Research Article

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# Double [3 + 2] cycloadditions for diastereoselective synthesis of spirooxindole-pyrrolizidines

## Supplementary material

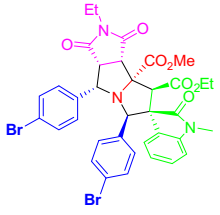
### S1 General information

All solvents were used as received from commercial sources without further purification. $^{1}$H-NMR and $^{13}$C-NMR spectra were detected on Agilent NMR spectrometers (400 and 106 MHz, respectively) instruments internally referenced to $SiMe_4$, chloroform, and dimethyl sulfoxide signals. Low resolution mass spectra on an Agilent 2100 LC were recorded in APCI (atmospheric pressure chemical ionization). The high-resolution mass spectra were obtained on a Waters Micromass GCT Premier. All products were purified on Agela Flash System with Venusil PrepG C18 column (10 μm, 120 Å, 21.2 mm × 250 mm).

### S2 General procedure for products 1 and 7

To a solution of TEA (1.25 mmol), glycine ester hydrochloride **2** (1.2 mmol), and aldehydes **4** (1.1 mmol) in 5 mL of MeCN was added maleimides **3** (1.0 mmol). The reaction solution was stirred at 125°C for 15 min under microwave heating. Upon the completion of the reaction as monitored by LC-MS. To the reaction solution were added aldehydes **4** or **4b′** (1.1 mmol), olefinic oxindoles **6** (1.0 mmol) and TFA (1.0 mmol), and then heated under conventional heating in the sealed vessels at 125°C for 18 h. The reaction mixture was evaporated to remove solvents, and the concentrated residue was isolated by Agela Flash System to give product **1** and **7**.

### S3 Characterization of products




*Compound **1a**:* white solid (62% yield). $^{1}$H NMR (400 MHz, $CDCl_3$) $\delta$ 7.33–7.29 (m, 1H), 7.20–7.09 (m, 5H), 7.04 (dt, $J$ = 7.6, 1.1 Hz, 1H), 6.98–6.93 (m, 2H), 6.89–6.84 (m, 1H), 6.80 (d, $J$ = 7.9 Hz, 2H), 5.28 (d, $J$ = 12.2 Hz, 1H), 4.45 (d, $J$ = 11.4 Hz, 1H), 4.26 (dd, $J$ = 8.0, 1.0 Hz, 1H), 4.03 (dd, $J$ = 12.2, 1.0 Hz, 1H), 3.62–3.54 (m, 2H), 3.50 (dd, $J$ = 7.9, 1.0 Hz, 1H), 3.33 (s, 3H), 3.21 (s, 3H), 3.15–3.08 (m, 1H), 2.99–2.91 (m, 1H), 0.77–0.71 (m, 3 t, $J$ = 7.2 Hz, 3H), 0.63–0.58 (t, $J$ = 7.1 Hz, 3H). $^{13}$C NMR (101 MHz, $CDCl_3$) $\delta$ 176.4, 174.2, 173.4, 168.6, 168.2, 143.1, 138.4, 133.1, 130.8, 130.6, 130.3, 129.3, 129.1, 128.6, 123.6, 122.6, 122.1, 121.1, 108.0, 84.9, 67.2, 65.4, 63.9, 60.7, 54.4, 54.0, 51.0, 50.5, 33.7, 27.0, 13.4, 12.3. HRMS (ESI-TOF, *m/z*): $[M + H]^+$ calcd for $C_{36}H_{33}Br_2N_3O_7$ 778.0764, found: 778.0759.

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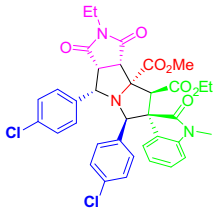
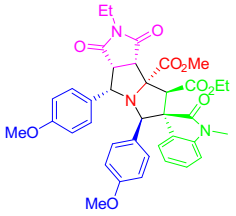
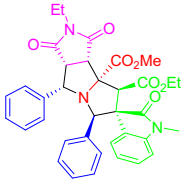


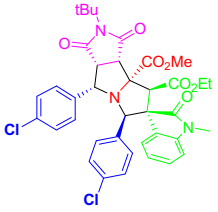
*Compound* ***1b:*** white solid (66% yield). $^1$H NMR (400 MHz, $CDCl_3$) $\delta$ 7.33–7.27 (m, 1H), 7.20–7.15 (m, 1H), 7.06–6.94 (m, 7H), 6.86 (d, $J$ = 7.9 Hz, 3H), 5.30 (d, $J$ = 12.2 Hz, 1H), 4.48 (d, $J$ = 11.4 Hz, 1H), 4.25 (ddd, $J$ = 11.4, 7.9, 0.9 Hz, 1H), 4.04 (dd, $J$ = 12.2, 0.9 Hz, 1H), 3.58 (ddd, $J$ = 7.1, 1.6, 0.9 Hz, 2H), 3.50 (dd, $J$ = 7.9, 0.9 Hz, 1H), 3.32 (s, 3H), 3.20 (s, 3H), 3.16–3.09 (m, 1H), 2.98–2.89 (m, 1H), 0.73 (t, $J$ = 7.2, 3H), 0.60 (t, $J$ = 7.1, 3H). $^{13}$C NMR (101 MHz, $CDCl_3$) $\delta$ 176.4, 174.3, 173.4, 168.6, 168.2, 143.1, 137.9, 133.9, 132.9, 132.6, 129.1, 128.9, 128.6, 127.9, 127.6, 123.7, 122.6, 108.0, 84.9, 67.2, 65.3, 63.9, 60.7, 54.4, 54.1, 51.0, 50.5, 33.7, 27.0, 13.4, 12.3. HRMS (ESI-TOF, *m/z*): $[M + H]^+$ calcd for $C_{36}H_{33}Cl_2N_3O_7$ 690.1774, found: 690.1776.



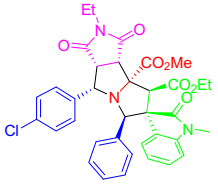
*Compound* ***1c:*** white solid (57% yield). $^1$H NMR (400 MHz, $CDCl_3$) $\delta$ 7.28 (td, $J$ = 7.7, 1.2 Hz, 1H), 7.22 (ddd, $J$ = 7.7, 1.2, 0.5 Hz, 1H), 7.05–6.98 (m, 3H), 6.86–6.82 (m, 3H), 6.55–6.47 (m, 4H), 5.30 (d, $J$ = 12.2 Hz, 1H), 4.52 (d, $J$ = 11.3 Hz, 1H), 4.22 (dd, $J$ = 11.3, 7.8 Hz, 1H), 4.01 (d, $J$ = 12.2 Hz, 1H), 3.67 (s, 3H), 3.64 (s, 3H), 3.58 (d, $J$ = 2.0 Hz, 1H), 3.48 (s, 2H), 3.32 (s, 3H), 3.19 (s, 3H), 3.14–3.08 (m, 1H), 2.94–2.87 (m, 1H), 0.71 (t, $J$ = 7.2 Hz, 3H), 0.61 (t, $J$ = 7.1 Hz, 3H). $^{13}$C NMR (101 MHz, $CDCl_3$) $\delta$ 176.6, 174.7, 173.9, 168.9, 168.5, 158.9, 158.5, 143.1, 131.9, 128.9, 128.8, 128.7, 126.5, 123.9, 122.5, 113.02, 112.70, 107.81, 84.8, 67.4, 65.2, 64.2, 60.5, 55.1, 55.1, 54.6, 54.5, 50.8, 50.8, 33.5, 30.9, 27.0, 13.4, 12.3. HRMS (ESI-TOF, *m/z*): $[M + H]^+$ calcd for $C_{38}H_{39}N_3O_9$ 682.2765, found: 682.2761.



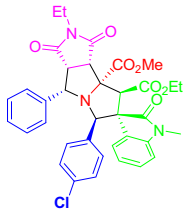
*Compound* ***1d:*** white solid (65% yield). $^1$H NMR (400 MHz, $CDCl_3$) $\delta$ 7.32–7.27 (m, 1H), 7.23 (dd, $J$ = 7.7, 1.2 Hz, 1H), 7.13–7.08 (m, 2H), 7.06–7.01 (m, 1H), 6.99–6.89 (m, 8H), 6.86 (d, $J$ = 7.9 Hz, 1H), 5.37 (d, $J$ = 12.1 Hz, 1H), 4.56 (d, $J$ = 11.4 Hz, 1H), 4.27 (ddd, $J$ = 11.4, 7.9, 1.1 Hz, 1H), 4.09 (dd, $J$ = 12.2, 1.1 Hz, 1H), 3.63–3.55 (m, 2H), 3.54–3.49 (m, 1H), 3.33 (s, 3H), 3.20 (s, 3H), 3.09 (ddd, $J$ = 13.3, 7.2, 1.1 Hz, 1H), 2.87 (ddd, $J$ = 13.3, 7.2, 1.1 Hz, 1H), 0.68 (t, $J$ = 7.2 Hz, 3H), 0.60 (t, $J$ = 7.1 Hz, 3H). $^{13}$C NMR (101 MHz, $CDCl_3$) $\delta$ 176.6, 174.5, 173.7, 168.8, 168.4, 143.1, 139.4, 134.1, 128.9, 128.9, 128.7, 127.7, 127.6, 127.6, 127.3, 126.9, 123.9, 122.5, 107.8, 85.0, 67.9, 65.9, 64.1, 60.5, 54.6, 54.3, 50.8, 50.7, 33.6, 27.0, 13.4, 12.2.



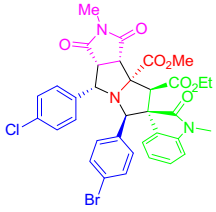
*Compound* ***1e:*** white solid (53% yield). $^1$H NMR (400 MHz, $CDCl_3$) $\delta$ 7.32–7.27 (m, 1H), 7.21–7.17 (m, 1H), 7.07–6.94 (m, 9H), 6.85 (d, $J$ = 7.8 Hz, 1H), 5.33–5.29 (m, 1H), 4.46 (d, $J$ = 11.3 Hz, 1H), 4.20–4.11 (m, 1H), 3.97 (d, $J$ = 12.2 Hz, 1H), 3.62–3.54 (m, 2H), 3.42 (dd, $J$ = 8.3, 1.0 Hz, 1H), 3.32 (s, 3H), 3.16 (s, 3H), 1.09 (s, 9H), 0.63 (t, $J$ = 7.1 Hz, 3H). $^{13}$C NMR (101 MHz, $CDCl_3$) $\delta$ 176.4, 175.1, 174.0, 168.9, 168.2, 143.1, 138.1, 133.8, 132.8, 130.8, 129.3, 129.0, 128.9, 128.7, 127.9, 127.9, 127.6, 127.4, 123.7, 122.5, 107.9, 84.9, 67.2, 65.2, 63.9, 60.6, 58.3, 54.7, 54.4, 50.9, 50.8, 28.1, 27.7, 27.0, 13.4.



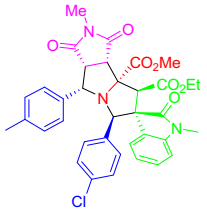
*Compound* ***7a:*** white solid (66% yield). $^1$H NMR (400 MHz, $CDCl_3$) $\delta$ 7.30 (tt, $J$ = 7.8, 1.1 Hz, 1H), 7.22 (d, $J$ = 7.5 Hz, 1H), 7.11–7.07 (m, 2H), 7.06–6.92 (m, 6H), 6.87 (d, $J$ = 8.3 Hz, 3H), 5.35 (d, $J$ = 12.2 Hz, 1H), 4.54 (d, $J$ = 11.4 Hz, 1H), 4.26 (dd, $J$ = 11.4, 7.9 Hz, 1H), 4.07 (d, $J$ = 12.2 Hz, 1H), 3.62–3.56 (m, 2H), 3.53 (d, $J$ = 0.8 Hz, 1H), 3.33 (s, 3H), 3.21 (s, 3H), 3.15–3.09 (m, 1H), 2.92 (dd, $J$ = 13.6, 7.0 Hz, 1H), 0.69 (t, $J$ = 7.2 Hz, 3H), 0.63 (t, $J$ = 7.1 Hz, 3H). $^{13}$C NMR (101 MHz, $CDCl_3$) $\delta$ 176.5, 174.4, 173.53, 168.7, 168.3, 143.0, 138.1, 133.9, 132.6, 128.9, 128.8, 127.9, 127.7, 127.4, 123.8, 122.5, 107.9, 84.9, 67.8, 65.2, 64.0, 60.5, 54.5, 54.2, 50.9, 50.6, 33.6, 27.0, 13.4, 12.3. HRMS (ESI-TOF, *m/z*): $[M + H]^+$ calcd for $C_{36}H_{34}ClN_3O_7$ 656.2164, found: 656.2168.



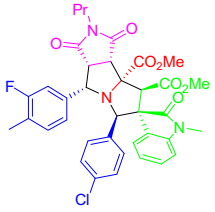
*Compound* ***7b:*** off-white solid (62% yield). $^1$H NMR (400 MHz, $CDCl_3$) $\delta$ 7.32–7.27 (m, 1H), 7.19 (ddd, $J$ = 7.7, 1.3, 0.5 Hz, 1H), 7.06–6.97 (m, 6H), 6.94–6.84 (m, 5H), 5.34–5.29 (m, 1H), 4.50 (d, $J$ = 11.4 Hz, 1H), 4.31–4.24 (m, 1H), 4.07 (d, $J$ = 12.2 Hz, 1H), 3.62–3.55 (m, 2H), 3.49 (d, $J$ = 7.9 Hz, 1H), 3.33 (s, 3H), 3.21 (s, 3H), 3.13 (dd, $J$ = 13.4, 7.2 Hz, 1H), 2.95-2.88 (m, 1H), 0.71 (t, $J$ = 7.2 Hz, 3H), 0.61 (t, $J$ = 7.1 Hz, 3H). $^{13}$C NMR (101 MHz, $CDCl_3$) $\delta$ 176.5, 174.5, 173.6, 168.7, 168.3, 143.1, 139.2, 133.6, 132.7, 130.1, 129.0, 128.8, 127.7, 127.6, 127.5, 127.1, 123.7, 122.5, 107.9, 85.0, 67.3, 66.0, 64.1, 60.6, 54.5, 54.1, 50.9, 50.6, 33.7, 27.0, 13.4, 12.3. HRMS (ESI-TOF, *m/z*): $[M + H]^+$ calcd for $C_{36}H_{34}ClN_3O_7$ 656.2164, found: 656.2163.



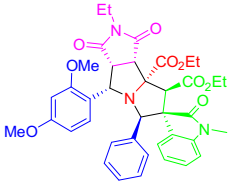
*Compound* ***7c:*** white solid (69% yield). $^1$H NMR (400 MHz, $CDCl_3$) $\delta$ 7.33–7.28 (m, 1H), 7.17 (d, $J$ = 7.8 Hz, 1H), 7.13–7.09 (m, 2H), 7.01 (tt, $J$ = 7.5, 1.1 Hz, 3H), 6.97–6.92 (m, 2H), 6.87 (d, $J$ = 7.8 Hz, 1H), 6.78 (d, $J$ = 7.7 Hz, 2H), 5.29 (d, $J$ = 12.2 Hz, 1H), 4.46 (d, $J$ = 11.4 Hz, 1H), 4.28 (dd, $J$ = 11.3, 7.8 Hz, 1H), 4.05 (d, $J$ = 12.2 Hz, 1H), 3.62–3.55 (m, 2H), 3.51 (d, $J$ = 7.7 Hz, 1H), 3.33 (s, 3H), 3.21 (s, 3H), 2.46 (s, 3H), 0.61 (t, $J$ = 7.1 Hz, 3H). $^{13}$C NMR (101 MHz, $CDCl_3$) $\delta$ 176.4, 174.6, 173.7, 168.6, 168.2, 143.1, 138.1, 133.2, 133.0, 130.8, 130.3, 129.1, 128.6, 128.6, 127.7, 123.7, 122.6, 122.1, 108.0, 85.0, 67.2, 65.6, 63.9, 60.7, 54.3, 54.0, 51.0, 50.8, 27.1, 24.4, 13.4. HRMS (ESI-TOF, *m/z*): $[M + H]^+$ calcd for $C_{35}H_{31}ClBrN_3O_7$ 720.1112, found: 720.1109.



*Compound* ***7d:*** white solid (60% yield). $^1$H NMR (400 MHz, $CDCl_3$) $\delta$ 7.33–7.27 (m, 1H), 7.18 (d, $J$ = 7.7 Hz, 1H), 7.04–6.97 (m, 3H), 6.92–6.84 (m, 3H), 6.81 (d, $J$ = 7.6 Hz, 2H), 6.67 (d, $J$ = 7.7 Hz, 2H), 5.31 (d, $J$ = 12.1 Hz, 1H), 4.44 (d, $J$ = 11.5 Hz, 1H), 4.27 (dd, $J$ = 11.6, 7.9 Hz, 1H), 4.06 (d, $J$ = 12.2 Hz, 1H), 3.59 (dtt, $J$ = 7.2, 5.4, 3.0 Hz, 2H), 3.49 (d, $J$ = 8.1 Hz, 1H), 3.32 (s, 3H), 3.20 (s, 3H), 2.44 (s, 3H), 2.20 (s, 3H), 0.60 (t, $J$ = 7.1 Hz, 3H). $^{13}$C NMR (101 MHz, $CDCl_3$) $\delta$ 176.5, 174.8, 174.0, 168.7, 168.4, 143.1, 136.7, 136.3, 133.5, 132.8, 130.0, 129.0, 128.7, 128.2, 127.7, 127.0, 123.8, 122.5, 107.9, 85.1, 67.3, 66.2, 64.0, 60.6, 54.4, 54.1, 50.9, 50.9, 27.0, 24.3, 21.0, 13.4. HRMS (ESI-TOF, *m/z*): $[M + H]^+$ calcd for $C_{38}H_{34}ClN_2O_3$ 656.2164, found: 656.2164.

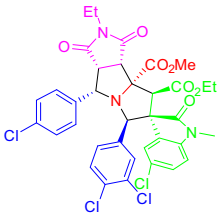


*Compound* ***7e:*** white solid (59% yield). $^1$H NMR (400 MHz, $CDCl_3$) $\delta$ 7.33–7.27 (m, 1H), 7.18–7.13 (m, 1H), 7.06–7.00 (m, 3H), 6.97–6.91 (m, 2H), 6.90–6.85 (m, 1H), 6.79 (dd, $J$ = 8.4, 7.3 Hz, 1H), 6.62 (d, $J$ = 10.7 Hz, 1H), 6.51–6.43 (m, 1H), 5.32 (d, $J$ = 12.2 Hz, 1H), 4.46 (d, $J$ = 11.4 Hz, 1H), 4.22 (dd, $J$ = 11.4, 8.0 Hz, 1H), 4.10 (d, $J$ = 12.2 Hz, 1H), 3.49–3.47 (m, 1H), 3.34 (s, 3H), 3.22 (s, 3H), 3.13–3.03 (m, 4H), 2.86 (ddd, $J$ = 13.2, 9.3, 6.1 Hz, 1H), 2.13 (s, 3H), 1.29–1.19 (m, 1H), 1.15–1.05 (m, 1H), 0.70 (t, $J$ = 7.4 Hz, 3H). $^{13}$C NMR (101 MHz, $CDCl_3$) $\delta$ 176.5, 174.5, 173.7, 168.9, 168.5, 142.9, 133.8, 132.6, 130.4, 130.3, 130.1, 129.0, 128.6, 127.8, 123.6, 123.5, 123.4, 122.9, 122.9, 122.5, 114.1, 113.9, 108.1, 85.0, 67.1, 65.4, 65.4, 64.1, 54.1, 54.1, 51.7, 50.9, 50.4, 40.4, 27.0, 20.5, 11.3. HRMS (ESI-TOF, *m/z*): $[M + H]^+$ calcd for $C_{37}H_{35}ClN_3O_7$ 688.2226, found: 688.222.

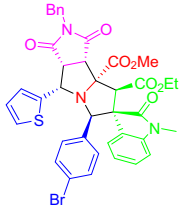


*Compound* ***7f:*** white solid (61% yield). $^1$H NMR (400 MHz, $CDCl_3$) $\delta$ 7.33–7.23 (m, 2H), 7.19–7.09 (m, 3H), 7.05–6.95 (m, 4H), 6.86 (dd, $J$ = 7.8, 1.0 Hz, 1H), 6.49 (dd, $J$ = 8.8, 3.2 Hz, 1H), 6.36 (d, $J$ = 8.8 Hz, 1H), 5.32 (d, $J$ = 12.2 Hz, 1H), 5.03 (d, $J$ = 11.3 Hz, 1H), 4.29 (dd, $J$ = 11.3, 7.9 Hz, 1H), 4.15 (d, $J$ = 12.2 Hz, 1H), 3.96 (dd, $J$ = 10.5, 7.2 Hz, 1H), 3.68 (s, 3H), 3.57 (dd, $J$ = 7.5, 2.7 Hz, 3H), 3.51–3.44 (m, 4H), 3.34 (s, 3H), 3.12 (dd, $J$ = 13.5, 7.1 Hz, 1H), 2.95 (dd, $J$ = 13.5, 7.0 Hz, 1H), 0.74–0.58 (m, 9H). $^{13}$C NMR (101 MHz, $CDCl_3$) $\delta$ 176.6, 174.5, 173.7, 168.6, 168.5,

153.0, 150.5, 143.3, 134.3, 129.3, 129.2, 128.9, 128.8, 127.5, 127.3, 123.9, 122.5, 114.3, 113.5, 110.9, 107.7, 84.9, 68.0, 60.4, 60.4, 56.0, 55.7, 54.6, 54.6, 49.8, 33.5, 27.0, 13.4, 13.1, 12.3.




*Compound* ***7g:*** white solid (55% yield). $^{1}$H NMR (400 MHz, $CDCl_3$) $\delta$ 7.32 (ddd, $J$ = 8.3, 2.1, 0.7 Hz, 1H), 7.16 (d, $J$ = 2.0 Hz, 1H), 7.14 (d, $J$ = 2.0 Hz, 1H), 7.07 (d, $J$ = 8.2 Hz, 1H), 7.02 (dd, $J$ = 8.7, 0.7 Hz, 2H), 6.93–6.88 (m, 1H), 6.83 (dd, $J$ = 11.6, 8.1 Hz, 3H), 5.23 (d, $J$ = 12.2 Hz, 1H), 4.45 (d, $J$ = 11.4 Hz, 1H), 4.20 (dd, $J$ = 11.4, 8.0 Hz, 1H), 4.05 (d, $J$ = 12.2 Hz, 1H), 3.71–3.64 (m, 2H), 3.43 (dd, $J$ = 8.0, 0.6 Hz, 1H), 3.33 (d, $J$ = 5.1 Hz, 6H), 3.19 (dd, $J$ = 13.5, 7.1 Hz, 1H), 3.01 (dd, $J$ = 13.5, 7.1 Hz, 1H), 0.79 (t, $J$ = 7.2 Hz, 3H), 0.70 (t, $J$ = 7.1 Hz, 3H). $^{13}$C NMR (101 MHz, $CDCl_3$) 176.0, 174.0, 173.2, 168.1, 167.9, 141.6, 137.5, 133.9, 133.3, 132.3, 132.1, 130.2, 129.6, 129.0, 128.8, 128.1, 127.8, 124.0, 109.0, 85.2, 66.7, 65.5, 64.1, 61.1, 54.0, 53.9, 51.2, 50.2, 33.9, 27.2, 13.4, 12.4.




*Compound* ***7h:*** white solid (49% yield). $^{1}$H NMR (400 MHz, $CDCl_3$) $\delta$ 7.31–7.26 (m, 1H), 7.22–7.11 (m, 8H), 7.10–7.06 (m, 2H), 7.02 (td, $J$ = 7.6, 1.0 Hz, 1H), 6.93 (dd, $J$ = 5.1, 1.2 Hz, 1H), 6.84 (d, $J$ = 7.5 Hz, 1H), 6.58 (dd, $J$ = 5.1, 3.6 Hz, 1H), 6.31 (d, $J$ = 3.3 Hz, 1H), 5.29 (s, 1H), 4.80 (d, $J$ = 11.0 Hz, 1H), 4.30–4.25 (m, 1H), 4.06–3.98 (m, 2H), 3.58 (dq, $J$ = 7.1, 3.6 Hz, 2H), 3.48 (d, $J$ = 0.7 Hz, 2H), 3.29 (s, 3H), 3.19 (s, 3H), 0.59 (t, $J$ = 7.1 Hz, 3H). $^{13}$C NMR (101 MHz, $CDCl_3$) $\delta$ 176.4, 173.8, 173.1, 168.1, 144.1, 143.1, 135.3, 133.1, 130.7, 129.1, 128.9, 128.4, 127.7, 126.2, 125.0, 124.7, 123.7, 122.6, 122.0, 107.9, 84.5, 67.3, 63.8, 61.7, 60.7, 54.2, 54.0, 51.0, 50.9, 42.2, 27.0, 13.4.

# S4 NMR spectra of products

S4 NMR spectra of products

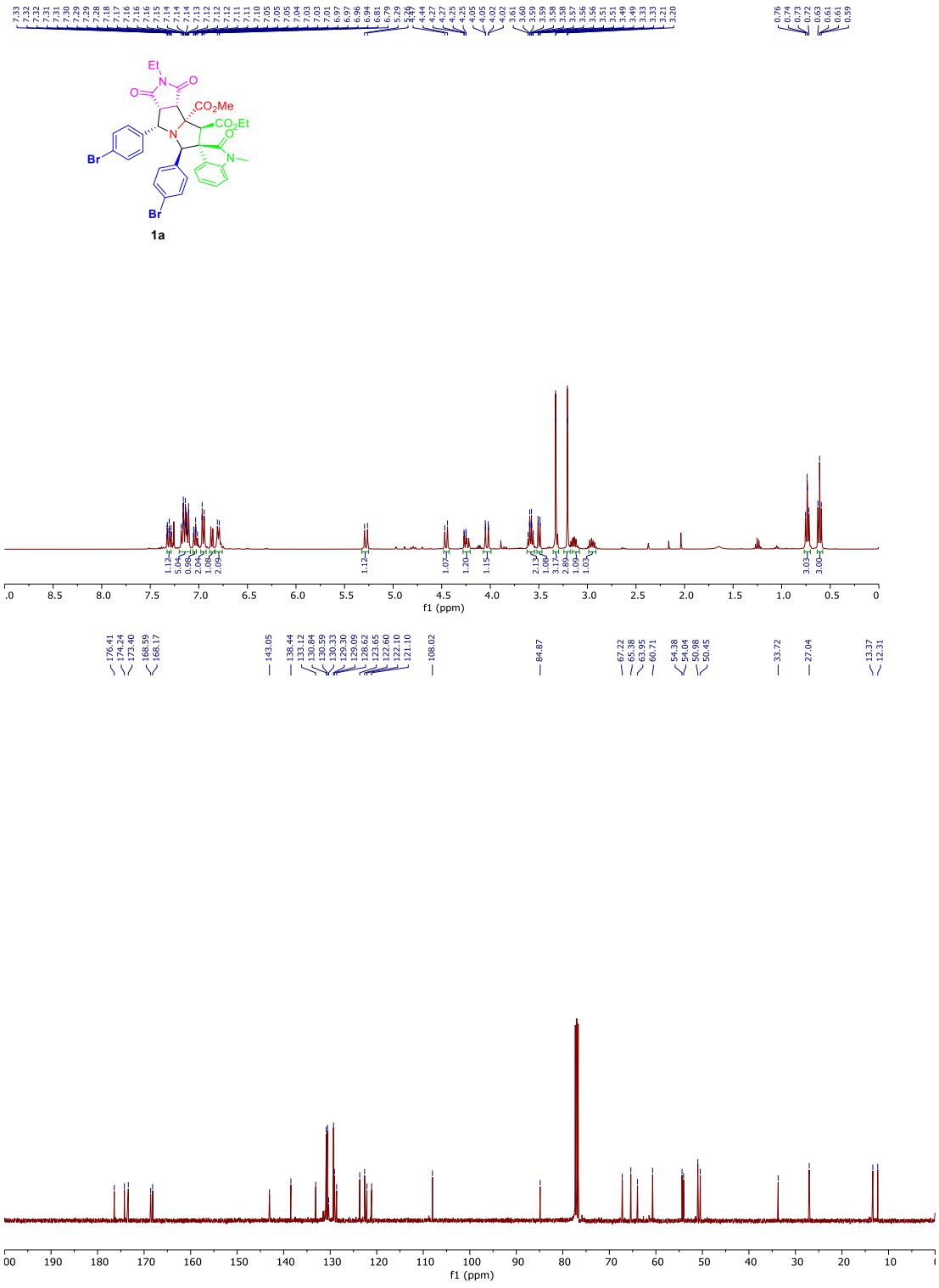



**Figure S1:** $^{1}$H- and $^{13}$C-NMR of compound **1a**.

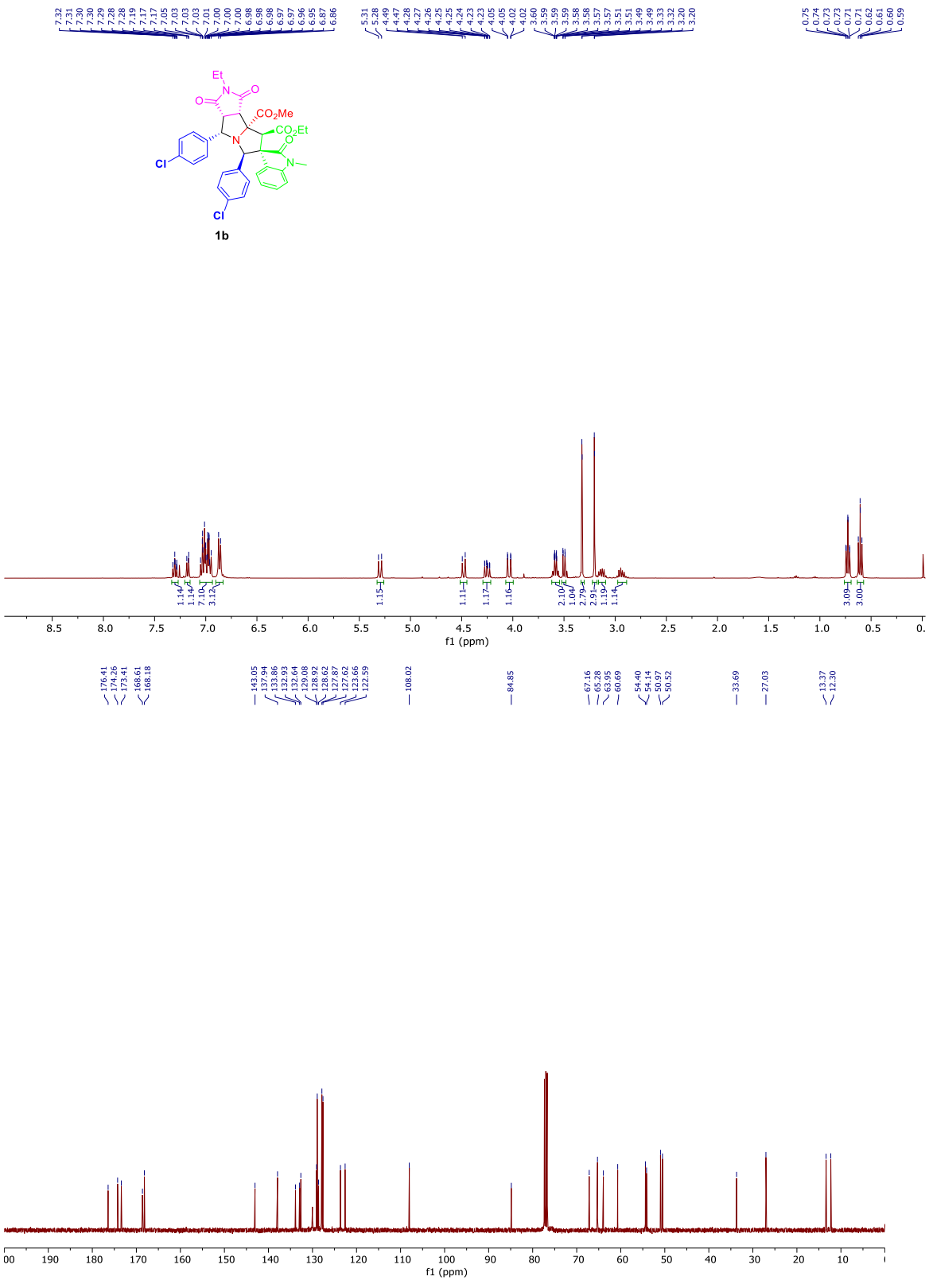



**Figure S2:** $^{1}$H- and $^{13}$C-NMR of compound **1b**.

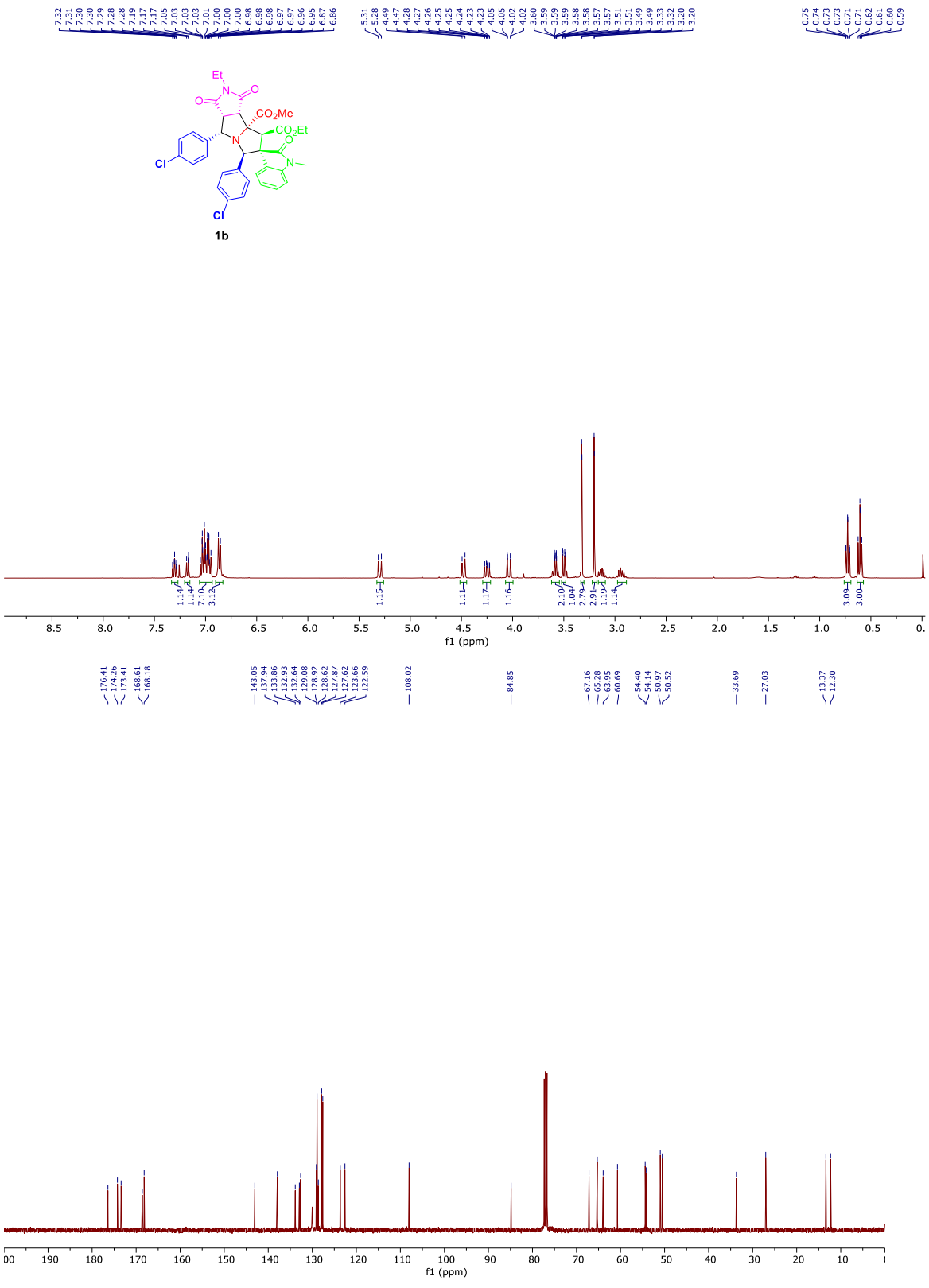



**Figure S3:** $^{1}$H- and $^{13}$C-NMR of compound **1c.**

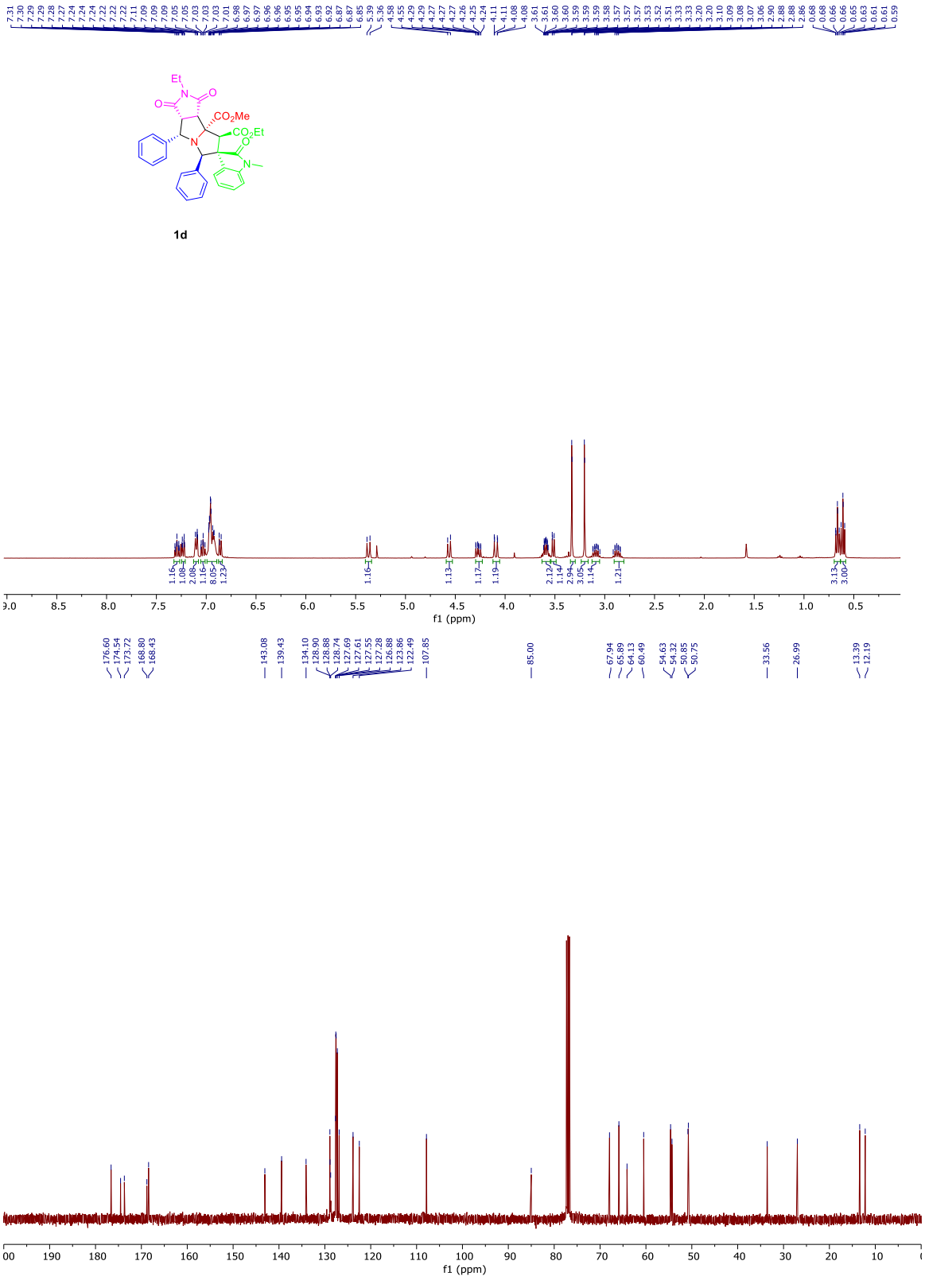



**Figure S4:** $^{1}$H- and $^{13}$C-NMR of compound **1d**.

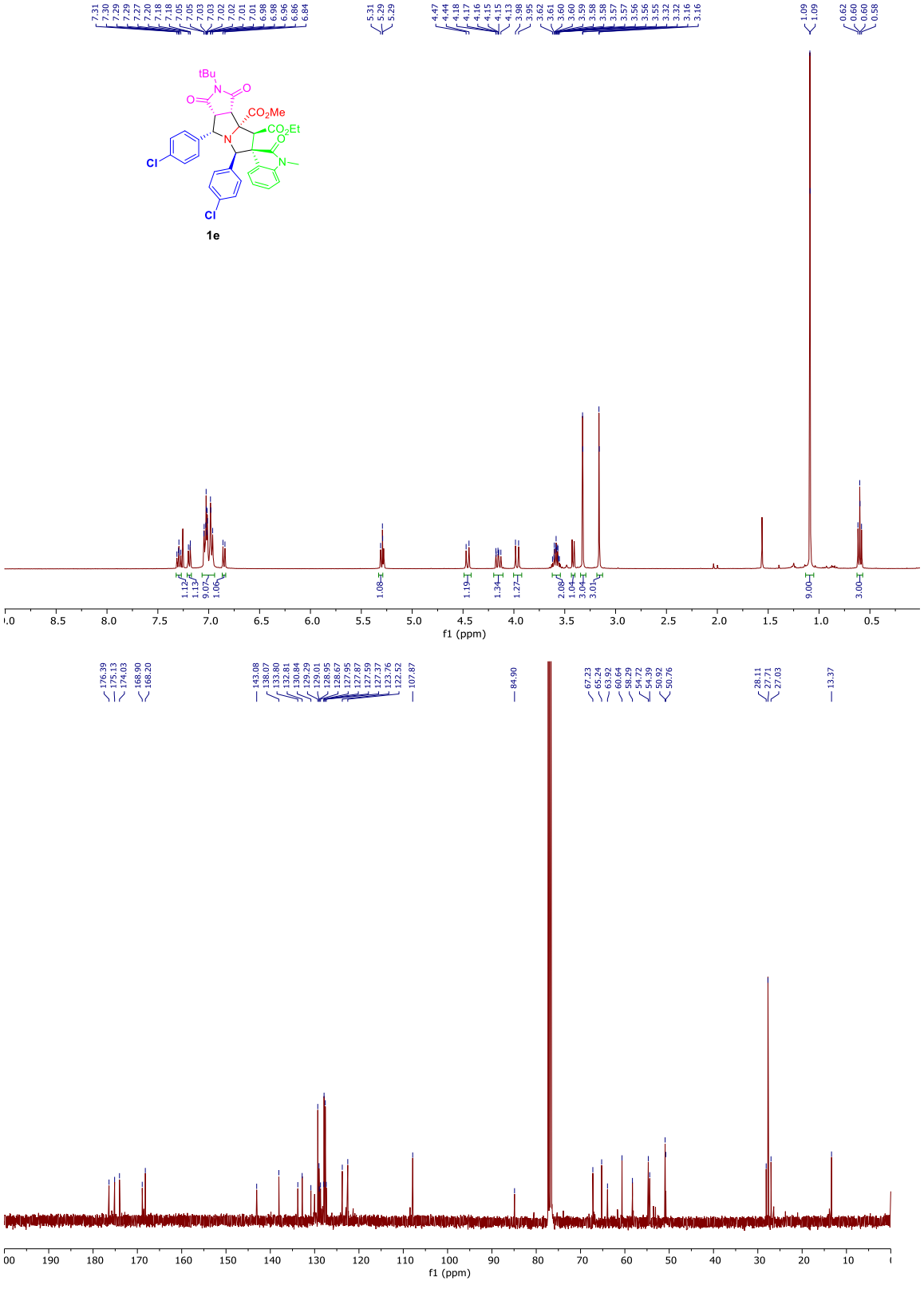



**Figure S5:** $^{1}$H- and $^{13}$C-NMR of compound **1e**.

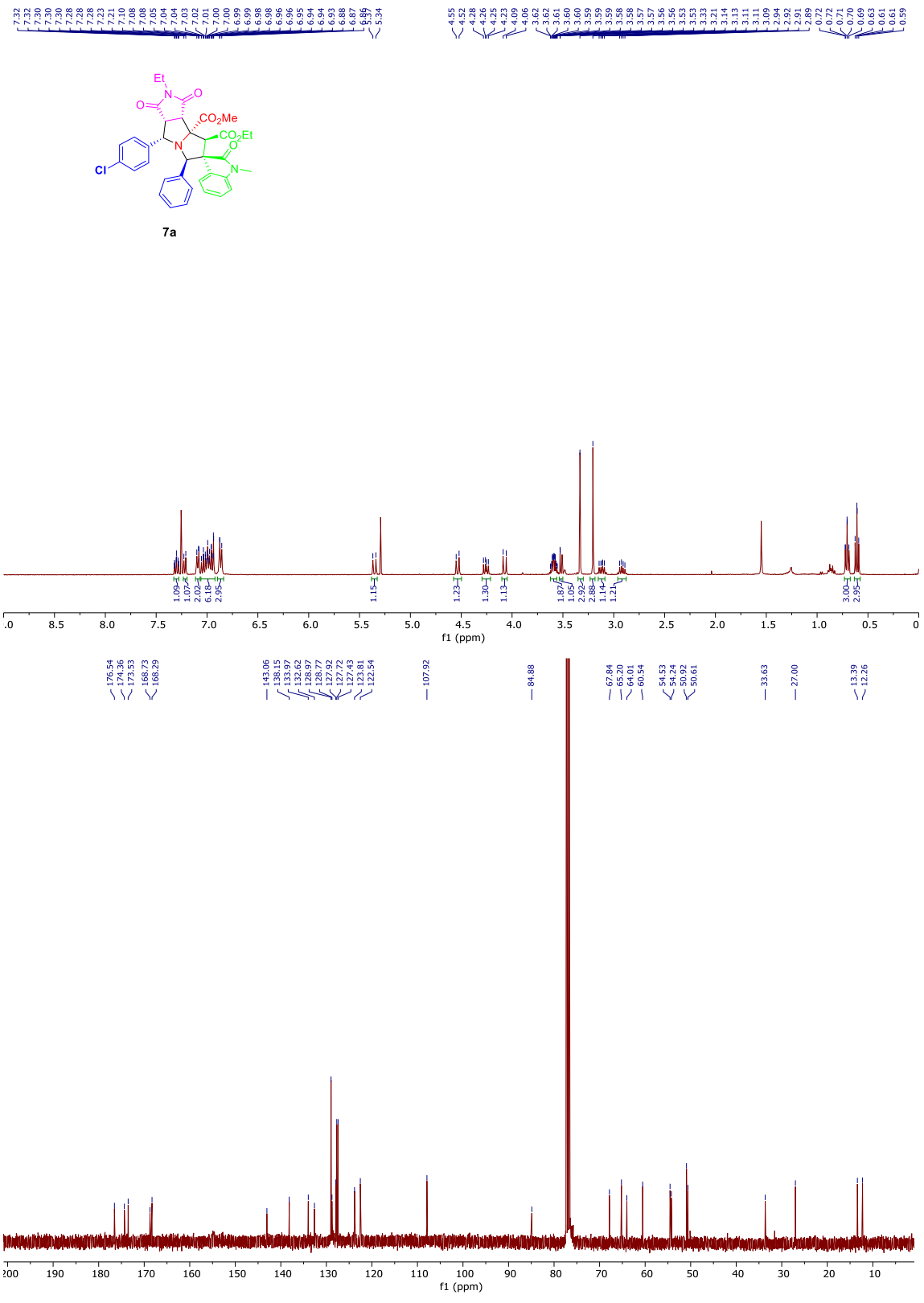



**Figure S6:** $^{1}$H- and $^{13}$C-NMR of compound **7a**.

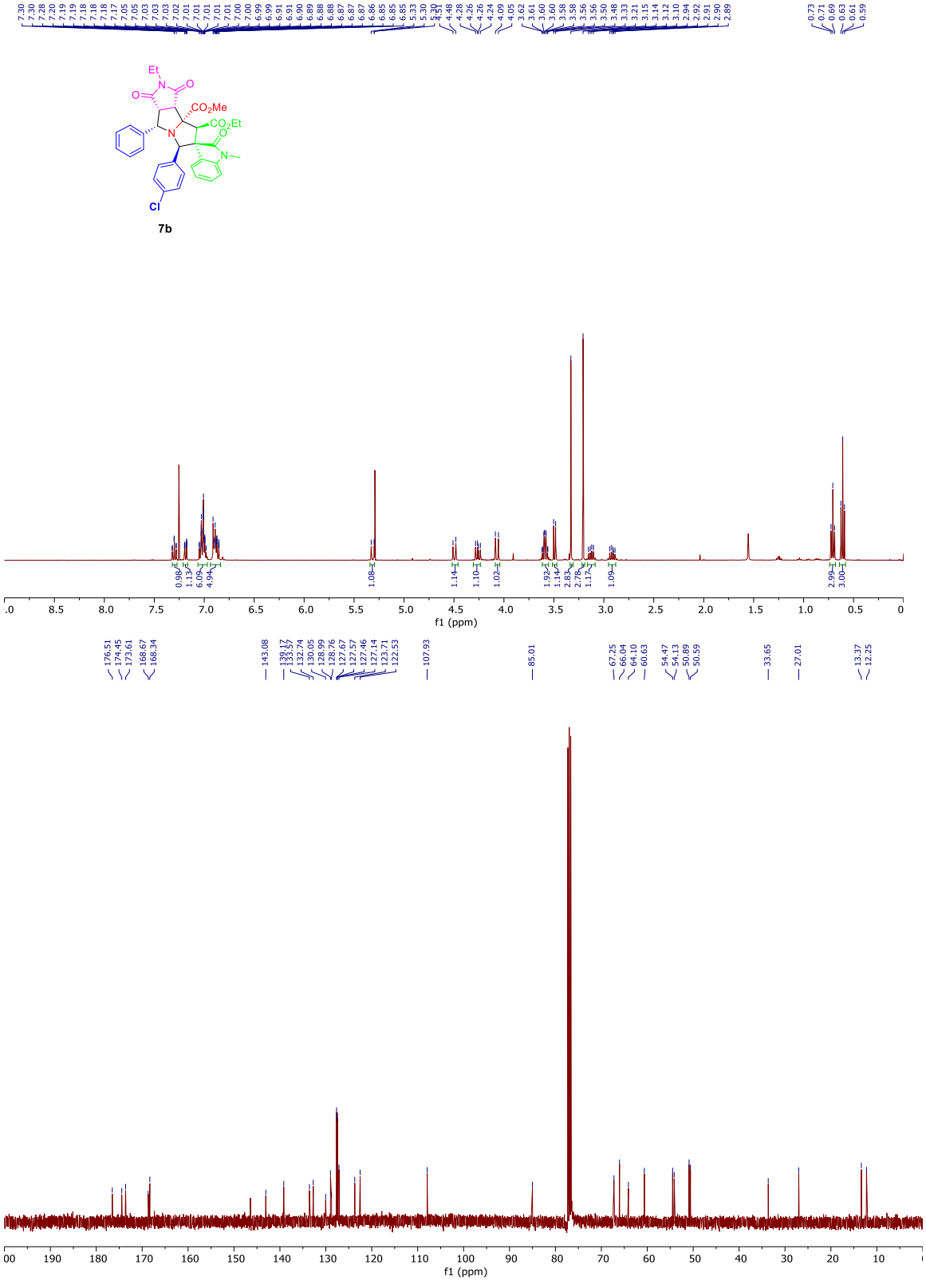



**Figure S7:** $^{1}$H- and $^{13}$C-NMR of compound **7b**.

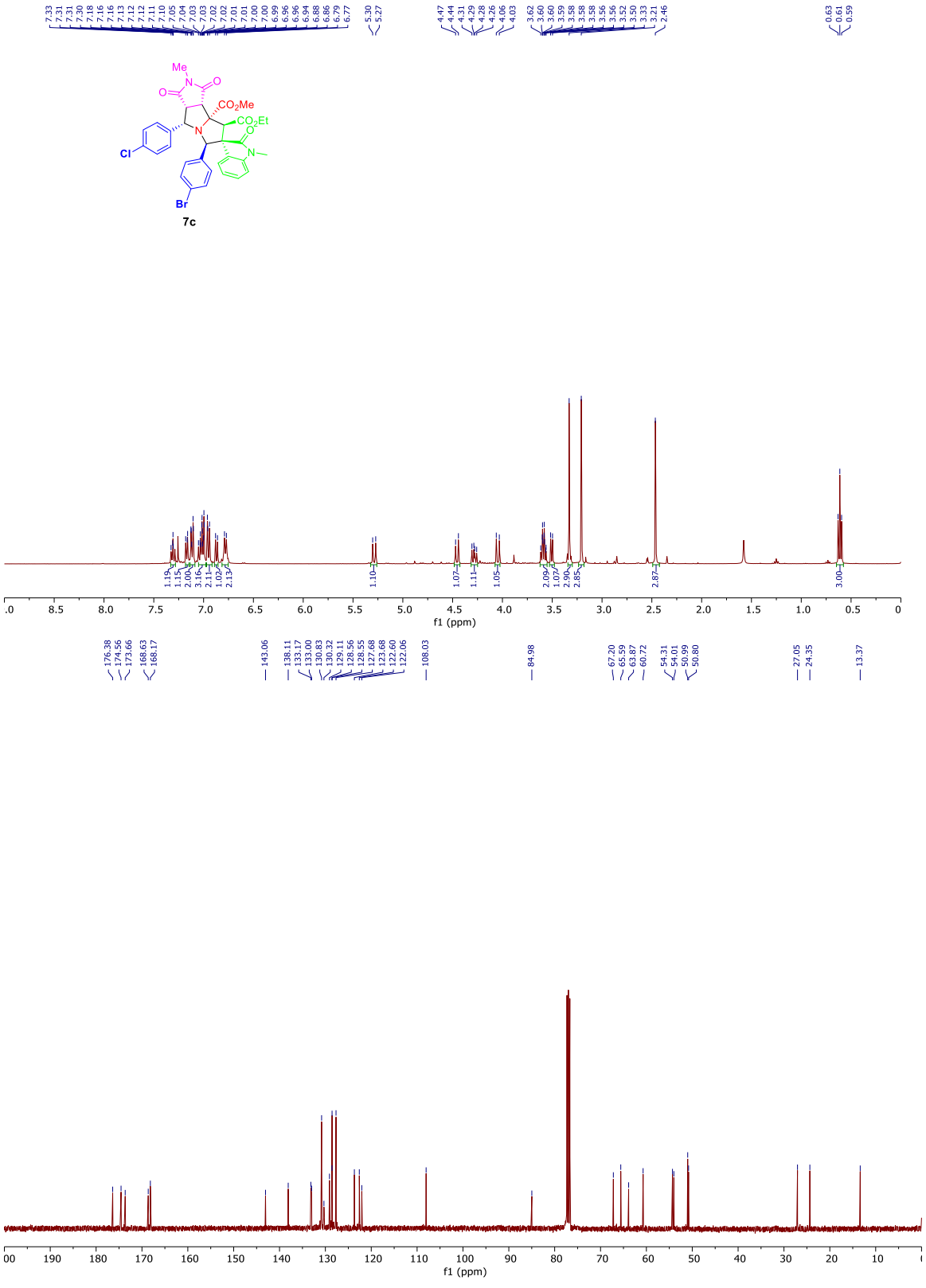



**Figure S8:** $^{1}$H- and $^{13}$C-NMR of compound **7c**.

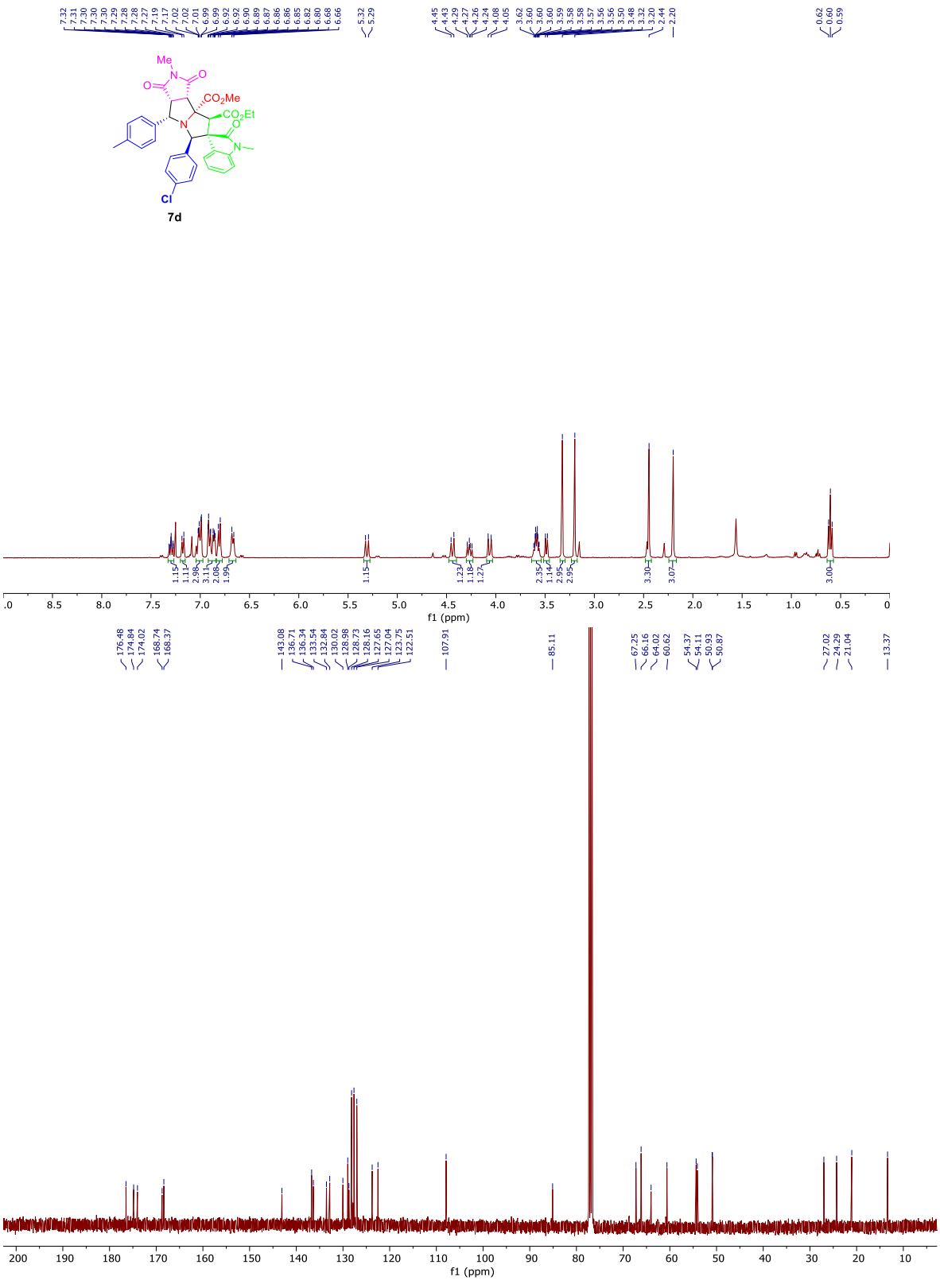



**Figure S9:** $^{1}$H- and $^{13}$C-NMR of compound **7d**.

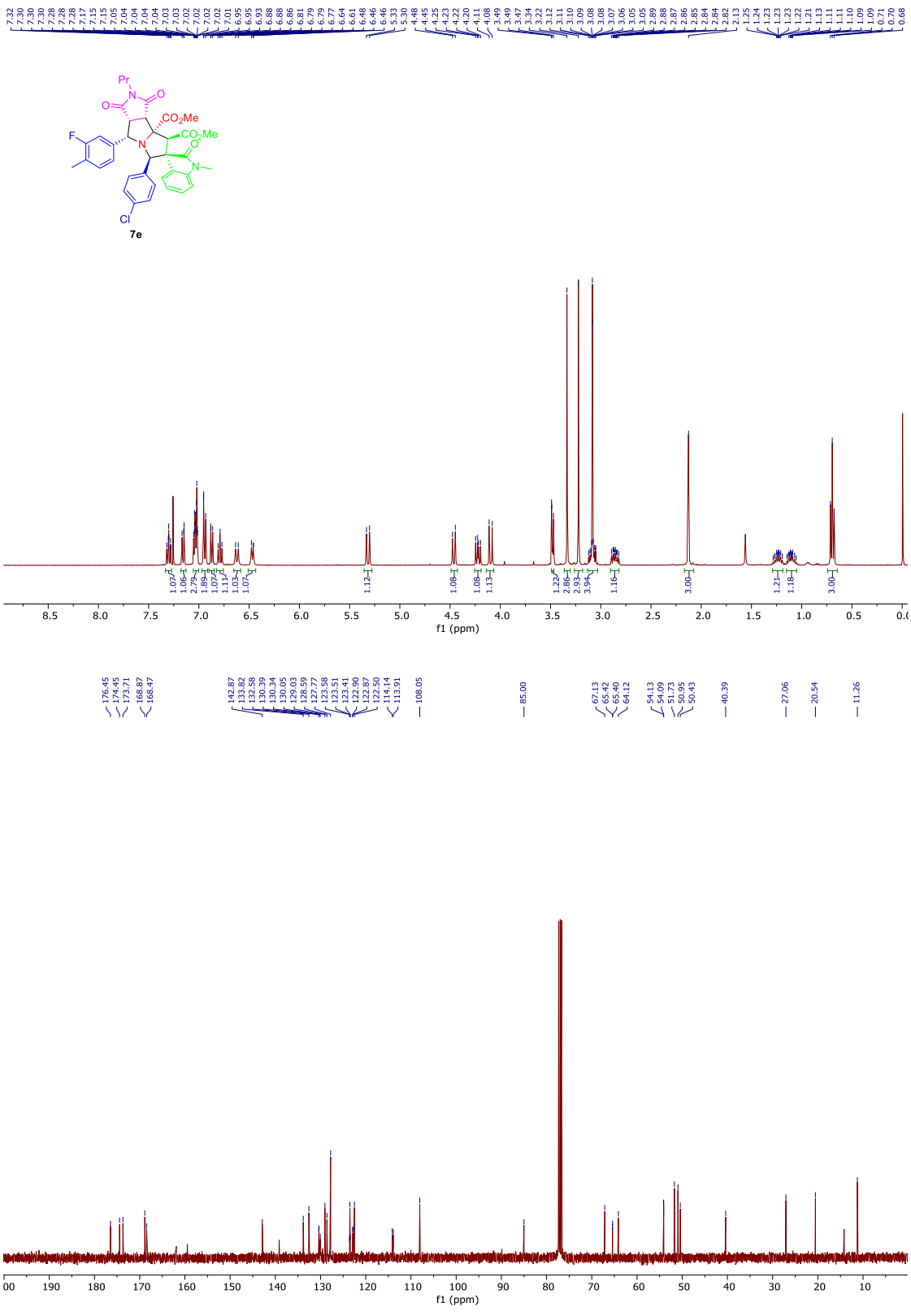



**Figure S10:** $^{1}$H- and $^{13}$C-NMR of compound **7e.**

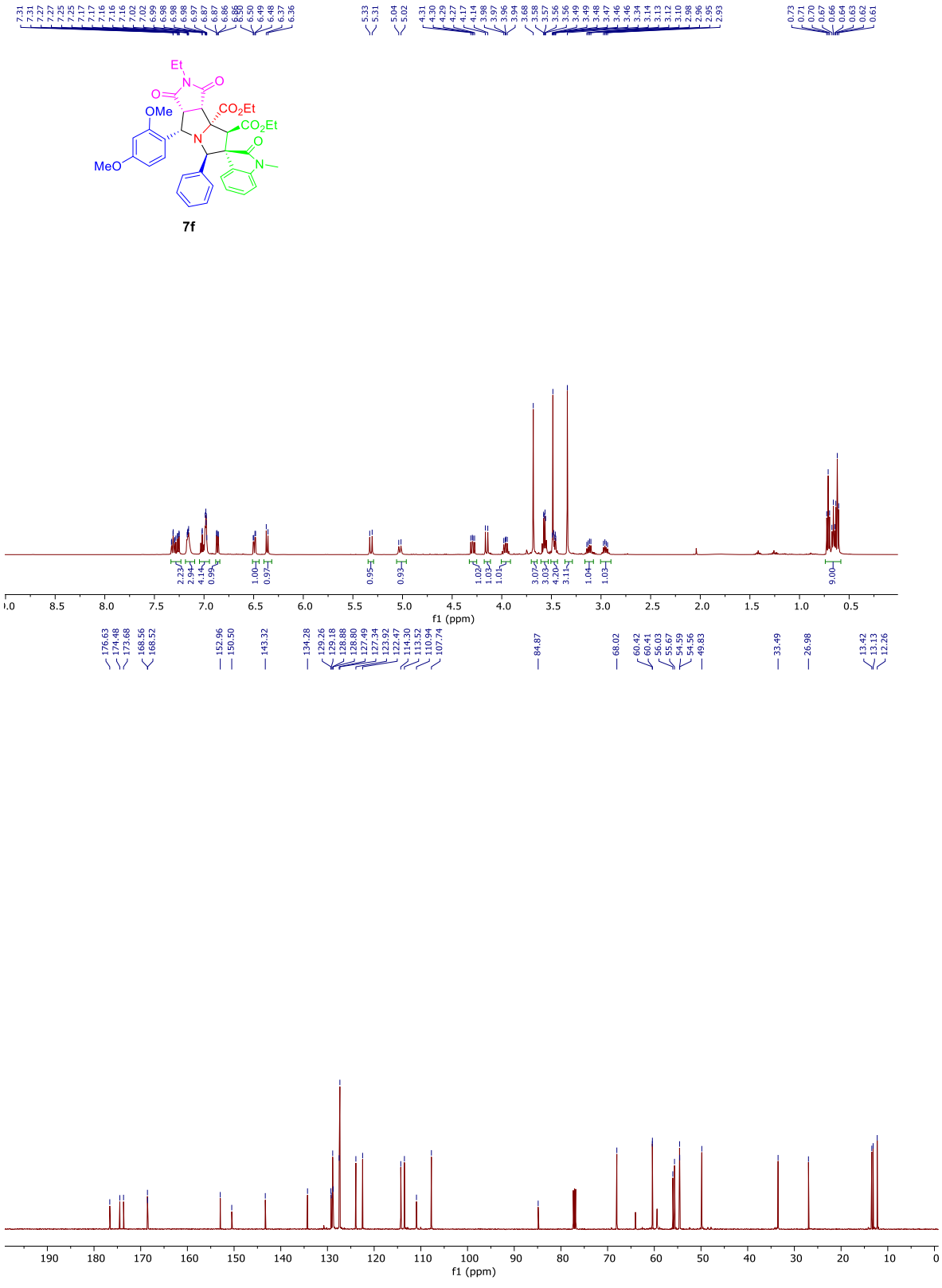



**Figure S11:** $^{1}$H- and $^{13}$C-NMR of compound **7f**.

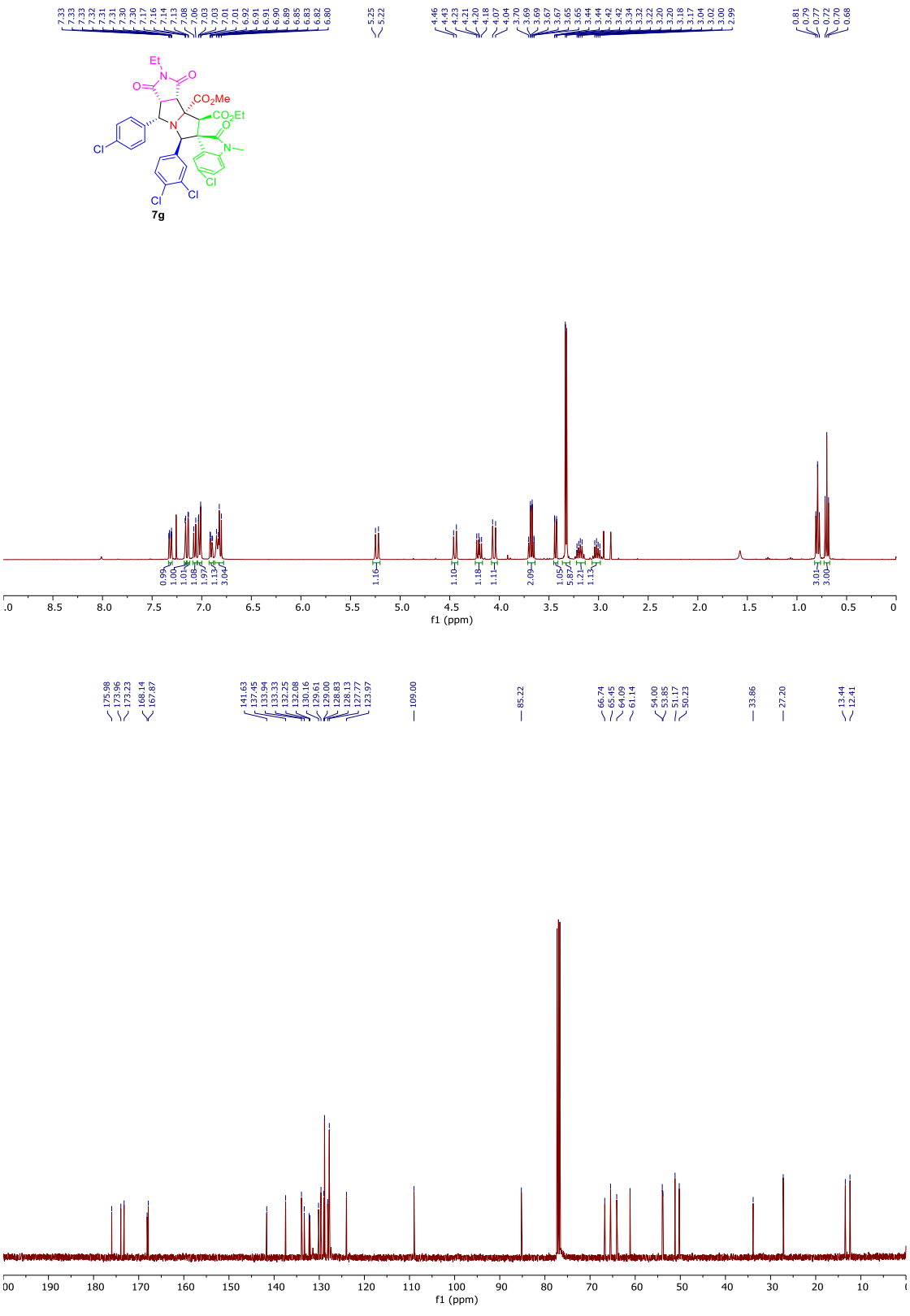



**Figure S12:** $^{1}$H- and $^{13}$C-NMR of compound **7g**.

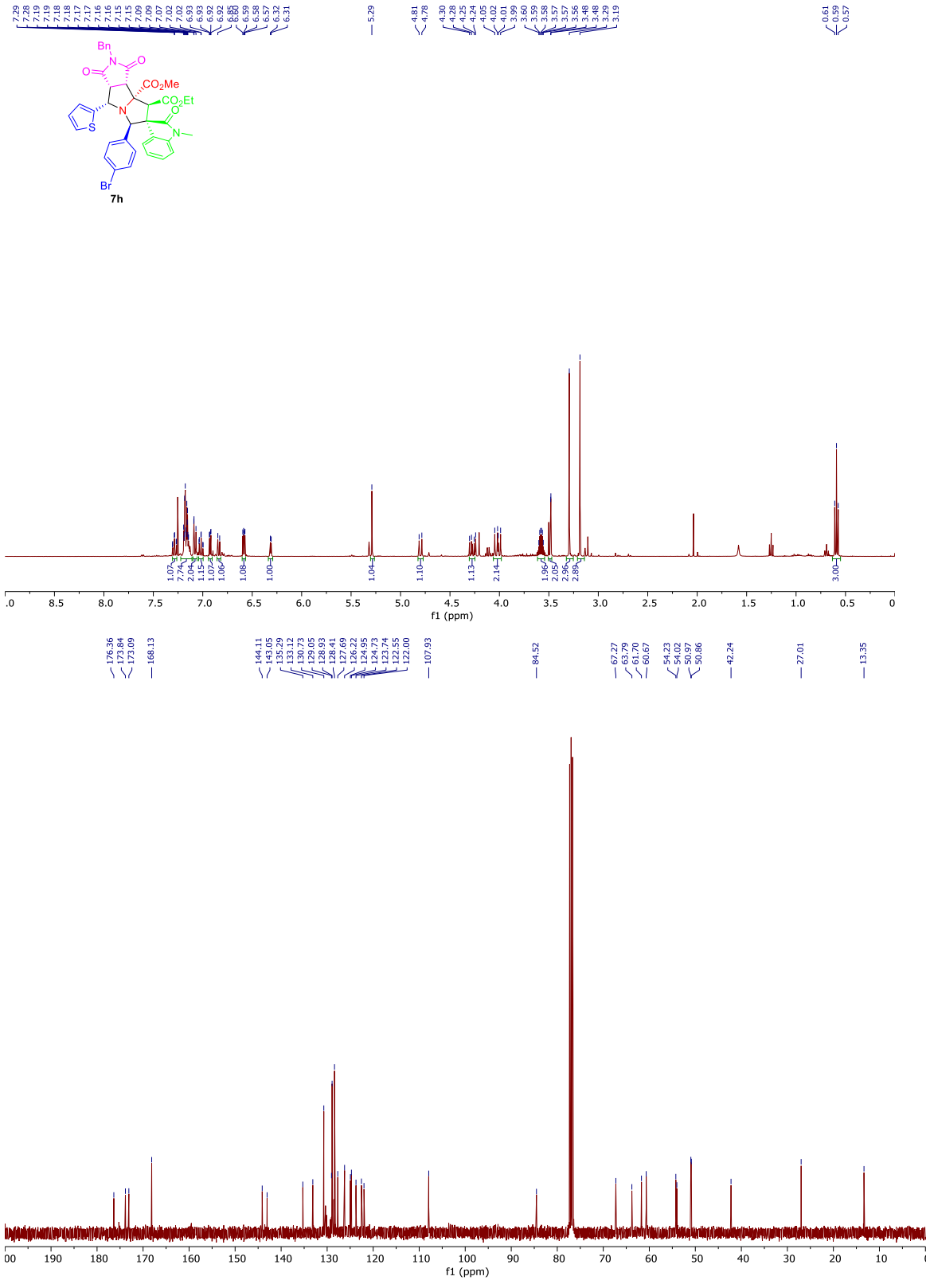



**Figure S13:** $^{1}$H- and $^{13}$C-NMR of compound **7h**.