

## SUPPORTING INFORMATION

### **A copper-catalyzed three-component reaction of dithioacetals with diazo ketones and ketimines**

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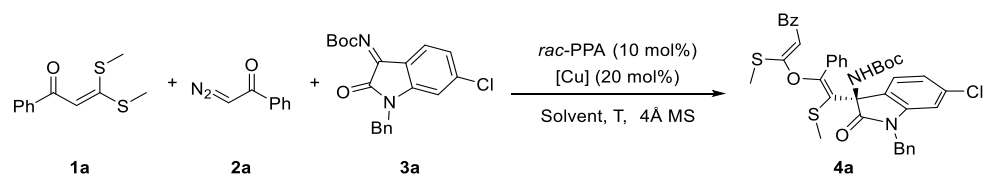
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## General Information

All reactions were performed in oven-dried glassware under atmosphere of argon. Solvents were dried and distilled followed the standard methods before using. Racemization phosphoric acid (PPA) and other metal catalysts purchased from chemical vendors and used directly without any treatment. Analytical thin-layer chromatography was performed using glass plates pre-coated with 200-300 mesh silica gel impregnated with a fluorescent indicator (254 nm). Flash column chromatography was performed using silica gel (300-400 mesh). <sup>1</sup>H NMR and <sup>13</sup>C NMR spectra were recorded in CDCl<sub>3</sub> or CD<sub>2</sub>Cl<sub>2</sub>-d<sub>2</sub> on 400/500 MHz spectrometer; chemical shifts are reported in ppm with the solvent signals as reference, and coupling constants (J) are given in Hertz. The peak information is described as: br = broad, s = singlet, d = doublet, t = triplet, q = quartet, m = multiplet, comp = composite. High-resolution mass spectra (HRMS) were recorded on a commercial apparatus (ESI Source) and (CI Source). Materials were prepared according to the known procedure and had physical and spectral properties identical to those earlier reported.

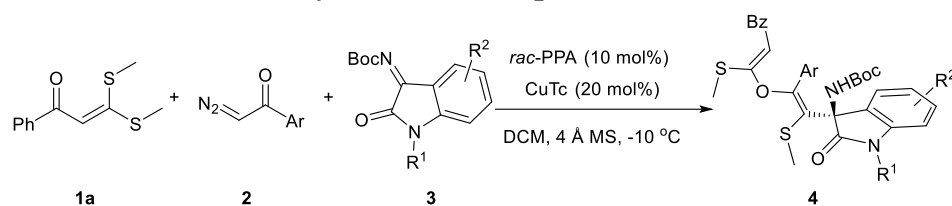
**Table S1: Condition optimization<sup>a</sup>**



Entry	[Cu](20 mol%)	Solvent	T (°C)	Yield (%) <sup>b</sup>
1	Cu(CH <sub>3</sub> CN) <sub>4</sub> BF <sub>4</sub>	DCE	25	35
2	Cu(CH <sub>3</sub> CN) <sub>4</sub> BF <sub>4</sub>	DCE	50	34
3	Cu(CH <sub>3</sub> CN) <sub>4</sub> BF <sub>4</sub>	DCE	0	42
4	Cu(CH <sub>3</sub> CN) <sub>4</sub> PF <sub>6</sub>	DCE	0	22
5	CuOTf	DCE	0	20
6	CuOAc	DCE	0	16
7	CuTc	DCE	0	48
8	CuTc	EA	0	15
9	CuTc	Toluene	0	31
10	CuTc	MTBE	0	20
11	CuTc	DCM	0	50
12 <sup>c</sup>	CuTc	DCM	0	76
13 <sup>c</sup>	CuTc	DCM	-10	82
14 <sup>d</sup>	CuTc	DCM	-10	70

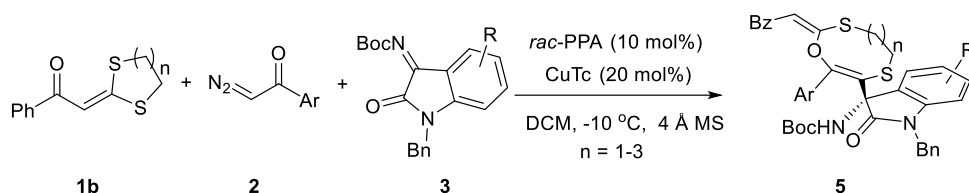
<sup>a</sup> Unless otherwise noted, all reactions were carried out on a 0.1 mmol scale (**1a** : **2a** : **3a** = 1 : 1.5 : 1) under an argon atmosphere for 12 h. *rac*-PPA = racemic phosphoric acid. <sup>b</sup> Isolated yields based on **3a** after flash-chromatography. <sup>c</sup> 0.2 mmol of **1a** and **2a** were used. <sup>d</sup> 0.3 mmol of **1a** and **2a** were used.

## General Procedure for the Synthesis of Compounds 4

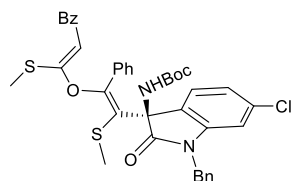


To a 10-mL oven-dried vial containing a magnetic stirring bar, ketimines **3** (0.1 mmol), CuTc (3.8 mg, 20 mol%), 4 Å MS (50 mg) and racemization phosphoric acid (3.5 mg, 10 mol%) in DCM (0.5 mL), was added acyclic ketene dithioacetal **1a** (0.2 mmol) and diazo-ketones **2** (0.2 mmol) in DCM (1.0 mL) *via* a syringe pump under stirring in 2 h under argon atmosphere at -10 °C. The resulting reaction mixture was stirred overnight under these conditions. When the reaction was completed (monitored by TLC), the solvent was evaporated *in vacuo* and the residue was purified by flash column chromatography on silica gel (hexanes/ethyl acetate = 5:1) to afford the pure products **4** in good yields.

## General Procedure for the Synthesis of Compounds 5



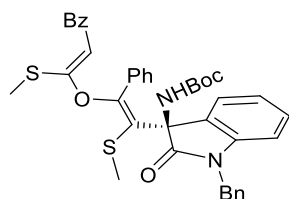
To a 10-mL oven-dried vial containing a magnetic stirring bar, ketimines **3** (0.1 mmol), CuTc (3.8 mg, 20 mol%), 4 Å MS (50 mg) and racemization phosphoric acid (3.5 mg, 10 mol%) in DCM (0.5 mL), was added cyclic ketene dithioacetal **1b** (0.2 mmol) and diazo-ketones **2** (0.2 mmol) in DCM (1.0 mL) *via* a syringe pump under stirring in 2 h under argon atmosphere at -10 °C. The resulting reaction mixture was stirred overnight under these conditions. When the reaction was completed (monitored by TLC), the solvent was evaporated *in vacuo* and the residue was purified by flash column chromatography on silica gel (hexanes/ethyl acetate = 5:1) to afford the pure products **5** in good yields.



**tert-Butyl (1-benzyl-6-chloro-3-((Z)-1-(methylthio)-2-(((Z)-1-(methylthio)-3-oxo-3-phenylprop-1-en-1-yl)oxy)-2-phenylvinyl)-2-oxoindolin-3-yl)carbamate (4a)**

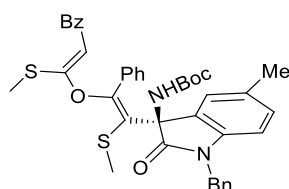
White solid, 58.4 mg, 82% yield, mp: 214 – 216 °C; <sup>1</sup>H NMR (500 MHz, CD<sub>2</sub>Cl<sub>2</sub>) (δ,

ppm) 7.86 – 7.84 (comp, 2H), 7.52 – 7.51 (comp, 2H), 7.43 – 7.36 (comp, 4H), 7.31 – 7.28 (comp, 3H), 7.25 – 7.18 (comp, 5H), 6.85 – 6.86 (m, 1H), 6.81 (s, 1H), 6.44 (s, 1H), 5.48 (s, 1H), 4.77 (d,  $J = 15.0$  Hz, 1H), 4.53 (d,  $J = 15.0$  Hz, 1H), 2.28 (s, 3H), 2.24 (s, 3H), 1.13 (s, 9H);  $^{13}\text{C}$  NMR (125 MHz,  $\text{CD}_2\text{Cl}_2$ ) ( $\delta$ , ppm) 187.6, 174.7, 171.7, 155.5, 153.2, 145.1, 139.2, 135.1, 133.3, 132.0, 130.2, 130.1, 129.1, 129.0, 128.9, 128.6, 128.3, 127.9, 127.7, 127.6, 127.5, 126.4, 122.8, 109.7, 100.0, 80.5, 64.6, 44.6, 28.0, 19.9, 12.9; HRMS (TOF MS  $\text{ESI}^+$ )  $m/z$ :  $[\text{M}+\text{Na}]^+$  calculated for  $\text{C}_{39}\text{H}_{37}\text{ClN}_2\text{O}_5\text{S}_2\text{Na}$  735.1725; found 735.1726.



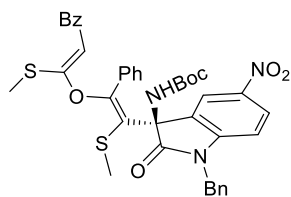
**tert-Butyl (1-benzyl-3-((Z)-1-(methylthio)-2-((Z)-1-(methylthio)-3-oxo-3-phenylprop-1-en-1-yl)oxy)-2-phenylvinyl)-2-oxoindolin-3-yl)carbamate (4b)**

White solid, 50.2 mg, 74% yield, mp: 218 – 219 °C;  $^1\text{H}$  NMR (500 MHz,  $\text{CD}_2\text{Cl}_2$ ) ( $\delta$ , ppm) 8.02 – 8.01 (comp, 2H), 7.71 – 7.70 (comp, 2H), 7.62 – 7.50 (comp, 4H), 7.46 – 7.42 (comp, 3H), 7.39 – 7.29 (comp, 5H), 7.23 – 7.20 (m, 1H), 7.04 – 7.01 (m, 1H), 7.00 (s, 1H), 6.63 – 6.61 (m, 1H), 5.58 (s, 1H), 4.91 (d,  $J = 15.0$  Hz, 1H), 4.71 (d,  $J = 15.0$  Hz, 1H), 2.43 (s, 3H), 2.37 (s, 3H), 1.26 (s, 9H);  $^{13}\text{C}$  NMR (125 MHz,  $\text{CD}_2\text{Cl}_2$ ) ( $\delta$ , ppm) 187.5, 174.4, 171.7, 155.0, 153.1, 143.8, 139.1, 135.5, 133.4, 131.8, 130.5, 130.1, 129.9, 129.4, 128.6, 128.4, 128.1, 127.9, 127.7, 127.6, 127.4, 125.3, 122.8, 109.1, 99.7, 80.1, 64.9, 44.3, 27.8, 19.8, 12.8; HRMS (TOF MS  $\text{ESI}^+$ )  $m/z$ :  $[\text{M}+\text{Na}]^+$  calculated for  $\text{C}_{39}\text{H}_{38}\text{N}_2\text{O}_5\text{S}_2\text{Na}$  701.2114; found 701.2111.



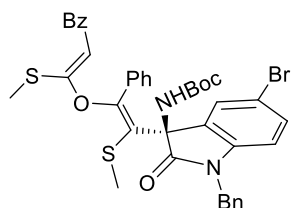
**tert-Butyl (1-benzyl-5-methyl-3-((Z)-1-(methylthio)-2-((Z)-1-(methylthio)-3-oxo-3-phenylprop-1-en-1-yl)oxy)-2-phenylvinyl)-2-oxoindolin-3-yl)carbamate (4c)**

White solid, 50.5 mg, 73% yield, mp: 189 – 191 °C;  $^1\text{H}$  NMR (500 MHz,  $\text{CD}_2\text{Cl}_2$ ) ( $\delta$ , ppm) 8.06 – 8.04 (comp, 2H), 7.74 – 7.73 (comp, 2H), 7.57 – 7.50 (comp, 3H), 7.45 – 7.30 (comp, 9H), 7.08 (s, 1H), 7.00 (m, 1H), 6.50 (m, 1H), 5.53 (s, 1H), 4.89 (d,  $J = 15.0$  Hz, 1H), 4.73 (d,  $J = 15.0$  Hz, 1H), 2.44 (s, 3H), 2.36 (s, 3H), 2.19 (s, 3H), 1.26 (s, 9H);  $^{13}\text{C}$  NMR (125 MHz,  $\text{CD}_2\text{Cl}_2$ ) ( $\delta$ , ppm) 187.6, 174.2, 171.9, 154.8, 153.1, 141.3, 139.2, 135.7, 133.5, 132.6, 131.8, 130.3, 130.1, 129.8, 129.6, 128.6, 128.4, 128.1, 128.0, 127.7, 127.6, 127.3, 126.2, 108.8, 99.7, 80.1, 65.1, 44.3, 27.9, 20.7, 19.8, 12.8; HRMS (TOF MS  $\text{ESI}^+$ )  $m/z$ :  $[\text{M}+\text{Na}]^+$  calculated for  $\text{C}_{40}\text{H}_{40}\text{N}_2\text{O}_5\text{S}_2\text{Na}$  715.2271; found 715.2269.



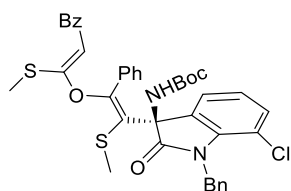
**tert-Butyl (1-benzyl-3-((Z)-1-(methylthio)-2-(((Z)-1-(methylthio)-3-oxo-3-phenylprop-1-en-1-yl)oxy)-2-phenylvinyl)-5-nitro-2-oxoindolin-3-yl)carbamate (4d)**

White solid, 52.1 mg, 72% yield, mp: 125 – 126 °C; <sup>1</sup>H NMR (400 MHz, CD<sub>2</sub>Cl<sub>2</sub>) (δ, ppm) 8.40 (s, 1H), 8.13 – 8.11 (m, 1H), 7.94 – 7.92 (comp, 2H), 7.61 – 7.51 (comp, 5H), 7.46 – 7.44 (comp, 2H), 7.42 – 7.40 (m, 1H), 7.36 – 7.33 (comp, 5H), 6.82 (s, 1H), 6.64 (m, 1H), 5.80 (s, 1H), 5.03 (d, *J* = 16.0 Hz, 1H), 4.71 (d, *J* = 16.0 Hz, 1H), 2.43 (s, 3H), 2.40 (s, 3H), 1.27 (s, 9H); <sup>13</sup>C NMR (100 MHz, CD<sub>2</sub>Cl<sub>2</sub>) (δ, ppm) 187.3, 175.1, 171.3, 156.2, 153.0, 149.4, 143.6, 138.9, 134.5, 132.6, 131.9, 131.4, 130.3, 130.0, 128.8, 128.5, 128.3, 128.0, 127.52, 127.47, 126.4, 126.2, 120.4, 108.7, 100.2, 80.8, 64.2, 44.9, 27.8, 19.9, 12.8; HRMS (TOF MS ESI<sup>+</sup>) *m/z*: [M+Na]<sup>+</sup> calculated for C<sub>39</sub>H<sub>37</sub>N<sub>3</sub>O<sub>7</sub>S<sub>2</sub>Na 746.1965; found 746.1960.



**tert-Butyl (1-benzyl-5-bromo-3-((Z)-1-(methylthio)-2-(((Z)-1-(methylthio)-3-oxo-3-phenylprop-1-en-1-yl)oxy)-2-phenylvinyl)-2-oxoindolin-3-yl)carbamate (4e)**

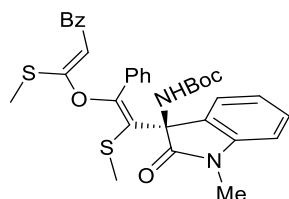
White solid, 56.7 mg, 75% yield, mp: 209 – 21 °C; <sup>1</sup>H NMR (500 MHz, CD<sub>2</sub>Cl<sub>2</sub>) (δ, ppm) 7.86 – 7.84 (comp, 2H), 7.58 (s, 1H), 7.51 – 7.50 (comp, 2H), 7.43 – 7.38 (comp, 3H), 7.30 – 7.27 (comp, 3H), 7.24 – 7.16 (comp, 6H), 6.79 (s, 1H), 6.32 (m, 1H), 5.51 (s, 1H), 4.79 (d, *J* = 15.0 Hz, 1H), 4.52 (d, *J* = 15.0 Hz, 1H), 2.30 (s, 3H), 2.25 (s, 3H), 1.14 (s, 9H); <sup>13</sup>C NMR (125 MHz, CD<sub>2</sub>Cl<sub>2</sub>) (δ, ppm) 187.4, 174.0, 171.6, 155.6, 153.1, 142.8, 139.0, 135.0, 133.1, 132.3, 132.1, 131.8, 130.04, 129.99, 128.7, 128.5, 128.3, 128.2, 127.8, 127.5, 127.4, 127.2, 115.4, 110.5, 99.8, 80.5, 64.7, 44.5, 27.8, 19.8, 12.8; HRMS (TOF MS ESI<sup>+</sup>) *m/z*: [M+Na]<sup>+</sup> calculated for C<sub>39</sub>H<sub>37</sub>BrN<sub>2</sub>O<sub>5</sub>S<sub>2</sub>Na 779.1219; found 779.1219.



**tert-Butyl (1-benzyl-7-chloro-3-((Z)-1-(methylthio)-2-(((Z)-1-(methylthio)-3-oxo-3-phenylprop-1-en-1-yl)oxy)-2-phenylvinyl)-2-oxoindolin-3-yl)carbamate (4f)**

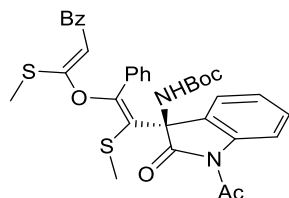
White solid, 43.4 mg, 61% yield, mp: 200 – 202 °C; <sup>1</sup>H NMR (400 MHz, CD<sub>2</sub>Cl<sub>2</sub>) (δ,

ppm) 7.81 – 7.79 (comp, 2H), 7.43 – 7.41 (comp, 3H), 7.39 – 7.33 (comp, 3H), 7.33 – 7.24 (comp, 5H), 7.22 – 7.13 (comp, 3H), 7.07 – 7.05 (m, 1H), 6.87 (m, 1H), 6.71 (s, 1H), 5.71 (s, 1H), 5.14 (d,  $J = 16.0$  Hz, 1H), 4.91 (d,  $J = 16.0$  Hz, 1H), 2.29 (s, 3H), 2.25 (s, 3H), 1.15 (s, 9H);  $^{13}\text{C}$  NMR (100 MHz,  $\text{CD}_2\text{Cl}_2$ ) ( $\delta$ , ppm) 187.3, 175.3, 171.6, 155.7, 152.9, 140.0, 139.0, 137.4, 133.7, 132.7, 132.0, 131.8, 130.2, 130.0, 128.43, 128.35, 128.1, 127.6, 127.5, 127.0, 126.6, 123.7, 123.3, 115.2, 99.9, 80.4, 64.0, 45.7, 27.8, 19.9, 12.7; HRMS (TOF MS  $\text{ESI}^+$ )  $m/z$ :  $[\text{M}+\text{Na}]^+$  calculated for  $\text{C}_{39}\text{H}_{37}\text{ClN}_2\text{O}_5\text{S}_2\text{Na}$  735.1725; found 735.1724.



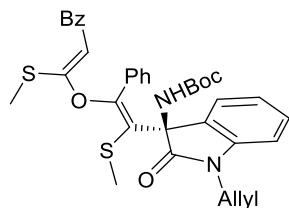
***tert*-Butyl (1-methyl-3-((*Z*)-1-(methylthio)-2-(((*Z*)-1-(methylthio)-3-oxo-3-phenylprop-1-en-1-yl)oxy)-2-phenylvinyl)-2-oxoindolin-3-yl)carbamate (4g)**

White solid, 36.7 mg, 61% yield, mp: 104 – 106 °C;  $^1\text{H}$  NMR (500 MHz,  $\text{CD}_2\text{Cl}_2$ ) ( $\delta$ , ppm) 7.99 – 7.97 (comp, 2H), 7.60 – 7.51 (comp, 4H), 7.36 – 7.26 (comp, 6H), 7.09 – 7.06 (m, 1H), 6.89 (s, 1H), 6.62 – 6.61 (m, 1H), 5.94 (s, 1H), 2.98 (s, 3H), 2.45 (s, 3H), 2.38 (s, 3H), 1.25 (s, 9H);  $^{13}\text{C}$  NMR (125 MHz,  $\text{CD}_2\text{Cl}_2$ ) ( $\delta$ , ppm) 187.3, 174.0, 171.7, 155.5, 153.2, 144.4, 139.0, 132.8, 131.8, 130.9, 129.9, 129.7, 129.5, 128.5, 128.4, 127.8, 127.6, 124.6, 122.7, 108.3, 99.5, 80.1, 64.0, 27.8, 26.3, 19.9, 12.7; HRMS (TOF MS  $\text{ESI}^+$ )  $m/z$ :  $[\text{M}+\text{Na}]^+$  calculated for  $\text{C}_{33}\text{H}_{34}\text{N}_2\text{O}_5\text{S}_2\text{Na}$  625.1801; found 625.1803.



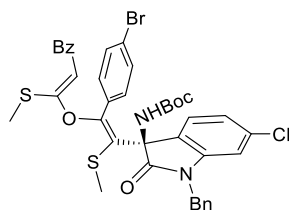
***tert*-Butyl (1-acetyl-3-((*Z*)-1-(methylthio)-2-(((*Z*)-1-(methylthio)-3-oxo-3-phenylprop-1-en-1-yl)oxy)-2-phenylvinyl)-2-oxoindolin-3-yl)carbamate (4h)**

White solid, 31.5 mg, 50% yield, mp: 180 – 182 °C;  $^1\text{H}$  NMR (400 MHz,  $\text{CD}_2\text{Cl}_2$ ) ( $\delta$ , ppm) 7.91 – 7.90 (m, 1H), 7.71 – 6.69 (comp, 2H), 7.46 – 7.44 (m, 1H), 7.41 – 7.33 (comp, 3H), 7.30 – 7.23 (comp, 2H), 7.21 – 7.12 (comp, 3H), 7.03 – 7.01 (comp, 2H), 6.48 (s, 1H), 6.31 (s, 1H), 2.39 (s, 3H), 2.35 (s, 3H), 2.27 (s, 3H), 1.13 (s, 9H);  $^{13}\text{C}$  NMR (100 MHz,  $\text{CD}_2\text{Cl}_2$ ) ( $\delta$ , ppm) 187.0, 175.4, 171.2, 170.0, 156.7, 153.0, 141.2, 138.9, 131.9, 131.7, 130.7, 130.4, 129.8, 128.5, 128.2, 128.1, 127.4, 125.4, 122.9, 116.6, 99.9, 80.9, 63.8, 27.7, 26.2, 20.1, 12.7; HRMS (TOF MS  $\text{ESI}^+$ )  $m/z$ :  $[\text{M}+\text{Na}]^+$  calculated for  $\text{C}_{34}\text{H}_{34}\text{N}_2\text{O}_6\text{S}_2\text{Na}$  653.1751; found 653.1749.



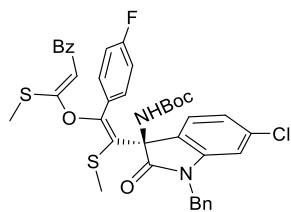
***tert*-Butyl (1-allyl-3-((*Z*)-1-(methylthio)-2-(((*Z*)-1-(methylthio)-3-oxo-3-phenylprop-1-en-1-yl)oxy)-2-phenylvinyl)-2-oxoindolin-3-yl)carbamate (4i)**

White solid, 39.6 mg, 63% yield, mp: 164 – 166 °C; <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) (δ, ppm) 8.00 – 7.98 (comp, 2H), 7.65 – 7.63 (comp, 2H), 7.60 – 7.58 (m, 1H), 7.51 – 7.43 (comp, 3H), 7.34 – 7.28 (comp, 3H), 7.24 – 7.22 (m, 1H), 7.01 – 6.94 (comp, 2H), 6.69 – 6.67 (m, 1H), 5.83 – 5.79 (m, 1H), 5.40 (s, 1H), 5.35 (s, 1H), 5.22 (d, *J* = 12 Hz, 1H), 4.28 (d, *J* = 16 Hz, 1H), 4.16 (d, *J* = 16 Hz, 1H), 2.38 (s, 3H), 2.30 (s, 3H), 1.18 (s, 9H); <sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>) (δ, ppm) 188.0, 174.2, 171.9, 154.7, 153.0, 143.5, 139.0, 133.4, 131.8, 130.8, 130.3, 130.1, 129.8, 129.4, 128.4, 128.1, 127.83, 127.80, 125.6, 122.9, 117.8, 109.0, 99.9, 80.1, 64.9, 42.9, 28.1, 19.8, 13.0; HRMS (TOF MS ESI<sup>+</sup>) *m/z*: [M+Na]<sup>+</sup> calculated for C<sub>35</sub>H<sub>36</sub>N<sub>2</sub>O<sub>5</sub>S<sub>2</sub>Na 651.1958; found 651.1957.



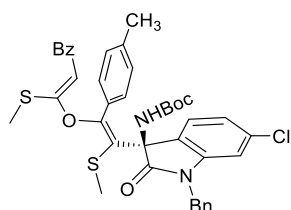
***tert*-Butyl (1-benzyl-3-((*Z*)-2-(4-bromophenyl)-1-(methylthio)-2-(((*Z*)-1-(methylthio)-3-oxo-3-phenylprop-1-en-1-yl)oxy)vinyl)-6-chloro-2-oxoindolin-3-yl)carbamate (4j)**

White solid, 37.9 mg, 48% yield, mp: 135 – 136 °C; <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) (δ, ppm) 8.04 – 8.02 (comp, 2H), 7.66 – 7.65 (comp, 2H), 7.57 – 7.55 (m, 1H), 7.52 – 7.50 (m, 1H), 7.47 – 7.43 (comp, 4H), 7.40 – 7.38 (comp, 2H), 7.35 – 7.28 (comp, 3H), 7.00 (s, 1H), 6.93 – 6.91 (m, 1H), 6.653 – 6.649 (m, 1H), 5.12 (s, 1H), 4.92 – 4.80 (m, 2H), 2.39 (s, 3H), 2.24 (s, 3H), 1.22 (s, 9H); <sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>) (δ, ppm) 188.0, 174.5, 171.7, 153.3, 153.0, 144.6, 138.9, 135.4, 134.6, 132.6, 132.0, 131.6, 131.3, 129.0, 128.5, 128.2, 128.1, 128.0, 127.8, 127.3, 127.2, 124.4, 123.1, 109.8, 99.9, 80.6, 64.9, 44.7, 28.1, 19.7, 13.0; HRMS (TOF MS ESI<sup>+</sup>) *m/z*: [M+Na]<sup>+</sup> calculated for C<sub>39</sub>H<sub>36</sub>BrClN<sub>2</sub>O<sub>5</sub>S<sub>2</sub>Na 813.0830; found 813.0834.



**tert-Butyl (1-benzyl-6-chloro-3-((Z)-2-(4-fluorophenyl)-1-(methylthio)-2-(((Z)-1-(methylthio)-3-oxo-3-phenylprop-1-en-1-yl)oxy)vinyl)-2-oxoindolin-3-yl)carbamate (4k)**

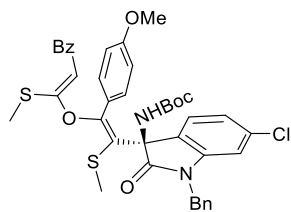
White solid, 47.5 mg, 65% yield, mp: 211 – 212 °C; <sup>1</sup>H NMR (500 MHz, CD<sub>2</sub>Cl<sub>2</sub>) (δ, ppm) 7.92 – 7.90 (comp, 2H), 7.66 – 7.65 (comp, 2H), 7.47 – 7.43 (comp, 2H), 7.41 – 7.38 (comp, 2H), 7.33 – 7.32 (comp, 2H), 7.28 – 7.21 (comp, 3H), 6.97 – 6.94 (comp, 2H), 6.92 – 6.84 (comp, 2H), 6.55 – 6.56 (m, 1H), 5.30 (s, 1H), 4.79 (d, *J* = 15.0 Hz, 1H), 4.71 (d, *J* = 15.0 Hz, 1H), 2.31 (s, 3H), 2.22 (s, 3H), 1.15 (s, 9H); <sup>13</sup>C NMR (125 MHz, CD<sub>2</sub>Cl<sub>2</sub>) (δ, ppm) 187.5, 174.5, 171.6, 168.8, 163.5 (d, *J*<sub>C-F</sub> = 248.8 Hz), 154.0, 153.1, 144.8, 139.0, 135.1, 134.8, 132.3 (d, *J*<sub>C-F</sub> = 8.7 Hz), 131.9, 129.7 (d, *J*<sub>C-F</sub> = 3.0 Hz), 128.8, 128.7, 128.4, 127.9, 127.6, 127.3, 126.6, 122.8, 115.2 (d, *J*<sub>C-F</sub> = 21.3 Hz), 109.5, 99.7, 80.5, 64.7, 44.5, 27.8, 19.7, 12.8; <sup>19</sup>F NMR (376 MHz, CDCl<sub>3</sub>) (δ, ppm) -109.77; HRMS (TOF MS ESI<sup>+</sup>) *m/z*: [M+Na]<sup>+</sup> calculated for C<sub>39</sub>H<sub>36</sub>ClFN<sub>2</sub>O<sub>5</sub>S<sub>2</sub>Na 753.1630; found 753.1632.



**tert-Butyl (1-benzyl-6-chloro-3-((Z)-1-(methylthio)-2-(((Z)-1-(methylthio)-3-oxo-3-phenylprop-1-en-1-yl)oxy)-2-(p-tolyl)vinyl)-2-oxoindolin-3-yl)carbamate (4l)**

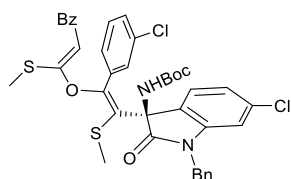
White solid, 39.9 mg, 55% yield, mp: 186 – 187 °C; <sup>1</sup>H NMR (400 MHz, CD<sub>2</sub>Cl<sub>2</sub>) (δ, ppm) 7.87 – 7.85 (comp, 2H), 7.46 – 7.42 (comp, 3H), 7.40 – 7.39 (comp, 2H), 7.37 – 7.32 (comp, 3H), 7.28 – 7.25 (comp, 3H), 7.10 – 7.08 (comp, 2H), 6.90 – 6.88 (m, 1H), 6.77 (s, 1H), 6.49 (s, 1H), 5.48 (s, 1H), 4.80 (d, *J* = 16.0 Hz, 1H), 4.60 (d, *J* = 16.0 Hz, 1H), 2.33 (s, 3H), 2.30 (s, 3H), 2.24 (s, 3H), 1.16 (s, 9H); <sup>13</sup>C NMR (100 MHz, CD<sub>2</sub>Cl<sub>2</sub>) (δ, ppm) 187.4, 174.6, 171.7, 155.5, 153.0, 145.0, 140.5, 139.0, 135.0, 134.9, 131.8, 130.1, 130.0, 128.9, 128.8, 128.7, 128.4, 127.8, 127.6, 127.3, 126.6, 126.1, 122.6, 109.5, 100.0, 80.2, 64.5, 44.5, 27.8, 21.1, 19.8, 12.8; HRMS (TOF MS ESI<sup>+</sup>) *m/z*: [M+Na]<sup>+</sup> calculated for C<sub>40</sub>H<sub>39</sub>ClN<sub>2</sub>O<sub>5</sub>S<sub>2</sub>Na 749.1881; found 749.1886.





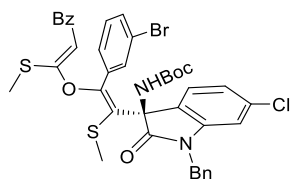
**tert-Butyl (1-benzyl-6-chloro-3-((Z)-2-(4-methoxyphenyl)-1-(methylthio)-2-(((Z)-1-(methylthio)-3-oxo-3-phenylprop-1-en-1-yl)oxy)vinyl)-2-oxoindolin-3-yl)carbamate (4m)**

White solid, 37.9 mg, 51% yield, mp: 164 – 166 °C; <sup>1</sup>H NMR (400 MHz, CD<sub>2</sub>Cl<sub>2</sub>) (δ, ppm) 7.87 – 7.85 (comp, 2H), 7.53 – 7.32 (comp, 8H), 7.27 – 7.21 (comp, 3H), 6.89 – 6.87 (m, 1H), 6.78 – 6.76 (comp, 3H), 6.50 (s, 1H), 5.51 (s, 1H), 4.81 (d, *J* = 16.0 Hz, 1H), 4.64 (d, *J* = 16.0 Hz, 1H), 3.74 (s, 3H), 2.33 (s, 3H), 2.23 (s, 3H), 1.17 (s, 9H); <sup>13</sup>C NMR (100 MHz, CD<sub>2</sub>Cl<sub>2</sub>) (δ, ppm) 187.4, 174.7, 171.7, 161.0, 155.5, 153.0, 145.0, 139.1, 135.0, 134.8, 131.8, 131.6, 129.0, 128.7, 128.4, 127.8, 127.5, 127.4, 126.1, 126.0, 125.1, 122.6, 113.5, 109.4, 99.9, 80.2, 64.6, 55.4, 44.5, 27.8, 19.8, 12.7; HRMS (TOF MS ESI<sup>+</sup>) *m/z*: [M+Na]<sup>+</sup> calculated for C<sub>40</sub>H<sub>39</sub>ClN<sub>2</sub>O<sub>6</sub>S<sub>2</sub> 765.1830; found 765.1825.



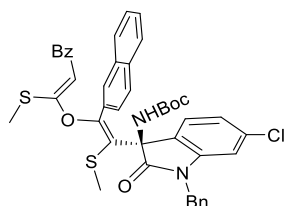
**tert-Butyl (1-benzyl-6-chloro-3-((Z)-2-(3-chlorophenyl)-1-(methylthio)-2-(((Z)-1-(methylthio)-3-oxo-3-phenylprop-1-en-1-yl)oxy)vinyl)-2-oxoindolin-3-yl)carbamate (4n)**

White solid, 52.2 mg, 70% yield, mp: 137 – 138 °C; <sup>1</sup>H NMR (500 MHz, CDCl<sub>3</sub>) (δ, ppm) 8.02 – 8.00 (comp, 2H), 7.63 – 7.62 (m, 1H), 7.56 – 7.50 (comp, 3H), 7.47 – 7.45 (comp, 2H), 7.39 – 7.28 (comp, 6H), 7.24 – 7.21 (m, 1H), 6.97 – 6.89 (comp, 2H), 6.59 (s, 1H), 5.32 (s, 1H), 4.89 (d, *J* = 15.0 Hz, 1H), 4.77 (d, *J* = 15.0 Hz, 1H), 2.38 (s, 3H), 2.29 (s, 3H), 1.24 (s, 9H); <sup>13</sup>C NMR (125 MHz, CDCl<sub>3</sub>) (δ, ppm) 188.0, 174.5, 171.5, 156.5, 153.1, 153.0, 144.6, 138.9, 138.8, 135.5, 135.3, 134.6, 134.0, 132.0, 130.0, 129.9, 129.4, 128.9, 128.5, 128.3, 128.0, 127.8, 127.3, 127.0, 123.1, 109.8, 100.0, 80.7, 64.6, 44.6, 28.1, 19.7, 13.0; HRMS (TOF MS ESI<sup>+</sup>) *m/z*: [M+Na]<sup>+</sup> calculated for C<sub>39</sub>H<sub>36</sub>Cl<sub>2</sub>N<sub>2</sub>O<sub>5</sub>S<sub>2</sub>Na 769.1335; found 769.1333.



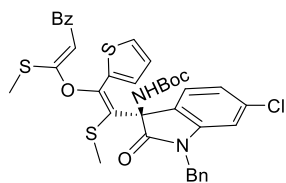
**tert-Butyl (1-benzyl-3-((Z)-2-(3-bromophenyl)-1-(methylthio)-2-(((Z)-1-(methylthio)-3-oxo-3-phenylprop-1-en-1-yl)oxy)vinyl)-6-chloro-2-oxoindolin-3-yl)carbamate (4o)**

White solid, 57.7 mg, 73% yield, mp: 152 – 153 °C; <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) (δ, ppm) 8.01 – 7.99 (comp, 2H), 7.75 (s, 1H), 7.59 – 7.58 (m, 1H), 7.55 – 7.44 (comp, 5H), 7.37 – 7.36 (comp, 2H), 7.34 – 7.27 (comp, 3H), 7.17 – 7.13 (m, 1H), 6.93 – 6.91 (comp, 2H), 6.57 – 6.58 (m, 1H), 5.36 (s, 1H), 4.88 (d, *J* = 16.0 Hz, 1H), 4.75 (d, *J* = 16.0 Hz, 1H), 2.38 (s, 3H), 2.30 (s, 3H), 1.25 (s, 9H); <sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>) (δ, ppm) 188.1, 174.5, 171.5, 153.2, 153.0, 144.6, 138.9, 135.5, 134.6, 132.9, 132.8, 132.0, 129.6, 129.0, 128.9, 128.5, 128.3, 128.0, 127.8, 127.7, 127.3, 127.2, 126.9, 123.1, 122.0, 109.8, 100.0, 80.7, 64.5, 44.7, 28.1, 19.8, 13.0; HRMS (TOF MS ESI<sup>+</sup>) *m/z*: [M+Na]<sup>+</sup> calculated for C<sub>39</sub>H<sub>36</sub>BrClN<sub>2</sub>O<sub>5</sub>S<sub>2</sub>Na 813.0830; found 813.0831.



**tert-Butyl (1-benzyl-6-chloro-3-((Z)-1-(methylthio)-2-(((Z)-1-(methylthio)-3-oxo-3-phenylprop-1-en-1-yl)oxy)-2-(naphthalen-2-yl)vinyl)-2-oxoindolin-3-yl)carbamate (4p)**

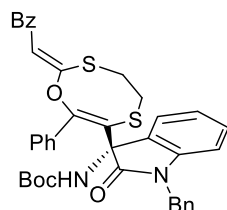
White solid, 34.3 mg, 45% yield, mp: 144 – 146 °C; <sup>1</sup>H NMR (400 MHz, CD<sub>2</sub>Cl<sub>2</sub>) (δ, ppm) 8.12 (s, 1H), 7.97 – 7.95 (comp, 2H), 7.91 – 7.89 (m, 1H), 7.87 – 7.83 (comp, 2H), 7.74 – 7.72 (m, 1H), 7.62 – 7.57 (comp, 2H), 7.56 – 7.54 (comp, 2H), 7.50 – 7.47 (comp, 2H), 7.38 – 7.28 (comp, 5H), 7.04 – 6.96 (comp, 2H), 6.44 (s, 1H), 5.61 (s, 1H), 4.84 (d, *J* = 16.0 Hz, 1H), 4.41 (d, *J* = 16.0 Hz, 1H), 2.46 (s, 3H), 2.42 (s, 3H), 1.07 (s, 9H); <sup>13</sup>C NMR (100 MHz, CD<sub>2</sub>Cl<sub>2</sub>) (δ, ppm) 187.5, 174.5, 171.6, 155.2, 153.0, 144.9, 139.1, 135.04, 134.99, 134.9, 133.7, 132.3, 131.8, 130.5, 130.3, 129.0, 128.70, 128.65, 128.6, 128.4, 127.9, 127.8, 127.7, 127.6, 127.3, 127.2, 126.8, 126.4, 122.7, 109.5, 100.0, 80.2, 64.5, 44.3, 27.6, 19.9, 12.8; HRMS (TOF MS ESI<sup>+</sup>) *m/z*: [M+Na]<sup>+</sup> calculated for C<sub>43</sub>H<sub>39</sub>ClN<sub>2</sub>O<sub>5</sub>S<sub>2</sub>Na 785.1881; found 785.1882.



**tert-butyl (1-benzyl-6-chloro-3-((Z)-1-(methylthio)-2-(((Z)-1-(methylthio)-3-oxo-3-phenylprop-1-en-1-yl)oxy)-2-(thiophen-3-yl)vinyl)-2-oxoindolin-3-yl)carbamate (4q)**

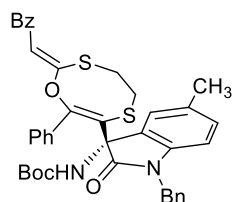
White solid, 46.0 mg, 64% yield, mp: 212 – 213 °C; <sup>1</sup>H NMR (400 MHz, CD<sub>2</sub>Cl<sub>2</sub>) (δ, ppm) 7.92 – 7.90 (comp, 2H), 7.56 – 7.55 (m, 1H), 7.46 – 7.41 (comp, 2H), 7.41 – 7.35 (comp, 3H), 7.32 – 7.30 (comp, 2H), 7.26 – 7.20 (comp, 3H), 6.92 – 6.87 (comp, 2H), 6.84 (s, 1H), 6.56 – 6.55 (m, 1H), 5.53 (s, 1H), 4.80 (d, *J* = 16.0 Hz, 1H), 4.66 (d, *J* = 16.0 Hz, 1H), 2.30 (s, 3H), 2.23 (s, 3H), 1.17 (s, 9H); <sup>13</sup>C NMR (100 MHz, CD<sub>2</sub>Cl<sub>2</sub>) (δ, ppm) 187.5, 174.4, 171.4, 153.3, 148.3, 144.9, 139.0, 135.0, 134.9, 133.5, 133.2, 131.9, 129.7, 129.4, 128.8, 128.7, 128.6, 128.4, 127.8, 127.7, 127.3, 126.5, 126.4, 122.8, 109.6,

99.5, 80.5, 64.8, 44.5, 27.9, 19.9, 12.8; HRMS (TOF MS ESI<sup>+</sup>) m/z: [M+Na]<sup>+</sup> calculated for C<sub>37</sub>H<sub>35</sub>ClN<sub>2</sub>O<sub>5</sub>S<sub>3</sub>Na 741.1289; found 741.1290.



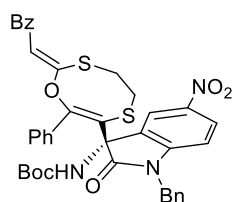
**tert-Butyl (1-benzyl-2-oxo-3-((2Z,7Z)-2-(2-oxo-2-phenylethylidene)-8-phenyl-4,5-dihydro-1,3,6-oxadithiocin-7-yl)indolin-3-yl)carbamate (5a)**

White solid, 54.1 mg, 80% yield, mp: 160 – 161 °C; <sup>1</sup>H NMR (500 MHz, CD<sub>2</sub>Cl<sub>2</sub>) (δ, ppm) 7.83 – 7.81 (comp, 3H), 7.48 – 7.41 (comp, 2H), 7.41 – 7.31 (comp, 7H), 7.30 – 7.18 (comp, 4H), 7.12 – 7.10 (m, 1H), 6.89 – 6.86 (comp, 2H), 6.59 – 6.58 (m, 1H), 5.06 (s, 1H), 4.83 – 4.73 (m, 2H), 3.34 – 3.32 (m, 1H), 3.10 – 3.09 (m, 2H), 2.96 – 2.84 (m, 1H), 1.10 (s, 9H); <sup>13</sup>C NMR (125 MHz, CD<sub>2</sub>Cl<sub>2</sub>) (δ, ppm) 188.2, 174.2, 171.0, 152.9, 143.7, 138.5, 135.7, 132.8, 132.2, 130.8, 130.1, 129.7, 129.5, 128.6, 128.4, 128.1, 127.8, 127.6, 127.5, 127.4, 125.8, 122.9, 122.5, 110.2, 108.7, 80.0, 64.6, 44.3, 36.7, 29.8, 27.8; HRMS (TOF MS ESI<sup>+</sup>) m/z: [M+H]<sup>+</sup> calculated for C<sub>39</sub>H<sub>37</sub>N<sub>2</sub>O<sub>5</sub>S<sub>2</sub> 677.2144; found 677.2139.



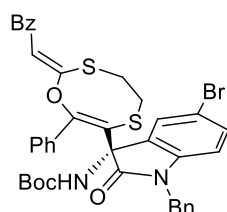
**tert-Butyl (1-benzyl-5-methyl-2-oxo-3-((2Z,7Z)-2-(2-oxo-2-phenylethylidene)-8-phenyl-4,5-dihydro-1,3,6-oxadithiocin-7-yl)indolin-3-yl)carbamate (5b)**

White solid, 49.0 mg, 71% yield, mp: 178 – 179 °C; <sup>1</sup>H NMR (400 MHz, CD<sub>2</sub>Cl<sub>2</sub>) (δ, ppm) 7.95 – 7.90 (comp, 4H), 7.53 – 7.52 (m, 1H), 7.47 – 7.39 (comp, 7H), 7.34 – 7.27 (comp, 4H), 6.99 – 6.97 (comp, 2H), 6.55 – 6.53 (m, 1H), 5.11 (s, 1H), 4.91 – 4.78 (m, 2H), 3.54 – 3.36 (m, 1H), 3.16 (m, 2H), 2.97 (m, 1H), 2.11 (s, 3H), 1.18 (s, 9H); <sup>13</sup>C NMR (100 MHz, CD<sub>2</sub>Cl<sub>2</sub>) (δ, ppm) 188.1, 174.1, 171.2, 154.3, 152.9, 141.3, 138.4, 135.8, 132.9, 132.7, 132.3, 130.8, 130.1, 129.7, 129.6, 128.6, 128.4, 128.1, 127.9, 127.6, 127.4, 126.5, 122.8, 109.9, 108.5, 79.9, 64.7, 44.3, 36.8, 29.7, 27.8, 20.6; HRMS (TOF MS ESI<sup>+</sup>) m/z: [M+H]<sup>+</sup> calculated for C<sub>40</sub>H<sub>39</sub>N<sub>2</sub>O<sub>5</sub>S<sub>2</sub> 691.2295; found 691.2295.



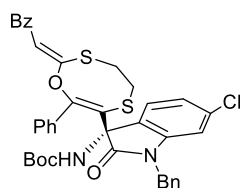
**tert-Butyl (1-benzyl-5-nitro-2-oxo-3-((2Z,7Z)-2-(2-oxo-2-phenylethylidene)-8-phenyl-4,5-dihydro-1,3,6-oxadithiocin-7-yl)indolin-3-yl)carbamate (5c)**

White solid, 41.8 mg, 58% yield, mp: 203 – 204 °C; <sup>1</sup>H NMR (500 MHz, CD<sub>2</sub>Cl<sub>2</sub>) (δ, ppm) 8.22 (s, 1H), 8.02 – 8.00 (m, 1H), 7.74 – 7.72 (comp, 2H), 7.61 – 7.60 (comp, 2H), 7.44 – 7.43 (m, 1H), 7.38 – 7.29 (comp, 7H), 7.27 – 7.21 (comp, 3H), 6.73 (s, 1H), 6.61 – 6.59 (m, 1H), 5.28 (s, 1H), 4.84 (d, *J* = 15.0 Hz, 1H), 4.72 (d, *J* = 15.0 Hz, 1H), 3.24 – 3.21 (m, 1H), 3.17 – 3.06 (m, 2H), 3.03 – 2.93 (m, 1H), 1.11 (s, 9H); <sup>13</sup>C NMR (125 MHz, CD<sub>2</sub>Cl<sub>2</sub>) (δ, ppm) 188.2, 174.8, 169.6, 155.6, 153.0, 149.3, 143.6, 138.3, 134.6, 132.4, 132.2, 130.6, 130.5, 128.8, 128.5, 128.4, 128.3, 128.0, 127.8, 127.5, 126.3, 120.9, 120.4, 111.3, 108.5, 80.7, 64.0, 44.7, 37.3, 30.5, 27.7; HRMS (TOF MS ESI<sup>+</sup>) *m/z*: [M+Na]<sup>+</sup> calculated for C<sub>39</sub>H<sub>35</sub>N<sub>3</sub>O<sub>7</sub>S<sub>2</sub>Na 744.1809; found 744.1816.



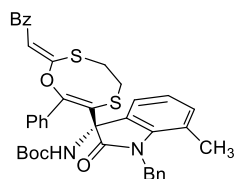
***tert*-Butyl (1-benzyl-5-bromo-2-oxo-3-((2*Z*,7*Z*)-2-(2-oxo-2-phenylethylidene)-8-phenyl-4,5-dihydro-1,3,6-oxadithiocin-7-yl)indolin-3-yl)carbamate (5d)**

White solid, 52.8 mg, 70% yield, mp: 197 – 199 °C; <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) (δ, ppm) 7.87 – 7.86 (comp, 2H), 7.75 – 7.74 (comp, 2H), 7.62 – 7.61 (m, 1H), 7.50 – 7.48 (m, 1H), 7.44 – 7.35 (comp, 7H), 7.33 – 7.28 (comp, 3H), 7.25 – 7.24 (m, 1H), 6.86 (s, 1H), 6.48 – 6.46 (comp, 1H), 5.15 (s, 1H), 4.82 (s, 2H), 3.39 – 3.33 (m, 1H), 3.23 – 3.11 (m, 2H), 3.05 – 2.98 (m, 1H), 1.20 (s, 9H); <sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>) (δ, ppm) 188.5, 174.0, 170.4, 154.7, 152.9, 142.6, 138.3, 135.0, 132.4, 131.4, 130.7, 130.2, 128.7, 128.6, 128.5, 128.4, 128.2, 128.1, 128.0, 127.8, 127.5, 121.5, 115.8, 110.8, 110.3, 80.5, 64.4, 44.5, 36.9, 30.2, 28.1; HRMS (TOF MS ESI<sup>+</sup>) *m/z*: [M+Na]<sup>+</sup> calculated for C<sub>39</sub>H<sub>35</sub>BrN<sub>2</sub>O<sub>5</sub>S<sub>2</sub>Na 777.1063; found 777.1060.



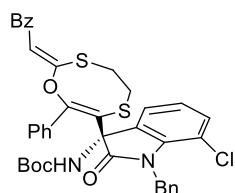
***tert*-Butyl (1-benzyl-6-chloro-2-oxo-3-((2*Z*,7*Z*)-2-(2-oxo-2-phenylethylidene)-8-phenyl-4,5-dihydro-1,3,6-oxadithiocin-7-yl)indolin-3-yl)carbamate (5e)**

White solid, 57.5 mg, 81% yield, mp: 195 – 196 °C; <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) (δ, ppm) 7.89 – 7.88 (comp, 2H), 7.78 – 7.76 (comp, 2H), 7.50 – 7.49 (m, 1H), 7.44 – 7.27 (comp, 11H), 6.97 – 6.82 (comp, 2H), 6.61 – 6.60 (m, 1H), 5.11 (s, 1H), 4.86 – 4.78 (m, 2H), 3.42 – 3.32 (m, 1H), 3.23 – 3.10 (m, 2H), 3.03 – 2.93 (m, 1H), 1.18 (s, 9H); <sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>) (δ, ppm) 188.6, 174.7, 170.9, 154.7, 153.1, 144.8, 138.5, 135.5, 135.0, 132.7, 132.5, 130.8, 130.2, 128.9, 128.8, 128.6, 128.3, 128.2, 128.1, 128.0, 127.5, 123.1, 122.0, 110.7, 109.6, 80.5, 64.3, 44.7, 36.9, 30.2, 28.2; HRMS (TOF MS ESI<sup>+</sup>) *m/z*: [M+Na]<sup>+</sup> calculated for Chemical Formula: C<sub>39</sub>H<sub>35</sub>ClN<sub>2</sub>O<sub>5</sub>S<sub>2</sub>Na 733.1568; found 733.1563;



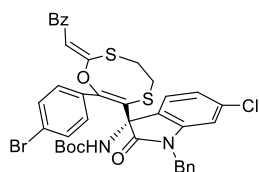
**tert-Butyl (1-benzyl-7-methyl-2-oxo-3-((2Z,7Z)-2-(2-oxo-2-phenylethylidene)-8-phenyl-4,5-dihydro-1,3,6-oxadithiocin-7-yl)indolin-3-yl)carbamate (5f)**

White solid, 40.0 mg, 58% yield, mp: 168 – 169 °C; <sup>1</sup>H NMR (400 MHz, CD<sub>2</sub>Cl<sub>2</sub>) (δ, ppm) 7.79 – 7.73 (comp, 4H), 7.46 – 7.42 (m, 1H), 7.39 – 7.28 (comp, 6H), 7.25 (comp, 4H), 7.16 – 7.19 (m, 1H), 6.90 – 6.88 (m, 1H), 6.85 – 6.76 (comp, 2H), 5.14 (s, 1H), 5.04 – 4.93 (m, 2H), 3.32 – 3.23 (m, 1H), 3.16 – 3.12 (m, 2H), 2.95 – 2.86 (m, 1H), 2.12 (s, 3H), 1.10 (s, 9H); <sup>13</sup>C NMR (100 MHz, CD<sub>2</sub>Cl<sub>2</sub>) (δ, ppm) 188.2, 175.2, 170.7, 154.3, 152.9, 141.8, 138.5, 137.7, 133.6, 132.6, 132.2, 130.8, 130.6, 130.1, 128.7, 128.4, 128.0, 127.8, 127.1, 126.0, 123.2, 122.9, 122.7, 119.5, 110.4, 80.0, 63.8, 45.8, 36.8, 30.0, 27.8, 18.5; HRMS (TOF MS ESI<sup>+</sup>) m/z: [M+H]<sup>+</sup> calculated for C<sub>40</sub>H<sub>39</sub>N<sub>2</sub>O<sub>5</sub>S<sub>2</sub> 691.2295; found 691.2297.



**tert-Butyl (1-benzyl-7-chloro-2-oxo-3-((2Z,7Z)-2-(2-oxo-2-phenylethylidene)-8-phenyl-4,5-dihydro-1,3,6-oxadithiocin-7-yl)indolin-3-yl)carbamate (5g)**

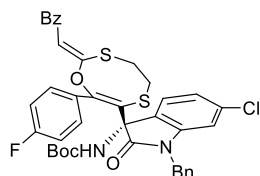
White solid, 48.3 mg, 68% yield, mp: 199 – 200 °C; <sup>1</sup>H NMR (400 MHz, CD<sub>2</sub>Cl<sub>2</sub>) (δ, ppm) 7.89 – 7.87 (comp, 2H), 7.82 – 7.81 (comp, 2H), 7.56 – 7.55 (m, 1H), 7.50 – 7.41 (comp, 7H), 7.38 – 7.26 (comp, 4H), 7.22 – 7.20 (m, 1H), 6.98 – 6.94 (m, 1H), 6.89 (s, 1H), 5.38 (d, *J* = 16.0 Hz, 1H), 5.28 (s, 1H), 5.20 (d, *J* = 16.0 Hz, 1H), 3.34 – 3.29 (m, 1H), 3.25 – 3.10 (m, 2H), 3.05 – 2.95 (m, 1H), 1.22 (s, 9H); <sup>13</sup>C NMR (100 MHz, CD<sub>2</sub>Cl<sub>2</sub>) (δ, ppm) 188.2, 175.0, 170.4, 154.7, 152.8, 139.9, 138.4, 137.5, 132.8, 132.3, 132.1, 130.7, 130.3, 128.5, 128.4, 128.3, 128.1, 128.0, 127.8, 127.1, 126.8, 123.8, 121.7, 114.9, 110.7, 80.3, 63.9, 45.6, 36.9, 30.1, 27.8; HRMS (TOF MS ESI<sup>+</sup>) m/z: [M+Na]<sup>+</sup> calculated for C<sub>39</sub>H<sub>35</sub>ClN<sub>2</sub>O<sub>5</sub>S<sub>2</sub>Na 733.1568; found 733.1573.



**tert-Butyl (1-benzyl-3-((2Z,7Z)-8-(4-bromophenyl)-2-(2-oxo-2-phenylethylidene)-4,5-dihydro-1,3,6-oxadithiocin-7-yl)-6-chloro-2-oxoindolin-3-yl)carbamate (5h)**

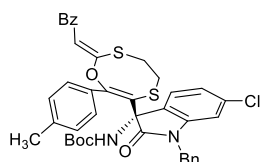
White solid, 48.9 mg, 62% yield, mp: 122 – 123 °C; <sup>1</sup>H NMR (500 MHz, CD<sub>2</sub>Cl<sub>2</sub>) (δ, ppm) 7.96 – 7.95 (comp, 2H), 7.81 – 7.80 (comp, 2H), 7.59 – 7.57 (comp, 3H), 7.53 – 7.47 (comp, 3H), 7.45 – 7.42 (comp, 2H), 7.40 – 7.34 (comp, 3H), 7.05 – 6.93 (comp,

2H), 6.72 – 6.67 (m, 1H), 5.07 (s, 1H), 4.96 – 4.84 (m, 2H), 3.48 – 3.37 (m, 1H), 3.25 – 3.16 (m, 2H), 3.05 – 2.98 (m, 1H), 1.25 (s, 9H); <sup>13</sup>C NMR (125 MHz, CD<sub>2</sub>Cl<sub>2</sub>) (δ, ppm) 188.1, 174.2, 170.7, 153.3, 152.9, 144.7, 138.4, 135.4, 135.0, 133.6, 132.4, 132.3, 131.8, 131.3, 128.8, 128.7, 128.5, 128.0, 127.9, 127.8, 127.3, 124.5, 122.9, 110.3, 109.4, 80.4, 64.2, 44.5, 36.7, 29.8, 27.8; HRMS (TOF MS ESI<sup>+</sup>) m/z: [M+Na]<sup>+</sup> calculated for C<sub>39</sub>H<sub>34</sub>BrClN<sub>2</sub>O<sub>5</sub>S<sub>2</sub>Na 811.0673; found 811.0671.



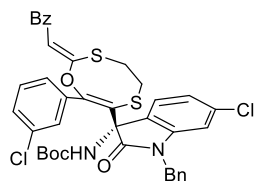
**tert-Butyl (1-benzyl-6-chloro-3-((2Z,7Z)-8-(4-fluorophenyl)-2-(2-oxo-2-phenylethylidene)-4,5-dihydro-1,3,6-oxadithiocin-7-yl)-2-oxoindolin-3-yl)carbamate (5i)**

White solid, 47.3 mg, 65% yield, mp: 199 – 201 °C; <sup>1</sup>H NMR (400 MHz, CD<sub>2</sub>Cl<sub>2</sub>) (δ, ppm) 7.93 – 7.75 (comp, 4H), 7.56 – 7.52 (m, 1H), 7.49 – 7.42 (comp, 3H), 7.41 – 7.39 (comp, 2H), 7.37 – 7.30 (comp, 3H), 7.12 – 7.07 (comp, 2H), 6.96 – 6.86 (comp, 2H), 6.68 – 6.62 (m, 1H), 5.07 (s, 1H), 4.91 – 4.80 (m, 2H), 3.44 – 3.30 (m, 1H), 3.21 – 3.12 (m, 2H), 3.03 – 2.95 (m, 1H), 1.20 (s, 9H); <sup>13</sup>C NMR (100 MHz, CD<sub>2</sub>Cl<sub>2</sub>) (δ, ppm) 188.1, 174.3, 170.6, 163.7 (d, J<sub>C-F</sub> = 249.0 Hz), 153.5, 152.9, 144.8, 138.4, 135.3, 135.0, 132.9 (d, J<sub>C-F</sub> = 8.0 Hz), 132.3, 128.7, 128.5, 128.1, 127.93, 127.87, 127.8, 127.4, 126.9, 122.9, 122.2, 115.1 (d, J<sub>C-F</sub> = 22.0 Hz), 110.4, 109.3, 80.3, 64.2, 44.4, 36.7, 29.9, 27.8; <sup>19</sup>F NMR (376 MHz, CDCl<sub>3</sub>) (δ, ppm) -109.73; HRMS (TOF MS ESI<sup>+</sup>) m/z: [M+Na]<sup>+</sup> calculated for C<sub>39</sub>H<sub>34</sub>ClFN<sub>2</sub>O<sub>5</sub>S<sub>2</sub>Na 751.1474; found 751.1467.



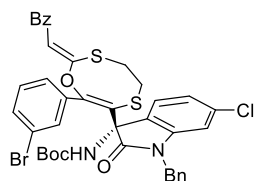
**tert-Butyl (1-benzyl-6-chloro-2-oxo-3-((2Z,7Z)-2-(2-oxo-2-phenylethylidene)-8-(p-tolyl)-4,5-dihydro-1,3,6-oxadithiocin-7-yl)indolin-3-yl)carbamate (5j)**

White solid, 36.9 mg, 51% yield, mp: 198 – 199 °C; <sup>1</sup>H NMR (500 MHz, CD<sub>2</sub>Cl<sub>2</sub>) (δ, ppm) 7.90 – 7.89 (comp, 2H), 7.79 – 7.72 (comp, 2H), 7.58 – 7.55 (m, 1H), 7.50 – 7.46 (comp, 2H), 7.45 – 7.43 (comp, 3H), 7.39 – 7.33 (comp, 3H), 7.27 – 7.25 (comp, 2H), 6.99 – 6.89 (comp, 2H), 6.67 – 6.63 (m, 1H), 5.21 (s, 1H), 4.89 – 4.82 (m, 2H), 3.42 – 3.34 (m, 1H), 3.25 – 3.17 (m, 2H), 3.06 – 3.02 (m, 1H), 2.42 (s, 3H), 1.22 (s, 9H); <sup>13</sup>C NMR (125 MHz, CD<sub>2</sub>Cl<sub>2</sub>) (δ, ppm) 188.2, 174.4, 170.7, 154.4, 153.0, 145.0, 140.7, 138.4, 135.2, 135.1, 132.3, 130.6, 129.5, 128.8, 128.7, 128.5, 128.2, 128.0, 127.8, 127.4, 126.5, 122.7, 121.1, 110.6, 109.2, 80.1, 64.2, 44.4, 36.6, 29.9, 27.8, 21.2; HRMS (TOF MS ESI<sup>+</sup>) m/z: [M+Na]<sup>+</sup> calculated for C<sub>40</sub>H<sub>37</sub>ClN<sub>2</sub>O<sub>5</sub>S<sub>2</sub>Na 747.1725; found 747.1721.



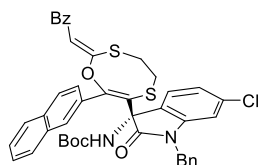
**tert-Butyl (1-benzyl-6-chloro-3-((2Z,7Z)-8-(3-chlorophenyl)-2-(2-oxo-2-phenylethylidene)-4,5-dihydro-1,3,6-oxadithiocin-7-yl)-2-oxoindolin-3-yl)carbamate (5k)**

White solid, 45.4 mg, 61% yield, mp: 126 – 128 °C; <sup>1</sup>H NMR (400 MHz, CD<sub>2</sub>Cl<sub>2</sub>) (δ, ppm) 7.97 – 7.95 (comp, 2H), 7.87 – 7.76 (comp, 2H), 7.59 – 7.48 (comp, 4H), 7.46 – 7.33 (comp, 7H), 7.12 – 6.83 (comp, 2H), 6.74 – 6.63 (m, 1H), 5.18 (s, 1H), 4.89 (s, 2H), 3.48 – 3.38 (m, 1H), 3.29 – 3.17 (m, 2H), 3.10 – 2.99 (m, 1H), 1.26 (s, 9H); <sup>13</sup>C NMR (100 MHz, CD<sub>2</sub>Cl<sub>2</sub>) (δ, ppm) 188.2, 174.2, 170.4, 153.3, 153.0, 144.7, 138.4, 135.3, 135.0, 134.7, 133.8, 132.3, 130.5, 130.0, 129.3, 128.73, 128.65, 128.5, 128.0, 127.9, 127.8, 127.5, 127.3, 123.4, 122.9, 110.3, 109.4, 80.4, 64.1, 44.4, 37.0, 30.0, 27.8; HRMS (TOF MS ESI<sup>+</sup>) m/z: [M+Na]<sup>+</sup> calculated for C<sub>39</sub>H<sub>34</sub>Cl<sub>2</sub>N<sub>2</sub>O<sub>5</sub>S<sub>2</sub>Na 767.1178; found 767.1184.



**tert-Butyl (1-benzyl-3-((2Z,7Z)-8-(3-bromophenyl)-2-(2-oxo-2-phenylethylidene)-4,5-dihydro-1,3,6-oxadithiocin-7-yl)-6-chloro-2-oxoindolin-3-yl)carbamate (5l)**

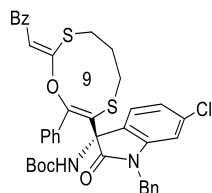
White solid, 44.9 mg, 57% yield, mp: 130 – 131 °C; <sup>1</sup>H NMR (400 MHz, CD<sub>2</sub>Cl<sub>2</sub>) (δ, ppm) 7.95 – 7.90 (comp, 2H), 7.77 – 7.75 (m, 1H), 7.57 – 7.53 (comp, 2H), 7.50 – 7.46 (comp, 3H), 7.40 – 7.27 (comp, 7H), 6.97 – 6.89 (comp, 2H), 6.65 – 6.63 (m, 1H), 5.15 (s, 1H), 4.89 – 4.81 (m, 2H), 3.40 – 3.35 (m, 1H), 3.24 – 3.15 (m, 2H), 3.04 – 2.99 (m, 1H), 1.23 (s, 9H); <sup>13</sup>C NMR (100 MHz, CD<sub>2</sub>Cl<sub>2</sub>) (δ, ppm) 188.2, 174.2, 170.4, 153.2, 153.0, 144.7, 138.4, 135.4, 135.0, 134.9, 133.3, 132.9, 132.4, 129.6, 129.3, 128.7, 128.5, 128.0, 127.9, 127.85, 127.5, 127.3, 123.5, 122.9, 121.9, 110.3, 109.4, 80.5, 64.1, 44.4, 37.0, 30.0, 27.8; HRMS (TOF MS ESI<sup>+</sup>) m/z: [M+Na]<sup>+</sup> calculated for C<sub>39</sub>H<sub>34</sub>BrClN<sub>2</sub>O<sub>5</sub>S<sub>2</sub>Na 811.0673; found 811.0672.



**tert-Butyl (1-benzyl-6-chloro-3-((2Z,7Z)-8-(naphthalen-2-yl)-2-(2-oxo-2-phenylethylidene)-4,5-dihydro-1,3,6-oxadithiocin-7-yl)-2-oxoindolin-3-yl)carbamate (5m)**

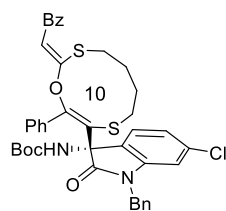
White solid, 43.3 mg, 57% yield, mp: 192 – 193 °C; <sup>1</sup>H NMR (500 MHz, CD<sub>2</sub>Cl<sub>2</sub>) (δ, ppm) 8.36 (s, 1H), 7.94 – 7.90 (comp, 3H), 7.86 – 7.84 (comp, 2H), 7.63 – 7.57 (comp,

2H), 7.52 (comp, 2H), 7.45 – 7.42 (comp, 2H), 7.40 – 7.31 (comp, 6H), 7.02 – 6.95 (comp, 2H), 6.62 – 6.57 (m, 1H), 5.22 (s, 1H), 4.81 (d,  $J = 15.0$  Hz, 1H), 4.66 (d,  $J = 15.0$  Hz, 1H), 3.50 – 3.45 (m, 1H), 3.34 – 3.25 (m, 2H), 3.14 – 3.09 (m, 1H), 1.01 (s, 9H);  $^{13}\text{C}$  NMR (125 MHz,  $\text{CD}_2\text{Cl}_2$ ) ( $\delta$ , ppm) 188.2, 174.4, 170.5, 154.5, 152.9, 144.8, 138.4, 135.2, 135.1, 133.9, 132.5, 132.3, 128.8, 128.7, 128.6, 128.4, 128.3, 128.1, 127.9, 127.79, 127.77, 127.7, 127.6, 127.5, 127.4, 127.3, 126.7, 122.8, 122.4, 110.6, 109.3, 80.0, 64.1, 53.9, 53.6, 53.4, 53.2, 53.0, 44.3, 36.9, 30.2, 27.6, 27.5; HRMS (TOF MS ESI<sup>+</sup>)  $m/z$ :  $[\text{M}+\text{H}]^+$  calculated for  $\text{C}_{43}\text{H}_{38}\text{ClN}_2\text{O}_5\text{S}_2$  761.1905; found 761.1908.



**tert-Butyl (1-benzyl-6-chloro-2-oxo-3-((2Z,8Z)-2-(2-oxo-2-phenylethylidene)-9-phenyl-5,6-dihydro-4H-1,3,7-oxadithionin-8-yl)indolin-3-yl)carbamate (5n)**

White solid, 50.0 mg, 69% yield, mp: 230 – 231 °C;  $^1\text{H}$  NMR (500 MHz,  $\text{CD}_2\text{Cl}_2$ ) ( $\delta$ , ppm) 8.14 – 8.12 (comp, 2H), 7.96 – 7.95 (comp, 2H), 7.45 – 7.43 (comp, 2H), 7.41 – 7.32 (comp, 6H), 7.30 – 7.20 (comp, 5H), 6.64 – 6.63 (m, 1H), 6.62 (s, 1H), 5.04 (s, 1H), 4.94 (d,  $J = 15$  Hz, 1H), 4.71 (d,  $J = 15$  Hz, 1H), 3.42 – 3.22 (m, 1H), 3.12 – 3.09 (m, 1H), 2.70 – 2.66 (m, 1H), 2.47 – 2.42 (m, 1H), 2.18 – 2.14 (m, 1H), 1.74 – 1.66 (m, 1H), 1.06 (s, 9H);  $^{13}\text{C}$  NMR (125 MHz,  $\text{CD}_2\text{Cl}_2$ ) ( $\delta$ , ppm) 188.0, 175.0, 174.5, 155.1, 153.2, 144.5, 139.0, 135.1, 135.0, 134.5, 131.81, 131.75, 130.4, 130.0, 128.8, 128.30, 128.25, 128.2, 128.0, 127.9, 127.7, 127.1, 122.8, 109.4, 101.2, 80.2, 64.8, 44.4, 39.4, 31.9, 28.7, 27.7; HRMS (TOF MS ESI<sup>+</sup>)  $m/z$ :  $[\text{M}+\text{Na}]^+$  calculated for  $\text{C}_{40}\text{H}_{37}\text{ClN}_2\text{O}_5\text{S}_2\text{Na}$  747.1725; found 747.1723.

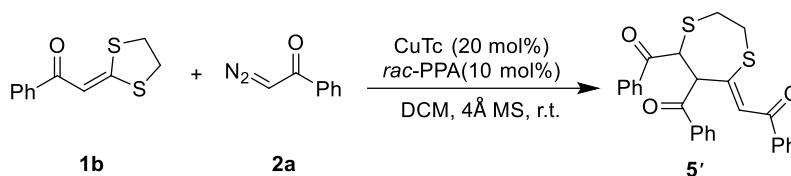


**tert-Butyl (1-benzyl-6-chloro-2-oxo-3-((2Z,9Z)-2-(2-oxo-2-phenylethylidene)-10-phenyl-4,5,6,7-tetrahydro-1,3,8-oxadithiecin-9-yl)indolin-3-yl)carbamate (5o)**

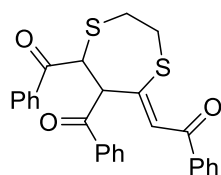
White solid, 39.1 mg, 53% yield, mp: 120.4 – 121.6 °C;  $^1\text{H}$  NMR (400 MHz,  $\text{CD}_2\text{Cl}_2$ ) ( $\delta$ , ppm) 8.05 – 8.03 (comp, 2H), 7.65 – 7.60 (comp, 3H), 7.58 – 7.55 (m, 1H), 7.52 – 7.48 (comp, 2H), 7.44 – 7.40 (comp, 3H), 7.39 – 7.32 (comp, 5H), 7.10 (s, 1H), 6.98 – 6.96 (m, 1H), 6.58 – 6.57 (m, 1H), 5.65 (s, 1H), 4.89 (d,  $J = 16$  Hz, 1H), 4.62 (d,  $J = 16$  Hz, 1H), 3.23 – 3.11 (m, 1H), 3.00 – 2.87 (m, 3H), 2.14 – 1.98 (m, 2H), 1.93 – 1.83 (m, 2H), 1.26 (s, 9H);  $^{13}\text{C}$  NMR (100 MHz,  $\text{CD}_2\text{Cl}_2$ ) ( $\delta$ , ppm) 187.6, 174.5, 169.8, 154.5, 153.2, 144.7, 139.0, 134.94, 134.90, 133.2, 131.9, 130.3, 130.2, 129.9, 129.0, 128.7, 128.4, 128.0, 127.8, 127.3, 126.9, 126.3, 122.7, 109.5, 101.7, 80.3, 64.3, 44.4, 35.7, 28.4, 27.8, 27.7, 27.6; HRMS (TOF MS ESI<sup>+</sup>)  $m/z$ :  $[\text{M}+\text{Na}]^+$  calculated for  $\text{C}_{41}\text{H}_{39}\text{ClN}_2\text{O}_5\text{S}_2\text{Na}$  761.1881; found 761.1881.



## General Procedure for the Synthesis of Compounds 5'



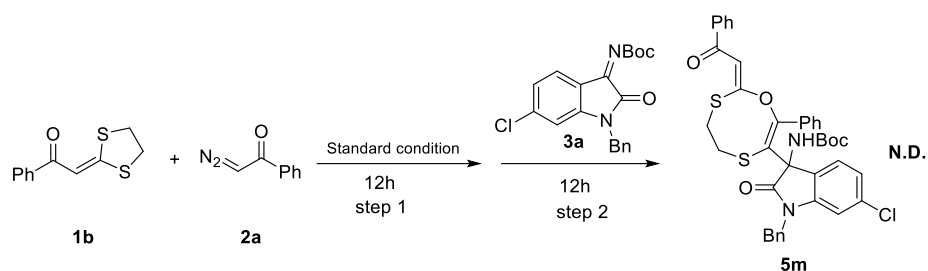
To a 10-mL oven-dried vial containing a magnetic stirring bar, ketene dithioacetal **1b** (0.1 mmol), CuTc (3.8 mg, 20 mol%), 4 Å MS (50 mg) and racemization phosphoric acid PPA (3.5 mg, 10 mol%) in DCM (0.5 mL), ketene dithioacetal **2a** (0.2 mmol) in DCM (0.1 mL) *via* a syringe pump under stirring in 2 h at room temperature under argon atmosphere. The resulting reaction mixture was stirred overnight under these conditions. When the reaction was completed (monitored by TLC), the solvent was evaporated *in vacuo* and the residue was purified by flash column chromatography on silica gel (hexanes/ethyl acetate = 5:1) to afford the pure products **5'** in 45% yields.



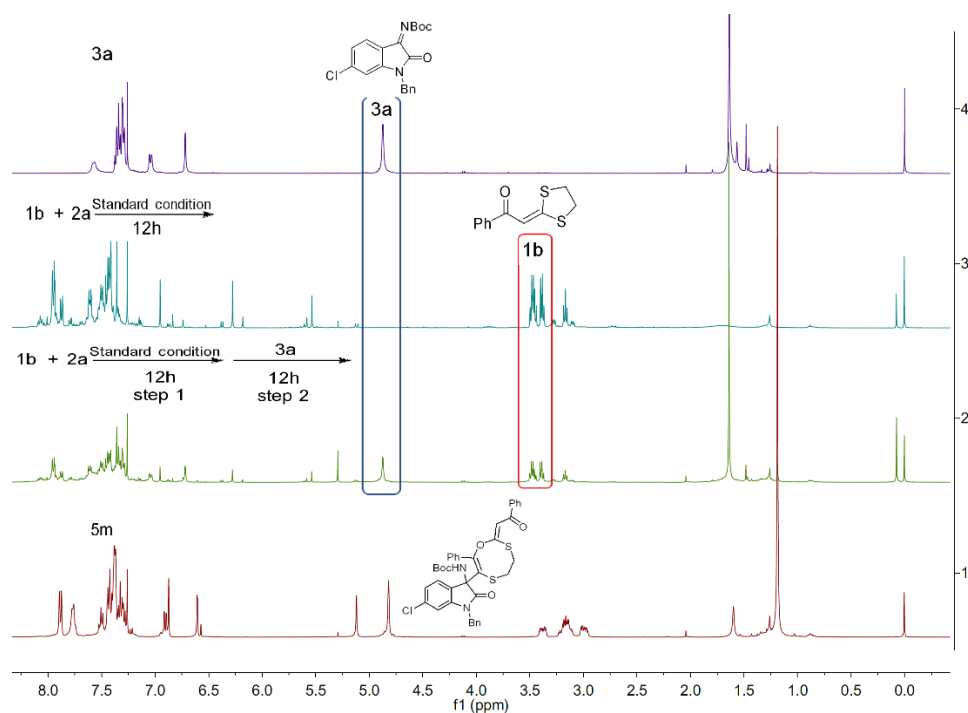
### (Z)-(7-(2-oxo-2-phenylethylidene)-1,4-dithiepane-5,6-diyl)bis(phenylmethanone) (**5'**)

White solid, 20.6 mg, 45% yield, mp: 102 – 103 °C; <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) (δ, ppm) 8.09 – 8.07 (comp, 2H), 7.94 – 7.93 (comp, 2H), 7.83 – 7.76 (comp, 2H), 7.63 – 7.59 (m, 1H), 7.57 – 7.47 (comp, 4H), 7.46 – 7.37 (comp, 4H), 6.73 (s, 1H), 5.59 (d, *J* = 8.0 Hz, 1H), 5.11 (d, *J* = 12.0 Hz, 1H), 3.30 – 3.24 (m, 1H), 3.19 – 3.08 (m, 2H), 2.76 – 2.68 (m, 1H); <sup>13</sup>C NMR (125 MHz, CDCl<sub>3</sub>) (δ, ppm) 196.4, 192.9, 188.2, 159.7, 138.1, 134.7, 134.1, 133.6, 132.4, 128.9, 128.9, 128.9, 128.8, 128.5, 128.0, 117.2, 52.1, 44.9, 30.7, 29.4; HRMS (TOF MS ESI<sup>+</sup>) *m/z*: [M+Na]<sup>+</sup> calculated for C<sub>27</sub>H<sub>22</sub>O<sub>3</sub>S<sub>2</sub>Na 481.0908; found 481.0904.

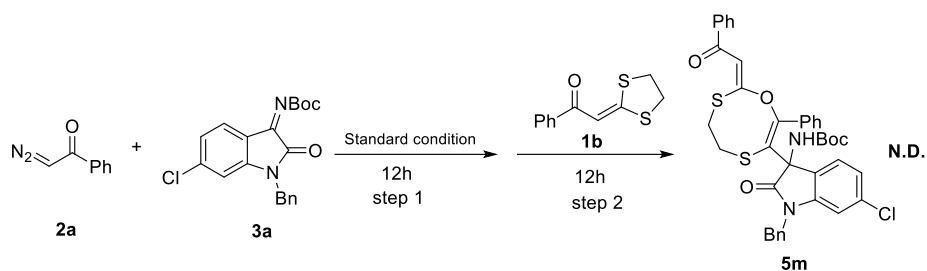
## Control Experiments



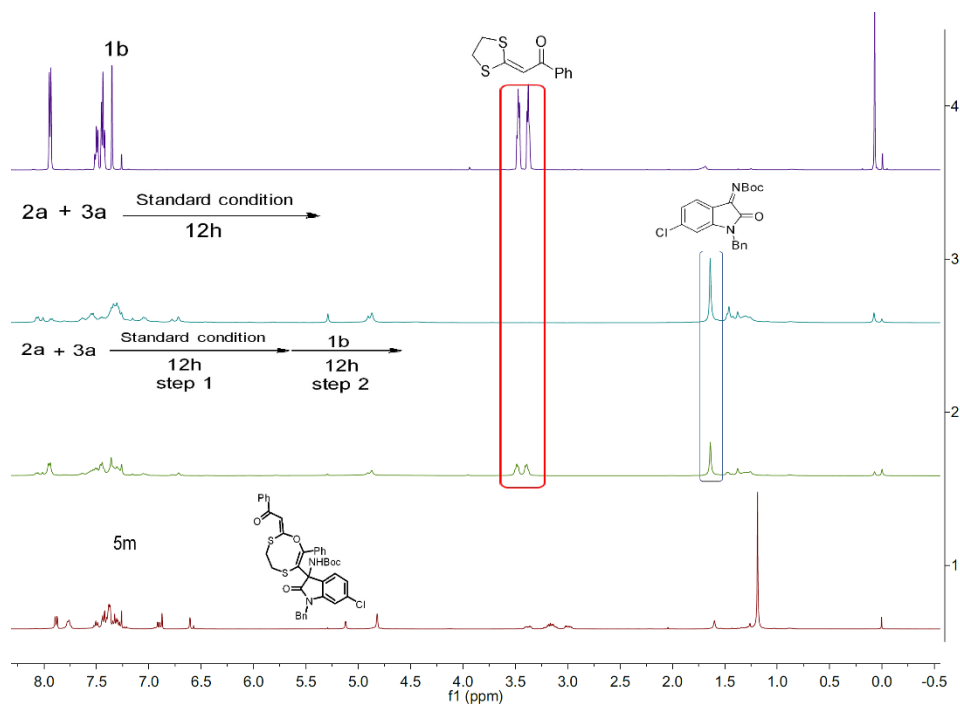
To a 10-mL oven-dried vial containing a magnetic stirring bar, cyclic ketene dithioacetal **1b** (0.2 mmol), CuTc (3.8 mg, 20 mol%), 4Å MS (50 mg) and racemization phosphoric acid PPA (3.5 mg, 10 mol%) in DCM (0.5 mL), was added diazo-ketones **2a** (0.2 mmol) in DCM (1.0 mL) *via* a syringe pump under stirring in 2 h at -10 °C under argon atmosphere. The resulting reaction mixture was stirred for 12 h. When the diazo-ketones **2a** was consumed (monitored by TLC), ketimines **3a** in DCM (0.5 mL) was added in the reaction mixture. The resulting reaction mixture was stirred for 12 h. Then the reaction mixture was subjected to proton NMR analysis in CDCl<sub>3</sub> after the solvent was evaporated, and **5m** was not observed.



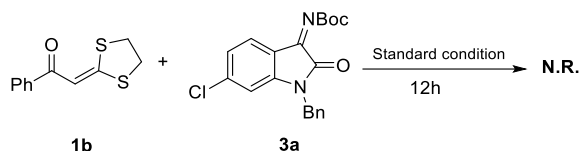
**Figure S1.** Proton NMR spectrum of crude reaction mixture of **1b** and **2a** with **3a** under standard conditions.



To a 10-mL oven-dried vial containing a magnetic stirring bar, ketimines **3a** (0.1 mmol), CuTc (3.8 mg, 20 mol%), 4 Å MS (50 mg) and racemization phosphoric acid PPA (3.5 mg, 10 mol%) in DCM (0.5 mL), was added diazo-ketones **2a** (0.2 mmol) in DCM (1.0 mL) *via* a syringe pump under stirring in 2 h at -10 °C under argon atmosphere. The resulting reaction mixture was stirred for 12 h. When the diazo-ketones **2a** was consumed (monitored by TLC), ketene dithioacetal **1b** (0.2 mmol) in DCM (0.5 mL) was added in the reaction mixture. The resulting reaction mixture was stirred for 12 h. Then the reaction mixture was subjected to proton NMR analysis in CDCl<sub>3</sub> after the solvent was evaporated, and **5m** was not observed.

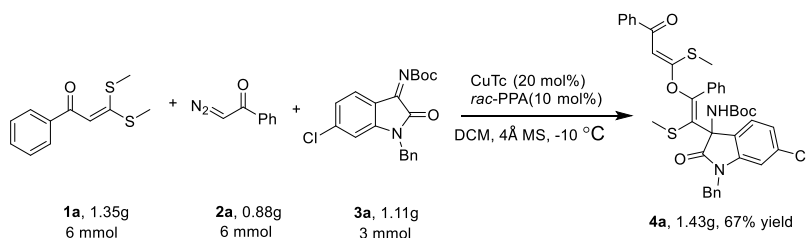


**Figure S2.** Proton NMR spectrum of crude reaction mixture of **2a** and **3a** with **1b** under standard conditions.



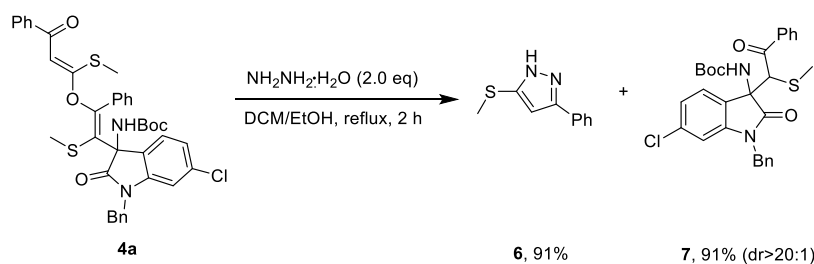
To a 10-mL oven-dried vial containing a magnetic stirring bar, ketimines **3a** (0.1 mmol), CuTc (3.8 mg, 20 mol%), 4 Å MS (50 mg) and racemization phosphoric acid PPA (3.5 mg, 10 mol%) in DCM (0.5 mL), was added diazo-ketones **2a** (0.2 mmol) in DCM (1.0 mL) *via* a syringe pump under stirring in 2 h at -10 °C under argon atmosphere. The resulting reaction mixture was stirred for 12 h. Then the reaction mixture was subjected to proton NMR analysis in CDCl<sub>3</sub> after the solvent was evaporated, and **1b** and **3a** were remain.

### Procedure for Scale up

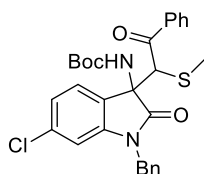


To a 10-mL oven-dried vial containing a magnetic stirring bar, ketimines **3a** (3 mmol), CuTc (114.0 mg, 20 mol%), 4 Å MS (200 mg) and racemization phosphoric acid PPA (104.4 mg, 10 mol%) in DCM (5.0 mL), was added ketene dithioacetal **1a** (6 mmol) and diazo-ketones **2a** (6 mmol) in DCM (5.0 mL) *via* a syringe pump under stirring in 4 h at -10 °C under argon atmosphere. The resulting reaction mixture was stirred overnight under these conditions. When the reaction was completed (monitored by TLC), the solvent was evaporated *in vacuo* and the residue was purified by flash column chromatography on silica gel (hexanes/ethyl acetate = 5:1) to afford the pure products **4a** in 67% yields.

### Derivations



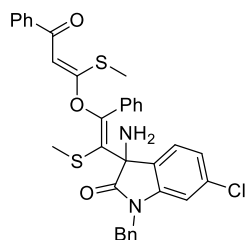
**Synthesis of 6 and 7:** To a 10-mL oven-dried vial with a magnetic stirring bar, **4a** (71.3 mg, 0.1 mmol) in 6 mL solvent (DCM : EtOH = 1:5 mL), was added  $\text{NH}_2\text{NH}_2 \cdot \text{H}_2\text{O}$  (10 mg, 0.2 mmol) at room temperature. The resulting solution was reflux at 78 °C for 2 h. The reaction mixture was added with  $\text{H}_2\text{O}$  (1.0 mL), extracted with  $\text{CH}_2\text{Cl}_2$  (5.0 mL). The organic layer was washed with brine, dried over anhydrous  $\text{Na}_2\text{SO}_4$ . The solvent was removed under reduced pressure after filtration. The residue was purified by silica gel column chromatography (hexanes/ethyl acetate = 5:1) to afford compound **6 and 7**.



**tert-Butyl (1-benzyl-6-chloro-3-(1-(methylthio)-2-oxo-2-phenylethyl)-2-oxoindolin-3-yl)carbamate (7)**

White solid, 48.8 mg, 91% yield, mp: 93 – 94 °C;  $^1\text{H}$  NMR (500 MHz,  $\text{CD}_2\text{Cl}_2$ ) ( $\delta$ , ppm) 7.82 – 7.81 (comp, 2H), 7.71 – 7.63 (m, 1H), 7.53 – 7.50 (m, 1H), 7.43 – 7.32 (comp, 4H), 7.29 – 7.17 (comp, 3H), 6.91 – 6.89 (m, 1H), 6.60 (s, 1H), 5.96 (s, 1H), 4.89 – 4.78 (m, 2H), 4.76 (s, 1H), 1.77 (s, 3H), 1.24 (s, 9H);  $^{13}\text{C}$  NMR (125 MHz,  $\text{CD}_2\text{Cl}_2$ ) ( $\delta$ , ppm) 194.0, 175.5, 154.4, 145.4, 136.1, 135.5, 135.1, 133.9, 128.9, 128.8, 128.5, 127.8, 127.6, 127.2, 127.1, 122.4, 109.6, 80.8, 62.8, 52.9, 44.6, 28.0, 15.6; HRMS (TOF MS ESI<sup>+</sup>) m/z:  $[\text{M}+\text{Na}]^+$  calculated for  $\text{C}_{29}\text{H}_{29}\text{ClN}_2\text{O}_4\text{SNa}$  559.1429; found 559.1428.

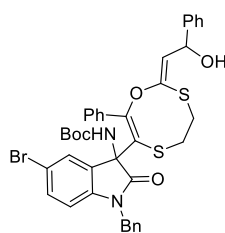
**Synthesis of 8:** To a 25-mL oven-dried vial with a magnetic stirring bar, **4a** (71.3 mg, 0.1 mmol) in 10 mL DCM, was added trifluoroacetic acid TFA (0.2 mL, 3.0 mmol) at 0 °C. The resulting solution was stirred at room temperature for 2 h. The reaction mixture was added with  $\text{H}_2\text{O}$  (1.0 mL), extracted with  $\text{CH}_2\text{Cl}_2$  (5.0 mL). The organic layer was washed with brine, dried over anhydrous  $\text{Na}_2\text{SO}_4$ . The solvent was removed under reduced pressure after filtration. The residue was purified by silica gel column chromatography (hexanes/ethyl acetate = 5:1) to afford compound **8**.



**3-Amino-1-benzyl-6-chloro-3-((Z)-1-(methylthio)-2-(((Z)-1-(methylthio)-3-oxo-3-phenylprop-1-en-1-yl)oxy)-2-phenylvinyl)indolin-2-one (8)**

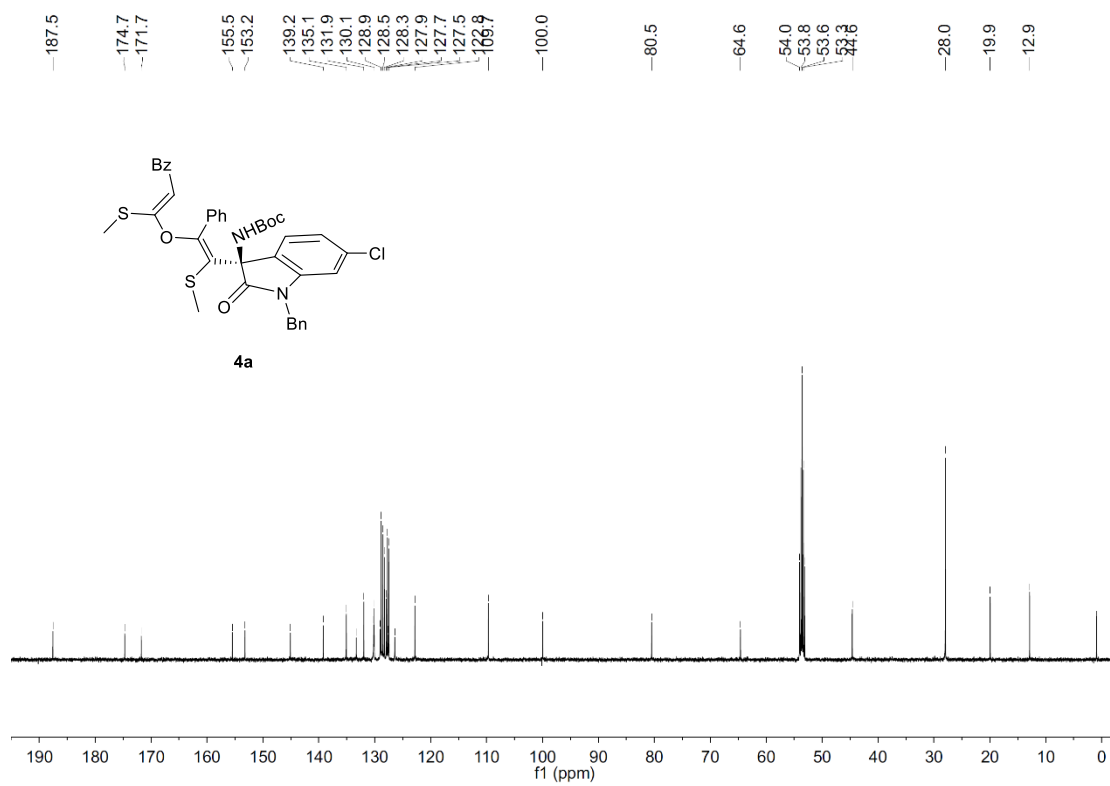
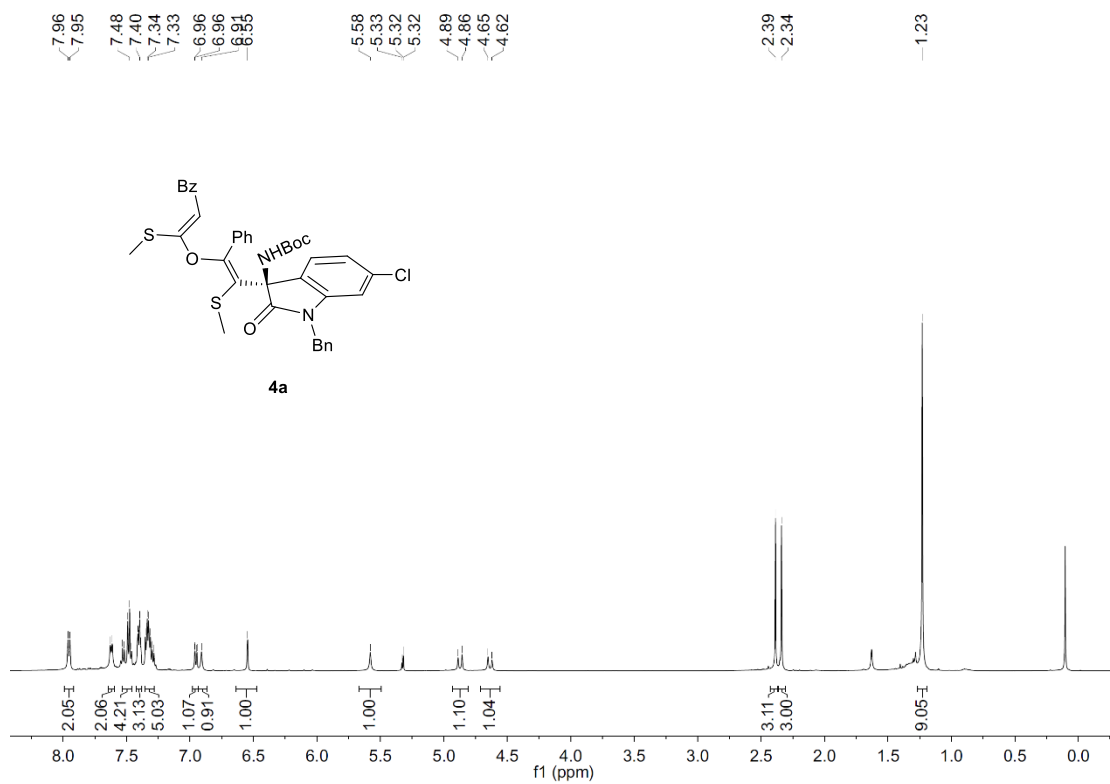
White solid, 50.8 mg, 83% yield, mp: 95 – 96 °C; <sup>1</sup>H NMR (500 MHz, CDCl<sub>3</sub>) (δ, ppm) 7.81 – 7.79 (comp, 2H), 7.49 – 7.47 (m, 1H), 7.44 – 7.41 (comp, 2H), 7.38 – 7.36 (m, 1H), 7.33 – 7.28 (comp, 3H), 7.26 – 7.23 (comp, 7H), 7.03 – 7.02 (m, 1H), 6.70 (s, 1H), 6.59 (s, 1H), 4.72 – 4.69 (m, 1H), 4.22 – 4.19 (m, 1H), 2.42 (s, 6H), 1.95 (s, 2H); <sup>13</sup>C NMR (125 MHz, CDCl<sub>3</sub>) (δ, ppm) 187.8, 177.1, 171.8, 153.3, 143.8, 139.1, 135.3, 134.8, 133.7, 132.0, 131.9, 131.3, 130.2, 130.0, 129.7, 128.9, 128.5, 128.2, 127.9, 127.6, 127.2, 124.3, 123.0, 110.2, 100.3, 63.7, 43.8, 19.8, 13.0; HRMS (TOF MS ESI<sup>+</sup>) m/z: [M+Na]<sup>+</sup> calculated for C<sub>34</sub>H<sub>29</sub>ClN<sub>2</sub>O<sub>3</sub>S<sub>2</sub>Na 635.1168; found 635.1173;

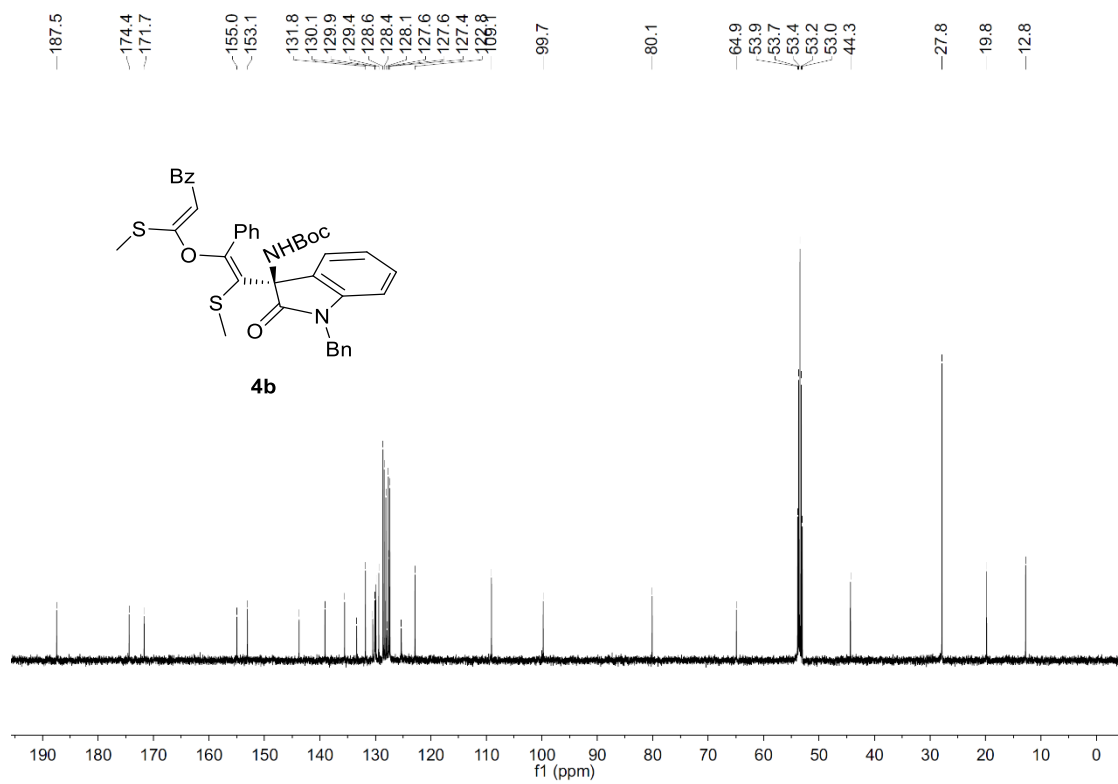
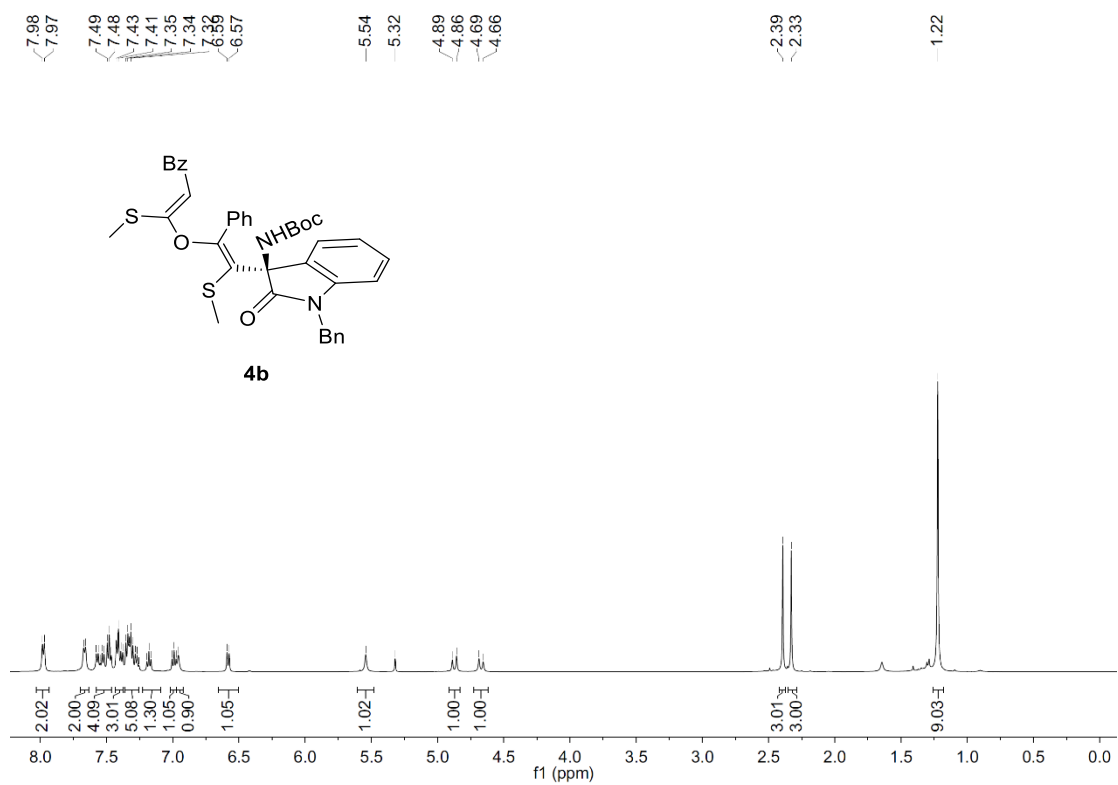
**Synthesis of 9:** To a 10-mL oven-dried vial with a magnetic stirring bar, **4a** (71.3 mg, 0.1 mmol) in 6 mL solvent (DCM : MeOH = 1 : 5 mL), was added NaBH<sub>4</sub> (3.8 mg, 0.1 mmol) at room temperature. The resulting solution was stirred at room temperature for 30 min. The reaction mixture was added with H<sub>2</sub>O (1.0 mL), extracted with CH<sub>2</sub>Cl<sub>2</sub> (5.0 mL). The organic layer was washed with brine, dried over anhydrous Na<sub>2</sub>SO<sub>4</sub>. The solvent was removed under reduced pressure after filtration. The residue was purified by silica gel column chromatography (hexanes/ethyl acetate = 5:1) to afford compound **9**.



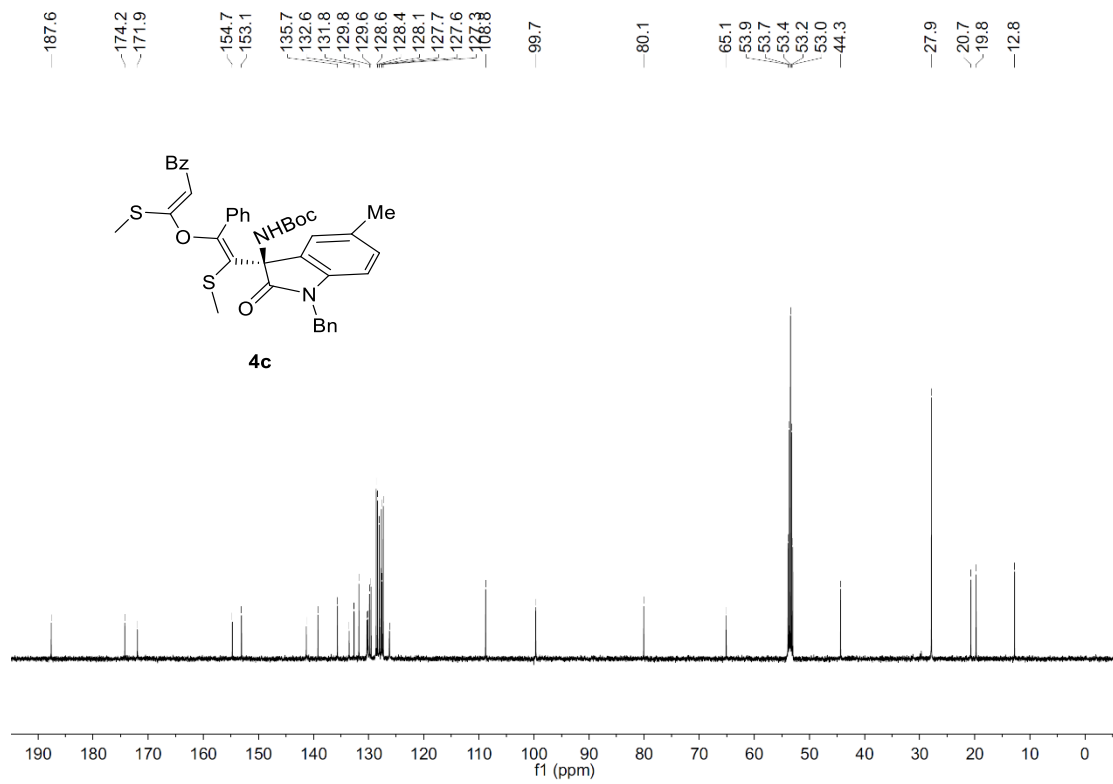
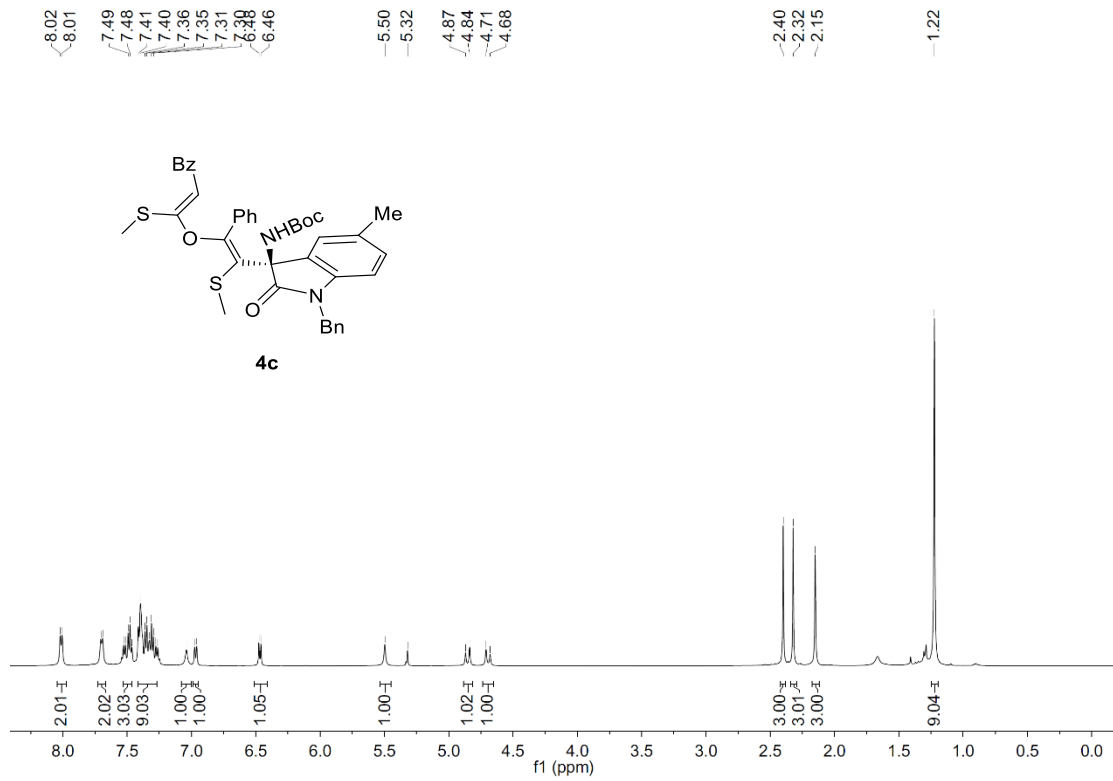
**tert-Butyl (1-benzyl-5-bromo-3-((2Z,7Z)-2-(2-hydroxy-2-phenylethylidene)-8-phenyl-4,5-dihydro-1,3,6-oxadithiocin-7-yl)-2-oxoindolin-3-yl)carbamate(9)**

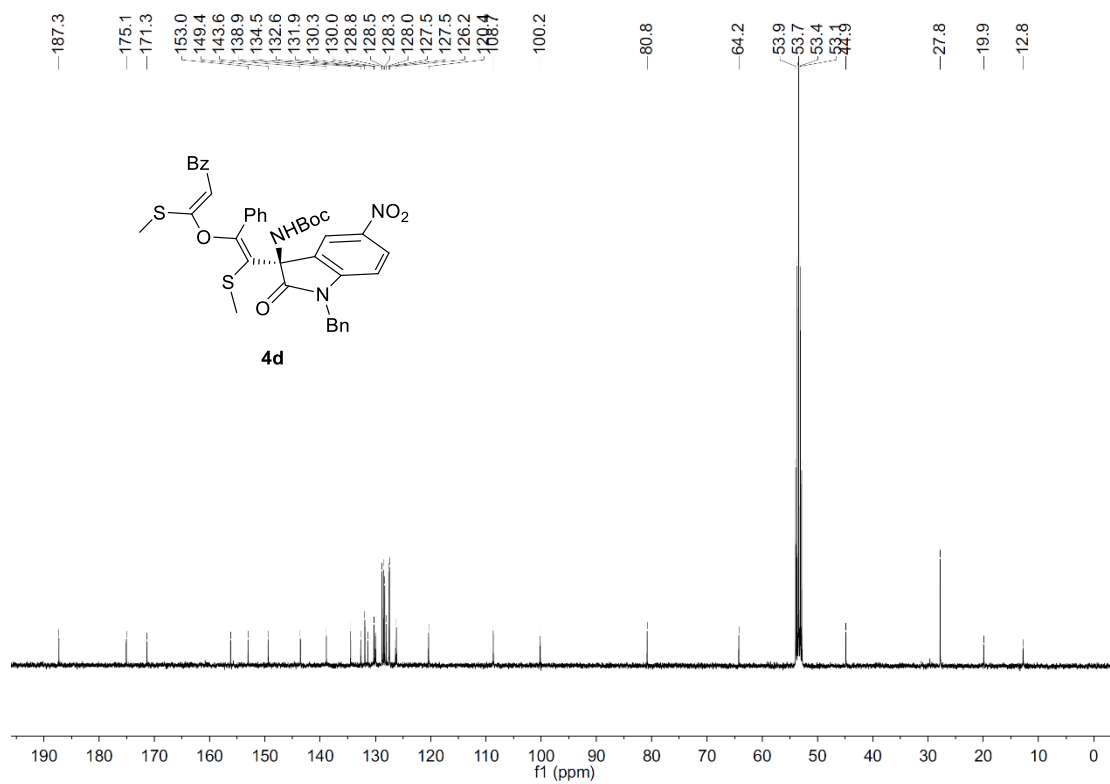
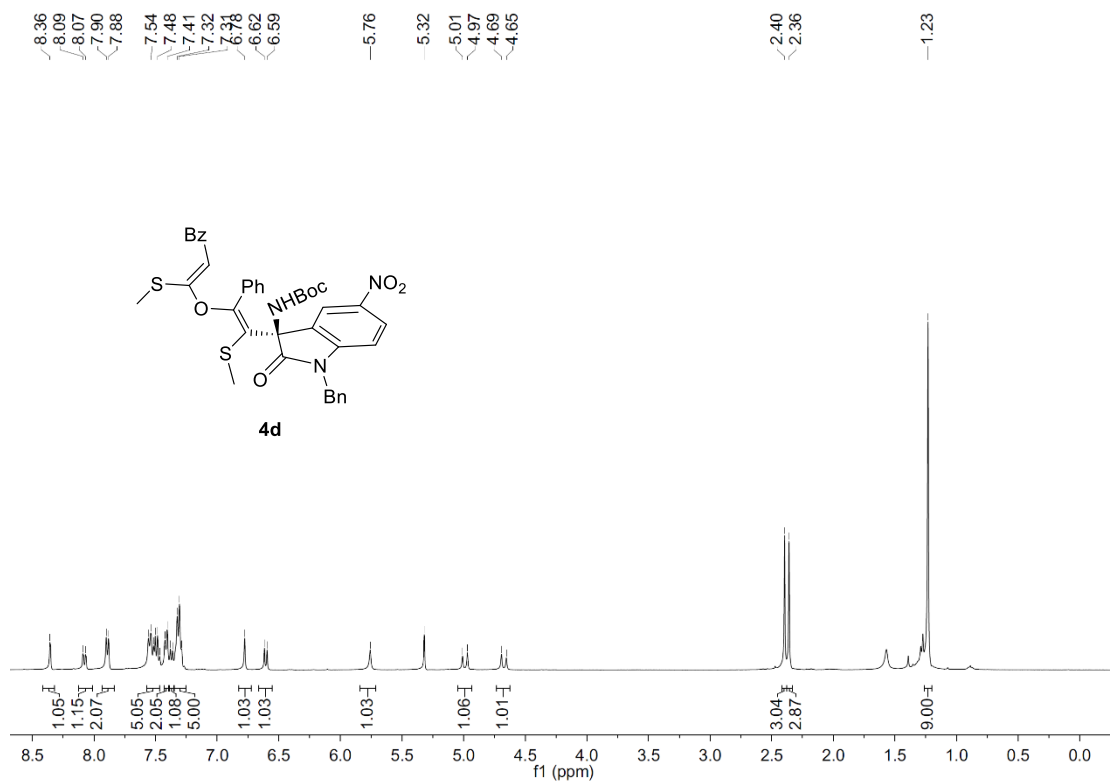
Yellow solid, 49.1 mg, 65% yield, mp: 83 – 84 °C; <sup>1</sup>H NMR (400 MHz, CD<sub>2</sub>Cl<sub>2</sub>) (δ, ppm) 13.07 (s, 1H), 8.02 – 8.00 (comp, 2H), 7.78 – 7.76 (comp, 2H), 7.57 – 7.56 (m, 1H), 7.44 – 7.35 (comp, 6H), 7.26 – 7.20 (comp, 6H), 7.10 – 7.07 (m, 1H), 6.79 – 6.78 (m, 1H), 6.52 – 6.50 (m, 1H), 5.82 (s, 1H), 4.89 (s, 2H), 3.04 – 3.02 (m, 2H), 2.96 – 2.95 (m, 2H), 1.42 (s, 9H). <sup>13</sup>C NMR (100 MHz, CD<sub>2</sub>Cl<sub>2</sub>) (δ, ppm) 191.0, 187.5, 165.8, 161.5, 152.0, 150.7, 140.2, 139.0, 135.84, 135.77, 133.9, 132.0, 130.8, 129.7, 128.8, 128.5, 127.7, 127.5, 127.3, 124.2, 122.0, 118.3, 114.4, 110.4, 100.0, 93.7, 82.4, 43.5, 30.9, 29.5, 27.8. HRMS (TOF MS ESI<sup>+</sup>) m/z: [M+H]<sup>+</sup> calculated for C<sub>39</sub>H<sub>38</sub>BrN<sub>2</sub>O<sub>5</sub>S<sub>2</sub> 757.1406; found 757.1399.

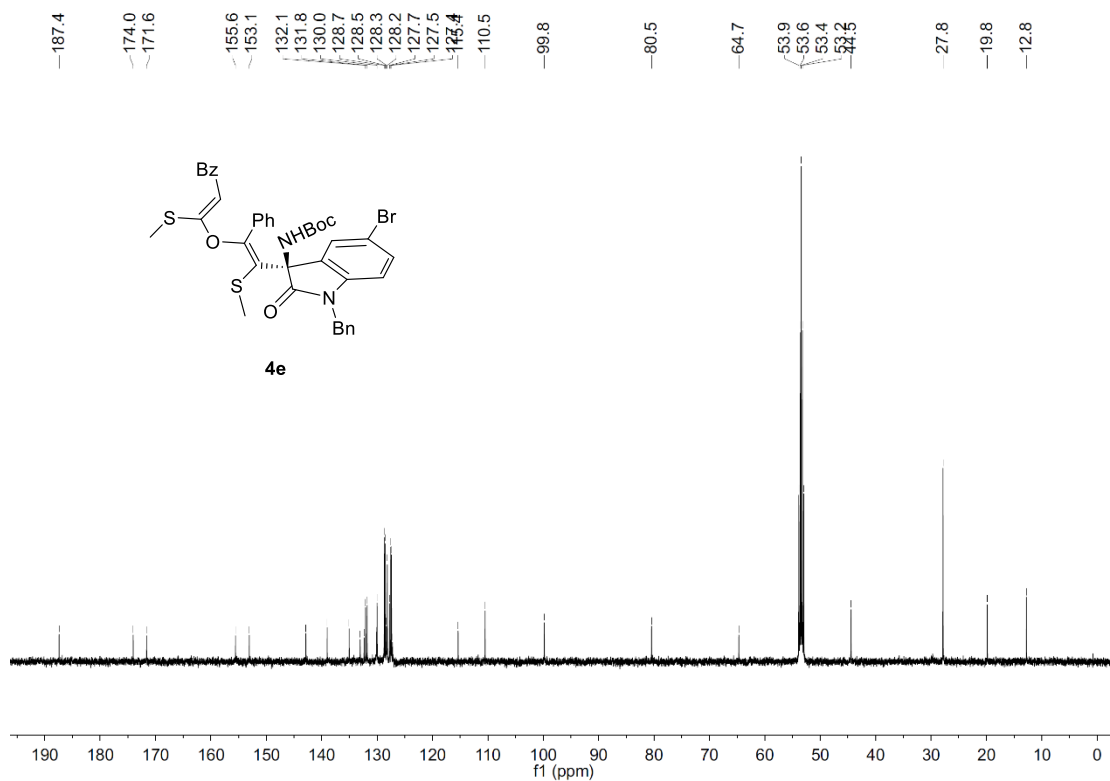
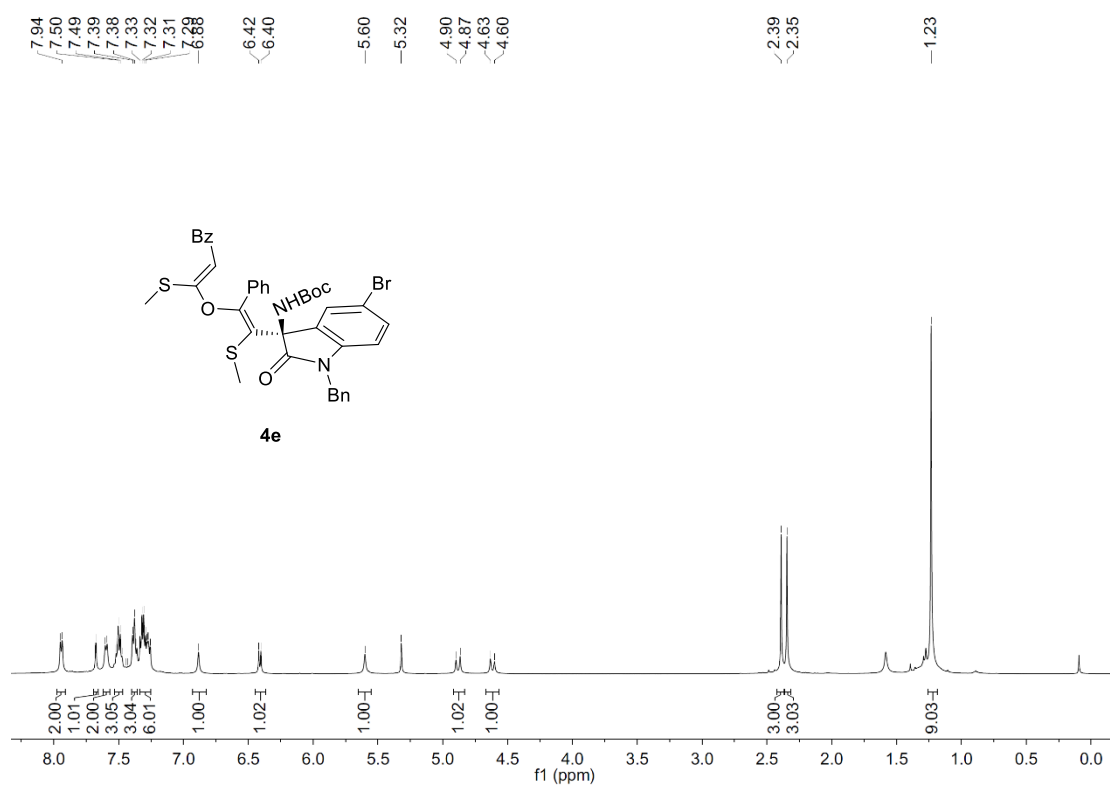


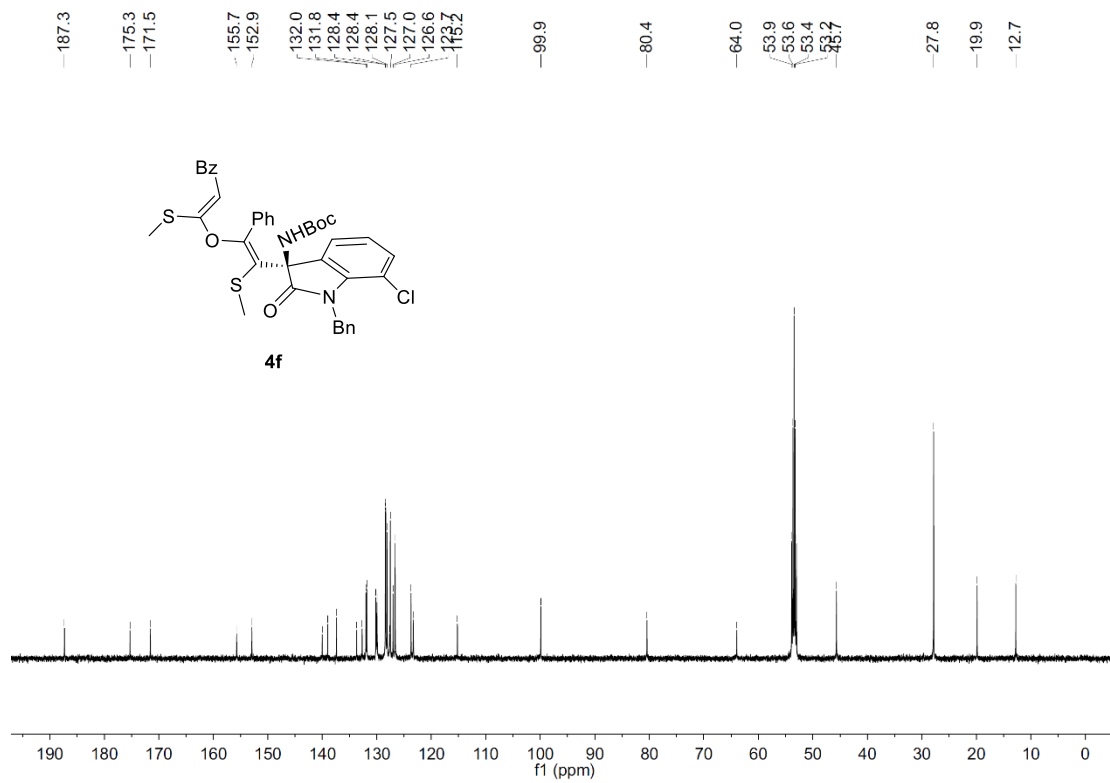
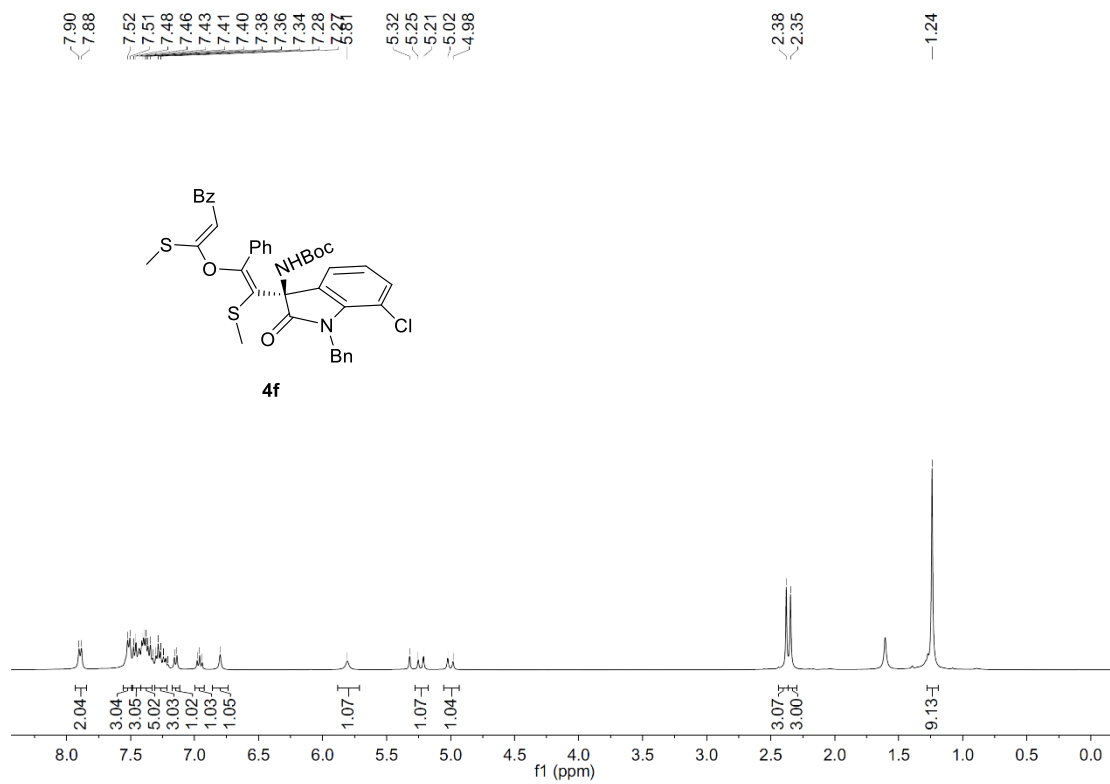


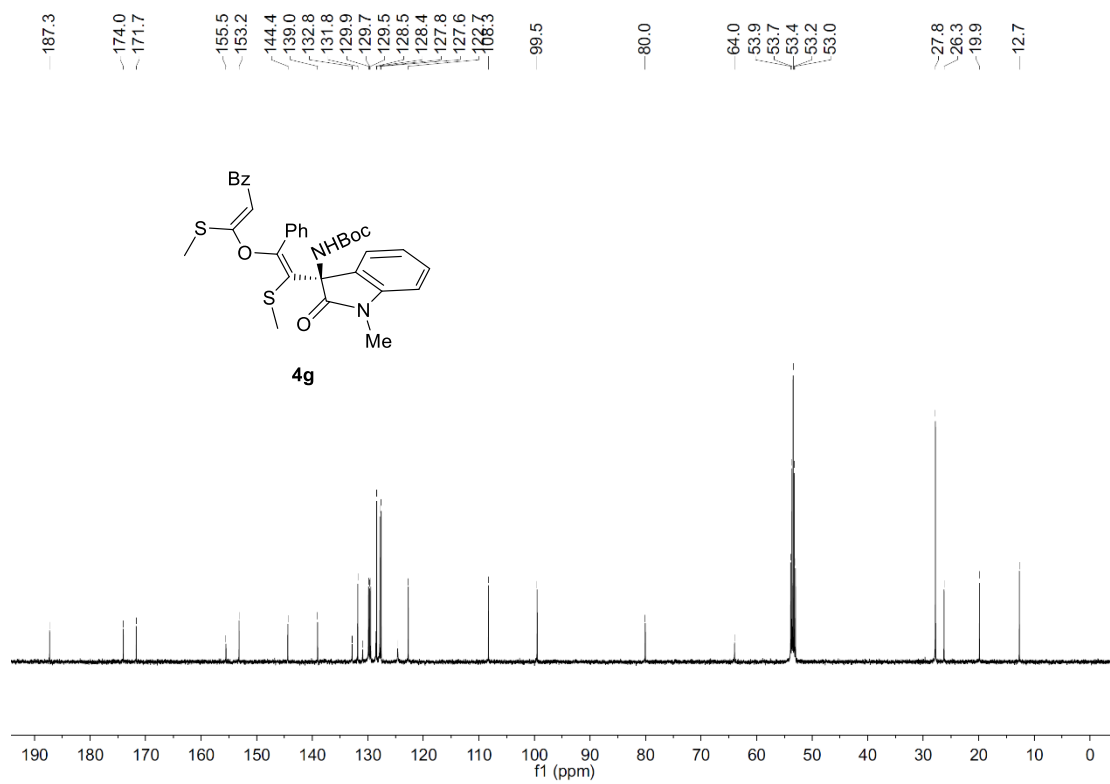
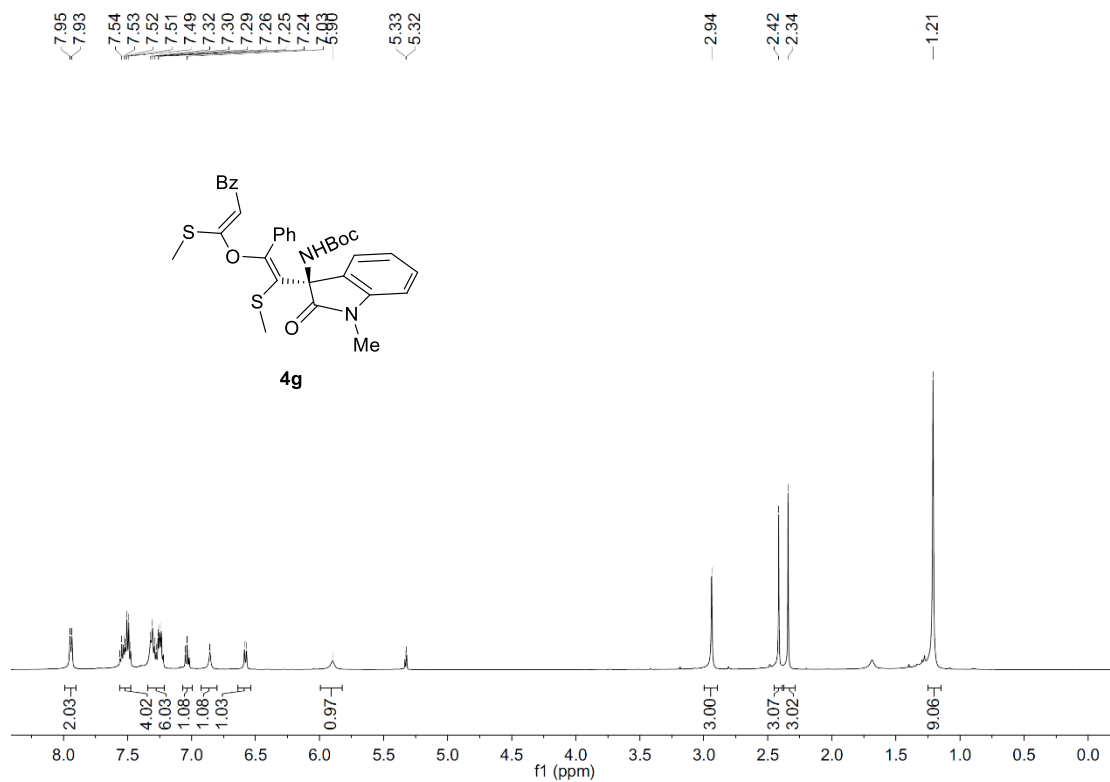


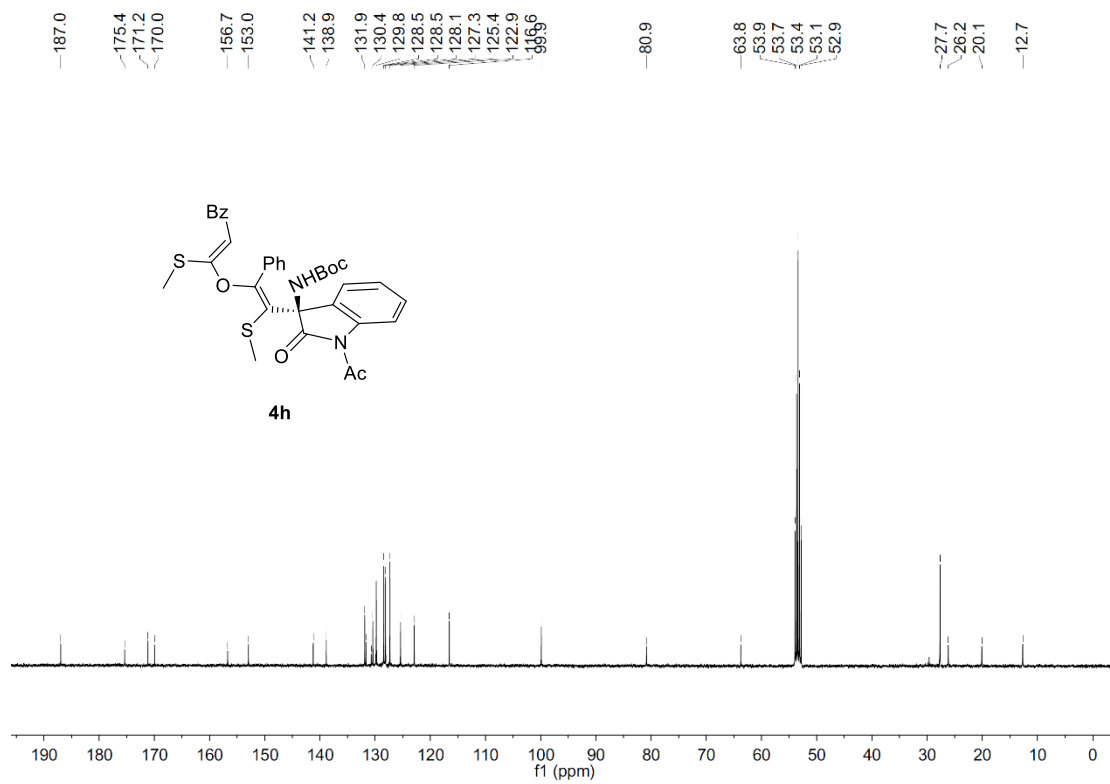
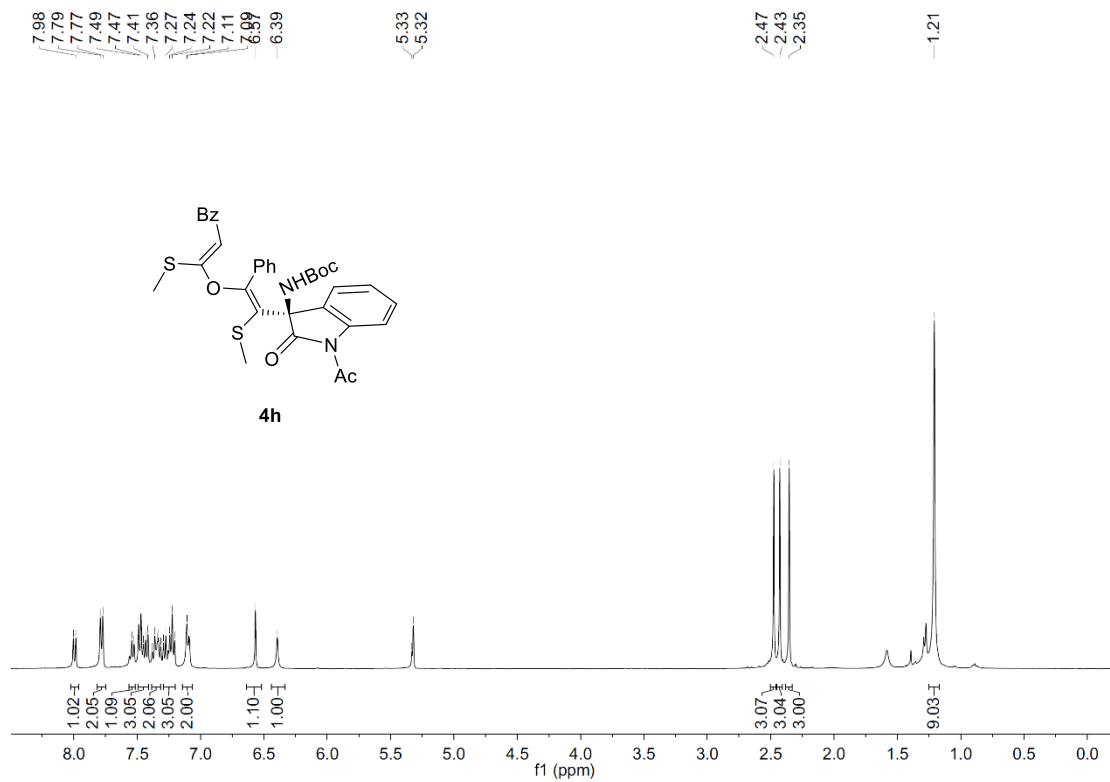


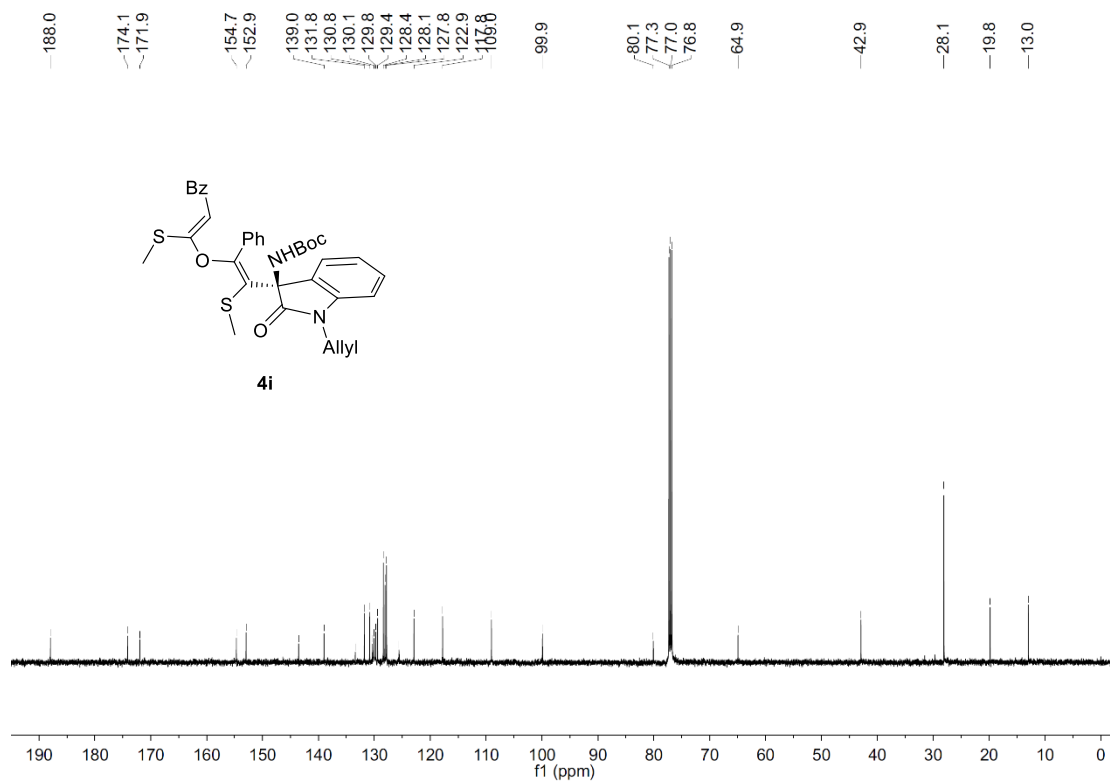
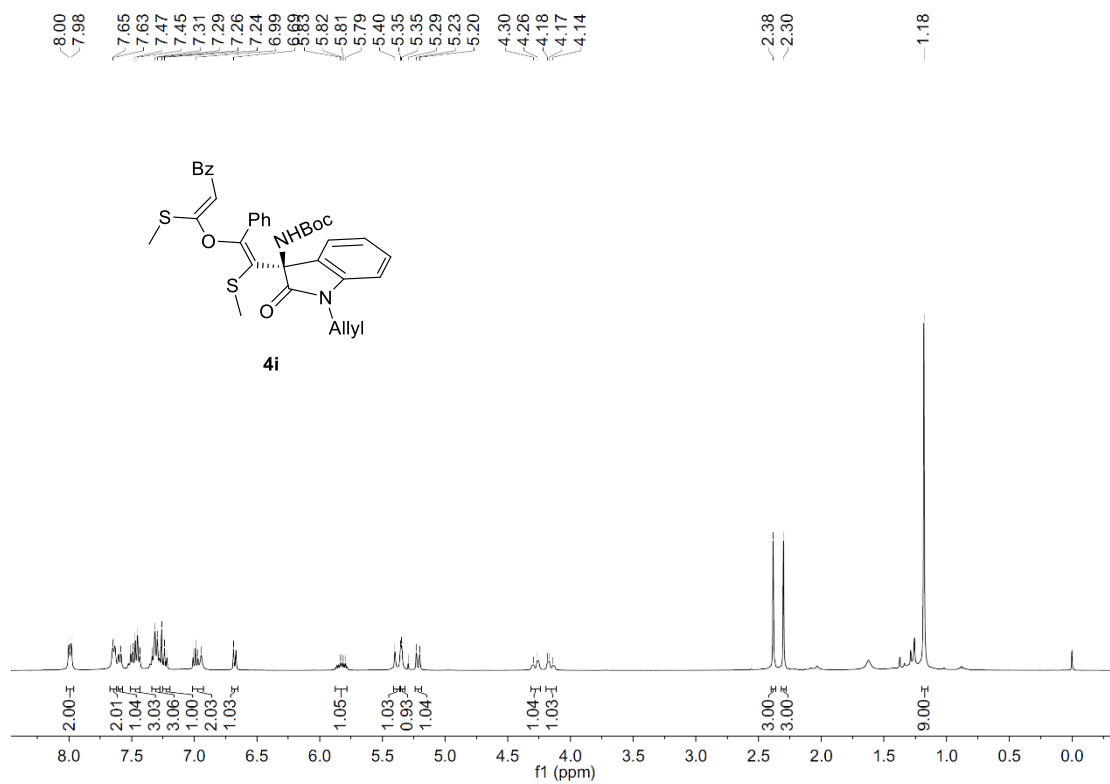


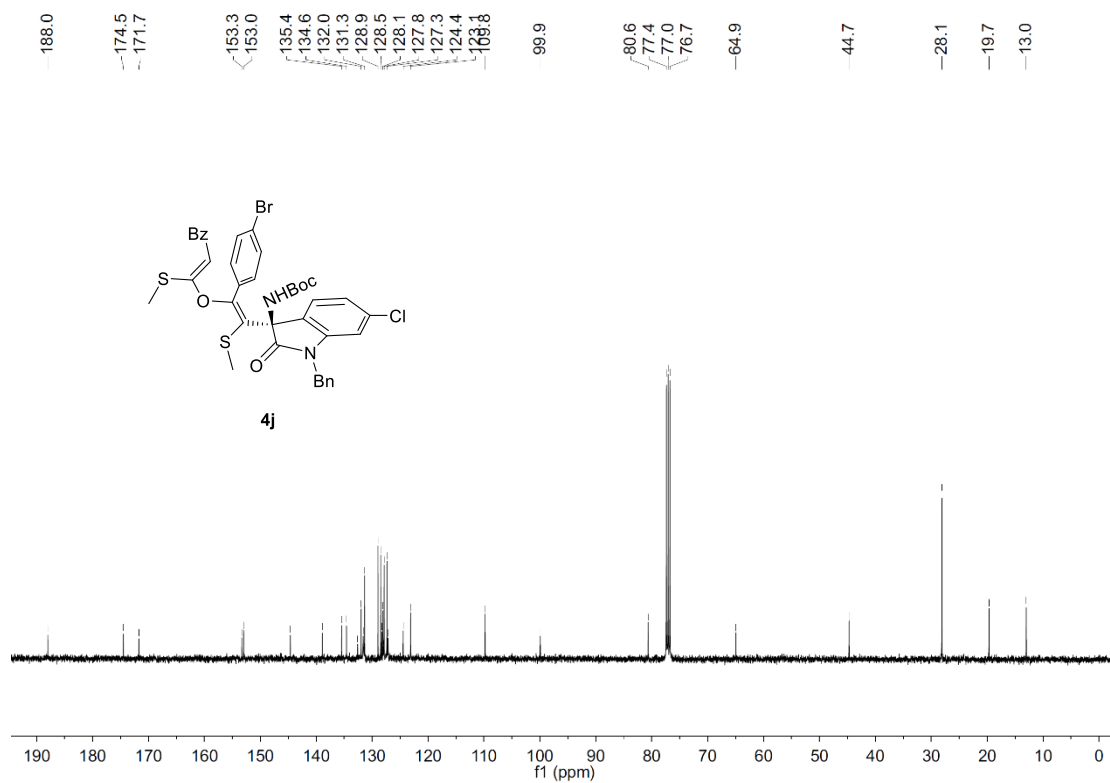
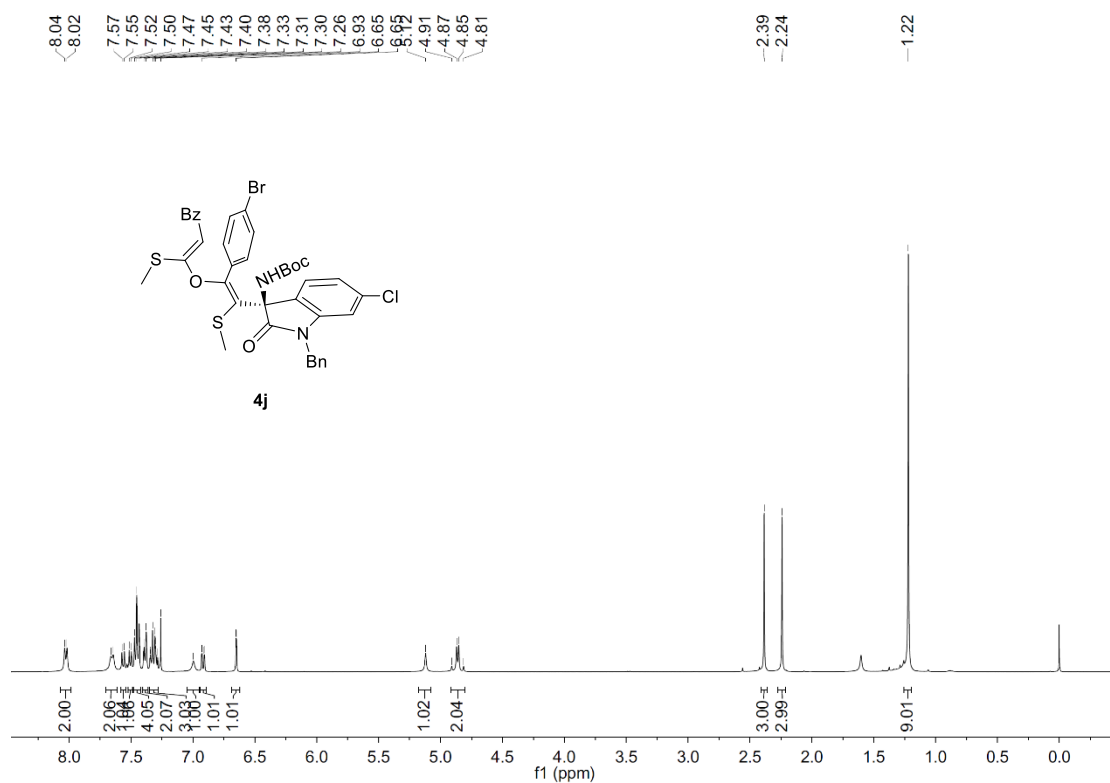




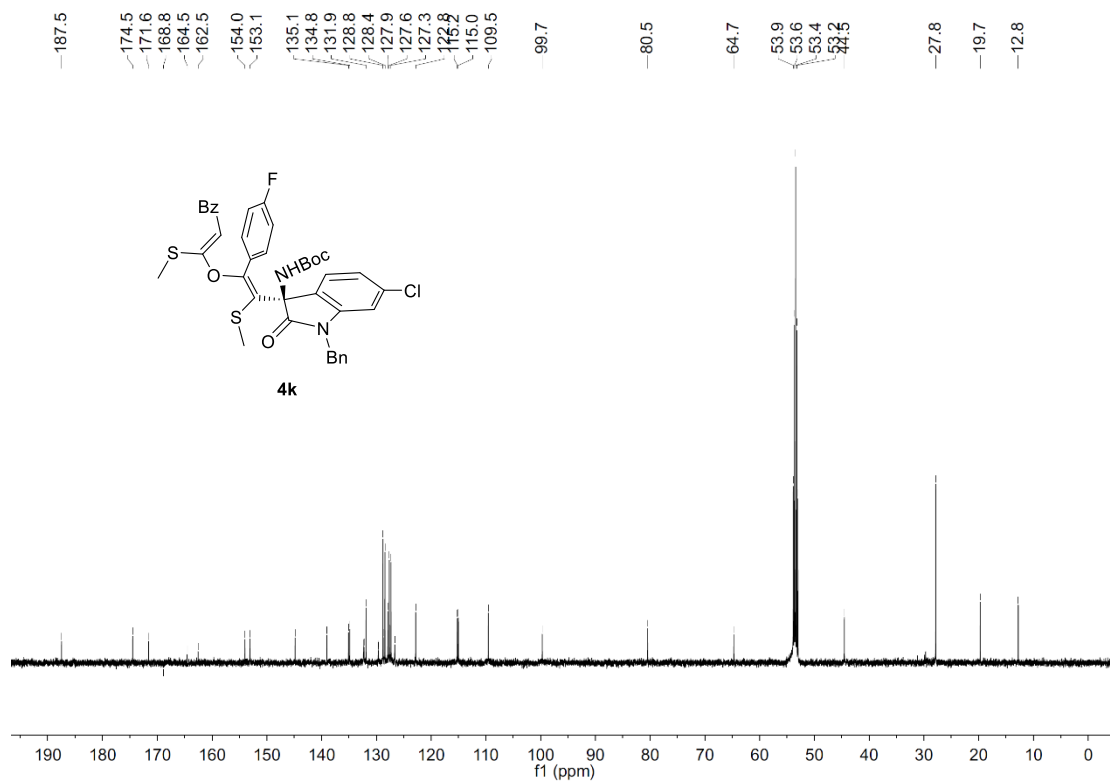
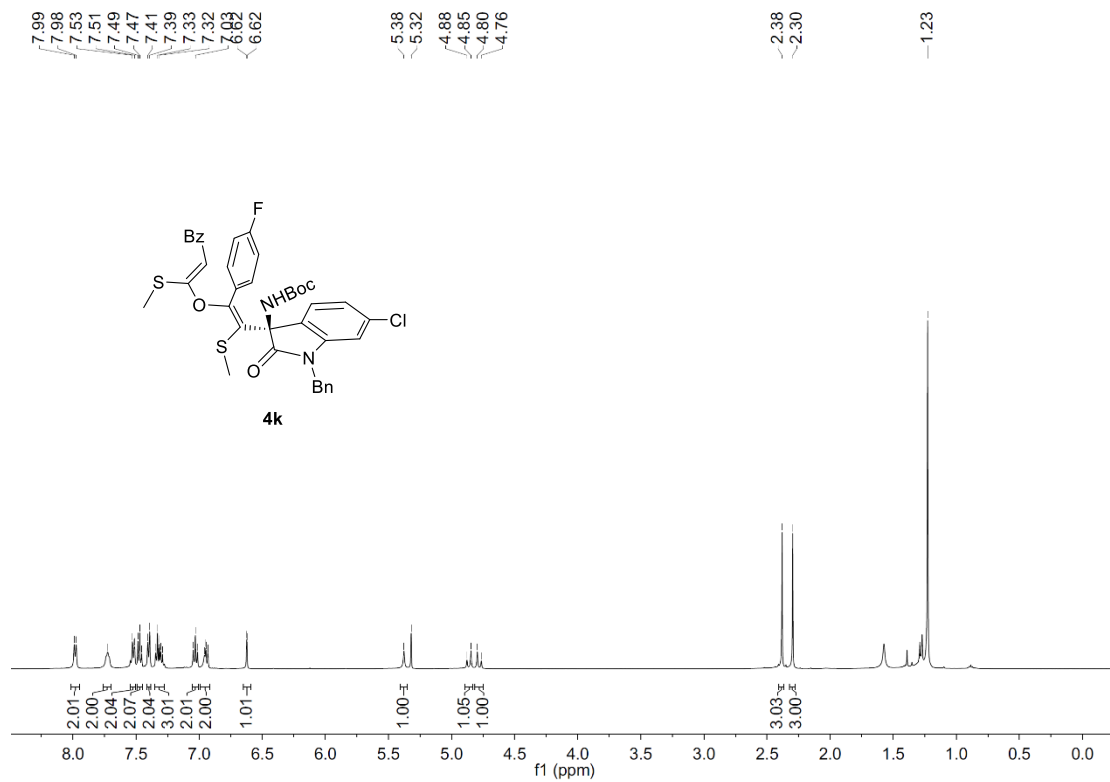


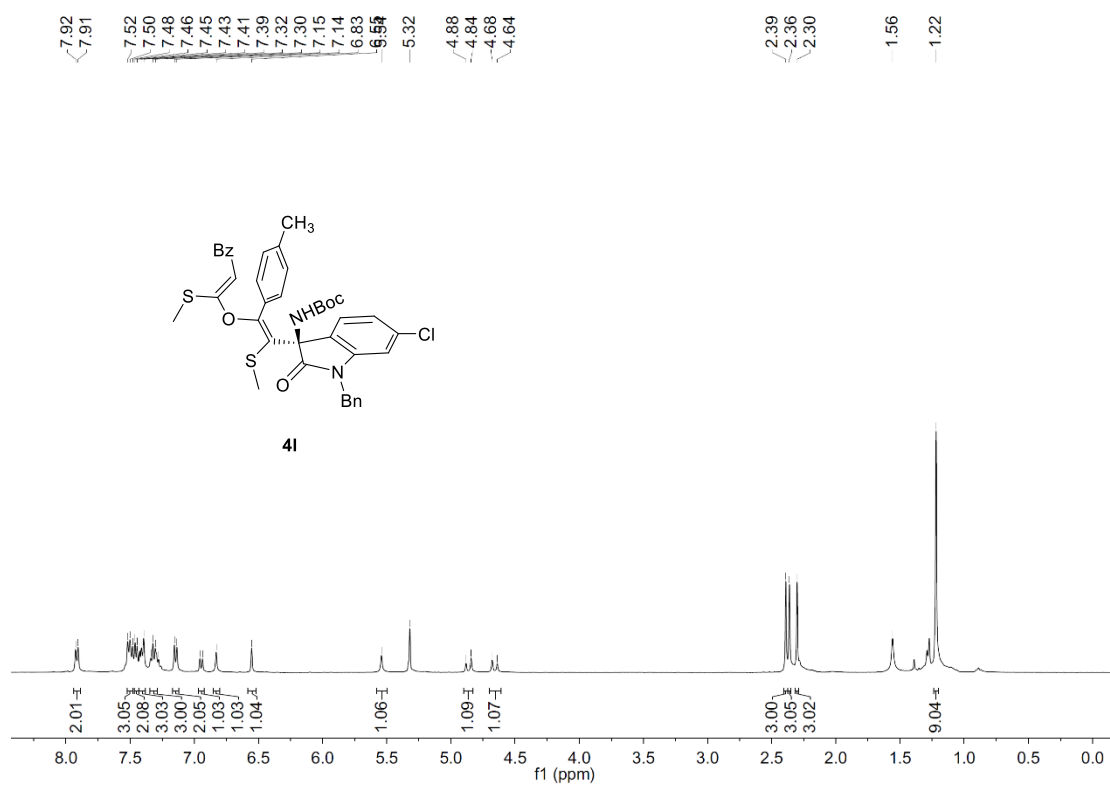
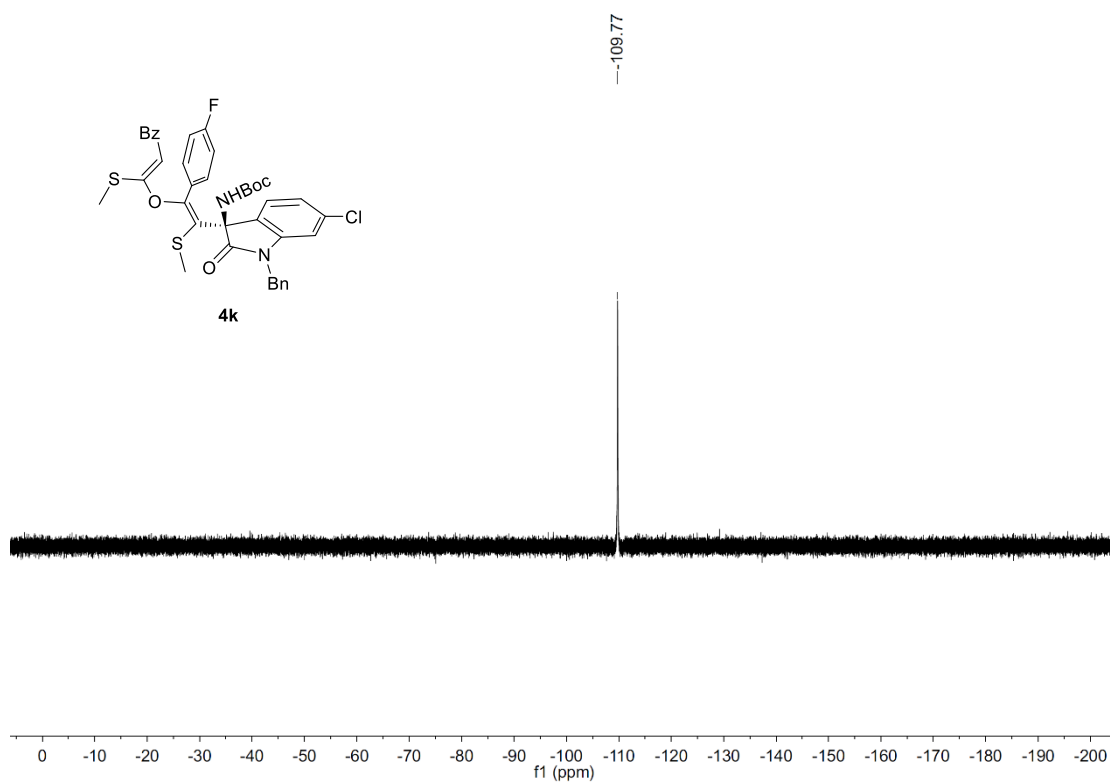


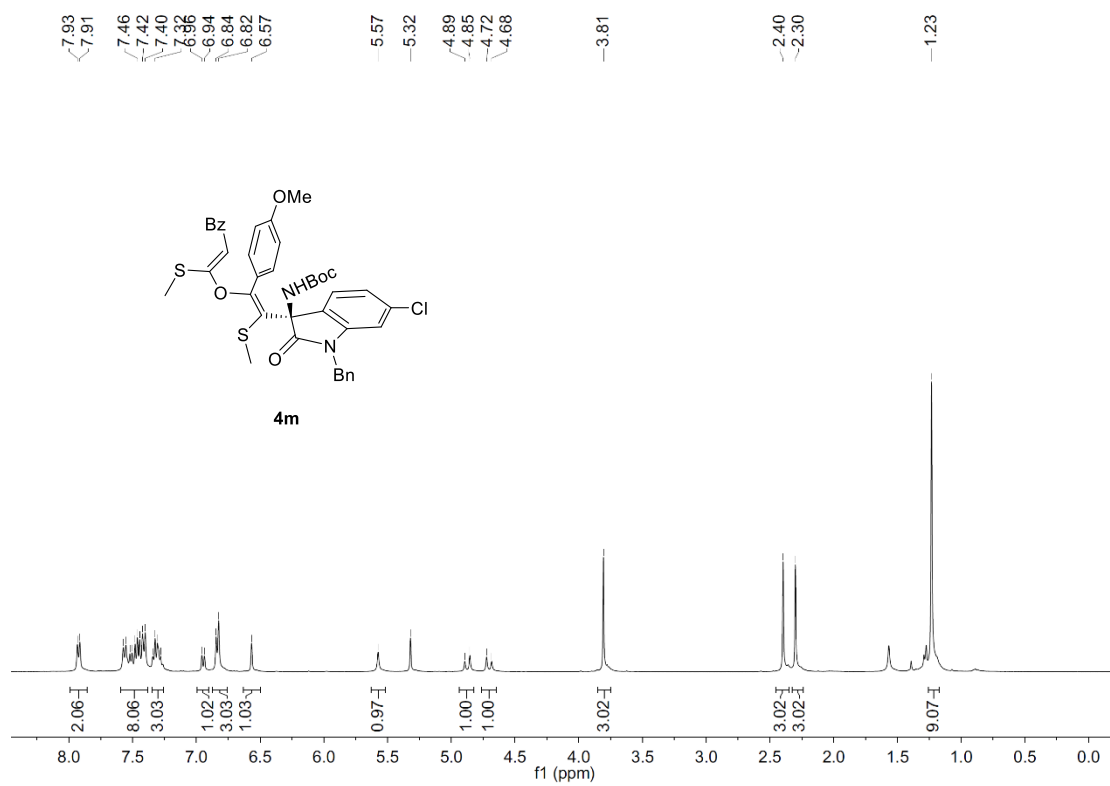
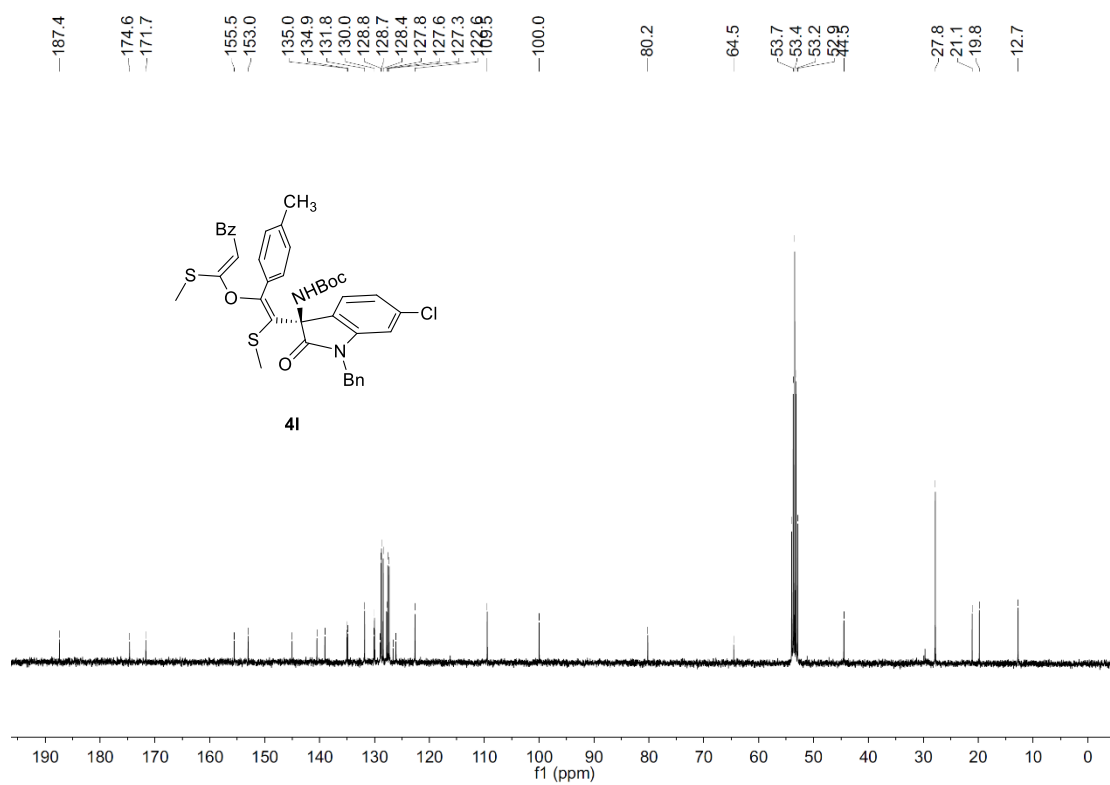


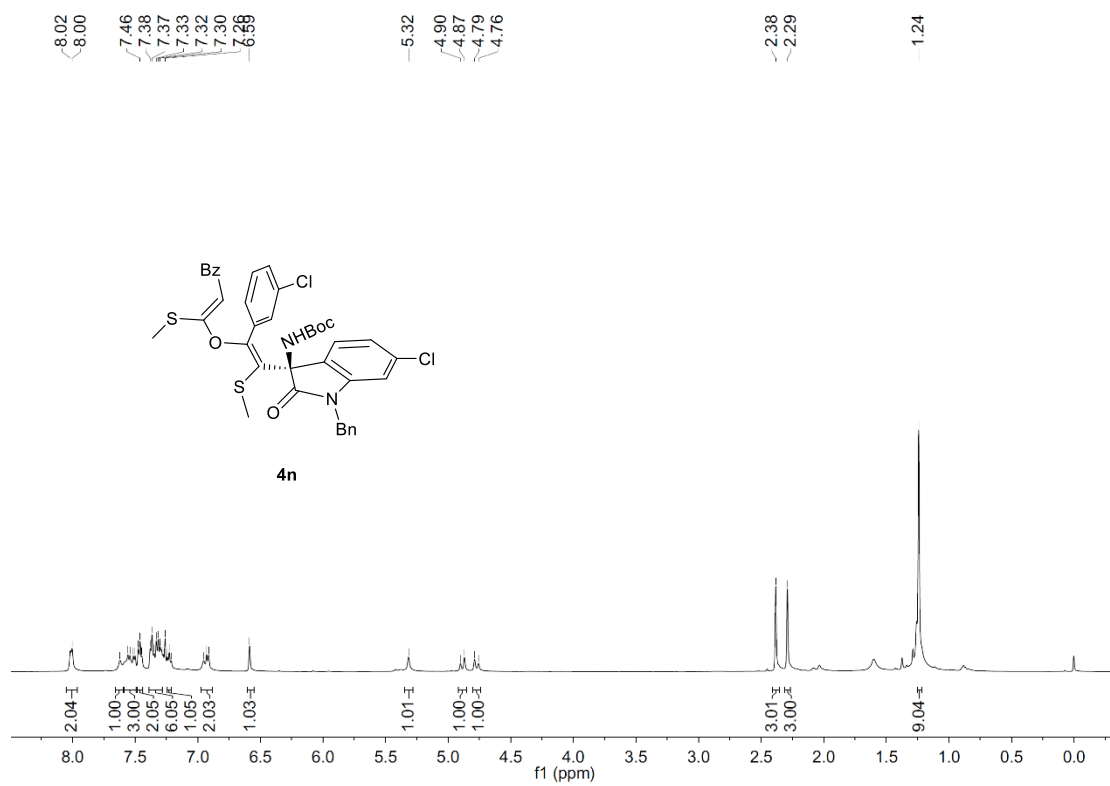
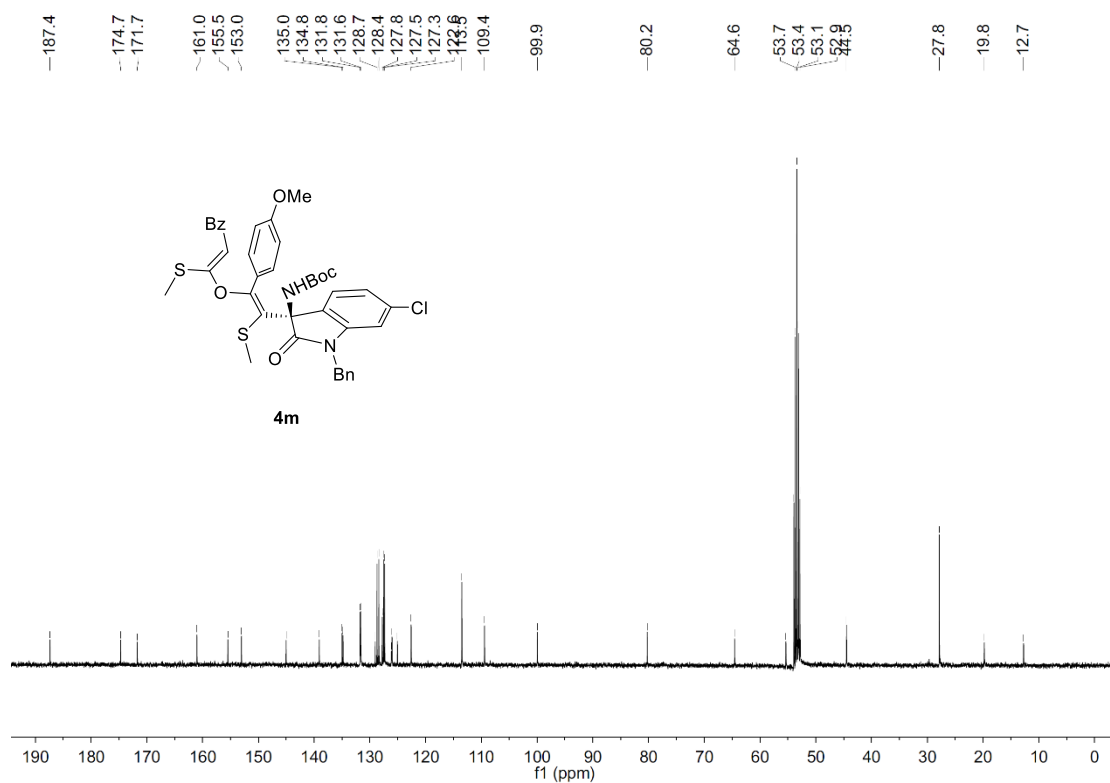


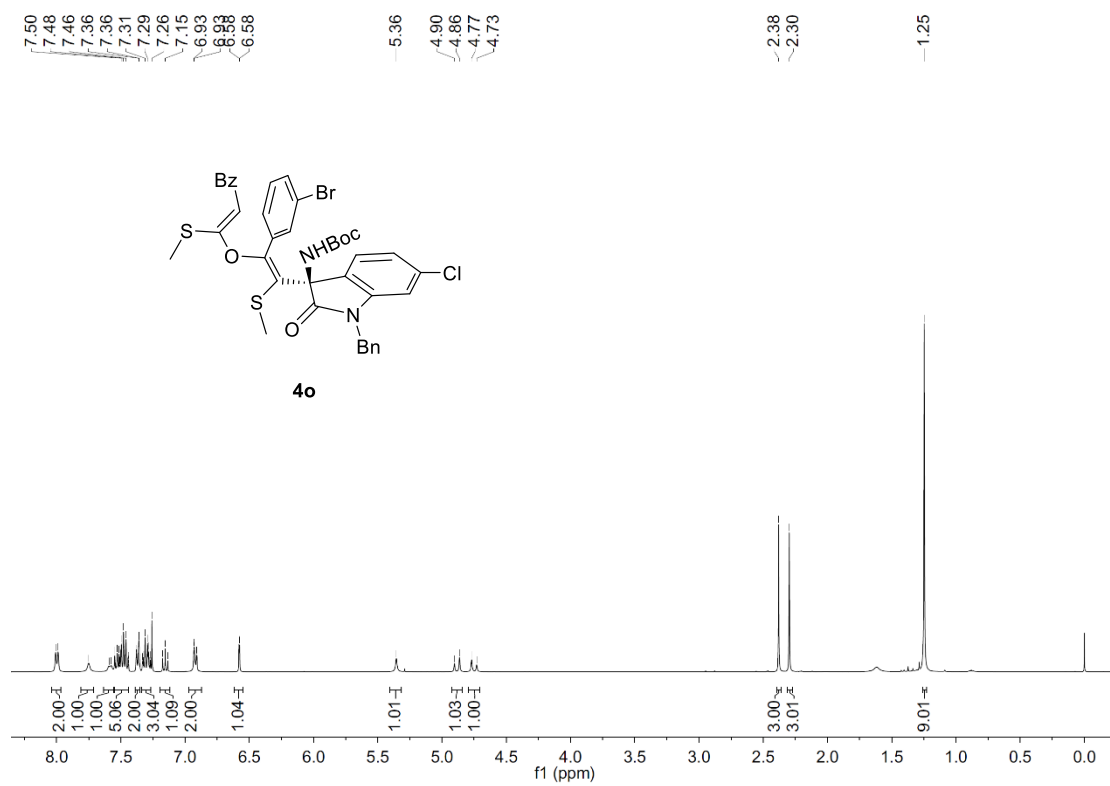
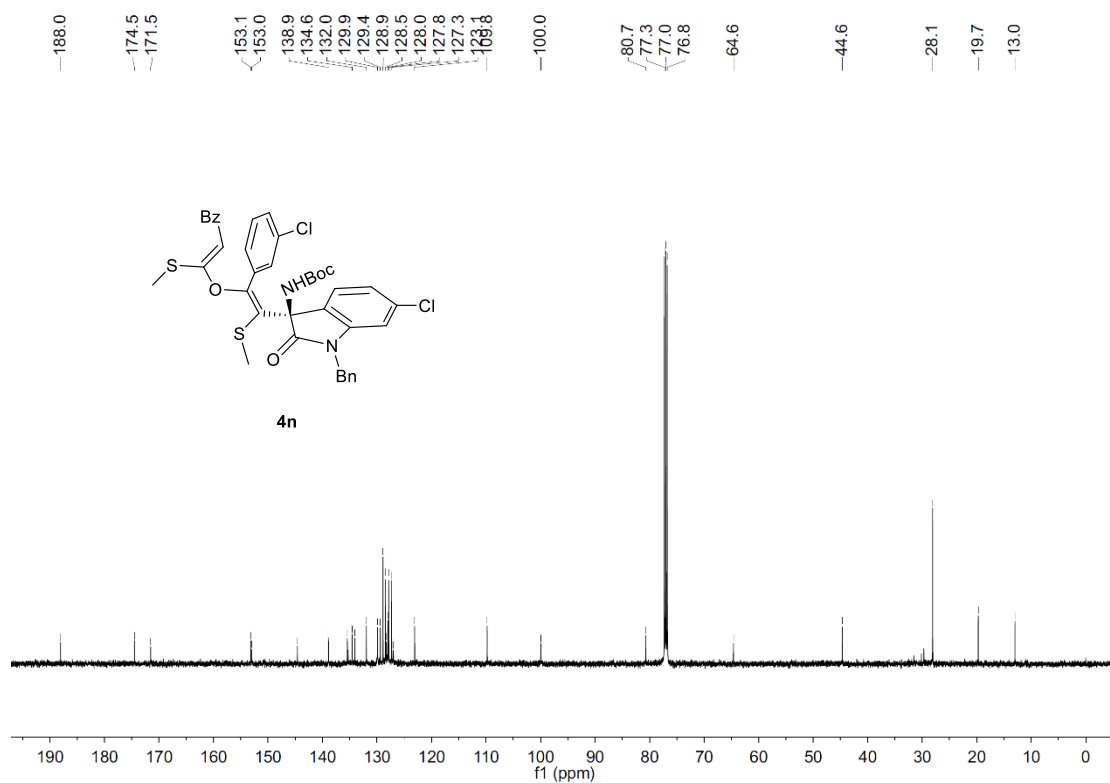


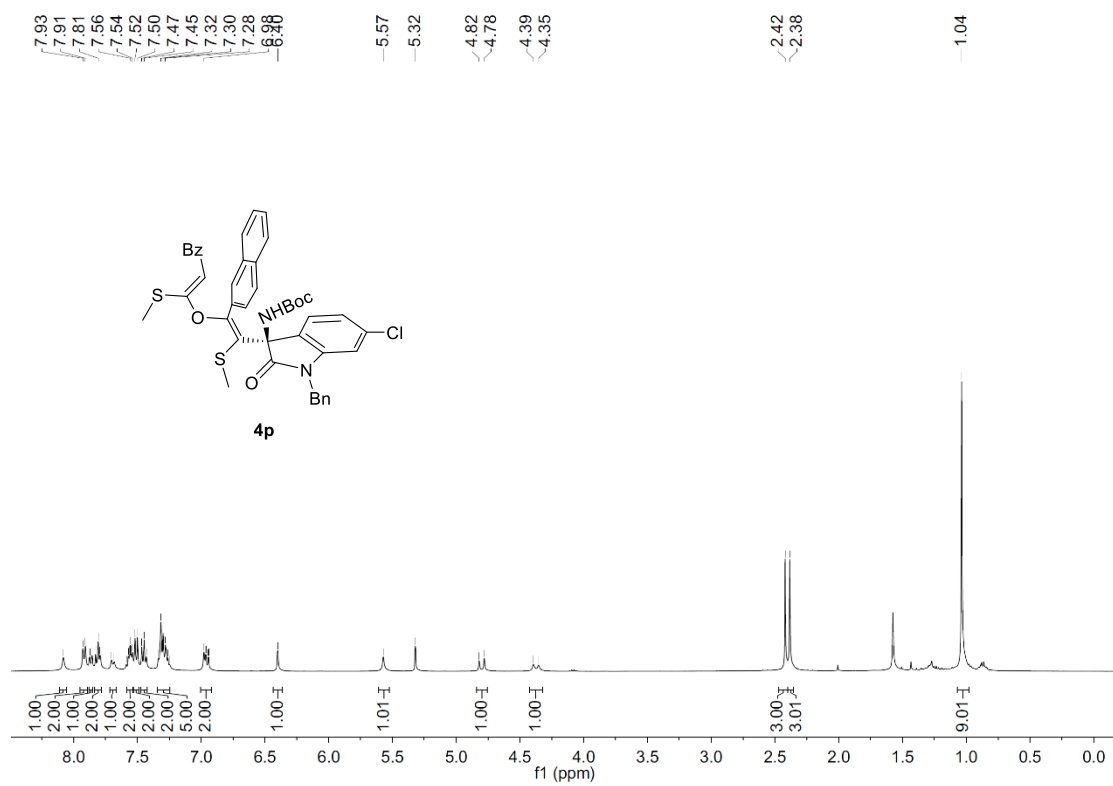
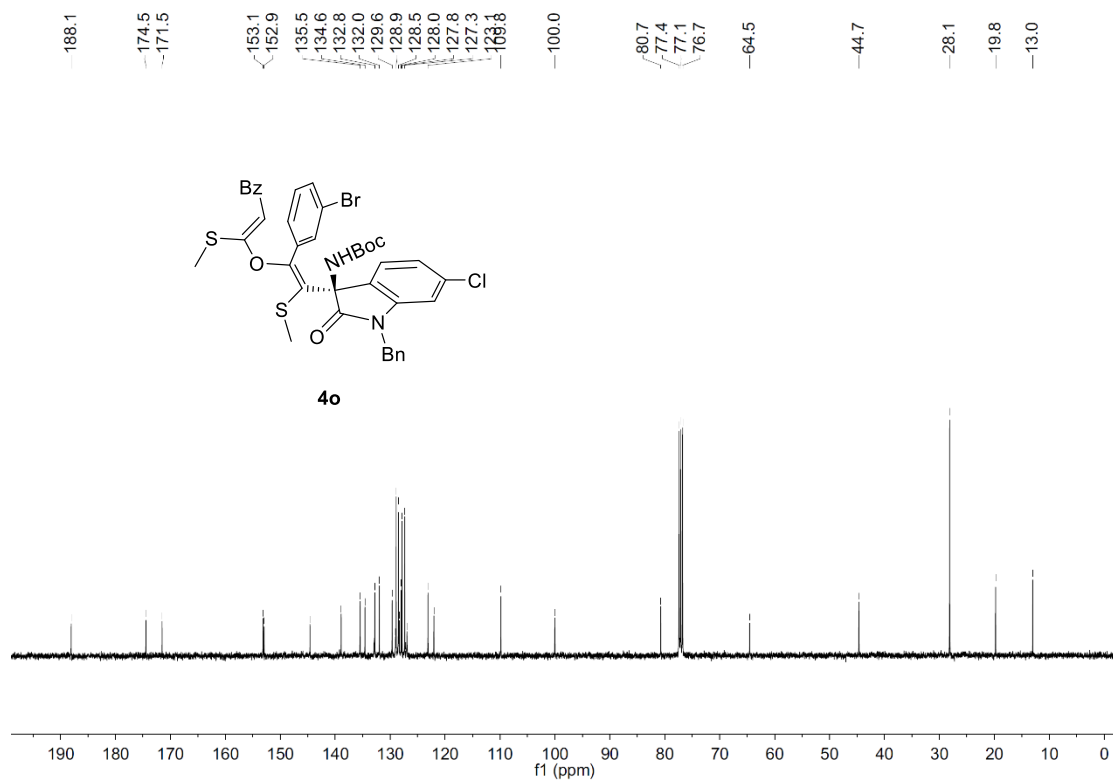


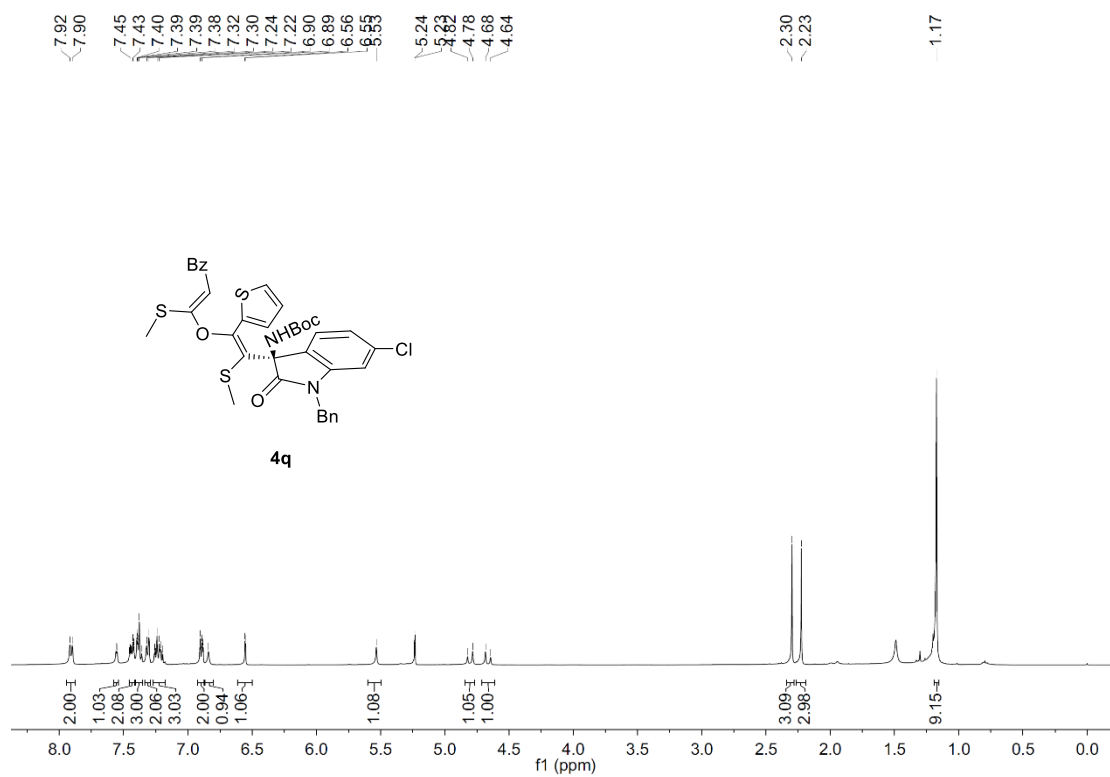
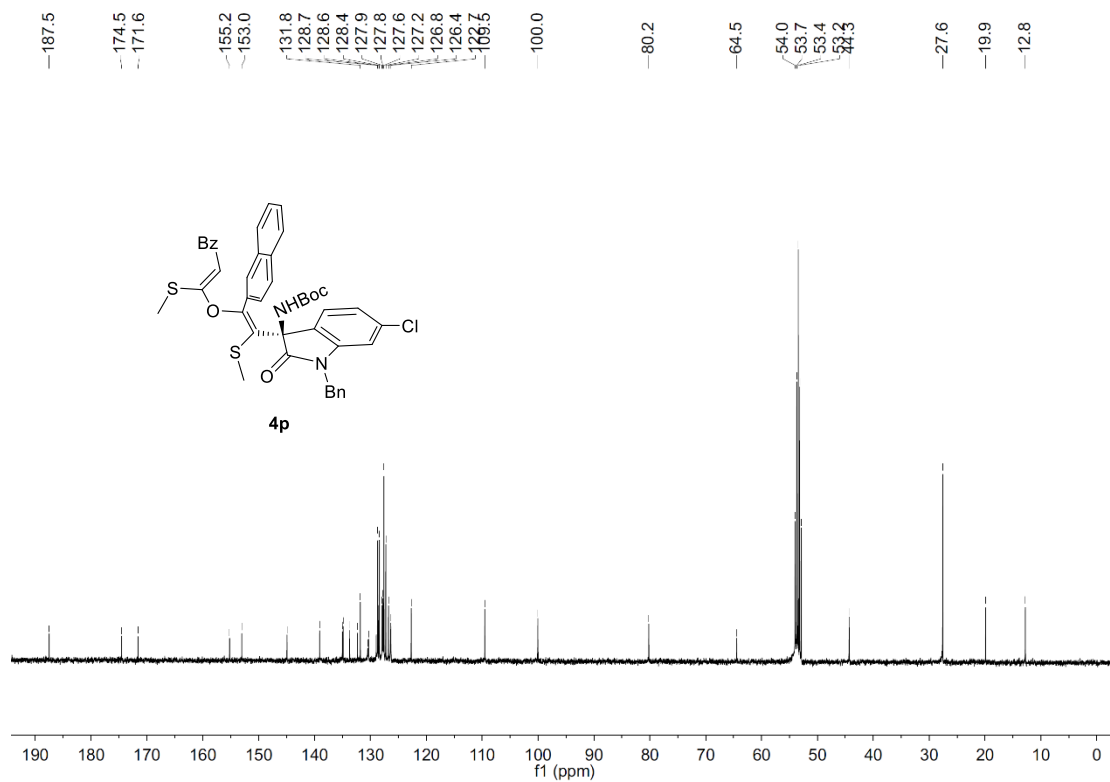


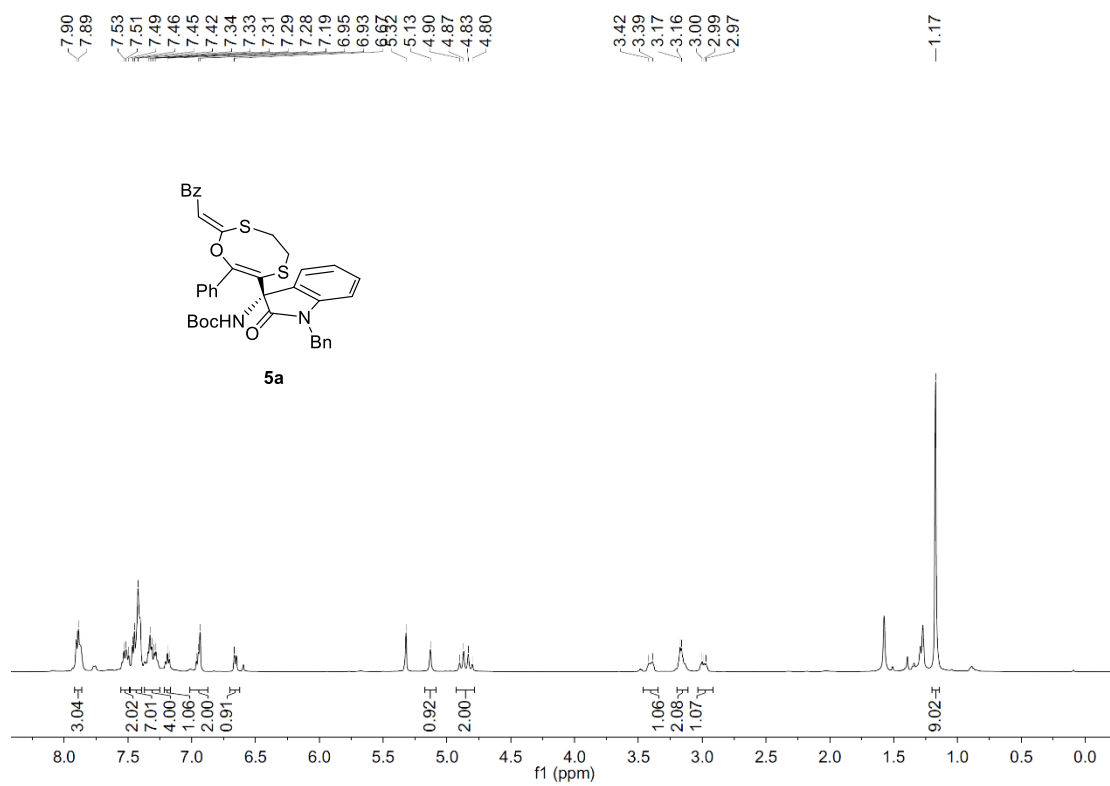
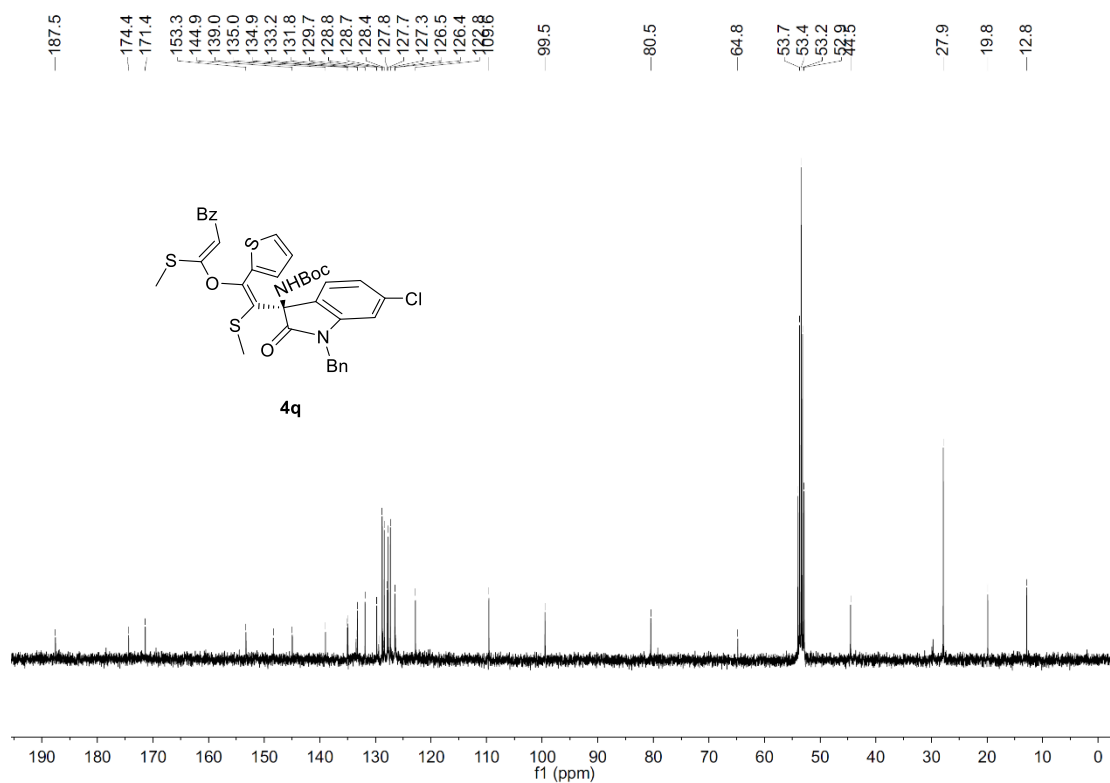




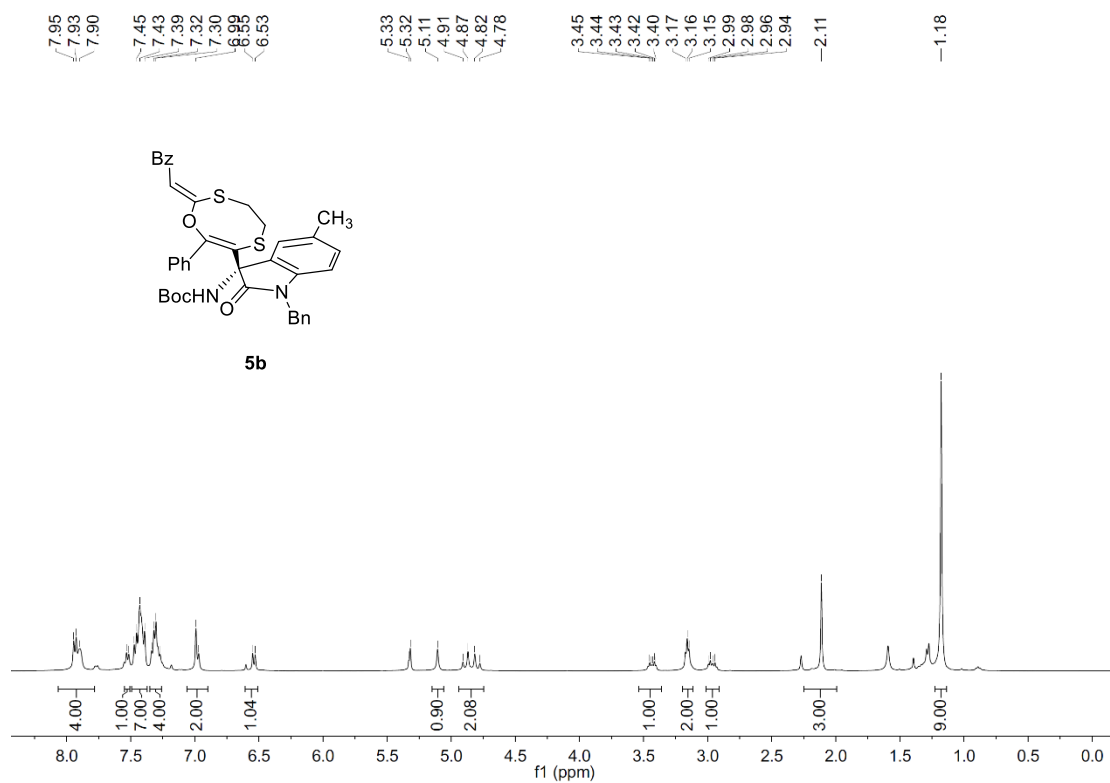
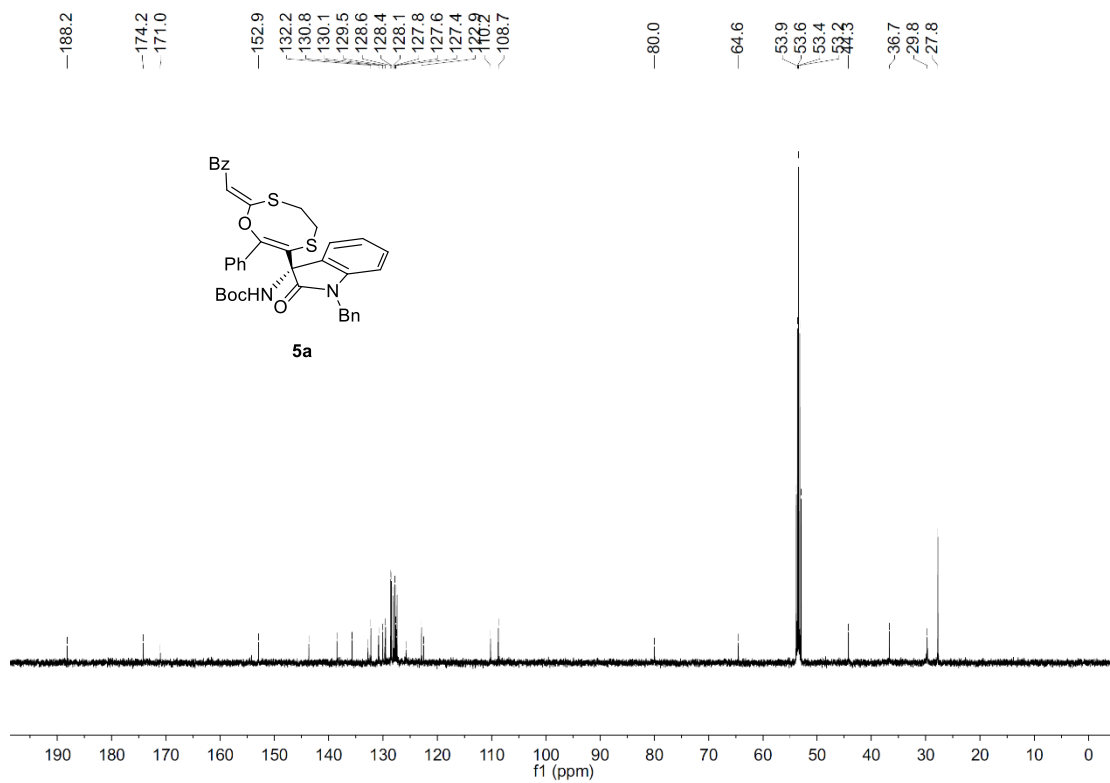


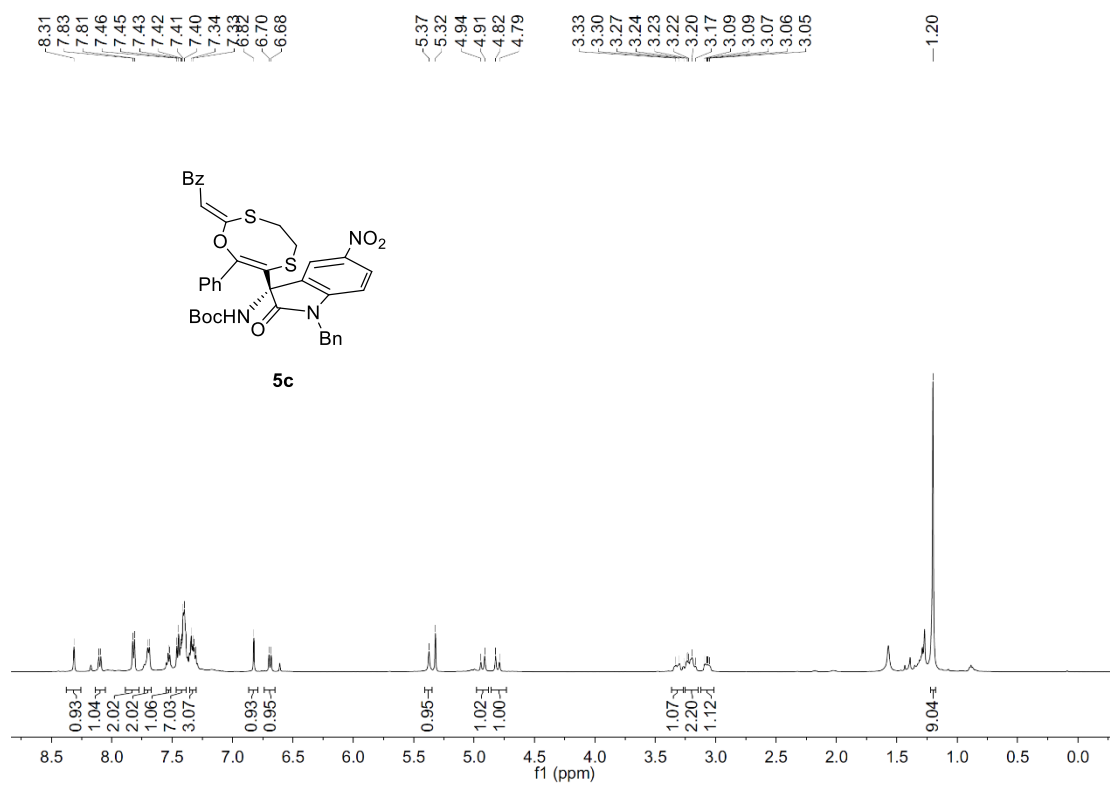
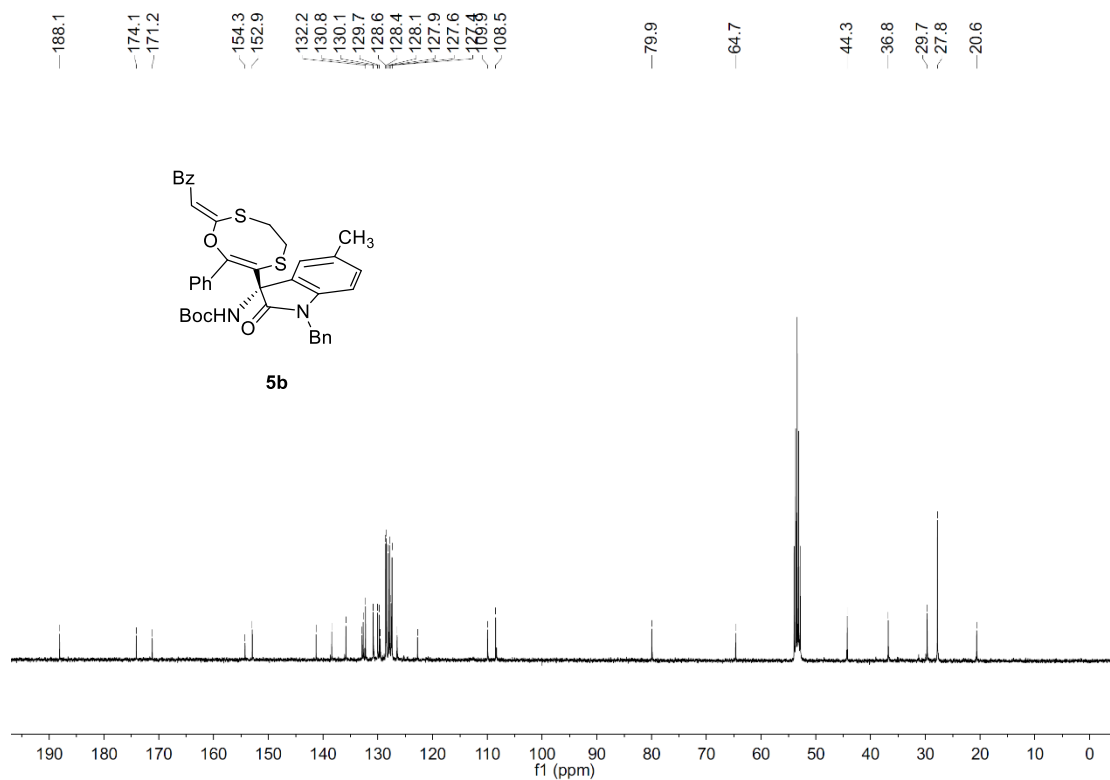


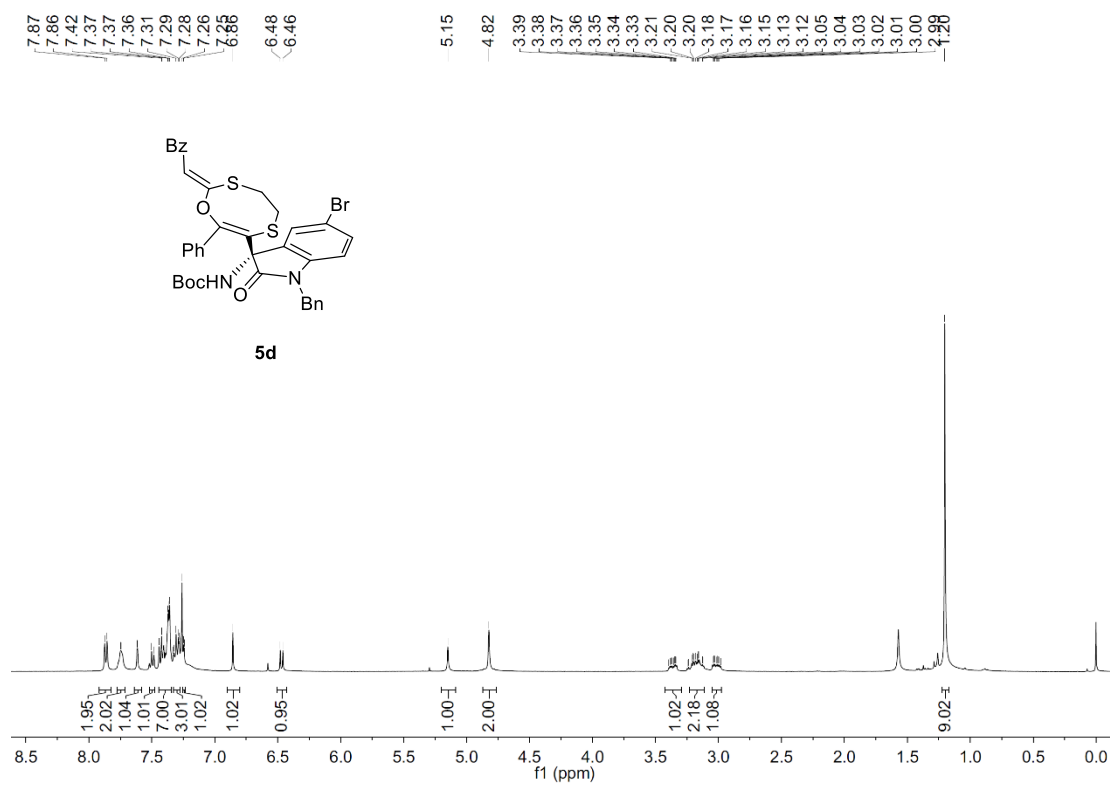
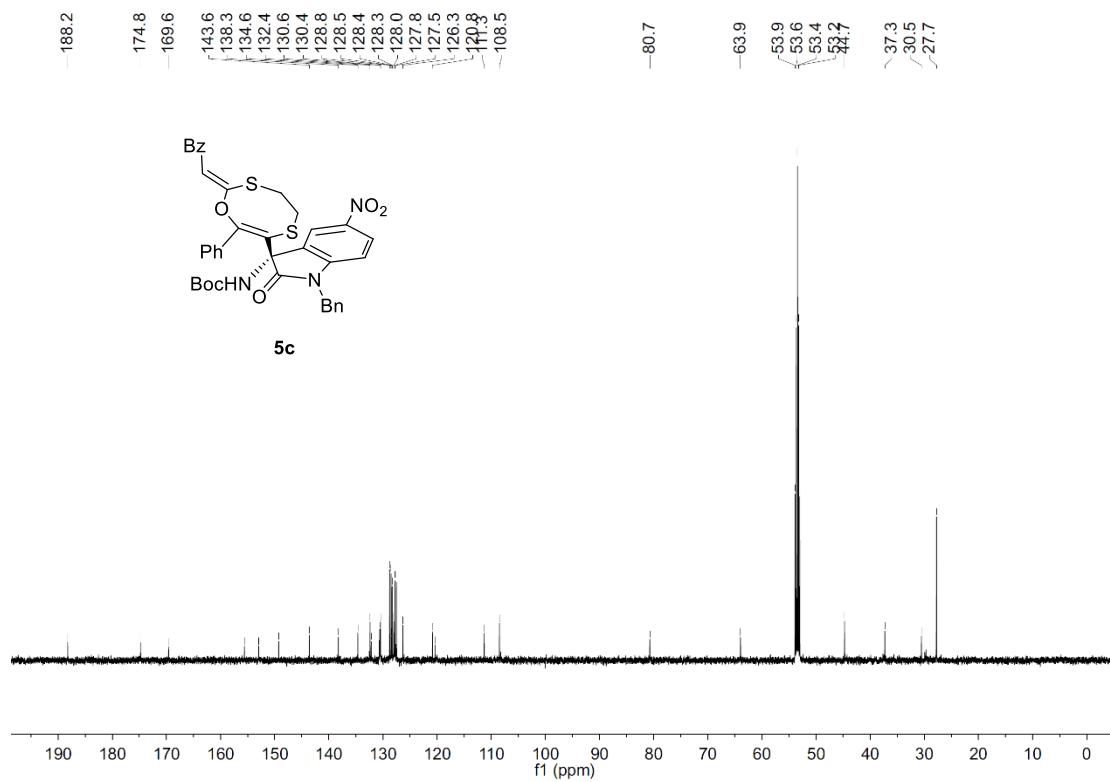


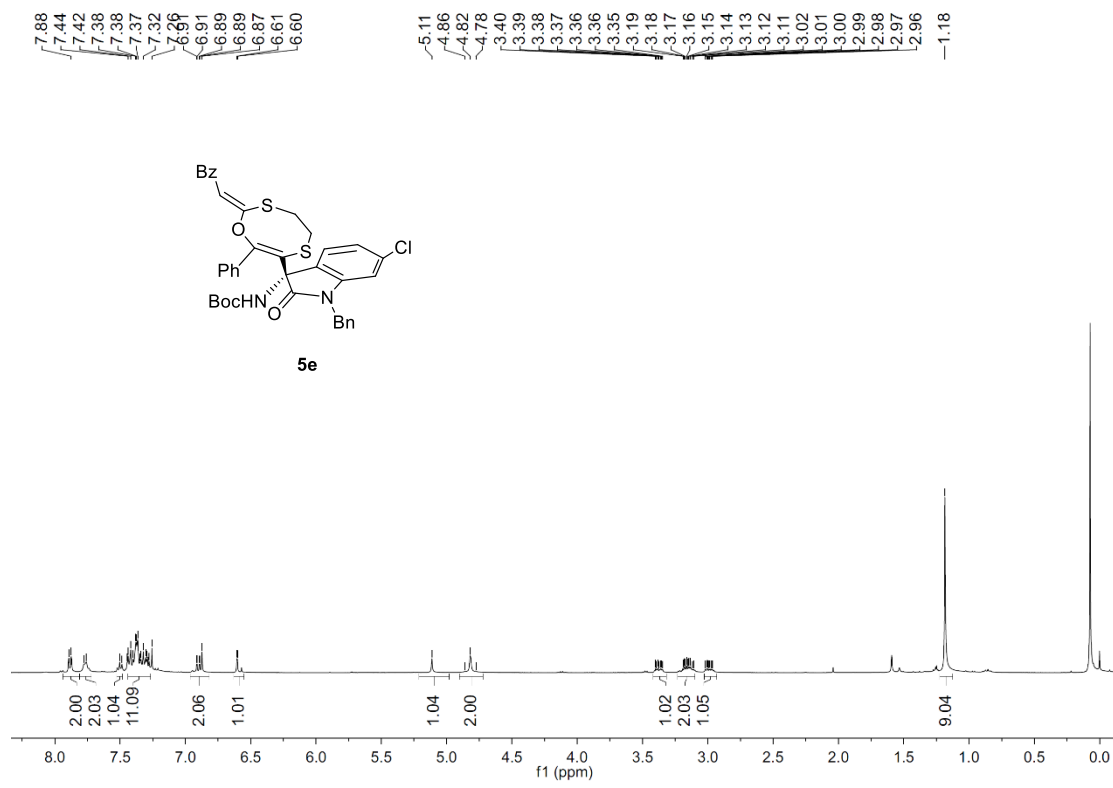
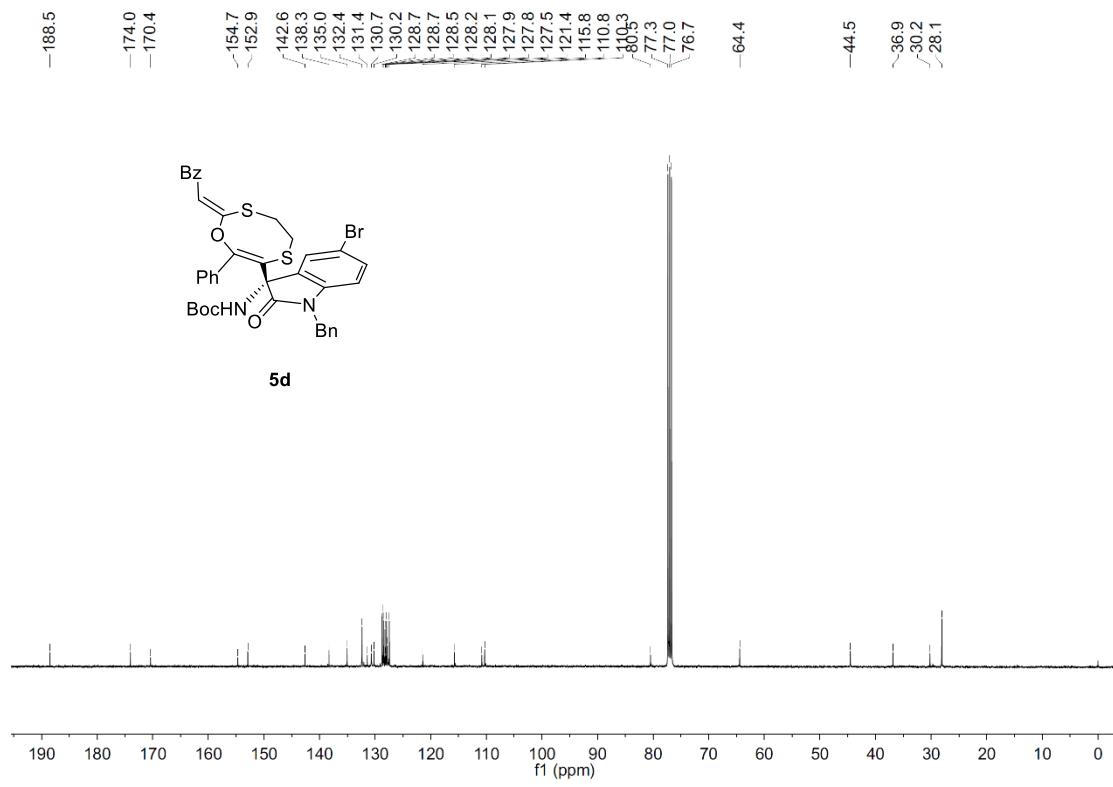


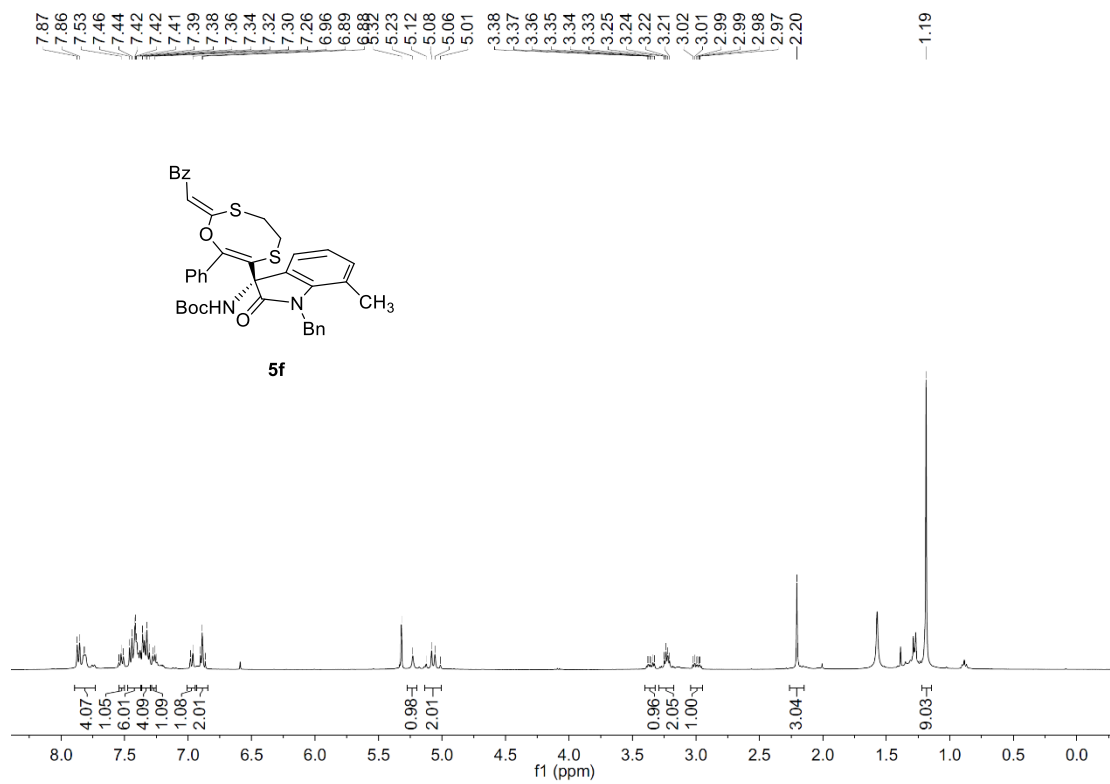
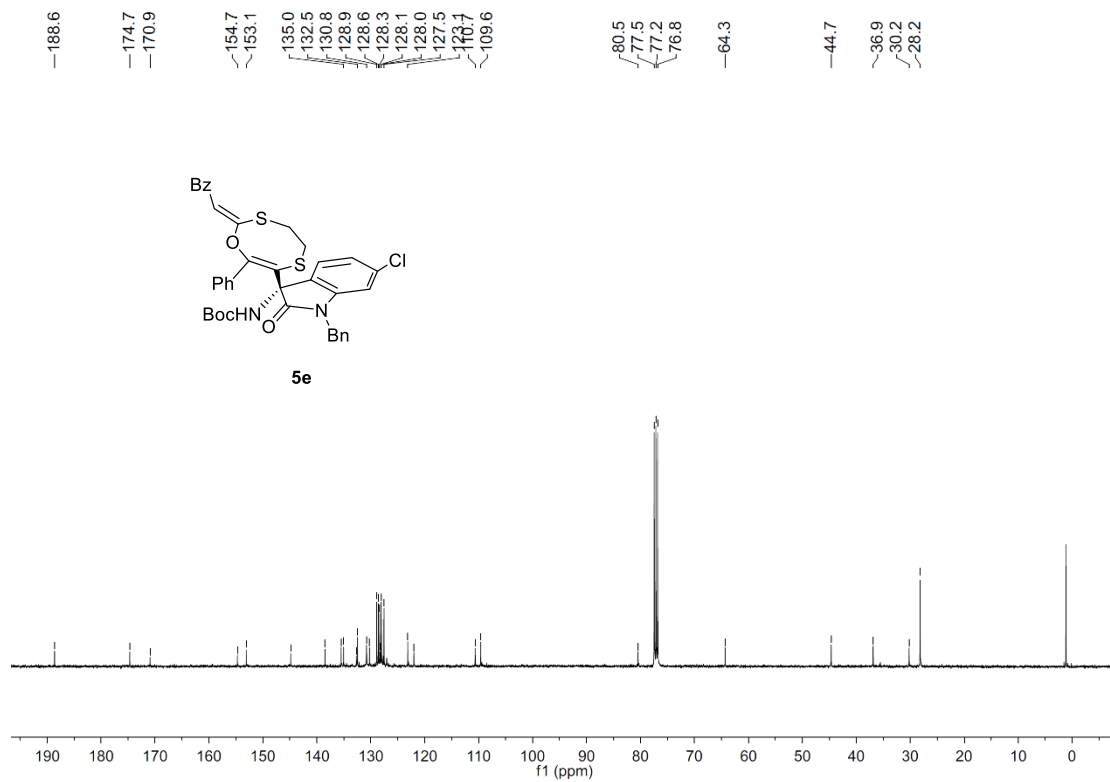


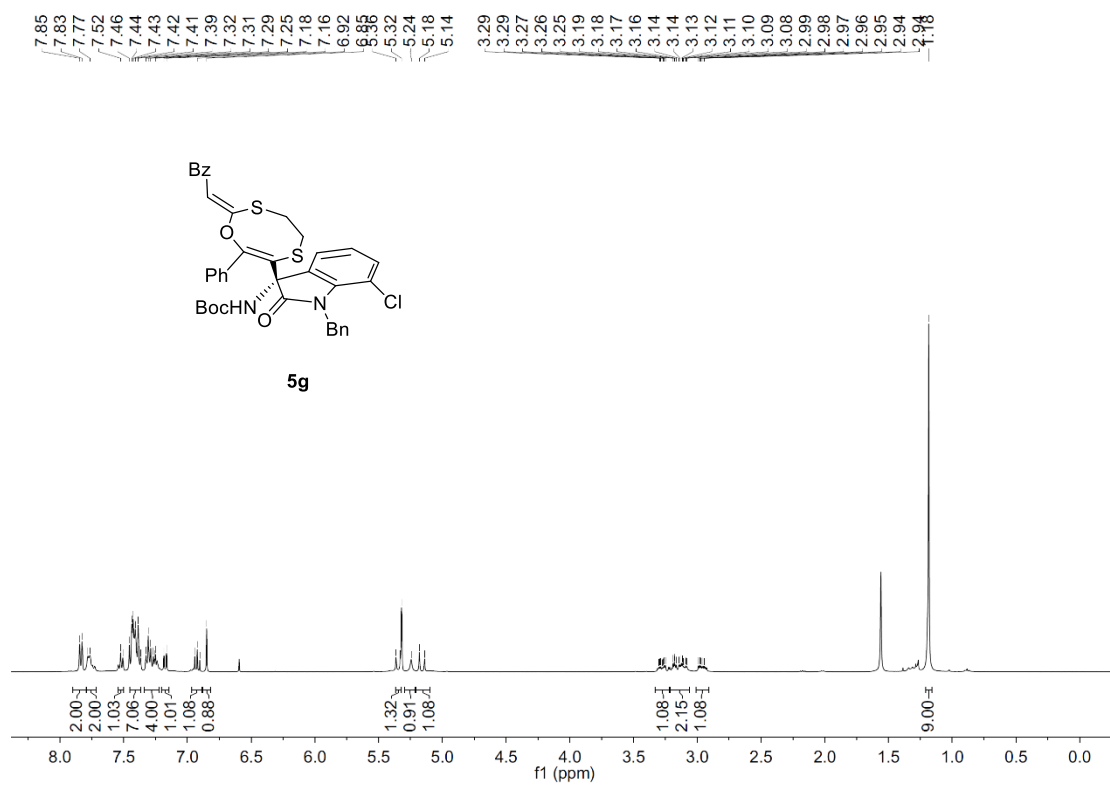
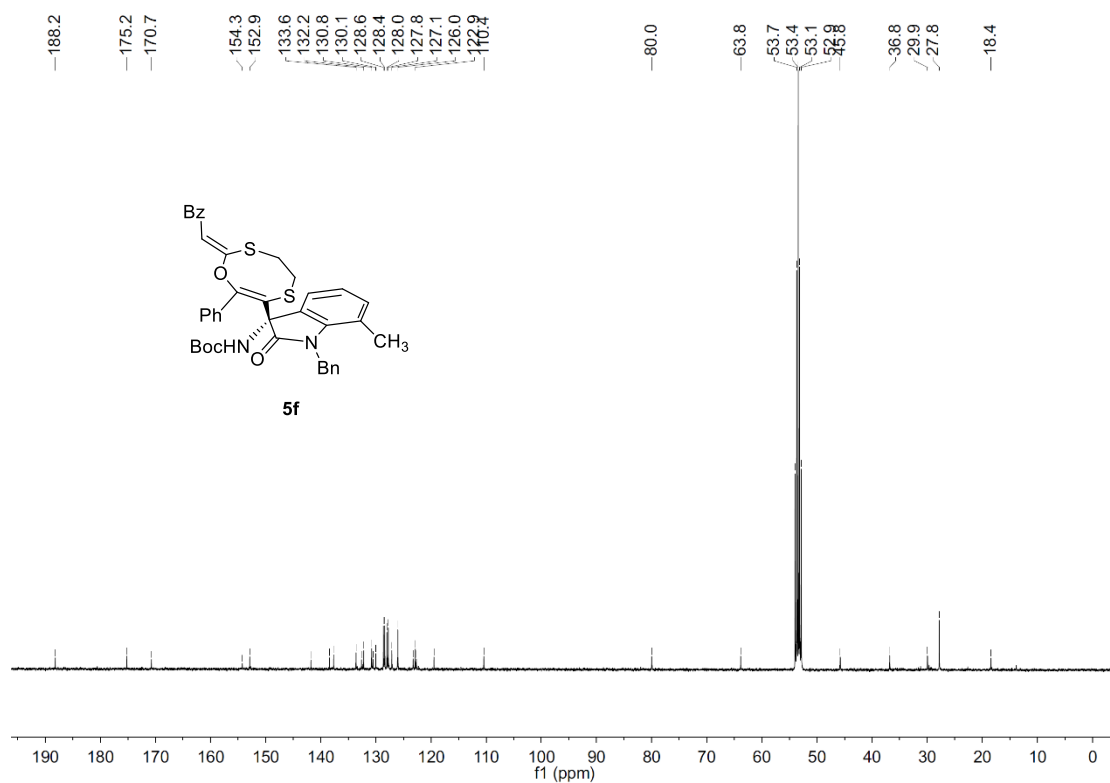


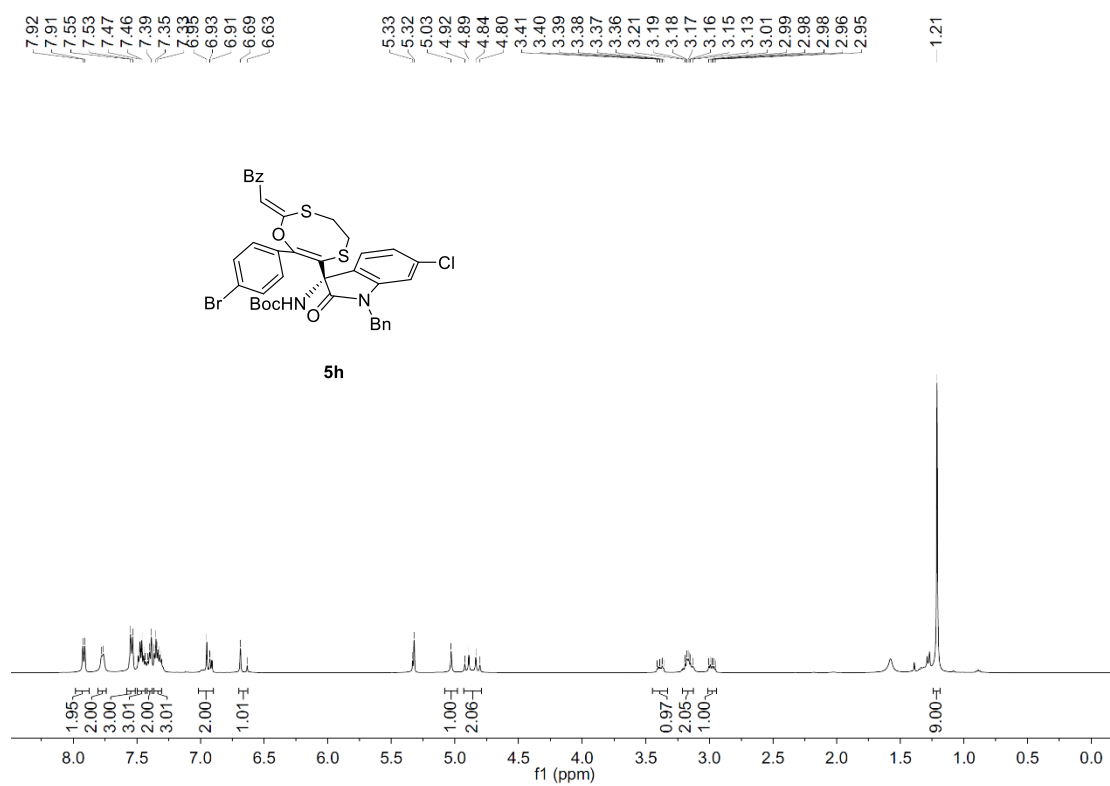
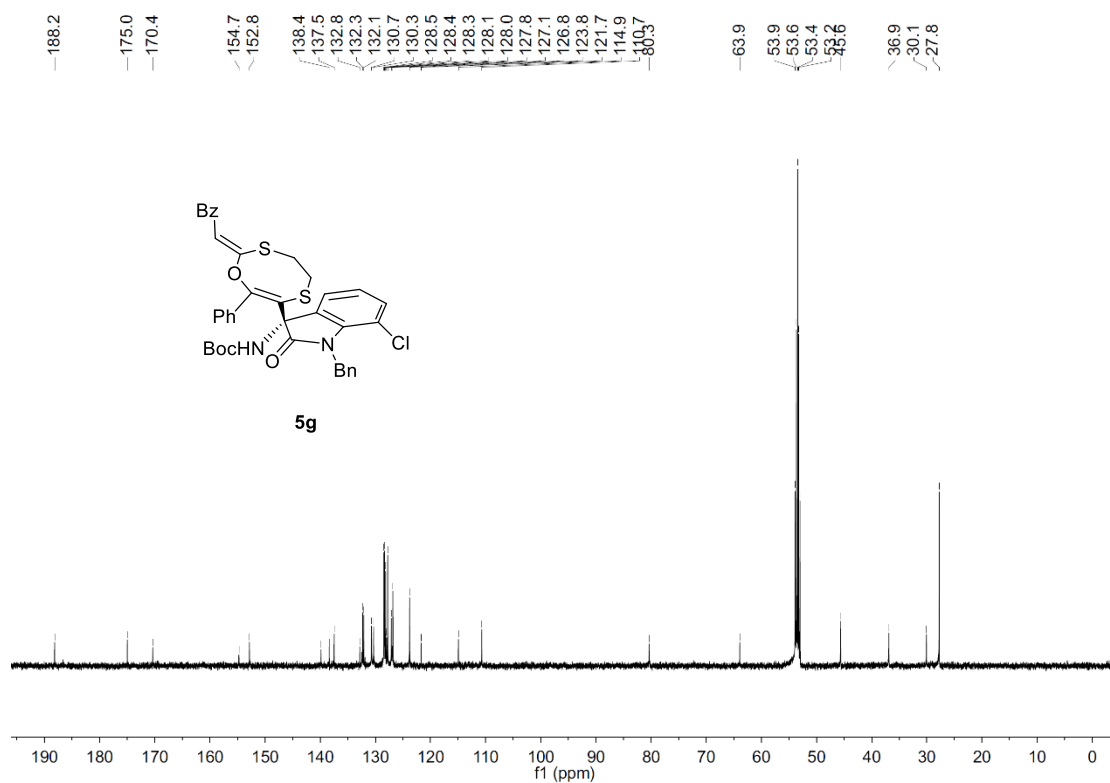


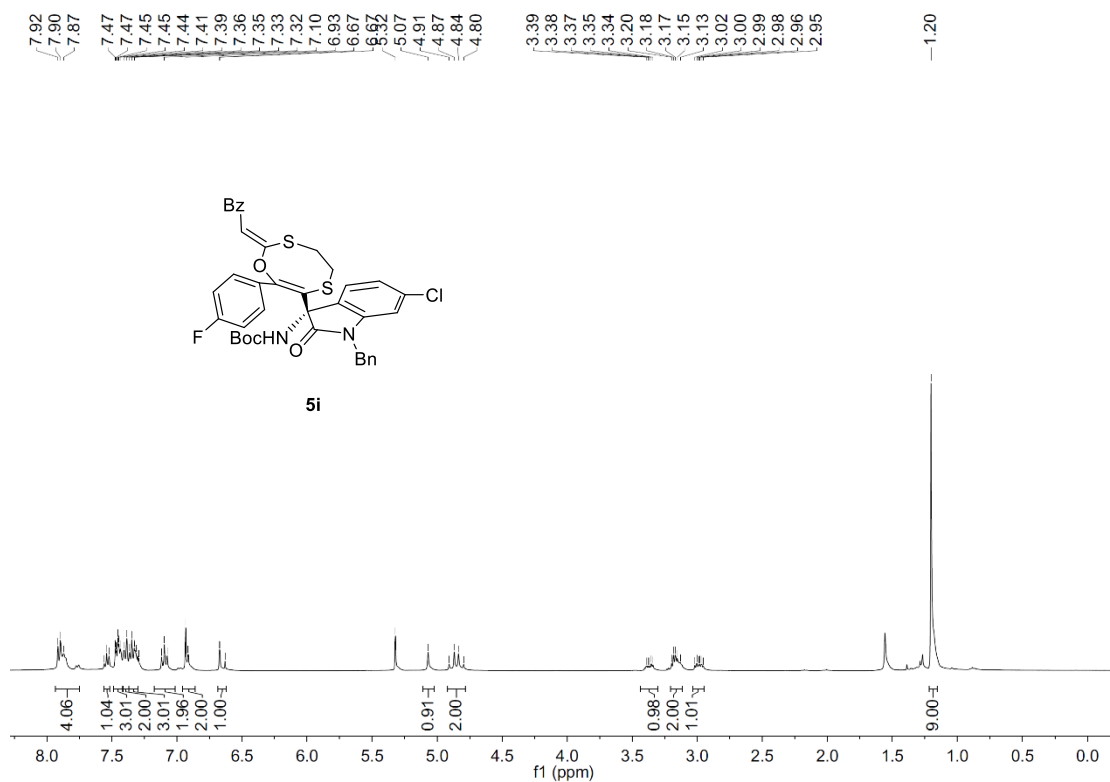
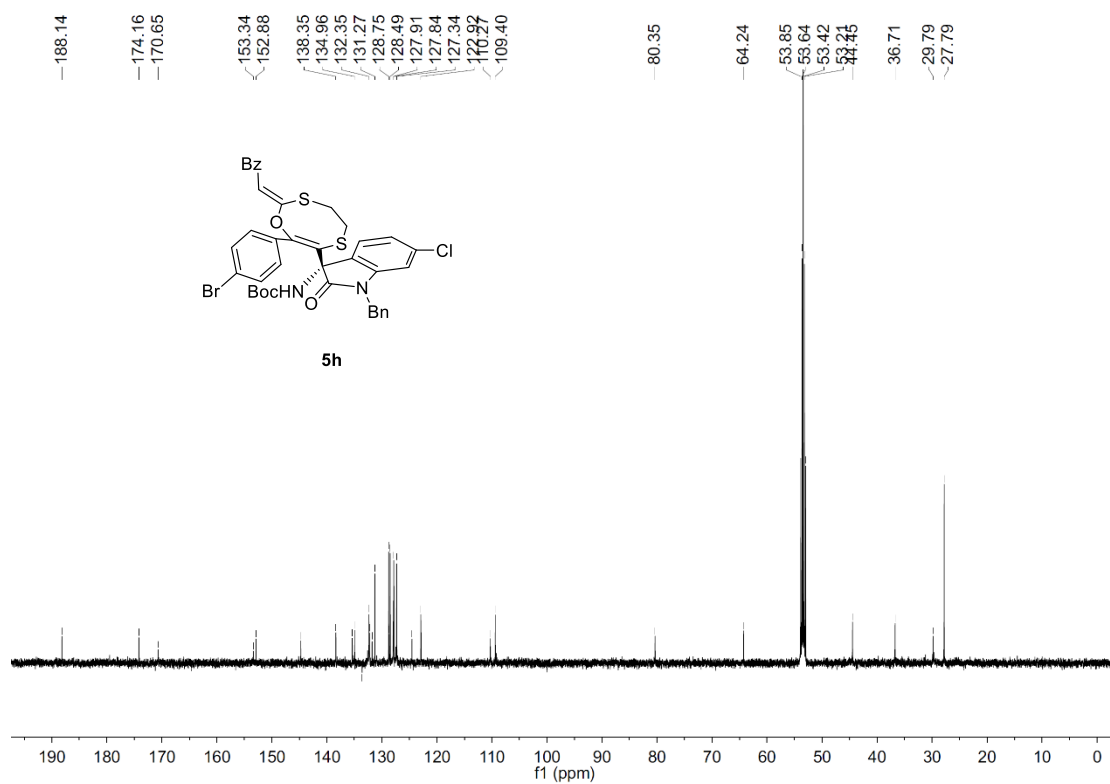




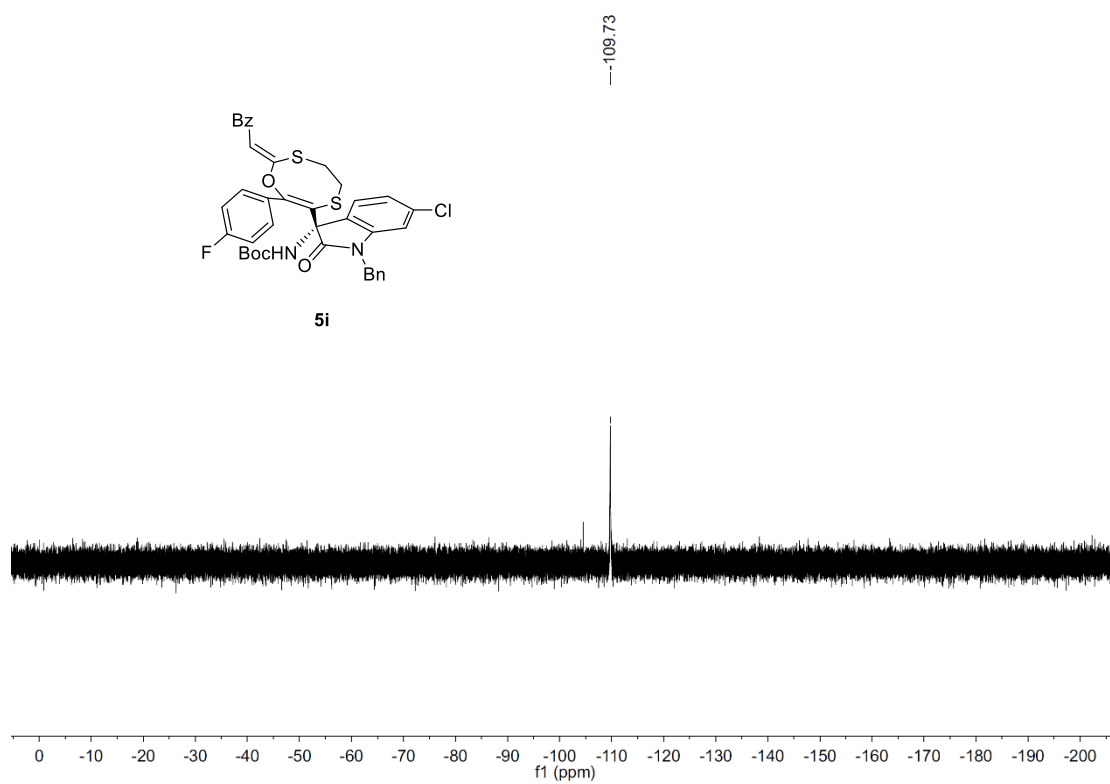
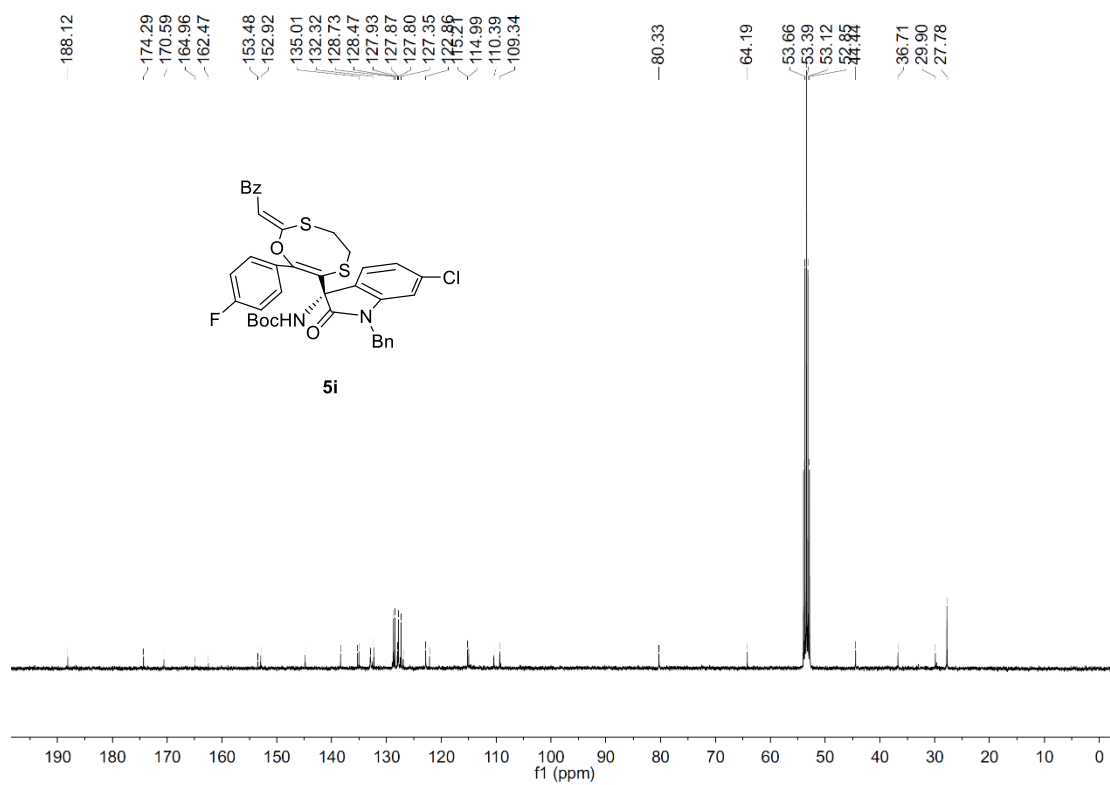


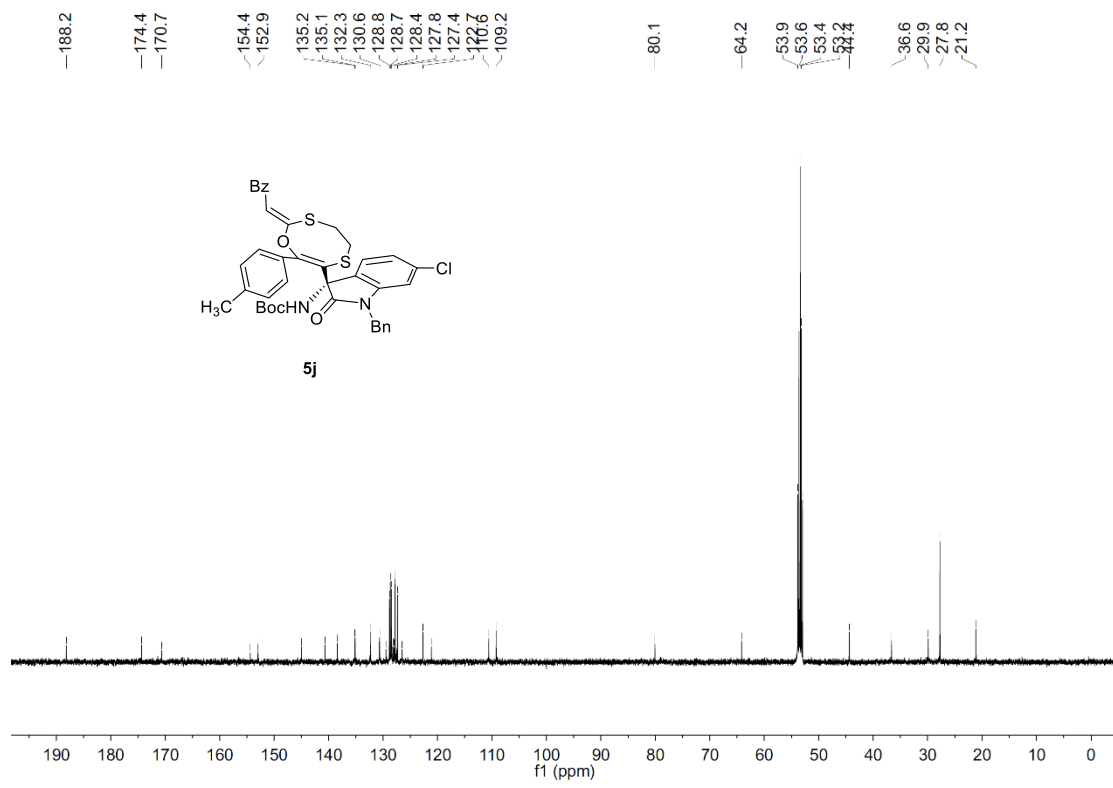
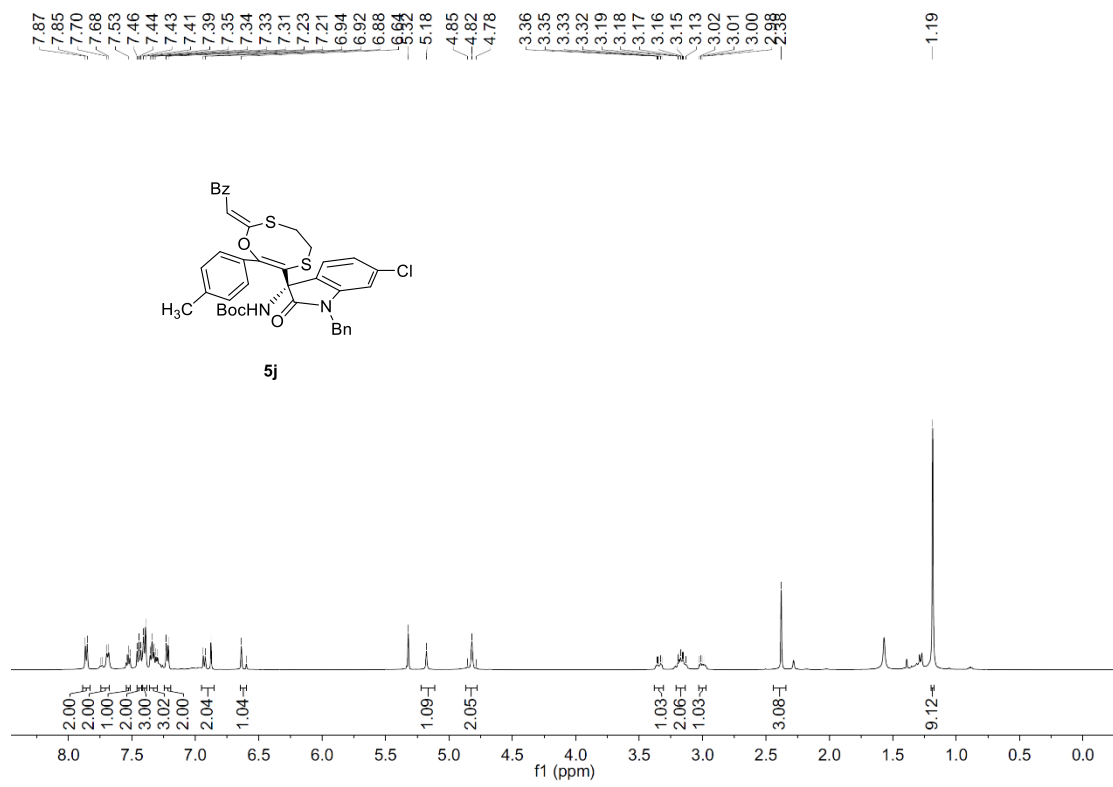


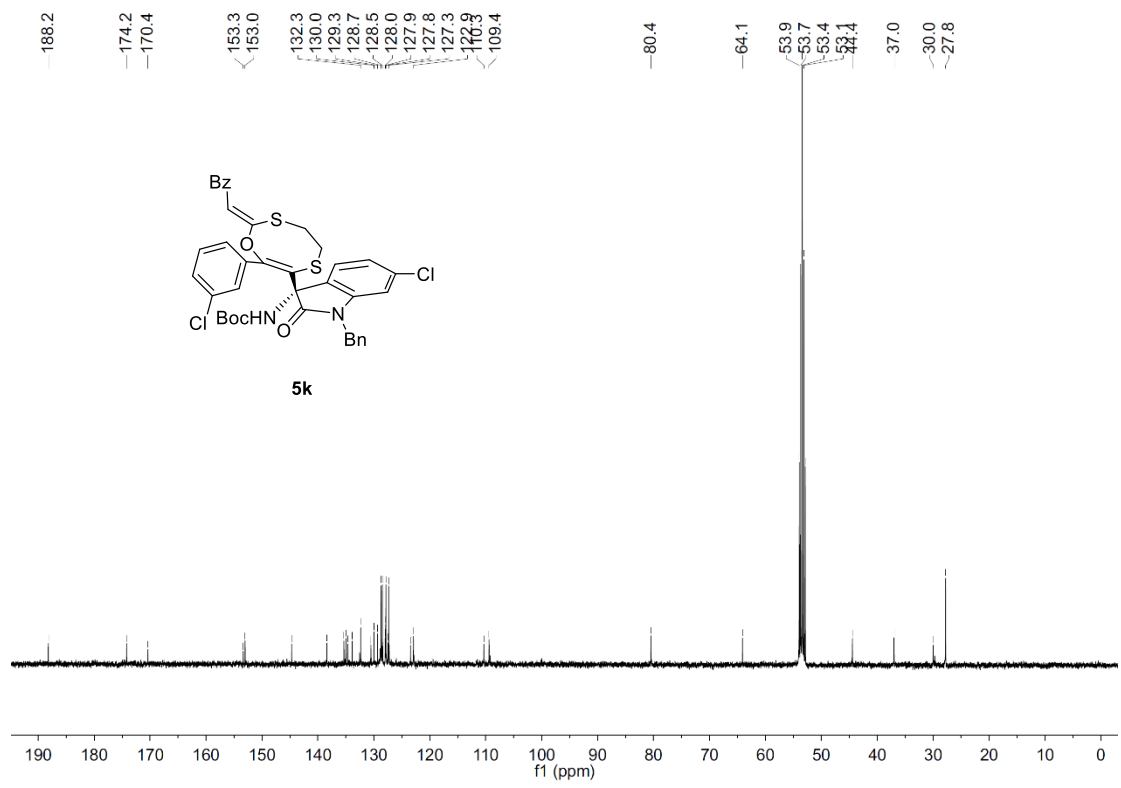
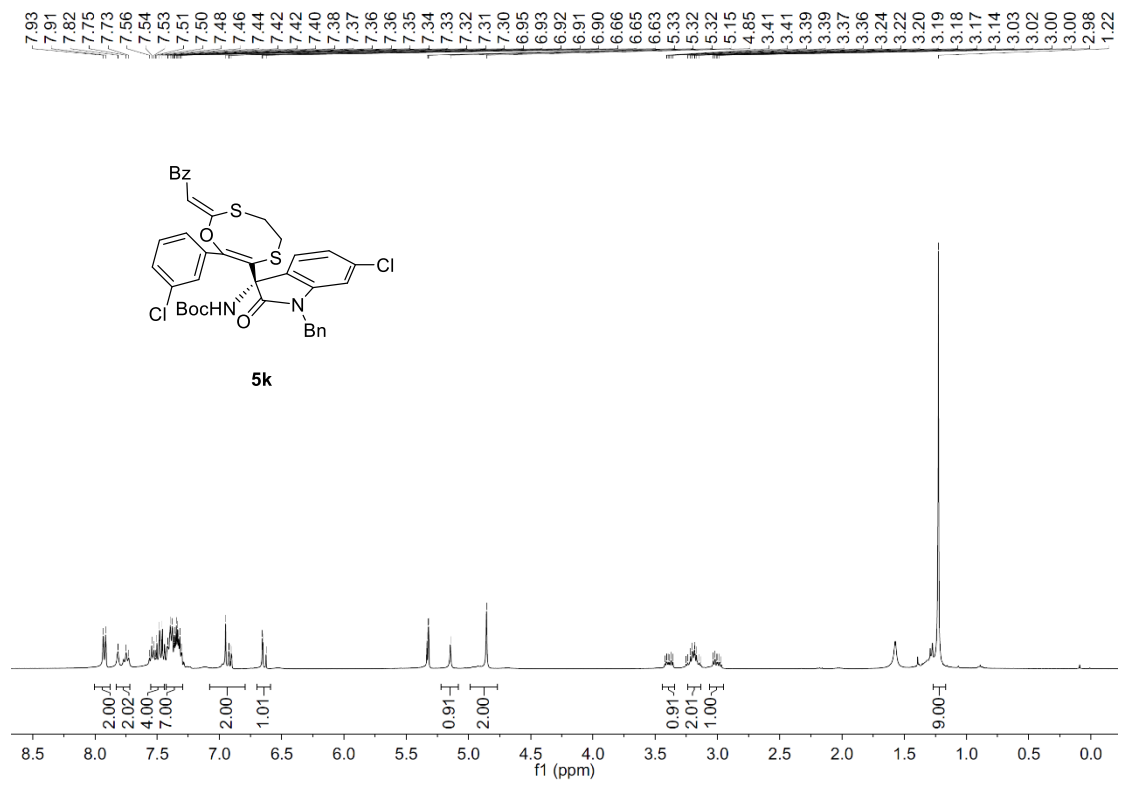


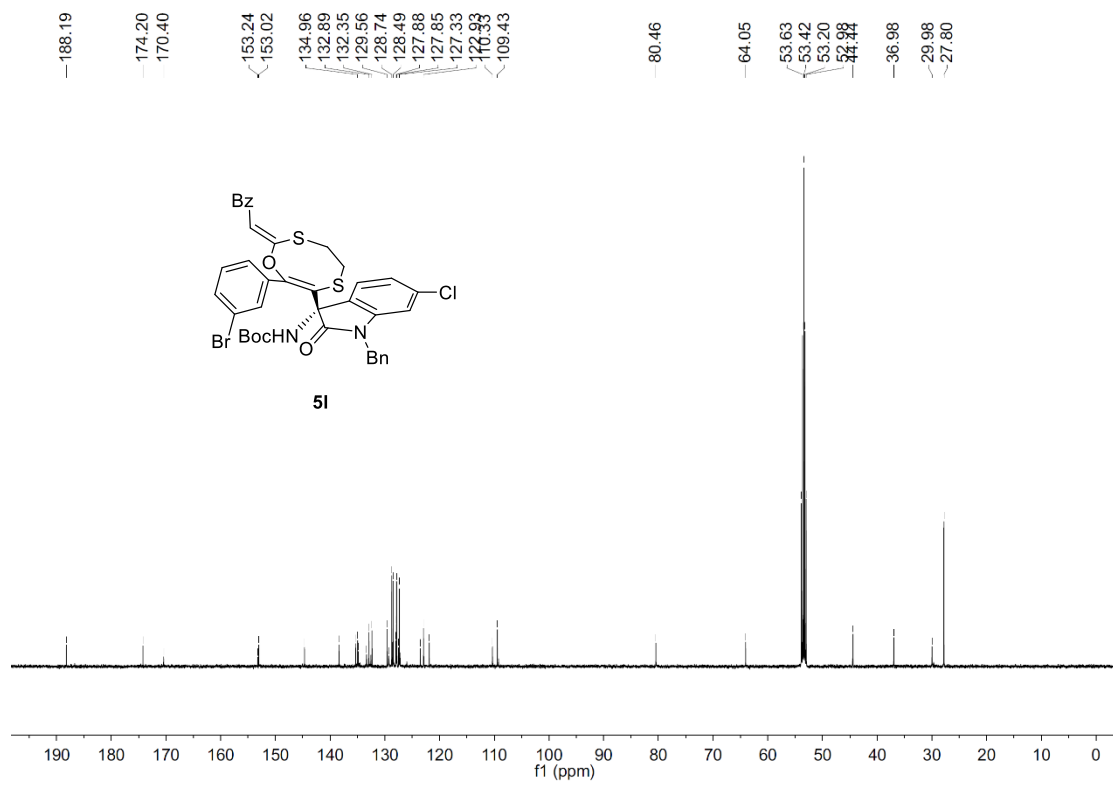
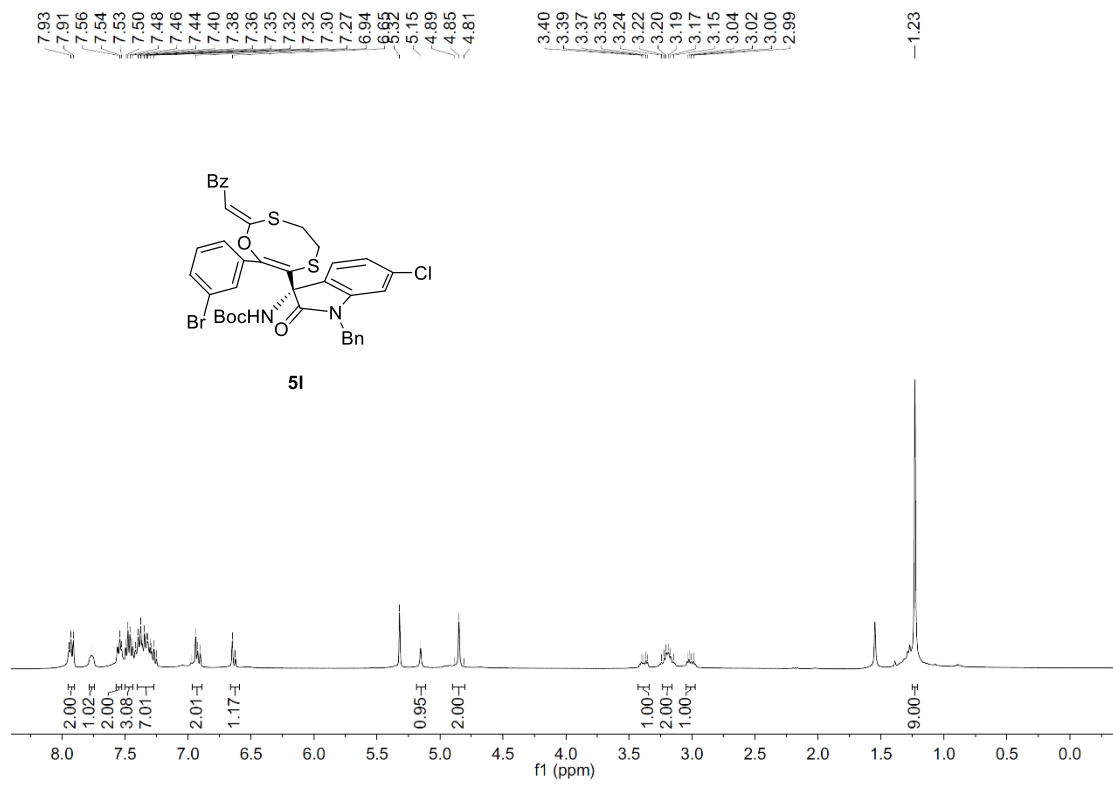


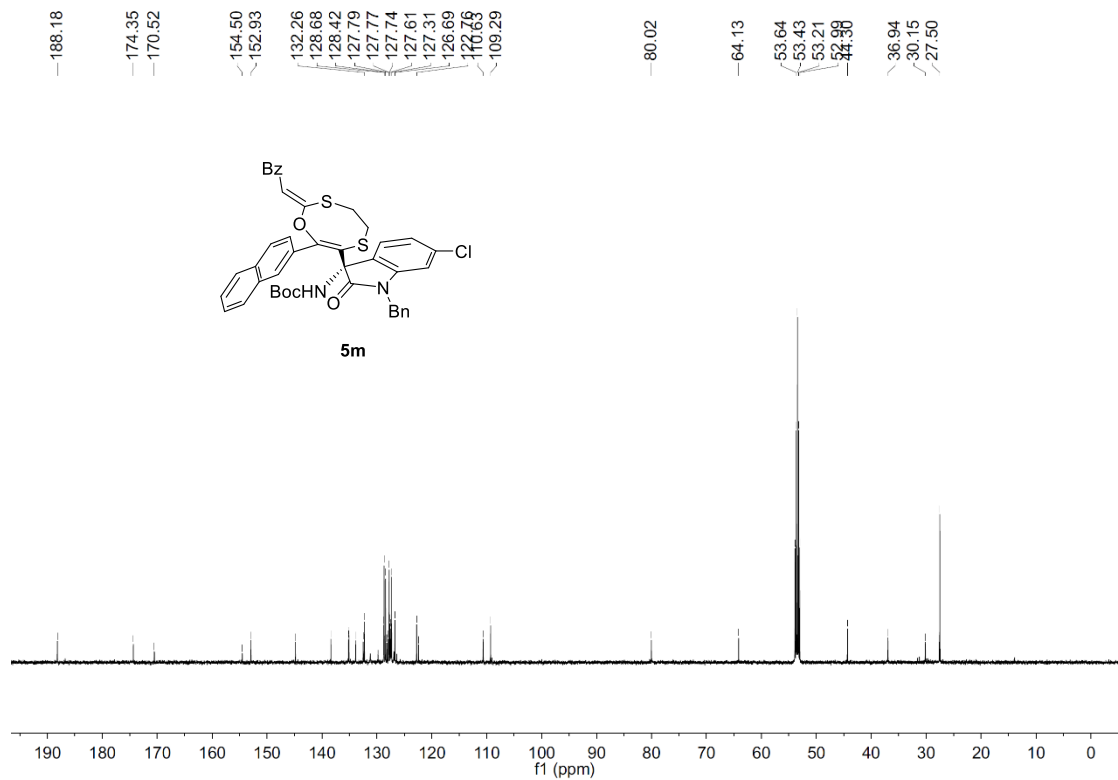
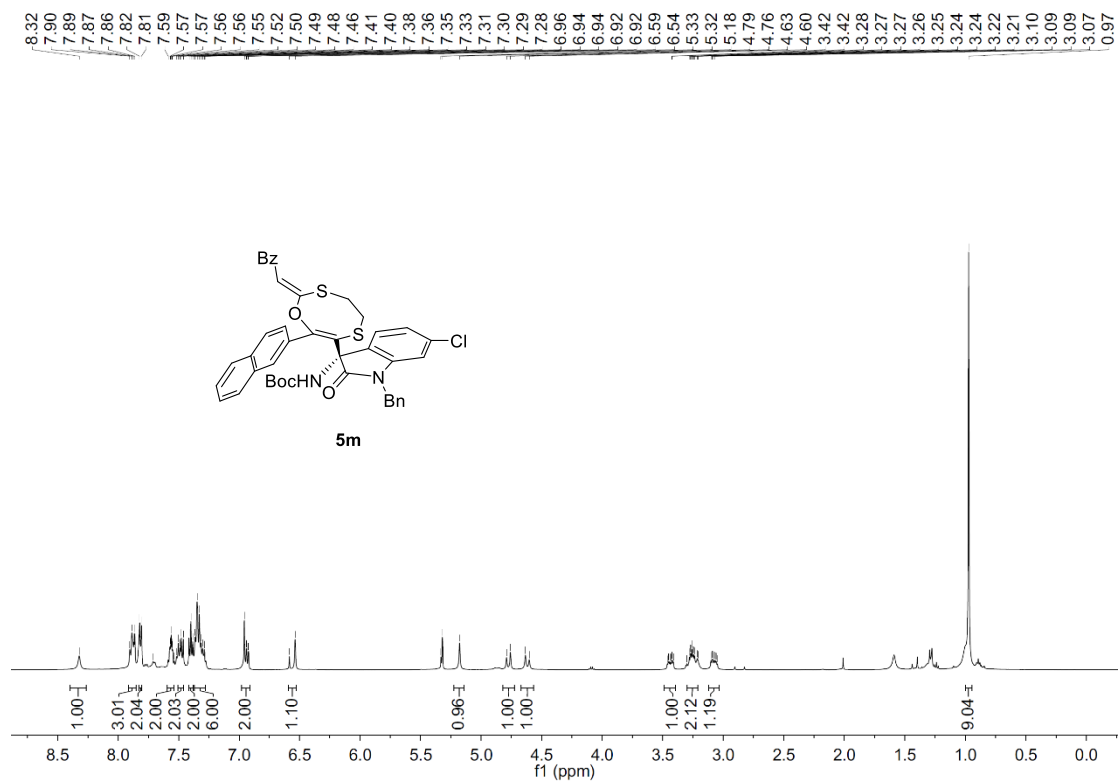


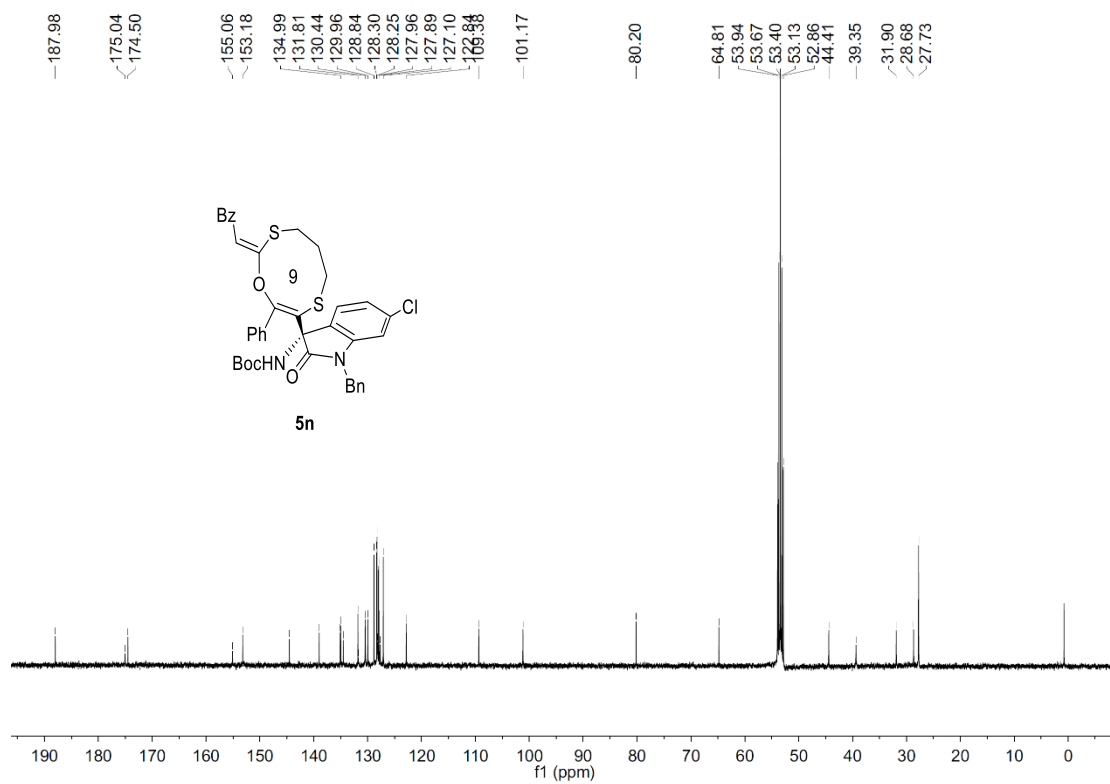
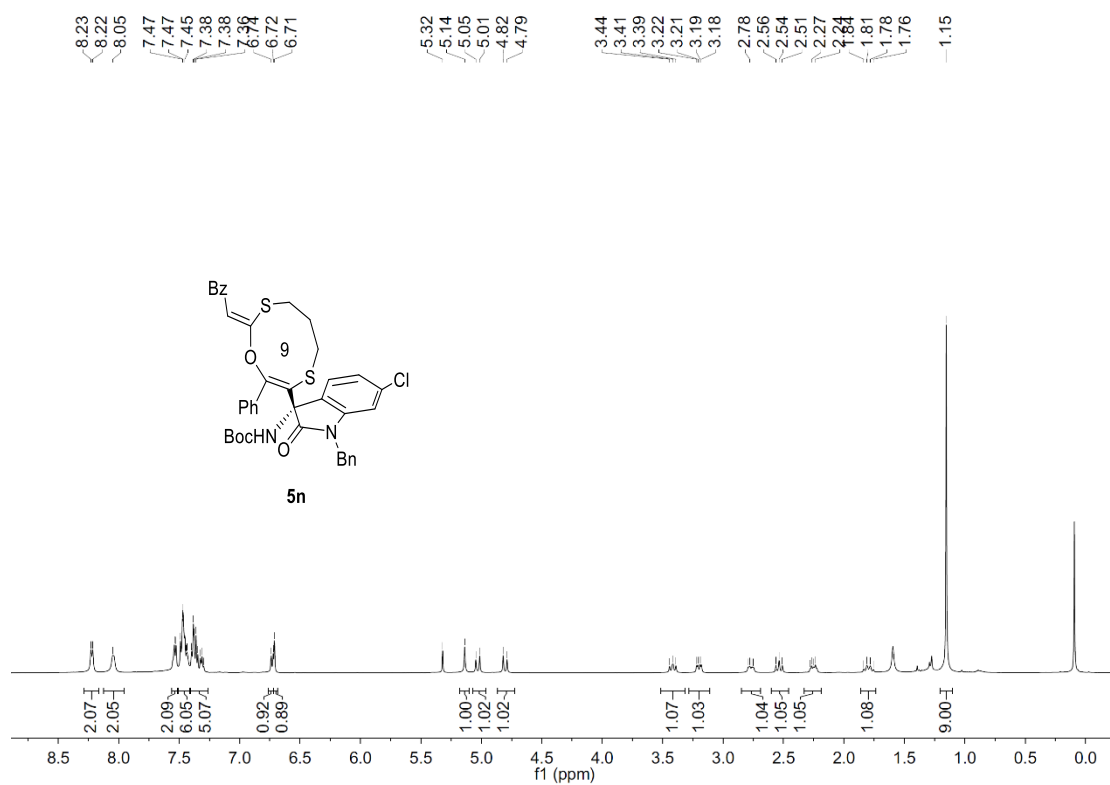


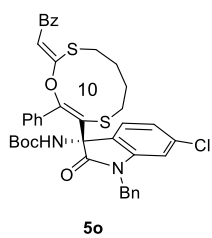
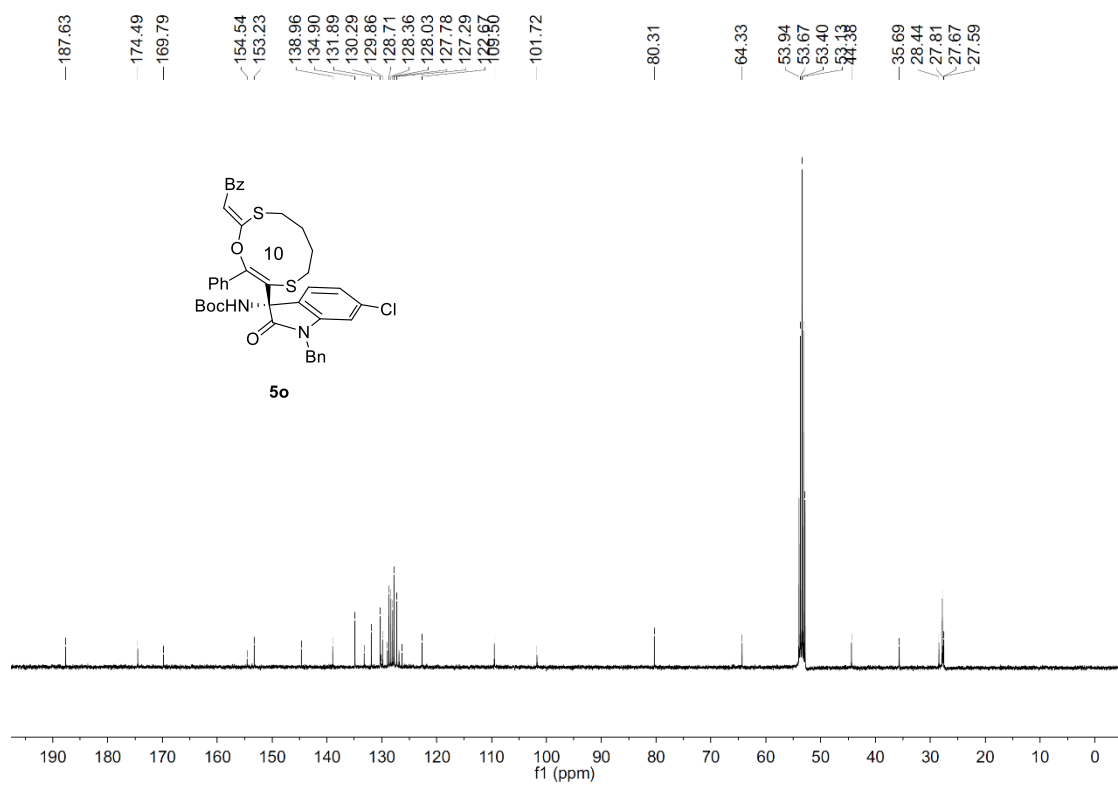
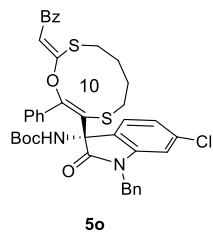
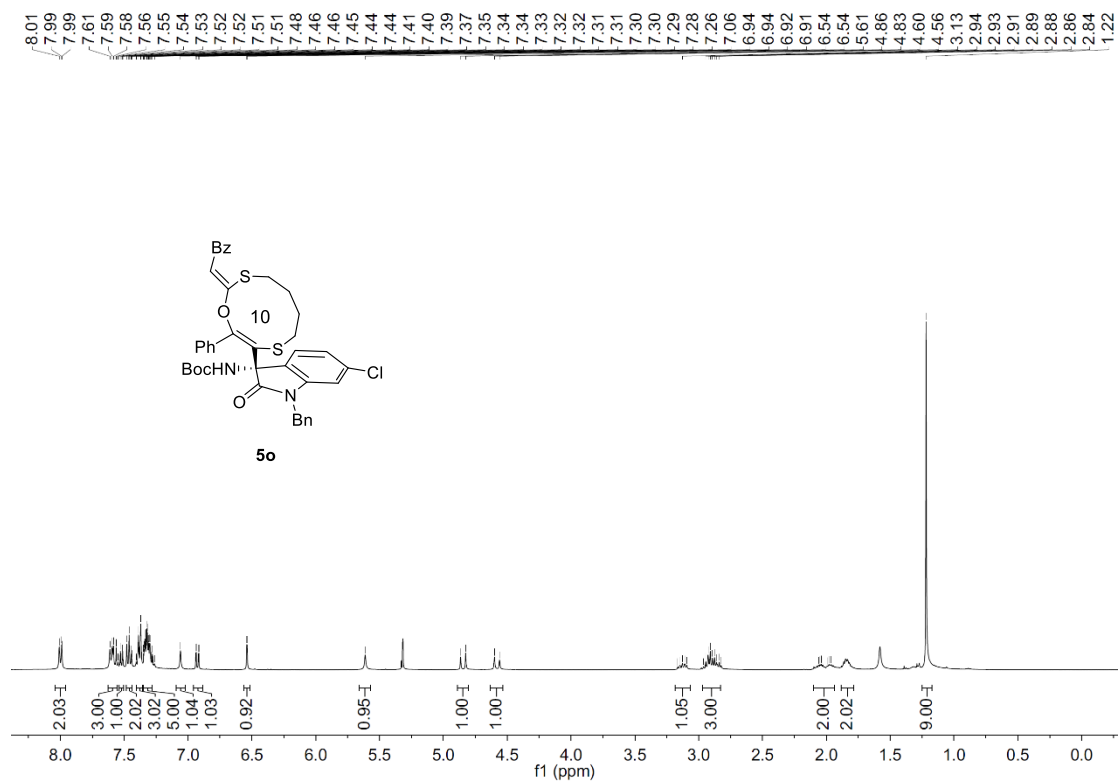


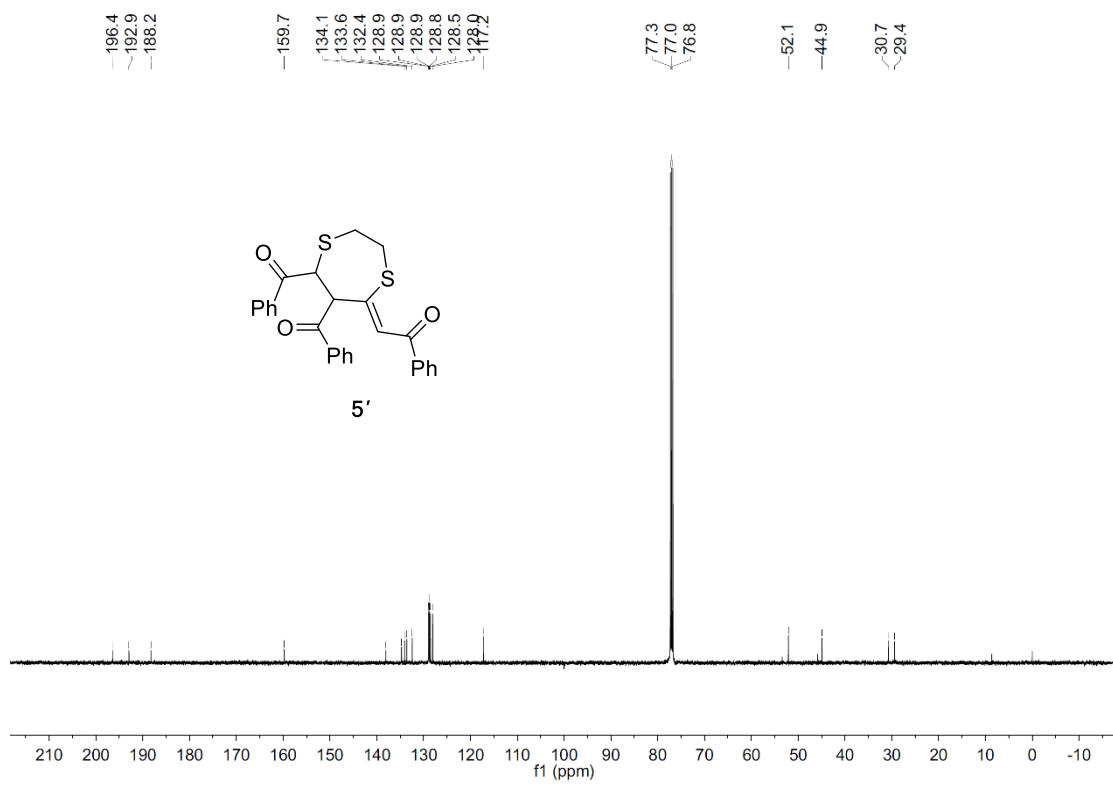
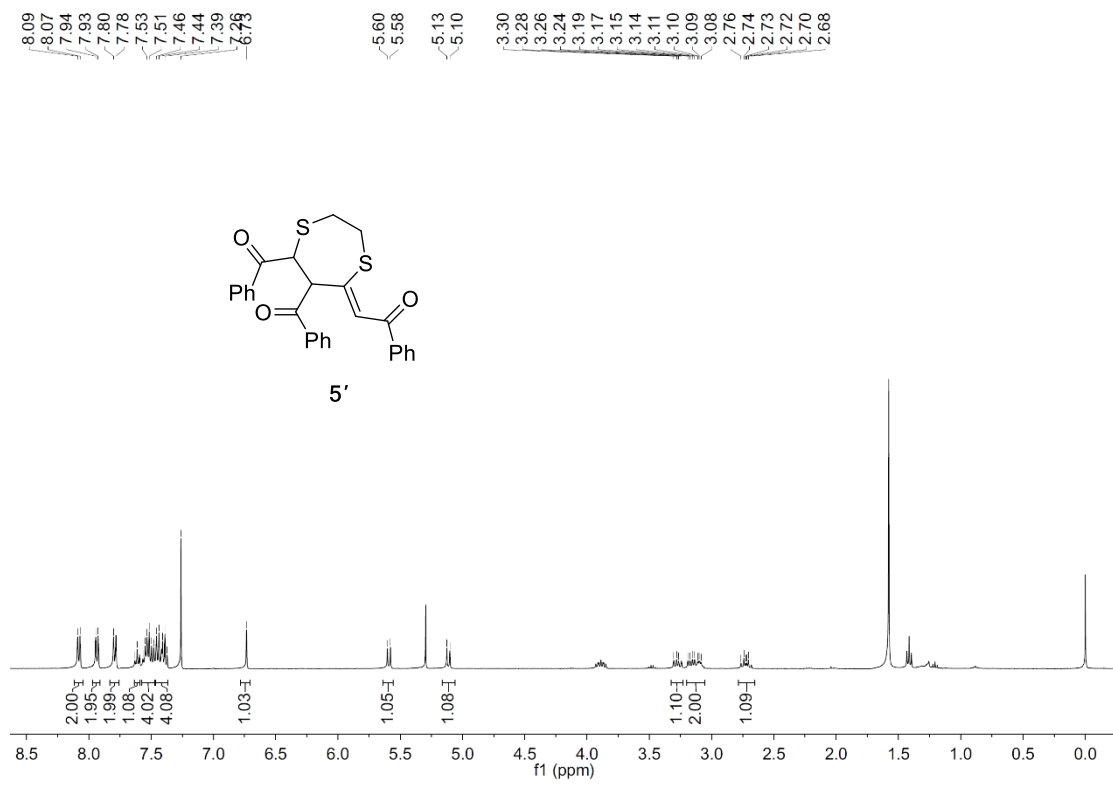




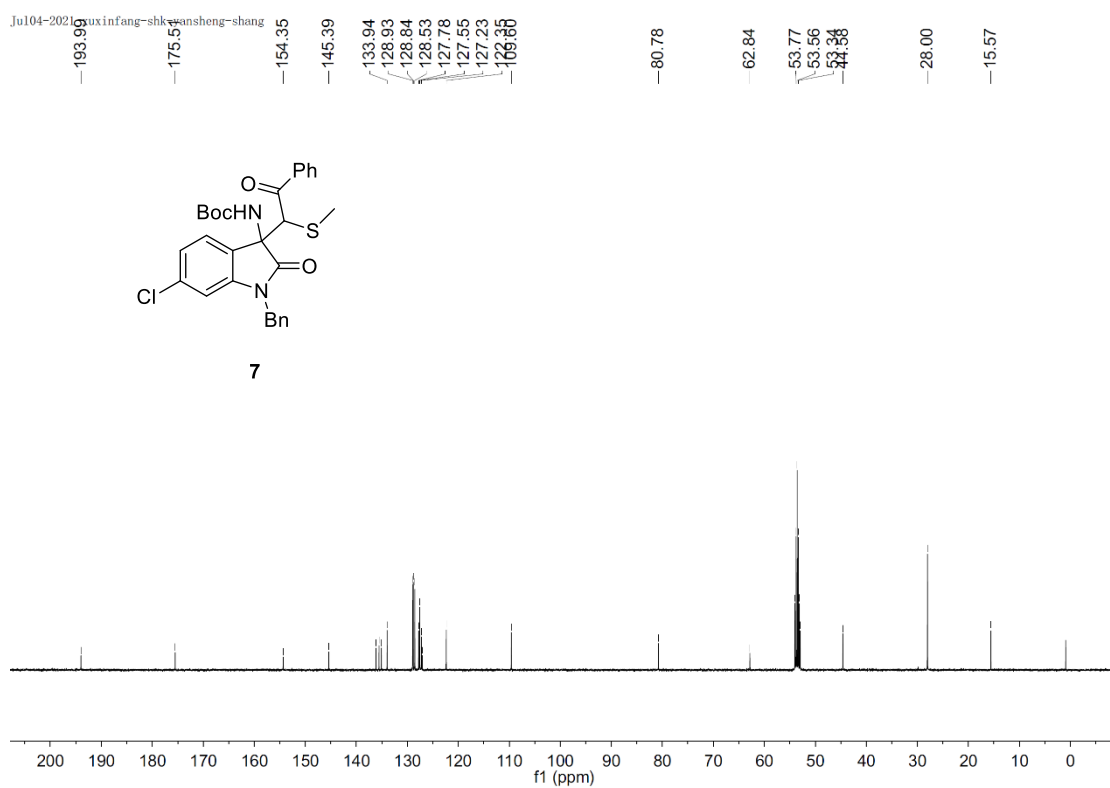
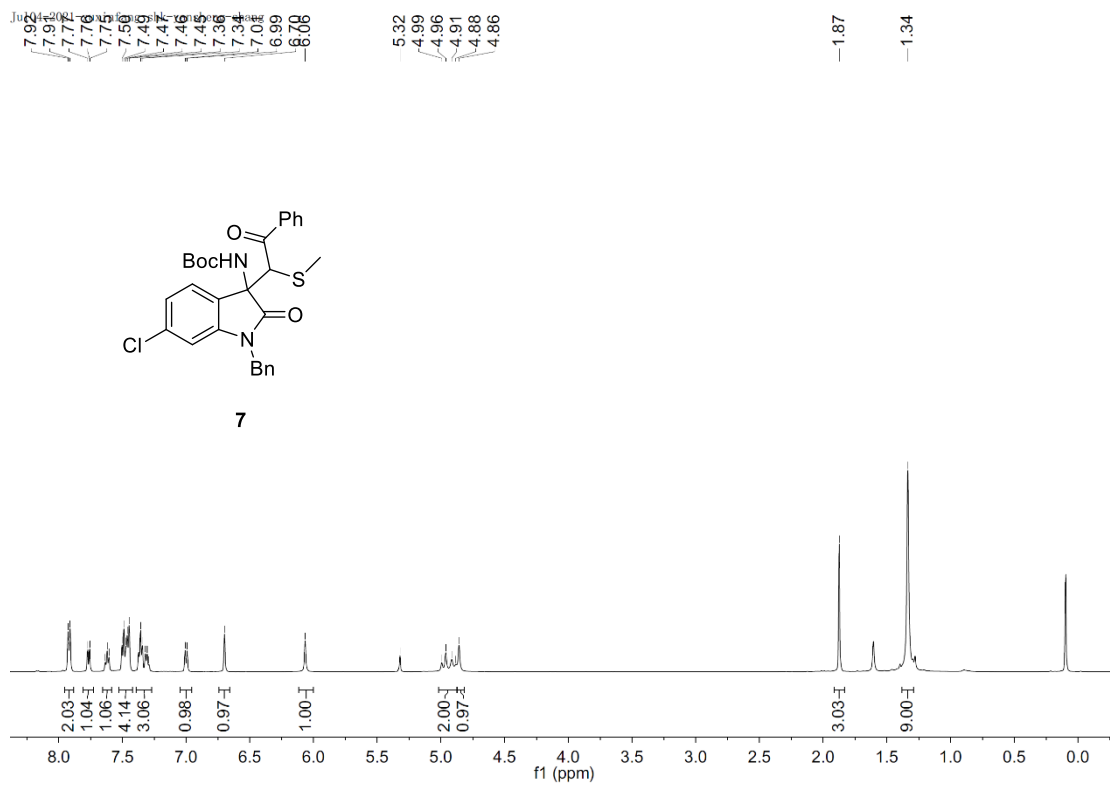


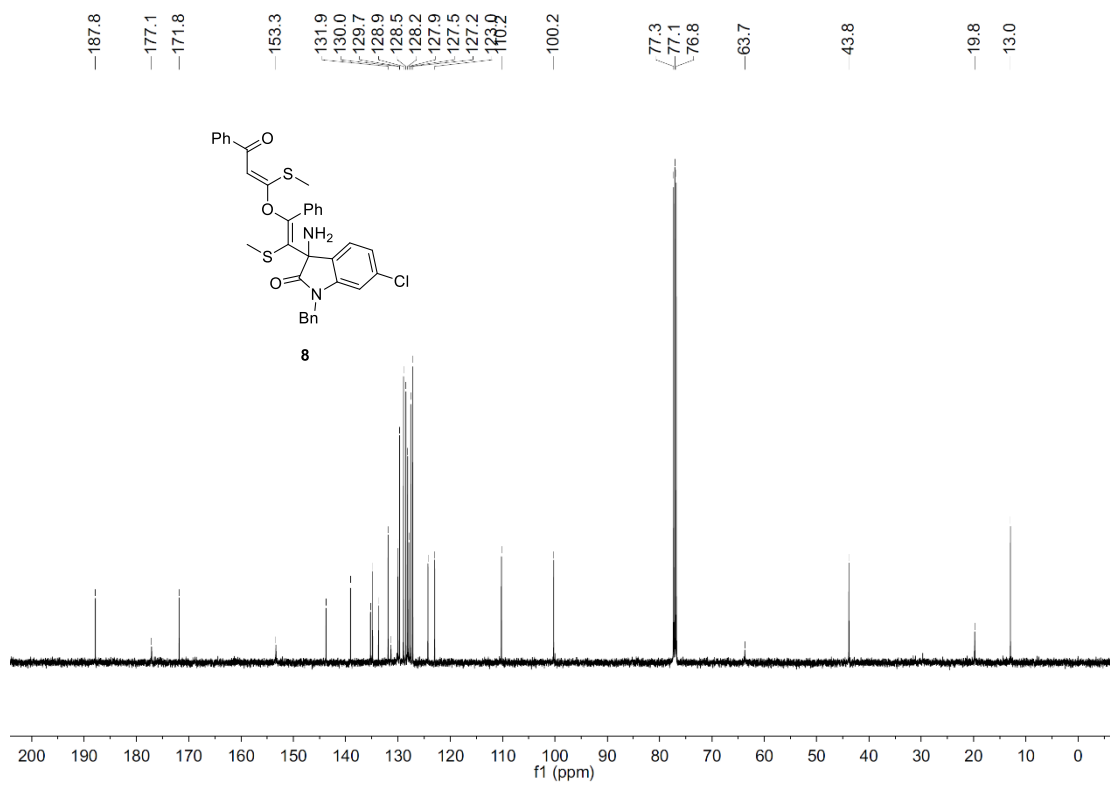
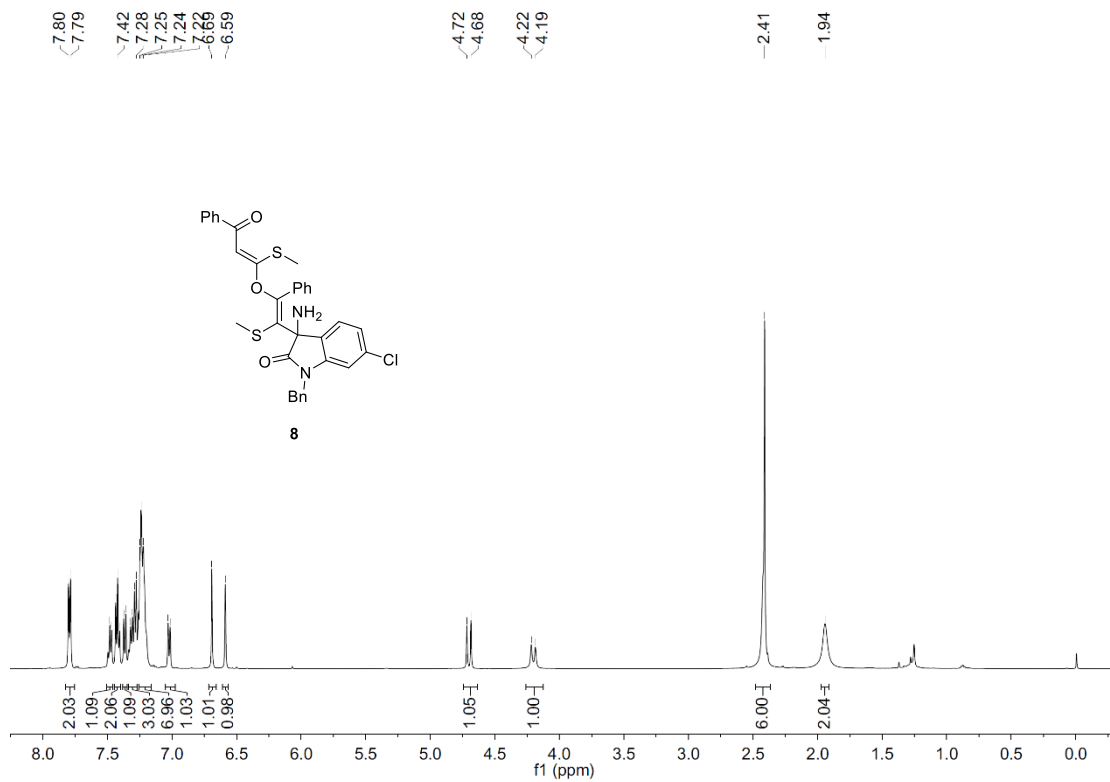


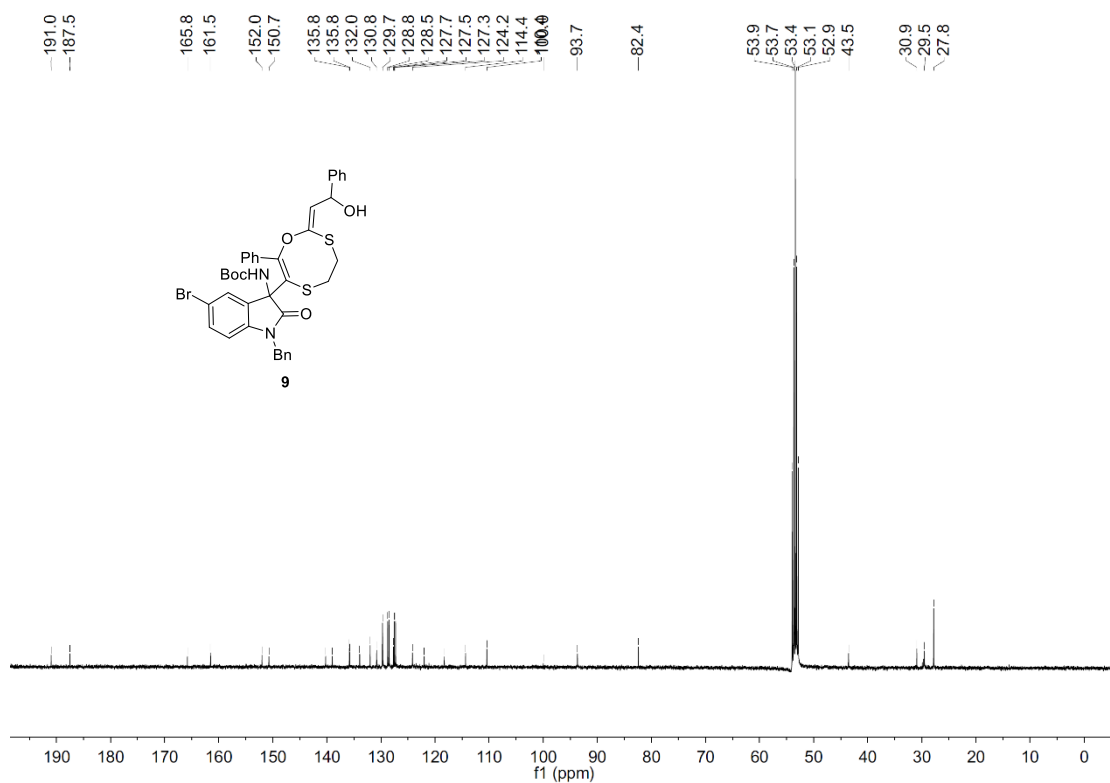
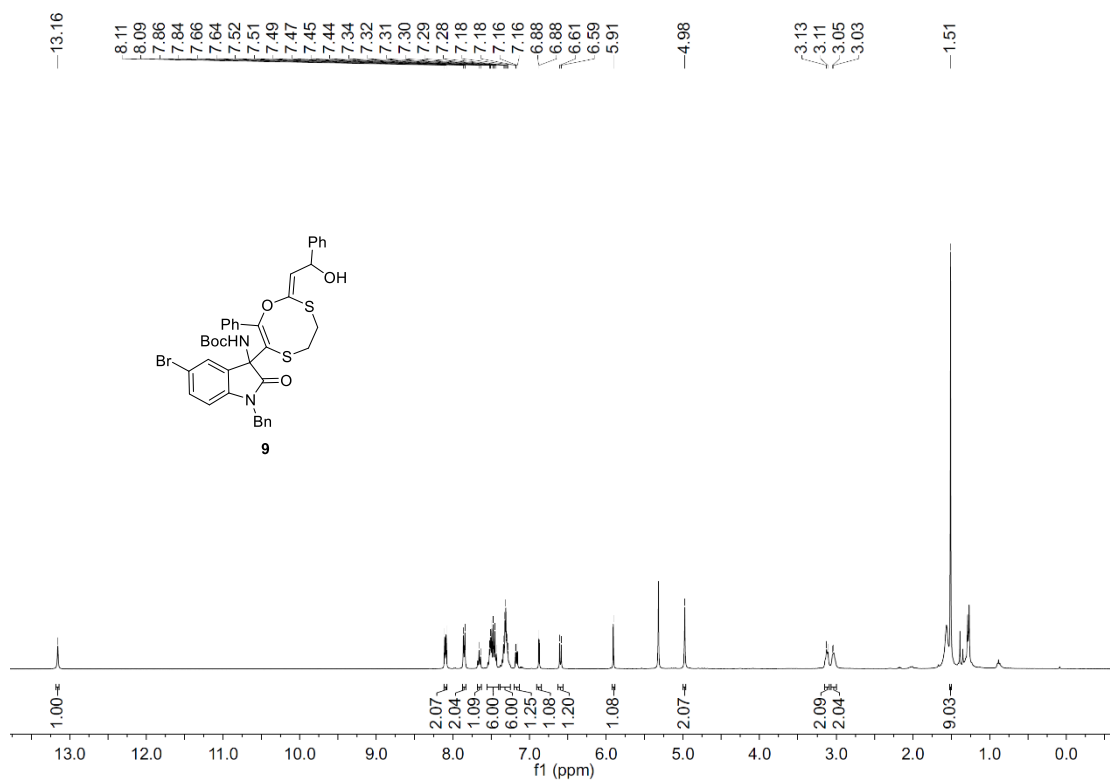




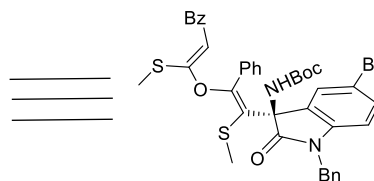
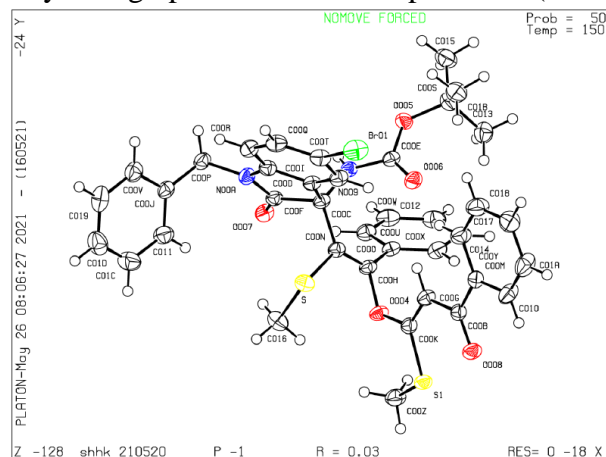








## Crystallographic Data for Compound **4e** (CCDC: 2105305)



### Datablock: shhk\_210520

Bond precision: C-C = 0.0031 Å

Wavelength=1.54184

Cell: a=10.1834 (2) b=12.1739 (2) c=15.8758 (2)  
 alpha=92.900 (1) beta=107.451 (1) gamma=105.810 (2)  
 Temperature: 150 K

	Calculated	Reported
Volume	1787.67 (6)	1787.67 (5)
Space group	P -1	P -1
Hall group	-P 1	-P 1
Moiety formula	C <sub>39</sub> H <sub>37</sub> Br N <sub>2</sub> O <sub>5</sub> S <sub>2</sub>	C <sub>39</sub> H <sub>37</sub> Br N <sub>2</sub> O <sub>5</sub> S <sub>2</sub>
Sum formula	C <sub>39</sub> H <sub>37</sub> Br N <sub>2</sub> O <sub>5</sub> S <sub>2</sub>	C <sub>39</sub> H <sub>37</sub> Br N <sub>2</sub> O <sub>5</sub> S <sub>2</sub>
Mr	757.73	757.73
Dx, g cm <sup>-3</sup>	1.408	1.408
Z	2	2
Mu (mm <sup>-1</sup> )	3.036	3.036
F <sub>000</sub>	784.0	784.0
F <sub>000</sub> '	785.92	
h, k, lmax	12, 15, 19	12, 15, 19
Nref	7470	7135
Tmin, Tmax	0.859, 0.859	0.909, 1.000
Tmin'	0.859	

Correction method= # Reported T Limits: Tmin=0.909 Tmax=1.000  
 AbsCorr = MULTI-SCAN

Data completeness= 0.955

Theta (max)= 76.094

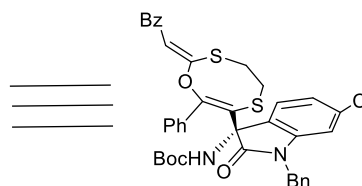
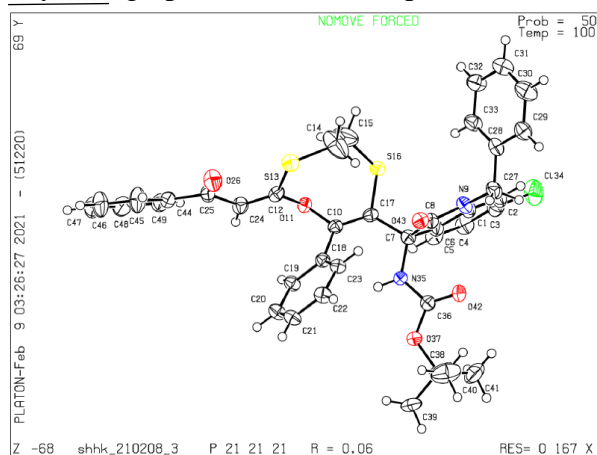
R (reflections)= 0.0314 ( 6403)

wR<sub>2</sub> (reflections)= 0.0761 ( 7135)

S = 1.074

Npar= 447

## Crystallographic Data for Compound **5e** (CCDC: 2105306)



### Datablock: shhk\_210208\_3

Bond precision: C-C = 0.0091 Å

Wavelength=1.54184

Cell: a=10.7902 (2) b=15.7345 (4) c=21.2170 (6)  
 alpha=90 beta=90 gamma=90

Temperature: 100 K

	Calculated	Reported
Volume	3602.19 (15)	3602.19 (15)
Space group	P 21 21 21	P 21 21 21
Hall group	P 2ac 2ab	P 2ac 2ab
Moiety formula	C <sub>39</sub> H <sub>35</sub> Cl N <sub>2</sub> O <sub>5</sub> S <sub>2</sub>	C <sub>39</sub> H <sub>35</sub> Cl N <sub>2</sub> O <sub>5</sub> S <sub>2</sub>
Sum formula	C <sub>39</sub> H <sub>35</sub> Cl N <sub>2</sub> O <sub>5</sub> S <sub>2</sub>	C <sub>39</sub> H <sub>35</sub> Cl N <sub>2</sub> O <sub>5</sub> S <sub>2</sub>
Mr	711.26	711.26
Dx, g cm <sup>-3</sup>	1.311	1.312
Z	4	4
Mu (mm <sup>-1</sup> )	2.396	2.396
F <sub>000</sub>	1488.0	1488.0
F <sub>000</sub> '	1496.02	
h, k, lmax	13, 19, 26	13, 19, 26
Nref	7601 [ 4244]	7487
Tmin, Tmax	0.866, 0.887	0.655, 1.000
Tmin'	0.698	

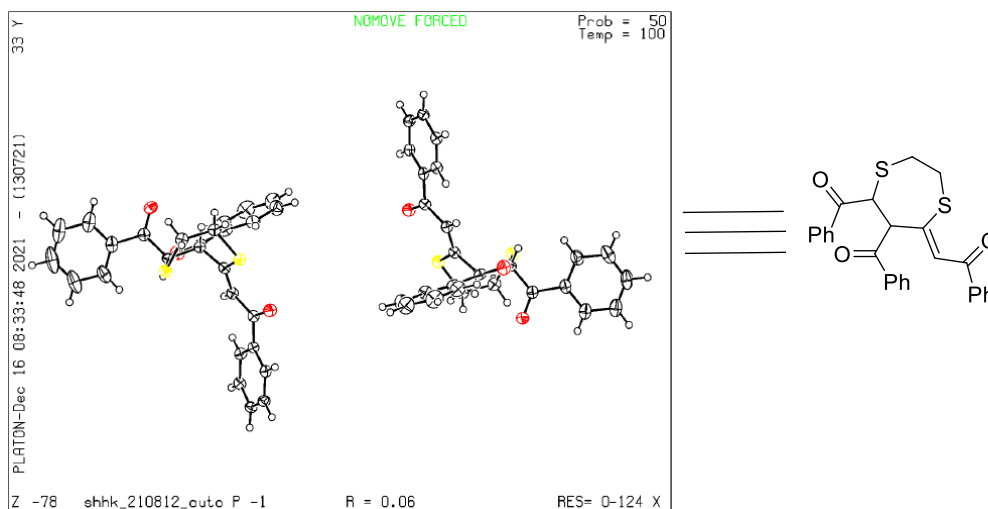
Correction method= # Reported T Limits: Tmin=0.655 Tmax=1.000  
 AbsCorr = MULTI-SCAN

Data completeness= 1.76/0.99 Theta(max)= 77.026

R(reflections)= 0.0616 ( 5883) wR2(reflections)= 0.1606 ( 7487)

S = 1.064 Npar= 445

Crystallographic Data for Compound **5'** (CCDC: 2129099)



**Datablock: shhk\_210812\_auto**

Bond precision: C-C = 0.0037 Å      Wavelength=1.54184  
 Cell:            a=10.2253 (2)      b=11.0686 (2)      c=22.4374 (5)  
                   alpha=103.079 (2)    beta=97.132 (2)    gamma=100.779 (2)  
 Temperature:    100 K

	Calculated	Reported
Volume	2392.88 (9)	2392.88 (9)
Space group	P -1	P -1
Hall group	-P 1	-P 1
Moiety formula	C27 H22 O3 S2 [+ solvent]	C27 H22 O3 S2
Sum formula	C27 H22 O3 S2 [+ solvent]	C27 H22 O3 S2
Mr	458.57	458.56
Dx, g cm <sup>-3</sup>	1.273	1.273
Z	4	4
Mu (mm <sup>-1</sup> )	2.222	2.222
F000	960.0	960.0
F000'	965.13	
h, k, lmax	12, 13, 28	12, 13, 27
Nref	9921	9400
Tmin, Tmax	0.539, 0.895	0.711, 1.000
Tmin'	0.489	

Correction method= # Reported T Limits: Tmin=0.711 Tmax=1.000  
 AbsCorr = MULTI-SCAN

Data completeness= 0.947      Theta(max)= 75.502

R(reflections)= 0.0566 ( 8056)      wR2(reflections)=  
 0.1597 ( 9400)

S = 1.084      Npar= 599