



Supporting Information

for

Selective construction of dispiro[indoline-3,2'-quinoline-3',3''-indoline] and dispiro[indoline-3,2'-pyrrole-3',3''-indoline] via three-component reaction

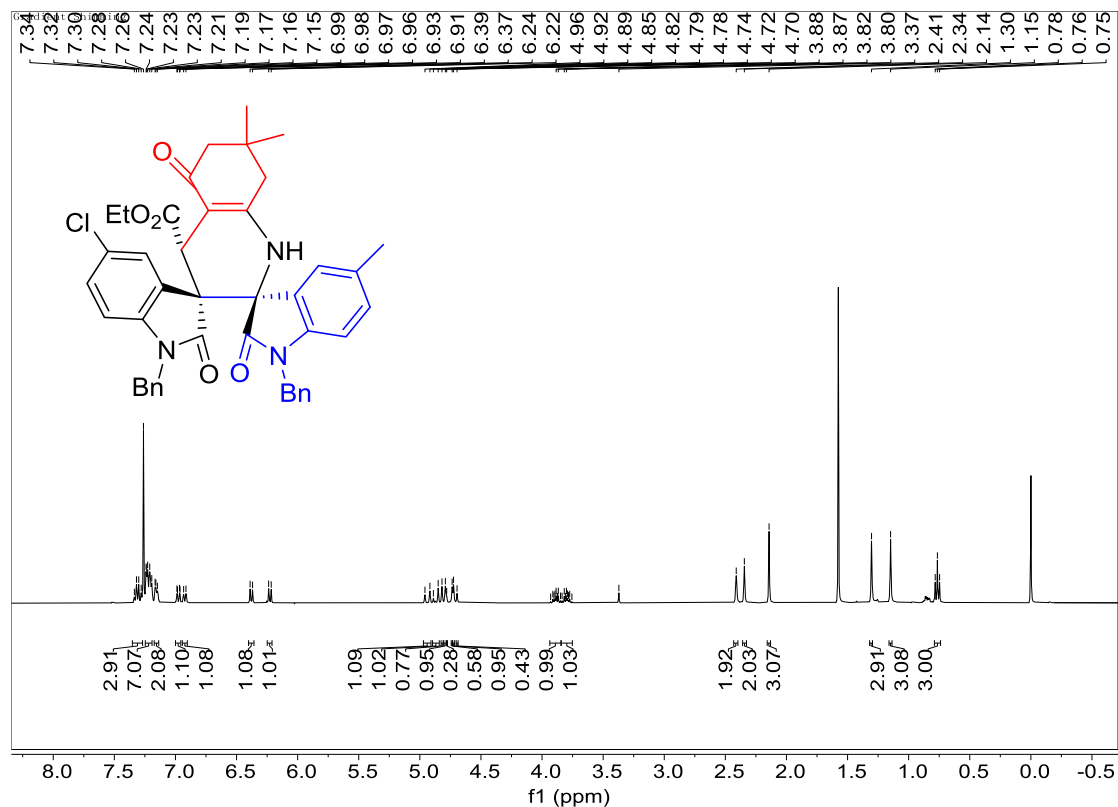
Ziying Xiao, Fengshun Xu, Jing Sun and Chao-Guo Yan

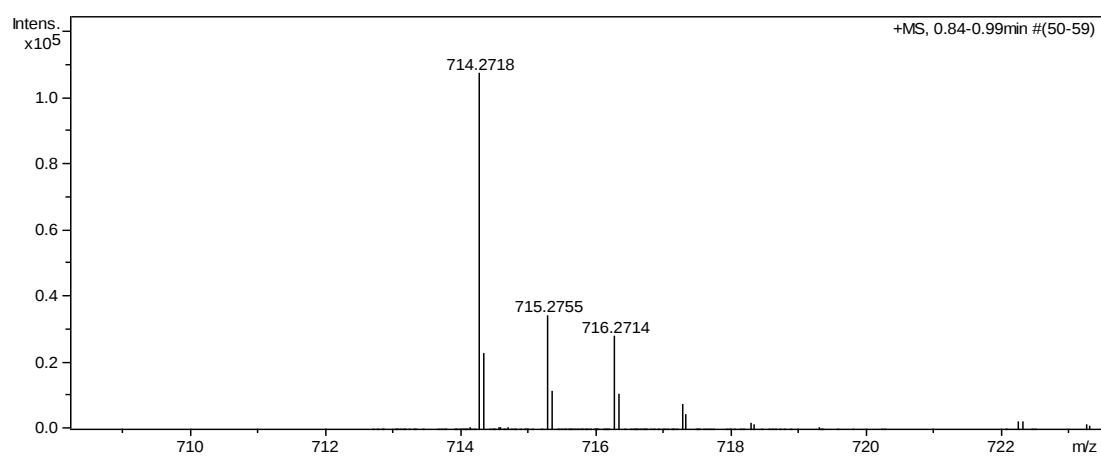
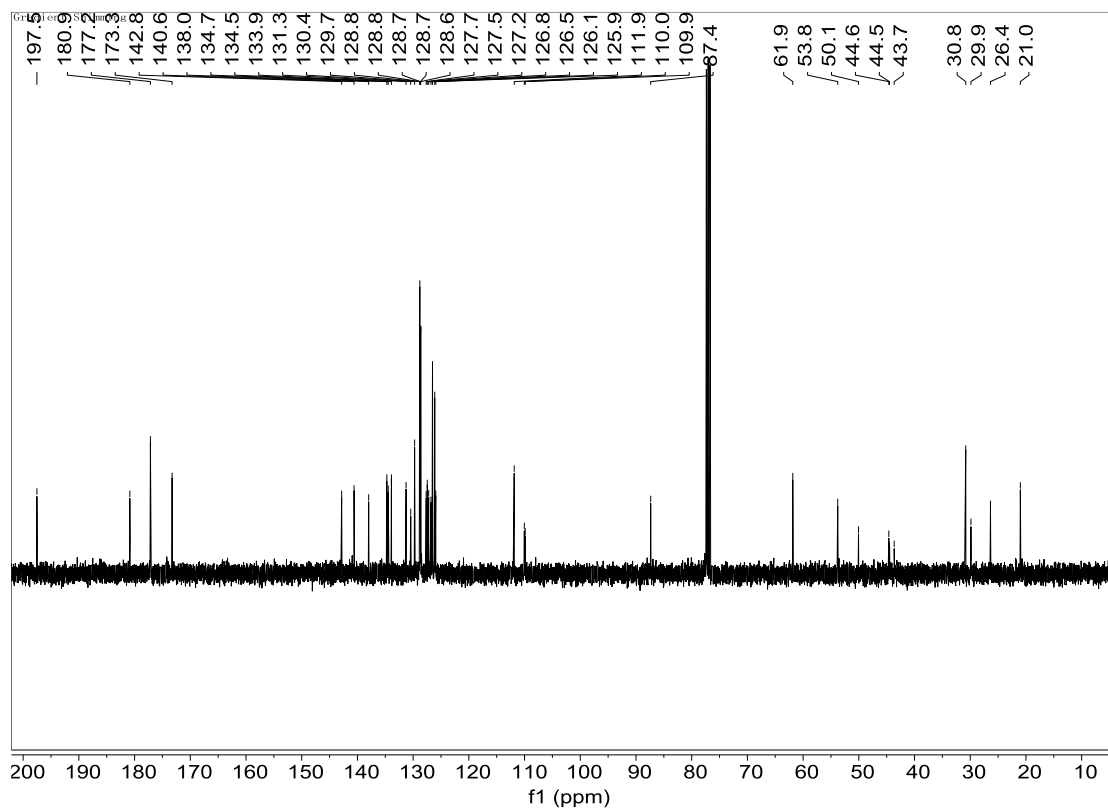
Beilstein J. Org. Chem. **2023**, *19*, 1234–1242. doi:10.3762/bjoc.19.91

Characterization data, ^1H NMR, ^{13}C NMR, and HRMS spectra of the compounds

Ethyl *rel*-(3*R*,3'*S*,4'*R*)-1,1''-dibenzyl-5''-chloro-5,7',7'-trimethyl-2,2'',5'-trioxo-1',4',5',6',7',8'-hexahydrodispiro[indoline-3,2'-quinoline-3',3''-indoline]-4'-carboxylate (**3a**):

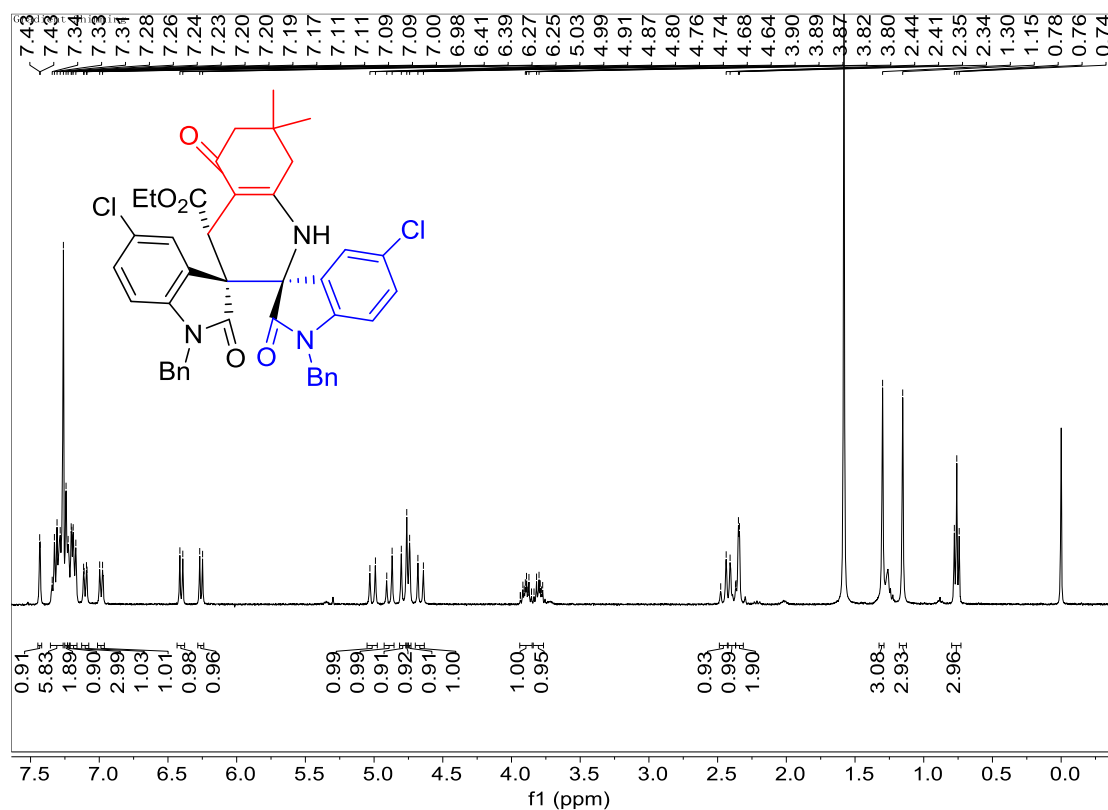
White solid, 85%, m.p. 259-260°C; ¹H NMR (400 MHz, CDCl₃) δ: 7.34 - 7.28 (m, 3H, ArH), 7.24 - 7.19 (m, 7H, ArH), 7.17 - 7.15 (m, 2H, ArH), 6.99 - 6.96 (m, 1H, ArH), 6.92 (d, *J* = 7.6 Hz, 1H, ArH), 6.38 (d, *J* = 8.0 Hz, 1H, ArH), 6.23 (d, *J* = 8.0 Hz, 1H, ArH), 4.94 (d, *J* = 16.0, 1H, CH₂), 4.87 (d, *J* = 15.6 Hz, 1H, CH₂), 4.80 (d, *J* = 15.2 Hz, 1H, CH₂), 4.79 (s, 1H, NH), 4.72 (d, *J* = 16.0 Hz, 1H, CH₂), 4.72 (s, 1H, CH), 3.93 - 3.85 (m, 1H, CH₂), 3.84 - 3.76 (m, 1H, CH₂), 2.41 (s, 2H, CH₂), 2.35 (s, 2H, CH₂), 2.14 (s, 3H, CH₃), 1.30 (s, 3H, CH₃), 1.15 (s, 3H, CH₃), 0.77 (t, *J* = 7.2 Hz, 3H, CH₃) ppm; ¹³C NMR (400 MHz, CDCl₃) δ: 197.5, 180.8, 177.1, 173.2, 142.8, 140.5, 137.9, 134.7, 134.4, 133.8, 131.2, 130.4, 129.7, 128.7, 128.7, 128.7, 128.6, 128.6, 127.6, 127.4, 127.1, 126.7, 126.5, 126.1, 125.9, 111.8, 110.0, 109.8, 87.3, 61.8, 53.7, 50.0, 44.6, 44.4, 43.6, 30.8, 29.8, 26.3, 21.0 ppm; IR (KBr) ν: 3526, 3052, 3025, 2997, 2983, 1843, 1765, 1623, 1524, 1422, 1283, 1246, 1055, 964, 841 cm⁻¹; HRMS (ESI-TOF) Calcd. for C₄₃H₃₈ClN₃O₅ ([M+H]⁺): 714.2729, Found: 714.2718.

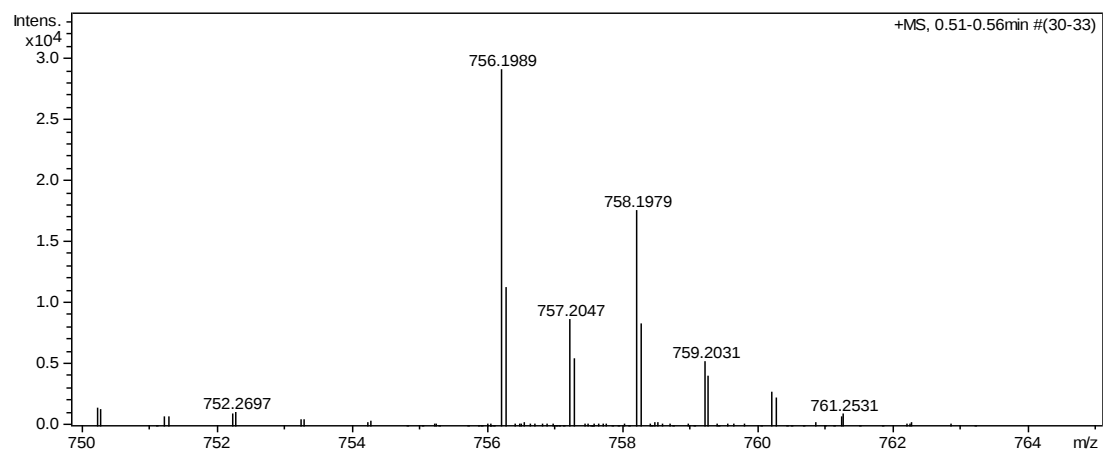
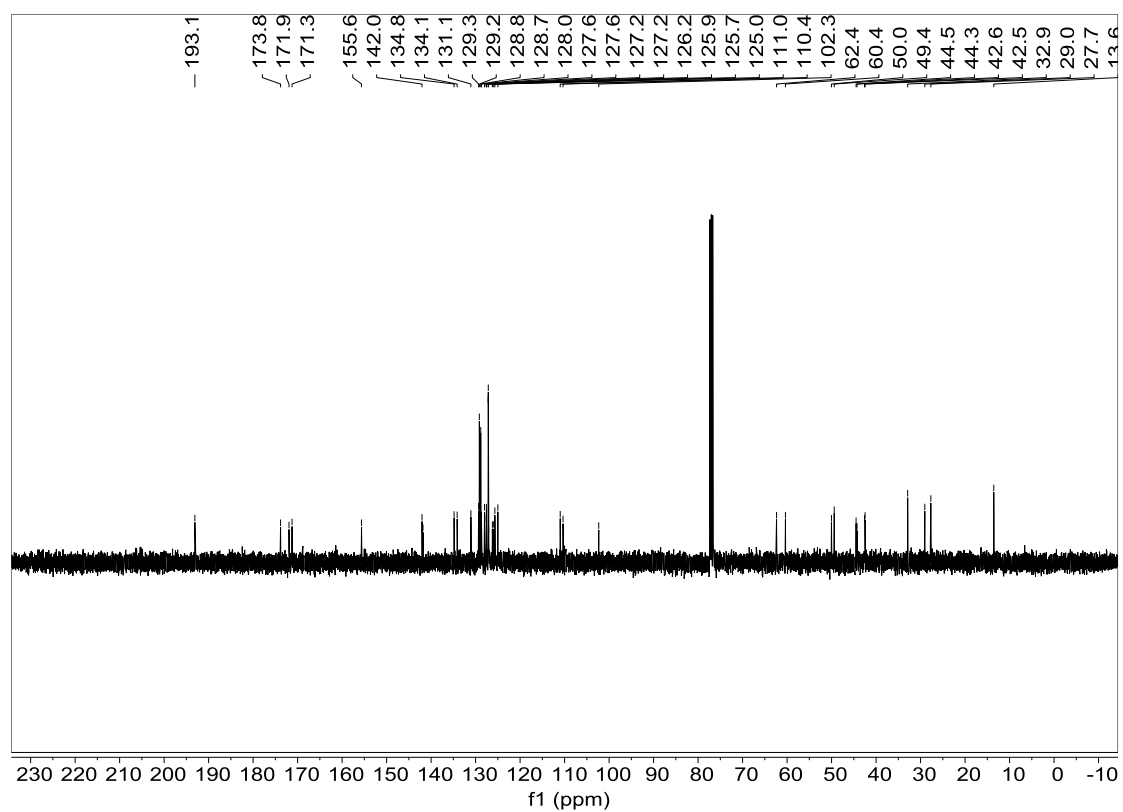




Ethyl *rel*-(3*R*,3'*S*,4'*R*)-1,1''-dibenzyl-5,5''-dichloro-7',7'-dimethyl-2'',5'-trioxo-1',4',5',6',7',8'-hexahydrodispiro[indoline-3,2'-quinoline-3',3''-indoline]-4'-carboxylate (**3b**):

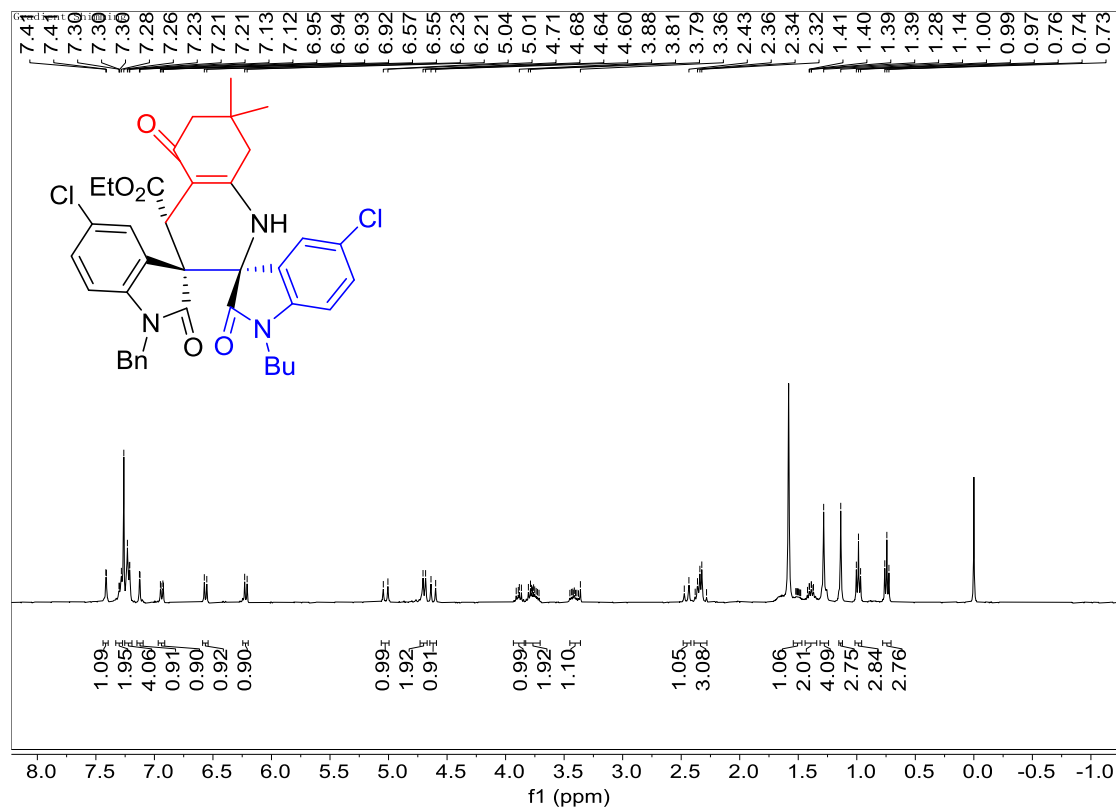
White solid, 78%, m.p. 280–282°C; ¹H NMR (400 MHz, CDCl₃) δ: 7.43 (d, *J* = 2.0 Hz, 1H, ArH), 7.34 - 7.28 (m, 6H, ArH), 7.51 (s, 1H, ArH), 7.24 (s, 2H, ArH), 7.23 (s, 1H, ArH), 7.20 - 7.17 (m, 3H, ArH), 7.11 - 7.09 (m, 1H, ArH), 7.0 - 6.98 (m, 1H, ArH), 6.40 (d, *J* = 8.4 Hz, 1H, ArH), 6.26 (d, *J* = 8.4 Hz, 1H, ArH), 5.01 (d, *J* = 16.4 Hz, 1H, CH₂), 4.89 (d, *J* = 15.6 Hz, 1H, CH₂), 4.78 (d, *J* = 15.6 Hz, 1H, CH₂), 4.76 (s, 1H, NH), 4.74 (s, 1H, CH), 4.66 (d, *J* = 16.4 Hz, 1H, CH₂), 3.94 - 3.87 (m, 1H, CH₂), 3.84 - 3.77 (m, 1H, CH₂), 2.46 (d, *J* = 16.0 Hz, 1H, CH₂), 2.39 (d, *J* = 16.0 Hz, 1H, CH₂), 2.37 - 2.34 (m, 2H, CH₂), 1.30 (s, 3H, CH₃), 1.15 (s, 3H, CH₃), 0.76 (t, *J* = 7.2 Hz, 3H, CH₃) ppm; ¹³C NMR (400 MHz, CDCl₃) δ: 193.0, 173.8, 171.9, 171.2, 155.6, 142.0, 141.8, 134.8, 134.1, 131.0, 129.3, 129.1, 128.8, 128.7, 128.6, 127.9, 127.5, 127.5, 127.1, 127.1, 127.0, 126.2, 125.9, 125.6, 124.9, 110.9, 110.3, 102.3, 62.3, 60.3, 50.0, 49.4, 44.4, 44.2, 42.5, 42.4, 32.9, 29.0, 27.6, 13.5 ppm; IR (KBr) ν: 3504, 3024, 3010, 2995, 2985, 1847, 1711, 1603, 1517, 1400, 1299, 1250, 1053, 953, 841 cm⁻¹; HRMS (ESI-TOF) Calcd. for C₄₂H₃₇Cl₂N₃O₅ ([M+Na]⁺): 756.2002, Found: 756.1989.

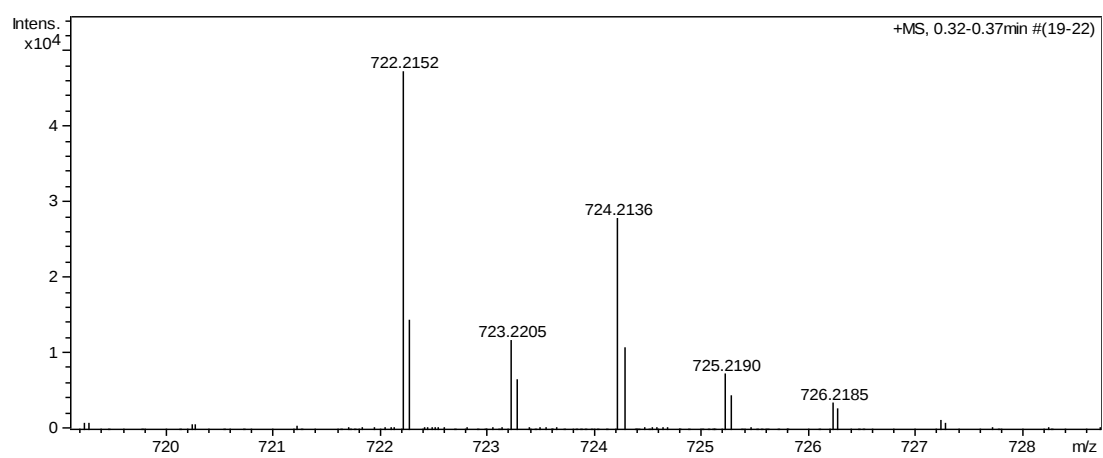
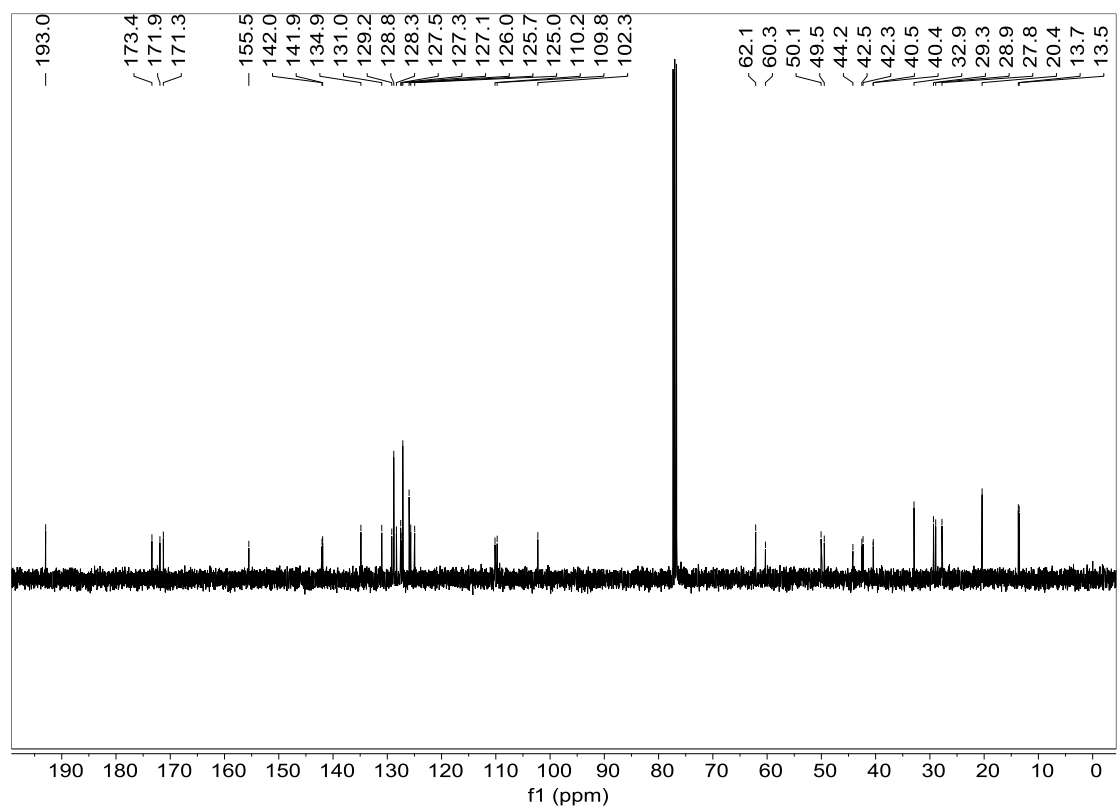




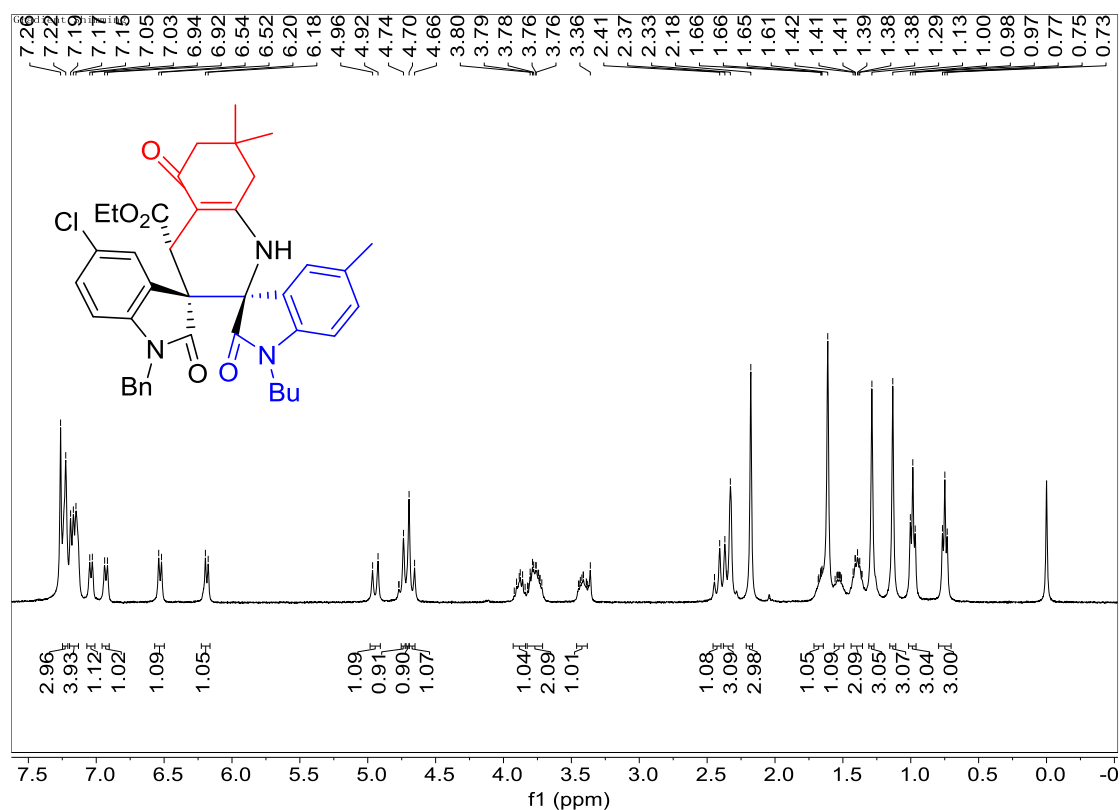
Ethyl *rel*-(3*R*,3'*S*,4'*R*)-1''-benzyl-1-butyl-5,5''-dichloro-7',7'-dimethyl-2,2'',5'-trioxo-1',4',5',6',7',8'-hexahydrodispiro[indoline-3,2'-quinoline-3',3''-indoline]-4'-carboxylate (**3c**):

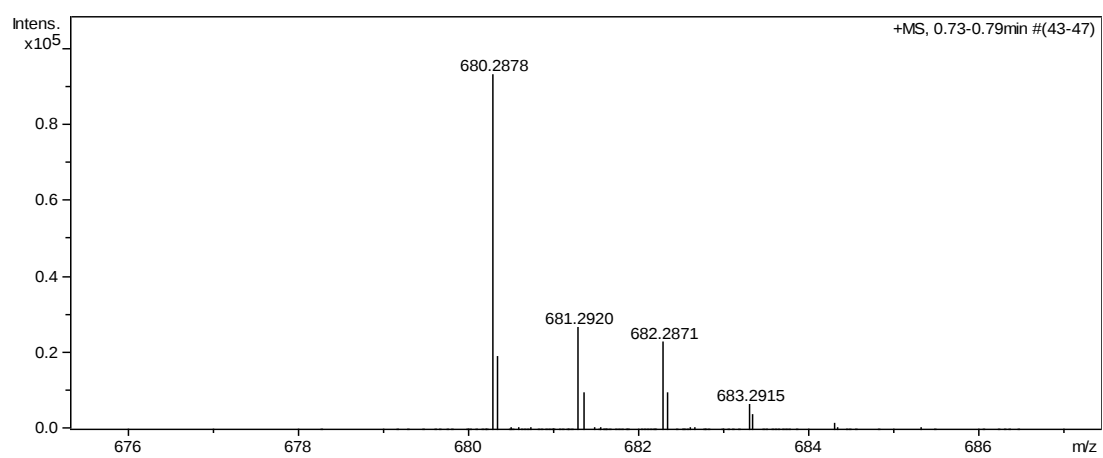
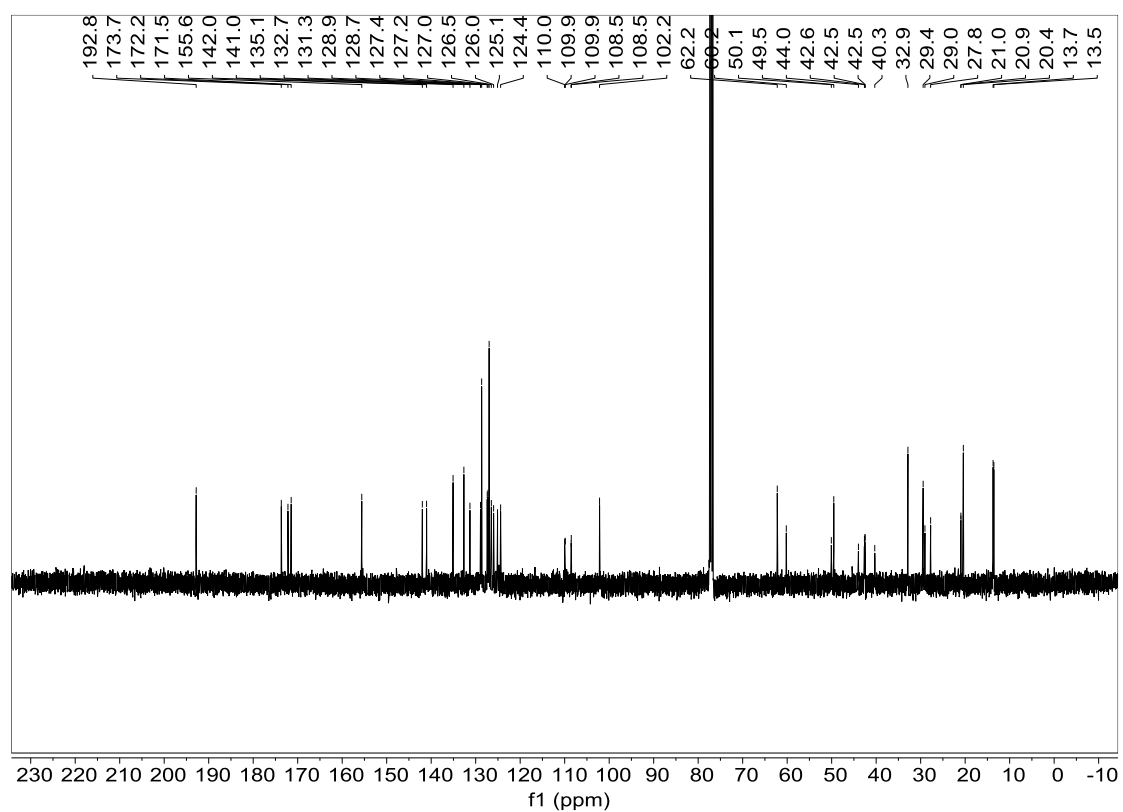
White solid, 82%, m.p. 220-221°C; ¹H NMR (400 MHz, CDCl₃) δ: 7.41 (d, *J* = 2.0 Hz, 1H, ArH), 7.33 - 7.28 (m, 2H, ArH), 7.23 - 7.21 (m, 4H, ArH), 7.12 (d, *J* = 2.0 Hz, 1H, 2H, ArH), 6.95 - 6.92 (m, 1H, ArH), 6.56 (d, *J* = 8.4 Hz, 1H, ArH), 6.21 (d, *J* = 8.4 Hz, 1H, ArH), 5.02 (d, *J* = 16.0 Hz, 1H, CH₂), 4.71 (s, 1H, NH), 4.68 (s, 1H, CH), 4.62 (d, *J* = 16.0 Hz, 1H, CH₂), 3.93 - 3.83 (m, 1H, CH₂), 3.81 - 3.72 (m, 2H, CH₂), 3.45 - 3.38 (m, 1H, CH₂), 2.38 - 2.28 (m, 3H, CH₂), 1.70 - 1.63 (m, 1H, CH₂), 1.42 - 1.35 (m, 2H, CH₂), 1.54 - 1.48 (m, 1H, CH₂), 1.28 (s, 3H, CH₃), 1.14 (s, 3H, CH₃), 0.99 (t, *J* = 7.2 Hz, 3H, CH₃), 0.74 (t, *J* = 6.8 Hz, 3H, CH₃) ppm; ¹³C NMR (400 MHz, CDCl₃) δ: 234.3, 192.9, 173.3, 171.8, 171.2, 155.5, 142.0, 141.8, 134.8, 131.0, 129.1, 128.7, 128.3, 127.5, 127.3, 127.1, 125.9, 125.6, 124.9, 110.1, 109.7, 102.2, 62.1, 60.3, 50.0, 49.4, 44.1, 42.5, 42.3, 40.4, 40.4, 32.9, 29.3, 28.9, 27.7, 20.3, 13.7, 13.5 ppm; IR (KBr) ν: 3533, 3069, 3012, 2993, 2869, 1862, 1726, 1608, 1516, 1463, 1526, 1276, 1224, 1053, 962, 856 cm⁻¹; HRMS (ESI-TOF) Calcd. for C₃₉H₃₉ClN₃O₅ ([M+Na]⁺): 722.2159, Found: 722.2152.



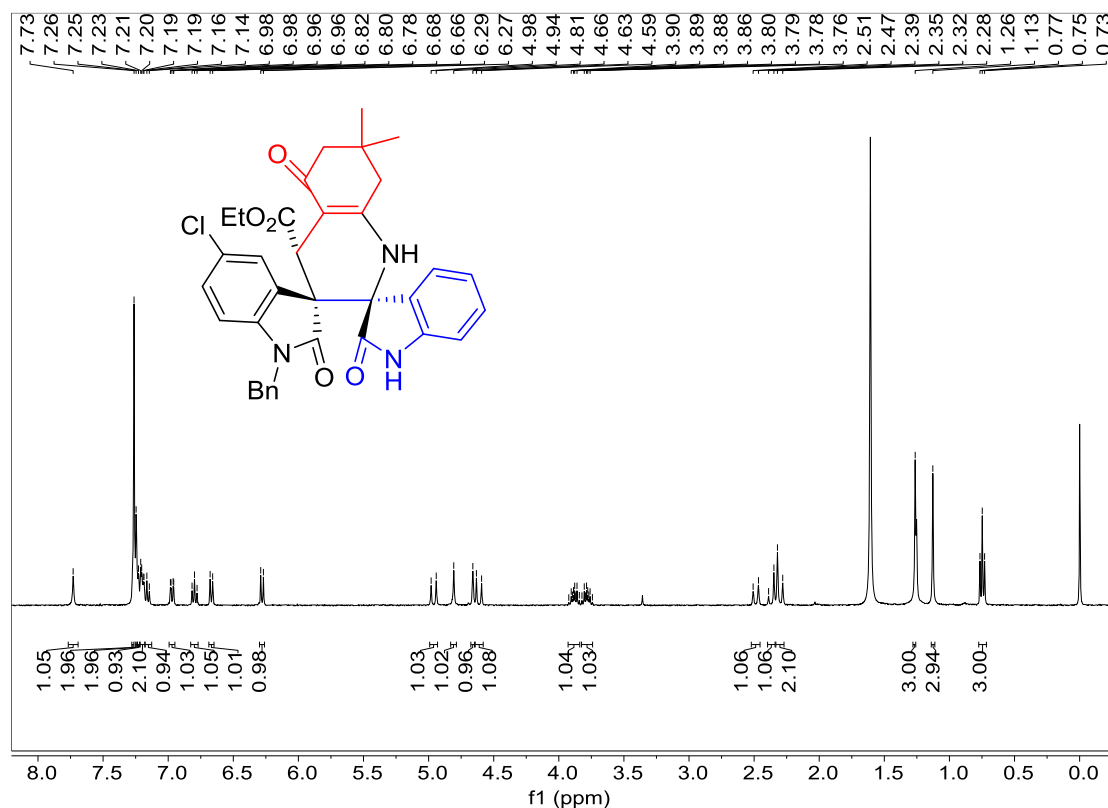


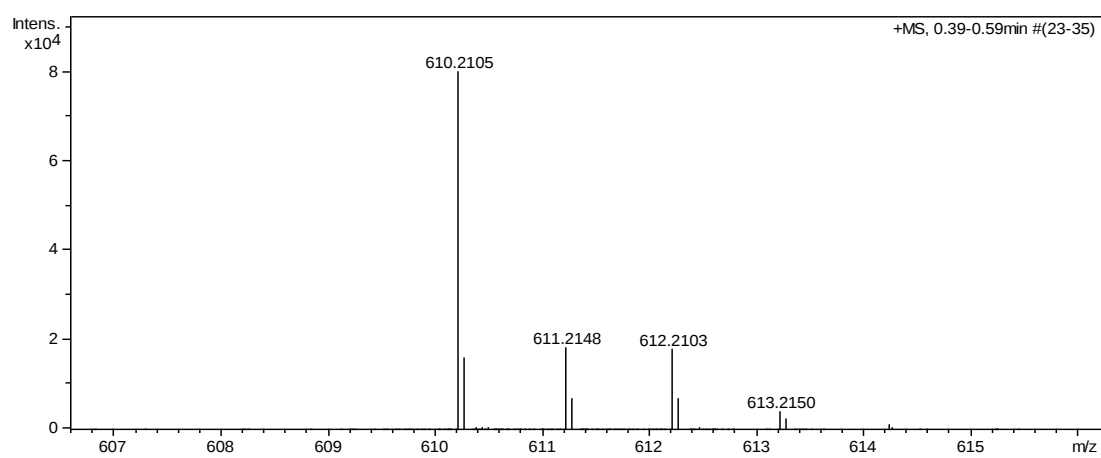
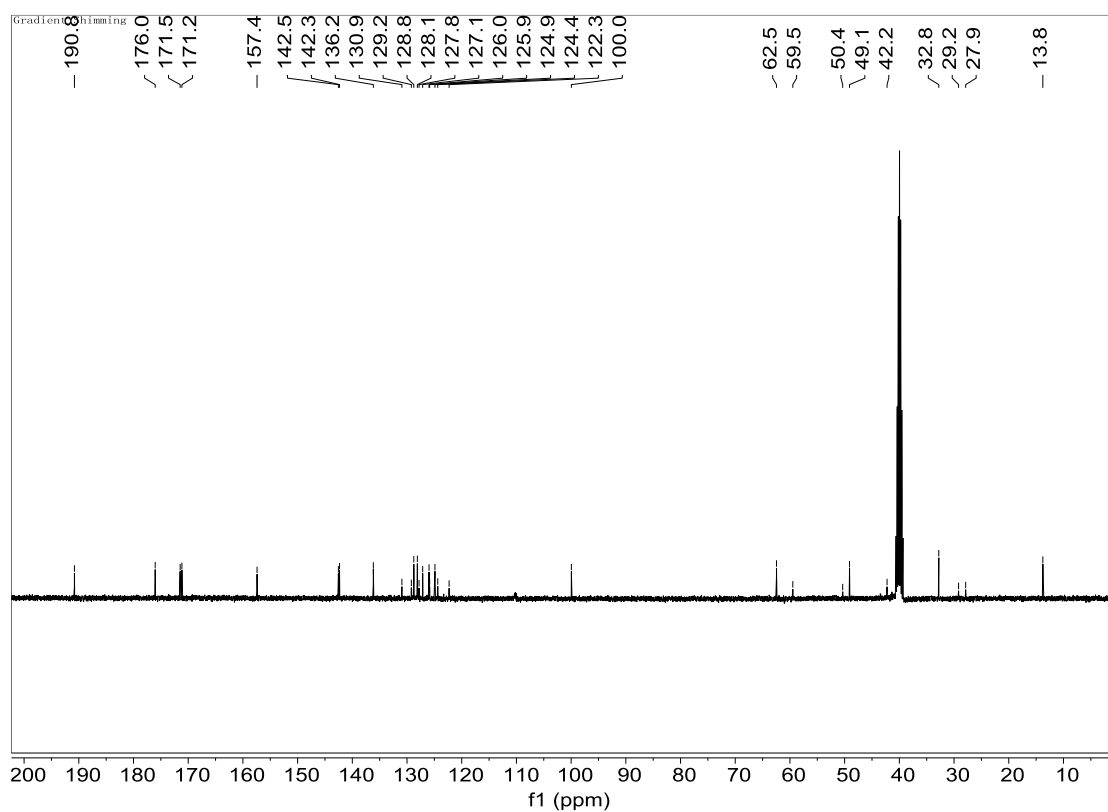
Ethyl *rel*-(3*R*,3'*S*,4'*R*)-1''-benzyl-1-butyl-5''-chloro-5,7',7'-trimethyl-2,2'',5'-trioxo-1',4',5',6',7',8'-hexahydrodispiro[indoline-3,2'-quinoline-3',3''-indoline]-4'-carboxylate (3d):
 White solid, 81%, m.p. 263-264°C; ¹H NMR (400 MHz, CDCl₃) δ: 7.23 (s, 3H, ArH), 7.19 - 7.15 (m, 4H, ArH), 7.04 (d, *J* = 7.6 Hz, 1H, ArH), 6.93 (d, *J* = 8.0 Hz, 1H, ArH), 6.53 (d, *J* = 8.0 Hz, 1H, ArH), 6.18 (d, *J* = 8.0 Hz, 1H, ArH), 4.94 (d, *J* = 16.0 Hz, 1H, CH₂), 4.74 (s, 1H, NH), 4.70 (s, 1H, CH), 4.18 (d, *J* = 16.4 Hz, 1H, CH₂), 3.92 - 3.84 (m, 1H, CH₂), 3.82 - 3.72 (m, 2H, CH₂), 3.45 - 3.38 (m, 1H, CH₂), 2.42 (d, *J* = 15.2 Hz, 1H, CH₂), 2.37 - 2.33 (m, 3H, CH₂), 2.18 (s, 3H, CH₃), 1.68 - 1.65 (m, 1H, CH₂), 0.99 (t, *J* = 7.2 Hz, 3H, CH₃), 0.75 (t, *J* = 7.2 Hz, 3H, CH₃) ppm; ¹³C NMR (400 MHz, CDCl₃) δ: 192.7, 173.6, 172.1, 171.4, 155.5, 141.9, 141.0, 135.0, 132.6, 131.2, 128.9, 128.6, 127.3, 127.2, 126.9, 126.4, 125.9, 125.0, 124.3, 109.9, 109.9, 109.8, 108.5, 108.5, 102.1, 62.2, 60.1, 50.0, 49.5, 43.9, 42.6, 42.5, 42.4, 40.3, 32.8, 29.4, 29.0, 27.7, 20.9, 20.9, 20.4, 13.7, 13.5 ppm; IR (KBr) ν: 3504, 3063, 3002, 2990, 2986, 1822, 1763, 1646, 1521, 1402, 1282, 1254, 1023, 989, 852 cm⁻¹; HRMS (ESI-TOF) Calcd. for C₄₀H₄₃ClN₃O₅ ([M+H]⁺): 680.2886, Found: 680.2878.



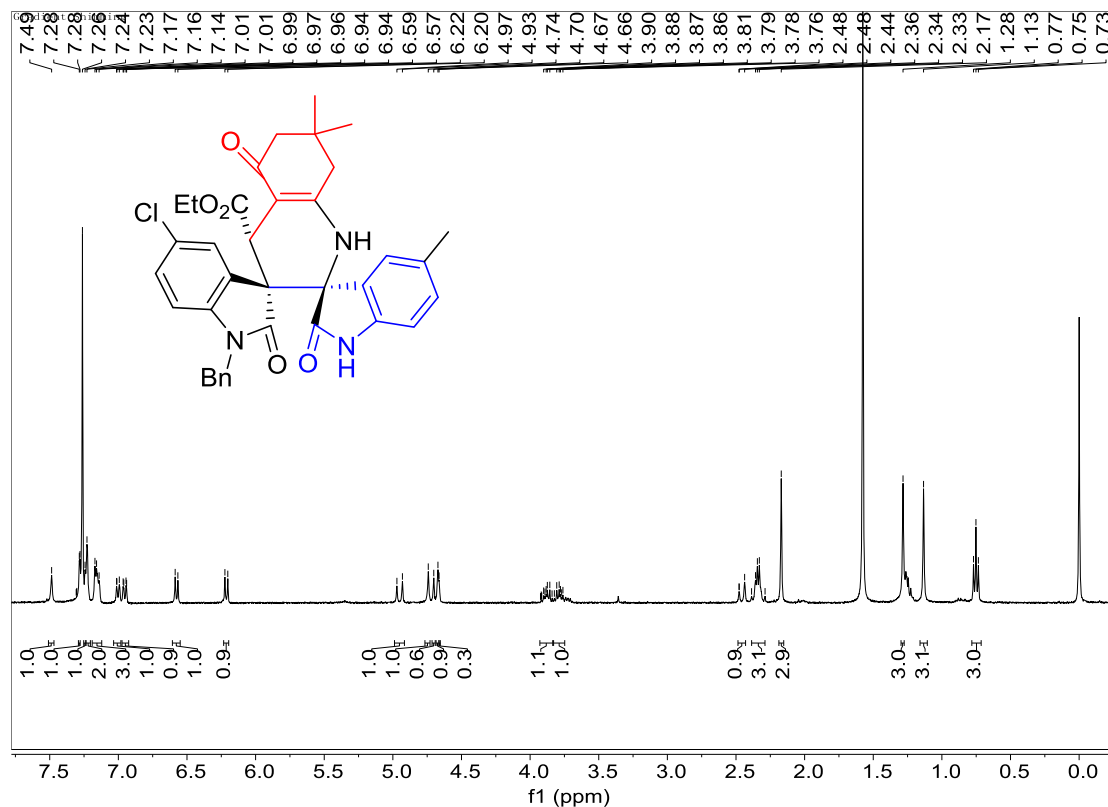


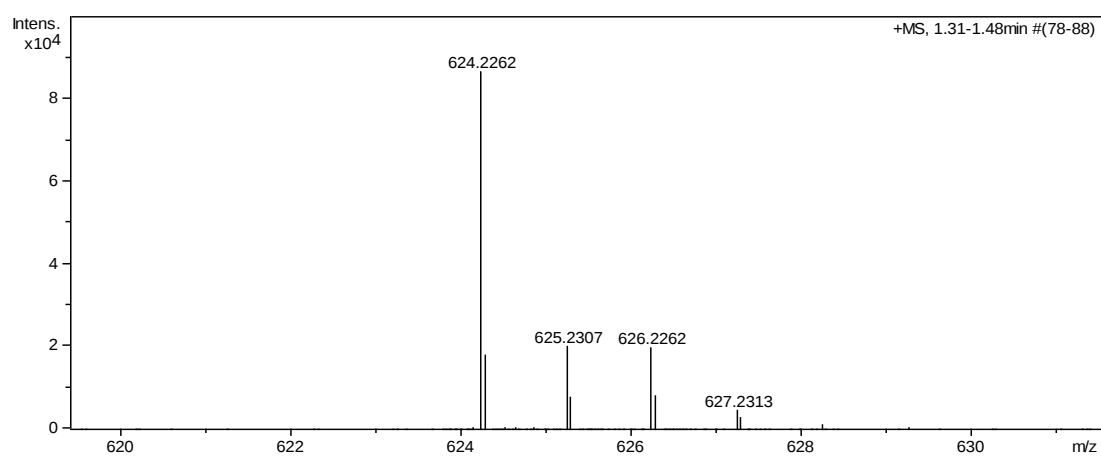
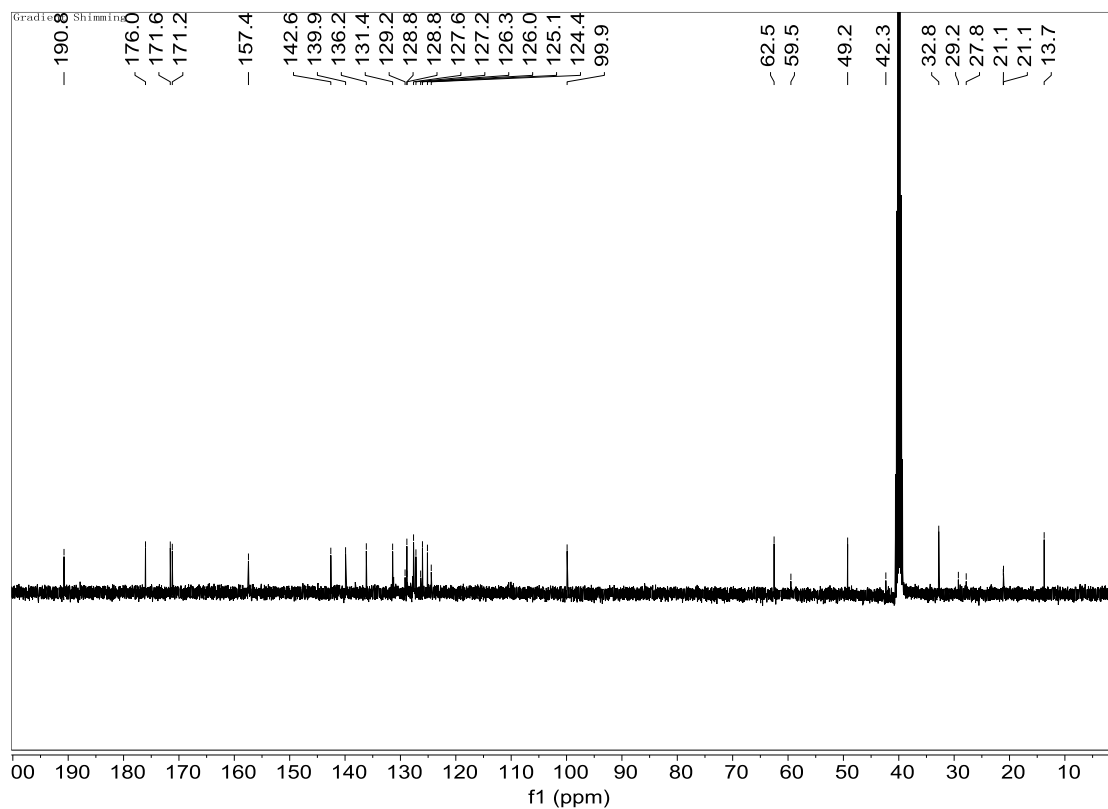
Ethyl *rel*-(3*R*,3'*S*,4'*R*)-1''-benzyl-5''-chloro-7',7'-dimethyl-2,2'',5'-trioxo-1',4',5',6',7',8'-hexahydrodispiro[indoline-3,2'-quinoline-3',3''-indoline]-4'-carboxylate (3e): White solid, 69%, m.p. 221-222°C; ¹H NMR (400 MHz, CDCl₃) δ: 7.73 (s, 1H, NH), 7.42 (s, 2H, ArH), 7.25 (s, 2H, ArH), 7.23 (s, 1H, ArH), 7.21 - 7.19 (m, 2H, ArH), 7.15 (d, *J* = 7.6 Hz, 1H, ArH), 6.98 - 6.96 (m, 1H, ArH), 6.80 (t, *J* = 7.6 Hz, 1H, ArH), 6.67 (d, *J* = 7.6 Hz, 1H, ArH), 6.28 (d, *J* = 8.4 Hz, 1H, ArH), 4.96 (d, *J* = 15.6 Hz, 1H, CH₂), 4.81 (s, 1H, NH), 4.66 (s, 1H, CH), 4.61 (d, *J* = 16.0 Hz, 1H, CH₂), 3.92 - 3.84 (m, 1H, CH₂), 3.82 - 3.74 (m, 1H, CH₂), 2.49 (d, *J* = 16.4 Hz, 1H, CH₂), 2.37 (d, *J* = 16.4 Hz, 1H, CH₂), 2.32 - 2.28 (m, 2H, CH₂), 1.26 (s, 3H, CH₃), 1.13 (s, 3H, CH₃), 0.75 (t, *J* = 7.2 Hz, 3H, CH₃) ppm; ¹³C NMR (400 MHz, CDCl₃) δ: 190.7, 176.0, 171.4, 171.1, 157.3, 142.5, 142.3, 136.1, 130.9, 129.1, 128.7, 128.0, 127.7, 127.1, 125.9, 125.8, 124.8, 124.3, 122.2, 99.9, 62.4, 59.4, 50.3, 49.1, 42.2, 32.7, 29.1, 27.8, 13.7 ppm; IR (KBr) ν: 3526, 3052, 3012, 2996, 2981, 2853, 1868, 1766, 1609, 1499, 1426, 1258, 1225, 1006, 982, 841 cm⁻¹; HRMS (ESI-TOF) Calcd. for C₃₅H₃₃ClN₃O₅ ([M+H]⁺): 610.2103, Found: 610.2105.



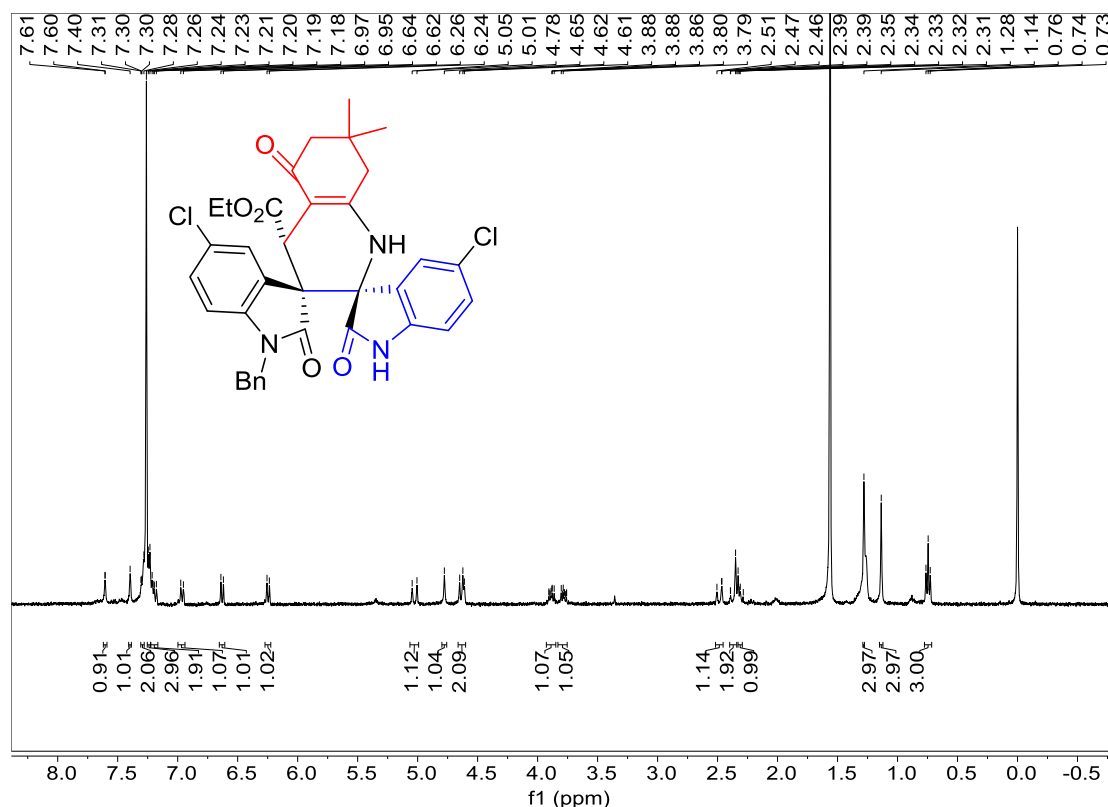


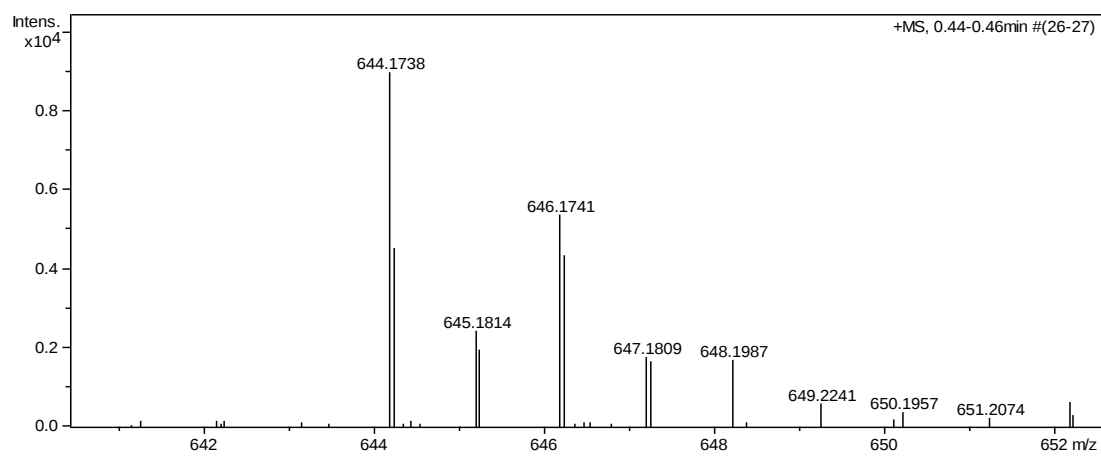
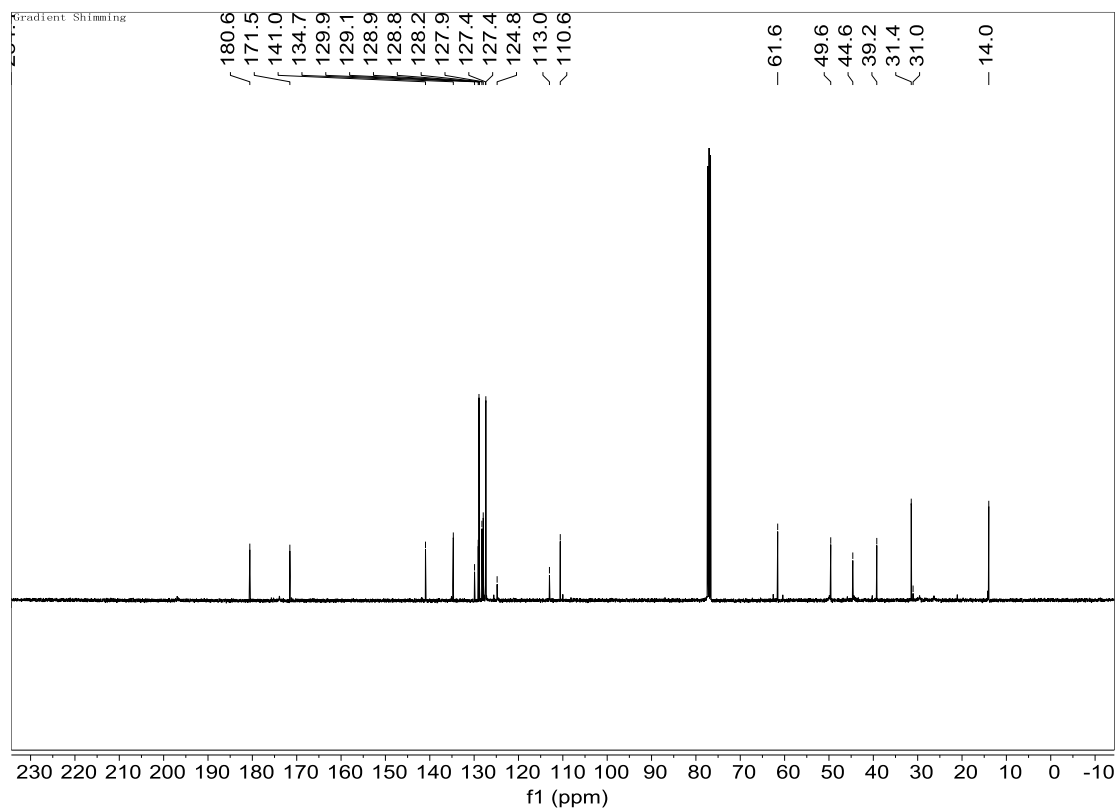
Ethyl *rel*-(3*R*,3'*S*,4'*R*)-1''-benzyl-5''-chloro-5,7,7'-trimethyl-2,2'',5'-trioxo-1',4',5',6',7',8'-hexahydrodispiro[indoline-3,2'-quinoline-3',3''-indoline]-4'-carboxylate (3f): White solid, 70%, m.p. 230–231°C; ¹H NMR (400 MHz, CDCl₃) δ: 7.49 (s, 1H, NH), 7.28 (d, *J* = 2.0 Hz, 1H, ArH), 7.24 (s, 1H, ArH), 7.23 (s, 2H, ArH), 7.17 - 7.14 (m, 3H, ArH), 7.01 - 6.99 (m, 1H, ArH), 6.97 - 6.94 (m, 1H, ArH), 6.58 (d, *J* = 7.6 Hz, 1H, ArH), 6.21 (d, *J* = 8.4 Hz, 1H, ArH), 4.95 (d, *J* = 16.0 Hz, 1H, CH₂), 4.74 (s, 1H, NH), 4.68 (d, *J* = 15.2 Hz, 1H, CH₂), 4.67 (s, 1H, CH), 4.76 (s, 1H, NH), 4.74 (s, 1H, CH), 4.66 (d, *J* = 16.4 Hz, 1H, CH₂), 3.94 - 3.87 (m, 1H, CH), 3.93 - 3.84 (m, 1H, CH₂), 3.82 - 3.76 (m, 1H, CH₂), 2.46 (d, *J* = 16.0 Hz, 1H, CH₂), 2.39 - 2.29 (m, 3H, CH₂), 2.17 (s, 3H, CH₃), 1.28 (s, 3H, CH₃), 1.13 (s, 3H, CH₃), 0.75 (t, *J* = 7.2 Hz, 3H, CH₃) ppm; ¹³C NMR (400 MHz, CDCl₃) δ: 190.7, 176.0, 171.5, 171.1, 157.4, 142.5, 139.8, 136.1, 131.3, 129.1, 128.8, 128.7, 127.6, 127.1, 126.3, 126.0, 125.1, 124.4, 99.8, 62.5, 59.4, 49.2, 42.3, 32.7, 29.2, 27.8, 21.1, 21.0, 13.7 ppm; IR (KBr) ν: 3608, 3589, 3052, 3007, 2991, 2982, 1866, 1739, 1613, 1509, 1425, 1276, 1242, 1024, 987, 856 cm⁻¹; HRMS (ESI-TOF) Calcd. for C₃₆H₃₅ClN₃O₅ ([M+H]⁺): 624.2260, Found: 624.2262.





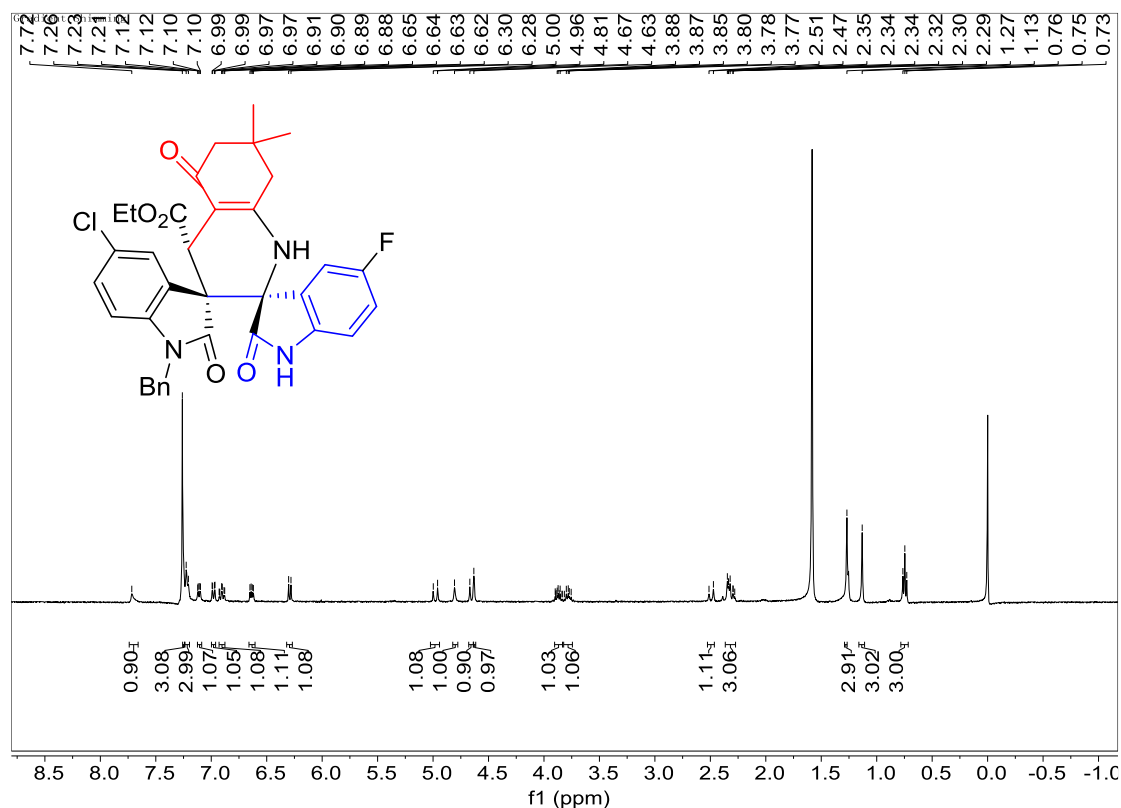
Ethyl *rel*-(3*R*,3'*S*,4'*R*)-1''-benzyl-5,5''-dichloro-7',7'-dimethyl-2,2'',5'-trioxo-1',4',5',6',7',8'-hexahydrodispiro[indoline-3,2'-quinoline-3',3''-indoline]-4'-carboxylate (3g): White solid, 72%, m.p. 234-235°C; ¹H NMR (400 MHz, CDCl₃) δ: 7.61 (s, 1H, NH), 7.40 (s, 1H, ArH), 7.31 - 7.28 (m, 2H, ArH), 7.24 (d, *J* = 5.2 Hz, 3H, ArH), 7.21 - 7.18 (m, 2H, ArH), 6.96 (d, *J* = 9.2 Hz, 1H, ArH), 6.63 (d, *J* = 8.4 Hz, 1H, ArH), 6.25 (d, *J* = 8.0 Hz, 1H, ArH), 5.02 (d, *J* = 16.0 Hz, 1H, CH₂), 4.78 (s, 1H, NH), 4.63 (d, *J* = 15.6 Hz, 1H, CH₂), 4.62 (s, 1H, CH), 3.91 - 3.85 (m, 1H, CH₂), 3.82 - 3.76 (m, 1H, CH₂), 2.49 (d, *J* = 16.0 Hz, 1H, CH₂), 2.39 - 2.31 (m, 3H, CH₂), 1.28 (s, 3H, CH₃), 1.14 (s, 3H, CH₃), 0.75 (t, *J* = 7.2 Hz, 3H, CH₃) ppm; ¹³C NMR (400 MHz, CDCl₃) δ: 234.3, 180.5, 171.5, 140.9, 134.6, 129.8, 129.0, 128.8, 128.7, 128.2, 127.9, 127.4, 127.3, 124.8, 113.0, 110.5, 61.5, 49.5, 44.6, 39.2, 31.4, 31.0, 13.9 ppm; R (KBr) ν: 3612, 3522, 3061, 3015, 2998, 2986, 1852, 1776, 1609, 1529, 1416, 1256, 1221, 1045, 985, 823, 752 cm⁻¹; HRMS (ESI-TOF) Calcd. for C₃₅H₃₂Cl₂N₃O₅ ([M+H]⁺): 644.1714, Found: 644.1738.

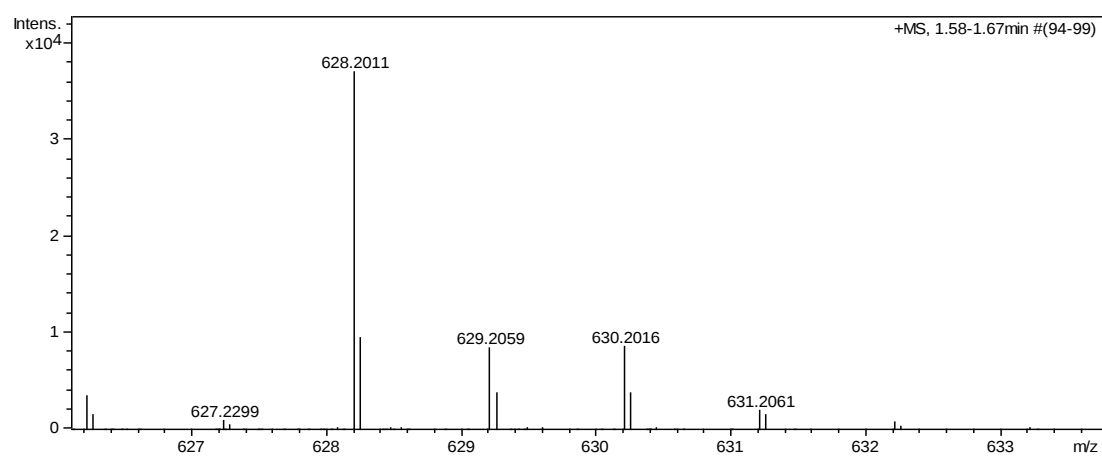
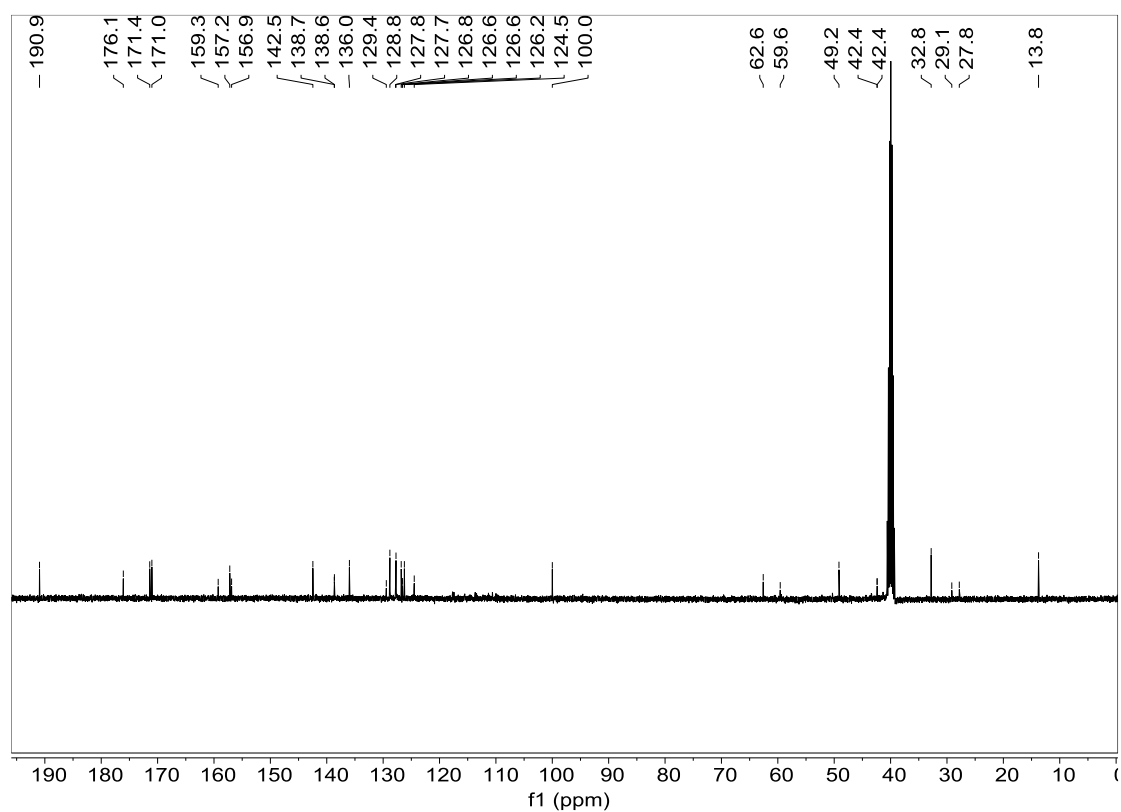




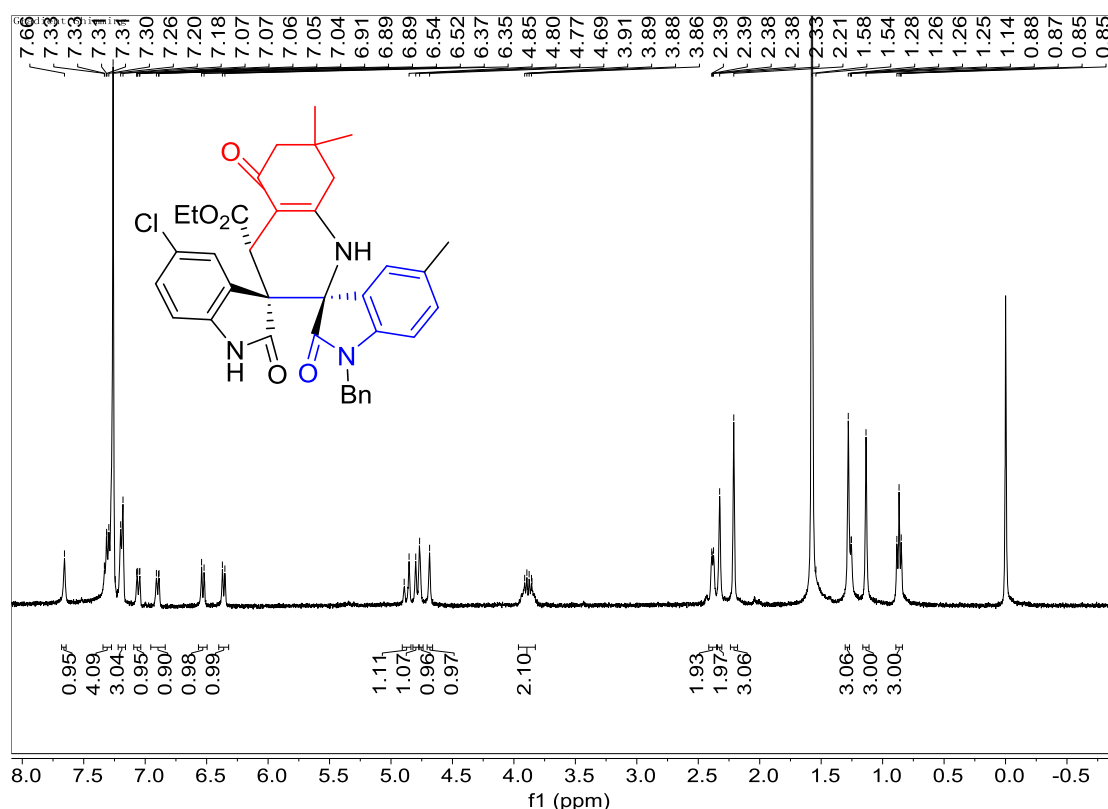
Ethyl *rel*-(3*R*,3'*S*,4'*R*)-1''-benzyl-5''-chloro-5-fluoro-7',7'-dimethyl-2,2'',5'-trioxo-1',4',5',6',7',8'-hexahydrodispiro[indoline-3,2'-quinoline-3',3''-indoline]-4'-carboxylate (**3h**):

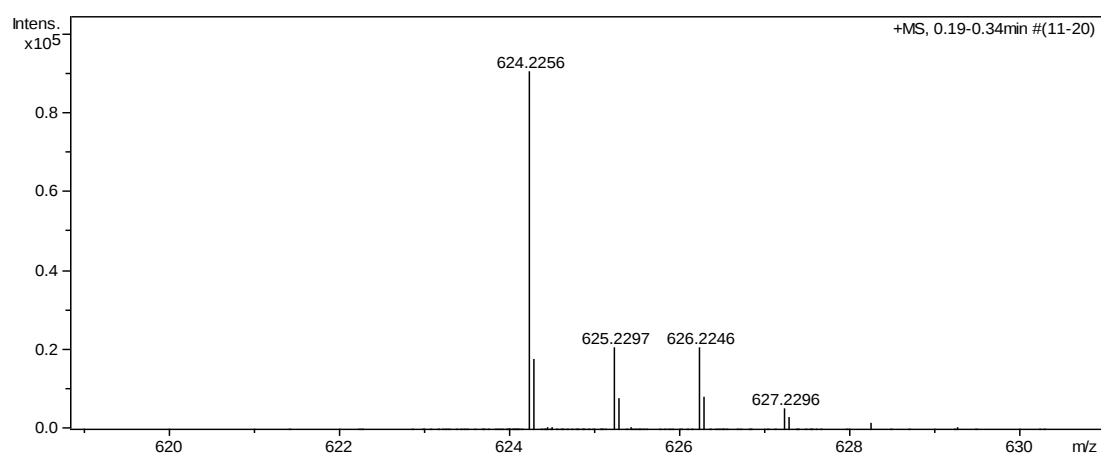
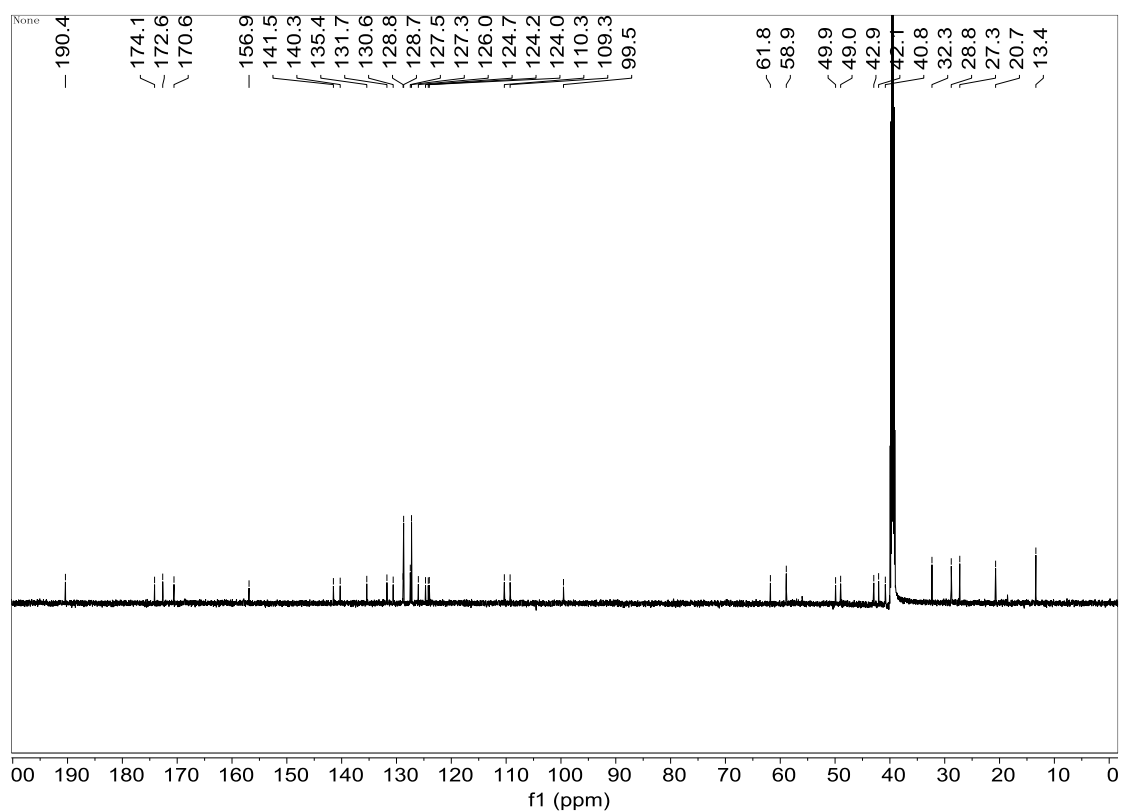
White solid, 70%, m.p. 240-241°C; ¹H NMR (400 MHz, CDCl₃) δ: 7.72 (s, 1H, NH), 7.26 (s, 3H, ArH), 7.23 - 7.21 (m, 3H, ArH), 7.12 - 7.10 (m, 1H, ArH), 7.12 - 7.10 (m, 1H, ArH), 6.99 - 6.97 (m, 1H, ArH), 6.93 - 6.88 (m, 1H, ArH), 6.65 - 6.62 (m, 1H, ArH), 6.29 (d, *J* = 8.4 Hz, 1H, ArH), 4.98 (d, *J* = 15.2 Hz, 1H, CH₂), 4.81 (s, 1H, NH), 4.65 (d, *J* = 14.4 Hz, 1H, CH₂), 4.63 (s, 1H, CH), 3.90 - 3.84 (m, 1H, CH₂), 3.82 - 3.76 (m, 1H, CH₂), 2.49 (d, *J* = 15.6 Hz, 1H, CH₂), 2.35 - 2.28 (m, 3H, CH₂), 1.27 (s, 3H, CH₃), 1.13 (s, 3H, CH₃), 0.75 (t, *J* = 6.8 Hz, 3H, CH₃) ppm; ¹³C NMR (400 MHz, CDCl₃) δ: 190.9, 176.0, 171.3, 170.9, 159.2, 157.1, 156.8, 142.4, 138.6, 135.9, 129.4, 128.7, 127.7, 127.7, 126.7, 126.6, 126.5, 126.2, 124.4, 99.9, 62.5, 59.5, 49.1, 42.3, 42.3, 32.8, 29.1, 27.8, 13.7 ppm; IR (KBr) ν: 3613, 3526, 3023, 3011, 1856, 1726, 1612, 1544, 1462, 1275, 1223, 1062, 956, 893 cm⁻¹; HRMS (ESI-TOF) Calcd. for C₃₅H₃₂ClFN₃O₅ ([M+H]⁺): 628.2009, Found: 628.2011.





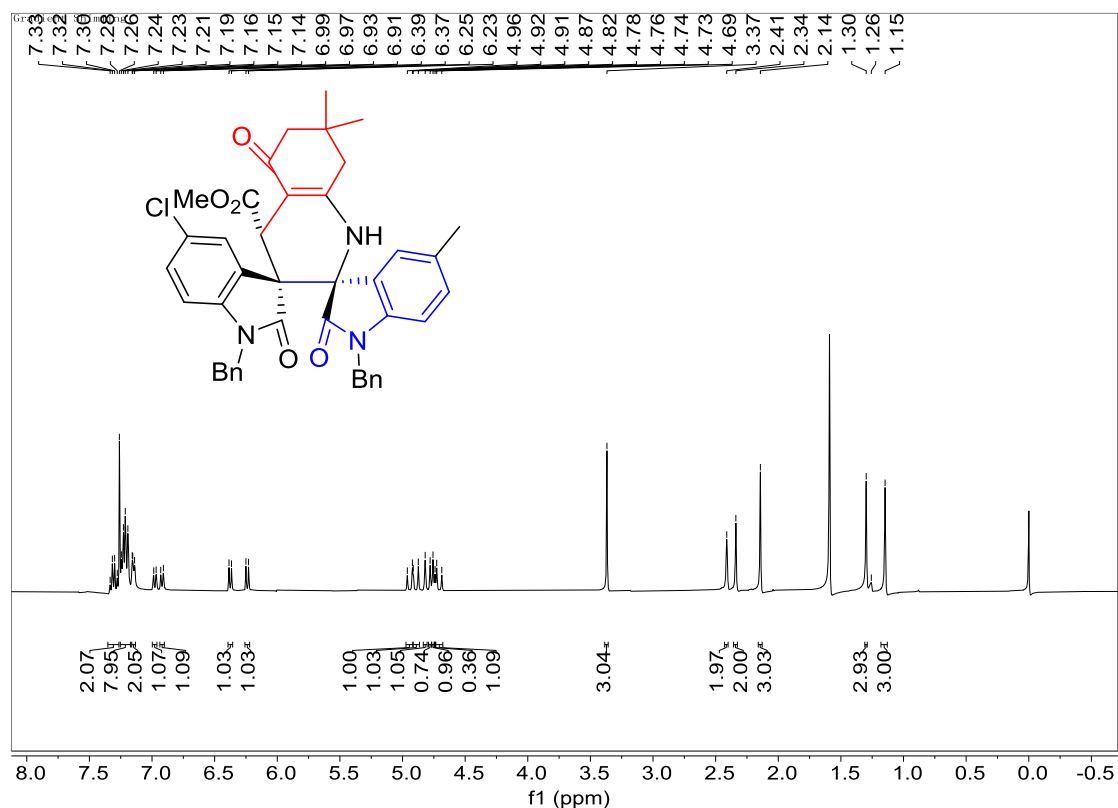
Ethyl *rel*-(3*R*,3'*S*,4'*R*)-1-benzyl-5''-chloro-5,7',7''-trimethyl-2,2'',5'-trioxo-1',4',5',6',7',8'-hexahydrodispiro[indoline-3,2'-quinoline-3',3''-indoline]-4'-carboxylate (3i): White solid, 68%, m.p. >300°C; ¹H NMR (400 MHz, CDCl₃) δ: 7.66 (s, 1H, NH), 7.33 - 7.30 (m, 4H, ArH), 7.20 - 7.18 (m, 3H, ArH), 7.07 - 7.04 (m, 1H, ArH), 6.89 (d, *J* = 8.4 Hz, 1H, ArH), 6.53 (d, *J* = 8.0 Hz, 1H, ArH), 6.36 (d, *J* = 8.0 Hz, 1H, ArH), 4.87 (d, *J* = 16.0 Hz, 1H, CH₂), 4.78 (d, *J* = 12.4, 1H, CH₂), 4.77 (s, 1H, NH), 4.69 (s, 1H, CH), 3.91 - 3.85 (m, 2H, CH₂), 2.39 - 2.38 (s, 2H, CH₂), 2.33 (s, 2H, CH₂), 3.21 (s, 3H, CH₃), 1.28 (s, 3H, CH₃), 1.14 (s, 3H, CH₃), 0.87 (t, *J* = 7.2 Hz, 3H, CH₃) ppm; ¹³C NMR (600 MHz, DMSO) δ: 190.3, 174.1, 172.6, 170.5, 156.8, 141.4, 140.2, 135.4, 131.7, 130.5, 128.7, 128.6, 127.4, 127.2, 125.9, 124.6, 124.1, 124.0, 110.3, 109.2, 99.5, 61.7, 58.8, 49.9, 48.9, 42.9, 42.0, 40.8, 32.3, 28.8, 27.2, 20.7, 13.3 ppm; IR (KBr) ν: 3610, 3526, 3026, 3002, 2985, 2953, 1823, 1756, 1625, 1521, 1465, 1228, 1214, 1023, 991, 863 cm⁻¹; HRMS (ESI-TOF) Calcd. for C₃₆H₃₅ClN₃O₅ ([M+H]⁺): 624.2260, Found: 624.2256.

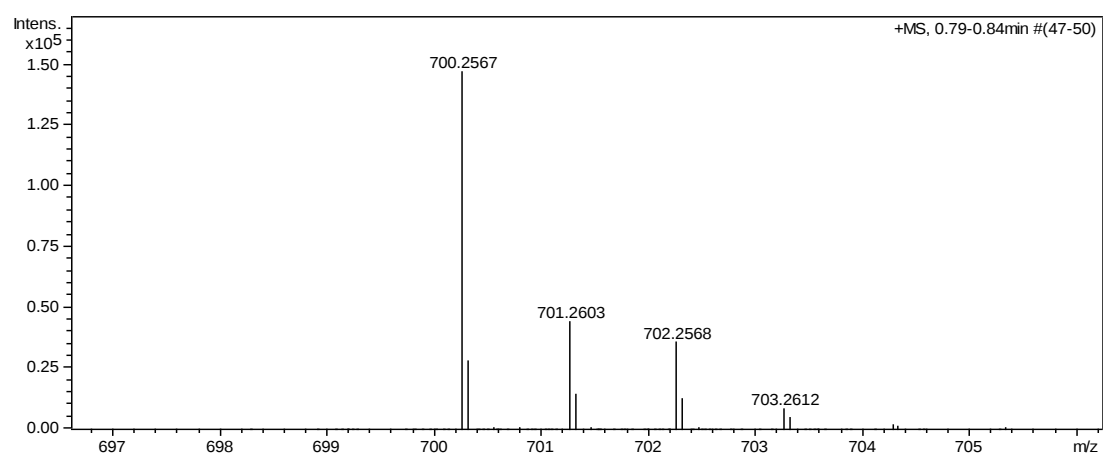
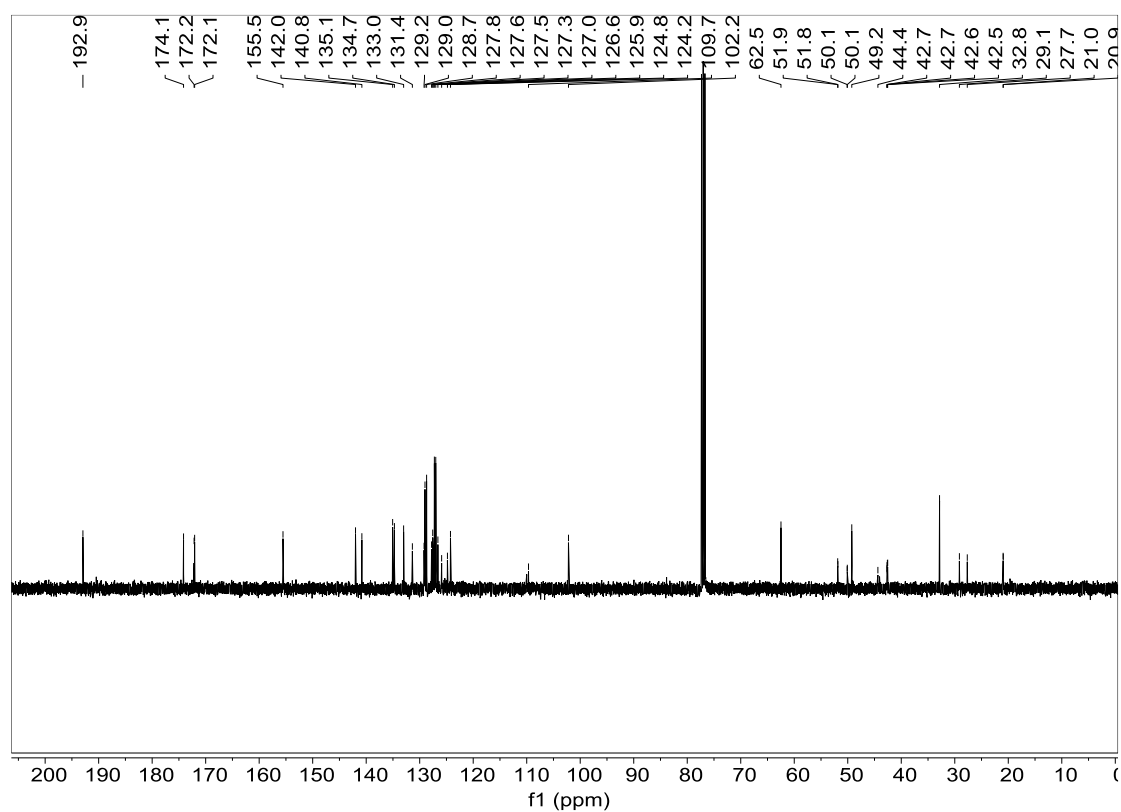




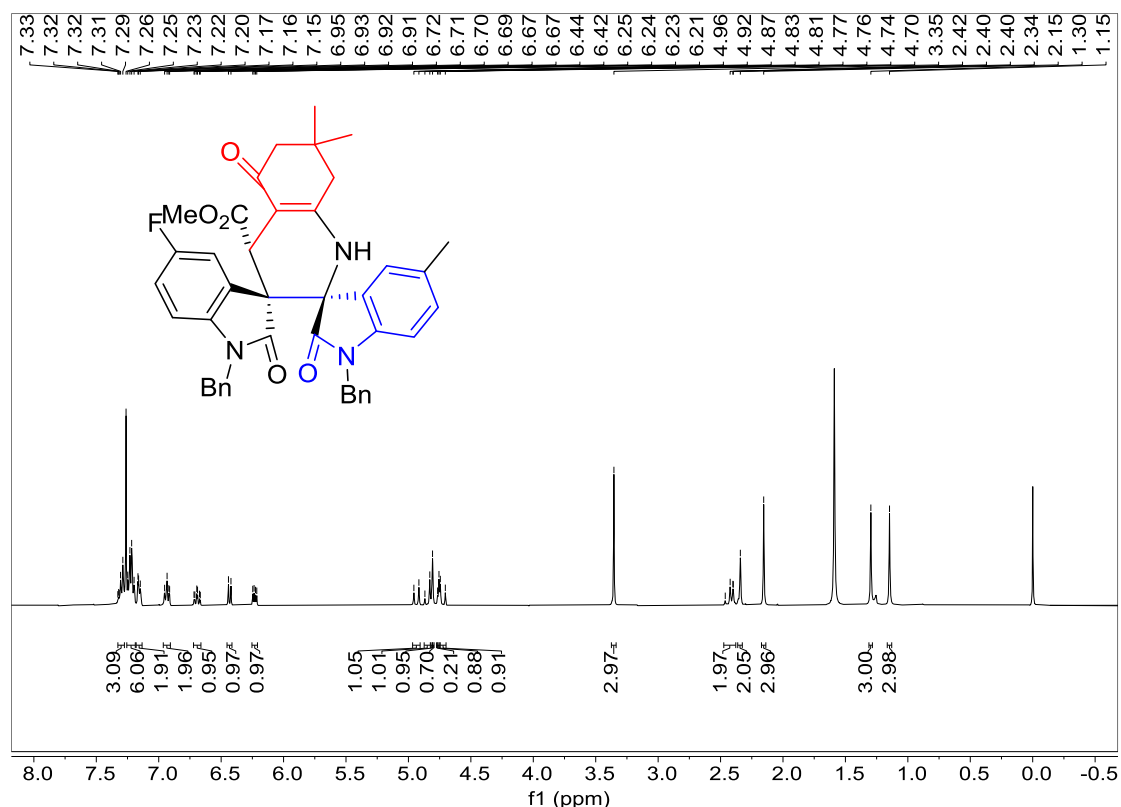
Methyl *rel*-(3*R*,3'*S*,4'*R*)-1,1''-dibenzyl-5''-chloro-5,7',7'-trimethyl-2,2'',5'-trioxo-1',4',5',6',7',8'-hexahydrodispiro[indoline-3,2'-quinoline-3',3''-indoline]-4'-carboxylate (**3j**):

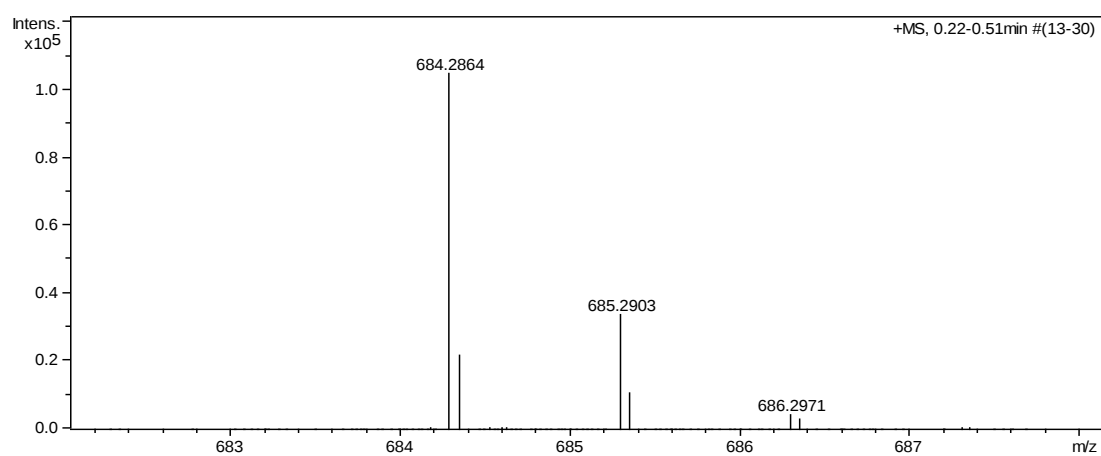
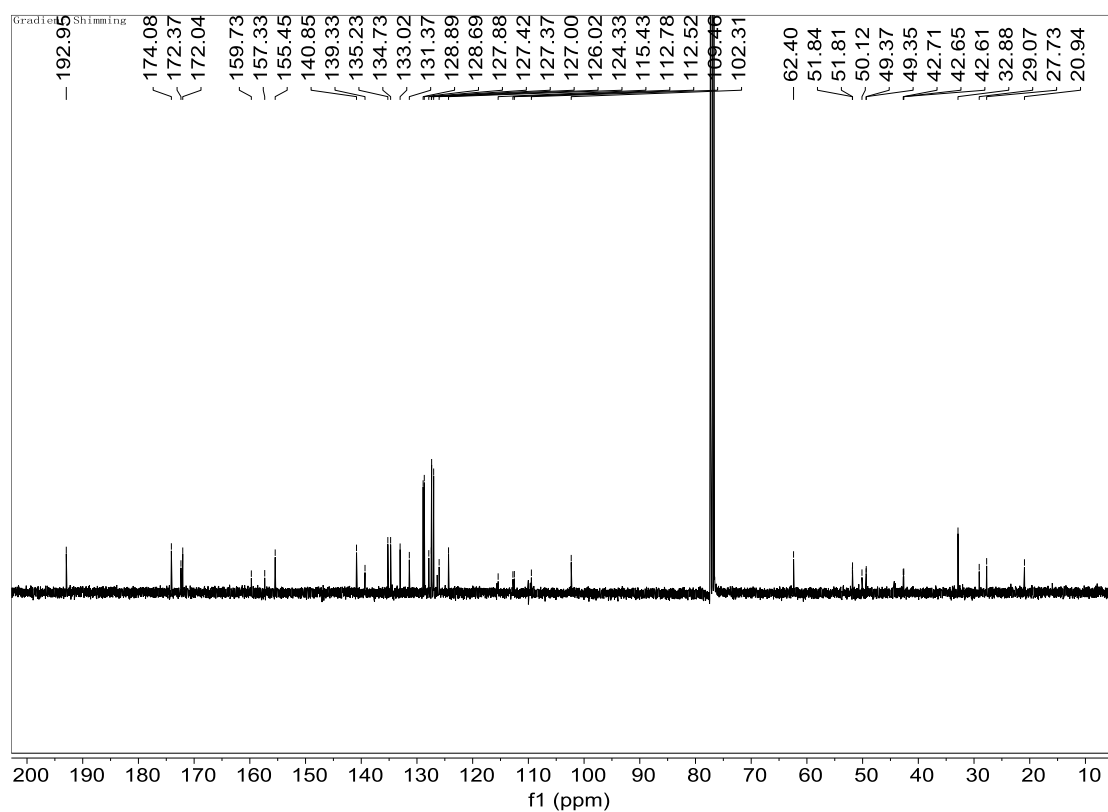
White solid, 72%, m.p. 270-272°C; ¹H NMR (400 MHz, CDCl₃) δ: 7.31 (q, *J*₁ = 6.8 Hz, *J*₂ = 14.0 Hz, 2H, ArH), 7.25 - 7.19 (m, 8H, ArH), 7.16 - 7.14 (m, 2H, ArH), 6.98 (d, *J* = 7.6 Hz, 1H, ArH), 6.92 (d, *J* = 8.8 Hz, 1H, ArH), 6.38 (d, *J* = 8.0 Hz, 1H, ArH), 6.24 (d, *J* = 8.4 Hz, 1H, ArH), 4.94 (d, *J* = 16.4 Hz, 1H, CH₂), 4.89 (d, *J* = 16.4 Hz, 1H, ArH), 4.82 (s, 1H, NH), 4.76 (d, *J* = 15.6 Hz, 1H, CH₂), 4.76 (s, 1H, CH), 4.70 (d, *J* = 16.0 Hz, 1H, CH₂), 3.37 (s, 3H, OCH₃), 2.41 (s, 2H, CH₂), 2.34 (s, 2H, CH₂), 2.14 (s, 3H, CH₃), 1.30 (s, 3H, CH₃), 1.15 (s, 3H, CH₃) ppm; ¹³C NMR (400 MHz, CDCl₃) δ: 192.9, 174.1, 172.1, 172.0, 155.5, 141.9, 140.7, 135.0, 134.7, 132.9, 131.3, 129.1, 129.0, 128.6, 127.7, 127.5, 127.4, 127.2, 126.9, 126.5, 125.8, 124.8, 124.2, 109.6, 102.1, 62.4, 51.8, 51.8, 50.1, 50.0, 49.2, 44.3, 42.6, 42.6, 42.6, 42.5, 42.5, 32.8, 29.1, 27.6, 20.9, 20.9 ppm; IR (KBr) ν: 3513, 3031, 3001, 2995, 2986, 1875, 1721, 1612, 1521, 1429, 1242, 1214, 1029, 987, 853 cm⁻¹; HRMS (ESI-TOF) Calcd. for C₄₂H₃₉ClN₃O₅ ([M+H]⁺): 700.2573, Found: 700.2567.



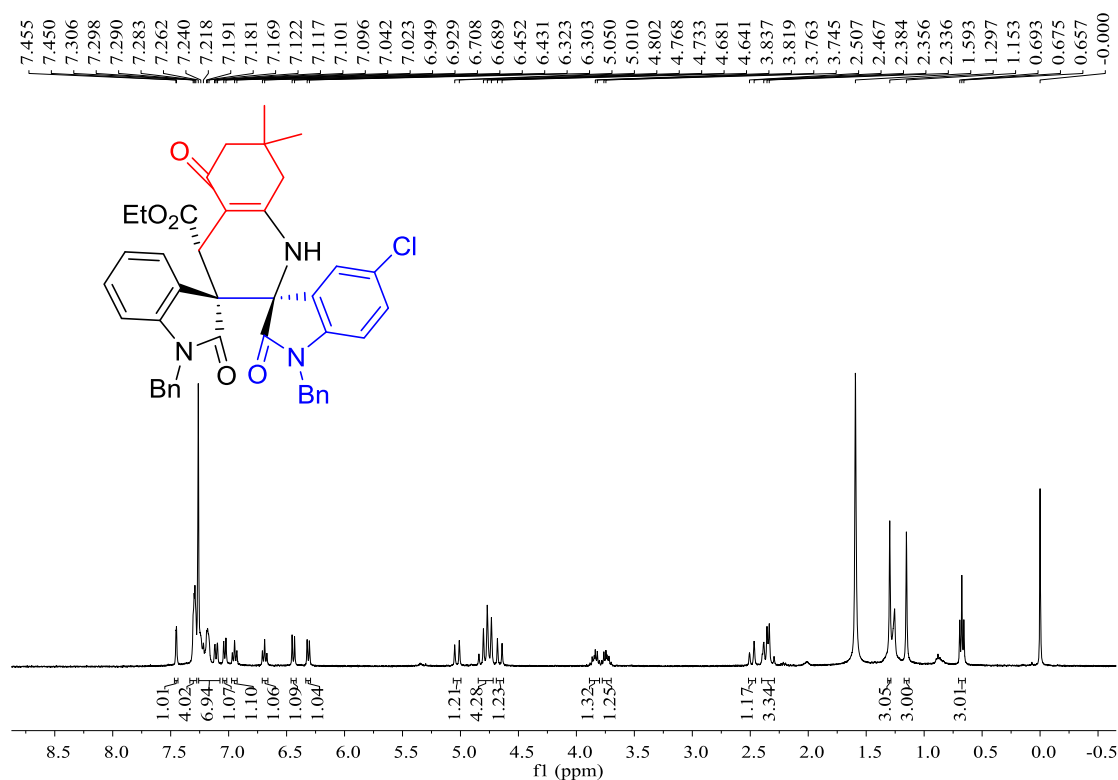


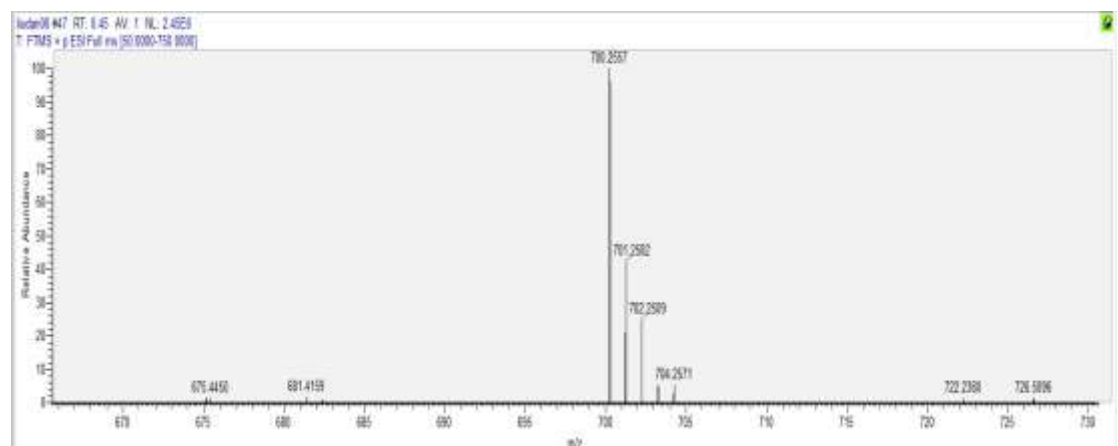
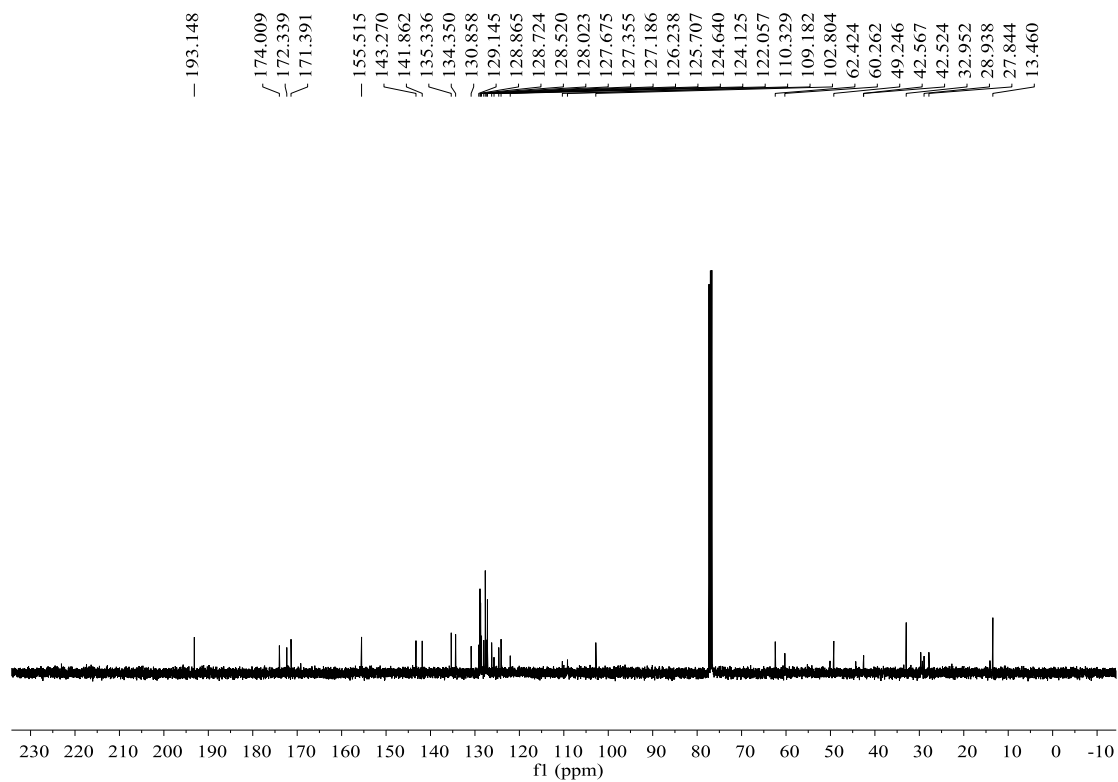
Methyl *rel*-(3*R*,3'*S*,4'*R*)-1,1''-dibenzyl-5''-fluoro-5,7',7'-trimethyl-2,2'',5'-trioxo-1',4',5',6',7',8'-hexahydrodispiro[indoline-3,2'-quinoline-3',3''-indoline]-4'-carboxylate (3k):
 White solid, 69%, m.p. 289-290°C; ¹H NMR (400 MHz, CDCl₃) δ: 7.33 - 7.29 (m, 3H, ArH), 7.25 - 7.20 (m, 6H, ArH), 7.17 - 7.15 (m, 2H, ArH), 6.95 - 6.91 (m, 2H, ArH), 6.72 - 6.67 (m, 1H, ArH), 6.43 (d, *J* = 8.0 Hz, 1H, ArH), 6.25 - 6.22 (m, 1H, ArH), 4.94 (d, *J* = 16.4 Hz, 1H, CH₂), 4.85 (d, *J* = 15.6, 1H, CH₂), 4.81 (s, 1H, NH), 4.79 (d, *J* = 16.0 Hz, 1H, CH₂), 4.76 (s, 1H, CH), 4.73 (d, *J* = 16.0 Hz, 1H, CH₂), 3.35 (s, 3H, OCH₃), 2.46 - 2.40 (m, 2H, CH₂), 2.34 (s, 2H, CH₂), 2.16 (s, 3H, CH₃), 1.30 (s, 3H, CH₃), 1.15 (s, 3H, CH₃) ppm; ¹³C NMR (400 MHz, CDCl₃) δ: 192.9, 174.1, 172.3, 172.0, 159.7, 157.3, 155.4, 140.8, 139.3, 135.2, 134.7, 133.0, 131.4, 128.9, 128.7, 127.9, 127.4, 127.4, 127.0, 126.0, 124.3, 115.4, 112.8, 112.5, 109.4, 102.3, 62.4, 51.8, 51.8, 50.1, 49.4, 49.3, 42.7, 42.6, 42.6, 32.9, 29.1, 27.7, 20.9 ppm; IR (KBr) ν: 3521, 3041, 3009, 2991, 2986, 1879, 1716, 1623, 1519, 1445, 1229, 1282, 1092, 994, 852 cm⁻¹; HRMS (ESI-TOF) Calcd. for C₄₂H₃₉FN₃O₅ ([M+H]⁺): 684.2868, Found: 684.2864.





Ethyl *rel*-(3*R*,3'*S*,4'*R*)-1,1''-dibenzyl-5''-chloro-7',7'-dimethyl-2,2'',5'-trioxo-1',4',5',6',7',8'-hexahydrodispiro[indoline-3,2'-quinoline-3',3''-indoline]-4'-carboxylate (3l): White solid, 42%, m.p. 275–277°C; ¹H NMR (400 MHz, CDCl₃) δ: 7.45 (d, *J* = 2.0 Hz, 1H, ArH), 7.31 - 7.28 (m, 4H, ArH), 7.24 - 7.10 (m, 7H, ArH), 7.03 (d, *J* = 8.0 Hz, 1H, ArH), 6.95 (t, *J* = 7.6 Hz, 1H, ArH), 6.69 (t, *J* = 7.6 Hz, 1H, ArH), 6.44 (d, *J* = 8.4 Hz, 1H, ArH), 6.31 (d, *J* = 8.0 Hz, 1H, ArH), 5.03 (d, *J* = 16.0 Hz, 1H, CH₂), 4.82 (d, *J* = 16.0 Hz, 2H, CH₂), 4.75 (d, *J* = 14.0 Hz, 2H, CH₂), 4.06 (d, *J* = 16.0 Hz, 1H, CH₂), 3.88 - 3.80 (m, 1H, CH₂), 3.78 - 3.70 (m, 1H, CH₂), 2.49 (d, *J* = 16.0 Hz, 1H, CH₂), 2.40 - 2.30 (m, 3H, CH₂), 1.30 (s, 3H, CH₃), 1.15 (s, 3H, CH₃), 0.68 (t, *J* = 7.2 Hz, 3H, CH₃) ppm; ¹³C NMR (400 MHz, CDCl₃) δ: 193.2, 174.1, 172.3, 171.4, 155.5, 143.3, 141.9, 135.3, 134.4, 130.9, 129.2, 128.9, 128.7, 128.5, 128.0, 127.7, 127.4, 127.2, 126.2, 125.7, 124.6, 124.1, 122.1, 110.3, 109.2, 102.8, 62.4, 60.3, 49.3, 42.8, 42.5, 32.9, 28.9, 27.8, 13.5 ppm; IR (KBr) ν: 3429, 1723, 1611, 1489, 1175, 953, 841 cm⁻¹; HRMS (ESI-TOF) Calcd. for C₄₂H₃₉ClN₃O₅ ([M+H]⁺): 700.2573, Found: 700.2557.



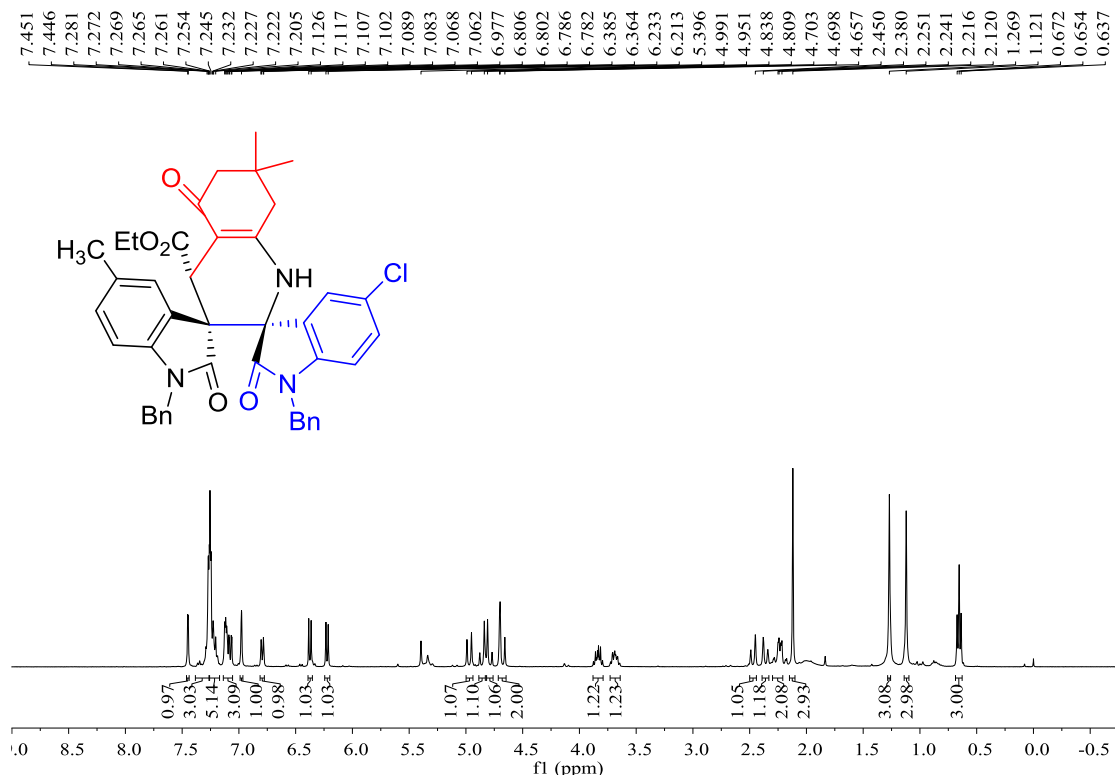


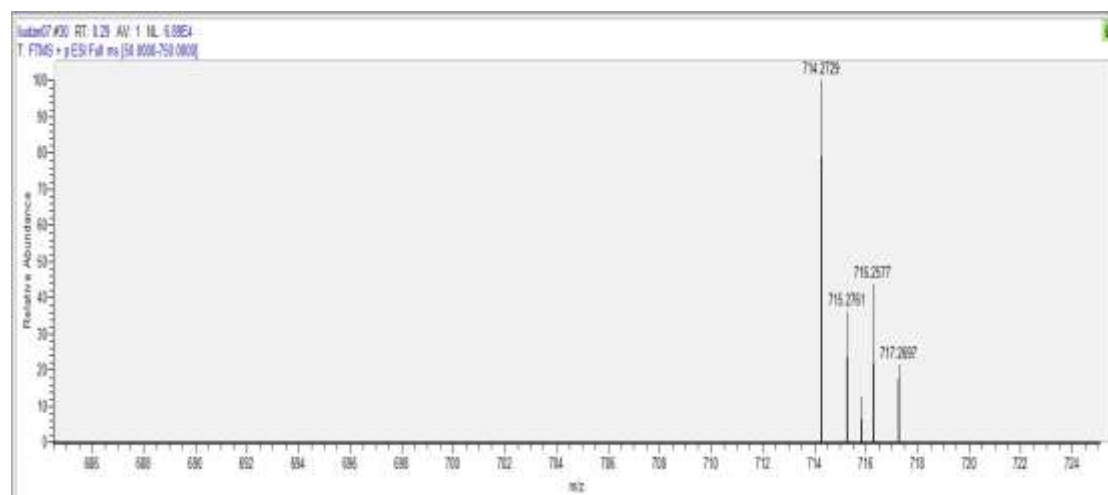
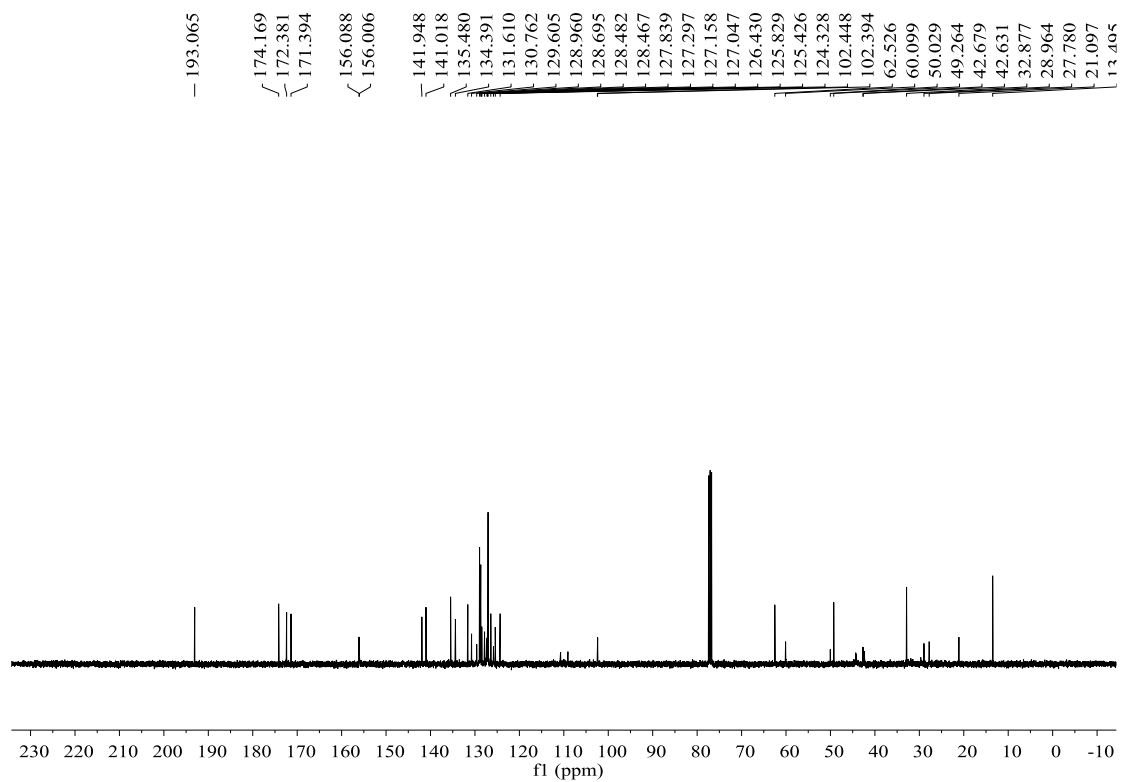
Ethyl

rel-(3*R*,3'*S*,4'*R*)-1,1''-dibenzyl-5-chloro-5'',7',7'-trimethyl-2,2'',5'-trioxo-

1',4',5',6',7',8'-hexahydrodispiro[indoline-3,2'-quinoline-3',3''-indoline]-4'-carboxylate (**3m**):

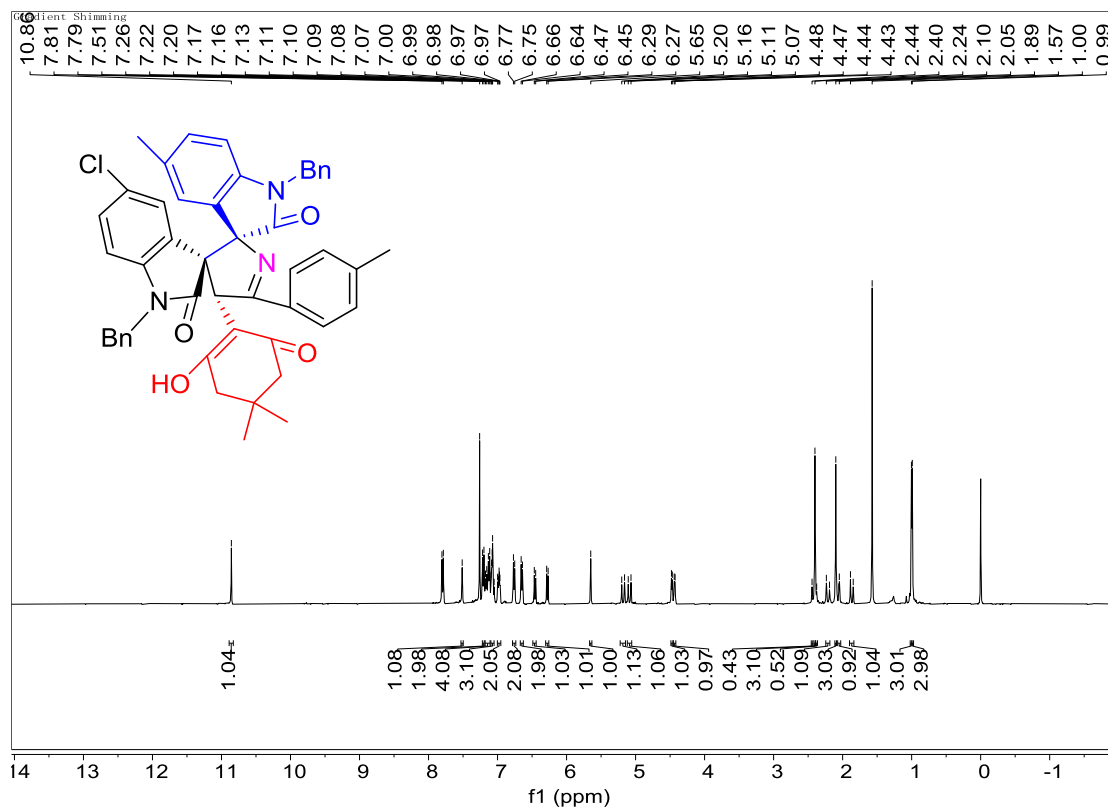
White solid, 48%, m.p. 287–289°C; ¹H NMR (400 MHz, CDCl₃) δ: 7.45 (d, *J* = 2.0 Hz, 1H, ArH), 7.29 - 7.26 (m, 3H, ArH), 7.25 - 7.21 (m, 5H, ArH), 7.13 - 7.06 (m, 3H, ArH), 6.98 (s, 1H, ArH), 6.80 (dd, *J*₁ = 8.0 Hz, *J*₂ = 1.6 Hz, 1H, ArH), 6.37 (d, *J* = 8.4 Hz, 1H, ArH), 6.22 (d, *J* = 8.0 Hz, 1H, ArH), 4.97 (d, *J* = 16.0 Hz, 1H, CH), 4.86 (d, *J* = 16.0 Hz, 1H, CH), 4.79 (d, *J* = 16.0 Hz, 1H, CH), 4.70 - 4.66 (m, 2H, CH₂), 3.88 - 3.80 (m, 1H, CH), 3.71 - 3.66 (m, 1H, CH), 2.47 (d, *J* = 16.0 Hz, 1H, CH), 2.36 (d, *J* = 15.6 Hz, 1H, CH), 2.28 - 2.22 (m, 2H, CH₂), 2.12 (s, 3H, CH₃), 1.27 (s, 3H, CH₃), 1.12 (s, 3H, CH₃), 0.65 (t, *J* = 7.2 Hz, 3H, CH₃) ppm; ¹³C NMR (400 MHz, CDCl₃) δ: 193.1, 174.2, 172.4, 171.4, 156.1, 156.0, 142.0, 141.0, 135.5, 134.4, 131.6, 130.8, 129.6, 129.0, 128.7, 128.6, 128.5, 127.8, 127.3, 127.2, 127.1, 126.4, 125.8, 125.4, 124.3, 110.7, 109.1, 102.5, 102.4, 62.5, 60.1, 50.0, 49.3, 42.7, 42.6, 42.4, 32.9, 29.0, 27.8, 21.1, 13.5 ppm; IR (KBr) ν: 3428, 1721, 1613, 1486, 1171, 951, 840 cm⁻¹; HRMS (ESI-TOF) Calcd. for C₄₃H₄₁ClN₃O₅ ([M+H]⁺): 714.2729, Found: 714.2729.

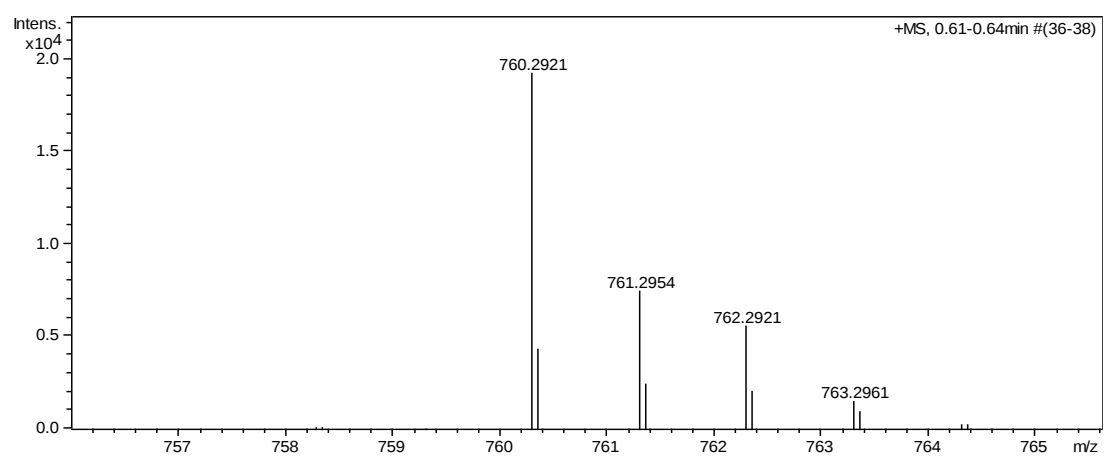
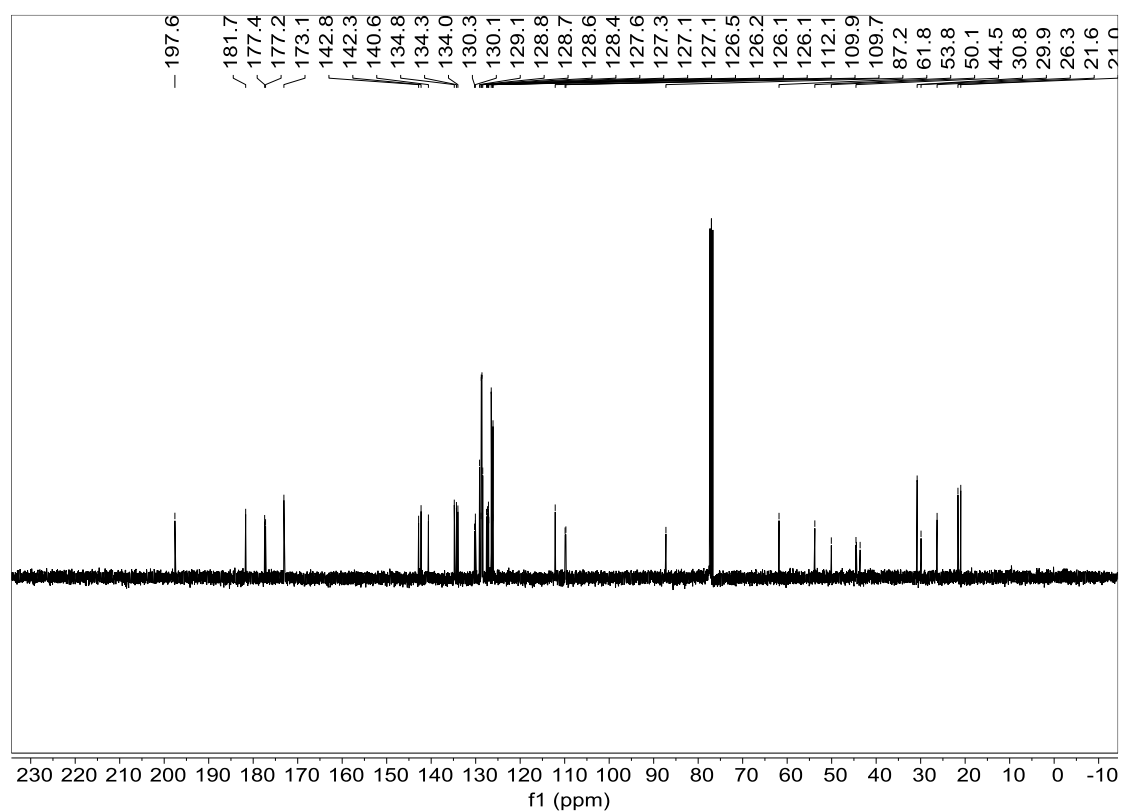




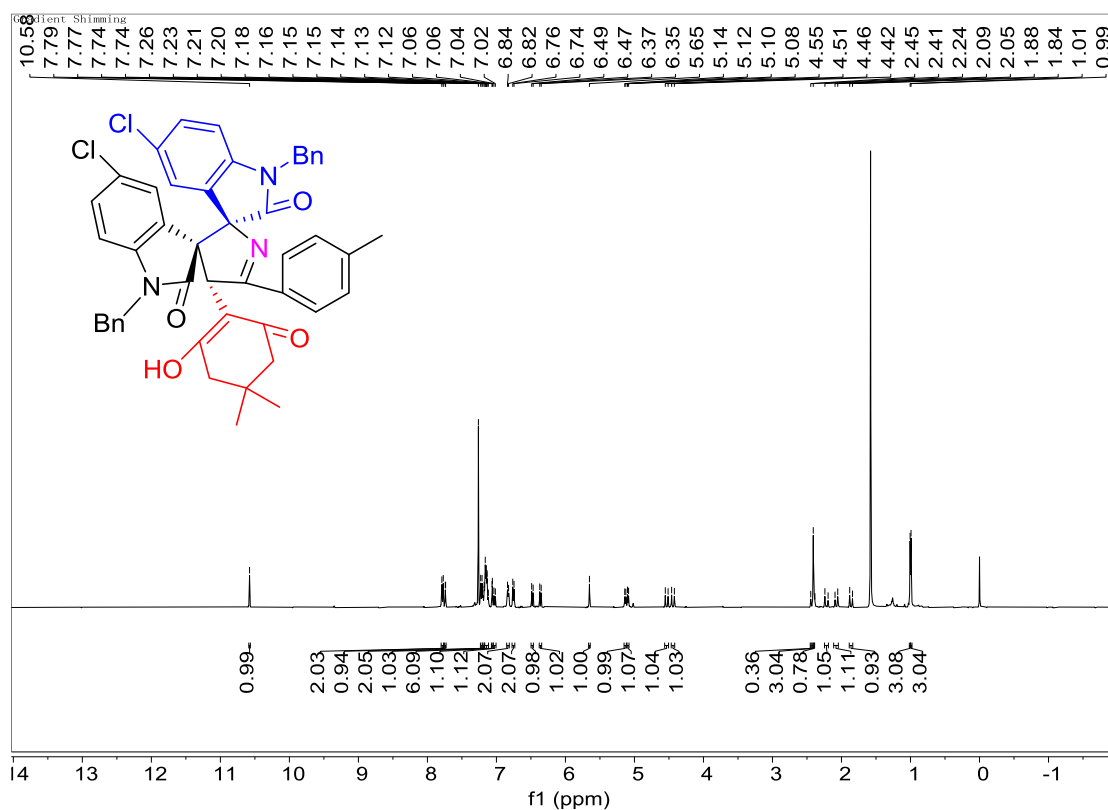
***rel*-(3*R*,3'*S*,4'*R*)-1,1''-Dibenzyl-5''-chloro-4'-(2-hydroxy-4,4-dimethyl-6-oxocyclohex-1-en-1-yl)-5-methyl-5'-(*p*-tolyl)-4'*H*-dispiro[indoline-3,2'-pyrrole-3',3''-indoline]-2,2''-dione (4a):**

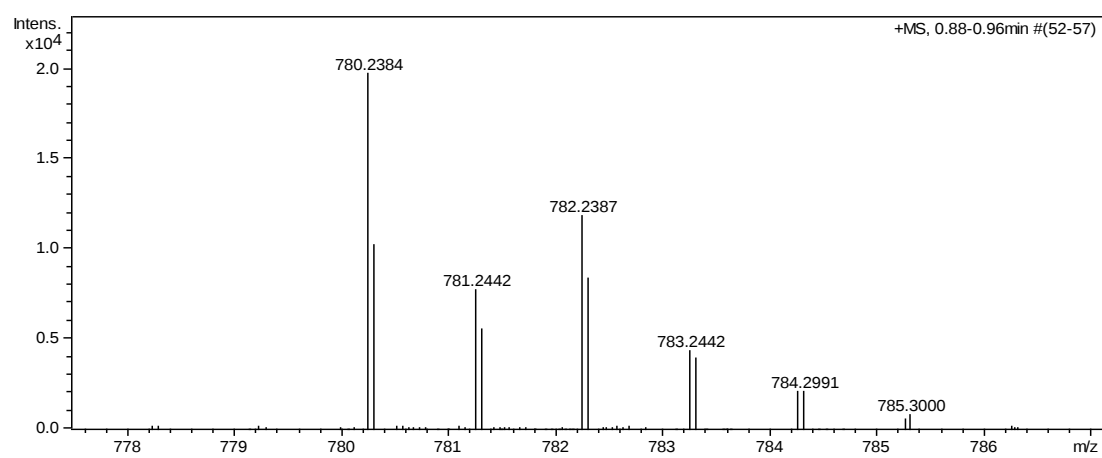
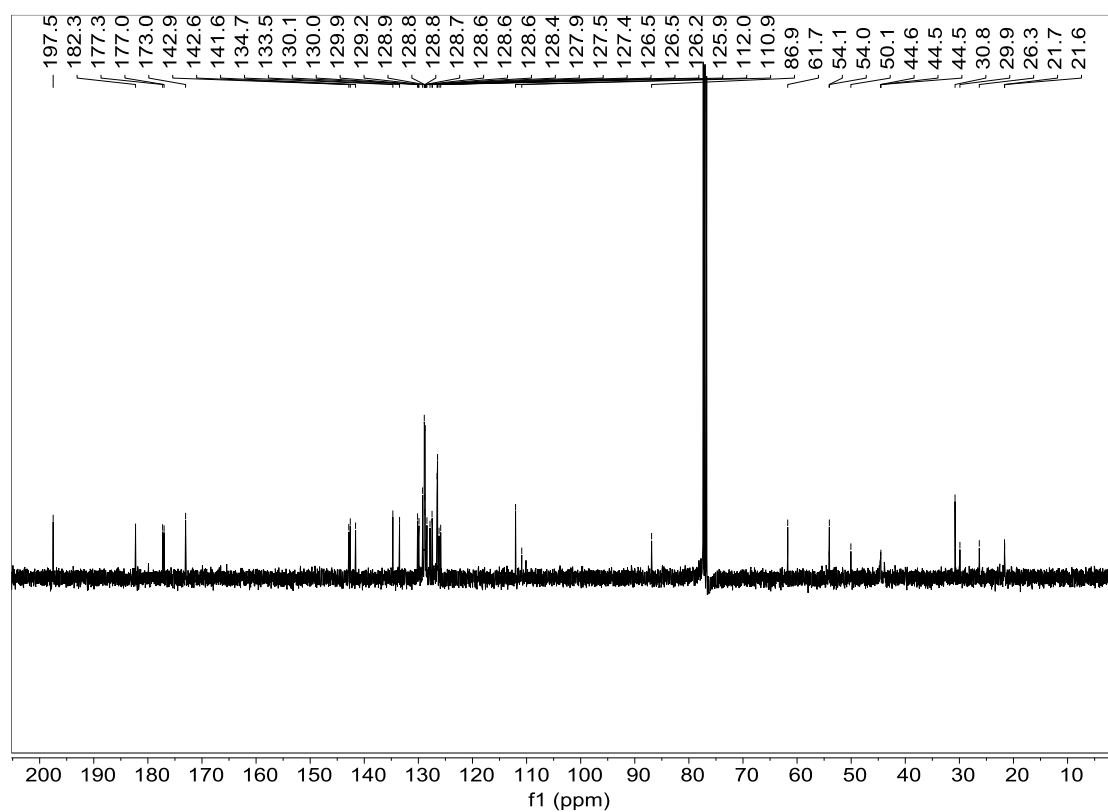
White solid, 85%, m.p. 250-251°C; ¹H NMR (400 MHz, CDCl₃) δ: 10.86 (s, 1H, OH), 7.80 (d, *J* = 8.0 Hz, 2H, ArH), 7.51 (s, 1H, ArH), 7.21 (d, *J* = 8.4 Hz, 2H, ArH), 7.18 - 7.11 (m, 4H, ArH), 7.10 - 7.05 (m, 3H, ArH), 7.00 - 6.97 (m, 2H, ArH), 6.76 (d, *J* = 7.2 Hz, 2H, ArH), 6.65 (d, *J* = 7.6 Hz, 2H, ArH), 6.46 (d, *J* = 8.0 Hz, 1H, ArH), 6.28 (d, *J* = 8.4 Hz, 1H, ArH), 5.65 (s, 1H, CH), 5.18 (d, *J* = 16.4 Hz, 1H, CH₂), 5.09 (d, *J* = 16.0, 1H, CH₂), 4.47 (d, *J* = 4.8 Hz, 1H, CH₂), 4.43 (d, *J* = 5.2 Hz, 1H, CH₂), 2.41 (d, *J* = 26.8 Hz, 1H, CH₂), 2.40 (s, 3H, CH₃), 2.21 (d, *J* = 18.4 Hz, 1H, CH₂), 2.10 (s, 1H, CH₃), 2.05 (s, 1H, CH₂), 1.87 (d, *J* = 16.0 Hz, 1H, CH₂), 1.00 (s, 3H, CH₃), 0.99 (s, 3H, CH₃) ppm; ¹³C NMR (400 MHz, CDCl₃) δ: 197.5, 181.6, 177.4, 177.2, 173.0, 142.8, 142.2, 140.6, 134.7, 134.3, 133.9, 130.2, 130.0, 129.1, 128.7, 128.7, 128.5, 128.4, 127.5, 127.3, 127.1, 127.0, 126.4, 126.1, 126.1, 126.0, 112.1, 109.8, 109.7, 87.2, 61.8, 53.7, 50.0, 44.5, 44.4, 43.6, 30.7, 29.9, 26.3, 21.6, 20.9 ppm; IR (KBr) ν: 3756, 3056, 3023, 2984, 2988, 1832, 1792, 1526, 1545, 1368, 1285, 1145, 1025, 956, 882 cm⁻¹; HRMS (ESI-TOF) Calcd. for C₄₈H₄₃ClN₃O₅ ([M+H]⁺): 760.2937, Found: 760.2921.



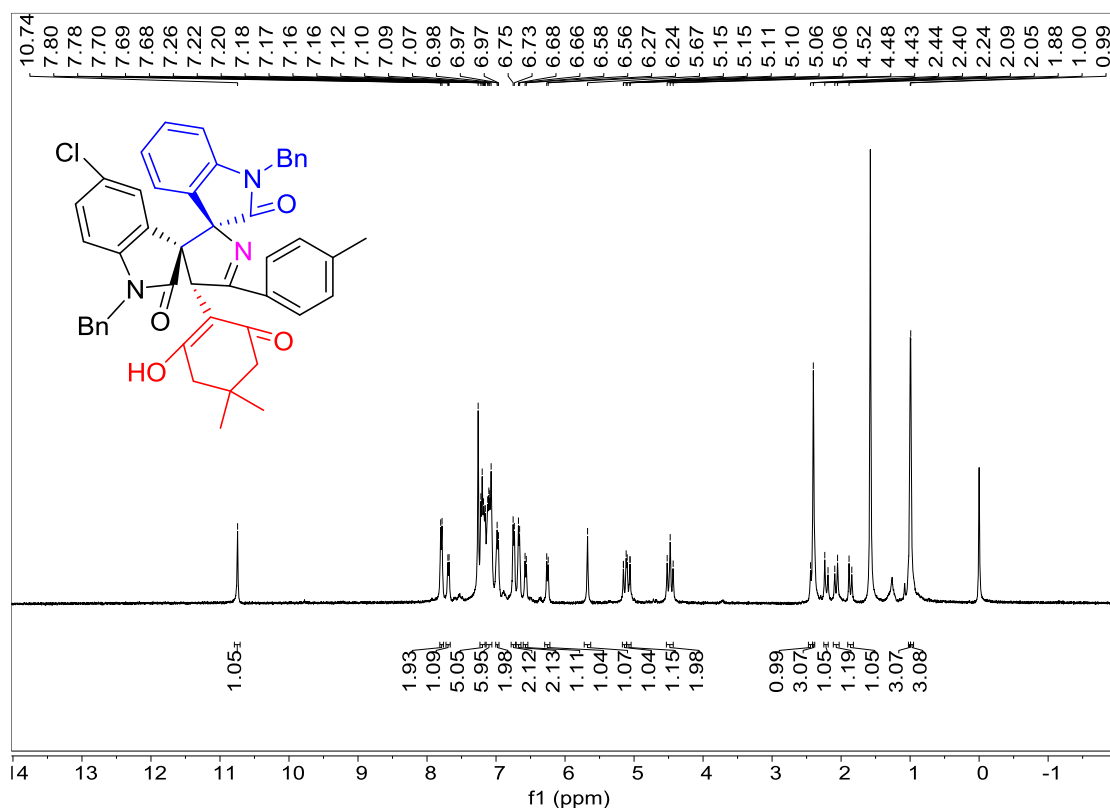


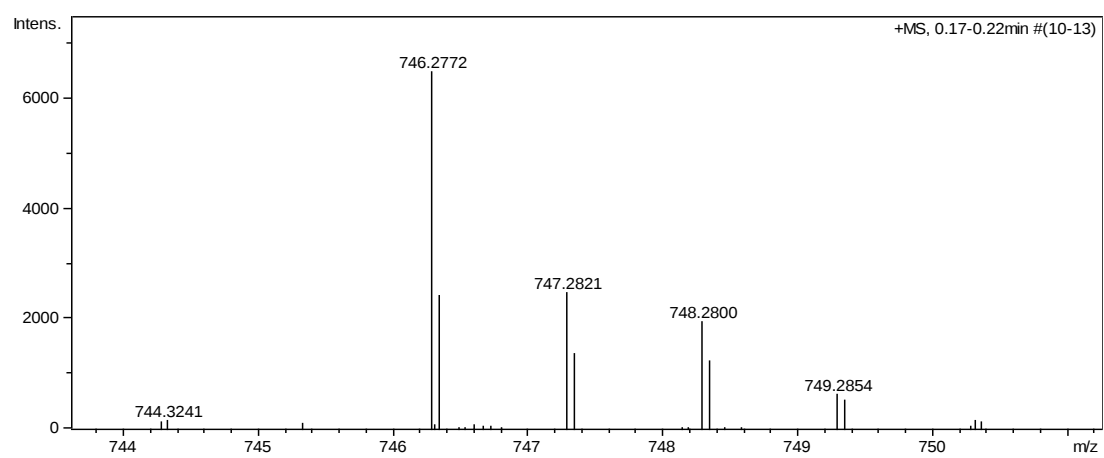
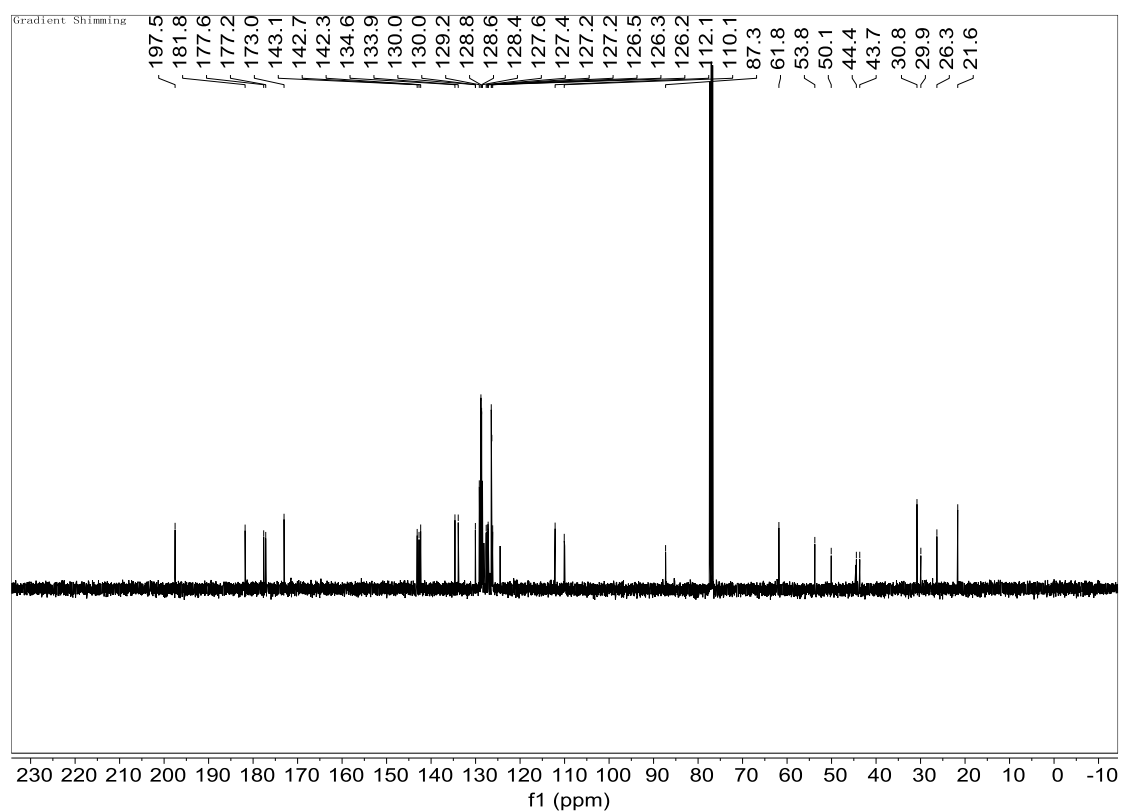
***rel*-(3*R*,3'*S*,4'*R*)-1,1''-Dibenzyl-5,5''-dichloro-4'-(2-hydroxy-4,4-dimethyl-6-oxocyclohex-1-en-1-yl)-5'-(*p*-tolyl)-4'*H*-dispiro[indoline-3,2'-pyrrole-3',3''-indoline]-2,2''-dione (4b):** White solid, 68%, m.p. 172-173°C; ¹H NMR (400 MHz, CDCl₃) δ: 10.58 (s, 1H, OH), 7.78 (d, *J* = 8.4 Hz, 2H, ArH), 7.74 (d, *J* = 2.0 Hz, 1H, ArH), 7.21 (d, *J* = 7.6 Hz, 2H, ArH), 7.19 (d, *J* = 7.6 Hz, 1H, ArH), 7.16 - 7.12 (m, 6H, ArH), 7.06 (d, *J* = 2.0 Hz, 1H, ArH), 7.03 (d, *J* = 8.4 Hz, 1H, ArH), 6.83 (d, *J* = 6.0 Hz, 2H, ArH), 6.75 (d, *J* = 7.2 Hz, 2H, ArH), 6.48 (d, *J* = 8.4 Hz, 1H, ArH), 6.36 (d, *J* = 8.4 Hz, 1H, CH), 5.65 (s, 1H, CH), 5.13 (d, *J* = 6.4 Hz, 1H, CH₂), 5.09 (d, *J* = 6.4 Hz, 1H, CH₂), 4.53 (d, *J* = 16.0 Hz, 1H, CH₂), 4.44 (d, *J* = 16.0 Hz, 1H, CH₂), 2.43 (d, *J* = 16.0 Hz, 1H, CH₂), 2.41 (s, 3H, CH₃), 2.22 (d, *J* = 18.8 Hz, 1H, CH₂), 2.08 (d, *J* = 15.6 Hz, 1H, CH₂), 1.86 (d, *J* = 16.0 Hz, 1H, CH₂), 1.01 (s, 3H, CH₃), 0.99 (s, 3H, CH₃) ppm; ¹³C NMR (400 MHz, CDCl₃) δ: 197.4, 182.2, 177.2, 176.9, 173.0, 142.8, 142.5, 141.5, 134.7, 133.4, 130.1, 129.9, 129.8, 129.2, 128.8, 128.8, 128.8, 128.7, 128.6, 128.5, 128.5, 128.4, 127.8, 127.4, 127.3, 126.5, 126.4, 126.1, 125.8, 112.0, 110.8, 86.8, 61.7, 54.0, 54.0, 50.0, 44.5, 44.5, 44.5, 30.8, 29.9, 26.3, 21.6, 21.6 ppm; IR (KBr) ν: 3763, 3027, 3017, 2956, 2865, 1829, 1756, 1701, 1565, 1365, 1329, 1152, 1029, 926, 806 cm⁻¹; HRMS (ESI-TOF) Calcd. for C₄₇H₄₀Cl₂N₃O₄ ([M+H]⁺): 780.2390, Found: 780.2384.



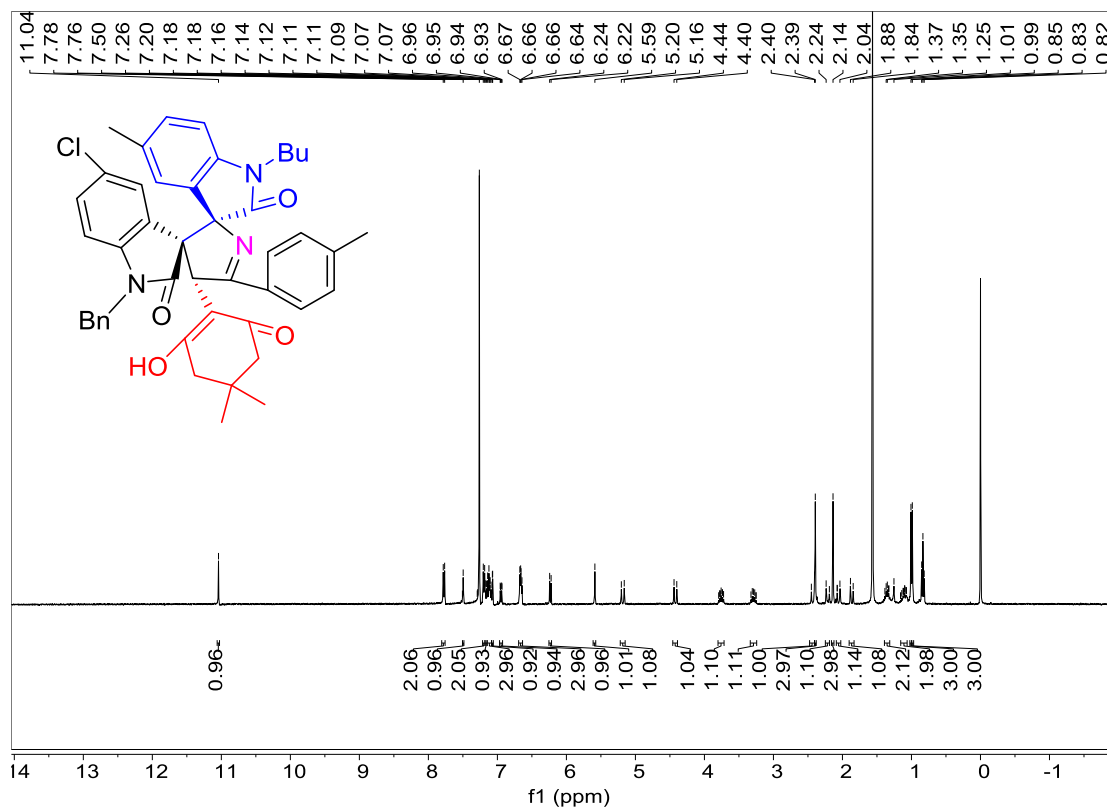


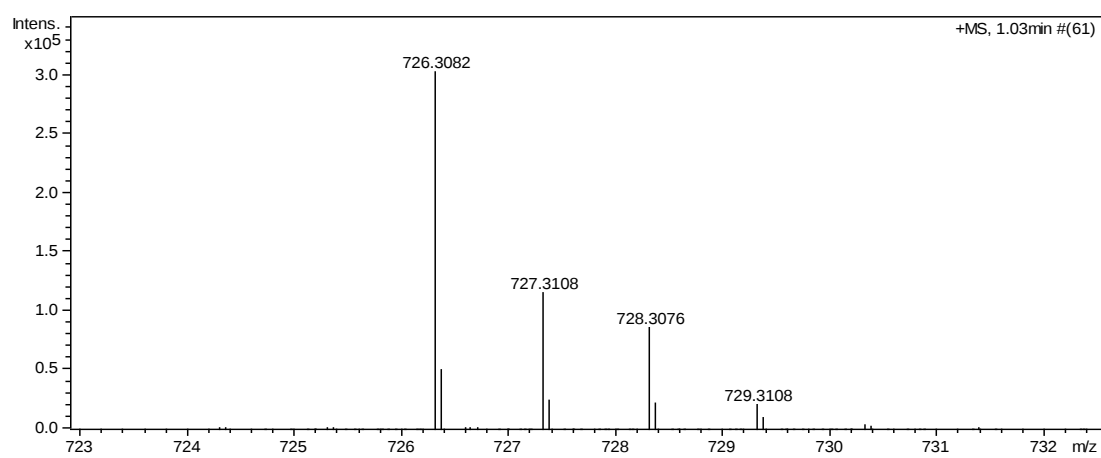
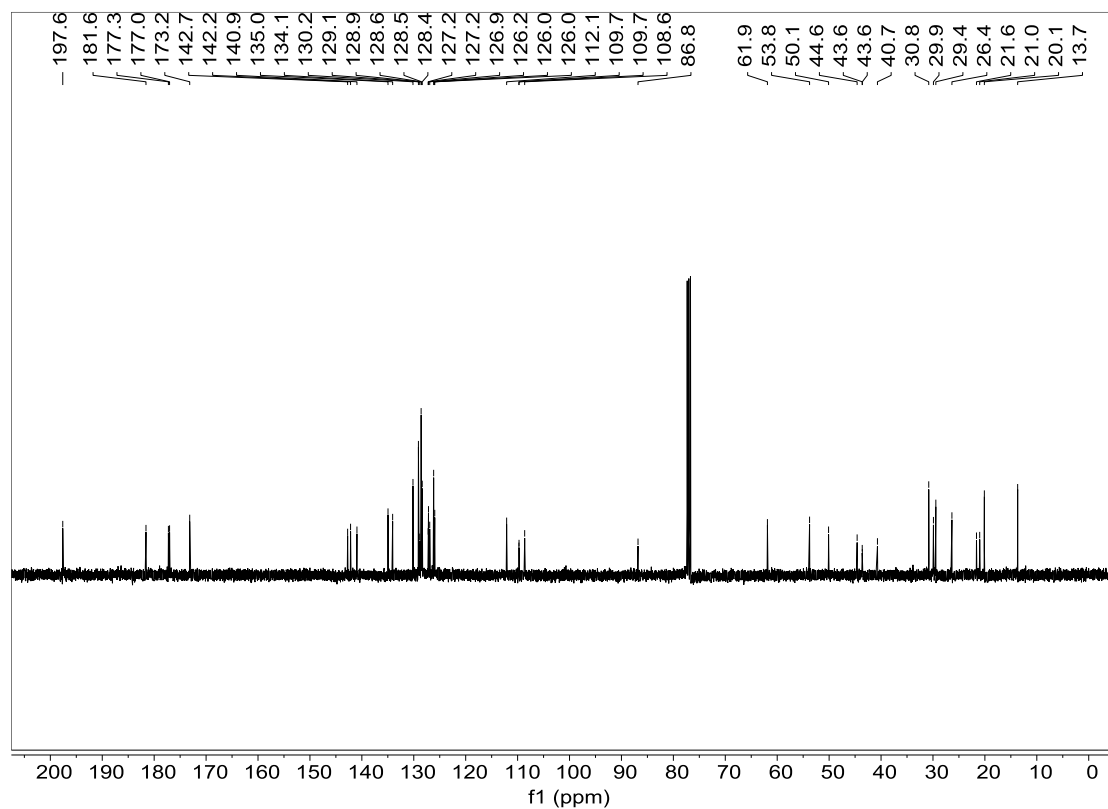
***rel*-(3*R*,3'*S*,4'*R*)-1,1''-Dibenzyl-5''-chloro-4'-(2-hydroxy-4,4-dimethyl-6-oxocyclohex-1-en-1-yl)-5'-(*p*-tolyl)-4'*H*-dispiro[indoline-3,2'-pyrrole-3',3''-indoline]-2,2''-dione (4c)**: White solid, 75%, m.p. 251-252°C; ¹H NMR (400 MHz, CDCl₃) δ: 10.75 (s, 1H, OH), 7.79 (d, *J* = 7.6 Hz, 2H, ArH), 7.69 (d, *J* = 6.8 Hz, 1H, ArH), 7.22 - 7.16 (m, 5H, ArH), 7.12 - 7.07 (m, 6H, ArH), 6.98 - 6.97 (m, 2H, ArH), 6.74 (d, *J* = 7.2 Hz, 2H, ArH), 6.67 (d, *J* = 6.8 Hz, 2H, ArH), 6.57 (d, *J* = 7.2 Hz, 1H, ArH), 6.26 (d, *J* = 8.4 Hz, 1H, ArH), 5.67 (s, 1H, CH), 5.14 (d, *J* = 16.0 Hz, 1H, CH₂), 5.08 (d, *J* = 16.4, 1H, CH₂), 4.48 (d, *J* = 17.2 Hz, 2H, CH₂), 2.44 (d, *J* = 5.2 Hz, 1H, CH₂), 2.40 (s, 3H, CH₃), 2.21 (d, *J* = 18.8 Hz, 1H, CH₂), 2.07 (d, *J* = 16.0 Hz, 1H, CH₂), 1.87 (d, *J* = 16.0 Hz, 1H, CH₂), 1.00 (s, 3H, CH₃), 0.99 (s, 3H, CH₃) ppm; ¹³C NMR (400 MHz, CDCl₃) δ: 197.5, 181.7, 177.6, 177.1, 173.0, 143.1, 142.6, 142.3, 134.6, 133.8, 130.0, 130.0, 129.1, 128.7, 128.6, 128.4, 127.6, 127.3, 127.1, 127.1, 126.4, 126.3, 126.1, 112.1, 110.0, 87.2, 61.8, 53.7, 50.0, 44.4, 43.6, 30.8, 29.9, 26.3, 21.6 ppm; IR (KBr) ν: 3778, 3042, 3012, 2985, 2862, 1862, 1792, 1723, 1625, 1425, 1142, 1021, 956, 843 cm⁻¹; HRMS (ESI-TOF) Calcd. for C₄₇H₄₁ClN₃O₄([M+H]⁺): 746.2780, Found: 746.2776.





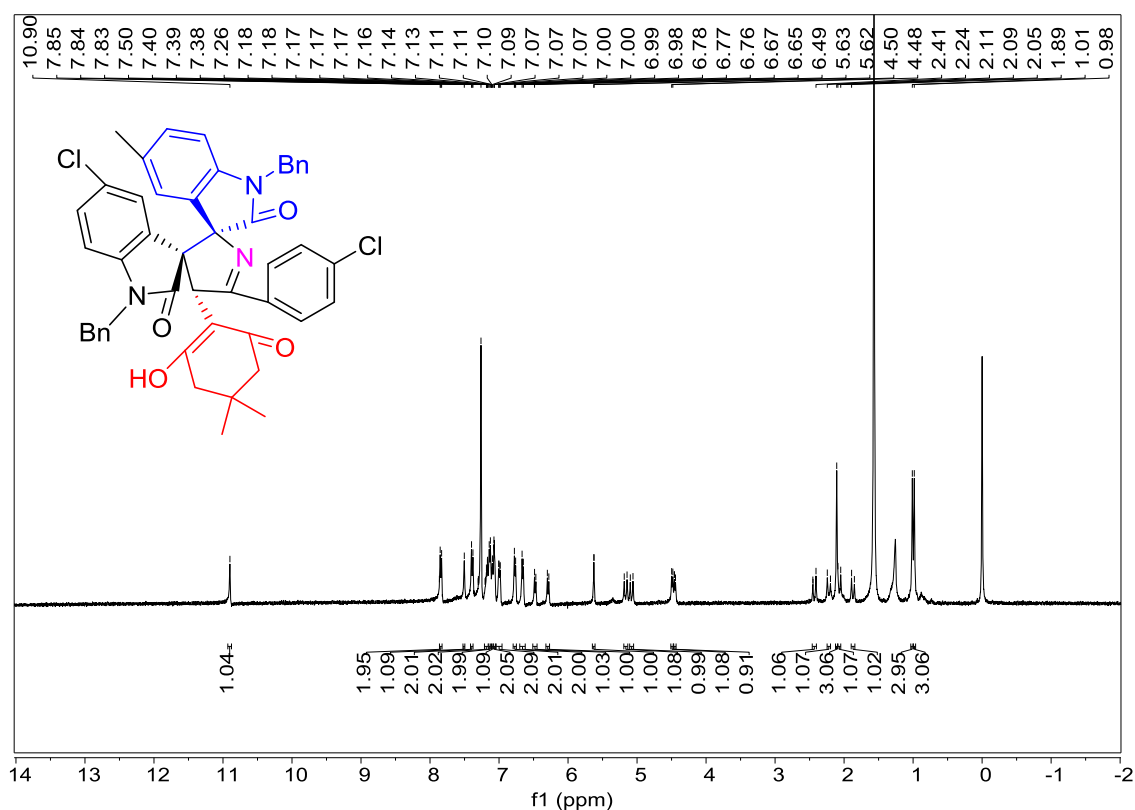
***rel*-(3*R*,3'*S*,4'*R*)-1''-Benzyl-1-butyl-5''-chloro-4'-(2-hydroxy-4,4-dimethyl-6-oxocyclohex-1-en-1-yl)-5-methyl-5'-(*p*-tolyl)-4'*H*-dispiro[indoline-3,2'-pyrrole-3',3''-indoline]-2,2''-dione**
(4d): White solid, 72%, m.p. 233-234°C; ¹H NMR (400 MHz, CDCl₃) δ: 11.04 (s, 1H, OH), 7.77 (d, *J* = 8.4 Hz, 2H, ArH), 7.50 (s, 1H, ArH), 7.19 (d, *J* = 7.6 Hz, 2H, ArH), 7.17 (d, *J* = 7.2 Hz, 1H, ArH), 7.14 - 7.09 (m, 3H, ArH), 7.07 (d, *J* = 2.0 Hz, 1H, ArH), 6.96 - 6.93 (d, *J* = 2.0 Hz, 1H, ArH), 6.68 - 6.64 (m, 3H, ArH), 6.23 (d, *J* = 8.4 Hz, 1H, ArH), 5.59 (s, 1H, CH), 5.18 (d, *J* = 16.8 Hz, 1H, CH₂), 4.42 (d, *J* = 16.0, 1H, CH₂), 3.79 - 3.72 (m, 1H, CH₂), 3.33 - 3.25 (m, 1H, CH₂), 4.43 (d, *J* = 17.6 Hz, 1H, CH₂), 2.39 (s, 3H, CH₃), 2.22 (d, *J* = 18.8 Hz, 1H, CH₂), 2.14 (s, 1H, CH₃), 2.06 (d, *J* = 16.0 Hz, 1H, CH₂), 1.86 (d, *J* = 15.6 Hz, 1H, CH₂), 1.39 - 1.33 (m, 2H, CH₂), 1.16 - 1.07 (m, 2H, CH₂), 1.01 (s, 3H, CH₃), 0.99 (s, 3H, CH₃) ppm; ¹³C NMR (400 MHz, CDCl₃) δ: 234.3, 197.5, 181.5, 177.2, 177.0, 173.1, 142.7, 142.1, 140.9, 134.9, 134.0, 130.1, 129.0, 128.8, 128.5, 128.4, 128.3, 127.2, 127.1, 126.9, 126.1, 126.0, 125.9, 112.1, 109.7, 109.7, 108.6, 86.8, 61.8, 53.7, 50.1, 44.6, 43.6, 43.6, 40.6, 30.8, 29.9, 29.4, 26.3, 21.6, 20.9, 20.1, 13.6 ppm; IR (KBr) ν: 3785, 3062, 3002, 2981, 2863, 1872, 1786, 1712, 1625, 1429, 1129, 1052, 956, 821 cm⁻¹; HRMS (ESI-TOF) Calcd. for C₄₅H₄₅ClN₃O₄([M+H]⁺): 726.3093, Found: 726.3082.

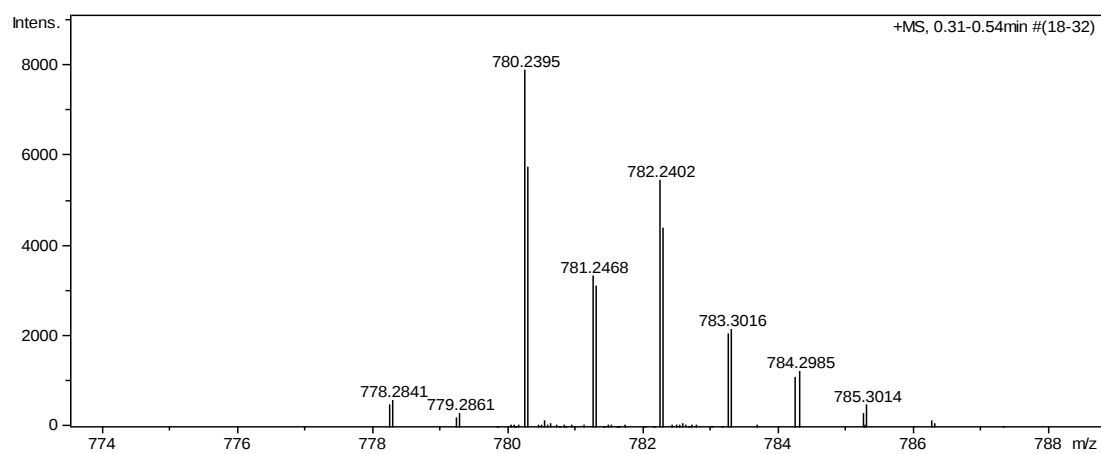
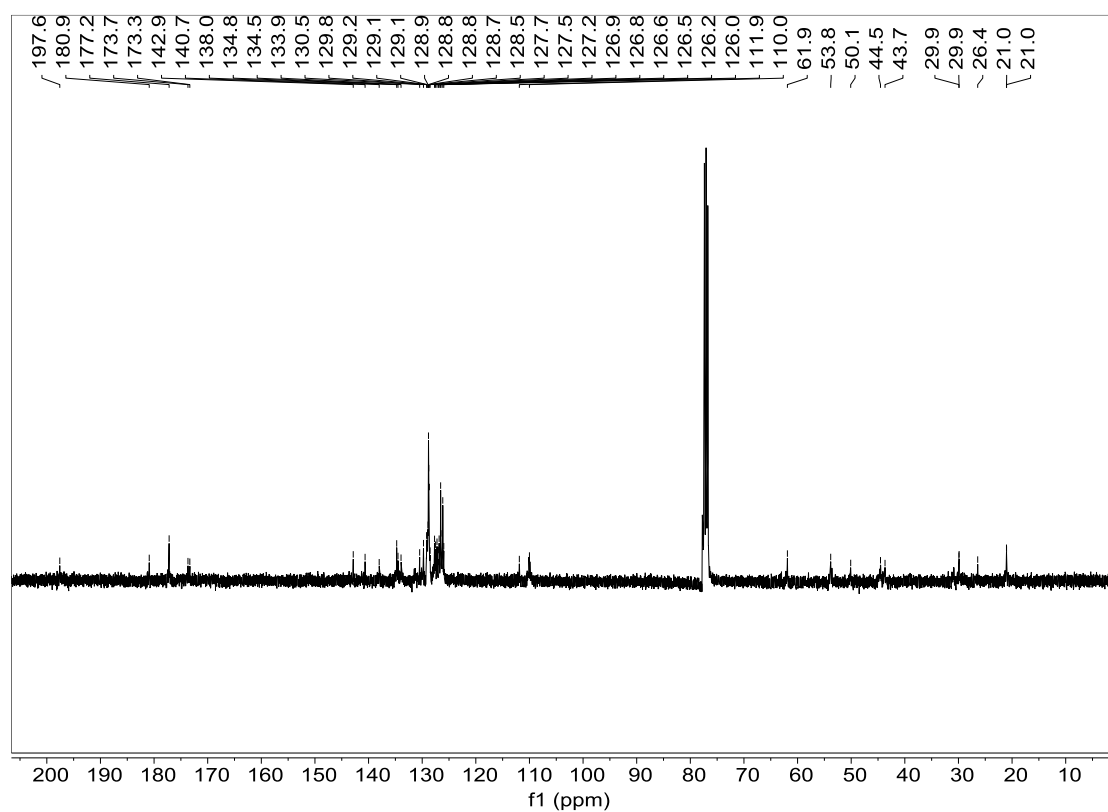




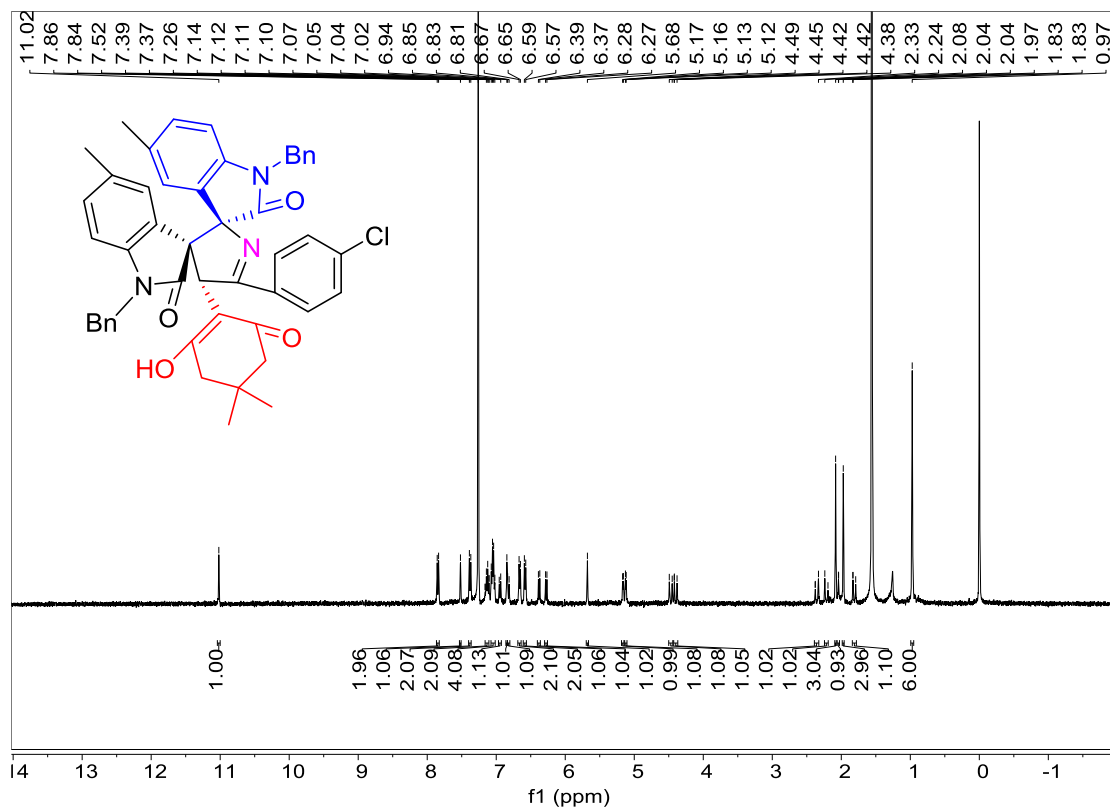
***rel*-(3*R*,3'*S*,4'*R*)-1,1''-Dibenzyl-5''-chloro-5'-(4-chlorophenyl)-4'-(2-hydroxy-4,4-dimethyl-6-oxocyclohex-1-en-1-yl)-5-methyl-4'*H*-dispiro[indoline-3,2'-pyrrole-3',3''-indoline]-2,2''-**

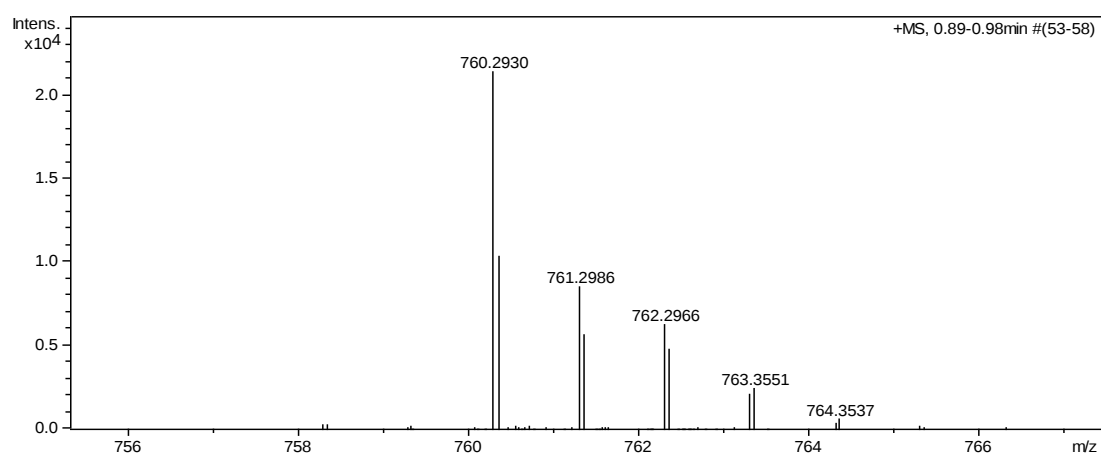
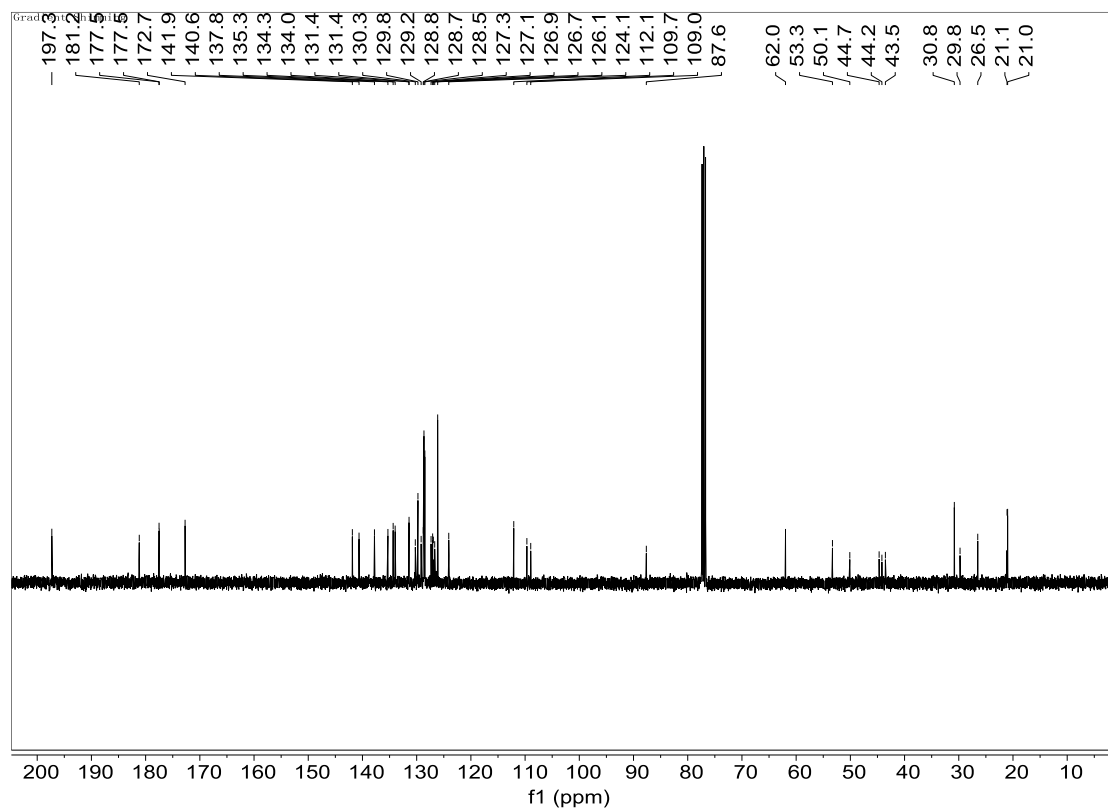
dione (4e): White solid, 63%, m.p. 264-265°C; ¹H NMR (400 MHz, CDCl₃) δ: 10.90 (s, 1H, OH), 7.84 (d, *J* = 8.0 Hz, 2H, ArH), 7.50 (s, 1H, ArH), 7.39 (d, *J* = 8.4 Hz, 2H, ArH), 7.20 - 7.16 (m, 2H, ArH), 7.13 (d, *J* = 6.4 Hz, 2H, ArH), 7.11 - 7.09 (m, 1H, ArH), 7.00 - 6.99 (m, 2H, ArH), 6.77 (d, *J* = 7.2 Hz, 2H, ArH), 6.66 (d, *J* = 7.2 Hz, 2H, ArH), 6.48 (d, *J* = 7.6 Hz, 1H, ArH), 6.29 (d, *J* = 8.8 Hz, 1H, ArH), 5.63 (s, 1H, CH), 5.16 (d, *J* = 16.4 Hz, 1H, CH₂), 5.08 (d, *J* = 16.4, 1H, CH₂), 4.49 (d, *J* = 6.8 Hz, 1H, CH₂), 4.49 (d, *J* = 6.8 Hz, 1H, CH₂), 4.45 (d, *J* = 7.2 Hz, 1H, CH₂), 2.42 (d, *J* = 18.4 Hz, 1H, CH₂), 2.22 (d, *J* = 18.0 Hz, 1H, CH₂), 2.11 (s, 3H, CH₃), 2.07 (d, *J* = 16.4 Hz, 1H, CH₂), 1.87 (d, *J* = 16.4 Hz, 1H, CH₂), 1.01 (s, 3H, CH₃), 0.98 (s, 3H, CH₃) ppm; ¹³C NMR (400 MHz, CDCl₃) δ: 197.5, 180.8, 177.1, 173.6, 173.3, 142.8, 140.6, 138.0, 134.7, 134.5, 133.9, 130.4, 129.7, 129.1, 129.0, 129.0, 128.8, 128.8, 128.7, 128.6, 128.5, 127.6, 127.4, 127.2, 126.9, 126.8, 126.5, 126.4, 126.1, 125.9, 111.8, 109.9, 61.8, 53.8, 50.0, 44.5, 43.6, 29.9, 29.8, 26.4, 21.0, 21.0 ppm; IR (KBr) ν: 3728, 3026, 3001, 2985, 2846, 1785, 1723, 1526, 1426, 1401, 1362, 1123, 1023, 926, 845 cm⁻¹; HRMS (ESI-TOF) Calcd. for C₄₇H₄₀Cl₂N₃O₄ ([M+H]⁺): 780.2390, Found: 780.2395.



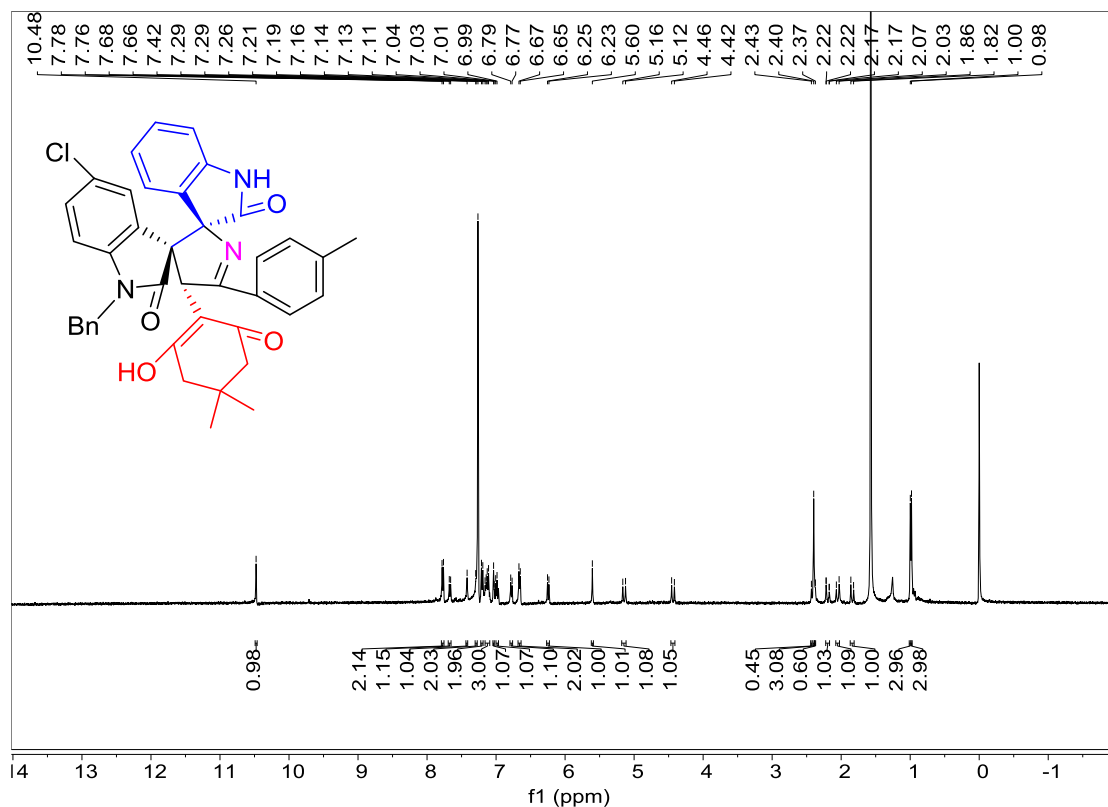


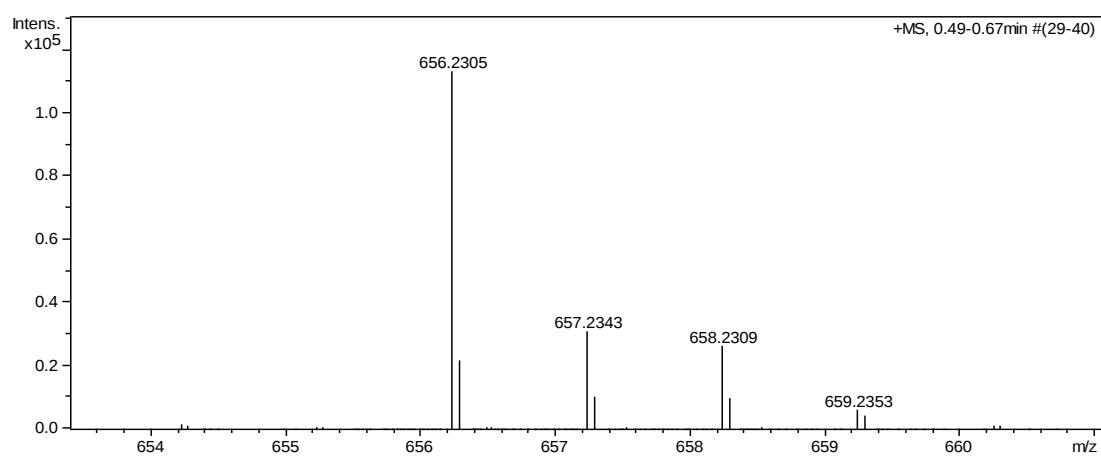
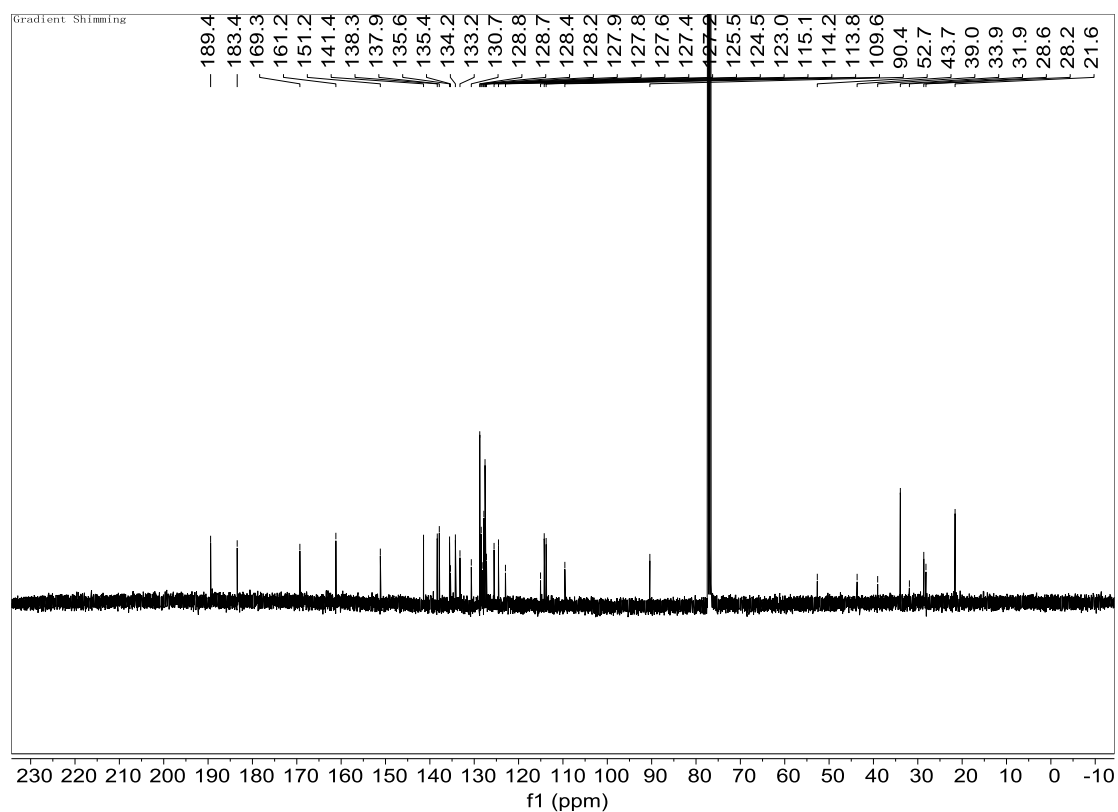
***rel*-(3*R*,3'*S*,4'*R*)-1,1''-Dibenzyl-5'-(4-chlorophenyl)-4'-(2-hydroxy-4,4-dimethyl-6-oxocyclohex-1-en-1-yl)-5,5''-dimethyl-4'*H*-dispiro[indoline-3,2'-pyrrole-3',3''-indoline]-2,2''-dione (4f)**: White solid, 51%, m.p. 265-266°C; ¹H NMR (400 MHz, CDCl₃) δ: 11.02 (s, 1H, OH), 7.85 (d, *J* = 8.0 Hz, 2H, ArH), 7.52 (s, 1H, ArH), 7.38 (d, *J* = 8.0 Hz, 2H, ArH), 7.16 - 7.11 (m, 2H, ArH), 7.07 - 7.02 (m, 4H, ArH), 6.95 (d, *J* = 8.8 Hz, 1H, ArH), 6.85 (s, 1H, ArH), 6.82 (d, *J* = 8.4 Hz, 1H, ArH), 6.66 (d, *J* = 7.6 Hz, 1H, ArH), 6.58 (d, *J* = 7.6 Hz, 2H, ArH), 6.38 (d, *J* = 8.0 Hz, 1H, ArH), 6.27 (d, *J* = 7.6 Hz, 1H, ArH), 5.68 (s, 1H, CH), 5.16 (d, *J* = 4.8 Hz, 1H, CH₂), 5.12 (d, *J* = 4.4, 1H, CH₂), 4.47 (d, *J* = 16.8 Hz, 1H, CH₂), 4.40 (d, *J* = 16.4 Hz, 1H, CH₂), 2.35 (d, *J* = 18.8 Hz, 1H, CH₂), 2.22 (d, *J* = 18.4 Hz, 1H, CH₂), 2.08 (s, 3H, CH₃), 2.04 (s, 1H, CH₂), 1.97 (s, 3H, CH₃), 1.82 (d, *J* = 16.4 Hz, 1H, CH₂), 0.97 (s, 6H, CH₃) ppm; ¹³C NMR (400 MHz, CDCl₃) δ: 197.2, 181.1, 177.5, 177.4, 172.7, 141.8, 140.6, 137.7, 135.2, 134.3, 133.9, 131.4, 131.3, 130.2, 129.7, 129.1, 128.7, 128.6, 128.4, 127.3, 127.0, 126.9, 126.6, 126.1, 124.0, 112.0, 109.6, 108.9, 87.6, 61.9, 53.2, 50.0, 44.6, 44.1, 43.5, 30.8, 29.7, 26.5, 21.0, 20.9 ppm; IR (KBr) ν: 3712, 3026, 2972, 2866, 1842, 1729, 1617, 1527, 1321, 1293, 1151, 1028, 962, 811 cm⁻¹; HRMS (ESI-TOF) Calcd. for C₄₈H₄₃ClN₃O₄ ([M+H]⁺): 760.2937, Found: 760.2930.



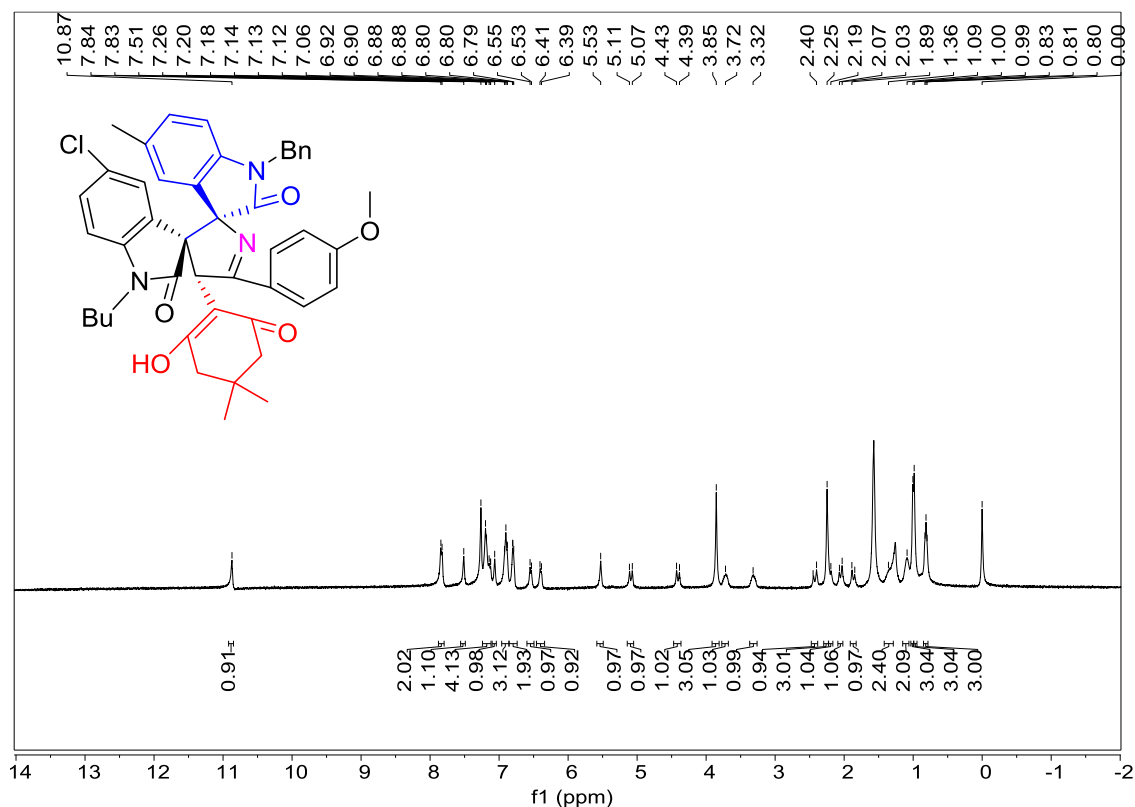


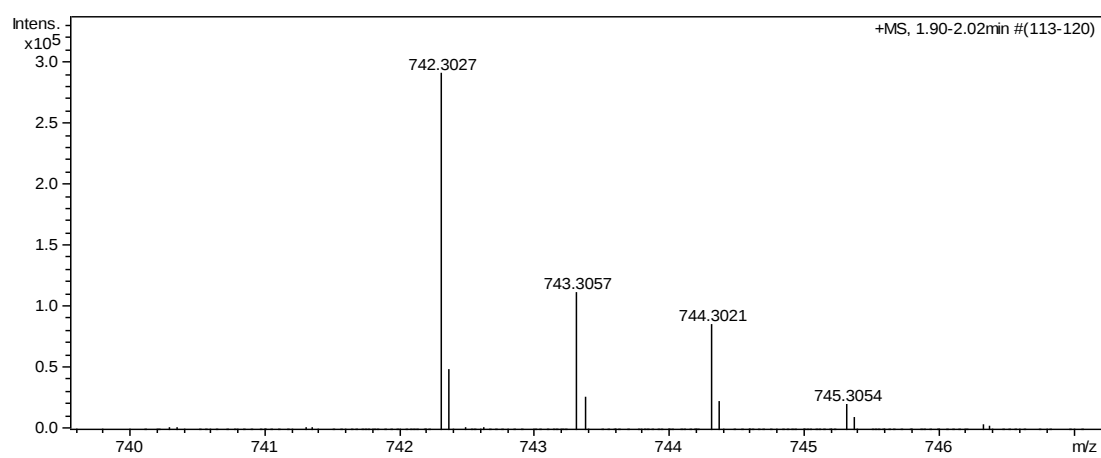
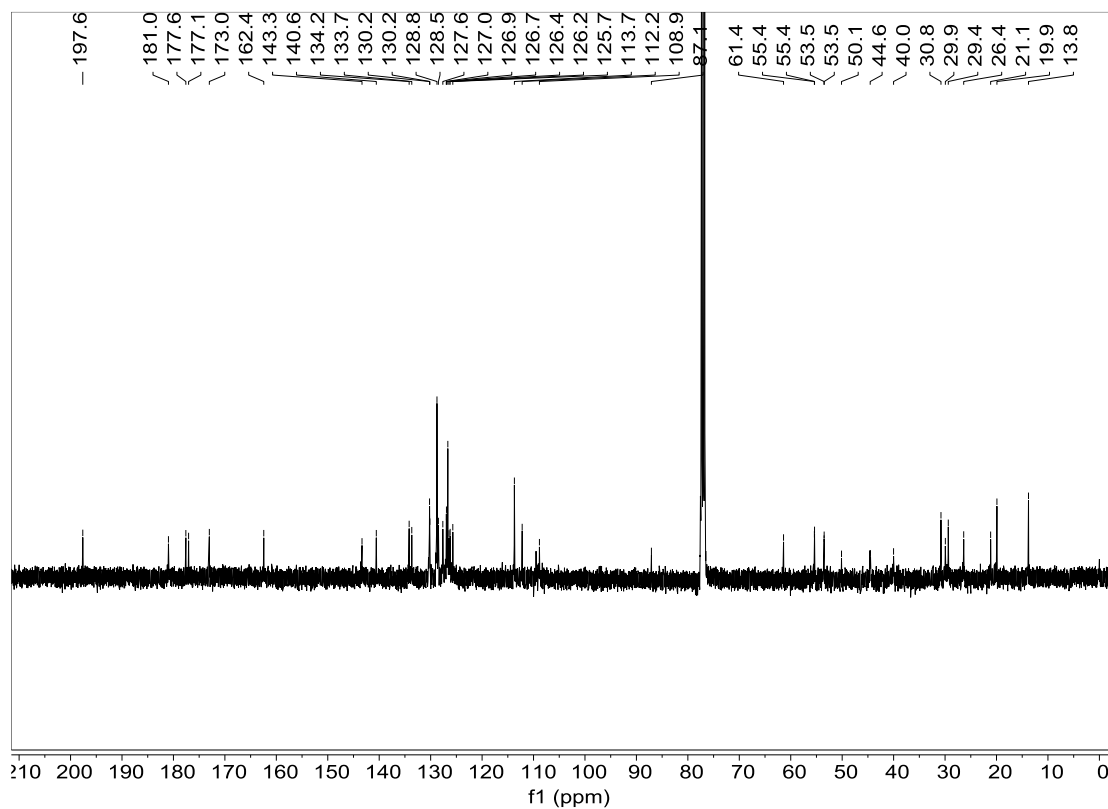
***rel*-(3*R*,3'*S*,4'*R*)-1''-Benzyl-5''-chloro-4'-(2-hydroxy-4,4-dimethyl-6-oxocyclohex-1-en-1-yl)-5'-(*p*-tolyl)-4'*H*-dispiro[indoline-3,2'-pyrrole-3',3''-indoline]-2,2''-dione (4g)**: White solid, 34%, m.p. 279-280°C; ¹H NMR (400 MHz, CDCl₃) δ: 10.48 (s, 1H, OH), 7.77 (d, *J* = 8.4 Hz, 2H, ArH), 7.67 (d, *J* = 7.6 Hz, 1H, ArH), 7.42 (s, 1H, NH), 7.29 (s, 2H, ArH), 7.20 (d, *J* = 8.0 Hz, 2H, ArH), 7.16 - 7.11 (m, 3H, ArH), 7.04 (s, 1H, ArH), 7.01 - 6.99 (m, 1H, ArH), 6.78 (d, *J* = 8.0 Hz, 1H, ArH), 6.66 (d, *J* = 7.6 Hz, 2H, ArH), 6.24 (d, *J* = 8.4, 1H, ArH), 5.61 (s, 1H, CH), 5.14 (d, *J* = 16.0 Hz, 1H, CH₂), 4.44 (d, *J* = 16.0 Hz, 1H, CH₂), 2.40 (d, *J* = 22.4, 1H, CH₂), 2.40 (s, 3H, CH₃), 2.19 (d, *J* = 18.4 Hz, 1H, CH₂), 2.05 (d, *J* = 16.0 Hz, 1H, CH₂), 1.84 (d, *J* = 15.6 Hz, 1H, CH₂), 1.00 (s, 3H, CH₃), 0.98 (s, 3H, CH₃) ppm; ¹³C NMR (101 MHz, CDCl₃) δ: 189.4, 183.4, 169.2, 161.1, 151.1, 141.4, 138.3, 137.8, 135.5, 135.3, 134.2, 133.1, 130.6, 128.7, 128.6, 128.4, 128.1, 127.8, 127.8, 127.5, 127.4, 127.2, 125.5, 124.5, 122.9, 115.0, 114.2, 113.7, 109.5, 90.3, 52.6, 43.6, 39.0, 33.9, 31.8, 28.6, 28.1, 21.5 ppm; IR (KBr) ν: 3726, 3023, 2982, 2847, 1856, 1745, 1687, 1521, 1329, 1025, 925, 829 cm⁻¹; HRMS (ESI-TOF) Calcd. for C₄₀H₃₅ClN₃O₄ ([M + H]⁺): 656.2303, Found: 656.2305.





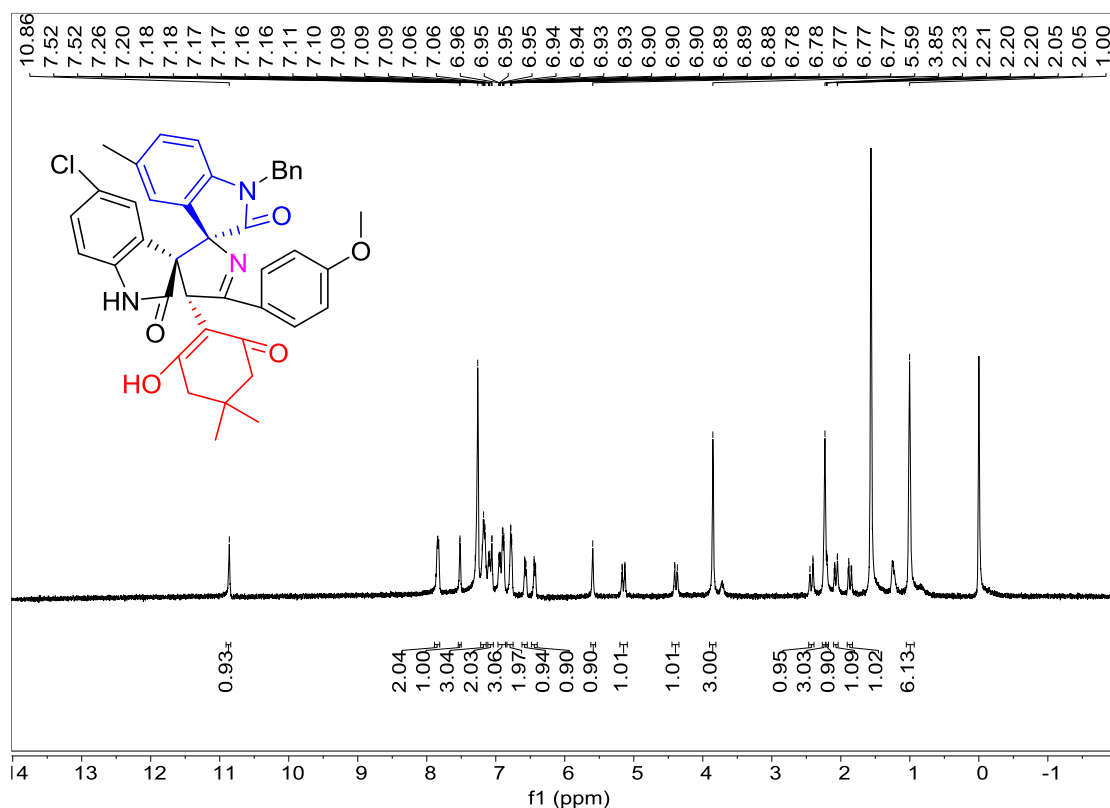
***rel*-(3*R*,3'*S*,4'*R*)-1-Benzyl-1''-butyl-5''-chloro-4'-(2-hydroxy-4,4-dimethyl-6-oxocyclohex-1-en-1-yl)-5'-(4-methoxyphenyl)-5-methyl-4*H*-dispiro[indoline-3,2'-pyrrole-3',3''-indoline]-2,2''-dione (4h)**: White solid, 65%, m.p. 228-230°C; ¹H NMR (400 MHz, CDCl₃) δ: 10.87 (s, 1H, OH), 7.83 (d, *J* = 6.8 Hz, 2H, ArH), 7.51 (s, 1H, ArH), 7.20 - 7.12 (m, 4H, ArH), 7.06 (s, 1H, ArH), 6.92 - 6.88 (m, 3H, ArH), 6.80 - 6.79 (m, 2H, ArH), 6.54 (d, *J* = 8.0 Hz, 1H, ArH), 6.40 (d, *J* = 8.8, 1H, ArH), 5.53 (s, 1H, CH), 5.09 (d, *J* = 16.8, 1H, CH₂), 4.41 (d, *J* = 17.2 Hz, 1H, CH₂), 3.85 (s, 3H, OCH₃), 3.72 (s, 1H, CH₂), 3.32 (s, 1H, CH₂), 2.43 (d, *J* = 20.4 Hz, 1H, CH), 2.25 (s, 3H, CH₃), 2.19 (s, 1H, CH₂), 2.05 (d, *J* = 16.0 Hz, 1H, CH₂), 1.87 (d, *J* = 16.4 Hz, 1H, CH₂), 1.36 (s, 2H, CH₂), 1.09 (s, 2H, CH₂), 1.00 (s, 3H, CH₃), 0.99 (s, 3H, CH₃), 0.81 (t, *J* = 6.4 Hz, 3H, CH₃) ppm; ¹³C NMR (400 MHz, CDCl₃) δ: 197.6, 180.9, 177.5, 177.0, 173.0, 162.4, 143.3, 140.5, 134.1, 133.6, 130.2, 130.1, 128.7, 128.4, 127.6, 126.9, 126.9, 126.6, 126.4, 126.1, 125.6, 113.7, 112.1, 108.8, 87.0, 61.3, 55.4, 55.3, 53.5, 53.4, 50.1, 44.5, 40.0, 30.7, 29.9, 29.3, 26.3, 21.1, 19.9, 13.7 ppm; IR (KBr) ν: 3689, 3068, 3019, 2956, 2847, 1872, 1742, 1652, 1526, 1126, 1059, 971, 863 cm⁻¹; HRMS (ESI-TOF) Calcd. for C₄₅H₄₅ClN₃O₅ ([M+H]⁺): 742.3042, Found: 742.3027.

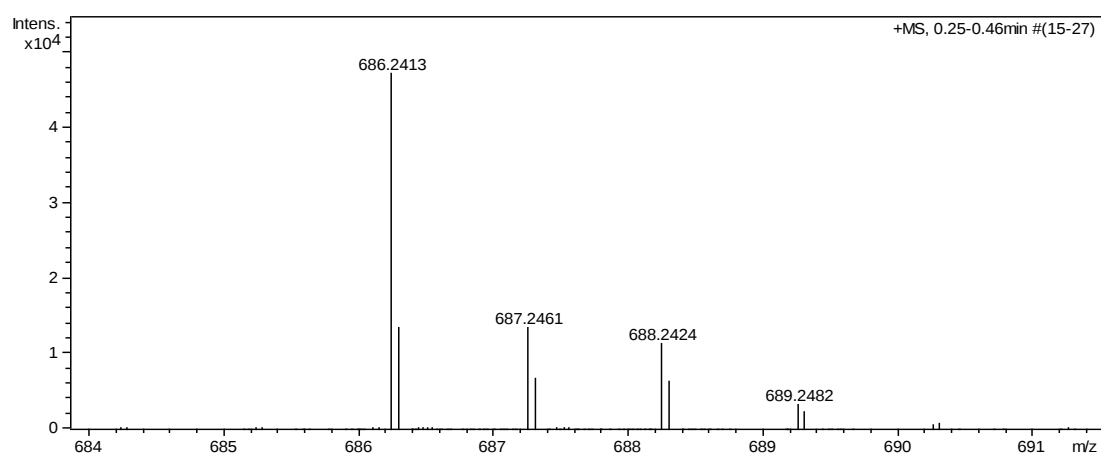
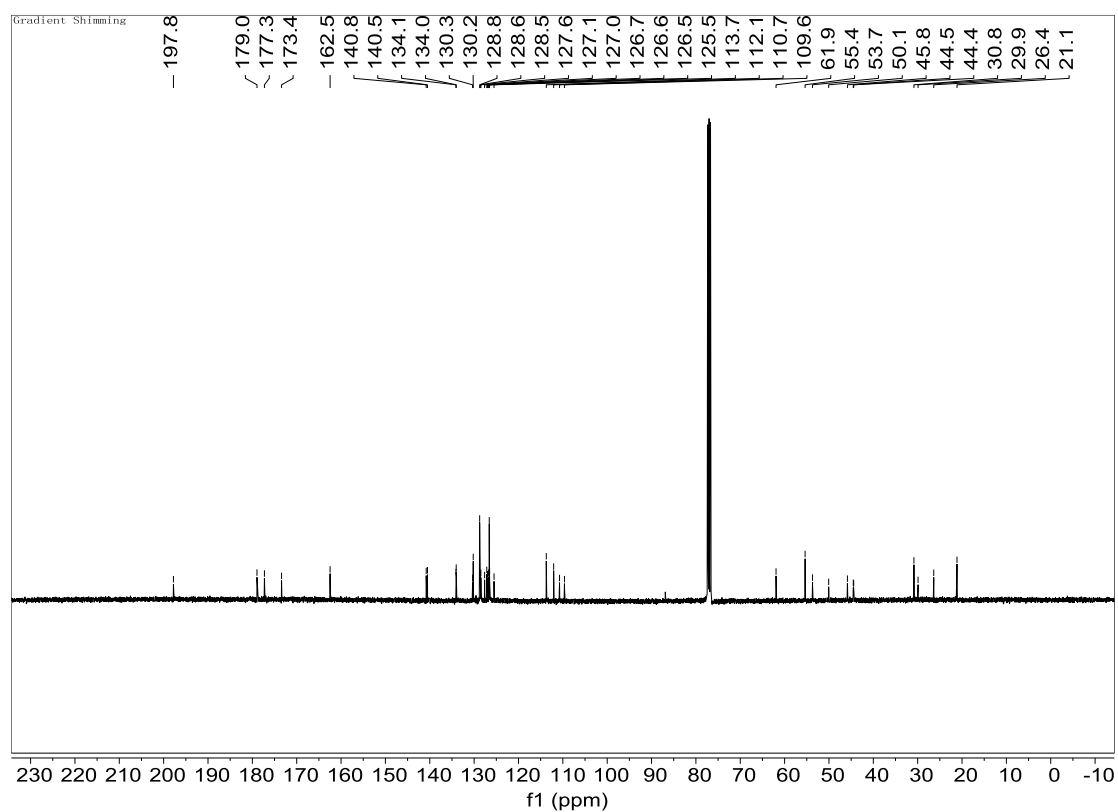




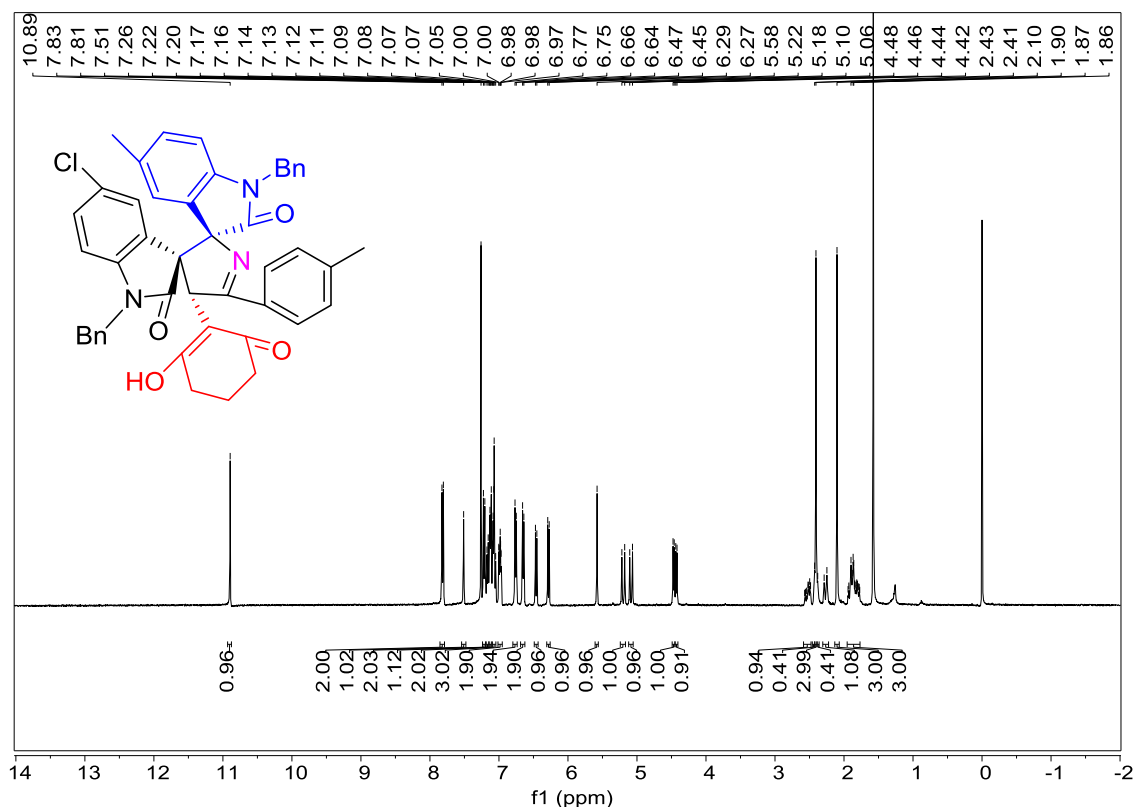
***rel*-(3*R*,3'*S*,4'*R*)-1-Benzyl-5''-chloro-4'-(2-hydroxy-4,4-dimethyl-6-oxocyclohex-1-en-1-yl)-5'-(4-methoxyphenyl)-5-methyl-4'*H*-dispiro[indoline-3,2'-pyrrole-3',3''-indoline]-2,2''-dione**

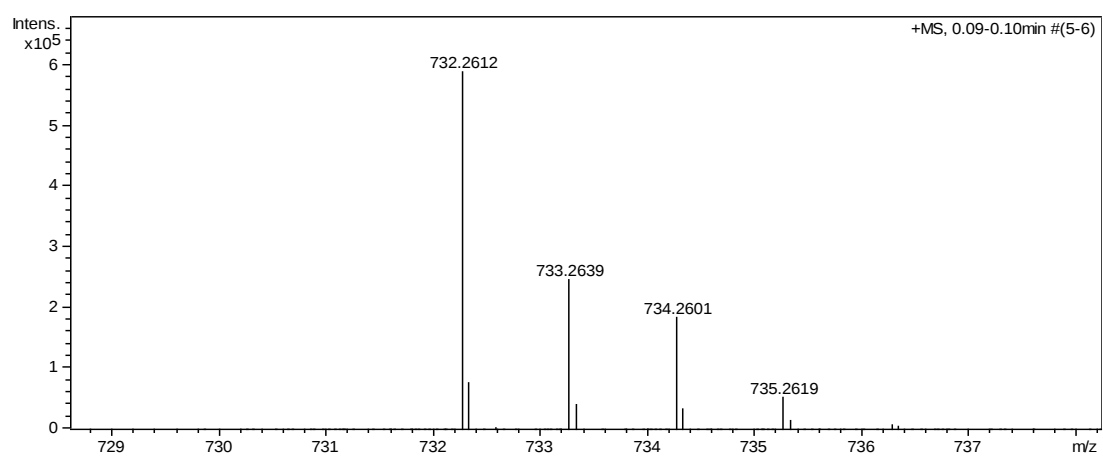
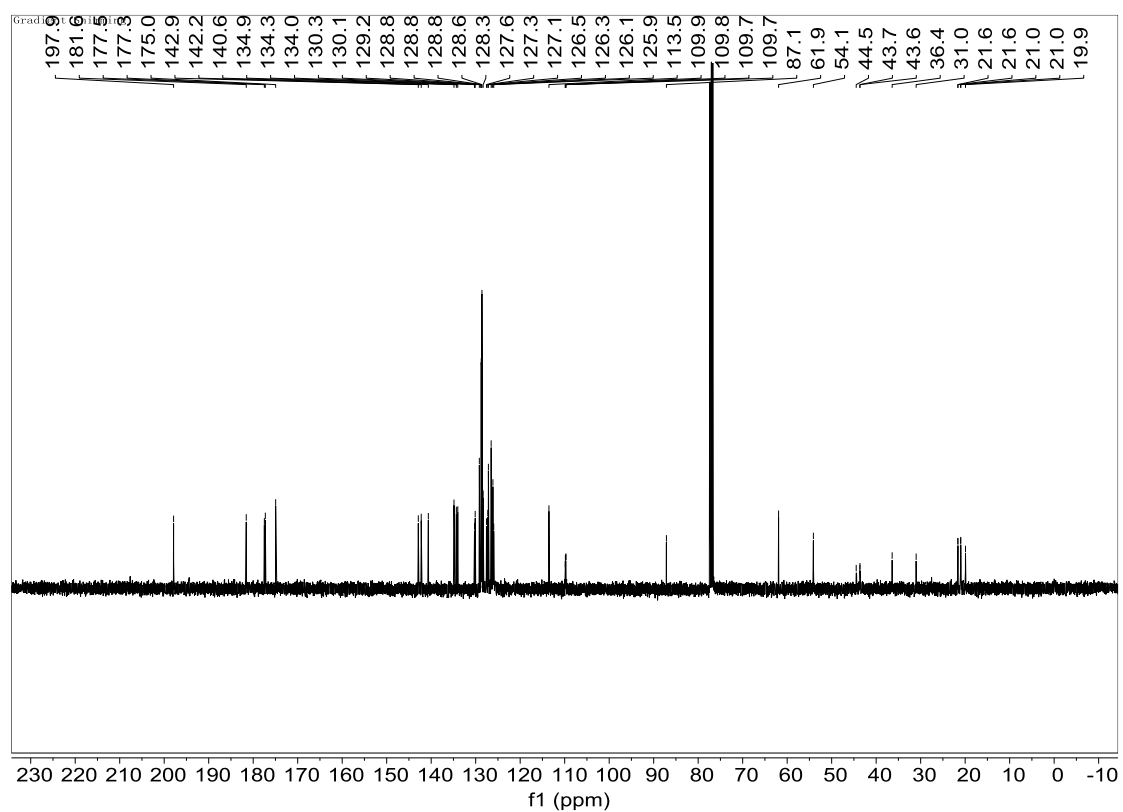
(4i): White solid, 62%, m.p. 226-225°C; ¹H NMR (400 MHz, CDCl₃) δ: 10.86 (s, 1H, OH), 7.85 - 7.83 (m, 2H, ArH), 7.52 (s, 1H, NH), 7.20 - 7.16 (m, 3H, ArH), 7.11 - 7.06 (m, 2H, ArH), 6.96 - 6.88 (m, 3H, ArH), 6.78 - 6.77 (m, 2H, ArH), 6.58 - 6.56 (m, 1H, ArH), 6.45 - 6.42 (m, 1H, ArH), 5.60 (s, 1H, CH), 5.15 (d, *J* = 16.0 Hz, 1H, CH₂), 4.39 (d, *J* = 16.0, 1H, CH₂), 4.39 (d, *J* = 16.0 Hz, 1H, CH₂), 4.39 (d, *J* = 16.0 Hz, 1H, CH₂), 3.86 (s, 3H, OCH₃), 2.42 (d, *J* = 17.2 Hz, 1H, CH₂), 2.21 - 2.20 (m, 1H, CH₂), 2.10 (s, 1H, CH₃), 2.05 (s, 1H, CH₂), 1.87 (d, *J* = 16.0 Hz, 1H, CH₂), 2.23 (s, 3H, CH₃), 2.06 (d, *J* = 16.0 Hz, 1H, CH₂), 1.87 (d, *J* = 16.4 Hz, 1H, CH₂), 1.00 (s, 6H, CH₃) ppm; ¹³C NMR (101 MHz, CDCl₃) δ: 197.7, 178.9, 177.2, 173.3, 162.4, 140.7, 140.5, 134.0, 134.0, 130.3, 130.1, 128.7, 128.5, 128.4, 127.6, 127.1, 126.9, 126.7, 126.5, 126.5, 125.5, 113.7, 112.0, 110.7, 109.6, 61.9, 55.3, 53.7, 50.0, 45.8, 44.5, 44.4, 30.8, 29.9, 26.3, 21.1 ppm; IR (KBr) ν: 3765, 3521, 3056, 3002, 2963, 2815, 1864, 1749, 1682, 1537, 1352, 1145, 1039, 921, 882 cm⁻¹; HRMS (ESI-TOF) Calcd. for C₄₁H₃₇ClN₃O₅ ([M+H]⁺): 686.2416, Found: 686.2413.



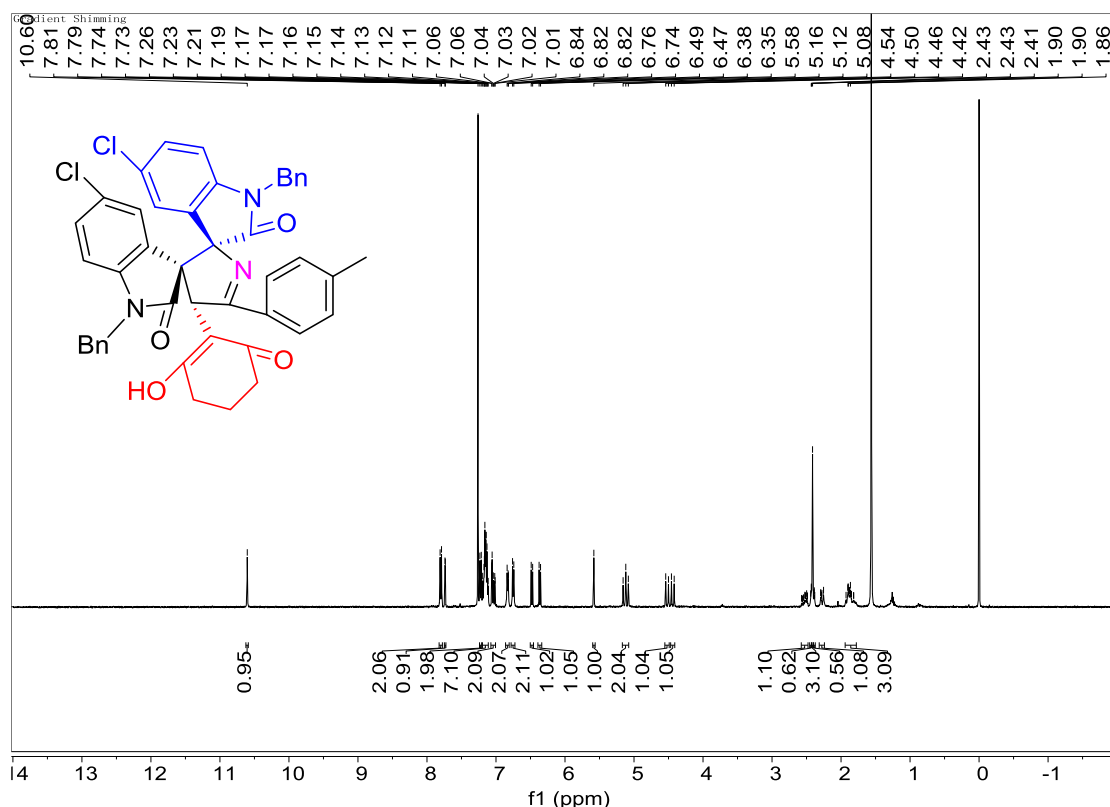


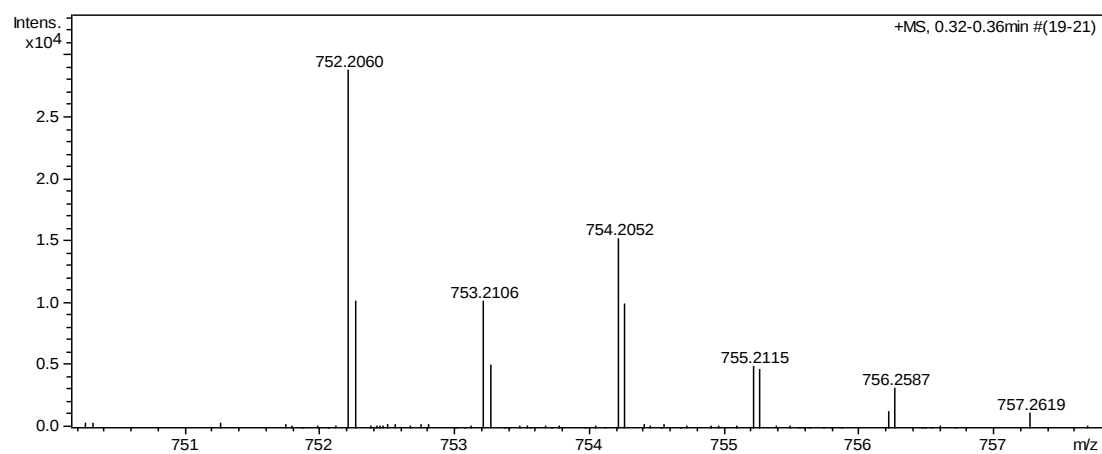
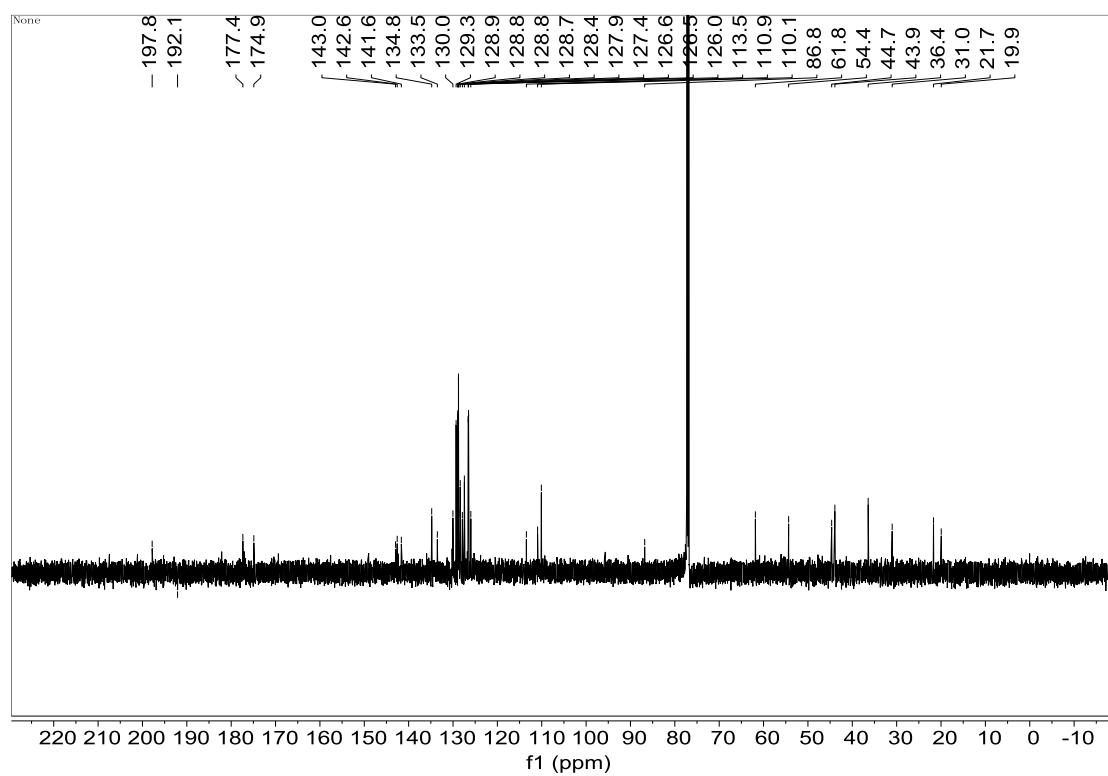
***rel*-(3*R*,3'*S*,4'*R*)-1,1''-dibenzyl-5''-chloro-4'-(2-hydroxy-6-oxocyclohex-1-en-1-yl)-5-methyl-5'-(*p*-tolyl)-4'*H*-dispiro[indoline-3,2'-pyrrole-3',3''-indoline]-2,2''-dione (4j):** White solid, 71%, m.p. 235-236°C; ¹H NMR (400 MHz, CDCl₃) δ: 10.90 (s, 1H, OH), 7.82 (d, *J* = 8.0 Hz, 2H, ArH), 7.21 (d, *J* = 8.0 Hz, 2H, ArH), 7.17 (d, *J* = 7.2 Hz, 1H, ArH), 7.14 - 7.11 (m, 2H, ArH), 7.09 - 7.05 (m, 3H, ArH), 7.00 - 6.97 (m, 2H, ArH), 6.76 (d, *J* = 7.2 Hz, 2H, ArH), 6.65 (d, *J* = 7.2 Hz, 2H, ArH), 6.46 (d, *J* = 8.0 Hz, 1H, ArH), 6.28 (d, *J* = 8.4 Hz, 1H, ArH), 5.58 (s, 1H, CH), 5.20 (d, *J* = 16.4 Hz, 1H, CH₂), 5.08 (d, *J* = 16.0 Hz, 1H, CH₂), 4.47 (d, *J* = 6.8 Hz, 1H, CH₂), 4.43 (d, *J* = 8.2 Hz, 1H, CH₂), 2.57 - 2.49 (m, 1H, CH₂), 2.40 (d, *J* = 18.0 Hz, 1H, CH₂), 2.41 (s, 3H, CH₃), 2.27 (d, *J* = 16.0 Hz, 1H, CH₂), 2.10 (s, 3H, CH₃), 1.94 - 1.77 (m, 3H, CH₂) ppm; ¹³C NMR (400 MHz, CDCl₃) δ: 197.8, 181.5, 177.4, 177.2, 174.9, 142.8, 142.2, 140.6, 134.8, 134.3, 134.0, 130.2, 130.0, 129.1, 128.8, 128.7, 128.7, 128.5, 128.3, 127.5, 127.2, 127.1, 126.5, 126.2, 126.1, 125.9, 113.5, 109.8, 109.8, 109.7, 109.7, 87.1, 61.9, 54.0, 44.4, 43.6, 43.6, 36.4, 31.0, 21.6, 21.6, 21.0, 20.9, 19.9 ppm; IR (KBr) ν: 3692, 3029, 2993, 2862, 1872, 1739, 1668, 1552, 1421, 1192, 1029, 952, 833, 724 cm⁻¹; HRMS (ESI-TOF) Calcd. for C₄₆H₃₈ClN₃O₄ ([M+H]⁺): 732.2624, Found: 732.2612.



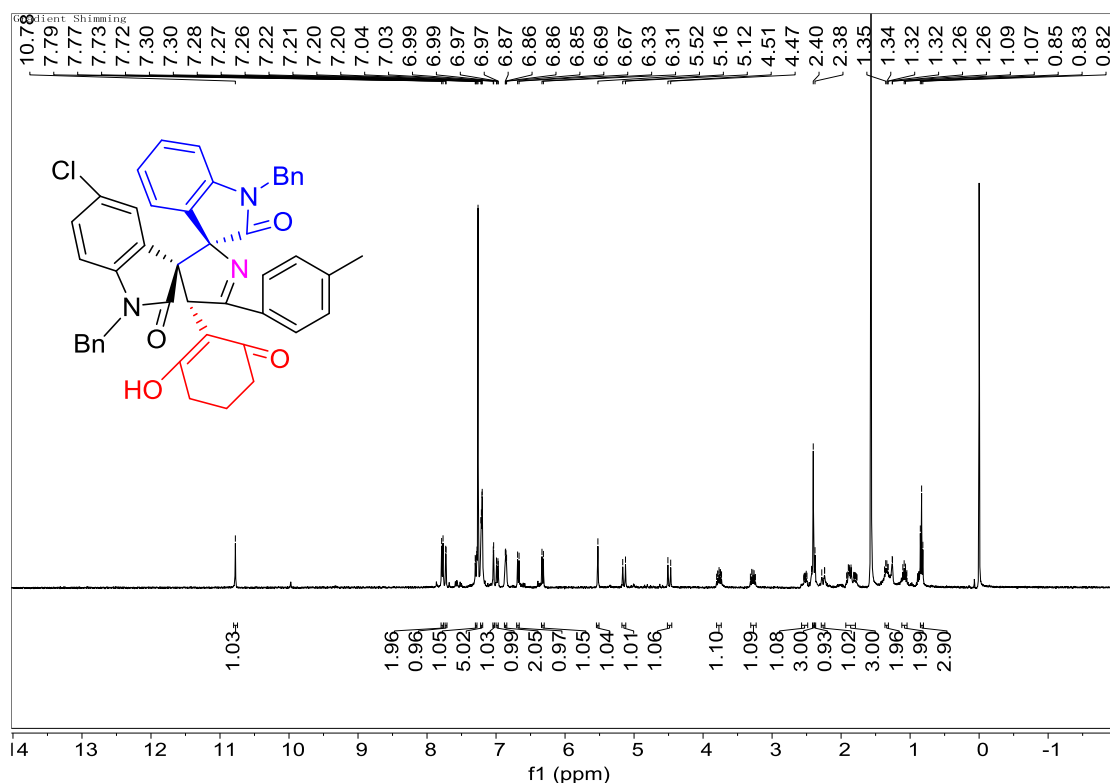


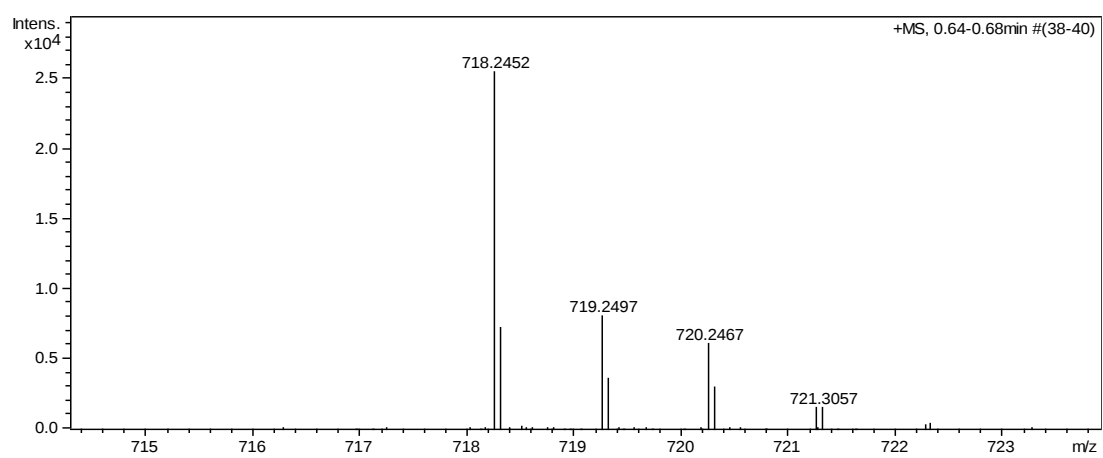
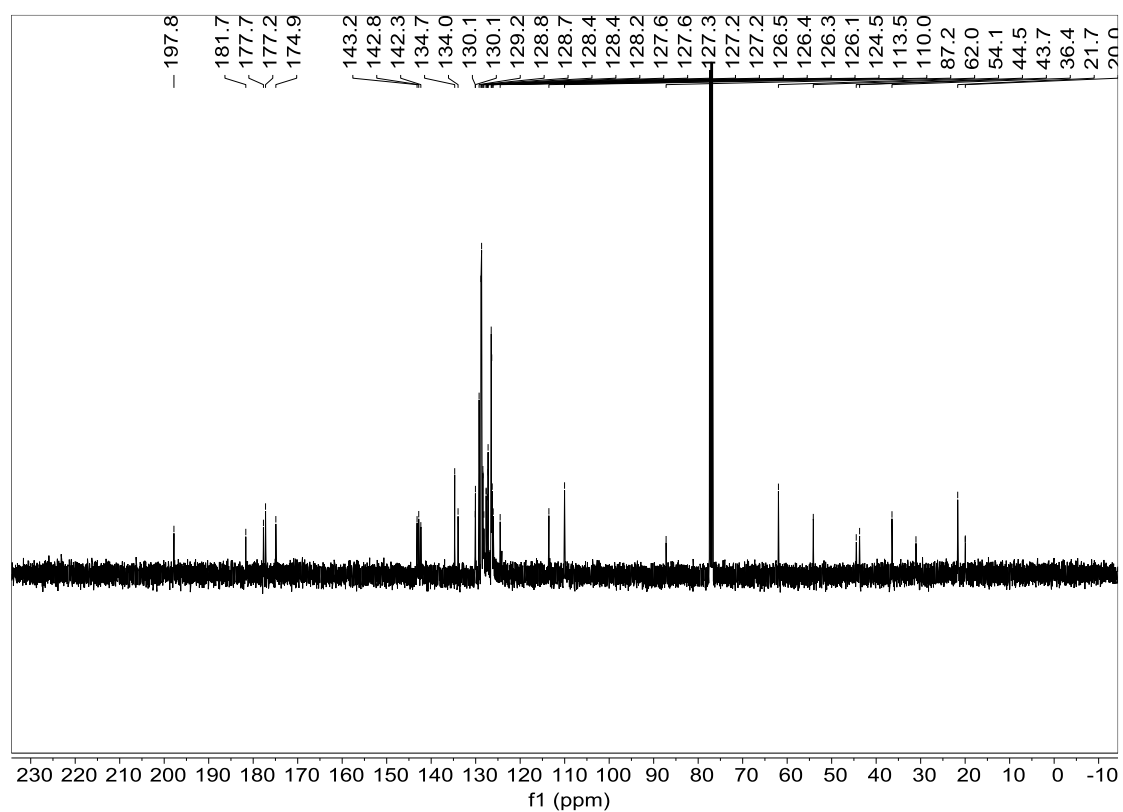
***rel*-(3*R*,3'*S*,4'*R*)-1,1''-Dibenzyl-5,5''-dichloro-4'-(2-hydroxy-6-oxocyclohex-1-en-1-yl)-5'-(*p*-tolyl)-4'*H*-dispiro[indoline-3,2'-pyrrole-3',3''-indoline]-2,2''-dione (4k)**: White solid, 68%, m.p. 221-222°C; ¹H NMR (400 MHz, CDCl₃) δ: 10.60 (s, 1H, OH), 7.80 (d, *J* = 8.4 Hz, 2H, ArH), 7.73 (d, *J* = 2.0 Hz, 1H, ArH), 7.22 (d, *J* = 8.0 Hz, 2H, ArH), 7.19 - 7.11 (m, 7H, ArH), 7.06 - 7.01 (m, 2H, ArH), 6.84 - 6.82 (m, 2H, ArH), 6.75 (d, *J* = 7.2 Hz, 2H, ArH), 6.48 (d, *J* = 8.4, 1H, ArH), 6.37 (d, *J* = 8.0, 1H, ArH), 5.58 (s, 1H, CH), 5.12 (t, *J* = 15.6 Hz, 2H, CH₂), 4.50 (d, *J* = 16.0, 1H, CH₂), 4.44 (d, *J* = 16.0 Hz, 1H, CH₂), 2.57 - 2.49 (m, 1H, CH₂), 2.44 - 2.38 (m, 1H, CH₂), 2.41 (s, 3H, CH₃), 2.30 - 2.25 (m, 1H, CH₂), 1.93 - 1.82 (m, 3H, CH₂) ppm; ¹³C NMR (600 MHz, CDCl₃) δ: 197.7, 192.0, 177.3, 174.8, 142.9, 142.5, 141.6, 134.7, 133.5, 130.0, 129.2, 128.9, 128.8, 128.7, 128.6, 128.3, 127.8, 127.4, 126.5, 126.4, 125.9, 113.4, 110.9, 110.0, 86.7, 61.8, 54.3, 44.6, 43.9, 36.4, 31.0, 21.6, 19.9 ppm; IR (KBr) ν: 3682, 3041, 2953, 2851, 1834, 1774, 1689, 1541, 1328, 1128, 1057, 952, 894, 832 cm⁻¹; HRMS (ESI-TOF) Calcd. for C₄₅H₃₆Cl₂N₃O₄ ([M+H]⁺): 752.2077, Found: 752.2060.



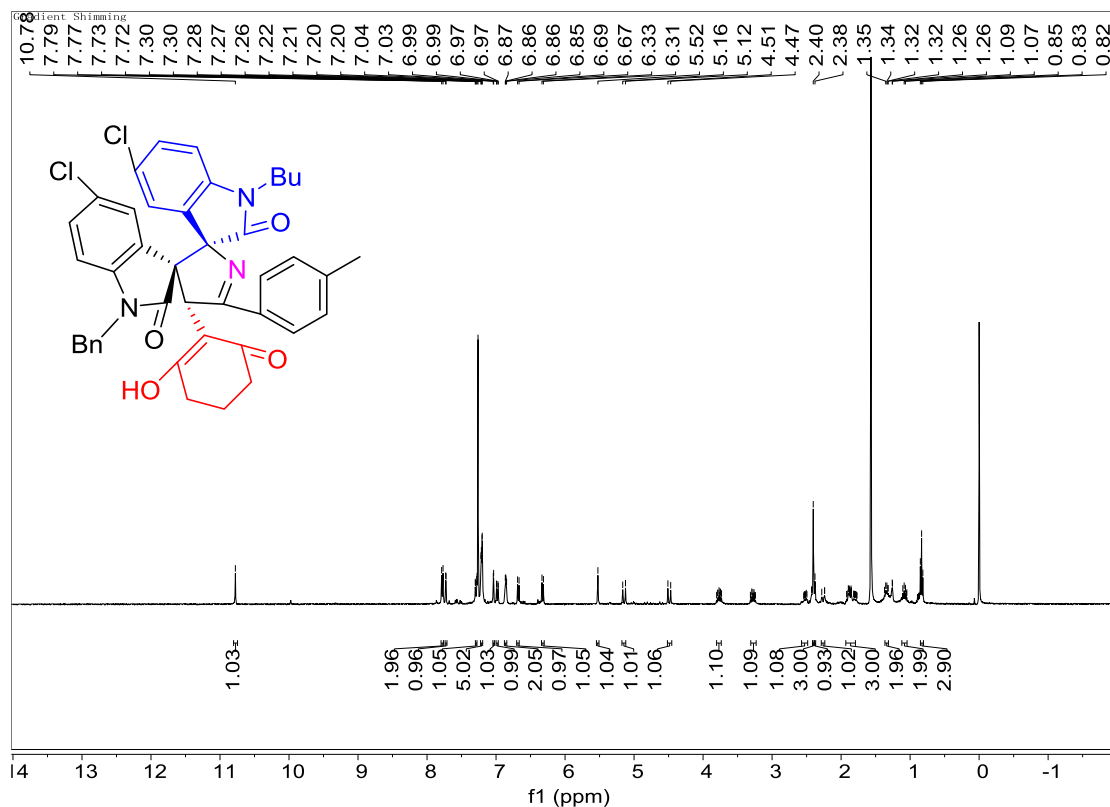


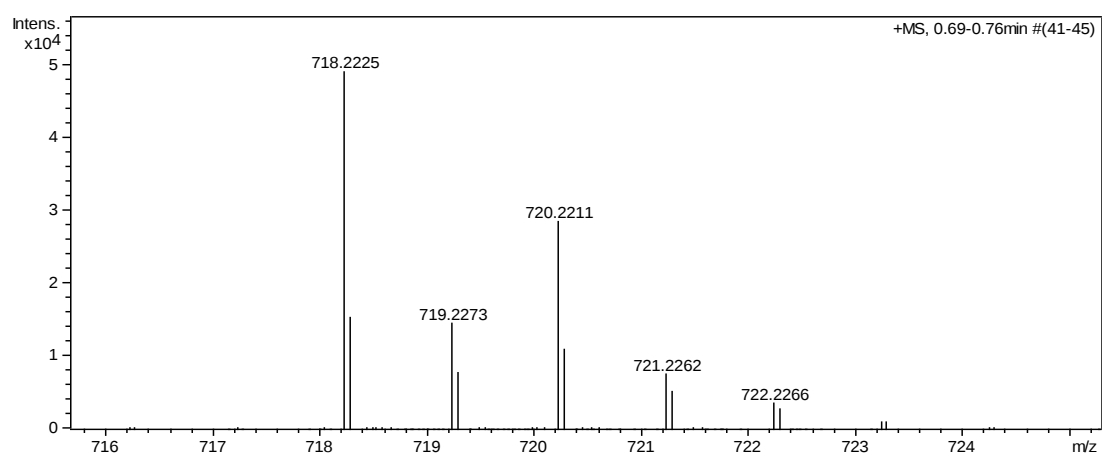
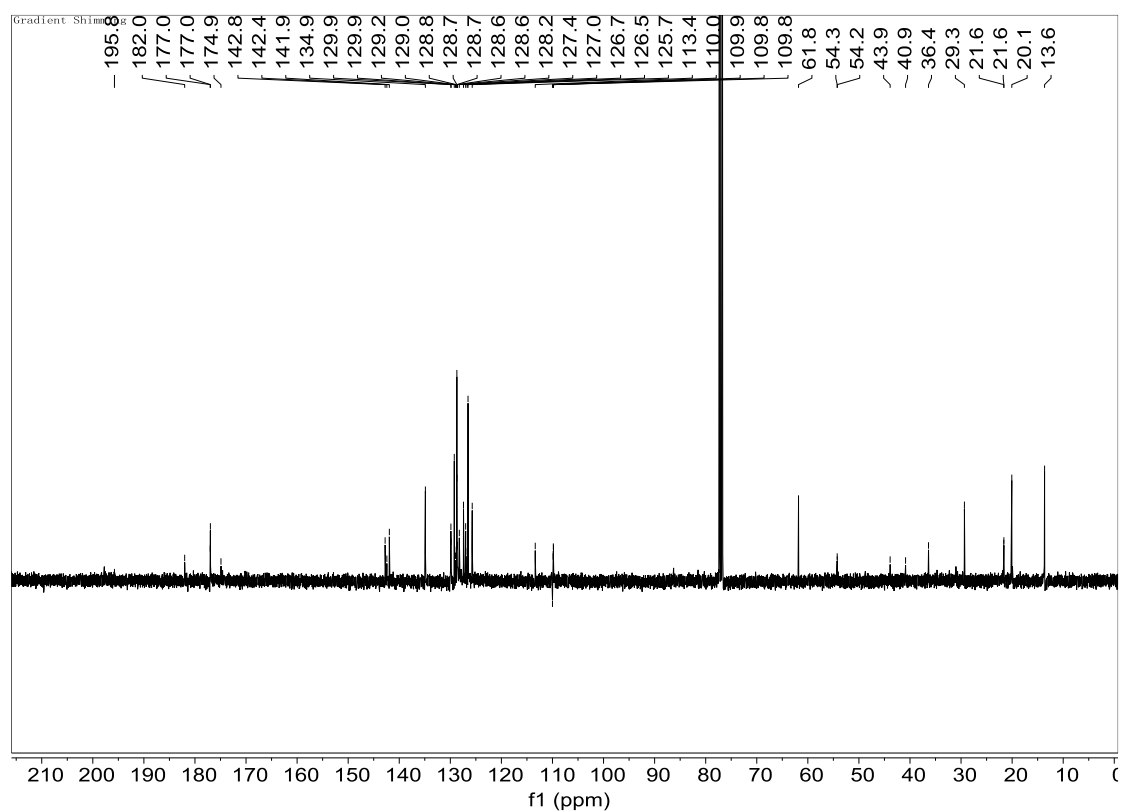
***rel*-(3*R*,3'*S*,4'*R*)-1,1''-Dibenzyl-5''-chloro-4'-(2-hydroxy-6-oxocyclohex-1-en-1-yl)-5'-(*p*-tolyl)-4'*H*-dispiro[indoline-3,2'-pyrrole-3',3''-indoline]-2,2''-dione (4l)**: White solid, 64%, m.p. 263-264°C; ¹H NMR (400 MHz, CDCl₃) δ: 10.79 (s, 1H, OH), 7.81 (d, *J* = 7.6 Hz, 2H, ArH), 7.69 (d, *J* = 7.2 Hz, 1H, ArH), 7.22 (d, *J* = 8.4 Hz, 2H, ArH), 7.19 - 7.15 (m, 2H, ArH), 7.13 - 7.07 (m, 6H, ArH), 6.98 (d, *J* = 5.6 Hz, 2H, ArH), 6.74 (d, *J* = 7.2 Hz, 2H, ArH), 6.66 (d, *J* = 7.2, 2H, ArH), 6.57 (d, *J* = 8.0 Hz, 1H, ArH), 6.26 (d, *J* = 8.4 Hz, 1H, ArH), 5.60 (s, 1H, CH), 5.14 (d, *J* = 16.4 Hz, 1H, CH₂), 5.10 (d, *J* = 16.8 Hz, 1H, CH₂), 4.47 (t, *J* = 16.0 Hz, 2H, CH₂), 2.57 - 2.49 (m, 1H, CH₂), 2.41 (s, 3H, CH₃), 2.38 (s, 1H, CH₂), 2.27 (d, *J* = 16.0 Hz, 1H, CH₂), 1.94 - 1.81 (m, 3H, CH₂) ppm; ¹³C NMR (600 MHz, CDCl₃) δ: 197.7, 181.6, 177.6, 177.2, 174.8, 143.1, 142.7, 142.3, 134.7, 133.9, 130.0, 130.0, 129.2, 128.8, 128.6, 128.3, 128.3, 128.1, 127.6, 127.6, 127.3, 127.2, 127.1, 126.4, 126.3, 126.2, 126.0, 124.4, 113.5, 110.0, 87.1, 61.9, 54.1, 44.4, 43.7, 36.4, 31.0, 21.6, 19.9, 19.9 ppm; IR (KBr) ν: 3745, 3062, 3002, 2994, 2953, 1863, 1742, 1702, 1685, 1563, 1375, 1169, 1056, 961, 842 cm⁻¹; HRMS (ESI-TOF) Calcd. for C₄₅H₃₇ClN₃O₄ ([M+H]⁺): 718.2467, Found: 718.2452.



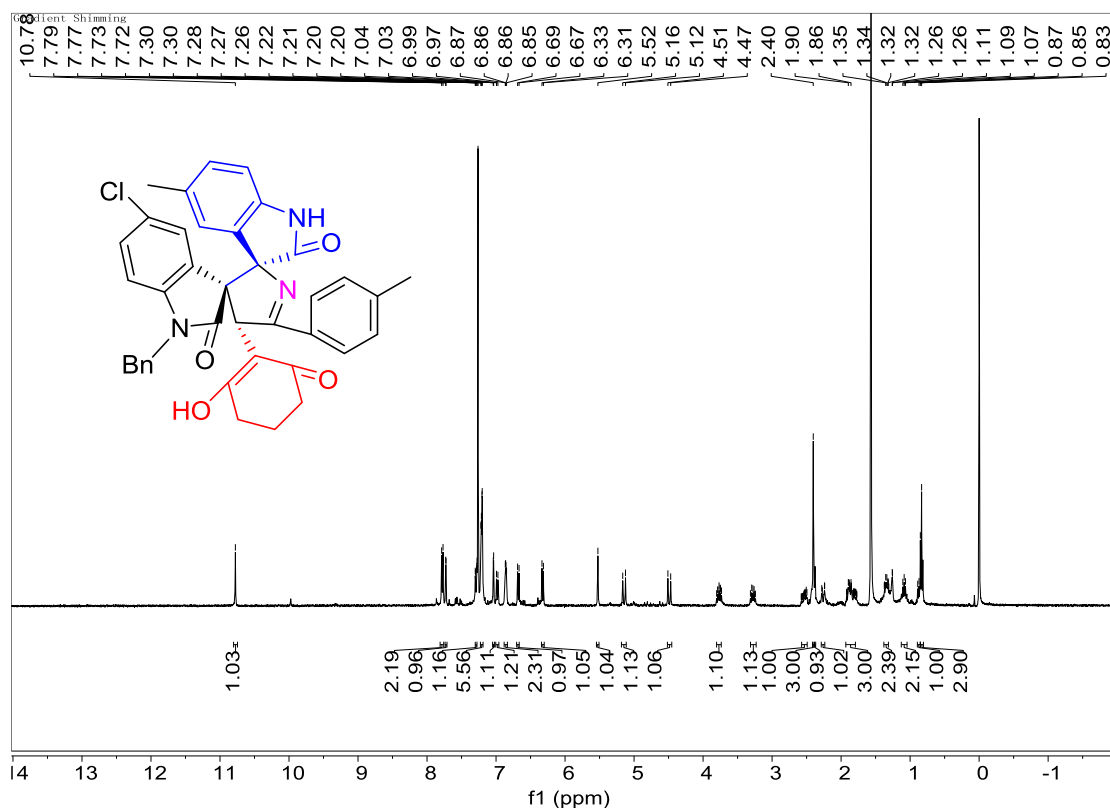


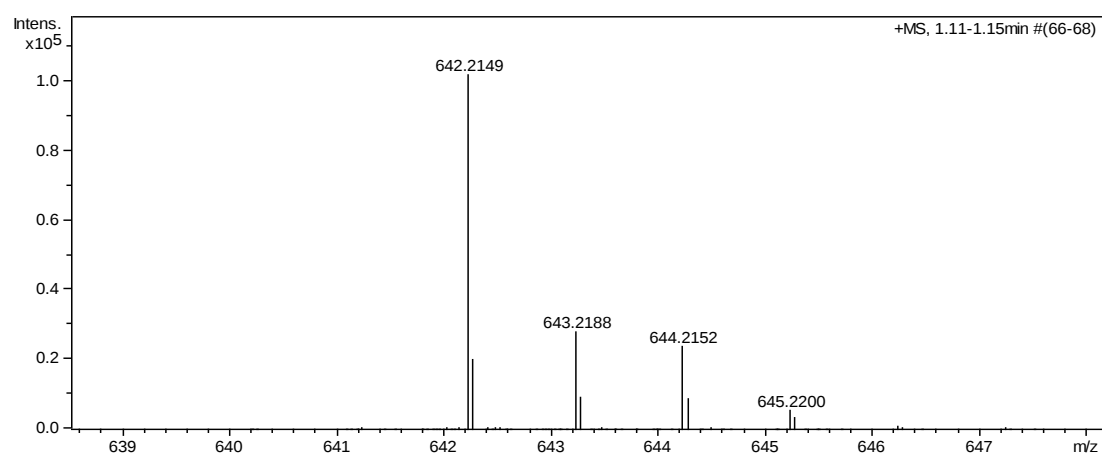
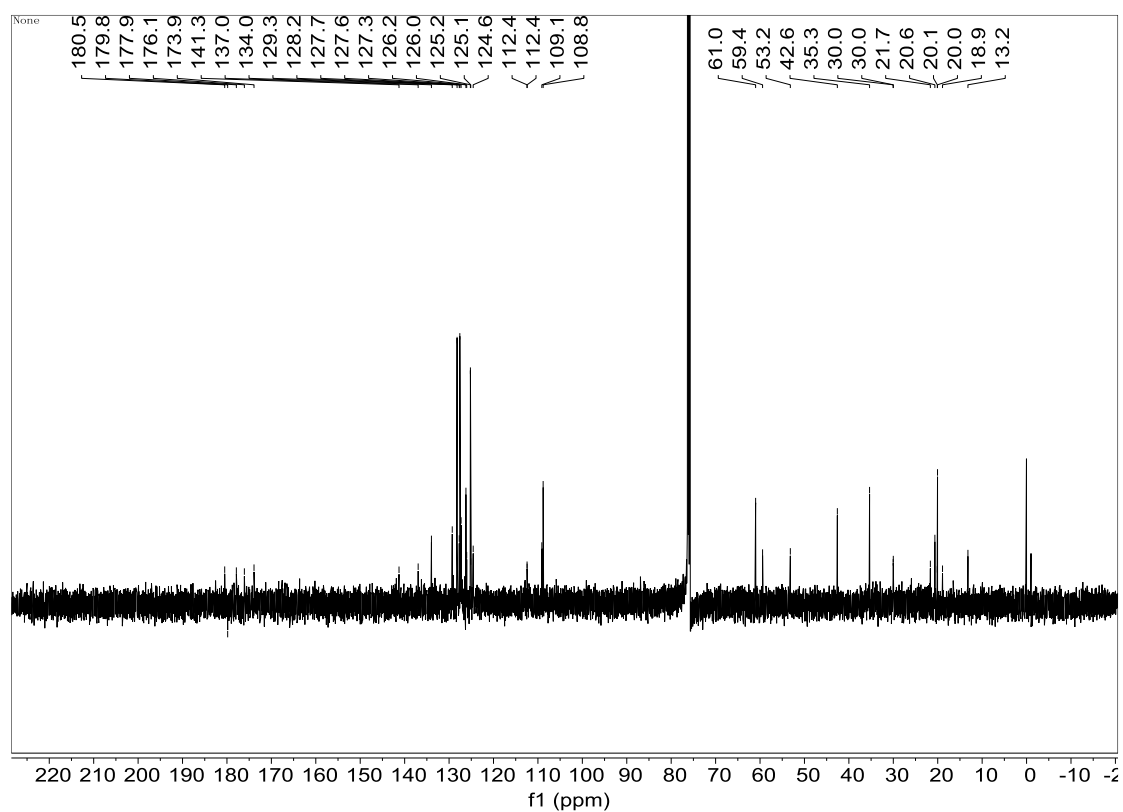
***rel*-(3*R*,3'*S*,4'*R*)-1''-Benzyl-1-butyl-5,5''-dichloro-4'-(2-hydroxy-6-oxocyclohex-1-en-1-yl)-5'-(*p*-tolyl)-4'*H*-dispiro[indoline-3,2'-pyrrole-3',3''-indoline]-2,2''-dione (4m):** White solid, 65%, m.p. 238-239°C; ¹H NMR (400 MHz, CDCl₃) δ: 10.78 (s, 1H, OH), 7.77 (d, *J* = 8.4 Hz, 2H, ArH), 7.73 (d, *J* = 2.0 Hz, 1H, ArH), 7.30 - 7.28 (m, 1H, ArH), 7.22 - 7.20 (m, 5H, ArH), 7.04 (d, *J* = 2.0 Hz, 1H, ArH), 6.99 - 6.97 (m, 1H, ArH), 6.87 - 6.85 (m, 2H, ArH), 6.68 (d, *J* = 8.4 Hz, 1H, ArH), 6.32 (d, *J* = 8.4 Hz, 1H, ArH), 5.52 (s, 1H, CH), 5.14 (d, *J* = 16.4 Hz, 1H, CH₂), 4.49 (d, *J* = 16.0 Hz, 1H, CH₂), 3.80 - 3.73 (m, 1H, CH₂), 3.31 (m, 1H, CH₂), 2.54 - 2.50 (m, 1H, CH₂), 2.40 (s, 3H, CH₃), 2.38 (s, 1H, CH₂), 2.38 - 2.24 (m, 1H, CH₂), 1.92 - 1.77 (m, 3H, CH₂), 1.37 - 1.32 (m, 2H, CH₂), 1.11 - 1.05 (m, 2H, CH₂), 0.83 (t, *J* = 16.0 Hz, 3H, CH₃) ppm; ¹³C NMR (400 MHz, CDCl₃) δ: 181.9, 176.9, 176.9, 174.8, 142.7, 142.4, 141.9, 134.8, 129.8, 129.8, 129.2, 128.9, 128.8, 128.7, 128.6, 128.6, 128.5, 128.2, 127.4, 126.9, 126.6, 126.5, 125.7, 113.3, 109.9, 109.8, 109.8, 109.7, 61.8, 54.2, 54.2, 43.8, 40.8, 36.3, 29.3, 21.6, 21.6, 20.0, 13.6 ppm; IR (KBr) ν: 3754, 3056, 2983, 2863, 2855, 1863, 1745, 1682, 1632, 1526, 1386, 1266, 1186, 1063, 963, 873 cm⁻¹; HRMS (ESI-TOF) Calcd. for C₄₂H₃₈ClN₃O₄ ([M+H]⁺): 718.2234, Found: 718.2225.



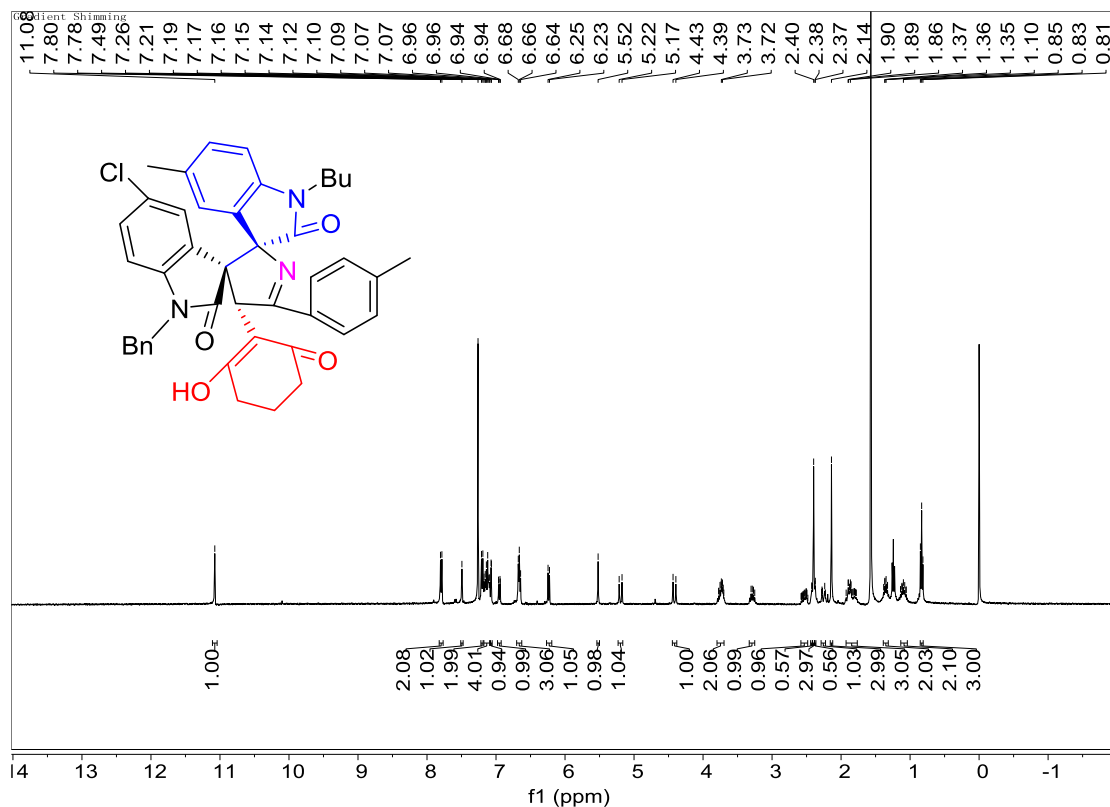


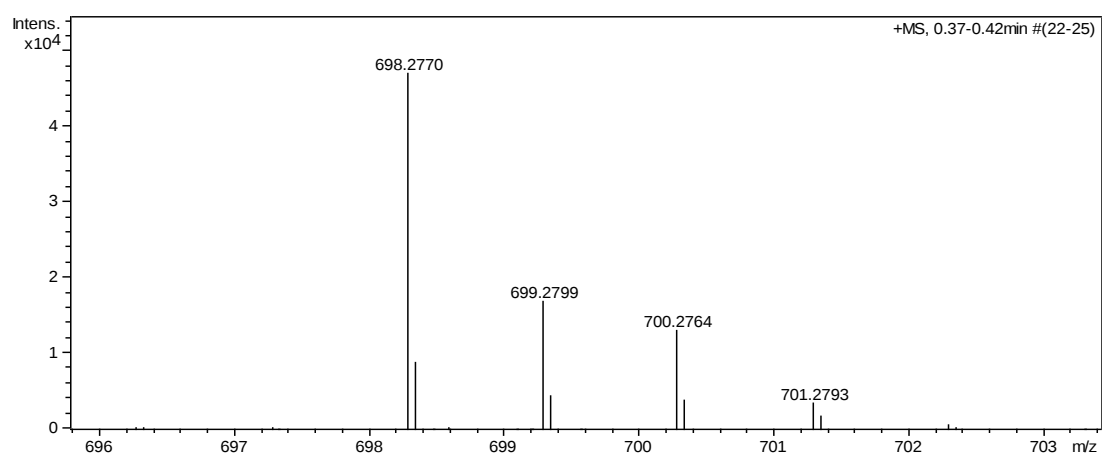
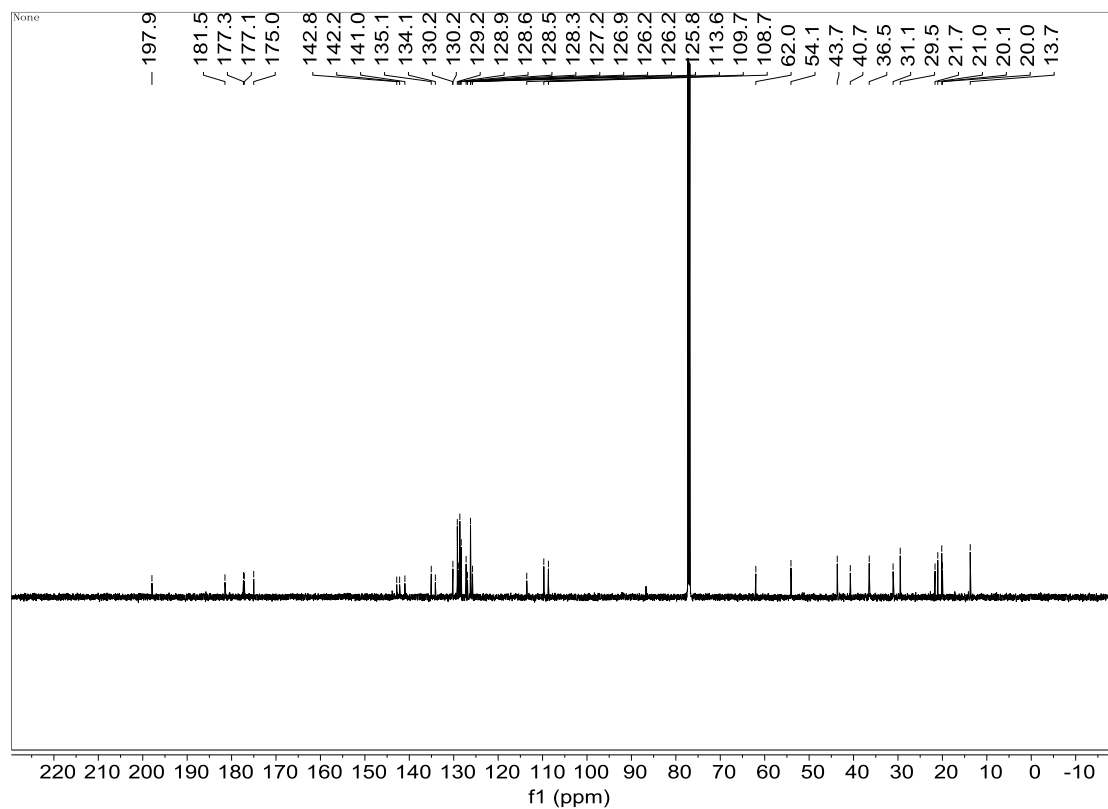
***rel*-(3*R*,3'*S*,4'*R*)-1''-Benzyl-5''-chloro-4'-(2-hydroxy-6-oxocyclohex-1-en-1-yl)-5-methyl-5'-(*p*-tolyl)-4' *H*-dispiro[indoline-3,2'-pyrrole-3',3''-indoline]-2,2''-dione (4n):** White solid, 52%, m.p. 242-245°C; ¹H NMR (400 MHz, CDCl₃) δ: 10.61 (s, 1H, OH), 7.79 (d, *J* = 8.0 Hz, 2H, ArH), 7.49 (s, 1H, ArH), 7.38 (s, 1H, NH), 7.20 (d, *J* = 8.4 Hz, 2H, ArH), 7.15 (d, *J* = 7.2 Hz, 1H, ArH), 7.12 - 7.06 (m, 3H, ArH), 7.04 (d, *J* = 2.0 Hz, 1H, ArH), 7.00 - 6.97 (m, 1H, ArH), 6.67 (d, *J* = 8.0 Hz, 1H, ArH), 6.64 (d, *J* = 7.2 Hz, 2H, ArH), 6.27 (d, *J* = 8.4 Hz, 1H, ArH), 5.52 (s, 1H, CH), 5.25 (d, *J* = 16.4 Hz, 1H, CH₂), 4.38 (d, *J* = 16.4 Hz, 1H, CH₂), 2.55 - 2.48 (m, 1H, CH₂), 2.43 - 2.36 (m, 1H, CH₂), 2.40 (s, 3H, CH₃), 2.27 - 2.22 (m, 1H, CH₂), 2.13 (s, 3H, CH₃), 1.91 - 1.79 (m, 3H, CH₂) ppm; ¹³C NMR (400 MHz, CDCl₃) δ: 180.4, 179.8, 177.8, 176.0, 173.8, 141.2, 136.9, 133.9, 129.2, 128.1, 127.6, 127.5, 127.2, 126.1, 126.0, 125.1, 125.1, 124.5, 112.4, 112.4, 109.1, 108.8, 60.9, 59.4, 53.1, 42.5, 35.3, 30.0, 30.0, 21.6, 20.6, 20.0, 20.0, 18.9, 13.2 ppm; IR (KBr) ν: 3763, 3562, 3061, 3010, 2936, 2846, 1876, 1742, 1692, 1600, 1326, 1185, 1023, 953, 842 cm⁻¹; HRMS (ESI-TOF) Calcd. for C₃₉H₃₃ClN₃O₄ ([M+H]⁺): 642.2154, Found: 642.2149.





***rel*-(3*R*,3'*S*,4'*R*)-1''-Benzyl-1-butyl-5''-chloro-4'-(2-hydroxy-6-oxocyclohex-1-en-1-yl)-5-methyl-5'-(*p*-tolyl)-4'*H*-dispiro[indoline-3,2'-pyrrole-3',3''-indoline]-2,2''-dione (4o):** White solid, 63%, m.p. 132-133°C; ¹H NMR (400 MHz, CDCl₃) δ: 11.08 (s, 1H, OH), 7.79 (d, *J* = 8.4 Hz, 2H, ArH), 7.49 (s, 1H, ArH), 7.20 (d, *J* = 8.0 Hz, 2H, ArH), 7.17 - 7.09 (m, 4H, ArH), 7.07 (d, *J* = 2.0 Hz, 1H, ArH), 6.69 - 6.94 (m, 1H, ArH), 6.68 - 6.64 (m, 3H, ArH), 6.24 (d, *J* = 8.4 Hz, 1H, ArH), 5.52 (s, 1H, CH), 5.19 (d, *J* = 16.8 Hz, 1H, CH₂), 4.41 (d, *J* = 16.4, 1H, CH₂), 3.77 - 3.70 (m, 2H, CH₂), 3.31 - 3.25 (m, 1H, CH₂), 2.58 - 2.50 (m, 1H, CH₂), 2.48 - 2.37 (m, 1H, CH₂), 2.38 (s, 3H, CH₃), 2.28 - 2.23 (m, 1H, CH₂), 2.14 (s, 3H, CH₃), 1.93 - 1.78 (m, 3H, CH₂), 1.38 - 1.33 (m, 2H, CH₂), 1.14 - 1.06 (m, 2H, CH₂), 0.83 (t, *J* = 7.2 Hz, 3H, CH₃) ppm; ¹³C NMR (600 MHz, CDCl₃) δ: 197.9, 181.4, 177.2, 177.1, 174.9, 142.8, 142.1, 140.9, 135.0, 134.1, 130.2, 130.1, 129.1, 128.8, 128.6, 128.5, 128.3, 127.1, 126.8, 126.2, 126.1, 125.7, 113.5, 109.7, 108.6, 61.9, 54.0, 43.6, 40.7, 36.4, 31.0, 29.4, 21.6, 21.0, 20.1, 19.9, 13.7; IR (KBr) ν: 3741, 3056, 3021, 2993, 2845, 2813, 1883, 1772, 1687, 1632, 1274, 1123, 1045, 956, 852, 831, 741 cm⁻¹; HRMS (ESI-TOF) Calcd. for C₄₃H₄₁ClN₃O₄ ([M+H]⁺): 698.2780, Found: 698.2770.





***rel*-(3*R*,3'*S*,4'*R*)-1,1''-Dibenzyl-5''-chloro-5'-(4-chlorophenyl)-4'-(2-hydroxy-6-oxocyclohex-1-en-1-yl)-5-methyl-4'*H*-dispiro[indoline-3,2'-pyrrole-3',3''-indoline]-2,2''-dione (4p)**: White solid, 73%, m.p. 255-256°C; ¹H NMR (400 MHz, CDCl₃) δ: 10.93 (s, 1H, OH), 7.86 (d, *J* = 8.4 Hz, 2H, ArH), 7.50 (s, 1H, ArH), 7.39 (d, *J* = 8.4 Hz, 2H, ArH), 7.21 - 7.16 (m, 2H, ArH), 7.13 (d, *J* = 8.0 Hz, 2H, ArH), 7.09 (s, 1H, ArH), 7.07 - 7.06 (m, 2H, ArH), 7.01 - 6.99 (m, 2H, ArH), 6.77 (d, *J* = 7.2 Hz, 2H, ArH), 6.66 (d, *J* = 7.6 Hz, 2H, ArH), 6.48 (d, *J* = 7.6 Hz, 1H, ArH), 5.55 (s, 1H, CH), 5.18 (d, *J* = 16.8 Hz, 1H, CH₂), 5.07 (d, *J* = 15.6 Hz, 1H, CH₂), 4.48 (d, *J* = 8.8 Hz, 1H, CH₂), 4.44 (d, *J* = 8.8 Hz, 1H, CH₂), 2.51 (d, *J* = 7.2 Hz, 1H, CH₂), 2.44 - 2.39 (m, 1H, CH₂), 2.27 (d, *J* = 16.0 Hz, 1H, CH₂), 2.11 (s, 3H, CH₃), 1.93 - 1.77 (m, 3H, CH₂) ppm; ¹³C NMR (600 MHz, CDCl₃) δ: 197.7, 180.6, 177.1, 177.1, 175.0, 142.8, 140.5, 137.9, 134.7, 134.4, 133.8, 131.2, 130.4, 129.6, 128.7, 128.6, 127.6, 127.3, 127.1, 126.8, 126.5, 126.1, 126.0, 125.8, 113.2, 109.9, 109.9, 109.8, 109.8, 109.8, 87.2, 61.9, 54.0, 36.3, 31.0, 21.0, 20.9, 19.8 ppm; IR (KBr) ν: 3692, 3052, 3026, 2995, 2864, 2841, 1872, 1741, 1654, 1611, 1321, 1185, 1024, 951, 852, 768 cm⁻¹; HRMS (ESI-TOF) Calcd. for C₄₅H₃₆Cl₂N₃O₄ ([M+H]⁺): 752.2077, Found: 752.2070.

