.2, 44.4, 23.9; IR(KBr) υ: 3448, 2925, 2854, 1711, 1637, 1439, 1376, 1020 cm^{-1}; MS (*m*/*z*): HRMS (ESI-TOF) Calcd. For $C_{36}H_{25}ClN_4NaO_3S$ ([M+Na]$^+$): 651.1218, found: 651.1190.

2. General procedure for the reactions of *a,ß*-unsaturated *N*-benzylaldimines and MBH maleimides of isatins: A mixture of *a,ß*-unsaturated *N*-benzylaldimine (0.10 mmol), MBH maleimide of isatin (0.10 mmol) and DABCO (20 mmol%) in CH_3CN (10.0 mL) was stirred at 50 °C for 8 hours. After removing the solvent by rotatory evaporation, the resulting residue was purified by column chromatography on silica gel with ethyl acetate and petroleum ether (V/V = 1:8) as eluent to afford the desired products **4a-4k** and minor isomers **4c'**, **4e'**and **4h'**.

***cis*-1,1'-Dibenzyl-7'-methyl-4'-phenyl-1',4'-dihydro-6'*H*-spiro[indoline-3,5'-pyrrolo[3,4-*b*]azepine]-2,6',8'(7'*H*)-trione (4a):** ethyl acetate and petroleum ether (V/V = 1:8) as eluent, yellow solid, 0.474 g, 86%, m.p. 178-180 °C; ^{1}H NMR (400 MHz, $CDCl_3$) δ: 7.42-7.27 (m, 7H), 7.25-7.22 (m, 1H), 7.18 (d, *J* = 7.6 Hz, 2H), 7.05-6.92 (m, 6H), 6.86 (d, *J* = 7.2 Hz, 2H), 6.33-6.30 (m, 1H), 6.31 (d, *J* = 7.6 Hz, 1H), 5.86 (d, *J* = 15.6 Hz, 1H), 5.71 (dd, J_1 = 8.8 Hz, J_2 = 3.2 Hz, 1H), 5.10 (d, *J* = 15.6 Hz, 1H), 4.96 (d, *J* = 16.0 Hz, 1H), 4.51 (d, *J* = 16.0 Hz, 1H), 3.78 (dd, J_1 = 5.6 Hz, J_2 = 2.0 Hz, 1H), 2.85 (s, 3H); ^{13}C{^{1}H} NMR (100 MHz, $CDCl_3$) δ: 176.8, 168.6, 167.2, 141.8, 141.3, 138.1, 137.6, 135.5, 134.3, 132.3, 128.9, 128.9, 128.6, 128.0, 127.7, 127.6, 127.2, 127.2, 126.9, 122.9, 122.2, 117.9, 108.7, 106.3, 58.6, 55.2, 50.6, 44.1, 23.6; IR(KBr) υ: 3726, 1697, 1576, 1489, 1442, 1384, 1328, 1254, 879 cm^{-1}; MS (*m*/*z*): HRMS (ESI-TOF) Calcd. For $C_{36}H_{30}N_3O_3$ ([M+H]$^+$): 552.2282, found: 552.2273.

***cis*-1,1'-Dibenzyl-5,7'-dimethyl-4'-phenyl-1',4'-dihydro-6'*H*-spiro[indoline-3,5'-pyrrolo[3,4-*b*]azepine]-2,6',8'(7'*H*)-trione (4b):** ethyl acetate and petroleum ether (V/V = 1:8) as eluent, yellow solid, 0.412 g, 73%, m.p. 190-192 °C; ^{1}H NMR (400 MHz, $CDCl_3$) δ: 7.42-7.31 (m, 6H), 7.24-7.21 (m, 2H), 7.17 (d, *J* = 7.2 Hz, 2H), 7.04 (t, *J* = 7.2 Hz, 1H), 6.96 (t, *J* = 7.6 Hz, 2H), 6.87

(d, J = 7.6 Hz, 2H), 6.81 (s, 1H), 6.75 (d, J = 8.0 Hz, 1H), 6.30 (d, J = 8.8 Hz, 1H), 6.18 (d, J = 8.0 Hz, 1H), 5.88 (d, J = 15.6 Hz, 1H), 5.70 (dd, J_1 = 8.8 Hz, J_2 = 3.2 Hz, 1H), 5.08 (d, J = 15.6 Hz, 1H), 4.95 (d, J = 16.0 Hz, 1H), 4.47 (d, J = 16.0 Hz, 1H), 3.75 (d, J = 7.2 Hz, 1H), 2.85 (s, 3H), 2.25 (s, 3H); $^{13}C\{^1H\}$ NMR (100 MHz, $CDCl_3$) δ: 176.7, 168.7, 167.3, 141.2, 139.5, 138.3, 137.6, 135.6, 134.3, 132.4, 131.6, 129.0, 128.8, 128.5, 128.4, 127.7, 127.6, 127.3, 127.2, 126.8, 123.7, 118.0, 116.6, 115.9, 108.9, 108.4, 108.3, 106.5, 58.6, 55.2, 50.6, 44.1, 23.6, 21.2; IR(KBr) υ: 1698, 1597, 1489, 1454, 753 cm^{-1}; MS (m/z): HRMS (ESI-TOF) Calcd. For $C_{37}H_{31}N_3NaO_3$ ($[M+Na]^+$): 588.2258, found: 588.2253.

***cis*-1,1'-Dibenzyl-5-chloro-7'-methyl-4'-phenyl-1',4'-dihydro-6'*H*-spiro[indoline-3,5'-pyrrolo[3,4-*b*]azepine]-2,6',8'(7'*H*)-trione (4c):** ethyl acetate and petroleum ether (V/V = 1:8) as eluent, yellow solid, 0.379 g, 65%, m.p. 194-196 °C; ^1H NMR (400 MHz, $CDCl_3$) δ: 7.40-7.27 (m, 7H), 7.23 (s, 1H), 7.15 (d, J = 5.6 Hz, 2H), 7.06 (d, J = 5.2 Hz, 1H), 7.01-6.99 (m, 3H), 6.93-6.87 (m, 3H), 6.32 (d, J = 8.8 Hz, 1H), 6.20 (d, J = 7.6 Hz, 1H), 5.86 (d, J = 15.6 Hz, 1H), 5.67 (dd, J_1 = 8.8 Hz, J_2 = 3.2 Hz, 1H), 5.10 (d, J = 15.6 Hz, 1H), 4.97 (d, J = 16.0 Hz, 1H), 4.45 (d, J = 16.0 Hz, 1H), 3.74 (s, 1H), 2.87 (s, 3H); $^{13}C\{^1H\}$ NMR (100 MHz, $CDCl_3$) δ: 176.4, 168.6, 167.0, 141.3, 140.4, 137.7, 137.3, 135.0, 134.4, 133.9, 128.9, 128.8, 128.7, 127.9, 127.8, 127.7, 127.6, 127.4, 127.3, 127.1, 127.0, 123.3, 117.7, 109.7, 105.4, 58.5, 55.2, 50.5, 44.25, 23.7; IR(KBr) υ: 1704, 1694, 1669, 1595, 1488, 1454, 1423, 1387, 1331, 1259, 1162, 1019, 996, 961, 818, 755 cm^{-1}; MS (m/z): HRMS (ESI-TOF) Calcd. For $C_{36}H_{29}ClN_3O_3$ ($[M+H]^+$): 586.1892, found: 586.1883.

***trans*-1,1'-Dibenzyl-5-chloro-7'-methyl-4'-phenyl-1',4'-dihydro-6'*H*-spiro[indoline-3,5'-pyrrolo[3,4-*b*]azepine]-2,6',8'(7'*H*)-trione (4c'):** ethyl acetate and petroleum ether (V/V = 1:8) as eluent, yellow solid, 0.105 g, 18%, m.p. 203-205 °C; ^1H NMR (400 MHz, $CDCl_3$) δ: 7.43-7.34 (m, 5H), 7.26-7.22 (m, 2H), 7.14-7.04 (m, 6H), 6.76 (d, J = 7.6 Hz, 2H), 6.57 (d, J = 6.8 Hz, 2H), 6.29 (dd, J_1 = 8.8 Hz, J_2 = 2.0 Hz, 1H), 6.21 (d, J = 9.2 Hz, 1H), 5.81 (d, J = 15.6 Hz, 1H), 5.47 (dd, J_1 = 8.8 Hz, J_2 = 5.2 Hz, 1H), 5.20 (d, J = 15.6 Hz, 1H), 4.67 (d, J = 16.4 Hz, 1H), 4.43 (d, J = 16.4 Hz, 1H), 4.15 (dd, J_1 = 5.2 Hz, J_2 = 2.4 Hz, 1H), 2.92 (s, 3H); $^{13}C\{^1H\}$ NMR (100 MHz, $CDCl_3$) δ: 174.4, 168.7, 167.0, 143.3, 140.9, 137.8, 137.1, 135.0, 134.2, 129.0, 128.5, 128.3, 128.2, 127.9, 127.6, 127.3, 127.2, 127.1, 126.5, 125.1, 117.9, 110.2, 107.4, 57.3, 55.1, 49.2, 44.1, 23.8; IR(KBr) υ: 1701, 1695, 1668, 1591, 1489, 1451, 1420, 1381, 1330, 1261, 1160, 1018, 995, 960, 817, 756 cm^{-1}; MS (m/z): HRMS (ESI-TOF) Calcd. For $C_{36}H_{29}ClN_3O_3$ ($[M+H]^+$): 586.1892, found:

586.1885.

***cis*-1-Benzyl-7'-methyl-1'-(4-methylbenzyl)-4'-phenyl-1',4'-dihydro-6'*H*-spiro[indoline-3,5'-*p*yrrolo[3,4-*b*]azepine]-2,6',8'(7'*H*)-trione (4d):** ethyl acetate and petroleum ether (V/V = 1:8) as eluent, yellow solid, 0.480 g, 85%, m.p. 197-199 °C; ^{1}H NMR (400 MHz, $CDCl_3$) δ: 7.28-7.27 (m, 2H), 7.25-7.17 (m, 7H), 7.05-6.90 (m, 6H), 6.87 (d, J = 7.6 Hz, 2H), 6.31 (d, J = 8.8 Hz, 1H), 6.30 (d, J = 8.8 Hz, 1H), 5.83 (d, J = 15.2 Hz, 1H), 5.69 (dd, J_1 = 9.2 Hz, J_2 = 3.2 Hz, 1H), 5.03 (d, J = 15.2 Hz, 1H), 4.95 (d, J = 16.0 Hz, 1H), 4.51 (d, J = 16.0 Hz, 1H), 3.78 (dd, J_1 = 5.6 Hz, J_2 = 2.0 Hz, 1H), 2.84 (s, 3H), 2.36 (s, 3H); ^{13}C{^{1}H} NMR (100 MHz, $CDCl_3$) δ: 176.8, 168.7, 167.3, 141.9, 141.3, 138.2, 137.5, 135.5, 134.5, 132.4, 129.5, 128.9, 128.6, 128.0, 127.6, 127.3, 127.2, 126.9, 122.9, 122.2, 117.9, 108.7, 106.2, 58.6, 55.0, 50.6, 44.2, 23.6, 21.2; IR(KBr) υ: 1701, 1697, 1595, 1488, 1481, 1331, 1264, 1150, 1018, 752 cm^{-1}; MS (*m*/*z*): HRMS (ESI-TOF) Calcd. For $C_{37}H_{32}N_3O_3$ ([M+H]$^+$): 566.2438, found: 566.2439.

***cis*-1-Benzyl-5-chloro-7'-methyl-1'-(4-methylbenzyl)-4'-phenyl-1',4'-dihydro-6'*H*-spiro[indoline-3,5'-pyrrolo[3,4-*b*]azepine]-2,6',8'(7'*H*)-trione (4e):** ethyl acetate and petroleum ether (V/V = 1:8) as eluent, yellow solid, 0.450 g, 75%, m.p. 198-200 °C; ^{1}H NMR (400 MHz, $CDCl_3$) δ: 7.29-7.26 (m, 2H), 7.25-7.19 (m, 5H), 7.15 (d, J = 6.8 Hz, 2H), 7.06 (t, J = 7.2 Hz, 1H), 7.01-6.98 (m, 3H), 6.91 (dd, J_1 = 8.4 Hz, J_2 = 2.4 Hz, 1H), 6.88 (d, J = 7.2 Hz, 2H), 6.31 (dd, J_1 = 8.8 Hz, J_2 = 2.0 Hz, 1H), 6.19 (d, J = 8.4 Hz, 1H), 6.19 (d, J = 8.4 Hz, 1H), 5.86 (d, J = 15.6 Hz, 1H), 5.67 (dd, J_1 = 8.8 Hz, J_2 = 3.2 Hz, 1H), 5.02 (d, J = 15.6 Hz, 1H), 4.96 (d, J = 16.0 Hz, 1H), 4.45 (d, J = 16.0 Hz, 1H), 3.72 (dd, J_1 = 5.6 Hz, J_2 = 2.0 Hz, 1H), 2.36 (s, 3H), 2.87 (s, 3H); ^{13}C{^{1}H} NMR (100 MHz, $CDCl_3$) δ: 176.4, 168.6, 167.0, 141.4, 140.4, 137.8, 137.6, 135.1, 134.4, 134.3, 134.0, 129.6, 128.9, 128.7, 127.9, 127.8, 127.6, 127.4, 127.3, 127.1, 123.4, 117.6, 109.7, 105.3, 58.5, 55.0, 50.5, 44.3, 23.7, 21.2; IR(KBr) υ: 3786, 3726, 3703, 3629, 1753, 1735, 1696, 1592, 1561, 1554, 1513, 1484, 1438, 1387, 1332, 1258, 1157, 1130, 995, 817, 756 cm^{-1}; MS (*m*/*z*): HRMS (ESI-TOF) Calcd. For $C_{37}H_{31}ClN_3O_3$ ([M+H]$^+$): 600.2048, found: 600.2038.

***trans*-1-Benzyl-5-chloro-7'-methyl-1'-(4-methylbenzyl)-4'-phenyl-1',4'-dihydro-6'*H*-spiro[indoline-3,5'-pyrrolo[3,4-*b*]azepine]-2,6',8'(7'*H*)-trione (4e'):** ethyl acetate and petroleum ether (V/V = 1:8) as eluent, yellow solid, 0.060 g, 10%, m.p. 211-213 °C; ^{1}H NMR (400 MHz, $CDCl_3$) δ: 7.25-7.20 (m, 6H), 7.16-7.08 (m, 5H), 7.05 (dd, J_1 = 8.4 Hz, J_2 = 2.0 Hz, 1H), 6.75 (d, J = 7.6 Hz, 2H), 6.57 (dd, J_1 = 7.6 Hz, J_2 = 2.0 Hz, 1H), 6.29 (dd, J_1 = 8.4 Hz, J_2 = 2.0 Hz, 1H), 6.20 (d, J =

8.4 Hz, 1H), 5.74 (d, J = 15.6 Hz, 1H), 5.45 (dd, J_1 = 9.2 Hz, J_2 = 3.6 Hz, 1H), 5.17 (d, J = 15.6 Hz, 1H), 4.67 (d, J = 16.0 Hz, 1H), 4.43 (d, J = 16.0 Hz, 1H), 4.14 (dd, J_1 = 5.6 Hz, J_2 = 2.4 Hz, 1H), 2.91 (s, 3H), 2.37 (s, 3H); $^{13}C\{^1H\}$ NMR (100 MHz, $CDCl_3$) δ: 174.4, 168.7, 167.0, 143.2, 141.0, 137.8, 137.7, 135.0, 134.3, 134.1, 129.6, 129.0, 128.5, 128.3, 128.1, 127.5, 127.3, 127.2, 127.1, 126.5, 125.1, 117.8, 107.3, 57.5, 49.2, 44.1, 29.7, 21.1; IR(KBr) υ: 3788, 3726, 3703, 3609, 1751, 1736, 1699, 1592, 1560, 1552, 1511, 1482, 1436, 1388, 1131, 995, 816, 754 cm^{-1}; MS (*m*/*z*): HRMS (ESI-TOF) Calcd. For $C_{37}H_{31}ClN_3O_3$ ($[M+H]^+$): 600.2048, found: 600.2040.

***cis*-1-Butyl-5-chloro-7'-methyl-1'-(4-methylbenzyl)-4'-phenyl-1',4'-dihydro-6'*H*-spiro[indoline-3,5'-pyrrolo[3,4-*b*]azepine]-2,6',8'(7'*H*)-trione (4f):** ethyl acetate and petroleum ether (V/V = 1:8) as eluent, yellow solid, 0.497 g, 88%, m.p. 206-208 °C; ^1H NMR (400 MHz, $CDCl_3$) δ: 7.24 (d, J = 8.0 Hz, 2H), 7.20 (d, J = 8.0 Hz, 2H), 7.05-7.01 (m, 4H), 6.95 (d, J = 2.0 Hz, 1H), 6.89-6.87 (m, 2H), 6.38 (d, J = 8.4 Hz, 1H), 6.30 (dd, J_1 = 8.8 Hz, J_2 = 2.0 Hz, 1H), 5.86 (d, J = 15.2 Hz, 1H), 5.66 (dd, J_1 = 8.4 Hz, J_2 = 5.2 Hz, 1H), 5.08 (d, J = 15.2 Hz, 1H), 3.68 (dd, J_1 = 5.2 Hz, J_2 = 2.0 Hz, 1H), 3.60-3.53 (m, 1H), 3.42-3.35 (m, 1H), 2.83 (s, 3H), 2.36 (s, 3H), 1.51-1.46 (m, 2H), 1.33-1.25 (m, 2H), 0.91 (t, J = 7.2 Hz, 3H); $^{13}C\{^1H\}$ NMR (100 MHz, $CDCl_3$) δ: 176.1, 168.5, 167.1, 141.4, 140.8, 137.8, 137.5, 134.4, 134.3, 134.0, 129.6, 128.9, 127.9, 127.6, 127.3, 127.2, 127.0, 123.4, 117.6, 108.6, 105.4, 58.3, 55.0, 50.5, 40.3, 29.1, 23.6, 21.2, 20.0, 13.7; IR(KBr) υ: 1715, 1696, 1591, 1487, 1423, 1340, 1257, 820, 756 cm^{-1}; MS (*m*/*z*): HRMS (ESI-TOF) Calcd. For $C_{34}H_{33}ClN_3O_3$ ($[M+H]^+$): 566.2205, found: 566.2203.

***cis*-1-Benzyl-1'-(4-methoxybenzyl)-7'-methyl-4'-phenyl-1',4'-dihydro-6'*H*-spiro[indoline-3,5'-pyrrolo[3,4-*b*]azepine]-2,6',8'(7'*H*)-trione (4g):** ethyl acetate and petroleum ether (V/V = 1:8) as eluent, yellow solid, 0.523 g, 90%, m.p. 161-163 °C; ^1H NMR (400 MHz, $CDCl_3$) δ: 7.32-7.28 (m, 3H), 7.25-7.17 (m, 4H), 7.05-6.86 (m, 10H), 6.32 (m, 2H), 5.79 (d, J = 15.2 Hz, 1H), 5.70 (dd, J_1 = 8.8 Hz, J_2 = 5.2 Hz, 1H), 5.02 (d, J = 15.2 Hz, 1H), 4.95 (d, J = 16.0 Hz, 1H), 4.51 (d, J = 16.0 Hz, 1H), 3.82 (s, 3H), 3.76 (d, J = 5.2 Hz, 1H), 2.85 (s, 3H); $^{13}C\{^1H\}$ NMR (100 MHz, $CDCl_3$) δ: 176.8, 168.7, 167.3, 159.2, 141.8, 141.3, 138.2, 135.5, 134.1, 132.4, 129.6, 128.9, 128.8, 128.6, 128.0, 127.6, 127.2, 127.1, 126.9, 122.9, 122.1, 117.9, 114.2, 108.7, 106.2, 58.6, 55.3, 54.6, 50.5, 44.2, 23.6; IR(KBr) υ: 1753, 1700, 1654, 1610, 1512, 1487, 1454 1386, 1357, 1301, 1248, 1175, 1029, 993, 812 cm^{-1}; MS (*m*/*z*): HRMS (ESI-TOF) Calcd. For $C_{37}H_{32}N_3O_4$ ($[M+H]^+$): 582.2387, found: 582.2374.

***cis*-1-Benzyl-5-chloro-1'-(4-methoxybenzyl)-7'-methyl-4'-phenyl-1',4'-dihydro-6'*H*-spiro[indoline-3,5'-pyrrolo[3,4-*b*]azepine]-2,6',8'(7'*H*)-trione (4h):** ethyl acetate and petroleum ether (V/V = 1:8) as eluent, yellow solid, 0.461 g, 75%, m.p. 160-162 °C; ^{1}H NMR (400 MHz, $CDCl_3$) δ: 7.30 (d, *J* = 8.4 Hz, 2H), 7.26-7.21 (m, 3H), 7.15 (d, *J* = 6.8 Hz, 2H), 7.05 (d, *J* = 7.2 Hz, 1H), 7.01-6.97 (m, 3H), 6.94-6.87 (m, 5H), 6.31 (dd, J_1 = 8.8 Hz, J_2 = 2.0 Hz, 1H), 6.19 (d, *J* = 8.0 Hz, 1H), 5.80 (d, *J* = 15.2 Hz, 1H), 5.68 (dd, J_1 = 8.8 Hz, J_2 = 5.2 Hz, 1H), 5.01 (d, *J* = 15.2 Hz, 1H), 4.96 (d, *J* = 16.0 Hz, 1H), 4.45 (d, *J* = 16.0 Hz, 1H), 3.82 (s, 3H), 3.71 (dd, J_1 = 5.2 Hz, J_2 = 2.0 Hz, 1H), 2.87 (s, 3H); ^{13}C{^{1}H} NMR (100 MHz, $CDCl_3$) δ: 176.4, 168.6, 167.1, 159.3, 141.4, 140.4, 137.8, 135.0, 133.9, 129.4, 128.9, 128.8, 128.7, 127.9, 127.8, 127.6, 127.4, 127.1, 123.4, 117.6, 114.3, 109.6, 105.3, 58.5, 55.3, 55.3, 54.6, 50.5, 44.2, 23.7; IR(KBr) υ: 1751, 1706, 1652, 1611, 1512, 1488, 1456 1385, 1356, 1300, 1247, 1172, 1028, 991, 812, 754 cm^{-1}; MS (*m*/*z*): HRMS (ESI-TOF) Calcd. For $C_{37}H_{30}ClN_3NaO_4$ ([M+Na]$^+$): 638.1817, found: 638.1842.

***trans*-1-Benzyl-5-chloro-1'-(4-methoxybenzyl)-7'-methyl-4'-phenyl-1',4'-dihydro-6'*H*-spiro[indoline-3,5'-pyrrolo[3,4-*b*]azepine]-2,6',8'(7'*H*)-trione (4h'):** ethyl acetate and petroleum ether (V/V = 1:8) as eluent, yellow solid, 0.068 g, 11%, m.p. 183-185 °C; ^{1}H NMR (400 MHz, $CDCl_3$) δ: 7.29 (d, *J* = 8.4 Hz, 2H), 7.24-7.23 (m, 2H), 7.14-7.08 (m, 4H), 7.06-7.03 (m, 1H), 6.93 (d, *J* = 8.4 Hz, 2H), 6.75 (d, *J* = 7.6 Hz, 2H), 6.56 (d, *J* = 7.4 Hz, 2H), 6.30 (dd, J_1 = 8.8 Hz, J_2 = 2.0 Hz, 1H), 6.20 (d, *J* = 8.4 Hz, 1H), 5.74 (d, *J* = 15.2 Hz, 1H), 5.45 (dd, J_1 = 8.8 Hz, J_2 = 5.2 Hz, 1H), 5.13 (d, *J* = 15.2 Hz, 1H), 4.77 (s, 1H), 4.67 (d, *J* = 15.6 Hz, 1H), 4.42 (d, *J* = 15.6 Hz, 1H), 4.11 (dd, J_1 = 5.6 Hz, J_2 = 2.4 Hz, 1H), 3.83 (s, 3H), 2.92 (s, 3H); ^{13}C{^{1}H} NMR (100 MHz, $CDCl_3$) δ: 174.5, 168.7, 167.1, 159.4, 143.2, 141.0, 137.8, 135.0, 134.3, 134.1, 129.1, 129.0, 128.7, 128.5, 128.3, 128.1, 127.5, 127.3, 127.1, 126.8, 126.5, 125.0, 117.9, 114.4, 110.1, 108.0, 107.3, 102.8, 57.5, 55.3, 54.6, 49.2, 44.1, 29.7, 23.8; IR(KBr) υ: 1698, 1604, 1513, 1485, 1454, 1388, 1249, 1175, 1010, 982, 971, 861, 758 cm^{-1}; MS (*m*/*z*): HRMS (ESI-TOF) Calcd. For $C_{37}H_{30}ClN_3NaO_4$ ([M+Na]$^+$): 638.1817, found: 638.1836.

***cis*-1-Benzyl-1'-(3,4-dimethoxyphenethyl)-7'-methyl-4'-phenyl-1',4'-dihydro-6'*H*-spiro[indoline-3,5'-pyrrolo[3,4-*b*]azepine]-2,6',8'(7'*H*)-trione (4i):** ethyl acetate and petroleum ether (V/V = 1:8) as eluent, yellow solid, 0.575 g, 92%, m.p. 160-162 °C; ^{1}H NMR (400 MHz, $CDCl_3$) δ: 7.25-7.19 (m, 3H), 7.14 (d, *J* = 6.4 Hz, 2H), 7.04 (t, *J* = 7.6 Hz, 1H), 6.98-6.89 (m, 4H), 6.86-6.83 (m, 5H), 6.76 (d, *J* = 6.8 Hz, 1H), 6.28-6.24 (m, 2H), 5.72 (dd, J_1 = 8.8 Hz, J_2 = 5.2 Hz, 1H),

5.23-5.16 (m, 1H), 4.93 (d, J = 16.0 Hz, 1H), 4.46 (d, J = 16.0 Hz, 1H), 3.93-3.88 (m, 1H), 3.91 (s, 3H), 3.86 (s, 3H), 3.52 (dd, J_1 = 5.2 Hz, J_2 = 2.0 Hz, 1H), 3.09-3.04 (m, 1H), 3.00-2.94 (m, 1H), 2.83 (s, 3H); $^{13}C\{^1H\}$ NMR (100 MHz, $CDCl_3$) δ: 177.1, 168.6, 167.5, 149.1, 147.9, 141.7, 141.5, 138.0, 135.5, 133.8, 132.2, 130.6, 128.9, 128.5, 128.0, 127.6, 127.2, 127.1, 126.9, 122.7, 122.1, 121.2, 118.6, 112.4, 111.2, 108.6, 105.4, 67.4, 58.7, 55.9, 55.8, 52.4, 49.9, 44.1, 36.1, 23.5; IR(KBr) υ: 1752, 1735, 1701, 1654, 1577, 1561, 1513, 1438, 1261, 750 cm^{-1}; MS (*m*/*z*): HRMS (ESI-TOF) Calcd. For $C_{39}H_{36}N_3O_5$ ($[M+H]^+$): 626.2649, found: 626.2644.

***cis*-1-Benzyl-1'-butyl-7'-methyl-4'-phenyl-1',4'-dihydro-6'*H*-spiro[indoline-3,5'-pyrrolo[3,4-*b*]azepine]-2,6',8'(7'*H*)-trione (4j):** ethyl acetate and petroleum ether (V/V = 1:8) as eluent, yellow solid, 0.481 g, 93%, m.p. 162-164 °C; ^1H NMR (400 MHz, $CDCl_3$) δ: 7.28 (s, 1H), 7.25-7.21 (m, 2H), 7.17 (d, J = 7.2 Hz, 2H), 7.06-6.89 (m, 8H), 6.30 (d, J = 7.2 Hz, 1H), 6.26 (dd, J_1 = 8.8 Hz, J_2 = 3.2 Hz, 1H), 5.69 (dd, J_1 = 8.8 Hz, J_2 = 5.2 Hz, 1H), 4.95 (d, J = 16.0 Hz, 1H), 4.65-6.58 (m, 1H), 4.51 (d, J = 16.0 Hz, 1H), 3.82-3.75 (m, 2H), 2.85 (s, 3H), 1.81-1.73 (m, 2H), 1.48-1.43 (m, 2H), 1.01 (t, J = 7.2 Hz, 3H); $^{13}C\{^1H\}$ NMR (100 MHz, $CDCl_3$) δ: 177.0, 168.7, 167.2, 141.8, 141.4, 138.3, 135.6, 134.0, 132.5, 128.9, 128.6, 128.0, 127.6, 127.2, 126.9, 122.9, 122.2, 117.5, 108.7, 105.1, 58.7, 52.4, 50.5, 44.2, 32.5, 23.6, 20.0, 13.9; IR(KBr) υ: 1723, 1695, 1656, 1613, 1483, 1466, 1428, 1410, 1381, 1357, 1340, 1303, 1265, 1204, 1078, 983, 762 cm^{-1}; MS (*m*/*z*): HRMS (ESI-TOF) Calcd. For $C_{33}H_{32}N_3O_3$ ($[M+H]^+$): 518.2438, found: 518.2435.

***cis*-1,1'-Dibenzyl-7'-methyl-4'-(*p*-tolyl)-1',4'-dihydro-6'*H*-spiro[indoline-3,5'-pyrrolo[3,4-*b*]azepine]-2,6',8'(7'*H*)-trione (4k):** ethyl acetate and petroleum ether (V/V = 1:8) as eluent, yellow solid, 0.429 g, 76%, m.p. 200-202 °C; ^1H NMR (400 MHz, $CDCl_3$) δ: 7.45-7.28 (m, 10H), 7.20-7.05 (m, 5H), 6.96-6.839 (m, 3H), 6.69 (d, J = 7.6 Hz, 1H), 6.12 (s, 1H), 5.58 (d, J = 15.2 Hz, 1H), 5.46 (d, J = 15.2 Hz, 1H), 5.04 (d, J = 15.6 Hz, 1H), 4.83 (d, J = 15.6 Hz, 1H), 3.24 (s, 1H), 2.89 (s, 3H), 1.68 (s, 3H); $^{13}C\{^1H\}$ NMR (150 MHz, $CDCl_3$) δ: 174.5, 168.7, 167.3, 153.3, 152.7, 142.3, 139.8, 139.6, 137.2, 136.3, 135.1, 129.2, 128.9, 128.8, 128.7, 128.6, 128.1, 128.0, 127.9, 127.7, 127.6, 127.4, 127.2, 126.2, 123.6, 122.1, 109.0, 105.0, 58.1, 55.6, 53.5, 44.2, 29.7, 25.8, 23.8; IR(KBr) υ: 1714, 1693, 1650, 1592, 1485, 1463, 1350, 1262, 1224, 1098, 1070, 758 cm^{-1}; MS (*m*/*z*): HRMS (ESI-TOF) Calcd. For $C_{37}H_{32}N_3O_3$ ($[M+H]^+$): 566.2438, found: 566.2432.

3. General procedure for the reactions of *a,ß*-unsaturated *N*-arylaldimine and MBH esters/nitriles of isatins: A mixture of *a,ß*-unsaturated *N*-arylaldimine (0.40 mmol), MBH esters

or nitrile of isatin (0.40 mmol) in CH_3CN (10.0 mL) was stirred at 80 °C for 72 hours. After removing the solvent by rotatory evaporation, the resulting residue was purified by column chromatography on silica gel with ethyl acetate and petroleum ether (V/V = 1:8) as eluent to afford the desired products **6a-6n**.

Methyl-*cis*-1-benzyl-2-oxo-1'-phenyl-2'-((*E*)-styryl)-1',2'-dihydrospiro[indoline-3,3'-pyrrole]-4'-carboxylate (6a): ethyl acetate and petroleum ether (V/V = 1:8) as eluent, white solid, 0.266 g, 52%, m.p. 197-199 °C; ^{1}H NMR (400 MHz, $CDCl_3$) δ: 8.05 (s, 1H), 7.32-7.28 (m, 7H), 7.18-7.00 (m, 9H), 6.85 (t, *J* = 7.6 Hz, 2H), 6.62-6.51 (m, 2H), 6.38 (t, *J* = 16.4 Hz, 1H), 5.16 (d, *J* = 8.0 Hz, 1H), 5.14 (d, *J* = 15.6 Hz, 1H), 4.58 (d, *J* = 15.6 Hz, 1H), 3.54 (s, 3H); ^{13}C{^{1}H} NMR (100 MHz, $CDCl_3$) δ: 175.1, 164.5, 147.4, 143.1, 140.6, 135.7, 134.4, 132.8, 129.4, 128.7, 128.6, 128.4, 128.3, 127.2, 127.1, 127.0, 125.6, 123.1, 122.9, 122.8, 117.3, 109.0, 107.2, 74.6, 62.2, 50.9, 50.8, 43.9; IR(KBr) υ: 1713, 1692, 1650, 1585, 1483, 1462, 1351, 1269, 1224, 1098, 1070, 754 cm^{-1}; MS (*m*/*z*): HRMS (ESI-TOF) Calcd. For $C_{34}H_{29}N_2O_3$ ([M+H]$^+$): 513.2173, found: 513.2172.

Methyl-*cis*-1-benzyl-5-chloro-2-oxo-1'-phenyl-2'-((*E*)-styryl)-1',2'-dihydrospiro[indoline-3,3'-pyrrole]-4'-carboxylate (6b): ethyl acetate and petroleum ether (V/V = 1:8) as eluent, white solid, 0.289 g, 53%, m.p. 201-203 °C; ^{1}H NMR (400 MHz, $CDCl_3$) δ: 8.03 (s, 1H), 7.31-7.27 (m, 8H), 7.13-7.01 (m, 7H), 6.86 (t, *J* = 7.6 Hz, 2H), 6.55-6.48 (m, 2H), 6.41 (d, *J* = 16.4 Hz, 1H), 5.14 (d, *J* = 7.6 Hz, 1H), 5.12 (d, *J* = 16.0 Hz, 1H), 4.55 (d, *J* = 16.0 Hz, 1H), 3.57 (s, 3H); ^{13}C{^{1}H} NMR (100 MHz, $CDCl_3$) δ: 174.8, 164.4, 147.7, 141.7, 140.3, 135.5, 135.2, 134.7, 134.5, 129.5, 128.7, 128.6, 128.5, 128.4, 128.2, 127.4, 127.1, 127.0, 125.1, 123.7, 123.1, 117.5, 110.0, 106.6, 74.5, 62.3, 51.0, 44.0; IR(KBr) υ: 1719, 1690, 16571, 1594, 1489, 1460, 13521, 1261, 1225, 1094, 10791, 7528 cm^{-1}; MS (*m*/*z*): HRMS (ESI-TOF) Calcd. For $C_{34}H_{28}ClN_2O_3$ ([M+H]$^+$): 547.1783, found: 547.1789.

Methyl-*cis*-1-benzyl-5-methyl-2-oxo-2'-((*E*)-styryl)-1'-(*p*-tolyl)-1',2'-dihydrospiro[indoline-3,3'-pyrrole]-4'-carboxylate (6c): ethyl acetate and petroleum ether (V/V = 1:8) as eluent, white solid, 0.265 g, 49%, m.p. 191-193 °C; ^{1}H NMR (400 MHz, $CDCl_3$) δ: 8.00 (s, 1H), 7.28 (d, *J* = 7.6 Hz, 4H), 7.12-6.93 (m, 10H), 6.85 (t, *J* = 7.2 Hz, 2H), 6.56-6.47 (m, 2H), 6.37 (d, *J* = 16.0 Hz, 1H), 5.12 (d, *J* = 12.4 Hz, 1H), 5.11 (d, *J* = 15.6 Hz, 1H), 4.55 (d, *J* = 15.6 Hz, 1H), 3.54 (s, 3H), 2.31 (s, 3H), 2.27 (s, 3H); ^{13}C{^{1}H} NMR (100 MHz, $CDCl_3$) δ: 175.2, 164.7, 147.6, 140.7, 138.2, 135.8, 135.7, 134.3, 133.0, 132.6, 132.4, 129.9, 129.0, 128.6, 128.4, 128.2, 127.1, 127.0, 126.9,

125.7, 124.0, 117.6, 108.7, 106.6, 74.9, 62.2, 50.9, 43.9, 21.2, 20.6; IR(KBr) υ: 1710, 1696, 1653, 1592, 1484, 1465, 1353, 1269, 1223, 1095, 1070, 750 cm^{-1}; MS (*m*/*z*): HRMS (ESI-TOF) Calcd. For $C_{36}H_{34}N_2O_3$ ($[M+H]^+$): 541.2486, found: 541.2490.

Methyl-*cis*-1-benzyl-1'-(4-(tert-butyl)phenyl)-5-methyl-2-oxo-2'-((*E*)-styryl)-1',2'-dihydrospiro[indoline-3,3'-pyrrole]-4'-carboxylate (6d): ethyl acetate and petroleum ether (V/V = 1:8) as eluent, white solid, 0.326 g, 56 %, m.p. 181-183 °C; ^1H NMR (400 MHz, $CDCl_3$) δ: 8.03 (s, 1H), 7.34.-7.29 (m, 5H), 7.26 (s, 2H), 7.12-7.03 (m, 6H), 6.85 (t, *J* = 8.0 Hz, 2H), 6.61-6.55 (m, 1H), 6.48 (d, *J* = 8.0 Hz, 1H), 6.39 (d, *J* = 16.8 Hz, 1H), 5.13 (d, *J* = 16.0 Hz, 1H), 5.11 (s, 1H), 4.55 (d, *J* = 16.0 Hz, 1H), 3.54 (s, 3H), 2.30 (s, 3H), 1.28 (s, 9H); ^{13}C NMR (100 MHz, $CDCl_3$) δ: 175.2, 164.7, 147.3, 145.7, 140.6, 138.1, 135.8, 135.8, 134.0, 133.0, 132.4, 128.9, 128.6, 128.4, 128.2, 127.1, 127.0, 126.3, 126.1, 124.9, 116.8, 108.6, 106.7, 74.7, 62.2, 50.8, 43.9, 34.2, 31.3, 21.2; IR(KBr) υ: 2958, 1713, 1688, 1595, 1521, 1496, 1450, 1427, 1405, 1346, 1280, 1237, 1215, 1186, 1122, 1106, 982, 815, 773 cm^{-1}; MS (*m*/*z*): HRMS (ESI-TOF) Calcd. For $C_{39}H_{39}N_2O_3$ ($[M+H]^+$): 583.2955, found: 583.2943.

Methyl-*cis*-1-benzyl-1'-(4-chlorophenyl)-5-methyl-2-oxo-2'-((*E*)-styryl)-1',2'-dihydrospiro[indoline-3,3'-pyrr (6e): ethyl acetate and petroleum ether (V/V = 1:8) as eluent, white solid, 0.280 g, 50 %, m.p. 139-141 °C; ^1H NMR (400 MHz, $CDCl_3$) δ: 7.89 (s, 1H), 7.24-6.90 (m, 16H), 6.54 (d, *J* = 15.6 Hz, 1H), 6.47 (d, *J* = 8.0 Hz, 1H), 5.84-5.78 (m, 1H), 5.37 (d, *J* = 9.2 Hz, 1H), 5.06 (d, *J* = 16.0 Hz, 1H), 4.90 (d, *J* = 16.0 Hz, 1H), 3.53 (s, 3H), 2.28 (s, 3H); ^{13}C NMR (100 MHz, $CDCl_3$) δ: 177.7, 164.2, 147.4, 139.9, 139.5, 135.6, 134.9, 131.8, 129.4, 129.2, 128.6, 128.5, 128.4, 128.3, 127.9, 127.3, 126.9, 126.6, 125.4, 124.4, 119.3, 109.3, 109.0, 73.5, 62.3, 51.1, 44.9, 21.1; IR(KBr) υ: 1717, 1589, 1496, 1438, 1189, 812 cm^{-1}; MS (*m*/*z*): HRMS (ESI-TOF) Calcd. For $C_{35}H_{30}ClN_2O_3$ ($[M+H]^+$): 561.1939, found: 561.1937.

Methyl-*cis*-1-benzyl-1'-(3-chlorophenyl)-5-methyl-2-oxo-2'-((*E*)-styryl)-1',2'-dihydrospiro[indoline-3,3'-pyrrole]-4'-carboxylateole]-4'-carboxylate (6f): ethyl acetate and petroleum ether (V/V = 1:8) as eluent, white solid, 0.330 g, 59 %, m.p. 136-138 °C; ^1H NMR (400 MHz, $CDCl_3$) δ: 7.91 (s, 1H), 7.29-7.27 (m, 2H), 7.24-7.08 (m, 8H), 7.03-6.90 (m, 6H), 6.57 (d, *J* = 16.0 Hz, 1H), 6.47 (d, *J* = 7.6 Hz, 1H), 5.81 (dd, J_1 = 16.0 Hz, J_2 = 8.8 Hz, 1H), 5.37 (d, *J* = 9.2 Hz, 1H), 5.05 (d, *J* = 16.0 Hz, 1H), 4.90 (d, *J* = 16.0 Hz, 1H), 3.54 (s, 3H), 2.28 (s, 3H); ^{13}C NMR (100 MHz, $CDCl_3$) δ: 178.0, 164.3, 148.2, 142.2, 140.9, 135.7, 135.5, 134.6, 129.4, 128.8, 128.6, 128.5, 128.3,

128.2, 127.6, 127.3, 126.9, 126.7, 124.8, 124.6, 123.3, 122.4, 118.1, 109.5, 108.2, 73.5, 62.4, 51.0, 50.9, 44.1; IR(KBr) υ: 1716, 1590, 1496, 1424, 1344, 1253, 1092, 875, 821, 753 cm^{-1}; MS (*m*/*z*): HRMS (ESI-TOF) Calcd. For $C_{35}H_{30}ClN_2O_3$ ($[M+H]^+$): 561.1939, found: 561.1942.

Methyl-*cis*-1-benzyl-5-chloro-1'-(4-chlorophenyl)-2-oxo-2'-((*E*)-styryl)-1',2'-dihydrospiro[indoline-3,3'-pyrrole]-4'-carboxylate (6g): ethyl acetate and petroleum ether (V/V = 1:8) as eluent, white solid, 0.278 g, 48%, m.p. 149-151 °C; ^1H NMR (400 MHz, $CDCl_3$) δ: 7.98 (s, 1H), 7.38 (d, *J* = 8.8 Hz, 2H), 7.30 (d, *J* = 2.0 Hz, 5H), 7.19-7.03 (m, 6H), 6.85 (d, *J* = 8.8 Hz, 2H), 6.84 (t, *J* = 7.2 Hz, 2H), 6.61 (d, *J* = 7.6 Hz, 1H), 6.50 (dd, J_1 = 16.0 Hz, J_2 = 8.8 Hz, 1H), 6.38 (d, *J* = 16.0 Hz, 1H), 5.14 (d, *J* = 16.0 Hz, 1H), 5.12 (d, *J* = 8.8 Hz, 1H), 4.57 (d, *J* = 16.0 Hz, 1H), 3.54 (s, 3H); $^{13}C\{^1H\}$ NMR (100 MHz, $CDCl_3$) δ: 174.6, 164.2, 147.2, 141.7, 138.9, 135.2, 135.2, 135.1, 134.2, 129.5, 128.8, 128.7, 128.6, 128.5, 128.3, 128.2, 127.4, 127.0, 126.9, 124.5, 123.7, 118.7, 110.1, 107.3, 74.6, 62.3, 51.1, 44.0; IR(KBr) υ: 1719, 1699, 1657, 1595, 1482, 1461, 1356, 1268, 1224, 1098, 1070, 756 cm^{-1}; MS (*m*/*z*): HRMS (ESI-TOF) Calcd. For $C_{34}H_{27}Cl_2N_2O_3$ ($[M+H]^+$): 581.1393, found: 581.1400.

Methyl-*cis*-1-benzyl-1'-(4-bromophenyl)-2-oxo-2'-((*E*)-styryl)-1',2'-dihydrospiro[indoline-3,3'-pyrrole]-4'-carboxylate (6h): ethyl acetate and petroleum ether (V/V = 1:8) as eluent, white solid, 0.236 g, 40%, m.p. 159-161 °C; ^1H NMR (400 MHz, $CDCl_3$) δ: 7.89 (s, 1H), 7.39 (d, *J* = 9.2 Hz, 2H), 7.24-7.20 (m, 4H), 7.15-7.07 (m, 3H), 7.03-6.97 (m, 4H), 6.90 (t, *J* = 8.4 Hz, 1H), 6.54 (d, *J* = 16.0 Hz, 1H), 6.47 (d, *J* = 8.0 Hz, 1H), 5.80 (dd, J_1 = 16.0 Hz, J_2 = 9.2 Hz, 1H), 5.36 (d, *J* = 9.2 Hz, 1H), 5.04 (d, *J* = 16.0 Hz, 1H), 4.90 (d, *J* = 16.0 Hz, 1H), 3.53 (s, 3H), 2.27 (s, 3H); $^{13}C\{^1H\}$ NMR (100 MHz, $CDCl_3$) δ: 177.7, 164.2, 147.3, 140.0, 139.9, 135.6, 134.9, 132.3, 131.8, 129.2, 128.6, 128.5, 128.3, 127.9, 127.3, 126.9, 126.7, 125.5, 124.4, 119.56, 115.8, 109.3, 109.2, 73.4, 62.4, 51.1, 51.0, 44.1, 21.1; IR(KBr) υ: 3062, 1715, 1692, 1654, 1597, 1482, 1465, 1359, 1261, 1224, 1096, 1070, 750 cm^{-1}; MS (*m*/*z*): HRMS (ESI-TOF) Calcd. For $C_{34}H_{28}BrN_2O_3$ ($[M+H]^+$): 591.2053, found: 591.2056.

Methyl-*cis*-1,1'-dibenzyl-2-oxo-2'-((*E*)-styryl)-1',2'-dihydrospiro[indoline-3,3'-pyrrole]-4'-carboxylate (6i): ethyl acetate and petroleum ether (V/V = 1:8) as eluent, white solid, 0.316 g, 60%, m.p. 229-231 °C; ^1H NMR (400 MHz, $CDCl_3$) δ: 7.64 (s, 1H), 7.42-7.27 (m, 10H), 7.11-6.95 (m, 6H), 6.83 (t, *J* = 7.6 Hz, 2H), 6.53-6.47 (m, 2H), 6.20 (d, *J* = 15.6 Hz, 1H), 5.16 (d, *J* = 16.0 Hz, 1H), 4.58 (d, *J* = 16.0 Hz, 1H), 4.46 (d, *J* = 15.2 Hz, 1H), 4.38 (d, *J* = 9.2 Hz, 1H), 4.18 (d, *J* =

15.2 Hz, 1H), 3.47 (s, 3H); $^{13}C\{^{1}H\}$ NMR (100 MHz, $CDCl_3$) δ: 175.8, 164.8, 153.0, 143.0, 136.3, 135.7, 135.6, 135.5, 133.1, 128.9, 128.7, 128.4, 128.3, 128.2, 128.1, 127.1, 127.0, 126.9, 123.2, 123.1, 122.7, 108.7, 103.3, 75.1, 61.5, 51.8, 50.5, 43.7; IR(KBr) υ: 1714, 1684, 1604, 1512, 1432, 1347, 1256, 1188, 1110, 1037, 829 cm^{-1}; MS (*m*/*z*): HRMS (ESI-TOF) Calcd. For $C_{35}H_{31}N_2O_3$ ($[M+H]^+$): 527.2329, found: 527.2313.

Methyl-*cis*-1-benzyl-1'-(4-methoxyphenyl)-2'-((*E*)-4-methoxystyryl)-5-methyl-2-oxo-1',2'-dihydrospiro[indoline-3,3'-pyrrole]-4'-carboxylate (6j): ethyl acetate and petroleum ether (V/V = 1:8) as eluent, white solid, 0.328 g, 56%, m.p. 211-213 °C; ^{1}H NMR (400 MHz, $CDCl_3$) δ: 7.91 (s, 1H), 7.24 (d, *J* = 8.0 Hz, 2H), 7.12 (d, *J* = 6.1 Hz, 3H), 7.06.-7.03 (m, 3H), 6.94-6.80 (m, 7H), 6.46 (d, *J* = 8.0 Hz, 1H), 6.41-6.35 (m, 1H), 6.28 (d, *J* = 16.0 Hz, 1H), 5.13 (d, *J* = 15.6 Hz, 1H), 5.04 (d, *J* = 8.8 Hz, 1H), 4.56 (d, *J* = 15.6 Hz, 1H), 3.79 (s, 3H), 3.76 (s, 3H), 3.54 (s, 3H), 2.31 (s, 3H); ^{13}C NMR (100 MHz, $CDCl_3$) δ: 175.3, 164.8, 159.7, 155.8, 148.4, 140.7, 135.8, 134.2, 134.1, 133.1, 132.3, 128.9, 128.5, 128.4, 128.3, 127.1, 127.0, 123.9, 123.0, 119.8, 114.6, 113.9, 108.6, 105.9, 75.8, 62.2, 55.5, 55.4, 50.8, 43.9, 21.2; IR(KBr) υ: 1706, 1678, 1593, 1488, 1467, 1455, 1428, 1354, 1256, 1231, 1179, 1148, 1088, 1017, 977, 941, 897, 752 cm^{-1}; MS (*m*/*z*): HRMS (ESI-TOF) Calcd. For $C_{37}H_{35}N_2O_5$ ($[M+H]^+$): 587.2540, found: 587.2530.

Methyl-*cis*-1-benzyl-1'-(2,6-dimethylphenyl)-2'-((*E*)-4-methoxystyryl)-5-methyl-2-oxo-1',2'-dihydrospiro[indoline-3,3'-pyrrole]-4'-carboxylate (6k): ethyl acetate and petroleum ether (V/V = 1:8) as eluent, white solid, 0.415 g, 71%, m.p. 236-238 °C; ^{1}H NMR (400 MHz, $CDCl_3$) δ: 7.51 (s, 1H), 7.21 (s, 1H),7.14-7.02 (m, 8H), 6.91 (d, *J* = 8.4 Hz, 1H), 6.86 (t, *J* = 7.6 Hz, 2H), 6.74 (t, *J* = 9.2 Hz, 2H), 6.45 (d, *J* = 8.0 Hz, 1H), 6.33 (dd, J_1 = 15.6 Hz, J_2 = 9.6 Hz, 1H), 6.03 (d, *J* = 15.6 Hz, 1H), 5.14 (d, *J* = 16.0 Hz, 1H), 5.05 (d, *J* = 9.6 Hz, 1H), 4.64 (d, *J* = 16.0 Hz, 1H), 3.76 (s, 3H), 3.50 (s, 3H), 2.51 (s, 3H), 2.40 (s, 3H), 2.35 (s, 3H); ^{13}C NMR (100 MHz, $CDCl_3$) δ: 175.8, 165.1, 159.7, 152.7, 141.0, 138.4, 137.2, 136.5, 135.8, 135.1, 133.3, 132.2, 128.9, 128.7, 128.5, 128.4, 128.4, 128.2, 128.0, 127.1, 126.9, 124.0, 120.1, 113.9, 108.6, 103.2, 97.6, 62.0, 55.3, 55.3, 50.6, 50.5, 43.8, 21.3, 19.1, 18.8; IR(KBr) υ: 1719, 1681, 1600, 1511, 1435, 1346, 1251, 1189, 1111, 1036, 823 cm^{-1}; MS (*m*/*z*): HRMS (ESI-TOF) Calcd. For $C_{38}H_{37}N_2O_4$ ($[M+H]^+$): 585.2748, found: 585.2723.

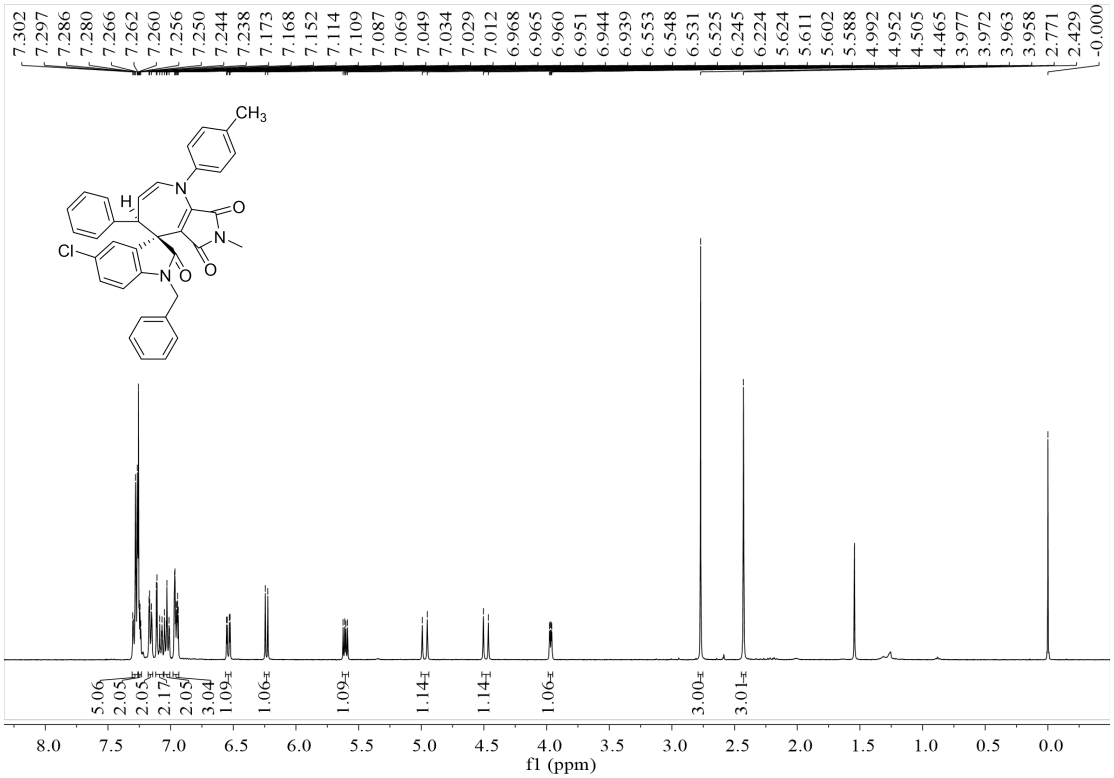
Methyl-*cis*-1-benzyl-2'-((*E*)-4-chlorostyryl)-5-methyl-2-oxo-1'-(*o*-tolyl)-1',2'-dihydrospiro[indoline-3,3'-pyrrole]-4'-carboxylate (6l): ethyl acetate and petroleum ether (V/V = 1:8) as eluent,

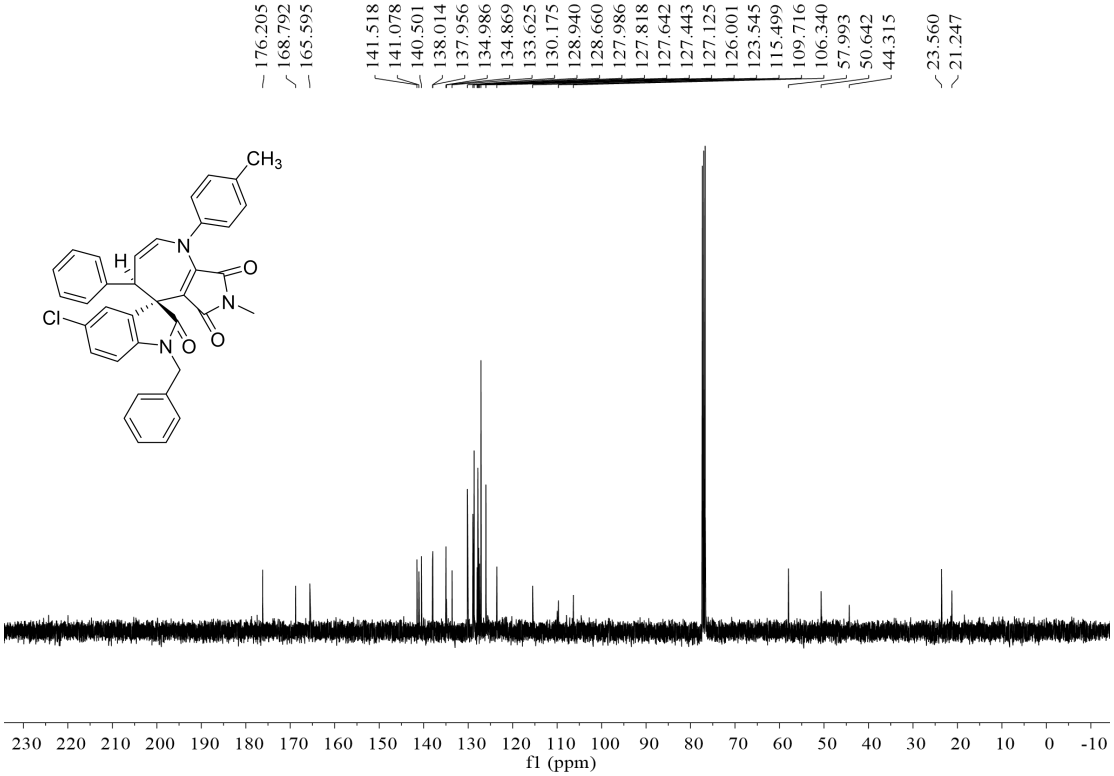
white solid, 0.390 g, 68%, m.p. 219-221 °C; ^{1}H NMR (400 MHz, $CDCl_3$) δ: 7.57 (s, 1H), 7.23-7.11 (m, 10H), 7.04 (t, *J* = 7.6 Hz, 2H), 6.93 (d, *J* = 7.6 Hz, 1H), 6.83 (d, *J* = 8.4 Hz, 2H), 6.48 (d, *J* = 8.0 Hz, 1H), 6.37 (d, *J* = 16.0 Hz, 1H), 5.72 (dd, J_1 = 15.6 Hz, J_2 = 6.0 Hz, 1H), 5.32 (d, *J* = 9.2 Hz, 1H), 5.09 (d, *J* = 16.0 Hz, 1H), 4.85 (d, *J* = 16.0 Hz, 1H), 3.52 (s, 3H); ^{13}C NMR (100 MHz, $CDCl_3$) δ: 177.9, 164.5, 151.5, 139.7, 139.7, 135.7, 134.6, 134.2, 133.9, 133.7, 131.9, 131.5, 129.2, 128.6, 128.5, 128.3, 127.8, 127.2, 126.9, 126.8, 126.6, 124.9, 124.7, 123.9, 109.3, 107.6, 61.9, 50.9, 50.9, 44.0, 21.2, 18.8; IR(KBr) υ: 1718, 1685, 1604, 1510, 1432, 1345, 1252, 1189, 1111, 1036, 823, 752 cm^{-1}; MS (*m*/*z*): HRMS (ESI-TOF) Calcd. For $C_{36}H_{32}ClN_2O_3$ ($[M+H]^+$): 575.2096, found: 575.2102.

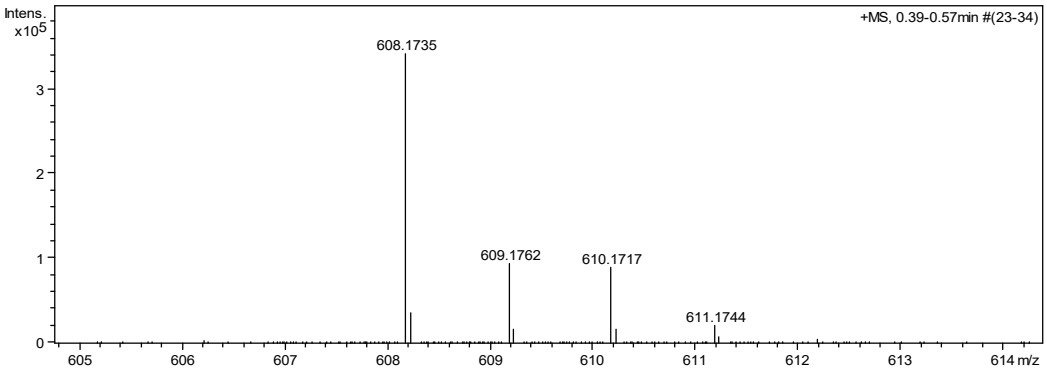
***cis*-1-Benzyl-5-methyl-2-oxo-2'-((*E*)-styryl)-1'-(*p*-tolyl)-1',2'-dihydrospiro[indoline-3,3'-pyrrole]-4'-carbonitrile (6m):** ethyl acetate and petroleum ether (V/V = 1:8) as eluent, white solid, 0.314 g, 62%, m.p. 198-200 °C; ^{1}H NMR (400 MHz, $CDCl_3$) δ: 7.68 (s, 1H), 7.27 (s, 4H), 7.23 (s, 1H), 7.09 (d, *J* = 8.4 Hz, 2H), 7.05-6.95 (m, 7H), 6.78 (t, *J* = 7.6 Hz, 2H), 6.51-6.45 (m, 2H), 6.37 (d, *J* = 16.0 Hz, 1H), 5.17 (d, *J* = 16.0 Hz, 1H), 5.14 (d, *J* = 8.8 Hz, 1H), 4.49 (d, *J* = 16.0 Hz, 1H), 2.35 (s, 3H), 2.28 (s, 3H); ^{13}C NMR (100 MHz, $CDCl_3$) δ: 173.8, 150.5, 140.6, 137.8, 135.6, 135.3, 135.0, 133.5, 133.2, 130.1, 130.0, 129.6, 128.7, 128.52, 128.50, 127.3, 127.0, 126.9, 126.8, 125.0, 124.1, 118.2, 116.4, 109.3, 84.4, 74.3, 62.8, 44.0, 29.7, 21.17, 20.7; IR(KBr) υ: 2901, 1710, 1682, 1606, 1574, 1511, 1497, 1478, 1429, 1398, 1340, 1248, 1222, 1177, 1133, 1106, 1028, 968, 857, 828, 806, 788, 771 cm^{-1}; MS (*m*/*z*): HRMS (ESI-TOF) Calcd. For $C_{35}H_{30}N_3O$ ($[M+H]^+$): 508.2383, found: 508.2399.

***cis*-1-Benzyl-1'-(4-methoxyphenyl)-5-methyl-2-oxo-2'-((*E*)-styryl)-1',2'-dihydrospiro[indoline-3,3'-pyrrole]-4'-carbonitrile (6n):** ethyl acetate and petroleum ether (V/V = 1:8) as eluent, white solid, 0.356 g, 68%, m.p. 212-214 °C; ^{1}H NMR (400 MHz, $CDCl_3$) δ: 7.60 (s, 1H), 7.27 (s, 4H), 7.25 (s, 1H), 7.05-6.98 (m, 7H), 6.83 (d, *J* = 8.8 Hz, 2H), 6.77 (t, *J* = 7.6 Hz, 2H), 6.49-6.45 (m, 2H), 6.34 (d, *J* = 16.0 Hz, 1H), 5.18 (d, *J* = 15.6 Hz, 1H), 5.07 (d, *J* = 8.8 Hz, 1H), 4.49 (d, *J* = 15.6 Hz, 1H), 3.76 (s, 3H), 2.36 (s, 3H);^{13}C NMR (100 MHz, $CDCl_3$) δ: 173.9, 156.5, 151.2, 146.2, 140.7, 135.9, 135.3, 135.0, 133.8, 133.1, 130.0, 129.6, 128.7, 128.6, 128.5, 127.3, 127.0, 126.8, 126.7, 126.7, 125.0, 123.8, 121.3, 120.7, 116.5, 114.7, 83.9, 62.7, 55.5, 44.0, 29.7, 21.7 21.2; IR(KBr) υ: 2195, 1707, 1594, 1519, 1496, 1435, 1352, 1250, 1224, 826 cm^{-1}; MS (*m*/*z*): HRMS (ESI-TOF) Calcd. For $C_{35}H_{30}N_3O_2$ ($[M+H]^+$): 524.2333, found: 524.2331.

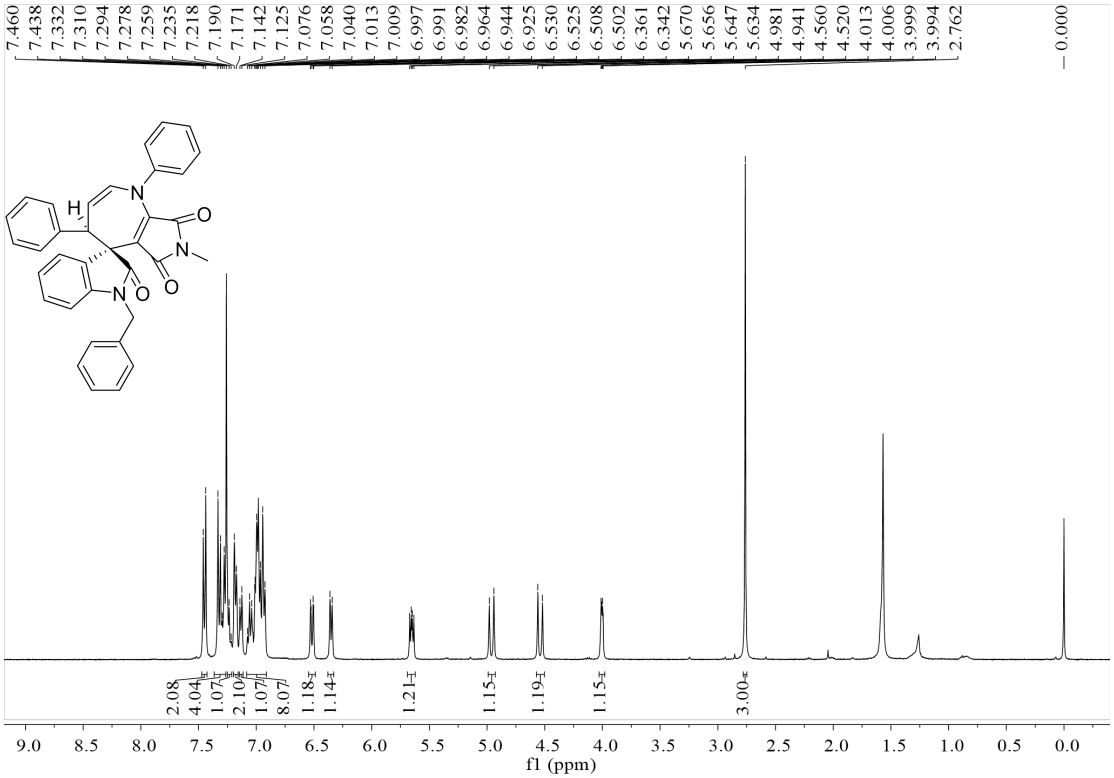
***cis*-1-benzyl-5-chloro-7'-methyl-4'-phenyl-1'-(*p*-tolyl)-1',4'-dihydro-6'*H*-spiro[indoline-3,5'-pyrrolo[3,4-*b*]azepine]-2,6',8'(7'*H*)-trione (3a):**

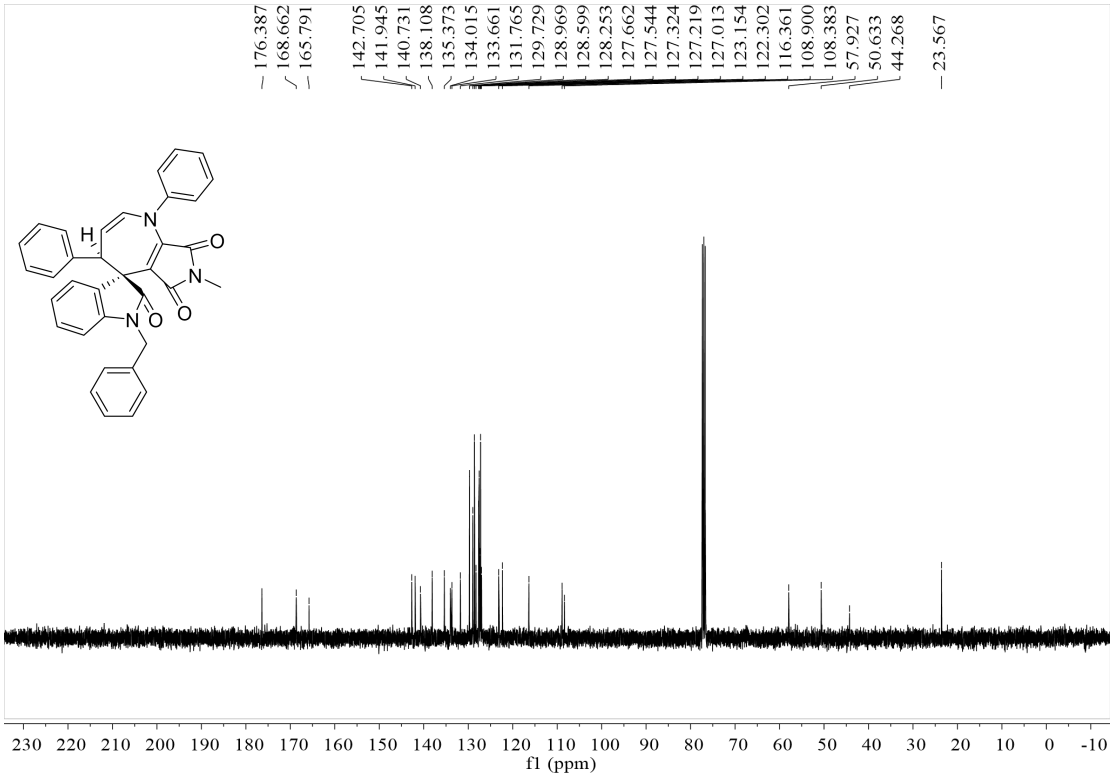


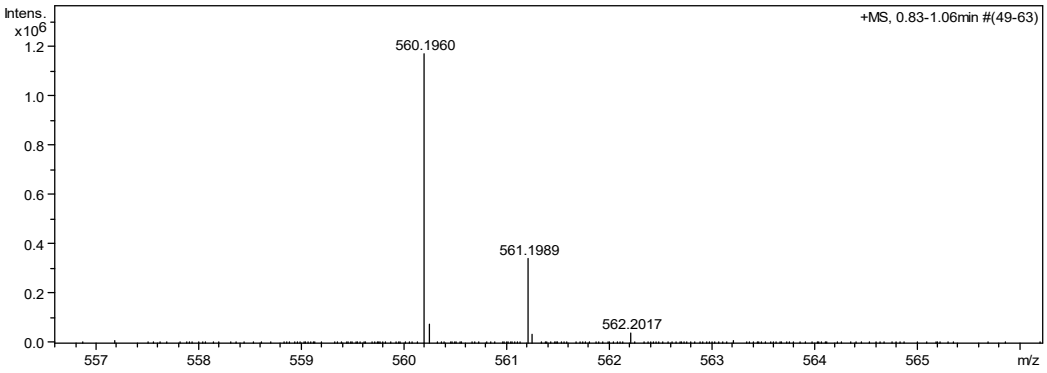



Intens.
x10^5
+MS, 0.39-0.57min #(23-34)
608.1735
609.1762
610.1717
611.1744
0
1
2
3
605
606
607
608
609
610
611
612
613
614 m/z

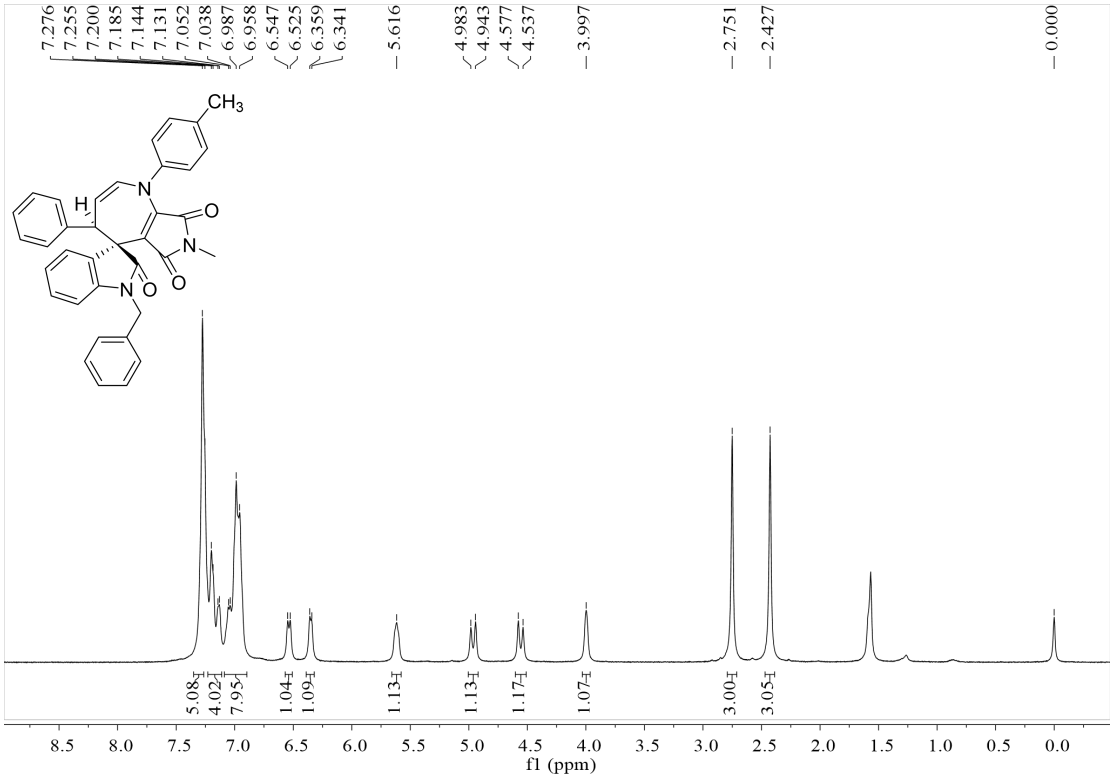
***cis*-1-benzyl-7'-methyl-1',4'-diphenyl-1',4'-dihydro-6'*H*-spiro[indoline-3,5'-pyrrolo[3,4-*b*]azepine]-2,6',8'(7'*H*)-trione (3b):**

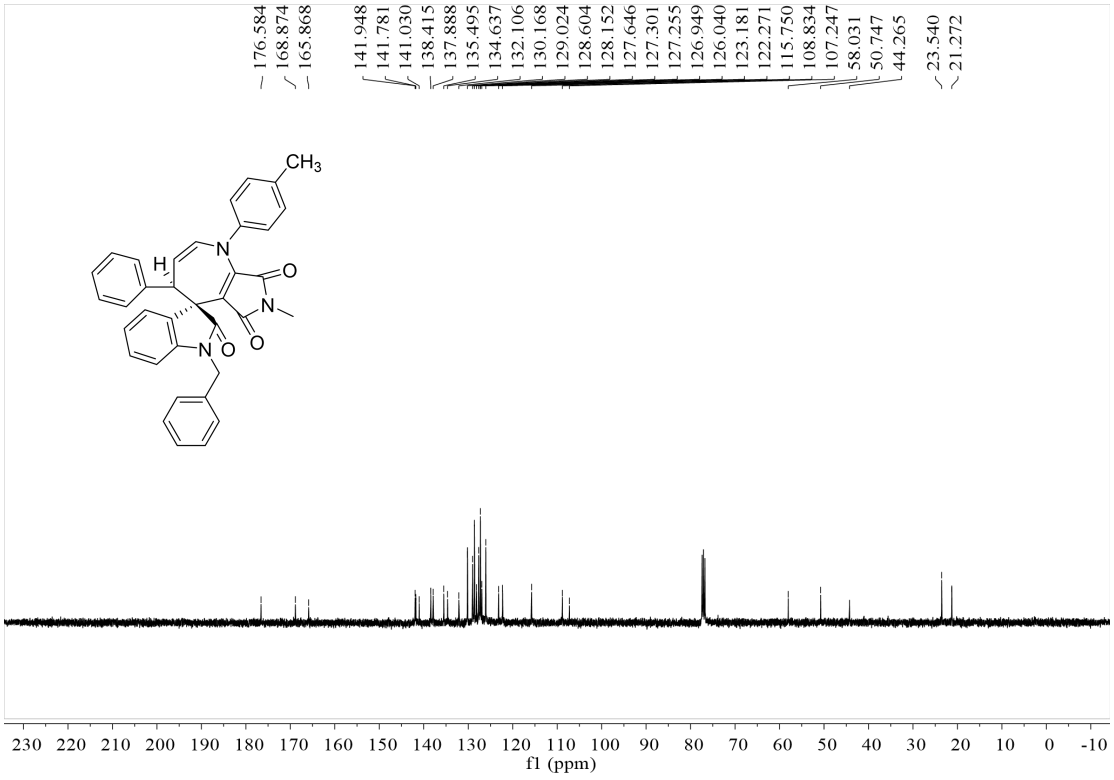


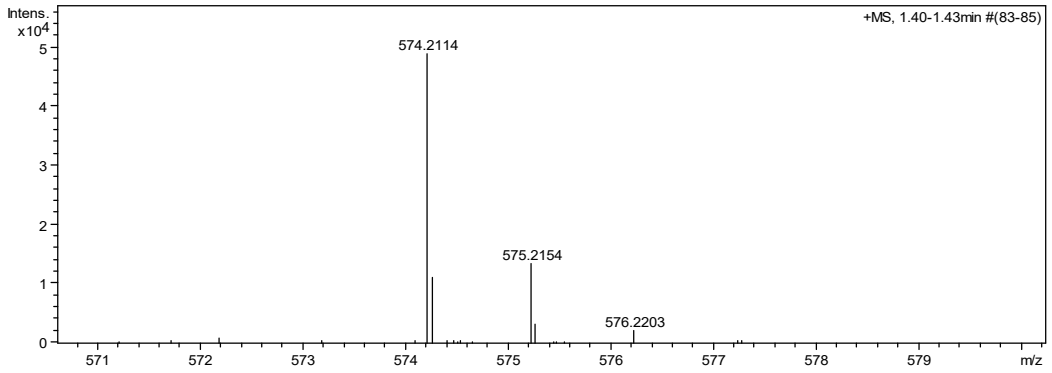



Intens.
x10^6
1.2
1.0
0.8
0.6
0.4
0.2
0.0
+MS, 0.83-1.06min #(49-63)
560.1960
561.1989
562.2017
557
558
559
560
561
562
563
564
565
m/z

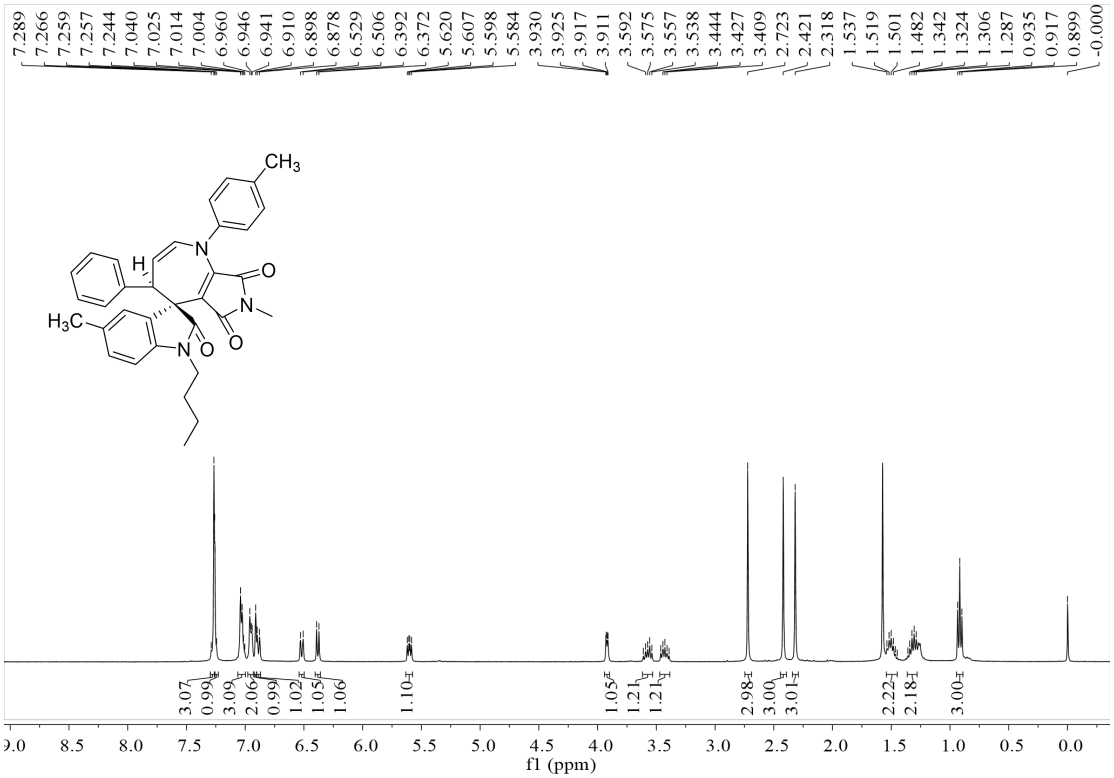
***cis*-1-benzyl-7'-methyl-4'-phenyl-1'-(*p*-tolyl)-1',4'-dihydro-6'*H*-spiro[indoline-3,5'-pyrrolo[3,4-*b*]azepine]-2,6',8'(7'*H*)-trione (3c):**

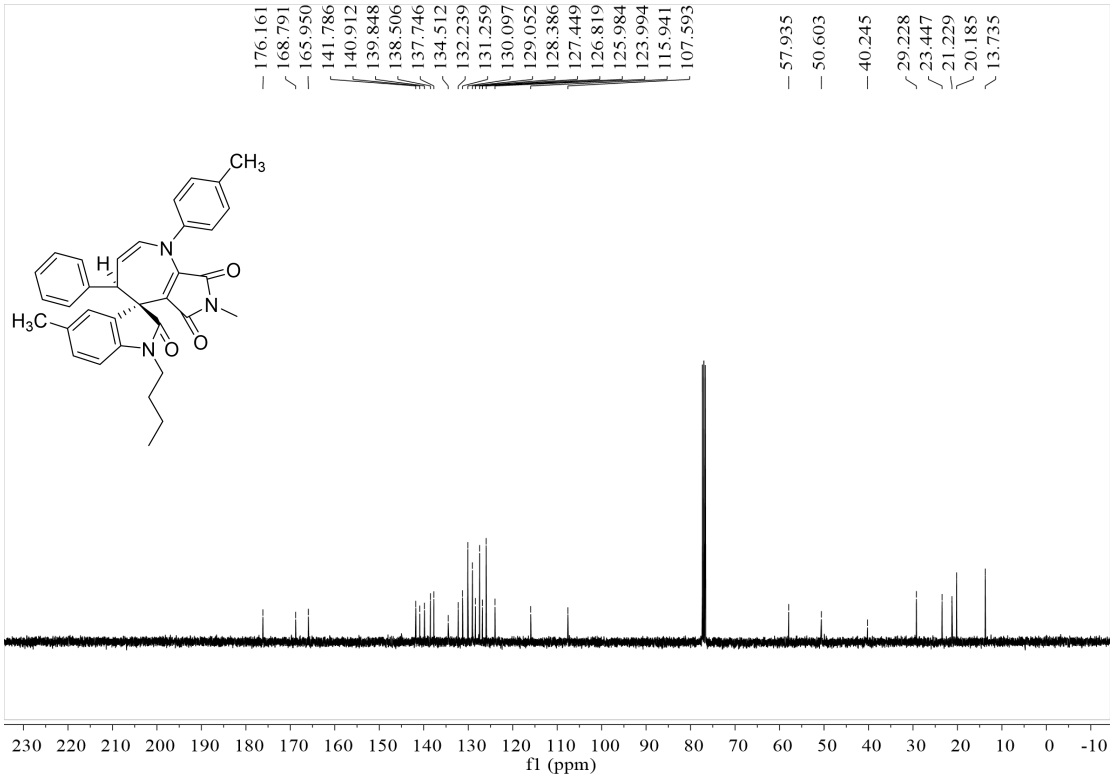


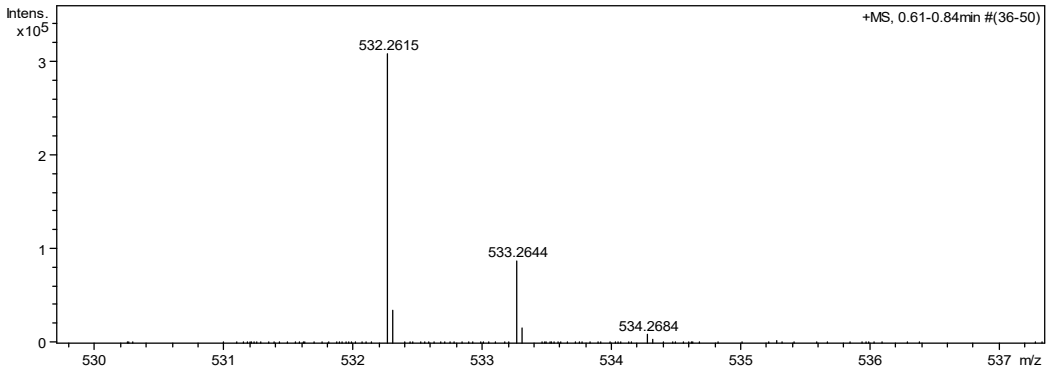



Intens.
x10^4
+MS, 1.40-1.43min #(83-85)
574.2114
575.2154
576.2203
m/z

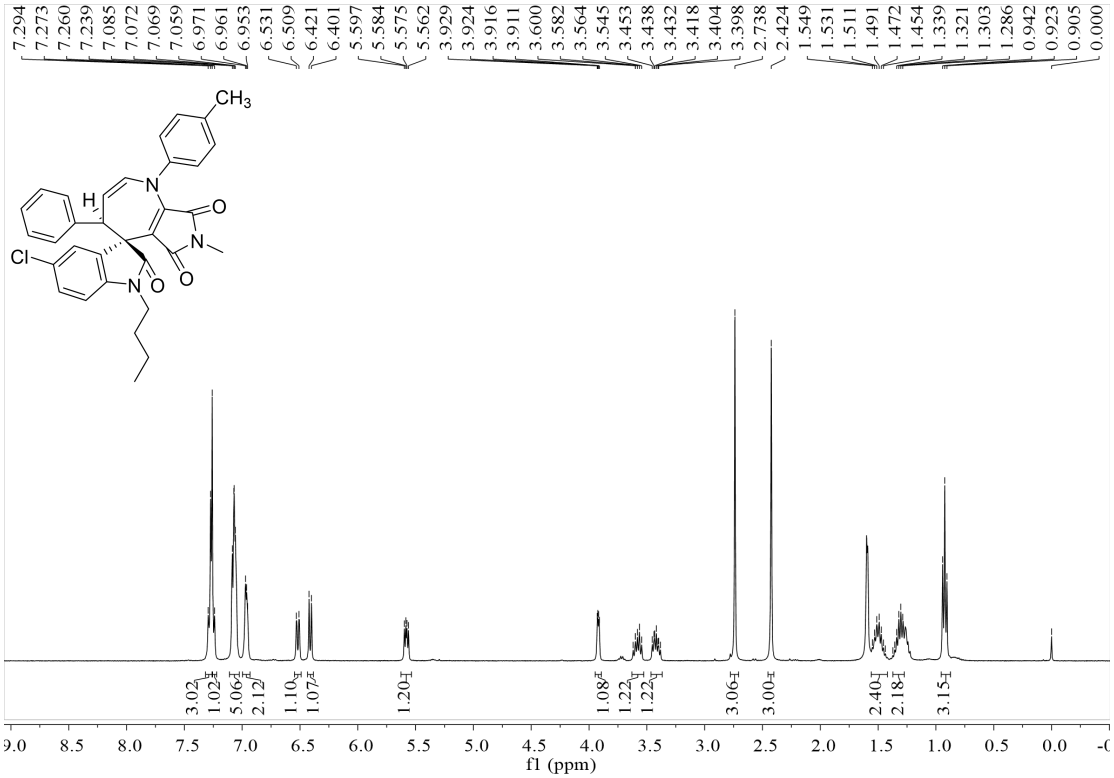
***cis*-1-butyl-5,7'-dimethyl-4'-phenyl-1'-(*p*-tolyl)-1',4'-dihydro-6'*H*-spiro[indoline-3,5'-pyrrolo[3,4-*b*]azepine]-2,6',8'(7'*H*)-trione (3d):**

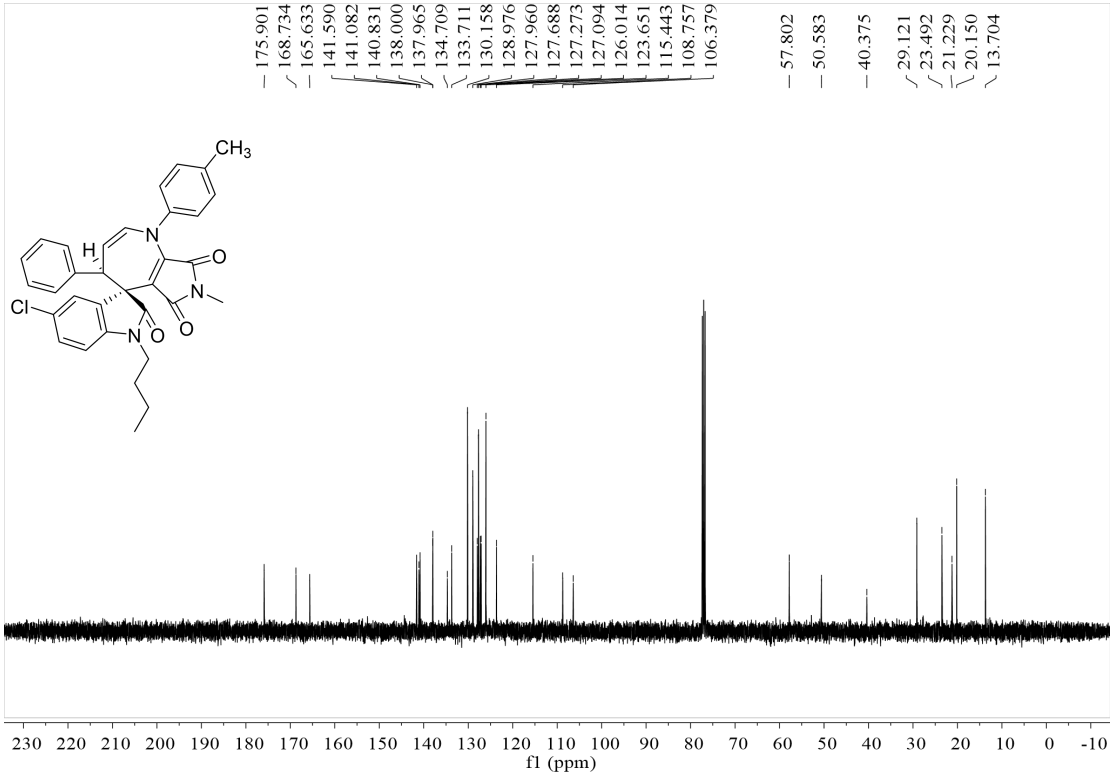


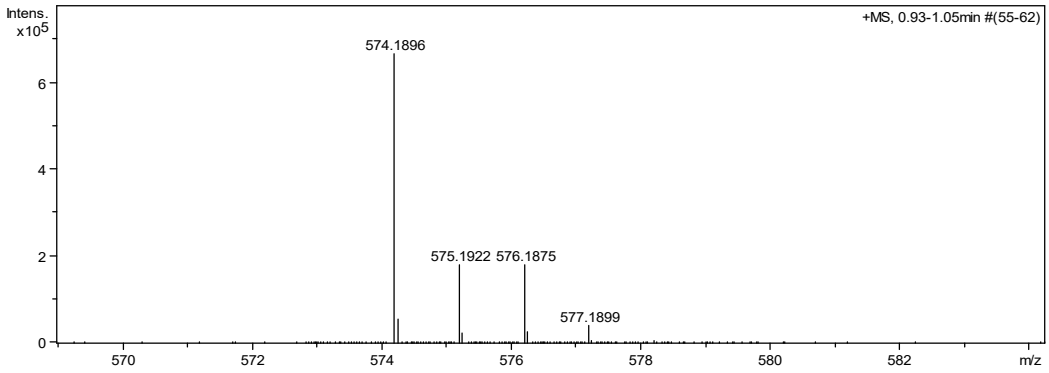



Intens.
x10^5
+MS, 0.61-0.84min #(36-50)
532.2615
533.2644
534.2684
0
1
2
3
530
531
532
533
534
535
536
537 m/z

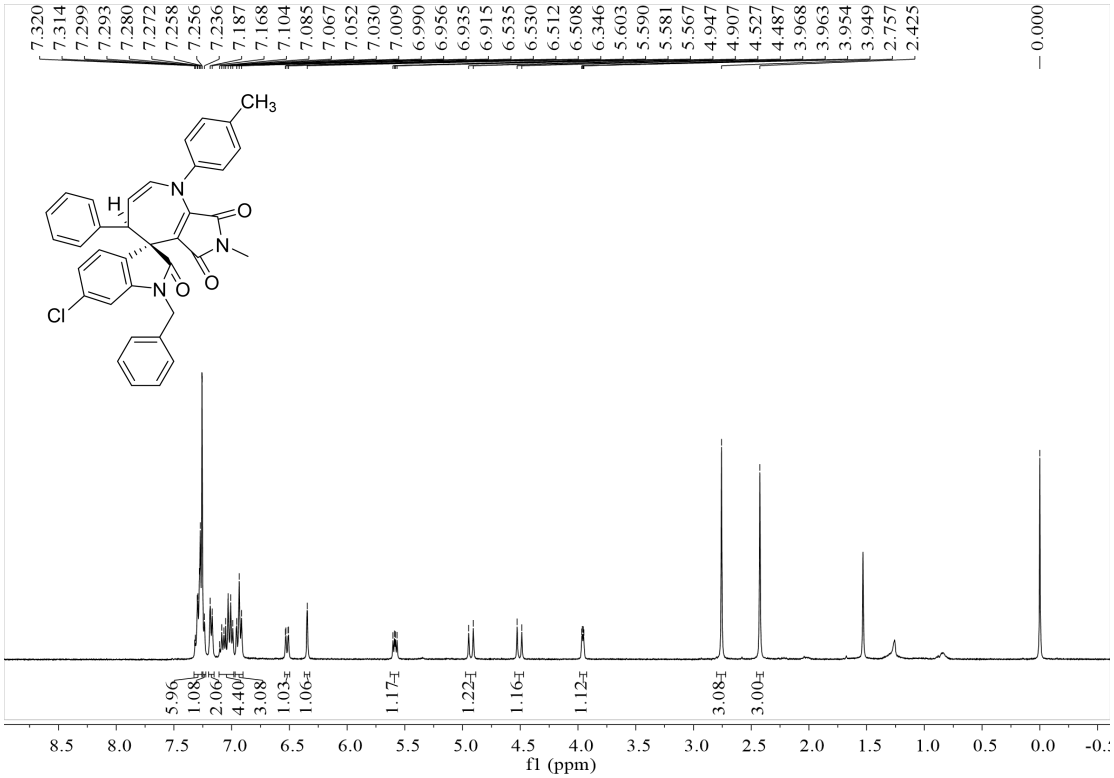
***cis*-1-butyl-5-chloro-7'-methyl-4'-phenyl-1'-(*p*-tolyl)-1',4'-dihydro-6'*H*-spiro[indoline-3,5'-pyrrolo[3,4-*b*]azepine]-2,6',8'(7'*H*)-trione (3e):**

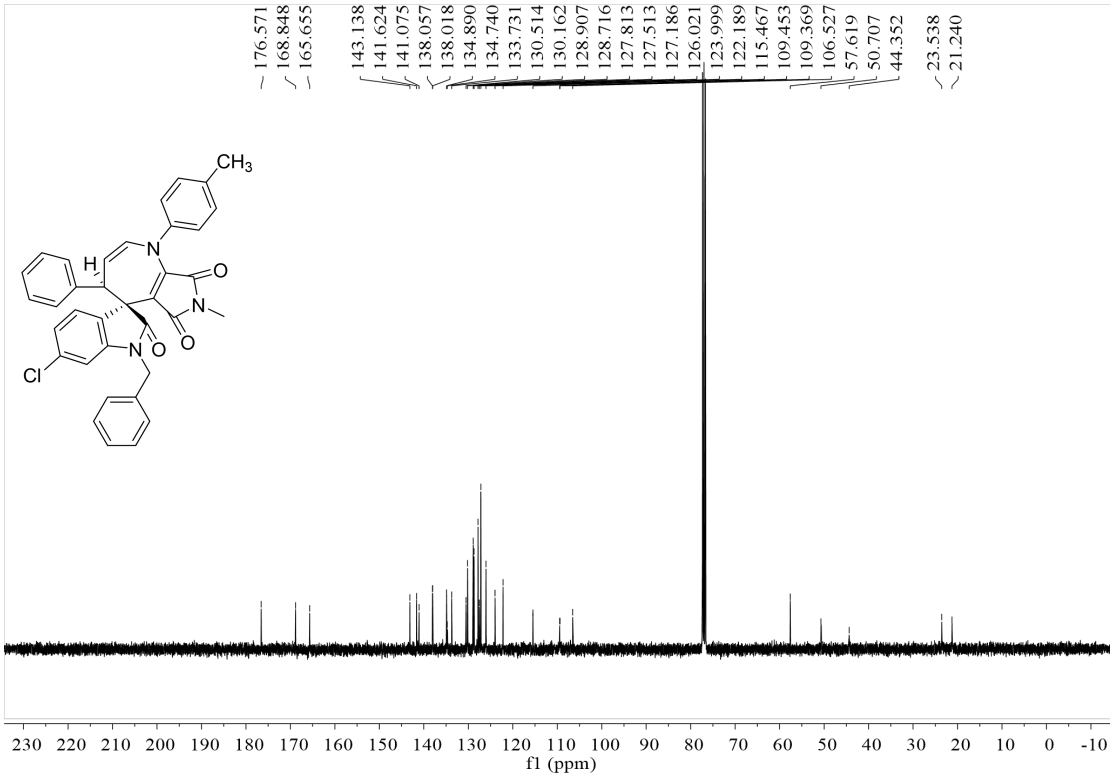


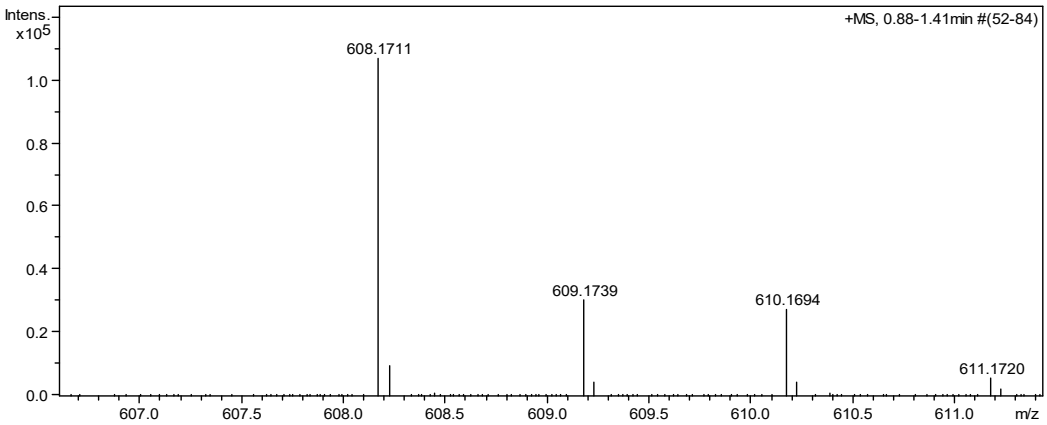



Intens.
x10^5
+MS, 0.93-1.05min #(55-62)
574.1896
575.1922
576.1875
577.1899
0
2
4
6
570
572
574
576
578
580
582
m/z

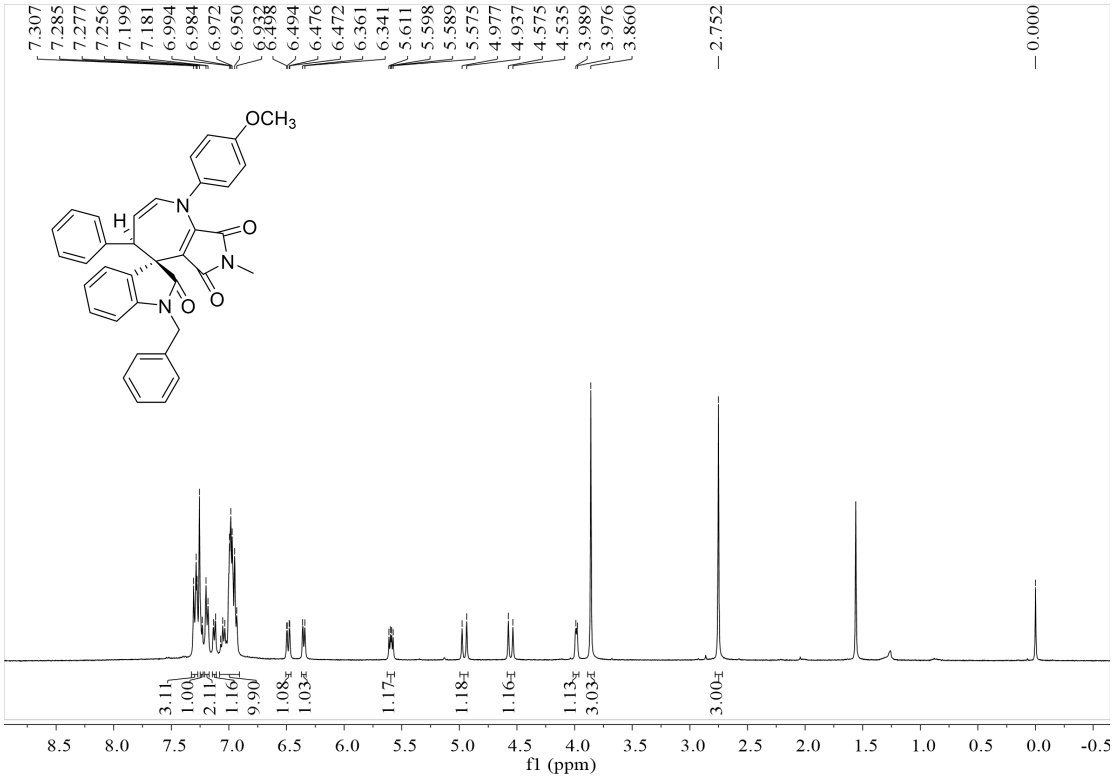
***cis*-1-benzyl-6-chloro-7'-methyl-4'-phenyl-1'-(*p*-tolyl)-1',4'-dihydro-6'*H*-spiro[indoline-3,5'-*p*yrrolo[3,4-*b*]azepine]-2,6',8'(7'*H*)-trione (3f):**

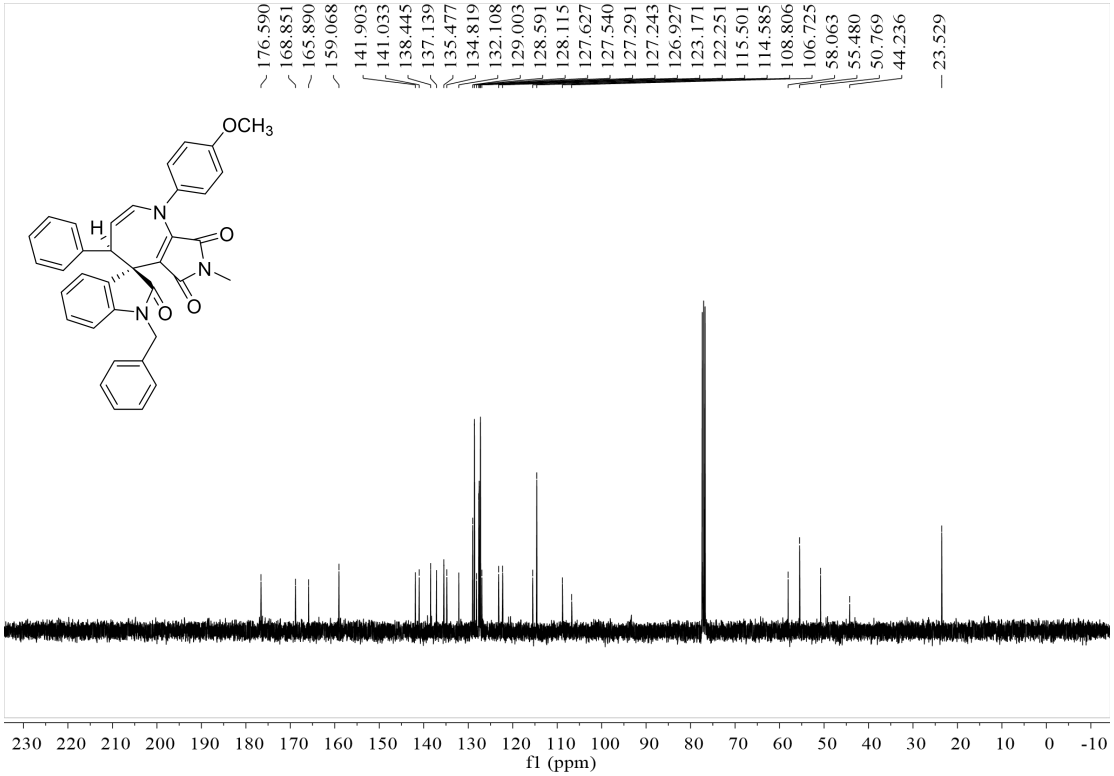


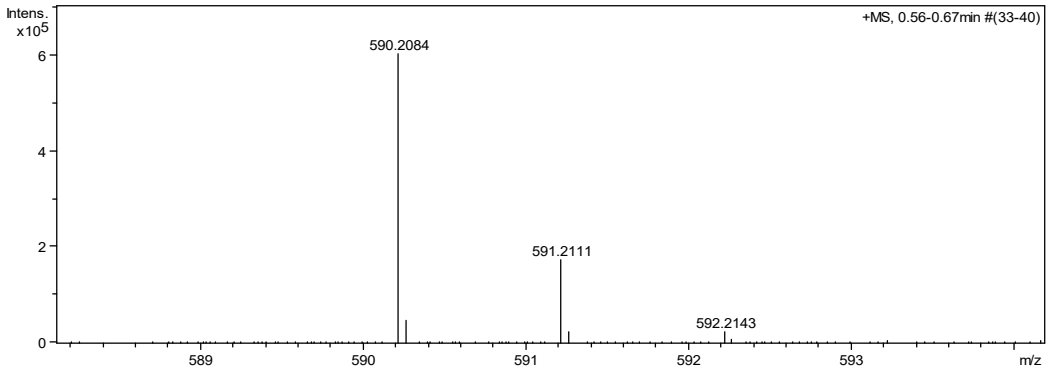



Intens.
x10^5
+MS, 0.88-1.41min #(52-84)
608.1711
609.1739
610.1694
611.1720
1.0
0.8
0.6
0.4
0.2
0.0
607.0
607.5
608.0
608.5
609.0
609.5
610.0
610.5
611.0
m/z

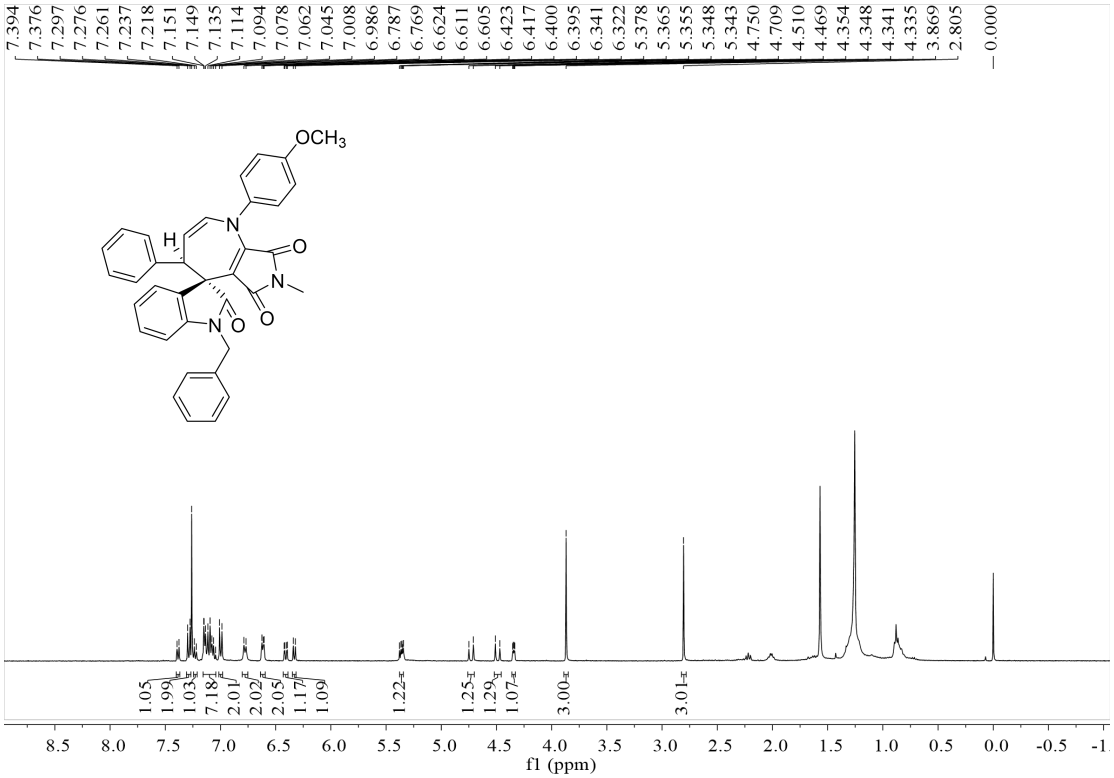
***cis*-1-benzyl-1'-(4-methoxyphenyl)-7'-methyl-4'-phenyl-1',4'-dihydro-6'*H*-spiro[indoline-3,5'-pyrrolo[3,4-*b*]azepine]-2,6',8'(7'*H*)-trione (3g):**

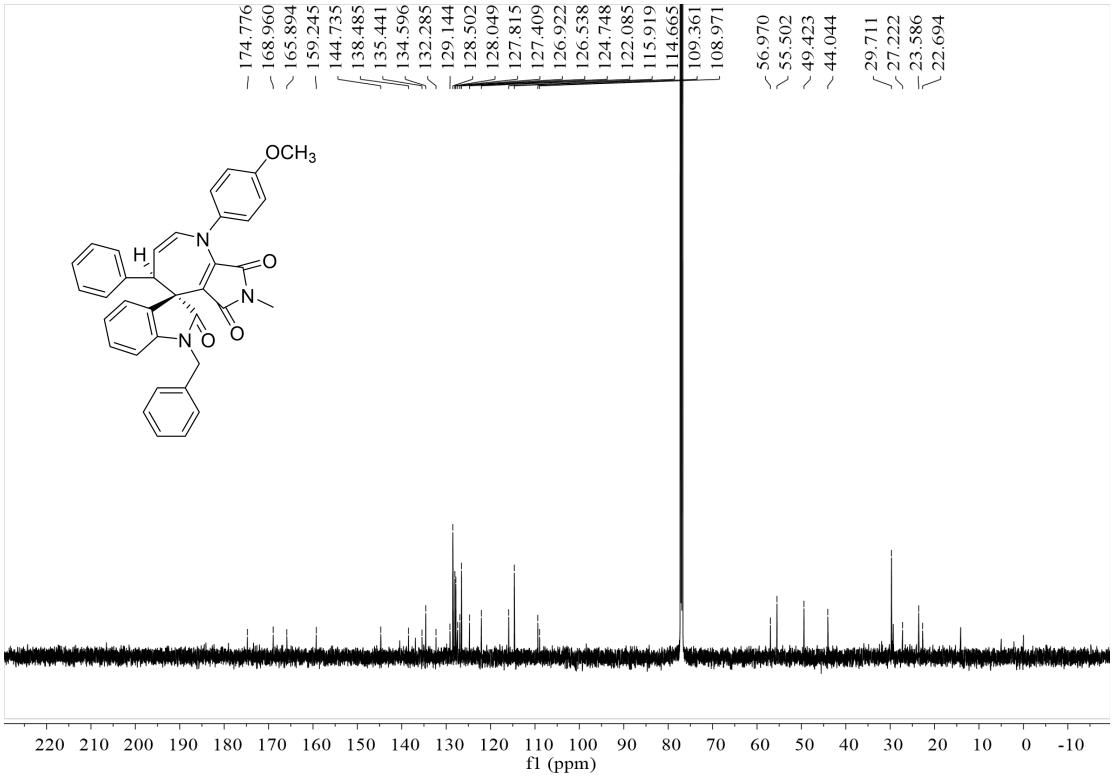


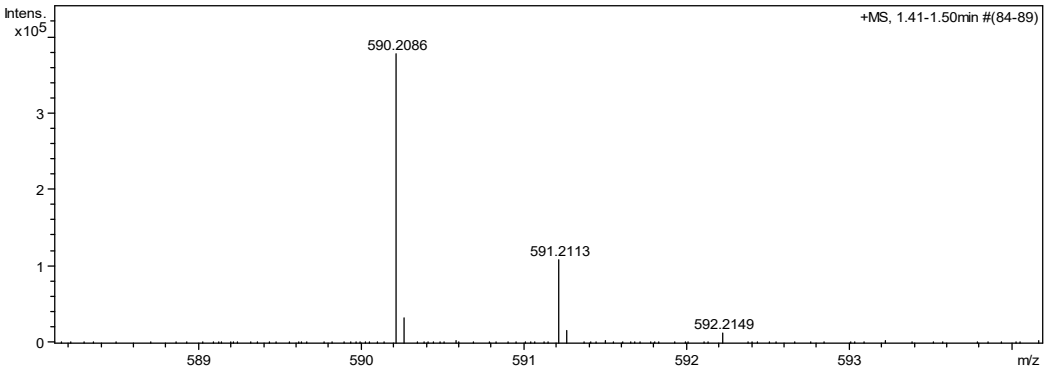



Intens.
x10^5
+MS, 0.56-0.67min #(33-40)
590.2084
591.2111
592.2143
6
4
2
0
589
590
591
592
593
m/z

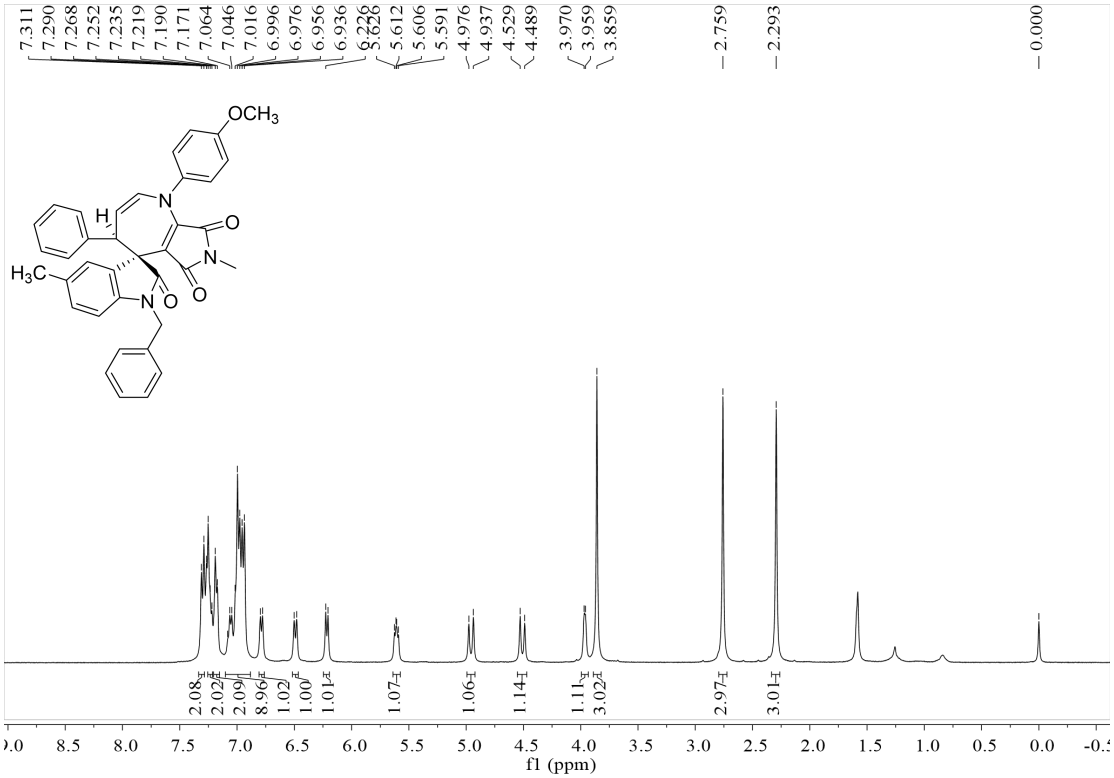
***trans*-1-benzyl-1'-(4-methoxyphenyl)-7'-methyl-4'-phenyl-1',4'-dihydro-6'*H*-spiro[indoline-3, 5'-pyrrolo[3,4-*b*]azepine]-2,6',8'(7'*H*)-trione (3g'):**

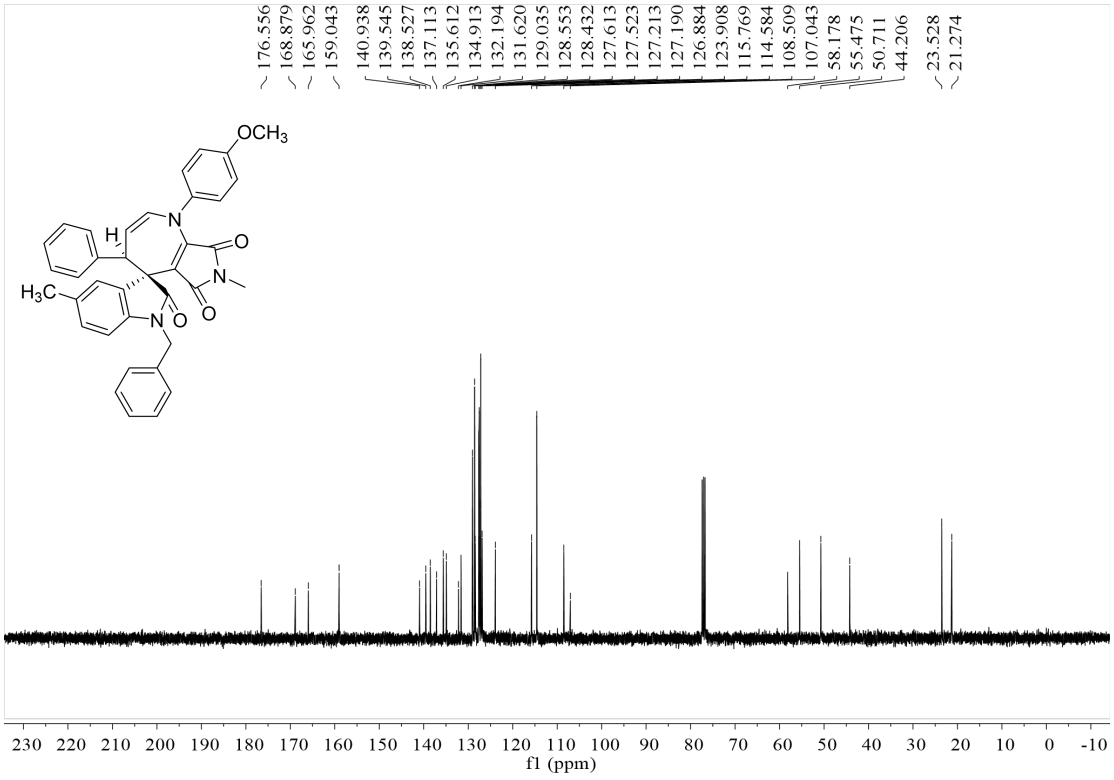


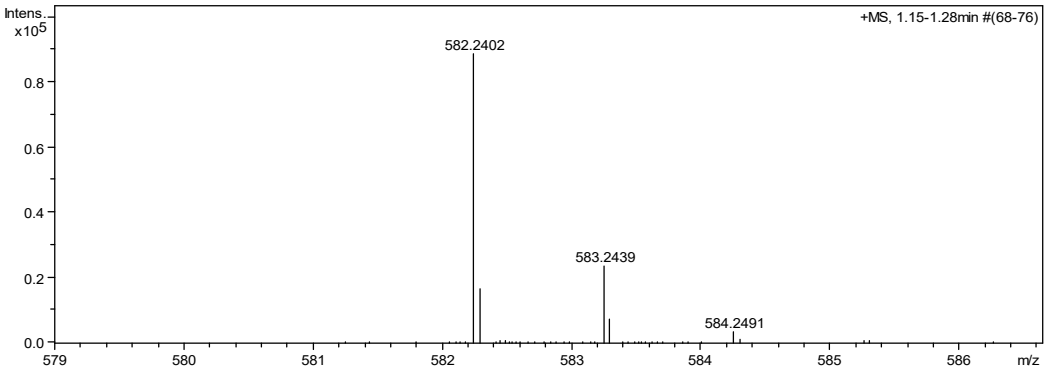



Intens.
x10^5
+MS, 1.41-1.50min #(84-89)
590.2086
591.2113
592.2149
0
1
2
3
589
590
591
592
593
m/z

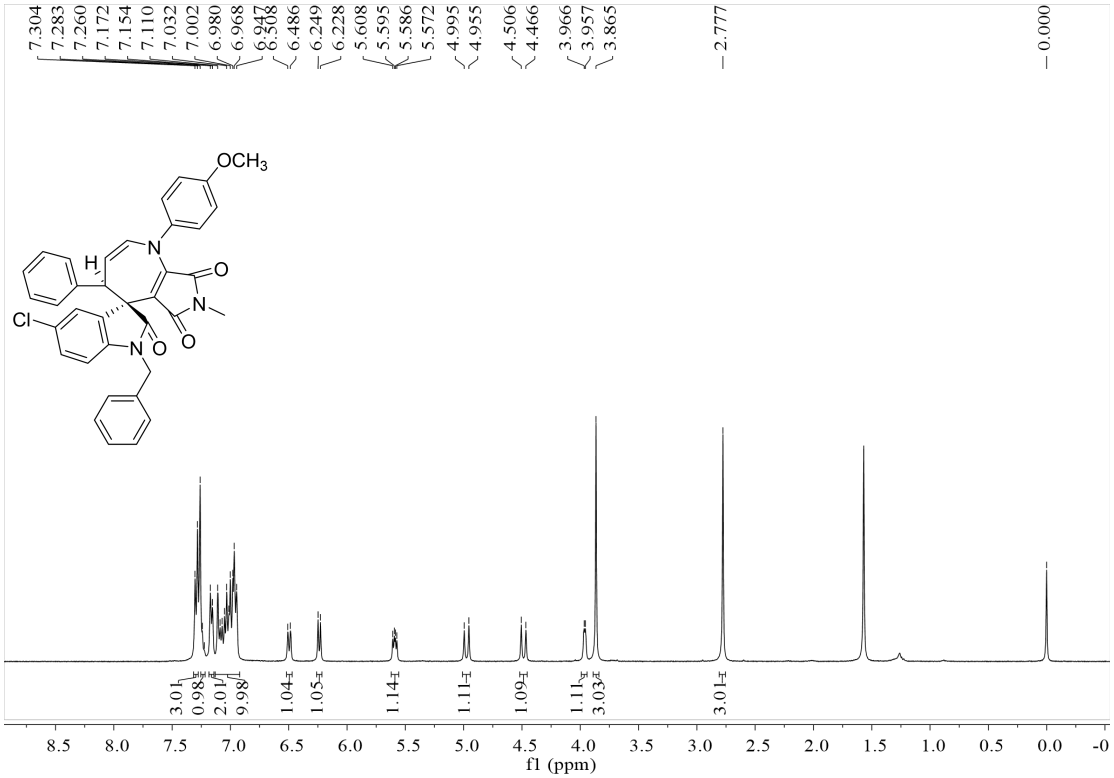
***cis*-1-benzyl-1'-(4-methoxyphenyl)-5,7'-dimethyl-4'-phenyl-1',4'-dihydro-6'*H*-spiro[indoline-3,5'-pyrrolo[3,4-*b*]azepine]-2,6',8'(7'*H*)-trione (3h):**

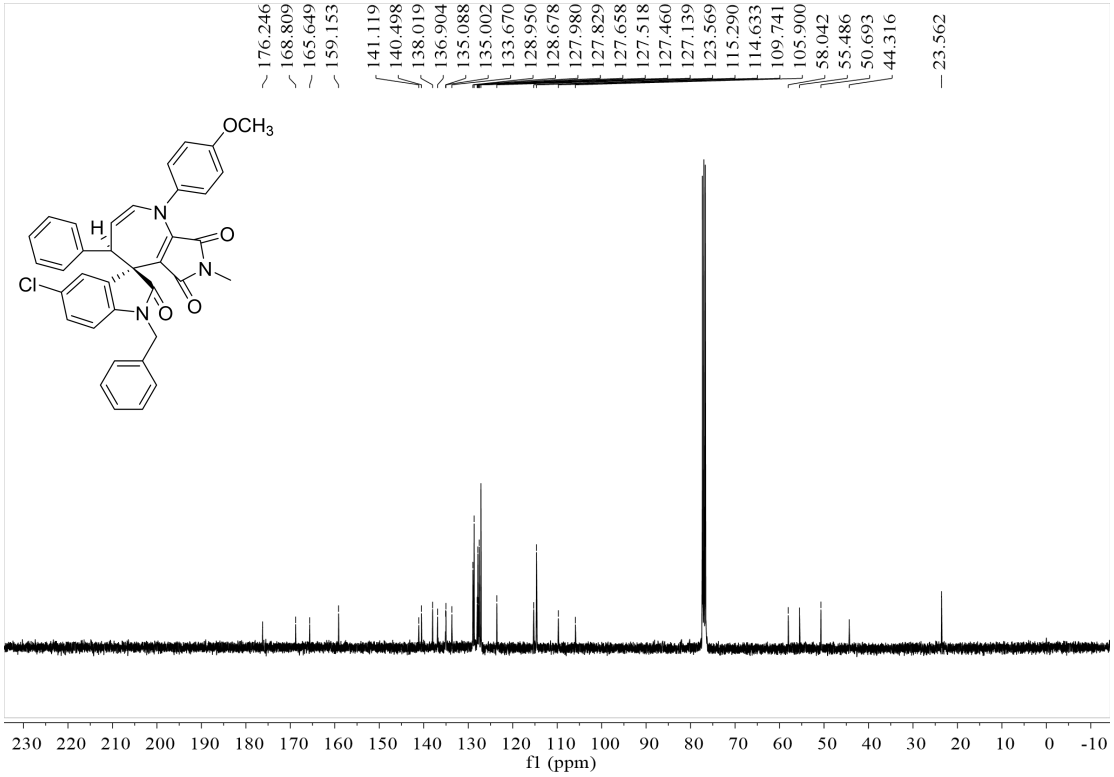


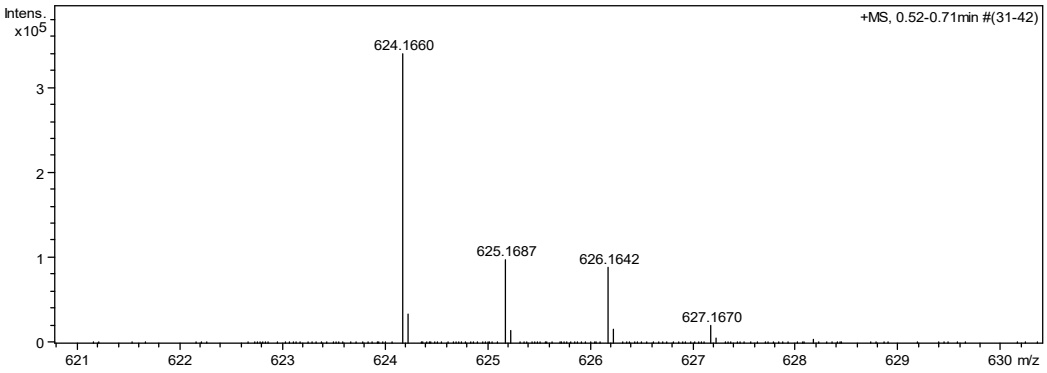



Intens.
x10^5
+MS, 1.15-1.28min #(68-76)
582.2402
583.2439
584.2491
0.0
0.2
0.4
0.6
0.8
579
580
581
582
583
584
585
586
m/z

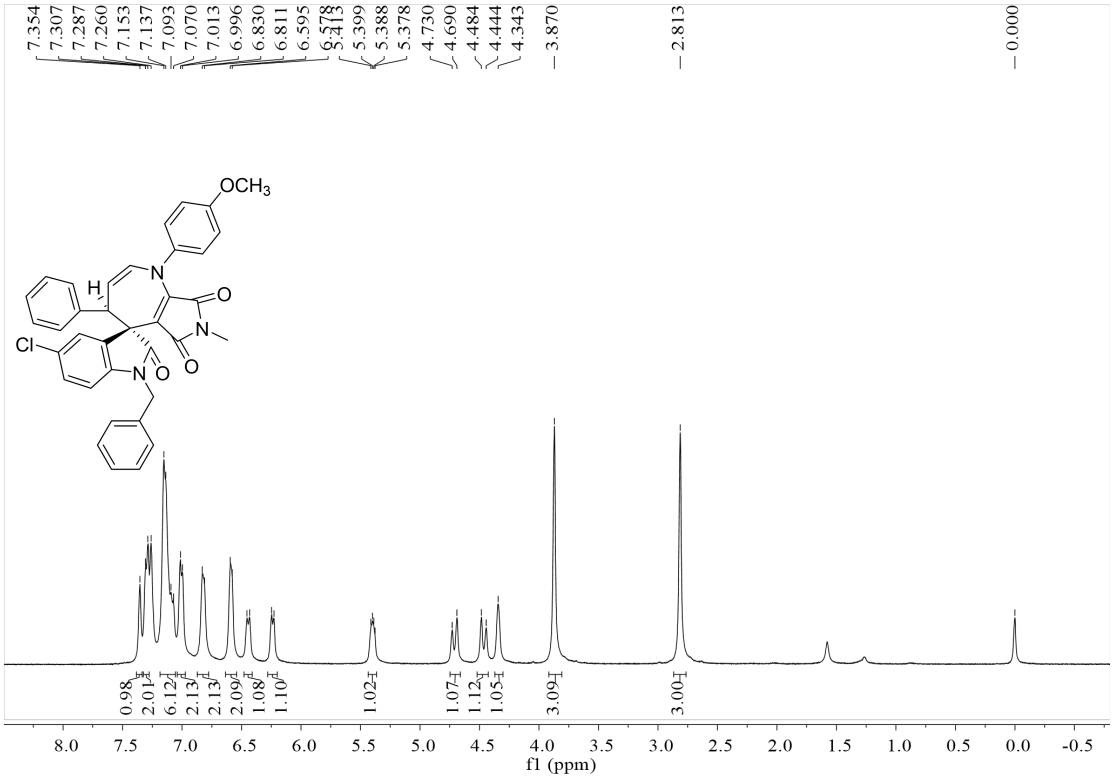
***cis*-1-benzyl-5-chloro-1'-(4-methoxyphenyl)-7'-methyl-4'-phenyl-1',4'-dihydro-6'*H*-spiro[indoline-3,5'-pyrrolo[3,4-*b*]azepine]-2,6',8'(7'*H*)-trione (3i):**

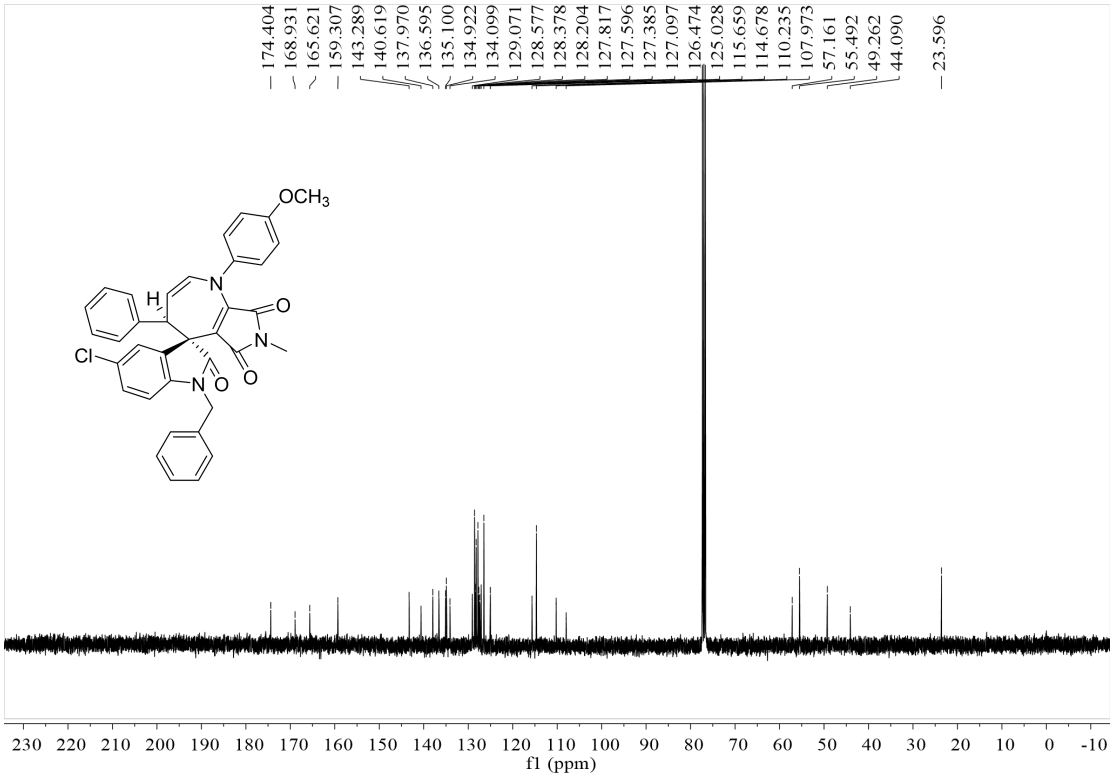


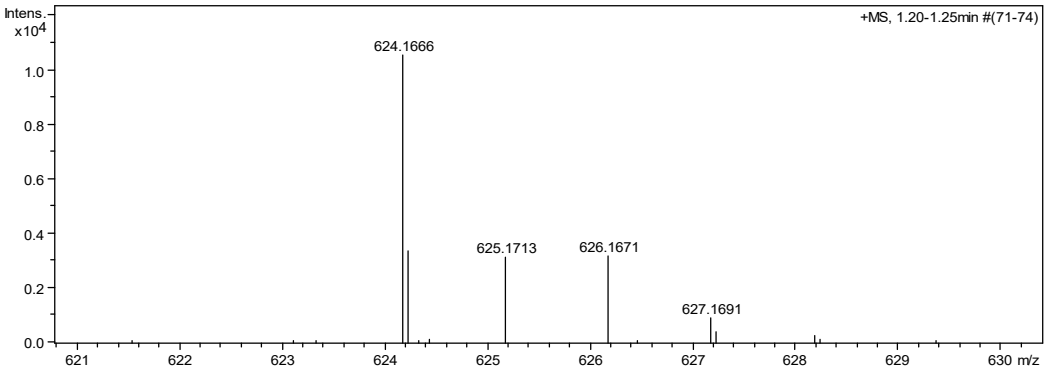



Intens.
x10^5
+MS, 0.52-0.71min #(31-42)
624.1660
625.1687
626.1642
627.1670
0
1
2
3
621
622
623
624
625
626
627
628
629
630 m/z

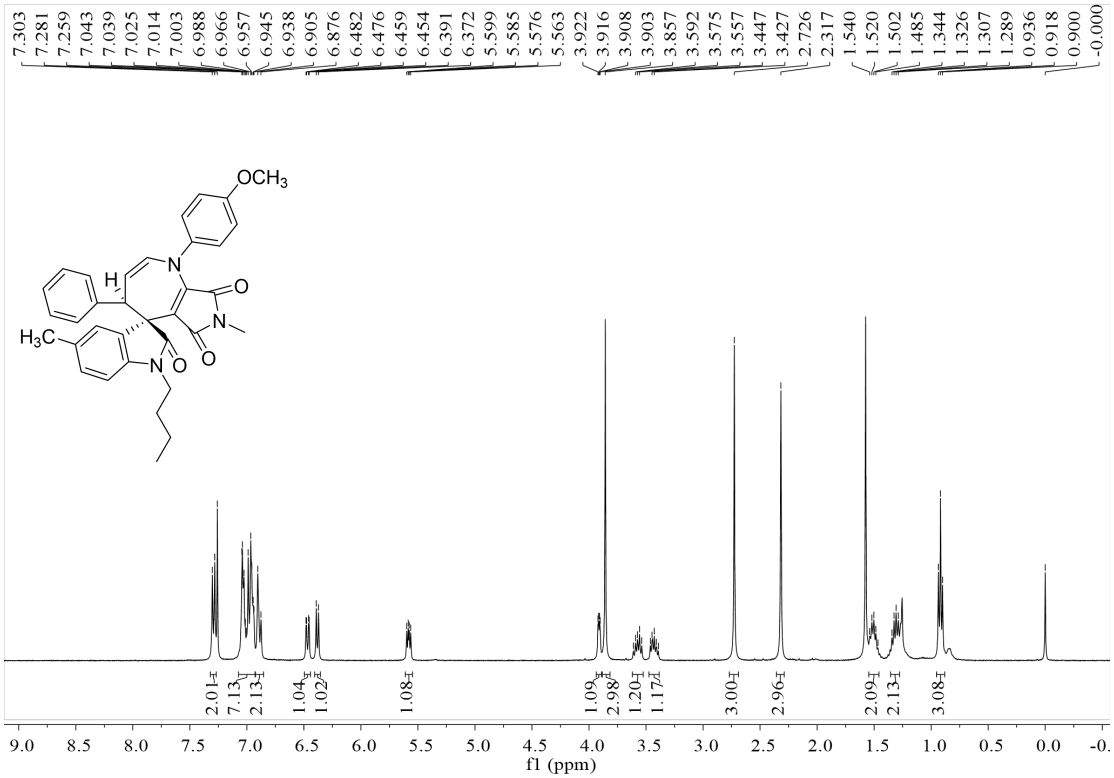
***trans*-1-benzyl-5-chloro-1'-(4-methoxyphenyl)-7'-methyl-4'-phenyl-1',4'-dihydro-6'*H*-spiro[indoline-3,5'-pyrrolo[3,4-*b*]azepine]-2,6',8'(7'*H*)-trione (3i'):**

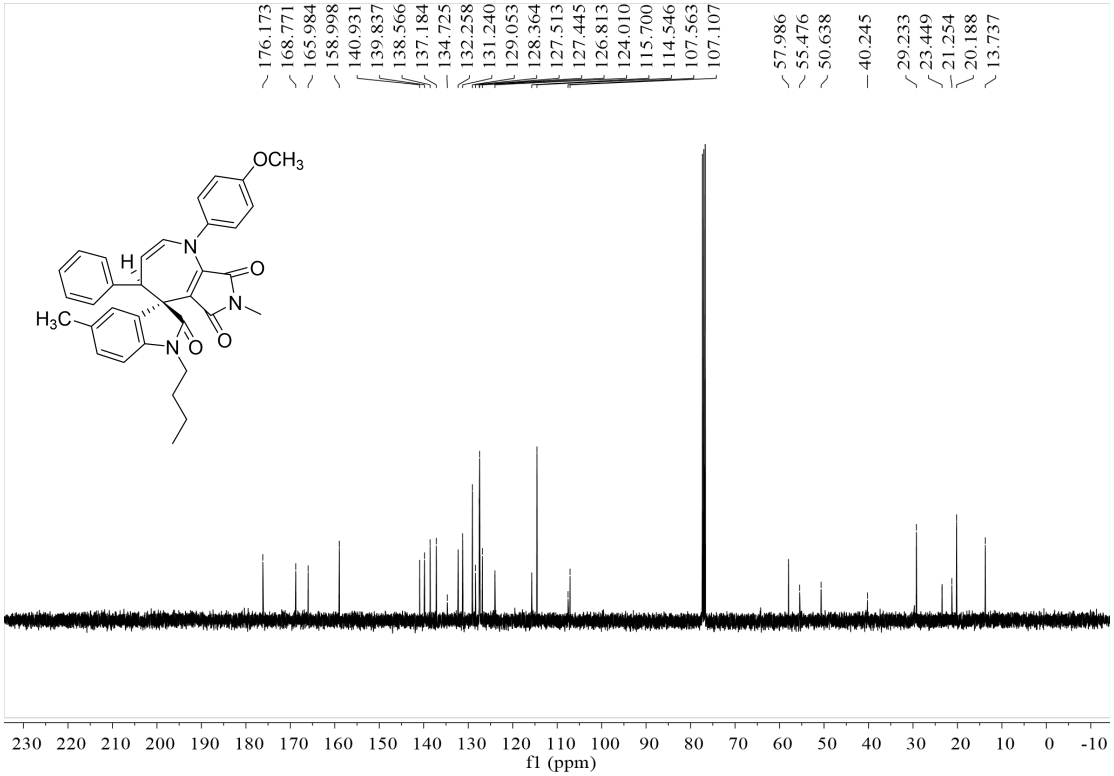


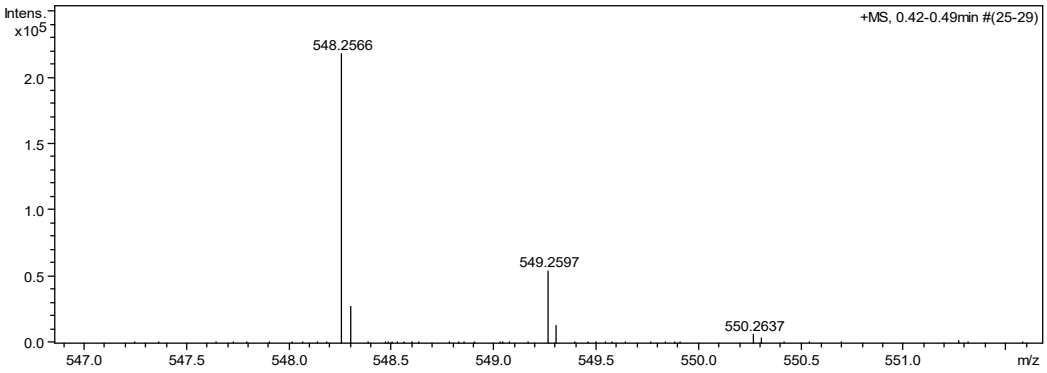



Intens.
x10^4
+MS, 1.20-1.25min #(71-74)
624.1666
625.1713
626.1671
627.1691
1.0
0.8
0.6
0.4
0.2
0.0
621
622
623
624
625
626
627
628
629
630 m/z

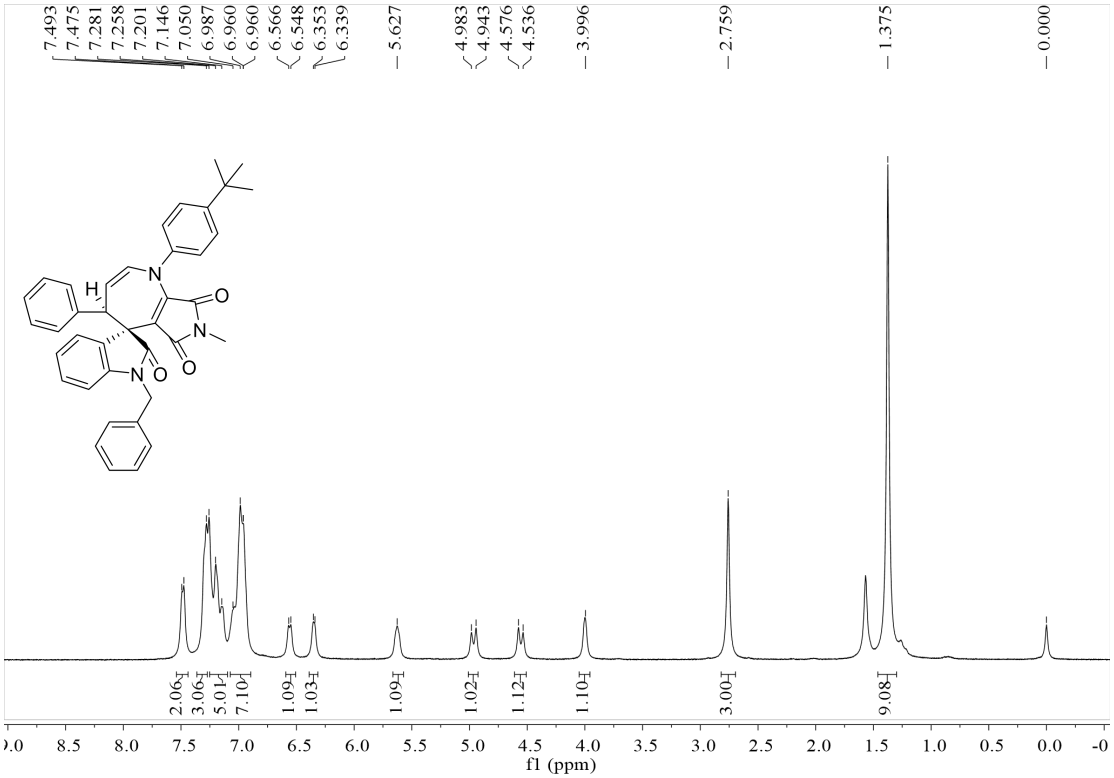
***cis*-1-butyl-1'-(4-methoxyphenyl)-5,7'-dimethyl-4'-phenyl-1',4'-dihydro-6'*H*-spiro[indoline-3, 5'-pyrrolo[3,4-*b*]azepine]-2,6',8'(7'*H*)-trione (3j):**

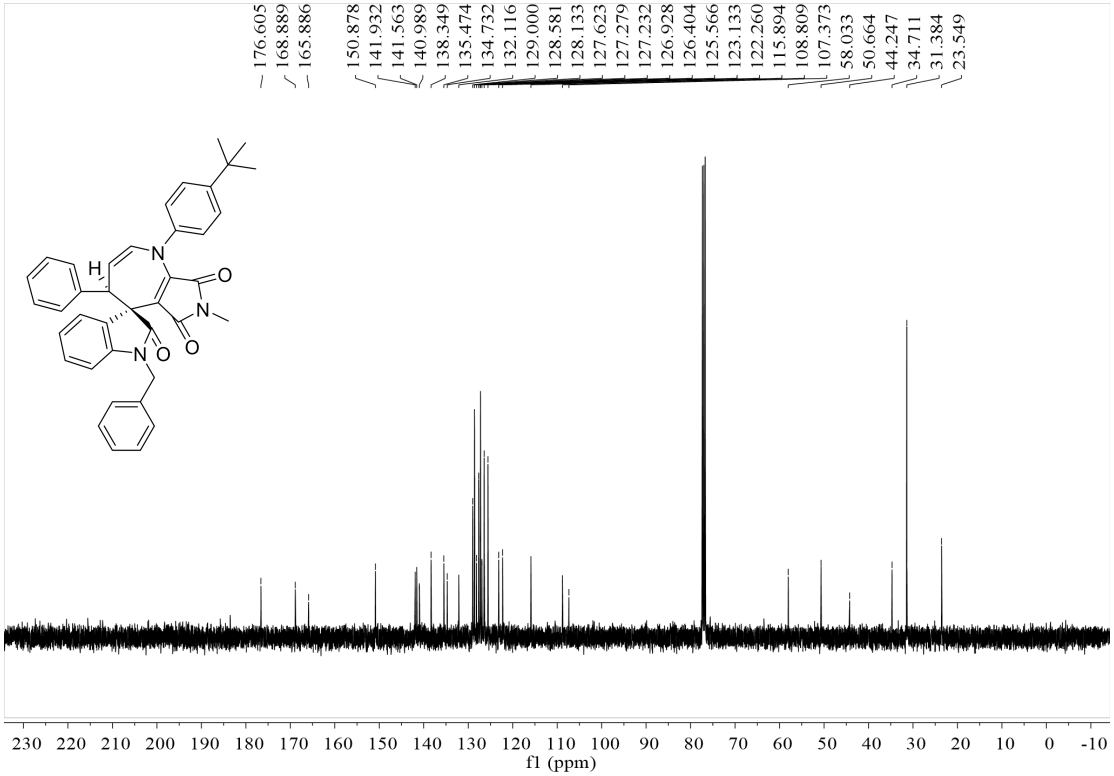


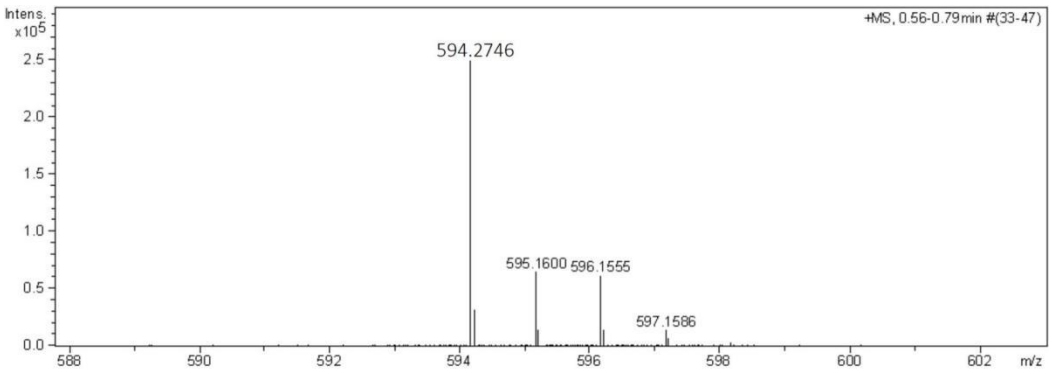



Intens.
x10^5
+MS, 0.42-0.49min #(25-29)
548.2566
549.2597
550.2637
2.0
1.5
1.0
0.5
0.0
547.0
547.5
548.0
548.5
549.0
549.5
550.0
550.5
551.0
m/z

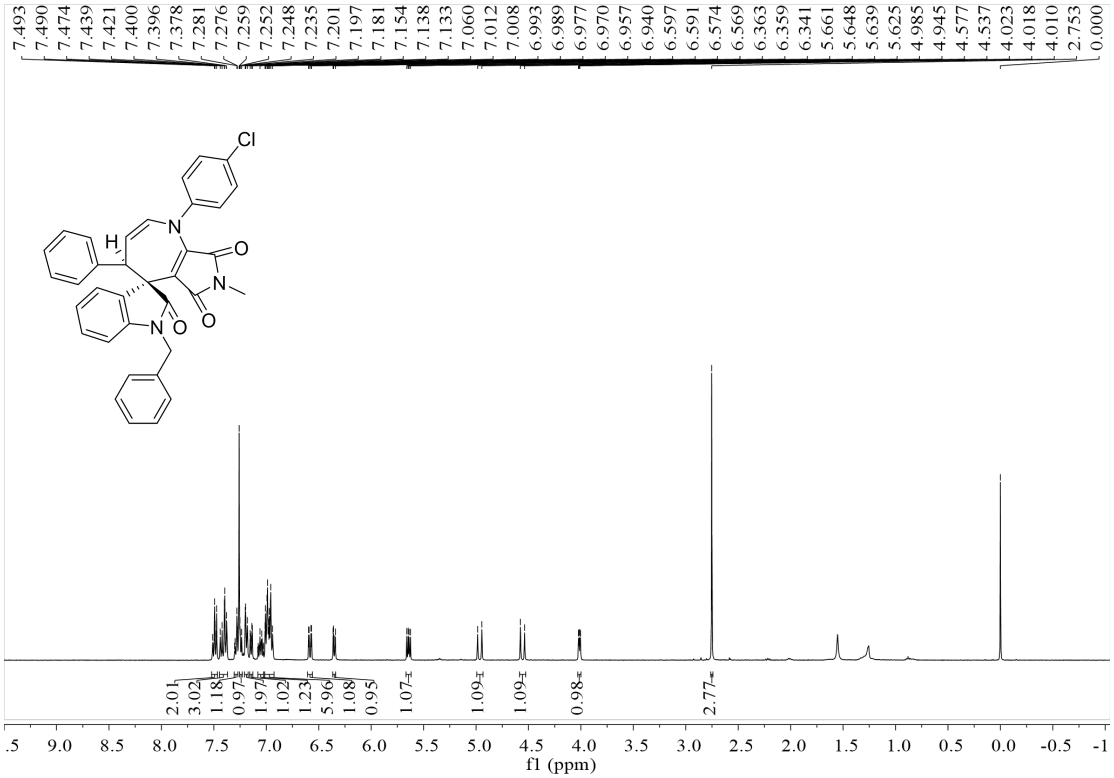
***cis*-1-benzyl-1'-(4-(tert-butyl)phenyl)-7'-methyl-4'-phenyl-1',4'-dihydro-6'*H*-spiro[indoline-3, 5'-pyrrolo[3,4-*b*]azepine]-2,6',8'(7'*H*)-trione (3k):**

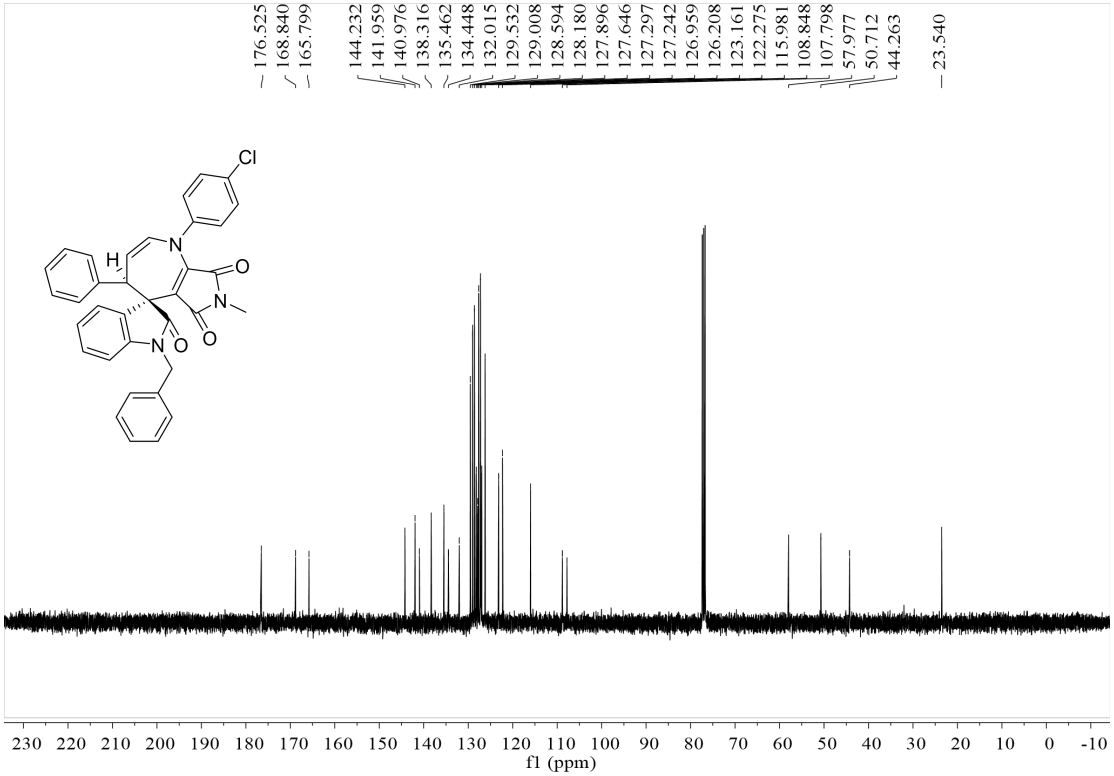


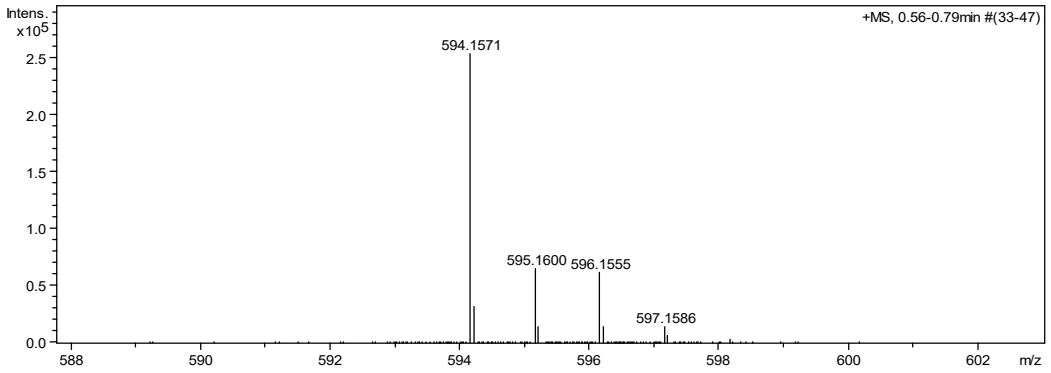



Intens.
x10^5
+MS, 0.56-0.79min #(33-47)
594.2746
595.1600
596.1555
597.1586
2.5
2.0
1.5
1.0
0.5
0.0
588
590
592
594
596
598
600
602
m/z

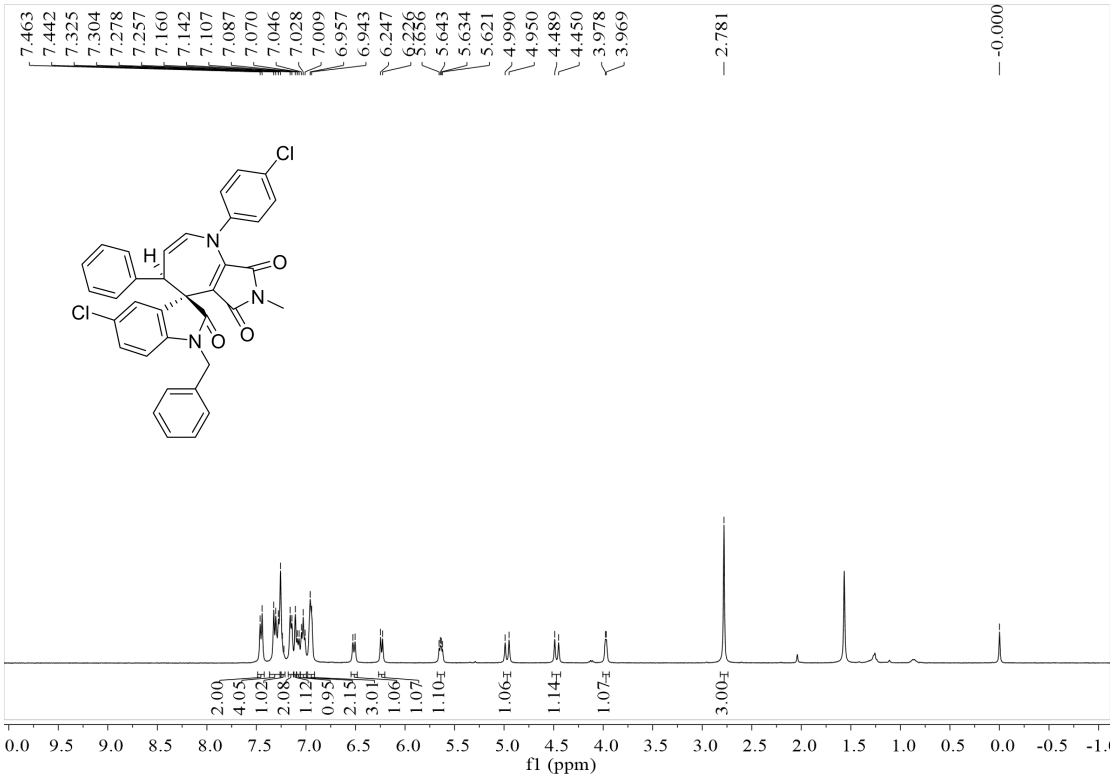
***cis*-1-benzyl-1'-(4-chlorophenyl)-7'-methyl-4'-phenyl-1',4'-dihydro-6'*H*-spiro[indoline-3,5'-pyrrolo[3,4-*b*]azepine]-2,6',8'(7'*H*)-trione (3l):**

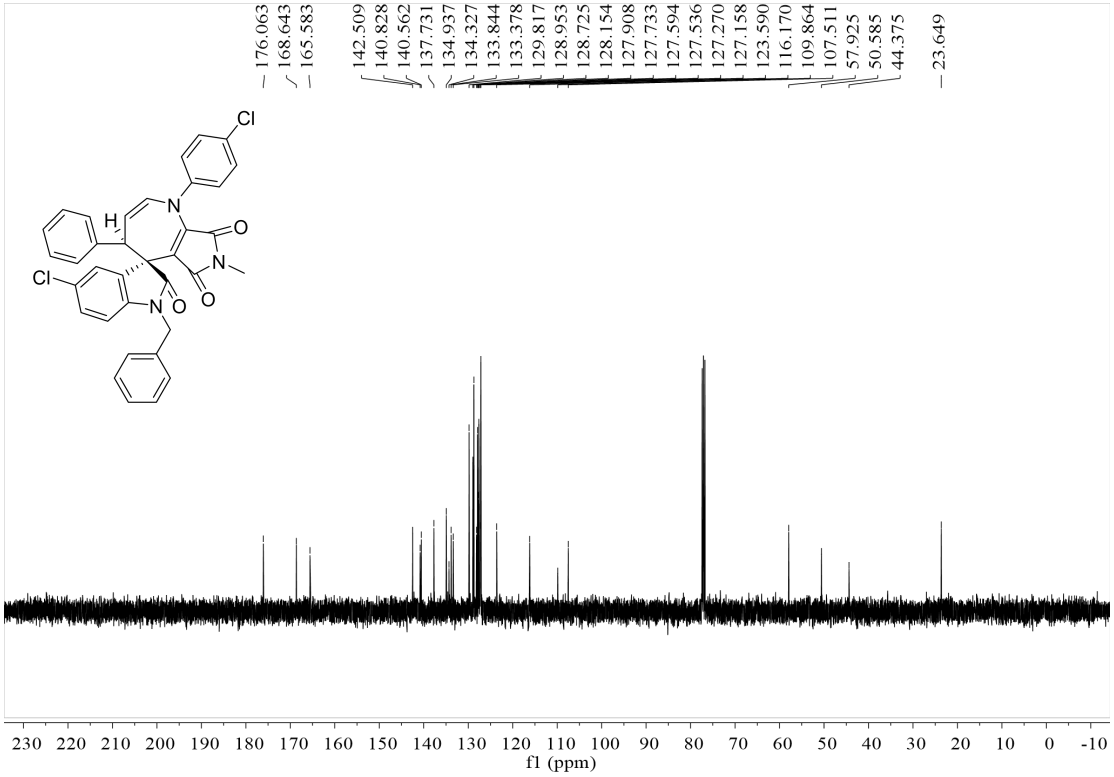


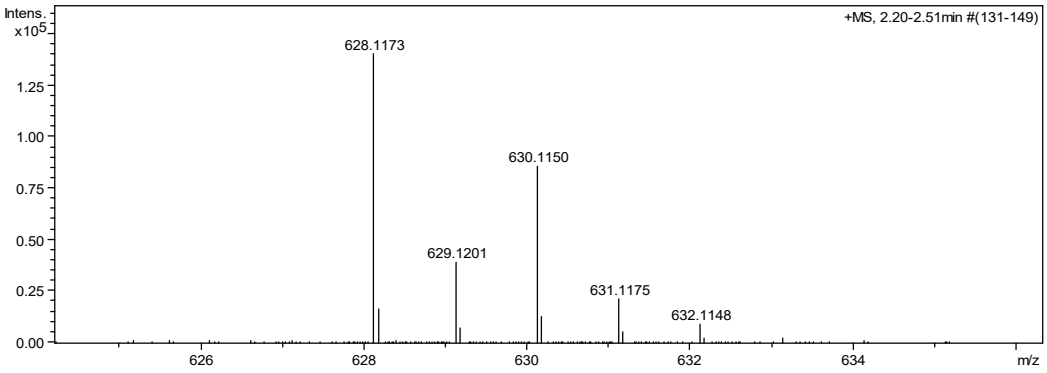



Intens.
x10^5
+MS, 0.56-0.79min #(33-47)
2.5
2.0
1.5
1.0
0.5
0.0
594.1571
595.1600
596.1555
597.1586
588
590
592
594
596
598
600
602
m/z

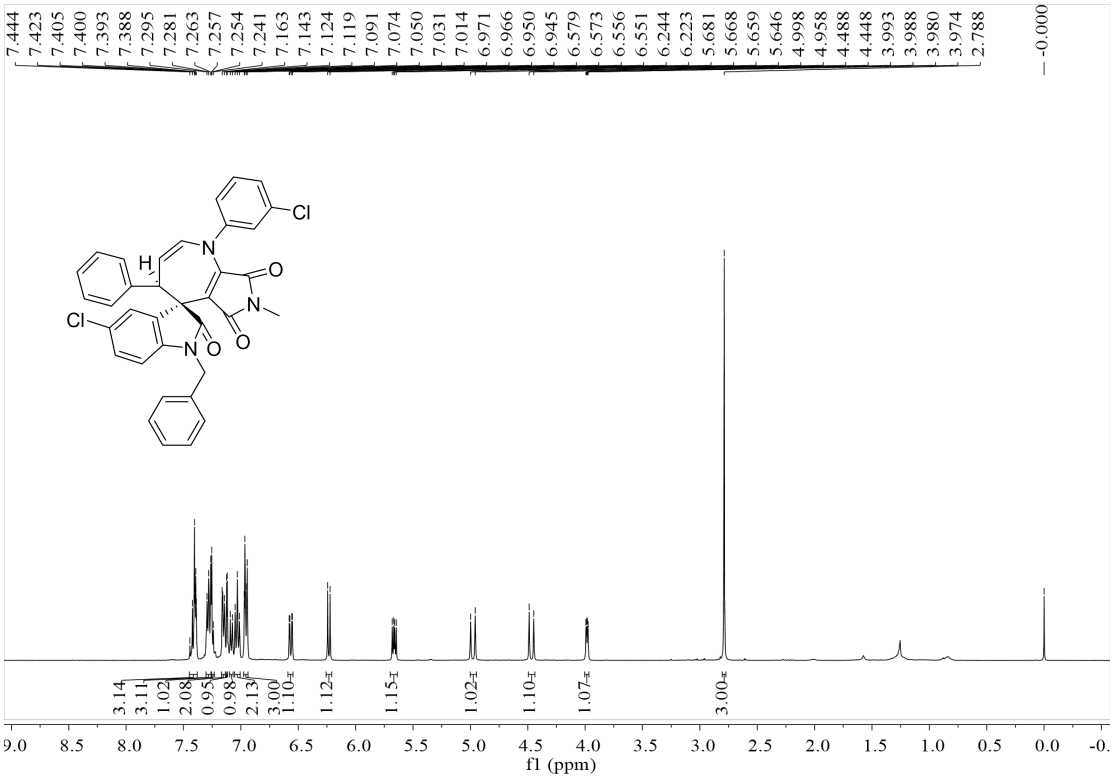
***cis*-1-benzyl-5-chloro-1'-(4-chlorophenyl)-7'-methyl-4'-phenyl-1',4'-dihydro-6'*H*-spiro[indoline-3,5'-pyrrolo[3,4-*b*]azepine]-2,6',8'(7'*H*)-trione (3m):**

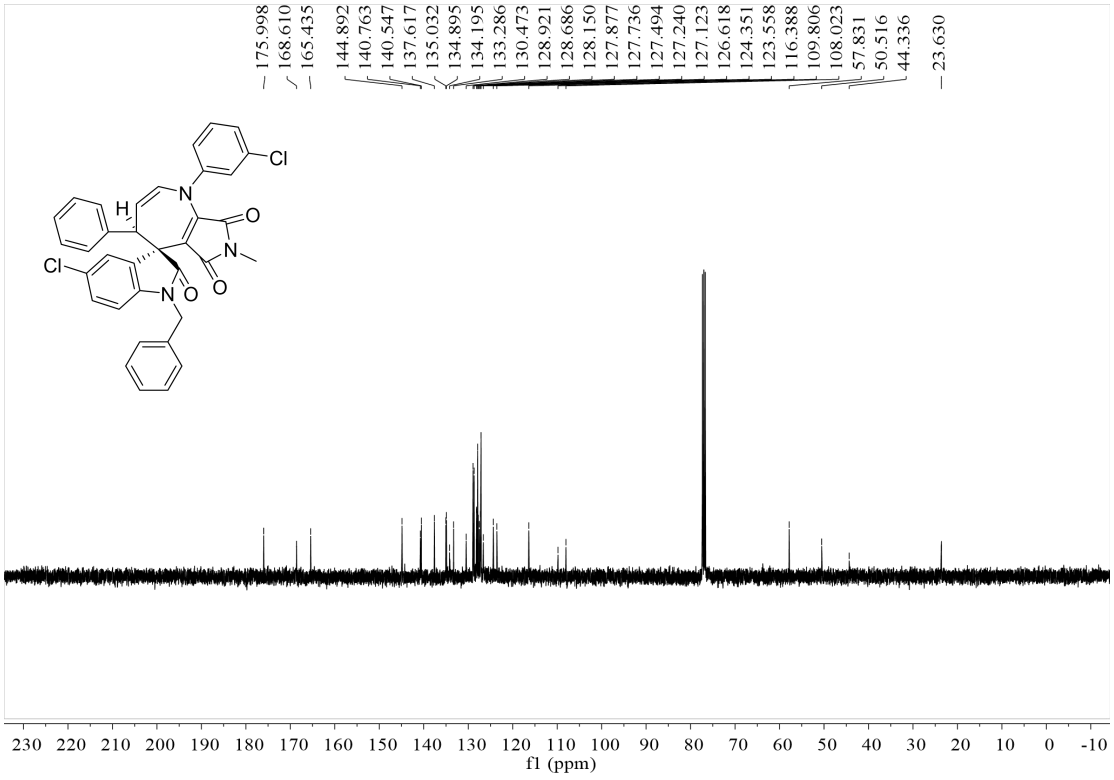


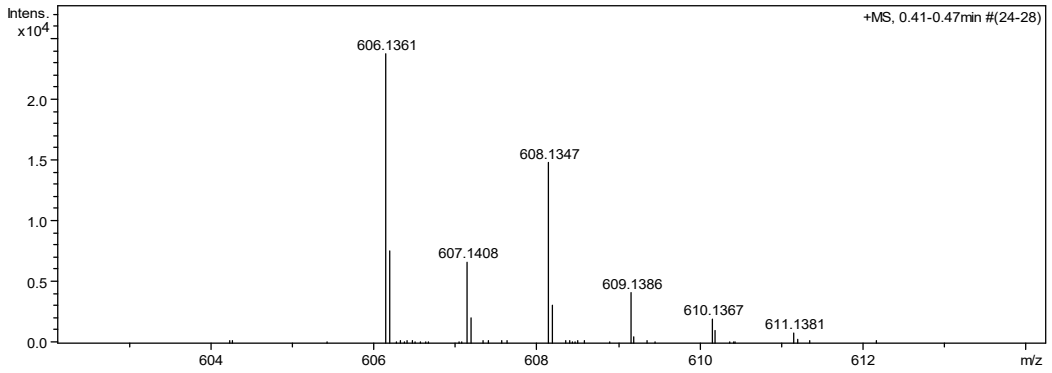



Intens.
x10^5
+MS, 2.20-2.51min #(131-149)
628.1173
630.1150
629.1201
631.1175
632.1148
1.25
1.00
0.75
0.50
0.25
0.00
626
628
630
632
634
m/z

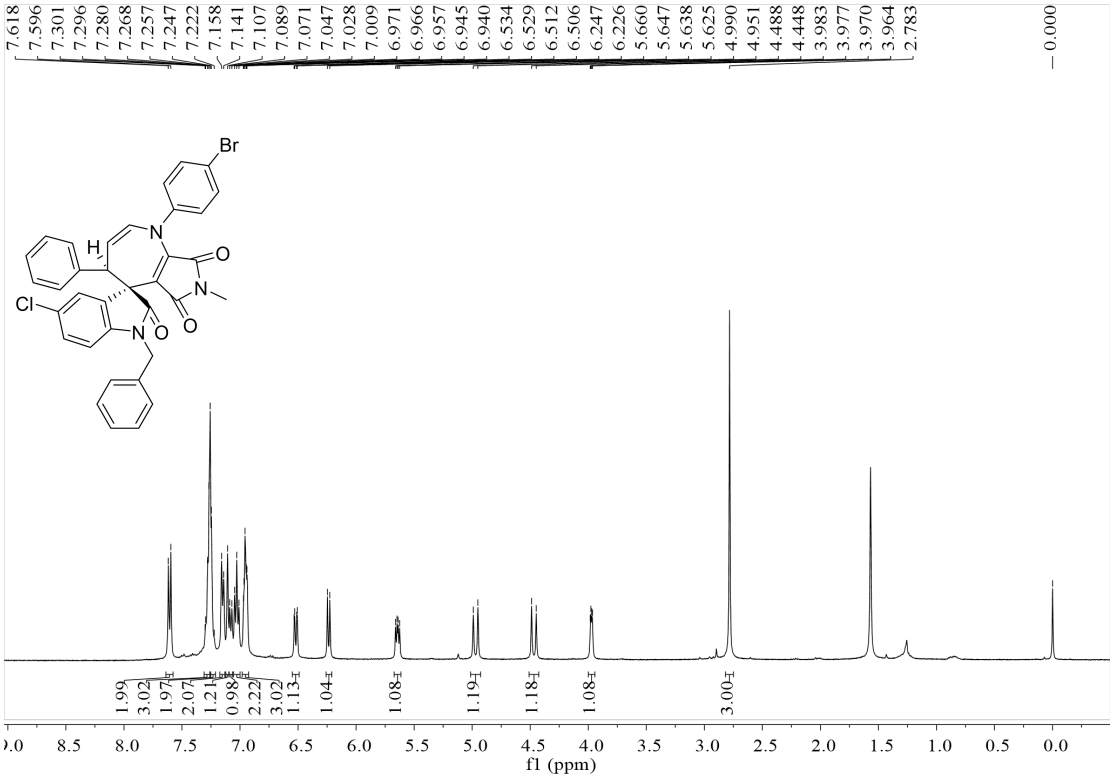
***cis*-1-benzyl-5-chloro-1'-(3-chlorophenyl)-7'-methyl-4'-phenyl-1',4'-dihydro-6'*H*-spiro[indoline-3,5'-pyrrolo[3,4-*b*]azepine]-2,6',8'(7'*H*)-trione (3n):**

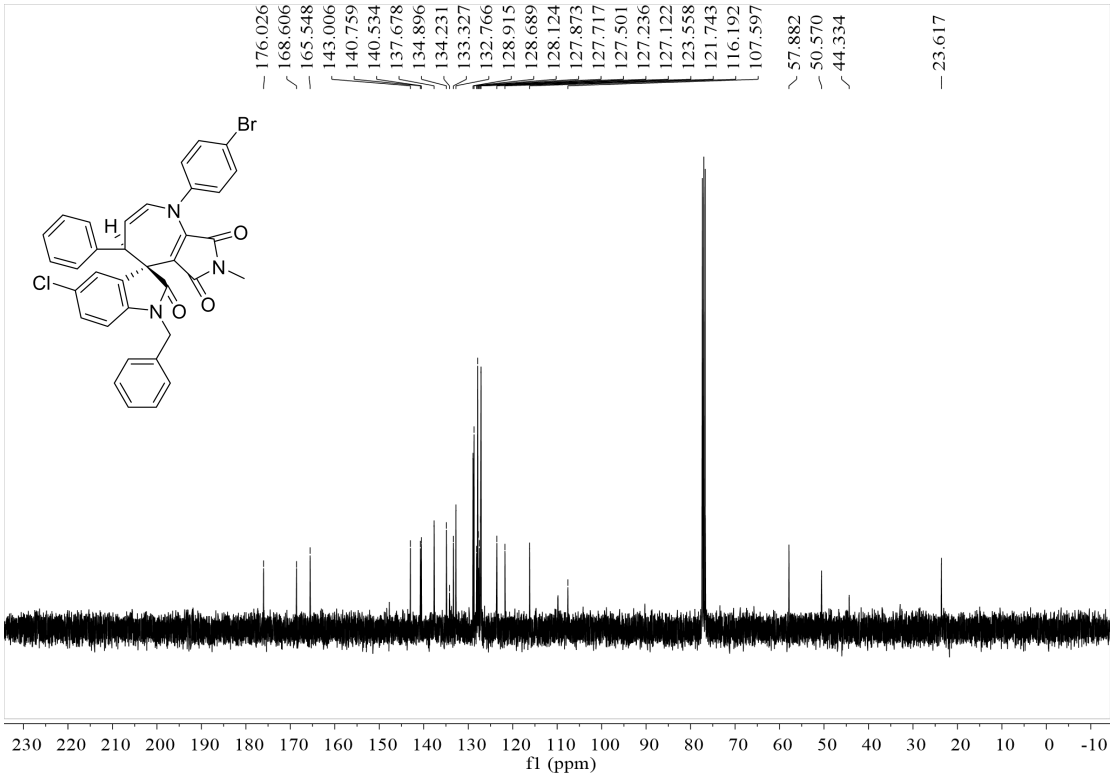


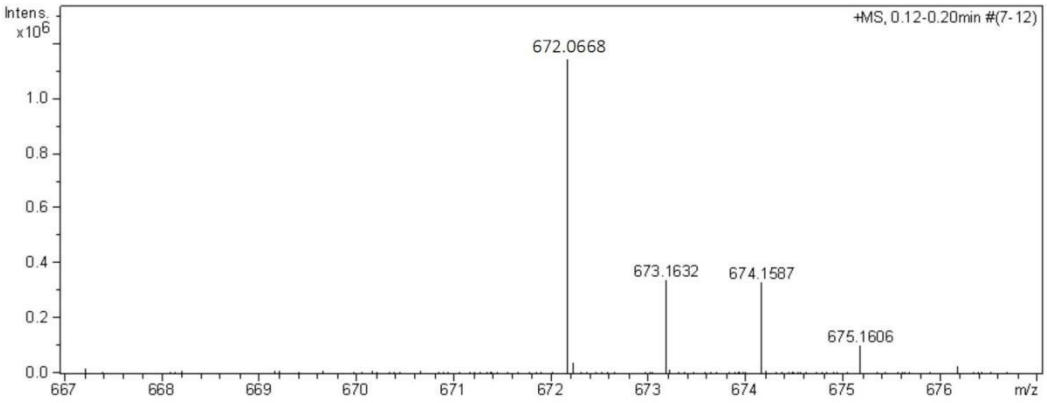



Intens.
x10^4
+MS, 0.41-0.47min #(24-28)
606.1361
608.1347
607.1408
609.1386
610.1367
611.1381
2.0
1.5
1.0
0.5
0.0
604
606
608
610
612
m/z

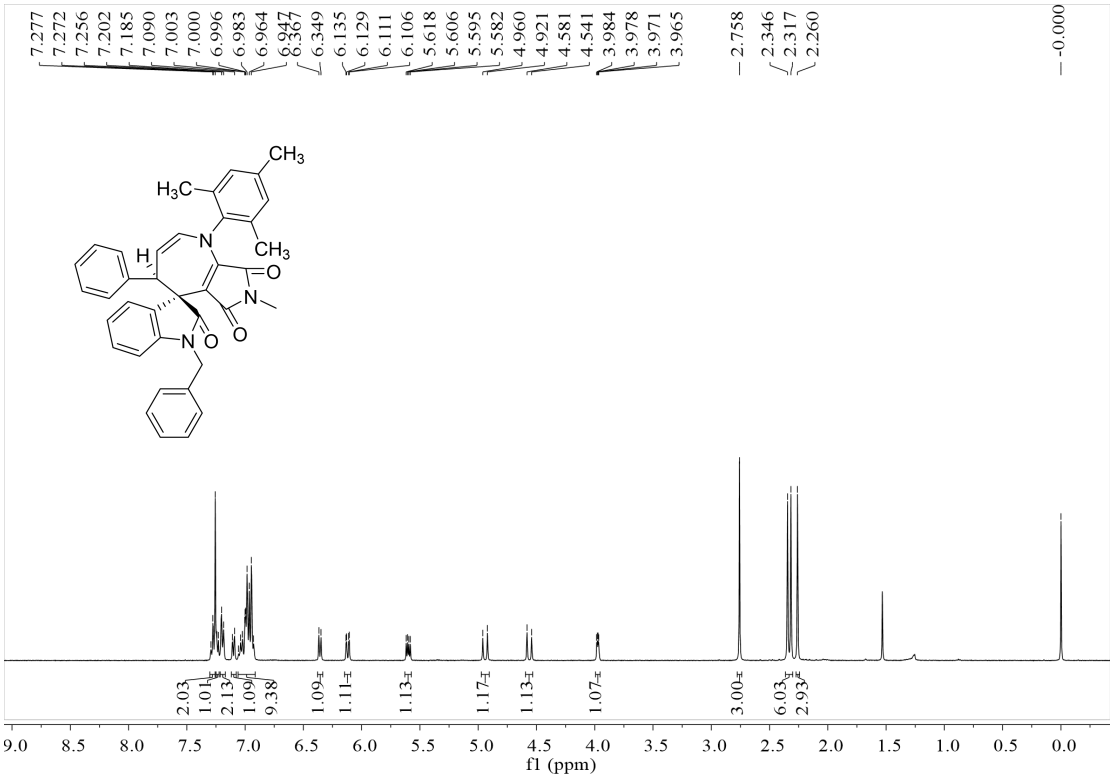
***cis*-1-benzyl-1'-(4-bromophenyl)-5-chloro-7'-methyl-4'-phenyl-1',4'-dihydro-6'*H*-spiro[indoline-3,5'-pyrrolo[3,4-*b*]azepine]-2,6',8'(7'*H*)-trione (3o):**

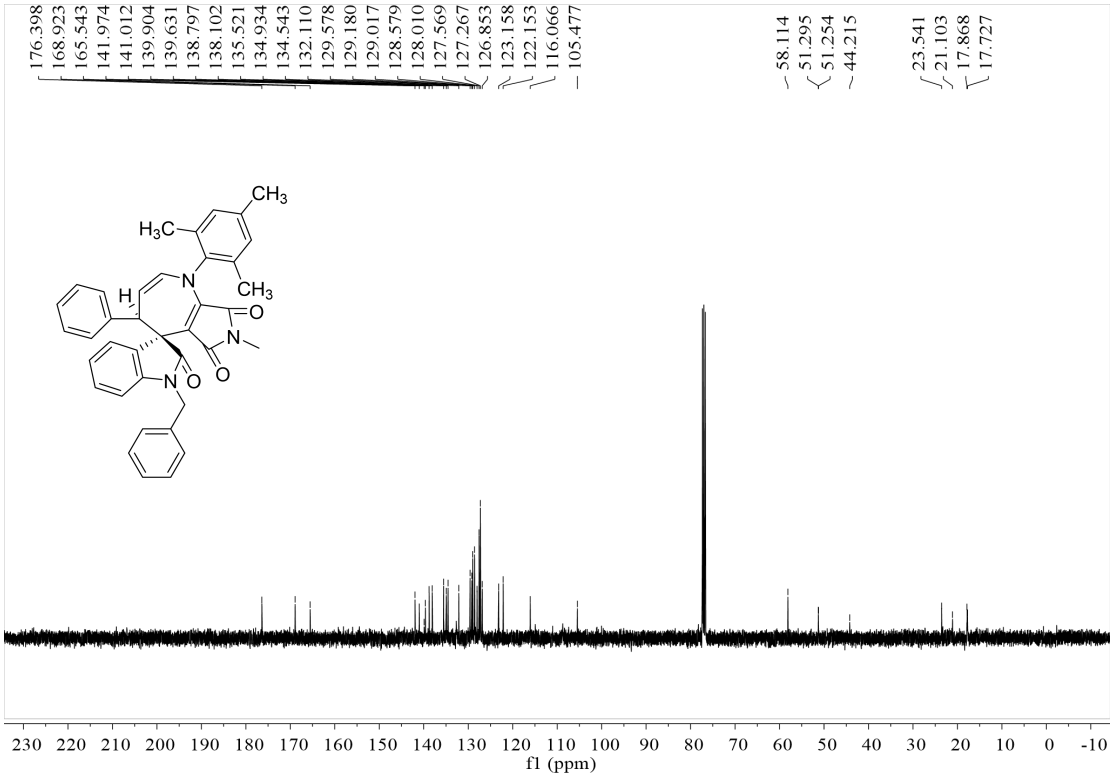


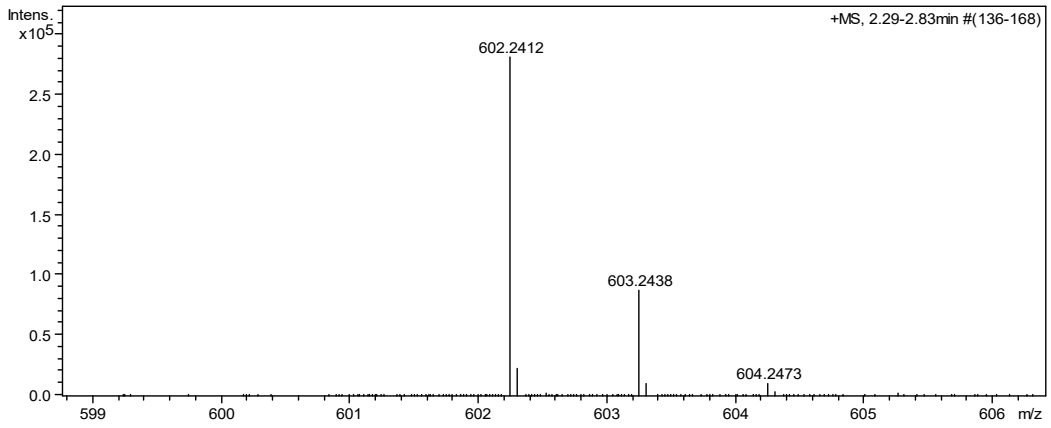



Intens.
x10^6
+MS, 0.12-0.20min #(7-12)
672.0668
673.1632
674.1587
675.1606
1.0
0.8
0.6
0.4
0.2
0.0
667
668
669
670
671
672
673
674
675
676
m/z

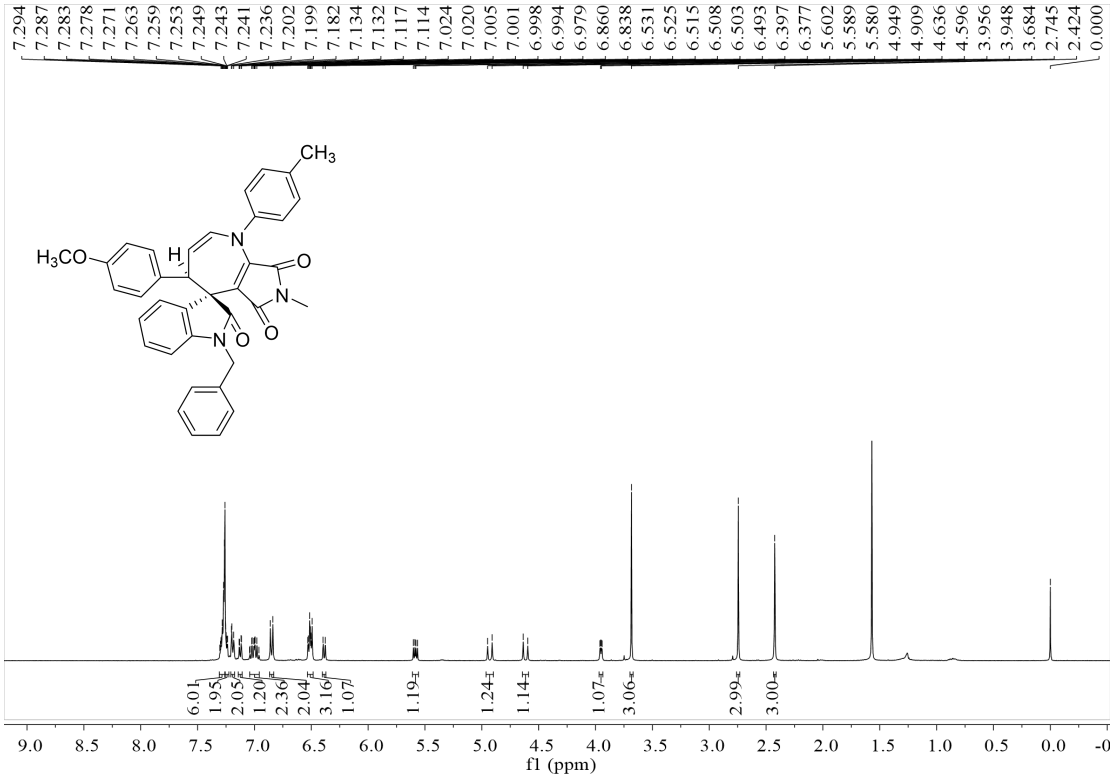
***cis*-1-benzyl-1'-mesityl-7'-methyl-4'-phenyl-1',4'-dihydro-6'*H*-spiro[indoline-3,5'-pyrrolo[3,4-*b*]azepine]-2,6',8'(7'*H*)-trione (3p):**

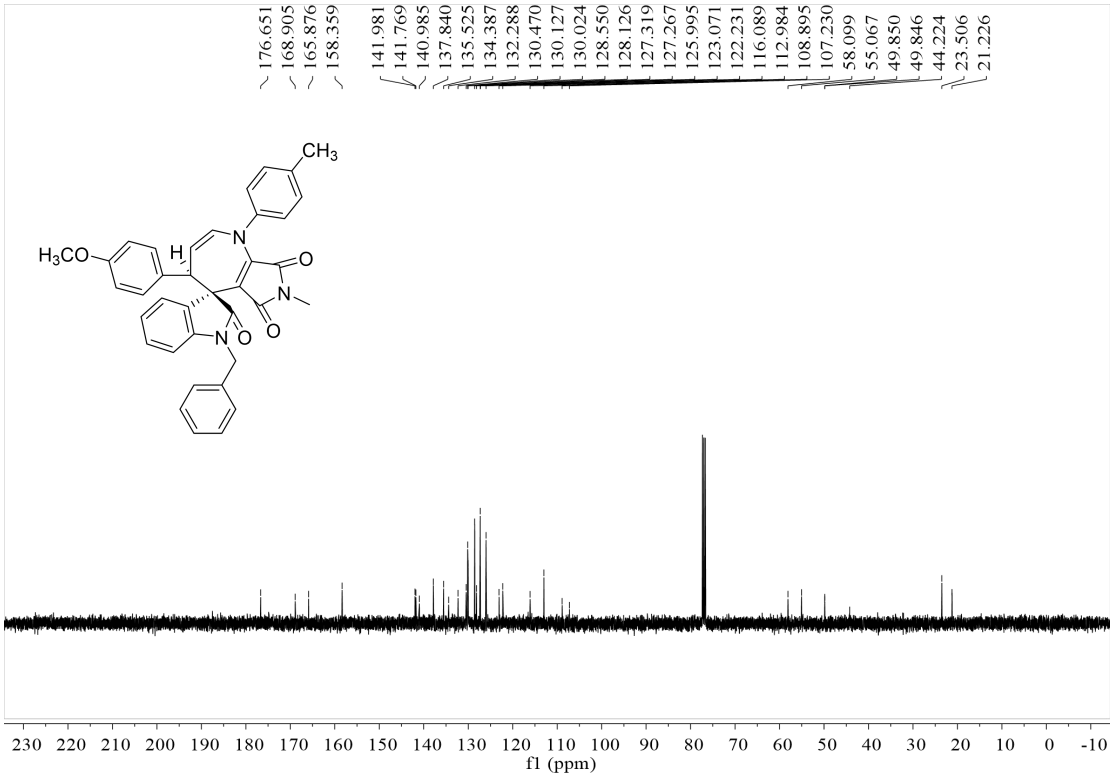


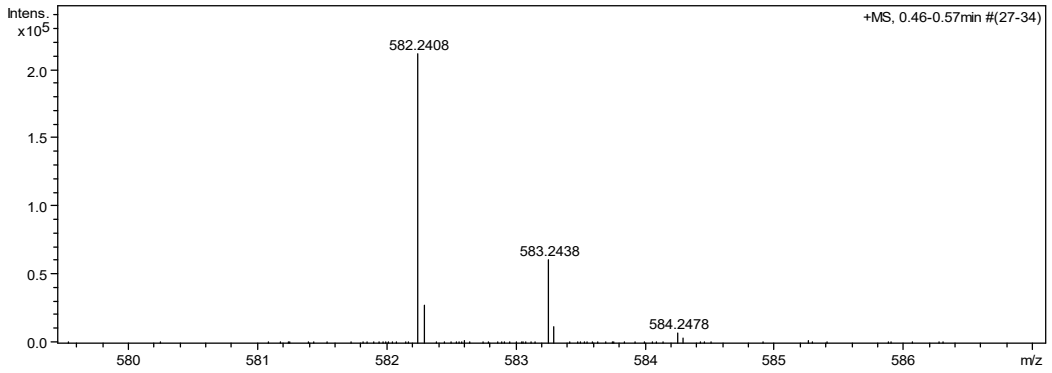



Intens.
x10^5
+MS, 2.29-2.83min #(136-168)
602.2412
603.2438
604.2473
2.5
2.0
1.5
1.0
0.5
0.0
599
600
601
602
603
604
605
606
m/z

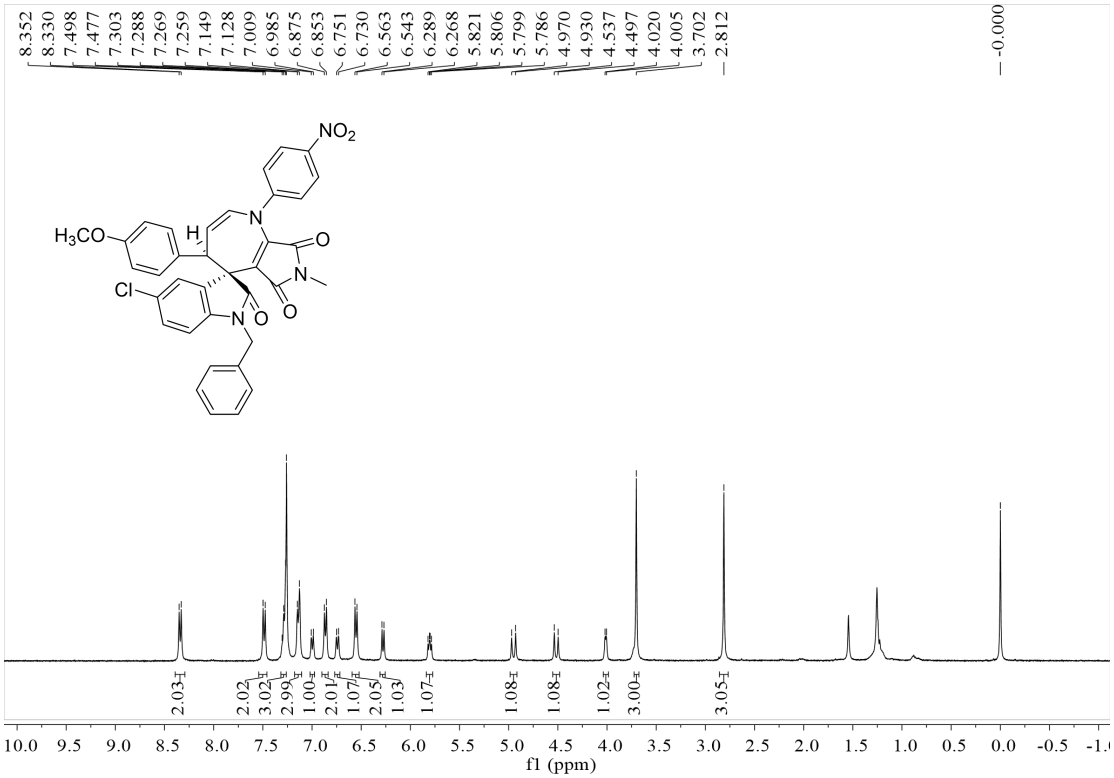
***cis*-1-benzyl-4'-(4-methoxyphenyl)-7'-methyl-1'-(*p*-tolyl)-1',4'-dihydro-6'*H*-spiro[indoline-3,5'-pyrrolo[3,4-*b*]azepine]-2,6',8'(7'*H*)-trione (3q):**

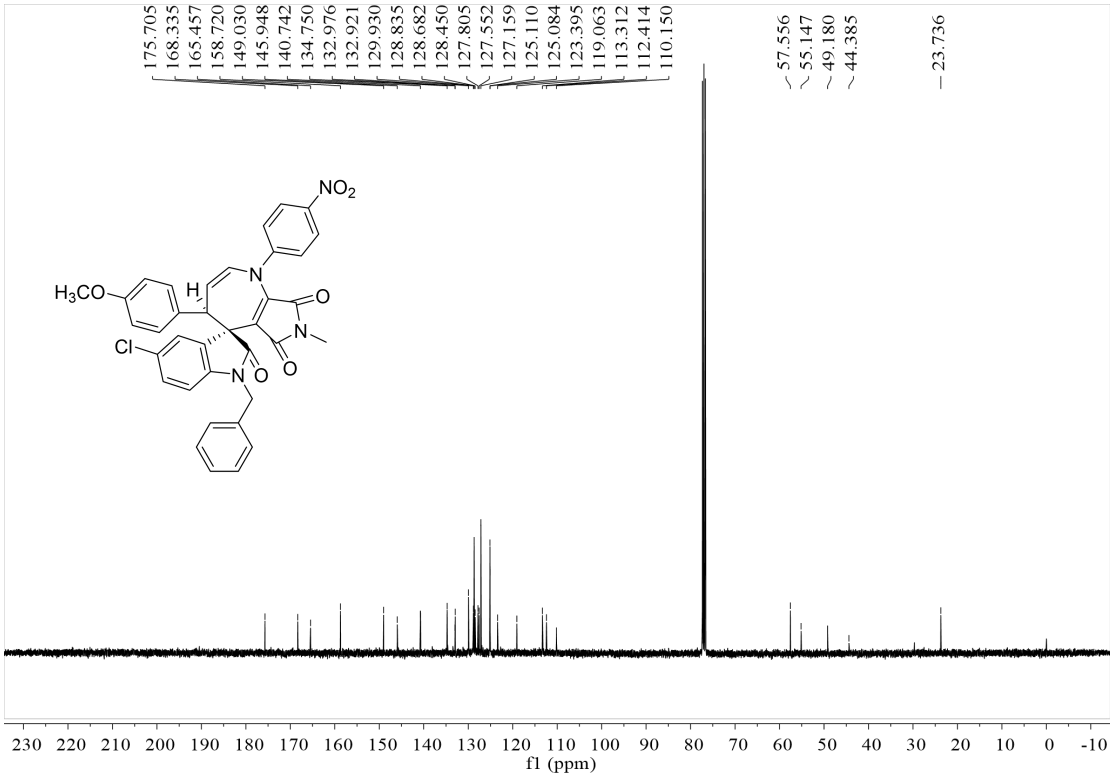


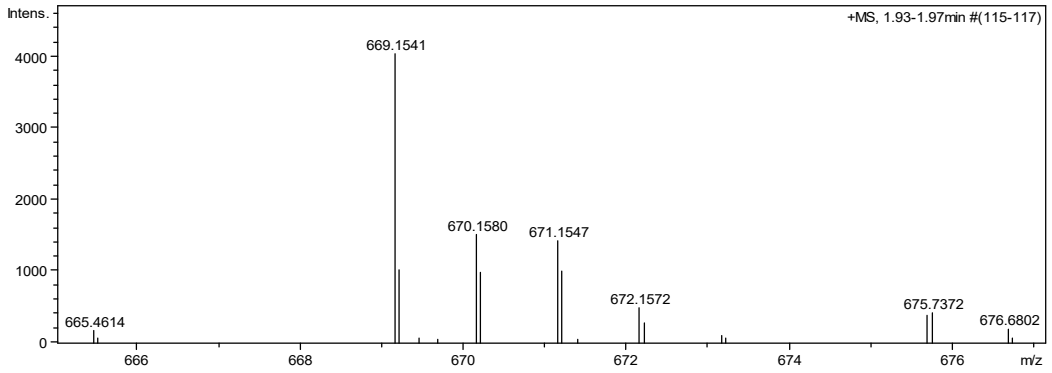



Intens.
x10^5
+MS, 0.46-0.57min #(27-34)
582.2408
583.2438
584.2478
2.0
1.5
1.0
0.5
0.0
580
581
582
583
584
585
586
m/z

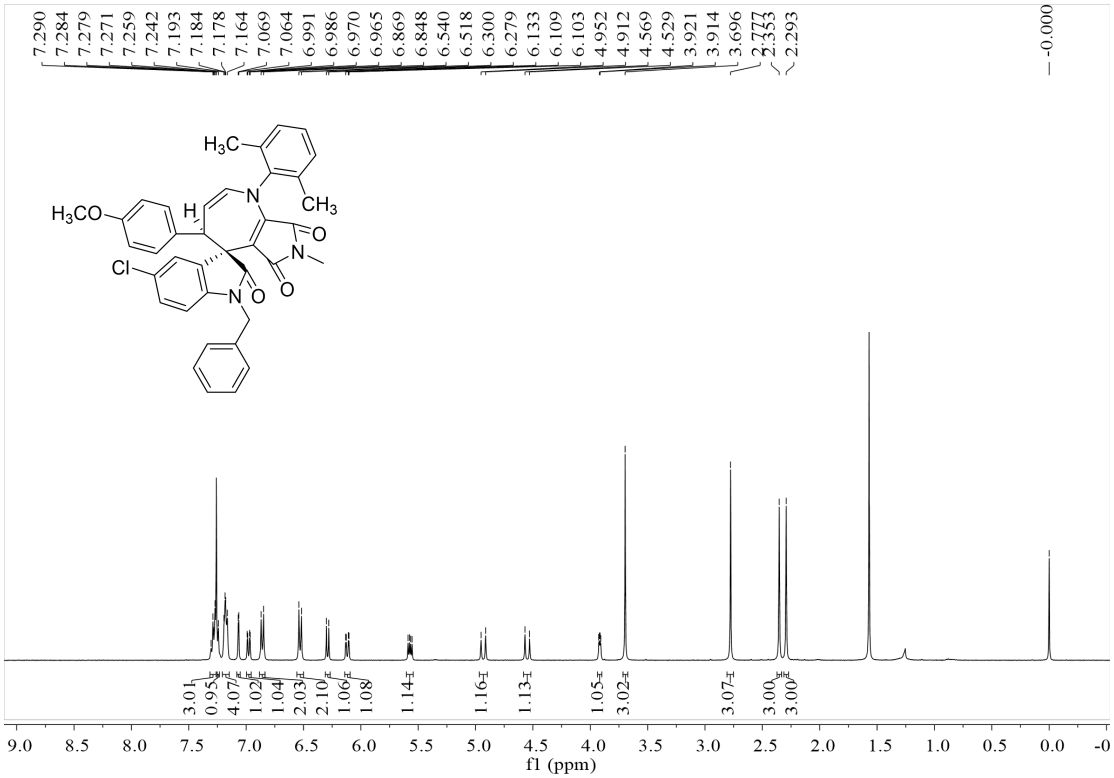
***cis*-1-benzyl-5-chloro-4'-(4-methoxyphenyl)-7'-methyl-1'-(4-nitrophenyl)-1',4'-dihydro-6'*H*-spiro[indoline-3,5'-pyrrolo[3,4-*b*]azepine]-2,6',8'(7'*H*)-trione (3r):**

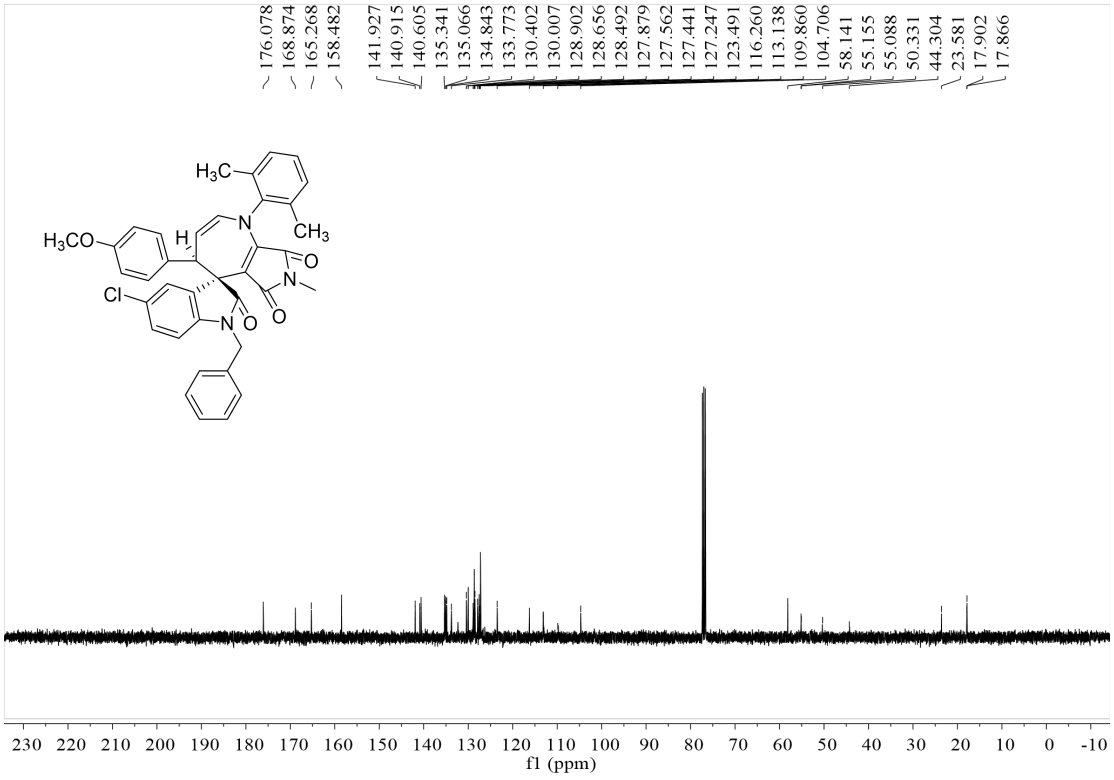


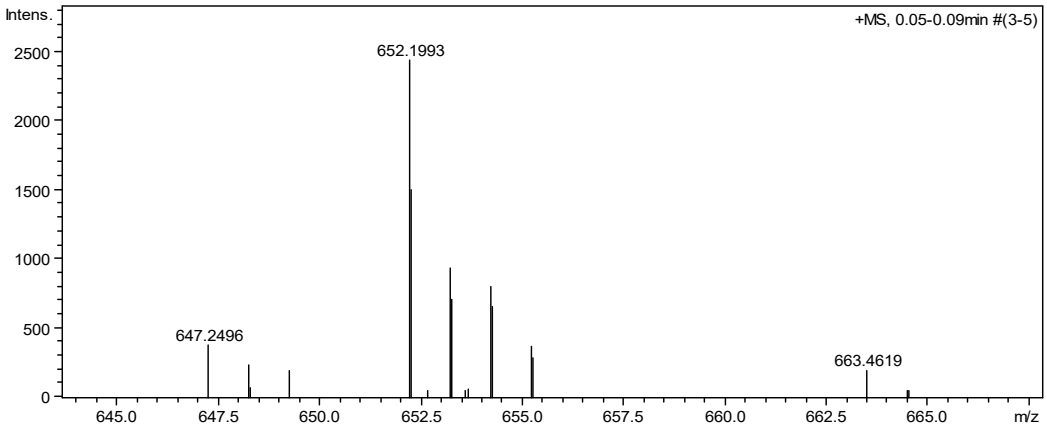



Intens.
+MS, 1.93-1.97min #(115-117)
669.1541
670.1580
671.1547
672.1572
675.7372
676.6802
665.4614
4000
3000
2000
1000
0
666
668
670
672
674
676
m/z

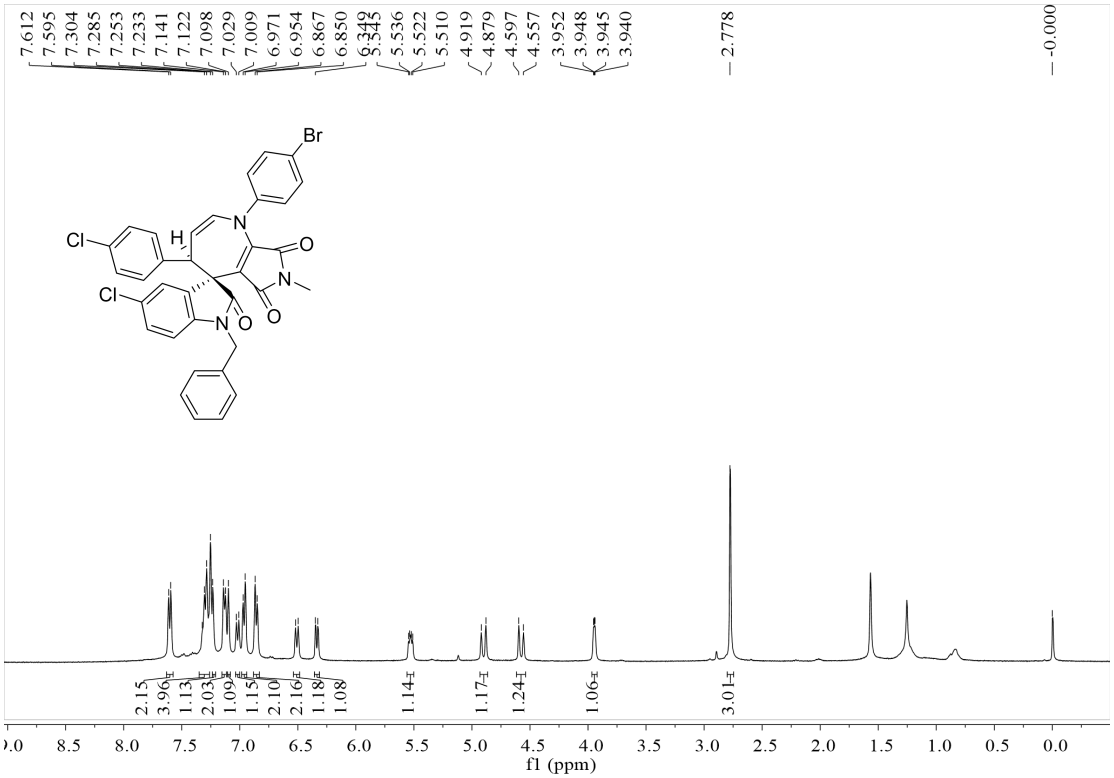
***cis*-1-benzyl-5-chloro-1'-(2,6-dimethylphenyl)-4'-(4-methoxyphenyl)-7'-methyl-1',4'-dihydro-6'*H*-spiro[indoline-3,5'-pyrrolo[3,4-*b*]azepine]-2,6',8'(7'*H*)-trione (3s):**

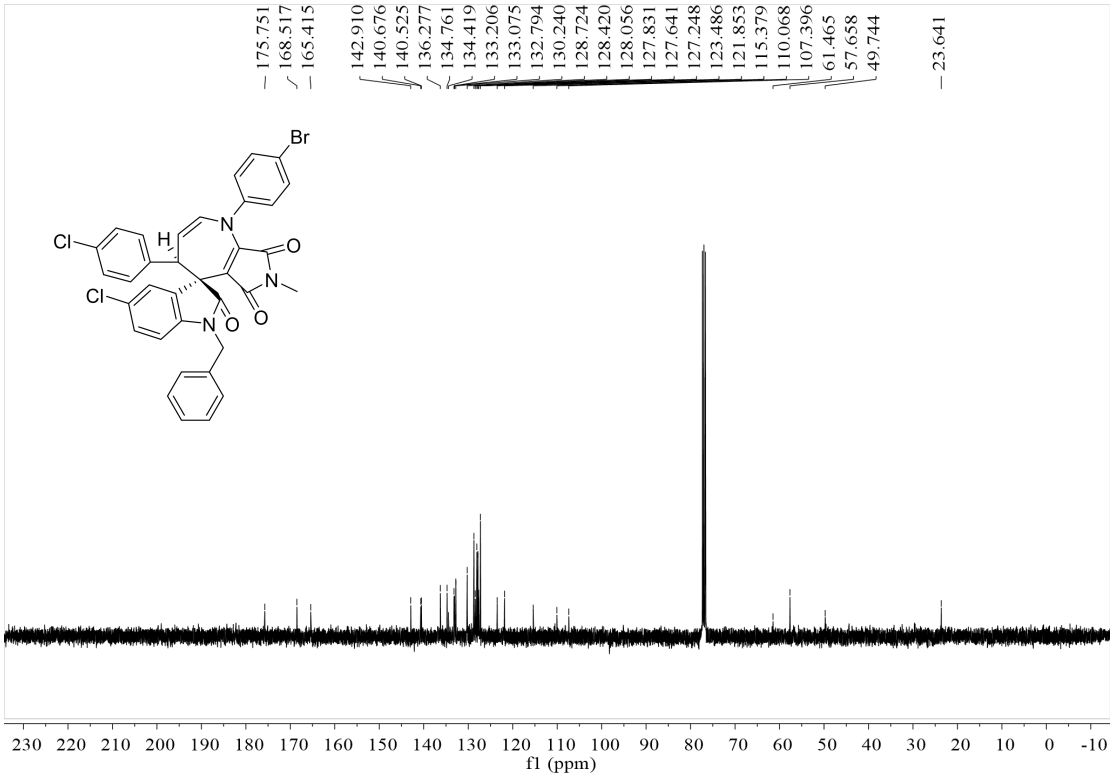


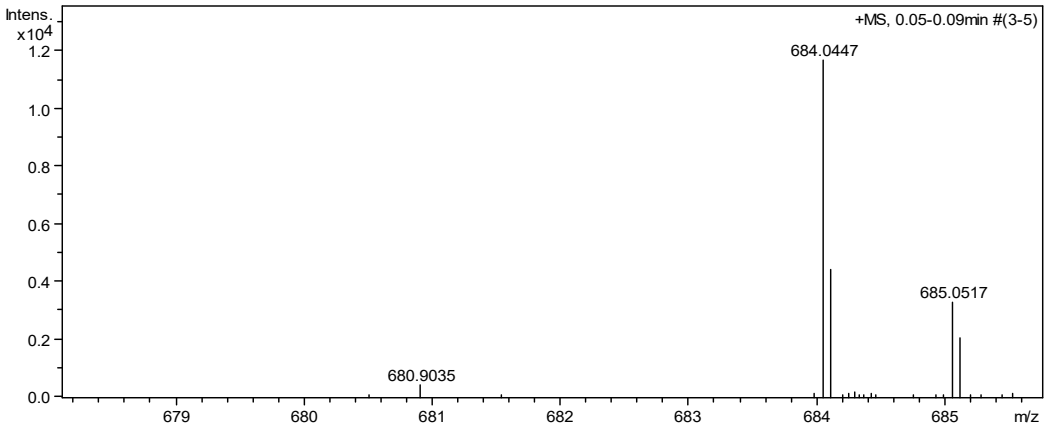



Intens.
+MS, 0.05-0.09min #(3-5)
652.1993
647.2496
663.4619
2500
2000
1500
1000
500
0
645.0
647.5
650.0
652.5
655.0
657.5
660.0
662.5
665.0
m/z

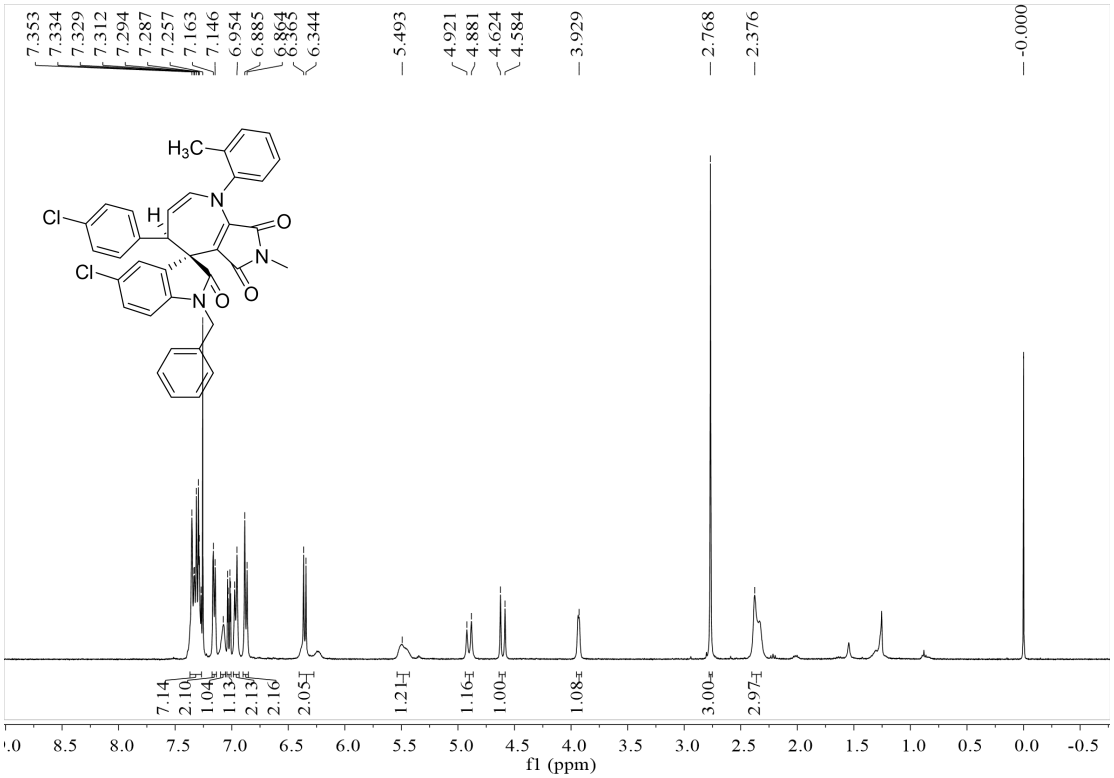
***cis*-1-benzyl-1'-(4-bromophenyl)-5-chloro-4'-(4-chlorophenyl)-7'-methyl-1',4'-dihydro-6'*H*-spiro[indoline-3,5'-pyrrolo[3,4-*b*]azepine]-2,6',8'(7'*H*)-trione (3t):**

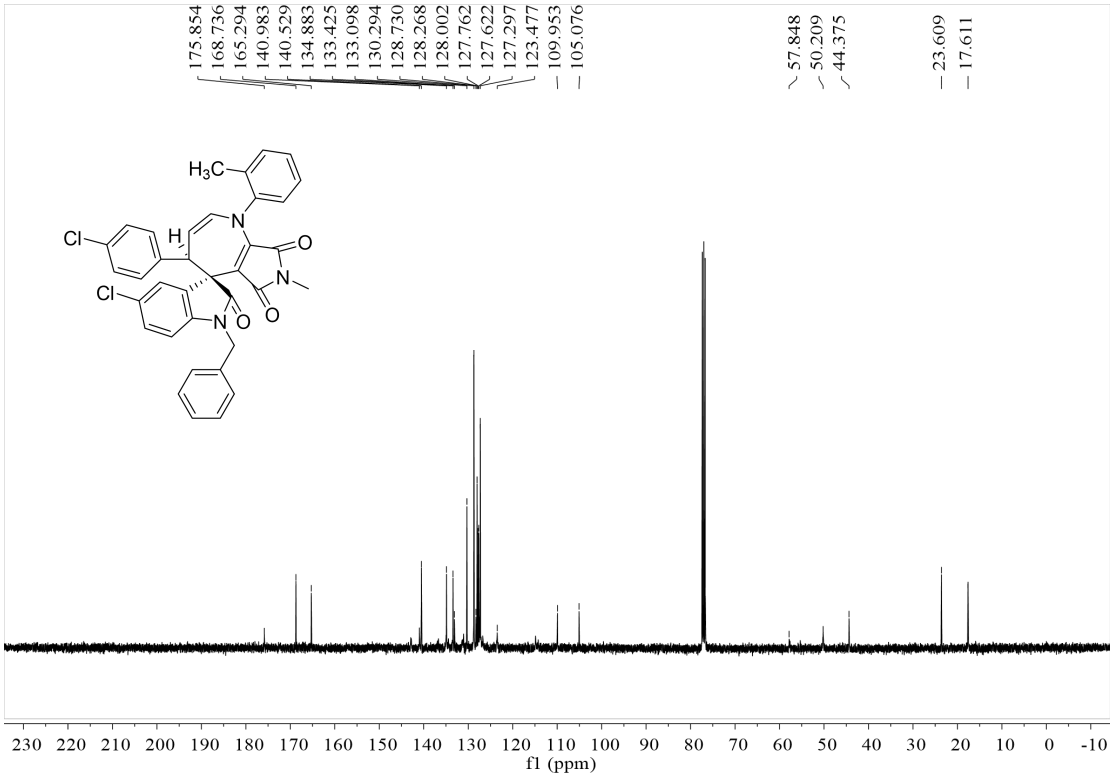


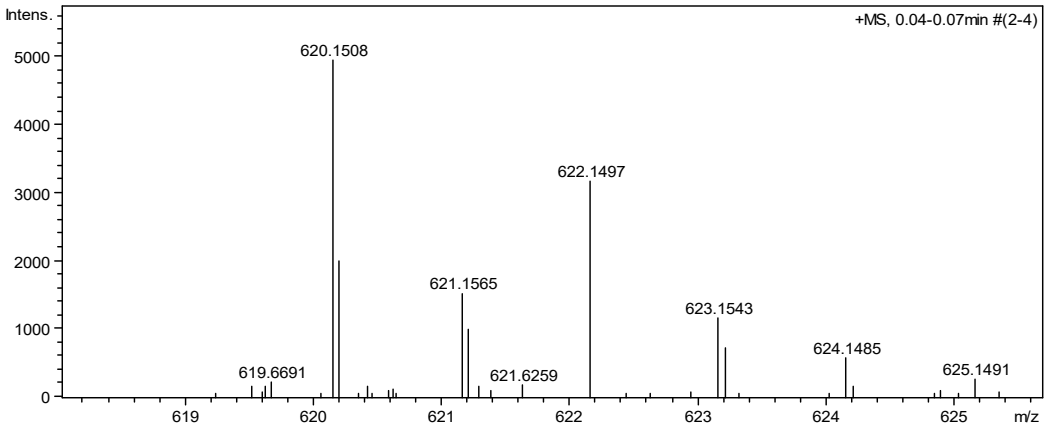



Intens.
x10^4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
+MS, 0.05-0.09min #(3-5)
684.0447
685.0517
680.9035
679
680
681
682
683
684
685
m/z

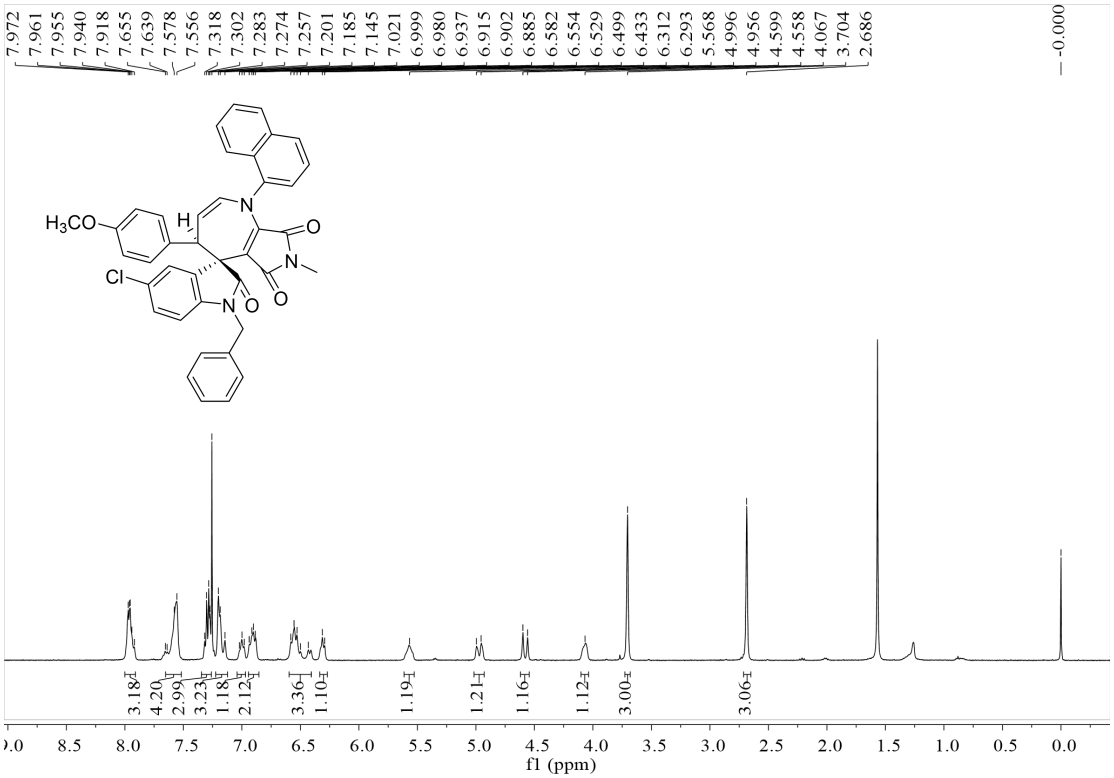
***cis*-1-benzyl-5-chloro-4'-(4-chlorophenyl)-7'-methyl-1'-(*o*-tolyl)-1',4'-dihydro-6'*H*-spiro[indoline-3,5'-pyrrolo[3,4-*b*]azepine]-2,6',8'(7'*H*)-trione (3u):**

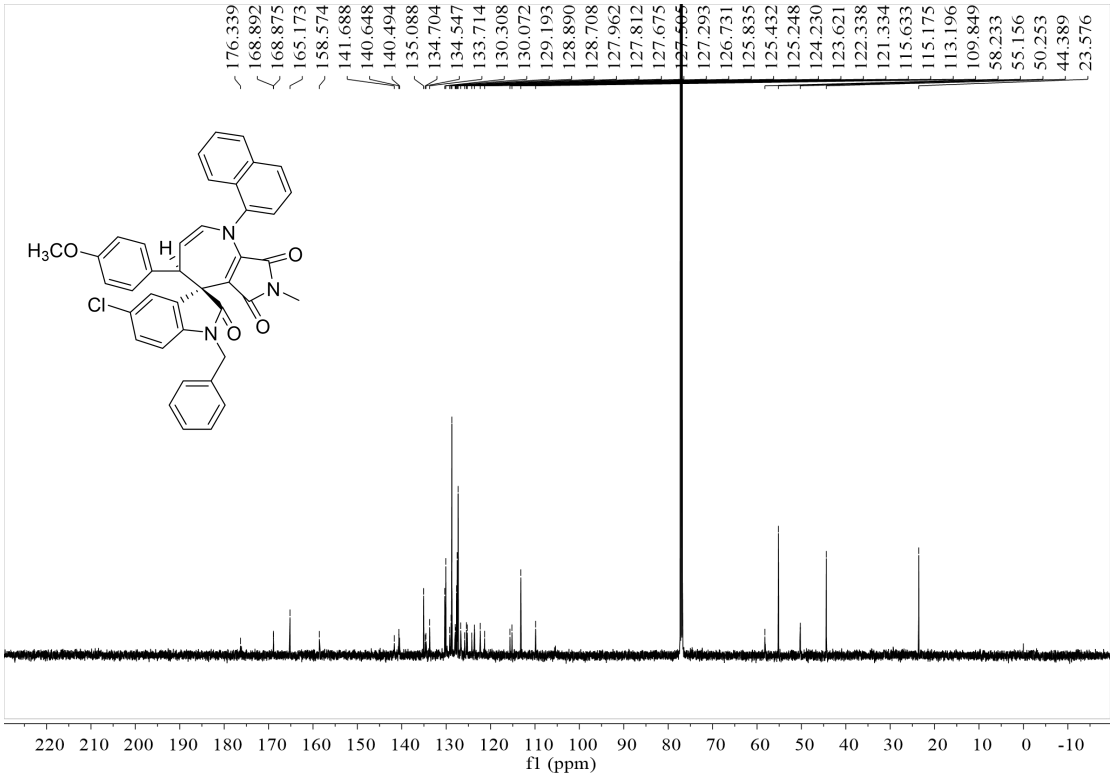


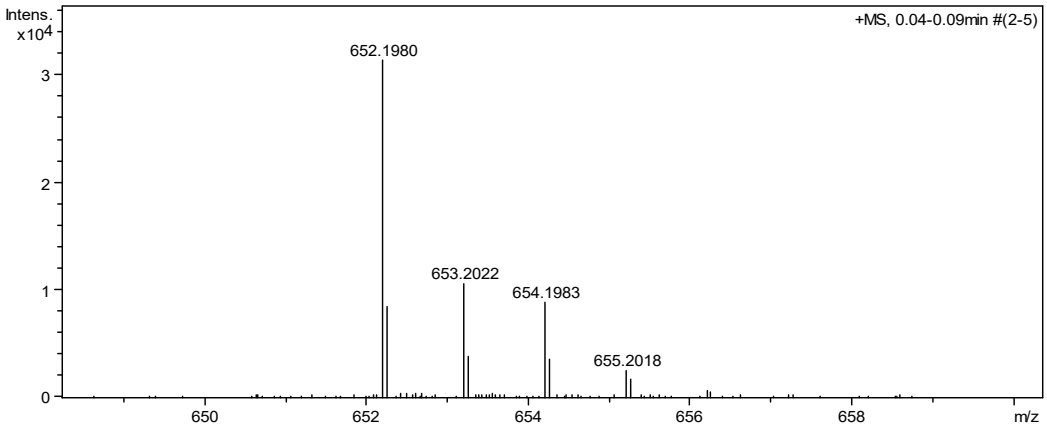



Intens.
+MS, 0.04-0.07min #(2-4)
5000
4000
3000
2000
1000
0
620.1508
622.1497
621.1565
623.1543
624.1485
625.1491
619.6691
621.6259
619
620
621
622
623
624
625
m/z

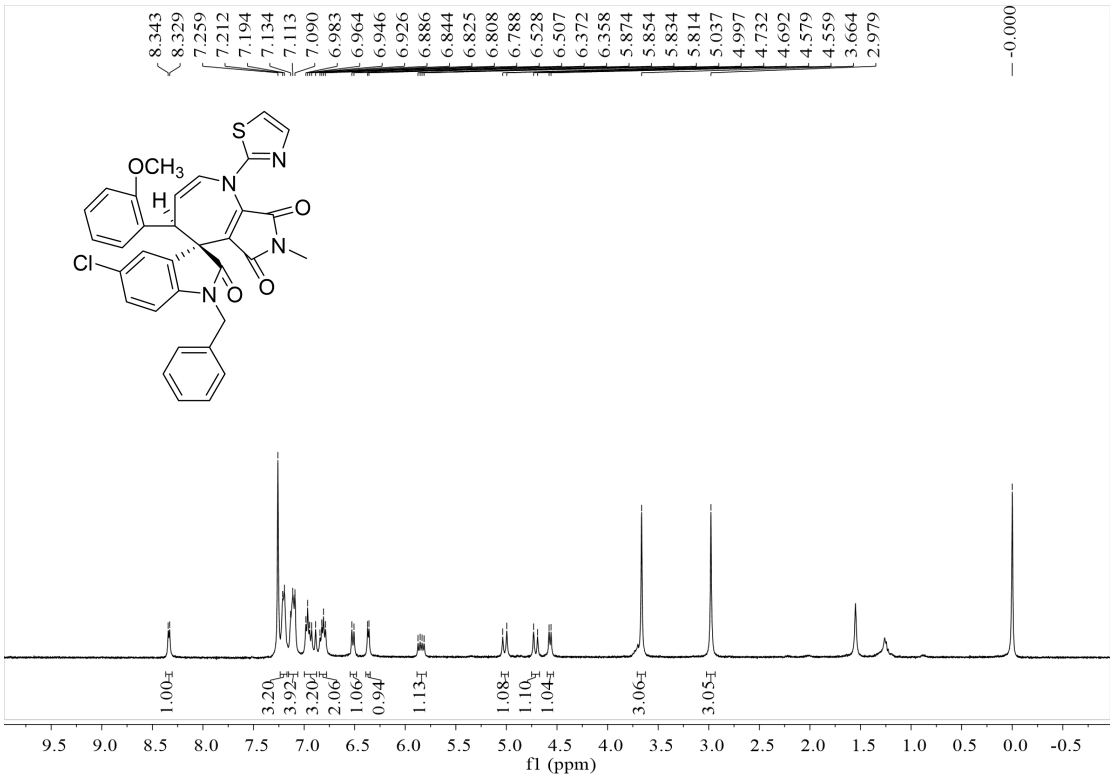
***cis*-1-benzyl-5-chloro-4'-(4-methoxyphenyl)-7'-methyl-1'-(naphthalen-1-yl)-1',4'-dihydro-6'*H*-spiro[indoline-3,5'-pyrrolo[3,4-*b*]azepine]-2,6',8'(7'*H*)-trione (3v):**

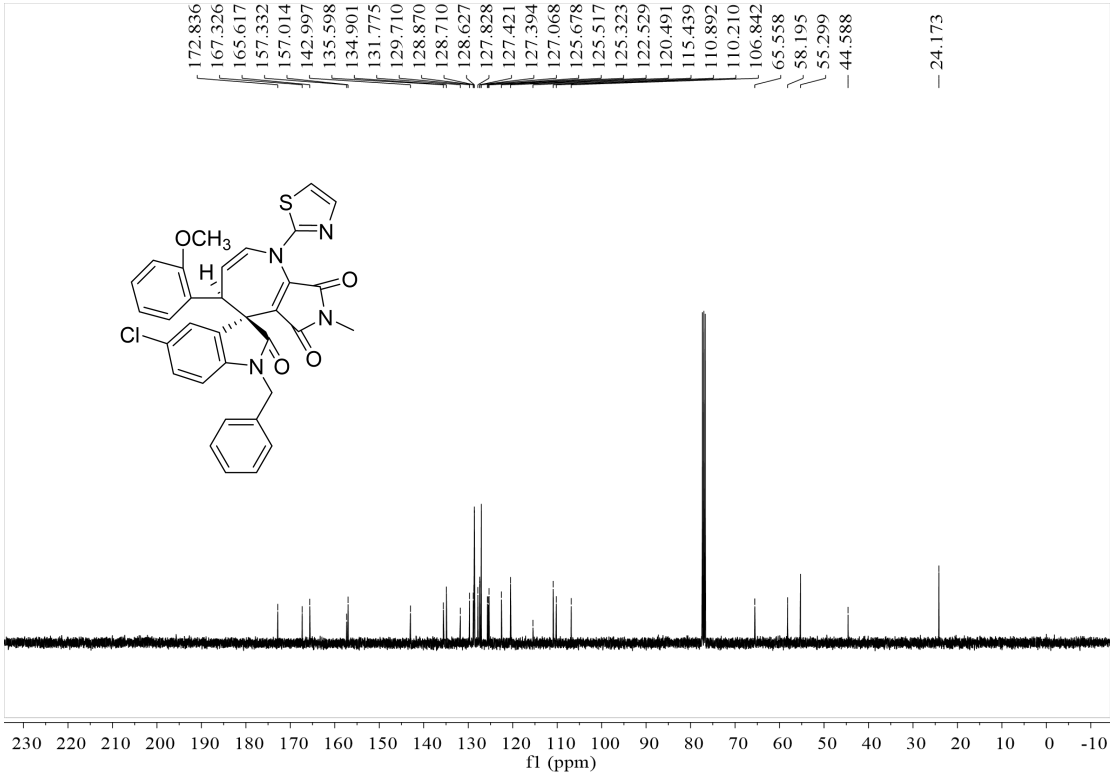


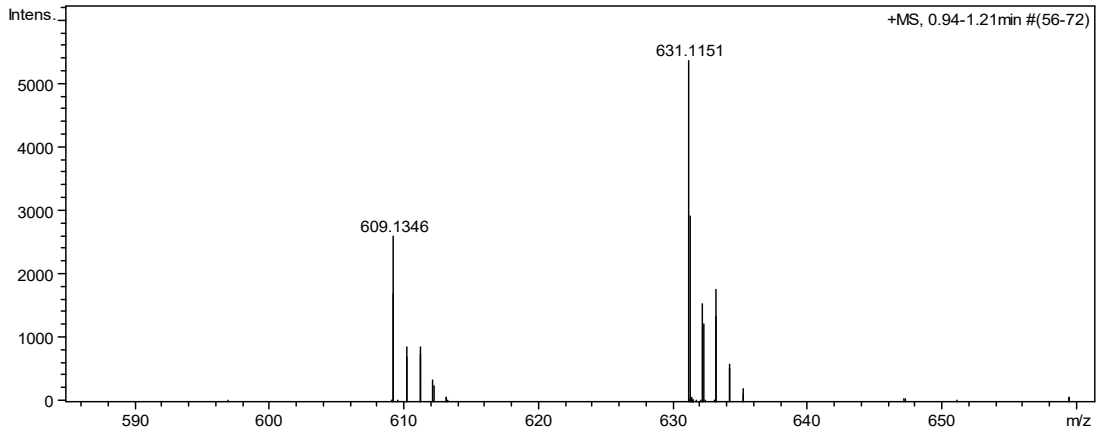



Intens.
x10^4
+MS, 0.04-0.09min #(2-5)
652.1980
653.2022
654.1983
655.2018
0
1
2
3
650
652
654
656
658
m/z

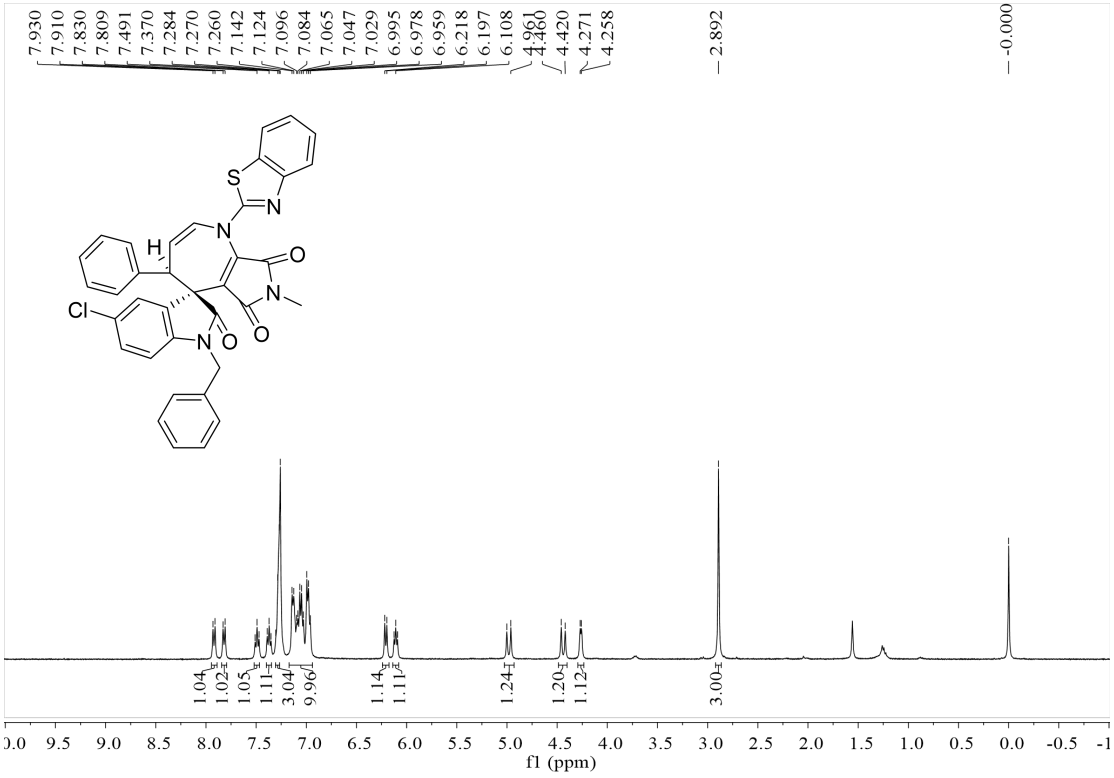
***cis*-1-benzyl-5-chloro-4'-(2-methoxyphenyl)-7'-methyl-1'-(thiazol-2-yl)-1',4'-dihydro-6'*H*-spiro[indoline-3,5'-pyrrolo[3,4-*b*]azepine]-2,6',8'(7'*H*)-trione (3w):**

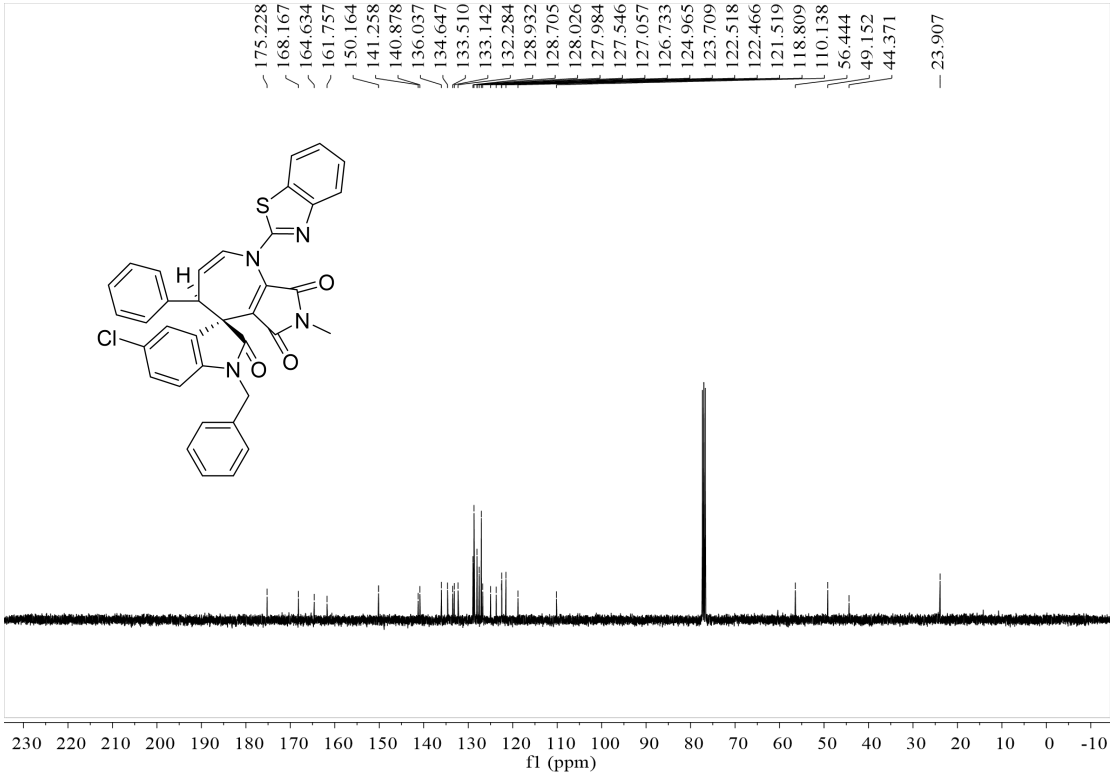


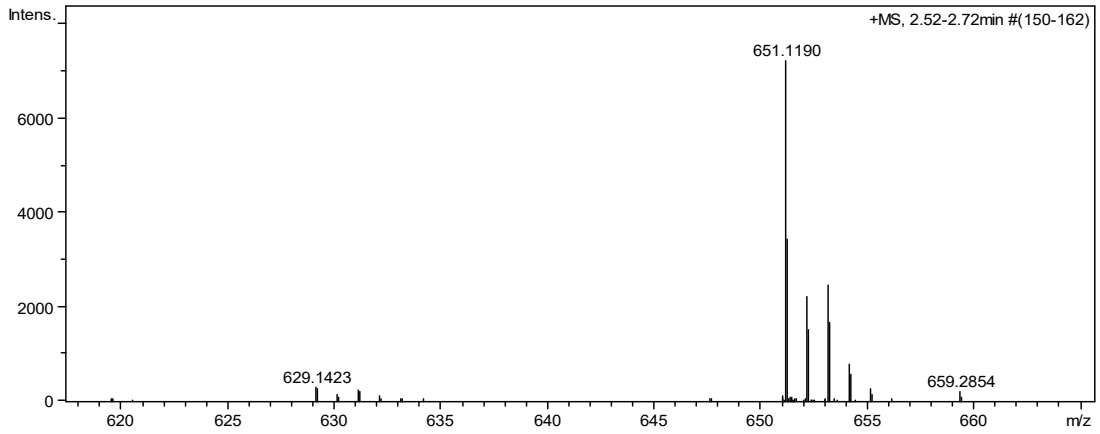



Intens.
+MS, 0.94-1.21min #(56-72)
631.1151
609.1346
5000
4000
3000
2000
1000
0
590
600
610
620
630
640
650
m/z

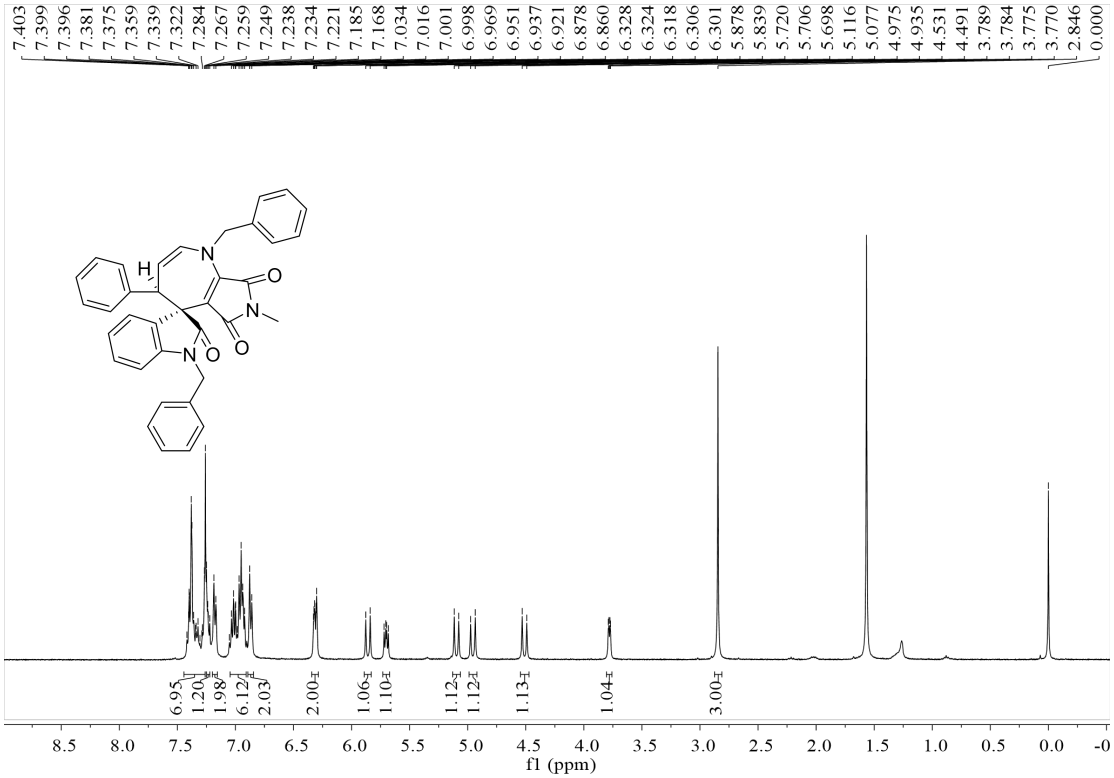
***cis*-1'-(benzo[*d*]thiazol-2-yl)-1-benzyl-5-chloro-7'-methyl-4'-phenyl-1',4'-dihydro-6'*H*-spiro[indoline-3,5'-pyrrolo[3,4-*b*]azepine]-2,6',8'(7'*H*)-trione (3x):**

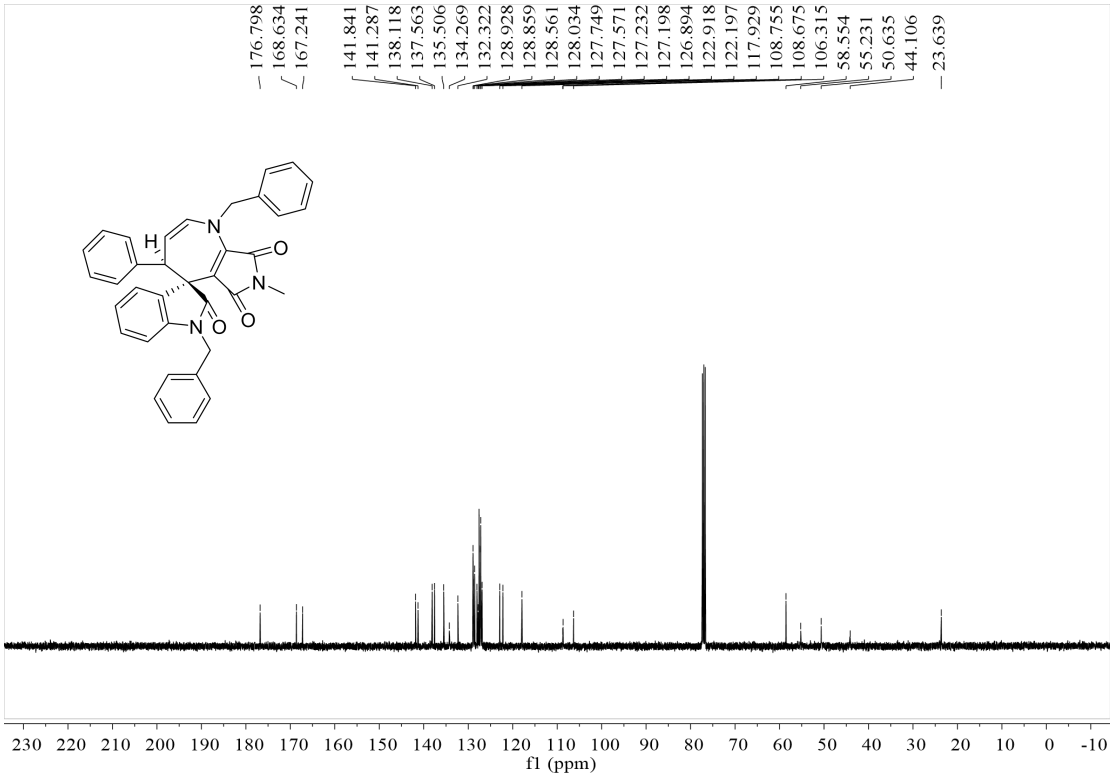


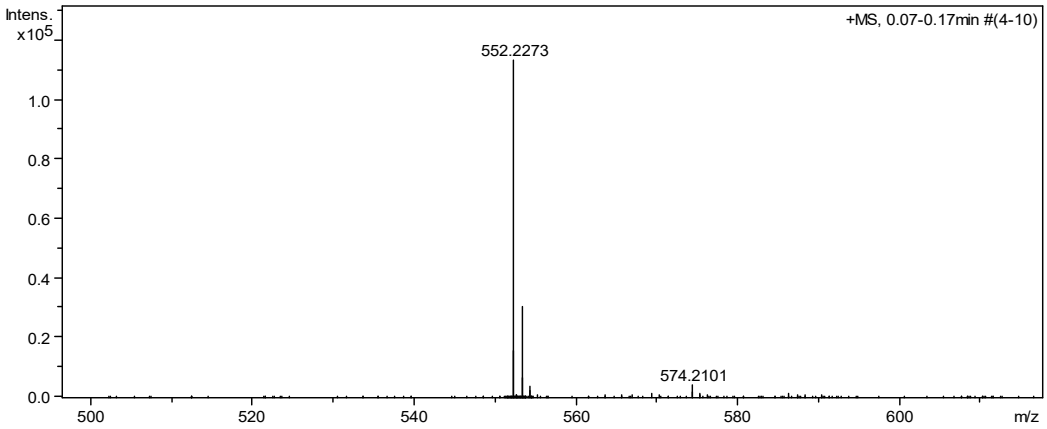



Intens.
+MS, 2.52-2.72min #(150-162)
651.1190
629.1423
659.2854
6000
4000
2000
0
620
625
630
635
640
645
650
655
660
m/z

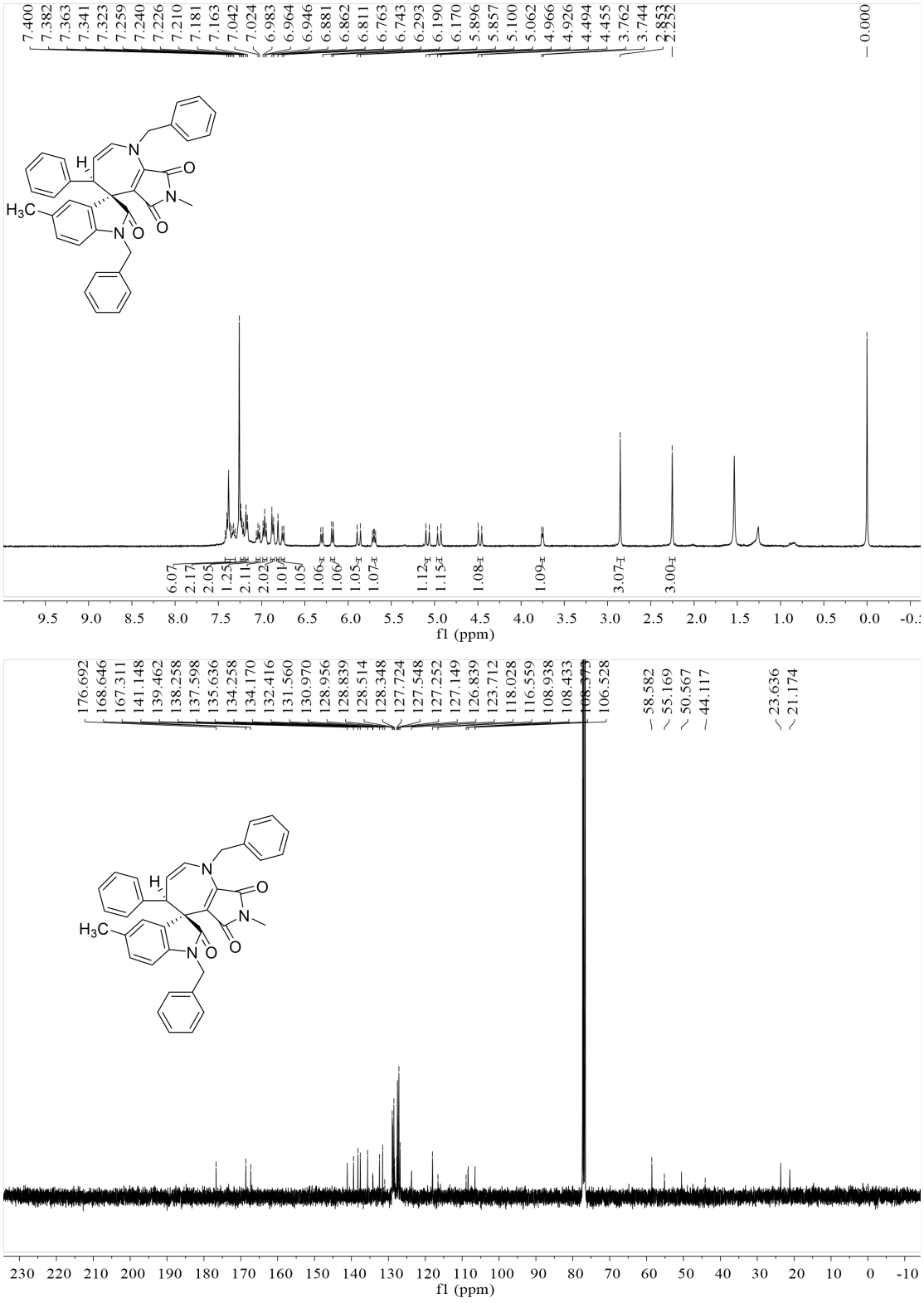
***cis*-1,1'-dibenzyl-7'-methyl-4'-phenyl-1',4'-dihydro-6'*H*-spiro[indoline-3,5'-pyrrolo[3,4-*b*]azepine]-2,6',8'(7'*H*)-trione (4a):**

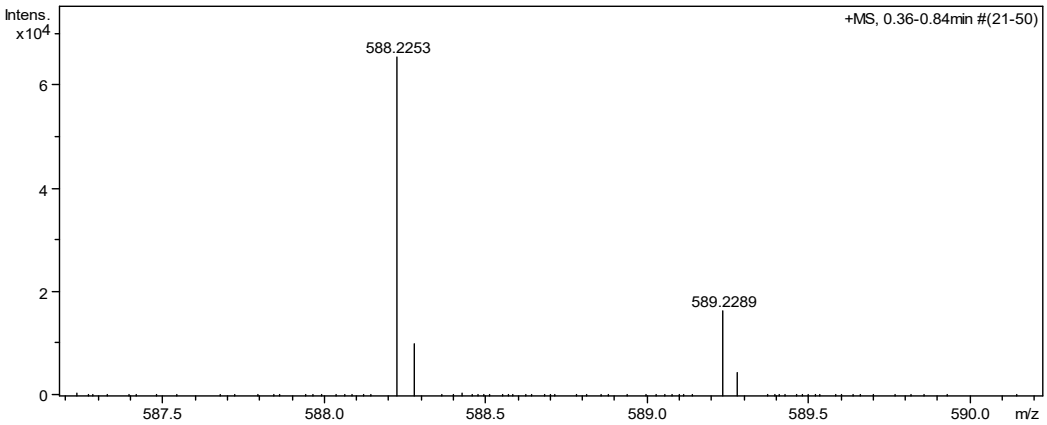




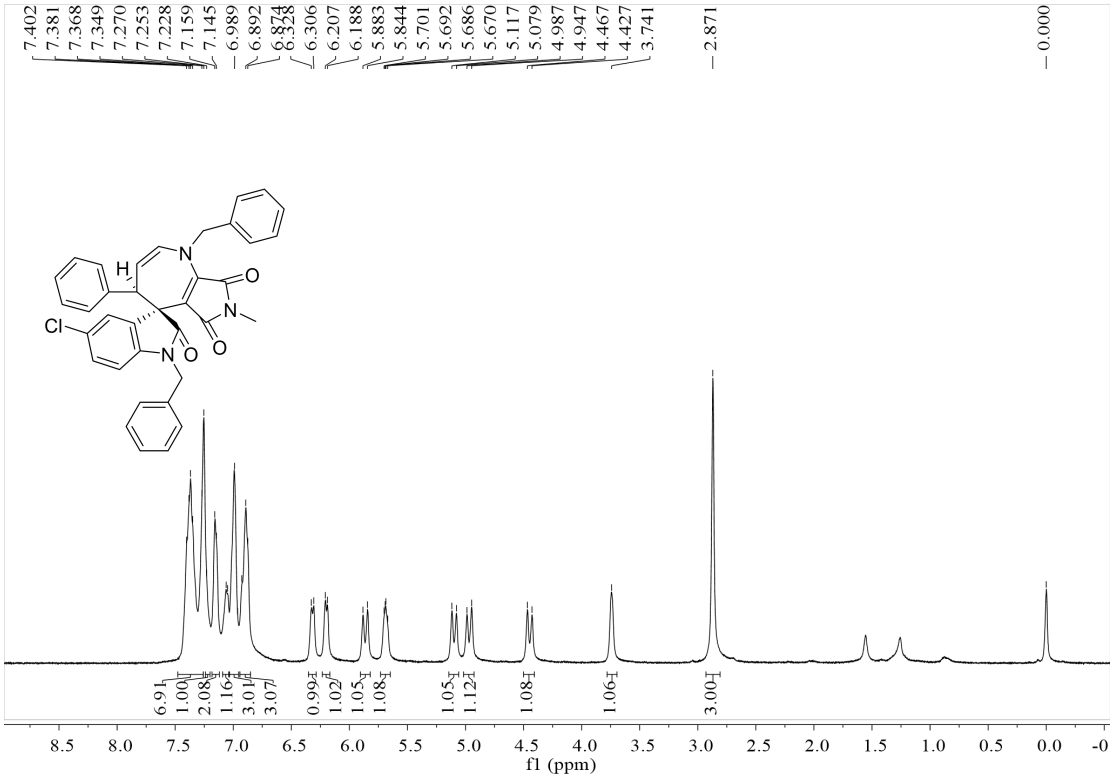

Intens.
x10^5
+MS, 0.07-0.17min #(4-10)
552.2273
574.2101
1.0
0.8
0.6
0.4
0.2
0.0
500
520
540
560
580
600
m/z

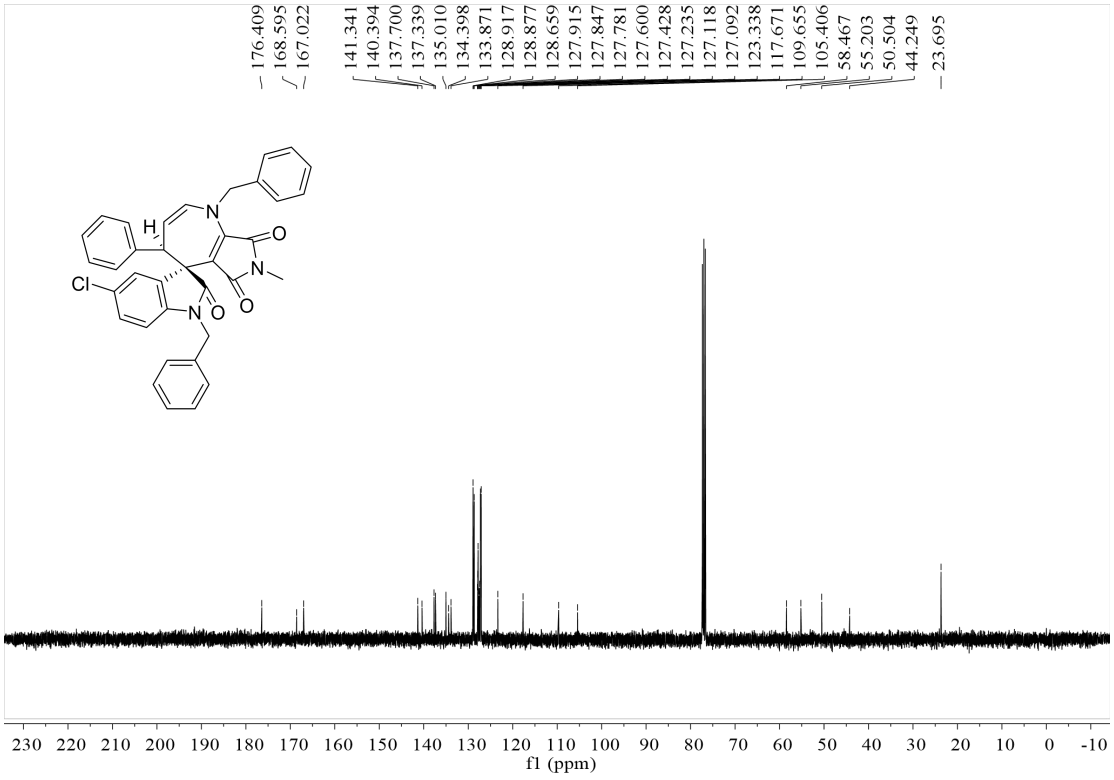
***cis*-1,1'-dibenzyl-5,7'-dimethyl-4'-phenyl-1',4'-dihydro-6'*H*-spiro[indoline-3,5'-pyrrolo[3,4-*b*]azepine]-2,6',8'(7'*H*)-trione (4b):**

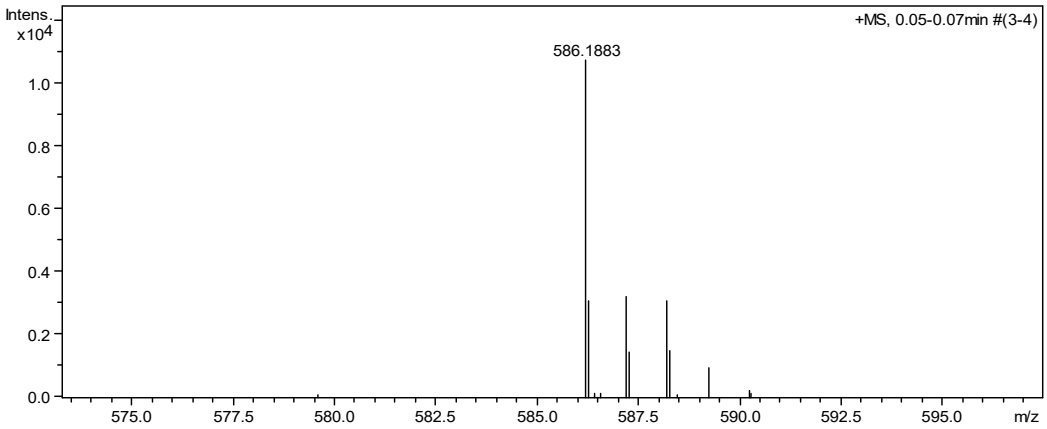



Intens.
x10^4
+MS, 0.36-0.84min #(21-50)
588.2253
589.2289
6
4
2
0
587.5
588.0
588.5
589.0
589.5
590.0
m/z

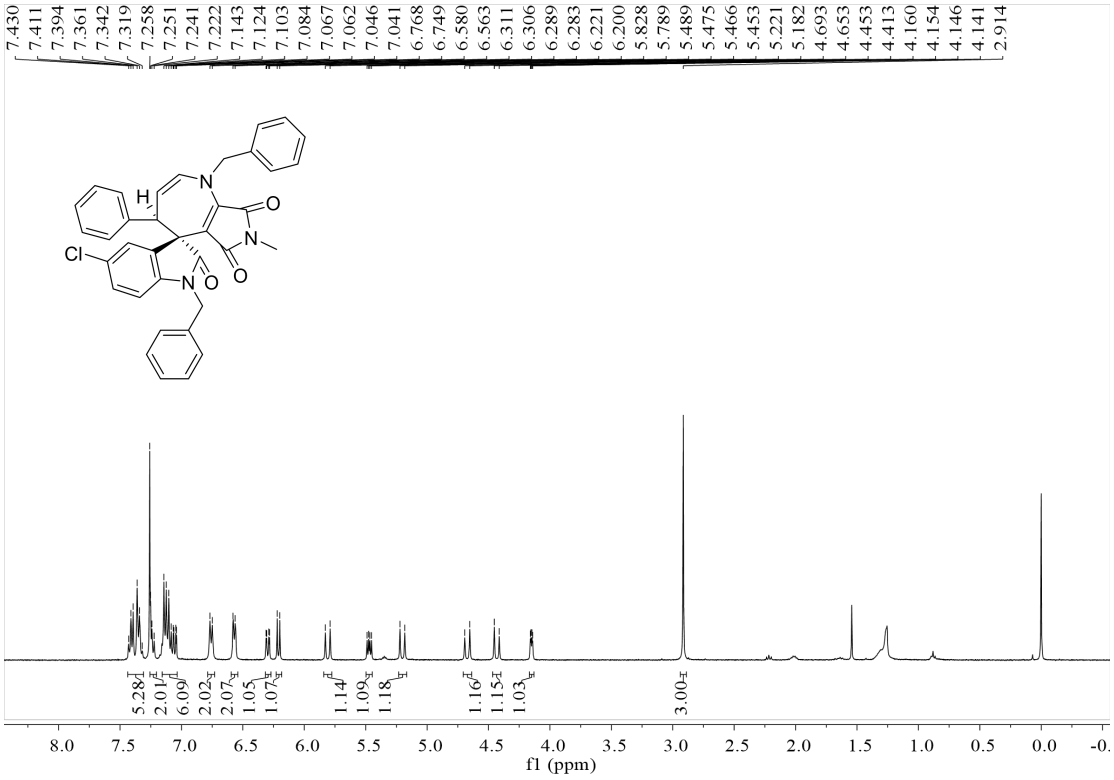
***cis*-1,1'-dibenzyl-5-chloro-7'-methyl-4'-phenyl-1',4'-dihydro-6'*H*-spiro[indoline-3,5'-pyrrolo[3,4-*b*]azepine]-2,6',8'(7'*H*)-trione (4c):**

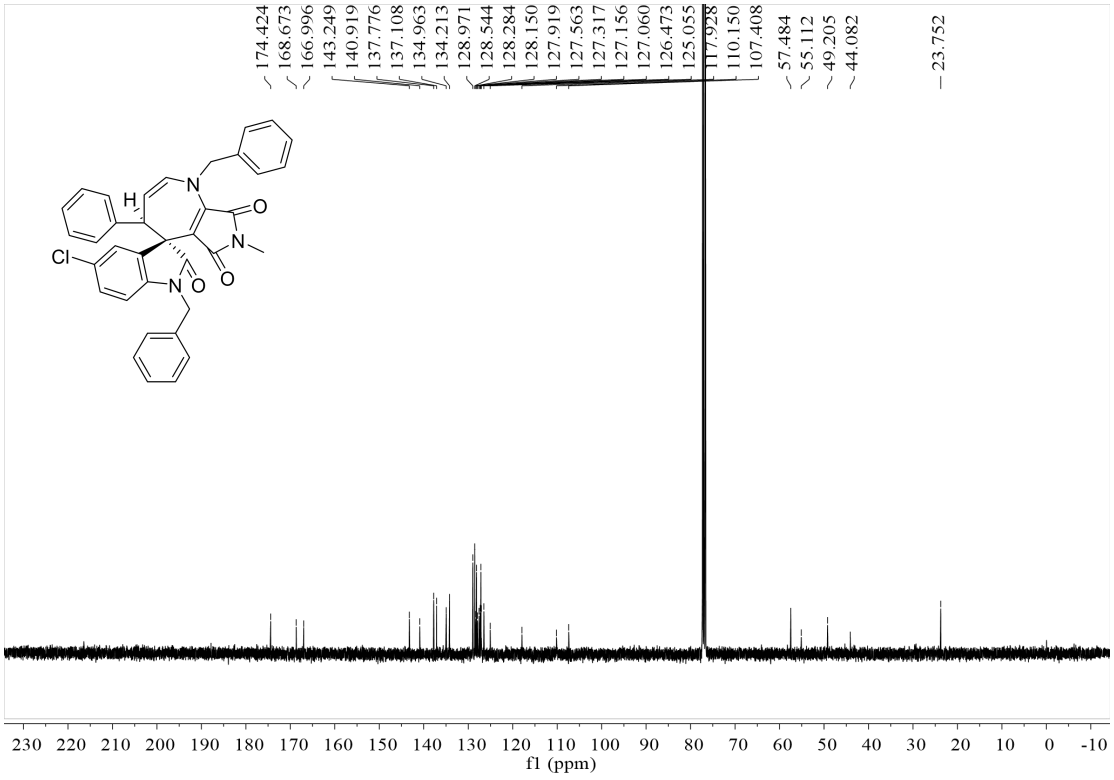


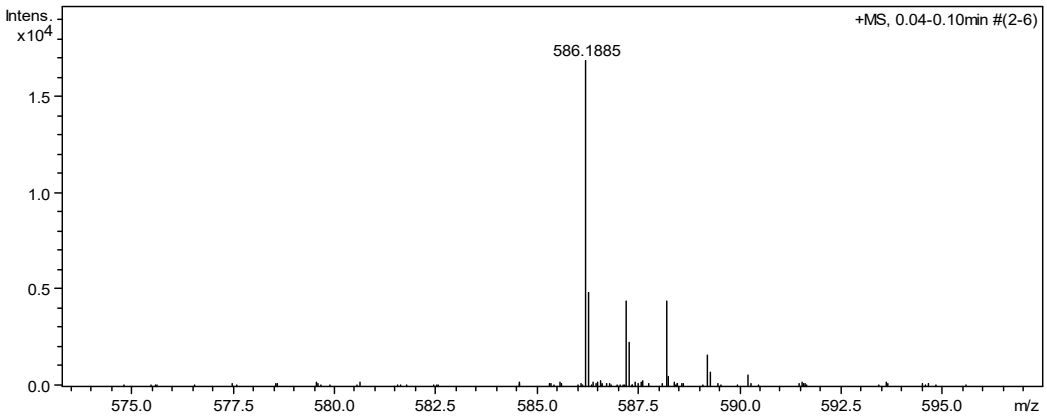



Intens.
x10^4
+MS, 0.05-0.07min #(3-4)
586.1883
1.0
0.8
0.6
0.4
0.2
0.0
575.0
577.5
580.0
582.5
585.0
587.5
590.0
592.5
595.0
m/z

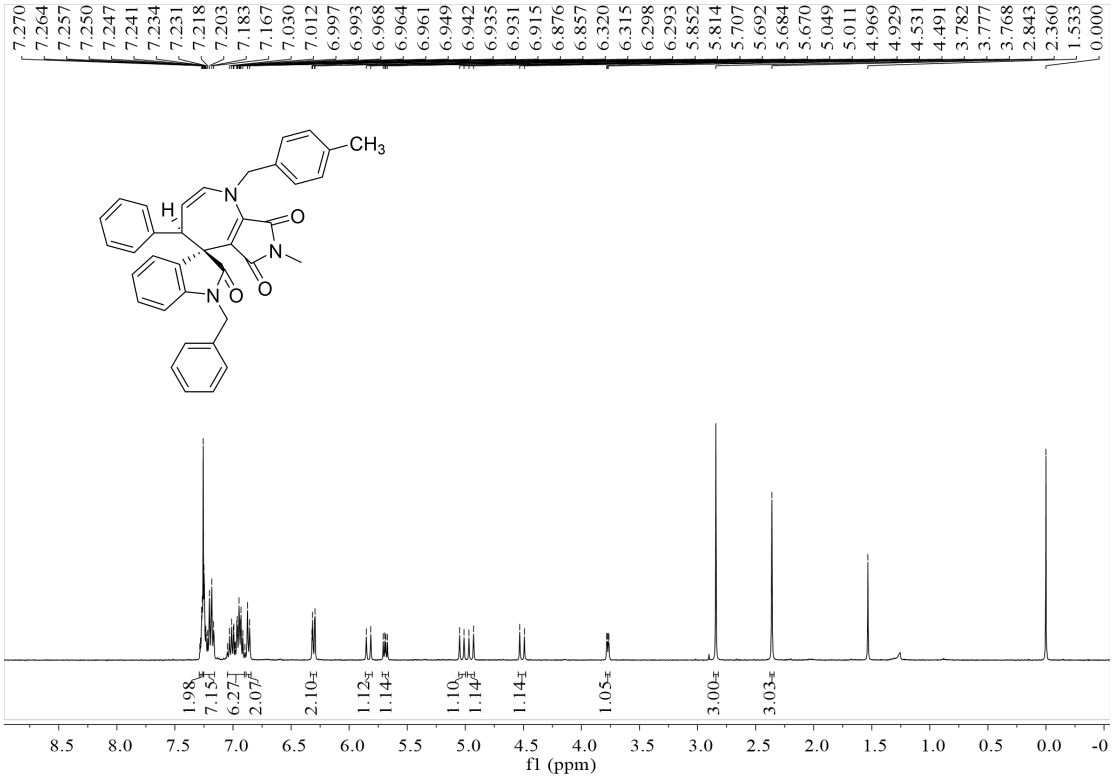
***trans*-1,1'-dibenzyl-5-chloro-7'-methyl-4'-phenyl-1',4'-dihydro-6'*H*-spiro[indoline-3,5'-pyrrolo[3,4-*b*]azepine]-2,6',8'(7'*H*)-trione (4c'):**

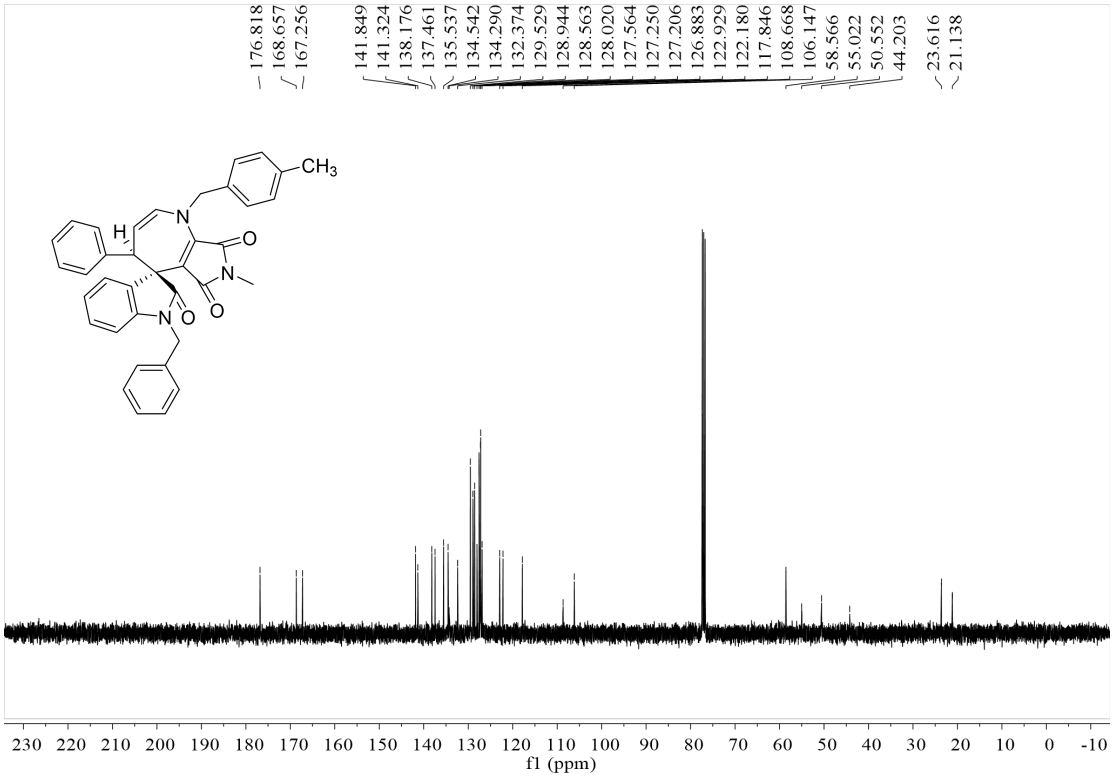


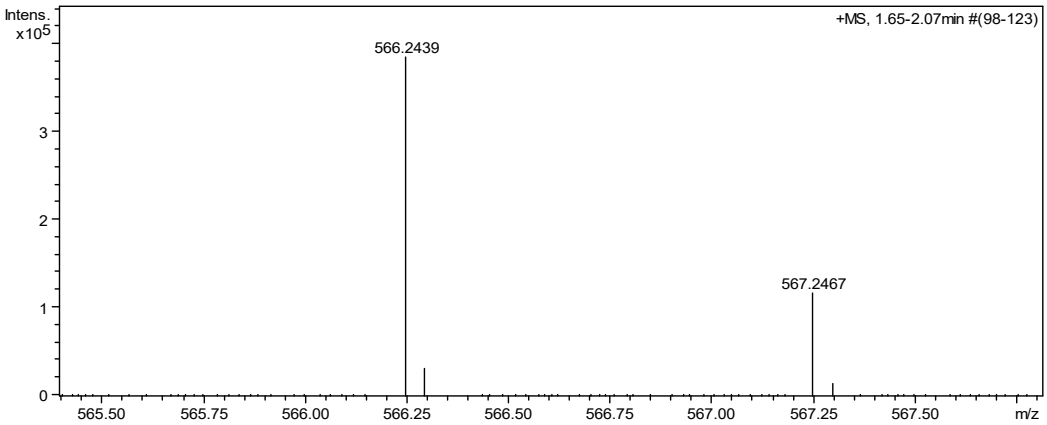



Intens.
x10^4
+MS, 0.04-0.10min #(2-6)
586.1885
1.5
1.0
0.5
0.0
575.0
577.5
580.0
582.5
585.0
587.5
590.0
592.5
595.0
m/z

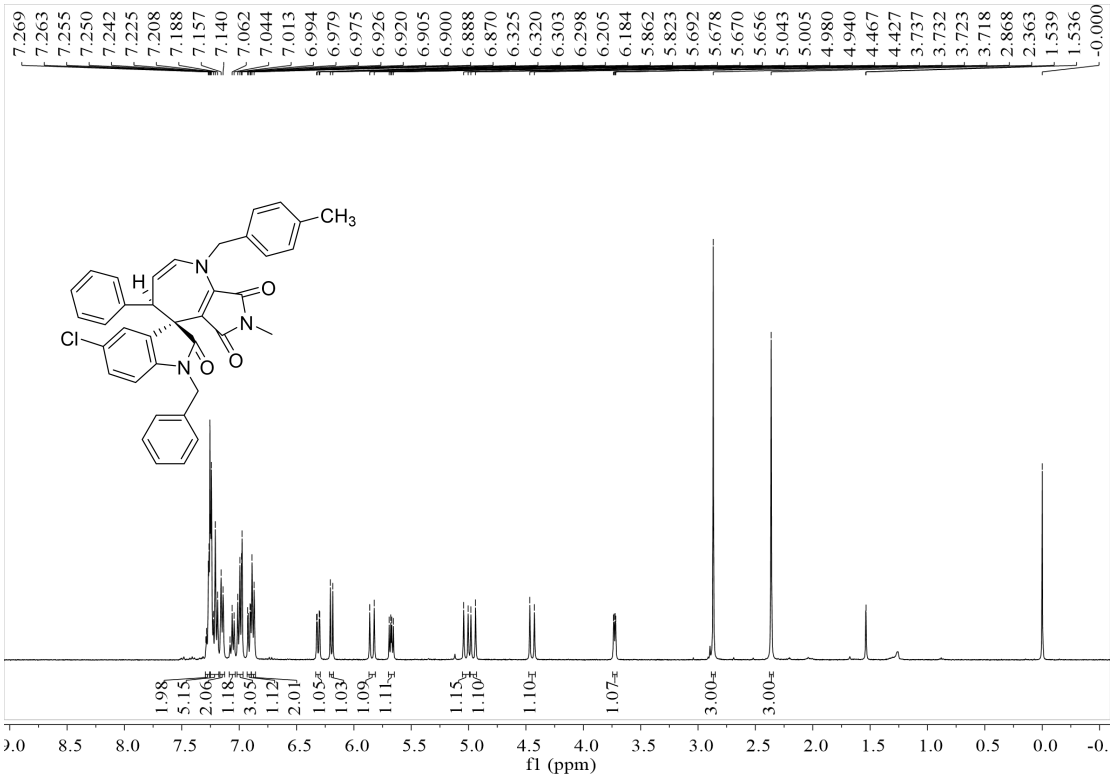
***cis*-1-benzyl-7'-methyl-1'-(4-methylbenzyl)-4'-phenyl-1',4'-dihydro-6'*H*-spiro[indoline-3,5'-*p*yrrolo[3,4-*b*]azepine]-2,6',8'(7'*H*)-trione (4d):**

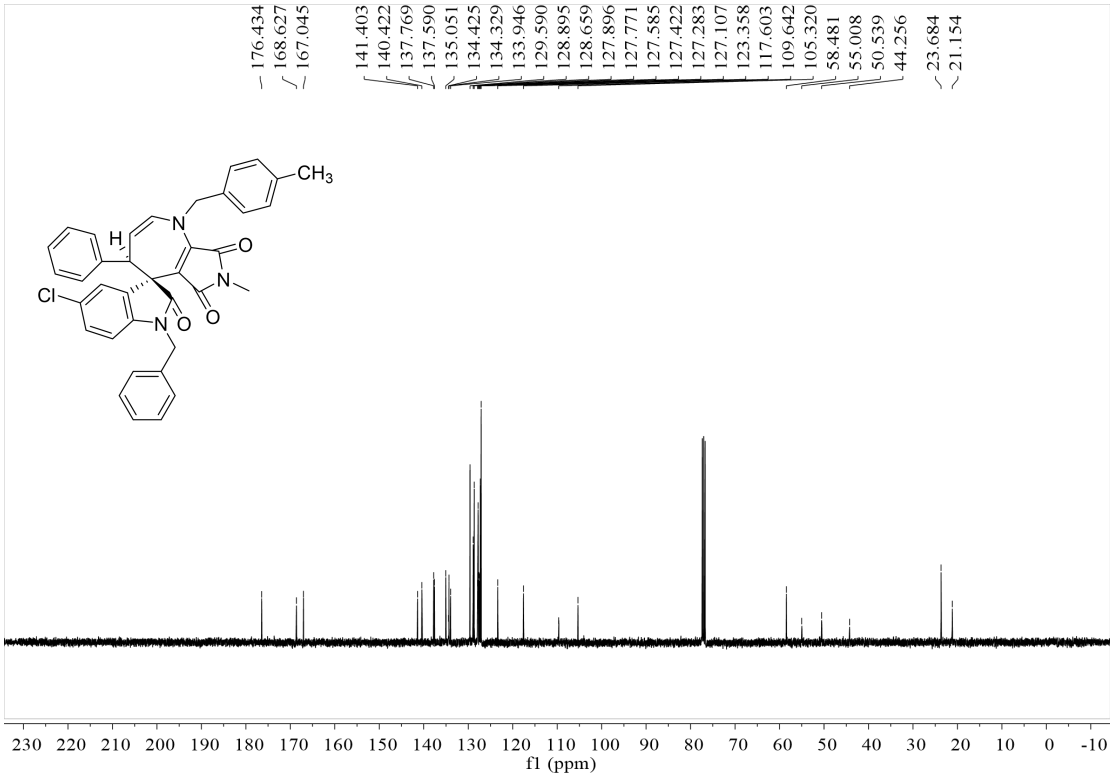


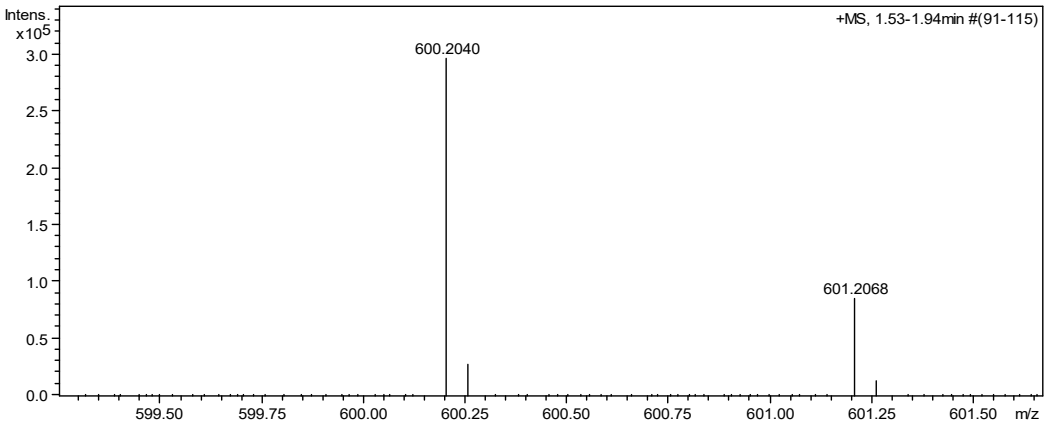



Intens.
x10^5
+MS, 1.65-2.07min #(98-123)
566.2439
567.2467
0
1
2
3
565.50
565.75
566.00
566.25
566.50
566.75
567.00
567.25
567.50
m/z

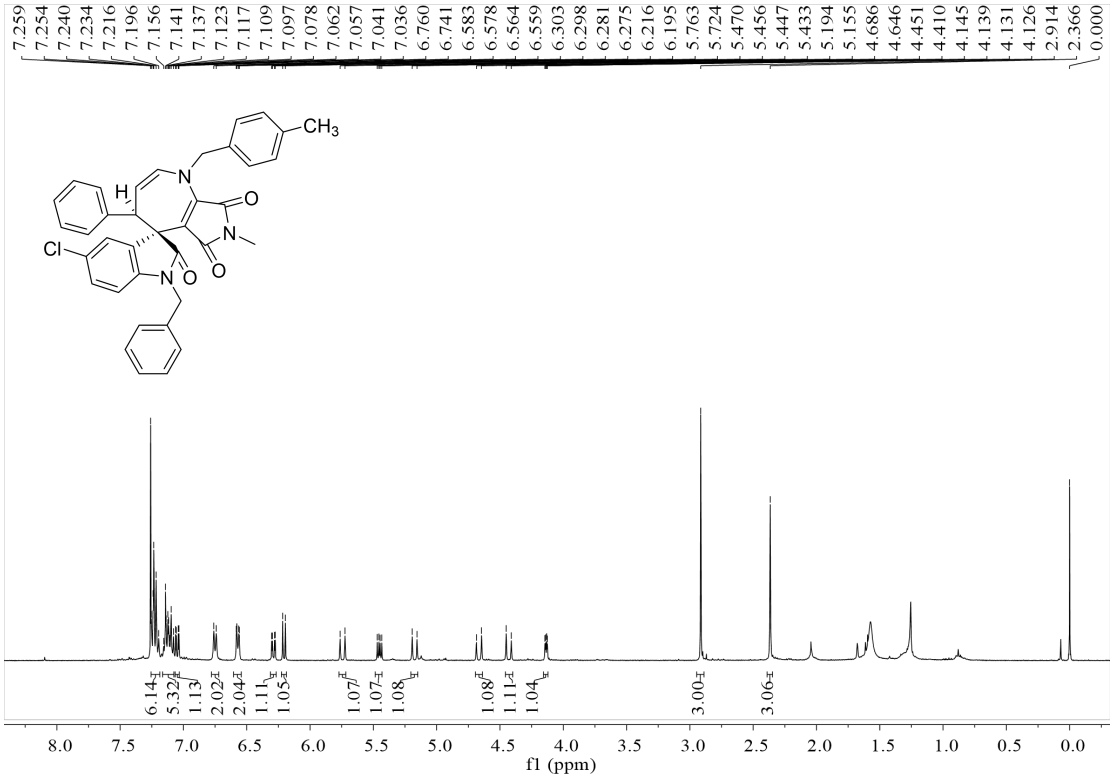
***cis*-1-benzyl-5-chloro-7'-methyl-1'-(4-methylbenzyl)-4'-phenyl-1',4'-dihydro-6'*H*-spiro[indoline-3,5'-pyrrolo[3,4-*b*]azepine]-2,6',8'(7'*H*)-trione (4e):**

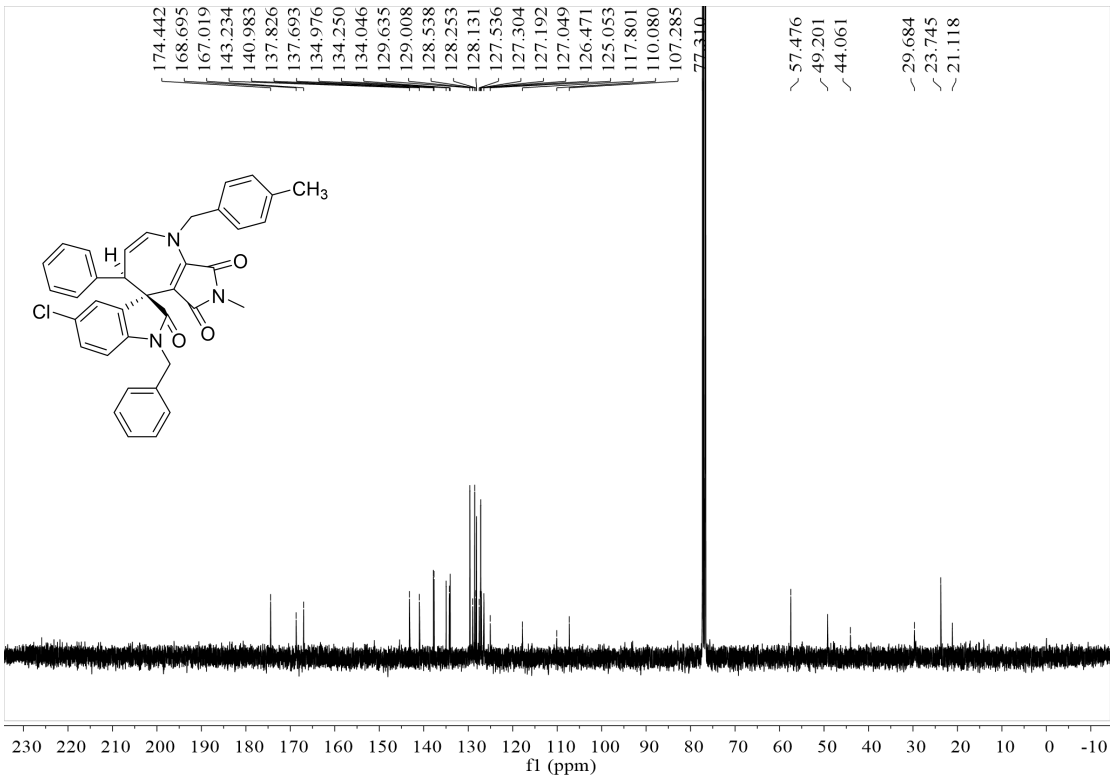


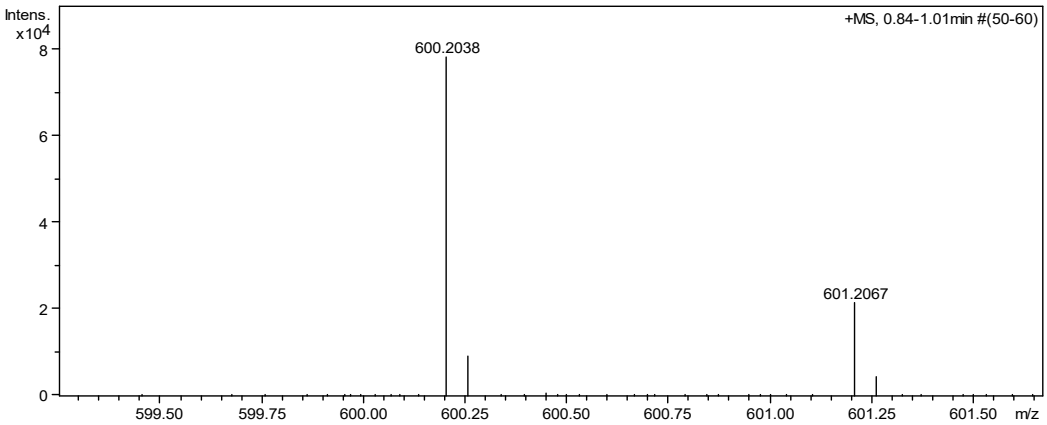



Intens.
x10^5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
+MS, 1.53-1.94min #(91-115)
600.2040
601.2068
599.50
599.75
600.00
600.25
600.50
600.75
601.00
601.25
601.50
m/z

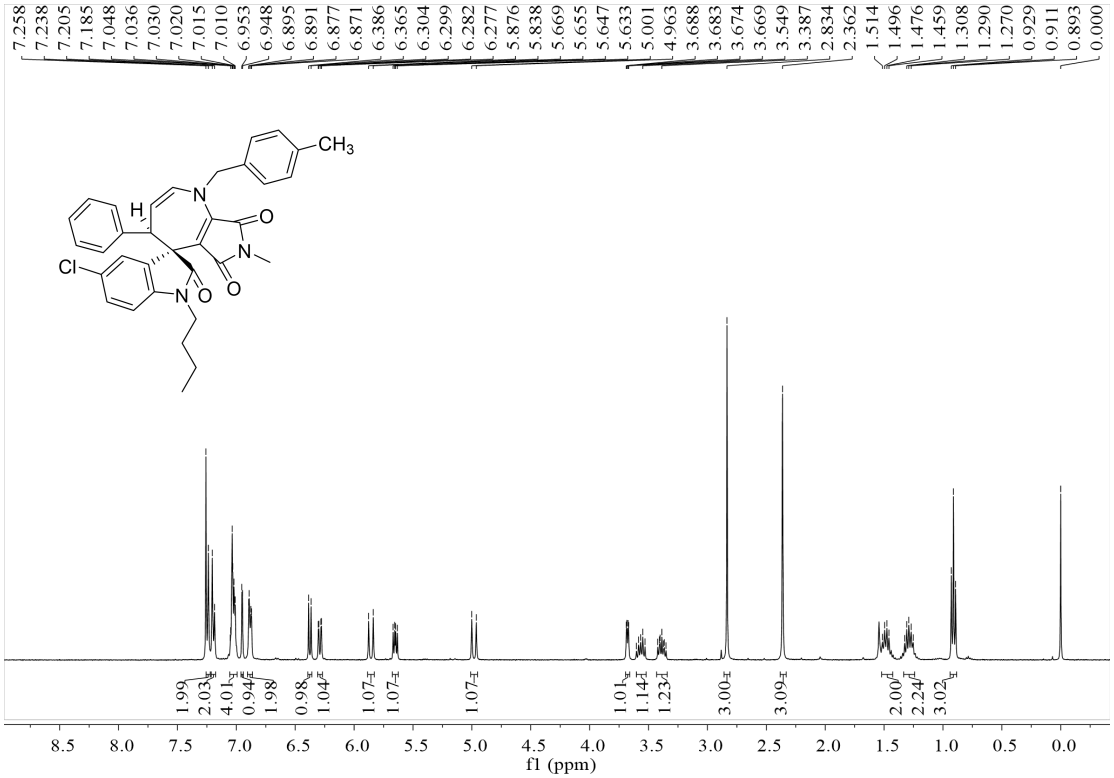
***trans*-1-benzyl-5-chloro-7'-methyl-1'-(4-methylbenzyl)-4'-phenyl-1',4'-dihydro-6'*H*-spiro[indoline-3,5'-pyrrolo[3,4-*b*]azepine]-2,6',8'(7'*H*)-trione (4e'):**

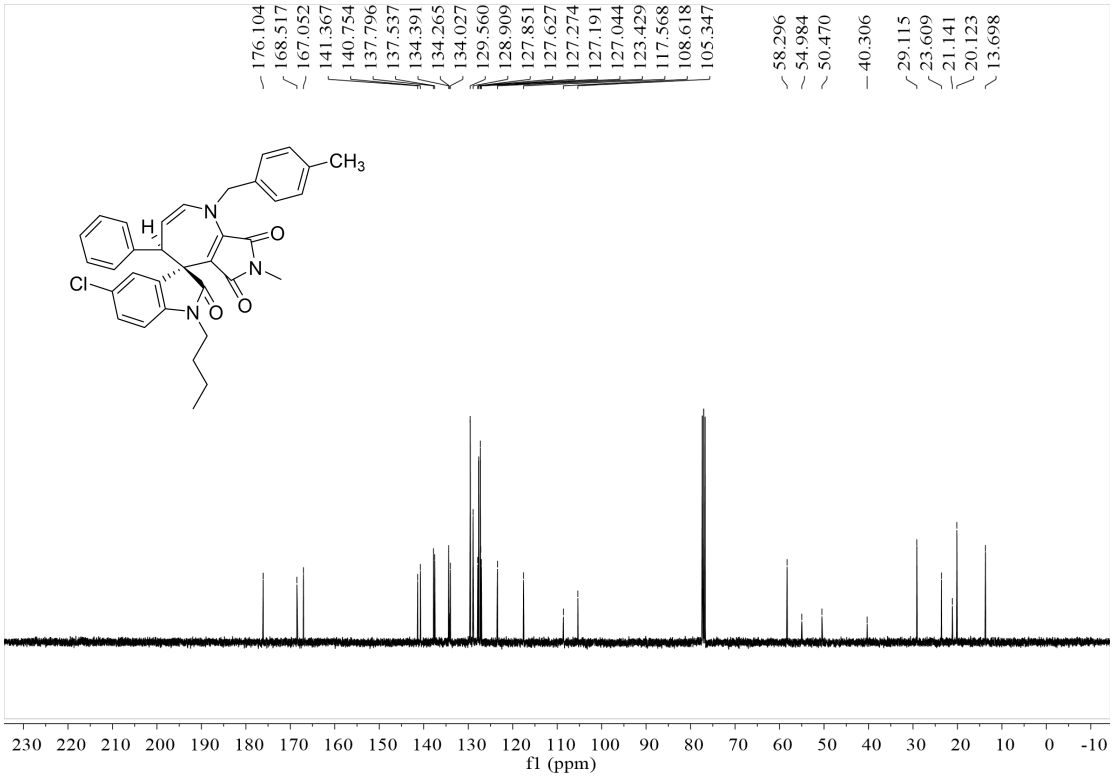


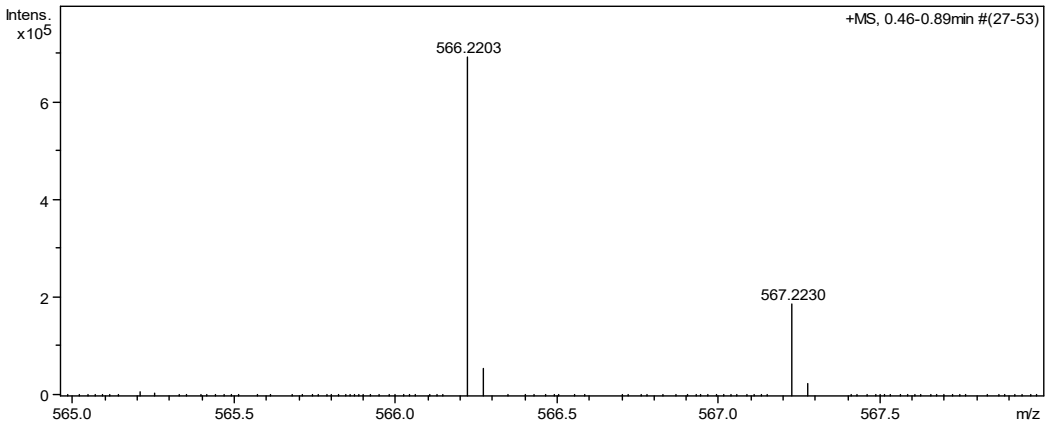



Intens.
x10^4
+MS, 0.84-1.01min #(50-60)
600.2038
601.2067
8
6
4
2
0
599.50
599.75
600.00
600.25
600.50
600.75
601.00
601.25
601.50
m/z

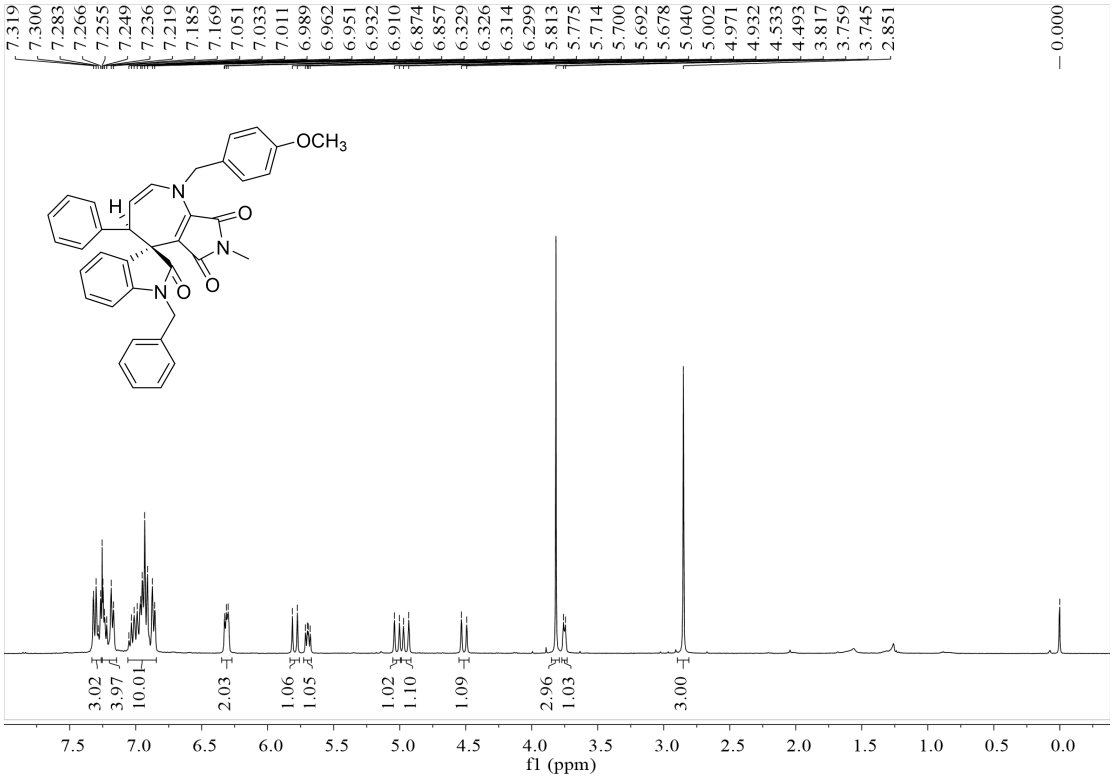
***cis*-1-butyl-5-chloro-7'-methyl-1'-(4-methylbenzyl)-4'-phenyl-1',4'-dihydro-6'*H*-spiro[indolin e-3,5'-pyrrolo[3,4-*b*]azepine]-2,6',8'(7'*H*)-trione (4f):**

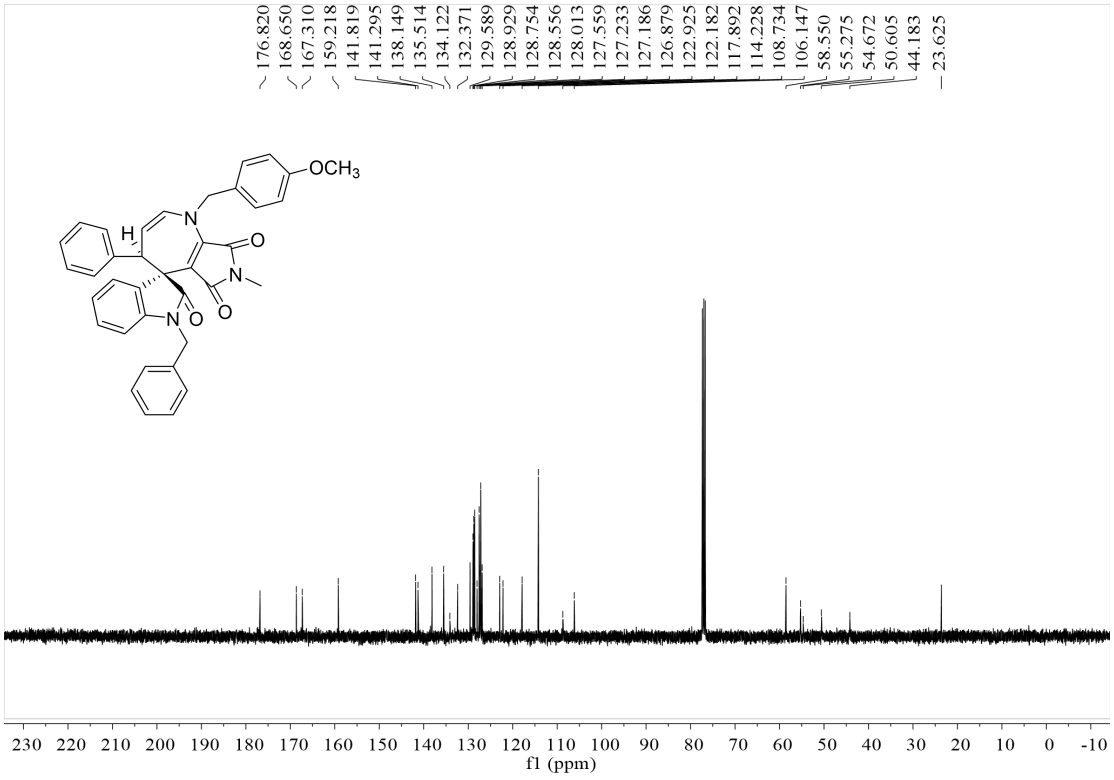


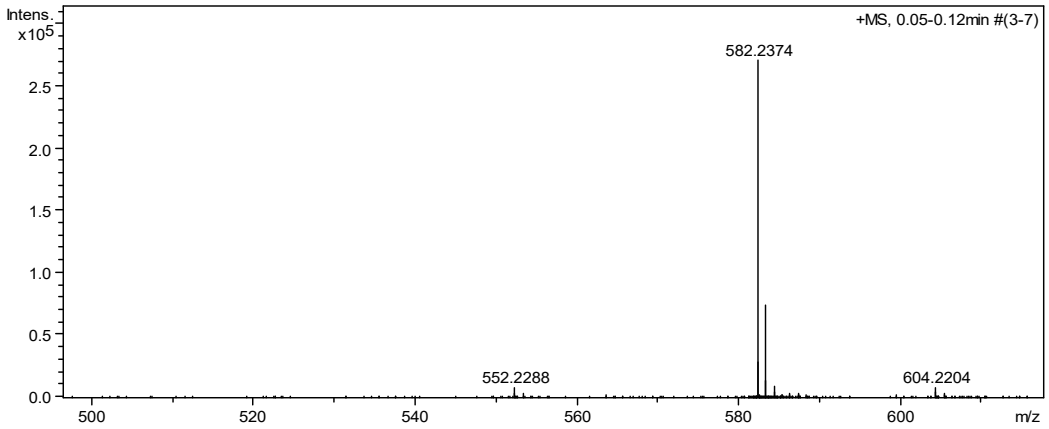



Intens.
x10^5
+MS, 0.46-0.89min #(27-53)
566.2203
567.2230
6
4
2
0
565.0
565.5
566.0
566.5
567.0
567.5
m/z

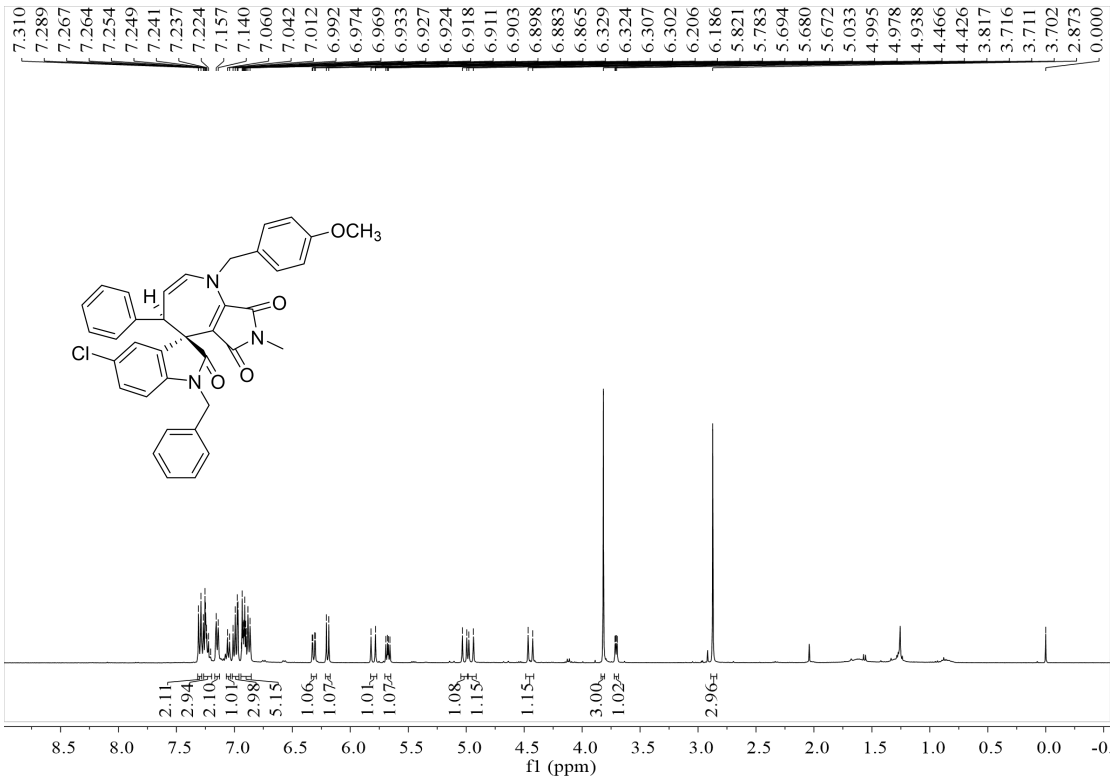
***cis*-1-benzyl-1'-(4-methoxybenzyl)-7'-methyl-4'-phenyl-1',4'-dihydro-6'*H*-spiro[indoline-3,5'-pyrrolo[3,4-*b*]azepine]-2,6',8'(7'*H*)-trione (4g):**

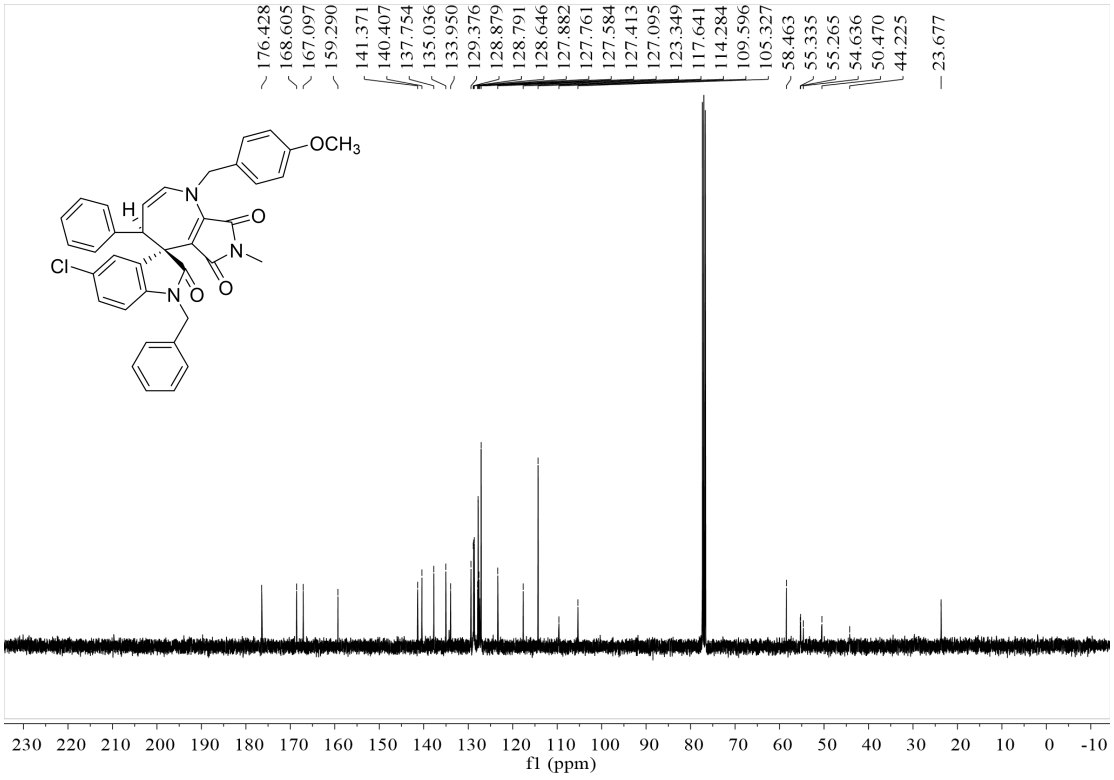


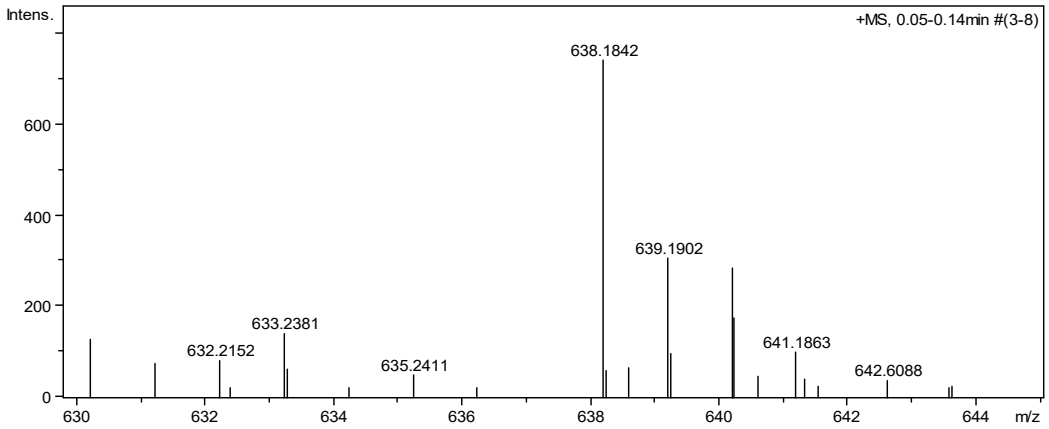



Intens.
x10^5
+MS, 0.05-0.12min #(3-7)
582.2374
552.2288
604.2204
2.5
2.0
1.5
1.0
0.5
0.0
500
520
540
560
580
600
m/z

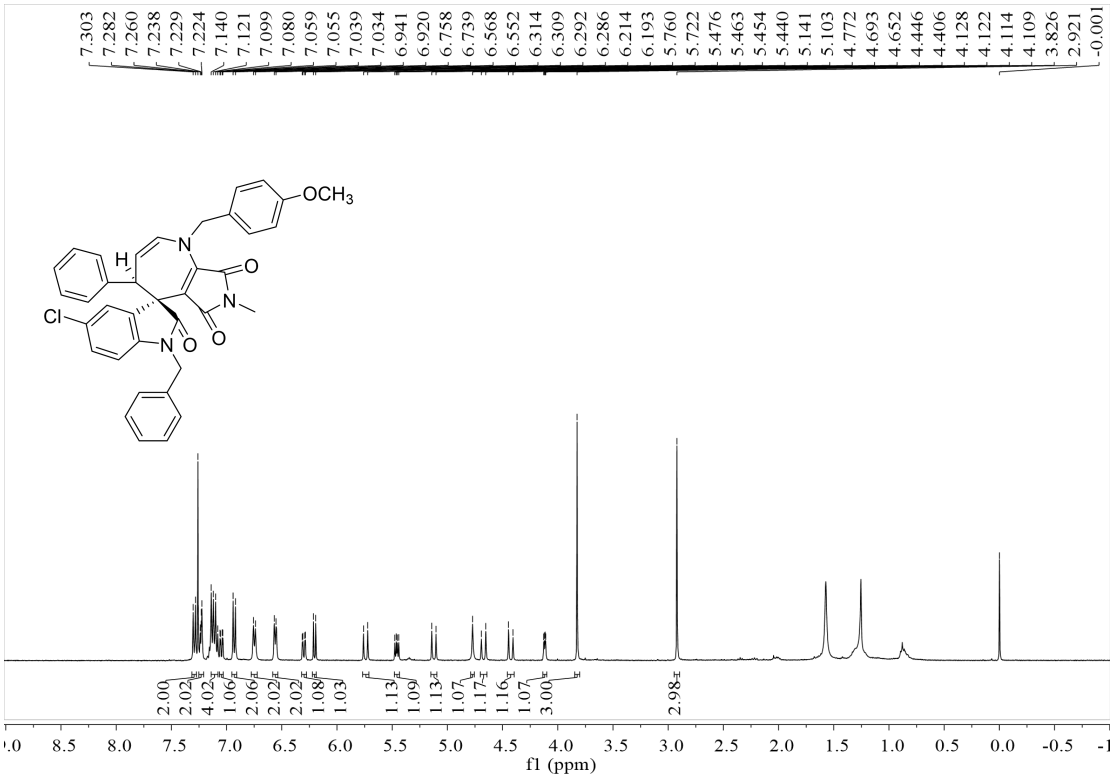
***cis*-1-benzyl-5-chloro-1'-(4-methoxybenzyl)-7'-methyl-4'-phenyl-1',4'-dihydro-6'*H*-spiro[indoline-3,5'-pyrrolo[3,4-*b*]azepine]-2,6',8'(7'*H*)-trione (4h):**

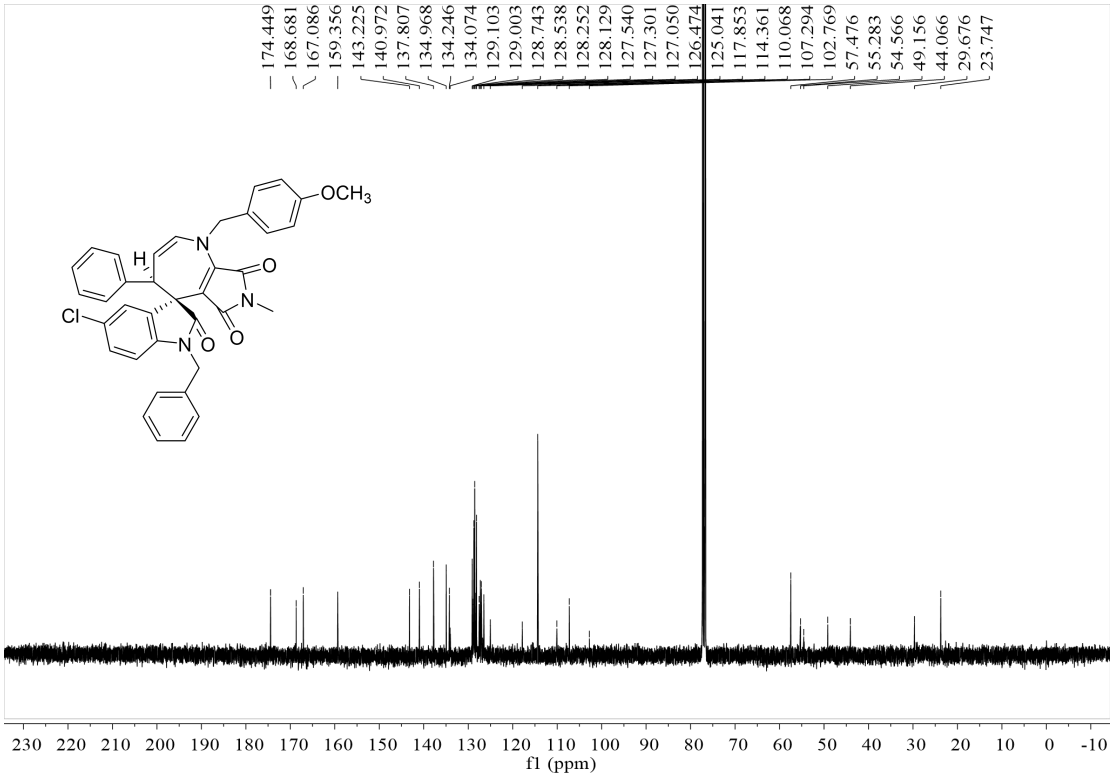


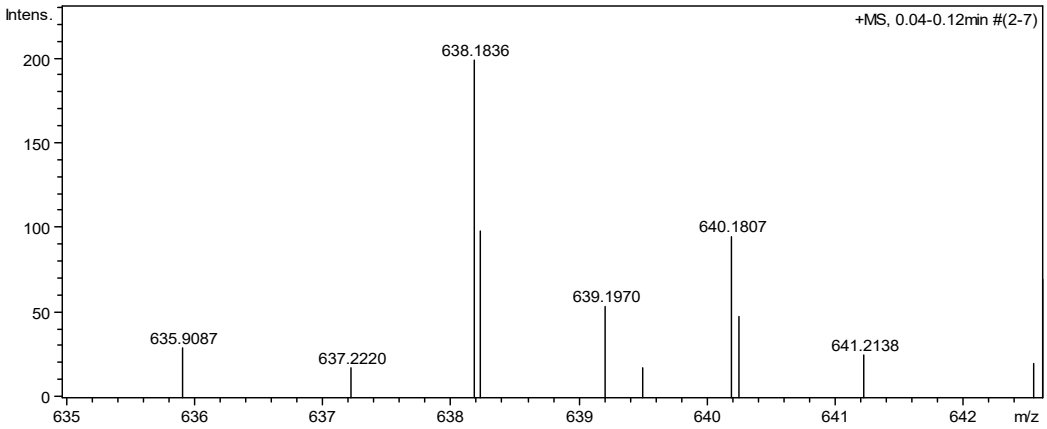



Intens.
+MS, 0.05-0.14min #(3-8)
638.1842
639.1902
633.2381
632.2152
635.2411
641.1863
642.6088
600
400
200
0
630
632
634
636
638
640
642
644
m/z

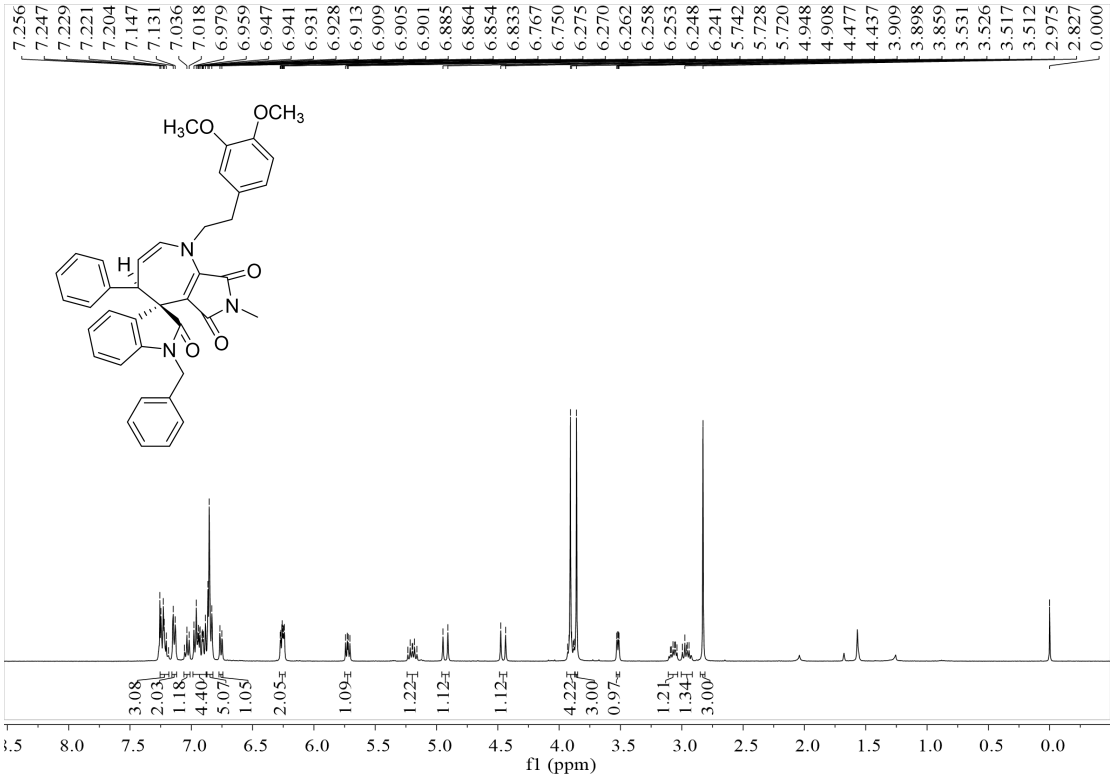
***trans*-1-benzyl-5-chloro-1'-(4-methoxybenzyl)-7'-methyl-4'-phenyl-1',4'-dihydro-6'*H*-spiro[indoline-3,5'-pyrrolo[3,4-*b*]azepine]-2,6',8'(7'*H*)-trione (4h'):**

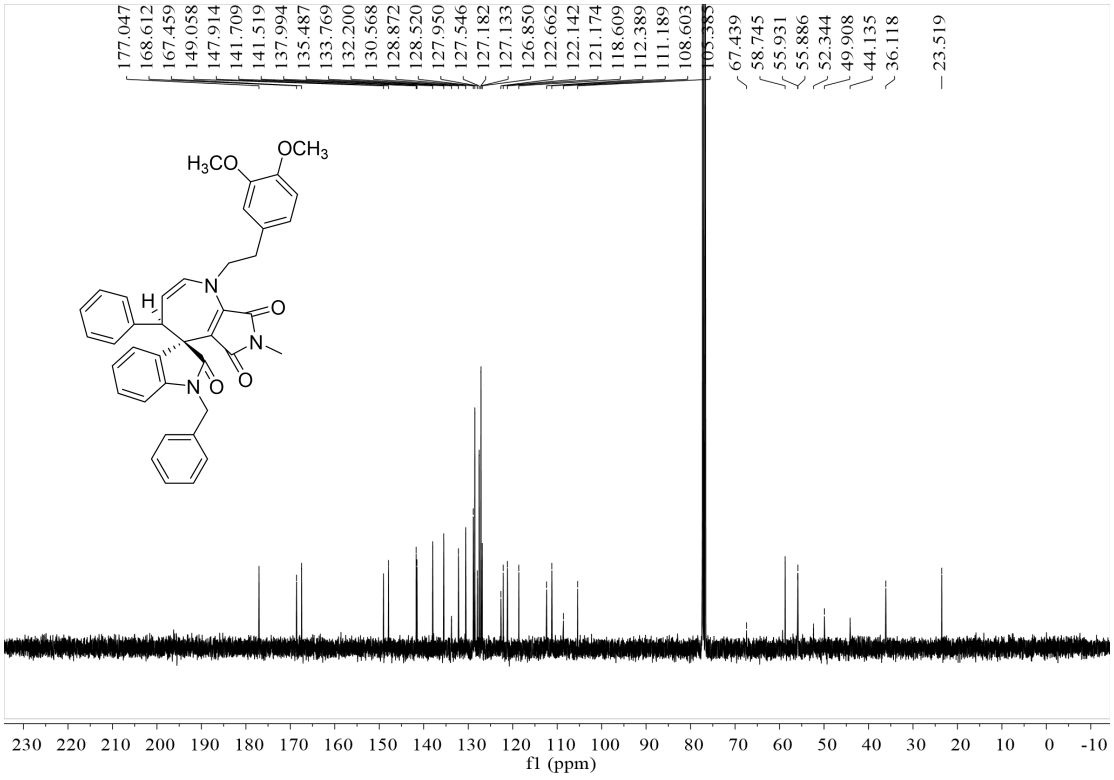


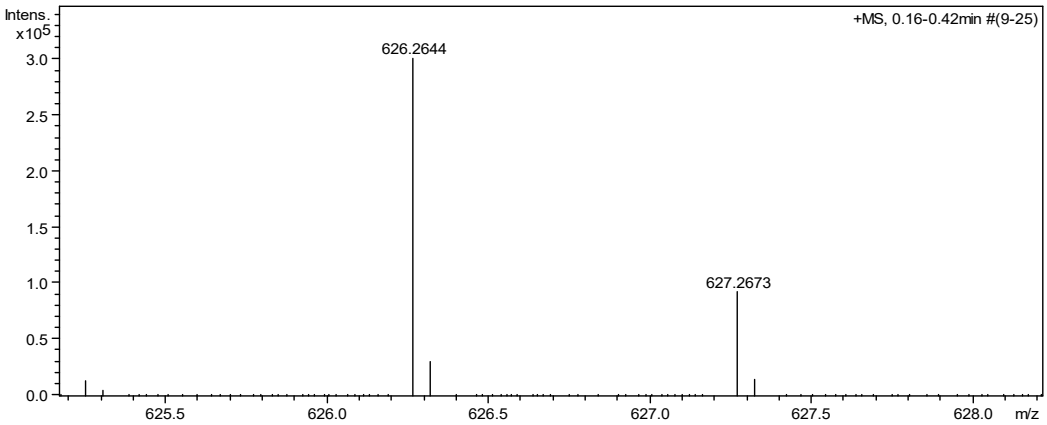



Intens.
+MS, 0.04-0.12min #(2-7)
638.1836
640.1807
639.1970
635.9087
637.2220
641.2138
200
150
100
50
0
635
636
637
638
639
640
641
642
m/z

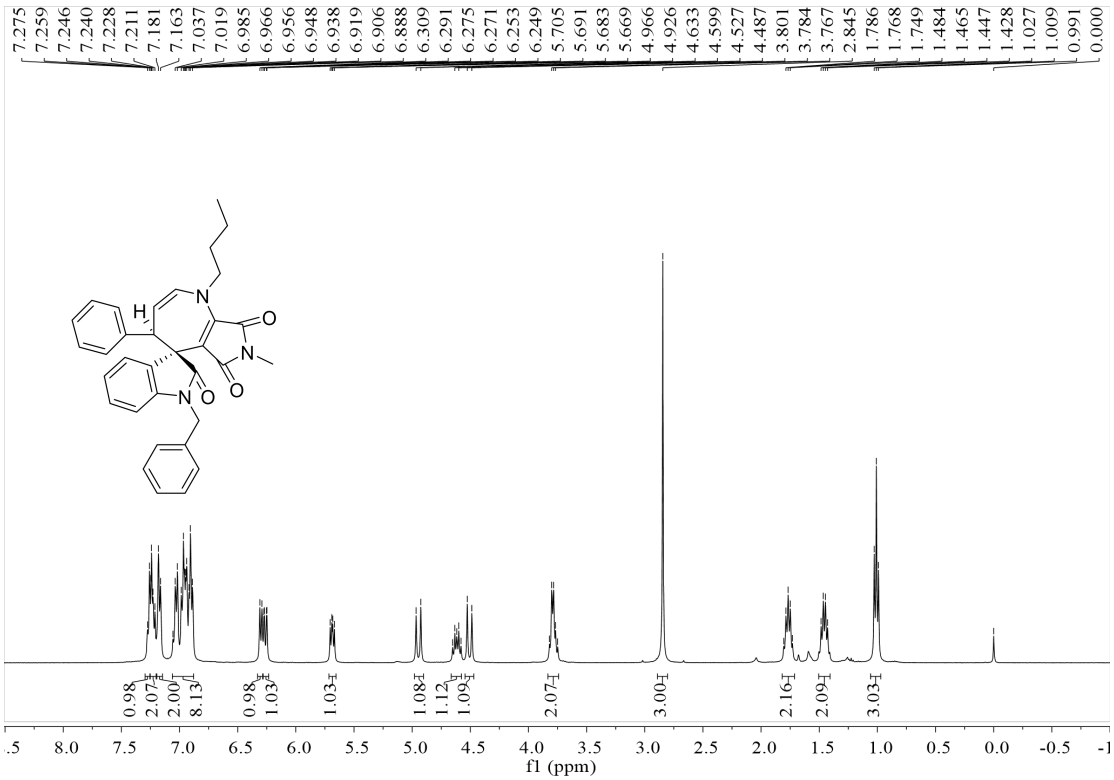
***cis*-1-benzyl-1'-(3,4-dimethoxyphenethyl)-7'-methyl-4'-phenyl-1',4'-dihydro-6'*H*-spiro[indoline-3,5'-pyrrolo[3,4-*b*]azepine]-2,6',8'(7'*H*)-trione (4i):**

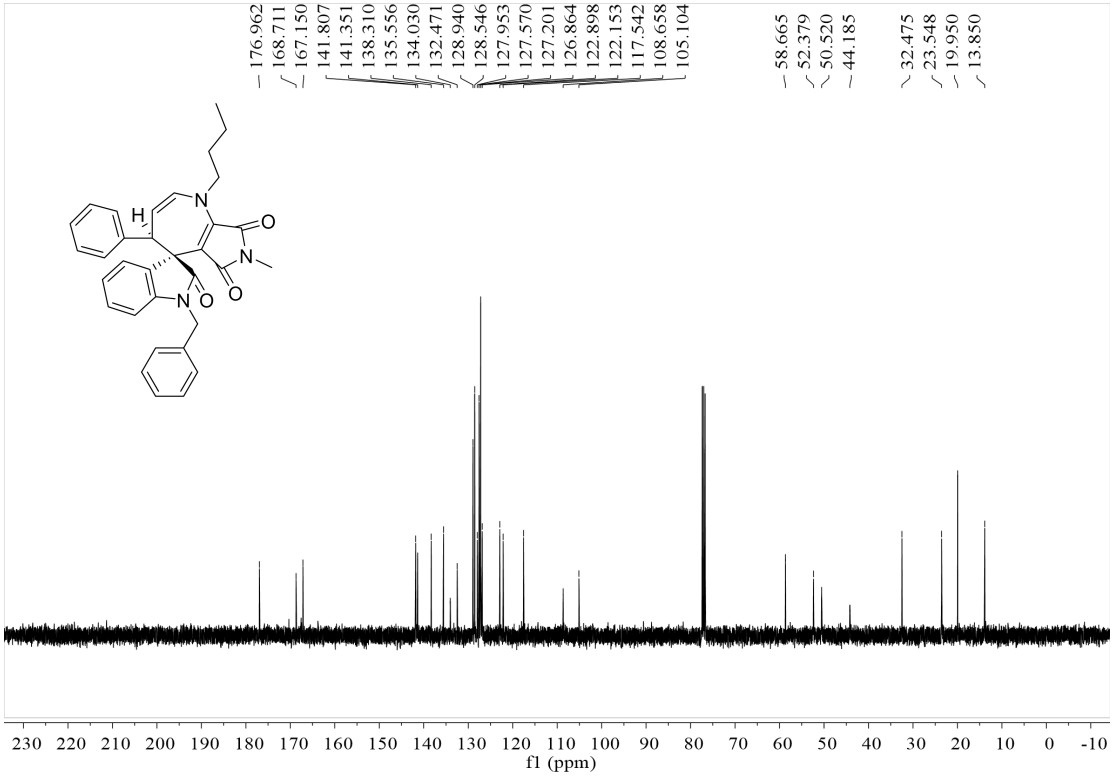


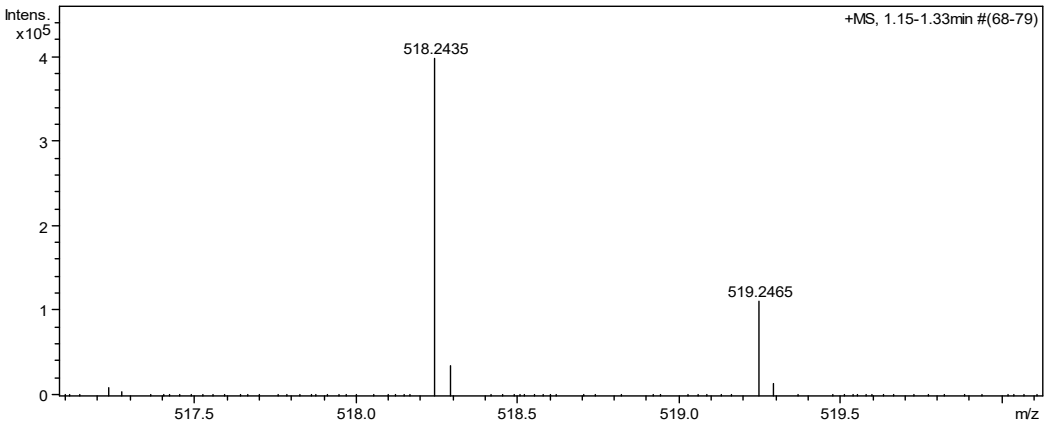



Intens.
x10^5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
+MS, 0.16-0.42min #(9-25)
626.2644
627.2673
625.5
626.0
626.5
627.0
627.5
628.0
m/z

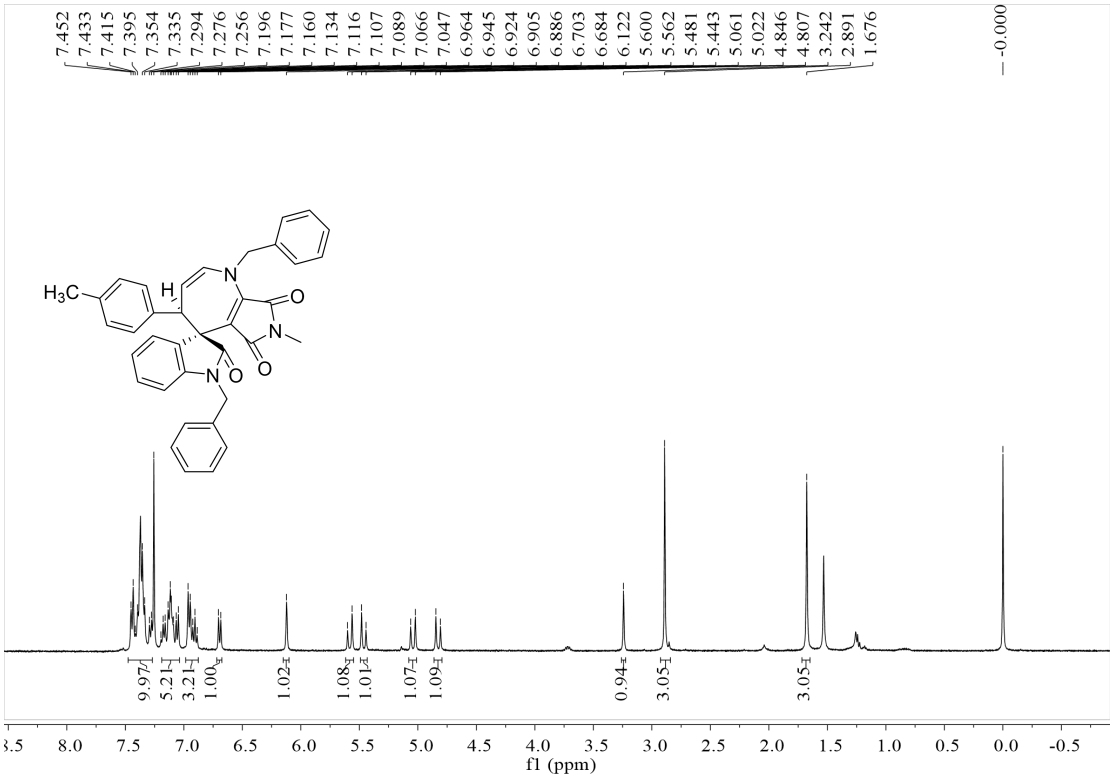
***cis*-1-benzyl-1'-butyl-7'-methyl-4'-phenyl-1',4'-dihydro-6'*H*-spiro[indoline-3,5'-pyrrolo[3,4-*b*]azepine]-2,6',8'(7'*H*)-trione (4j):**

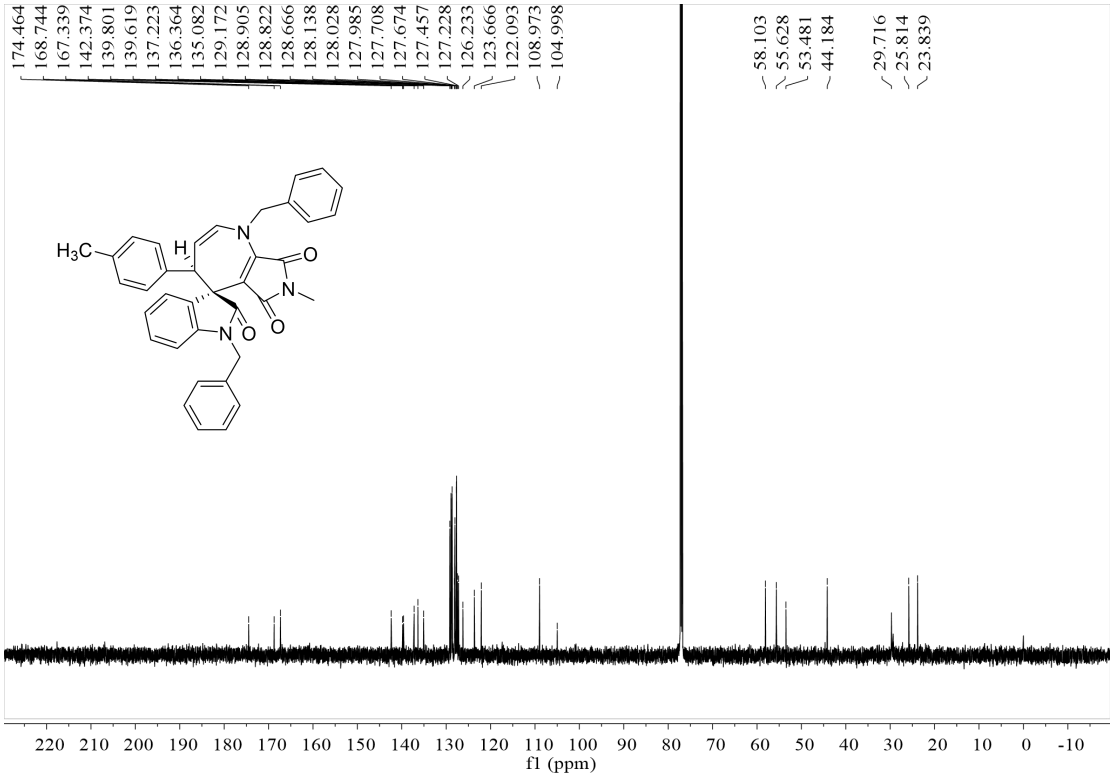


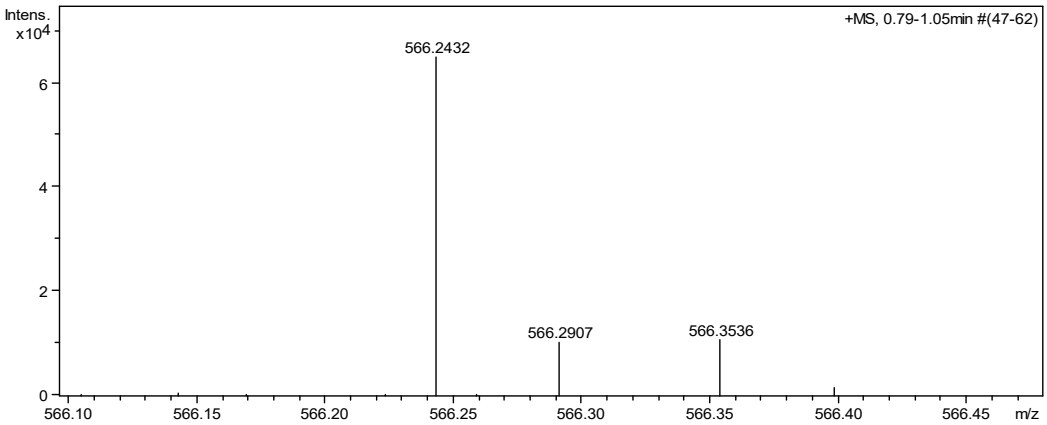



Intens.
x10^5
+MS, 1.15-1.33min #(68-79)
518.2435
519.2465
0
1
2
3
4
517.5
518.0
518.5
519.0
519.5
m/z

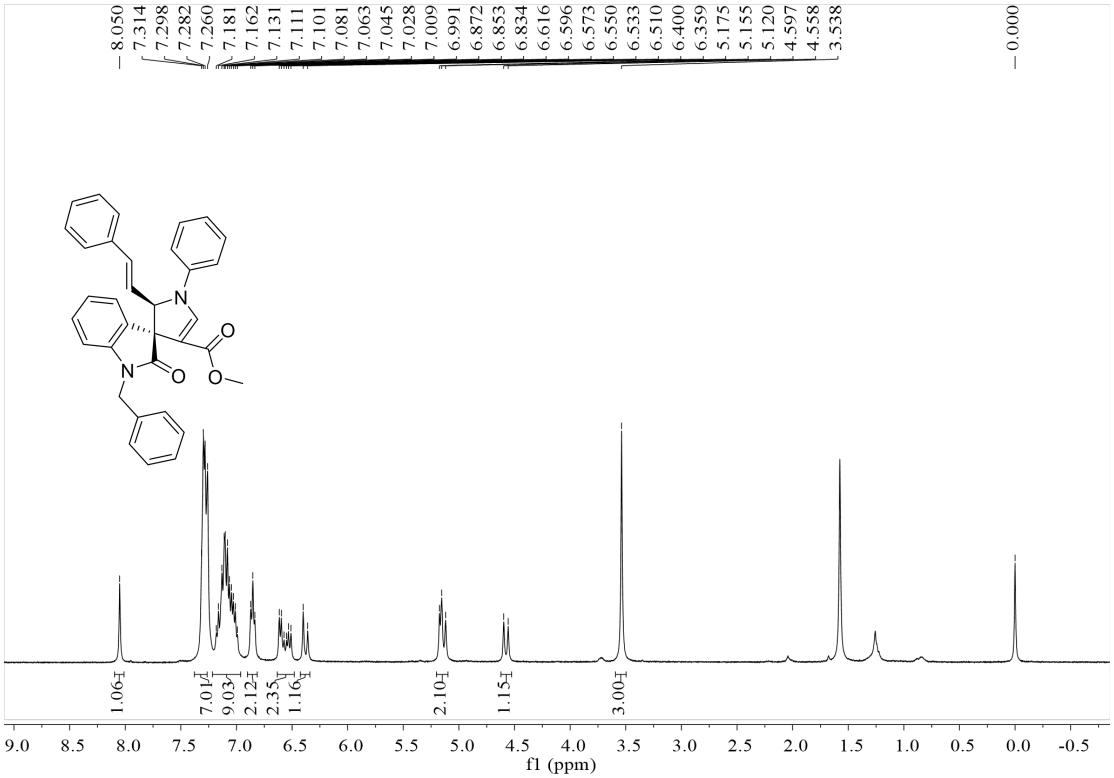
***cis*-1,1'-dibenzyl-7'-methyl-4'-(*p*-tolyl)-1',4'-dihydro-6'*H*-spiro[indoline-3,5'-pyrrolo[3,4-*b*]azepine]-2,6',8'(7'*H*)-trione (4k):**

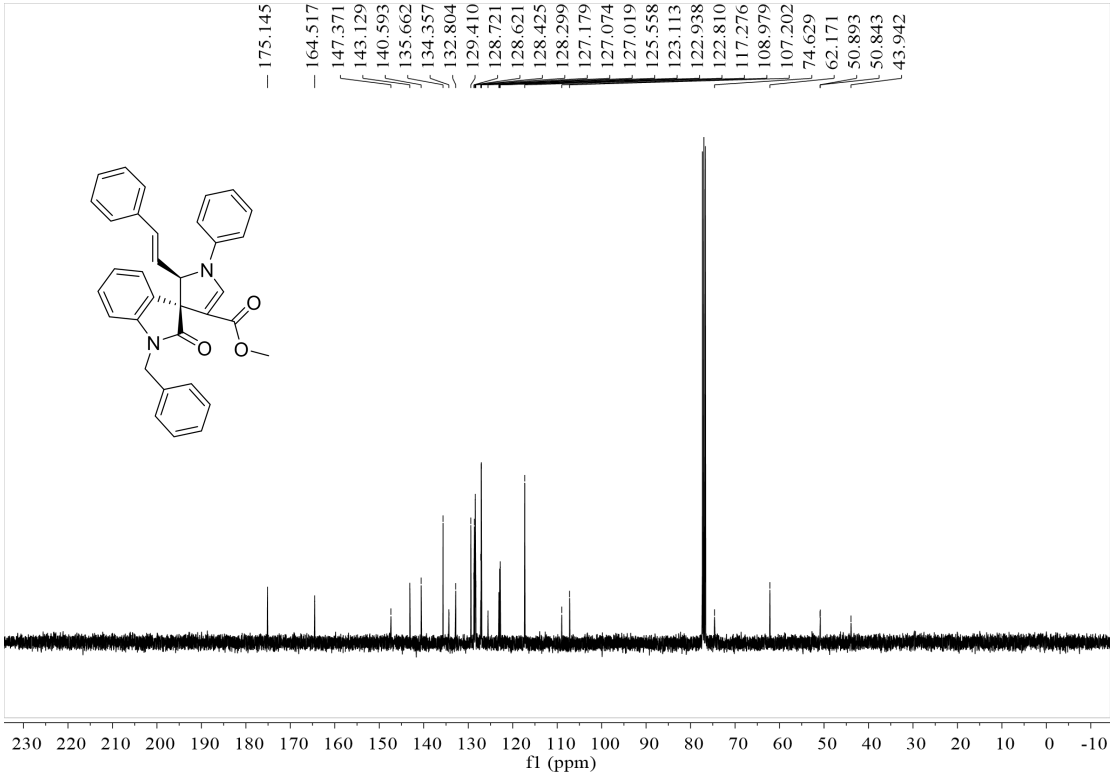


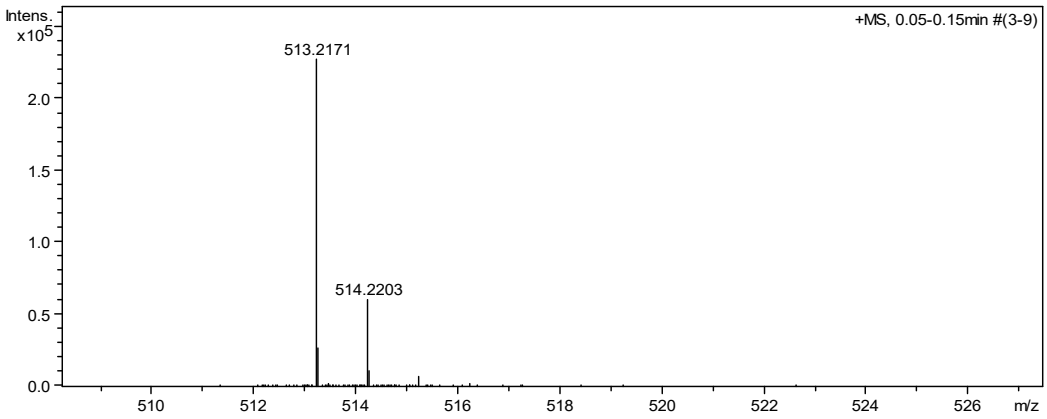



Intens.
x10^4
+MS, 0.79-1.05min #(47-62)
566.2432
566.2907
566.3536
6
4
2
0
566.10
566.15
566.20
566.25
566.30
566.35
566.40
566.45
m/z

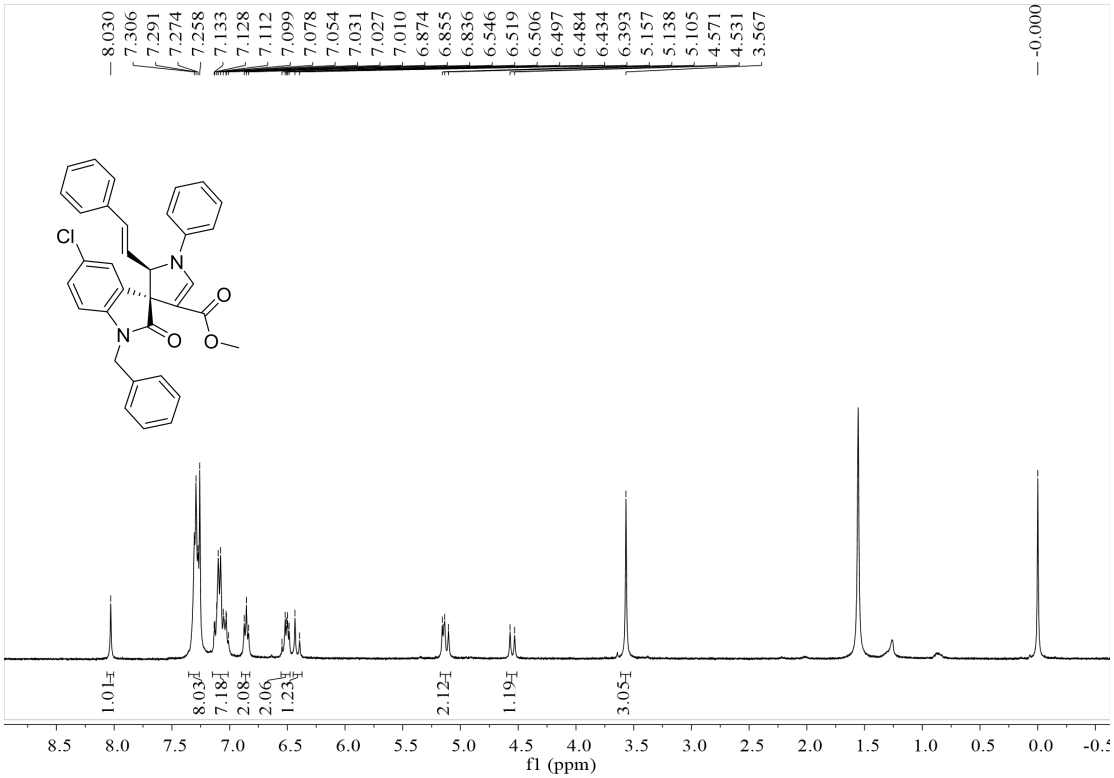
Methyl-*cis*-1-benzyl-2-oxo-1'-phenyl-2'-((*E*)-styryl)-1',2'-dihydrospiro[indoline-3,3'-pyrrole]-4'-carboxylate (6a):

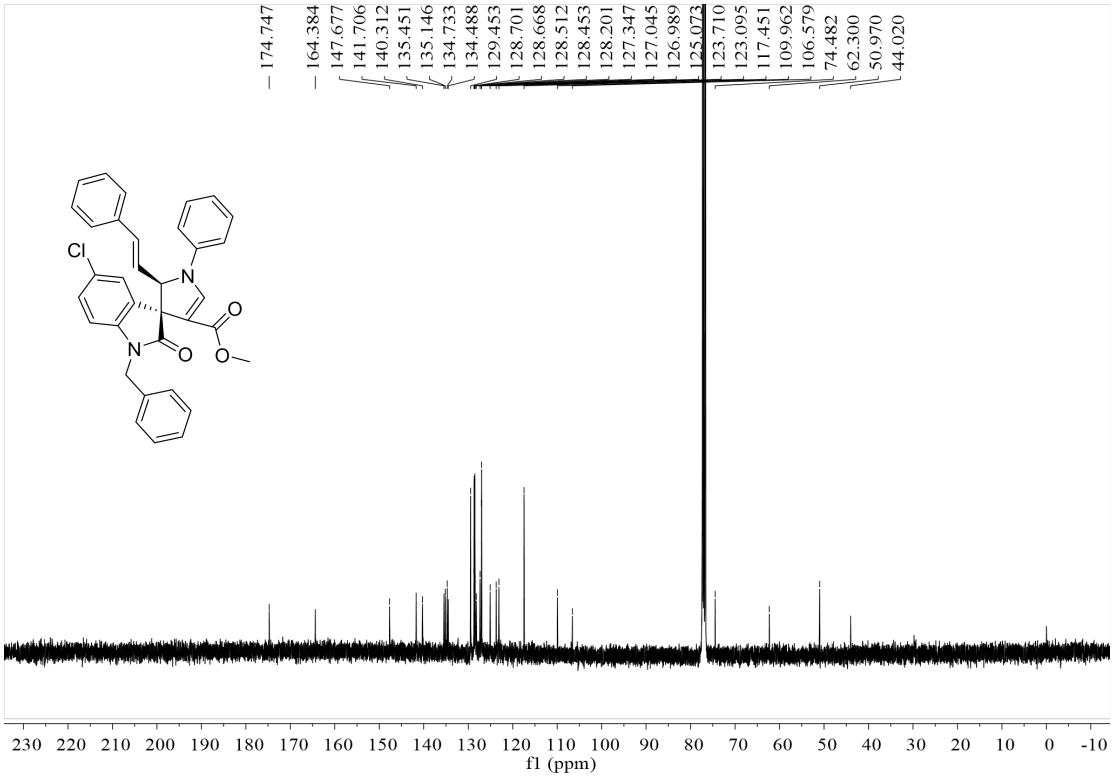


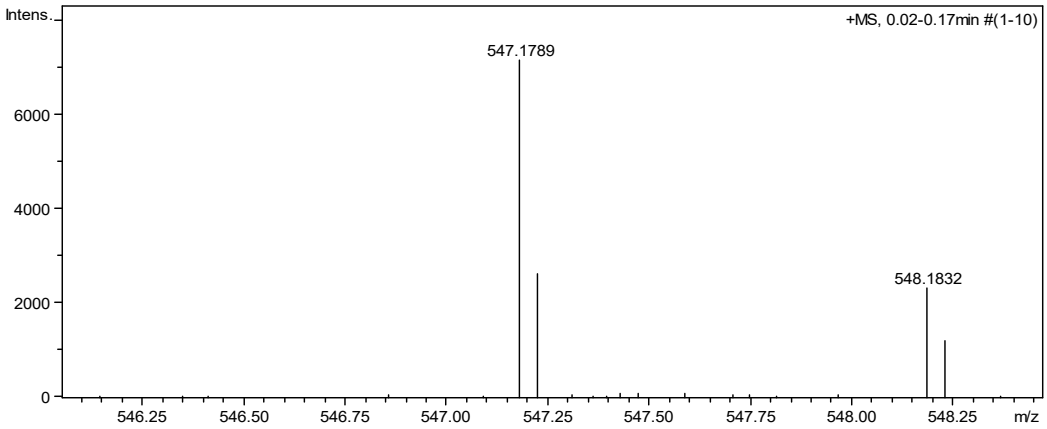



Intens.
x10^5
+MS, 0.05-0.15min #(3-9)
513.2171
514.2203
2.0
1.5
1.0
0.5
0.0
510
512
514
516
518
520
522
524
526
m/z

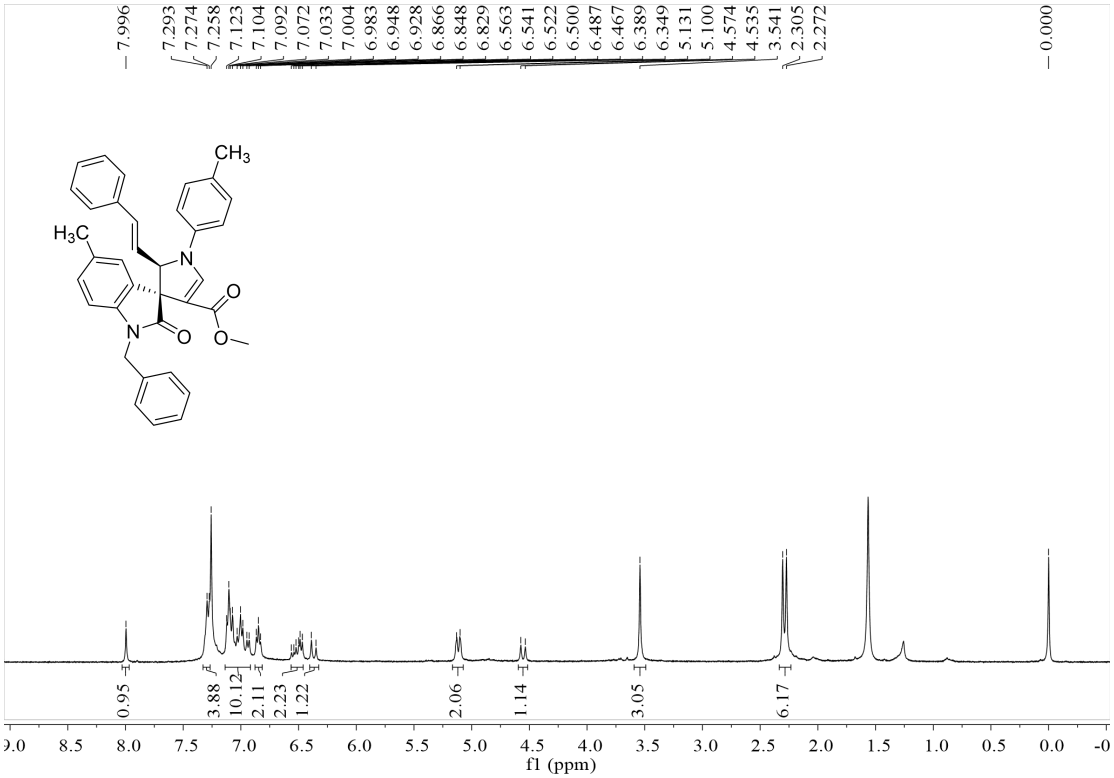
Methyl-*cis*-1-benzyl-5-chloro-2-oxo-1'-phenyl-2'-((*E*)-styryl)-1',2'-dihydrospiro[indoline-3,3'-pyrrole]-4'-carboxylate (6b):

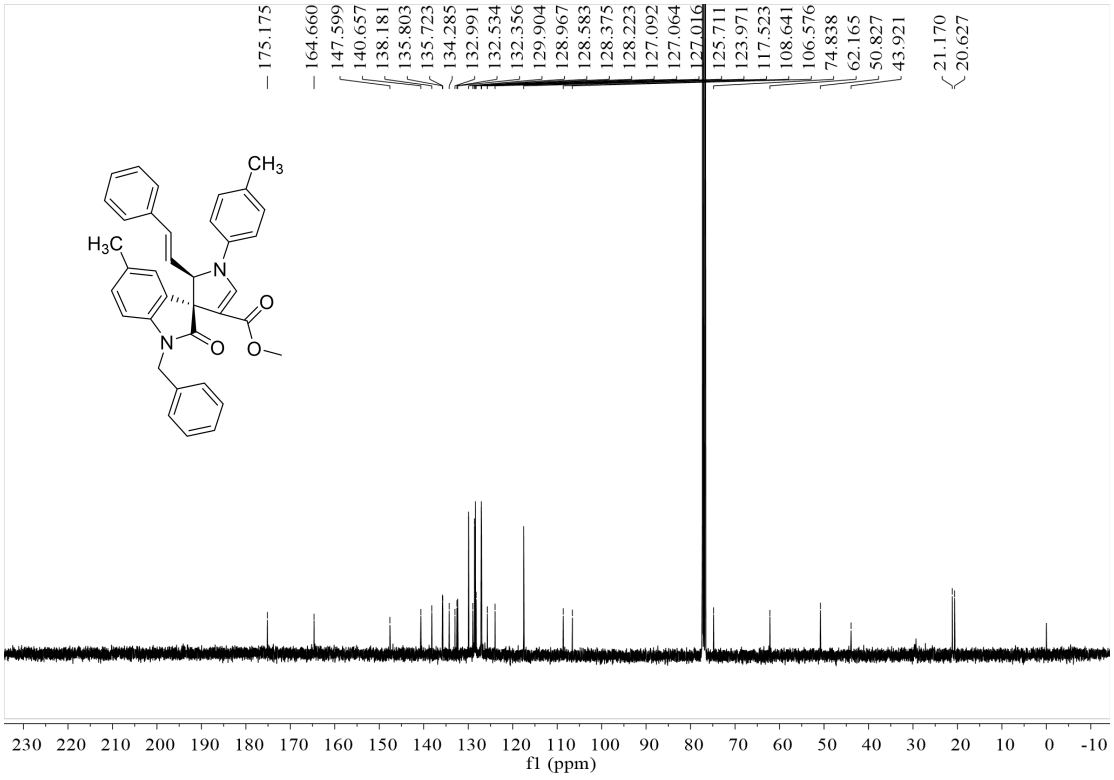


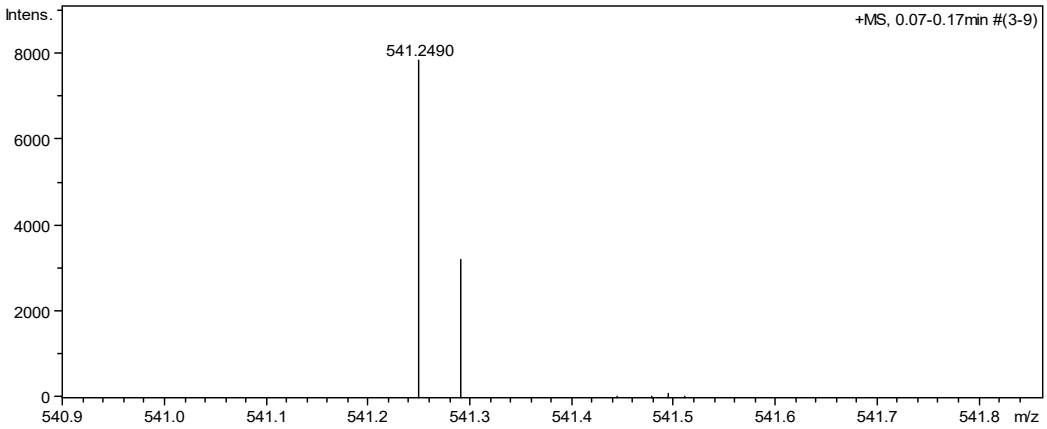



Intens.
+MS, 0.02-0.17min #(1-10)
547.1789
548.1832
6000
4000
2000
0
546.25
546.50
546.75
547.00
547.25
547.50
547.75
548.00
548.25
m/z

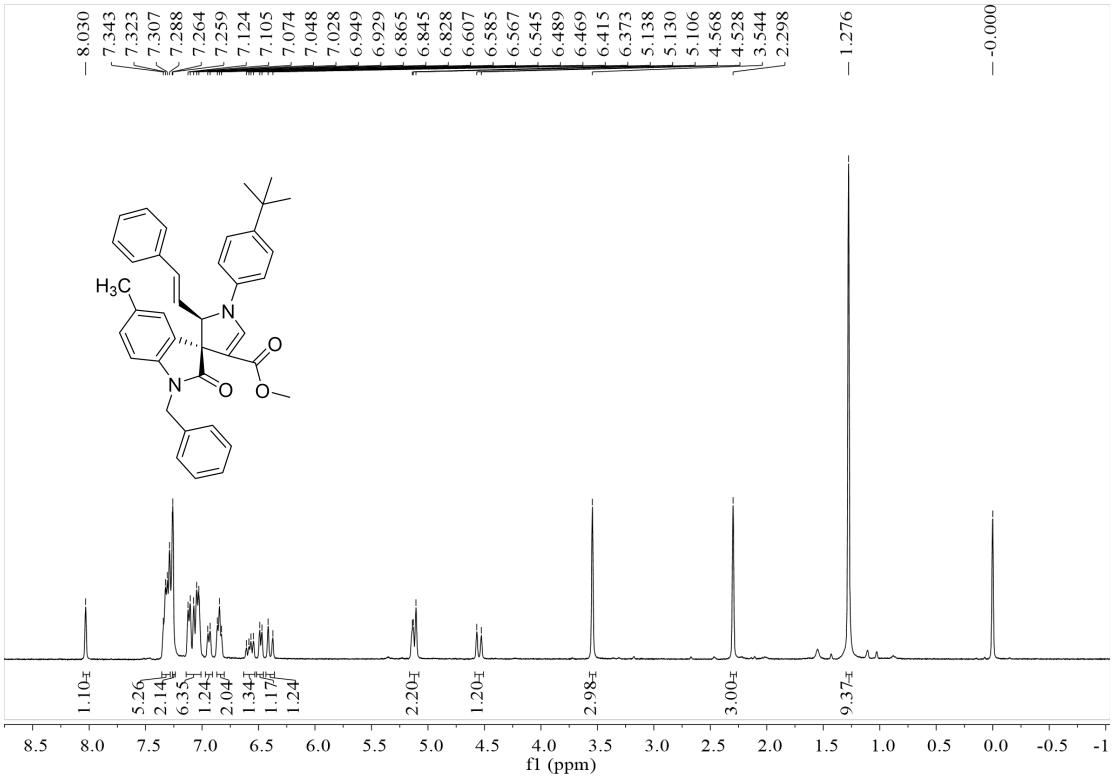
Methyl-*cis*-1-benzyl-5-methyl-2-oxo-2'-((*E*)-styryl)-1'-(*p*-tolyl)-1',2'-dihydrospiro[indoline-3, 3'-pyrrole]-4'-carboxylate (6c):

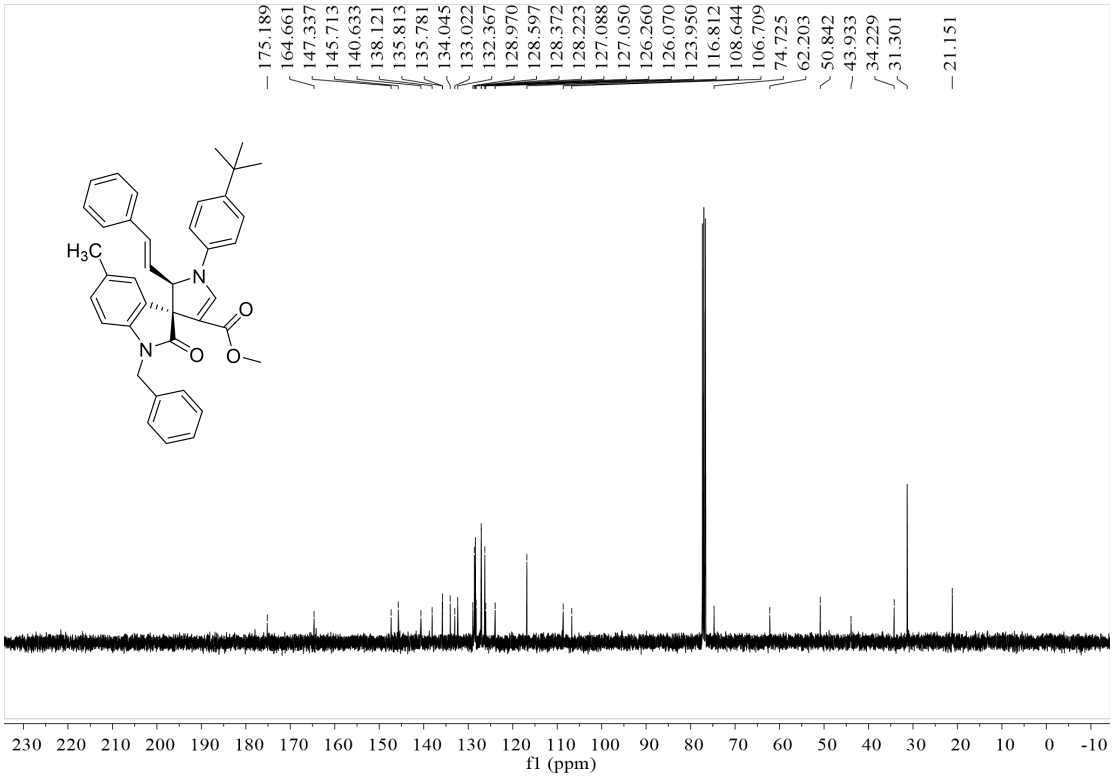


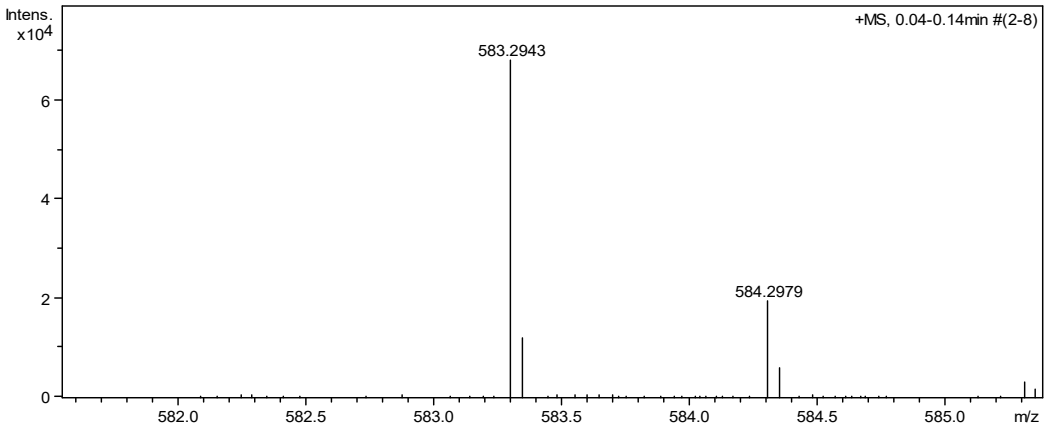



Intens.
+MS, 0.07-0.17min #(3-9)
541.2490
8000
6000
4000
2000
0
540.9
541.0
541.1
541.2
541.3
541.4
541.5
541.6
541.7
541.8
m/z

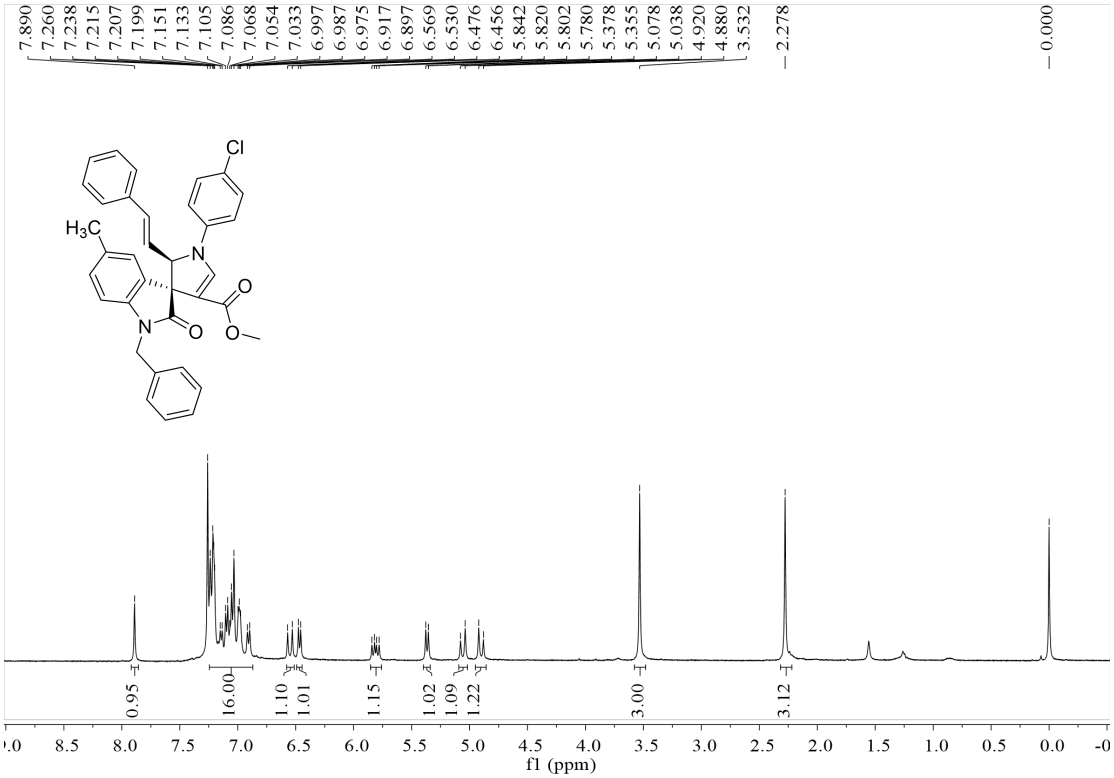
Methyl-*cis*-1-benzyl-1'-(4-(tert-butyl)phenyl)-5-methyl-2-oxo-2'-((*E*)-styryl)-1',2'-dihydrospiro[indoline-3,3'-pyrrole]-4'-carboxylate (6d):

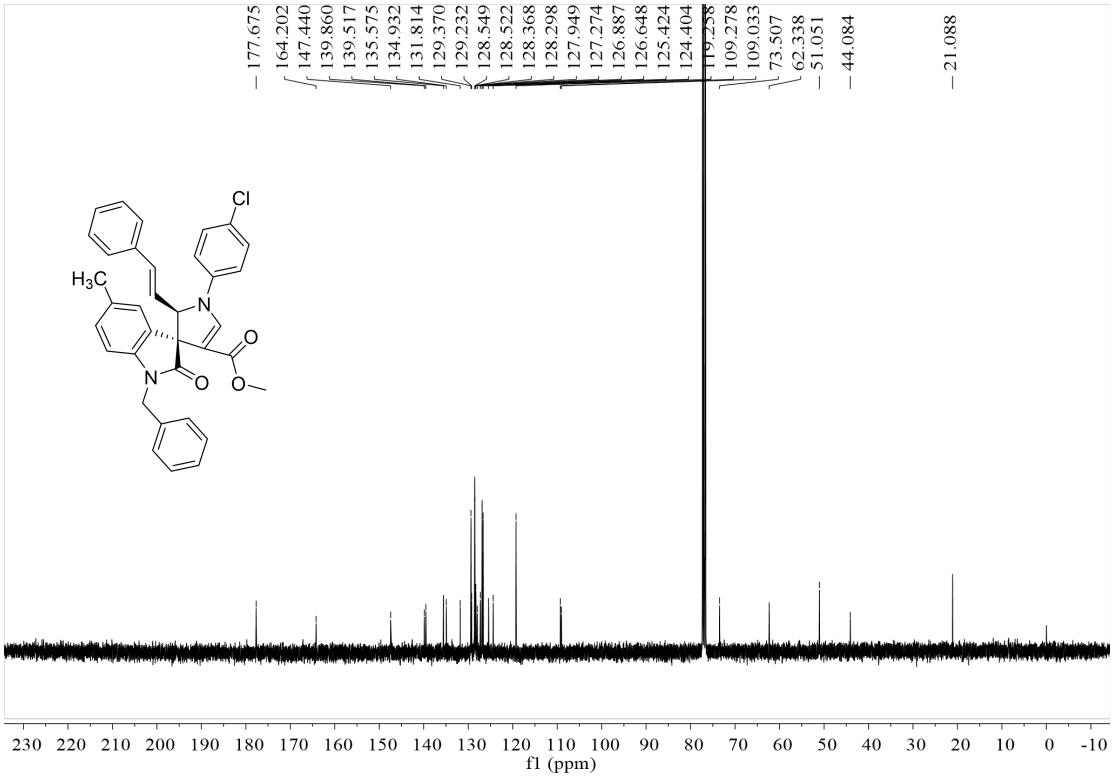


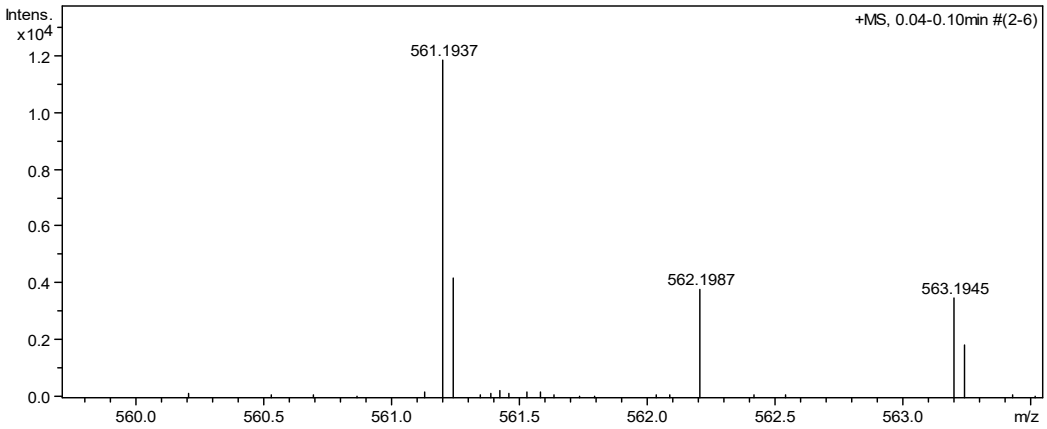



Intens.
x10^4
+MS, 0.04-0.14min #(2-8)
583.2943
584.2979
6
4
2
0
582.0
582.5
583.0
583.5
584.0
584.5
585.0
m/z

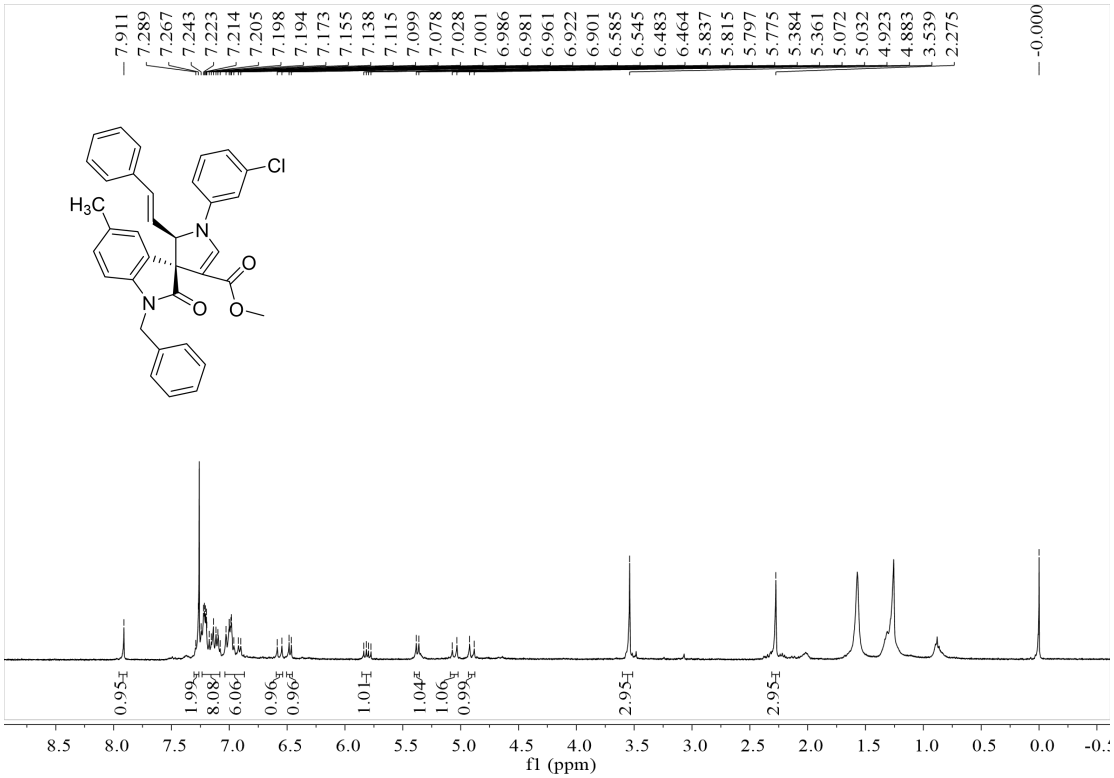
Methyl-*cis*-1-benzyl-1'-(4-chlorophenyl)-5-methyl-2-oxo-2'-((*E*)-styryl)-1',2'-dihydrospiro[indoline-3,3'-pyrr (6e):

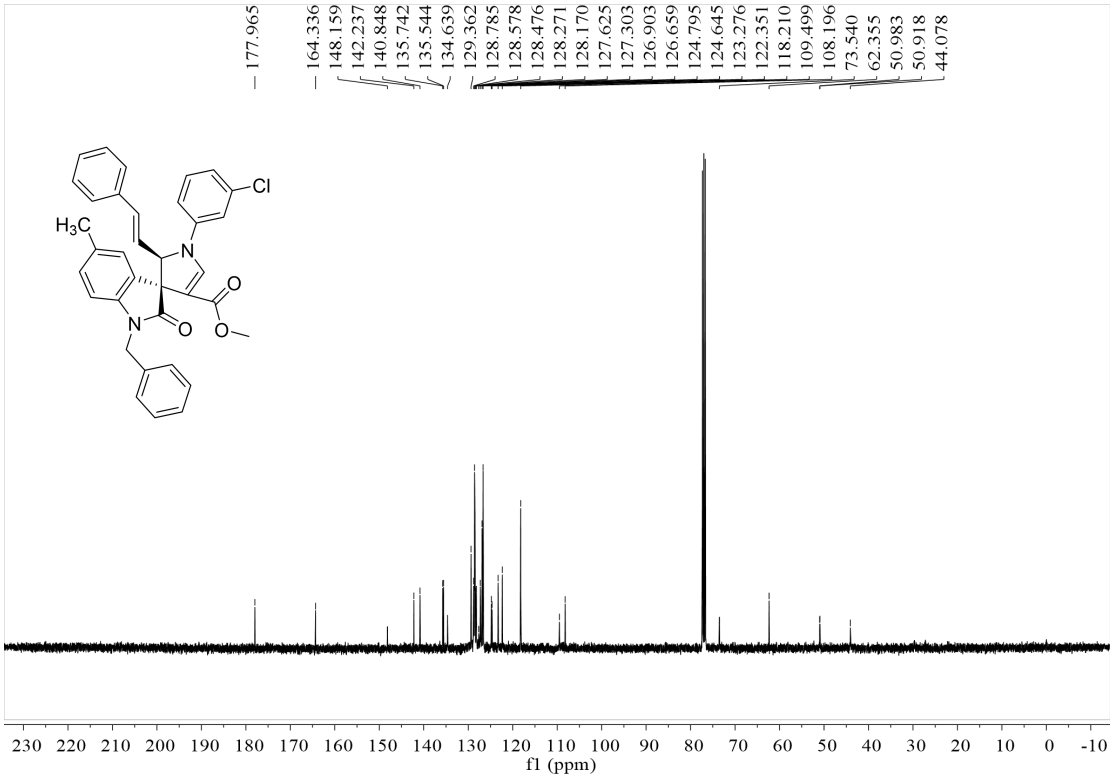


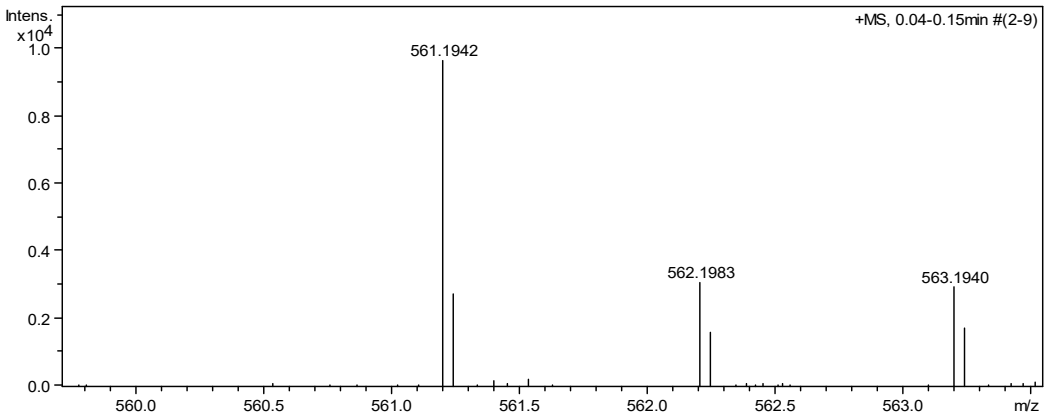



Intens.
x10^4
+MS, 0.04-0.10min #(2-6)
561.1937
562.1987
563.1945
1.2
1.0
0.8
0.6
0.4
0.2
0.0
560.0
560.5
561.0
561.5
562.0
562.5
563.0
m/z

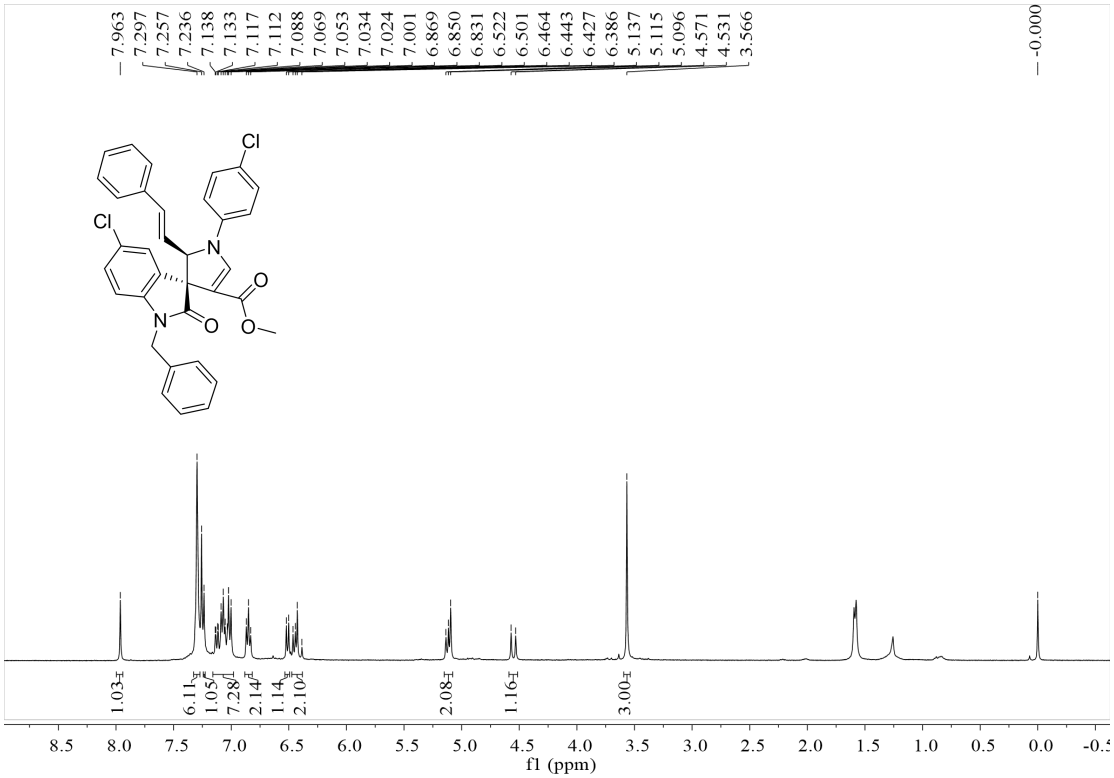
Methyl-*cis*-1-benzyl-1'-(3-chlorophenyl)-5-methyl-2-oxo-2'-((*E*)-styryl)-1',2'-dihydrospiro[indoline-3,3'-pyrrole]-4'-carboxylateole]-4'-carboxylate (6f):

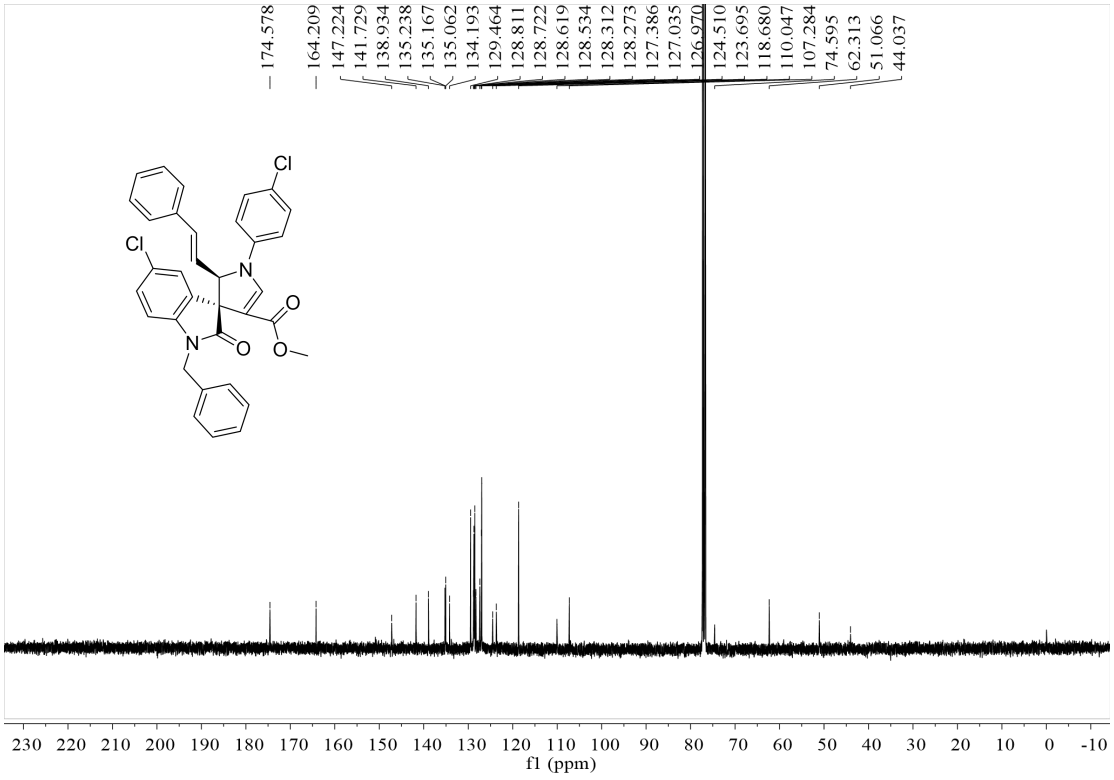


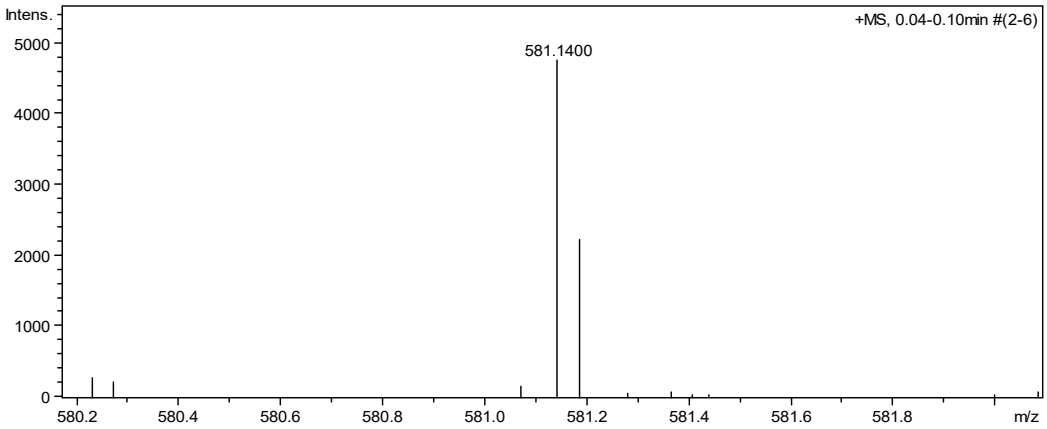



Intens.
x10^4
1.0
0.8
0.6
0.4
0.2
0.0
+MS, 0.04-0.15min #(2-9)
561.1942
562.1983
563.1940
560.0
560.5
561.0
561.5
562.0
562.5
563.0
m/z

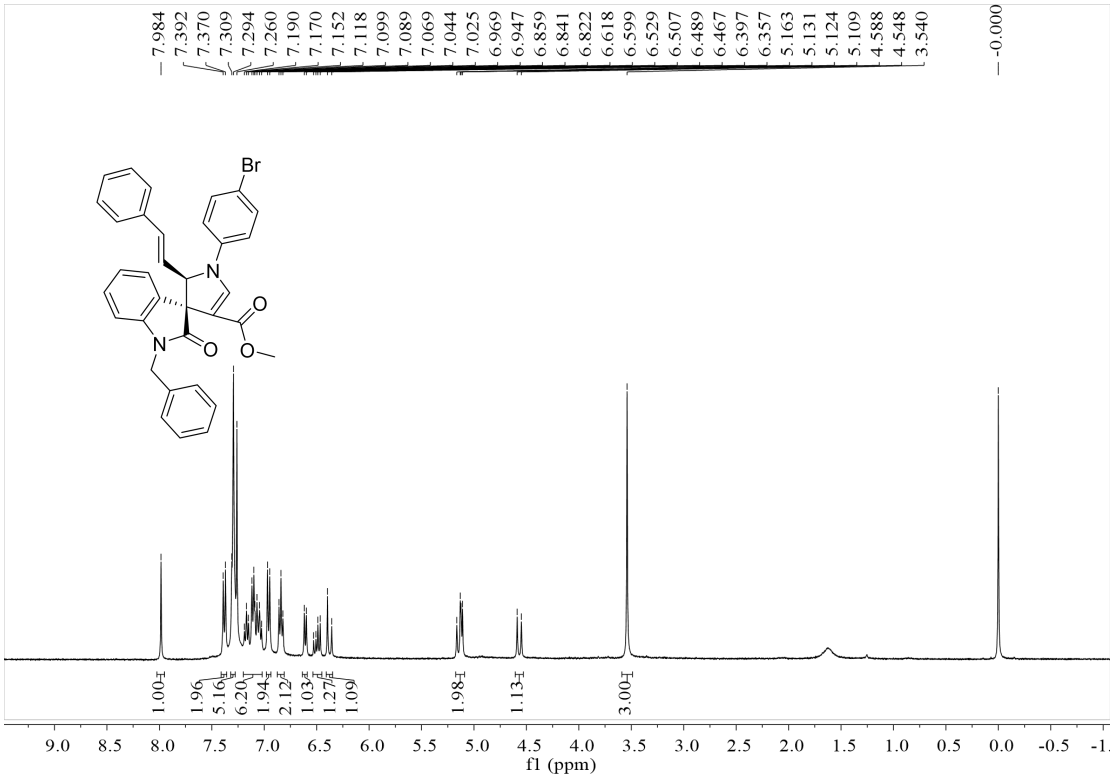
Methyl-*cis*-1-benzyl-5-chloro-1'-(4-chlorophenyl)-2-oxo-2'-((*E*)-styryl)-1',2'-dihydrospiro[indoline-3,3'-pyrrole]-4'-carboxylate (6g):

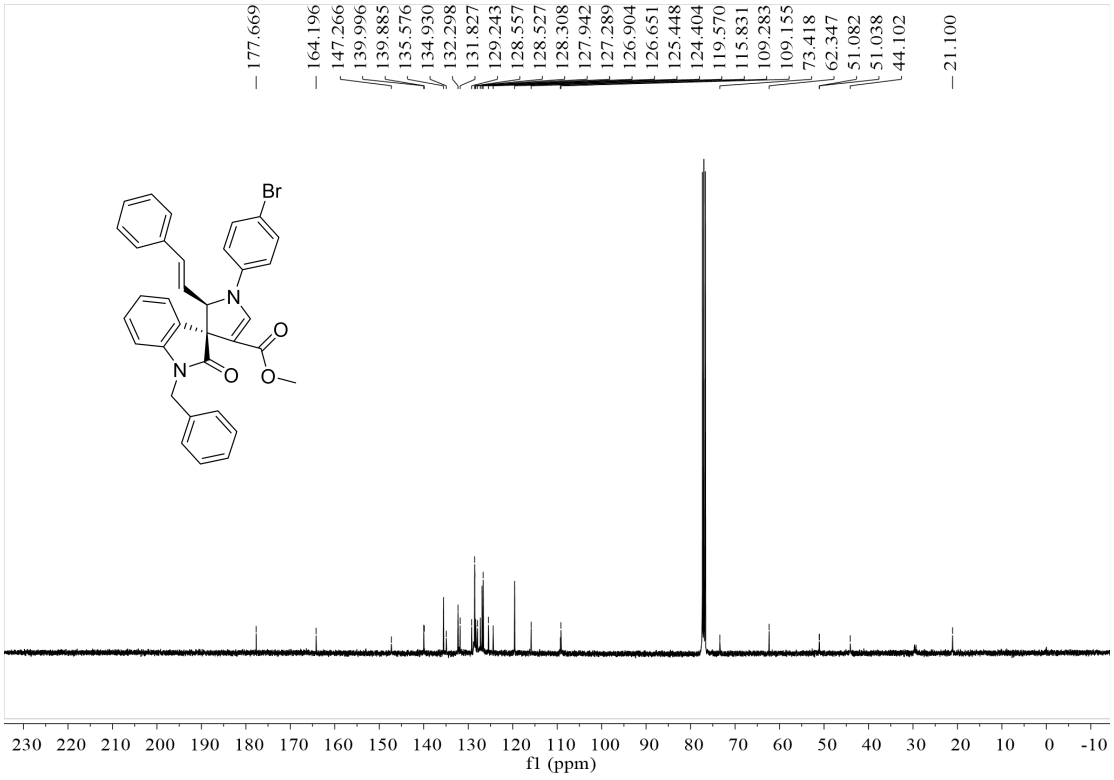


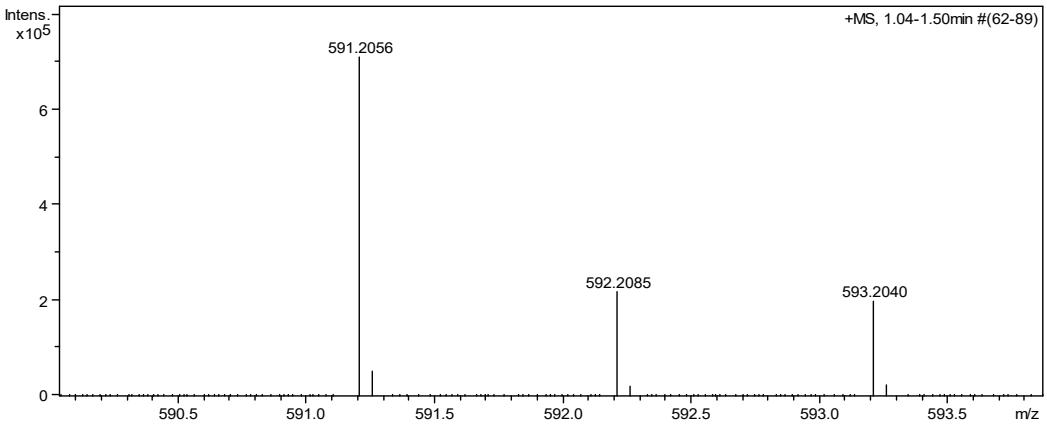



Intens.
+MS, 0.04-0.10min #(2-6)
581.1400
5000
4000
3000
2000
1000
0
580.2
580.4
580.6
580.8
581.0
581.2
581.4
581.6
581.8
m/z

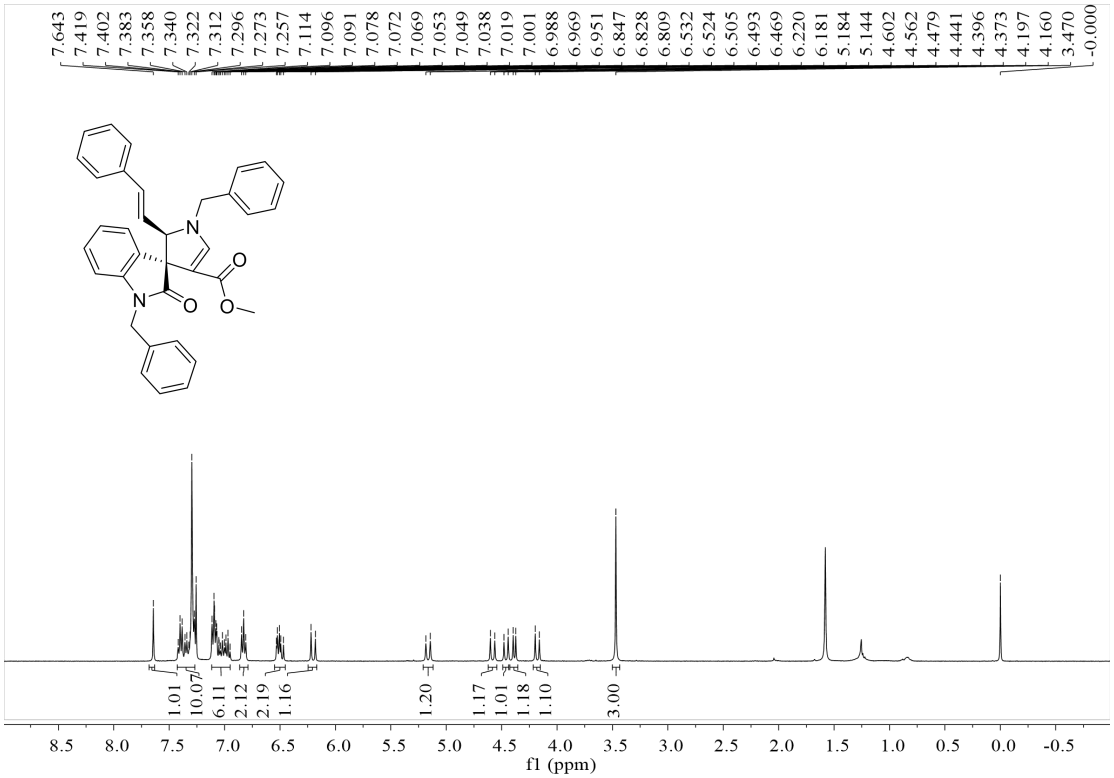
Methyl-*cis*-1-benzyl-1'-(4-bromophenyl)-2-oxo-2'-((*E*)-styryl)-1',2'-dihydrospiro[indoline-3,3'-pyrrole]-4'-carboxylate (6h):

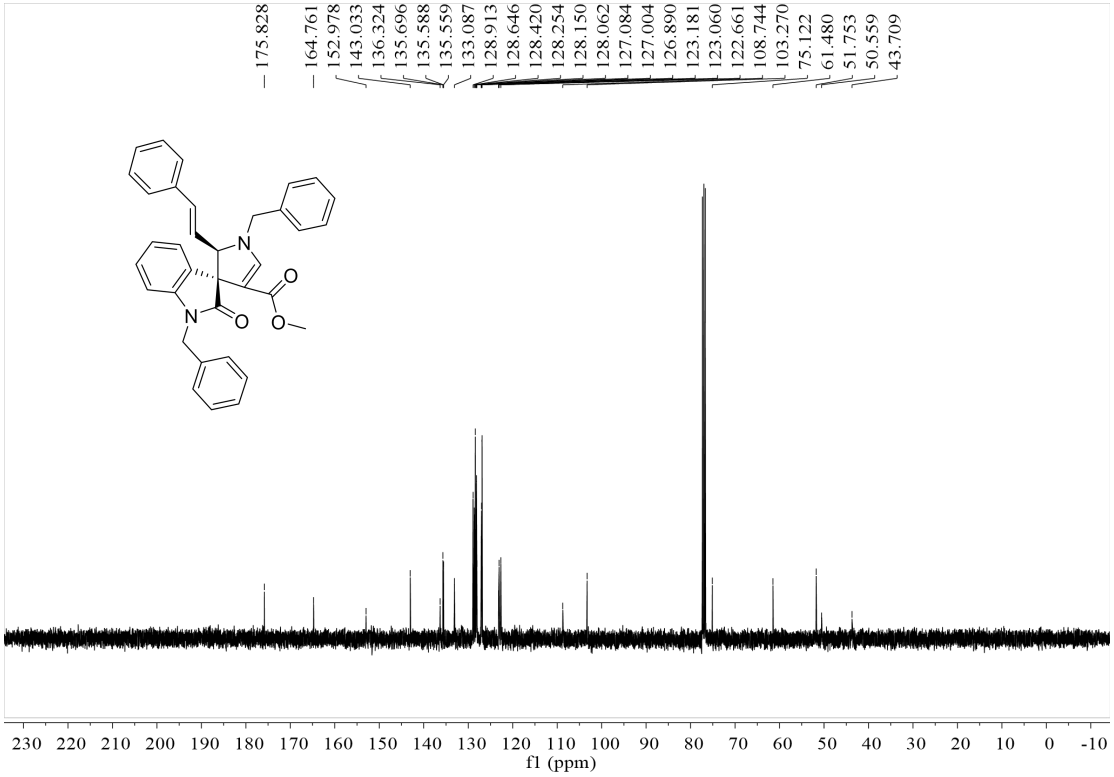


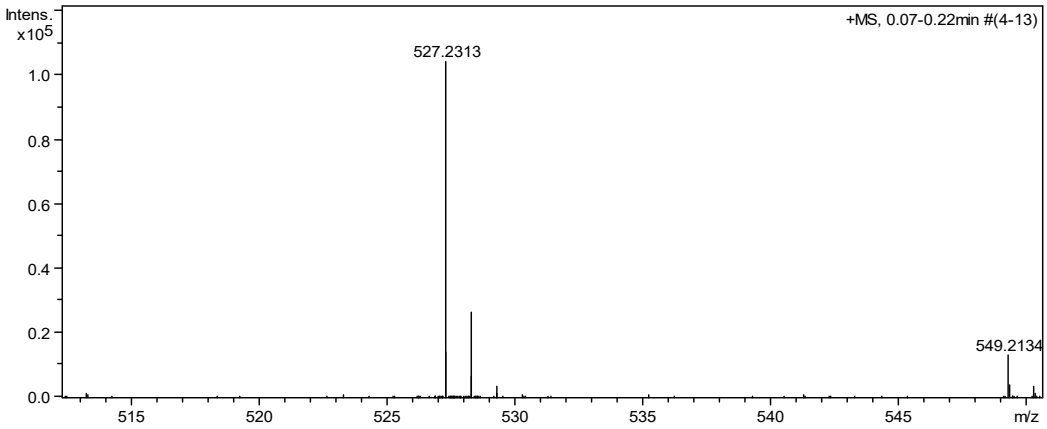



Intens.
x10^5
+MS, 1.04-1.50min #(62-89)
591.2056
592.2085
593.2040
6
4
2
0
590.5
591.0
591.5
592.0
592.5
593.0
593.5
m/z

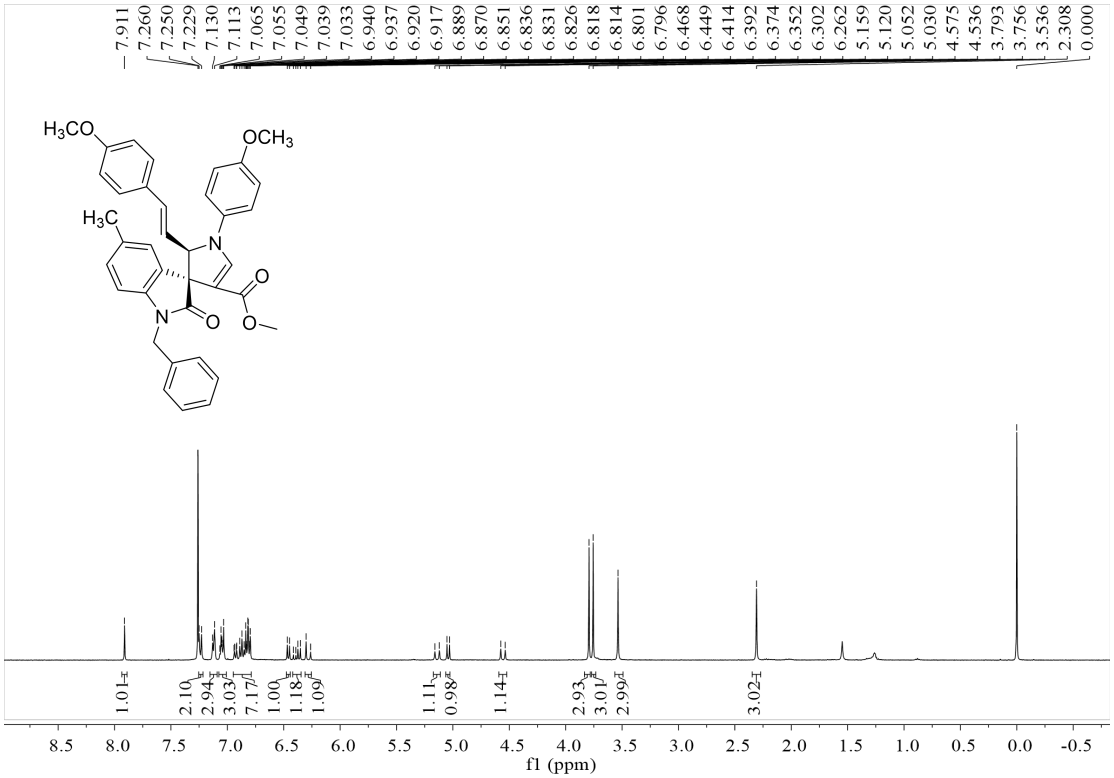
Methyl-*cis*-1,1'-dibenzyl-2-oxo-2'-((*E*)-styryl)-1',2'-dihydrospiro[indoline-3,3'-pyrrole]-4'-carboxylate (6i):

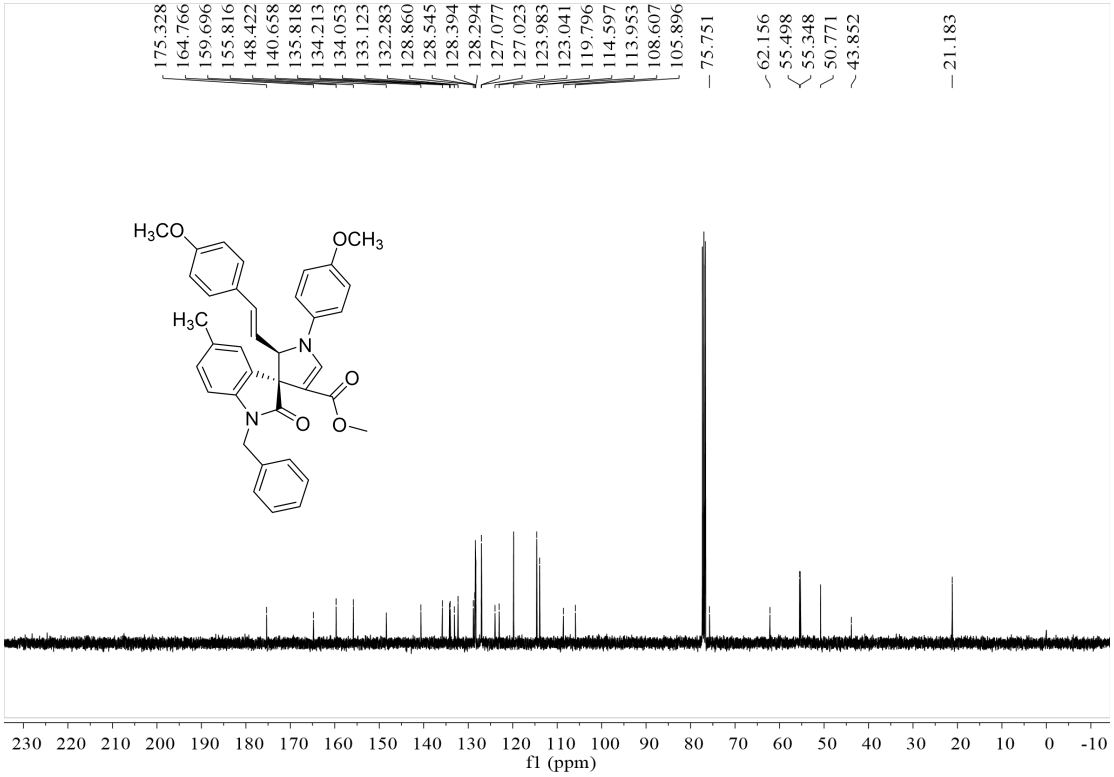


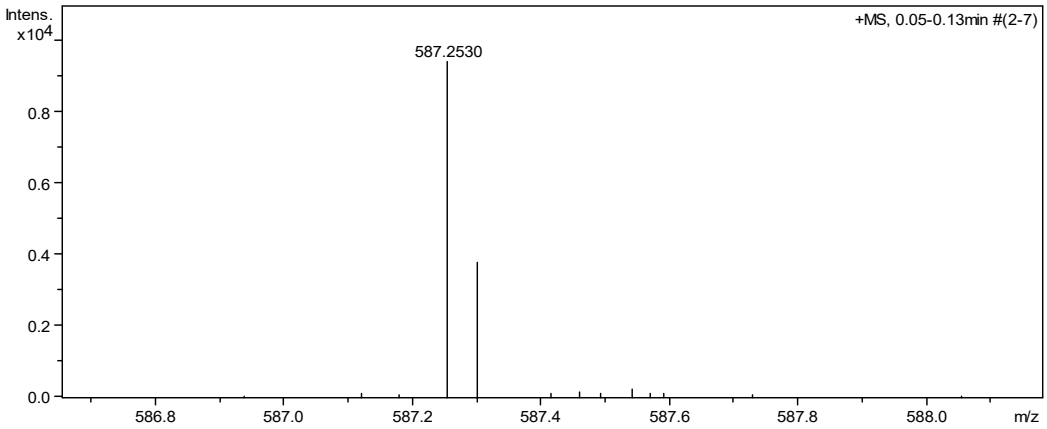



Intens.
x10^5
+MS, 0.07-0.22min #(4-13)
527.2313
549.2134
1.0
0.8
0.6
0.4
0.2
0.0
515
520
525
530
535
540
545
m/z

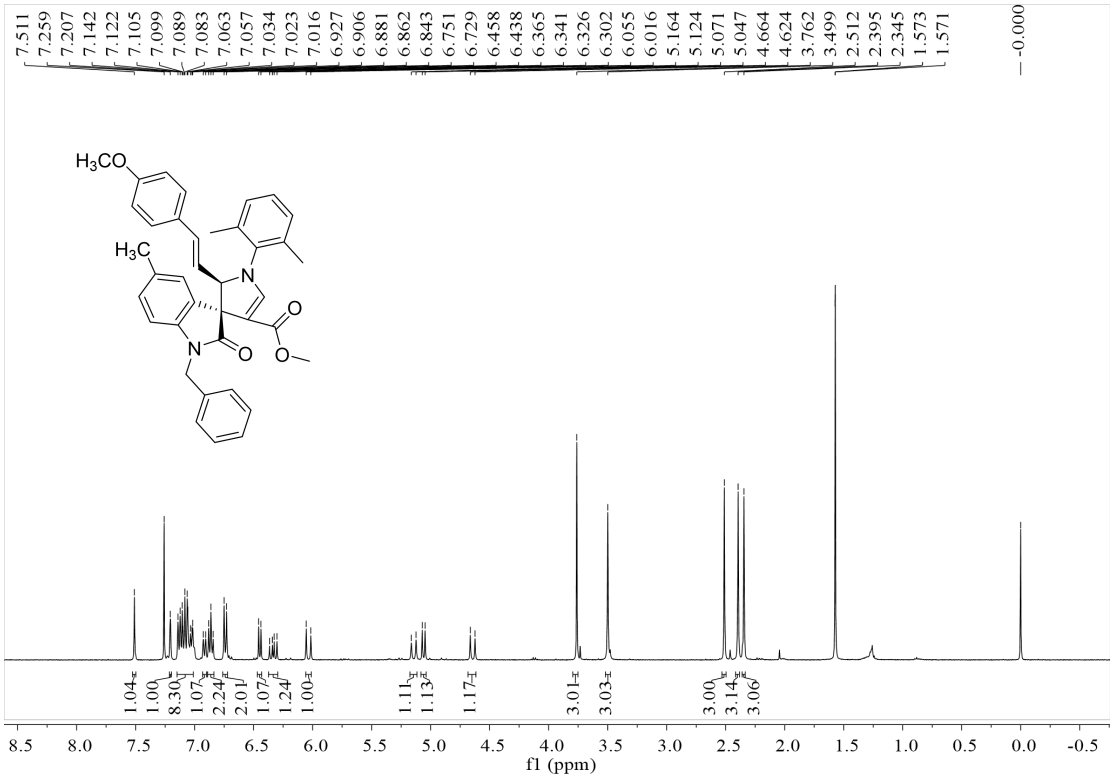
Methyl-*cis*-1-benzyl-1'-(4-methoxyphenyl)-2'-((*E*)-4-methoxystyryl)-5-methyl-2-oxo-1',2'-dihydrospiro[indoline-3,3'-pyrrole]-4'-carboxylate (6j):

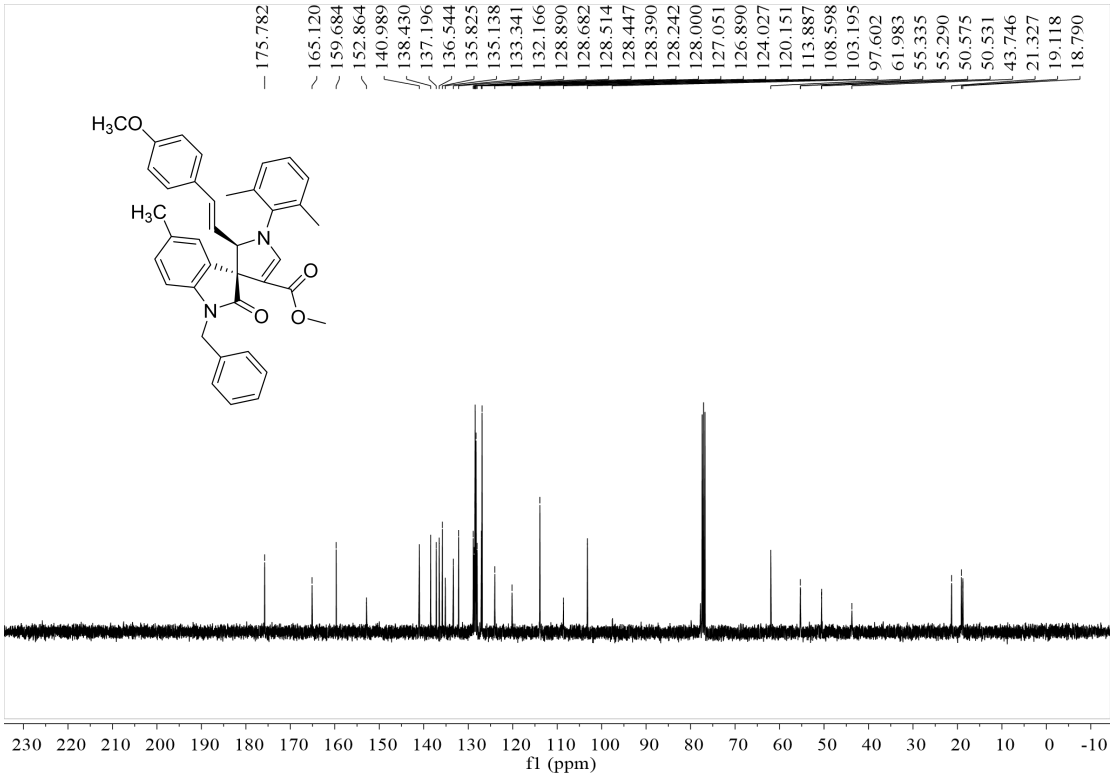


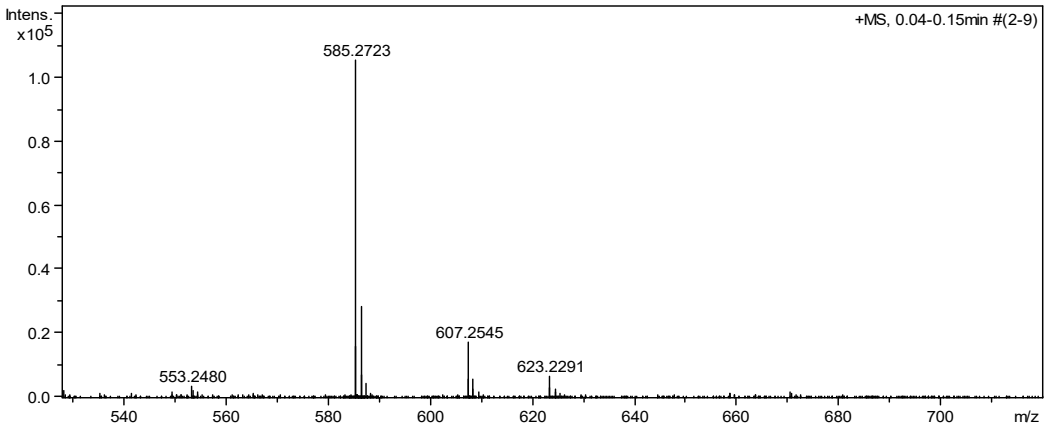



Intens.
x10^4
+MS, 0.05-0.13min #(2-7)
587.2530
0.8
0.6
0.4
0.2
0.0
586.8
587.0
587.2
587.4
587.6
587.8
588.0
m/z

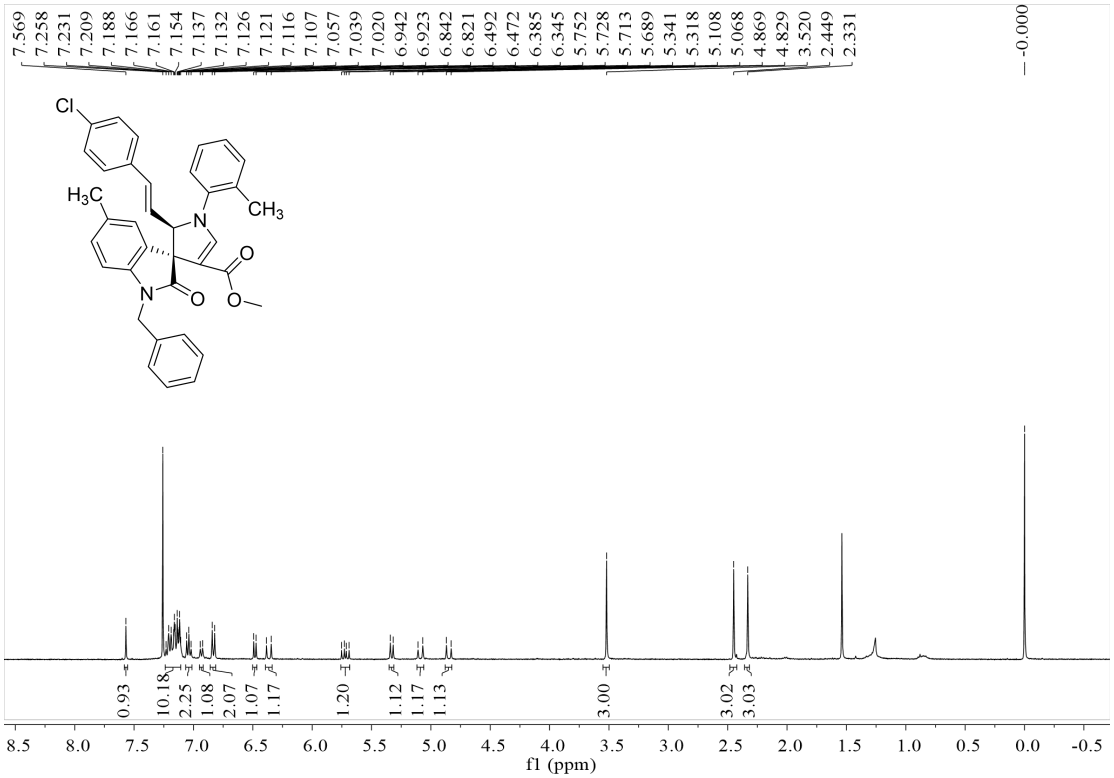
Methyl-*cis*-1-benzyl-1'-(2,6-dimethylphenyl)-2'-((*E*)-4-methoxystyryl)-5-methyl-2-oxo-1',2'-dihydrospiro[indoline-3,3'-pyrrole]-4'-carboxylate (6k):

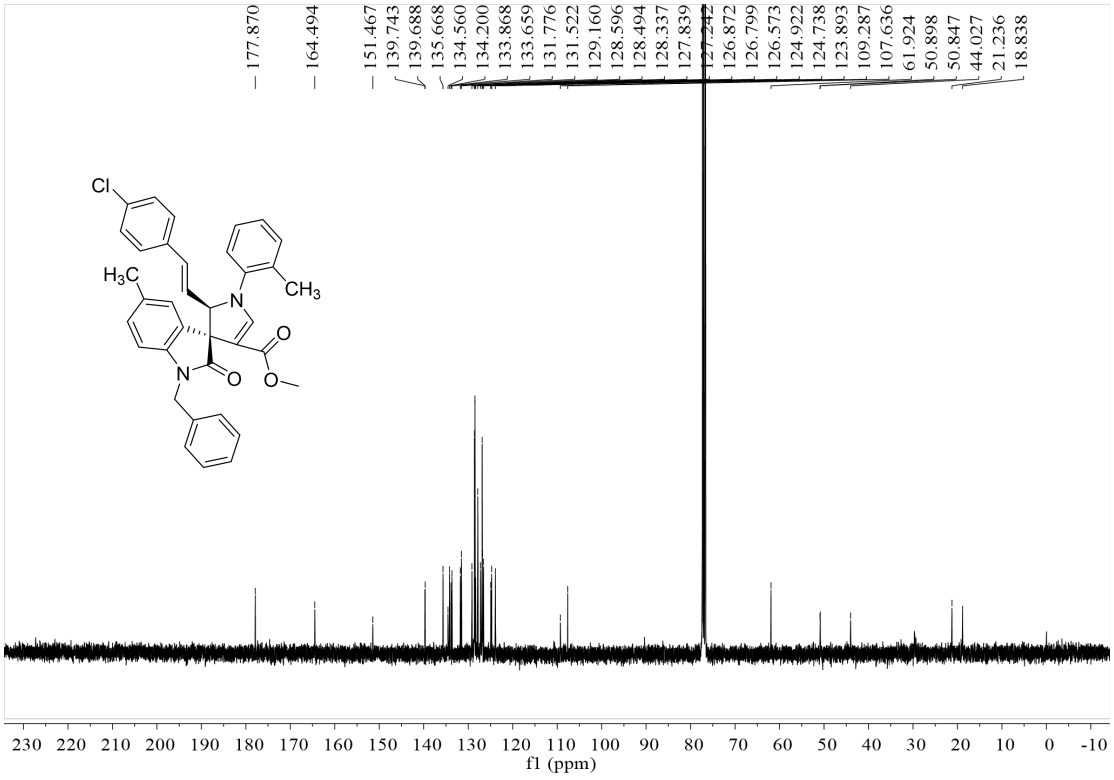


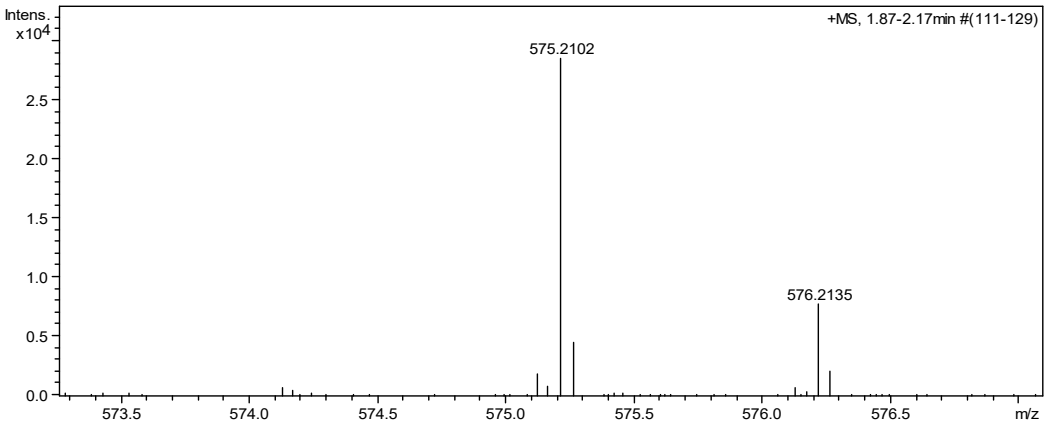



Intens.
x10^5
+MS, 0.04-0.15min #(2-9)
585.2723
607.2545
623.2291
553.2480
1.0
0.8
0.6
0.4
0.2
0.0
540
560
580
600
620
640
660
680
700
m/z

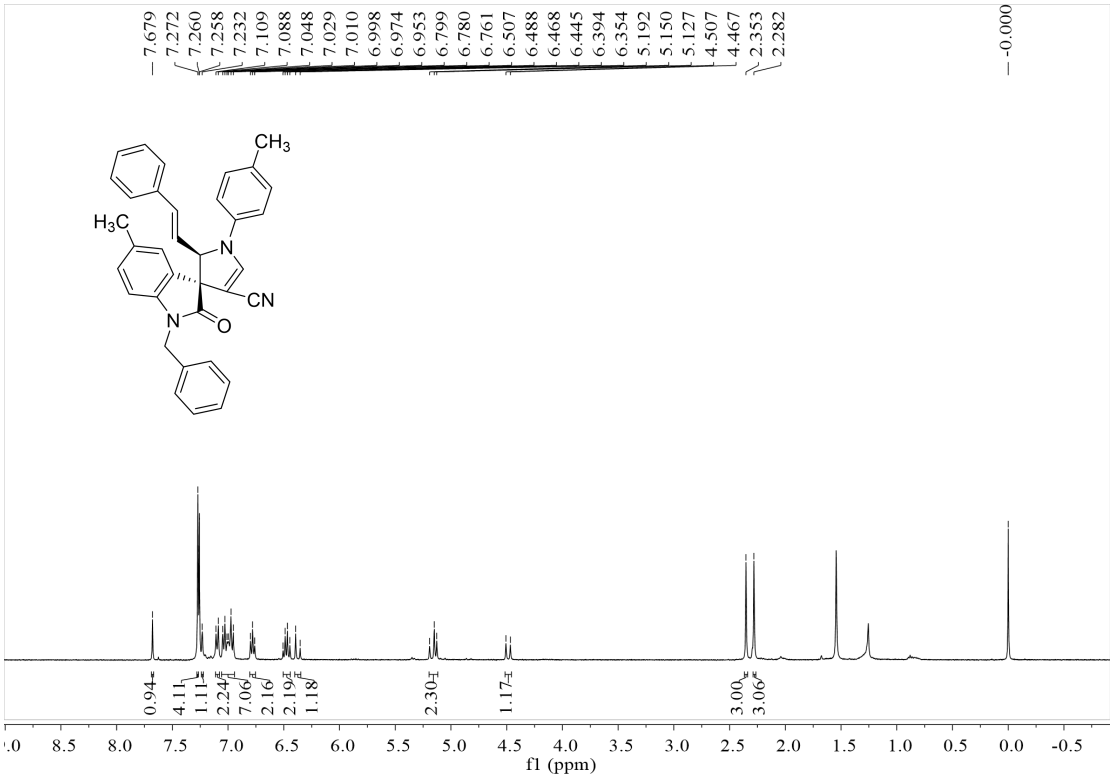
Methyl-*cis*-1-benzyl-2'-((*E*)-4-chlorostyryl)-5-methyl-2-oxo-1'-(*o*-tolyl)-1',2'-dihydrospiro[indoline-3,3'-pyrrole]-4'-carboxylate(6l):

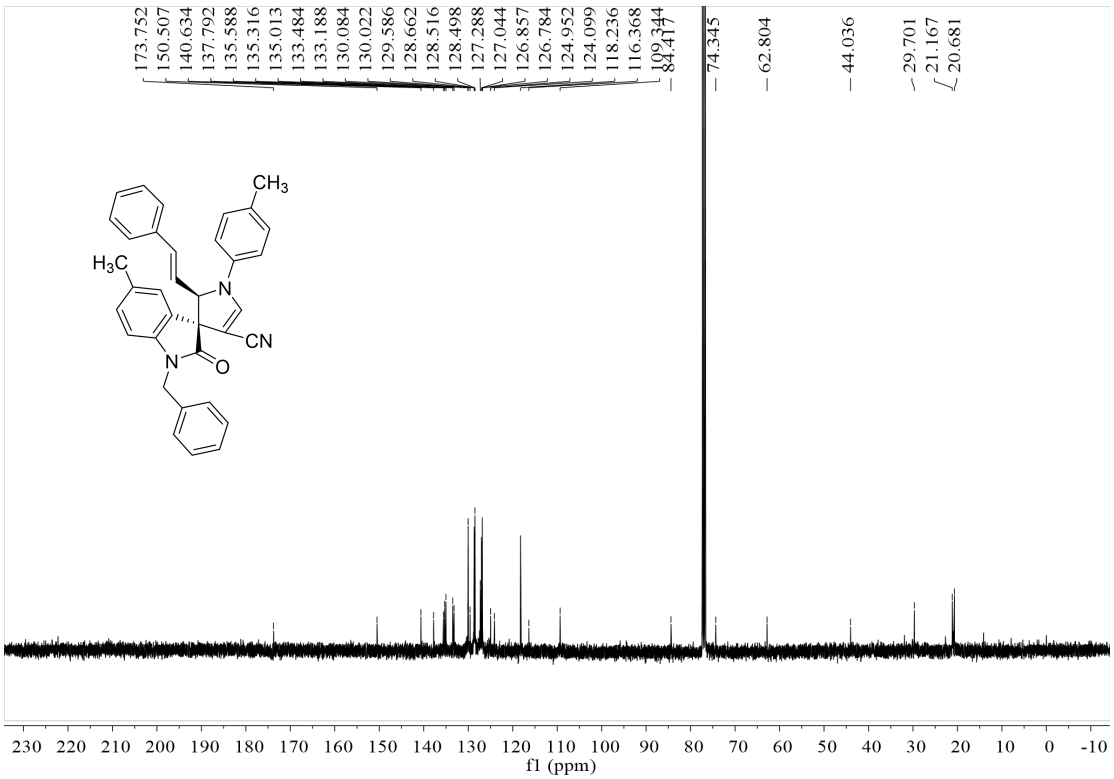


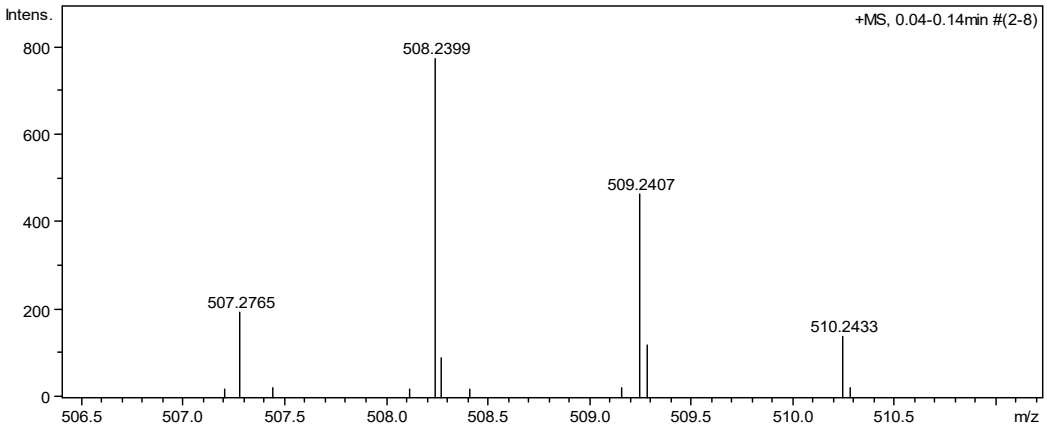



Intens.
x10^4
+MS, 1.87-2.17min #(111-129)
575.2102
576.2135
2.5
2.0
1.5
1.0
0.5
0.0
573.5
574.0
574.5
575.0
575.5
576.0
576.5
m/z

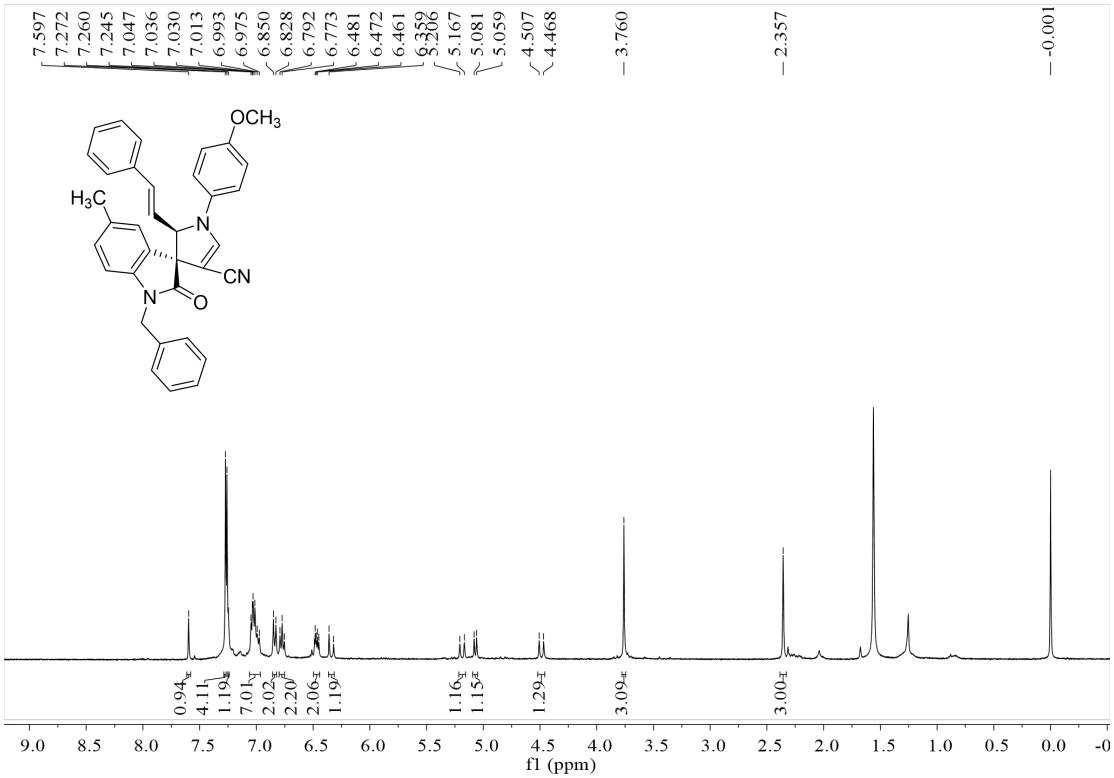
***cis*-1-benzyl-5-methyl-2-oxo-2'-((*E*)-styryl)-1'-(*p*-tolyl)-1',2'-dihydrospiro[indoline-3,3'-pyrrole]-4'-carbonitrile(6m):**

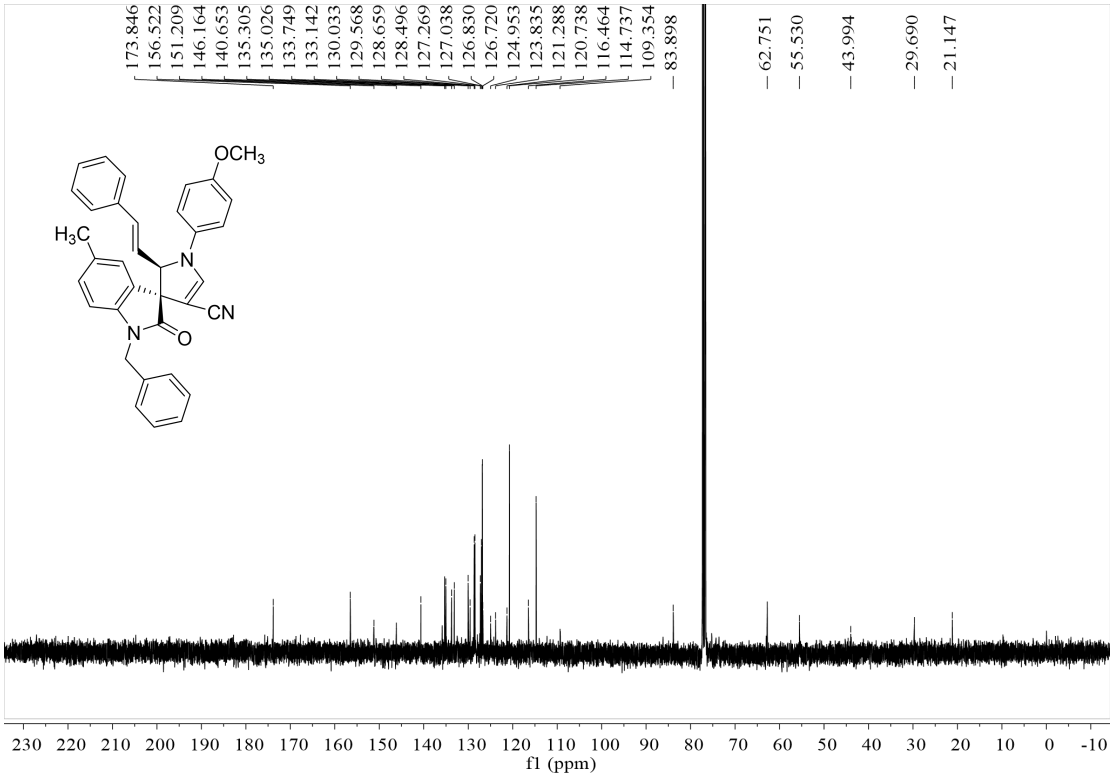


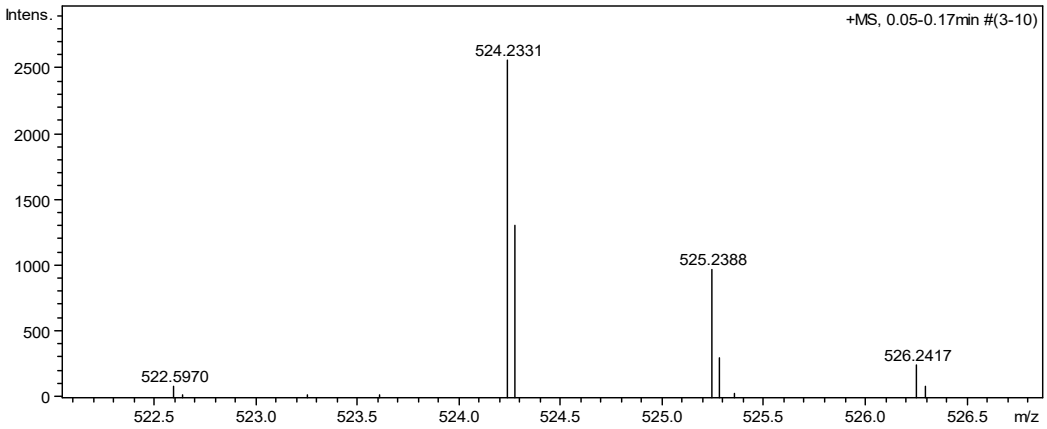



Intens.
+MS, 0.04-0.14min #(2-8)
800
600
400
200
0
508.2399
509.2407
507.2765
510.2433
506.5
507.0
507.5
508.0
508.5
509.0
509.5
510.0
510.5
m/z

***cis*-1-benzyl-1'-(4-methoxyphenyl)-5-methyl-2-oxo-2'-((*E*)-styryl)-1',2'-dihydrospiro[indoline-3,3'-pyrrole]-4'-carbonitrile (6n):**






Intens.
+MS, 0.05-0.17min #(3-10)
524.2331
525.2388
526.2417
522.5970
2500
2000
1500
1000
500
0
522.5
523.0
523.5
524.0
524.5
525.0
525.5
526.0
526.5
m/z