Electronic Supplementary Material (ESI) for Green Chemistry.

# An Electrochemical Method for Deborylative Seleno/thiocyanation of Arylboronic Acids under Catalyst- and Oxidant-free Conditions

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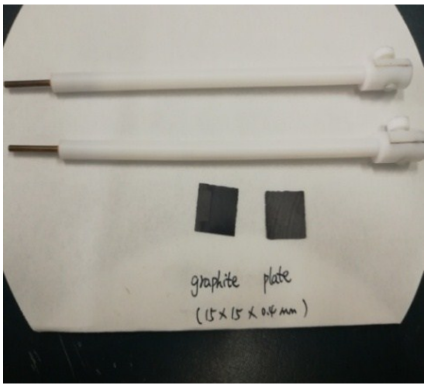
**General considerations**. The reagents used for experiments were commercially available and used as received unless otherwise noted. $CH_3CN$ was distilled from $CaH_2$ under reduced pressure and stored under nitrogen. The instrument for electrolysis is dual display potentiostat (DJS-292B) (made in China). Cyclic voltammograms were obtained on a IVIUMSTAT potentiostat. Column chromatography was performed on silica gel 300 - 400 mesh. The yields reported are the isolated yields and the average of two runs. $^1H$ and $^{13}C$ NMR spectra of all compounds were recorded at 400 and 100 MHz with $CDCl_3$ as solvent respectively. All coupling constants (*J* values) were reported in Herz (Hz). HRMS were performed by Analysis and Testing Center, Nanchang University. GC-MS analysis was conducted on a Shimadzu GCMS-QP2010 instrument equipped with a Restec-5HT column (30 m × 0.25 mm, Hewlett-Packard).

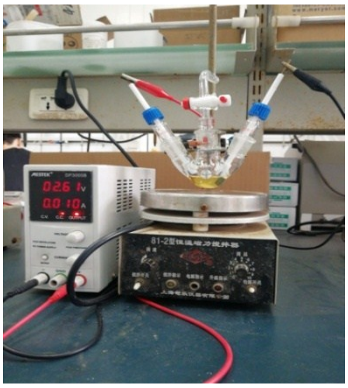
## General procedure for metal-free electrocatalytic selenocyanation of arylboronic acids

**Procedure A**: Arylboronic acid (0.2 mmol), KSeCN (0.8 mmol, 4.0 equiv), $CH_3CN$ (10 mL) and $H_2O$ (50 μL) were combined and added into oven-dried three-necked flask (25 mL) with a stir bar. The flask was equipped with two graphite felts (15 mm × 15 mm × 0.4 mm) as the cathode and anode. The reaction mixture was stirred and electrolyzed at a constant current of 10 mA under room temperature for 80 min. When the reaction was finished, the reaction mixture was filtered through a short plug of silica gel that was then washed with EtOAc and concentrated in vacuo. The resulting residue was purified by flash chromatography on silica gel to provide corresponding product.

## General procedure for metal-free electrocatalytic thiocyanation of arylboronic acids

**Procedure B**: Arylboronic acid (0.2 mmol), TMSNCS (0.6 mmol, 3.0 equiv), $CH_3CN$ (10 mL) and $H_2O$ (30 μL) were combined and added into oven-dried three-necked flask (25 mL) with a stir bar. The flask was equipped with two graphite felts (15 mm × 15 mm × 0.4 mm) as the cathode and anode. The reaction mixture was stirred and electrolyzed at a constant current of 10 mA under room temperature for 3 h. When the reaction was finished, the reaction mixture was filtered through a short plug of silica gel that was then washed with EtOAc and concentrated in vacuo. The resulting residue was purified by flash chromatography on silica gel to provide corresponding product.





**1-Methoxy-4-selenocyanatobenzene (1a)**. Procedure A was followed using (4-methoxyphenyl)boronic acid (30.4 mg, 0.2 mmol) and KSeCN (115.3 mg, 0.8 mmol, 4.0 equiv). With stirring, the reaction mixture was performed for 3 hours instead of 80 minutes. The reaction mixture was purified by flash column chromatography on silica gel (49:1, petroleum ether: EtOAc) to afford 36.0 mg (85%) of the product as a colorless liquid. Exhibited spectral data in accordance with previous report.[1] $^1$H NMR (400 MHz, $CDCl_3$): $\delta$ 7.60 (d, $J$ = 8.8 Hz, 2 H), 6.92 (d, $J$ = 8.8 Hz, 2 H), 3.82 (s, 3 H). $^{13}$C NMR (100 MHz, $CDCl_3$): δ 161.3, 136.0, 116.0, 111.0, 102.1, 55.5.

**1-Methoxy-2-selenocyanatobenzene (2a)**. Procedure A was followed using (2-methoxyphenyl)boronic acid (30.4 mg, 0.2 mmol) and KSeCN (115.3 mg, 0.8 mmol, 4.0 equiv). With stirring, the reaction mixture was performed for 5 hours instead of 80 minutes. The reaction mixture was purified by flash column chromatography on silica gel (49:1, petroleum ether: EtOAc) to afford 31.0 mg (73%) of the product as a colorless liquid. $^1$H NMR (400 MHz, $CDCl_3$): $\delta$ 7.63 (d, $J$ = 7.6 Hz, 1 H), 7.34 (t, $J$ = 7.6 Hz, 1 H), 7.03 (t, $J$ = 7.6 Hz, 1 H), 6.90 (d, $J$ = 8.4 Hz, 1 H), 3.90 (s, 3 H). $^{13}$C NMR (100 MHz, $CDCl_3$): $\delta$ 155.7, 130.0, 129.8, 122.8, 112.6, 110.9, 101.5, 56.2. HRMS (ESI-TOF) *m/z*: $[M+H]^+$ Calcd. for $C_8H_7NOSe$: 213.9773; Found: 213.9755.

**2,4-Dimethoxy-1-selenocyanatobenzene (3a)**. Procedure A was followed using (2,4-dimethoxyphenyl)boronic acid (36.4 mg, 0.2 mmol) and KSeCN (115.3 mg, 0.8 mmol, 4.0 equiv). The reaction mixture was purified by flash column chromatography on silica gel (49:1, petroleum ether: EtOAc) to afford 39.2 mg (81%) of the product as a colorless liquid. $^1$H NMR (400 MHz, $CDCl_3$): $\delta$ 7.50 (d, $J$ = 8.4 Hz, 1 H), 6.54 (dd, $J$ = 8.8 Hz, 2.4 Hz, 1 H), 6.48 (s, 1 H), 3.87 (s, 1 H), 3.81(s, 1 H). $^{13}$C NMR (100 MHz, $CDCl_3$): $\delta$ 162.4, 157.8, 132.9, 106.7, 101.9, 101.7, 99.3, 56.2, 55.7. HRMS (ESI-TOF) *m/z*: $[M+H]^+$ Calcd. for $C_9H_9NO_2Se$: 243.9879; Found: 243.9863.

**2-Methoxy-5-selenocyanatobenzaldehyde (4a)**. Procedure A was followed using (3-formyl-4-methoxyphenyl)boronic acid (36.0 mg, 0.2 mmol), KSeCN (115.3 mg, 0.8 mmol, 4.0 equiv) and $H_2O$ (10 μL) instead of $H_2O$ (50 μL). With stirring, the reaction mixture was performed for 5 hours instead of 80 minutes. The reaction mixture was purified by flash column chromatography on silica gel (22:3, petroleum ether: EtOAc) to afford 31.7 mg (66%) of the product as a white solid. $^1$H NMR (400 MHz, $CDCl_3$): $\delta$ 10.41 (s, 1 H), 8.09 (s, 1 H), 7.87 (d, $J$ = 8.4 Hz, 1 H), 7.06 (d, $J$ = 8.8 Hz, 1 H), 3.98 (s, 3 H). $^{13}$C NMR (100 MHz, $CDCl_3$): $\delta$ 188.1, 162.9, 141.5, 134.4, 125.9, 114.1, 112.2, 101.4, 56.2. HRMS (ESI-TOF) *m/z*: $[M+H]^+$ Calcd. for $C_9H_7NO_2Se$: 241.9722; Found: 241.9710.

**4-Selenocyanatophenol (5a)**. Procedure A was followed using (4-hydroxyphenyl)boronic acid (27.6 mg, 0.2 mmol) and KSeCN (115.3 mg, 0.8 mmol, 4.0 equiv). The reaction mixture was purified by flash column chromatography on silica gel (22:3, petroleum ether: EtOAc) to afford 31.7 mg (80%) of the product as a colorless liquid. Exhibited spectral data in accordance with previous report.[2] $^1$H

NMR (400 MHz, $CDCl_3$): $\delta$ 7.52 (d, $J$ = 8.8 Hz, 2 H), 6.84 (d, $J$ = 8.0 Hz, 2 H), 6.38 (s, 1 H). $^{13}C$ NMR (100 MHz, $CDCl_3$): $\delta$ 158.1, 136.5, 117.6, 110.3, 103.2.

**2-Selenocyanatoaniline (6a)**. Procedure A was followed using (2-aminophenyl)boronic acid (27.4 mg, 0.2 mmol) and KSeCN (115.3 mg, 0.8 mmol, 4.0 equiv). The reaction mixture was purified by flash column chromatography on silica gel (9:1, petroleum ether: EtOAc) to afford 29.2 mg (74%) of the product as a white solid. $^1H$ NMR (400 MHz, $CDCl_3$): $\delta$ 7.55 (d, $J$ = 8.0 Hz, 1 H), 7.26 (t, $J$ = 8.0 Hz, 1 H), 6.82 (d, $J$ = 8.0 Hz, 1 H), 6.72 (t, $J$ = 7.6 Hz, 1 H), 4.34 (s, 2 H). $^{13}C$ NMR (100 MHz, $CDCl_3$): $\delta$ 148.2, 137.4, 132.9, 119.5, 116.2, 105.0, 100.5. HRMS (ESI-TOF) *m/z*: $[M+H]^+$ Calcd. for $C_7H_6N_2Se$: 198.9762; Found: 198.9776.

***N,N*-dimethyl-4-selenocyanatoaniline (7a)**. Procedure A was followed using (4-(dimethylamino)phenyl)boronic acid (33.0 mg, 0.2 mmol) and KSeCN (115.3 mg, 0.8 mmol, 4.0 equiv). The reaction mixture was purified by flash column chromatography on silica gel (49:1, petroleum ether: EtOAc) to afford 40.0 mg (89%) of the product as a yellow solid. Exhibited spectral data in accordance with previous report.[2] $^1H$ NMR (400 MHz, $CDCl_3$): $\delta$ 7.51 (d, $J$ = 8.8 Hz, 2 H), 6.64 (d, $J$ = 8.8 Hz, 2 H), 2.99 (s, 6 H). $^{13}C$ NMR (100 MHz, $CDCl_3$): $\delta$ 151.6, 136.4, 113.3, 104.3, 102.8, 40.1.

**1-Isopropyl-4-selenocyanatobenzene (8a)**. Procedure A was followed using (4-isopropylphenyl)boronic acid (32.8 mg, 0.2 mmol) and KSeCN (115.3 mg, 0.8 mmol, 4.0 equiv). With stirring, the reaction mixture was performed for 5 hours instead of 80 minutes. The reaction mixture was purified by flash column chromatography on silica gel (49:1, petroleum ether: EtOAc) to afford 35.9 mg (80%) of the product as a colorless liquid. $^1H$ NMR (400 MHz, $CDCl_3$): $\delta$ 7.55 (d, $J$ = 8.0 Hz, 2 H), 7.25 (d, $J$ = 8.0 Hz, 2 H), 2.99 - 2.85 (m, 1 H), 1.24 (d, $J$ = 6.8 Hz, 6 H). $^{13}C$ NMR (100 MHz, $CDCl_3$): $\delta$ 151.3, 133.4, 128.6, 118.2, 101.8, 33.9, 23.8. HRMS (ESI-TOF) *m/z*: $[M+H]^+$ Calcd. for $C_{10}H_{11}NSe$: 226.0137; Found: 226.0122.

**1-Methyl-4-selenocyanatobenzene (9a).** Procedure A was followed using p-tolylboronic acid (27.2 mg, 0.2 mmol) and KSeCN (115.3 mg, 0.8 mmol, 4.0 equiv). With stirring, the reaction mixture was performed for 5 hours instead of 80 minutes. The reaction mixture was purified by flash column chromatography on silica gel (49:1, petroleum ether: EtOAc) to afford 25.5 mg (65%) of the product as a light yellow liquid. Exhibited spectral data in accordance with previous report.[1] $^1H$ NMR (400 MHz, $CDCl_3$): $\delta$ 7.53 (d, $J$ = 8.0 Hz, 2 H), 7.21 (d, $J$ = 7.6 Hz, 2 H), 2.38 (s, 3 H). $^{13}C$ NMR (100 MHz, $CDCl_3$): $\delta$ 140.4, 133.3, 131.1, 117.9, 101.7, 21.2.

**1-Methyl-2-selenocyanatobenzene (10a)**. Procedure A was followed using o-tolylboronic acid (27.2 mg, 0.2 mmol) and KSeCN (115.3 mg, 0.8 mmol, 4.0 equiv). With stirring, the reaction mixture was performed for 5 hours instead of 80 minutes. The reaction mixture was purified by flash column chromatography on silica gel (49:1, petroleum ether: EtOAc) to afford 30.1 mg (78%) of the product as a colorless liquid.

$^1$H NMR (400 MHz, CDCl$_3$): *δ* 7.72 (d, *J* = 7.6 Hz, 1 H), 7.35 (t, *J* = 7.6 Hz, 1 H), 7.31 (t, *J* = 7.2 Hz, 1 H), 7.22 (t, *J* = 7.6 Hz, 1 H), 2.49 (s, 3 H). $^{13}$C NMR (100 MHz, CDCl$_3$): *δ* 139.9, 134.0, 131.2, 130.3, 127.8, 123.0, 101.2, 22.3. HRMS (ESI-TOF) *m*/*z*: $[M+H]^+$ Calcd. for $C_8H_7NSe$: 197.9824; Found: 197.9810.

**1,3-Dimethyl-2-selenocyanatobenzene (11a)**. Procedure A was followed using (2,6-dimethylphenyl)boronic acid (30.0 mg, 0.2 mmol) and KSeCN (115.3 mg, 0.8 mmol, 4.0 equiv). With stirring, the reaction mixture was performed for 5 hours instead of 80 minutes and 15 mA instead of 10 mA. The reaction mixture was purified by flash column chromatography on silica gel (49:1, petroleum ether: EtOAc) to afford 17.7 mg (42%) of the product as a colorless liquid. $^1$H NMR (400 MHz, CDCl$_3$): *δ* 7.24 - 7.22 (m, 1 H), 7.16 (d, *J* = 7.2 Hz, 2 H), 2.60 (s, 6 H). $^{13}$C NMR (100 MHz, CDCl$_3$): *δ* 143.1, 130.9, 128.8, 123.9, 101.1, 24.5. HRMS (ESI-TOF) *m*/*z*: $[M+H]^+$ Calcd. for $C_9H_9NSe$: 211.9980; Found: 211.9970.

**Selenocyanatobenzene (12a)**. Procedure A was followed using phenylboronic acid (24.4 mg, 0.2 mmol) and KSeCN (115.3 mg, 0.8 mmol, 4.0 equiv). With stirring, the reaction mixture was performed for 5 hours instead of 80 minutes and 15 mA instead of 10 mA. The reaction mixture was purified by flash column chromatography on silica gel (99:1, petroleum ether: EtOAc) to afford 17.4 mg (48%) of the product as a colorless liquid. Exhibited spectral data in accordance with previous report.[1] $^1$H NMR (400 MHz, CDCl$_3$): *δ* 7.64 (dd, *J* = 6.8 Hz, 0.8 Hz, 2 H), 7.43 - 7.38 (m, 3 H). $^{13}$C NMR (100 MHz, CDCl$_3$): *δ* 132.8, 130.4, 129.8, 121.8, 101.6.

**1-Selenocyanatonaphthalene (17a).** Procedure A was followed using naphthalen-1-ylboronic acid (34.4 mg, 0.2 mmol) and KSeCN (115.3 mg, 0.8 mmol, 4.0 equiv). With stirring, the reaction mixture was performed for 5 hours instead of 80 minutes. The reaction mixture was purified by flash column chromatography on silica gel (49:1, petroleum ether: EtOAc) to afford 37.6 mg (81%) of the product as a white solid. Exhibited spectral data in accordance with previous report.[1] $^1$H NMR (400 MHz, CDCl$_3$): *δ* 8.16 (d, *J* = 8.4 Hz, 1 H), 7.98 (d, *J* = 7.2 Hz, 1 H), 7.95 (d, *J* = 8.0 Hz, 1 H), 7.88 (d, *J* = 8.0 Hz, 1 H), 7.66 (t, *J* = 7.2 Hz, 1 H), 7.58 (t, *J* = 7.2 Hz, 1 H), 7.43 (t, *J* = 8.0 Hz, 1 H). $^{13}$C NMR (100 MHz, CDCl$_3$): *δ* 134.6, 134.4, 133.1, 131.7, 129.0, 128.2, 127.1, 126.6, 126.1, 120.5, 101.2.

**2-Selenocyanatonaphthalene (18a)**. Procedure A was followed using naphthalen-2-ylboronic acid (34.4 mg, 0.2 mmol) and KSeCN (115.3 mg, 0.8 mmol, 4.0 equiv), $H_2O$ (30 μL) instead of $H_2O$ (50 μL). With stirring, the reaction mixture was performed for 3 hours instead of 80 minutes. The reaction mixture was purified by flash column chromatography on silica gel (49:1, petroleum ether: EtOAc) to afford 24.6 mg (53%) of the product as a white solid. Exhibited spectral data in accordance with previous report.[1] $^1$H NMR (400 MHz, CDCl$_3$): *δ* 8.09 (s, 1 H), 7.85 - 7.76 (m, 3 H), 7.61 (dd, *J* = 8.4, 1.6 Hz, 1 H), 7.57 - 7.52 (m, 2 H). $^{13}$C NMR (100 MHz, CDCl$_3$): *δ* 133.8, 133.1, 132.6, 130.2, 128.8, 127.9, 127.7, 127.4, 118.8, 101.6.

**4-Selenocyanatodibenzo[b,d]furan (19a)**. Procedure A was followed using dibenzo[b,d]furan-4-ylboronic acid (42.4 mg, 0.2 mmol) and KSeCN (115.3 mg, 0.8 mmol, 4.0 equiv). With stirring, the reaction mixture was performed for 5 hours instead of 80 minutes and 15 mA instead of 10 mA. The reaction mixture was purified by flash column chromatography on silica gel (49:1, petroleum ether: EtOAc) to afford 23.4 mg (43%) of the product as a yellow solid. $^1$H NMR (400 MHz, $CDCl_3$): $\delta$ 7.93 (dd, $J$ = 8.0, 0.8 Hz, 1 H), 7.89 (dd, $J$ = 7.6, 0.4 Hz, 1 H), 7.68 (dd, $J$ = 7.6, 0.8 Hz, 1 H), 7.59 (d, $J$ = 8.4 Hz, 1 H), 7.48 (td, $J$ = 8.4, 1.2 Hz, 1 H), 7.35 (t, $J$ = 7.2 Hz, 1 H), 7.31 (t, $J$ = 8.0 Hz, 1 H). $^{13}$C NMR (100 MHz, $CDCl_3$): $\delta$ 156.0, 154.7, 131.4, 128.2, 125.5, 124.3, 123.6, 122.7, 121.1, 112.1, 103.5, 100.1. HRMS (ESI-TOF) *m*/*z*: $[M+H]^+$ Calcd. for $C_{13}H_7NOSe$: 273.9773; Found: 273.9761.

**3-Selenocyanatobenzo[*b*]thiophene (20a)**. Procedure A was followed using benzo[b]thiophen-3-ylboronic acid (35.6 mg, 0.2 mmol) and KSeCN (115.3 mg, 0.8 mmol, 4.0 equiv). The reaction mixture was purified by flash column chromatography on silica gel (49:1, petroleum ether: EtOAc) to afford 38.6 mg (81%) of the product as a red solid. $^1$H NMR (400 MHz, $CDCl_3$): $\delta$ 7.97 (d, $J$ = 8.0 Hz 1 H), 7.91 (d, $J$ = 5.2 Hz, 2 H), 7.54 (t, $J$ = 7.2 Hz, 1 H), 7.47 (t, $J$ = 7.2 Hz, 1 H). $^{13}$C NMR (100 MHz, $CDCl_3$):$\delta$ 139.4, 138.5, 135.3, 125.73, 125.72, 123.3, 123.0, 109.1, 100.1. HRMS (ESI-TOF) *m*/*z*: $[M+H]^+$ Calcd. for $C_9H_5NSSe$: 239.9388; Found: 239.9382.

**2-Selenocyanatobenzo[*b*]thiophene (21a)**. Procedure A was followed using benzo[b]thiophen-2-ylboronic acid (35.6 mg, 0.2 mmol) and KSeCN (115.3 mg, 0.8 mmol, 4.0 equiv). With stirring, the reaction mixture was performed for 5 hours instead of 80 minutes. The reaction mixture was purified by flash column chromatography on silica gel (49:1, petroleum ether: EtOAc) to afford 31.4 mg (66%) of the product as a red solid. $^1$H NMR (400 MHz, $CDCl_3$): $\delta$ 7.87 - 7.80 (m, 2 H), 7.69 (s, 1 H), 7.45 - 7.39 (m, 2 H). $^{13}$C NMR (100 MHz, $CDCl_3$): $\delta$ 144.0, 139.1, 135.1, 126.2, 125.2, 124.2, 122.0, 115.3, 100.2. HRMS (ESI-TOF) *m*/*z*: $[M+H]^+$ Calcd. for $C_9H_5NSSe$: 239.9388; Found: 239.9377.

**3-Selenocyanatobenzofuran (22a)**. Procedure A was followed using benzofuran-3-ylboronic acid (32.4 mg, 0.2 mmol) and KSeCN (115.3 mg, 0.8 mmol, 4.0 equiv). The reaction mixture was purified by flash column chromatography on silica gel (49:1, petroleum ether: EtOAc) to afford 31.0 mg (70%) of the product as a white solid. $^1$H NMR (400 MHz, $CDCl_3$): $\delta$ 7.89 (s, 1 H), 7.70 (d, $J$ = 6.8 Hz, 1 H), 7.56 (d, $J$ = 8.0 Hz, 1 H), 7.45 - 7.36 (m, 2 H). $^{13}$C NMR (100 MHz, $CDCl_3$): $\delta$ 155.1, 145.0, 127.3, 126.1, 124.4, 120.2, 112.1, 99.6, 97.2. HRMS (ESI-TOF) *m*/*z*: $[M-H]^-$ Calcd. for $C_9H_5NOSe$: 221.9426; Found: 221.9524.

**2-Selenocyanatobenzofuran (23a)**. Procedure A was followed using benzofuran-2-ylboronic acid (32.4 mg, 0.2 mmol) and KSeCN (115.3 mg, 0.8 mmol, 4.0 equiv). The reaction mixture was purified by flash column chromatography on silica gel (49:1, petroleum ether: EtOAc) to afford 23.5 mg (53%) of the product as a white solid. $^1$H

NMR (400 MHz, $CDCl_3$): $\delta$ 7.59 (d, $J$ = 8.0 Hz, 1 H), 7.53 (d, $J$ = 8.4 Hz, 1 H), 7.38 (t, $J$ = 8.0 Hz, 1 H), 7.28 (t, $J$ = 7.6 Hz, 1 H), 7.23 (s, 1 H). $^{13}C$ NMR (100 MHz, $CDCl_3$): $\delta$ 157.8, 132.0, 127.5, 126.6, 123.8, 121.5, 119.0, 111.7, 98.5. HRMS (ESI-TOF) *m*/*z*: $[M+H]^+$ Calcd. for $C_9H_5NOSe$: 223.9614; Found: 223.9604.

**1-Methoxy-4-thiocyanatobenzene (1b)**. Procedure B was followed using 4-methoxyphenylboronic acid (30.4 mg, 0.2 mmol) and TMSNCS (84.5 μL, 0.6 mmol, 3.0 equiv). The reaction mixture was purified by flash column chromatography on silica gel (97:3, petroleum ether: EtOAc) to afford 27.6 mg (83%) of the product as a light yellow liquid. Exhibited spectral data in accordance with previous report.[6] $^1H$ NMR (400 MHz, $CDCl_3$): $\delta$ 7.48 (d, $J$ = 8.8 Hz, 2 H), 6.94 (d, $J$ = 8.8 Hz, 2 H), 3.82 (s, 3 H). $^{13}C$ NMR (100 MHz, $CDCl_3$): $\delta$ 161.3, 133.9, 115.8, 113.7, 111.7, 55.5.

**1-Methoxy-2-thiocyanatobenzene (2b)**. Procedure B was followed using (2-methoxyphenyl)boronic acid (30.4 mg, 0.2 mmol) and TMSNCS (84.5 μL, 0.6 mmol, 3.0 equiv). The reaction mixture was purified by flash column chromatography on silica gel (97:3, petroleum ether: EtOAc) to afford 21.6 mg (65%) of the product as a colorless liquid. Exhibited spectral data in accordance with previous report.[8] $^1H$ NMR (400 MHz, $CDCl_3$): $\delta$ 7.56 (d, $J$ = 8.0 Hz, 1 H), 7.36 (t, $J$ = 8.0 Hz, 1 H), 7.06 (t, $J$ = 7.6 Hz, 1 H), 6.94 (d, $J$ = 8.0 Hz, 1 H), 3.92 (s, 3 H). $^{13}C$ NMR (100 MHz, $CDCl_3$): $\delta$ 156.5, 130.5, 129.9, 122.0, 113.1, 111.4, 110.4, 56.2.

**2,4-Dimethoxy-1-thiocyanatobenzene (3b)**. Procedure B was followed using (2,4-dimethoxyphenyl)boronic acid (36.4 mg, 0.2 mmol) and TMSNCS (84.5 μL, 0.6 mmol, 3.0 equiv). With stirring, the reaction mixture was performed for 80 minutes instead of 3 hours. The reaction mixture was purified by flash column chromatography on silica gel (97:3, petroleum ether: EtOAc) to afford 33.3 mg (85%) of the product as a yellow liquid. Exhibited spectral data in accordance with previous report.[3] $^1H$ NMR (400 MHz, $CDCl_3$): $\delta$ 7.45 (d, $J$ = 8.4 Hz, 1 H), 6.53 (dd, $J$ = 8.4, 2.4 Hz, 1 H), 6.50 (d, $J$ = 2.4 Hz, 1 H), 3.90 (s, 3 H), 3.82 (s, 3 H). $^{13}C$ NMR (100 MHz, $CDCl_3$): $\delta$ 163.0, 159.0, 133.9, 111.4, 106.1, 102.3, 99.5, 56.2, 55.7.

**2-Methoxy-5-thiocyanatobenzaldehyde (4b)**. Procedure B was followed using (3-formyl-4-methoxyphenyl)boronic acid (36.0 mg, 0.2 mmol) and TMSNCS (84.5 μL, 0.6 mmol, 3.0 equiv), $H_2O$ (10 μL) instead of $H_2O$ (30 μL). With stirring, the reaction mixture was performed for 5 hours instead of 3 hours. The reaction mixture was purified by flash column chromatography on silica gel (22:3, petroleum ether: EtOAc) to afford 23.3 mg (60%) of the product as a white solid. $^1H$ NMR (400 MHz, $CDCl_3$): $\delta$ 10.42 (s, 1 H), 8.00 (d, $J$ = 2.8 Hz, 1 H), 7.77 (dd, $J$ = 8.8 Hz, 2.4 Hz, 1 H), 7.10 (d, $J$ = 8.8 Hz, 1 H), 3.99 (s, 3 H). $^{13}C$ NMR (100 MHz, $CDCl_3$): $\delta$ 187.9, 162.8, 138.9, 132.2, 125.9, 115.4, 114.0, 110.7, 56.2. HRMS (ESI-TOF) *m*/*z*: $[M+H_3O^+]^-$ Calcd. for $C_8H_7NSO_2$: 212.0381; found: 212.0800.

**4-Thiocyanatophenol (5b)**. Procedure B was followed using (4-hydroxyphenyl)boronic acid (27.6 mg, 0.2 mmol), TMSNCS (84.5 μL, 0.6 mmol, 3.0 equiv). With stirring, the reaction mixture was performed for 80 minutes instead of 3 hours. The reaction mixture was purified by flash column chromatography on silica gel (22:3, petroleum ether: EtOAc) to afford 23.7 mg (78%) of the product as a colorless liquid. Exhibited spectral data in accordance with previous report.[6] $^1$H NMR (400 MHz, CDCl$_3$): $\delta$ 7.43 (d, $J$ = 8.4 Hz, 2 H), 6.88 (d, $J$ = 8.4 Hz, 2 H), 6.29 (s, 1 H). $^{13}$C NMR (100 MHz, CDCl$_3$): $\delta$ 158.0, 134.2, 117.5, 113.1, 112.3.

***N,N*-Dimethyl-4-thiocyanatoaniline (7b)**. Procedure B was followed using (4-(dimethylamino)phenyl)boronic acid (33.0 mg, 0.2 mmol) and TMSNCS (84.5 μL, 0.6 mmol, 3.0 equiv). With stirring, the reaction mixture was performed for 80 minutes instead of 3 hours. The reaction mixture was purified by flash column chromatography on silica gel (97:3, petroleum ether: EtOAc) to afford 31.1 mg (87%) of the product as a white solid. Exhibited spectral data in accordance with previous report.[5] $^1$H NMR (400 MHz, CDCl$_3$): $\delta$ 7.42 (d, $J$ = 8.4 Hz, 2 H), 6.67 (d, $J$ = 8.4 Hz, 2 H), 3.00 (s, 6 H). $^{13}$C NMR (100 MHz, CDCl$_3$): $\delta$ 151.6, 134.5, 113.1, 112.7, 106.3, 40.2.

**1-Isopropyl-4-thiocyanatobenzene (8b)**. Procedure B was followed using 4-isopropylphenylboronic acid (32.8 mg, 0.2 mmol) and TMSNCS (84.5 μL, 0.6 mmol, 3.0 equiv). With stirring, the reaction mixture was performed for 5 hours instead of 3 hours. The reaction mixture was purified by flash column chromatography on silica gel (97:3, petroleum ether: EtOAc) to afford 19.6 mg (55%) of the product as a colorless liquid. Exhibited spectral data in accordance with previous report.[6] $^1$H NMR (400 MHz, CDCl$_3$): $\delta$ 7.45 (d, $J$ = 8.0 Hz, 2 H), 7.28 (d, $J$ = 8.0 Hz, 2 H), 2.98 - 2.95 (m, 1 H), 1.23 (d, $J$ = 6.8 Hz, 6 H). $^{13}$C NMR (100 MHz, CDCl$_3$): $\delta$ 151.1, 130.8, 128.4, 120.7, 111.1, 33.4, 23.8.

**1-Methyl-4-thiocyanatobenzene (9b)**. Procedure B was followed using p-tolylboronic acid (27.2 mg, 0.2 mmol) and TMSNCS (84.5 μL, 0.6 mmol, 3.0 equiv). The reaction mixture was purified by flash column chromatography on silica gel (97:3, petroleum ether: EtOAc) to afford 18.3 mg (62%) of the product as a colorless liquid. Exhibited spectral data in accordance with previous report.[6] $^1$H NMR (400 MHz, CDCl$_3$): $\delta$ 7.42 (d, $J$ = 8.0 Hz, 2 H), 7.24 (d, $J$ = 8.0 Hz, 2 H), 2.38 (s, 3 H). $^{13}$C NMR (100 MHz, CDCl$_3$): $\delta$ 140.2, 130.9, 130.7, 120.5, 111.0, 21.1.

**2-Methylphenyl thiocyanate (10b)**. Procedure B was followed using o-tolylboronic acid (27.2 mg, 0.2 mmol) and TMSNCS (84.5 μL, 0.6 mmol, 3.0 equiv). The reaction mixture was purified by flash column chromatography on silica gel (97:3, petroleum ether: EtOAc) to afford 17.4 mg (58%) of the product as a colorless liquid. Exhibited spectral data in accordance with previous report.[8] $^1$H NMR (400 MHz, CDCl$_3$): $\delta$ 7.63 (d, $J$ = 8.0 Hz, 1 H), 7.35 (t, $J$ = 7.2 Hz, 1 H), 7.29 (t, $J$ = 5.6 Hz, 2 H), 2.48 (s, 3 H). $^{13}$C NMR (100 MHz, CDCl$_3$): $\delta$ 139.3, 131.9, 131.4, 130.2, 127.7, 123.6, 110.4, 20.4.

**1,3-Dimethyl-2-thiocyanatobenzene (11b)**. Procedure B was followed using (2,6-dimethylphenyl)boronic acid (30.0 mg, 0.2 mmol) and TMSNCS (84.5 μL, 0.6 mmol, 3.0 equiv). With stirring, the reaction mixture was performed for 5 hours instead of 3 hours and 15 mA instead of 10 mA. The reaction mixture was purified by flash column chromatography on silica gel (97:3, petroleum ether: EtOAc) to afford 20.3 mg (60%) of the product as a colorless solid. Exhibited spectral data in accordance with previous report.[4] $^1$H NMR (400 MHz, CDCl$_3$): $\delta$ 7.28 (t, $J$ = 7.2 Hz, 1 H), 7.19 (d, $J$ = 7.2 Hz, 2 H), 2.60 (s, 6 H). $^{13}$C NMR (100 MHz, CDCl$_3$): $\delta$ 142.9, 131.1, 129.2, 122.6, 110.6, 22.1.

**Thiocyanatobenzene (12b)**. Procedure B was followed using phenylboronic acid (24.4 mg, 0.2 mmol) and TMSNCS (84.5 μL, 0.6 mmol, 3.0 equiv). With stirring, the reaction mixture was performed for 5 hours instead of 3 hours and 15 mA instead of 10 mA. The reaction mixture was purified by flash column chromatography on silica gel (99:1, petroleum ether: EtOAc) to afford 6.8 mg (25%) of the product as a colorless liquid. Exhibited spectral data in accordance with previous report.[7] $^1$H NMR (400 MHz, CDCl$_3$): $\delta$ 7.53 - 7.50 (m, 2 H), 7.42 - 7.40 (m, 3 H). $^{13}$C NMR (100 MHz, CDCl$_3$): $\delta$ 130.2, 130.0, 129.5, 124.4, 110.4.

**1-Bromo-4-thiocyanatobenzene (13b)**. Procedure B was followed using (4-bromophenyl)boronic acid (40.2 mg, 0.2 mmol) and TMSNCS (84.5 μL, 0.6 mmol, 3.0 equiv). W With stirring, the reaction mixture was performed for 5 hours instead of 3 hours and 15 mA instead of 10 mA. The reaction mixture was purified by flash column chromatography on silica gel (97:3, petroleum ether: EtOAc) to afford 9.1 mg (21%) of the product as a white solid. Exhibited spectral data in accordance with previous report.[7] $^1$H NMR (400 MHz, CDCl$_3$): $\delta$ 7.55 (d, $J$ = 8.8 Hz, 2 H), 7.38 (d, $J$ = 8.8 Hz, 2 H). $^{13}$C NMR (100 MHz, CDCl$_3$): $\delta$ 133.4, 131.5, 124.1, 123.4, 109.8.

**1-Chloro-4-thiocyanatobenzene (14b)**. Procedure B was followed using (4-chlorophenyl)boronic acid (31.3 mg, 0.2 mmol) and TMSNCS (84.5 μL, 0.6 mmol, 3.0 equiv). With stirring, the reaction mixture was performed for 5 hours instead of 3 hours and 15 mA instead of 10 mA. The reaction mixture was purified by flash column chromatography on silica gel (97:3, petroleum ether: EtOAc) to afford 7.5 mg (22%) of the product as a white solid. Exhibited spectral data in accordance with previous report.[6] $^1$H NMR (400 MHz, CDCl$_3$): $\delta$ 7.45 (d, $J$ = 8.4 Hz, 2 H), 7.39 (d, $J$ = 8.4 Hz, 2 H). $^{13}$C NMR (100 MHz, CDCl$_3$): $\delta$ 136.1, 131.4, 130.4, 122.7, 110.0.

**Methyl-4-thiocyanatobenzoate (15b)**. Procedure B was followed using (4-(methoxycarbonyl)phenyl)boronic acid (36.0 mg, 0.2 mmol) and TMSNCS (84.5 μL, 0.6 mmol, 3.0 equiv). With stirring, the reaction mixture was performed for 5 hours instead of 3 hours and 15 mA instead of 10 mA. The reaction mixture was purified by flash column chromatography on silica gel (22:3, petroleum ether: EtOAc) to afford 12.4 mg (32%) of the product as a white soild. Exhibited spectral data in accordance with previous report.[3] $^1$H NMR (400 MHz, $CDCl_3$): $\delta$ 8.08 (d, $J$ = 8.4 Hz, 2 H), 7.55 (d, $J$ = 8.4 Hz, 2 H), 3.93 (s, 3 H). $^{13}$C NMR (100 MHz, $CDCl_3$): $\delta$ 165.7, 131.1, 130.8, 130.4, 128.3, 109.0, 52.5.

**4-Thiocyanatobenzonitrile (16b)**. Procedure B was followed using (4-cyanophenyl)boronic acid (29.4 mg, 0.2 mmol) and TMSNCS (84.5 μL, 0.6 mmol, 3.0 equiv). With stirring, the reaction mixture was performed for 5 hours instead of 3 hours and 15 mA instead of 10 mA. The reaction mixture was purified by flash column chromatography on silica gel (22:3, petroleum ether: EtOAc) to afford 10.6 mg (33%) of the product as a white solid. Exhibited spectral data in accordance with previous report.[7] $^1$H NMR (400 MHz, $CDCl_3$): $\delta$ 7.73 (d, $J$ = 8.4 Hz, 2 H), 7.61 (d, $J$ = 8.4 Hz, 2 H). $^{13}$C NMR (100 MHz, $CDCl_3$): $\delta$ 133.5, 131.3, 128.8, 117.4, 113.0, 108.1.

**1-Thiocyanatonaphthalene (17b)**. Procedure B was followed using naphthalen-1-ylboronic acid (34.4 mg, 0.2 mmol) and TMSNCS (84.5 μL, 0.6 mmol, 3.0 equiv). The reaction mixture was purified by flash column chromatography on silica gel (97:3, petroleum ether: EtOAc) to afford 23.4 mg (63%) of the product as a white solid. Exhibited spectral data in accordance with previous report.[6] $^1$H NMR (400 MHz, $CDCl_3$): $\delta$ 8.25 (d, $J$ = 8.4 Hz, 1 H), 7.99 (d, $J$ = 8.4 Hz, 1 H), 7.94 (d, $J$ = 7.6 Hz, 2 H), 7.71 (t, $J$ = 7.2 Hz, 1 H), 7.62 (t, $J$ = 7.2 Hz, 1 H), 7.52 (t, $J$ = 8.0 Hz, 1 H). $^{13}$C NMR (100 MHz, $CDCl_3$): $\delta$ 134.3, 132.4, 132.2, 131.6, 129.0, 128.1, 127.2, 125.9, 124.2, 120.7, 110.7.

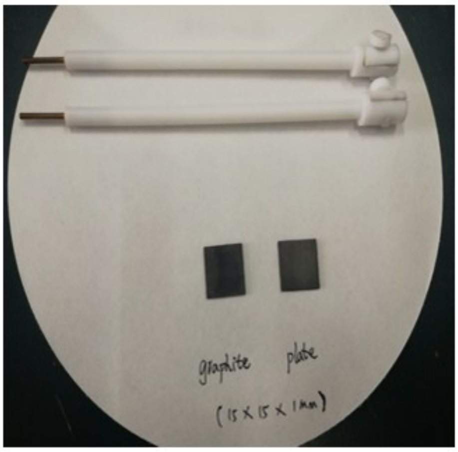
**2-Thiocyanatonaphthalene (18b)**. Procedure B was followed using naphthalen-2-ylboronic acid (34.4 mg, 0.2 mmol) and TMSNCS (84.5 μL, 0.6 mmol, 3.0 equiv). With stirring, the reaction mixture was performed for 5 hours instead of 3 hours. The reaction mixture was purified by flash column chromatography on silica gel (97:3, petroleum ether: EtOAc) to afford 11.5 mg (31%) of the product as a white solid. Exhibited spectral data in accordance with previous report.[6] $^1$H NMR (400 MHz, $CDCl_3$): $\delta$ 8.01 (s, 1 H), 7.92 - 7.78 (m, 3 H), 7.59 - 7.51 (m, 3 H). $^{13}$C NMR (100 MHz, $CDCl_3$): $\delta$ 133.6, 133.0, 130.3, 129.8, 127.9, 127.7, 127.6, 127.5 , 126.2, 121.2, 110.6.

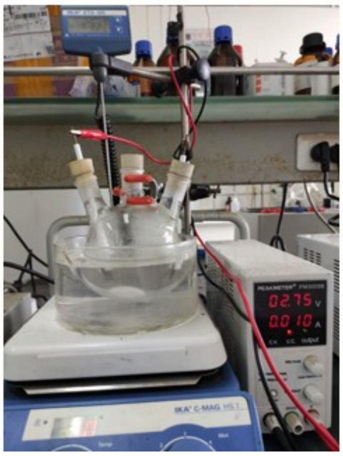
**3-Thiocyanatobenzo[b]thiophene (20b)**. Procedure B was followed using benzo[b]thiophen-3-ylboronic acid (35.6 mg, 0.2 mmol) and TMSNCS (84.5 μL, 0.6 mmol, 3.0 equiv). With stirring, the reaction mixture was performed for 80 minutes instead of 3 hours. The reaction mixture was purified by flash column chromatography on silica gel (97:3, petroleum ether: EtOAc) to afford 31.9 mg (83%) of the product as a white solid. Exhibited spectral data in accordance with previous report.[5] $^1$H NMR (400 MHz, $CDCl_3$): $\delta$ 7.99 (d, $J$ = 7.2 Hz, 1 H), 7.90 (d, $J$ = 6.8 Hz, 2 H), 7.55 (t, $J$ = 8.0 Hz, 1 H), 7.47 (d, $J$ = 7.6 Hz, 1 H). $^{13}$C NMR (100 MHz, $CDCl_3$): $\delta$ 139.5, 137.2, 134.3, 125.9, 125.7, 123.2, 122.2, 112.0, 109.7.

**3-Thiocyanatobenzofuran (22b)**. Procedure B was followed using benzofuran-3-ylboronic acid (32.4 mg, 0.2 mmol) and TMSNCS (84.5 μL, 0.6 mmol, 3.0 equiv). The reaction mixture was purified by flash column chromatography on silica gel (97:3, petroleum ether: EtOAc) to afford 25.6 mg (73%) of the product as a yellow solid. $^1$H NMR (400 MHz, $CDCl_3$): $\delta$ 7.94 (s, 1 H), 7.81 - 7.76 (m, 1 H), 7.58 (dd, J = 8.0, 1.6 Hz, 1 H), 7.46 - 7.42 (m, 2 H). $^{13}$C NMR (100 MHz, $CDCl_3$): $\delta$ 155.3, 149.1, 126.3, 126.2, 124.4, 119.6, 112.3, 109.3, 101.3. HRMS (ESI-TOF) *m/z*: $[M-H]^-$ Calcd. for $C_9H_5NSO$: 174.0024; found: 173.9630.

**2-Thiocyanatobenzofuran (23b)**. Procedure B was followed using benzofuran-2-ylboronic acid (32.4 mg, 0.2 mmol) and TMSNCS (84.5 μL, 0.6 mmol, 3.0 equiv). The reaction mixture was purified by flash column chromatography on silica gel (97:3, petroleum ether: EtOAc) to afford 22.9 mg (65%) of the product as a yellow solid. $^1$H NMR (400 MHz, $CDCl_3$): $\delta$ 7.61 (d, $J$ = 8.0 Hz, 1 H), 7.55 (d, $J$ = 8.0 Hz, 1 H), 7.43 (t, $J$ = 8.0 Hz, 1 H), 7.31 (t, $J$ = 7.6 Hz, 1 H), 7.22 (s, 1 H). $^{13}$C NMR (100 MHz, $CDCl_3$): $\delta$ 157.2, 134.9, 127.4, 126.9, 123.9, 121.6, 117.1, 111.8, 107.4. HRMS: $[M+H]^+$ calcd. for $C_9H_5NSO$: 176.0153; found: 176.0170.

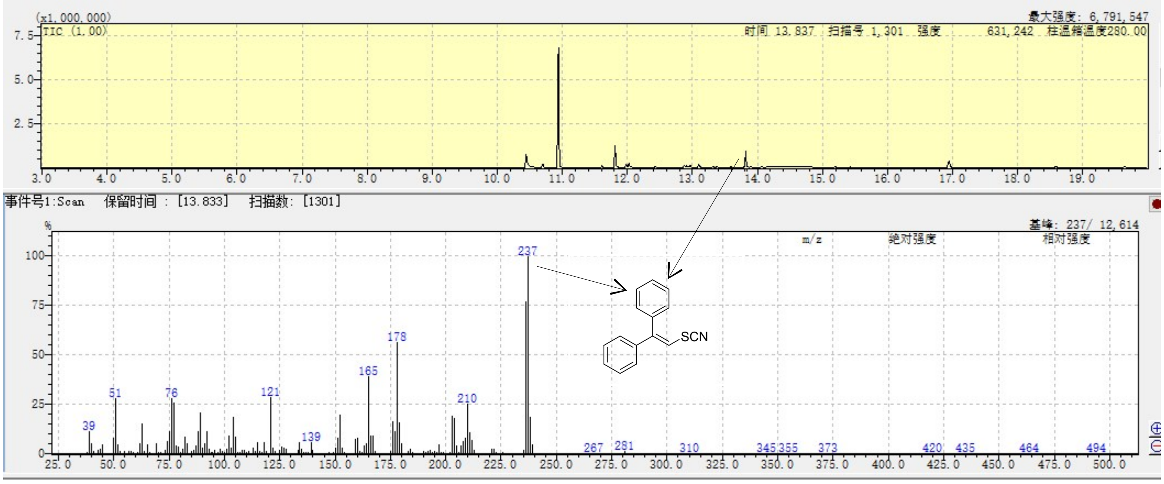
**Gram-scale synthesis of *p*-hydroxyphenyl selenocyanate (5a).** (4-hydroxyphenyl)boronic acid (4.0 mmol), KSeCN (16.0 mmol) and MeCN (200 mL), $H_2O$ (1 mL) were combined and added into an oven-dried three-necked flask (500 mL) with a stir bar. The flask was equipped with graphite felts (15 mm × 15 mm × 1 mm) as both the anode and cathode. The reaction mixture was stirred and electrolyzed at a constant current of 10 mA (The dual display potentiostat was operating in constant current mode) under room temperature for 23 h. When the reaction was finished, the solution was filtered and washed with EtOAc. The solvent was removed with a rotary evaporator. The pure product was obtained by flash column chromatography on silica gel (22:3, petroleum ether: EtOAc) to afford 0.66 g (84%) of the **5a.**





**Free radical trapping experiment**

Into a round bottom flask, (4-methoxyphenyl)boronic acid (0.2 mmol, 1.0 equiv), TMSNCS (0.6 mmol, 3.0 equiv), and DPE (0.4 mmol, 2.0 equiv) were dissolved in MeCN (10 mL), $H_2O$ (30 μL) with KF (0.1 M) as an electrolyte. The resulting solution was electrolyzed with two graphite felts (15 mm × 15 mm × 0.4 mm) as the cathode and anode under a constant current (10 mA) at room temperature for 3 h. GC-MS analysis of the resulting crude reaction solution revealed a DPE-SCN adduct (13.833 min) (mass weight: 237).



**General procedure for cyclic voltammetry (CV)**. CV was performed in a threeelectrode cell connected to a schlenk line under room temperature. Glassy carbon electrode was used as working electrode, and platinum wire was employed as counter electrode. Ag/AgCl reference electrode was submerged in saturated aqueous KCl solution and separated from reaction by a salt bridge. The MeCN (10 mL), $H_2O$ (50 μL) containing 0.25 mol/L KF was poured into the electrochemical cell in all experiments. The scan rate was 100 mV/s ranging from -1.5 V to 3.0 V.

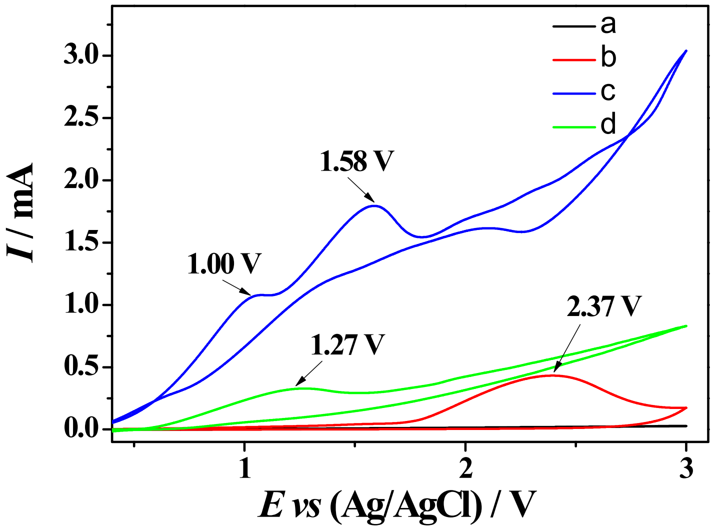


**Figure 1.** Cyclic voltammograms of substrates: (a) background (KF 0.25 mol/L in

$MeCN/H_2O$); (b) 4-methoxyphenylboronic acid **2** (0.05 mol/L); (c) KSeCN (0.08 mol/L); (d). TMSNCS (0.06 mmol/L).

**Crystal data and structure refinement for product 2-thiocyanatobenzofuran (23b).**

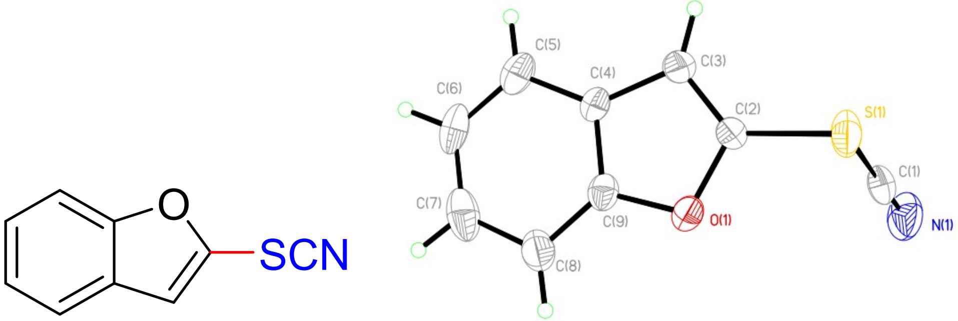


**Figure 2.** X-structure of **23b**. (CCDC 1902841)

**Table 1.** Crystallographic information for **23b**

| compound | 23b |
|---|---|
| CCDC numbers | 1902841 |
| Empirical formula | $C_9H_5NOS$ |
| Formula weight | 175.21 |
| Temperature | 293(2) K |
| Wavelength | 0.71073 Å |
| Crystal system | Monoclinic |
| Space group | P2(1)/c |
| Unit cell dimensions | a = 8.398(5) Å = 90°<br>b = 7.421(5) Å = 90.90°<br>c = 13.749(7) Å = 90° |
| Volume | 844.1(9) $Å^3$ |
| Z | 4 |
| Density (calculated) | 1.379 $Mg/m^3$ |
| Absorption coefficient | 0.327 $mm^{-1}$ |
| F(000) | 360 |
| Crystal size | 0.25 x 0.23 x 0.20 mm |
| Theta range for data collection | 2.46 to 26.00° |
| Index ranges | -10<=h<=10, -9 <=k<=9, -16<=l<=16 |
| Reflections collected | 6090 |
| Independent reflections | 1655 [R(int) = 0.0472] |
| Completeness to theta = 26.00° | 99.9% |
| Absorption correction | Semi-empirical from equivalents |
| Max. and min. transmission | 0.937 and 0.922 |

| | |
|---|---|
| Refinement method | Full-matrix least-squares on F2 |
| Data / restraints / parameters | 1655 / 0 / 109 |
| Goodness-of-fit on F2 | 3.633 |
| Final R indices [I>2sigma(I)] | $R_1$ = 0.0905, $wR_2$ = 0.1814 |
| R indices (all data) | $R_1$ = 0.1066, $wR_2$ = 0.1828 |
| Absolute structure parameter | 109 |
| Largest diff. peak and hole | 0.760 and -0.359 e.Å$^{-3}$ |

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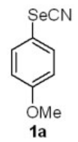
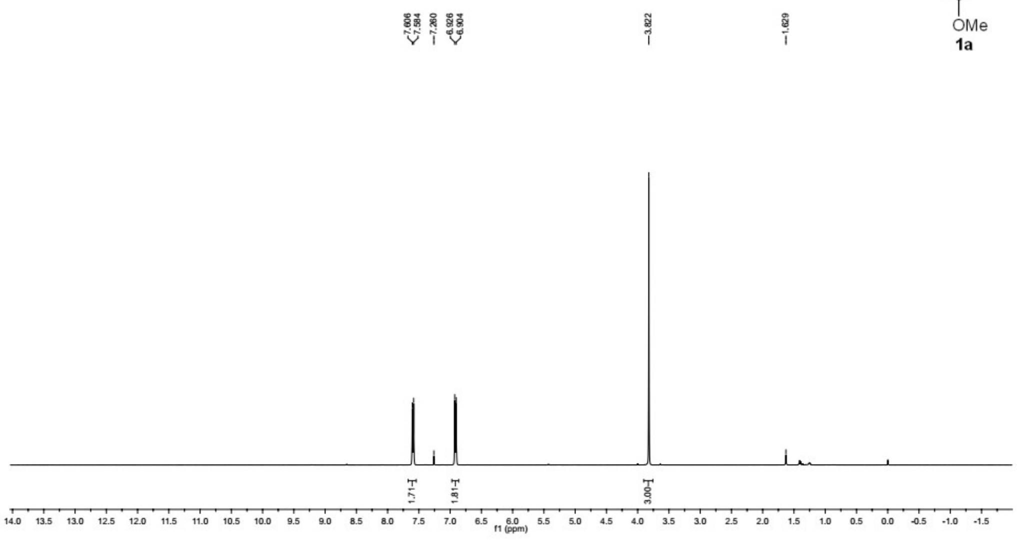

SeCN
OMe

**1a**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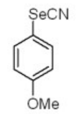
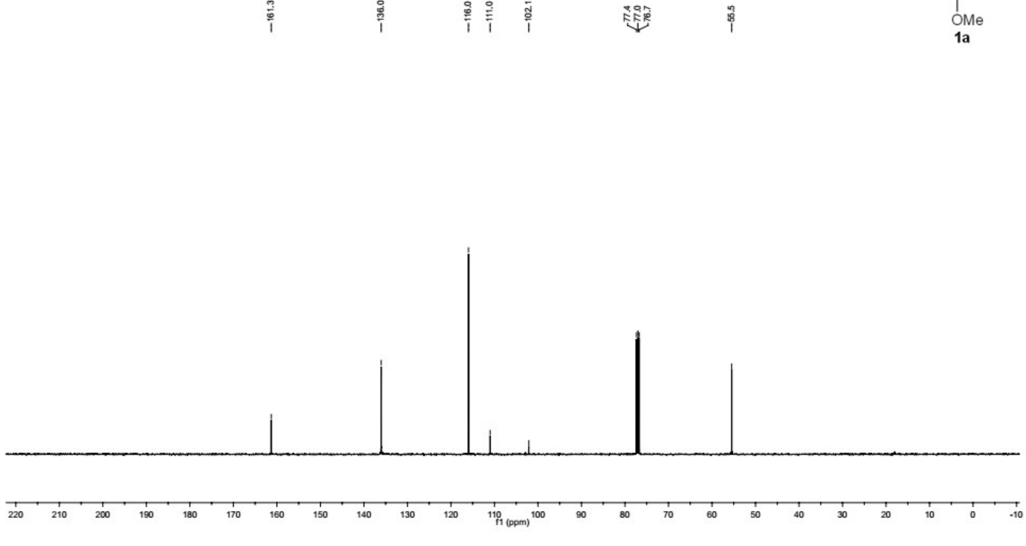
7.260
6.926
6.904
3.822
1.629
1.71
1.81
3.00
14.0 13.5 13.0 12.5 12.0 11.5 11.0 10.5 10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5 -1.0 -1.5
f1 (ppm)


SeCN
OMe

**1a**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116.0
111.0
102.1
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77.0
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55.5
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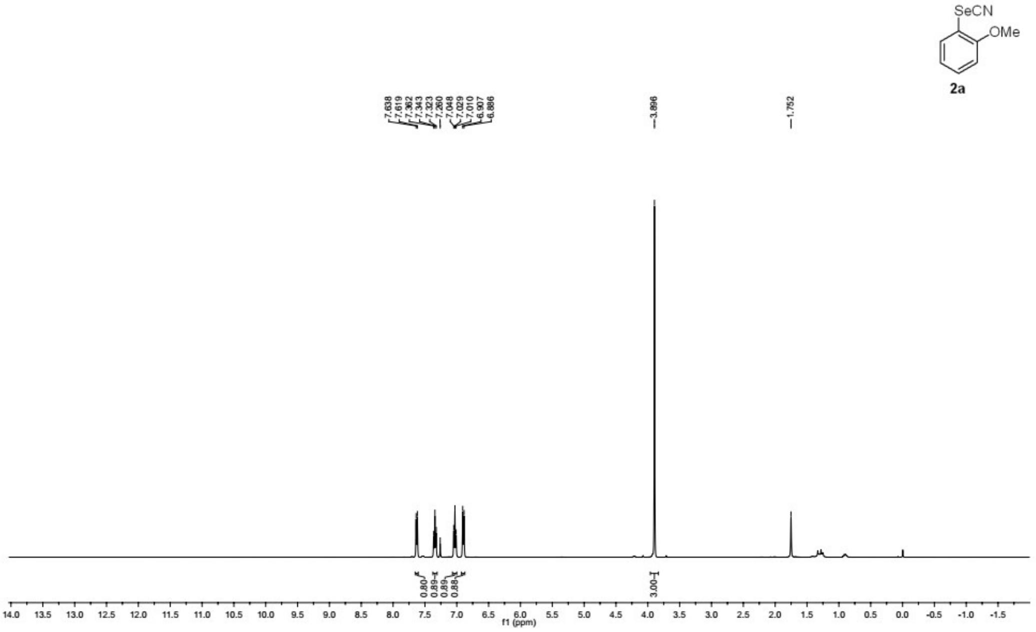
f1 (ppm)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OMe
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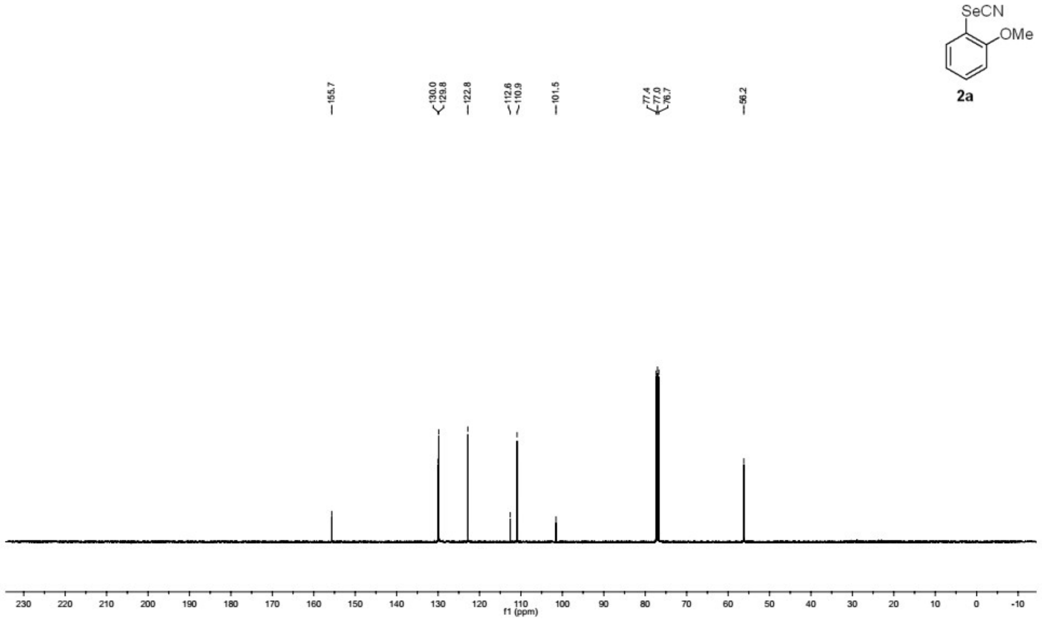
0.89
0.89
0.88
3.00
f1 (ppm)

2a


SeCN
OMe
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129.8
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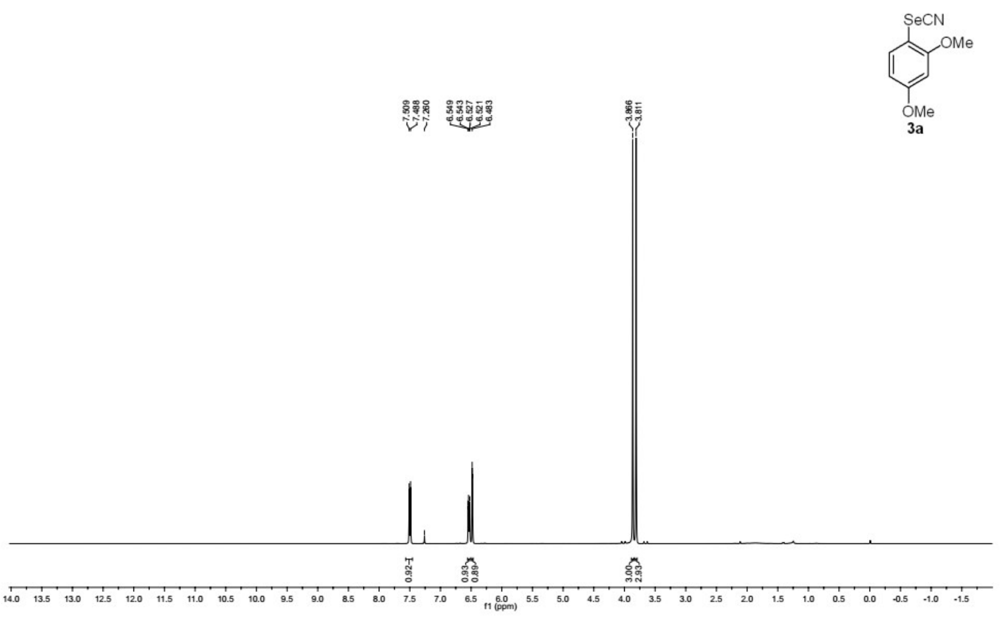
112.6
110.9
101.5
77.4
77.0
76.7
56.2
f1 (ppm)

2a


SeCN
OMe
OMe
3a
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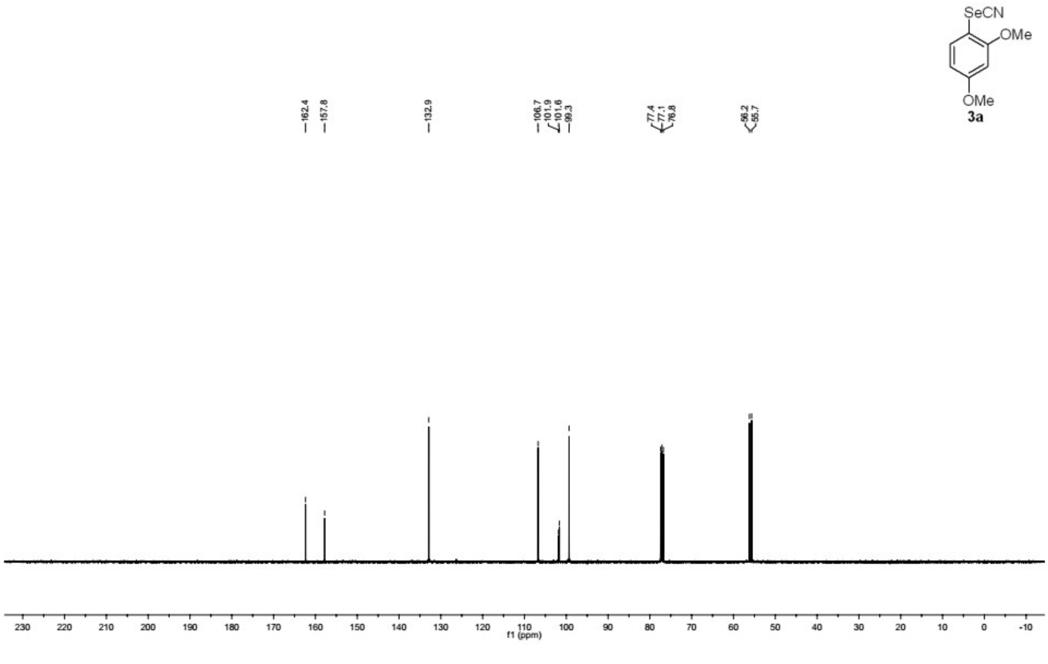
7.488
7.260
6.549
6.543
6.527
6.521
6.483
3.866
3.811
0.92
0.93
0.89
3.00
2.93
14.0 13.5 13.0 12.5 12.0 11.5 11.0 10.5 10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5 -1.0 -1.5
f1 (ppm)


SeCN
OMe
OMe
3a
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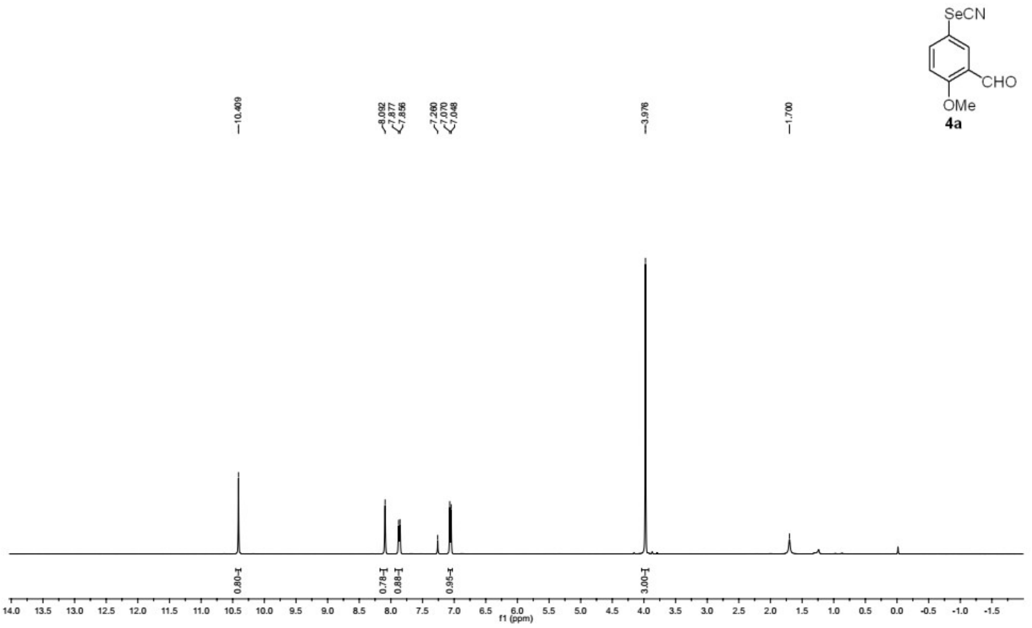
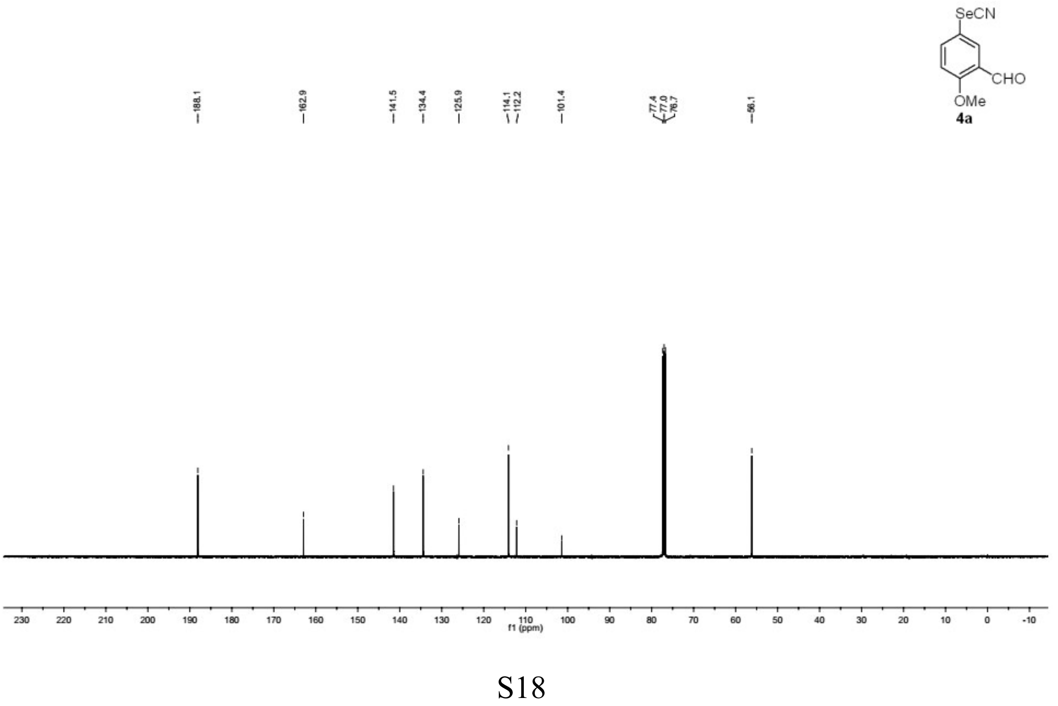
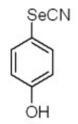
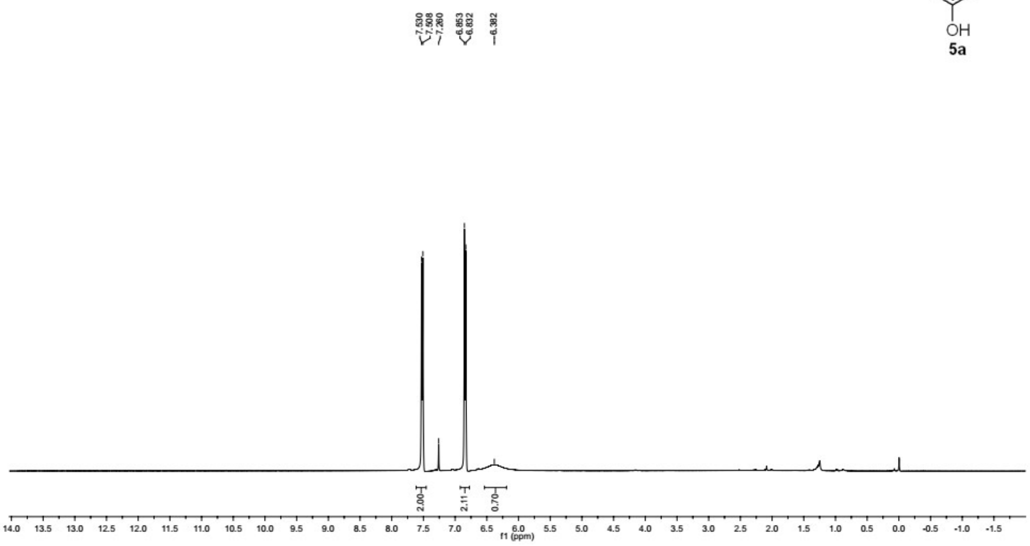
132.9
106.7
101.9
101.6
99.3
77.4
77.1
76.8
56.2
55.7
230 220 210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10
f1 (ppm)

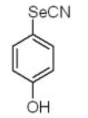

10.409
8.092
7.877
7.856
7.260
7.070
7.048
3.976
1.700
0.80
0.78
0.88
0.95
3.00
SeCN
CHO
OMe
4a
14.0 13.5 13.0 12.5 12.0 11.5 11.0 10.5 10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5 -1.0 -1.5
f1 (ppm)


188.1
162.9
141.5
134.4
125.9
114.1
112.2
101.4
77.4
77.0
76.7
56.1
SeCN
CHO
OMe
4a
230 220 210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10
f1 (ppm)

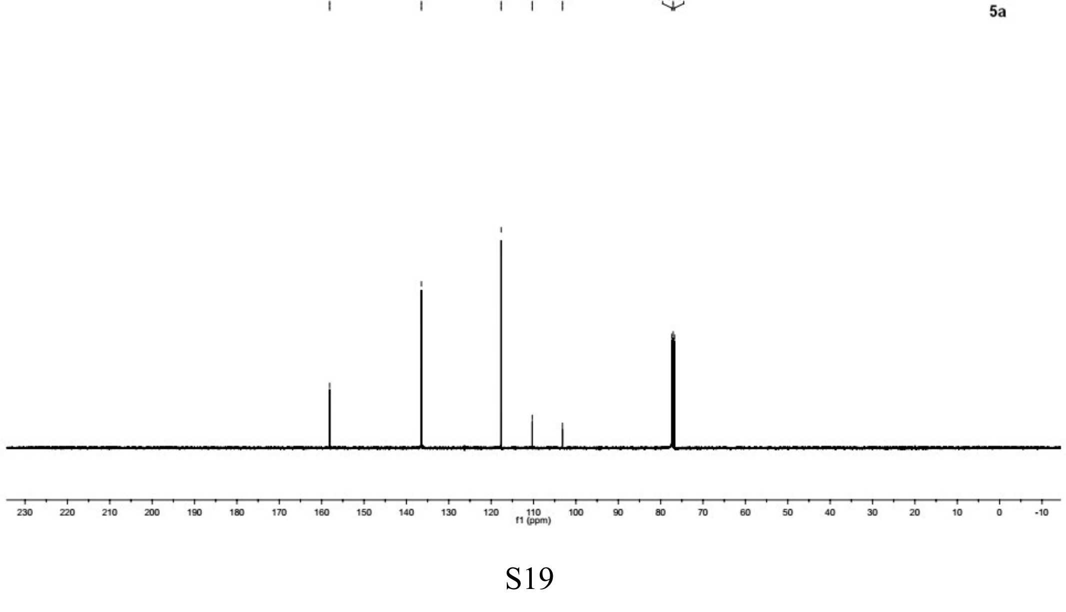

SeCN
OH

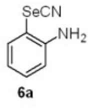
**5a**


7.530
7.508
7.260
6.853
6.832
6.382
2.00
2.11
0.70
14.0 13.5 13.0 12.5 12.0 11.5 11.0 10.5 10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5 -1.0 -1.5
f1 (ppm)

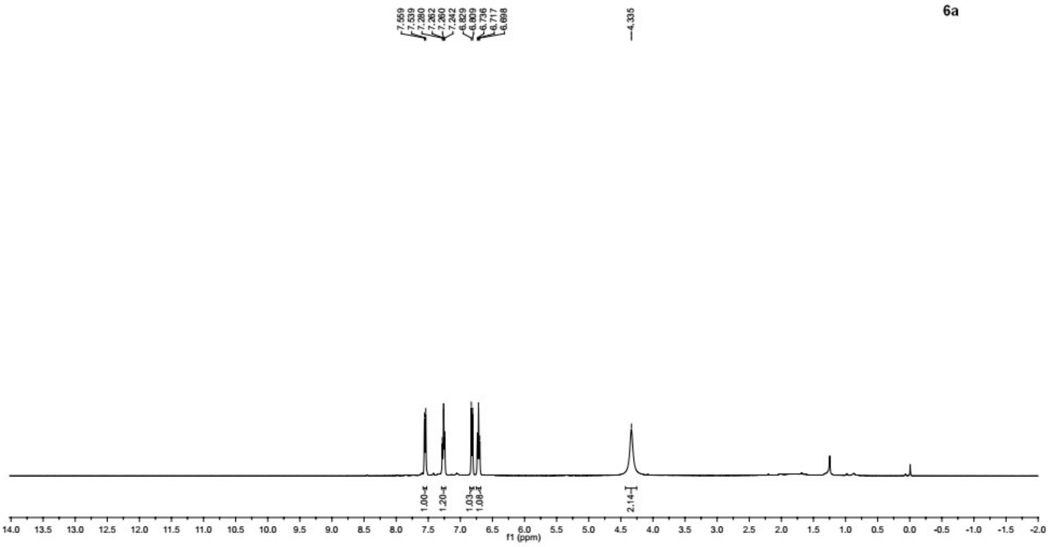

SeCN
OH

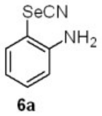
**5a**


158.1
136.5
117.6
110.3
103.2
77.4
77.0
76.7
230 220 210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10
f1 (ppm)

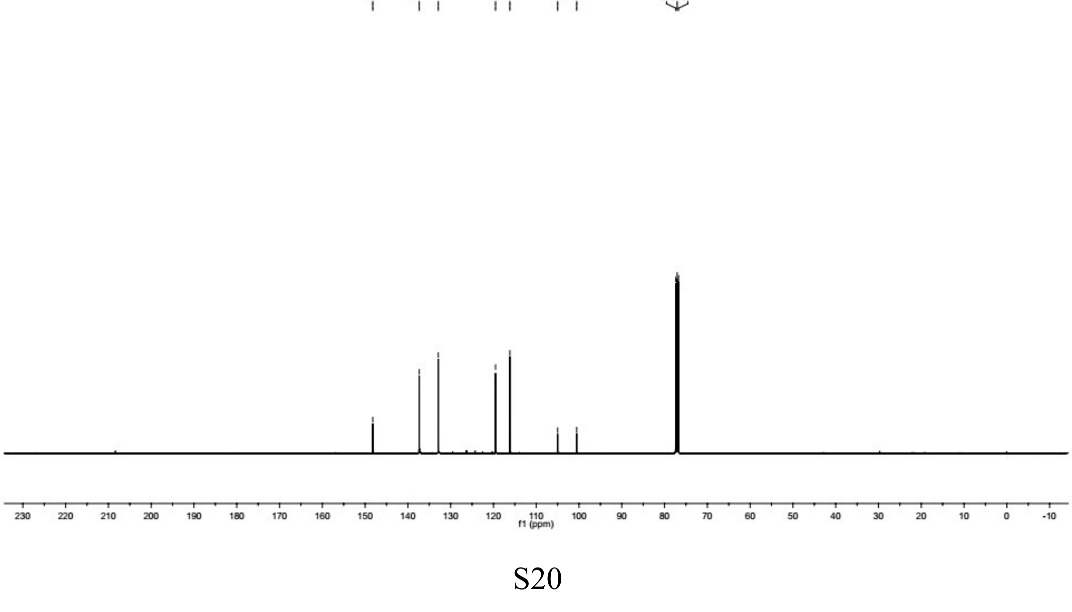


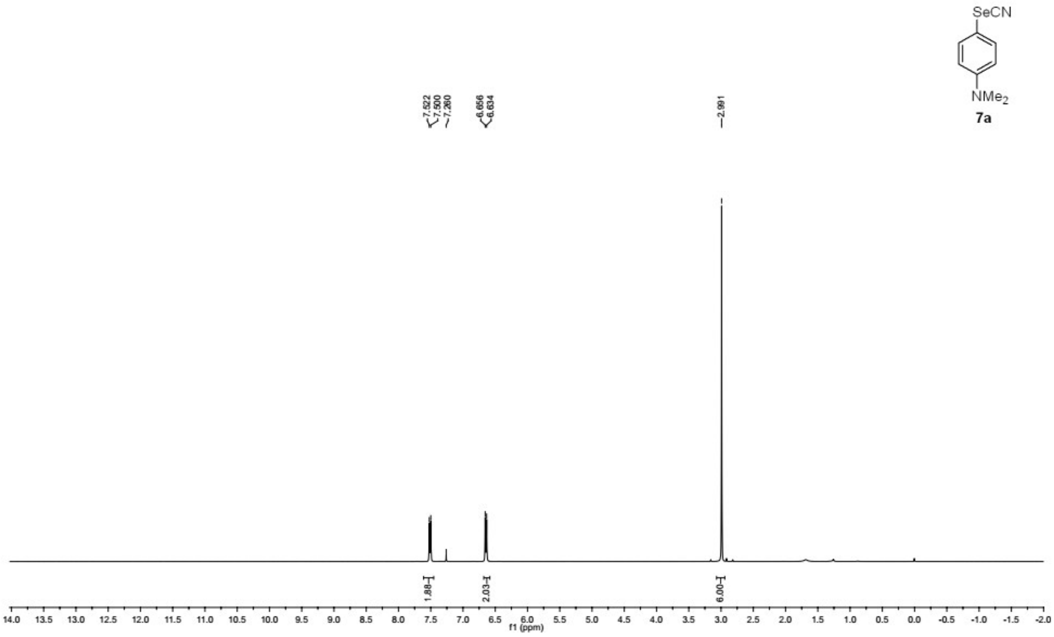
**6a**


7.559
7.539
7.280
7.262
7.260
7.242
6.829
6.809
6.736
6.717
6.698
4.335
1.00
1.20
1.03
1.08
2.14
14.0 13.5 13.0 12.5 12.0 11.5 11.0 10.5 10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5 -1.0 -1.5 -2.0
f1 (ppm)

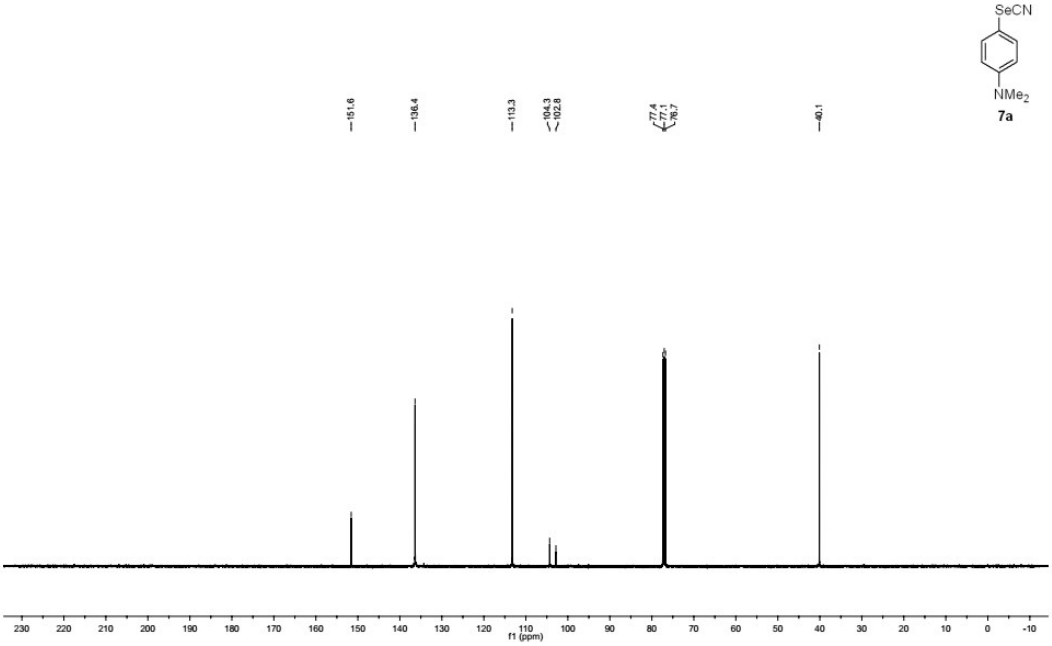


**6a**

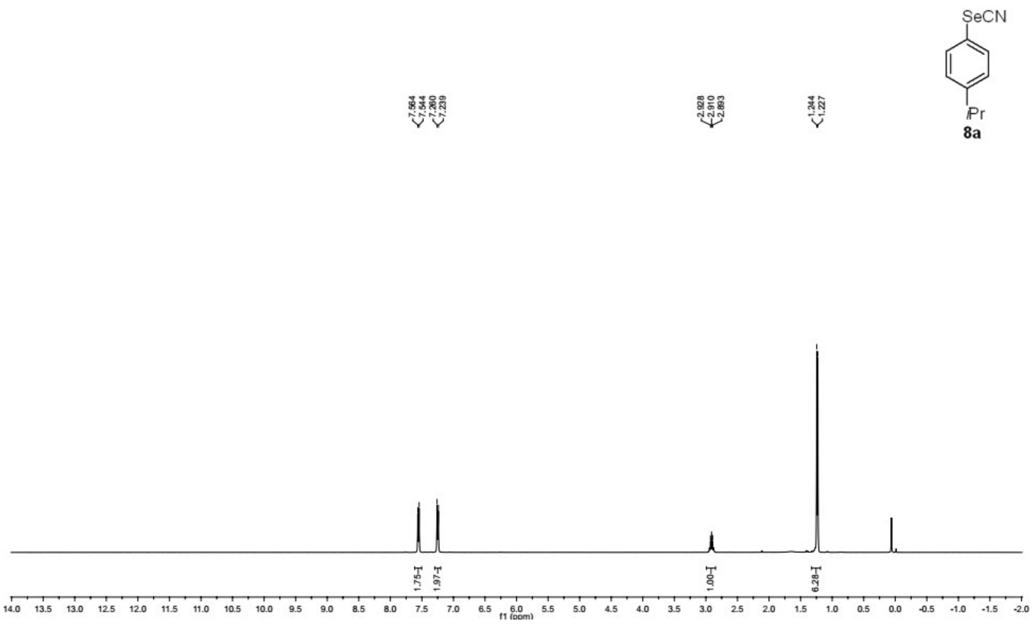

148.2
137.3
132.9
119.5
116.2
105.0
100.5
77.4
77.1
76.7
230 220 210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10
f1 (ppm)

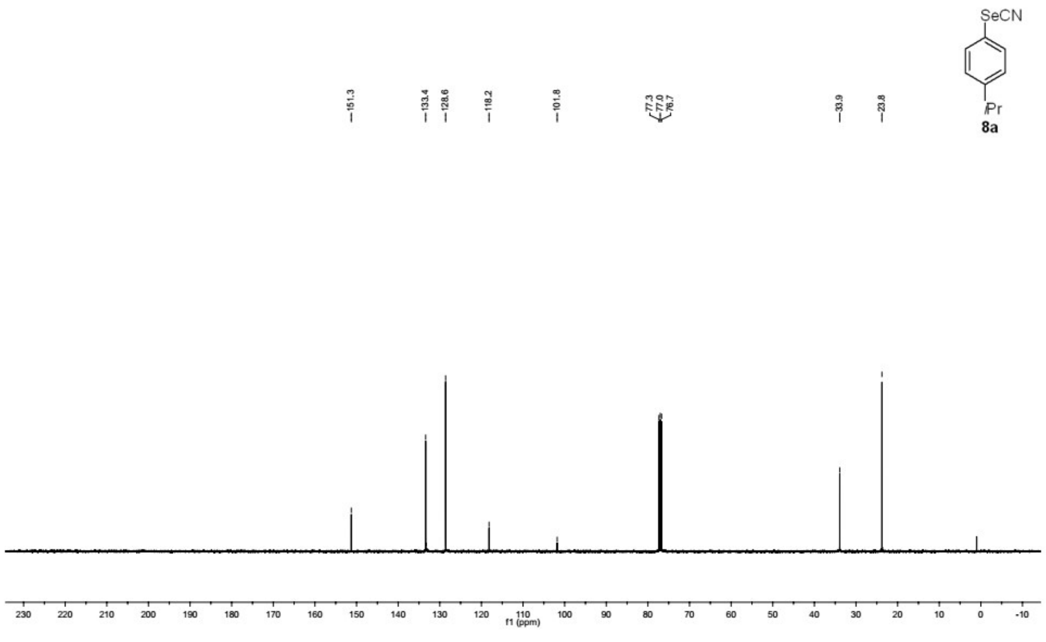

SeCN
NMe$_2$
7.522
7.500
7.260
6.656
6.634
2.991
1.88
2.03
6.00
14.0 13.5 13.0 12.5 12.0 11.5 11.0 10.5 10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5 -1.0 -1.5 -2.0
f1 (ppm)

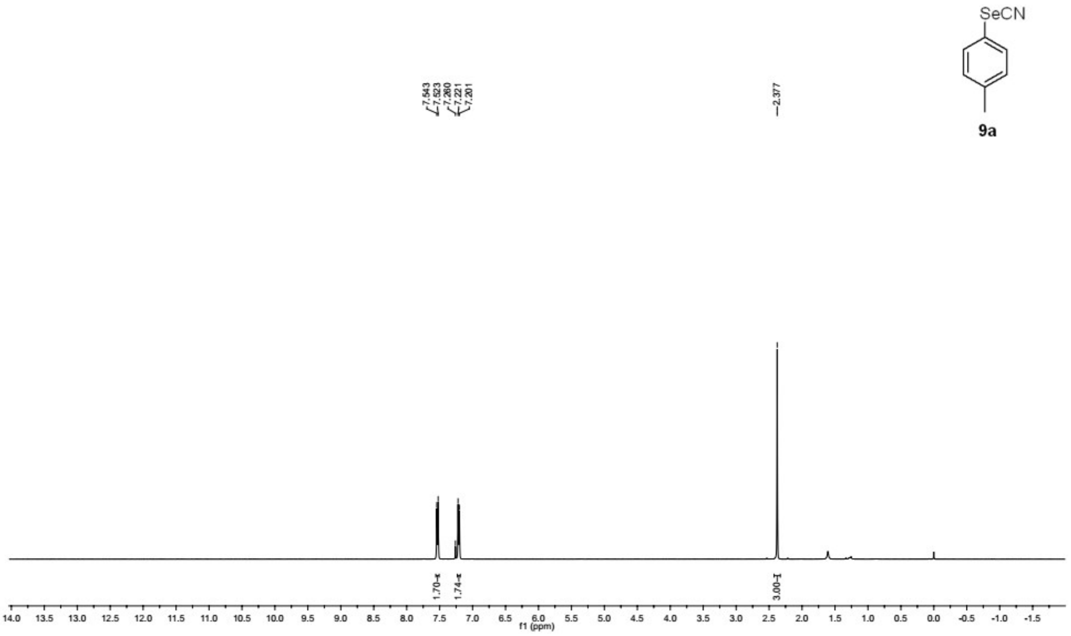
**7a**


SeCN
NMe$_2$
151.6
136.4
113.3
104.3
102.8
77.4
77.1
76.7
40.1
230 220 210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10
f1 (ppm)

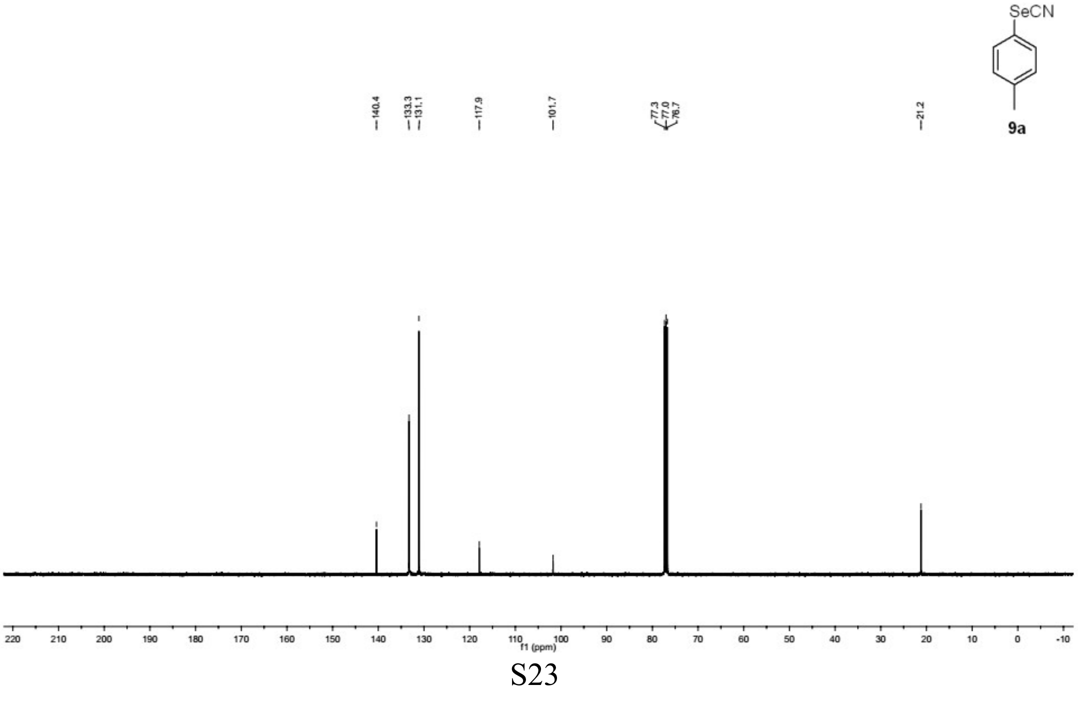
**7a**


SeCN
iPr
8a
7.564
7.544
7.260
7.239
2.928
2.910
2.893
1.244
1.227
1.75
1.97
1.00
6.28
14.0 13.5 13.0 12.5 12.0 11.5 11.0 10.5 10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5 -1.0 -1.5 -2.0
f1 (ppm)

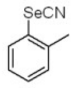

SeCN
iPr
8a
151.3
133.4
128.6
118.2
101.8
77.3
77.0
76.7
33.9
23.8
230 220 210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10
f1 (ppm)



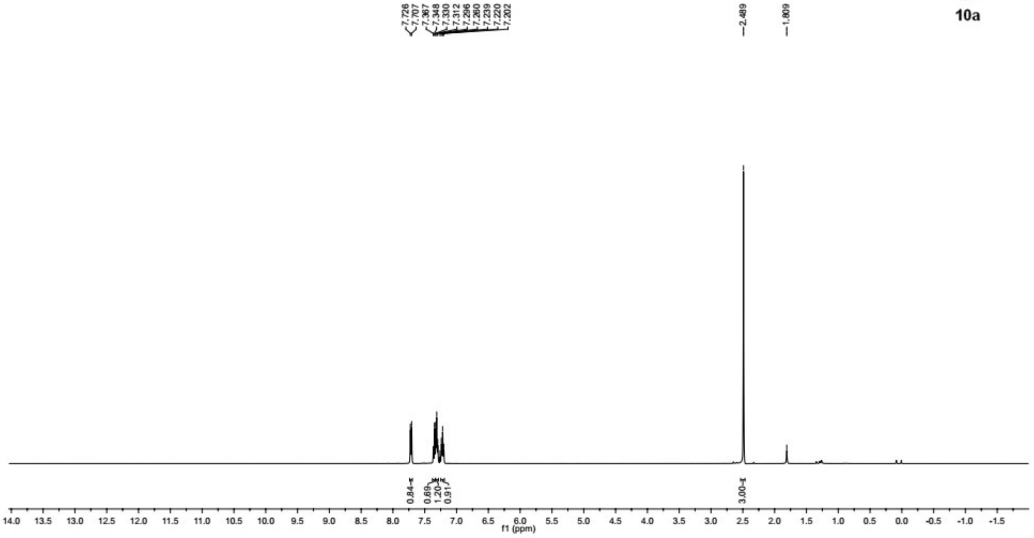
SeCN
9a
7.543
7.523
7.260
7.221
7.201
2.377
1.70
1.74
3.00
14.0
13.5
13.0
12.5
12.0
11.5
11.0
10.5
10.0
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
-0.5
-1.0
-1.5
f1 (ppm)

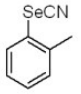


SeCN
9a
140.4
133.3
131.1
117.9
101.7
77.3
77.0
76.7
21.2
220
210
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
-10
f1 (ppm)

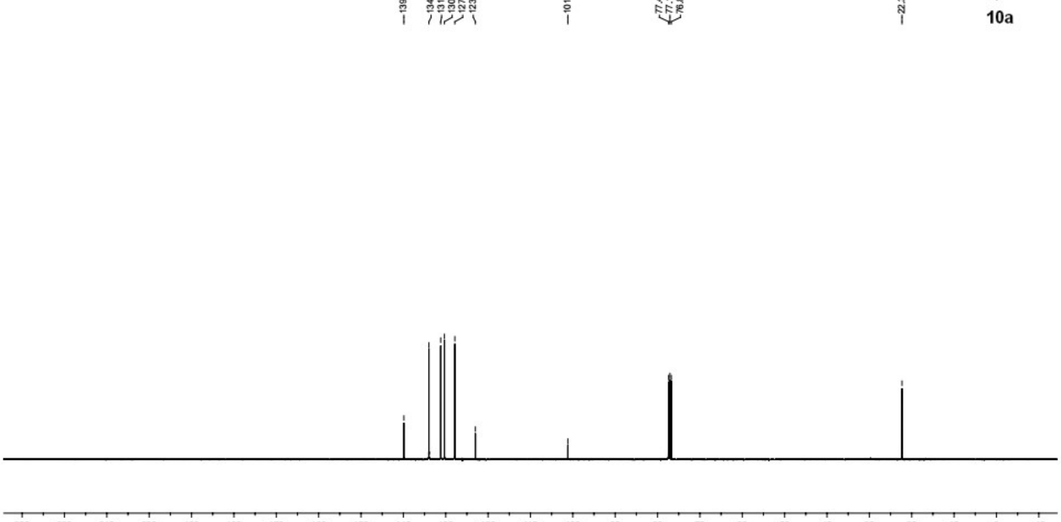

SeCN

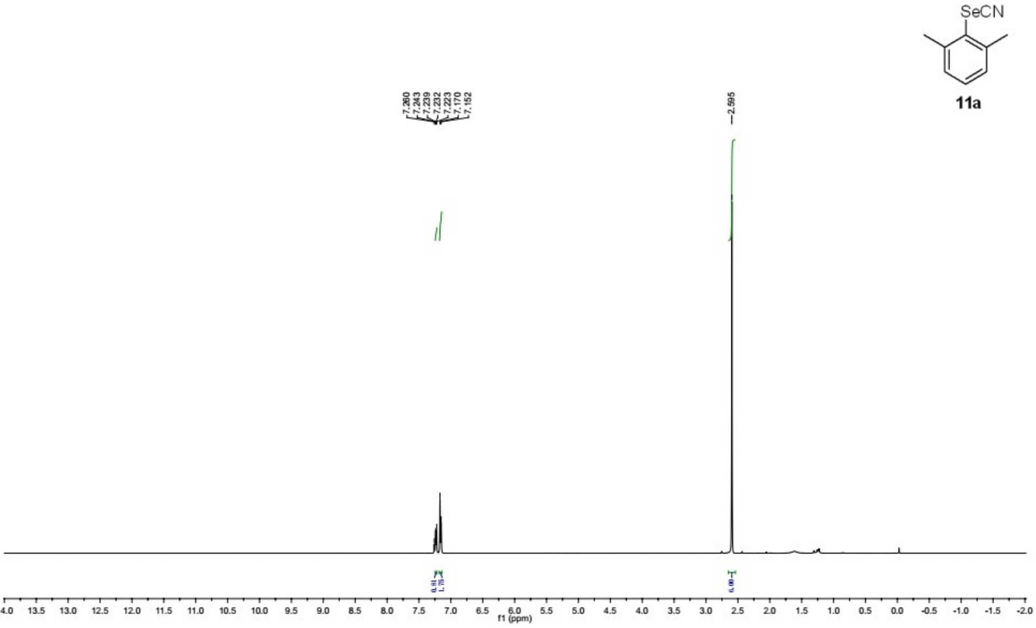
**10a**

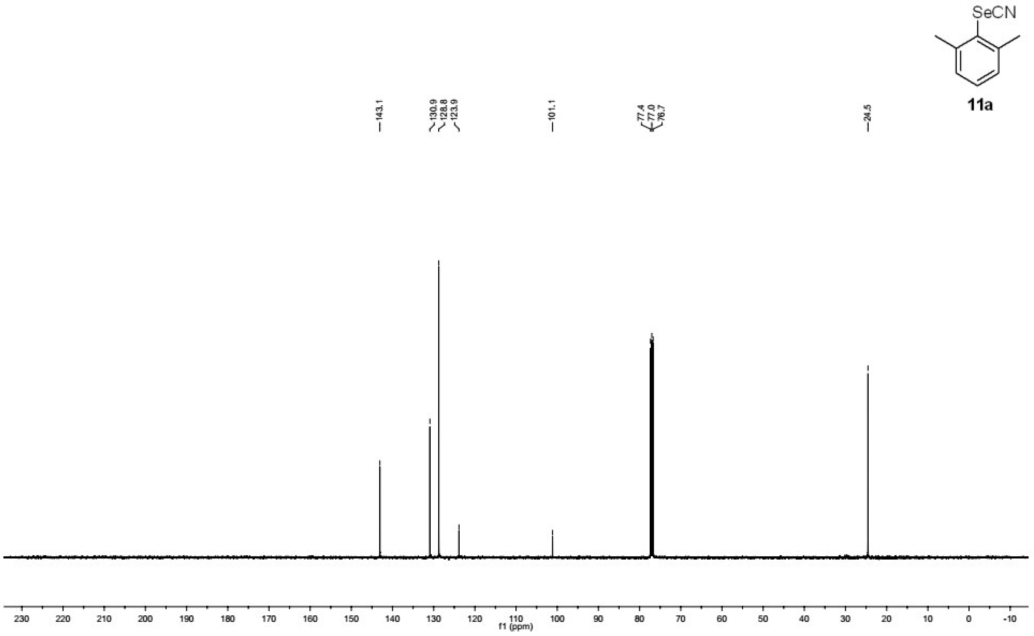

7.726
7.707
7.367
7.348
7.330
7.312
7.296
7.260
7.239
7.220
7.202
2.489
1.809
0.84
0.69
1.20
0.91
3.00
14.0 13.5 13.0 12.5 12.0 11.5 11.0 10.5 10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5 -1.0 -1.5
f1 (ppm)

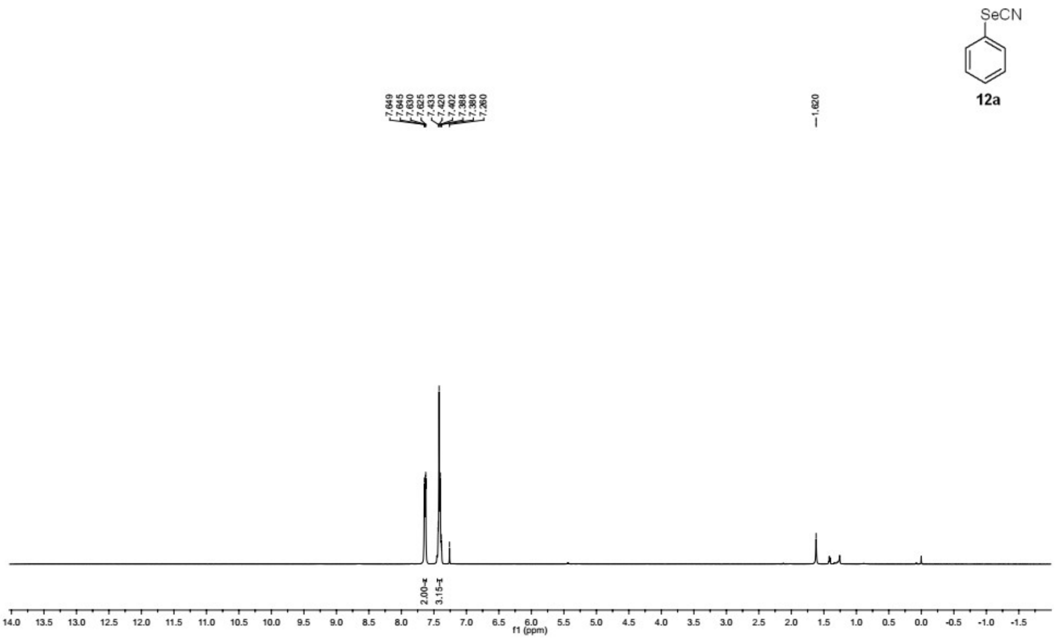

SeCN

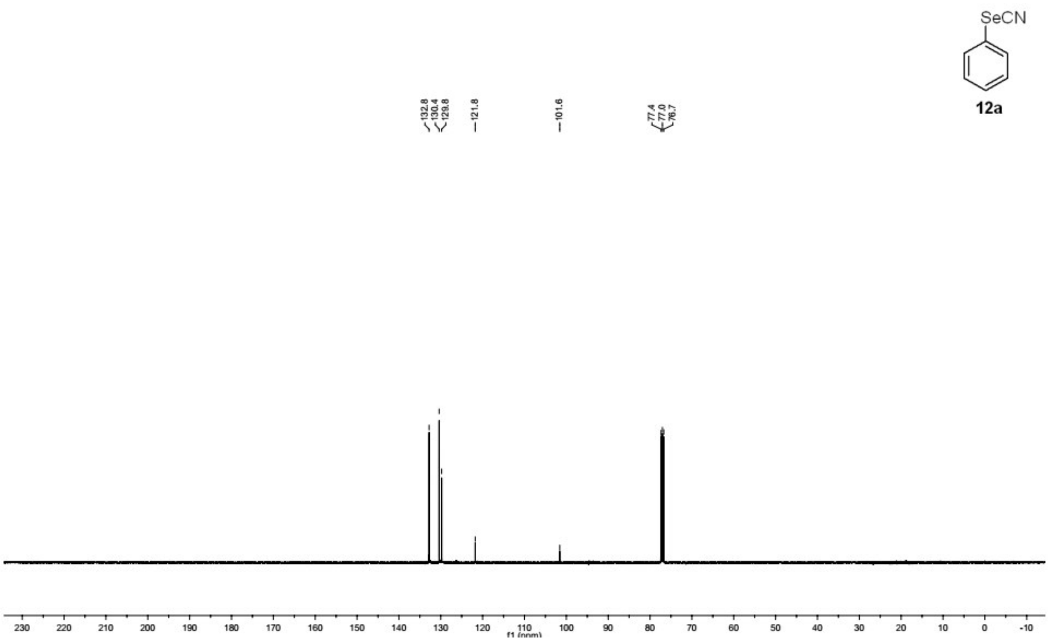
**10a**

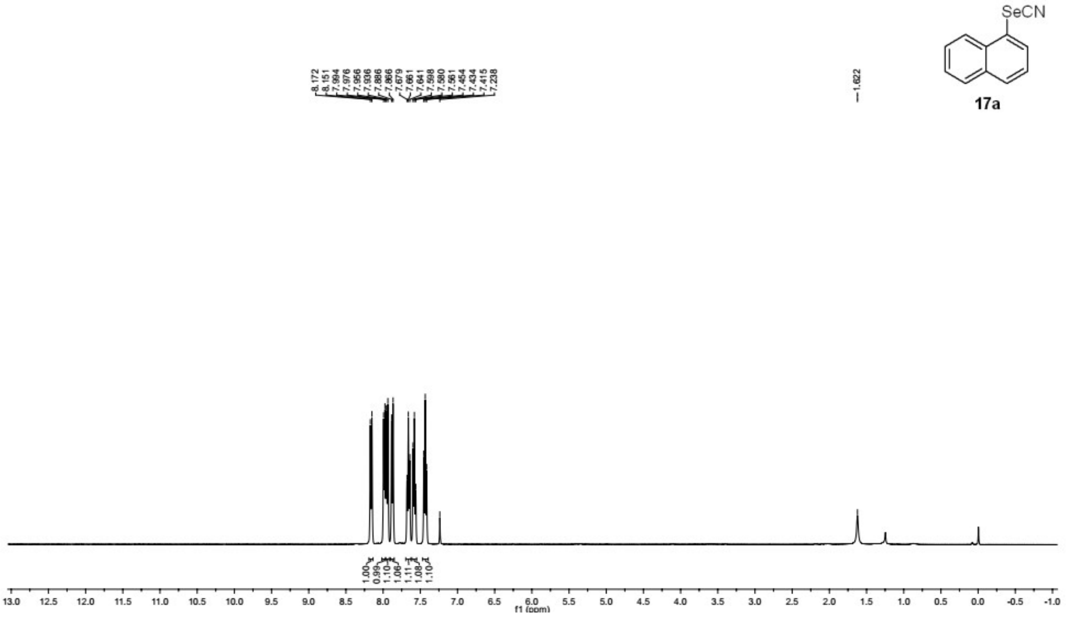

139.9
134.0
131.2
130.3
127.8
123.0
101.2
77.4
77.1
76.8
22.3
230 220 210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10
f1 (ppm)


SeCN
11a
7.260
7.243
7.239
7.232
7.223
7.170
7.152
2.595
0.81
1.75
6.00
14.0 13.5 13.0 12.5 12.0 11.5 11.0 10.5 10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5 -1.0 -1.5 -2.0
f1 (ppm)

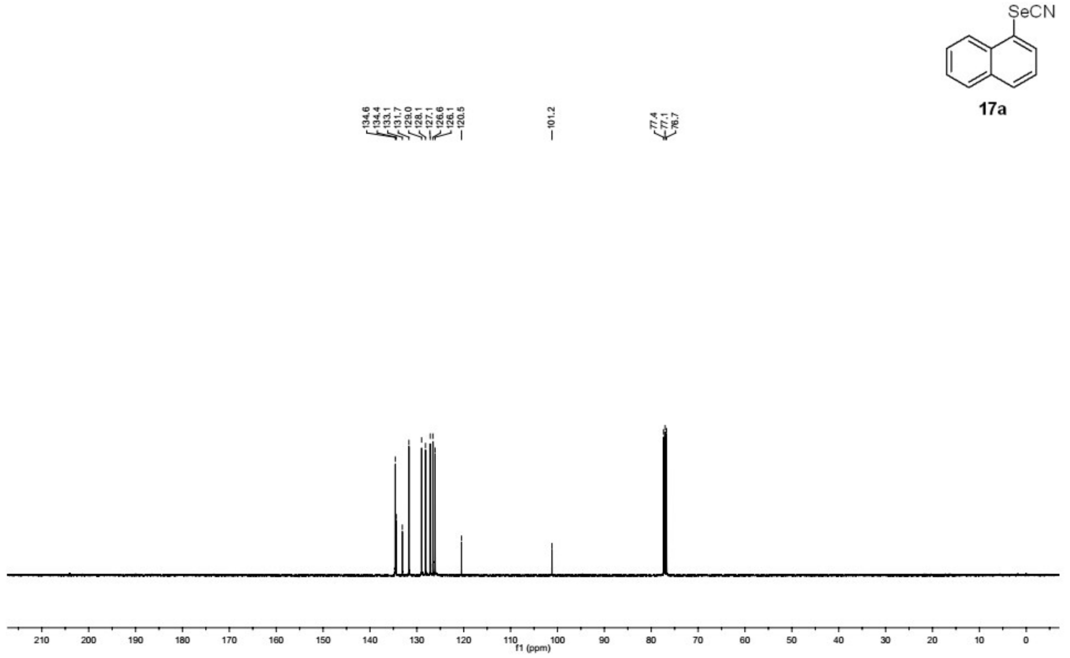

SeCN
11a
143.1
130.9
128.8
123.9
101.1
77.4
77.0
76.7
24.5
230 220 210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10
f1 (ppm)


SeCN
12a
7.649
7.645
7.630
7.625
7.433
7.420
7.402
7.388
7.380
7.260
1.620
2.00
3.15
14.0 13.5 13.0 12.5 12.0 11.5 11.0 10.5 10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5 -1.0 -1.5
f1 (ppm)

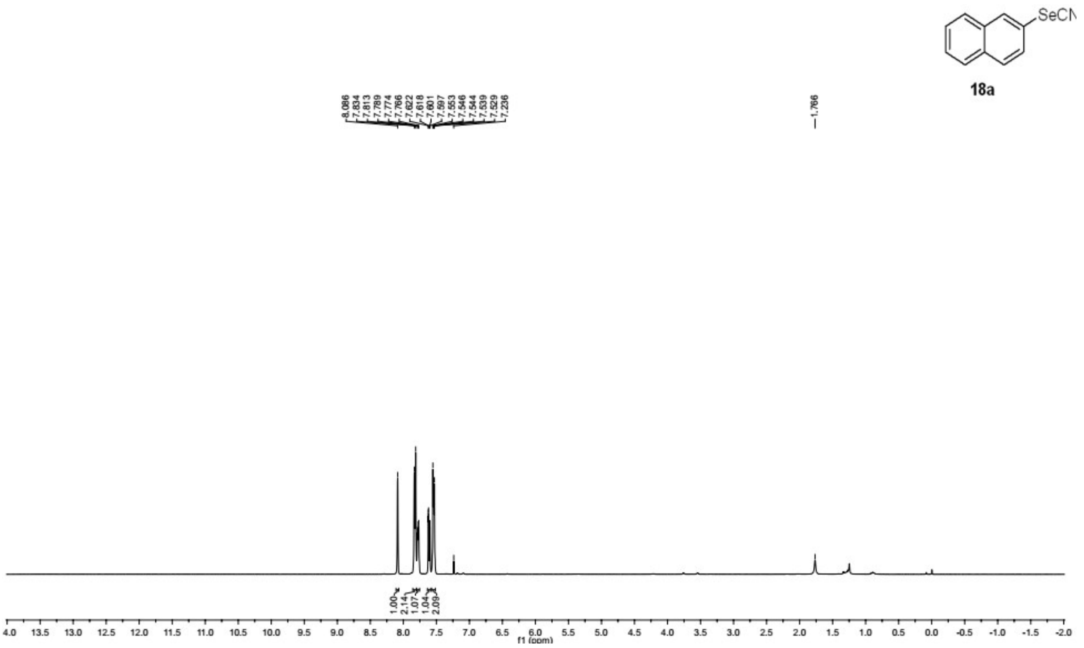

SeCN
12a
132.8
130.4
129.8
121.8
101.6
77.4
77.0
76.7
230 220 210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10
f1 (ppm)


SeCN
8.172
8.151
7.994
7.976
7.956
7.936
7.886
7.866
7.679
7.661
7.641
7.598
7.580
7.561
7.454
7.434
7.415
7.238
1.622
1.00
0.99
1.10
1.06
1.11
1.08
1.10
13.0
12.5
12.0
11.5
11.0
10.5
10.0
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
-0.5
-1.0
f1 (ppm)

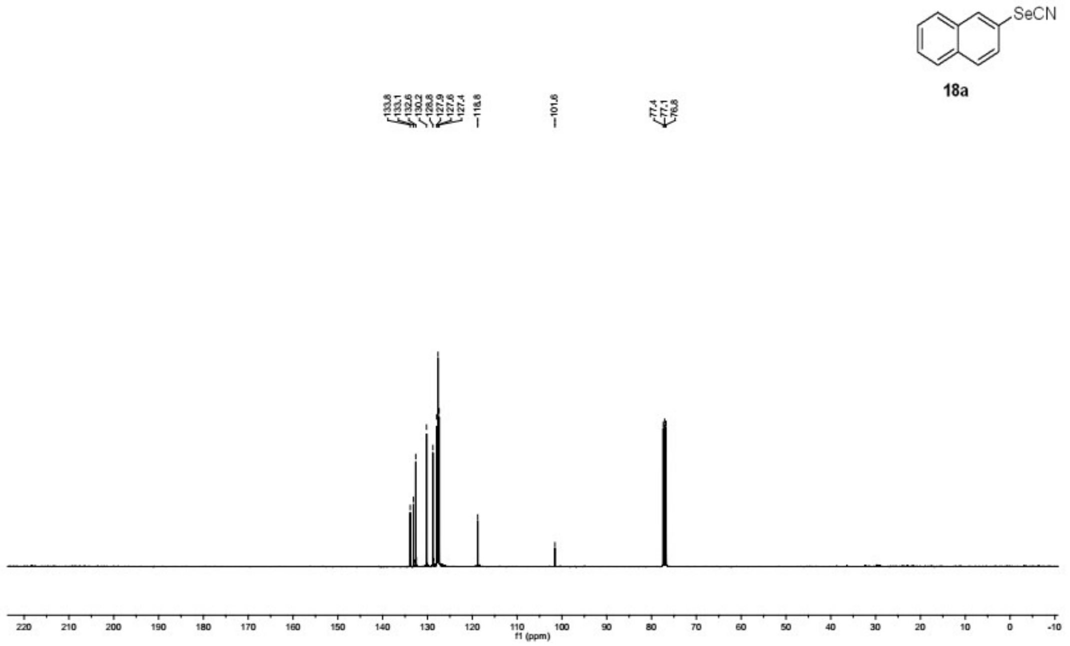
**17a**


SeCN
134.6
134.4
133.1
131.7
129.0
128.1
127.1
126.6
126.1
120.5
101.2
77.4
77.1
76.7
210
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
f1 (ppm)

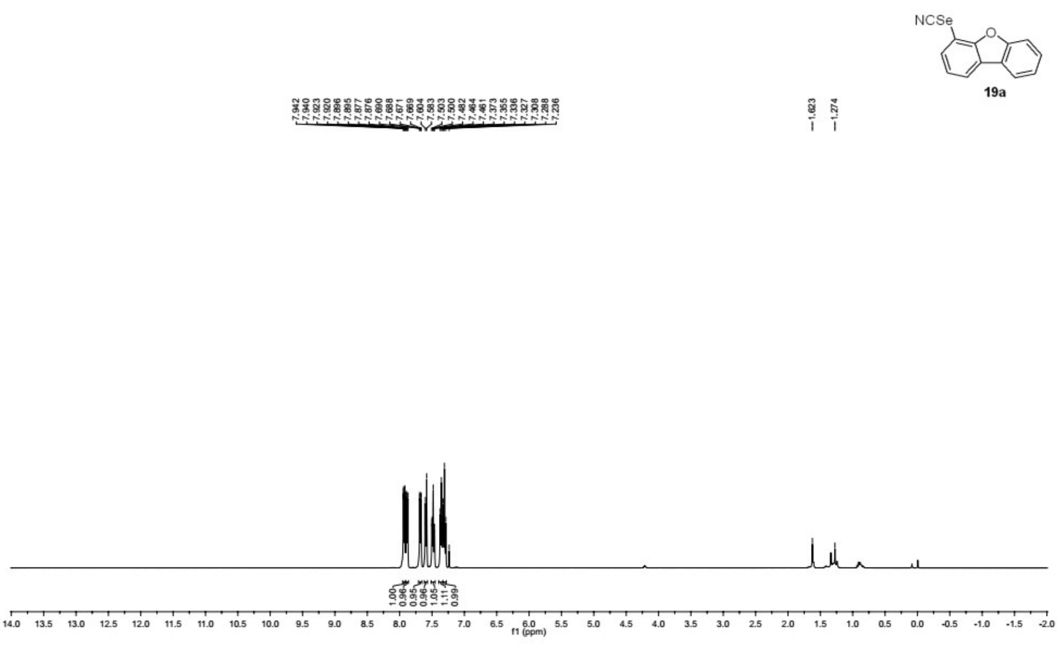
**17a**

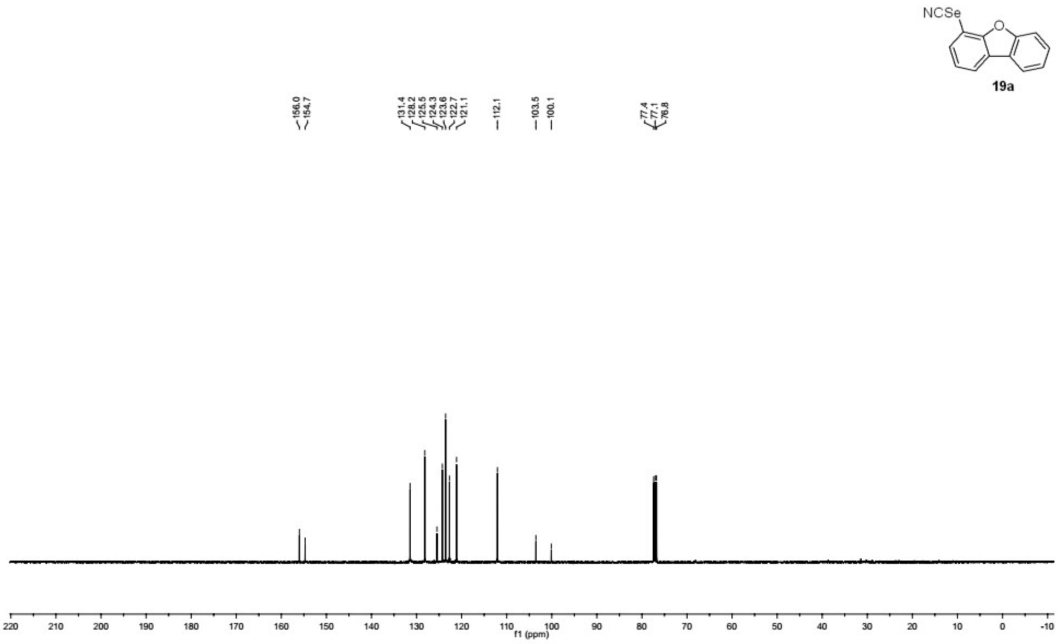

**18a**

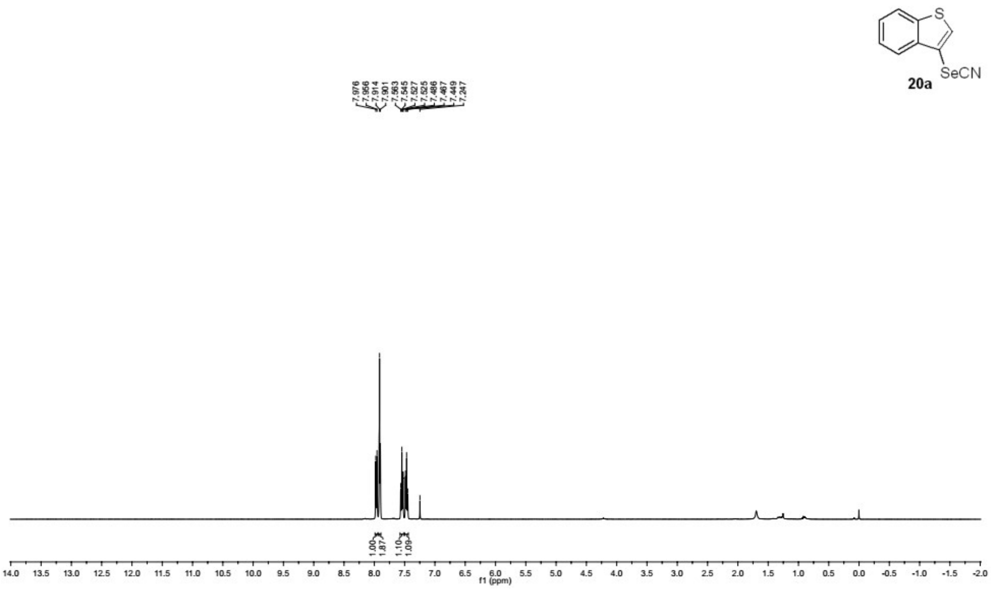
SeCN
8.086
7.834
7.813
7.789
7.774
7.766
7.622
7.618
7.601
7.597
7.553
7.546
7.544
7.539
7.529
7.236
1.766
1.00
2.14
1.07
1.04
2.09
4.0
13.5
13.0
12.5
12.0
11.5
11.0
10.5
10.0
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
-0.5
-1.0
-1.5
-2.0
f1 (ppm)

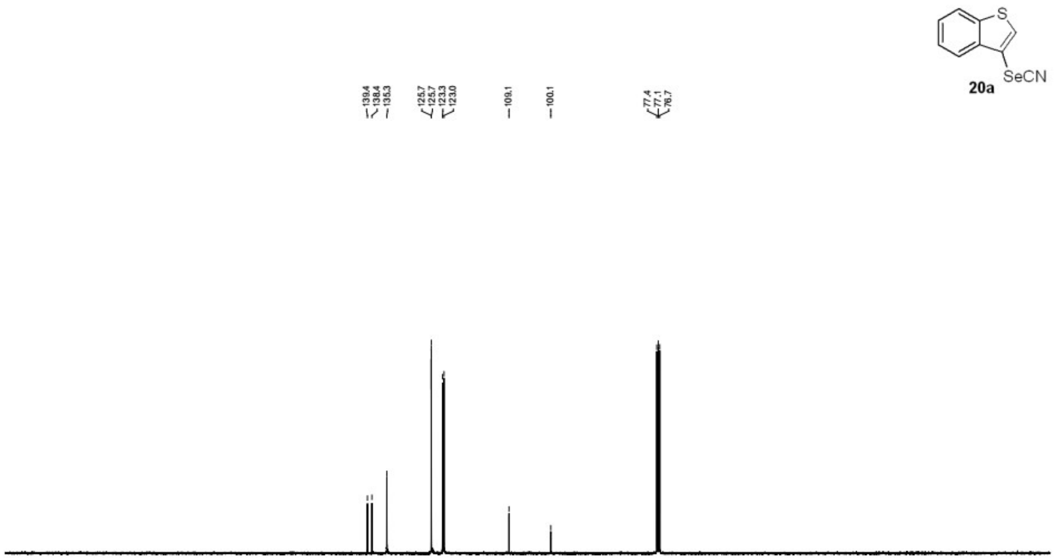

**18a**

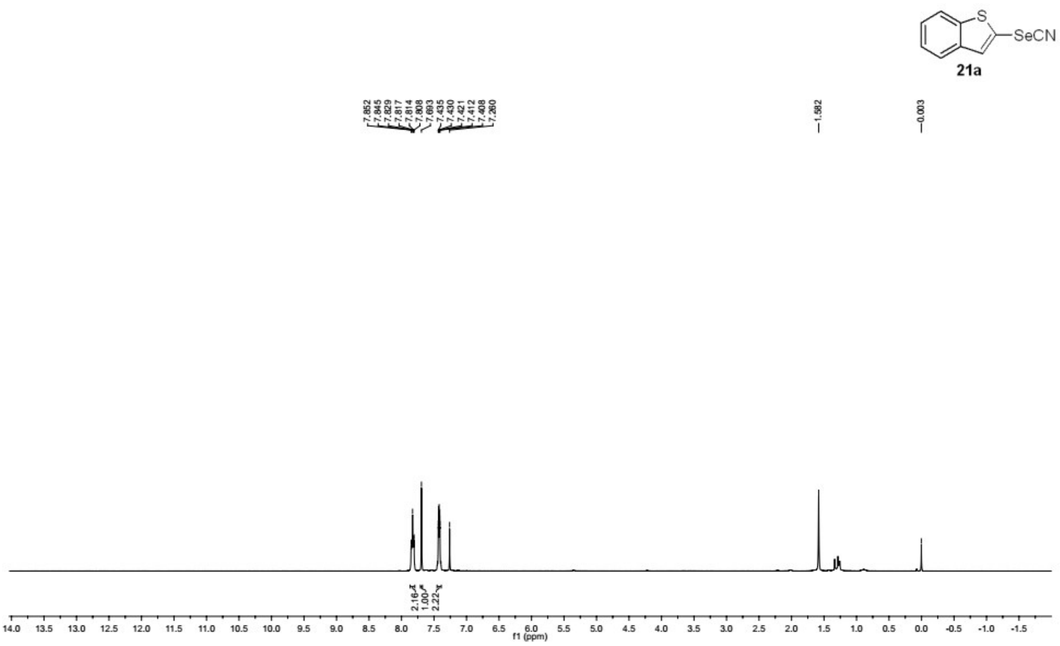
SeCN
133.8
133.1
132.6
130.2
128.8
127.9
127.6
127.4
118.8
101.6
77.4
77.1
76.8
220
210
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
-10
f1 (ppm)

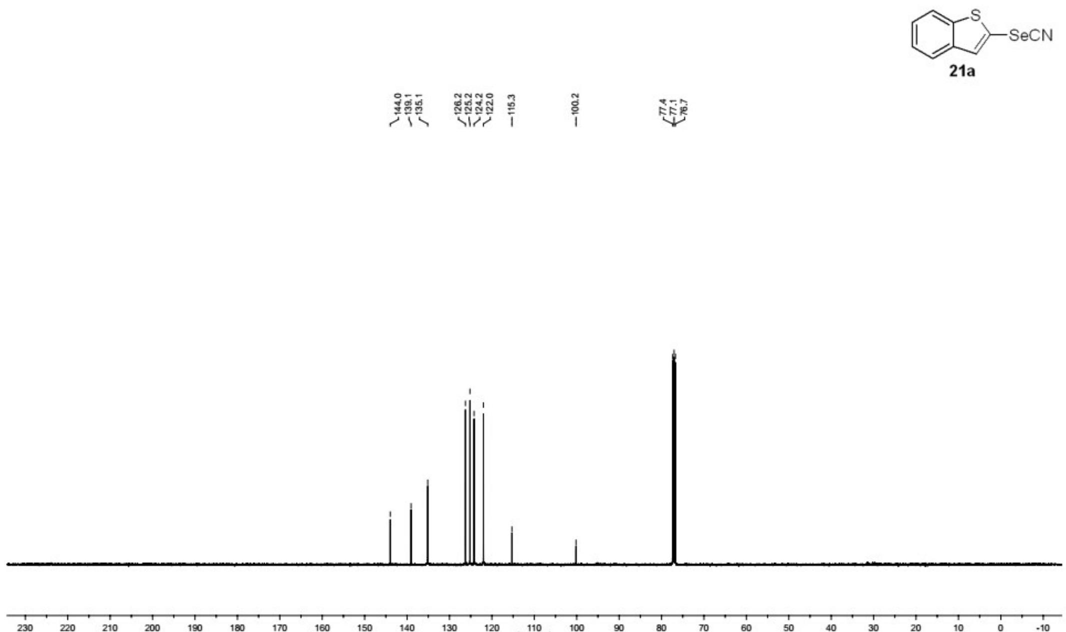

NCSe
19a
7.942
7.940
7.923
7.920
7.896
7.895
7.877
7.876
7.690
7.688
7.671
7.669
7.604
7.583
7.503
7.500
7.482
7.464
7.461
7.373
7.355
7.336
7.327
7.308
7.288
7.236
1.623
1.274
1.00
0.96
0.95
0.96
1.05
1.11
0.99
14.0 13.5 13.0 12.5 12.0 11.5 11.0 10.5 10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5 -1.0 -1.5 -2.0
f1 (ppm)

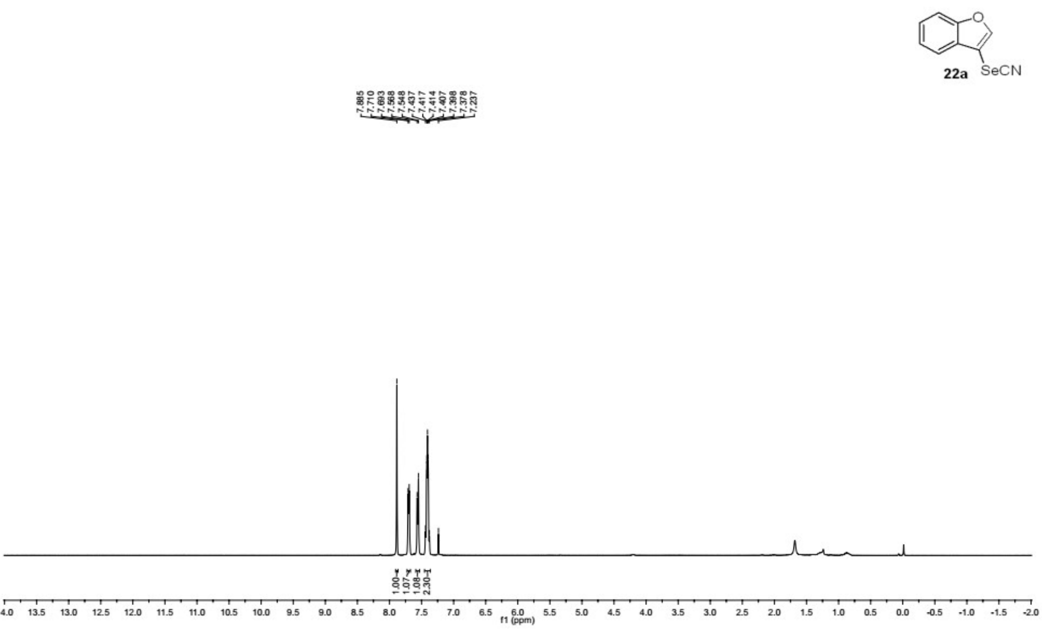

NCSe
19a
156.0
154.7
131.4
128.2
125.5
124.3
123.6
122.7
121.1
112.1
103.5
100.1
77.4
77.1
76.8
220 210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10
f1 (ppm)


S
SeCN
20a
7.976
7.956
7.914
7.901
7.563
7.545
7.527
7.525
7.486
7.467
7.449
7.247
1.00
1.87
1.10
1.09
14.0 13.5 13.0 12.5 12.0 11.5 11.0 10.5 10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5 -1.0 -1.5 -2.0
f1 (ppm)

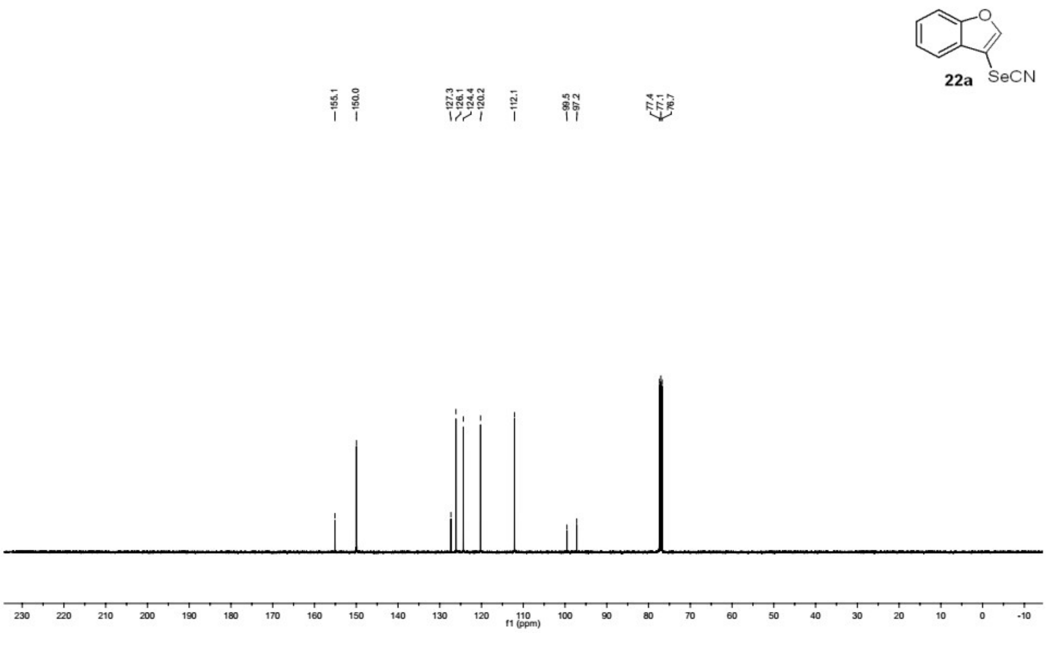

S
SeCN
20a
139.4
138.4
135.3
125.7
125.7
123.3
123.0
109.1
100.1
77.4
77.1
76.7
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0
f1 (ppm)


SeCN
S
21a
7.852
7.845
7.829
7.817
7.814
7.808
7.693
7.435
7.430
7.421
7.412
7.408
7.260
1.582
0.003
2.16
1.00
2.22
14.0 13.5 13.0 12.5 12.0 11.5 11.0 10.5 10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5 -1.0 -1.5
f1 (ppm)

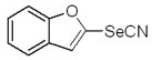

SeCN
S
21a
144.0
139.1
135.1
126.2
125.2
124.2
122.0
115.3
100.2
77.4
77.1
76.7
230 220 210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10
f1 (ppm)


SeCN
7.885
7.710
7.693
7.568
7.548
7.437
7.417
7.414
7.407
7.398
7.378
7.237
1.00
1.07
1.08
2.30
14.0
13.5
13.0
12.5
12.0
11.5
11.0
10.5
10.0
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
-0.5
-1.0
-1.5
-2.0
f1 (ppm)

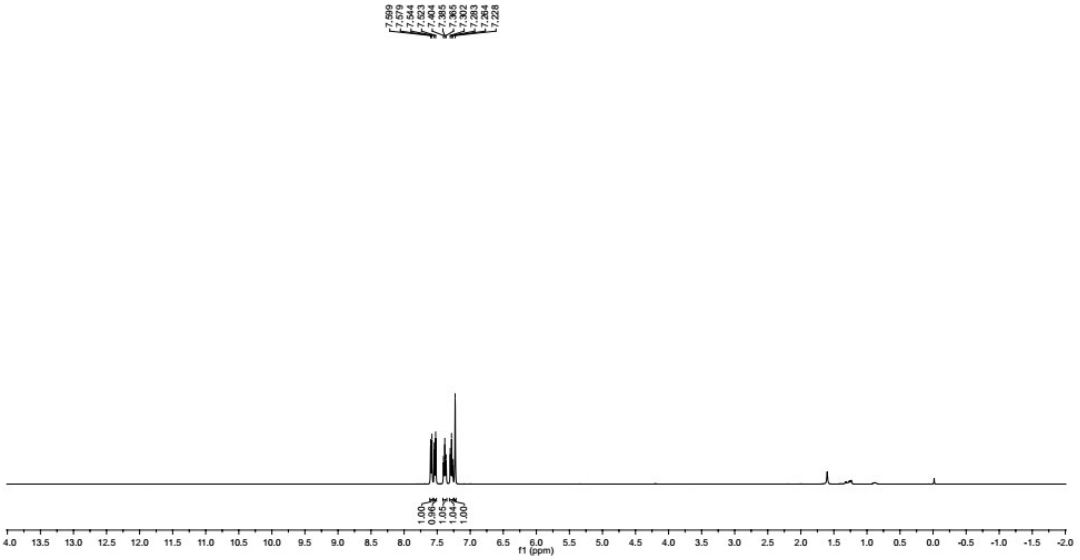
**22a**

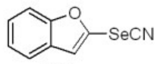

SeCN
155.1
150.0
127.3
126.1
124.4
120.2
112.1
99.5
97.2
77.4
77.1
76.7
230
220
210
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
-10
f1 (ppm)

**22a**

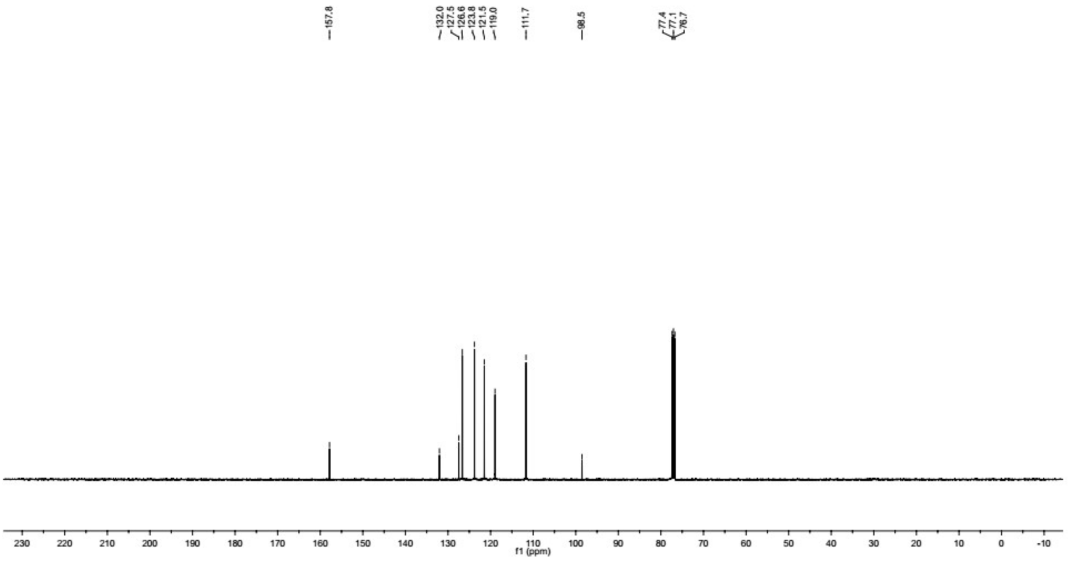

O
SeCN

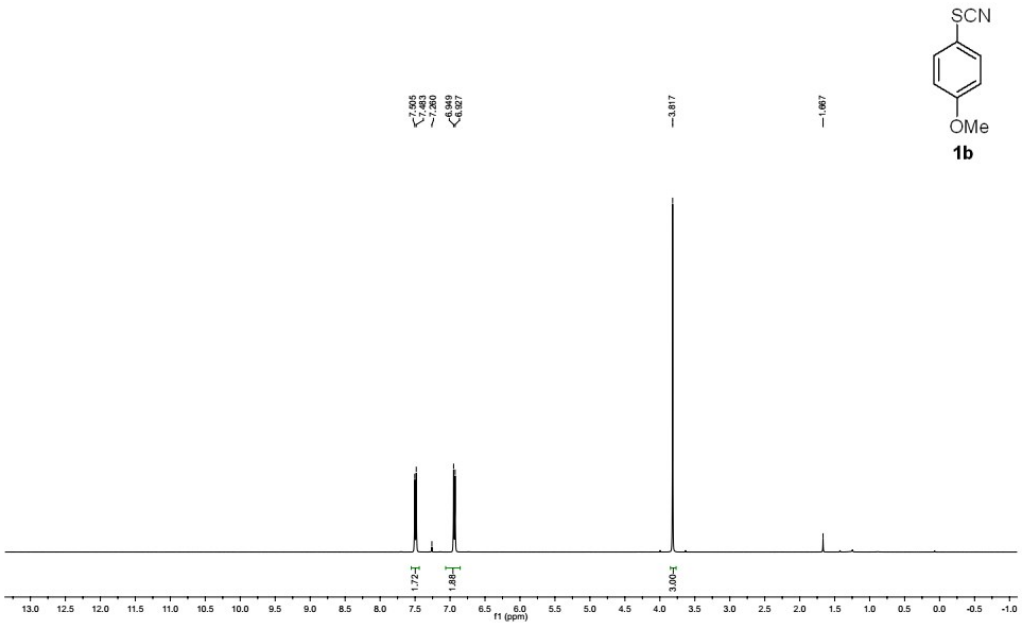
**23a**

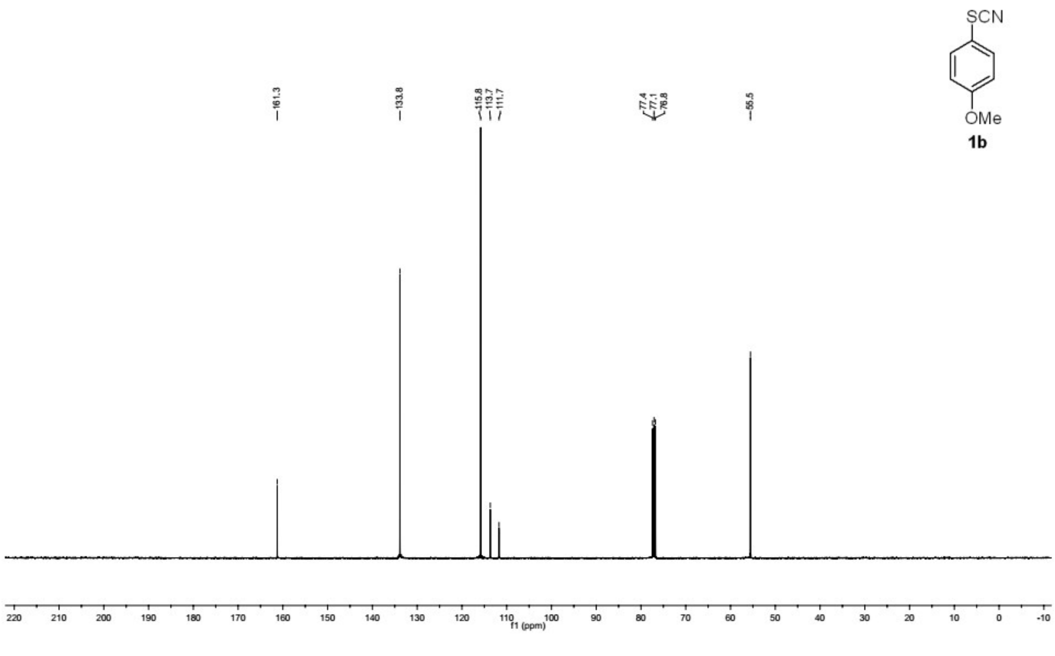

7.599
7.579
7.544
7.523
7.404
7.385
7.365
7.302
7.283
7.264
7.228
1.00
0.96
1.05
1.04
1.00
4.0
13.5
13.0
12.5
12.0
11.5
11.0
10.5
10.0
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
-0.5
-1.0
-1.5
-2.0
f1 (ppm)

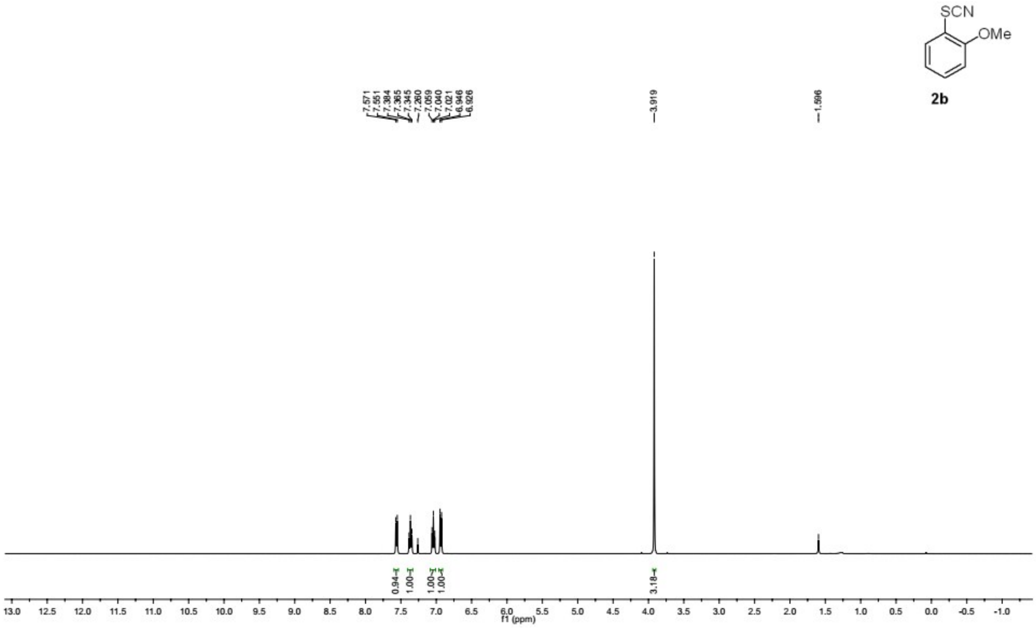

O
SeCN

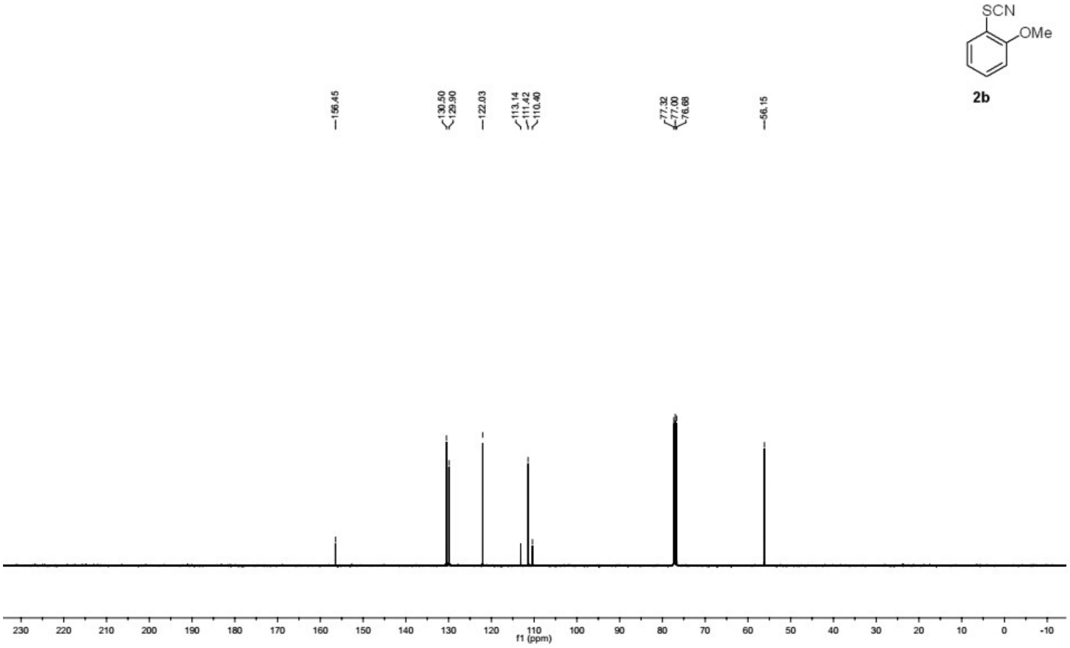
**23a**

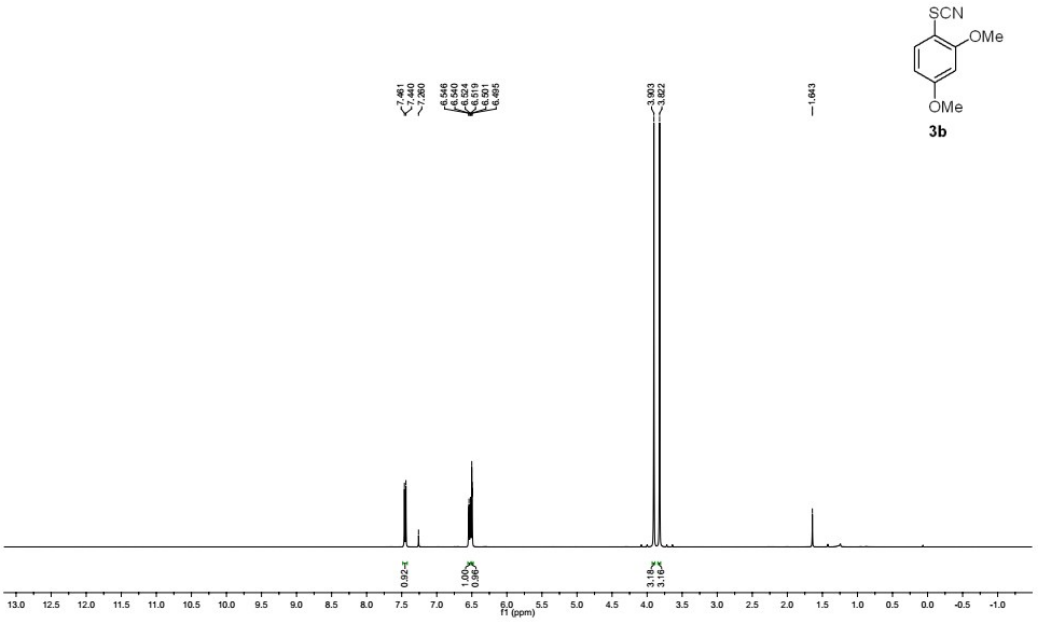

157.8
132.0
127.5
126.6
123.8
121.5
119.0
111.7
98.5
77.4
77.1
76.7
230
220
210
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
-10
f1 (ppm)

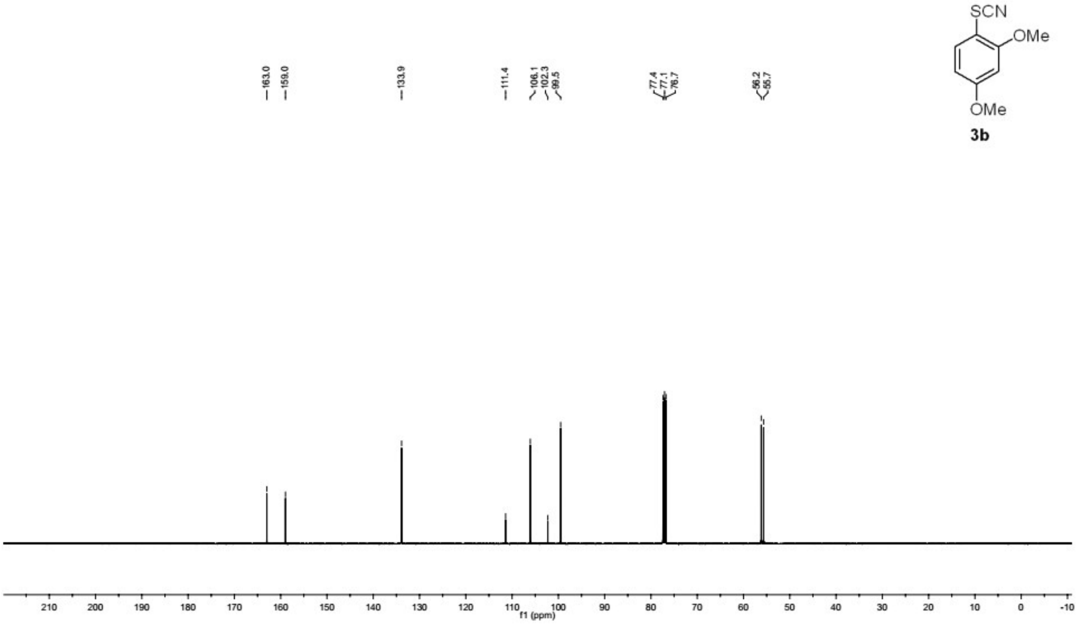

SCN
OMe
1b
7.505
7.483
7.260
6.949
6.927
3.817
1.667
1.72
1.88
3.00
13.0
12.5
12.0
11.5
11.0
10.5
10.0
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
-0.5
-1.0
f1 (ppm)

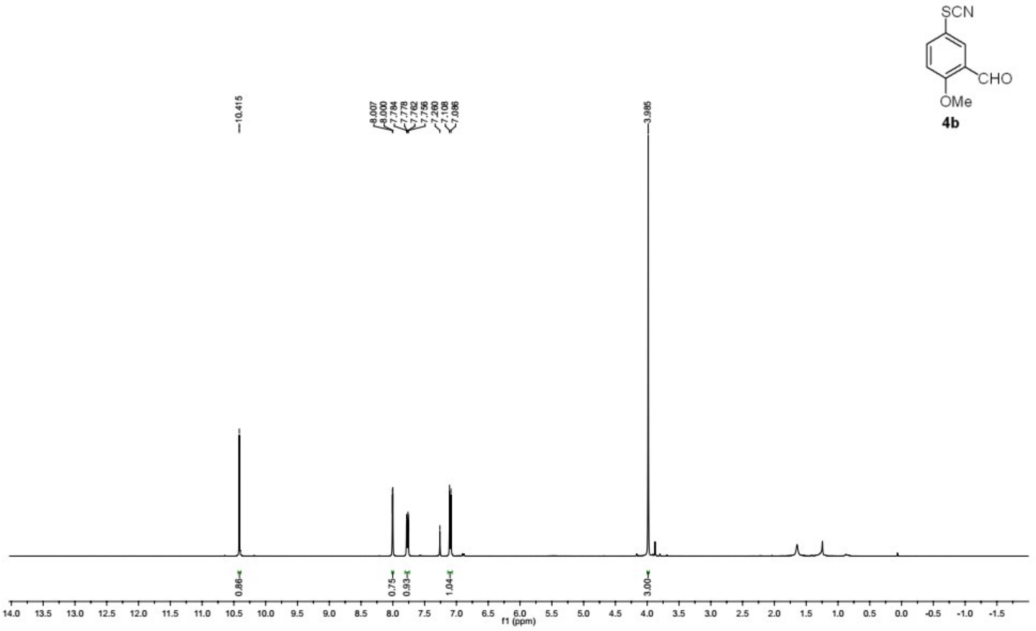

SCN
OMe
1b
161.3
133.8
115.8
113.7
111.7
77.4
77.1
76.8
55.5
220
210
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
-10
f1 (ppm)


SCN
OMe
2b
7.571
7.551
7.384
7.365
7.345
7.260
7.059
7.040
7.021
6.946
6.926
3.919
1.596
0.94
1.00
1.00
1.00
3.18
13.0 12.5 12.0 11.5 11.0 10.5 10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5 -1.0
f1 (ppm)


SCN
OMe
2b
156.45
130.50
129.90
122.03
113.14
111.42
110.40
77.32
77.00
76.68
56.15
230 220 210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10
f1 (ppm)

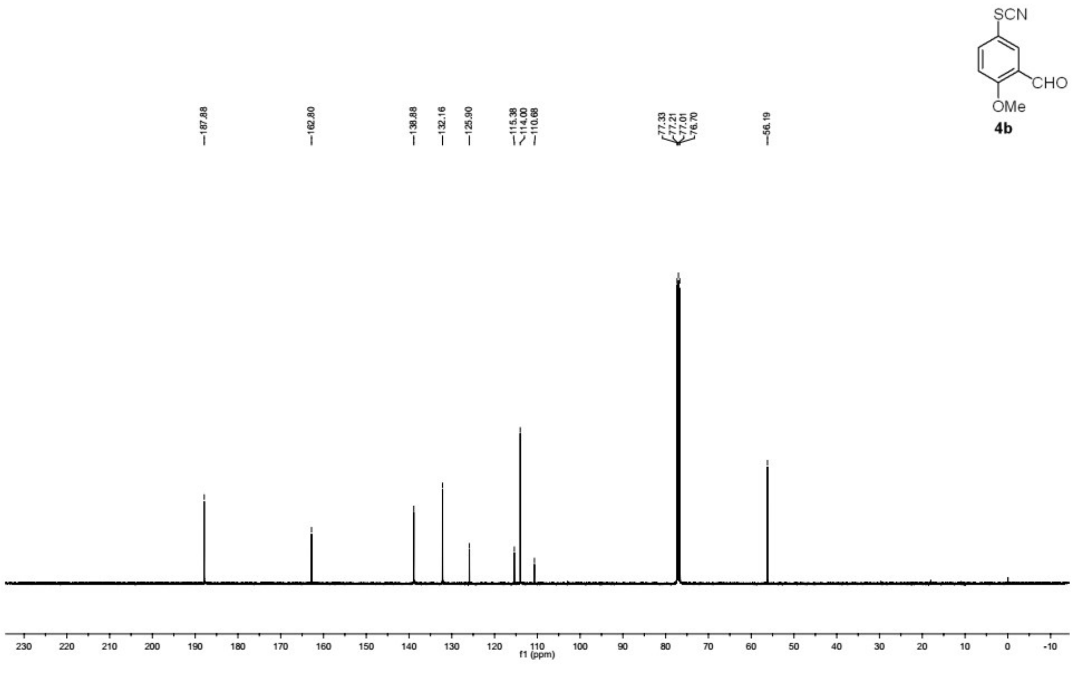

7.461
7.440
7.260
6.546
6.540
6.524
6.519
6.501
6.495
3.903
3.822
1.643
0.92
1.00
0.96
3.18
3.16
13.0 12.5 12.0 11.5 11.0 10.5 10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5 -1.0
f1 (ppm)
SCN
OMe
OMe
3b


163.0
159.0
133.9
111.4
106.1
102.3
99.5
77.4
77.1
76.7
56.2
55.7
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10
f1 (ppm)
SCN
OMe
OMe
3b



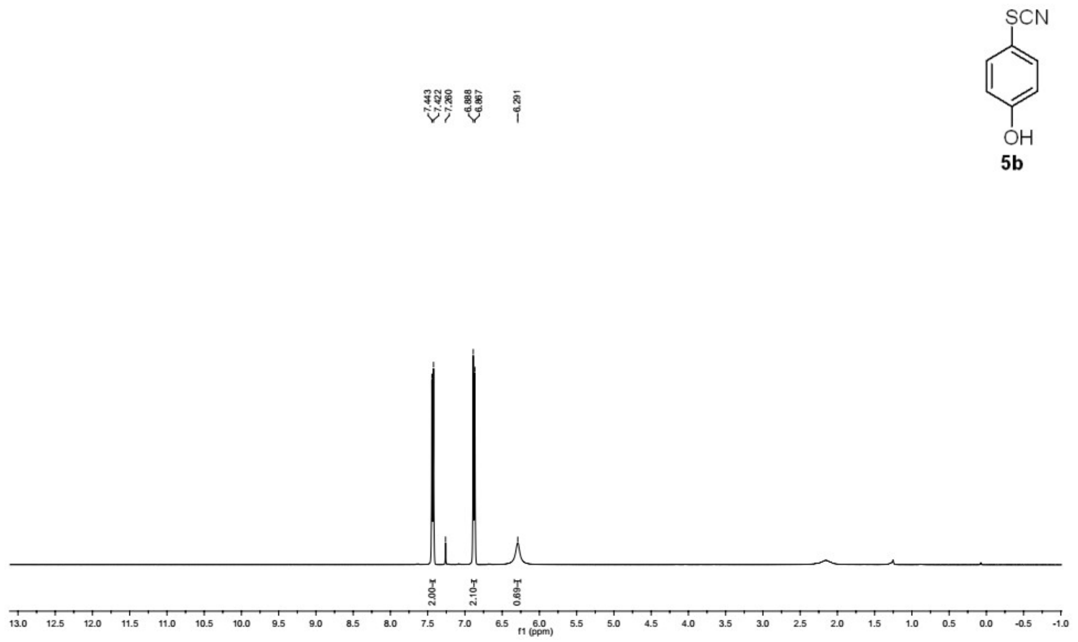
**4b**

SCN
CHO
OMe
10.415
8.007
8.000
7.784
7.778
7.762
7.756
7.260
7.108
7.086
3.985
0.86
0.75
0.93
1.04
3.00
14.0 13.5 13.0 12.5 12.0 11.5 11.0 10.5 10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5 -1.0 -1.5
f1 (ppm)

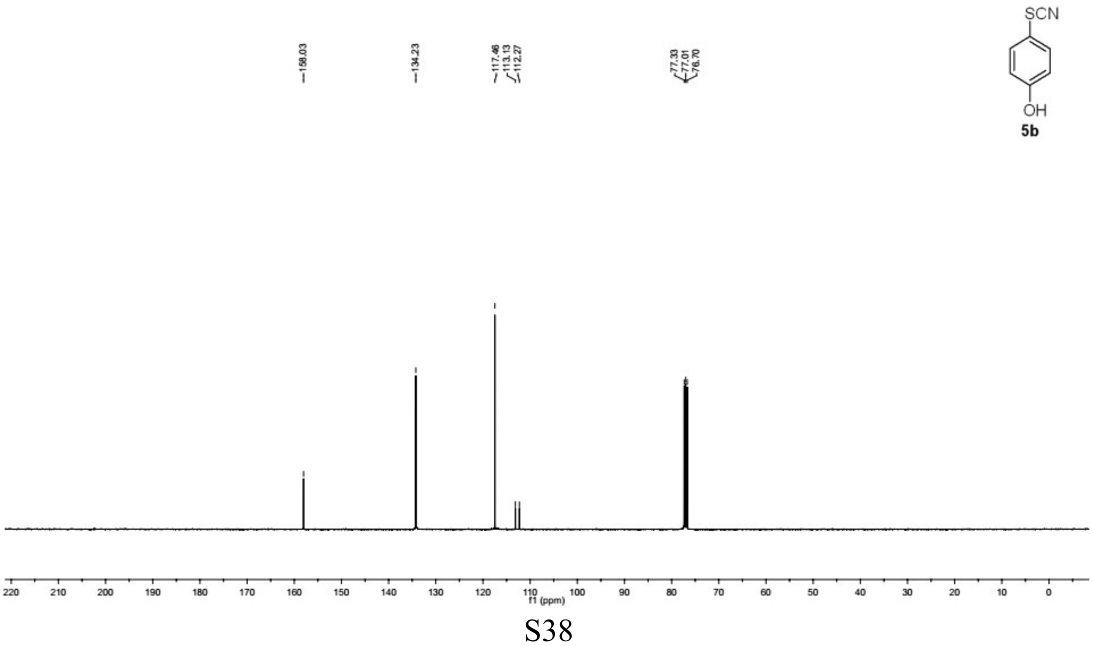


**4b**

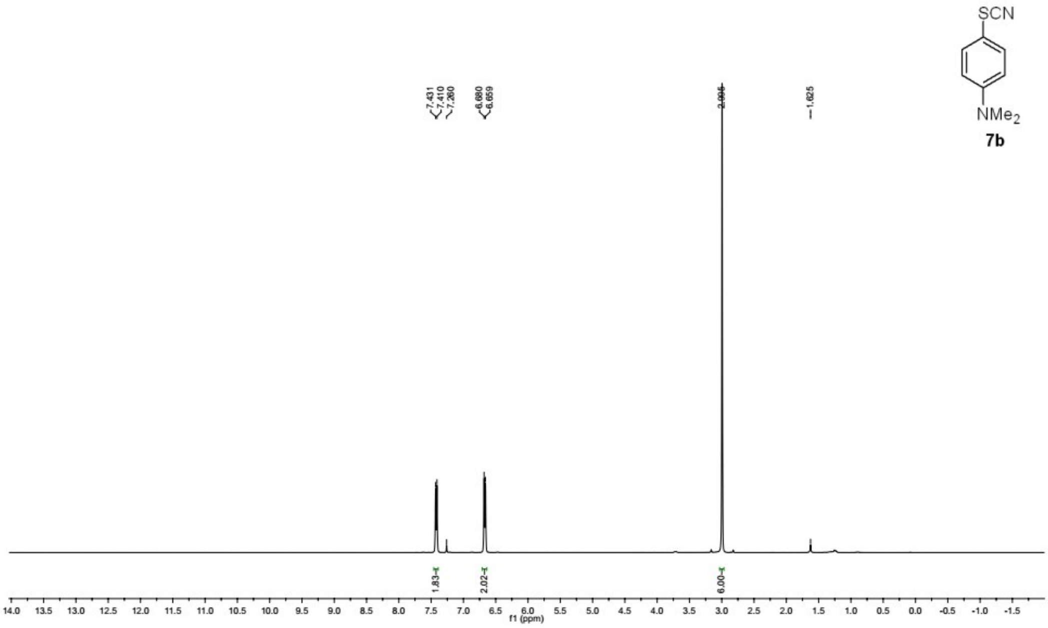
SCN
CHO
OMe
187.88
162.80
138.88
132.16
125.90
115.38
114.00
110.68
77.33
77.21
77.01
76.70
56.19
230 220 210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10
f1 (ppm)



7.443
7.422
7.260
6.888
6.867
6.291
2.00
2.10
0.69
13.0 12.5 12.0 11.5 11.0 10.5 10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5 -1.0
f1 (ppm)
SCN
OH
5b

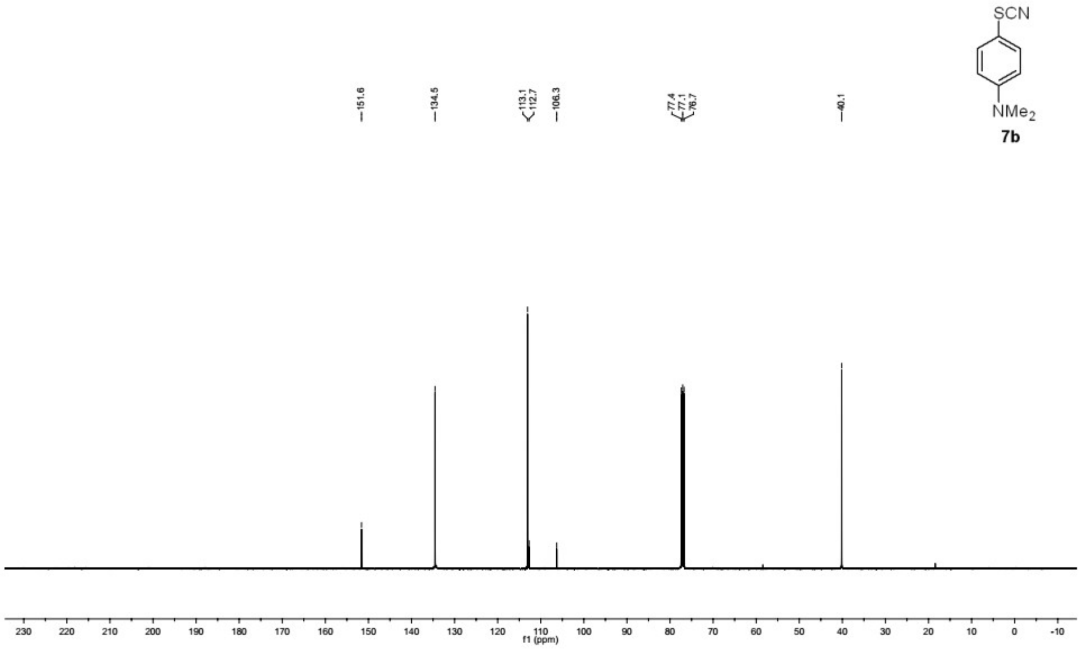


158.03
134.23
117.46
113.13
112.27
77.33
77.01
76.70
220 210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0
f1 (ppm)
SCN
OH
5b



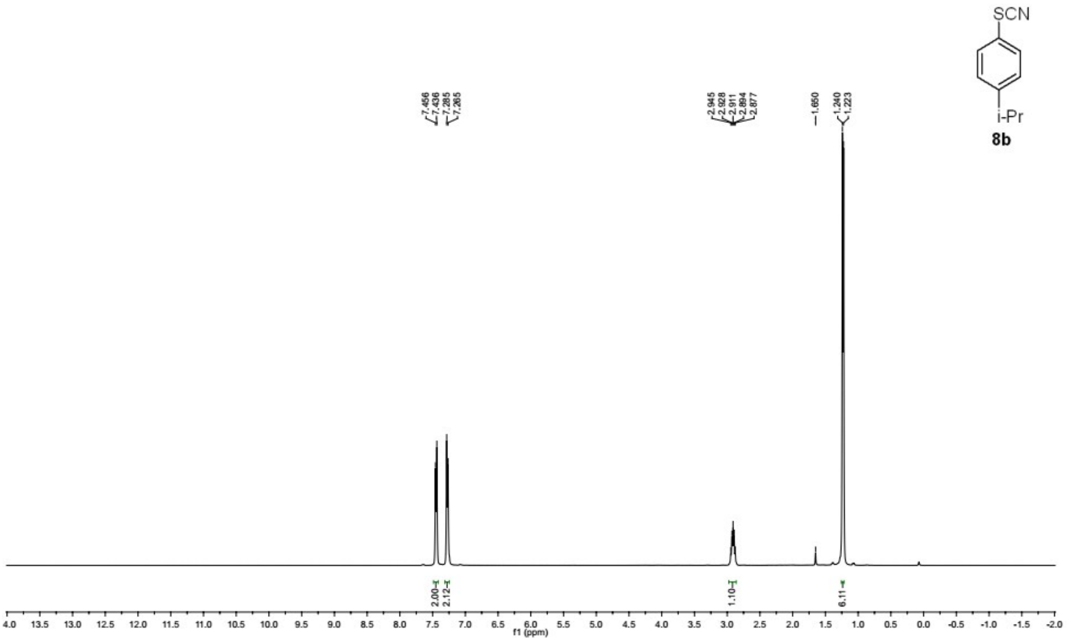
7.431
7.410
7.260
6.680
6.659
2.995
1.625
SCN
NMe$_2$
1.83
2.02
6.00
14.0 13.5 13.0 12.5 12.0 11.5 11.0 10.5 10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5 -1.0 -1.5
f1 (ppm)

**7b**

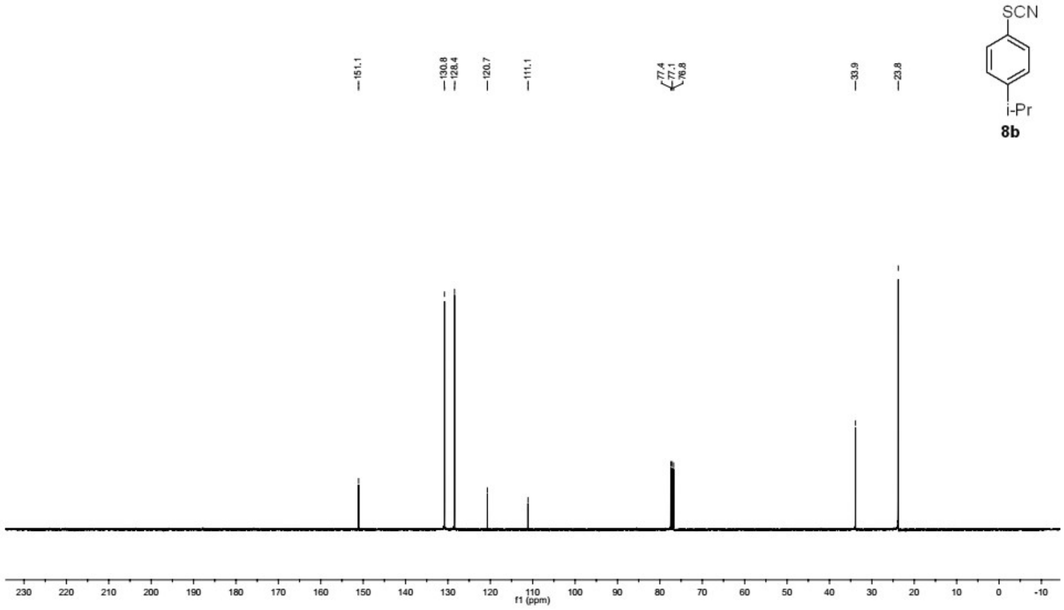


151.6
134.5
113.1
112.7
106.3
77.4
77.1
76.7
40.1
SCN
NMe$_2$
230 220 210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10
f1 (ppm)

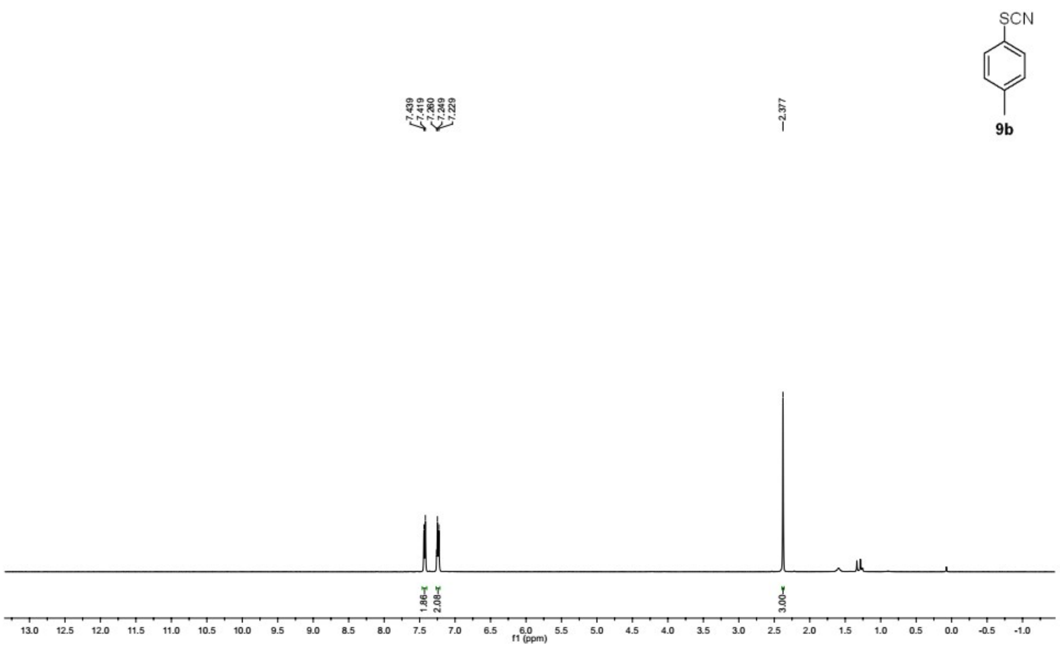
**7b**

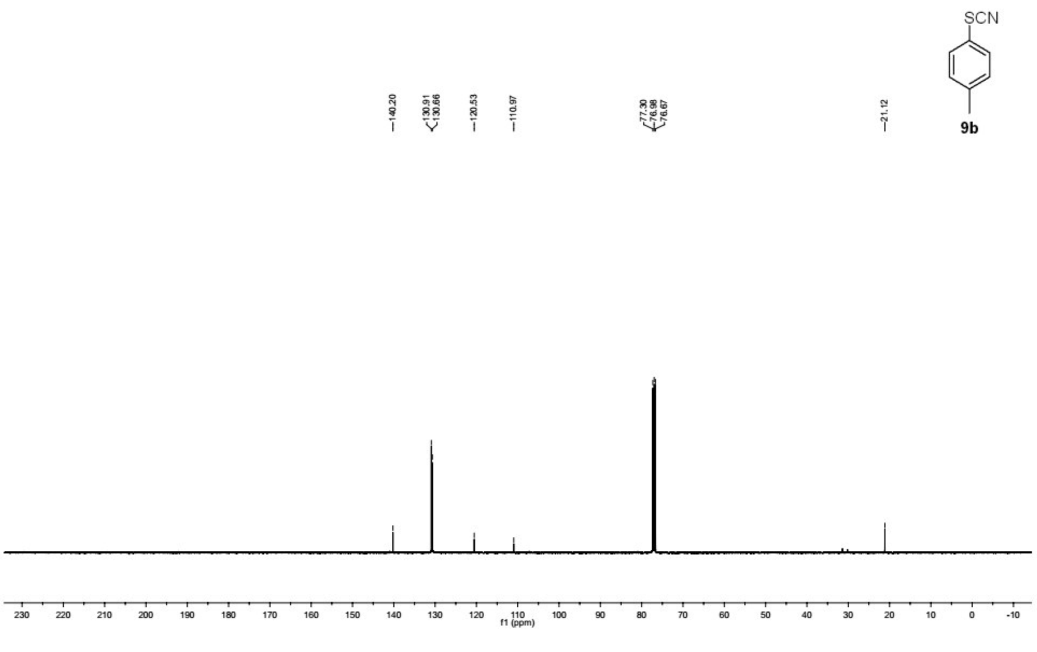

SCN
i-Pr
7.456
7.436
7.285
7.265
2.945
2.928
2.911
2.894
2.877
1.650
1.240
1.223
2.00
2.12
1.10
6.11
4.0 13.5 13.0 12.5 12.0 11.5 11.0 10.5 10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5 -1.0 -1.5 -2.0
f1 (ppm)

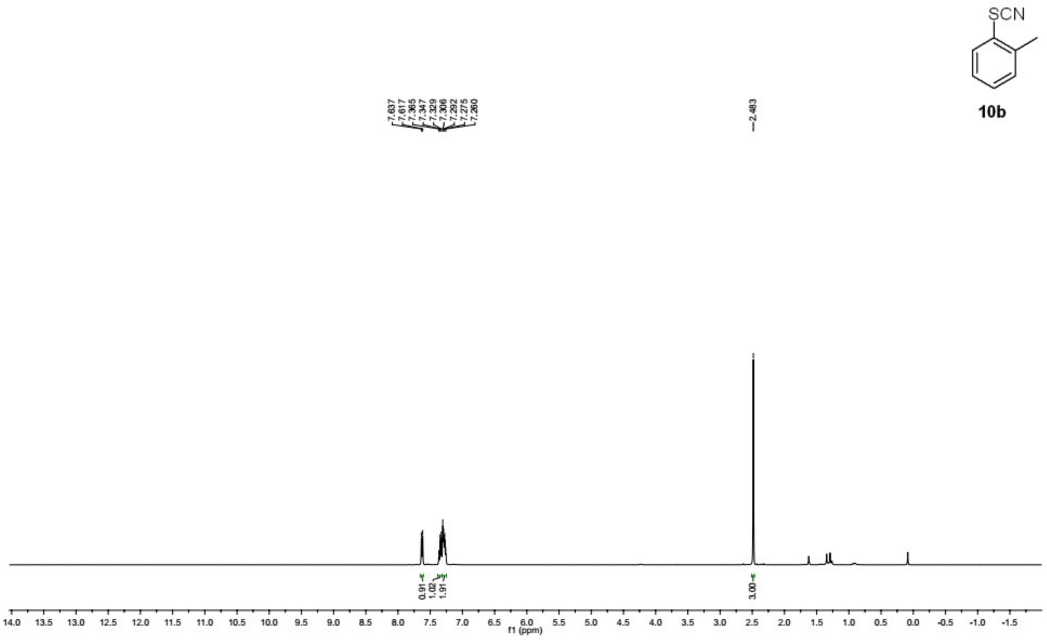
**8b**


SCN
i-Pr
151.1
130.8
128.4
120.7
111.1
77.4
77.1
76.8
33.9
23.8
230 220 210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10
f1 (ppm)

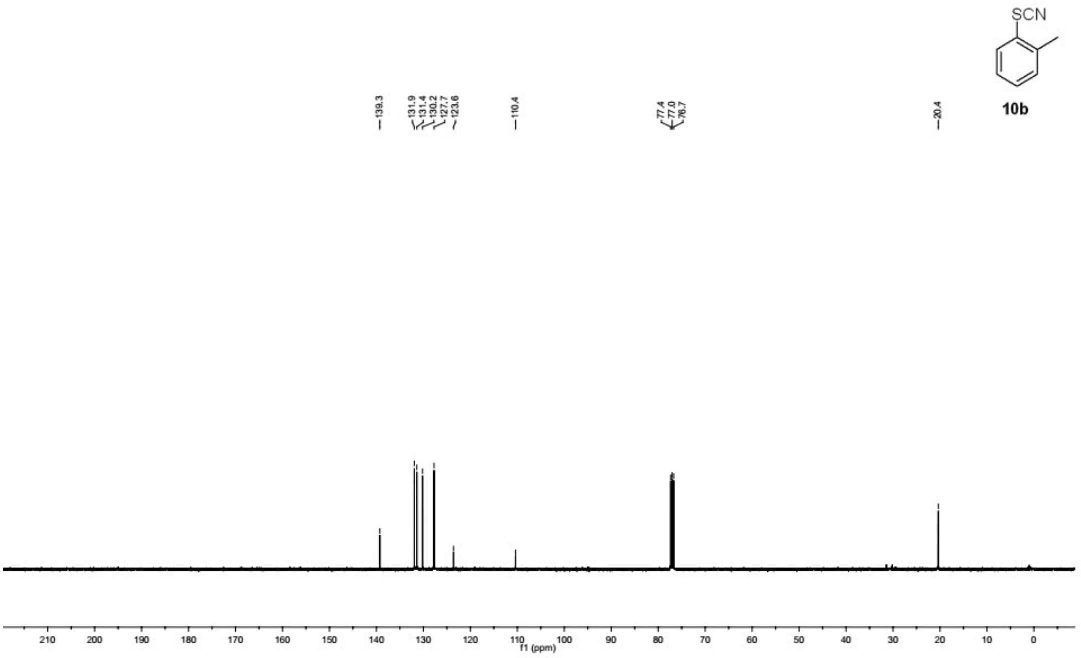
**8b**


SCN
9b
7.439
7.419
7.260
7.249
7.229
2.377
1.86
2.08
3.00
13.0 12.5 12.0 11.5 11.0 10.5 10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5 -1.0
f1 (ppm)

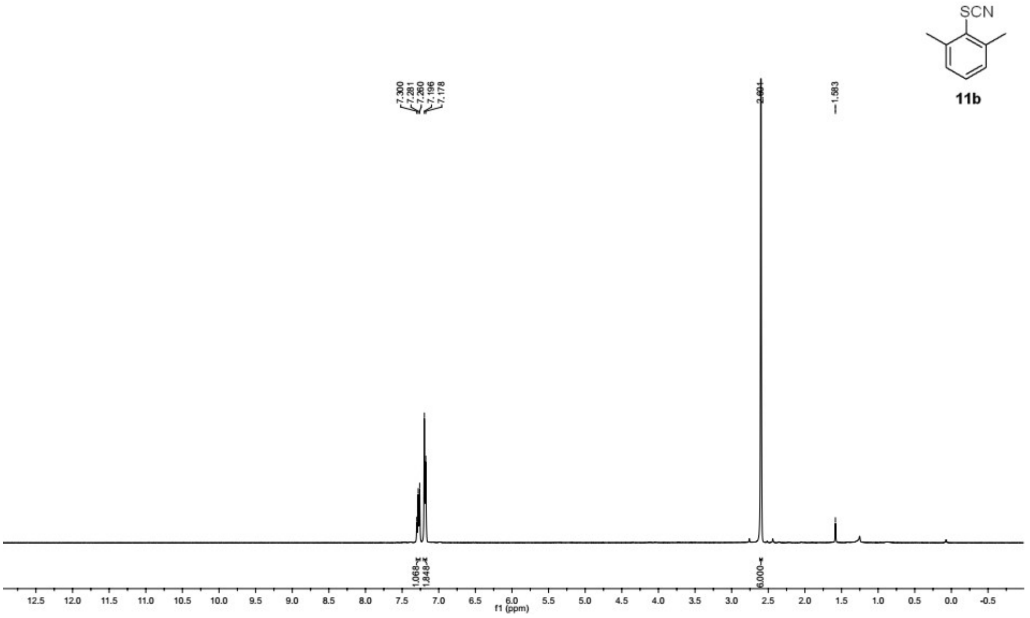

SCN
9b
140.20
130.91
130.66
120.53
110.97
77.30
76.98
76.67
21.12
230 220 210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10
f1 (ppm)

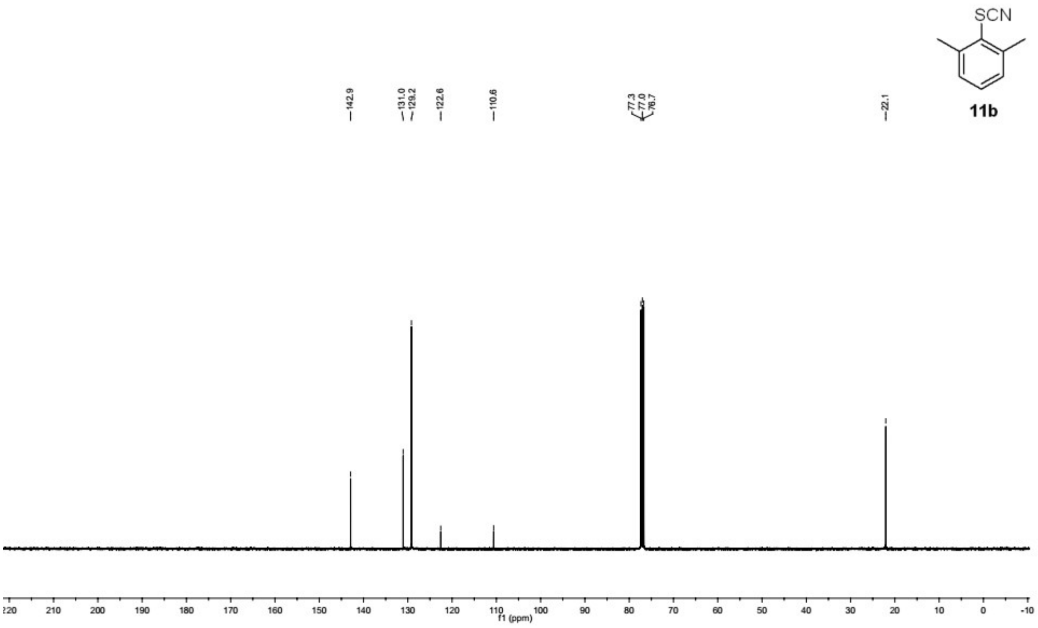

SCN
7.637
7.617
7.365
7.347
7.329
7.306
7.292
7.275
7.260
2.483
0.91
1.02
1.91
3.00
14.0 13.5 13.0 12.5 12.0 11.5 11.0 10.5 10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5 -1.0 -1.5
f1 (ppm)

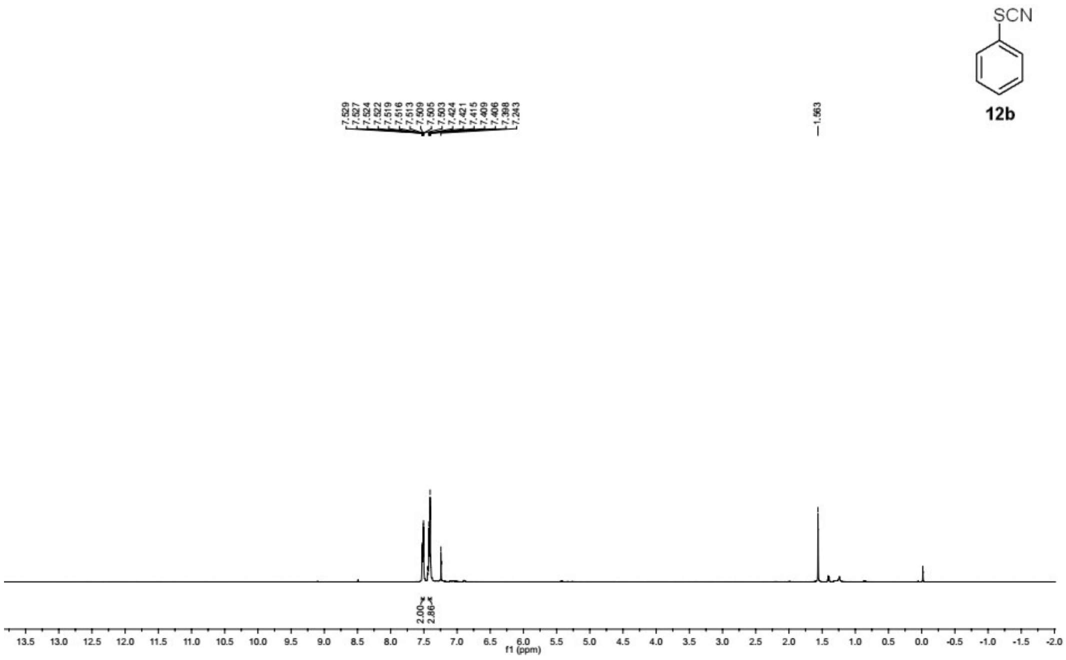
10b

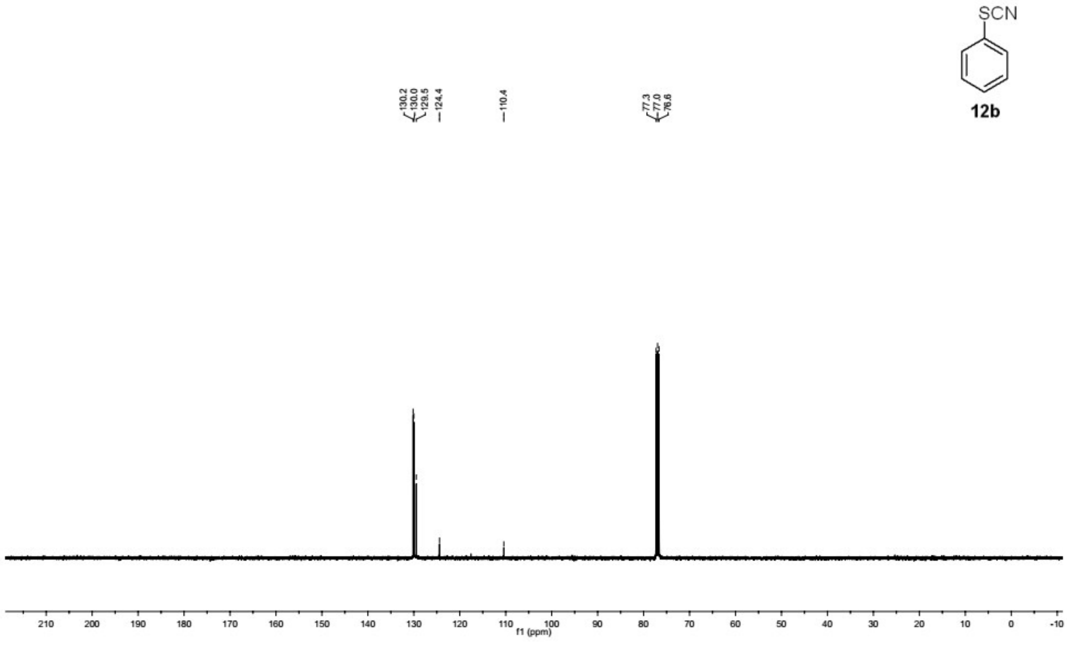

SCN
139.3
131.9
131.4
130.2
127.7
123.6
110.4
77.4
77.0
76.7
20.4
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0
f1 (ppm)

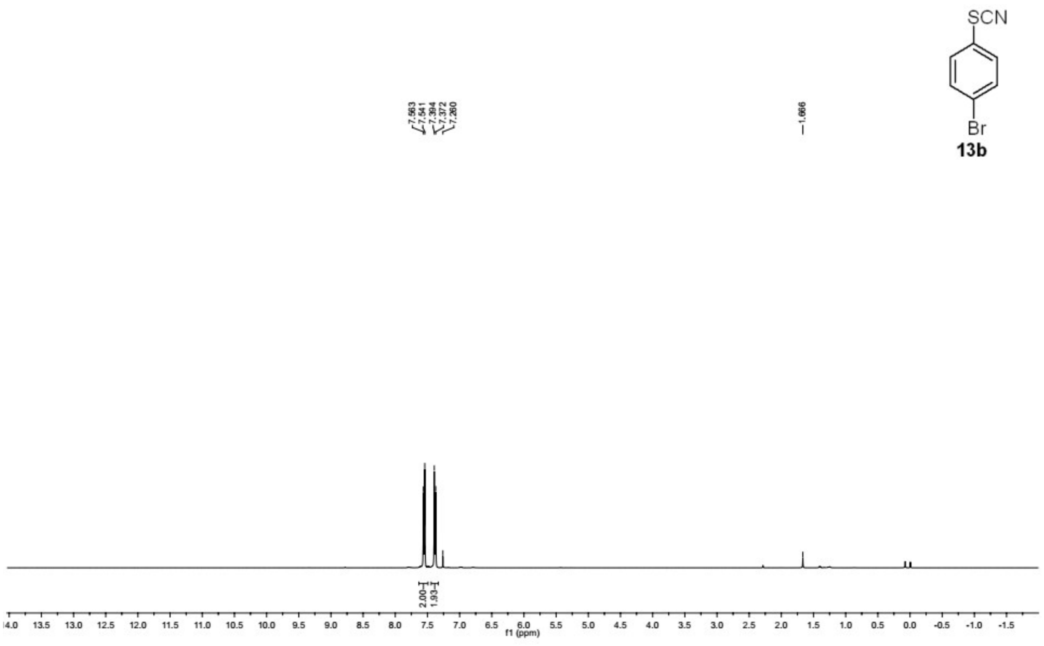
10b

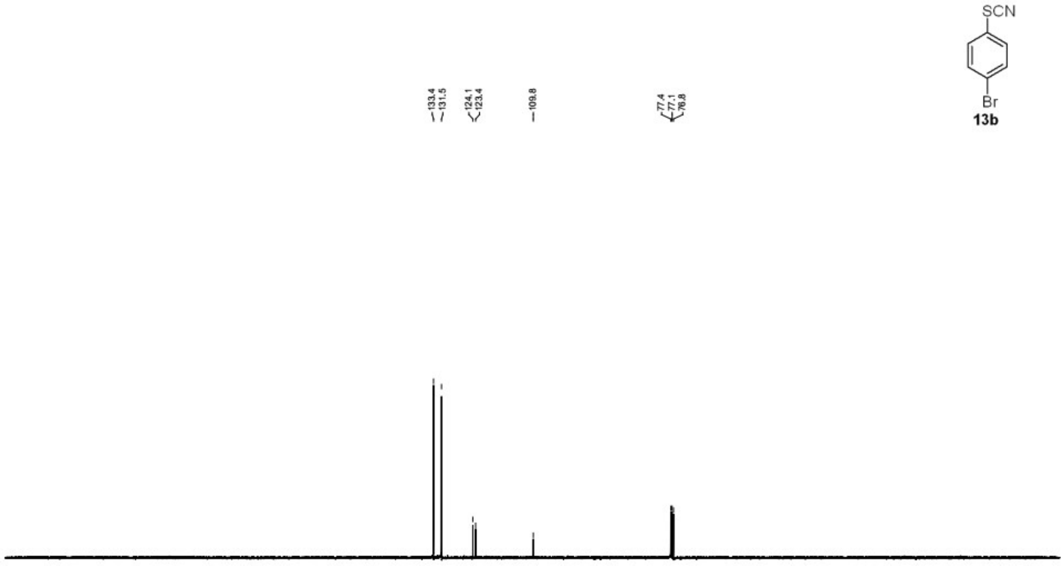

SCN
11b
7.300
7.281
7.260
7.196
7.178
2.601
1.583
1.068
1.848
6.000
12.5
12.0
11.5
11.0
10.5
10.0
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
-0.5
f1 (ppm)

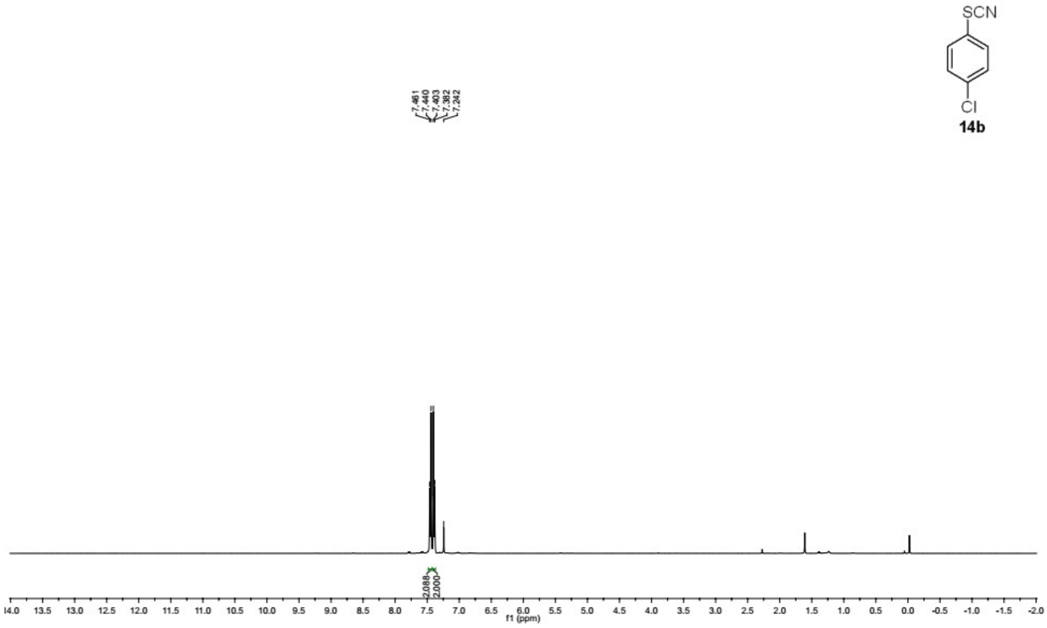

SCN
11b
142.9
131.0
129.2
122.6
110.6
77.3
77.0
76.7
22.1
220
210
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
-10
f1 (ppm)

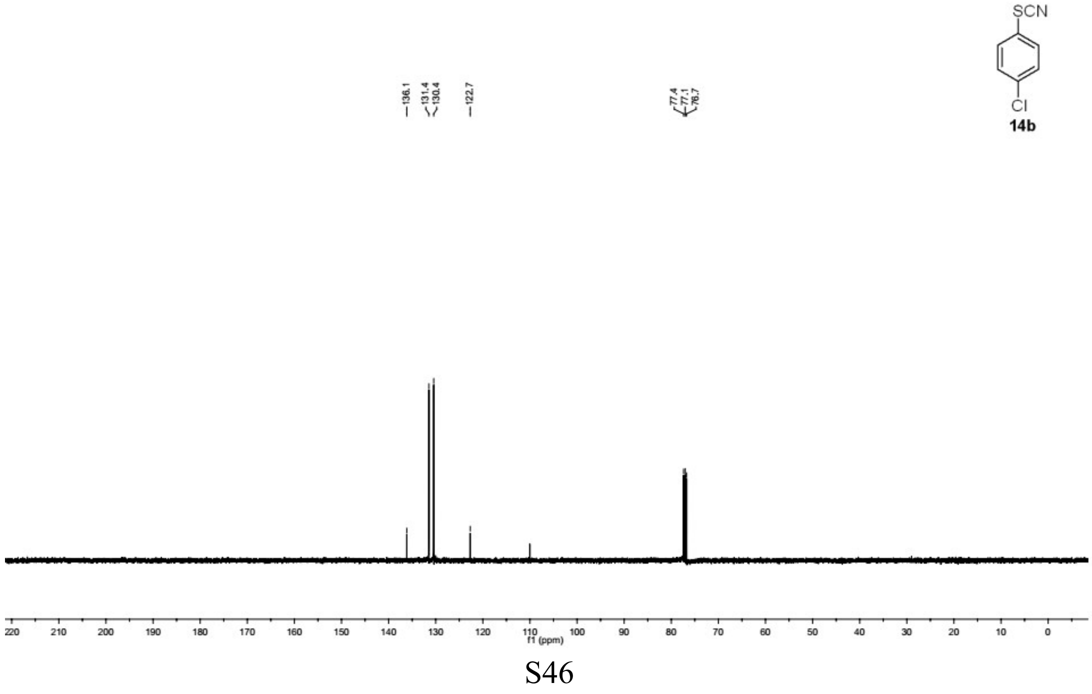

SCN
12b
7.529
7.527
7.524
7.522
7.519
7.516
7.513
7.509
7.505
7.503
7.424
7.421
7.415
7.409
7.406
7.398
7.243
1.563
2.00
2.86
13.5 13.0 12.5 12.0 11.5 11.0 10.5 10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5 -1.0 -1.5 -2.0
f1 (ppm)

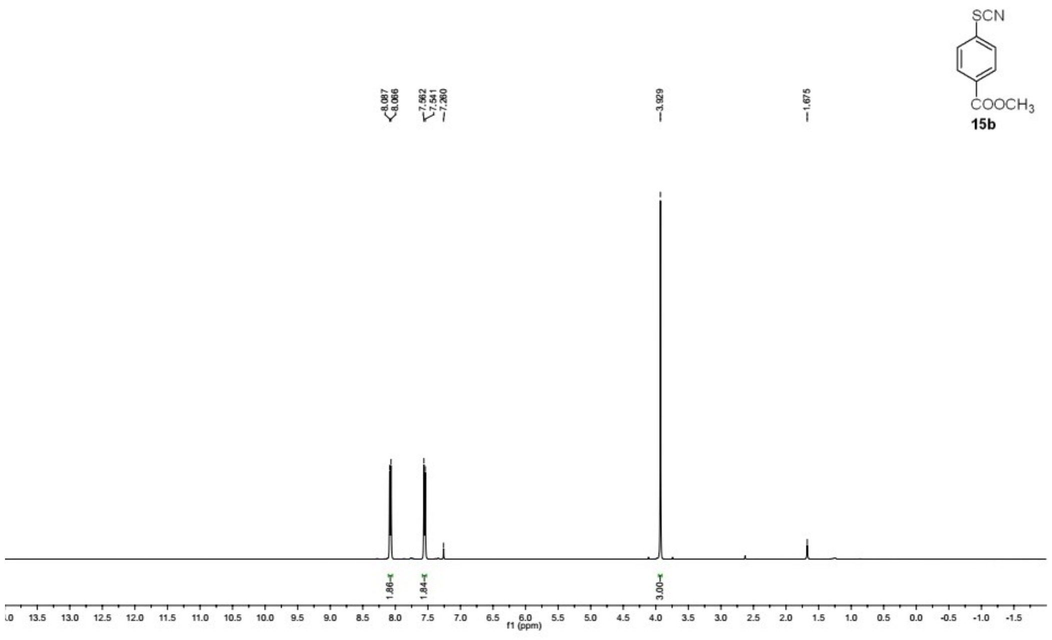

SCN
12b
130.2
130.0
129.5
124.4
110.4
77.3
77.0
76.6
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10
f1 (ppm)


7.563
7.541
7.394
7.372
7.260
1.666
SCN
Br
13b
2.00
1.93
14.0 13.5 13.0 12.5 12.0 11.5 11.0 10.5 10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5 -1.0 -1.5
f1 (ppm)

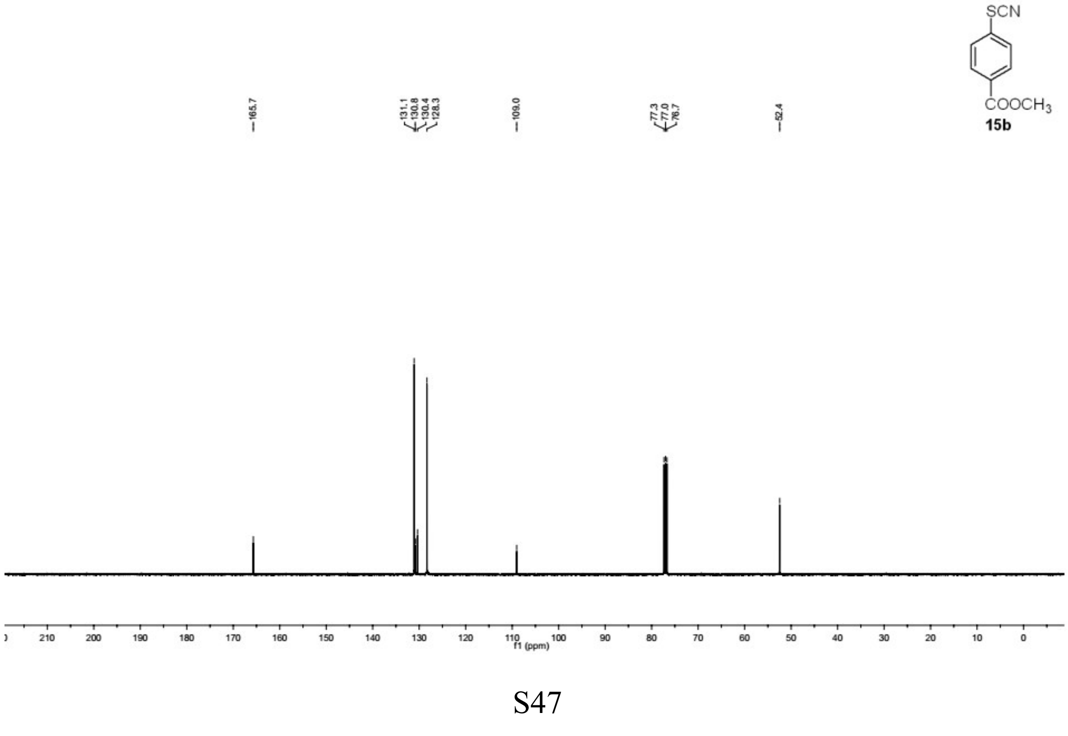

133.4
131.5
124.1
123.4
109.8
77.4
77.1
76.8
SCN
Br
13b
230 220 210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10
f1 (ppm)


SCN
Cl
14b
7.461
7.440
7.403
7.382
7.242
2.088
2.000
14.0 13.5 13.0 12.5 12.0 11.5 11.0 10.5 10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5 -1.0 -1.5 -2.0
f1 (ppm)

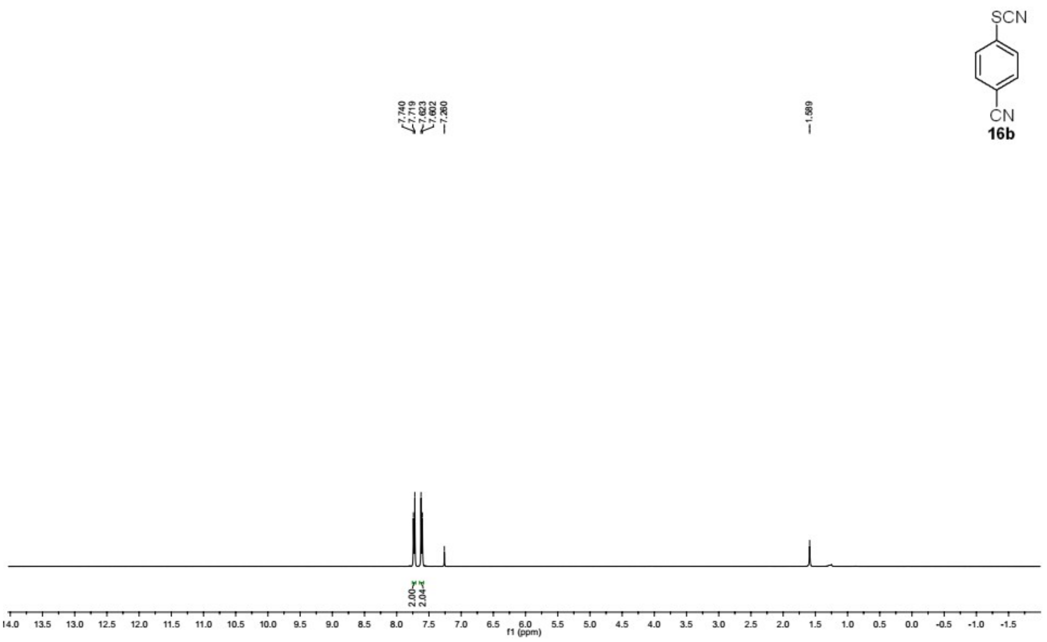

SCN
Cl
14b
136.1
131.4
130.4
122.7
77.4
77.1
76.7
220 210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0
f1 (ppm)

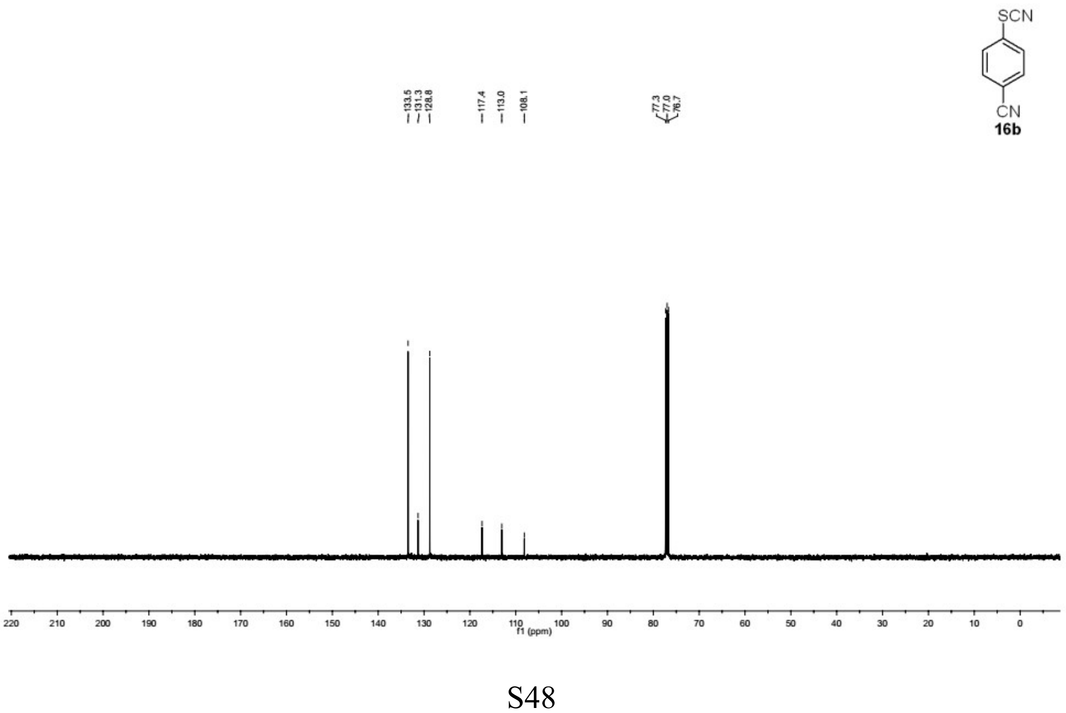


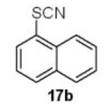
8.087
8.066
7.562
7.541
7.260
3.929
1.675
1.86
1.84
3.00
f1 (ppm)
SCN
COOCH3
15b



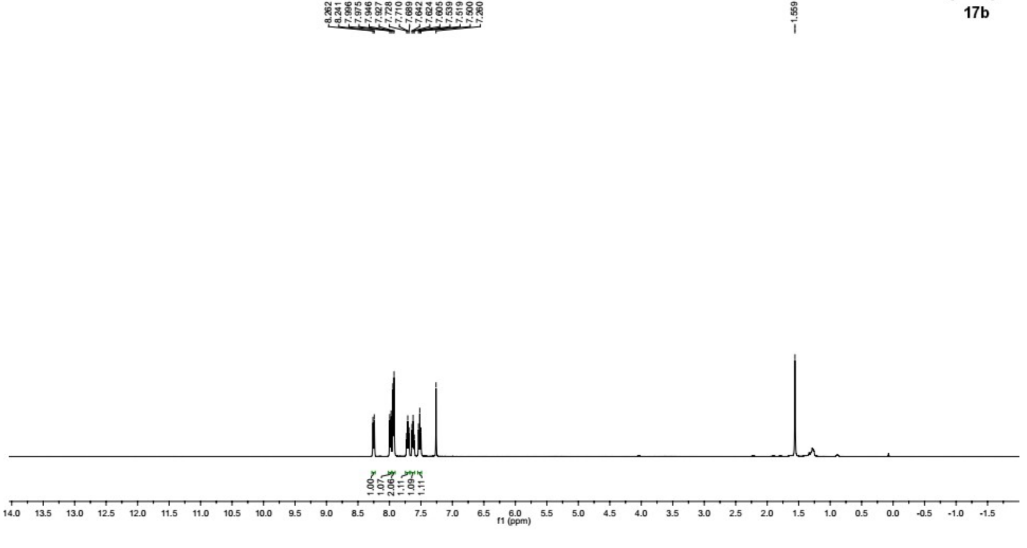
165.7
131.1
130.8
130.4
128.3
109.0
77.3
77.0
76.7
52.4
f1 (ppm)
SCN
COOCH3
15b

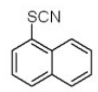

SCN
CN
16b
7.740
7.719
7.623
7.602
7.260
1.589
2.00
2.04
14.0 13.5 13.0 12.5 12.0 11.5 11.0 10.5 10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5 -1.0 -1.5
f1 (ppm)


SCN
CN
16b
133.5
131.3
128.8
117.4
113.0
108.1
77.3
77.0
76.7
220 210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0
f1 (ppm)

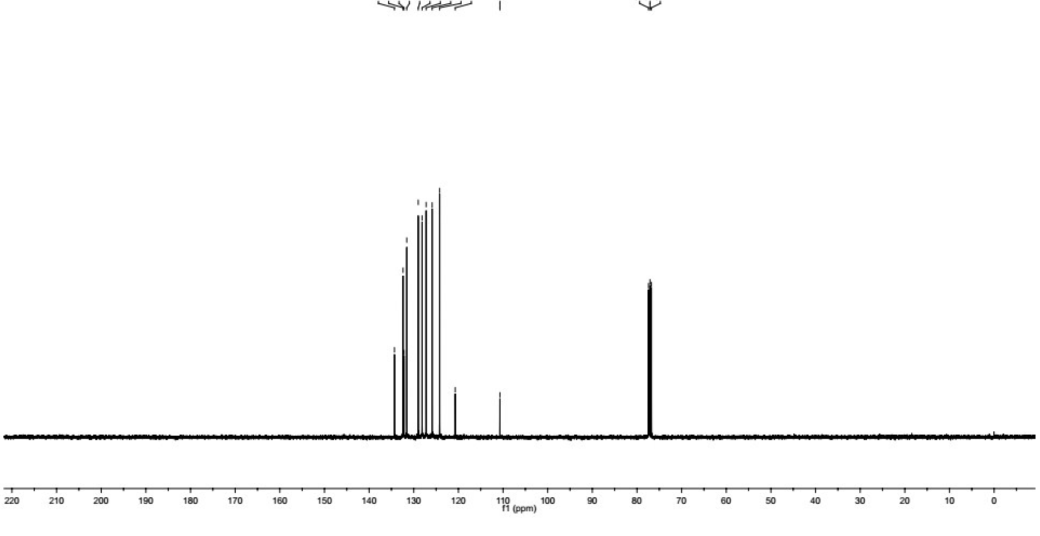

SCN

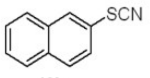
**17b**


8.262
8.241
7.996
7.975
7.946
7.927
7.728
7.710
7.689
7.642
7.624
7.605
7.539
7.519
7.500
7.260
1.559
1.00
1.07
2.06
1.11
1.09
1.11
14.0 13.5 13.0 12.5 12.0 11.5 11.0 10.5 10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5 -1.0 -1.5
f1 (ppm)

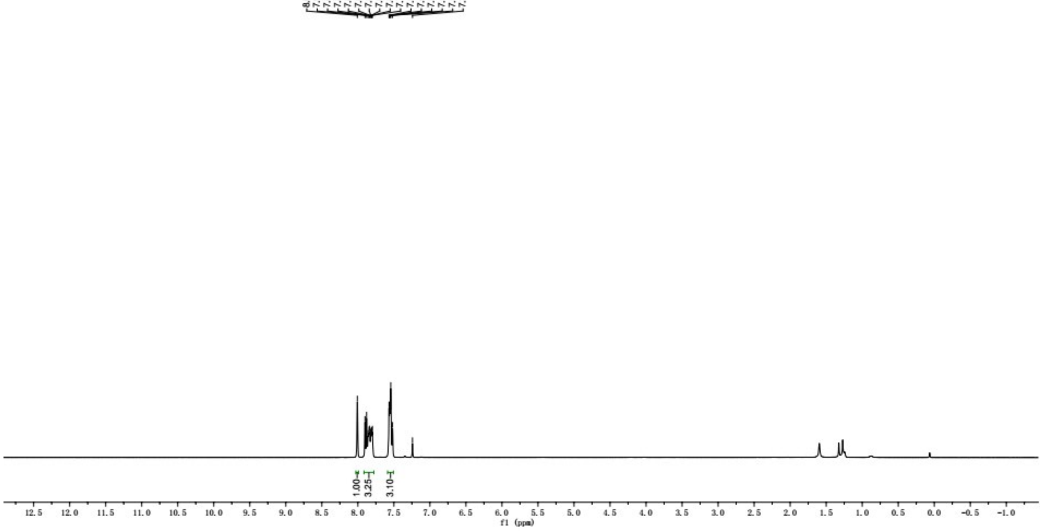

SCN

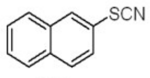
**17b**


134.3
132.4
132.2
131.6
129.0
128.1
127.2
125.9
124.2
120.7
110.7
77.4
77.1
76.8
220 210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0
f1 (ppm)

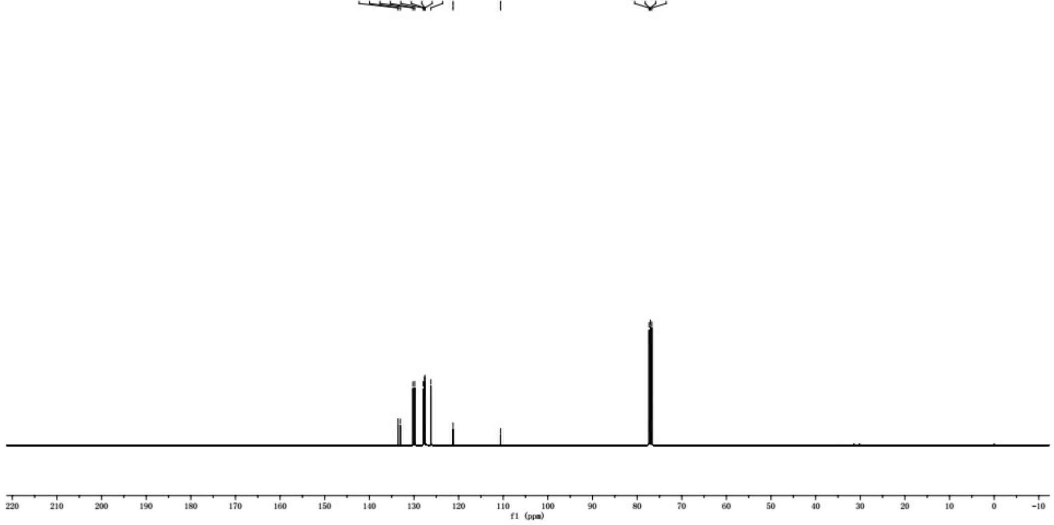


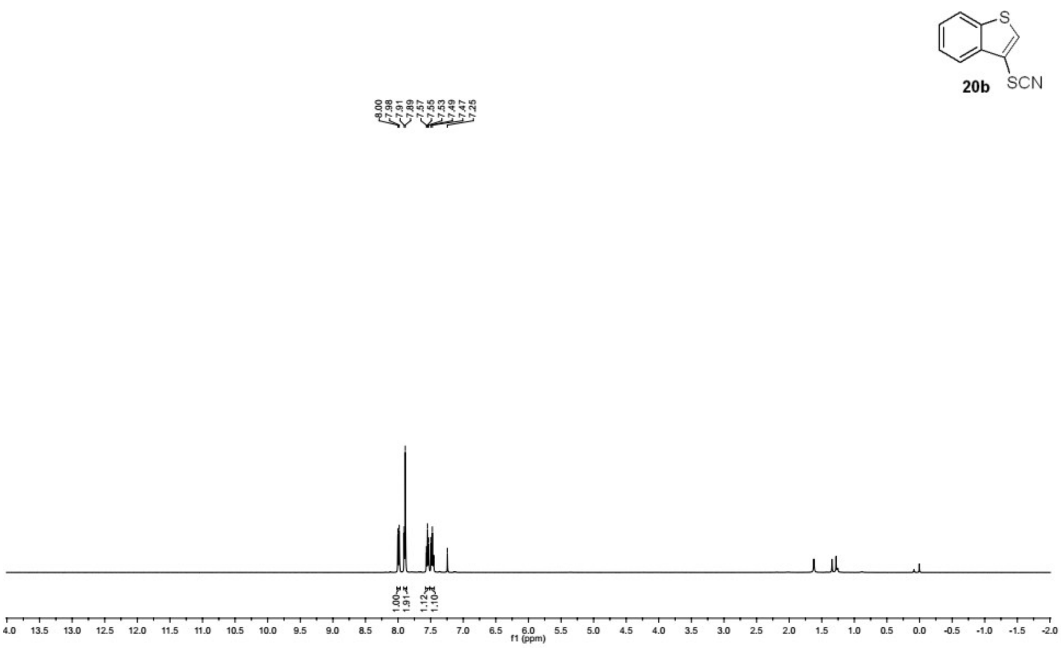
**18b**

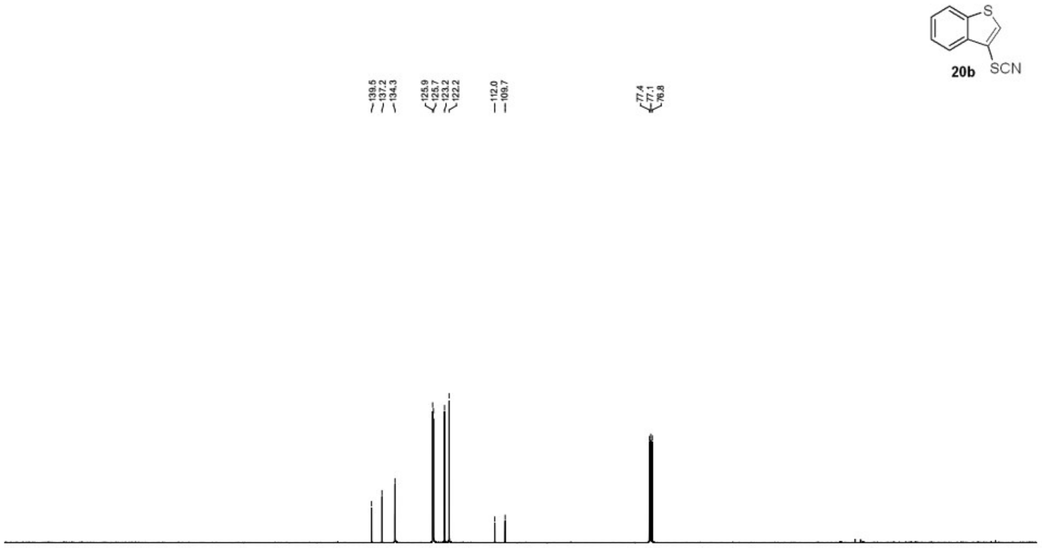

8.007
7.901
7.880
7.859
7.845
7.837
7.821
7.813
7.806
7.798
7.567
7.561
7.552
7.544
7.519
7.242
1.00
3.25
3.10
12.5 12.0 11.5 11.0 10.5 10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5 -1.0
f1 (ppm)

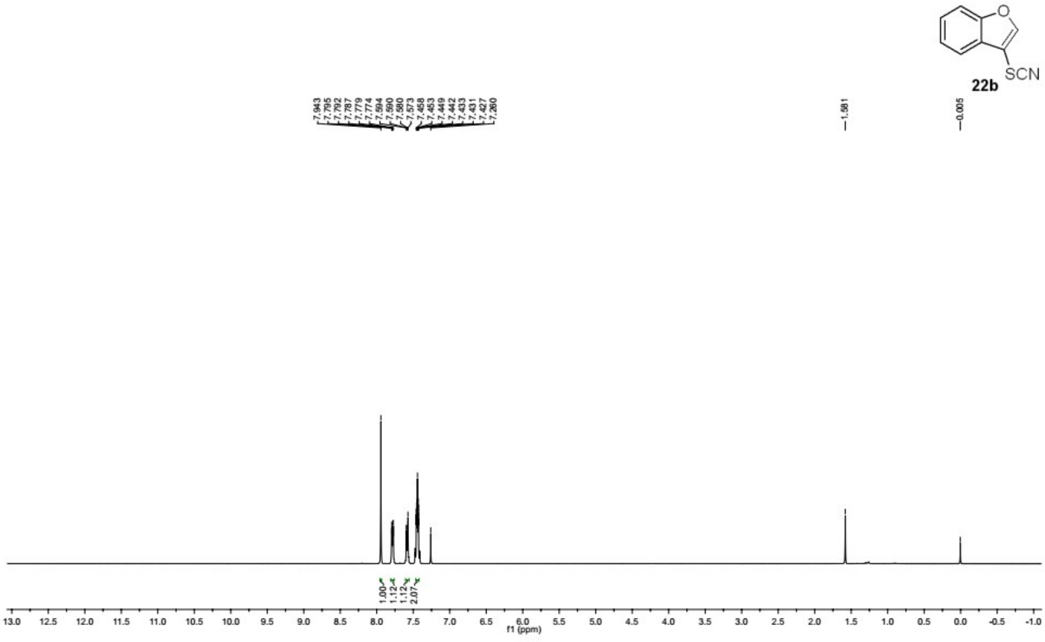


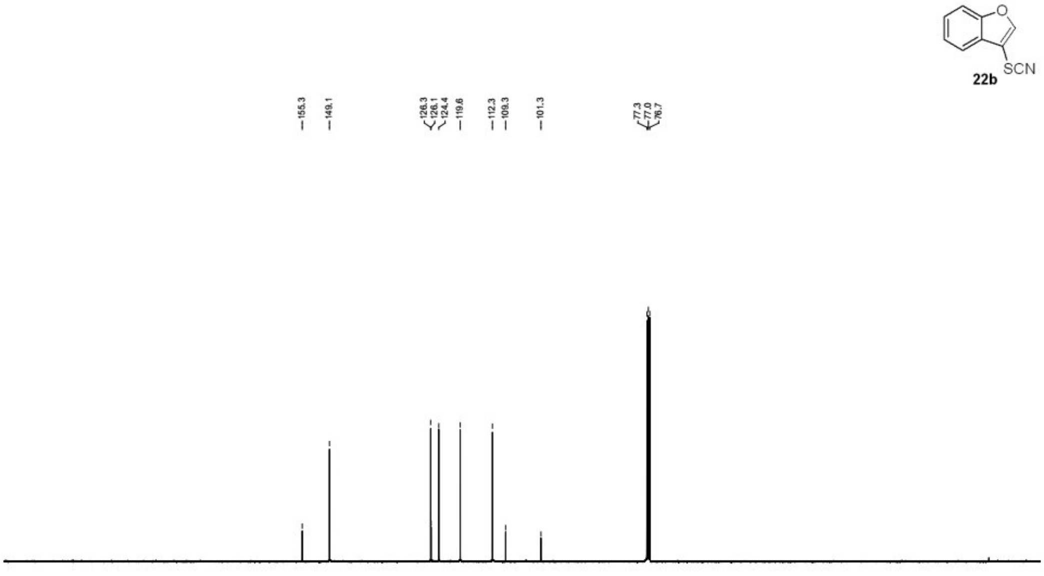
**18b**

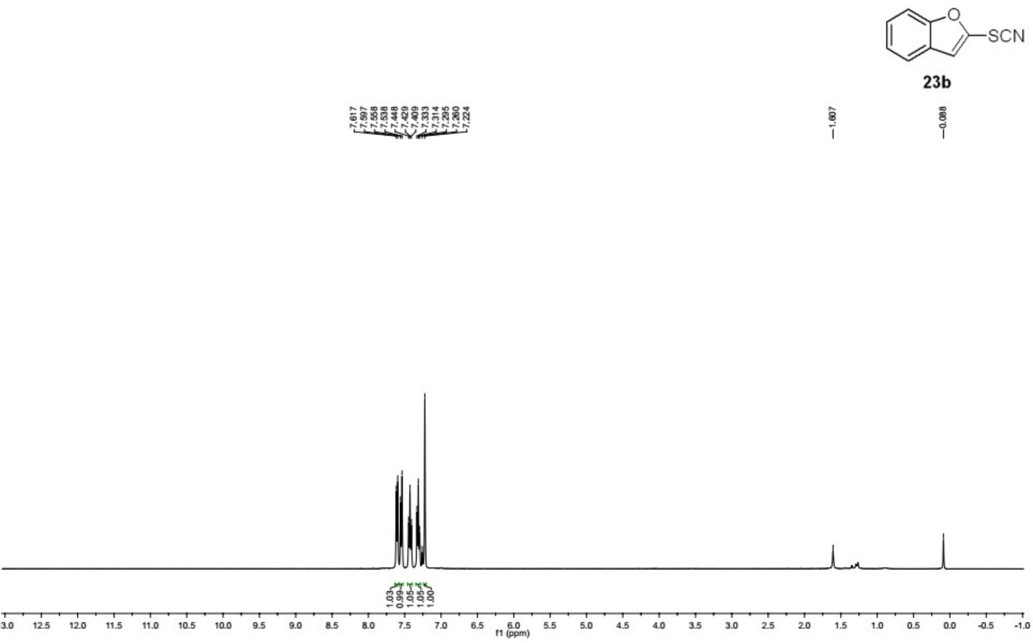

133.6
133.0
130.3
129.8
127.9
127.6
127.6
127.5
126.2
121.2
110.6
77.3
77.2
77.0
76.7
220 210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10
f1 (ppm)


S
20b
SCN
8.00
7.98
7.91
7.89
7.57
7.55
7.53
7.49
7.47
7.25
1.00
1.91
1.12
1.10
4.0 13.5 13.0 12.5 12.0 11.5 11.0 10.5 10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5 -1.0 -1.5 -2.0
f1 (ppm)

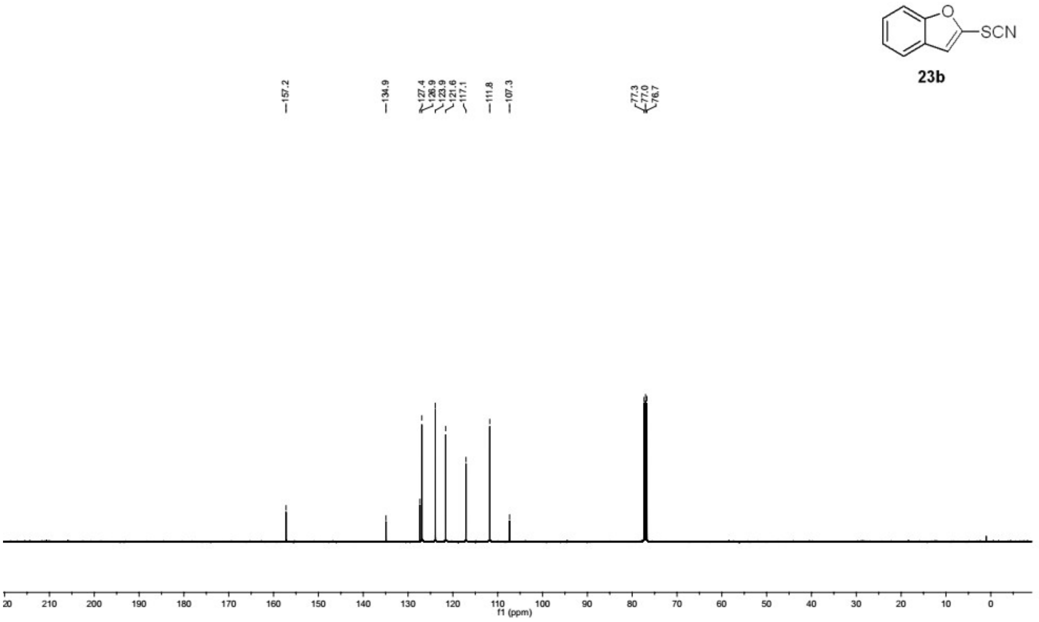

S
20b
SCN
139.5
137.2
134.3
125.9
125.7
123.2
122.2
112.0
109.7
77.4
77.1
76.8
220 210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0
f1 (ppm)


22b
SCN
7.943
7.795
7.792
7.787
7.779
7.774
7.594
7.590
7.580
7.573
7.458
7.453
7.449
7.442
7.433
7.431
7.427
7.260
1.581
0.005
1.00
1.12
1.12
2.07
13.0
12.5
12.0
11.5
11.0
10.5
10.0
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
-0.5
-1.0
f1 (ppm)


22b
SCN
155.3
149.1
126.3
126.1
124.4
119.6
112.3
109.3
101.3
77.3
77.0
76.7
220
210
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
-10
f1 (ppm)


SCN
7.617
7.597
7.558
7.538
7.448
7.429
7.409
7.333
7.314
7.295
7.260
7.224
1.607
0.088
1.03
0.99
1.05
1.05
1.00
13.0
12.5
12.0
11.5
11.0
10.5
10.0
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
-0.5
-1.0
f1 (ppm)

**23b**


SCN
157.2
134.9
127.4
126.9
123.9
121.6
117.1
111.8
107.3
77.3
77.0
76.7
20
210
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
f1 (ppm)

**23b**