

– Supporting Information –

**Programmable Deconstruction–Reconstruction Enables
Divergent Skeletal Editing of Pyridines into Multisubstituted
Benzenes**

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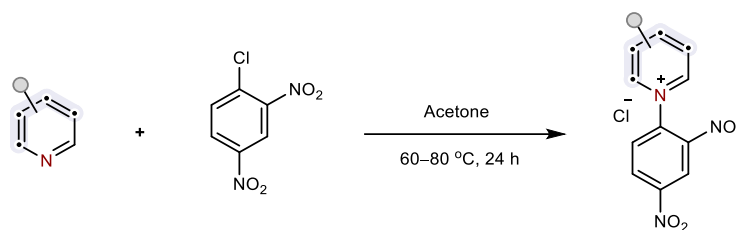
General information:

All non-aqueous reactions were carried out under an atmosphere of nitrogen in flame-dried glassware and were stirred using a magnetic stir plate. All reactions were carried out using commercial grade solvent unless otherwise noted. CH₃CN, DCE, and CH₂Cl₂ were dried over calcium hydride. Dry THF was prepared by distilling over sodium ketyl.

All reactions were monitored by thin layer chromatography (TLC) on WhatmanPartisil® K6F TLC plates (silica gel 60 Å, 0.25 mm thickness) and visualized using a UV lamp (366 or 254 nm) or by use of one of the following visualization reagents: PMA: 10 g phosphomolybdic acid/ 100 mL ethanol; KMnO₄: 0.75 g potassium permanganate, 5 g K₂CO₃, / 100mL water. Products were isolated by column chromatography (Merck silica gel 100-200µm). Yields refer to chromatographically and spectroscopically homogenous materials unless noted otherwise. ¹³C and ¹H NMR spectra were recorded on a Bruker400 or Bruker 500 MHz spectrometers. Chemical shift values (δ) are reported in ppm and calibrated to the residual solvent peak CDCl₃ δ = 7.2600 ppm for ¹H, δ = 77.16 ppm for ¹³C, DMSO-d₆ δ = 2.500 ppm for ¹H, δ = 39.500 ppm for ¹³C; or calibrated to tetramethylsilane (δ = 0.00 ppm). All NMR spectra were recorded at ambient temperature (290 K) unless otherwise noted. ¹H NMR spectra are reported as follows: chemical shift (multiplicity, coupling constant, integration). The following abbreviations are used to indicate multiplicities: s, singlet; d, doublet; t, triplet; q, quartet; quint, quintet; sext, sextet; sept, septet; m, multiplet; dd, doublet of doublet; dt, doublet of triplet; dq, doublet of quartet; td, triplet of doublet; tt, triplet of triplet; dq, doublet of quartet; br, broad; app, apparent.

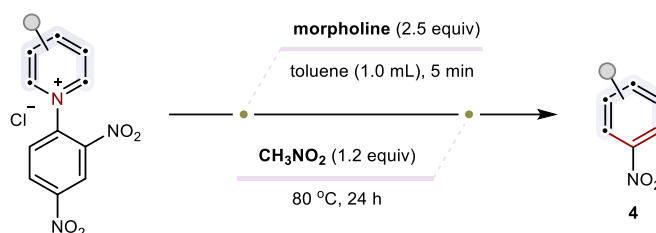
Mass spectra were recorded by electrospray ionization (ESI) method on a Q-TOF Micro with lock spray source. The crystal data were collected and integrated using a BrukerAxs kappa apex2 CCD diffractometer, with graphite monochromated Mo-Kα radiation.

General procedure for the synthesis of Zincke salts:



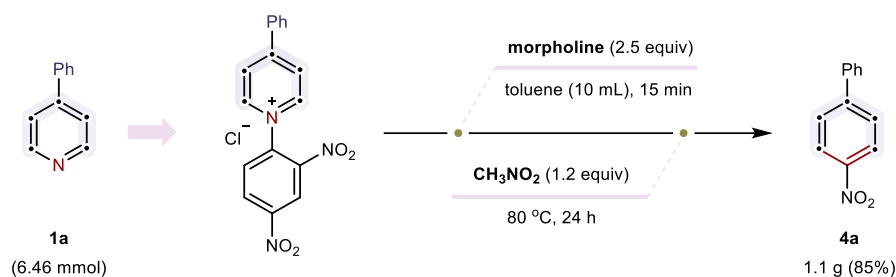
A 25 mL oven-dried round-bottom flask equipped with a magnetic stir bar was charged with the corresponding pyridine (1.0 equiv), 1-chloro-2,4-dinitrobenzene (1.2 equiv), and acetone (10 mL). The resulting reaction mixture was heated at 60–80 °C for 24 h. After completion, the mixture was allowed to cool to room temperature and concentrated *in vacuo* to afford the crude product, which was washed with ethyl acetate (2–3 times) to give the corresponding Zincke salts.

General procedure for the synthesis of compound 4:



An oven-dried 16×100 mm reaction tube equipped with a magnetic stir bar was charged with the Zincke salt (0.1 mmol) and toluene (1.0 mL). Morpholine (0.25 mmol, 2.5 equiv) was added dropwise, and the mixture was stirred at 25 °C for 5 min. Nitromethane (1.2 equiv) was then added, and the reaction was stirred at 80 °C, for 24 h. After completion, as monitored by TLC, volatiles were removed under reduced pressure, and the crude product was purified by silica gel column chromatography to afford product **4**.

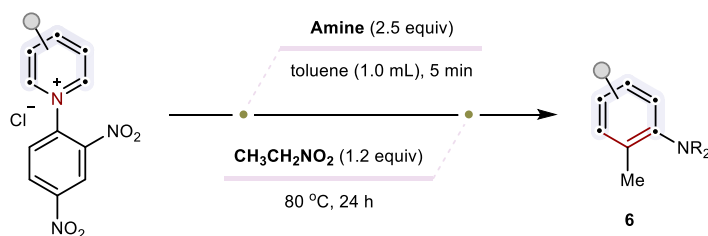
Gram-scale synthesis of compound 4a:



A 25 mL oven-dried round-bottom flask equipped with a magnetic stir bar was charged with the corresponding pyridine **1a** (6.46 mmol), 1-chloro-2,4-dinitrobenzene (1.2 equiv), and acetone (10 mL). The resulting reaction mixture was heated at 70 °C for 24 h. After completion, the mixture was allowed to cool to room temperature and concentrated *in vacuo* to afford the crude product, which was washed with ethyl acetate (2–3 times) to give the corresponding Zincke salts.

A 25 mL oven-dried round-bottom flask equipped with a magnetic stir bar was charged with the Zincke salt and toluene (10 mL). Morpholine (2.5 equiv) was added dropwise, and the mixture was stirred at 25 °C for 15 min. Nitromethane (1.2 equiv) was then added, and the reaction was stirred at 80 °C, for 24 h. After completion, as monitored by TLC, volatiles were removed under reduced pressure, and the crude product was purified by silica gel column chromatography to afford product **4a** (1.1 g, 85%).

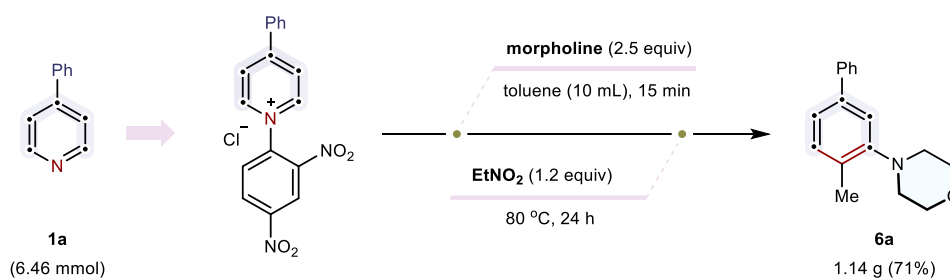
General procedure for the synthesis of compound 6:



An oven-dried 16×100 mm reaction tube equipped with a magnetic stir bar was charged with the Zincke salt (0.1 mmol) and toluene (1.0 mL). Amines (0.25 mmol, 2.5 equiv) was added dropwise, and the mixture was stirred at 25 °C for 5 min. Nitroethane (1.2 equiv) was then added,

and the reaction was stirred at 80 °C, for 24 h. After completion, as monitored by TLC, volatiles were removed under reduced pressure, and the crude product was purified by silica gel column chromatography to afford product **6**.

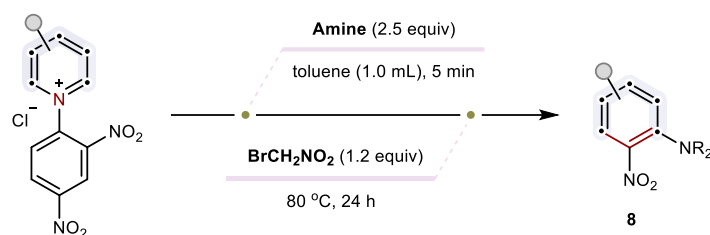
Gram-scale synthesis of compound **6a**:



A 25 mL oven-dried round-bottom flask equipped with a magnetic stir bar was charged with the corresponding pyridine **1a** (6.46 mmol), 1-chloro-2,4-dinitrobenzene (1.2 equiv), and acetone (10 mL). The resulting reaction mixture was heated at 70 °C for 24 h. After completion, the mixture was allowed to cool to room temperature and concentrated *in vacuo* to afford the crude product, which was washed with ethyl acetate (2–3 times) to give the corresponding Zincke salts.

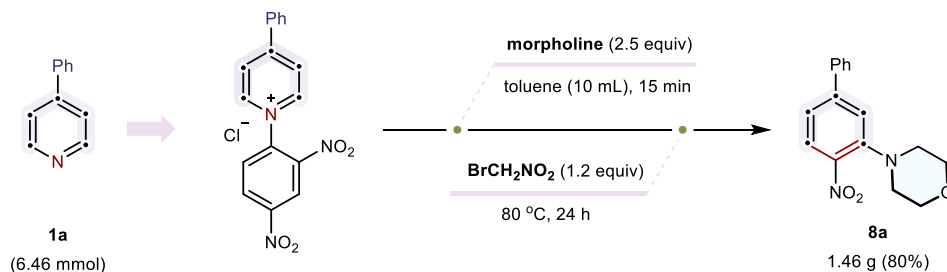
A 25 mL oven-dried round-bottom flask equipped with a magnetic stir bar was charged with the Zincke salt and toluene (10 mL). Morpholine (2.5 equiv) was added dropwise, and the mixture was stirred at 25 °C for 15 min. Nitroethane (1.2 equiv) was then added, and the reaction was stirred at 80 °C, for 24 h. After completion, as monitored by TLC, volatiles were removed under reduced pressure, and the crude product was purified by silica gel column chromatography to afford product **6a** (1.14 g, 71%).

General procedure for the synthesis of compound **8**:



An oven-dried 16×100 mm reaction tube equipped with a magnetic stir bar was charged with the Zincke salt (0.1 mmol) and toluene (1.0 mL). Amine (0.25 mmol, 2.5 equiv) was added dropwise, and the mixture was stirred at 25 °C for 5 min. Bromonitromethane (1.2 equiv) was then added, and the reaction was stirred at 80 °C, for 24 h. After completion, as monitored by TLC, volatiles were removed under reduced pressure, and the crude product was purified by silica gel column chromatography to afford product **8**.

Gram-scale synthesis of compound **8a**:

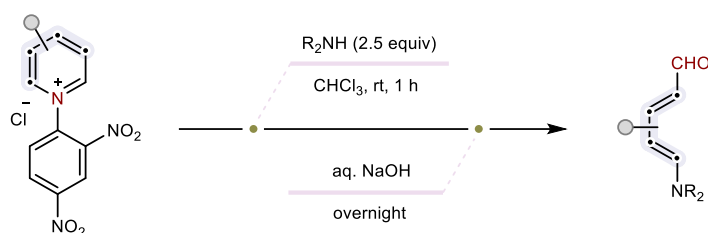


A 25 mL oven-dried round-bottom flask equipped with a magnetic stir bar was charged with the corresponding pyridine **1a** (6.46 mmol), 1-chloro-2,4-dinitrobenzene (1.2 equiv), and acetone (10 mL). The resulting reaction mixture was heated at 70 °C for 24 h. After completion, the mixture was allowed to cool to room temperature and concentrated *in vacuo* to afford the crude product, which was washed with ethyl acetate (2–3 times) to give the corresponding Zincke salts.

A 25 mL oven-dried round-bottom flask equipped with a magnetic stir bar was charged with the Zincke salt and toluene (10 mL). Morpholine (2.5 equiv) was added dropwise, and the mixture was stirred at 25 °C for 15 min. bromonitromethane (1.2 equiv) was then added, and the reaction

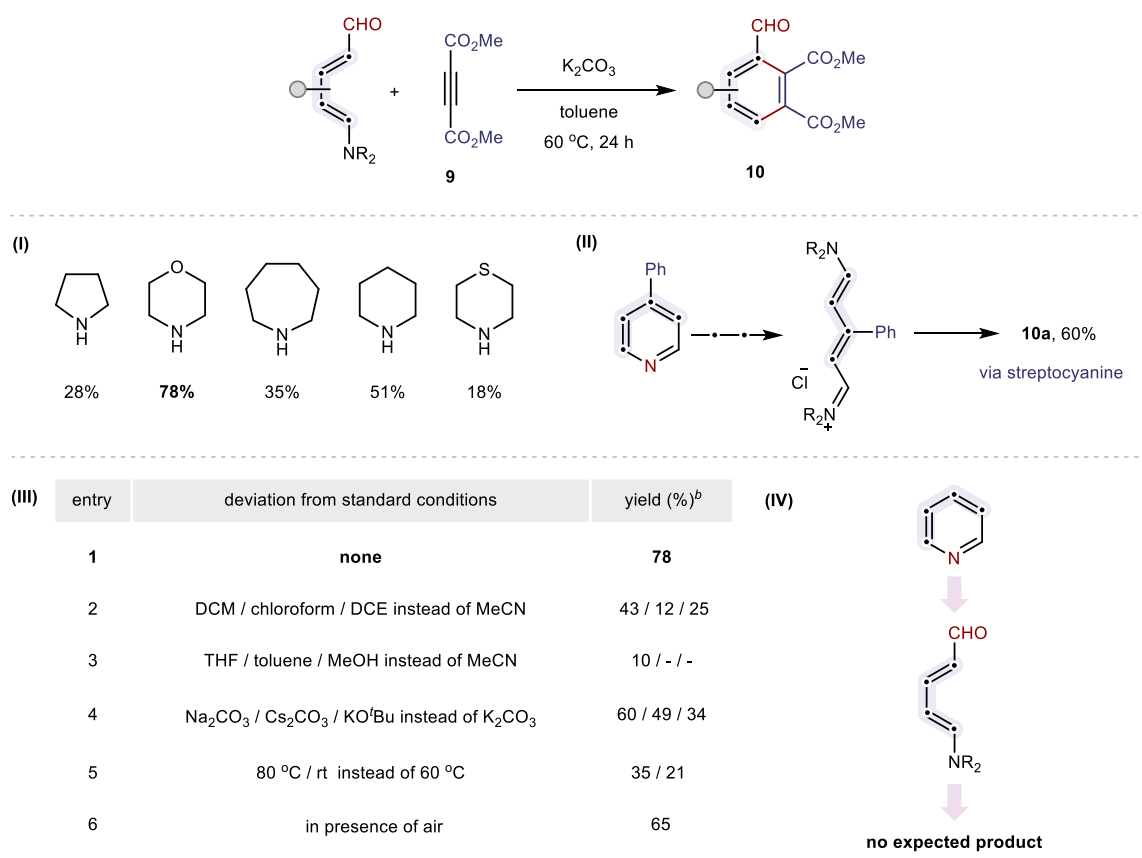
was stirred at 80 °C, for 24 h. After completion, as monitored by TLC, volatiles were removed under reduced pressure, and the crude product was purified by silica gel column chromatography to afford product **8a** (1.46 g, 80%).

General procedure for the synthesis of Zincke aldehyde:



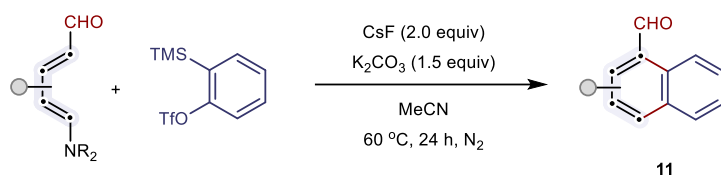
An oven-dried 16×100 mm reaction tube equipped with a magnetic stir bar was charged with the Zincke salt (0.1 mmol) and $CHCl_3$ (1.0 mL). Amine (0.25 mmol, 2.5 equiv) was added dropwise, and the mixture was stirred at 25 °C for 1 h. Saturated aqueous NaOH (1.0 mL) was then added, and the reaction was stirred overnight. The mixture was diluted with EtOAc, and the organic layer was separated. The aqueous phase was extracted with EtOAc. Combined organic layers were dried ($MgSO_4$), filtered, and concentrated. The crude product was used directly in the next step.

General procedure and optimization studies for the synthesis of compound 10:



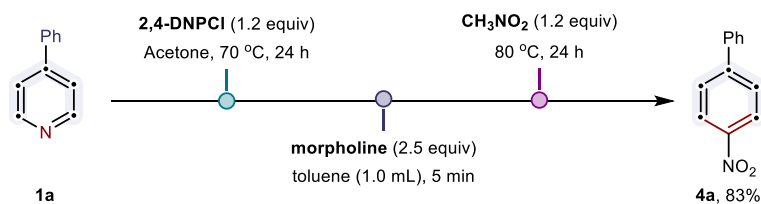
An oven-dried 16×100 mm reaction tube equipped with a magnetic stir bar was charged with Zincke aldehyde (0.10 mmol), Dimethyl acetylenedicarboxylate (0.15 mmol, 1.5 equiv), and K₂CO₃ (1.2 equiv). Toluene (1.5 mL) was added, and the mixture was stirred at 60 °C for 24 h. After completion, as monitored by TLC, volatiles were removed under reduced pressure, and the crude product was purified by silica gel column chromatography to afford product **10**.

General procedure for the synthesis of compound 11:



An oven-dried 16×100 mm reaction tube equipped with a magnetic stir bar was charged with Zincke aldehyde (0.10 mmol), *o*-trimethylsilyl aryl triflate (1.2 equiv), CsF (2.0 equiv), and K₂CO₃ (1.2 equiv) under N₂ atmosphere. MeCN (1.0 mL) was then added, and the mixture was stirred at 60 °C for 24 h. After completion, as monitored by TLC, volatiles were removed under reduced pressure, and the crude product was purified by silica gel column chromatography to afford product **11**.

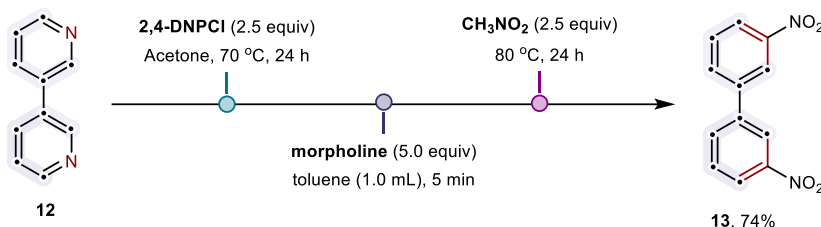
One-pot strategy for the synthesis of compound 4a:



An oven-dried 16×100 mm reaction tube equipped with a magnetic stir bar was charged with the corresponding pyridine **1a** (0.1 mmol), 1-chloro-2,4-dinitrobenzene (1.2 equiv), and acetone (1.0 mL). The resulting reaction mixture was heated at 70 °C for 24 h. After completion, the mixture was allowed to cool to room temperature and concentrated in vacuo to afford the crude product, which was washed with ethyl acetate (2–3 times) to give the corresponding Zincke salts. Then, Morpholine (2.5 equiv) and 1.0 mL toluene was added, and the mixture was stirred at 25 °C for 5 min. Nitromethane (1.2 equiv) was then added, and the reaction was stirred at 80 °C, for 24 h.

After completion, as monitored by TLC, volatiles were removed under reduced pressure, and the crude product was purified by silica gel column chromatography to afford product **4a**.

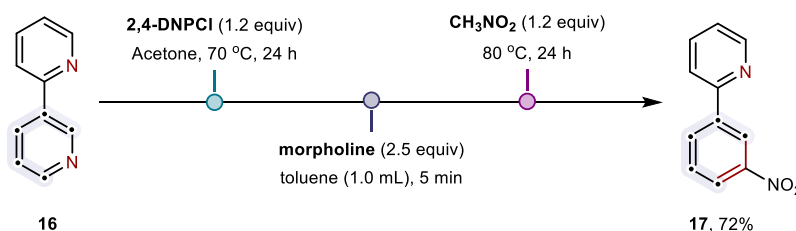
General procedure for the synthesis of compound **13** & **15**:



An oven-dried 16×100 mm reaction tube equipped with a magnetic stir bar was charged with the corresponding pyridine **12** (0.1 mmol), 1-chloro-2,4-dinitrobenzene (2.5 equiv), and acetone (1.0 mL). The resulting reaction mixture was heated at 70 °C for 24 h. After completion, the mixture was allowed to cool to room temperature and concentrated in vacuo to afford the crude product, which was washed with ethyl acetate (2–3 times) to give the corresponding Zincke salts. Then, Morpholine (5.0 equiv) and 1.0 mL toluene was added, and the mixture was stirred at 25 °C for 5 min. Nitromethane (2.5 equiv) was then added, and the reaction was stirred at 80 °C, for 24 h. After completion, as monitored by TLC, volatiles were removed under reduced pressure, and the crude product was purified by silica gel column chromatography to afford product **13**.

Compound **15** was also synthesized following these steps.

General procedure for the synthesis of compound **17** & **19**:



An oven-dried 16×100 mm reaction tube equipped with a magnetic stir bar was charged with the corresponding pyridine **16** (0.1 mmol), 1-chloro-2,4-dinitrobenzene (1.2 equiv), and acetone (1.0

mL). The resulting reaction mixture was heated at 70 °C for 24 h. After completion, the mixture was allowed to cool to room temperature and concentrated in vacuo to afford the crude product, which was washed with ethyl acetate (2–3 times) to give the corresponding Zincke salts. Then, Morpholine (2.5 equiv) and 1.0 mL toluene was added, and the mixture was stirred at 25 °C for 5 min. Nitromethane (1.2 equiv) was then added, and the reaction was stirred at 80 °C, for 24 h. After completion, as monitored by TLC, volatiles were removed under reduced pressure, and the crude product was purified by silica gel column chromatography to afford product **17**.

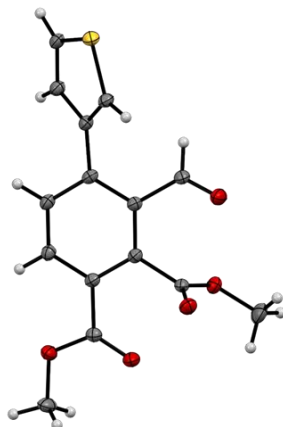
Compound **19** was also synthesized following these steps.

Crystallographic Experimental Section

X-ray crystal data of compound **5e**: (CCDC 2576558)

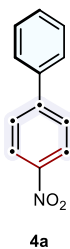
Crystallization: Crystals of compound **5e** were obtained through a slow evaporation technique at room temperature from DCM/hexane solvent mixture.

Crystal structure of compound **5e** (CCDC number: **2576558**, Ellipsoid Probability 50%):

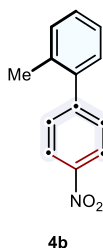


Empirical formula	C ₁₅ H ₁₂ O ₅ S
Formula weight	304.31
Temperature [K]	100(2)
Crystal system	monoclinic
Space group (number)	<i>P</i> 2 ₁ / <i>c</i> (14)
<i>a</i> [Å]	11.9241(3)

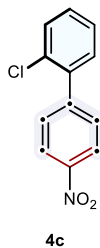
b [Å]	16.2376(4)
c [Å]	7.1175(2)
α [°]	90
β [°]	95.5050(10)
γ [°]	90
Volume [Å ³]	1371.73(6)
Z	4
ρ_{calc} [gcm ⁻³]	1.474
μ [mm ⁻¹]	0.255
$F(000)$	632
Crystal size [mm ³]	0.094×0.12×0.183
Crystal colour	clear light colourless
Crystal shape	plate
Radiation	MoK $_{\alpha}$ (λ =0.71073 Å)
2 θ range [°]	4.25 to 56.64 (0.75 Å)
Index ranges	$-15 \leq h \leq 15$ $-21 \leq k \leq 21$ $-9 \leq l \leq 9$
Reflections collected	44280
Independent reflections	3400 $R_{\text{int}} = 0.049$ $R_{\text{sigma}} = 0.0298$
Completeness to $\theta = 25.242^{\circ}$	99.7
Data / Restraints / Parameters	3400 / 0 / 192
Goodness-of-fit on F^2	1.202
Final R indexes	$R_1 = 0.0394$
$[I \geq 2\sigma(I)]$	$wR_2 = 0.1372$
Final R indexes	$R_1 = 0.0429$
[all data]	$wR_2 = 0.1418$
Largest peak/hole [eÅ ⁻³]	0.53/−0.22



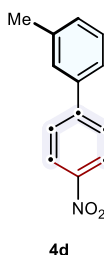
Compound, **4a**: pale yellow solid, mp: 121–123 °C; eluent (5% ethyl acetate in hexane). **Yield**: 94% (19 mg); **¹H NMR (400 MHz, Chloroform-*d*)** δ : 8.30 (d, *J* = 8.8 Hz, 2H), 7.74 (d, *J* = 8.8 Hz, 2H), 7.64 – 7.62 (m, 2H), 7.53 – 7.43 (m, 3H). **¹³C NMR (101 MHz, Chloroform-*d*)** δ : 147.8, 147.2, 138.9, 129.3, 129.0, 127.9, 127.5, 124.2. **HRMS** (ESI/TOF-Q) *m/z*: [M+H]⁺ Calculated for C₁₂H₉NO₂H⁺ 200.0706; Found 200.0710.



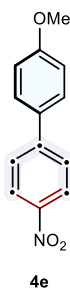
Compound, **4b**: pale yellow solid; eluent (5% ethyl acetate in hexane). **Yield**: 88% (19 mg); **¹H NMR (500 MHz, Chloroform-*d*)** δ : 8.28 (d, *J* = 8.6 Hz, 2H), 7.50 (d, *J* = 8.9 Hz, 2H), 7.36 – 7.27 (m, 3H), 7.22 (dd, *J* = 7.3, 1.4 Hz, 1H), 2.28 (s, 3H). **¹³C NMR (126 MHz, Chloroform-*d*)** δ : 149.0, 147.0, 139.7, 135.2, 130.9, 130.2, 129.5, 128.6, 126.3, 123.6, 20.5. **HRMS** (ESI/TOF-Q) *m/z*: [M+H]⁺ Calculated for C₁₃H₁₁NO₂H⁺ 214.0863; Found 214.0861.



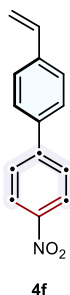
Compound, **4c**: pale yellow solid; eluent (5% ethyl acetate in hexane). **Yield**: 86% (20 mg); **¹H NMR (500 MHz, Chloroform-*d*)** δ : 8.30 (d, *J* = 8.9 Hz, 2H), 7.62 (d, *J* = 8.8 Hz, 2H), 7.53 – 7.50 (m, 1H), 7.38 – 7.33 (m, 3H). **¹³C NMR (126 MHz, Chloroform-*d*)** δ : 147.4, 146.0, 138.4, 132.4, 131.1, 130.6, 130.4, 129.9, 127.3, 123.5. **HRMS** (ESI/TOF-Q) *m/z*: [M+H]⁺ Calculated for C₁₂H₈ClNO₂H⁺ 234.0316; Found 234.0325.



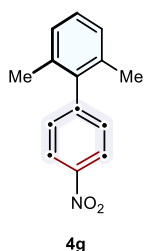
Compound, **4d**: pale yellow solid; eluent (5% ethyl acetate in hexane). **Yield**: 79% (17 mg); **¹H NMR (500 MHz, Chloroform-*d*)** δ : 8.16 (d, *J* = 8.4 Hz, 2H), 7.61 (d, *J* = 8.5 Hz, 2H), 7.31 (d, *J* = 9.1 Hz, 2H), 7.27 (t, *J* = 7.4 Hz, 1H), 7.15 (d, *J* = 7.9 Hz, 1H), 2.34 (s, 3H). **¹³C NMR (126 MHz, Chloroform-*d*)** δ : 147.9, 147.1, 139.0, 138.8, 129.8, 129.2, 128.2, 127.9, 124.6, 124.1, 21.6. **HRMS** (ESI/TOF-Q) *m/z*: [M+H]⁺ Calculated for C₁₃H₁₁NO₂H⁺ 214.0863; Found 214.0861.



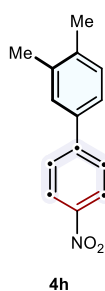
Compound, **4e**: pale yellow solid, mp: 120–123 °C; eluent (5% ethyl acetate in hexane). **Yield**: 89% (20 mg); **¹H NMR (500 MHz, Chloroform-*d*)** δ : 8.28 (d, *J* = 8.9 Hz, 2H), 7.72 (d, *J* = 8.9 Hz, 2H), 7.43 – 7.39 (m, 1H), 7.21 – 7.19 (m, 1H), 7.13 (dd, *J* = 2.6, 1.7 Hz, 1H), 6.99 (ddd, *J* = 8.3, 2.6, 0.9 Hz, 1H), 3.88 (s, 3H). **¹³C NMR (126 MHz, Chloroform-*d*)** δ : 160.3, 147.6, 147.3, 140.3, 130.3, 128.0, 124.2, 119.9, 114.2, 113.4, 55.5. **HRMS** (ESI/TOF-Q) *m/z*: [M+H]⁺ Calculated for C₁₃H₁₁NO₃H⁺ 230.0812; Found 230.0815.



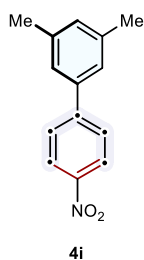
Compound, **4f**: pale yellow solid, mp: 160–165 °C; eluent (5% ethyl acetate in hexane). **Yield**: 83% (19 mg); **¹H NMR (500 MHz, Chloroform-*d*)** δ : 8.31 – 8.28 (m, 2H), 7.75 – 7.73 (m, 2H), 7.62 – 7.59 (m, 2H), 7.55 – 7.53 (m, 2H), 6.77 (dd, *J* = 17.6, 10.9 Hz, 1H), 5.85 (dd, *J* = 17.6, 0.8 Hz, 1H), 5.35 (dd, *J* = 10.9, 0.8 Hz, 1H). **¹³C NMR (126 MHz, Chloroform-*d*)** δ : 147.22, 147.15, 138.4, 138.1, 136.1, 127.7 (2C), 127.1, 124.3, 115.3. **HRMS** (ESI/TOF-Q) *m/z*: [M+H]⁺ Calculated for C₁₄H₁₁NO₂H⁺ 226.0863; Found 226.0863.



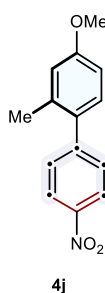
Compound, **4g**: pale yellow solid; eluent (5% ethyl acetate in hexane). **Yield**: 92% (21 mg); **¹H NMR (500 MHz, Chloroform-*d*)** δ : 8.31 (d, *J* = 8.8 Hz, 2H), 7.35 (d, *J* = 8.8 Hz, 2H), 7.24 – 7.21 (m, 1H), 7.15 (d, *J* = 7.6 Hz, 2H), 2.03 (s, 6H). **¹³C NMR (126 MHz, Chloroform-*d*)** δ : 148.5, 147.1, 139.7, 135.5, 130.3, 128.1, 127.8, 124.0, 20.8. **HRMS** (ESI/TOF-Q) *m/z*: [M+H]⁺ Calculated for C₁₄H₁₃NO₂H⁺ 228.1019; Found 228.1023.



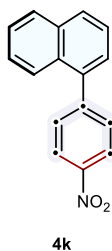
Compound, **4h**: pale yellow solid, mp: 55–60 °C; eluent (5% ethyl acetate in hexane). **Yield**: 90% (20mg); **¹H NMR (500 MHz, Chloroform-*d*)** δ : 8.26 (d, *J* = 8.8 Hz, 2H), 7.71 (d, *J* = 8.8 Hz, 2H), 7.41 (d, *J* = 2.1 Hz, 1H), 7.37 (dd, *J* = 7.7, 2.1 Hz, 1H), 7.26 (d, *J* = 7.7 Hz, 1H), 2.36 (s, 3H), 2.34 (s, 3H). **¹³C NMR (126 MHz, Chloroform-*d*)** δ : 147.8, 146.9, 137.9, 137.6, 136.4, 130.5, 128.6, 127.6, 124.8, 124.1, 20.0, 19.7. **HRMS** (ESI/TOF-Q) *m/z*: [M+H]⁺ Calculated for C₁₄H₁₃NO₂H⁺ 228.1019; Found 228.1023.



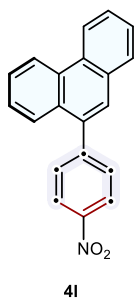
Compound, **4i**: pale yellow solid, mp: 121–123 °C; eluent (5% ethyl acetate in hexane). **Yield**: 89% (20 mg); **¹H NMR (400 MHz, Chloroform-*d*)** δ : 8.27 (d, *J* = 8.9 Hz, 2H), 7.72 (d, *J* = 8.8 Hz, 2H), 7.24 – 7.24 (m, 2H), 7.10 – 7.09 (m, 1H), 2.41 (s, 6H). **¹³C NMR (126 MHz, Chloroform-*d*)** δ : 148.1, 147.0, 138.9, 130.7, 127.9, 125.4, 124.1, 21.5. **HRMS** (ESI/TOF-Q) *m/z*: [M+H]⁺ Calculated for C₁₄H₁₃NO₂H⁺ 228.1019; Found 228.1023.



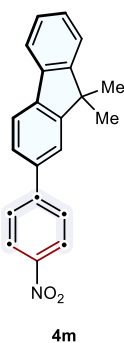
Compound, **4j**: pale yellow solid, mp: 120–125 °C; eluent (5% ethyl acetate in hexane). **Yield**: 75% (18mg); **¹H NMR (500 MHz, Chloroform-*d*)** δ : 8.25 (d, *J* = 8.7 Hz, 2H), 7.46 (d, *J* = 8.7 Hz, 2H), 7.16 (d, *J* = 8.3 Hz, 1H), 6.85 – 6.82 (m, 2H), 3.85 (s, 3H), 2.28 (s, 3H). **¹³C NMR (126 MHz, Chloroform-*d*)** δ : 159.8, 148.7, 146.7, 136.7, 132.3, 130.8, 130.3, 123.5, 116.3, 111.7, 55.4, 20.8. **HRMS** (ESI/TOF-Q) *m/z*: [M+H]⁺ Calculated for C₁₄H₁₃NO₃H⁺ 244.0968; Found 244.0971.



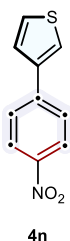
Compound, **4k**: pale yellow solid; eluent (5% ethyl acetate in hexane). **Yield**: 87% (22 mg); **¹H NMR (500 MHz, Chloroform-*d*)** δ : 8.35 (d, *J* = 8.6 Hz, 2H), 7.97 – 7.94 (m, 2H), 7.81 – 7.79 (m, 1H), 7.66 (d, *J* = 8.7 Hz, 2H), 7.59 – 7.54 (m, 2H), 7.49 (ddd, *J* = 8.2, 6.8, 1.4 Hz, 1H), 7.44 (dd, *J* = 7.1, 1.3 Hz, 1H). **¹³C NMR (126 MHz, Chloroform-*d*)** δ : 147.7, 147.2, 137.9, 133.9, 131.0 (2C), 129.1, 128.7, 127.2, 126.8, 126.3, 125.4, 125.2, 123.7. **HRMS** (ESI/TOF-Q) *m/z*: [M+H]⁺ Calculated for C₁₆H₁₁NO₂H⁺ 250.0863; Found 250.0860.



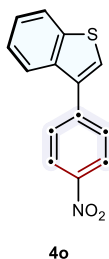
Compound, **4l**: pale yellow solid; eluent (5% ethyl acetate in hexane). **Yield**: 83% (25 mg); **¹H NMR (400 MHz, Chloroform-*d*)** δ : 8.82 – 8.79 (m, 1H), 8.74 (d, *J* = 8.2 Hz, 1H), 8.39 – 8.37 (m, 2H), 7.92 (dd, *J* = 7.9, 1.5 Hz, 1H), 7.79 (dd, *J* = 8.2, 1.3 Hz, 1H), 7.75 – 7.64 (m, 6H), 7.57 (ddd, *J* = 8.2, 7.0, 1.2 Hz, 1H). **¹³C NMR (101 MHz, Chloroform-*d*)** δ : 147.9, 147.4, 136.6, 131.2, 131.1, 130.8, 130.5, 130.3, 129.0, 128.2, 127.5, 127.3, 127.09, 127.06, 126.3, 123.8, 123.3, 122.8. **HRMS** (ESI/TOF-Q) *m/z*: [M+H]⁺ Calculated for C₂₀H₁₃NO₂H⁺ 300.1019; Found 300.1018.



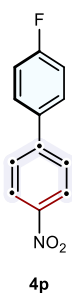
Compound, **4m**: pale yellow solid, mp: 160–165 °C; eluent (5% ethyl acetate in hexane). **Yield**: 85% (27mg); **¹H NMR (400 MHz, Chloroform-*d*)** δ : 8.32 (d, *J* = 8.8 Hz, 2H), 7.84 – 7.78 (m, 4H), 7.69 (d, *J* = 1.7 Hz, 1H), 7.62 (dd, *J* = 7.9, 1.8 Hz, 1H), 7.50 – 7.48 (m, 1H), 7.40 – 7.38 (m, 2H), 1.57 (s, 6H). **¹³C NMR (101 MHz, Chloroform-*d*)** δ : 154.7, 154.1, 148.1, 147.0, 140.3, 138.4, 137.8, 128.0, 127.8, 127.3, 126.7, 124.2, 122.9, 121.7, 120.7, 120.5, 47.2, 27.3. **HRMS** (ESI/TOF-Q) *m/z*: [M+H]⁺ Calculated for C₂₁H₁₇NO₂H⁺ 316.1332; Found 316.1332.



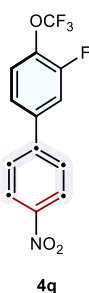
Compound, **4n**: pale yellow solid, mp: 160–165 °C; eluent (5% ethyl acetate in hexane). **Yield**: 81% (17mg); **¹H NMR (500 MHz, Chloroform-*d*)** δ : 8.25 (d, *J* = 8.8 Hz, 2H), 7.73 (d, *J* = 8.9 Hz, 2H), 7.63 (dd, *J* = 2.9, 1.5 Hz, 1H), 7.47 – 7.43 (m, 2H). **¹³C NMR (126 MHz, Chloroform-*d*)** δ : 146.8, 142.1, 140.1, 127.4, 127.0, 126.2, 124.4, 123.3. **HRMS** (ESI/TOF-Q) *m/z*: [M+H]⁺ Calculated for C₁₀H₇NO₂H⁺ 206.0270; Found 206.0274.



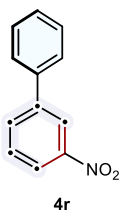
Compound, **4o**: pale yellow solid, mp: 105–108 °C; eluent (5% ethyl acetate in hexane). **Yield**: 84% (21 mg); **¹H NMR (500 MHz, Chloroform-*d*)** δ : 8.35 – 8.33 (m, 2H), 7.96 – 7.94 (m, 1H), 7.89 – 7.88 (m, 1H), 7.76 – 7.74 (m, 2H), 7.55 (d, *J* = 1.2 Hz, 1H), 7.45 – 7.44 (m, 2H). **¹³C NMR (126 MHz, Chloroform-*d*)** δ : 147.2, 142.7, 140.9, 137.1, 135.9, 129.4, 125.9, 125.08, 125.05, 124.2, 123.3, 122.5. **HRMS** (ESI/TOF-Q) *m/z*: [M+H]⁺ Calculated for C₁₄H₉NO₂SH⁺ 256.0427; Found 256.0430.



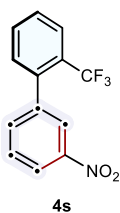
Compound, **4p**: pale yellow solid; eluent (5% ethyl acetate in hexane). **Yield**: 78% (17 mg); **¹H NMR (500 MHz, Chloroform-*d*)** δ : 8.28 (d, *J* = 8.8 Hz, 2H), 7.69 (d, *J* = 8.8 Hz, 2H), 7.61 – 7.58 (m, 2H), 7.20 – 7.17 (m, 2H). **¹³C NMR (126 MHz, Chloroform-*d*)** δ : 163.5 (d, *J* = 249.5 Hz), 147.2, 146.7, 135.0 (d, *J* = 3.6 Hz), 129.3 (d, *J* = 8.5 Hz), 127.8, 124.3, 116.3 (d, *J* = 21.6 Hz). **¹⁹F NMR (376 MHz, Chloroform-*d*)** δ : -112.71. **HRMS** (ESI/TOF-Q) *m/z*: [M+H]⁺ Calculated for C₁₂H₈FNO₂H⁺ 218.0612; Found 218.0611.



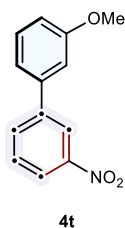
Compound, **4q**: pale yellow solid; eluent (7% ethyl acetate in hexane). **Yield**: 83% (25 mg); **¹H NMR (400 MHz, Chloroform-*d*)** δ : 8.32 (d, *J* = 8.8 Hz, 2H), 7.72 – 7.70 (m, 2H), 7.48 – 7.40 (m, 3H). **¹³C NMR (101 MHz, Chloroform-*d*)** δ : 154.9 (d, *J* = 253.9 Hz), 147.9, 145.1, 139.5 (d, *J* = 6.8 Hz), 137.0 (d, *J* = 13.9 Hz), 128.1, 124.5, 124.4, 123.7 (d, *J* = 3.8 Hz), 120.6 (d, *J* = 259.5 Hz), 116.5 (d, *J* = 19.7 Hz). **¹⁹F NMR (471 MHz, Chloroform-*d*)** δ : -58.72 (d, *J* = 5.2 Hz), -127.26 (p, *J* = 5.0, 4.4 Hz). **HRMS** (ESI/TOF-Q) *m/z*: [M+H]⁺ Calculated for C₁₃H₇F₄NO₃H⁺ 302.0435; Found 302.0435.



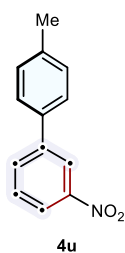
Compound, **4r**: pale yellow solid; eluent (5% ethyl acetate in hexane). **Yield**: 75% (15 mg); **¹H NMR (500 MHz, Chloroform-*d*)** δ : 8.45 (t, *J* = 2.1 Hz, 1H), 8.20 (ddd, *J* = 8.2, 2.3, 1.0 Hz, 1H), 7.92 (dt, *J* = 7.7, 1.4 Hz, 1H), 7.64 – 7.59 (m, 3H), 7.52 – 7.49 (m, 2H), 7.45 – 7.42 (m, 1H). **¹³C NMR (126 MHz, Chloroform-*d*)** δ : 148.9, 143.0, 138.8, 133.2, 129.8, 129.3, 128.7, 127.3, 122.2, 122.1. **HRMS** (ESI/TOF-Q) *m/z*: [M+H]⁺ Calculated for C₁₂H₉NO₂H⁺ 200.0706; Found 200.0712.



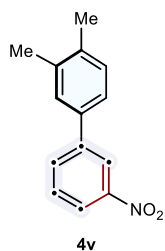
Compound, **4s**: pale yellow solid; eluent (5% ethyl acetate in hexane). **Yield**: 81% (22 mg); **¹H NMR (400 MHz, Chloroform-*d*)** δ : 8.27 (ddd, *J* = 8.1, 2.3, 1.1 Hz, 1H), 8.22 (t, *J* = 2.1 Hz, 1H), 7.81 – 7.78 (m, 1H), 7.69 – 7.66 (m, 1H), 7.65 – 7.62 (m, 1H), 7.61 – 7.53 (m, 2H), 7.36 – 7.33 (m, 1H). **¹³C NMR (101 MHz, Chloroform-*d*)** δ : 147.9, 141.4, 138.7, 135.2, 131.9 (3C), 129.0, 128.6, 126.5 (q, *J* = 4.9 Hz), 124.0 (d, *J* = 273.6 Hz), 124.1, 122.9. **¹⁹F NMR (376 MHz, Chloroform-*d*)** δ : -56.76. **HRMS** (ESI/TOF-Q) *m/z*: [M+H]⁺ Calculated for C₁₃H₈F₃NO₂H⁺ 268.0580; Found 268.0585.



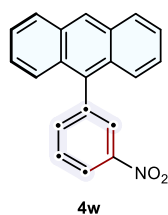
Compound, **4t**: pale yellow solid, mp: 80–85 °C; eluent (5% ethyl acetate in hexane). **Yield**: 83% (19 mg); **¹H NMR (500 MHz, Chloroform-*d*)** δ : 8.44 (t, *J* = 2.1 Hz, 1H), 8.20 (ddd, *J* = 8.2, 2.3, 1.0 Hz, 1H), 7.90 (ddd, *J* = 7.7, 1.8, 1.0 Hz, 1H), 7.60 (t, *J* = 8.0 Hz, 1H), 7.41 (t, *J* = 7.9 Hz, 1H), 7.20 (ddd, *J* = 7.6, 1.7, 0.9 Hz, 1H), 7.14 (dd, *J* = 2.5, 1.7 Hz, 1H), 6.97 (ddd, *J* = 8.3, 2.5, 0.9 Hz, 1H), 3.89 (s, 3H). **¹³C NMR (126 MHz, Chloroform-*d*)** δ : 160.3, 148.8, 142.9, 140.3, 133.2, 130.4, 129.8, 122.3, 122.1, 119.7, 114.0, 113.1, 55.6. **HRMS** (ESI/TOF-Q) *m/z*: [M+H]⁺ Calculated for C₁₃H₁₁NO₃H⁺ 230.0812; Found 230.0815.



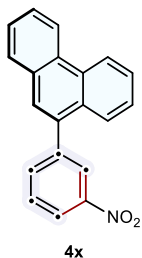
Compound, **4u**: pale yellow solid, mp: 78–80 °C; eluent (5% ethyl acetate in hexane). **Yield**: 82% (17 mg); **¹H NMR (500 MHz, Chloroform-*d*)** δ : 8.43 (t, *J* = 2.0 Hz, 1H), 8.18 – 8.16 (m, 1H), 7.90 (dt, *J* = 7.8, 1.4 Hz, 1H), 7.61 – 7.57 (m, 1H), 7.54 – 7.51 (m, 2H), 7.31 – 7.30 (m, 2H), 2.42 (s, 3H). **¹³C NMR (126 MHz, Chloroform-*d*)** δ : 148.8, 142.9, 138.7, 135.9, 132.9, 130.0, 129.8, 127.1, 121.84, 121.80, 21.3. **HRMS** (ESI/TOF-Q) *m/z*: [M+H]⁺ Calculated for C₁₃H₁₁NO₂H⁺ 214.0863; Found 214.0861.



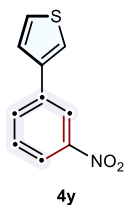
Compound, **4v**: pale yellow solid; eluent (5% ethyl acetate in hexane). **Yield**: 86% (20 mg); **¹H NMR (500 MHz, Chloroform-*d*)** δ : 8.43 (t, *J* = 2.1 Hz, 1H), 8.16 (ddd, *J* = 8.1, 2.3, 1.0 Hz, 1H), 7.90 (ddd, *J* = 7.8, 1.8, 1.1 Hz, 1H), 7.58 (t, *J* = 8.0 Hz, 1H), 7.41 (d, *J* = 2.1 Hz, 1H), 7.37 (dd, *J* = 7.8, 2.1 Hz, 1H), 7.26 – 7.25 (m, 1H), 2.36 (s, 3H), 2.33 (s, 3H). **¹³C NMR (126 MHz, Chloroform-*d*)** δ : 148.8, 143.0, 137.6, 137.4, 136.3, 132.9, 130.5, 129.7, 128.4, 124.6, 121.8, 121.7, 20.0, 19.6. **HRMS** (ESI/TOF-Q) *m/z*: [M+H]⁺ Calculated for C₁₄H₁₃NO₂H⁺ 228.1019; Found 228.1021.



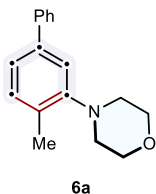
Compound, **4w**: pale yellow solid; eluent (5% ethyl acetate in hexane). **Yield**: 85% (25 mg); **¹H NMR (400 MHz, Chloroform-*d*)** δ : 8.57 (s, 1H), 8.43 (ddd, *J* = 5.7, 3.4, 2.3 Hz, 1H), 8.35 (q, *J* = 1.5 Hz, 1H), 8.09 (d, *J* = 8.5 Hz, 2H), 7.79 – 7.77 (m, 2H), 7.55 – 7.52 (m, 2H), 7.50 (ddd, *J* = 8.2, 6.6, 1.3 Hz, 2H), 7.40 (ddd, *J* = 8.8, 6.5, 1.3 Hz, 2H). **¹³C NMR (101 MHz, Chloroform-*d*)** δ : 148.7, 140.8, 137.7, 133.8, 131.4, 130.1, 129.6, 128.8, 127.9, 126.3, 126.3, 125.9, 125.5, 122.8. **HRMS** (ESI/TOF-Q) *m/z*: [M+H]⁺ Calculated for C₂₀H₁₃NO₂H⁺ 300.1019; Found 300.1019.



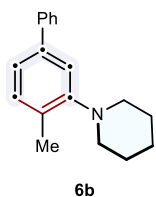
Compound, **4x**: pale yellow solid, mp: 120–123 °C; eluent (5% ethyl acetate in hexane). **Yield**: 83% (25 mg); **¹H NMR (500 MHz, Chloroform-*d*)** δ : 8.81 (d, *J* = 8.3 Hz, 1H), 8.75 (d, *J* = 8.2 Hz, 1H), 8.44 (d, *J* = 1.9 Hz, 1H), 8.33 (ddd, *J* = 8.2, 2.4, 1.1 Hz, 1H), 7.92 (dd, *J* = 8.0, 1.5 Hz, 1H), 7.89 (ddd, *J* = 7.6, 1.7, 1.1 Hz, 1H), 7.78 (dd, *J* = 8.2, 1.3 Hz, 1H), 7.74 – 7.68 (m, 4H), 7.66 (ddd, *J* = 8.1, 7.0, 1.2 Hz, 1H), 7.58 (ddd, *J* = 8.2, 7.0, 1.2 Hz, 1H). **¹³C NMR (126 MHz, Chloroform-*d*)** δ : 148.5, 142.7, 136.4, 136.3, 131.3, 130.9, 130.5, 130.4, 129.4, 129.0, 128.4, 127.4, 127.3, 127.10, 127.07, 126.2, 125.1, 123.4, 122.8, 122.6. **HRMS** (ESI/TOF-Q) *m/z*: [M+H]⁺ Calculated for C₂₀H₁₃NO₂H⁺ 300.1019; Found 300.1025.



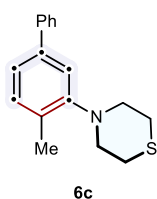
Compound, **4y**: pale yellow solid; eluent (5% ethyl acetate in hexane). **Yield**: 77% (16 mg); **¹H NMR (500 MHz, Chloroform-*d*)** δ : 8.43 (t, *J* = 2.1 Hz, 1H), 8.13 (ddd, *J* = 8.2, 2.3, 1.1 Hz, 1H), 7.90 (ddd, *J* = 7.8, 1.8, 1.1 Hz, 1H), 7.58 (dd, *J* = 2.9, 1.4 Hz, 1H), 7.56 (t, *J* = 8.0 Hz, 1H), 7.45 (dd, *J* = 5.0, 2.9 Hz, 1H), 7.43 (dd, *J* = 5.0, 1.4 Hz, 1H). **¹³C NMR (126 MHz, Chloroform-*d*)** δ : 148.8, 139.9, 137.5, 132.3, 129.9, 127.3, 126.0, 122.3, 121.9, 121.2. **HRMS** (ESI/TOF-Q) *m/z*: [M+H]⁺ Calculated for C₁₀H₇NO₂SH⁺ 206.0270; Found 206.0276.



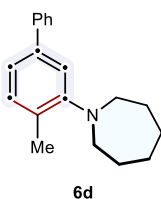
Compound, **6a**: white solid; eluent (2% ethyl acetate in hexane; Prep-TLC). **Yield**: 79% (20 mg); **¹H NMR (500 MHz, Chloroform-*d*)** δ : 7.58 – 7.56 (m, 2H), 7.44 – 7.41 (m, 2H), 7.34 – 7.31 (m, 1H), 7.24 – 7.22 (m, 3H), 3.88 – 3.86 (m, 4H), 2.98 – 2.96 (m, 4H), 2.35 (s, 3H). **¹³C NMR (126 MHz, Chloroform-*d*)** δ : 151.7, 141.4, 140.0, 131.7, 131.7, 128.8, 127.2, 127.1, 122.2, 117.9, 67.6, 52.4, 17.8. **HRMS** (ESI/TOF-Q) *m/z*: [M+H]⁺ Calculated for C₁₇H₁₉NOH⁺ 254.1539; Found 254.1539.



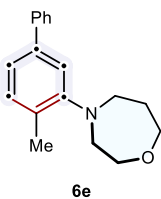
Compound, **6b**: white solid; eluent (2% ethyl acetate in hexane; Prep-TLC). **Yield**: 78% (20 mg); **¹H NMR (500 MHz, Chloroform-*d*)** δ : 7.60 (d, *J* = 8.2 Hz, 2H), 7.44 (t, *J* = 7.6 Hz, 2H), 7.35 – 7.32 (m, 1H), 7.26 – 7.24 (m, 2H), 7.21 – 7.19 (m, 1H), 2.93 (t, *J* = 5.2 Hz, 4H), 2.36 (s, 3H), 1.75 (p, *J* = 5.6 Hz, 4H), 1.63 – 1.57 (m, 2H). **¹³C NMR (126 MHz, Chloroform-*d*)** δ : 153.4, 141.8, 139.7, 131.9, 131.4, 128.8, 127.2, 127.0, 121.4, 118.1, 53.5, 26.8, 24.6, 17.8. **HRMS** (ESI/TOF-Q) *m/z*: [M+H]⁺ Calculated for C₁₈H₂₁NH⁺ 252.1747; Found 252.1754.



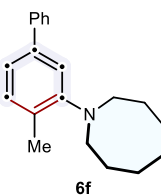
Compound, **6c**: white solid, mp: 75–78 °C; eluent (2% ethyl acetate in hexane; Prep-TLC). **Yield**: 84% (23 mg); **¹H NMR (500 MHz, Chloroform-*d*)** δ : 7.57 – 7.55 (m, 2H), 7.44 – 7.41 (m, 2H), 7.35 – 7.31 (m, 1H), 7.25 – 7.22 (m, 3H), 3.22 – 3.20 (m, 4H), 2.83 – 2.81 (m, 4H), 2.32 (s, 3H). **¹³C NMR (126 MHz, Chloroform-*d*)** δ : 153.1, 141.4, 140.0, 132.2, 131.5, 128.8, 127.2, 127.1, 122.3, 118.9, 54.6, 28.7, 17.7. **HRMS** (ESI/TOF-Q) m/z : $[M+H]^+$ Calculated for $C_{17}H_{19}NSH^+$ 270.1311; Found 270.1315.



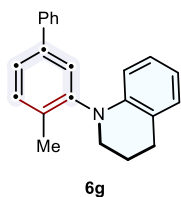
Compound, **6d**: white solid; eluent (2% ethyl acetate in hexane; Prep-TLC). **Yield**: 72% (19 mg); **¹H NMR (500 MHz, Chloroform-*d*)** δ : 7.58 (d, J = 7.3 Hz, 2H), 7.42 (t, J = 7.7 Hz, 2H), 7.34 – 7.31 (m, 1H), 7.29 (d, J = 1.9 Hz, 1H), 7.23 (d, J = 7.7 Hz, 1H), 7.15 (dd, J = 7.8, 1.8 Hz, 1H), 3.16 (t, J = 5.7 Hz, 4H), 2.36 (s, 3H), 1.82 – 1.80 (m, 4H), 1.75 – 1.73 (m, 4H). **¹³C NMR (126 MHz, Chloroform-*d*)** δ : 155.2, 141.8, 139.7, 132.0, 131.4, 128.8, 127.2, 127.0, 121.1, 119.8, 56.0, 29.7, 27.3, 18.8. **HRMS** (ESI/TOF-Q) m/z : $[M+H]^+$ Calculated for $C_{19}H_{23}NH^+$ 266.1903; Found 266.1909.



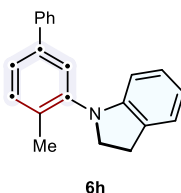
Compound, **6e**: white solid; eluent (2% ethyl acetate in hexane; Prep-TLC). **Yield**: 81% (22 mg); **¹H NMR (500 MHz, Chloroform-*d*)** δ : 7.58 – 7.56 (m, 2H), 7.45 – 7.42 (m, 2H), 7.35 – 7.32 (m, 1H), 7.30 (d, J = 2.0 Hz, 1H), 7.25 (d, J = 7.6 Hz, 1H), 7.20 (dd, J = 7.7, 1.9 Hz, 1H), 3.99 – 3.96 (m, 2H), 3.88 – 3.86 (m, 2H), 3.25 – 3.22 (m, 4H), 2.37 (s, 3H), 2.06 (p, J = 6.0 Hz, 2H). **¹³C NMR (126 MHz, Chloroform-*d*)** δ : 154.1, 141.5, 139.9, 131.9, 131.5, 128.8, 127.2 (2C), 121.8, 119.6, 71.2, 69.4, 58.1, 54.4, 31.2, 18.5. **HRMS** (ESI/TOF-Q) m/z : $[M+H]^+$ Calculated for $C_{18}H_{21}NOH^+$ 268.1696; Found 268.1701.



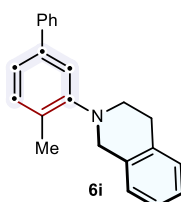
Compound, **6f**: white solid; eluent (2% ethyl acetate in hexane; Prep-TLC). **Yield**: 82% (23 mg); **¹H NMR (500 MHz, Chloroform-*d*)** δ : 7.58 – 7.55 (m, 2H), 7.44 – 7.40 (m, 2H), 7.36 (d, J = 1.8 Hz, 1H), 7.33 – 7.30 (m, 1H), 7.22 (d, J = 7.7 Hz, 1H), 7.18 (dd, J = 7.8, 1.8 Hz, 1H), 3.14 – 3.13 (m, 4H), 2.40 (s, 3H), 1.74 (s, 10H). **¹³C NMR (126 MHz, Chloroform-*d*)** δ : 155.3, 141.7, 139.9, 133.0, 131.6, 128.8, 127.2, 127.0, 121.9, 121.7, 55.4, 28.7, 28.2, 25.5, 19.1. **HRMS** (ESI/TOF-Q) m/z : $[M+H]^+$ Calculated for $C_{20}H_{25}NH^+$ 280.2060; Found 280.2058.



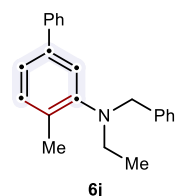
Compound, **6g**: white solid; eluent (2% ethyl acetate in hexane; Prep-TLC). **Yield**: 75% (22 mg); **¹H NMR (500 MHz, Chloroform-*d*)** δ : 7.58 – 7.56 (m, 2H), 7.46 – 7.39 (m, 4H), 7.37 (d, *J* = 7.7 Hz, 1H), 7.34 – 7.30 (m, 1H), 7.03 (dd, *J* = 7.5, 1.6 Hz, 1H), 6.88 (ddd, *J* = 8.8, 7.5, 1.7 Hz, 1H), 6.61 (td, *J* = 7.2, 1.2 Hz, 1H), 6.14 (dd, *J* = 8.3, 1.2 Hz, 1H), 3.56 (s, 2H), 2.92 (s, 2H), 2.23 (s, 3H), 2.12 (p, *J* = 6.0 Hz, 2H). **¹³C NMR (101 MHz, Chloroform-*d*)** δ : 146.5, 145.2, 140.9, 140.6, 136.1, 131.9, 129.4, 128.9, 127.32, 127.26, 127.0, 126.9, 125.1, 121.9, 116.6, 113.3, 50.7, 28.1, 22.6, 17.7. **HRMS** (ESI/TOF-Q) *m/z*: [M+H]⁺ Calculated for C₂₂H₂₁NH⁺ 300.1747; Found 300.1753.



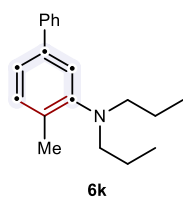
Compound, **6h**: white solid; eluent (2% ethyl acetate in hexane; Prep-TLC). **Yield**: 73% (21 mg); **¹H NMR (500 MHz, Chloroform-*d*)** δ : 7.62 – 7.60 (m, 3H), 7.47 – 7.44 (m, 3H), 7.41 (d, *J* = 7.9 Hz, 1H), 7.38 – 7.35 (m, 1H), 7.24 – 7.23 (m, 1H), 7.08 – 7.05 (m, 1H), 6.78 – 6.75 (m, 1H), 6.39 (d, *J* = 7.9 Hz, 1H), 3.90 (t, *J* = 8.4 Hz, 2H), 3.23 (t, *J* = 8.4 Hz, 2H), 2.40 (s, 3H). **¹³C NMR (126 MHz, Chloroform-*d*)** δ : 150.8, 144.3, 140.8, 140.3, 134.8, 131.8, 130.2, 128.8, 127.3 (2C), 127.0, 124.8, 124.4, 123.0, 118.0, 108.4, 54.7, 29.1, 18.1. **HRMS** (ESI/TOF-Q) *m/z*: [M+H]⁺ Calculated for C₂₁H₁₉NH⁺ 286.1590; Found 286.1590.



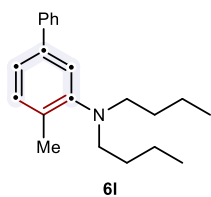
Compound, **6i**: white solid; eluent (2% ethyl acetate in hexane; Prep-TLC). **Yield**: 82% (25 mg); **¹H NMR (400 MHz, Chloroform-*d*)** δ : 7.61 – 7.58 (m, 2H), 7.46 – 7.42 (m, 2H), 7.36 – 7.31 (m, 2H), 7.29 (d, *J* = 7.8 Hz, 1H), 7.26 – 7.23 (m, 1H), 7.20 – 7.16 (m, 3H), 7.12 – 7.10 (m, 1H), 4.20 (s, 2H), 3.29 (t, *J* = 5.8 Hz, 2H), 3.06 (t, *J* = 5.7 Hz, 2H), 2.39 (s, 3H). **¹³C NMR (101 MHz, Chloroform-*d*)** δ : 152.0, 141.6, 139.9, 135.5, 134.7, 132.1, 131.7, 129.1, 128.9, 127.2, 127.2, 126.6, 126.4, 125.9, 122.0, 118.2, 54.4, 50.6, 30.0, 18.0. **HRMS** (ESI/TOF-Q) *m/z*: [M+H]⁺ Calculated for C₂₂H₂₁NH⁺ 300.1747; Found 300.1752.



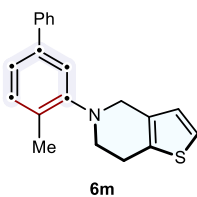
Compound, **6j**: white solid; eluent (2% ethyl acetate in hexane; Prep-TLC). **Yield**: 72% (22 mg); **¹H NMR (500 MHz, Chloroform-*d*)** δ : 7.55 – 7.53 (m, 2H), 7.44 – 7.41 (m, 2H), 7.39 – 7.37 (m, 2H), 7.34 – 7.30 (m, 3H), 7.29 – 7.26 (m, 2H), 7.26 – 7.21 (m, 2H), 4.15 (s, 2H), 3.01 (q, *J* = 7.1 Hz, 2H), 2.42 (s, 3H), 1.01 (t, *J* = 7.0 Hz, 3H). **¹³C NMR (126 MHz, Chloroform-*d*)** δ : 150.4, 141.6, 139.5, 139.3, 133.8, 131.5, 128.8, 128.6, 128.3, 127.2, 127.1, 127.0, 122.2, 121.3, 58.4, 46.4, 18.3, 12.2. **HRMS** (ESI/TOF-Q) *m/z*: [M+H]⁺ Calculated for C₂₂H₂₃NH⁺ 302.1903; Found 302.1900.



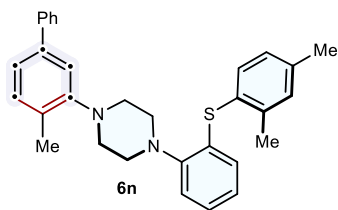
Compound, **6k**: white solid; eluent (2% ethyl acetate in hexane; Prep-TLC). **Yield**: 76% (20 mg); **¹H NMR (500 MHz, Chloroform-*d*)** δ : 7.58 – 7.55 (m, 2H), 7.44 – 7.41 (m, 2H), 7.34 – 7.29 (m, 2H), 7.24 (d, *J* = 7.8 Hz, 1H), 7.21 – 7.18 (m, 1H), 2.95 – 2.92 (m, 4H), 2.34 (s, 3H), 1.52 – 1.44 (m, 4H), 0.86 (t, *J* = 7.4 Hz, 6H). **¹³C NMR (126 MHz, Chloroform-*d*)** δ : 151.0, 141.7, 139.3, 134.2, 131.4, 128.8, 127.2, 127.0, 121.9, 121.2, 55.9, 20.6, 18.2, 11.9. **HRMS** (ESI/TOF-Q) *m/z*: [M+H]⁺ Calculated for C₁₉H₂₅NH⁺ 268.2060; Found 268.2065.



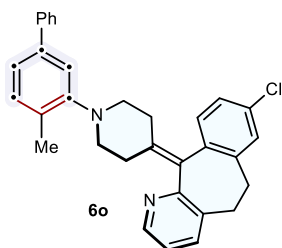
Compound, **6l**: white solid; eluent (2% ethyl acetate in hexane; Prep-TLC). **Yield**: 78% (23 mg); **¹H NMR (500 MHz, Chloroform-*d*)** δ : 7.58 – 7.56 (m, 2H), 7.45 – 7.41 (m, 2H), 7.34 – 7.32 (m, 1H), 7.31 – 7.29 (m, 1H), 7.24 (d, *J* = 7.8 Hz, 1H), 7.20 (dd, *J* = 7.8, 1.8 Hz, 1H), 2.98 – 2.95 (m, 4H), 2.32 (s, 3H), 1.47 – 1.41 (m, 4H), 1.33 – 1.25 (m, 4H), 0.88 (t, *J* = 7.3 Hz, 6H). **¹³C NMR (126 MHz, Chloroform-*d*)** δ : 151.1, 141.8, 139.2, 134.1, 131.4, 128.8, 127.2, 127.0, 121.8, 121.1, 53.8, 29.6, 20.6, 18.2, 14.2. **HRMS** (ESI/TOF-Q) *m/z*: [M+H]⁺ Calculated for C₂₁H₂₉NH⁺ 296.2373; Found 296.2379.



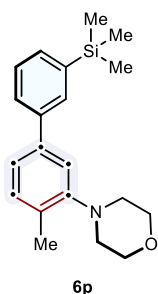
Compound, **6m**: white solid; eluent (2% ethyl acetate in hexane; Prep-TLC). **Yield**: 87% (27 mg); **¹H NMR (500 MHz, Chloroform-*d*)** δ : 7.59 – 7.56 (m, 2H), 7.45 – 7.41 (m, 2H), 7.35 – 7.32 (m, 2H), 7.28 (d, *J* = 7.8 Hz, 1H), 7.25 – 7.23 (m, 1H), 7.14 (d, *J* = 5.1 Hz, 1H), 6.82 (d, *J* = 5.1 Hz, 1H), 4.13 (t, *J* = 1.8 Hz, 2H), 3.32 (t, *J* = 5.6 Hz, 2H), 3.02 (t, *J* = 5.5 Hz, 2H), 2.39 (s, 3H). **¹³C NMR (126 MHz, Chloroform-*d*)** δ : 151.8, 141.5, 139.9, 134.5, 133.8, 132.1, 131.7, 128.9, 127.2 (2C), 125.3, 122.9, 122.1, 118.6, 51.5, 50.7, 26.4, 18.0. **HRMS** (ESI/TOF-Q) *m/z*: [M+H]⁺ Calculated for C₂₀H₁₉NSH⁺ 306.1311; Found 306.1315.



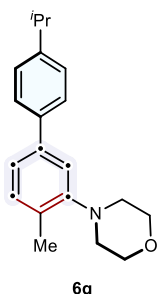
Compound, **6n**: white solid; eluent (5% ethyl acetate in hexane; Prep-TLC). **Yield**: 85% (39 mg); **¹H NMR (500 MHz, Chloroform-*d*)** δ : 7.62 – 7.60 (m, 2H), 7.46 – 7.42 (m, 3H), 7.37 (d, *J* = 1.8 Hz, 1H), 7.36 – 7.32 (m, 1H), 7.29 (d, *J* = 7.8 Hz, 1H), 7.27 – 7.25 (m, 1H), 7.18 – 7.16 (m, 2H), 7.12 (td, *J* = 7.5, 1.5 Hz, 1H), 7.05 (dd, *J* = 7.8, 2.0 Hz, 1H), 6.92 – 6.89 (m, 1H), 6.57 (dd, *J* = 7.9, 1.5 Hz, 1H), 3.29 – 3.27 (m, 4H), 3.22 – 3.20 (m, 4H), 2.43 (s, 3H), 2.38 (s, 3H), 2.36 (s, 3H). **¹³C NMR (126 MHz, Chloroform-*d*)** δ : 152.2, 149.5, 142.6, 141.5, 139.9, 139.3, 136.4, 134.8, 131.9, 131.8, 131.6, 128.8, 128.2, 127.9, 127.2, 127.1, 126.4, 125.6, 124.5, 121.9, 120.1, 118.4, 52.4, 52.4, 21.3, 20.8, 17.9. **HRMS** (ESI/TOF-Q) *m/z*: [M+H]⁺ Calculated for C₃₁H₃₂N₂SH⁺ 465.2359; Found 465.2367.



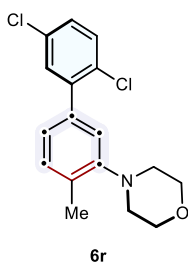
Compound, **6o**: white solid; eluent (10% ethyl acetate in hexane; Prep-TLC). **Yield**: 78% (37 mg); **¹H NMR (500 MHz, Chloroform-*d*)** δ : 8.44 (dd, *J* = 4.9, 1.7 Hz, 1H), 7.56 – 7.54 (m, 2H), 7.45 (dd, *J* = 7.7, 1.7 Hz, 1H), 7.42 – 7.39 (m, 2H), 7.33 – 7.30 (m, 1H), 7.24 (s, 1H), 7.21 – 7.20 (m, 3H), 7.18 – 7.14 (m, 2H), 7.11 (dd, *J* = 7.7, 4.8 Hz, 1H), 3.50 – 3.39 (m, 2H), 3.21 – 3.14 (m, 2H), 2.90 – 2.84 (m, 1H), 2.83 – 2.79 (m, 1H), 2.79 – 2.69 (m, 3H), 2.64 – 2.58 (m, 1H), 2.55 – 2.47 (m, 2H), 2.37 (s, 3H). **¹³C NMR (126 MHz, Chloroform-*d*)** δ : 157.7, 152.2, 146.8, 141.5, 139.7, 139.7, 138.7, 138.0, 137.5, 133.6, 133.2, 132.9, 131.9, 131.5, 131.0, 129.1, 128.8, 127.11 (2C), 127.08, 126.2, 122.3, 121.8, 118.2, 53.67, 53.65, 32.0, 31.9, 31.7, 31.6, 17.7. **HRMS (ESI/TOF-Q)** *m/z*: [M+H]⁺ Calculated for C₃₂H₂₉ClN₂H⁺ 477.2092; Found 477.2091.



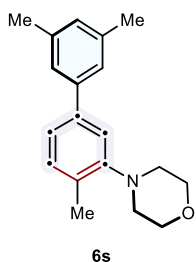
Compound, **6p**: white solid, mp: 118–120 °C; eluent (2% ethyl acetate in hexane; Prep-TLC). **Yield**: 85% (28 mg); **¹H NMR (400 MHz, Chloroform-*d*)** δ : 7.69 – 7.68 (m, 1H), 7.56 – 7.49 (m, 2H), 7.43 (td, *J* = 7.5, 0.7 Hz, 1H), 7.28 – 7.26 (m, 1H), 7.24 – 7.22 (m, 2H), 3.90 – 3.87 (m, 4H), 3.00 – 2.98 (m, 4H), 2.36 (s, 3H), 0.31 (s, 9H). **¹³C NMR (101 MHz, Chloroform-*d*)** δ : 151.7, 141.2, 140.8, 140.5, 132.3, 132.2, 131.7, 131.7, 128.2, 127.8, 122.4, 118.2, 67.6, 52.4, 17.8, -0.9. **HRMS (ESI/TOF-Q)** *m/z*: [M+H]⁺ Calculated for C₂₀H₂₇NOSiH⁺ 326.1935; Found 326.1935.



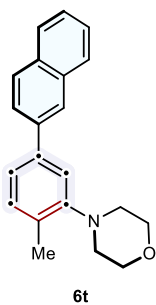
Compound, **6q**: white solid; eluent (2% ethyl acetate in hexane; Prep-TLC). **Yield**: 83% (25 mg); **¹H NMR (500 MHz, Chloroform-*d*)** δ : 7.57 – 7.52 (m, 2H), 7.34 – 7.32 (m, 2H), 7.29 – 7.25 (m, 3H), 3.92 – 3.90 (m, 4H), 3.02 – 2.95 (m, 5H), 2.38 (s, 3H), 1.33 (d, *J* = 6.9 Hz, 6H). **¹³C NMR (126 MHz, Chloroform-*d*)** δ : 151.7, 148.0, 140.0, 139.0, 131.6, 131.5, 127.1, 126.9, 122.1, 117.9, 67.6, 52.5, 33.9, 24.2, 17.8. **HRMS (ESI/TOF-Q)** *m/z*: [M+H]⁺ Calculated for C₂₀H₂₅NOH⁺ 296.2009; Found 296.2015.



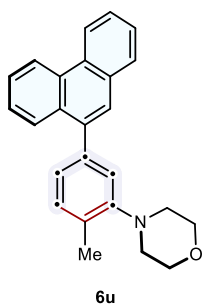
Compound, **6r**: white solid, mp: 90–95 °C; eluent (2% ethyl acetate in hexane; Prep-TLC). **Yield**: 79% (25 mg); **¹H NMR (400 MHz, Chloroform-*d*)** δ : 7.39 (d, *J* = 8.6 Hz, 1H), 7.33 (d, *J* = 2.5 Hz, 1H), 7.26 – 7.22 (m, 2H), 7.07 – 7.04 (m, 2H), 3.88 – 3.85 (m, 4H), 2.96 – 2.94 (m, 4H), 2.36 (s, 3H). **¹³C NMR (101 MHz, Chloroform-*d*)** δ : 151.1, 142.1, 136.7, 132.7, 132.7, 131.24, 131.17 (2C), 131.0, 128.4, 124.2, 120.3, 67.6, 52.4, 17.9. **HRMS (ESI/TOF-Q)** *m/z*: [M+H]⁺ Calculated for C₁₇H₁₇Cl₂NOH⁺ 322.0760; Found 322.0760.



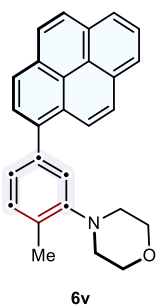
Compound, **6s**: white solid; eluent (2% ethyl acetate in hexane; Prep-TLC). **Yield**: 86% (24 mg); **¹H NMR (500 MHz Chloroform-*d*)** δ : 7.24 – 7.22 (m, 3H), 7.19 (s, 2H), 7.00 (s, 1H), 3.90 – 3.88 (m, 4H), 3.00 – 2.98 (m, 4H), 2.40 (s, 6H), 2.36 (s, 3H). **¹³C NMR (126 MHz, Chloroform-*d*)** δ : 151.6, 141.5, 140.3, 138.4, 131.6, 128.9, 125.1 (2C), 122.3, 118.0, 67.6, 52.4, 21.6, 17.8. **HRMS (ESI/TOF-Q)** m/z : $[M+H]^+$ Calculated for C₁₉H₂₃NOH⁺ 282.1852; Found 282.1853.



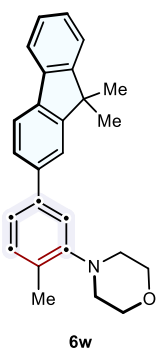
Compound, **6t**: white solid; eluent (2% ethyl acetate in hexane; Prep-TLC). **Yield**: 80% (24 mg); **¹H NMR (400 MHz Chloroform-*d*)** δ : 8.02 (d, J = 1.8 Hz, 1H), 7.92 – 7.86 (m, 3H), 7.75 – 7.72 (m, 1H), 7.53 – 7.46 (m, 2H), 7.39 – 7.36 (m, 2H), 7.31 (d, J = 8.3 Hz, 1H), 3.91 – 3.89 (m, 4H), 3.04 – 3.02 (m, 4H), 2.39 (s, 3H). **¹³C NMR (101 MHz, Chloroform-*d*)** δ : 151.9, 139.9, 138.8, 133.8, 132.7, 131.9, 131.8, 128.5, 128.3, 127.8, 126.4, 126.0, 125.7, 125.6, 122.5, 118.2, 67.6, 52.5, 17.8. **HRMS (ESI/TOF-Q)** m/z : $[M+H]^+$ Calculated for C₂₁H₂₁NOH⁺ 304.1696; Found 304.1696.



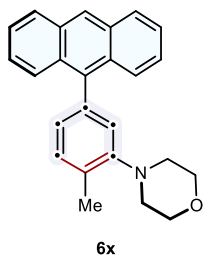
Compound, **6u**: white solid; eluent (2% ethyl acetate in hexane; Prep-TLC). **Yield**: 76% (27 mg); **¹H NMR (500 MHz, Chloroform-*d*)** δ : 8.78 (d, J = 8.2 Hz, 1H), 8.73 (d, J = 8.2 Hz, 1H), 7.96 (d, J = 8.2 Hz, 1H), 7.90 (d, J = 7.4 Hz, 1H), 7.69 – 7.66 (m, 3H), 7.64 – 7.61 (m, 1H), 7.56 – 7.52 (m, 1H), 7.34 (d, J = 8.0 Hz, 1H), 7.21 – 7.19 (m, 2H), 3.90 – 3.88 (m, 4H), 3.00 – 2.99 (m, 4H), 2.44 (s, 3H). **¹³C NMR (126 MHz, Chloroform-*d*)** δ : 151.3, 139.4, 138.9, 131.7, 131.7, 131.4, 131.2, 130.8, 130.1, 128.8, 127.5, 127.1, 127.0, 126.7, 126.60, 126.55, 125.1, 123.1, 122.7, 120.9, 67.6, 52.5, 18.0. **HRMS (ESI/TOF-Q)** m/z : $[M+H]^+$ Calculated for C₂₅H₂₃NOH⁺ 354.1852; Found 354.1855.



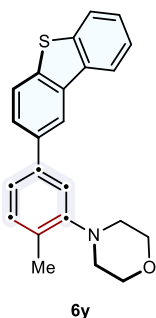
Compound, **6v**: white solid; eluent (2% ethyl acetate in hexane; Prep-TLC). **Yield**: 79% (30 mg); **¹H NMR (500 MHz, Chloroform-*d*)** δ : 8.23 – 8.21 (m, 2H), 8.19 – 8.16 (m, 2H), 8.10 (d, J = 1.1 Hz, 2H), 8.04 (d, J = 2.3 Hz, 1H), 8.02 – 7.99 (m, 2H), 7.39 (d, J = 7.8 Hz, 1H), 7.31 – 7.29 (m, 2H), 3.91 – 3.90 (m, 4H), 3.04 – 3.02 (m, 4H), 2.47 (s, 3H). **¹³C NMR (126 MHz, Chloroform-*d*)** δ : 151.4, 139.8, 137.9, 131.64, 131.59, 131.3, 131.1, 130.6, 128.6, 127.7, 127.6, 127.53, 127.48, 126.1, 125.6, 125.5, 125.2, 125.12, 125.07, 124.9, 124.8, 121.5, 67.6, 52.5, 18.0. **HRMS (ESI/TOF-Q)** m/z : $[M+H]^+$ Calculated for C₂₇H₂₃NOH⁺ 378.1852; Found 378.1849.



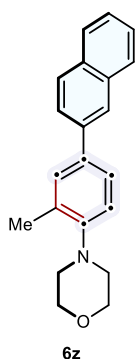
Compound, **6w**: white solid; eluent (2% ethyl acetate in hexane; Prep-TLC). **Yield**: 87% (32 mg); **¹H NMR (400 MHz, Chloroform-*d*)** δ : 7.79 – 7.74 (m, 2H), 7.61 (d, *J* = 1.7 Hz, 1H), 7.57 – 7.54 (m, 1H), 7.47 – 7.45 (m, 1H), 7.38 – 7.32 (m, 2H), 7.30 (d, *J* = 1.9 Hz, 3H), 3.91 – 3.89 (m, 4H), 3.03 – 3.01 (m, 4H), 2.38 (s, 3H), 1.55 (s, 6H). **¹³C NMR (126 MHz, Chloroform-*d*)** δ : 154.4, 154.0, 151.8, 140.7, 140.5, 139.1, 138.5, 131.7 (2C), 127.4, 127.2, 126.2, 122.7, 122.4, 121.4, 120.4, 120.2, 118.1, 67.6, 52.5, 47.1, 27.4, 17.8. **HRMS** (ESI/TOF-Q) *m/z*: [M+H]⁺ Calculated for C₂₆H₂₇NOH⁺ 370.2165; Found 370.2169.



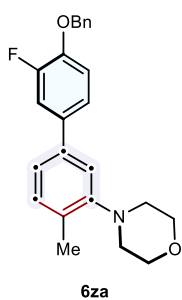
Compound, **6x**: white solid; eluent (2% ethyl acetate in hexane; Prep-TLC). **Yield**: 75% (26 mg); **¹H NMR (400 MHz, Chloroform-*d*)** δ : 8.49 (s, 1H), 8.06 – 8.03 (m, 2H), 7.74 – 7.71 (m, 2H), 7.48 – 7.44 (m, 2H), 7.41 – 7.33 (m, 3H), 7.10 – 7.08 (m, 2H), 3.88 – 3.86 (m, 4H), 2.98 – 2.96 (m, 4H), 2.49 (s, 3H). **¹³C NMR (101 MHz, Chloroform-*d*)** δ : 151.3, 137.4, 137.2, 131.6, 131.5, 131.3, 130.4, 128.5, 127.1, 126.5, 126.3, 125.4, 125.2, 122.0, 67.6, 52.5, 18.1. **HRMS** (ESI/TOF-Q) *m/z*: [M+H]⁺ Calculated for C₂₅H₂₃NOH⁺ 354.1852; Found 354.1852.



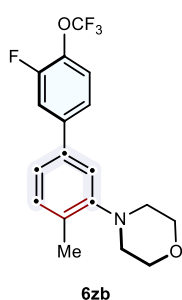
Compound, **6y**: white solid; eluent (2% ethyl acetate in hexane; Prep-TLC). **Yield**: 83% (30 mg); **¹H NMR (500 MHz, Chloroform-*d*)** δ : 8.32 (d, *J* = 1.7 Hz, 1H), 8.25 – 8.22 (m, 1H), 7.90 (d, *J* = 8.3 Hz, 1H), 7.89 – 7.86 (m, 1H), 7.68 (dd, *J* = 8.3, 1.8 Hz, 1H), 7.50 – 7.46 (m, 2H), 7.36 – 7.34 (m, 2H), 7.32 (d, *J* = 7.6 Hz, 1H), 3.91 – 3.90 (m, 4H), 3.04 – 3.02 (m, 4H), 2.39 (s, 3H). **¹³C NMR (126 MHz, Chloroform-*d*)** δ : 151.9, 140.1, 140.0, 138.5, 138.2, 136.2, 135.7, 131.9 (2C), 127.0, 126.3, 124.6, 123.1, 123.1, 122.5, 121.8, 120.0, 118.2, 67.6, 52.5, 17.8. **HRMS** (ESI/TOF-Q) *m/z*: [M+H]⁺ Calculated for C₂₃H₂₁NOSH⁺ 360.1417; Found 360.1418.



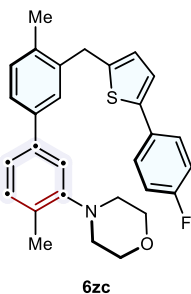
Compound, **6z**: white solid; eluent (2% ethyl acetate in hexane; Prep-TLC). **Yield**: 72% (22 mg); **¹H NMR (400 MHz, Chloroform-*d*)** δ : 8.01 (d, *J* = 1.8 Hz, 1H), 7.90 – 7.84 (m, 3H), 7.73 (dd, *J* = 8.5, 1.8 Hz, 1H), 7.58 – 7.54 (m, 2H), 7.52 – 7.45 (m, 2H), 7.13 (d, *J* = 8.1 Hz, 1H), 3.91 – 3.88 (m, 4H), 3.00 – 2.97 (m, 4H), 2.42 (s, 3H). **¹³C NMR (126 MHz, Chloroform-*d*)** δ : 151.0, 138.4, 136.2, 133.9, 133.1, 132.6, 130.4, 128.4, 128.2, 127.8, 126.4, 125.8, 125.72, 125.65, 125.4, 119.5, 67.6, 52.5, 18.3. **HRMS** (ESI/TOF-Q) *m/z*: [M+H]⁺ Calculated for C₂₁H₂₁NOH⁺ 304.1696; Found 304.1701.



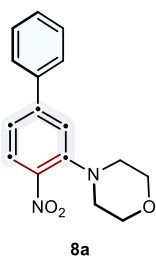
Compound, **6za**: white solid; eluent (4% ethyl acetate in hexane; Prep-TLC). **Yield**: 79% (28 mg); **¹H NMR (500 MHz, Chloroform-*d*)** δ : 7.48 – 7.46 (m, 2H), 7.42 – 7.39 (m, 2H), 7.36 – 7.31 (m, 2H), 7.25 – 7.23 (m, 2H), 7.17 – 7.15 (m, 2H), 7.05 (t, *J* = 8.5 Hz, 1H), 5.19 (s, 2H), 3.89 – 3.87 (m, 4H), 2.98 – 2.96 (m, 4H), 2.34 (s, 3H). **¹³C NMR (126 MHz, Chloroform-*d*)** δ : 153.2 (d, *J* = 246.1 Hz), 151.8, 146.0 (d, *J* = 10.9 Hz), 138.5, 136.7, 135.3 (d, *J* = 6.6 Hz), 131.8, 128.8, 128.3, 127.6, 122.6 (d, *J* = 3.4 Hz), 121.8, 117.5, 116.1, 115.0 (d, *J* = 18.9 Hz), 71.7, 67.6, 52.4, 17.8. **¹⁹F NMR (376 MHz, Chloroform-*d*)** δ : -133.50. **HRMS** (ESI/TOF-Q) *m/z*: [M+H]⁺ Calculated for C₂₄H₂₄FNO₂H⁺ 378.1864; Found 378.1861.



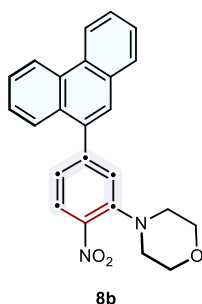
Compound, **6zb**: white solid; eluent (2% ethyl acetate in hexane; Prep-TLC). **Yield**: 81% (31 mg); **¹H NMR (400 MHz, Chloroform-*d*)** δ : 7.38 – 7.35 (m, 1H), 7.33 – 7.30 (m, 2H), 7.24 (d, *J* = 1.3 Hz, 1H), 7.17 – 7.14 (m, 2H), 3.87 – 3.85 (m, 4H), 2.96 – 2.94 (m, 4H), 2.34 (s, 3H). **¹³C NMR (101 MHz, Chloroform-*d*)** δ : 154.8 (d, *J* = 252.3 Hz), 152.0, 142.2 (d, *J* = 6.8 Hz), 137.6, 133.0, 132.0, 124.0, 123.0 (d, *J* = 3.6 Hz), 122.0, 120.7 (d, *J* = 258.1 Hz), 117.8, 115.9, 115.7, 67.5, 52.4, 17.9. **¹⁹F NMR (376 MHz, Chloroform-*d*)** δ : -58.79 (d, *J* = 4.9 Hz), -128.62 (q, *J* = 4.9 Hz). **HRMS** (ESI/TOF-Q) *m/z*: [M+H]⁺ Calculated for C₁₈H₁₇F₄NO₂H⁺ 356.1268; Found 356.1275.



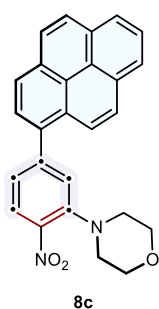
Compound, **6zc**: white solid; eluent (2% ethyl acetate in hexane; Prep-TLC). **Yield**: 85% (39 mg); **¹H NMR (400 MHz, Chloroform-*d*)** δ : 7.51 – 7.46 (m, 2H), 7.44 (d, *J* = 2.0 Hz, 1H), 7.41 (dd, *J* = 7.7, 2.0 Hz, 1H), 7.26 (d, *J* = 2.0 Hz, 1H), 7.25 – 7.22 (m, 3H), 7.06 – 7.01 (m, 3H), 6.73 – 6.71 (m, 1H), 4.20 (s, 2H), 3.88 – 3.86 (m, 4H), 2.99 – 2.97 (m, 4H), 2.38 (s, 3H), 2.35 (s, 3H). **¹³C NMR (101 MHz, Chloroform-*d*)** δ : 162.2 (d, *J* = 246.6 Hz), 151.7, 143.5, 141.7, 139.8, 139.4, 138.7, 135.4, 131.7, 131.6, 131.0, 128.3, 127.2 (d, *J* = 7.8 Hz), 126.2, 125.6, 122.8, 122.1, 117.8, 115.8 (d, *J* = 21.8 Hz), 67.6, 52.4, 34.4, 19.3, 17.8. **¹⁹F NMR (376 MHz, Chloroform-*d*)** δ : -115.13. **HRMS** (ESI/TOF-Q) *m/z*: [M+H]⁺ Calculated for C₂₉H₂₈FNOSH⁺ 458.1948; Found 458.1948.



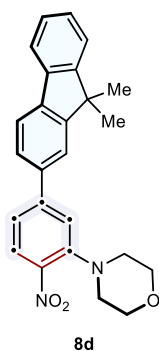
Compound, **8a**: pale yellow solid; eluent (10% ethyl acetate in hexane). **Yield**: 91% (26 mg); **¹H NMR (400 MHz, Chloroform-*d*)** δ : 7.91 (d, *J* = 8.4 Hz, 1H), 7.59 – 7.56 (m, 2H), 7.51 – 7.41 (m, 3H), 7.29 (d, *J* = 1.8 Hz, 1H), 7.27 – 7.25 (m, 1H), 3.89 – 3.87 (m, 4H), 3.14 – 3.12 (m, 4H). **¹³C NMR (126 MHz, Chloroform-*d*)** δ : 147.2, 146.6, 142.2, 139.4, 129.2, 128.9, 127.4, 127.0, 120.9, 119.5, 67.0, 52.3. **HRMS** (ESI/TOF-Q) *m/z*: [M+H]⁺ Calculated for C₁₆H₁₆N₂O₃H⁺ 285.1234; Found 285.1233.



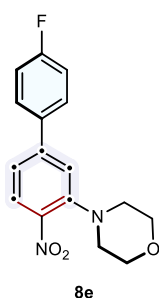
Compound, **8b**: pale yellow solid, mp: 115–116 °C; eluent (10% ethyl acetate in hexane). **Yield**: 90% (35 mg); **¹H NMR (500 MHz, Chloroform-*d*)** δ : 8.80 (d, *J* = 8.2 Hz, 1H), 8.73 (d, *J* = 8.3 Hz, 1H), 7.97 (d, *J* = 8.3 Hz, 1H), 7.92 (dd, *J* = 7.9, 1.4 Hz, 1H), 7.83 (dd, *J* = 8.3, 1.3 Hz, 1H), 7.73 – 7.69 (m, 2H), 7.68 – 7.64 (m, 2H), 7.59 – 7.56 (m, 1H), 7.29 (d, *J* = 1.8 Hz, 1H), 7.24 (dd, *J* = 8.2, 1.8 Hz, 1H), 3.88 – 3.87 (m, 4H), 3.14 – 3.12 (m, 4H). **¹³C NMR (126 MHz, Chloroform-*d*)** δ : 147.0, 146.0, 142.2, 136.9, 131.2, 130.8, 130.4, 129.0, 127.8, 127.4, 127.3, 127.0 (3C), 126.4, 126.4, 123.8, 123.3, 122.8, 122.4, 67.0, 52.2. **HRMS** (ESI/TOF-Q) *m/z*: [M+H]⁺ Calculated for C₂₄H₂₀N₂O₃H⁺ 385.1547; Found 385.1552.



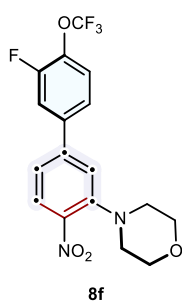
Compound, **8c**: pale yellow solid; eluent (10% ethyl acetate in hexane). **Yield**: 86% (35 mg); **¹H NMR (400 MHz, Chloroform-*d*)** δ : 8.25 – 8.23 (m, 2H), 8.21 (dd, *J* = 7.6, 1.1 Hz, 1H), 8.15 – 8.11 (m, 2H), 8.09 (d, *J* = 1.8 Hz, 2H), 8.07 – 8.01 (m, 2H), 7.95 (d, *J* = 7.8 Hz, 1H), 7.37 (d, *J* = 1.8 Hz, 1H), 7.33 (dd, *J* = 8.2, 1.8 Hz, 1H), 3.90 – 3.88 (m, 4H), 3.17 – 3.15 (m, 4H). **¹³C NMR (101 MHz, Chloroform-*d*)** δ : 147.5, 146.0, 142.0, 135.4, 131.6, 131.5, 130.9, 128.5, 128.4, 128.2, 127.4, 127.2, 126.51, 126.48, 125.8, 125.5, 125.1, 124.9, 124.8, 124.4, 124.2, 122.9, 67.0, 52.2. **HRMS** (ESI/TOF-Q) *m/z*: [M+H]⁺ Calculated for C₂₆H₂₀N₂O₃H⁺ 409.1547; Found 409.1543.



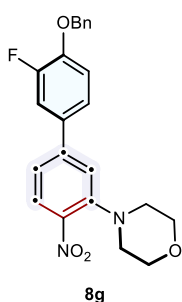
Compound, **8d**: pale yellow solid, mp: 190–192 °C; eluent (10% ethyl acetate in hexane). **Yield**: 87% (35 mg); **¹H NMR (500 MHz, Chloroform-*d*)** δ : 7.95 (d, *J* = 8.4 Hz, 1H), 7.82 (d, *J* = 7.9 Hz, 1H), 7.79 – 7.77 (m, 1H), 7.62 (d, *J* = 1.7 Hz, 1H), 7.56 (dd, *J* = 7.8, 1.7 Hz, 1H), 7.49 – 7.47 (m, 1H), 7.40 – 7.35 (m, 3H), 7.33 (dd, *J* = 8.4, 1.9 Hz, 1H), 3.91 – 3.89 (m, 4H), 3.18 – 3.16 (m, 4H), 1.56 (s, 6H). **¹³C NMR (126 MHz, Chloroform-*d*)** δ : 154.7, 154.1, 147.6, 146.7, 141.9, 140.1, 138.43, 138.37, 128.0, 127.3, 127.0, 126.6, 122.8, 121.6, 121.0, 120.7, 120.5, 119.4, 67.0, 52.3, 47.2, 27.3. **HRMS** (ESI/TOF-Q) *m/z*: [M+H]⁺ Calculated for C₂₅H₂₄N₂O₃H⁺ 401.1860; Found 401.1867.



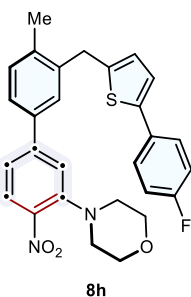
Compound, **8e**: pale yellow solid, mp: 140–145 °C; eluent (10% ethyl acetate in hexane). **Yield**: 84% (25 mg); **¹H NMR (500 MHz, Chloroform-*d*)** δ : 7.90 (d, *J* = 8.4 Hz, 1H), 7.56 – 7.53 (m, 2H), 7.23 – 7.20 (m, 2H), 7.18 – 7.15 (m, 2H), 3.87 (dd, *J* = 4.3, 2.2 Hz, 4H), 3.13 – 3.11 (m, 4H). **¹³C NMR (126 MHz, Chloroform-*d*)** δ : 163.4 (d, *J* = 249.0 Hz), 146.6, 146.1, 142.0, 135.5 (d, *J* = 3.3 Hz), 129.2 (d, *J* = 8.3 Hz), 127.1, 120.7, 119.3, 116.2 (d, *J* = 21.6 Hz), 67.0, 52.2. **¹⁹F NMR (471 MHz, Chloroform-*d*)** δ : -113.01. **HRMS** (ESI/TOF-Q) *m/z*: [M+H]⁺ Calculated for C₁₆H₁₅FN₂O₃H⁺ 303.1139; Found 303.1139.



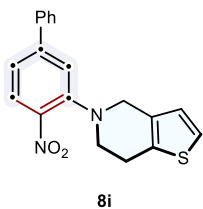
Compound, **8f**: pale yellow solid; eluent (10% ethyl acetate in hexane). **Yield**: 87% (34 mg); **¹H NMR (500 MHz, Chloroform-*d*)** δ : 7.90 (d, *J* = 8.3 Hz, 1H), 7.44 – 7.40 (m, 2H), 7.37 – 7.35 (m, 1H), 7.22 (d, *J* = 1.8 Hz, 1H), 7.20 (dd, *J* = 8.3, 1.9 Hz, 1H), 3.87 (t, *J* = 2.0 Hz, 4H), 3.14 – 3.12 (m, 4H). **¹³C NMR (126 MHz, Chloroform-*d*)** δ : 154.8 (d, *J* = 253.9 Hz), 146.6, 144.5, 142.6, 140.0 (d, *J* = 6.8 Hz), 127.2, 124.4, 123.6 (d, *J* = 3.7 Hz), 120.63, 120.58 (d, *J* = 259.3 Hz), 119.5, 116.4 (d, *J* = 19.7 Hz), 66.9, 52.1. **¹⁹F NMR (471 MHz, Chloroform-*d*)** δ : -58.71 (d, *J* = 4.6 Hz), -127.33 (q, *J* = 5.1 Hz). **HRMS** (ESI/TOF-Q) *m/z*: [M+H]⁺ Calculated for C₁₇H₁₄F₄N₂O₄H⁺ 387.0962; Found 387.0968.



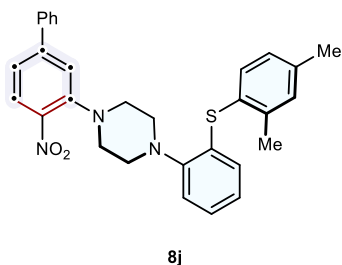
Compound, **8g**: pale yellow solid; eluent (10% ethyl acetate in hexane). **Yield**: 81% (33 mg); **¹H NMR (400 MHz, Chloroform-*d*)** δ : 7.89 (d, *J* = 8.4 Hz, 1H), 7.48 – 7.45 (m, 2H), 7.43 – 7.38 (m, 2H), 7.37 – 7.32 (m, 2H), 7.28 – 7.25 (m, 1H), 7.21 – 7.17 (m, 2H), 7.08 (t, *J* = 8.5 Hz, 1H), 5.21 (s, 2H), 3.89 – 3.86 (m, 4H), 3.13 – 3.10 (m, 4H). **¹³C NMR (101 MHz, Chloroform-*d*)** δ : 153.13 (d, *J* = 247.4 Hz), 147.41 (d, *J* = 10.8 Hz), 146.10 (d, *J* = 116.5 Hz), 141.88, 136.29, 132.75 (d, *J* = 6.5 Hz), 128.85, 128.43, 127.55, 127.17, 123.20 (d, *J* = 3.6 Hz), 120.28, 118.86, 116.03 (d, *J* = 2.4 Hz), 115.32 (d, *J* = 19.5 Hz), 71.53, 66.97, 52.23. **¹⁹F NMR (376 MHz, Chloroform-*d*)** δ : -132.57. **HRMS** (ESI/TOF-Q) *m/z*: [M+H]⁺ Calculated for C₂₃H₂₁FN₂O₄H⁺ 409.1558; Found 409.1560.



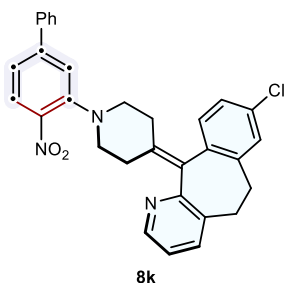
Compound, **8h**: pale yellow solid; eluent (10% ethyl acetate in hexane). **Yield**: 83% (41 mg); **¹H NMR (500 MHz, Chloroform-*d*)** δ : 7.90 (d, *J* = 8.2 Hz, 1H), 7.49 – 7.47 (m, 2H), 7.43 – 7.40 (m, 2H), 7.30 (d, *J* = 7.8 Hz, 1H), 7.27 – 7.24 (m, 2H), 7.06 – 7.01 (m, 3H), 6.72 – 6.71 (m, 1H), 4.21 (s, 2H), 3.86 – 3.85 (m, 4H), 3.12 – 3.10 (m, 4H), 2.40 (s, 3H). **¹³C NMR (126 MHz, Chloroform-*d*)** δ : 162.3 (d, *J* = 247.0 Hz), 146.9, 146.6, 142.9, 141.9 (d, *J* = 3.4 Hz), 139.2, 137.5, 137.3, 131.4, 130.9, 130.8, 128.5, 127.3 (d, *J* = 7.9 Hz), 127.0, 126.3, 125.8, 122.9, 120.7, 119.2, 115.9 (d, *J* = 21.7 Hz), 67.0, 52.3, 34.3, 19.4. **¹⁹F NMR (376 MHz, Chloroform-*d*)** δ : -114.84. **HRMS** (ESI/TOF-Q) *m/z*: [M+H]⁺ Calculated for C₂₈H₂₅FN₂O₃SH⁺ 489.1643; Found 489.1643.



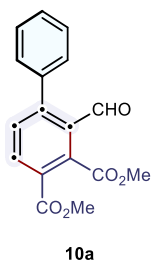
Compound, **8i**: pale yellow solid; eluent (10% ethyl acetate in hexane). **Yield**: 79% (27 mg); **¹H NMR (500 MHz, Chloroform-*d*)** δ : 7.93 (dd, *J* = 8.5, 2.6 Hz, 1H), 7.59 – 7.57 (m, 2H), 7.50 – 7.47 (m, 2H), 7.45 – 7.42 (m, 1H), 7.35 (s, 1H), 7.18 (d, *J* = 8.5 Hz, 1H), 7.14 (t, *J* = 3.9 Hz, 1H), 6.82 – 6.80 (m, 1H), 4.31 (s, 2H), 3.53 – 3.51 (m, 2H), 3.08 – 3.05 (m, 2H). **¹³C NMR (101 MHz, Chloroform-*d*)** δ : 147.1, 146.2, 140.5, 139.6, 133.9, 132.7, 129.2, 128.8, 127.5, 127.4, 125.0, 123.4, 119.5, 118.8, 50.9, 50.7, 25.5. **HRMS** (ESI/TOF-Q) *m/z*: [M+H]⁺ Calculated for C₁₉H₁₆N₂O₂SH⁺ 337.1005; Found 337.1009.



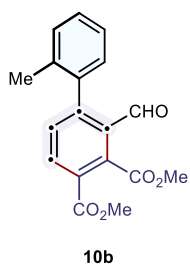
Compound, **8j**: pale yellow solid, mp: 178–180 °C; eluent (12% ethyl acetate in hexane). **Yield**: 86% (43 mg); **¹H NMR (500 MHz, Chloroform-*d*)** δ : 7.93 (d, *J* = 8.4 Hz, 1H), 7.62 – 7.60 (m, 2H), 7.51 – 7.47 (m, 2H), 7.45 – 7.43 (m, 1H), 7.42 – 7.40 (m, 2H), 7.27 – 7.25 (m, 1H), 7.17 – 7.16 (m, 1H), 7.13 (dd, *J* = 7.3, 1.5 Hz, 1H), 7.11 (dd, *J* = 7.8, 1.5 Hz, 1H), 7.05 (dd, *J* = 7.8, 2.1 Hz, 1H), 6.92 – 6.89 (m, 1H), 6.55 – 6.53 (m, 1H), 3.37 – 3.35 (m, 4H), 3.29 – 3.27 (m, 4H), 2.37 (s, 3H), 2.35 (s, 3H). **¹³C NMR (126 MHz, Chloroform-*d*)** δ : 149.0, 147.00, 146.98, 142.6, 142.0, 139.5, 139.4, 136.4, 134.8, 131.8, 129.2, 128.8, 128.0, 127.4 (2C), 126.9, 126.3, 125.7, 124.8, 120.5, 120.3, 119.8, 52.4, 51.8, 21.3, 20.7. **HRMS** (ESI/TOF-Q) *m/z*: [M+H]⁺ Calculated for C₃₀H₂₉N₃O₂SH⁺ 496.2053; Found 496.2051.



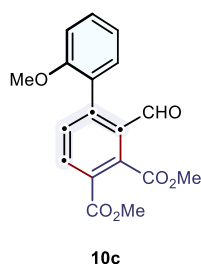
Compound, **8k**: pale yellow solid; eluent (20% ethyl acetate in hexane). **Yield**: 77% (39 mg); **¹H NMR (500 MHz, Chloroform-*d*)** δ : 8.42 (dd, *J* = 4.8, 1.7 Hz, 1H), 7.90 (d, *J* = 8.5 Hz, 1H), 7.56 – 7.54 (m, 2H), 7.48 – 7.39 (m, 4H), 7.27 (d, *J* = 1.8 Hz, 1H), 7.19 – 7.13 (m, 4H), 7.12 – 7.09 (m, 1H), 3.46 – 3.28 (m, 4H), 3.06 – 3.00 (m, 2H), 2.89 – 2.74 (m, 3H), 2.67 – 2.61 (m, 1H), 2.53 – 2.45 (m, 2H). **¹³C NMR (126 MHz, Chloroform-*d*)** δ : 157.4, 146.90, 146.85, 141.3, 139.7, 139.6, 137.8, 137.6, 137.5, 134.1, 133.6, 133.0, 130.9, 129.1, 128.8, 127.4, 127.1, 126.3, 122.4, 119.9, 119.7, 53.2, 53.0, 31.9, 31.7, 31.2, 30.9. **HRMS** (ESI/TOF-Q) *m/z*: [M+H]⁺ Calculated for C₃₁H₂₆ClN₃O₂H⁺ 508.1786; Found 508.1788.



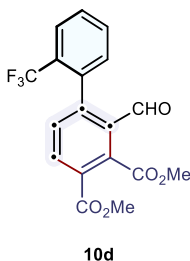
Compound, **10a**: colorless liquid; eluent (15% ethyl acetate in hexane; Prep-TLC). **Yield**: 78% (23 mg); **¹H NMR (500 MHz, Chloroform-*d*)** δ : 9.88 (s, 1H), 8.27 (d, *J* = 8.1 Hz, 1H), 7.57 (d, *J* = 8.1 Hz, 1H), 7.49 (d, *J* = 2.5 Hz, 3H), 7.37 – 7.35 (m, 2H), 4.03 (s, 3H), 3.94 (s, 3H). **¹³C NMR (126 MHz, Chloroform-*d*)** δ : 190.7, 169.0, 165.0, 150.3, 136.7, 135.8, 134.5, 131.9, 131.5, 130.0, 129.2, 128.9, 127.7, 53.1, 53.0. **HRMS** (ESI/TOF-Q) *m/z*: [M+H]⁺ Calculated for C₁₇H₁₄O₅H⁺ 299.0914; Found 299.0914.



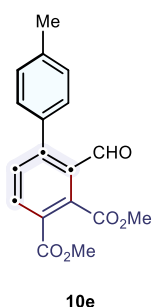
Compound, **10b**: colorless liquid; eluent (15% ethyl acetate in hexane; Prep-TLC). **Yield:** 62% (19 mg); **¹H NMR (400 MHz, Chloroform-*d*)** δ : 9.70 (s, 1H), 8.28 (d, *J* = 8.1 Hz, 1H), 7.45 (d, *J* = 8.0 Hz, 1H), 7.39 – 7.35 (m, 1H), 7.33 – 7.28 (m, 2H), 7.15 (dd, *J* = 7.5, 1.4 Hz, 1H), 4.03 (s, 3H), 3.95 (s, 3H), 2.11 (s, 3H). **¹³C NMR (101 MHz, Chloroform-*d*)** δ : 190.4, 168.9, 165.1, 150.4, 136.4, 136.0, 135.6, 134.7, 132.0, 131.6, 130.6, 129.9, 129.2, 128.0, 126.2, 53.1, 53.0, 20.4. **HRMS (ESI/TOF-Q)** *m/z*: [M+H]⁺ Calculated for C₁₈H₁₆O₅H⁺ 313.1071; Found 313.1078.



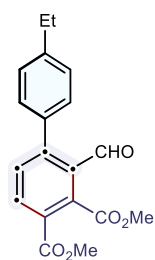
Compound, **10c**: colorless liquid; eluent (15% ethyl acetate in hexane; Prep-TLC). **Yield:** 76% (25 mg); **¹H NMR (400 MHz, Chloroform-*d*)** δ : 9.71 (s, 1H), 8.26 (d, *J* = 8.1 Hz, 1H), 7.48 – 7.43 (m, 2H), 7.26 – 7.24 (m, 1H), 7.11 – 7.07 (m, 1H), 6.97 (dd, *J* = 8.3, 1.1 Hz, 1H), 4.02 (s, 3H), 3.93 (s, 3H), 3.73 (s, 3H). **¹³C NMR (101 MHz, Chloroform-*d*)** δ : 190.7, 169.2, 165.2, 156.4, 146.8, 135.0, 134.6, 132.5, 131.7, 131.2, 131.1, 127.6, 125.7, 121.3, 110.9, 55.5, 53.0, 52.9. **HRMS (ESI/TOF-Q)** *m/z*: [M+H]⁺ Calculated for C₁₈H₁₆O₆H⁺ 329.1020; Found 329.1025.



Compound, **10d**: colorless liquid; eluent (15% ethyl acetate in hexane; Prep-TLC). **Yield:** 64% (23 mg); **¹H NMR (500 MHz, Chloroform-*d*)** δ : 9.65 (s, 1H), 8.26 (d, *J* = 8.0 Hz, 1H), 7.83 (d, *J* = 7.5 Hz, 1H), 7.65 – 7.59 (m, 2H), 7.47 (d, *J* = 8.1 Hz, 1H), 7.29 (d, *J* = 7.2 Hz, 1H), 4.02 (s, 3H), 3.94 (s, 3H). **¹³C NMR (101 MHz, Chloroform-*d*)** δ : 189.2, 168.6, 164.9, 146.9, 135.64, 135.58, 134.0, 132.1, 131.8, 131.7, 131.6, 129.3, 129.0 (d, *J* = 30.1 Hz), 128.7, 126.5 (q, *J* = 4.9 Hz), 123.7 (q, *J* = 273.9 Hz), 53.2, 53.1. **¹⁹F NMR (376 MHz, Chloroform-*d*)** δ : -58.01. **HRMS (ESI/TOF-Q)** *m/z*: [M+H]⁺ Calculated for C₁₈H₁₃F₃O₅H⁺ 367.0788; Found 367.0794.

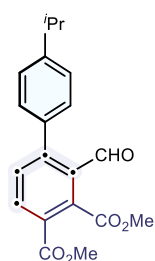


Compound, **10e**: colorless liquid; eluent (15% ethyl acetate in hexane; Prep-TLC). **Yield:** 71% (22 mg); **¹H NMR (500 MHz, Chloroform-*d*)** δ : 9.83 (s, 1H), 8.20 (d, *J* = 8.1 Hz, 1H), 7.51 (d, *J* = 8.1 Hz, 1H), 7.25 (d, *J* = 7.7 Hz, 2H), 7.20 (d, *J* = 8.1 Hz, 2H), 3.97 (s, 3H), 3.89 (s, 3H), 2.39 (s, 3H). **¹³C NMR (126 MHz, Chloroform-*d*)** δ : 190.8, 169.0, 165.1, 150.4, 139.4, 135.8, 134.4, 133.7, 131.9, 131.5, 129.9, 129.6, 127.4, 53.1, 52.9, 21.4. **HRMS (ESI/TOF-Q)** *m/z*: [M+H]⁺ Calculated for C₁₈H₁₆O₅H⁺ 313.1071; Found 313.1072.



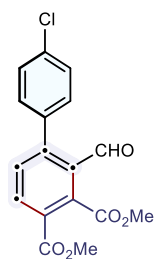
10f

Compound, **10f**: colorless liquid; eluent (15% ethyl acetate in hexane; Prep-TLC). **Yield**: 72% (23 mg); **¹H NMR (400 MHz, Chloroform-*d*)** δ : 9.89 (s, 1H), 8.26 (d, *J* = 8.2 Hz, 1H), 7.57 (d, *J* = 8.2 Hz, 1H), 7.33 (d, *J* = 8.3 Hz, 2H), 7.29 – 7.26 (m, 2H), 4.03 (s, 3H), 3.94 (s, 3H), 2.73 (q, *J* = 7.6 Hz, 2H), 1.30 (t, *J* = 7.6 Hz, 3H). **¹³C NMR (101 MHz, Chloroform-*d*)** δ : 190.9, 169.1, 165.1, 150.5, 145.7, 135.8, 134.4, 134.0, 131.9, 131.5, 130.0, 128.5, 127.4, 53.1, 53.0, 28.8, 15.5. **HRMS (ESI/TOF-Q)** *m/z*: [M+H]⁺ Calculated for C₁₉H₁₈O₅H⁺ 327.1227; Found 327.1230.



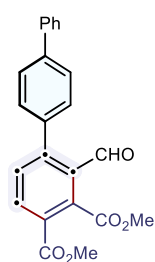
10g

Compound, **10g**: colorless liquid; eluent (15% ethyl acetate in hexane; Prep-TLC). **Yield**: 69% (23 mg); **¹H NMR (500 MHz, Chloroform-*d*)** δ : 9.89 (s, 1H), 8.25 (d, *J* = 8.1 Hz, 1H), 7.57 (d, *J* = 8.1 Hz, 1H), 7.36 – 7.34 (m, 2H), 7.29 – 7.28 (m, 2H), 4.02 (s, 3H), 3.94 (s, 3H), 2.99 (hept, *J* = 7.0 Hz, 1H), 1.31 (d, *J* = 6.9 Hz, 6H). **¹³C NMR (126 MHz, Chloroform-*d*)** δ : 190.9, 169.0, 165.1, 150.4, 150.3, 135.8, 134.4, 134.1, 131.9, 131.6, 130.1, 127.5, 127.1, 53.1, 52.9, 34.1, 24.0. **HRMS (ESI/TOF-Q)** *m/z*: [M+H]⁺ Calculated for C₂₀H₂₀O₅H⁺ 341.1384; Found 341.1384.



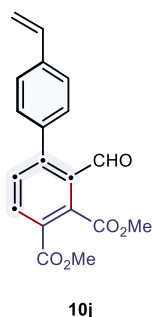
10h

Compound, **10h**: colorless liquid; eluent (15% ethyl acetate in hexane; Prep-TLC). **Yield**: 71% (24 mg); **¹H NMR (400 MHz, Chloroform-*d*)** δ : 9.87 (s, 1H), 8.27 (d, *J* = 8.1 Hz, 1H), 7.54 (d, *J* = 8.1 Hz, 1H), 7.49 – 7.47 (m, 2H), 7.31 – 7.29 (m, 2H), 4.02 (s, 3H), 3.94 (s, 3H). **¹³C NMR (101 MHz, Chloroform-*d*)** δ : 190.2, 168.7, 164.9, 148.8, 136.0, 135.8, 135.1, 134.6, 131.8, 131.6, 131.2, 129.2, 128.1, 53.2, 53.1. **HRMS (ESI/TOF-Q)** *m/z*: [M+H]⁺ Calculated for C₁₇H₁₃ClO₅H⁺ 333.0524; Found 333.0529.

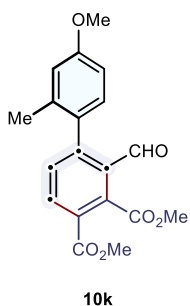


10i

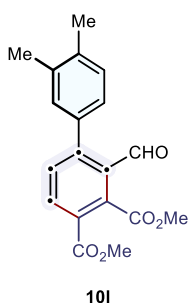
Compound, **10i**: colorless liquid; eluent (15% ethyl acetate in hexane; Prep-TLC). **Yield**: 59% (22 mg); **¹H NMR (400 MHz, Chloroform-*d*)** δ : 9.96 (s, 1H), 8.29 (d, *J* = 8.1 Hz, 1H), 7.74 – 7.72 (m, 2H), 7.66 – 7.62 (m, 3H), 7.51 – 7.45 (m, 3H), 7.44 – 7.38 (m, 2H), 4.04 (s, 3H), 3.95 (s, 3H). **¹³C NMR (101 MHz, Chloroform-*d*)** δ : 190.7, 168.9, 165.1, 149.9, 142.3, 140.1, 135.9, 135.5, 134.5, 131.9, 131.6, 130.5, 129.1, 128.1, 127.7, 127.6, 127.3, 53.1, 53.0. **HRMS (ESI/TOF-Q)** *m/z*: [M+H]⁺ Calculated for C₂₃H₁₈O₅H⁺ 375.1227; Found 375.1221.



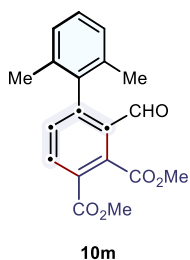
Compound, **10j**: colorless liquid; eluent (15% ethyl acetate in hexane; Prep-TLC). **Yield**: 78% (25 mg); **¹H NMR (400 MHz, Chloroform-*d*)** δ : 9.89 (s, 1H), 8.26 (d, *J* = 8.1 Hz, 1H), 7.57 (dd, *J* = 8.1, 1.0 Hz, 1H), 7.54 – 7.51 (m, 2H), 7.34 – 7.31 (m, 2H), 6.77 (dd, *J* = 17.6, 10.9 Hz, 1H), 5.85 (dd, *J* = 17.6, 0.8 Hz, 1H), 5.37 (dd, *J* = 10.9, 0.8 Hz, 1H), 4.02 (s, 3H), 3.94 (s, 3H). **¹³C NMR (101 MHz, Chloroform-*d*)** δ : 190.6, 168.9, 165.0, 149.9, 138.6, 135.93 (2C), 135.90, 134.5, 131.8, 131.5, 130.3, 127.7, 126.7, 115.8, 53.1, 53.0. **HRMS** (ESI/TOF-Q) *m/z*: [M+H]⁺ Calculated for C₁₉H₁₆O₅H⁺ 325.1071; Found 325.1079.



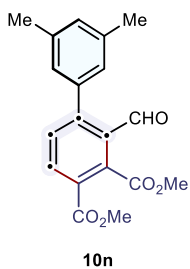
Compound, **10k**: colorless liquid; eluent (15% ethyl acetate in hexane; Prep-TLC). **Yield**: 71% (24 mg); **¹H NMR (500 MHz, Chloroform-*d*)** δ : 9.71 (s, 1H), 8.25 (d, *J* = 8.1 Hz, 1H), 7.43 (d, *J* = 8.1 Hz, 1H), 7.06 (d, *J* = 8.3 Hz, 1H), 6.85 (d, *J* = 2.6 Hz, 1H), 6.82 (dd, *J* = 8.4, 2.7 Hz, 1H), 4.02 (s, 3H), 3.94 (s, 3H), 3.84 (s, 3H), 2.09 (s, 3H). **¹³C NMR (126 MHz, Chloroform-*d*)** δ : 190.7, 169.0, 165.1, 160.2, 150.3, 137.5, 135.5, 134.5, 132.5, 131.9, 131.3, 128.6, 127.7, 116.1, 111.6, 55.5, 53.1, 52.9, 20.7. **HRMS** (ESI/TOF-Q) *m/z*: [M+H]⁺ Calculated for C₁₉H₁₈O₆H⁺ 343.1176; Found 343.1176.



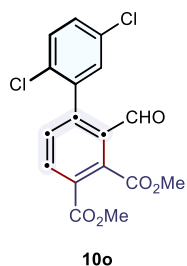
Compound, **10l**: colorless liquid; eluent (15% ethyl acetate in hexane; Prep-TLC). **Yield**: 66% (22 mg); **¹H NMR (500 MHz, Chloroform-*d*)** δ : 9.89 (s, 1H), 8.24 (dd, *J* = 8.1, 1.0 Hz, 1H), 7.55 (dd, *J* = 8.1, 1.0 Hz, 1H), 7.26 – 7.24 (m, 1H), 7.13 (s, 1H), 7.09 (d, *J* = 7.6 Hz, 1H), 4.02 (s, 3H), 3.93 (s, 3H), 2.34 (s, 3H), 2.32 (s, 3H). **¹³C NMR (126 MHz, Chloroform-*d*)** δ : 190.9, 169.0, 165.1, 150.6, 138.1, 137.4, 135.8, 134.3, 134.2, 131.9, 131.6, 131.2, 130.2, 127.5, 127.4, 53.0, 52.9, 19.9, 19.7. **HRMS** (ESI/TOF-Q) *m/z*: [M+H]⁺ Calculated for C₁₉H₁₈O₅H⁺ 327.1227; Found 327.1232.



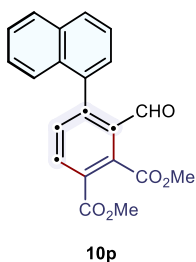
Compound, **10m**: colorless liquid; eluent (15% ethyl acetate in hexane; Prep-TLC). **Yield**: 74% (24 mg); **¹H NMR (400 MHz, Chloroform-*d*)** δ : 9.60 (s, 1H), 8.30 (d, *J* = 8.0 Hz, 1H), 7.35 (d, *J* = 8.1 Hz, 1H), 7.25 – 7.22 (m, 1H), 7.13 (d, *J* = 7.6 Hz, 2H), 4.00 (s, 3H), 3.93 (s, 3H), 1.96 (s, 6H). **¹³C NMR (101 MHz, Chloroform-*d*)** δ : 190.4, 168.9, 165.1, 150.0, 135.9, 135.9, 135.7, 135.3, 131.8, 131.3, 128.9, 127.9 (2C), 53.1, 53.0, 21.0. **HRMS** (ESI/TOF-Q) *m/z*: [M+H]⁺ Calculated for C₁₉H₁₈O₅H⁺ 327.1227; Found 327.1232.



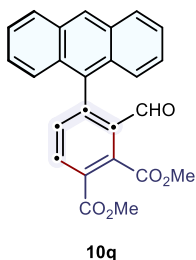
Compound, **10n**: colorless liquid; eluent (15% ethyl acetate in hexane; Prep-TLC). **Yield**: 63% (21 mg); **¹H NMR (500 MHz, Chloroform-*d*)** δ : 9.87 (s, 1H), 8.25 (d, *J* = 8.1 Hz, 1H), 7.55 (d, *J* = 8.1 Hz, 1H), 7.11 (s, 1H), 6.97 (s, 2H), 4.03 (s, 3H), 3.94 (s, 3H), 2.38 (s, 6H). **¹³C NMR (126 MHz, Chloroform-*d*)** δ : 190.9, 169.0, 165.1, 150.8, 138.6, 136.6, 135.7, 134.3, 131.8, 131.5, 130.8, 127.9, 127.4, 53.1, 52.9, 21.4. **HRMS** (ESI/TOF-Q) *m/z*: [M+H]⁺ Calculated for C₁₉H₁₈O₅H⁺ 327.1227; Found 327.1331.



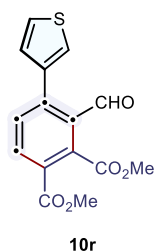
Compound, **10o**: colorless liquid; eluent (15% ethyl acetate in hexane; Prep-TLC). **Yield**: 64% (23 mg); **¹H NMR (400 MHz, Chloroform-*d*)** δ : 9.77 (s, 1H), 8.31 (d, *J* = 8.1 Hz, 1H), 7.46 (s, 1H), 7.44 (d, *J* = 0.8 Hz, 1H), 7.41 (d, *J* = 2.4 Hz, 1H), 7.31 (dd, *J* = 2.5, 0.4 Hz, 1H), 4.03 (s, 3H), 3.95 (s, 3H). **¹³C NMR (101 MHz, Chloroform-*d*)** δ : 189.0, 168.4, 164.8, 145.6, 137.5, 136.0, 134.9, 133.4, 132.0, 131.6, 131.5, 131.1 (2C), 130.6, 129.0, 53.2, 53.1. **HRMS** (ESI/TOF-Q) *m/z*: [M+H]⁺ Calculated for C₁₇H₁₂Cl₂O₅H⁺ 367.0135; Found 367.0136.



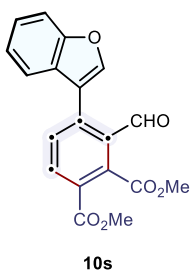
Compound, **10p**: colorless liquid; eluent (15% ethyl acetate in hexane; Prep-TLC). **Yield**: 72% (25 mg); **¹H NMR (500 MHz, Chloroform-*d*)** δ : 9.57 (s, 1H), 8.34 (d, *J* = 8.1 Hz, 1H), 7.96 (dd, *J* = 13.6, 8.2 Hz, 2H), 7.59 (d, *J* = 8.0 Hz, 1H), 7.58 – 7.52 (m, 2H), 7.48 – 7.43 (m, 2H), 7.38 (d, *J* = 6.6 Hz, 1H), 4.04 (s, 3H), 3.97 (s, 3H). **¹³C NMR (126 MHz, Chloroform-*d*)** δ : 190.2, 168.9, 165.0, 149.1, 135.5, 134.6, 134.2, 133.5, 133.0, 132.5, 132.1, 129.6, 128.7, 128.3 (2C), 127.5, 126.7, 125.5, 125.2, 53.1, 53.0. **HRMS** (ESI/TOF-Q) *m/z*: [M+H]⁺ Calculated for C₂₁H₁₆O₅H⁺ 349.1071; Found 349.1071.



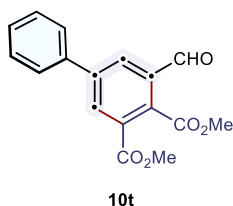
Compound, **10q**: colorless liquid; eluent (15% ethyl acetate in hexane; Prep-TLC). **Yield**: 78% (31mg); **¹H NMR (400 MHz, Chloroform-*d*)** δ : 9.29 (s, 1H), 8.61 (s, 1H), 8.44 (dd, *J* = 8.0, 0.8 Hz, 1H), 8.09 (d, *J* = 8.4 Hz, 2H), 7.59 (dd, *J* = 8.0, 0.8 Hz, 1H), 7.53 – 7.48 (m, 2H), 7.42 – 7.39 (m, 4H), 4.05 (s, 3H), 4.01 (s, 3H). **¹³C NMR (101 MHz, Chloroform-*d*)** δ : 190.1, 168.9, 165.1, 148.0, 135.8, 135.0, 134.0, 133.4, 131.2, 130.7, 129.9, 128.9, 128.8, 128.7, 127.2, 125.8, 125.7, 53.2, 53.1. **HRMS** (ESI/TOF-Q) *m/z*: [M+H]⁺ Calculated for C₂₅H₁₈O₅H⁺ 399.1227; Found 399.1225.



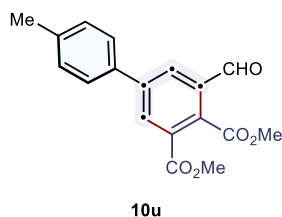
Compound, **10r**: colorless liquid; eluent (15% ethyl acetate in hexane; Prep-TLC). **Yield**: 77% (23 mg); **¹H NMR (400 MHz, Chloroform-*d*)** δ : 10.00 (s, 1H), 8.24 (d, *J* = 8.2 Hz, 1H), 7.60 (d, *J* = 8.1 Hz, 1H), 7.49 (dd, *J* = 5.0, 3.0 Hz, 1H), 7.36 (dd, *J* = 2.9, 1.4 Hz, 1H), 7.18 (dd, *J* = 5.0, 1.4 Hz, 1H), 4.02 (s, 3H), 3.93 (s, 3H). **¹³C NMR (101 MHz, Chloroform-*d*)** δ : 190.8, 168.8, 165.0, 144.7, 139.3, 137.2, 135.8, 134.5, 131.6, 129.0, 127.6, 127.3, 126.6, 53.1, 53.0. **HRMS** (ESI/TOF-Q) *m/z*: [M+H]⁺ Calculated for C₁₅H₁₂O₅SH⁺ 305.0478; Found 305.0483.



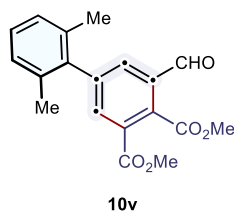
Compound, **10s**: colorless liquid; eluent (15% ethyl acetate in hexane; Prep-TLC). **Yield**: 72% (24 mg); **¹H NMR (400 MHz, Chloroform-*d*)** δ : 9.80 (s, 1H), 8.33 (d, *J* = 8.1 Hz, 1H), 7.97 – 7.95 (m, 1H), 7.67 – 7.65 (m, 1H), 7.52 – 7.50 (m, 1H), 7.47 (s, 1H), 7.45 – 7.40 (m, 2H), 4.04 (s, 3H), 3.97 (s, 3H). **¹³C NMR (101 MHz, Chloroform-*d*)** δ : 190.3, 168.8, 165.0, 144.0, 140.2, 138.7, 136.0, 134.8, 132.6, 132.5, 132.2, 128.3, 128.0, 125.5 (2C), 123.2, 122.6, 53.2, 53.1. **HRMS** (ESI/TOF-Q) *m/z*: [M+H]⁺ Calculated for C₁₉H₁₄O₆H⁺ 339.0863; Found 339.0864.



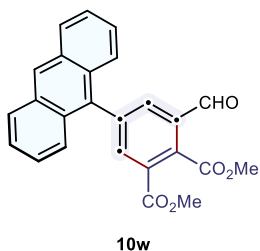
Compound, **10t**: colorless liquid; eluent (15% ethyl acetate in hexane; Prep-TLC). **Yield**: 63% (19 mg); **¹H NMR (400 MHz, Chloroform-*d*)** δ : 10.11 (s, 1H), 8.47 (d, *J* = 1.9 Hz, 1H), 8.31 (d, *J* = 1.9 Hz, 1H), 7.66 – 7.64 (m, 2H), 7.53 – 7.49 (m, 2H), 7.47 – 7.45 (m, 1H), 4.04 (s, 3H), 3.96 (s, 3H). **¹³C NMR (101 MHz, Chloroform-*d*)** δ : 189.5, 168.1, 165.3, 143.3, 138.0, 135.3, 134.2, 133.8, 132.0, 129.7, 129.4, 129.1, 127.3, 53.3, 53.1. **HRMS** (ESI/TOF-Q) *m/z*: [M+H]⁺ Calculated for C₁₇H₁₄O₅H⁺ 299.0914; Found 299.0914.



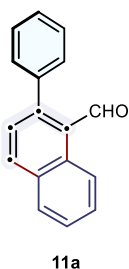
Compound, **10u**: colorless liquid; eluent (15% ethyl acetate in hexane; Prep-TLC). **Yield**: 61% (19 mg); **¹H NMR (400 MHz, Chloroform-*d*)** δ : 10.10 (s, 1H), 8.45 (d, *J* = 1.9 Hz, 1H), 8.29 (d, *J* = 2.0 Hz, 1H), 7.56 (d, *J* = 8.2 Hz, 2H), 7.31 (d, *J* = 8.0 Hz, 2H), 4.04 (s, 3H), 3.96 (s, 3H), 2.42 (s, 3H). **¹³C NMR (101 MHz, Chloroform-*d*)** δ : 189.6, 168.1, 165.3, 143.2, 139.2, 135.1, 135.0, 134.2, 133.5, 131.7, 130.1, 129.7, 127.1, 53.3, 53.1, 21.3. **HRMS** (ESI/TOF-Q) *m/z*: [M+H]⁺ Calculated for C₁₈H₁₆O₅H⁺ 313.1071; Found 313.1076.



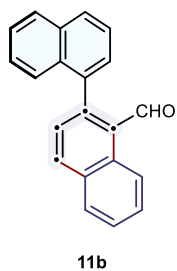
Compound, **10v**: colorless liquid; eluent (15% ethyl acetate in hexane; Prep-TLC). **Yield**: 65% (21 mg); **¹H NMR (400 MHz, Chloroform-*d*)** δ : 10.08 (s, 1H), 8.09 (d, *J* = 1.8 Hz, 1H), 7.92 (d, *J* = 1.7 Hz, 1H), 7.22 (dd, *J* = 8.4, 6.7 Hz, 1H), 7.14 (d, *J* = 7.5 Hz, 2H), 4.07 (s, 3H), 3.93 (s, 3H), 2.01 (s, 6H). **¹³C NMR (101 MHz, Chloroform-*d*)** δ : 189.44, 168.24, 165.16, 143.57, 138.58, 136.34, 135.75, 135.12, 134.92, 133.98, 129.35, 128.41, 127.89, 53.32, 53.03, 21.01. **HRMS** (ESI/TOF-Q) *m/z*: [M+H]⁺ Calculated for C₁₉H₁₈O₅H⁺ 327.1227; Found 327.1232.



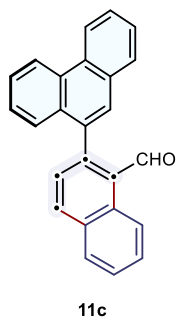
Compound, **10w**: colorless liquid; eluent (15% ethyl acetate in hexane; Prep-TLC). **Yield**: 59% (23 mg); **¹H NMR (400 MHz, Chloroform-*d*)** δ : 10.15 (s, 1H), 8.58 (s, 1H), 8.36 (d, *J* = 1.7 Hz, 1H), 8.18 (d, *J* = 1.6 Hz, 1H), 8.09 (d, *J* = 8.4 Hz, 2H), 7.53 – 7.48 (m, 4H), 7.43 – 7.39 (m, 2H), 4.13 (s, 3H), 3.91 (s, 3H). **¹³C NMR (126 MHz, Chloroform-*d*)** δ : 189.4, 168.3, 165.1, 141.6, 138.2, 137.1, 135.7, 134.0, 132.9, 131.4, 130.1, 129.4, 128.8, 128.21, 126.6, 125.8, 125.6, 53.5, 53.1. **HRMS** (ESI/TOF-Q) *m/z*: [M+H]⁺ Calculated for C₂₅H₁₈O₅H⁺ 399.1227; Found 399.1226.



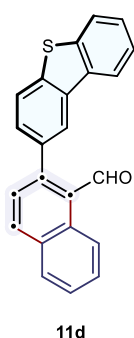
Compound, **11a**: colorless liquid; eluent (hexane; Prep-TLC). **Yield**: 72% (17 mg); **¹H NMR (400 MHz, Chloroform-*d*)** δ : 10.20 (s, 1H), 9.26 (dd, *J* = 8.7, 1.0 Hz, 1H), 8.09 (d, *J* = 8.4 Hz, 1H), 7.94 – 7.91 (m, 1H), 7.72 – 7.68 (m, 1H), 7.62 – 7.58 (m, 1H), 7.54 (d, *J* = 8.4 Hz, 1H), 7.51 – 7.47 (m, 3H), 7.47 – 7.44 (m, 2H). **¹³C NMR (101 MHz, Chloroform-*d*)** δ : 194.9, 148.1, 138.9, 134.1, 133.1, 130.7 (2C), 130.5, 129.4, 129.0, 128.49, 128.46, 128.4, 126.9, 125.9. **HRMS** (ESI/TOF-Q) *m/z*: [M+H]⁺ Calculated for C₁₇H₁₂O⁺ 233.0961; Found 233.0965.



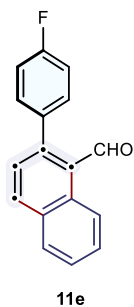
Compound, **11b**: colorless liquid; eluent (hexane; Prep-TLC). **Yield**: 62% (17 mg); **¹H NMR (500 MHz, Chloroform-*d*)** δ : 10.01 (s, 1H), 9.37 – 9.35 (m, 1H), 8.13 (d, *J* = 8.4 Hz, 1H), 7.99 – 7.95 (m, 3H), 7.76 – 7.72 (m, 1H), 7.66 – 7.63 (m, 1H), 7.57 (dd, *J* = 8.3, 6.9 Hz, 1H), 7.54 – 7.51 (m, 3H), 7.46 – 7.40 (m, 2H). **¹³C NMR (126 MHz, Chloroform-*d*)** δ : 194.6, 147.3, 136.5, 134.1, 133.6, 133.5, 132.7, 130.7, 129.9, 129.5, 129.2, 128.9, 128.9, 128.6, 128.5, 127.1, 127.0, 126.5, 126.3, 126.2, 125.1. **HRMS** (ESI/TOF-Q) *m/z*: [M+H]⁺ Calculated for C₂₁H₁₄O⁺ 283.1117; Found 283.1120.



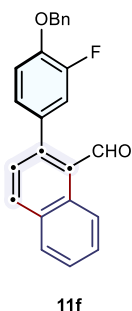
Compound, **11c**: colorless liquid; eluent (hexane; Prep-TLC). **Yield**: 59% (20 mg); **¹H NMR (500 MHz, Chloroform-*d*)** δ : 10.13 (s, 1H), 9.38 (dd, J = 8.6, 1.1 Hz, 1H), 8.82 (dd, J = 8.3, 1.2 Hz, 1H), 8.77 (d, J = 8.3 Hz, 1H), 8.16 (d, J = 8.3 Hz, 1H), 7.99 (dd, J = 8.2, 1.4 Hz, 1H), 7.90 (dd, J = 7.9, 1.4 Hz, 1H), 7.77 – 7.74 (m, 2H), 7.72 – 7.64 (m, 4H), 7.58 – 7.56 (m, 2H), 7.53 – 7.50 (m, 1H). **¹³C NMR (126 MHz, Chloroform-*d*)** δ : 194.5, 147.2, 135.2, 134.2, 133.6, 131.8, 131.1, 130.7, 130.6, 130.5, 130.2, 130.0, 129.6, 129.2, 129.0, 128.5, 127.50, 127.46, 127.4, 127.3, 127.2 (2C), 126.2, 123.2, 122.8. **HRMS (ESI/TOF-Q)** m/z : $[M+H]^+$ Calculated for $C_{25}H_{16}OH^+$ 333.1274; Found 333.1272.



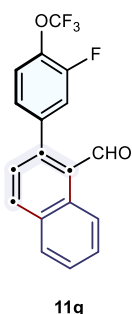
Compound, **11d**: colorless liquid; eluent (hexane; Prep-TLC). **Yield**: 61% (21 mg); **¹H NMR (500 MHz, Chloroform-*d*)** δ : 10.26 (s, 1H), 9.30 – 9.28 (m, 1H), 8.21 (dd, J = 1.8, 0.6 Hz, 1H), 8.19 – 8.17 (m, 1H), 8.14 – 8.12 (m, 1H), 7.99 – 7.97 (m, 1H), 7.97 – 7.95 (m, 1H), 7.92 – 7.90 (m, 1H), 7.75 – 7.71 (m, 1H), 7.65 (d, J = 8.5 Hz, 1H), 7.63 – 7.61 (m, 1H), 7.55 (dd, J = 8.2, 1.8 Hz, 1H), 7.53 – 7.47 (m, 2H). **¹³C NMR (126 MHz, Chloroform-*d*)** δ : 194.7, 147.9, 140.2, 139.9, 135.8, 135.2, 135.2, 134.1, 133.2, 130.6, 129.5, 129.3, 129.0, 128.7, 128.5, 127.5, 127.0, 126.0, 124.9, 123.7, 123.1, 122.9, 122.0. **HRMS (ESI/TOF-Q)** m/z : $[M+H]^+$ Calculated for $C_{23}H_{14}OSH^+$ 339.0838; Found 339.0838.



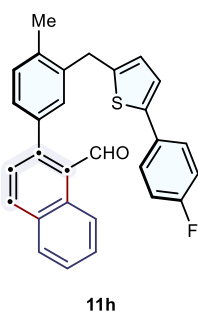
Compound, **11e**: colorless liquid; eluent (hexane; Prep-TLC). **Yield**: 58% (15 mg); **¹H NMR (500 MHz, Chloroform-*d*)** δ : 10.19 (s, 1H), 9.23 (dd, J = 8.7, 1.0 Hz, 1H), 8.09 (d, J = 8.4 Hz, 1H), 7.92 (dd, J = 8.2, 1.4 Hz, 1H), 7.70 (ddd, J = 8.6, 6.9, 1.5 Hz, 1H), 7.60 (ddd, J = 8.1, 6.8, 1.2 Hz, 1H), 7.50 (d, J = 8.5 Hz, 1H), 7.43 – 7.41 (m, 2H), 7.22 – 7.18 (m, 2H). **¹³C NMR (126 MHz, Chloroform-*d*)** δ : 194.5, 163.1 (d, J = 248.9 Hz), 146.8, 134.9 (d, J = 3.7 Hz), 134.2, 133.2, 132.3 (d, J = 8.3 Hz), 130.5, 129.5, 129.2, 128.5, 128.3, 127.1, 125.9, 115.6 (d, J = 21.6 Hz). **¹⁹F NMR (471 MHz, Chloroform-*d*)** δ : -113.32. **HRMS (ESI/TOF-Q)** m/z : $[M+H]^+$ Calculated for $C_{17}H_{11}FOH^+$ 251.0867; Found 251.0866.



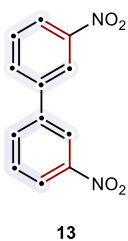
Compound, **11f**: colorless liquid; eluent (hexane; Prep-TLC). **Yield**: 59% (21 mg); **¹H NMR (500 MHz, Chloroform-*d*)** δ : 10.19 (s, 1H), 9.21 (dd, *J* = 8.7, 1.1 Hz, 1H), 8.07 (d, *J* = 8.4 Hz, 1H), 7.92 – 7.90 (m, 1H), 7.69 (ddd, *J* = 8.5, 6.8, 1.5 Hz, 1H), 7.59 (ddd, *J* = 8.1, 6.8, 1.2 Hz, 1H), 7.50 – 7.48 (m, 3H), 7.44 – 7.40 (m, 2H), 7.38 – 7.35 (m, 1H), 7.27 – 7.24 (m, 1H), 7.13 – 7.07 (m, 2H), 5.23 (s, 2H). **¹³C NMR (126 MHz, Chloroform-*d*)** δ : 194.5, 152.6 (d, *J* = 248.5 Hz), 147.3 (d, *J* = 10.6 Hz), 146.3, 136.4, 133.1, 132.1 (d, *J* = 6.5 Hz), 130.5, 129.5, 129.1, 128.9, 128.5, 128.4, 128.2, 127.6, 127.2, 127.2, 127.0, 125.9, 118.3 (d, *J* = 19.0 Hz), 115.4, 71.6. **¹⁹F NMR (471 MHz, Chloroform-*d*)** δ : -132.97. **HRMS (ESI/TOF-Q)** *m/z*: [M+H]⁺ Calculated for C₂₄H₁₇FO₂H⁺ 357.1285; Found 357.1289.



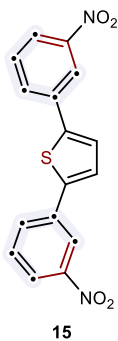
Compound, **11g**: colorless liquid; eluent (hexane; Prep-TLC). **Yield**: 57% (19 mg); **¹H NMR (500 MHz, Chloroform-*d*)** δ : 10.23 (s, 1H), 9.21 (dd, *J* = 8.7, 1.0 Hz, 1H), 8.12 (d, *J* = 8.3 Hz, 1H), 7.95 – 7.93 (m, 1H), 7.72 (ddd, *J* = 8.5, 6.9, 1.4 Hz, 1H), 7.63 (ddd, *J* = 8.1, 6.9, 1.2 Hz, 1H), 7.48 (d, *J* = 8.4 Hz, 1H), 7.45 – 7.42 (m, 1H), 7.35 – 7.33 (m, 1H), 7.23 (ddd, *J* = 8.4, 2.1, 1.3 Hz, 1H). **¹³C NMR (126 MHz, Chloroform-*d*)** δ : 193.8, 154.2 (d, *J* = 255.4 Hz), 145.0, 139.6 (d, *J* = 6.8 Hz), 136.8 (d, *J* = 13.8 Hz), 134.5, 133.5, 130.4, 129.8, 129.3, 128.5, 127.7, 127.5, 127.0 (d, *J* = 3.8 Hz), 126.0, 123.6, 120.6 (d, *J* = 259.7 Hz), 119.3 (d, *J* = 19.1 Hz). **¹⁹F NMR (471 MHz, Chloroform-*d*)** δ : -58.65 (d, *J* = 4.6 Hz), -127.65 (q, *J* = 5.0 Hz). **HRMS (ESI/TOF-Q)** *m/z*: [M+H]⁺ Calculated for C₁₈H₁₀F₄O₂H⁺ 335.0690; Found 335.0696.



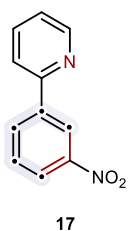
Compound, **11h**: colorless liquid; eluent (hexane; Prep-TLC). **Yield**: 63% (27 mg); **¹H NMR (400 MHz, Chloroform-*d*)** δ : 10.23 (s, 1H), 9.25 (dd, *J* = 8.7, 1.0 Hz, 1H), 8.12 – 8.01 (m, 1H), 7.95 – 7.87 (m, 1H), 7.69 (ddd, *J* = 8.5, 6.8, 1.4 Hz, 1H), 7.58 (ddd, *J* = 8.1, 6.8, 1.2 Hz, 1H), 7.54 (d, *J* = 8.4 Hz, 1H), 7.50 – 7.48 (m, 2H), 7.32 – 7.31 (m, 2H), 7.28 – 7.27 (m, 1H), 7.05 – 7.01 (m, 3H), 6.73 – 6.72 (m, 1H), 4.21 (s, 2H), 2.43 (s, 3H). **¹³C NMR (126 MHz, Chloroform-*d*)** δ : 194.8, 162.3 (d, *J* = 246.7 Hz), 147.9, 142.9, 142.0, 138.6, 137.0, 136.8, 134.0, 133.1, 131.8, 130.9 (d, *J* = 3.4 Hz), 130.7, 130.5, 129.4 (d, *J* = 5.2 Hz), 129.0, 128.5, 128.4, 127.4, 127.3, 126.9, 126.3, 125.9, 122.9, 115.9 (d, *J* = 21.9 Hz), 34.2, 19.4. **¹⁹F NMR (471 MHz, Chloroform-*d*)** δ : -115.10. **HRMS (ESI/TOF-Q)** *m/z*: [M+H]⁺ Calculated for C₂₉H₂₁FOSH⁺ 437.1370; Found 437.1370.



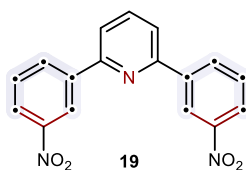
Compound, **13**: pale yellow solid; eluent (15% ethyl acetate in hexane). **Yield:** 74% (18 mg); **¹H NMR (500 MHz, Chloroform-*d*)** δ : 8.88 (s, 1H), 8.68 – 8.67 (m, 1H), 8.45 – 8.43 (m, 1H), 8.27 – 8.24 (m, 1H), 7.94 – 7.91 (m, 2H), 7.69 – 7.65 (m, 1H), 7.45 – 7.42 (m, 1H). **¹³C NMR (126 MHz, Chloroform-*d*)** δ : 149.8, 149.0, 148.3, 139.7, 134.7, 134.5, 133.1, 130.3, 124.0, 123.0 (2C), 122.2. **HRMS (ESI/TOF-Q)** m/z : $[M+H]^+$ Calculated for $C_{12}H_8N_2O_4H^+$ 245.0557; Found 245.0556.



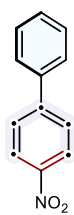
Compound, **15**: pale yellow solid; eluent (15% ethyl acetate in hexane). **Yield:** 71% (23 mg); **¹H NMR (500 MHz, Chloroform-*d*)** δ : 8.48 (t, J = 2.0 Hz, 2H), 8.17 (ddd, J = 8.2, 2.2, 1.0 Hz, 2H), 7.94 (ddd, J = 7.8, 1.9, 1.0 Hz, 2H), 7.60 (t, J = 8.0 Hz, 2H), 7.47 (s, 2H). **¹³C NMR (126 MHz, Chloroform-*d*)** δ : 149.0, 142.5, 135.6, 131.5, 130.2, 126.1, 122.6, 120.5. **HRMS (ESI/TOF-Q)** m/z : $[M+H]^+$ Calculated for $C_{16}H_{10}N_2O_4SH^+$ 327.0434; Found 327.0434.



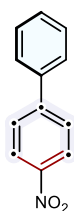
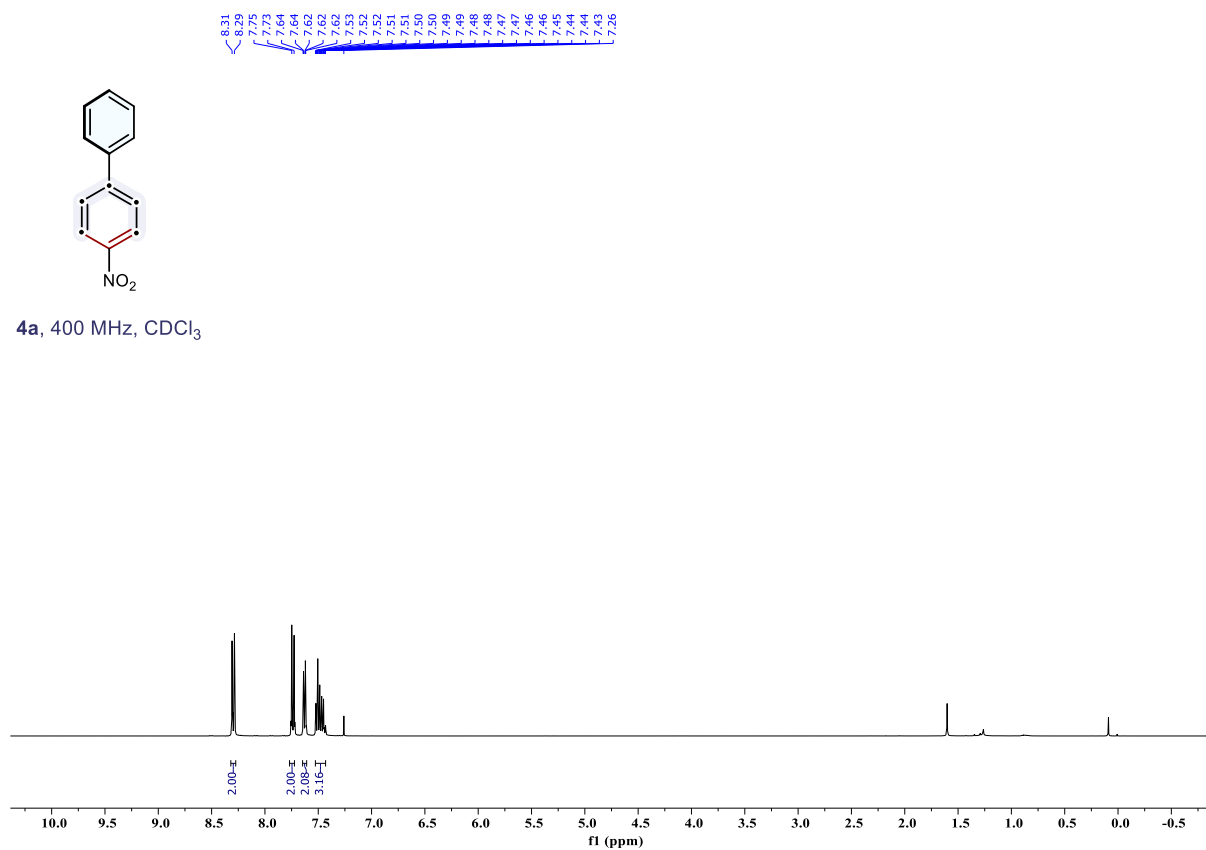
Compound, **17**: pale yellow solid; eluent (15% ethyl acetate in hexane). **Yield:** 72% (14 mg); **¹H NMR (400 MHz, Chloroform-*d*)** δ : 8.86 (t, J = 2.0 Hz, 1H), 8.74 – 8.72 (m, 1H), 8.38 – 8.35 (m, 1H), 8.27 – 8.24 (m, 1H), 7.85 – 7.79 (m, 2H), 7.64 (t, J = 8.0 Hz, 1H), 7.34 – 7.31 (m, 1H). **¹³C NMR (101 MHz, Chloroform-*d*)** δ : 154.9, 150.2, 148.9, 141.2, 137.3, 132.8, 129.9, 123.7, 123.4, 121.9, 120.8. **HRMS (ESI/TOF-Q)** m/z : $[M+H]^+$ Calculated for $C_{11}H_8N_2O_2H^+$ 201.0659; Found 201.0664.



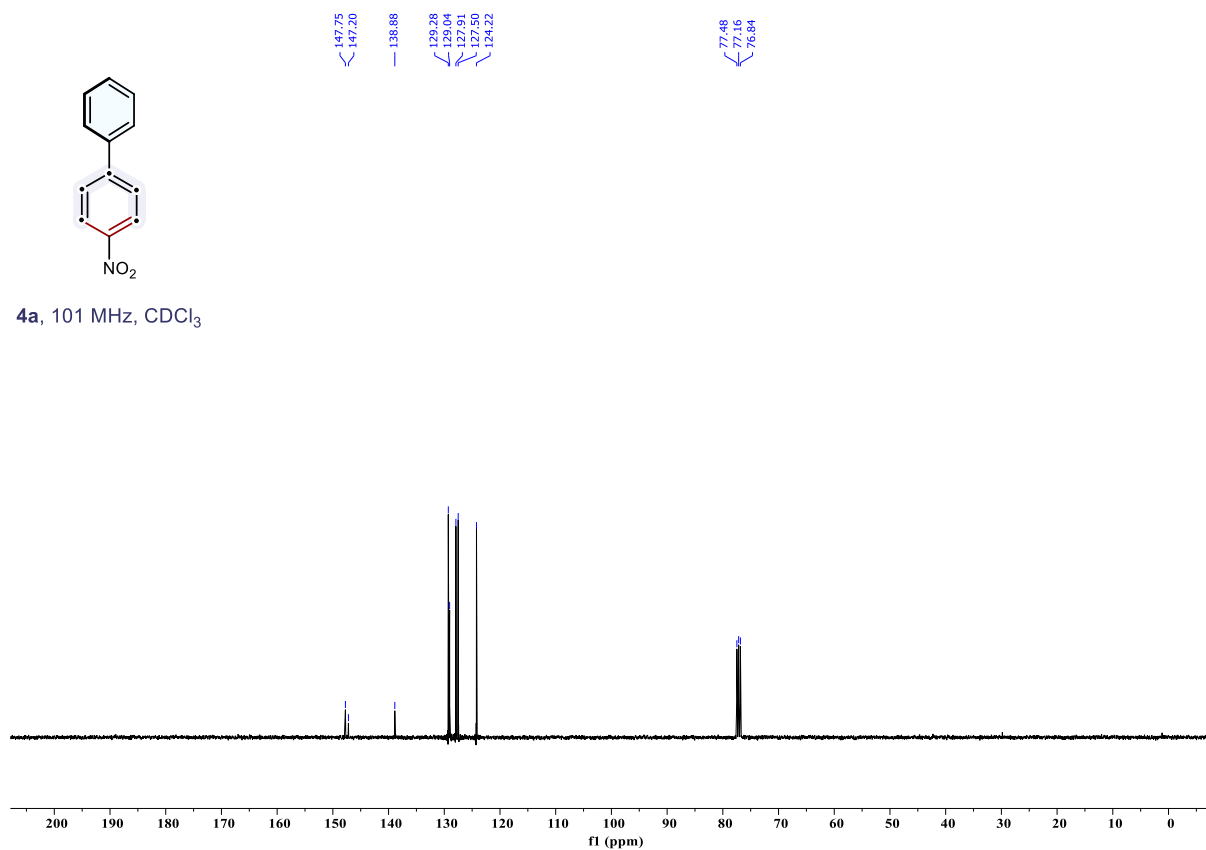
Compound, **19**: pale yellow solid; eluent (15% ethyl acetate in hexane). **Yield:** 69% (22 mg); **¹H NMR (500 MHz, Chloroform-*d*)** δ : 8.96 (t, J = 2.0 Hz, 2H), 8.54 (ddd, J = 7.7, 1.8, 1.0 Hz, 2H), 8.32 (ddd, J = 8.1, 2.3, 1.1 Hz, 2H), 7.98 (dd, J = 8.4, 7.3 Hz, 1H), 7.87 (d, J = 7.7 Hz, 2H), 7.71 (t, J = 8.0 Hz, 2H). **¹³C NMR (126 MHz, Chloroform-*d*)** δ : 154.9, 149.0, 140.7, 138.6, 133.0, 130.0, 124.1, 122.0, 120.1. **HRMS (ESI/TOF-Q)** m/z : $[M+H]^+$ Calculated for $C_{17}H_{11}N_3O_4H^+$ 322.0822; Found 322.0826.

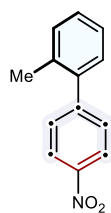


4a, 400 MHz, CDCl₃

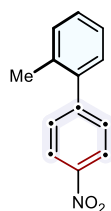
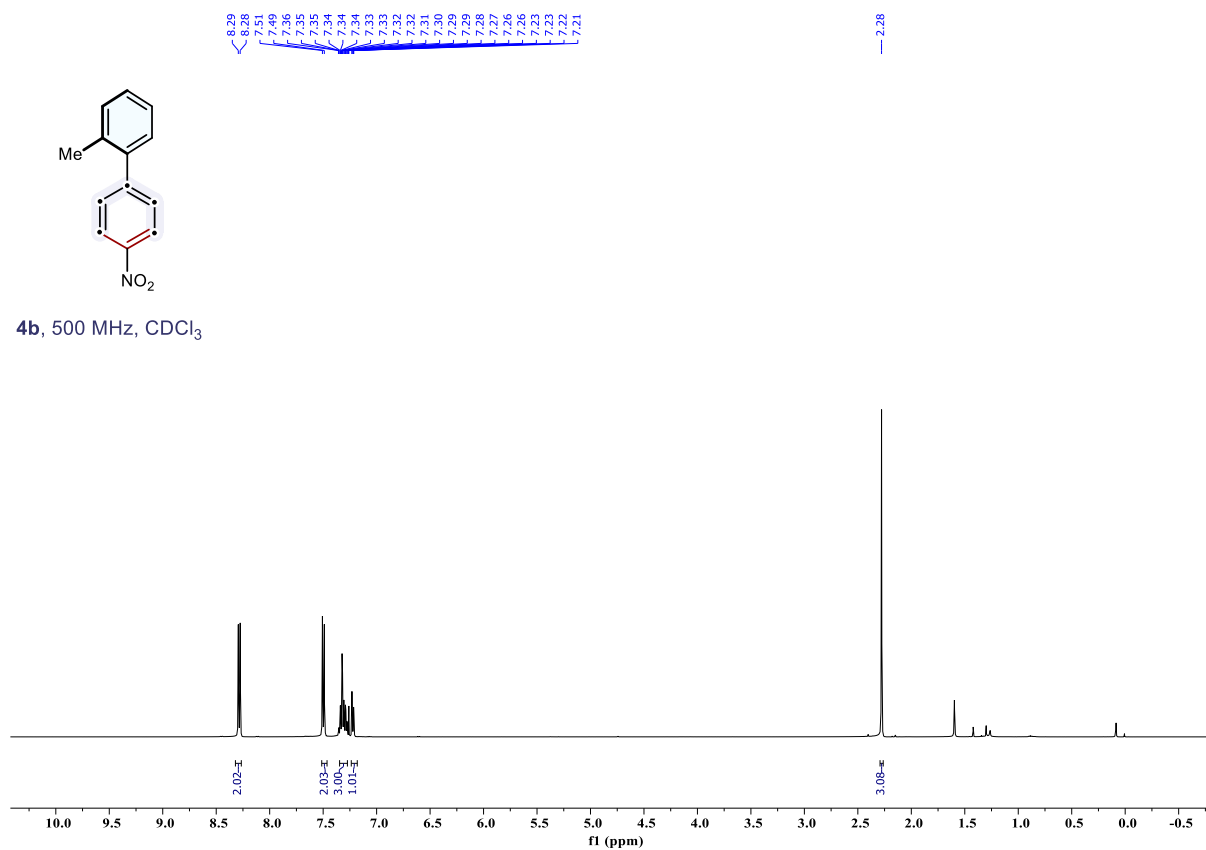


4a, 101 MHz, CDCl₃

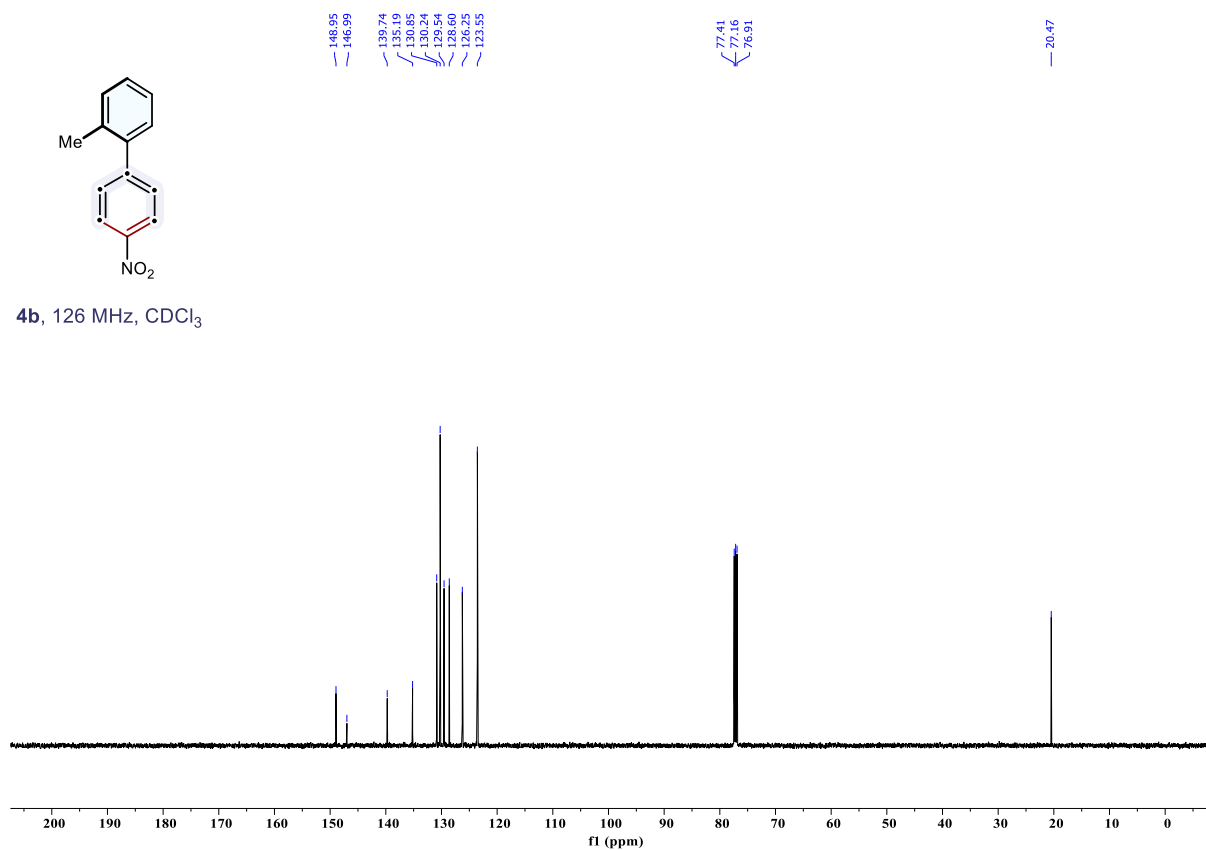


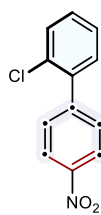


4b, 500 MHz, CDCl₃

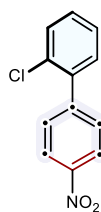
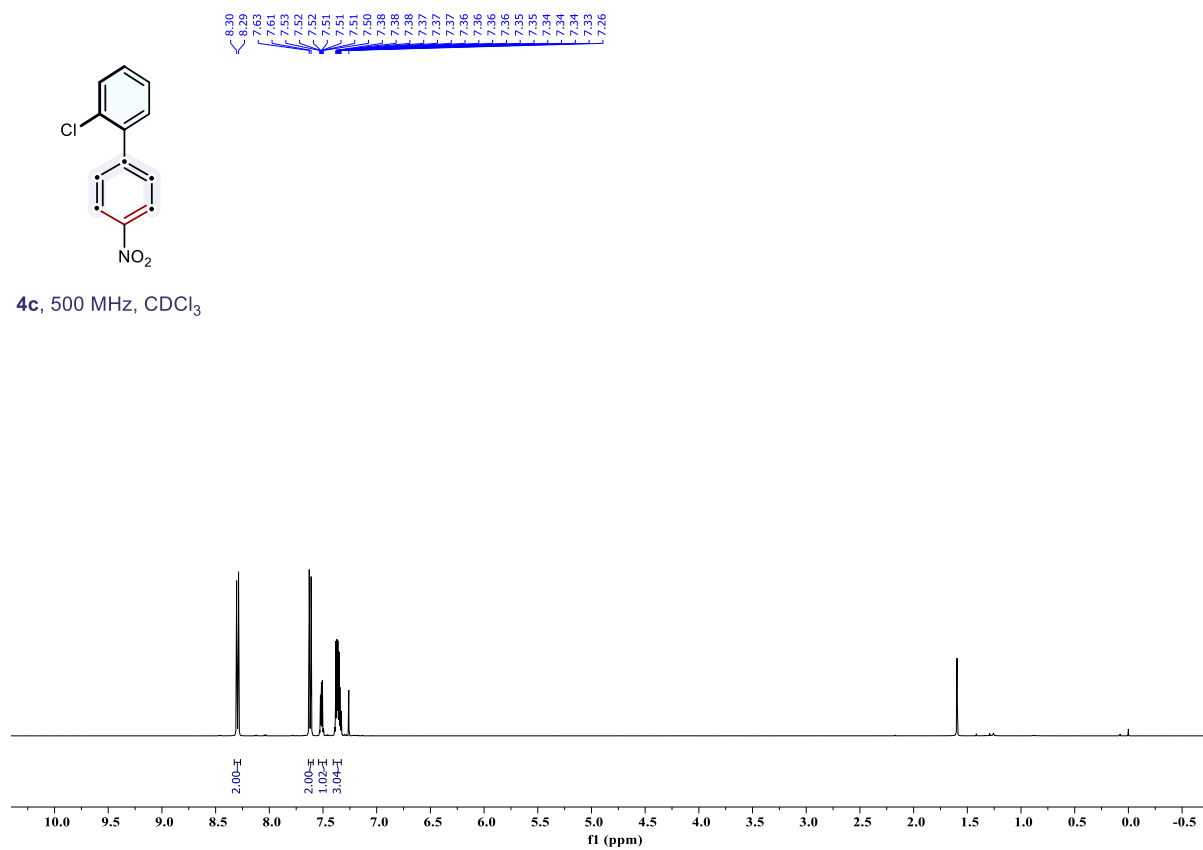


4b, 126 MHz, CDCl₃

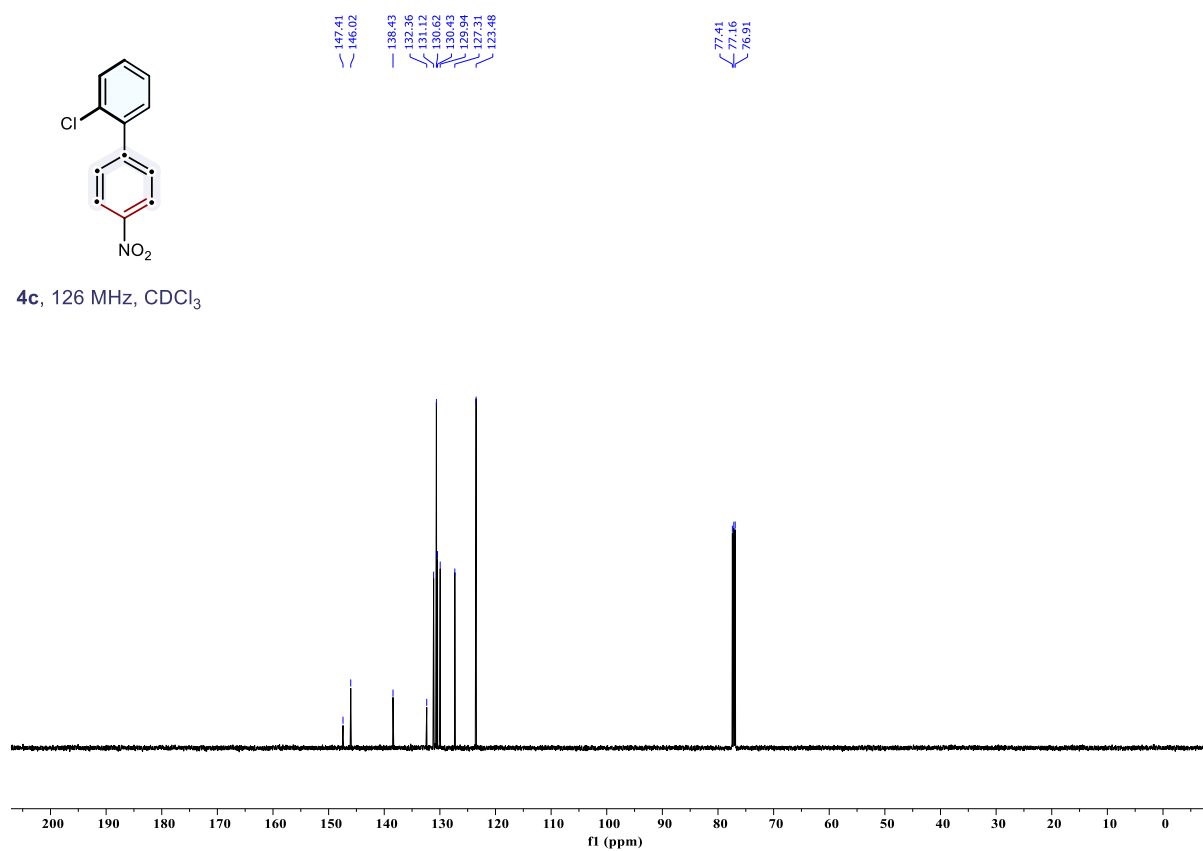


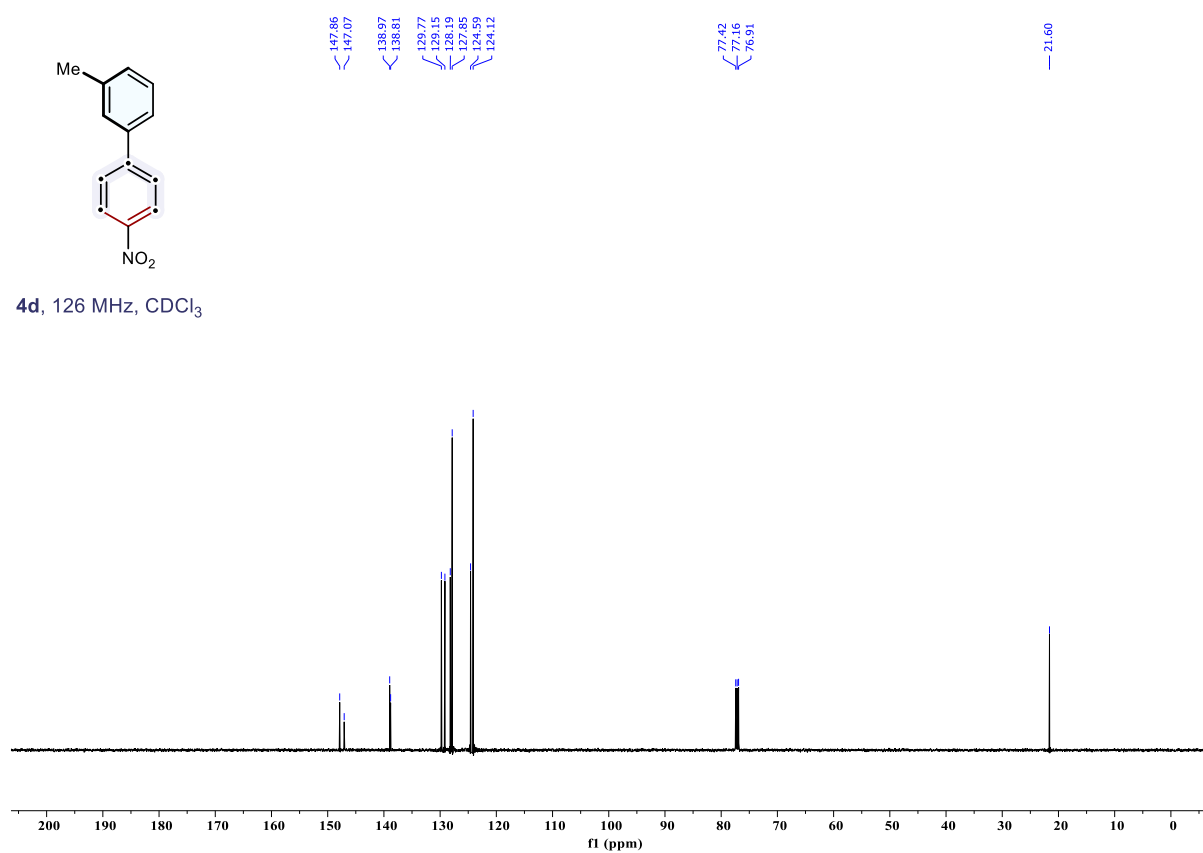
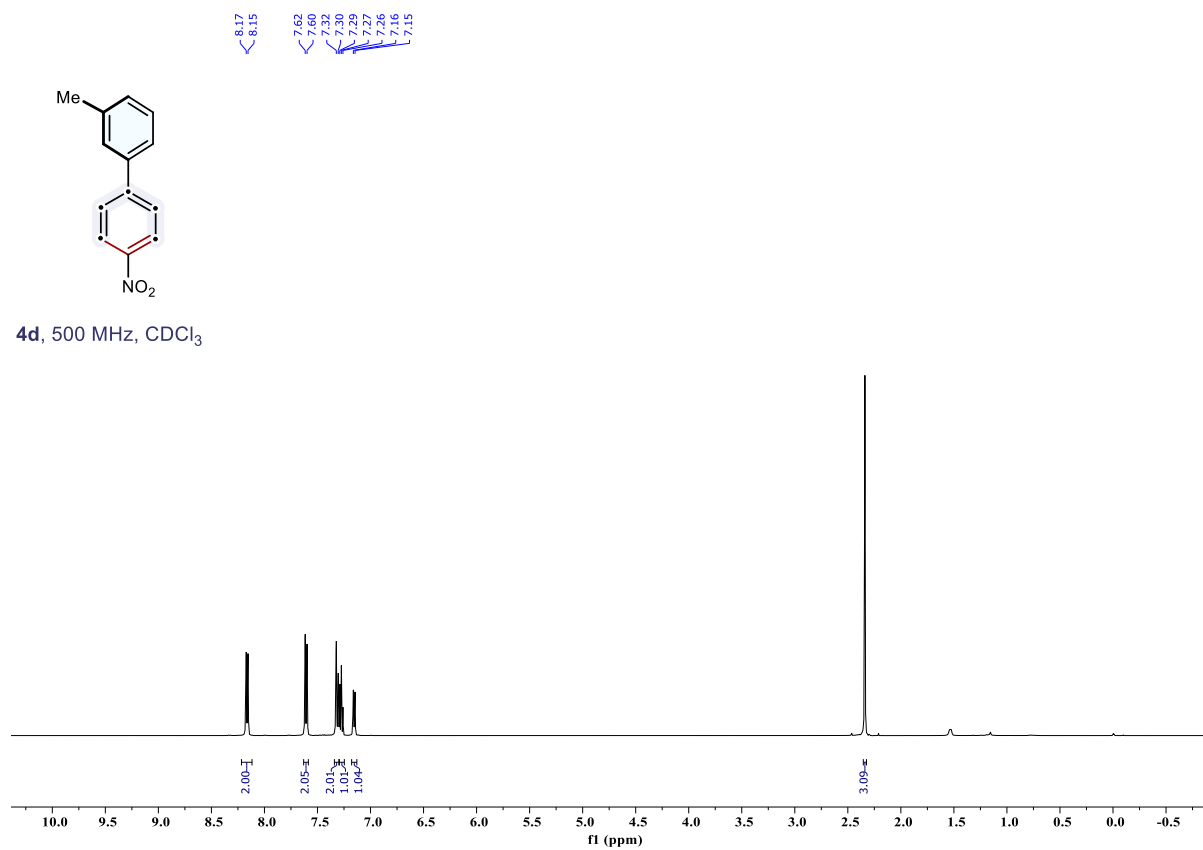


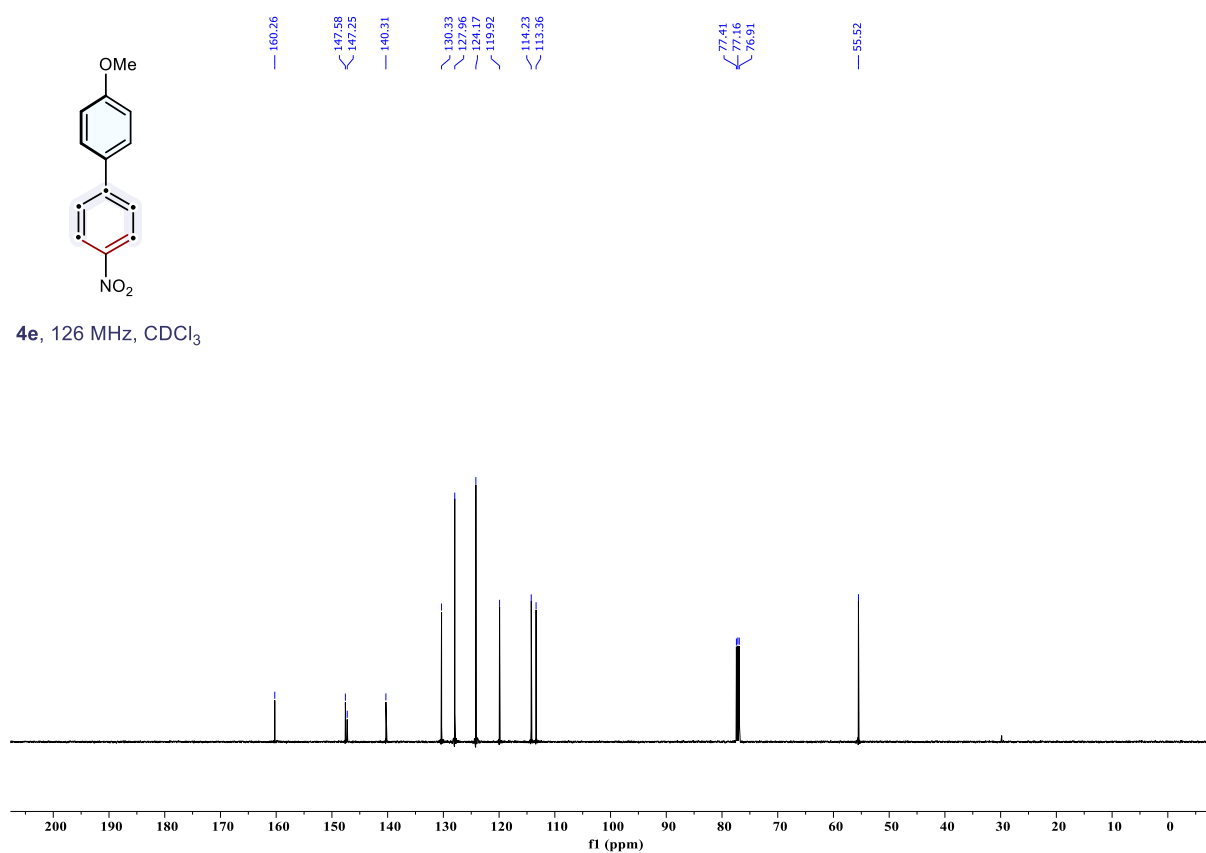
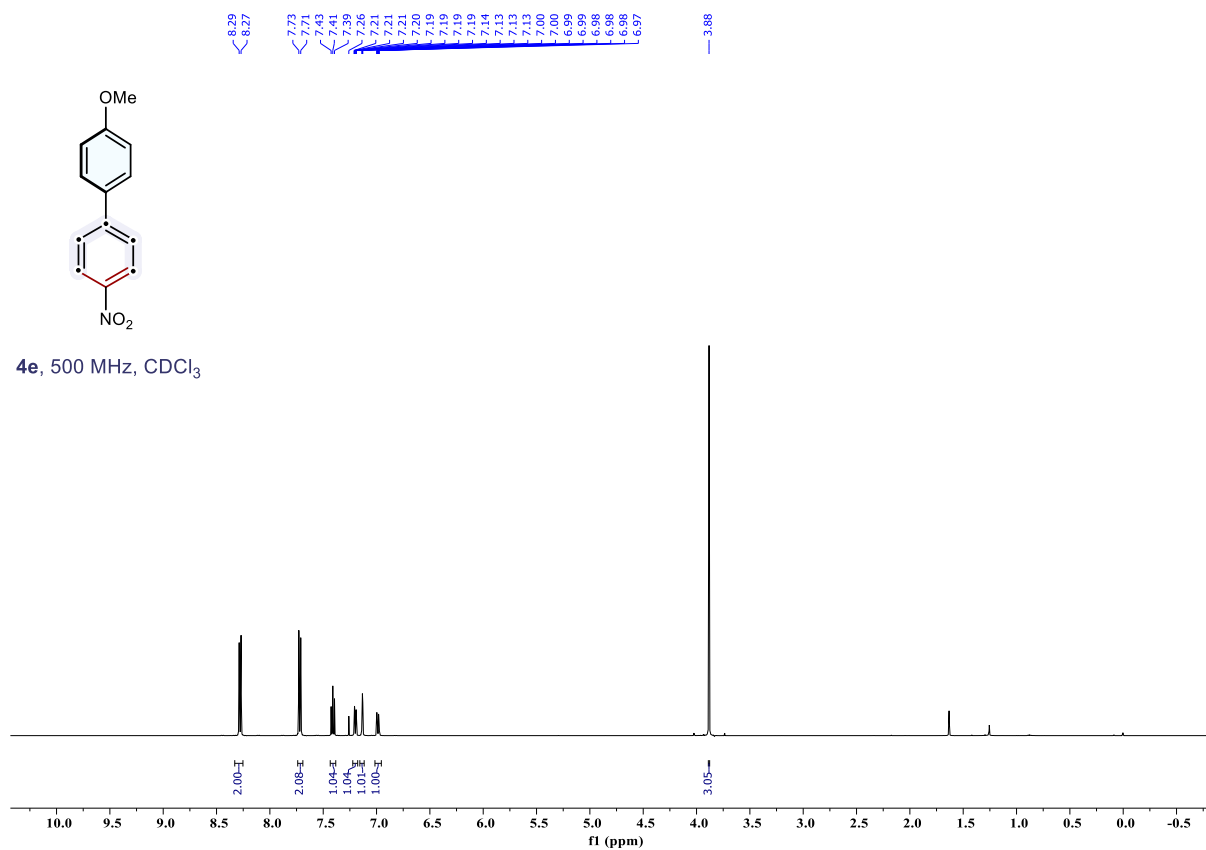
4c, 500 MHz, CDCl₃

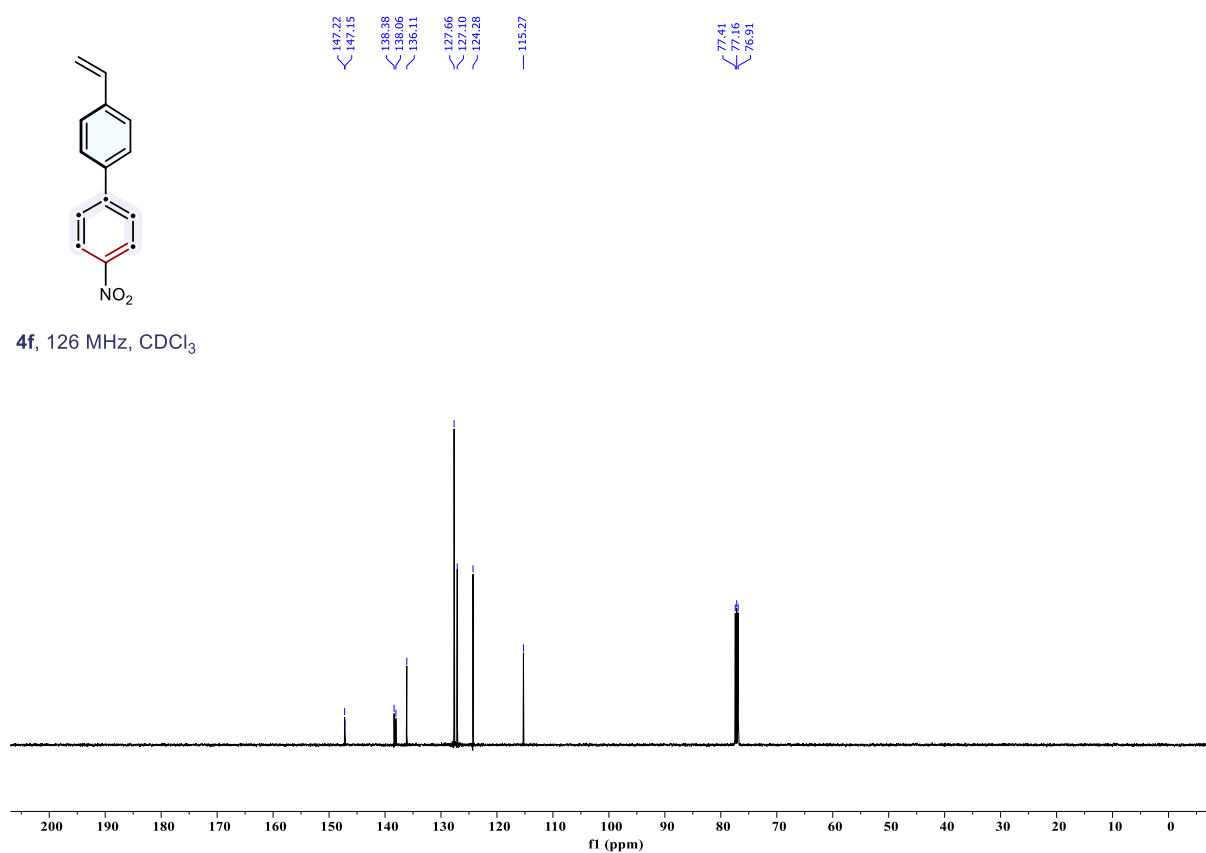
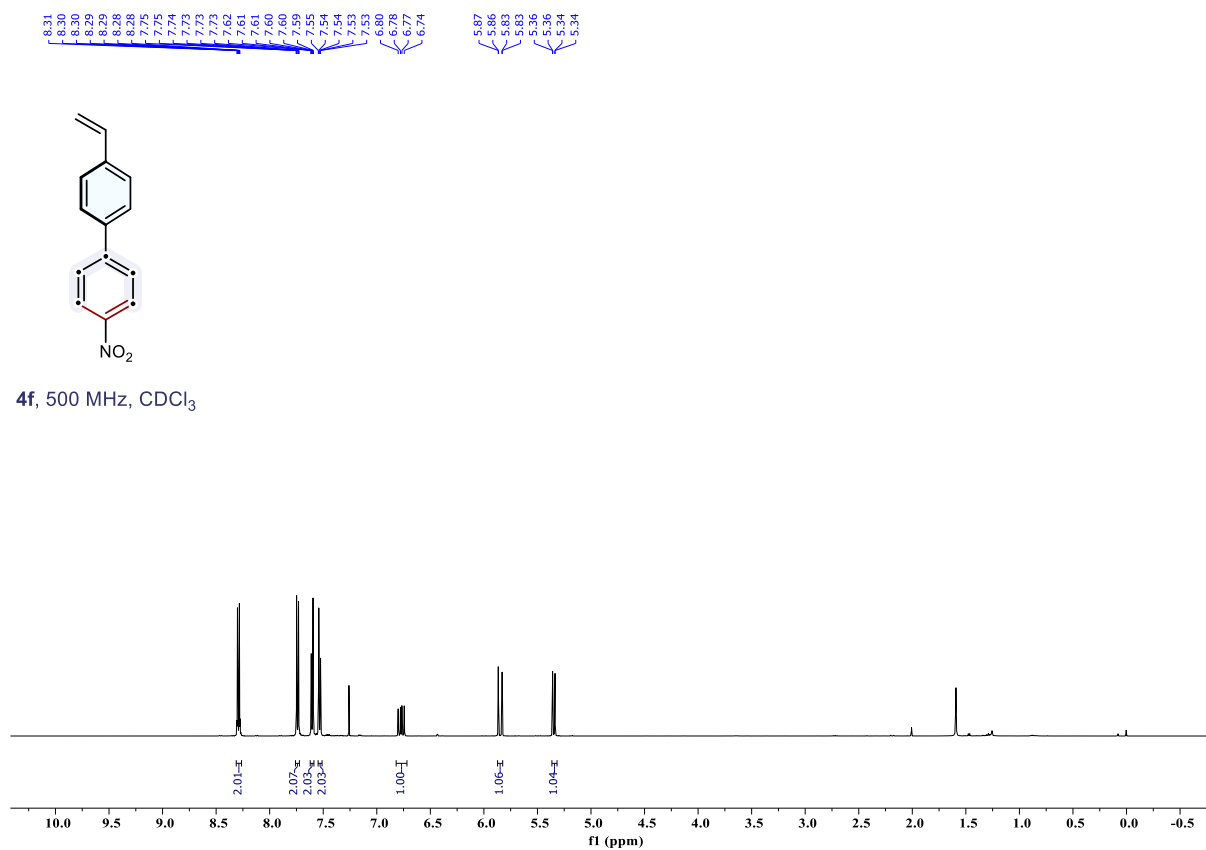


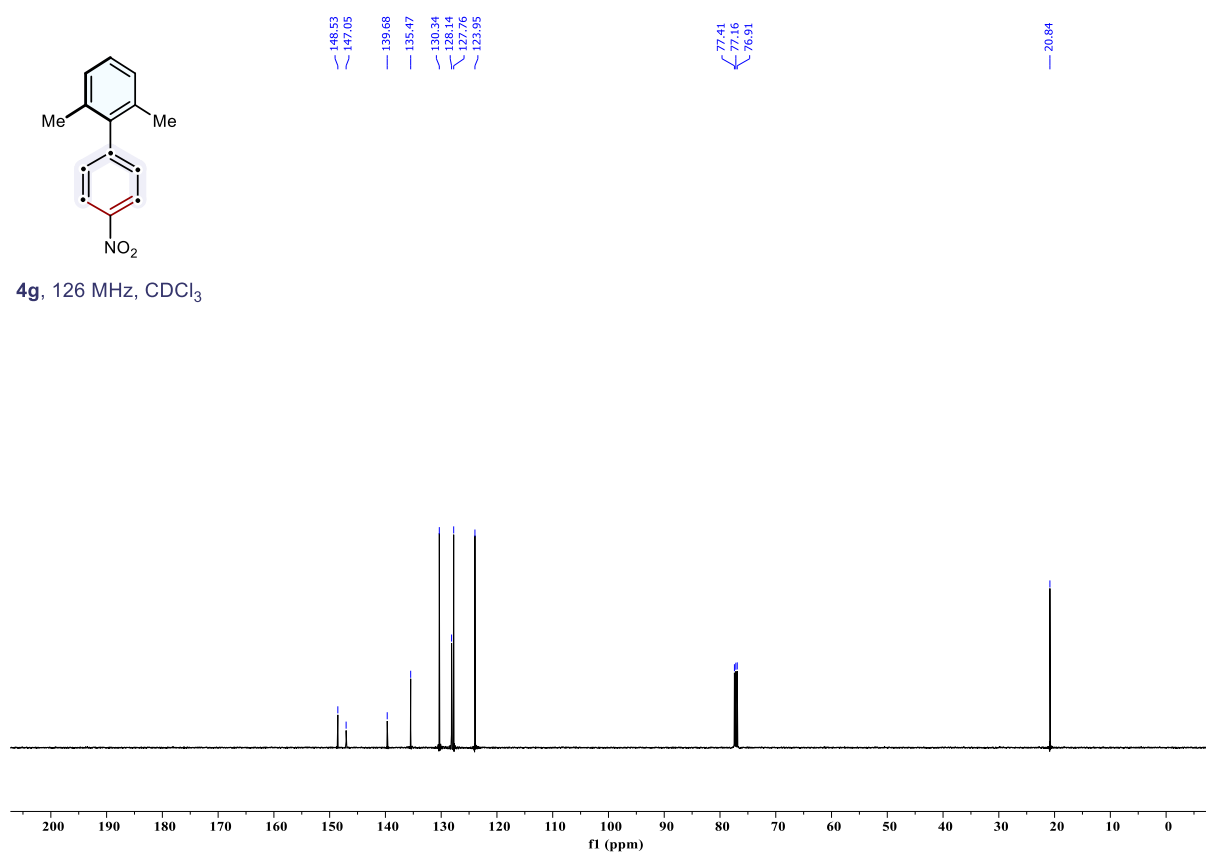
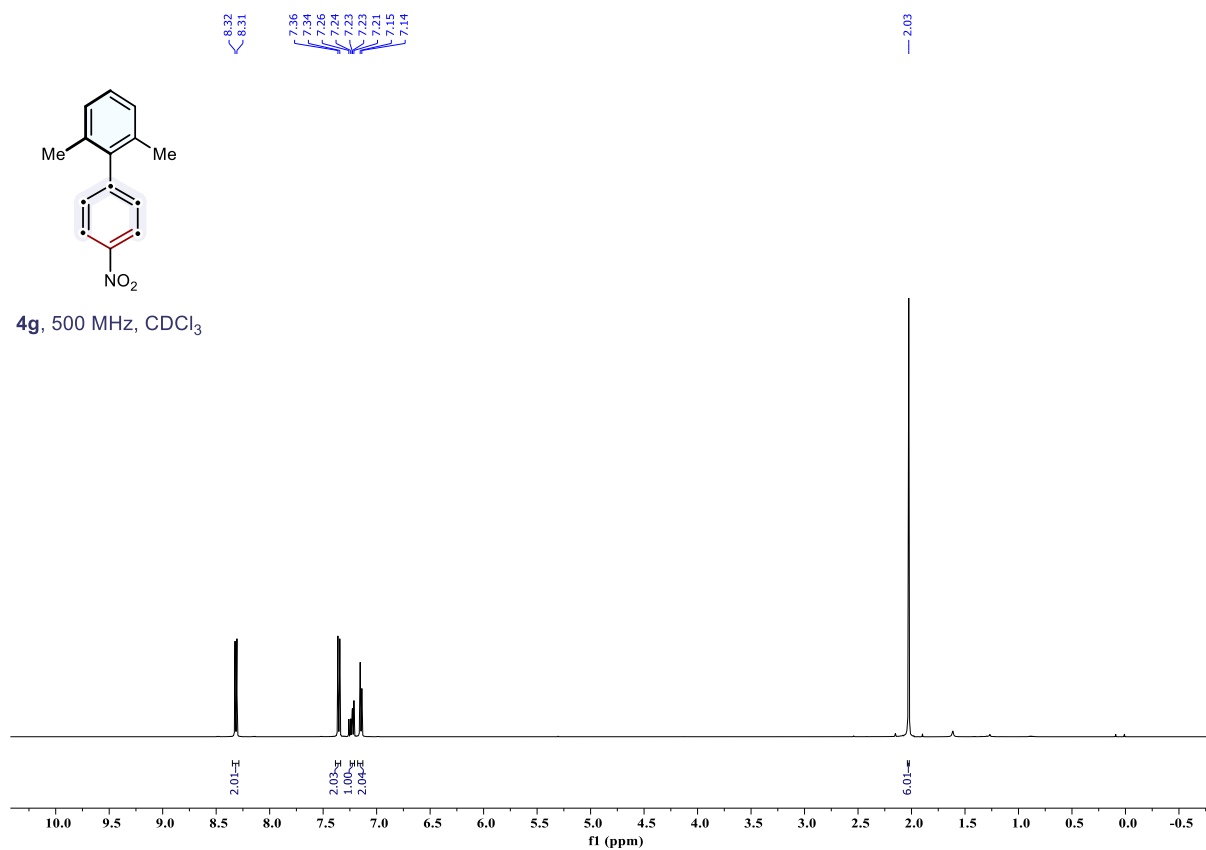
4c, 126 MHz, CDCl₃

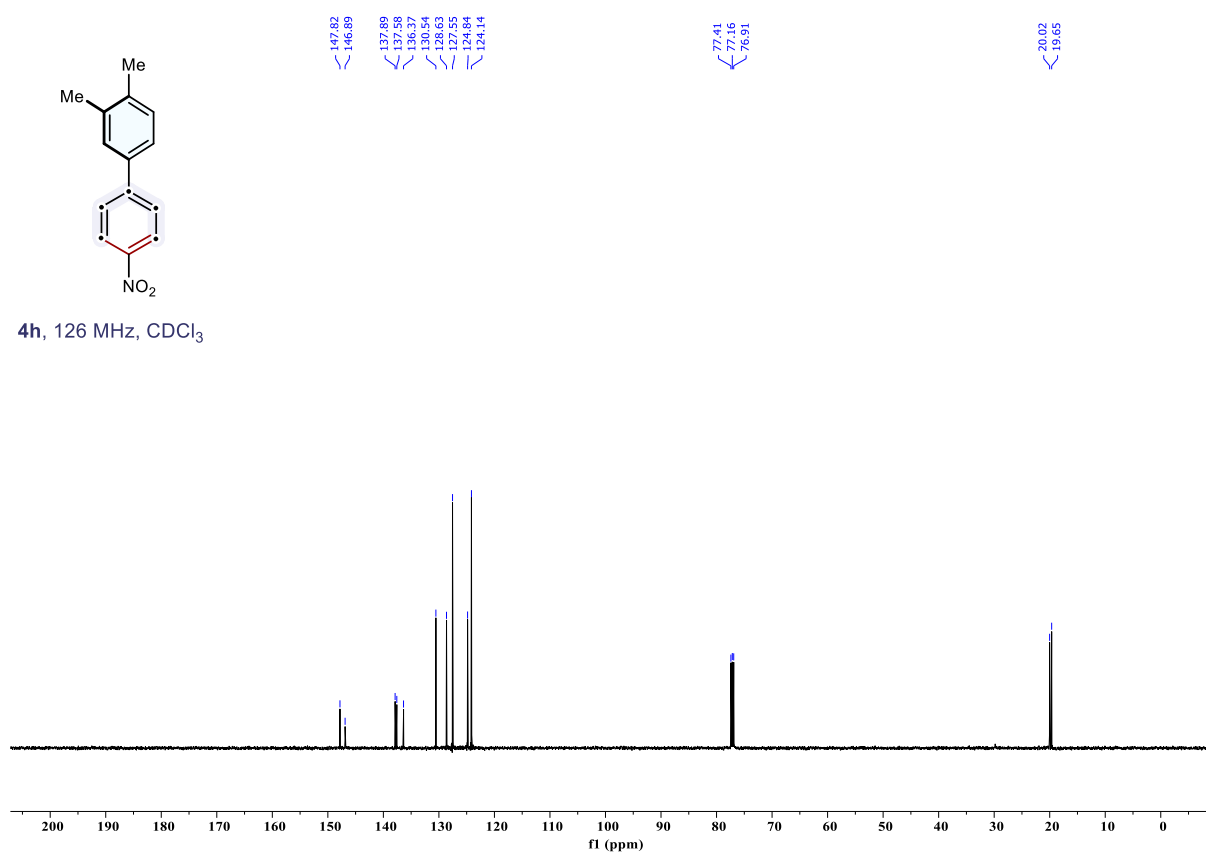
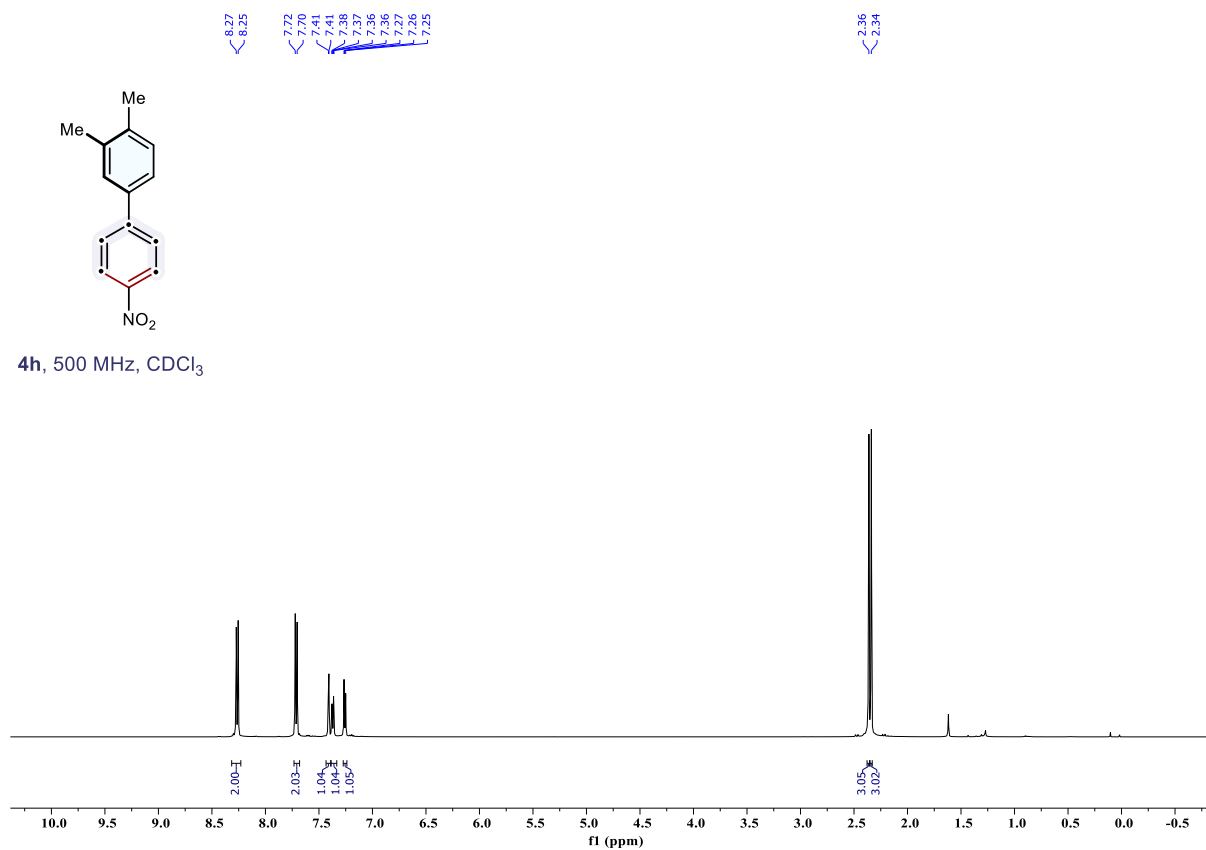


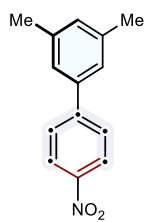




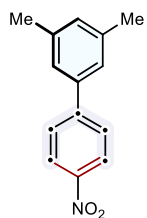
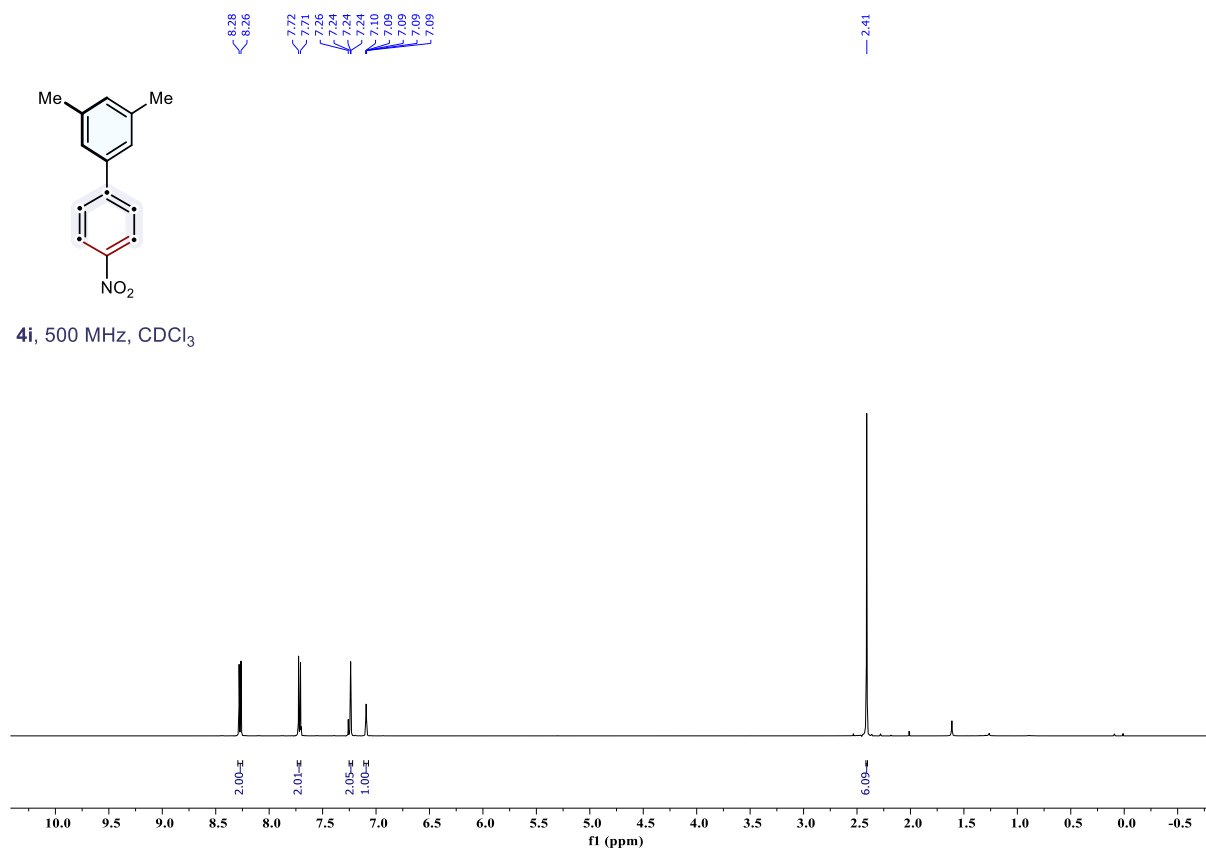




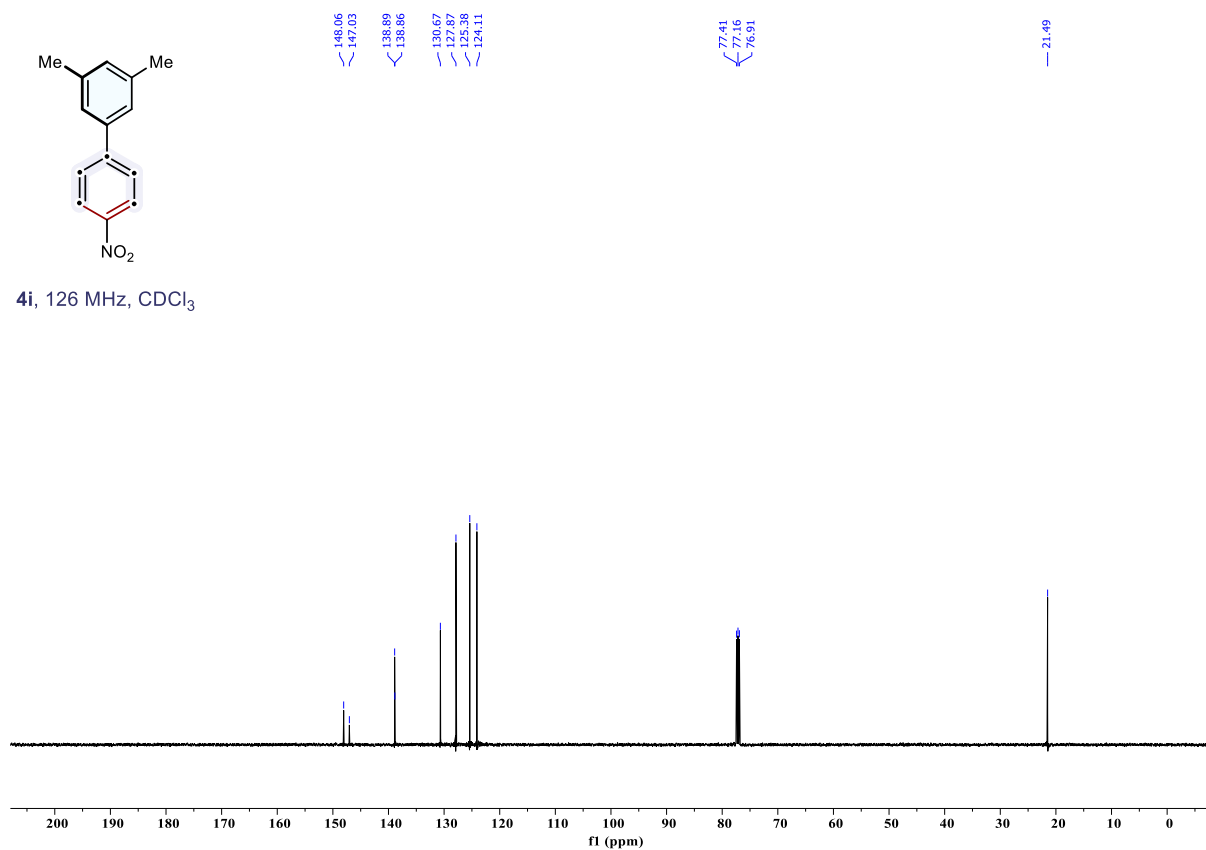


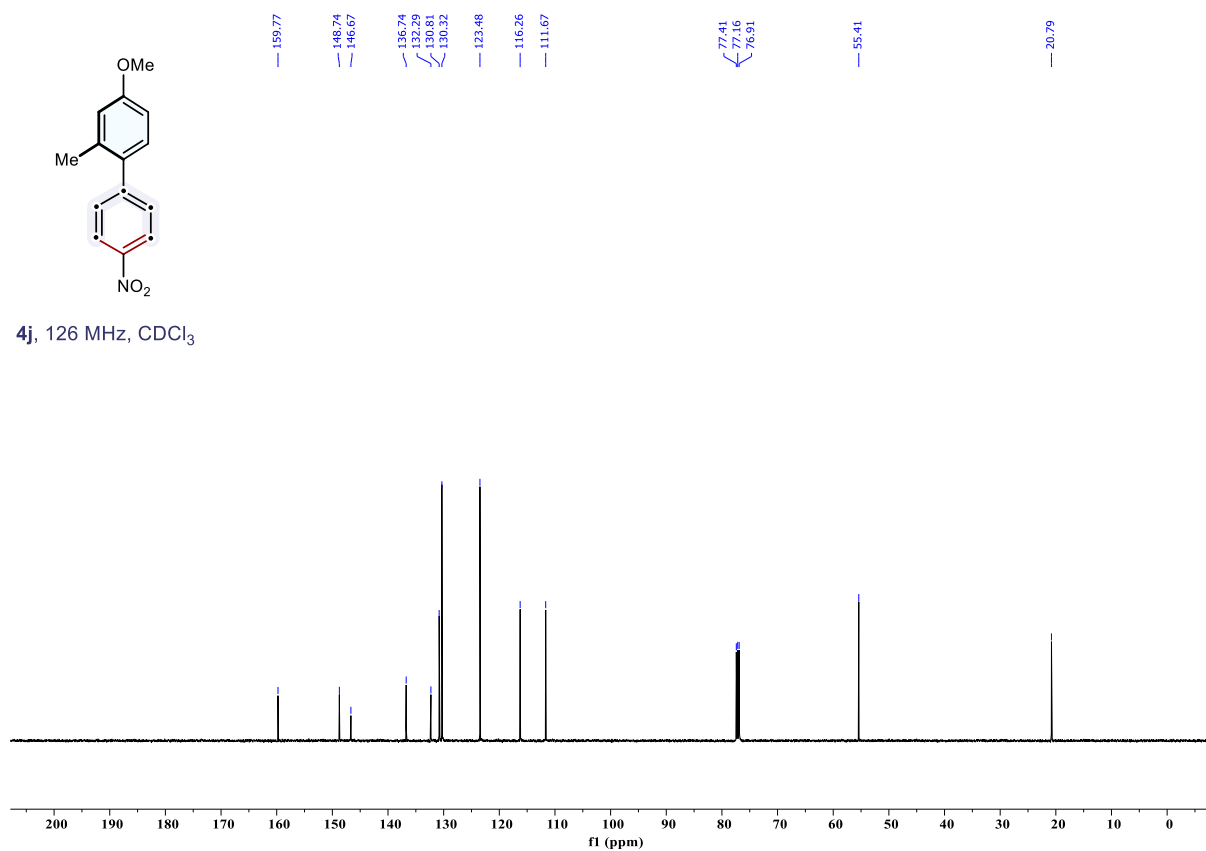
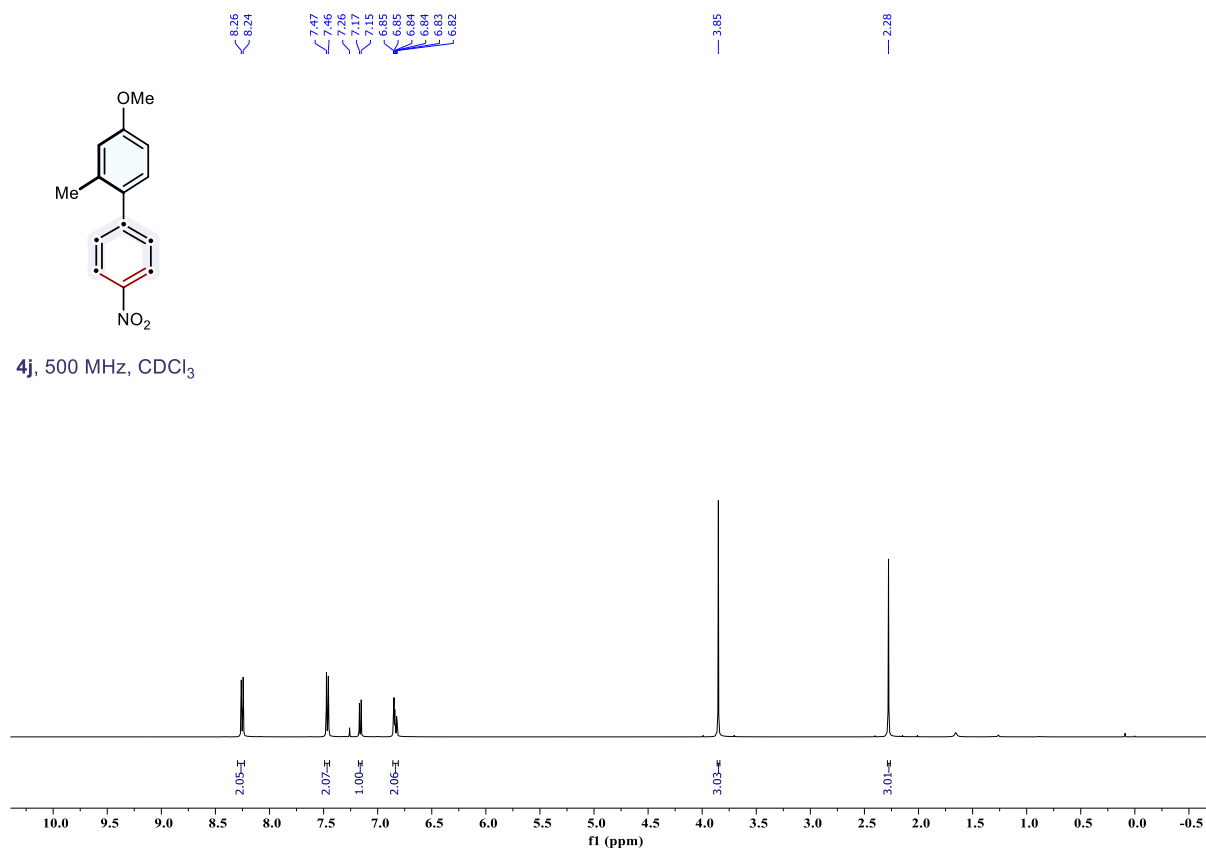


4i, 500 MHz, CDCl₃

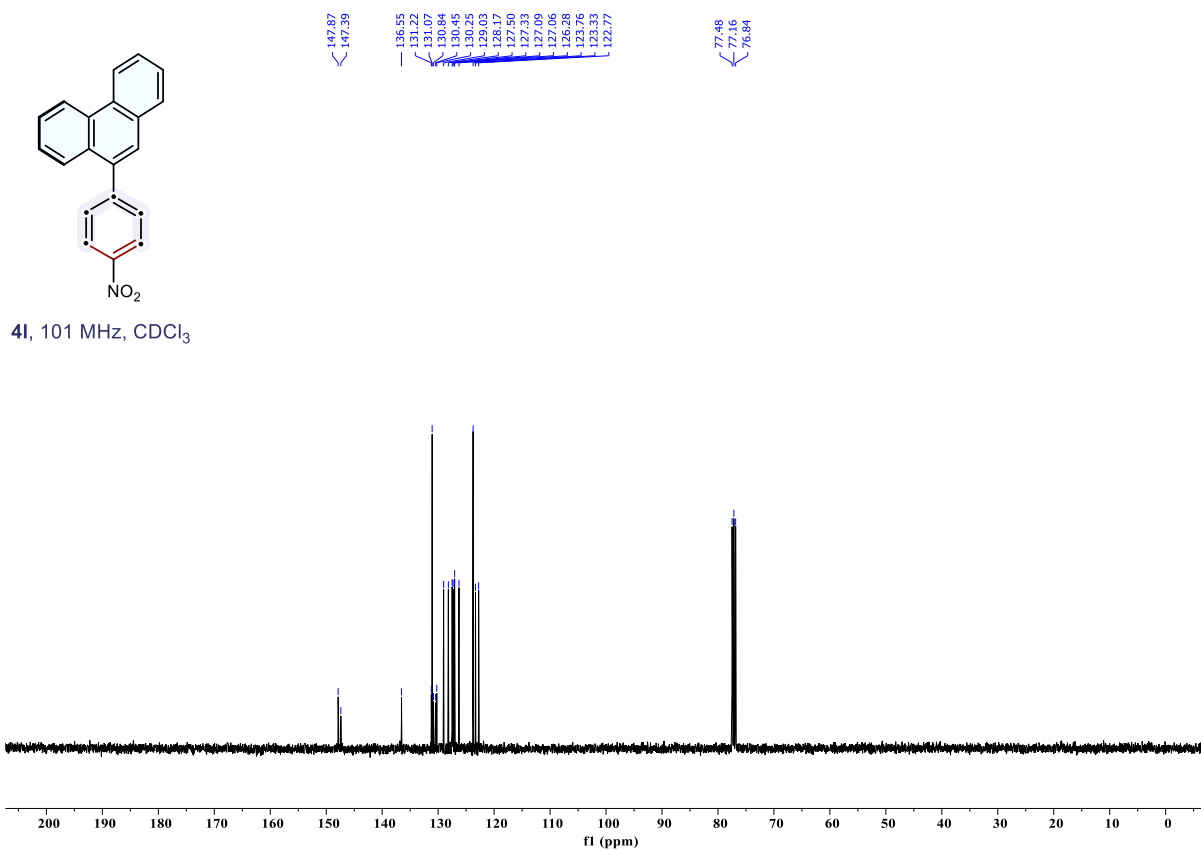


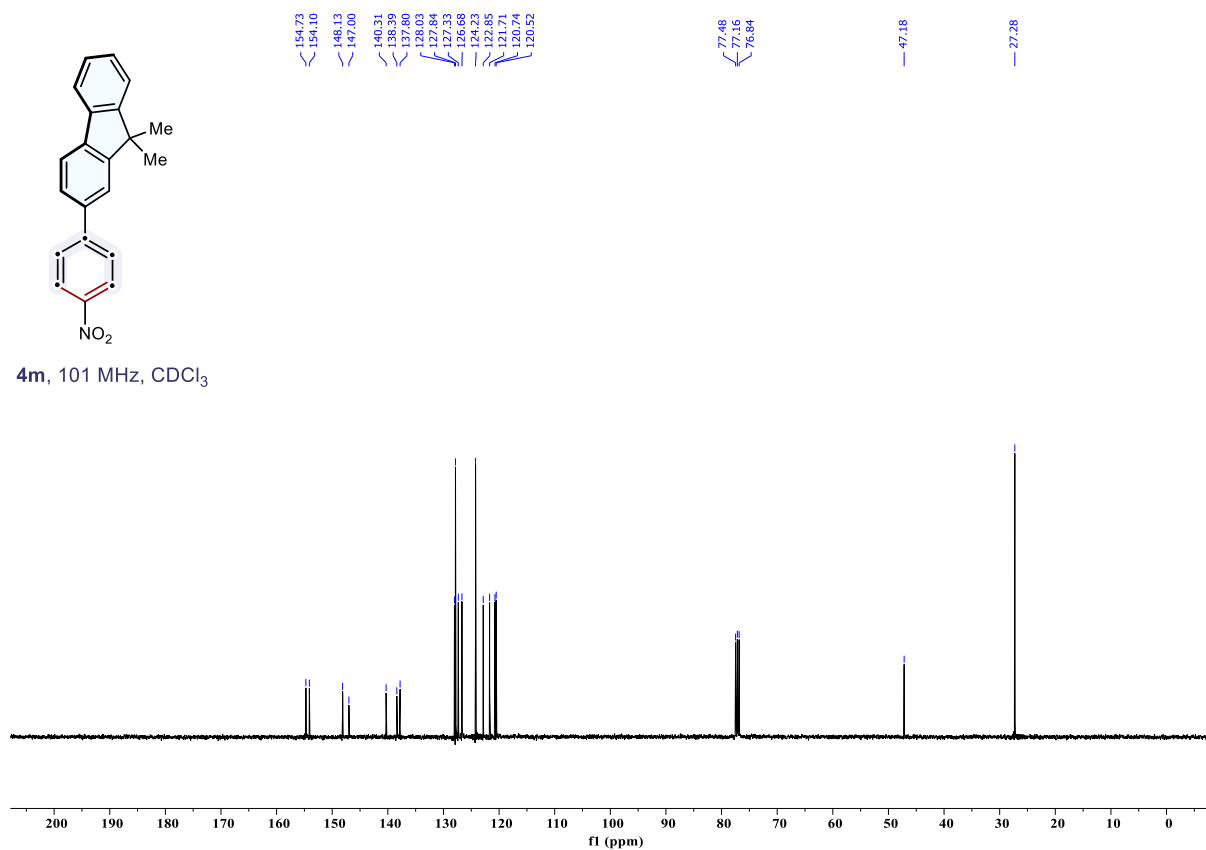
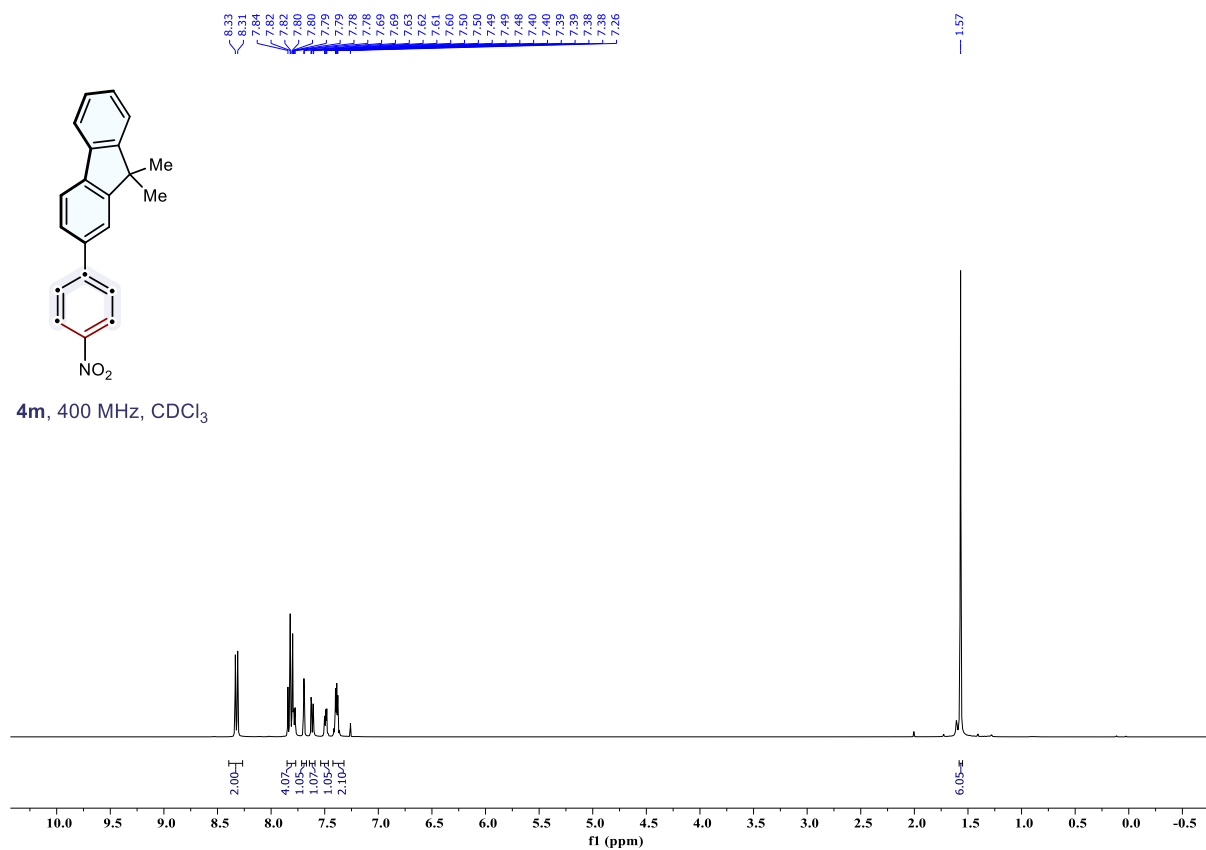
4i, 126 MHz, CDCl₃

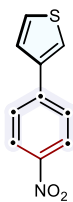




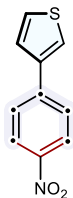
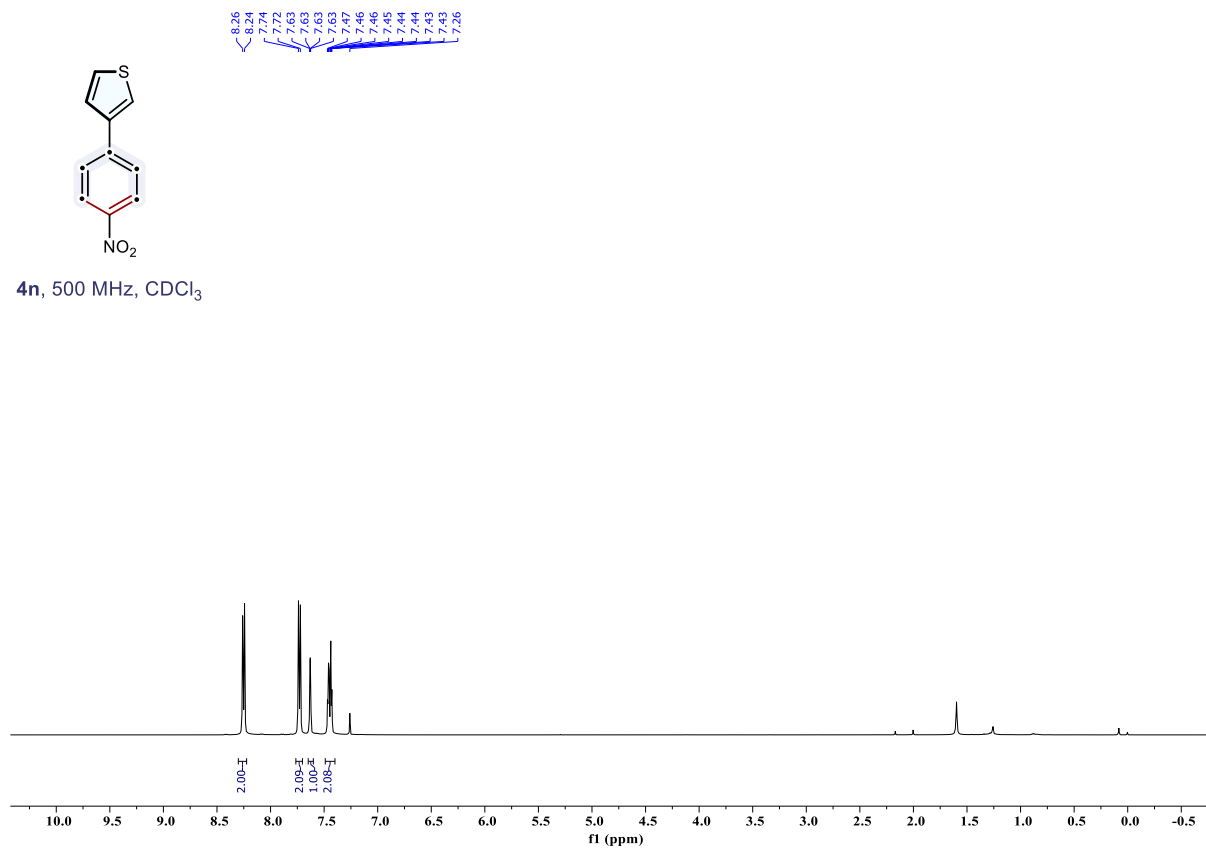




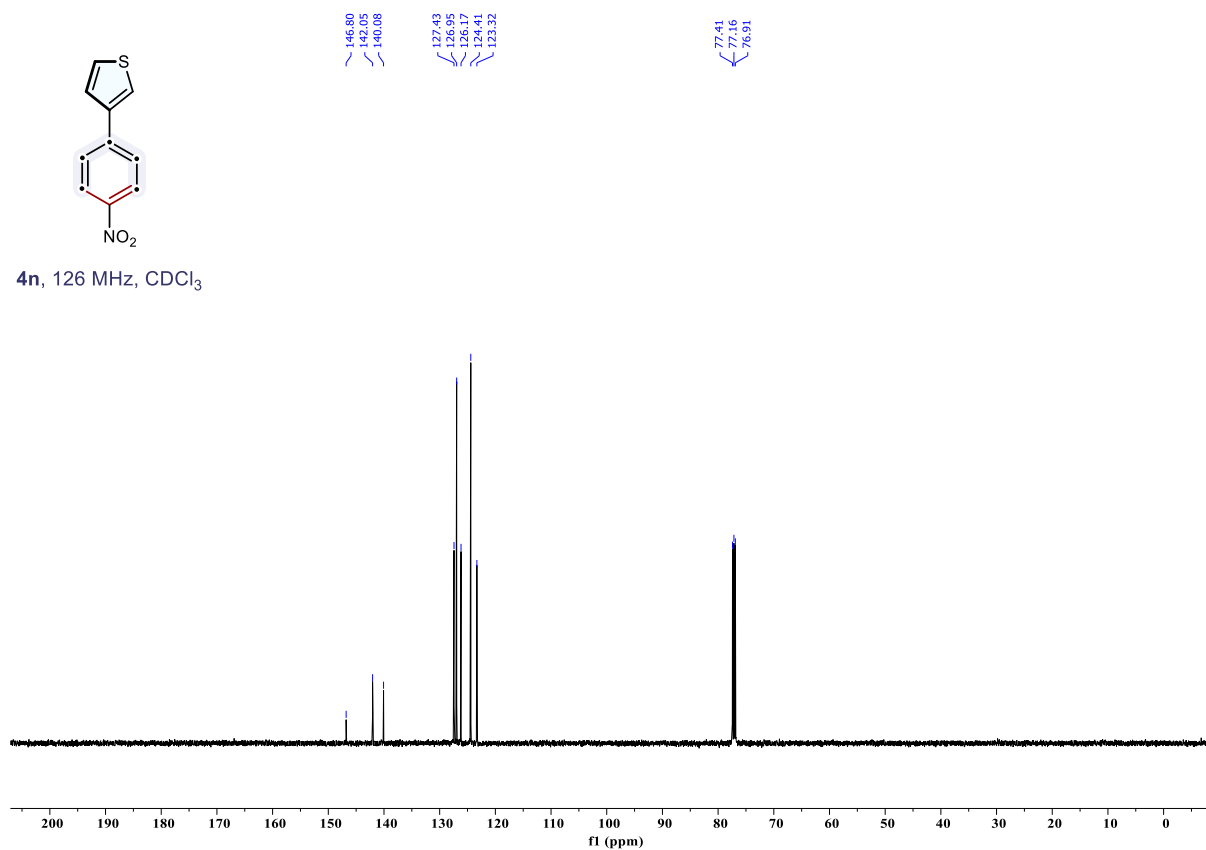


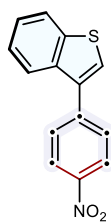


4n, 500 MHz, CDCl₃

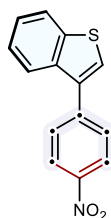
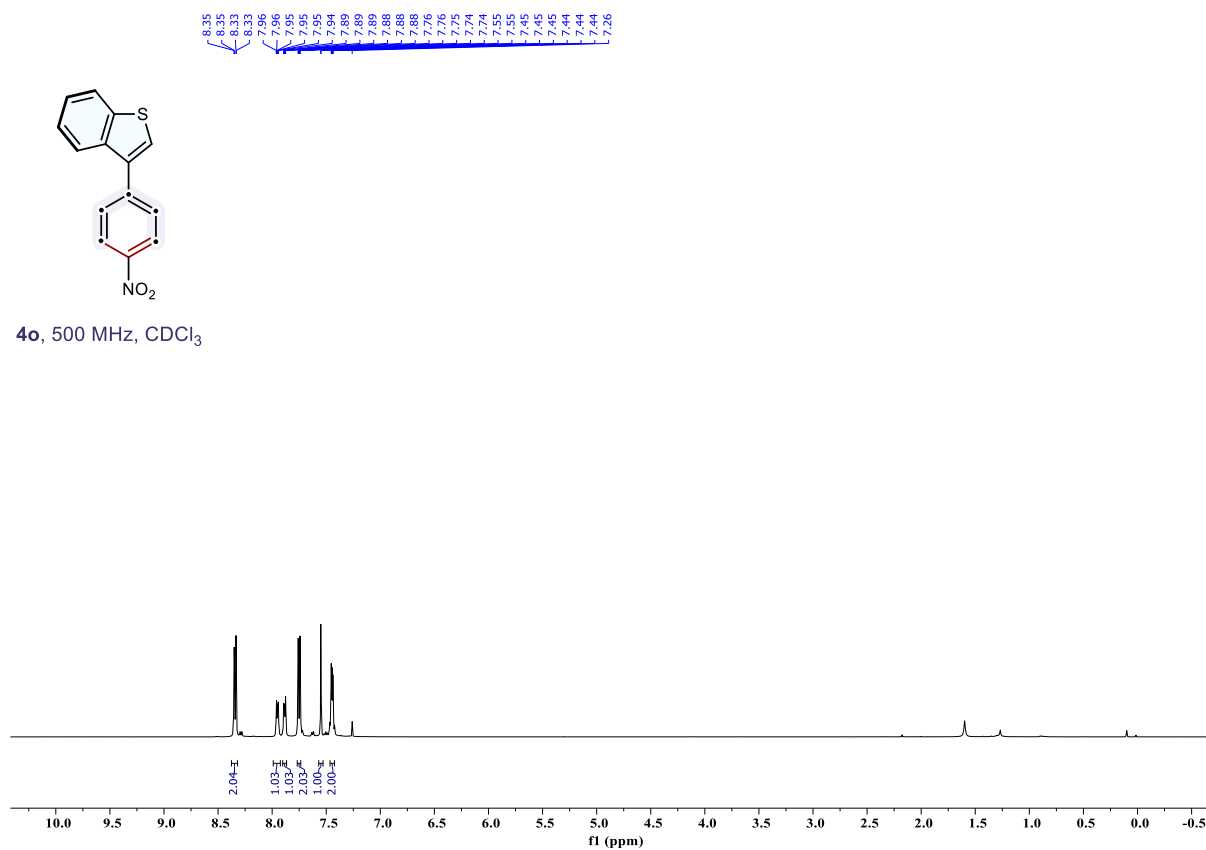


4n, 126 MHz, CDCl₃

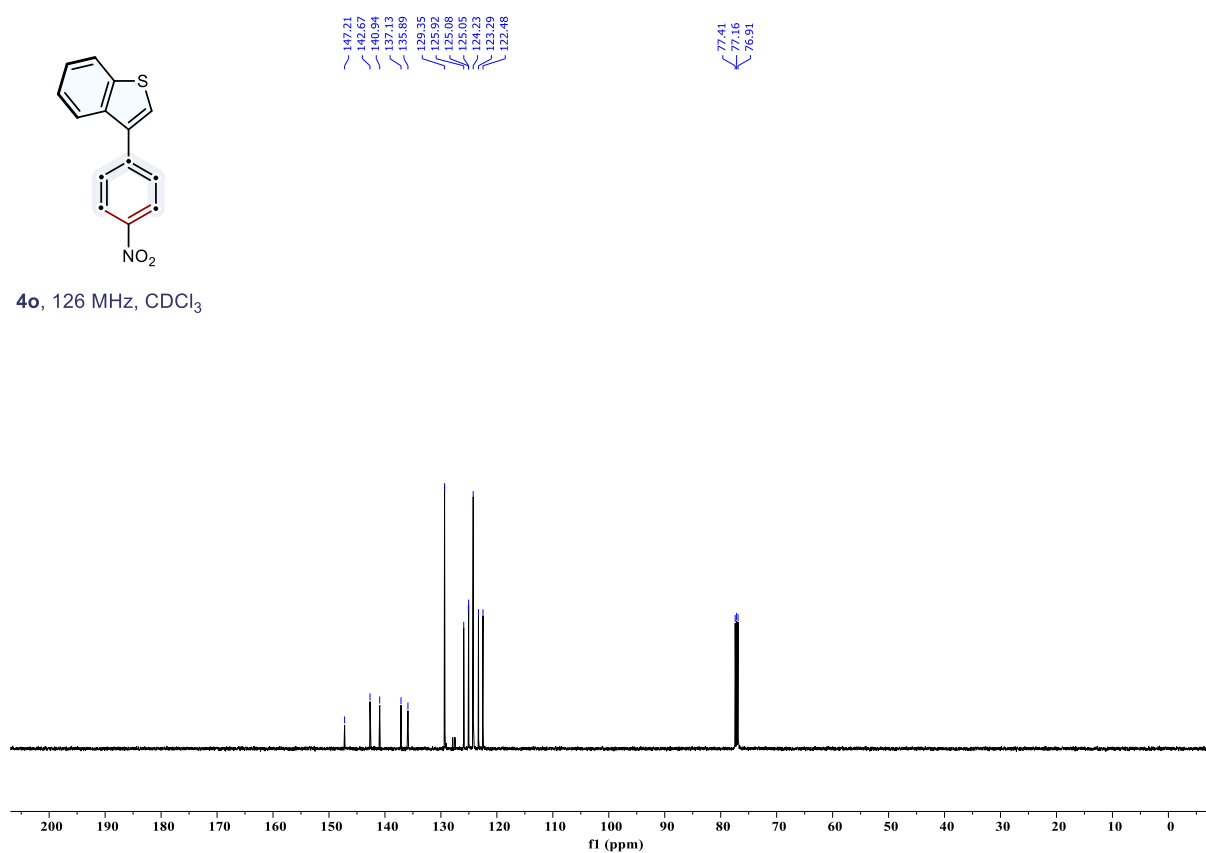


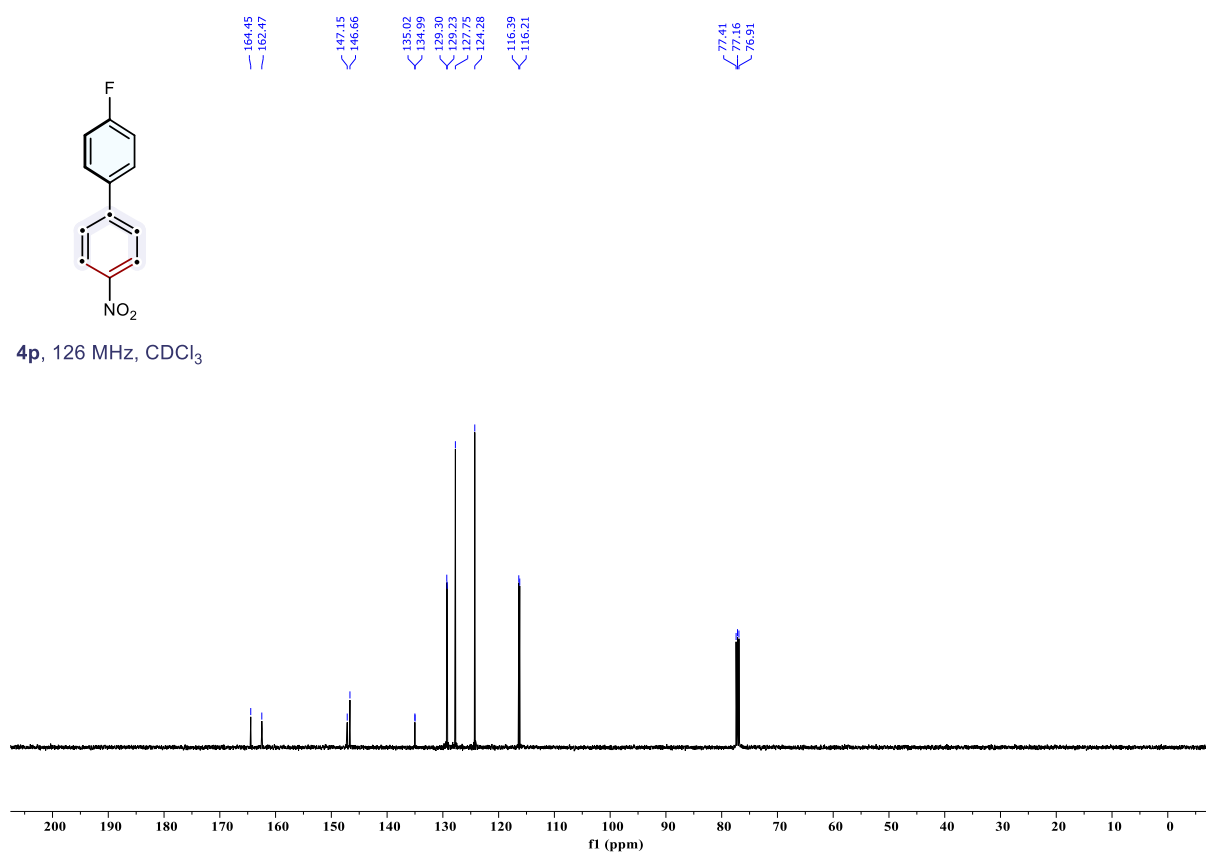
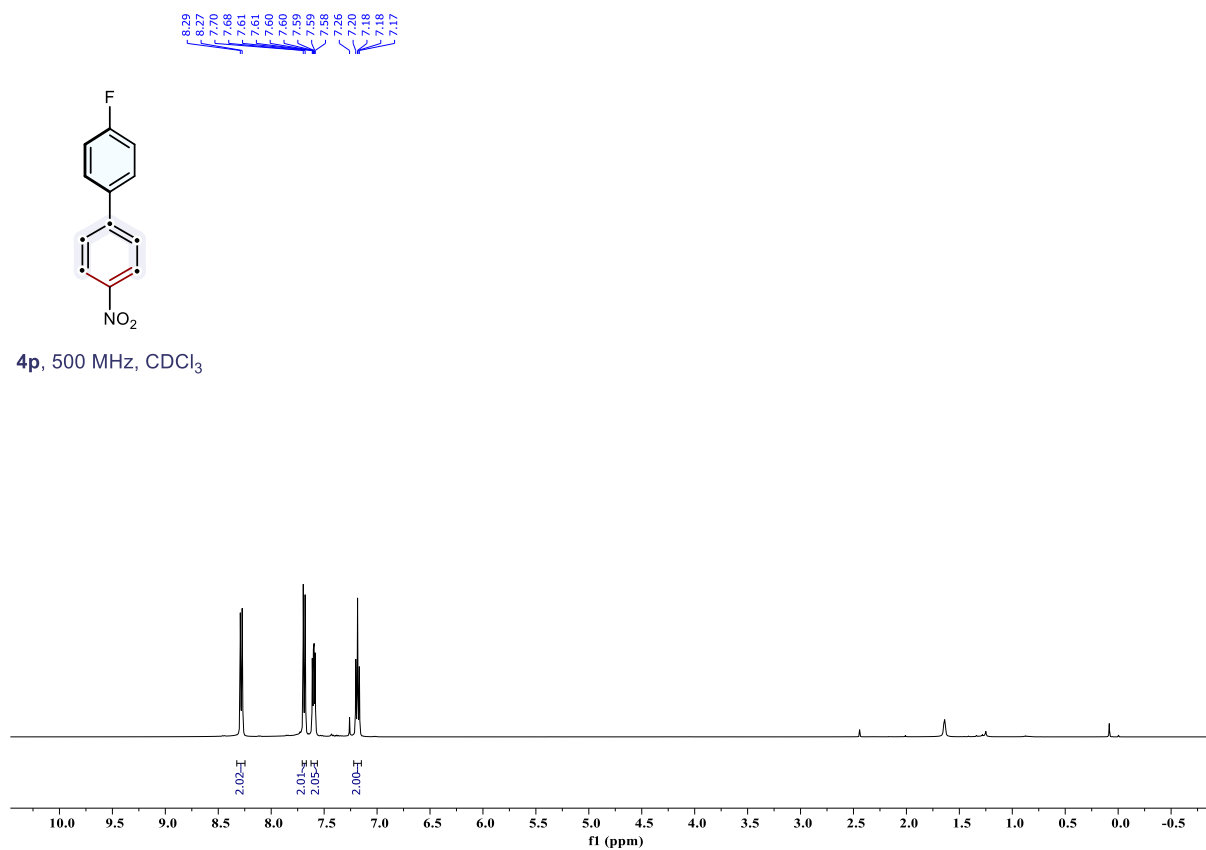


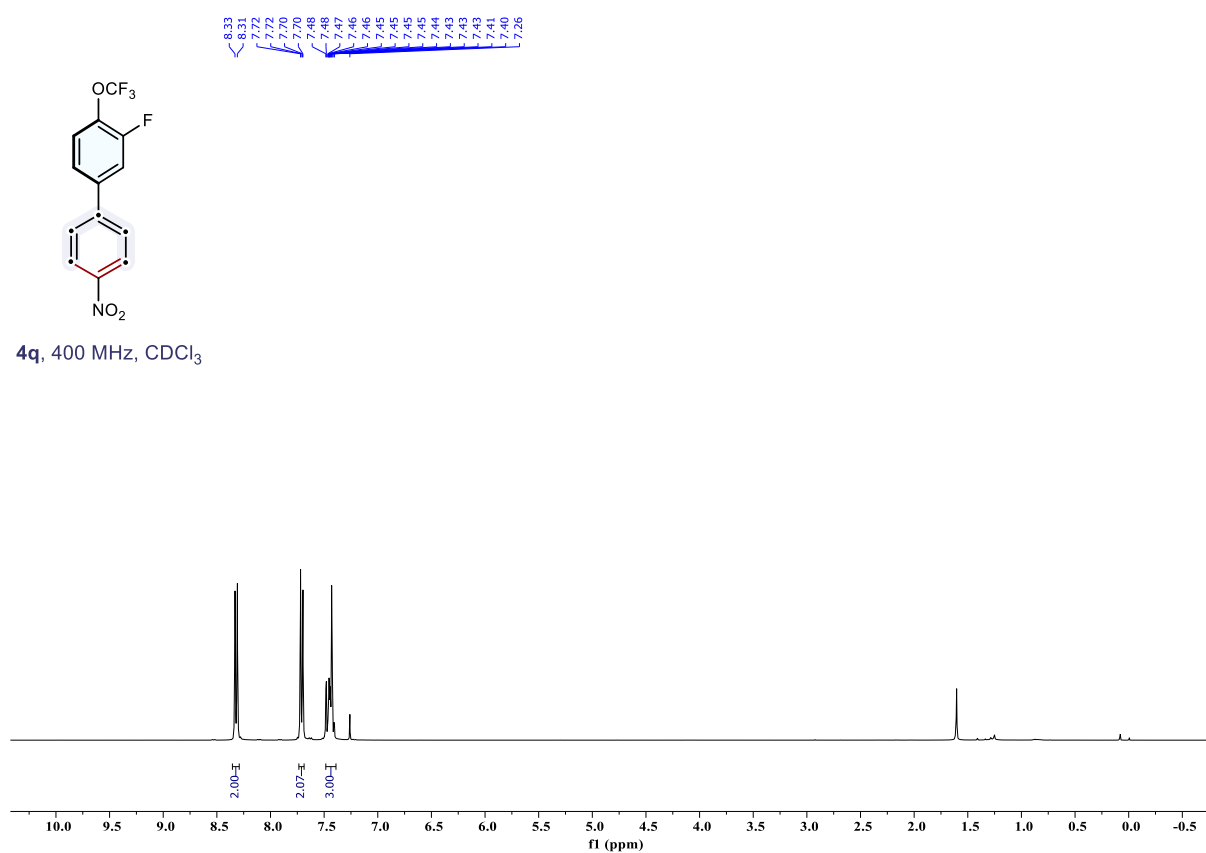
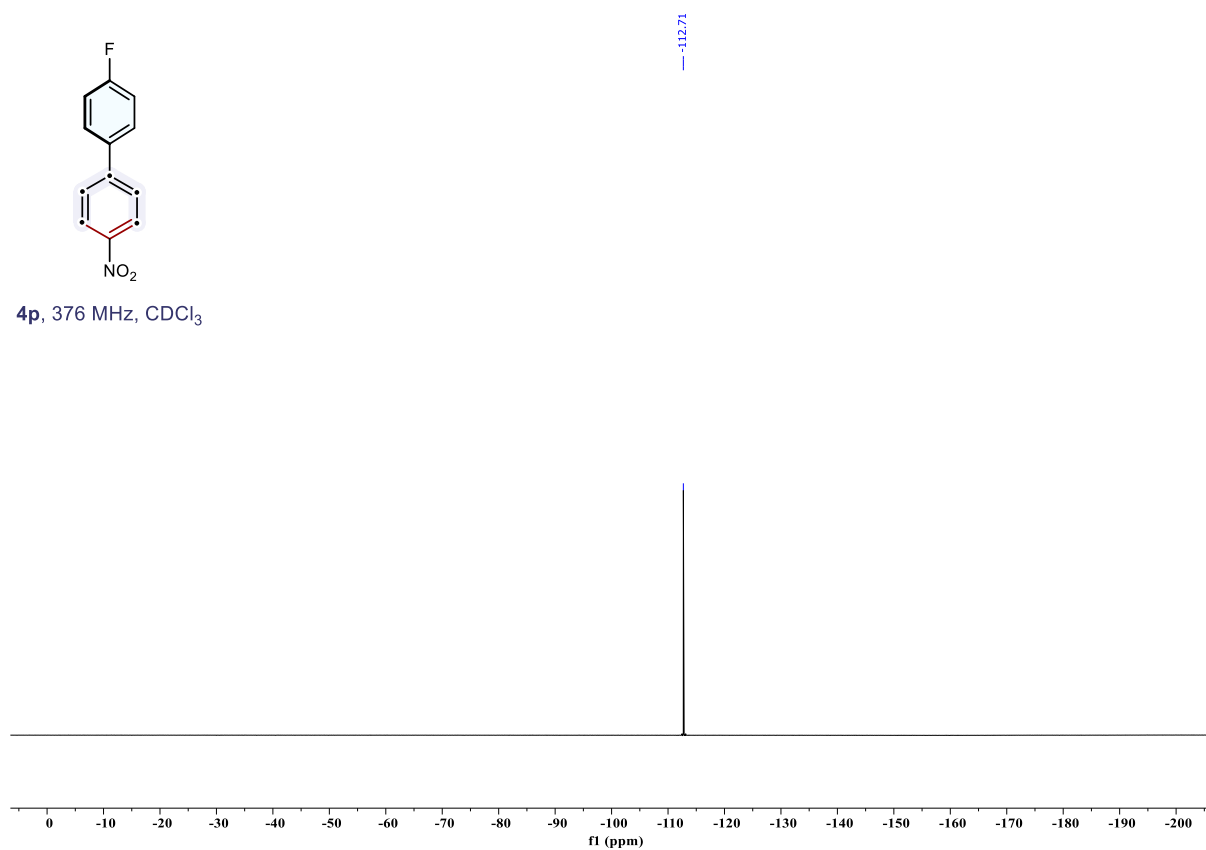
4o, 500 MHz, CDCl₃

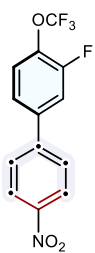


4o, 126 MHz, CDCl₃

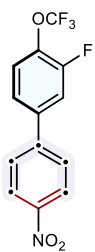
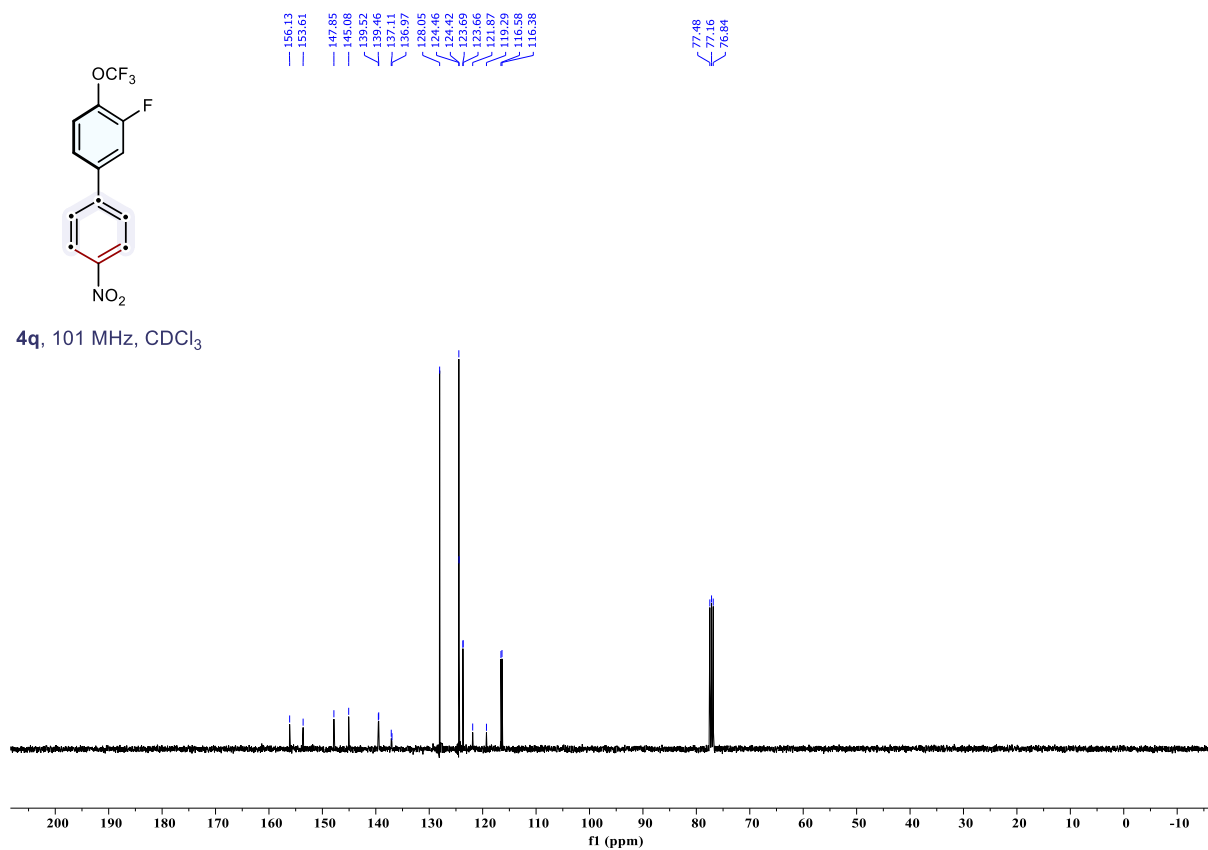




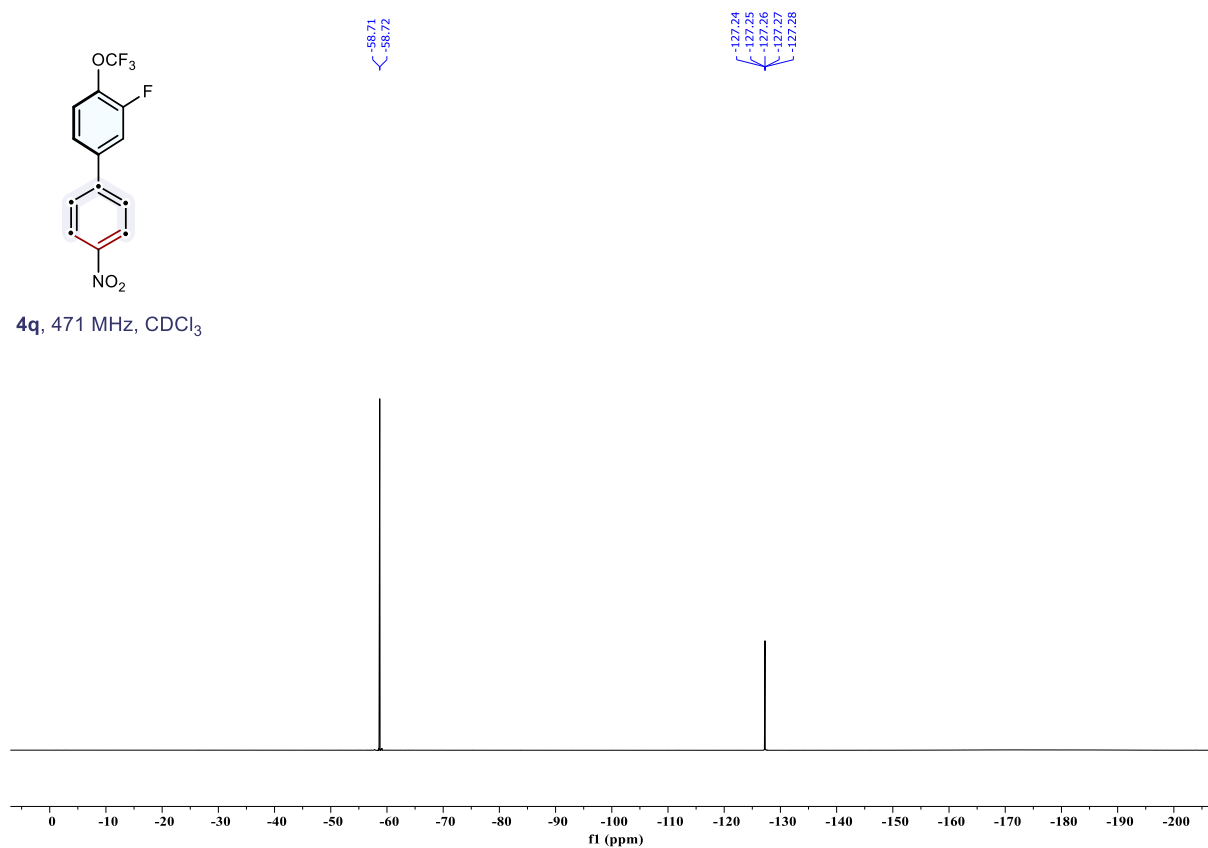


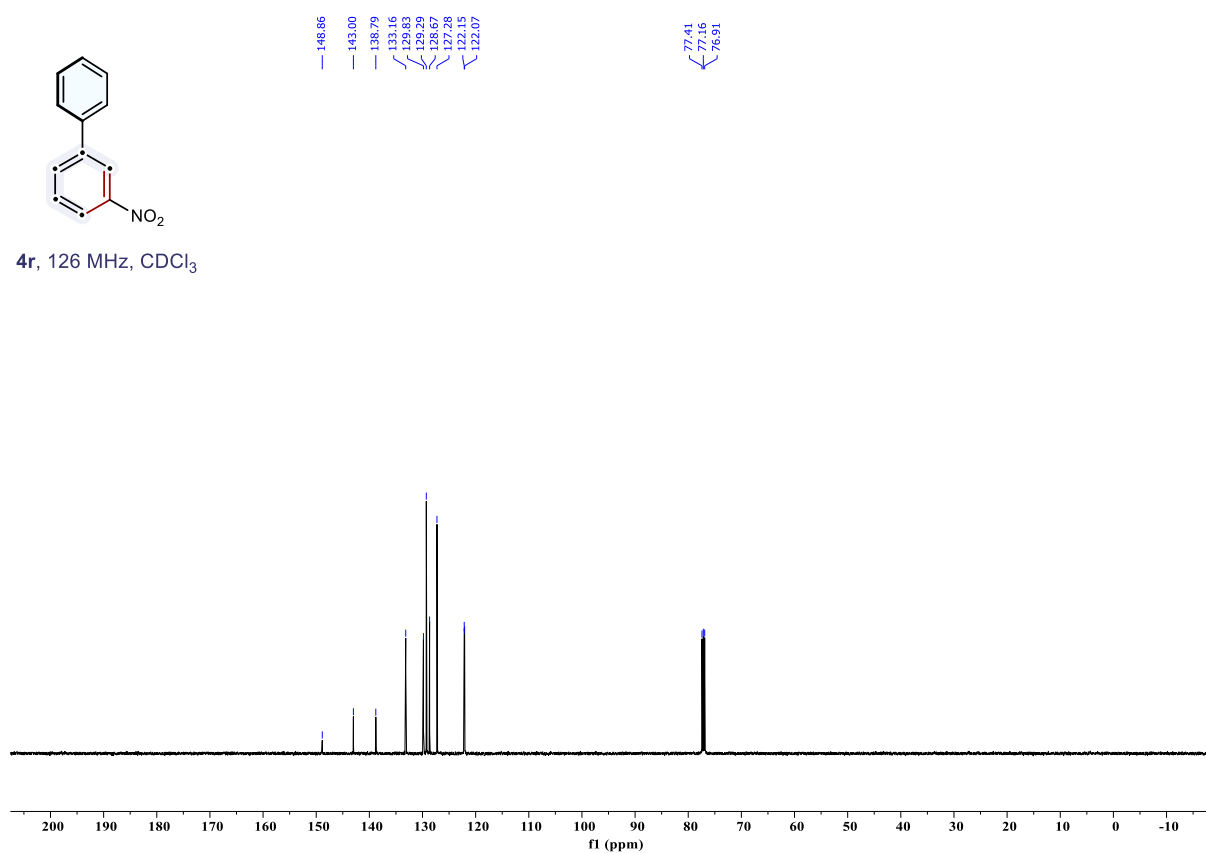
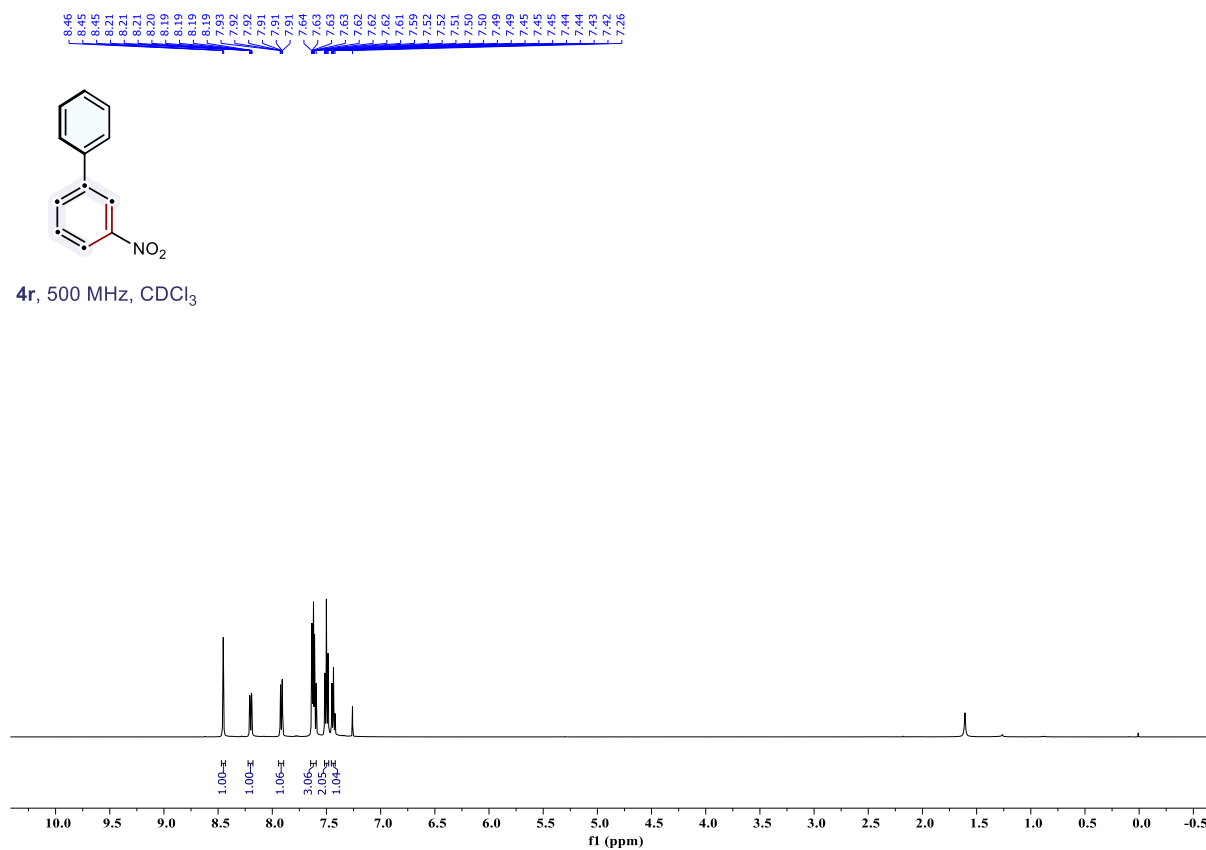


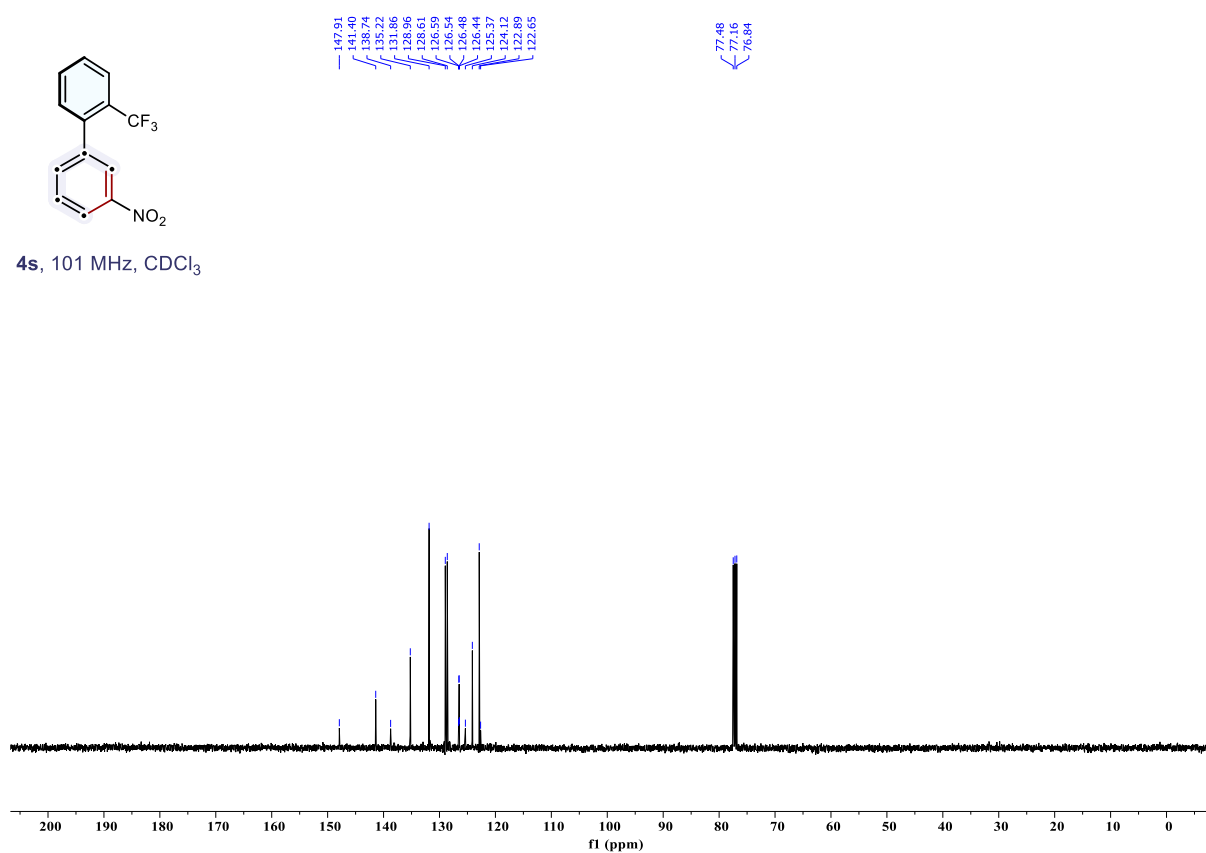
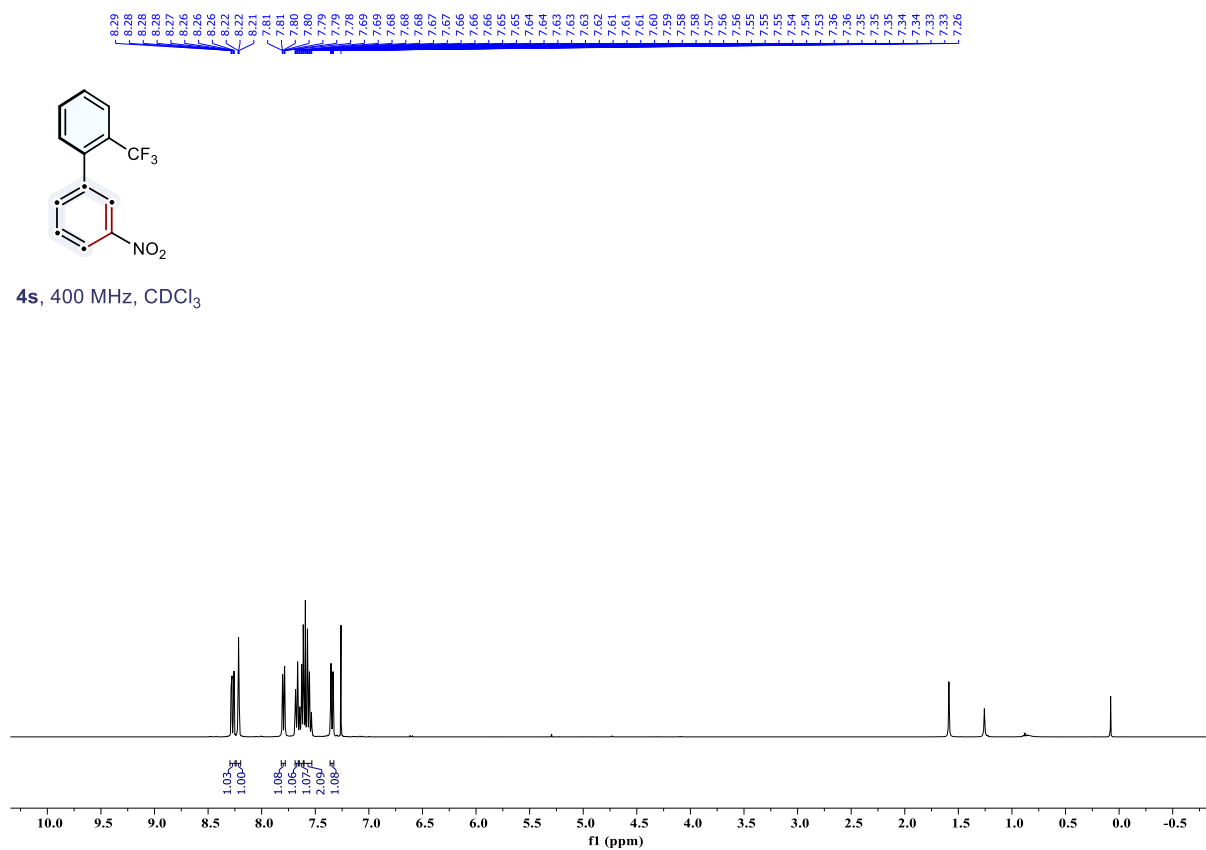
4q, 101 MHz, CDCl₃

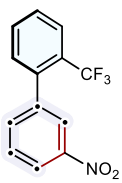


4q, 471 MHz, CDCl₃

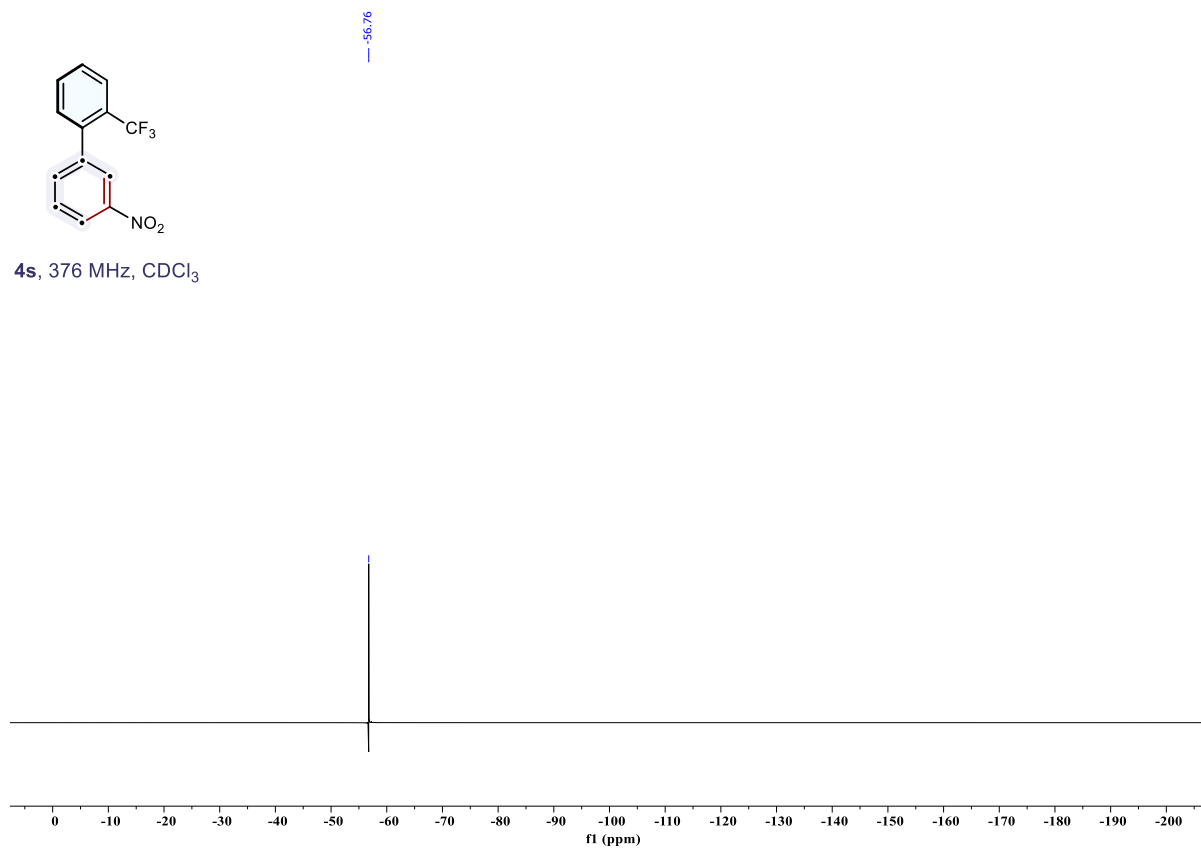


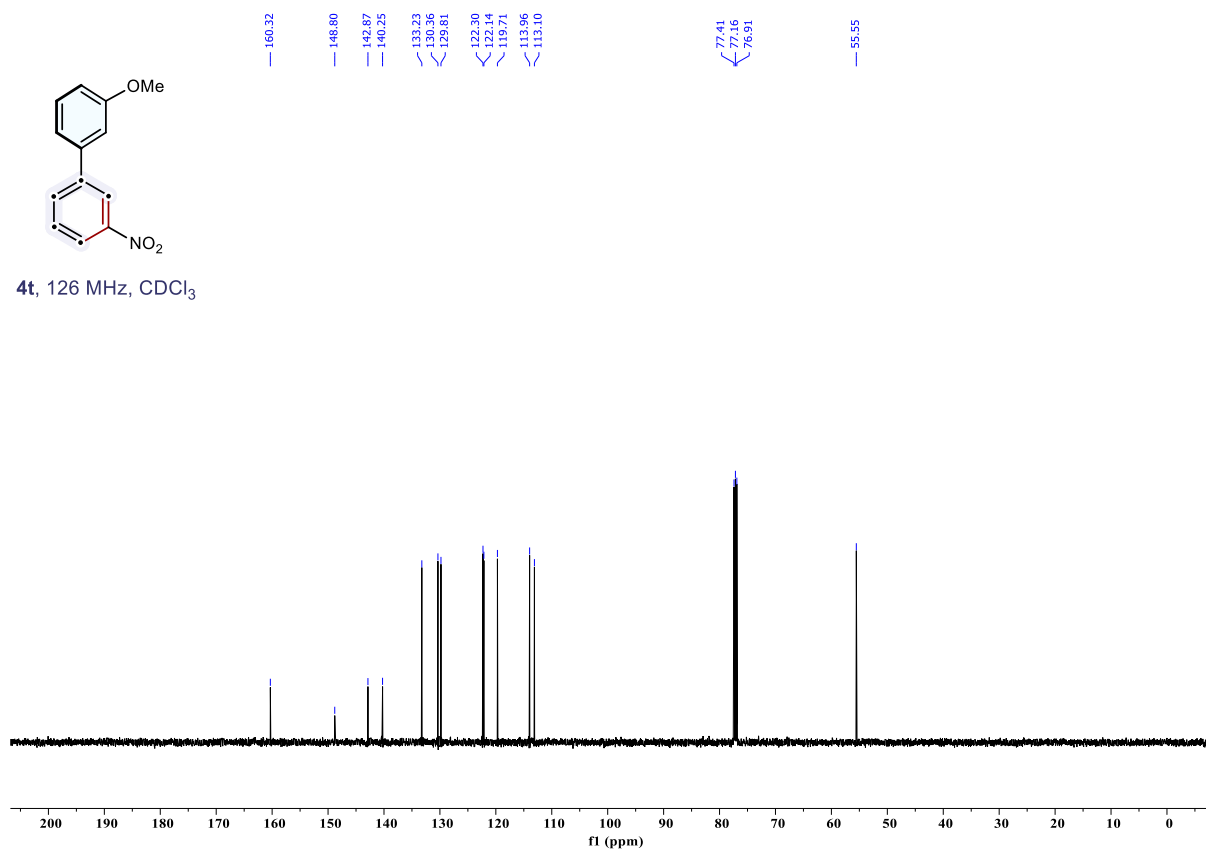
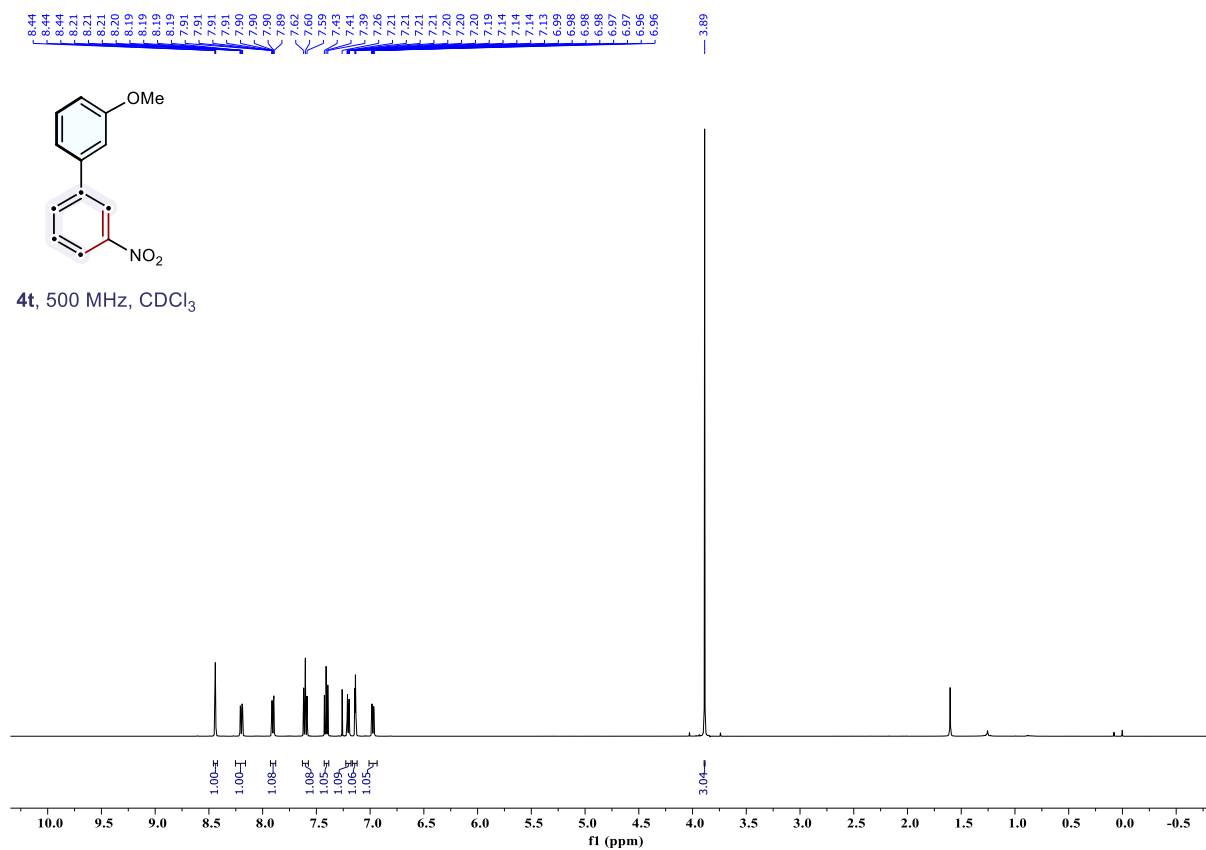


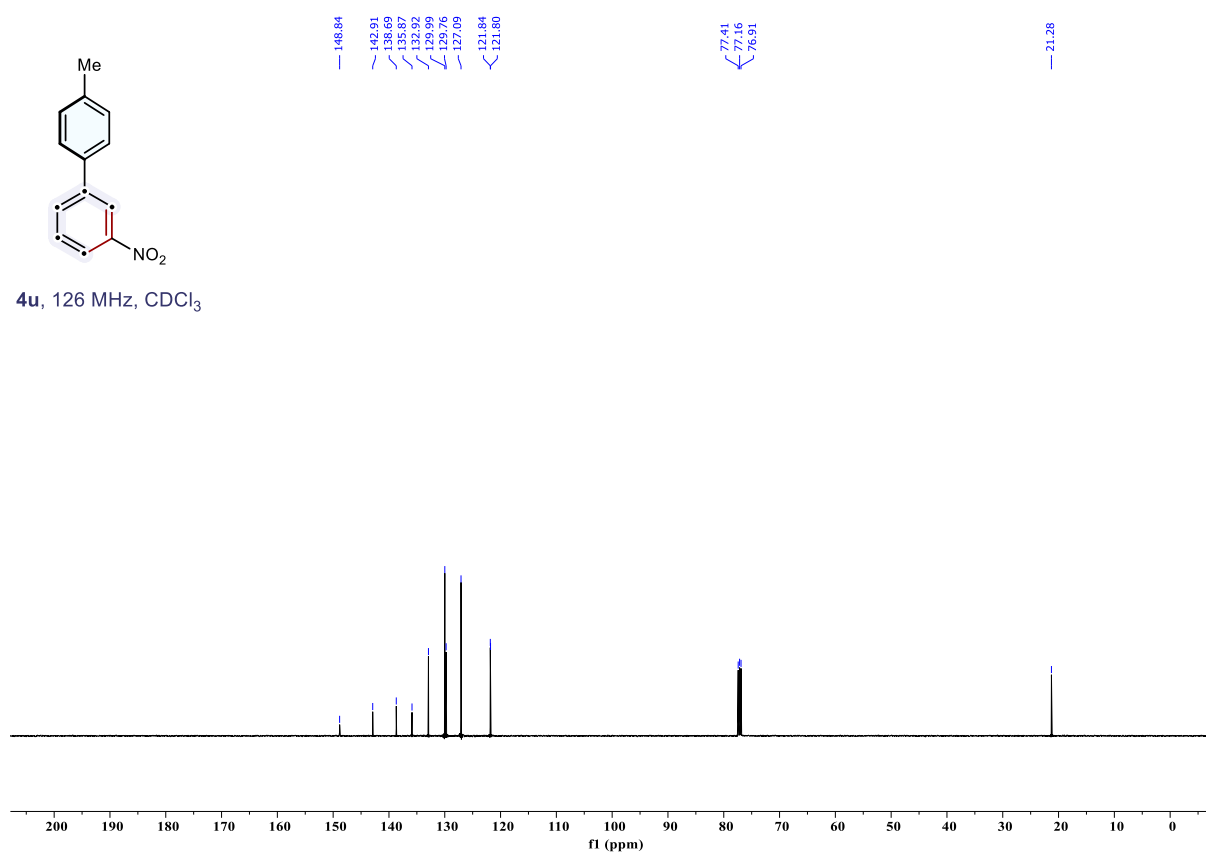
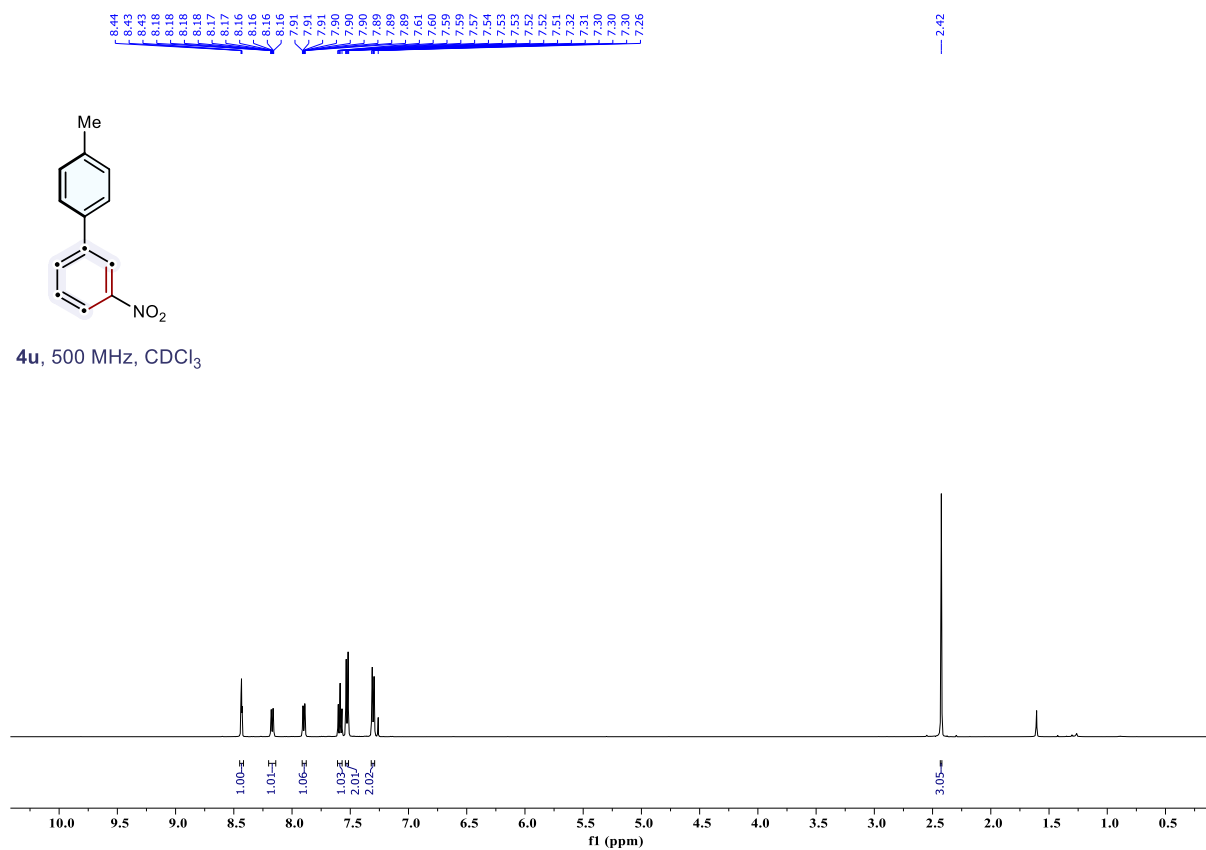


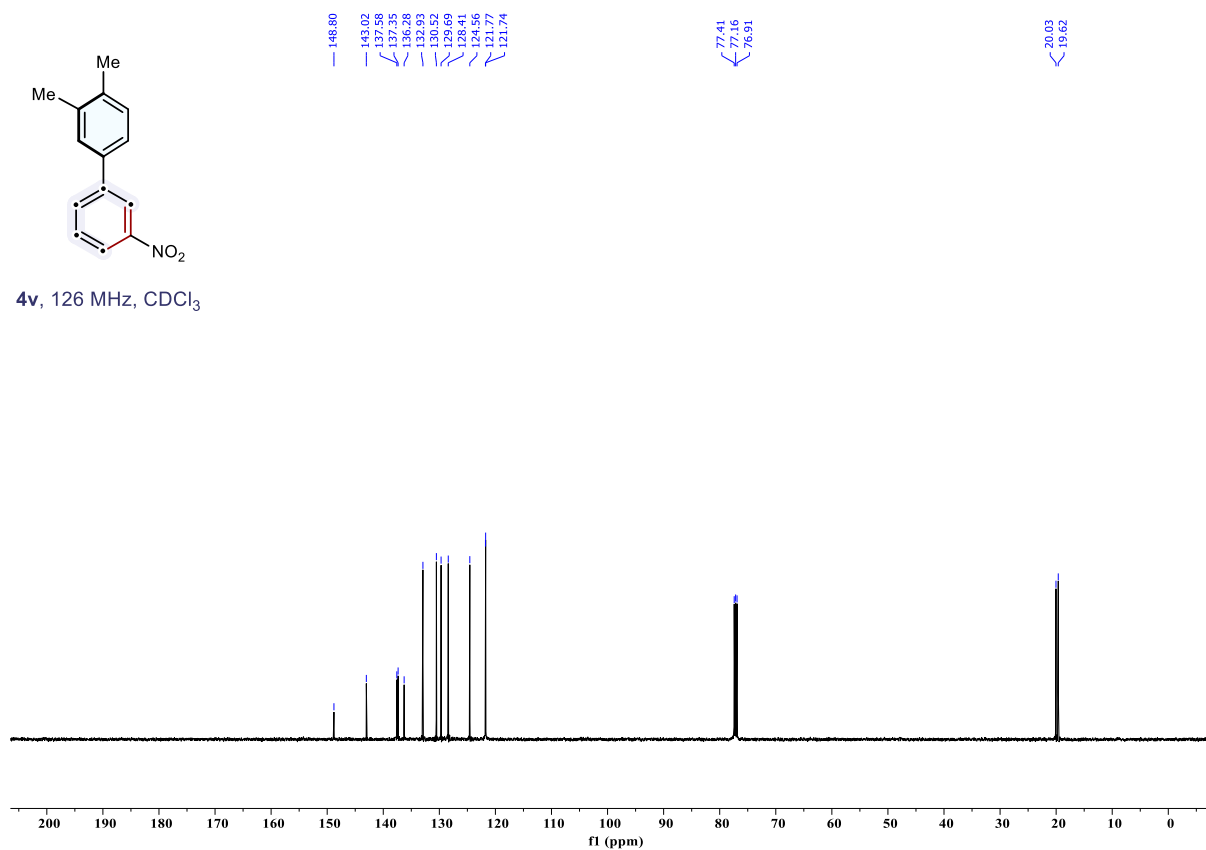
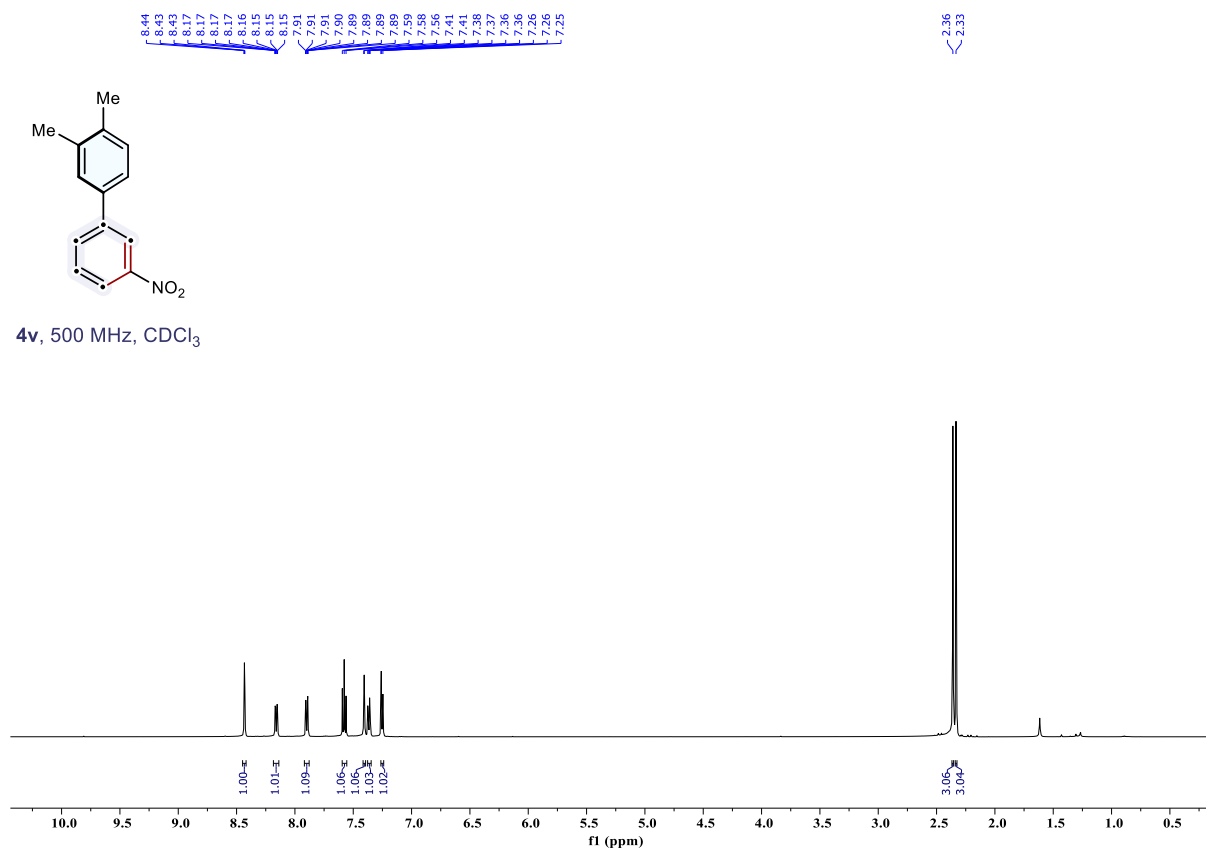


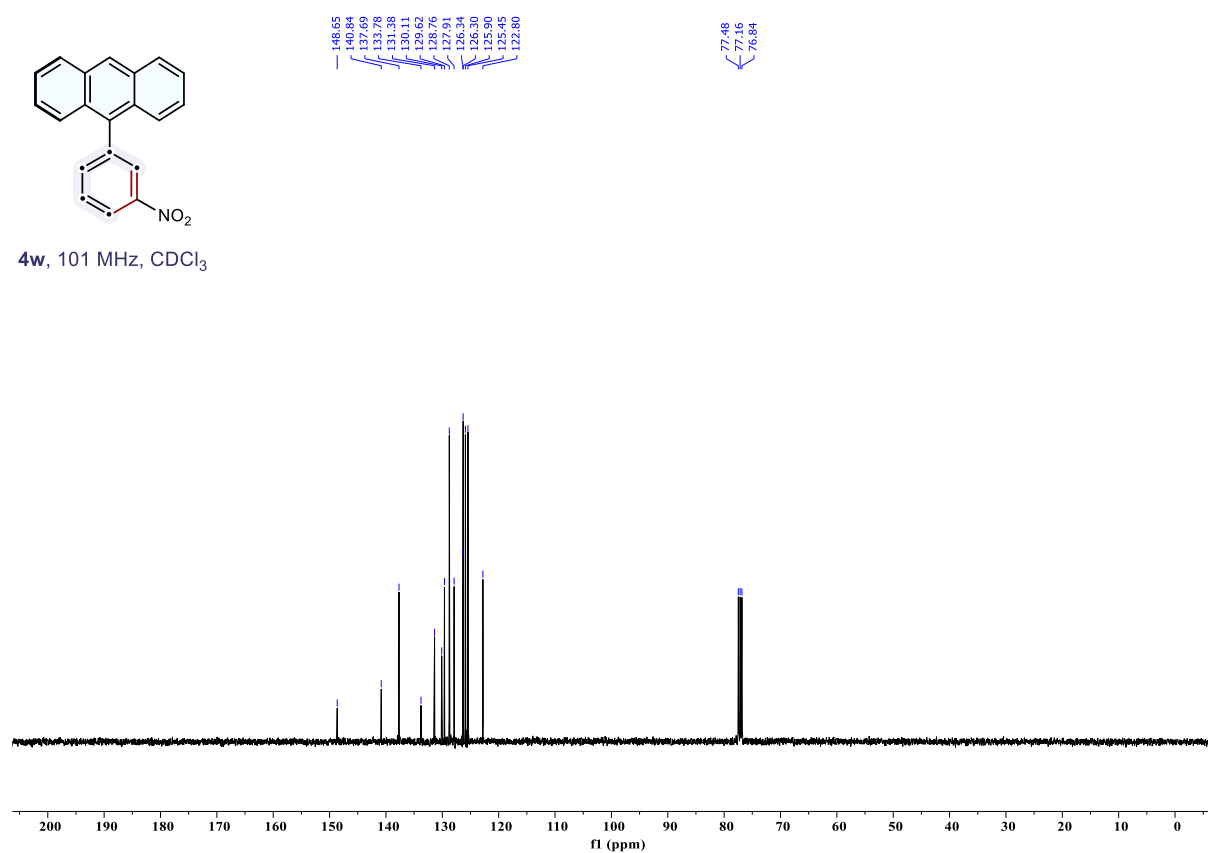
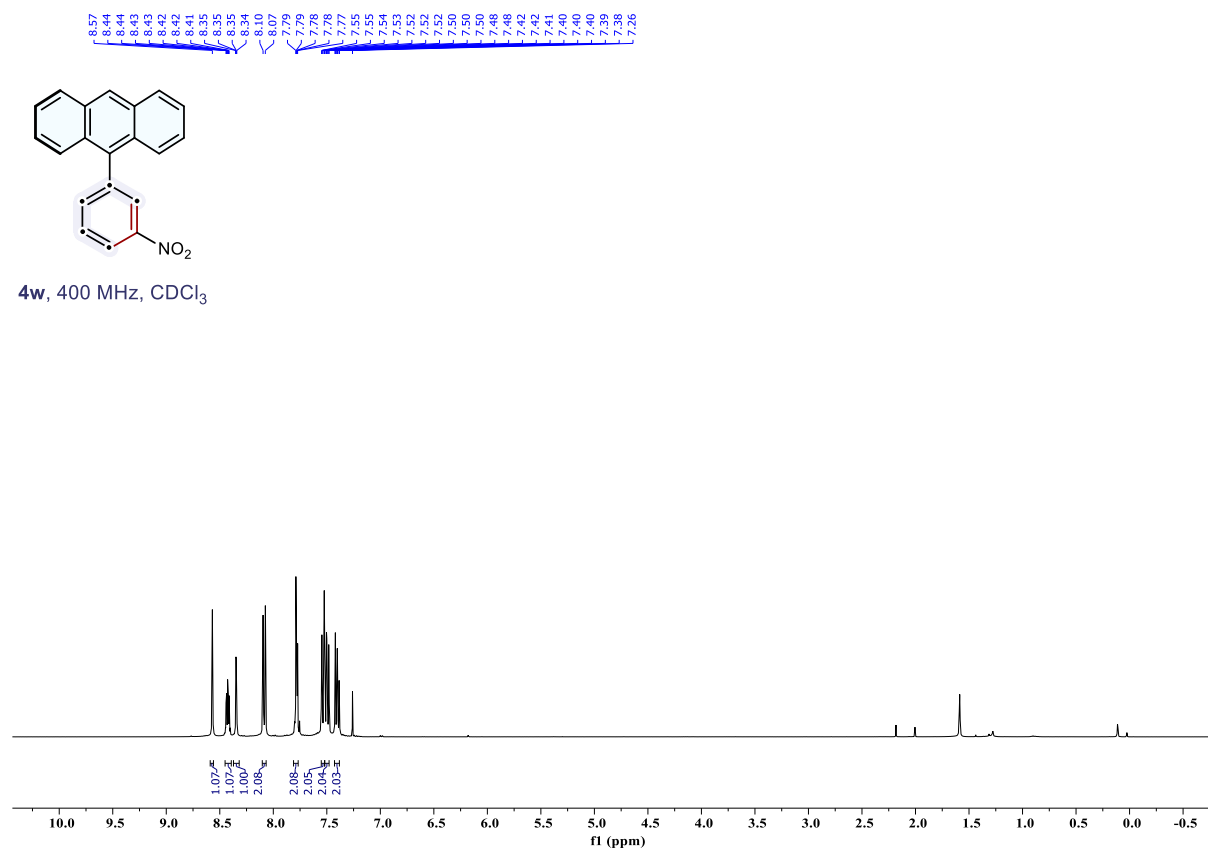
4s, 376 MHz, CDCl₃

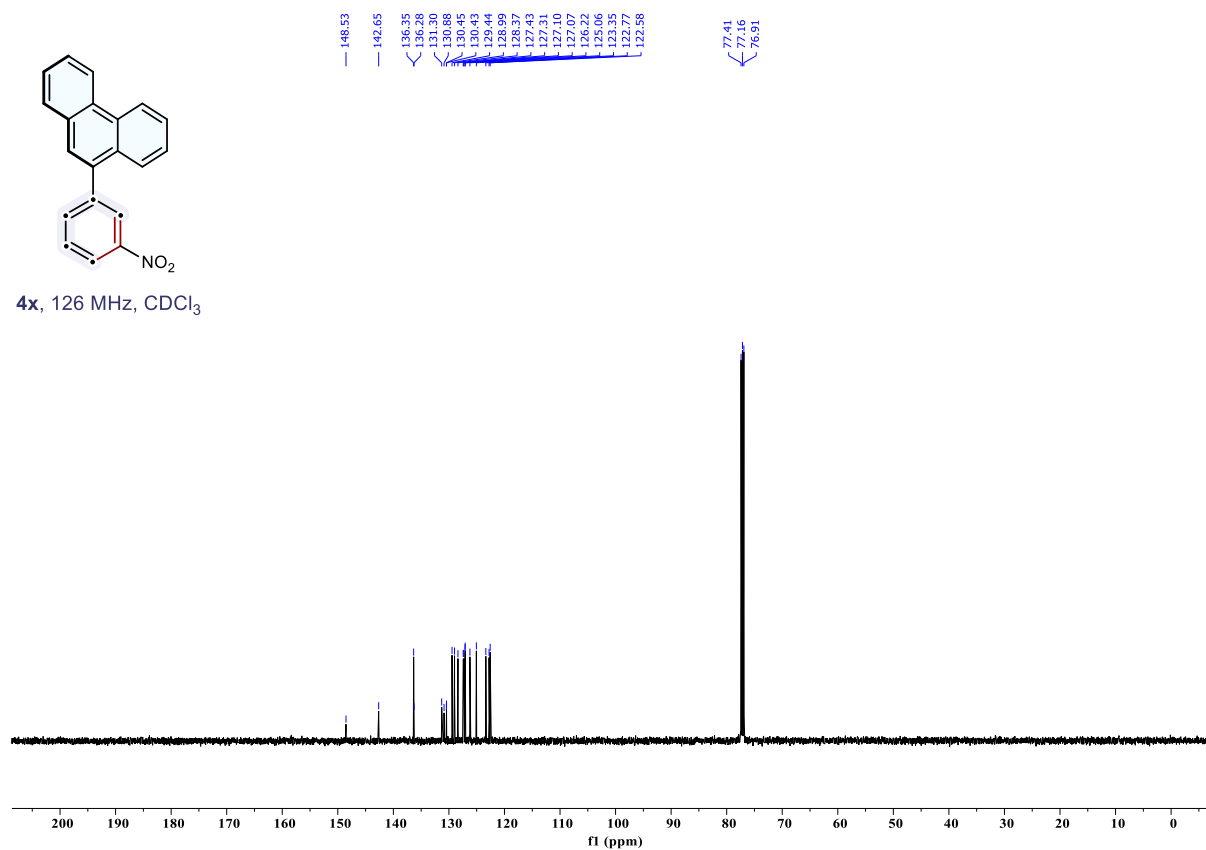
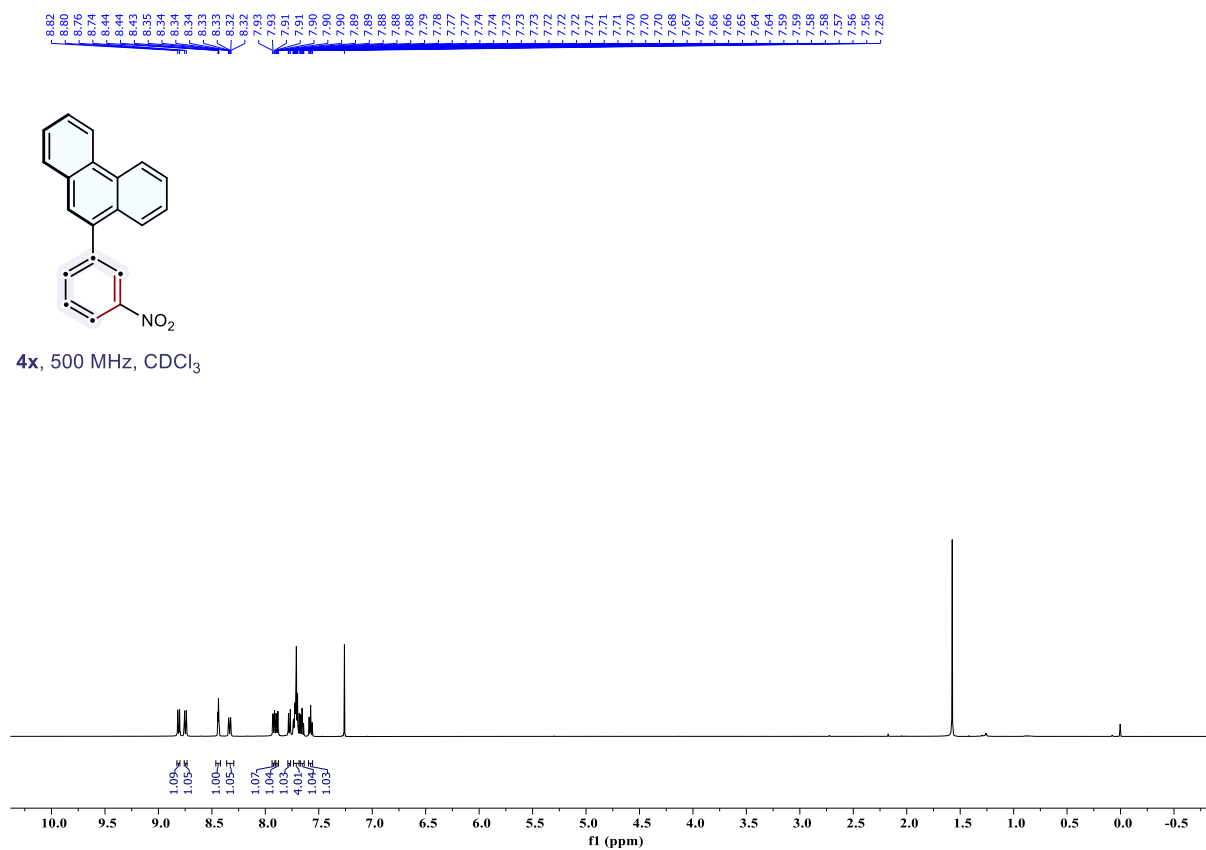




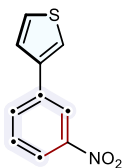




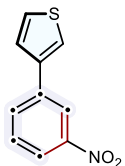
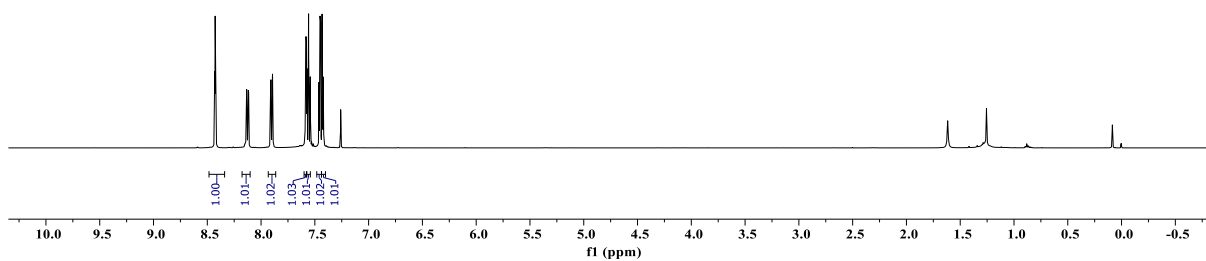




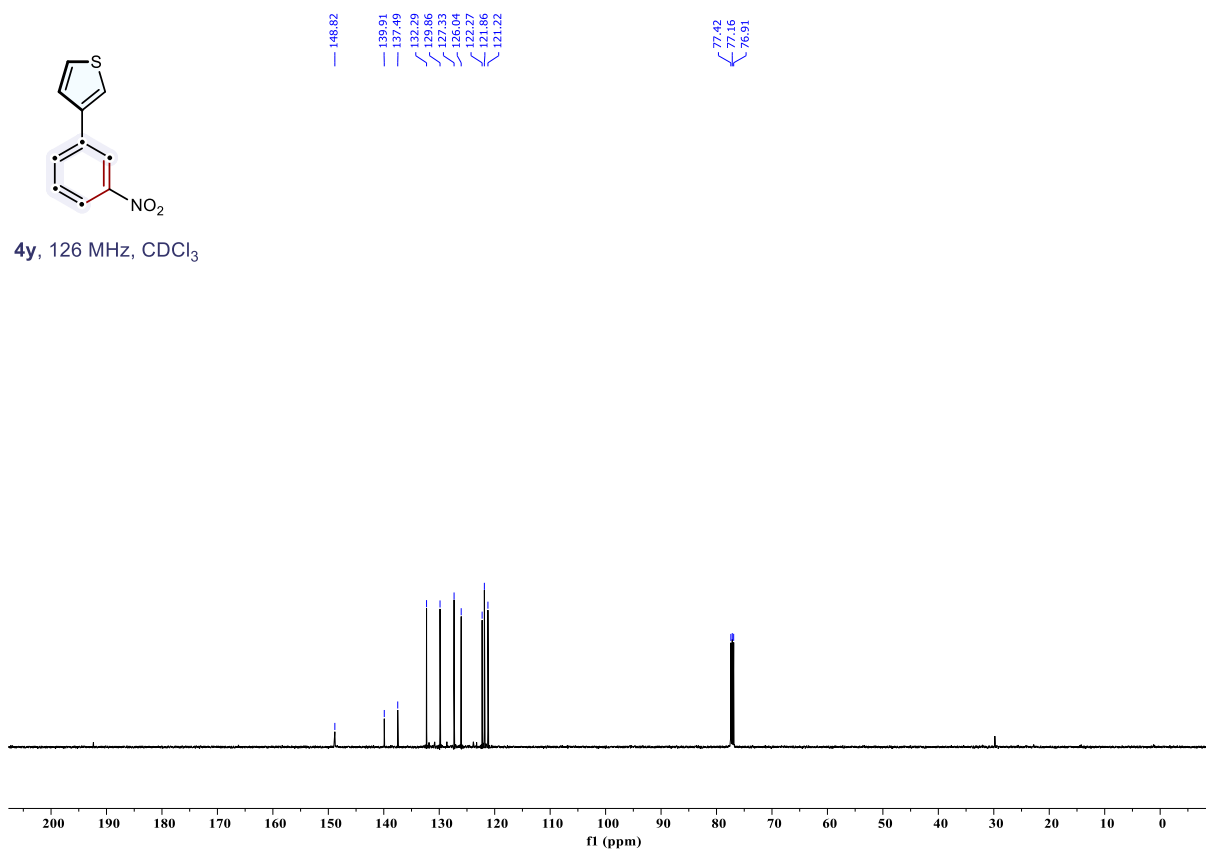
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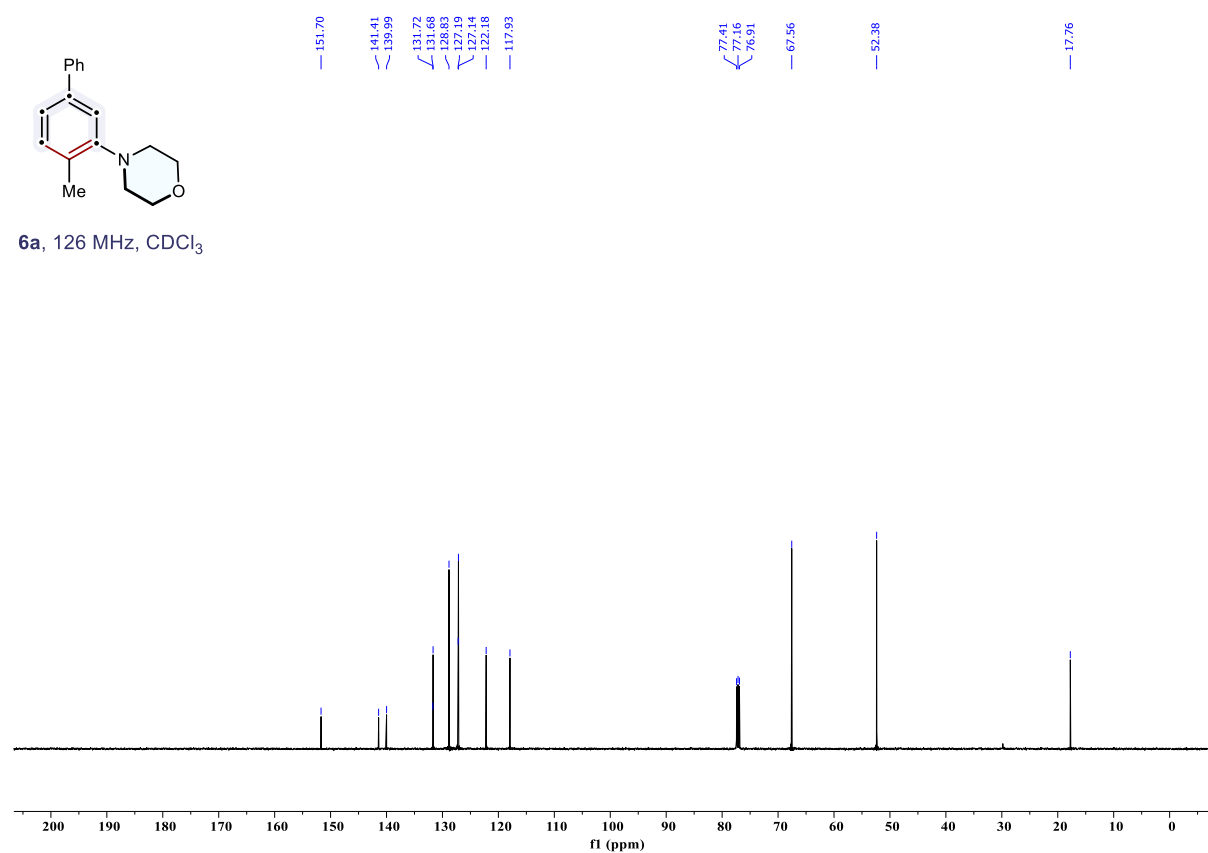
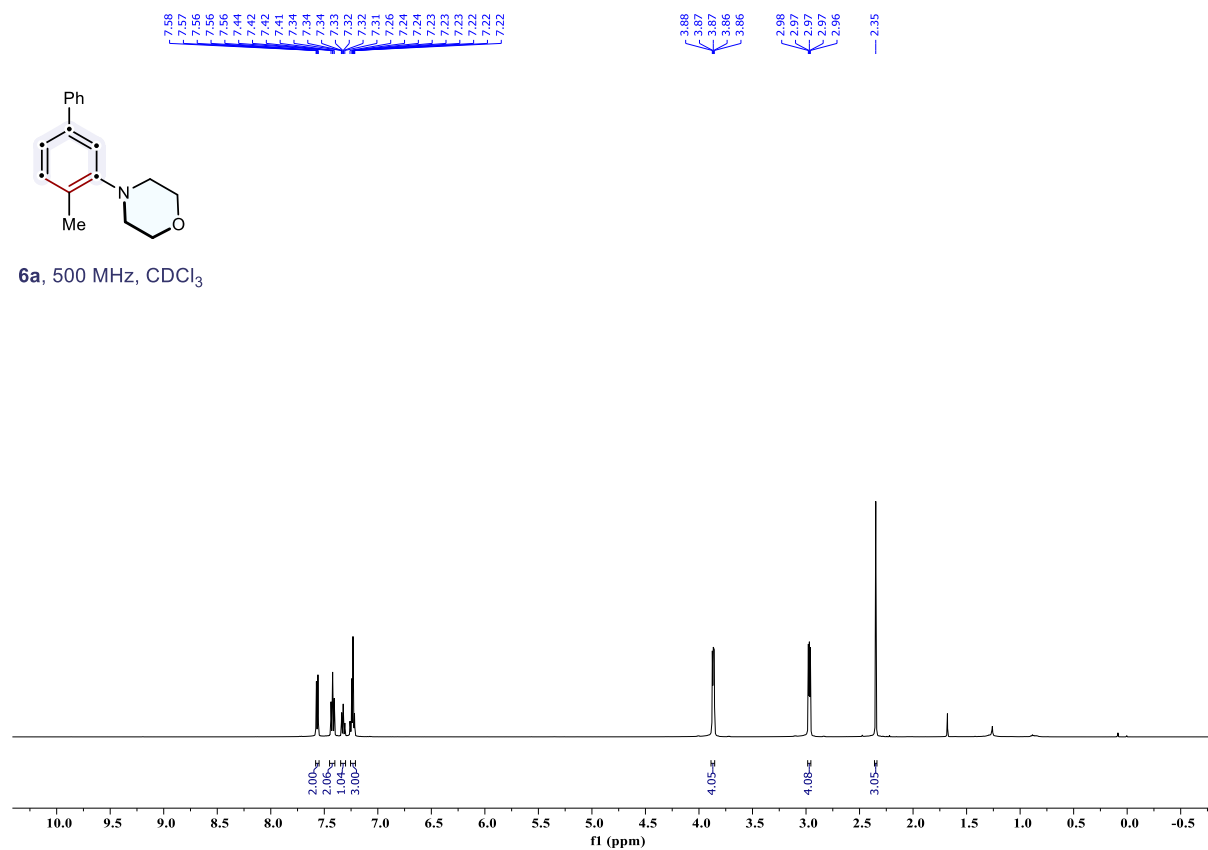


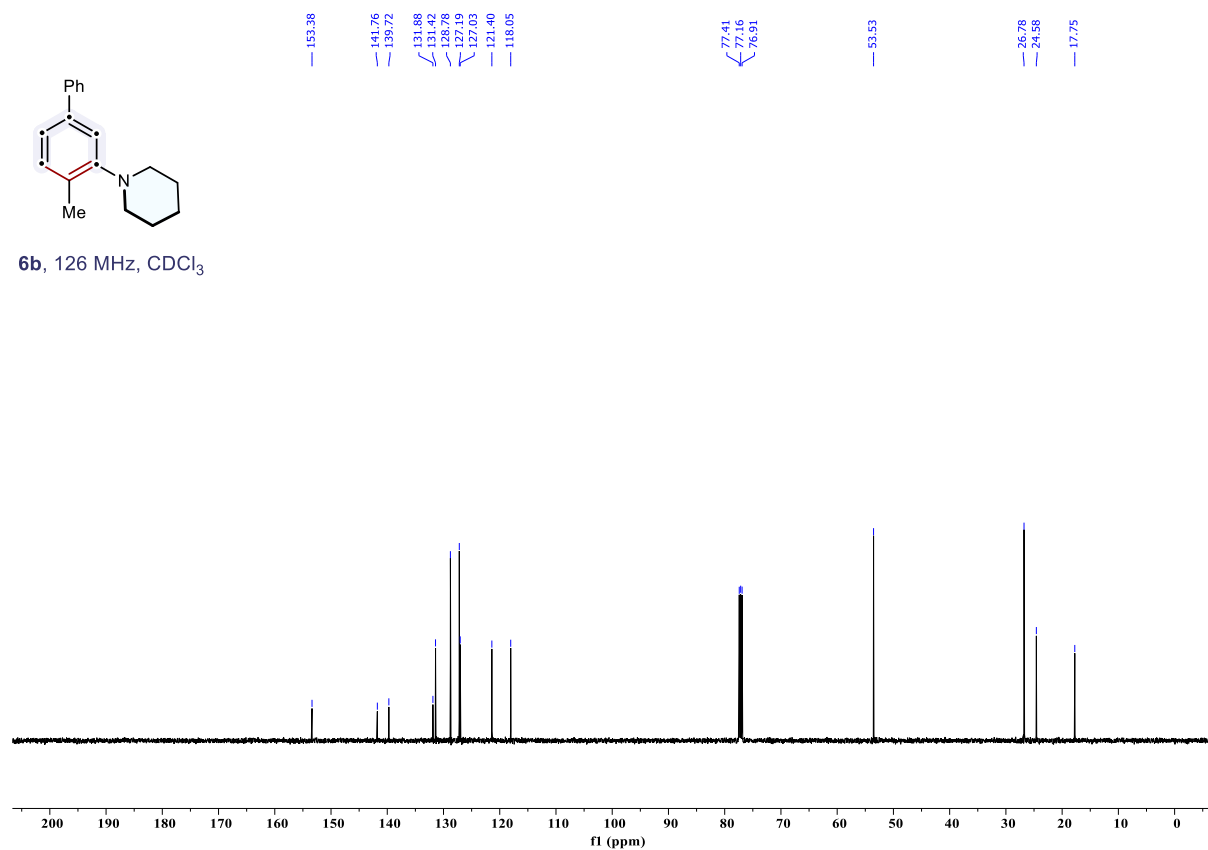
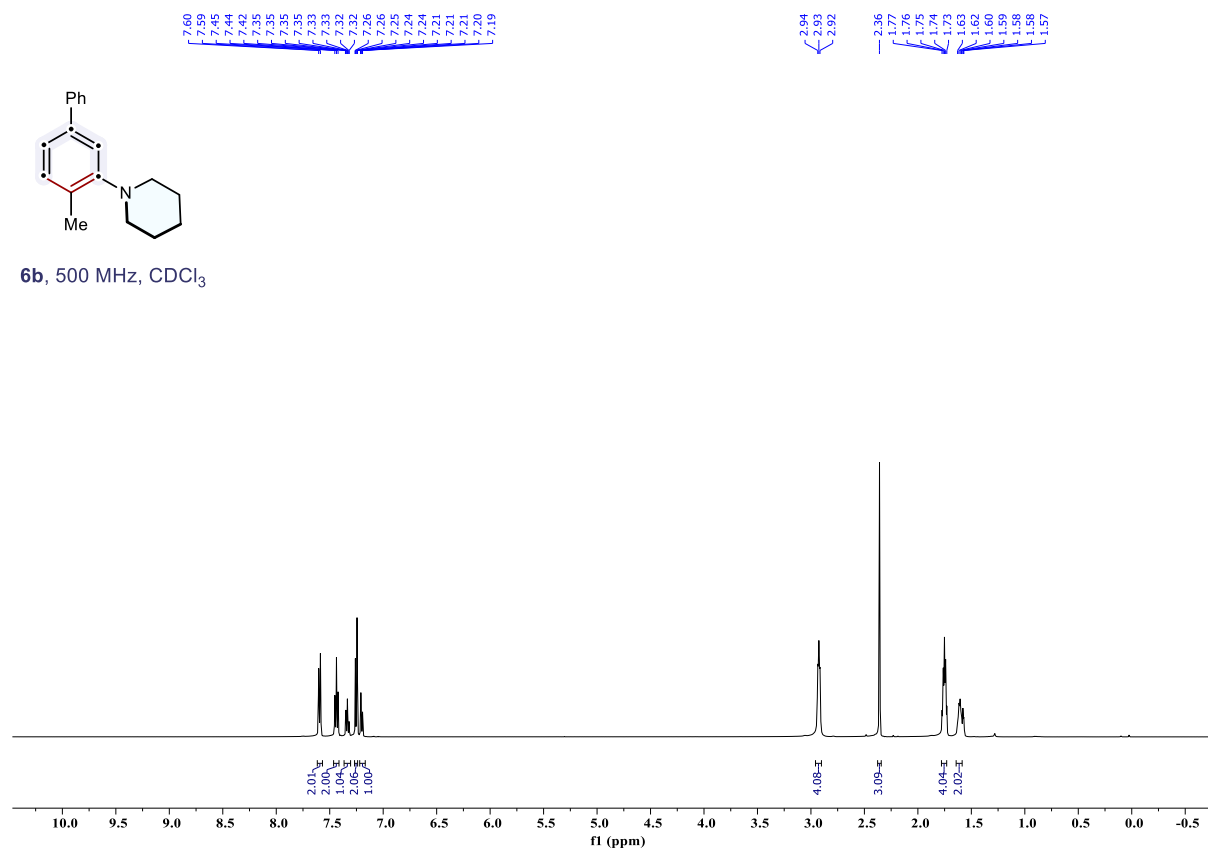
4y, 500 MHz, CDCl₃

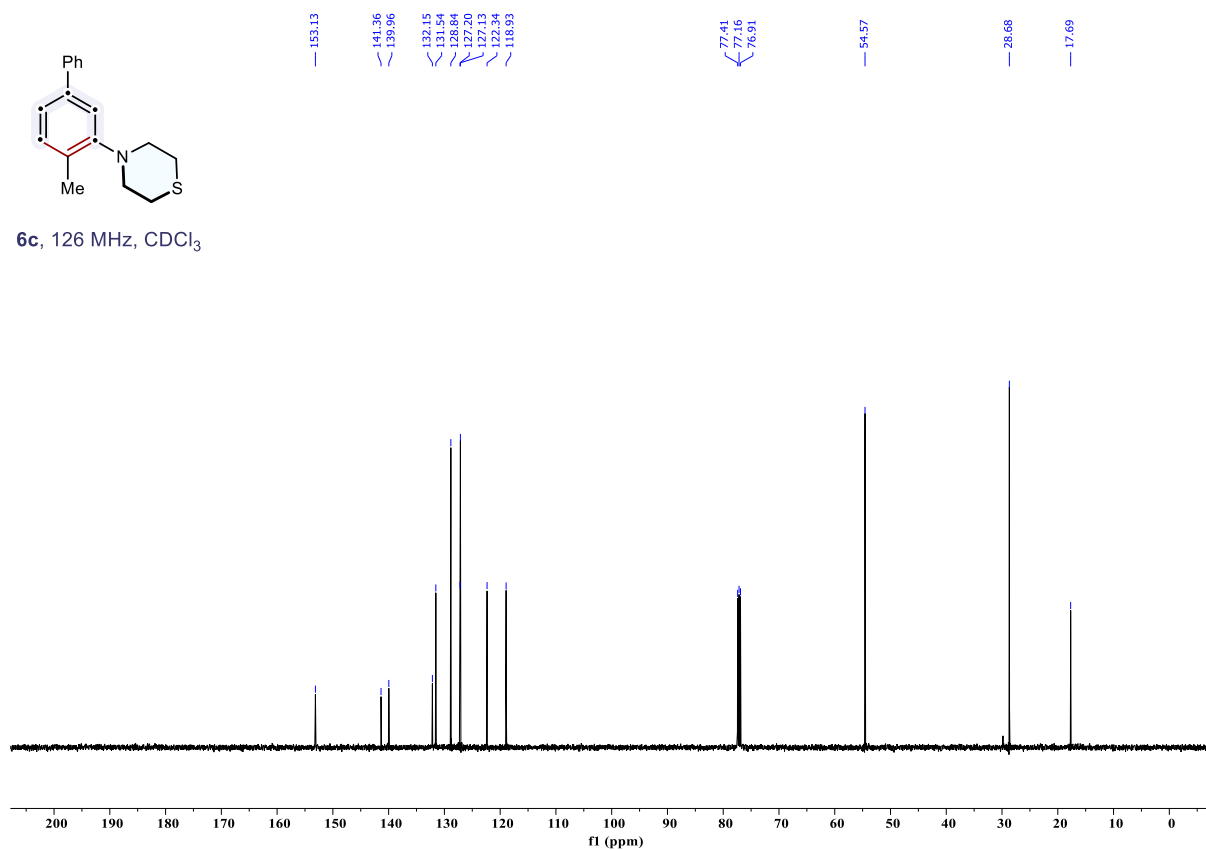
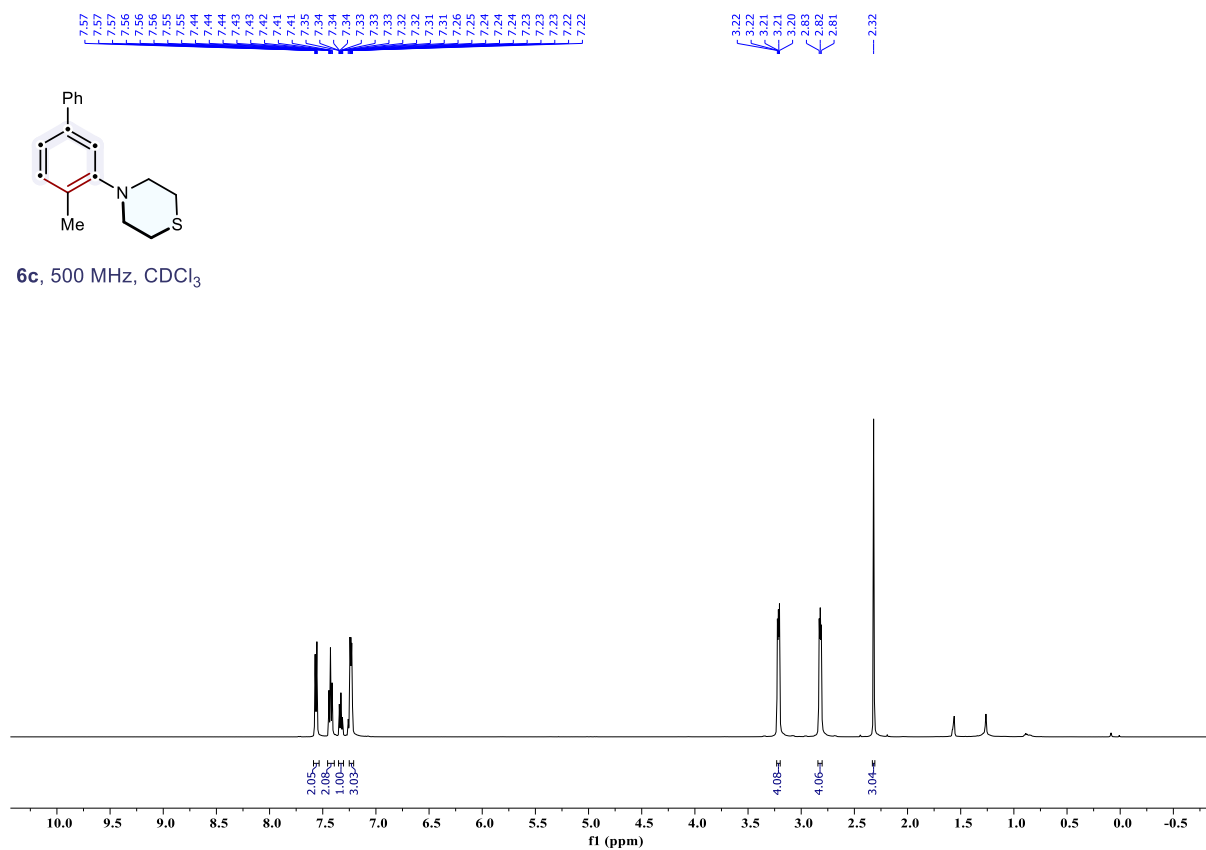


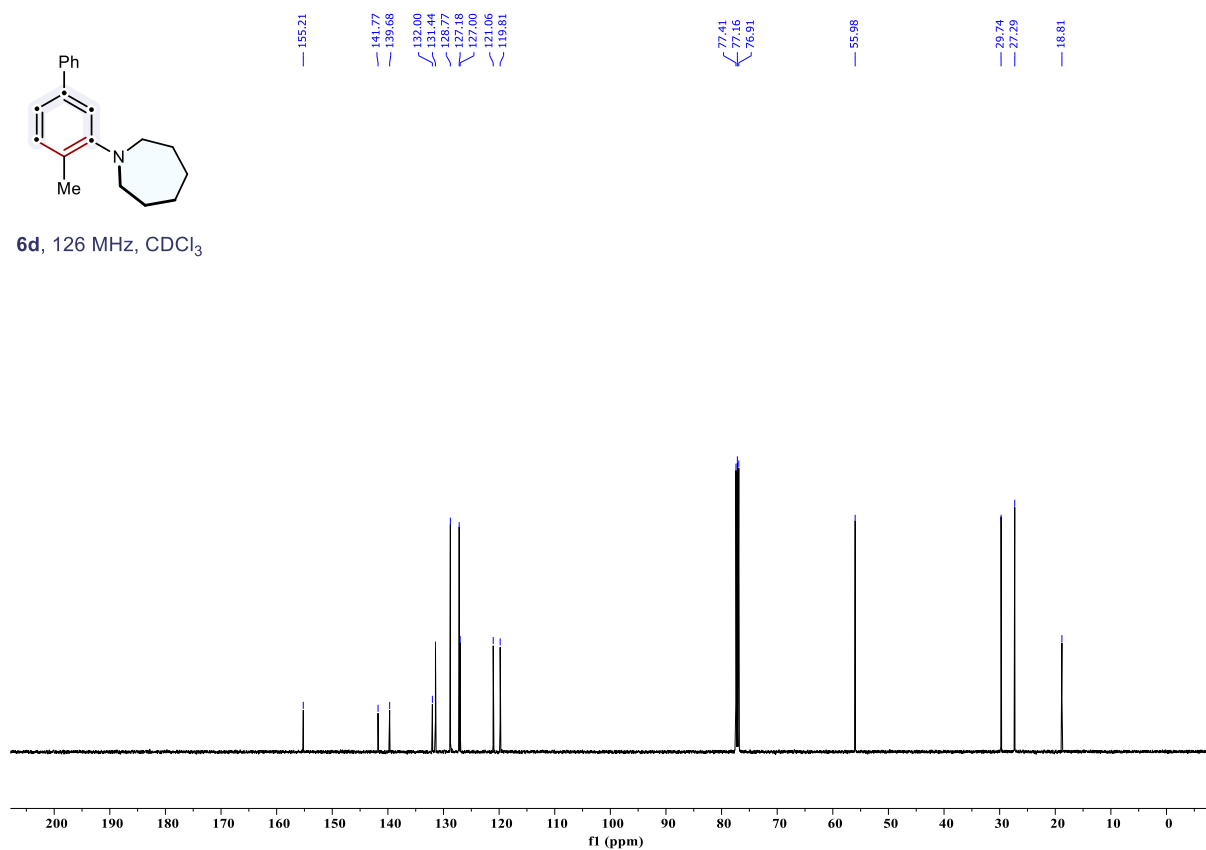
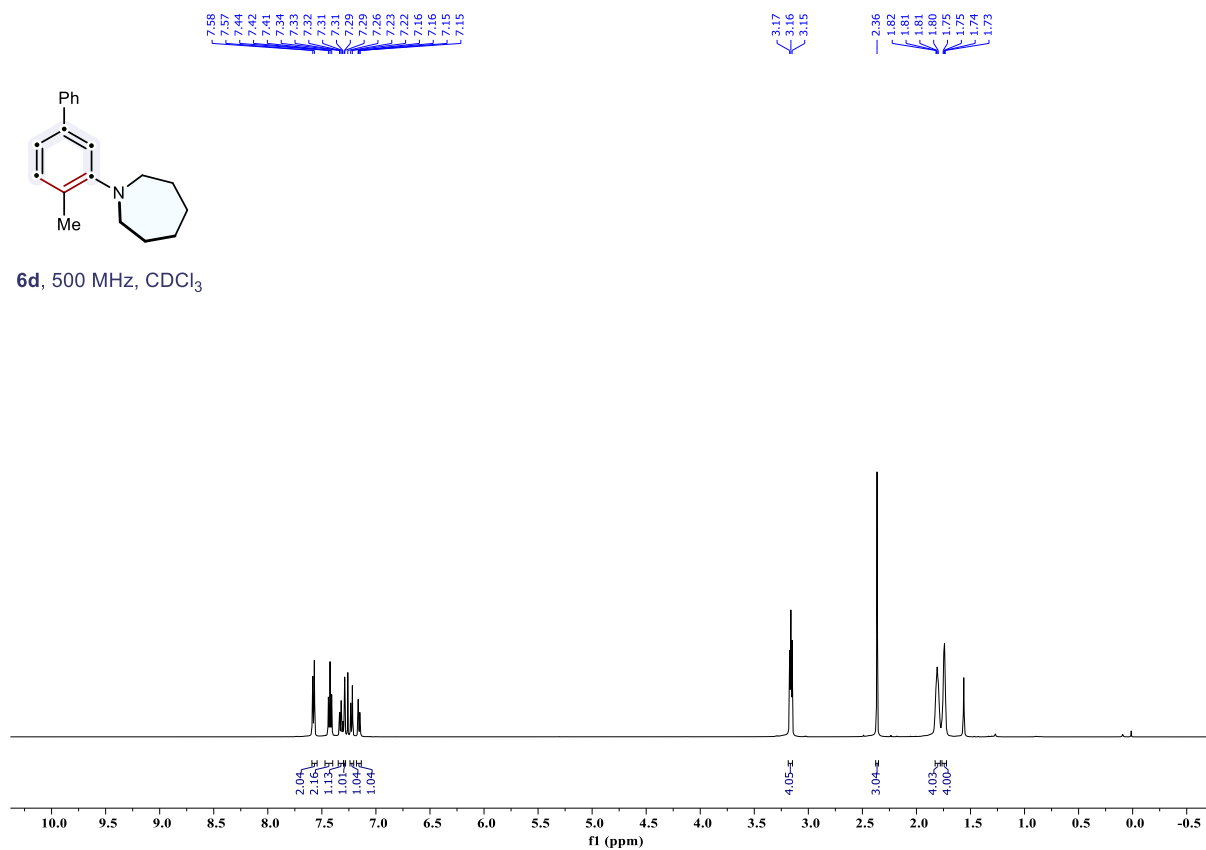
4y, 126 MHz, CDCl₃

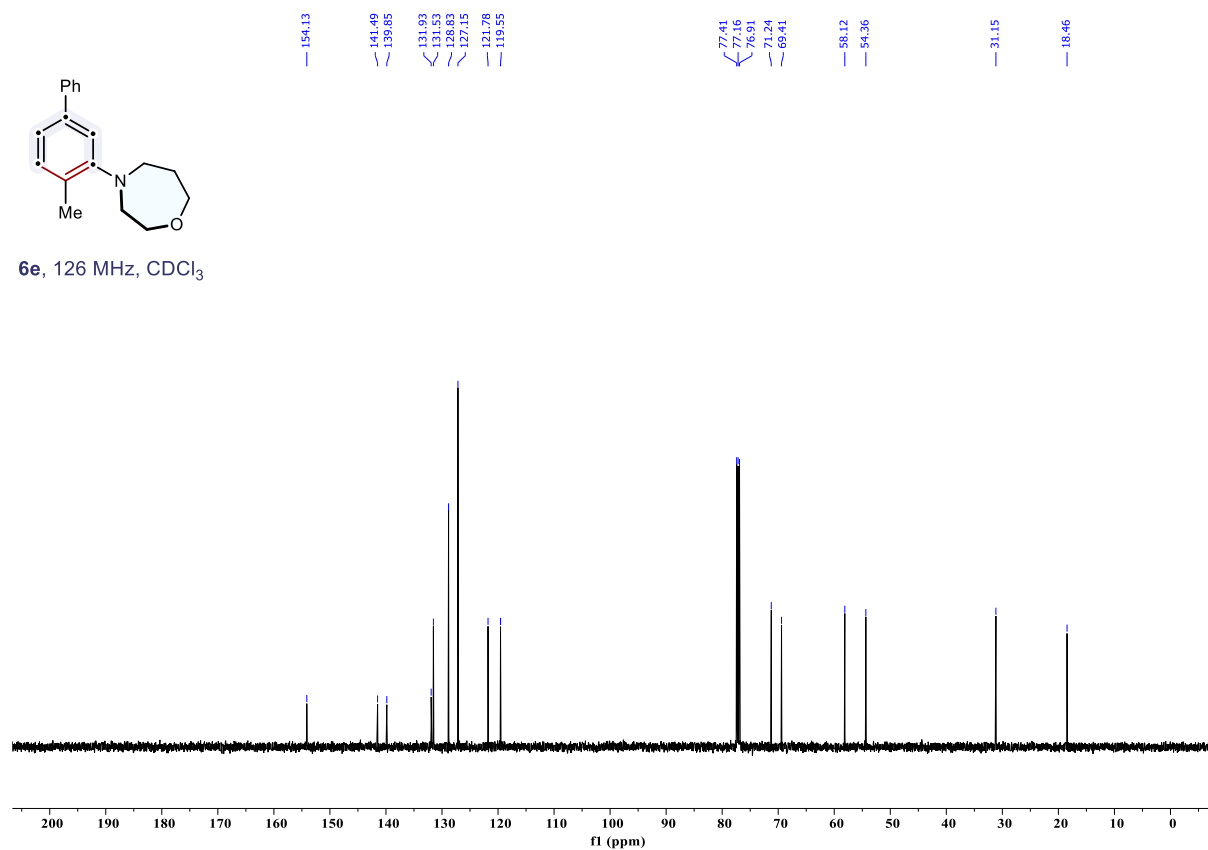
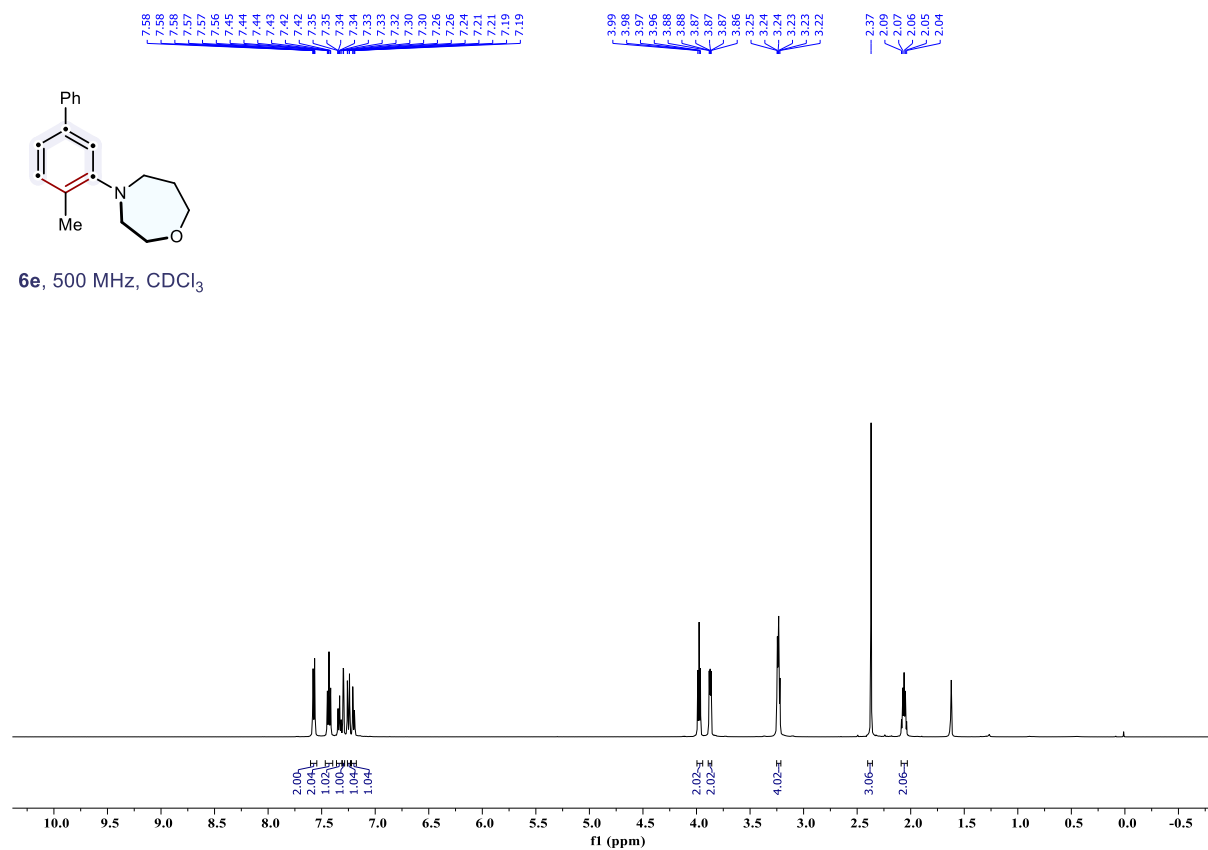


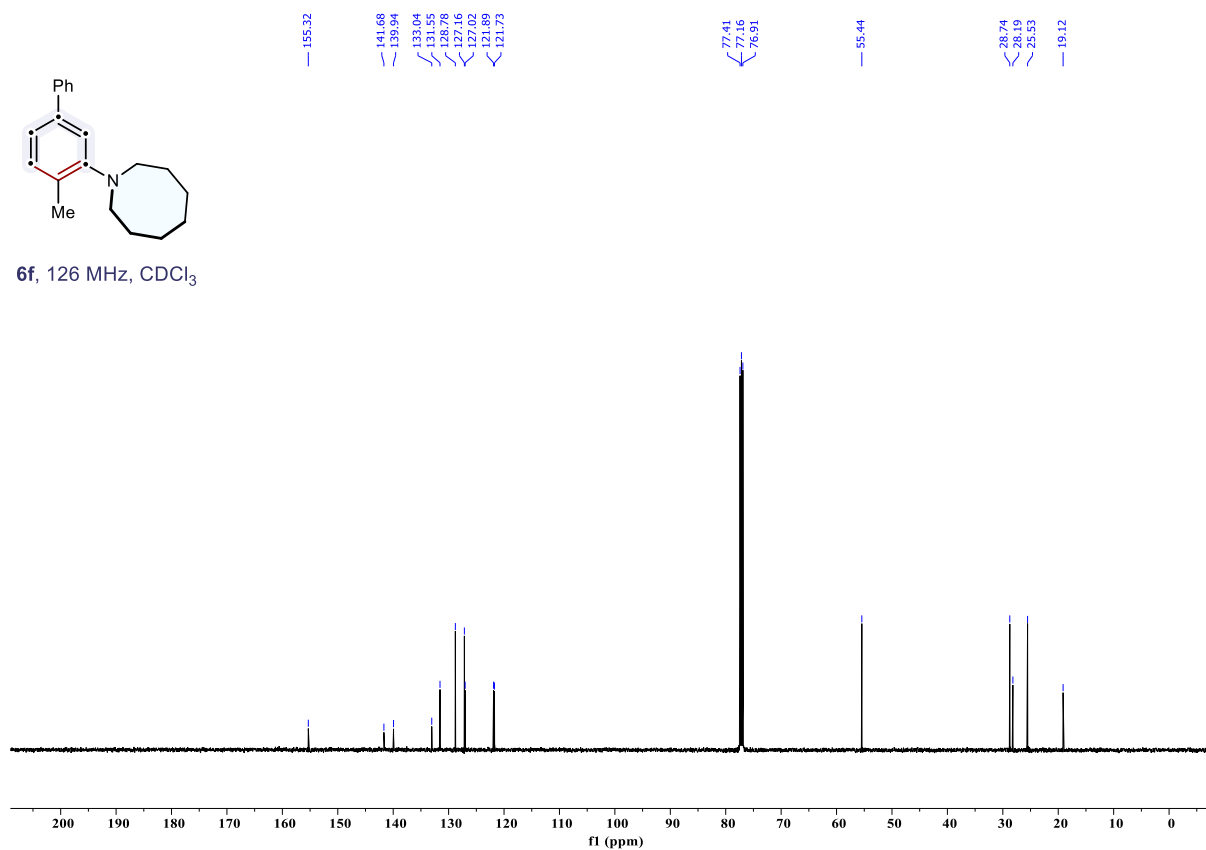
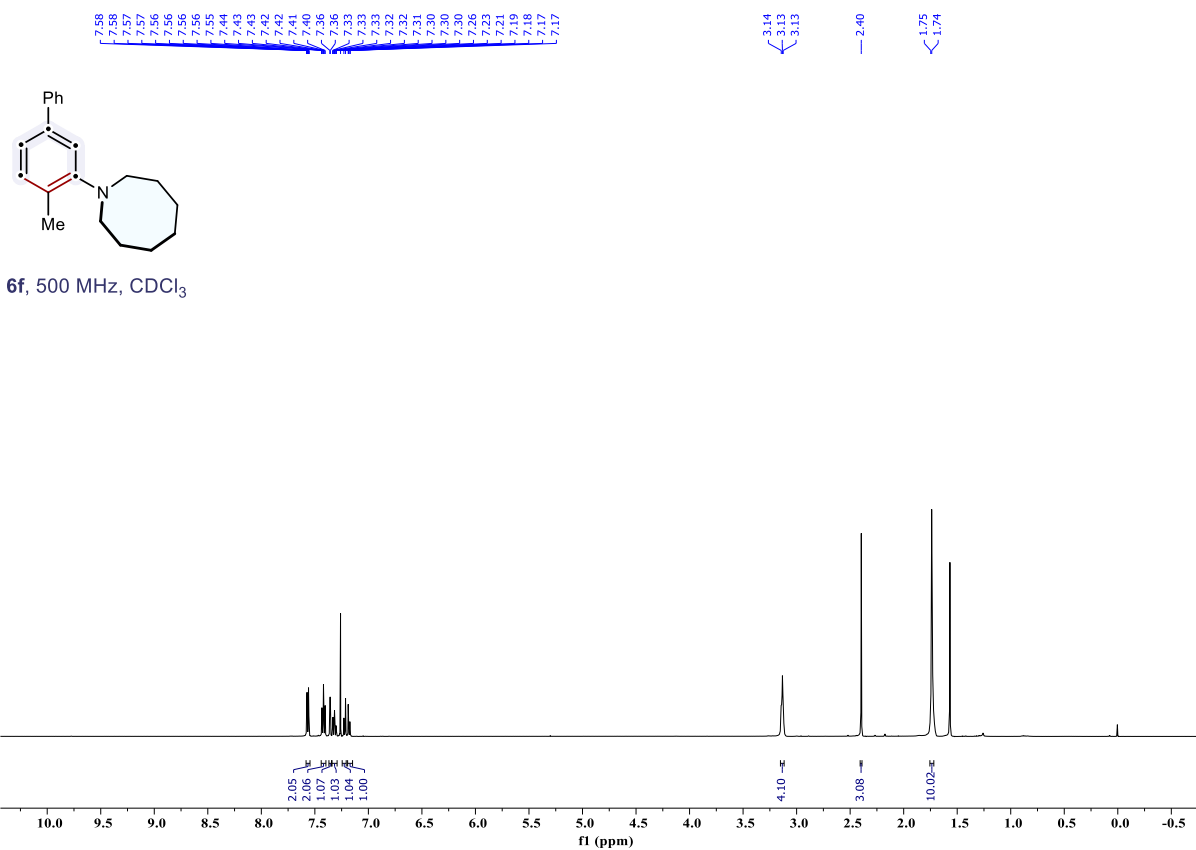










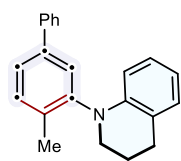


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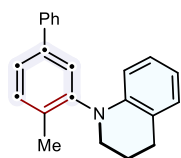
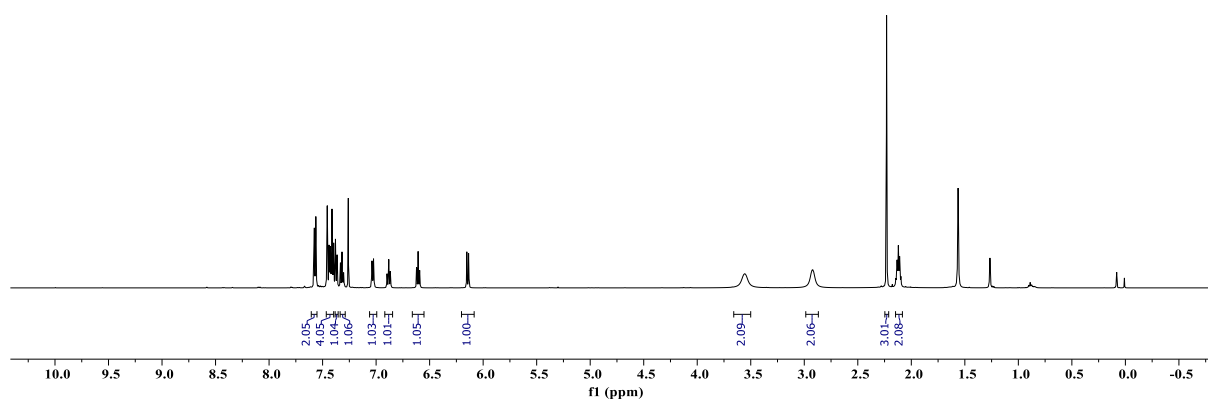
— 3.56

— 2.92

2.23
2.14
2.13
2.12
2.11
2.10



6g, 500 MHz, CDCl₃



6g, 101 MHz, CDCl₃

146.54
145.20
140.87
140.64
138.06
131.90
129.58
128.82
127.32
127.26
127.00
126.94
125.06
121.88
116.82
113.25

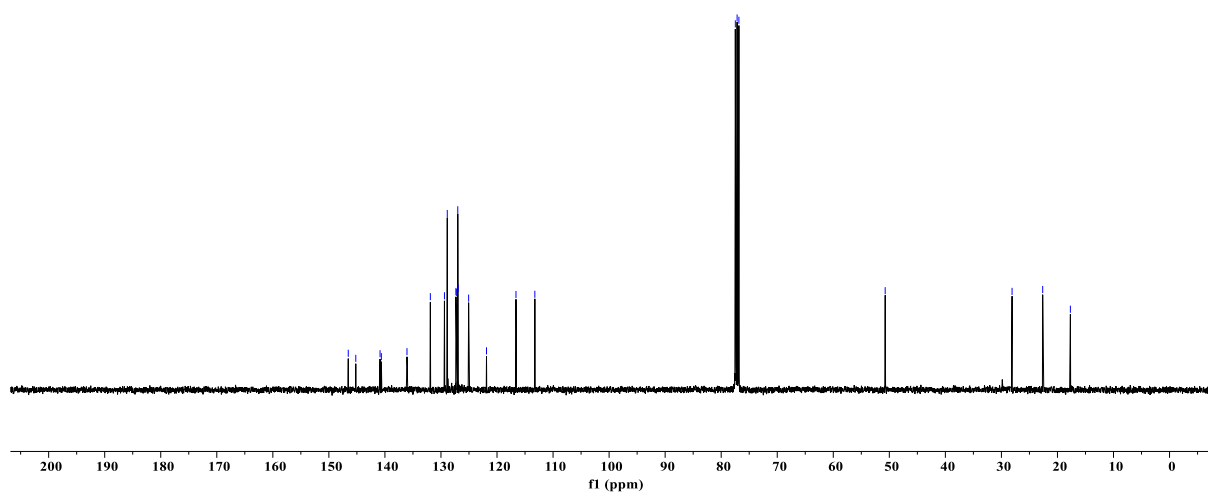
77.48
77.16
76.84

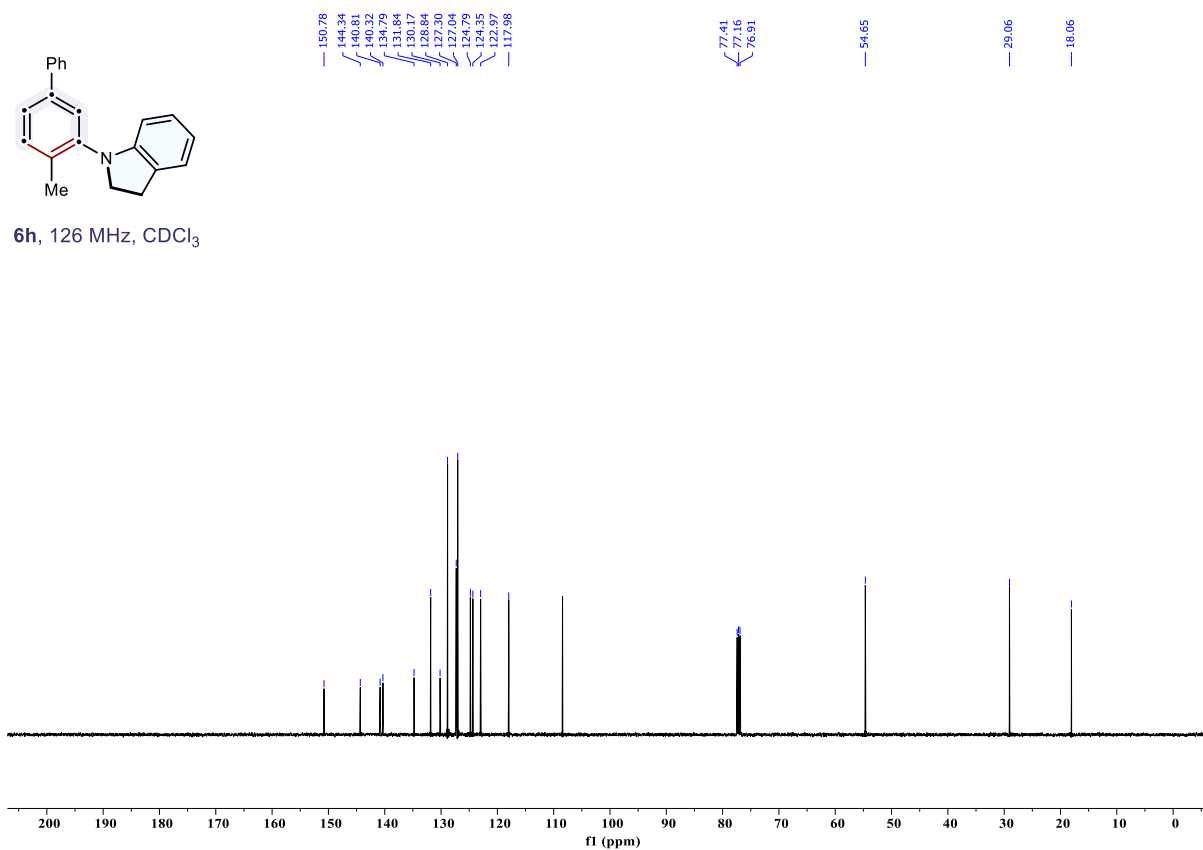
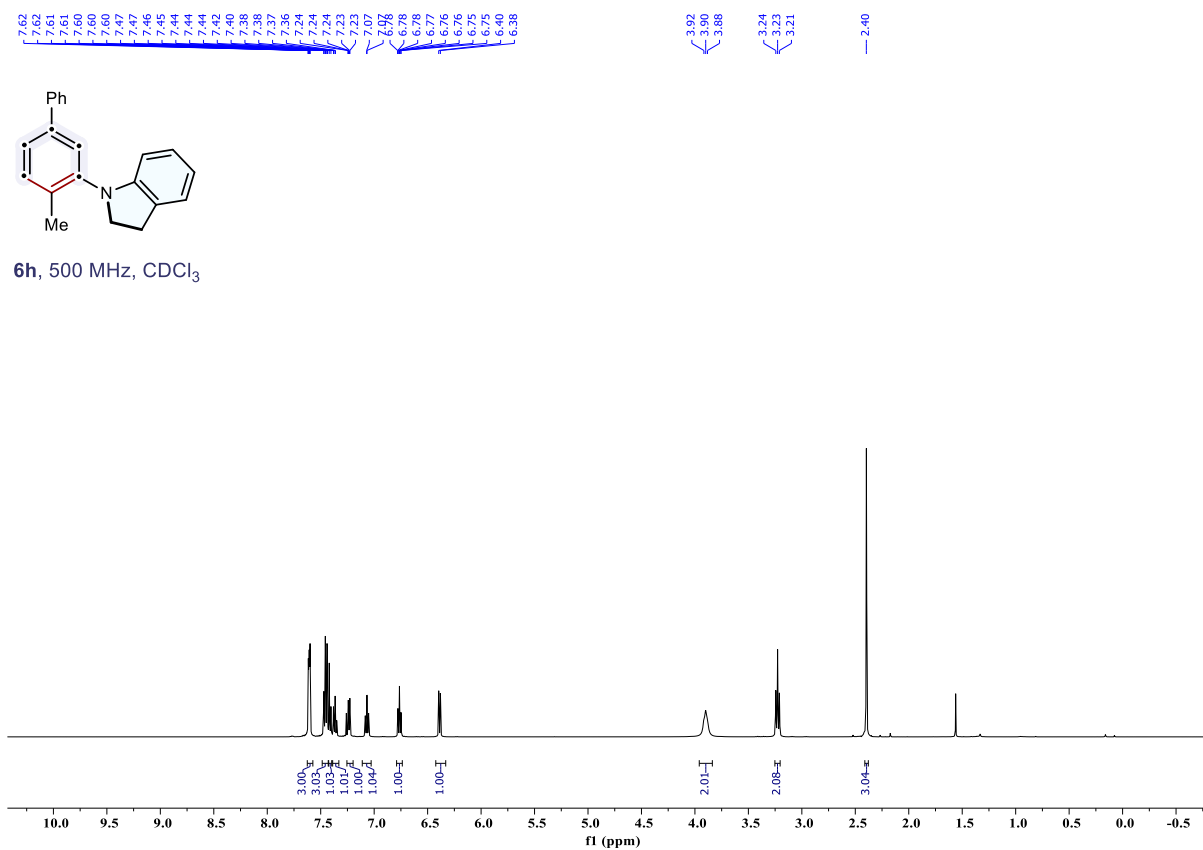
— 50.74

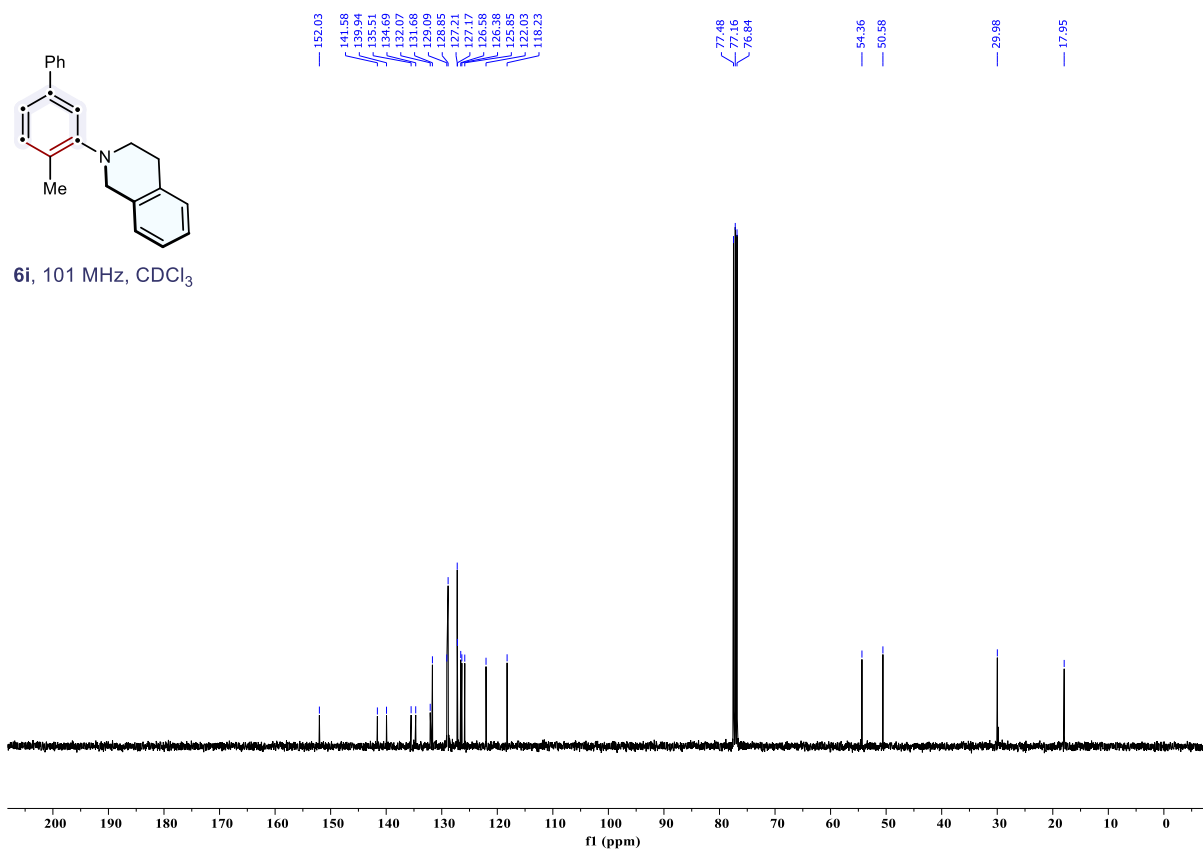
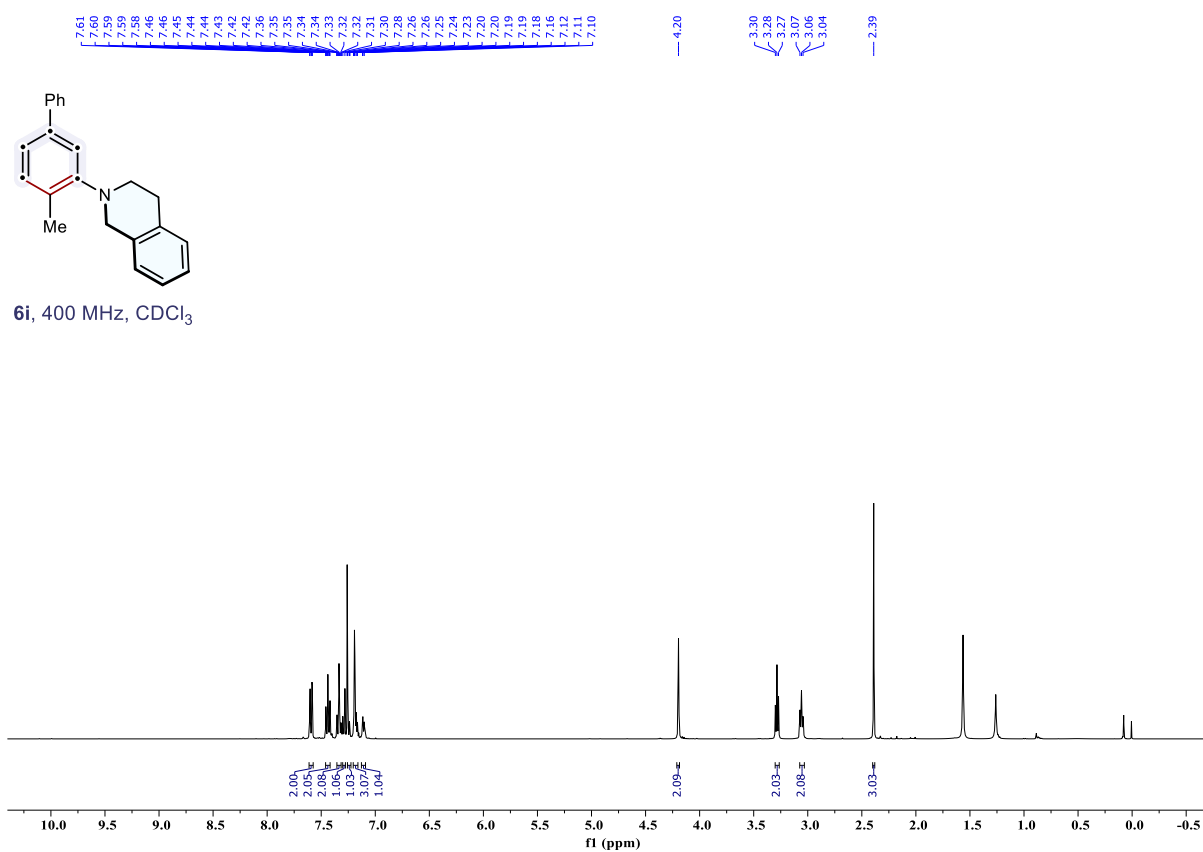
— 28.10

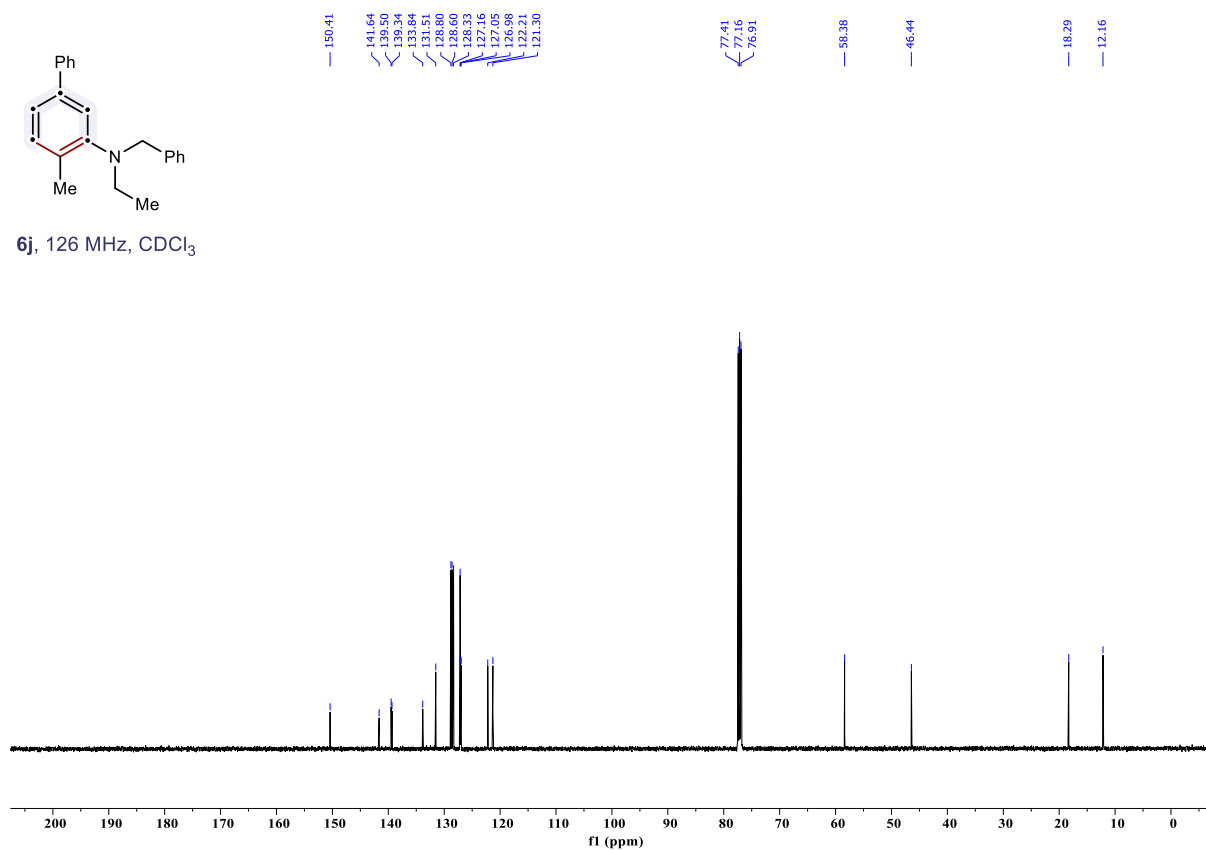
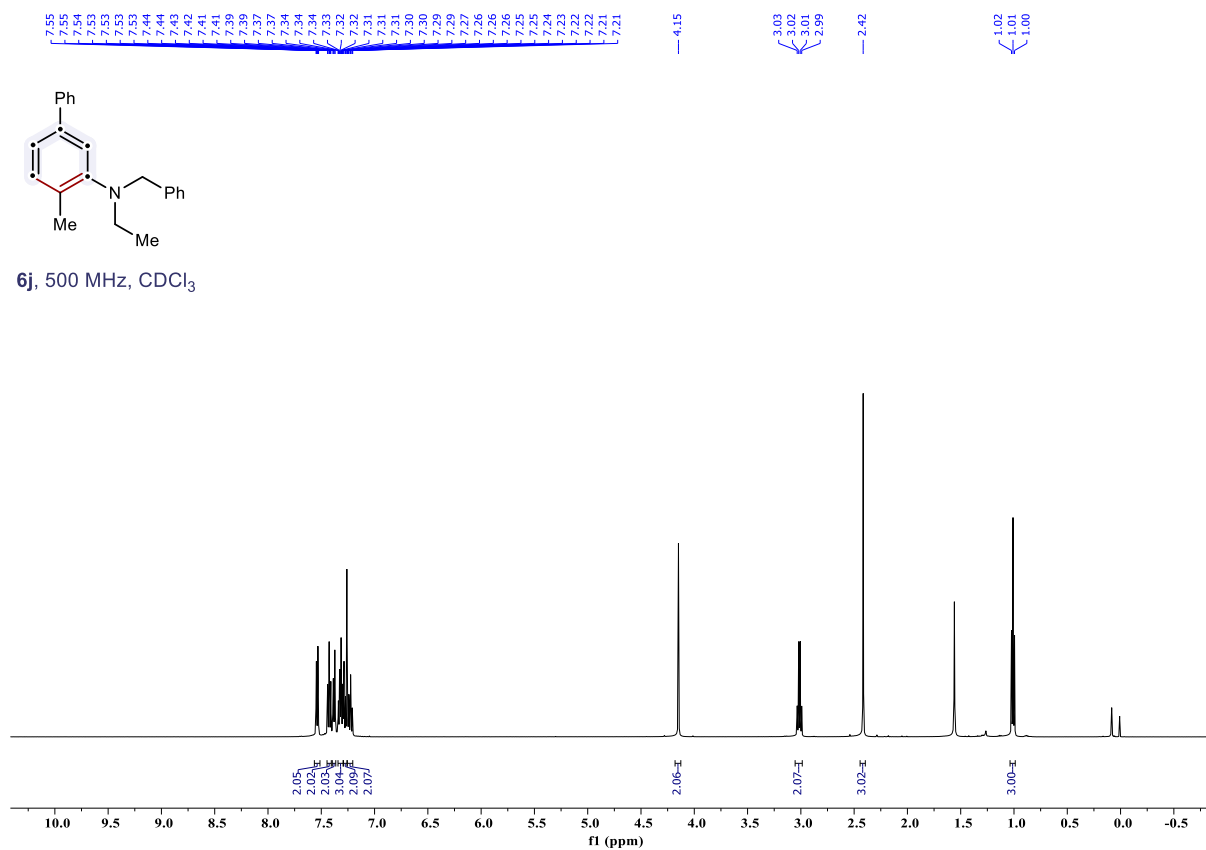
— 22.64

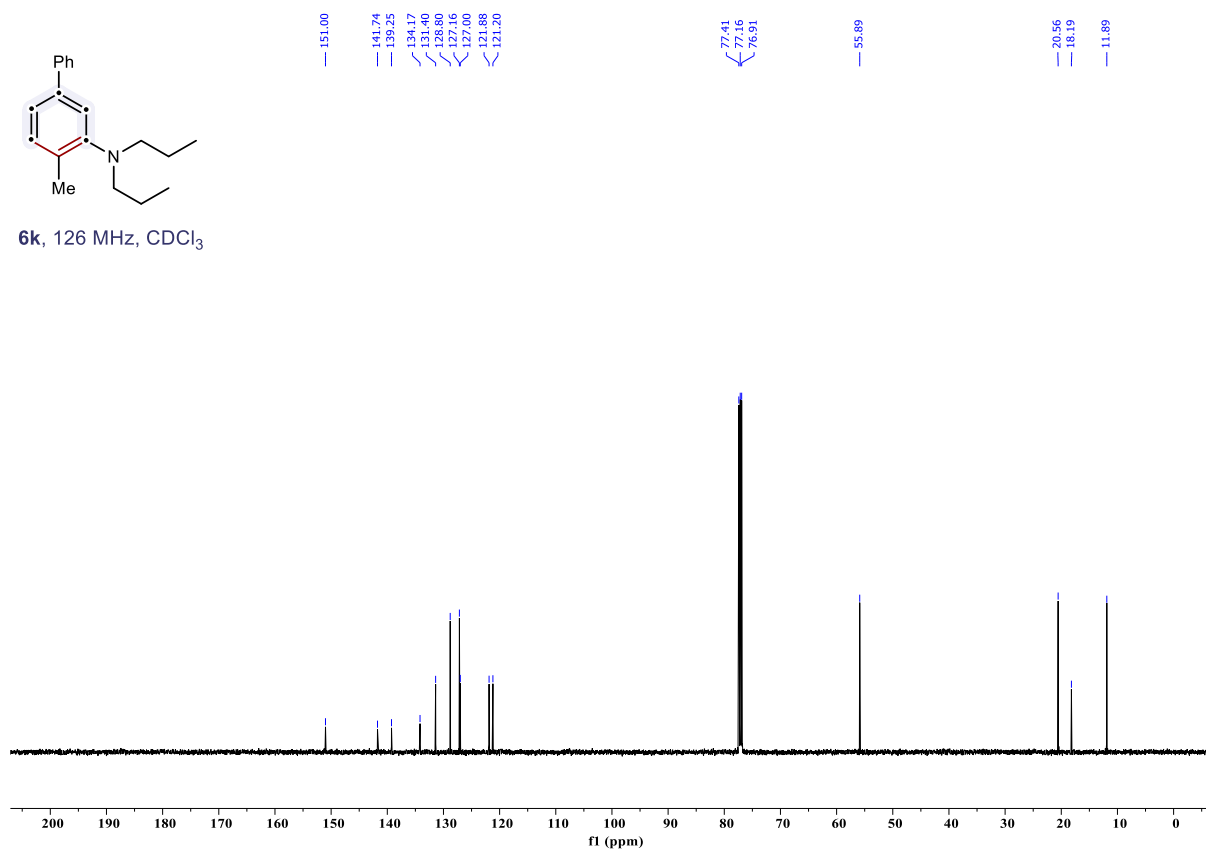
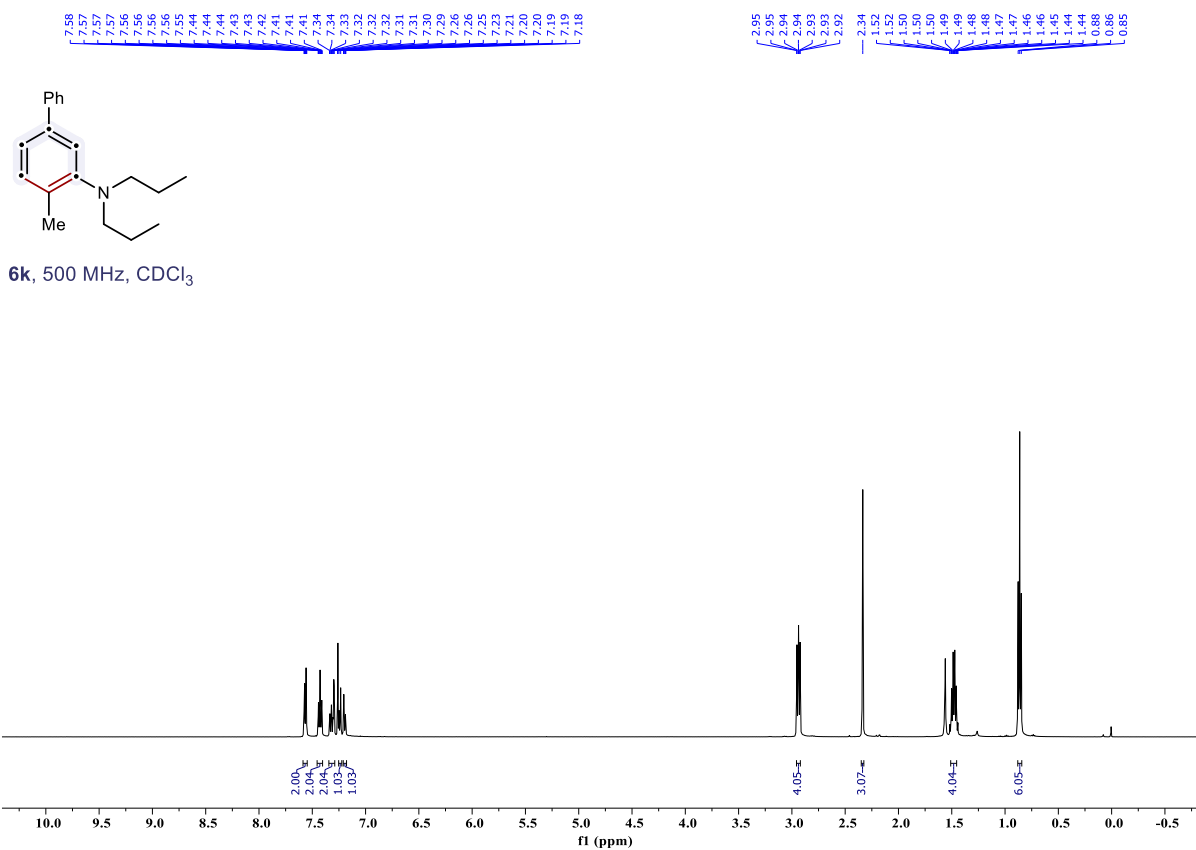
— 17.69

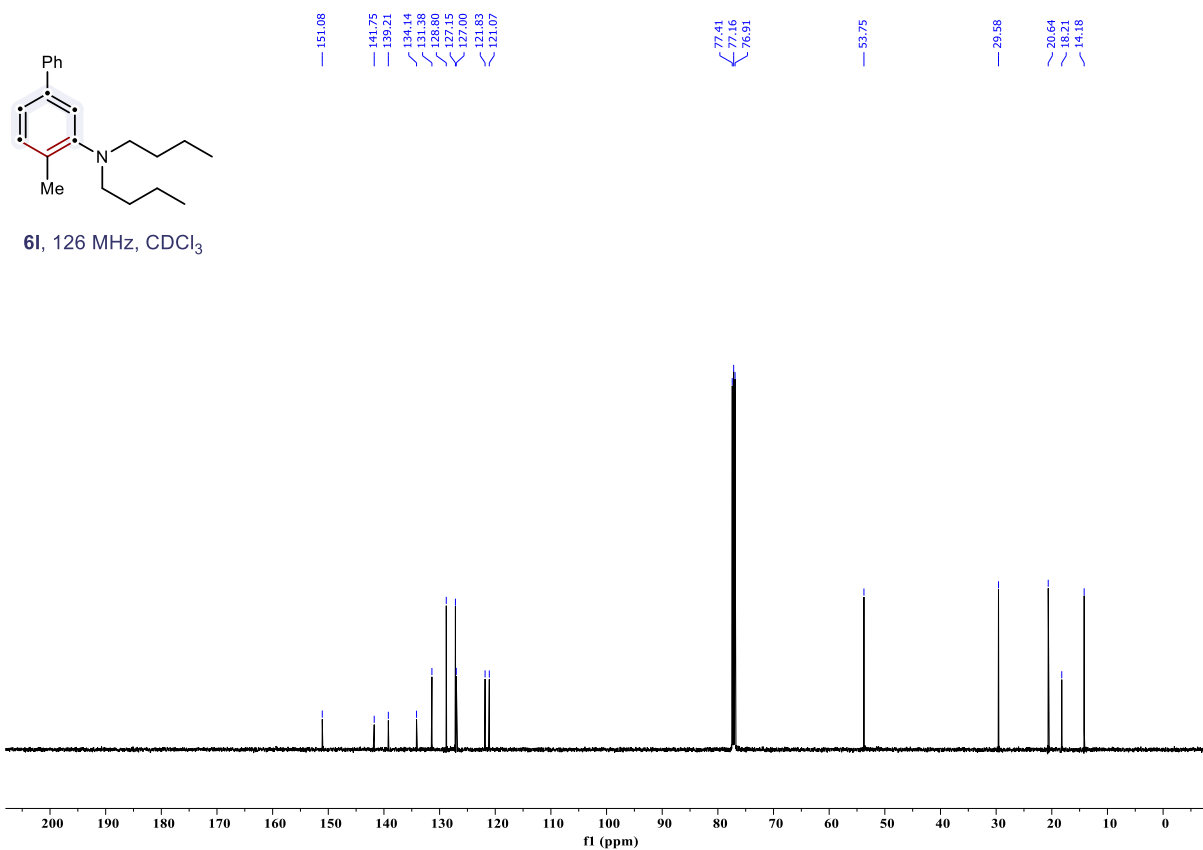
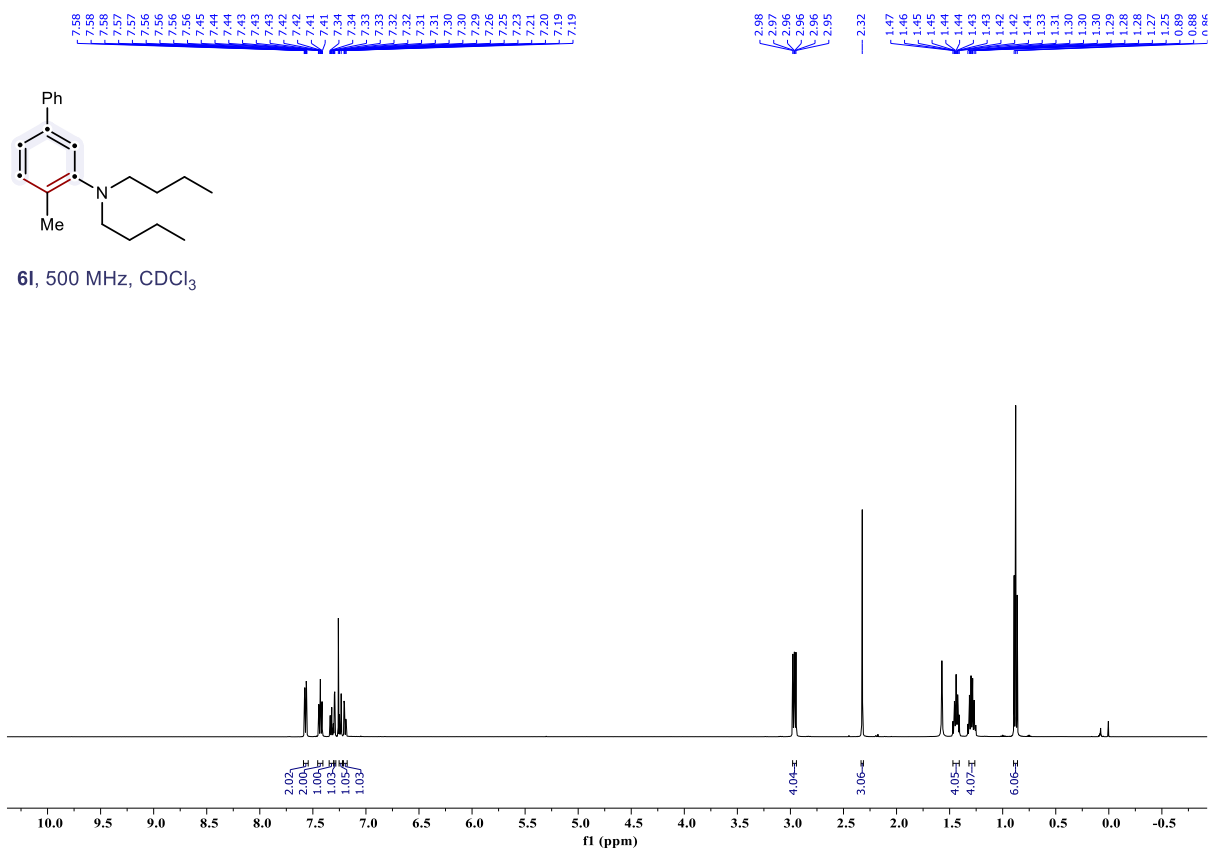


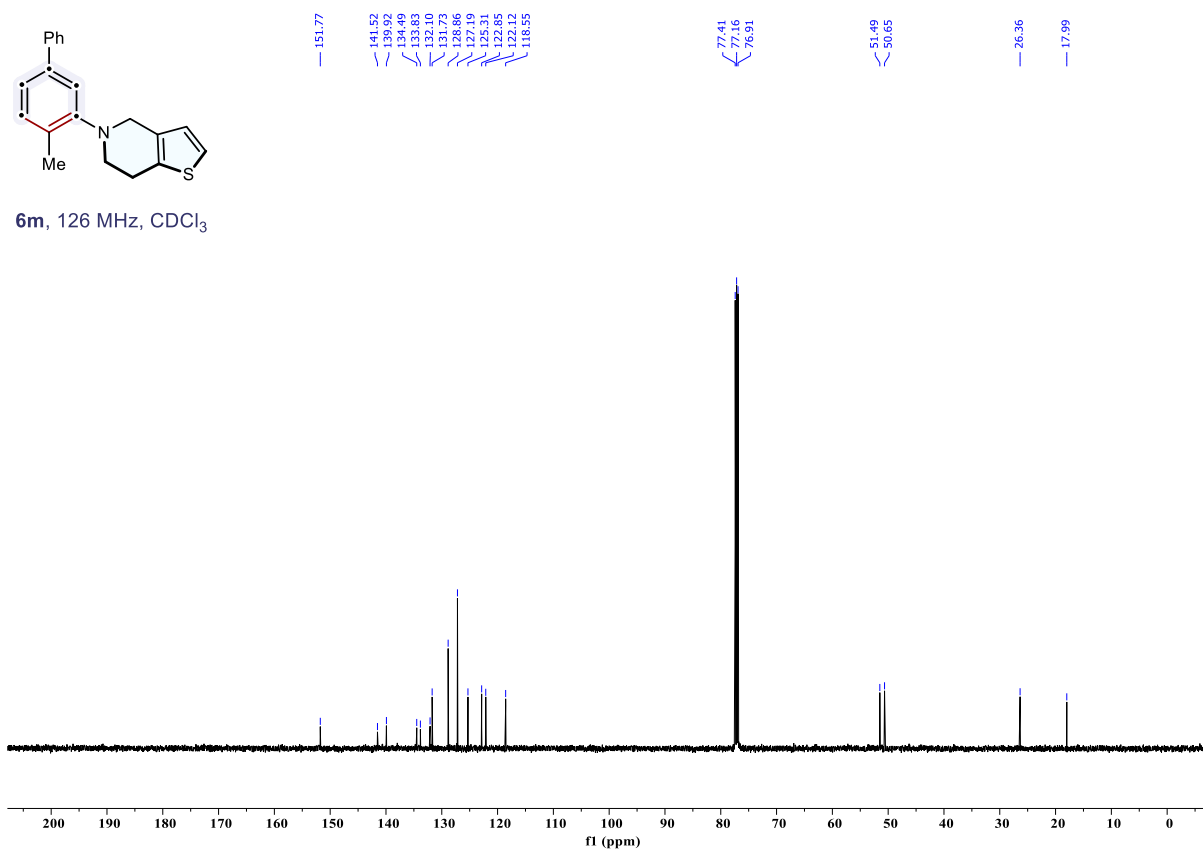
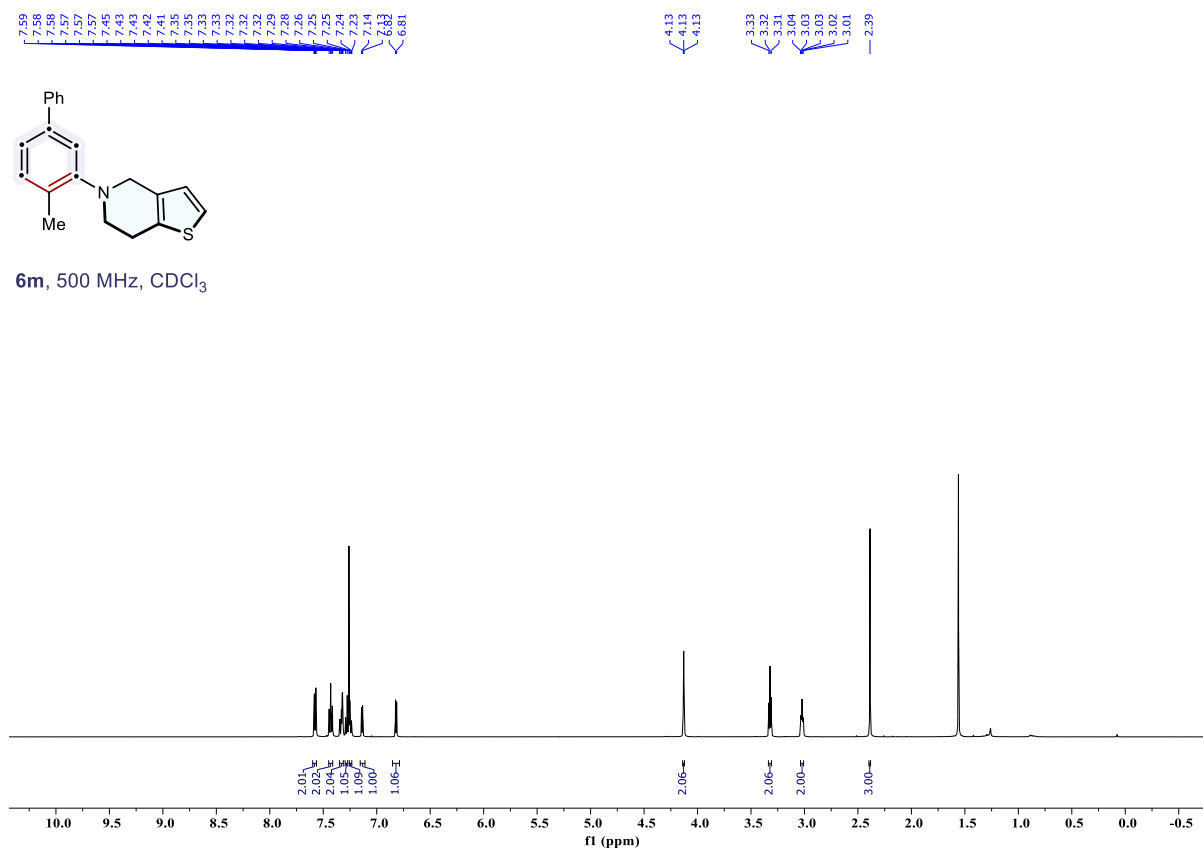


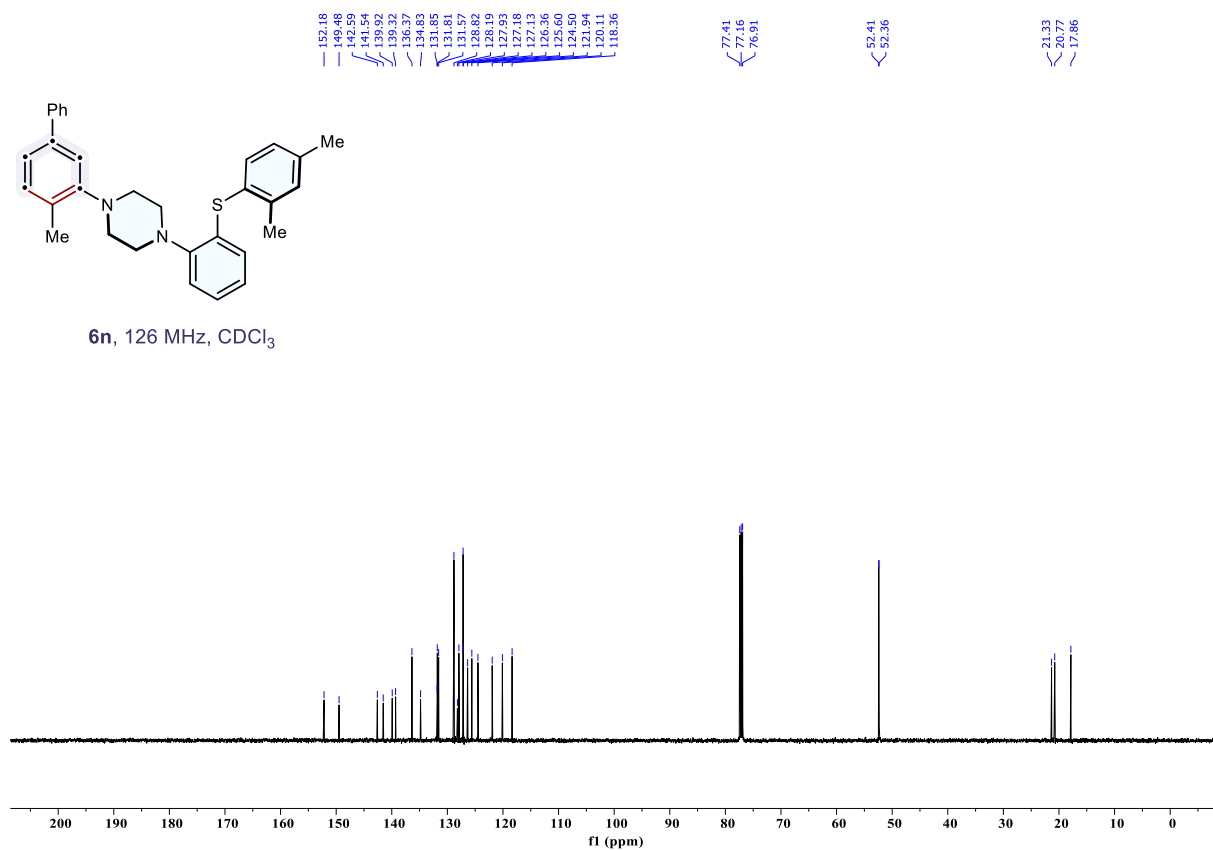
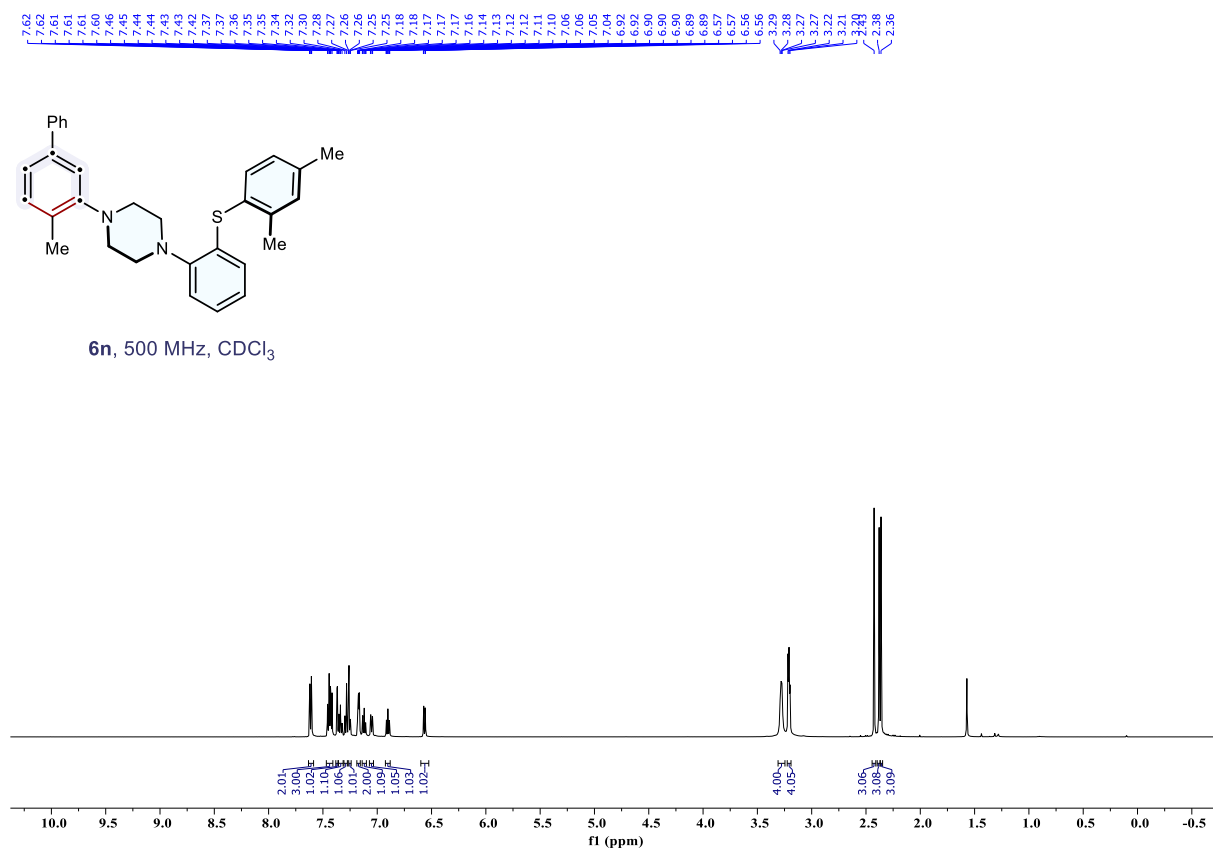


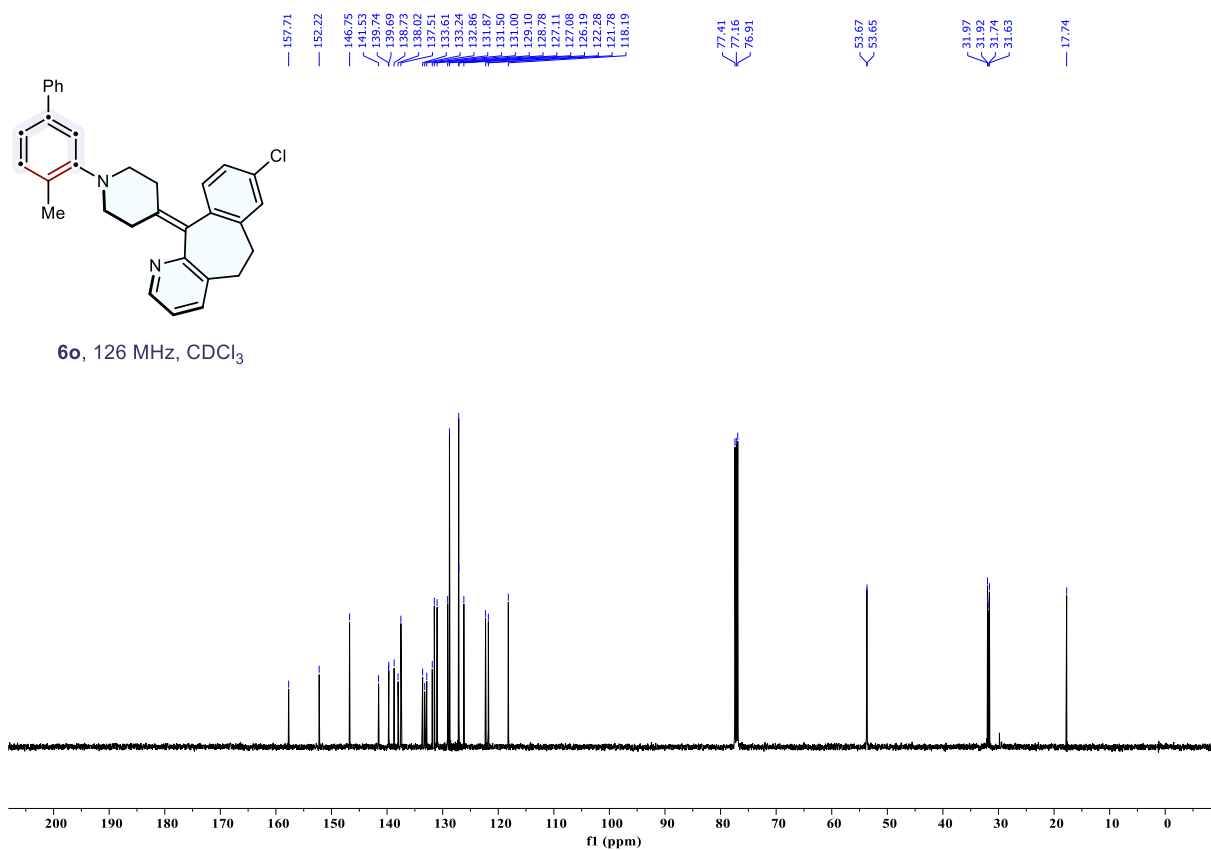
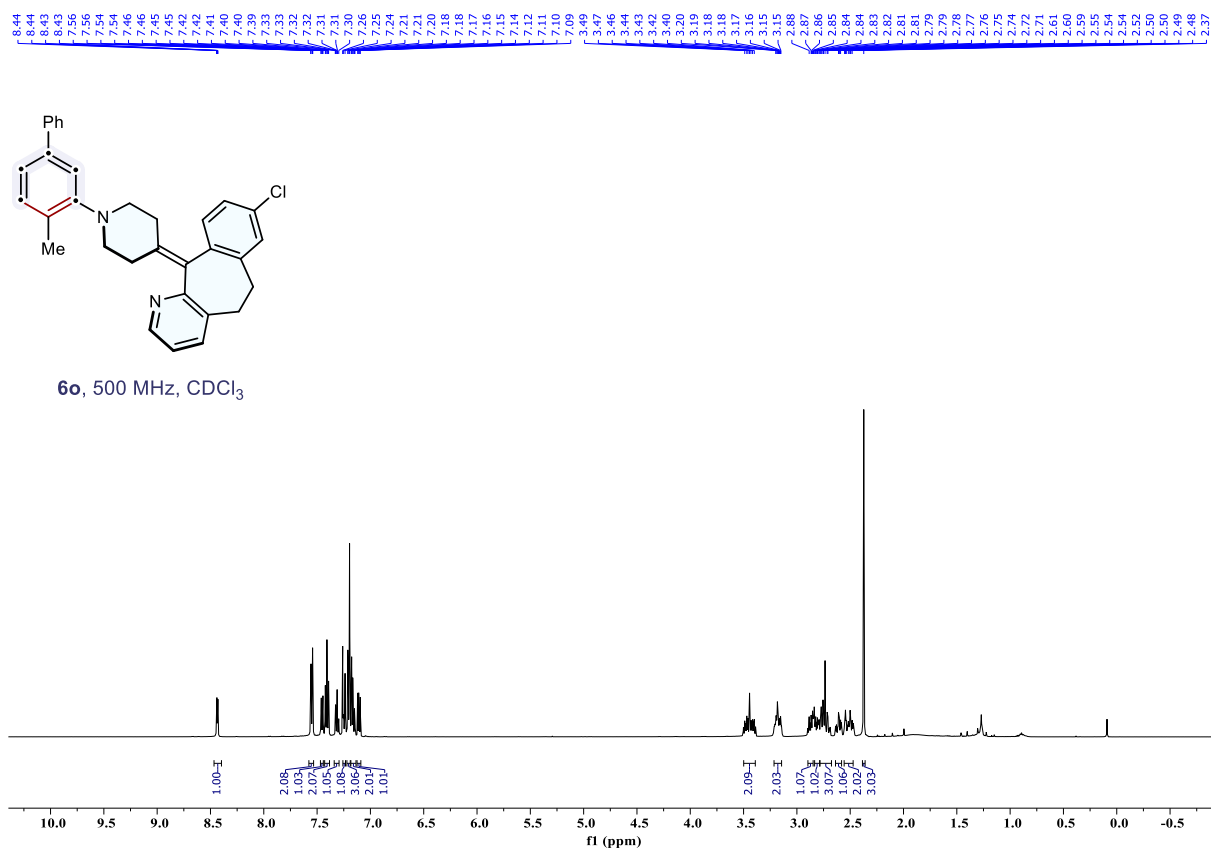


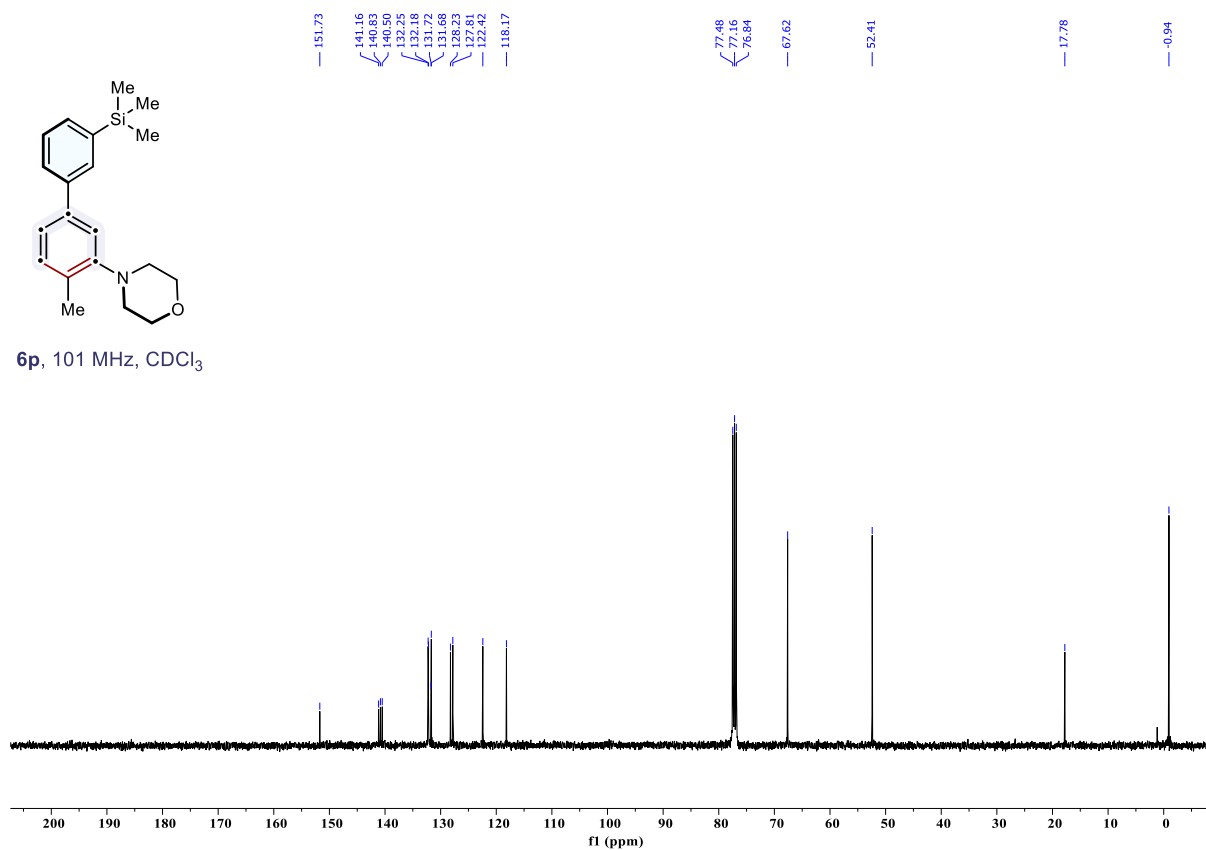
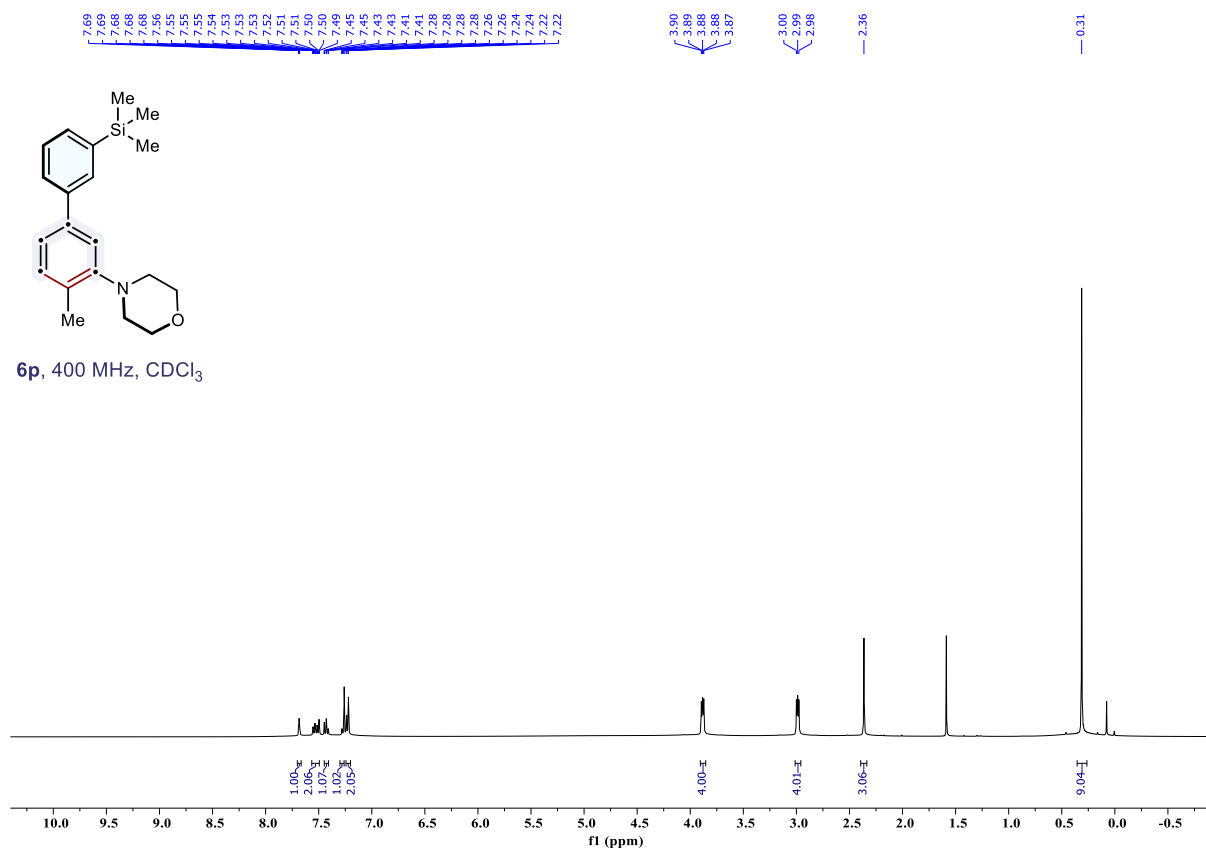


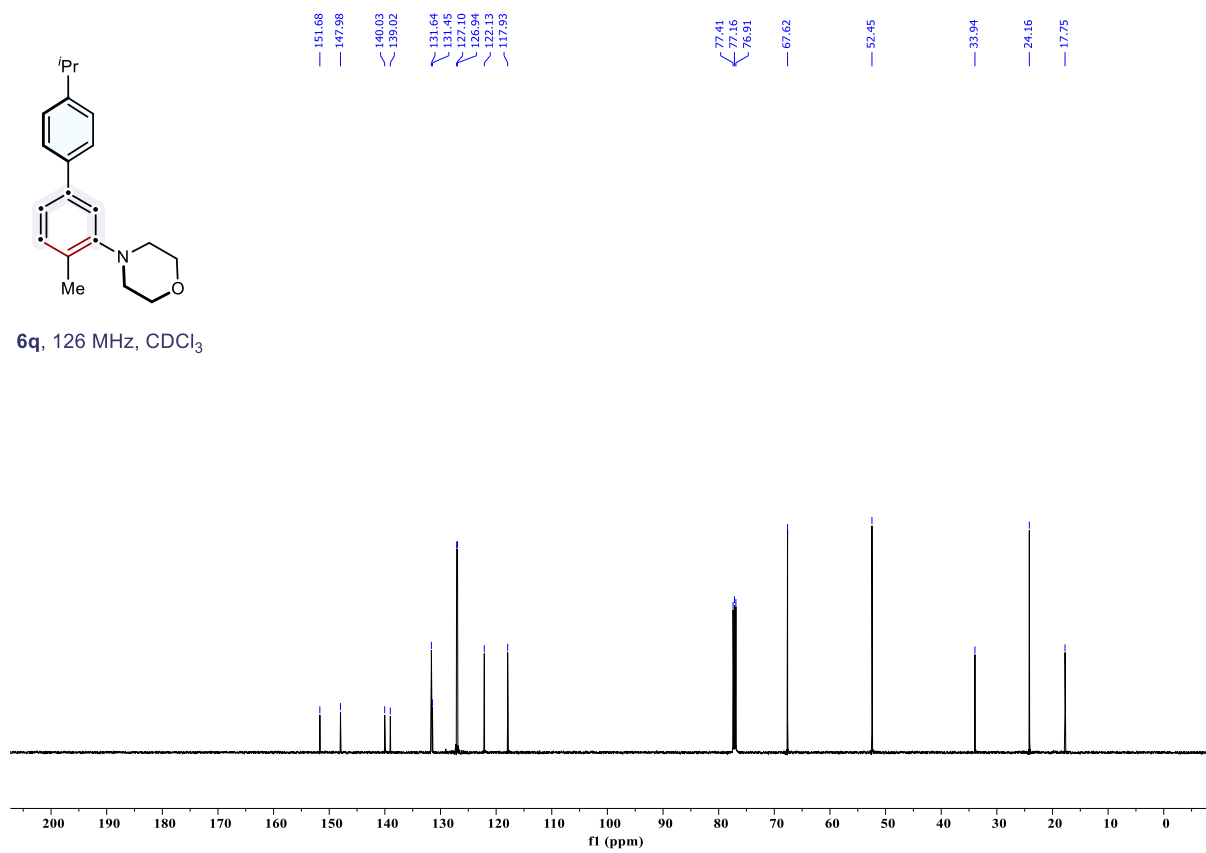
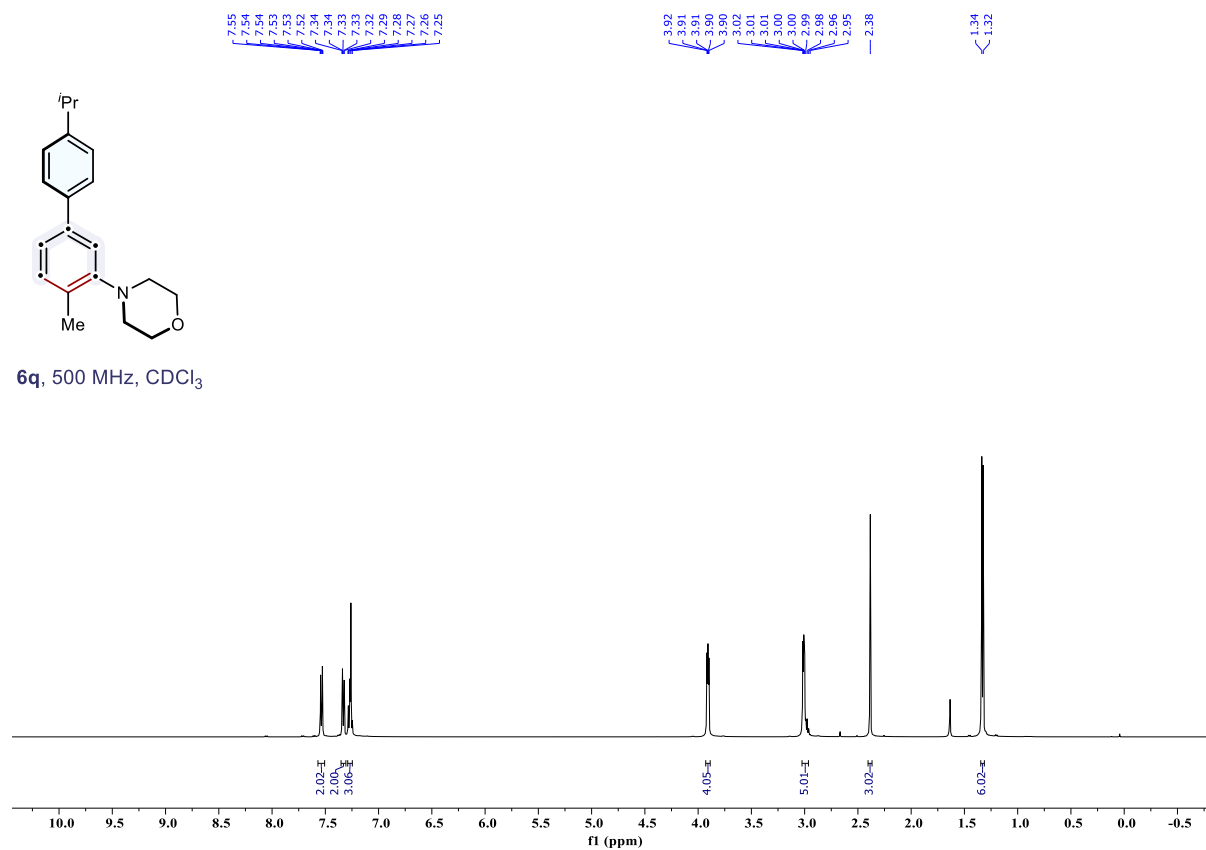


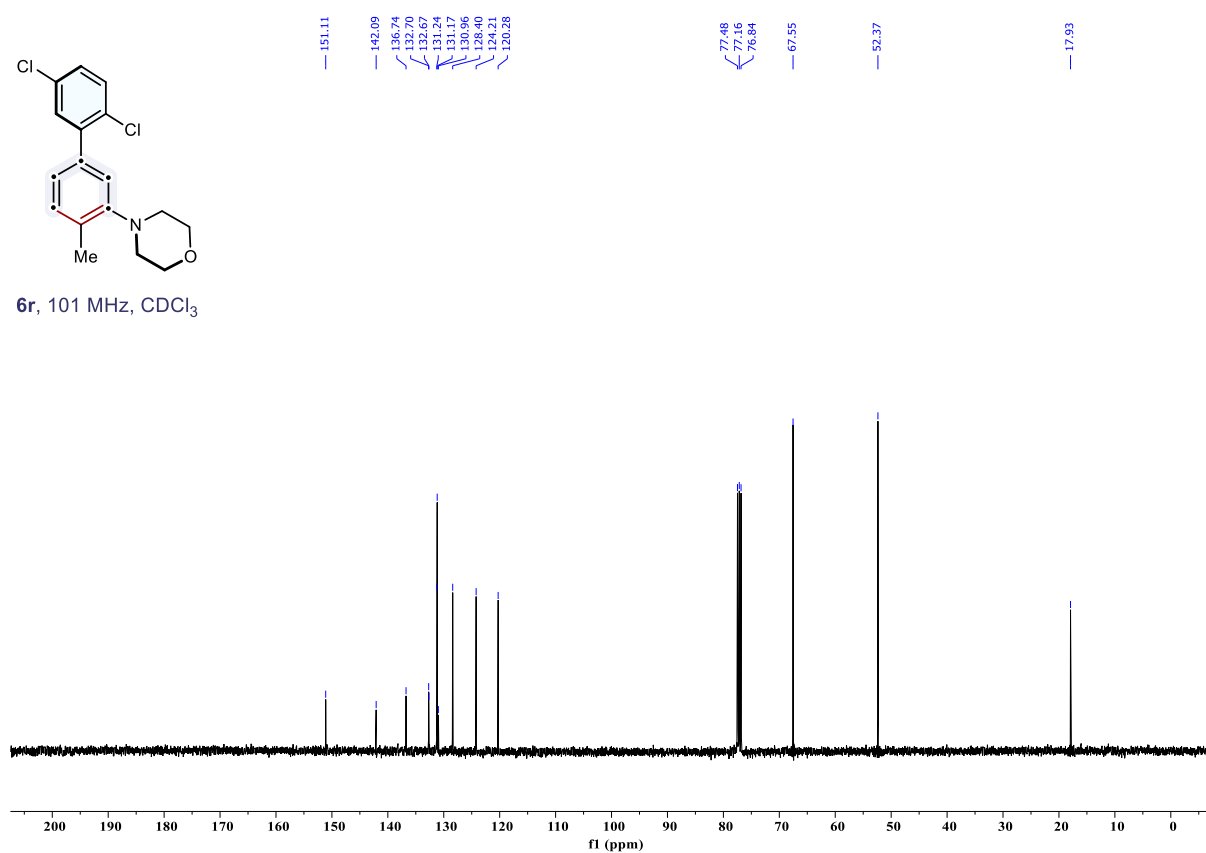
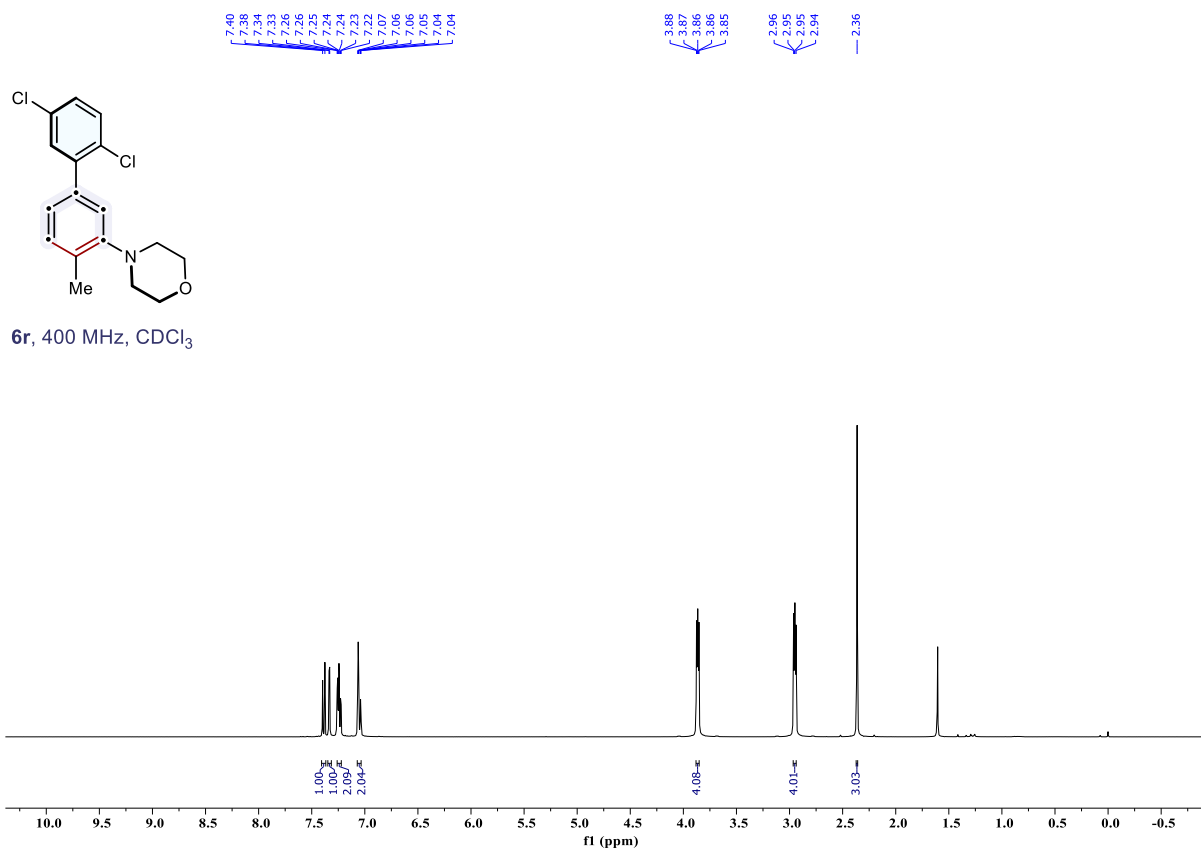


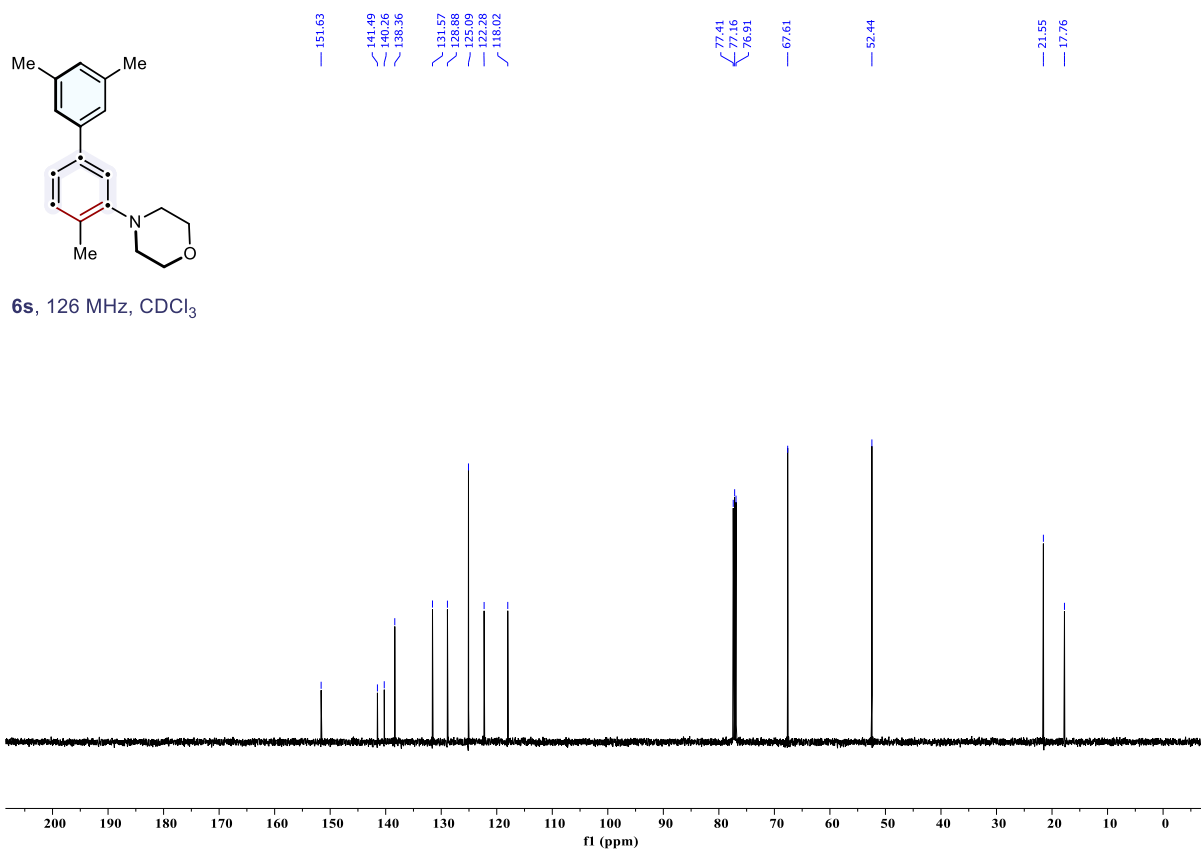
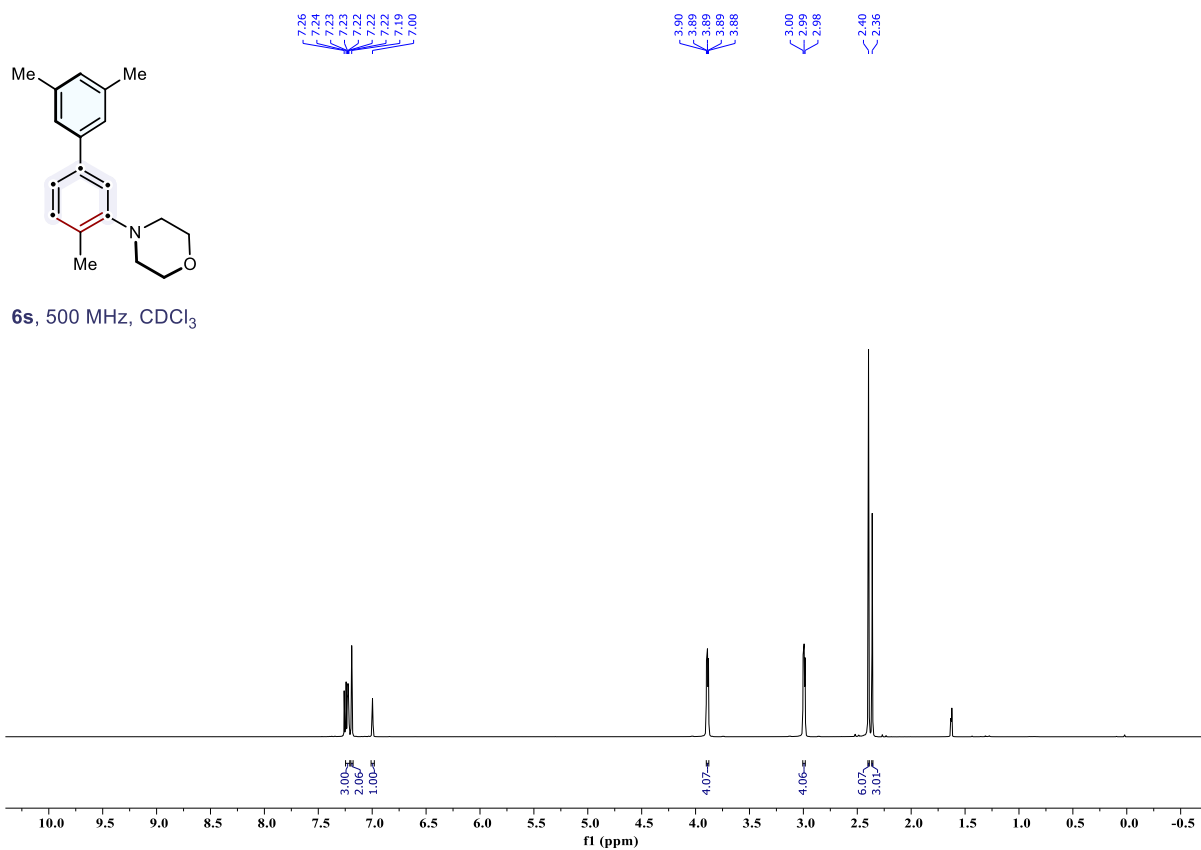


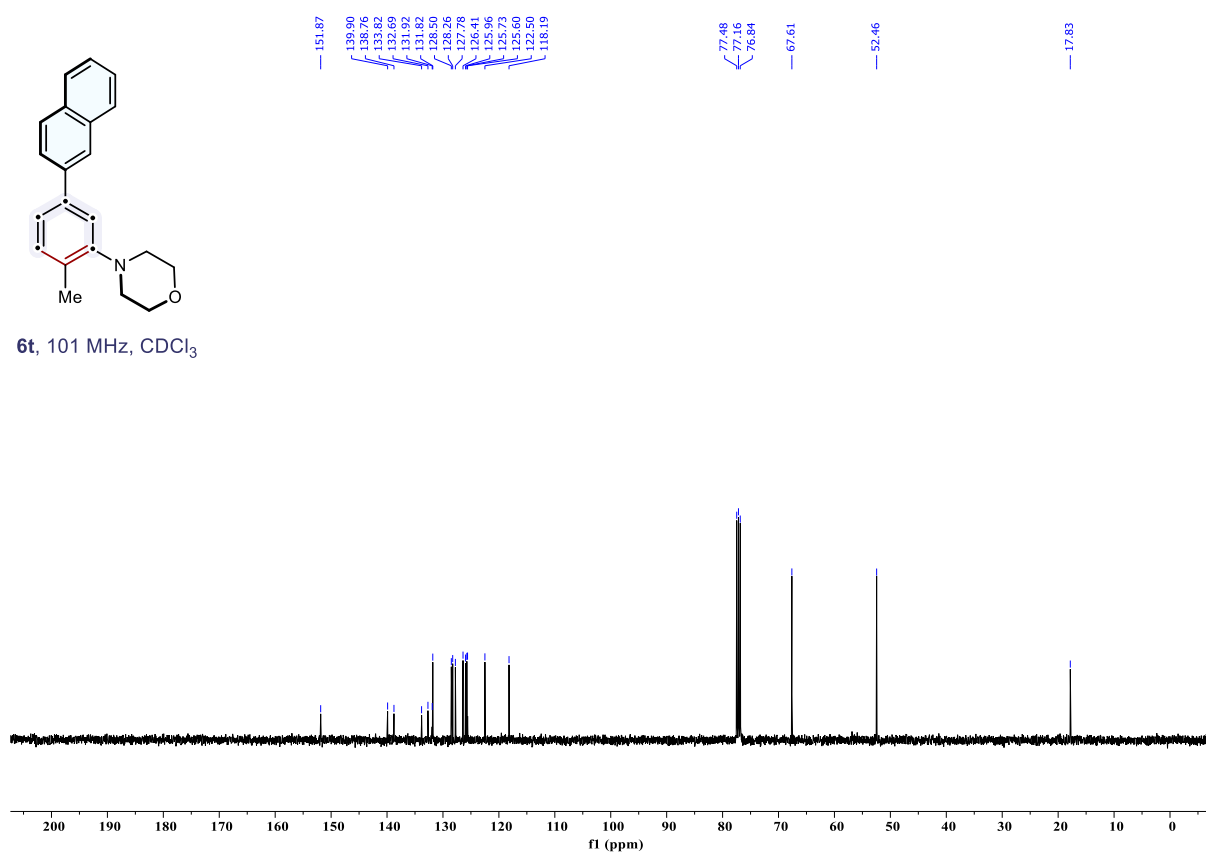
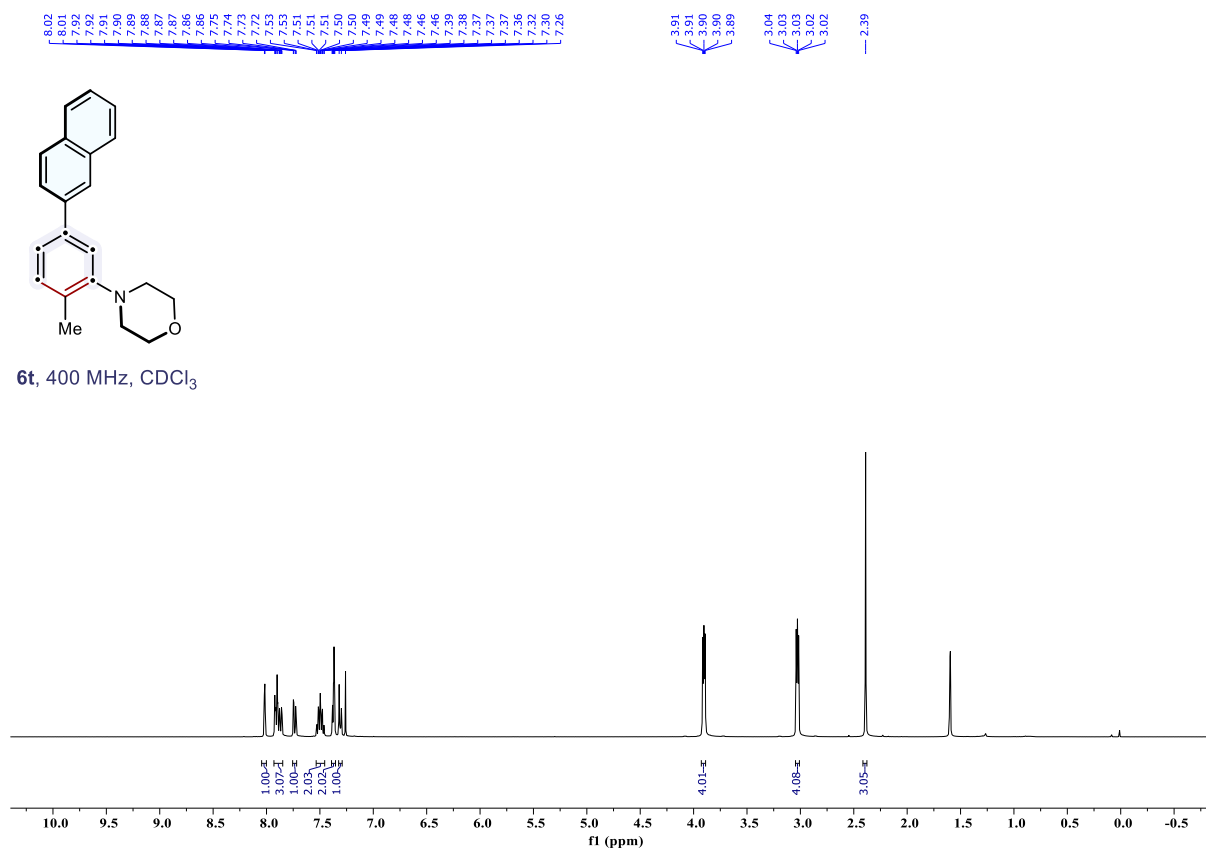


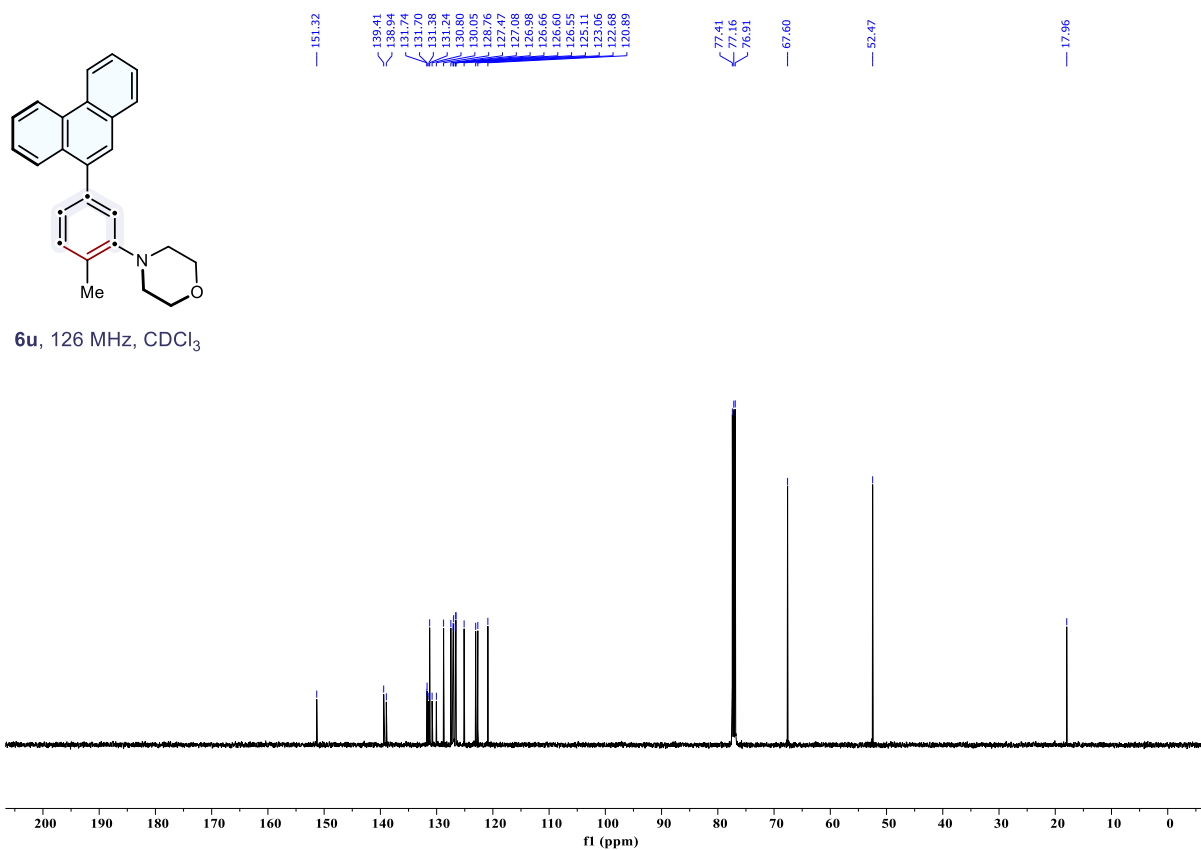
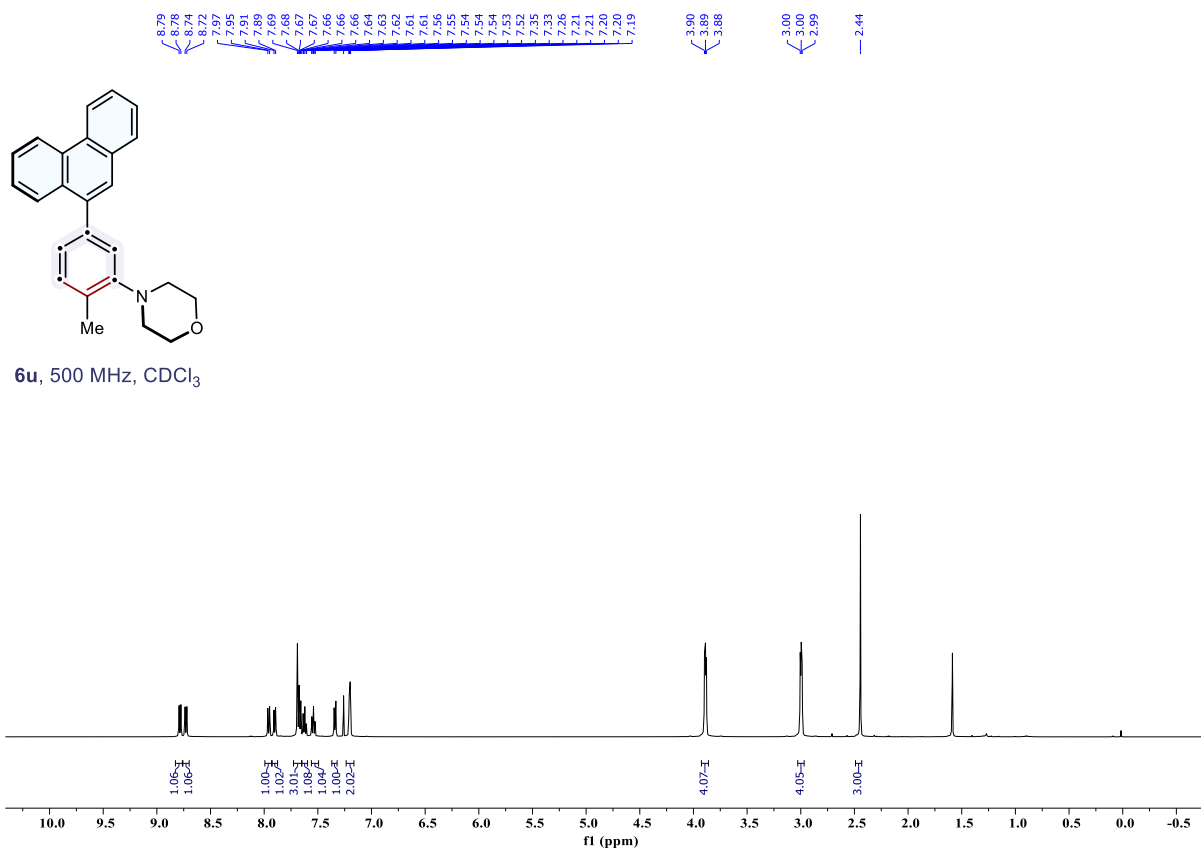


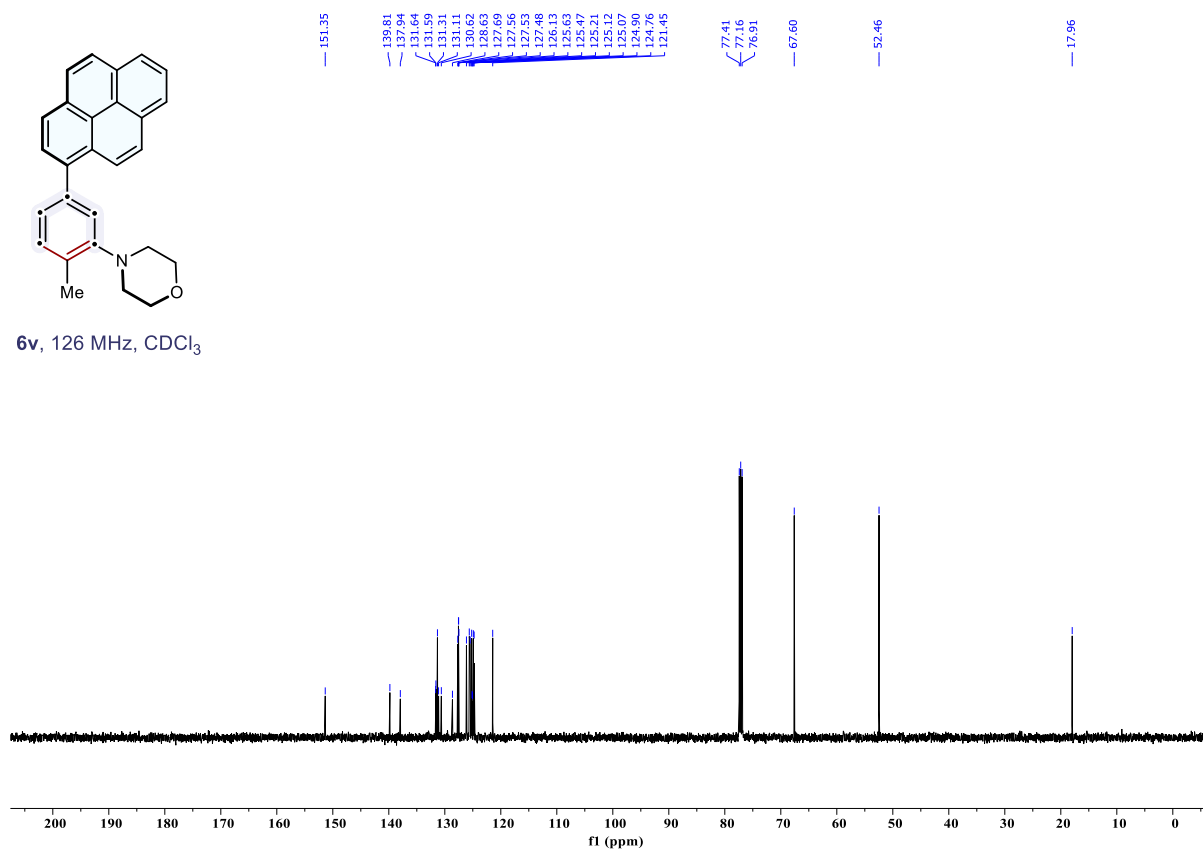
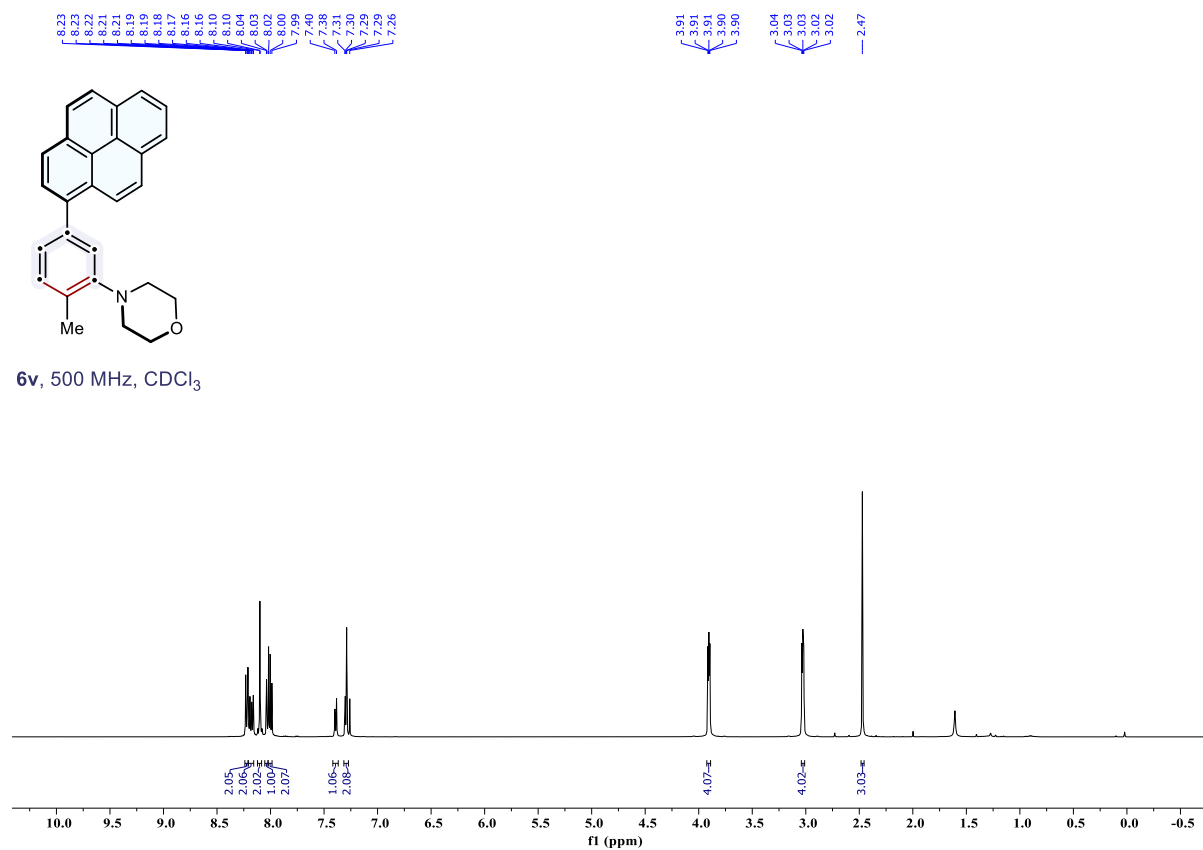


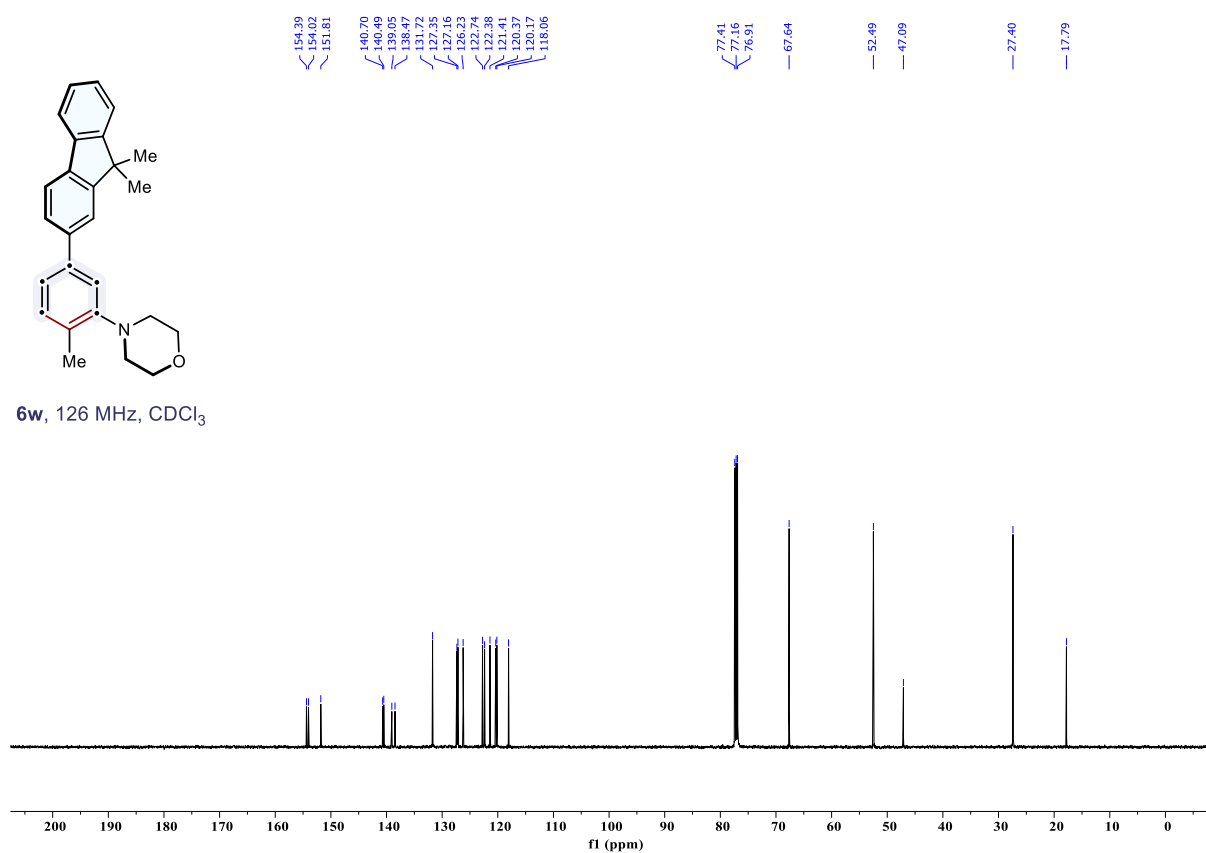
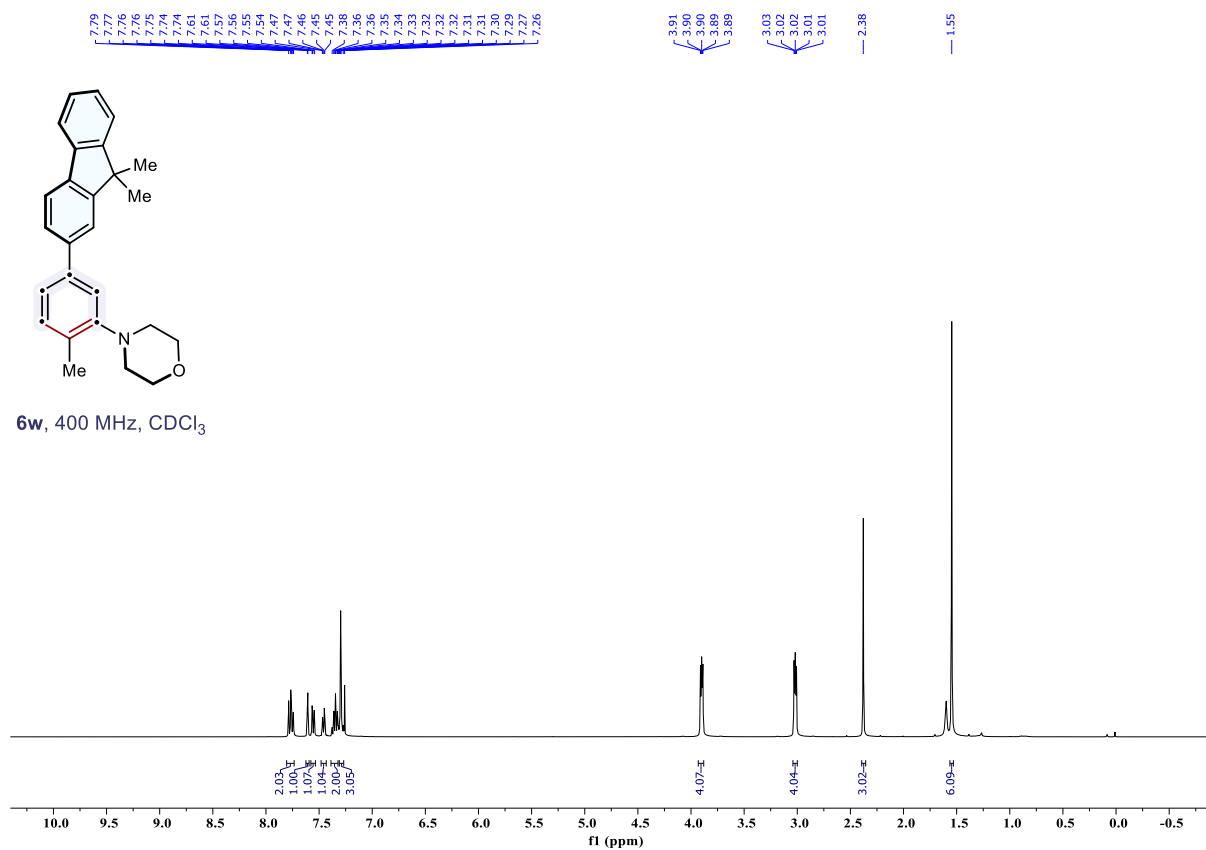


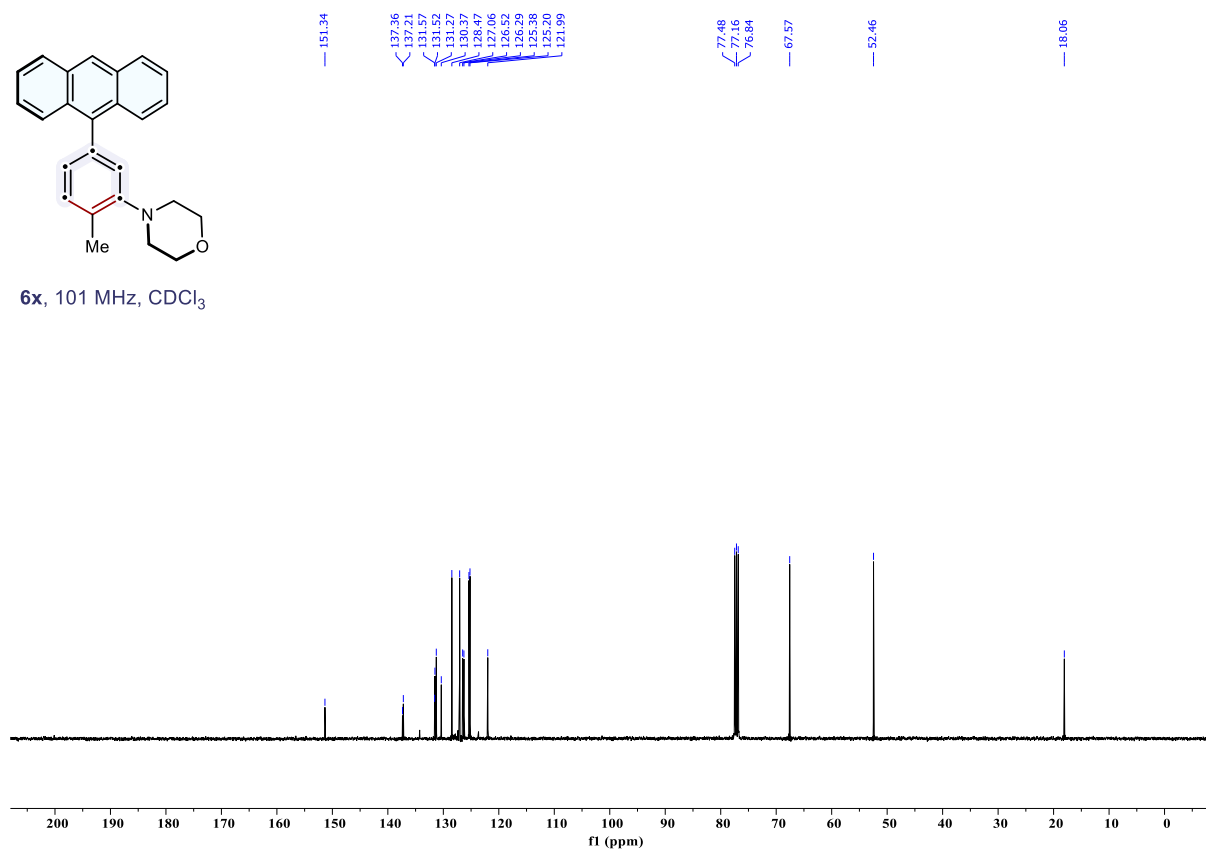
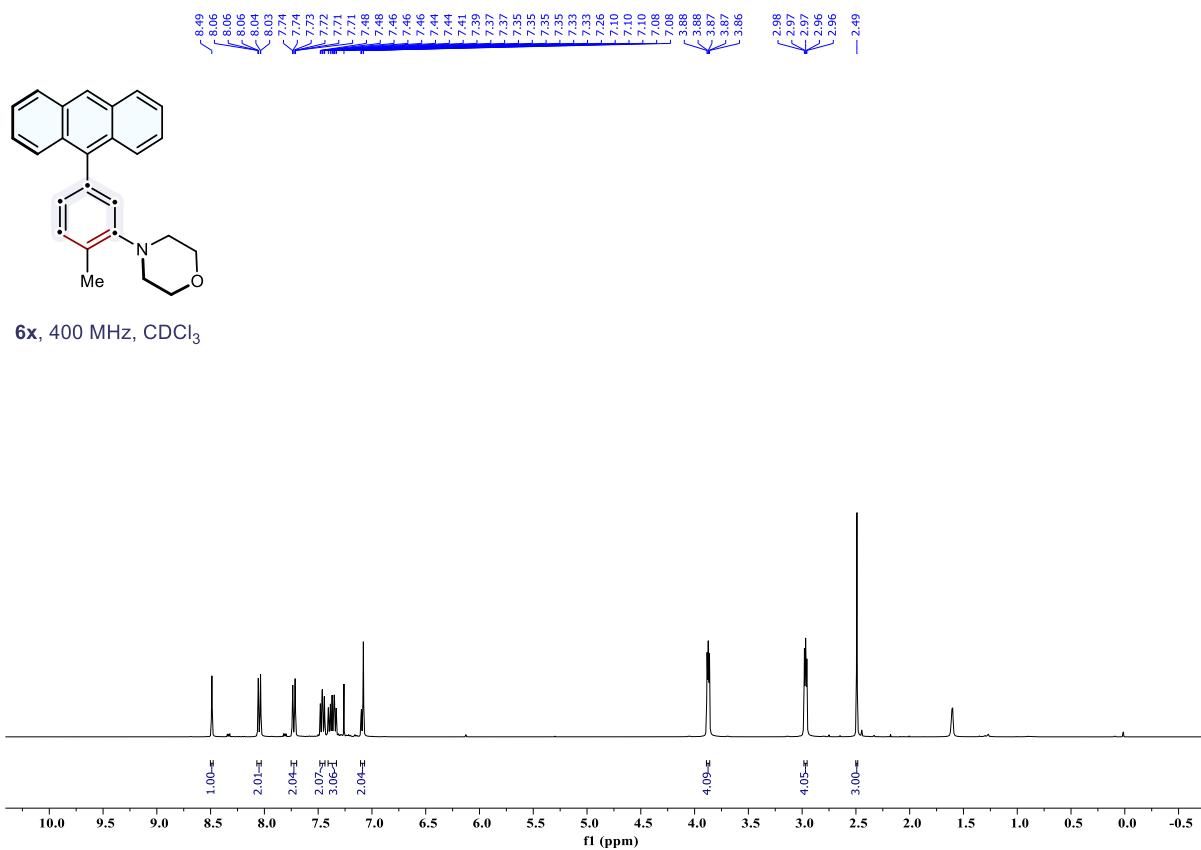


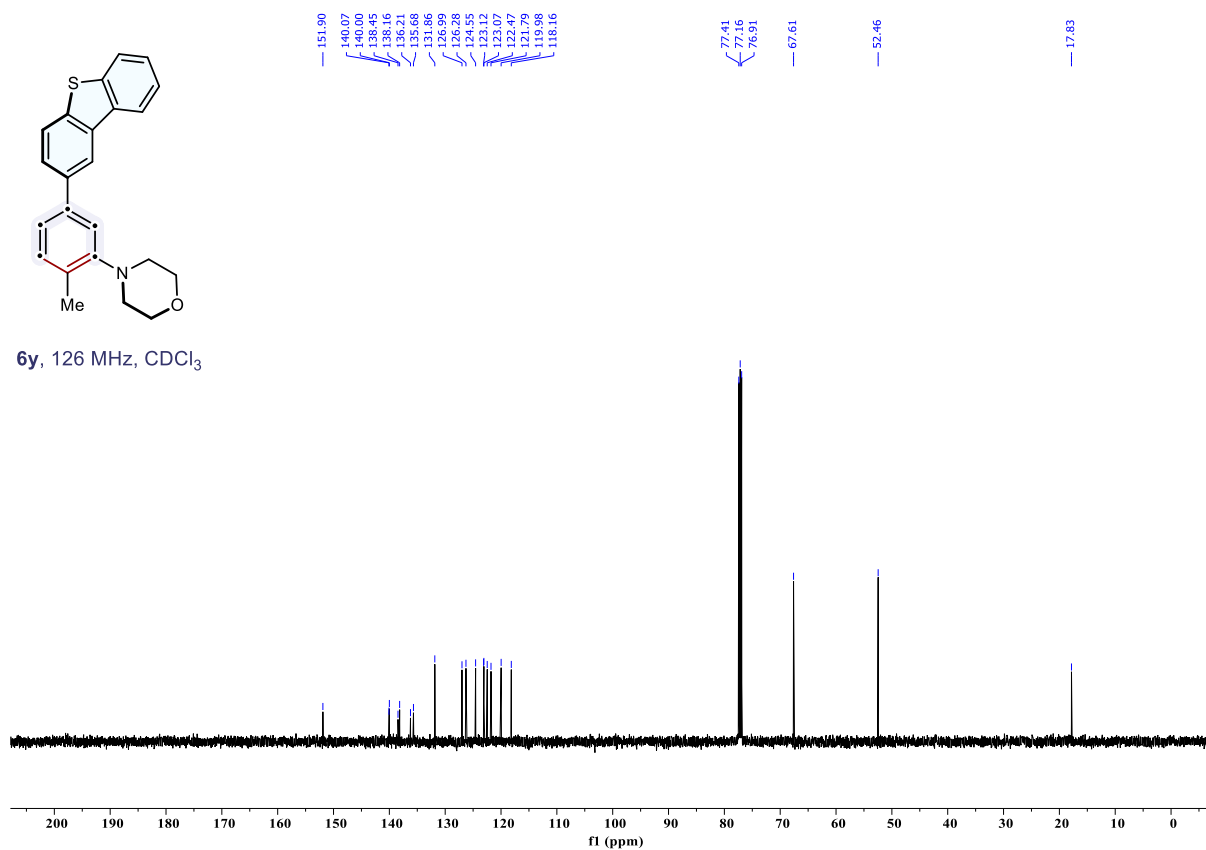
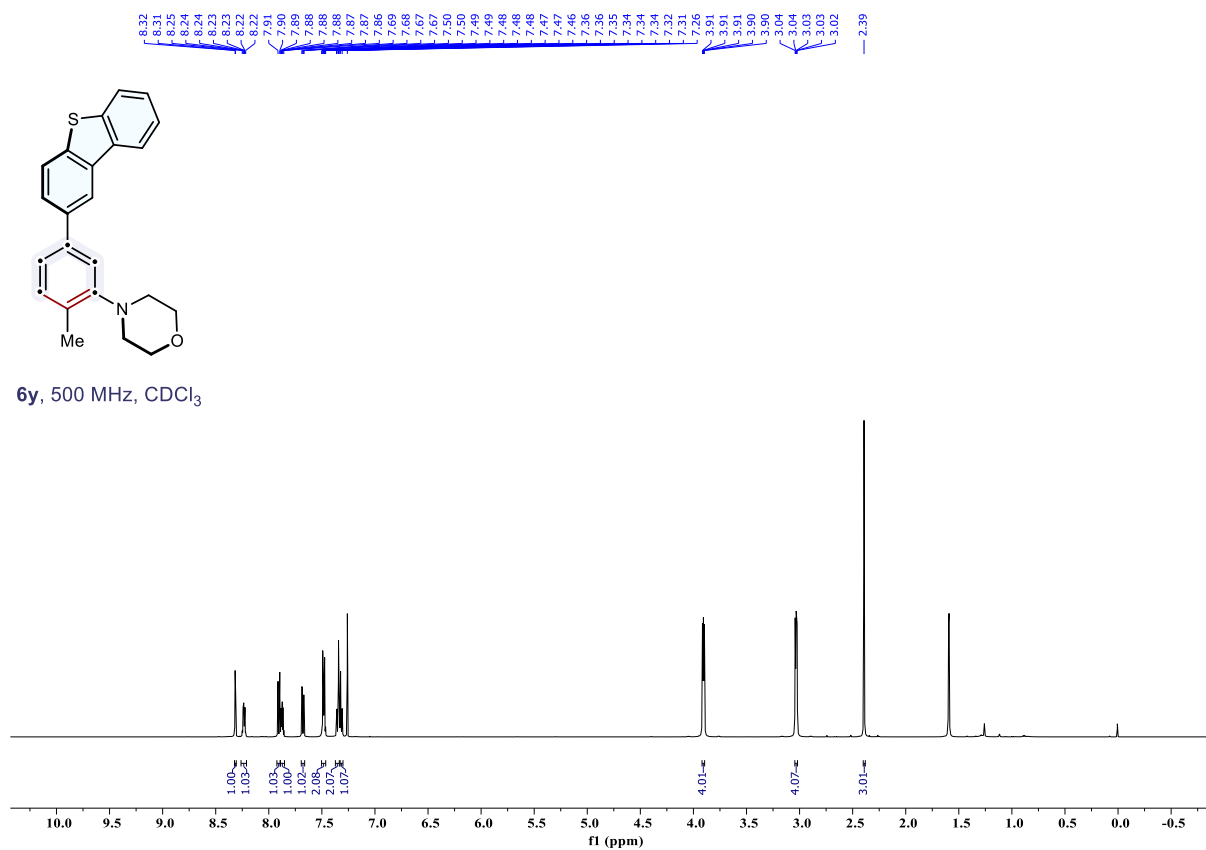


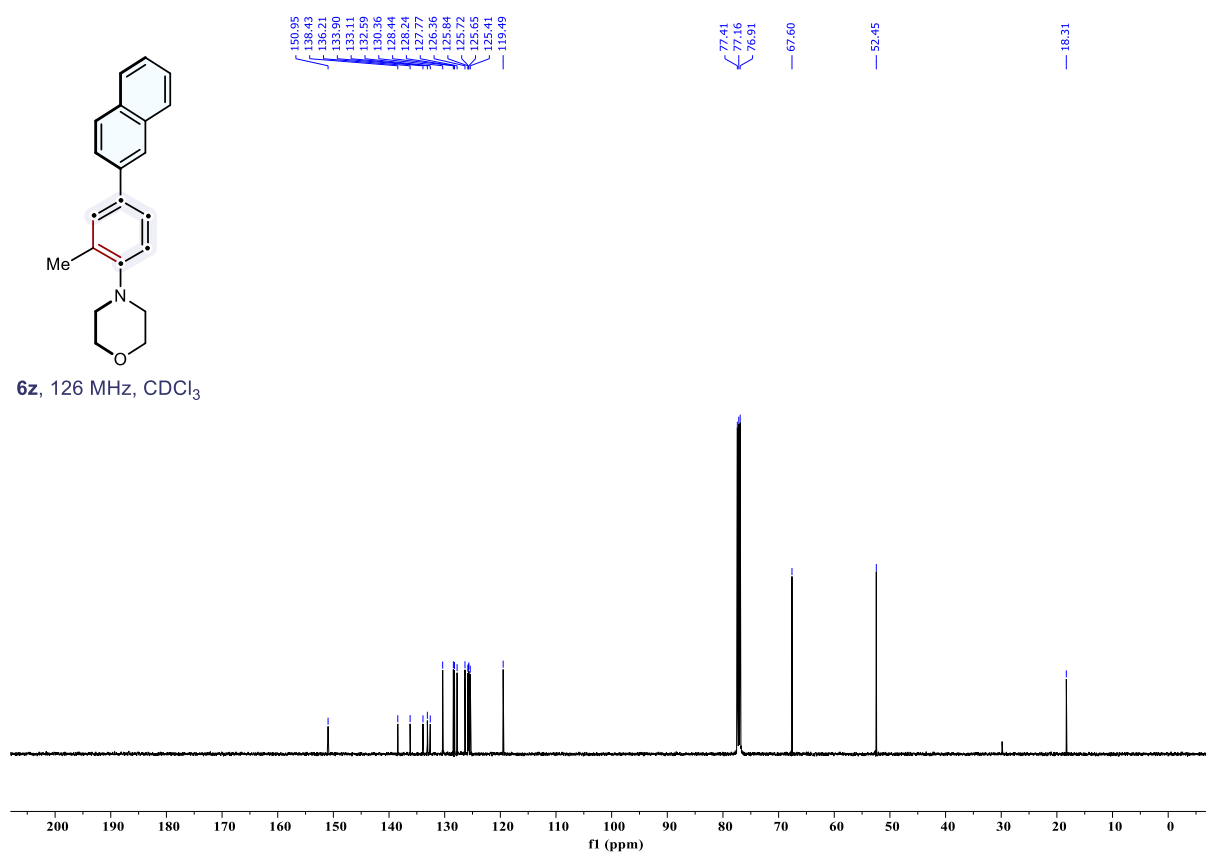
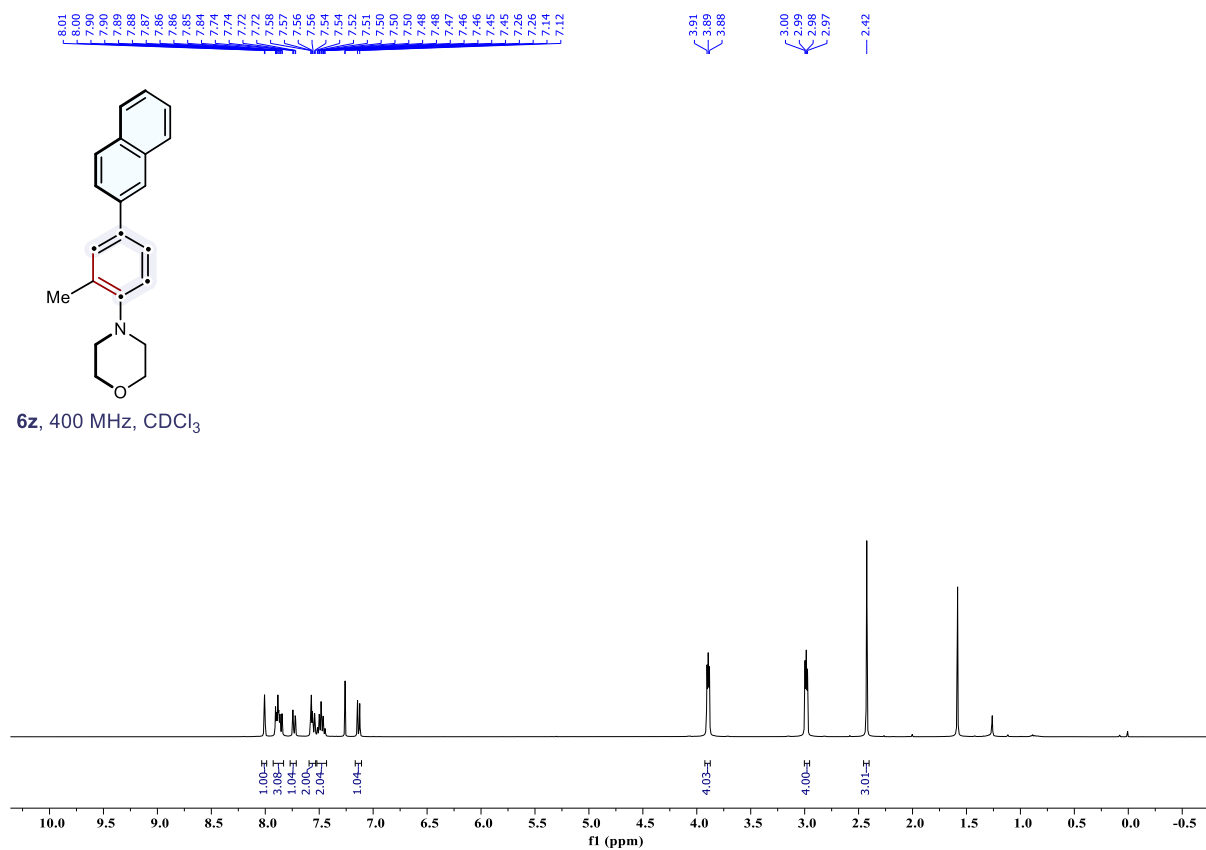


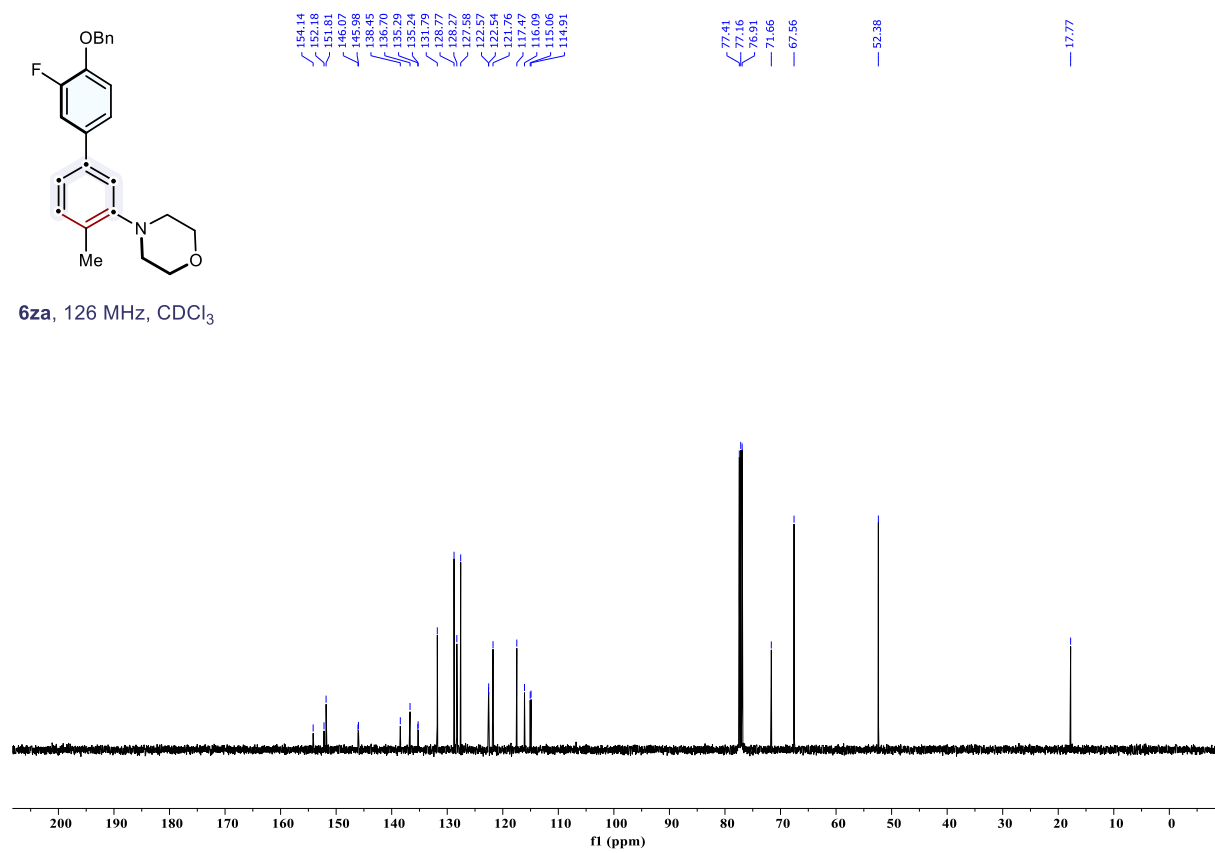
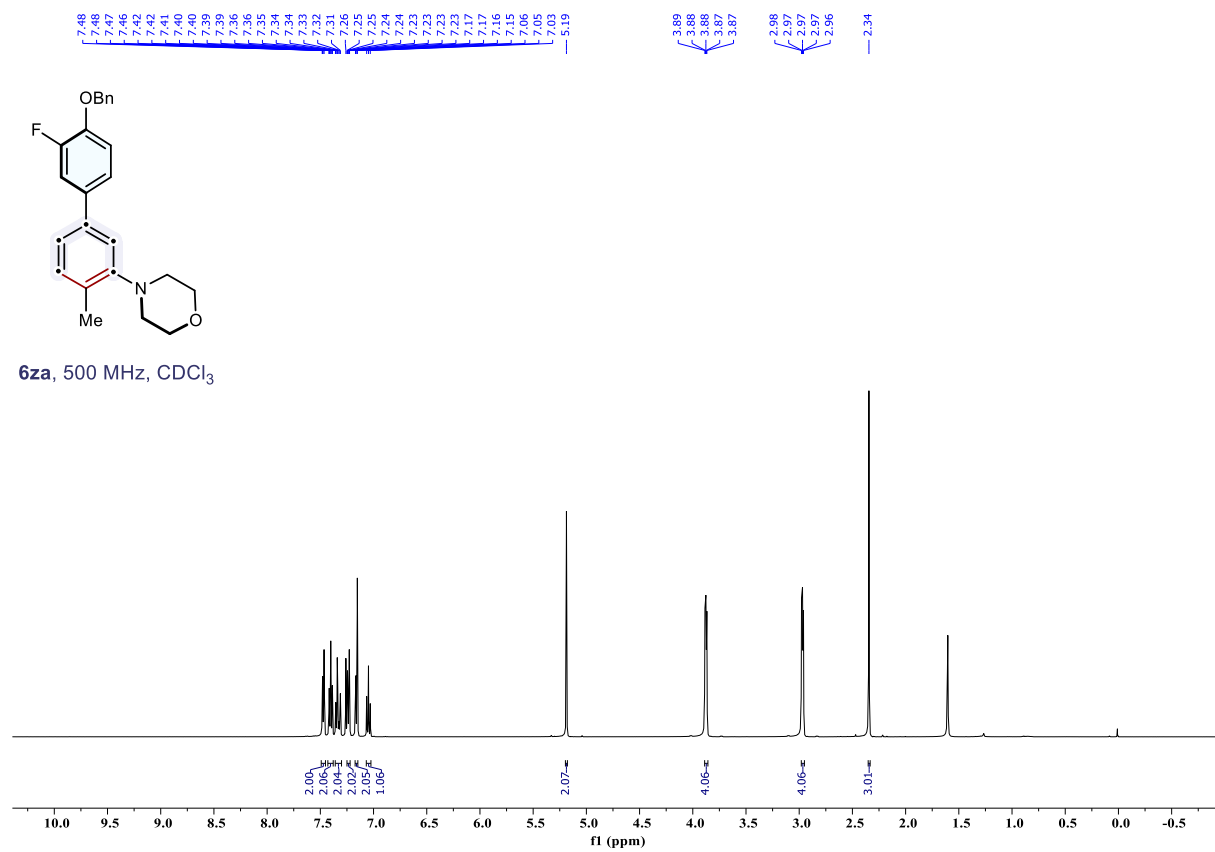


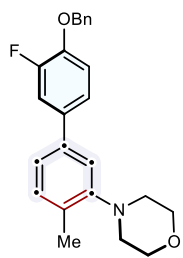




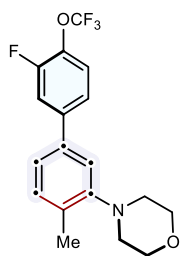
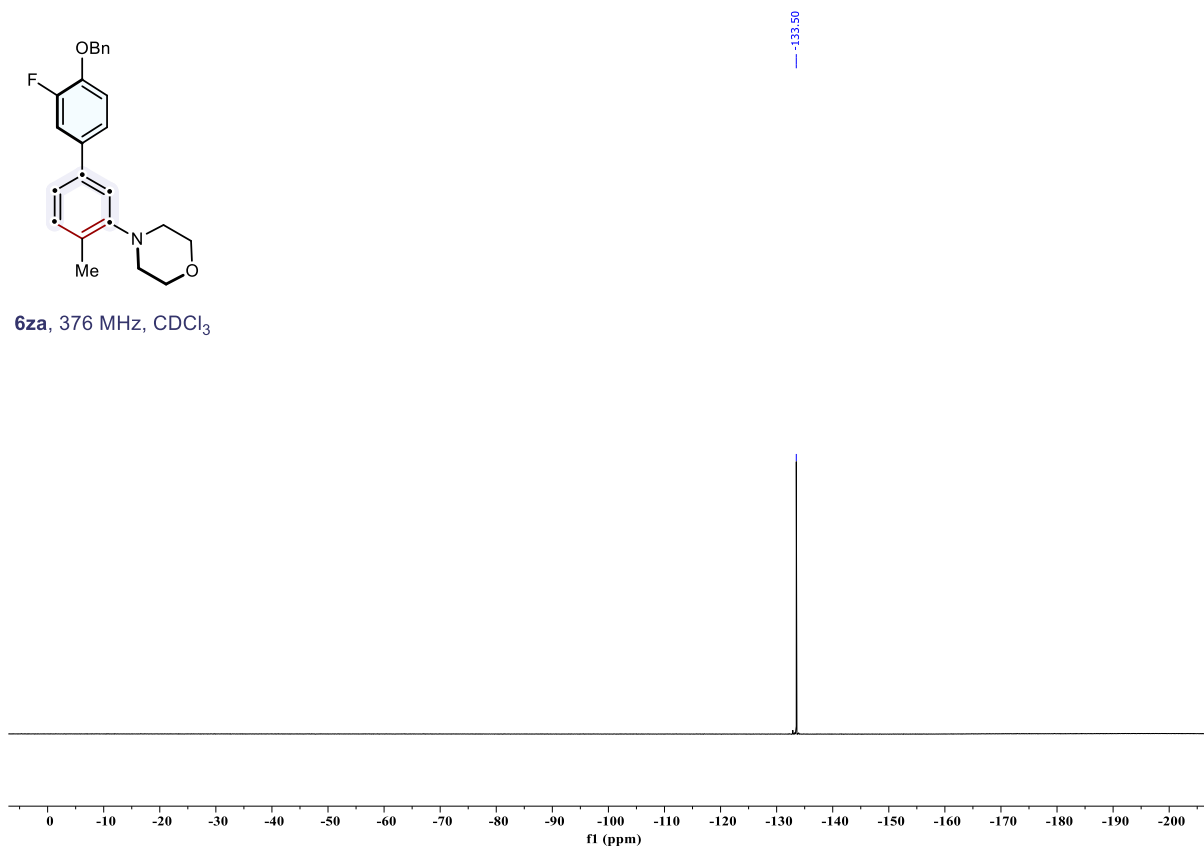




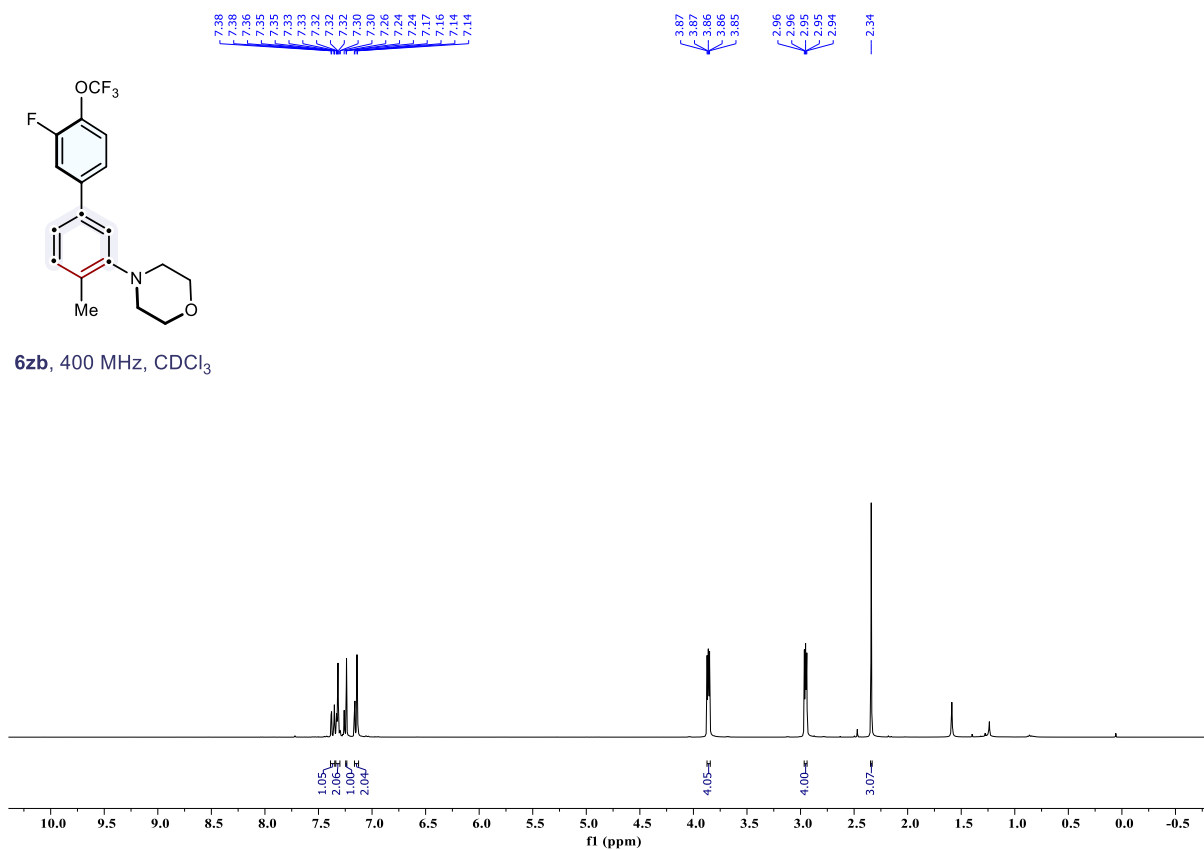


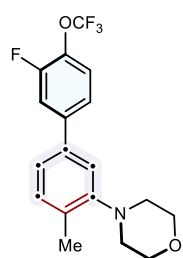


6za, 376 MHz, CDCl₃

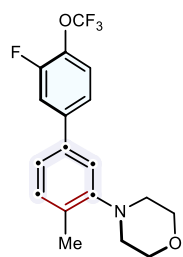
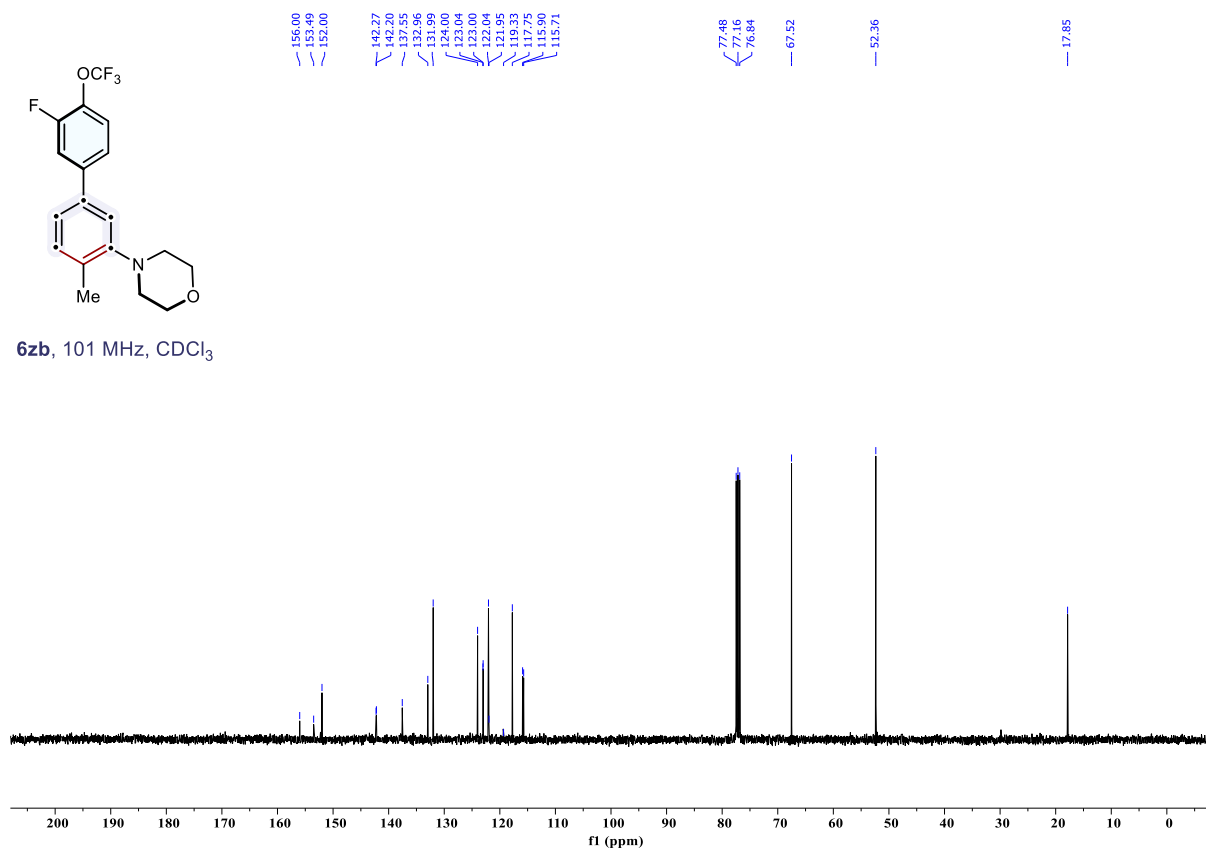


6zb, 400 MHz, CDCl₃

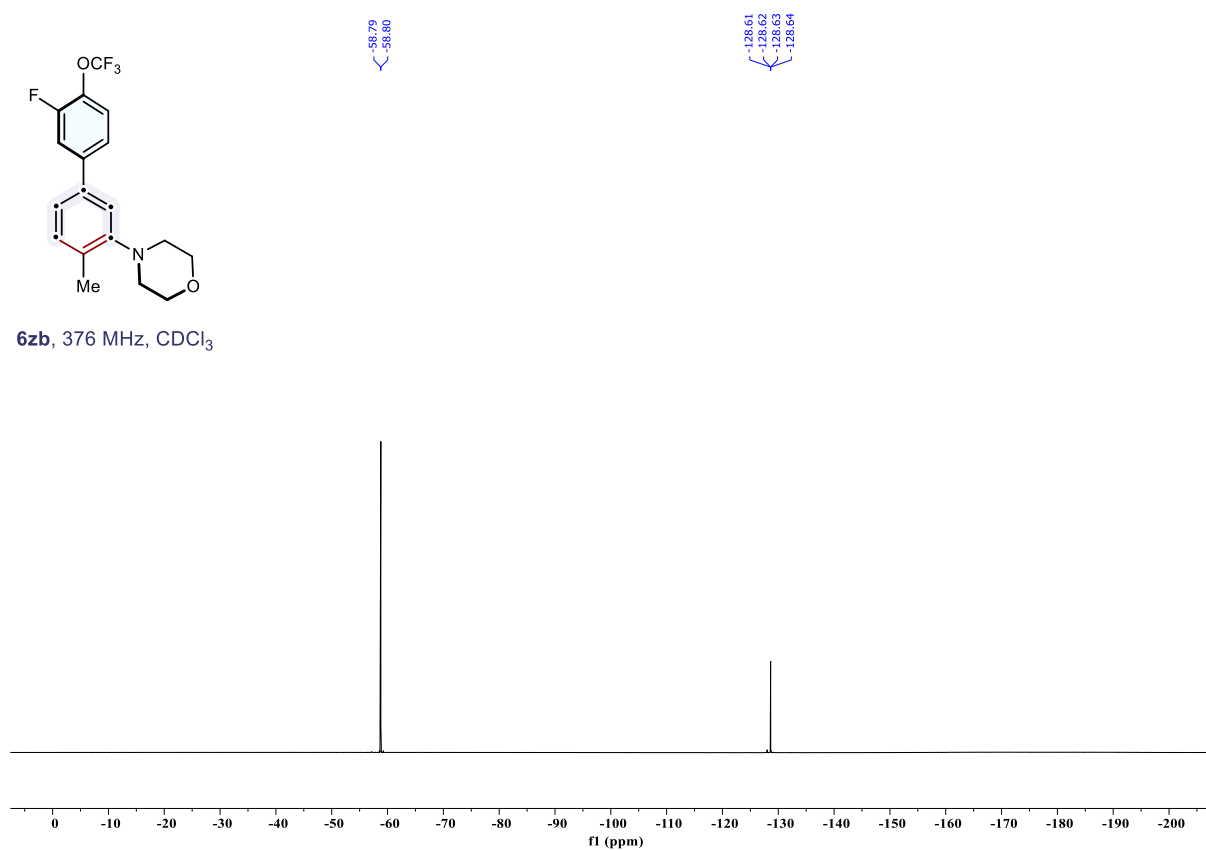


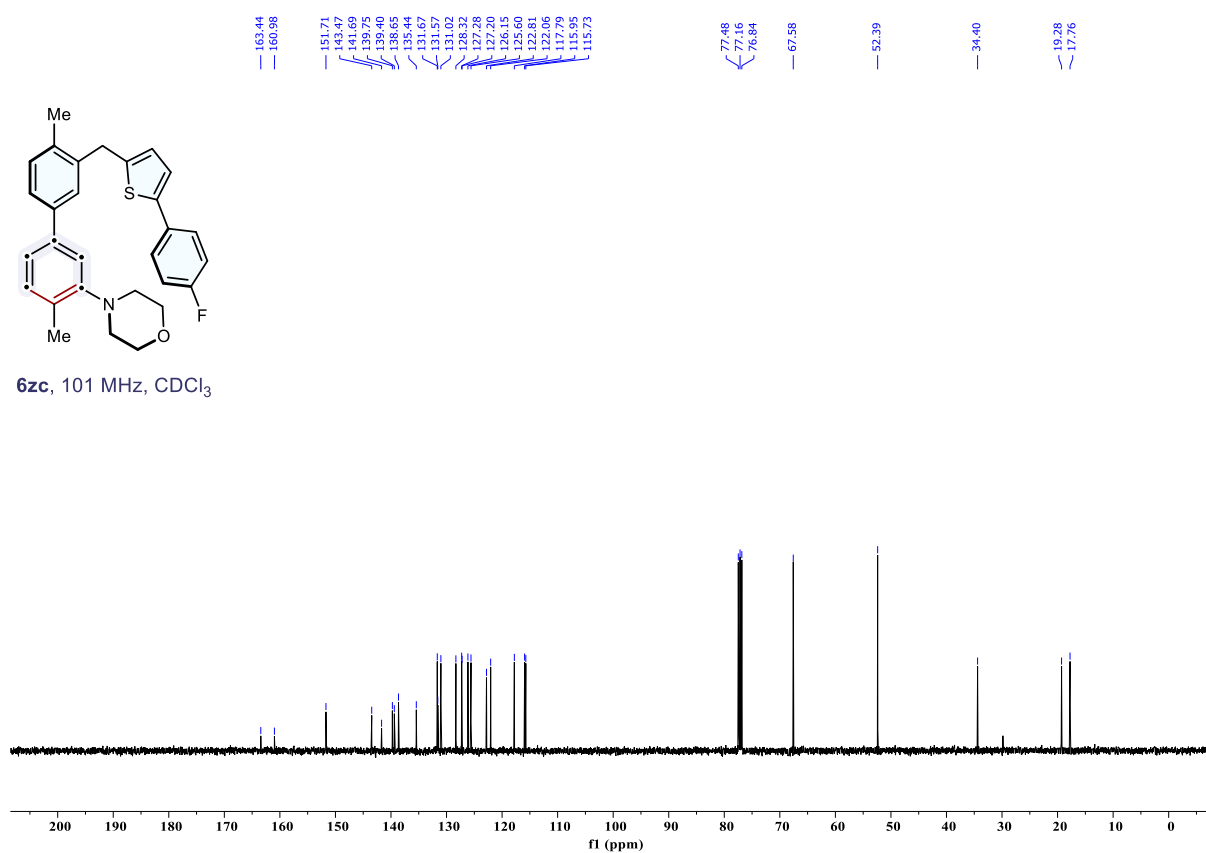
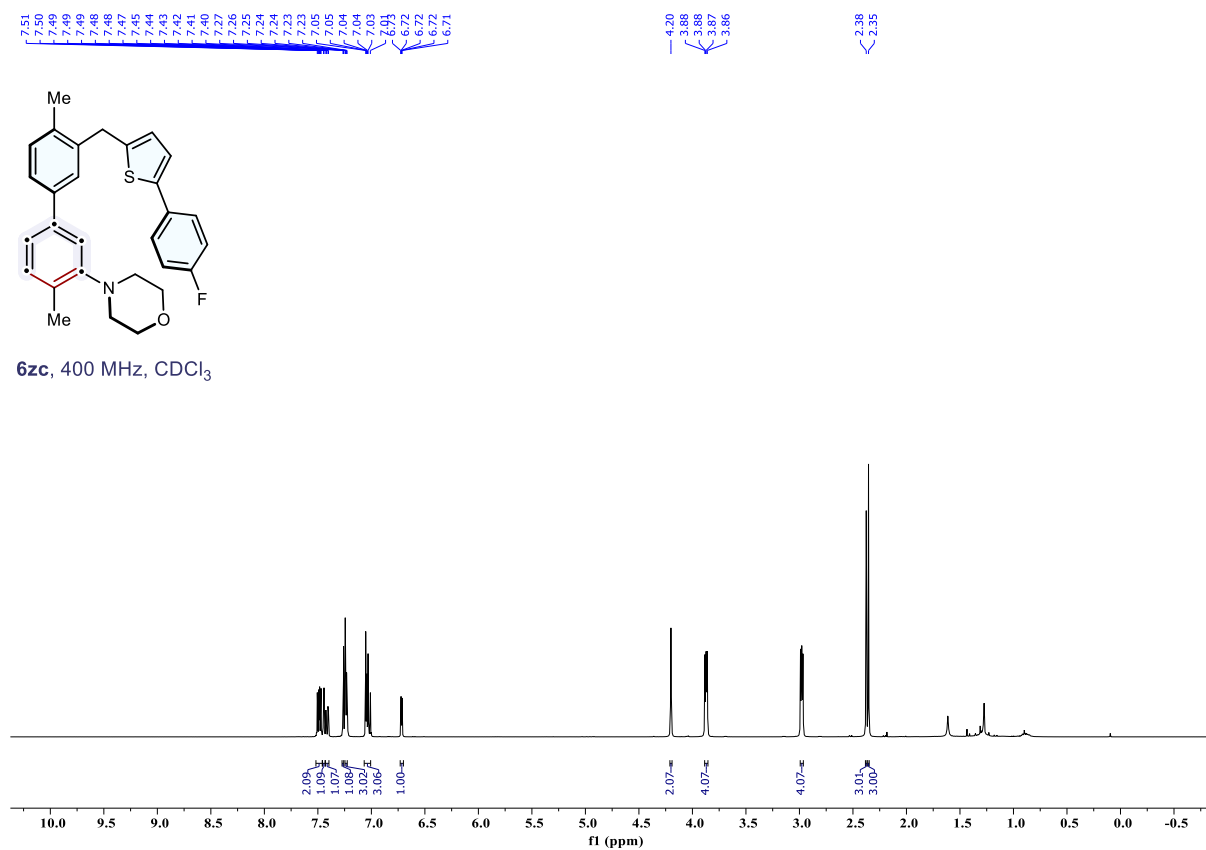


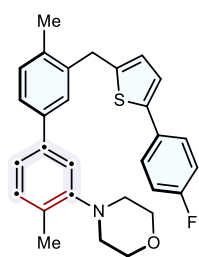
6zb, 101 MHz, CDCl₃



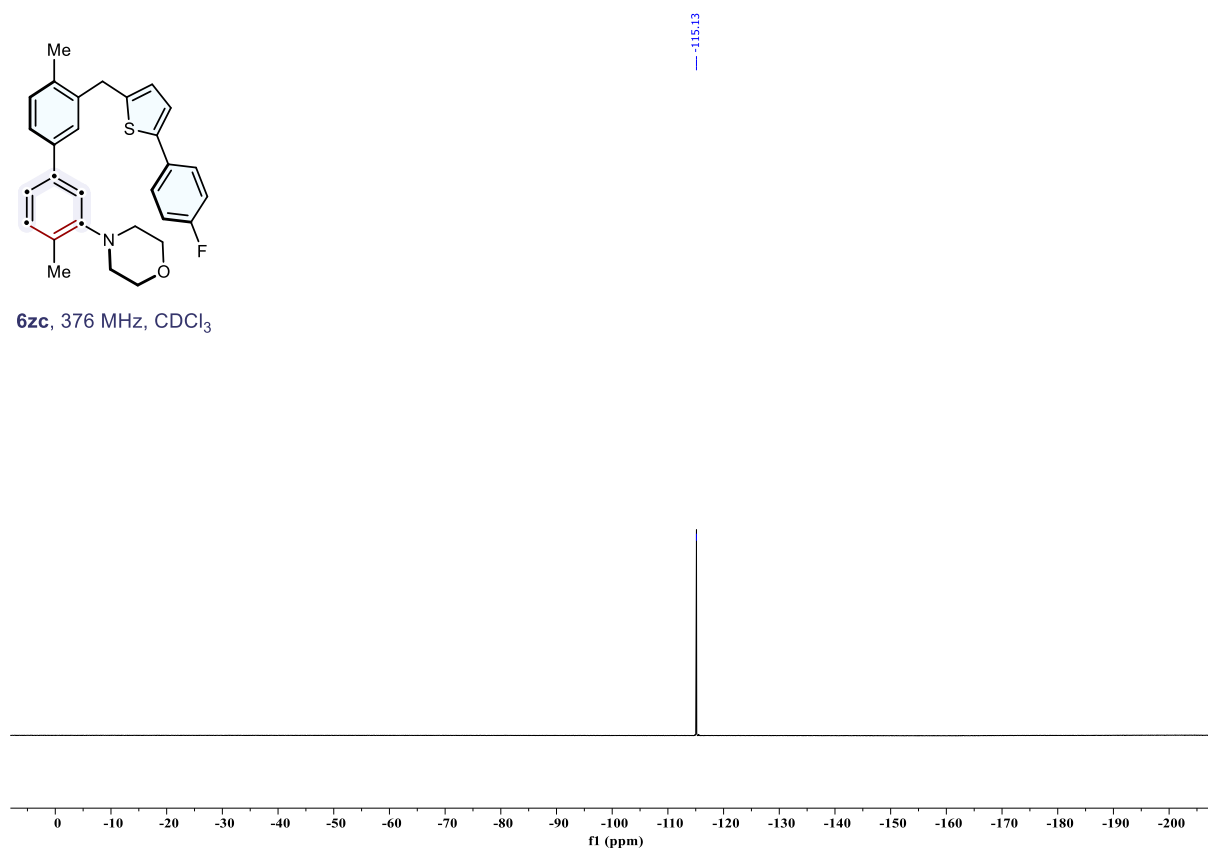
6zb, 376 MHz, CDCl₃

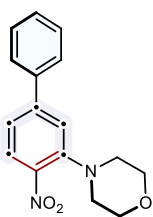




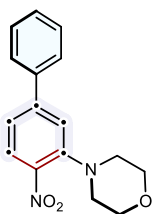
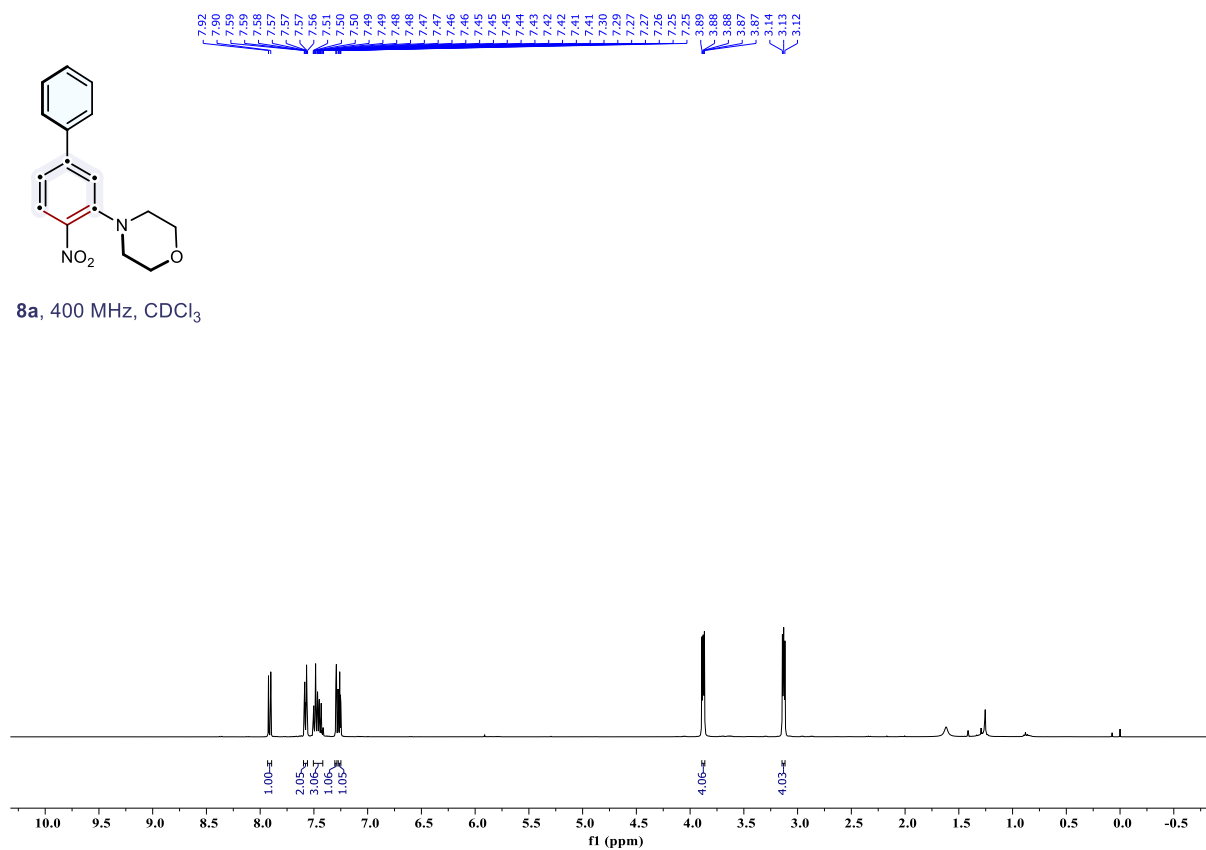


6zc, 376 MHz, CDCl₃

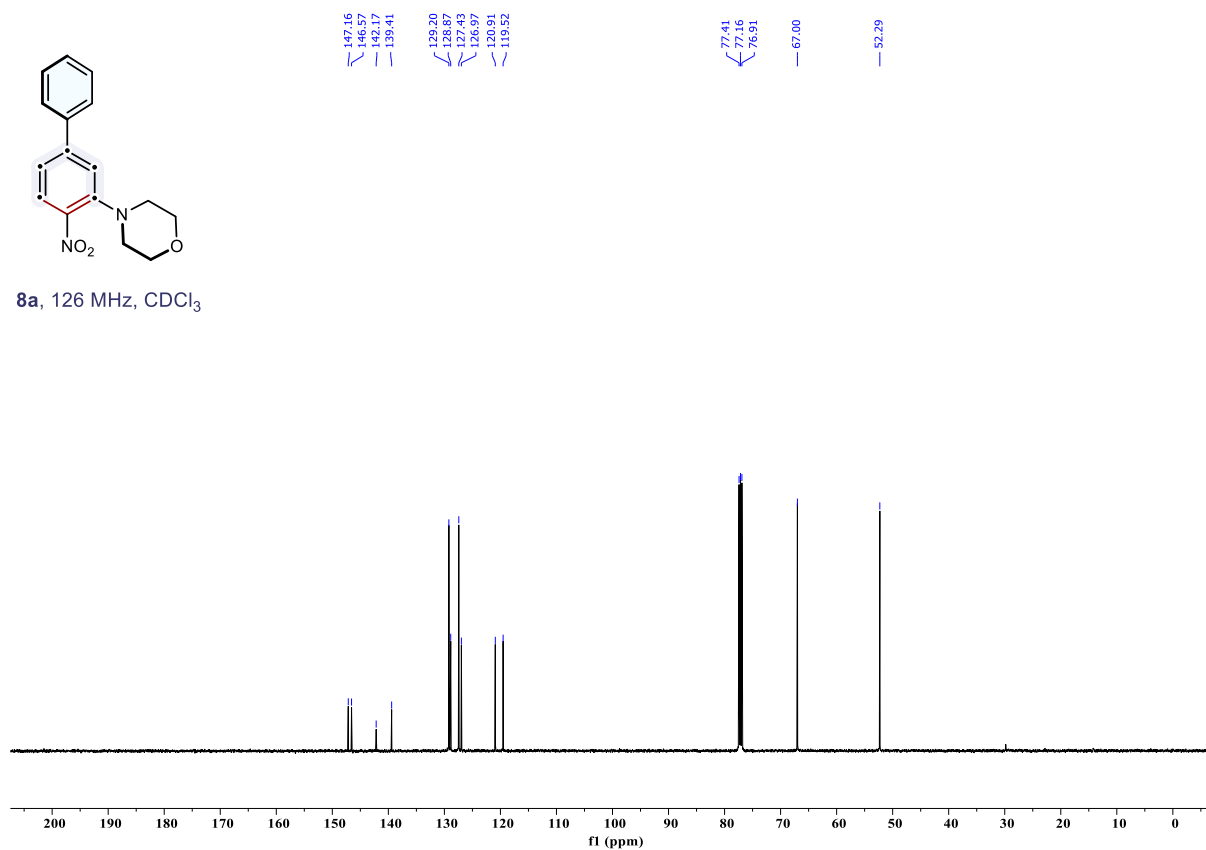


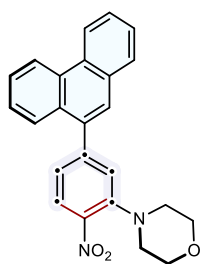


8a, 400 MHz, CDCl₃

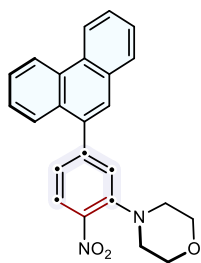
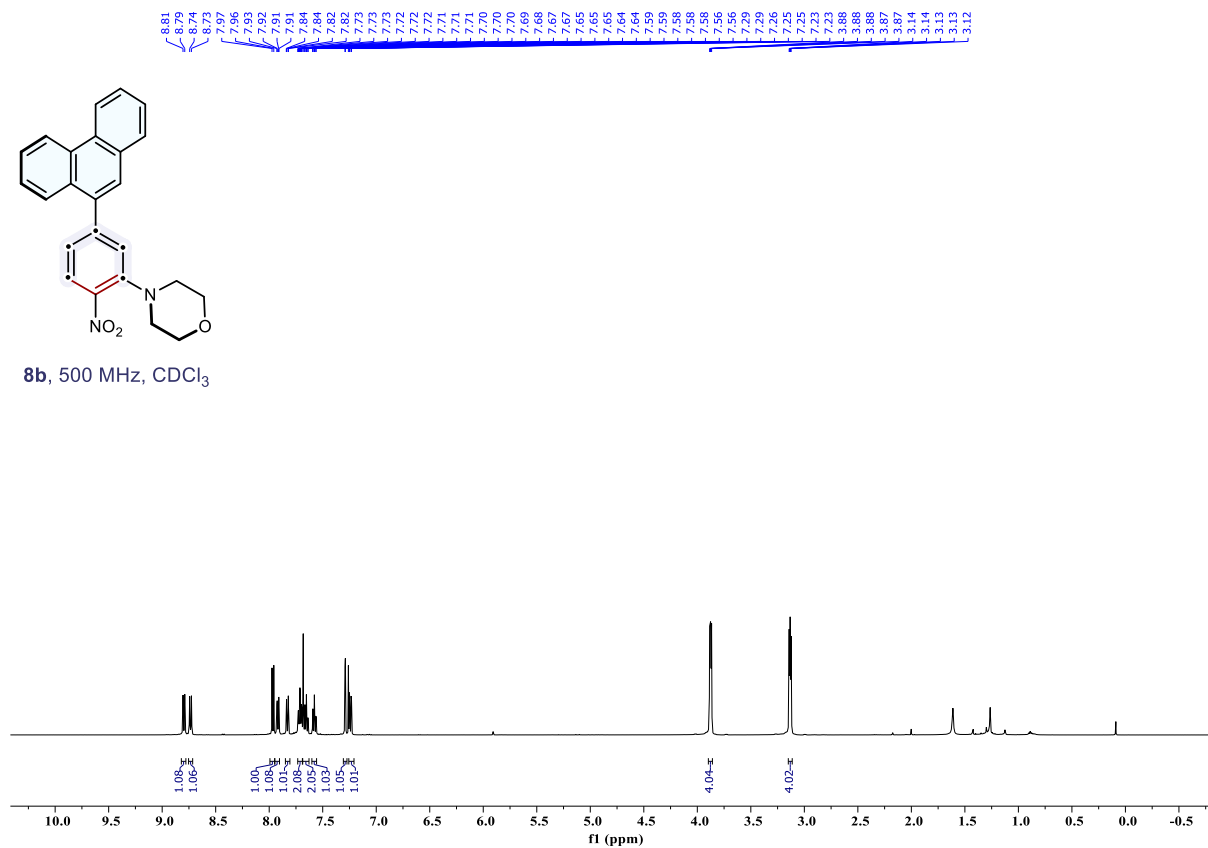


8a, 126 MHz, CDCl₃

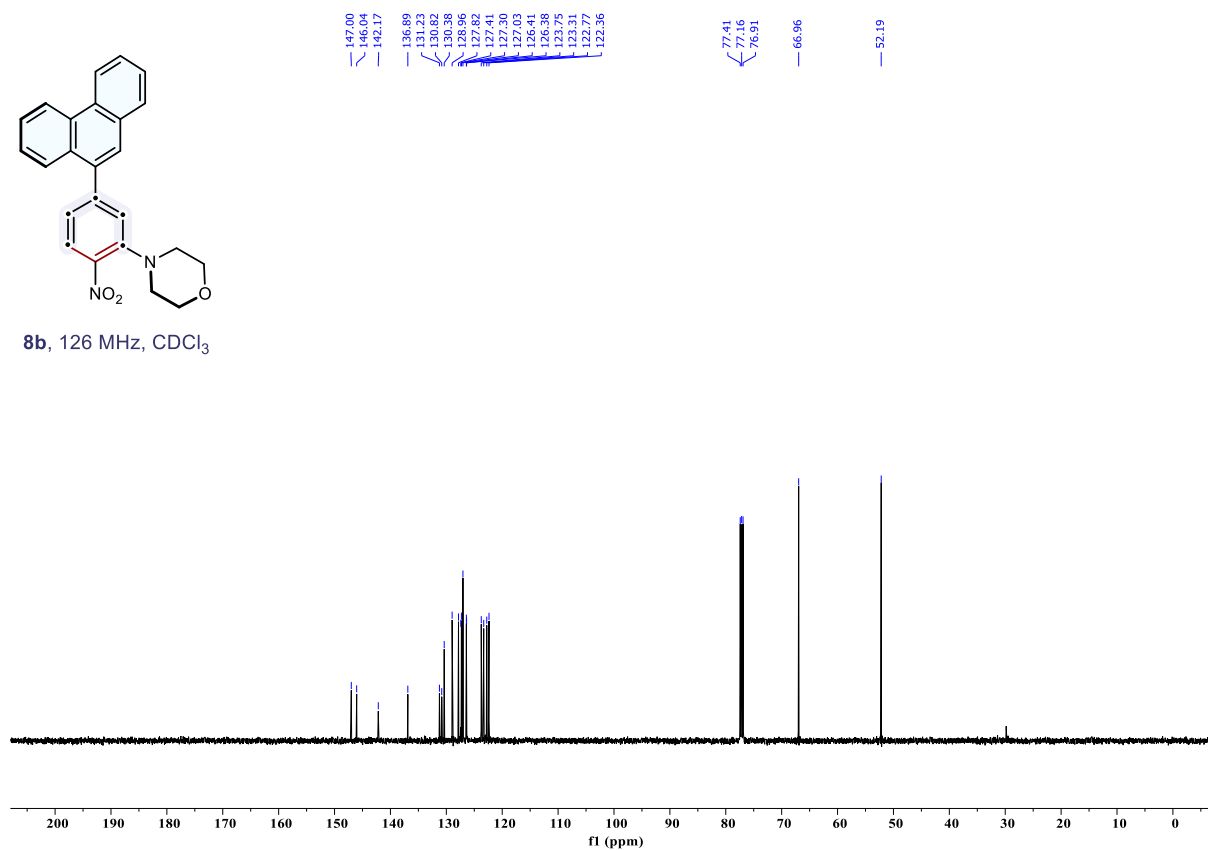




8b, 500 MHz, CDCl₃

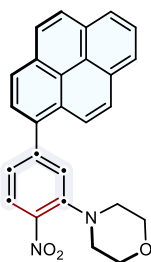


8b, 126 MHz, CDCl₃

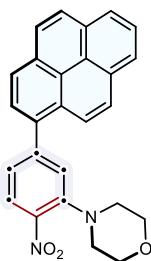
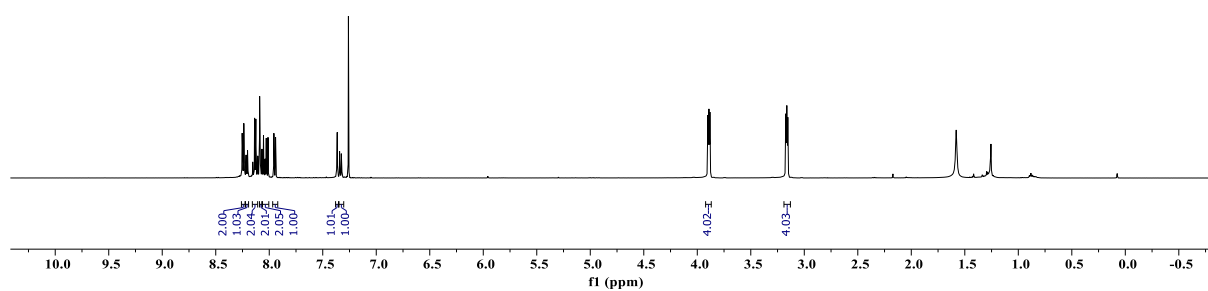


8.25
8.24
8.23
8.22
8.21
8.20
8.15
8.14
8.13
8.11
8.09
8.08
8.05
8.04
8.03
8.01
7.96
7.94
7.92
7.86
7.84
7.34
7.33
7.32
7.26

3.90
3.90
3.89
3.88
3.17
3.17
3.16
3.15



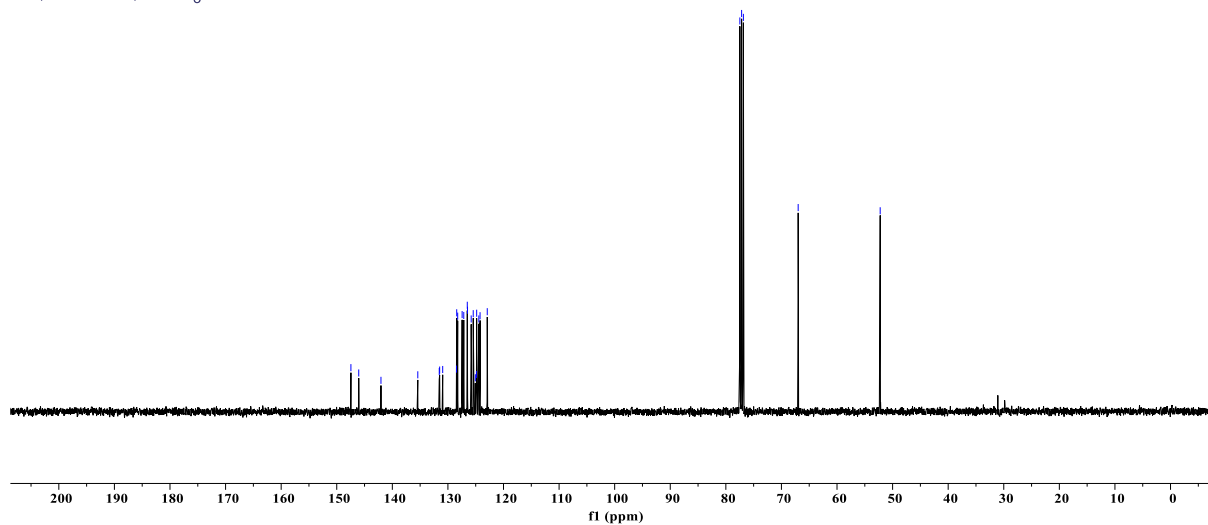
8c, 400 MHz, CDCl₃

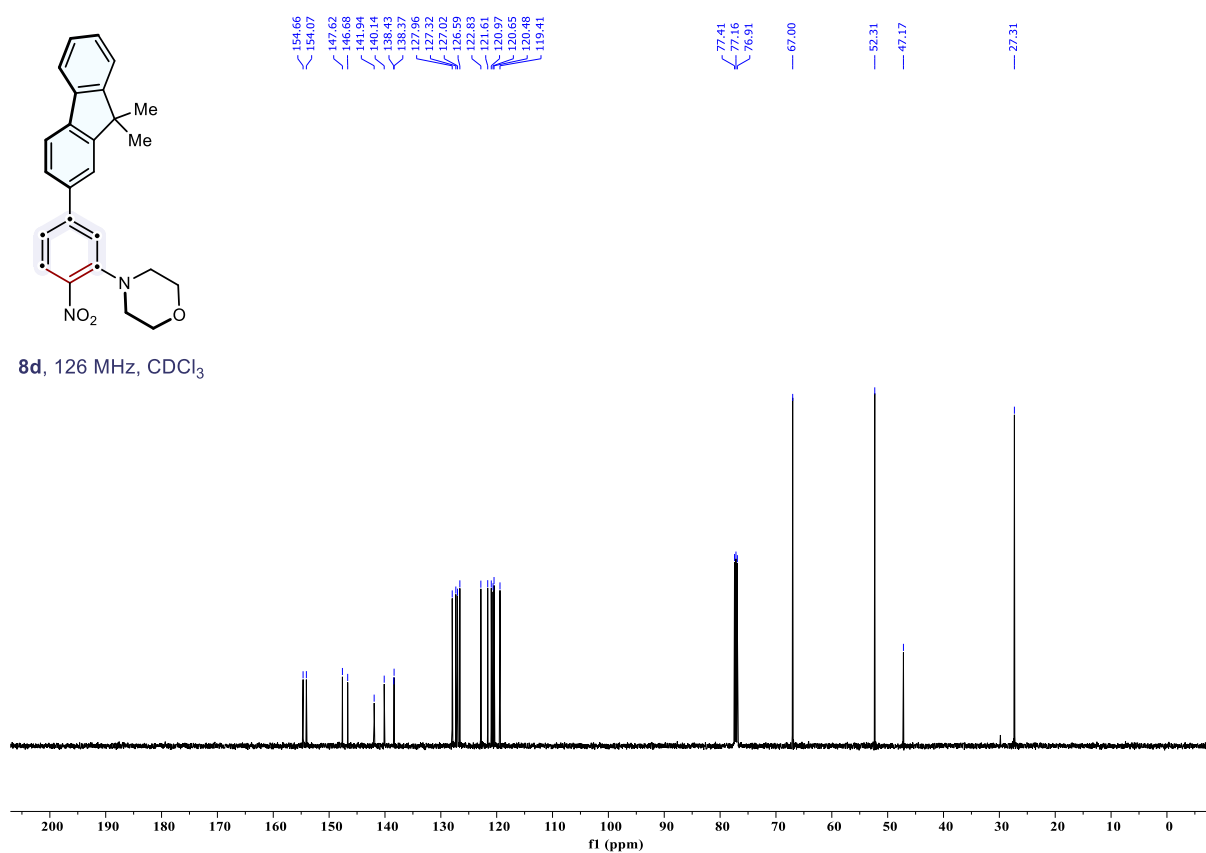
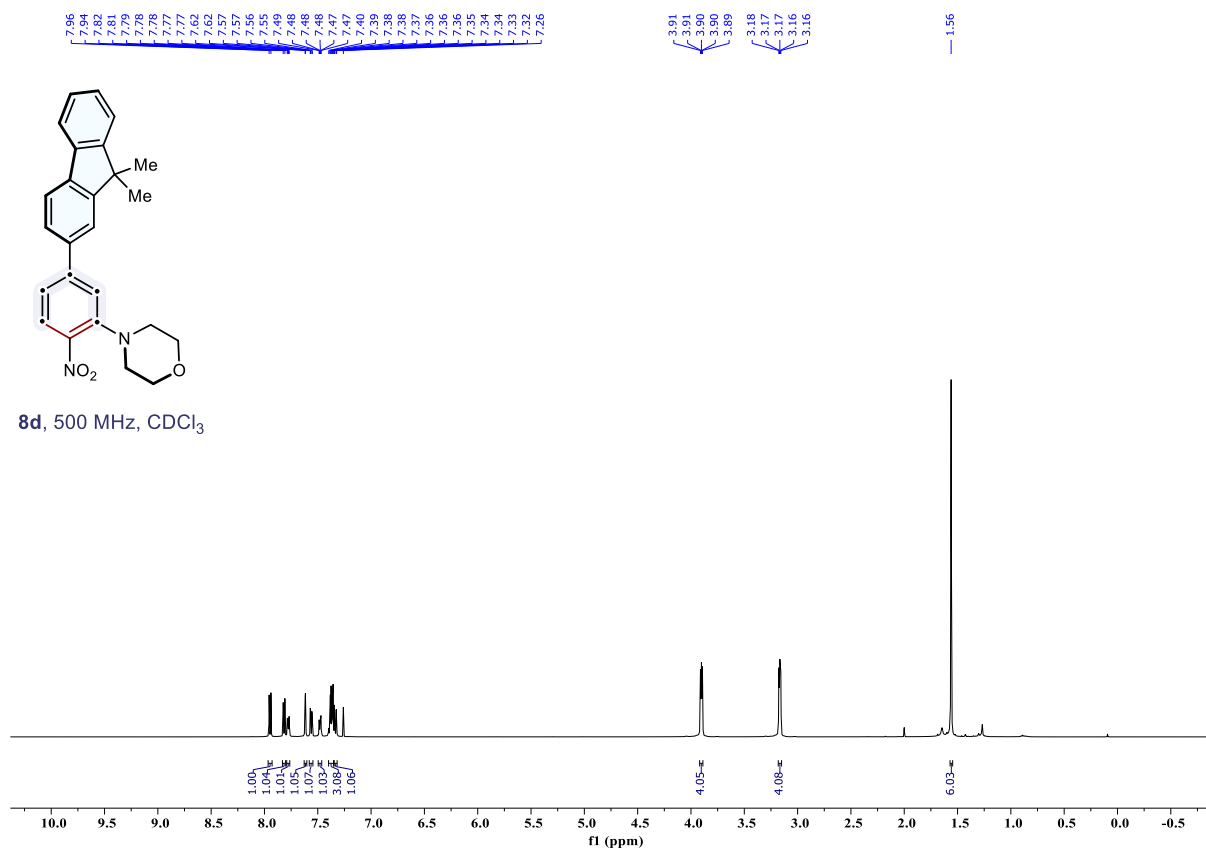


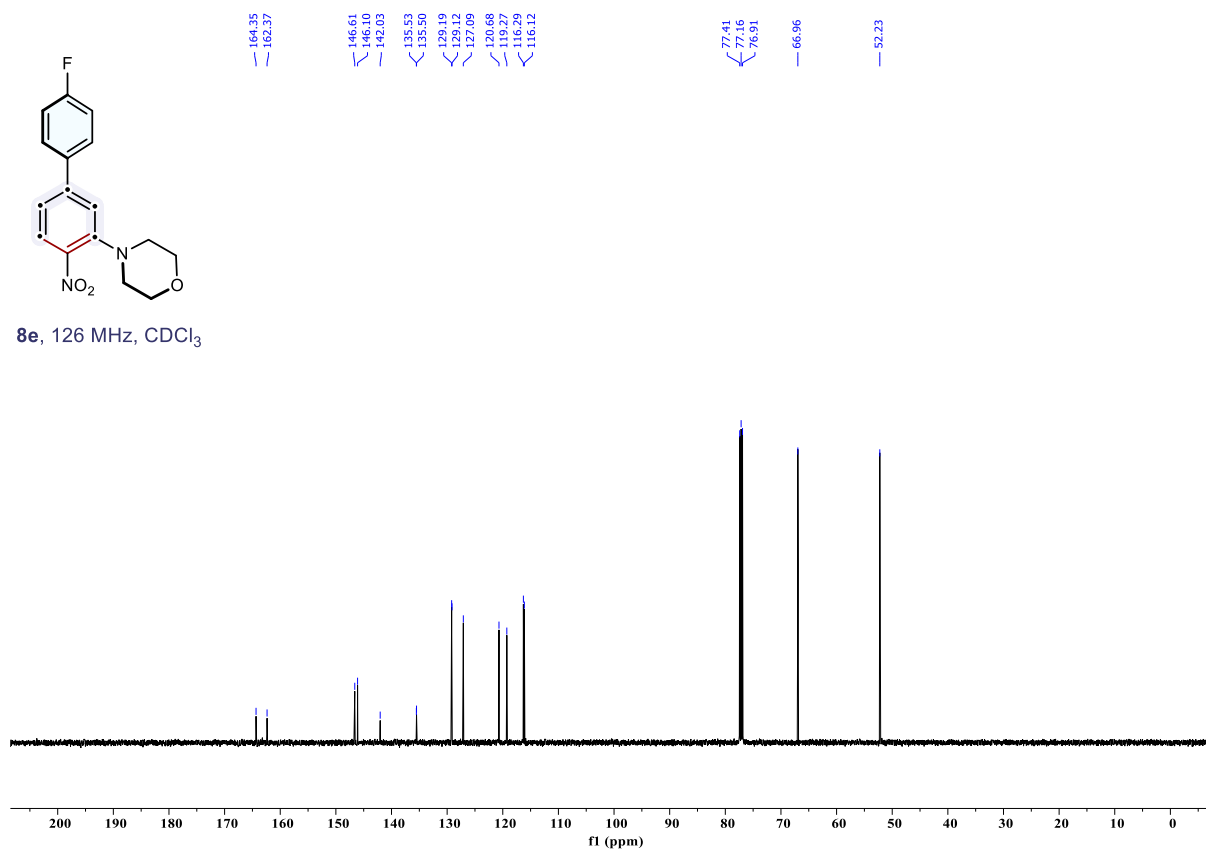
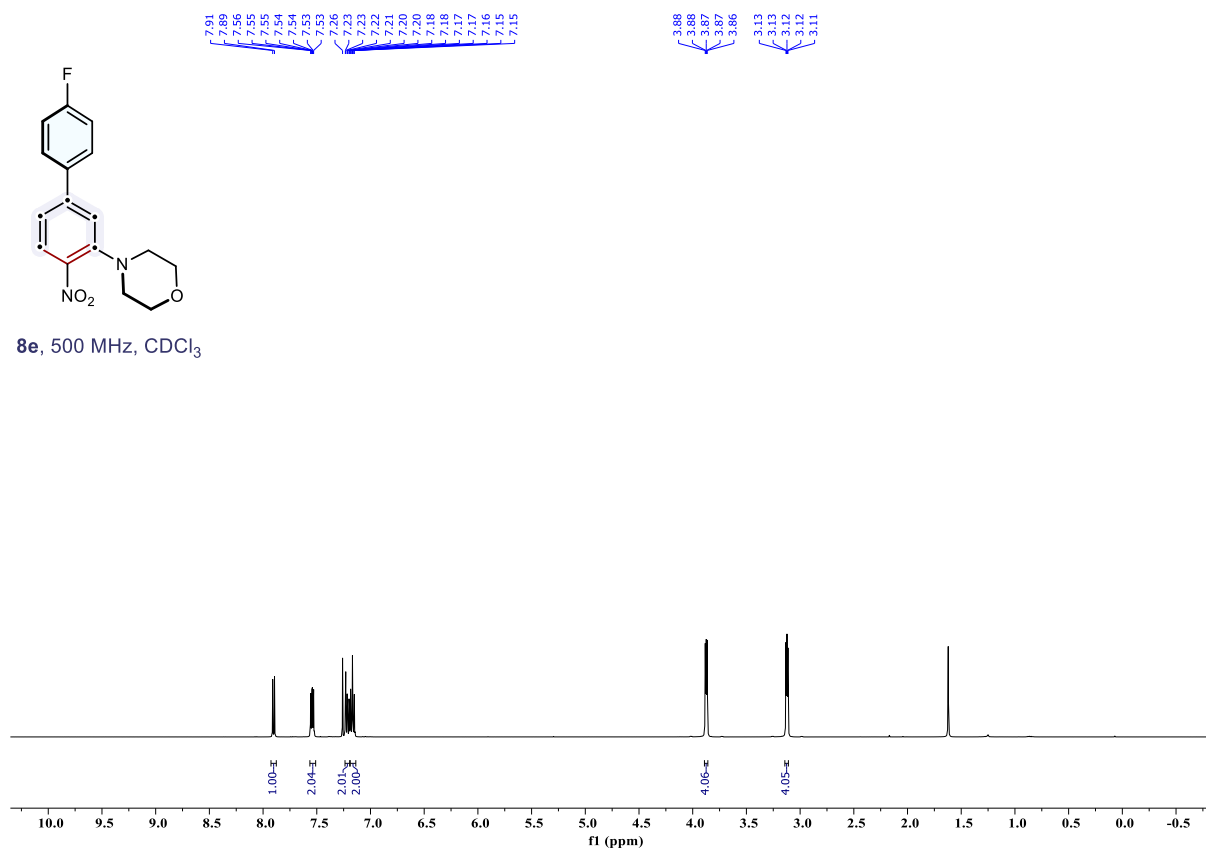
8c, 101 MHz, CDCl₃

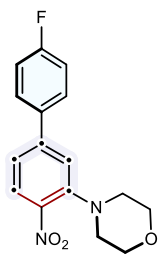
147.45
146.04
146.04
135.42
131.56
131.49
130.94
128.46
128.42
128.24
127.44
127.15
126.81
126.48
125.81
125.45
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124.87
124.83
124.44
124.32
122.92

77.48
77.16
76.84
66.99
52.23

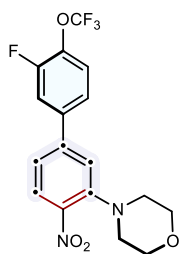
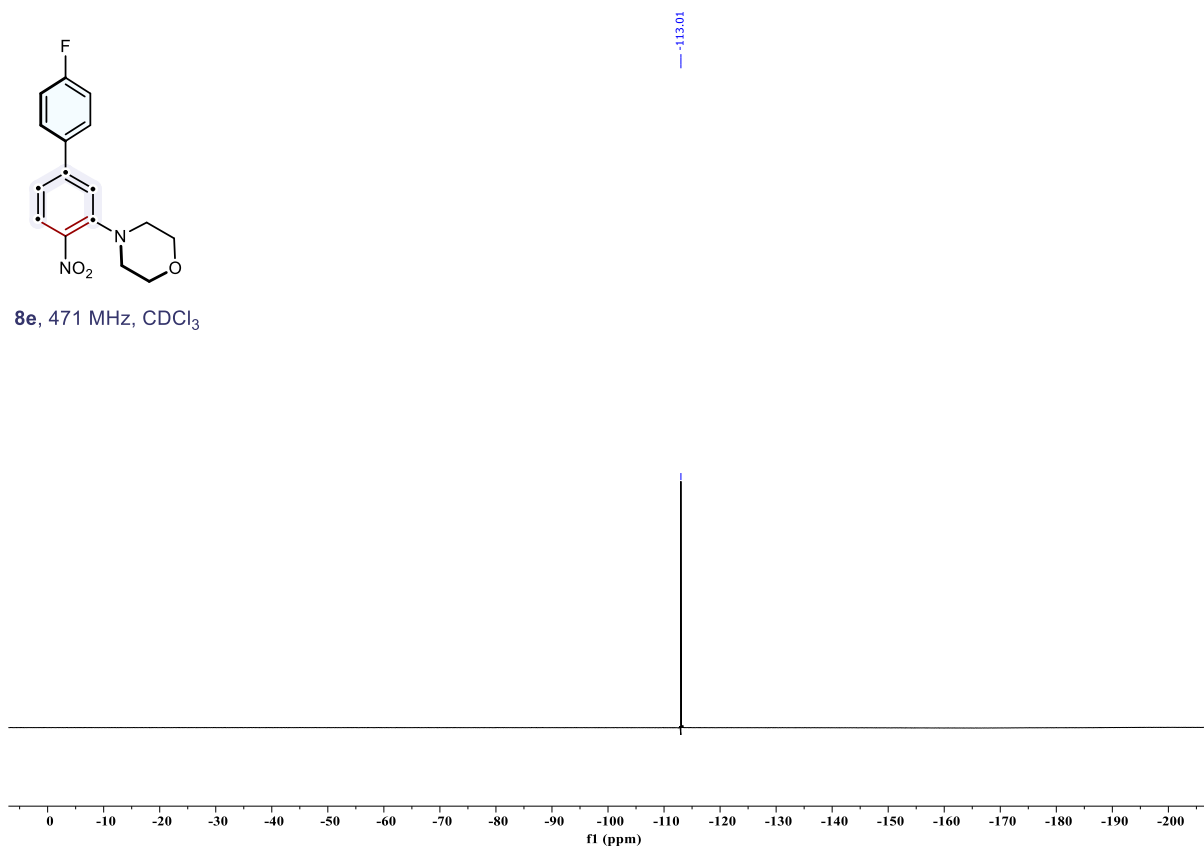




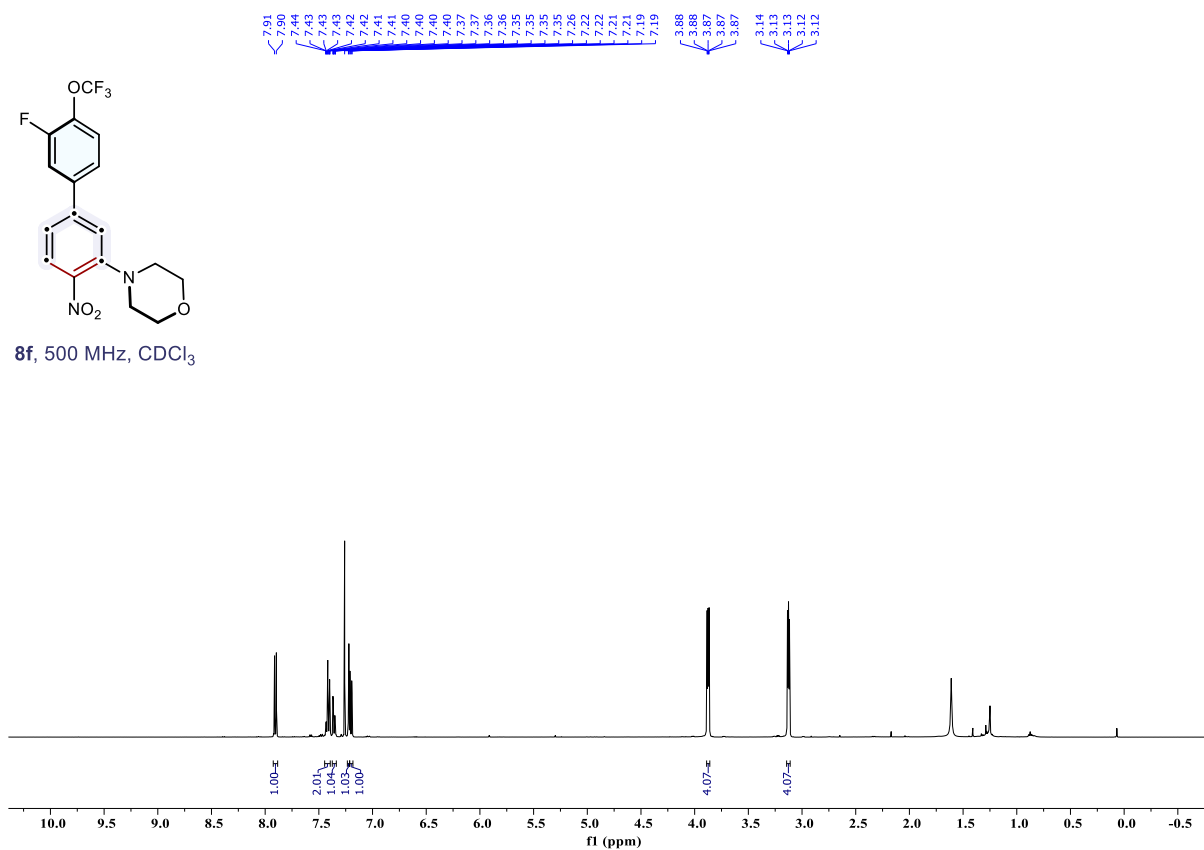


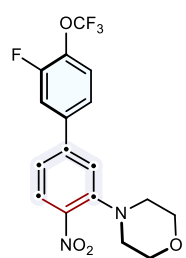


8e, 471 MHz, CDCl₃

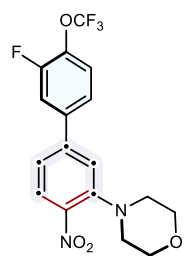
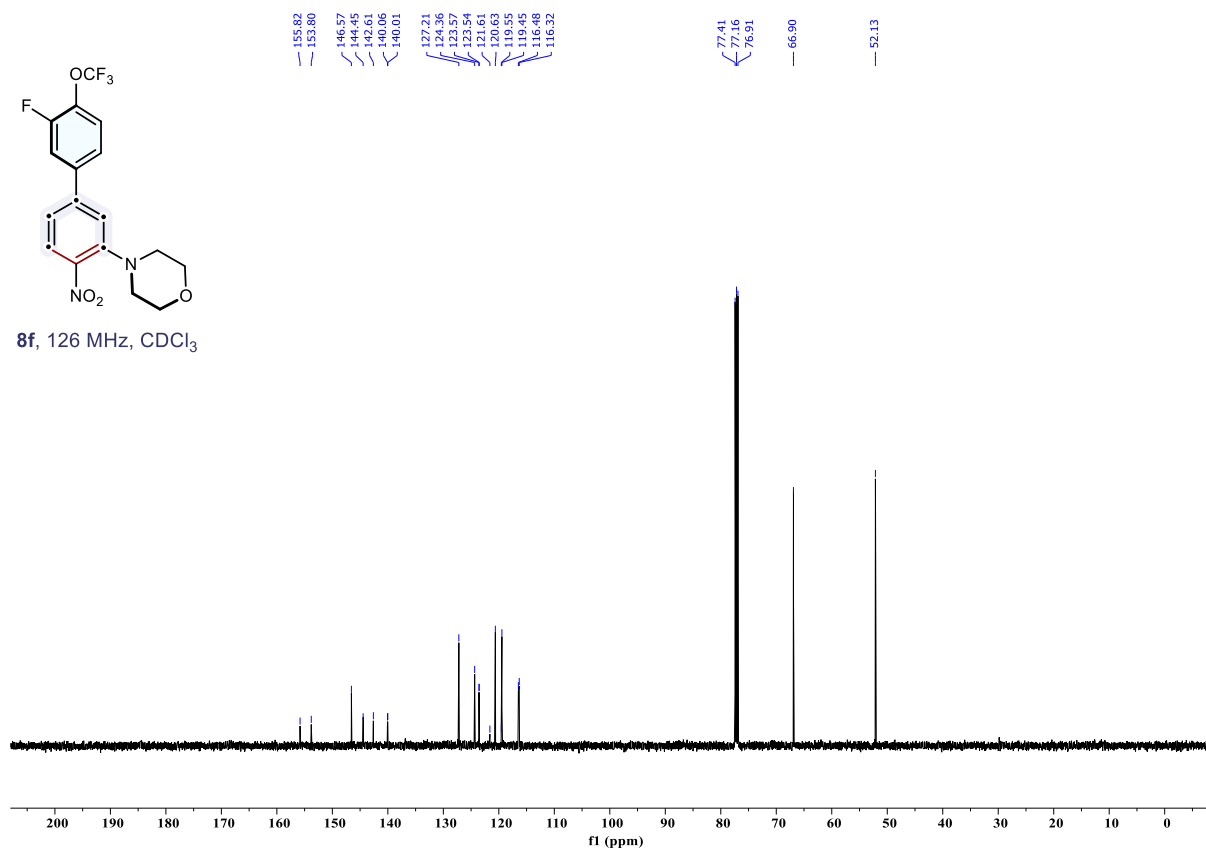


8f, 500 MHz, CDCl₃

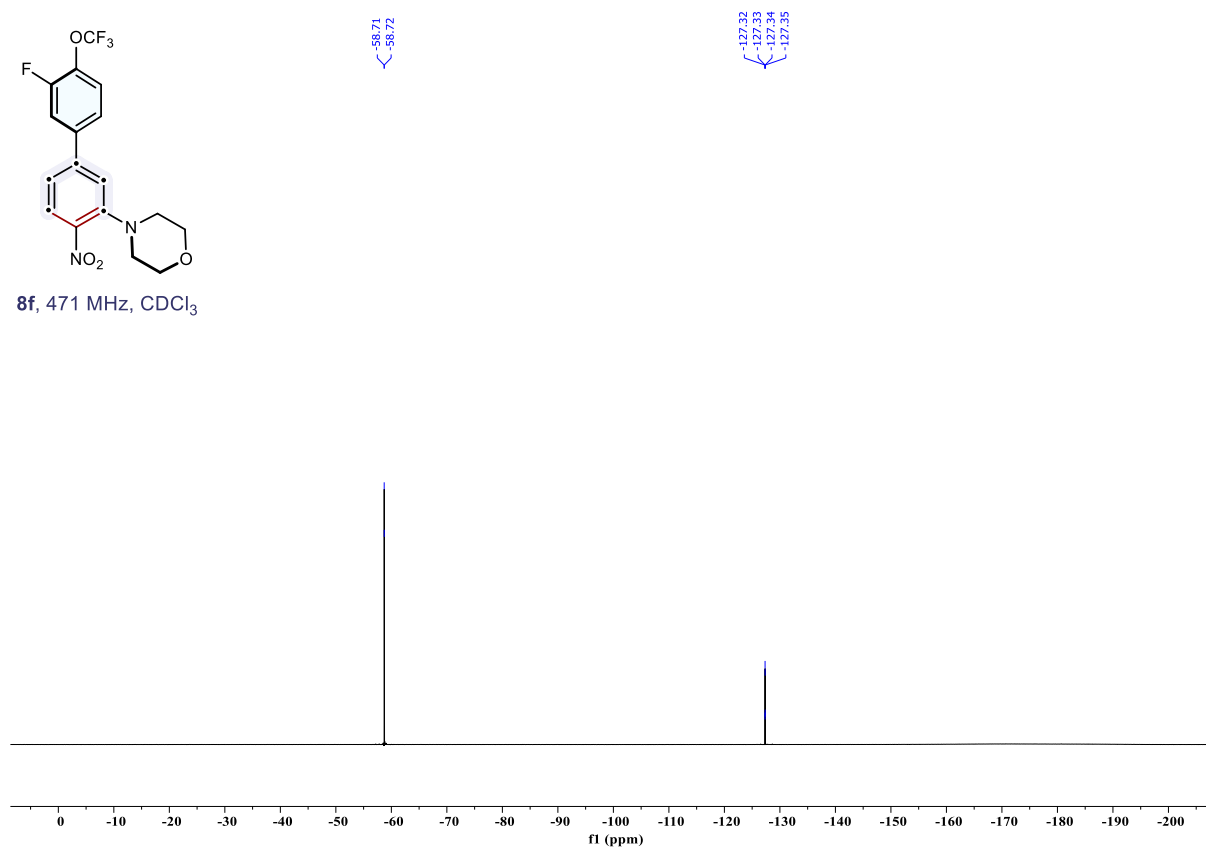


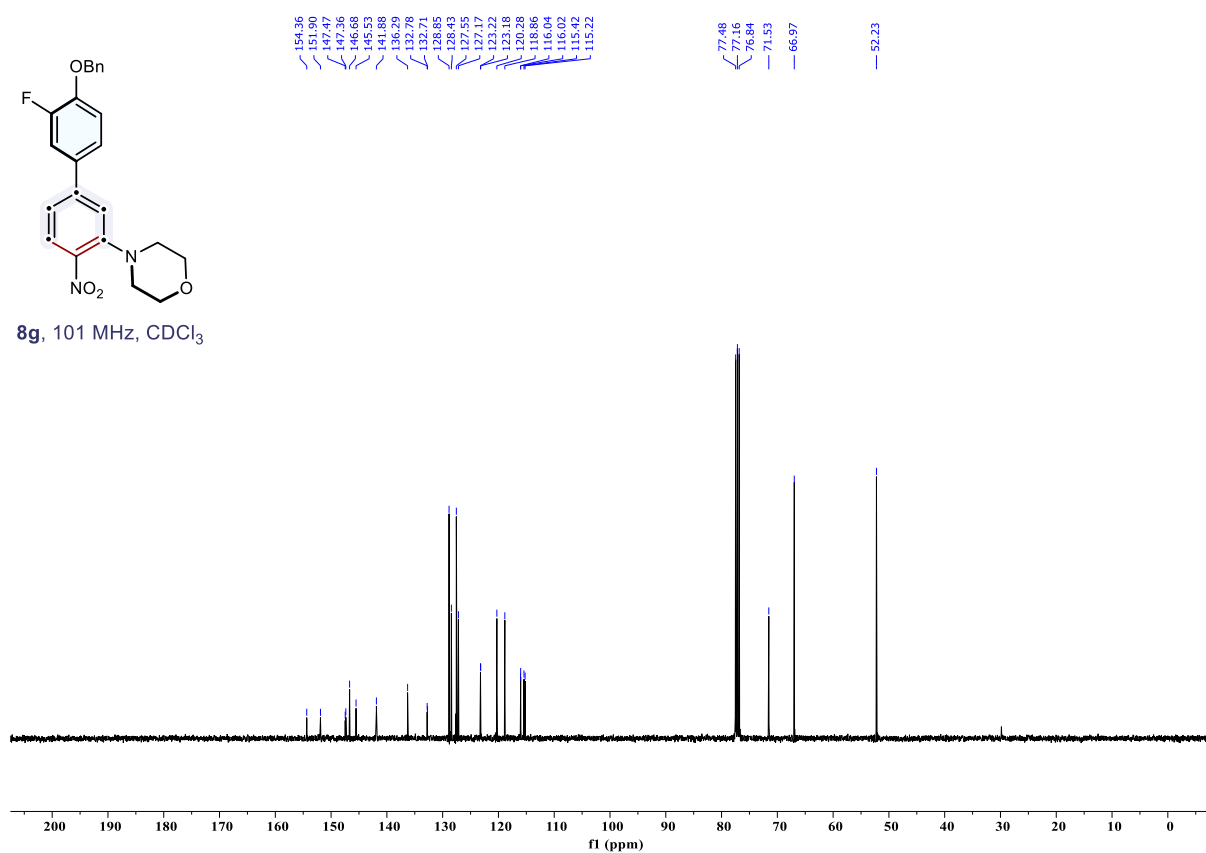
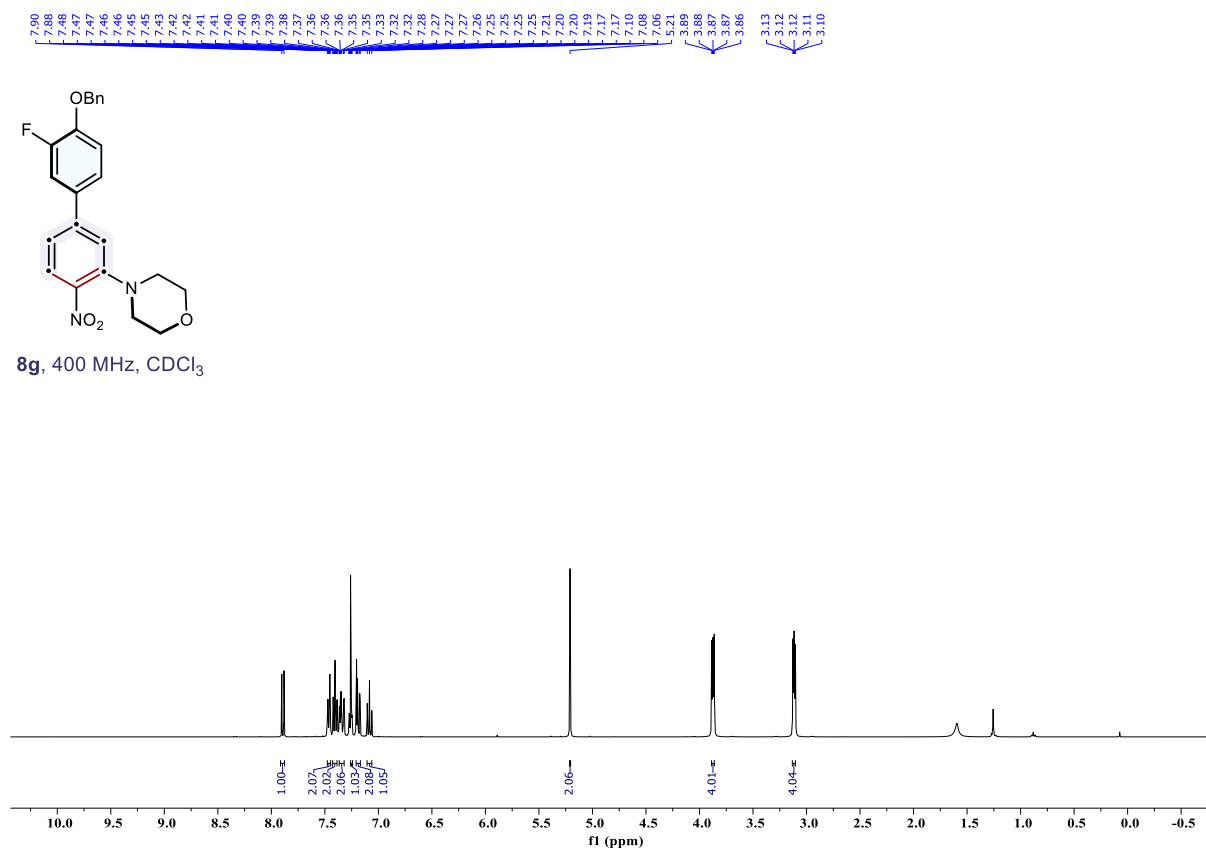


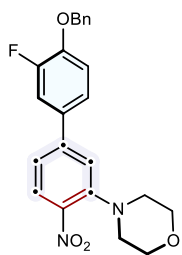
8f, 126 MHz, CDCl₃



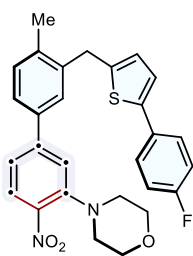
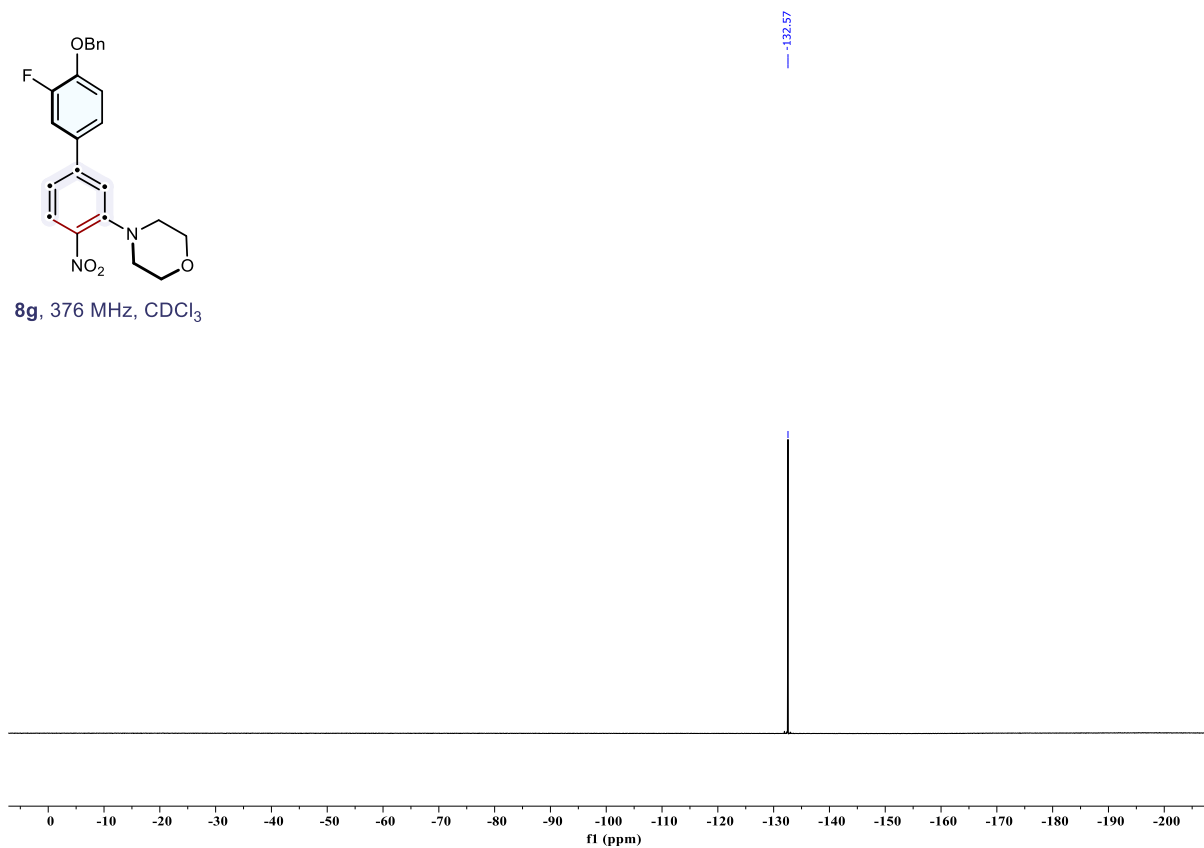
8f, 471 MHz, CDCl₃



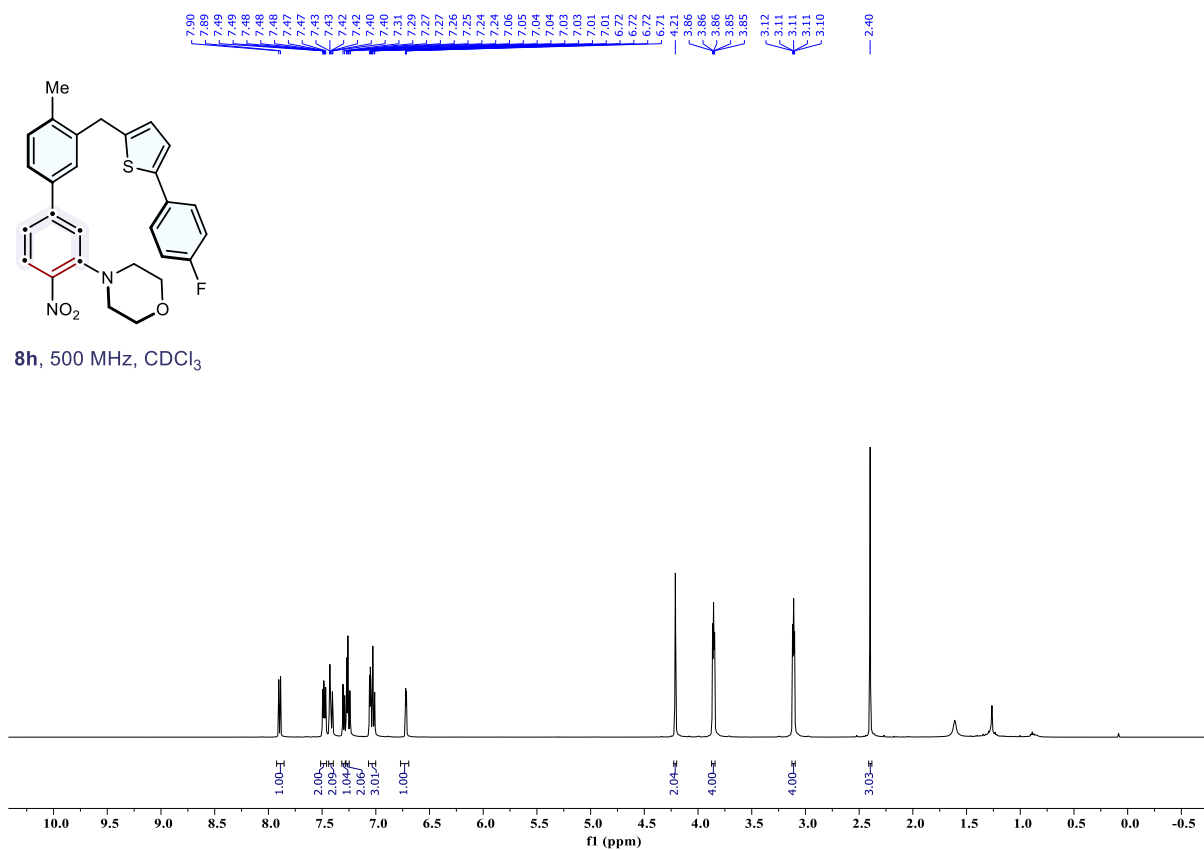


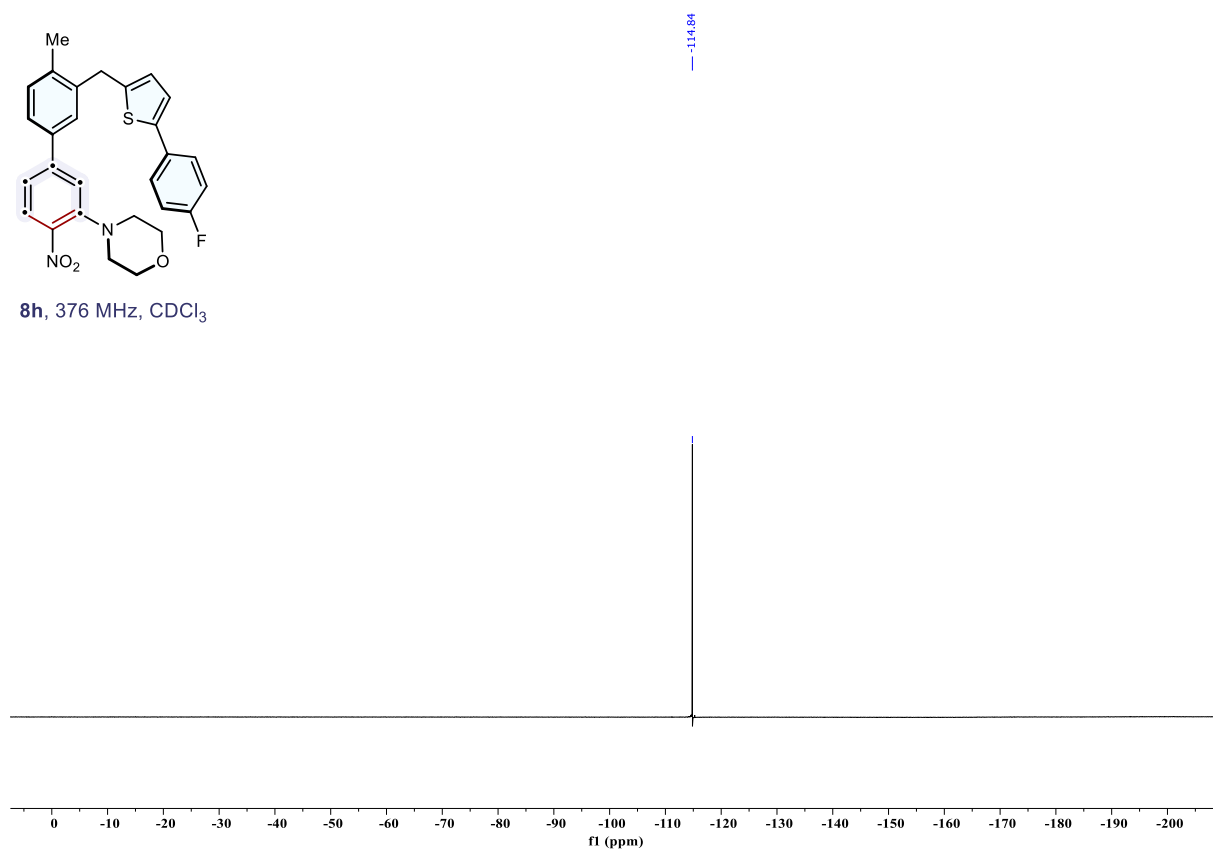
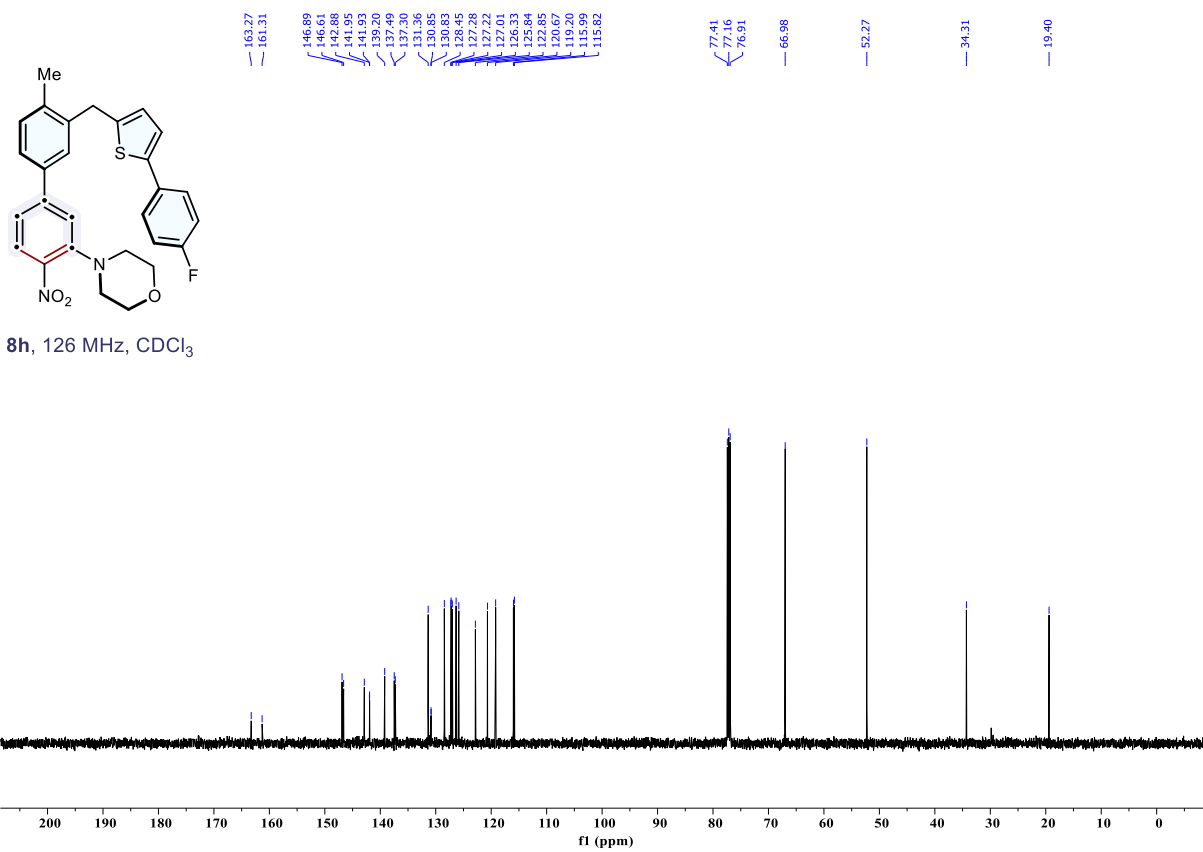


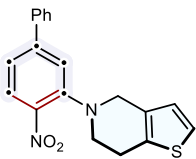
8g, 376 MHz, CDCl₃



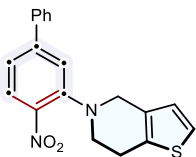
8h, 500 MHz, CDCl₃



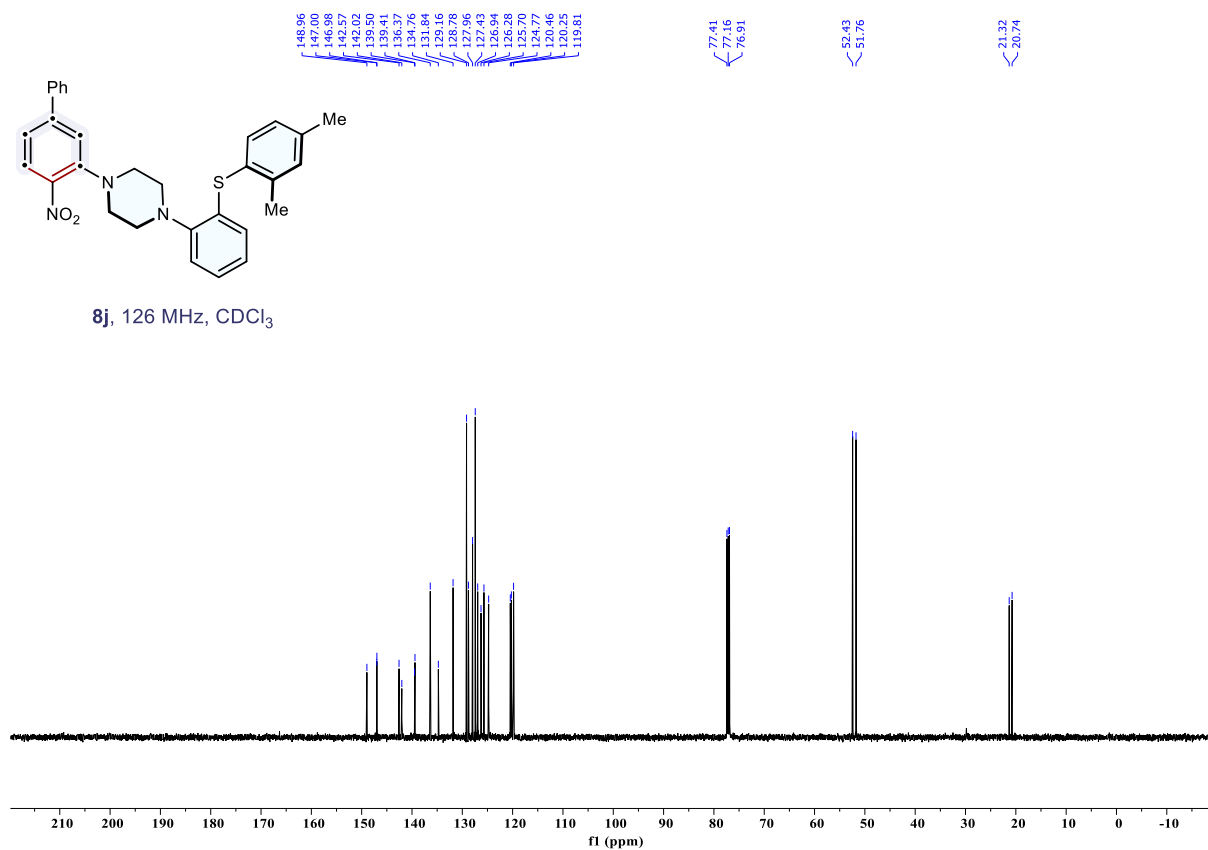
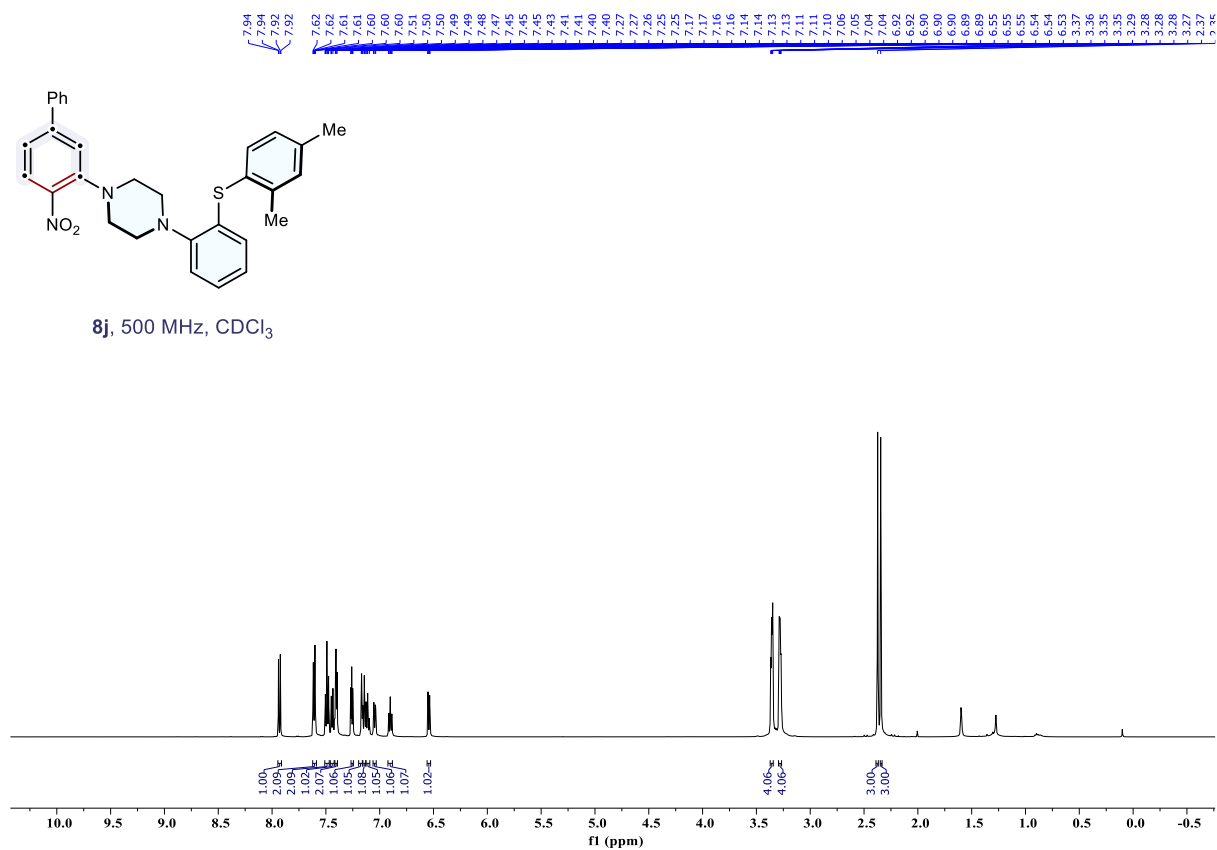


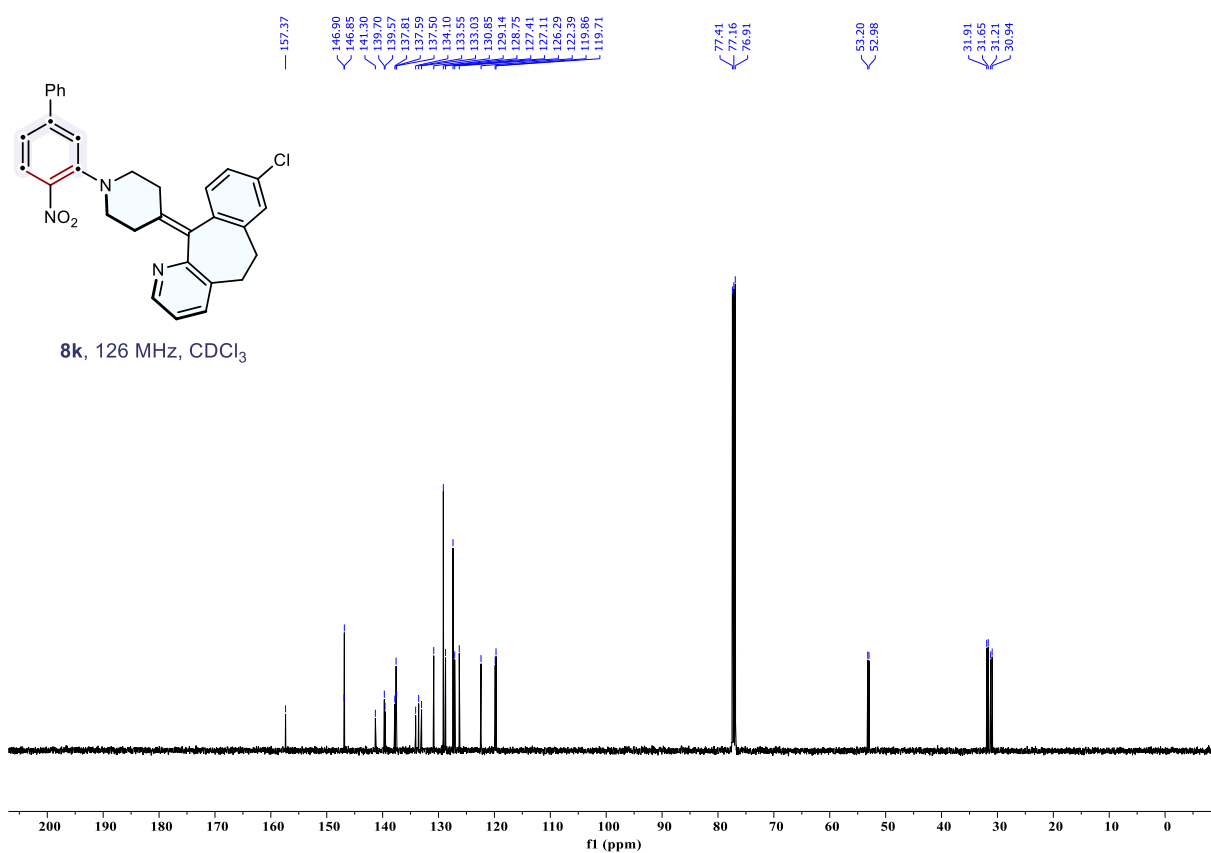
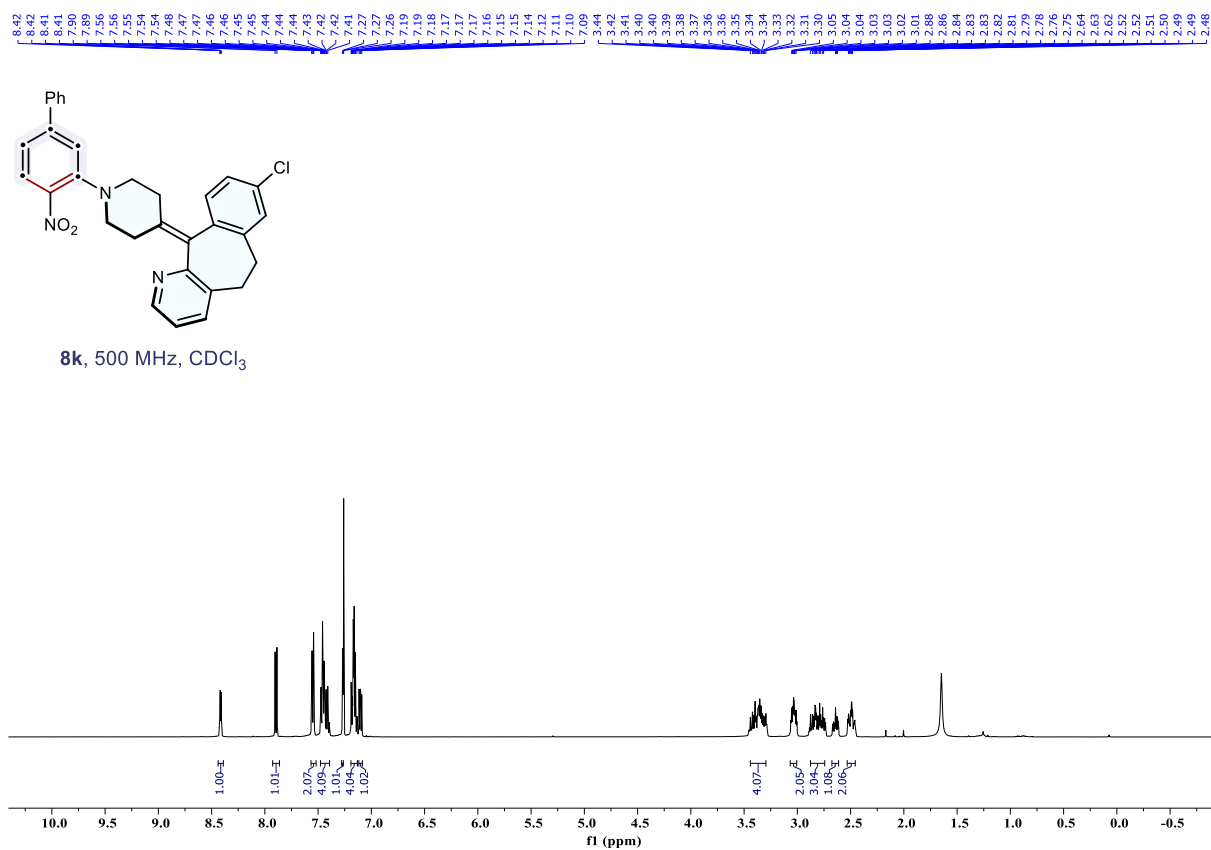


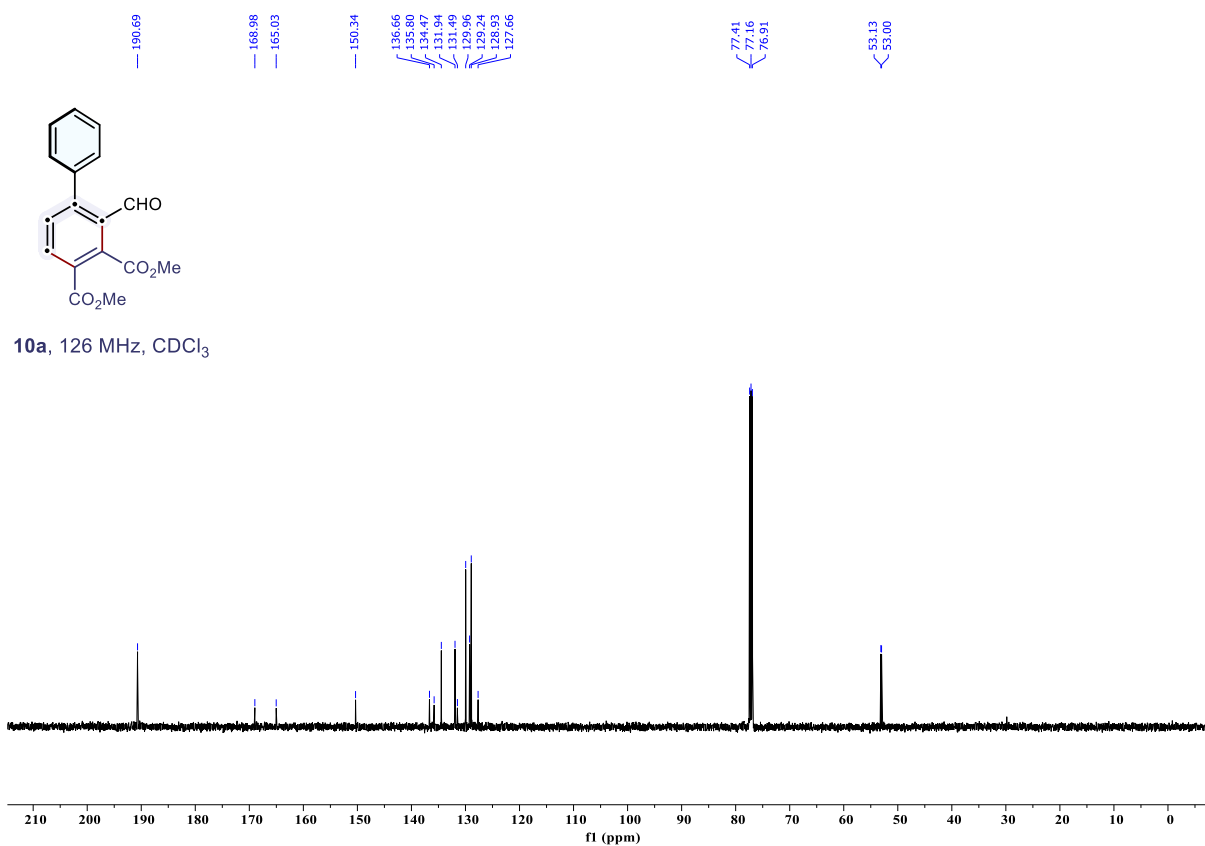
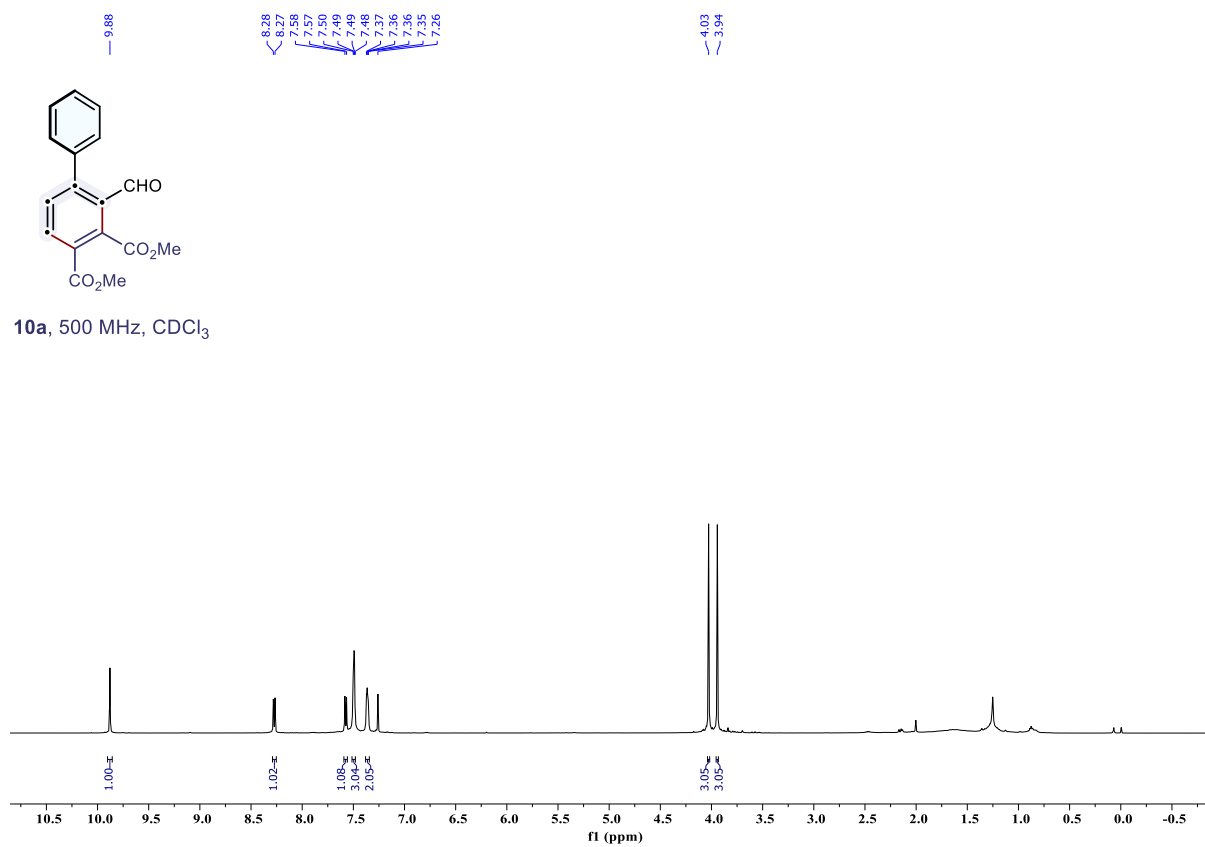
8i, 500 MHz, CDCl₃

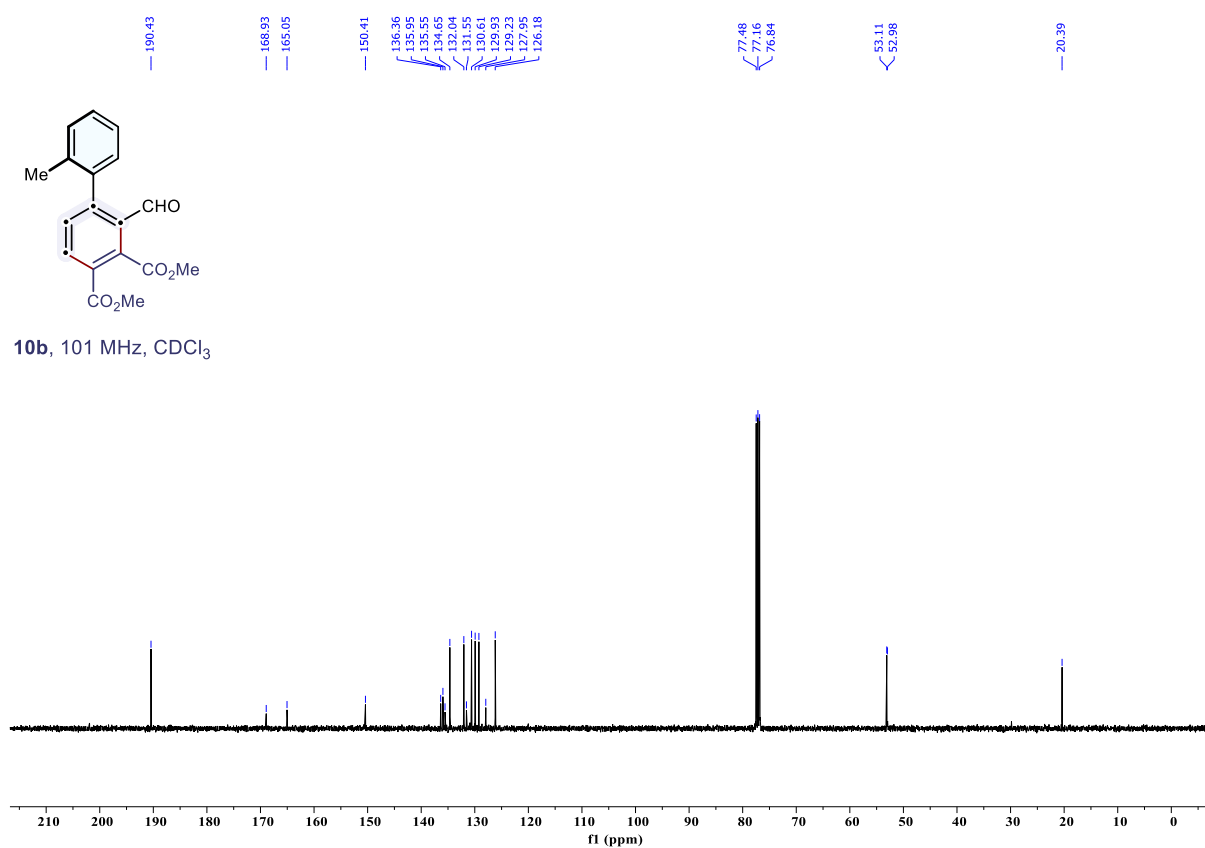
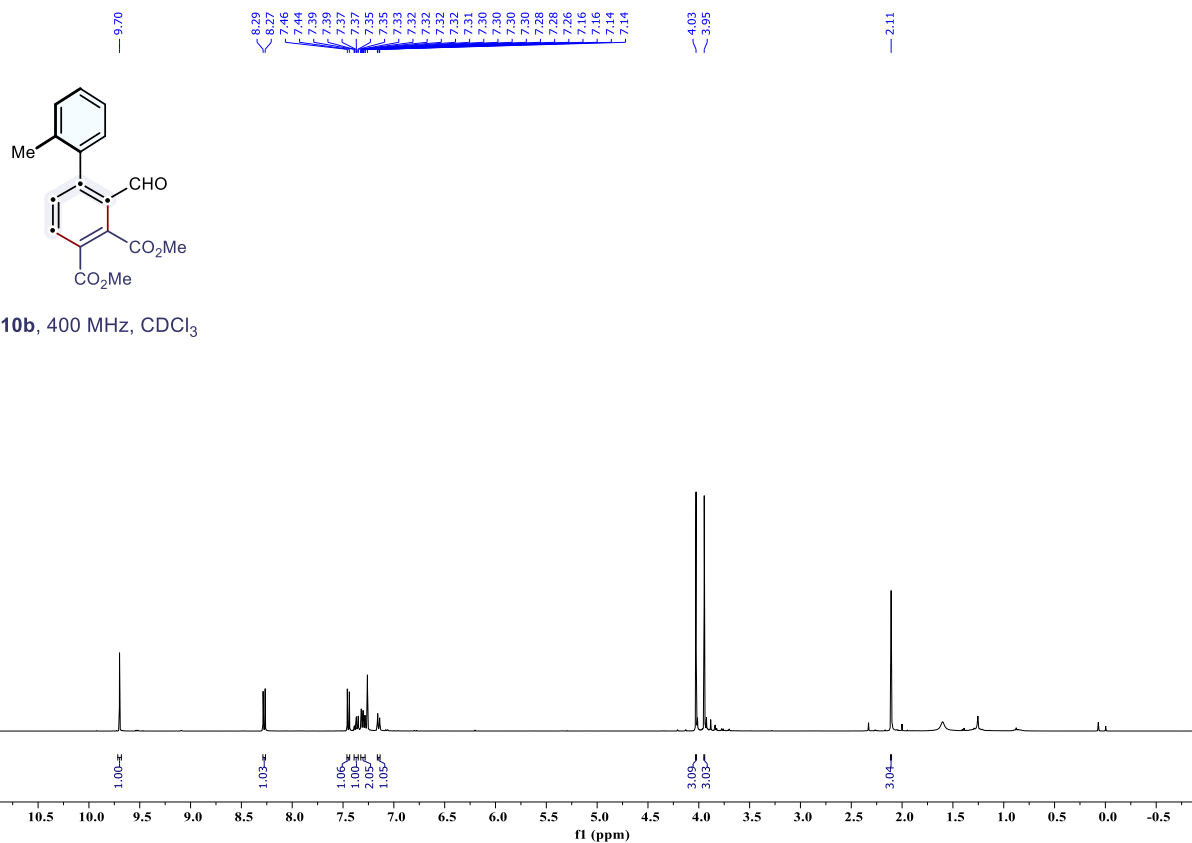


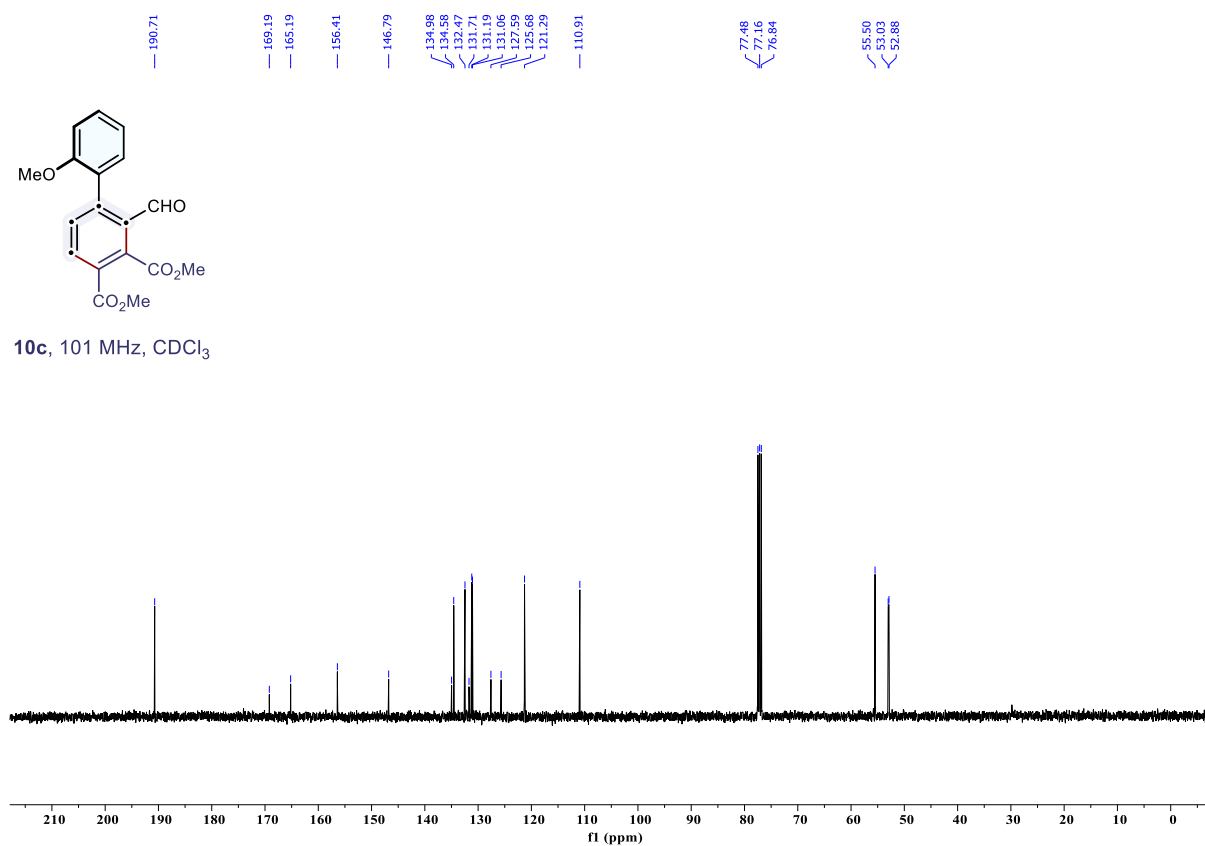
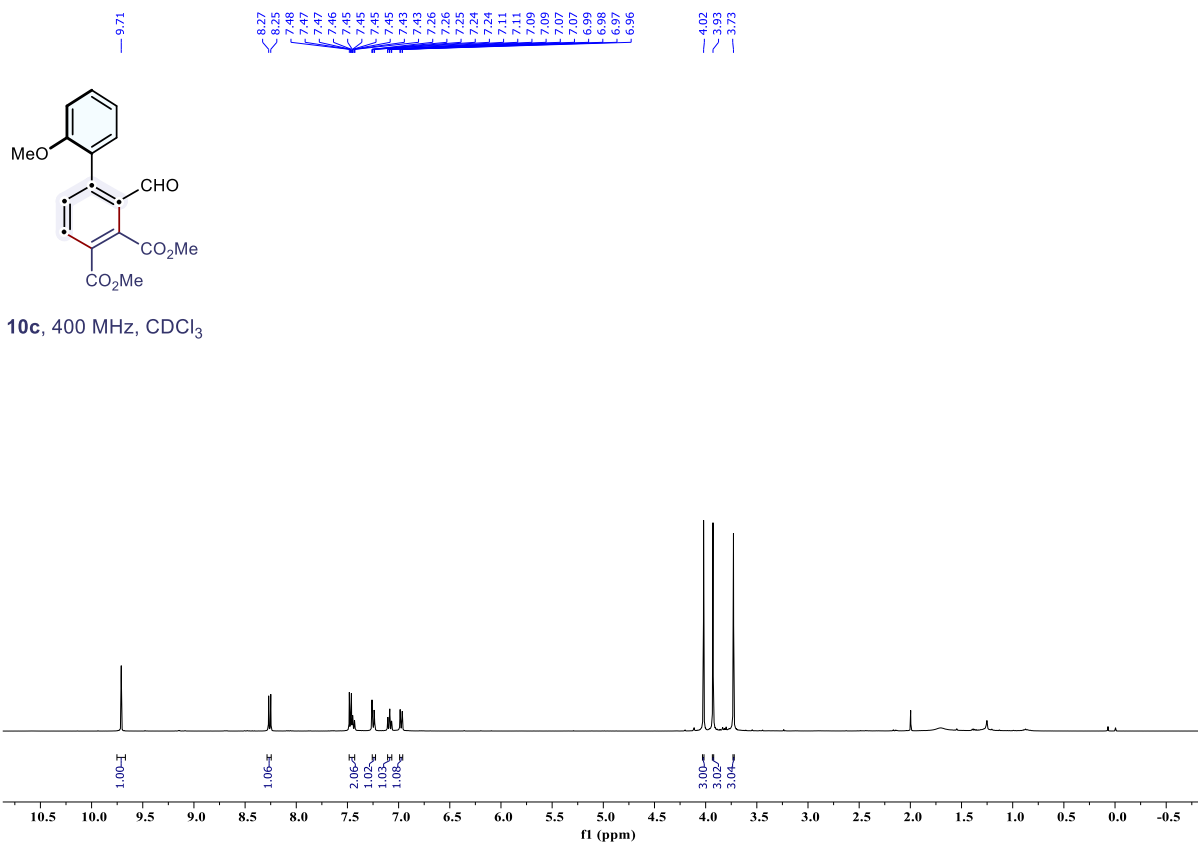
8i, 101 MHz, CDCl₃

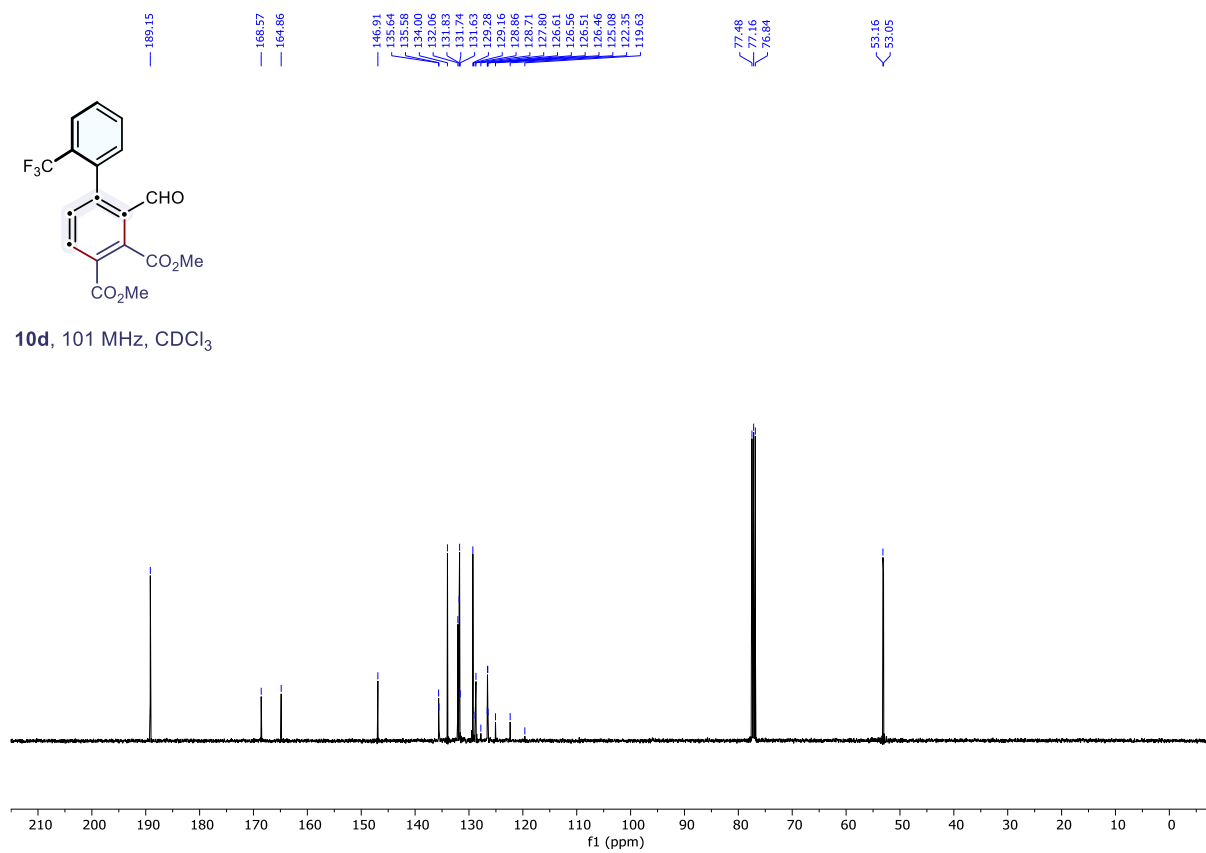
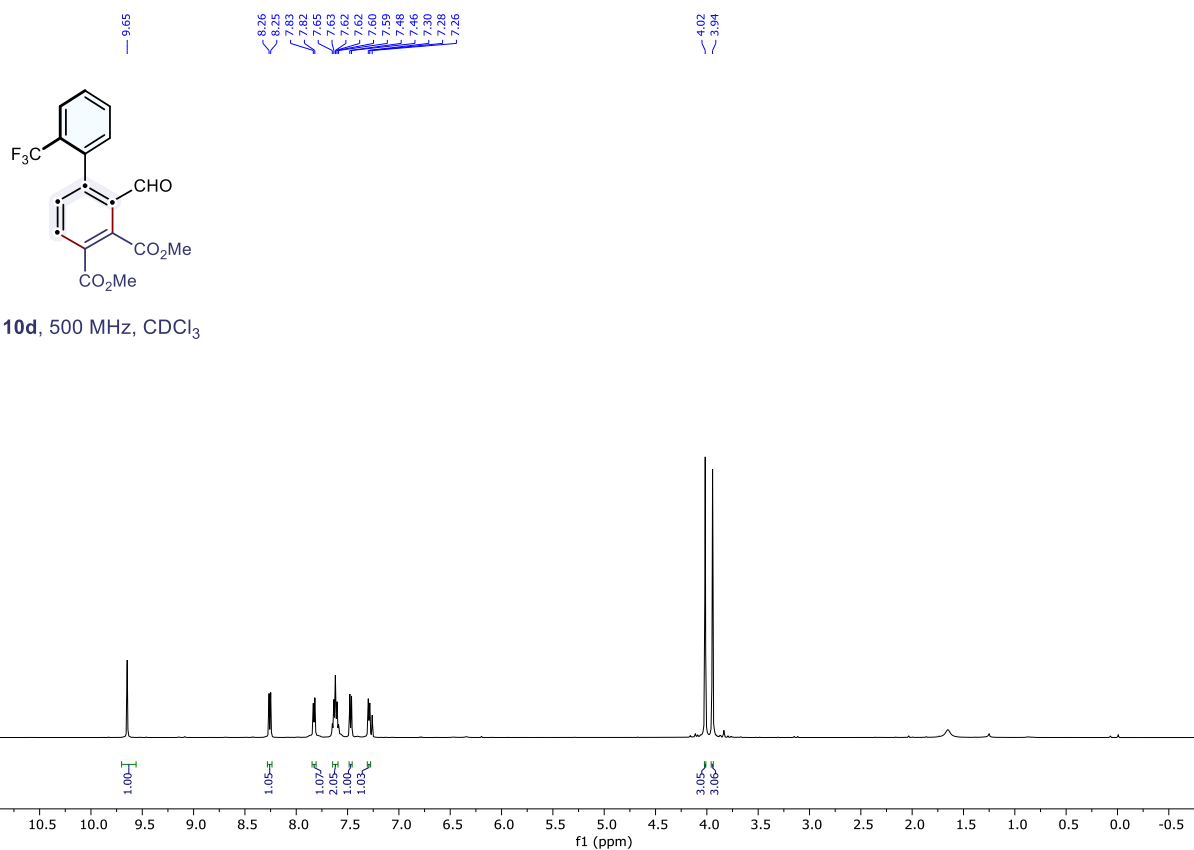


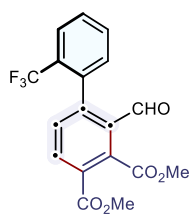




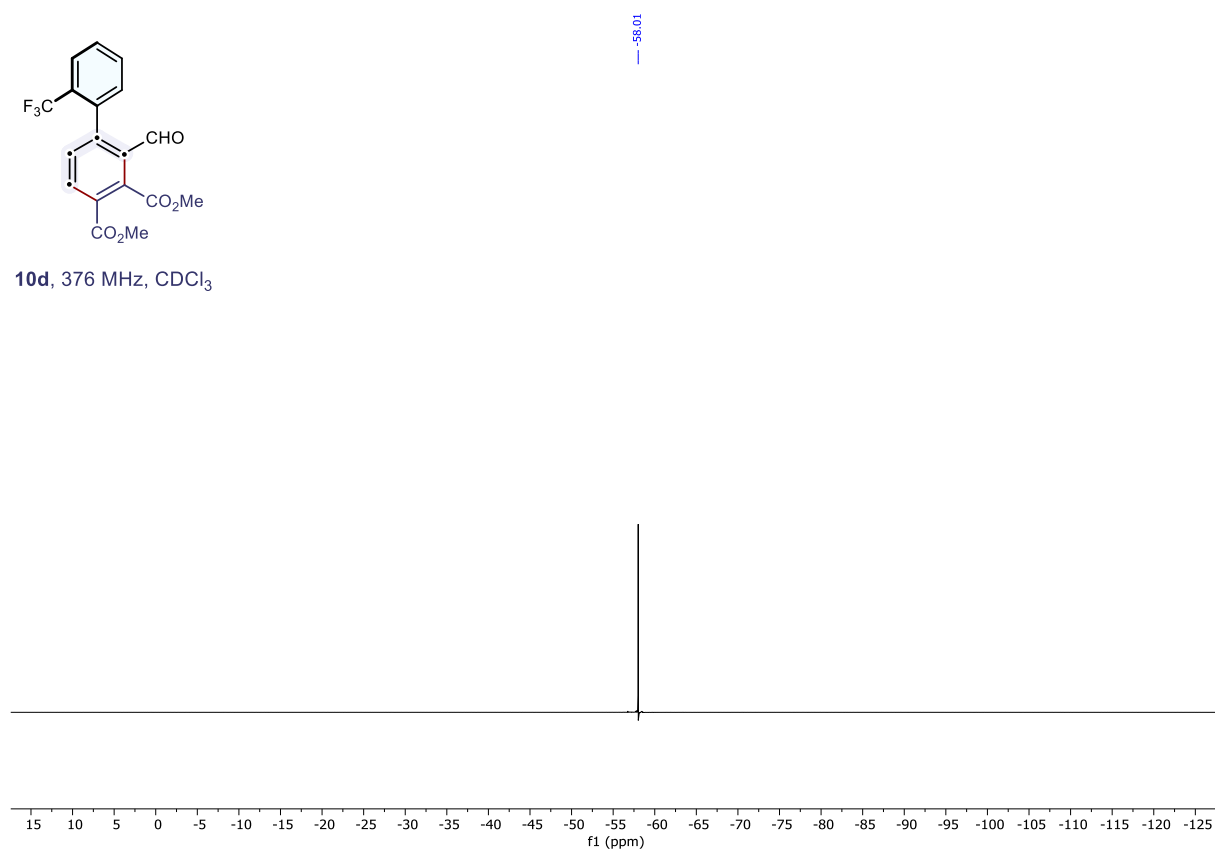


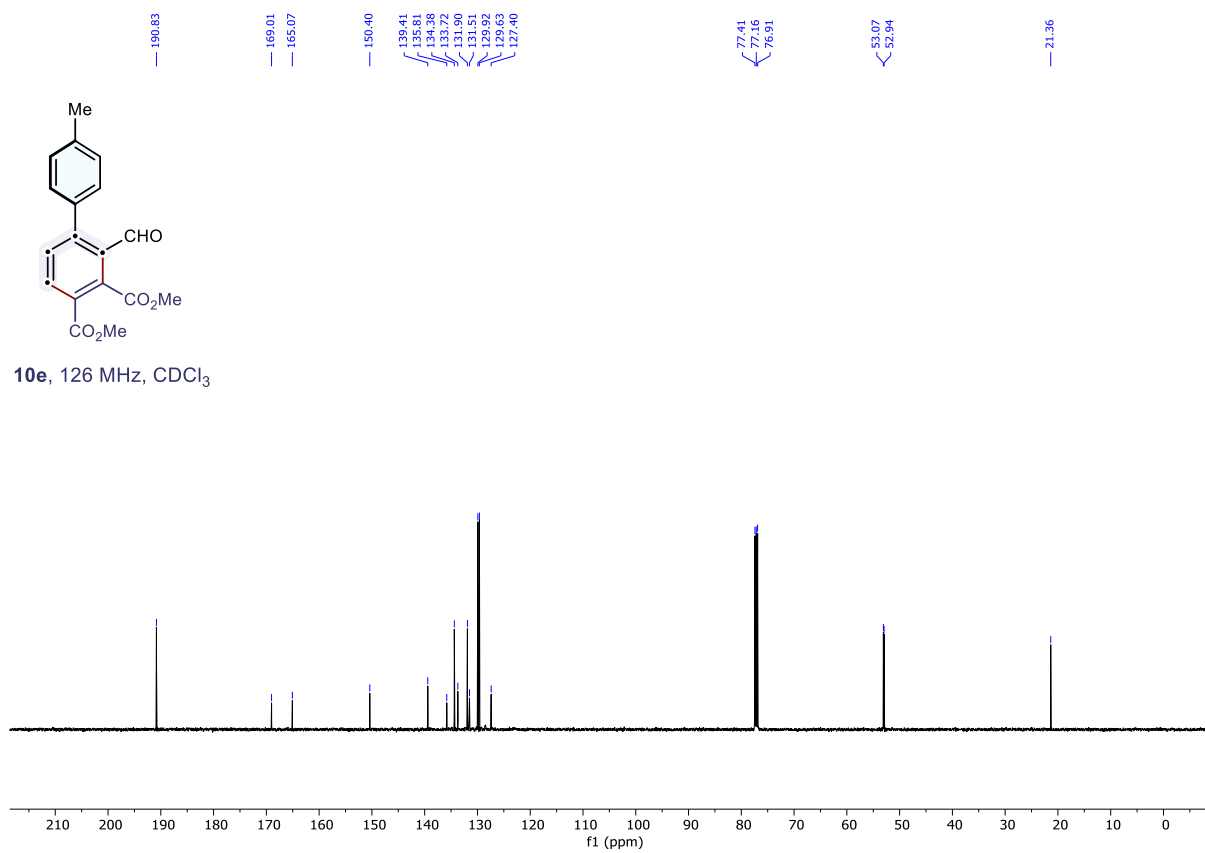
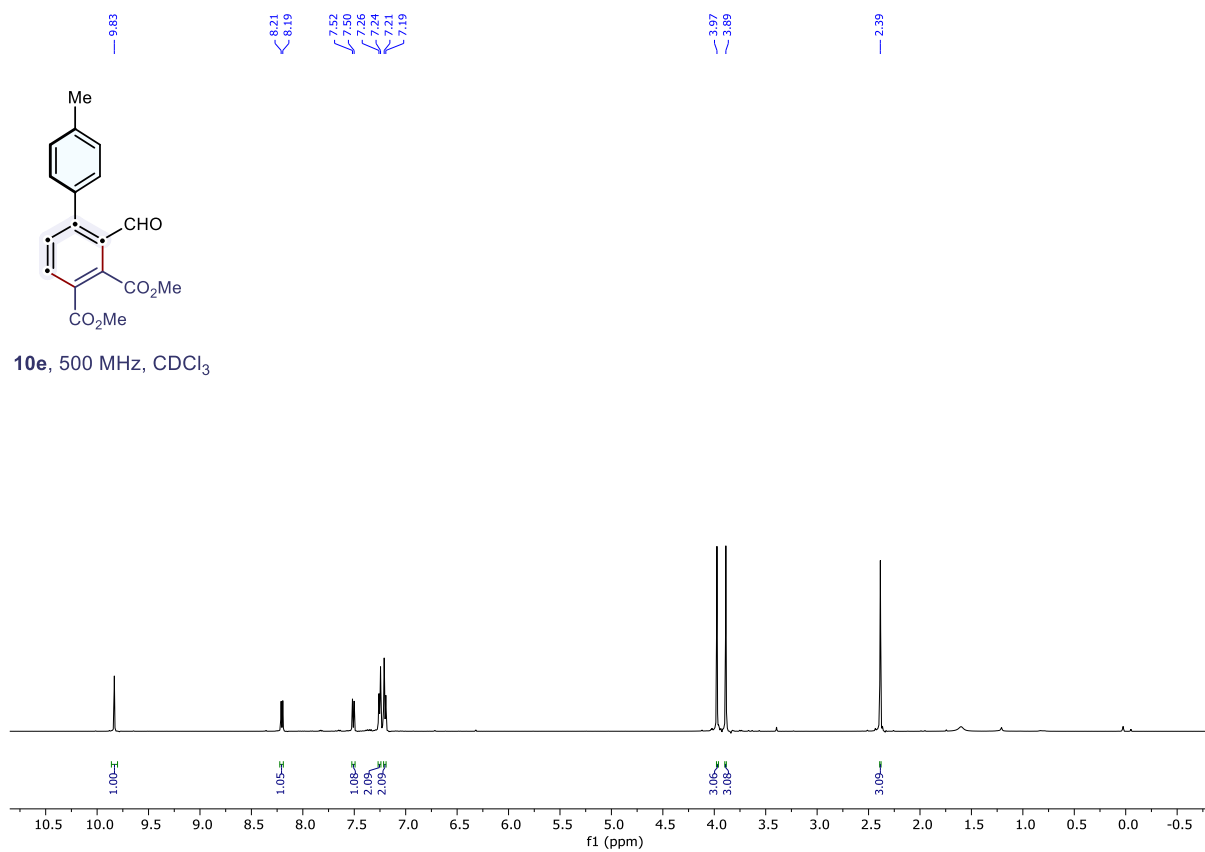


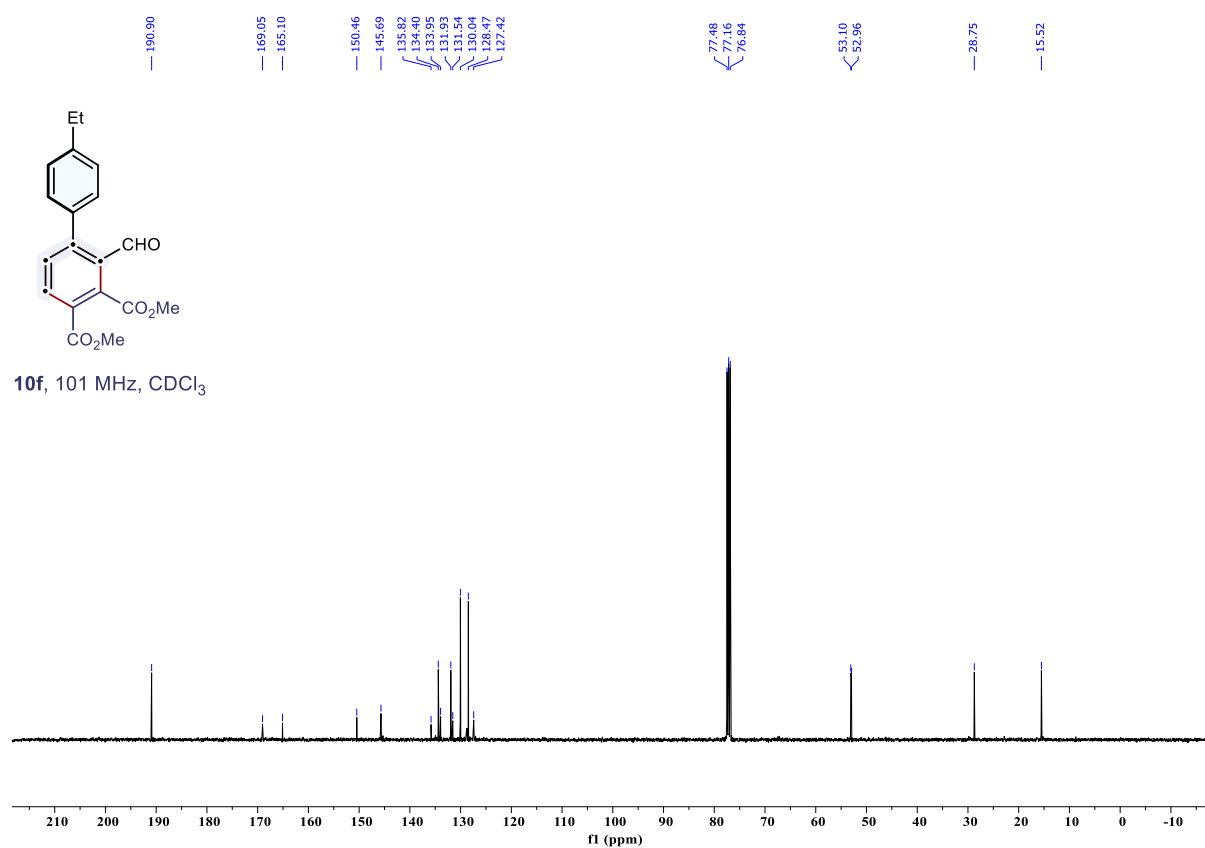
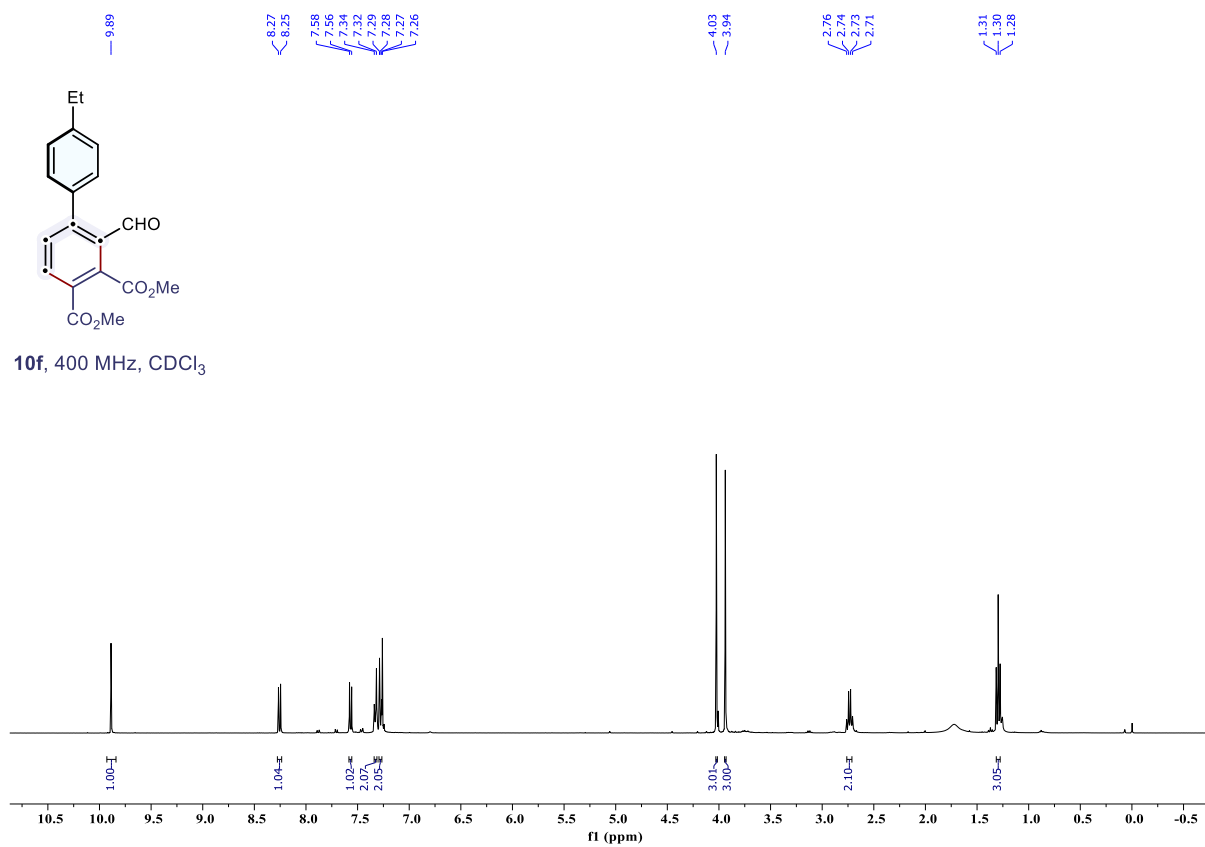


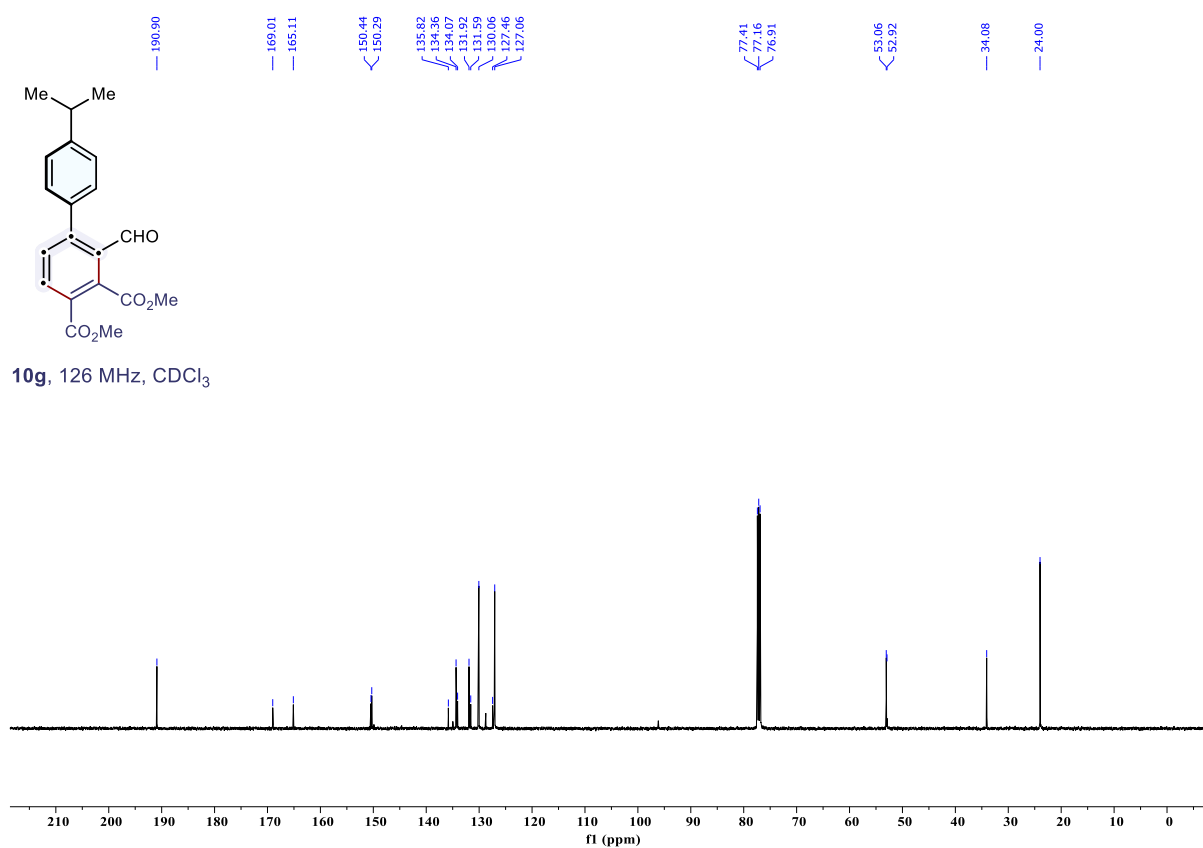
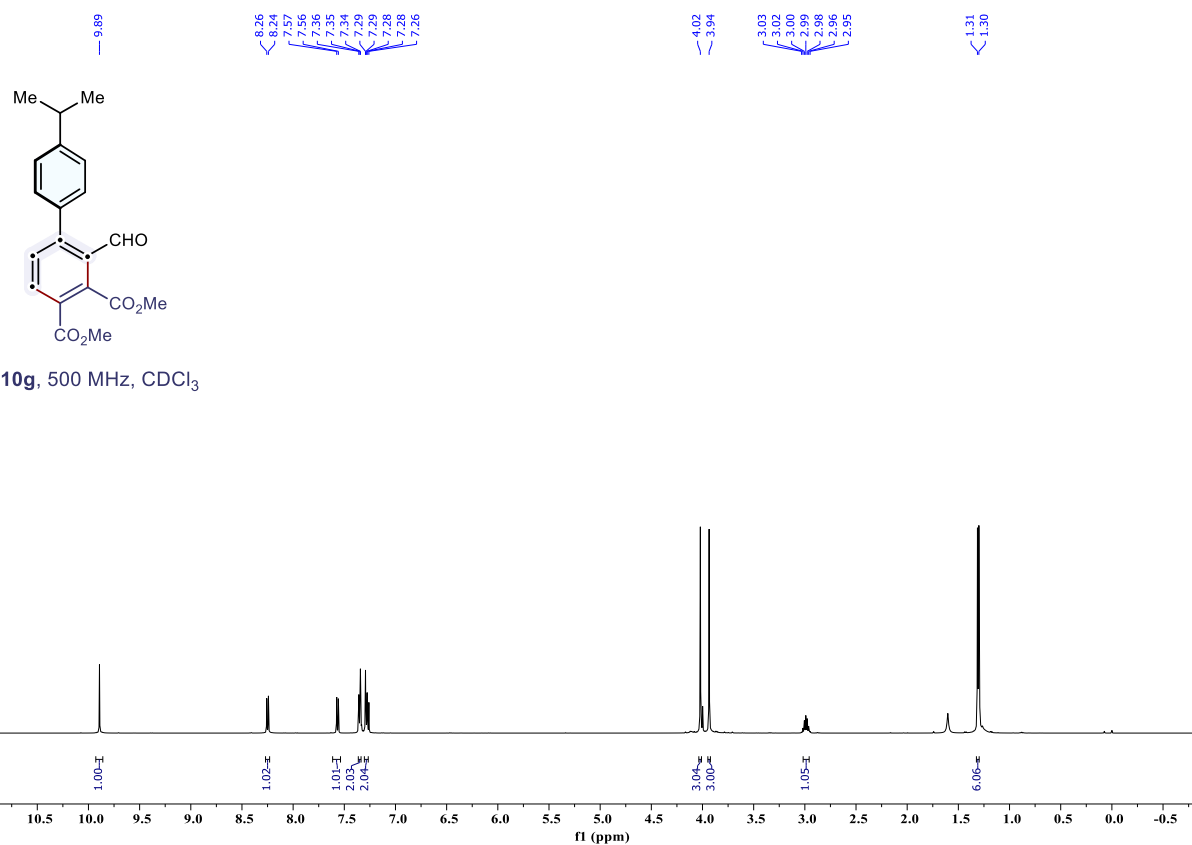


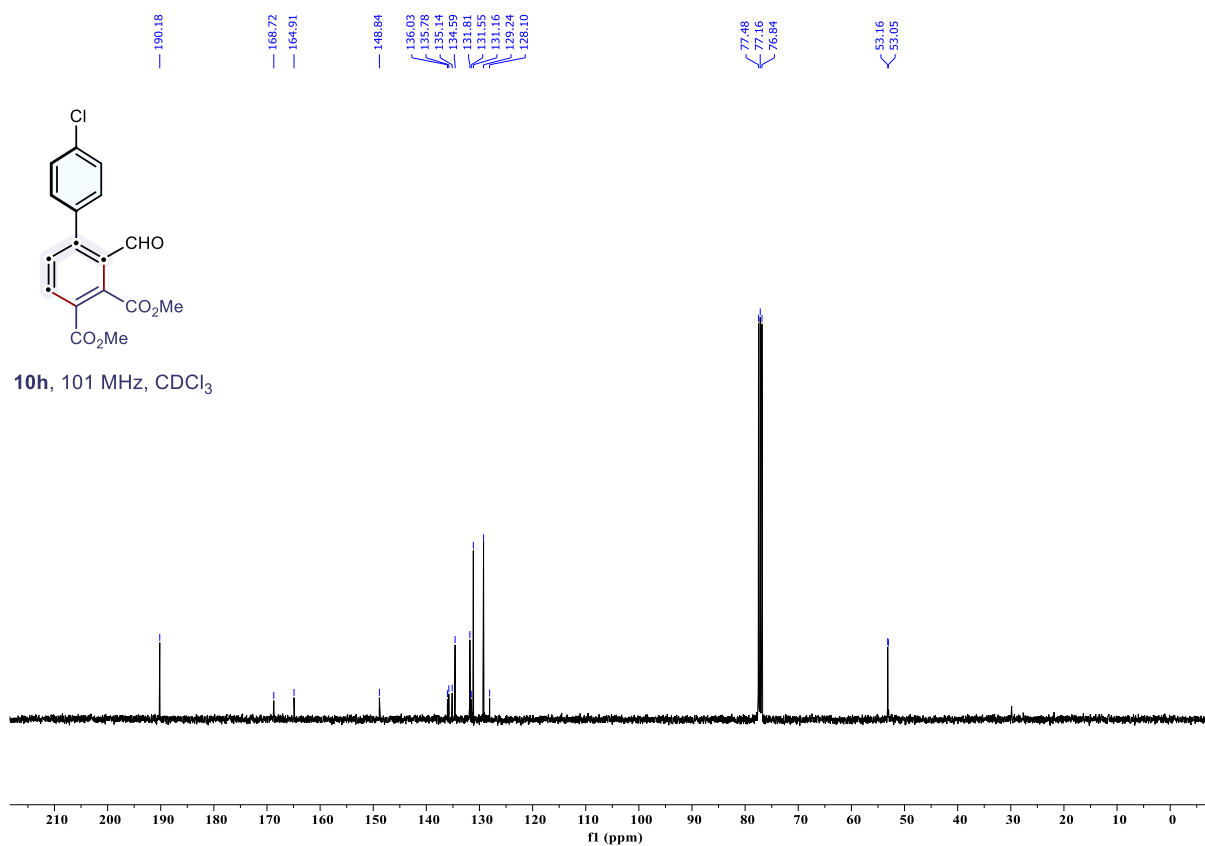
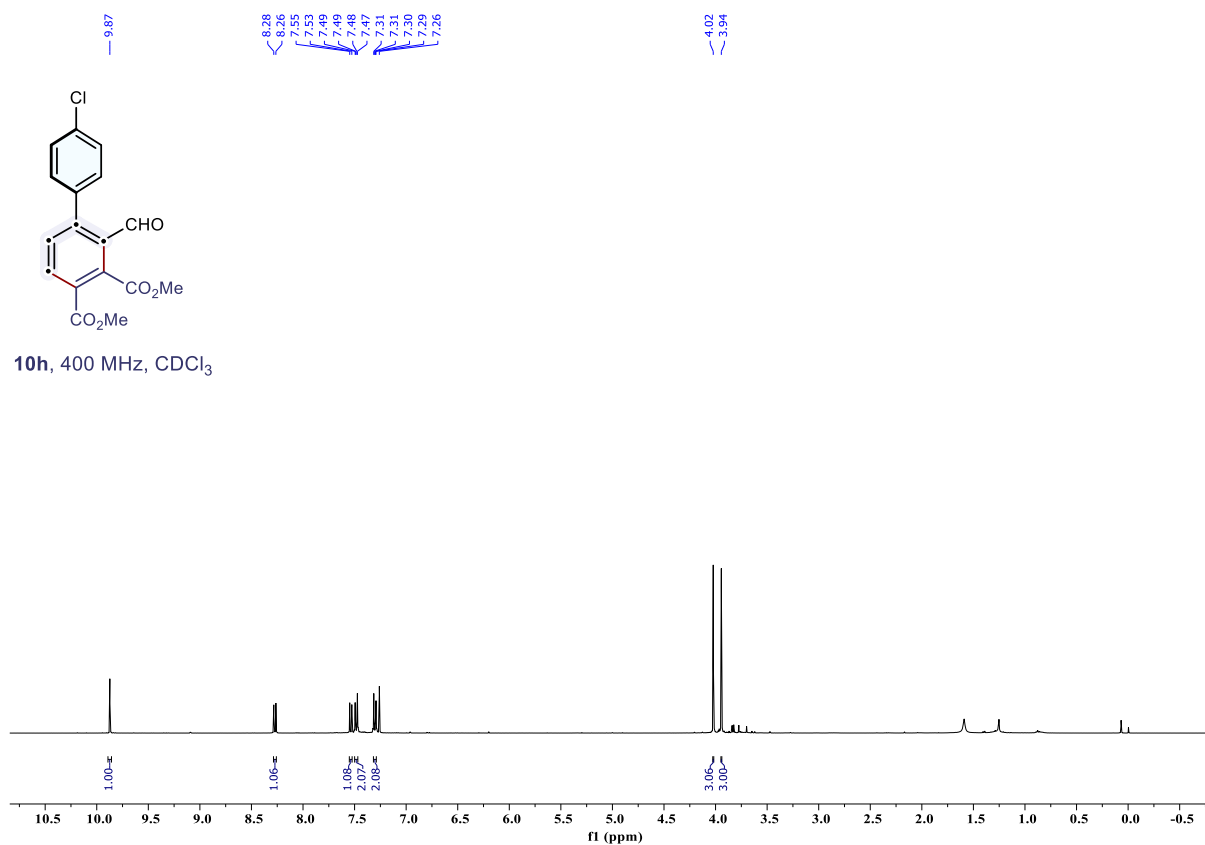
10d, 376 MHz, CDCl₃

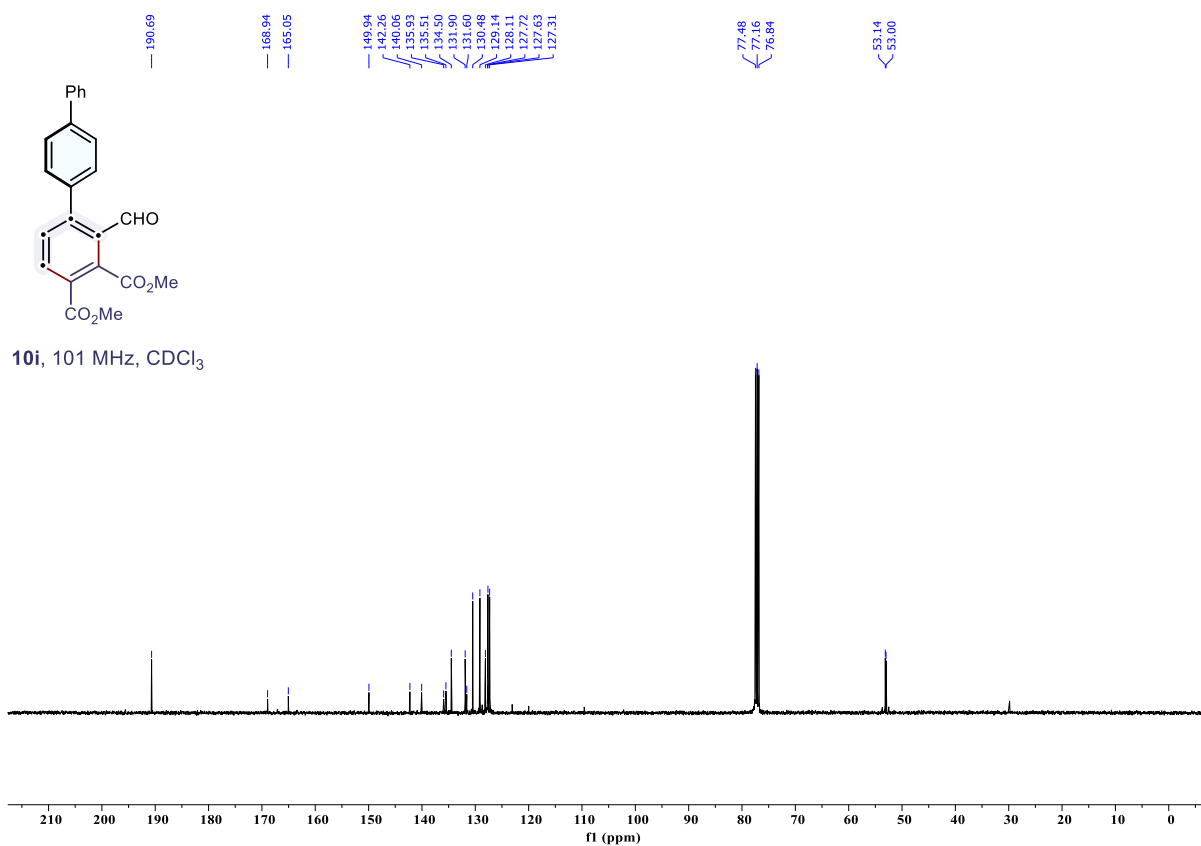
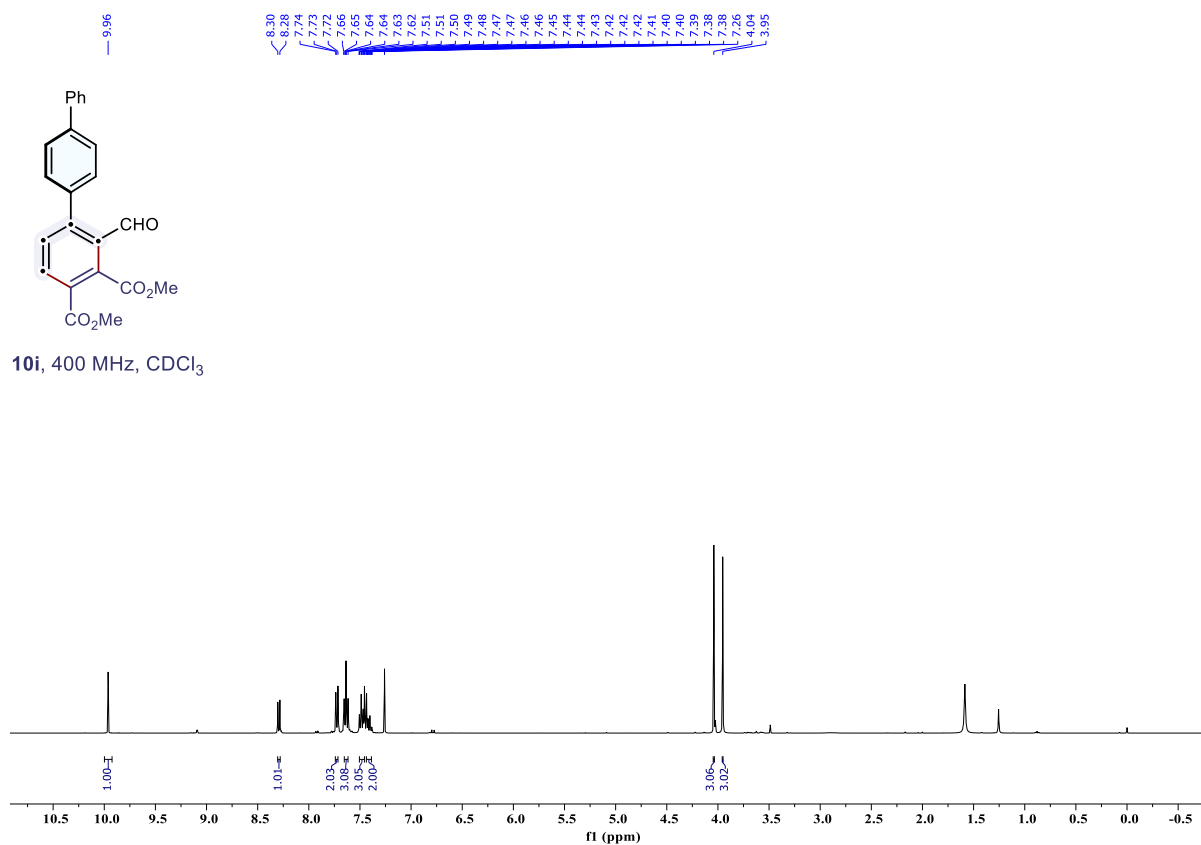


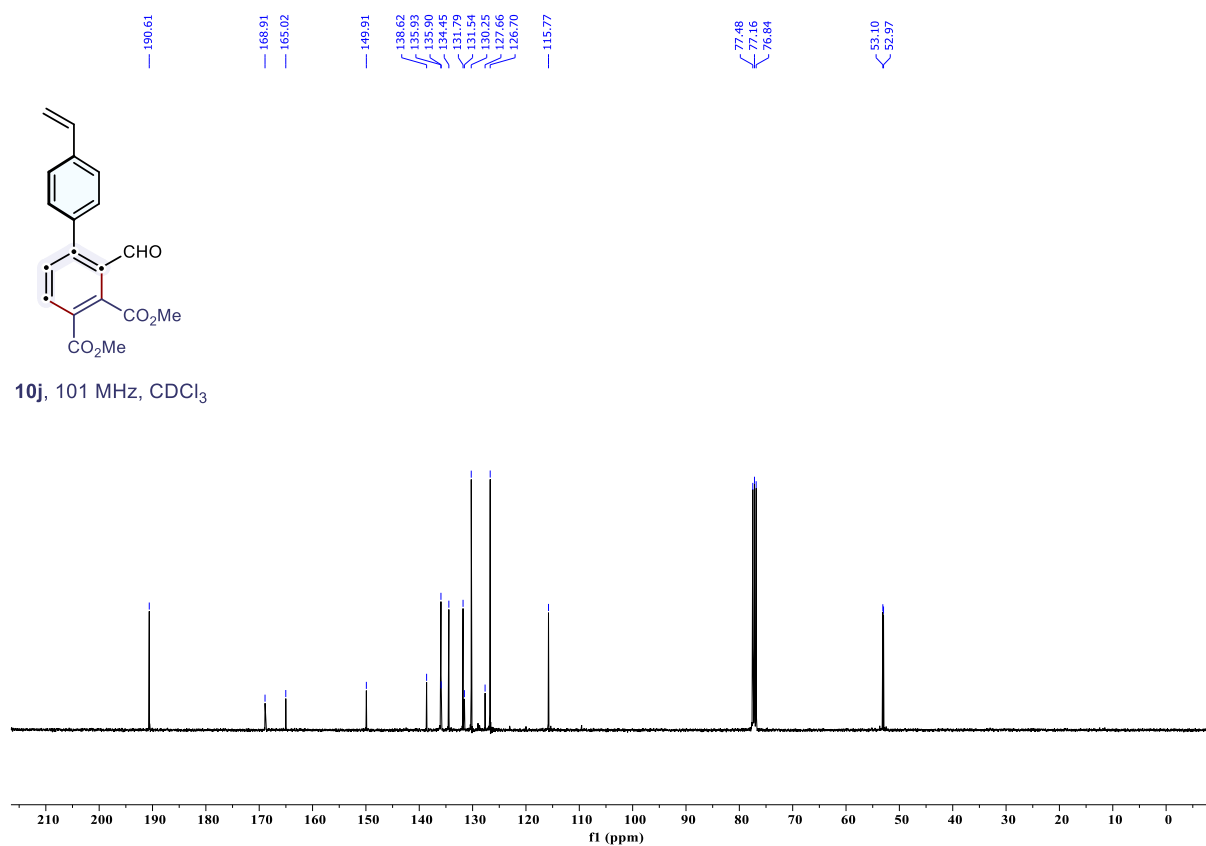
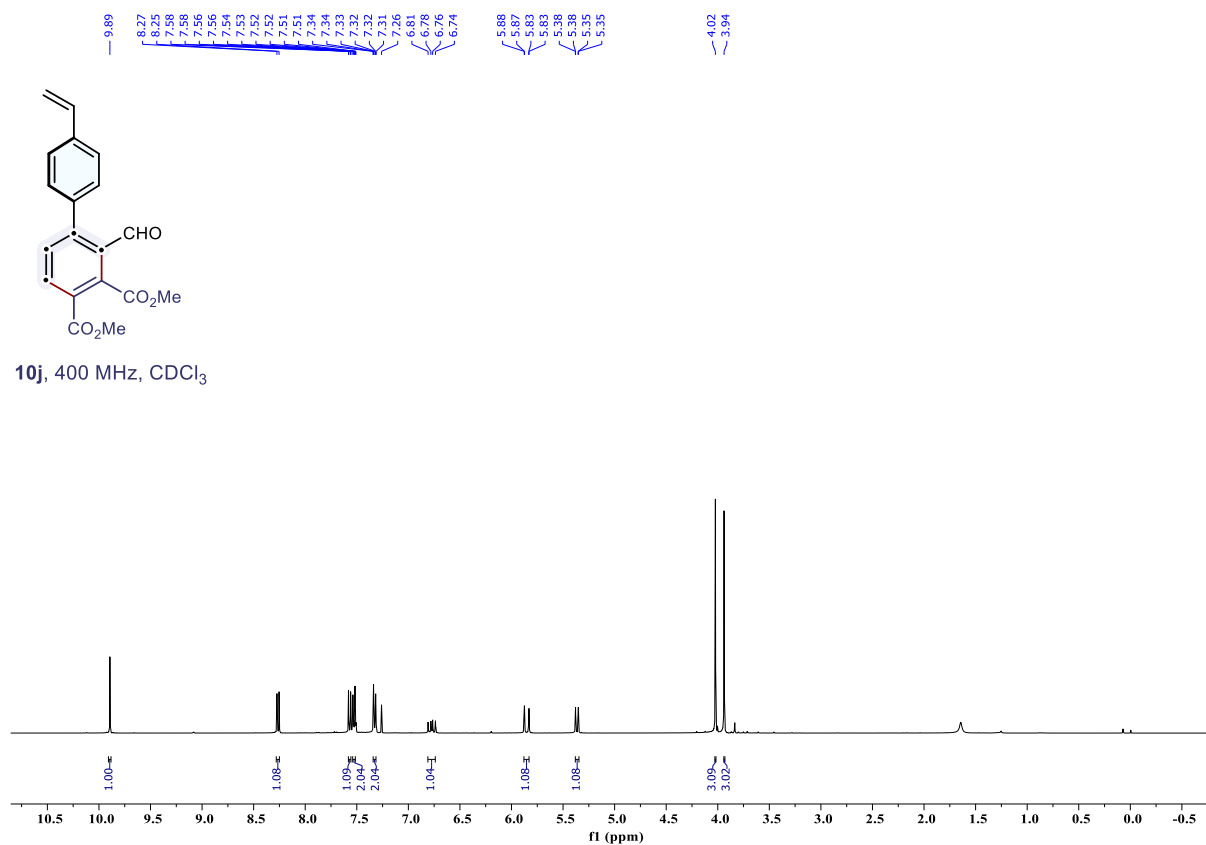


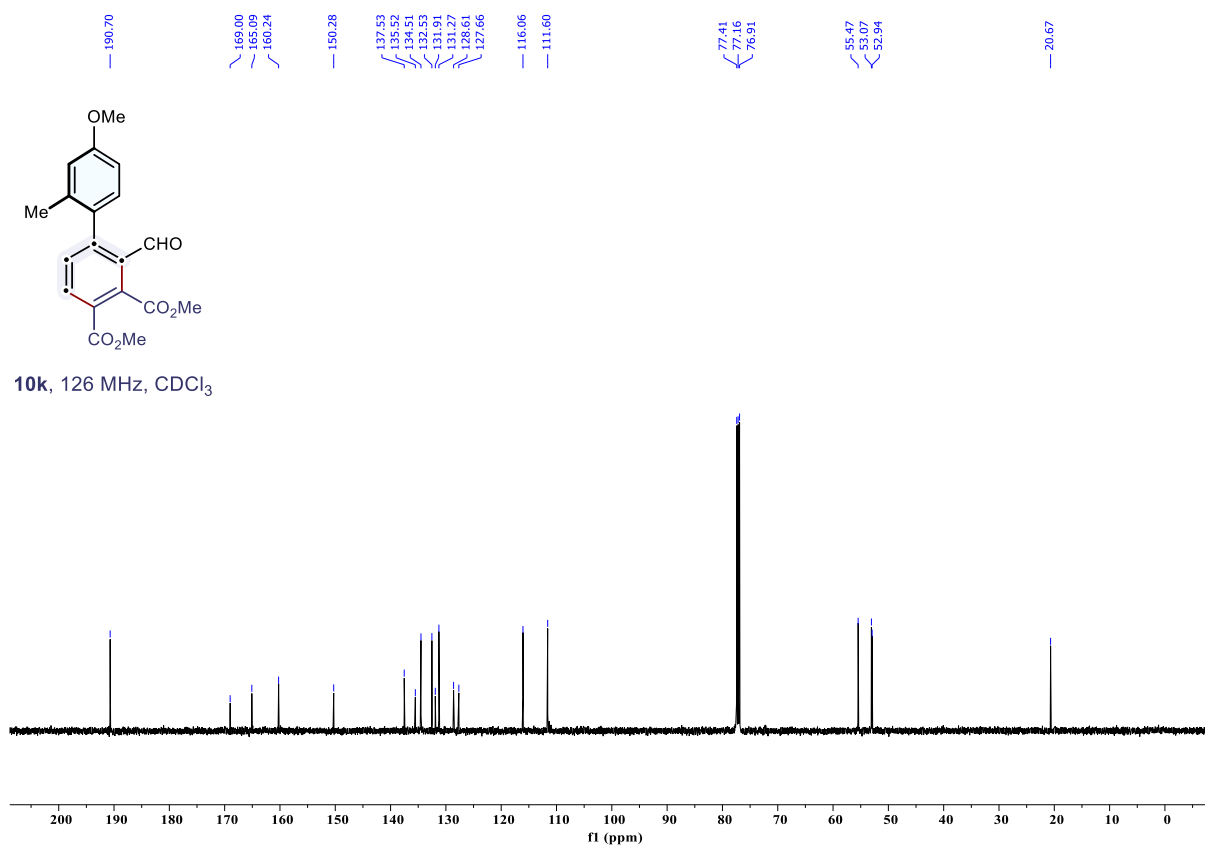
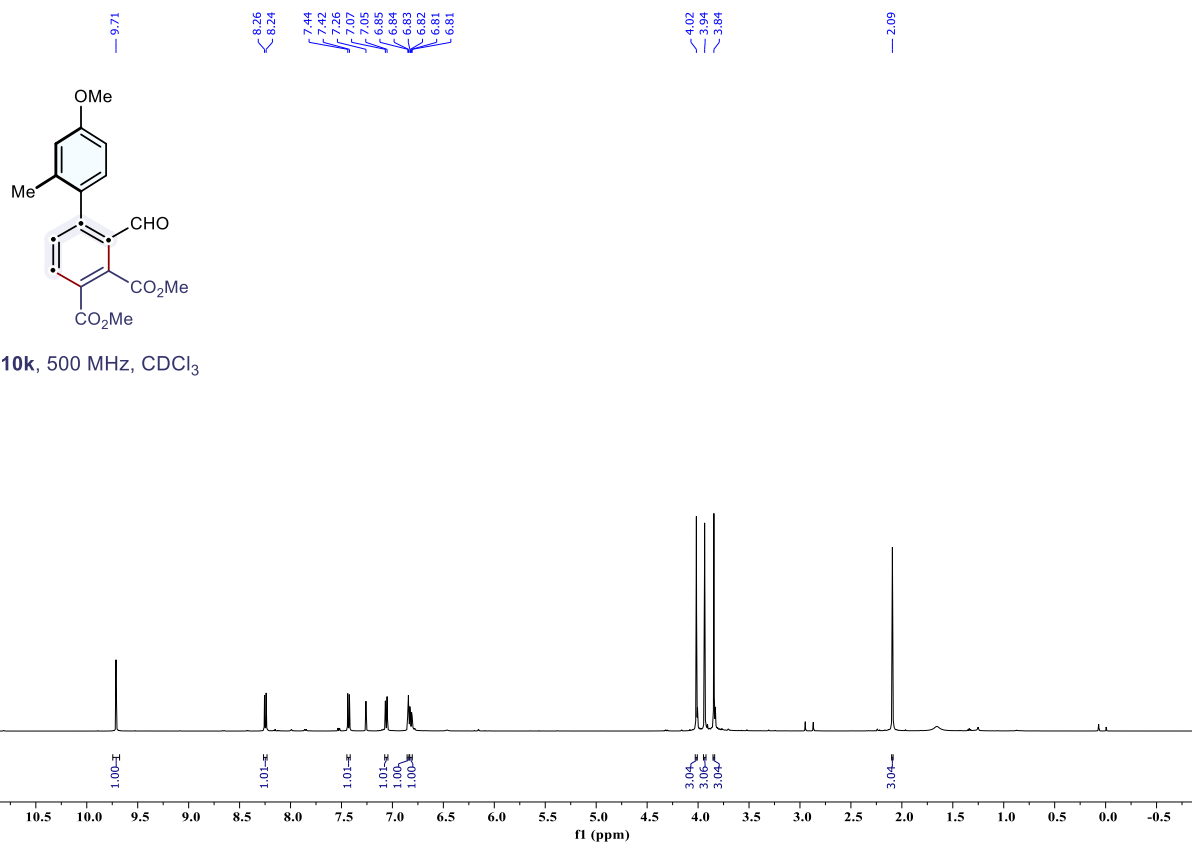


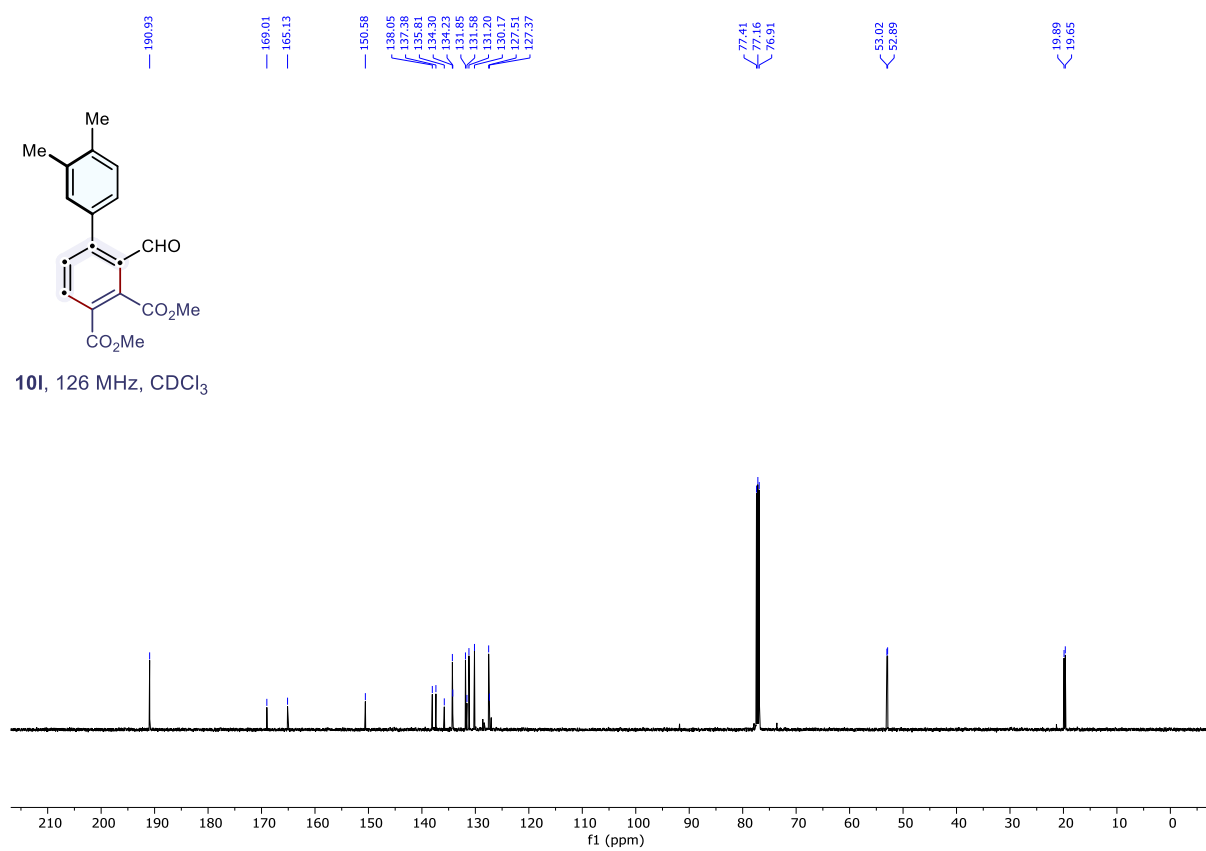
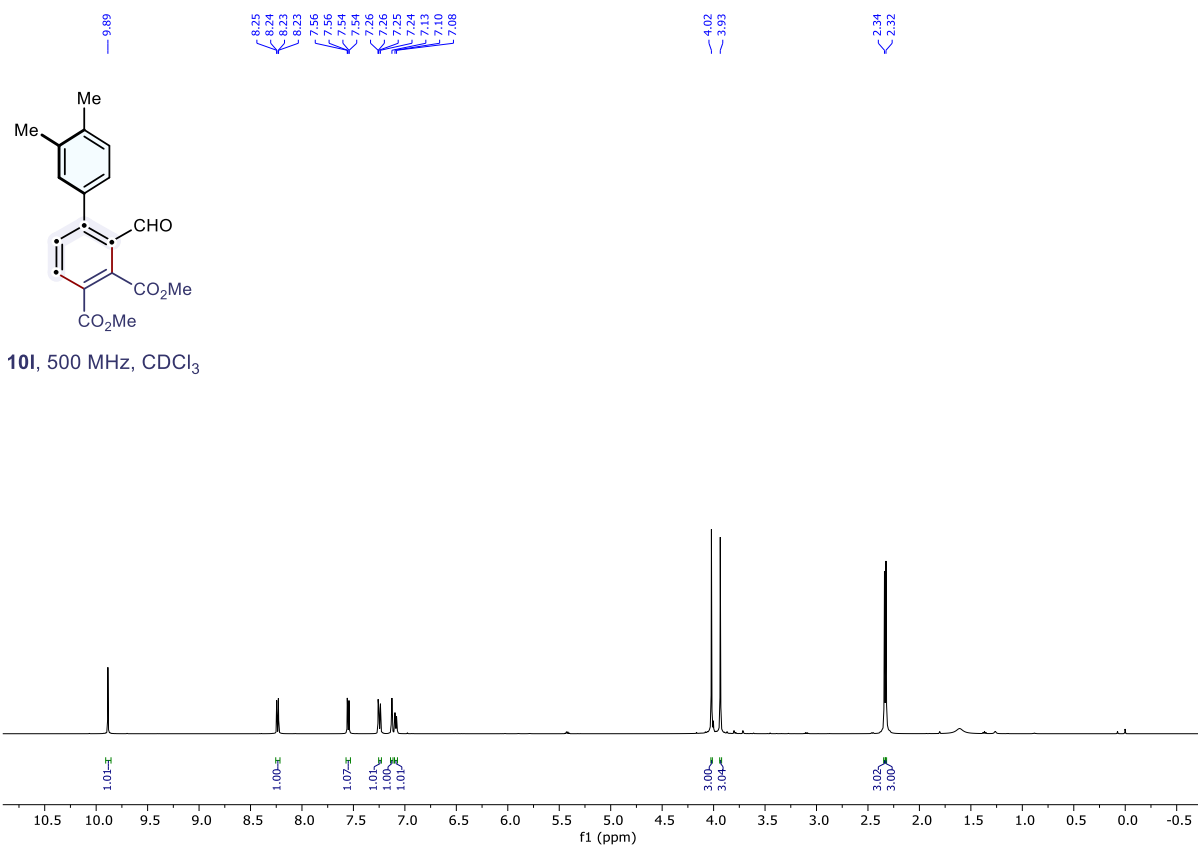


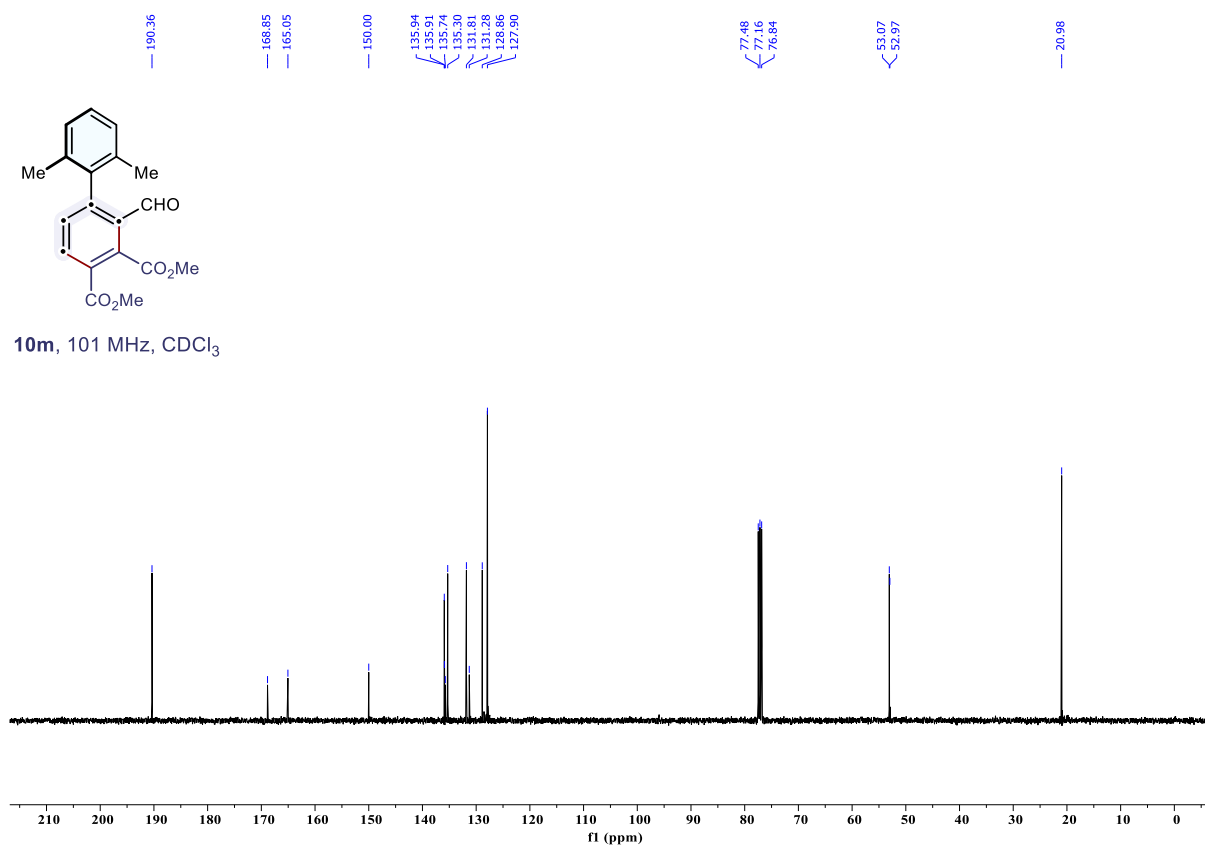
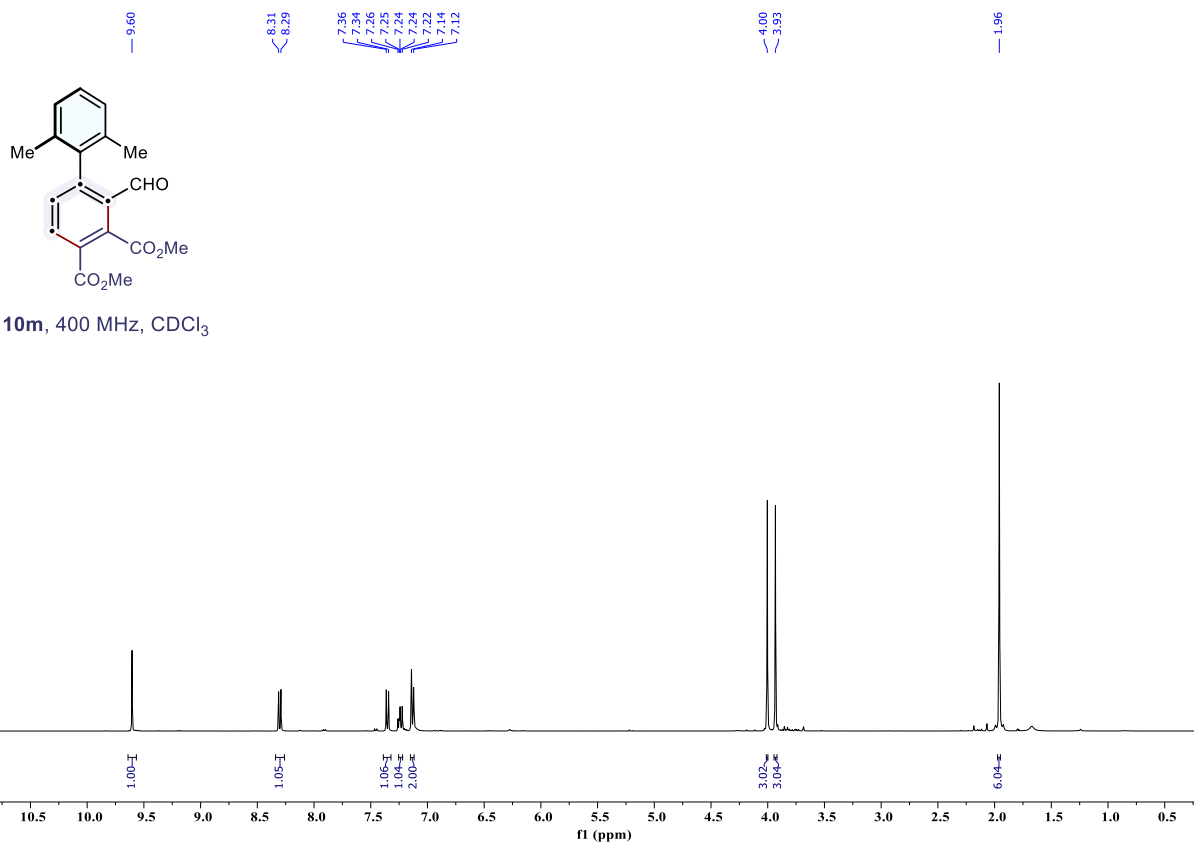


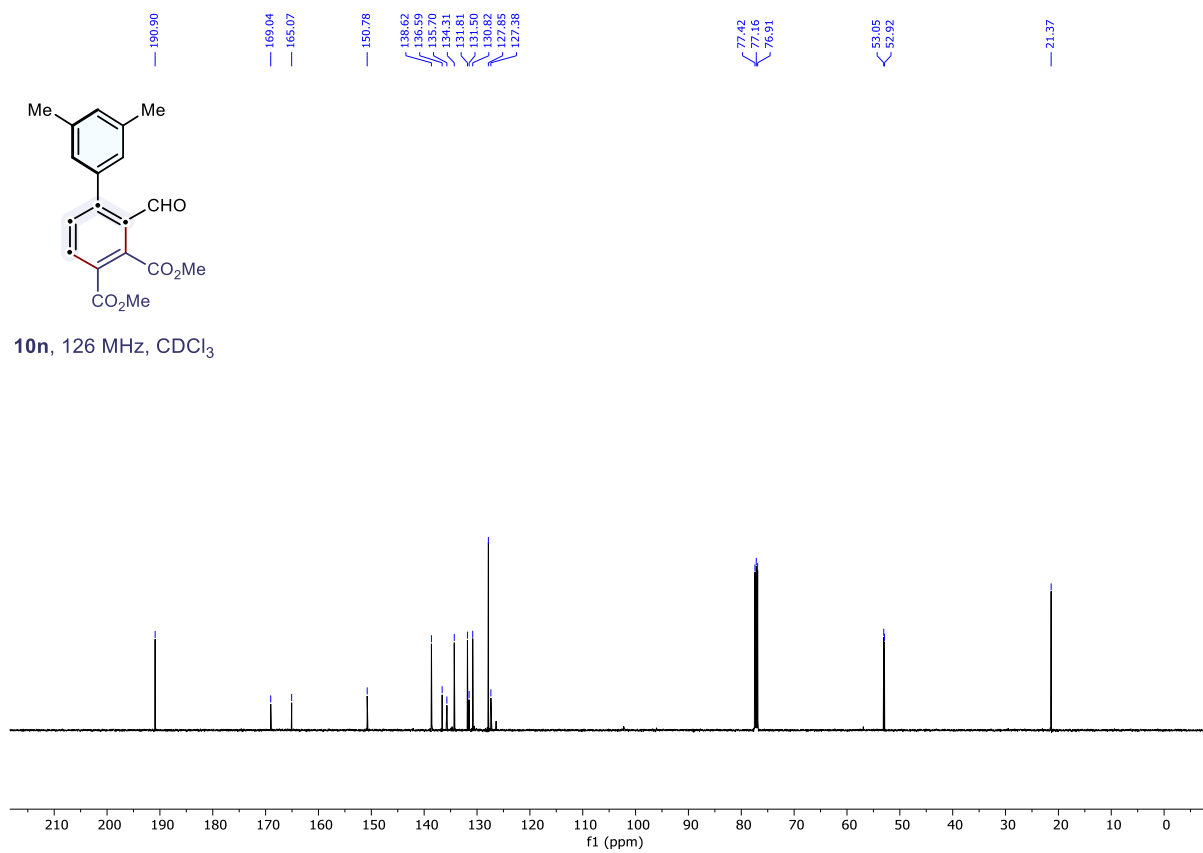
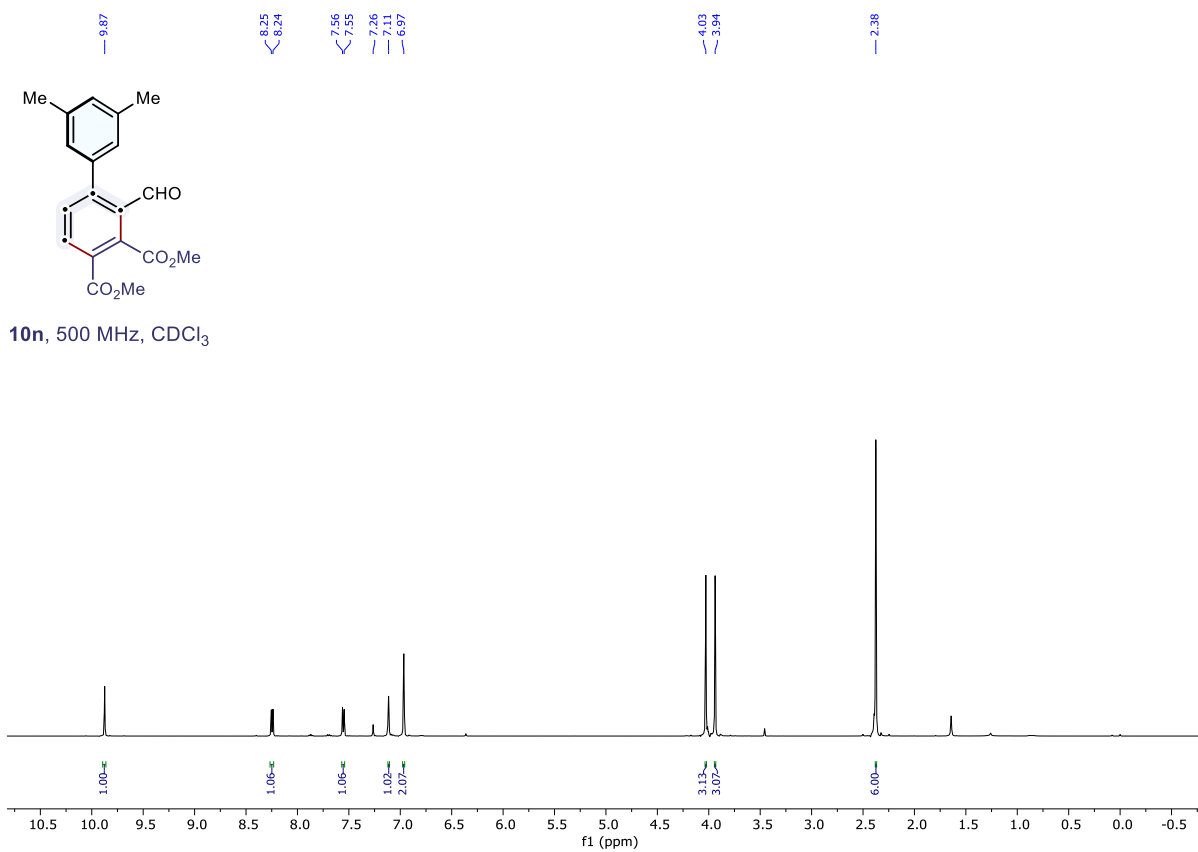


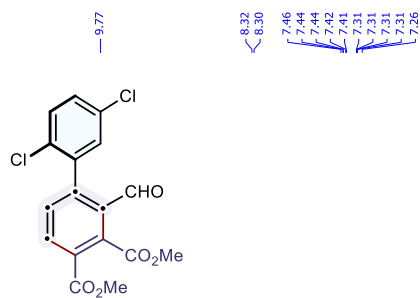




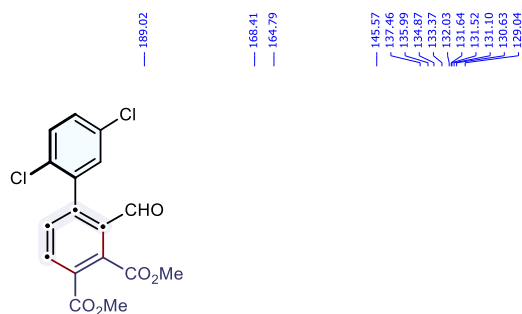
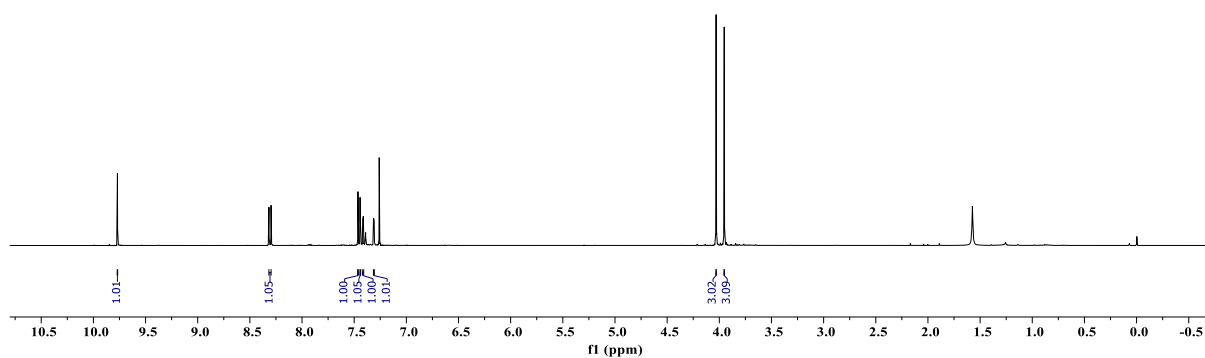




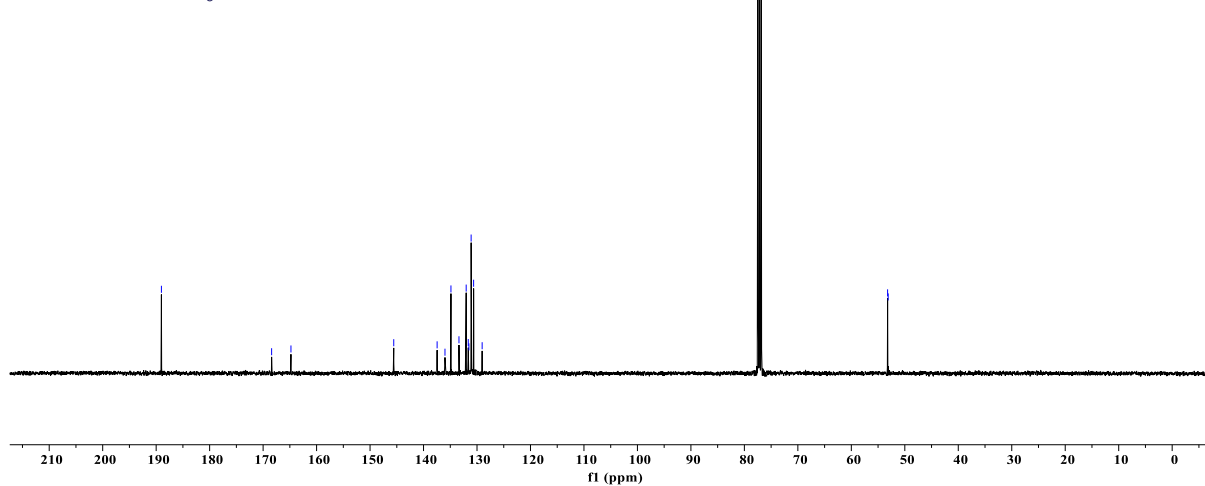


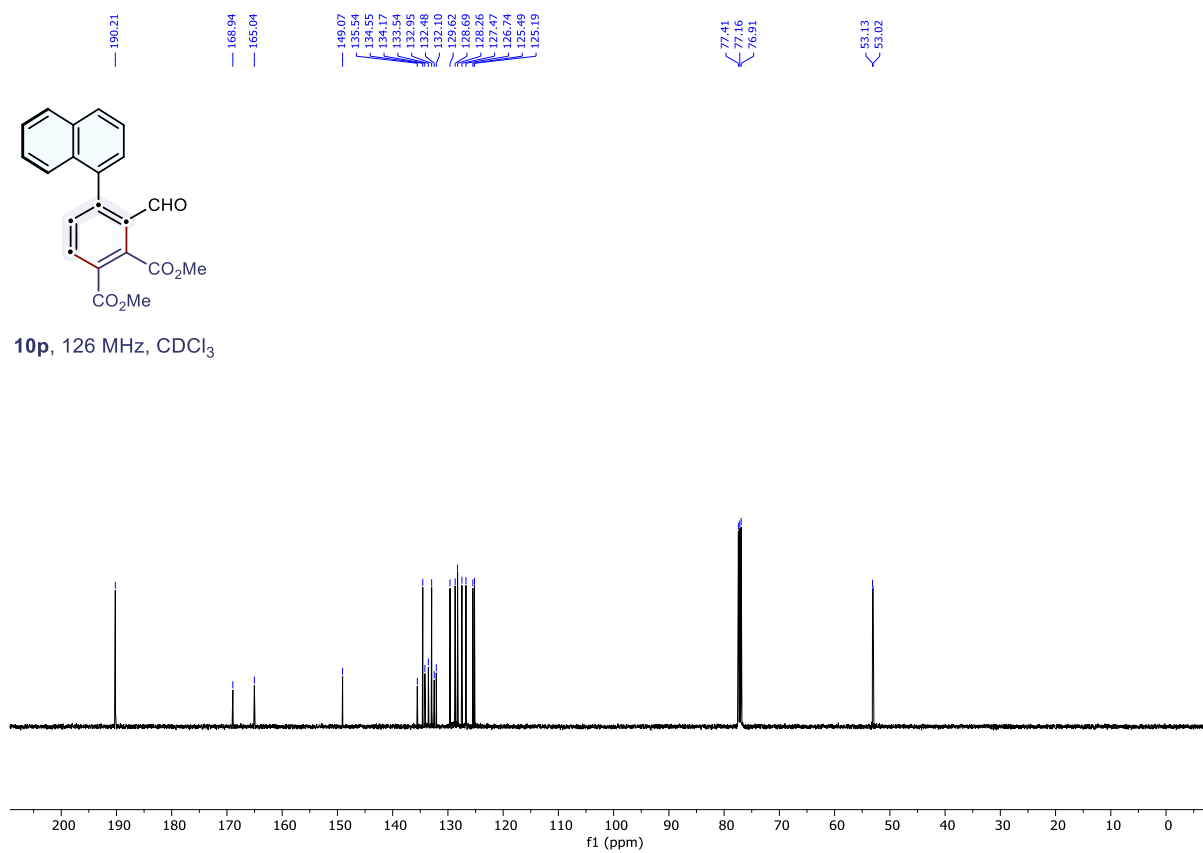
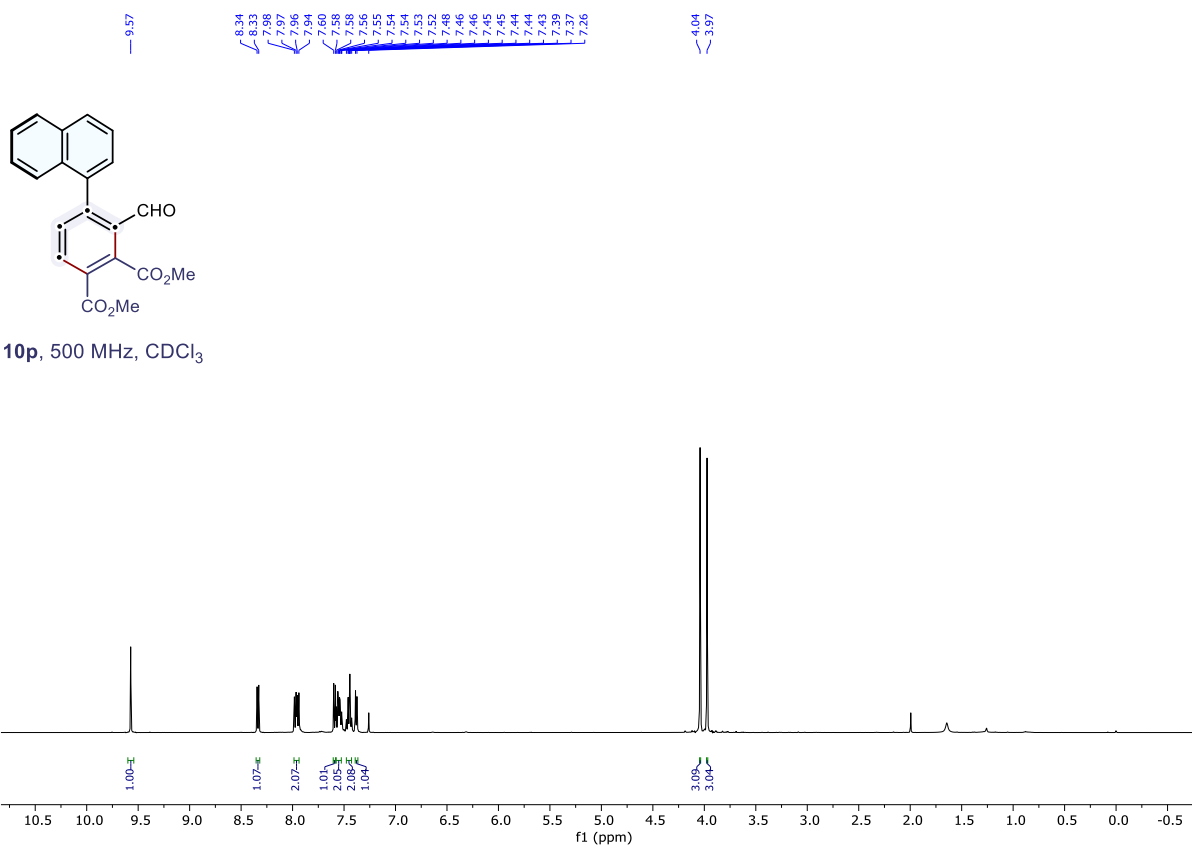


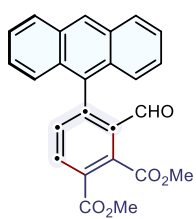
10o, 400 MHz, CDCl₃



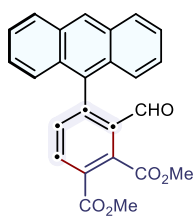
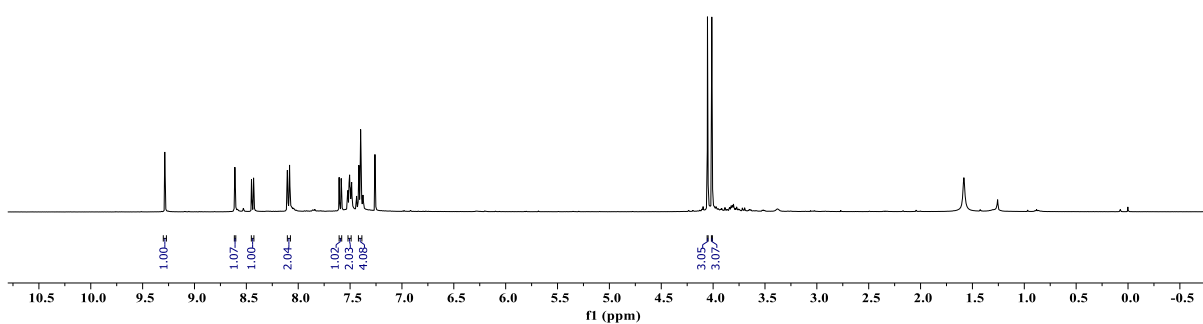
10o, 101 MHz, CDCl₃



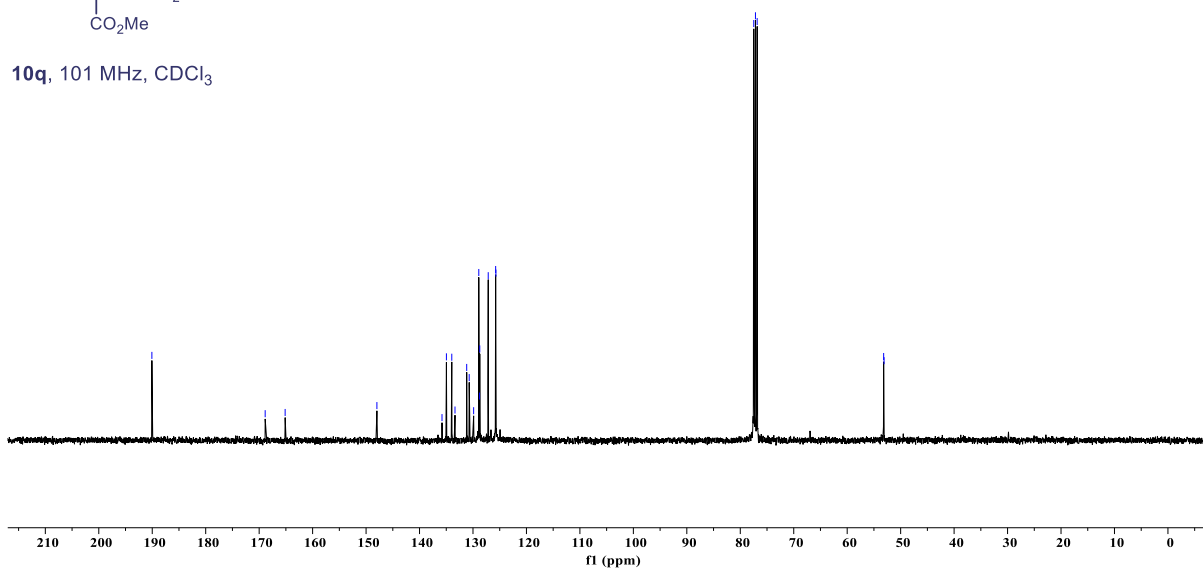


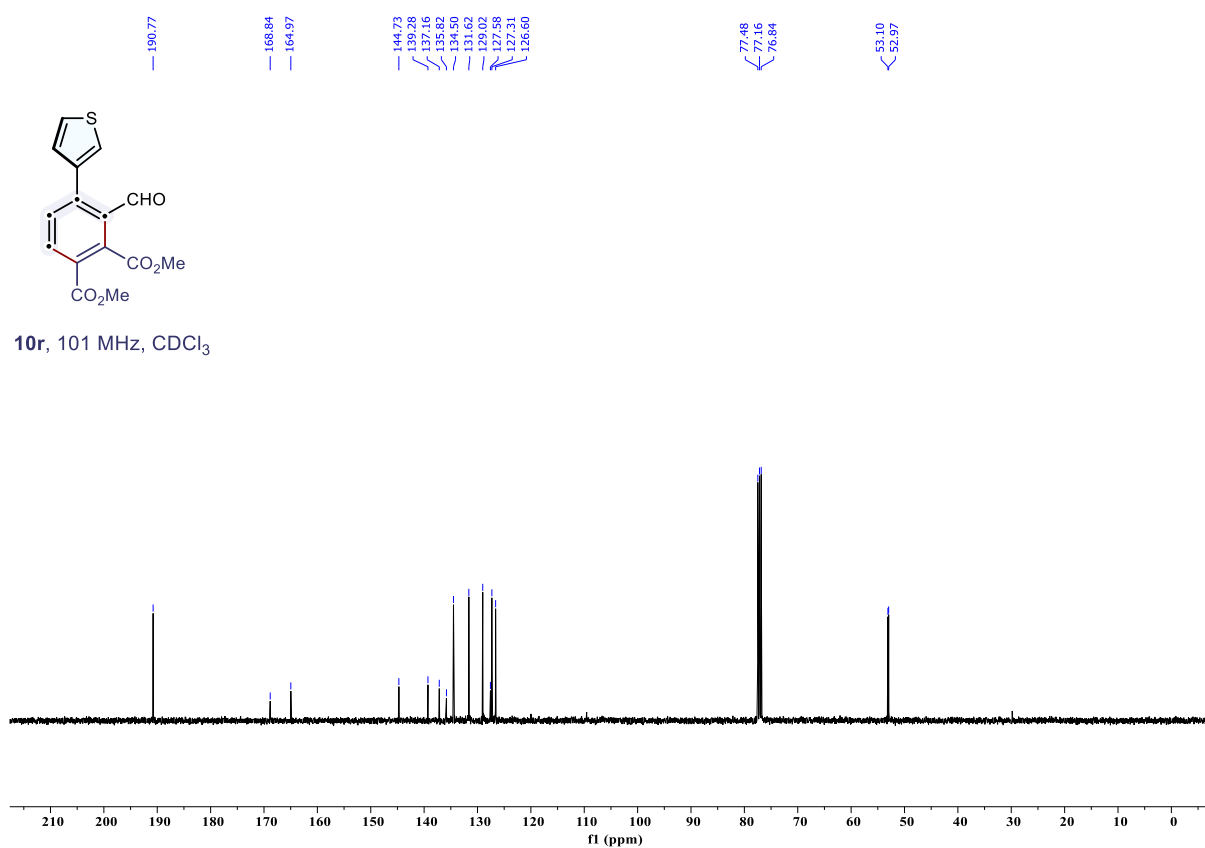
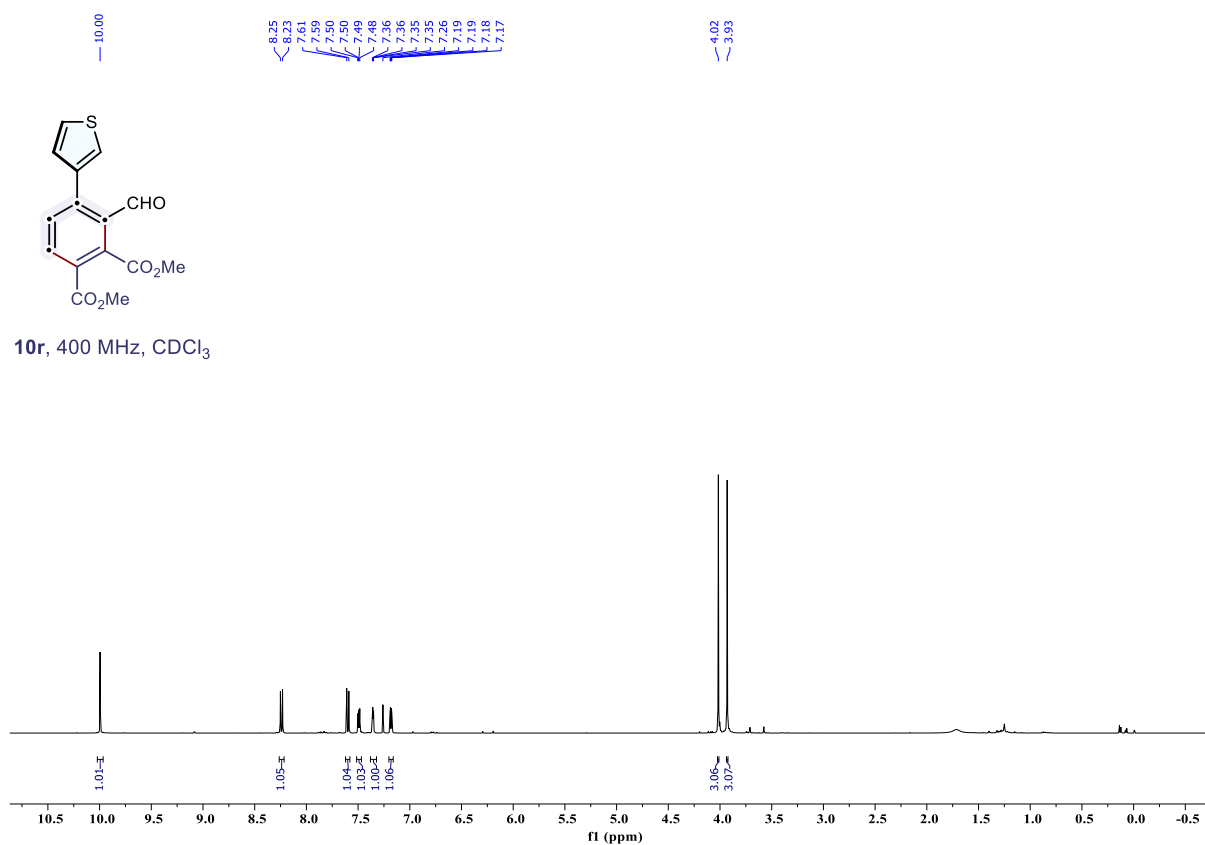


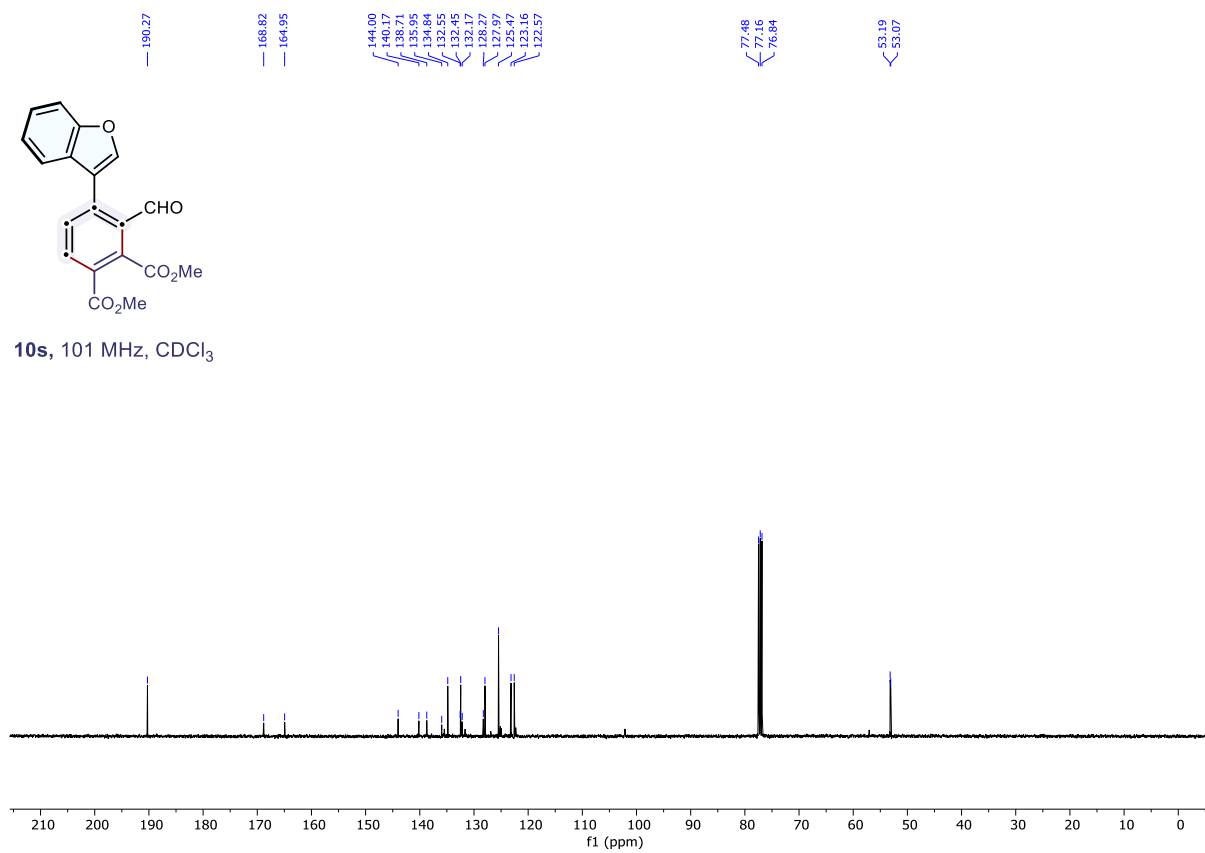
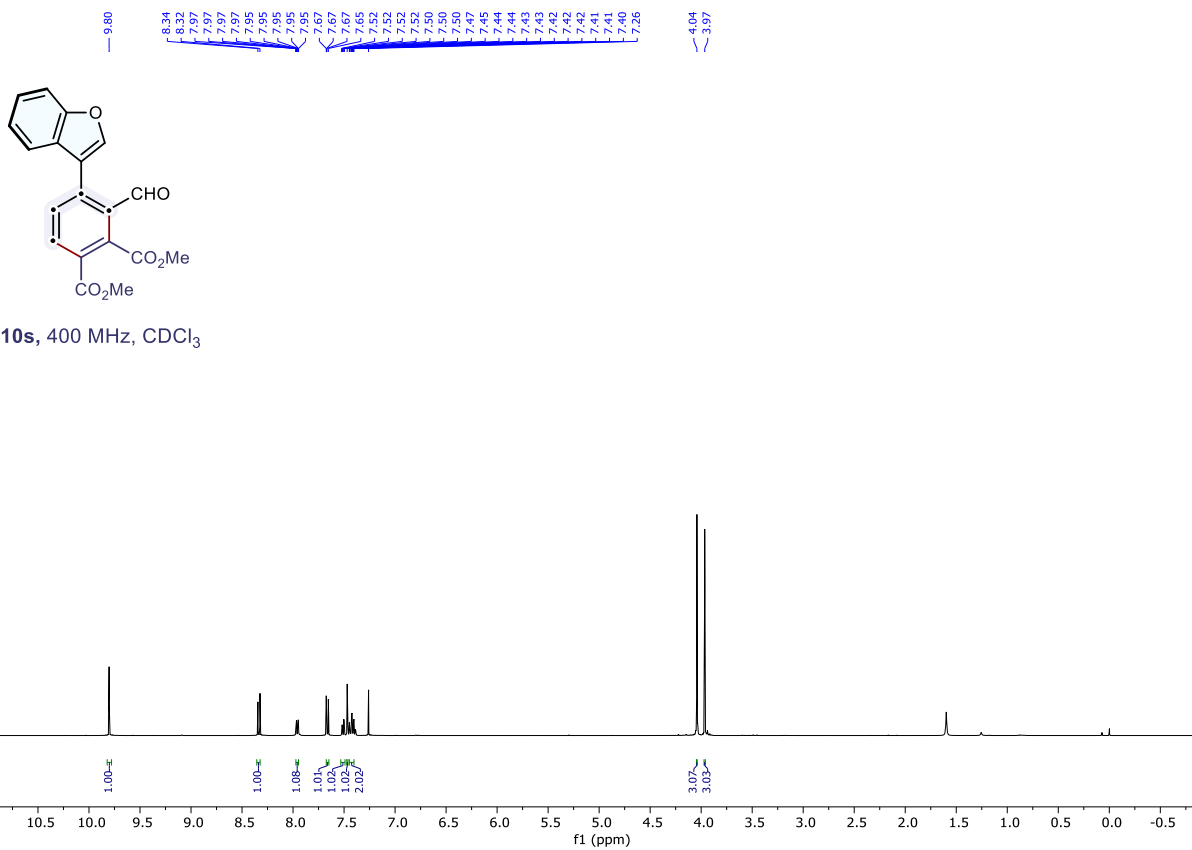
10q, 400 MHz, CDCl₃

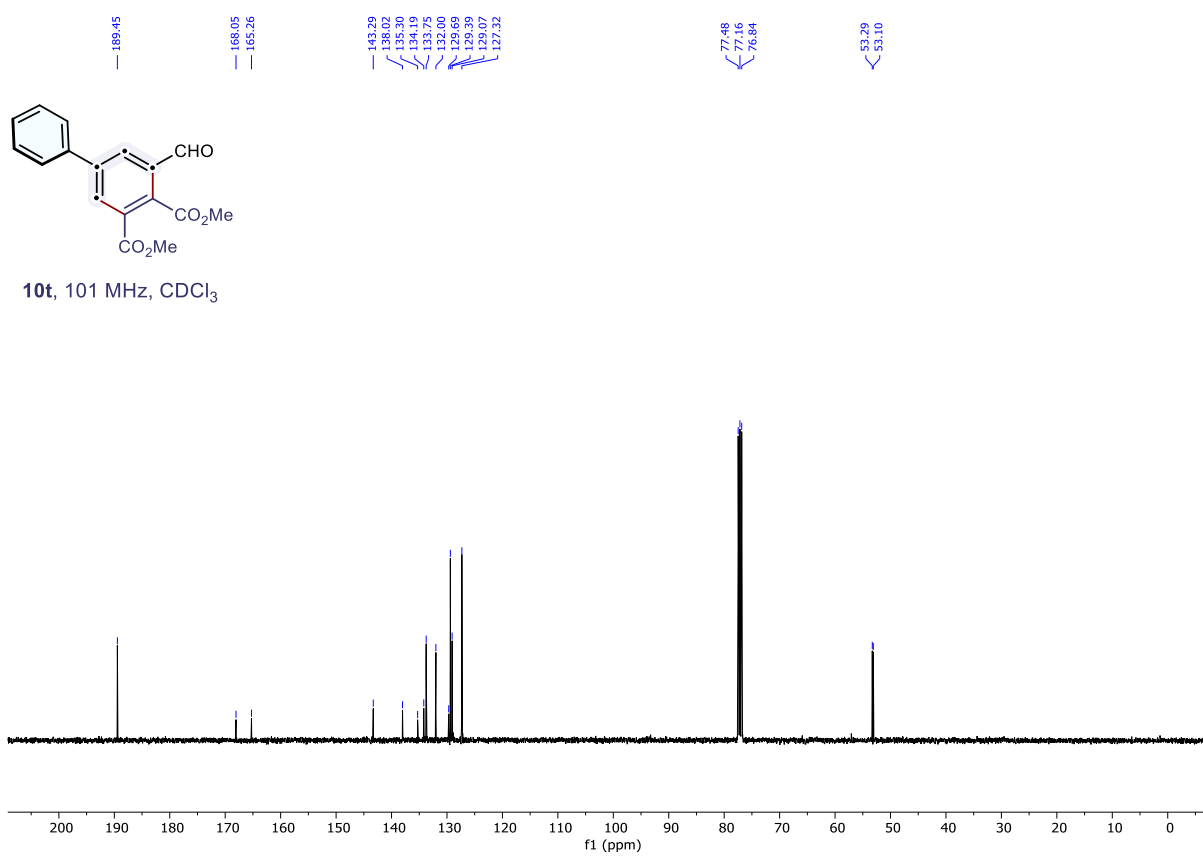
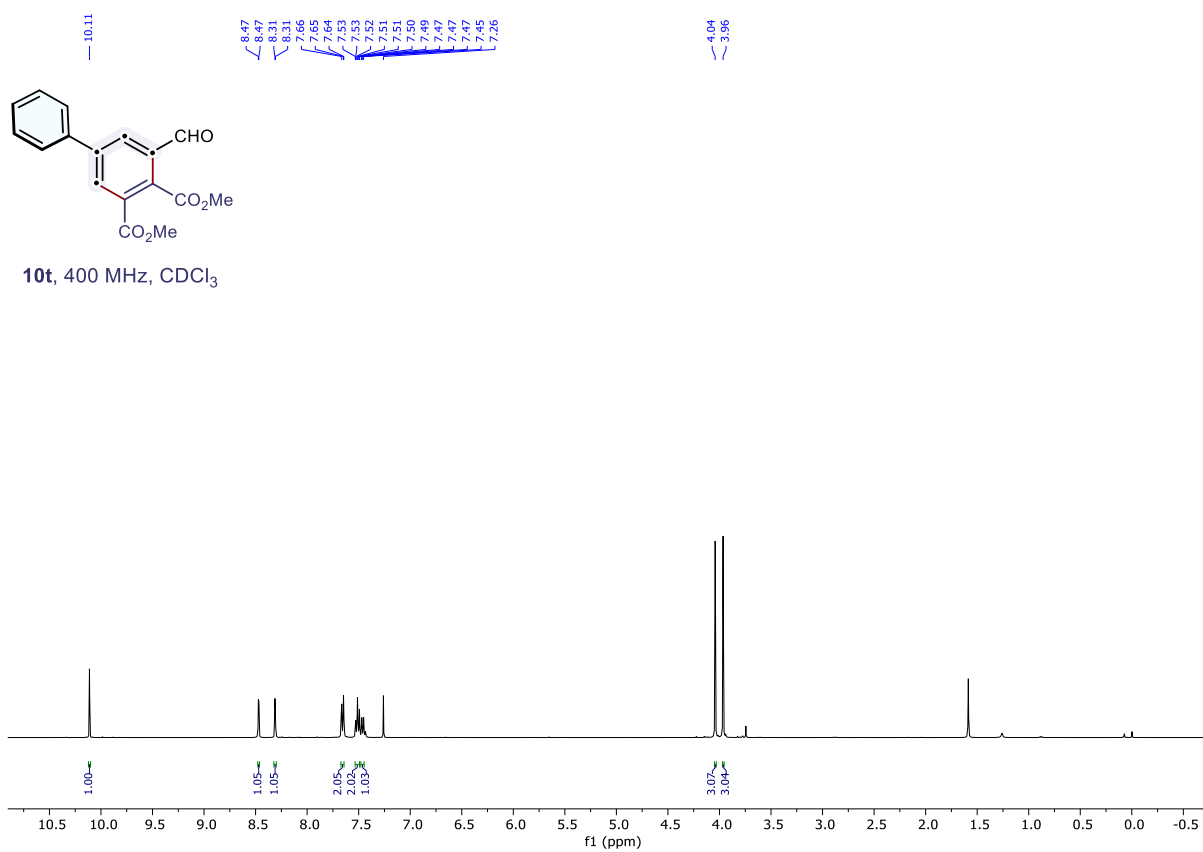


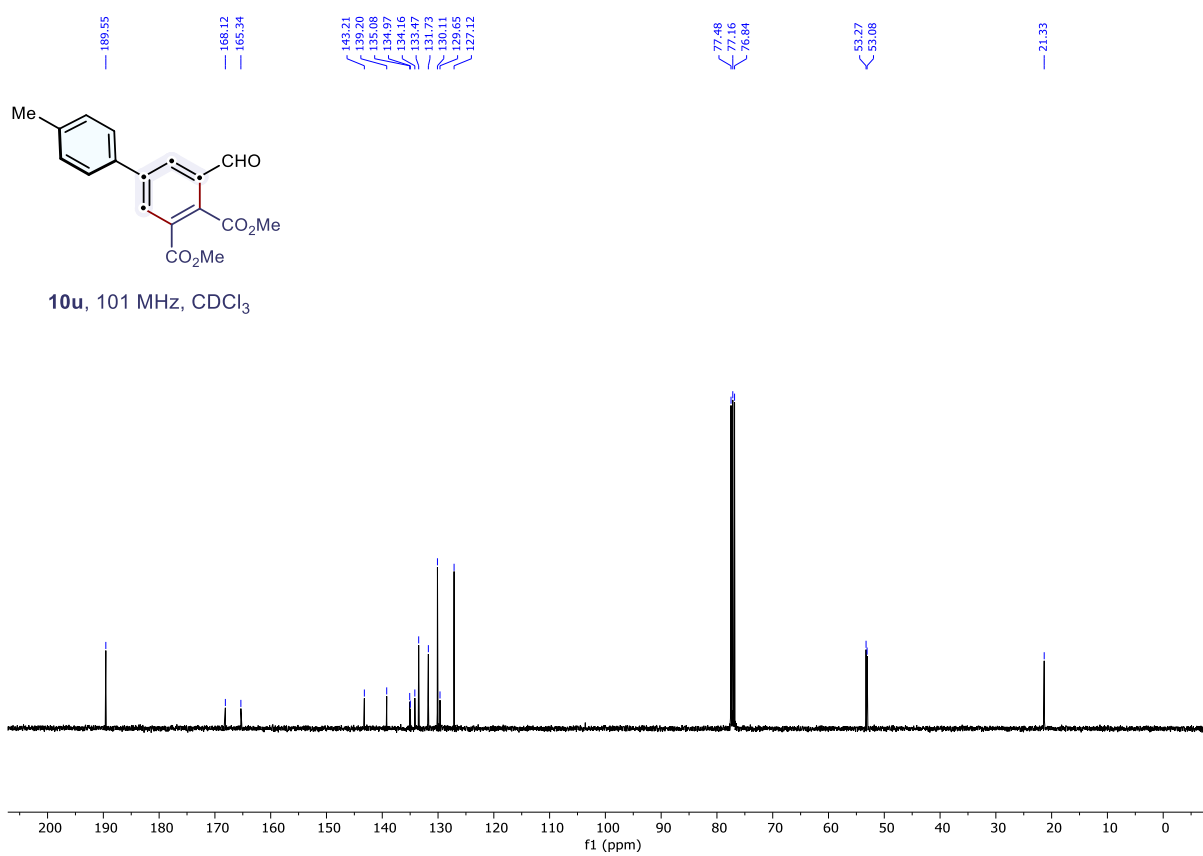
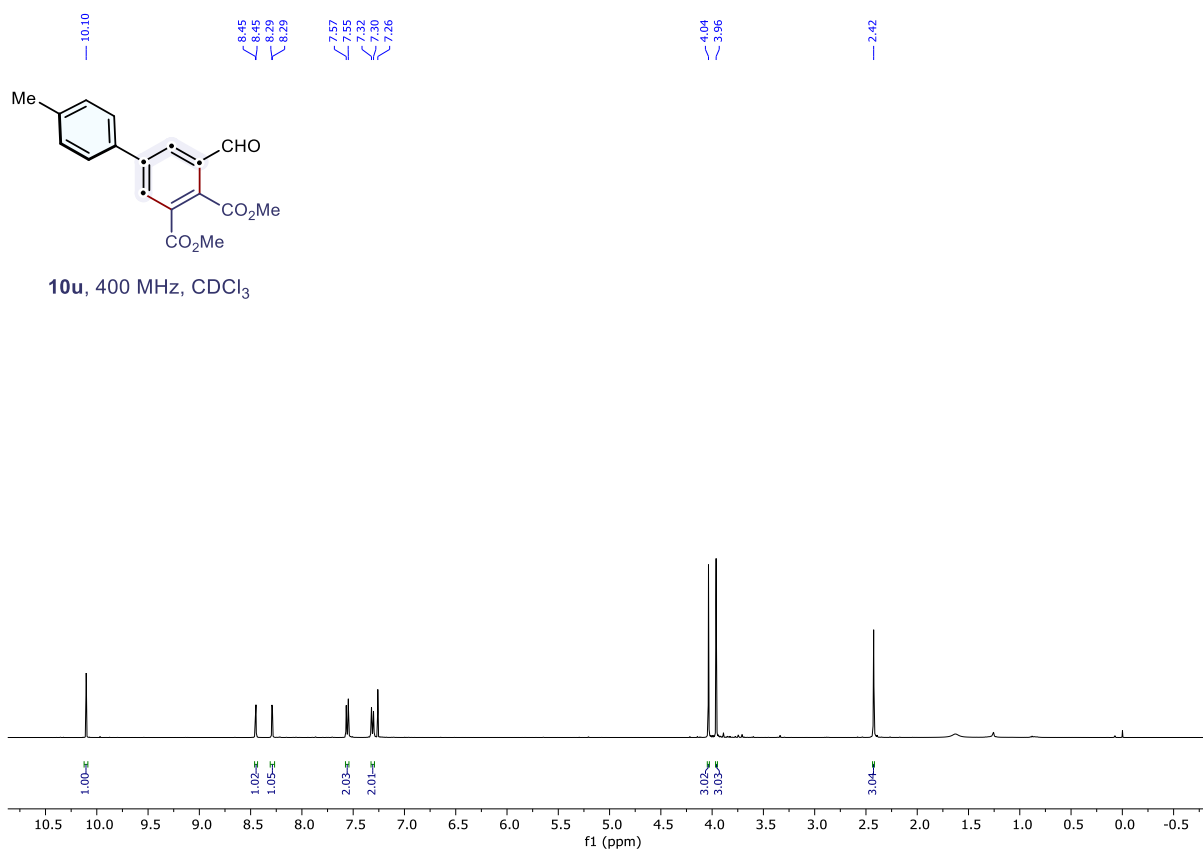
10q, 101 MHz, CDCl₃

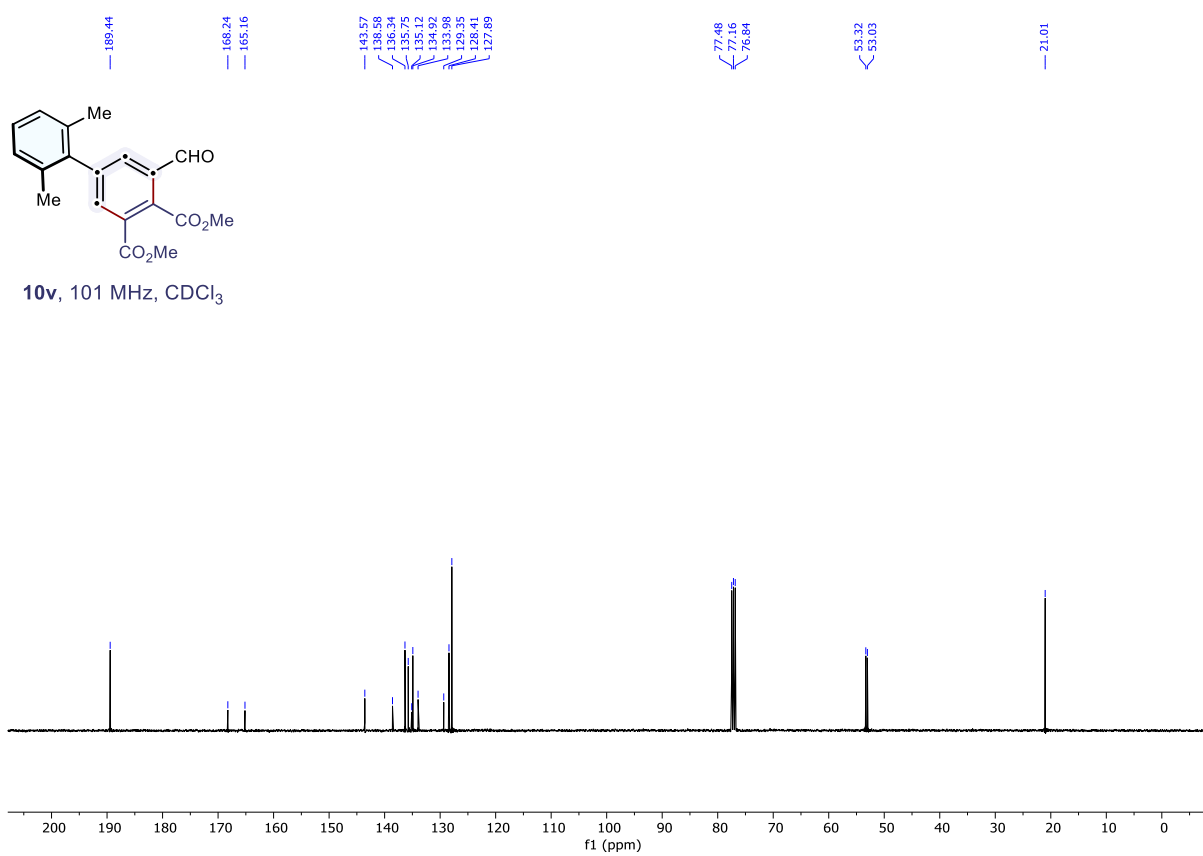
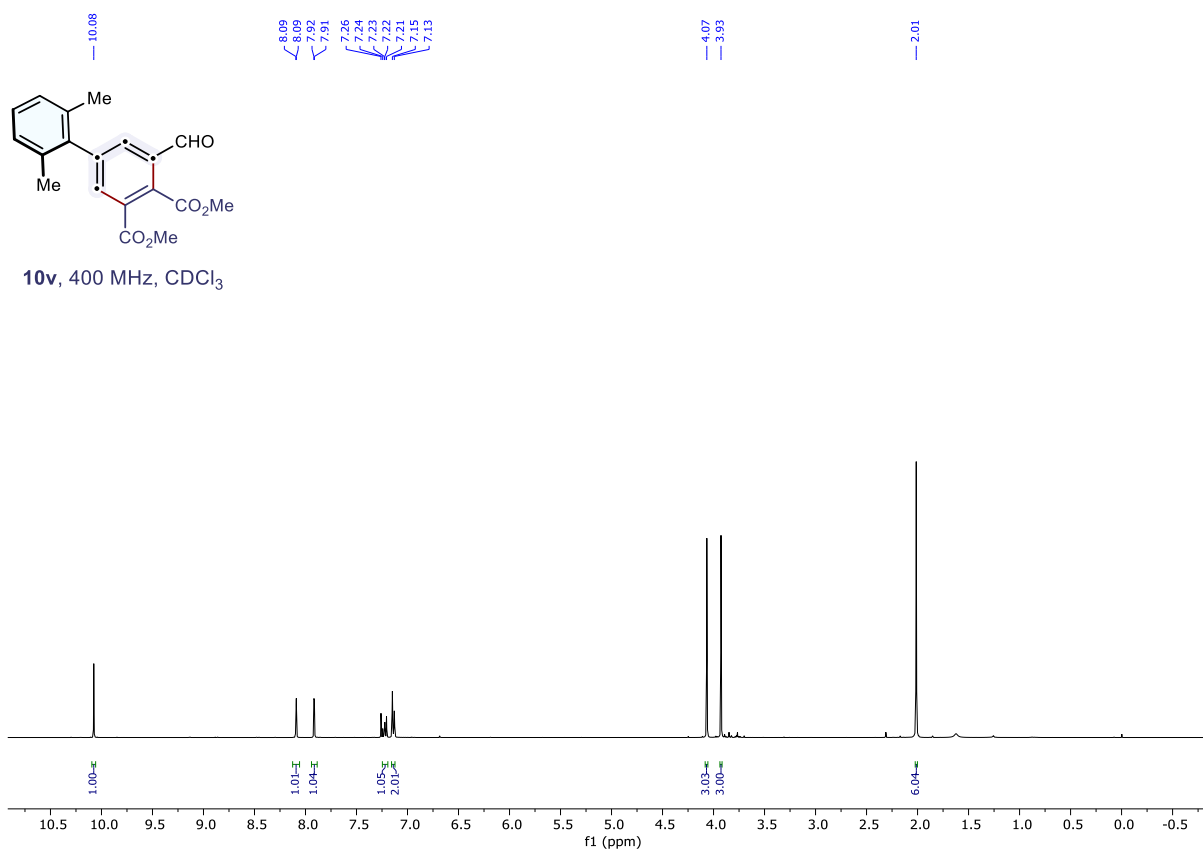


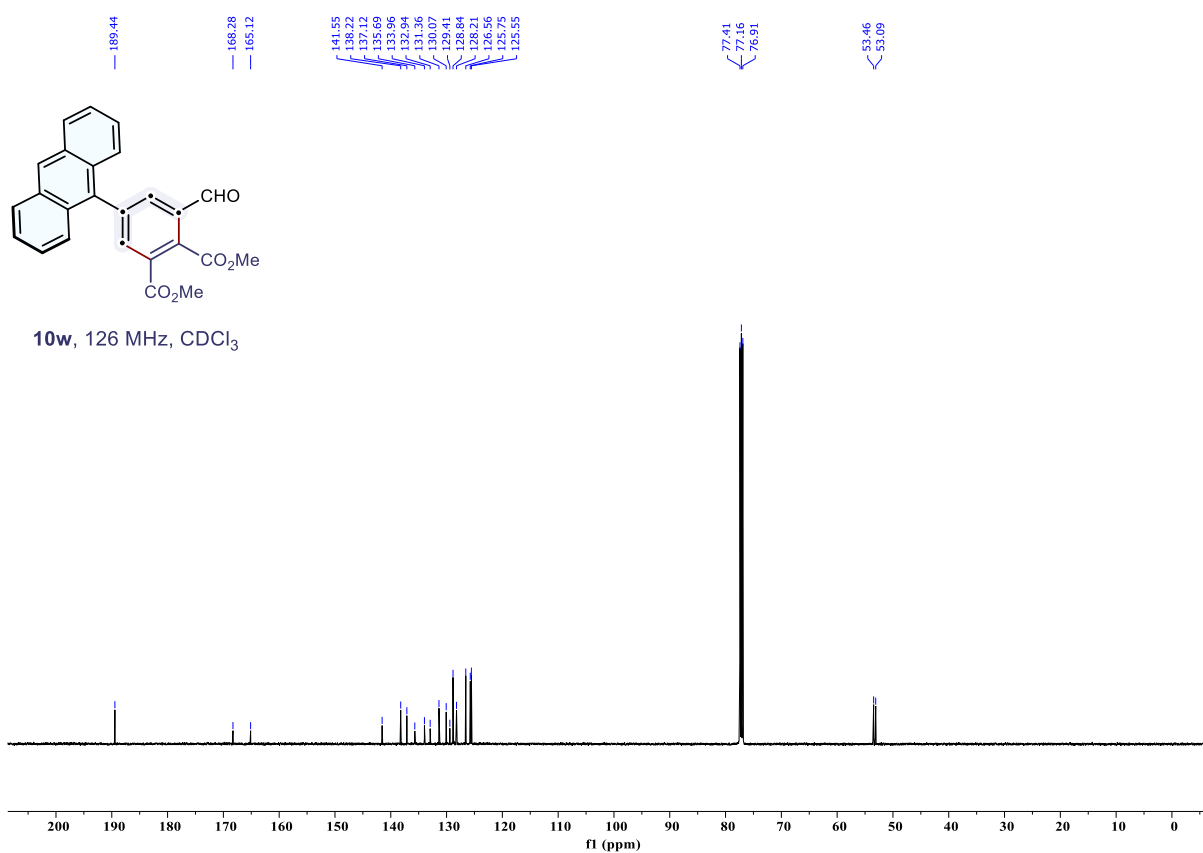
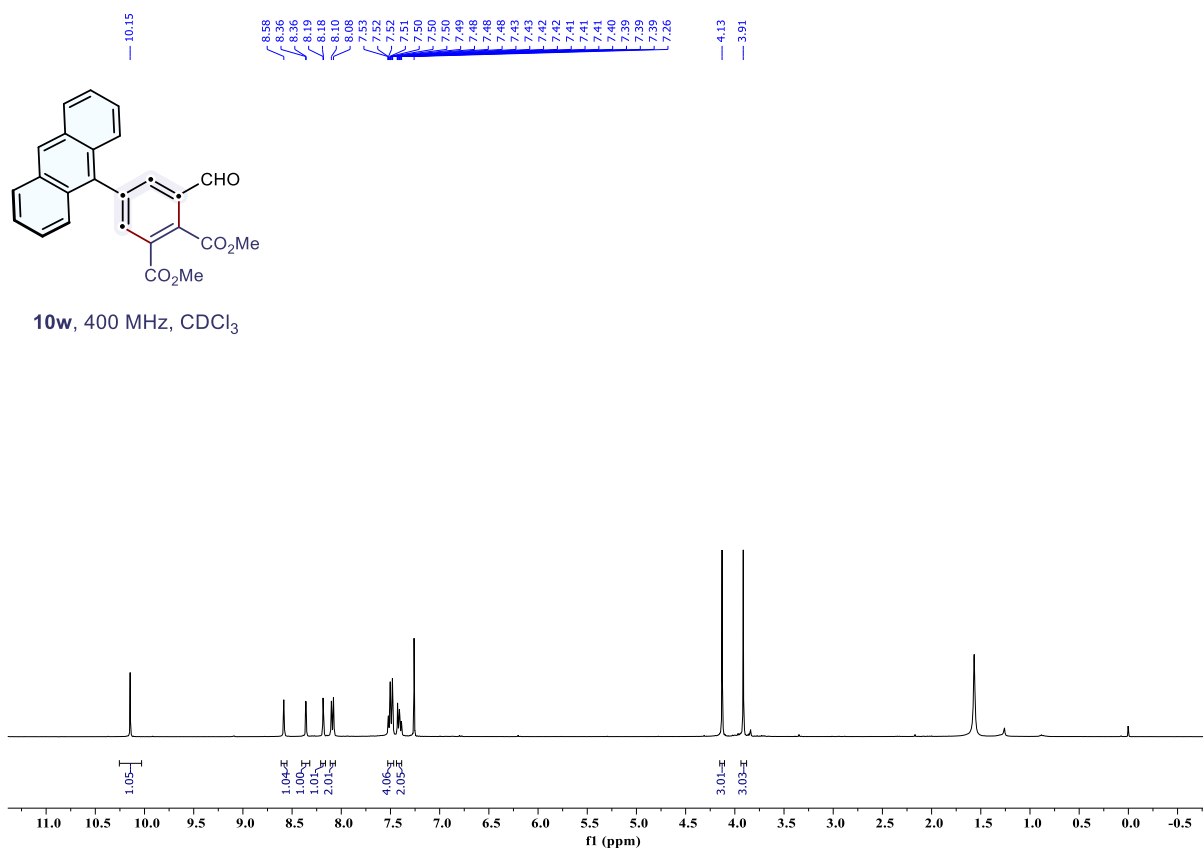


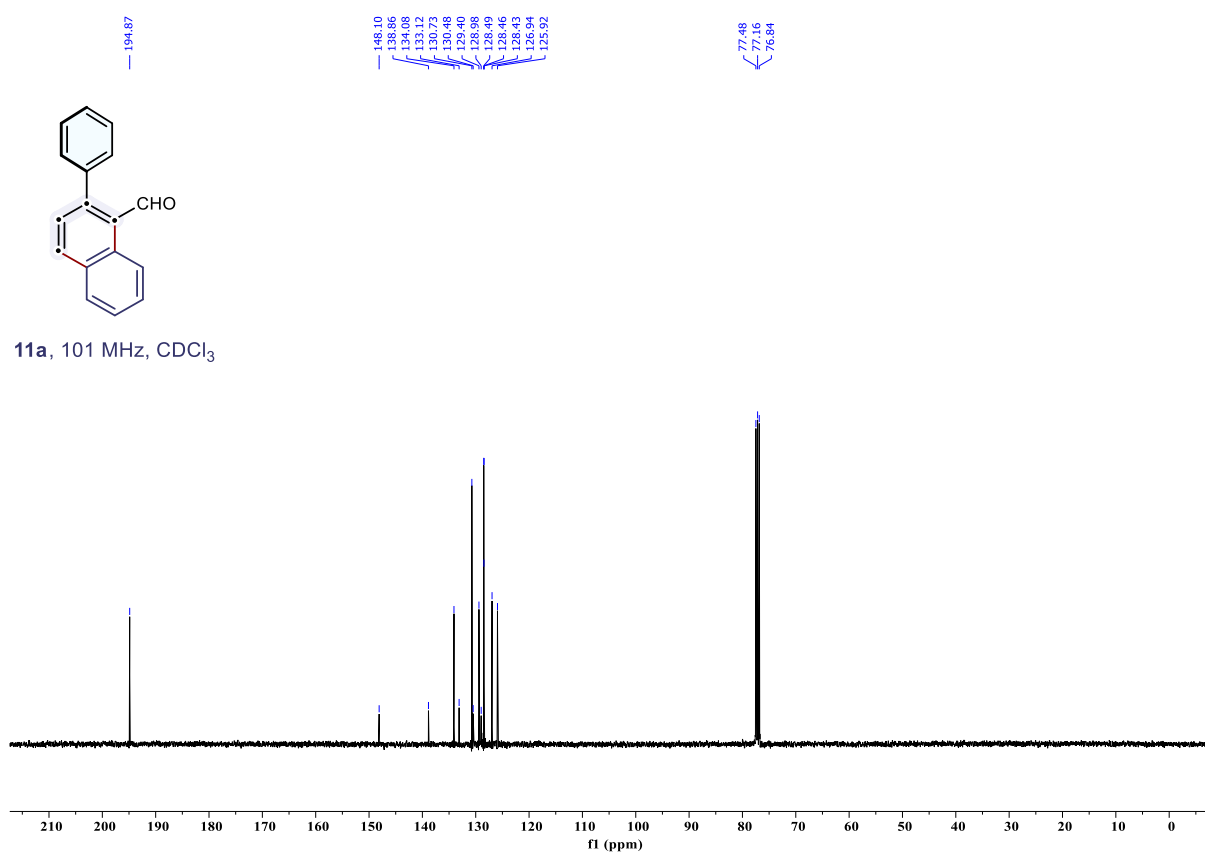
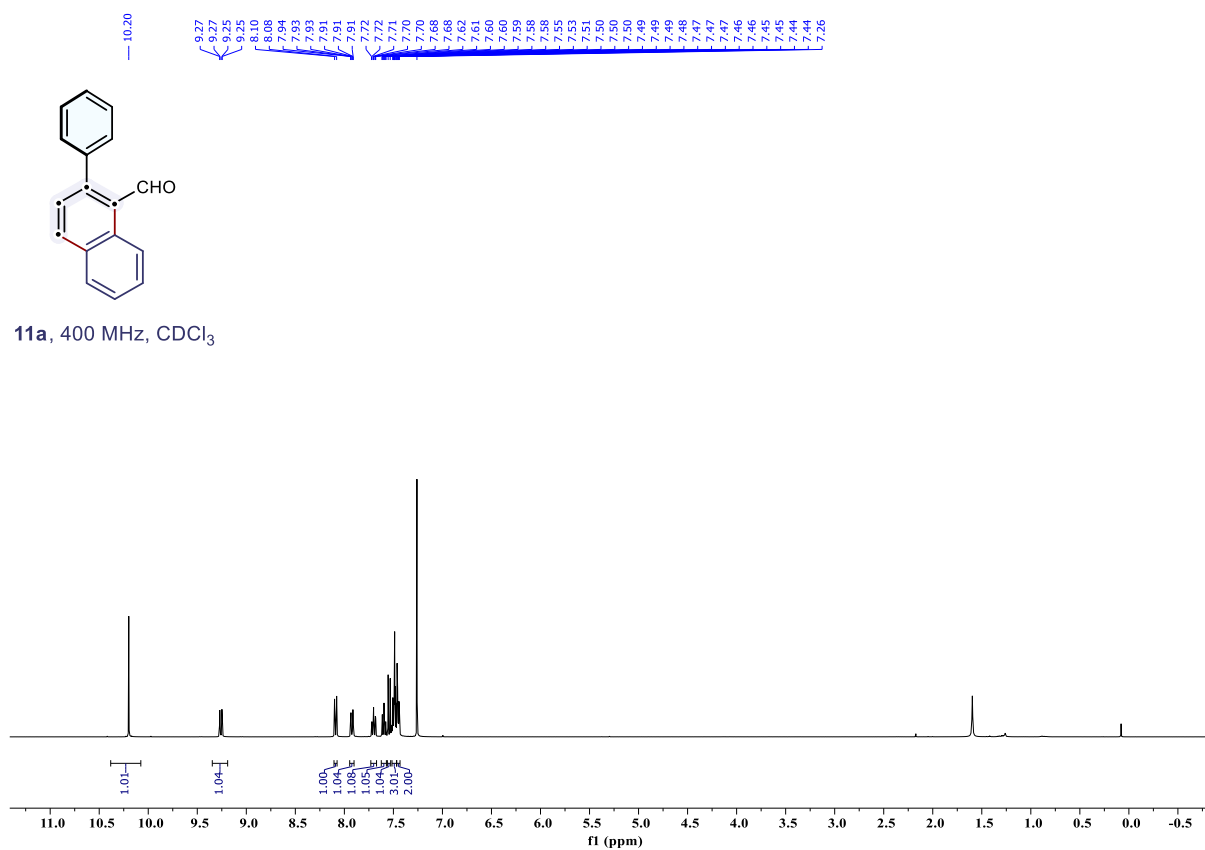


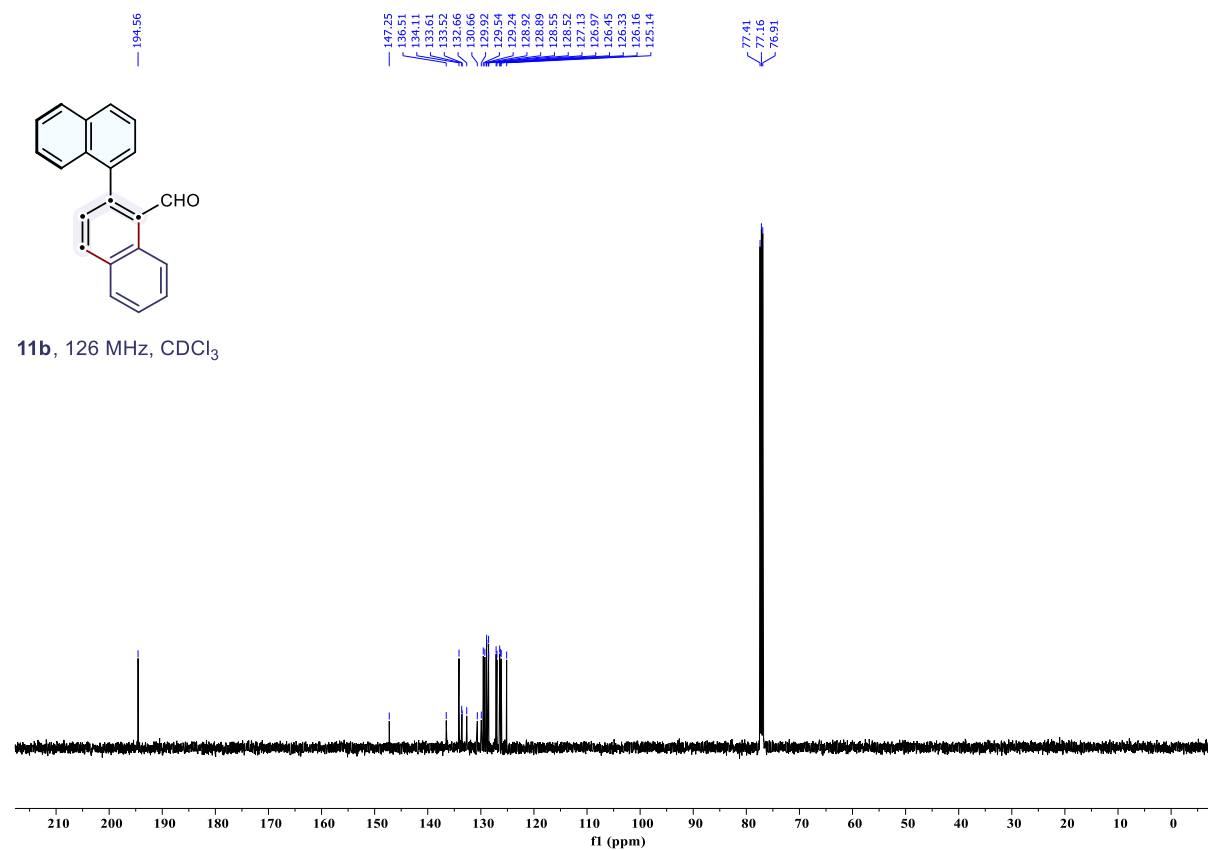
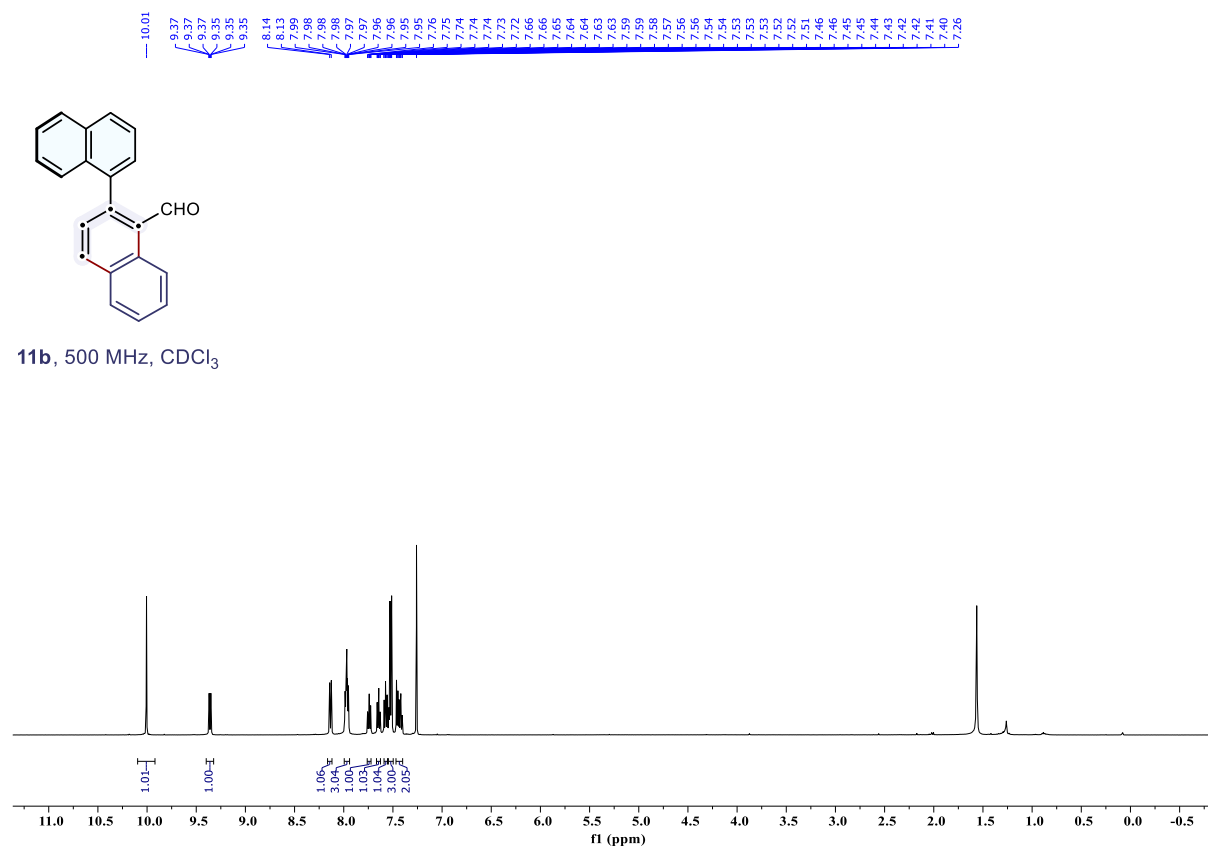


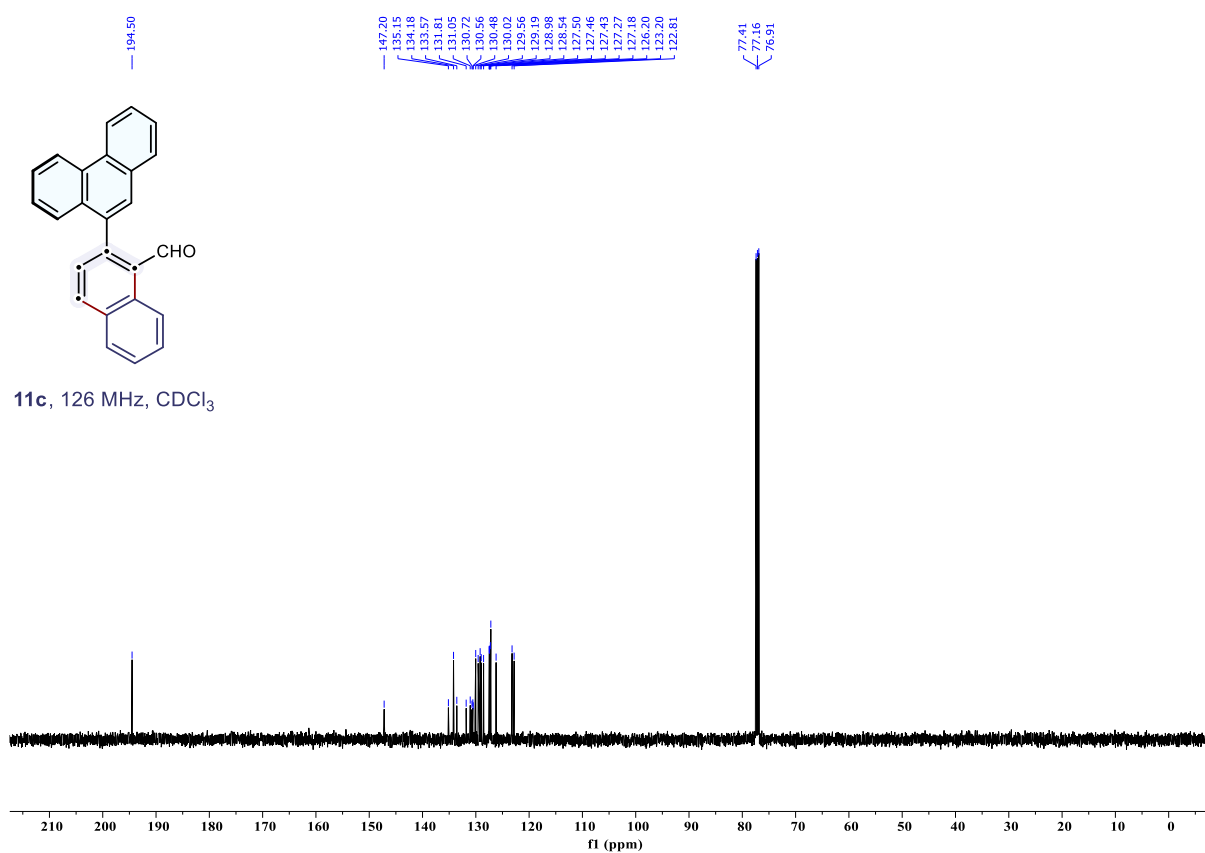
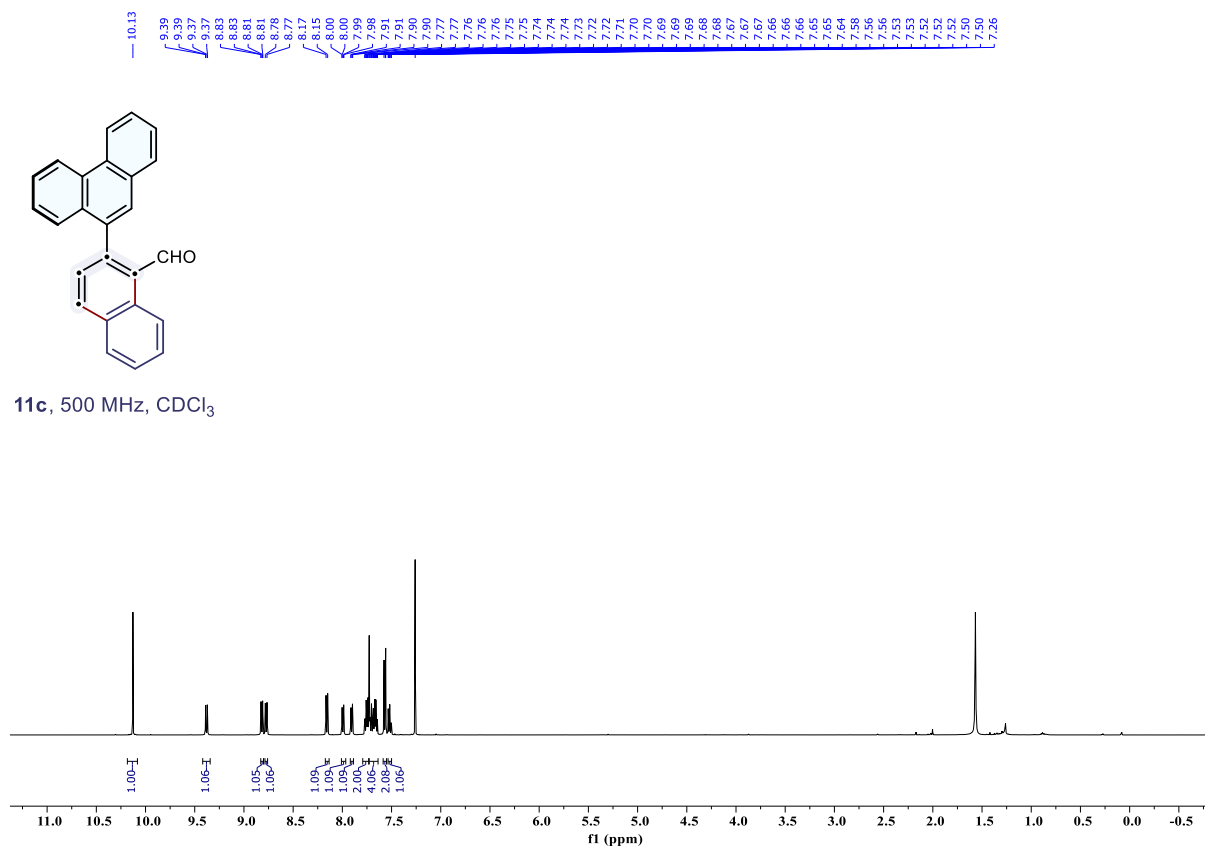


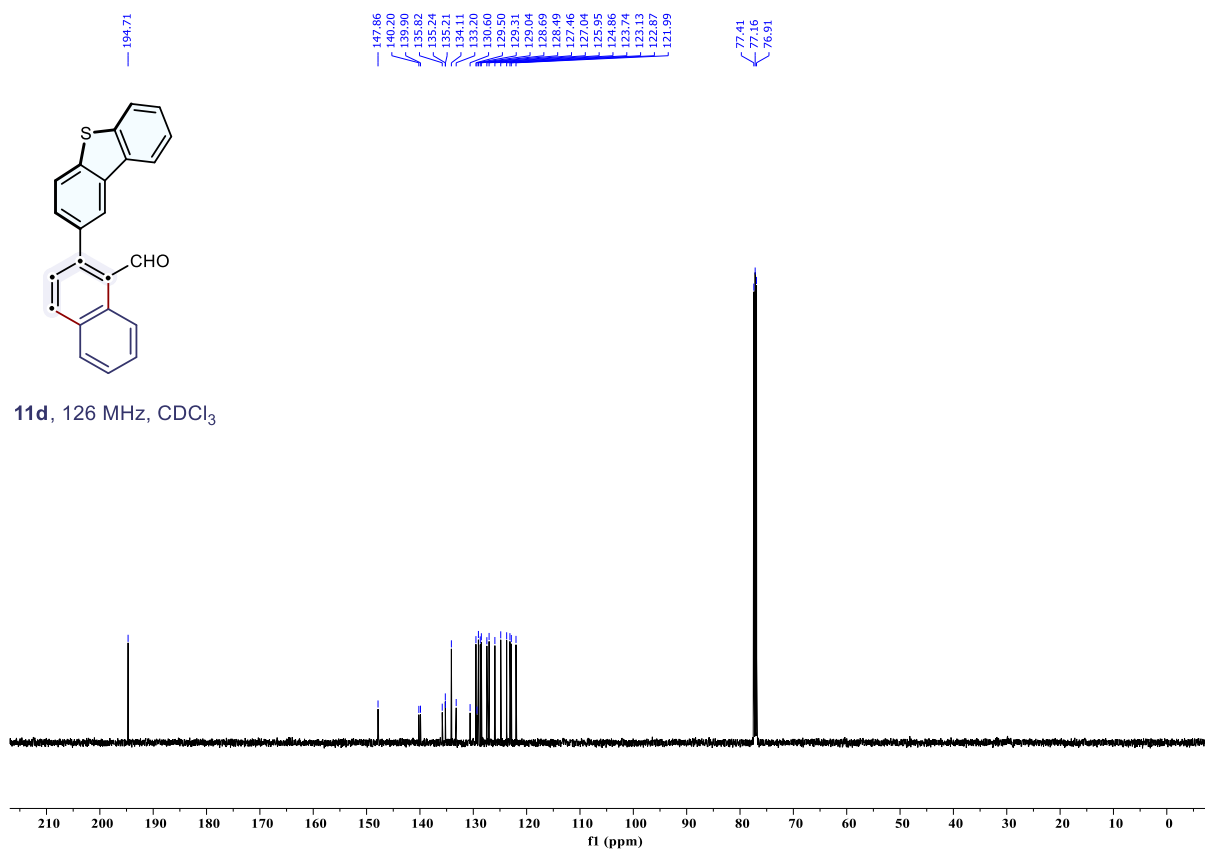
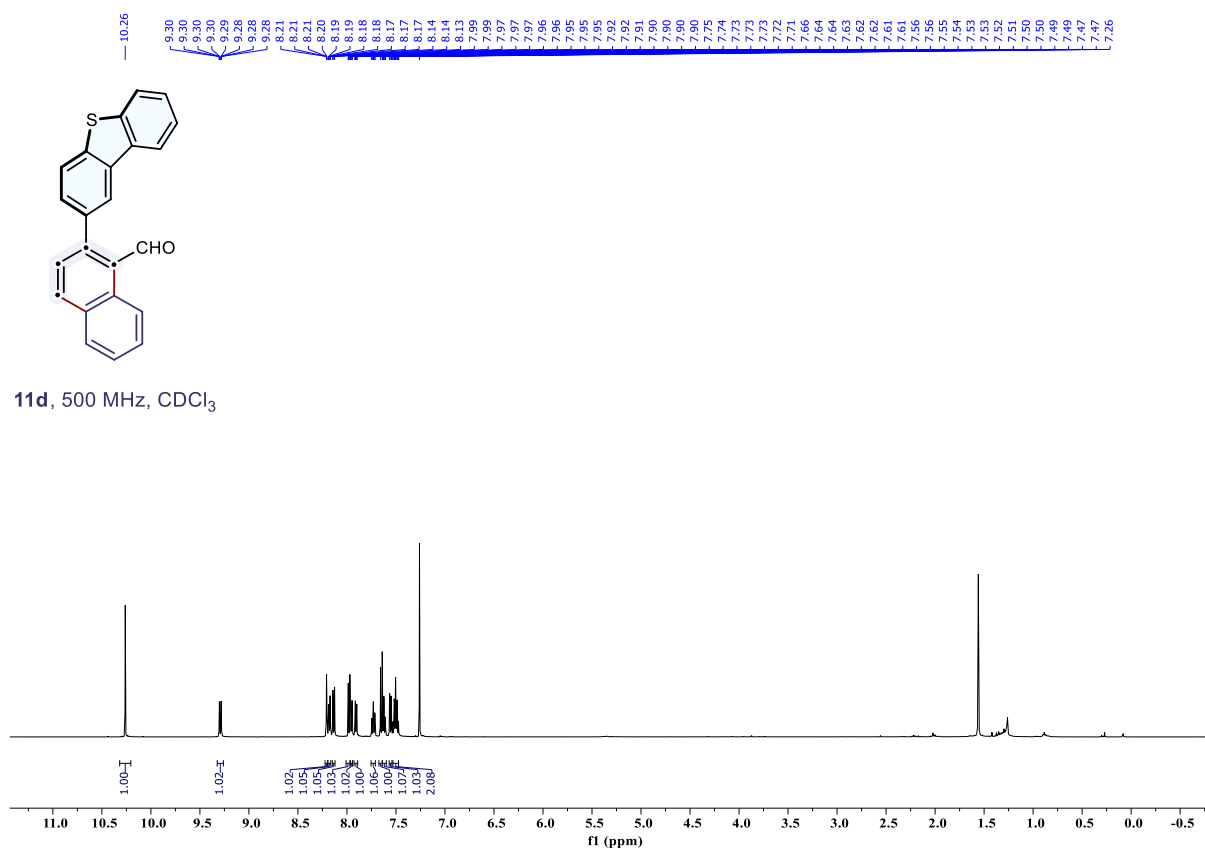


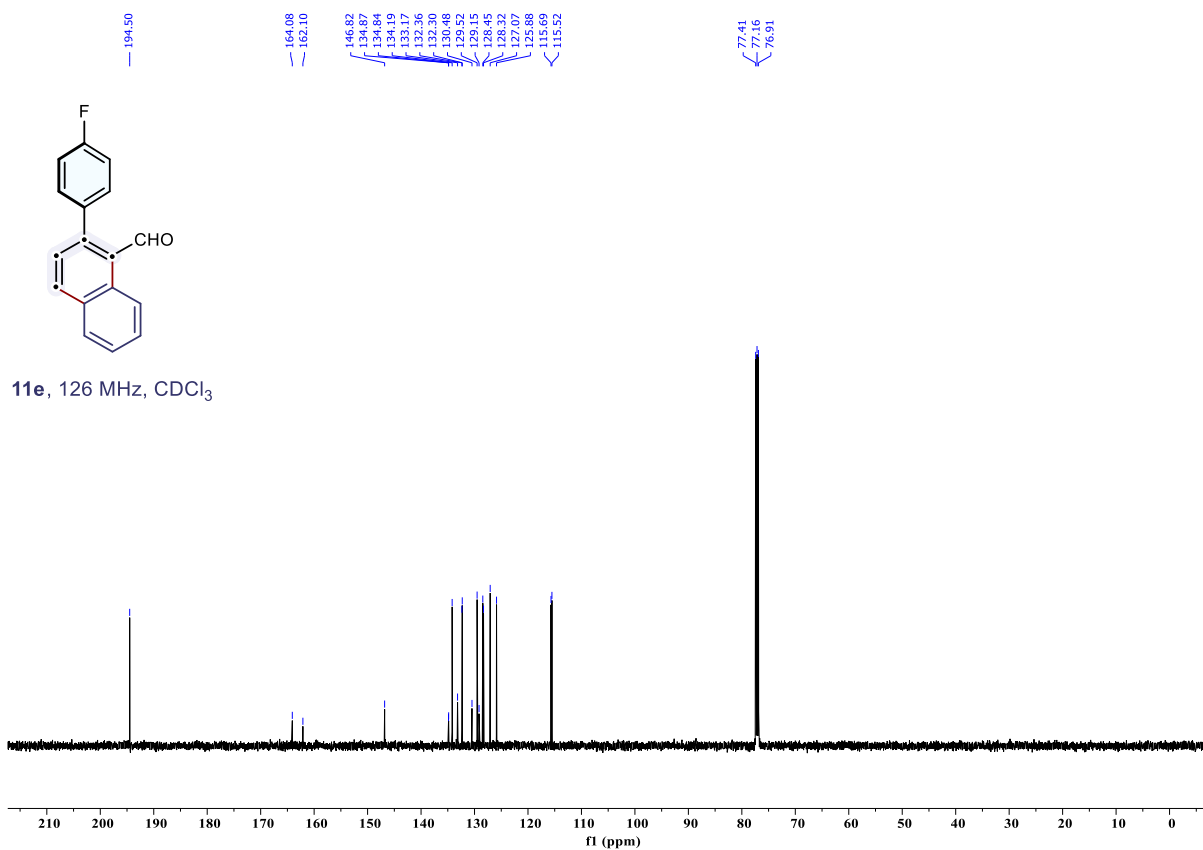
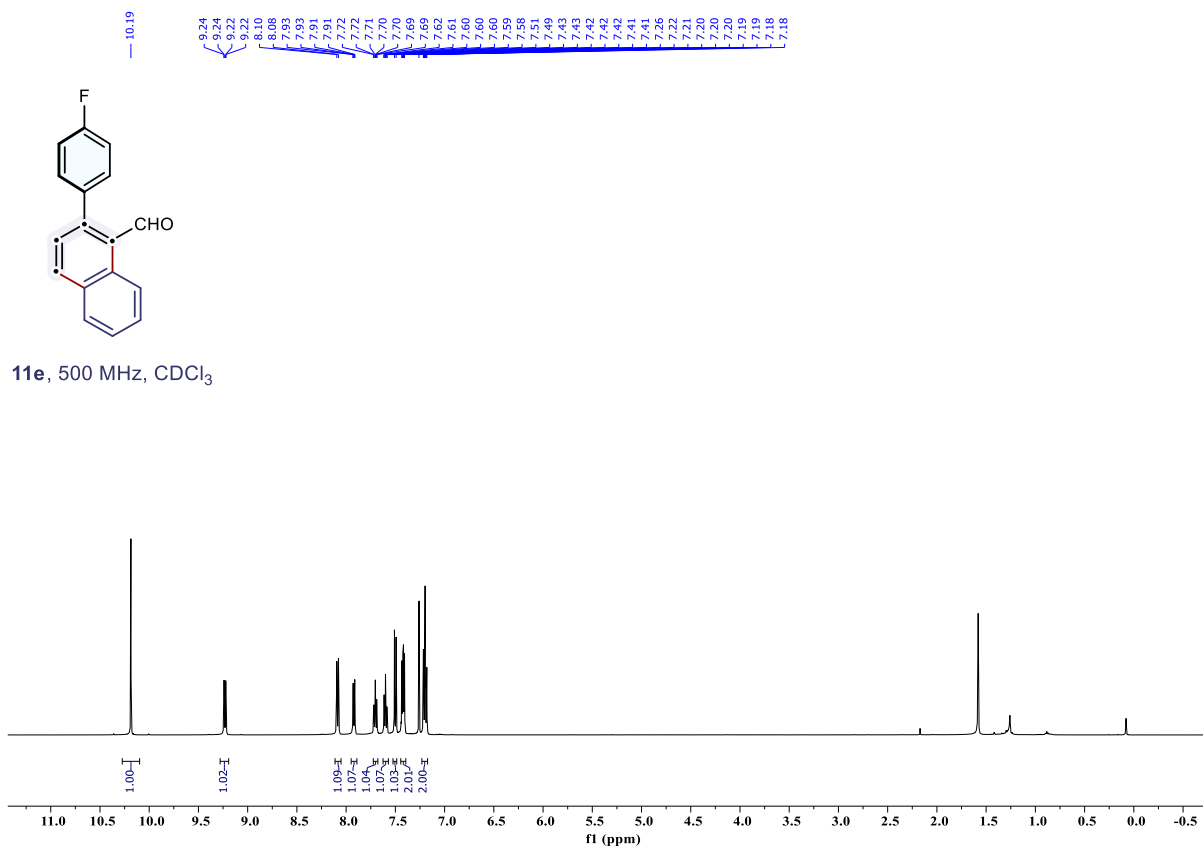


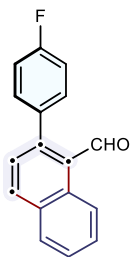




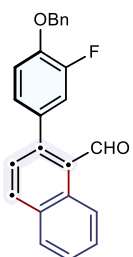
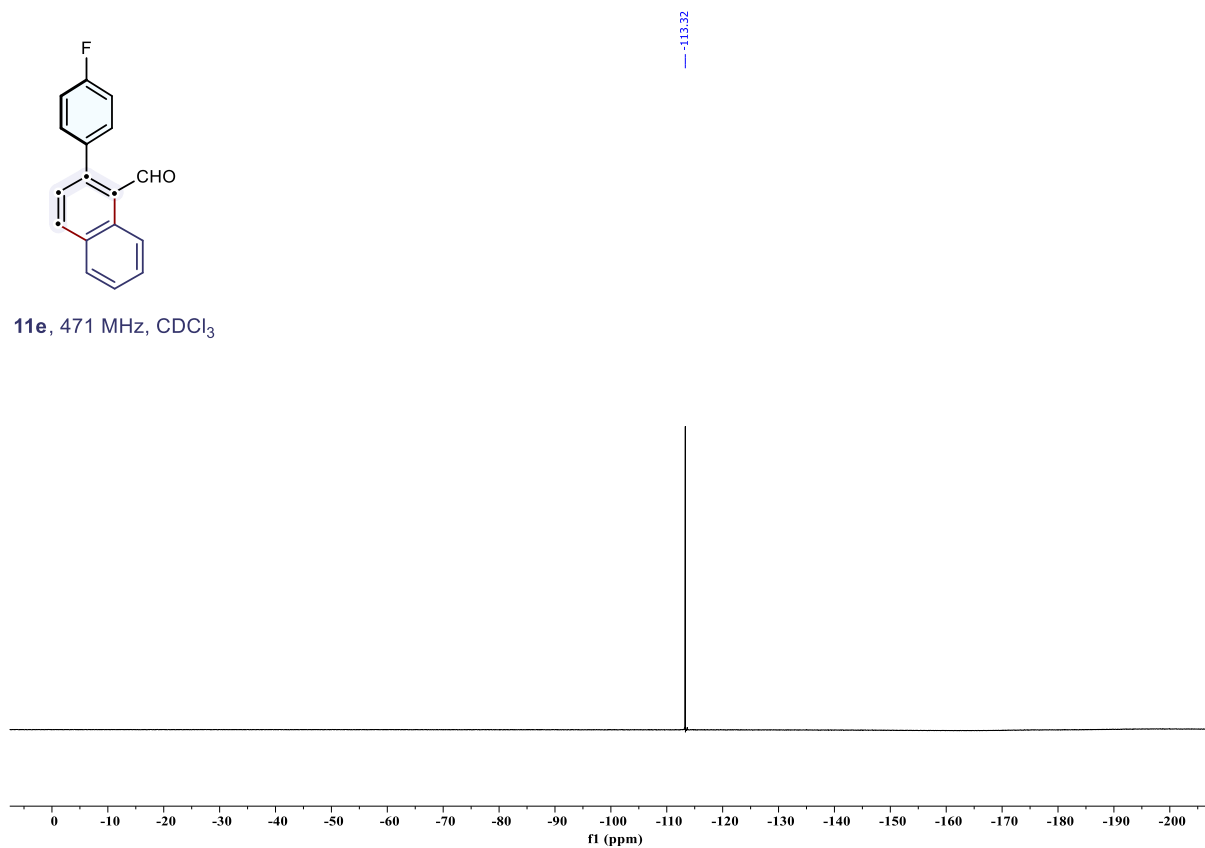




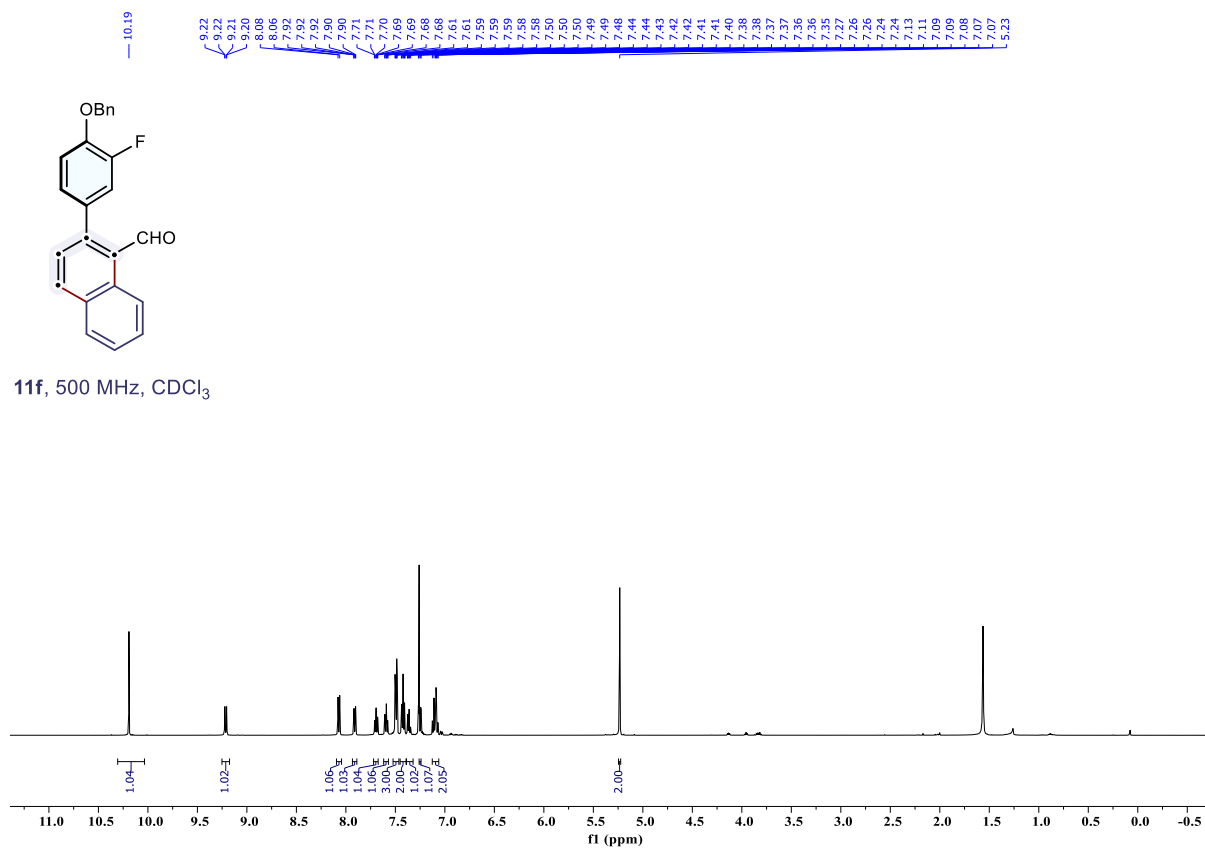


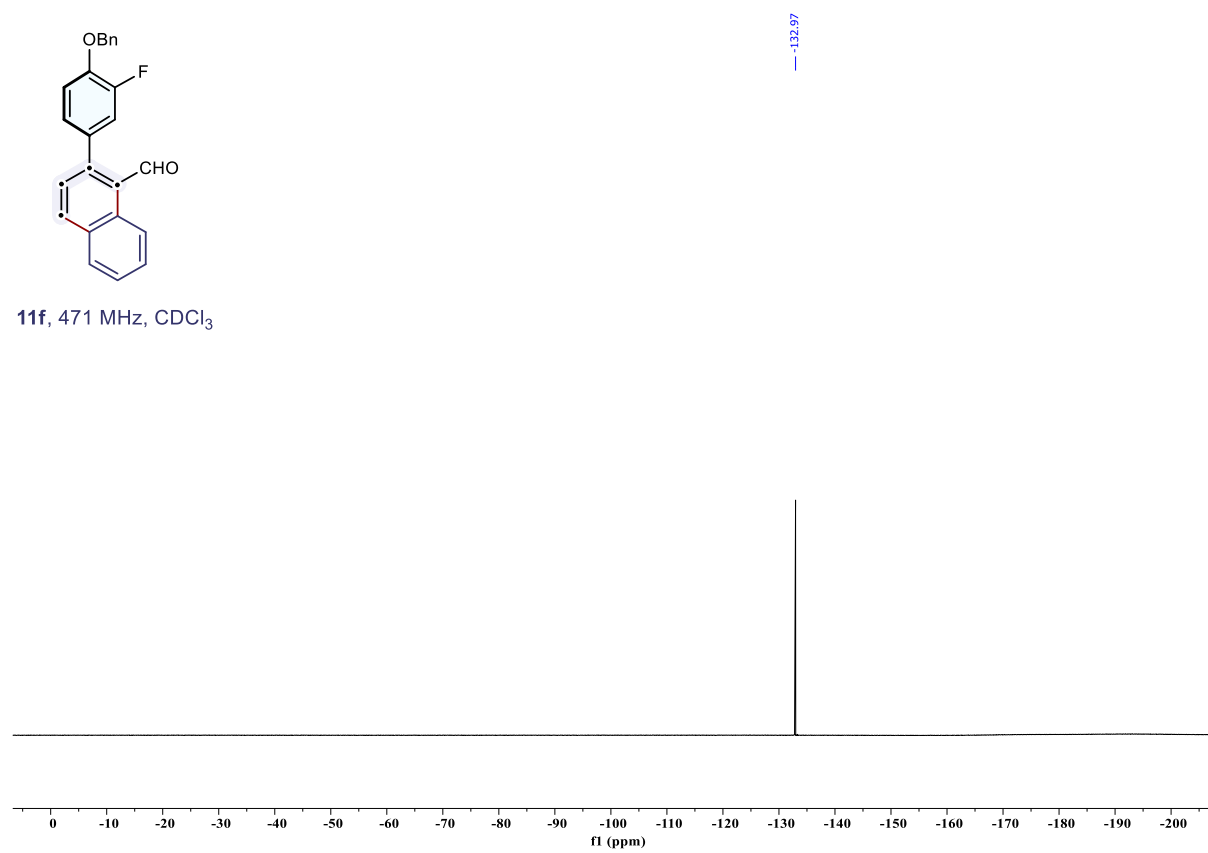
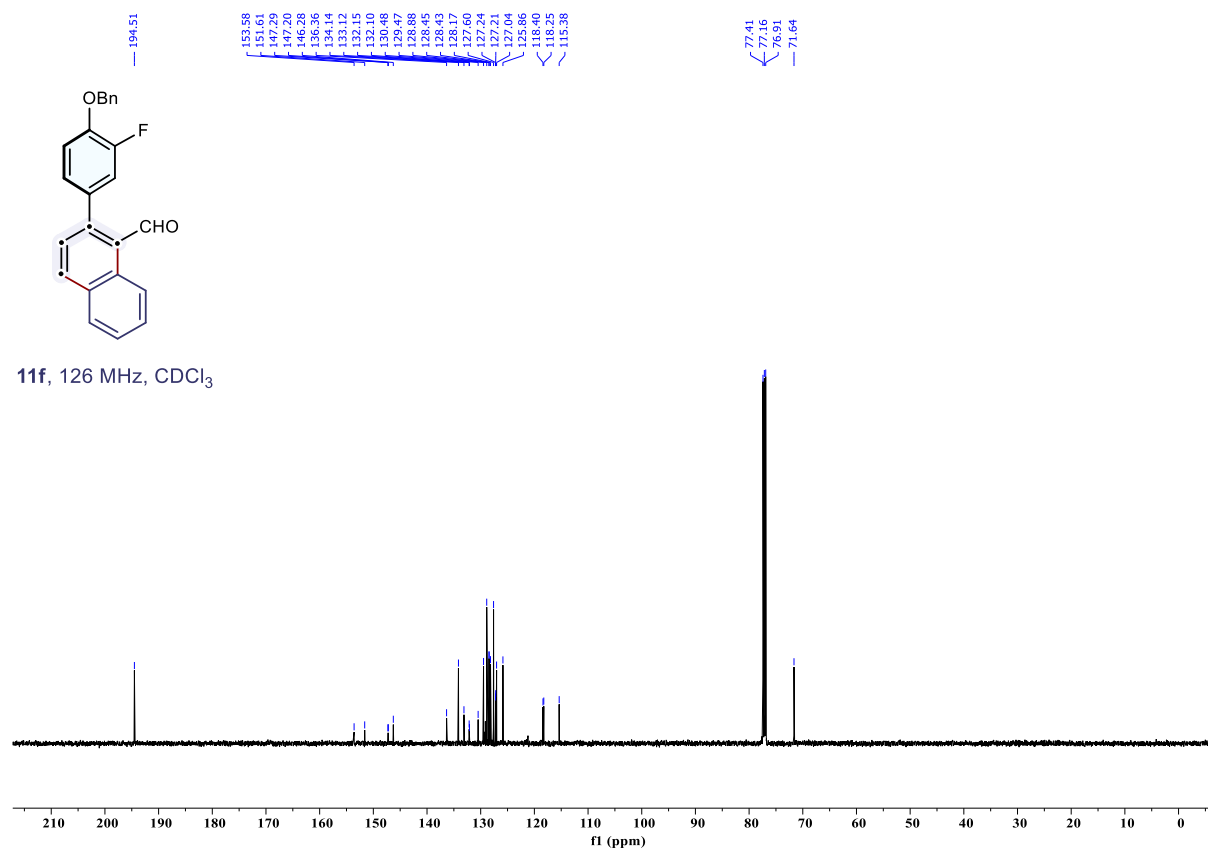


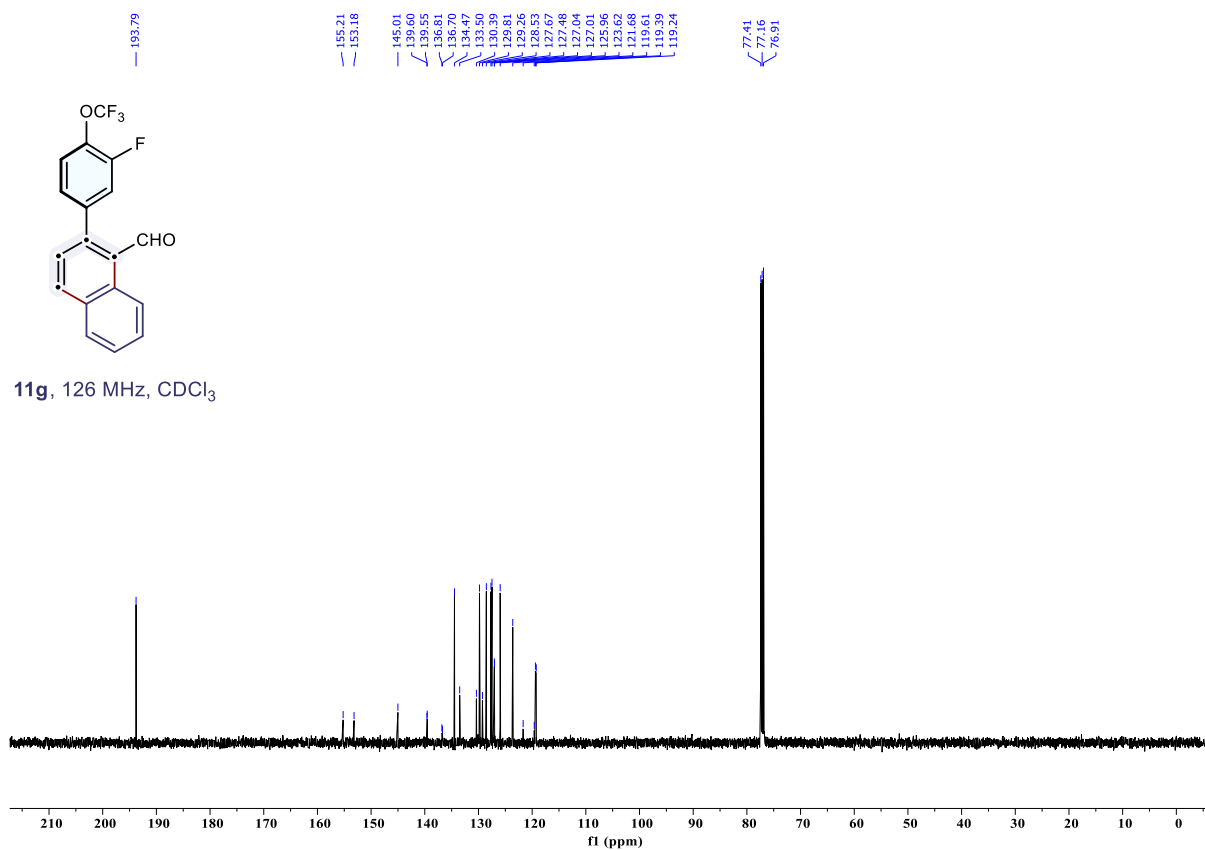
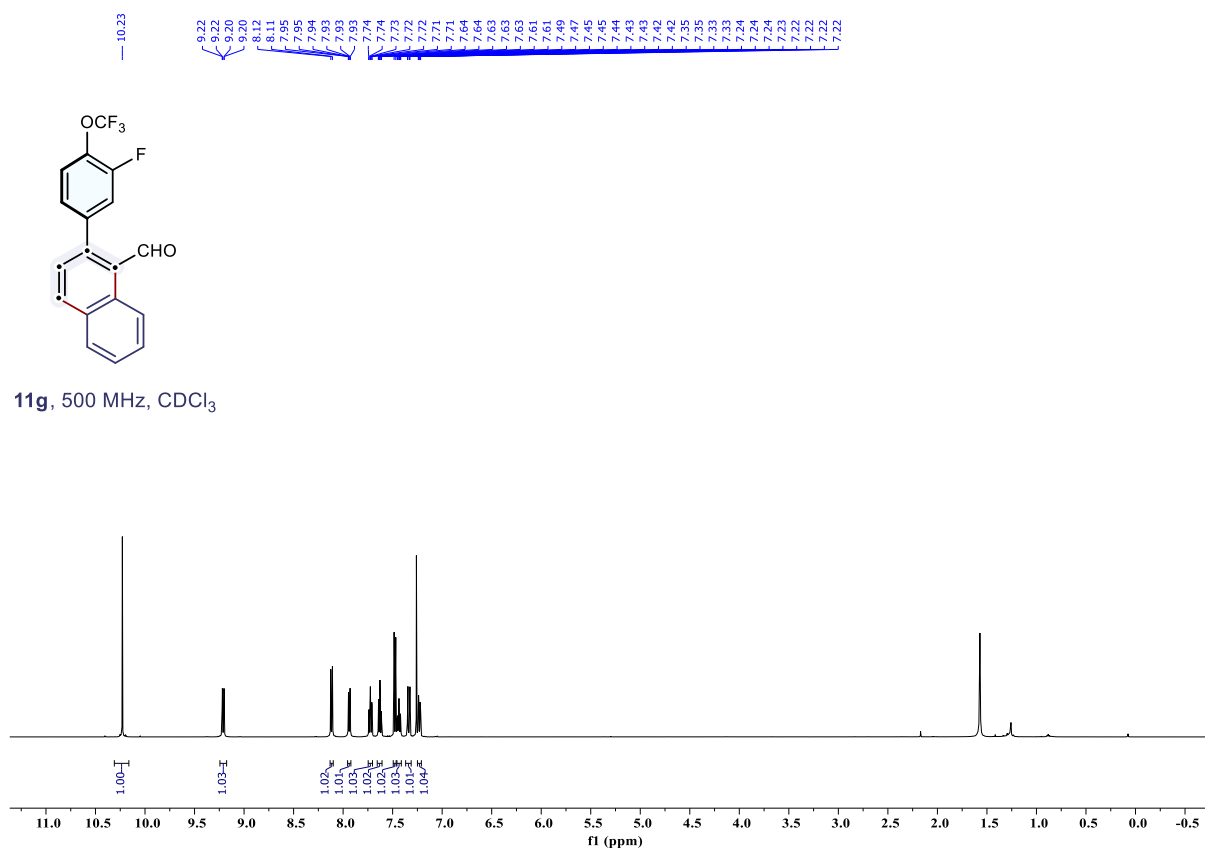
11e, 471 MHz, CDCl₃

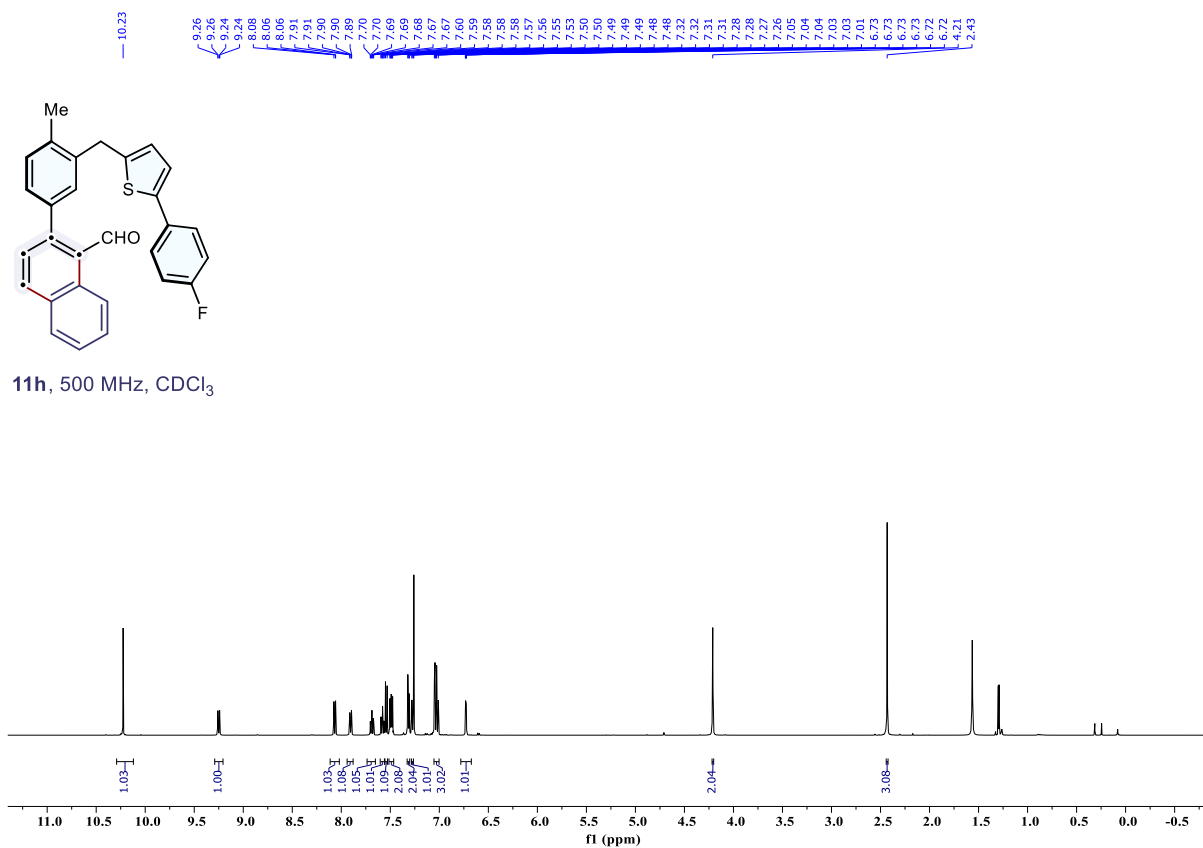
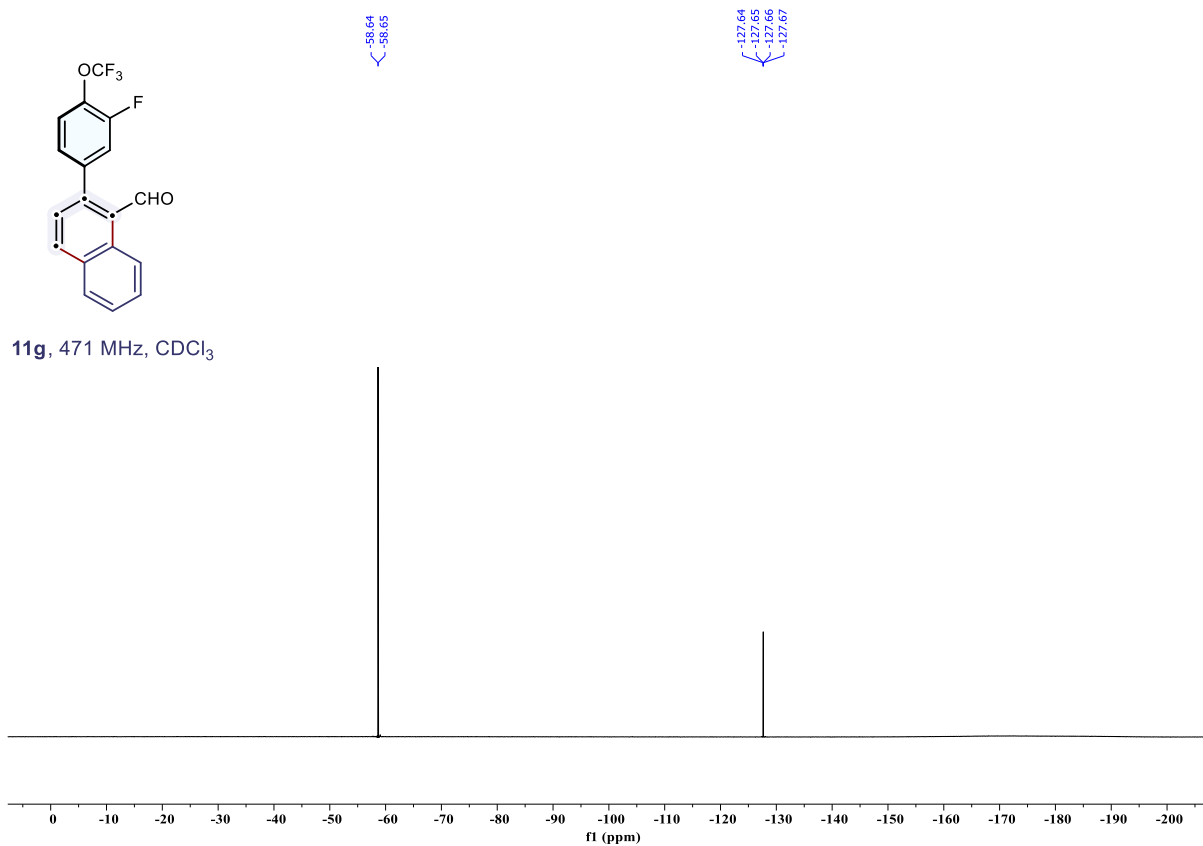


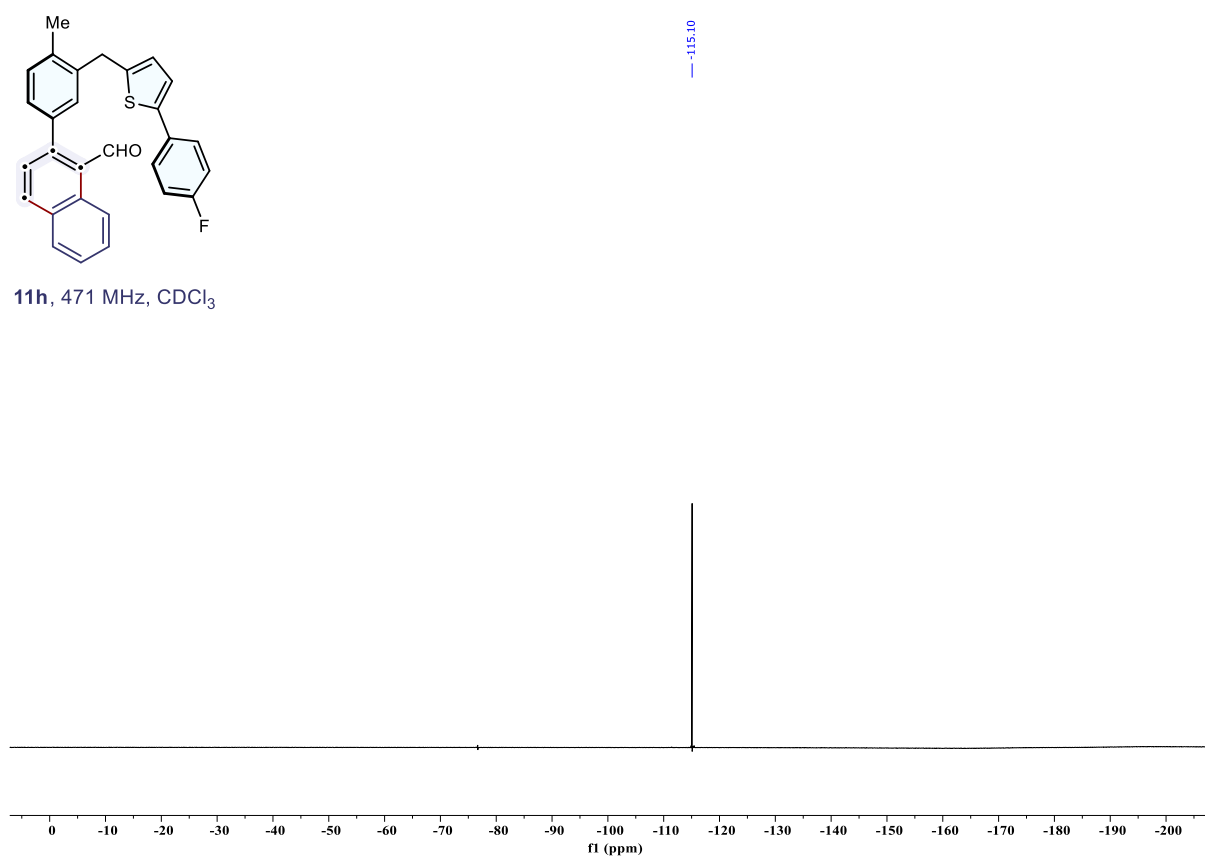
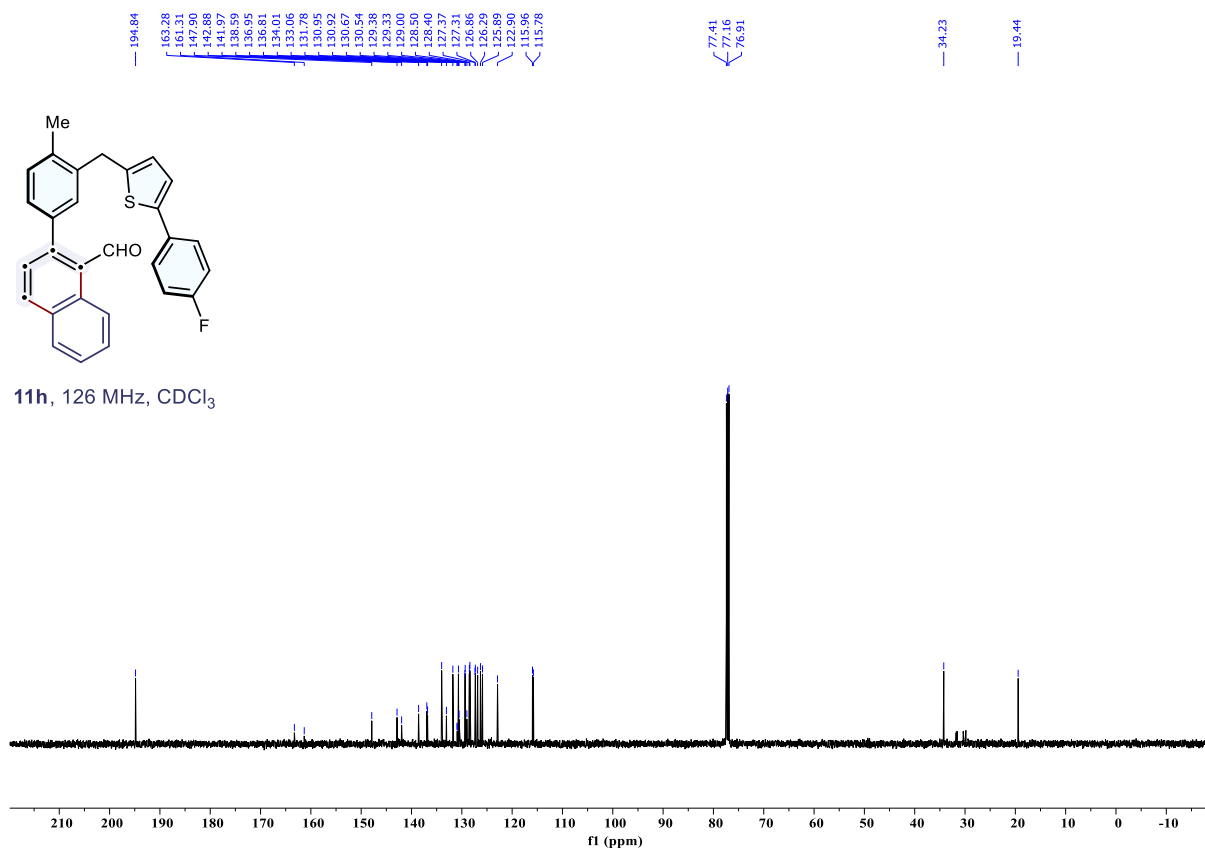
11f, 500 MHz, CDCl₃

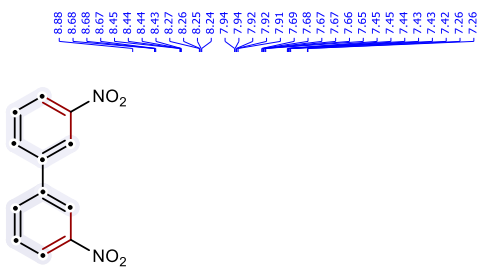




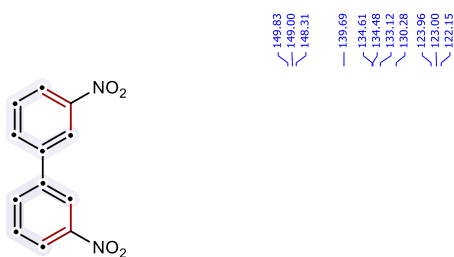
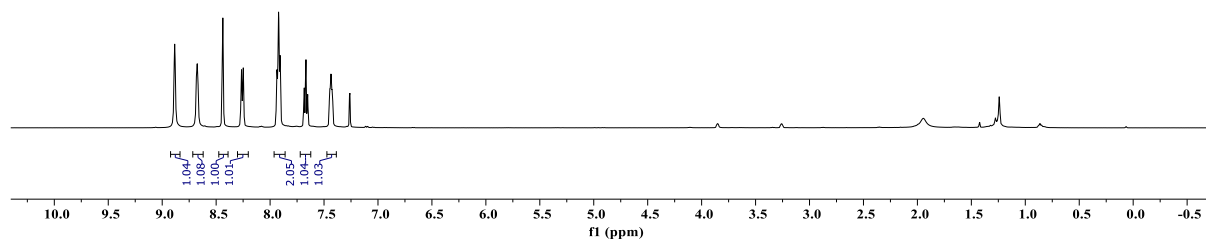








13, 500 MHz, CDCl₃



13, 126 MHz, CDCl₃

