

Supporting Information

Polymer supported eosin Y as a reusable photocatalyst for the visible light mediated organic transformations.

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Determination of molar extinction coefficient of eosin Y in water

The absorption spectrum of different concentrations of Na₂eosin Y in water were recorded as shown in figure 1 and Na₂eosin Y shows absorption maximum at 517 nm. The extinction coefficient of Na₂eosin Y was calculated from the plot of absorbance vs concentration as shown in figure 2. The extinction coefficient was found to be $7.4 \times 10^5 \text{ M}^{-1}\text{cm}^{-1}$. Correlation coefficient (R^2) is 0.999.

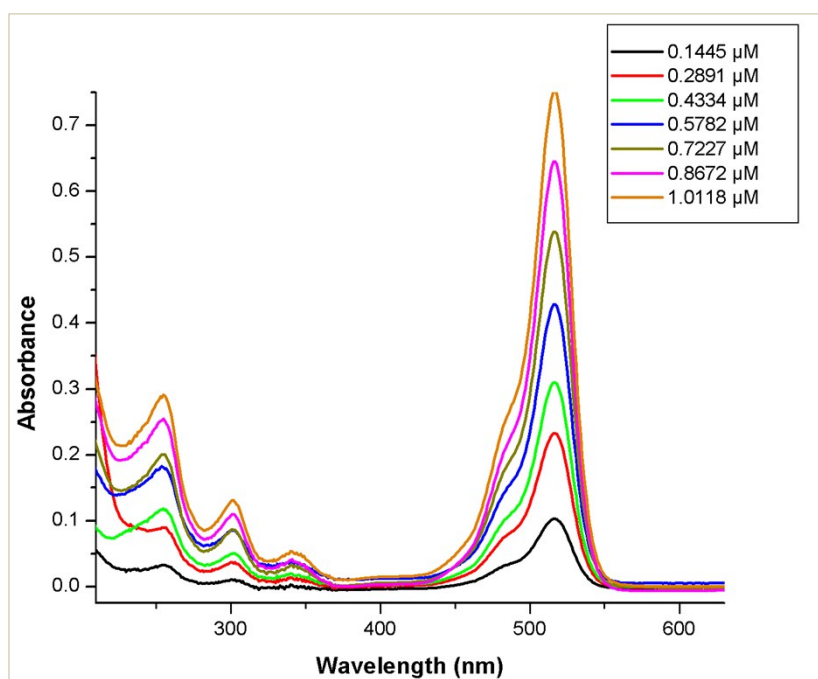


Figure 1 Absorption spectra of Na₂eosin Y in aqueous solution with different concentration.

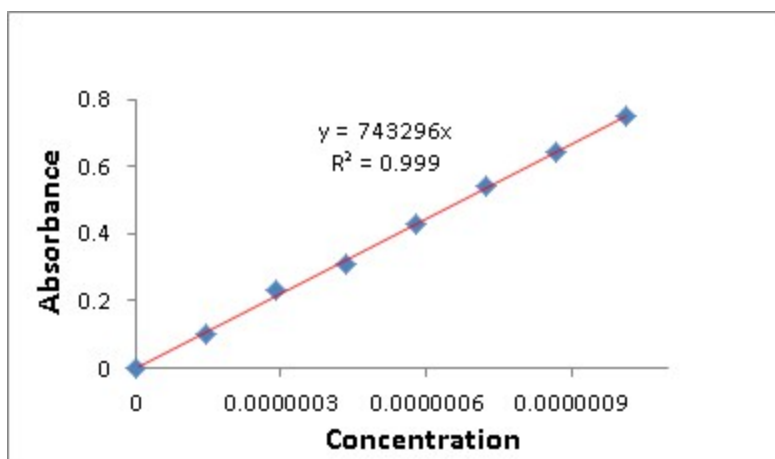


Figure 2 Plot of absorbance vs concentration of aqueous solution of Na₂eosin Y at 517 nm.

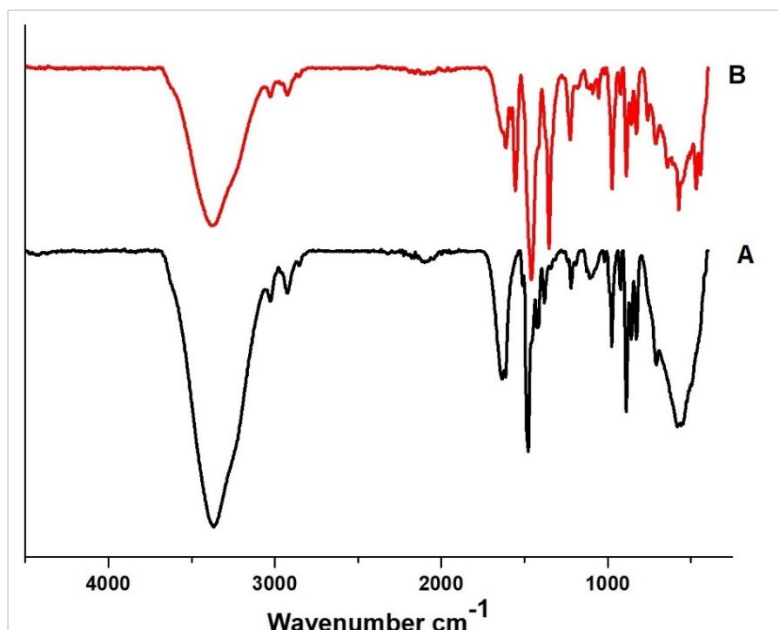
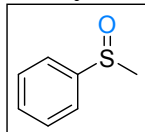


Figure 3. (A) IR spectra of eosin Y. (B) polymer-supported eosin Y.

Polymer supported eosin Y shows most of the IR peaks of eosin Y which confirms that the eosin y is immobilized on the polymer. The stretching frequency around 1610 cm⁻¹ corresponding to carbonyl group present in carboxylate anion which decreased significantly in polymer supported eosin Y due to anion-exchange reaction.

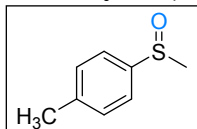
Spectral data of sulfoxide and phenol derivatives

methylsulfinylbenzene 2a: pale yellow oil; ^1H NMR (400 MHz, CDCl_3) δ 7.64 (d, $J = 7.2$ Hz,



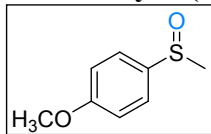
2H), 7.54 – 7.46 (m, 3H), 2.71 (s, 3H) ppm; ^{13}C NMR (100 MHz, CDCl_3) δ 145.5, 130.9, 129.2, 123.4, 43.8 ppm.

1-methyl-4-(methylsulfinyl)benzene 2b: colorless oil; ^1H NMR (400 MHz, CDCl_3) δ 7.54 (d, J



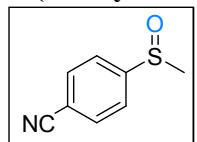
= 8.0 Hz, 2H), 7.3 (d, $J = 8.0$ Hz, 2H), 2.69 (s, 3H), 2.41 (s, 3H) ppm; ^{13}C NMR (100 MHz, CDCl_3) δ 142.4, 141.5, 130.0, 123.5, 43.9, 21.3 ppm.

1-methoxy-4-(methylsulfinyl)benzene 2c: pale yellow oil; ^1H NMR (500 MHz, CDCl_3) δ 7.58



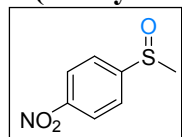
(d, $J = 9.0$ Hz, 2H), 7.02 (d, $J = 9.0$ Hz, 2H), 3.83 (s, 3H), 2.68 (s, 3H) ppm; ^{13}C NMR (125 MHz, CDCl_3) δ 161.9, 136.4, 125.4, 114.8, 55.4, 43.9 ppm.

4-(methylsulfinyl)benzonitrile 2d: white solid; mp 87-89 °C; ^1H NMR (500 MHz, CDCl_3) δ



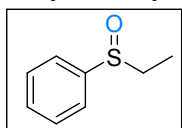
7.83 – 7.80 (m, 2H), 7.72 – 7.74 (m, 2H), 2.74 (s, 3H) ppm; ^{13}C NMR (125 MHz, CDCl_3) δ 151.4, 132.9, 124.2, 117.6, 114.7, 43.7 ppm.

1-(methylsulfinyl)-4-nitrobenzene 2e: yellow solid; mp 150-153 °C; ^1H NMR (500 MHz,



CDCl_3) δ 8.30 (d, $J = 8.5$ Hz, 2H), 7.84 (d, $J = 9.0$ Hz, 2H), 2.78 (s, 3H) ppm; ^{13}C NMR (125 MHz, CDCl_3) δ 153.2, 149.4, 124.6, 124.4, 43.8 ppm.

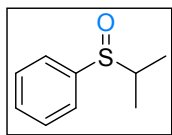
ethylsulfinylbenzene 2f: pale yellow oil; ^1H NMR (500 MHz, CDCl_3) δ 7.59 – 7.57 (m, 2H),



7.50 – 7.46 (m, 3H), 2.91 – 2.84 (m, 1H), 2.77 – 2.70 (m, 1H), 1.18 (t, $J = 7.5$ Hz, 3H) ppm; ^{13}C NMR (125 MHz, CDCl_3) δ 130.8, 129.0, 124.0, 50.1, 5.87

ppm.

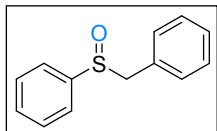
isopropylsulfinylbenzene 2g: colorless oil; ^1H NMR (500 MHz, CDCl_3) δ 7.58 – 7.56 (m, 2H),



7.51 – 7.47 (m, 3H), 2.85 (sept, $J = 7.0$ Hz, 1H), 1.21 (d, $J = 7.0$ Hz, 3H), 1.13 (d, $J = 7.0$ Hz, 3H) ppm; ^{13}C NMR (125 MHz, CDCl_3) δ 141.6, 130.9, 128.8, 124.9,

54.4, 15.8, 13.8 ppm.

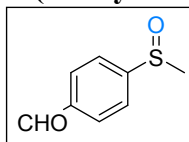
benzylsulfinylbenzene 2h: white solid; mp 121-123 °C; ^1H NMR (500 MHz, CDCl_3) δ 7.47 –



7.39 (m, 5H), 7.38 – 7.36 (m, 3H), 7.29 – 7.22 (m, 2H), 4.09 (d, $J = 12.5$ Hz, 1H), 4.00 (d, $J = 12.5$ Hz, 1H) ppm; ^{13}C NMR (125 MHz, CDCl_3) δ 142.6,

131.0, 130.2, 129.0, 128.7, 128.3, 128.1, 124.3, 63.4 ppm.

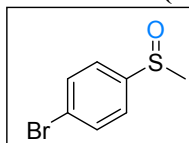
4-(methylsulfinyl)benzaldehyde 2i: white solid; mp 80-82 °C; ^1H NMR (400 MHz, CDCl_3) δ



10.06 (s, 1H), 8.03 (d, $J = 8.0$ Hz, 2H), 7.81 (d, $J = 8.4$ Hz, 2H), 2.76 (s, 3H) ppm; ^{13}C NMR (100 MHz, CDCl_3) δ 191.1, 152.3, 138.0, 130.3, 124.0, 43.7

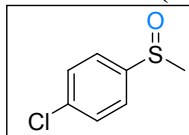
ppm.

1-bromo-4-(methylsulfinyl)benzene 2j: white solid; mp 81-83 °C; ^1H NMR (500 MHz,



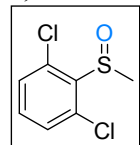
CDCl_3) δ 7.66 (d, $J = 8.5$ Hz, 2H), 7.52 (d, $J = 8.5$ Hz, 2H), 2.70 (s, 3H) ppm; ^{13}C NMR (125 MHz, CDCl_3) δ 144.8, 132.5, 125.4, 125.1, 43.9 ppm.

1-chloro-4-(methylsulfinyl)benzene 2k: pale yellow oil; ^1H NMR (500 MHz, CDCl_3) δ 7.58



(d, $J = 8.5$ Hz, 2H), 7.50 (d, $J = 9.0$ Hz, 2H), 2.70 (s, 3H) ppm; ^{13}C NMR (125 MHz, CDCl_3) δ 144.1, 137.1, 129.5, 124.9, 43.9 ppm.

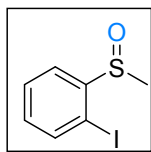
1,3-dichloro-2-(methylsulfinyl)benzene 2l: white solid; mp 71-74 °C; ^1H NMR (500 MHz,



CDCl_3) δ 7.91 – 7.90 (m, 1H), 7.40 – 7.38 (m, 1H), 7.32 (d, $J = 8.5$ Hz, 1H), 2.81 (s, 3H) ppm; ^{13}C NMR (125 MHz, CDCl_3) δ 145.3, 134.8, 132.0, 130.9, 127.7,

125.4, 41.4 ppm.

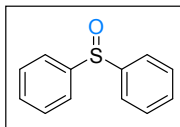
1-iodo-2-(methylsulfinyl)benzene 2m: pale yellow oil; ^1H NMR (500 MHz, CDCl_3) δ 7.91 (dd,



$J = 7.8$ Hz, 1.6 Hz, 1H), 7.81 (dd, $J = 7.8$ Hz, 1.0 Hz, 1H), 7.62 (t, $J = 7.5$ Hz, 1H),
7.23 (td, $J = 7.6$ Hz, 1.6 Hz, 1H), 2.78 (s, 3H) ppm; ^{13}C NMR (125 MHz, CDCl_3) δ

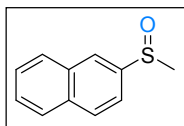
148.2, 139.3, 132.4, 129.5, 125.7, 91.3, 42.1 ppm.

Sulfinyldibenzene 2n: pale yellow solid; mp 68-71 $^\circ\text{C}$; ^1H NMR (400 MHz, CDCl_3) δ 7.65 –



7.63 (m, 4H), 7.48 – 7.43 (m, 6H) ppm; ^{13}C NMR (100 MHz, CDCl_3) δ 145.4,
131.0, 129.3, 124.7 ppm.

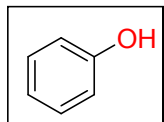
2-(methylsulfinyl)naphthalene 2o: white solid; mp 105-107 $^\circ\text{C}$; ^1H NMR (500 MHz, CDCl_3) δ



8.21 (s, 1H), 7.99 (d, $J = 8.5$ Hz, 1H), 7.94 – 7.89 (m, 2H), 7.60 – 7.58 (m, 3H),
2.79 (s, 3H) ppm; ^{13}C NMR (125 MHz, CDCl_3) δ 142.6, 134.3, 132.8, 129.5,

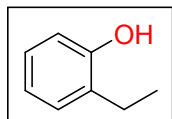
128.4, 128.0, 127.7, 127.3, 124.0, 119.4, 43.7 ppm.

Phenol 4a: colorless oil; ^1H NMR (400 MHz, CDCl_3) δ 7.27 – 7.24 (m, 2H), 6.96 (t, $J = 7.2$ Hz,



1H), 6.86 (d, $J = 8.0$ Hz, 2H), 5.07 (brs, 1H) ppm; ^{13}C NMR (100 MHz, CDCl_3) δ
155.5, 129.6, 120.7, 115.2 ppm.

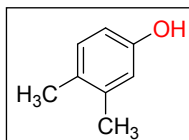
2-ethylphenol 4b: pale yellow oil; ^1H NMR (500 MHz, CDCl_3) δ 7.17 (d, $J = 7.5$ Hz, 1H), 7.11



(t, $J = 7.5$ Hz, 1H), 6.92 (t, $J = 7.5$ Hz, 1H), 6.78 (d, $J = 8.0$ Hz, 1H), 4.96 (brs,
1H), 2.69 (q, $J = 7.5$ Hz, 2H), 1.28 (t, $J = 7.5$ Hz, 3H) ppm; ^{13}C NMR (125 MHz,

CDCl_3) δ 153.3, 129.9, 129.2, 126.9, 120.8, 115.1, 22.8, 13.9 ppm.

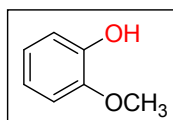
3, 4-dimethylphenol 4c: white solid; mp 59-62 $^\circ\text{C}$; ^1H NMR (500 MHz, CDCl_3) δ 7.00 (d, $J =$



8.0 Hz, 1H), 6.66 (d, $J = 3.0$ Hz, 1H), 6.60 (dd, $J = 8.0$ Hz, 2.5 Hz, 1H), 4.84
(brs, 1H), 2.22 (s, 3H), 2.19 (s, 3H) ppm; ^{13}C NMR (125 MHz, CDCl_3) δ 153.3,

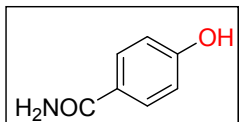
137.9, 130.4, 128.6, 116.5, 112.3, 19.8, 18.7 ppm.

2-methoxyphenol 4d: colorless oil; ^1H NMR (500 MHz, CDCl_3) δ 6.94 – 6.92 (m, 1H), 6.89 –



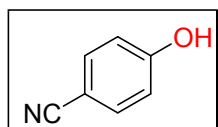
6.85 (m, 3H), 5.63 (brs, 1H), 3.89 (s, 3H) ppm; ^{13}C NMR (125 MHz, CDCl_3) δ 146.5, 145.6, 121.4, 120.1, 114.4, 110.6, 55.8 ppm.

4-hydroxybenzamide 4e: white solid; mp 162-164 °C; ^1H NMR (500 MHz, DMSO-d_6) δ 9.93



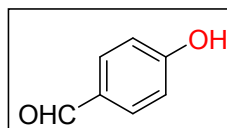
(s, 1H), 7.74 (t, J = 8.5 Hz, 3H), 7.04 (s, 1H), 6.78 (d, J = 8.5 Hz, 2H) ppm; ^{13}C NMR (125 MHz, DMSO-d_6) δ 168.2, 160.6, 129.9, 125.4, 115.1 ppm.

4-hydroxybenzonitrile 4f: yellowish semi solid; ^1H NMR (500 MHz, CDCl_3) δ 8.01 (s, 1H),



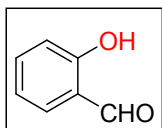
7.53 (d, J = 9.0 Hz, 2H), 6.93 (d, J = 8.5 Hz, 2H) ppm; ^{13}C NMR (125 MHz, CDCl_3) δ 160.4, 134.2, 119.3, 116.4, 102.8 ppm.

4-hydroxybenzaldehyde 4g: yellow solid; mp 112-115 °C; ^1H NMR (400 MHz, CDCl_3) δ 9.84



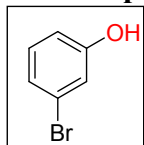
(s, 1H), 7.82 (d, J = 8.4 Hz, 2H), 6.99 – 6.97 (m, 3H) ppm; ^{13}C NMR (100 MHz, CDCl_3) δ 191.5, 162.1, 132.6, 130.8, 116.0 ppm.

2-hydroxybenzaldehyde 4h: pale yellow oil; ^1H NMR (400 MHz, CDCl_3) δ 11.01 (s, 1H), 9.90



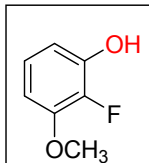
(s, 1H), 7.57 – 7.51 (m, 2H), 7.04 – 6.98 (m, 2H) ppm; ^{13}C NMR (100 MHz, CDCl_3) δ 196.5, 161.6, 136.9, 133.7, 119.8, 117.6 ppm.

3-bromophenol 4i: pale yellow oil; ^1H NMR (500 MHz, CDCl_3) δ 7.11-7.05 (m, 2H), 7.02 (t, J



= 3.0 Hz, 1H), 6.78 – 6.75 (m, 1H), 5.31 (brs, 1H) ppm; ^{13}C NMR (125 MHz, CDCl_3) δ 156.3, 130.7, 123.9, 122.7, 118.8, 114.2 ppm.

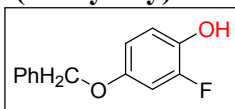
2-fluoro-3-methoxyphenol 4j: pale yellow oil; ^1H NMR (400 MHz, CDCl_3) δ 6.94 (t, J = 8.4



Hz, 1H), 6.63 (t, J = 7.6 Hz, 1H), 6.54 (t, J = 7.6 Hz, 1H), 5.54 (brs, 1H), 3.87 (s,

3H) ppm; ^{13}C NMR (100 MHz, CDCl_3) δ 148.1, 144.4, 140.3, 123.6, 109.5, 104.9, 56.3 ppm.

4-(benzyloxy)-2-fluorophenol 4k: white solid; mp 58-61 °C; ^1H NMR (500 MHz, CDCl_3) δ



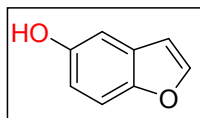
7.42-7.37 (m, 4H), 7.34-7.31 (s, 1H), 6.92 (t, $J = 9.0$ Hz, 1H), 6.76 (dd, $J =$

12.0 Hz, 2.5 Hz, 1H), 6.67 (d, $J = 9.0$ Hz, 1H), 4.99 (s, 2H), 4.87 (brs, 1H) ppm; ^{13}C NMR (125

MHz, CDCl_3) δ 152.6, 152.5, 151.8, 149.9, 137.6, 137.4, 136.6, 128.5, 128.0, 127.4, 117.2,

110.9, 103.4, 103.3, 70.8 ppm.

Benzofuran-5-ol 4l: white solid; mp 56-58 °C; ^1H NMR (400 MHz, CDCl_3) δ 7.59 (s, 1H), 7.36

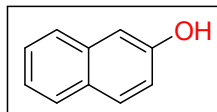


(d, $J = 8.8$ Hz, 1H), 7.02 (s, 1H), 6.84 (d, $J = 8.8$ Hz, 1H), 6.66 (s, 1H), 5.42

(brs, 1H) ppm; ^{13}C NMR (100 MHz, CDCl_3) δ 151.3, 149.9, 145.9, 128.2,

112.9, 111.7, 106.4, 106.1 ppm.

Naphthalen-2-ol 4m: brownish solid; mp 121-124 °C; ^1H NMR (500 MHz, CDCl_3) δ 7.79 (t, J



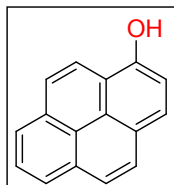
= 10.0 Hz, 2H), 7.69 (d, $J = 8.5$ Hz, 1H), 7.45 (t, $J = 8.0$ Hz, 1H), 7.35 (t, $J =$

8.0 Hz, 1H), 7.15 (d, $J = 2.5$ Hz, 1H), 7.12 (d, $J = 2.5$ Hz, 1H), 7.11 (d, $J =$

3.0 Hz, 1H), 5.34 (brs, 1H) ppm; ^{13}C NMR (125 MHz, CDCl_3) δ 153.2, 134.5, 129.8, 128.9,

127.7, 126.5, 126.3, 123.6, 117.7, 109.4 ppm.

Pyren-1-ol 4n: white solid; mp 178-180 °C; ^1H NMR (400 MHz, DMSO-d_6) δ 8.34 (d, $J = 9.2$



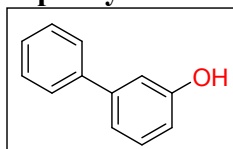
Hz, 1H), 8.06 (t, $J = 7.6$ Hz, 3H), 7.97-7.89 (m, 3H), 7.83 (d, $J = 8.8$ Hz, 1H),

7.57 (d, $J = 8.4$ Hz, 1H), 5.59 (brs, 1H) ppm; ^{13}C NMR (100 MHz, DMSO-d_6) δ

152.5, 131.7, 127.6, 126.29, 126.2, 125.8, 125.6, 124.9, 124.0, 123.9, 123.7,

121.8, 118.5, 113.5 ppm.

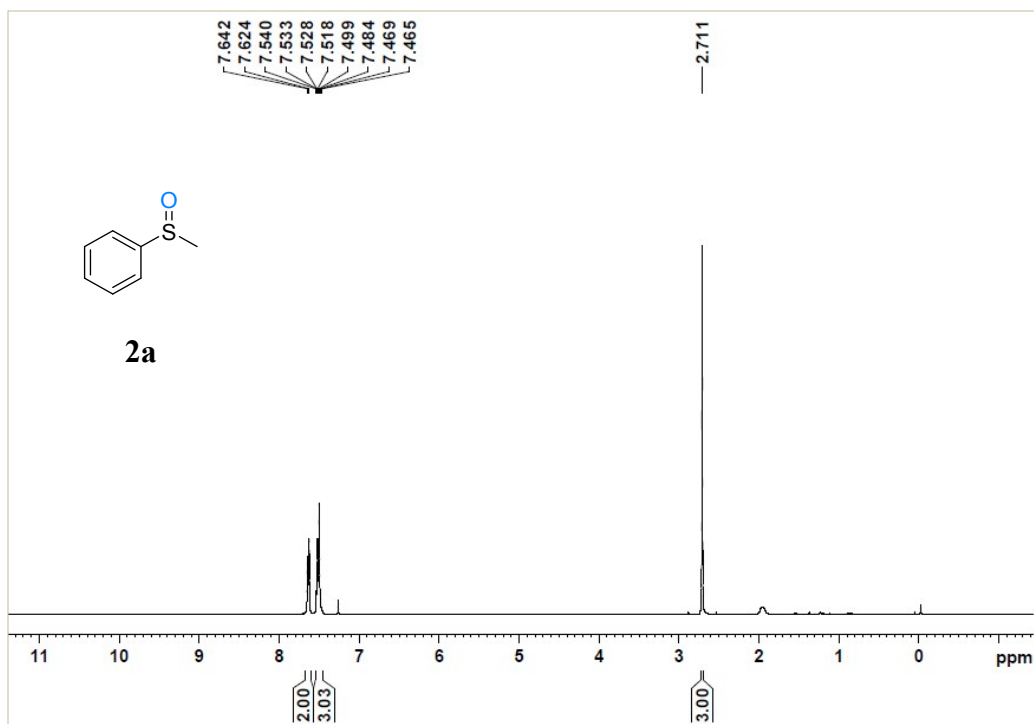
Biphenyl-3-ol 4o: white solid; mp 76-79 °C; ^1H NMR (400 MHz, CDCl_3) δ 7.58 (d, $J = 7.2$ Hz,



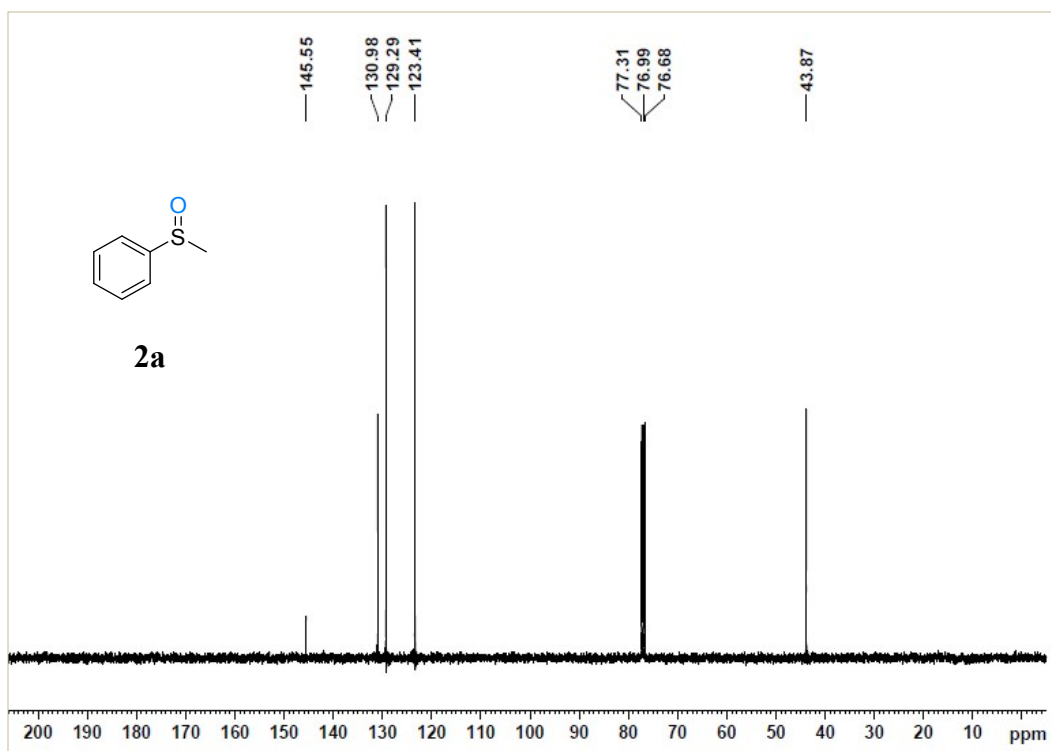
2H), 7.45 (t, $J = 7.2$ Hz, 2H), 7.37-7.29 (m, 2H), 7.18 (d, $J = 7.6$ Hz, 1H),

7.07 (s, 1H), 6.84 (d, $J = 8.0$ Hz, 1H), 5.18 (brs, 1H) ppm; ^{13}C NMR (100 MHz, CDCl_3) δ 155.8, 142.9, 140.7, 129.9, 128.7, 127.4, 127.0, 119.7, 114.1, 114.0 ppm.

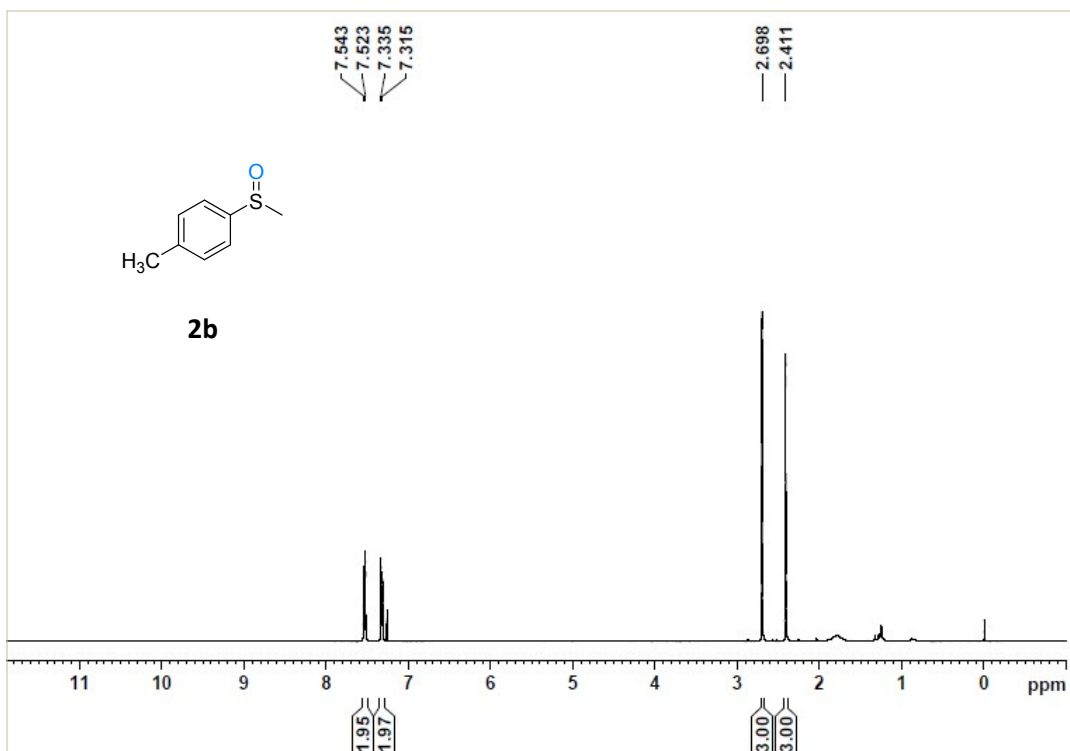
Copies of ^1H and ^{13}C NMR spectra of all compounds



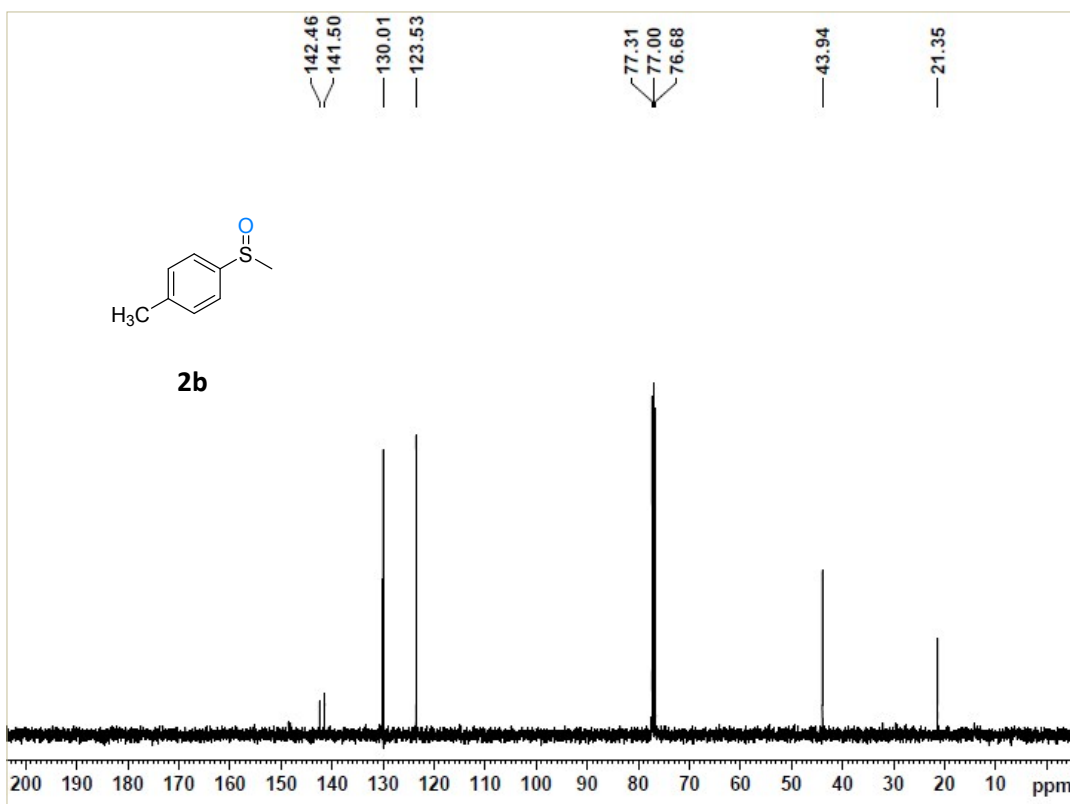
400 MHz ^1H NMR spectrum of **2a** in CDCl_3



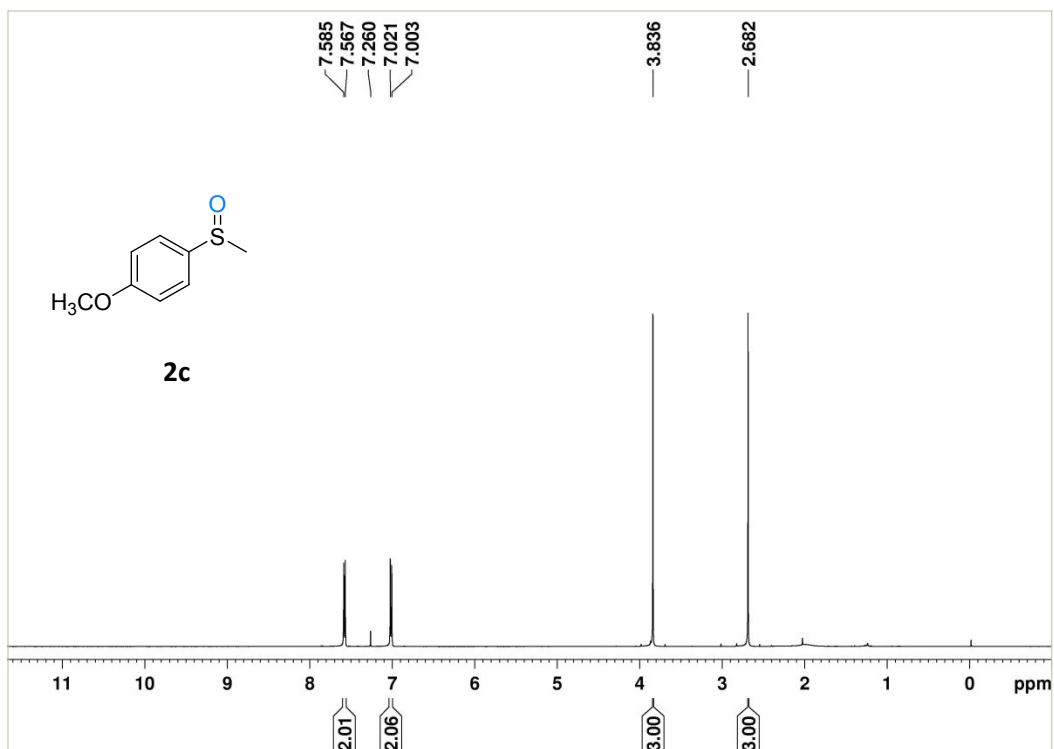
100 MHz ^{13}C -NMR spectrum of **2a** in CDCl_3



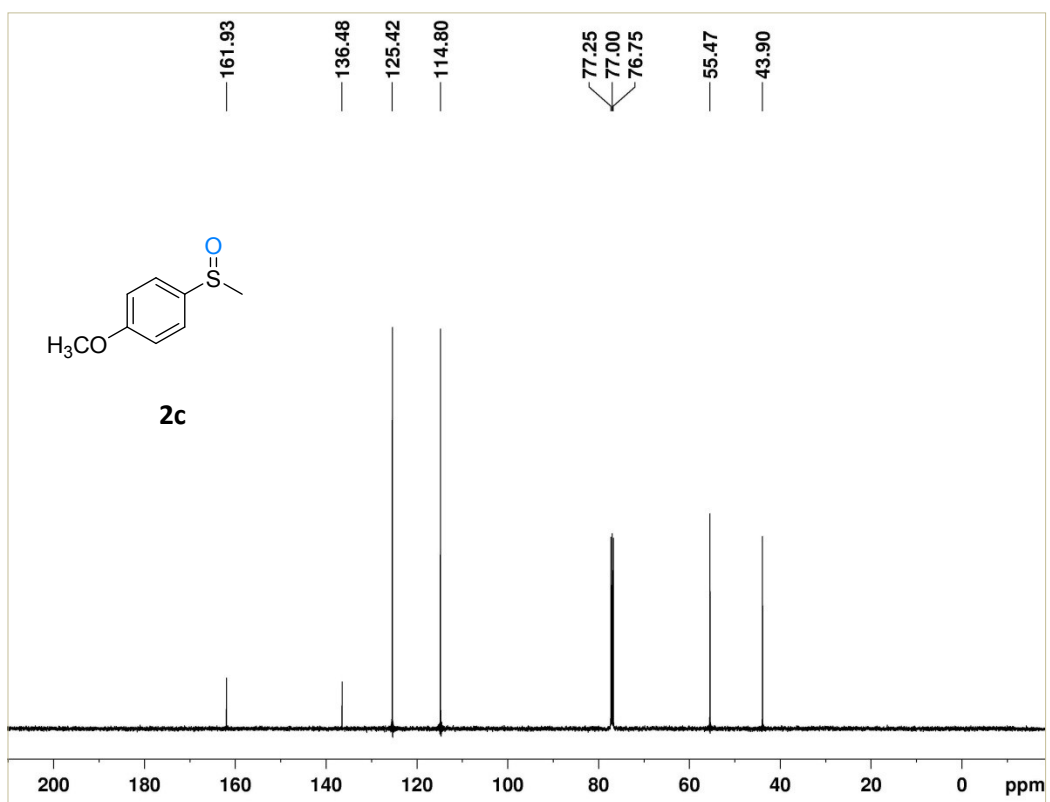
400 MHz ^1H NMR spectrum of **2b** in CDCl_3



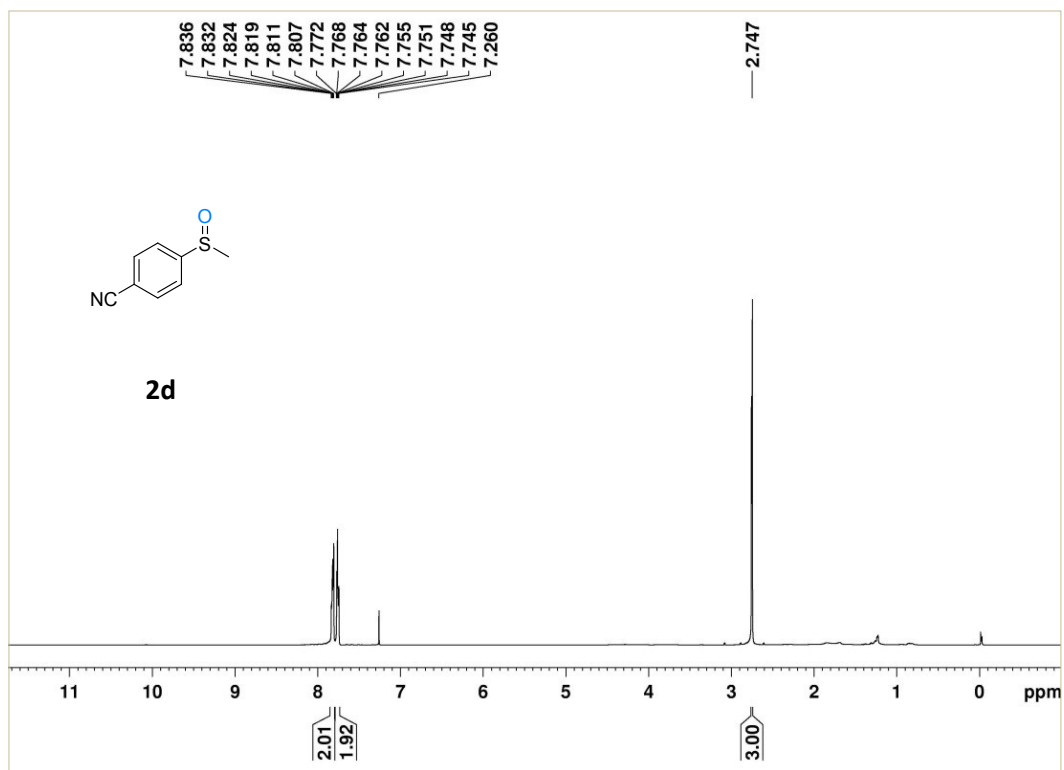
100 MHz ^{13}C -NMR spectrum of **2b** in CDCl_3



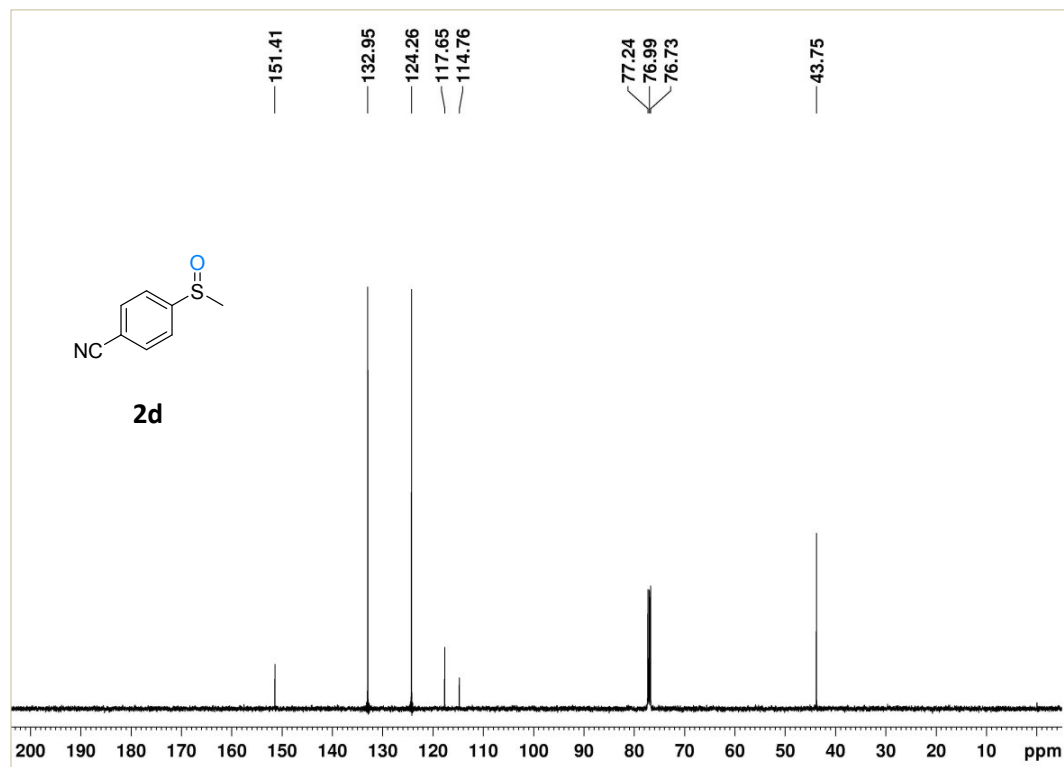
500 MHz ^1H NMR spectrum of **2c** in CDCl_3



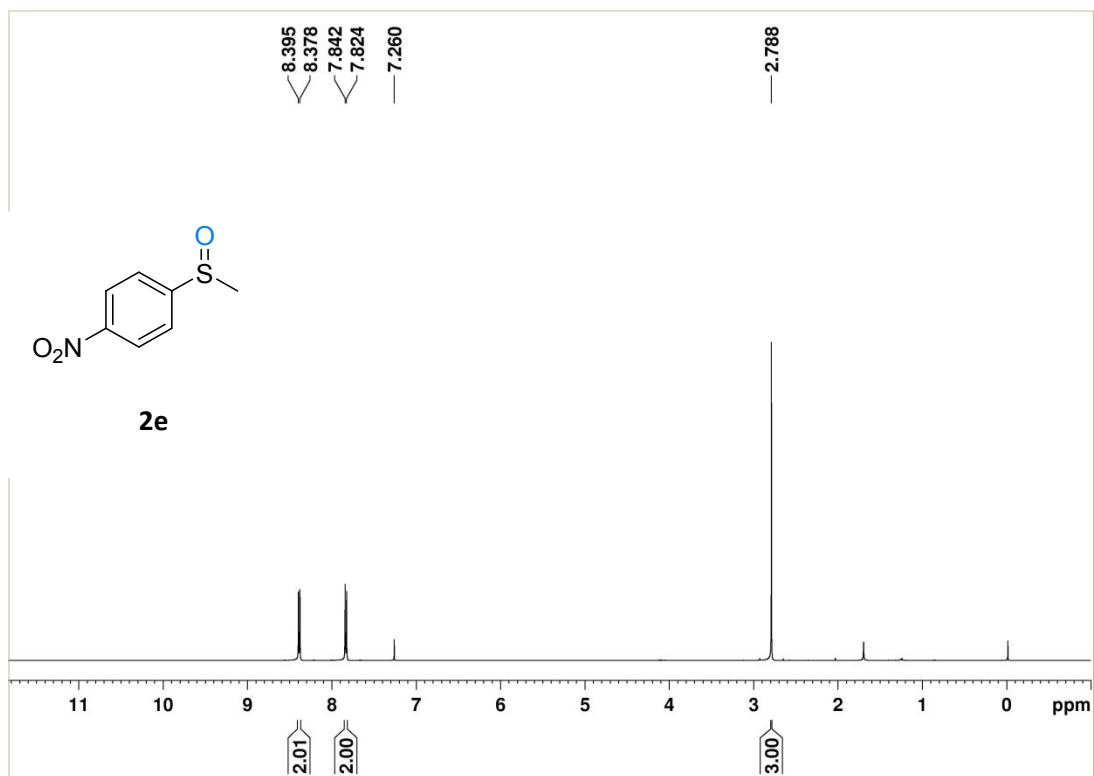
125 MHz ^{13}C -NMR spectrum of **2c** in CDCl_3



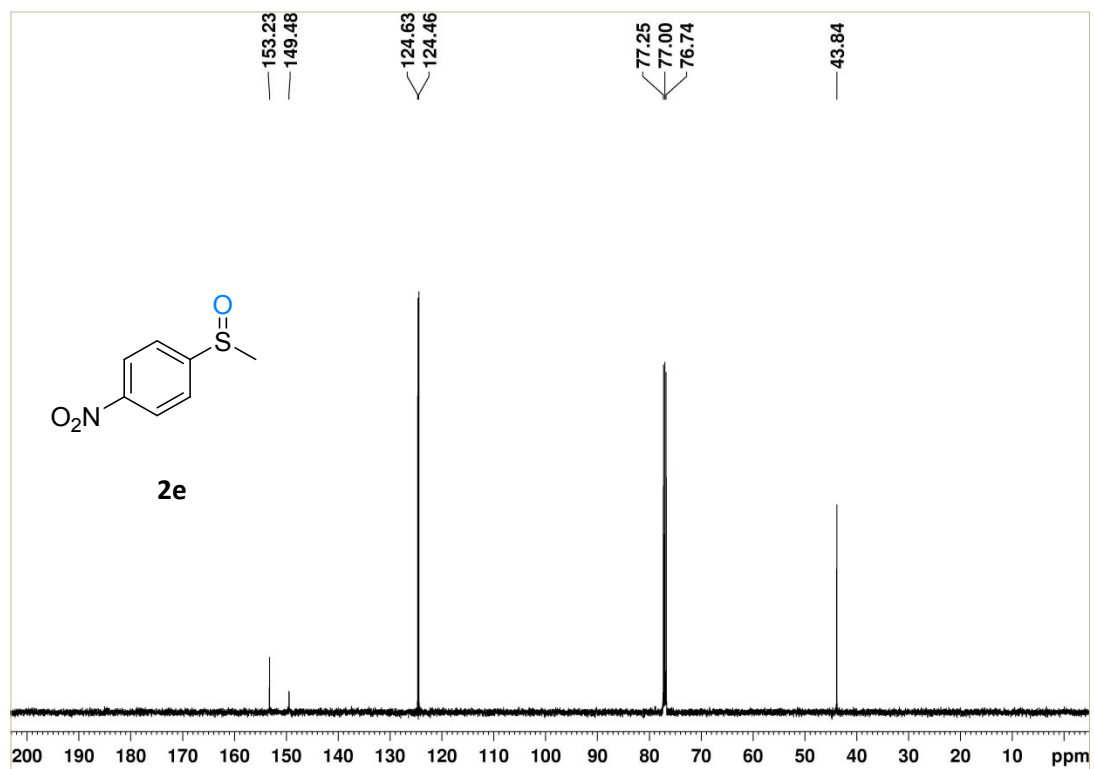
500 MHz ^1H NMR spectrum of **2d** in CDCl_3



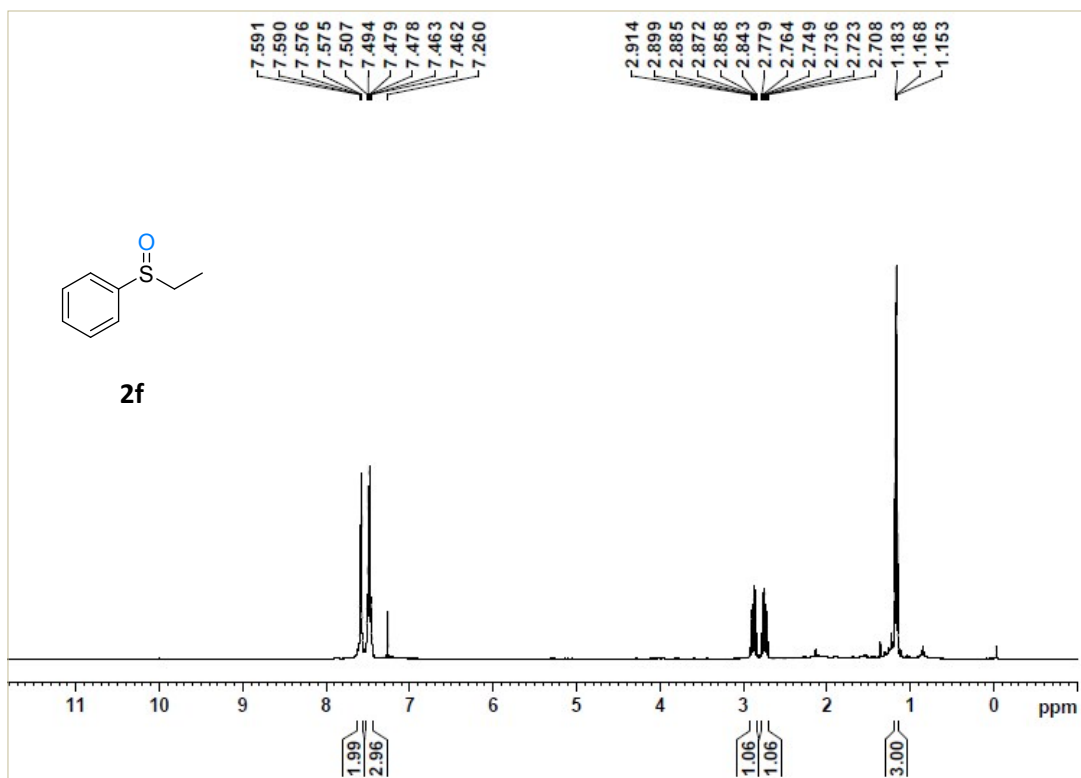
125 MHz ^{13}C -NMR spectrum of **2d** in CDCl_3



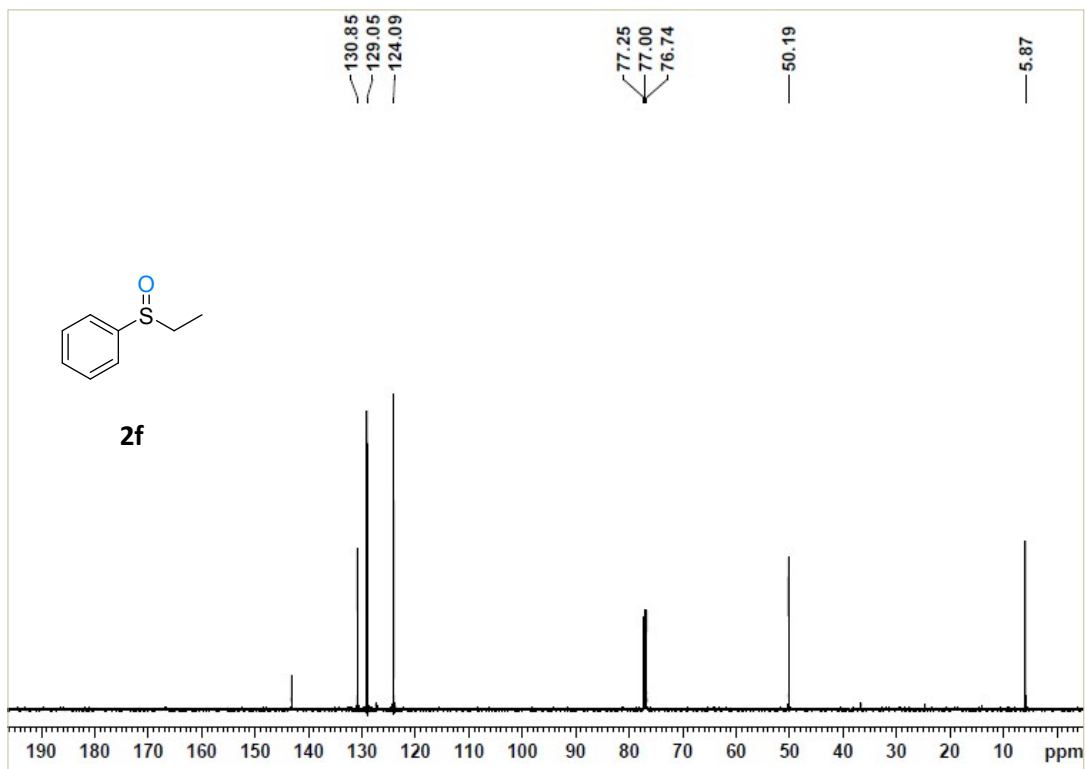
500 MHz ^1H NMR spectrum of **2e** in CDCl_3



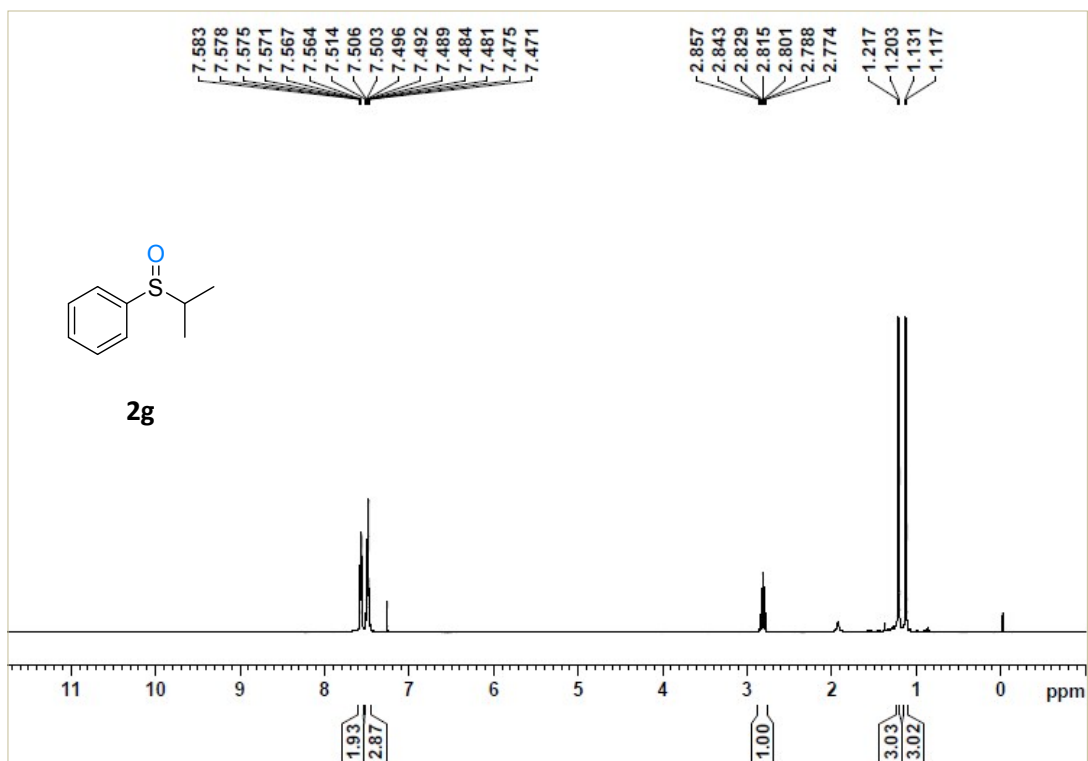
125 MHz ^{13}C -NMR spectrum of **2e** in CDCl_3



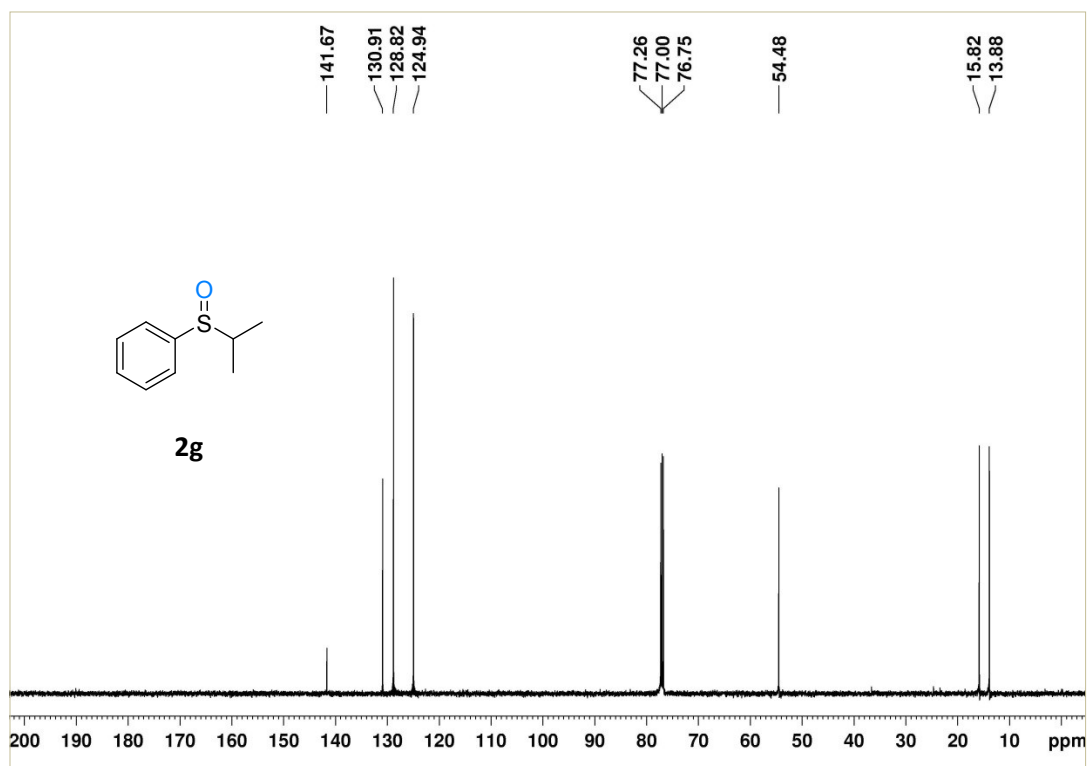
500 MHz ^1H NMR spectrum of **2f** in CDCl_3



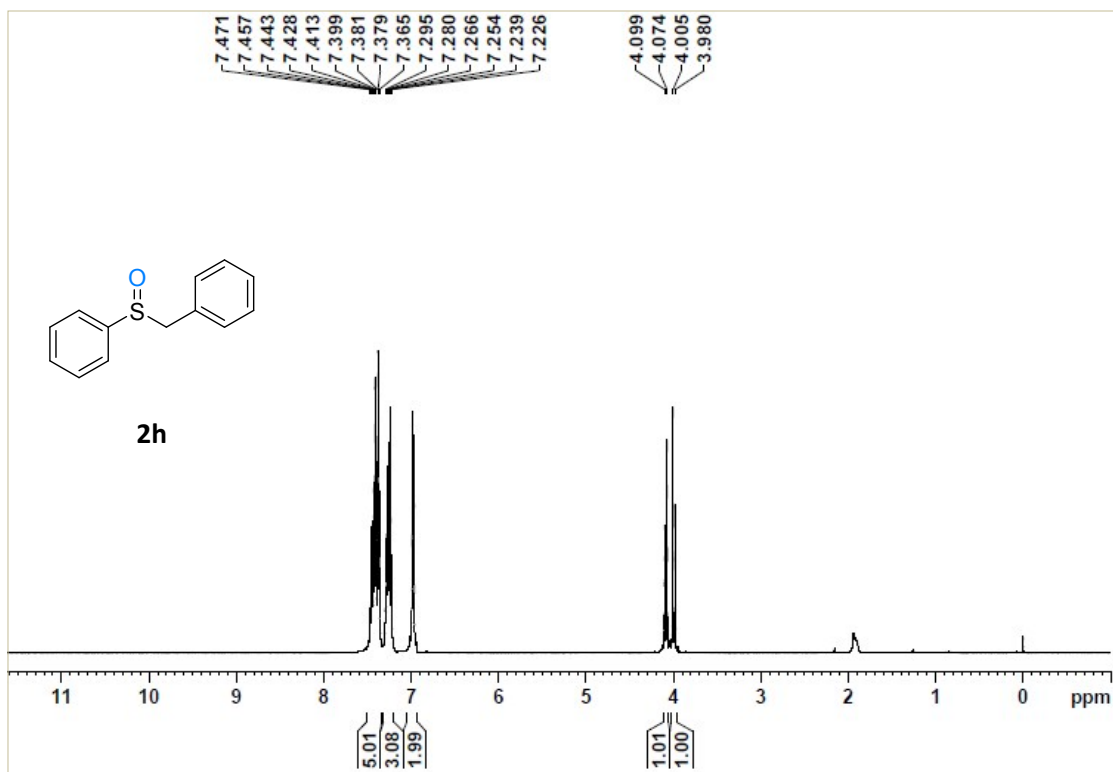
125 MHz ^{13}C -NMR spectrum of **2f** in CDCl_3



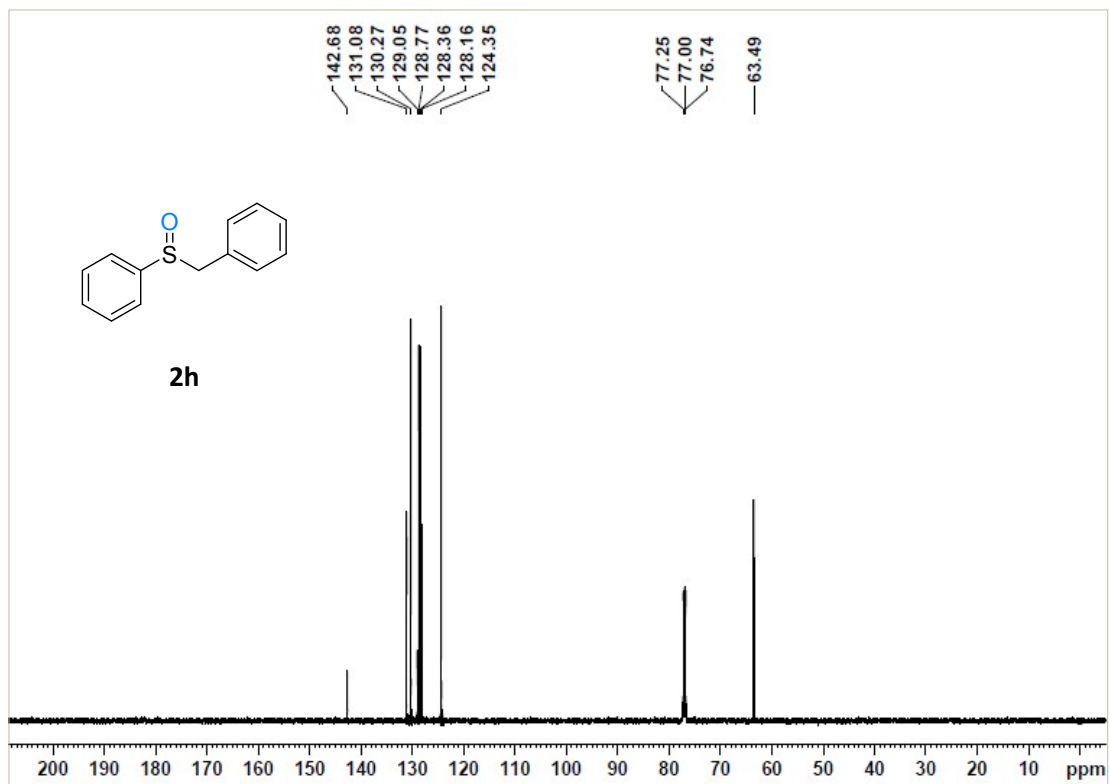
500 MHz ^1H NMR spectrum of **2g** in CDCl_3



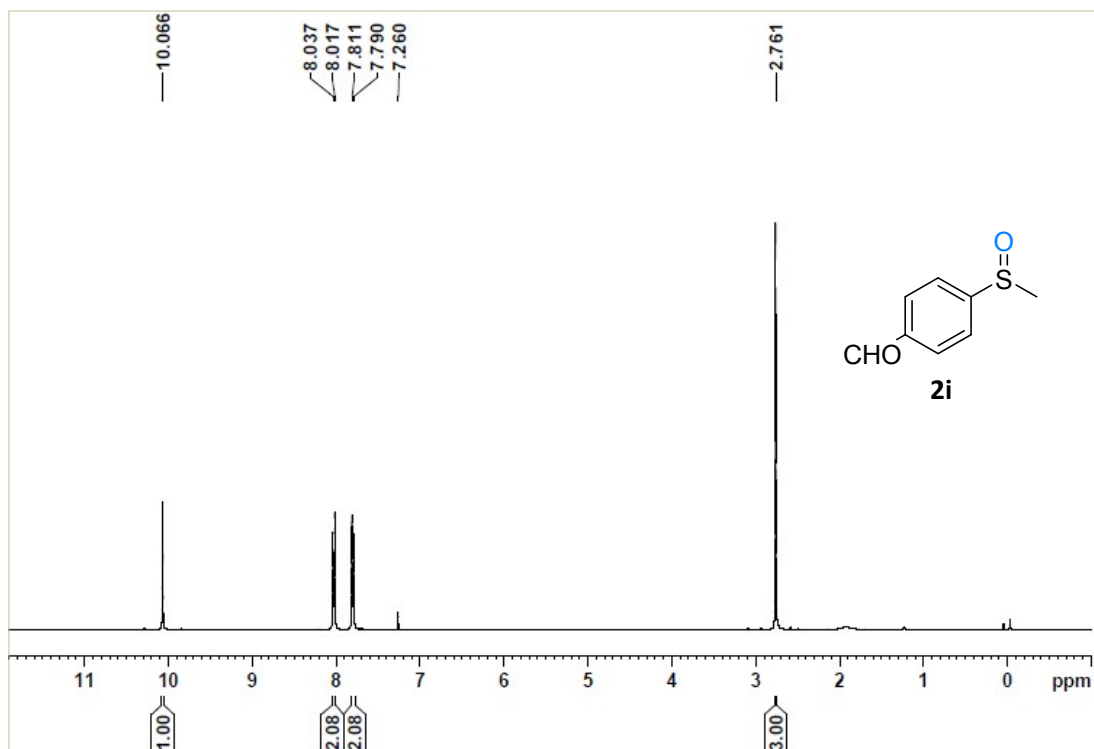
125 MHz ^{13}C -NMR spectrum of **2g** in CDCl_3



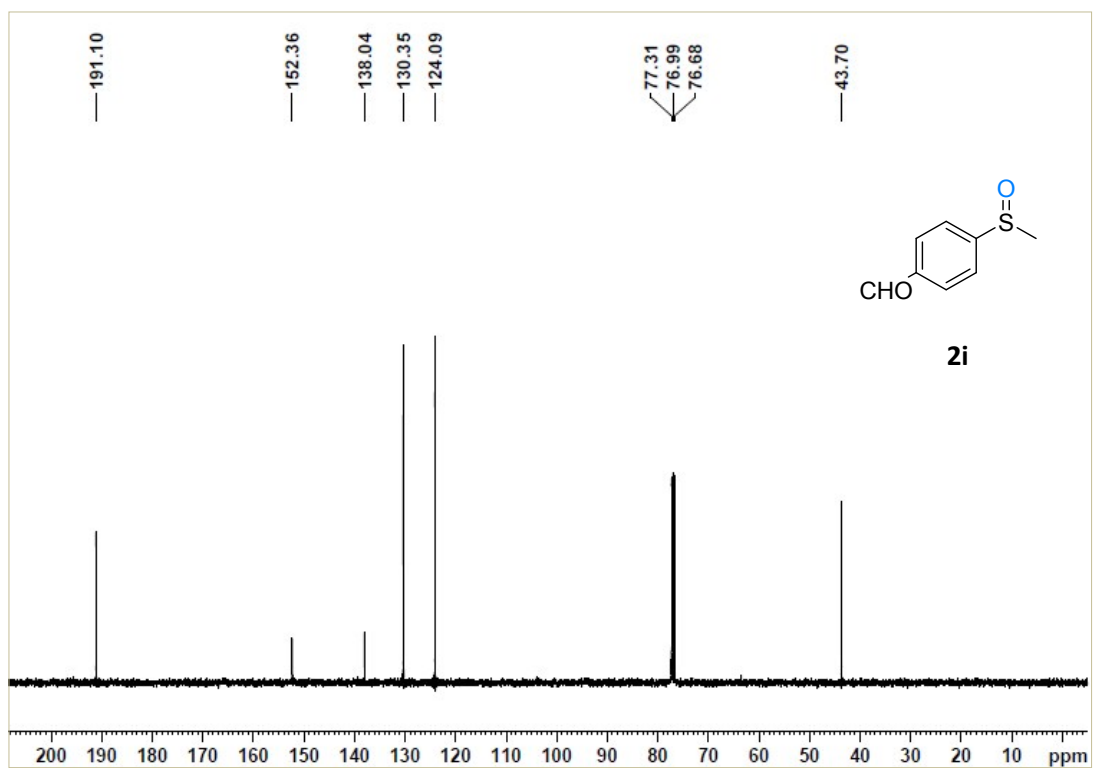
500 MHz ^1H NMR spectrum of **2h** in CDCl_3



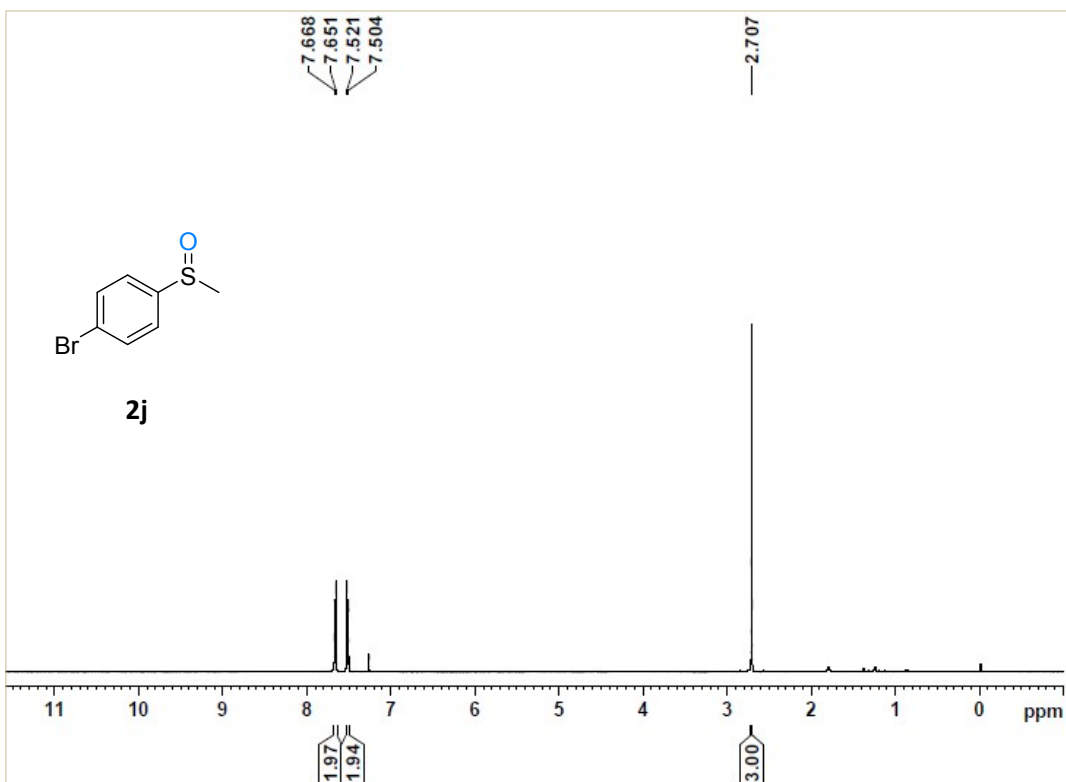
125 MHz ^{13}C -NMR spectrum of **2h** in CDCl_3



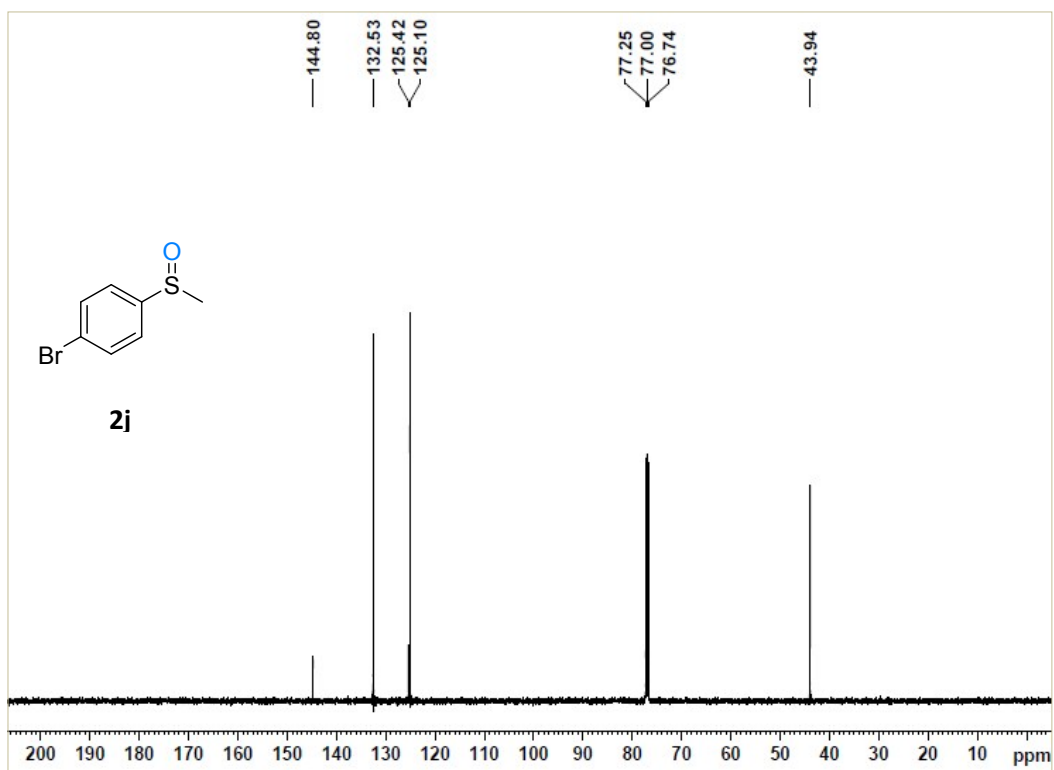
400 MHz ^1H NMR spectrum of **2i** in CDCl_3



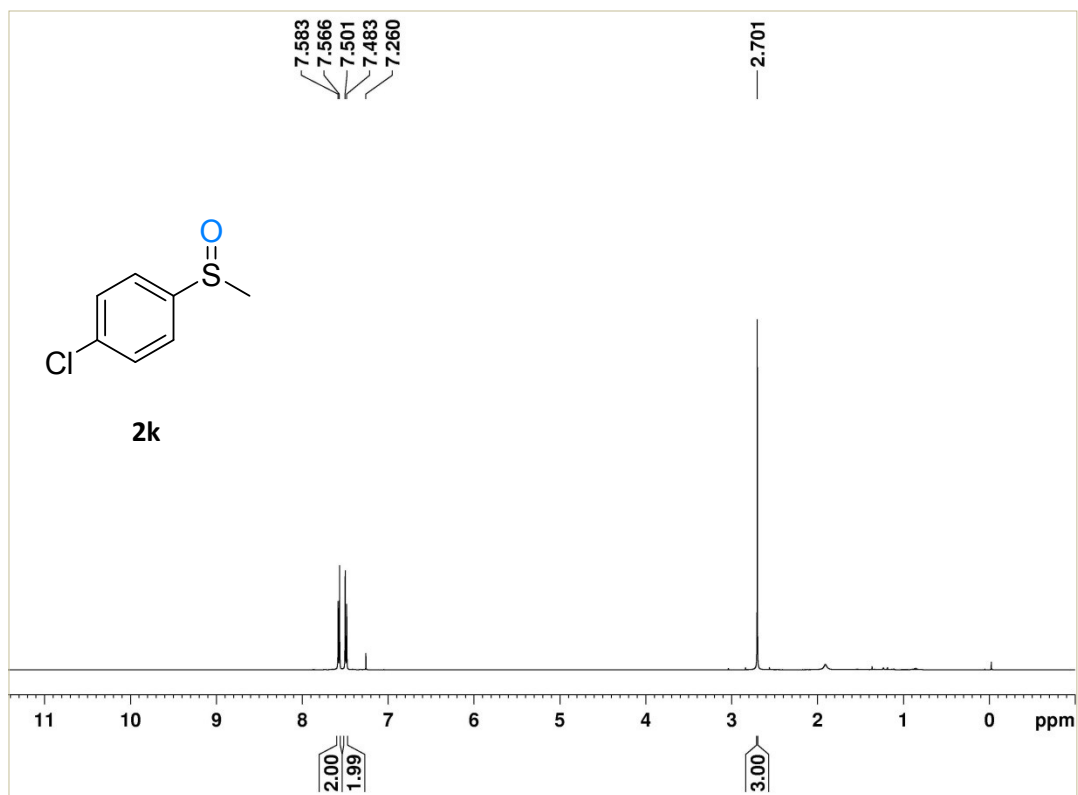
100 MHz ^{13}C -NMR spectrum of **2i** in CDCl_3



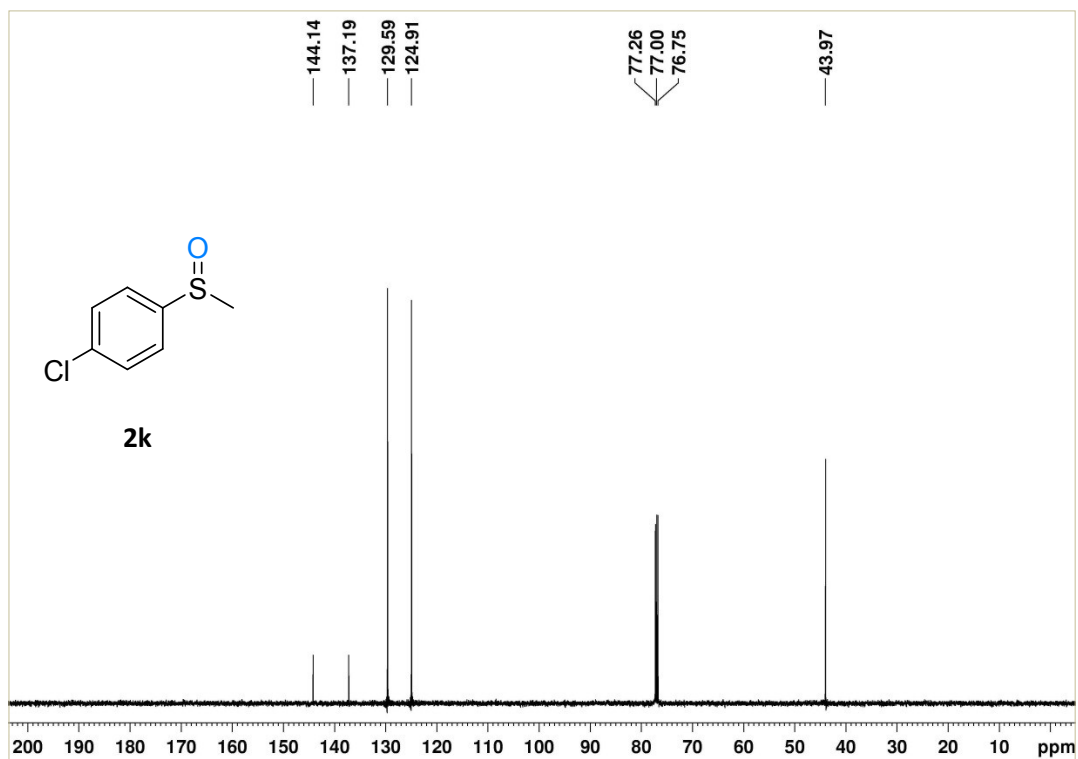
500 MHz ^1H NMR spectrum of **2j** in CDCl_3



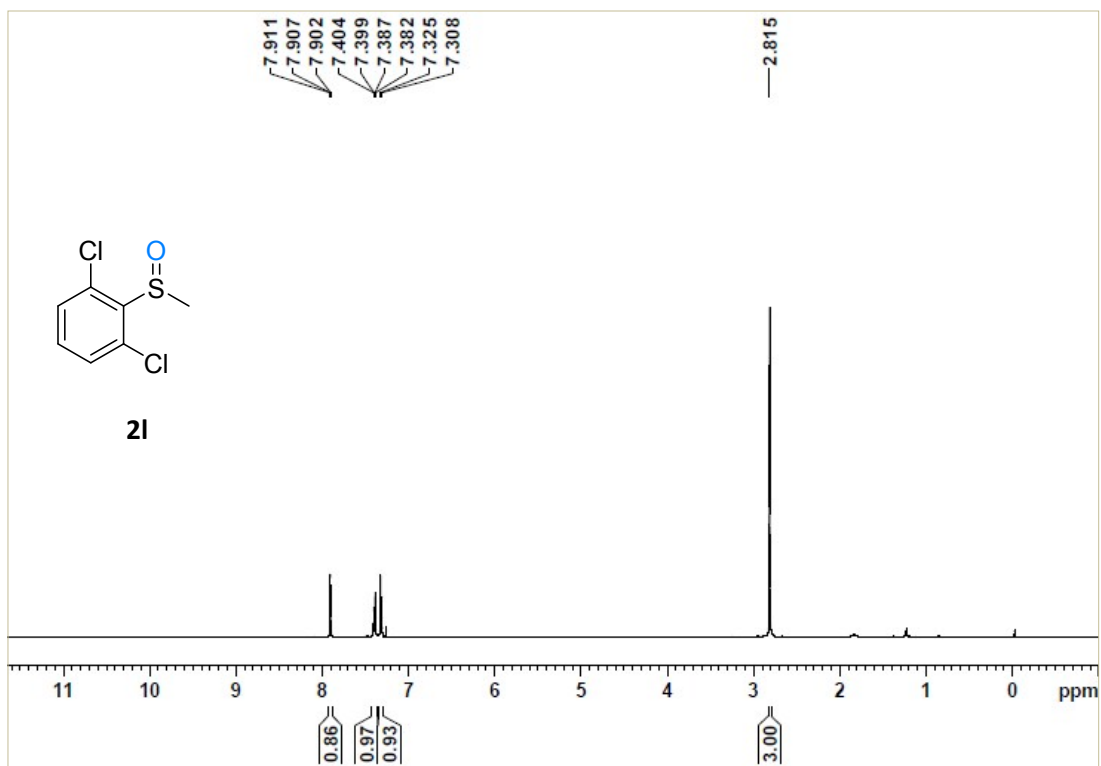
125 MHz ^{13}C -NMR spectrum of **2j** in CDCl_3



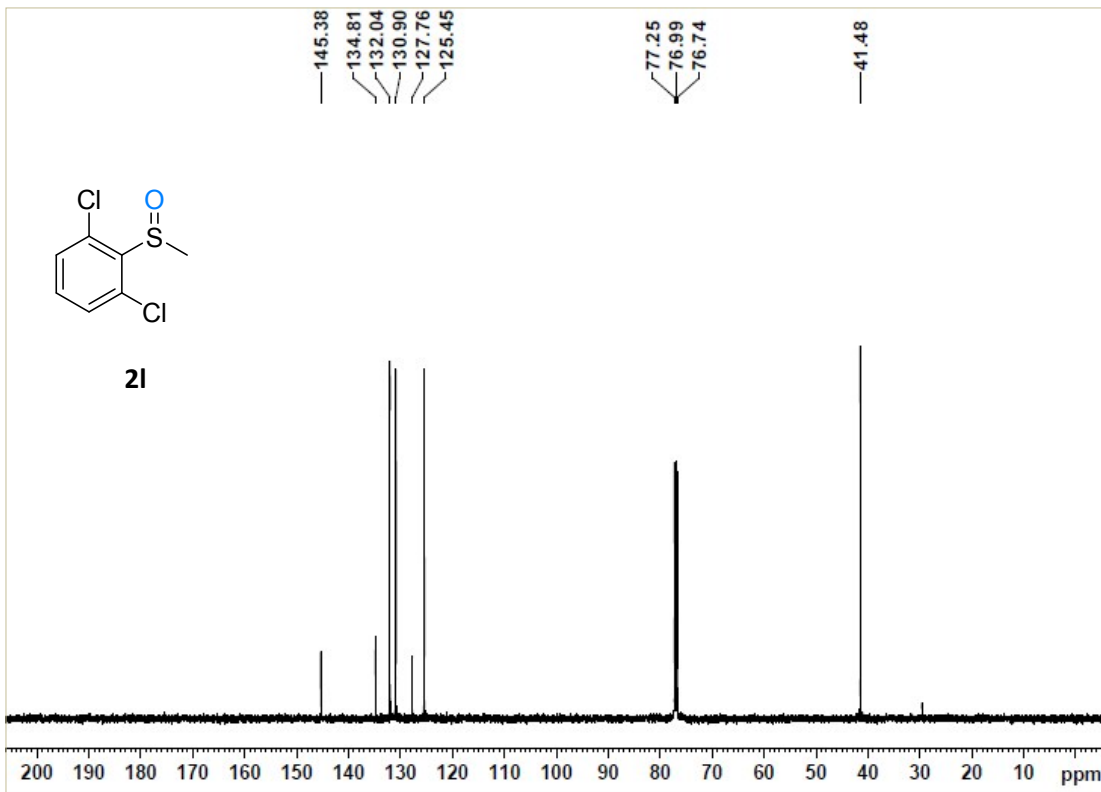
500 MHz ^1H NMR spectrum of **2k** in CDCl_3



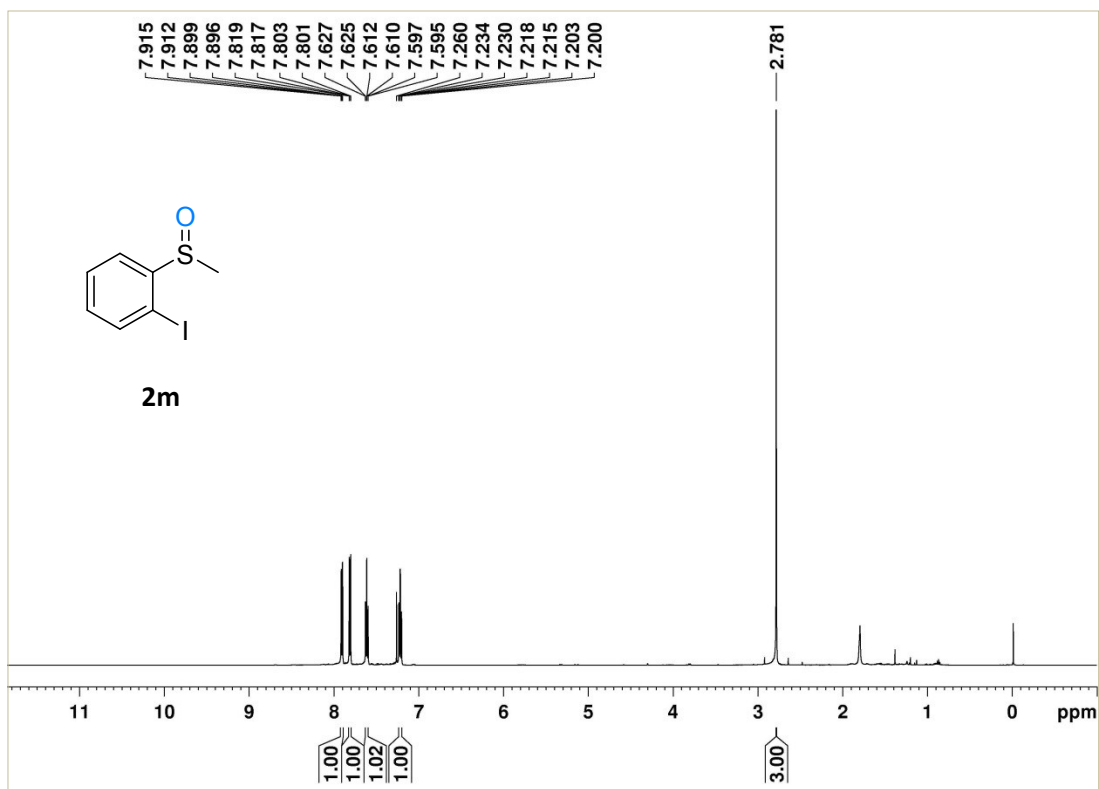
125 MHz ^{13}C -NMR spectrum of **2k** in CDCl_3



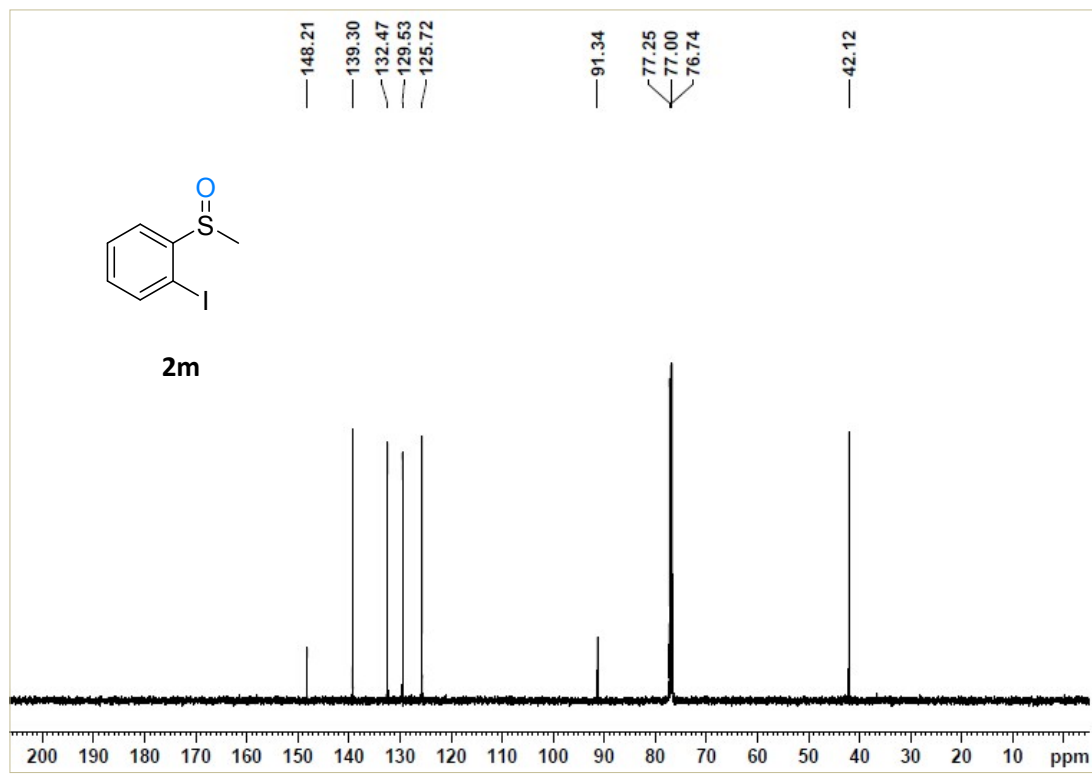
500 MHz ^1H NMR spectrum of **2I** in CDCl_3



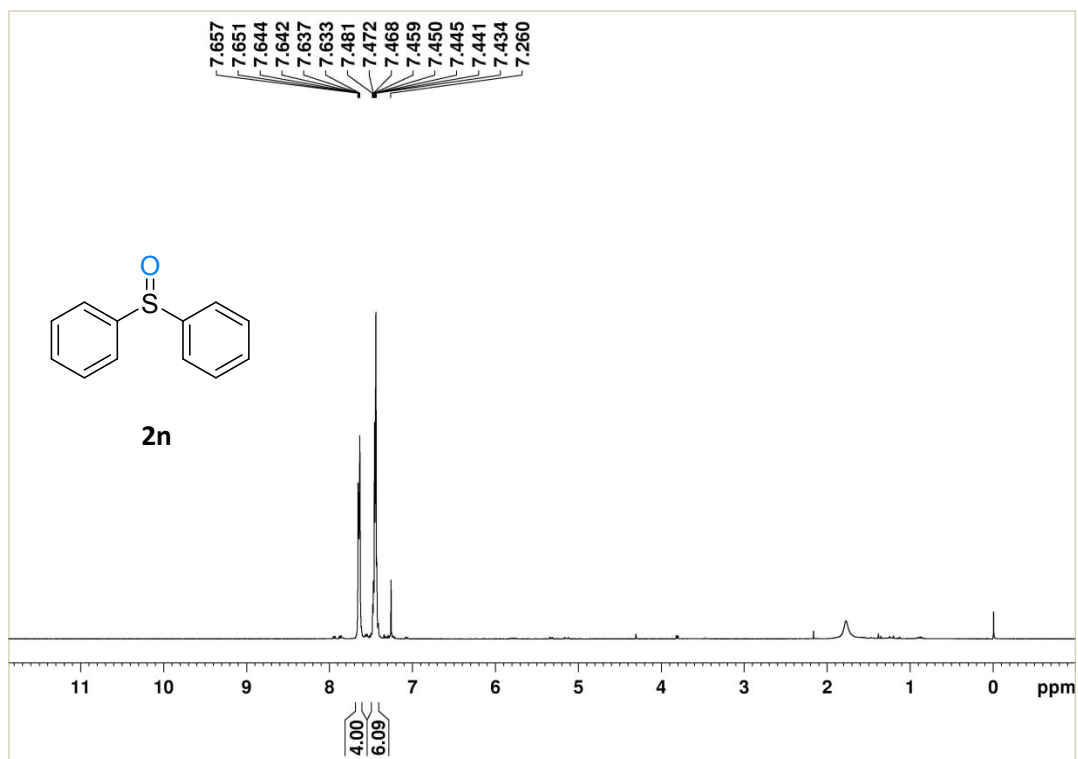
125 MHz ^{13}C -NMR spectrum of **2I** in CDCl_3



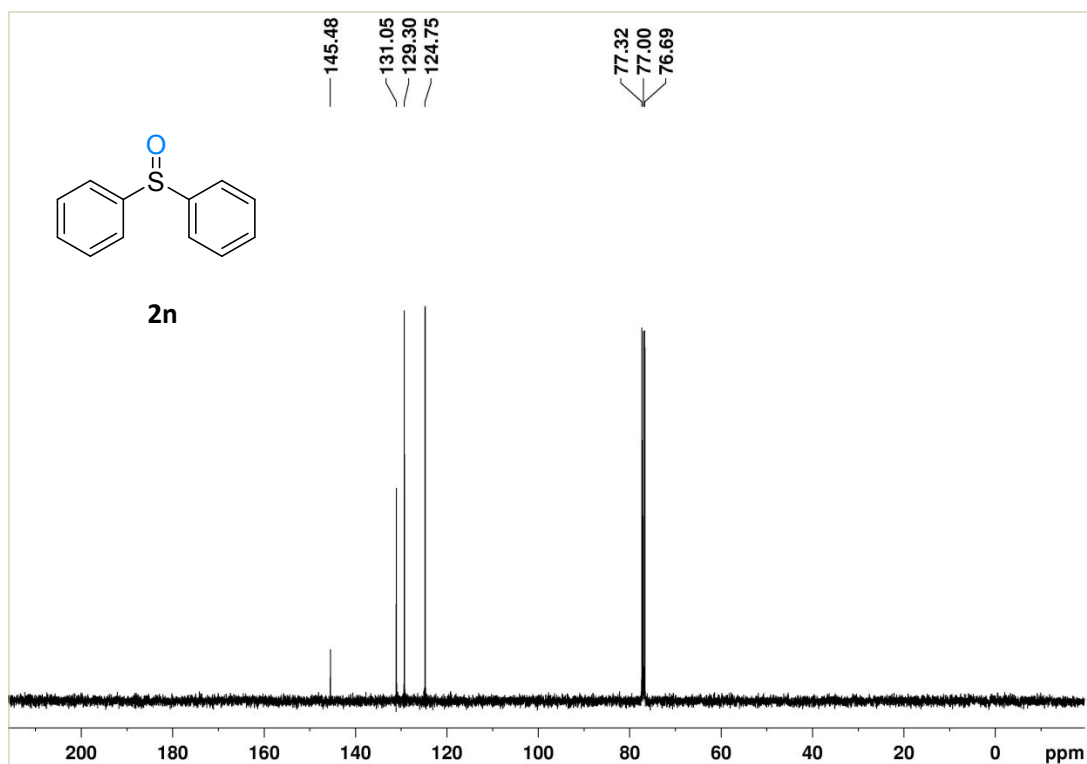
500 MHz ^1H NMR spectrum of **2m** in CDCl_3



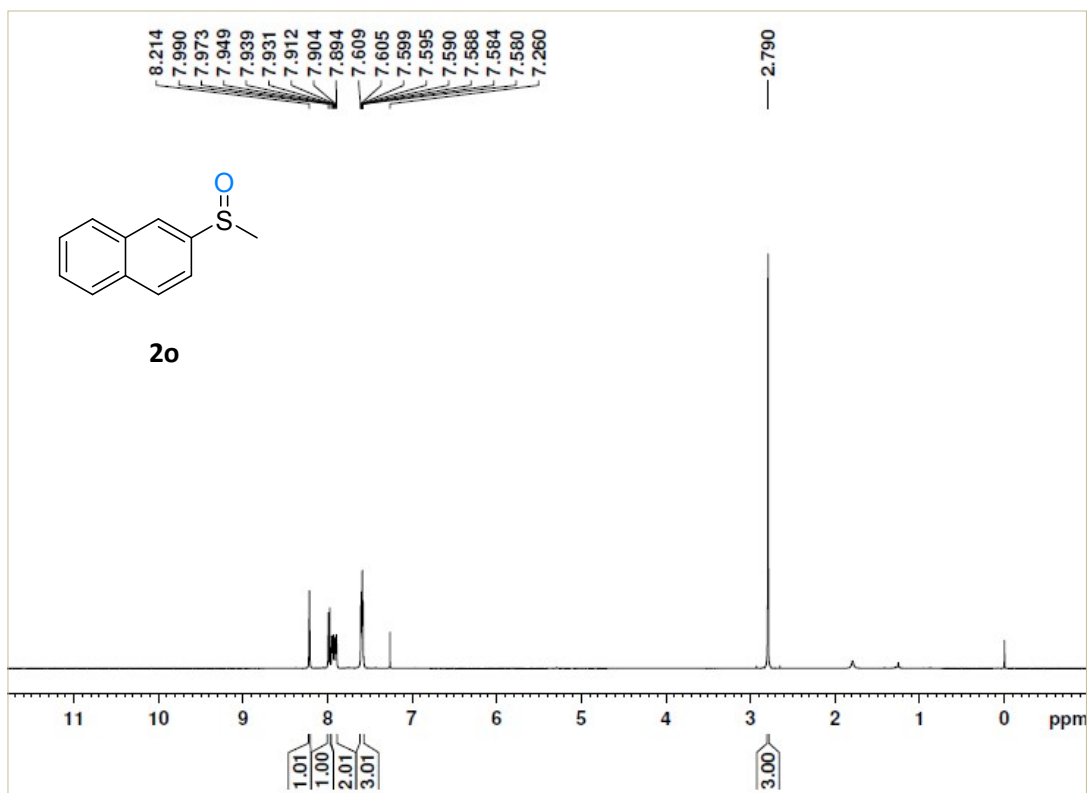
125 MHz ^{13}C -NMR spectrum of **2m** in CDCl_3



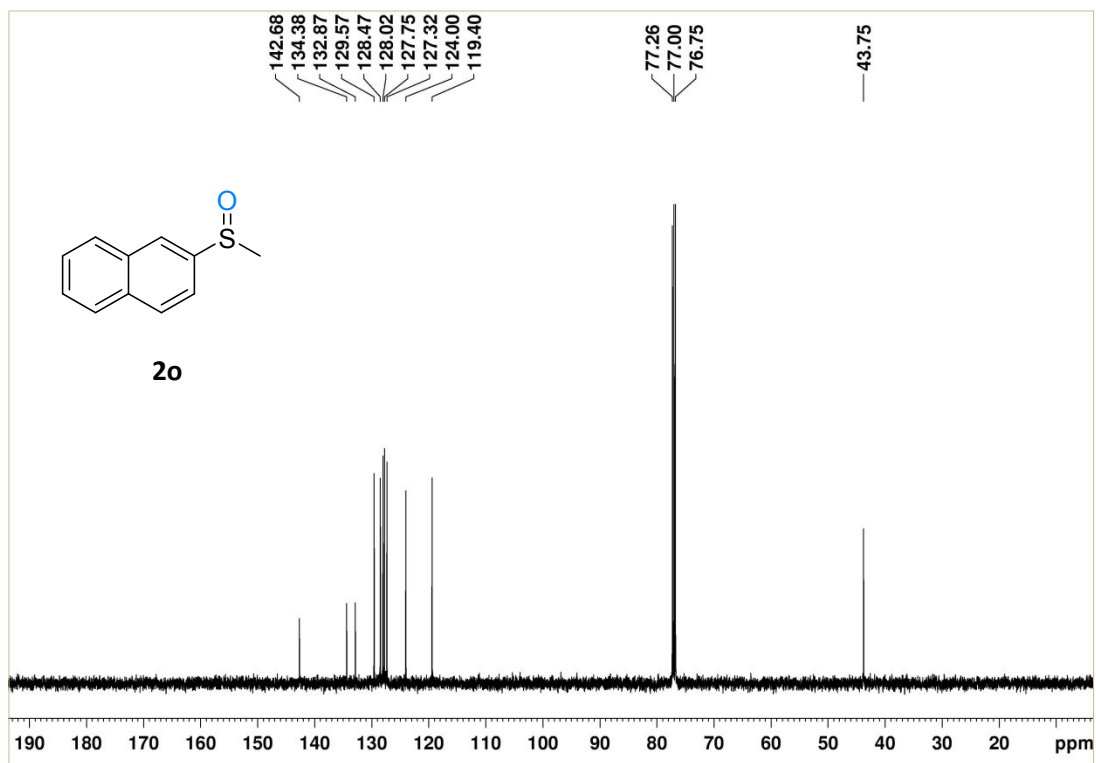
400 MHz ^1H NMR spectrum of **2n** in CDCl_3



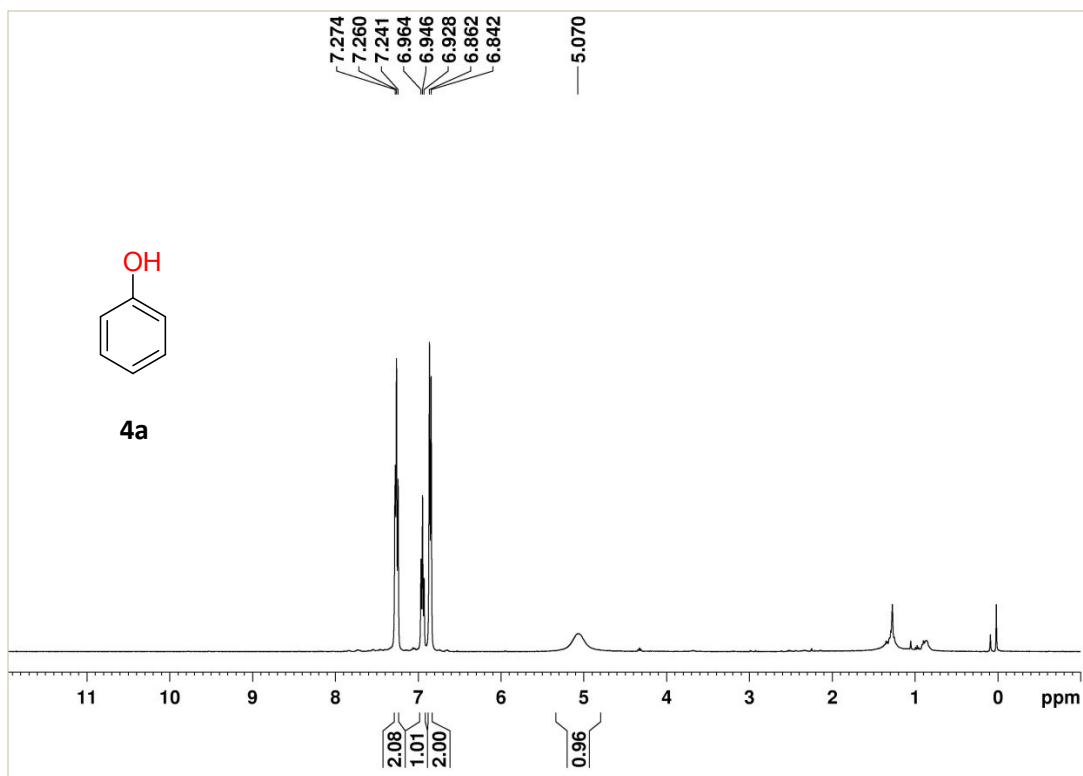
100 MHz ^{13}C -NMR spectrum of **2n** in CDCl_3



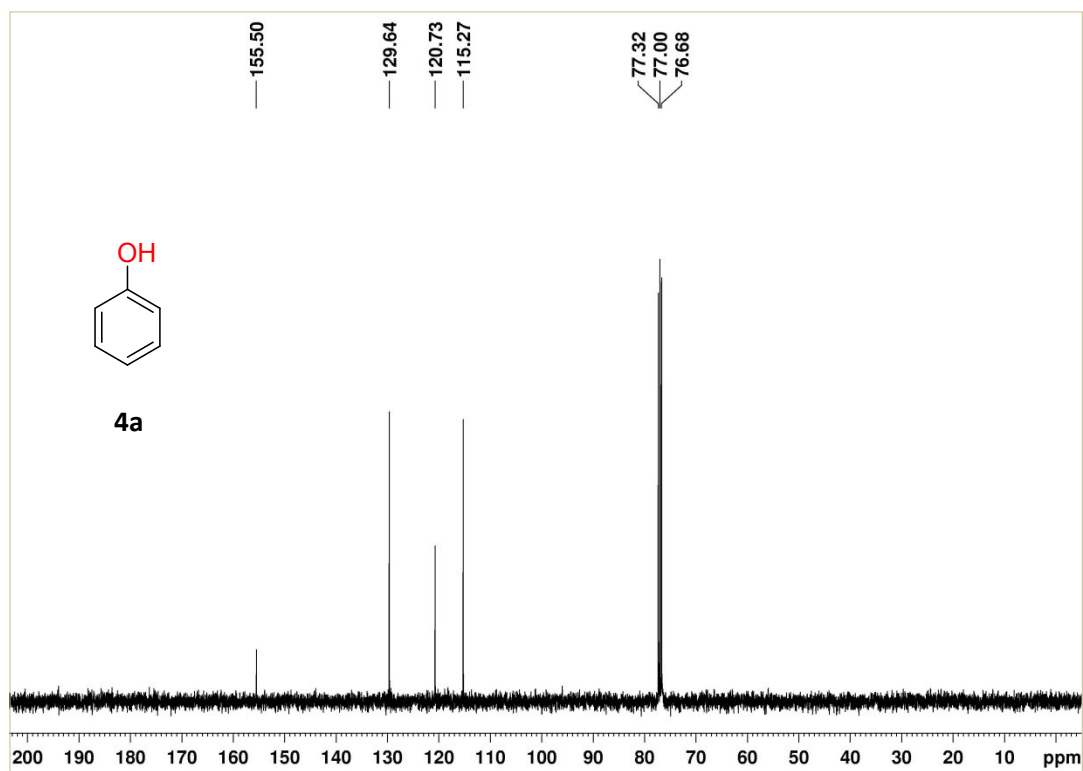
500 MHz ^1H NMR spectrum of **2o** in CDCl_3



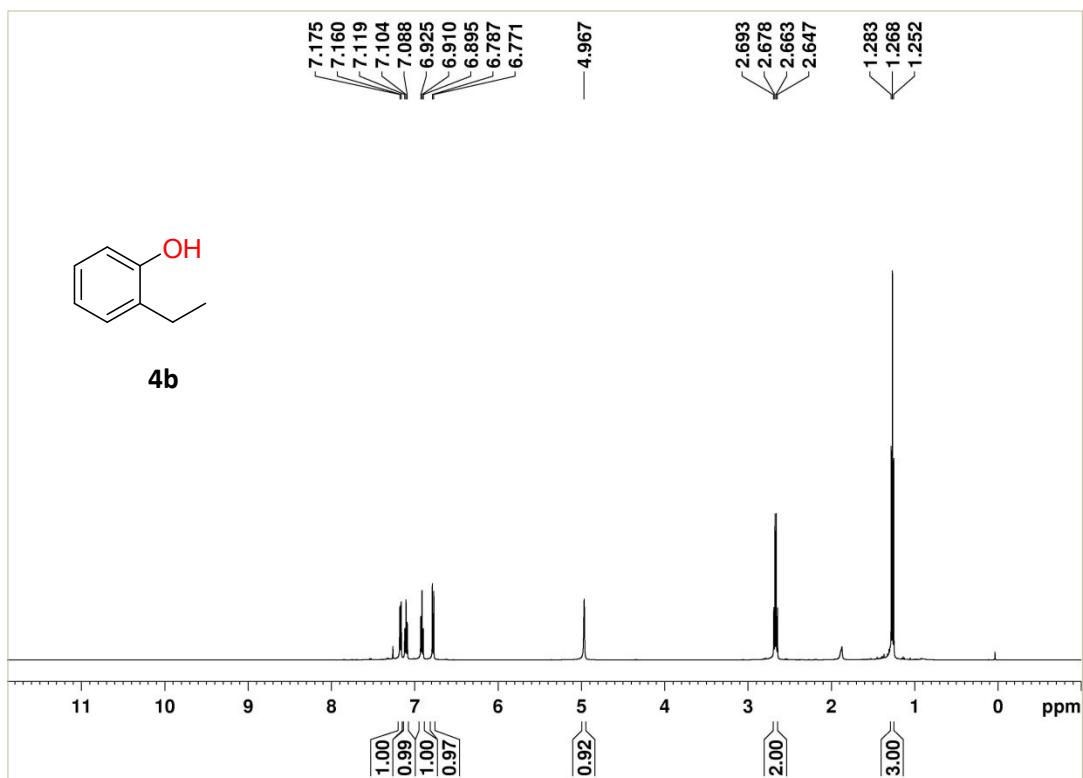
125 MHz ^{13}C -NMR spectrum of **2o** in CDCl_3



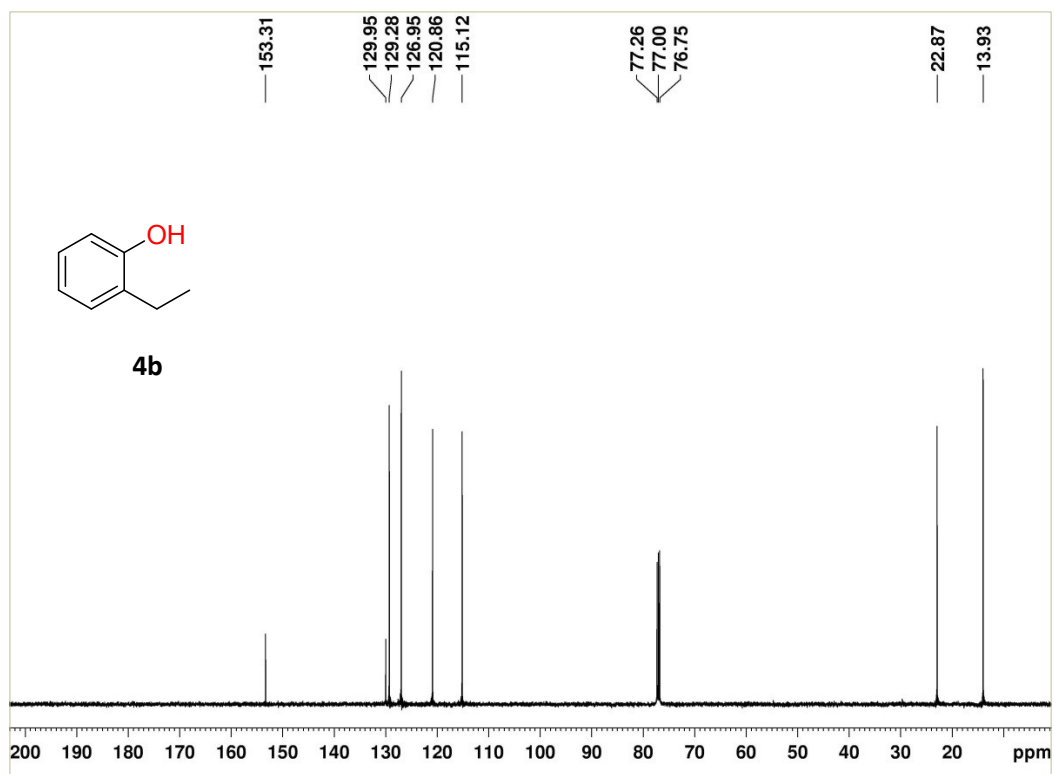
400 MHz ^1H NMR spectrum of **4a** in CDCl_3



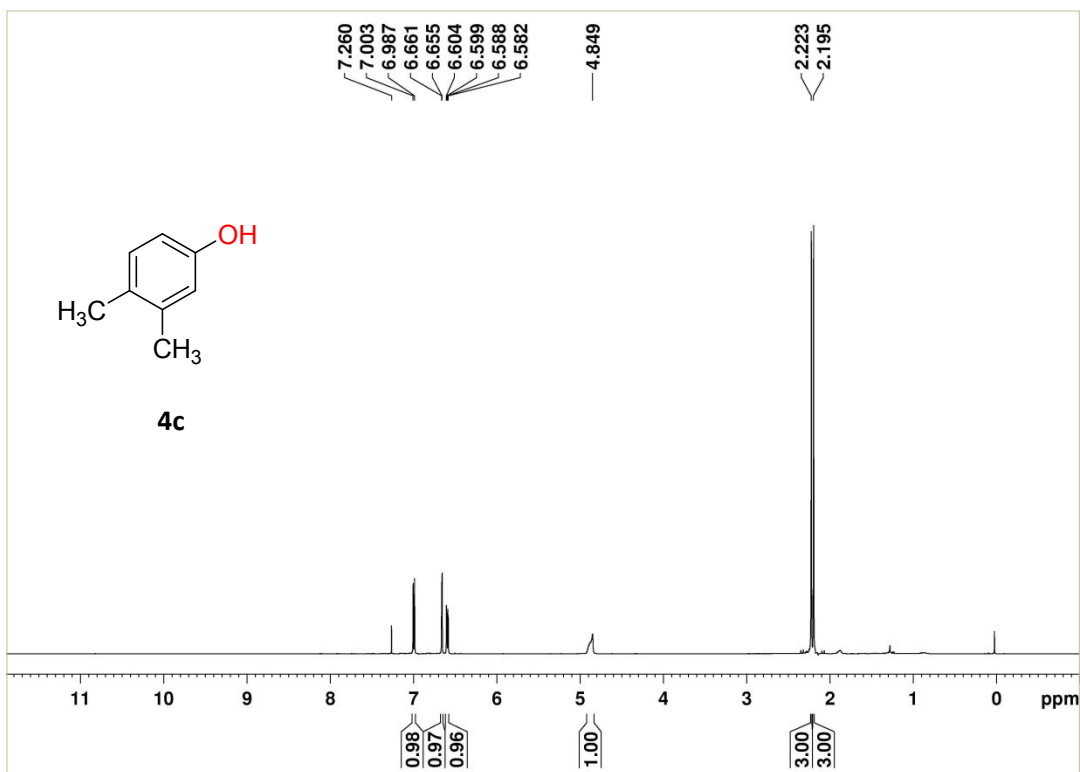
100 MHz ^{13}C -NMR spectrum of **4a** in CDCl_3



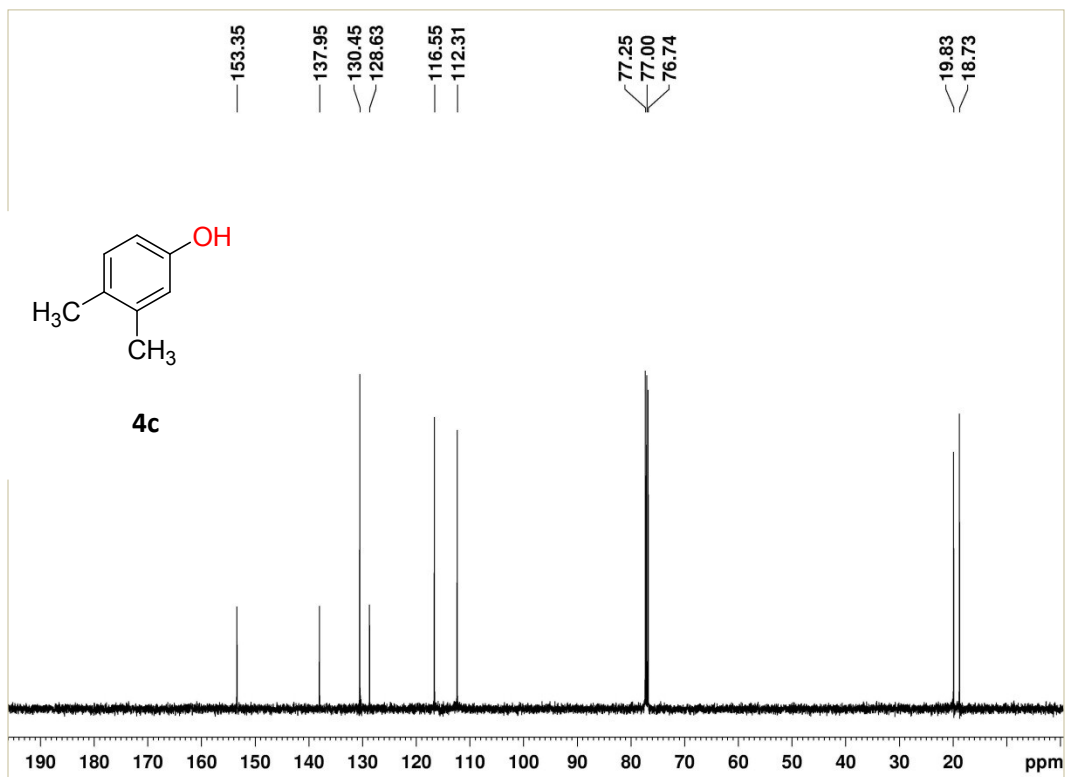
500 MHz ^1H NMR spectrum of **4b** in CDCl_3



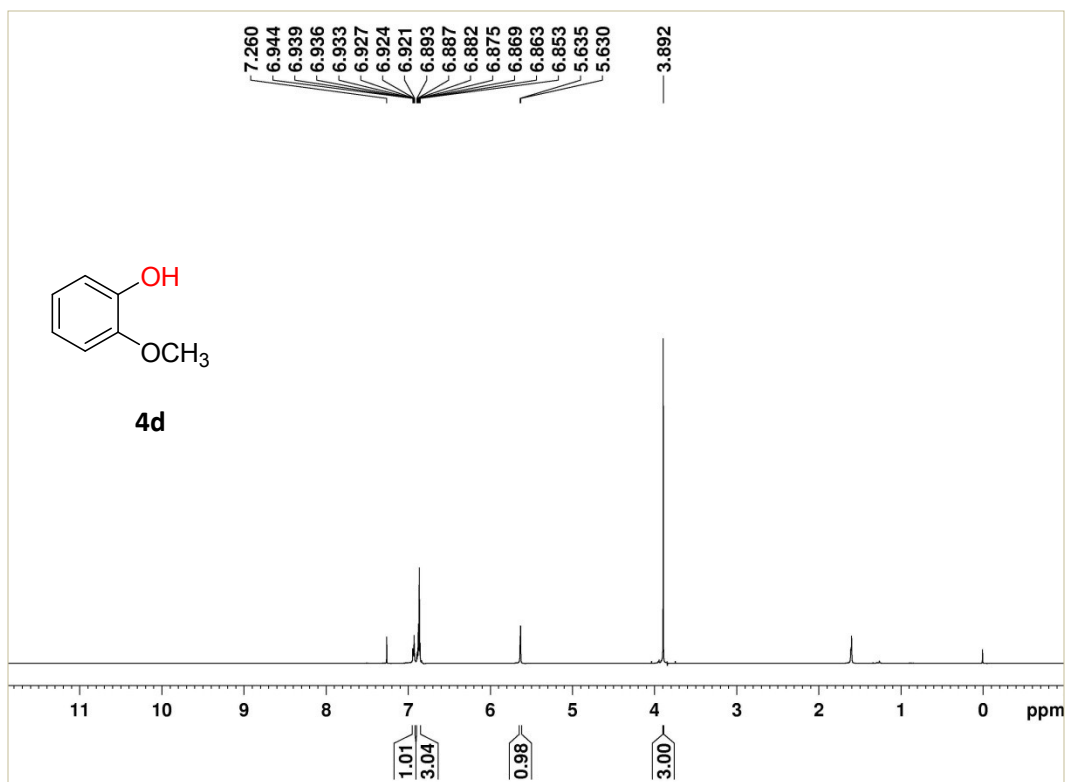
125 MHz ^{13}C -NMR spectrum of **4b** in CDCl_3



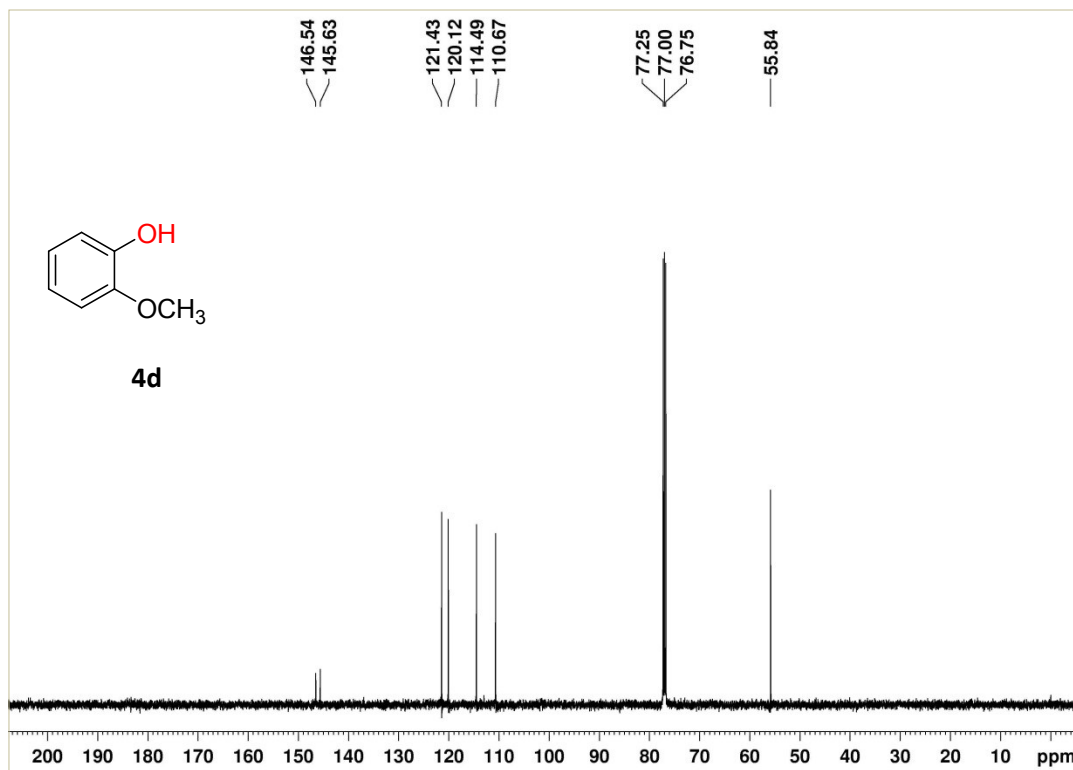
500 MHz ^1H NMR spectrum of **4c** in CDCl_3



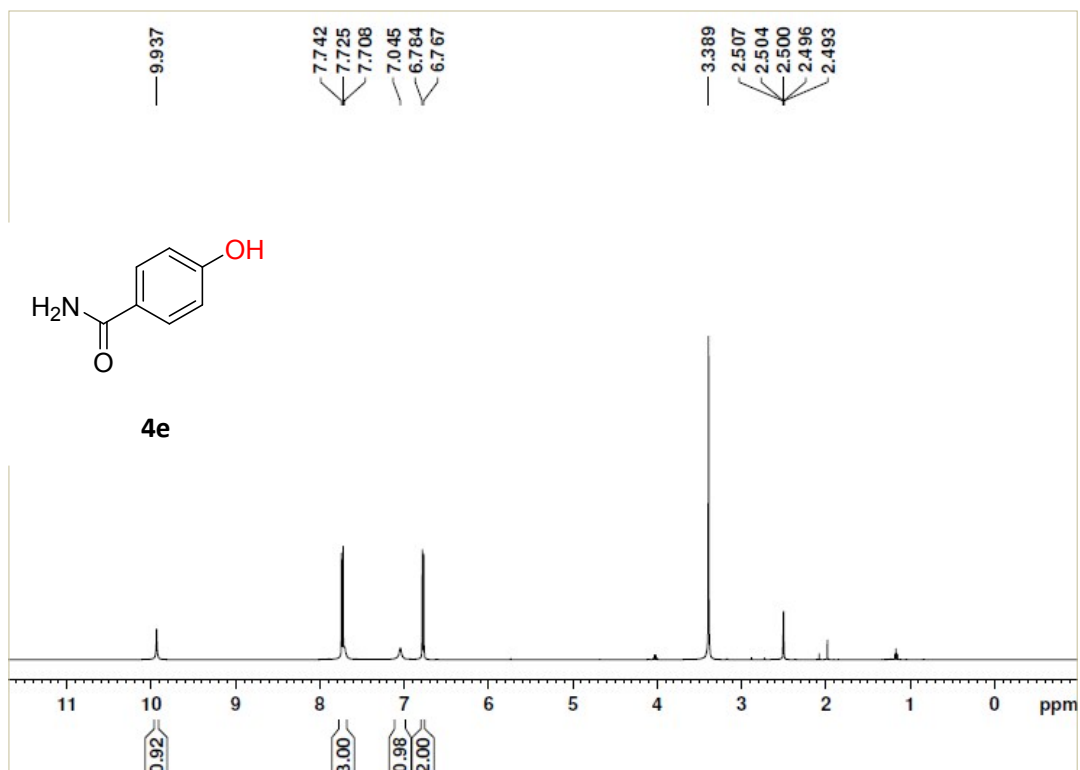
125 MHz ^{13}C -NMR spectrum of **4c** in CDCl_3



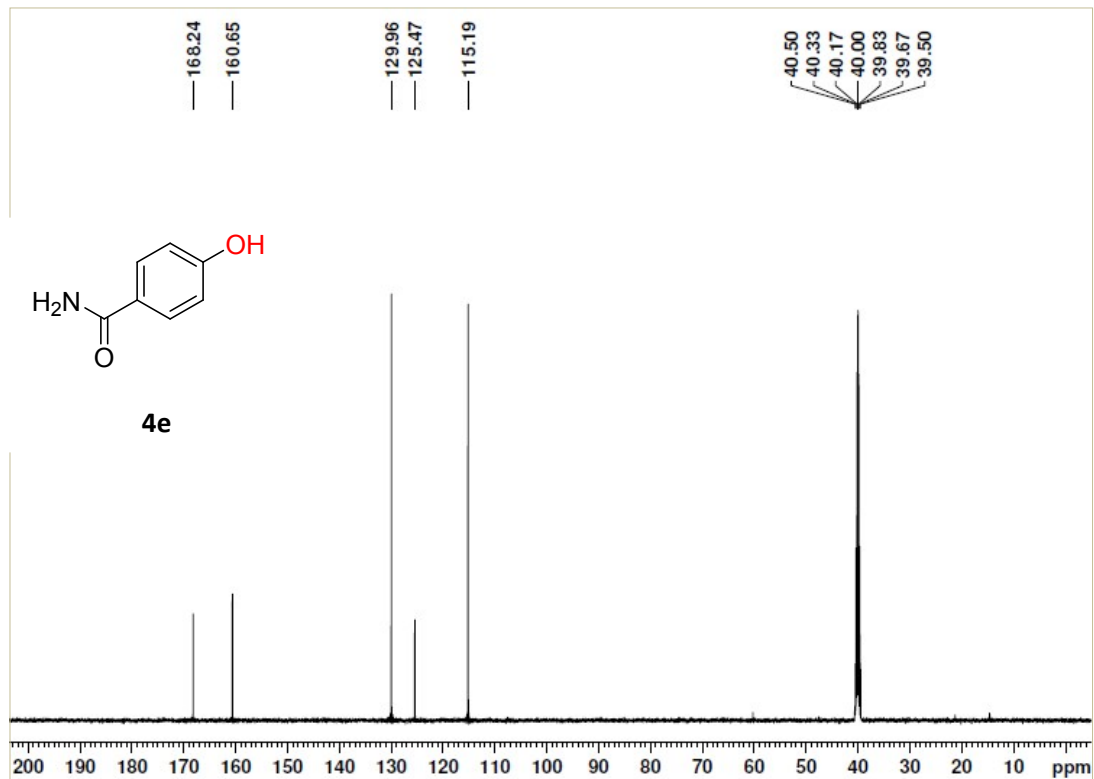
500 MHz ^1H NMR spectrum of **4d** in CDCl_3



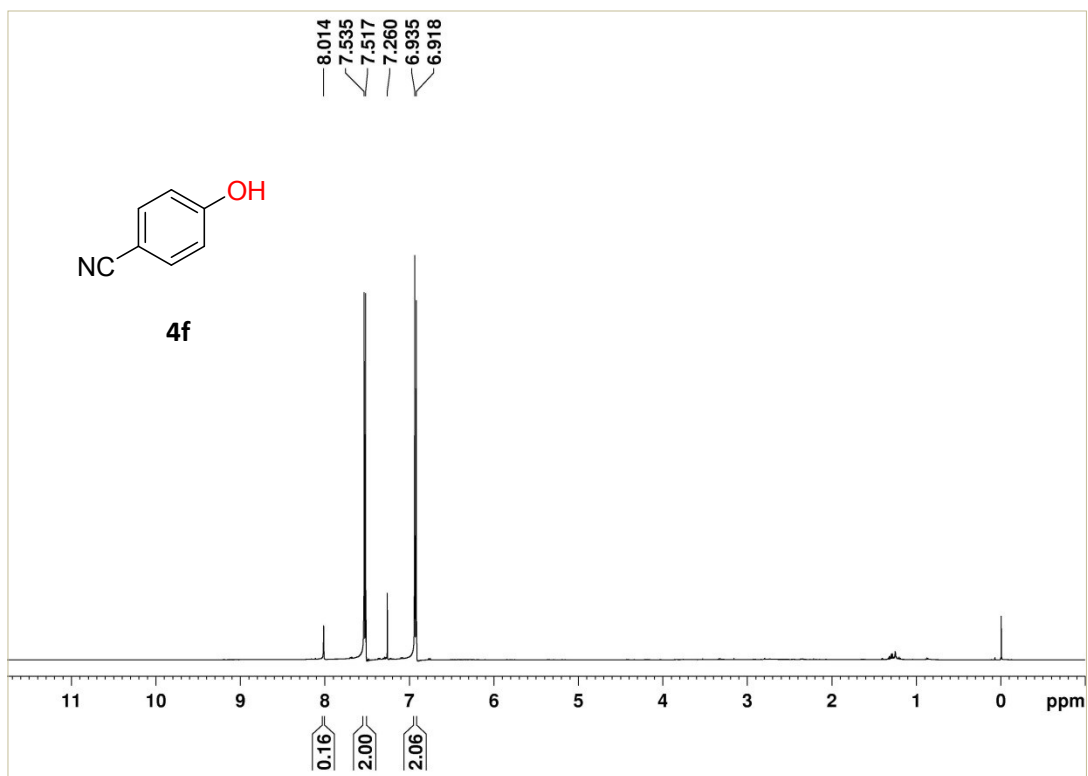
125 MHz ^{13}C -NMR spectrum of **4d** in CDCl_3



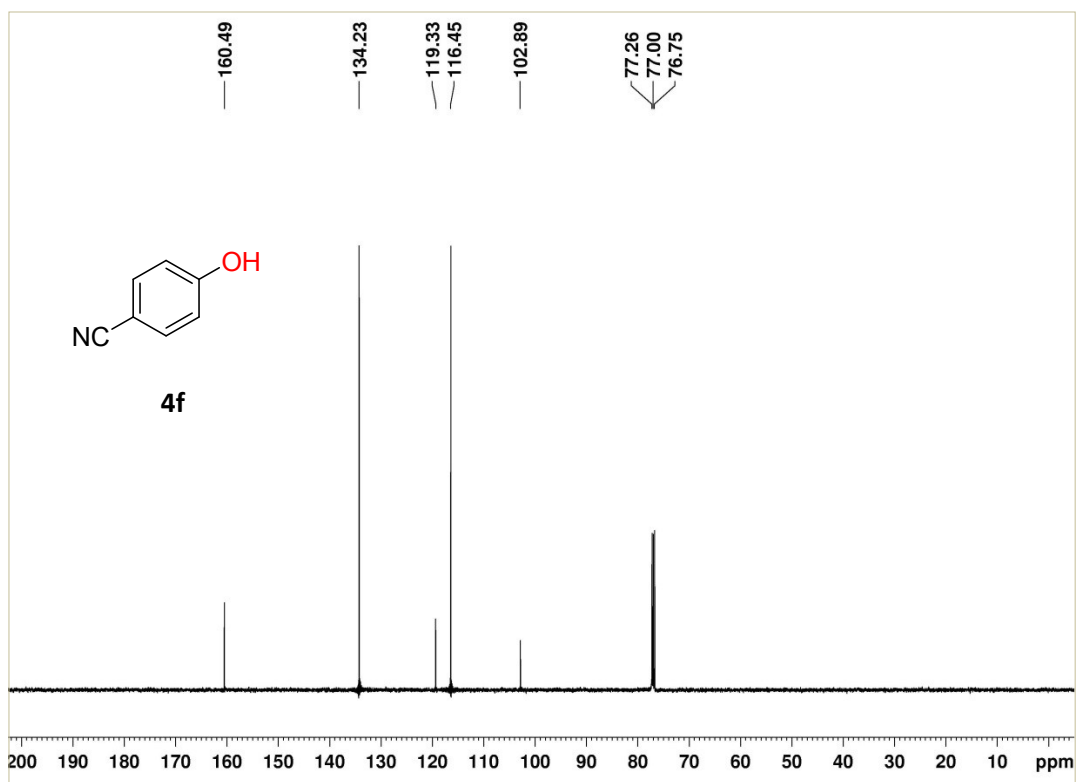
500 MHz ^1H NMR spectrum of **4e** in DMSO - d_6



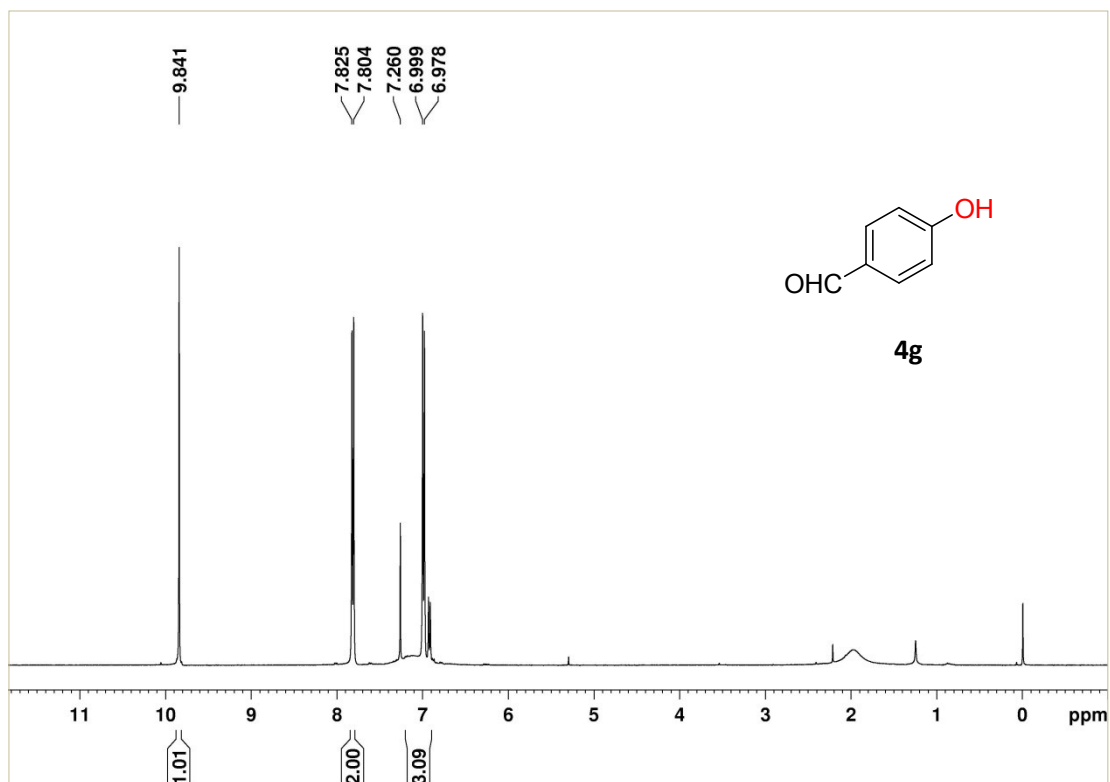
125 MHz ^{13}C -NMR spectrum of **4e** in DMSO - d_6



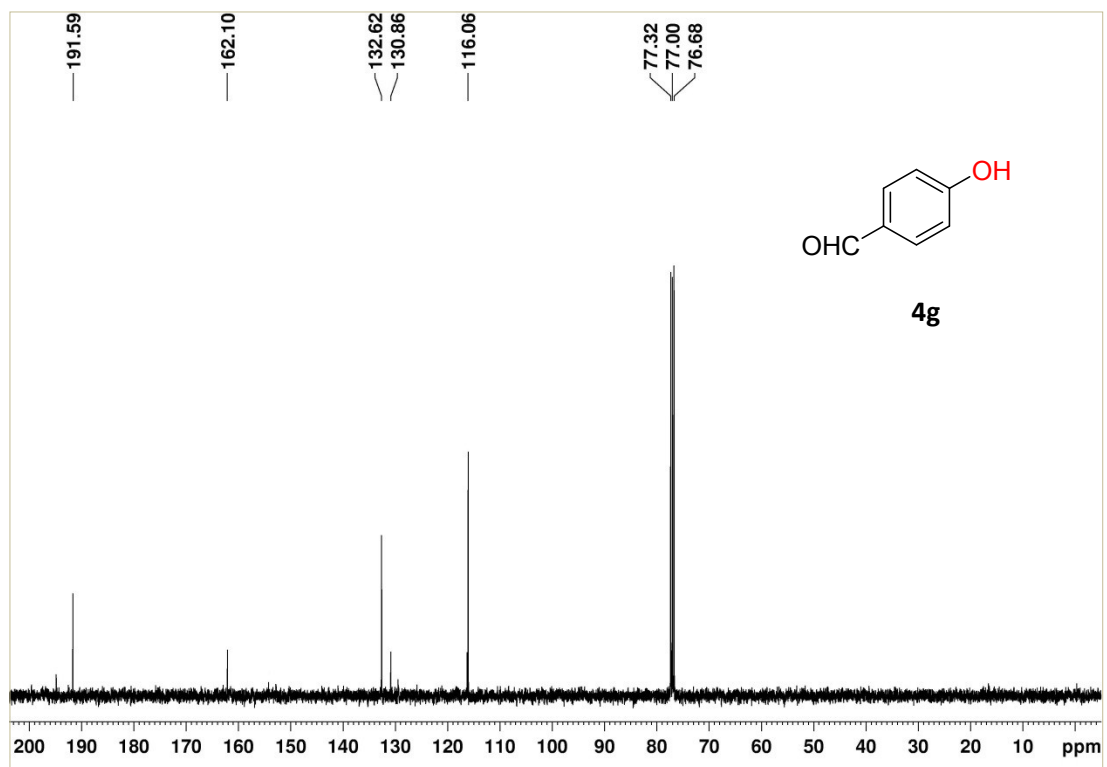
500 MHz ^1H NMR spectrum of **4f** in CDCl_3



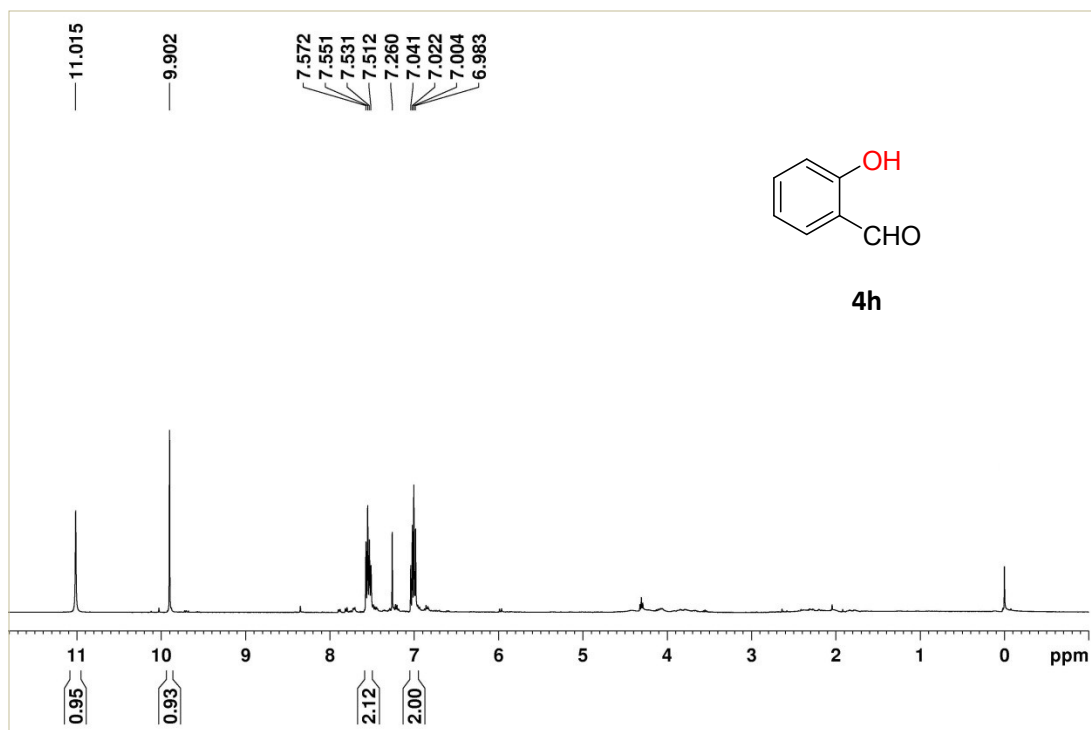
125 MHz ^{13}C -NMR spectrum of **4f** in CDCl_3



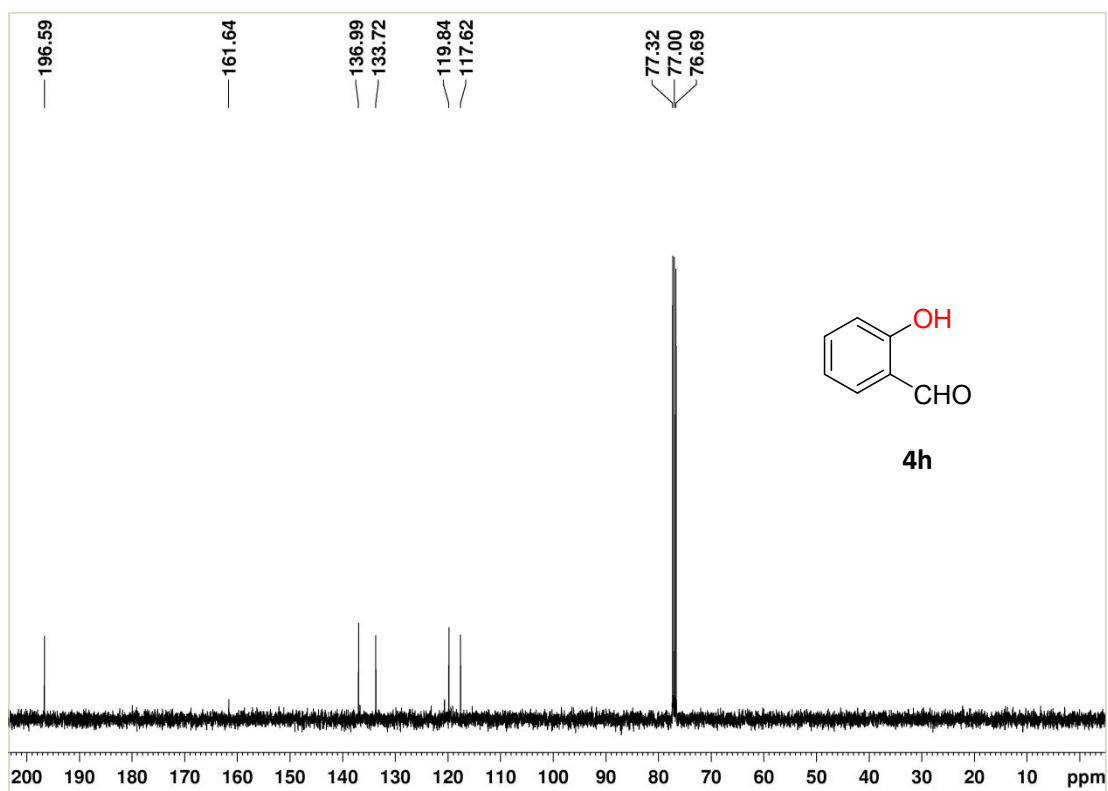
400 MHz ^1H NMR spectrum of **4g** in CDCl_3



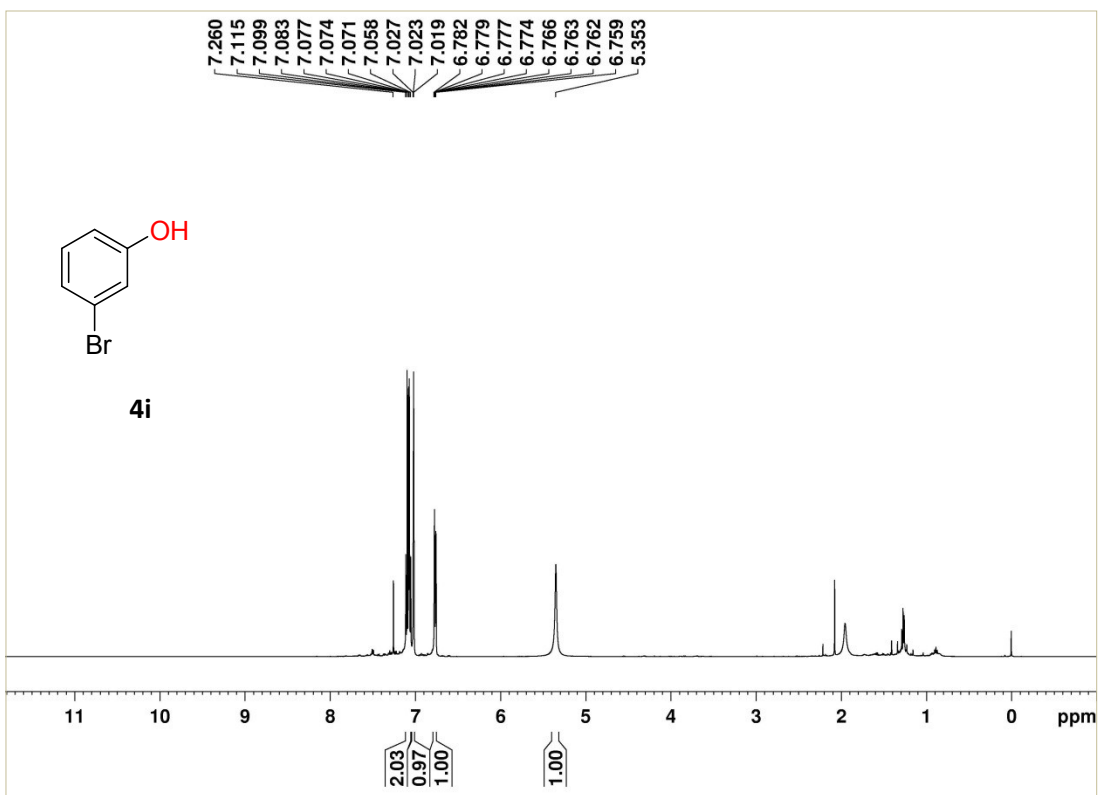
100 MHz ^{13}C -NMR spectrum of **4g** in CDCl_3



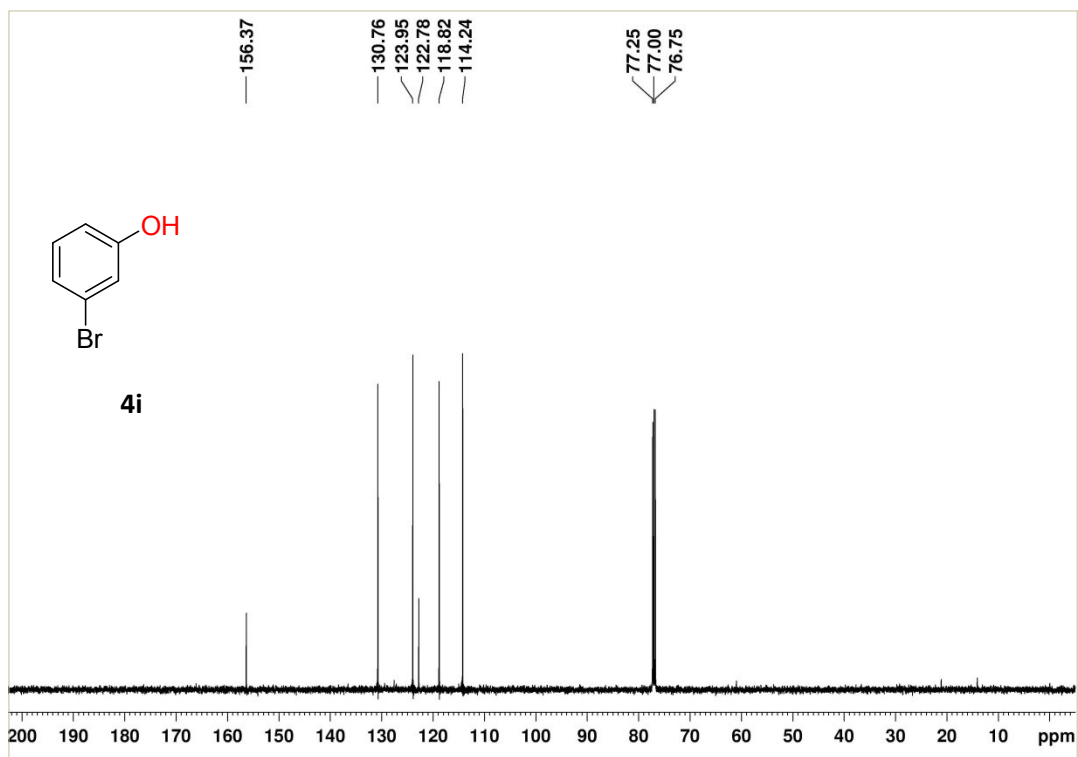
400 MHz ¹H NMR spectrum of **4h** in CDCl₃



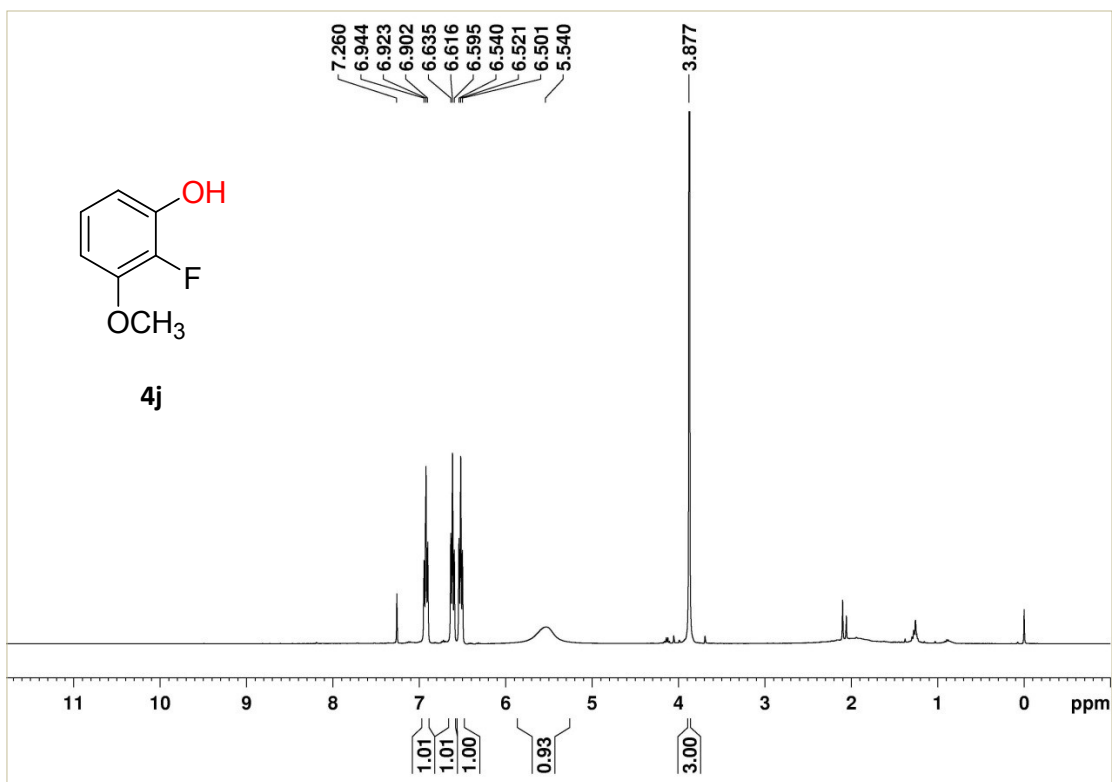
100 MHz ¹³C-NMR spectrum of **4h** in CDCl₃



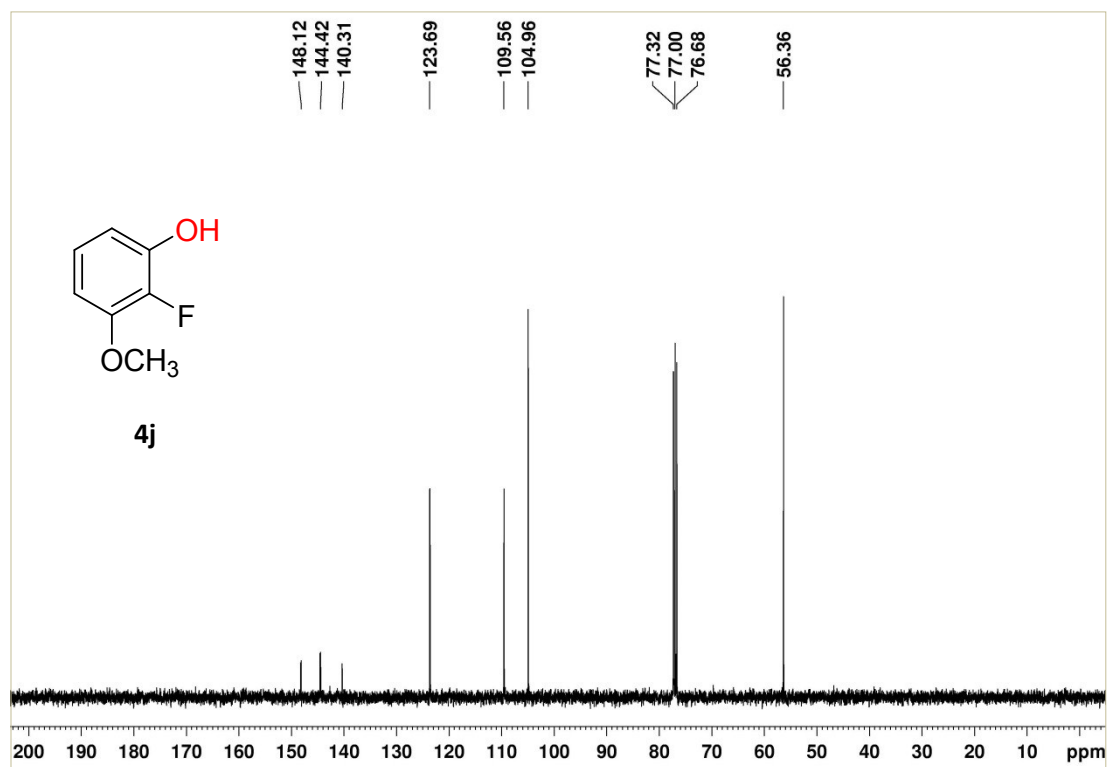
500 MHz ^1H NMR spectrum of **4i** in CDCl_3



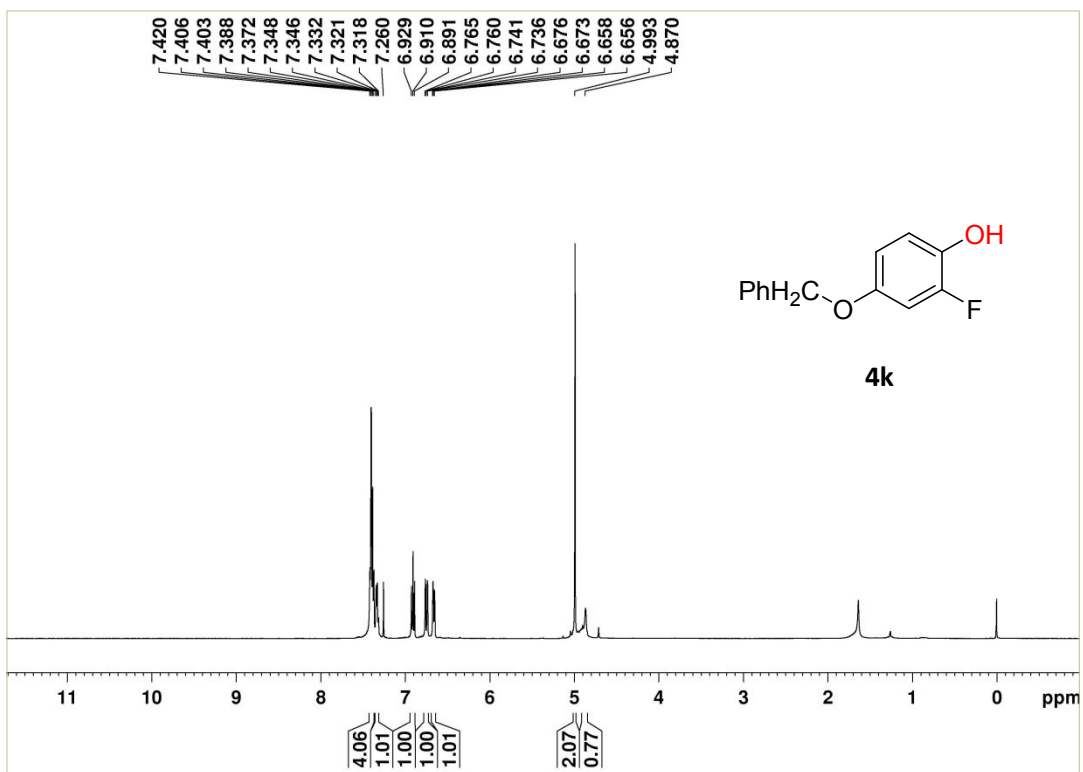
125 MHz ^{13}C -NMR spectrum of **4i** in CDCl_3



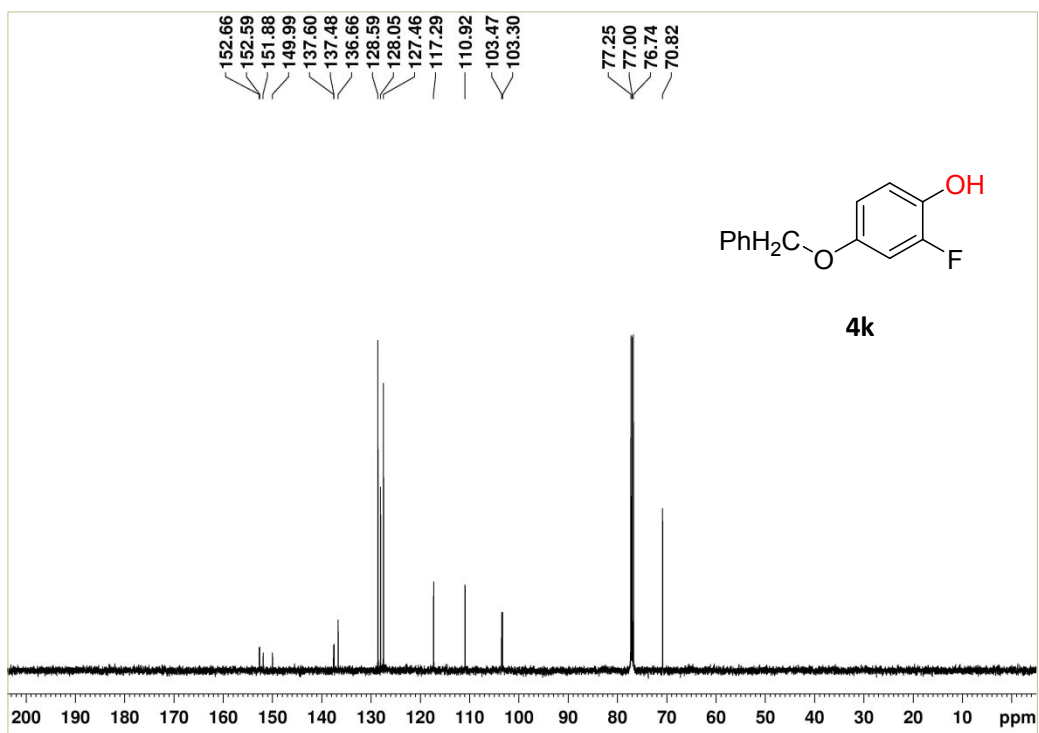
400 MHz ^1H NMR spectrum of **4j** in CDCl_3



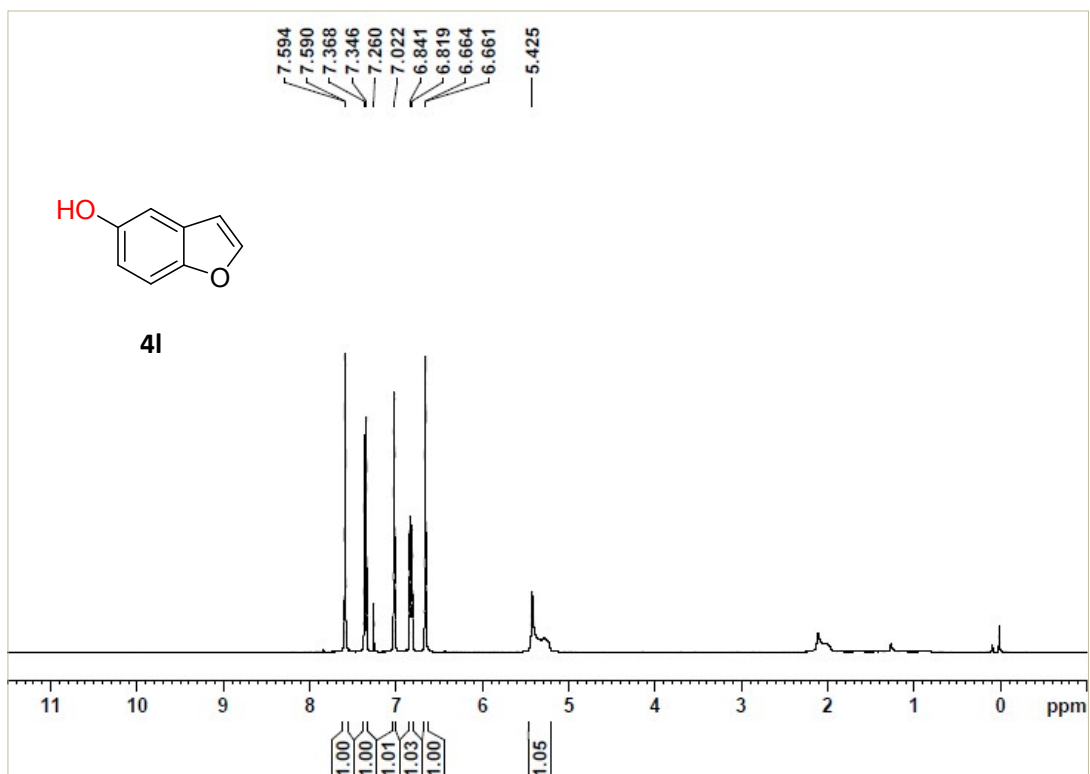
100 MHz ^{13}C -NMR spectrum of **4j** in CDCl_3



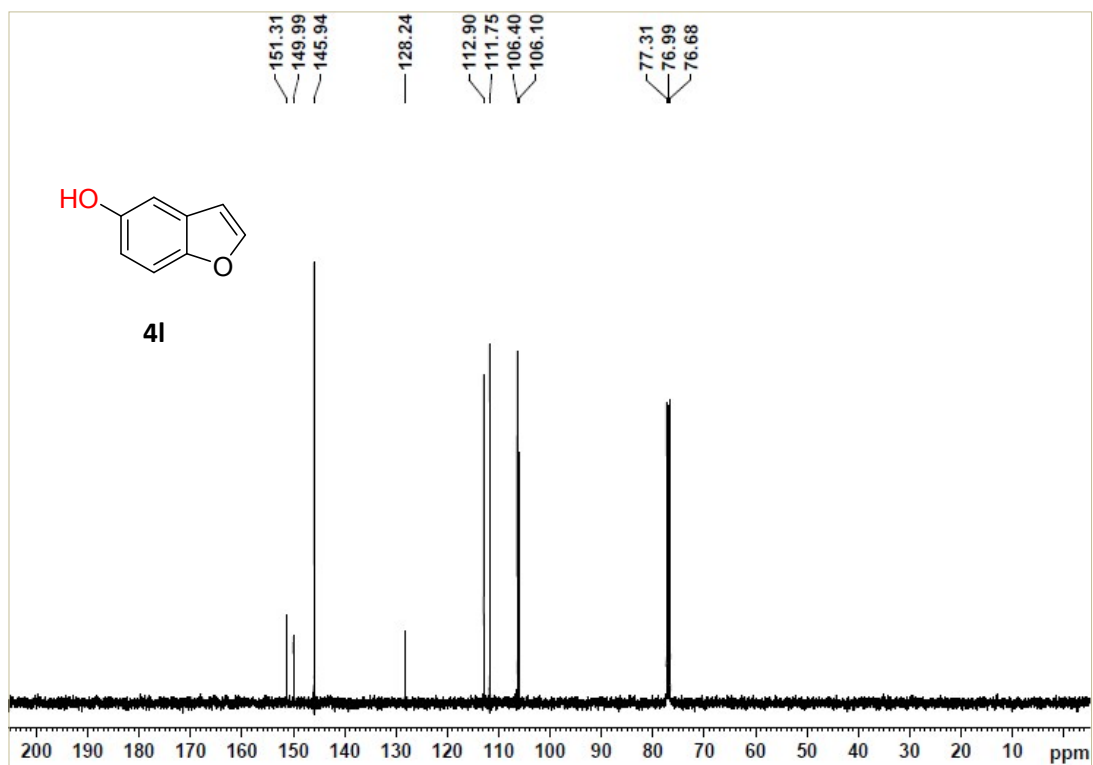
500 MHz ^1H NMR spectrum of **4k** in CDCl_3



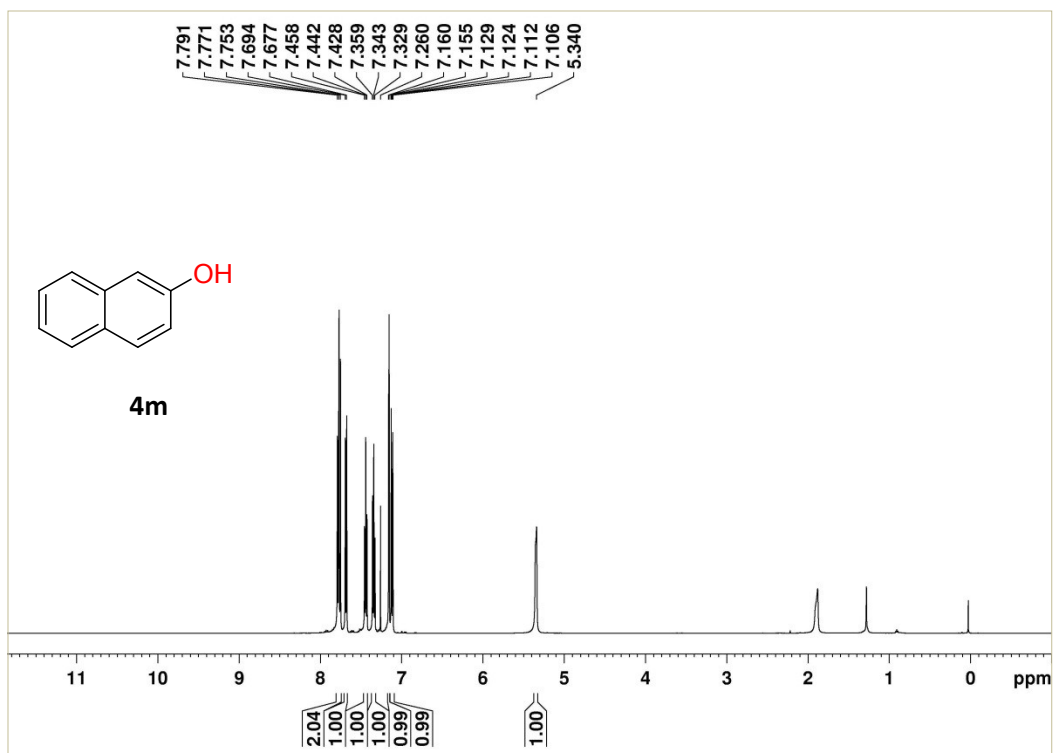
125 MHz ^{13}C -NMR spectrum of **4k** in CDCl_3



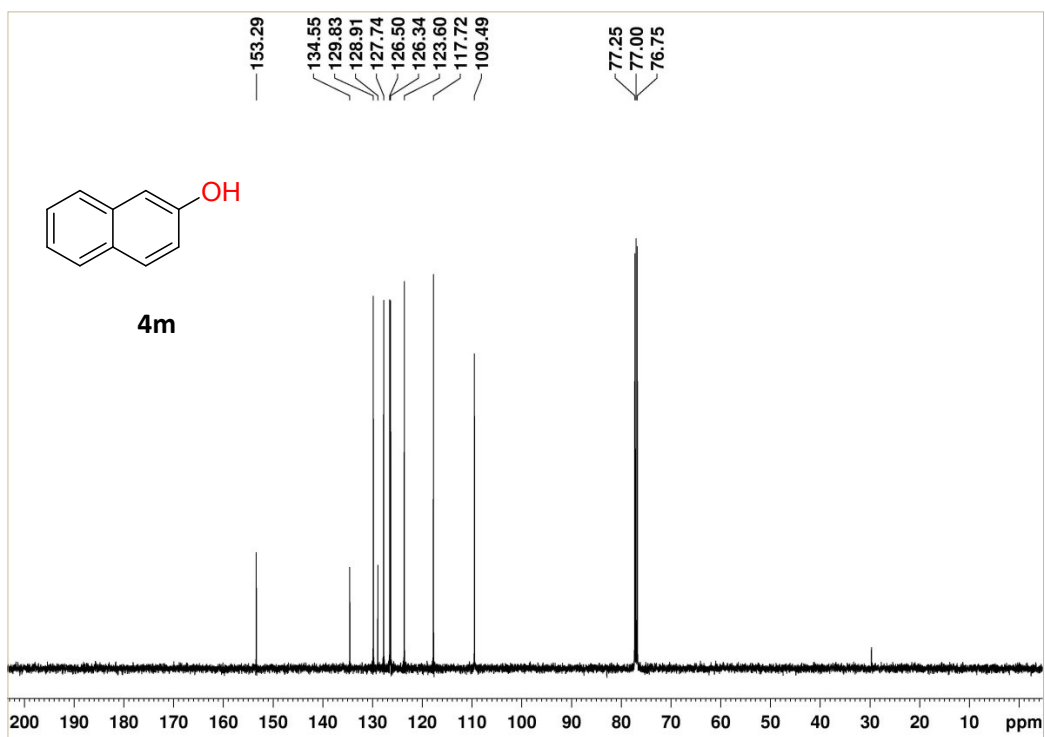
400 MHz ^1H NMR spectrum of **4I** in CDCl_3



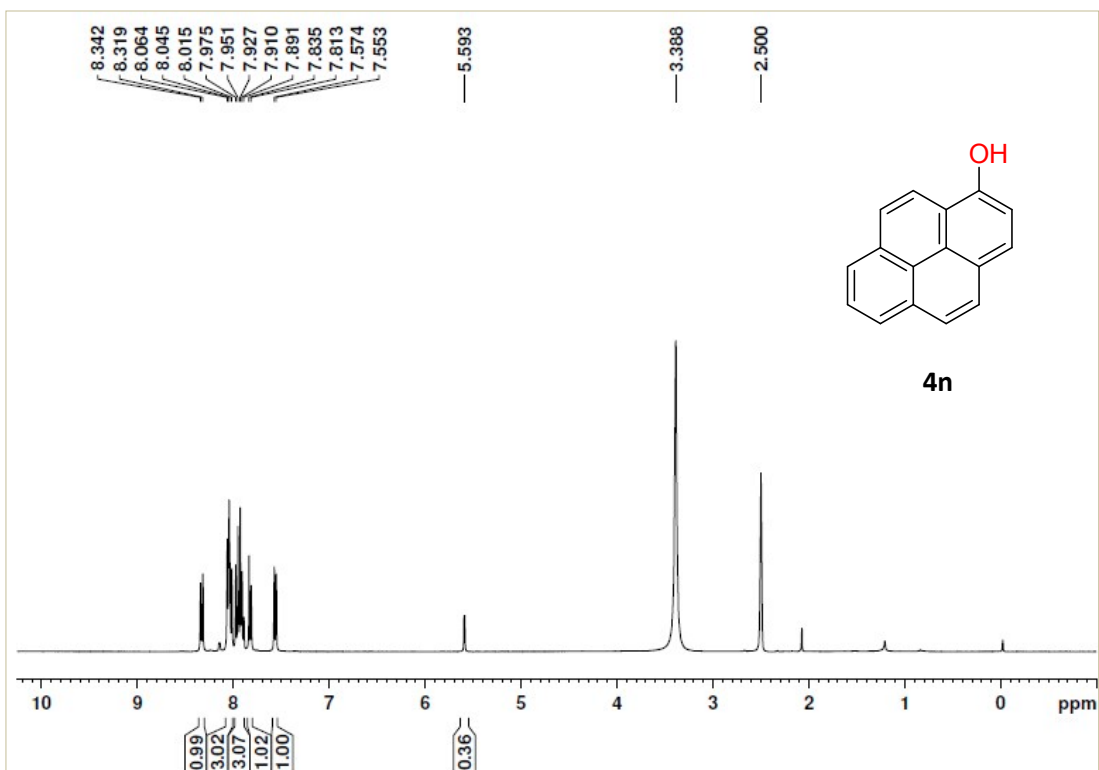
100 MHz ^{13}C -NMR spectrum of **4I** in CDCl_3



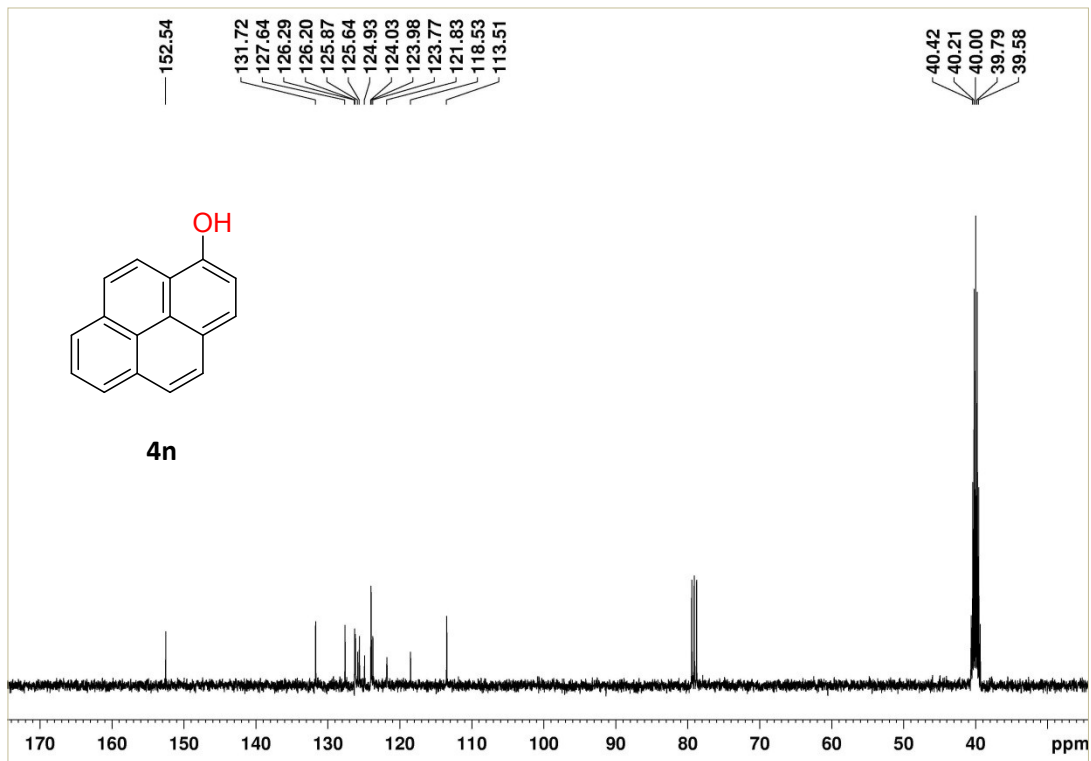
500 MHz ^1H NMR spectrum of **4m** in CDCl_3



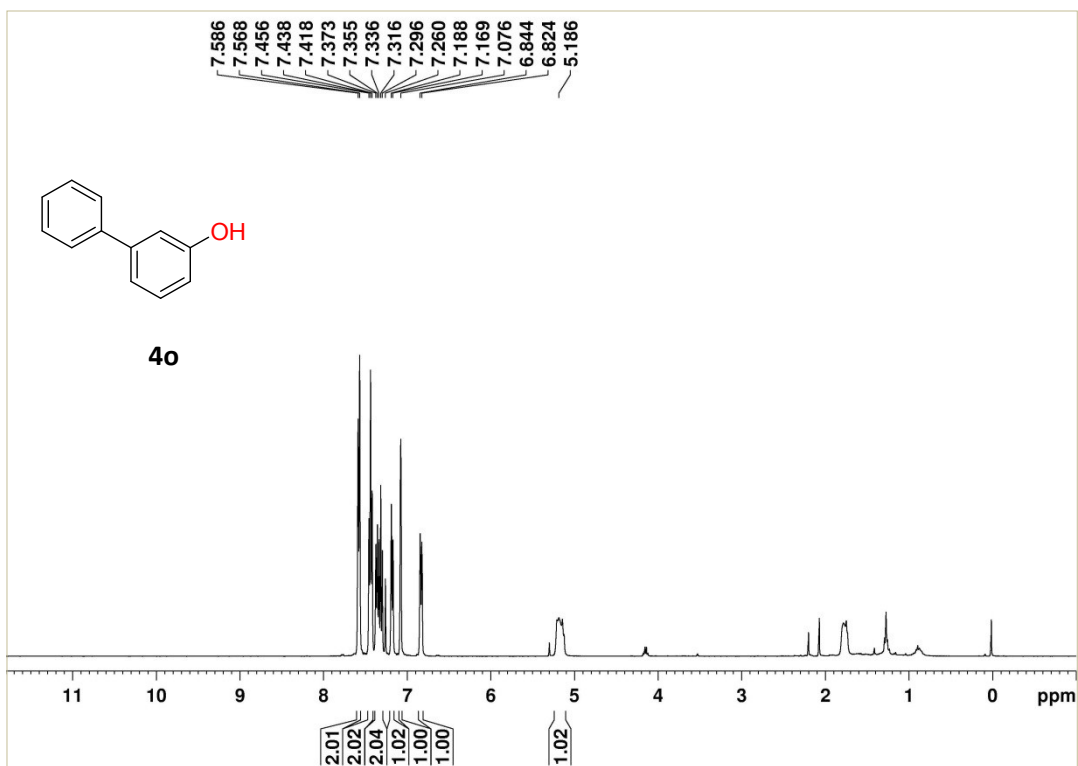
125 MHz ^{13}C -NMR spectrum of **4m** in CDCl_3



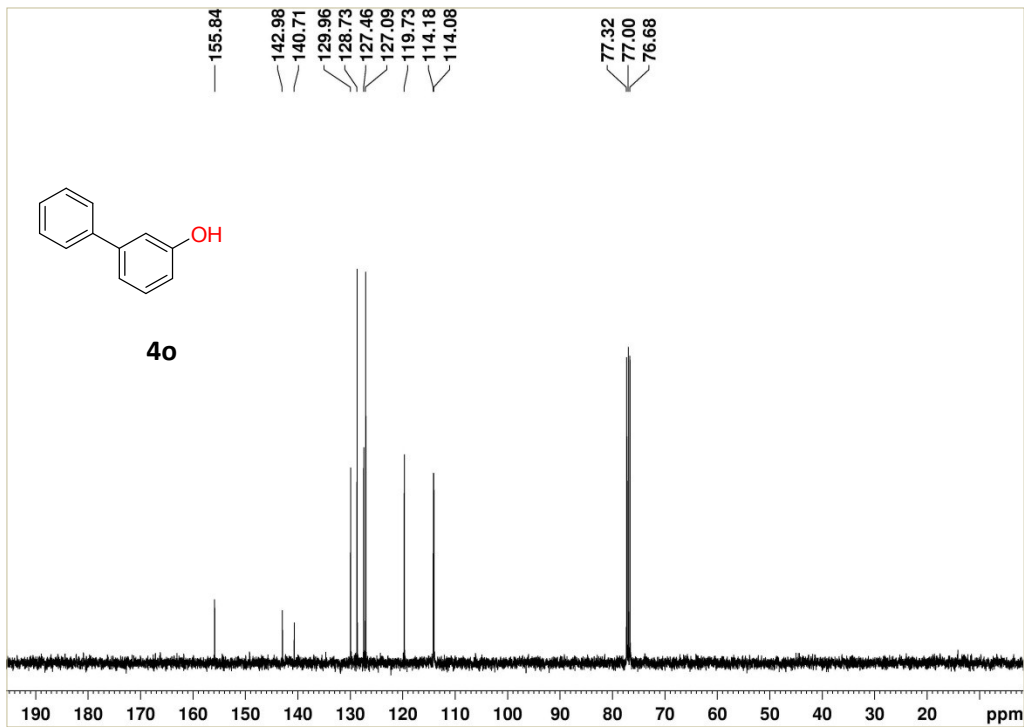
400 MHz ^1H NMR spectrum of **4n** in DMSO $-d_6$



125 MHz ^{13}C NMR spectrum of **4n** in DMSO $-d_6$



400 MHz ^1H NMR spectrum of **4o** in CDCl_3



100 MHz ^{13}C -NMR spectrum of **4o** in CDCl_3