Supporting information

Unusual Coordination of Triazolyl-Pyridine Ligand in a Pd(II) Complex: Applications in Suzuki-Miyaura Coupling Reaction

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Instrumentation methods

Nuclear magnetic resonance spectra were recorded on a JEOL ECS-400 spectrometer operating at 400 MHz for ^{1}H NMR and 101 MHz for $^{13}C\{^{1}H\}$NMR respectively. Tetramethyl silane (TMS) (0.00 ppm) was used as an reference internal solvent to record ^{1}H and $^{13}C\{^{1}H\}$NMR spectra for all the compounds. During analysis of 1H NMR spectra proton peak for CDCl3 was fixed at 7.246 ppm and the carbon peak was fixed at 77.0 ppm. ^{1}H NMR patterns of chemical shifts were characterized in parts per million (ppm). The terms singlet (s), doublet (d), double of doublet (dd), triplet (t), and multiplet (m) were used to describe peak splitting patterns. The coupling constant (*J*) values are given in Hertz (Hz). The Xevo G2-SQ-Tof (Waters, USA) was used to examine high-resolution electron impact mass spectra (HR-EIMS), which are compatible with ACQUITY UPLC® and nano ACQUITY UPLC® systems. The melting point of Ligand and complex were determined on an analog melting point apparatus.

NMR spectral data of 2, 3, 4 and 1a.

Spectroscopic data of di(prop-2-yn-1-yl) phthalate [dpp] **(2)**

^{1}H NMR (400 MHz, Chloroform-*d*) δ 7.72-7.70 (m, 2H), 7.52-7.50 (m, 2H), 4.85 (d, *J* = 2.4 Hz, 4H), 2.47 (t, *J* = 2.4 Hz, 2H); ^{13}C NMR (101 MHz, Chloroform-*d*) δ 166.63, 131.62, 131.25, 129.27, 77.29,75.56, 53.28. HRMS (ES) m/z calcd for $C_{14}H_{10}O_4$ ($[M+H]^+$) 243.0652; found 243.0654.

Spectroscopic data of bis((1-(pyridin-2-yl)-1H-1,2,3-triazol-5-yl) methyl) phthalate [bptmp] **(3)**

Mp: 180-183 °C. ^{1}H NMR (400 MHz, Chloroform-*d*) δ 8.67 (s, 2H), 8.42 (s, 2H), 8.10 (d, *J* = 8.0 Hz, 2H), 7.86-7.82 (m, 2H), 7.69 (dd, *J* = 5.6, 3.2 Hz, 2H), 7.48-7.46 (m, 2H), 7.27 (dd, *J* = 7.6, 4.8 Hz, 2H), 5.48 (s, 4H); ^{13}C NMR (101 MHz, Chloroform-*d*) δ 167.27, 149.03, 148.69, 143.02, 139.23, 131.65, 131.46, 129.26, 123.82, 121.59, 113.93, 58.89. HRMS (ES) m/z calcd for $C_{24}H_{18}N_8O_4$ ($[M+H]^+$) 483.1524; found 483.1526. IR υ_{max} (cm^{-1}): 3132 (w, C_{sp2}-H stretch.), 3085 (w, N-N stretch.), 2958 (w, C_{sp3}-H stretch.), 1721 (s, C=O stretch.), 1581(m, C=C_{sp2} stretch.), 1477 (m, C_{sp3}-H bend.), 1280 (s, C-N stretch.), 1115 (m, C-C_{sp3} stretch.), 783 (s, C=C_{sp2} bend.) [1,2].

Spectroscopic data of [$PdCl_2$(bptmp)] **(4)**

Mp: 250-253 °C. ^{1}H NMR (400 MHz, DMSO-d_6) δ 8.92 (s, 2H), 8.58 (d, J = 4.8 Hz, 2H), 8.11 (s, 4H), 7.83 – 7.78 (m, 2H), 7.72-7.69 (m, 2H), 7.57-7.53 (m, 2H), 5.47 (s, 4H); ^{13}C NMR (101 MHz, DMSO-d_6) δ 167.02, 149.46, 144.20, 142.98, 140.63, 132.43, 131.53, 129.43, 124.95, 122.44, 114.21, 58.88. HRMS (ES) m/z calcd for $C_{24}H_{18}N_8O_4$ ([M+H]$^+$) 658.9936; found 658.9934. IR υ_{max} (cm^{-1}): 3073 (w, N-N stretch.), 1722 (s, C=O stretch.), 1118 (m, C-C_{sp3} stretch.), 503 (w, Pd-N stretch.), 423 (w, Pd-Cl stretch.) [3].

Synthesis of 2-azidopyridine **(1a)**

Compound **1a** was synthesised according to literature procedure [4].

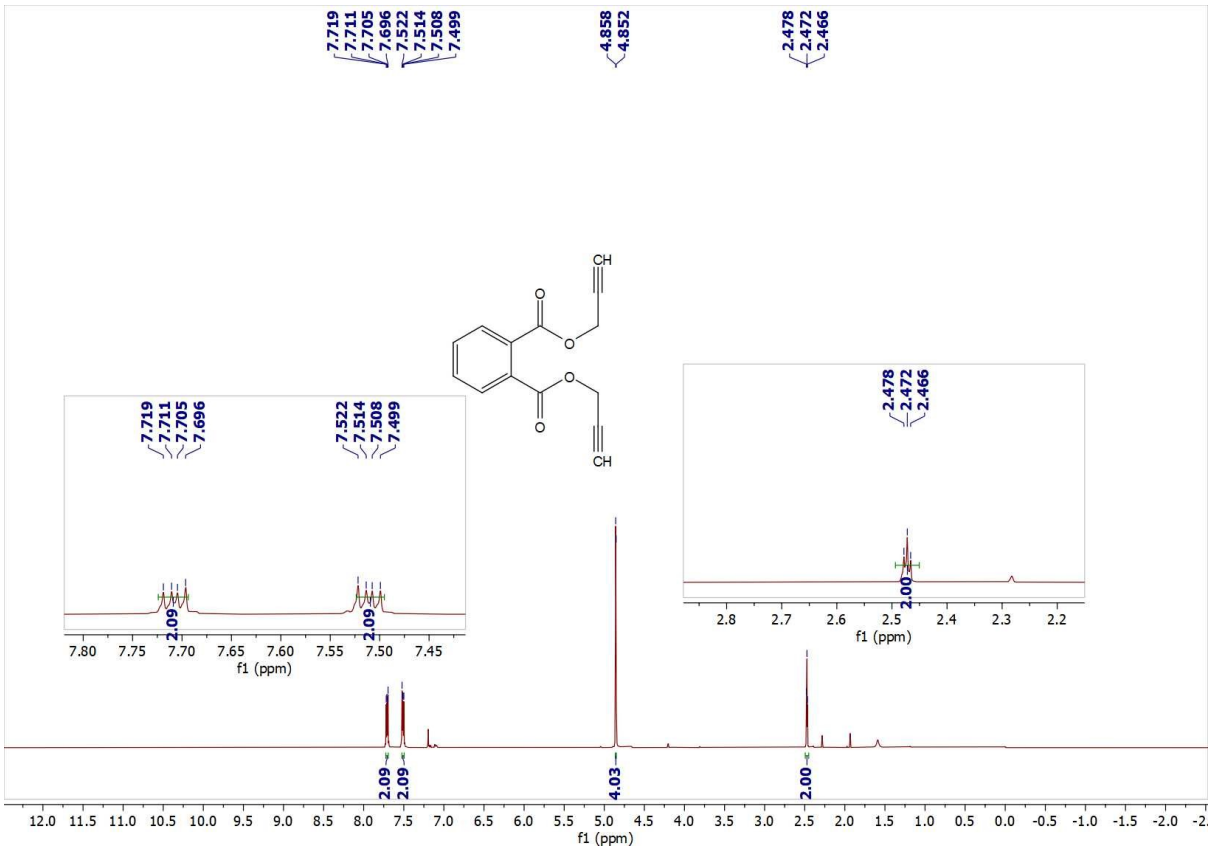


Fig. S1 ^{1}H NMR spectrum of **2** in $CDCl_3$ (400 MHz)

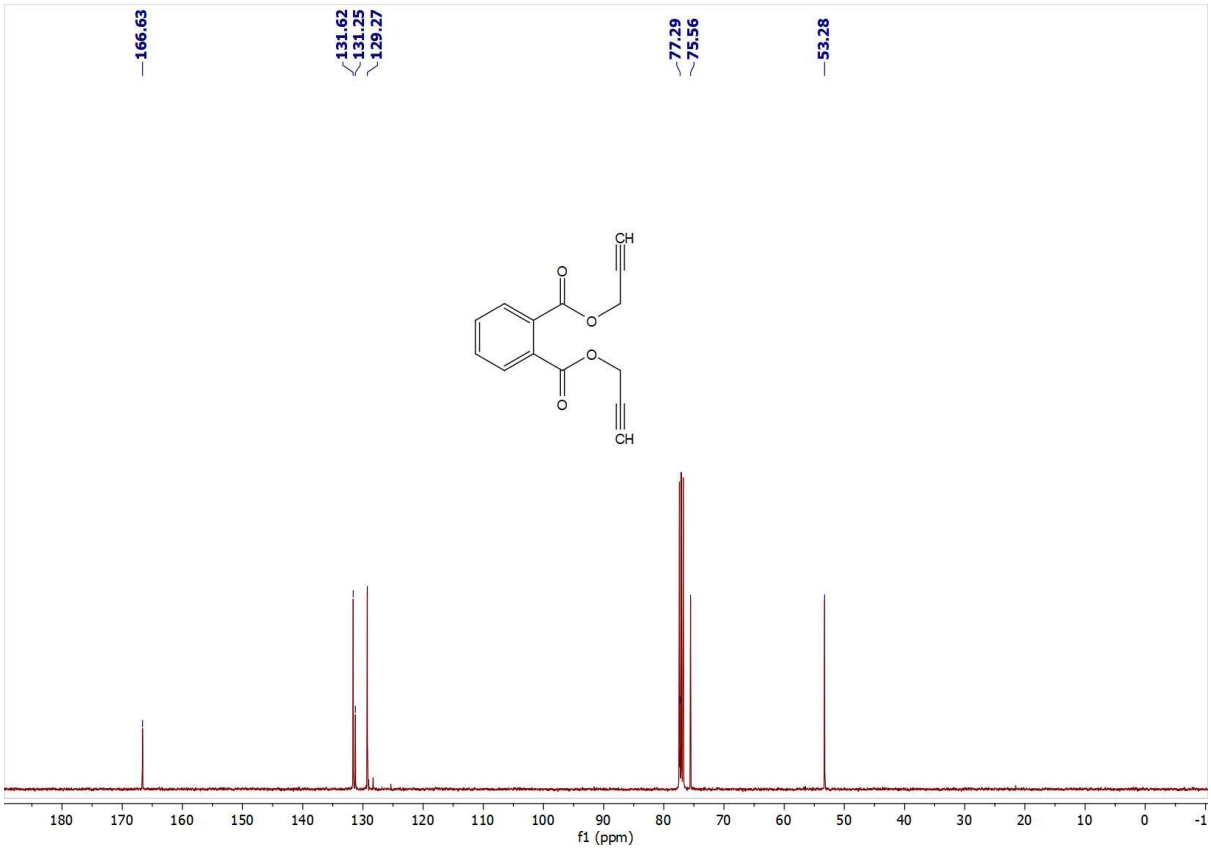


Fig. S2 ^{13}C NMR spectrum of **2** in $CDCl_3$ (101 MHz)

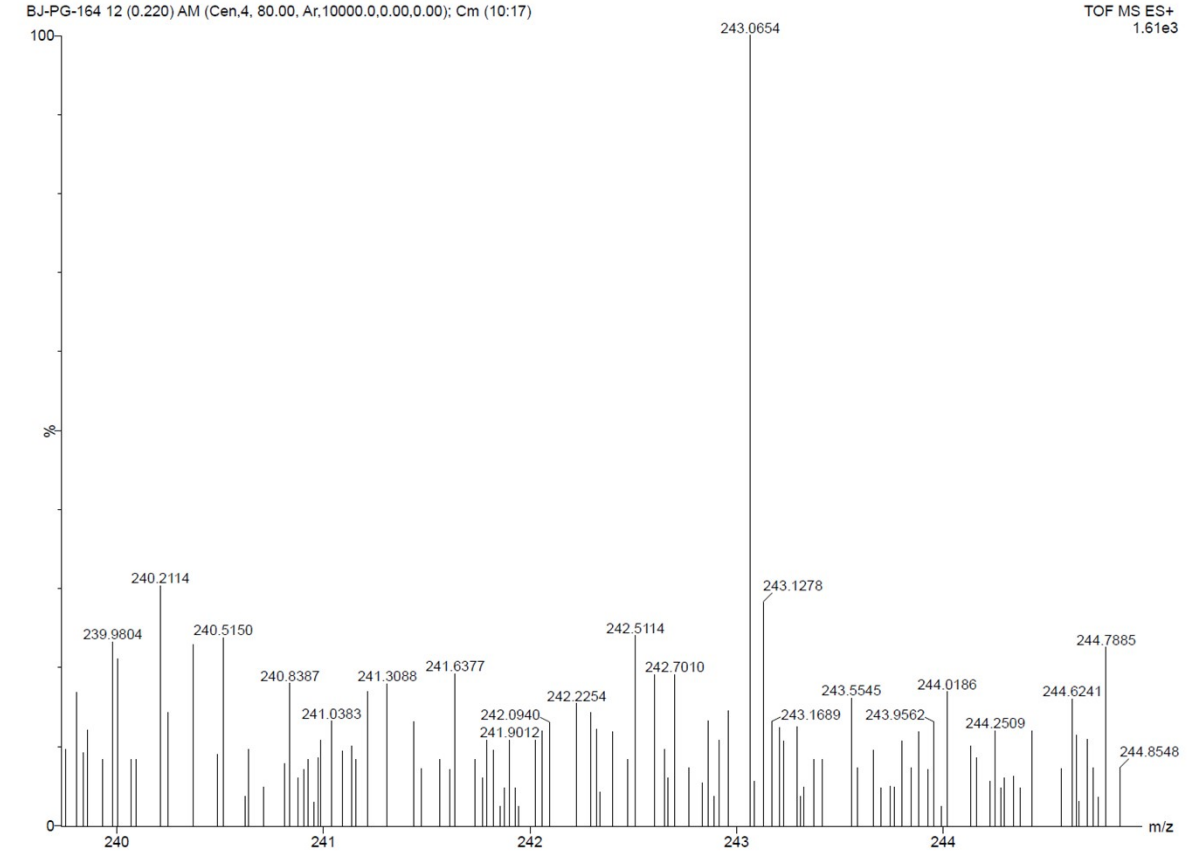


Fig. S3 EI mass spectrum of **2**

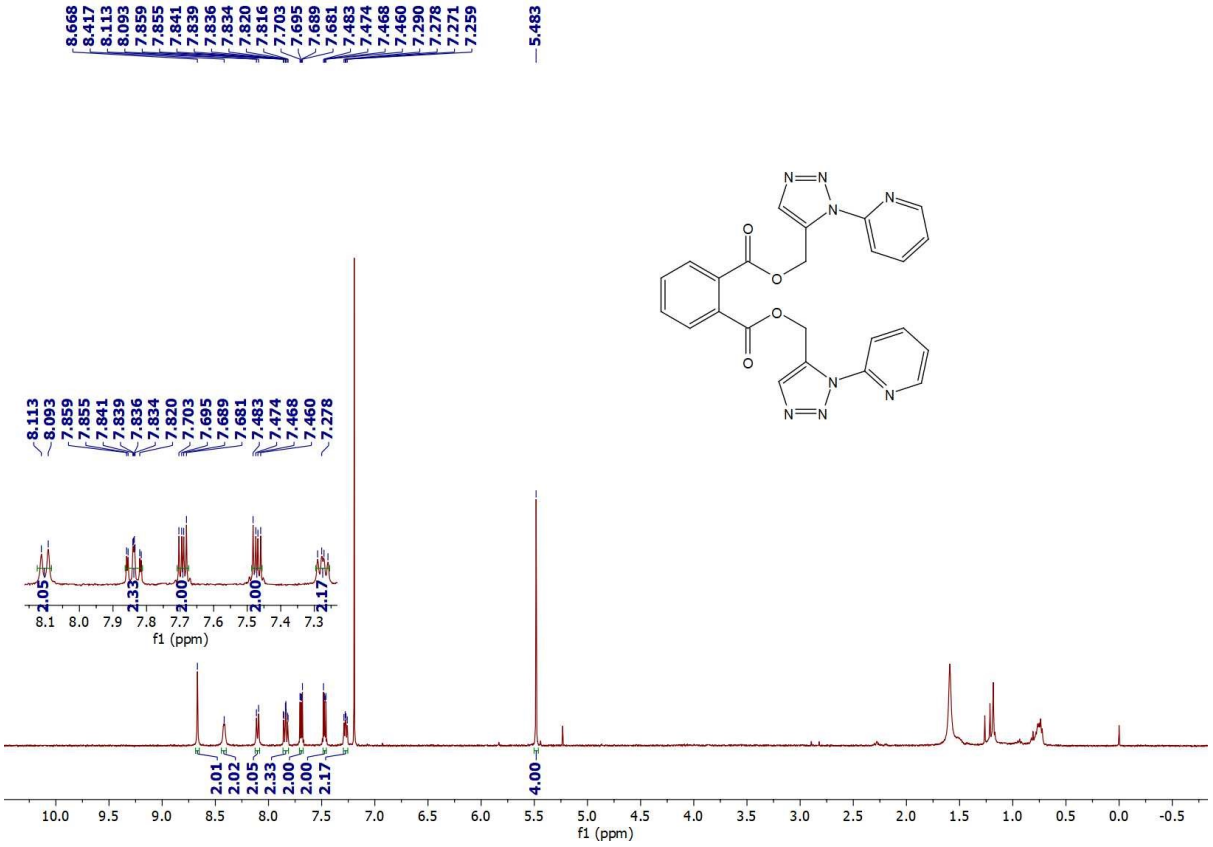


Fig. S4 ^{1}H NMR spectrum of **3** in $CDCl_3$ (400 MHz)

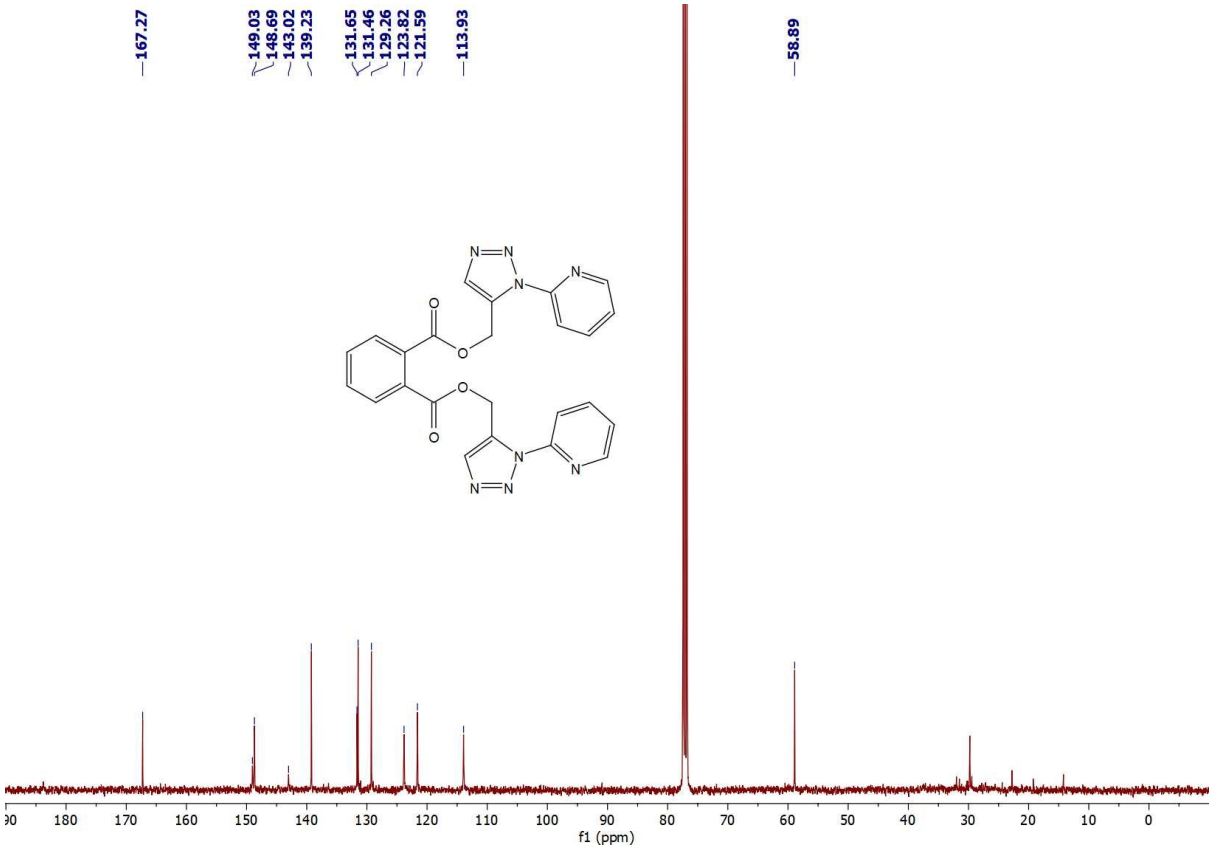


Fig. S5 ^{13}C NMR spectrum of **3** in $CDCl_3$ (101 MHz)

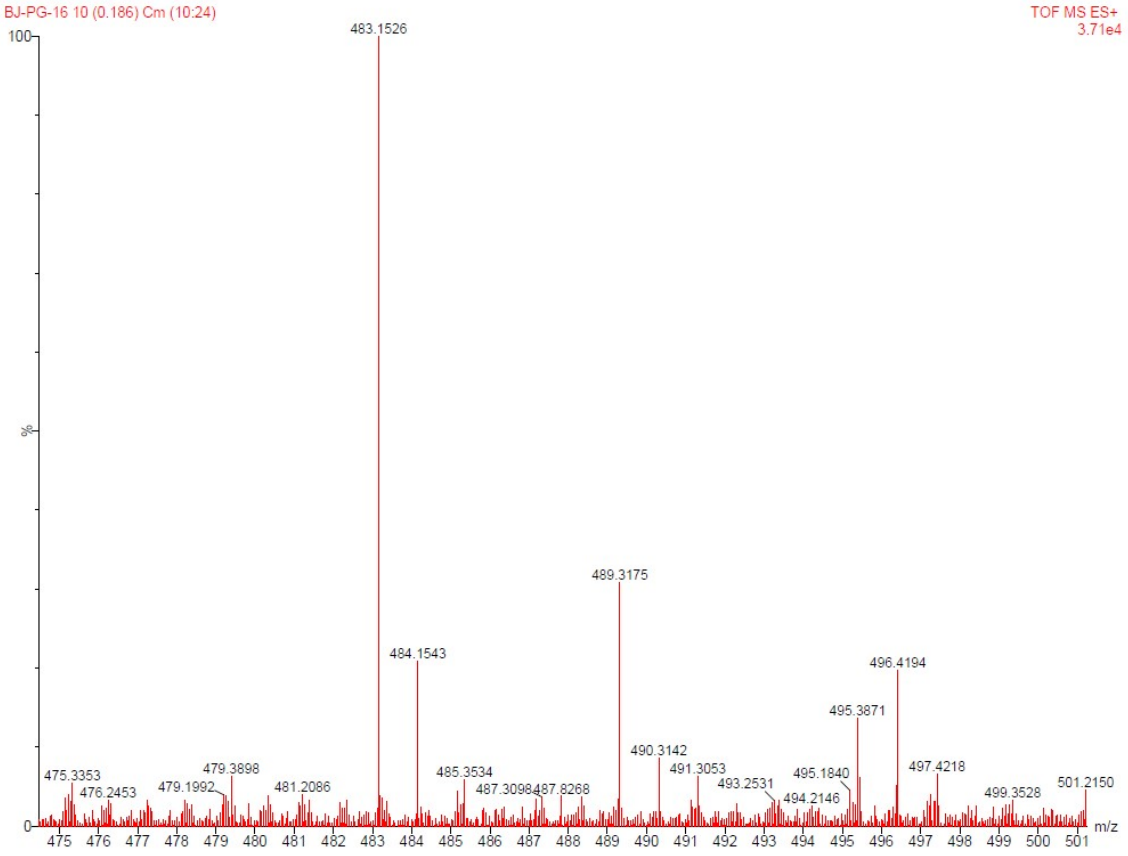


Fig. S6 EI mass spectrum of **3**

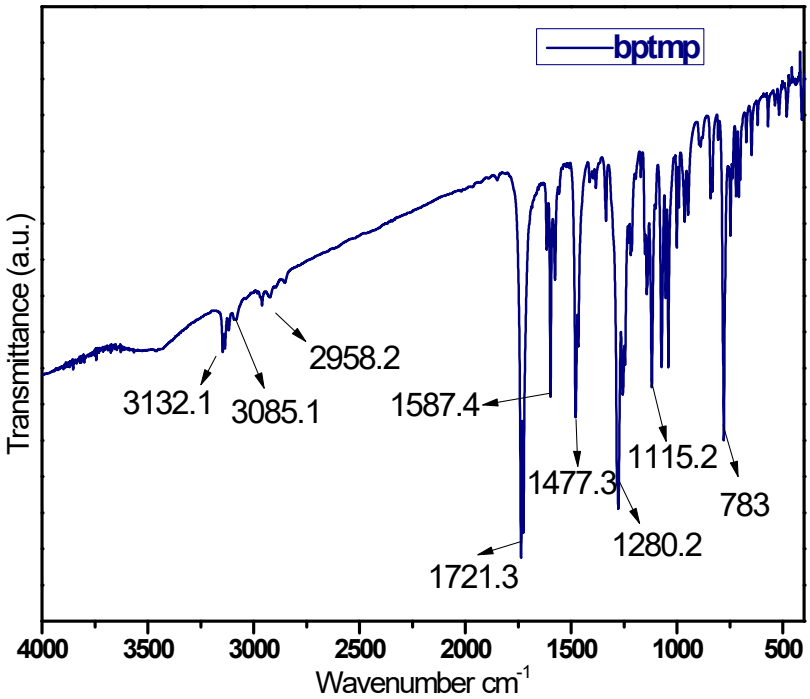


Fig. S7 FT-IR spectrum of **bptmp 3**

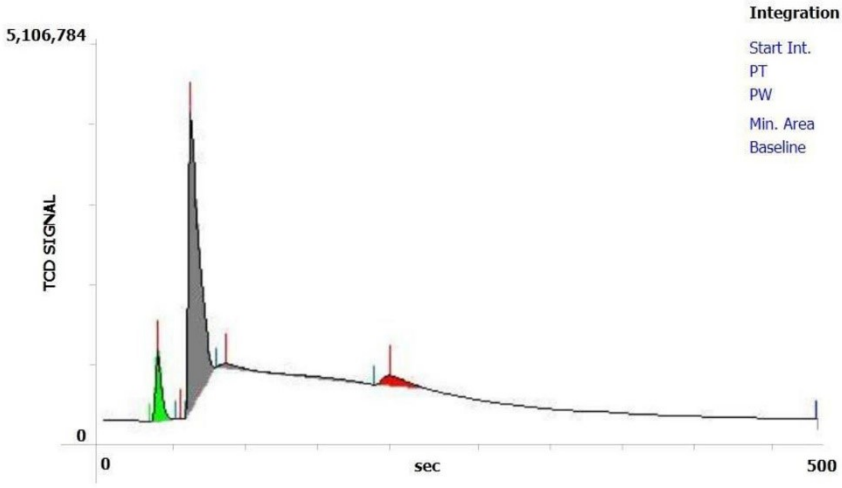
EuroEA Elemental Analyser

AutoRun Name	:	2022-43 (189)
Date of Analysis	:	17 Dec 2022
Time of Analysis	:	15:13:38
Analysed By	:	EVR
Signed By	:	EVR
Operator Group	:	GRP1
Configuration	:	CHNS
Sample Name	:	bptmp (Ligand)A
Sample Position #	:	10
Type	:	Smp
Sample Weight	:	1.122 (mg)
Calibration type	:	Linear

Instrument Parameters

Carrier (kPa)	Purge (ml/min)	Oxygen (ml)	Delta P O2 (kPa)	Sampling Delay (s)	Run Time (s)	Front (°C)	Rear (°C)	Oven (°C)
100	80	15	35	8	500	980	Off	100

Chromatogram



Integration Parameters

Start Int.	24
PT	1
PW	1
Min. Area	1000
Baseline	Valley-Valley

Results

Element	RT (s)	Area	Area %	Element %
Nitrogen	39	557,563	11.423	24.181
Carbon	86	4,019,868	82.353	61.148
Hydrogen	200	303,825	6.224	3.016
Sulphur	-	-	-	-

Fig. S8 C,H,N analysis of **bptmp 3**

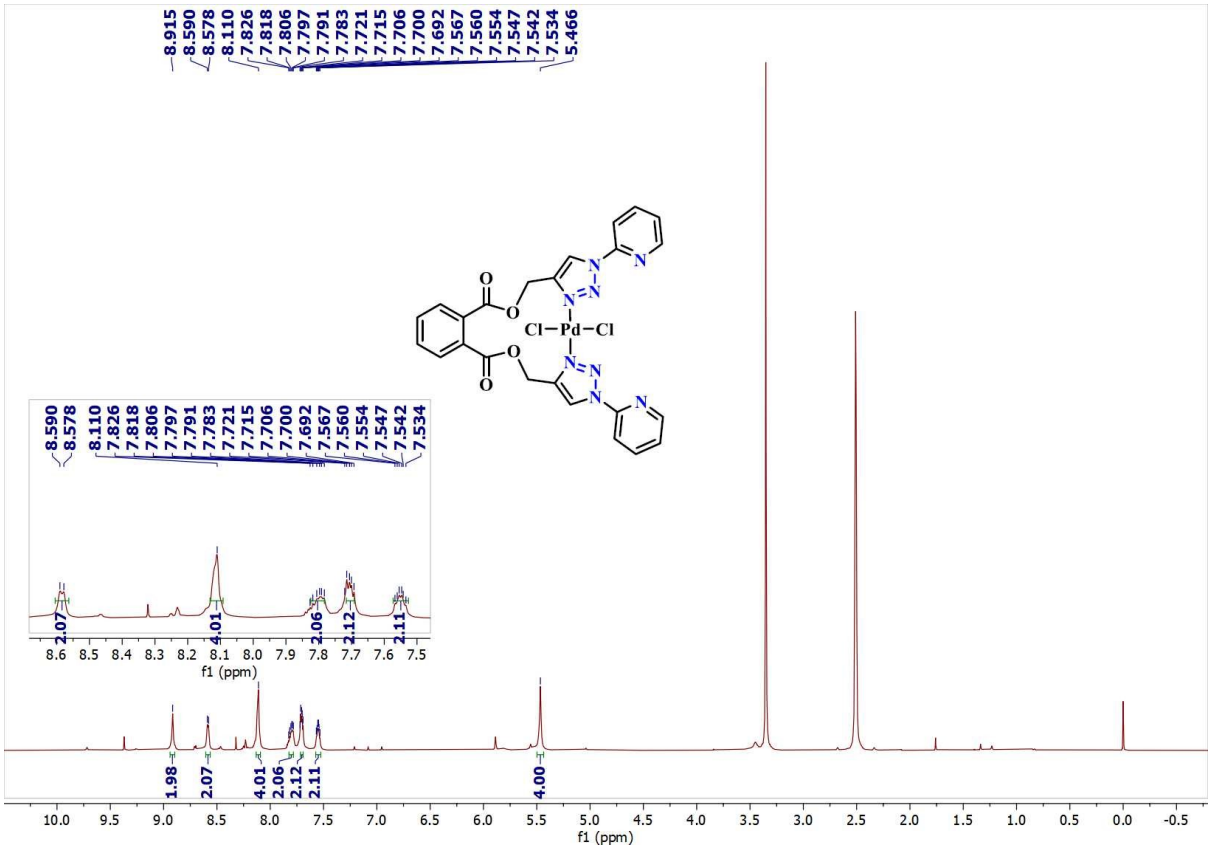


Fig. S9 ^{1}H NMR spectrum of **4** in DMSO-d6 (400 MHz)

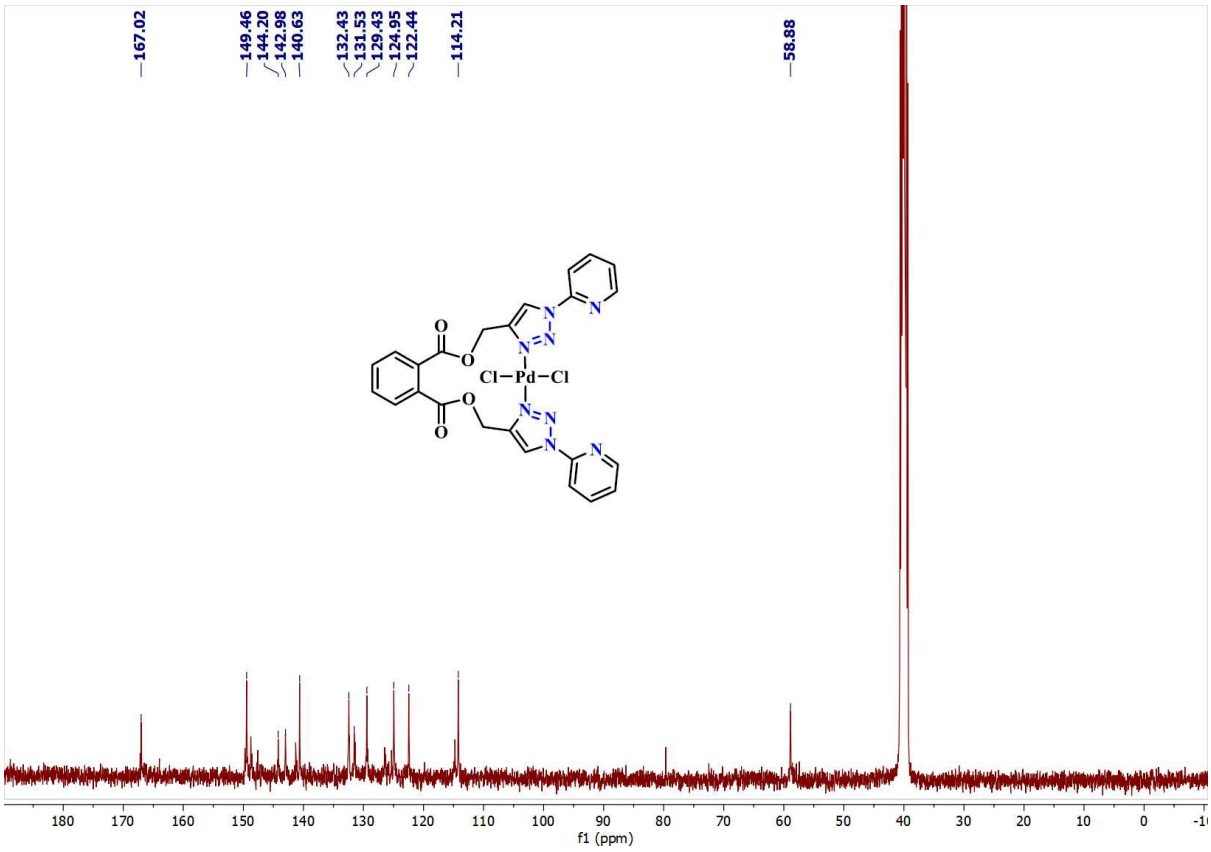


Fig. S10 ^{13}C NMR spectrum of **4** in DMSO-d6 (101 MHz)

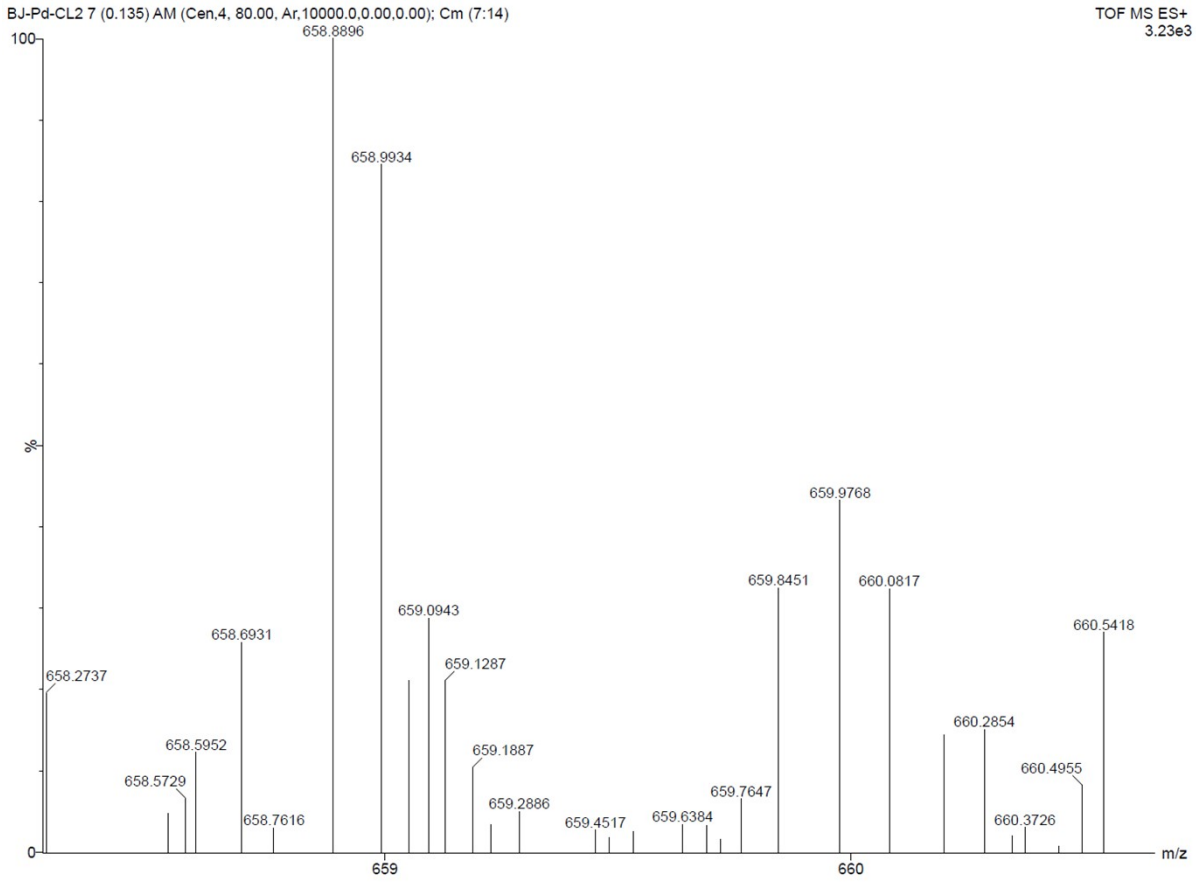


Fig. S11 EI mass spectrum of **4**

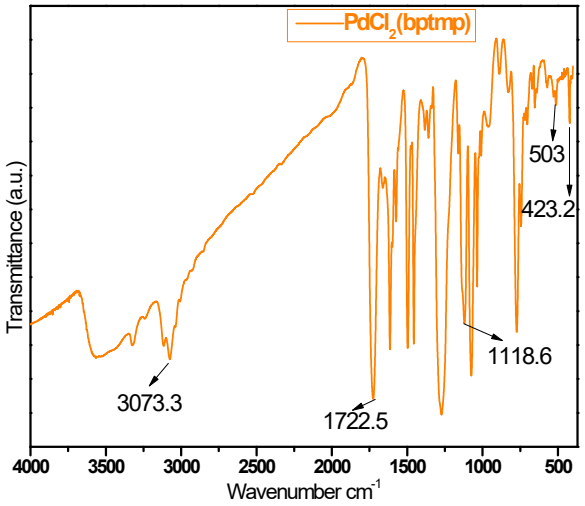


Fig. S12 FT-IR Spectrum of **$PdCl_2$(bptmp) 4**

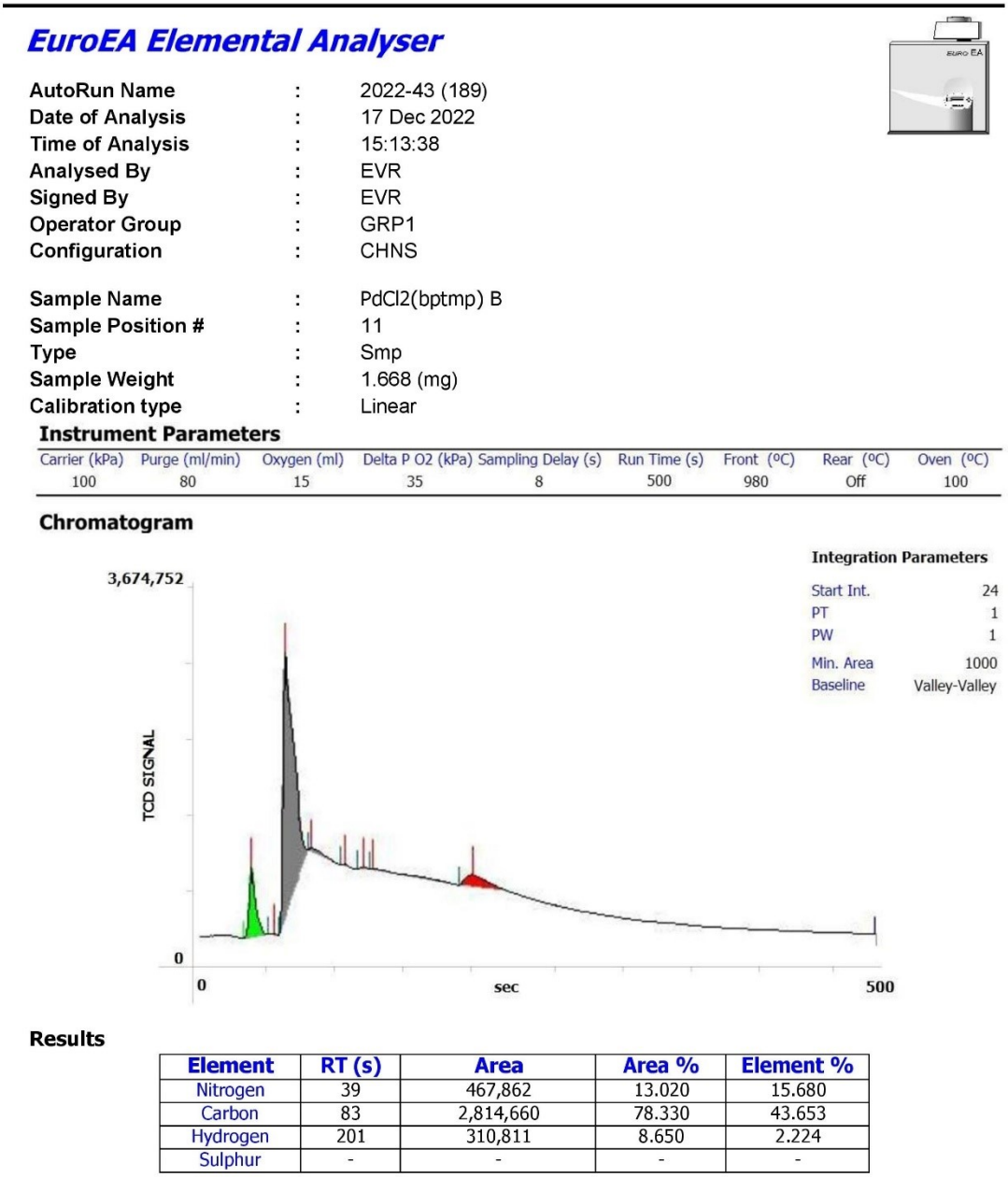


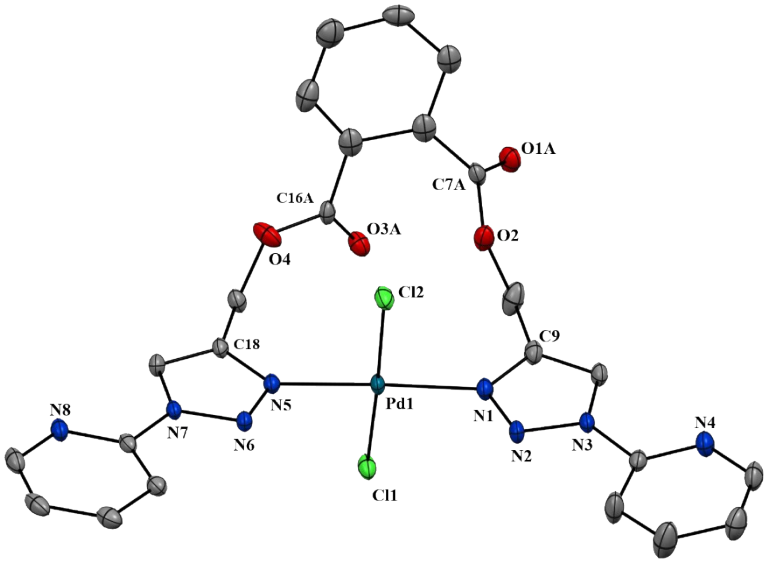
Fig. S13 FT-IR Spectrum of **$PdCl_2$(bptmp) 4**

Crystallographic Information for catalyst 4.

Single-crystal suitable for X-ray diffraction study for **4** was obtained from a mixed solvents of chloroform-acetonitrile (10:1) at room temperature. The crystals were chosen from the mother liquor, immersed in paratone oil, mounted on the tip of a glass fiber, and cemented using epoxy resin. Bruker APEX-III photon diffractometer was used to collect the single crystal data at 100

K. Bruker software package SAINT was used for data reduction, whereas SADABS was used for the absorption corrections and additional systematic error corrections. SHELXT was used for structure solving and refined by SHELXL-2019. In SHELX program suite, latest X-seed version 4.20 was used as graphical interface. Both the disordered carbonyl groups are model with fractional occupancy. Riding model was used to locate all the hydrogen atoms. The crystal contains severely disordered and partially occupied chloroform molecule. Hence, it was squeezed using the program PLATON and the squeeze data is appended in the .CIF file.

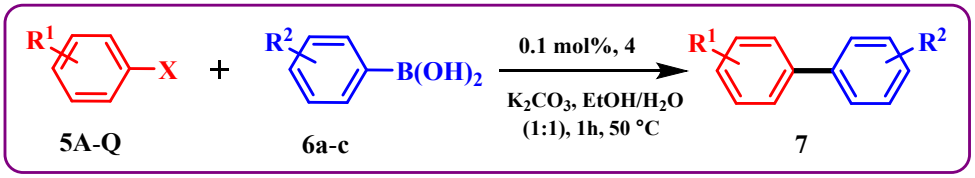
Fig. S14 Molecular structure and atom numbering scheme of compound **4**. The thermal ellipsoids are drawn at the 30% probability level. Hydrogen atoms are omitted for clarity. Selected bond lengths [pm] and angles [°]:



General procedure for the synthesis of C-C cross coupling of variety of aryl halides (5A-Q) with different type of phenyl boronic acids (6a-c).

A mixture of different type of aryl halides **(5A-Q)** (0.5 mmol) with different phenyl boronic acid **(6a-c)** (0.55 mmol) in the presence of catalyst **4** (0.1 mol%) and K_2CO_3 (1mmol) was

charged in a reaction tube at a temperature of 50°C for 1h in EtOH/H_2O combination. After the completion of the reaction, the reaction mixture was cooled and the work-up was done with H_2O (15 mL) and ethyl acetate (3 × 20 mL). The combined organic layers were dried over anhydrous Na_2SO_4, filtered, and concentrated under reduced pressure to get the crude residue which was further purified through column chromatography on silica gel (230-400 mesh) using hexane: ethyl acetate (99:1 ratio) as eluting solvent to afford the C-C coupling product **7Aa-7Oa, 7Fb-7Pb** and **7Qc-7Mc** in 68-98 % yield.



Scheme 1. Synthesis of C-C cross coupling product using different type of aryl halides **(5A-Q)** with various phenyl boronic acid **(6a-c)**

Characterization data of C-C cross coupling product 7Aa-7Oa,7Fb-7Pb and 7Qc-7Mc.

[1,1'-biphenyl]-2-carbaldehyde **(7Aa)**

^{1}H NMR (400 MHz, Chloroform-*d*) δ 9.90 (s, 1H), 7.94 (d, *J* = 8.0 Hz, 1H), 7.55 (td, *J* = 7.6, 1.6 Hz, 1H), 7.43 – 7.28 (m, 7H); ^{13}C NMR (101 MHz, Chloroform-*d*) δ 192.61, 146.06, 137.79, 133.74, 133.67, 130.86, 130.18, 128.51, 128.20, 127.86, 127.63. **7Aa** was more confirmed by ref [5].

1-([1,1'-biphenyl]-4-yl) ethan-1-one **(7Ba)**

^{1}H NMR (400 MHz, Chloroform-*d*) δ 7.94 (d, *J* = 8.4 Hz, 2H), 7.59 (d, *J* = 8.4 Hz, 2H), 7.53 (d, *J* = 6.8 Hz, 2H), 7.40-7.36 (m, 2H), 7.32 (d, *J* = 7.6 Hz, 1H), 2.54 (s, 3H); ^{13}C NMR (101 MHz, Chloroform-*d*) δ 197.89, 145.84, 139.91, 135.88, 129.03, 129.00, 128.31, 127.34, 127.29, 26.76. **7Ba** was more confirmed by ref [6].

2-phenylpyridine **(7Ca)**

^{1}H NMR (400 MHz, Chloroform-*d*) δ 8.64 (d, *J* = 5.2 Hz, 1H), 7.93 (d, *J* = 7.6 Hz, 2H), 7.74-7.67 (m, 2H), 7.44 – 7.33 (m, 3H), 7.21-7.18 (m, 1H); ^{13}C NMR (101 MHz, Chloroform-*d*) δ 155.73, 147.51, 137.08, 132.73, 128.56, 127.94, 126.13, 121.42, 120.19. **7Ca** was more confirmed by ref [7].

1-phenylnaphthalene **(7Da)**

^{1}H NMR (400 MHz, Chloroform-*d*) δ 7.82-7.78 (m, 2H), 7.75 (d, *J* = 8.4 Hz, 1H), 7.43 – 7.29 (m, 9H); ^{13}C NMR (101 MHz, Chloroform-*d*) δ 140.85, 140.35, 133.88, 131.70, 130.18, 128.36, 127.73, 127.34, 127.03, 126.12, 125.87, 125.49. **7Da** was more confirmed by ref [7].

2-methyl-3-phenylquinoline **(7Ea)**

^{1}H NMR (400 MHz, Chloroform-*d*) δ 8.05 (dd, *J* = 20.4, 8.4 Hz, 2H), 7.88 – 7.84 (m, 2H), 7.60-7.57 (m, 2H), 7.38 (t, *J* = 7.6 Hz, 2H), 7.40 – 7.27 (m, 1H), 7.21 (d, *J* = 7.6 Hz, 1H), 2.70 (s, 3H); ^{13}C NMR (101 MHz, Chloroform-*d*) δ 158.73, 145.85, 140.14, 139.07, 137.69, 129.93, 129.08, 128.03, 127.87, 127.45, 126.81, 125.30, 122.61, 24.70. **7Ea** was more confirmed by ref [8].

4-nitro-1,1'-biphenyl **(7Fa)**

^{1}H NMR (400 MHz, Chloroform-*d*) δ 8.19 (d, *J* = 8.8 Hz, 2H), 7.63 (d, *J* = 8.8 Hz, 2H), 7.54 – 7.51 (m, 2H), 7.42 – 7.33 (m, 3H); ^{13}C NMR (101 MHz, Chloroform-*d*) δ 147.69, 147.13, 138.82, 129.25, 129.02, 127.87, 127.47, 124.19. **7Fa** was more confirmed by ref [9].

2-phenylpyrazine **(7Ga)**

^{1}H NMR (400 MHz, Chloroform-*d*) δ 8.93 (d, *J* = 1.6 Hz, 1H), 8.52 (dd, *J* = 2.4, 1.6 Hz, 1H), 8.40 (d, *J* = 2.4 Hz, 1H), 7.93 – 7.90 (m, 2H), 7.43 – 7.35 (m, 3H); ^{13}C NMR (101 MHz, Chloroform-*d*) δ 152.85, 144.24, 142.92, 142.22, 136.34, 129.99, 129.11, 126.99. **7Ga** was more confirmed by ref [10].

4-phenylisoquinoline **(7Ha)**

^{1}H NMR (400 MHz, Chloroform-*d*) δ 9.24 (s, 1H), 8.43 (s, 1H), 8.01 (d, *J* = 7.2 Hz, 1H), 7.87 (d, *J* = 8.8 Hz, 1H), 7.66 – 7.58 (m, 2H), 7.49 – 7.40 (m, 5H); ^{13}C was found in good agreement with the ref [11].

4-fluoro-1,1'-biphenyl **(7Ia)**

^{1}H NMR (400 MHz, Chloroform-*d*) δ 7.46 – 7.24 (m, 7H), 7.04-6.99 (m, 2H); ^{13}C NMR (101 MHz, Chloroform-*d*) δ 162.40 (J_{C-F} = 244.8 Hz), 140.18, 137.26, 128.76, 128.62 (J_{C-F} = 8.2 Hz), 127.20, 126.96, 115.54 (J_{C-F} = 21.2 Hz). **7Ia** was more confirmed by ref [12].

3,5-bis(trifluoromethyl)-1,1'-biphenyl **(7Ja)**

^{1}H NMR (400 MHz, Chloroform-*d*) δ 7.18 (s, 2H), 7.04 (s, 1H), 6.77 – 6.75 (m, 2H), 6.69 – 6.59 (m, 3H); ^{13}C NMR (100 MHz, Chloroform-*d*) δ 143.40, 138.31, 132.20 (J_{C-F} = 33 Hz), 129.34, 128.94, 127.29, 124.87, 122.16, 120.97 (J_{C-F} = 4.0 Hz).^{13}C was more confirmed by ref [13]

[1,1'-biphenyl]-4-carbonitrile **(7Ka)**

^{1}H NMR (400 MHz, Chloroform-*d*) δ 7.69-7.62 (m, 4H), 7.56 – 7.53 (m, 2H), 7.46 – 7.36 (m, 3H); ^{13}C NMR (101 MHz, Chloroform-*d*) δ 145.75, 139.25, 132.69, 129.21, 128.76, 127.82, 127.32, 119.06, 110.97. **7Ka** was more confirmed by ref [12].

1,1':2',1''-terphenyl **(7La)**

^{1}H NMR (400 MHz, Chloroform-*d*) δ 7.34 (d, *J* = 1.2 Hz, 4H), 7.13-7.10 (m, 6H), 7.07 – 7.04 (m, 4H); ^{13}C NMR (101 MHz, Chloroform-*d*) δ 141.57, 140.63, 130.68, 129.97, 127.93, 127.55, 126.52. **7La** was more confirmed by ref [14].

4-methoxy-1,1'-biphenyl **(7Ma)**

^{1}H NMR (400 MHz, Chloroform-*d*) δ 7.49 – 7.45 (m, 4H), 7.36-7.32 (m, 2H), 7.25 – 7.18 (m, 1H), 6.91 (d, *J* = 8.4 Hz, 2H), 3.78 (s, 3H); ^{13}C was found in good agreement with the ref [15].

4-methyl-1,1'-biphenyl **(7Na)**

^{1}H NMR (400 MHz, Chloroform-*d*) δ 7.50 (d, *J* = 7.2 Hz, 2H), 7.41 (d, *J* = 8.0 Hz, 2H), 7.37-7.32 (m, 2H), 7.26 – 7.21 (m, 1H), 7.16 (d, *J* = 8.0 Hz, 2H), 2.31 (s, 3H); ^{13}C was found in good agreement with the ref [15].

4-(trifluoromethoxy)-1,1'-biphenyl **(7Oa)**

^{1}H NMR (400 MHz, Chloroform-*d*) δ 7.53 – 7.46 (m, 4H), 7.39 – 7.34 (m, 2H), 7.31 – 7.26 (m, 1H), 7.20 (d, *J* = 8.0 Hz, 2H); ^{13}C was found in good agreement with the ref [16].

4-methoxy-4'-nitro-1,1'-biphenyl **(7Fb)**

^{1}H NMR (400 MHz, Chloroform-*d*) δ 8.19 (d, *J* = 8.8 Hz, 2H), 7.61 (d, *J* = 8.8 Hz, 2H), 7.50 (d, *J* = 8.8 Hz, 2H), 6.94 (d, *J* = 8.8 Hz, 2H), 3.80 (s, 3H); ^{13}C was found in good agreement with the ref [17].

4'-methoxy-[1,1'-biphenyl]-4-carbonitrile **(7Kb)**

^{1}H NMR (400 MHz, Chloroform-*d*) δ 7.61 – 7.54 (m, 4H), 7.45 (d, *J* = 8.8 Hz, 2H), 6.92 (d, *J* = 8.4 Hz, 2H), 3.78 (s, 3H); ^{13}C was found in good agreement with the ref [18].

4,4'-dimethoxy-1,1'-biphenyl **(7Mb)**

^{1}H NMR (400 MHz, Chloroform-*d*) δ 7.40 (d, *J* = 8.8 Hz, 4H), 6.88 (d, *J* = 8.8 Hz, 4H), 3.76 (s, 6H); ^{13}C was found in good agreement with the ref [19].

4-methoxy-4'-methyl-1,1'-biphenyl **(7Nb)**

^{1}H NMR (400 MHz, Chloroform-*d*) δ 7.44 (d, *J* = 8.8 Hz, 2H), 7.38 (d, *J* = 8.4 Hz, 2H), 7.18 – 7.14 (m, 2H), 6.89 (d, *J* = 8.8 Hz, 2H), 3.77 (s, 3H), 2.31 (s, 3H); ^{13}C was found in good agreement with the ref [20].

1-(4'-methoxy-[1,1'-biphenyl]-4-yl) ethan-1-one **(7Pb)**

^{1}H NMR (400 MHz, Chloroform-*d*) δ 7.92 (d, *J* = 8.4 Hz, 2H), 7.53 (dd, *J* = 25.6, 8.4 Hz, 4H), 6.92 (d, *J* = 8.8 Hz, 2H), 3.78 (s, 3H), 2.54 (s, 3H); ^{13}C was found in good agreement with the ref [20].

1-(2'-nitro-[1,1'-biphenyl]-4-yl) ethan-1-one **(7Qc)**

^{1}H NMR (400 MHz, Chloroform-*d*) δ 7.95 (d, *J* = 8.4 Hz, 2H), 7.86 (dd, *J* = 8.0, 1.2 Hz, 1H), 7.61-7.57(m, 1H), 7.49-7.45 (m, 1H), 7.38 – 7.33 (m, 3H), 2.57 (s, 3H); ^{13}C was found in good agreement with the ref [21].

1,1'-([1,1'-biphenyl]-4,4'-diyl) bis(ethan-1-one) **(7Pc)**

^{1}H NMR (400 MHz, Chloroform-*d*) δ 8.00 (d, *J* = 8.4 Hz, 4H), 7.66 (d, *J* = 8.4 Hz, 4H), 2.59 (s, 6H); ^{13}C was found in good agreement with the ref [20].

1-(4'-methoxy-[1,1'-biphenyl]-4-yl) ethan-1-one **(7Mc)**

Since the structure of compound **7Mc** is same as **7Pb,** so ^{1}H NMR of **7Mc** is matched with **7Pb** and it found in good agreement with ref [20].

4'-fluoro-2-methoxy-1,1'-biphenyl **(7Rd)**

^{1}H NMR (400 MHz, Chloroform-*d*) δ 7.57 – 7.53 (m, 2H), 7.40 – 7.33 (m, 2H), 7.17 – 7.02 (m, 4H), 3.85 (s, 3H); ^{13}C NMR (101 MHz, Chloroform-*d*) δ 162.15 (J_{C-F} = 245 Hz), 156.51, 134.58 (J_{C-F} = 3 Hz), 131.28 (J_{C-F} = 8 Hz), 130.91, 129.78, 128.90, 121.03, 115.01 (J_{C-F} = 22 Hz), 111.36, 55.62. **7Rd** was more confirmed by ref [22].

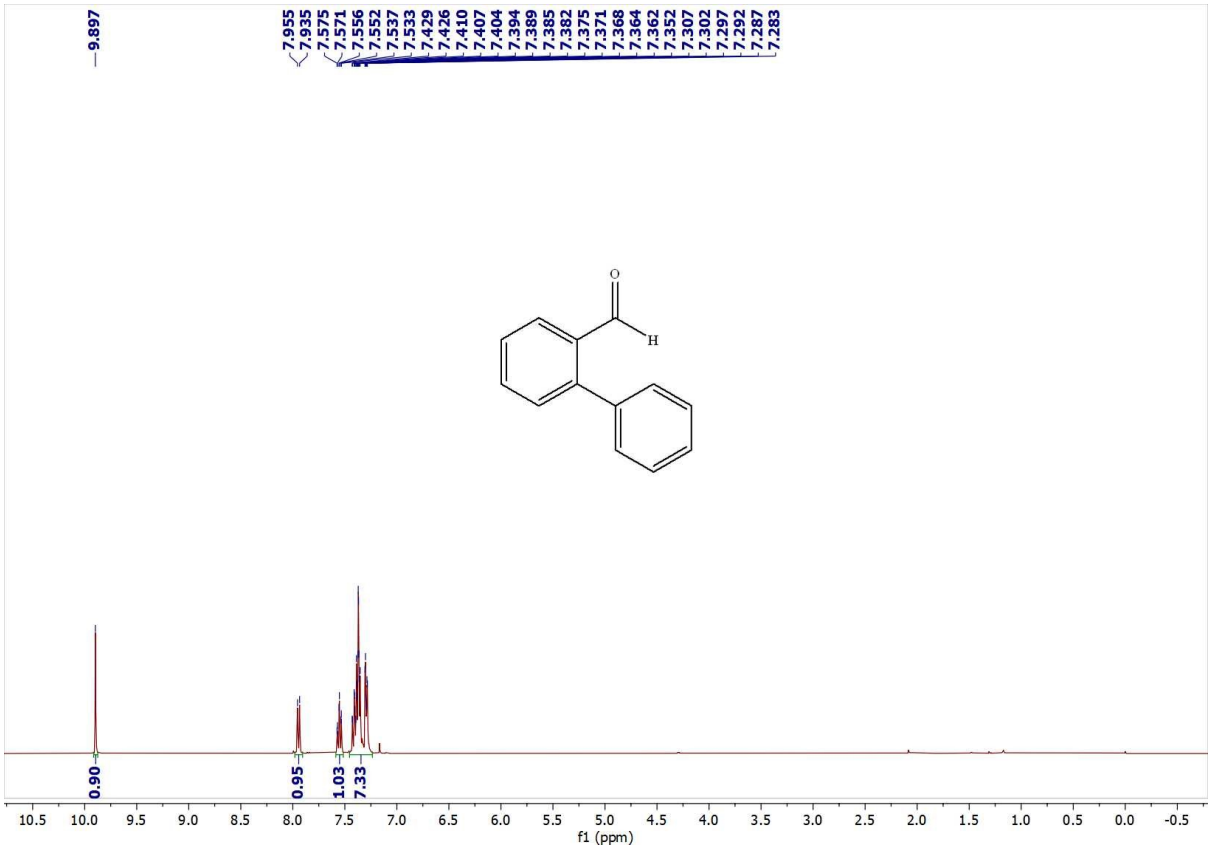


Fig. S15 ^{1}H NMR spectrum of **7Aa** in $CDCl_3$ (400 MHz)

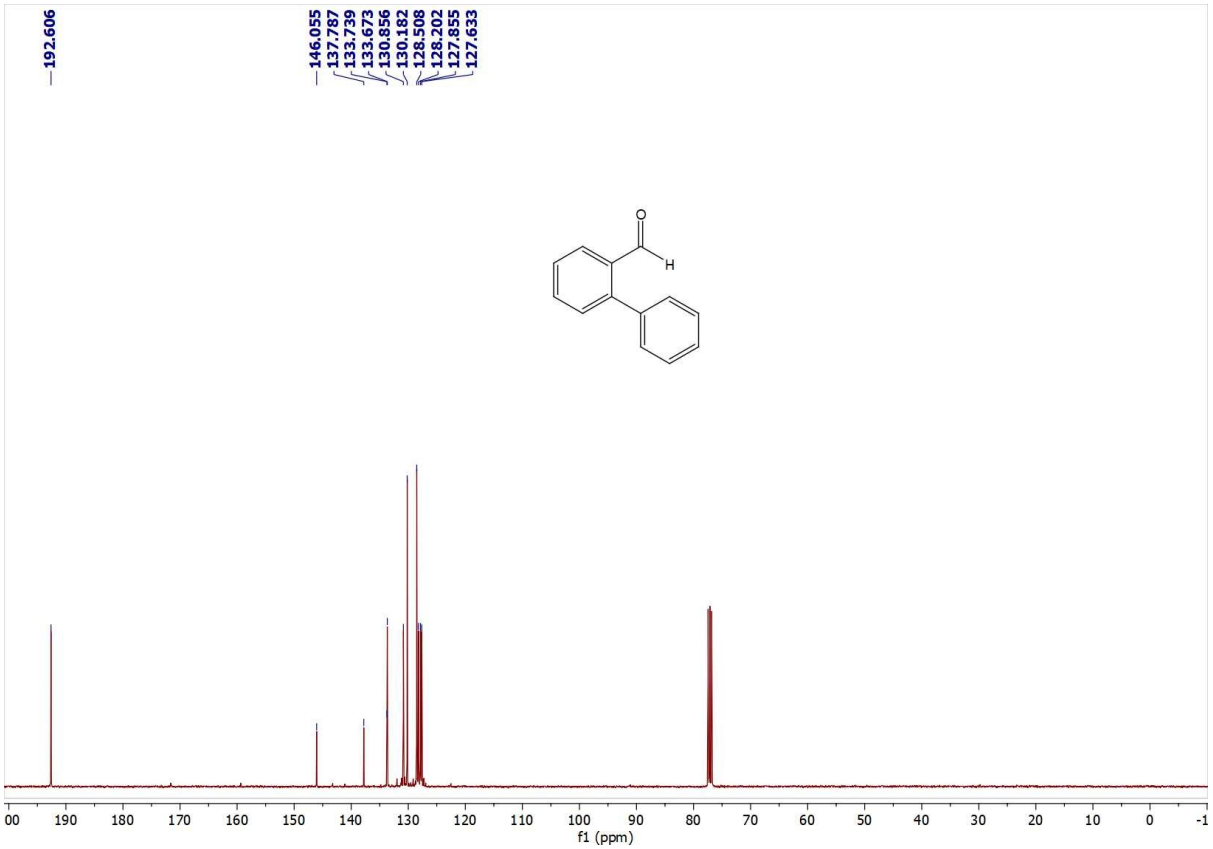


Fig. S16 ^{13}C NMR spectrum of **7Aa** in $CDCl_3$ (101 MHz)

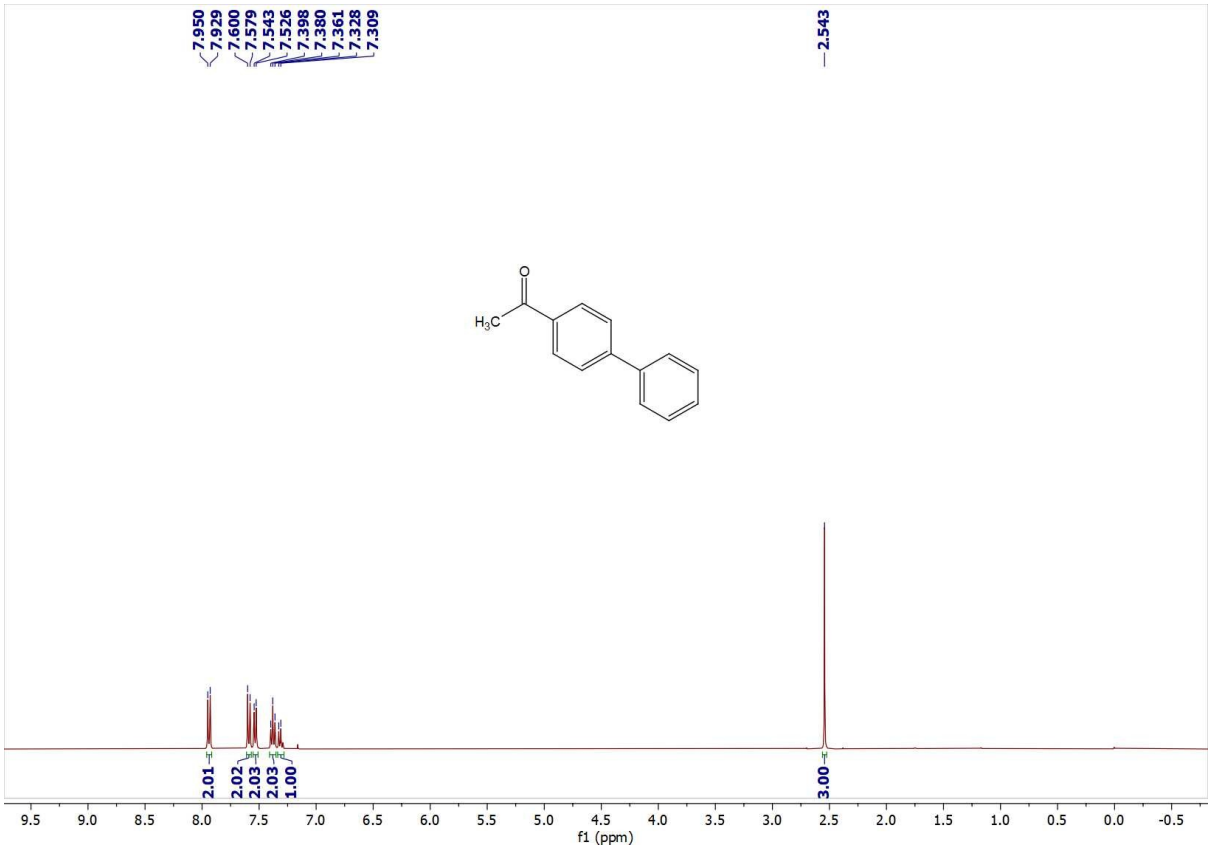


Fig. S17 ^{1}H NMR spectrum of **7Ba** in $CDCl_3$ (400 MHz)

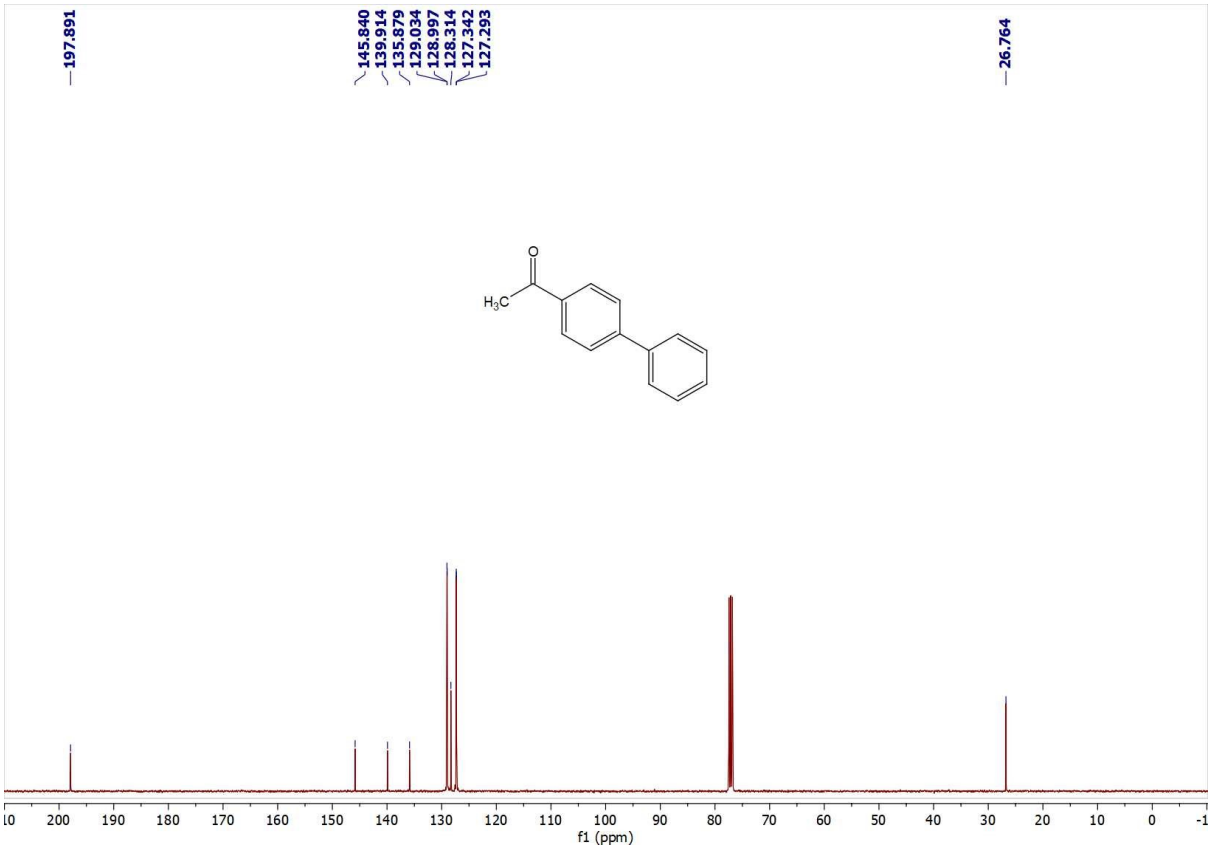


Fig. S18 ^{13}C NMR spectrum of **7Ba** in $CDCl_3$ (101 MHz)

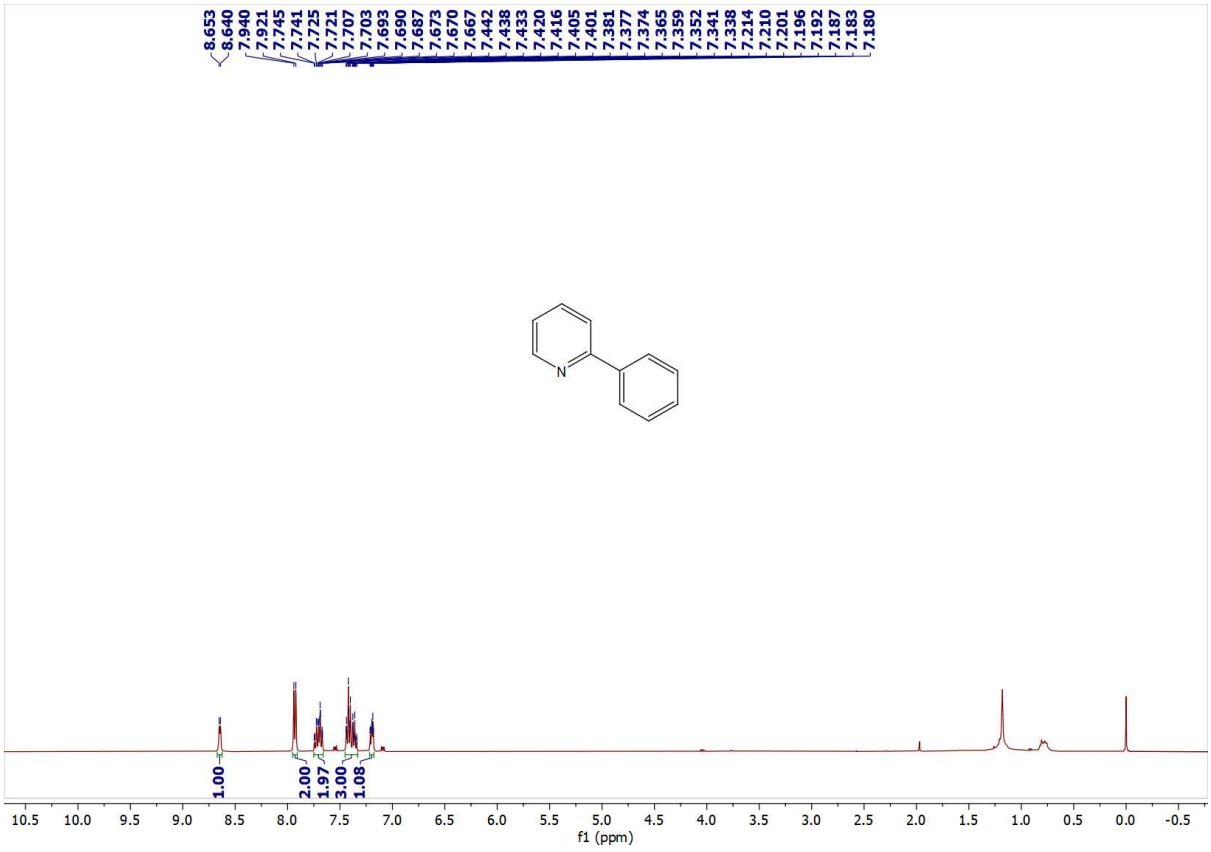


Fig. S19 ^{1}H NMR spectrum of **7Ca** in $CDCl_3$ (400 MHz)

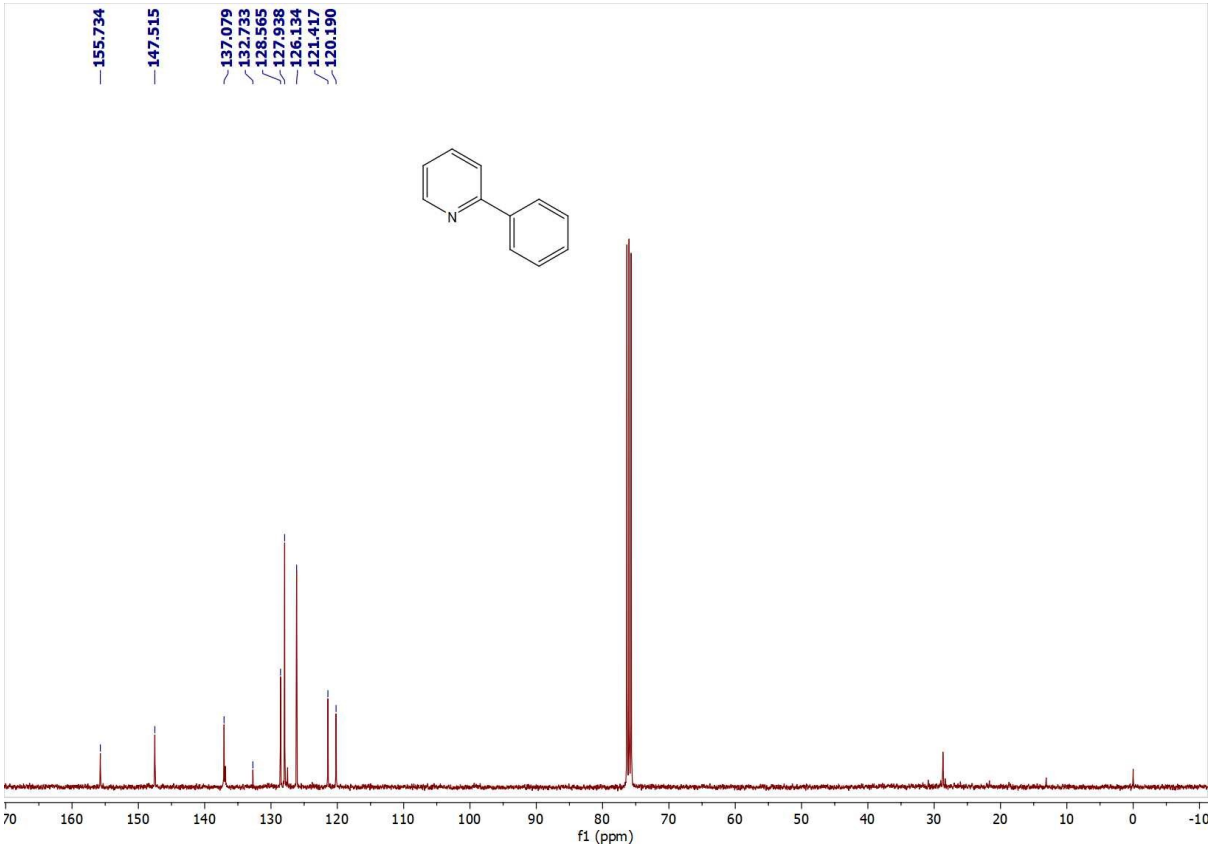


Fig. S20 ^{13}C NMR spectrum of **7Ca** in $CDCl_3$ (101 MHz)

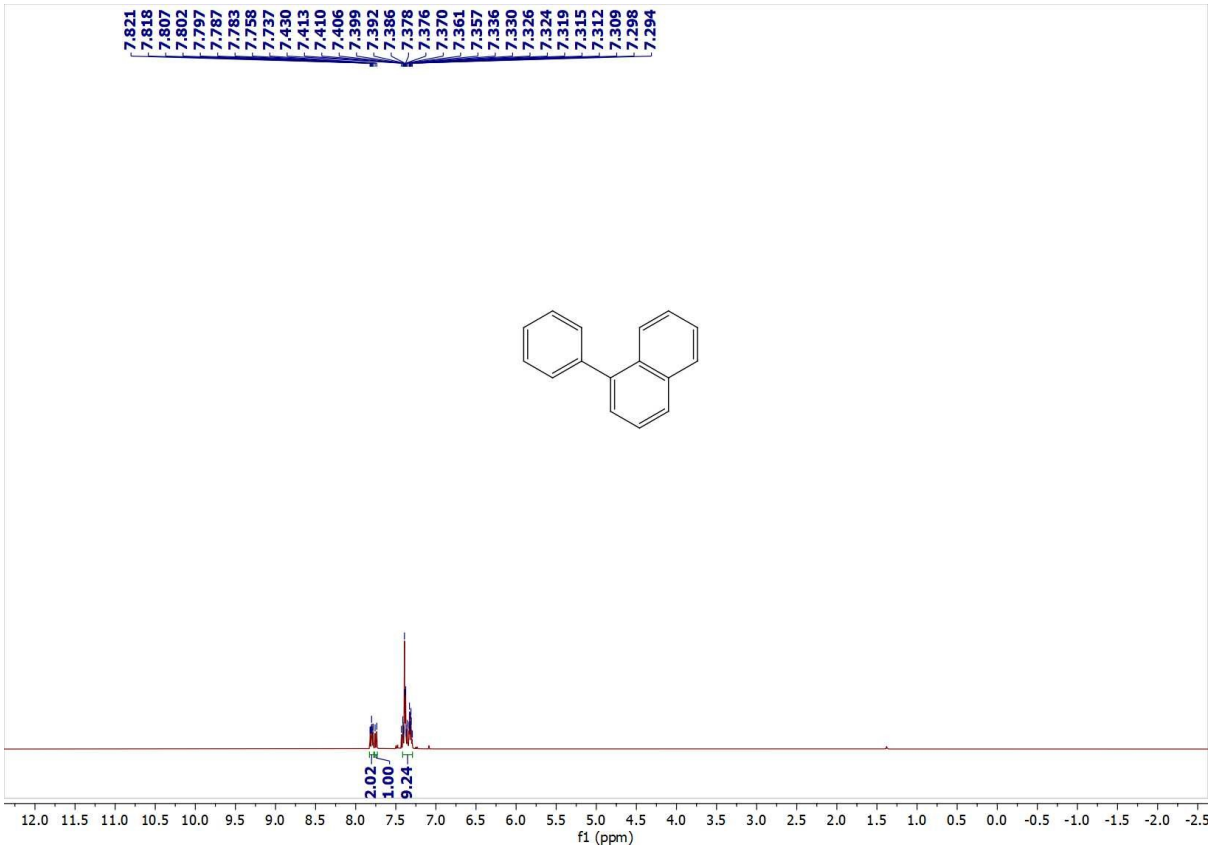


Fig. S21 ^{1}H NMR spectrum of **7Da** in $CDCl_3$ (400 MHz)

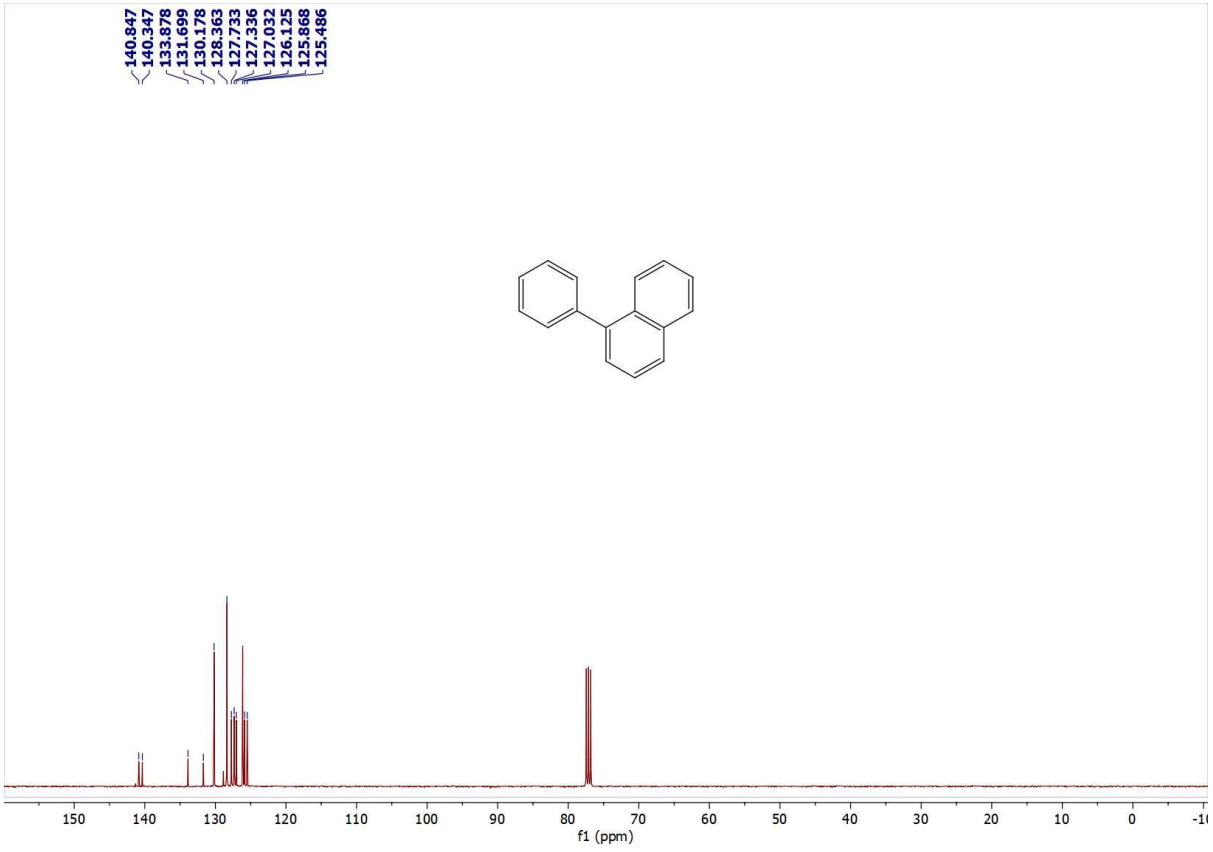


Fig. S22 ^{13}C NMR spectrum of **7Da** in $CDCl_3$ (101 MHz)

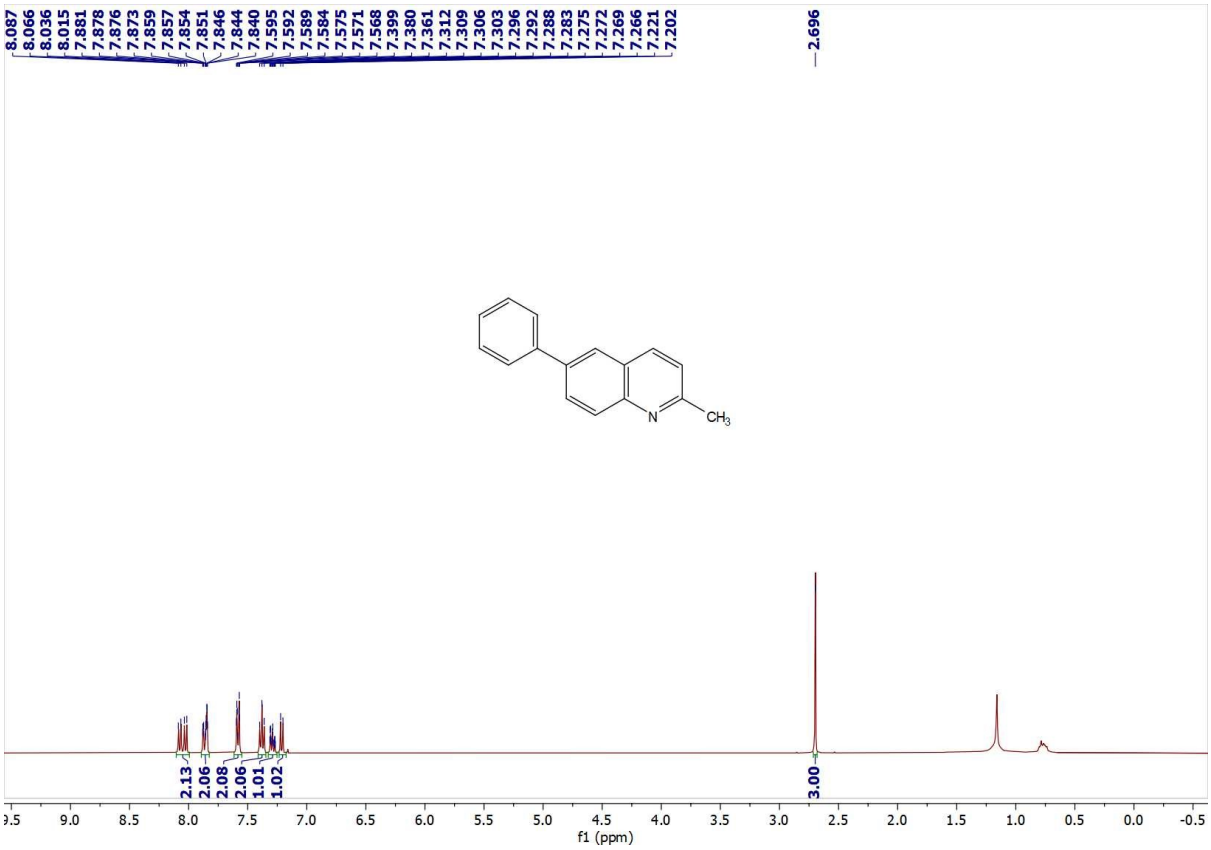


Fig. S23 ^{1}H NMR spectrum of **7Ea** in $CDCl_3$ (400 MHz)

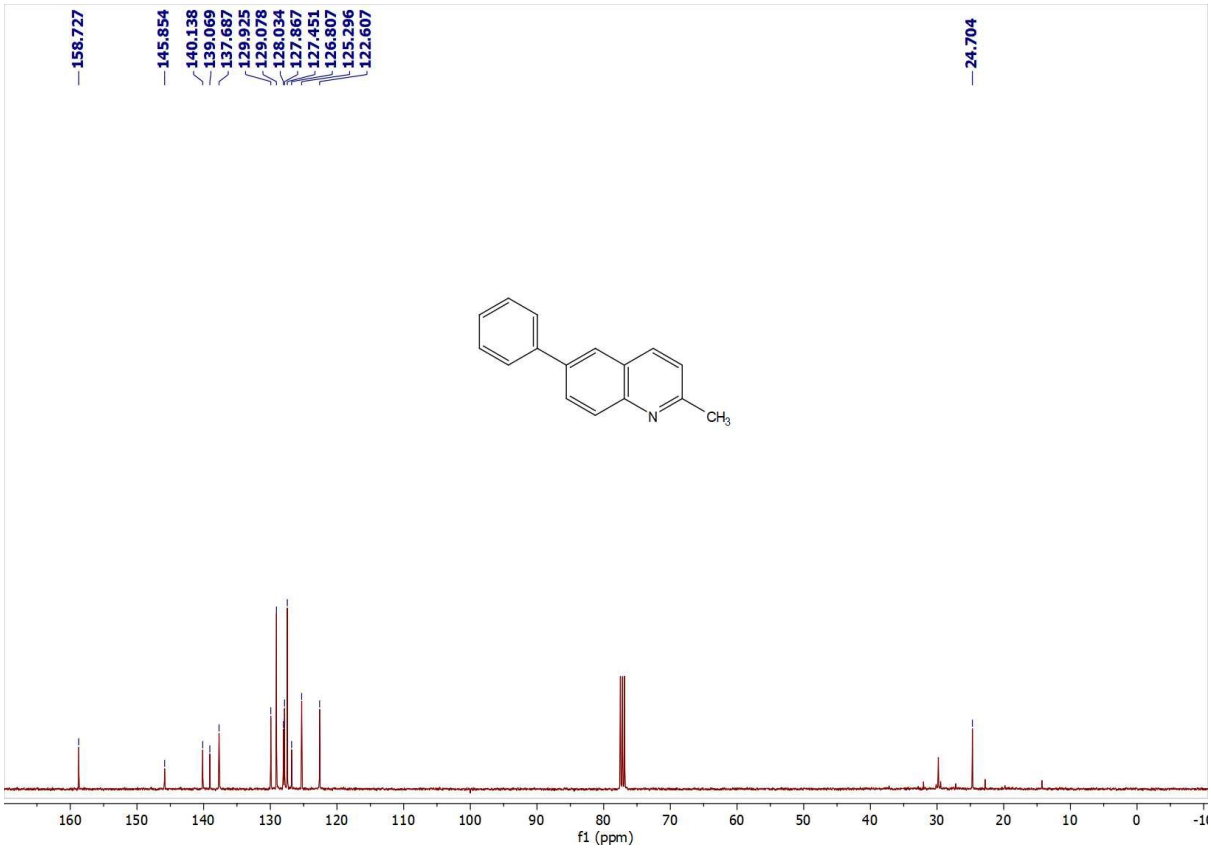


Fig. S24 ^{13}C NMR spectrum of **7Ea** in $CDCl_3$ (101 MHz)

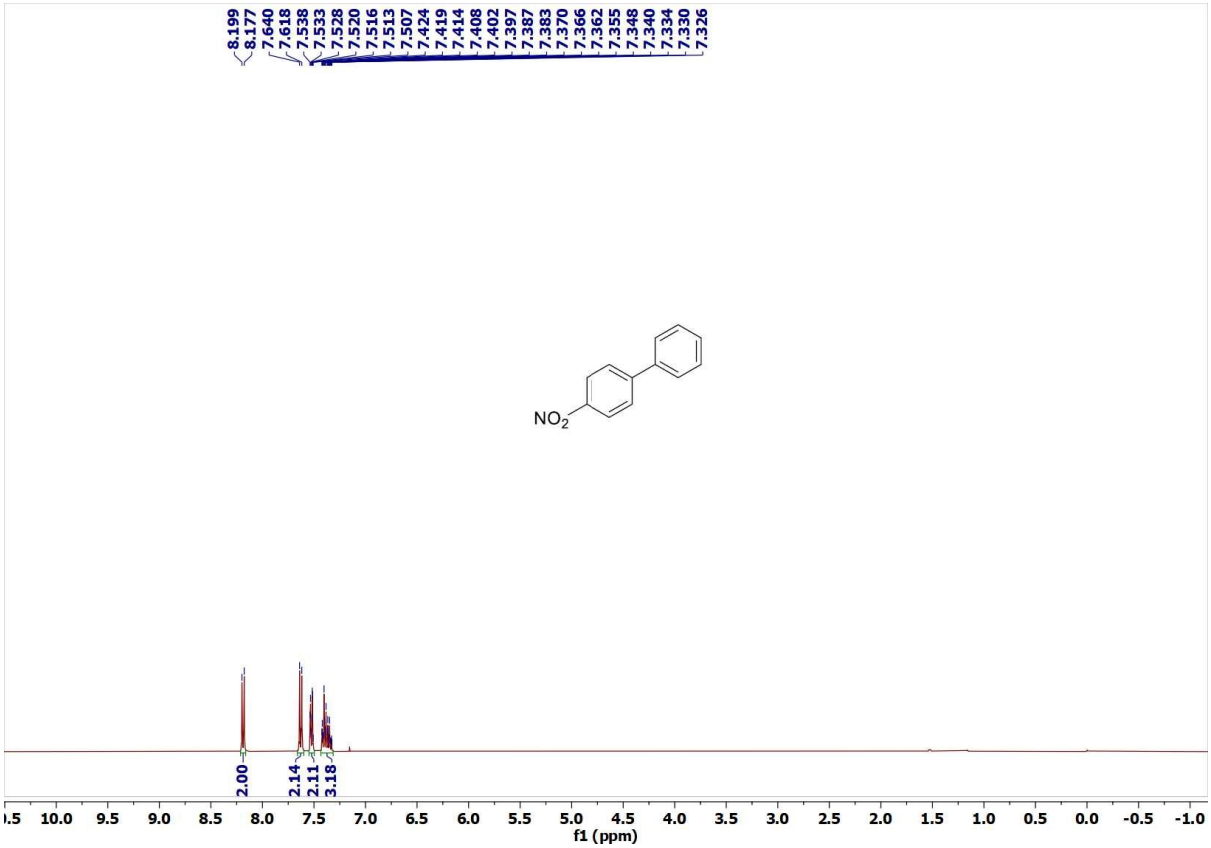


Fig. S25 ^{1}H NMR spectrum of **7Fa** in $CDCl_3$ (400 MHz)

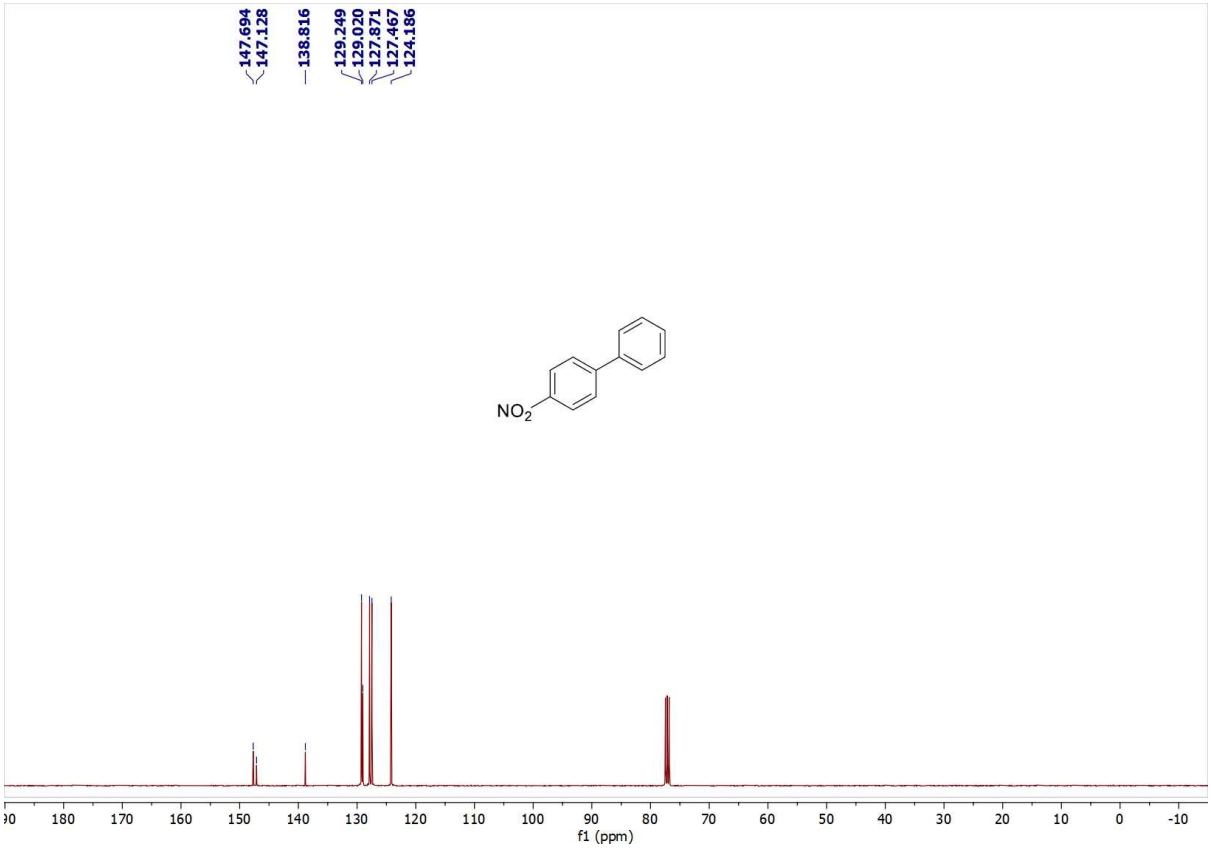


Fig. S26 ^{13}C NMR spectrum of **7Fa** in $CDCl_3$ (101 MHz)

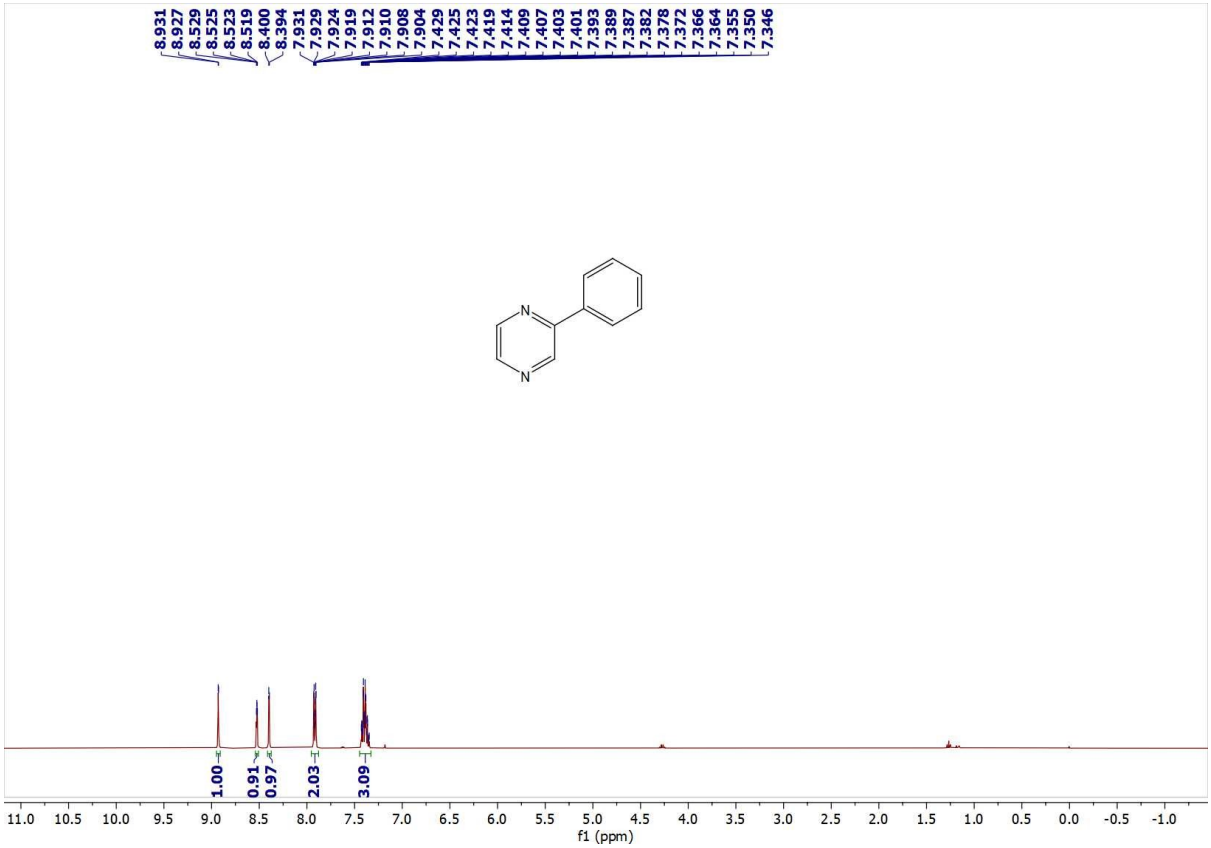


Fig. S27 ^{1}H NMR spectrum of **7Ga** in $CDCl_3$ (400 MHz)

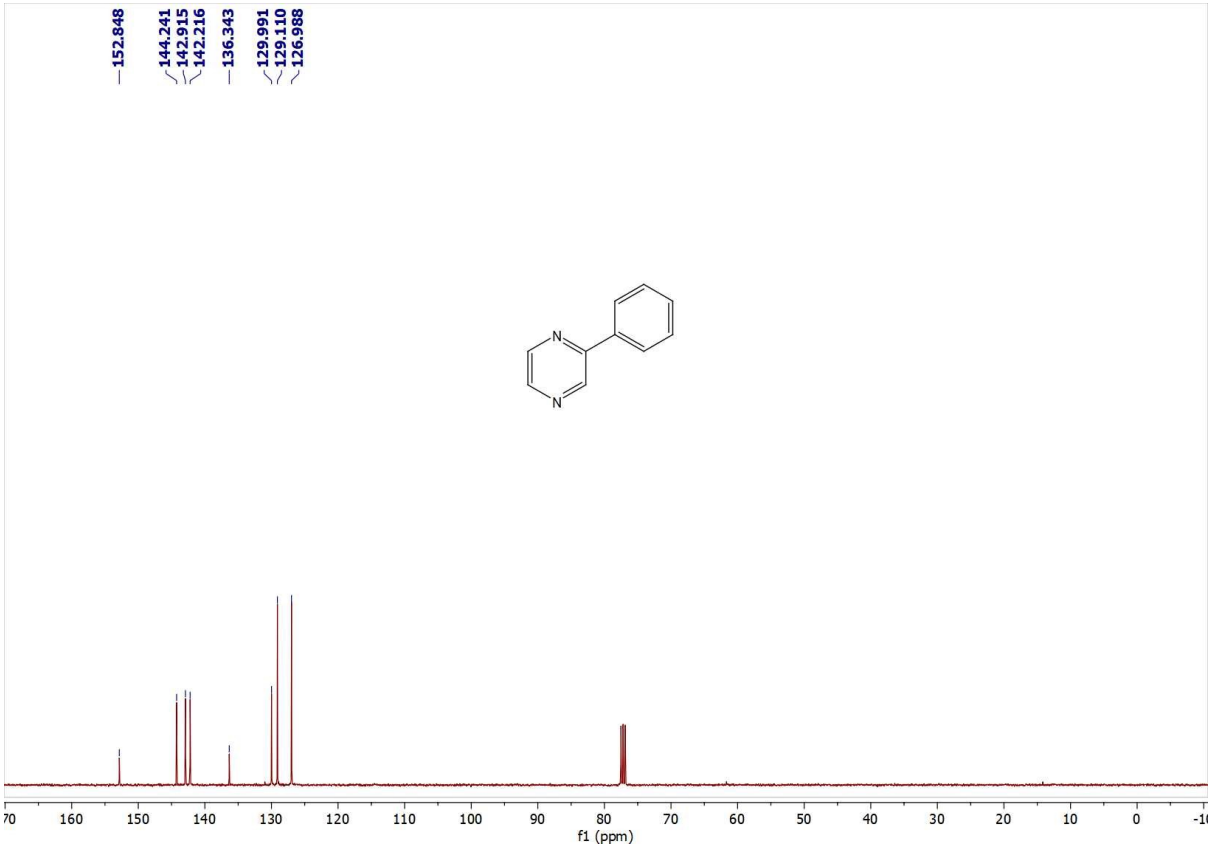


Fig. S28 ^{13}C NMR spectrum of **7Ga** in $CDCl_3$ (101 MHz)

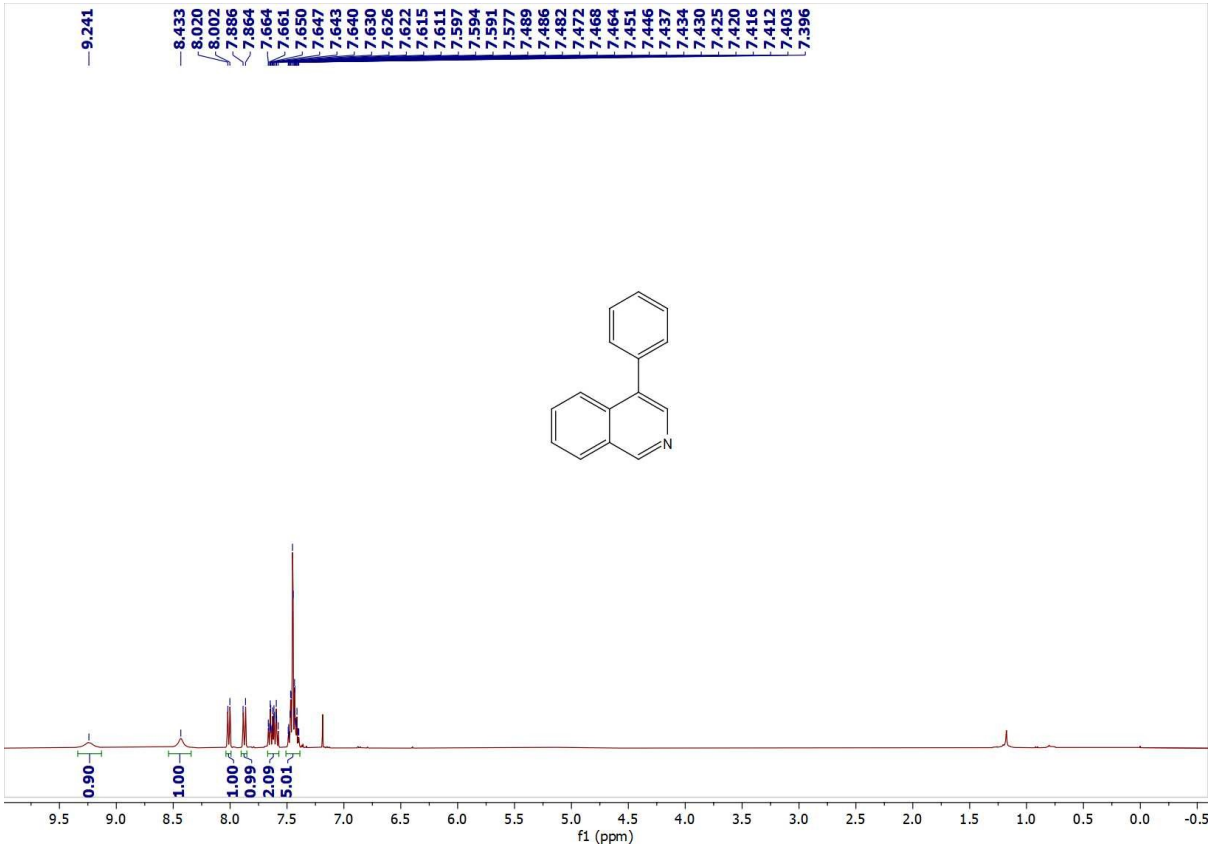


Fig. S29 ^{1}H NMR spectrum of **7Ha** in $CDCl_3$ (400 MHz)

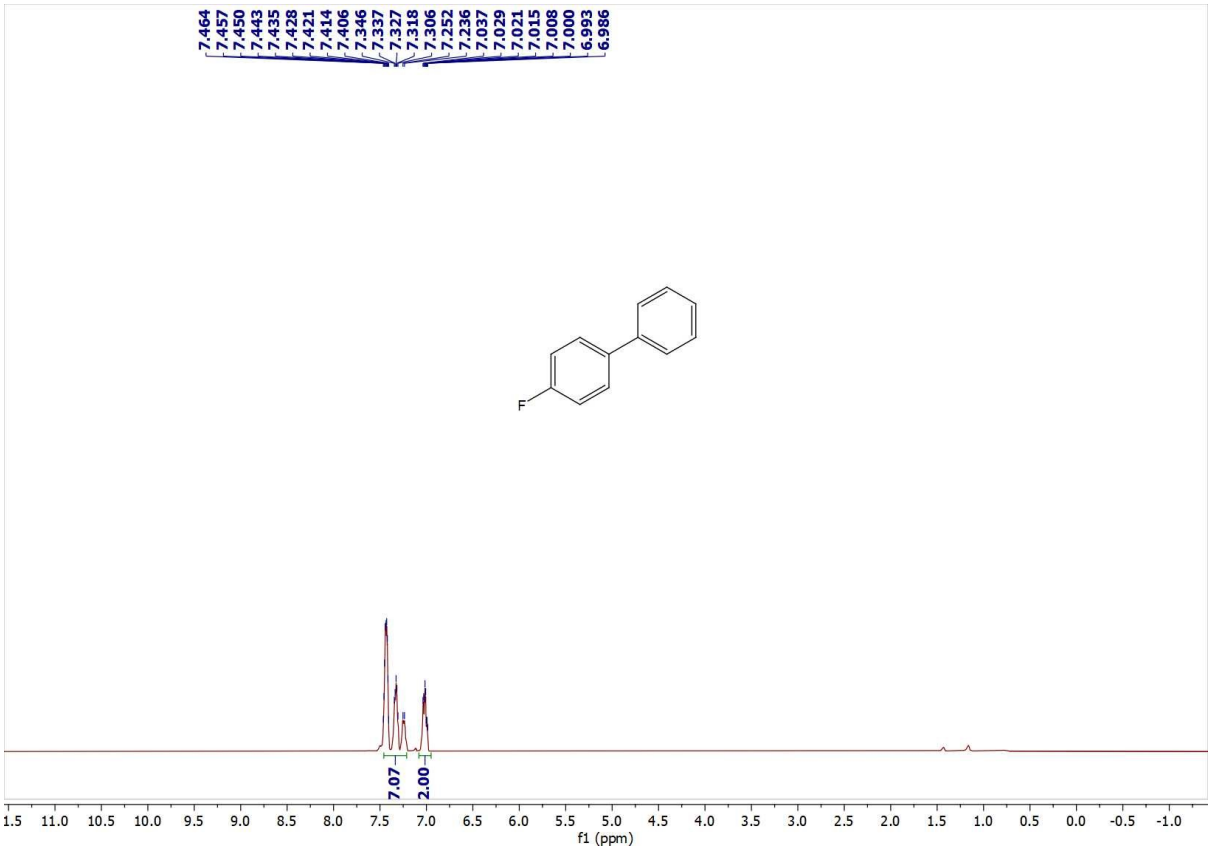


Fig. S30 ^{1}H NMR spectrum of **7Ia** in $CDCl_3$ (400 MHz)

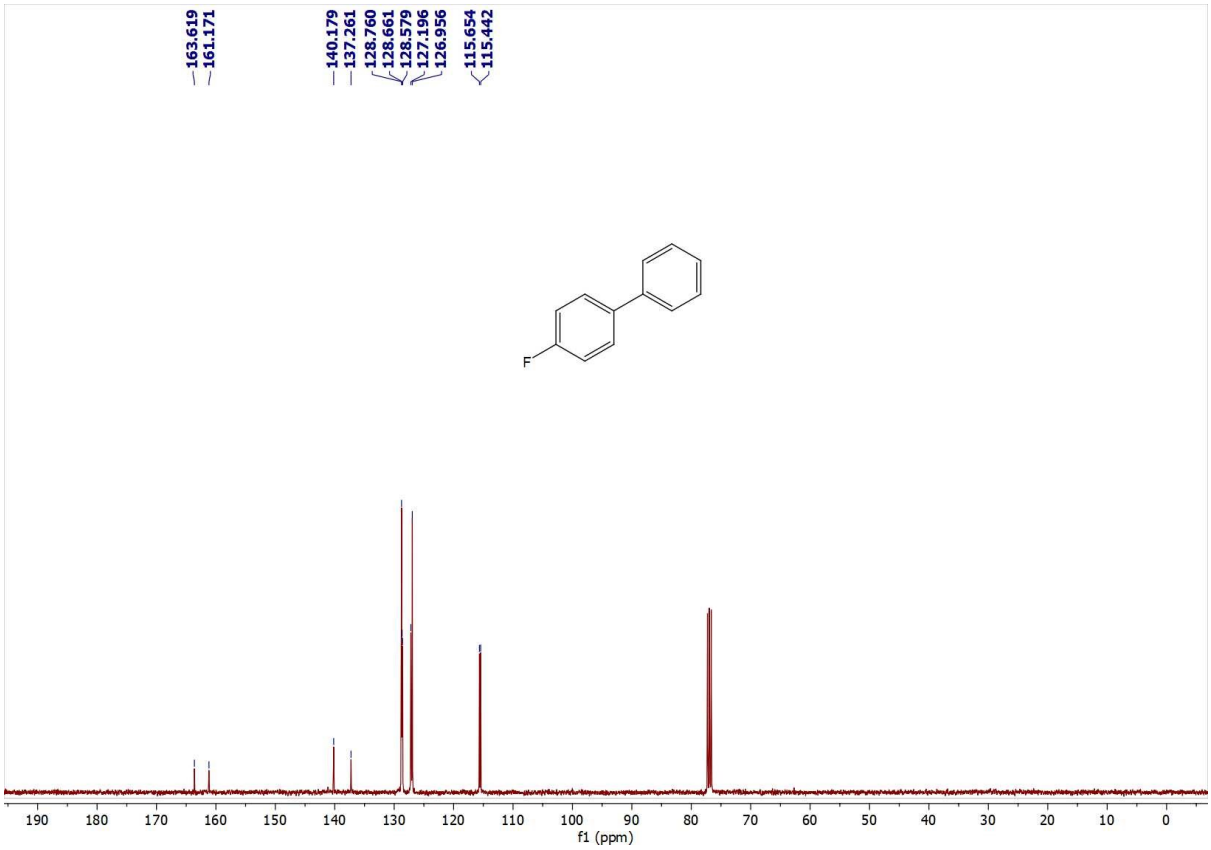


Fig. S31 ^{13}C NMR spectrum of **7Ia** in $CDCl_3$ (101 MHz)

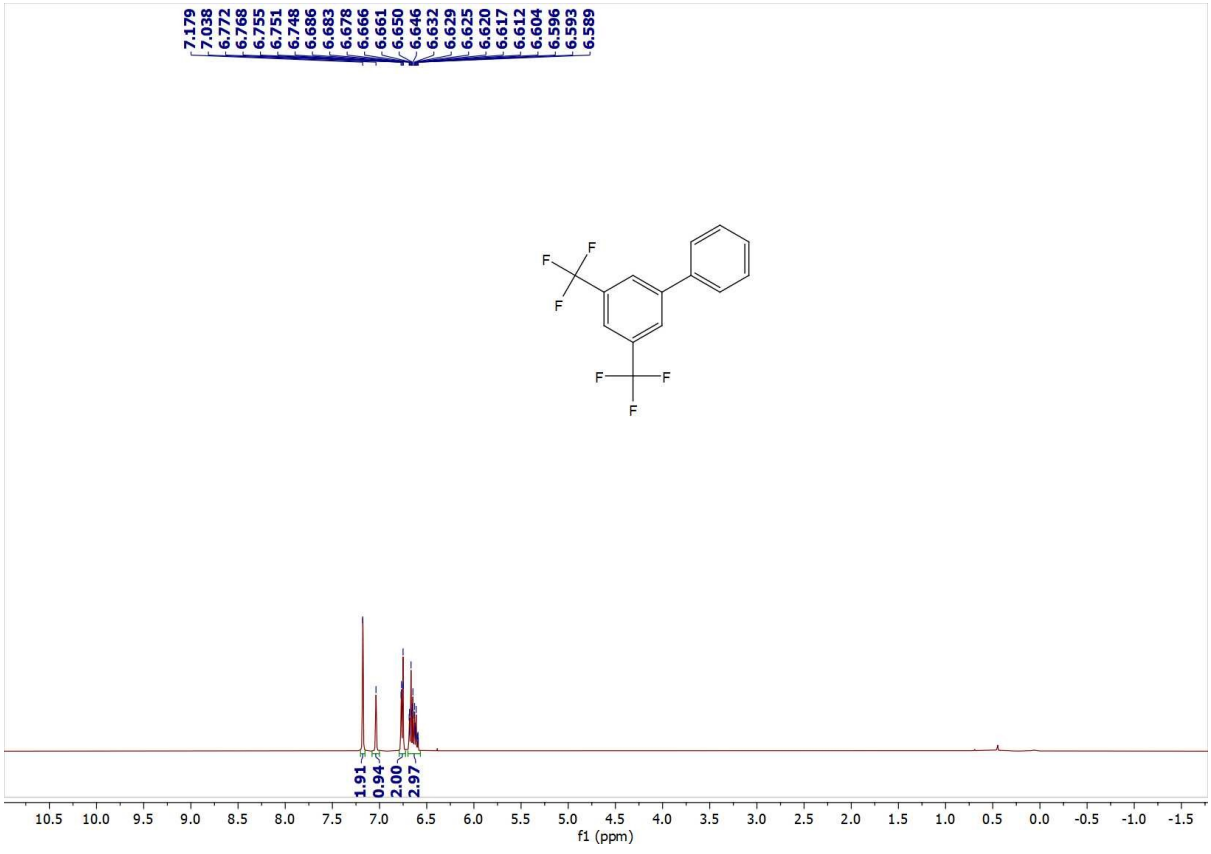


Fig. S32 ^{1}H NMR spectrum of **7Ja** in $CDCl_3$ (400 MHz)

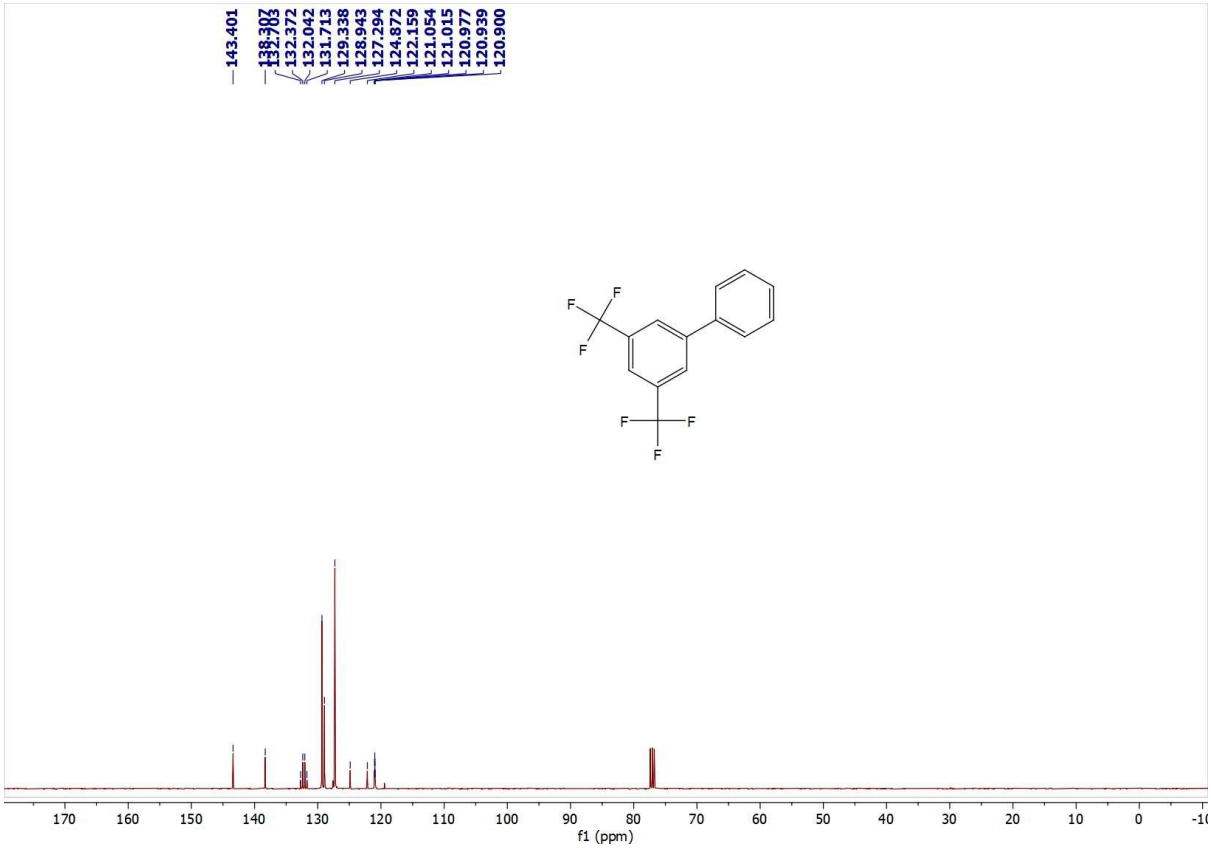


Fig. S33 ^{13}C NMR spectrum of **7Ja** in $CDCl_3$ (101 MHz)

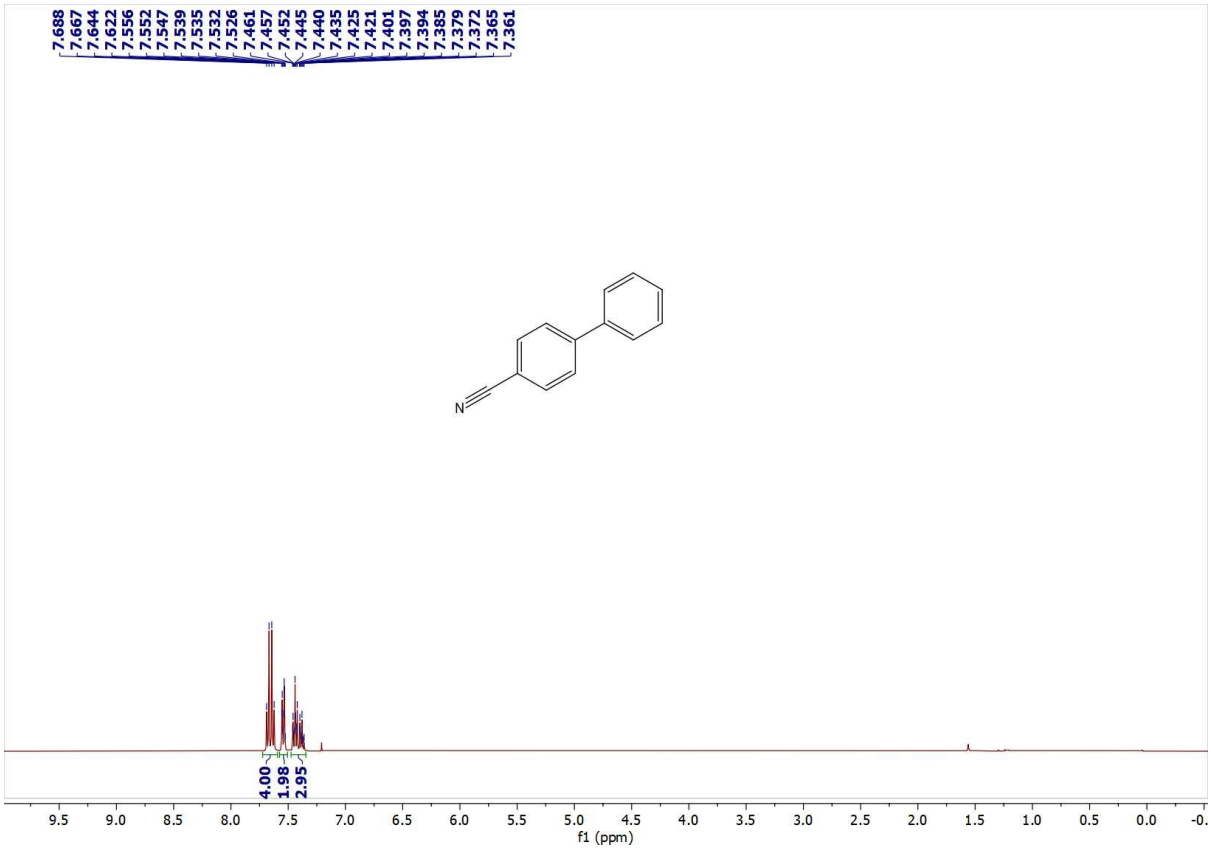


Fig. S34 ^{1}H NMR spectrum of **7Ka** in $CDCl_3$ (400 MHz)

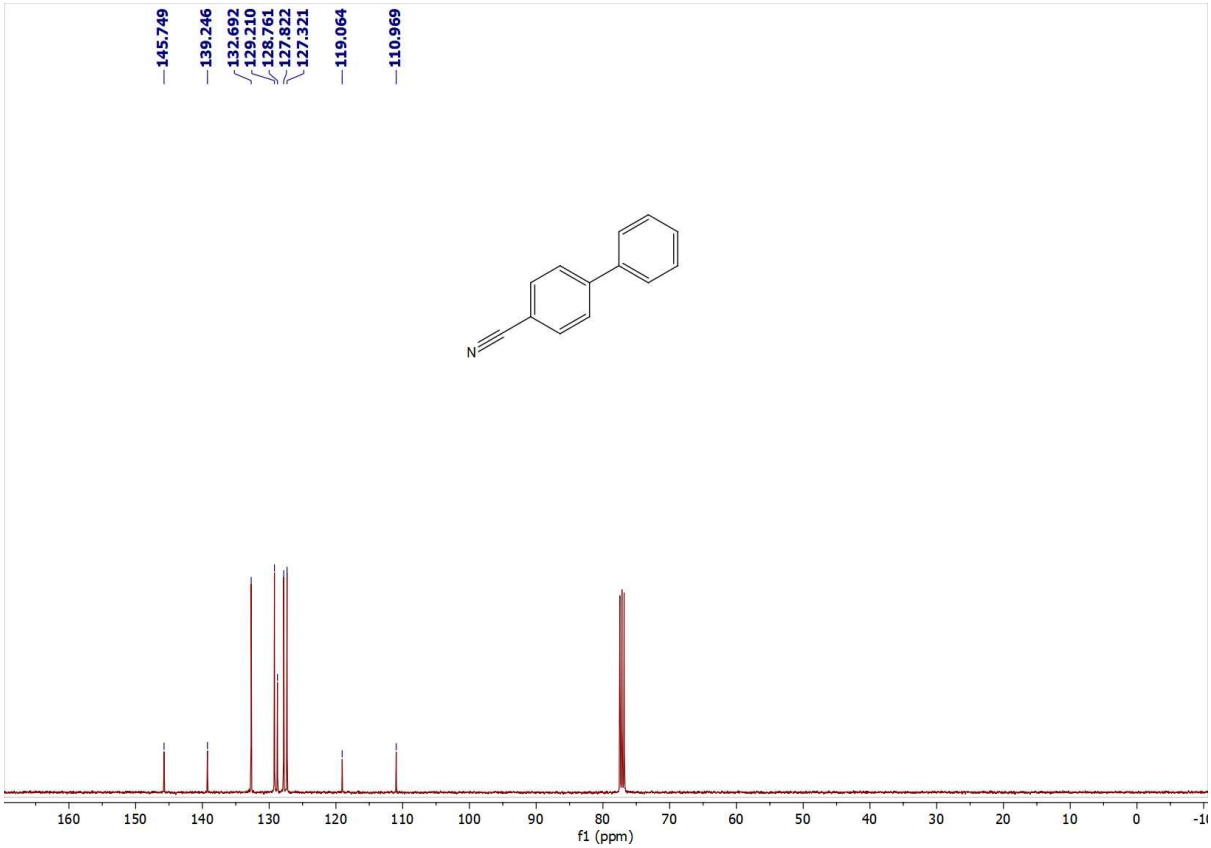


Fig. S35 ^{13}C NMR spectrum of **7Ka** in $CDCl_3$ (101 MHz)

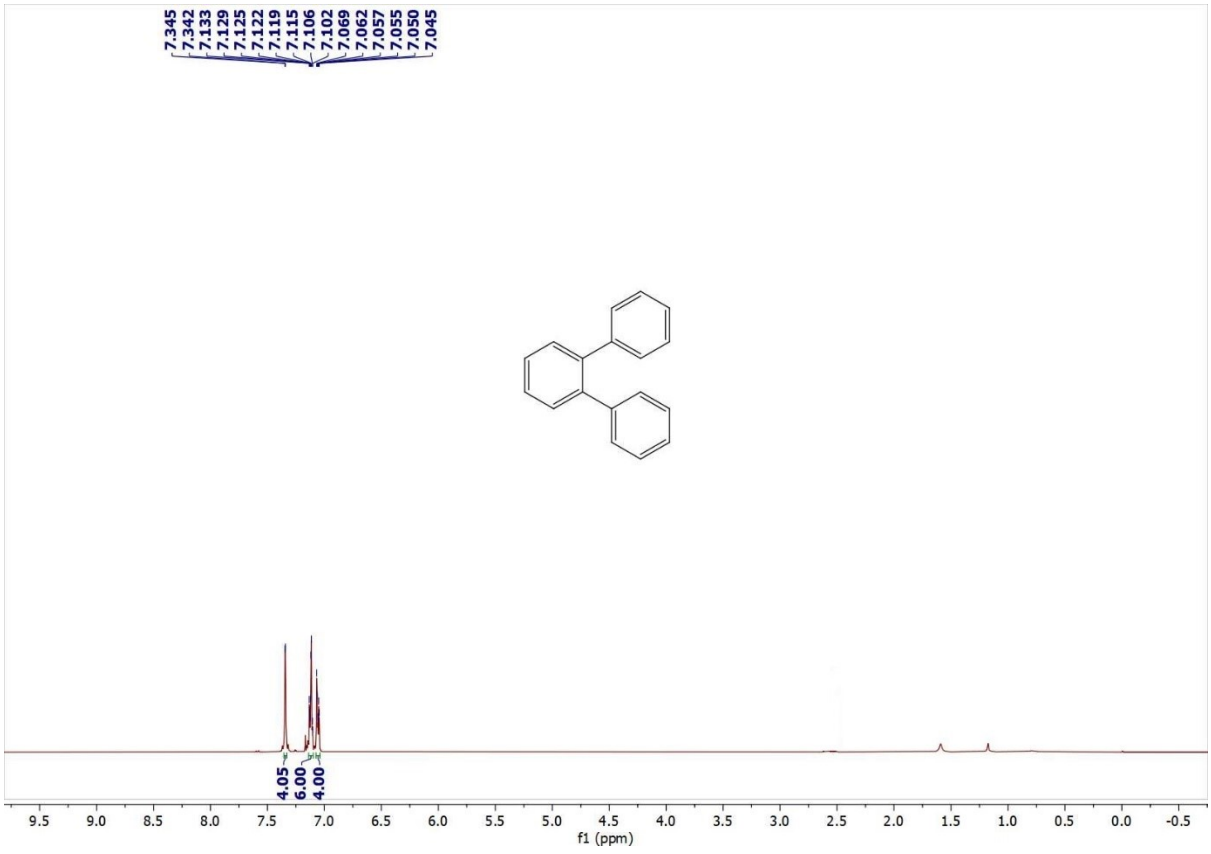


Fig. S36 ^{1}H NMR spectrum of **7La** in $CDCl_3$ (400 MHz)

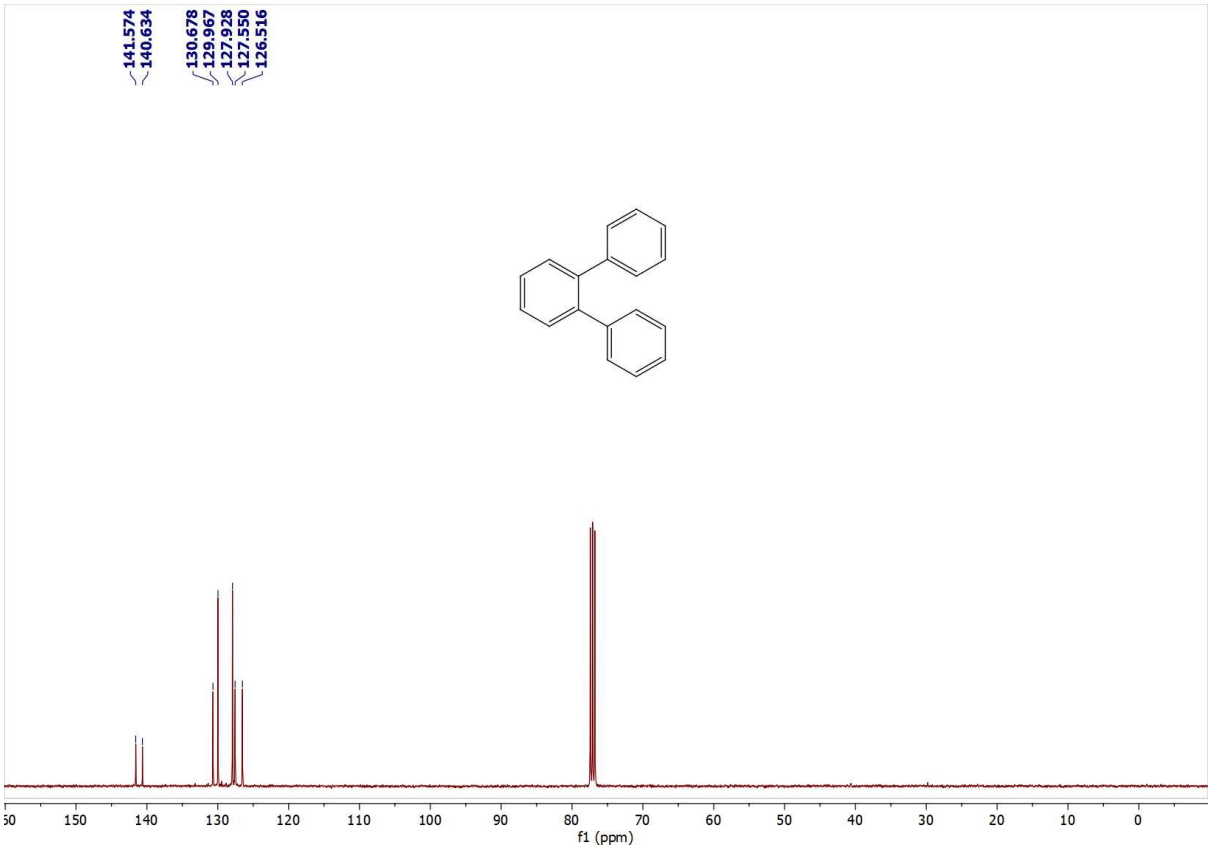


Fig. S37 ^{13}C NMR spectrum of **7La** in $CDCl_3$ (101 MHz)

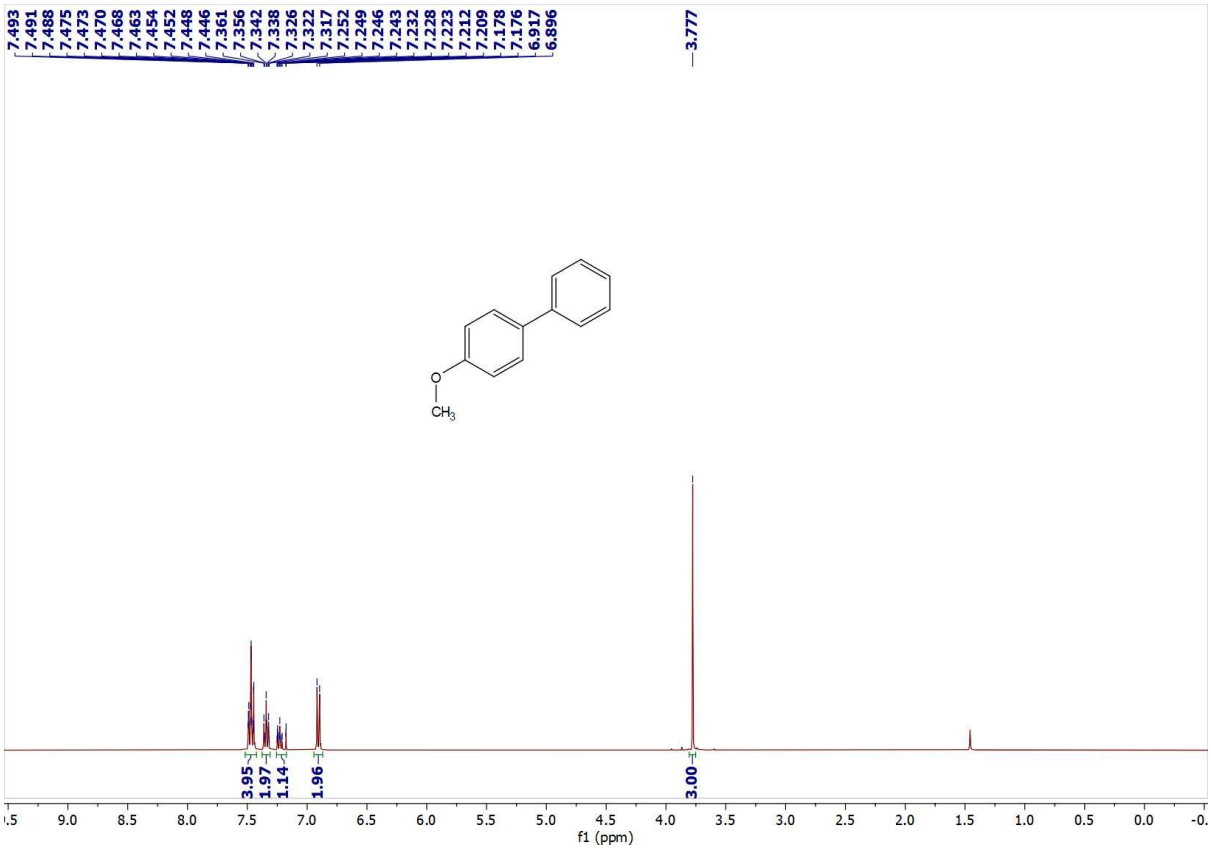


Fig. S38 ^{1}H NMR spectrum of **7Ma** in $CDCl_3$ (400 MHz)

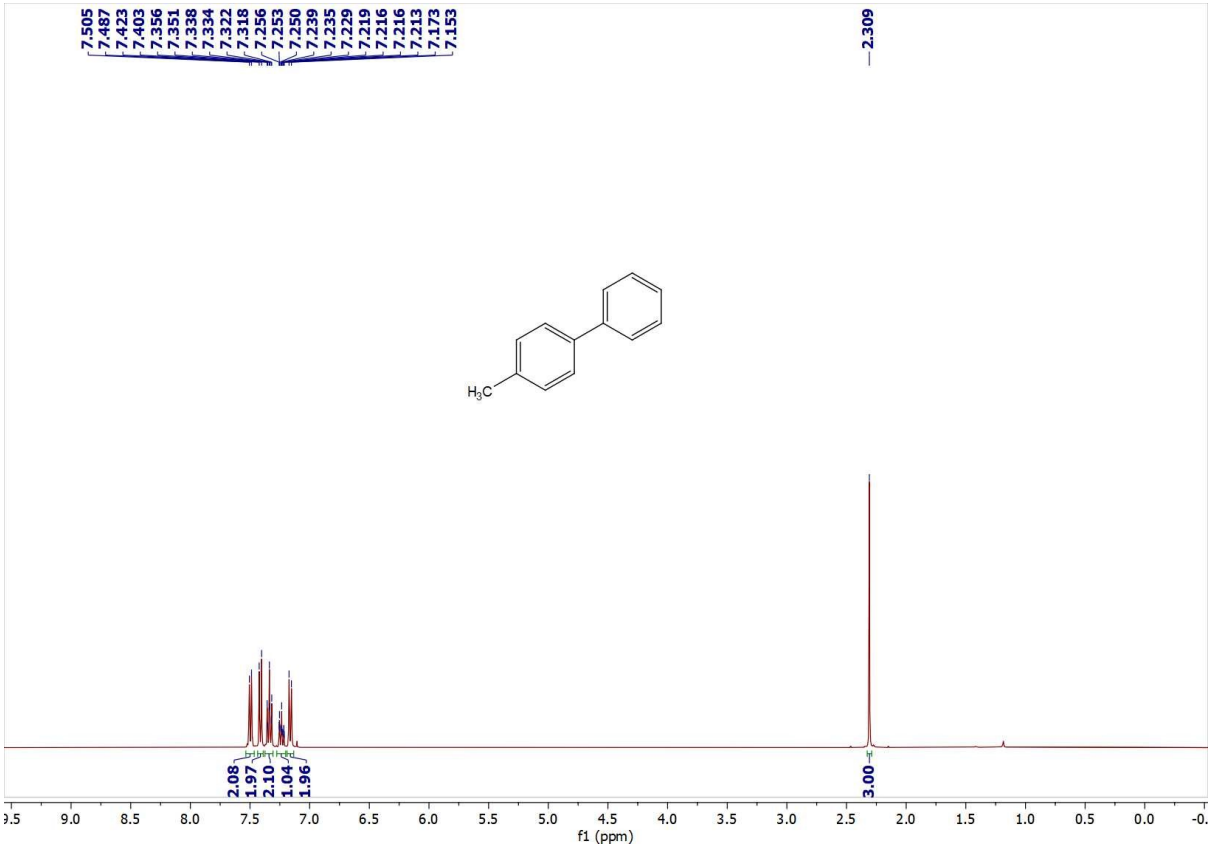


Fig. S39 ^{1}H NMR spectrum of **7Na** in $CDCl_3$ (400 MHz)

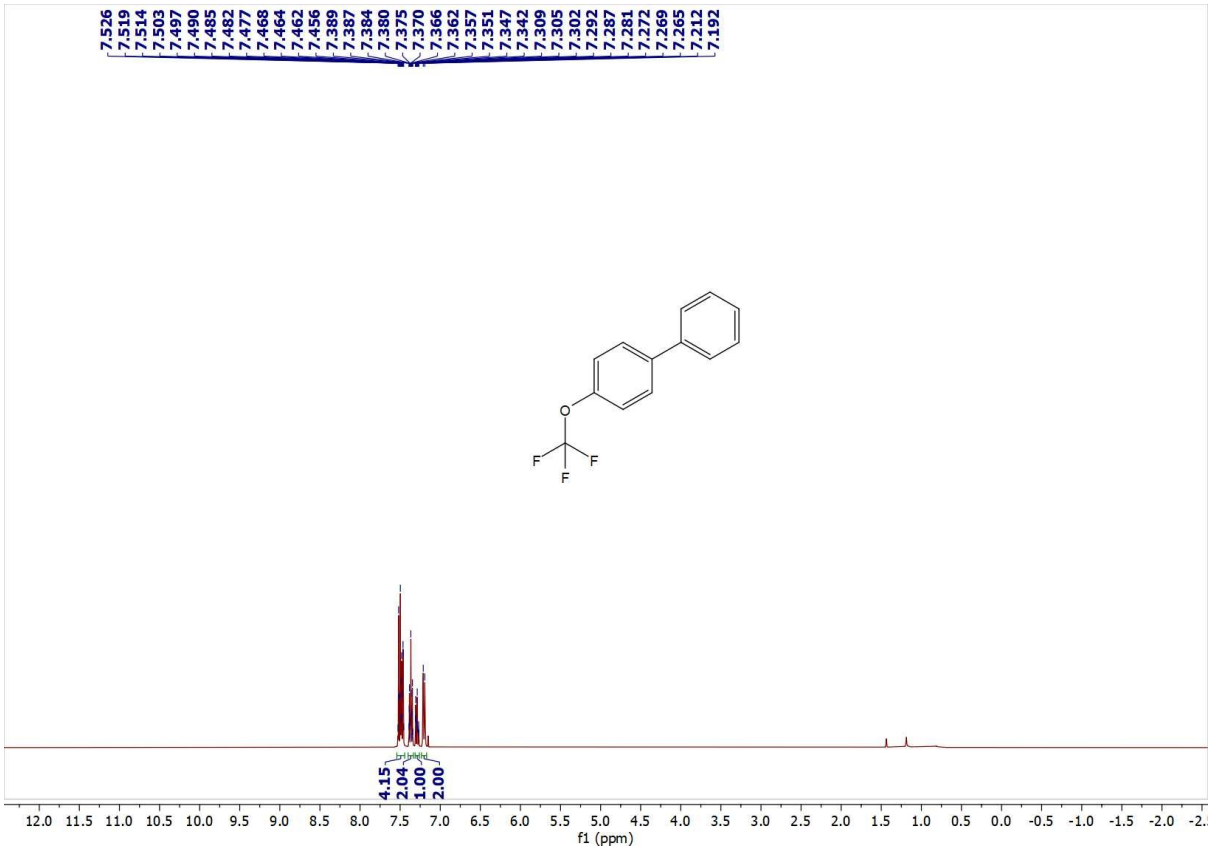


Fig. S40 ^{1}H NMR spectrum of **7Oa** in $CDCl_3$ (400 MHz)

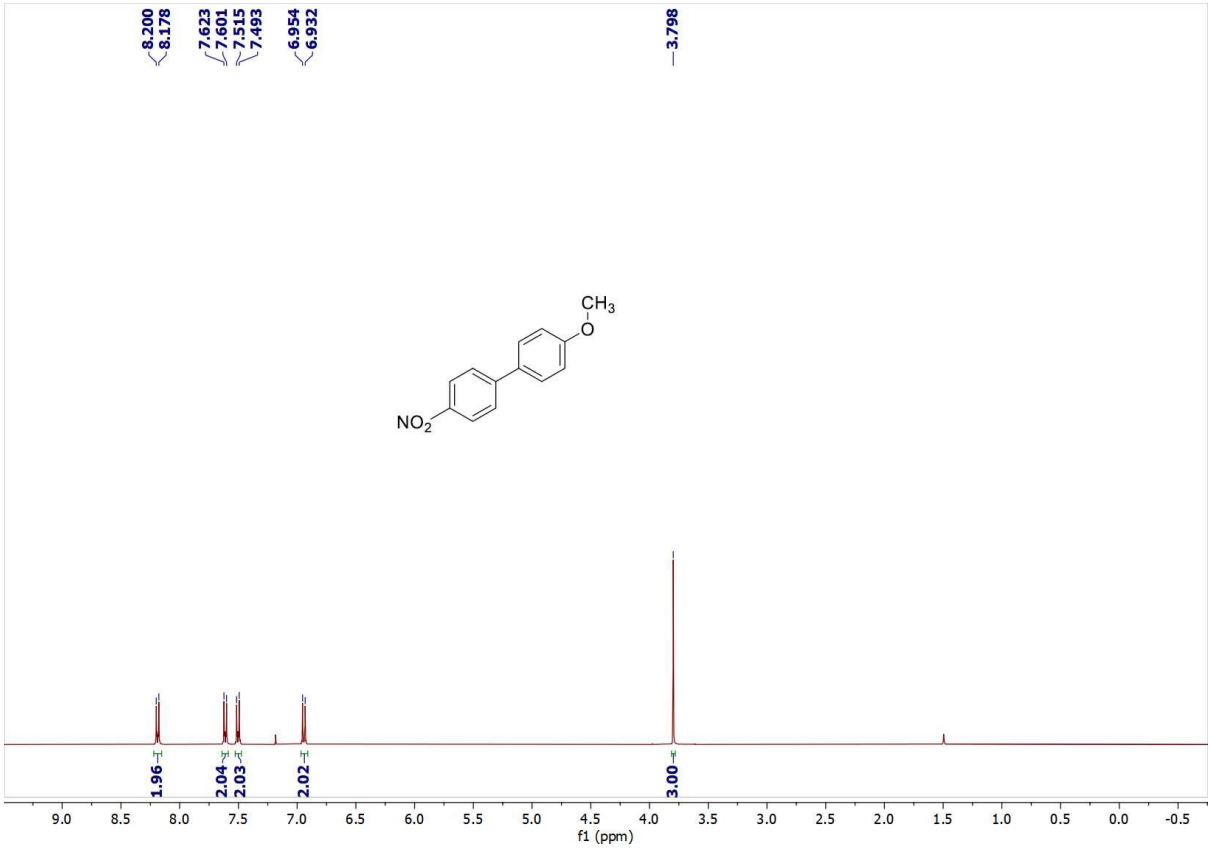


Fig. S41 ^{1}H NMR spectrum of **7Fb** in $CDCl_3$ (400 MHz)

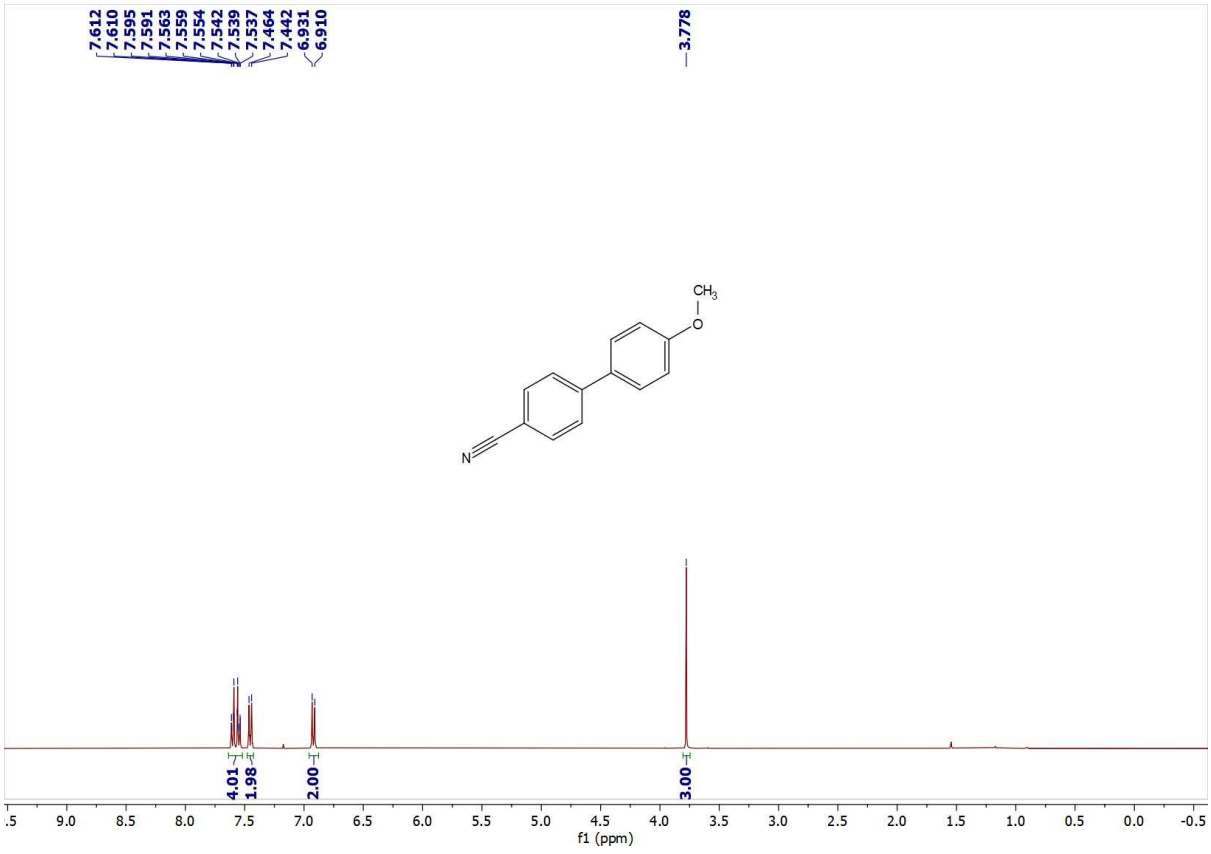


Fig. S42 ^{1}H NMR spectrum of **7Kb** in $CDCl_3$ (400 MHz)

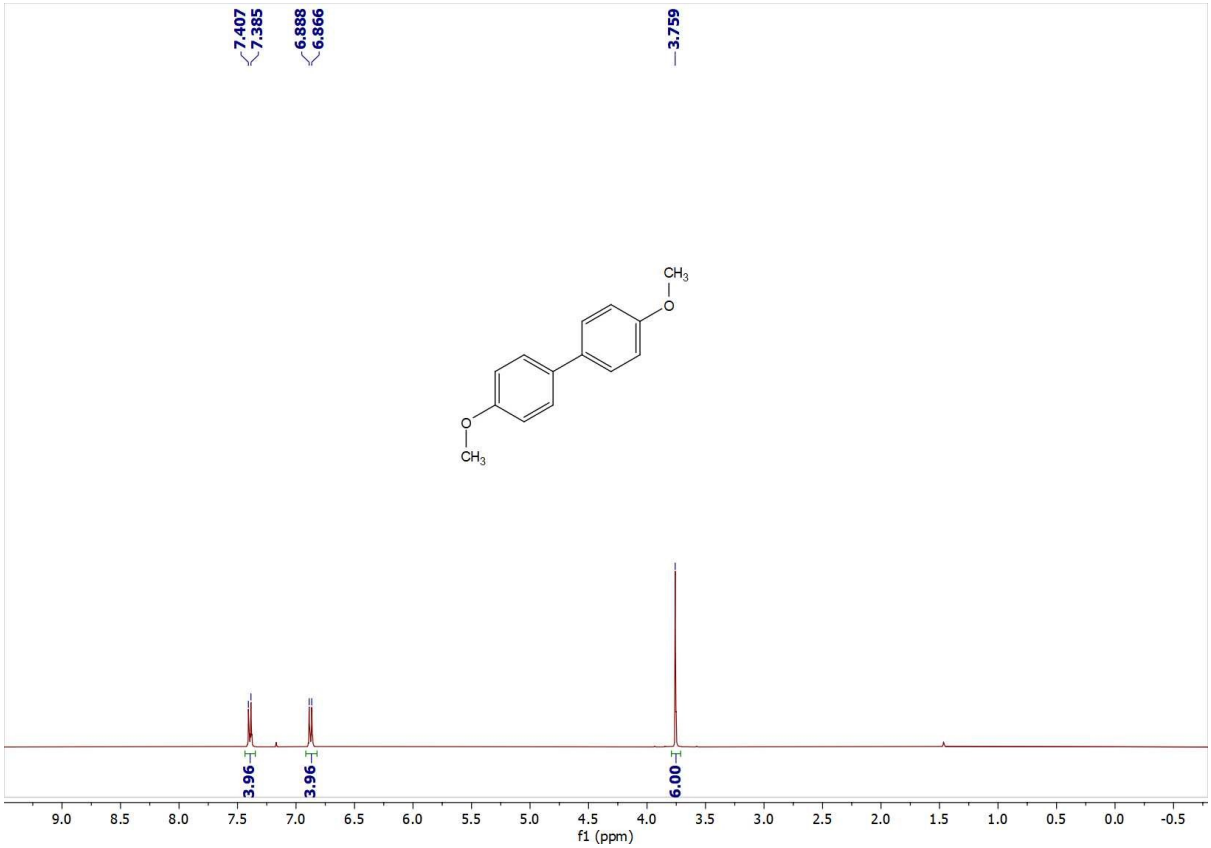


Fig. S43 ^{1}H NMR spectrum of **7Mb** in $CDCl_3$ (400 MHz)

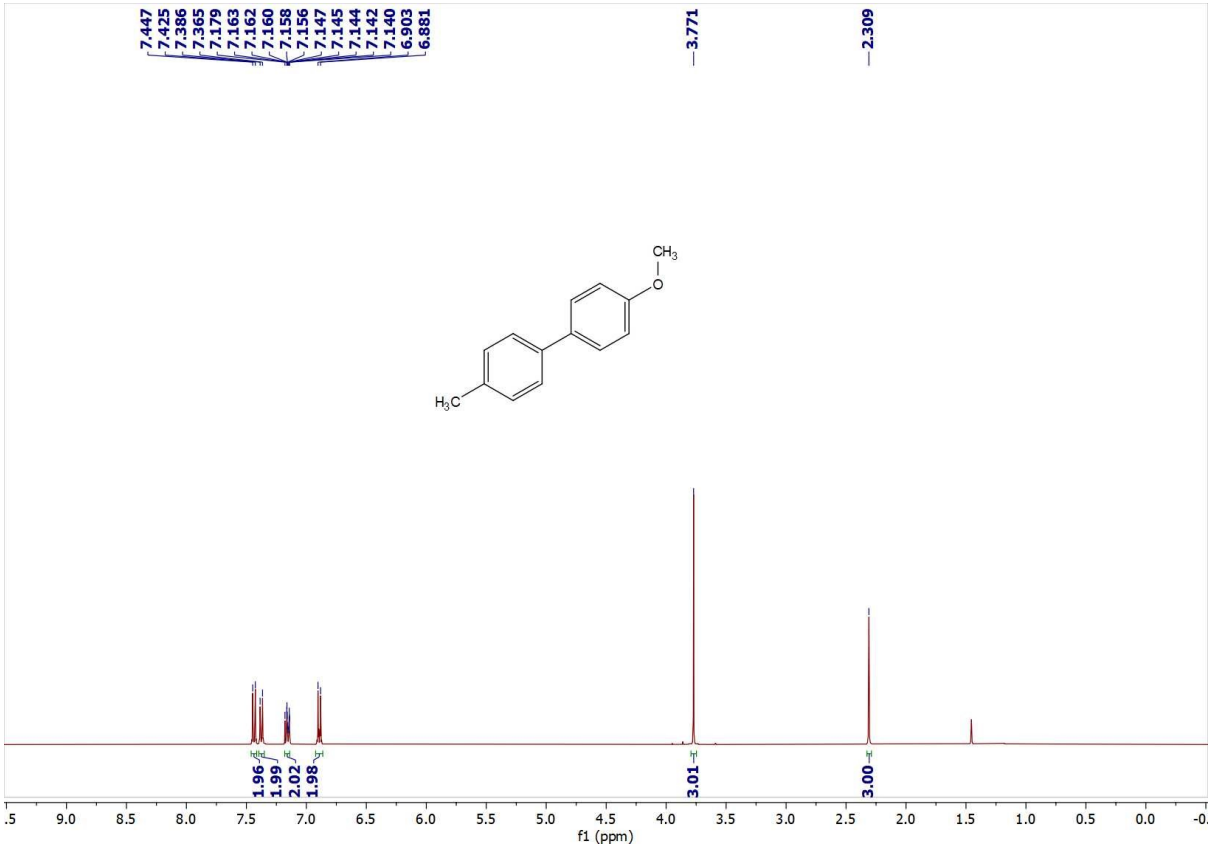


Fig. S44 ^{1}H NMR spectrum of **7Nb** in $CDCl_3$ (400 MHz)

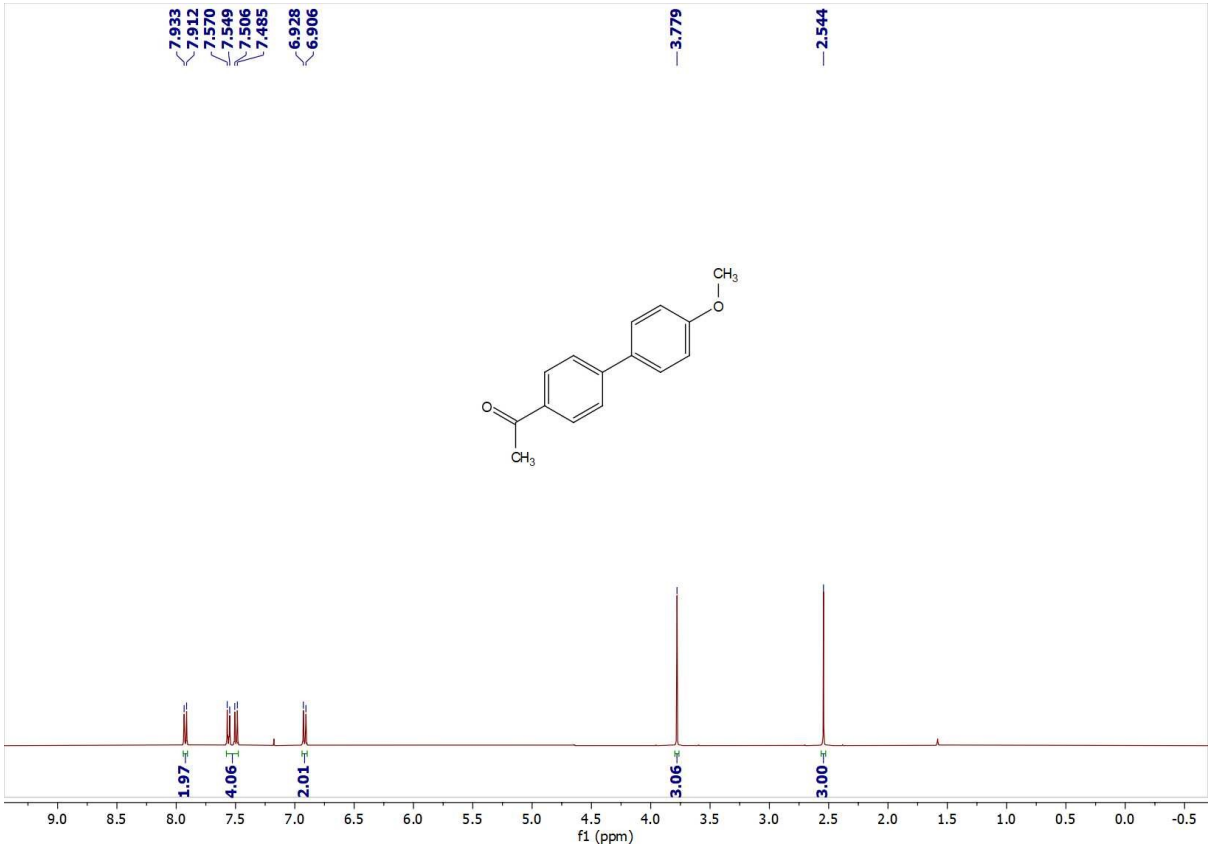


Fig. S45 ^{1}H NMR spectrum of **7Pb** in $CDCl_3$ (400 MHz)

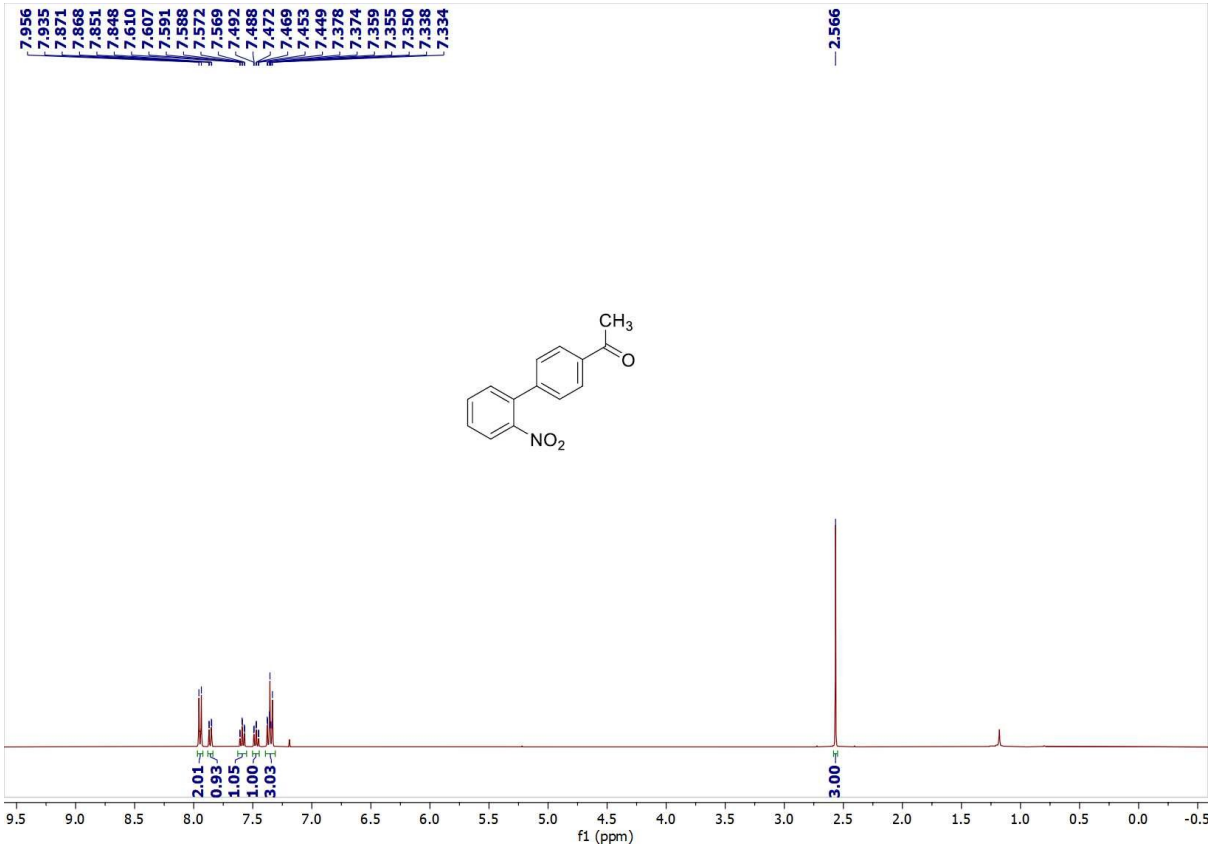


Fig. S46 ^{1}H NMR spectrum of **7Qc** in $CDCl_3$ (400 MHz)

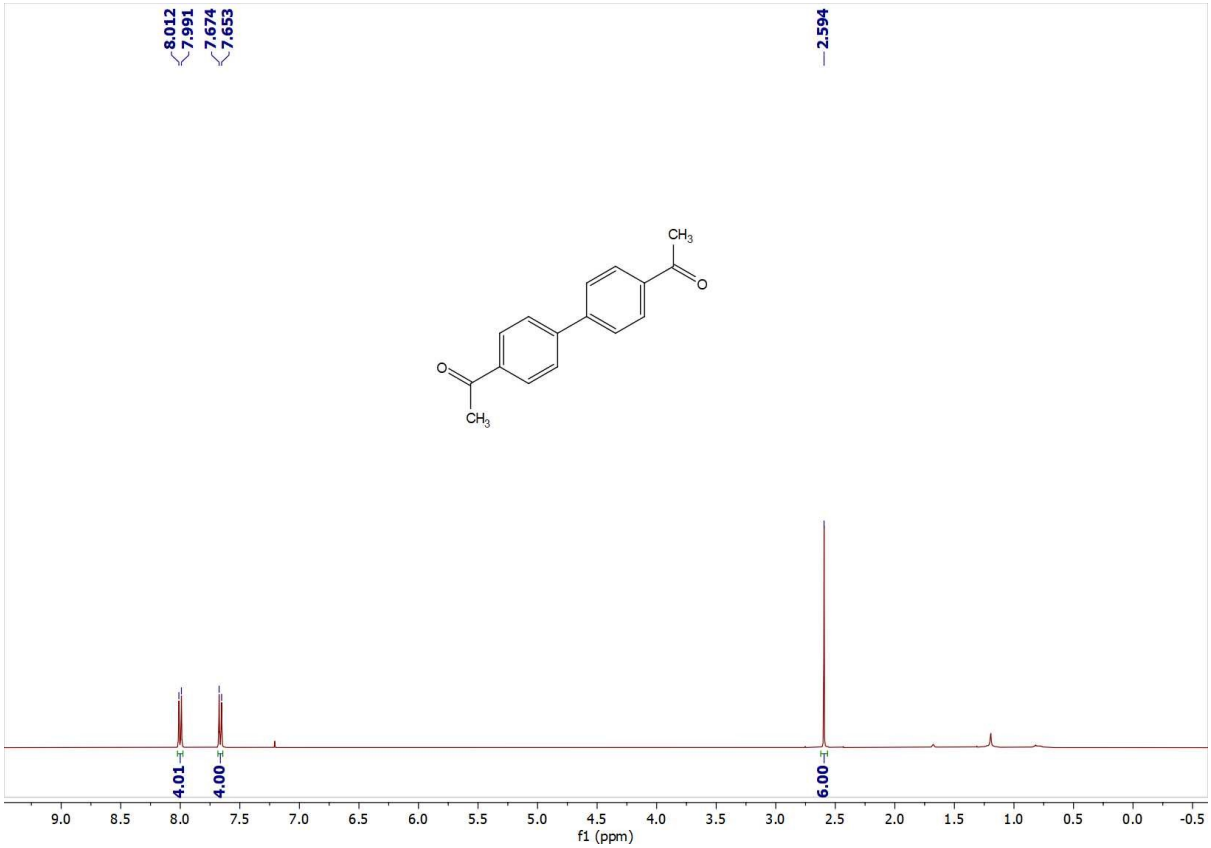


Fig. S47 ^{1}H NMR spectrum of **7Pc** in $CDCl_3$ (400 MHz)

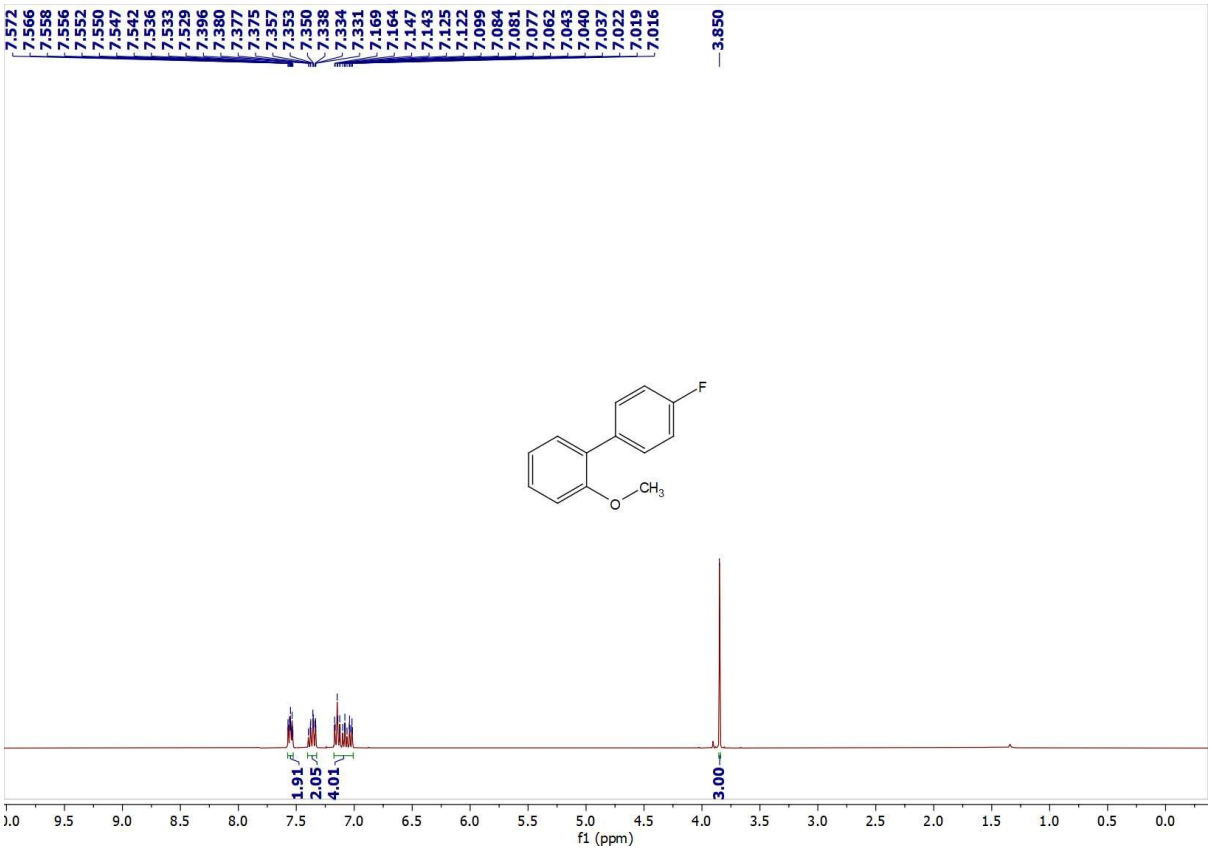


Fig. S48 ^{1}H NMR spectrum of **7Rd** in $CDCl_3$ (400 MHz)

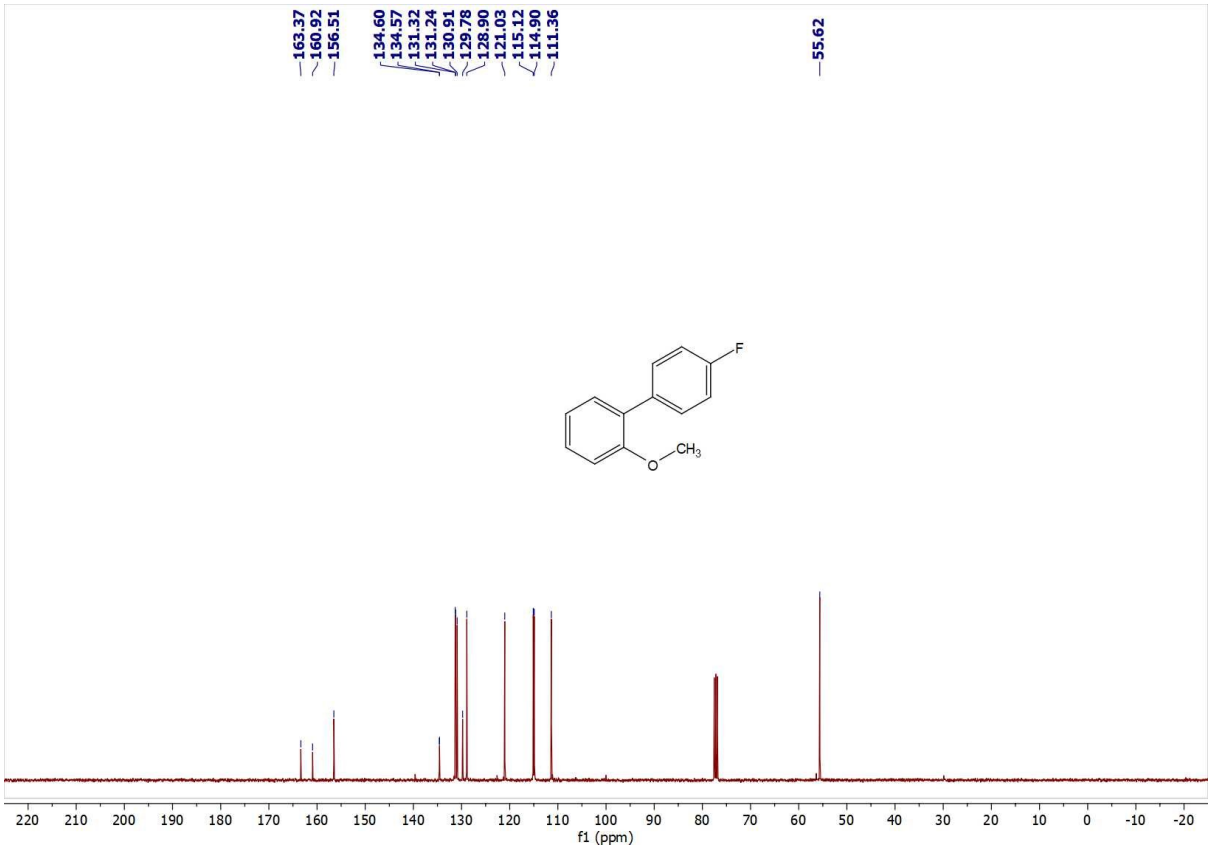


Fig. S49 ^{13}C NMR spectrum of **7Rd** in $CDCl_3$ (101 MHz)

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