Supplementary Information

An Efficient Approach for the Synthesis of New (±)-Coixspirolactams

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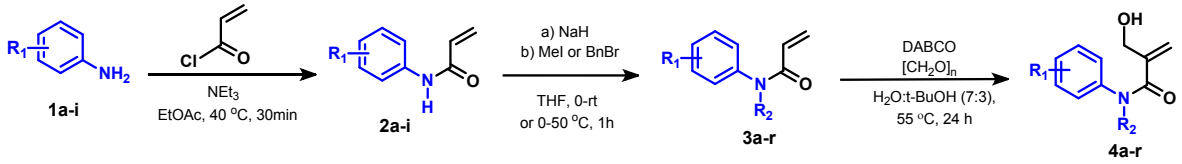
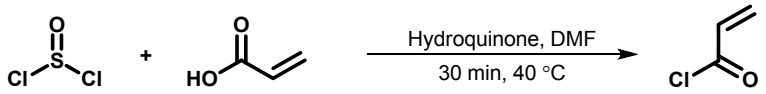
1. General Procedure for the Synthesis of the 2-(hydroxymethyl)-*N*-alkyl-*N*-arylacrylamide



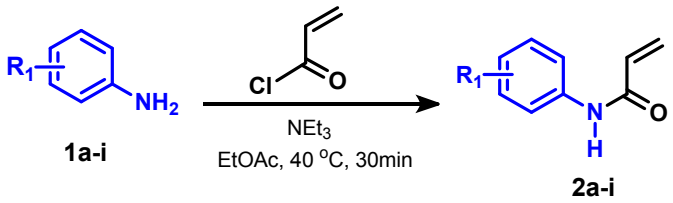
R_1 = H, *p*-Me, *p*-F,*m*-F, *o*-F, *p*-CF_3, *p*-Cl, *p*-OMe, *o*-Ph
R_2 = Me, Bn

1.1 Synthesis of acryloyl chloride[1]



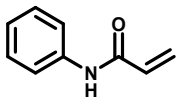
A two-neck round-bottom flask (50 mL) equipped with a reflux condenser and a magnetic stirrer bar was charged with 4.35 mL of thionyl chloride (60 mmol) and 4.15 mL of acrylic acid (60 mmol) under nitrogen atmosphere. A solution of 10 mg of hydroquinone in 462 µL *N*-*N*-dimethylformamide was added to the reaction dropwise. The resulting mixture was heated at 40 ºC for 30 minutes. Finally, acryloyl chloride was removed by distillation at 77 ºC (2.95 mL, 60%) as a colorless liquid.

1.2 General procedure for synthesis of acrylamides 2a–i[2]

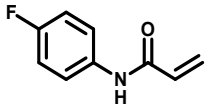


R_1 = H, *p*-Me, *p*-F,*m*-F, *o*-F, *p*-CF_3, *p*-Cl, *p*-OMe, *o*-Ph

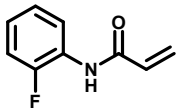
A round-bottom flask (250 mL) containing a magnetic stirrer bar was charged with aniline **1a–i** (20 mmol), triethylamine (1.05 eq, 2.92 mL) and anhydrous ethyl acetate (80 mL) under nitrogen atmosphere. Acryloyl chloride (freshly prepared; 1.5 eq, 3.25 mL) was added dropwise with stirring at 0 ºC. The reaction mixture was stirred for 2 h at room temperature. Then, it was quenched with 20 mL of deionized water. The organic phase was washed with HCl 2 M aqueous solution (3 x 10 mL), H_2O (2 x 10 mL) and brine (10 mL). The organic phase was collected and dried over anhydrous $MgSO_4$ and the solvent was removed by reduced pressure. The crude product was used in the next step without further purification.



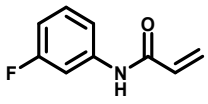
***N*-phenylacrylamide (2a):** light salmon solid, 81% yield. MS-EI: m/z(%) 147(M+, 38), 93(100).



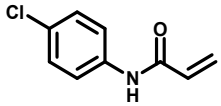
***N*-(4-fluorophenyl)acrylamide (2b):** white solid, 92% yield. MS-EI: m/z(%) 165(M+, 34), 111(100).



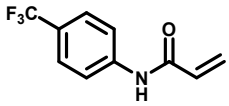
***N*-(2-fluorophenyl)acrylamide (2c):** pale yellow solid, 92% yield. MS-EI: m/z(%) 165(M+, 27), 111(100).



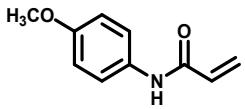
***N*-(3-fluorophenyl)acrylamide (2d):** pale brown solid, 99% yield. MS-EI: m/z(%) 165(M+, 19), 55(100).



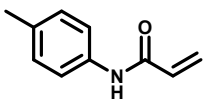
***N*-(4-chlorophenyl)acrylamide (2e):** white solid, 87% yield. MS-EI: m/z(%) 181(M+, 12), 55(100).



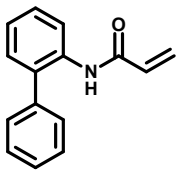
***N*-(4-(trifluoromethyl)phenyl)acrylamide (2f):** pale yellow solid, 90% yield. MS-EI: m/z(%) 215(M+, 21), 55(100).



***N*-(4-methoxyphenyl)acrylamide (2g):** white solid, 92% yield. MS-EI: m/z(%) 177(M+, 50), 123(100).

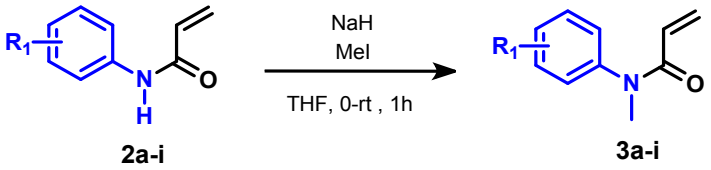


***N*-(*p*-tolyl)acrylamide (2h):** white solid, 90% yield. MS-EI: m/z(%) 161(M+, 31), 107(100).



***N*-([1,1'-biphenyl]-2-yl)acrylamide (2i):** light salmon solid, 99% yield. MS-EI: m/z(%) 223(M+, 44), 169(100).

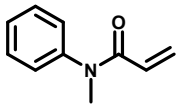
1.3 **General procedure for synthesis of *N*-methyl-*N*-arylacrylamides 3a–i**[3]



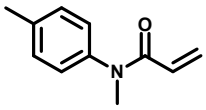
2a-i **3a-i**

R_1 = H, *p*-Me, *p*-F,*m*-F, *o*-F, *p*-CF_3, *p*-Cl, *p*-OMe, *o*-Ph

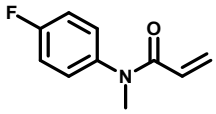
A two-neck round-bottom flask (100 mL) containing a magnetic stirrer bar was charged with acrylamide **2a–i** (20 mmol) and anhydrous THF (20 mL) under nitrogen atmosphere. Sodium hydride 60% (1.1 eq, 0.88 g) was added in portions with stirring at 0 ºC. The mixture was stirred for an additional 15 min. Then, iodomethane (1.1 eq, 1.37 mL) was added dropwise at 0 ºC, and the mixture was stirred at room temperature for 1 h. Deionized water (20 mL) was slowly added to quench the reaction. THF was removed by reduced pressure. Ethyl acetate (50 mL) was added to the crude mixture and transferred to a separatory funnel. The organic phase was washed with HCl 2 M aqueous solution (30 mL), H_2O (20 mL) and brine (10 mL). The organic phase was collected and dried over anhydrous $MgSO_4$ and the solvent was removed by reduced pressure. The crude material was purified by column chromatography on silica gel (1:1 hexane/ethyl acetate).



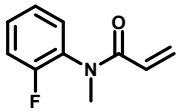
***N*-methyl-*N*-phenylacrylamide (3a):** orange solid, 96% yield. **MS-EI**: m/z(%) 161 (M+, 37), 107(100).



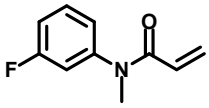
***N*-methyl-*N*-(*p*-tolyl)acrylamide (3b):** white solid, 64% yield. **MS-EI**: m/z(%) 175 (M+, 37), 121(100)



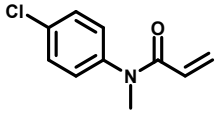
***N*-(4-fluorophenyl)-*N*-methylacrylamide (3c):** crystalline solid, 50% yield. **MS-EI**: m/z(%) 179 (M+, 27), 55(100).



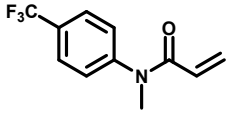
***N*-(2-fluorophenyl)-*N*-methylacrylamide (3d):** yellow oil, 80% yield. **MS-EI**: m/z(%) 179 (M+, 12), 125(100).



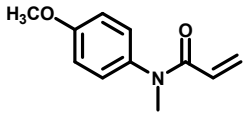
***N*-(3-fluorophenyl)-*N*-methylacrylamide (3e):** white solid, 64% yield. **MS-EI**: m/z(%) 179 (M+, 13), 55(100).



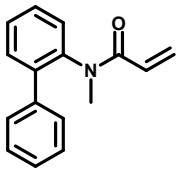
***N*-(4-chlorophenyl)-*N*-methylacrylamide (3f):** white solid, 87% yield. **MS-EI**: m/z(%) 195 (M+, 12), 55(100).



***N*-methyl-*N*-(4-(trifluoromethyl)phenyl)acrylamide (3g):** colorless oil, 63% yield. **MS-EI**: m/z(%) 229 (M+, 16), 55(100).

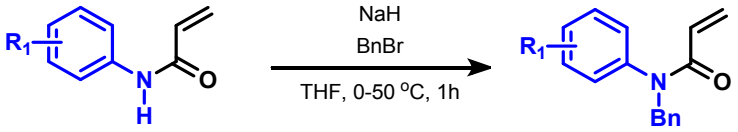


***N*-(4-methoxyphenyl)-*N*-methylacrylamide (3h):** pale yellow solid, 65% yield. **MS-EI**: m/z(%) 191 (M+, 51), 68(100).



***N*-([1,1'-biphenyl]-2-yl)-*N*-methylacrylamide (3i):** off-white solid, 61% yield. **MS-EI**: m/z(%) 237(M+, 40), 68(100).

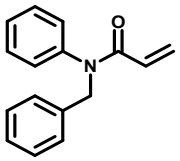
1.4 General procedure for synthesis of *N*-benzyl-*N*-phenylacrylamides 3j–r[3]



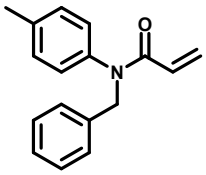
2a-i **3j-r**

R_1 = H, *p*-Me, *p*-F,*m*-F, *o*-F, *p*-CF_3, *p*-Cl, *p*-OMe, *o*-Ph

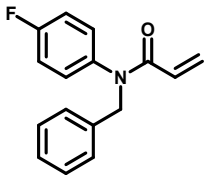
The benzylation reaction was carried out using the same protocol described for methylation. However, benzylation required 1 h at 50 °C. The crude material was purified by column chromatography on silica gel (7:3 hexane/ethyl acetate).



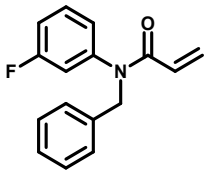
***N*-benzyl-*N*-phenylacrylamide (3j):** white solid, 22% yield. **MS-EI**: m/z(%) 237 (M+, 23), 91(100).



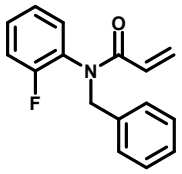
***N*-benzyl-*N*-(*p*-tolyl)acrylamide (3k):** white solid, 70% yield. **MS-EI**: m/z(%) 251 (M+, 25), 91(100).



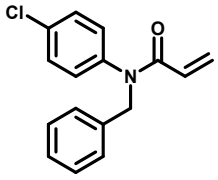
***N*-benzyl-*N*-(4-fluorophenyl)acrylamide (3l):** white solid, 89% yield. **MS-EI**: m/z(%) 255 (M+, 26), 91(100).



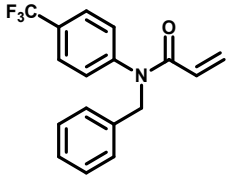
***N*-benzyl-*N*-(3-fluorophenyl)acrylamide (3m):** off-white solid, 54% yield. **MS-EI**: m/z(%) 255 (M+, 12), 91(100).



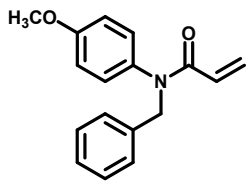
***N*-benzyl-*N*-(2-fluorophenyl)acrylamide (3n):** light salmon solid, 52% yield. **MS-EI**: m/z(%) 255 (M+, 15), 91(100).



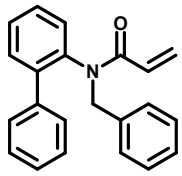
***N*-benzyl-*N*-(4-chlorophenyl)acrylamide (3o):** white solid, 63% yield. **MS-EI**: m/z(%) 271 (M+, 11), 91(100).



***N*-benzyl-*N*-(4-(trifluoromethyl)phenyl)acrylamide (3p):** white solid, 58% yield. **MS-EI**: m/z(%) 305 (M+, 31), 91(100).

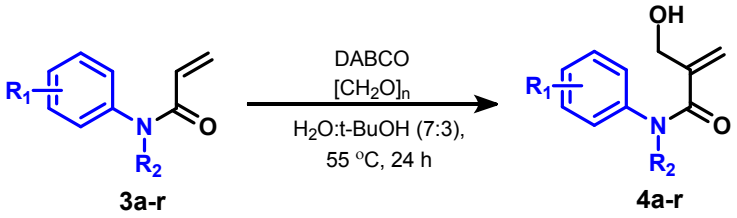


***N*-benzyl-*N*-(4-methoxyphenyl)acrylamide (3q):** orange solid, 72% yield. **MS-EI**: m/z(%) 267 (M+, 52), 91(100).



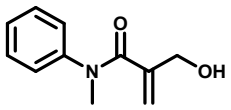
***N*-([1,1'-biphenyl]-2-yl)-*N*-benzylacrylamide (3r):** off-white solid, 63% yield. **MS-EI**: m/z(%) 313(M+, 25), 91(100).

1.5 General procedure for synthesis of 2-(hydroxymethyl)-*N*-alkyl-*N*-arylacrylamides 4a–r[4]



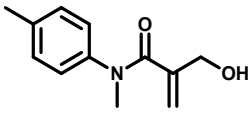
R_1 = H, *p*-Me, *p*-F,*m*-F, *o*-F, *p*-CF_3, *p*-Cl, *p*-OMe, *o*-Ph
R_2 = Me, Bn

A two-neck round-bottom flask (25 mL) equipped with a reflux condenser and a magnetic stirrer bar was charged with paraformaldehyde (3.0 g, 5 eq), DABCO (2.24 g, 1 eq), phenol (0.47 g, 0.25 eq) and a mixture of *t*-butanol and water (7 mL, 3:7). The mixture was stirred at 55 ºC until dissolution is complete. *N*-phenylacrylamides (**3a–r**, 20 mmol) were added and stirred at 55 ºC for 24 h. Then, the organic solvent was removed by reduced pressure and the residue was extracted with chloroform (3 x 20 mL). The organic phase was collected and dried over anhydrous $MgSO_4$ and the solvent was removed by reduced pressure. The crude material was purified by column chromatography on silica gel (1:1 or 3:7 hexane/ethyl acetate).



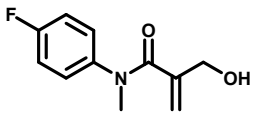
2-(hydroxymethyl)-*N*-methyl-*N*-phenylacrylamide (4a): White solid, 52% yield.

^{1}H NMR (300 MHz, $CDCl_3$) δ 7.38–7.29 (m, 3H), 7.18 (d, J = 6.0 Hz, 2H), 5.30 (s, 1H), 4.97 (s, 1H), 4.23 - 4.17 (m, 2H), 3.38 (s, 3H). **^{13}C NMR** (75 MHz, $CDCl_3$) δ 170.30, 143.06, 141.46, 129.35, 127.16, 126.73, 120.06, 64.43, 37.84.



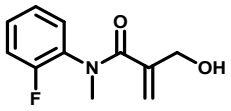
2-(hydroxymethyl)-*N*-methyl-*N*-(p-tolyl)acrylamide (4b): White solid, 53% yield.

^{1}H NMR (300 MHz, $CDCl_3$) δ 7.15 (d, J = 9.0 Hz, 2H), 7.06 (d, J = 9.0 Hz, 2H), 5.29 (s, 1H), 4.99 (s, 1H), 4.21 - 4.13 (m, 2H), 3.34 (s, 3H), 2.34 (s, 3H). **^{13}C NMR** (75 MHz, $CDCl_3$) δ 170.35, 143.24, 141.77, 137.10, 129.94, 126.52, 119.79, 68.51, 64.40, 37.86.



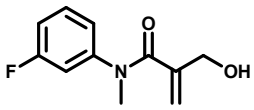
***N*-(4-fluorophenyl)-2-(hydroxymethyl)-*N*-methylacrylamide (4c):** Colorless oil, 78% yield.

^{1}H NMR (300 MHz, $CDCl_3$) δ 7.21–7.15 (m, 2H), 7.07–6.01 (m, 2H), 5.31 (s, 1H), 4.95 (s, 1H), 4.21 (s, 2H), 3.35 (s, 3H). **^{13}C NMR** (75 MHz, $CDCl_3$) δ 172.83, 161.30(d, $J_{C,F}$ = 246.75), 141.37, 128.45 (d, $J_{C,F}$ = 8.25), 119.90, 116.34 (d, $J_{C,F}$ = 8.25 Hz), 116.04 (d, $J_{C,F}$ = 7.5 Hz), 64.40, 37.98.



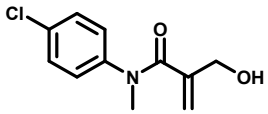
***N*-(2-fluorophenyl)-2-(hydroxymethyl)-*N*-methylacrylamide (4d):** White solid, actual mass 0.9587g, 30% yield.

^{1}H NMR (300 MHz, $CDCl_3$) δ 7.31–7.21 (m, 2H), 7.17–7.09 (m, 2H), 5.30 (s, 1H), 5.00 (s, 1H), 4.24 (s, 2H), 3.32 (s, 3H). **^{13}C NMR** (75 MHz, $CDCl_3$) δ 170.73, 157.38 (d, $J_{C,F}$ = 248.25), 142.56, 132.10, 129.22 (d, $J_{C,F}$ = 7.50 Hz), 129.06, 124.85 (d, $J_{C,F}$ = 3.75 Hz), 119.11, 116.71 (d, $J_{C,F}$ = 20.25 Hz), 64.16, 37.00.



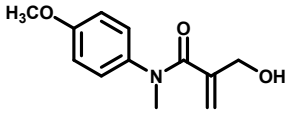
***N*-(3-fluorophenyl)-2-(hydroxymethyl)-*N*-methylacrylamide (4e):** Colorless oil, 51% yield.

^{1}H NMR (300 MHz, $CDCl_3$) δ 7.38–7.24 (m, 1H), 7.04–6.90 (m, 3H), 5.33 (s, 1H), 4.99 (s, 1H), 4.26–4.21 (m, 2H), 3.37 (s, 3H). **^{13}C NMR** (75 MHz, $CDCl_3$) δ 170.18, 162.77 (d, $J_{C,F}$ = 246.75 Hz), 145.87 (d, $J_{C,F}$ = 9.75 Hz), 142.89, 130.45 (d, $J_{C,F}$ = 9.2 Hz), 122.50 (d, $J_{C,F}$ = 3.0 Hz), 120.13, 114.29 (d, $J_{C,F}$ = 7.5 Hz), 114.00 (d, $J_{C,F}$ = 4.5 Hz), 64.30, 37.76.



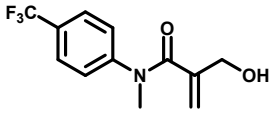
***N*-(4-chlorophenyl)-2-(hydroxymethyl)-*N*-methylacrylamide (4f):** Colorless oil, 99% yield.

^{1}H NMR (300 MHz, $CDCl_3$) δ 7.36–7.24 (m, 2H), 7.20–7.10 (m, 2H), 5.32 (s, 1H), 5.0–4.95 (m, 1H), 4.25 - 4.21 (s, 2H), 3.36 (s, 3H). **^{13}C NMR (**75 MHz, $CDCl_3$) δ 170.14, 142.88, 132.75, 129.52, 128.00, 121.06, 120.18, 64.36, 37.80.



2-(hydroxymethyl)-*N*-(4-methoxyphenyl)-*N*-methylacrylamide (4g): Pale yellow solid, 58% yield.

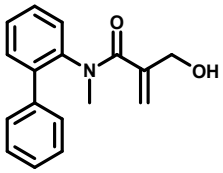
^{1}H NMR (300 MHz, $CDCl_3$) δ 7.13–7.05 (m, 2H), 6.85 (d, J = 9.0 Hz, 2H), 5.29 (s, 1H), 5.00–5.95 (m, 1H), 4.20–4.11 (m, 2H), 3.78 (s, 3H), 3.33 (s, 3H). **^{13}C NMR** (75 MHz, $CDCl_3$) δ 170.41, 143.28, 141.64, 128.02, 127.90, 114.48, 114.39, 68.64, 64.46, 55.43.



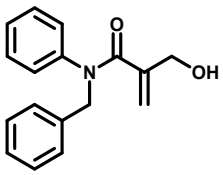
2-(hydroxymethyl)-*N*-methyl-*N*-(4-(trifluoromethyl)phenyl)acrylamide (4h): White solid, 36% yield.

^{1}H NMR (300 MHz, $CDCl_3$) δ 7.62 (d, J = 9.0 Hz, 2H), 7.34 (d, J = 6.0 Hz, 2H), 5.34 (s, 1H), 4.95 (s, 1H), 4.31 - 4.23 (m, 2H), 3.41 (s, 3H). **^{13}C NMR** (75 MHz, $CDCl_3$) δ 170.16, 147.58,

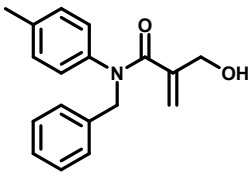
142.76, 126.85 (q, $J_{C,F}$ = 3.75 Hz) 126.46 (q, $J_{C,F}$ = 3.75 Hz), 123.70 (q, $J_{C,F}$ = 270.75 Hz), 121.35, 120.47, 64.23, 37.66.



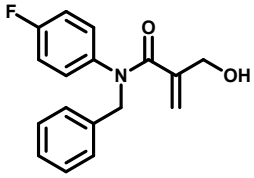
***N*-([1,1'-biphenyl]-2-yl)-2-(hydroxymethyl)-*N*-methylacrylamide (4i):** White solid, 75% yield. **^{1}H NMR** (300 MHz, $CDCl_3$) δ 7.46–7.21 (m, 9H), 5.24 (s, 1H), 4.77 (s, 1H), 3.50–3.41 (m, 2H), 3.32 (s, 3H). **^{13}C NMR** (75 MHz, $CDCl_3$) δ 169.85, 141.96, 138.74, 138.63, 131.38, 128.85 (2C), 128.65, 128.27, 127.94, 127.84, 127.75, 120.85, 64.20, 38.43.



***N*-benzyl-2-(hydroxymethyl)-*N*-phenylacrylamide (4j):** White solid, 65% yield.
^{1}H NMR (300 MHz, $CDCl_3$) δ 7.35–7.20 (m, 8H), 7.05–7.00 (m, 2H), 5.30 (s, 1H), 5.00 (s, 3H), 4.21 (s, 2H). **^{13}C NMR** (75 MHz, $CDCl_3$) δ 169.66, 143.04, 142.95, 137.07, 129.17, 128.46, 128.37, 127.65, 127.42, 127.34, 120.27, 64.66, 53.39.

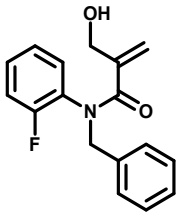


***N*-benzyl-2-(hydroxymethyl)-*N*-(p-tolyl)acrylamide (4k):** White solid, 58% yield.
^{1}H NMR (300 MHz, $CDCl_3$) δ 7.33–7.19 (m, 5H), 7.05 (d, J = 6.0 Hz, 2H), 6.89 (d, J = 9.0 Hz, 2H), 5.28 (s, 1H), 5.02 (s, 1H), 4.96 (s, 2H), 4.21–4.15 (m, 2H), 2.30 (s, 3H). **^{13}C NMR** (75 MHz, $CDCl_3$) δ 170.20, 143.29, 140.25, 137.26, 137.18, 129.78, 128.43 (2C), 127.45, 127.36, 119.90, 64.56, 53.40, 21.00.



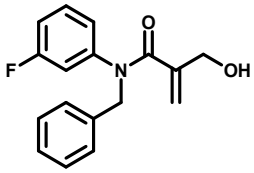
***N*-benzyl-*N*-(4-fluorophenyl)-2-(hydroxymethyl)acrylamide (4l):** White solid, 73% yield.

^{1}H NMR (300 MHz, $CDCl_3$) δ 7.29–7.19 (m, 5H), 7.01–6.91 (m, 4H), 5.29 (s, 1H), 4.97 (m, 3H), 4.24–4.16 (m, 2H). **^{13}C NMR** (75 MHz, $CDCl_3$) δ 170.06, 161.42(d, $J_{C,F}$ = 246 Hz), 141.17, 138.77, 136.80, 129.46 (d, $J_{C,F}$ = 8.25 Hz), 128.55-128.46 (m, 2C), 127.57, 119.89, 116.07(d, $J_{C,F}$ = 22.5 Hz), 64.50, 53.39.



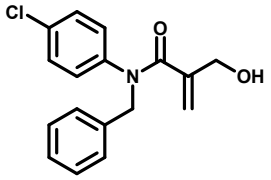
***N*-benzyl-*N*-(2-fluorophenyl)-2-hydroxyacrylamide (4m):** White solid, 34% yield.

^{1}H NMR (300 MHz, $CDCl_3$) δ 7.33–7.15 (m, 6H), 7.07–6.95 (m, 3H), 5.30 (s, 2H), 5.05 (s, 1H), 4.69 (s, 1H), 4.42–4.07 (m, 2H).**^{13}C NMR** (75 MHz, $CDCl_3$) δ 170.58, 157.57 (d, $J_{C,F}$ = 247.50), 142.71, 136.52, 129.80, 129.29 (d, $J_{C,F}$ = 7.50 Hz), 128.60, 128.40 (2C), 127.56, 124.55 (d, $J_{C,F}$ = 4.50 Hz), 119.12, 116.55 (d, $J_{C,F}$ = 20.25 Hz), 64.19, 52.45.



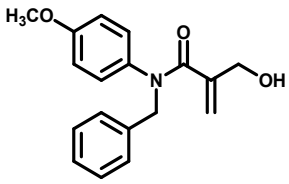
***N*-benzyl-*N*-(3-fluorophenyl)-2-(hydroxymethyl)acrylamide (4n):** Colorless oil, 34% yield.

^{1}H NMR (300 MHz, $CDCl_3$) δ 7.31–7.19 (m, 6H), 6.98–6.88 (m, 1H), 6.88–6.75 (m, 2H), 5.33 (s, 1H), 5.04 (s, 1H), 5.00 (s, 2H), 4.29–4.20 (m, 2H). **^{13}C NMR** (75 MHz, $CDCl_3$) δ 170.00, 162.63 (d, $J_{C,F}$ = 246.75 Hz), 144.45 (d, $J_{C,F}$ = 9.75 Hz), 143.02, 136.74, 130.23 (d, $J_{C,F}$ = 9.0 Hz), 128.57, 128.23, 127.58, 123.45 (d, $J_{C,F}$ = 2.25 Hz), 120.16, 114.94 (d, $J_{C,F}$ = 22.5 Hz), 114.37 (d, $J_{C,F}$ = 21.0 Hz), 64.40, 53.28.



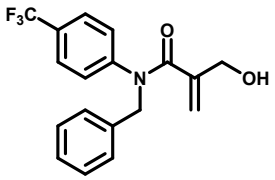
***N*-benzyl-*N*-(4-chlorophenyl)-2-(hydroxymethyl)acrylamide (4o):** Crystalline solid, 56% yield.

^{1}H NMR (300 MHz, $CDCl_3$) δ 7.32–7.16 (m, 7H), 6.97 (d, J = 9.0 Hz, 2H), 5.31 (s, 1H), 4.99–4.95 (m, 3H), 4.29–4.19 (m, 2H). **^{13}C NMR** (75 MHz, $CDCl_3$) δ 169.99, 143.07, 141.41, 136.73, 133.08, 129.36, 128.97, 128.58, 128.36, 127.59, 120.13, 64.41, 53.27.



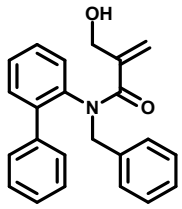
***N*-benzyl-2-(hydroxymethyl)-*N*-(4-methoxyphenyl)acrylamide (4p):** White solid, 46% yield.

^{1}H NMR (300 MHz, $CDCl_3$) δ 7.35–7.17 (m, 6H), 6.96–6.88 (m, 2H), 6.76 (d, J = 9.0 Hz, 2H), 5.29 (s, 1H), 4.97 (s, 2H), 4.23–4.13 (m, 2H), 3.78 (s, 3H). **^{13}C NMR** (75 MHz, $CDCl_3$) δ 170.27, 143.48, 141.80, 137.12, 135.46, 129.03, 128.89, 128.53, 128.43, 114.26, 114.16, 68.62, 64.51, 55.33.



***N*-benzyl-2-(hydroxymethyl)-*N*-(4-(trifluoromethyl)phenyl)acrylamide (4q):** Crystalline solid, 75% yield.

^{1}H NMR (300 MHz, $CDCl_3$) δ 7.53 (d, J = 6.0 Hz, 2H), 7.30–7.18 (m, 7H), 5.33 (s, 1H), 5.03 (s, 2H), 4.99 (s, 1H), 4.27 (s, 2H). **^{13}C NMR** (75 MHz, $CDCl_3$) δ 170.02, 146.23, 142.91, 136.62, 128.65, 128.12, 127.72, 127.69 (m), 127.66, 127.26 (q, $J_{C,F}$ = 211.00 Hz) 126.31 (q, $J_{C,F}$ = 3.75 Hz), 120.53, 64.31, 53.22.



***N*-([1,1'-biphenyl]-2-yl)-*N*-benzyl-3-hydroxy-2-oxopropanamide (4r):** White solid, 17% yield. **^{1}H NMR** (300 MHz, $CDCl_3$) δ 7.54–7.14 (m, 13H), 7.08-7.00 (m, 1H), 5.58 (d, *J* = 15.0 Hz, 1H), 5.30 (s, 1H), 4.89 (s, 1H), 4.12 (d, *J* = 15.0 Hz, 1H), 3.61 - 3.36 (m, 2H**). ^{13}C NMR** (75 MHz, $CDCl_3$) δ 169.85, 142.24, 140.88, 138.65, 138.48, 137.26, 131.52, 129.01, 128.86, 128.55, 128.46 (2C), 128.32, 128.01, 127.76, 127.50, 121.26, 64.38, 53.62.

Coixspirolactams: Copies of ^{1}H and ^{13}C NMR Spectra

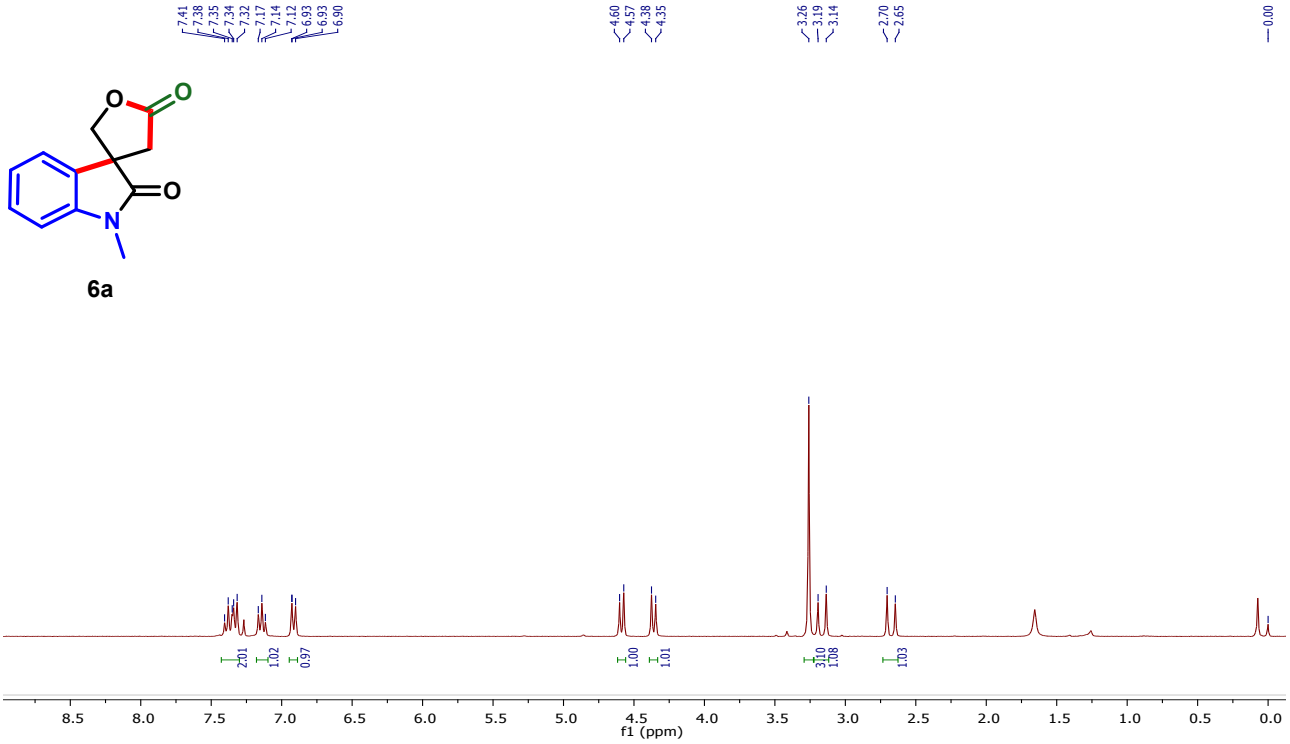


Figure S1. ^{1}H NMR spectrum (300 MHz, $CDCl_3$) of the compound **6a**.

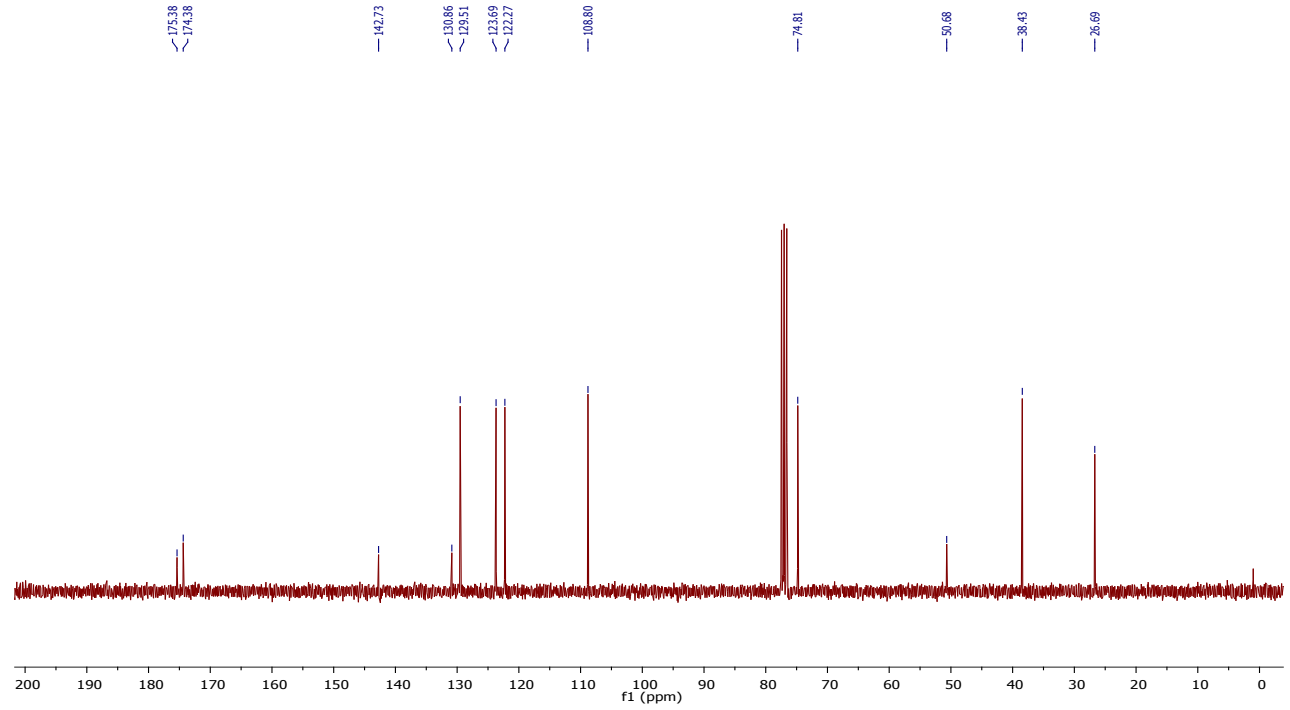


Figure S2. ^{13}C NMR spectrum (75 MHz, $CDCl_3$) of the compound **6a**.

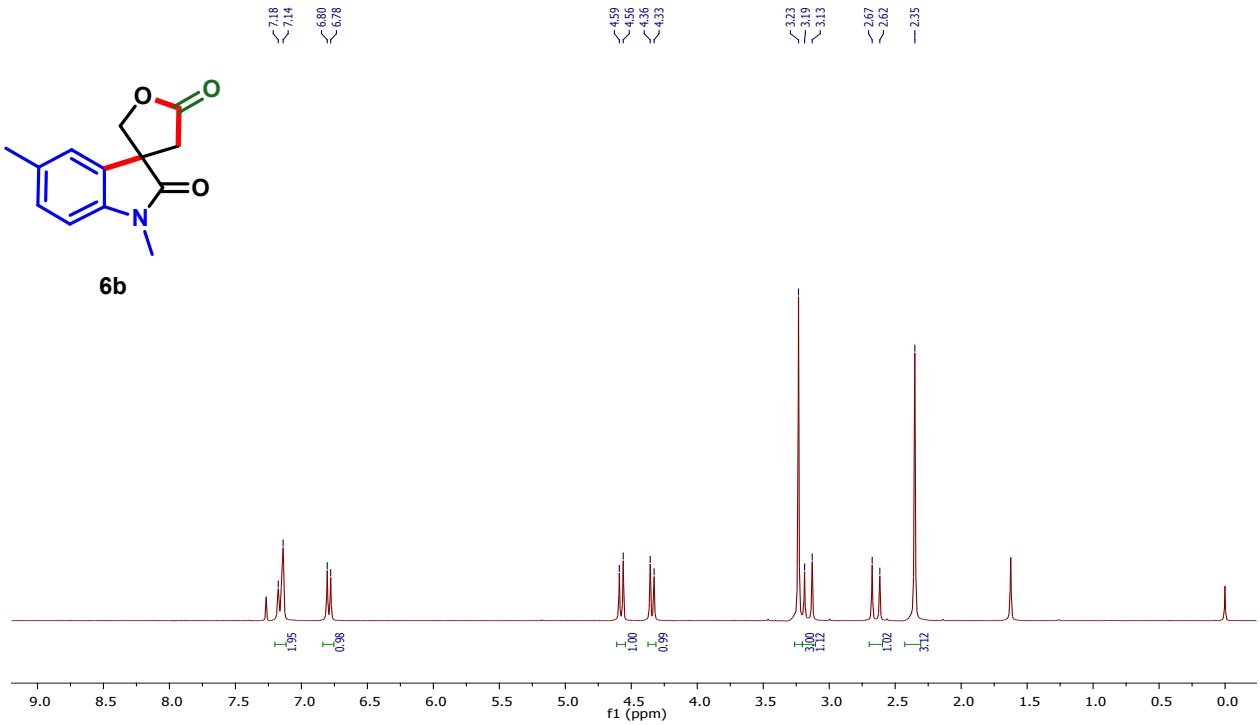


Figure S3. ^{1}H NMR spectrum (300 MHz, $CDCl_3$) of the compound **6b**.

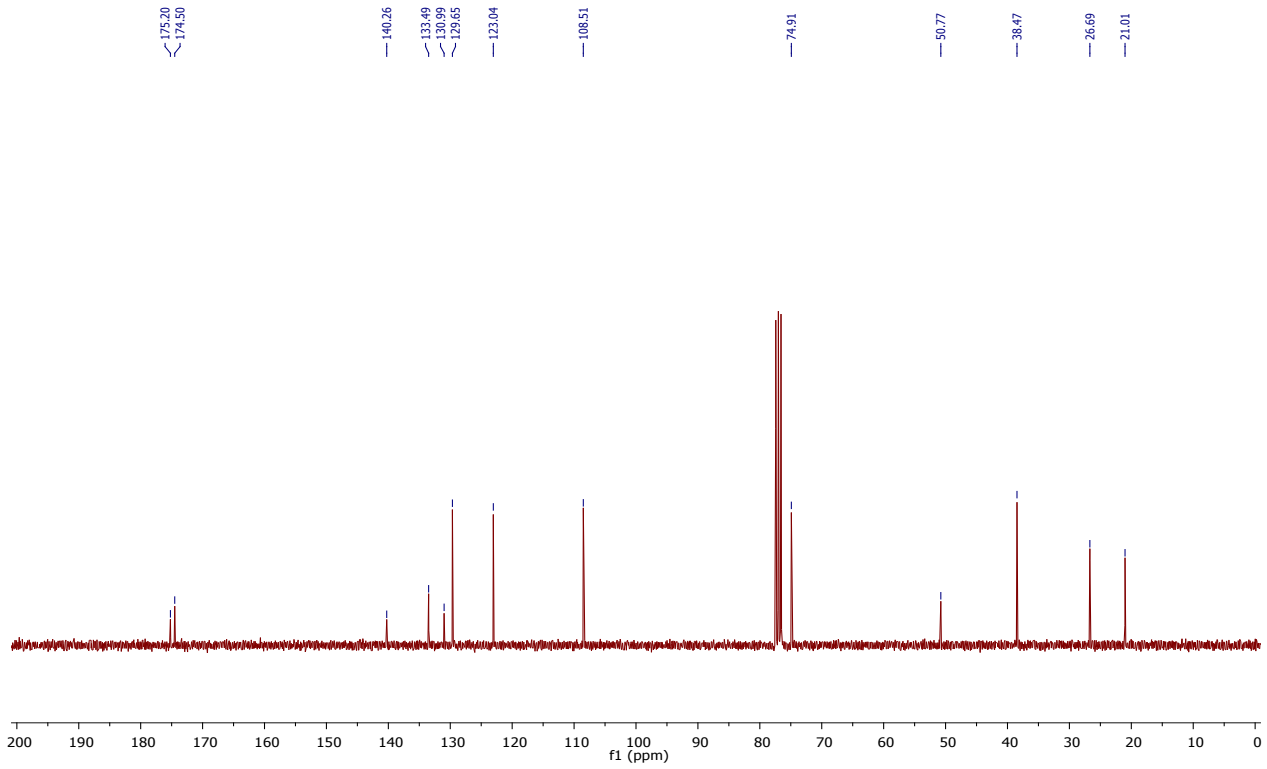


Figure S4. ^{13}C NMR spectrum (75 MHz, $CDCl_3$) of the compound **6b**.

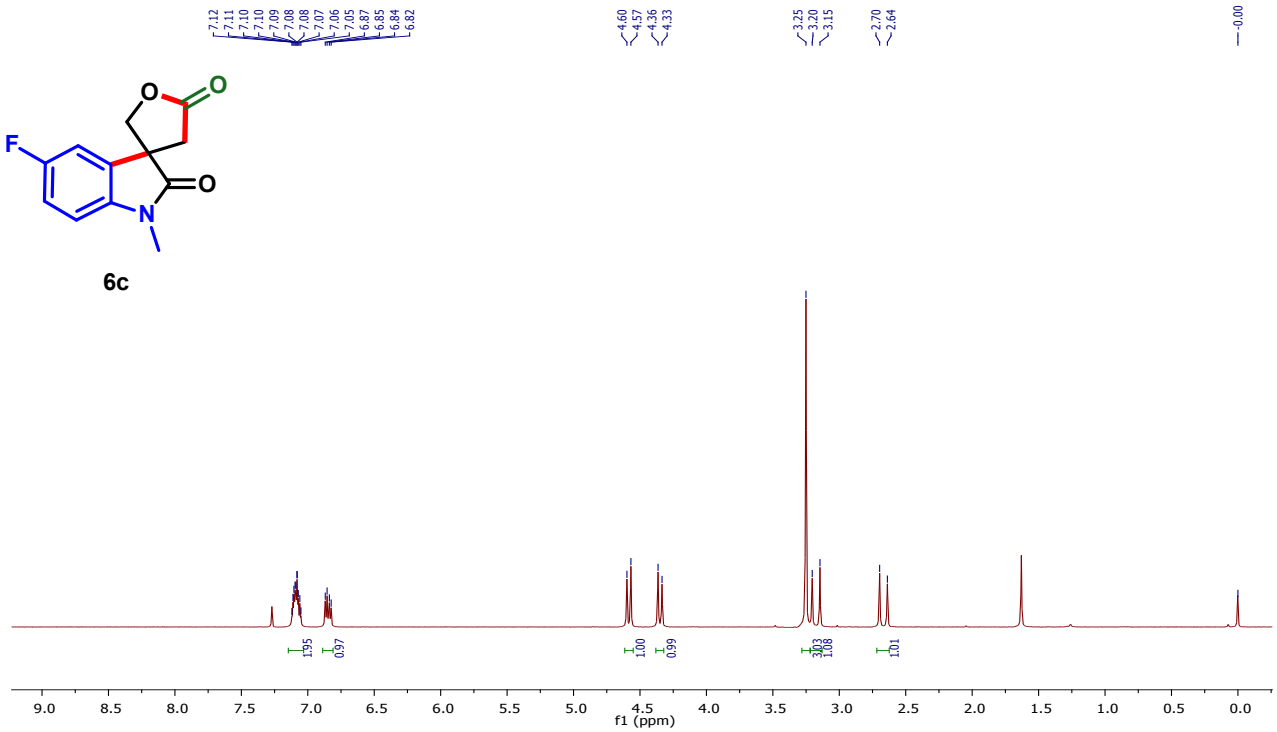


Figure S5. ^{1}H NMR spectrum (300 MHz, $CDCl_3$) of the compound **6c**.

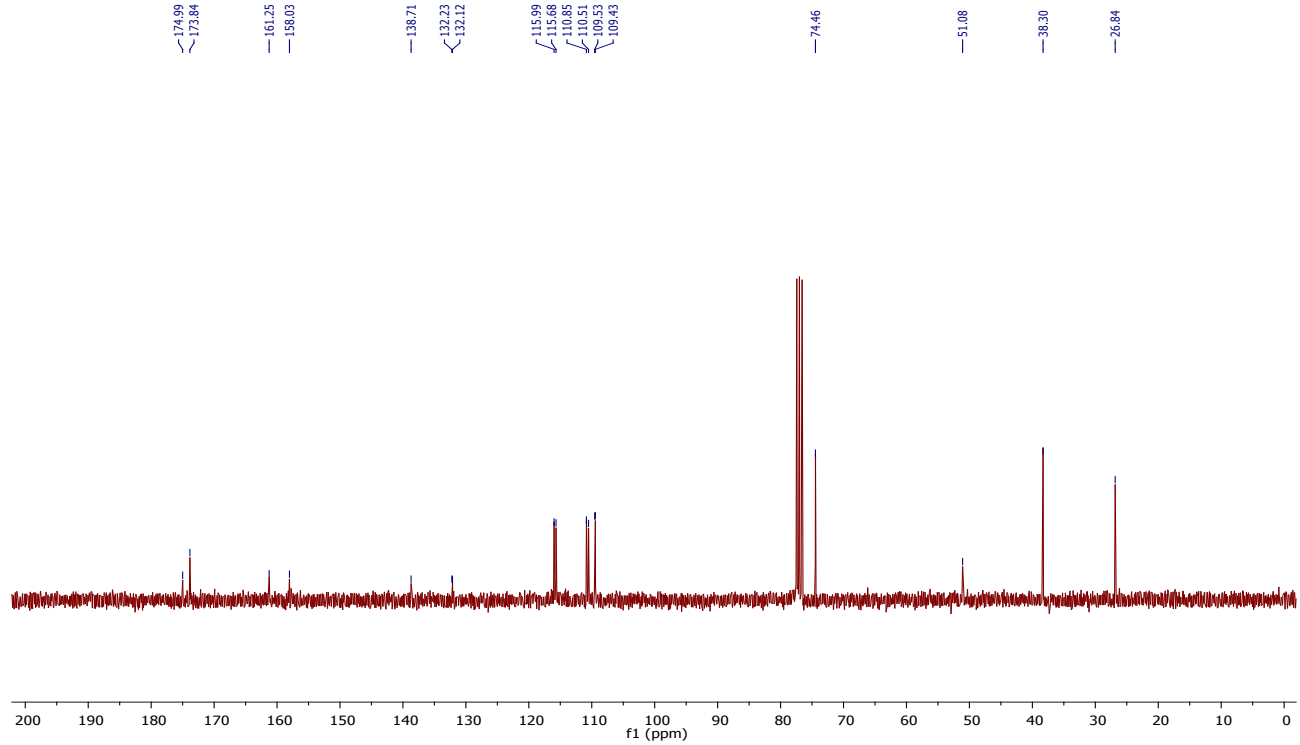


Figure S6. ^{13}C NMR spectrum (75 MHz, $CDCl_3$) of the compound **6c**.

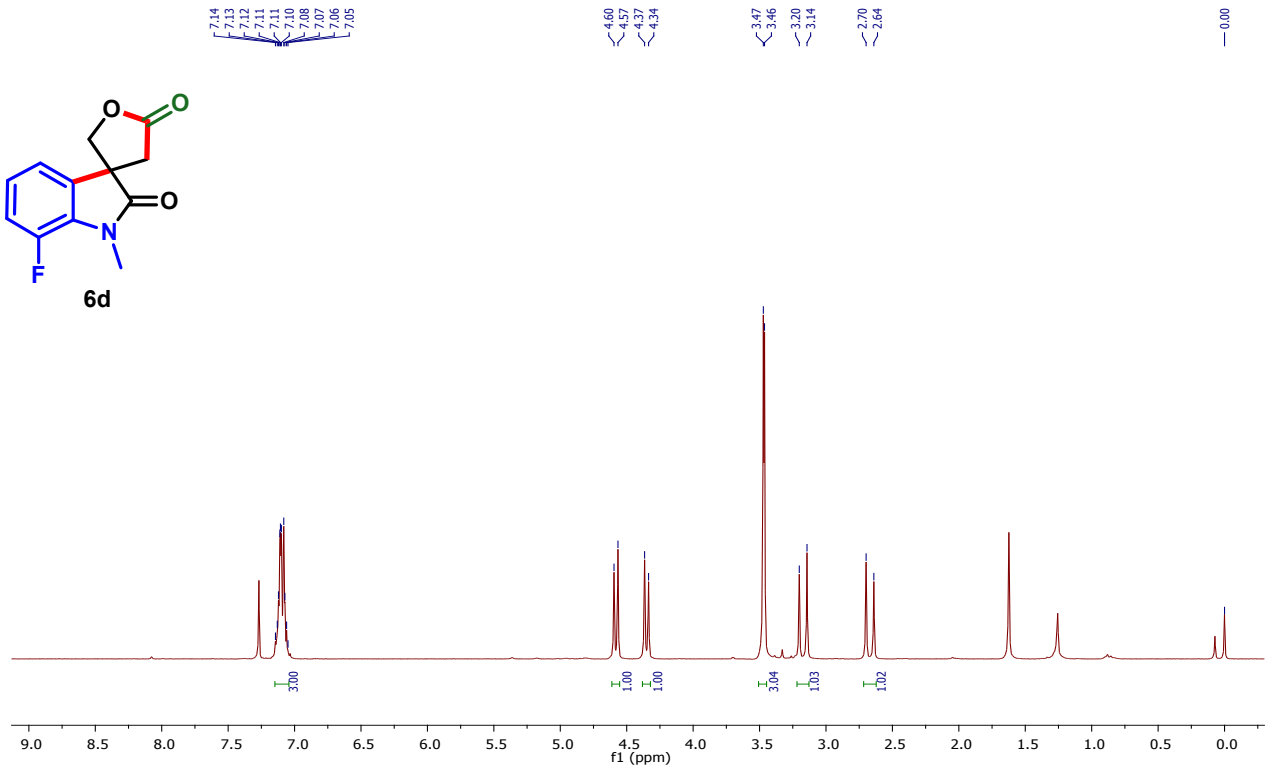


Figure S7. ^{1}H NMR spectrum (300 MHz, $CDCl_3$) of the compound **6d**.

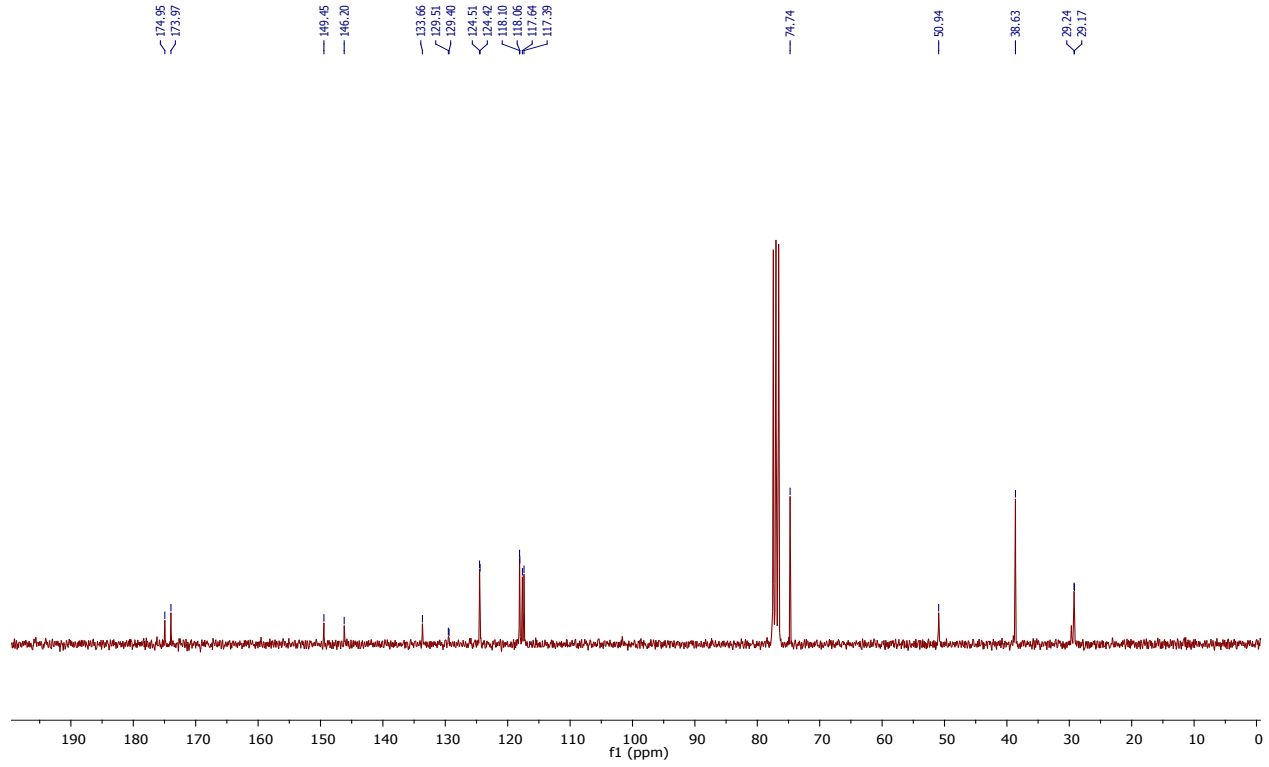


Figure S8. ^{13}C NMR spectrum (75 MHz, $CDCl_3$) of the compound **6d**.

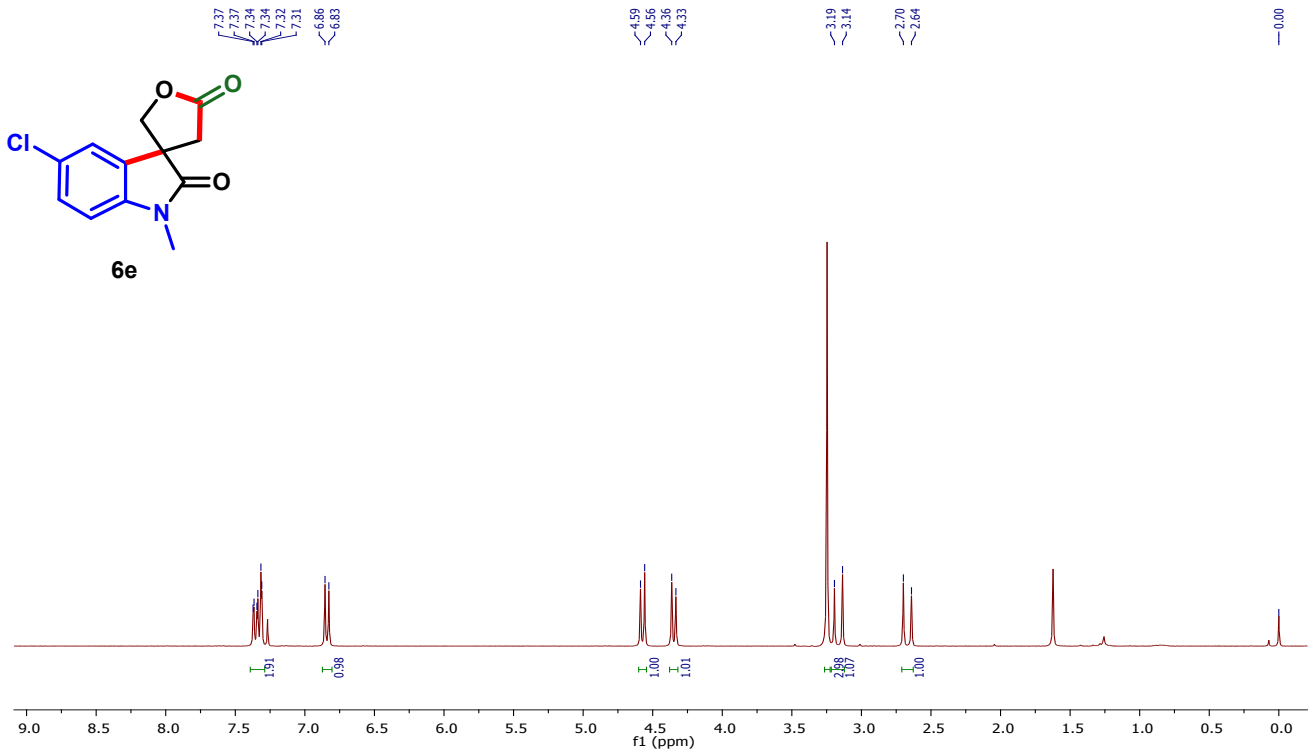


Figure S9. ^{1}H NMR spectrum (300 MHz, $CDCl_3$) of the compound **6e**.

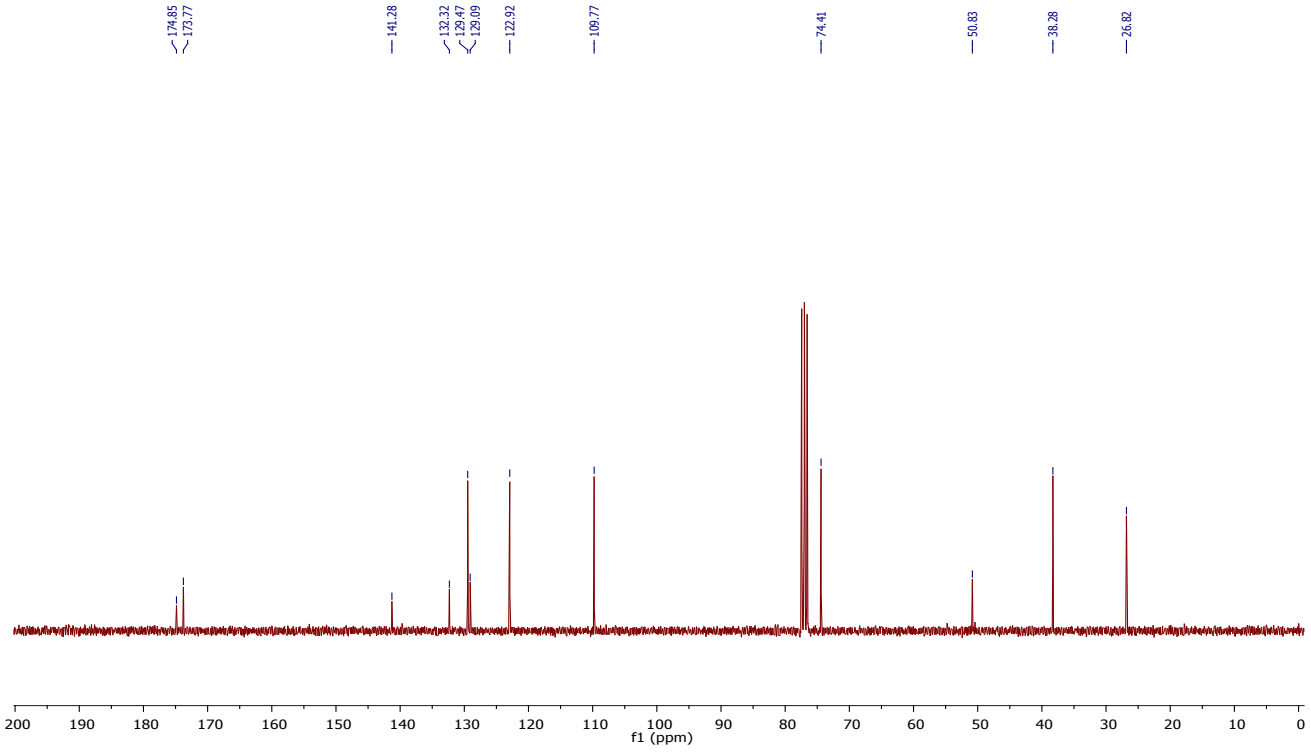


Figure S10. ^{13}C NMR spectrum (75 MHz, $CDCl_3$) of the compound **6e**.

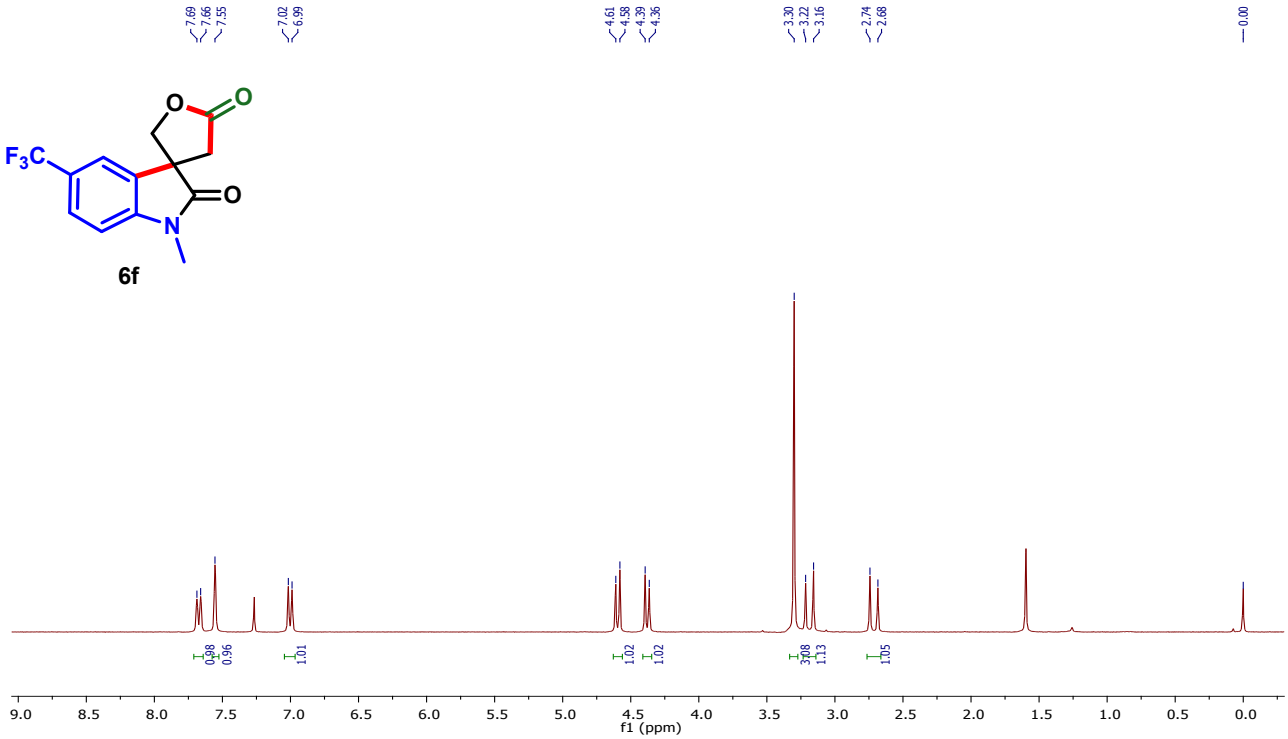


Figure S11. ^{1}H NMR spectrum (300 MHz, $CDCl_3$) of the compound **6f**.

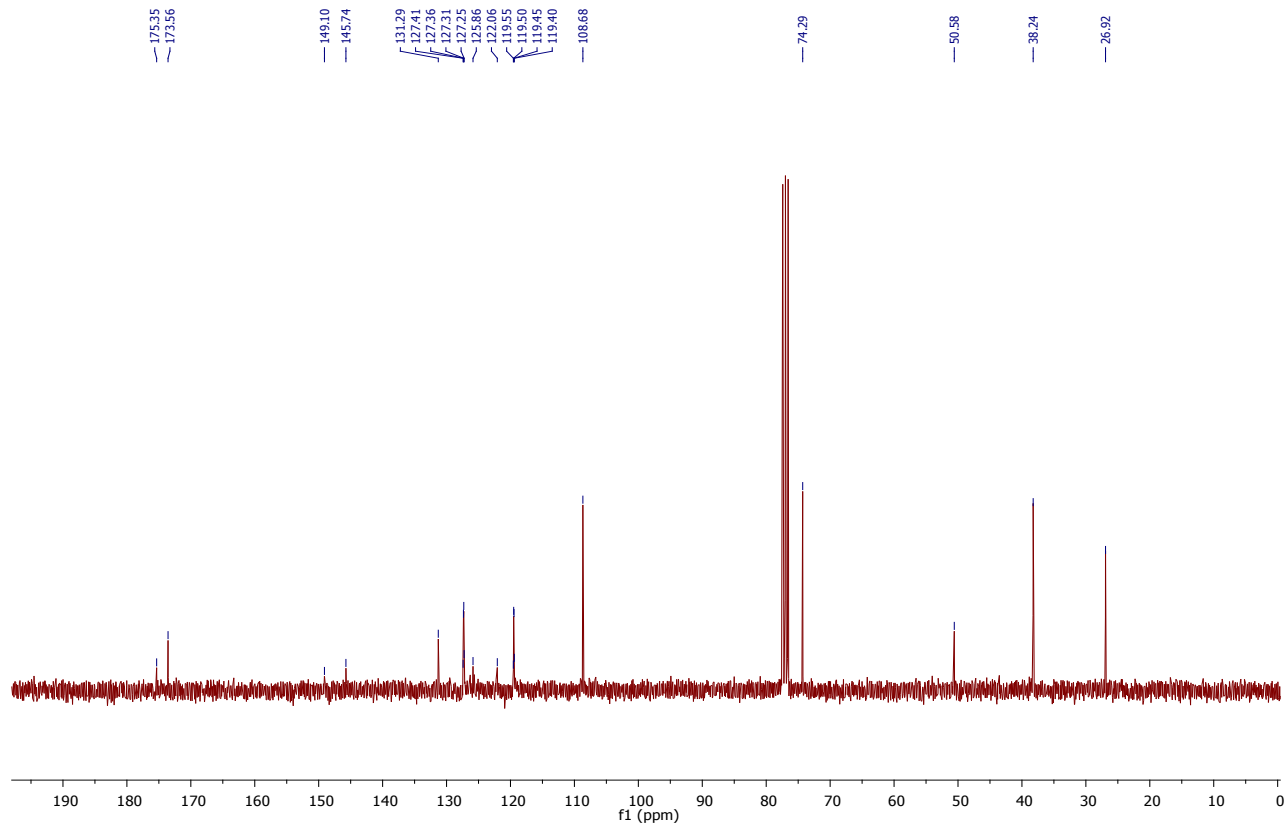


Figure S12. ^{13}C NMR spectrum (75 MHz, $CDCl_3$) of the compound **6f**.

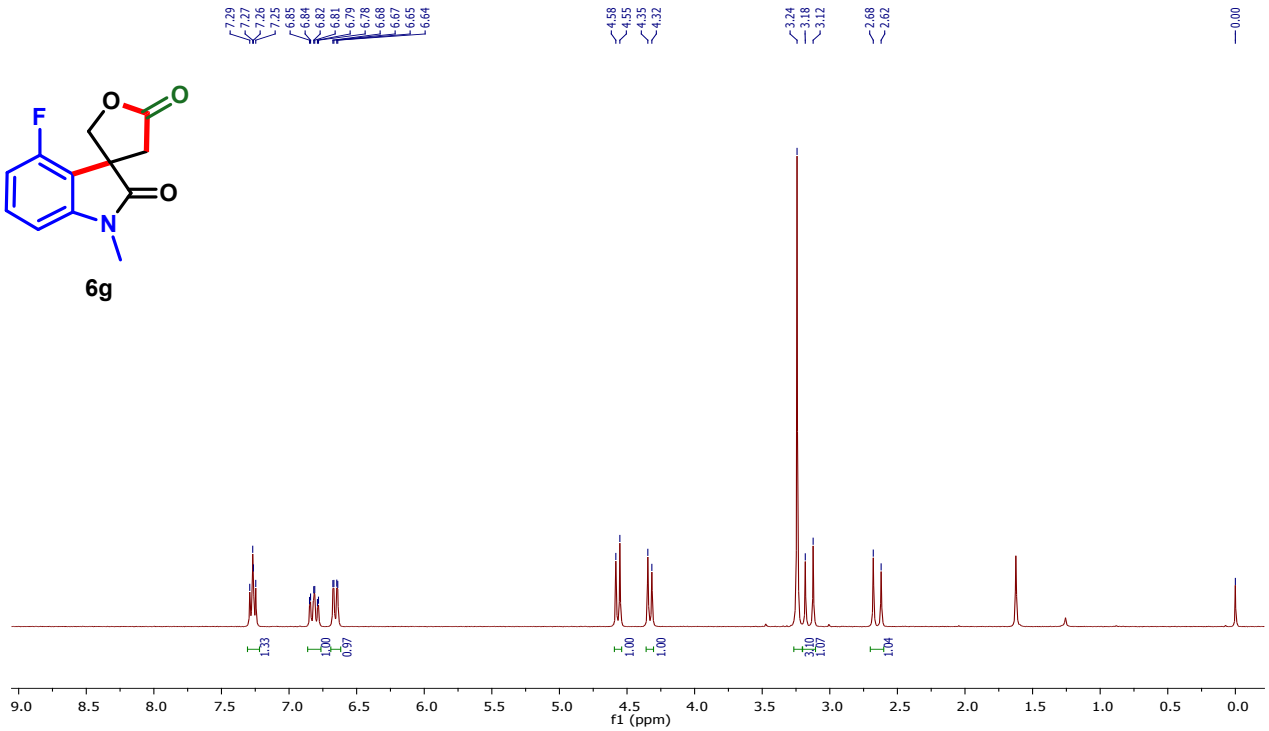


Figure S13. ^{1}H NMR spectrum (300 MHz, $CDCl_3$) of the compound **6g**.

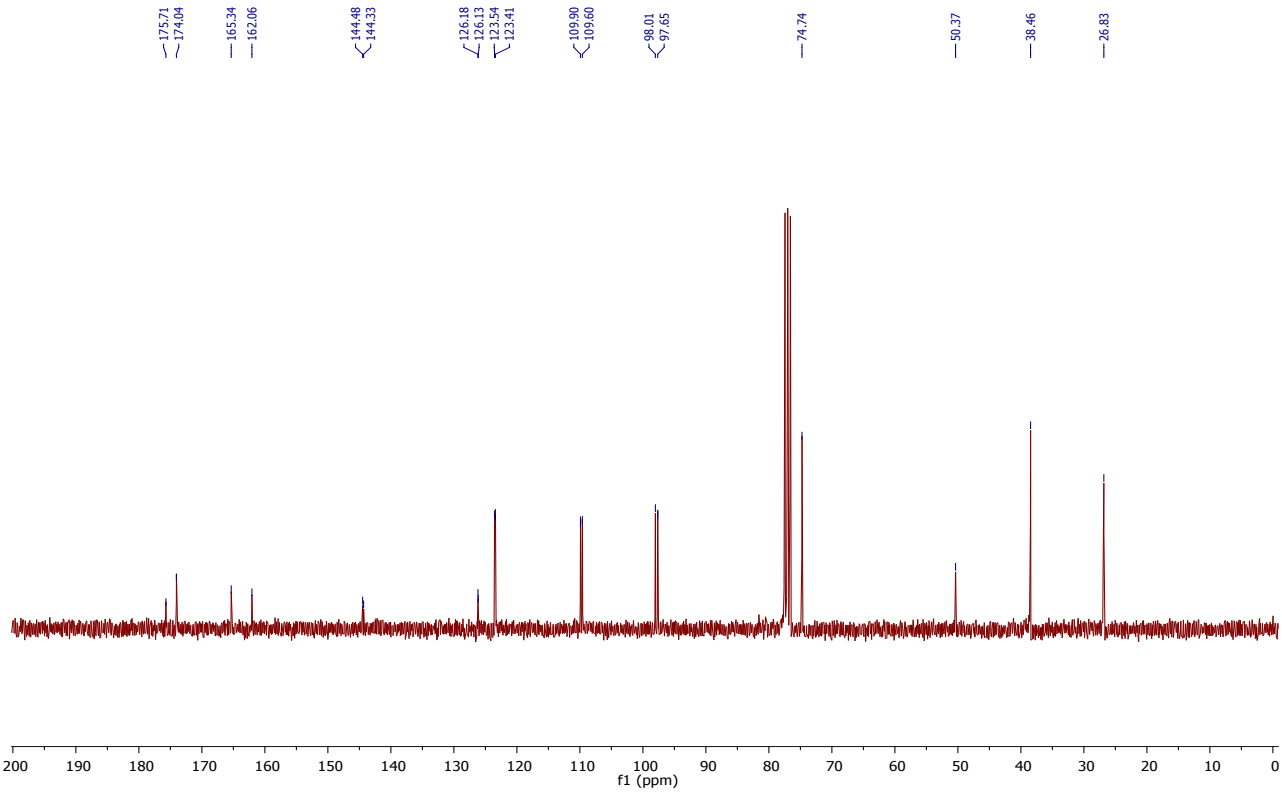


Figure S14. ^{13}C NMR spectrum (75 MHz, $CDCl_3$) of the compound **6g**.

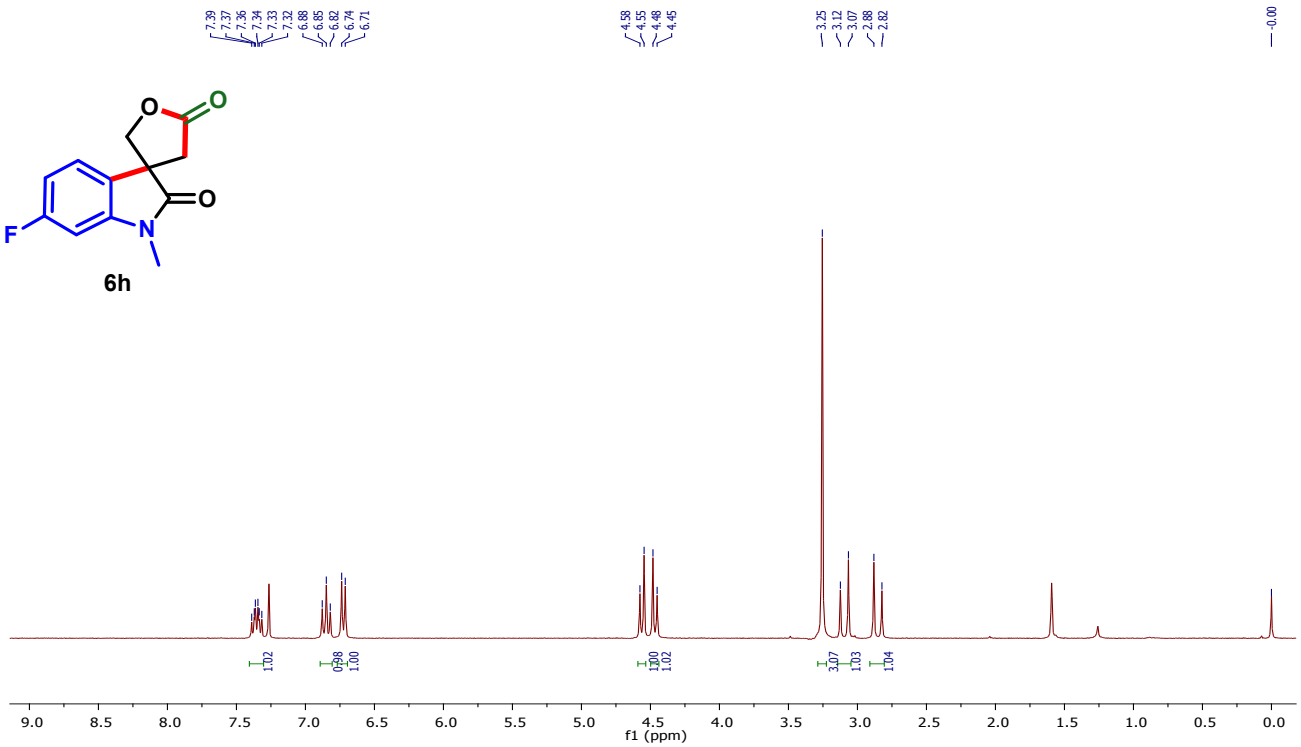


Figure S15. ^{1}H NMR spectrum (300 MHz, $CDCl_3$) of the compound **6h**.

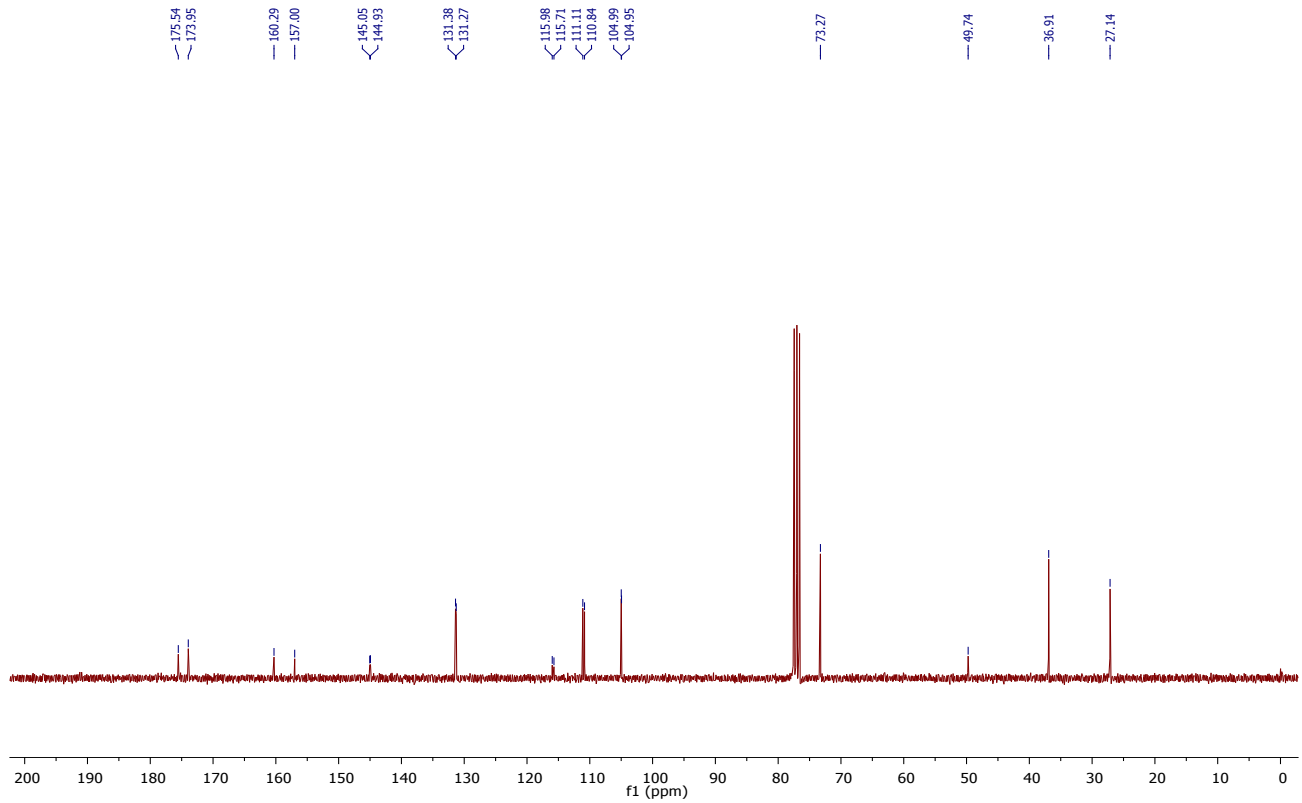


Figure S16. ^{13}C NMR spectrum (75 MHz, $CDCl_3$) of the compound **6h**.

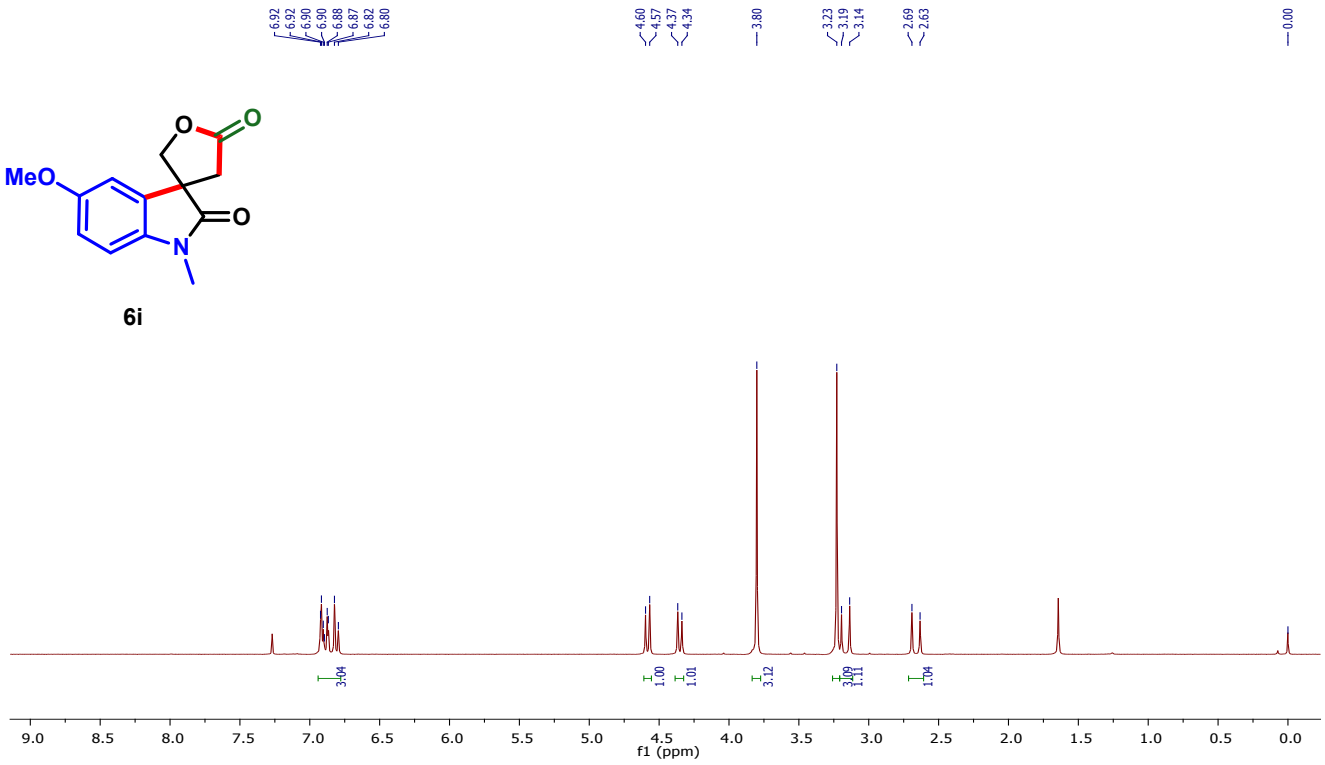


Figure S17. ^{1}H NMR spectrum (300 MHz, $CDCl_3$) of the compound **6i**.

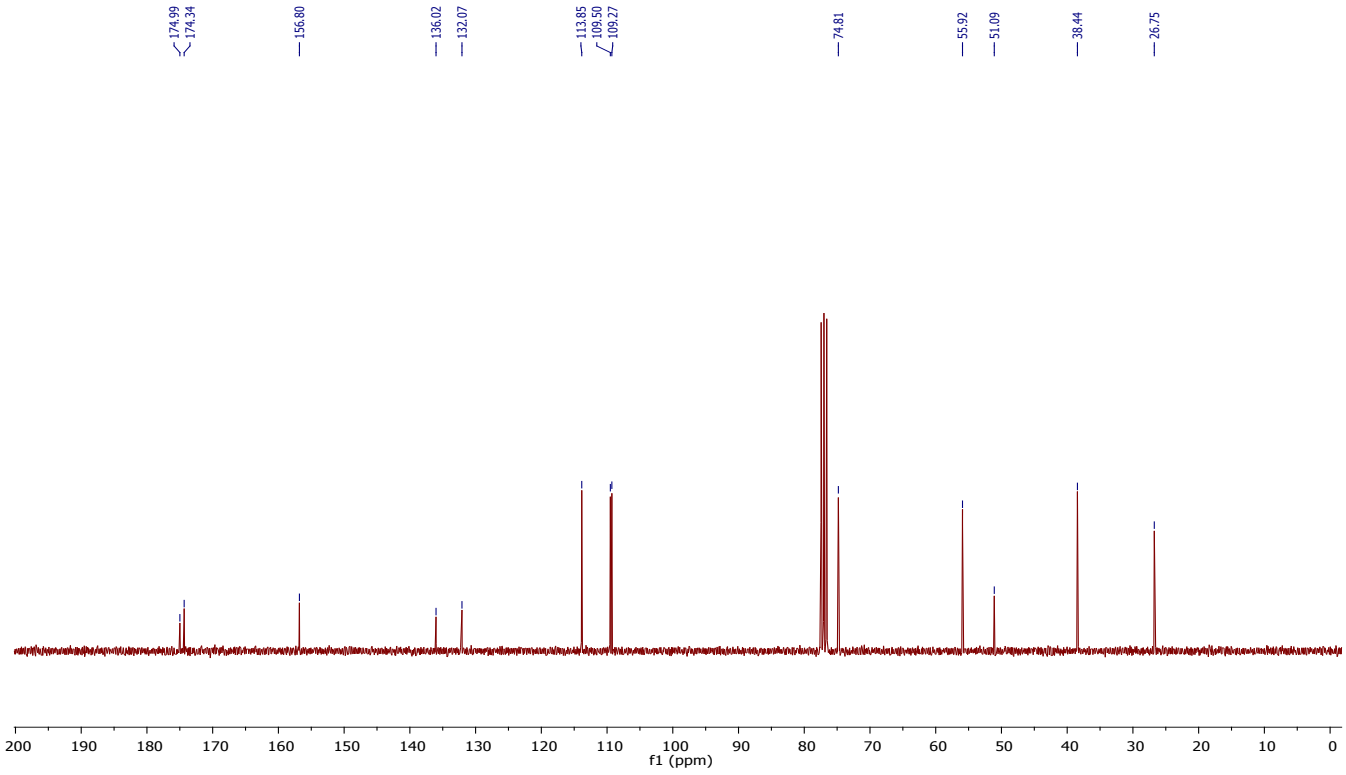


Figure S18. ^{13}C NMR spectrum (75 MHz, $CDCl_3$) of the compound **6i**.

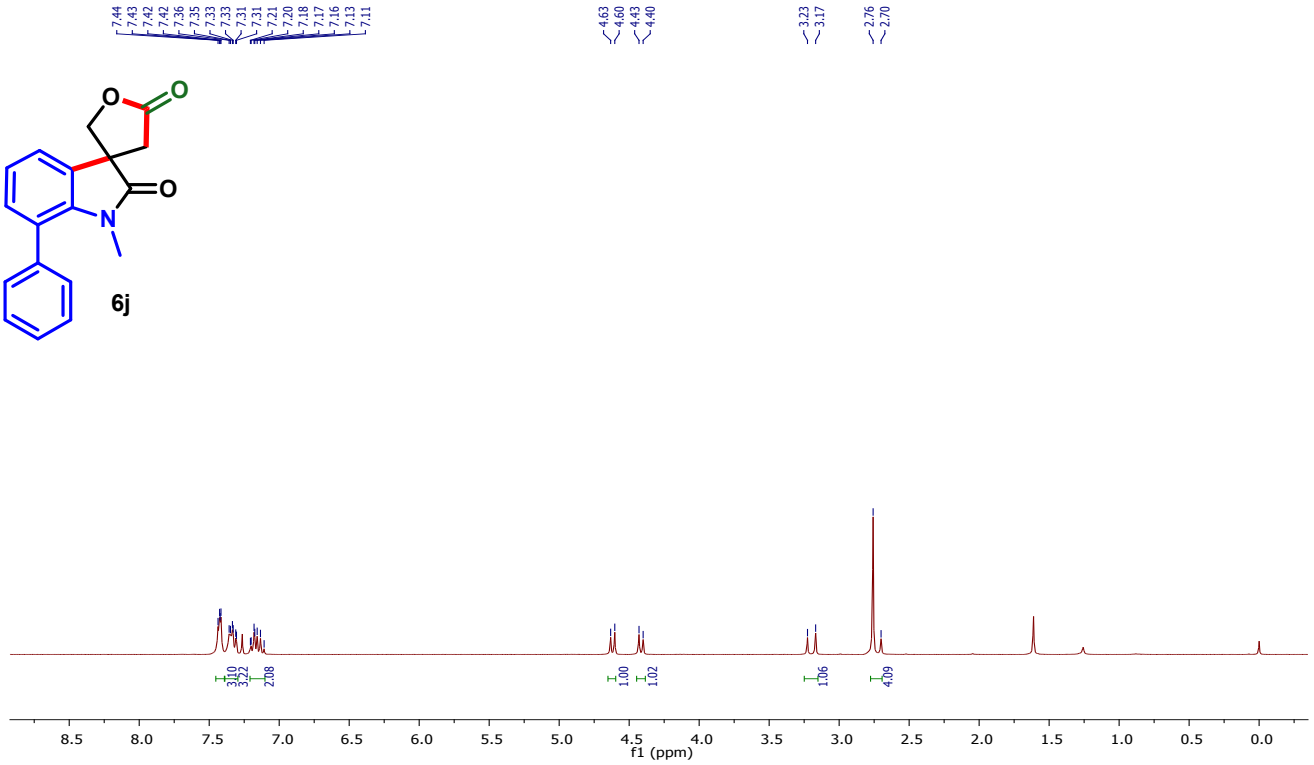


Figure S19. ^{1}H NMR spectrum (300 MHz, $CDCl_3$) of the compound **6j**.

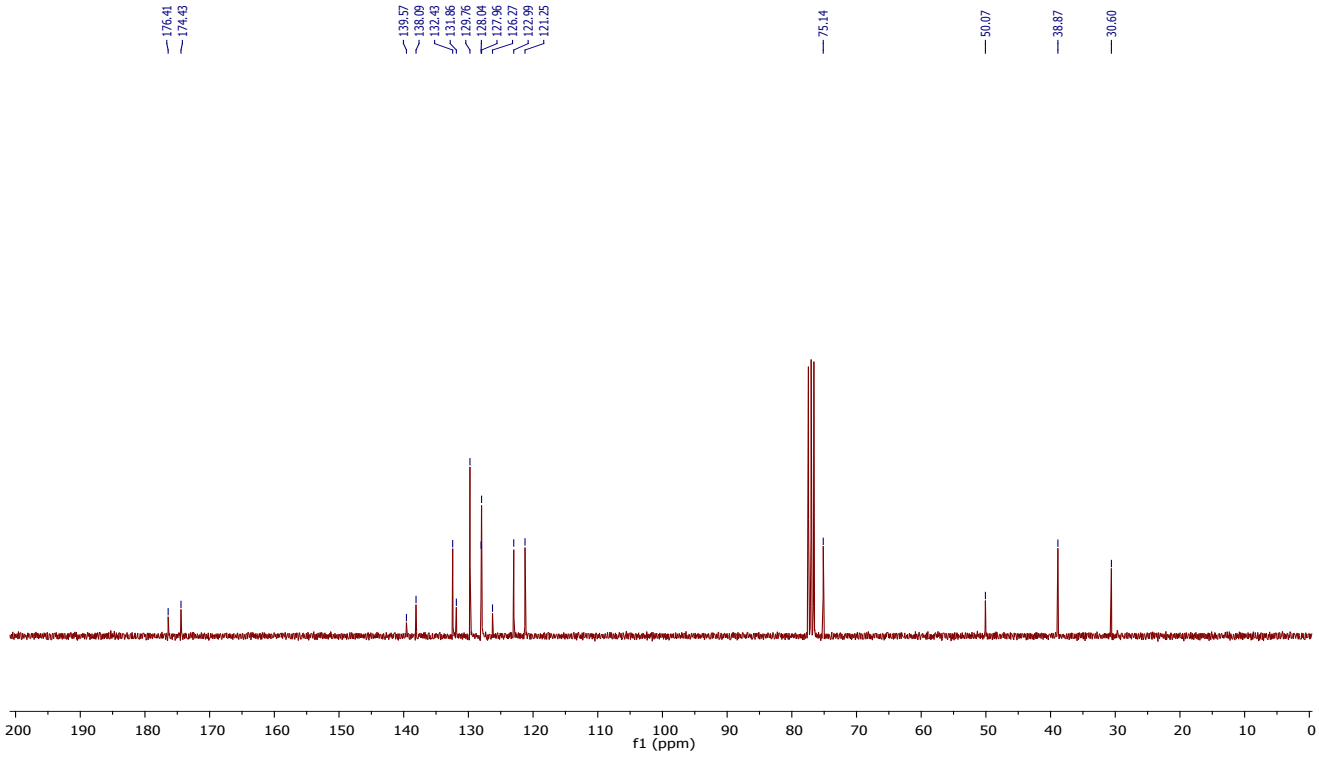


Figure S20. ^{13}C NMR spectrum (75 MHz, $CDCl_3$) of the compound **6j**.

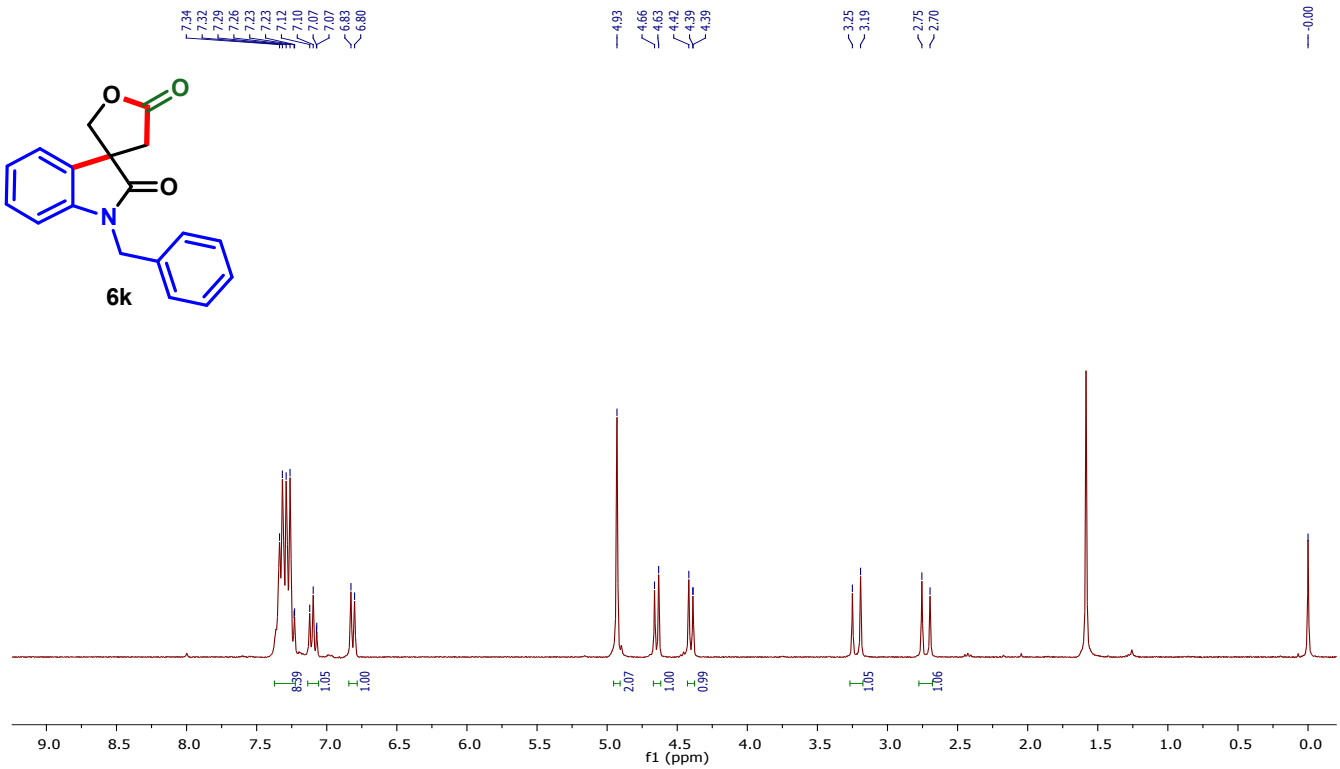


Figure S21. ^{1}H NMR spectrum (300 MHz, $CDCl_3$) of the compound **6k**.

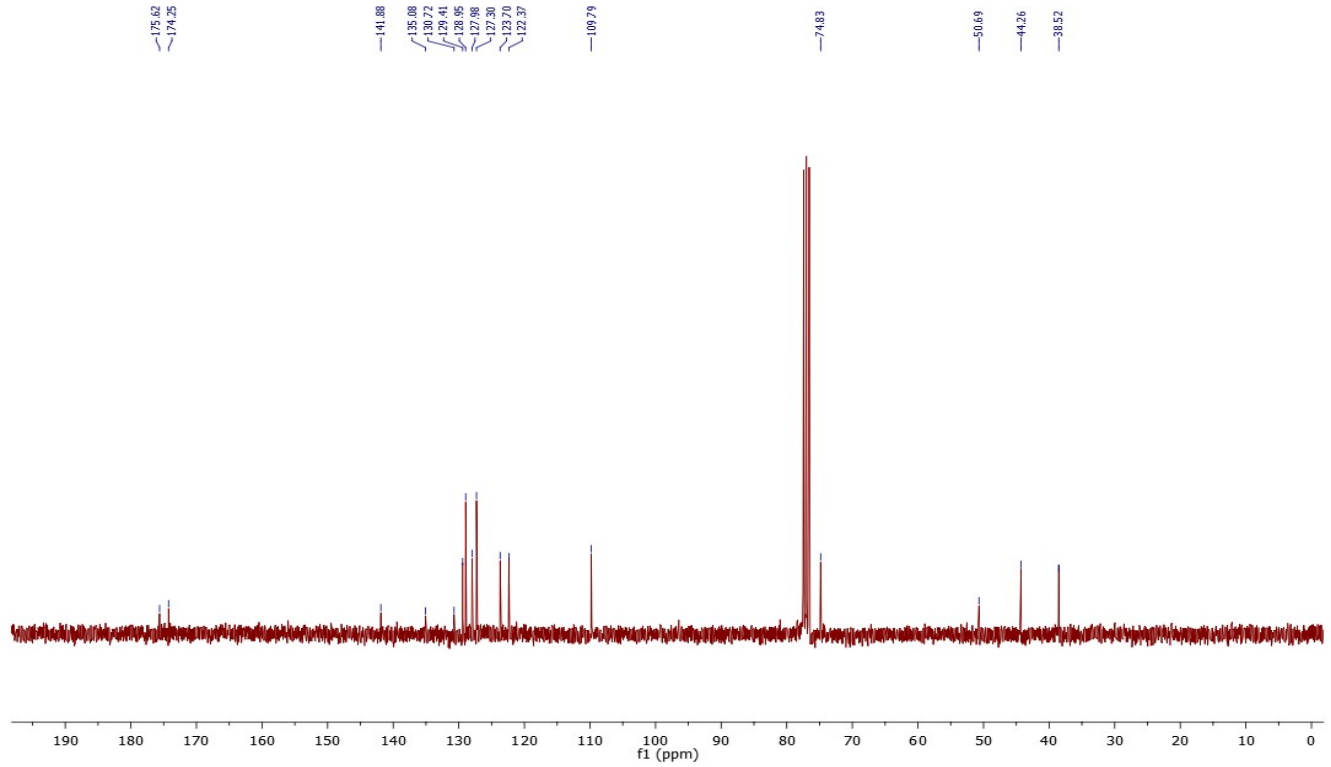


Figure S22. ^{13}C NMR spectrum (75 MHz, $CDCl_3$) of the compound **6k**.

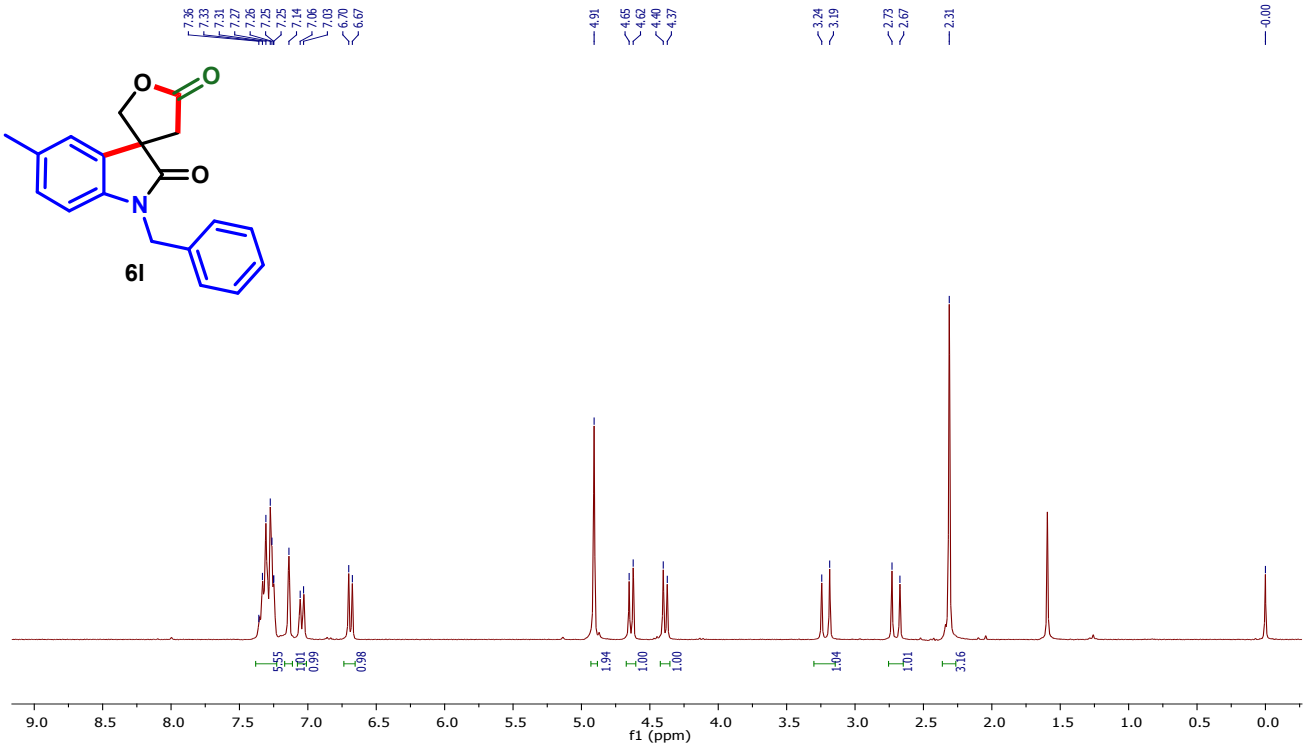


Figure S23. ^{1}H NMR spectrum (300 MHz, $CDCl_3$) of the compound **6l**.

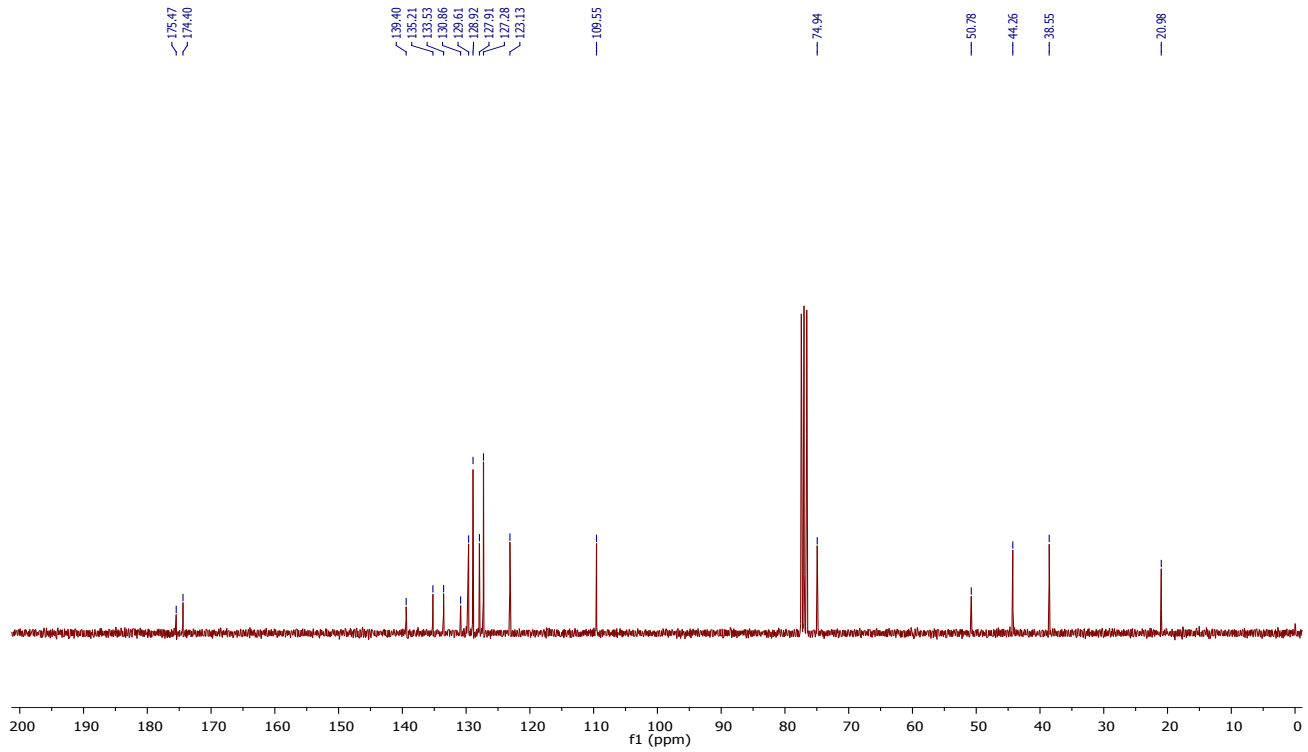


Figure S24. ^{13}C NMR spectrum (75 MHz, $CDCl_3$) of the compound **6l**.

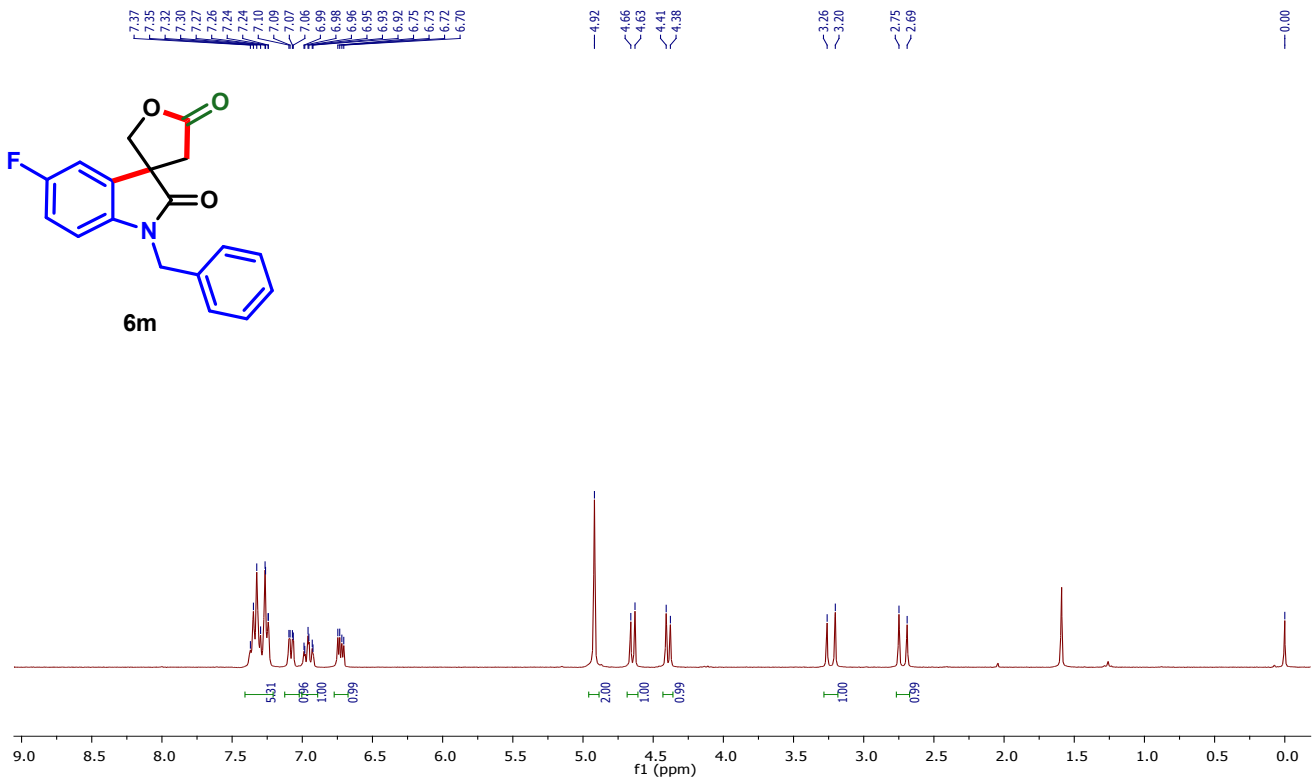


Figure S25. ^{1}H NMR spectrum (300 MHz, $CDCl_3$) of the compound **6m**.

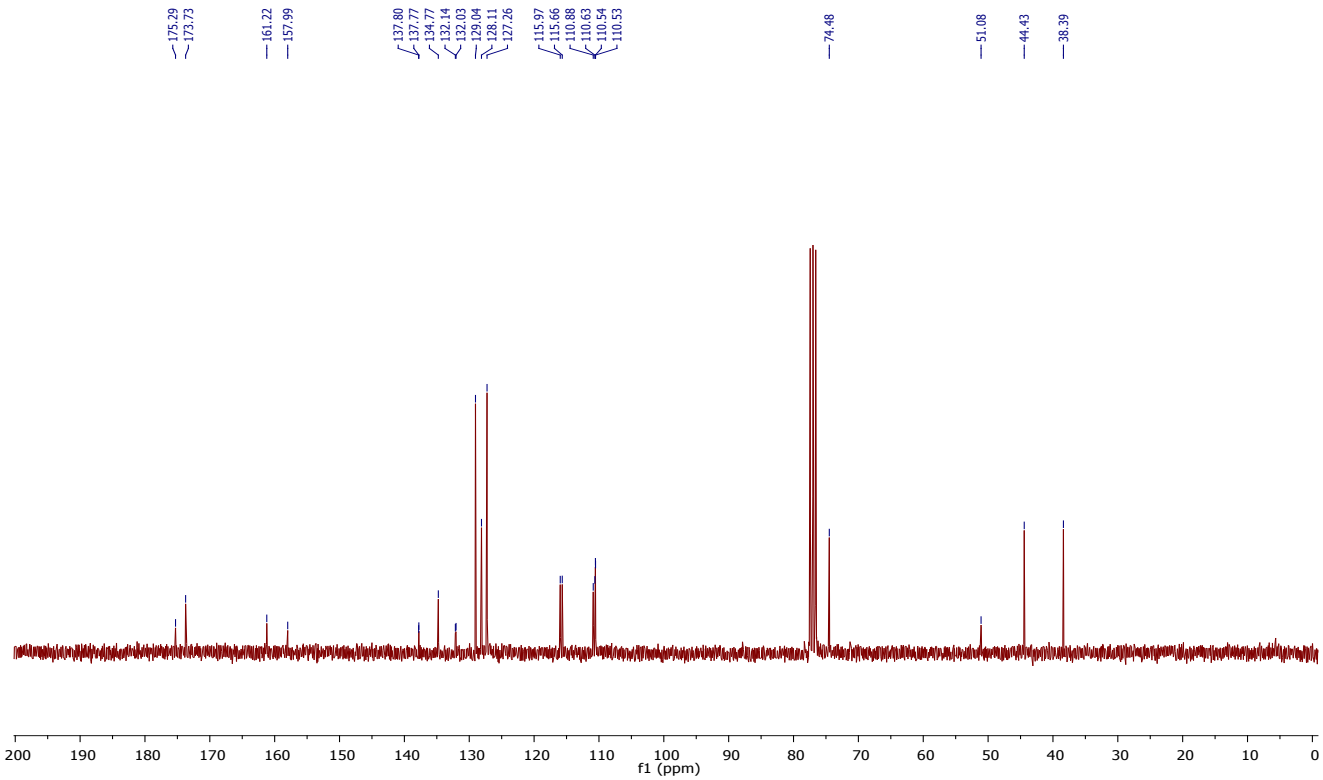


Figure S26. ^{13}C NMR spectrum (75 MHz, $CDCl_3$) of the compound **6m**.

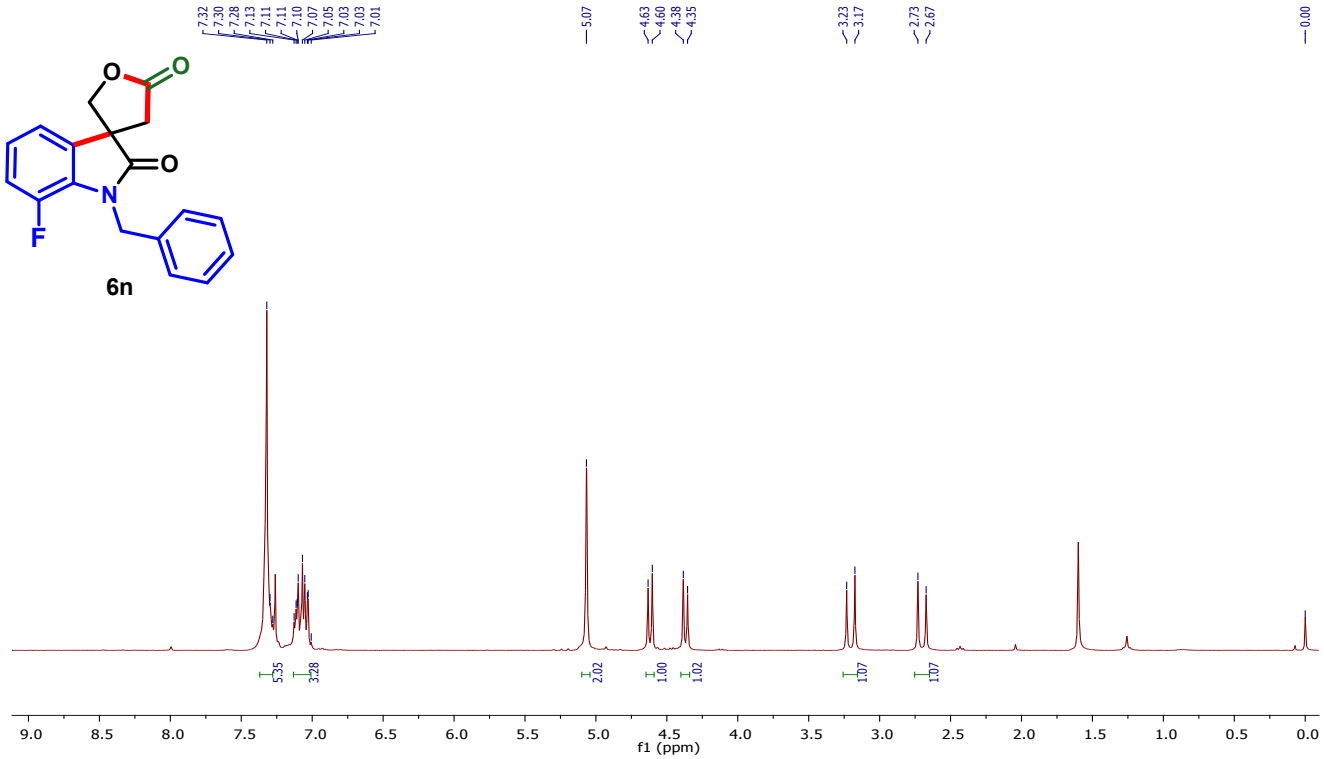


Figure S27. ^{1}H NMR spectrum (300 MHz, $CDCl_3$) of the compound **6n**.

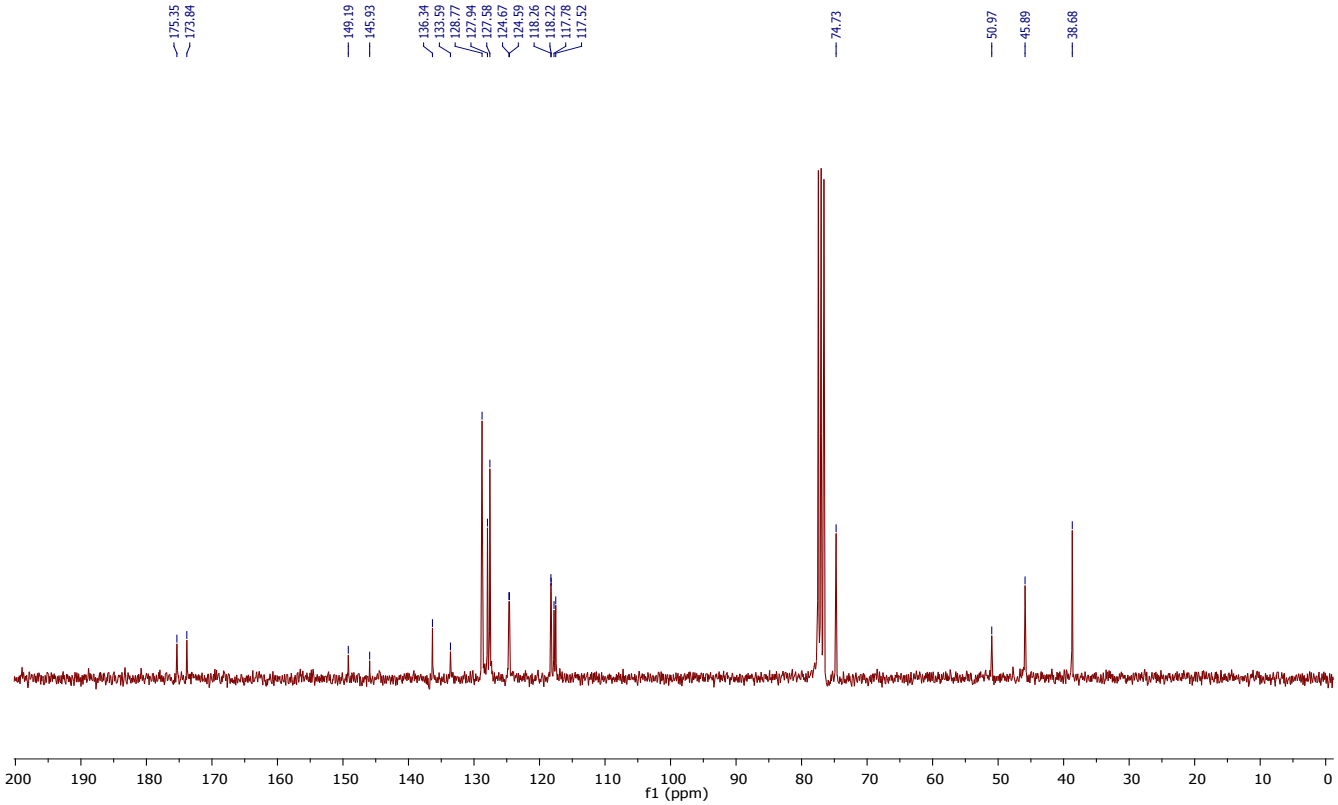


Figure S28. ^{13}C NMR spectrum (75 MHz, $CDCl_3$) of the compound **6n**.

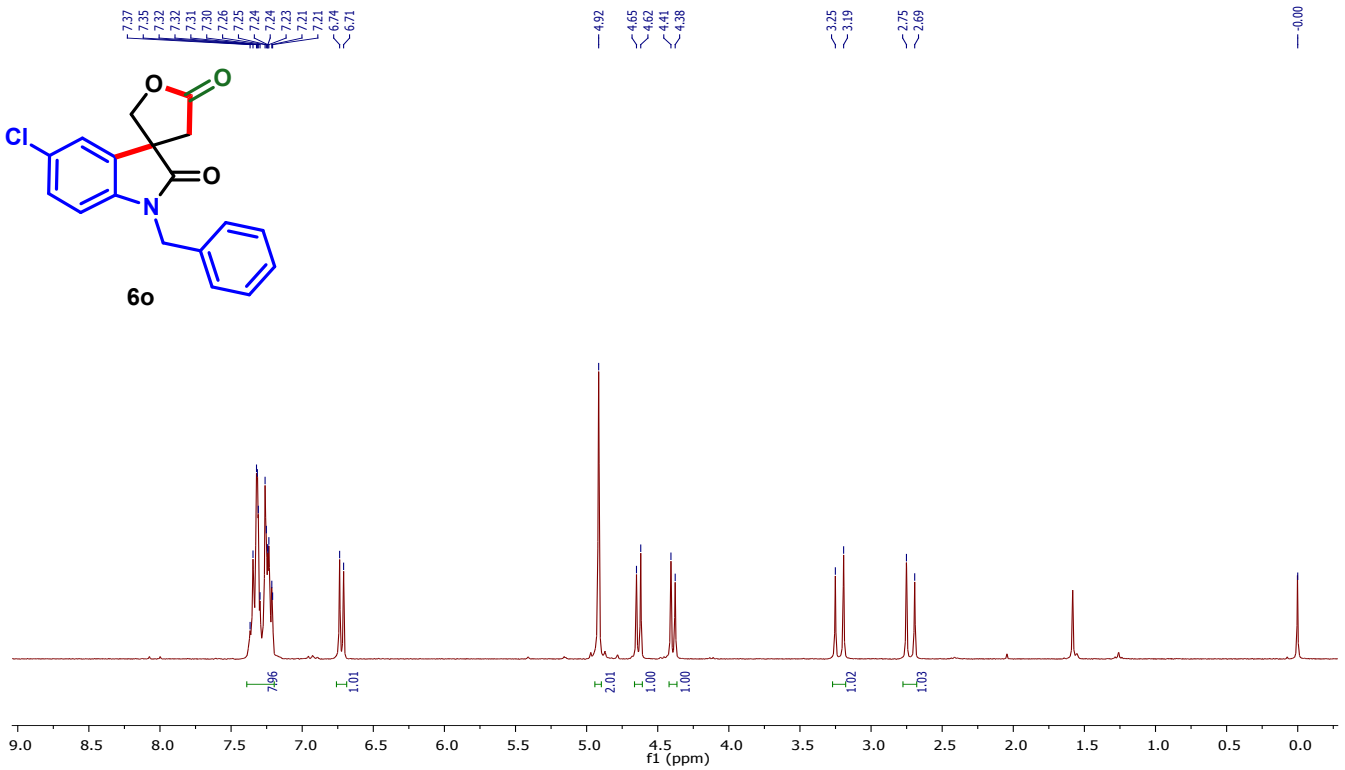


Figure S29. ^{1}H NMR spectrum (300 MHz, $CDCl_3$) of the compound **6o**.

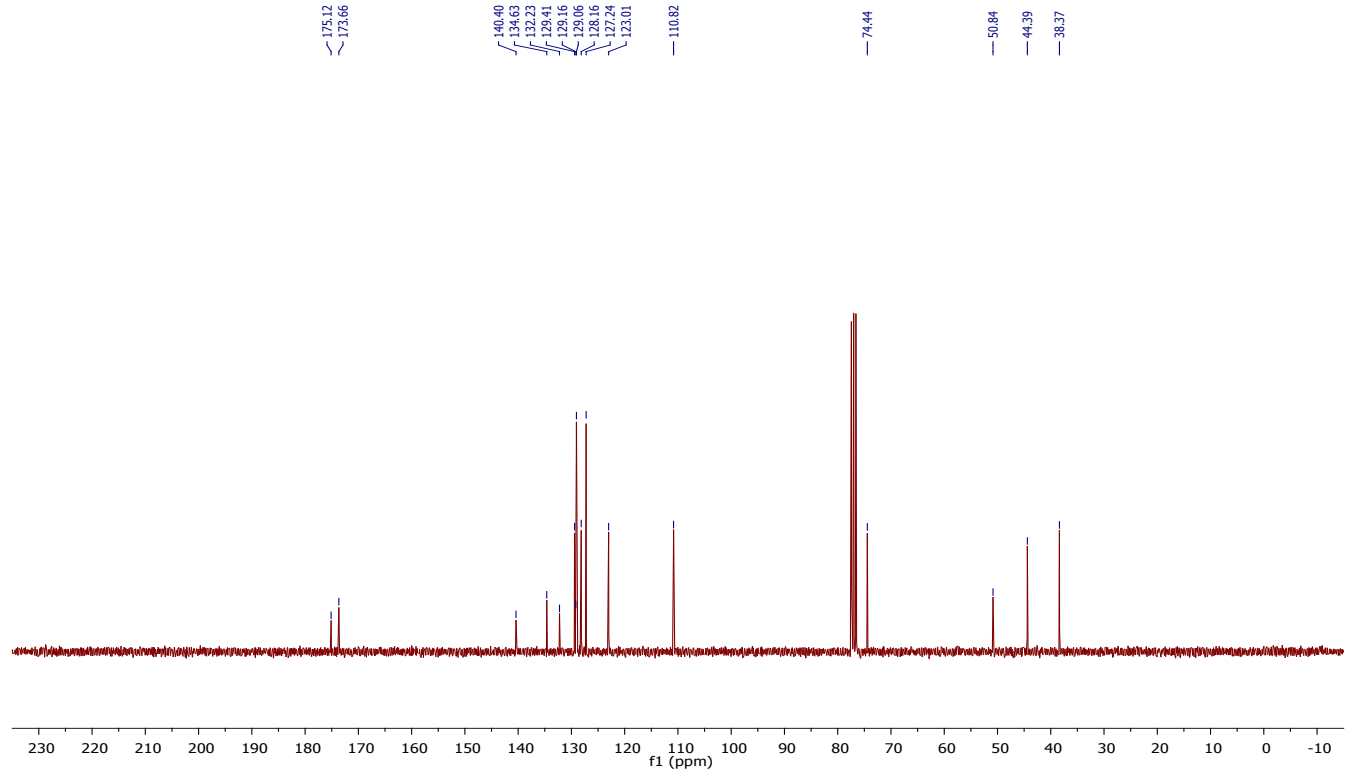


Figure S30. ^{13}C NMR spectrum (75 MHz, $CDCl_3$) of the compound **6o**.

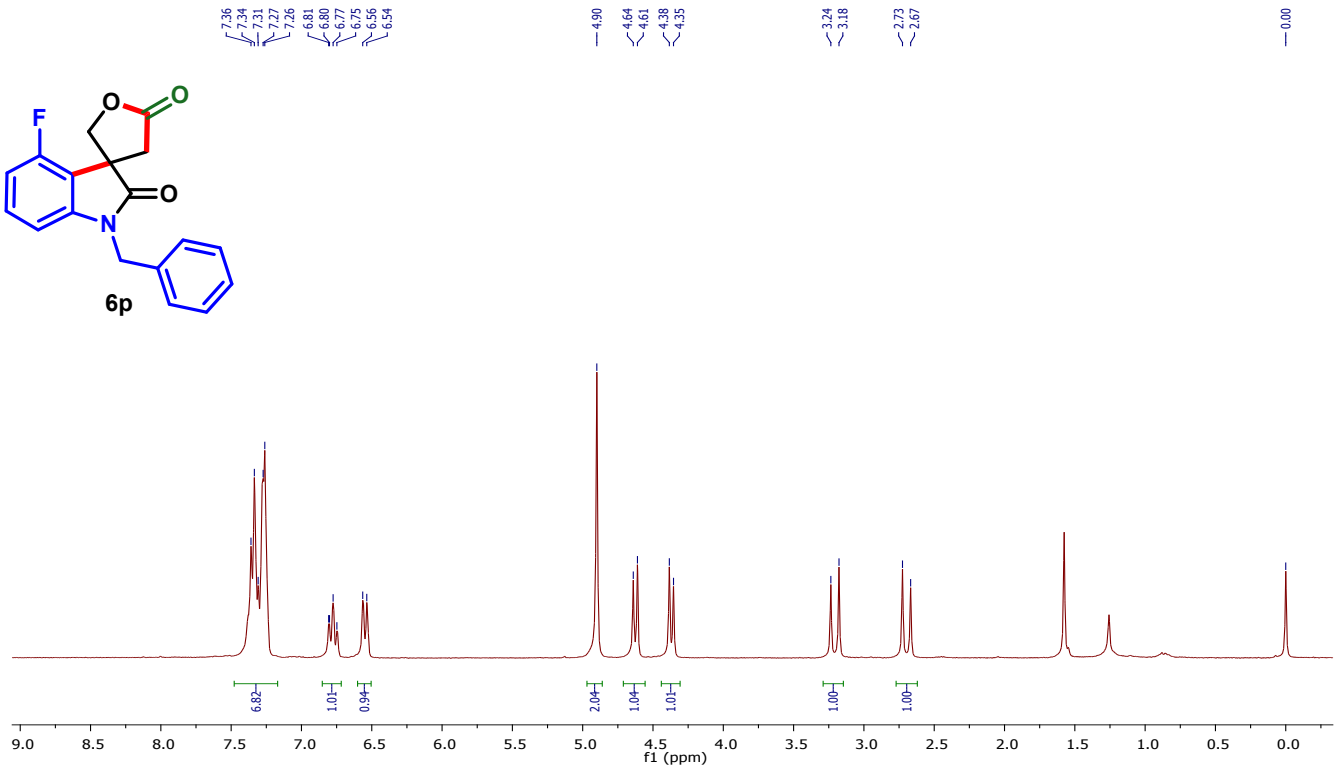


Figure S31. ^{1}H NMR spectrum (300 MHz, $CDCl_3$) of the compound **6p**.

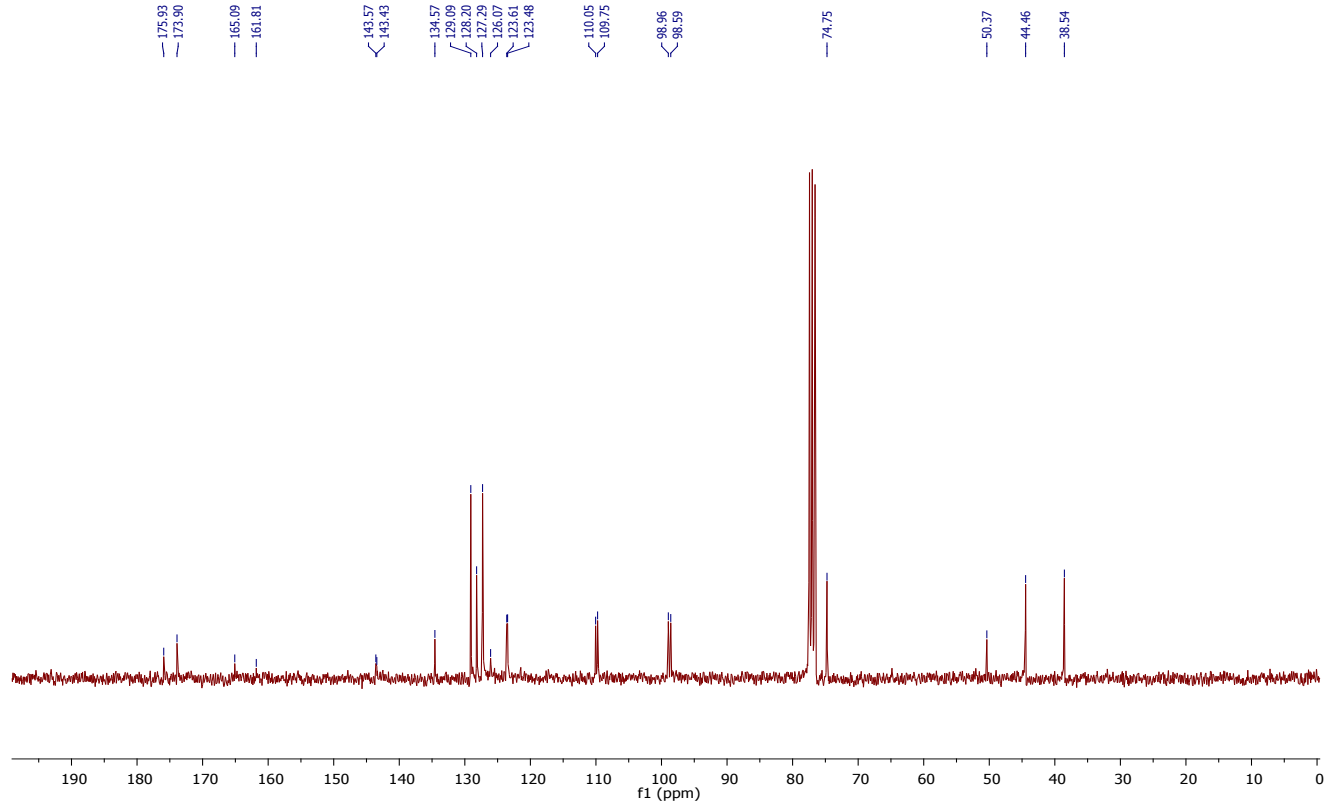


Figure S32. ^{13}C NMR spectrum (75 MHz, $CDCl_3$) of the compound **6p**.

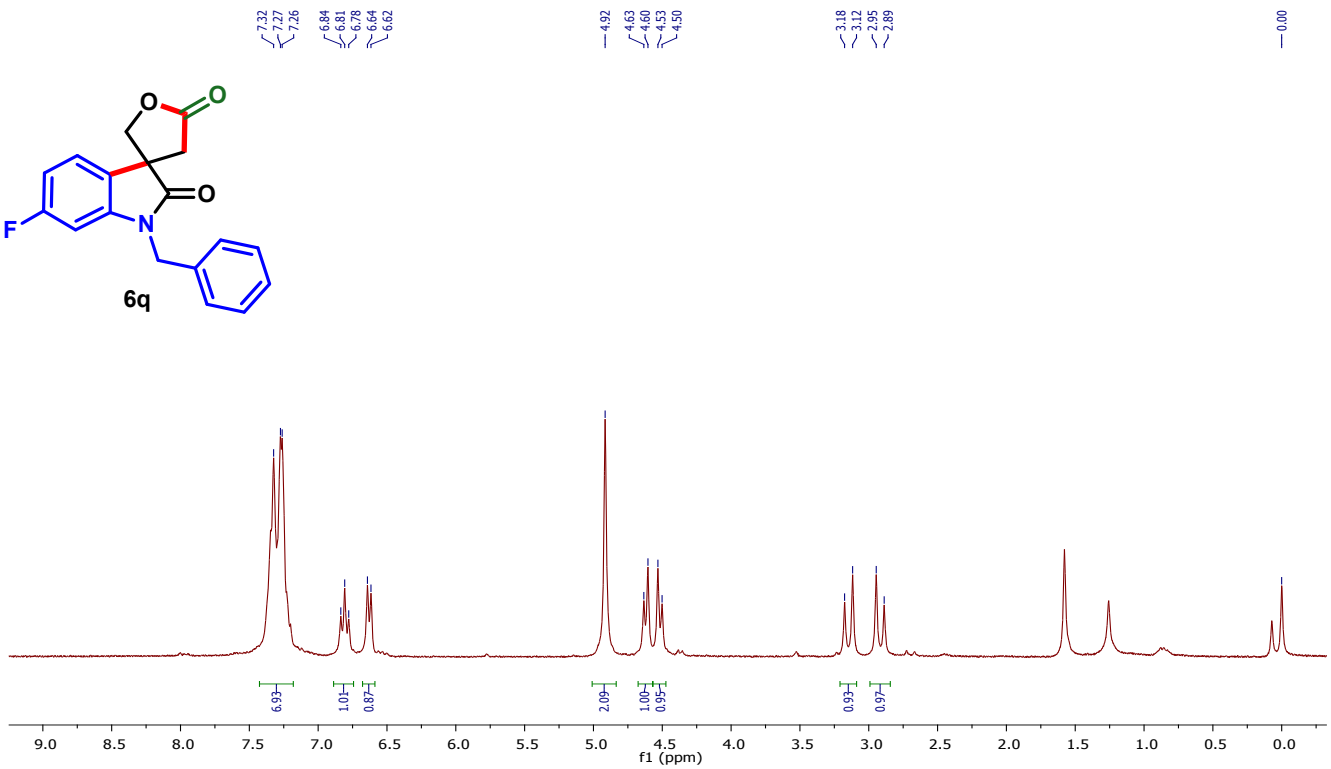


Figure S33. ^{1}H NMR spectrum (300 MHz, $CDCl_3$) of the compound **6q**.

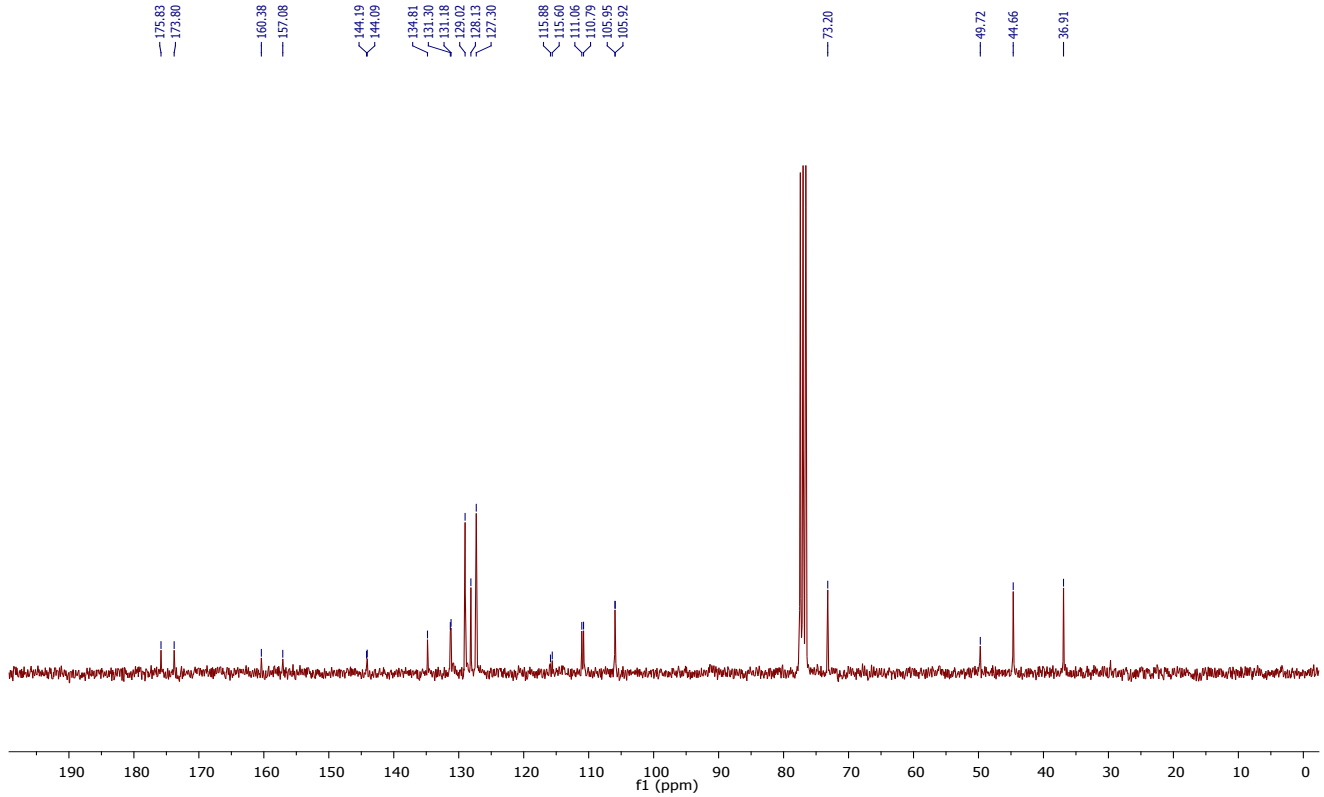


Figure S34. ^{13}C NMR spectrum (75 MHz, $CDCl_3$) of the compound **6q**.

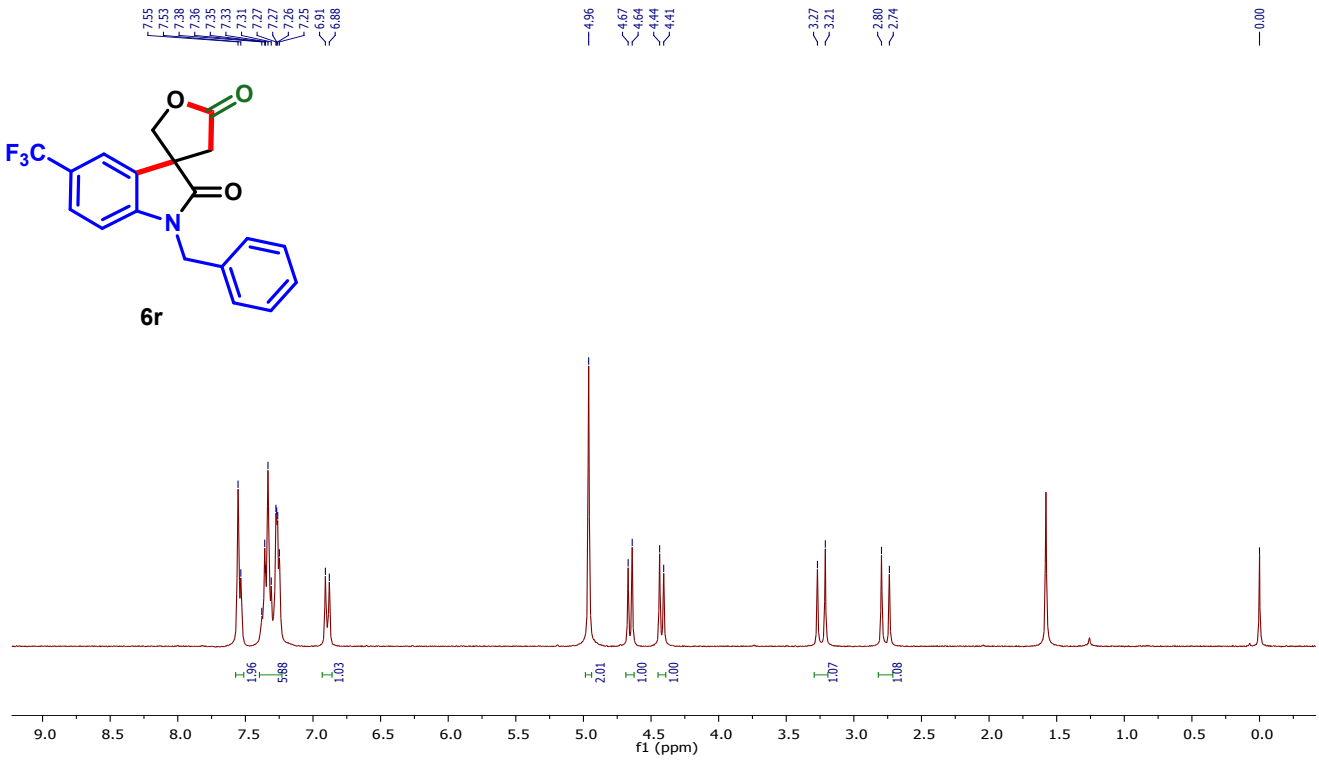


Figure S35. ^{1}H NMR spectrum (300 MHz, $CDCl_3$) of the compound **6r**.

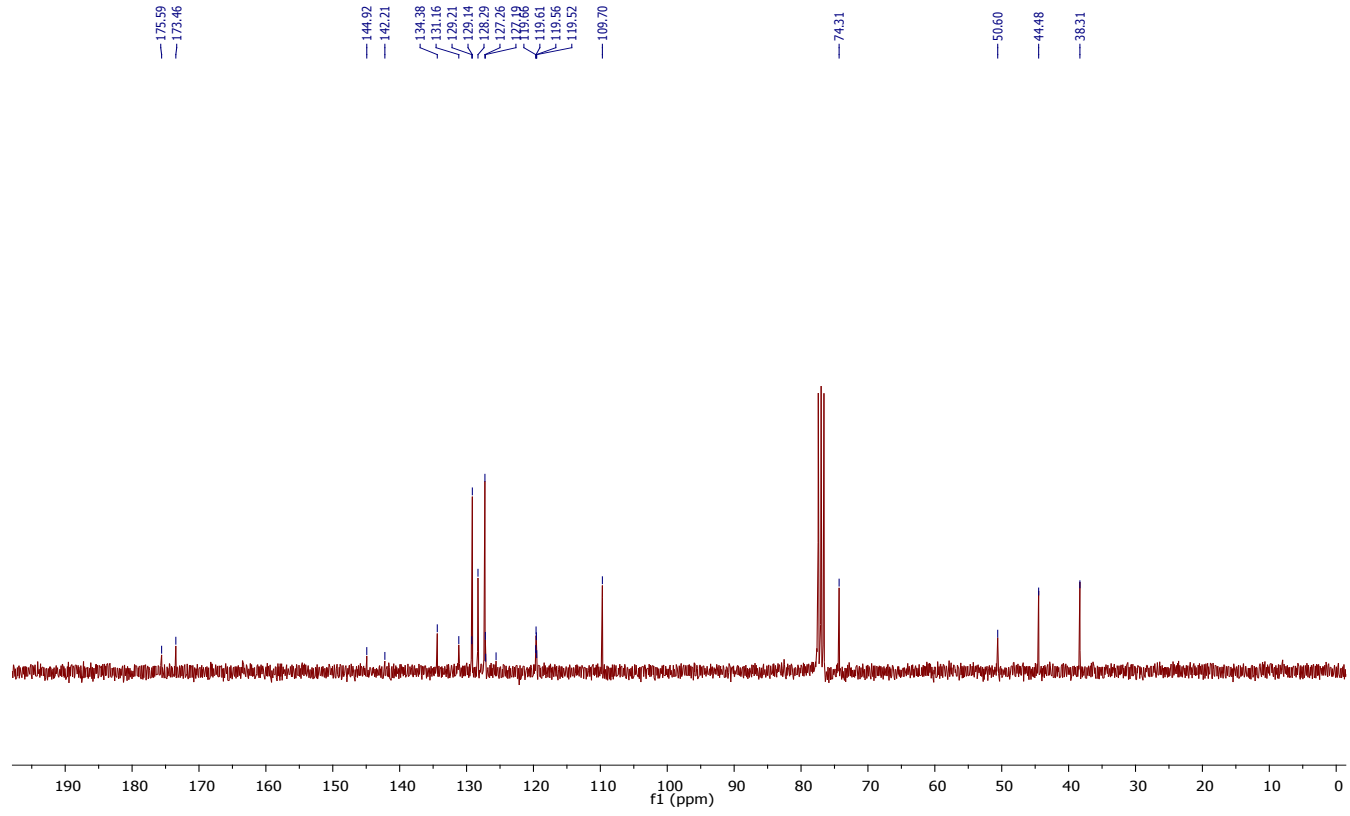


Figure S36. ^{13}C NMR spectrum (75 MHz, $CDCl_3$) of the compound **6r**.

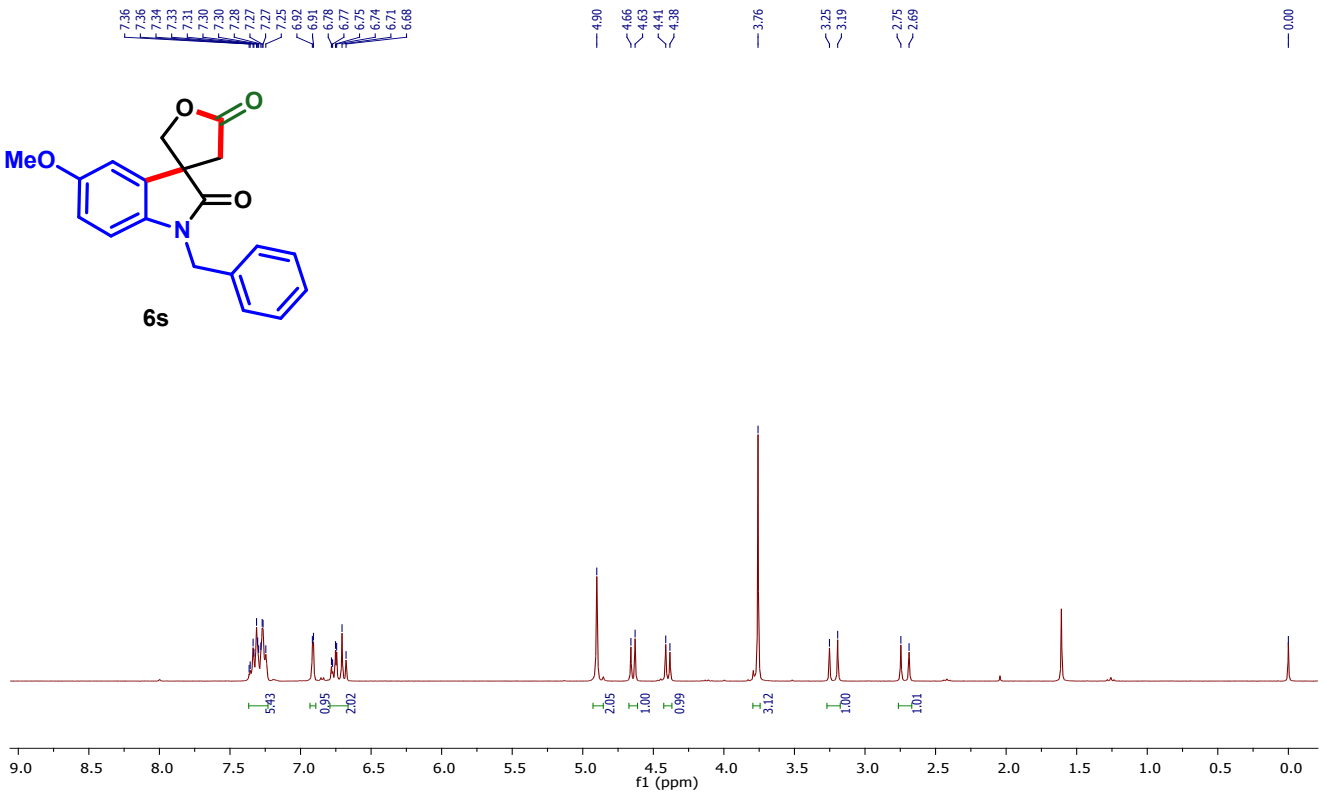


Figure S37. ^{1}H NMR spectrum (300 MHz, $CDCl_3$) of the compound **6s**.

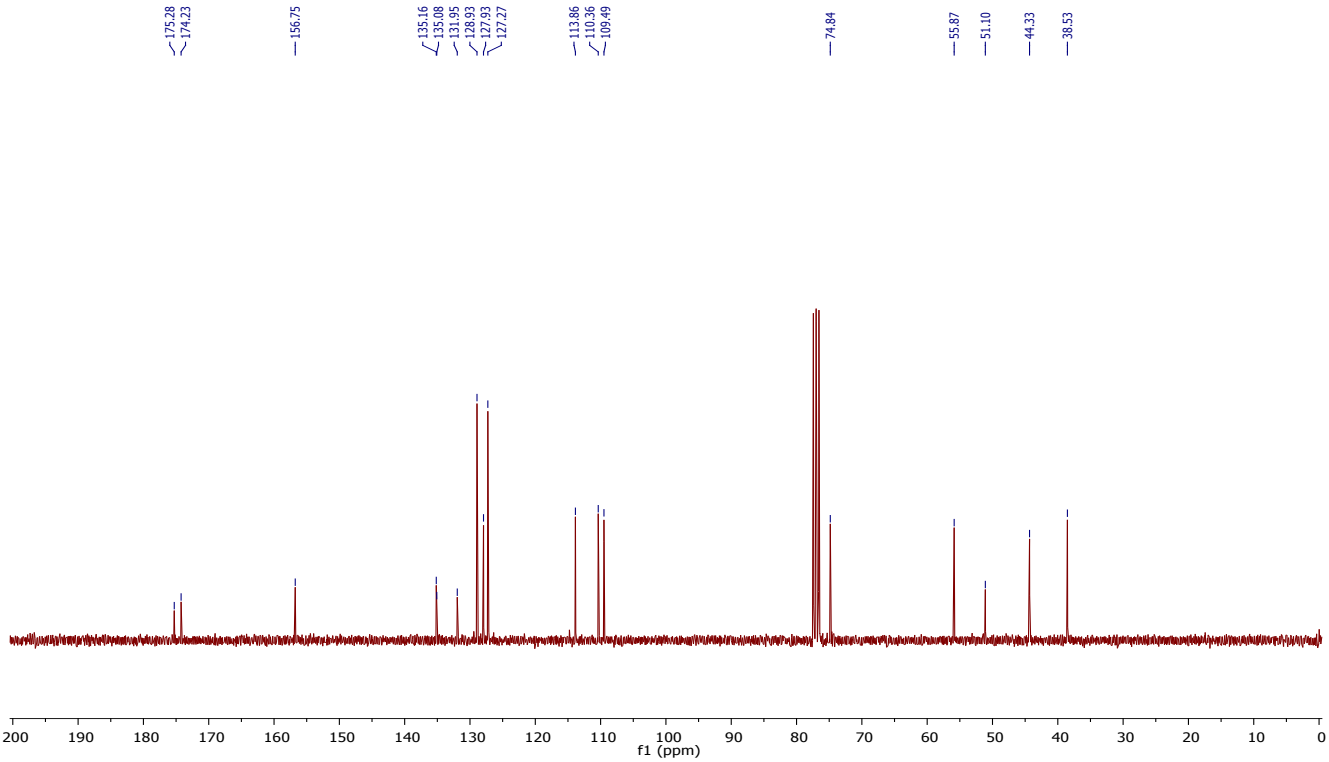


Figure S38. ^{13}C NMR spectrum (75 MHz, $CDCl_3$) of the compound **6s**.

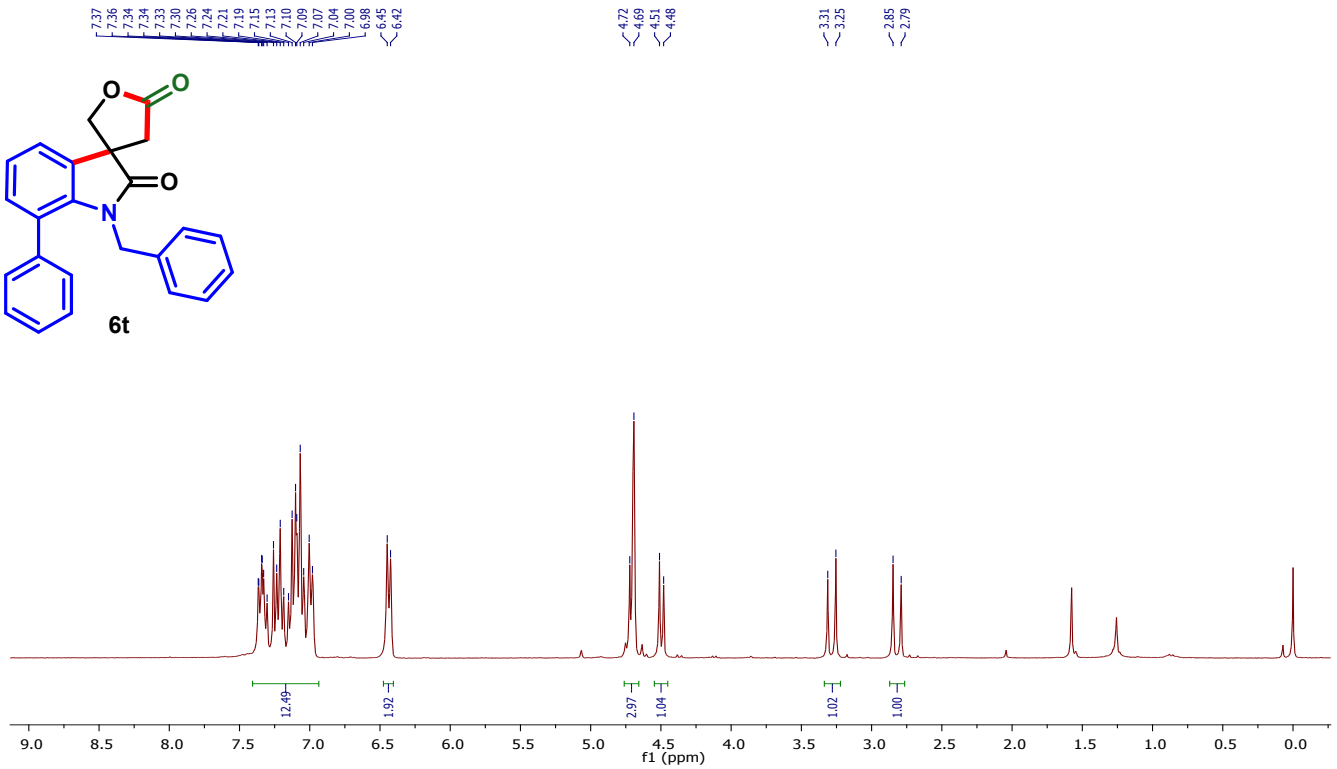


Figure S39. ^{1}H NMR spectrum (300 MHz, $CDCl_3$) of the compound **6t**.

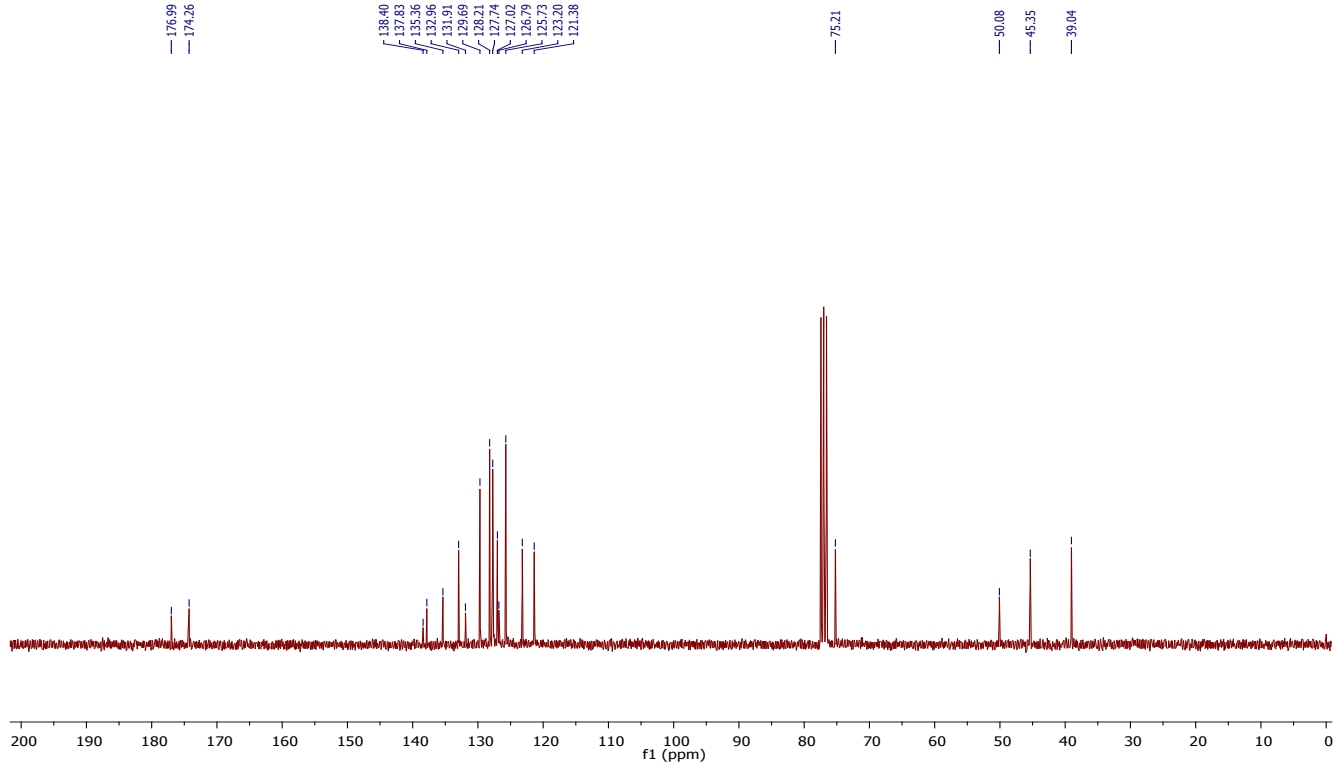


Figure S40. ^{13}C NMR spectrum (75 MHz, $CDCl_3$) of the compound **6t**.

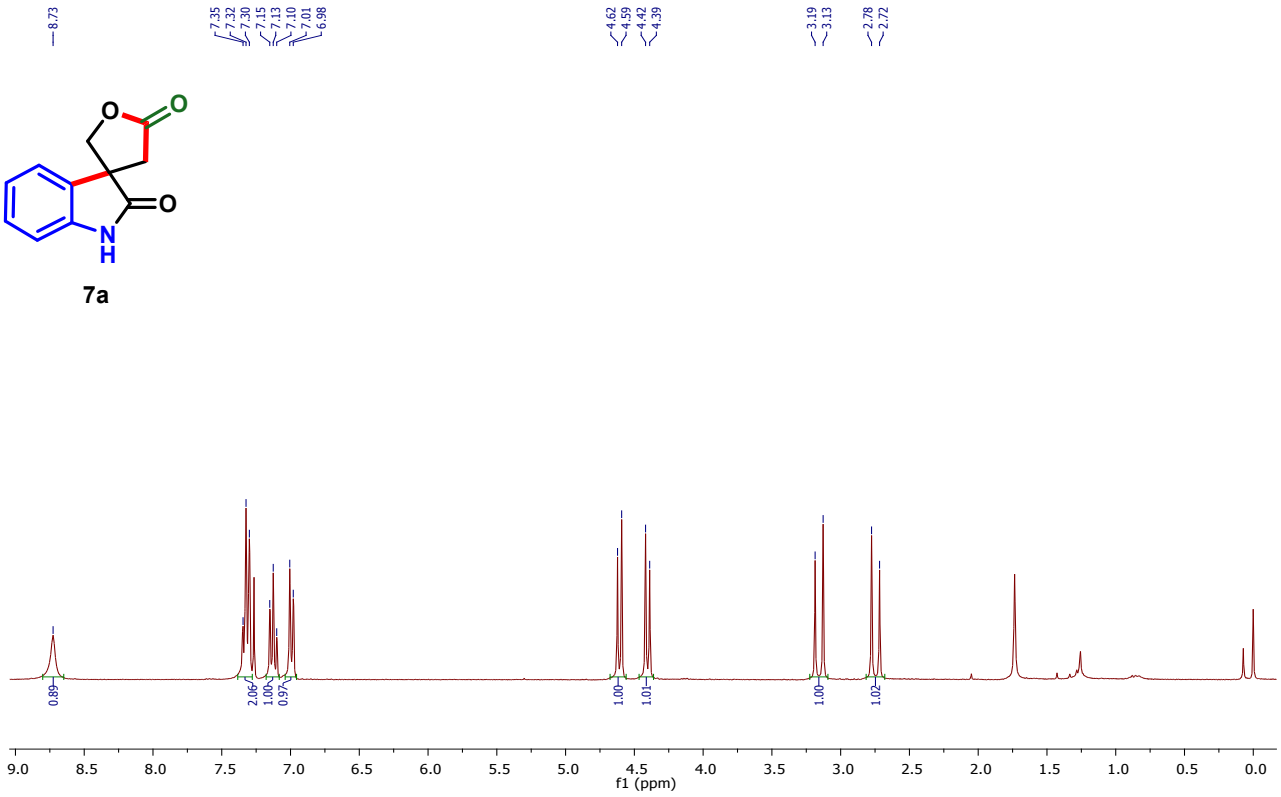


Figure S41. ^{1}H NMR spectrum (300 MHz, $CDCl_3$) of the compound **7a**.

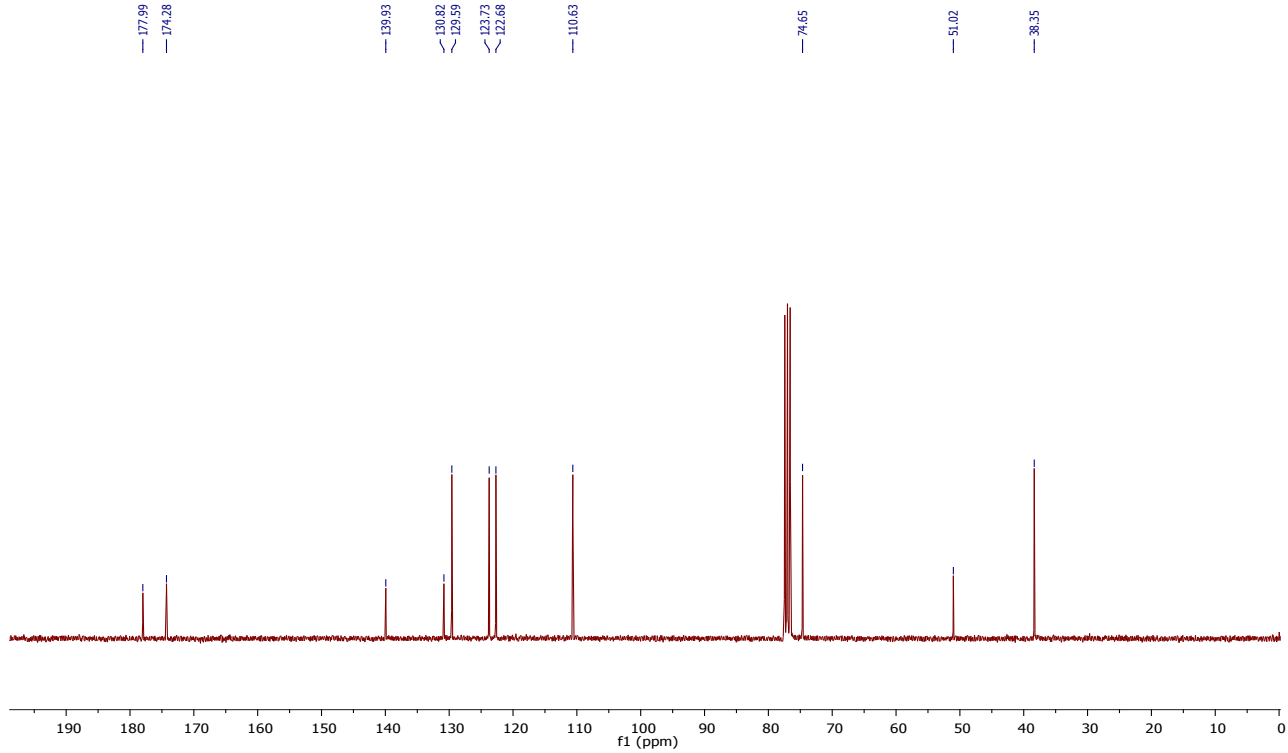


Figure S42. ^{13}C NMR spectrum (75 MHz, $CDCl_3$) of the compound **7a**.

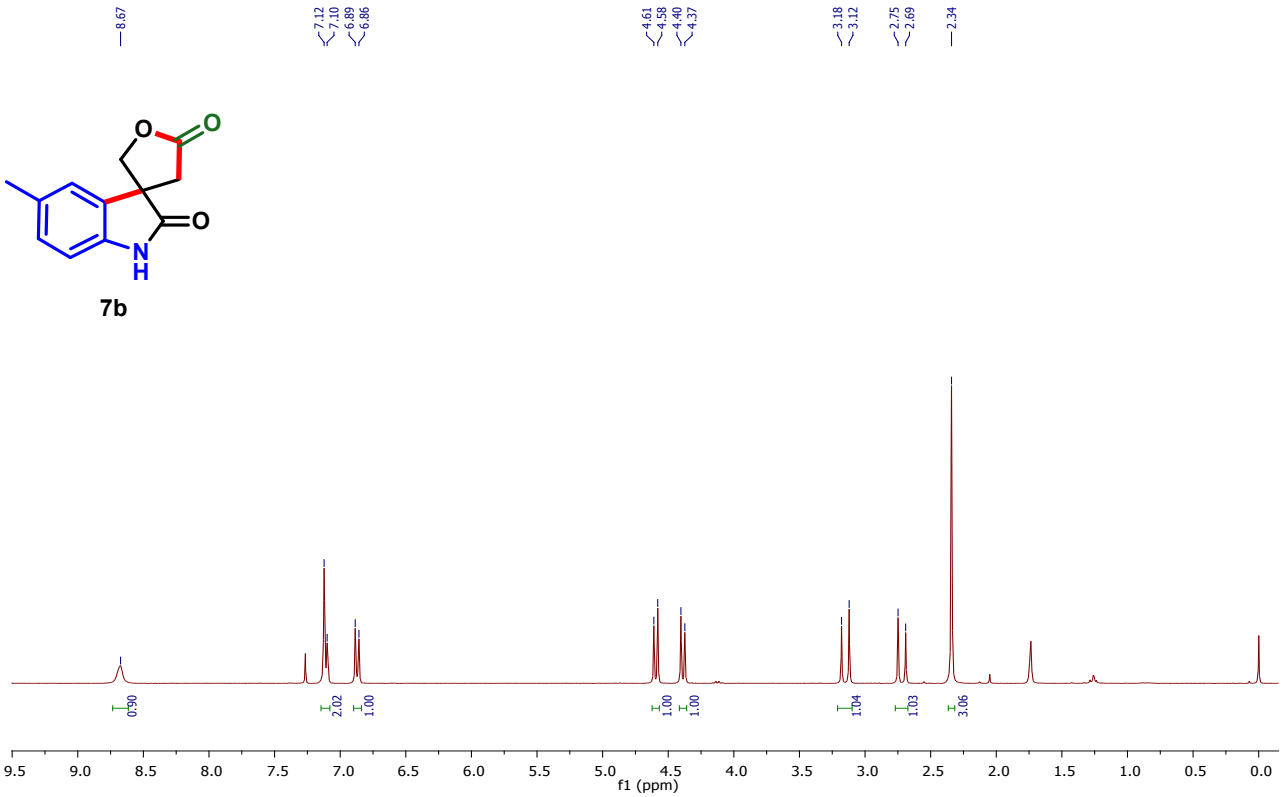


Figure S43. ^{1}H NMR spectrum (300 MHz, $CDCl_3$) of the compound **7b**.

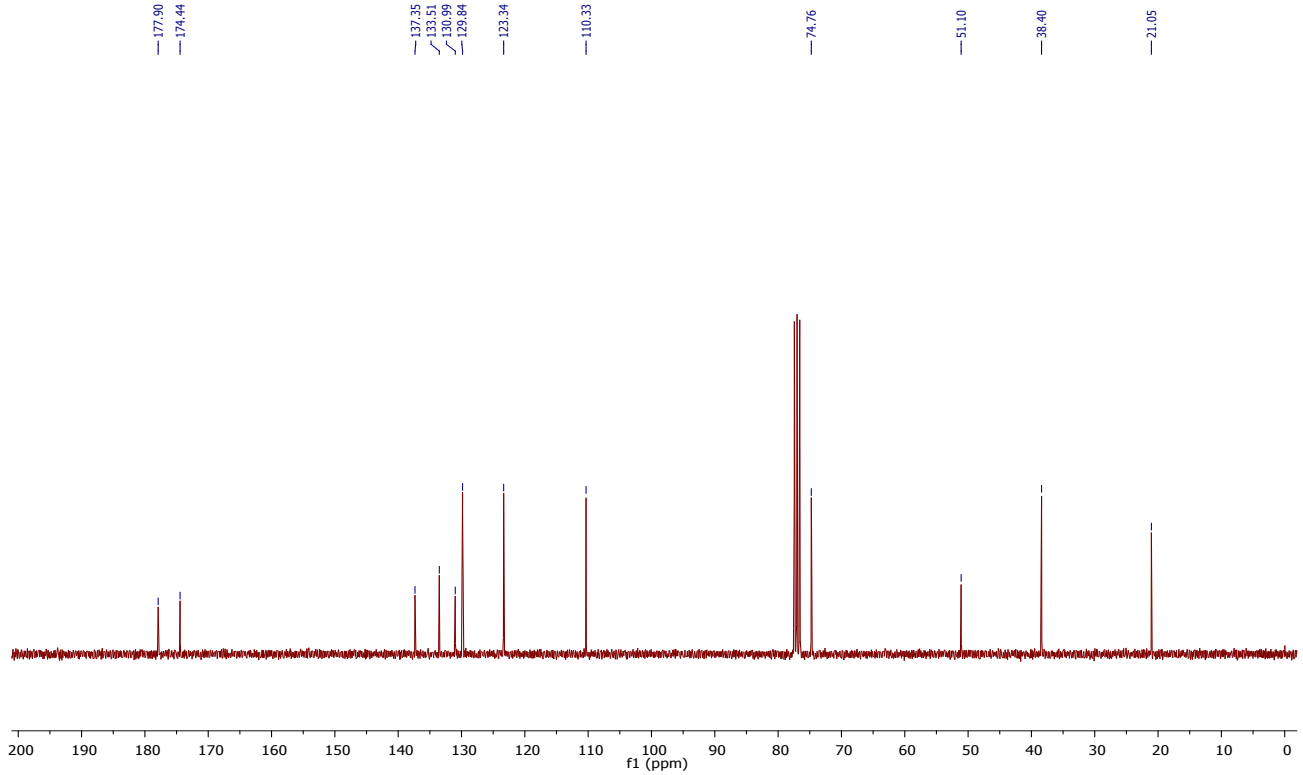


Figure S44. ^{13}C NMR spectrum (75 MHz, $CDCl_3$) of the compound **7b**.

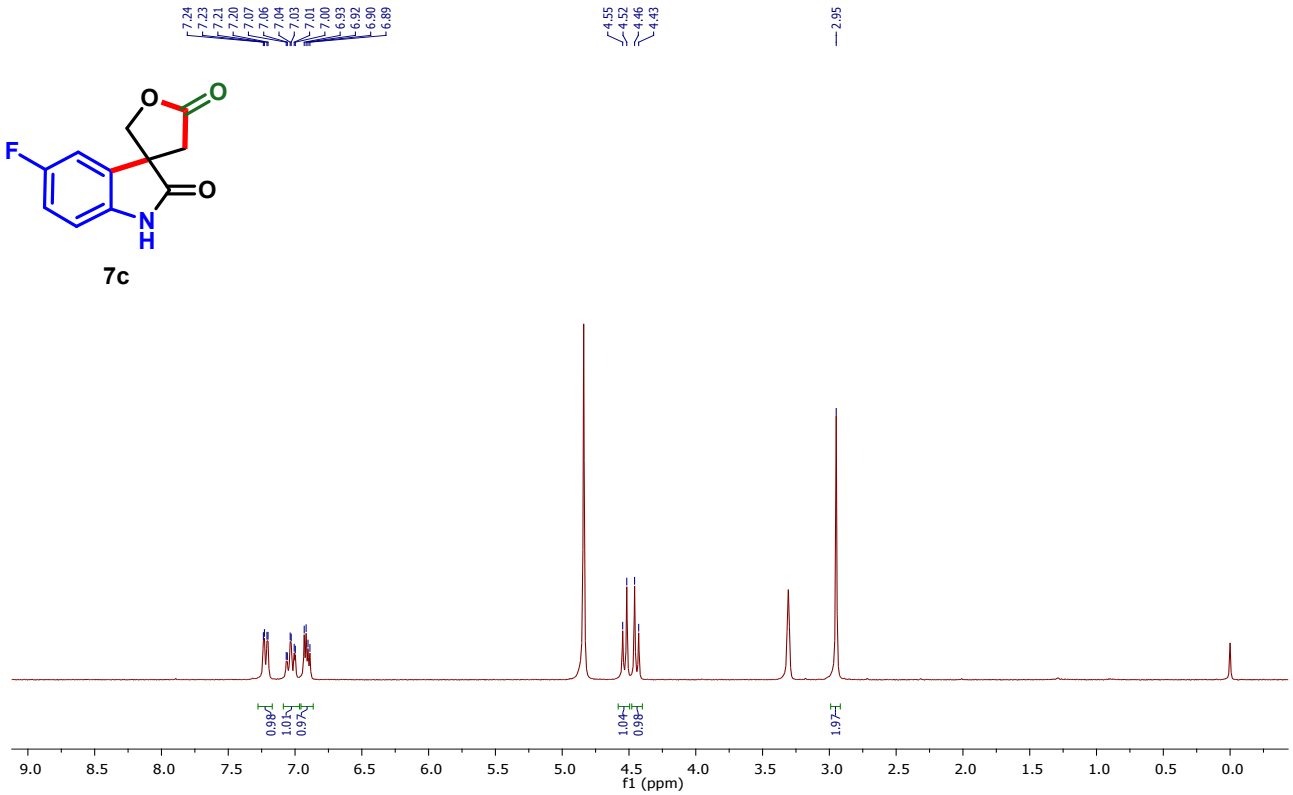


Figure S45. ^{1}H NMR spectrum (300 MHz, CD_3OD) of the compound **7c**.

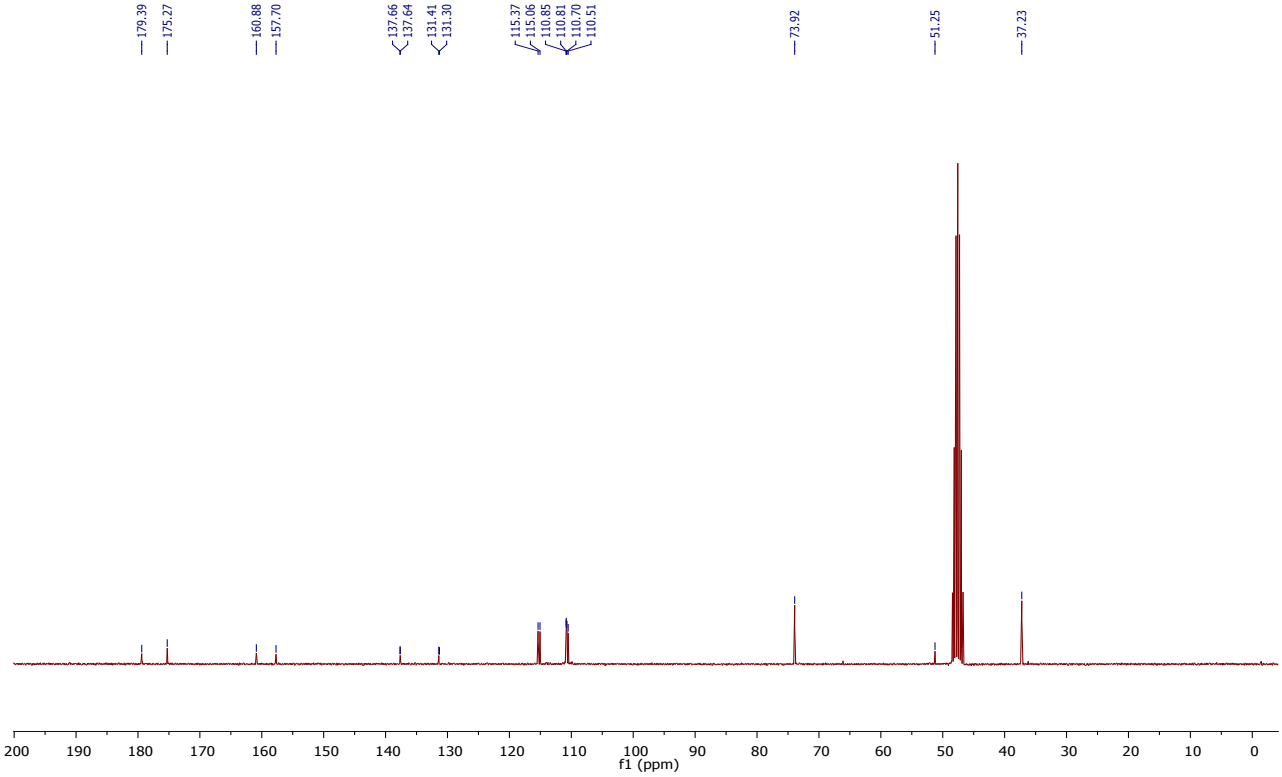


Figure S46. ^{13}C NMR spectrum (75 MHz, CD_3OD) of the compound **7c**.

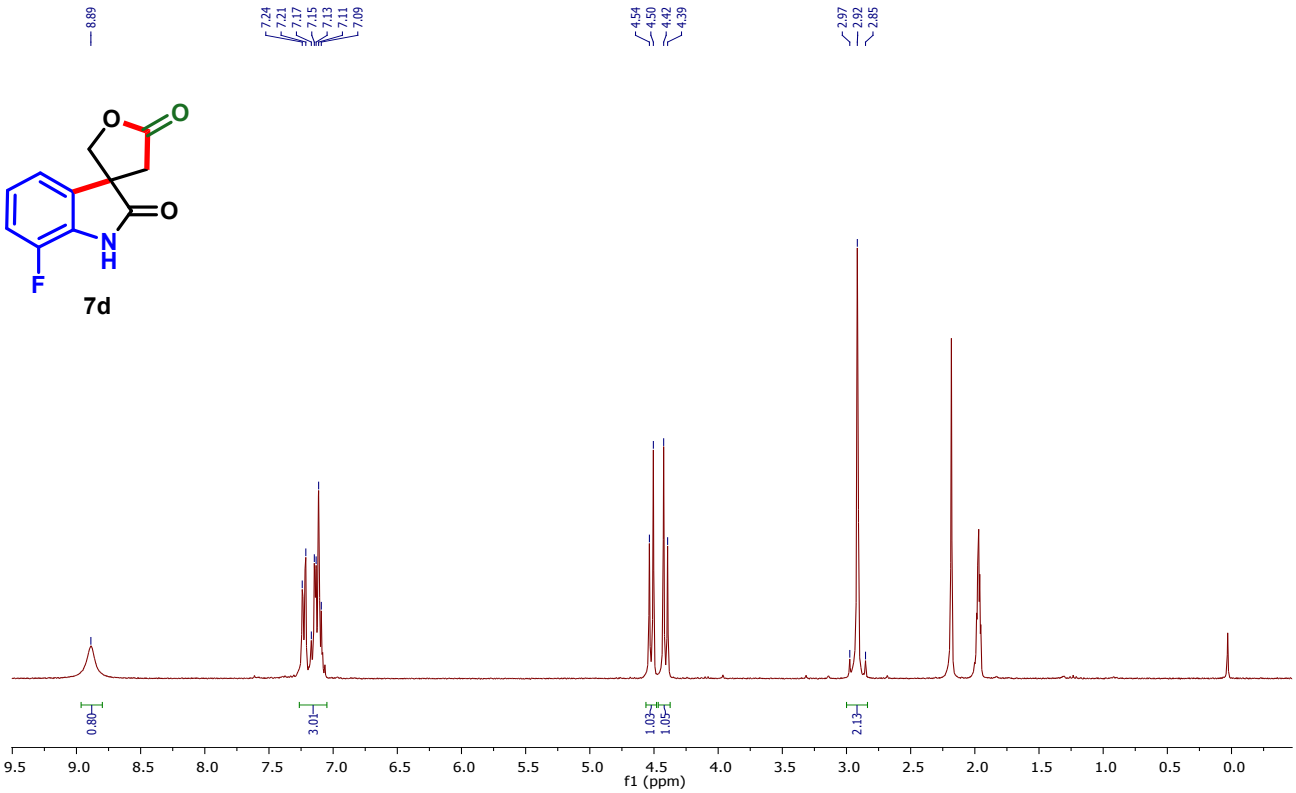


Figure S47. ^{1}H NMR spectrum (300 MHz, CD_3CN) of the compound **7d**.

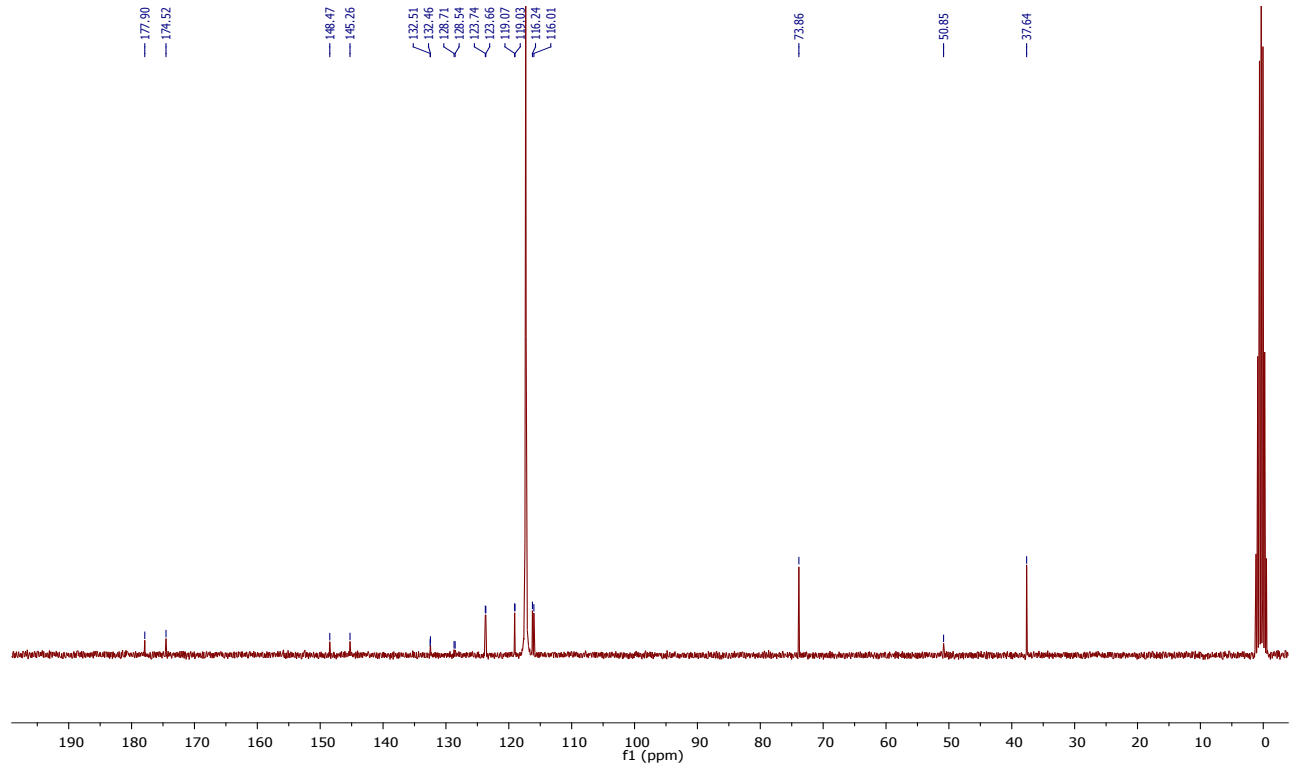


Figure S48. ^{13}C NMR spectrum (75 MHz, CD_3CN) of the compound **7d**.

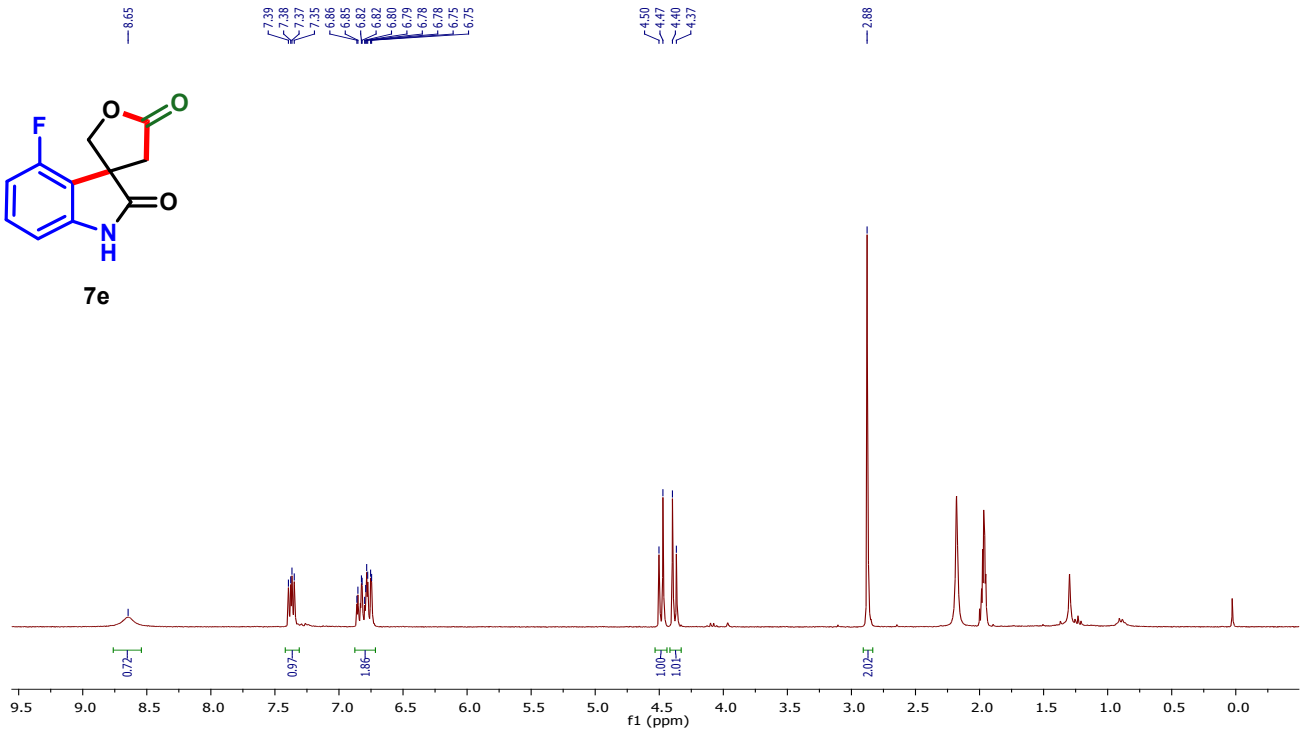


Figure S49. ^{1}H NMR spectrum (300 MHz, CD_3CN) of the compound **7e**.

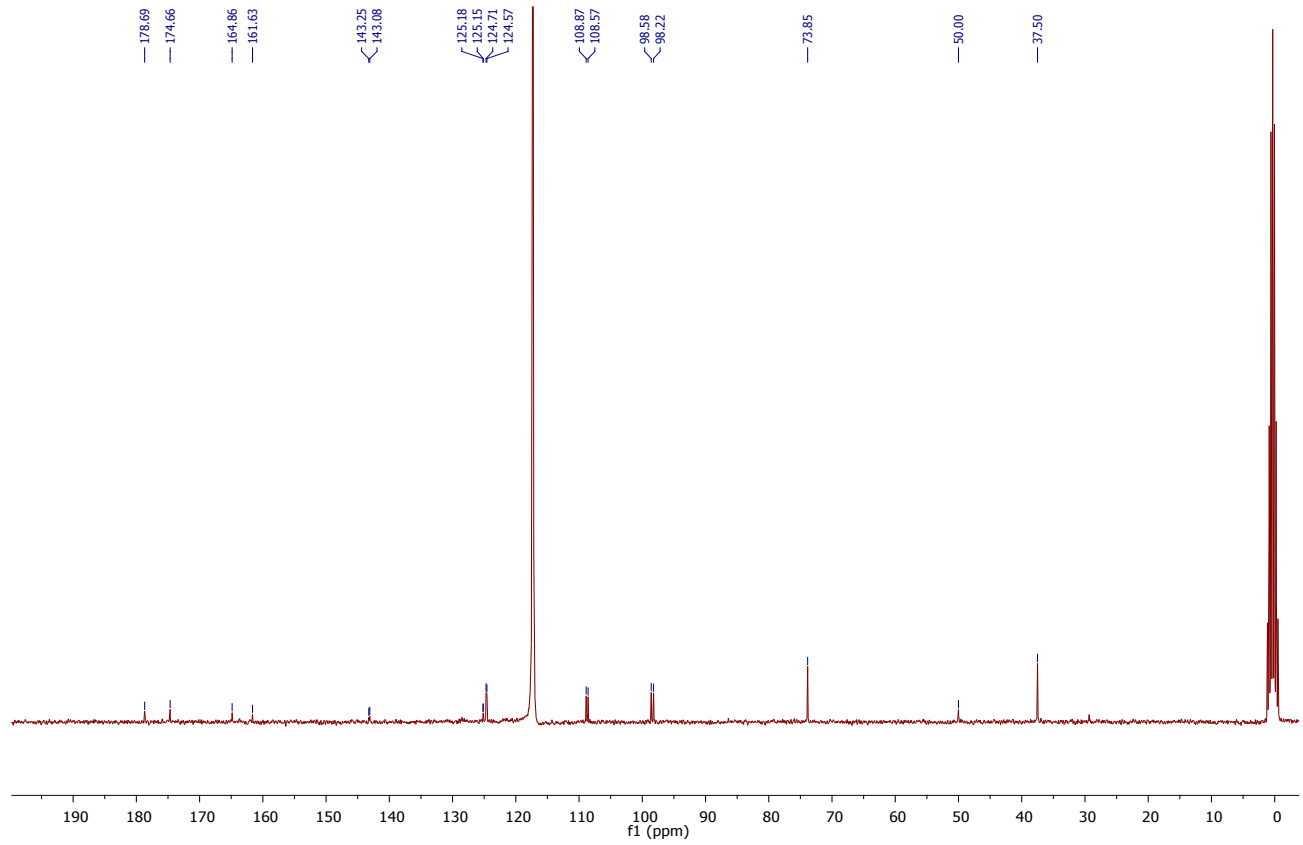


Figure S50. ^{13}C NMR spectrum (75 MHz, CD_3CN) of the compound **7e**.

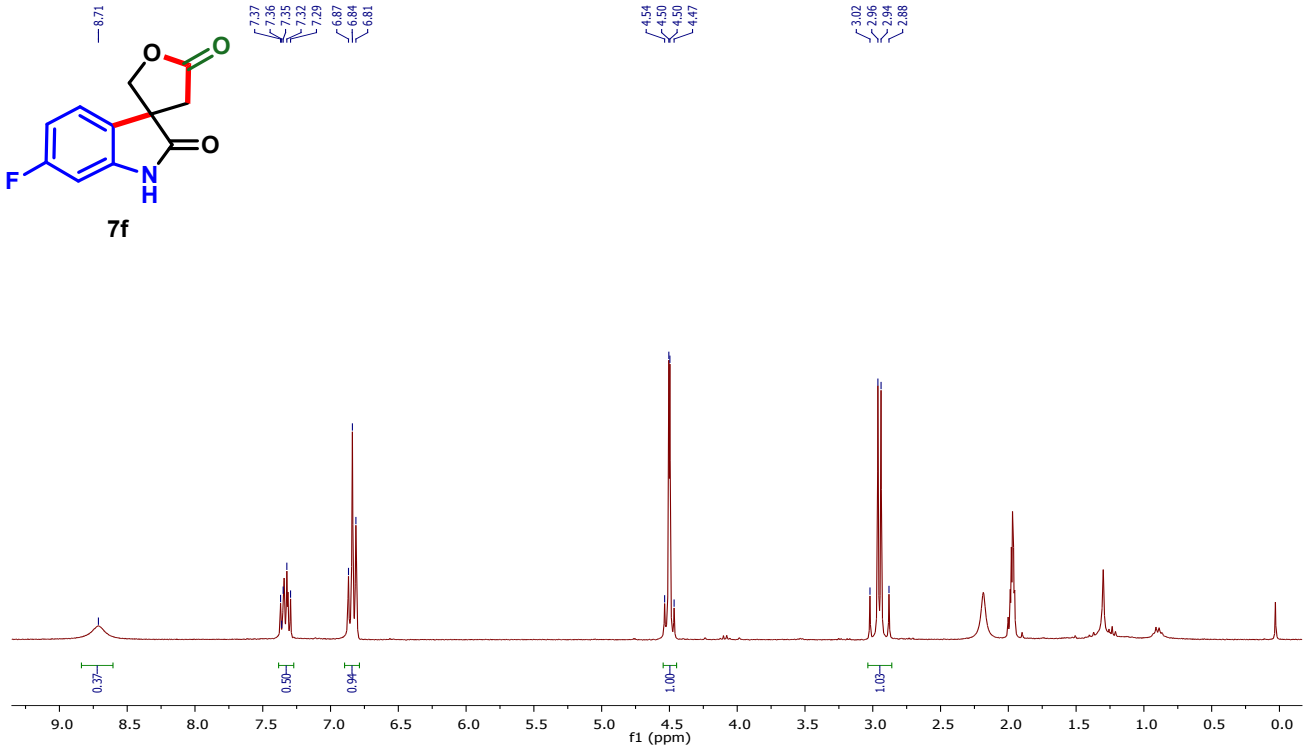


Figure S51. ^{1}H NMR spectrum (300 MHz, CD_3CN) of the compound **7f**.

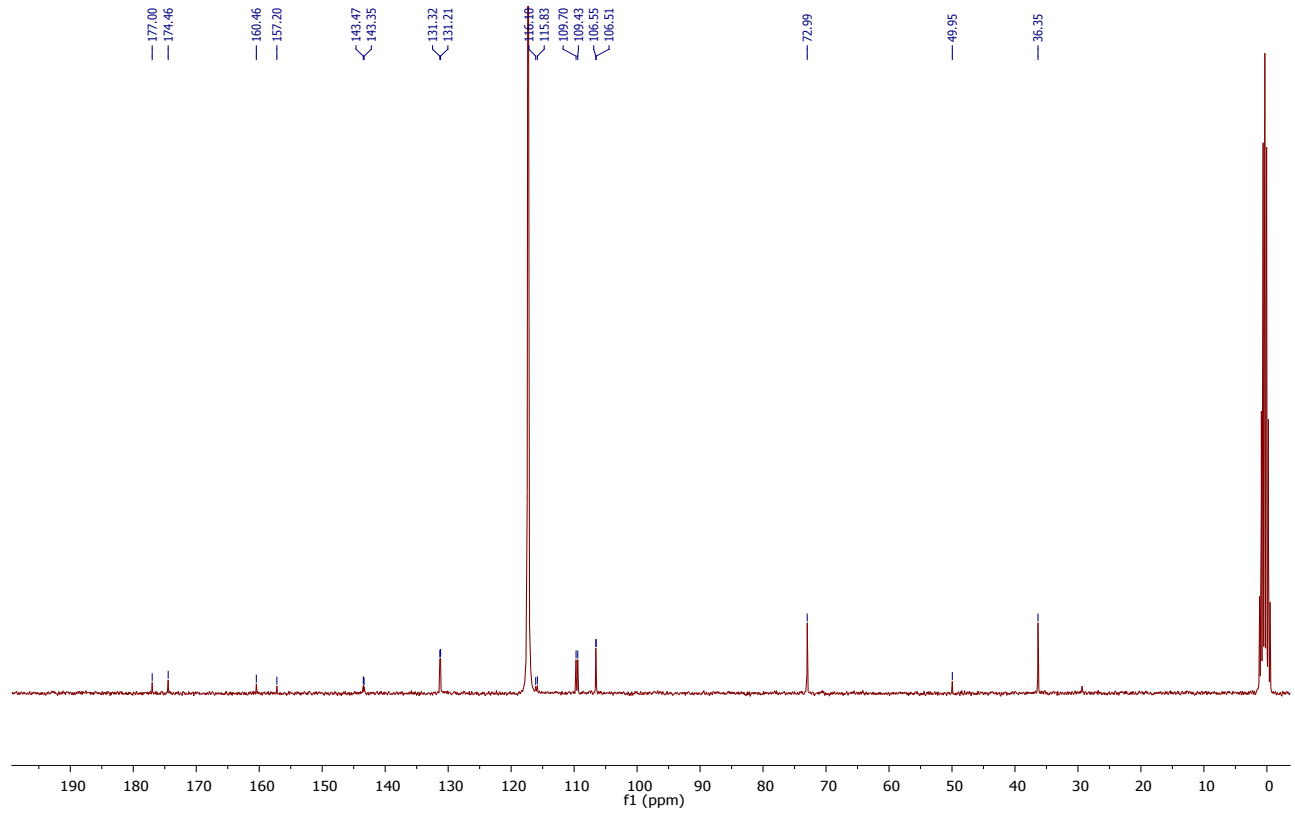


Figure S52. ^{13}C NMR spectrum (75 MHz, CD_3CN) of the compound **7f**.

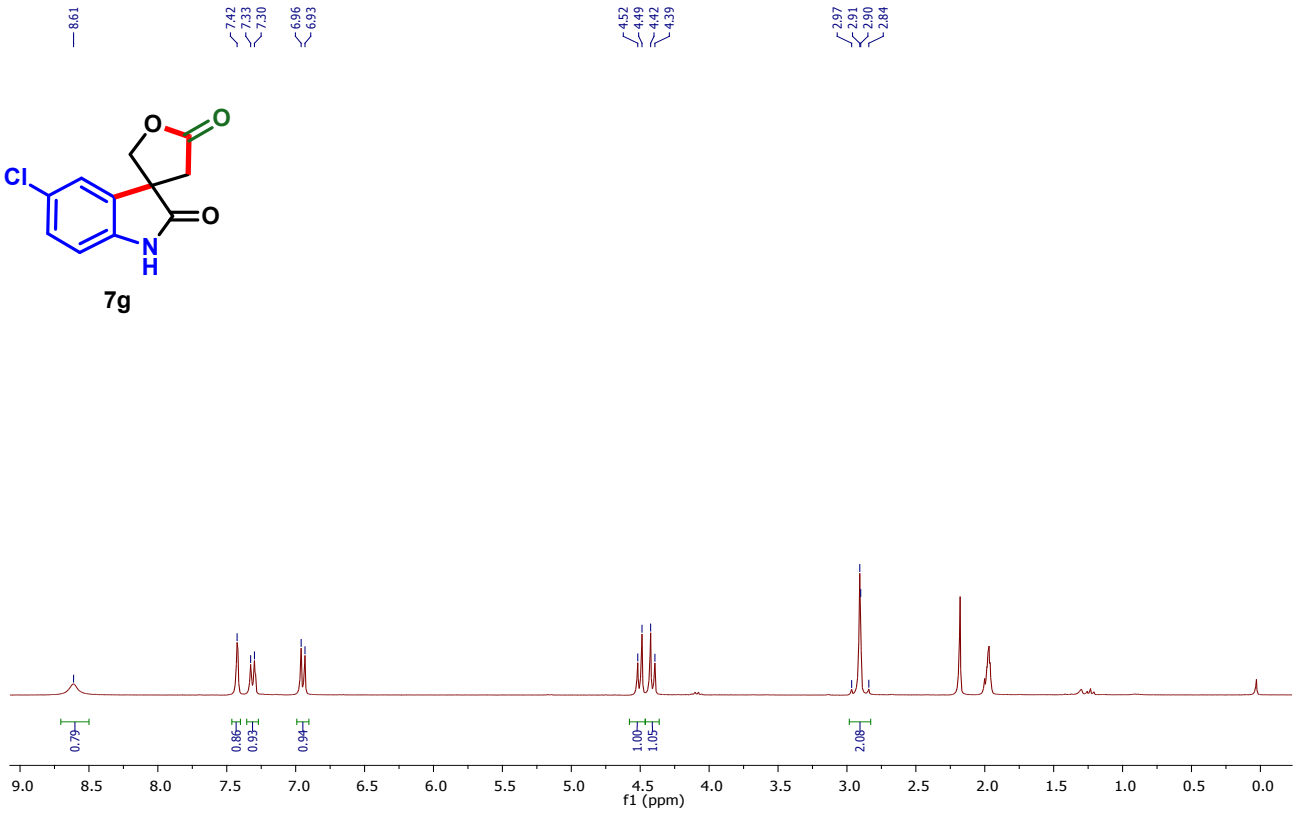


Figure S53. ^{1}H NMR spectrum (300 MHz, CD_3CN) of the compound **7g**.

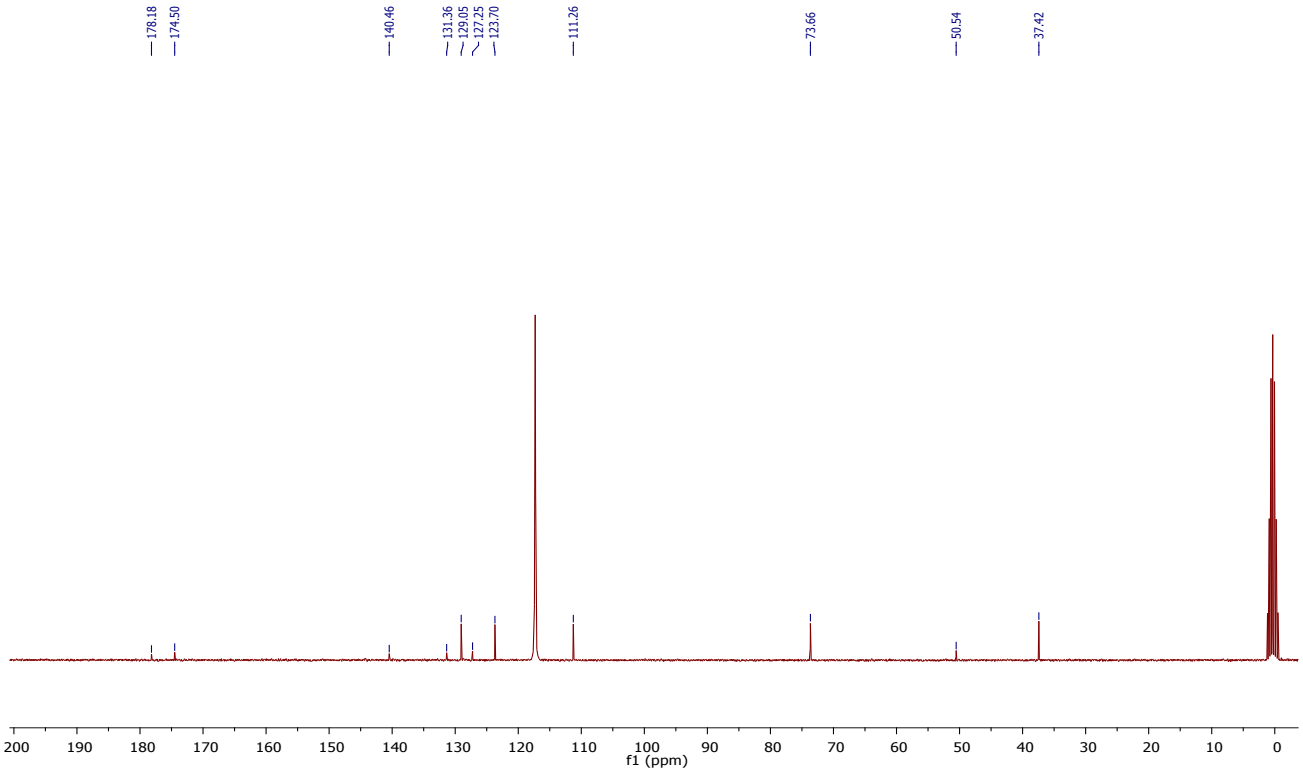


Figure S54. ^{13}C NMR spectrum (75 MHz, CD_3CN) of the compound **7g**.

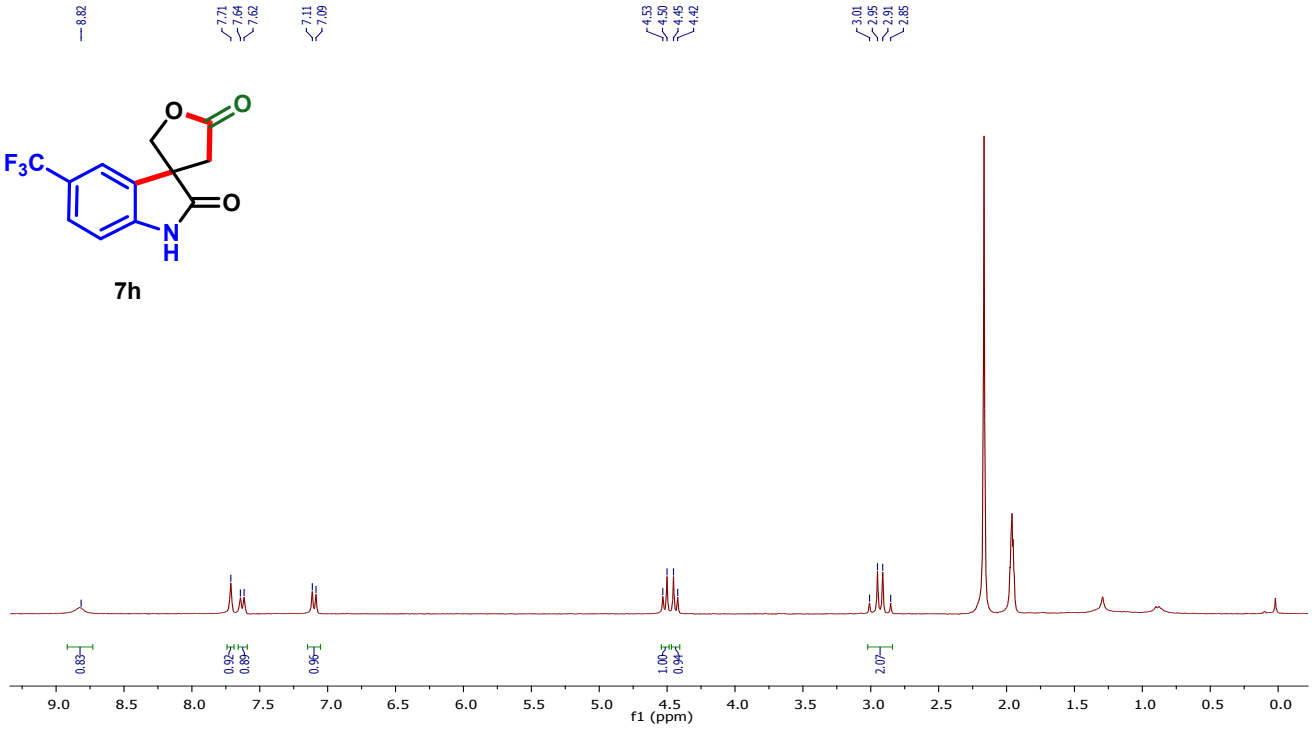


Figure S55. ^{1}H NMR spectrum (300 MHz, CD_3CN) of the compound **7h**.

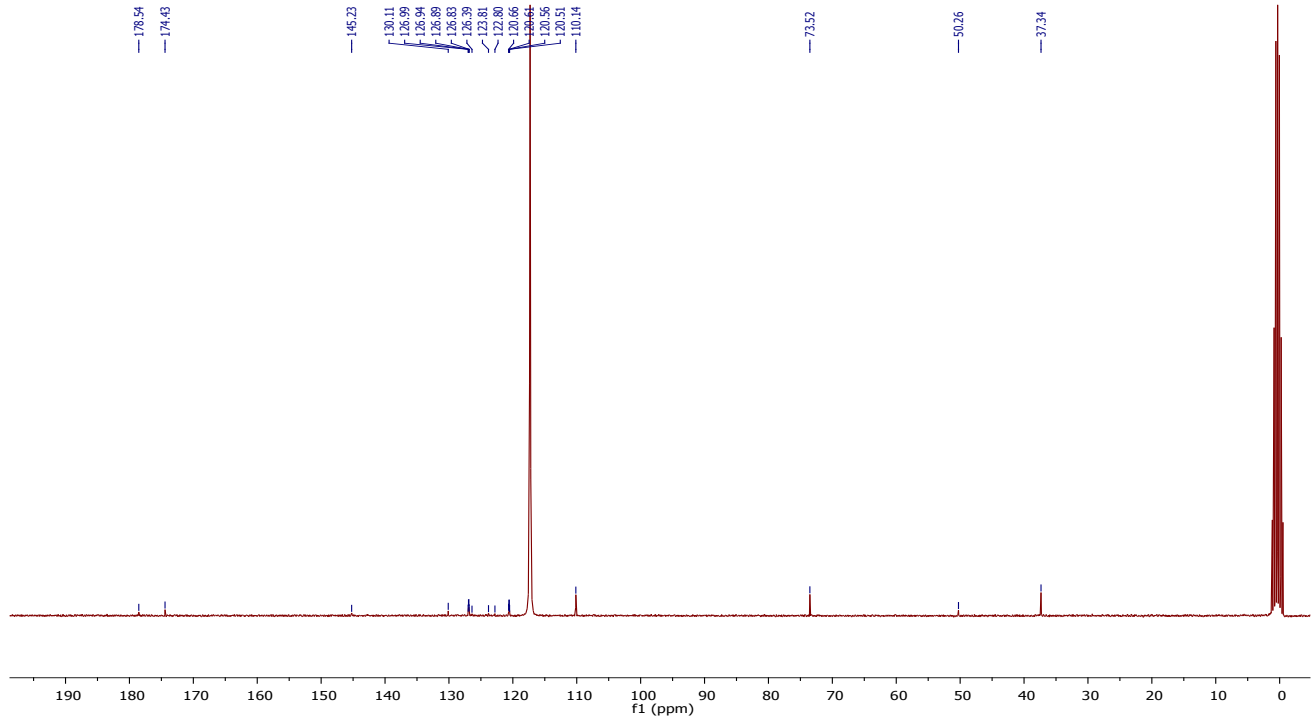


Figure S56. ^{13}C NMR spectrum (75 MHz, CD_3CN) of the compound **7h**.

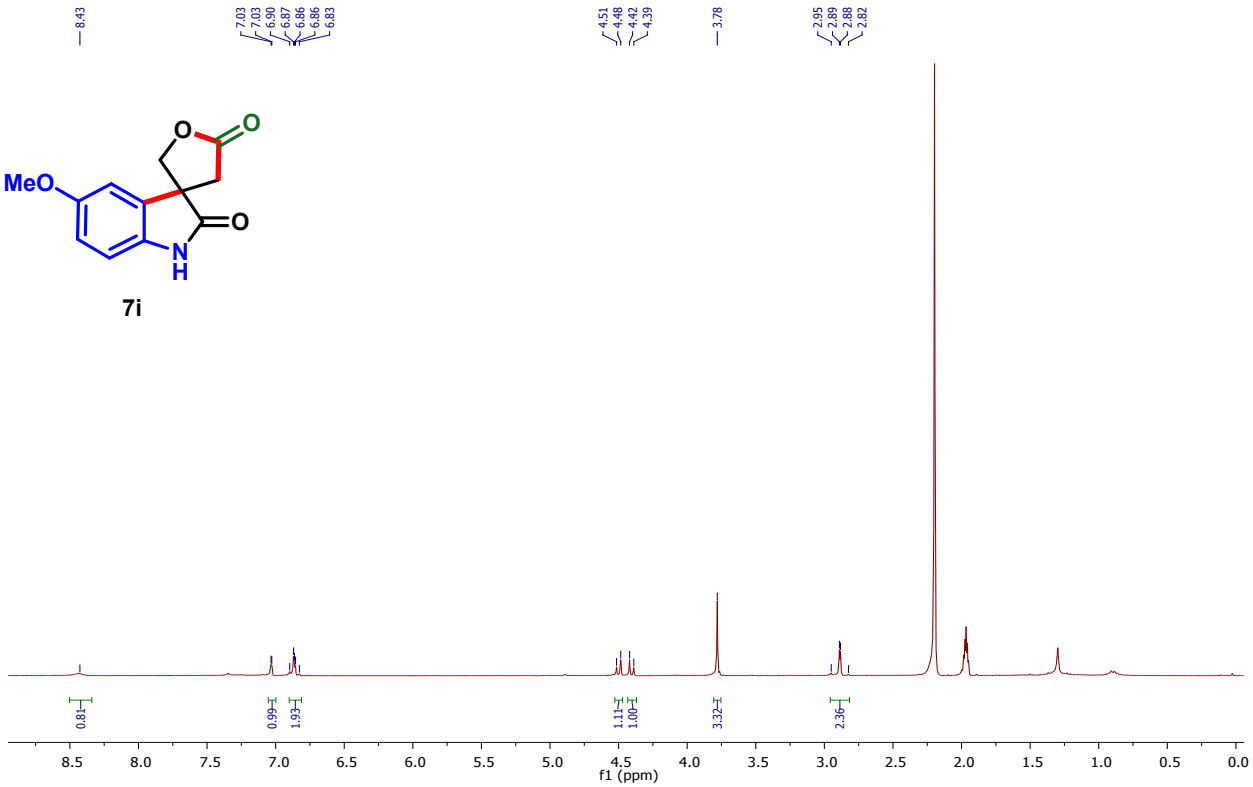


Figure S57. ^{1}H NMR spectrum (300 MHz, CD_3CN) of the compound **7i**.

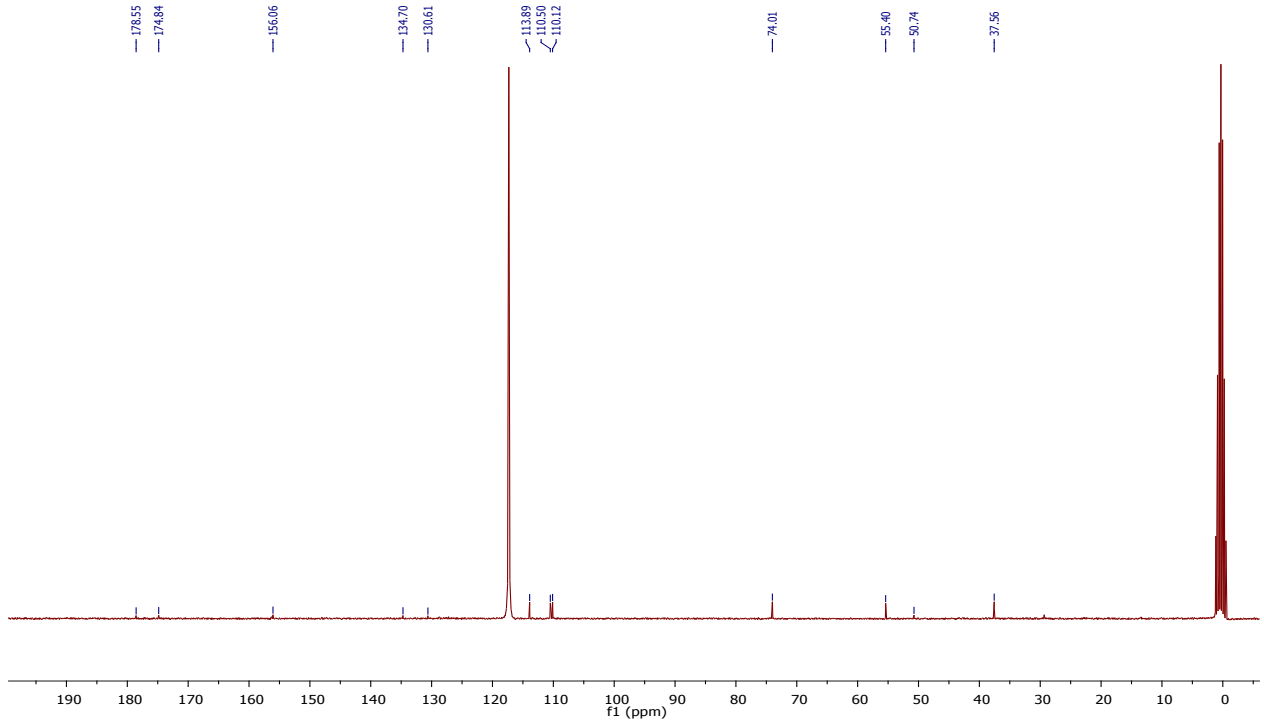


Figure S58. ^{13}C NMR spectrum (75 MHz, CD_3CN) of the compound **7i**.

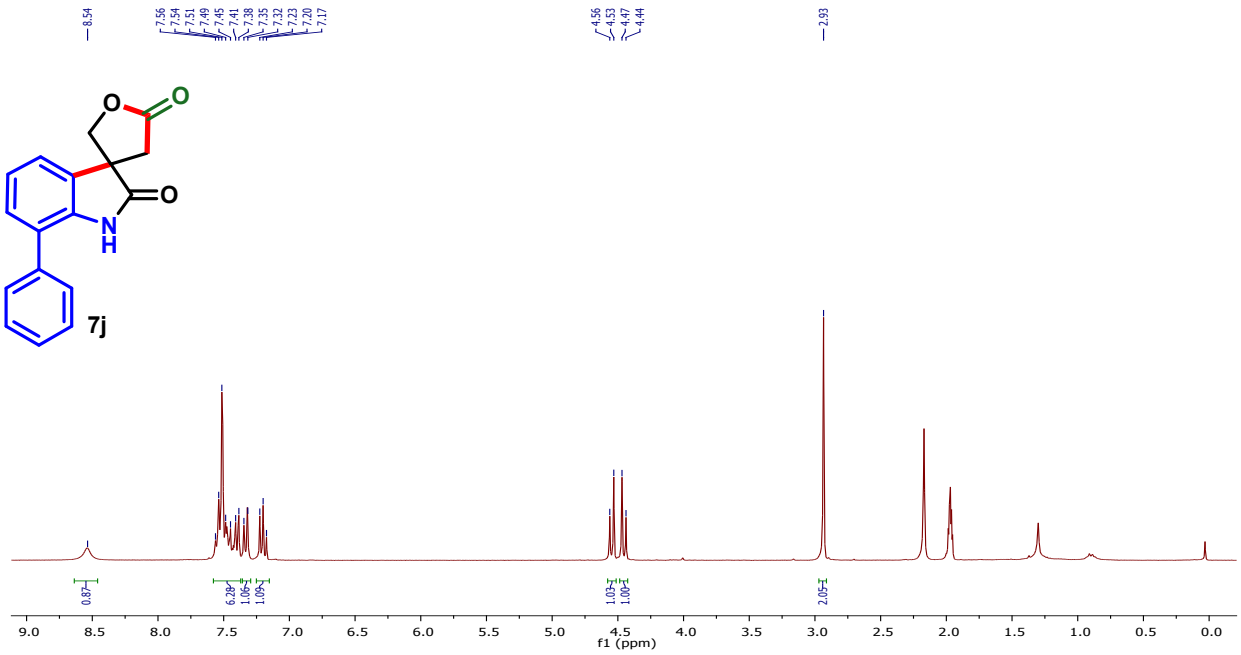


Figure S59. ^{1}H NMR spectrum (300 MHz, CD_3CN) of the compound **7j**.

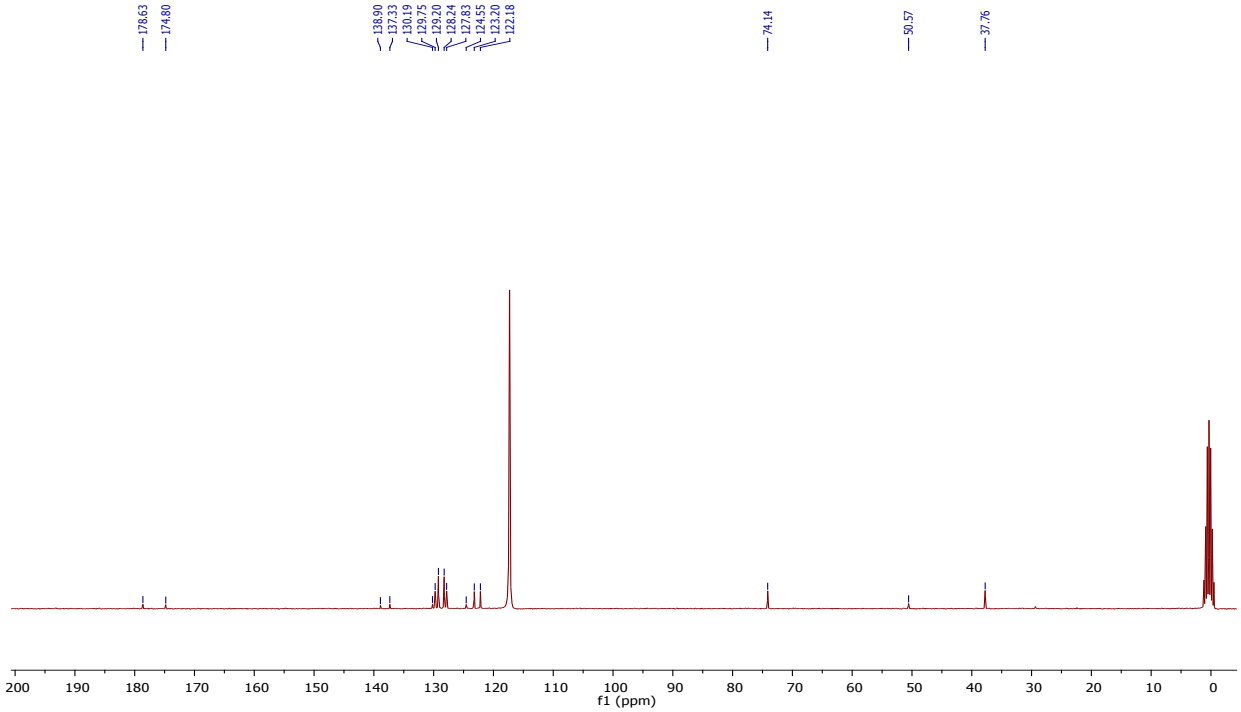


Figure S60. ^{13}C NMR spectrum (75 MHz, CD_3CN) of the compound **7j**.

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[3] C-W. Chan, P-Y. Lee and W-Y. Yu, *Tetrahedron Letters*, 2015, **56**, 2559–2563.

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