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## *Supporting Information*

### **Enantioselective Synthesis of Chiral $\beta$ -Hydroxy Sulfones via Manganese Catalyzed Asymmetric Hydrogenation**

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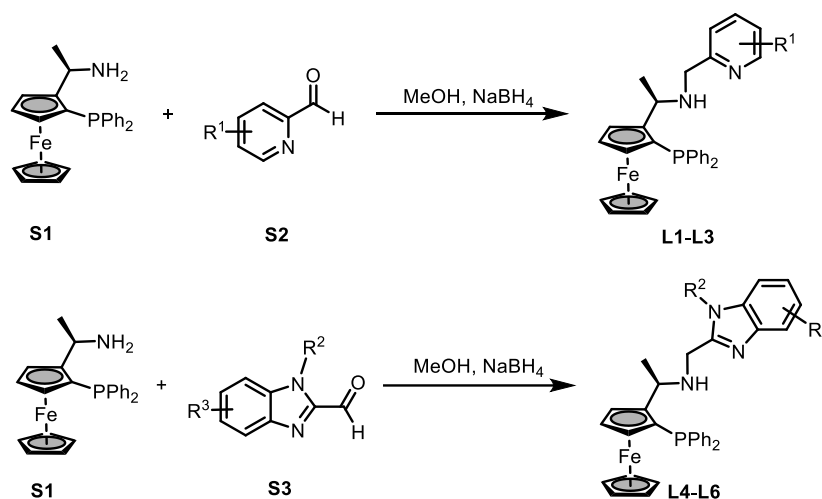
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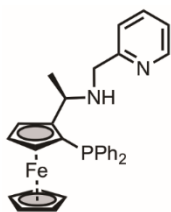
## 1. General experimental information

All reactions were performed in an argon-filled glovebox. Anhydrous THF and toluene were distilled from sodium benzophenoneketyl. Anhydrous MeOH, EtOH and *i*PrOH were freshly distilled from magnesium. Hydrogen gas (99.999%), Mn(CO)<sub>5</sub>Br and other chemical reagents were purchased from commercial suppliers. <sup>1</sup>H NMR (400 MHz), <sup>13</sup>C NMR (100 MHz), <sup>19</sup>F NMR (376 MHz) and <sup>31</sup>P NMR (162 MHz) spectra were recorded on a Bruker ADVANCE III instruments in CDCl<sub>3</sub> with TMS as internal standard. <sup>1</sup>H NMR chemical shifts were referenced to Deuterium chloroform signal (7.26 ppm), <sup>13</sup>C NMR chemical shifts were referenced to the solvent resonance (77.00 ppm, CDCl<sub>3</sub>). Optical rotations were determined using an AUTOPOL V polarimeter. HPLC analysis were performed using Agilent 1100 or Waters e2695 equipped with OJ-H, OD-H, AD-H and IA-H. HRMS spectra were recorded on an Agilent 1200HPLC-6210TOFMS using ESI as ion source. The conversion of starting materials was monitored by thin layer chromatography (TLC) using silica gel plates (silica gel 60 F254 0.25 mm), and components were visualized by observation under UV light (254 and 365 nm).

## 2. General procedure for the preparation of ligands

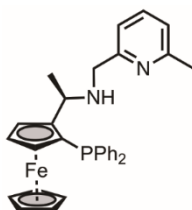


Under N<sub>2</sub> atmosphere, a solution of (*R*<sub>C</sub>, *S*<sub>FC</sub>)-**S1**<sup>[1]</sup> (1 mmol) and aldehyde **S2** or **S3**<sup>[2]</sup> (1.1 mmol) in dry MeOH (10 mL) was stirred at room temperature for 10-12 h. Then NaBH<sub>4</sub> (3 mmol) was added and the mixture was stirred at room temperature for 4 h. The solvent was removed under vacuum, and the crude product was purified by column chromatography on silica gel to get **L1-L6**, 59-64% yield.



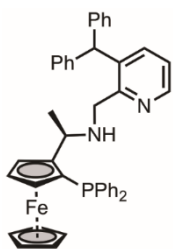
**(Rc, Sp)-N-2-Picolyl-1-(2-diphenylphosphino)ferrocenylethylamine (L1)**

Orange solid, 63% yield, m.p. 109.3-111.4 °C,  $[\alpha]_D^{20} = -121.0$  (c = 0.5, CH<sub>2</sub>Cl<sub>2</sub>). <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) δ 8.37 – 8.30 (m, 1H), 7.58 – 7.50 (m, 1H), 7.41 – 7.09 (m, 10H), 7.02 – 6.92 (m, 1H), 6.55 (d, *J* = 7.6 Hz, 1H), 4.53 (s, 1H), 4.31 (s, 1H), 4.23 – 4.16 (m, 1H), 4.02 (s, 5H), 3.81 (s, 1H), 3.63 (s, 2H), 1.55 (d, *J* = 6.4 Hz, 3H). <sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>) δ 159.8, 148.6, 140.0 (d, *J* = 9.7 Hz), 137.2 (d, *J* = 8.8 Hz), 136.0, 134.92 (d, *J* = 21.0 Hz), 132.6 (d, *J* = 14.5 Hz), 129.0, 128.20 (d, *J* = 6.3 Hz), 128.0 (d, *J* = 8.1 Hz), 128.0, 121.4 (d, *J* = 19.3 Hz), 97.7 (d, *J* = 24.1 Hz), 75.0 (d, *J* = 7.5 Hz), 71.2 (d, *J* = 4.2 Hz), 69.6, 69.4 (d, *J* = 4.1 Hz), 69.0, 52.2, 51.2 (d, *J* = 9.2 Hz), 19.4. <sup>31</sup>P NMR (162 MHz, CDCl<sub>3</sub>) δ -25.11. HRMS (ESI) calcd for C<sub>30</sub>H<sub>40</sub>FeN<sub>2</sub>P [M+H]<sup>+</sup>: 515.2273, found: 515.2275.



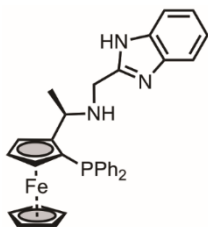
**(Rc, Sp)-N-2-(6-Methyl-picolyl)-1-(2-diphenylphosphino)ferrocenylethylamine (L2)**

Orange solid, 60% yield, m.p. 96.8-99.4 °C,  $[\alpha]_D^{20} = -132.6$  (c = 0.5, CH<sub>2</sub>Cl<sub>2</sub>). <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) δ 7.60 – 7.54 (m, 2H), 7.39 (s, 3H), 7.35 – 7.06 (m, 7H), 6.86 (d, *J* = 7.6 Hz, 1H), 6.35 (d, *J* = 8.0 Hz, 1H), 4.56 (s, 1H), 4.33 (s, 1H), 4.26 – 4.21 (m, 2H), 4.04 (s, 5H), 3.84 (s, 1H), 3.64 (s, 2H), 2.43 (s, 3H), 1.58 (d, *J* = 6.4 Hz, 3H). <sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>) δ 159.1, 157.1, 140.0 (d, *J* = 9.7 Hz), 137.2 (d, *J* = 8.9 Hz), 136.3, 134.9 (d, *J* = 21.0 Hz), 132.49 (d, *J* = 18.6 Hz), 129.0, 128.2 (d, *J* = 6.2 Hz), 128.1, 128.0 (d, *J* = 3.7 Hz), 120.8, 118.2, 97.6 (d, *J* = 24.1 Hz), 75.0 (d, *J* = 7.6 Hz), 71.2 (d, *J* = 4.3 Hz), 69.6, 69.5 (d, *J* = 4.2 Hz), 69.0, 52.1, 51.18 (d, *J* = 9.1 Hz), 24.3, 19.3. <sup>31</sup>P NMR (162 MHz, CDCl<sub>3</sub>) δ -25.11. HRMS (ESI) calcd for C<sub>31</sub>H<sub>42</sub>FeN<sub>2</sub>P [M+H]<sup>+</sup>: 529.2430, found: 529.2431.



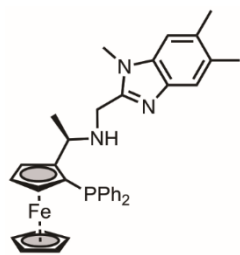
**(Rc, Sp)-N-2-(3-Diphenylmethyl-picolyl)-1-(2-diphenylphosphino)ferrocenylethylamine (L3)**

Orange solid, 61% yield, m.p. 114.3-116.7 °C,  $[\alpha]_D^{20} = +122.8$  ( $c = 0.5$ ,  $\text{CH}_2\text{Cl}_2$ ).  $^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ )  $\delta$  8.06 (d,  $J = 4.8$  Hz, 1H), 7.58 – 7.50 (m, 2H), 7.39 – 7.31 (m, 3H), 7.30 – 7.09 (m, 9H), 7.07 – 6.88 (m, 9H), 5.64 (s, 1H), 4.48 (s, 1H), 4.29 (s, 1H), 4.07 – 4.01 (m, 1H), 3.97 (s, 5H), 3.82 (s, 1H), 3.58 – 3.37 (m, 2H), 1.46 (d,  $J = 6.4$  Hz, 3H).  $^{13}\text{C}$  NMR (100 MHz,  $\text{CDCl}_3$ )  $\delta$  157.1, 146.5, 142.4 (d,  $J = 13.9$  Hz), 139.9 (d,  $J = 9.3$  Hz), 137.8 (d,  $J = 9.5$  Hz), 136.9, 136.6, 135.2, 135.0, 132.6, 132.4, 129.5 (d,  $J = 1.6$  Hz), 129.0, 128.4, 128.1 (d,  $J = 3.2$  Hz), 128.1 (d,  $J = 1.0$  Hz), 127.7, 126.6 (d,  $J = 1.9$  Hz), 121.1, 98.5 (d,  $J = 24.9$  Hz), 75.0 (d,  $J = 8.2$  Hz), 71.0 (d,  $J = 4.0$  Hz), 69.6, 69.4 (d,  $J = 4.3$  Hz), 69.1, 51.3, 51.2, 49.5, 20.8.  $^{31}\text{P}$  NMR (162 MHz,  $\text{CDCl}_3$ )  $\delta$  -24.52. HRMS (ESI) calcd for  $\text{C}_{42}\text{H}_{50}\text{FeN}_2\text{P}$   $[\text{M}+\text{H}]^+$ : 681.3056, found: 681.3054.



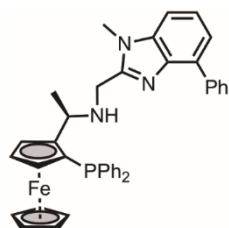
**(Rc, Sp)-N-((1H-Benzo[d]imidazol-2-yl)methyl)-1-(2-diphenylphosphino)ferrocenylethylamine (L4)**

Orange solid, 59% yield, m.p. 96.8-99.4 °C,  $[\alpha]_D^{20} = -155.8$  ( $c = 0.5$ ,  $\text{CH}_2\text{Cl}_2$ ).  $^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ )  $\delta$  7.65 – 7.49 (m, 3H), 7.45 – 7.26 (m, 9H), 7.18 – 7.12 (m, 2H), 4.50 (s, 1H), 4.33 (s, 1H), 4.31 – 4.25 (m,  $J = 1$  Hz), 4.03 – 3.88 (m, 8H), 1.52 (d,  $J = 6.4$  Hz, 3H).  $^{13}\text{C}$  NMR (100 MHz,  $\text{CDCl}_3$ )  $\delta$  154.2, 141.2 (d,  $J = 9.1$  Hz), 137.4 (d,  $J = 7.5$  Hz), 135.1 (d,  $J = 21.4$  Hz), 132.4 (d,  $J = 17.5$  Hz), 131.6 (d,  $J = 9.1$  Hz), 129.2, 128.3 (d,  $J = 5.9$  Hz), 128.1, 128.1, 96.9 (d,  $J = 24.1$  Hz), 75.1 (d,  $J = 7.1$  Hz), 71.7 (d,  $J = 4.9$  Hz), 69.6, 69.1, 69.0 (d,  $J = 4.4$  Hz), 51.9 (d,  $J = 7.9$  Hz), 44.6, 18.4.  $^{31}\text{P}$  NMR (162 MHz,  $\text{CDCl}_3$ )  $\delta$  -23.87. HRMS (ESI) calcd for  $\text{C}_{32}\text{H}_{41}\text{FeN}_3\text{P}$   $[\text{M}+\text{H}]^+$ : 554.2382, found: 554.2384.



**(Rc, Sp)-N-((1,2,5,6-Tetramethyl-1H-benzo[d]imidazol-2-yl)methyl)-1-(2-diphenylphosphino)-ferrocenylethylamine (L5)**

Orange solid, 64% yield, m.p. 161.4-164.5 °C,  $[\alpha]_D^{20} = -167.2$  ( $c = 0.5$ ,  $\text{CH}_2\text{Cl}_2$ ).  $^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ )  $\delta$  7.58 – 7.52 (m, 2H), 7.43 (s, 1H), 7.40 – 7.34 (m, 3H), 7.22 (t,  $J = 6.8$  Hz, 2H), 7.13 (t,  $J = 8.0$  Hz, 2H), 7.10 – 7.04 (m, 1H), 6.93 (s, 1H), 4.51 (s, 1H), 4.32 (s, 1H), 4.20 – 4.15 (m, 1H), 3.97 (s, 5H), 3.87 (s, 1H), 3.76 – 3.62 (m, 2H), 3.24 (s, 3H), 2.36 (d,  $J = 4.4$  Hz, 6H), 1.54 (d,  $J = 6.4$  Hz, 3H).  $^{13}\text{C}$  NMR (100 MHz,  $\text{CDCl}_3$ )  $\delta$  152.1, 140.7, 140.23 (d,  $J = 9.8$  Hz), 137.5 (d,  $J = 8.8$  Hz), 135.0 (d,  $J = 21.2$  Hz), 134.5, 132.4 (d,  $J = 18.2$  Hz), 130.9, 130.1, 129.0, 128.1 (d,  $J = 6.0$  Hz), 128.0 (d,  $J = 8.1$  Hz), 127.80, 119.4, 109.2, 97.8 (d,  $J = 25.1$  Hz), 74.8 (d,  $J = 8.5$  Hz), 71.17 (d,  $J = 4.4$  Hz), 70.2, 69.6, 69.2, 69.1 (d,  $J = 4.3$  Hz), 51.3 (d,  $J = 9.5$  Hz), 43.8, 29.3, 20.5, 20.14 (d,  $J = 9.9$  Hz).  $^{31}\text{P}$  NMR (162 MHz,  $\text{CDCl}_3$ )  $\delta$ -24.83. HRMS (ESI) calcd for  $\text{C}_{30}\text{H}_{40}\text{FeN}_2\text{P}$   $[\text{M}+\text{H}]^+$ : 596.2852, found: 596.2850.

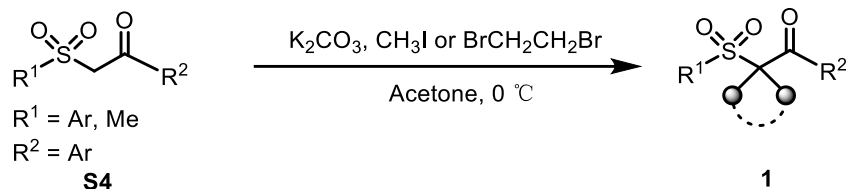


**(Rc, Sp)-N-((1,2-Dimethyl-4-phenyl-1H-benzo[d]imidazol-2-yl)methyl)-1-(2-diphenylphosphino)-ferrocenylethylamine (L6)**

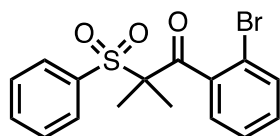
Orange solid, 61% yield, m.p. 170.5-173.6 °C,  $[\alpha]_D^{20} = -162.2$  ( $c = 0.5$ ,  $\text{CH}_2\text{Cl}_2$ ).  $^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ )  $\delta$  8.07 (d,  $J = 7.2$  Hz, 2H), 7.61 – 7.59 (m, 2H), 7.39 (s, 5H), 7.31 (t,  $J = 7.6$  Hz, 1H), 7.23 – 7.05 (m, 6H), 4.55 (s, 1H), 4.38 – 4.27 (m, 2H), 4.02 (s, 5H), 3.91 (s, 1H), 3.88 – 3.75 (m, 2H), 3.38 (s, 3H), 1.63 (d,  $J = 6.4$  Hz, 3H).  $^{13}\text{C}$  NMR (100 MHz,  $\text{CDCl}_3$ )  $\delta$  152.9, 140.21 (d,  $J = 9.5$  Hz), 140.0, 138.7, 137.5 (d,  $J = 8.8$  Hz), 136.7, 135.0 (d,  $J = 21.6$  Hz), 132.3, 132.1, 132.0, 129.1, 129.1 (d,  $J = 15.5$  Hz), 128.3, 128.0, 128.0, 128.0, 127.9, 127.7, 127.0, 122.1, 120.9, 108.0, 97.7 (d,  $J = 25.1$  Hz), 74.8 (d,  $J = 25.1$  Hz), 71.2 (d,  $J = 8.6$  Hz), 69.6, 69.2, 69.1 (d,  $J = 4.3$  Hz), 51.2, 43.5,

29.5, 19.8.  $^{31}\text{P}$  NMR (162 MHz,  $\text{CDCl}_3$ )  $\delta$ -24.83. HRMS (ESI) calcd for  $\text{C}_{39}\text{H}_{47}\text{FeN}_3\text{P}$   $[\text{M}+\text{H}]^+$ : 664.2852, found: 664.2851.

### 3. General procedure for the preparation of substrates

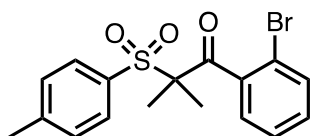


Under  $\text{N}_2$  atmosphere, a solution of **S4** (5 mmol), potassium carbonate (15 mmol), and  $\text{CH}_3\text{I}$  (15 mmol) in acetone (15 mL) was stirred in room temperature overnight. Filtered to remove solids and concentrated solution. 20 mL water and 15 mL DCM were added, organic layer was combined and dried by anhydrous sodium sulfate. The reaction mixture was filtered and concentrated to get the crude product **1**. Crude product **1** was purified by column chromatography on silica gel to get white solid.



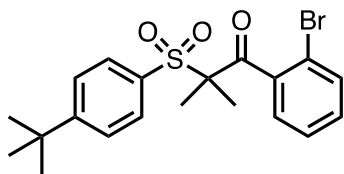
#### 1-(2-Bromophenyl)-2-methyl-2-(phenylsulfonyl)propan-1-one (**1a**):

White solid, 78% yield, m.p. 119.3-122.6  $^\circ\text{C}$ .  $^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ )  $\delta$  7.87 (d,  $J = 8.0$  Hz, 2H), 7.76 – 7.70 (m, 2H), 7.61 – 7.54 (m, 3H), 7.42 (t,  $J = 7.2$  Hz, 1H), 7.29 (t,  $J = 7.6$  Hz, 1H), 1.66 (s, 6H).  $^{13}\text{C}$  NMR (100 MHz,  $\text{CDCl}_3$ )  $\delta$  201.9, 141.5, 135.1, 134.3, 123.7, 131.0, 130.9, 128.7, 127.4, 127.0, 117.5, 72.7, 21.2. HRMS (ESI) calcd for  $\text{C}_{16}\text{H}_{16}\text{BrO}_3\text{S}$   $[\text{M}+\text{H}]^+$ : 366.9998, found: 368.9999.



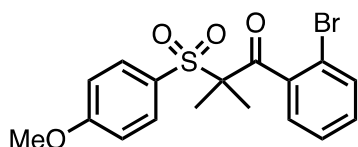
#### 1-(2-Bromophenyl)-2-methyl-2-(4-methylphenylsulfonyl)propan-1-one (**1b**):

White solid, 72% yield, m.p. 116.8-119.9  $^\circ\text{C}$ .  $^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ )  $\delta$  7.79 – 7.71 (m, 3H), 7.55 (dd,  $J = 8.4, 0.8$  Hz, 1H), 7.44 – 7.35 (m, 3H), 7.28 (td,  $J = 8.0, 1.6$  Hz, 1H), 2.47 (s, 3H), 1.65 (s, 6H).  $^{13}\text{C}$  NMR (100 MHz,  $\text{CDCl}_3$ )  $\delta$  202.1, 145.5, 141.4, 132.6, 131.9, 130.9, 130.8, 129.4, 127.3, 127.0, 117.5, 21.8, 21.2. HRMS (ESI) calcd for  $\text{C}_{17}\text{H}_{18}\text{BrO}_3\text{S}$   $[\text{M}+\text{H}]^+$ : 381.0155, found: 381.0156.



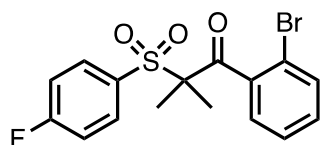
**1-(2-Bromophenyl)-2-((4-(tert-butyl)phenyl)sulfonyl)-2-methylpropan-1-one (1c):**

White solid, 62% yield, m.p. 132.1-135.4 °C. <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) δ 7.80 – 7.76 (m, 2H), 7.72 (dd, *J* = 7.6, 1.6 Hz, 1H), 7.60 – 7.54 (m, 3H), 7.40 (td, *J* = 7.6, 0.8 Hz, 1H), 7.28 (td, *J* = 8.0, 2.0 Hz, 1H), 1.66 (s, 6H), 1.37 (s, 9H). <sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>) δ 202.1, 158.2, 141.4, 132.5, 131.9, 130.7, 127.3, 126.9, 125.7, 117.4, 72.5, 35.3, 31.1, 21.2. HRMS (ESI) calcd for C<sub>20</sub>H<sub>24</sub>BrO<sub>3</sub>S [M+H]<sup>+</sup>: 423.0624, found: 423.0624.



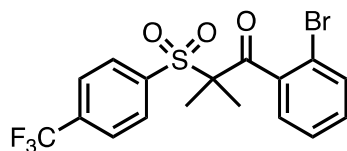
**1-(2-Bromophenyl)-2-((4-methoxyphenyl)sulfonyl)-2-methylpropan-1-one (1d):**

White solid, 73% yield, m.p. 85.4-88.1 °C. <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) δ 7.80 – 7.75 (m, 3H), 7.55 (d, *J* = 8.0 Hz, 1H), 7.41 (td, *J* = 7.6, 1.2 Hz, 1H), 7.28 (td, *J* = 8.0, 1.6 Hz, 1H), 7.01 (m, 2H), 3.90 (s, 3H), 1.64 (s, 6H). <sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>) δ 202.2, 164.3, 141.5, 133.0, 132.6, 130.8, 127.3, 127.0, 126.3, 117.5, 114.0, 72.6, 55.7, 21.3. HRMS (ESI) calcd for C<sub>17</sub>H<sub>18</sub>BrO<sub>3</sub>S [M+H]<sup>+</sup>: 397.0104, found: 397.0102.



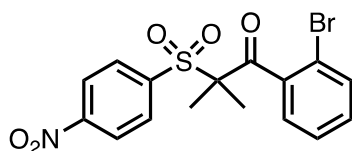
**1-(2-Bromophenyl)-2-((4-fluorophenyl)sulfonyl)-2-methylpropan-1-one (1e):**

White solid, 70% yield, m.p. 115.9-118.9 °C. <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) δ 7.90 – 7.85 (m, 2H), 7.74 (dd, *J* = 7.6, 1.6 Hz, 1H), 7.56 (d, *J* = 8.0 Hz, 1H), 7.42 (td, *J* = 7.6, 0.8 Hz, 1H), 7.33 – 7.24 (m, 3H), 1.65 (s, 6H). <sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>) δ 202.2, 166.4 (d, *J* = 256 Hz), 141.2, 133.8 (d, *J* = 10 Hz), 132.7, 131.0, 130.9 (d, *J* = 3 Hz), 127.4, 126.9, 117.4, 116.1 (d, *J* = 23 Hz), 72.7, 21.2. <sup>19</sup>F NMR (376 MHz, CDCl<sub>3</sub>) δ -102.50. HRMS (ESI) calcd for C<sub>16</sub>H<sub>15</sub>BrFO<sub>3</sub>S [M+H]<sup>+</sup>: 384.9904, found: 384.9906.



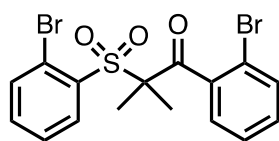
**1-(2-Bromophenyl)-2-methyl-2-((4-(trifluoromethyl)phenyl)sulfonyl)propan-1-one (1f):**

White solid, 69% yield, m.p. 126.4-129.0 °C. <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) δ 8.00 (d, *J* = 8.0 Hz, 2H), 7.85 (d, *J* = 8.4 Hz, 2H), 7.73 (dd, *J* = 7.6, 1.6 Hz, 1H), 7.57 (dd, *J* = 8.0, 0.8 Hz, 1H), 7.44 (td, *J* = 7.6, 1.2 Hz, 1H), 7.31 (td, *J* = 7.6, 1.6 Hz, 1H), 1.68 (s, 6H). <sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>) δ 201.9, 141.1, 138.8, 135.8(q, *J* = 33.0 Hz), 132.7, 131.6, 131.0, 127.4, 126.8, 125.7 (q, *J* = 3.7 Hz), 123.2 (d, *J* = 271.5 Hz), 73.0, 21.1. <sup>19</sup>F NMR (376 MHz, CDCl<sub>3</sub>) δ -62.22. HRMS (ESI) calcd for C<sub>17</sub>H<sub>15</sub>BrF<sub>3</sub>O<sub>3</sub>S [M+H]<sup>+</sup>: 434.9872, found: 434.9870.



**1-(2-Bromophenyl)-2-methyl-2-((4-nitrophenyl)sulfonyl)propan-1-one (1g):**

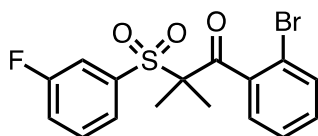
White solid, 75% yield, m.p. 110.0-112.8 °C. <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) δ 8.41 (dd, *J* = 9.2, 3.2 Hz, 2H), 8.09 – 8.03 (m, 2H), 7.73 – 7.68 (m, 1H), 7.60 – 7.54 (m, 1H), 7.47 – 7.42 (m, 1H), 7.35 – 7.29 (m, 1H), 1.69 (s, 6H). <sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>) δ 202.0, 151.2, 141.0, 140.9, 132.8, 132.4, 131.2, 127.5, 126.8, 123.7, 117.3, 73.3, 21.2. HRMS (ESI) calcd for C<sub>16</sub>H<sub>15</sub>BrNO<sub>5</sub>S [M+H]<sup>+</sup>: 411.9849, found: 411.9050.



**1-(2-Bromophenyl)-2-((2-bromophenyl)sulfonyl)-2-methylpropan-1-one (1h):**

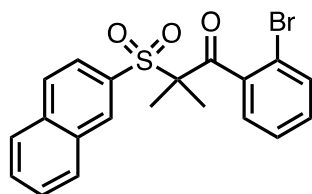
White solid, 71% yield, m.p. 77.8-81.1 °C. <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) δ 8.03 (d, *J* = 7.2 Hz, 1H), 7.89 (d, *J* = 7.6 Hz, 1H), 7.81 (d, *J* = 7.2 Hz, 1H), 7.61 – 7.46 (m, 3H), 7.43 (t, *J* = 7.2 Hz, 1H), 7.30 (t, *J* = 7.6 Hz, 1H), 1.73 (s, 6H). <sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>) δ 201.3, 141.1, 136.4, 135.6, 135.1, 134.6, 132.7, 131.0, 127.6, 127.3, 127.1, 123.2, 117.6, 74.4, 21.4. HRMS (ESI) calcd for C<sub>16</sub>H<sub>15</sub>Br<sub>2</sub>O<sub>3</sub>S [M+H]<sup>+</sup>: 446.9103, found: 446.9104.





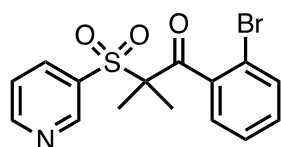
**1-(2-Bromophenyl)-2-((3-fluorophenyl)sulfonyl)-2-methylpropan-1-one (1i):**

White solid, 65% yield, m.p. 94.8-98.5 °C. <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) δ 7.72 (dd, *J* = 7.6, 1.6 Hz, 1H), 7.67 (dt, *J* = 8.0, 1.2 Hz, 1H), 7.61 – 7.53 (m, 3H), 7.45 – 7.39 (m, 2H), 7.30 (td, *J* = 8.0, 1.6 Hz, 1H), 1.67 (s, 6H). <sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>) δ 201.7, 162.1(d, *J* = 250.3 Hz), 141.2, 137.1 (d, *J* = 6.6 Hz), 132.7, 131.0, 130.3 (d, *J* = 7.5 Hz), 127.4, 126.9, 126.8 (d, *J* = 3.3 Hz), 121.6 (d, *J* = 21.1 Hz), 118.2 (d, *J* = 24.4 Hz), 117.4, 73.0, 21.2. <sup>19</sup>F NMR (376 MHz, CDCl<sub>3</sub>) δ -109.89. HRMS (ESI) calcd for C<sub>16</sub>H<sub>15</sub>BrFO<sub>3</sub>S [M+H]<sup>+</sup>: 384.9904, found: 384.9905.



**1-(2-Bromophenyl)-2-methyl-2-(naphthalen-2-ylsulfonyl)propan-1-one (1j):**

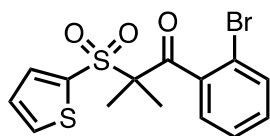
White solid, 62% yield, m.p. 98.1-101.7 °C. <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) δ 8.45 (s, 1H), 8.01 (dd, *J* = 8.0, 2.4 Hz, 2H), 7.95 (d, *J* = 8.0 Hz, 1H), 7.87 – 7.81 (m, 2H), 7.71 – 7.66 (m, 1H), 7.65 – 7.60 (m, 1H), 7.55 (d, *J* = 8.0 Hz, 1H), 7.44 (t, *J* = 7.2 Hz, 1H), 7.30 (td, *J* = 8.0, 1.6 Hz, 1H), 1.70 (s, 6H). <sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>) δ 202.0, 141.4, 135.6, 133.1, 132.6, 132.1, 131.9, 130.9, 129.7, 129.6, 128.6, 128.0, 127.6, 127.4, 127.0, 125.4, 117.5, 729, 21.4. HRMS (ESI) calcd for C<sub>20</sub>H<sub>18</sub>BrO<sub>3</sub>S [M+H]<sup>+</sup>: 417.0155, found: 417.0154.



**1-(2-Bromophenyl)-2-methyl-2-(pyridin-3-ylsulfonyl)propan-1-one (1k):**

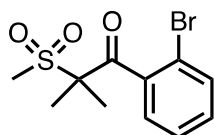
White solid, 60% yield, m.p. 84.1-86.3 °C. <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) δ 9.04 (d, *J* = 2.0 Hz, 1H), 8.90 (dd, *J* = 5.2, 1.6 Hz, 1H), 8.13 (dt, *J* = 8.0, 2.0 Hz, 1H), 7.70 (dd, *J* = 7.6, 1.6 Hz, 1H), 7.57 – 7.51 (m, 2H), 7.43 (td, *J* = 7.6, 1.2 Hz, 1H), 7.30 (td, *J* = 7.6, 1.6 Hz, 1H), 1.68 (s, 6H). <sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>) δ 202.2, 154.5, 151.1, 140.0,

137.8, 132.7, 131.9, 131.1, 127.5, 126.9, 123.4, 117.2, 72.9, 21.0. HRMS (ESI) calcd for C<sub>15</sub>H<sub>15</sub>BrNO<sub>3</sub>S [M+H]<sup>+</sup>: 367.9961, found: 369.9950.



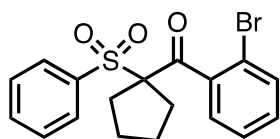
**1-(2-Bromophenyl)-2-methyl-2-(thiophen-2-ylsulfonyl)propan-1-one (1l):**

White solid, 65% yield, m.p. 115.9-119.2 °C. <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) δ 7.83 (dd, *J* = 5.2, 1.6 Hz, 1H), 7.69 (dd, *J* = 3.6, 1.2 Hz, 1H), 7.66 (dd, *J* = 7.6, 1.6 Hz, 1H), 7.55 (dd, *J* = 8.0, 0.8 Hz, 1H), 7.40 (td, *J* = 7.6, 1.2 Hz, 1H), 7.28 (td, *J* = 7.6, 1.6 Hz, 1H), 7.21 (dd, *J* = 4.8, 3.6 Hz, 1H), 1.71 (s, 6H). <sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>) δ 201.6, 141.3, 137.2, 135.6, 135.5, 132.6, 130.9, 127.8, 127.4, 127.0, 117.5, 73.2, 21.3. HRMS (ESI) calcd for C<sub>14</sub>H<sub>14</sub>BrO<sub>3</sub>S<sub>2</sub> [M+H]<sup>+</sup>: 372.9562, found: 372.9566.



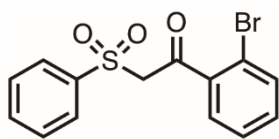
**1-(2-Bromophenyl)-2-methyl-2-(methylsulfonyl)propan-1-one (1m):**

White solid, 88% yield, m.p. 88.6-91.4 °C. <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) δ 7.57 (t, *J* = 8.4 Hz, 2H), 7.40 (t, *J* = 7.6 Hz, 1H), 7.31 (t, *J* = 7.6 Hz, 1H), 3.13 (s, 3H), 1.73 (s, 6H). <sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>) δ 203.9, 141.1, 132.5, 131.0, 127.5, 127.0, 117.0, 71.4, 36.5, 20.2. HRMS (ESI) calcd for C<sub>11</sub>H<sub>14</sub>BrO<sub>3</sub>S [M+H]<sup>+</sup>: 304.9842, found: 304.9844.



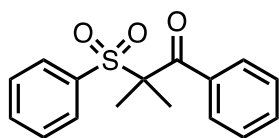
**(2-Bromophenyl)(1-(phenylsulfonyl)cyclopentyl)methanone (1n):**

White solid, 42% yield, m.p. 152.8-156.5 °C. <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) δ 8.03 (dd, *J* = 7.6, 1.2 Hz, 1H), 7.85 (d, *J* = 7.2 Hz, 2H), 7.70 (t, *J* = 7.6 Hz, 1H), 7.62–7.53 (m, 3H), 7.42 (t, *J* = 7.6 Hz, 1H), 7.30 (td, *J* = 8.0, 1.6 Hz, 1H), 2.65–2.50 (m, 2H), 2.35–2.18 (m, 2H), 1.94–1.80 (m, 2H), 1.76–1.64 (m, 2H). <sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>) δ 201.9, 140.4, 135.8, 134.2, 133.2, 131.2, 130.7, 128.7, 127.5, 127.2, 118.9, 84.0, 34.4, 25.9. HRMS (ESI) calcd for C<sub>18</sub>H<sub>18</sub>BrO<sub>3</sub>S [M+H]<sup>+</sup>: 393.0155, found: 393.0153.



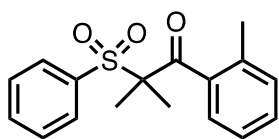
**1-(2-Bromophenyl)-2-(phenylsulfonyl)ethan-1-one (1o)<sup>[3]</sup>:**

White solid, m.p. 77.2-80.3 °C. <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) δ 7.88 (d, *J* = 7.6 Hz, 2H), 7.65 (t, *J* = 7.2 Hz, 1H), 7.58 – 7.43 (m, 4H), 7.40 – 7.30(m, 2H), 4.82 (s, 2H). <sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>) δ 190.9, 139.4, 138.8, 134.3, 133.9, 133.0, 130.4, 129.3, 128.5, 127.8, 119.4, 60.0. HRMS (ESI) calcd for C<sub>14</sub>H<sub>12</sub>BrO<sub>3</sub>S [M+H]<sup>+</sup>: 338.9685, found: 338.9687.



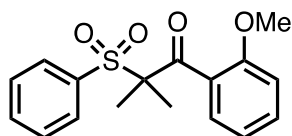
**2-Methyl-1-phenyl-2-(phenylsulfonyl)propan-1-one (1p):**

White solid, 79% yield, m.p. 71.9-73.9 °C. <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) δ 7.95 – 7.90 (m, 2H), 7.82 – 7.77 (m, 2H), 7.66 (t, *J* = 7.6 Hz, 1H), 7.52 (t, *J* = 7.6 Hz, 3H), 7.43 (t, *J* = 7.6 Hz, 2H), 1.70 (s, 6H). <sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>) δ 199.2, 137.6, 135.1, 134.1, 132.0, 130.4, 128.7, 128.6, 128.1, 73.3, 22.5. HRMS (ESI) calcd for C<sub>16</sub>H<sub>17</sub>O<sub>3</sub>S [M+H]<sup>+</sup>: 289.3683, found: 289.3685.



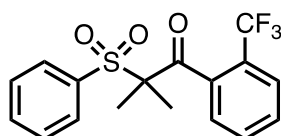
**2-Methyl-2-(phenylsulfonyl)-1-(o-tolyl)propan-1-one (1q):**

White solid, 80% yield, m.p. 77.6-79.6 °C. <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) δ 7.91 – 7.85 (m, 2H), 7.75 – 7.66 (m, 2H), 7.60 – 7.54 (m, 2H), 7.31 (td, *J* = 7.6, 1.6 Hz, 1H), 7.26 – 7.19 (m, 2H), 2.16 (s, 3H), 1.62 (s, 6H). <sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>) δ 203.7, 138.8, 135.4, 134.4, 134.1, 130.8, 130.8, 129.8, 128.5, 125.2, 125.2, 72.9, 22.0, 19.6. HRMS (ESI) calcd for C<sub>17</sub>H<sub>19</sub>O<sub>3</sub>S [M+H]<sup>+</sup>: 303.1049, found: 303.1048.



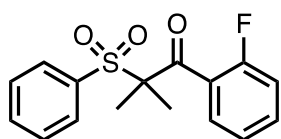
**1-(2-Methoxyphenyl)-2-methyl-2-(phenylsulfonyl)propan-1-one (1r):**

White solid, 72% yield, m.p. 94.0-96.3 °C. <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) δ 8.10 – 8.02 (m, 2H), 7.80 – 7.73 (m, 2H), 7.66 – 7.60 (m, 1H), 7.53 – 7.46 (m, 2H), 6.97 – 6.88 (m, 2H), 3.86 (s, 3H), 1.72 (s, 6H). <sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>) δ 196.2, 163.0, 135.5, 134.0, 132.1, 130.3, 129.8, 128.7, 113.4, 73.7, 55.5, 22.8. HRMS (ESI) calcd for C<sub>17</sub>H<sub>19</sub>O<sub>4</sub>S [M+H]<sup>+</sup>: 319.0999, found: 319.0997.



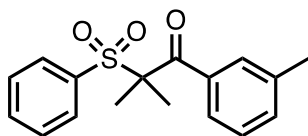
**2-Methyl-2-(phenylsulfonyl)-1-(2-(trifluoromethyl)phenyl)propan-1-one (1s):**

White solid, 73% yield, m.p. 133.0-135.9 °C. <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) δ 8.03 (d, *J* = 8.0 Hz, 2H), 7.79 (dd, *J* = 8.0, 0.8 Hz, 2H), 7.73 – 7.66 (m, 3H), 7.55 (t, *J* = 8.0 Hz, 2H), 1.68 (s, 6H). <sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>) δ 198.8, 140.8, 134.9, 134.4, 133.4(q, *J* = 33 Hz), 130.5, 129.0, 128.8, 125.3(q, *J* = 3.6 Hz), 125.5(q, *J* = 271 Hz), 73.3, 22.4. <sup>19</sup>F NMR (376 MHz, CDCl<sub>3</sub>) δ -62.16. HRMS (ESI) calcd for C<sub>17</sub>H<sub>16</sub>F<sub>3</sub>O<sub>3</sub>S [M+H]<sup>+</sup>: 357.0767, found: 357.0766.



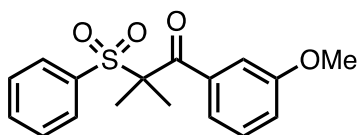
**1-(2-Fluorophenyl)-2-methyl-2-(phenylsulfonyl)propan-1-one (1t):**

White solid, 72% yield, m.p. 70.9-73.2 °C. <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) δ 7.87 (d, *J* = 7.6 Hz, 2H), 7.70 (t, *J* = 7.2 Hz, 1H), 7.63 – 7.53 (m, 3H), 7.46 - 7.38 (m, 1H), 7.21 (t, *J* = 7.6 Hz, 1H), 7.08 (t, *J* = 8.8 Hz, 1H), 1.64 (s, 6H). <sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>) δ 199.9, 158.1 (d, *J* = 246 Hz), 135.3, 134.3, 132.0 (d, *J* = 8 Hz), 130.8, 128.7, 128.0 (d, *J* = 3 Hz), 127.8 (d, *J* = 17 Hz), 124.2 (d, *J* = 3 Hz), 115.8 (d, *J* = 21 Hz), 73.2, 20.8. <sup>19</sup>F NMR (376 MHz, CDCl<sub>3</sub>) δ -114.30. HRMS (ESI) calcd for C<sub>16</sub>H<sub>16</sub>FO<sub>3</sub>S [M+H]<sup>+</sup>: 307.0799, found: 307.0797.



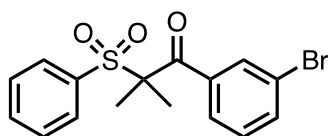
**2-Methyl-2-(phenylsulfonyl)-1-(m-tolyl)propan-1-one (1u):**

White solid, 67% yield, m.p. 80.4-82.7 °C. <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) δ 7.82 – 7.76 (m, 2H), 7.76 – 7.71 (m, 1H), 7.67 – 7.60 (m, 2H), 7.54 – 7.47 (m, 2H), 7.34 – 7.27 (m, 2H), 2.37 (s, 3H), 1.69 (s, 6H). <sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>) δ 199.5, 148.0, 137.9, 135.4, 134.1, 132.7, 130.5, 129.2, 128.7, 128.0, 125.8, 73.4, 22.6, 21.4. HRMS (ESI) calcd for C<sub>17</sub>H<sub>19</sub>O<sub>3</sub>S [M+H]<sup>+</sup>: 303.1049, found: 303.1051.



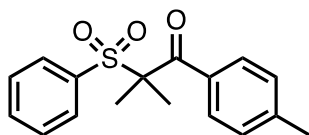
**1-(3-Methoxyphenyl)-2-methyl-2-(phenylsulfonyl)propan-1-one (1v):**

White solid, 71% yield, m.p. 62.3-64.7 °C. <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) δ 7.82 – 7.77 (m, 2H), 7.69 – 7.63 (m, 1H), 7.55 – 7.49 (m, 3H), 7.44 (t, *J* = 2.0 Hz, 1H), 7.34 (t, *J* = 8.0 Hz, 1H), 7.06 (dd, *J* = 8.4, 2.8 Hz, 1H), 3.83 (s, 3H), 1.69 (s, 6H). <sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>) δ 199.1, 159.4, 139.0, 135.3, 134.1, 130.5, 129.3, 128.7, 121.1, 118.3, 113.6, 73.5, 55.4, 22.6. HRMS (ESI) calcd for C<sub>17</sub>H<sub>19</sub>O<sub>4</sub>S [M+H]<sup>+</sup>: 319.0999, found: 319.0998.



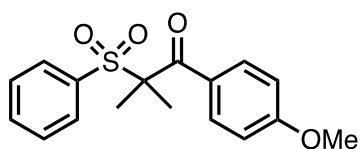
**1-(3-Bromophenyl)-2-methyl-2-(phenylsulfonyl)propan-1-one (1w):**

White solid, 65% yield, m.p. 77.3-79.6 °C. <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) δ 7.97 – 7.92 (m, 2H), 7.81 – 7.76 (m, 2H), 7.70 – 7.63 (m, 2H), 7.57 – 7.51 (m, 2H), 7.32 (t, *J* = 8.0 Hz, 1H), 1.68 (s, 6H). <sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>) δ 198.0, 139.3, 135.0, 134.9, 134.3, 131.6, 130.4, 129.7, 128.7, 127.2, 122.4, 73.3, 22.5. HRMS (ESI) calcd for C<sub>16</sub>H<sub>16</sub>BrO<sub>3</sub>S [M+H]<sup>+</sup>: 366.9998, found: 366.9996.



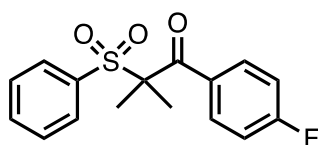
**2-Methyl-2-(phenylsulfonyl)-1-(p-tolyl)propan-1-one (1x):**

White solid, 66% yield, m.p. 83.5-86.7 °C. <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) δ 7.87 (dd, *J* = 8.0, 1.2 Hz, 2H), 7.80 – 7.75 (m, 2H), 7.67 – 7.62 (m, 1H), 7.53 – 7.48 (m, 2H), 7.25 – 7.20 (m, 2H), 2.40 (s, 3H), 1.70 (s, 6H). <sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>) δ 198.3, 142.9, 135.5, 134.9, 134.1, 130.4, 129.3, 128.9, 128.7, 22.7, 21.5. HRMS (ESI) calcd for C<sub>17</sub>H<sub>19</sub>O<sub>3</sub>S [M+H]<sup>+</sup>: 303.1049, found: 303.1051.



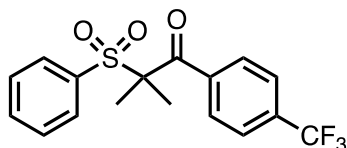
**1-(4-Methoxyphenyl)-2-methyl-2-(phenylsulfonyl)propan-1-one (1y):**

White solid, 78% yield, m.p. 99.9-102.5 °C. <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) δ 8.10 – 8.02 (m, 2H), 7.80 – 7.73 (m, 2H), 7.66 – 7.60 (m, 1H), 7.53 – 7.46 (m, 2H), 6.97 – 6.88 (m, 2H), 3.86 (s, 3H), 1.72 (s, 6H). <sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>) δ 196.2, 163.0, 135.5, 134.0, 132.1, 130.3, 129.8, 128.7, 113.4, 73.7, 55.5, 22.8. HRMS (ESI) calcd for C<sub>17</sub>H<sub>19</sub>O<sub>4</sub>S [M+H]<sup>+</sup>: 319.0999, found: 319.0997.



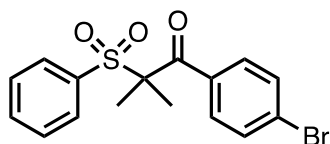
**1-(4-Fluorophenyl)-2-methyl-2-(phenylsulfonyl)propan-1-one (1z):**

White solid, 75% yield, m.p. 108.2-111.5 °C. <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) δ 8.06 – 8.01 (m, 2H), 7.79 – 7.74 (m, 2H), 7.68 – 7.63 (m, 1H), 7.55 – 7.49 (m, 2H), 7.14 – 8.01 (m, 2H), 1.68 (s, 6H). <sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>) δ 197.2, 165.05 (d, *J* = 253 Hz), 135.2, 134.2, 133.7 (d, *J* = 3 Hz), 132.0 (d, *J* = 9 Hz), 130.4, 128.7, 115.3 (d, *J* = 22 Hz), 73.5, 22.7. <sup>19</sup>F NMR (376 MHz, CDCl<sub>3</sub>) δ -105.91. HRMS (ESI) calcd for C<sub>16</sub>H<sub>16</sub>FO<sub>3</sub>S [M+H]<sup>+</sup>: 307.0799, found: 307.0801.



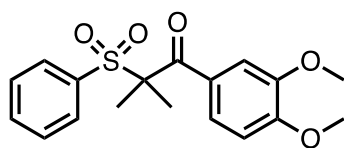
**2-Methyl-2-(phenylsulfonyl)-1-(4-(trifluoromethyl)phenyl)propan-1-one (1aa):**

White solid, 73% yield, m.p. 108.2-111.5 °C. <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) δ 8.03 (d, *J* = 8.0 Hz, 2H), 7.79 (dd, *J* = 8.0, 0.8 Hz, 2H), 7.73 – 7.66 (m, 3H), 7.55 (t, *J* = 8.0 Hz, 2H), 1.68 (s, 6H). <sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>) δ 198.8, 140.8, 134.9, 134.4, 133.4(q, *J* = 33 Hz), 130.5, 129.0, 128.8, 125.3(q, *J* = 3.6 Hz), 125.5(q, *J* = 271 Hz), 73.3, 22.4. <sup>19</sup>F NMR (376 MHz, CDCl<sub>3</sub>) δ -62.16. HRMS (ESI) calcd for C<sub>17</sub>H<sub>16</sub>F<sub>3</sub>O<sub>3</sub>S [M+H]<sup>+</sup>: 357.0767, found: 357.0766.



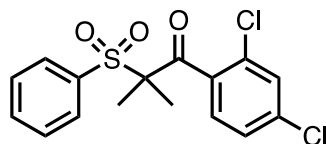
**1-(4-Bromophenyl)-2-methyl-2-(phenylsulfonyl)propan-1-one (1ab):**

White solid, 74% yield, m.p. 122.8-125.0 °C. <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) δ 7.85 (d, *J* = 8.4 Hz, 2H), 7.77 (d, *J* = 7.2 Hz, 2H), 7.67 (t, *J* = 7.6 Hz, 1H), 7.58 (d, *J* = 8.4 Hz, 2H), 7.53 (t, *J* = 8.0 Hz, 2H), 1.67 (s, 3H). <sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>) δ 198.0, 136.3, 135.1, 134.3, 131.5, 130.7, 130.4, 128.8, 127.3, 73.4, 22.6. HRMS (ESI) calcd for C<sub>16</sub>H<sub>16</sub>BrO<sub>3</sub>S [M+H]<sup>+</sup>: 366.9998, found: 367.0000.



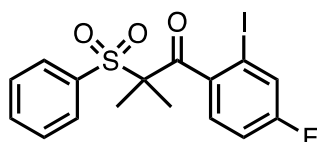
**1-(3,4-Dimethoxyphenyl)-2-methyl-2-(phenylsulfonyl)propan-1-one (1ac):**

White solid, 67% yield, m.p. 138.0-140.6 °C. <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) δ 7.86 – 7.80 (m, 1H), 7.68 – 7.59 (m, 2H), 7.54 – 7.46 (m, 2H), 7.54 – 7.46 (m, 2H), 6.92 – 6.87 (m, 1H), 3.92 (dd, *J* = 10.4, 2.0 Hz, 6H), 1.72 (s, 6H). <sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>) δ 195.9, 152.7, 148.3, 135.2, 134.0, 130.1, 129.5, 129.5, 128.6, 124.3, 112.5, 109.8, 73.7, 55.9, 22.9. HRMS (ESI) calcd for C<sub>18</sub>H<sub>21</sub>O<sub>5</sub>S [M+H]<sup>+</sup>: 349.1104, found: 349.1106.



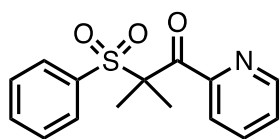
**1-(2,4-Dichlorophenyl)-2-methyl-2-(phenylsulfonyl)propan-1-one (1ad) :**

White solid, 62% yield, m.p. 95.8-99.5 °C. <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) δ 7.87 – 7.82 (m, 2H), 7.74 – 7.69 (m, 2H), 7.61 – 7.56 (m, 2H), 7.41 (d, *J* = 1.6 Hz, 1H), 7.35 (dd, *J* = 8.4, Hz, 1H), 1.61 (s, 6H). <sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>) δ 200.6, 137.6, 136.2, 134.9, 134.4, 130.9, 130.1, 129.5, 128.7, 127.9, 127.3, 72.9, 21.0. HRMS (ESI) calcd for C<sub>16</sub>H<sub>15</sub>Cl<sub>2</sub>O<sub>3</sub>S [M+H]<sup>+</sup>: 357.0113, found: 357.0110.



**1-(4-Fluoro-2-iodophenyl)-2-methyl-2-(phenylsulfonyl)propan-1-one (1ae)**

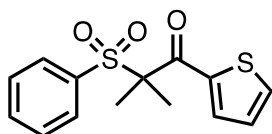
White solid, 65% yield, m.p. 102.9-105.8 °C. <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) δ 7.87 – 7.81 (m, 2H), 7.78 – 7.69 (m, 2H), 7.64 – 7.54 (m, 3H), 6.89 (td, *J* = 8.8, 2.8 Hz, 1H), 1.69 (s, 6H). <sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>) δ 201.4, 162.4 (d, *J* = 250 Hz), 147.1 (d, *J* = 7 Hz), 140.8 (d, *J* = 8 Hz), 134.7, 134.4, 130.9, 128.8, 118.6 (d, *J* = 22 Hz), 114.7 (d, *J* = 25 Hz), 83.5 (d, *J* = 4 Hz), 72.4, 21.6. <sup>19</sup>F NMR (376 MHz, CDCl<sub>3</sub>) δ -111.59. HRMS (ESI) calcd for C<sub>16</sub>H<sub>15</sub>FIO<sub>3</sub>S [M+H]<sup>+</sup>: 432.9765, found: 432.9766.



**2-Methyl-2-(phenylsulfonyl)-1-(pyridin-2-yl)propan-1-one (1af) :**

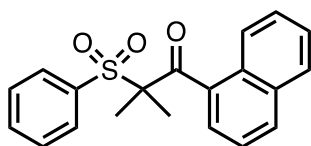
White solid, 68% yield, m.p. 81.3-83.9 °C. <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) δ 8.40 (s, 1H), 7.87 (d, *J* = 8.0 Hz, 2H), 7.81 (d, *J* = 8.0 Hz, 1H), 7.73 (t, *J* = 7.6 Hz, 1H), 7.56 (t, *J* = 7.2 Hz, 1H), 7.44 (t, *J* = 7.6 Hz, 2H), 7.36 – 7.29 (m, 1H), 1.96 (s, 6H). <sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>) δ 196.2, 153.6, 147.6, 136.7, 133.5, 130.6, 128.2, 126.5, 123.9, 74.5, 20.9. HRMS (ESI) calcd for C<sub>15</sub>H<sub>16</sub>NO<sub>3</sub>S [M+H]<sup>+</sup>: 290.0845, found: 290.0844.





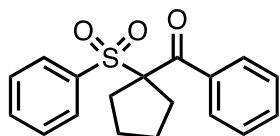
**2-Methyl-2-(phenylsulfonyl)-1-(thiophen-2-yl)propan-1-one (1ag):**

White solid, 66% yield, m.p. 67.2-70.3 °C. <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) δ 8.21 (s, 1H), 7.74 – 7.58 (m, 4H), 7.47 (t, *J* = 7.6 Hz, 2H), 7.18 – 7.12 (m, 4H), 1.77 (s, 6H). <sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>) δ 187.9, 142.4, 135.2, 135.1, 134.9, 134.1, 129.9, 128.7, 128.4, 73.5, 21.9. HRMS (ESI) calcd for C<sub>14</sub>H<sub>15</sub>O<sub>3</sub>S<sub>2</sub> [M+H]<sup>+</sup>: 295.0457, found: 295.0455.



**2-Methyl-1-(naphthalen-1-yl)-2-(phenylsulfonyl)propan-1-one (1ah):**

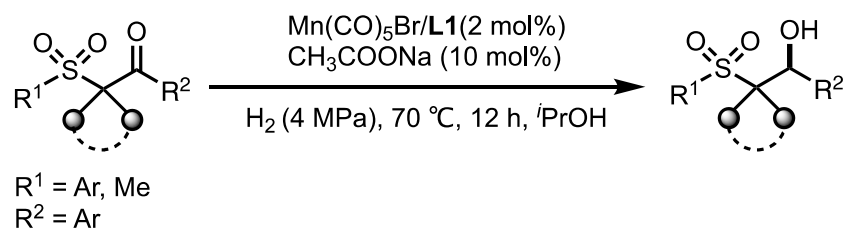
White solid, 52% yield, m.p. 110.3-113.7 °C. <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) δ 8.03 – 7.82 (m, 5H), 7.70 (t, *J* = 7.7 Hz, 1H), 7.61 – 7.43 (m, 6H), 1.68 (s, 6H). <sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>) δ 203.5, 136.5, 135.4, 134.1, 133.5, 130.8, 130.3, 129.6, 128.6, 127.3, 126.3, 124.4, 124.4, 123.7, 73.3, 21.9. HRMS (ESI) calcd for C<sub>20</sub>H<sub>19</sub>O<sub>3</sub>S [M+H]<sup>+</sup>: 339.1049, found: 339.1048.



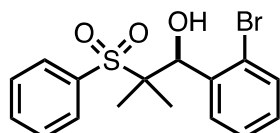
**Phenyl(1-(phenylsulfonyl)cyclopentyl)methanone (1ai):**

White solid, 47% yield, m.p. 81.6-84.7 °C. <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) δ 8.11 – 8.01 (m, 2H), 7.74 – 7.66 (m, 2H), 7.66 – 7.60 (m, 1H), 7.57 – 7.52 (m, 1H), 7.52 – 7.40 (m, 4H), 2.74 – 2.64 (m, 2H), 2.52 – 2.41 (m, 2H), 1.90 – 1.81 (m, 2H), 1.59 – 1.47 (m, 2H). <sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>) δ 197.5, 136.1, 136.0, 133.9, 132.6, 130.2, 130.0, 128.6, 128.0, 84.3, 34.4, 25.8. HRMS (ESI) calcd for C<sub>18</sub>H<sub>19</sub>O<sub>3</sub>S [M+H]<sup>+</sup>: 315.1049, found: 315.1049.

#### 4. General procedure for the asymmetric hydrogenation of $\beta$ -keto sulfones

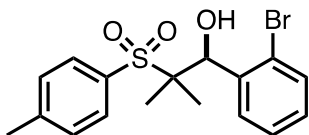


Under argon atmosphere,  $\text{Mn}(\text{CO})_5\text{Br}$  (0.02 mmol), **L1** (0.022 mmol), degassed toluene (2 mL) was added into tube and the mixture was heated to reflux for 10 h. The mixture was cooled to room temperature and concentrated to dryness, then 2 mL of degassed dried *i*PrOH was added to the crude Mn-**L1** complex. Under an argon atmosphere, a vial was charged with a solution of Mn-**L1** complex in *i*PrOH (0.4 mL, 0.004 mmol),  $\text{CH}_3\text{COONa}$  (0.02 mmol), **1** (0.2 mmol) and 1.1 mL of degassed dried *i*PrOH. The vial was placed in an alloy plate which was then placed into the autoclave. And the autoclave was purged five times with hydrogen, then pressurized to 4 MPa, stirred at 70 °C for 12 h. After slowly releasing the hydrogen pressure, the solvent was removed, and the mixture was purified by passing through a short column of silica gel to afford the corresponding alcohol.



##### 1-(2-Bromophenyl)-2-methyl-2-(phenylsulfonyl)propan-1-ol (**2a**):

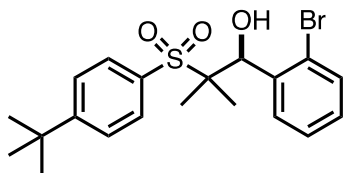
White solid, 96% yield, 94% *ee*, m.p. 126.9-130.0 °C;  $[\alpha]_{\text{D}}^{20} = +27.2$  ( $c = 0.5$ ,  $\text{CH}_2\text{Cl}_2$ ). The *ee* was determined by HPLC on Chiralpak OJ-H column, hexane: isopropanol = 90:10; flow rate = 1 mL/min; column temperature 25 °C; UV detection at 215 nm;  $t_{\text{R}1} = 24.58$  min (minor),  $t_{\text{R}2} = 30.75$  min (major).  $^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ )  $\delta$  7.99 (d,  $J = 7.6$  Hz, 2H), 7.72 (t,  $J = 7.6$  Hz, 1H), 7.67 – 7.57 (m, 3H), 7.45 (d,  $J = 8.0$  Hz, 1H), 7.34 (t,  $J = 7.6$  Hz, 1H), 7.14 (t,  $J = 7.6$  Hz, 1H), 5.70 (s, 1H), 4.19 (s, 1H), 1.53 (s, 3H), 1.05 (s, 3H).  $^{13}\text{C}$  NMR (100 MHz,  $\text{CDCl}_3$ )  $\delta$  137.4, 134.4, 134.2, 132.8, 130.6, 129.7, 129.6, 129.1, 127.5, 123.8, 71.8, 67.6, 20.3, 13.5. HRMS (ESI) calcd for  $\text{C}_{16}\text{H}_{18}\text{BrO}_3\text{S}$   $[\text{M}+\text{H}]^+$ : 369.0155, found: 369.0153.



**1-(2-Bromophenyl)-2-methyl-2-tosylpropan-1-ol (2b):**

White solid, 94% yield, 94% *ee*, m.p. 123.6-125.9 °C;  $[\alpha]_D^{20} = +41.2$  ( $c = 0.5$ ,  $\text{CH}_2\text{Cl}_2$ ).

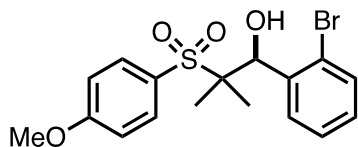
The *ee* was determined by HPLC on Chiralpak OJ-H column, hexane: isopropanol = 90:10; flow rate = 1 mL/min; column temperature 25 °C; UV detection at 215 nm;  $t_{R1} = 19.79$  min (minor),  $t_{R2} = 27.41$  min (major).  $^1\text{H NMR}$  (400 MHz,  $\text{CDCl}_3$ )  $\delta$  7.86 (d,  $J = 8.4$  Hz, 2H), 7.60 (dd,  $J = 7.6, 1.6$  Hz, 1H), 7.46 (dd,  $J = 8.0, 1.2$  Hz, 1H), 7.41 (d,  $J = 8.0$  Hz, 2H), 7.36 – 7.30 (m, 1H), 7.13 (td,  $J = 7.6, 1.6$  Hz, 1H), 5.72 (s, 1H), 4.23 (d,  $J = 1.2$  Hz, 1H), 2.48 (s, 3H), 1.51 (s, 3H), 1.04 (s, 3H).  $^{13}\text{C NMR}$  (100 MHz,  $\text{CDCl}_3$ )  $\delta$  145.3, 137.5, 132.7, 131.4, 130.5, 129.7, 129.6, 129.6, 127.4, 123.8, 71.8, 67.4, 21.7, 20.3, 13.6. HRMS (ESI) calcd for  $\text{C}_{17}\text{H}_{20}\text{BrO}_3\text{S}$   $[\text{M}+\text{H}]^+$ : 383.0311, found: 383.0312.



**1-(2-Bromophenyl)-2-((4-(tert-butyl)phenyl)sulfonyl)-2-methylpropan-1-ol (2c):**

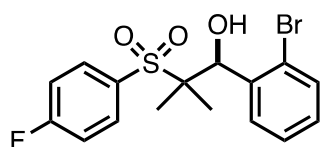
White solid, 94% yield, 94% *ee*, m.p. 153.0-156.0 °C;  $[\alpha]_D^{20} = +42.4$  ( $c = 0.5$ ,  $\text{CH}_2\text{Cl}_2$ ).

The *ee* was determined by HPLC on Chiralpak OJ-H column, hexane: isopropanol = 93:7; flow rate = 1 mL/min; column temperature 25 °C; UV detection at 215 nm;  $t_{R1} = 10.77$  min (minor),  $t_{R2} = 12.32$  min (major).  $^1\text{H NMR}$  (400 MHz,  $\text{CDCl}_3$ )  $\delta$  7.93 – 7.88 (m, 2H), 7.65 – 7.58 (m, 3H), 7.44 (dd,  $J = 8.4, 1.2$  Hz, 1H), 7.36 – 7.30 (m, 1H), 7.13 (td,  $J = 8.0, 1.6$  Hz, 1H), 5.68 (s, 1H), 4.19 (s, 1H), 1.52 (s, 3H), 1.36 (s, 9H), 1.04 (s, 3H).  $^{13}\text{C NMR}$  (100 MHz,  $\text{CDCl}_3$ )  $\delta$  158.3, 137.6, 132.8, 131.1, 130.5, 129.7, 129.6, 127.5, 126.1, 123.8, 71.8, 67.4, 35.3, 31.0, 20.4, 13.5. HRMS (ESI) calcd for  $\text{C}_{20}\text{H}_{26}\text{BrO}_3\text{S}$   $[\text{M}+\text{H}]^+$ : 425.0781, found: 425.0780.



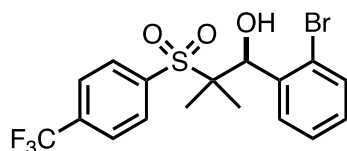
**1-(2-Bromophenyl)-2-((4-methoxyphenyl)sulfonyl)-2-methylpropan-1-ol (2d):**

White solid, 95% yield, 96% *ee*, m.p. 132.8-135.2 °C;  $[\alpha]_D^{20} = +50.0$  ( $c = 0.5$ ,  $\text{CH}_2\text{Cl}_2$ ). The *ee* was determined by HPLC on Chiralpak OD-H column, hexane: isopropanol = 90:10; flow rate = 1 mL/min; column temperature 25 °C; UV detection at 215 nm;  $t_{R1} = 40.98$  min (minor),  $t_{R2} = 53.02$  min (major).  $^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ )  $\delta$  7.90 (d,  $J = 9.2$  Hz, 2H), 7.64 – 7.58 (m, 1H), 7.46 (d,  $J = 8.0$  Hz, 1H), 7.34 (t,  $J = 7.6$  Hz, 1H), 7.16 – 7.11 (m, 1H), 7.11 – 7.05 (m, 2H), 5.71 (s, 1H), 4.25 (s, 1H), 3.91 (s, 3H), 1.51 (s, 3H), 1.04 (s, 3H).  $^{13}\text{C}$  NMR (100 MHz,  $\text{CDCl}_3$ )  $\delta$  164.2, 137.6, 132.8, 132.7, 129.7, 125.7, 123.9, 114.3, 71.9, 67.5, 55.7, 20.3, 13.7. HRMS (ESI) calcd for  $\text{C}_{17}\text{H}_{20}\text{BrO}_3\text{S}$   $[\text{M}+\text{H}]^+$ : 339.0260, found: 339.0262.



**1-(2-Bromophenyl)-2-((4-fluorophenyl)sulfonyl)-2-methylpropan-1-ol (2e):**

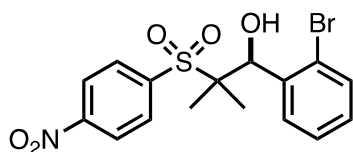
White solid, 96% yield, 94% *ee*, m.p. 103.6-106.7 °C;  $[\alpha]_D^{20} = +28.0$  ( $c = 0.5$ ,  $\text{CH}_2\text{Cl}_2$ ). The *ee* was determined by HPLC on Chiralpak OJ-H column, hexane: isopropanol = 90:10; flow rate = 1 mL/min; column temperature 25 °C; UV detection at 215 nm;  $t_{R1} = 16.86$  min (minor),  $t_{R2} = 20.65$  min (major).  $^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ )  $\delta$  8.04 – 7.97 (m, 2H), 7.59 (dd,  $J = 8.0, 2.0$  Hz, 1H), 7.47 (dd,  $J = 8.4, 1.6$  Hz, 1H), 7.36 – 7.28 (m, 3H), 7.15 (td,  $J = 7.6, 1.6$  Hz, 1H), 5.68 (s, 1H), 4.07 (d,  $J = 1.6$  Hz, 1H), 1.52 (s, 3H), 1.05 (s, 3H).  $^{13}\text{C}$  NMR (100 MHz,  $\text{CDCl}_3$ )  $\delta$  166.2 (d,  $J = 256$  Hz), 137.3, 133.4 (d,  $J = 9.6$  Hz), 132.8, 130.6 (d,  $J = 3.2$  Hz), 129.8, 129.6, 127.5, 123.8, 116.44 (d,  $J = 22.4$  Hz), 71.9, 67.8, 20.3, 13.6.  $^{19}\text{F}$  NMR (376 MHz,  $\text{CDCl}_3$ )  $\delta$  -102.41. HRMS (ESI) calcd for  $\text{C}_{16}\text{H}_{17}\text{BrFO}_3\text{S}$   $[\text{M}+\text{H}]^+$ : 387.0060, found: 387.0062.



**1-(2-Bromophenyl)-2-methyl-2-((4-(trifluoromethyl)phenyl)sulfonyl)propan-1-ol (2f):**

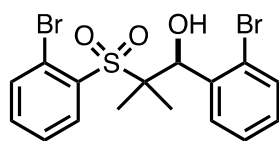
White solid, 96% yield, 94% *ee*, m.p. 141.6-145.0 °C;  $[\alpha]_D^{20} = +23.4$  ( $c = 0.5$ ,  $\text{CH}_2\text{Cl}_2$ ). The *ee* was determined by HPLC on Chiralpak IA-H column, hexane: isopropanol = 90:10; flow rate = 1 mL/min; column temperature 25 °C; UV detection at 215 nm;  $t_{R1} = 10.28$  min (major),  $t_{R2} = 13.67$  min (minor).  $^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ )  $\delta$  8.13 (d,  $J$

= 8.4 Hz, 2H), 7.89 (d,  $J = 8.4$  Hz, 2H), 7.57 (dd,  $J = 8.0, 2.0$  Hz, 1H), 7.48 (dd,  $J = 8.0, 1.2$  Hz, 1H), 7.34 (td,  $J = 7.6, 1.2$  Hz, 1H), 7.16 (td,  $J = 7.6, 1.6$  Hz, 1H), 5.74 (d,  $J = 1.6$  Hz, 1H), 3.88 (d,  $J = 2.0$  Hz, 1H), 1.52 (s, 3H), 1.09 (s, 3H).  $^{13}\text{C}$  NMR (100 MHz,  $\text{CDCl}_3$ )  $\delta$  138.8, 137.3, 135.8 (q,  $J = 32.6$  Hz), 132.9, 131.3, 129.9, 129.6, 127.6, 126.1 (d,  $J = 15.2$  Hz), 123.8, 123.1 (d,  $J = 271.6$  Hz), 71.9, 68.4, 20.2, 13.9.  $^{19}\text{F}$  NMR (376 MHz,  $\text{CDCl}_3$ )  $\delta$ -63.17. HRMS (ESI) calcd for  $\text{C}_{17}\text{H}_{17}\text{BrF}_3\text{O}_3\text{S}$   $[\text{M}+\text{H}]^+$ : 437.0028, found: 437.0029.



**1-(2-Bromophenyl)-2-methyl-2-((4-nitrophenyl)sulfonyl)propan-1-ol (2g):**

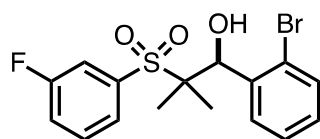
White solid, 96% yield, 94% *ee*, m.p.172.5-175.3 °C;  $[\alpha]_{\text{D}}^{20} = +31.2$  ( $c = 0.5$ ,  $\text{CH}_2\text{Cl}_2$ ). The *ee* was determined by HPLC on Chiralpak OJ-H column, hexane: isopropanol = 90:10; flow rate = 1 mL/min; column temperature 25 °C; UV detection at 215 nm;  $t_{\text{R}1} = 48.31$  min (minor),  $t_{\text{R}2} = 66.78$  min (major).  $^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ )  $\delta$  8.47 – 8.40 (m, 2H), 8.23 – 8.18 (m, 2H), 7.55 (dd,  $J = 8.0, 1.6$  Hz, 1H), 7.49 (dd,  $J = 8.0, 1.2$  Hz, 1H), 7.35 (td,  $J = 7.2, 1.2$  Hz, 1H), 7.17 (td,  $J = 7.2, 1.6$  Hz, 1H), 5.74 (d,  $J = 1.6$  Hz, 1H), 3.68 (d,  $J = 2.0$  Hz, 1H), 1.52 (s, 3H), 1.12 (s, 3H).  $^{13}\text{C}$  NMR (100 MHz,  $\text{CDCl}_3$ )  $\delta$  151., 141.5, 137.2, 133.0, 132.1, 130.0, 129.5, 127.7, 123.9, 123.8, 71.9, 68.9, 20.1, 14.1. HRMS (ESI) calcd for  $\text{C}_{16}\text{H}_{17}\text{BrNO}_5\text{S}$   $[\text{M}+\text{H}]^+$ : 414.0005, found: 414.0003.



**1-(2-Bromophenyl)-2-((2-bromophenyl)sulfonyl)-2-methylpropan-1-ol (2h):**

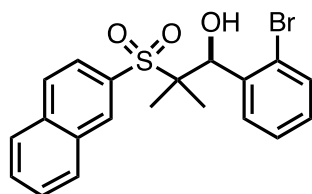
White solid, 94% yield, 95% *ee*, m.p.157.5-160.0 °C;  $[\alpha]_{\text{D}}^{20} = +44.0$  ( $c = 0.5$ ,  $\text{CH}_2\text{Cl}_2$ ). The *ee* was determined by HPLC on Chiralpak OJ-H column, hexane: isopropanol = 90:10; flow rate = 0.8 mL/min; column temperature 25 °C; UV detection at 215 nm;  $t_{\text{R}1} = 30.83$  min (minor),  $t_{\text{R}2} = 49.97$  min (major).  $^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ )  $\delta$  8.15 (dd,  $J = 7.6, 1.6$  Hz, 1H), 7.86 (dd,  $J = 7.6, 0.8$  Hz, 1H), 7.62 – 7.44 (m, 4H), 7.34 (t,  $J = 7.6$  Hz, 1H), 7.15 (td,  $J = 7.6, 1.6$  Hz, 1H), 5.85 (d,  $J = 1.6$  Hz, 1H), 4.09 (d,  $J = 1.6$  Hz, 1H), 1.59 (s, 3H), 1.12 (s, 3H).  $^{13}\text{C}$  NMR (100 MHz,  $\text{CDCl}_3$ )  $\delta$  137.5, 136.6, 135.3,

134.9, 134.5, 132.8, 129.8, 129.5, 127.9, 127.6, 123.9, 123.3, 71.6, 70.7, 20.6, 13.9. HRMS (ESI) calcd for C<sub>16</sub>H<sub>17</sub>BrO<sub>3</sub>S [M+H]<sup>+</sup>: 448.9260, found: 448.9261.



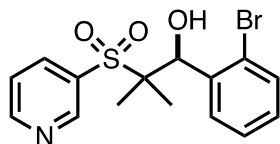
**1-(2-Bromophenyl)-2-((3-fluorophenyl)sulfonyl)-2-methylpropan-1-ol (2i):**

White solid, 95% yield, 96% *ee*, m.p.137.7-141.6 °C; [ $\alpha$ ]<sup>20</sup><sub>D</sub> = +23.6 (c = 0.5, CH<sub>2</sub>Cl<sub>2</sub>). The *ee* was determined by HPLC on Chiralpak OJ-H column, hexane: isopropanol = 90:10; flow rate = 1 mL/min; column temperature 25 °C; UV detection at 215 nm; t<sub>R1</sub> = 21.06 min (minor), t<sub>R2</sub> = 22.68 min (major). <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>)  $\delta$  7.79 (d, *J* = 8.0 Hz, 1H), 7.70 (dt, *J* = 8.0, 2.0 Hz, 1H), 7.65 – 7.55 (m, 2H), 7.49 – 7.39 (m, 2H), 7.34 (t, *J* = 7.5 Hz, 1H), 7.14 (td, *J* = 8.0, 1.6 Hz, 1H), 5.72 (s, 1H), 3.98 (d, *J* = 1.6 Hz, 1H), 1.52 (s, 3H), 1.07 (s, 3H). <sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>)  $\delta$  162.3 (d, *J* = 250.9 Hz), 137.4, 137.0 (d, *J* = 6.4 Hz), 132.8, 130.8 (d, *J* = 7.6 Hz), 129.8, 129.6, 127.5, 126.5 (d, *J* = 3.4 Hz), 123.8, 121.41 (d, *J* = 21.2 Hz), 117.9 (d, *J* = 24.1 Hz), 71.8, 68.2, 20.3, 13.8. <sup>19</sup>F NMR (376 MHz, CDCl<sub>3</sub>)  $\delta$ -109.23. HRMS (ESI) calcd for C<sub>16</sub>H<sub>17</sub>BrFO<sub>3</sub>S [M+H]<sup>+</sup>: 387.0060, found: 387.0060.



**1-(2-Bromophenyl)-2-methyl-2-(naphthalen-2-ylsulfonyl)propan-1-ol (2j):**

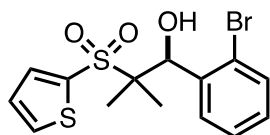
White solid, 77% yield, 95% *ee*, m.p.172.4-175.9 °C; [ $\alpha$ ]<sup>20</sup><sub>D</sub> = +42.4 (c = 0.5, CH<sub>2</sub>Cl<sub>2</sub>). The *ee* was determined by HPLC on Chiralpak OJ-H column, hexane: isopropanol = 97:3; flow rate = 0.8 mL/min; column temperature 25 °C; UV detection at 215 nm; t<sub>R1</sub> = 74.71 min (minor), t<sub>R2</sub> = 81.75 min (major). <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>)  $\delta$  8.57 (d, *J* = 1.2 Hz, 1H), 8.08 – 8.02 (m, 2H), 7.99 – 7.94 (m, 2H), 7.74 – 7.60 (m, 3H), 7.43 (dd, *J* = 8.0, 1.6 Hz, 1H), 7.34 (td, *J* = 7.6, 1.2 Hz, 1H), 7.16 – 7.09 (m, 2H), 5.84 (s, 1H), 4.26 (d, *J* = 1.2 Hz, 1H), 1.57 (s, 3H), 1.10 (s, 3H). <sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>)  $\delta$  137.5, 135.4, 132.8, 132.7, 129.7, 129.6, 129.6, 129.5, 129.1, 128.0, 127.8, 127.5, 124.9, 123.9, 72.0, 68.0, 20.5, 13.9. HRMS (ESI) calcd for C<sub>20</sub>H<sub>20</sub>BrO<sub>3</sub>S [M+H]<sup>+</sup>: 419.0311, found: 419.0309.



**1-(2-Bromophenyl)-2-methyl-2-(pyridin-3-ylsulfonyl)propan-1-ol (2k):**

White solid, 92% yield, 95% *ee*, m.p.143.7-146.4 °C;  $[\alpha]_D^{20} = +22.0$  (*c* = 0.5, CH<sub>2</sub>Cl<sub>2</sub>).

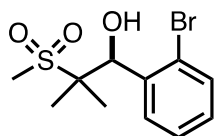
The *ee* was determined by HPLC on Chiralpak OD-H column, hexane: isopropanol = 90:10; flow rate = 1 mL/min; column temperature 25 °C; UV detection at 215 nm;  $t_{R1} = 24.86$  min (minor),  $t_{R2} = 32.19$  min (major). <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) δ 9.09 (d, *J* = 1.6 Hz, 1H), 8.78 (dd, *J* = 5.2, 1.6 Hz, 1H), 8.25 (dt, *J* = 8.0, 2 Hz, 1H), 7.56 – 7.45 (m, 2H), 7.50 – 7.45 (m, 1H), 7.32 (t, *J* = 7.2 Hz, 1H), 7.14 (td, *J* = 8.0, 1.6 Hz, 1H), 5.78 (s, 1H), 4.44 (s, 1H), 1.47 (s, 3H), 1.14 (s, 3H). <sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>) δ 153.8, 150.9, 138.2, 138.0, 133.0, 132.8, 129.8, 129.6, 127.6, 123.7, 123.5, 71.8, 68.9, 19.5, 14.3. HRMS (ESI) calcd for C<sub>15</sub>H<sub>17</sub>BrNO<sub>3</sub>S [M+H]<sup>+</sup>: 370.0107, found: 370.0106.



**1-(2-Bromophenyl)-2-methyl-2-(thiophen-2-ylsulfonyl)propan-1-ol (2l):**

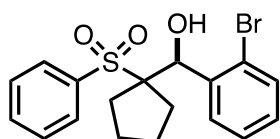
White solid, 93% yield, 97% *ee*, m.p.129.6-133.1 °C;  $[\alpha]_D^{20} = +36.6$  (*c* = 0.5, CH<sub>2</sub>Cl<sub>2</sub>).

The *ee* was determined by HPLC on Chiralpak OJ-H column, hexane: isopropanol = 97:3; flow rate = 1 mL/min; column temperature 25 °C; UV detection at 215 nm;  $t_{R1} = 20.21$  min (major),  $t_{R2} = 30.27$  min (minor). <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) δ 7.85 (dd, *J* = 5.2, 1.6 Hz, 1H), 7.80 (dd, *J* = 3.6, 1.2 Hz, 1H), 7.60 (dd, *J* = 8.0, 1.6 Hz, 1H), 7.48 (dd, *J* = 8.0, 1.2 Hz, 1H), 7.34 (td, *J* = 7.6, 1.2 Hz, 1H), 7.25 (dd, *J* = 4.8, 3.6 Hz, 1H), 7.15 (td, *J* = 7.6, 1.6 Hz, 1H), 5.80 (s, 1H), 4.01 (s, 1H), 1.56 (s, 3H), 1.16 (s, 3H). <sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>) δ 137.5, 136.8, 135.5, 135.1, 132.8, 129.8, 129.5, 128.1, 127.5, 123.8, 71.9, 68.4, 20.5, 13.7. HRMS (ESI) calcd for C<sub>14</sub>H<sub>16</sub>BrO<sub>3</sub>S<sub>2</sub> [M+H]<sup>+</sup>: 374.7919, found: 374.7916.



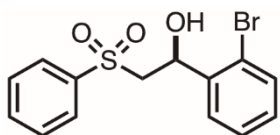
**1-(2-Bromophenyl)-2-methyl-2-(methylsulfonyl)propan-1-ol (2m):**

White solid, 97% yield, 94% *ee*, m.p.154.0-156.7 °C;  $[\alpha]_D^{20} = +27.6$  ( $c = 0.5$ , CH<sub>2</sub>Cl<sub>2</sub>). The *ee* was determined by HPLC on Chiralpak OJ-H column, hexane: isopropanol = 90:10; flow rate = 1 mL/min; column temperature 25 °C; UV detection at 215 nm;  $t_{R1} = 12.64$  min (major),  $t_{R2} = 14.67$  min (minor). <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>)  $\delta$  7.61 – 7.53 (m, 2H), 7.39 – 7.34 (m, 1H), 7.19 (td,  $J = 7.6, 1.6$  Hz, 1H), 5.80 (d,  $J = 2.4$  Hz, 1H), 3.48 (d,  $J = 2.4$  Hz, 1H), 3.08 (s, 3H), 1.46 (s, 3H), 1.20 (s, 3H). <sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>)  $\delta$  138.2, 132.9, 129.9, 129.6, 127.6, 123.9, 72.4, 67.2, 37.9, 18.6, 14.3. HRMS (ESI) calcd for C<sub>11</sub>H<sub>16</sub>BrO<sub>3</sub>S [M+H]<sup>+</sup>: 306.9998, found: 307.0001.



**(2-Bromophenyl)(1-(phenylsulfonyl)cyclopentyl)methanol (2n):**

White solid, 91% yield, 94% *ee*, m.p.121.6-125.8 °C;  $[\alpha]_D^{20} = +33.8$  ( $c = 0.5$ , CH<sub>2</sub>Cl<sub>2</sub>). The *ee* was determined by HPLC on Chiralpak OJ-H column, hexane: isopropanol = 90:10; flow rate = 1 mL/min; column temperature 25 °C; UV detection at 215 nm;  $t_{R1} = 29.69$  min (minor),  $t_{R2} = 42.25$  min (major). <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>)  $\delta$  8.08 – 7.02 (m, 3H), 7.75 – 7.69 (m, 1H), 7.68 – 7.60 (m, 3H), 7.41 (dd,  $J = 8.0, 1.6$  Hz, 1H), 7.32 (td,  $J = 7.6, 1.6$  Hz, 1H), 7.13 (td,  $J = 8.0, 1.6$  Hz, 1H), 5.60 (s, 1H), 4.34 (d,  $J = 1.2$  Hz, 1H), 2.62 – 2.54 (m, 2H), 2.12 – 2.01 (m, 1H), 1.62 – 1.42 (m, 4H), 0.62 – 0.51 (m, 1H). <sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>)  $\delta$  137.6, 135.2, 134.1, 132.7, 130.6, 129.8, 129.6, 129.2, 127.6, 124.0, 77.7, 71.7, 32.4, 263, 25.9, 25.8. HRMS (ESI) calcd for C<sub>18</sub>H<sub>20</sub>BrO<sub>3</sub>S [M+H]<sup>+</sup>: 395.0311, found: 395.0312.

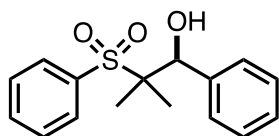


**1-(2-Bromophenyl)-2-(phenylsulfonyl)ethan-1-ol (2o):**

White solid, 94% yield, 60% *ee*, m.p.119.4-122.0 °C;  $[\alpha]_D^{20} = +33.8$  ( $c = 0.5$ , CH<sub>2</sub>Cl<sub>2</sub>). The *ee* was determined by HPLC on Chiralpak OJ-H column, hexane: isopropanol = 90:10; flow rate = 1 mL/min; column temperature 25 °C; UV detection at 215 nm;  $t_{R1} = 40.14$  min (minor),  $t_{R2} = 51.64$  min (major). <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>)  $\delta$  8.06 – 7.97 (m, 2H), 7.73 – 7.58 (m, 4H), 7.42 (dd,  $J = 8.4, 1.2$  Hz, 1H), 7.37 – 7.30 (m, 1H), 7.13 (td,  $J = 8.0, 1.6$  Hz, 1H), 5.36 (d,  $J = 10.4$  Hz, 1H), 4.04 (d,  $J = 2$  Hz, 1H), 3.52

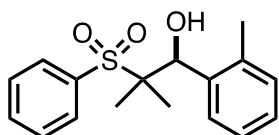


(dd,  $J = 14.8, 1.2$  Hz, 1H), 3.26 (dd,  $J = 14.4, 10.0$  Hz, 1H).  $^{13}\text{C}$  NMR (100 MHz,  $\text{CDCl}_3$ )  $\delta$  139.2, 138.3, 124.2, 132.6, 129.6, 129.4, 128.3, 128.0, 127.5, 120.7, 67.6, 61.75. HRMS (ESI) calcd for  $\text{C}_{14}\text{H}_{14}\text{BrO}_3\text{S}$   $[\text{M}+\text{H}]^+$ : 340.9842, found: 340.9841.



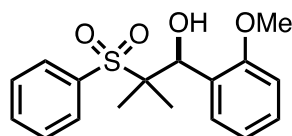
**2-Methyl-1-phenyl-2-(phenylsulfonyl)propan-1-ol (2p):**

White solid, 95% yield, 86% *ee*, m.p. 174.5-176.7 °C;  $[\alpha]_{\text{D}}^{20} = +26.7$  ( $c = 0.5$ ,  $\text{CH}_2\text{Cl}_2$ ). The *ee* was determined by HPLC on Chiralpak OJ-H column, hexane: isopropanol = 90:10; flow rate = 1 mL/min; column temperature 25 °C; UV detection at 215 nm;  $t_{\text{R}1} = 16.48$  min (minor),  $t_{\text{R}2} = 24.67$  min (major).  $^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ )  $\delta$  7.99 – 7.91 (m, 2H), 7.72 (t,  $J = 7.2$  Hz, 1H), 7.61 (t,  $J = 7.6$  Hz, 2H), 7.34 – 7.25 (m, 5H), 5.19 (s, 1H), 4.24 (d,  $J = 0.8$  Hz, 1H), 1.40 (s, 3H), 0.94 (s, 3H).  $^{13}\text{C}$  NMR (100 MHz,  $\text{CDCl}_3$ )  $\delta$  137.8, 134.9, 134.2, 130.4, 129.0, 128.2, 127.9, 127.9, 74.6, 66.6, 21.5, 13.9. HRMS (ESI) calcd for  $\text{C}_{16}\text{H}_{19}\text{O}_3\text{S}$   $[\text{M}+\text{H}]^+$ : 291.1049, found: 291.1048.



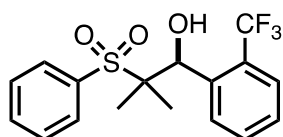
**2-Methyl-2-(phenylsulfonyl)-1-(o-tolyl)propan-1-ol (2q):**

White solid, 94% yield, 90% *ee*, m.p. 135.6-138.7 °C;  $[\alpha]_{\text{D}}^{20} = +31.8$  ( $c = 0.5$ ,  $\text{CH}_2\text{Cl}_2$ ). The *ee* was determined by HPLC on Chiralpak OJ-H column, hexane: isopropanol = 90:10; flow rate = 1 mL/min; column temperature 25 °C; UV detection at 215 nm;  $t_{\text{R}1} = 19.30$  min (minor),  $t_{\text{R}2} = 25.58$  min (major).  $^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ ) 8.01 – 7.95 (m, 2H), 7.75 – 7.69 (m, 1H), 7.66 – 7.59 (m, 2H), 7.53 (dd,  $J = 7.6, 1.6$  Hz, 1H), 7.24 – 7.15 (m, 2H), 7.09 (dd,  $J = 7.6, 2.0$  Hz, 1H), 5.65 (d,  $J = 1.6$  Hz, 1H), 3.96 (d,  $J = 1.6$  Hz, 1H), 2.12 (s, 3H), 1.50 (s, 3H), 0.92 (s, 3H).  $^{13}\text{C}$  NMR (100 MHz,  $\text{CDCl}_3$ )  $\delta$  136.5, 135.5, 134.8, 134.1, 130.5, 130.4, 129.0, 127.2, 127.5, 126.0, 68.8, 67.9, 20.2, 19.9, 14.4. HRMS (ESI) calcd for  $\text{C}_{17}\text{H}_{21}\text{O}_3\text{S}$   $[\text{M}+\text{H}]^+$ : 305.1206, found: 305.1204.



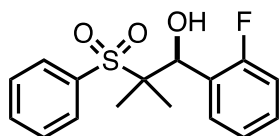
**1-(2-Methoxyphenyl)-2-methyl-2-(phenylsulfonyl)propan-1-ol (2r):**

White solid, 94% yield, 88% *ee*, m.p. 145.5-148.0 °C;  $[\alpha]_D^{20} = +17.2$  ( $c = 0.5$ , CH<sub>2</sub>Cl<sub>2</sub>). The *ee* was determined by HPLC on Chiralpak OJ-H column, hexane: isopropanol = 90:10; flow rate = 1 mL/min; column temperature 25 °C; UV detection at 215 nm;  $t_{R1} = 48.78$  min (minor),  $t_{R2} = 53.29$  min (major). <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>)  $\delta$  7.98 (d,  $J = 7.6$  Hz, 2H), 7.71 (t,  $J = 7.2$  Hz, 1H), 7.61 (t,  $J = 7.6$  Hz, 2H), 7.52 – 7.47 (m, 1H), 7.27 – 7.21 (m, 1H), 6.97 (t,  $J = 7.2$  Hz, 1H), 6.78 (d,  $J = 8.4$  Hz, 1H), 5.76 (d,  $J = 1.2$  Hz, 1H), 4.00 (d,  $J = 2.0$  Hz, 1H), 3.59 (s, 3H), 1.45 (s, 3H), 0.95 (s, 3H). <sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>)  $\delta$  156.3, 135.3, 133.8, 130.5, 129.0, 128.7, 128.4, 126.6, 120.6, 110.2, 67.5, 66.8, 55.0, 20.0, 13.9. HRMS (ESI) calcd for C<sub>17</sub>H<sub>21</sub>O<sub>4</sub>S [M+H]<sup>+</sup>: 321.1155, found: 321.1155.



**2-Methyl-2-(phenylsulfonyl)-1-(2-(trifluoromethyl)phenyl)propan-1-ol (2s):**

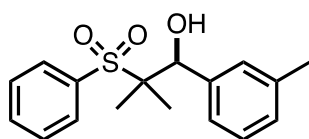
White solid, 93% yield, 89% *ee*, m.p. 153.9-156.4 °C;  $[\alpha]_D^{20} = +98.8$  ( $c = 0.5$ , CH<sub>2</sub>Cl<sub>2</sub>). The *ee* was determined by HPLC on Chiralpak OJ-H column, hexane: isopropanol = 90:10; flow rate = 1 mL/min; column temperature 25 °C; UV detection at 210 nm;  $t_{R1} = 16.61$  min (minor),  $t_{R2} = 18.36$  min (major). <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>)  $\delta$  7.99 – 7.93 (m, 2H), 7.81 (d,  $J = 8.0$  Hz, 1H), 7.77 – 7.72 (m, 2H), 7.66 – 7.56 (m, 4H), 7.40 (t,  $J = 8.0$  Hz, 1H), 5.59 (s, 1H), 4.22 (d,  $J = 1.2$  Hz, 1H), 1.67 (s, 3H), 0.85 (s, 3H). <sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>)  $\delta$  134.3, 134.1, 131.9, 130.5, 129.4, 129.0, 128.5, 128.2 (q,  $J = 29.5$  Hz), 126.6 (q,  $J = 4.7$  Hz), 125.97 (q,  $J = 5.9$  Hz), 123.7 (q,  $J = 272.6$  Hz), 68.34 (q,  $J = 2.5$  Hz), 67.3, 20.6 (q,  $J = 2.5$  Hz), 13.8. <sup>19</sup>F NMR (376 MHz, CDCl<sub>3</sub>)  $\delta$  -56.62. HRMS (ESI) calcd for C<sub>17</sub>H<sub>18</sub>F<sub>3</sub>O<sub>3</sub>S [M+H]<sup>+</sup>: 359.0923, found: 359.0921.



**1-(2-Fluorophenyl)-2-methyl-2-(phenylsulfonyl)propan-1-ol (2t):**

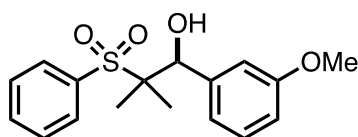
White solid, 94% yield, 87% *ee*, m.p. 142.0-144.6 °C;  $[\alpha]_D^{20} = +58.8$  ( $c = 0.5$ , CH<sub>2</sub>Cl<sub>2</sub>). The *ee* was determined by HPLC on Chiralpak IA-H column, hexane: isopropanol = 90:10; flow rate = 1 mL/min; column temperature 25 °C; UV detection at 210 nm;  $t_{R1} = 14.39$  min (minor),  $t_{R2} = 18.10$  min (major). <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>)  $\delta$  8.02 –

7.94 (m, 2H), 7.77 – 7.70 (m, 1H), 7.67 – 7.56 (m, 3H), 7.31 – 7.23 (m, 1H), 7.17 (td,  $J = 7.8, 1.2$  Hz, 1H), 7.00 – 6.92 (m, 1H), 5.60 (s, 1H), 4.26 (d,  $J = 1.6$  Hz, 1H), 1.44 (s, 3H), 1.00 (d,  $J = 2.0$  Hz, 3H).  $^{13}\text{C}$  NMR (100 MHz,  $\text{CDCl}_3$ )  $\delta$  159.6 (d,  $J = 245$  Hz), 134.7, 134.2, 130.4, 129.7 (d,  $J = 8.4$  Hz), 129.2 (d,  $J = 3.5$  Hz), 129.0, 125.4 (d,  $J = 12.3$  Hz), 124.2 (d,  $J = 3.4$  Hz), 115.0 (d,  $J = 22.3$  Hz), 67.1 (d,  $J = 2.5$  Hz), 66.8 (d,  $J = 1.1$  Hz), 20.1 (d,  $J = 3.5$  Hz), 13.7.  $^{19}\text{F}$  NMR (376 MHz,  $\text{CDCl}_3$ )  $\delta$ -114.61. HRMS (ESI) calcd for  $\text{C}_{16}\text{H}_{18}\text{FO}_3\text{S}$   $[\text{M}+\text{H}]^+$ : 309.0955, found: 309.0954.



**2-Methyl-2-(phenylsulfonyl)-1-(*m*-tolyl)propan-1-ol (2u):**

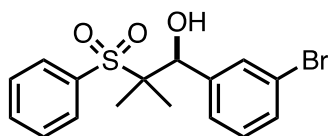
White solid, 95% yield, 81% *ee*, m.p. 140.5-143.1 °C;  $[\alpha]_{\text{D}}^{20} = +33.8$  ( $c = 0.5$ ,  $\text{CH}_2\text{Cl}_2$ ). The *ee* was determined by HPLC on Chiralpak IA-H column, hexane: isopropanol = 90:10; flow rate = A mL/min; column temperature 25 °C; UV detection at 215 nm;  $t_{\text{R}1} = 12.24$  min (minor),  $t_{\text{R}2} = 14.87$  min (major).  $^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ )  $\delta$  7.99 – 7.93 (m, 2H), 7.72 (t,  $J = 7.2$  Hz, 1H), 7.61 (t,  $J = 8.0$  Hz, 2H), 7.18 (t,  $J = 7.6$  Hz, 1H), 7.13 – 7.03 (m, 3H), 5.15 (s, 1H), 4.19 (s, 1H), 2.32 (s, 3H), 1.41 (s, 3H), 0.94 (s, 3H).  $^{13}\text{C}$  NMR (100 MHz,  $\text{CDCl}_3$ )  $\delta$  137.8, 137.6, 135.1, 134.1, 130.4, 129.0, 128.9, 128.5, 127.7, 125.2, 74.7, 66.7, 21.6, 21.4, 13.0. HRMS (ESI) calcd for  $\text{C}_{17}\text{H}_{21}\text{O}_3\text{S}$   $[\text{M}+\text{H}]^+$ : 305.1206, found: 305.1208.



**1-(3-Methoxyphenyl)-2-methyl-2-(phenylsulfonyl)propan-1-ol (2v):**

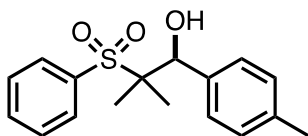
White solid, 93% yield, 81% *ee*, m.p. 90.2-92.9 °C;  $[\alpha]_{\text{D}}^{20} = +29.8$  ( $c = 0.5$ ,  $\text{CH}_2\text{Cl}_2$ ). The *ee* was determined by HPLC on Chiralpak IA-H column, hexane: isopropanol = 90:10; flow rate = 1 mL/min; column temperature 25 °C; UV detection at 215 nm;  $t_{\text{R}1} = 16.61$  min (minor),  $t_{\text{R}2} = 25.47$  min (major).  $^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ )  $\delta$  7.95 (dd,  $J = 8.4, 1.2$  Hz, 2H), 7.72 (t,  $J = 7.6$  Hz, 1H), 7.61 (t,  $J = 8.0$  Hz, 2H), 7.21 (t,  $J = 7.8$  Hz, 1H), 6.88 – 6.80 (m, 3H), 5.16 (s, 1H), 4.20 (s, 1H), 3.78 (s, 3H), 1.41 (s, 3H), 0.95 (s, 3H).  $^{13}\text{C}$  NMR (100 MHz,  $\text{CDCl}_3$ )  $\delta$  159.2, 139.4, 134.9, 134.1, 130.4, 120.0, 128.8,

120.5, 113.8, 113.5, 74.5, 66.7, 55.2, 21.6, 14.0. HRMS (ESI) calcd for C<sub>17</sub>H<sub>21</sub>O<sub>4</sub>S [M+H]<sup>+</sup>: 321.1155, found: 321.1155.



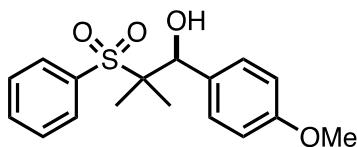
**1-(3-Bromophenyl)-2-methyl-2-(phenylsulfonyl)propan-1-ol (2w):**

White solid, 94% yield, 91% *ee*, m.p. 166.6-169.4 °C; [ $\alpha$ ]<sub>D</sub><sup>20</sup> = +29.4 (c = 0.5, CH<sub>2</sub>Cl<sub>2</sub>). The *ee* was determined by HPLC on Chiralpak IA-H column, hexane: isopropanol = 90:10; flow rate = 1 mL/min; column temperature 25 °C; UV detection at 215 nm; t<sub>R1</sub> = 14.24 min (minor), t<sub>R2</sub> = 16.68 min (major). <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>)  $\delta$  7.97 – 7.92 (m, 2H), 7.76 – 7.70 (m, 1H), 7.66 – 7.59 (m, 2H), 7.46 (t, *J* = 2.0 Hz, 1H), 7.23 – 7.14 (m, 2H), 5.14 (s, 1H), 4.31 (s, 1H), 1.38 (s, 3H), 0.95 (s, 3H). <sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>)  $\delta$  140.2, 134.7, 134.3, 131.4, 130.9, 130.4, 129.4, 129.1, 126.7, 122.2, 74.1, 66.4, 21.5, 13.9. HRMS (ESI) calcd for C<sub>16</sub>H<sub>18</sub>BrO<sub>3</sub>S [M+H]<sup>+</sup>: 369.0155, found: 369.0153.



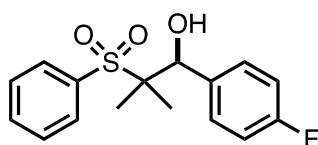
**2-Methyl-2-(phenylsulfonyl)-1-(p-tolyl)propan-1-ol (2x):**

White solid, 94% yield, 88% *ee*, m.p. 105.4-107.9 °C; [ $\alpha$ ]<sub>D</sub><sup>20</sup> = +32.8 (c = 0.5, CH<sub>2</sub>Cl<sub>2</sub>). The *ee* was determined by HPLC on Chiralpak OJ-H column, hexane: isopropanol = 90:10; flow rate = 1 mL/min; column temperature 25 °C; UV detection at 215 nm; t<sub>R1</sub> = 22.85 min (major), t<sub>R2</sub> = 26.42 min (minor). <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>)  $\delta$  7.98 – 7.92 (m, 2H), 7.74 – 7.68 (m, 1H), 7.64 – 7.57 (m, 2H), 7.17 (d, *J* = 8.0 Hz, 2H), 7.11 (d, *J* = 8.0 Hz, 2H), 5.15 (s, 1H), 4.18 (s, 1H), 2.32 (s, 3H), 1.40 (s, 3H), 0.94 (s, 3H). <sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>)  $\delta$  138.0, 135.1, 134.9, 134.0, 130.42, 128.9, 128.6, 127.8, 74.53, 66.8, 21.5, 21.0, 13.9. HRMS (ESI) calcd for C<sub>17</sub>H<sub>21</sub>O<sub>3</sub>S [M+H]<sup>+</sup>: 305.1206, found: 305.1205.

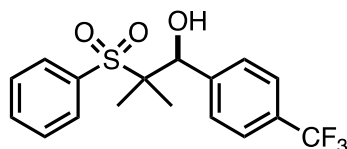


**1-(4-Methoxyphenyl)-2-methyl-2-(phenylsulfonyl)propan-1-ol (2y):**

White solid, 92% yield, 86% *ee*, m.p. 115.6-118.2 °C;  $[\alpha]_{\text{D}}^{20} = +31.8$  ( $c = 0.5$ ,  $\text{CH}_2\text{Cl}_2$ ). The *ee* was determined by HPLC on Chiralpak IA-H column, hexane: isopropanol = 93:7; flow rate = 1 mL/min; column temperature 25 °C; UV detection at 215 nm;  $t_{\text{R}1} = 35.01$  min (minor),  $t_{\text{R}2} = 59.67$  min (major).  $^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ )  $\delta$  7.98 – 7.92 (m, 2H), 7.73 – 7.68 (m, 1H), 7.63 – 7.57 (m, 2H), 7.23 – 7.17 (m, 2H), 6.86 – 6.79 (m, 2H), 5.14 (s, 1H), 4.18 (s, 1H), 3.77 (s, 3H), 1.38 (s, 3H), 0.92 (s, 3H).  $^{13}\text{C}$  NMR (100 MHz,  $\text{CDCl}_3$ )  $\delta$  159.5, 135.1, 134.0, 130.4, 130.0, 129.0, 128.9, 113.3, 74.3, 66.9, 55.2, 21.5, 13.9. HRMS (ESI) calcd for  $\text{C}_{17}\text{H}_{21}\text{O}_4\text{S}$   $[\text{M}+\text{H}]^+$ : 321.1155, found: 321.1154.

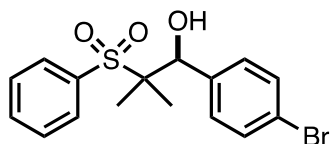
**1-(4-Fluorophenyl)-2-methyl-2-(phenylsulfonyl)propan-1-ol (2z):**

White solid, 94% yield, 76% *ee*, m.p. 113.7-117.0 °C;  $[\alpha]_{\text{D}}^{20} = +16.8$  ( $c = 0.5$ ,  $\text{CH}_2\text{Cl}_2$ ). The *ee* was determined by HPLC on Chiralpak OJ-H column, hexane: isopropanol = 90:10; flow rate = 1 mL/min; column temperature 25 °C; UV detection at 215 nm;  $t_{\text{R}1} = 25.10$  min (minor),  $t_{\text{R}2} = 34.96$  min (major).  $^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ )  $\delta$  7.95 (d,  $J = 7.6$  Hz, 2H), 7.72 (t,  $J = 7.2$  Hz, 1H), 7.61 (t,  $J = 7.6$  Hz, 2H), 7.30 – 7.24 (m, 2H), 7.00 (t,  $J = 8.4$  Hz, 2H), 5.18 (s, 1H), 4.30 (d,  $J = 1.2$  Hz, 1H), 1.37 (s, 3H), 0.92 (s, 3H).  $^{13}\text{C}$  NMR (100 MHz,  $\text{CDCl}_3$ )  $\delta$  162.6 (d,  $J = 245.4$  Hz), 134.9, 134.2, 133.7 (d,  $J = 3.2$  Hz), 130.4, 129.6 (d,  $J = 8.0$  Hz), 129.0, 114.9 (d,  $J = 21.3$  Hz), 74.1, 66.6, 21.5, 13.9.  $^{19}\text{F}$  NMR (376 MHz,  $\text{CDCl}_3$ )  $\delta$  -113.65. HRMS (ESI) calcd for  $\text{C}_{16}\text{H}_{18}\text{FO}_3\text{S}$   $[\text{M}+\text{H}]^+$ : 309.0955, found: 309.0954.

**2-Methyl-2-(phenylsulfonyl)-1-(4-(trifluoromethyl)phenyl)propan-1-ol (2aa):**

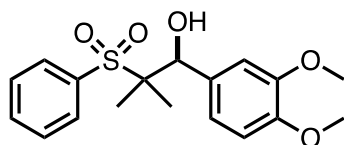
White solid, 92% yield, 75% *ee*, m.p. 133.7-137.4 °C;  $[\alpha]_{\text{D}}^{20} = +42.6$  ( $c = 0.5$ ,  $\text{CH}_2\text{Cl}_2$ ). The *ee* was determined by HPLC on Chiralpak IA-H column, hexane: isopropanol = 90:10; flow rate = 1 mL/min; column temperature 25 °C; UV detection at 215 nm;  $t_{\text{R}1} = 24.32$  min (minor),  $t_{\text{R}2} = 29.79$  min (major).  $^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ )  $\delta$  7.95 (d,  $J = 8.0$  Hz, 2H), 7.73 (t,  $J = 7.6$  Hz, 1H), 7.65 – 7.56 (m, 4H), 7.43 (d,  $J = 8.0$  Hz, 2H),

5.26 (s, 1H), 4.38 (s, 1H), 1.37 (s, 3H), 0.95 (s, 3H).  $^{13}\text{C}$  NMR (100 MHz,  $\text{CDCl}_3$ )  $\delta$  142.0, 134.7, 134.3, 130.5 (q,  $J = 32.3$  Hz), 130.5, 129.1, 128.4, 124.9 (q,  $J = 3.8$  Hz), 123.9 (q,  $J = 270.5$  Hz), 74.2, 66.3, 21.5, 14.0.  $^{19}\text{F}$  NMR (376 MHz,  $\text{CDCl}_3$ )  $\delta$ -62.60. HRMS (ESI) calcd for  $\text{C}_{17}\text{H}_{18}\text{F}_3\text{O}_3\text{S}$   $[\text{M}+\text{H}]^+$ : 359.0923, found: 359.0924.



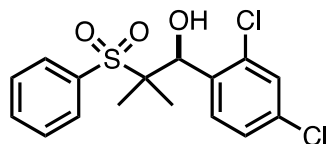
**1-(4-Bromophenyl)-2-methyl-2-(phenylsulfonyl)propan-1-ol (2ab):**

White solid, 93% yield, 81% *ee*, m.p. 131.2-135.4 °C;  $[\alpha]_{\text{D}}^{20} = +22.6$  ( $c = 0.5$ ,  $\text{CH}_2\text{Cl}_2$ ). The *ee* was determined by HPLC on Chiralpak OJ-H column, hexane: isopropanol = 90:10; flow rate = 1 mL/min; column temperature 25 °C; UV detection at 210 nm;  $t_{\text{R}1} = 25.92$  min (minor),  $t_{\text{R}2} = 32.89$  min (major).  $^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ )  $\delta$  7.95 (d,  $J = 7.2$  Hz, 2H), 7.73 (t,  $J = 7.6$  Hz, 1H), 7.62 (t,  $J = 8.0$  Hz, 2H), 7.44 (d,  $J = 8.4$  Hz, 2H), 7.18 (d,  $J = 8.4$  Hz, 2H), 5.15 (s, 1H), 4.31 (s, 1H), 1.36 (s, 3H), 0.93 (s, 3H).  $^{13}\text{C}$  NMR (100 MHz,  $\text{CDCl}_3$ )  $\delta$  136.9, 134.6, 134.3, 131.1, 130.4, 129.6, 129.1, 122.3, 74.1, 66.3, 21.5, 13.9. HRMS (ESI) calcd for  $\text{C}_{16}\text{H}_{18}\text{BrO}_3\text{S}$   $[\text{M}+\text{H}]^+$ : 369.0155, found: 369.0156.



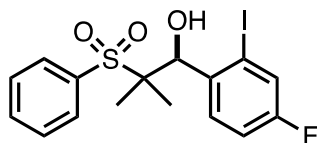
**1-(3,4-Dimethoxyphenyl)-2-methyl-2-(phenylsulfonyl)propan-1-ol (2ac):**

White solid, 92% yield, 86% *ee*, m.p. 148.5-151.5 °C;  $[\alpha]_{\text{D}}^{20} = +26.0$  ( $c = 0.5$ ,  $\text{CH}_2\text{Cl}_2$ ). The *ee* was determined by HPLC on Chiralpak IA-H column, hexane: isopropanol = 90:10; flow rate = 1 mL/min; column temperature 25 °C; UV detection at 215 nm;  $t_{\text{R}1} = 14.06$  min (major),  $t_{\text{R}2} = 21.08$  min (minor).  $^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ )  $\delta$  7.94 (d,  $J = 7.6$  Hz, 2H), 7.71 (t,  $J = 7.6$  Hz, 1H), 7.60 (t,  $J = 8.0$  Hz, 2H), 6.87 (s, 1H), 6.77 (s, 2H), 5.16 (s, 1H), 4.19 (d,  $J = 1.2$  Hz, 1H), 3.84 (d,  $J = 2.8$  Hz, 6H), 1.39 (s, 3H), 0.93 (s, 3H).  $^{13}\text{C}$  NMR (100 MHz,  $\text{CDCl}_3$ )  $\delta$  148.9, 148.5, 135.0, 134.100, 128.9, 120.5, 110.9, 110.3, 74.4, 66.8, 55.9, 55.8, 21.5, 14.1. HRMS (ESI) calcd for  $\text{C}_{18}\text{H}_{23}\text{O}_5\text{S}$   $[\text{M}+\text{H}]^+$ : 351.1261, found: 351.1262.



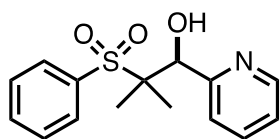
**1-(2,4-Dichlorophenyl)-2-methyl-2-(phenylsulfonyl)propan-1-ol (2ad):**

White solid, 92% yield, 95% *ee*, m.p. 110.0-112.6 °C;  $[\alpha]_D^{20} = +33.4$  ( $c = 0.5$ , CH<sub>2</sub>Cl<sub>2</sub>). The *ee* was determined by HPLC on Chiralpak IA-H column, hexane: isopropanol = 90:10; flow rate = 1 mL/min; column temperature 25 °C; UV detection at 215 nm;  $t_{R1} = 15.17$  min (major),  $t_{R2} = 45.01$  min (minor). <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>)  $\delta$  8.00 – 7.94 (m, 2H), 7.75 – 7.70 (m, 1H), 7.66 – 7.60 (m, 1H), 7.56 (d,  $J = 8.4$  Hz, 1H), 7.31 – 7.26 (m, 2H), 5.72 (s, 1H), 4.21 (s, 1H), 1.46 (s, 3H), 1.01 (s, 3H). <sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>)  $\delta$  134.6, 134.6, 134.5, 134.3, 133.9, 130.5, 130.4, 129.1, 129.1, 127.3, 69.2, 67.3, 20.1, 13.8. HRMS (ESI) calcd for C<sub>16</sub>H<sub>17</sub>Cl<sub>2</sub>O<sub>3</sub>S [M+H]<sup>+</sup>: 359.0270, found: 359.0268.



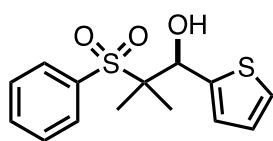
**1-(4-Fluoro-2-iodophenyl)-2-methyl-2-(phenylsulfonyl)propan-1-ol (2ae):**

White solid, 93% yield, 91% *ee*, m.p. 148.5-151.5 °C;  $[\alpha]_D^{20} = +36.2$  ( $c = 0.5$ , CH<sub>2</sub>Cl<sub>2</sub>). The *ee* was determined by HPLC on Chiralpak OJ-H column, hexane: isopropanol = 90:10; flow rate = 1 mL/min; column temperature 25 °C; UV detection at 215 nm;  $t_{R1} = 17.64$  min (minor),  $t_{R2} = 30.23$  min (major). <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>)  $\delta$  8.05 – 7.97 (m, 2H), 7.75 – 7.62 (m, 4H), 7.29 (dd,  $J = 10.0, 3.2$  Hz, 1H), 6.80 – 6.74 (m, 1H), 5.45 (s, 1H), 4.27 (d,  $J = 1.2$  Hz, 1H), 1.54 (s, 3H), 1.10 (s, 3H). <sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>)  $\delta$  164.2, 161.7, 142.8 (d,  $J = 6.9$  Hz), 140.7 (d,  $J = 7.4$  Hz), 134.3, 130.8, 129.3, 117.7 (d,  $J = 21.7$  Hz), 116.8 (d,  $J = 23.3$  Hz), 92.4 (d,  $J = 3.2$  Hz), 76.4, 67.8, 20.8, 13.5. <sup>19</sup>F NMR (376 MHz, CDCl<sub>3</sub>)  $\delta$  -112.40. HRMS (ESI) calcd for C<sub>16</sub>H<sub>17</sub>FIO<sub>3</sub>S [M+H]<sup>+</sup>: 434.9922, found: 434.9924.



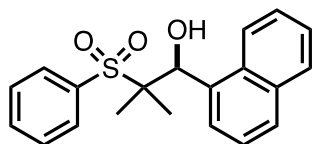
**2-Methyl-2-(phenylsulfonyl)-1-(pyridin-2-yl)propan-1-ol (2af):**

White solid, 92% yield, 59% *ee*, m.p. 109.9-112.4 °C;  $[\alpha]_D^{20} = -18.2$  ( $c = 0.5$ , CH<sub>2</sub>Cl<sub>2</sub>). The *ee* was determined by HPLC on Chiralpak OJ-H column, hexane: isopropanol = 90:10; flow rate = 1 mL/min; column temperature 25 °C; UV detection at 210 nm;  $t_{R1} = 99.40$  min (minor),  $t_{R2} = 110.00$  min (major). <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>)  $\delta$  8.48 (d,  $J = 4.4$  Hz, 1H), 8.00 – 7.93 (m, 2H), 7.71 – 7.65 (m, 2H), 7.57 (t,  $J = 8.0$  Hz, 2H), 7.46 (d,  $J = 8.0$  Hz, 1H), 7.24 – 7.19 (m, 1H), 5.17 (d,  $J = 4.0$  Hz, 1H), 4.54 (d,  $J = 4.4$  Hz, 1H), 1.37 (s, 3H), 1.12 (s, 3H). <sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>)  $\delta$  157.6, 148.2, 136.3, 135.9, 133.9, 130.5, 128.8, 123.2, 123.2, 74.9, 67.2, 20.2, 15.1. HRMS (ESI) calcd for C<sub>15</sub>H<sub>18</sub>NO<sub>3</sub>S [M+H]<sup>+</sup>: 292.1002, found: 292.1003.



**2-Methyl-2-(phenylsulfonyl)-1-(thiophen-2-yl)propan-1-ol (2ag):**

White solid, 91% yield, 66% *ee*, m.p. 150.0-152.9 °C;  $[\alpha]_D^{20} = -20.4$  ( $c = 0.5$ , CH<sub>2</sub>Cl<sub>2</sub>). The *ee* was determined by HPLC on Chiralpak OJ-H column, hexane: isopropanol = 90:10; flow rate = 1 mL/min; column temperature 25 °C; UV detection at 210 nm;  $t_{R1} = 60.36$  min (minor),  $t_{R2} = 65.85$  min (major). <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>)  $\delta$  7.98 – 7.91 (m, 2H), 7.72 (t,  $J = 7.6$  Hz, 1H), 7.61 (t,  $J = 7.6$  Hz, 2H), 7.30 – 7.25 (d,  $J = 4.8$  Hz, 1H), 6.98 – 6.88 (m, 2H), 5.50 (s, 1H), 4.29 (d,  $J = 0.8$  Hz, 1H), 1.49 (s, 3H), 1.03 (s, 3H). <sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>)  $\delta$  140.9, 134.8, 134.3, 130.4, 129.0, 126.5, 126.1, 125.6, 71.8, 66.5, 21.3, 14.2. HRMS (ESI) calcd for C<sub>14</sub>H<sub>17</sub>O<sub>3</sub>S<sub>2</sub> [M+H]<sup>+</sup>: 297.0614, found: 297.0615.

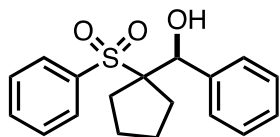


**2-Methyl-1-(naphthalen-1-yl)-2-(phenylsulfonyl)propan-1-ol (2ah):**

White solid, 90% yield, 43% *ee*, m.p. 218.8-221.9 °C;  $[\alpha]_D^{20} = -48.4$  ( $c = 0.5$ , CH<sub>2</sub>Cl<sub>2</sub>). The *ee* was determined by HPLC on Chiralpak OJ-H column, hexane: isopropanol = 90:10; flow rate = 1 mL/min; column temperature 25 °C; UV detection at 210 nm;  $t_{R1} = 57.71$  min (minor),  $t_{R2} = 71.18$  min (major). <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>)  $\delta$  8.05 – 8.00 (m, 2H), 7.88 – 7.71 (m, 2H), 7.66 (t,  $J = 7.6$  Hz, 2H), 7.51 (t,  $J = 8.0$  Hz, 1H), 7.46 – 7.37 (m, 2H), 6.41 (s, 1H), 4.07 (s, 1H), 1.52 (s, 3H), 0.83 (s, 3H). <sup>13</sup>C NMR



(100 MHz, CDCl<sub>3</sub>)  $\delta$  135.0, 134.3, 134.2, 133.4, 131.5, 130.6, 129.1, 128.9, 128.8, 126.1, 125.8, 125.4, 125.2, 68.0, 67.6, 21.6, 14.4. HRMS (ESI) calcd for C<sub>20</sub>H<sub>21</sub>O<sub>3</sub>S [M+H]<sup>+</sup>: 341.1206 found: 241.1208.

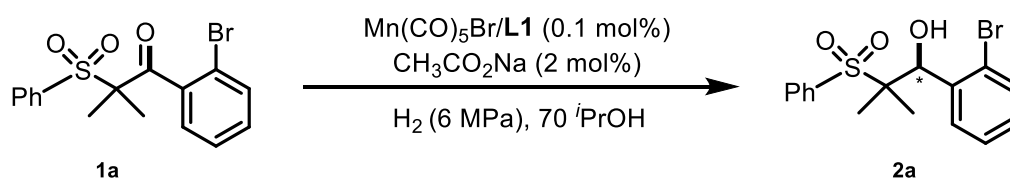


### Phenyl(1-(phenylsulfonyl)cyclopentyl)methanol (**2ai**):

White solid, 91% yield, 80% *ee*, m.p. 88.2-90.8 °C;  $[\alpha]_D^{20} = +18.4$  (*c* = 0.5, CH<sub>2</sub>Cl<sub>2</sub>). The *ee* was determined by HPLC on Chiralpak OJ-H column, hexane: isopropanol = 90:10; flow rate = 1 mL/min; column temperature 25 °C; UV detection at 210 nm; *t*<sub>R1</sub> = 22.08 min (minor), *t*<sub>R2</sub> = 46.31 min (major). <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>)  $\delta$  8.06 – 7.97 (m, 2H), 7.77 – 7.69 (m, 1H), 7.67 – 7.58 (m, 2H), 7.26 (s, 5H), 5.11 (s, 1H), 4.50 (s, 1H), 2.46 (t, *J* = 6.8 Hz, 2H), 2.09 – 1.96 (m, 1H), 1.55 – 1.47 (m, 1H), 1.38 – 1.28 (m, 3H), 0.33 – 0.18 (m, 1H). <sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>)  $\delta$  137.9, 135.6, 134.1, 130.3, 129.1, 128.3, 128.1, 127.9, 76.9, 74.2, 32.6, 26.1, 25.9, 25.5. HRMS (ESI) calcd for C<sub>18</sub>H<sub>21</sub>O<sub>3</sub>S [M+H]<sup>+</sup>: 317.1206, found: 317.1205.

## 5. General procedure for gram-scale reaction and functional group transformations

### Gram-scale reaction

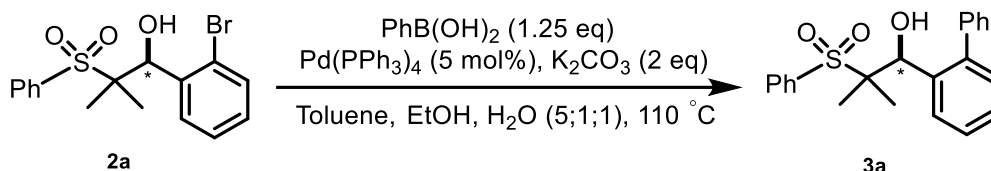


Under argon atmosphere, Mn(CO)<sub>5</sub>Br (0.02 mmol), **L1** (0.022 mmol), degassed toluene (2 mL) was added into a tube and the mixture was heated to reflux for 10 h. The mixture was cooled to room temperature and concentrated to dryness, then 2 mL of degassed dried *i*PrOH was added to the crude Mn-**L1** complex. Under an argon atmosphere, a vial was charged with a solution of Mn-**L1** complex in *i*PrOH (0.5 mL, 0.005 mmol), CH<sub>3</sub>COONa (0.1 mmol), **1a** (5 mmol) and 15 mL of degassed dried *i*PrOH. The vial was placed in an alloy plate which was then placed into the autoclave. And the autoclave was purged five times with hydrogen, then pressurized to 6 MPa,

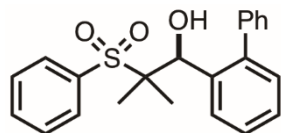
stirred at 70 °C for 24 h. After slowly releasing the hydrogen pressure, the solvent was removed, and the mixture was purified by passing through a short column of silica gel to afford the corresponding alcohol **2a** with 1.84 g, 90% yield in 93% *ee*.

## Functional group transformations

### (1) The synthesis of **3a**



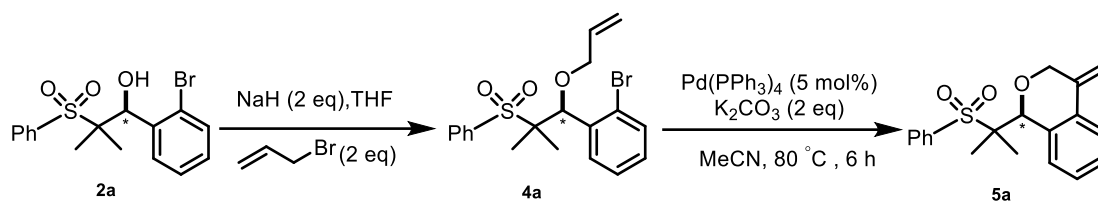
Under N<sub>2</sub> atmosphere, a solution of **2a** (1 mmol),  $\text{PhB(OH)}_2$  (1.25 mmol),  $\text{Pd(PPh}_3)_4$  (0.05 mmol) and  $\text{K}_2\text{CO}_3$  (2 mmol) in a mixture solvents of toluene: EtOH: H<sub>2</sub>O (10 mL: 2 mL: 2 mL) was stirred at 110 °C for 6 h. The solvent was removed under vacuum and 20 mL water and 15 mL DCM were added, organic layer was combined and dried by anhydrous sodium sulfate. The reaction mixture was filtered and concentrated to get the crude product **3a**. The crude product **3a** was purified by column chromatography on silica gel to get white solid, 87% yield, 93% *ee*.



### 1-([1,1'-Biphenyl]-2-yl)-2-methyl-2-(phenylsulfonyl)propan-1-ol (**3a**):

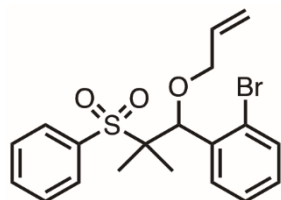
White solid, 87% yield, 93% *ee*, m.p. 172.9-175.6 °C;  $[\alpha]_D^{20} = +33.4$  ( $c = 0.5$ ,  $\text{CH}_2\text{Cl}_2$ ). The *ee* was determined by HPLC on Chiralpak OJ-H column, hexane: isopropanol = 90:10; flow rate = 1 mL/min; column temperature 25 °C; UV detection at 210 nm;  $t_{R1} = 21.42$  min (minor),  $t_{R2} = 45.66$  min (major). <sup>1</sup>H NMR (400 MHz,  $\text{CDCl}_3$ )  $\delta$  7.74 (d,  $J = 7.6$  Hz, 1H), 7.68 – 7.61 (m, 2H), 7.57 (t,  $J = 7.2$  Hz, 1H), 7.45 – 7.36 (m, 3H), 7.34 – 7.29 (m, 1H), 7.18 – 7.09 (m, 4H), 7.08 – 7.00 (m, 2H), 5.38 (s, 1H), 4.35 (s, 1H), 1.56 (s, 3H), 0.58 (s, 3H). <sup>13</sup>C NMR (100 MHz,  $\text{CDCl}_3$ )  $\delta$  142.0, 140.9, 135.1, 134.0, 133.8, 130.1, 129.9, 129.0, 128.8, 128.1, 128.1, 128.0, 127.3, 126.8, 69.2, 67.9, 20.9, 12.7. HRMS (ESI) calcd for  $\text{C}_{22}\text{H}_{23}\text{O}_3\text{S}$   $[\text{M}+\text{H}]^+$ : 367.1362, found: 367.1358.

## (2) The synthesis of **5a**



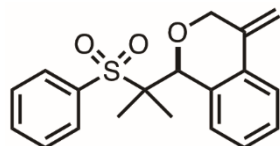
Under N<sub>2</sub> atmosphere, NaH (2 mmol) was added to a solution of **2a** (1 mmol) in 10 mL dry THF at 0 °C, then the mixture was stirred at room temperature for 1 h. Next, allyl bromide (2 mmol) was added at 0 °C and the mixture was stirred at room temperature for another 5 h. The solvent was removed under vacuum and 20 mL water and 15 mL DCM were added, organic layer was combined and dried by anhydrous sodium sulfate. The reaction mixture was filtered and concentrated to get the crude product **4a**. The crude product **4a** was purified by column chromatography on silica gel to get a white solid, 0.389 mg, 95% yield, 89% *ee*.

Under N<sub>2</sub> atmosphere, a solution of **4a** (0.5 mmol), Pd(PPh<sub>3</sub>)<sub>4</sub> (0.025 mmol), K<sub>2</sub>CO<sub>3</sub> (1 mmol) in MeCN was stirred at 80 °C for 6 h. The reaction mixture was filtered and concentrated to get the crude product **5a**. The crude product **5a** was purified by column chromatography on silica gel to get a white solid, 107 mg, 65% yield, 89% *ee*.



### 1-(1-(Allyloxy)-2-methyl-2-(phenylsulfonyl)propyl)-2-bromobenzene (**4a**):

White solid, 95% yield, 89% *ee*, m.p. 157.6-160.3 °C; [ $\alpha$ ]<sub>D</sub><sup>20</sup> = +28.6 (c = 0.5, CH<sub>2</sub>Cl<sub>2</sub>). The *ee* was determined by HPLC on Chiralpak AD-H column, hexane: isopropanol = 98:2; flow rate = 0.5 mL/min; column temperature 25 °C; UV detection at 210 nm; t<sub>R1</sub> = 41.19 min (major), t<sub>R2</sub> = 43.72 min (minor). <sup>1</sup>H NMR (600 MHz, CDCl<sub>3</sub>) δ 7.98 – 7.92 (m, 2H), 7.63 – 7.58 (m, 1H), 7.57 – 7.53 (m, 1H), 7.53 – 7.49 (m, 2H), 7.35 – 7.32 (m, 1H), 7.31 – 7.27 (m, 1H), 7.18 – 7.14 (m, 1H), 5.60 – 5.49 (m, 2H), 5.00 – 4.90 (m, 2H), 3.72 – 3.66 (m, 1H), 3.60 – 3.53 (m, 1H), 1.43 (d, *J* = 1.2 Hz, 1H), 1.25 (d, *J* = 1.8 Hz, 1H). <sup>13</sup>C NMR (150 MHz, CDCl<sub>3</sub>) δ 138.8, 136.8, 133.6, 133.1, 133.0, 130.1, 129.8, 129.3, 128.4, 127.4, 125.6, 116.7, 79.2, 69.4, 19.0, 16.6. HRMS (ESI) calcd for C<sub>19</sub>H<sub>22</sub>BrO<sub>3</sub>S [M+H]<sup>+</sup>: 409.0468, found: 409.0467.



#### 4-Methylene-1-(2-(phenylsulfonyl)propan-2-yl)isochromane (5a):

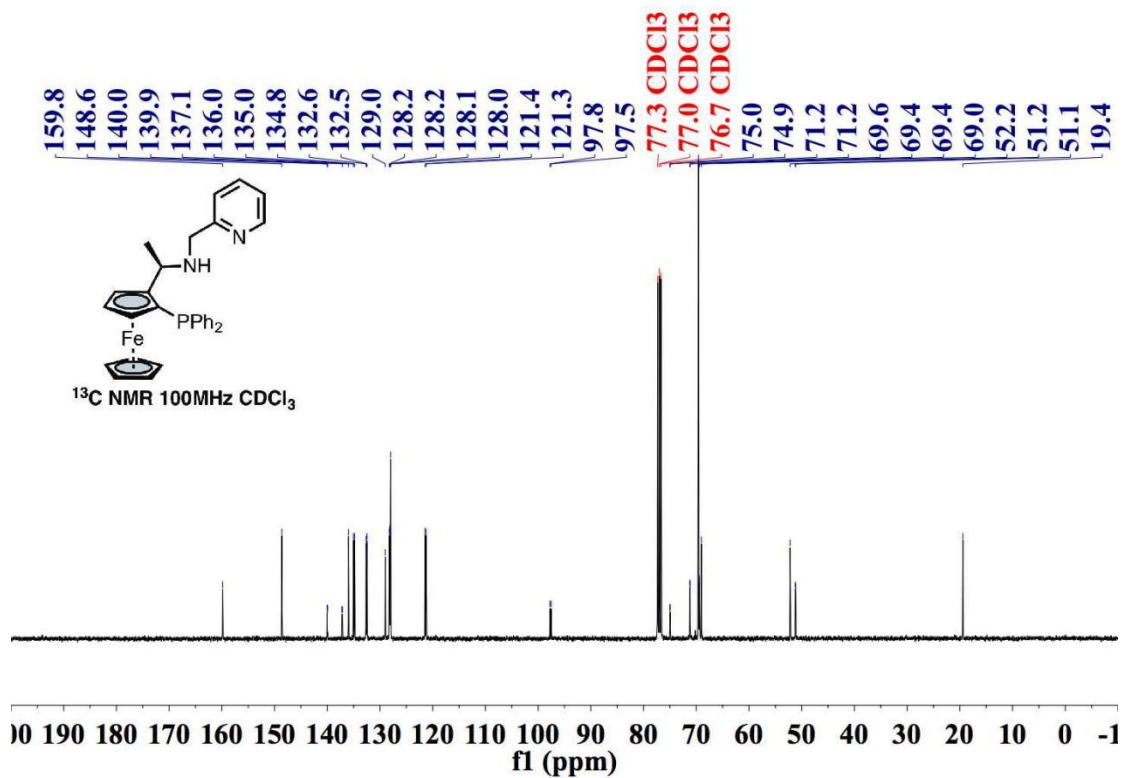
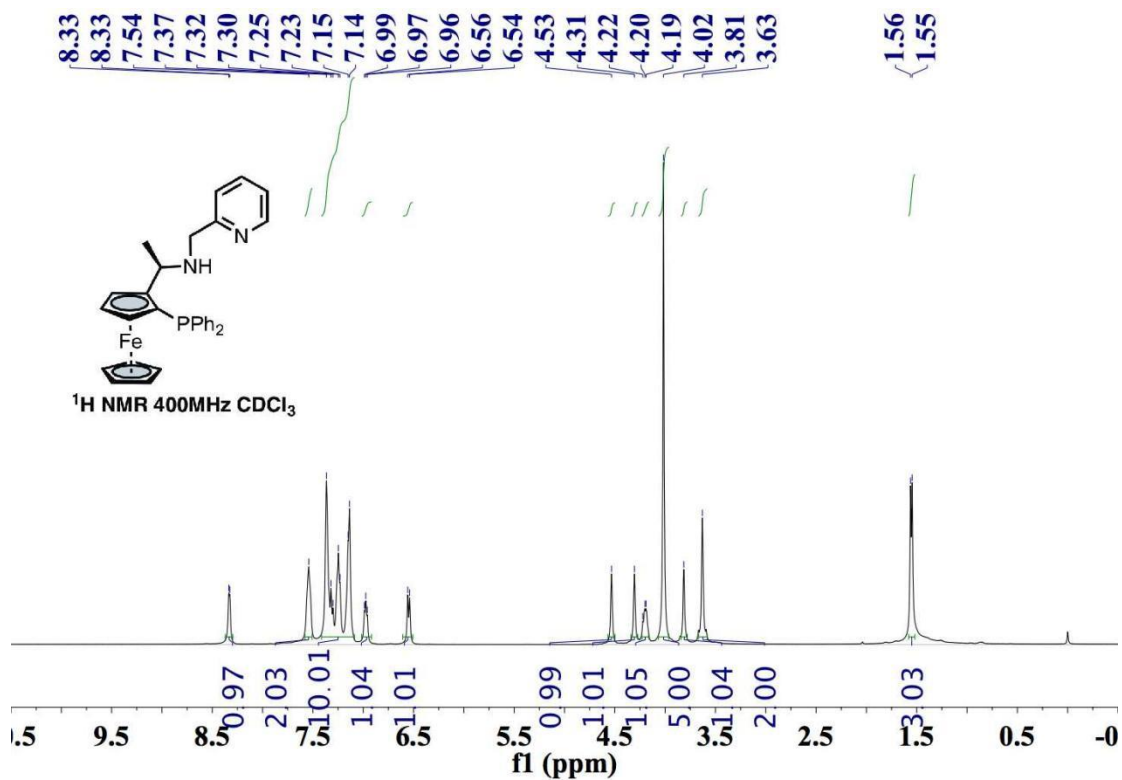
White solid, 65% yield, 89% *ee*, m.p. 166.2-169.8 °C;  $[\alpha]_{\text{D}}^{20} = +45.9$  ( $c = 0.5$ ,  $\text{CH}_2\text{Cl}_2$ ). The *ee* was determined by HPLC on Chiralpak OJ-H column, hexane: isopropanol = 90:10; flow rate = 1 mL/min; column temperature 25 °C; UV detection at 210 nm;  $t_{\text{R}1} = 18.40$  min (major),  $t_{\text{R}2} = 21.83$  min (minor).  $^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ )  $\delta$  8.02 – 7.95 (m, 2H), 7.65 – 7.60 (m, 1H), 7.56 – 7.49 (m, 3H), 7.34 – 7.24 (m, 2H), 7.15 (dd,  $J = 7.2, 1.2$  Hz, 1H), 5.46 (s, 1H), 5.34 (s, 1H), 4.88 (s, 1H), 4.16 (s, 2H), 1.41 (s, 3H), 1.09 (s, 3H).  $^{13}\text{C}$  NMR (100 MHz,  $\text{CDCl}_3$ )  $\delta$  139.1, 138.8, 134.4, 133.0, 132.1, 130.7, 128.1, 127.9, 127.6, 127.4, 124.5, 108.2, 77.9, 70.8, 66.9, 20.7, 17.5. HRMS (ESI) calcd for  $\text{C}_{19}\text{H}_{21}\text{O}_3\text{S}$   $[\text{M}+\text{H}]^+$ : 329.1206, found: 329.1201.

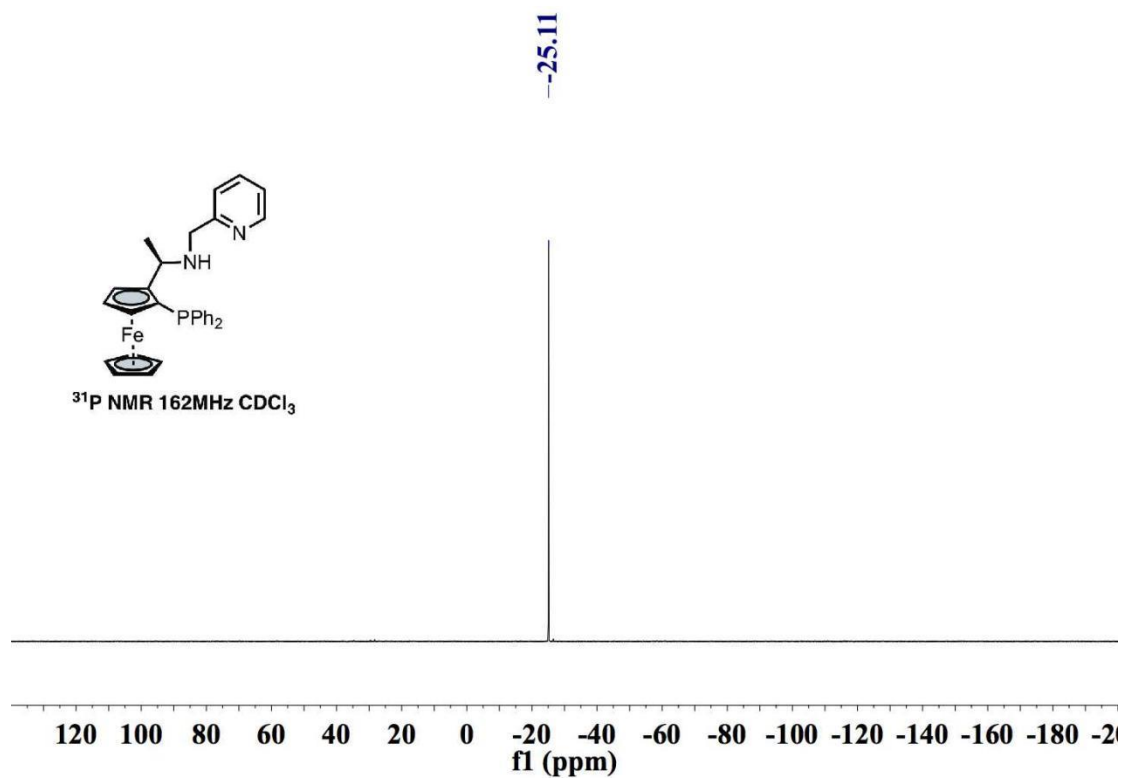
## 6. References

- [1] (a) H. Nie, L. Yao, B. Li, S. Zhang and W. Chen, *Organometallics*, 2014, **33**, 2109; (b) W. Zeng, G.-Y. Chen, Y.-G. Zhou and Y.-X. Li, *J. Am. Chem. Soc.*, 2007, **129**, 750; (c) W. Wu, S. Liu, M. Duan, X. Tan, C. Chen, Y. Xie, Y. Lan, X.-Q. Dong and X. Zhang, *Org. Lett.*, 2016, **18**, 2938; (d) J. Ma, C. Li, D. Zhang, Y. Lei, M. Li, R. Jiang and W. Chen, *RSC Adv.*, 2015, **5**, 35888.
- [2] (a) W. Zhu, X. Zhai, Q. Fu, F. Guo, M. Bai, J. Wang, H. Wang and P. Gong, *Chem. Pharm. Bull.*, 2012, **60**, 1037; (b) K. Vishal, B. D. Fahlman, B. S. Sasidhar, S. A. Patil and S. A. Patil, *Catal. Lett.*, 2017, **147**, 900.
- [3] X. Kong, K. Yu, Q. Chen and B. Xu, *Asian J. Org. Chem.*, 2020, **9**, 1760.

## 7. Copies of NMR spectra

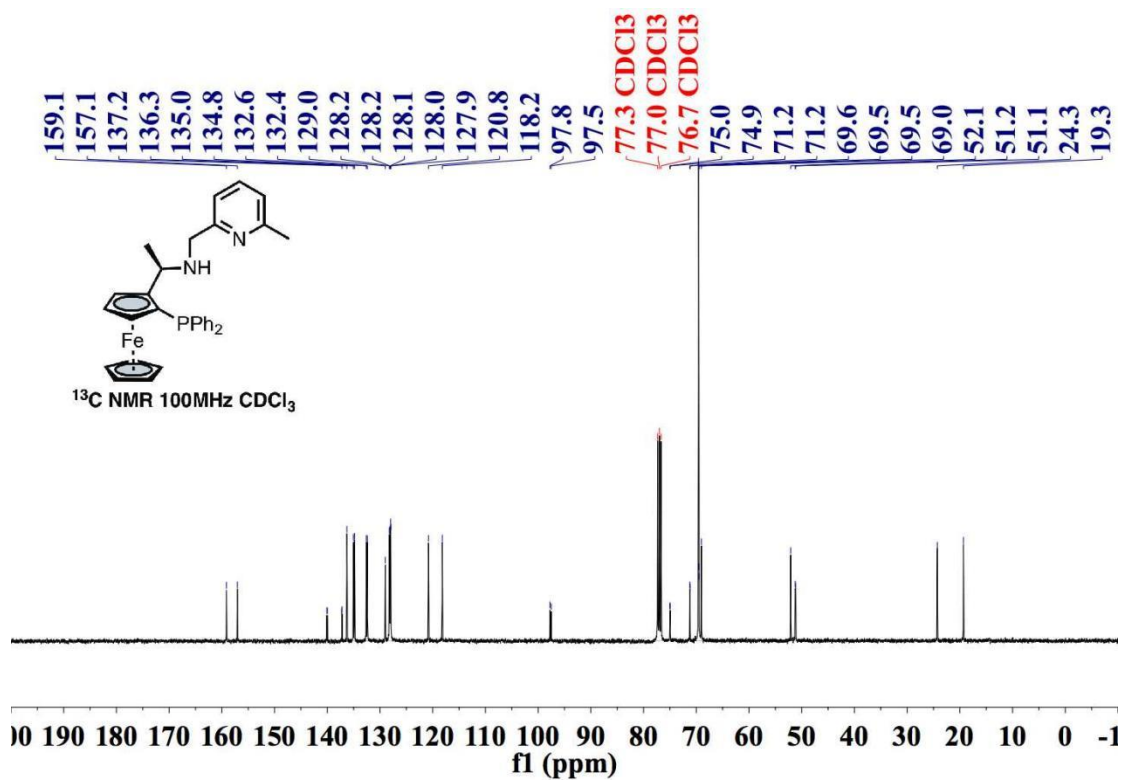
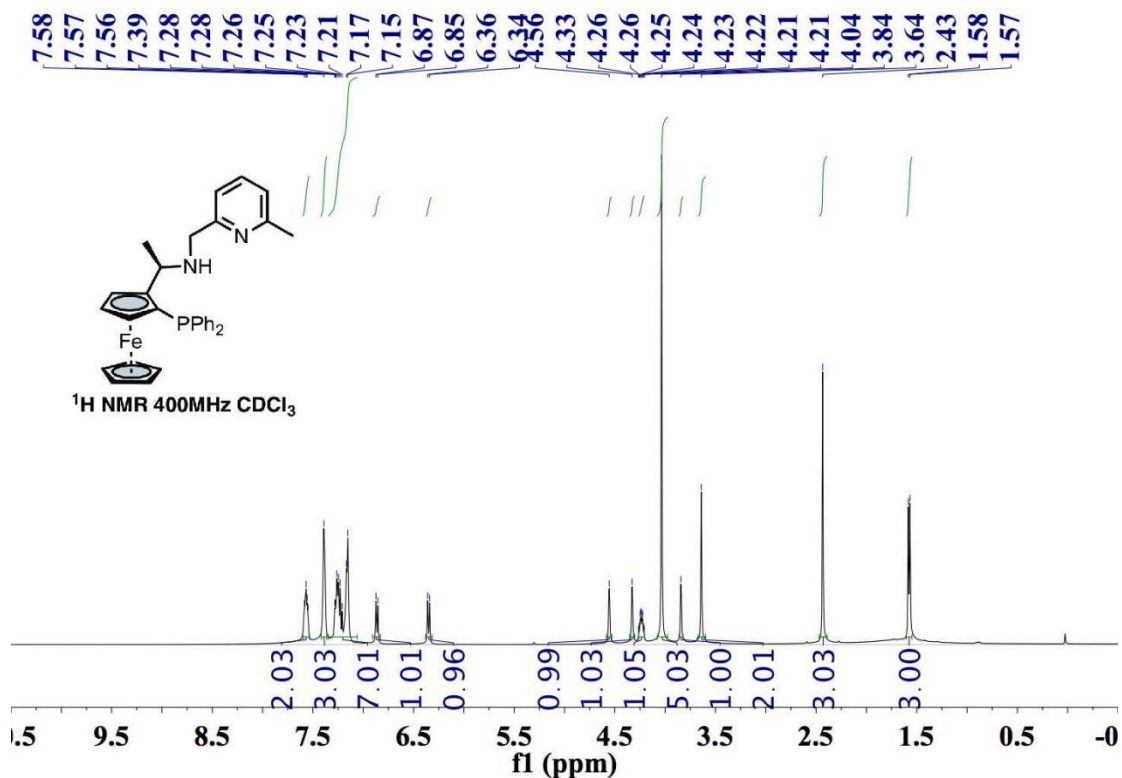
### (*Rc, Sp*)-*N*-2-Picolyl-1-(2-diphenylphosphino)ferrocenylethylamine (L1)

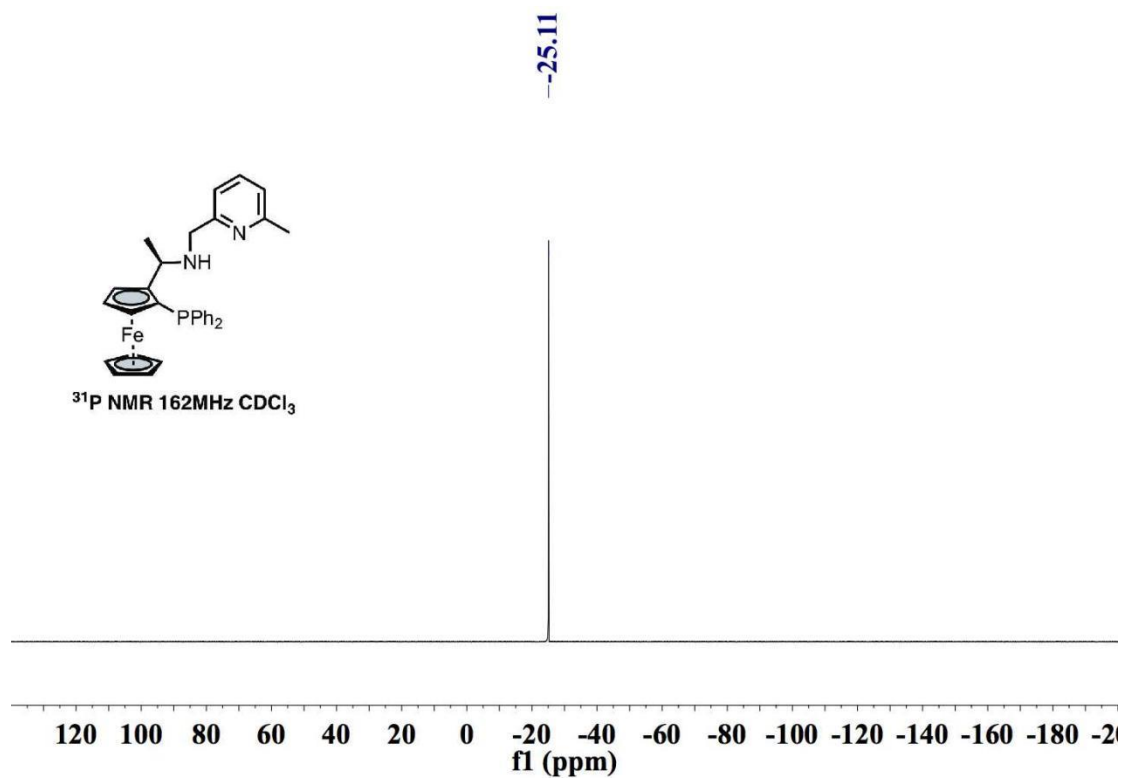




**(R<sub>c</sub>, S<sub>p</sub>)-N-2-(6-Methyl-picolyl)-1-(2-diphenylphosphino)ferrocenylethylamine**

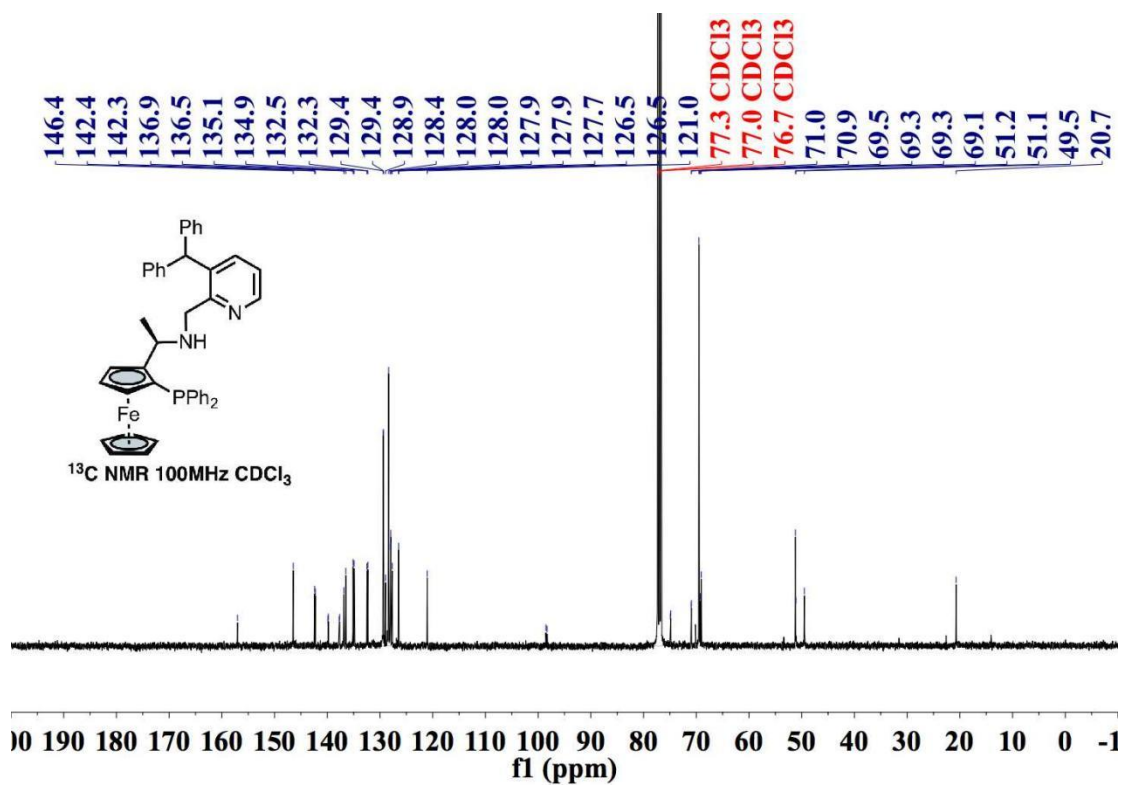
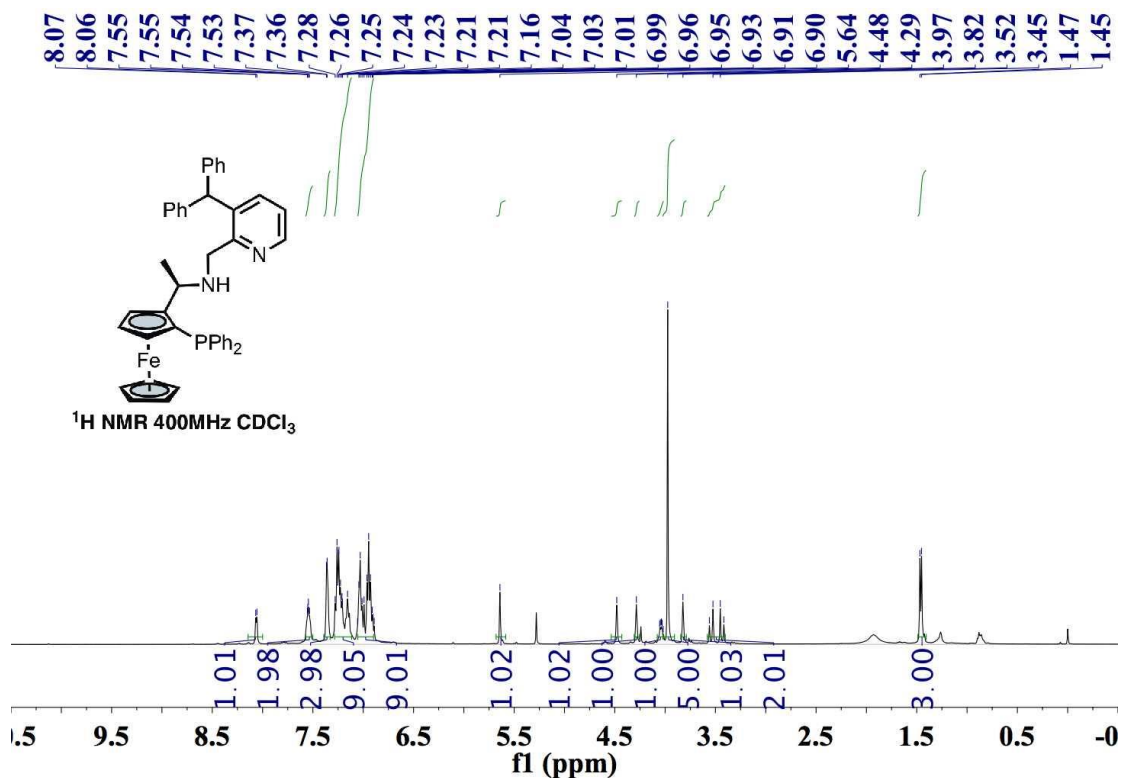
**(L2)**

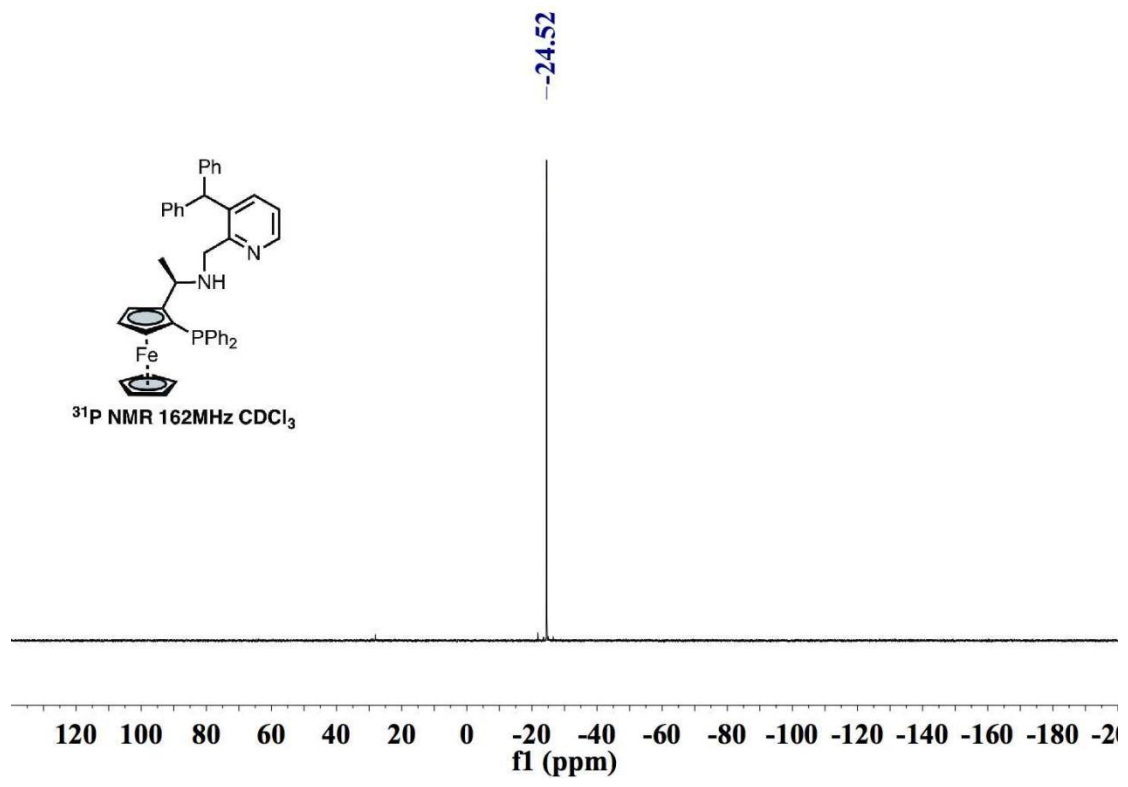




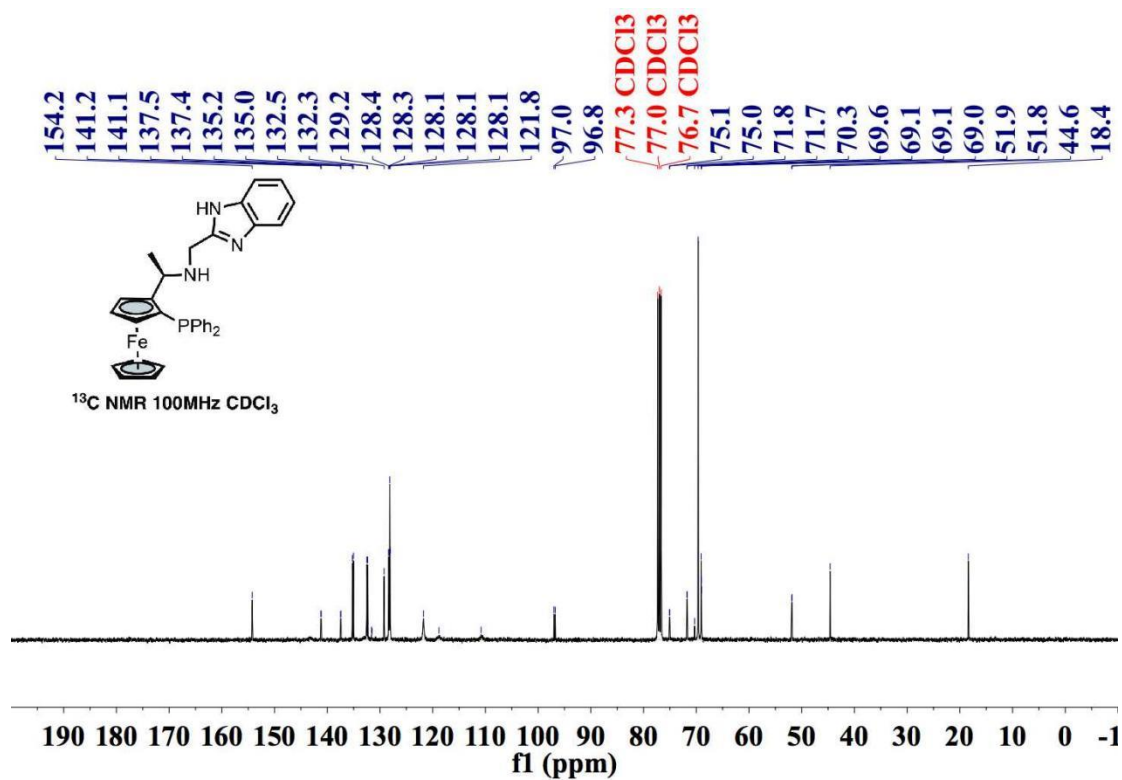
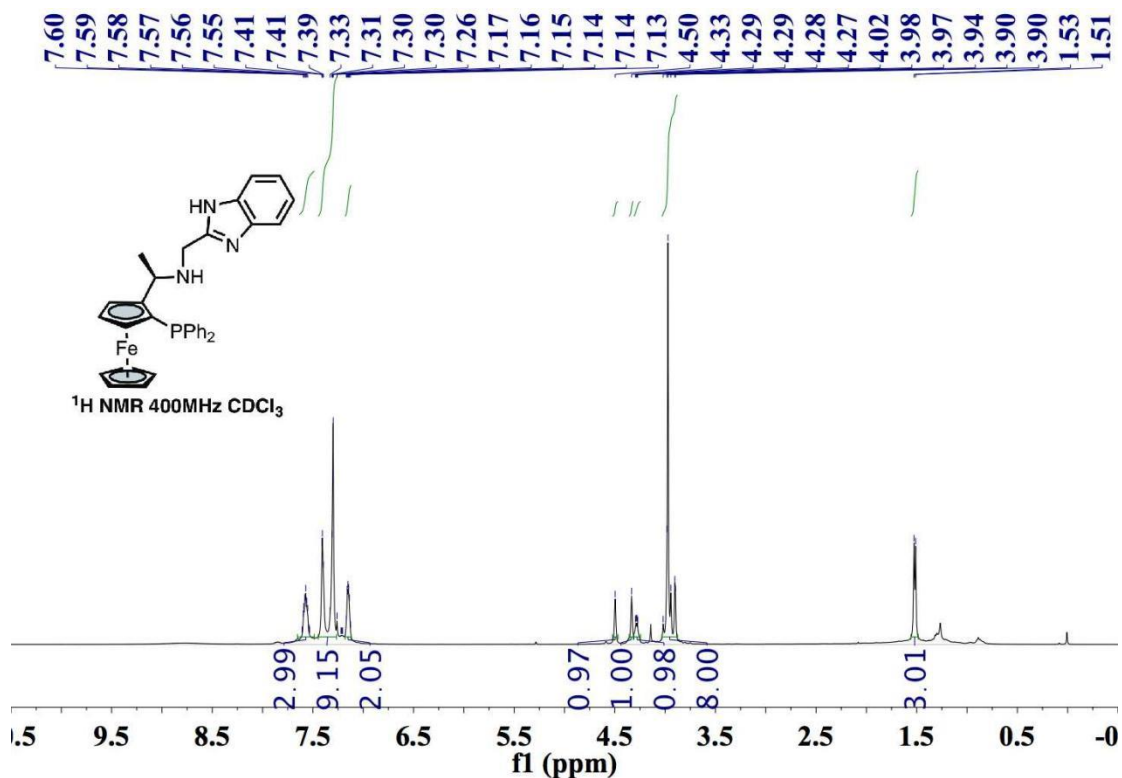


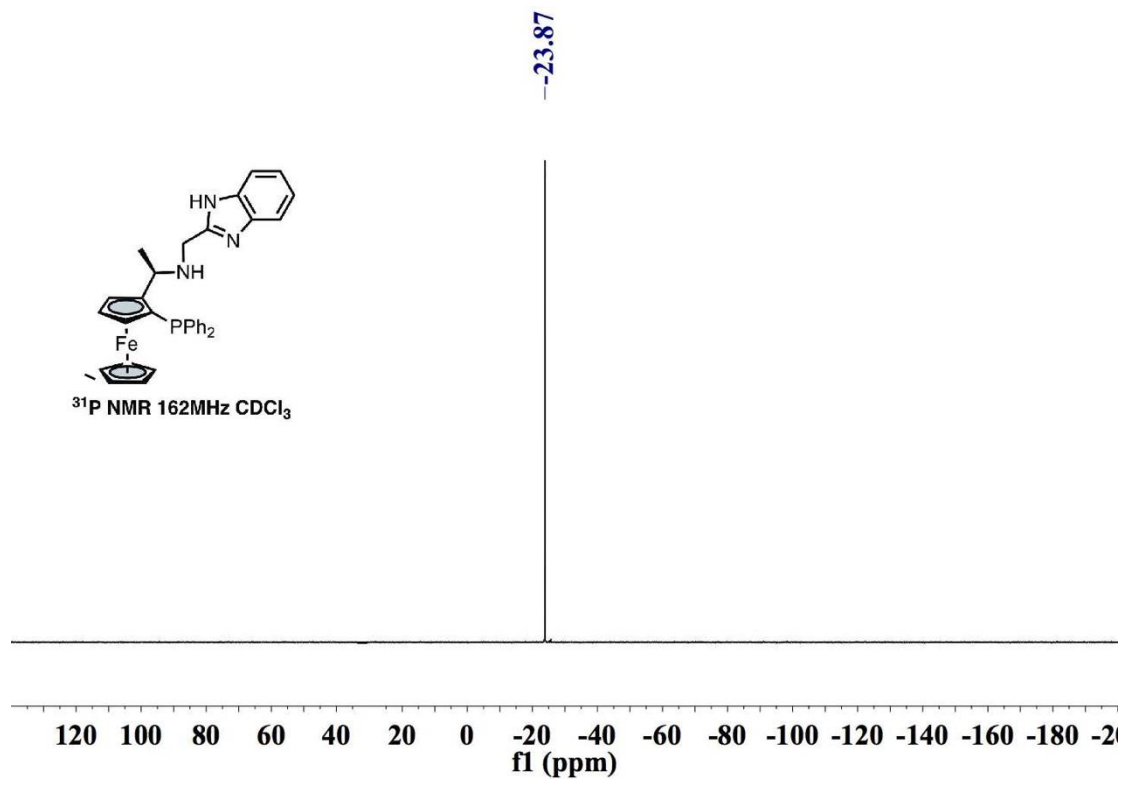
**(R<sub>c</sub>, S<sub>p</sub>)-N-2-(3-Diphenylmethyl-picolyl)-1-(2-Diphenylphosphino)ferrocenyl-ethylamine (L3)**



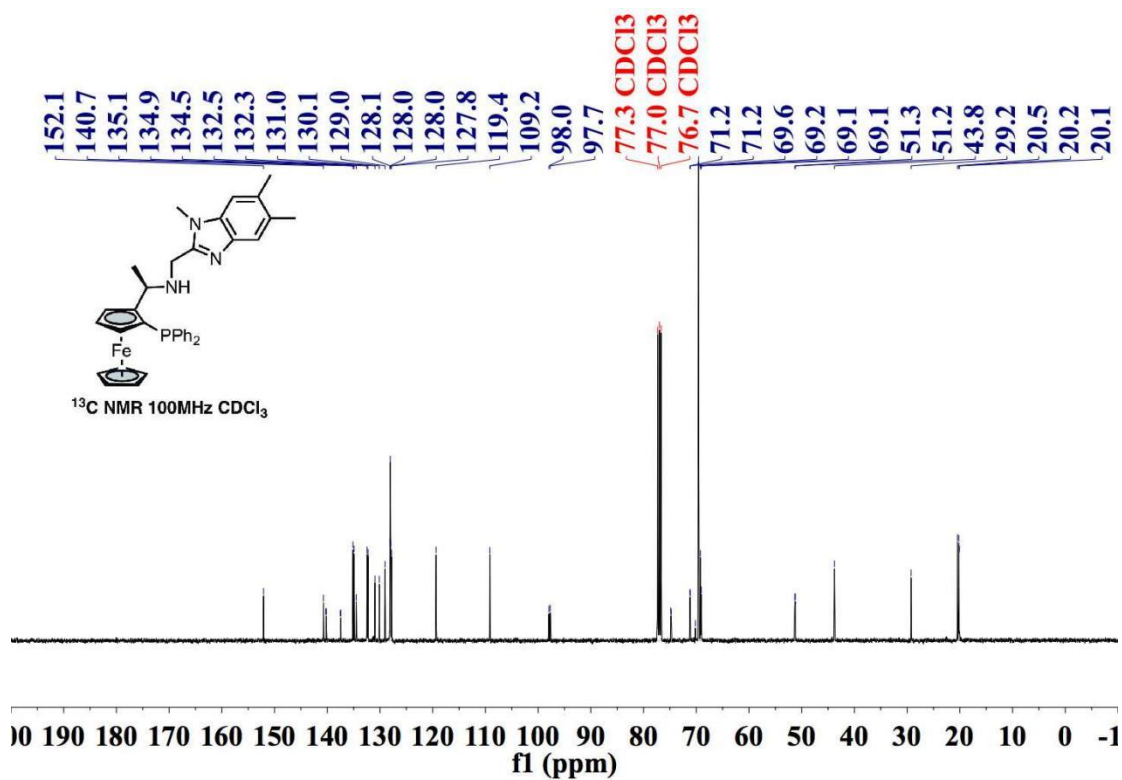
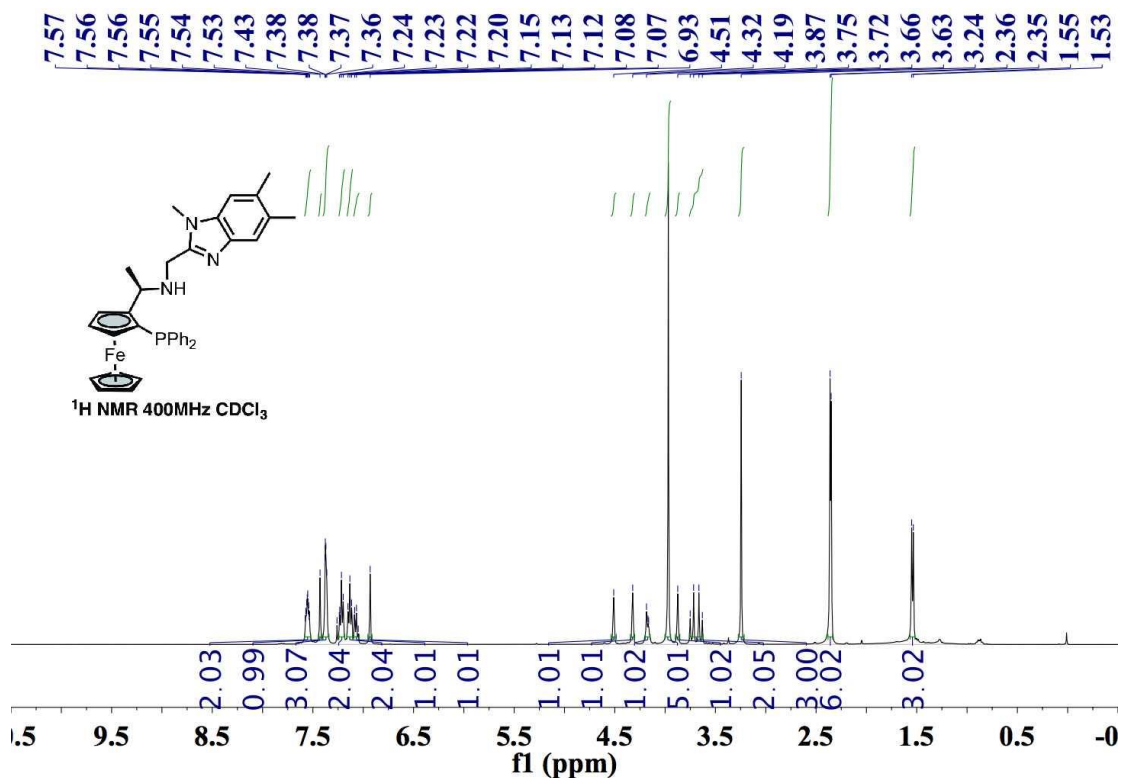


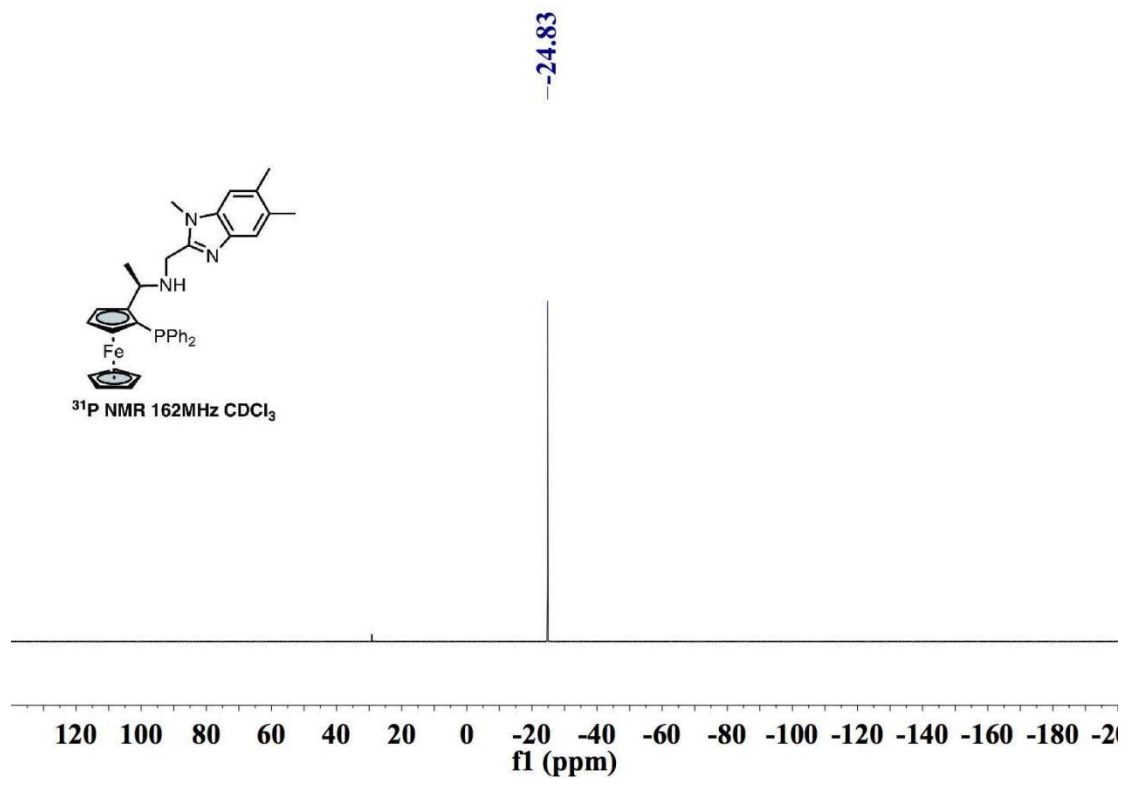
**(R<sub>c</sub>, S<sub>p</sub>)-N-((1H-Benzo[d]imidazol-2-yl)methyl)-1-(2-diphenylphosphino)-ferrocenylethylamine (L4)**



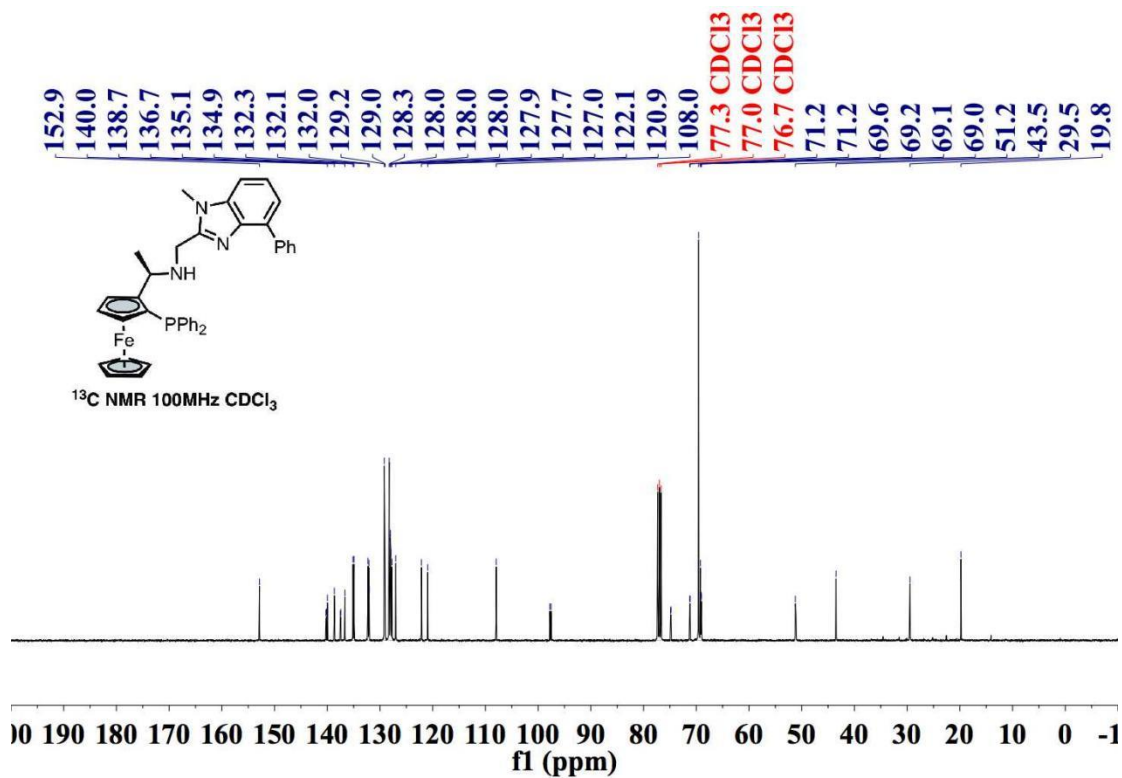
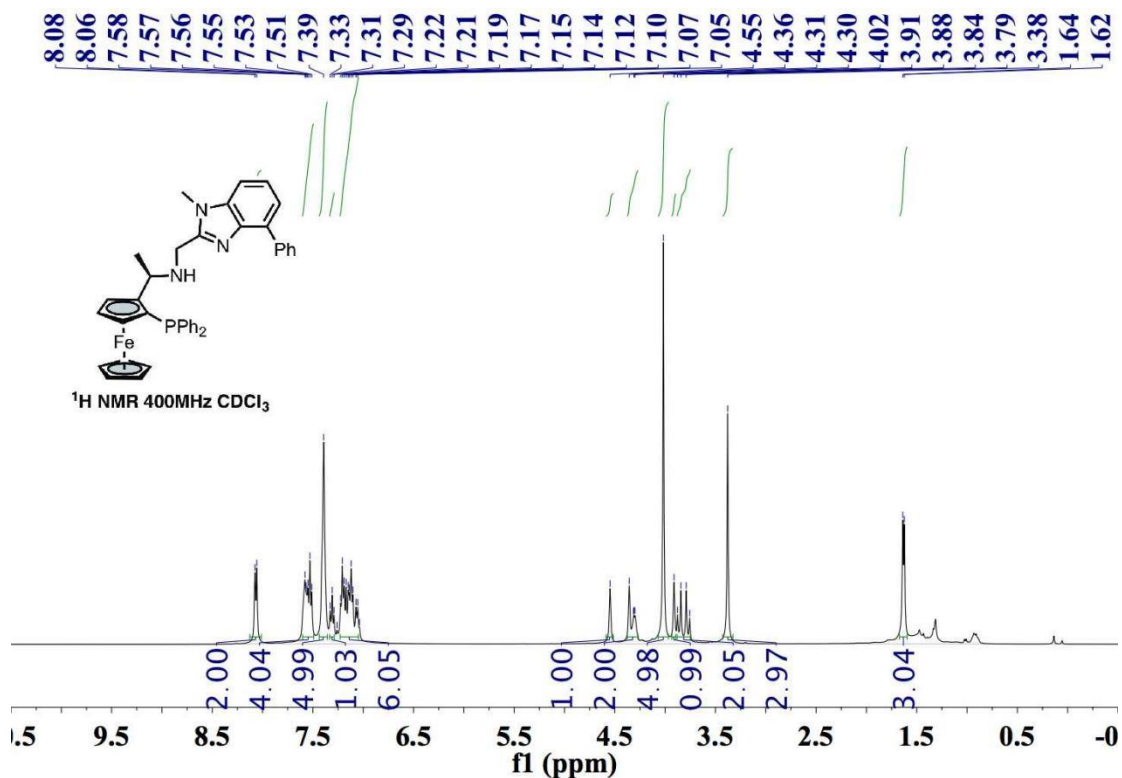


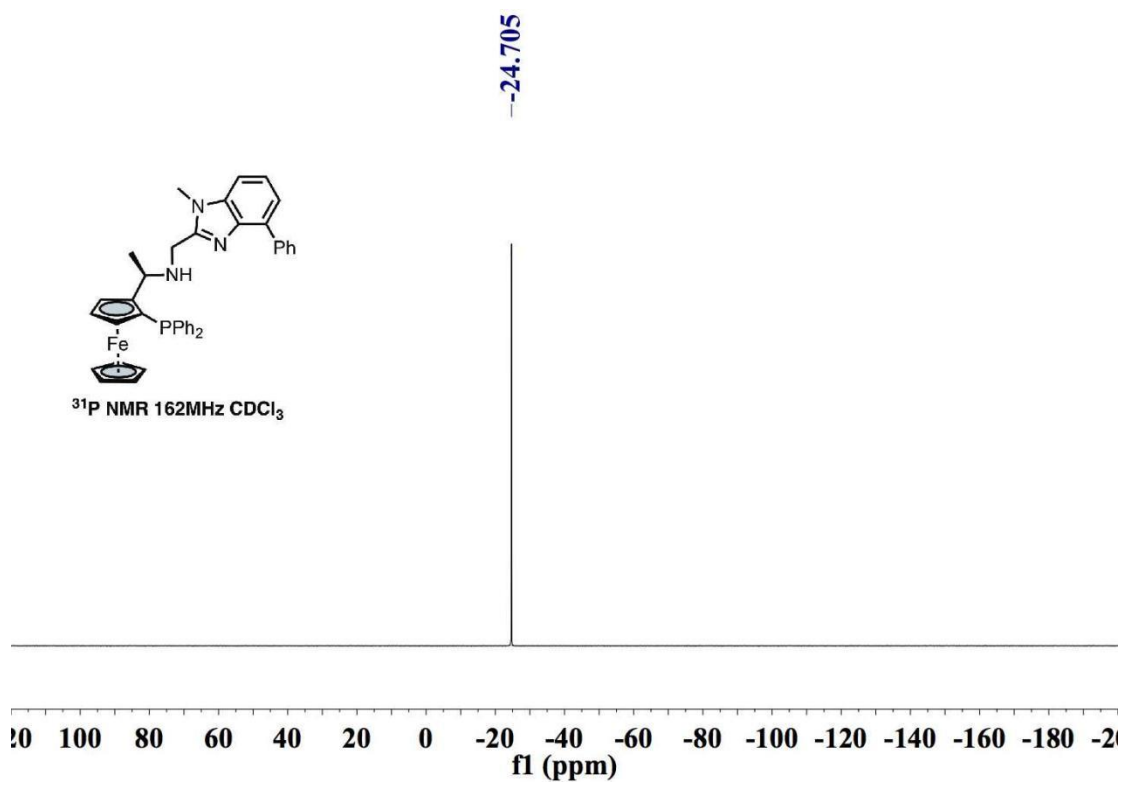
**(*Rc, Sp*)-*N*-((1,2,5,6-Tetramethyl-1*H*-benzo[d]imidazol-2-yl)methyl)-1-(2-diphenylphosphino)-ferrocenylethylamine (L5)**





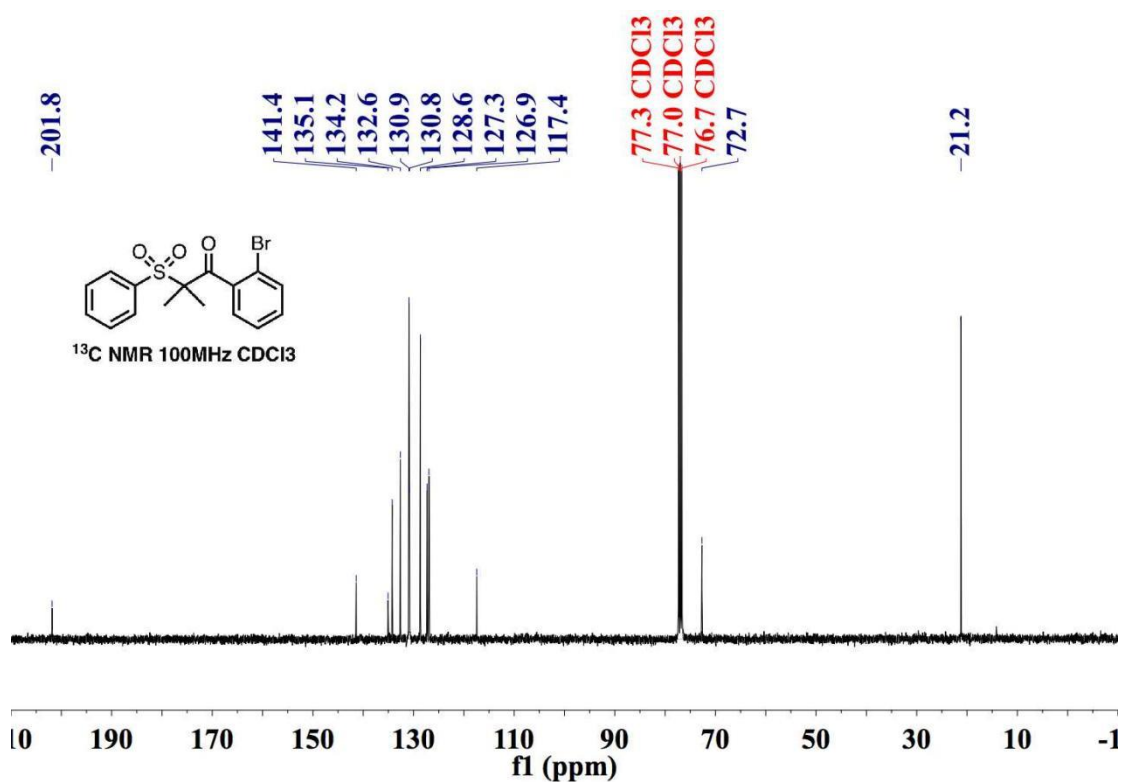
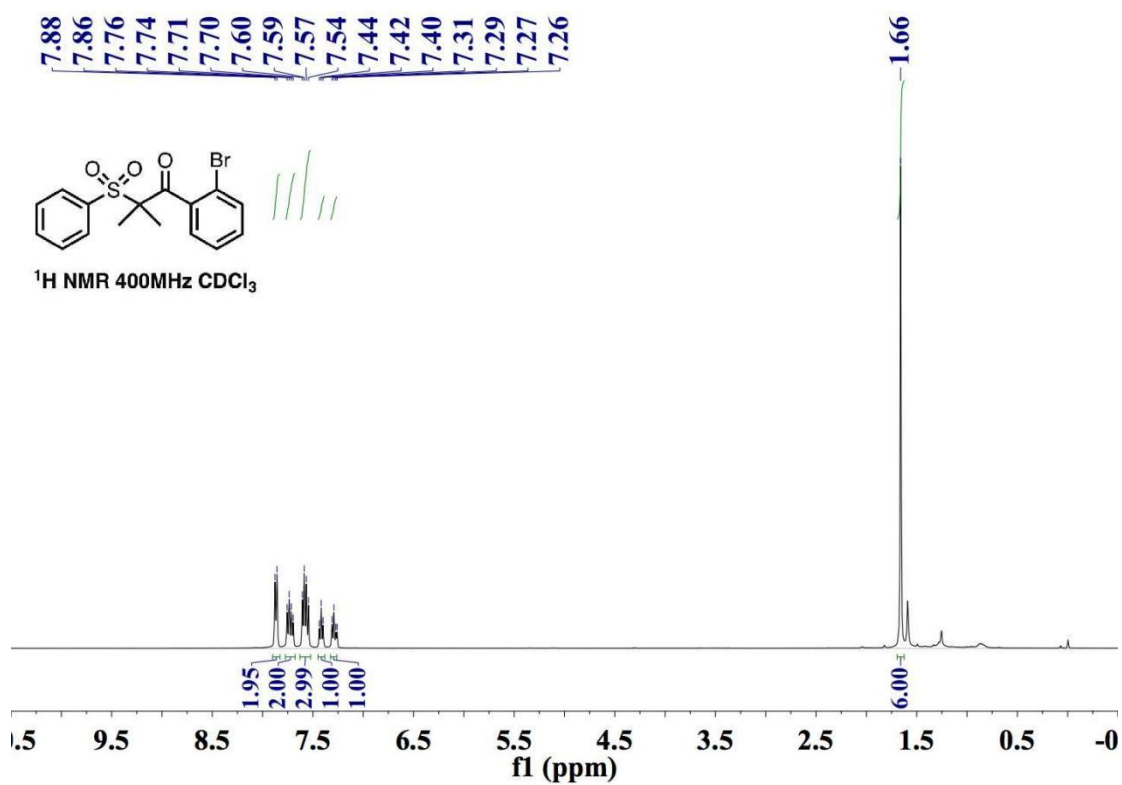
**(*Rc, Sp*)-*N*-((1,2-Dimethyl-4-phenyl-1*H*-benzo[d]imidazol-2-yl)methyl)-1-(2-diphenylphosphino)-ferrocenylethylamine (L6)**



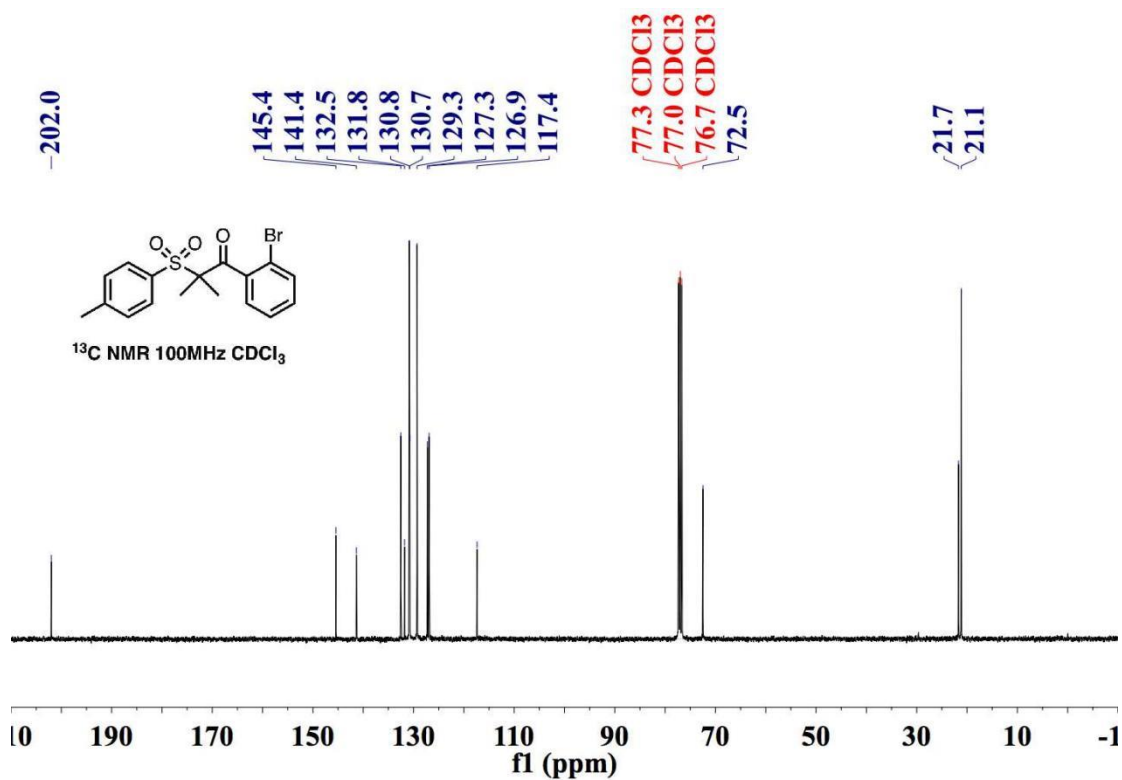
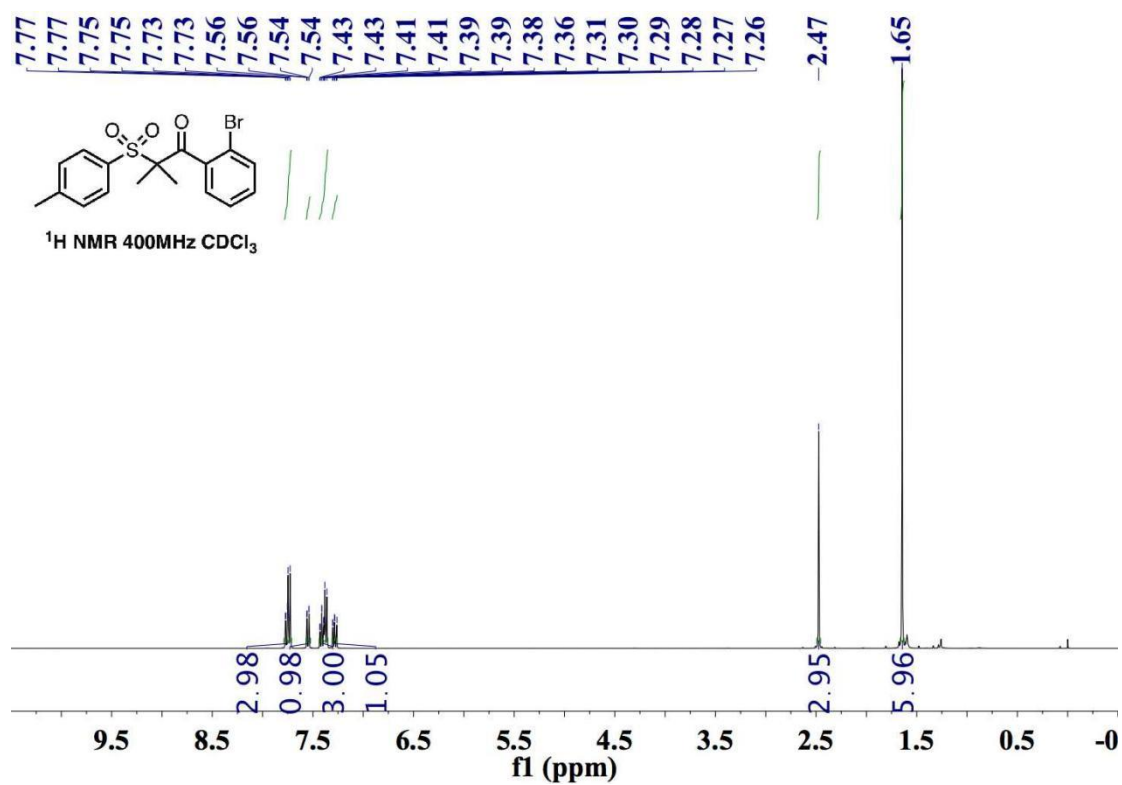




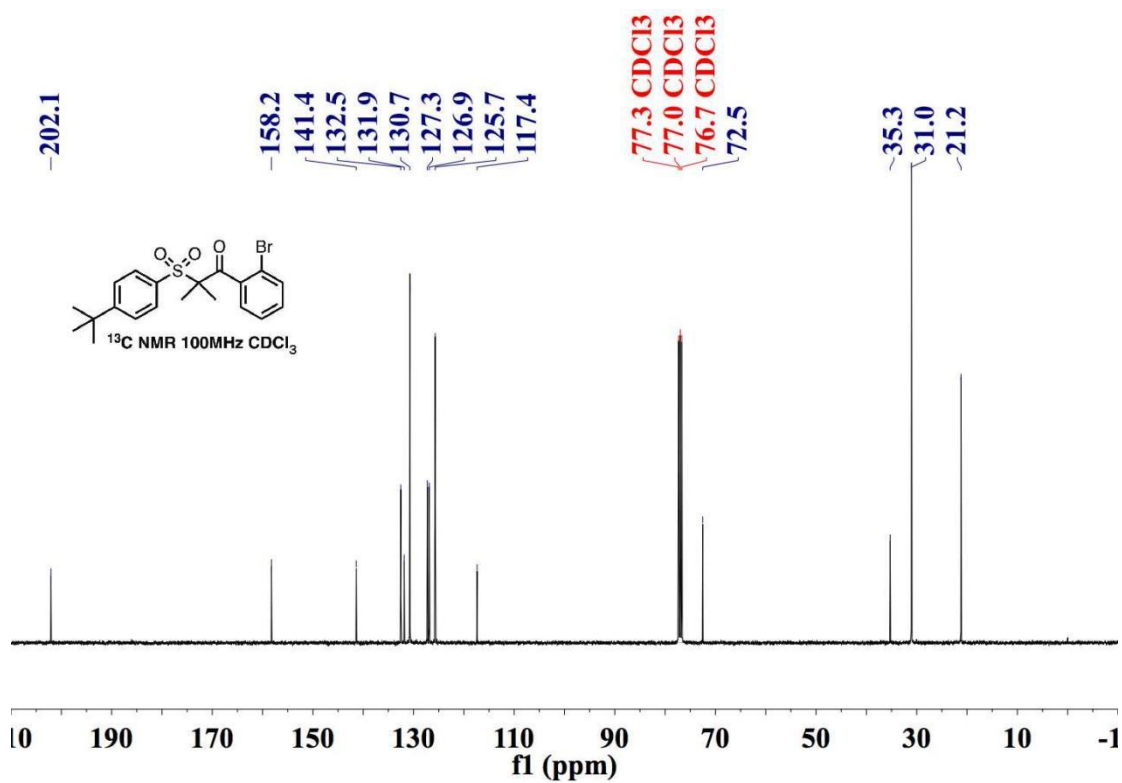
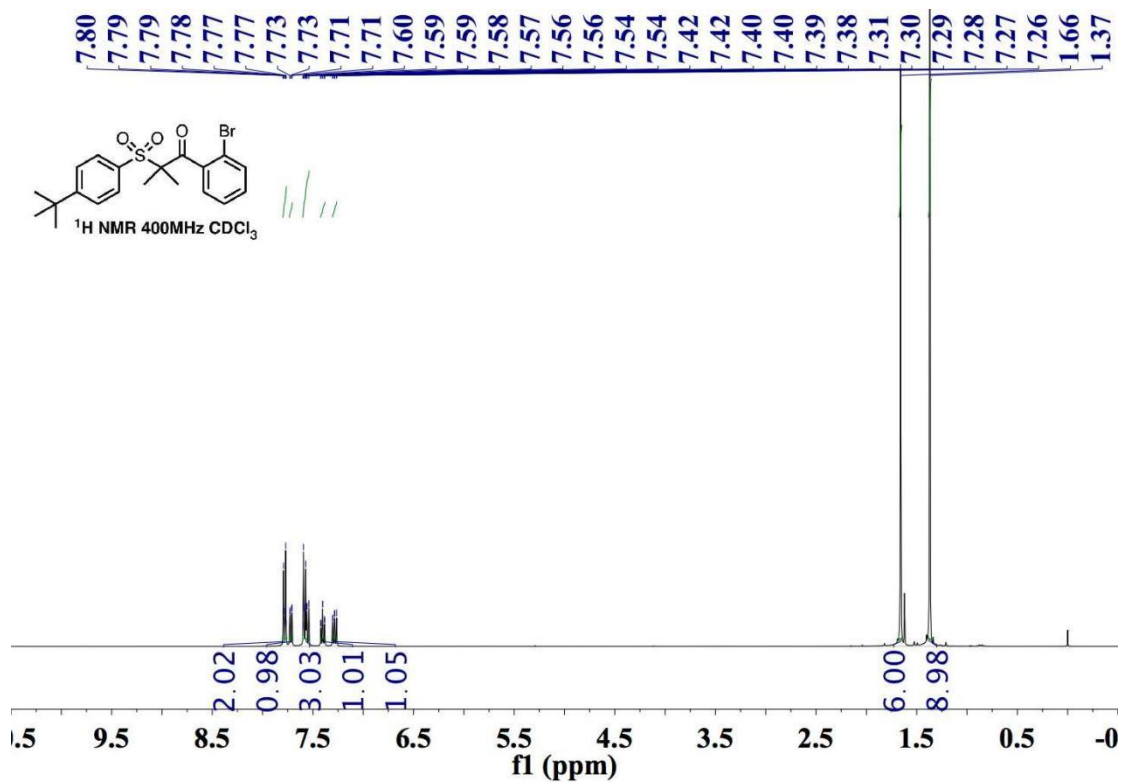
**1-(2-Bromophenyl)-2-methyl-2-(phenylsulfonyl)propan-1-one (1a):**



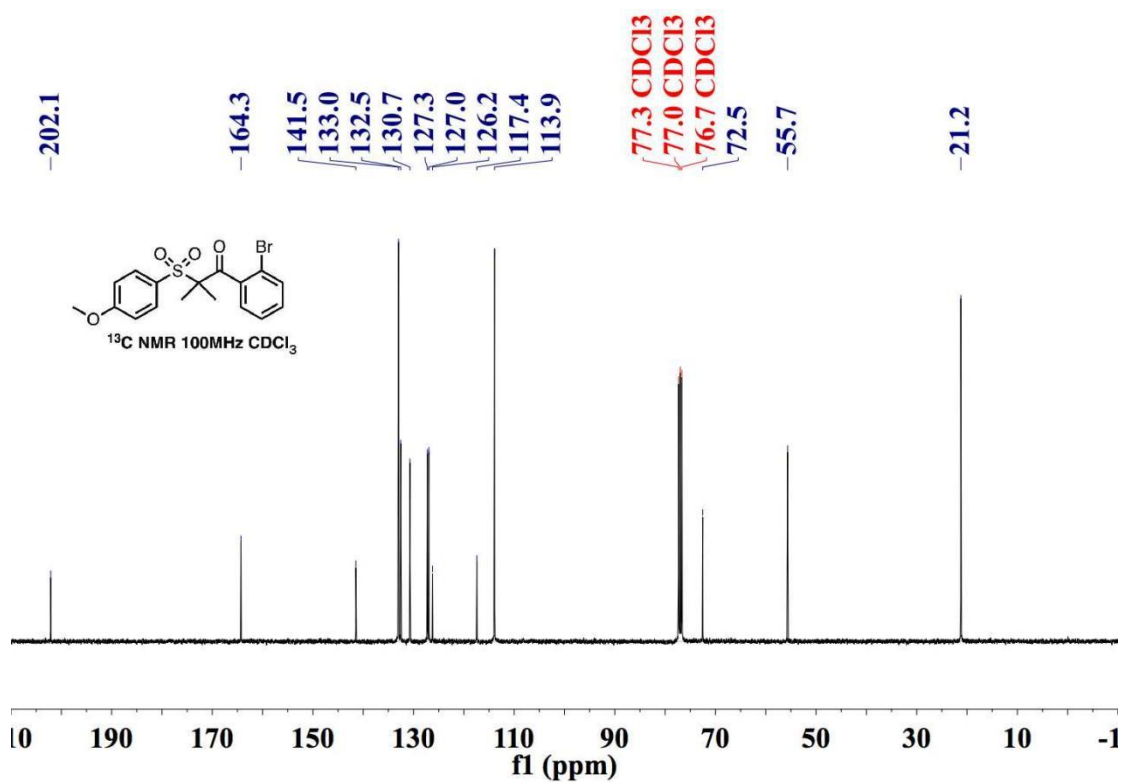
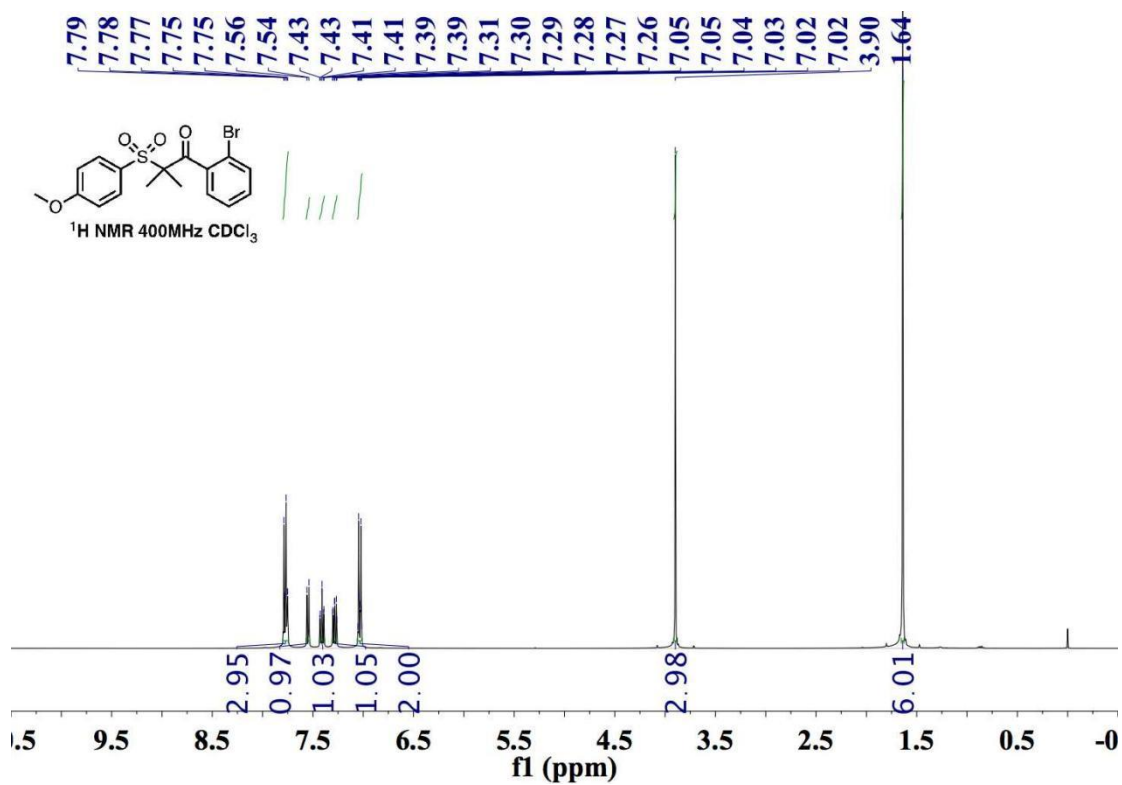
**1-(2-Bromophenyl)-2-methyl-2-tosylpropan-1-one (1b):**



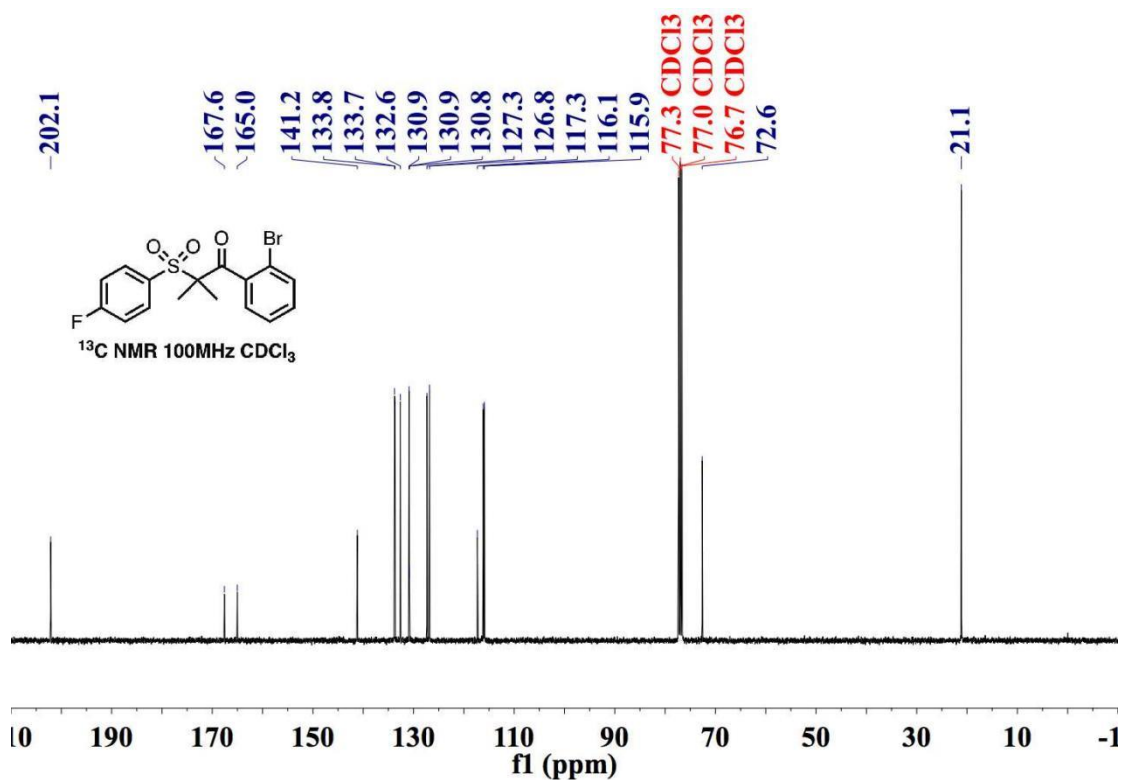
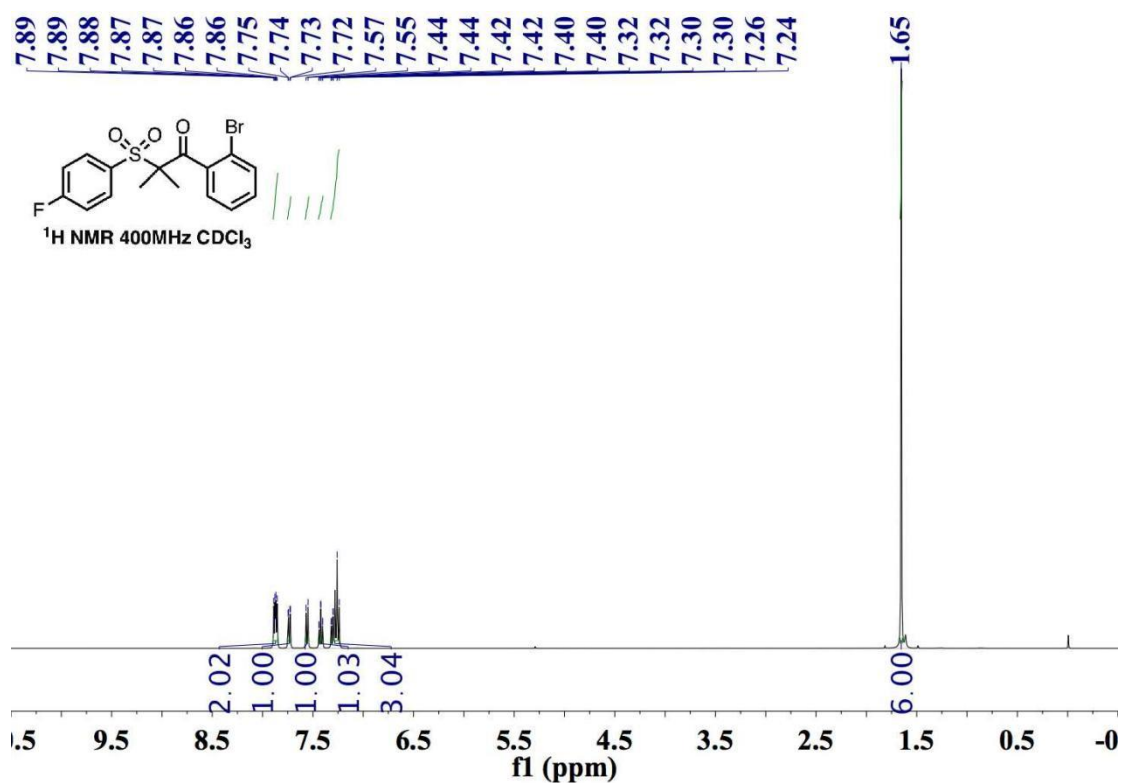
**1-(2-Bromophenyl)-2-((4-(tert-butyl)phenyl)sulfonyl)-2-methylpropan-1-one (1c):**

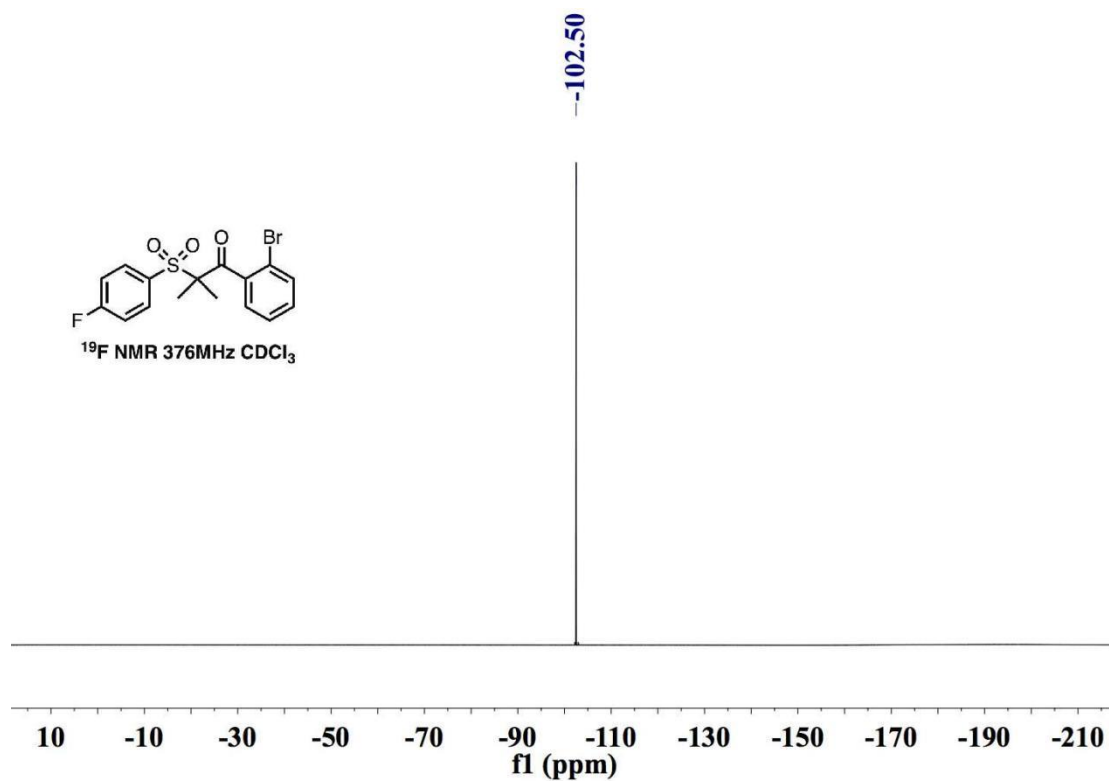
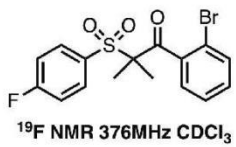


**1-(2-Bromophenyl)-2-((4-methoxyphenyl)sulfonyl)-2-methyl-propan-1-one (1d):**

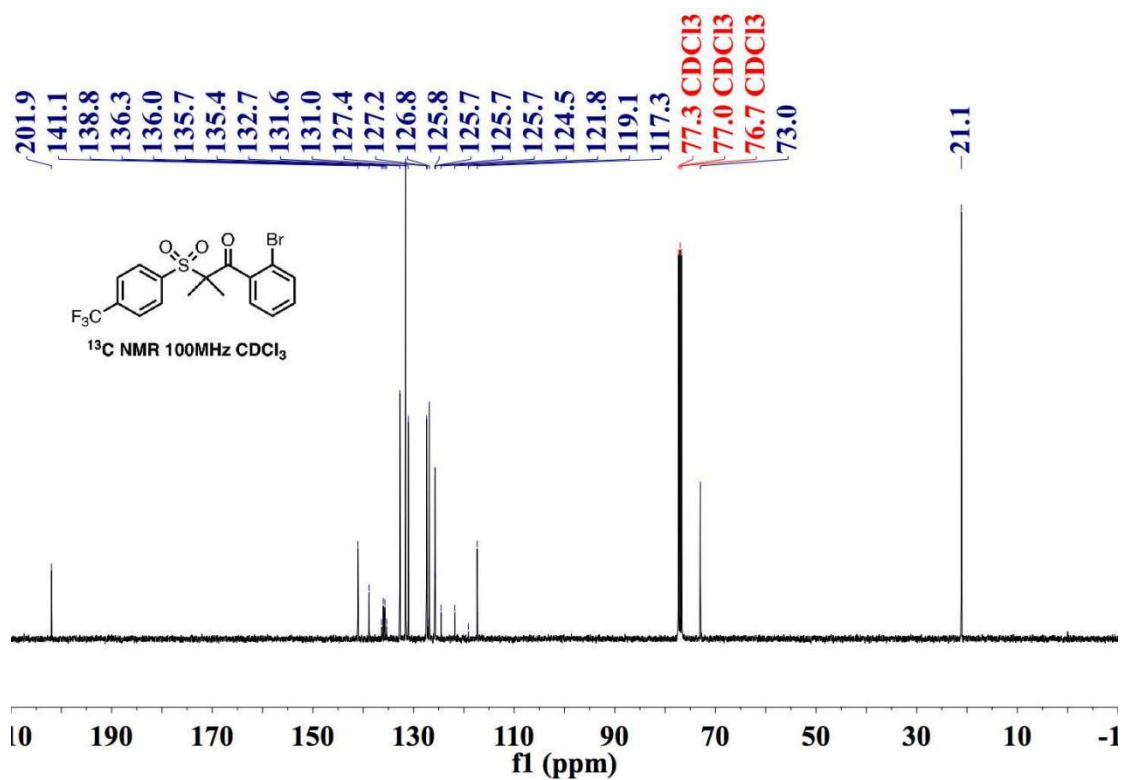
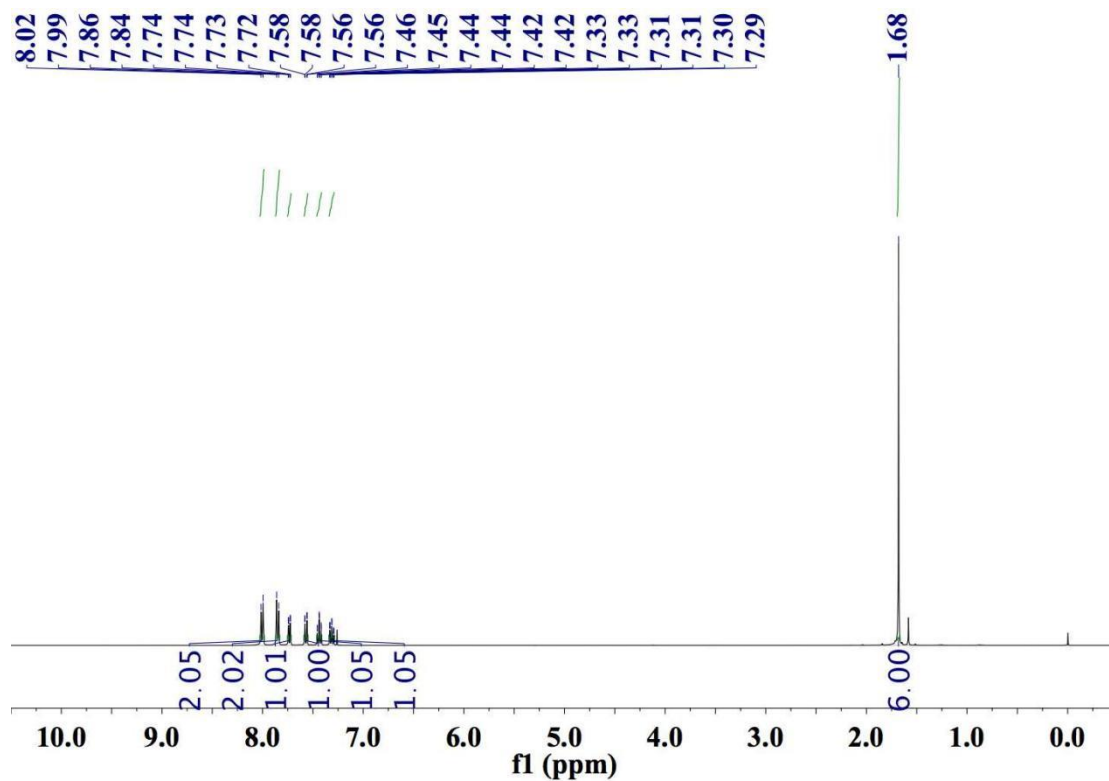


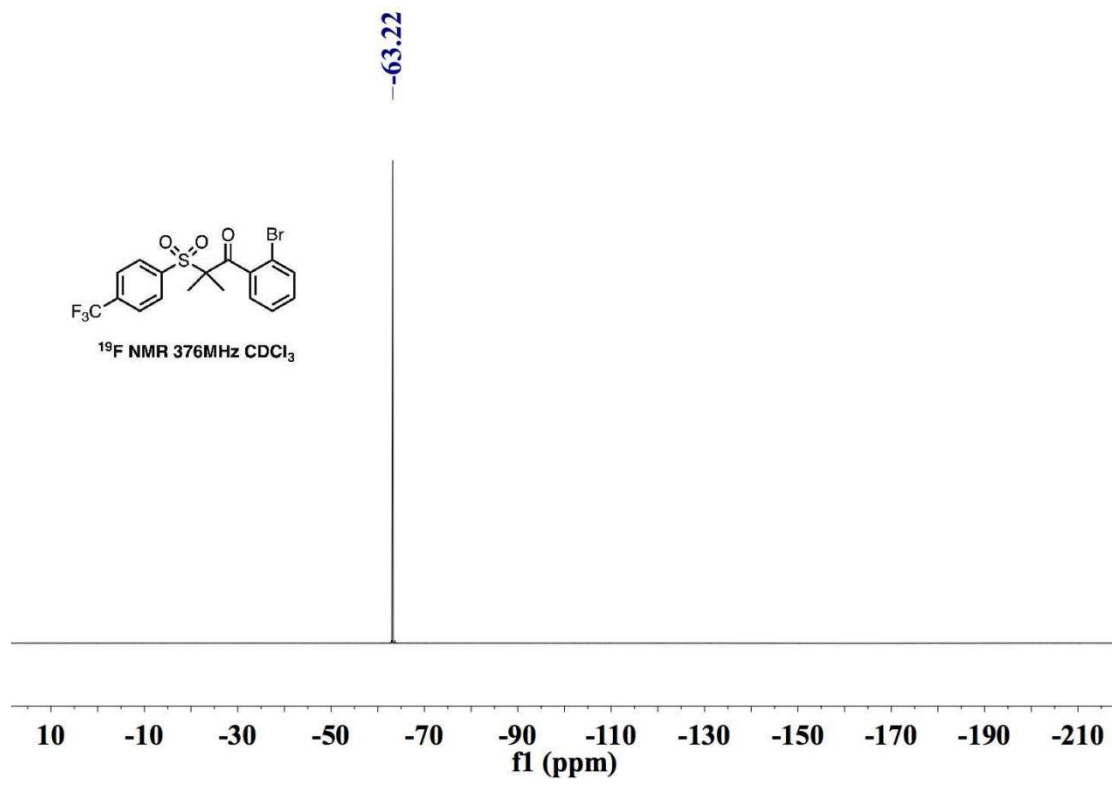
1-(2-Bromophenyl)-2-((4-fluorophenyl)sulfonyl)-2-methylpropan-1-one (1e):





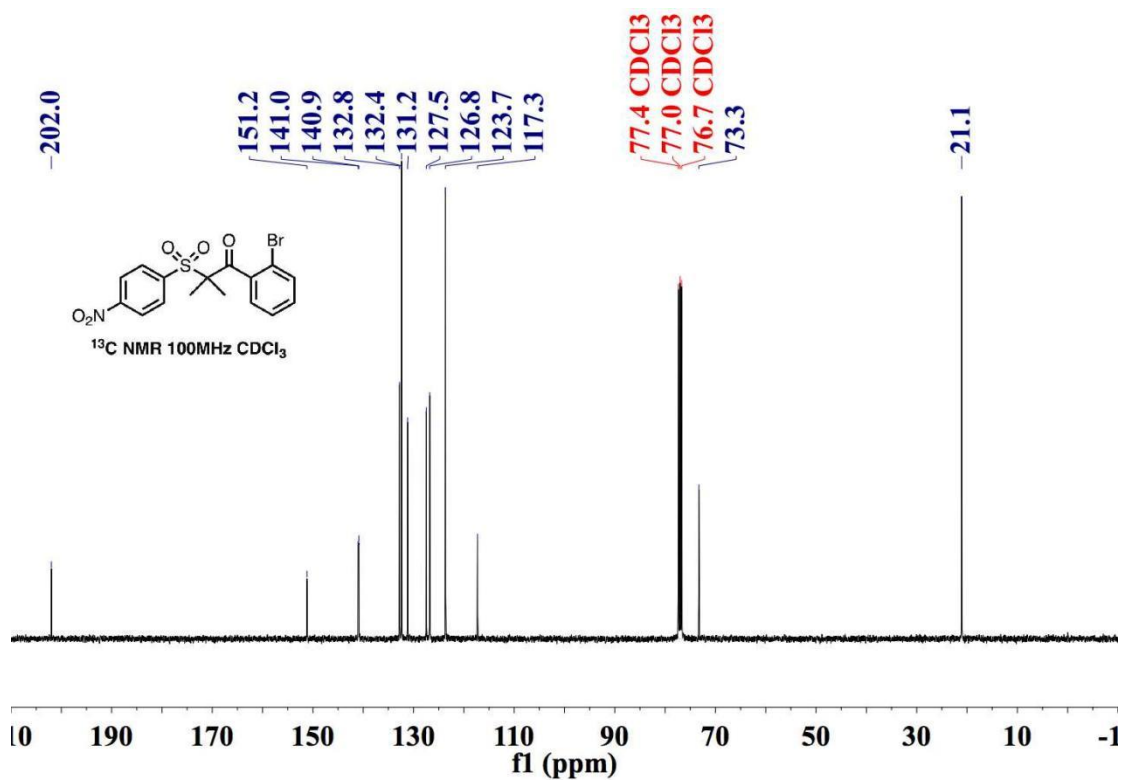
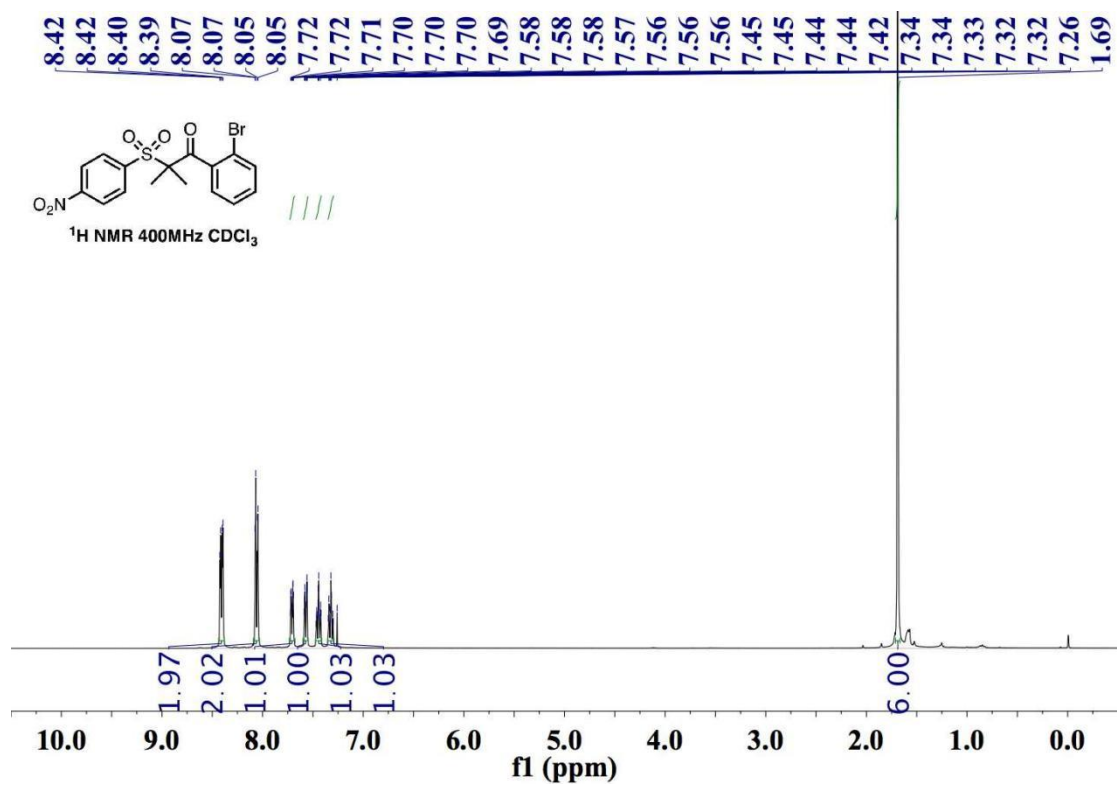
**1-(2-Bromophenyl)-2-methyl-2-((4-(trifluoromethyl)phenyl)sulfonyl)propan-1-one (1f):**



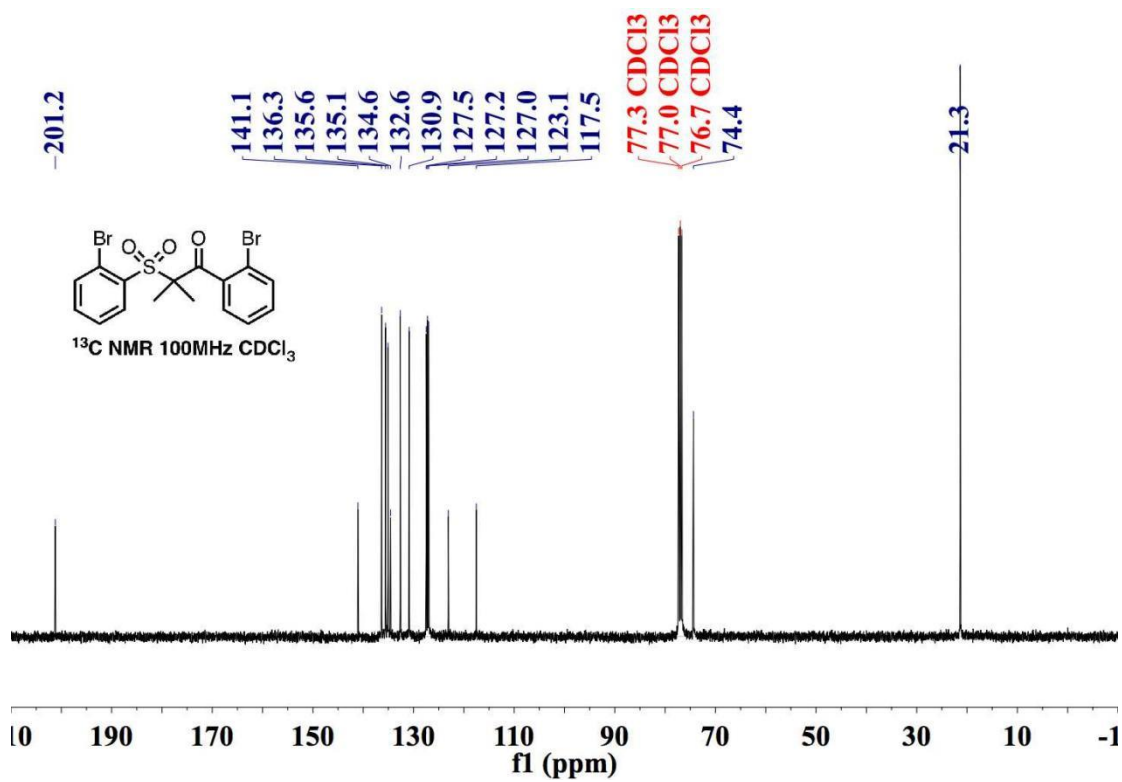
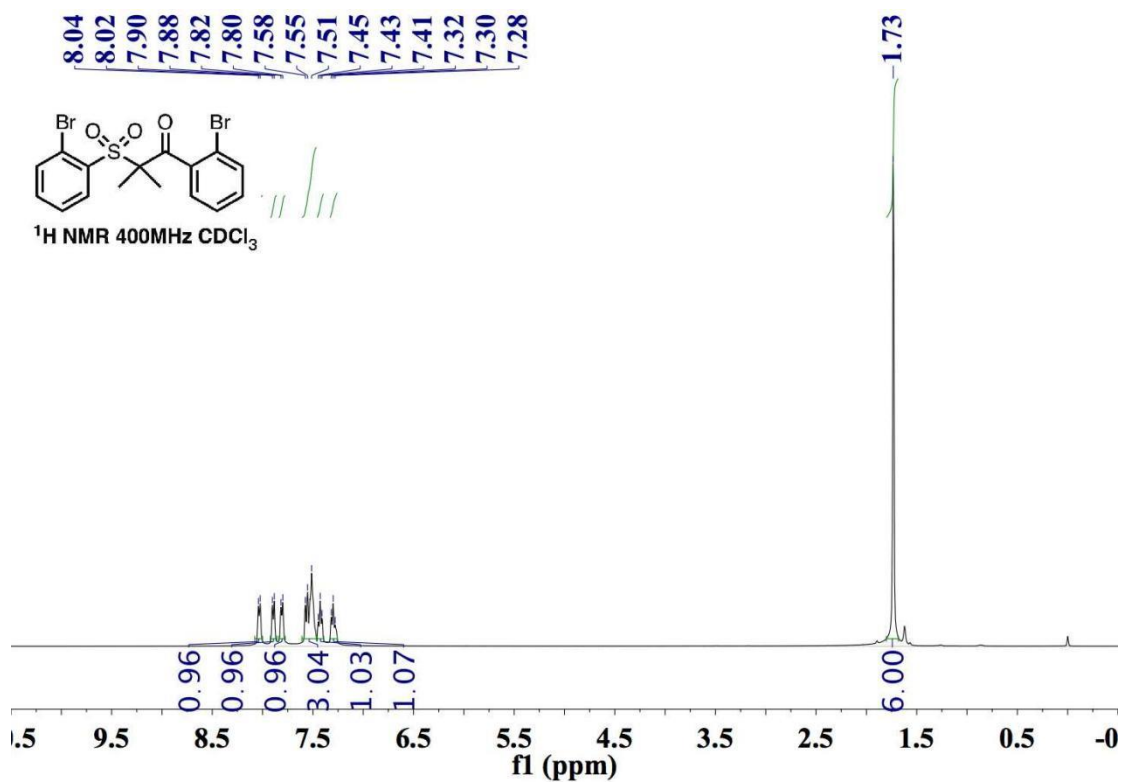




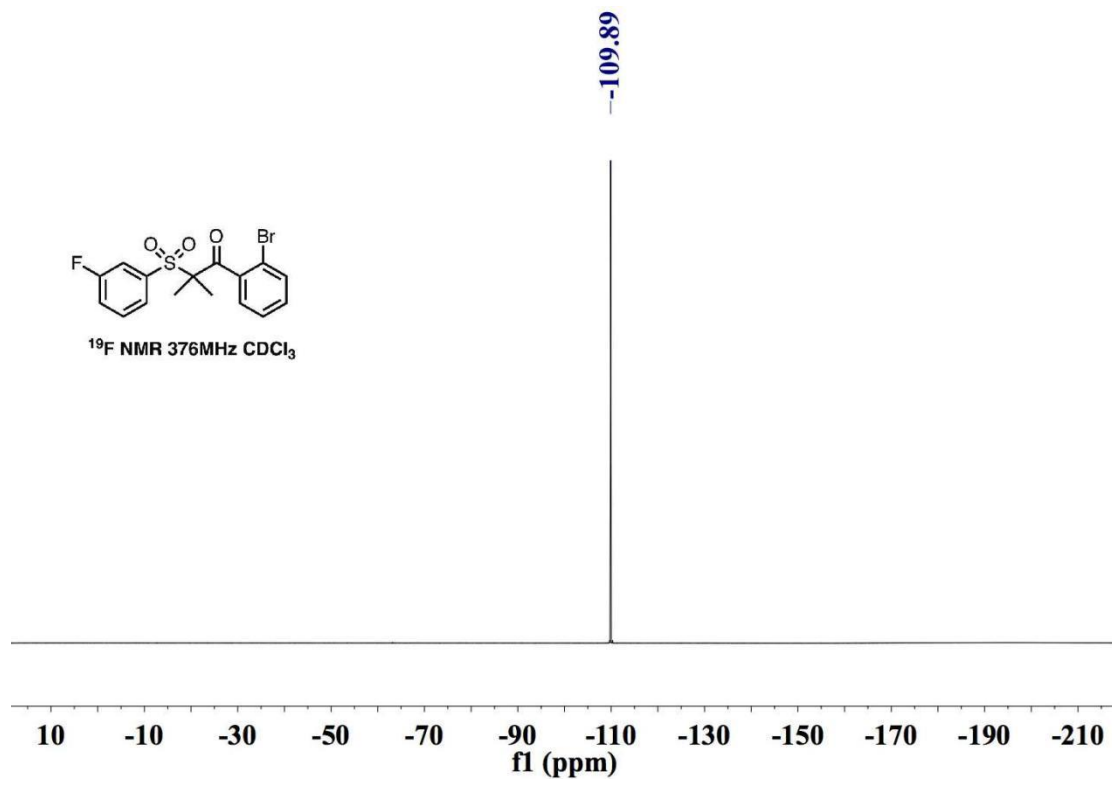
**1-(2-Bromophenyl)-2-methyl-2-((4-nitrophenyl)sulfonyl)propan-1-one (1g):**



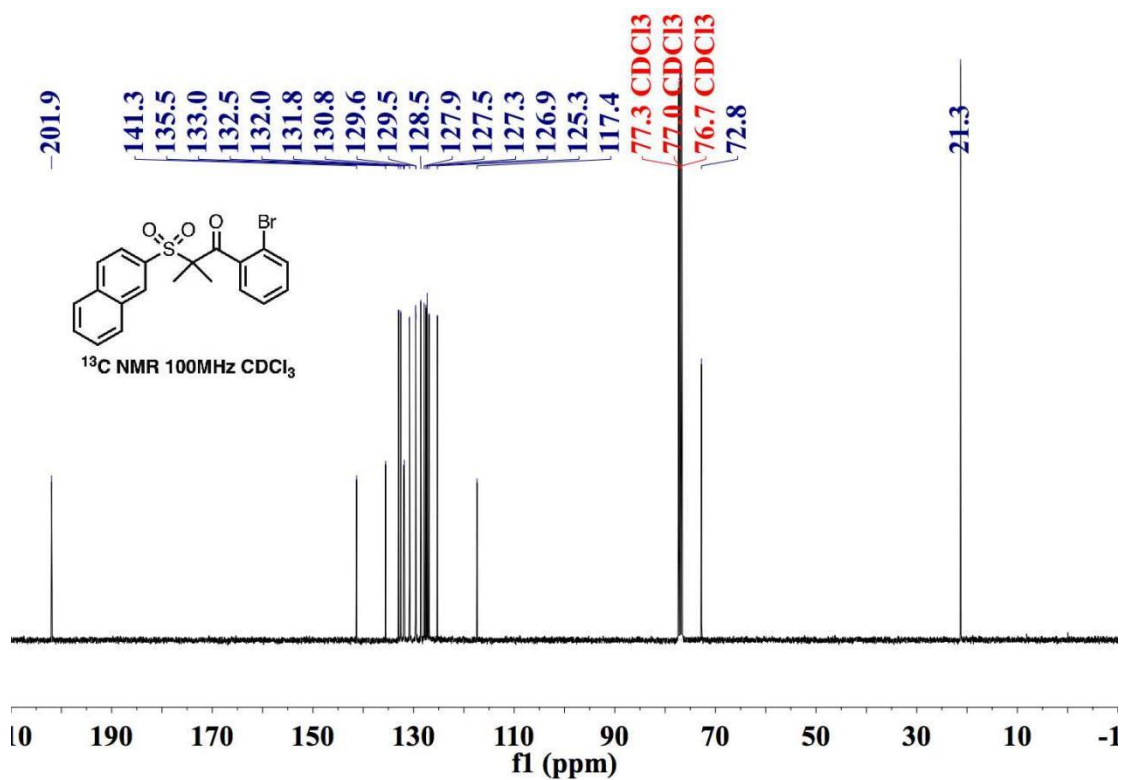
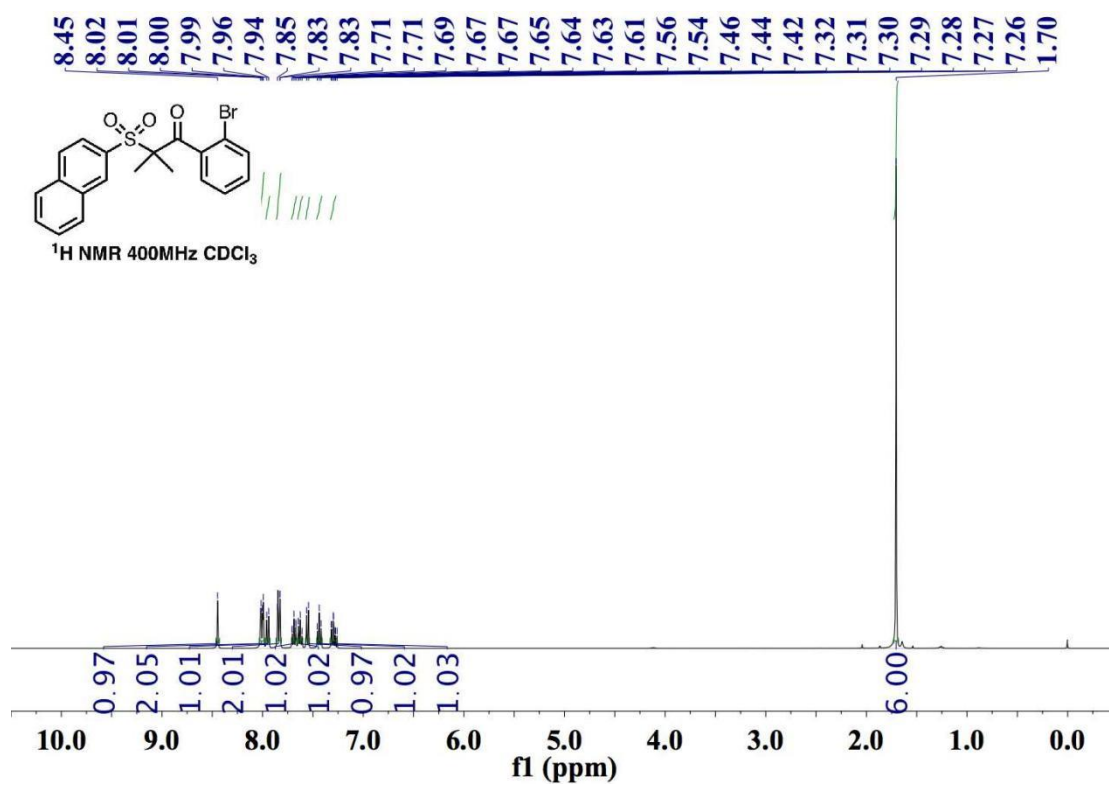
1-(2-Bromophenyl)-2-((2-bromophenyl)sulfonyl)-2-methylpropan-1-one (1h):



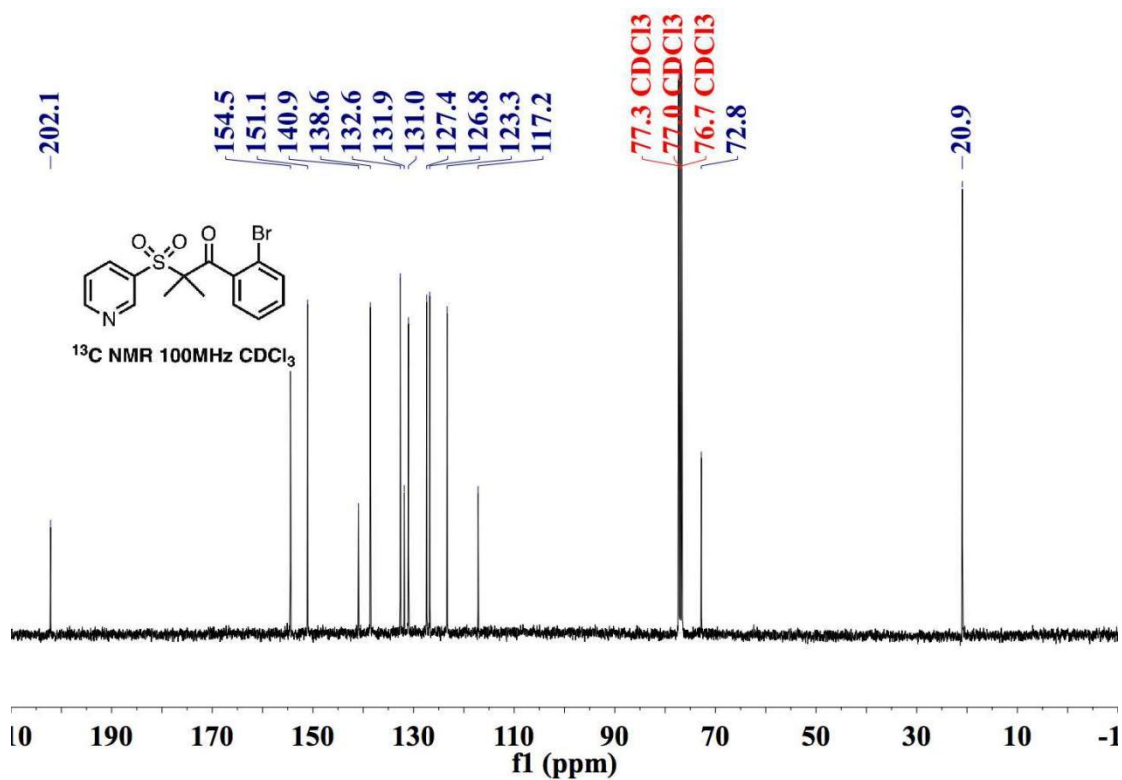
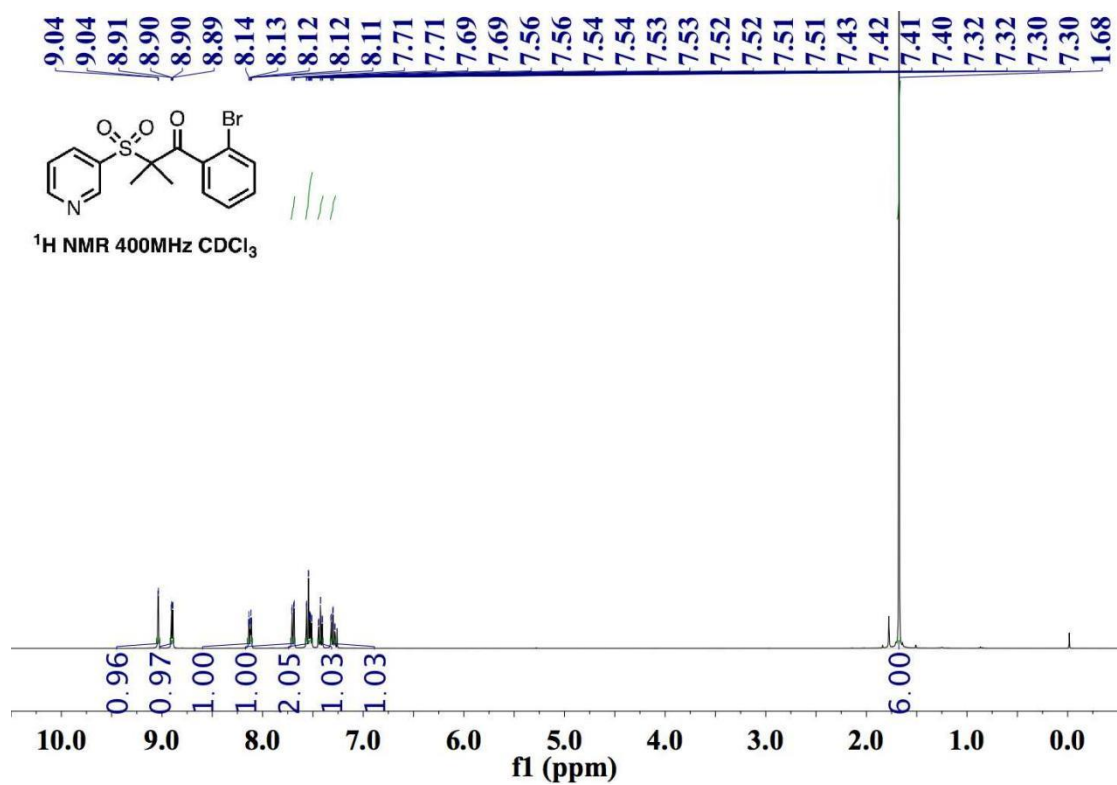




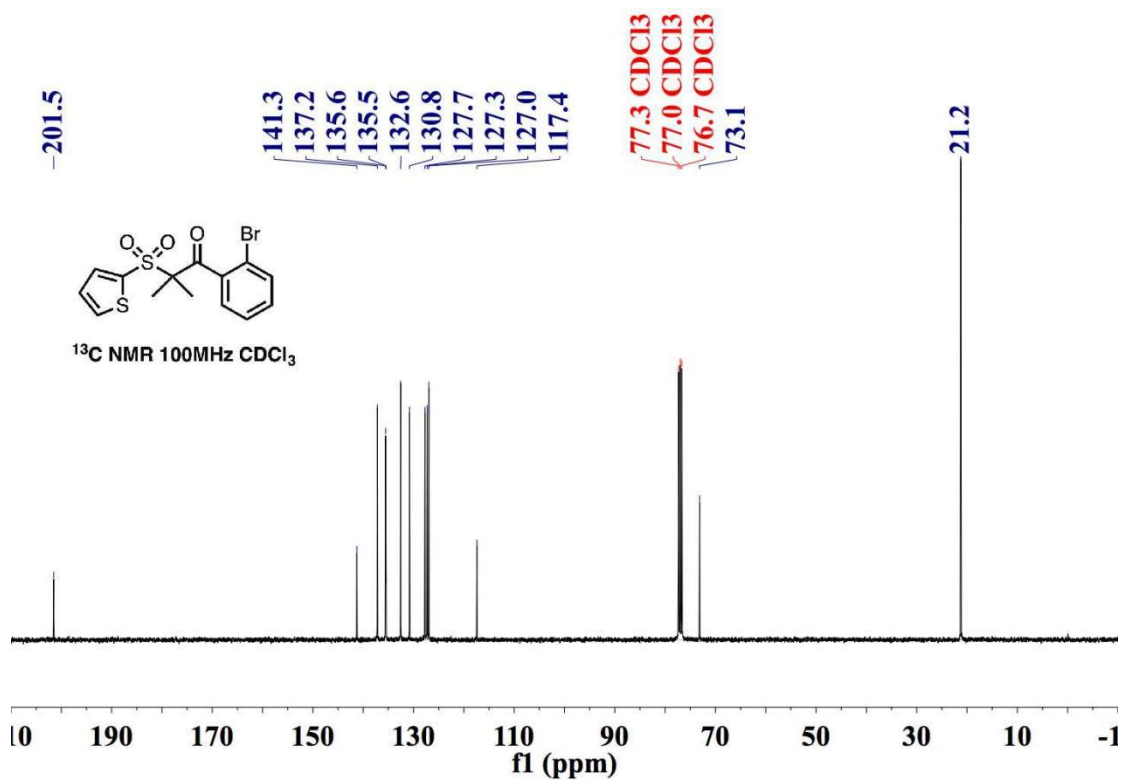
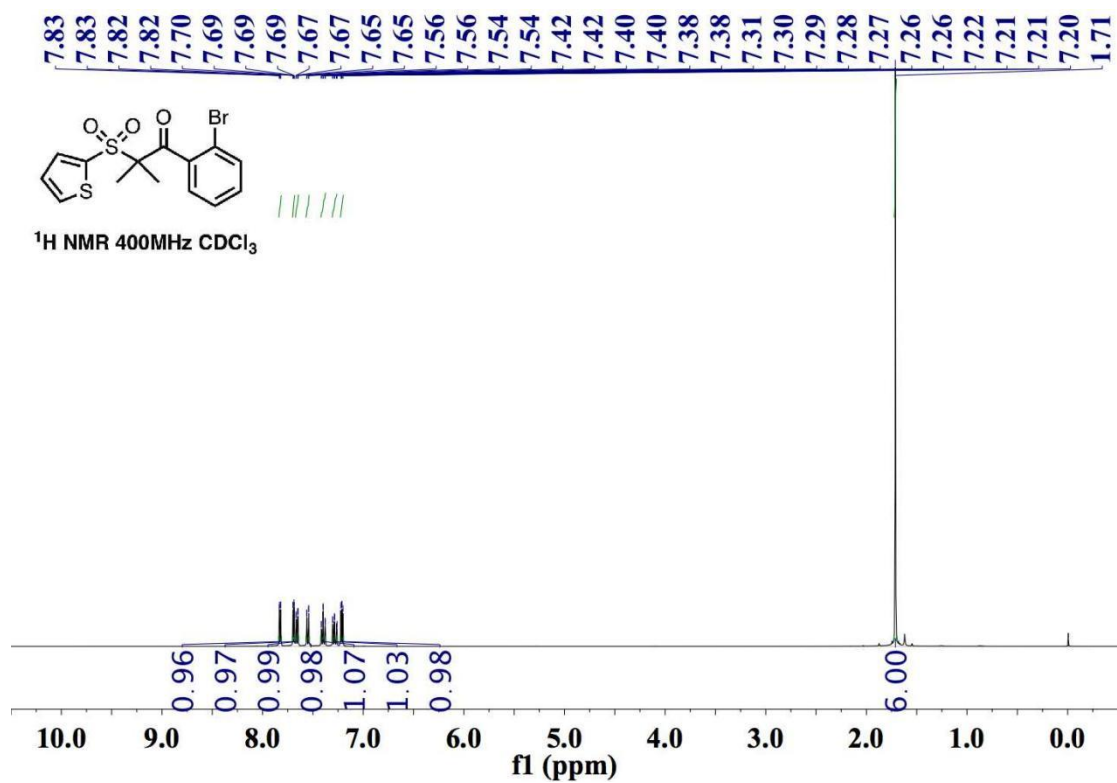
**1-(2-Bromophenyl)-2-methyl-2-(naphthalen-2-ylsulfonyl)propan-1-one (1j):**



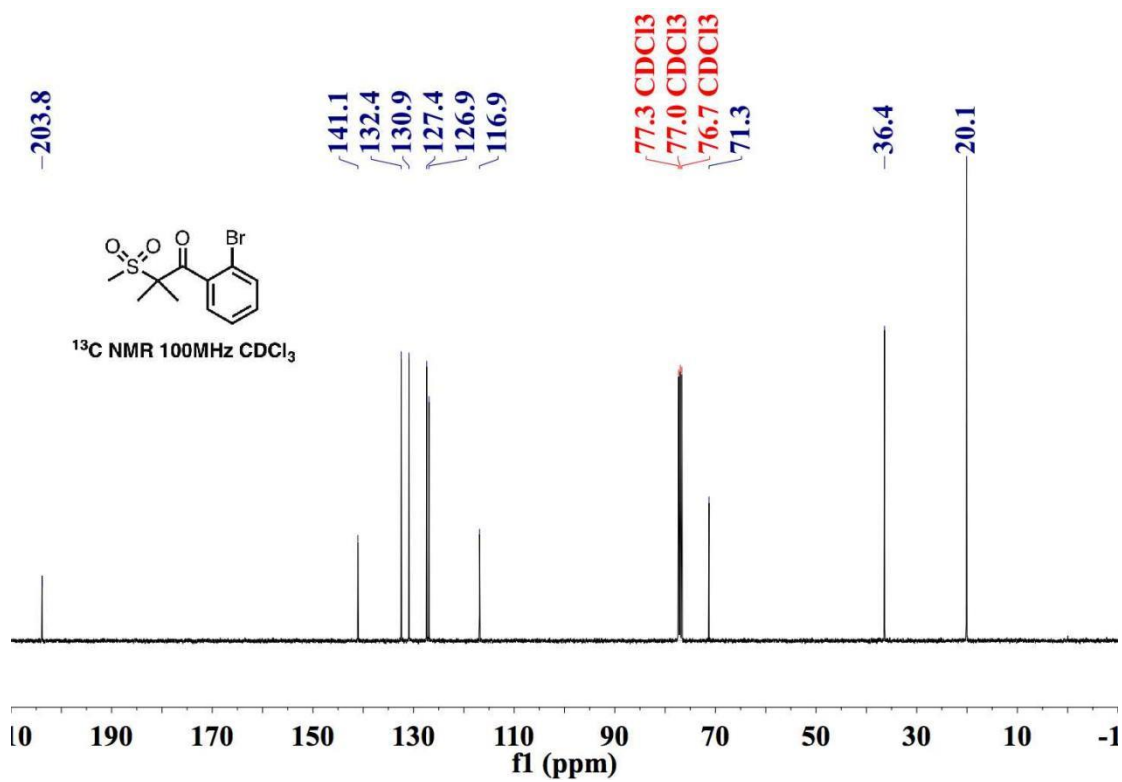
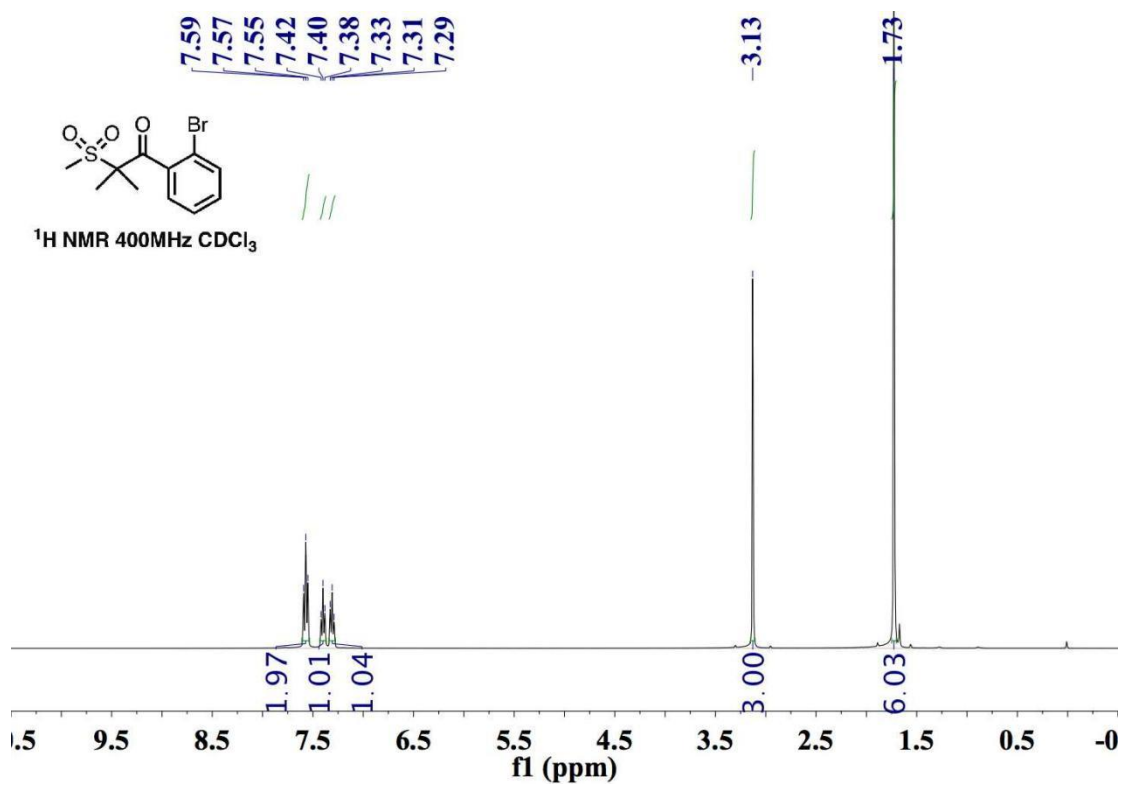
**1-(2-Bromophenyl)-2-methyl-2-(pyridin-3-ylsulfonyl)propan-1-one (1k):**



**1-(2-Bromophenyl)-2-methyl-2-(thiophen-2-ylsulfonyl)propan-1-one (11):**

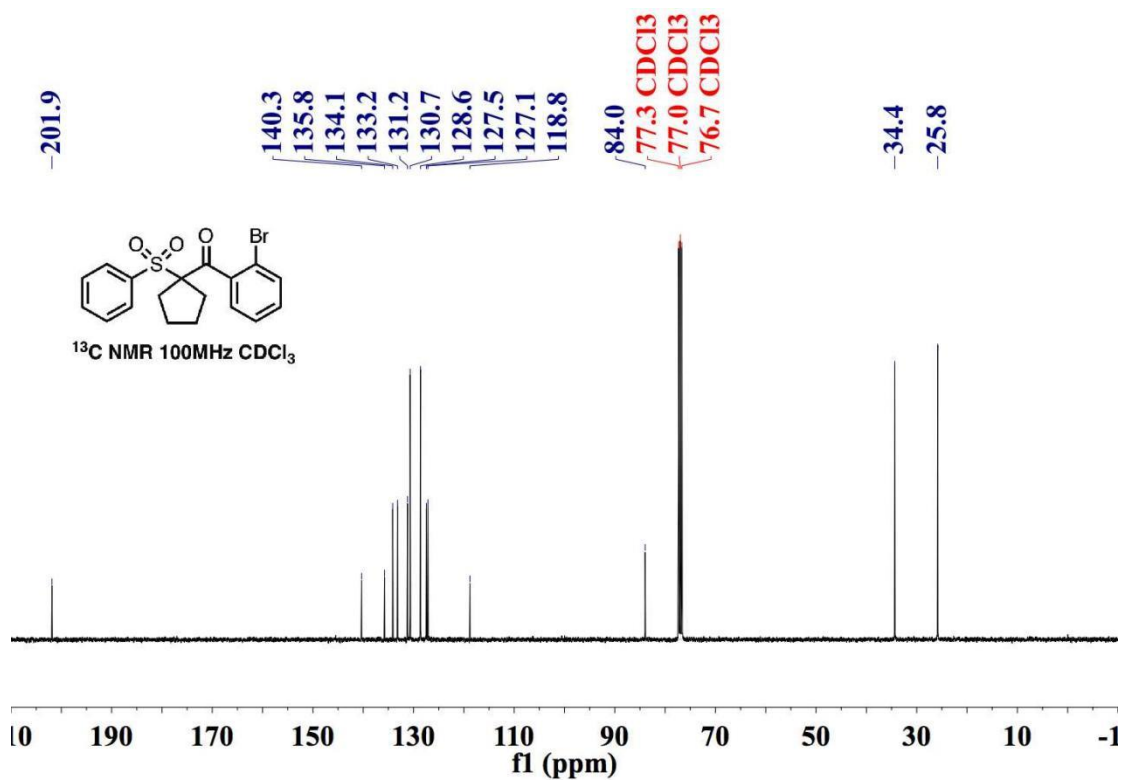
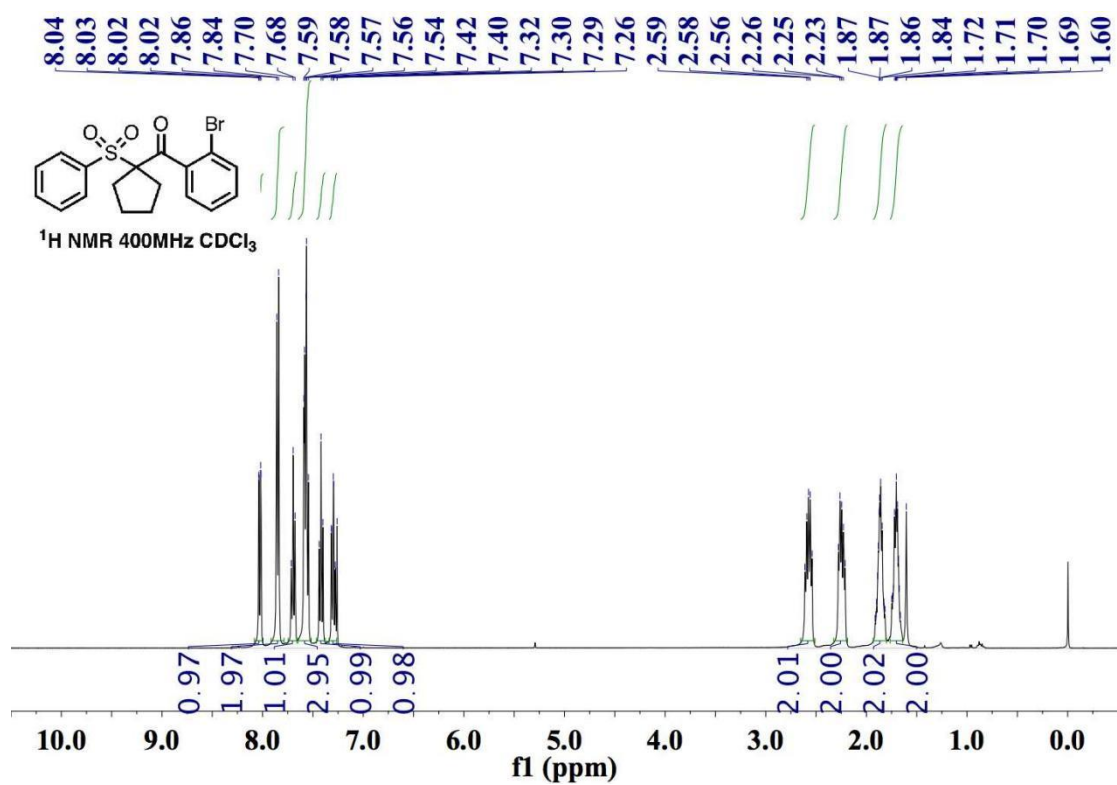


1-(2-Bromophenyl)-2-methyl-2-(methylsulfonyl)propan-1-one (1m):

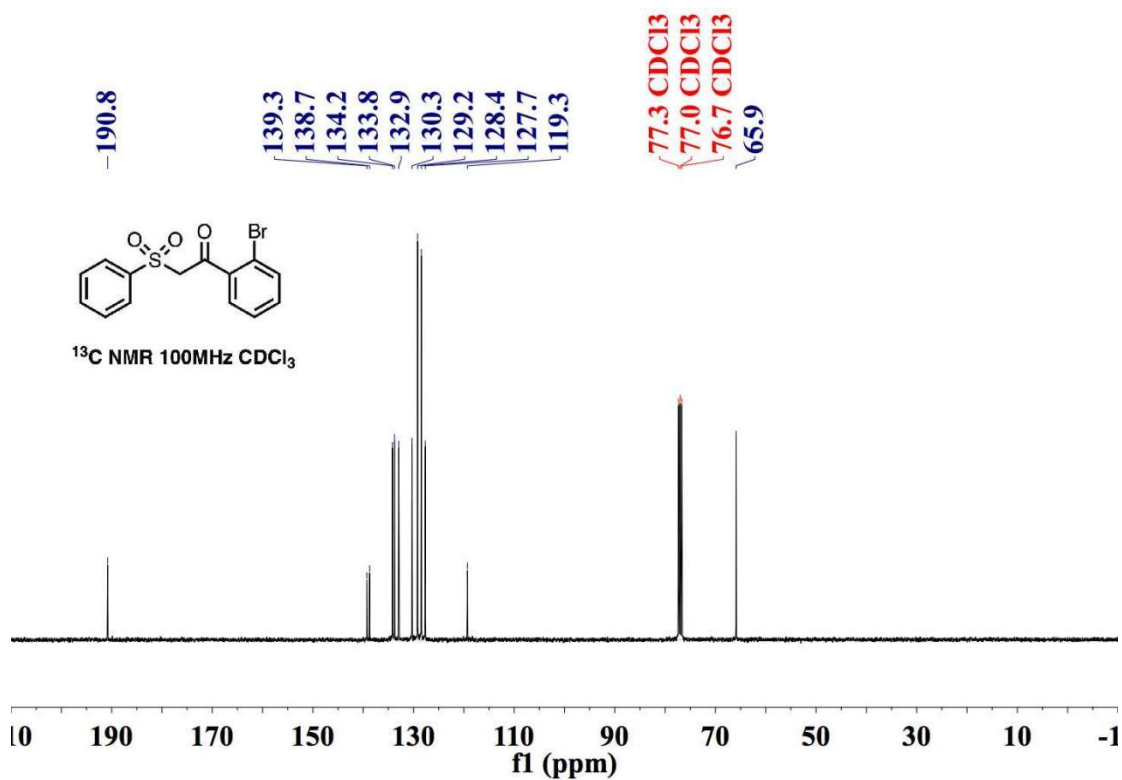
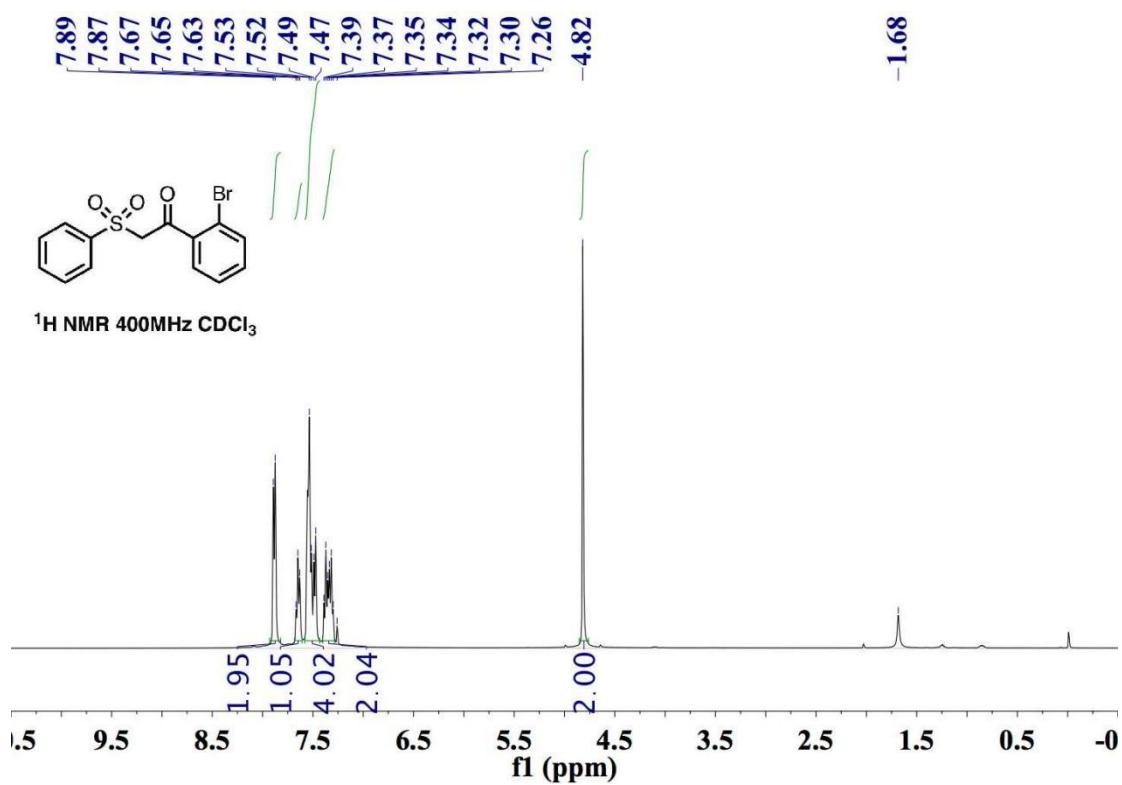




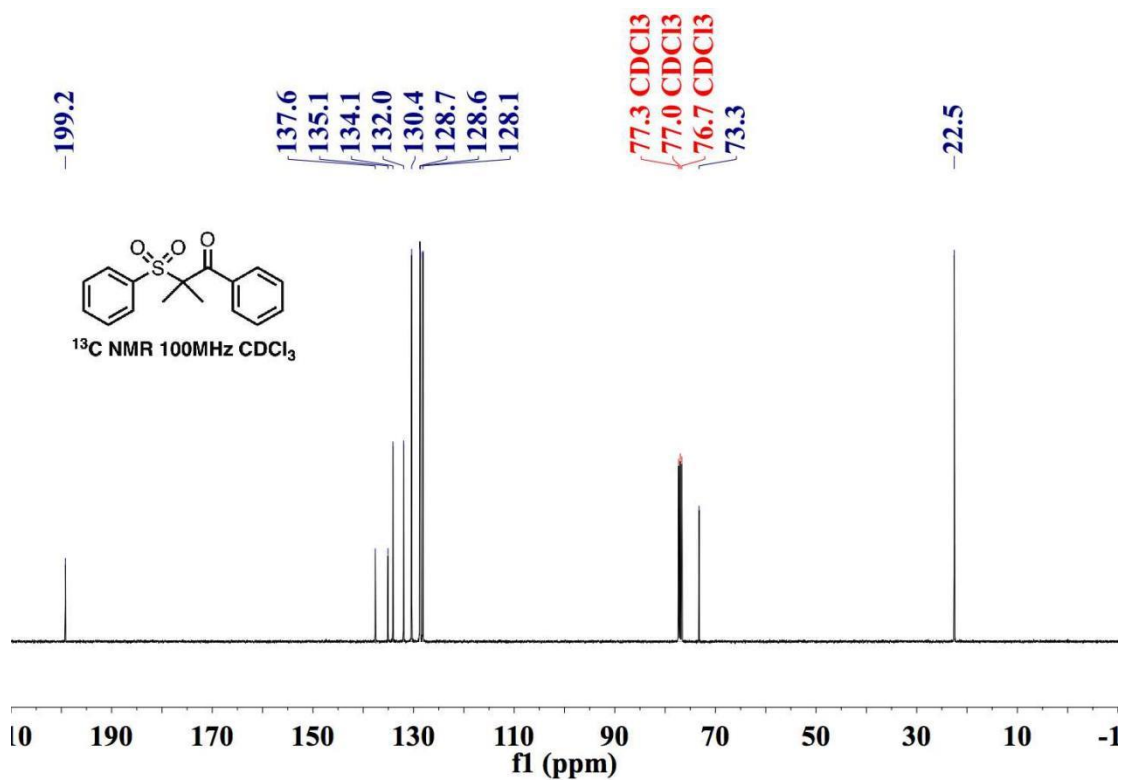
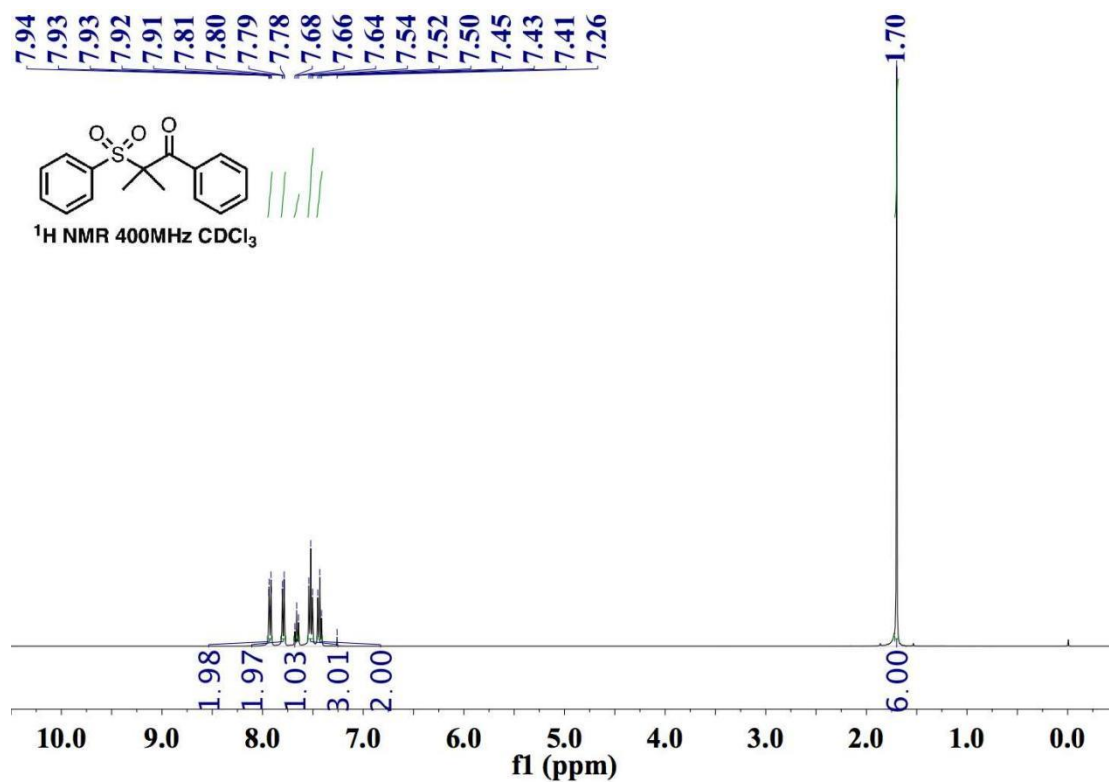
**(2-Bromophenyl)(1-(phenylsulfonyl)cyclopentyl)methanone (1n):**



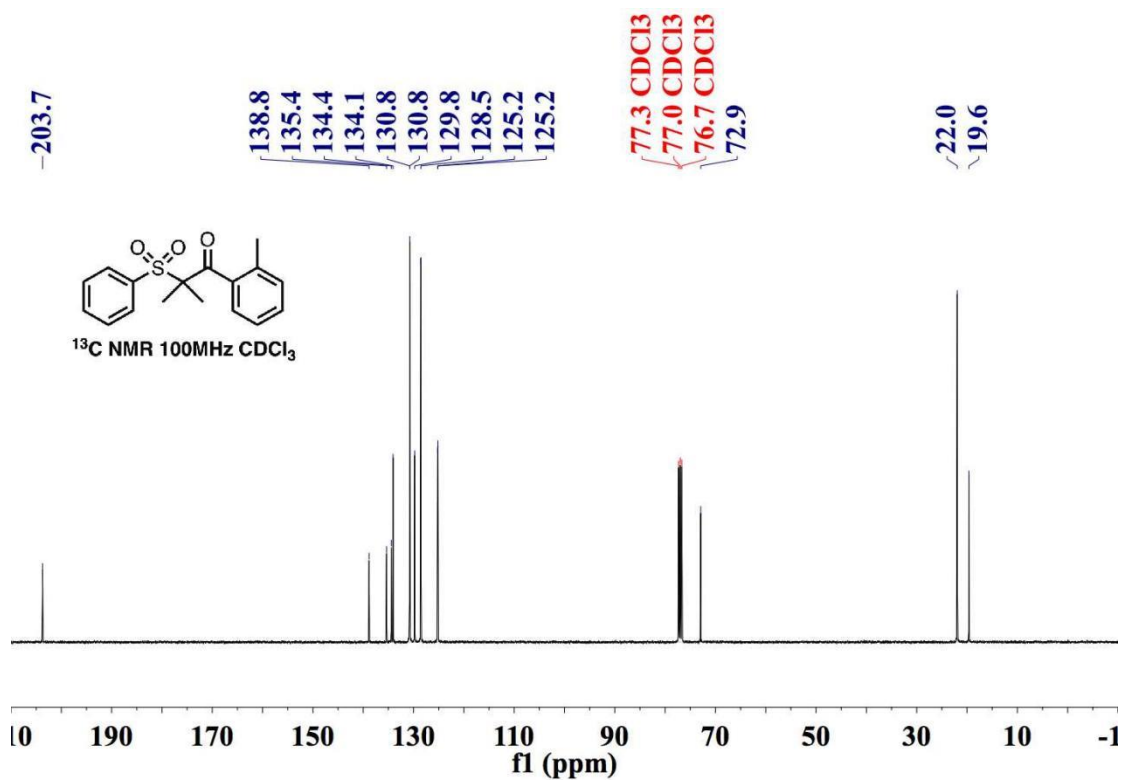
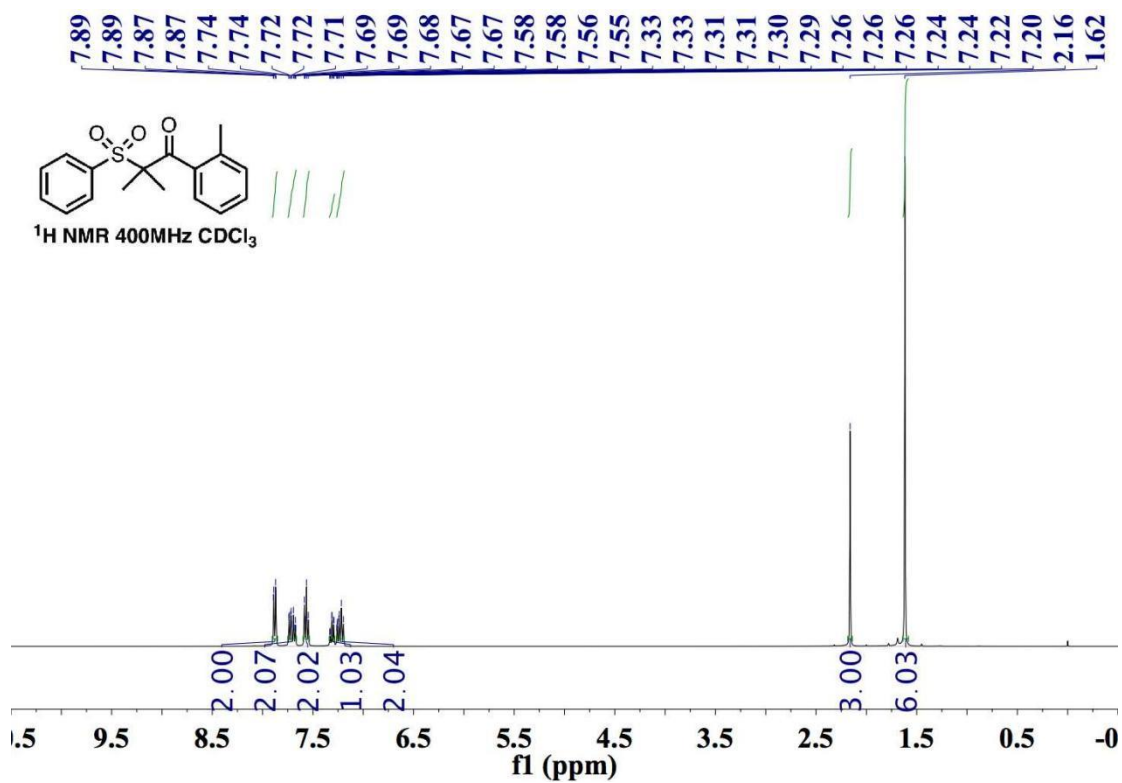
**1-(2-Bromophenyl)-2-(phenylsulfonyl)ethan-1-one (1o):**



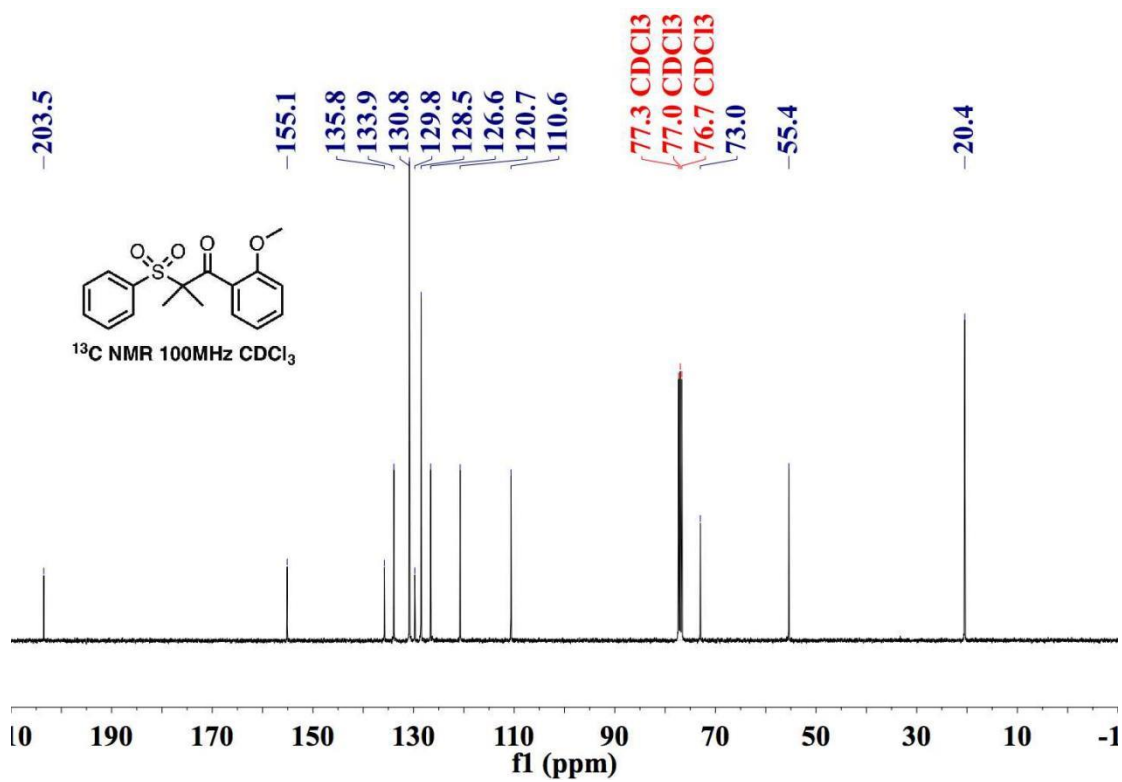
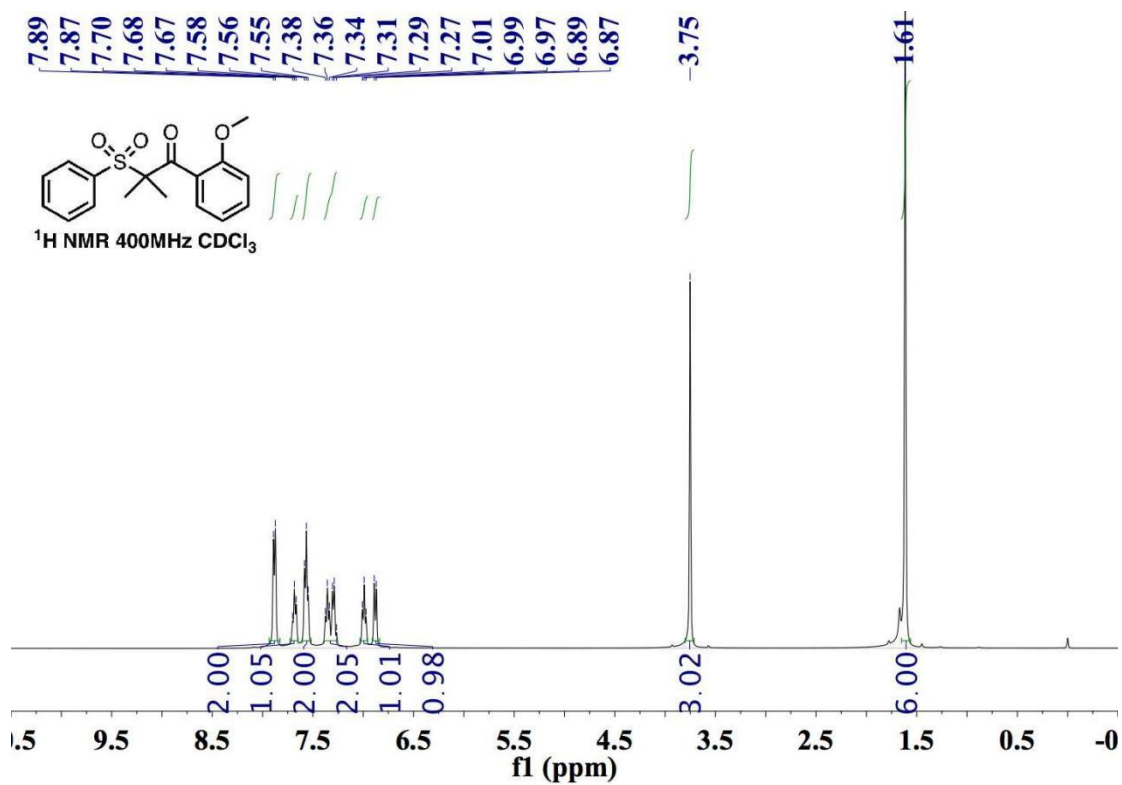
**2-Methyl-1-phenyl-2-(phenylsulfonyl)propan-1-one (1p):**



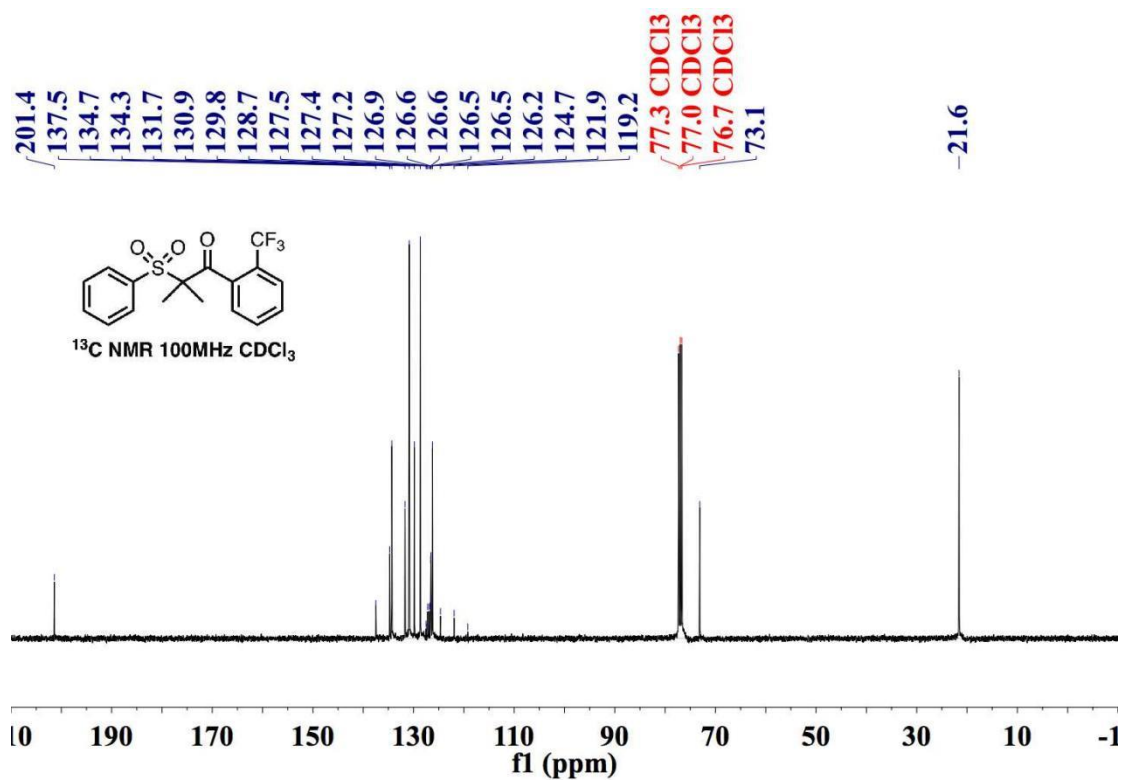
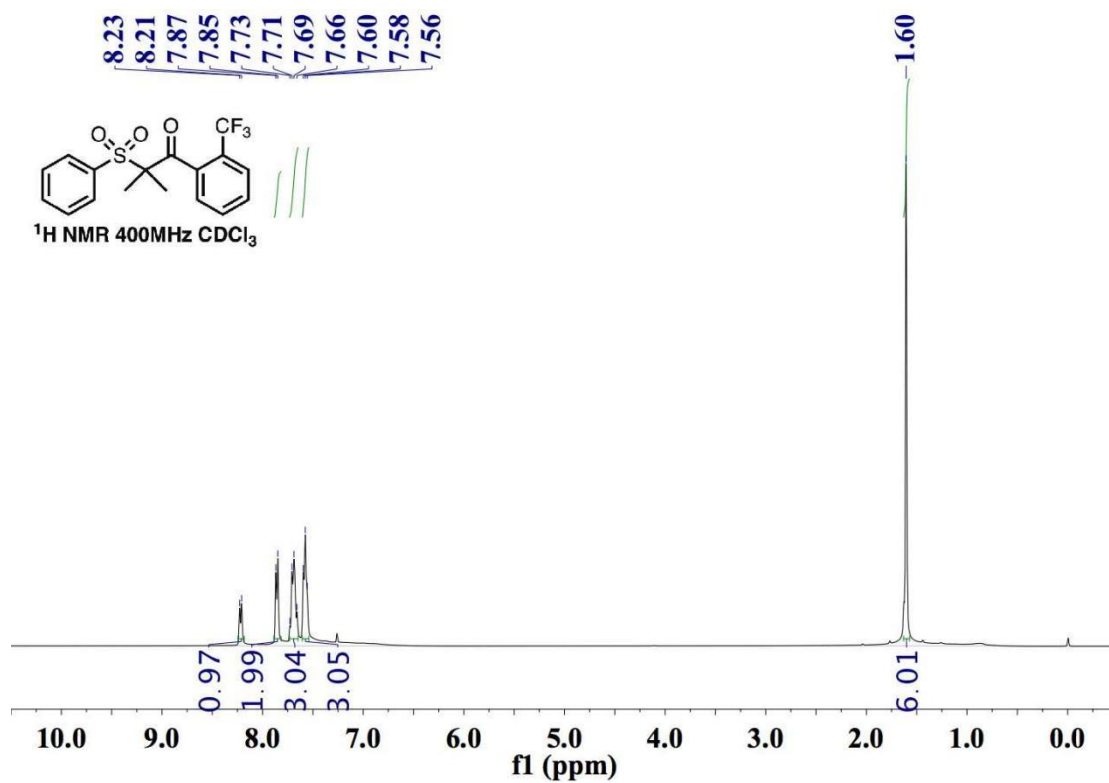
**2-Methyl-2-(phenylsulfonyl)-1-(o-tolyl)propan-1-one (1q):**

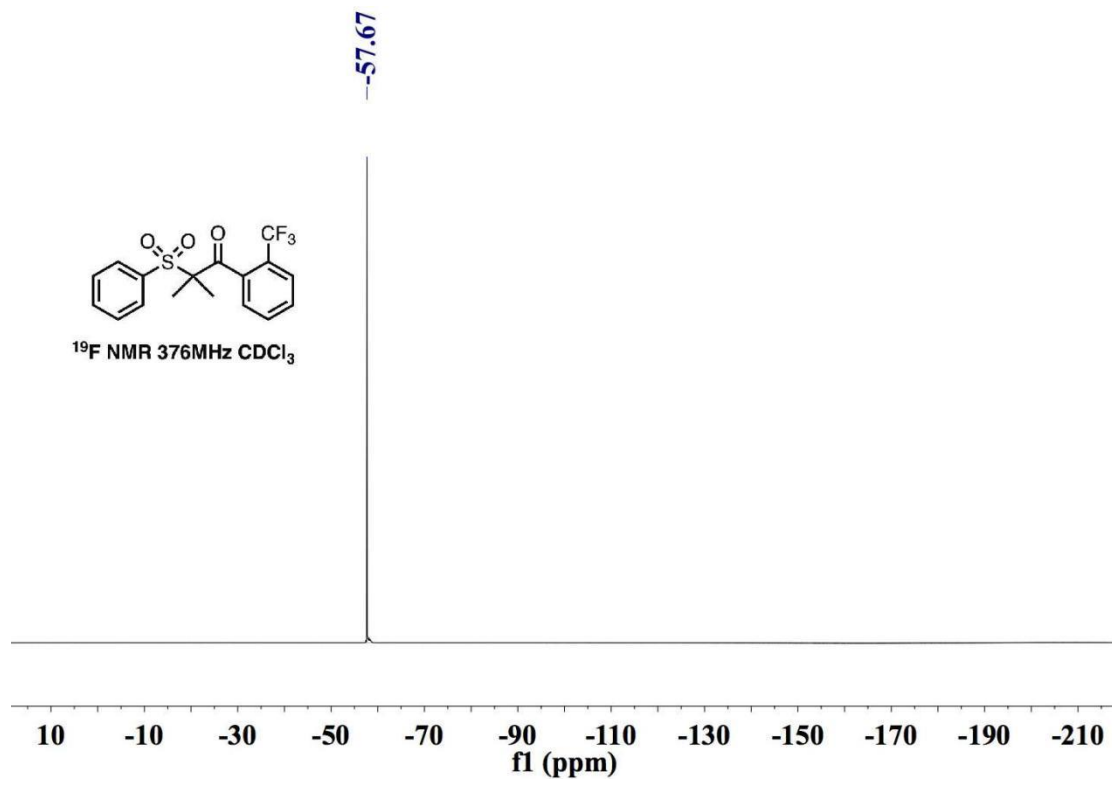


**1-(2-Methoxyphenyl)-2-methyl-2-(phenylsulfonyl)propan-1-one (1r):**

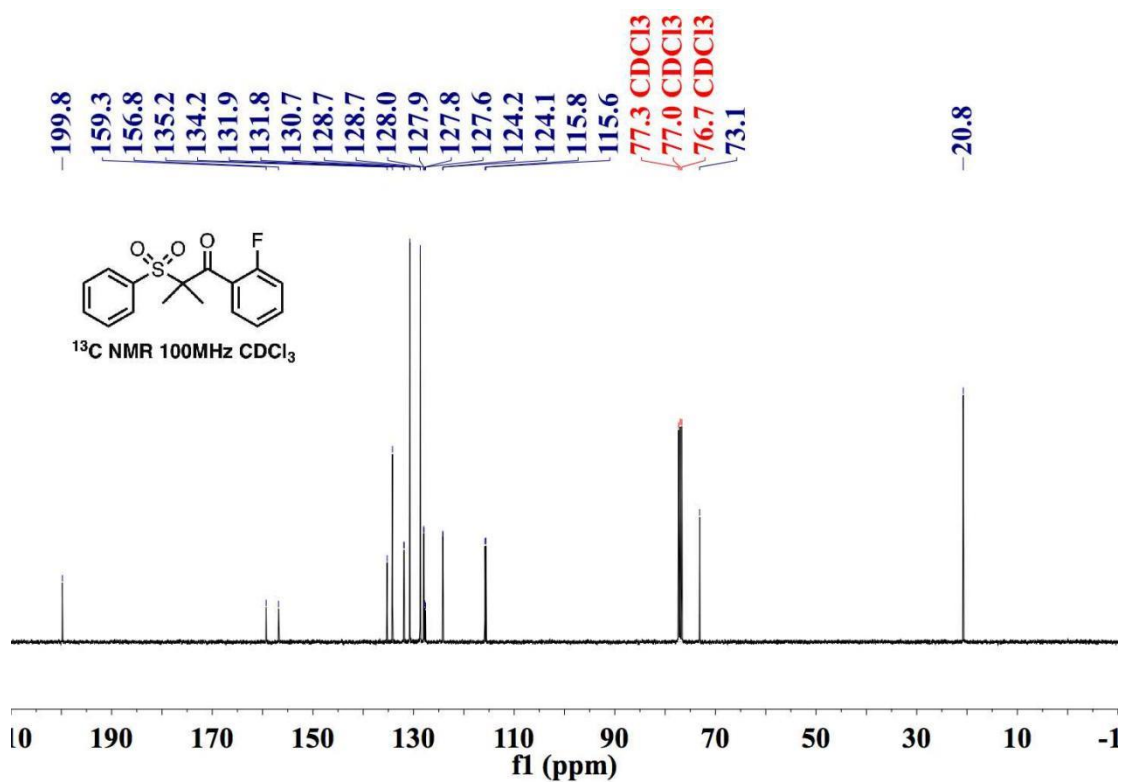
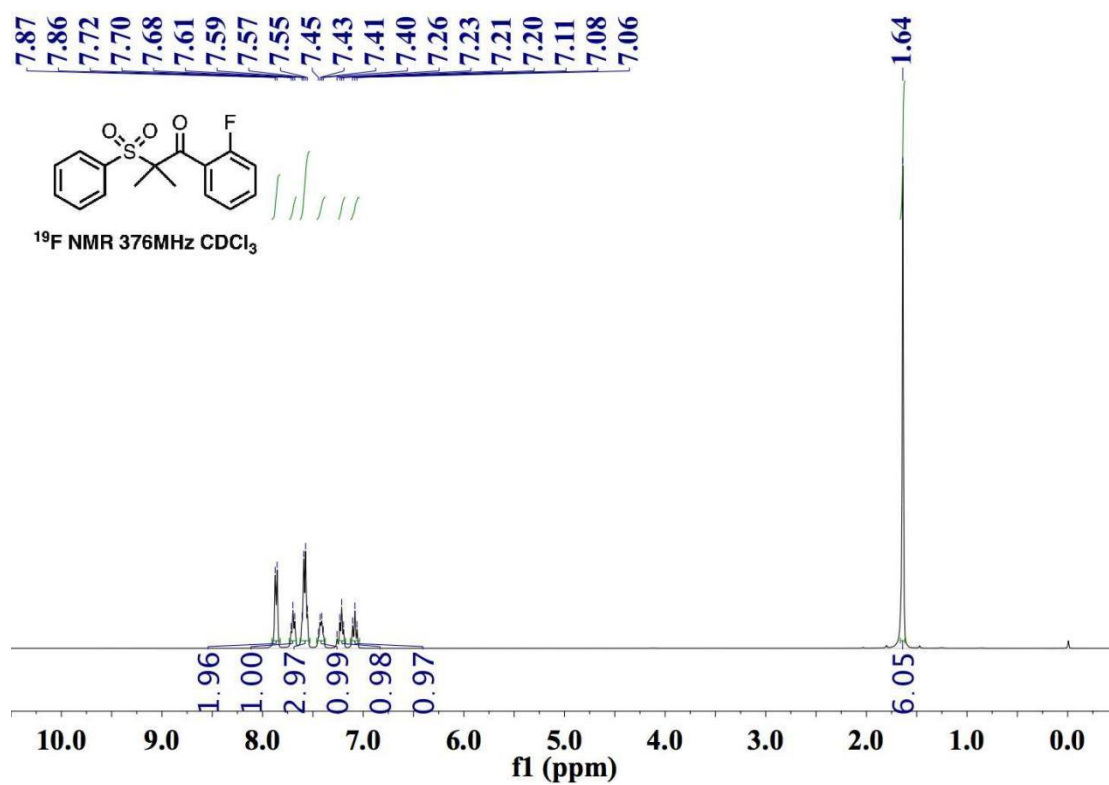


2-Methyl-2-(phenylsulfonyl)-1-(2-(trifluoromethyl)phenyl)propan-1-one (1s):

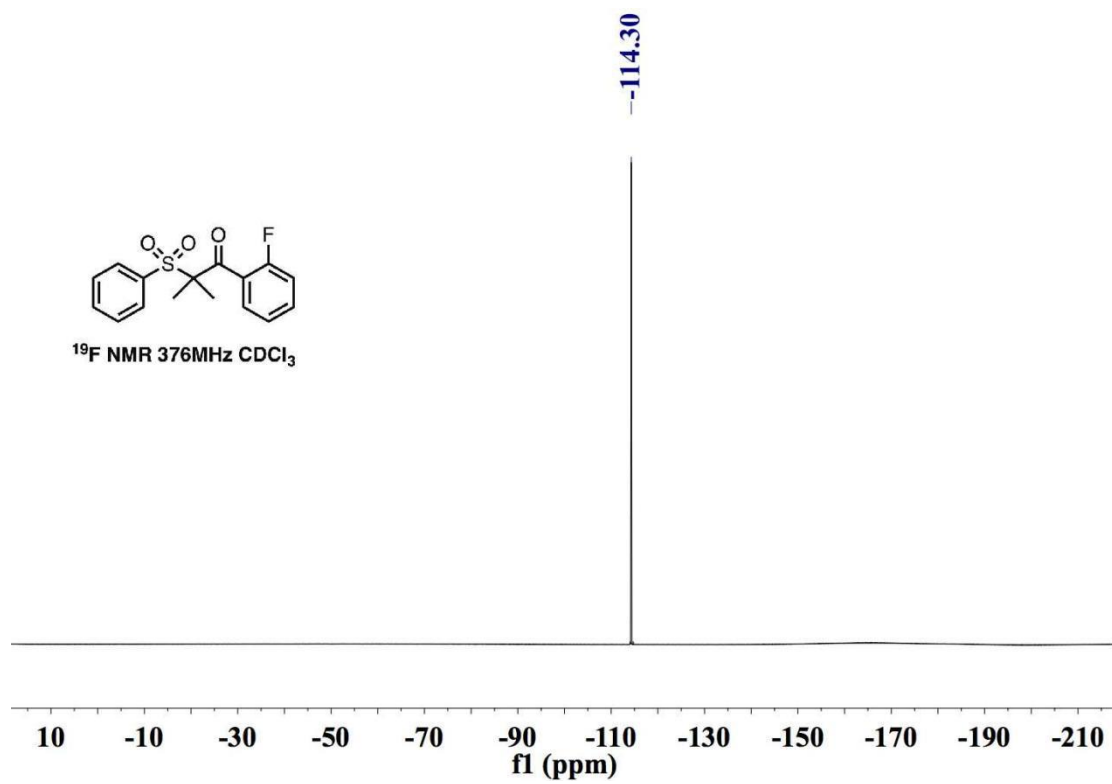




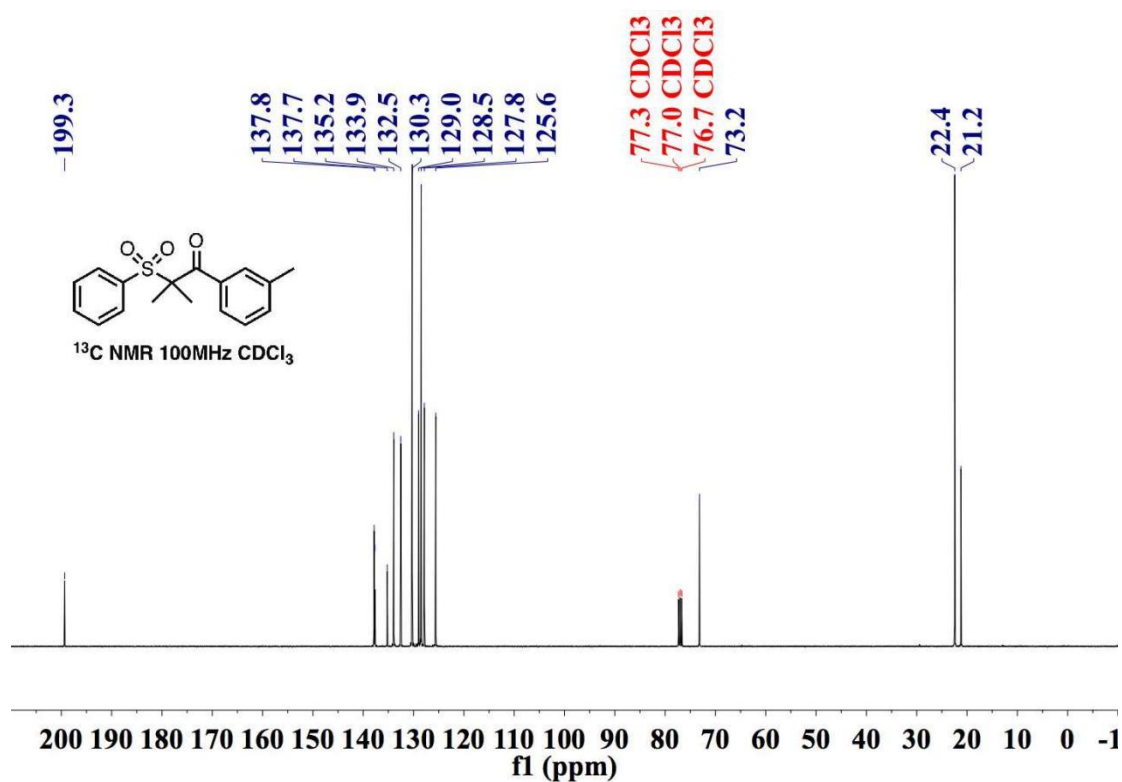
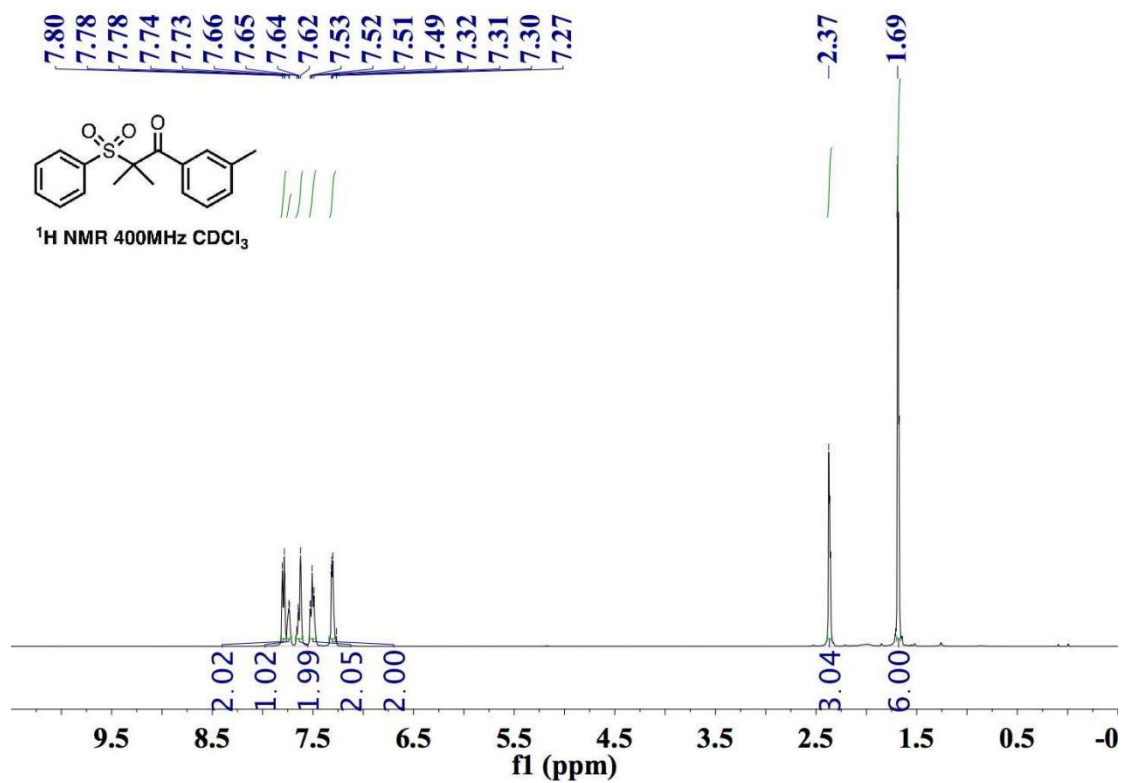
**1-(2-Fluorophenyl)-2-methyl-2-(phenylsulfonyl)propan-1-one (1t):**



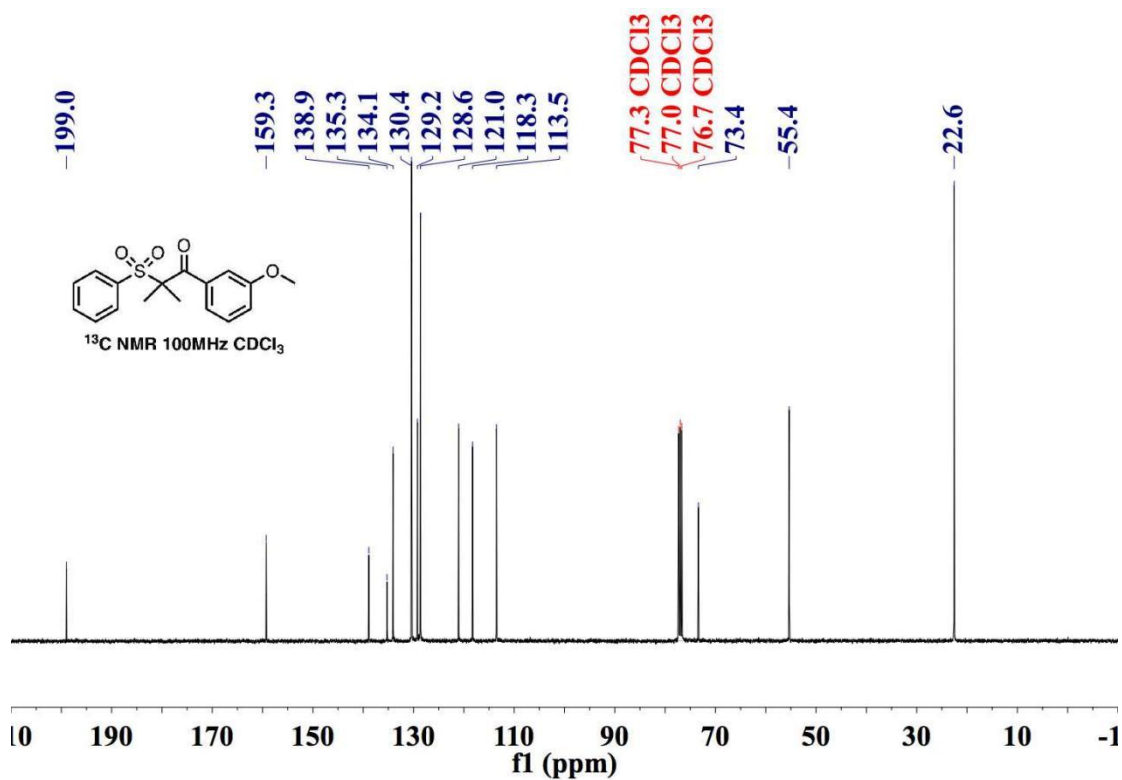
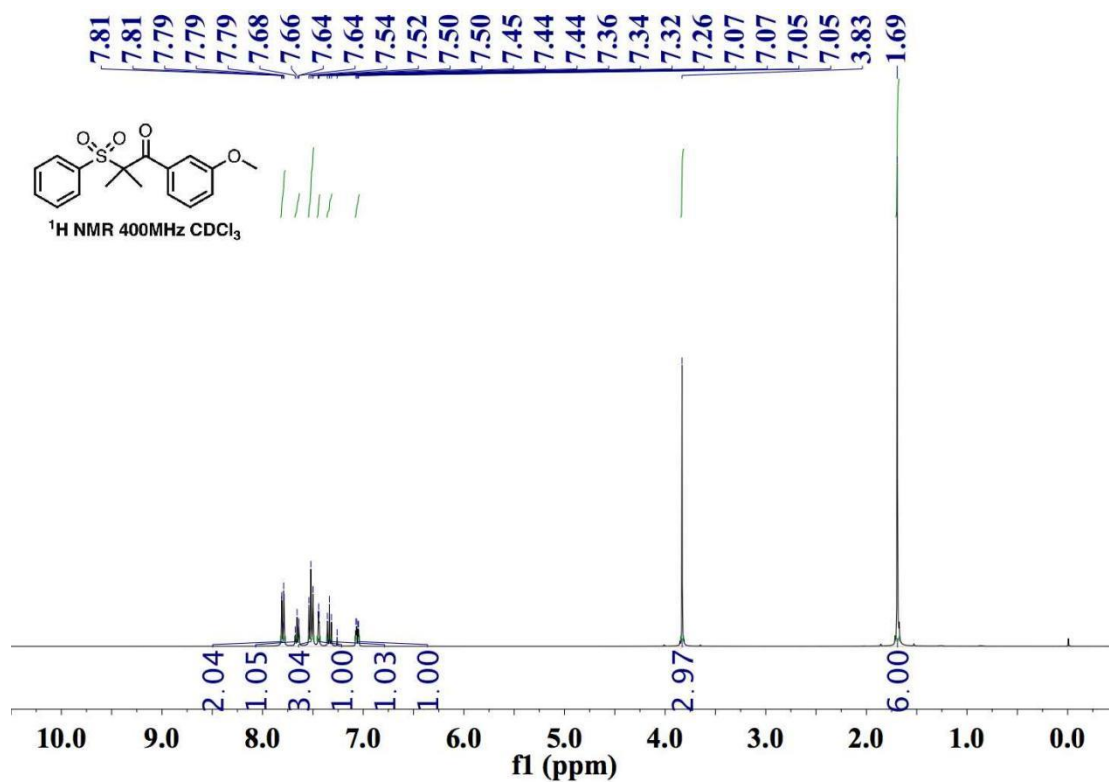




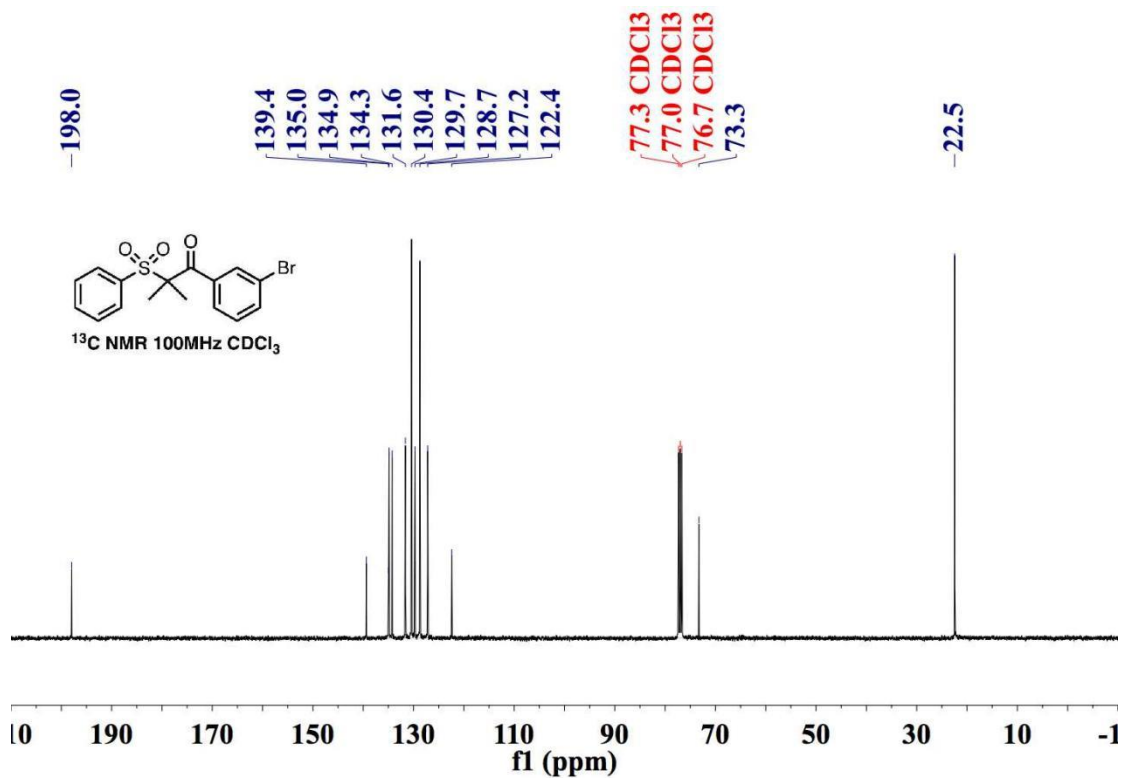
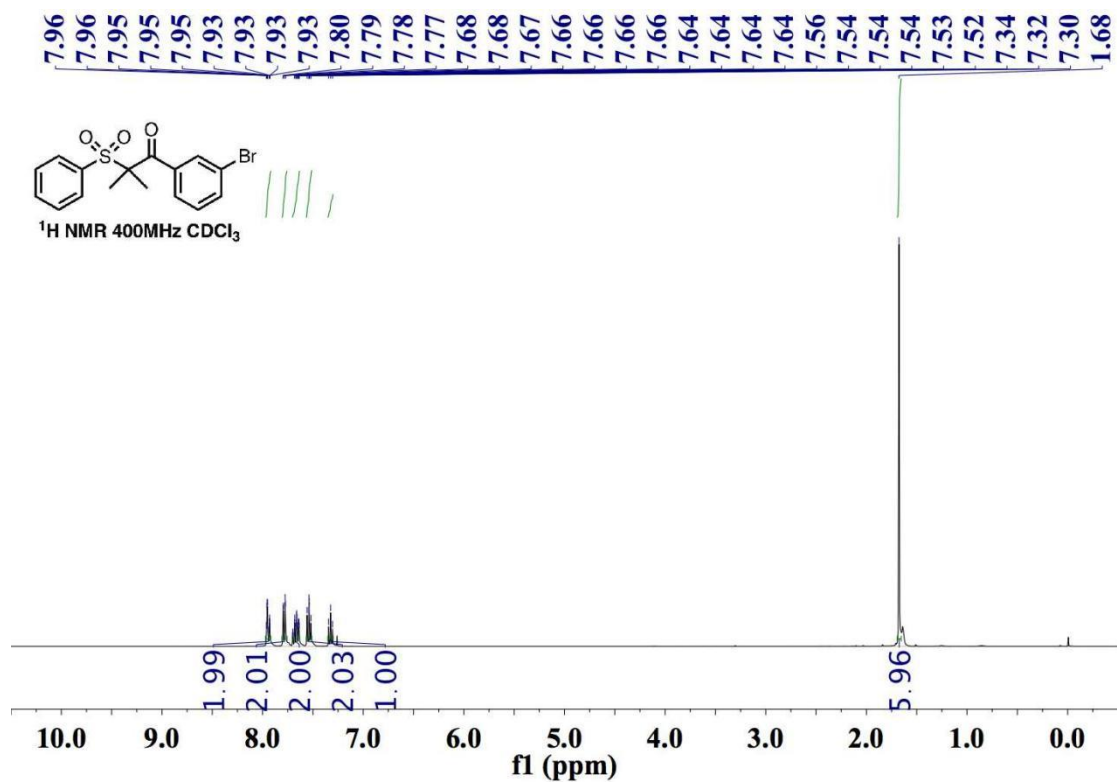
**2-Methyl-2-(phenylsulfonyl)-1-(m-tolyl)propan-1-one (1u):**



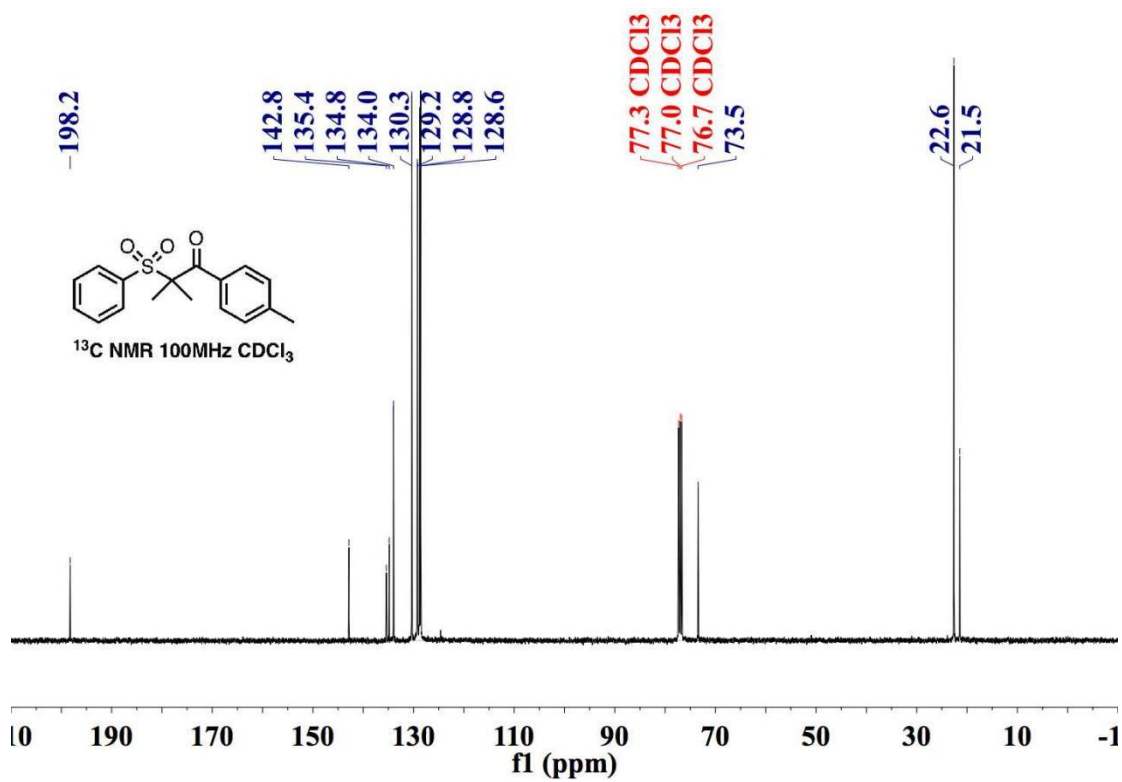
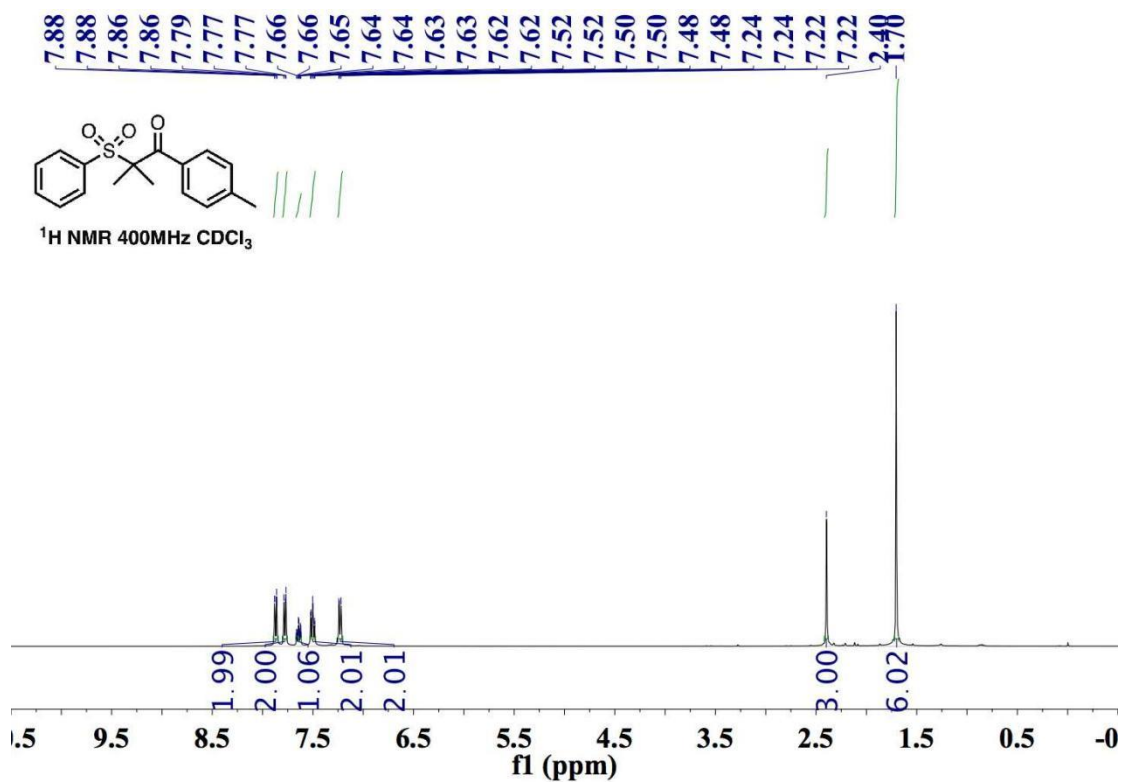
**1-(3-Methoxyphenyl)-2-methyl-2-(phenylsulfonyl)propan-1-one (1v):**



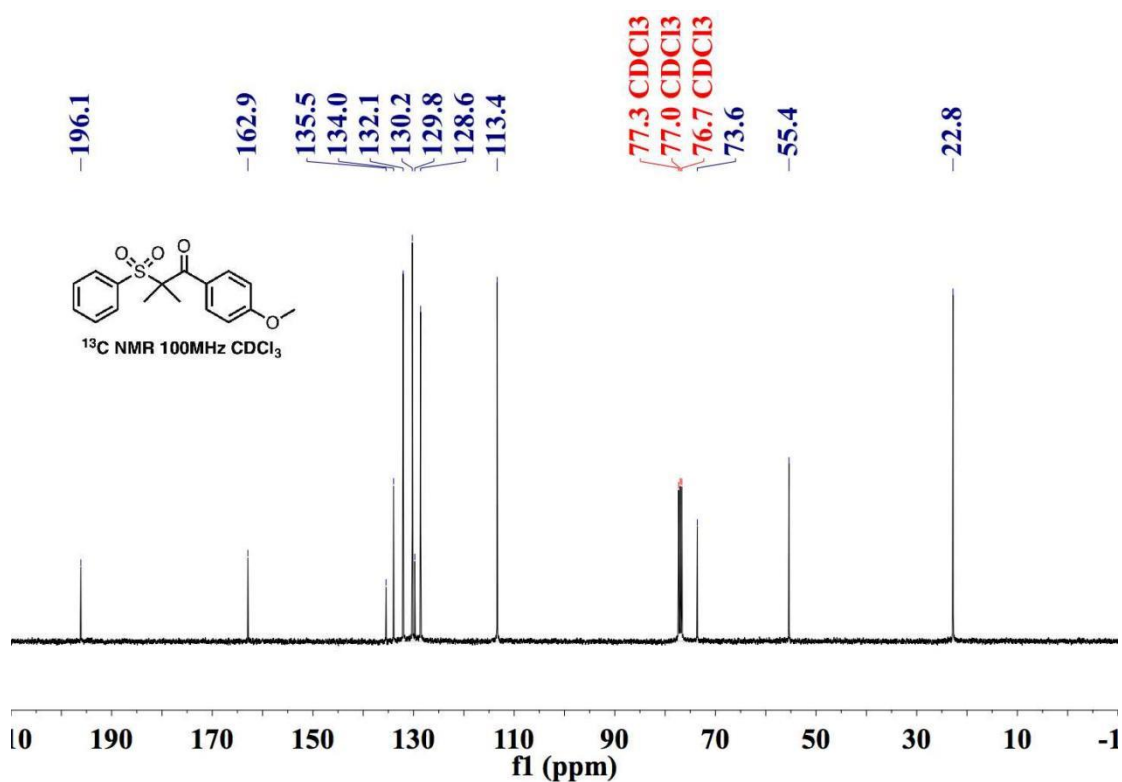
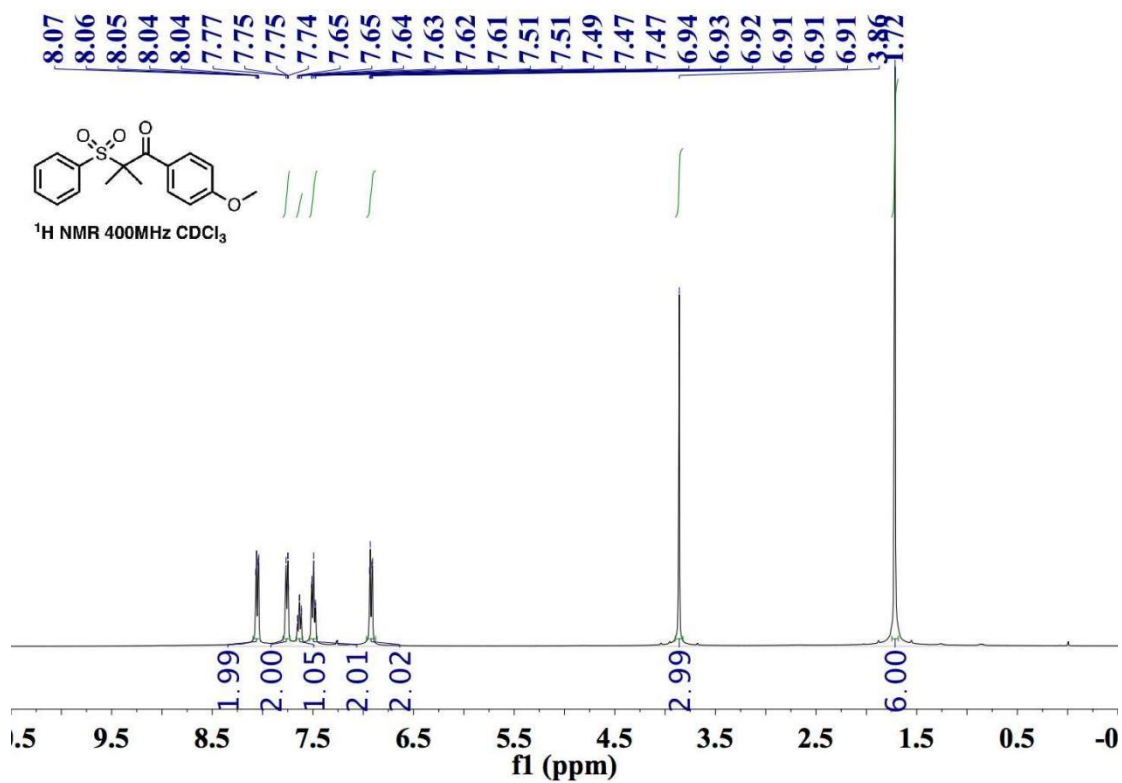
**1-(3-Bromophenyl)-2-methyl-2-(phenylsulfonyl)propan-1-one (1w):**



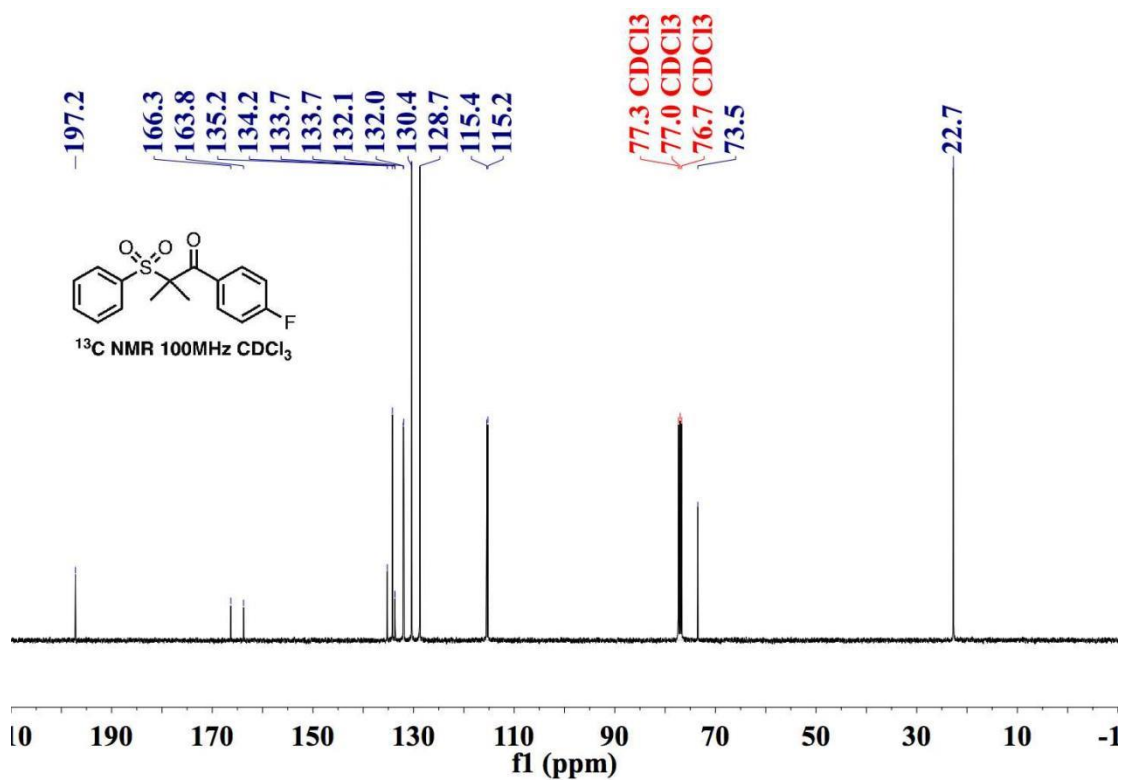
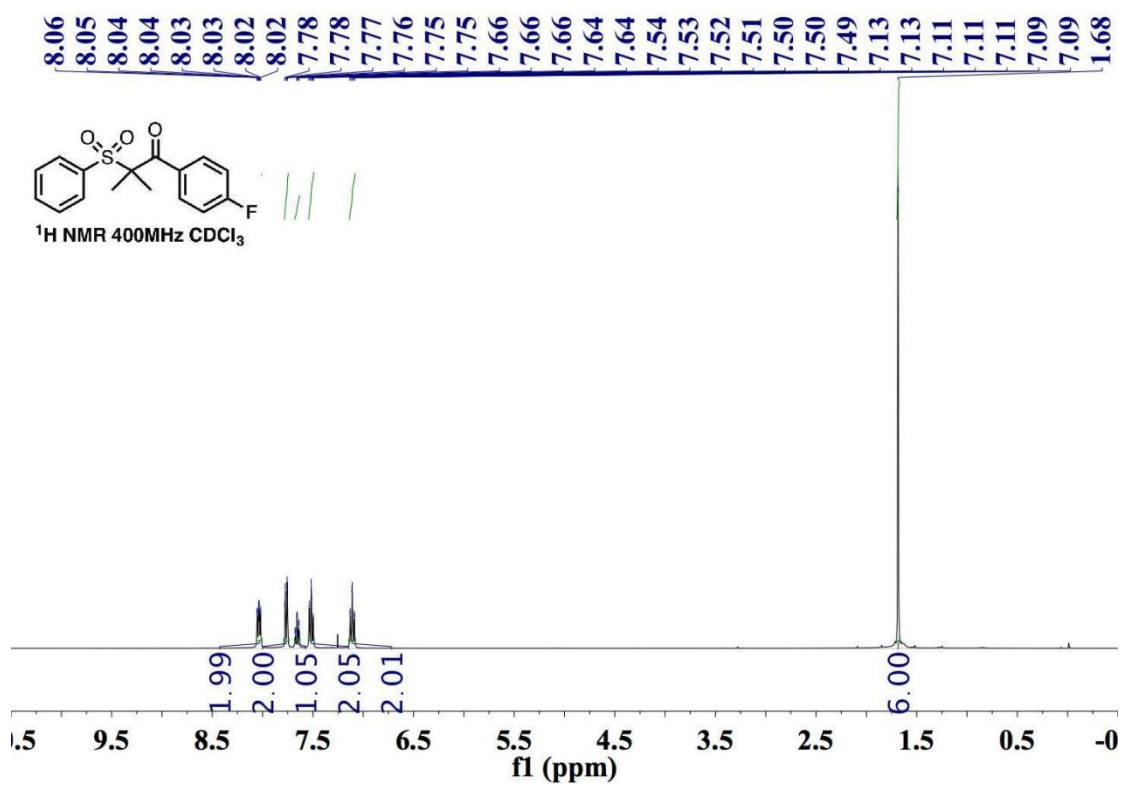
**2-Methyl-2-(phenylsulfonyl)-1-(p-tolyl)propan-1-one (1x):**

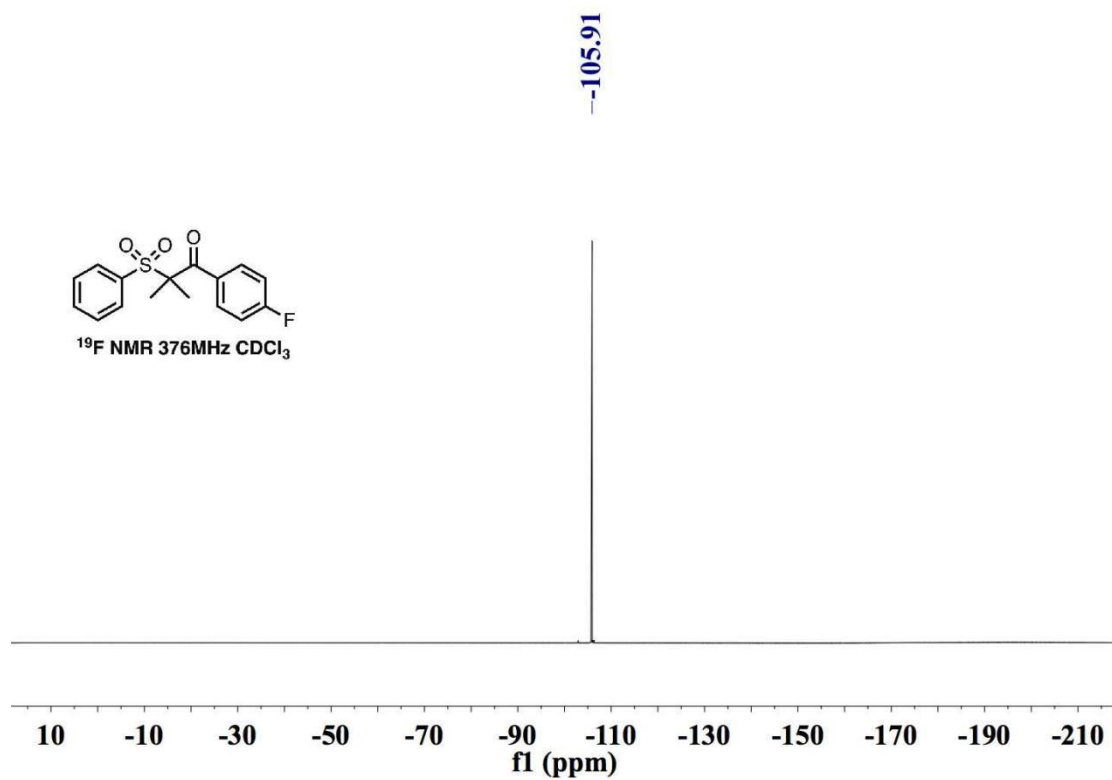


1-(4-methoxyphenyl)-2-methyl-2-(phenylsulfonyl)propan-1-one (1y):



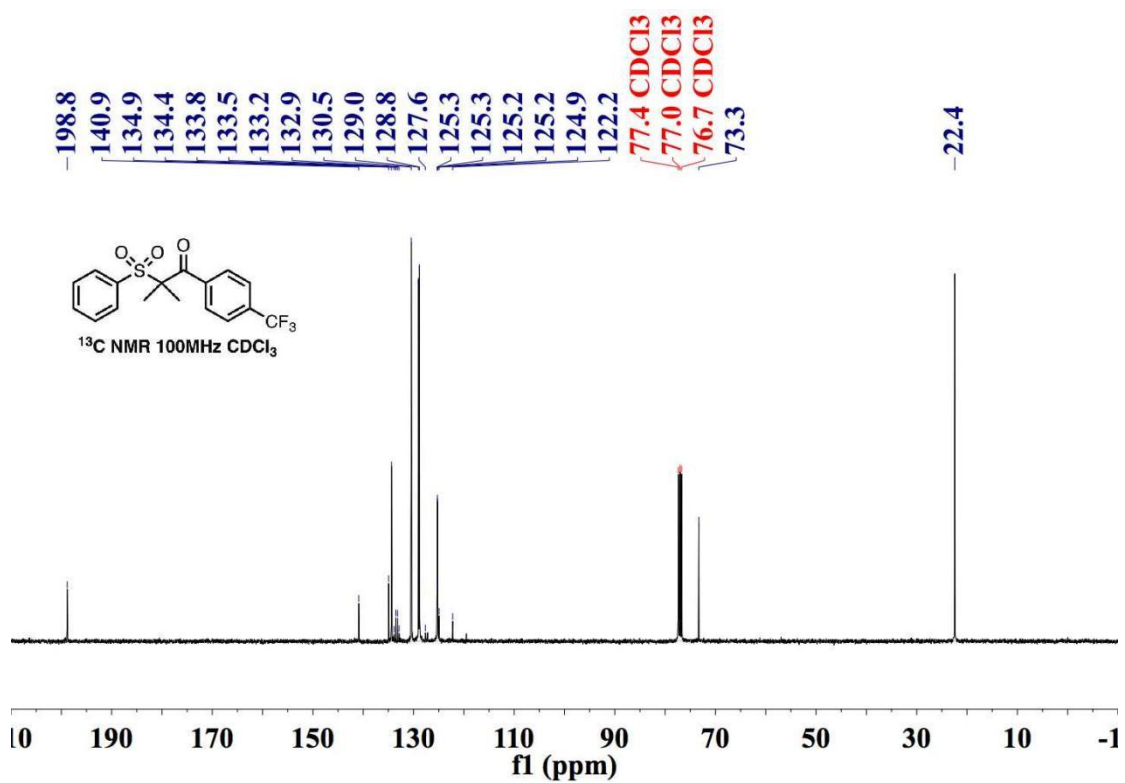
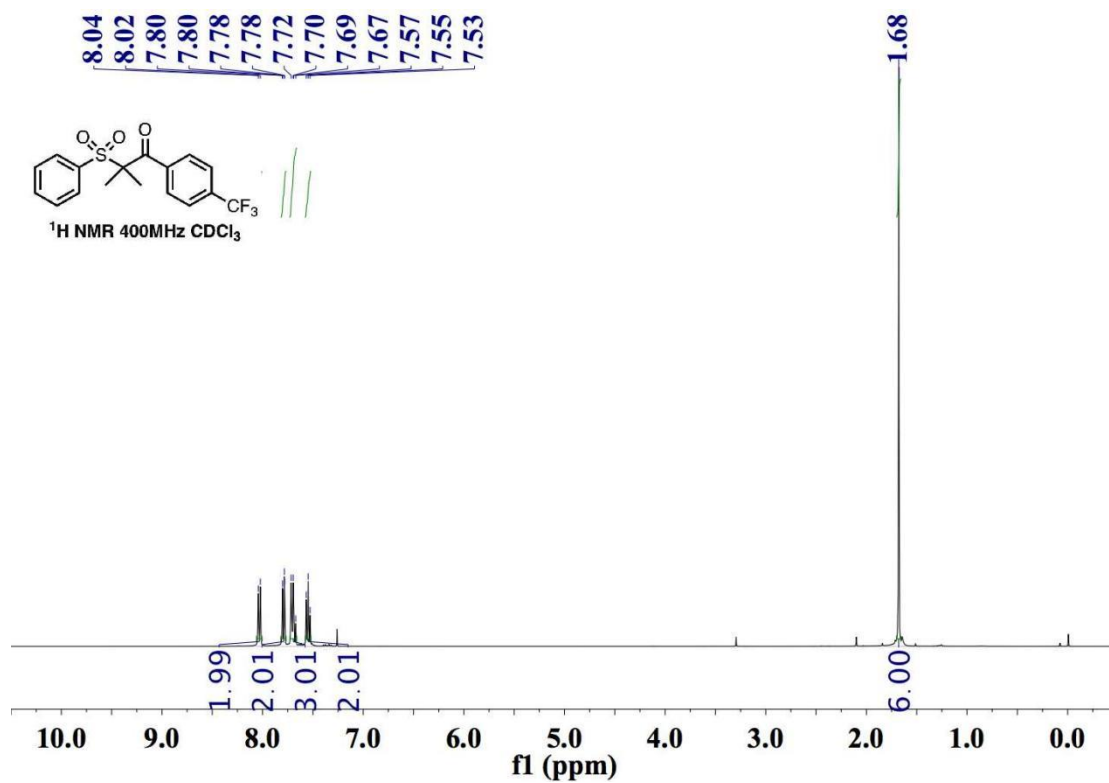
1-(4-Fluorophenyl)-2-methyl-2-(phenylsulfonyl)propan-1-one (1z):

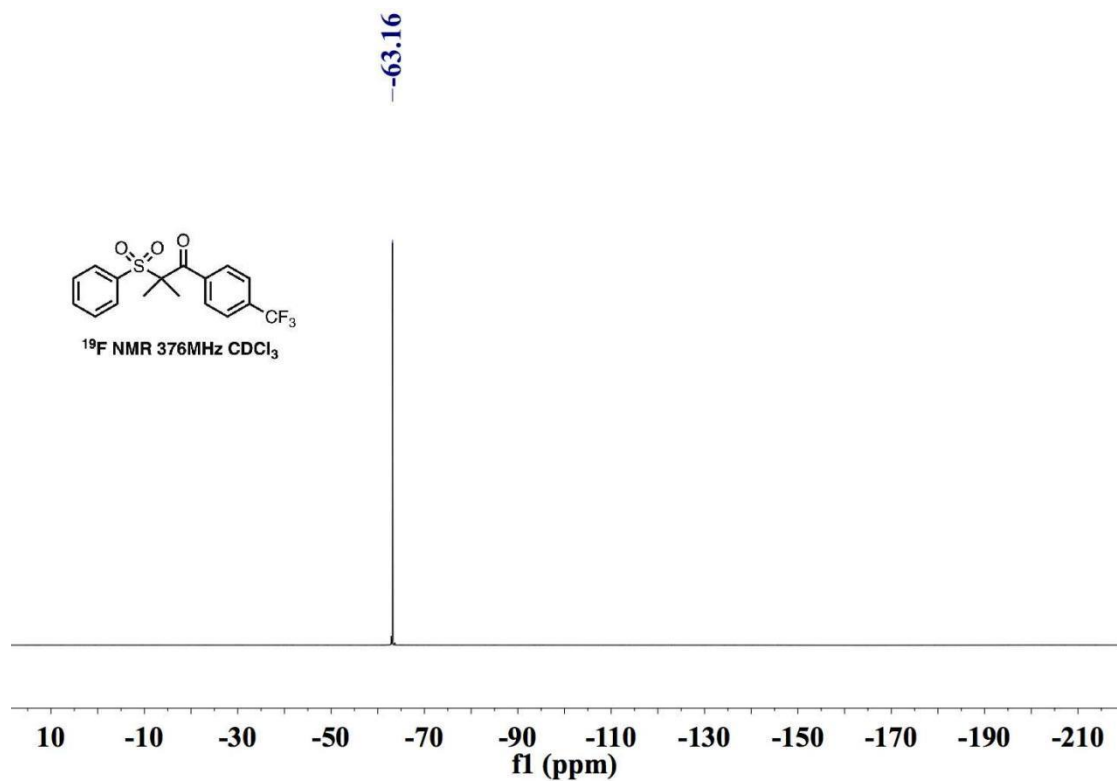




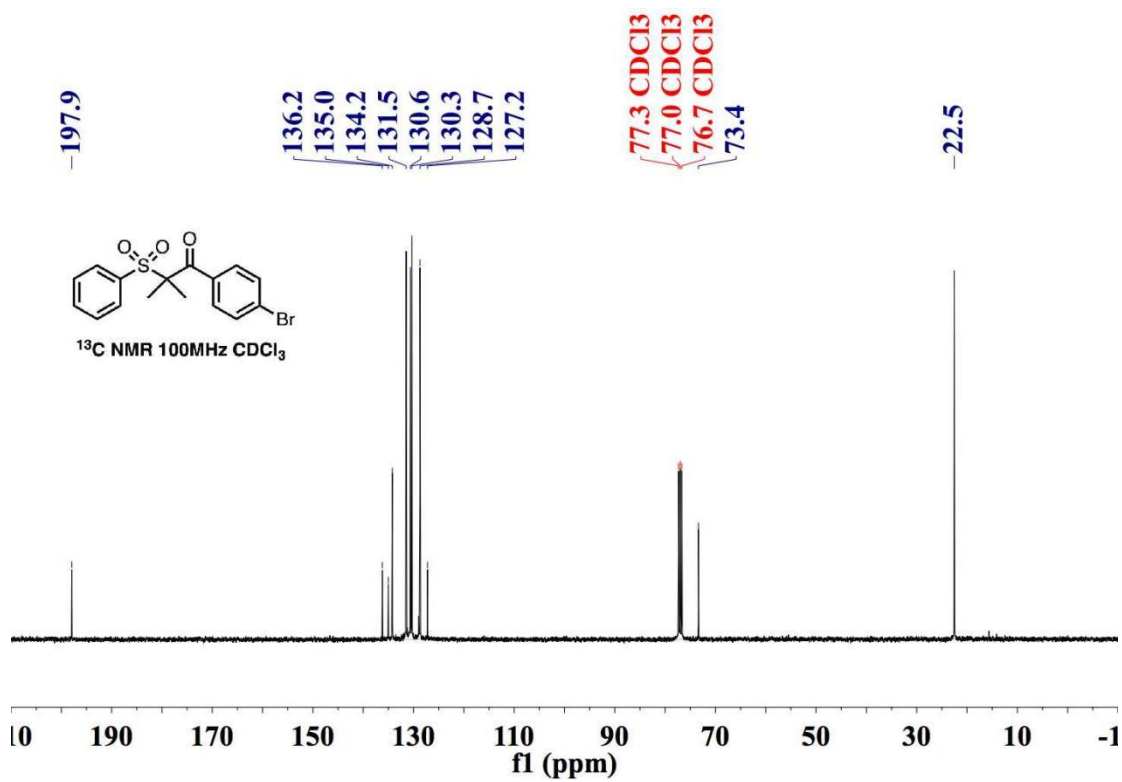
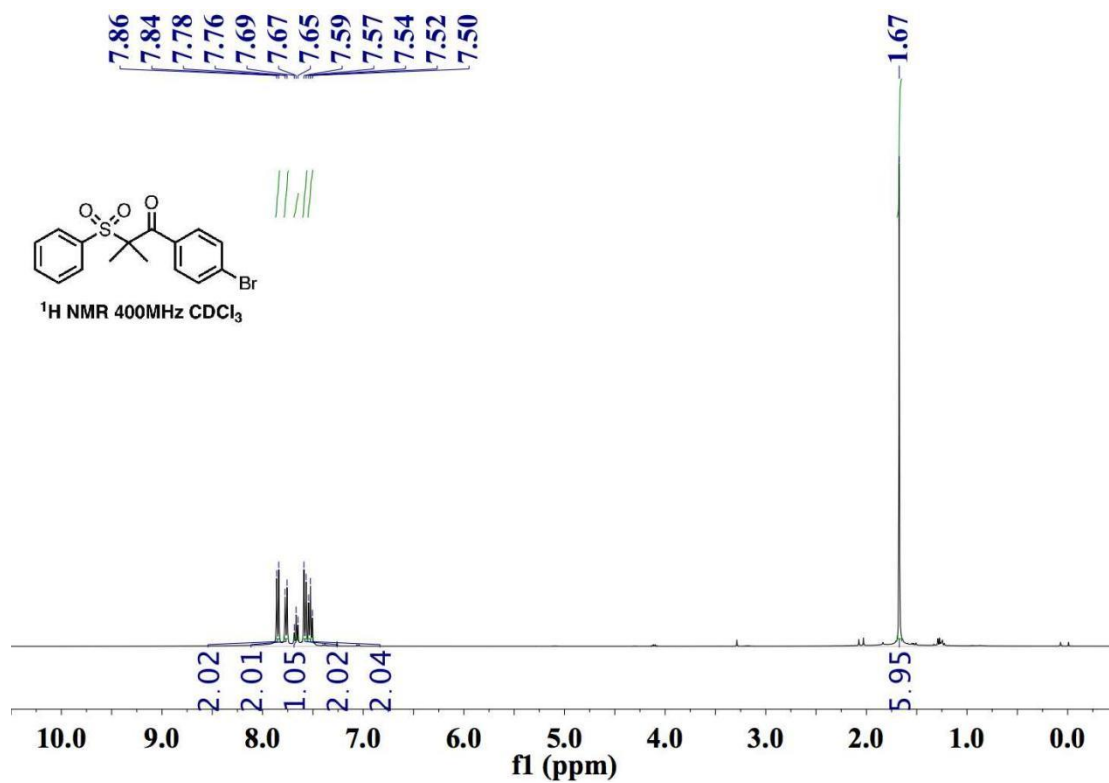


2-Methyl-2-(phenylsulfonyl)-1-(4-(trifluoromethyl)phenyl)propan-1-one (1aa):

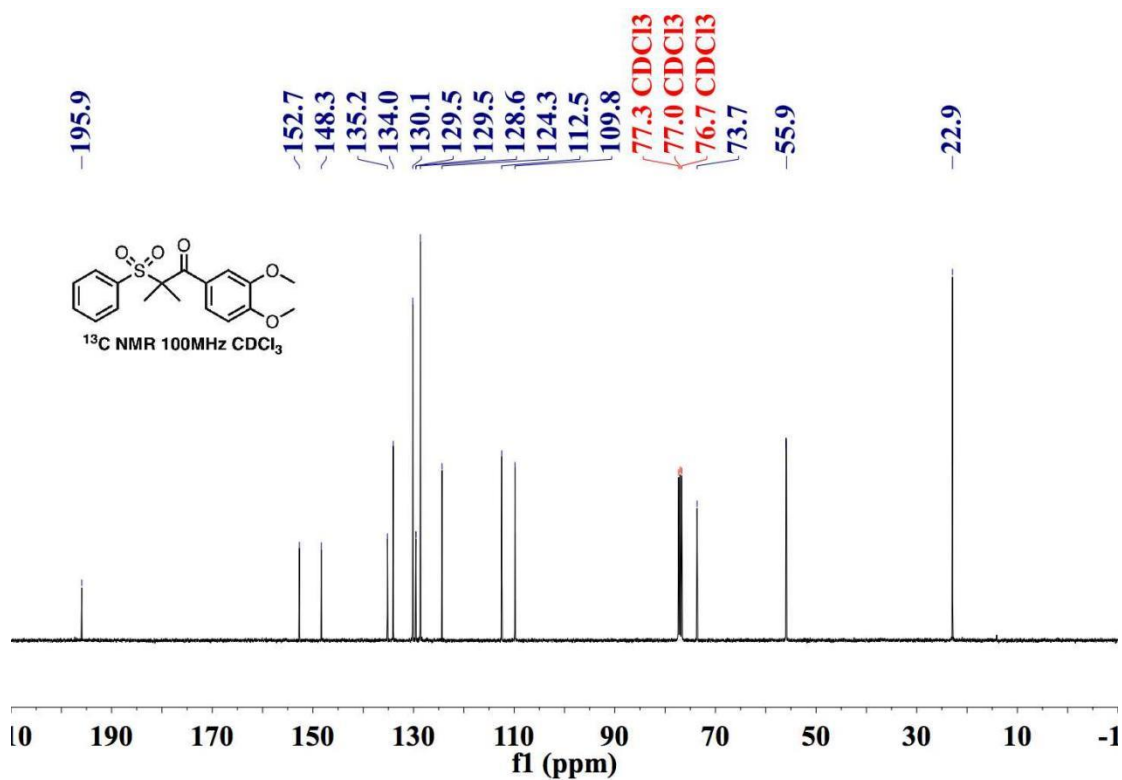
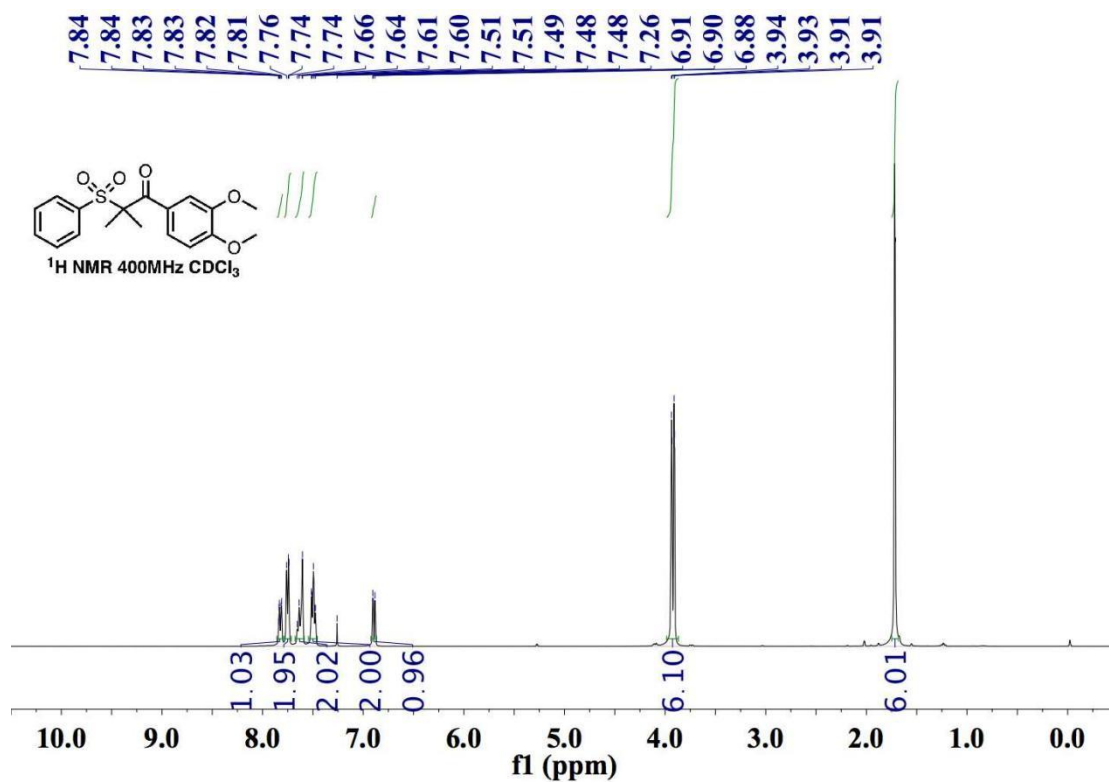




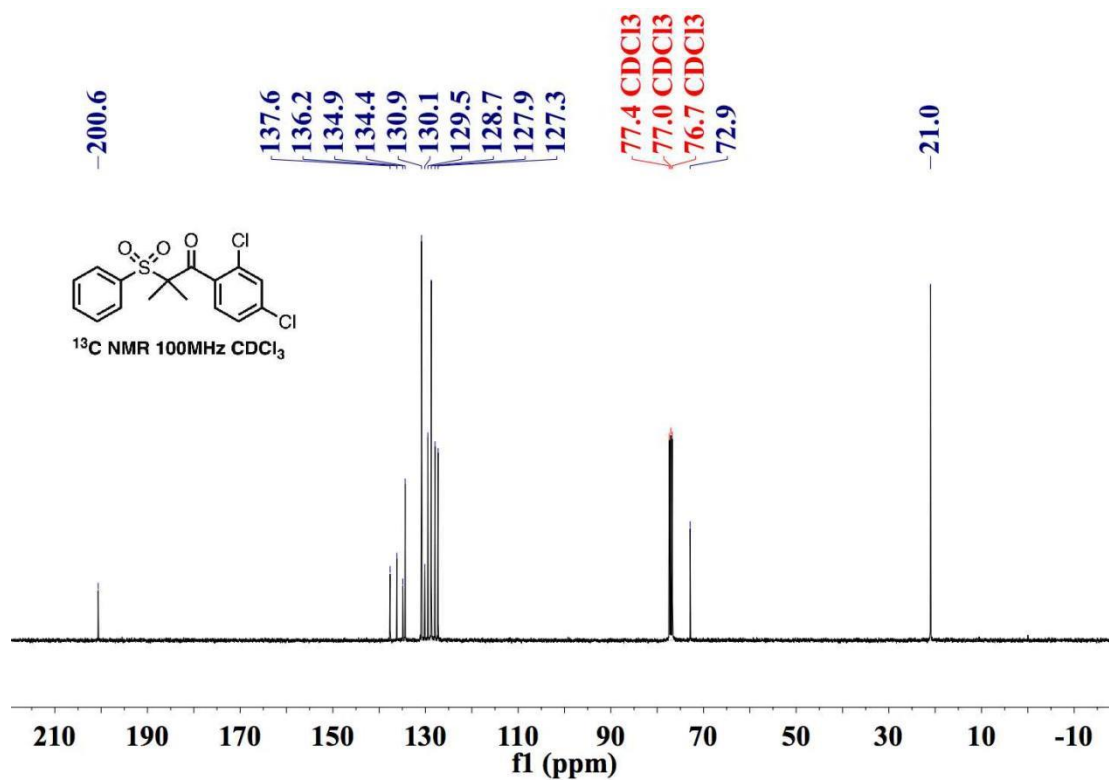
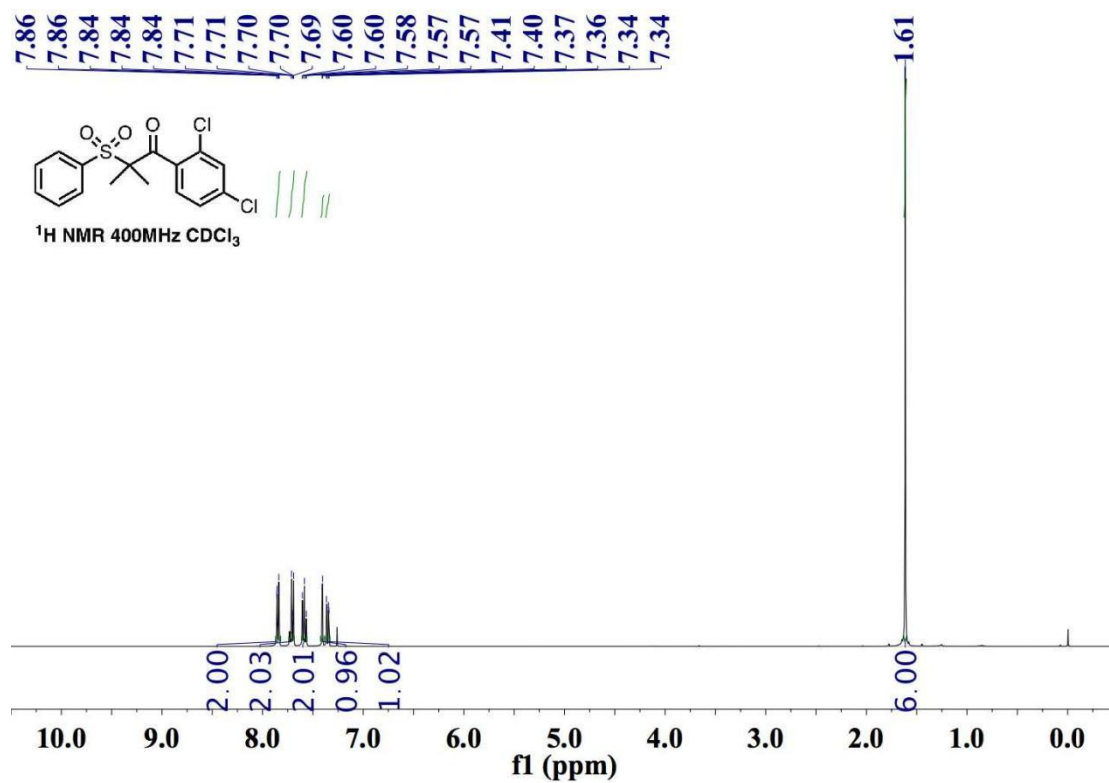
**1-(4-Bromophenyl)-2-methyl-2-(phenylsulfonyl)propan-1-one (1ab):**



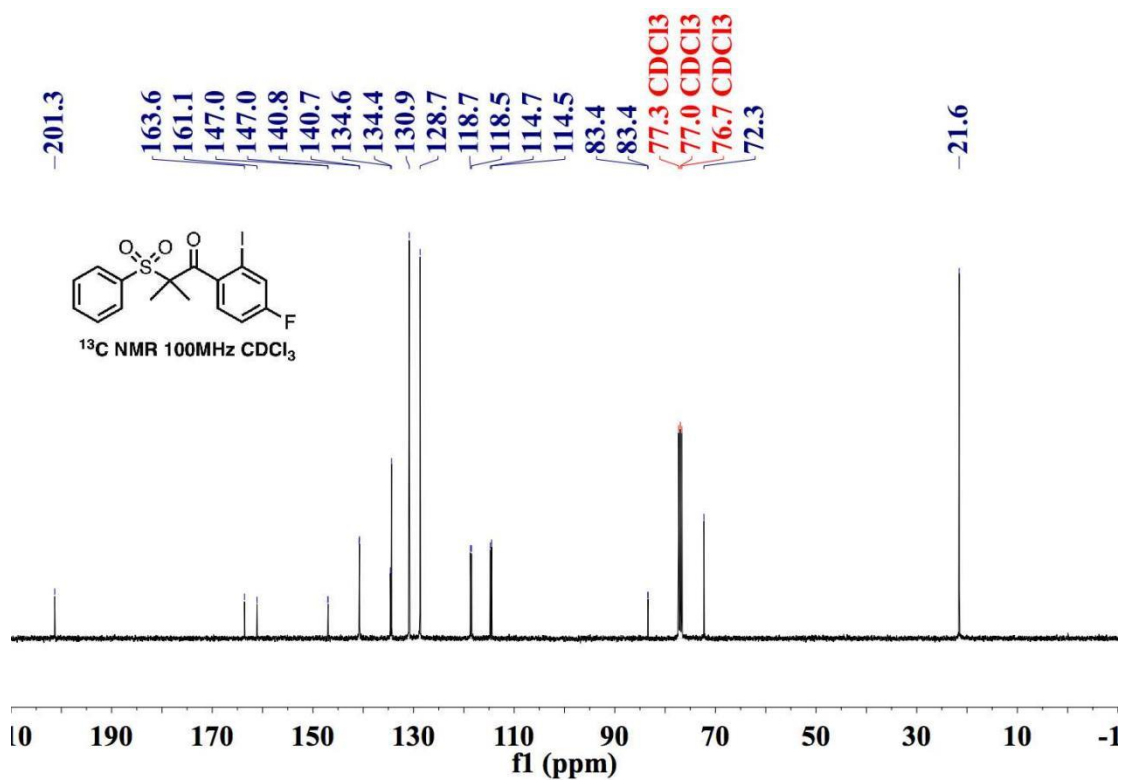
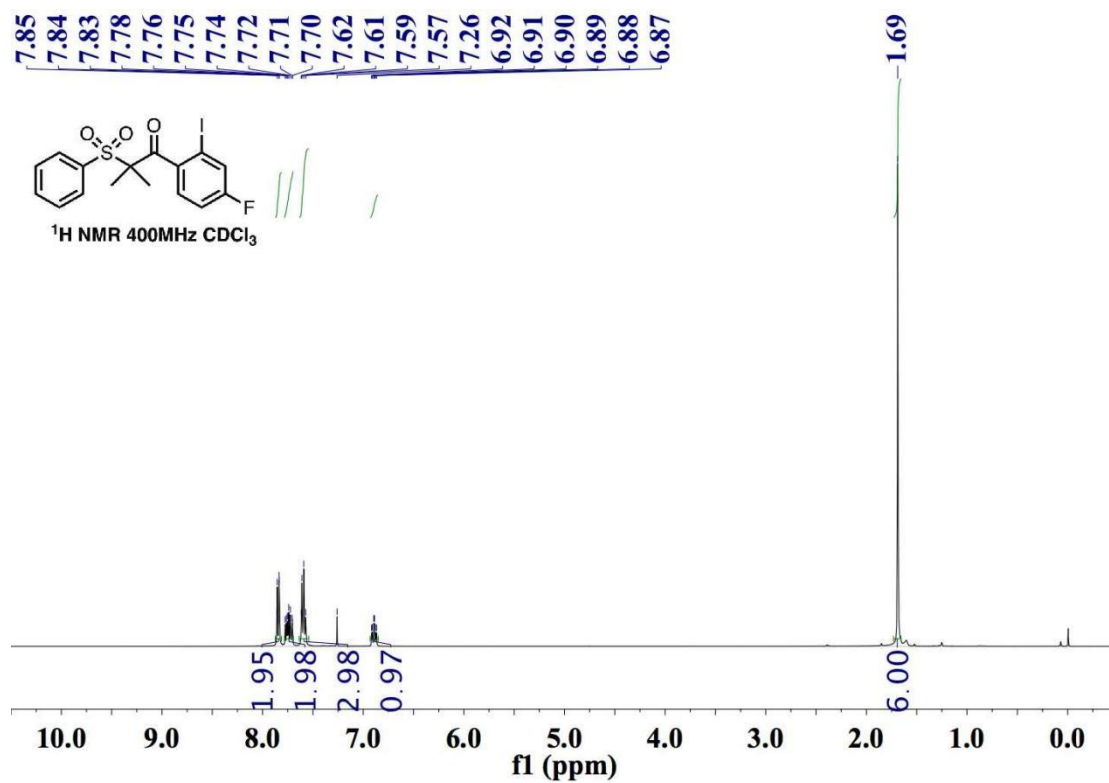
**1-(3,4-Dimethoxyphenyl)-2-methyl-2-(phenylsulfonyl)propan-1-one (1ac):**

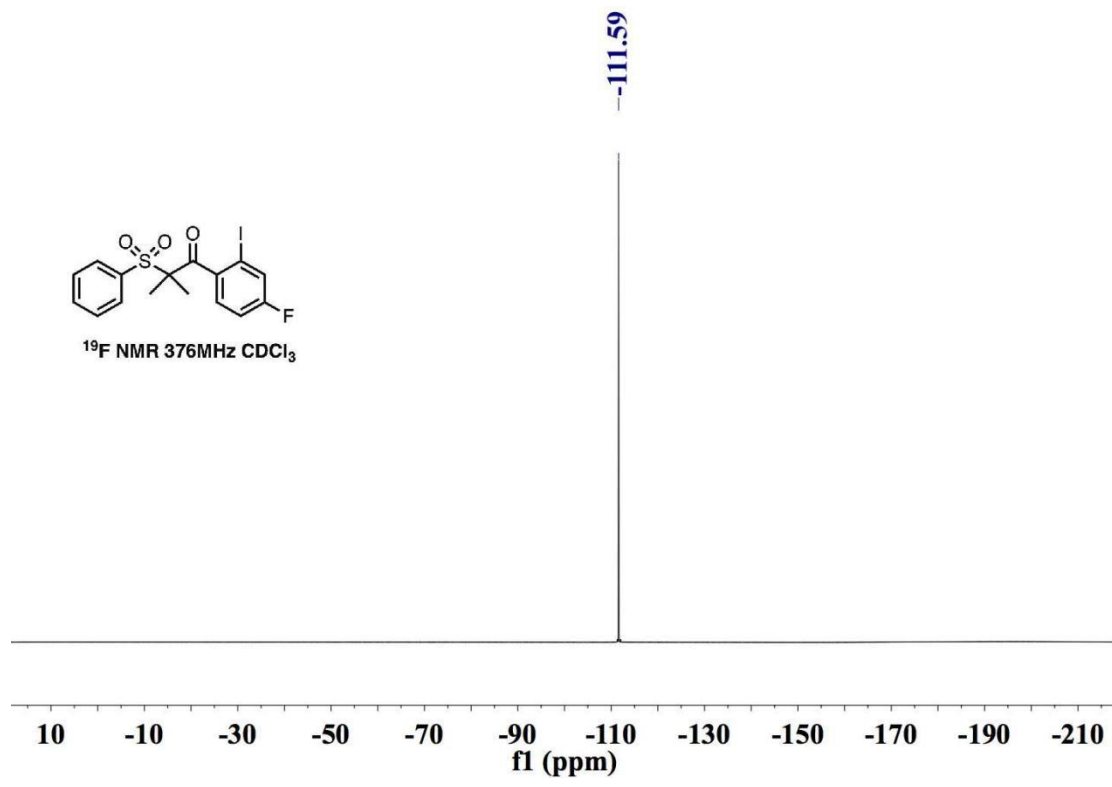


1-(2,4-Dichlorophenyl)-2-methyl-2-(phenylsulfonyl)propan-1-one (1ad) :

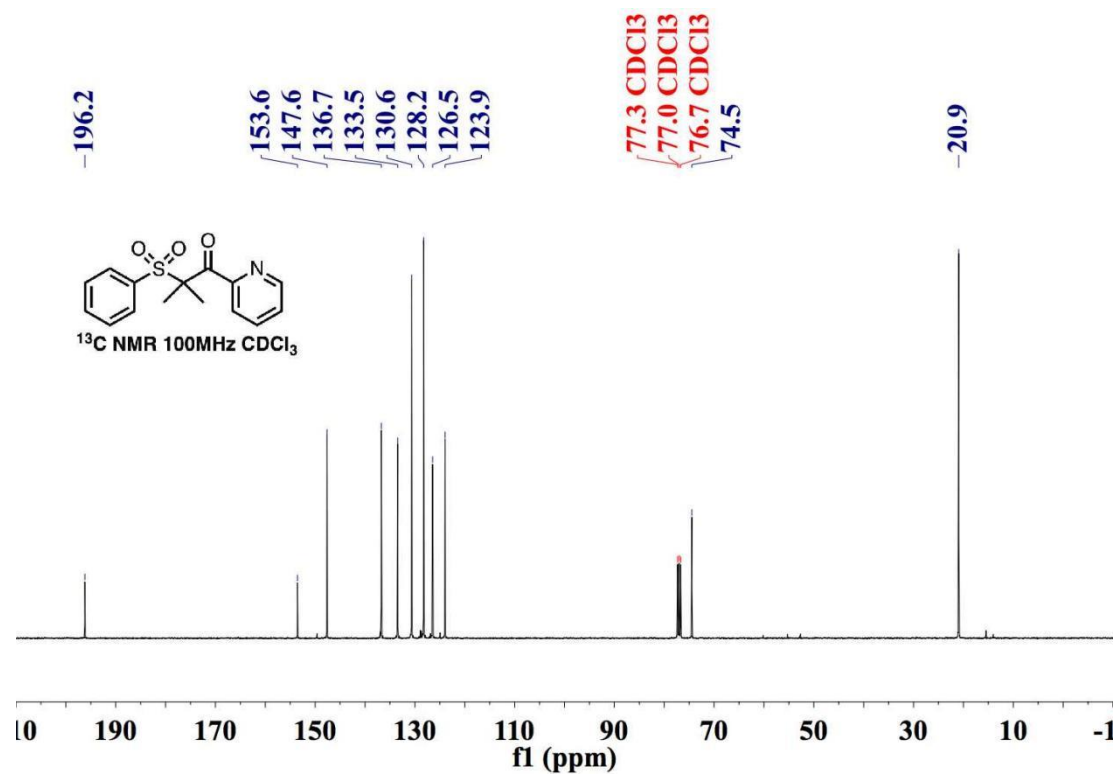
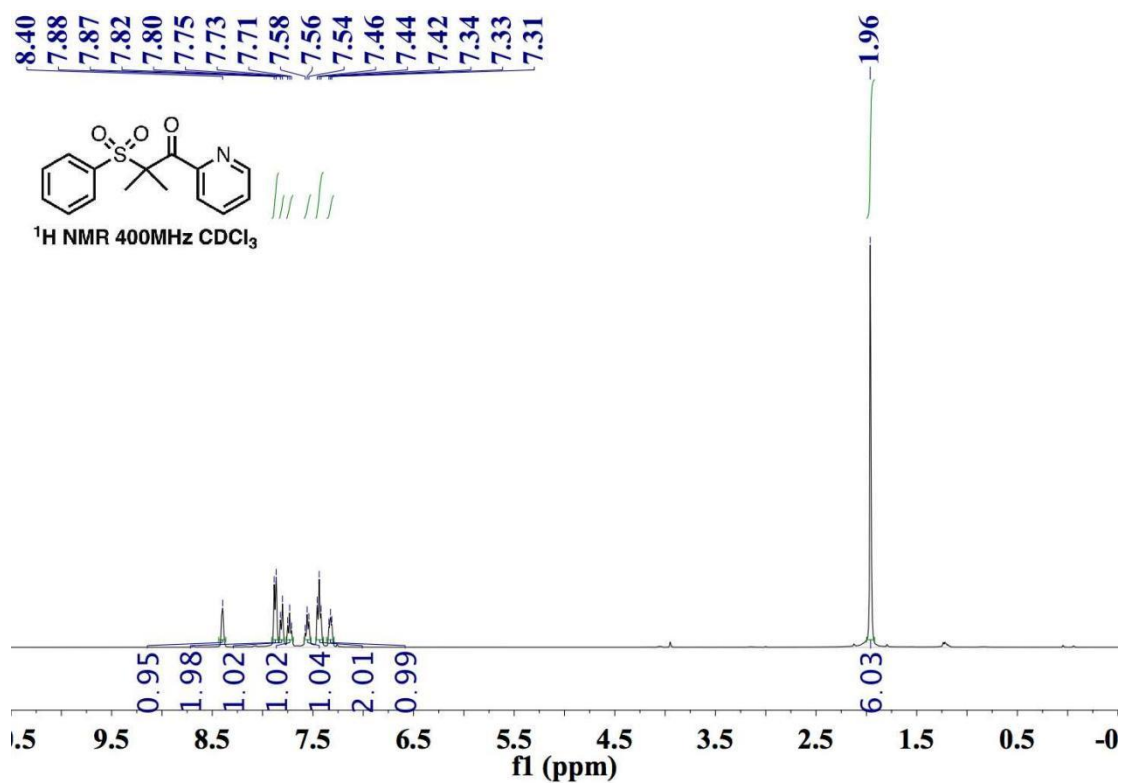


1-(4-Fluoro-2-iodophenyl)-2-methyl-2-(phenylsulfonyl)propan-1-one (1ae)



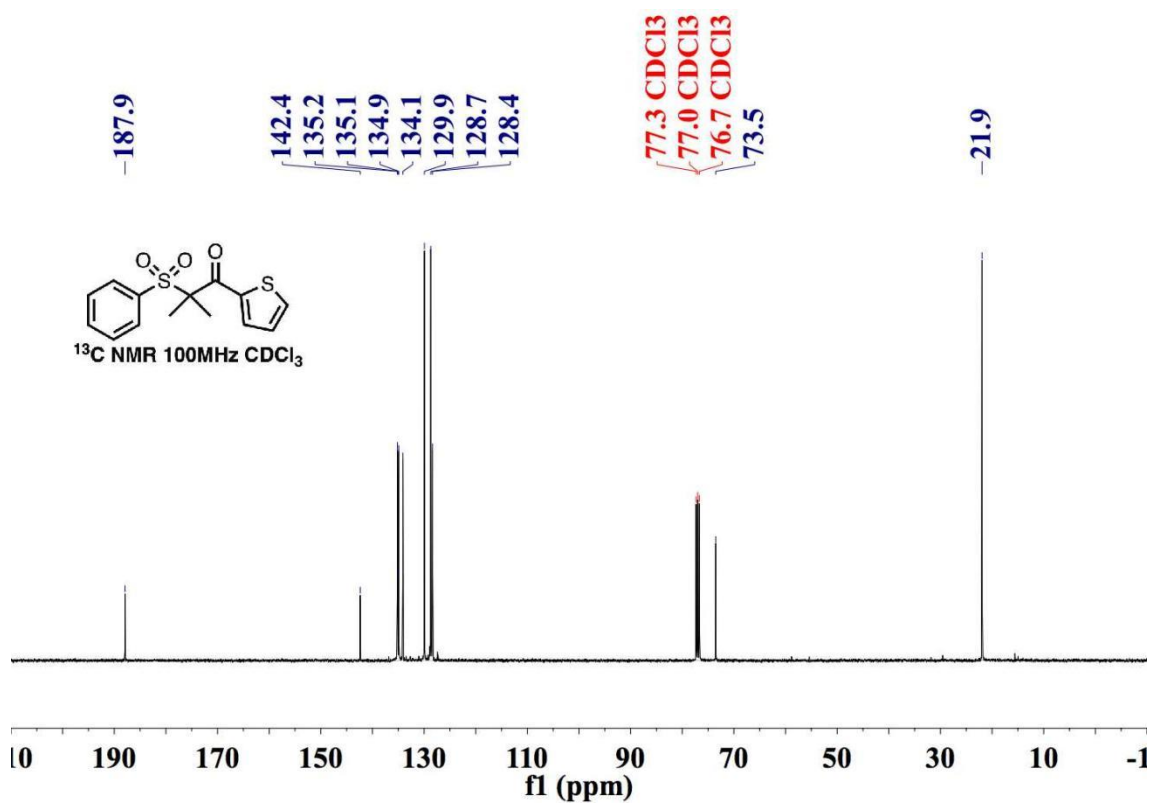
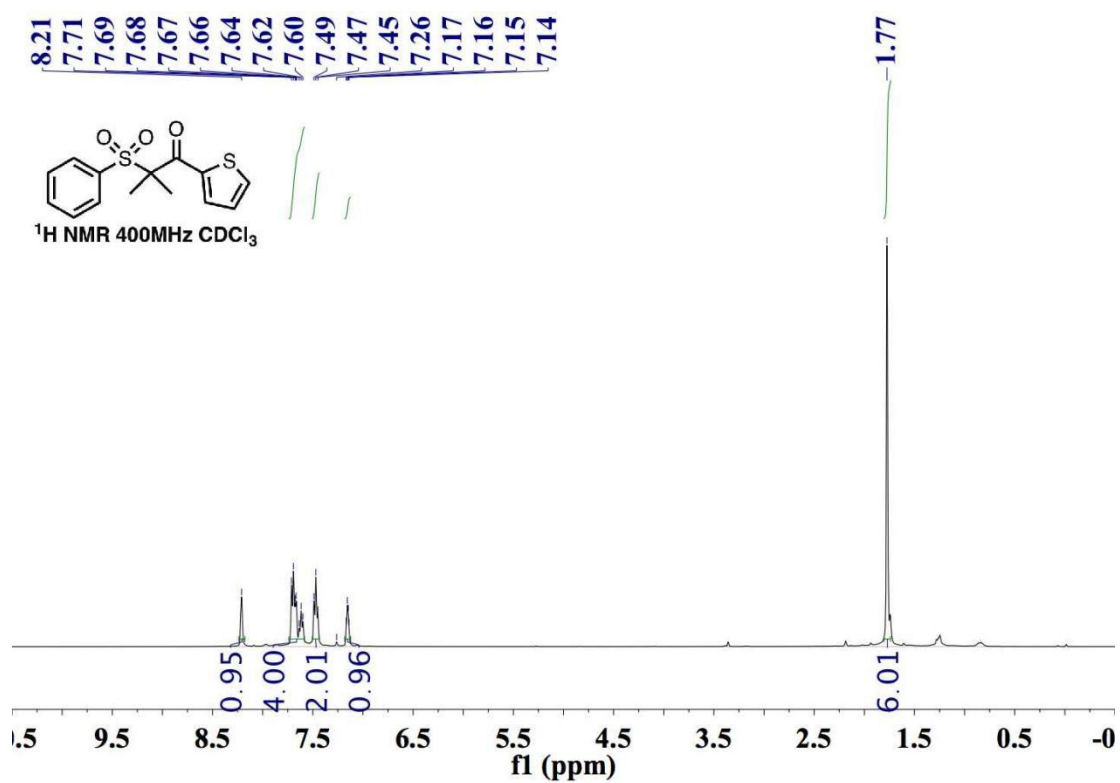


2-Methyl-2-(phenylsulfonyl)-1-(pyridin-2-yl)propan-1-one (1af) :

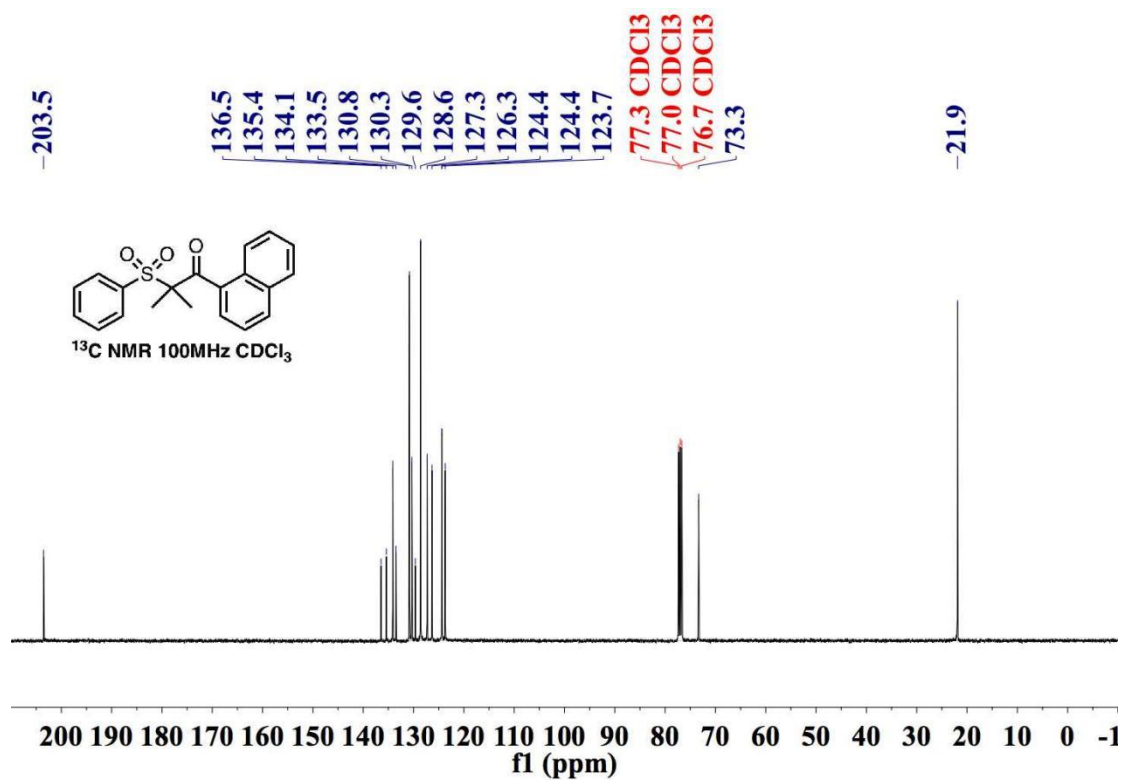
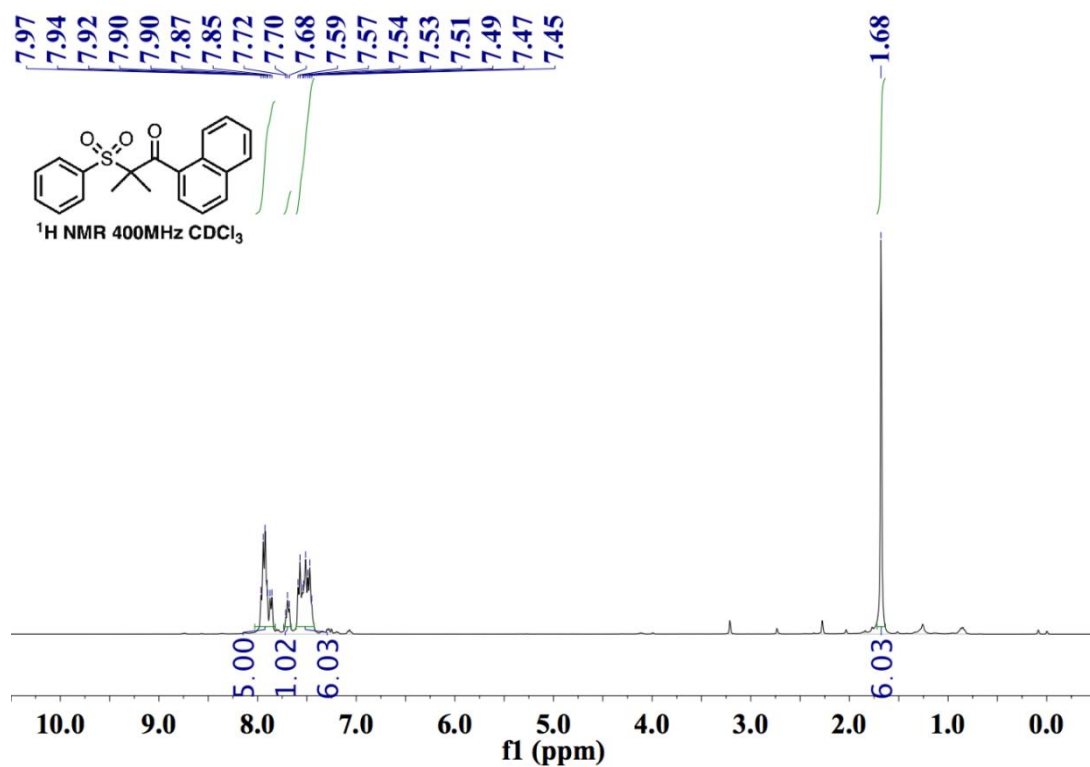




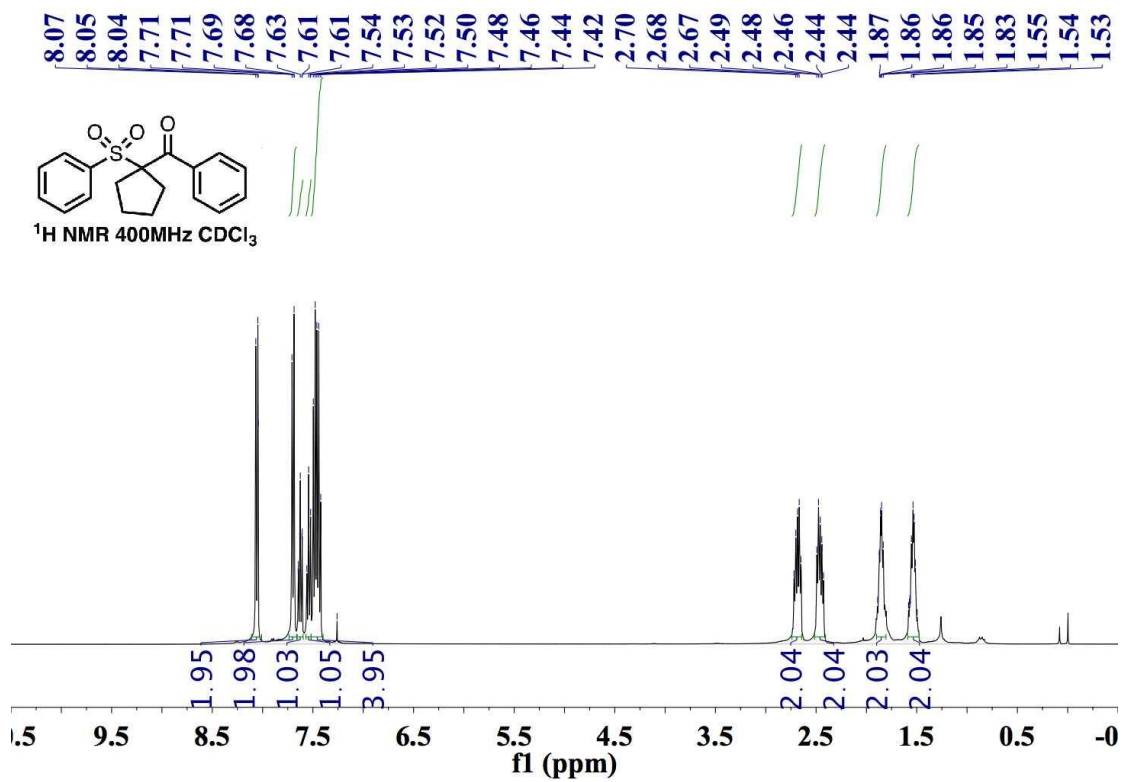
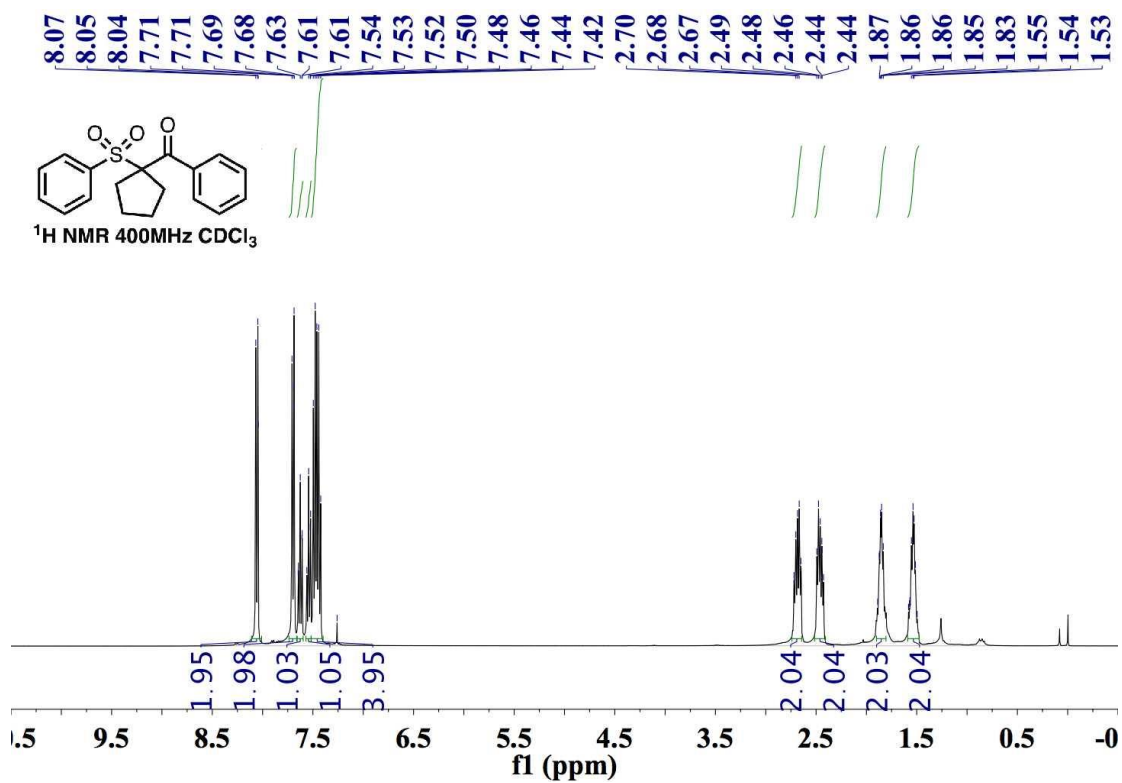
**2-Methyl-2-(phenylsulfonyl)-1-(thiophen-2-yl)propan-1-one (1ag):**



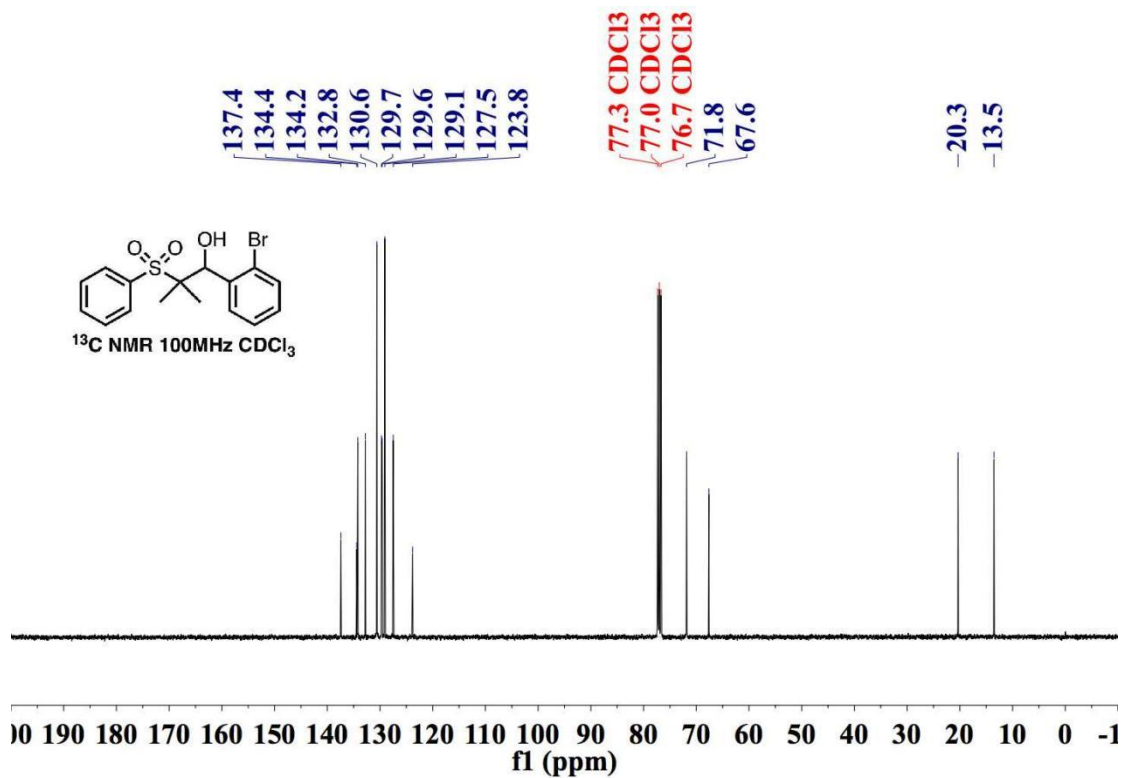
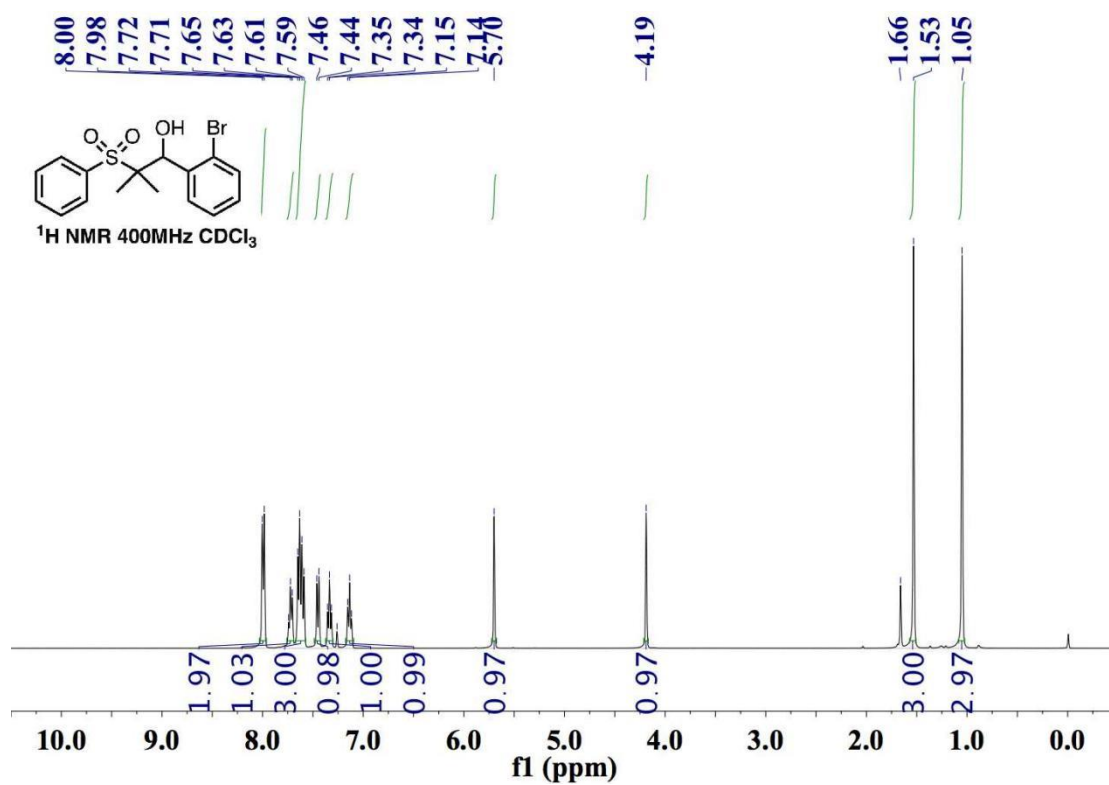
**2-Methyl-1-(naphthalen-1-yl)-2-(phenylsulfonyl)propan-1-one (1ah):**



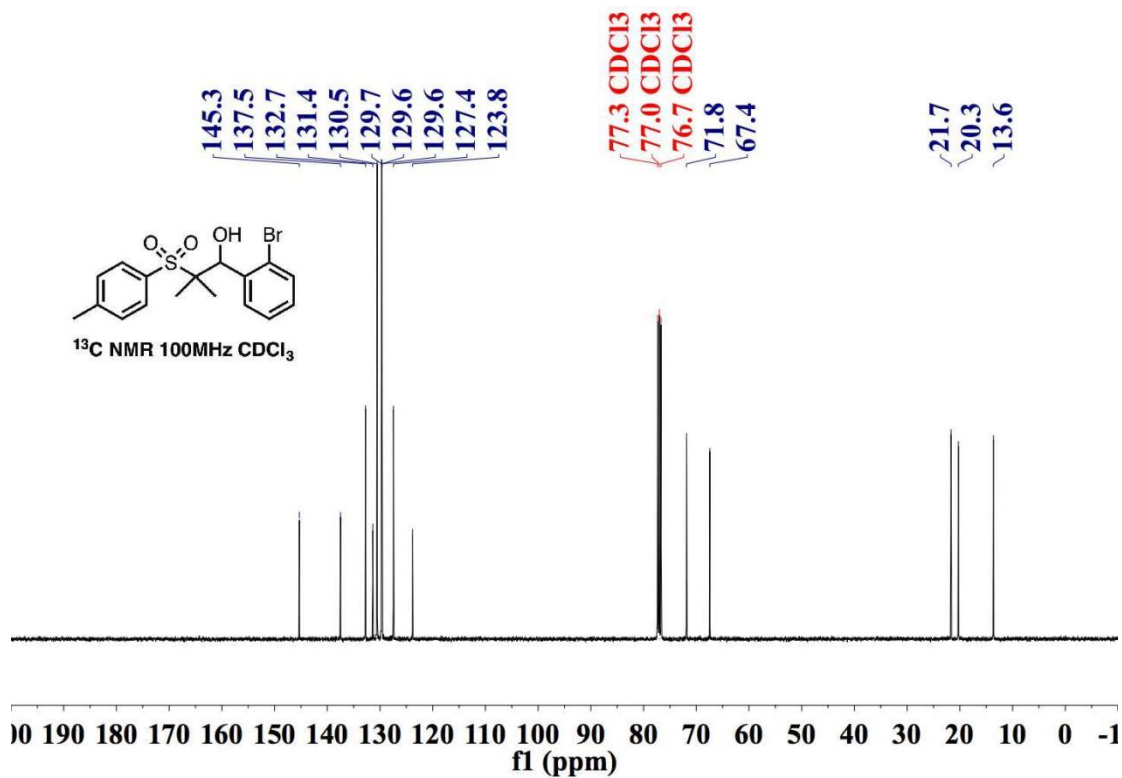
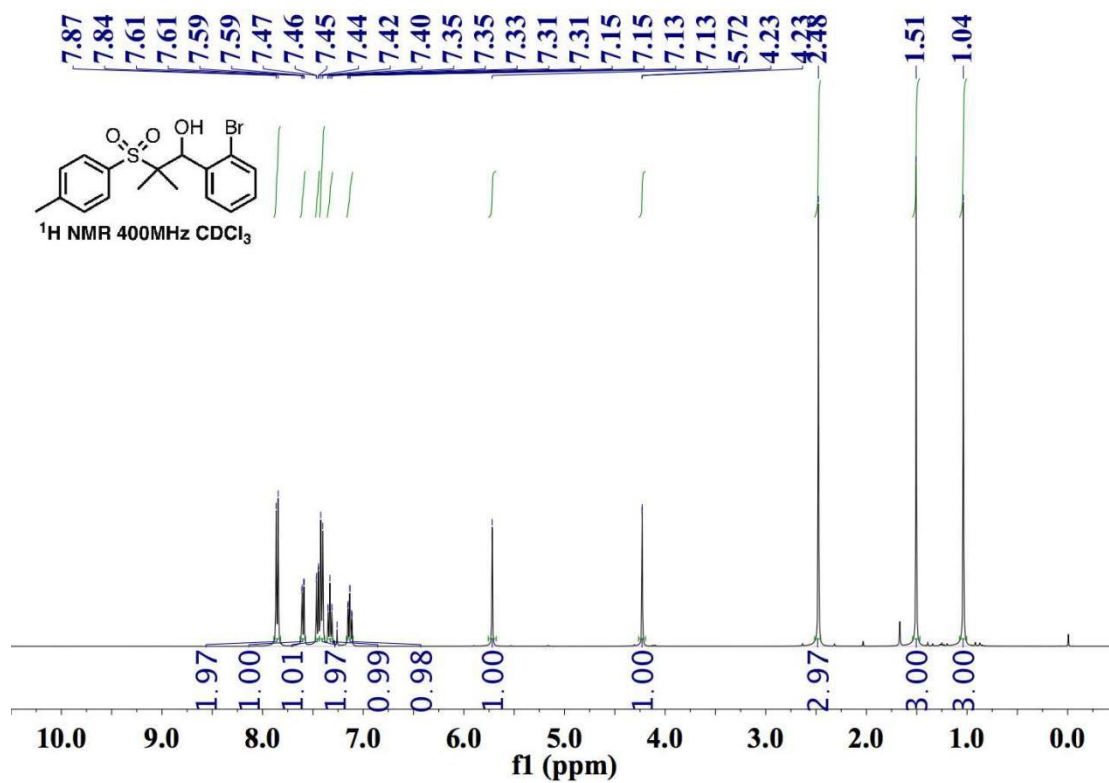
Phenyl(1-(phenylsulfonyl)cyclopentyl)methanone (1ai):



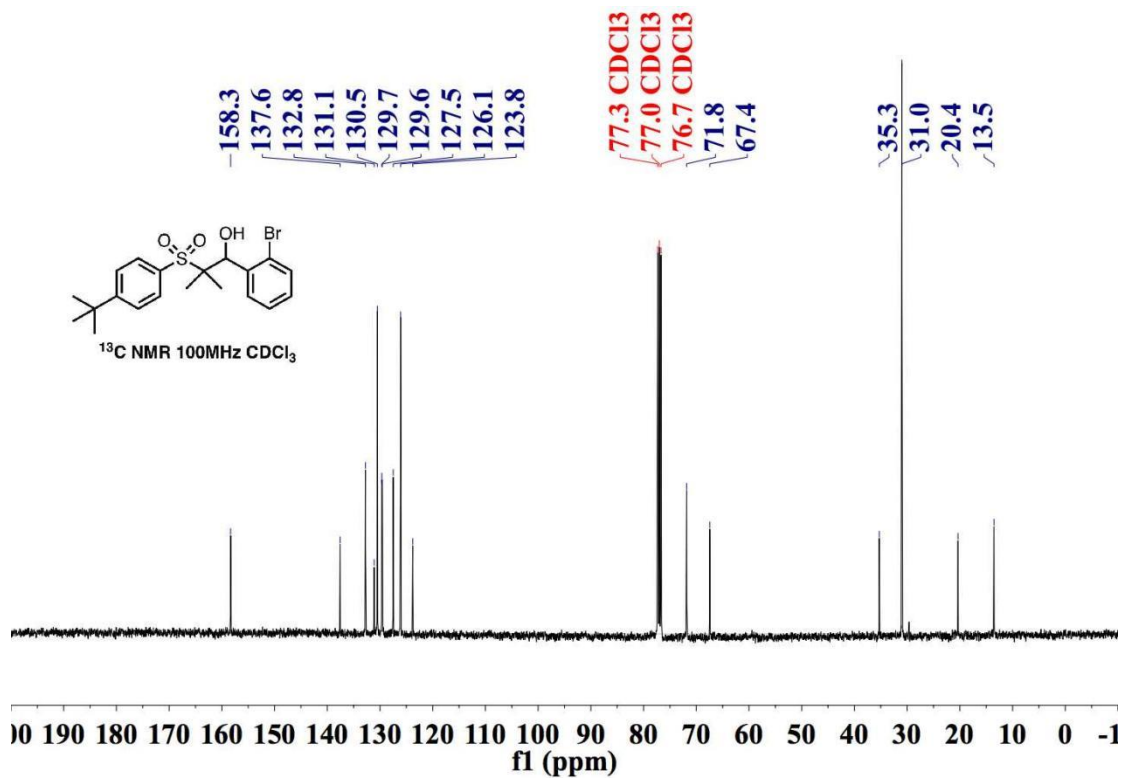
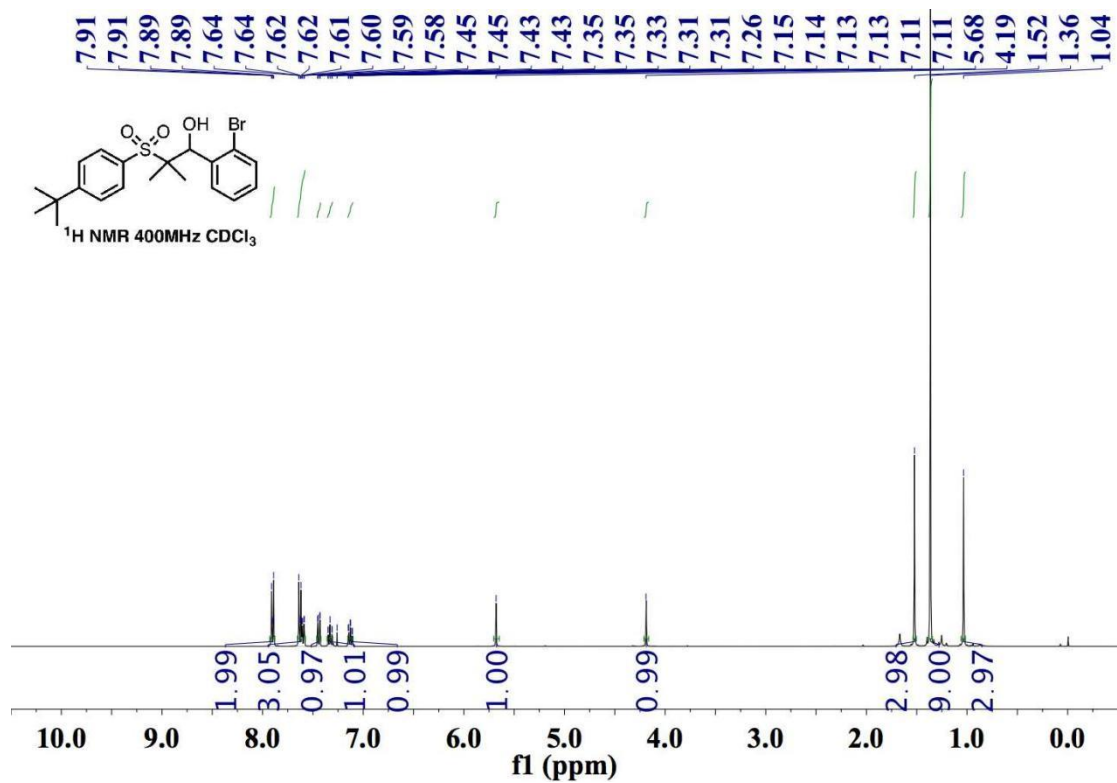
**1-(2-Bromophenyl)-2-methyl-2-(phenylsulfonyl)propan-1-ol (2a):**



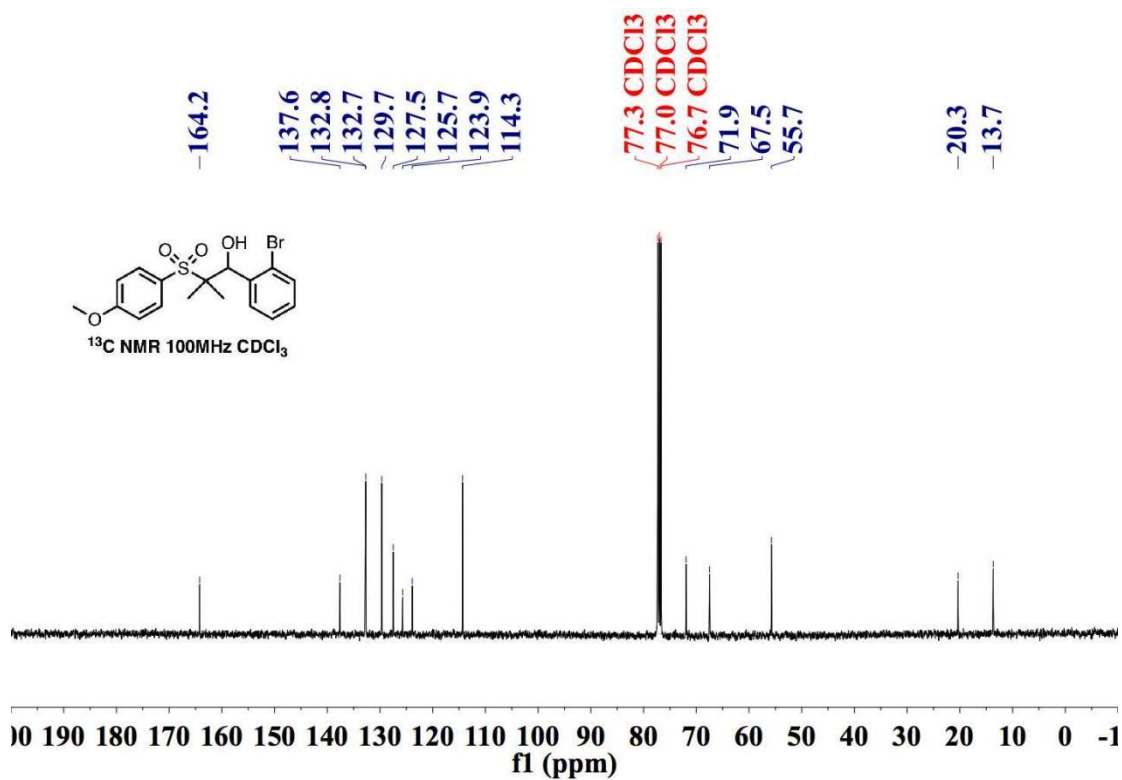
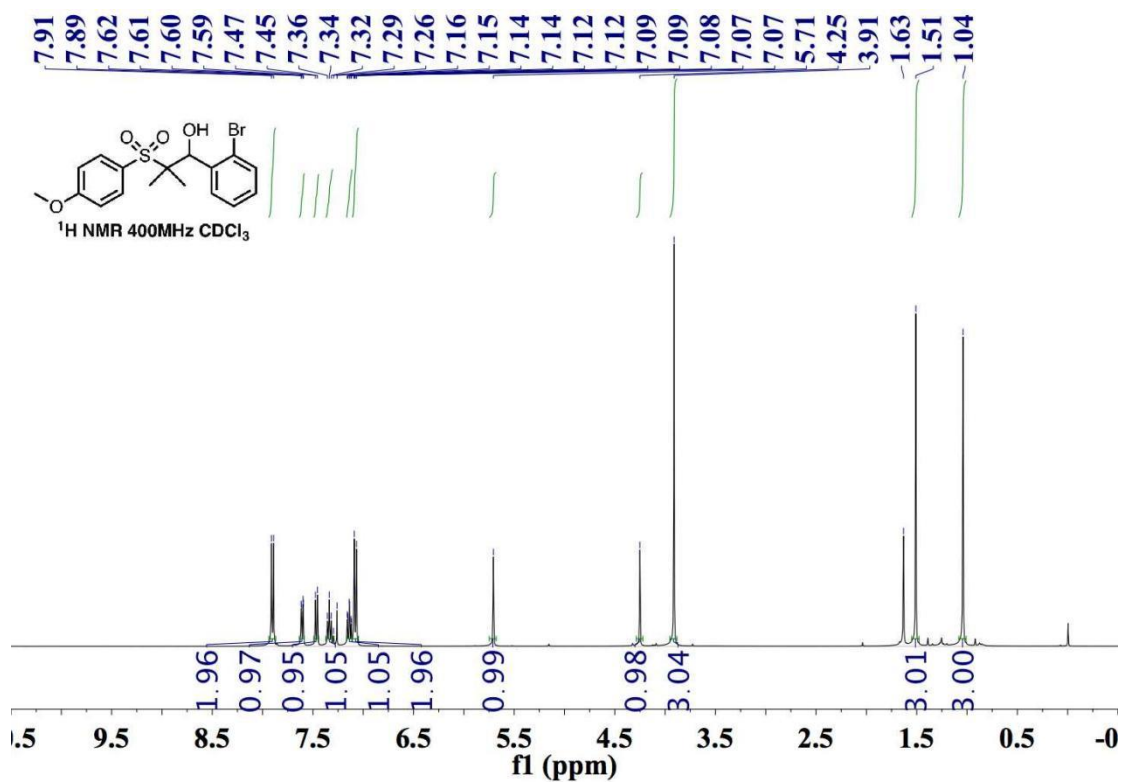
**1-(2-Bromophenyl)-2-methyl-2-tosylpropan-1-ol (2b):**



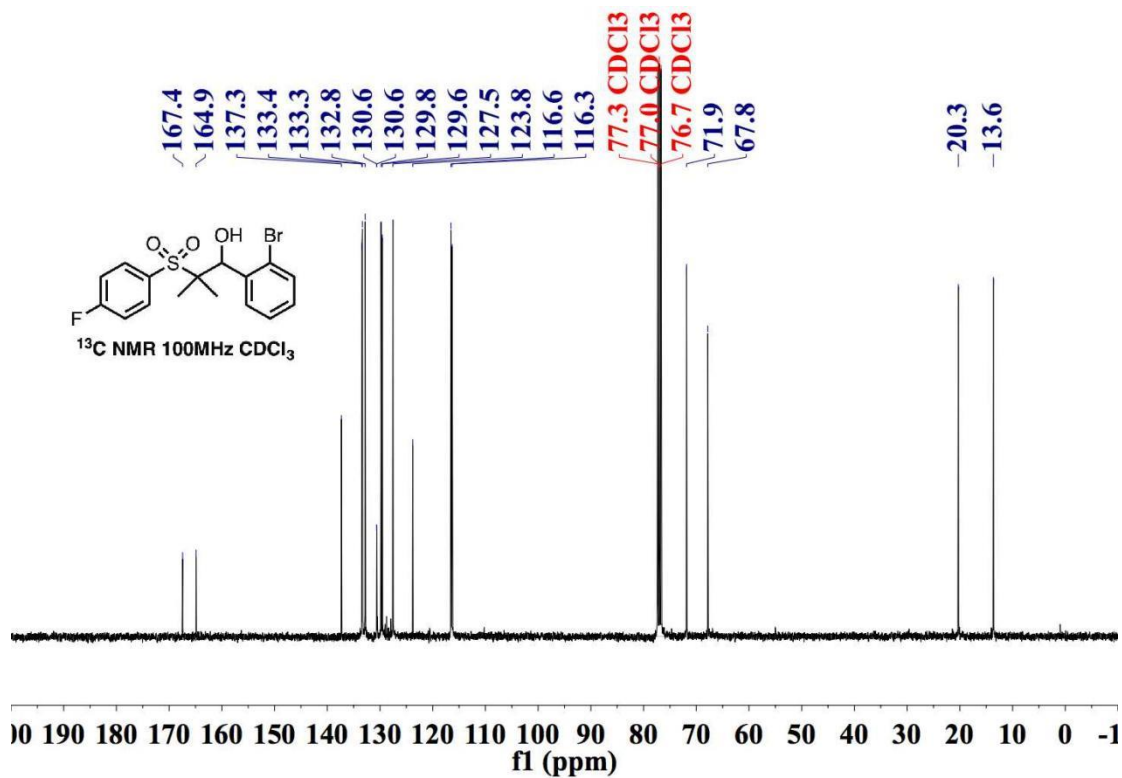
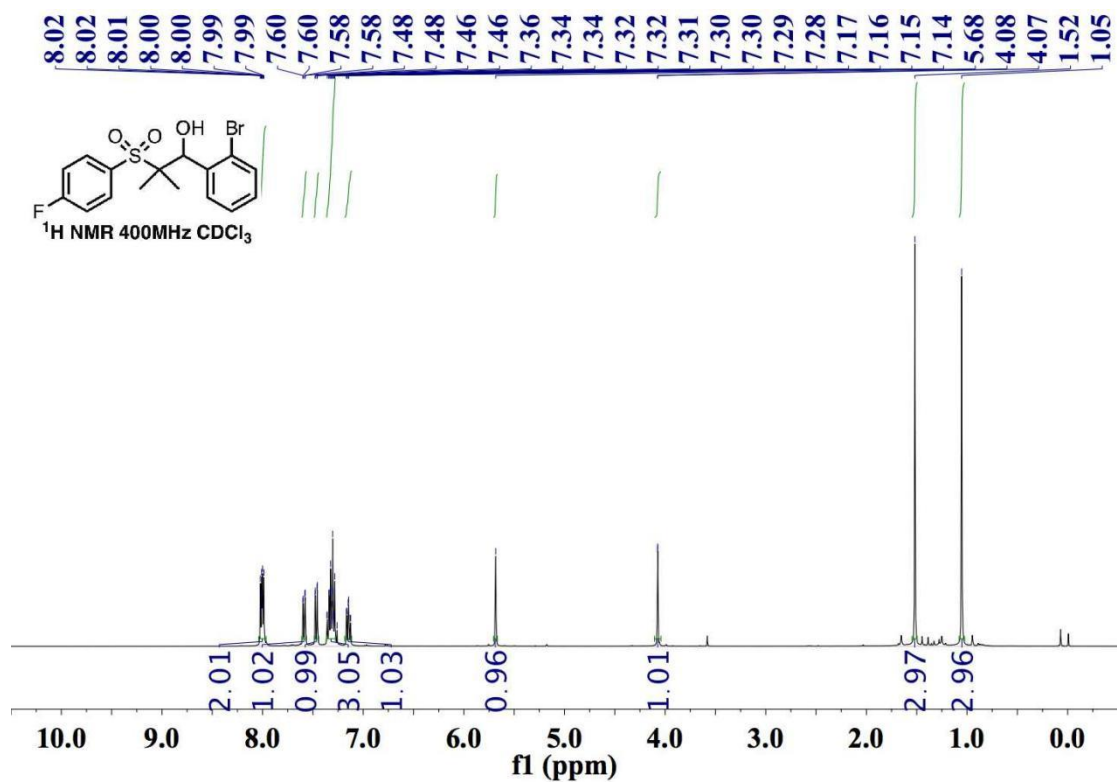
**1-(2-Bromophenyl)-2-((4-(tert-butyl)phenyl)sulfonyl)-2-methylpropan-1-ol (2c):**



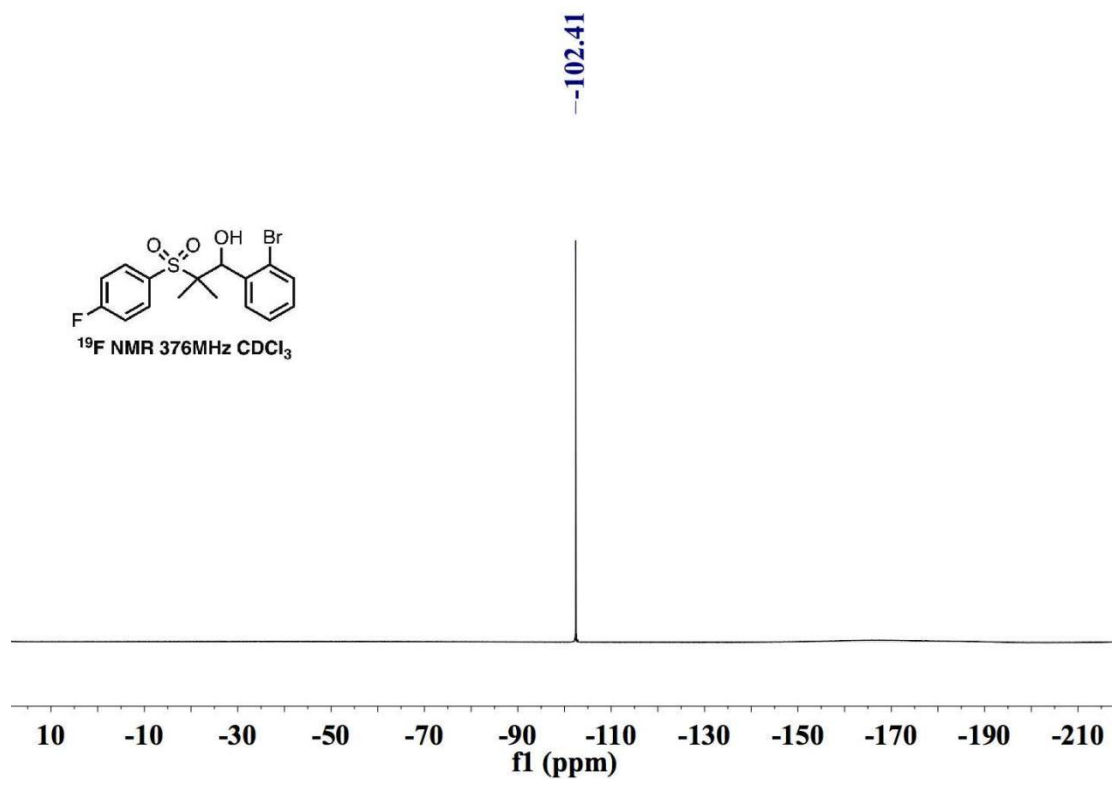
**1-(2-Bromophenyl)-2-((4-methoxyphenyl)sulfonyl)-2-methylpropan-1-ol (2d):**



**1-(2-Bromophenyl)-2-((4-fluorophenyl)sulfonyl)-2-methylpropan-1-ol (2e):**

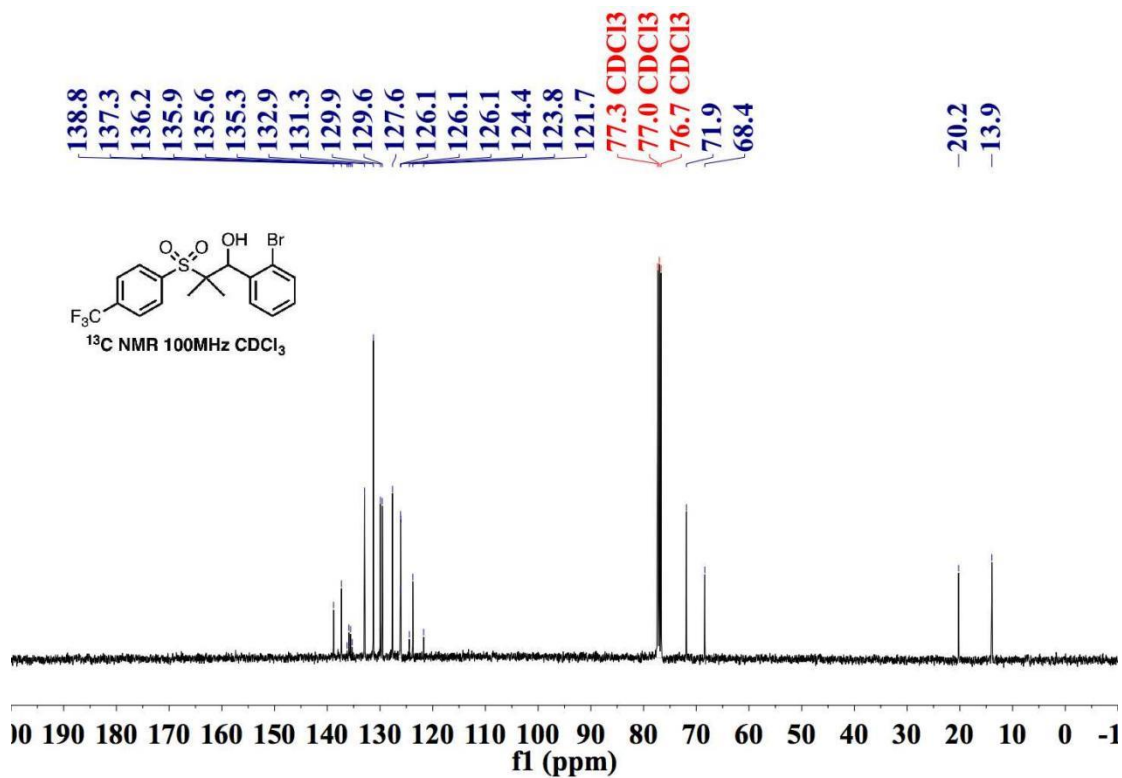
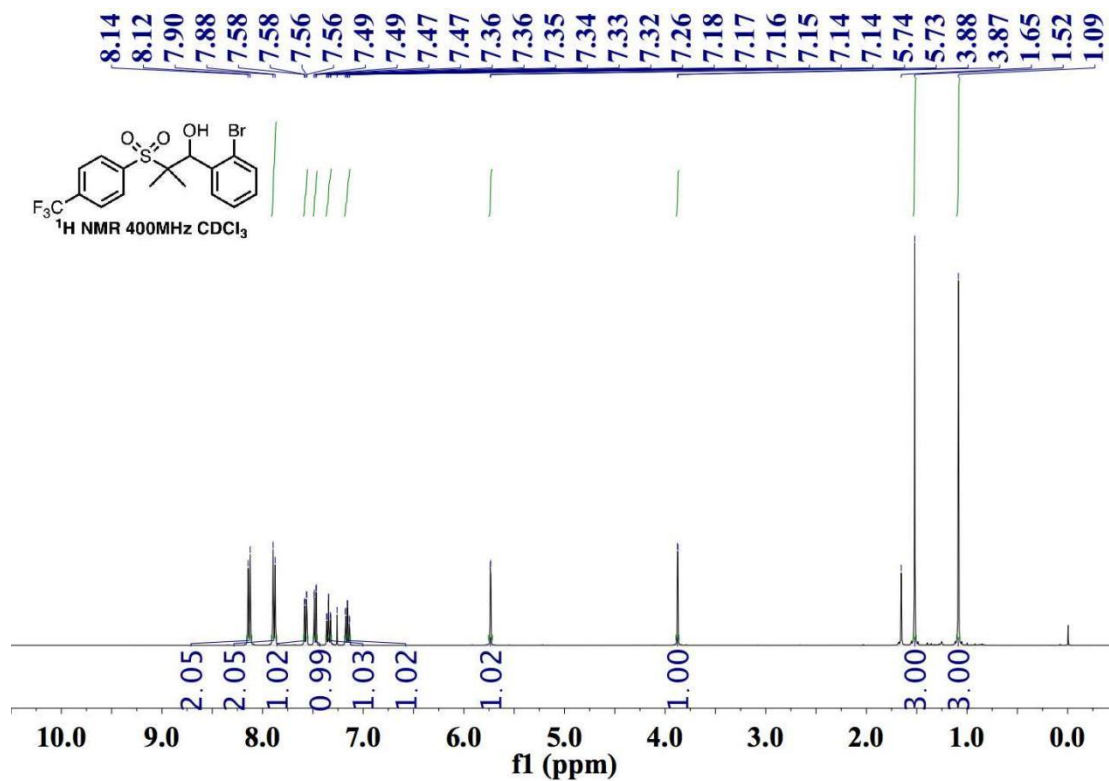


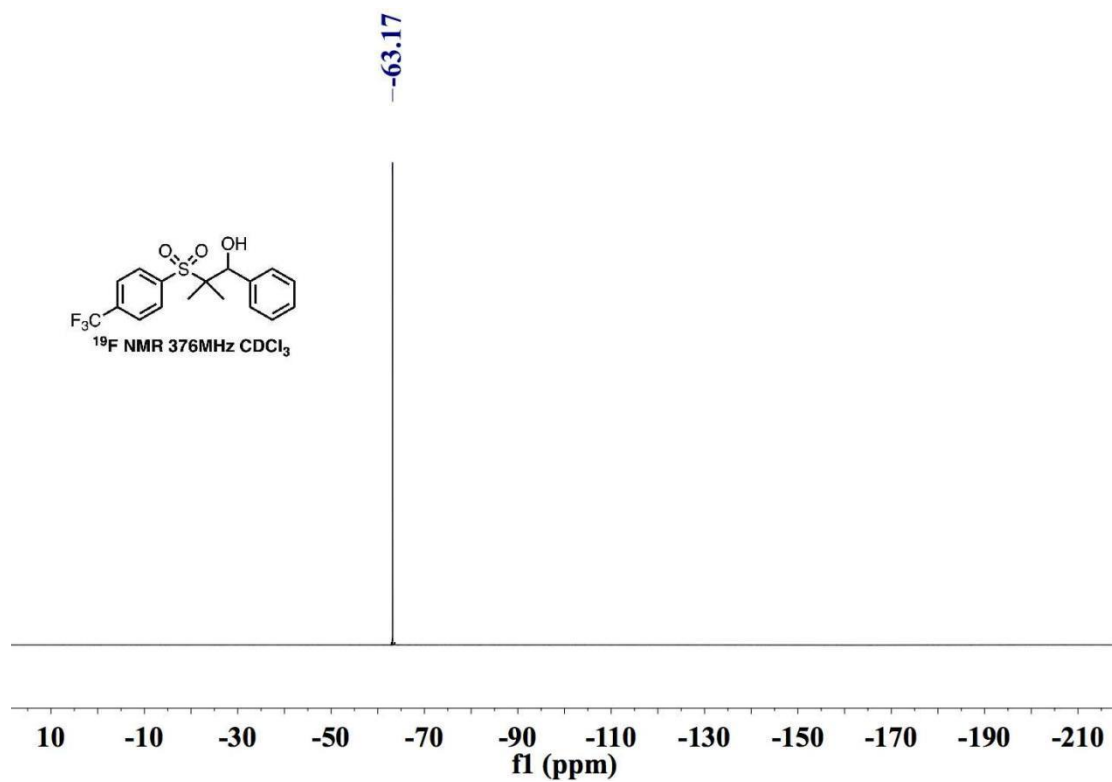




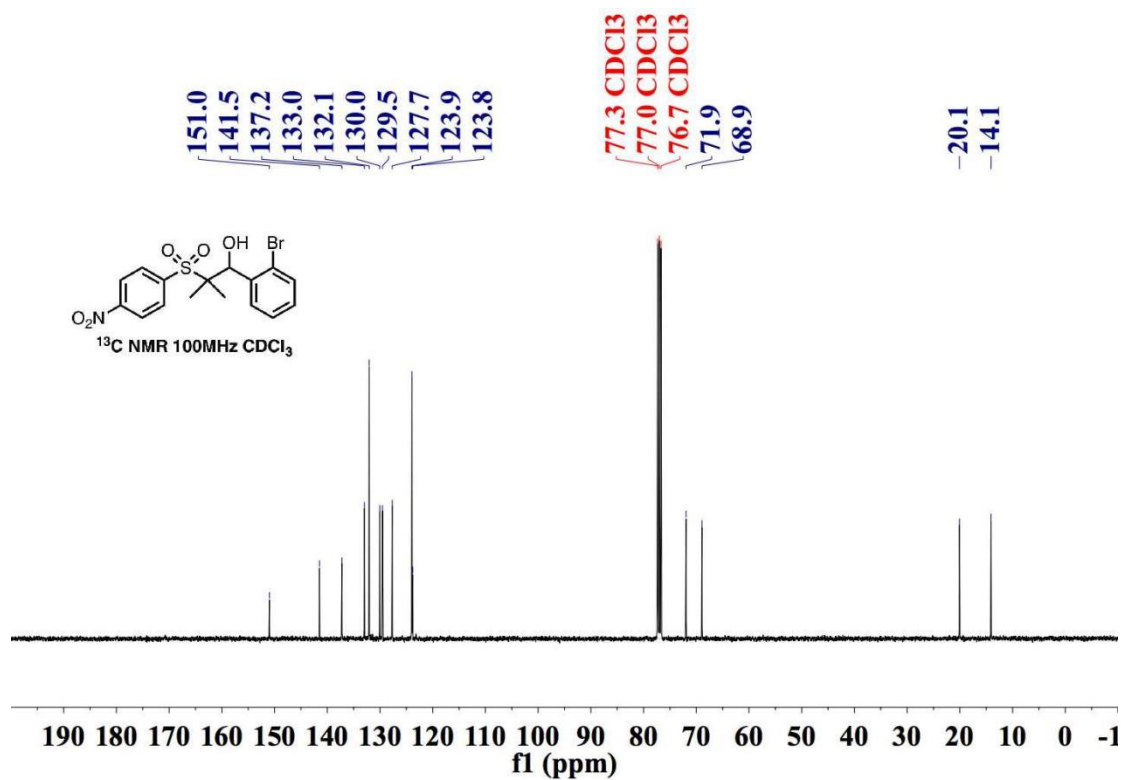
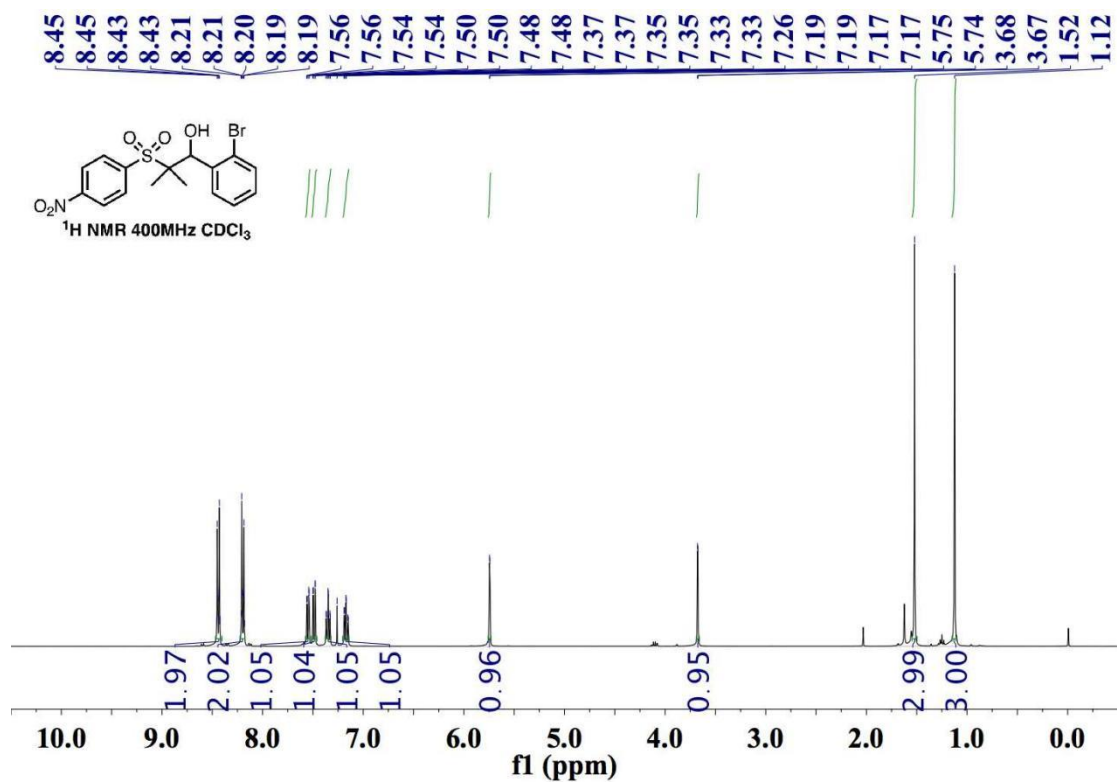
**1-(2-Bromophenyl)-2-methyl-2-((4-(trifluoromethyl)phenyl)sulfonyl)propan-1-ol**

**(2f):**

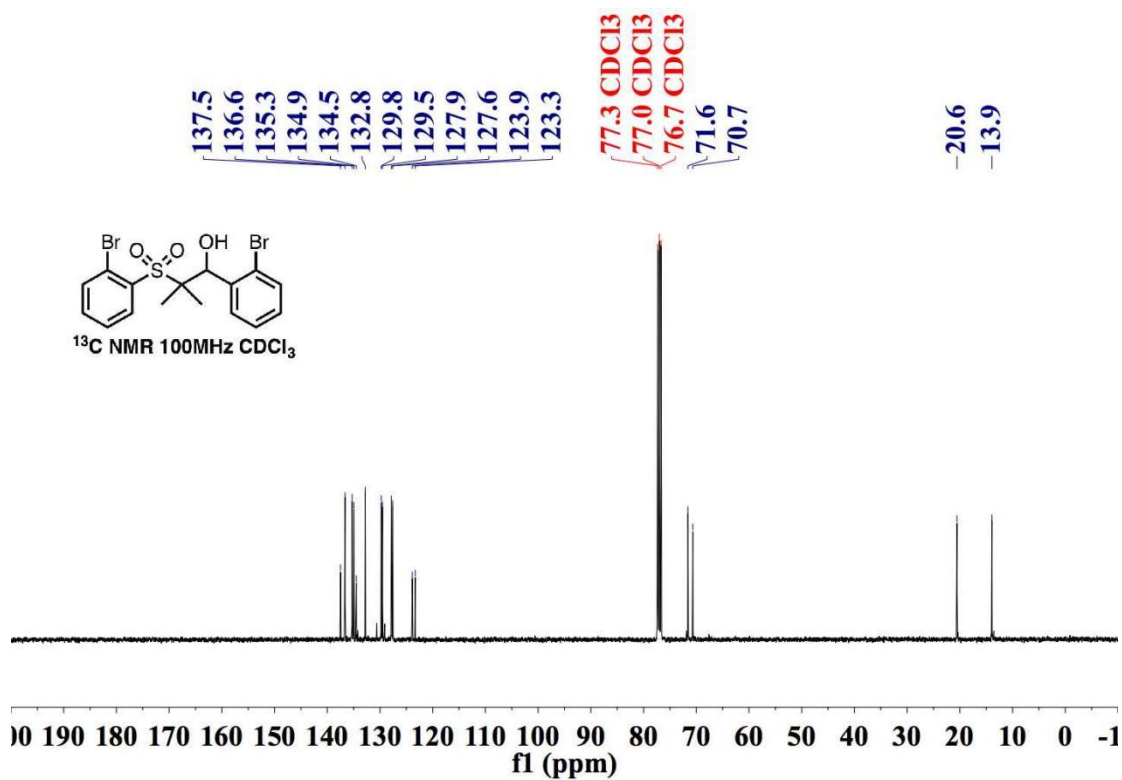
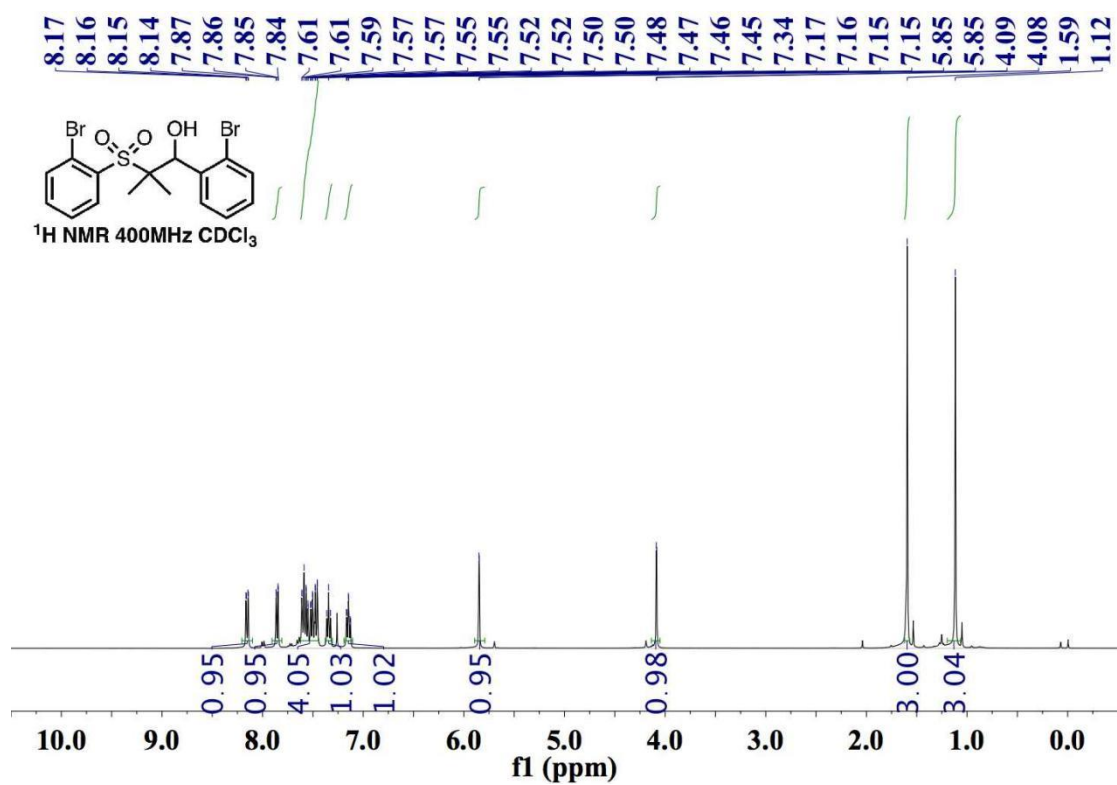




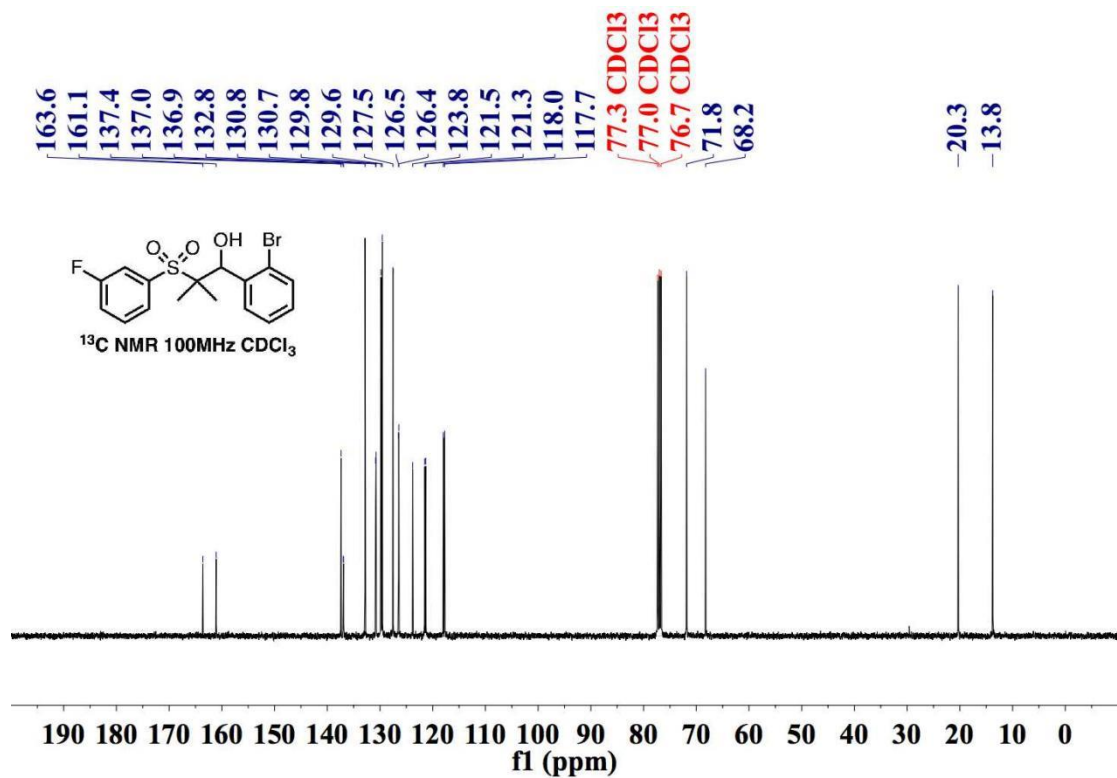
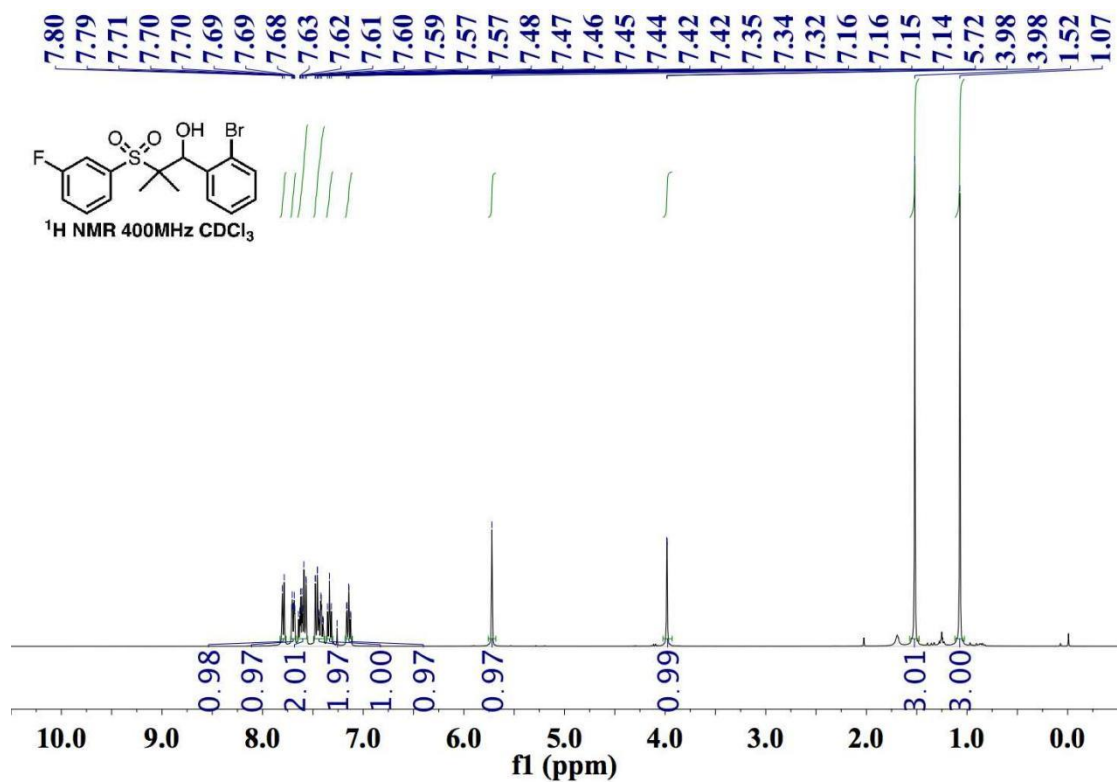
**1-(2-Bromophenyl)-2-methyl-2-((4-nitrophenyl)sulfonyl)-propan-1-ol (2g):**

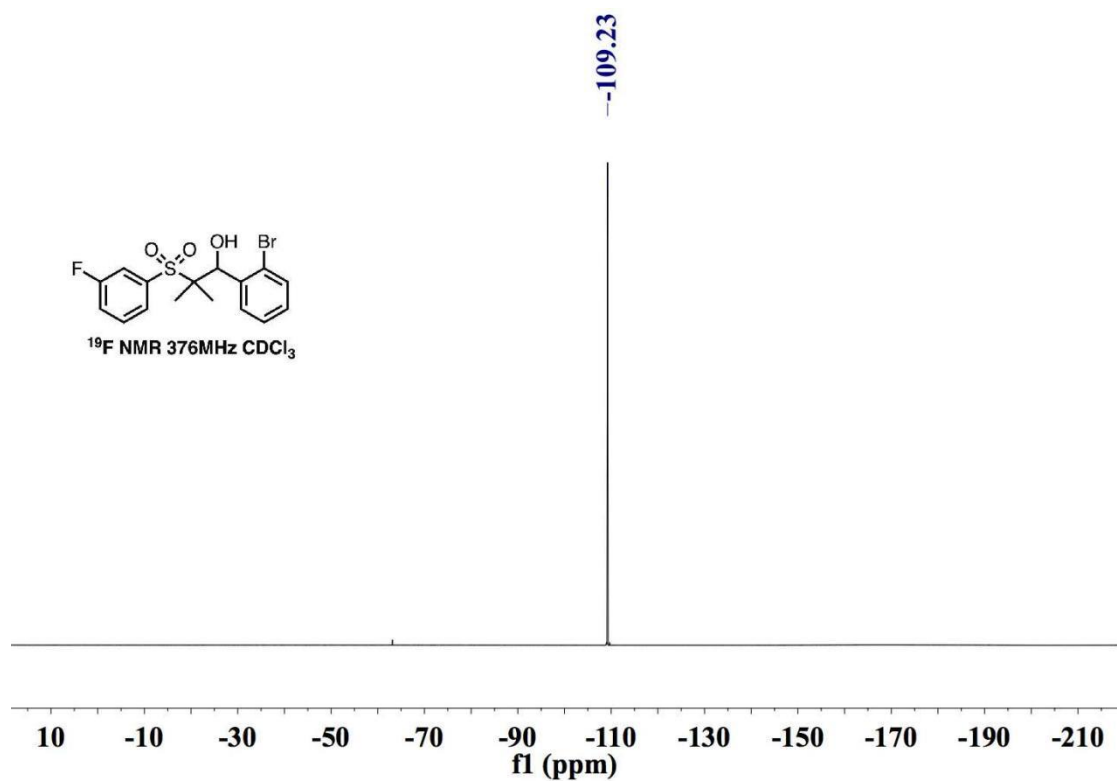


**1-(2-Bromophenyl)-2-((2-bromophenyl)sulfonyl)-2-methylpropan-1-ol (2h):**

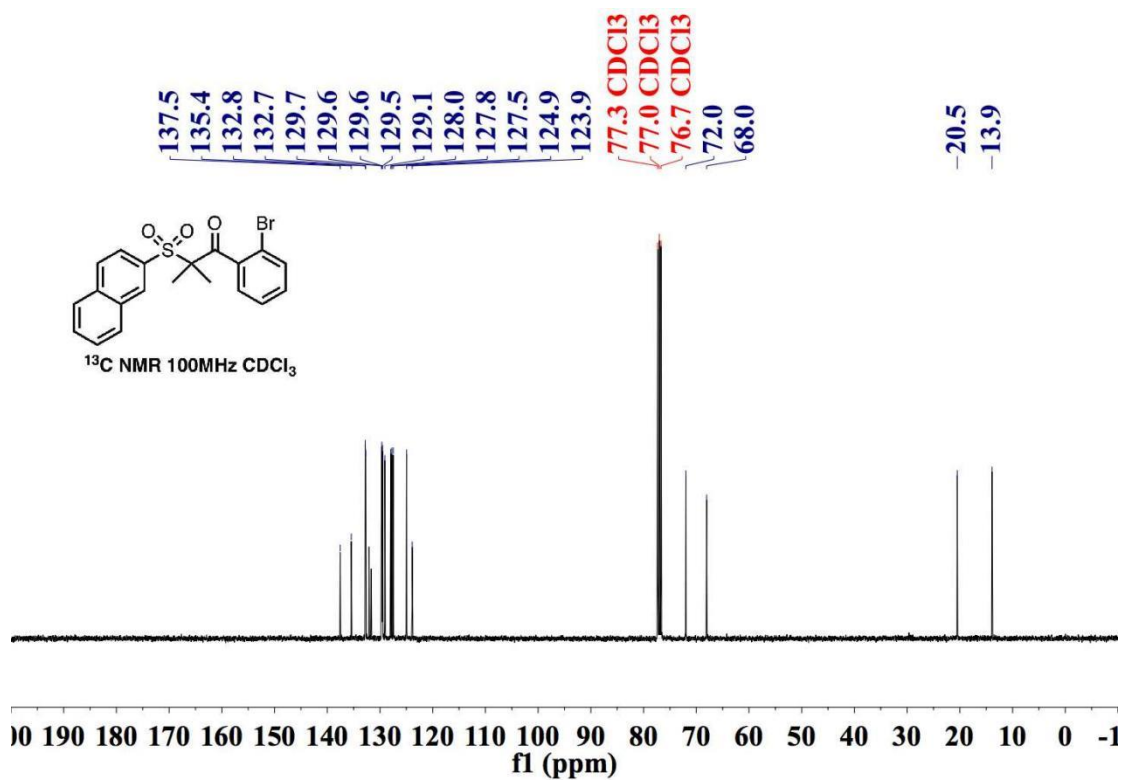
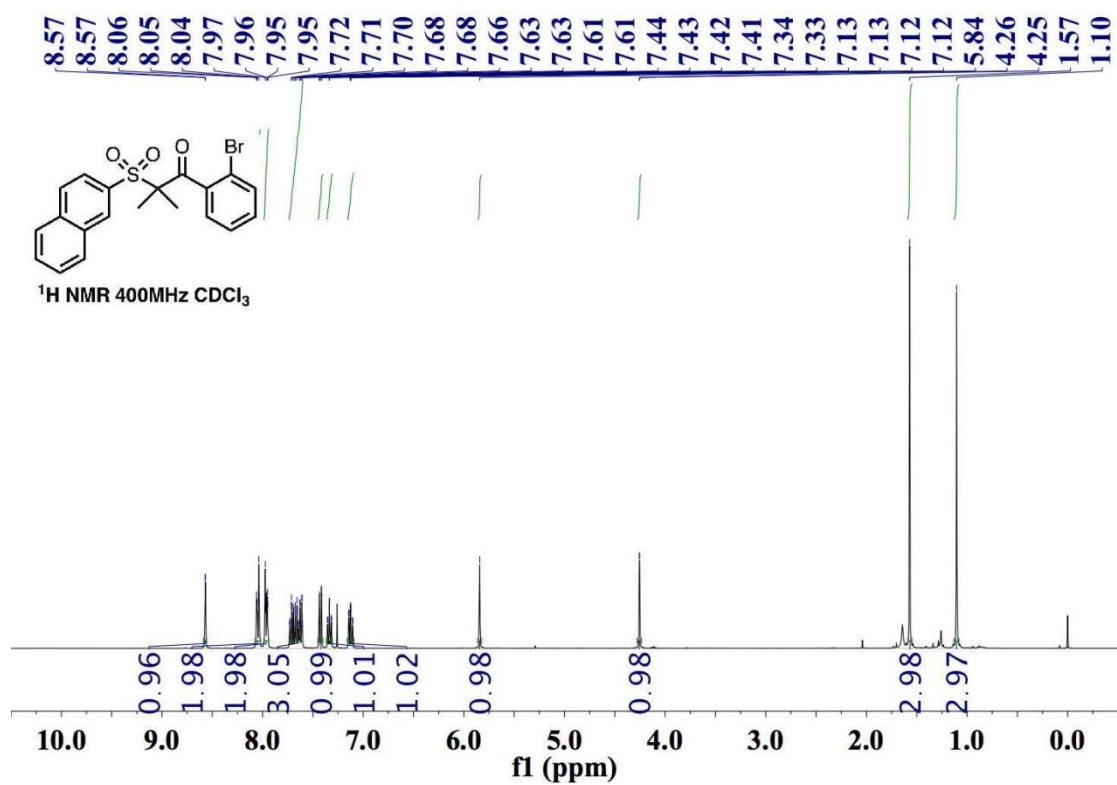


**1-(2-Bromophenyl)-2-((3-fluorophenyl)sulfonyl)-2-methylpropan-1-ol (2i):**



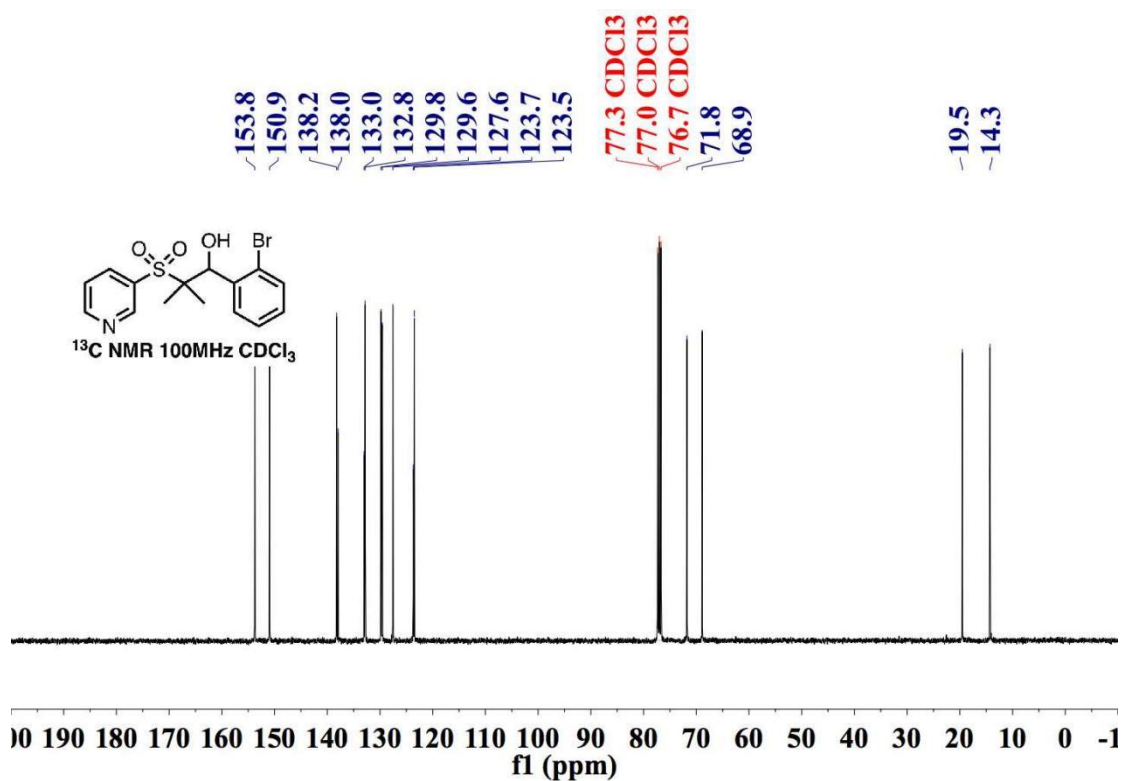
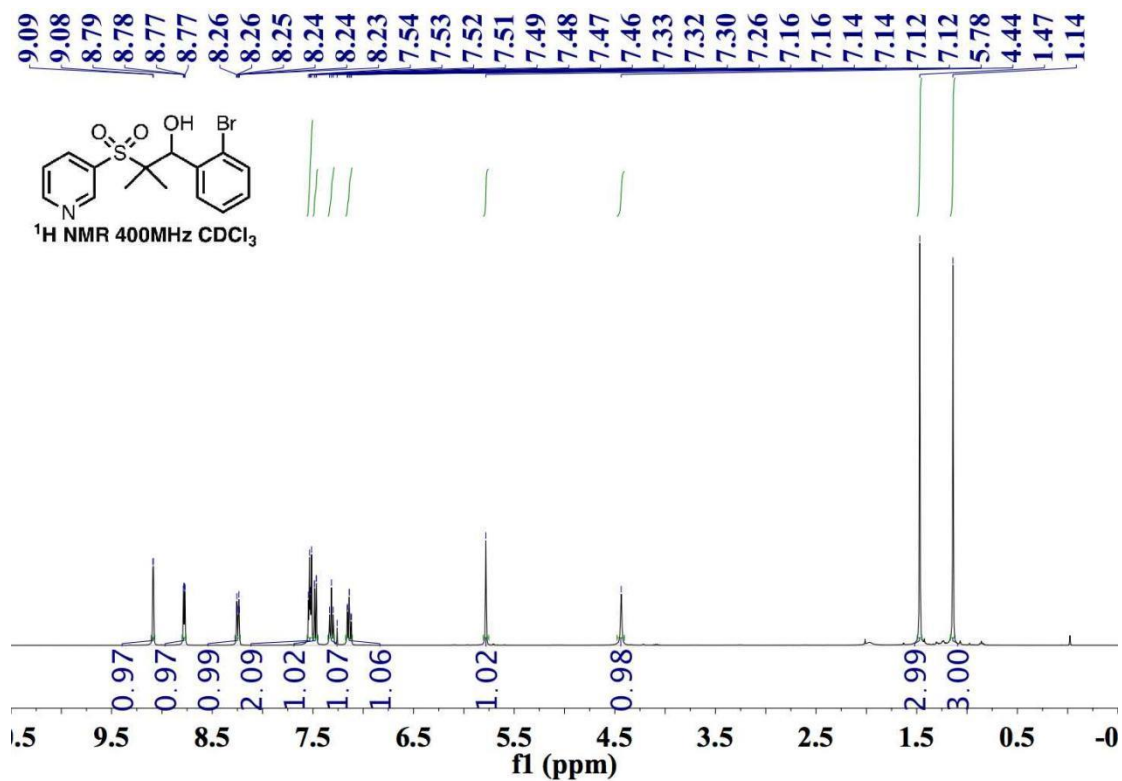


**1-(2-Bromophenyl)-2-methyl-2-(naphthalen-2-ylsulfonyl)propan-1-ol (2j):**

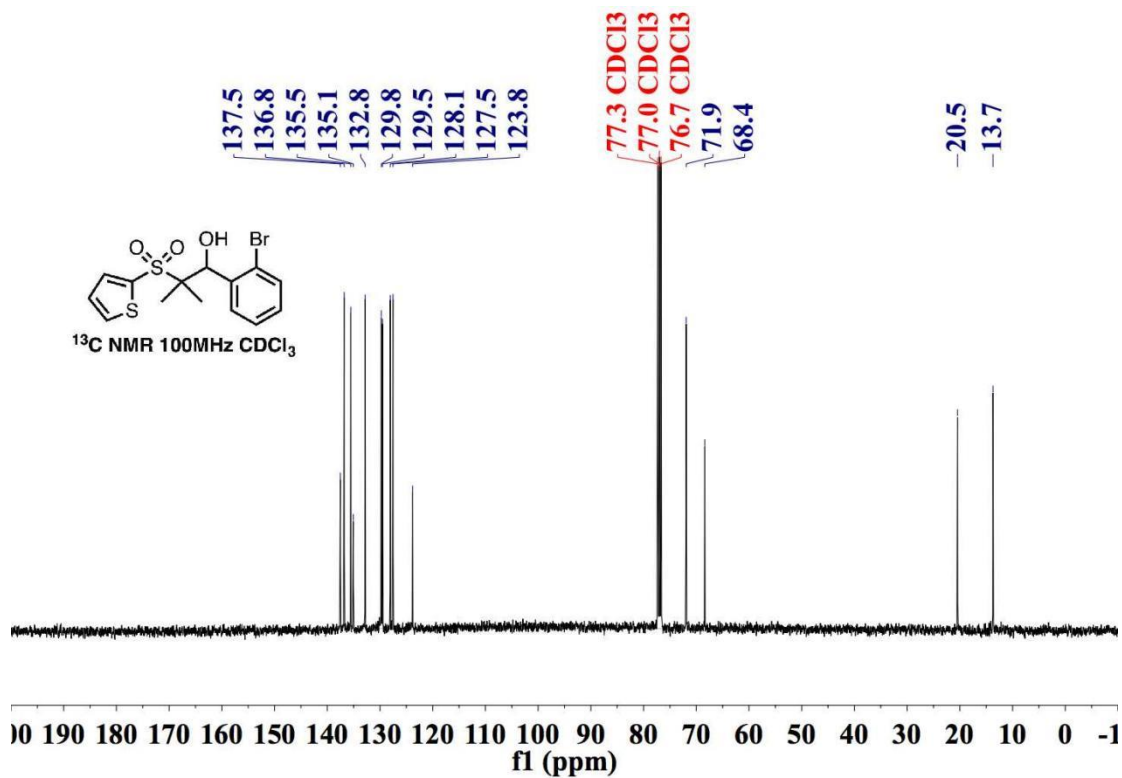
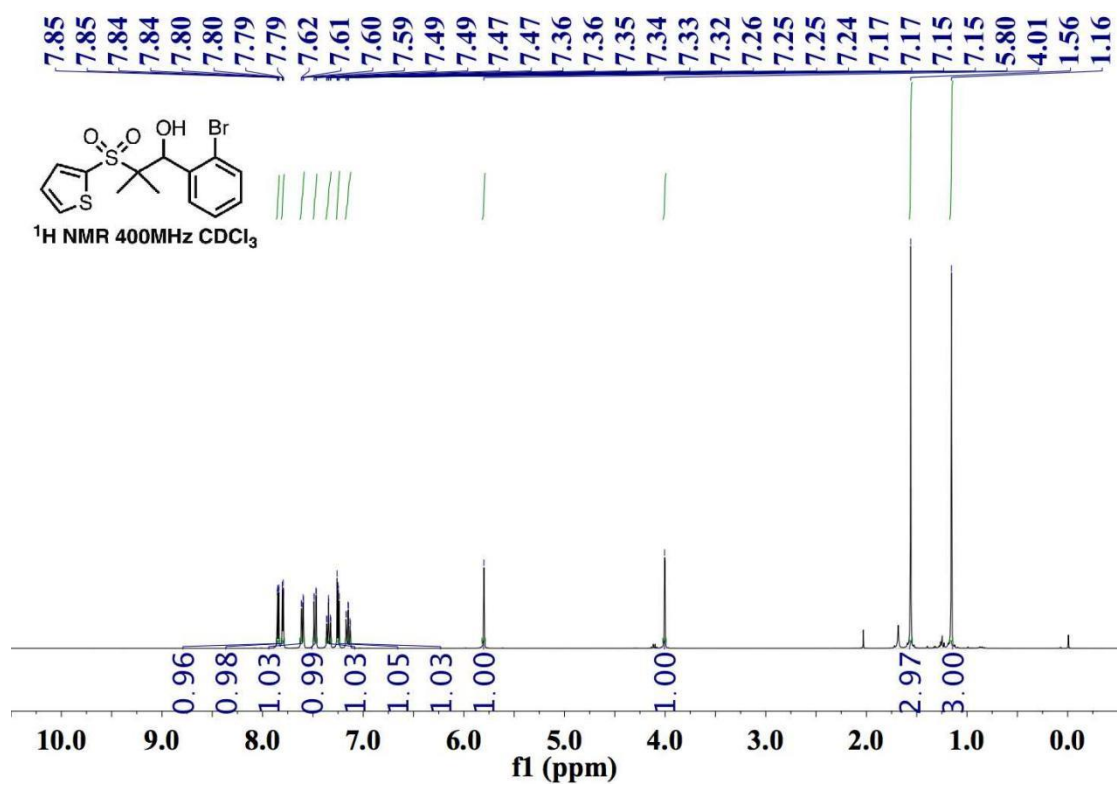




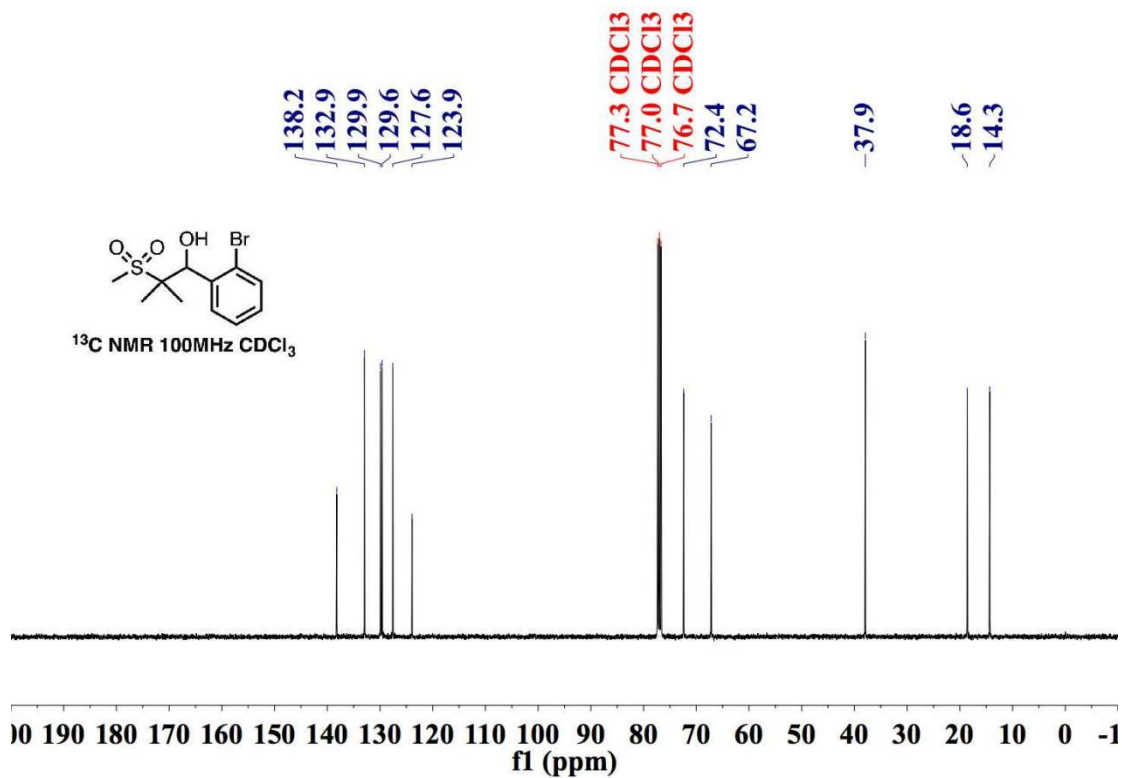
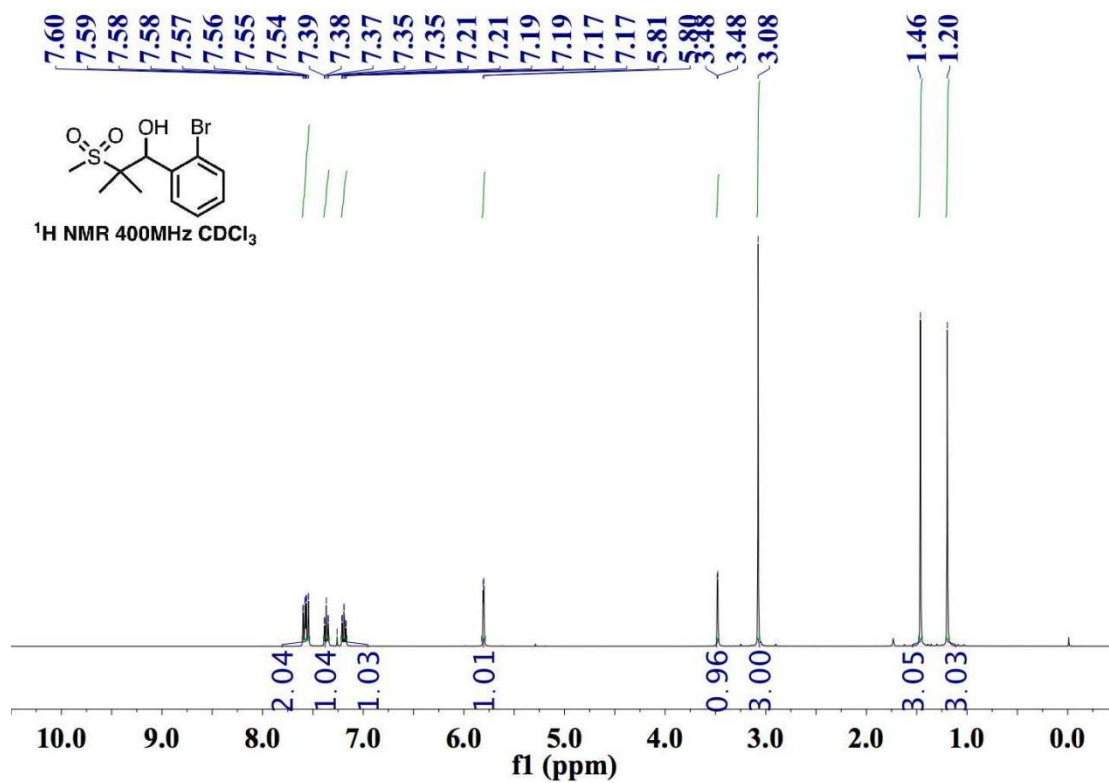
1-(2-Bromophenyl)-2-methyl-2-(pyridin-3-ylsulfonyl)propan-1-ol (2k):



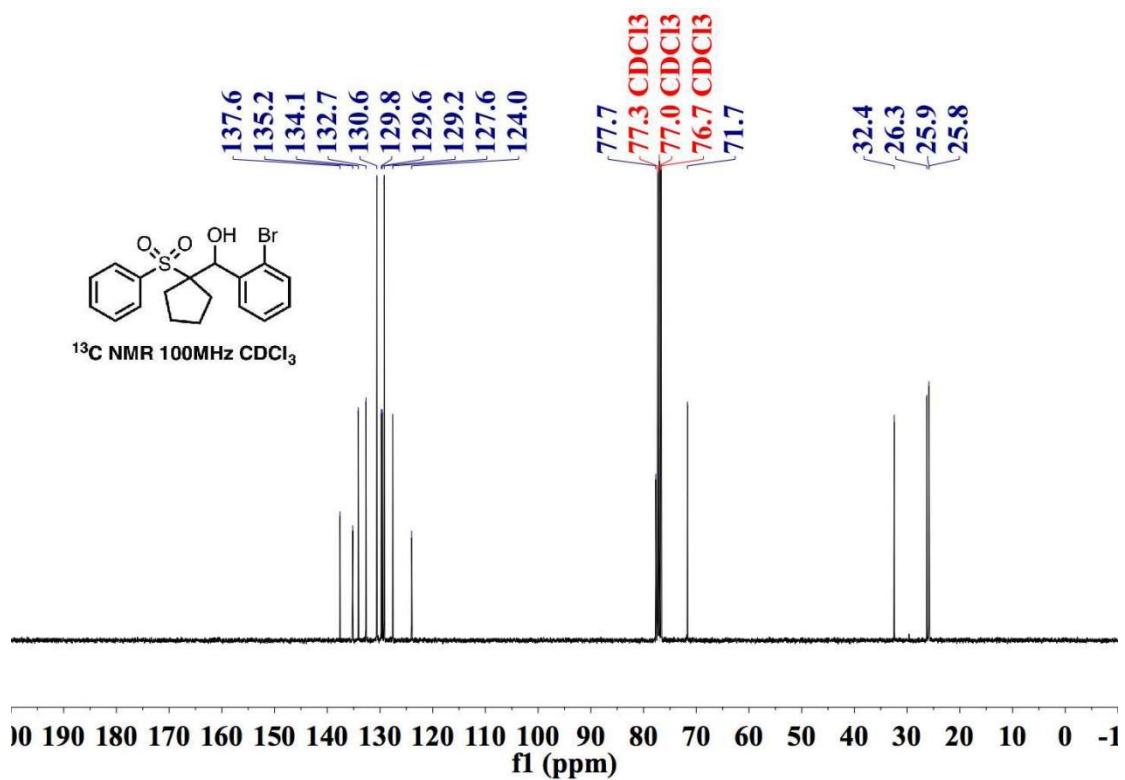
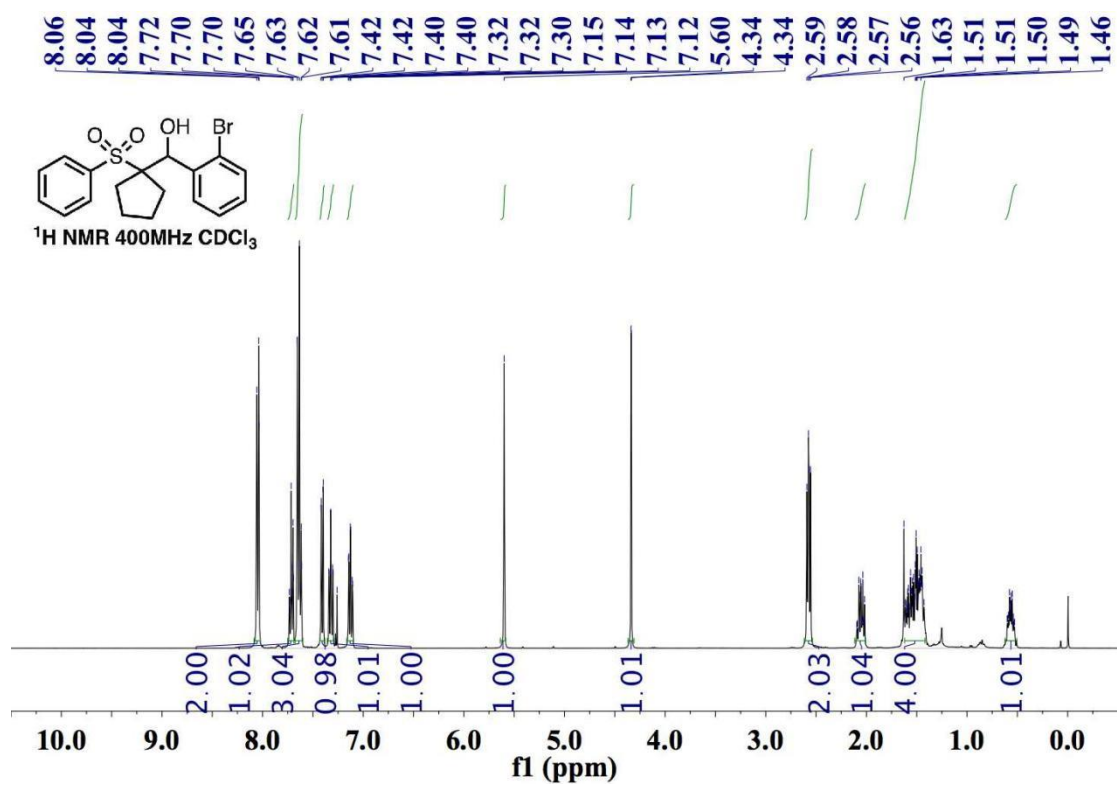
**1-(2-Bromophenyl)-2-methyl-2-(thiophen-2-ylsulfonyl)propan-1-ol (2l):**



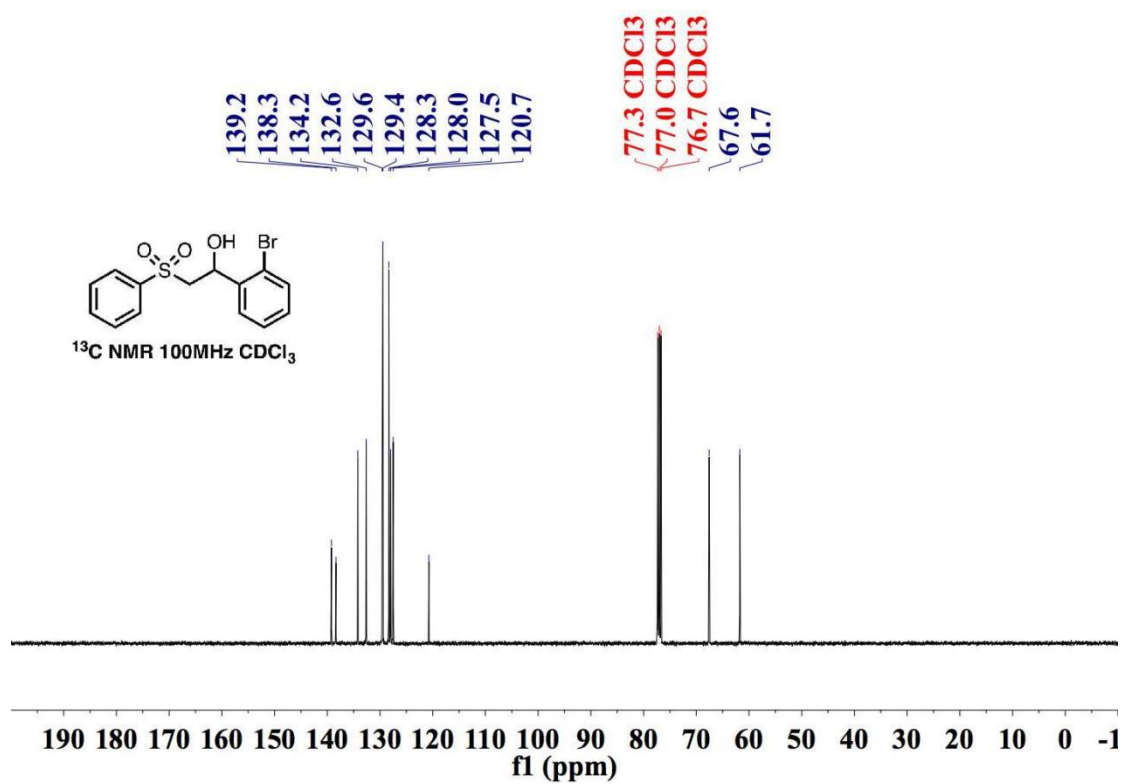
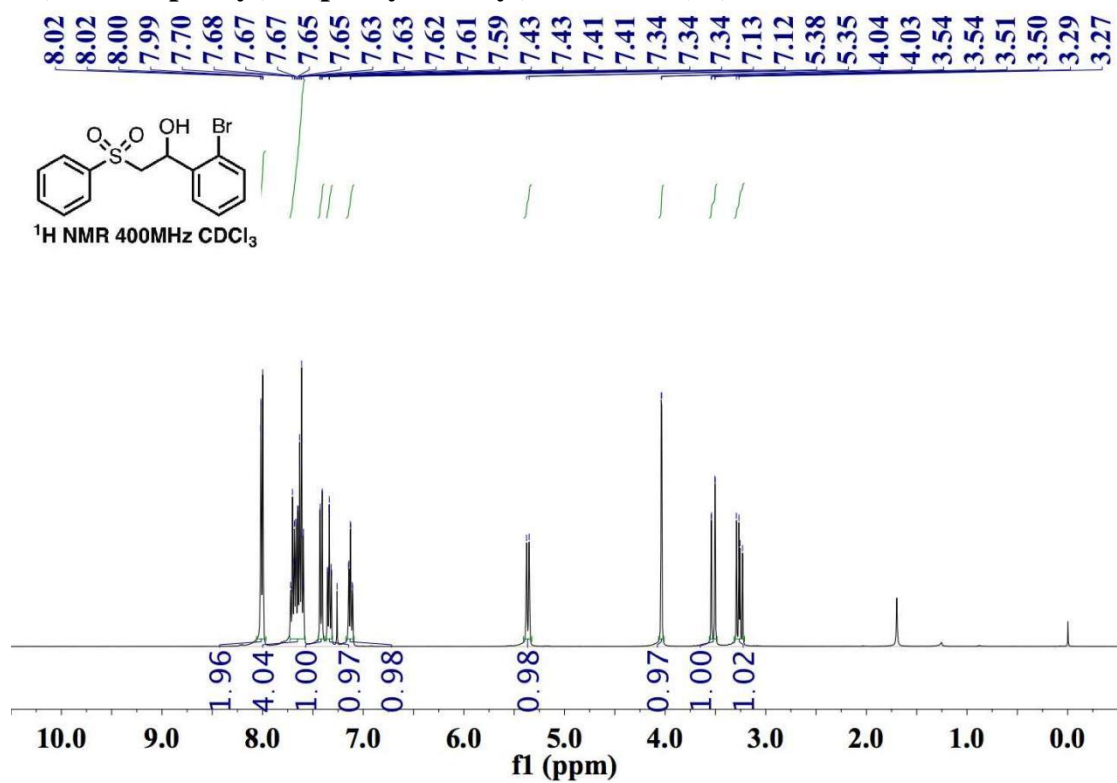
**1-(2-Bromophenyl)-2-methyl-2-(methylsulfonyl)propan-1-ol (2m):**



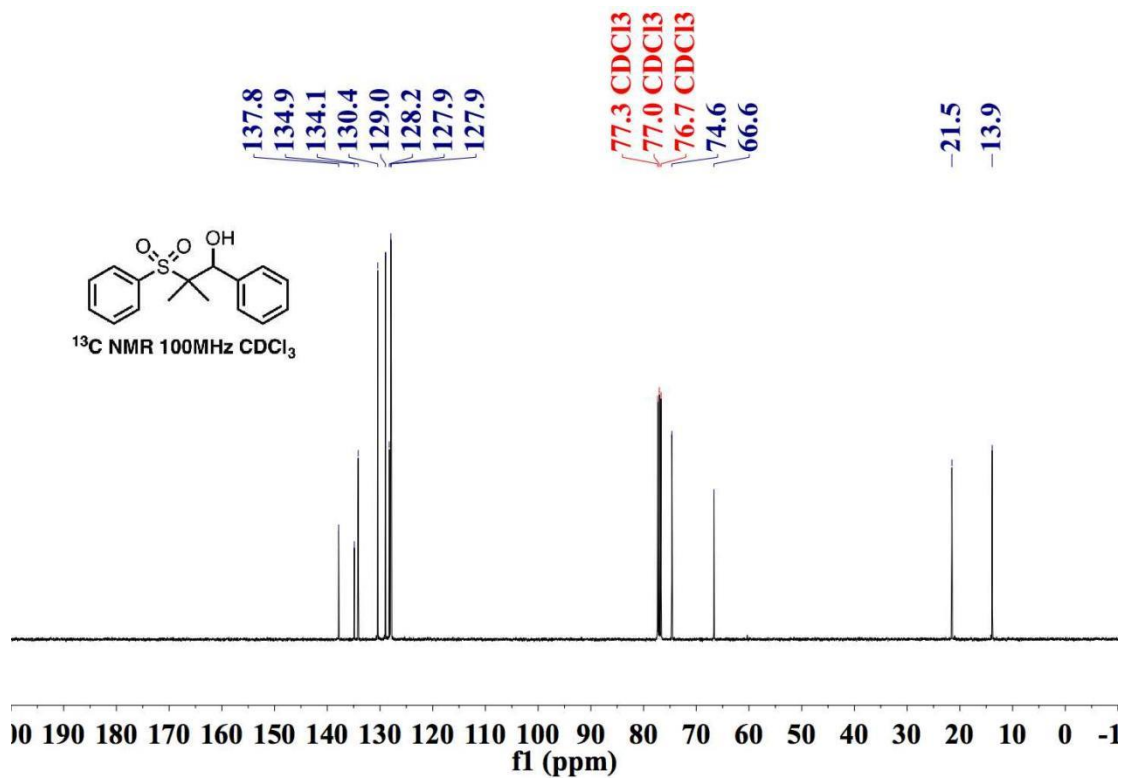
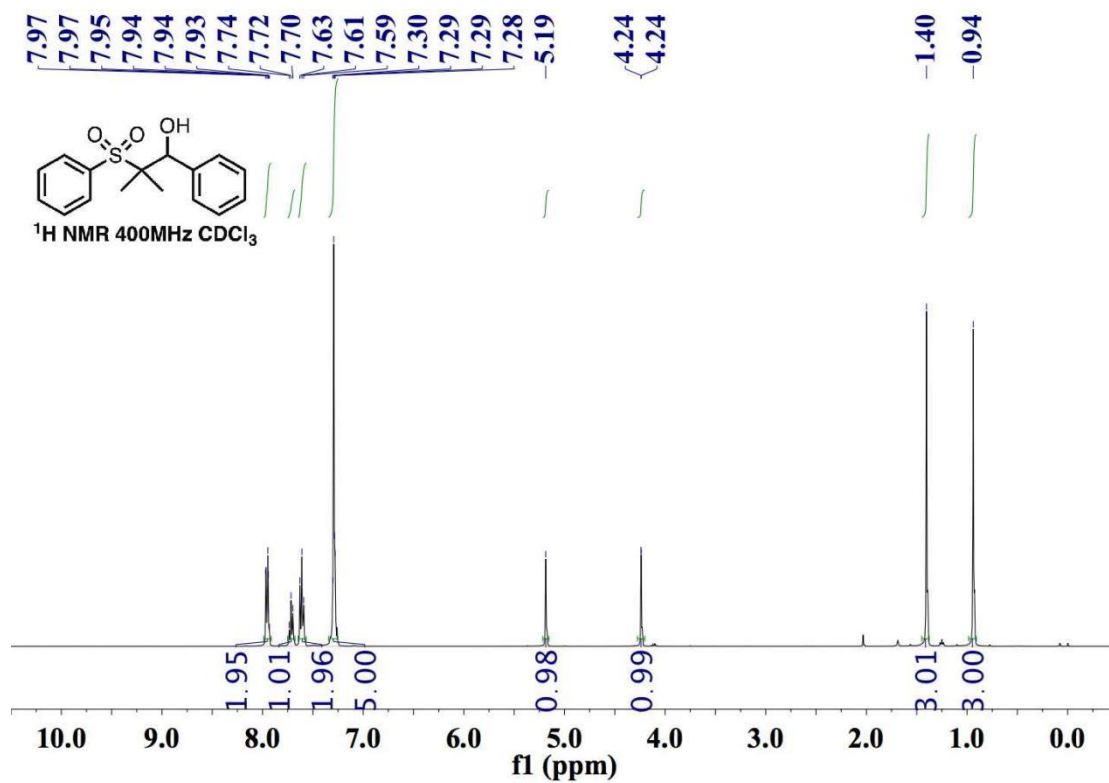
**(2-Bromophenyl)(1-(phenylsulfonyl)cyclopentyl)methanol (2n):**



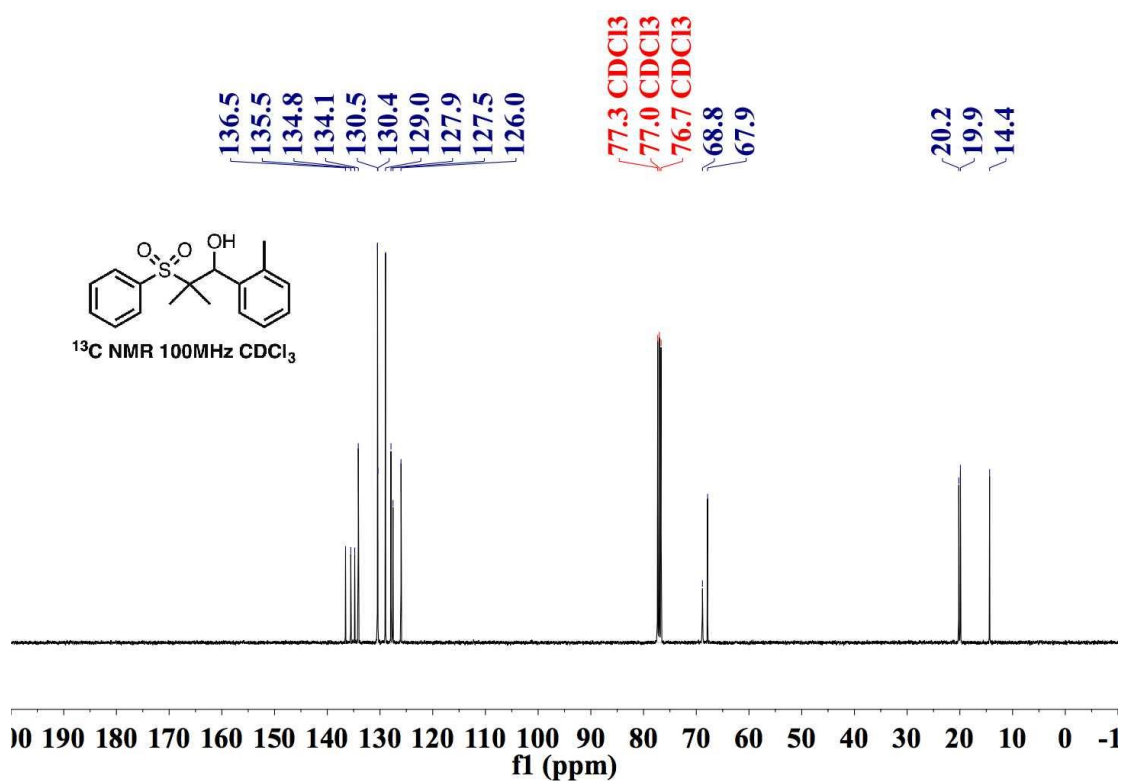
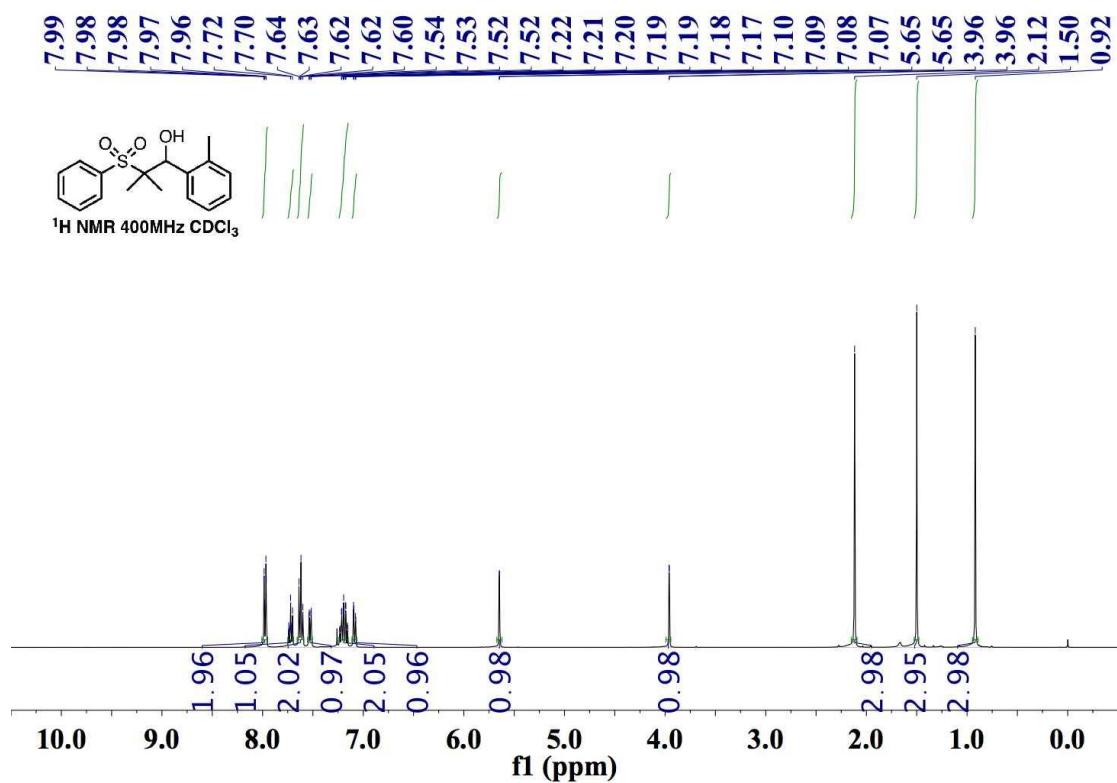
**1-(2-Bromophenyl)-2-(phenylsulfonyl)ethan-1-ol (2o):**



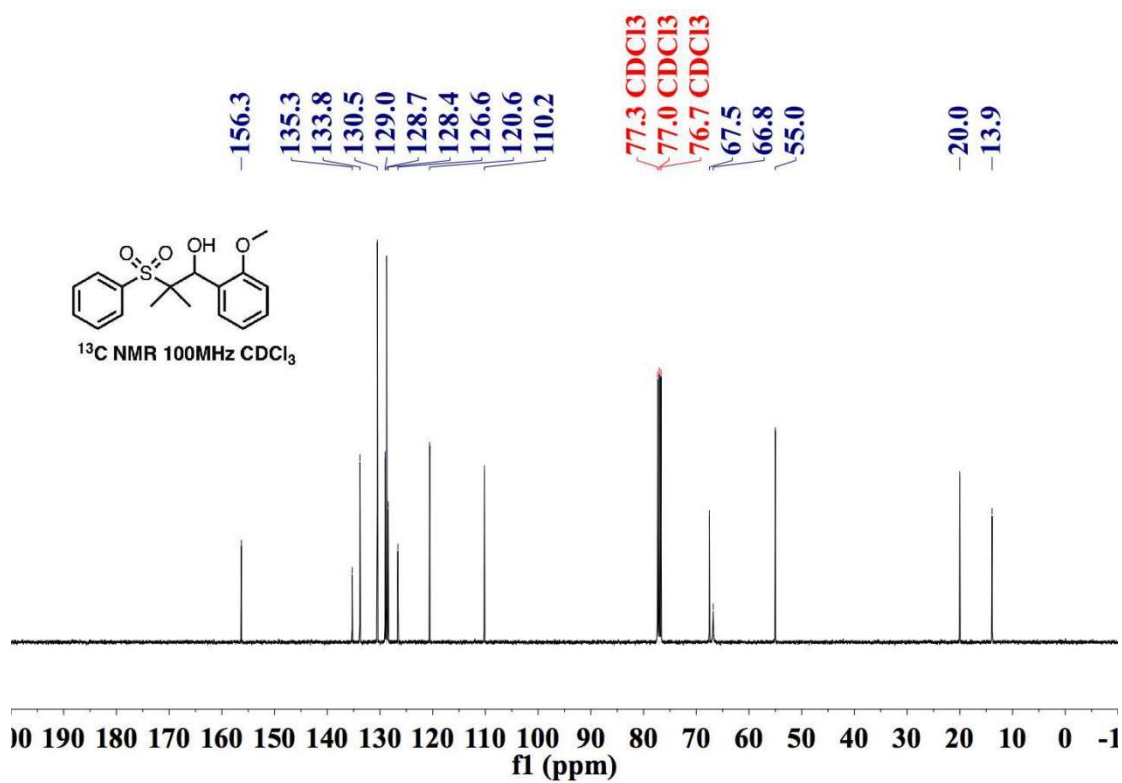
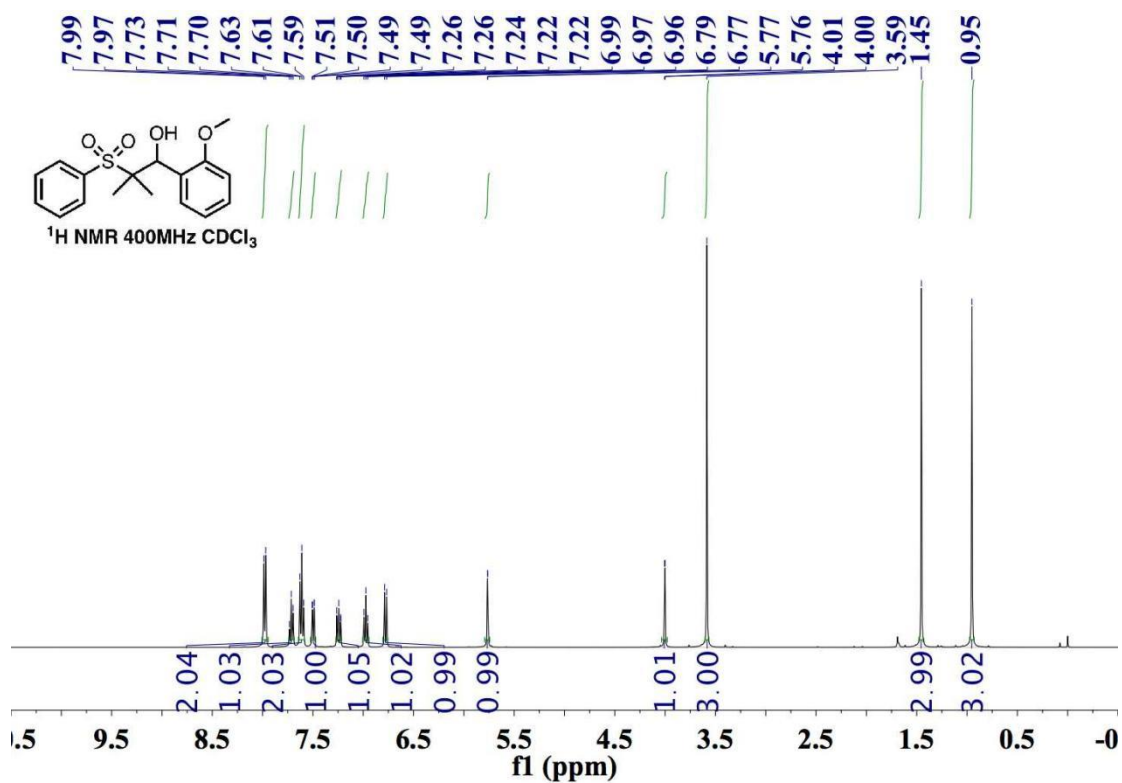
**2-Methyl-1-phenyl-2-(phenylsulfonyl)propan-1-ol (2p):**



**2-Methyl-2-(phenylsulfonyl)-1-(o-tolyl)propan-1-ol (2q):**

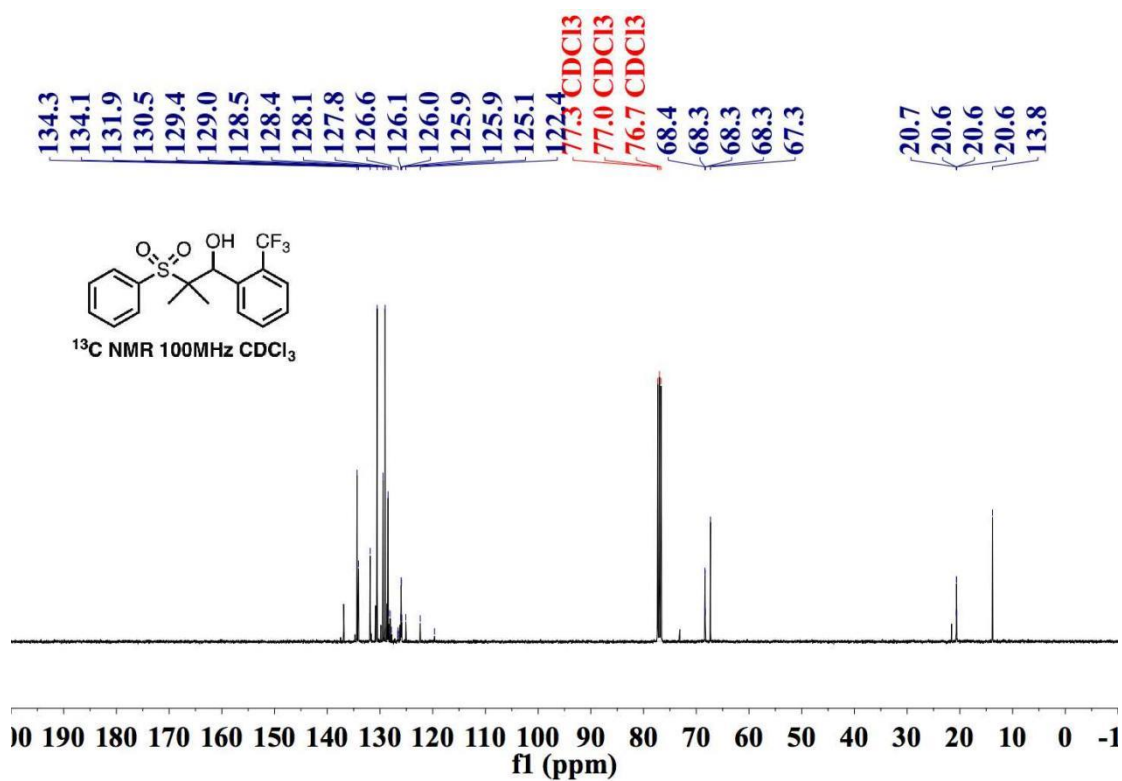
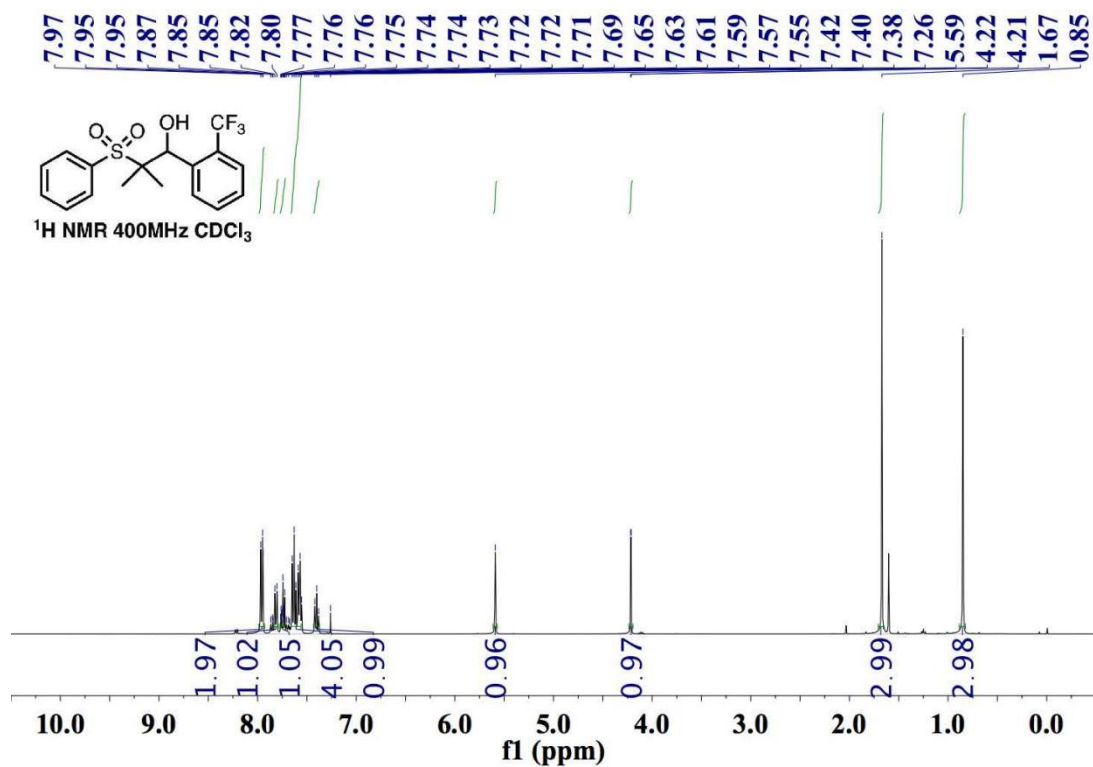


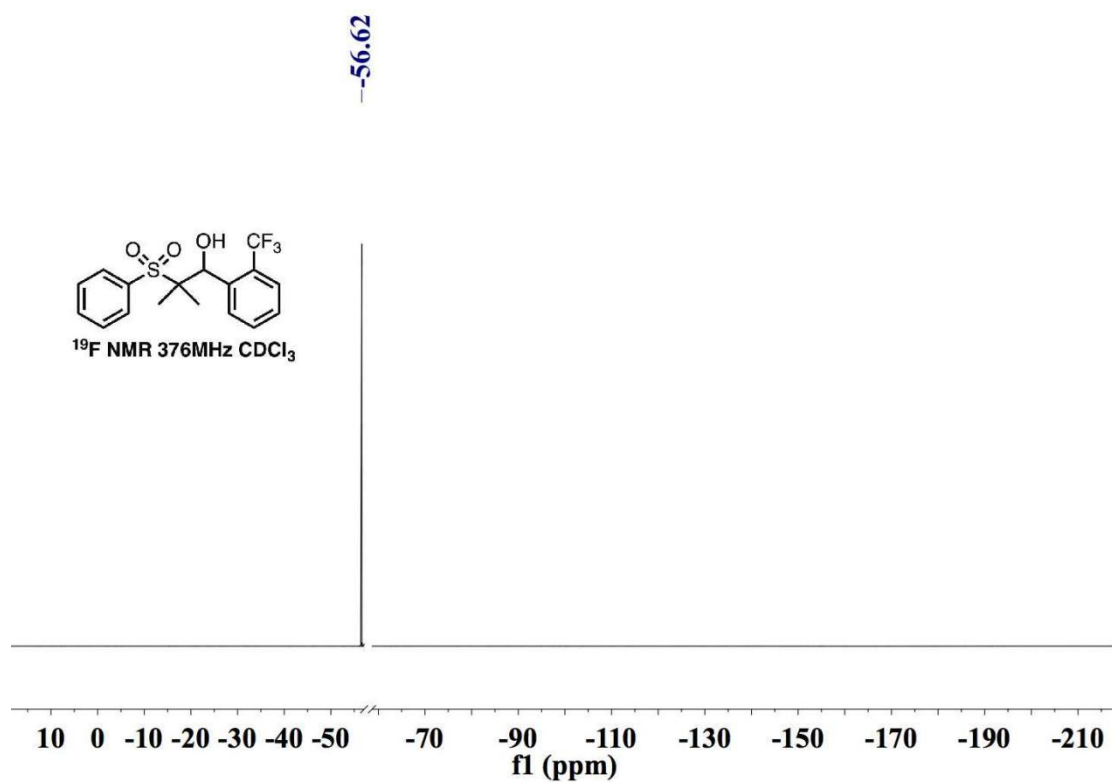
**1-(2-Methoxyphenyl)-2-methyl-2-(phenylsulfonyl)propan-1-ol (2r):**



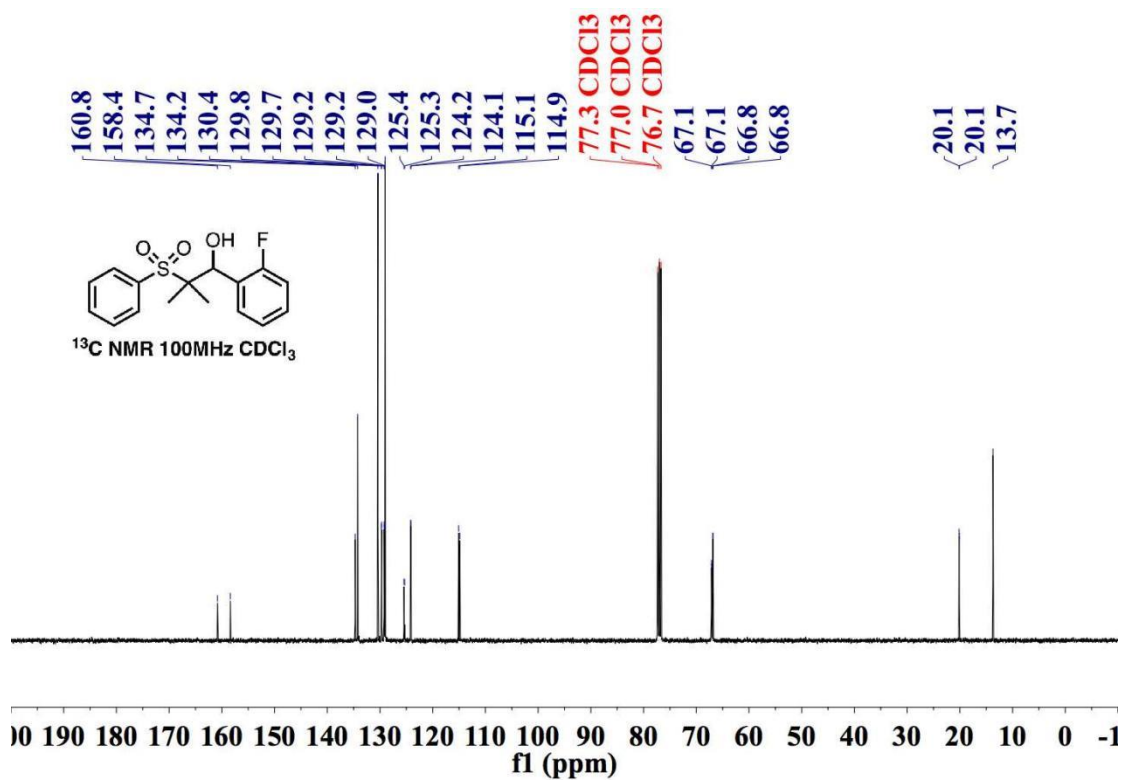
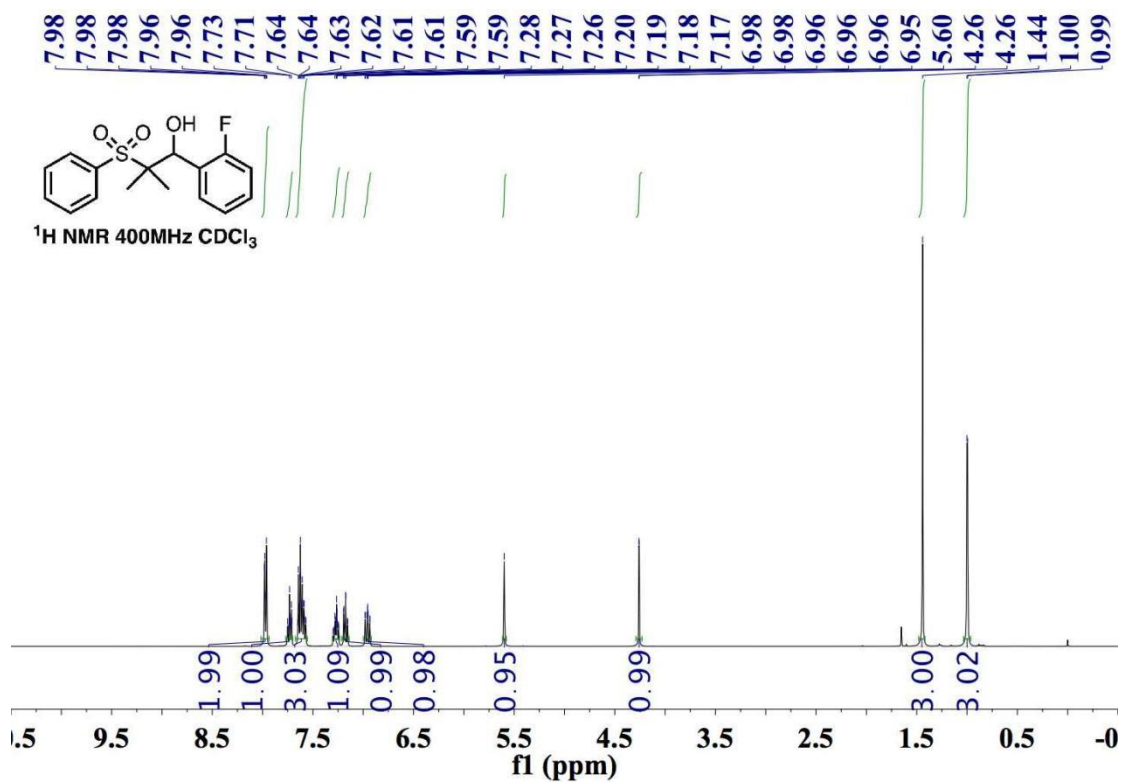


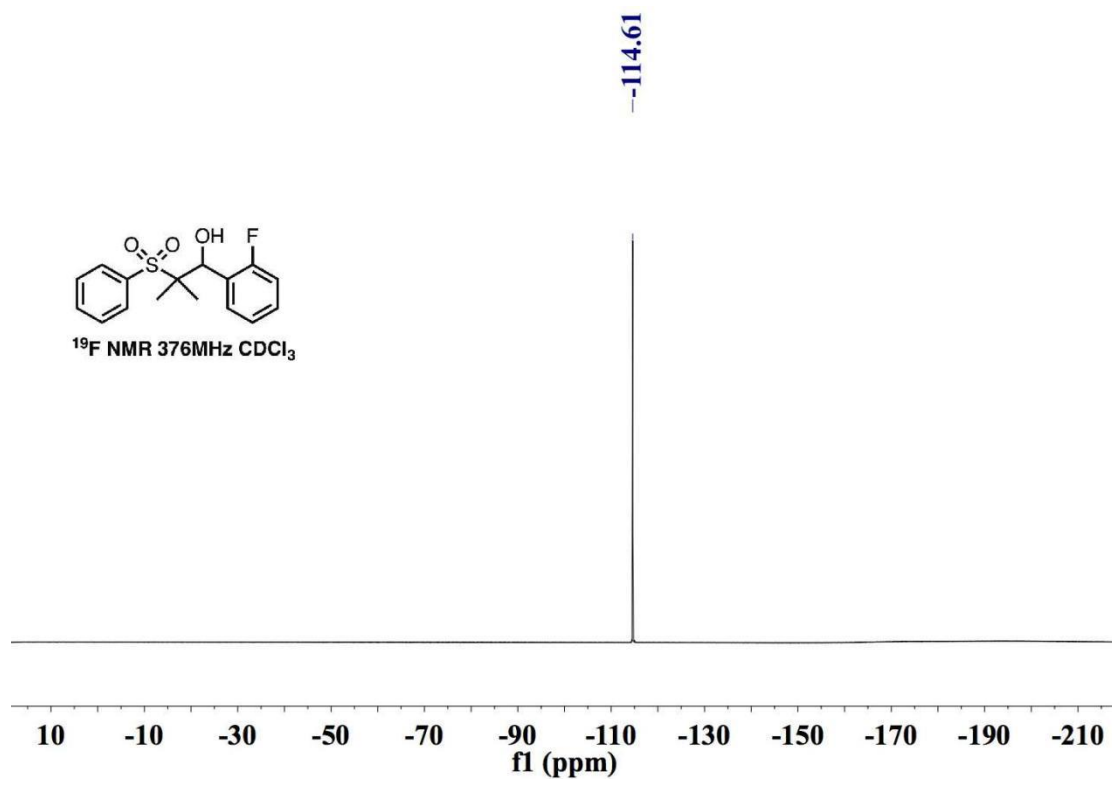
**2-Methyl-2-(phenylsulfonyl)-1-(2-(trifluoromethyl)phenyl)propan-1-ol (2s):**



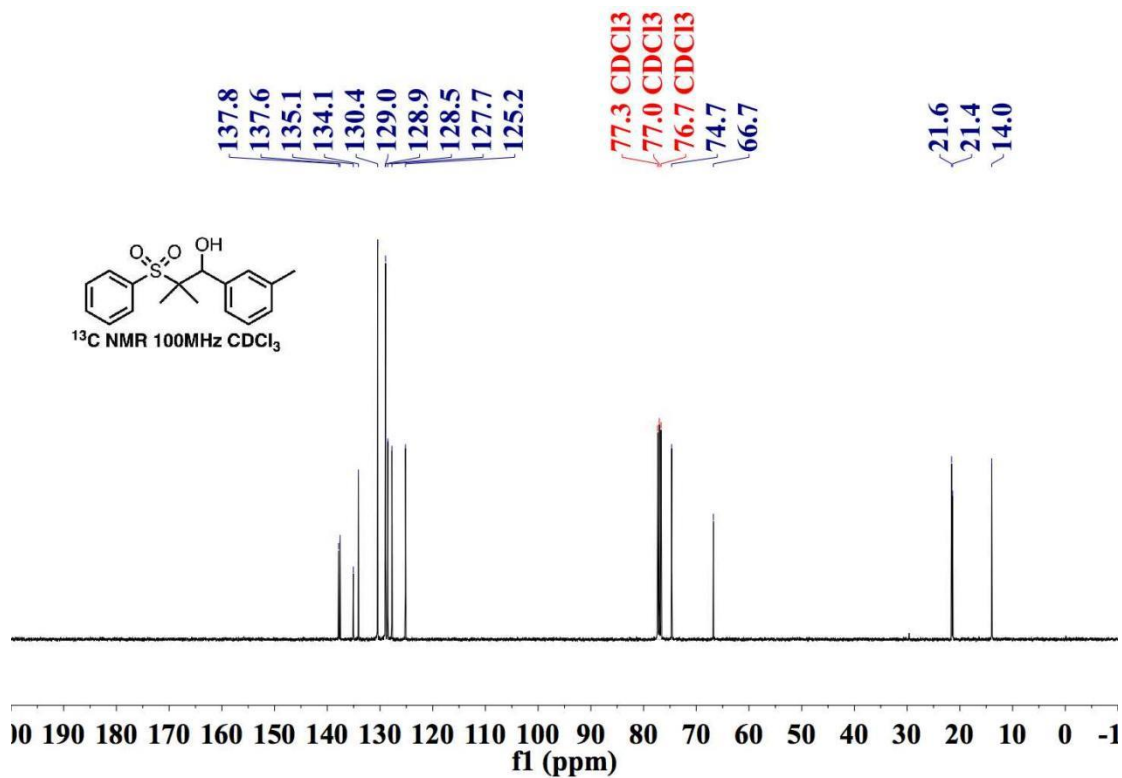
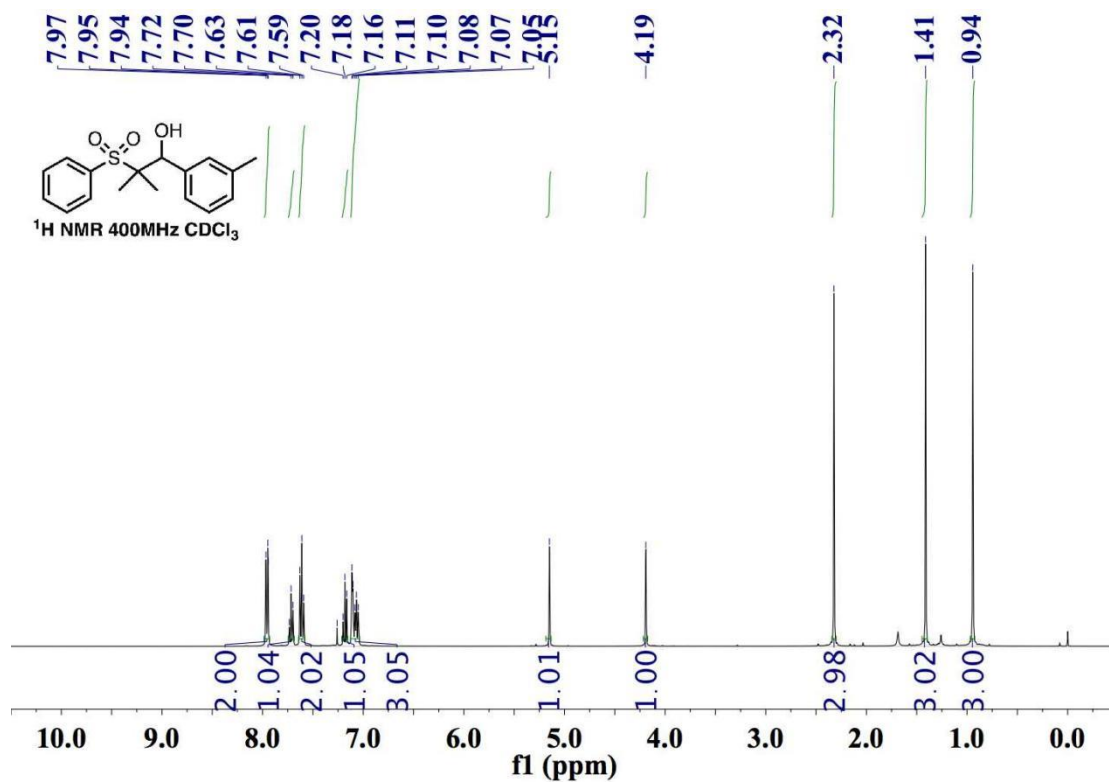


**1-(2-Fluorophenyl)-2-methyl-2-(phenylsulfonyl)propan-1-ol (2t):**

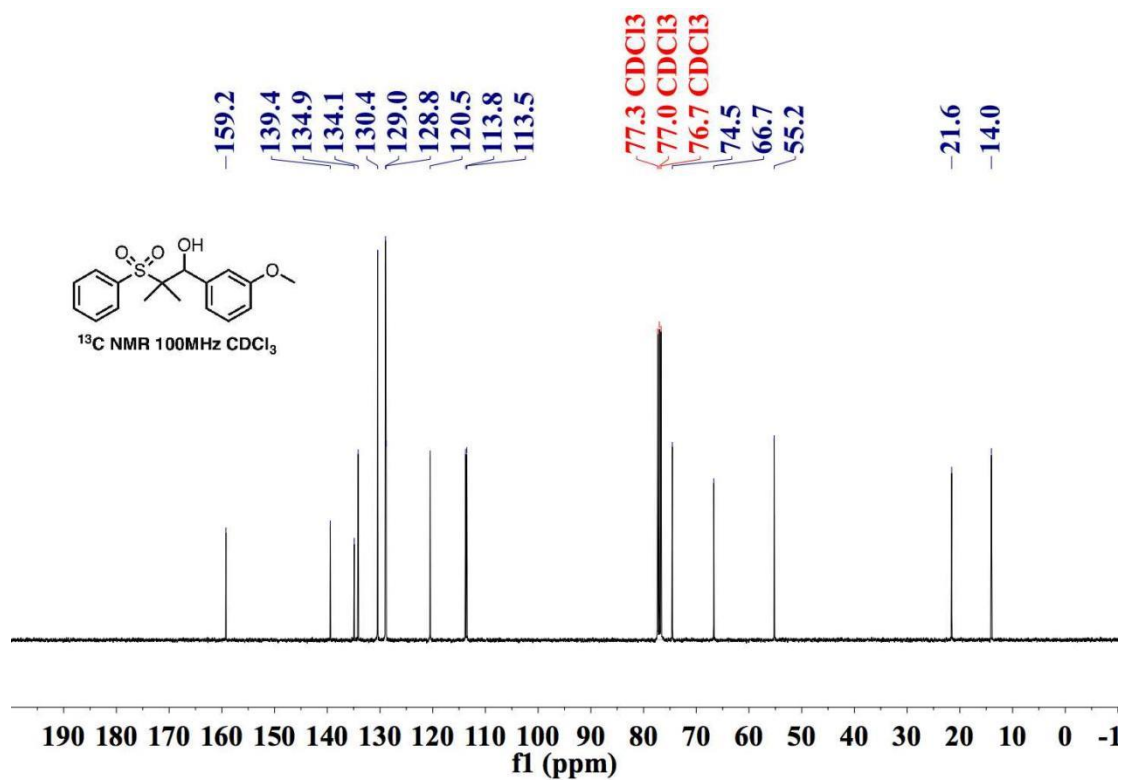
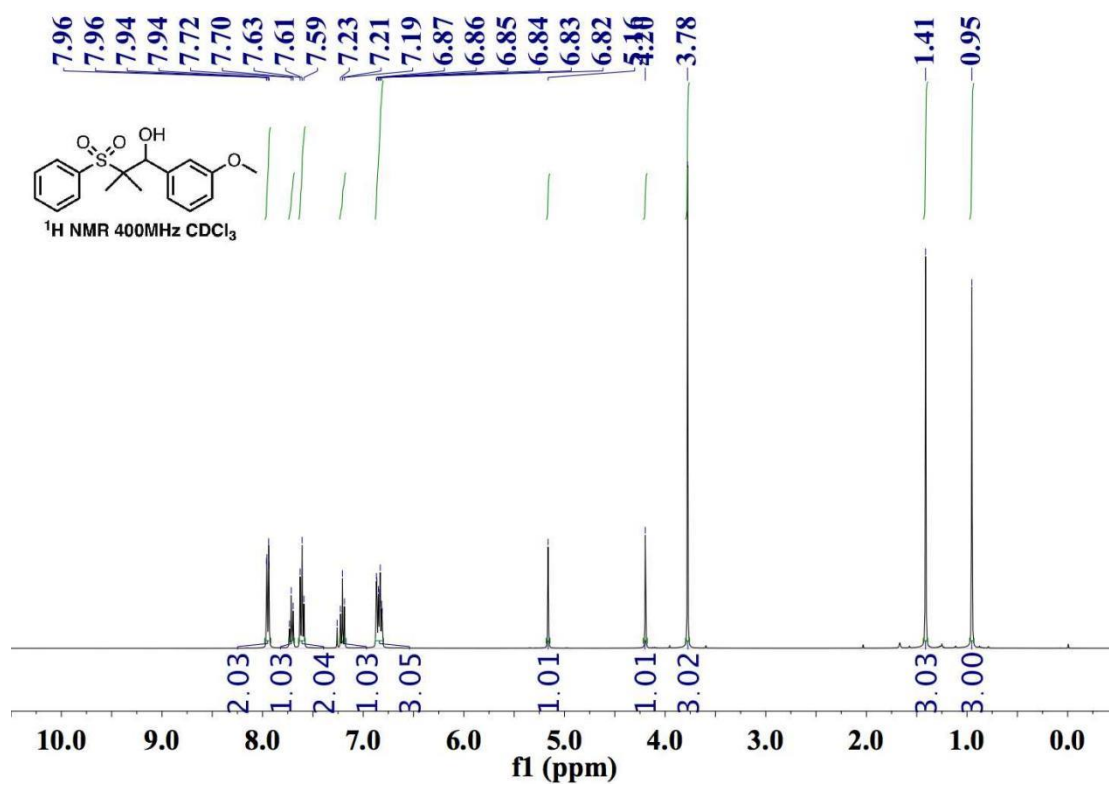




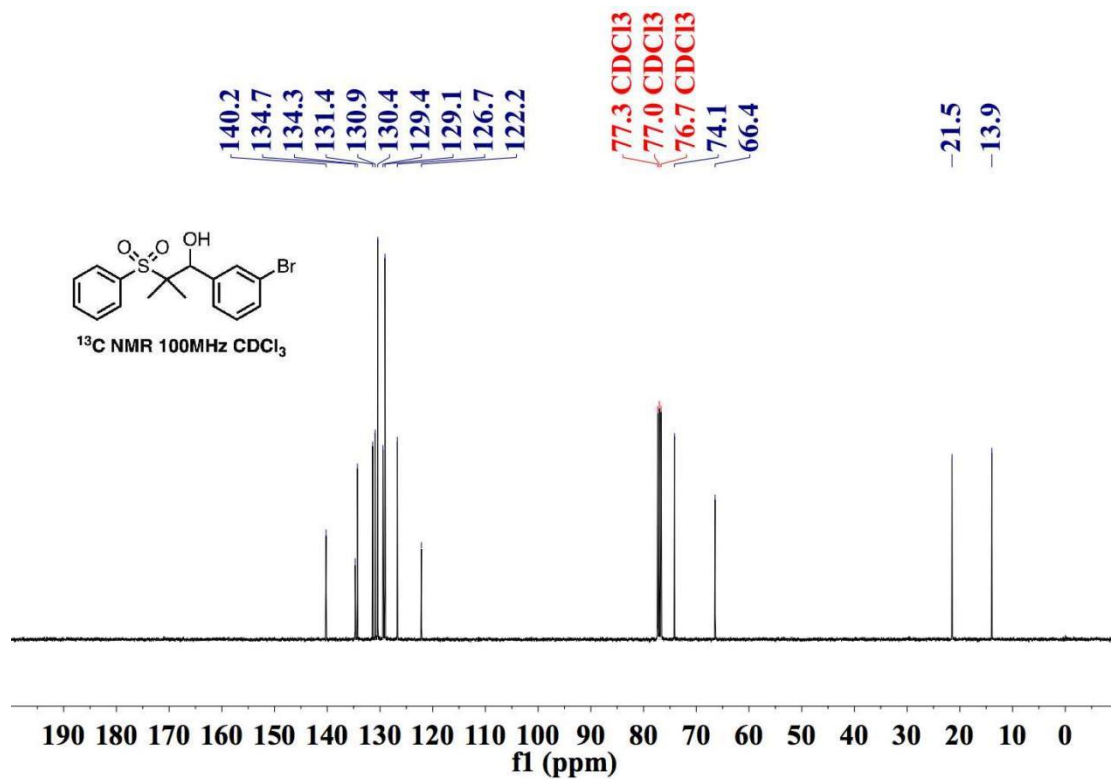
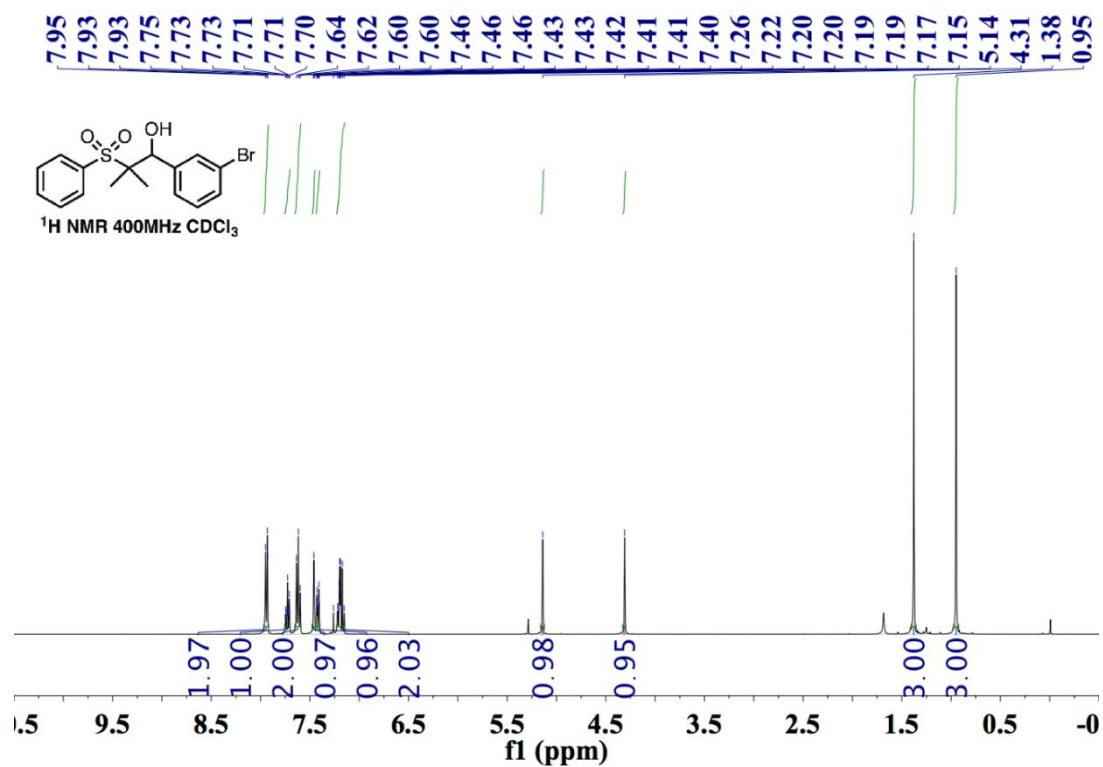
**2-Methyl-2-(phenylsulfonyl)-1-(m-tolyl)propan-1-ol (2u):**



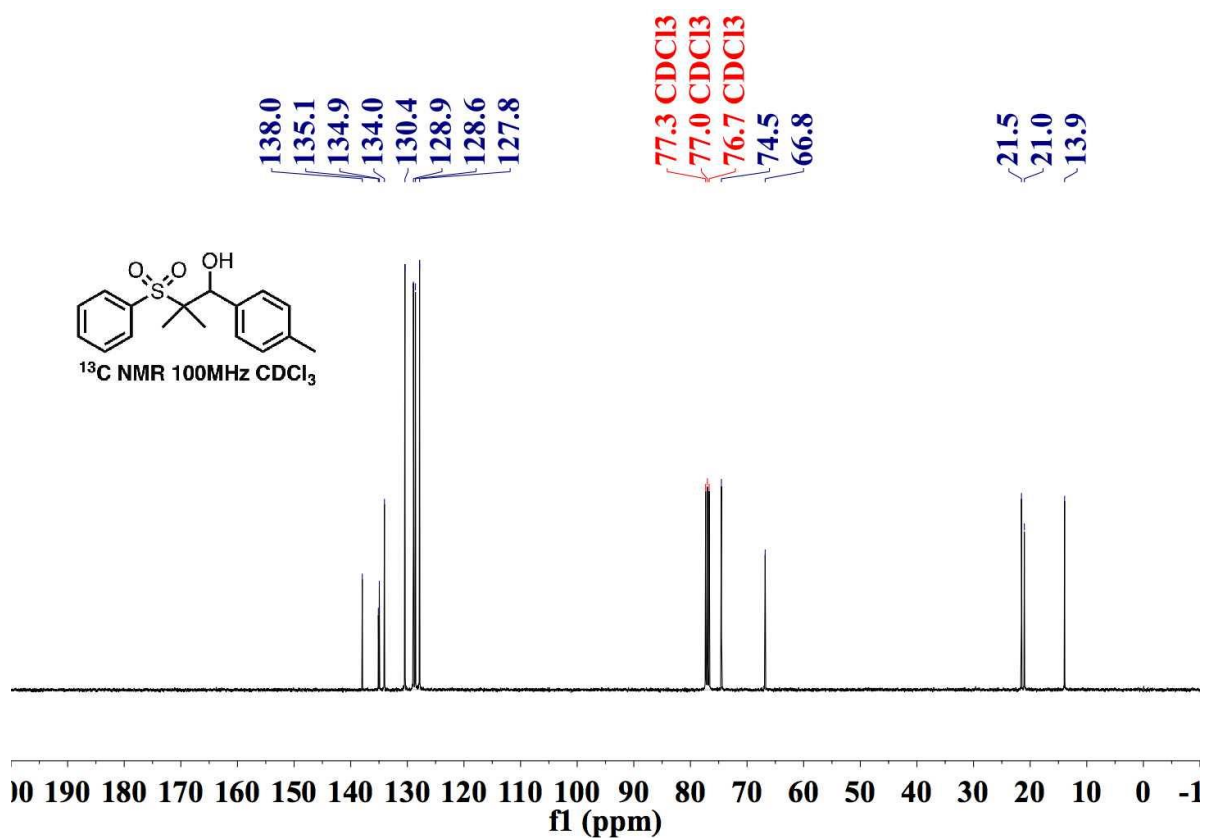
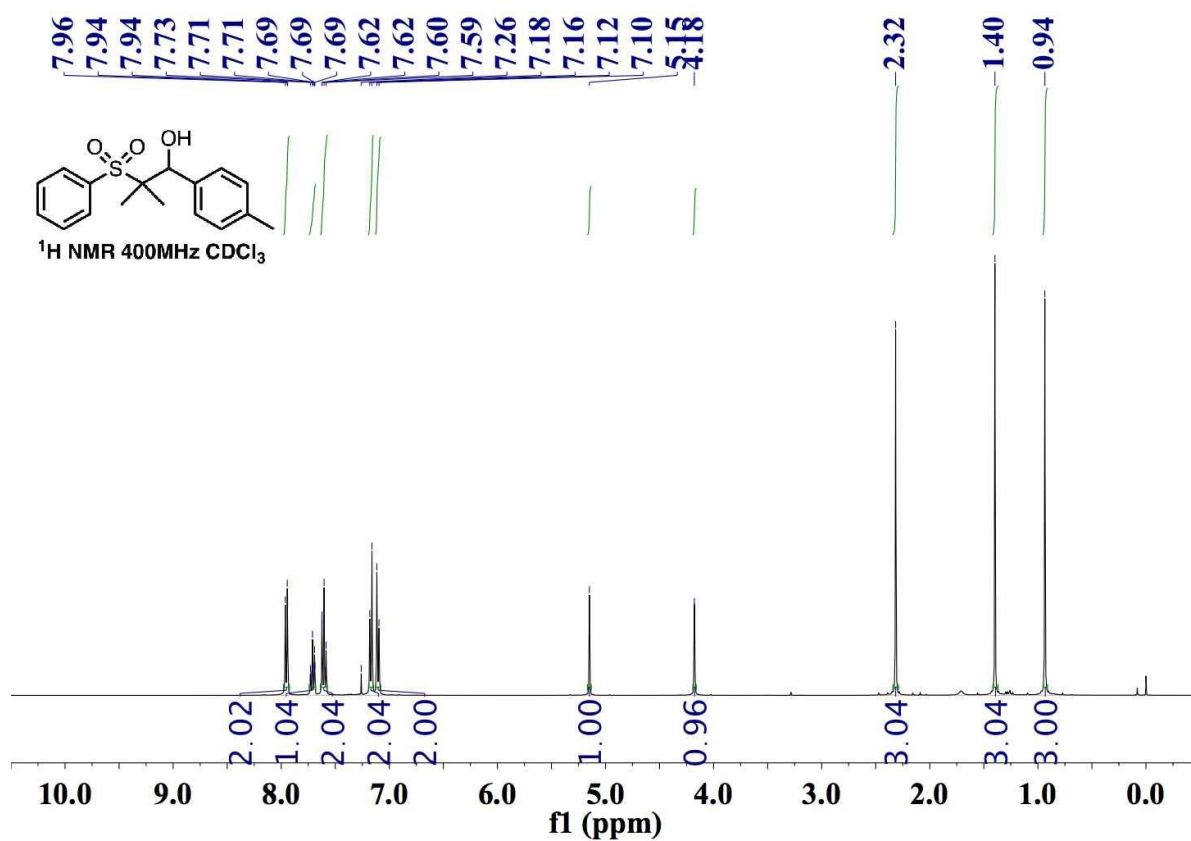
**1-(3-Methoxyphenyl)-2-methyl-2-(phenylsulfonyl)propan-1-ol (2v):**



**1-(3-Bromophenyl)-2-methyl-2-(phenylsulfonyl)propan-1-ol (2w):**

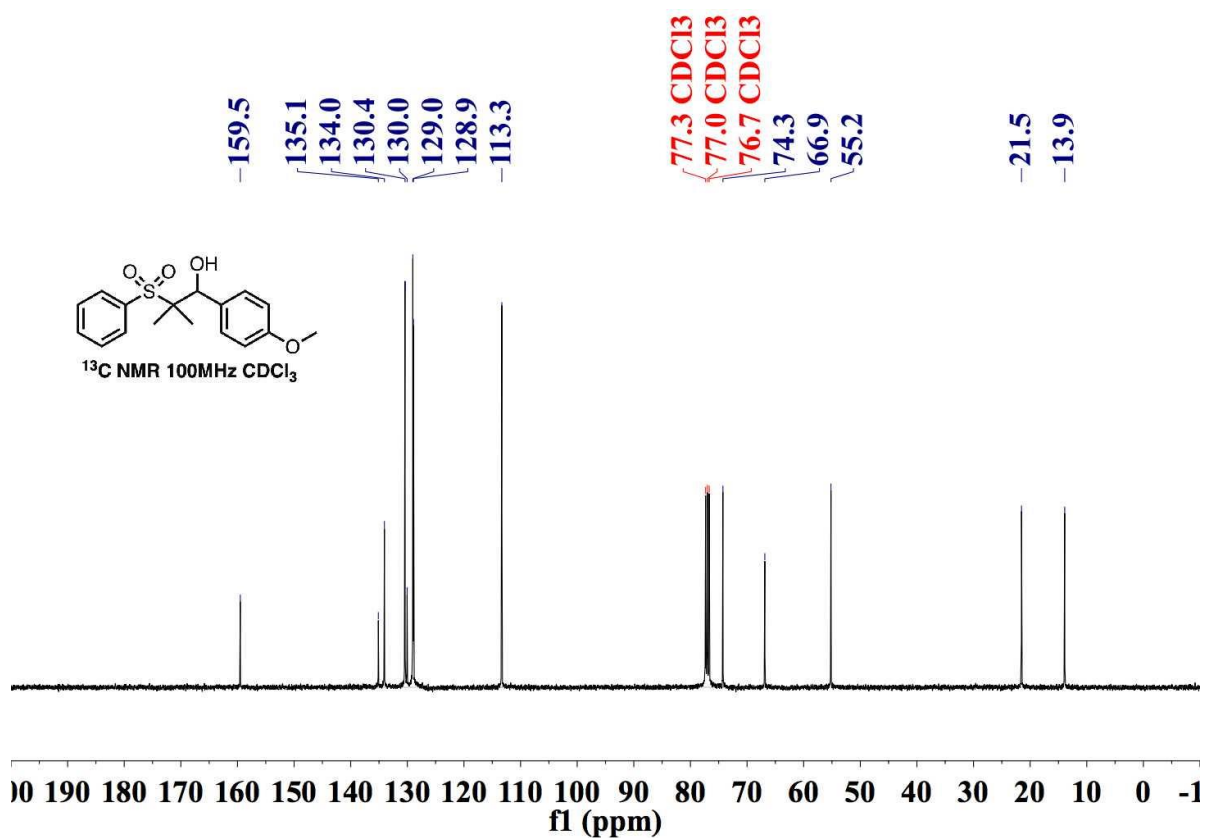
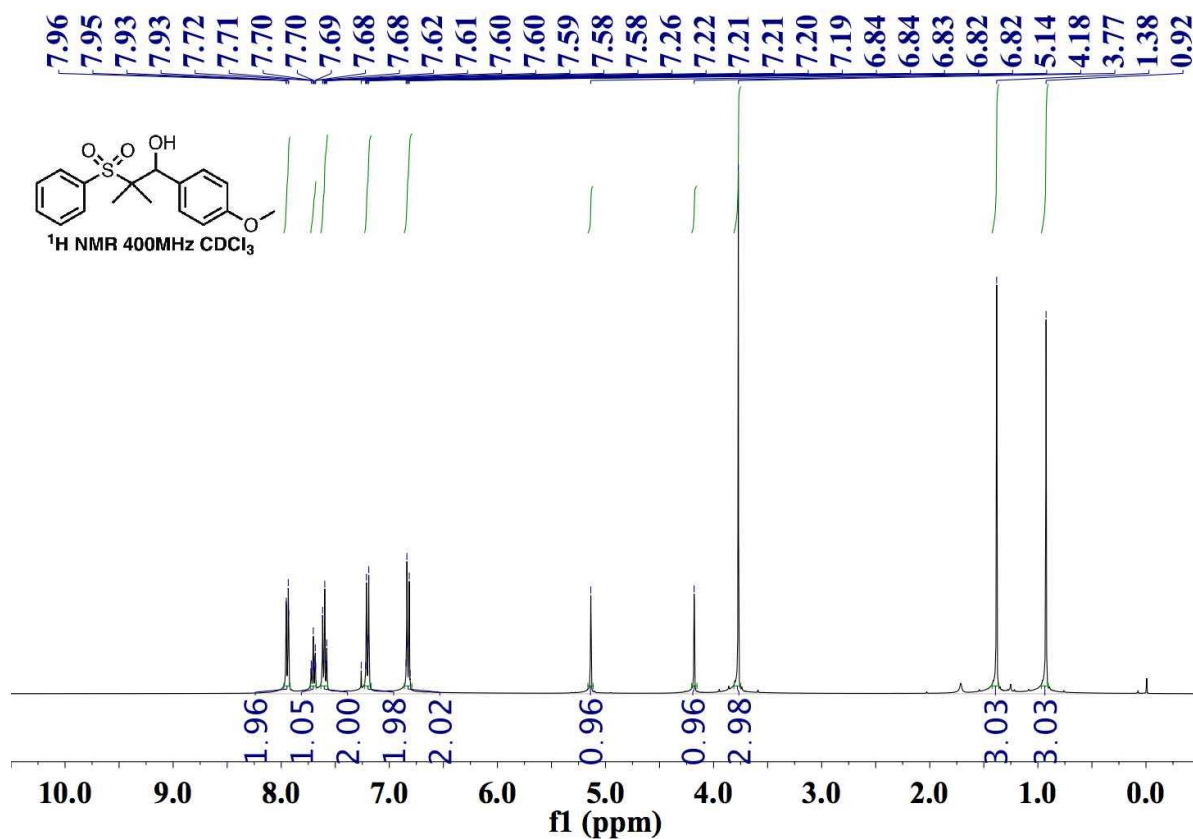


**2-Methyl-2-(phenylsulfonyl)-1-(p-tolyl)propan-1-ol (2x):**

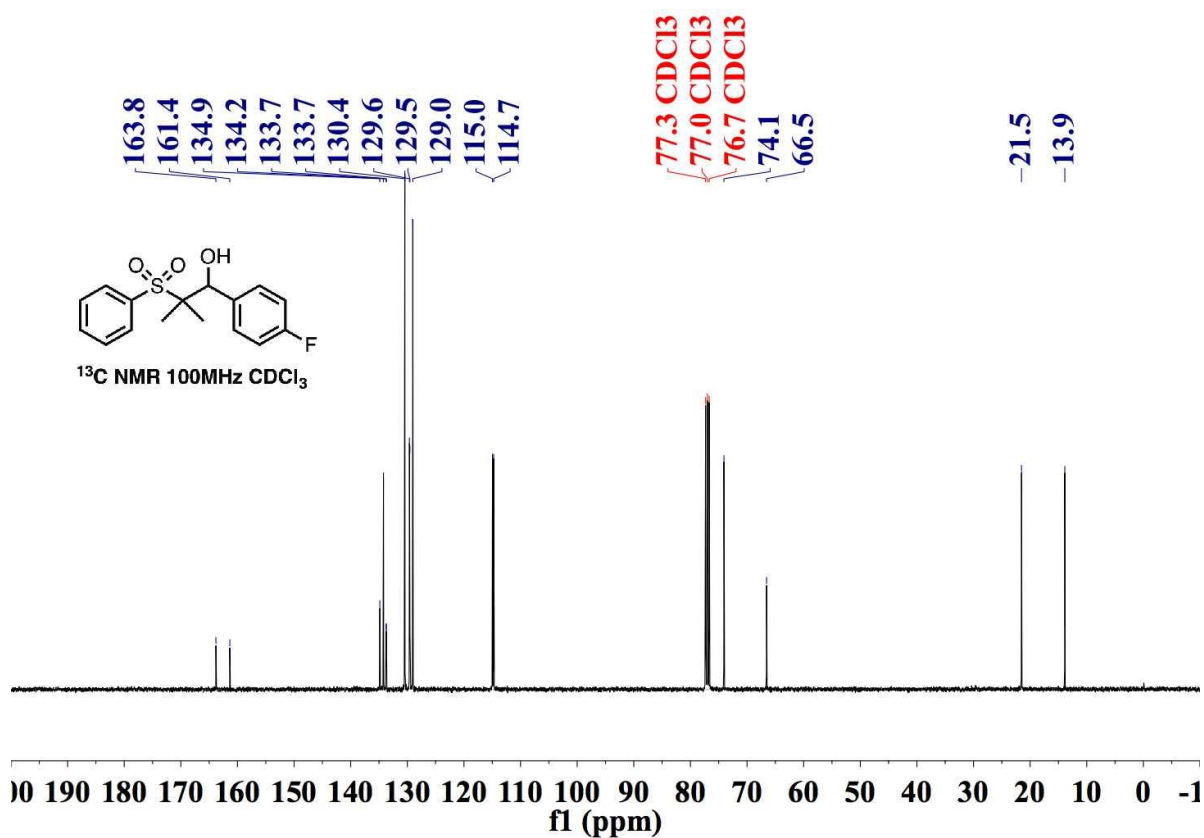
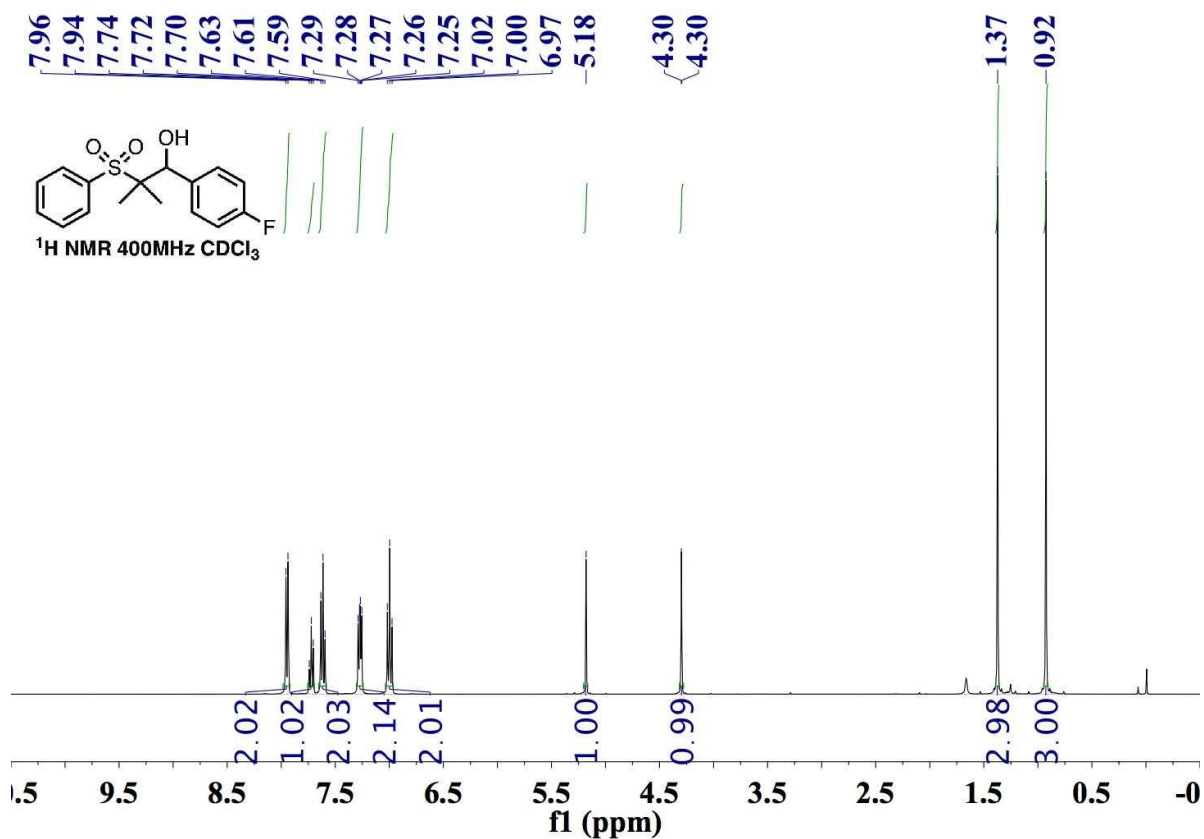


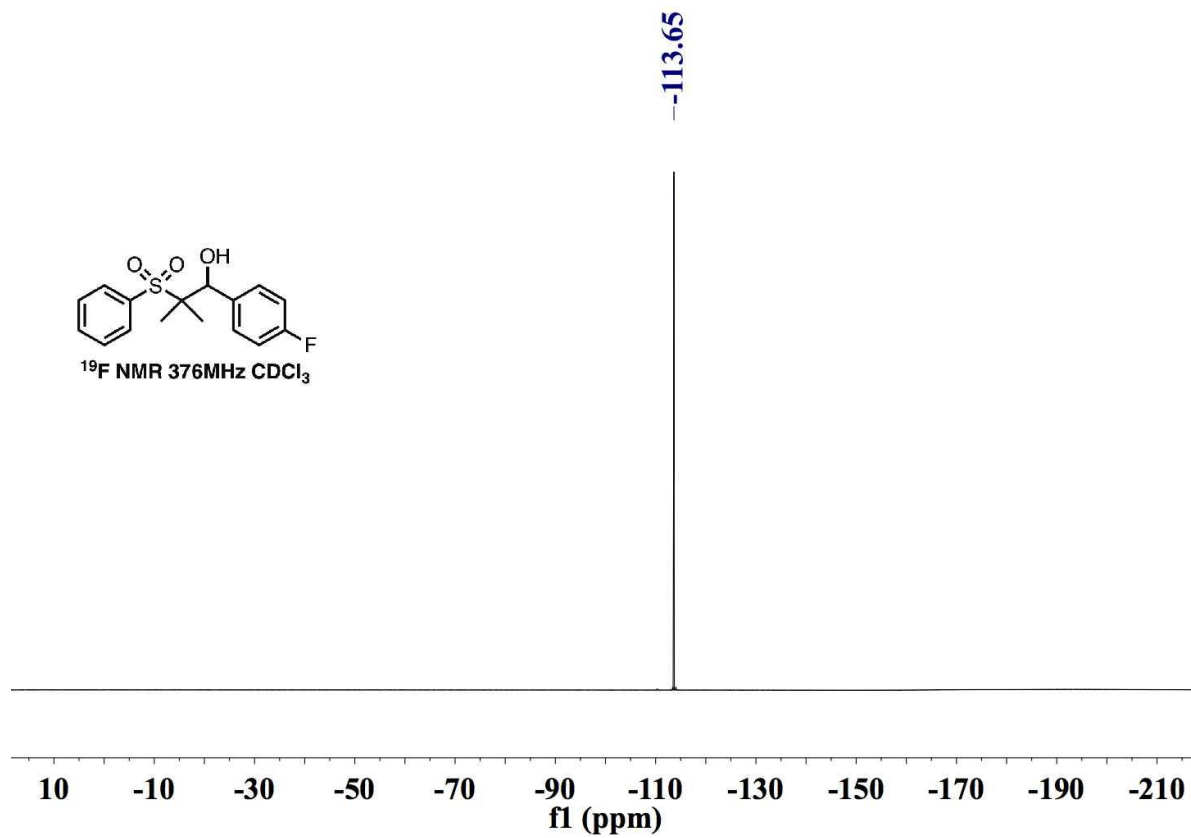


**1-(4-Methoxyphenyl)-2-methyl-2-(phenylsulfonyl)-propan-1-ol (2y):**

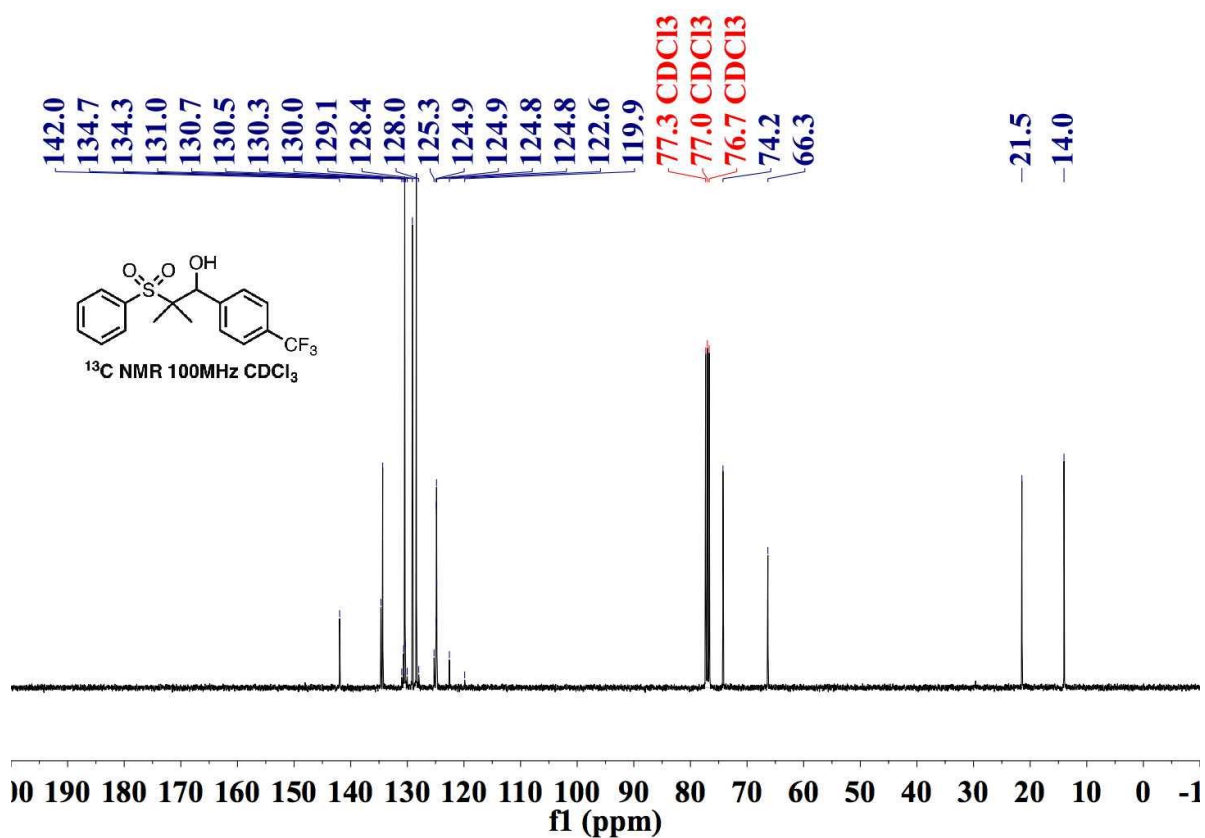
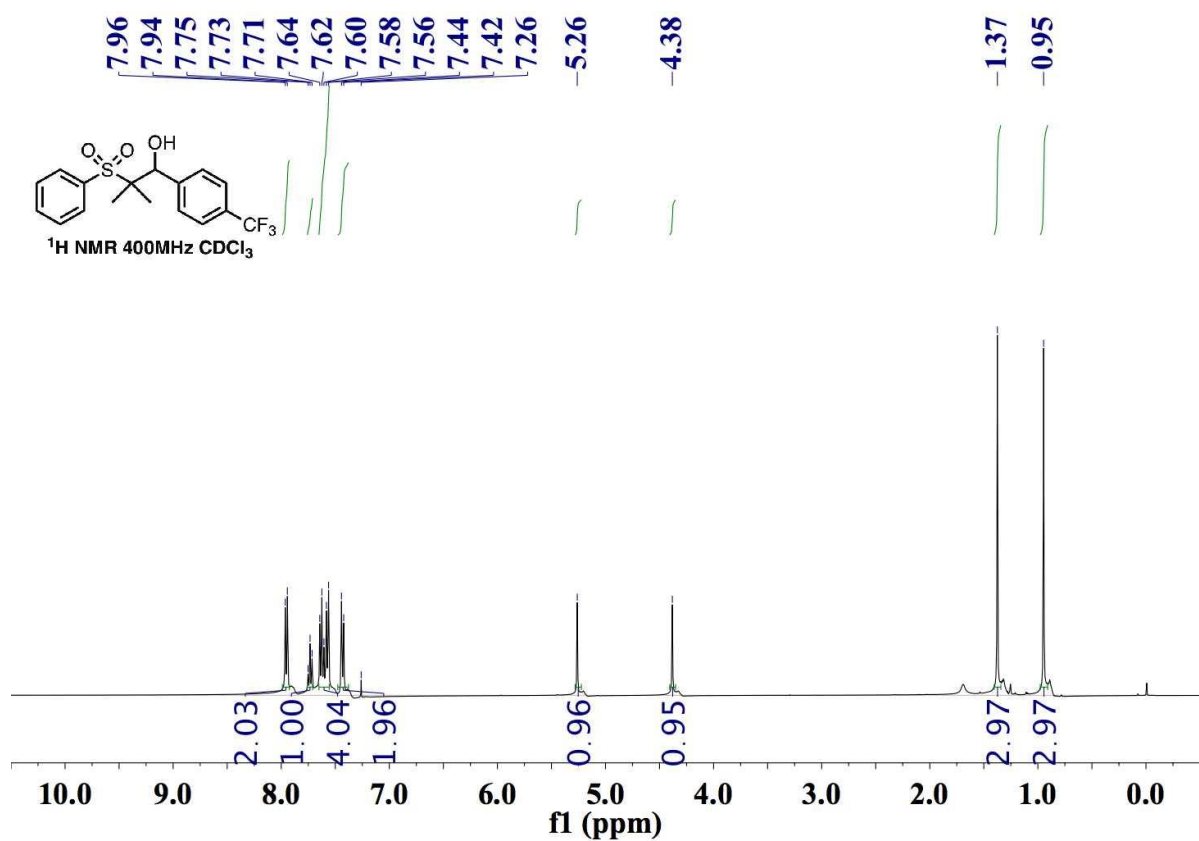


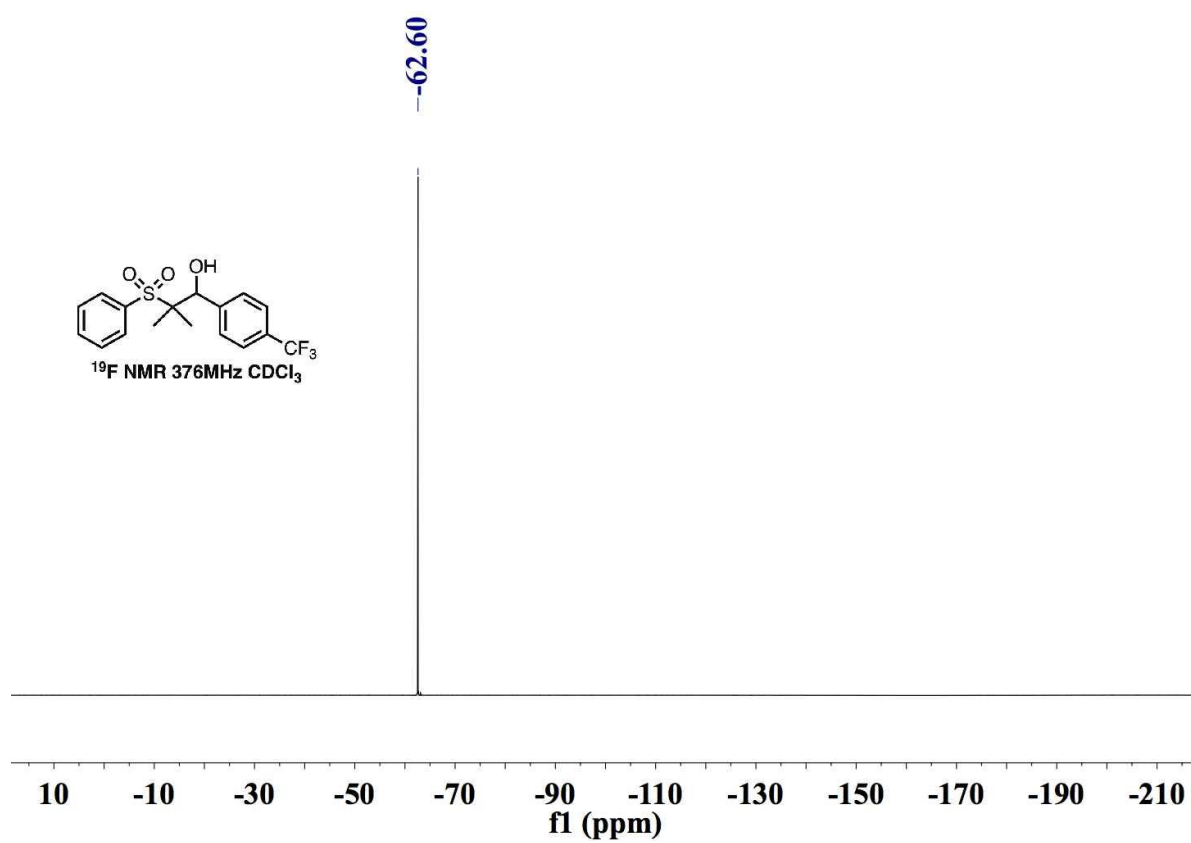
1-(4-Fluorophenyl)-2-methyl-2-(phenylsulfonyl)propan-1-ol (2z):



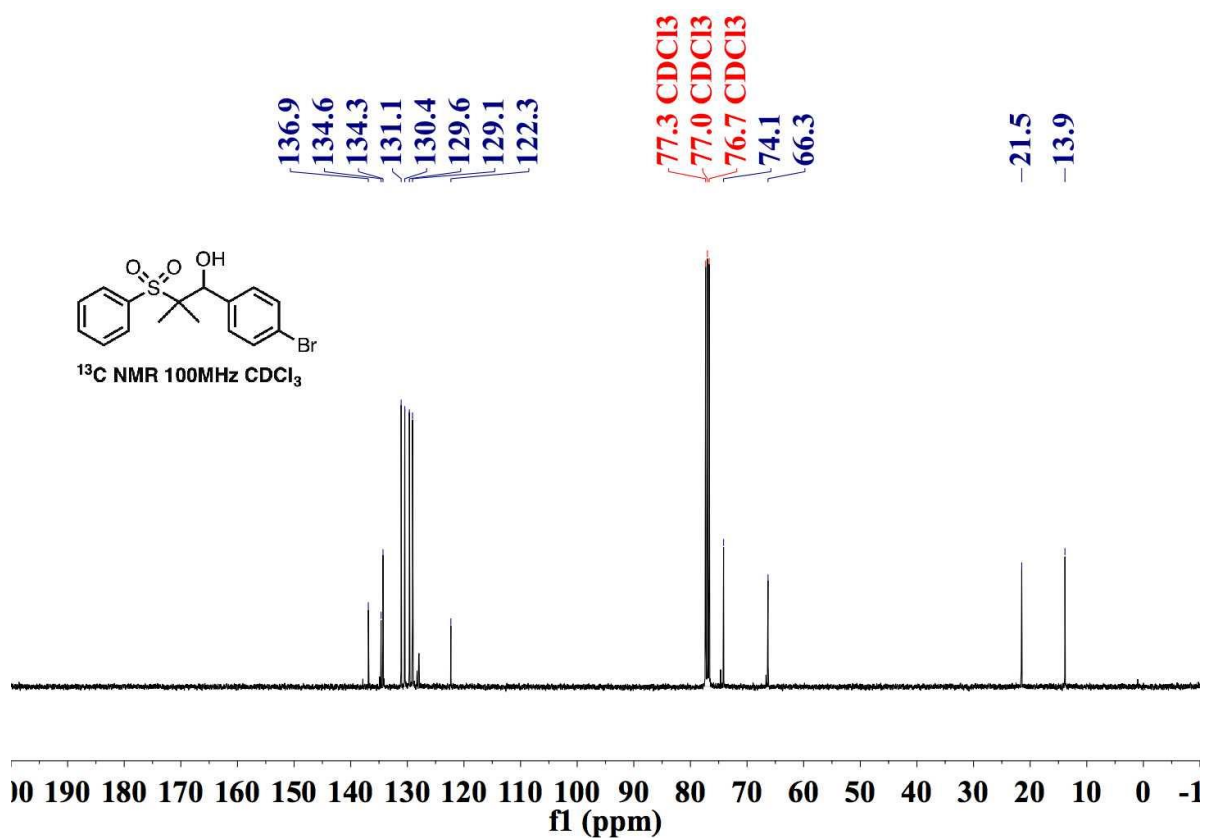
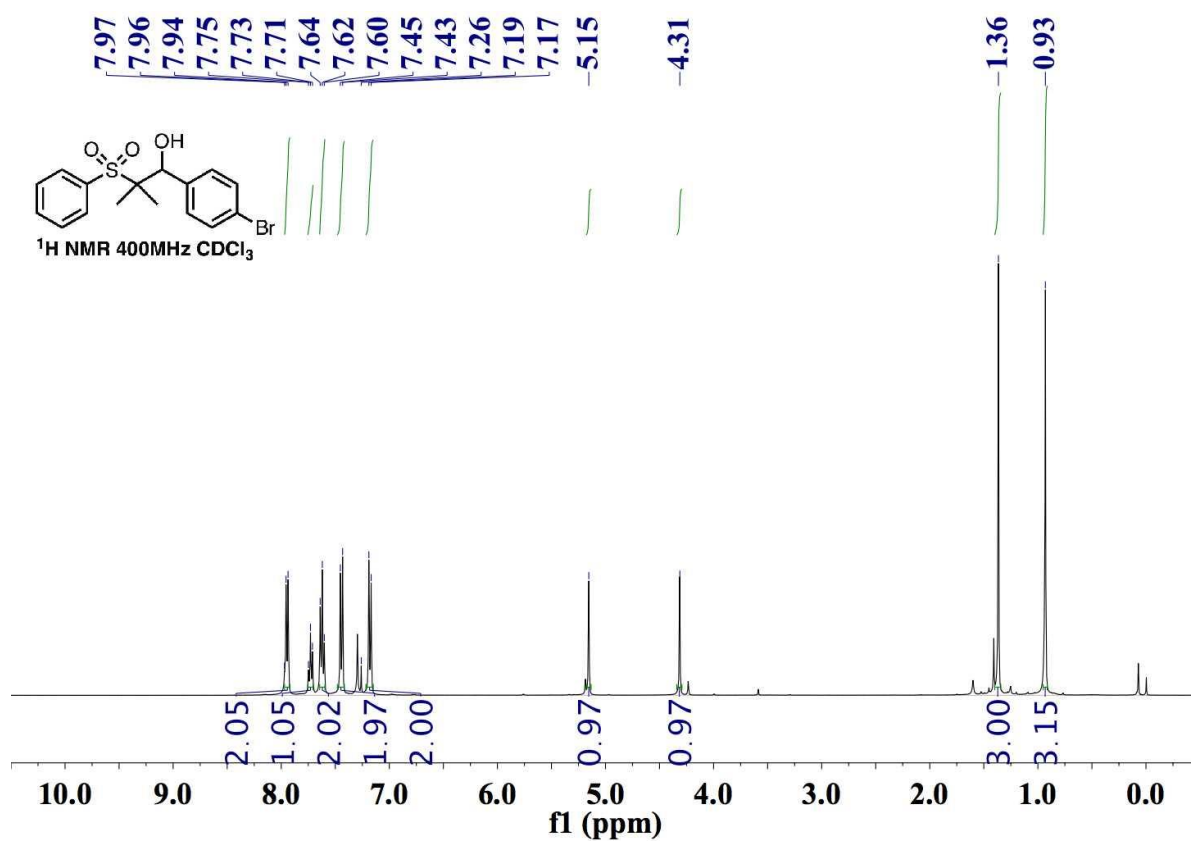


2-Methyl-2-(phenylsulfonyl)-1-(4-(trifluoromethyl)phenyl)propan-1-ol (2aa):

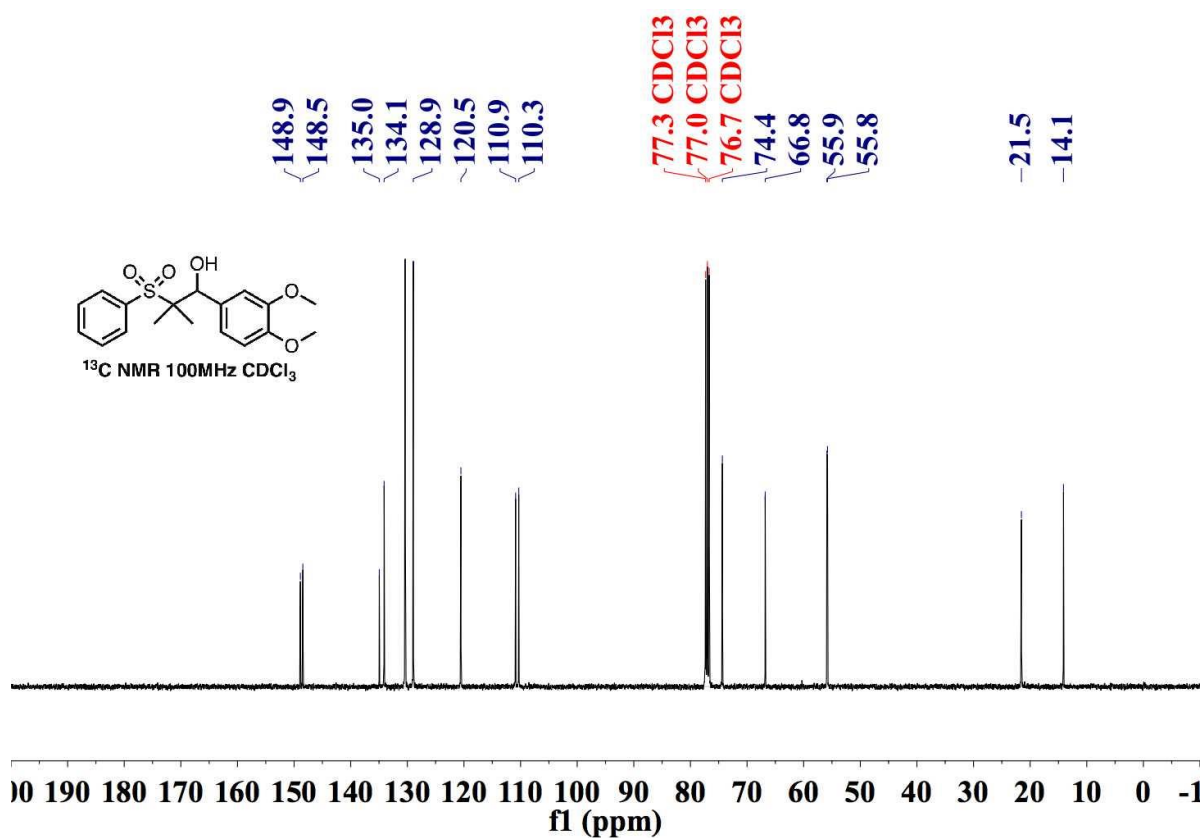
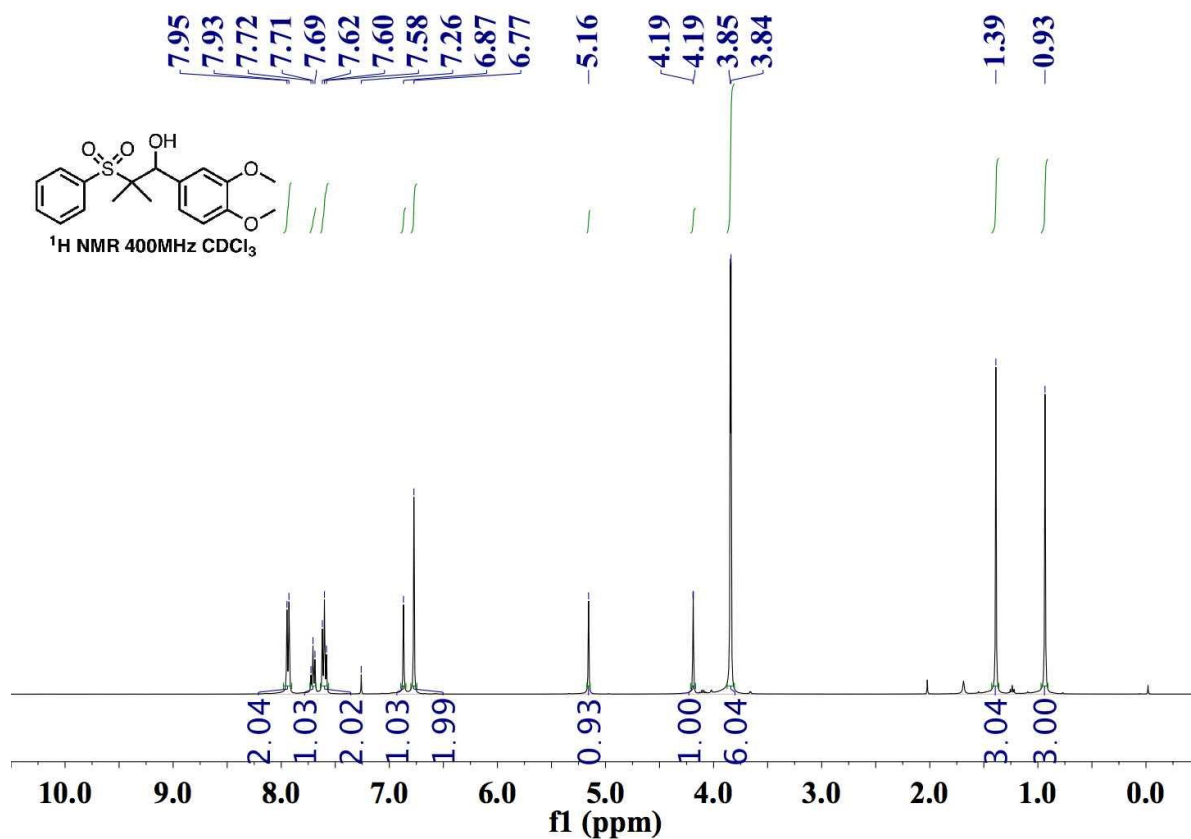




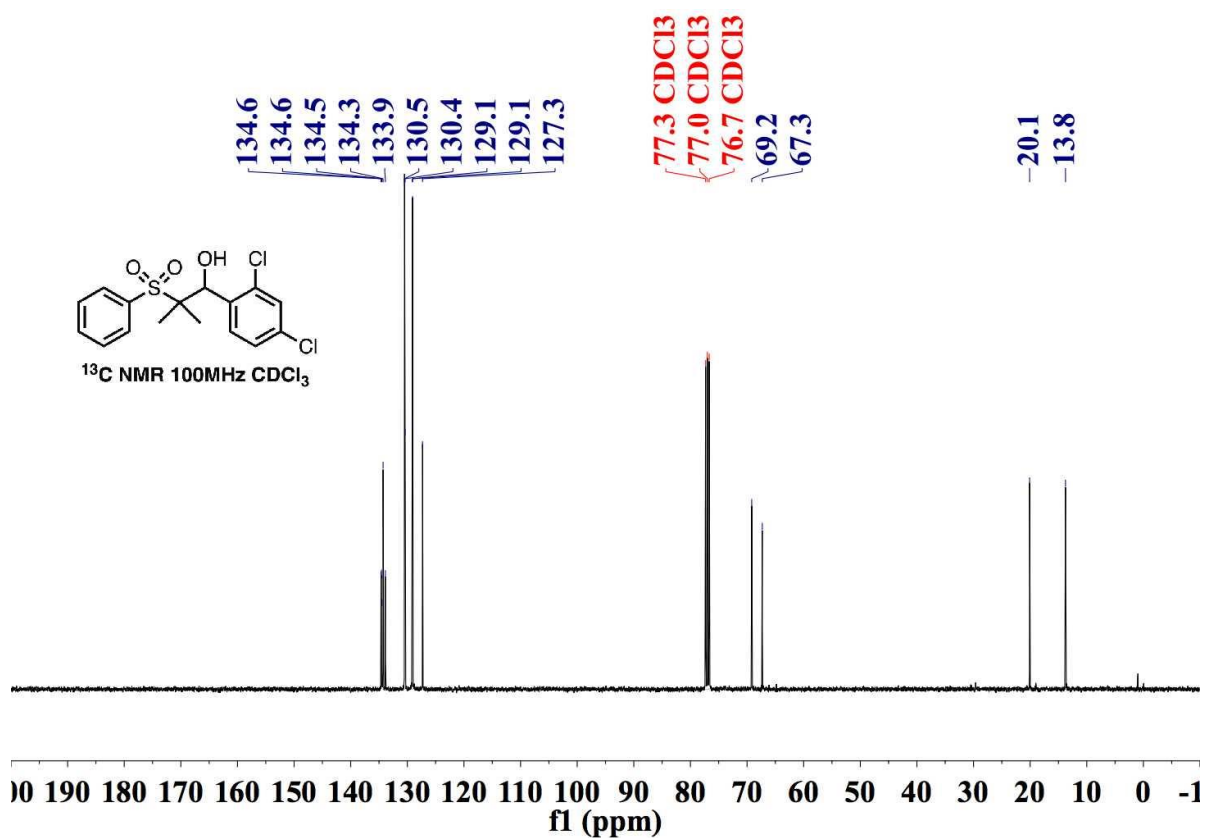
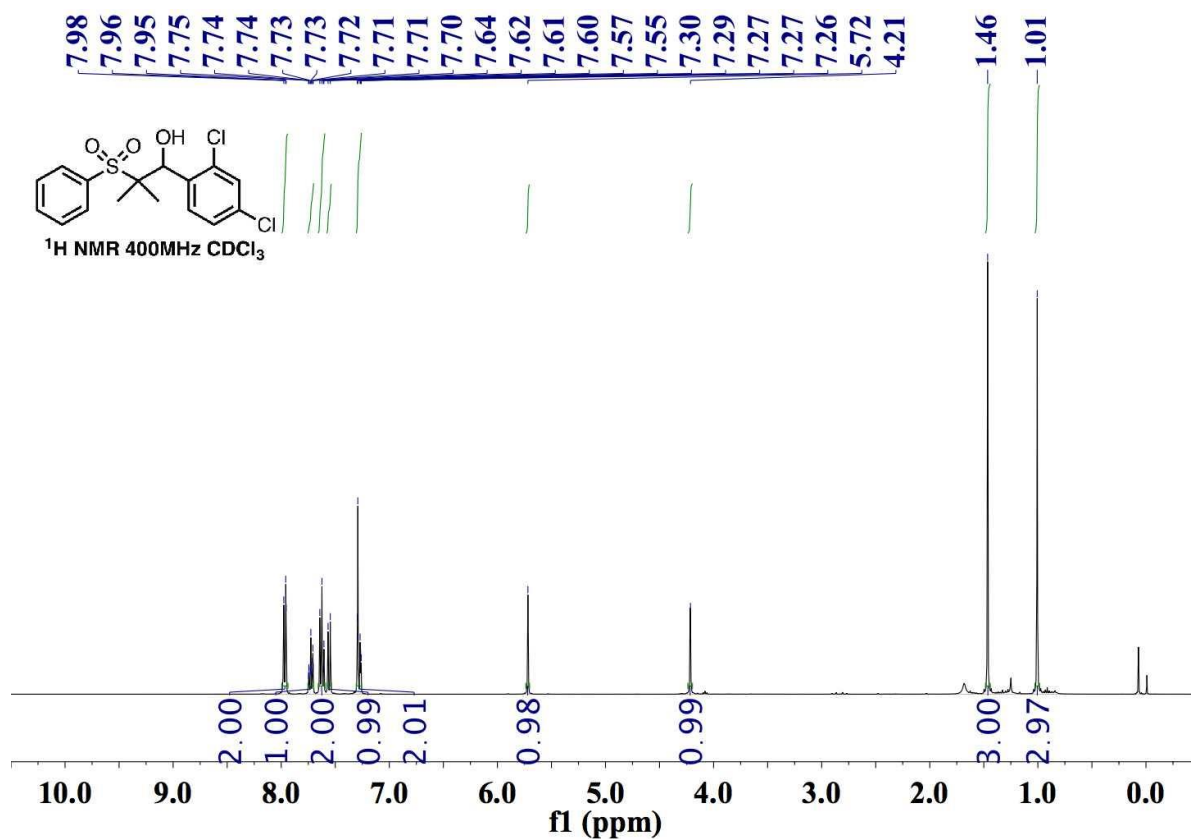
**1-(4-Bromophenyl)-2-methyl-2-(phenylsulfonyl)propan-1-ol (2ab):**



1-(3,4-Dimethoxyphenyl)-2-methyl-2-(phenylsulfonyl)propan-1-ol (2ac):

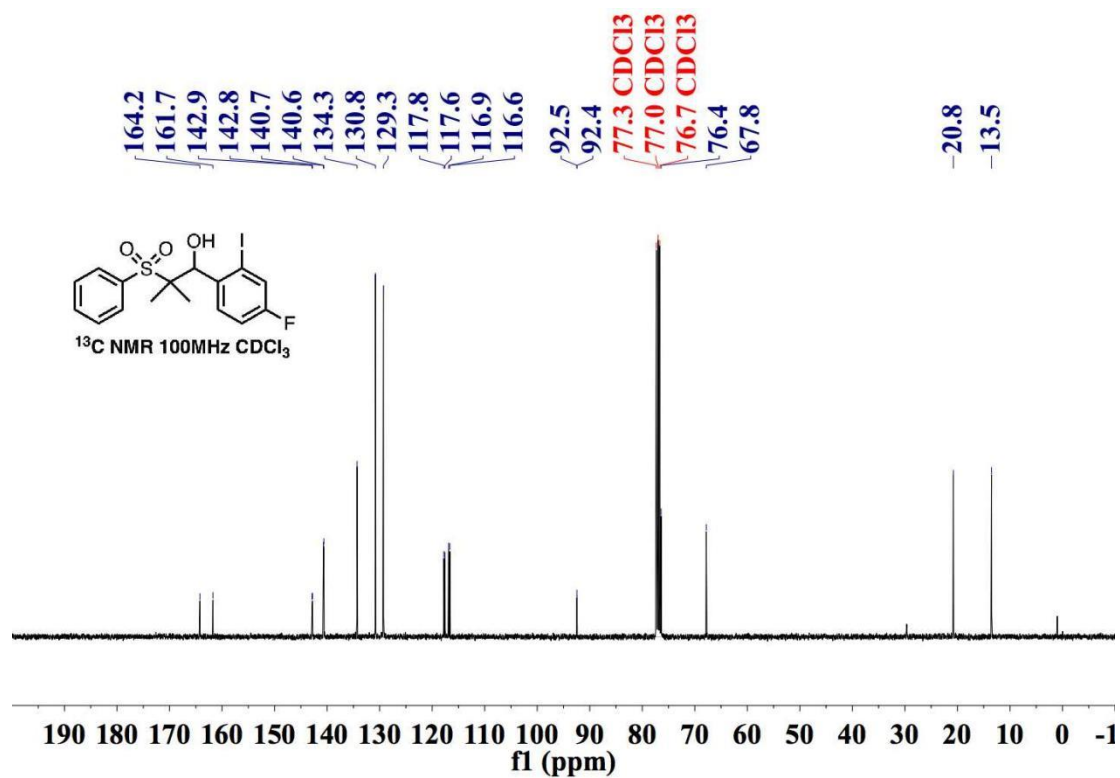
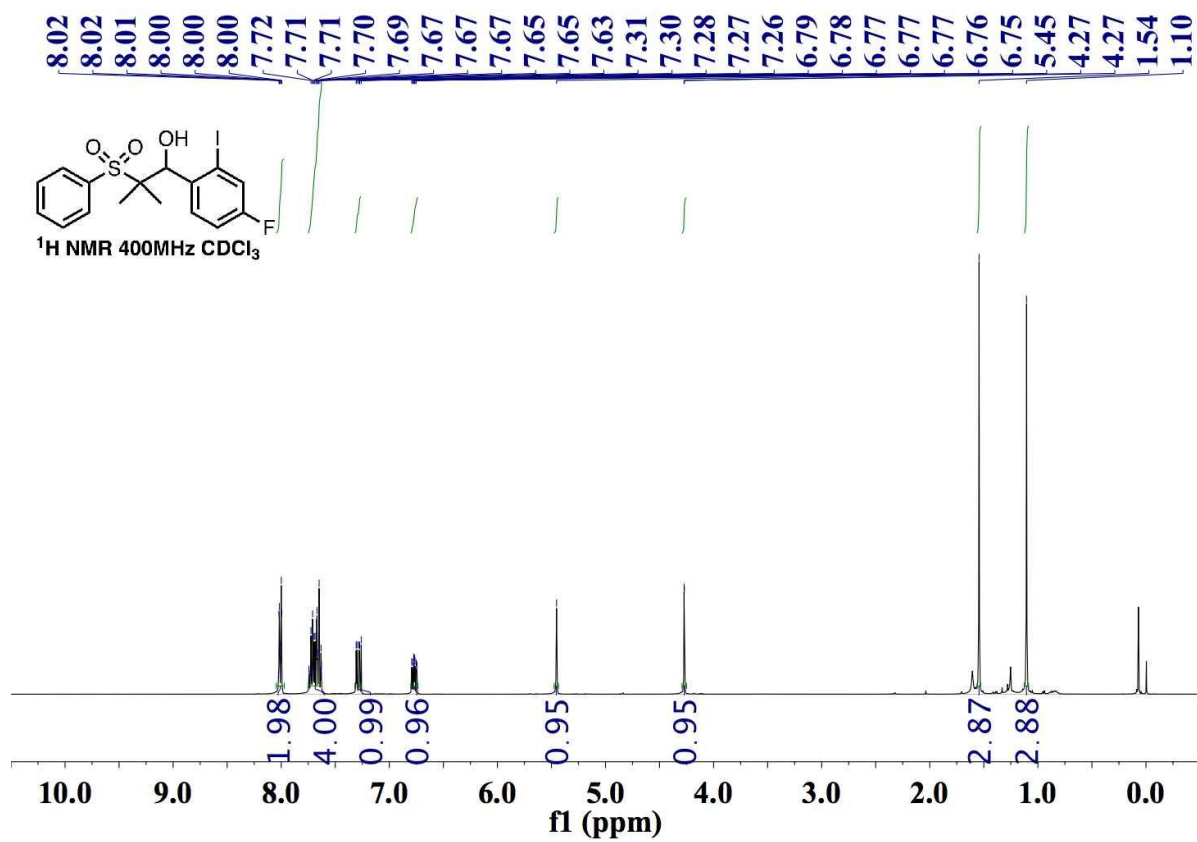


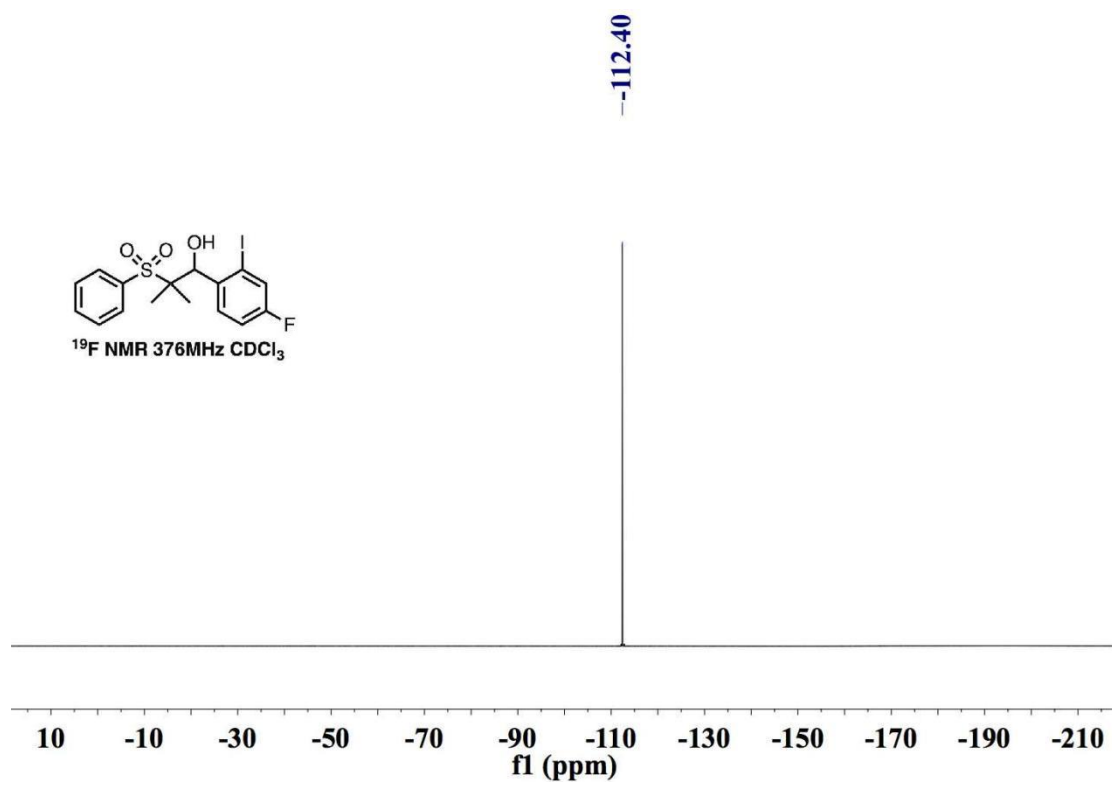
1-(2,4-Dichlorophenyl)-2-methyl-2-(phenylsulfonyl)propan-1-ol (2ad):



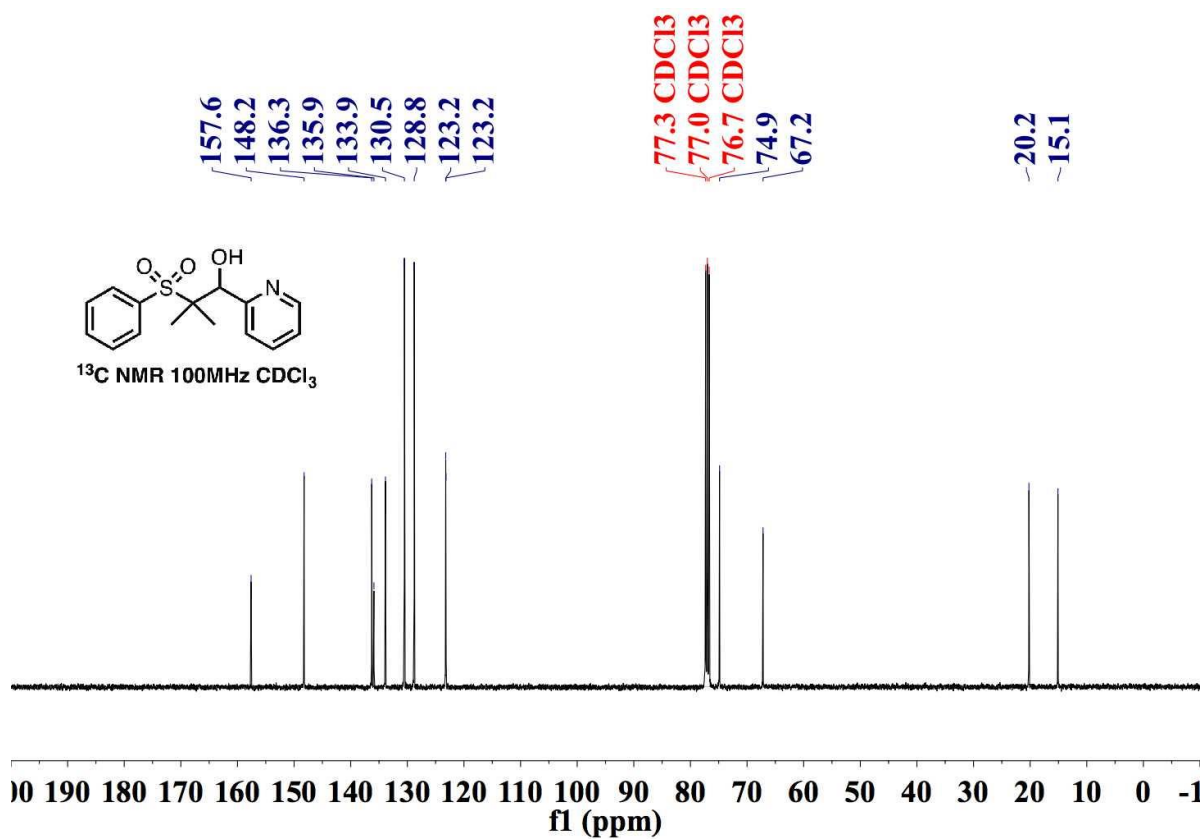
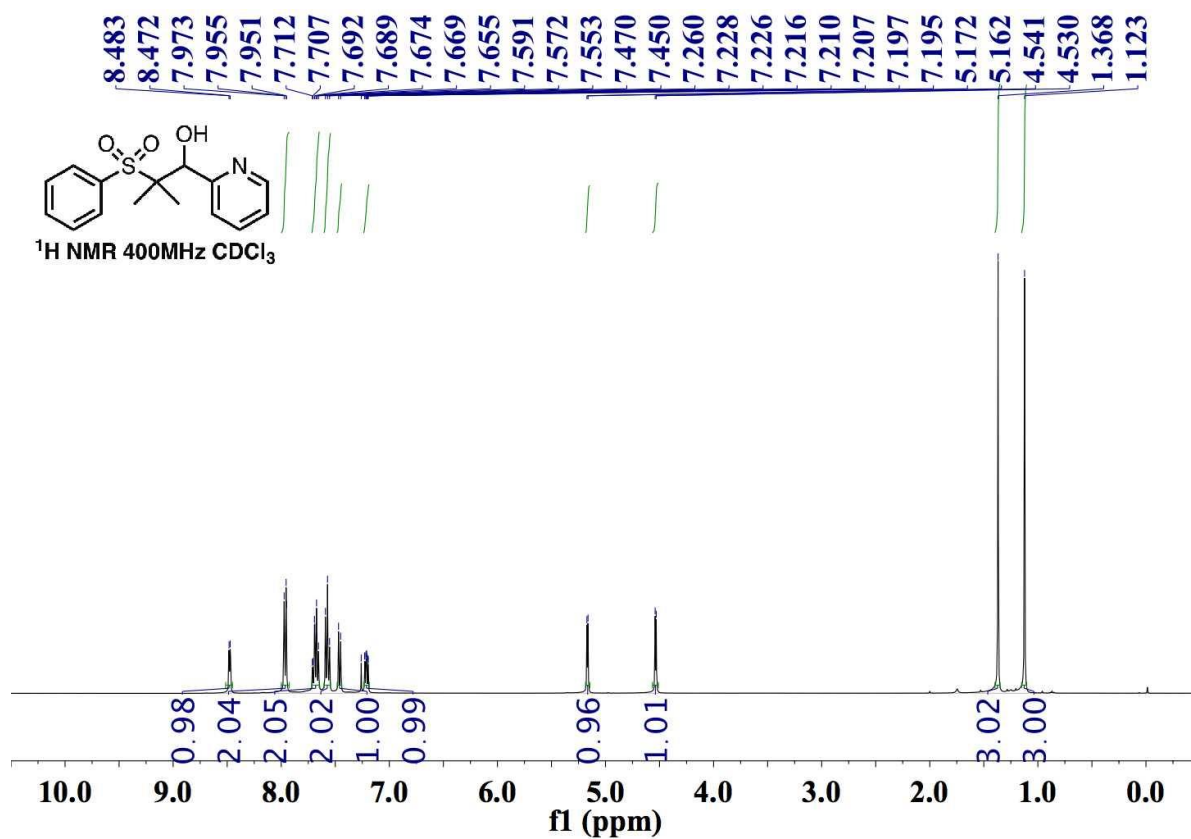


**1-(4-Fluoro-2-iodophenyl)-2-methyl-2-(phenylsulfonyl)propan-1-ol (2ae):**

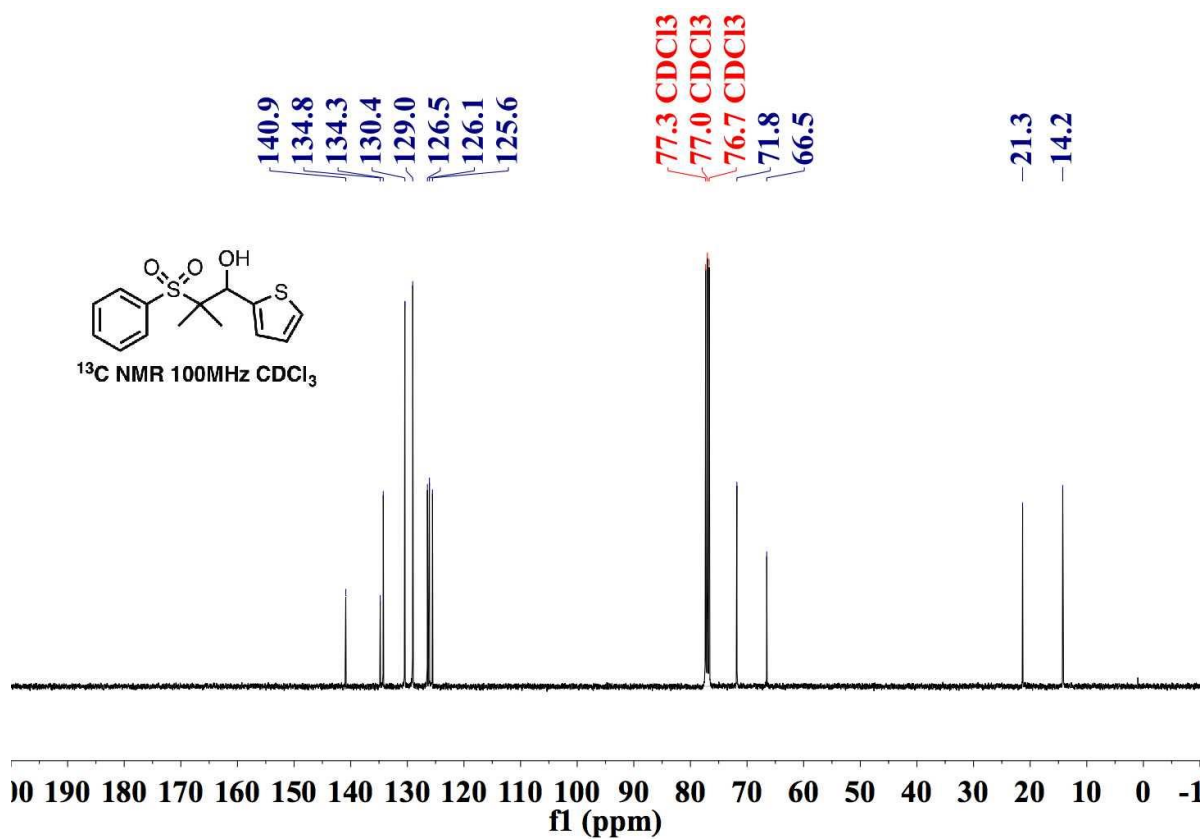
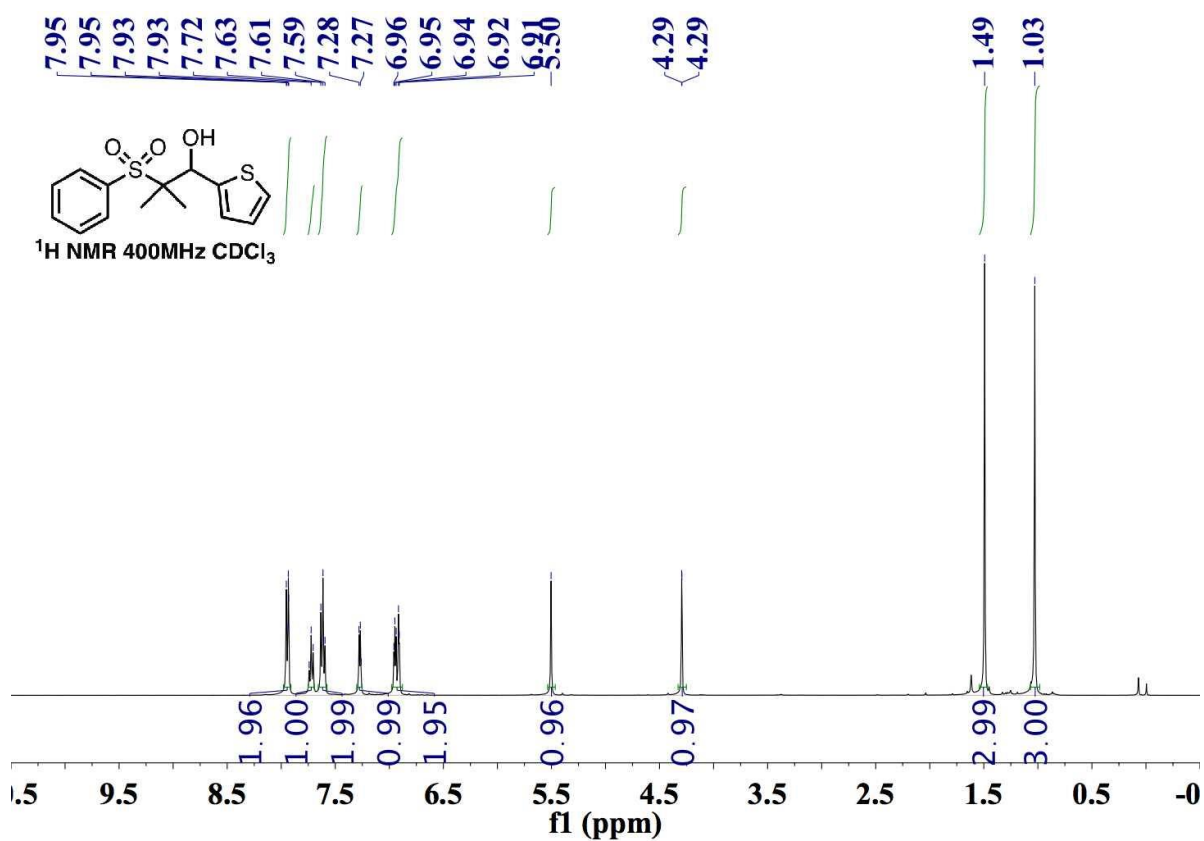




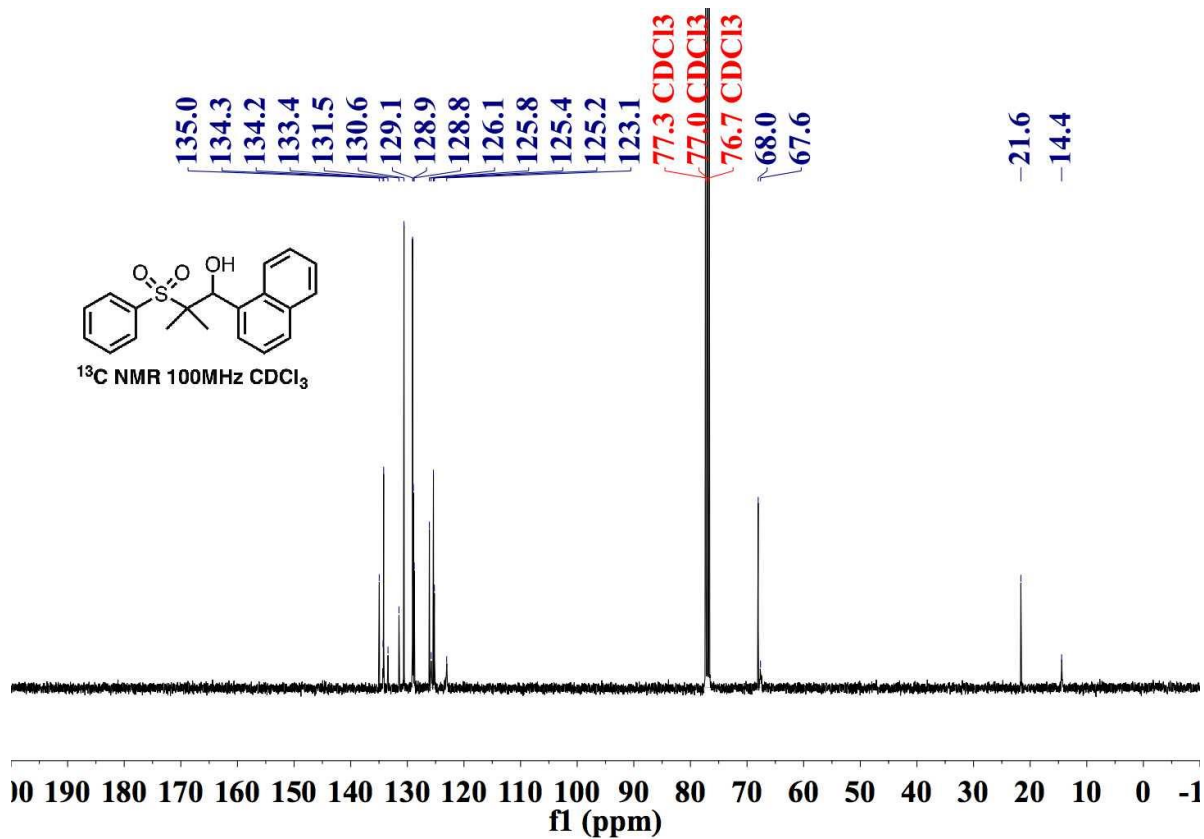
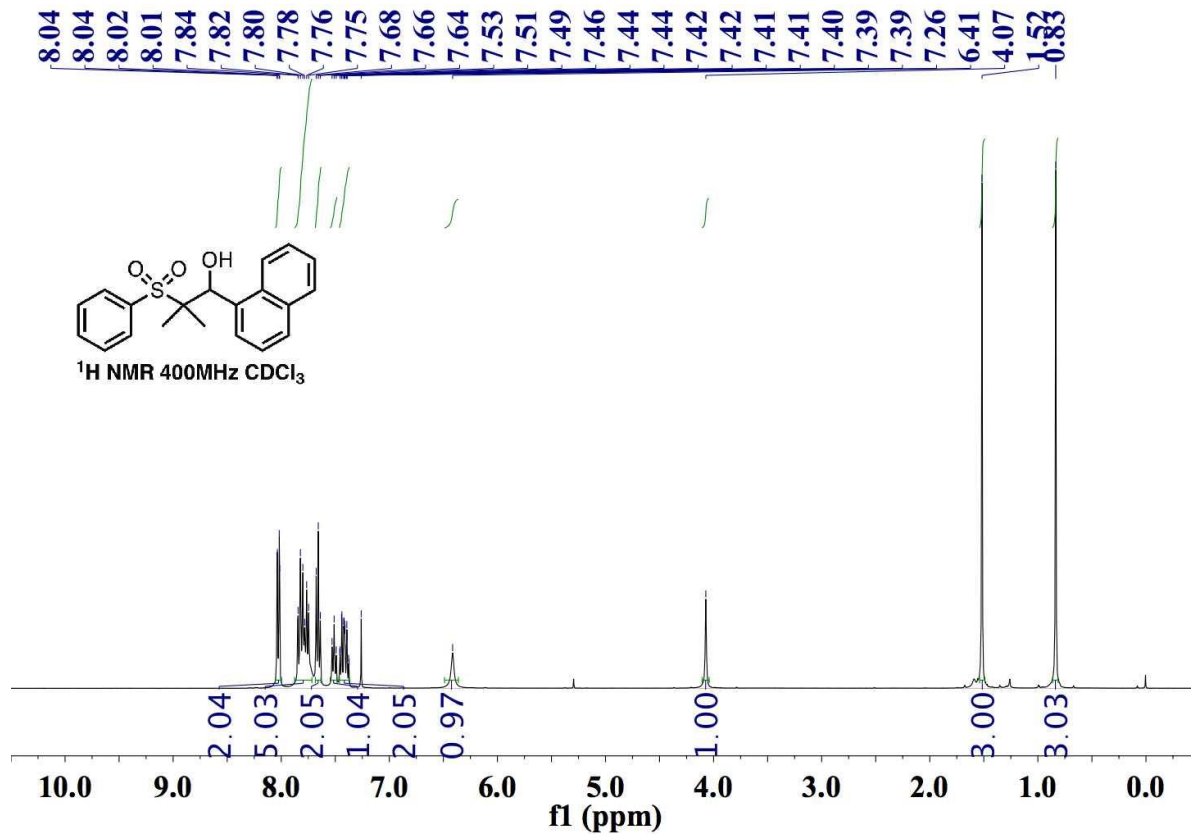
**2-Methyl-2-(phenylsulfonyl)-1-(pyridin-2-yl)propan-1-ol (2af):**



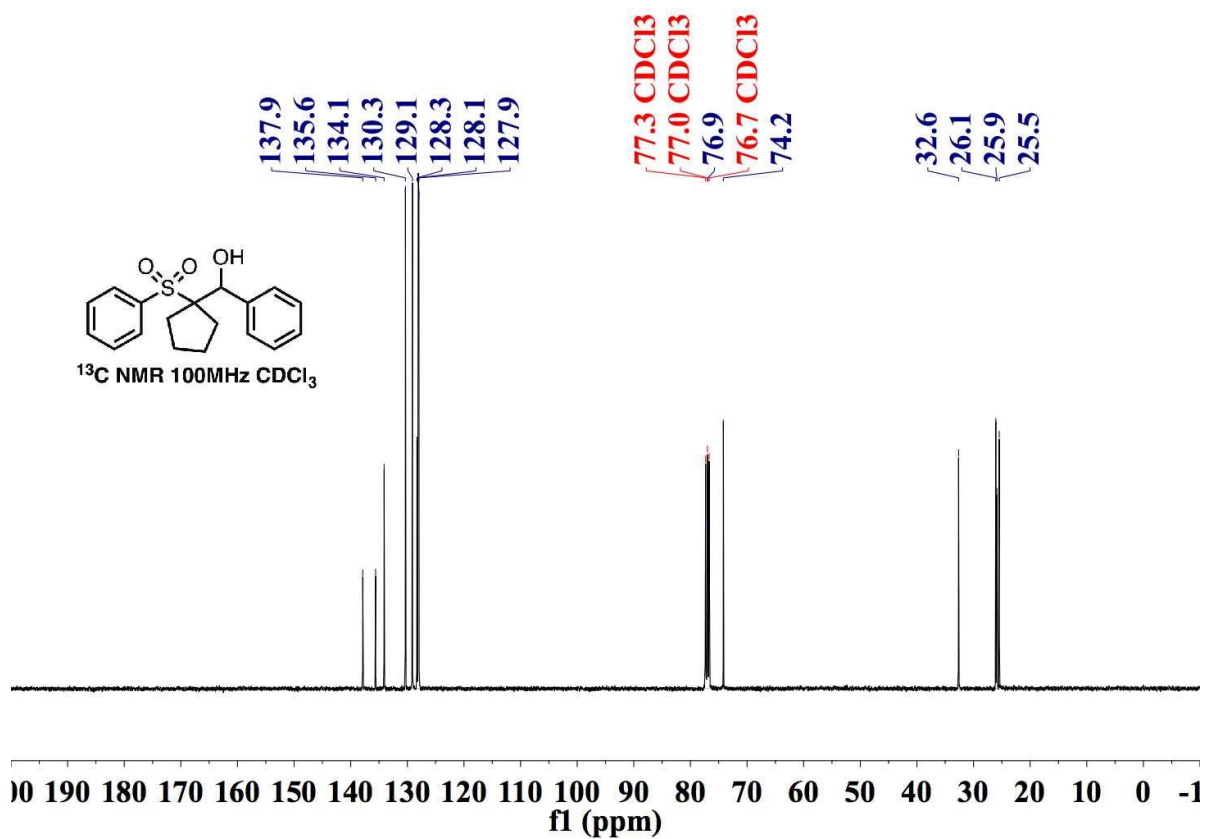
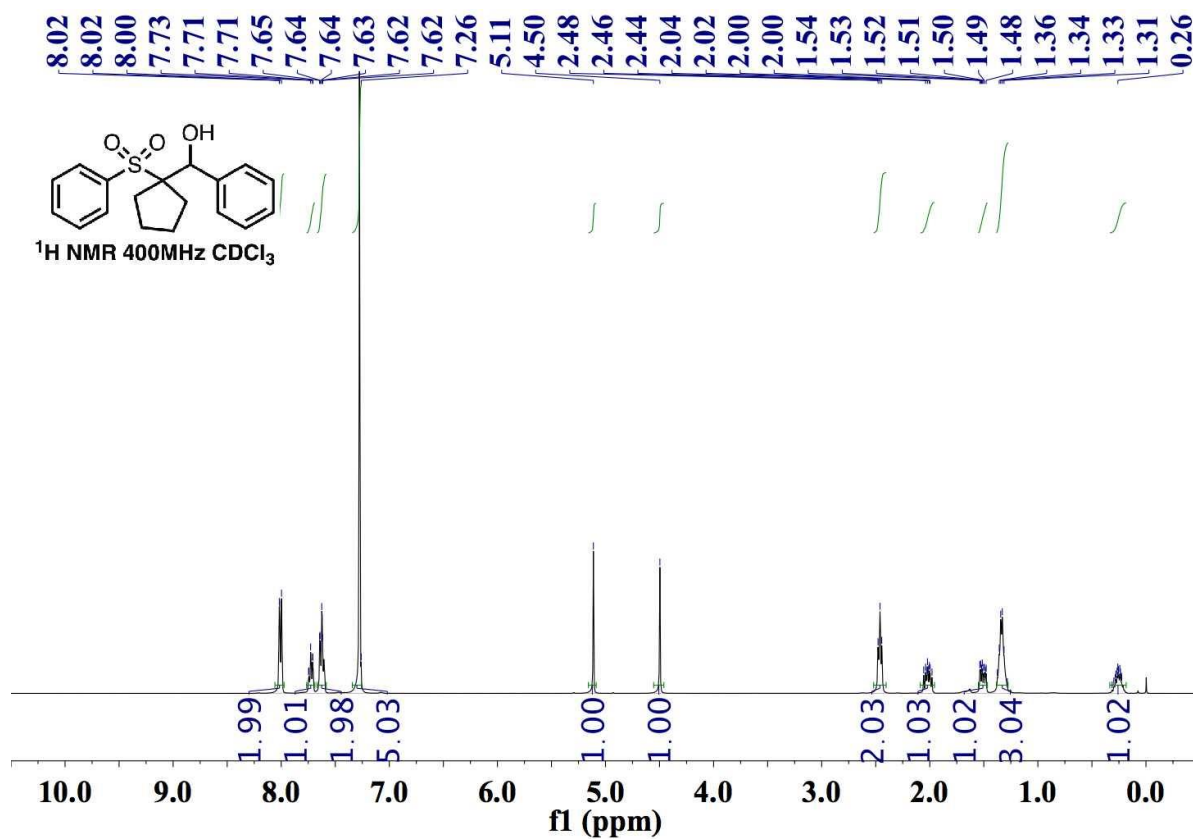
**2-Methyl-2-(phenylsulfonyl)-1-(thiophen-2-yl)propan-1-ol (2ag):**



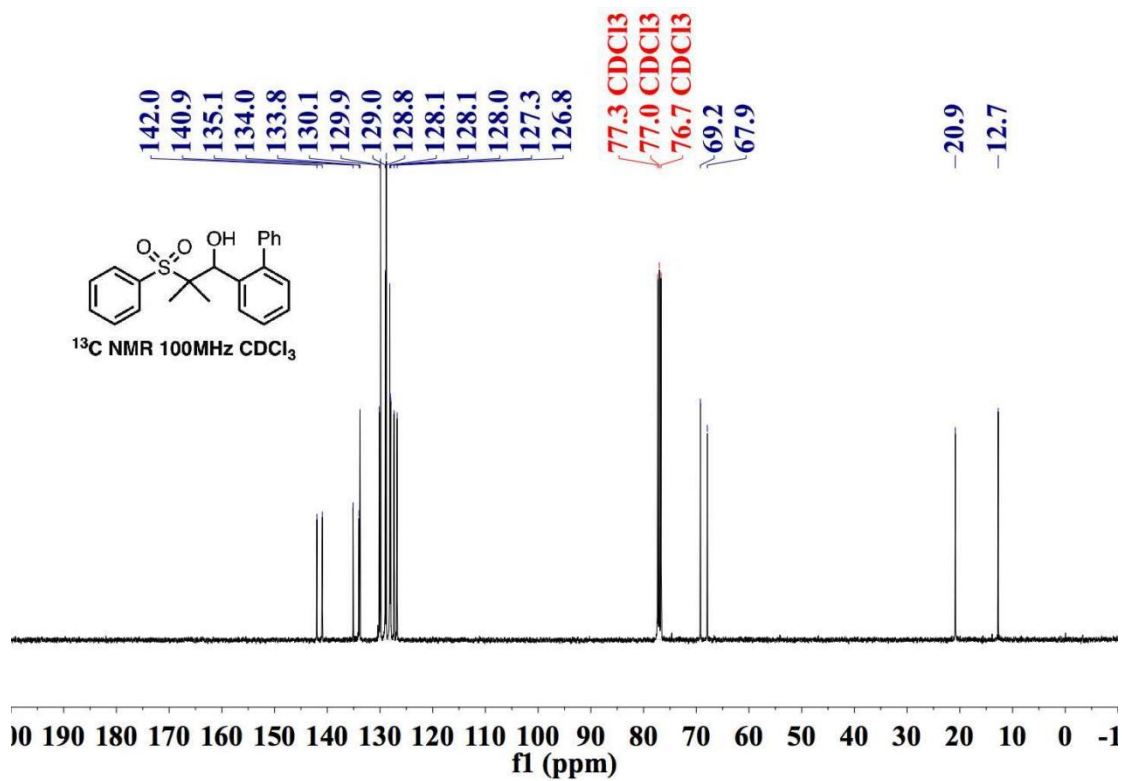
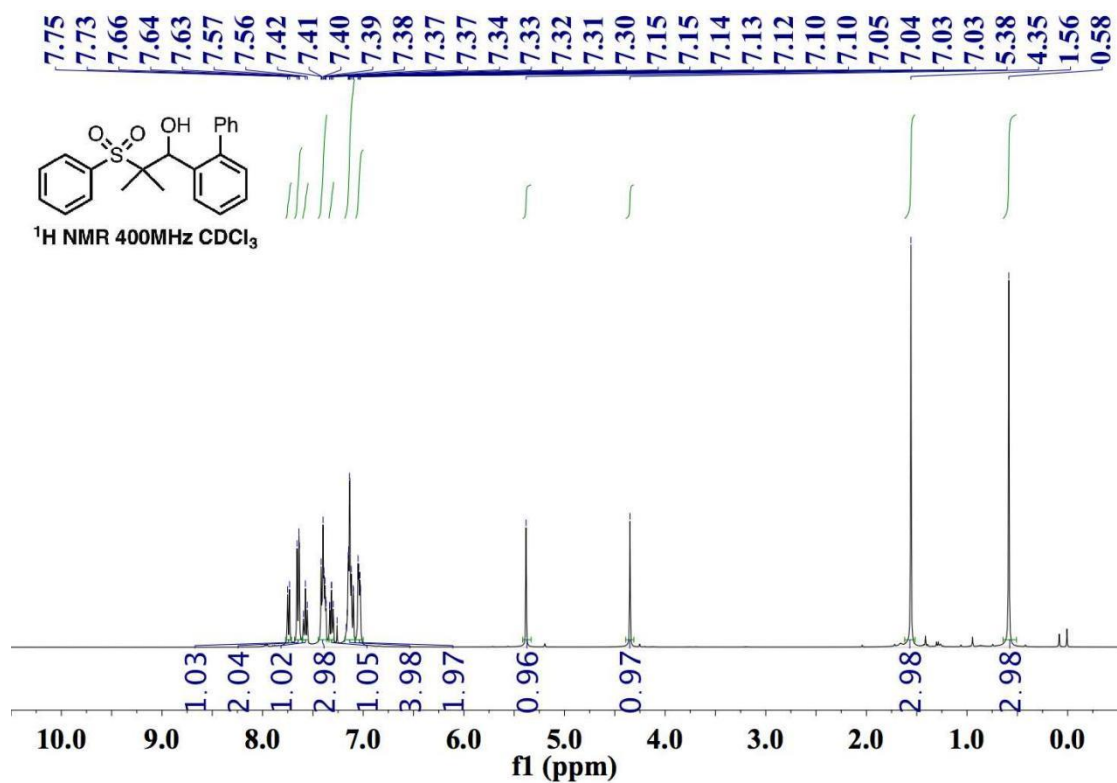
**2-Methyl-1-(naphthalen-1-yl)-2-(phenylsulfonyl)propan-1-ol (2ah):**



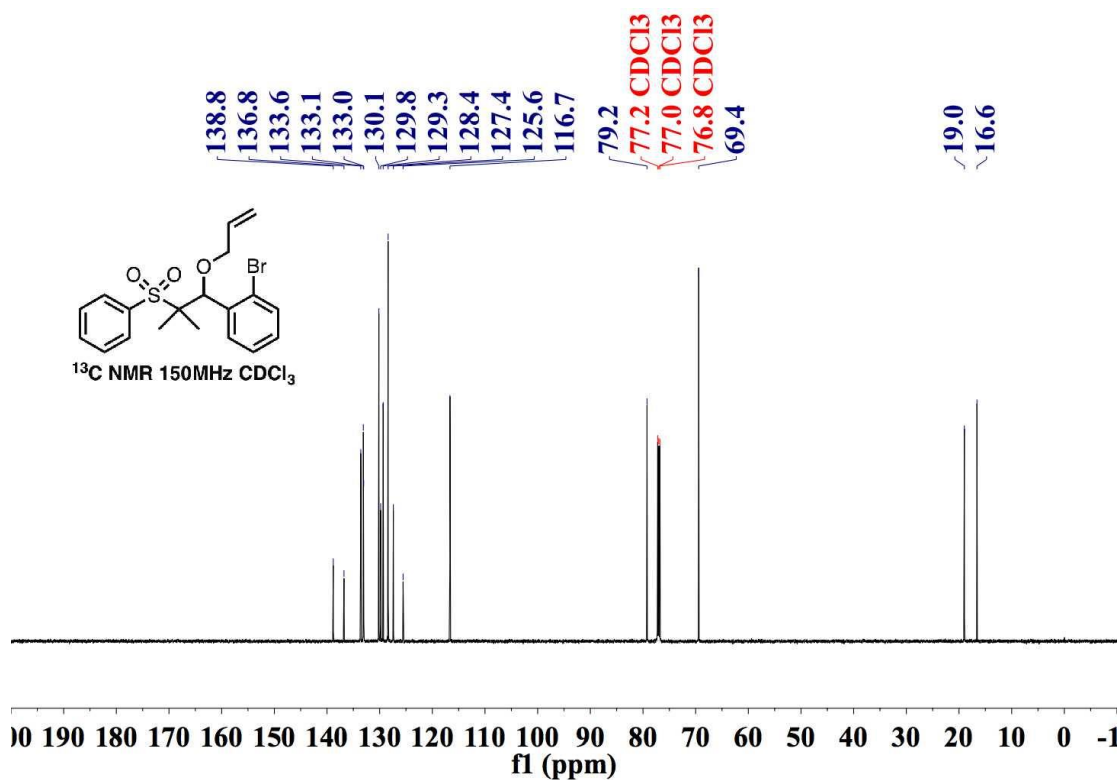
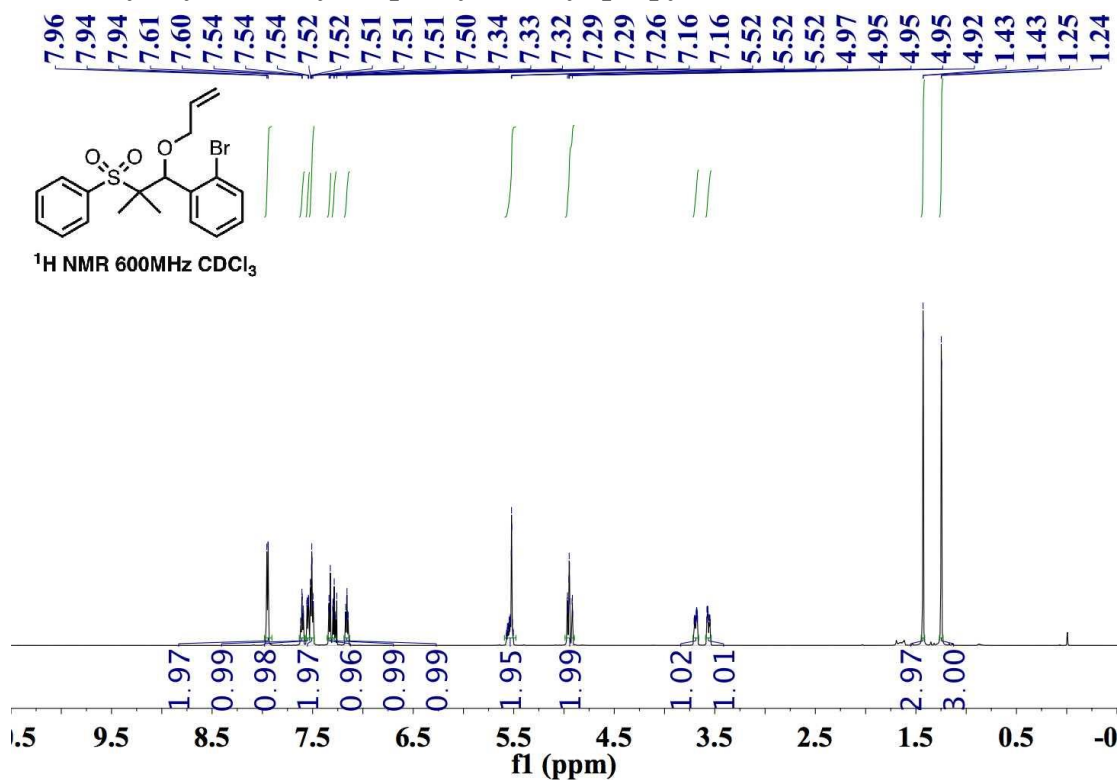
Phenyl(1-(phenylsulfonyl)cyclopentyl)methanol (2ai):



**1-([1,1'-Biphenyl]-2-yl)-2-methyl-2-(phenylsulfonyl)propan-1-ol (3a):**

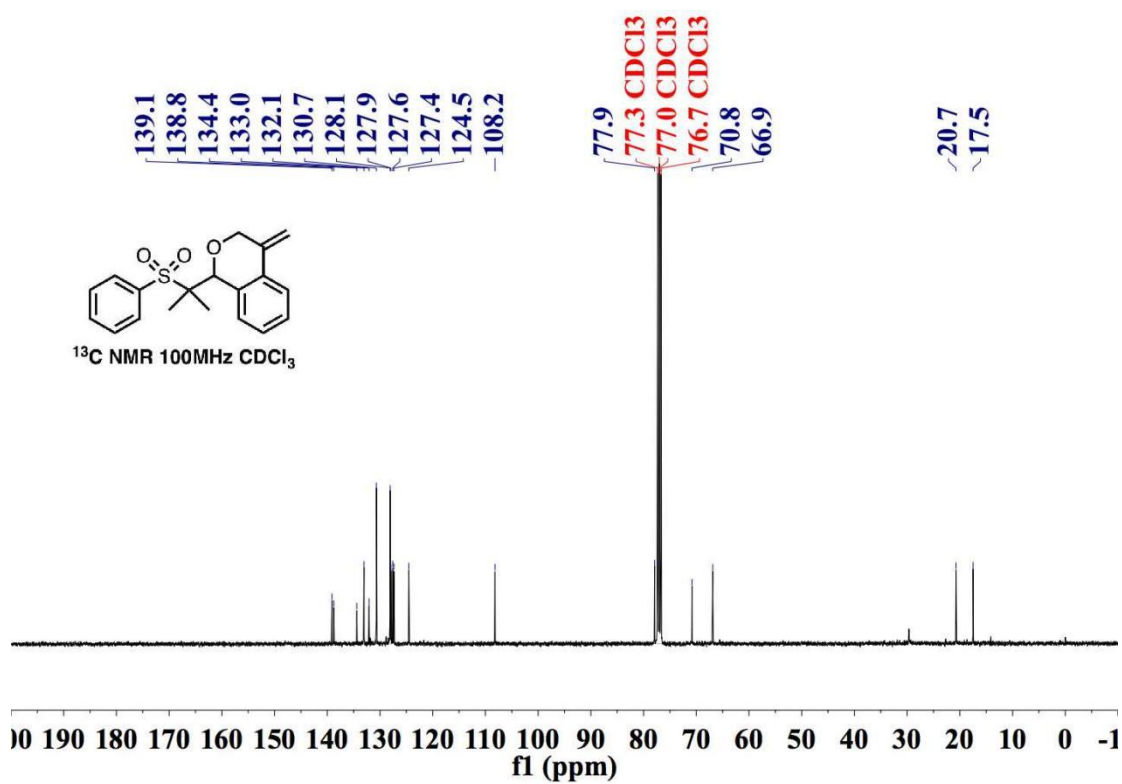
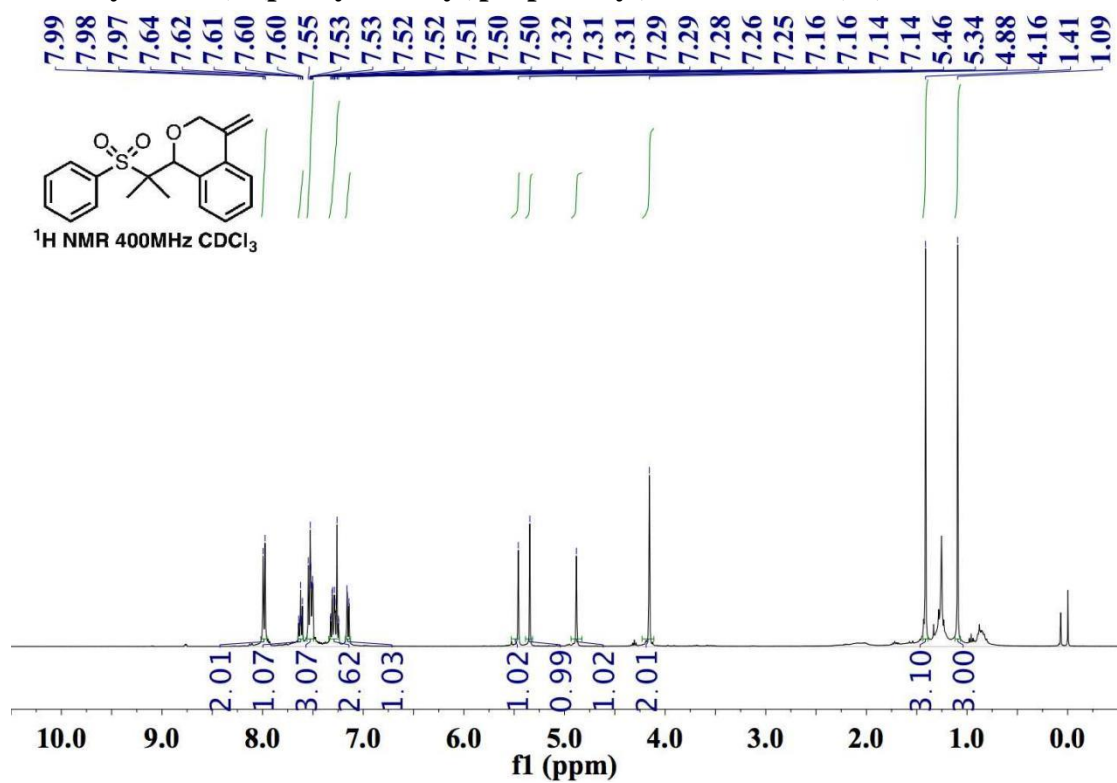


**1-(1-(Allyloxy)-2-methyl-2-(phenylsulfonyl)propyl)-2-bromobenzene (4a):**



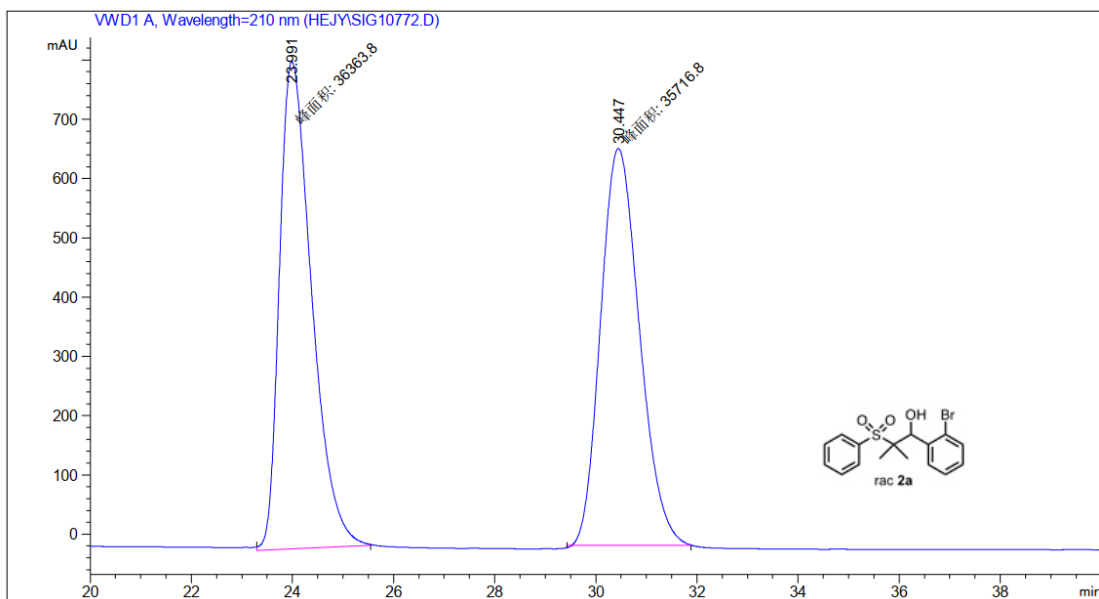


**4-Methylene-1-(2-(phenylsulfonyl)propan-2-yl)isochromane (5a):**

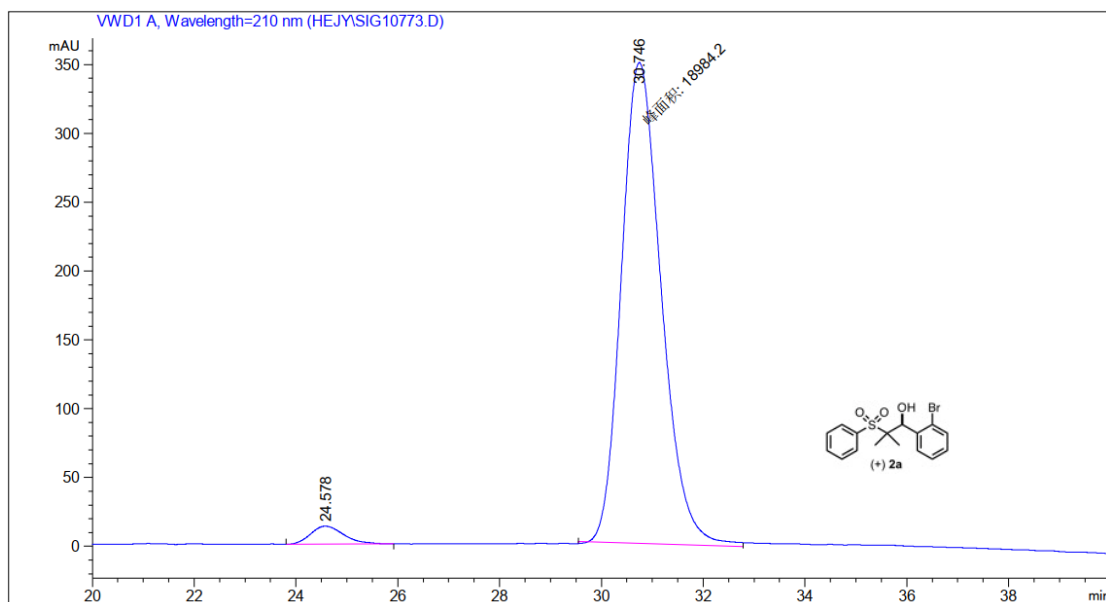


## 8. Copies of HPLC charts

### 1-(2-Bromophenyl)-2-methyl-2-(phenylsulfonyl)propan-1-ol (2a):

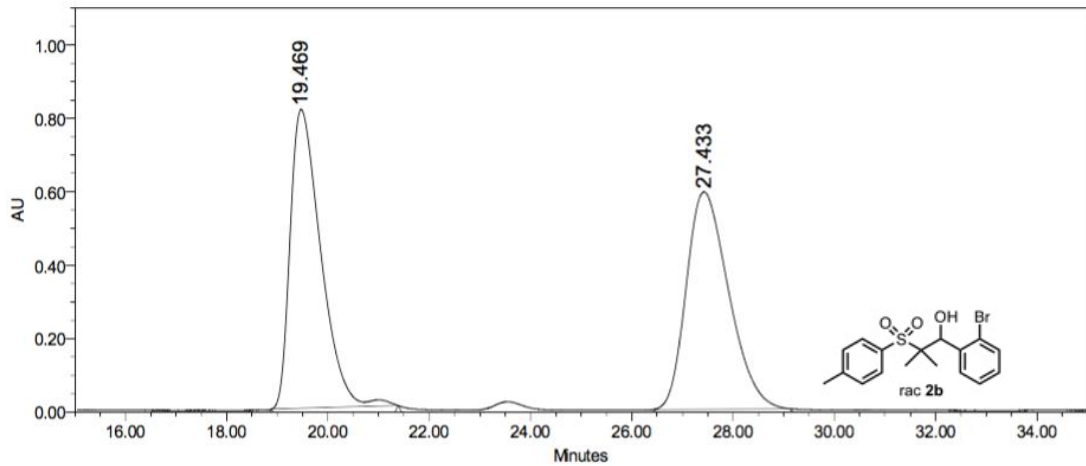


#	[min]	[min]	[mAU*s]	[mAU]	%
1	23.991 MM	0.7374	3.63638e4	821.91675	50.4488
2	30.447 MM	0.8891	3.57168e4	669.56494	49.5512



#	[min]	[min]	[mAU*s]	[mAU]	%
1	24.578 BB	0.6948	590.42316	13.02483	3.0163
2	30.746 MM	0.9060	1.89842e4	349.21771	96.9837

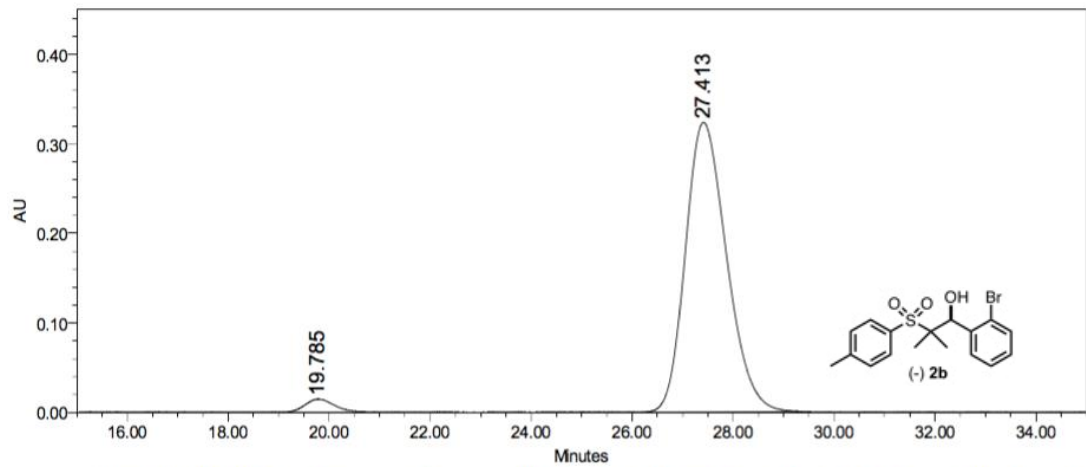
### 1-(2-Bromophenyl)-2-methyl-2-tosylpropan-1-ol (2b):



Channel: W2489 ChA; Processed Channel: W2489 ChA 215nm; Result Id: 3054; Processing Method: 3

**Processed Channel Descr.: W2489 ChA 215nm**

	Processed Channel Descr.	RT	Area	% Area	Height
1	W2489 ChA 215nm	19.469	34431871	50.01	815002
2	W2489 ChA 215nm	27.433	34412489	49.99	591795

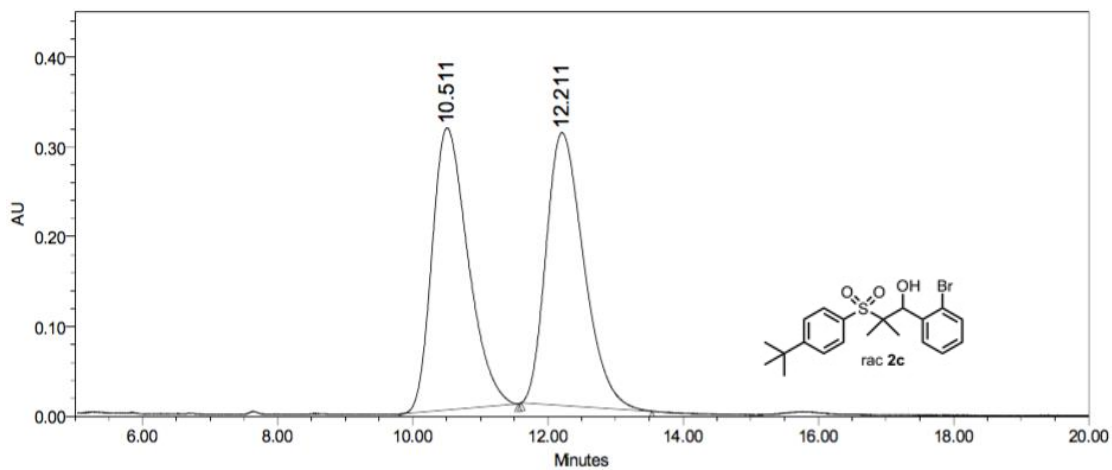


Channel: W2489 ChA; Processed Channel: W2489 ChA 215nm; Result Id: 3057; Processing Method: 6

**Processed Channel Descr.: W2489 ChA 215nm**

	Processed Channel Descr.	RT	Area	% Area	Height
1	W2489 ChA 215nm	19.785	550799	2.93	14262
2	W2489 ChA 215nm	27.413	18266785	97.07	323409

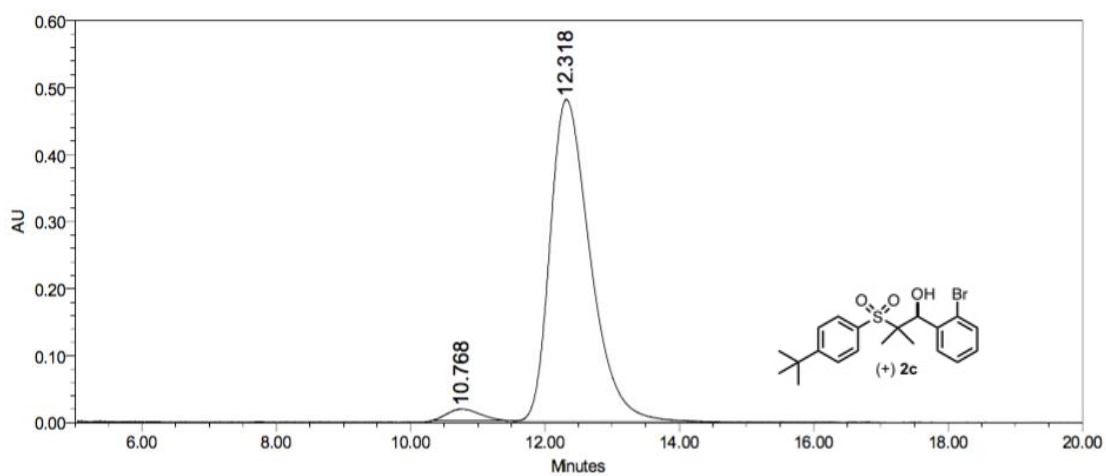
**1-(2-Bromophenyl)-2-((4-(tert-butyl)phenyl)sulfonyl)-2-methylpropan-1-ol (2c):**



Channel: W2489 ChA; Processed Channel: W2489 ChA 215nm; Result Id: 3348; Processing Method: C

**Processed Channel Descr.: W2489 ChA 215nm**

	Processed Channel Descr.	RT	Area	% Area	Height
1	W2489 ChA 215nm	10.511	11597705	49.61	313837
2	W2489 ChA 215nm	12.211	11778089	50.39	303643

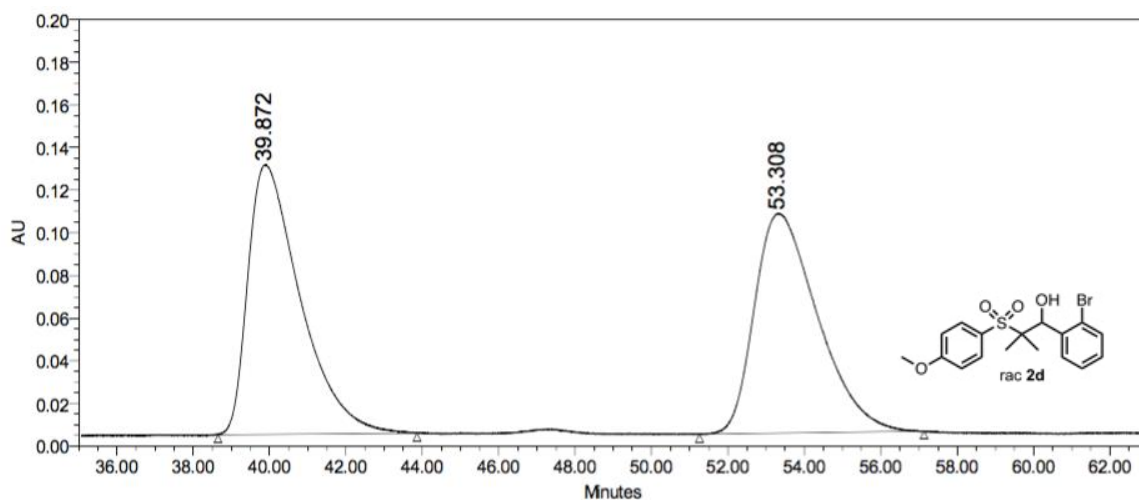


Channel: W2489 ChA; Processed Channel: W2489 ChA 215nm; Result Id: 3352; Processing Method: C

**Processed Channel Descr.: W2489 ChA 215nm**

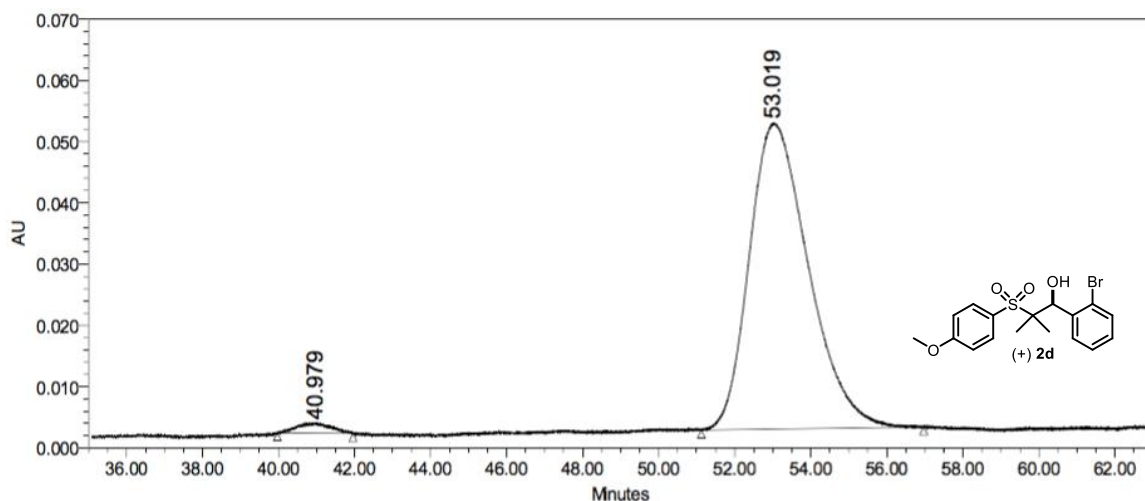
	Processed Channel Descr.	RT	Area	% Area	Height
1	W2489 ChA 215nm	10.768	595498	2.91	17565
2	W2489 ChA 215nm	12.318	19886615	97.09	480561

**1-(2-Bromophenyl)-2-((4-methoxyphenyl)sulfonyl)-2-methylpropan-1-ol (2d):**



**Processed Channel Descr.: W2489 ChA 215nm**

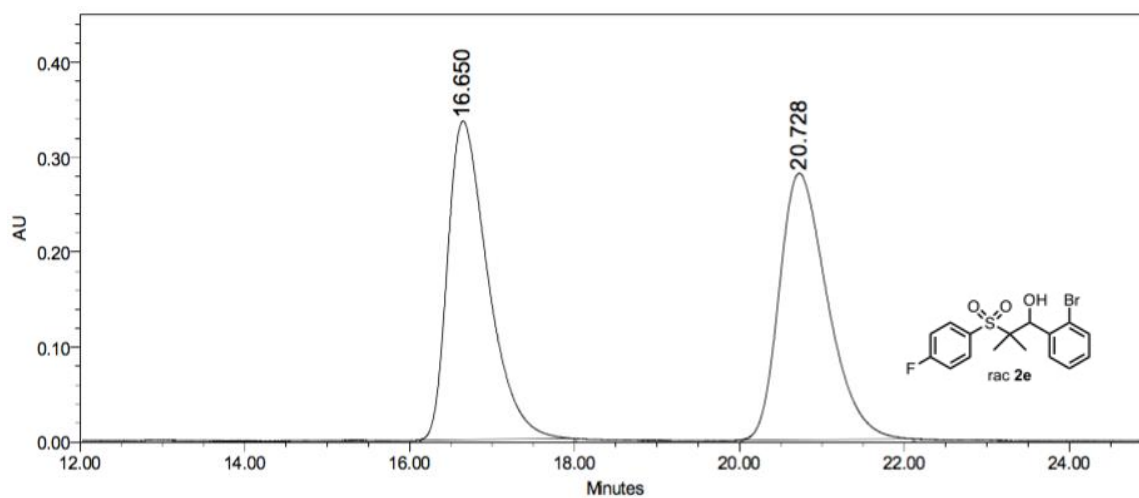
	Processed Channel Descr.	RT	Area	% Area	Height
1	W2489 ChA 215nm	39.872	12040095	50.41	126422
2	W2489 ChA 215nm	53.308	11843228	49.59	103006



**Processed Channel Descr.: W2489 ChA 215nm**

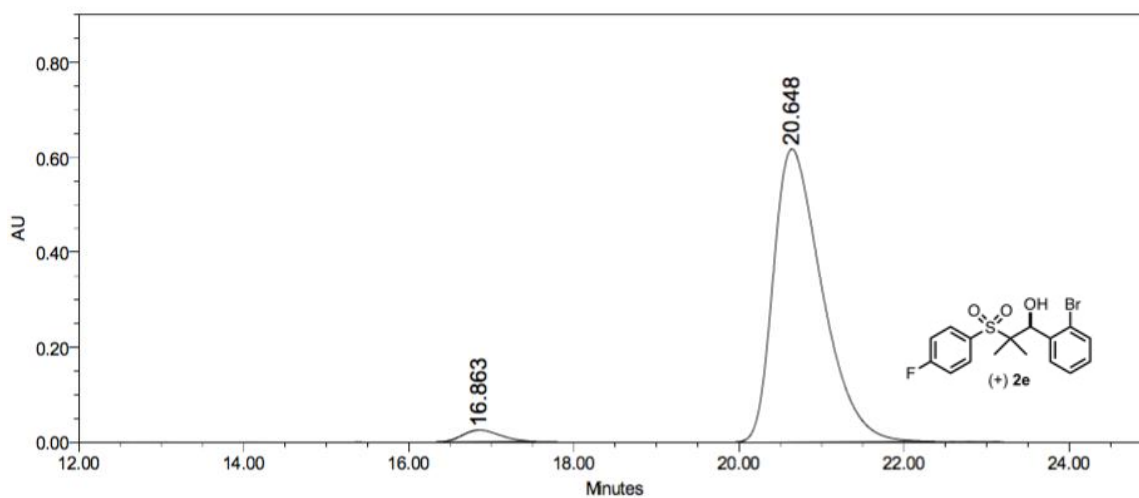
	Processed Channel Descr.	RT	Area	% Area	Height
1	W2489 ChA 215nm	40.979	102118	1.85	1630
2	W2489 ChA 215nm	53.019	5413041	98.15	50066

**1-(2-Bromophenyl)-2-((4-fluorophenyl)sulfonyl)-2-methylpropan-1-ol (2e):**



**Processed Channel Descr.: W2489 ChA 215nm**

	Processed Channel Descr.	RT	Area	% Area	Height
1	W2489 ChA 215nm	16.650	11335680	49.97	335207
2	W2489 ChA 215nm	20.728	11348434	50.03	280193

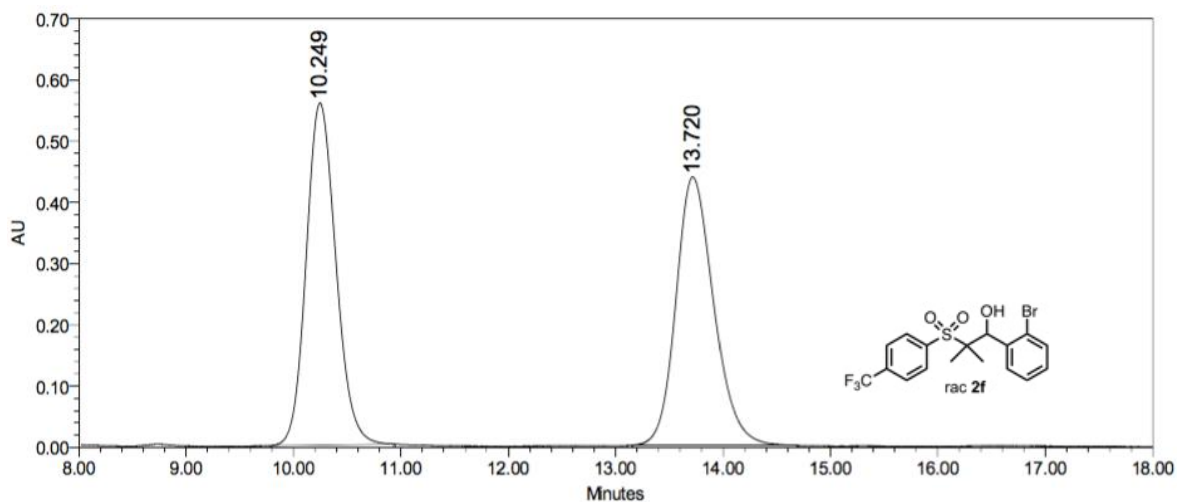


**Processed Channel Descr.: W2489 ChA 215nm**

	Processed Channel Descr.	RT	Area	% Area	Height
1	W2489 ChA 215nm	16.863	741968	2.86	24359
2	W2489 ChA 215nm	20.648	25234554	97.14	616330

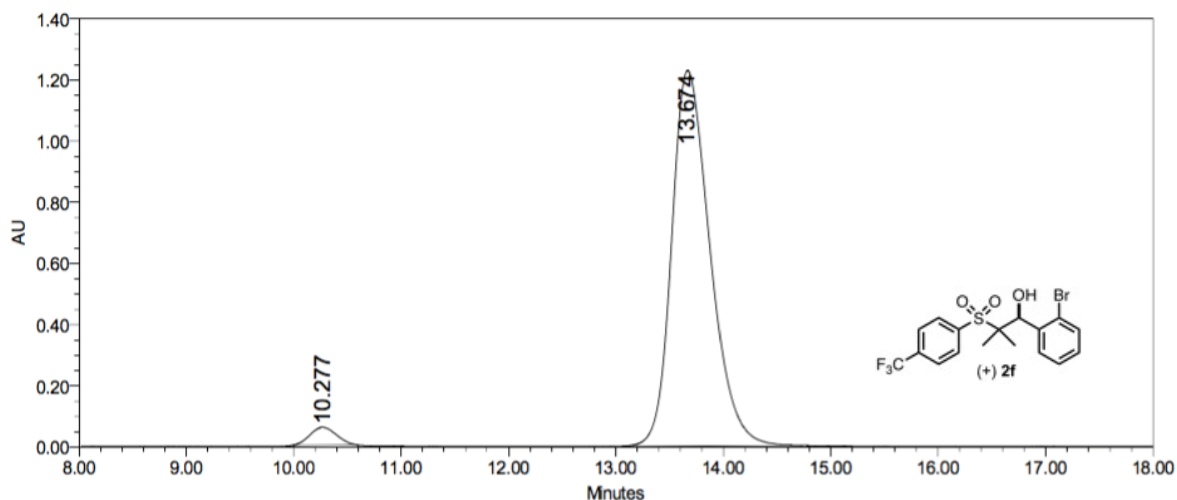
**1-(2-Bromophenyl)-2-methyl-2-((4-(trifluoromethyl)phenyl)sulfonyl)propan-1-ol**

**(2f):**



**Processed Channel Descr.: W2489 ChA 215nm**

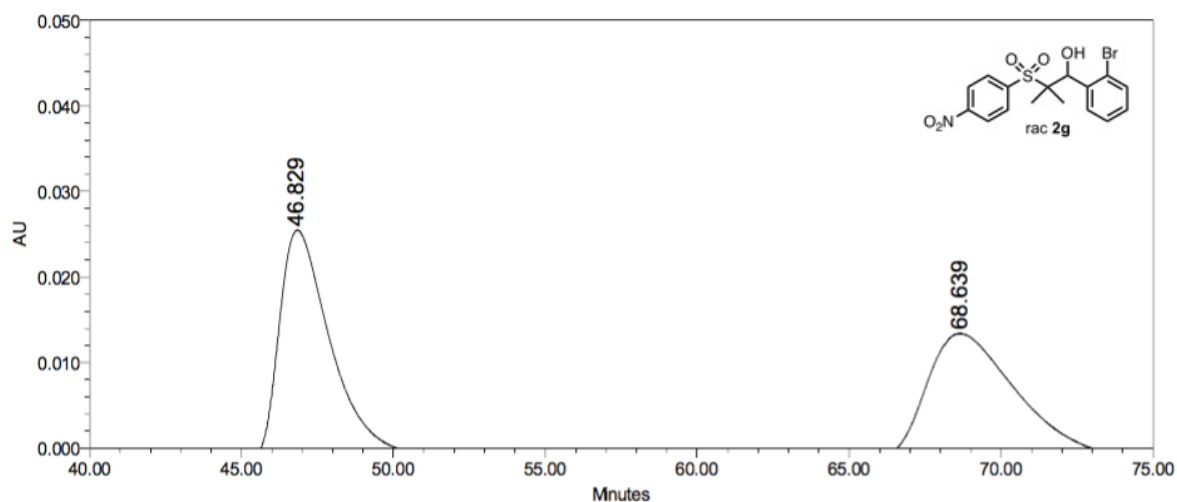
	Processed Channel Descr.	RT	Area	% Area	Height
1	W2489 ChA 215nm	10.249	10731709	50.00	558820
2	W2489 ChA 215nm	13.720	10733014	50.00	438158



**Processed Channel Descr.: W2489 ChA 215nm**

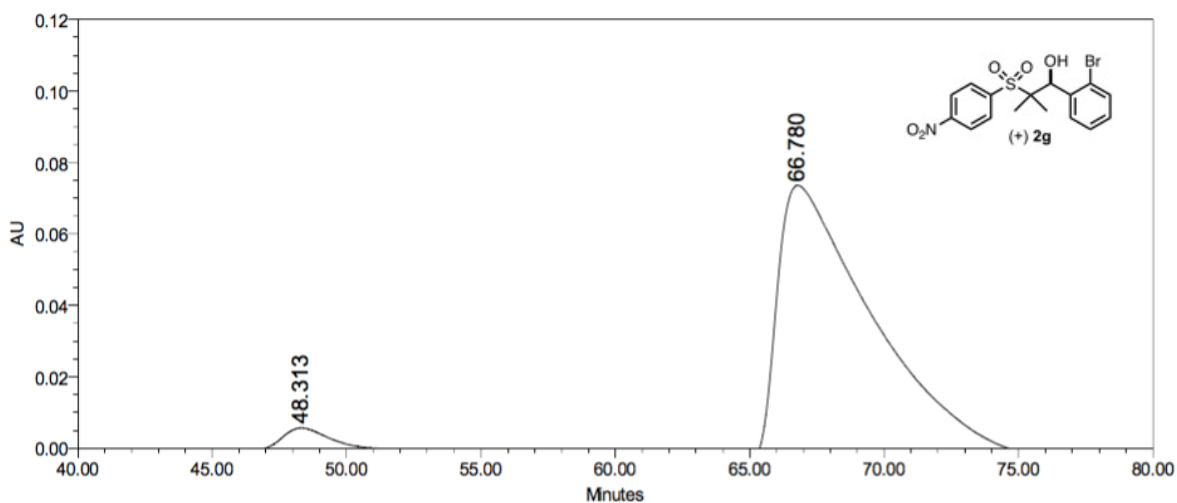
	Processed Channel Descr.	RT	Area	% Area	Height
1	W2489 ChA 215nm	10.277	992743	3.16	57969
2	W2489 ChA 215nm	13.674	30411358	96.84	1227860

**1-(2-Bromophenyl)-2-methyl-2-((4-nitrophenyl)sulfonyl)-propan-1-ol (2g):**



**Processed Channel Descr.: W2489 ChA 215nm**

	Processed Channel Descr.	RT	Area	% Area	Height
1	W2489 ChA 215nm	46.829	3158488	50.01	26655
2	W2489 ChA 215nm	68.639	3156731	49.99	14842

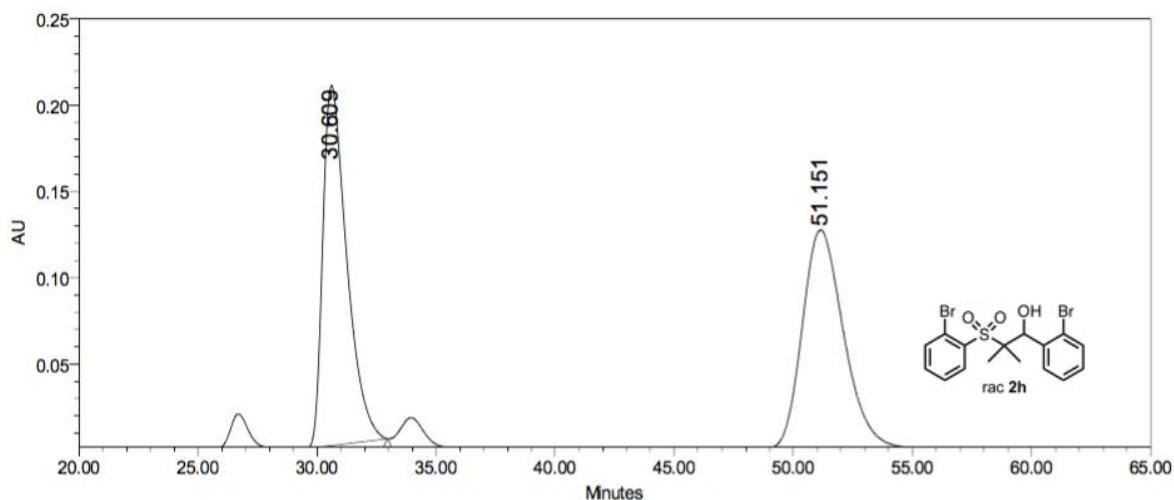


**Processed Channel Descr.: W2489 ChA 215nm**

	Processed Channel Descr.	RT	Area	% Area	Height
1	W2489 ChA 215nm	48.313	622742	3.03	5671
2	W2489 ChA 215nm	66.780	19956232	96.97	77713



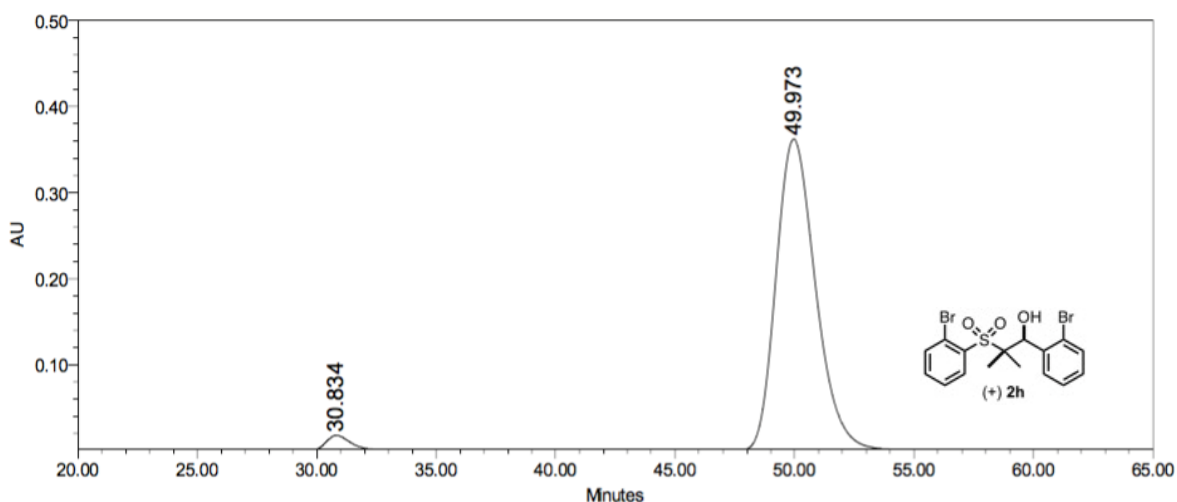
**1-(2-Bromophenyl)-2-((2-bromophenyl)sulfonyl)-2-methylpropan-1-ol (2h):**



Channel: W2489 ChA; Processed Channel: W2489 ChA 215nm; Result Id: 3756; Processing Method: C

**Processed Channel Descr.: W2489 ChA 215nm**

	Processed Channel Descr.	RT	Area	% Area	Height
1	W2489 ChA 215nm	30.609	14610360	48.91	208750
2	W2489 ChA 215nm	51.151	15262476	51.09	126860

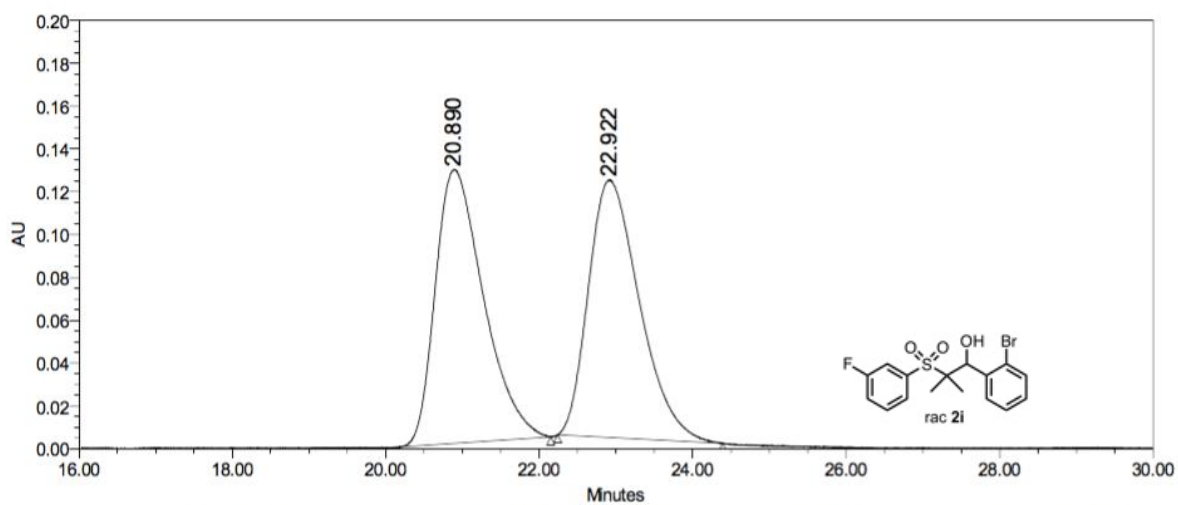


Channel: W2489 ChA; Processed Channel: W2489 ChA 215nm; Result Id: 3766; Processing Method: C

**Processed Channel Descr.: W2489 ChA 215nm**

	Processed Channel Descr.	RT	Area	% Area	Height
1	W2489 ChA 215nm	30.834	1136549	2.64	16896
2	W2489 ChA 215nm	49.973	41989099	97.36	362892

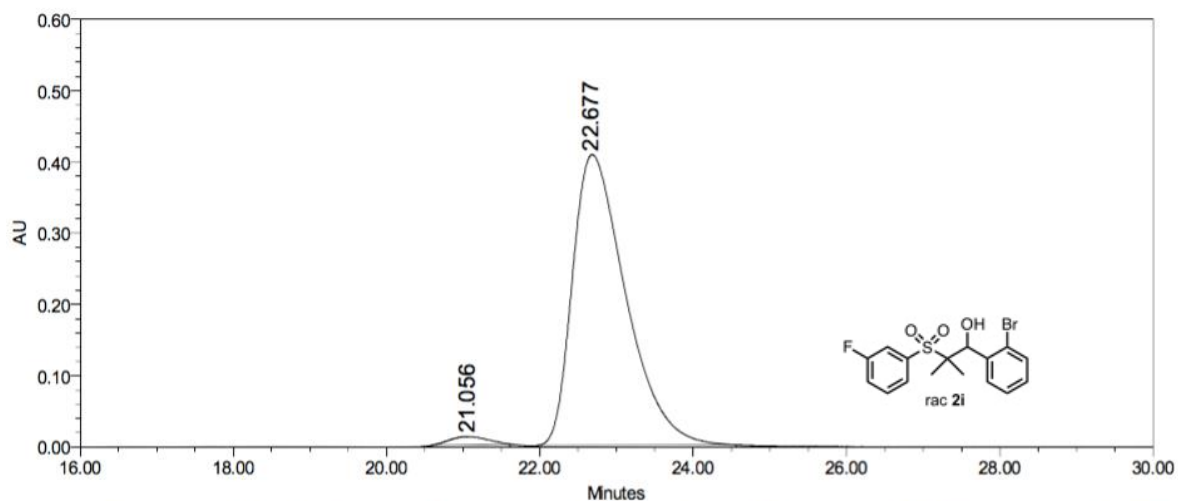
**1-(2-Bromophenyl)-2-((3-fluorophenyl)sulfonyl)-2-methylpropan-1-ol (2i):**



Channel: W2489 ChA; Processed Channel: W2489 ChA 215nm; Result Id: 3370; Processing Method: C

**Processed Channel Descr.: W2489 ChA 215nm**

	Processed Channel Descr.	RT	Area	% Area	Height
1	W2489 ChA 215nm	20.890	5582411	50.05	127883
2	W2489 ChA 215nm	22.922	5571839	49.95	120354

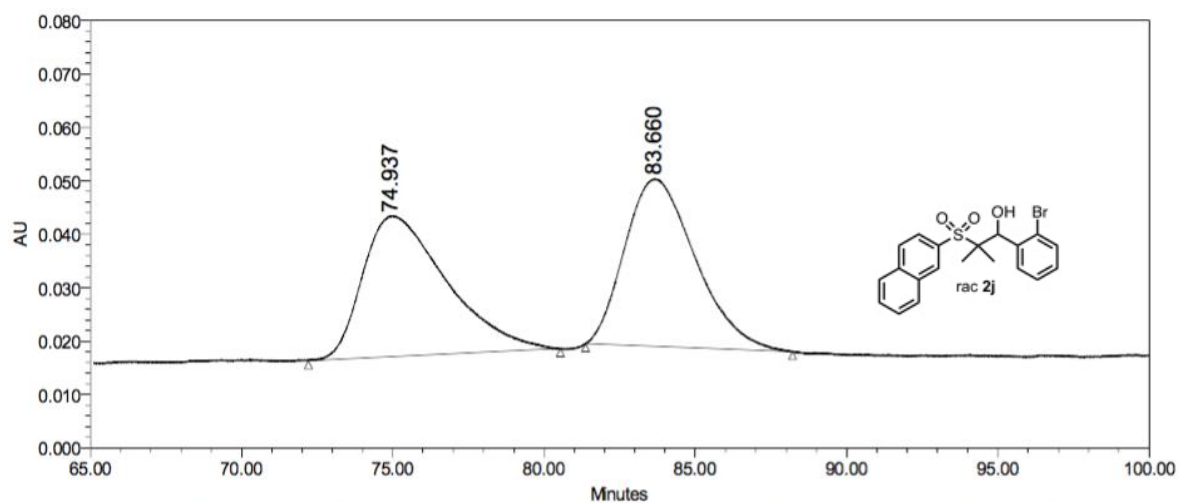


Channel: W2489 ChA; Processed Channel: W2489 ChA 215nm; Result Id: 3367; Processing Method: C

**Processed Channel Descr.: W2489 ChA 215nm**

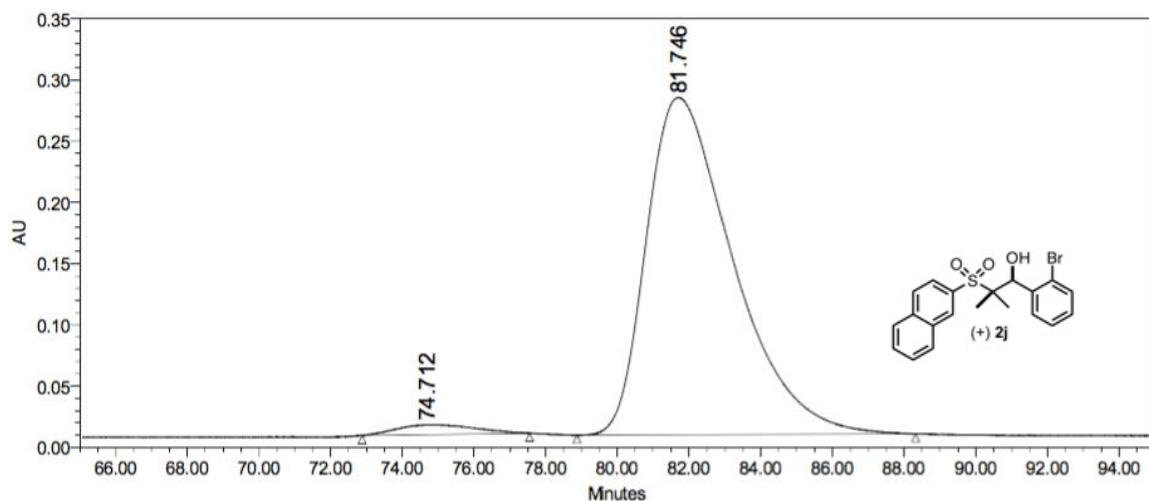
	Processed Channel Descr.	RT	Area	% Area	Height
1	W2489 ChA 215nm	21.056	397422	1.98	11620
2	W2489 ChA 215nm	22.677	19699977	98.02	408057

**1-(2-Bromophenyl)-2-methyl-2-(naphthalen-2-ylsulfonyl)propan-1-ol (2j):**



**Processed Channel Descr.: W2489 ChA 215nm**

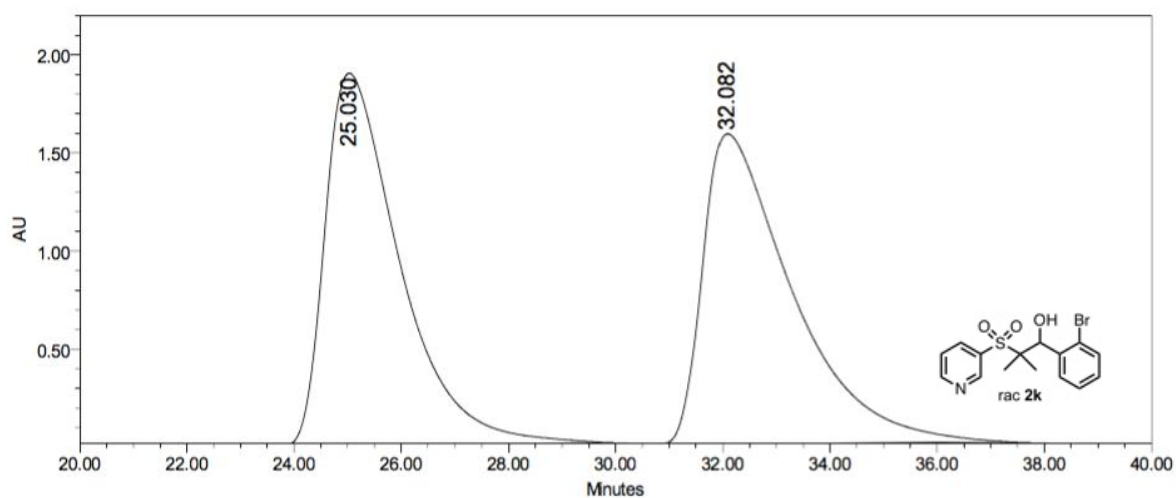
	Processed Channel Descr.	RT	Area	% Area	Height
1	W2489 ChA 215nm	74.937	5061095	49.89	26312
2	W2489 ChA 215nm	83.660	5084042	50.11	31355



**Processed Channel Descr.: W2489 ChA 215nm**

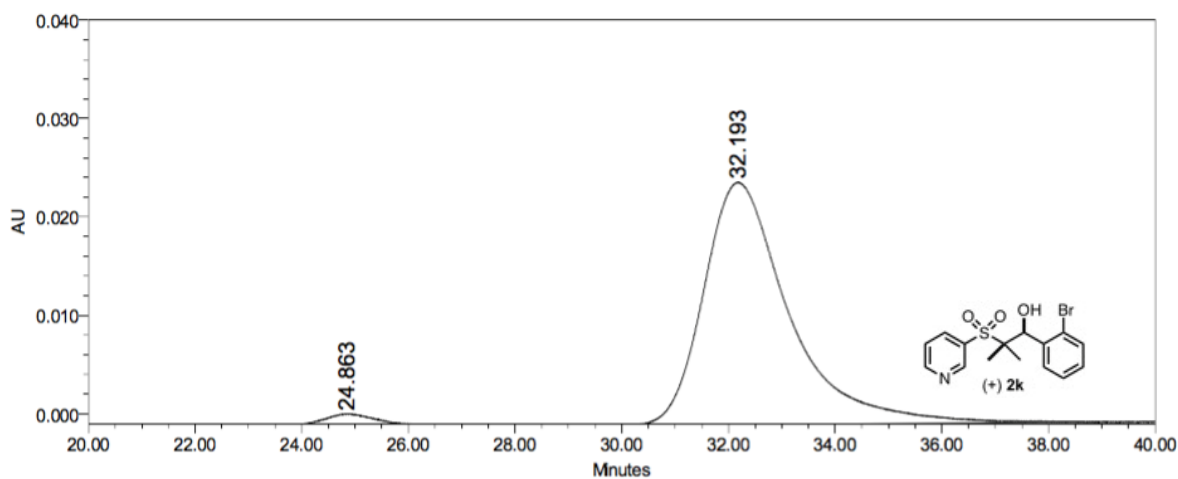
	Processed Channel Descr.	RT	Area	% Area	Height
1	W2489 ChA 215nm	74.712	1201530	2.53	8040
2	W2489 ChA 215nm	81.746	46214495	97.47	275489

**1-(2-Bromophenyl)-2-methyl-2-(pyridin-3-ylsulfonyl)propan-1-ol (2k):**



**Processed Channel Descr.: W2489 ChA 215nm**

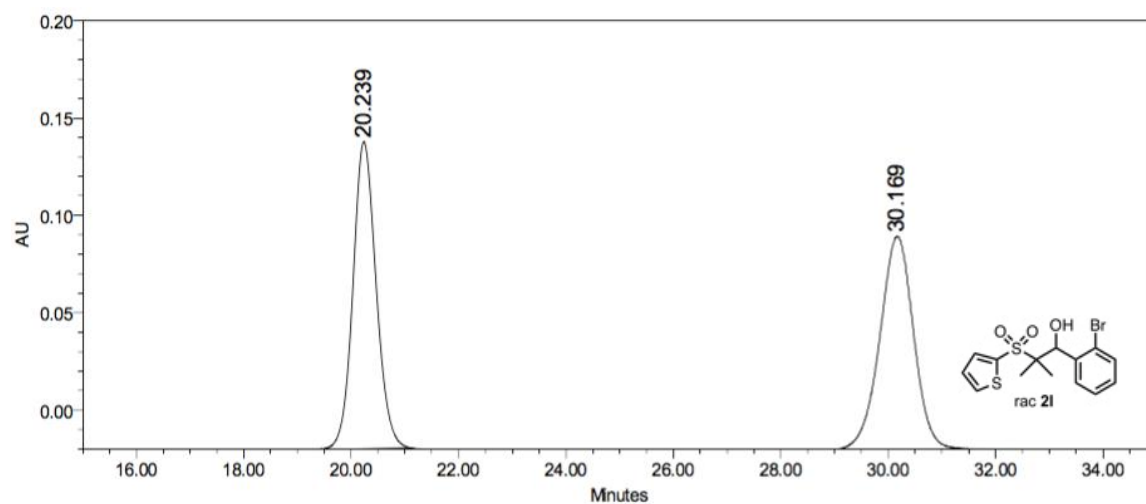
	Processed Channel Descr.	RT	Area	% Area	Height
1	W2489 ChA 215nm	25.030	182989389	50.10	1896866
2	W2489 ChA 215nm	32.082	182266093	49.90	1582068



**Processed Channel Descr.: W2489 ChA 215nm**

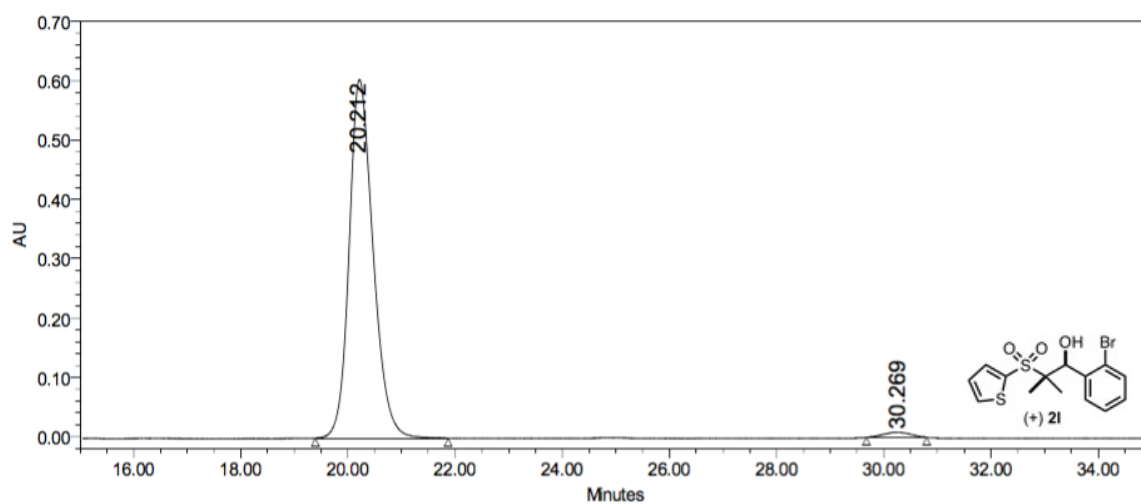
	Processed Channel Descr.	RT	Area	% Area	Height
1	W2489 ChA 215nm	24.863	69487	2.49	1141
2	W2489 ChA 215nm	32.193	2724568	97.51	24591

**1-(2-Bromophenyl)-2-methyl-2-(thiophen-2-ylsulfonyl)propan-1-ol (2I):**



**Processed Channel Descr.: W2489 ChA 215nm**

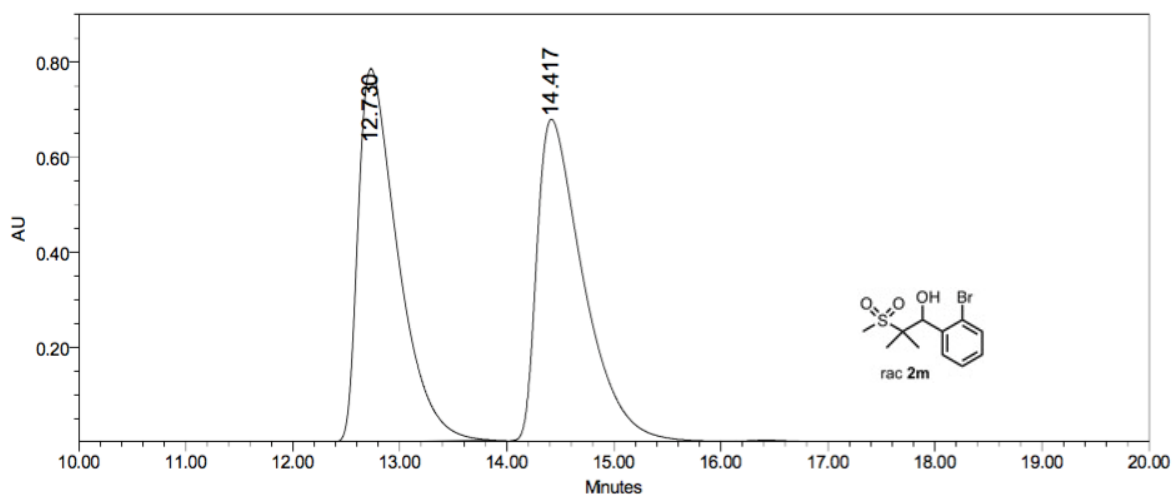
	Processed Channel Descr.	RT	Area	% Area	Height
1	W2489 ChA 215nm	20.239	4718100	49.72	157721
2	W2489 ChA 215nm	30.169	4771213	50.28	109507



**Processed Channel Descr.: W2489 ChA 215nm**

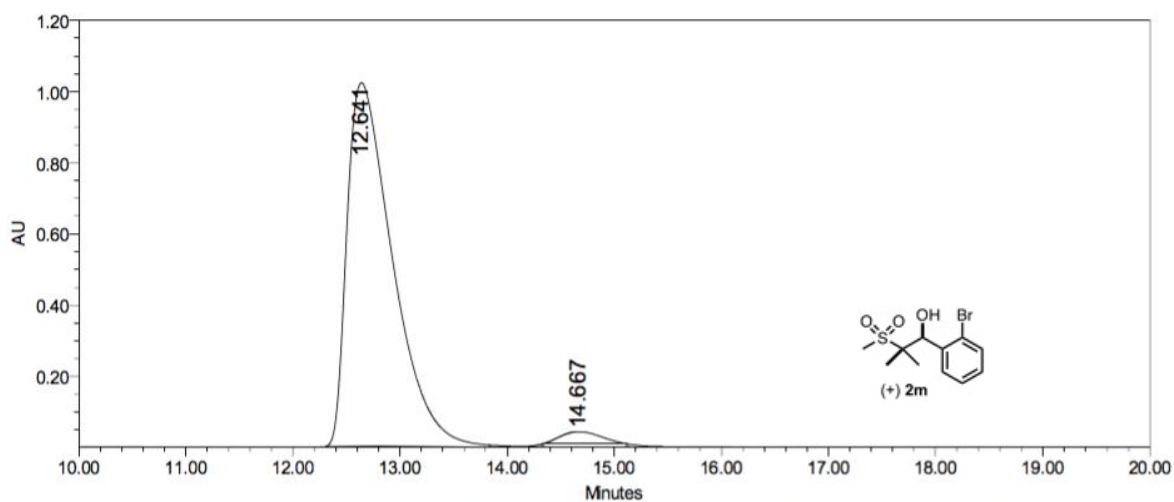
	Processed Channel Descr.	RT	Area	% Area	Height
1	W2489 ChA 215nm	20.212	18801989	98.44	604907
2	W2489 ChA 215nm	30.269	297908	1.56	8498

**1-(2-Bromophenyl)-2-methyl-2-(methylsulfonyl)propan-1-ol (2m):**



**Processed Channel Descr.: W2489 ChA 215nm**

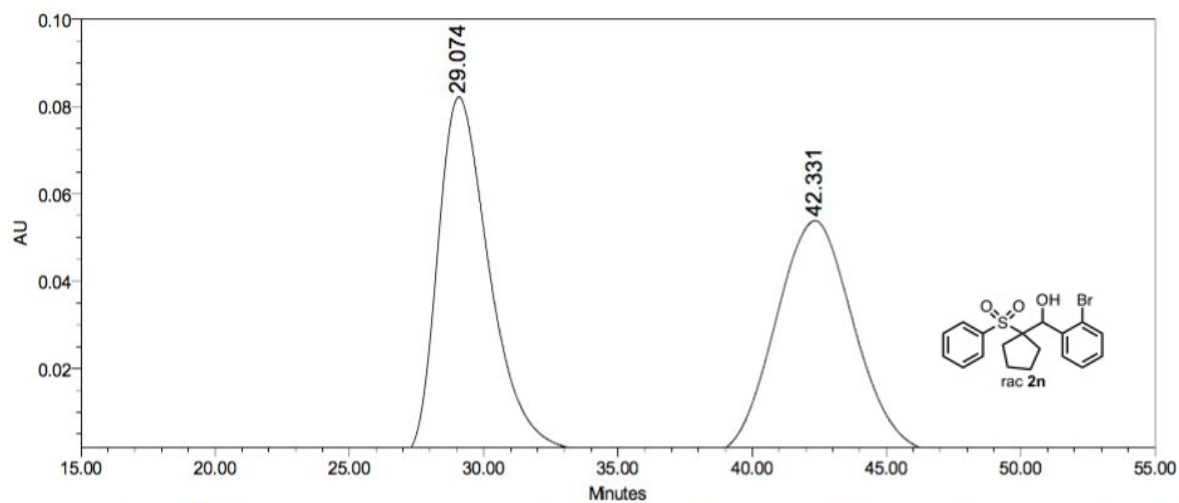
	Processed Channel Descr.	RT	Area	% Area	Height
1	W2489 ChA 215nm	12.730	20126291	49.87	784677
2	W2489 ChA 215nm	14.417	20232635	50.13	676305



**Processed Channel Descr.: W2489 ChA 215nm**

	Processed Channel Descr.	RT	Area	% Area	Height
1	W2489 ChA 215nm	12.641	29878101	97.08	1020274
2	W2489 ChA 215nm	14.667	899941	2.92	34418

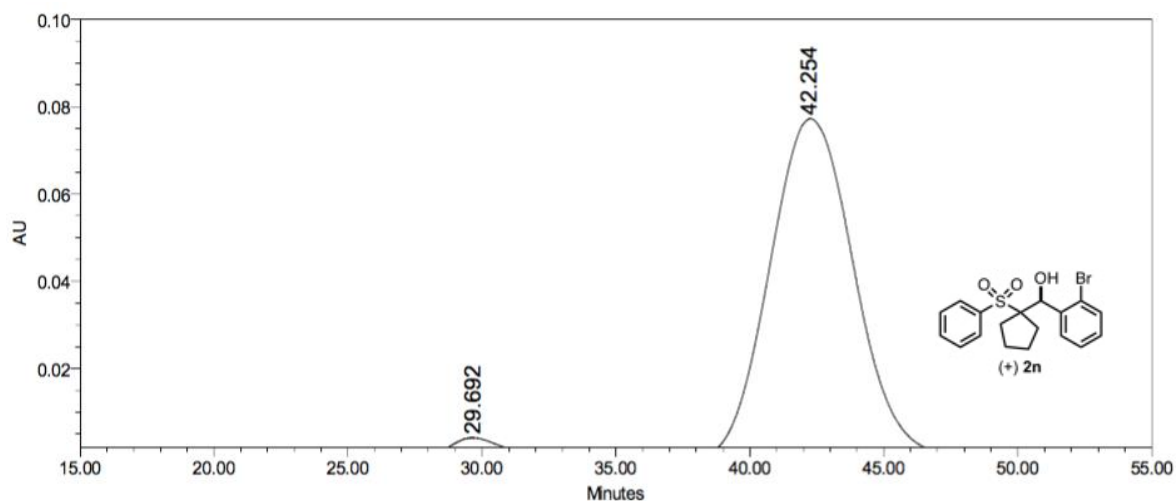
**(2-Bromophenyl)(1-(phenylsulfonyl)cyclopentyl)methanol (2n):**



Channel: W2489 ChA; Processed Channel: W2489 ChA 215nm; Result Id: 3722; Processing Method: C

**Processed Channel Descr.: W2489 ChA 215nm**

	Processed Channel Descr.	RT	Area	% Area	Height
1	W2489 ChA 215nm	29.074	11098049	50.01	82082
2	W2489 ChA 215nm	42.331	11091811	49.99	53809

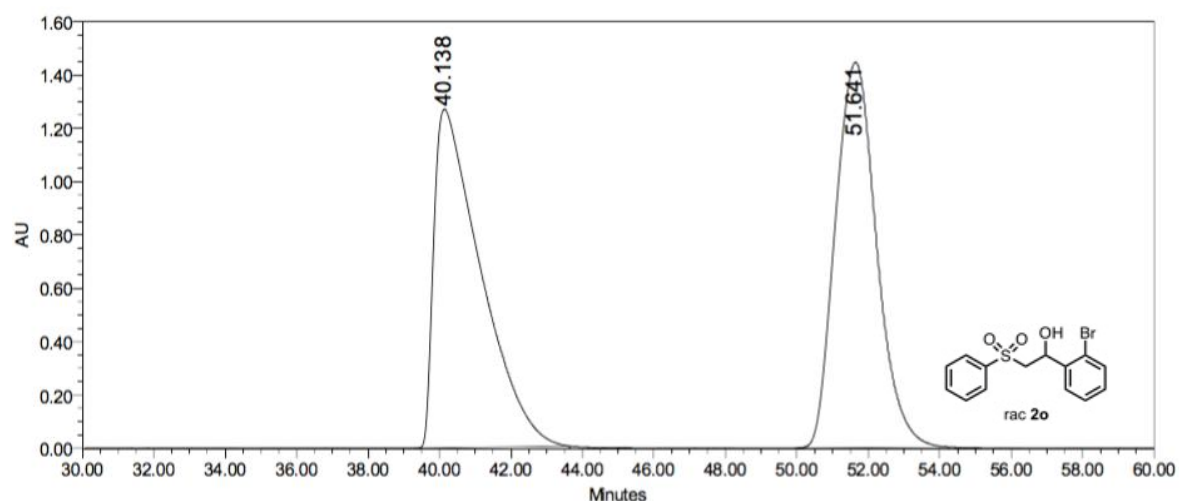


Channel: W2489 ChA; Processed Channel: W2489 ChA 215nm; Result Id: 3725; Processing Method: C

**Processed Channel Descr.: W2489 ChA 215nm**

	Processed Channel Descr.	RT	Area	% Area	Height
1	W2489 ChA 215nm	29.692	534822	3.02	4270
2	W2489 ChA 215nm	42.254	17195530	96.98	77928

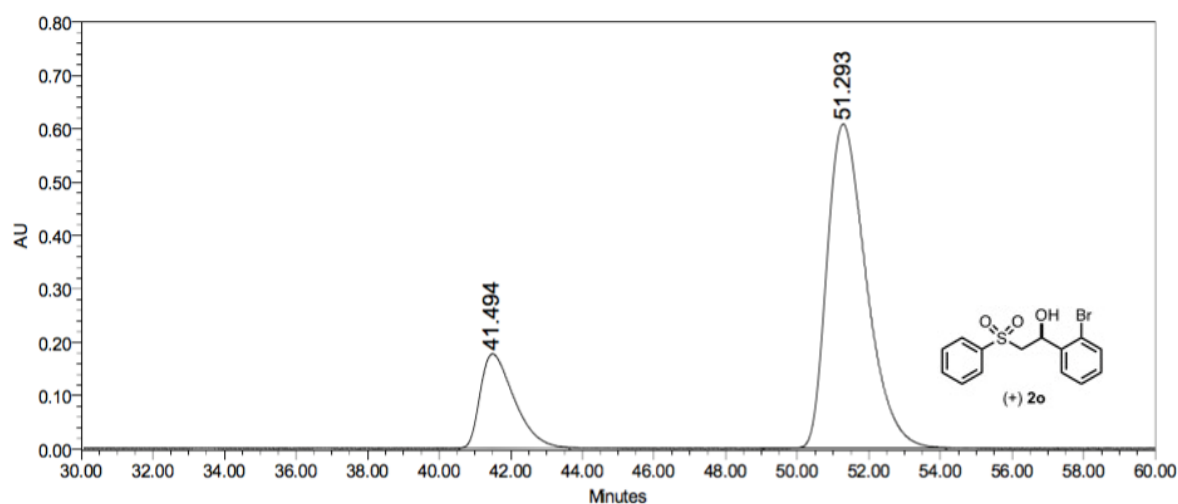
**1-(2-Bromophenyl)-2-(phenylsulfonyl)ethan-1-ol (2o):**



Channel: W2489 ChA; Processed Channel: W2489 ChA 215nm; Result Id: 3679; Processing Method: C

**Processed Channel Descr.: W2489 ChA 215nm**

	Processed Channel Descr.	RT	Area	% Area	Height
1	W2489 ChA 215nm	40.138	115650906	50.00	1270224
2	W2489 ChA 215nm	51.641	115644001	50.00	1446000



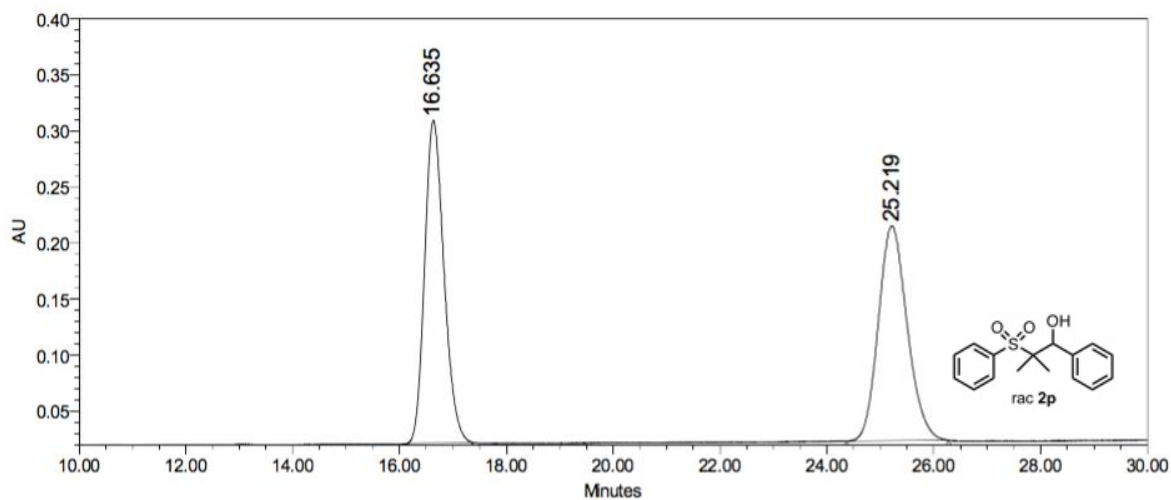
Channel: W2489 ChA; Processed Channel: W2489 ChA 215nm; Result Id: 3682; Processing Method: L

**Processed Channel Descr.: W2489 ChA 215nm**

	Processed Channel Descr.	RT	Area	% Area	Height
1	W2489 ChA 215nm	41.494	11501356	19.99	176683
2	W2489 ChA 215nm	51.293	46021295	80.01	607400



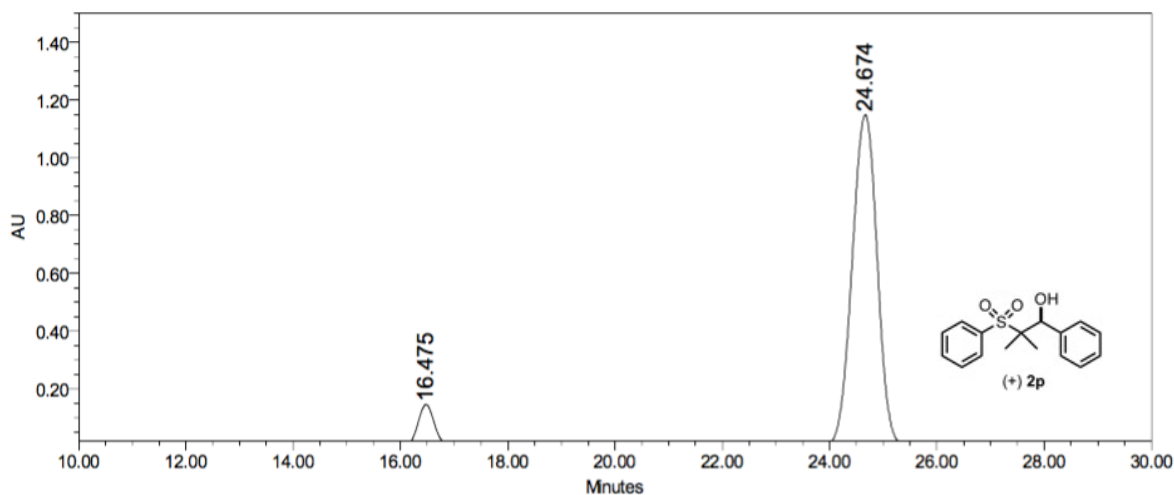
**2-Methyl-1-phenyl-2-(phenylsulfonyl)propan-1-ol (2p):**



Channel: W2489 ChA; Processed Channel: W2489 ChA 215nm; Result Id: 3793; Processing Method: C

**Processed Channel Descr.: W2489 ChA 215nm**

	Processed Channel Descr.	RT	Area	% Area	Height
1	W2489 ChA 215nm	16.635	7234302	50.16	287746
2	W2489 ChA 215nm	25.219	7187701	49.84	191815

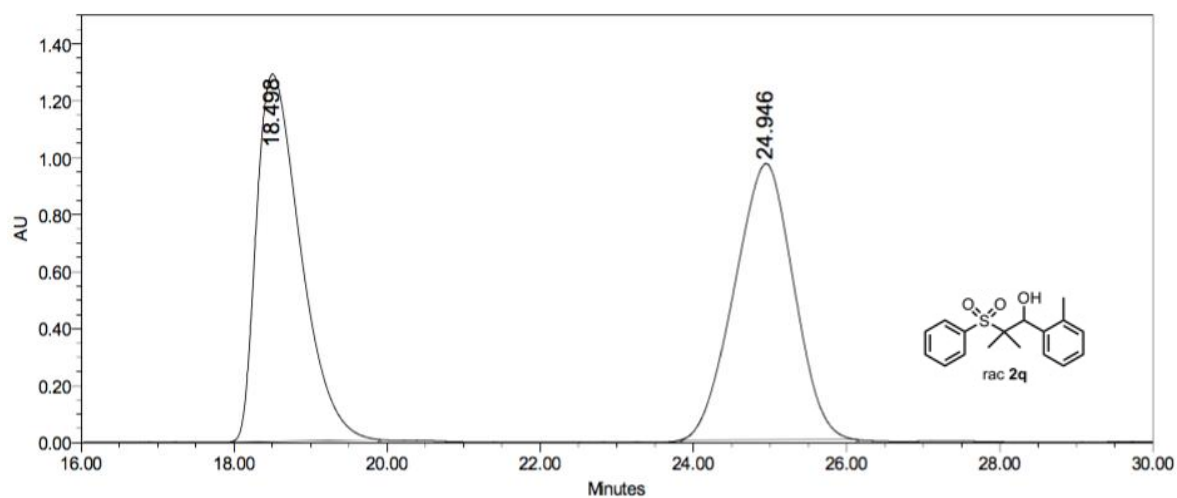


Channel: W2489 ChA; Processed Channel: W2489 ChA 215nm; Result Id: 3796; Processing Method: 5

**Processed Channel Descr.: W2489 ChA 215nm**

	Processed Channel Descr.	RT	Area	% Area	Height
1	W2489 ChA 215nm	16.475	2770659	6.93	138762
2	W2489 ChA 215nm	24.674	37205214	93.07	1148059

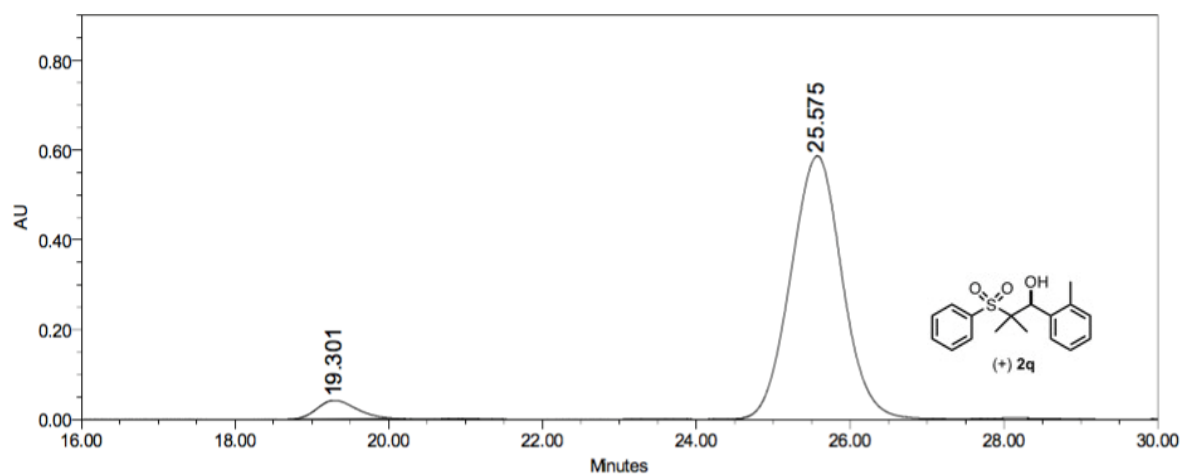
**2-Methyl-2-(phenylsulfonyl)-1-(o-tolyl)propan-1-ol (2q):**



Channel: W2489 ChA; Processed Channel: W2489 ChA 215nm; Result Id: 3026; Processing Method: C

**Processed Channel Descr.: W2489 ChA 215nm**

	Processed Channel Descr.	RT	Area	% Area	Height
1	W2489 ChA 215nm	18.498	51467318	49.71	1289375
2	W2489 ChA 215nm	24.946	52066417	50.29	969222

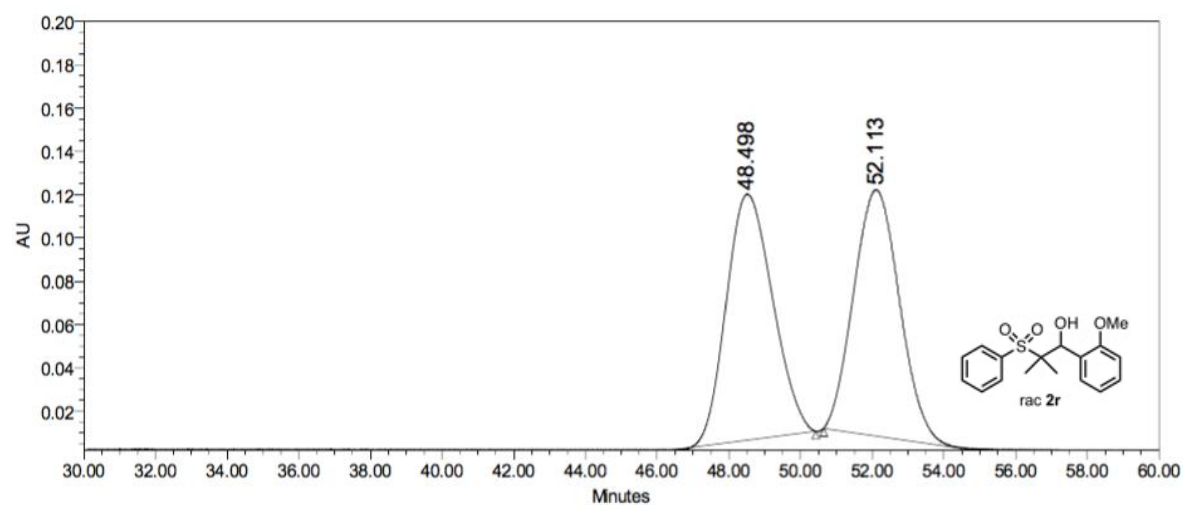


Channel: W2489 ChA; Processed Channel: W2489 ChA 215nm; Result Id: 3020; Processing Method: OOO

**Processed Channel Descr.: W2489 ChA 215nm**

	Processed Channel Descr.	RT	Area	% Area	Height
1	W2489 ChA 215nm	19.301	1412769	4.94	40788
2	W2489 ChA 215nm	25.575	27181436	95.06	585852

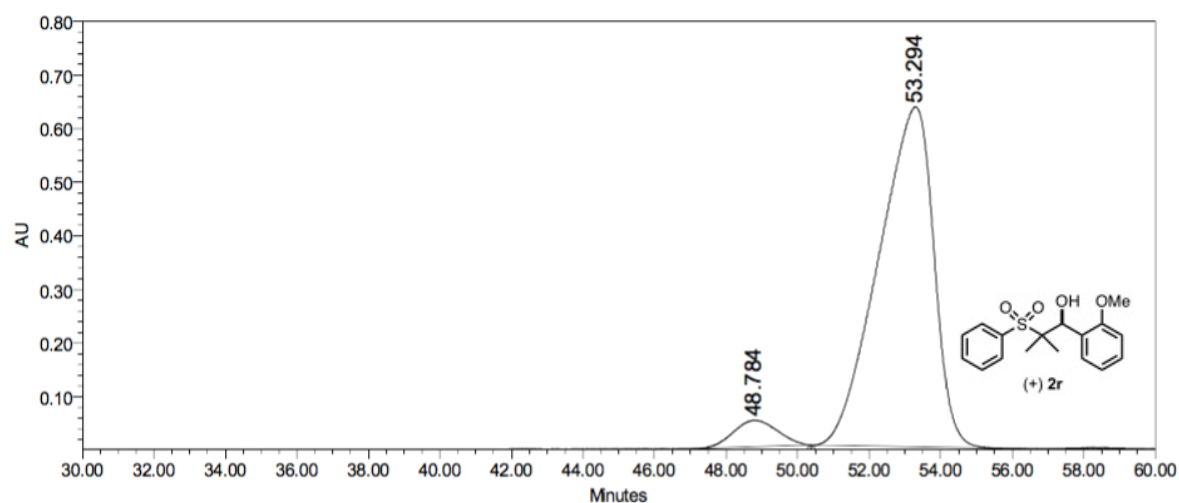
**1-(2-Methoxyphenyl)-2-methyl-2-(phenylsulfonyl)propan-1-ol (2r):**



Channel: W2489 ChA; Processed Channel: W2489 ChA 215nm; Result Id: 3693; Processing Method: C

**Processed Channel Descr.: W2489 ChA 215nm**

	Processed Channel Descr.	RT	Area	% Area	Height
1	W2489 ChA 215nm	48.498	10196615	50.22	113719
2	W2489 ChA 215nm	52.113	10108045	49.78	113881

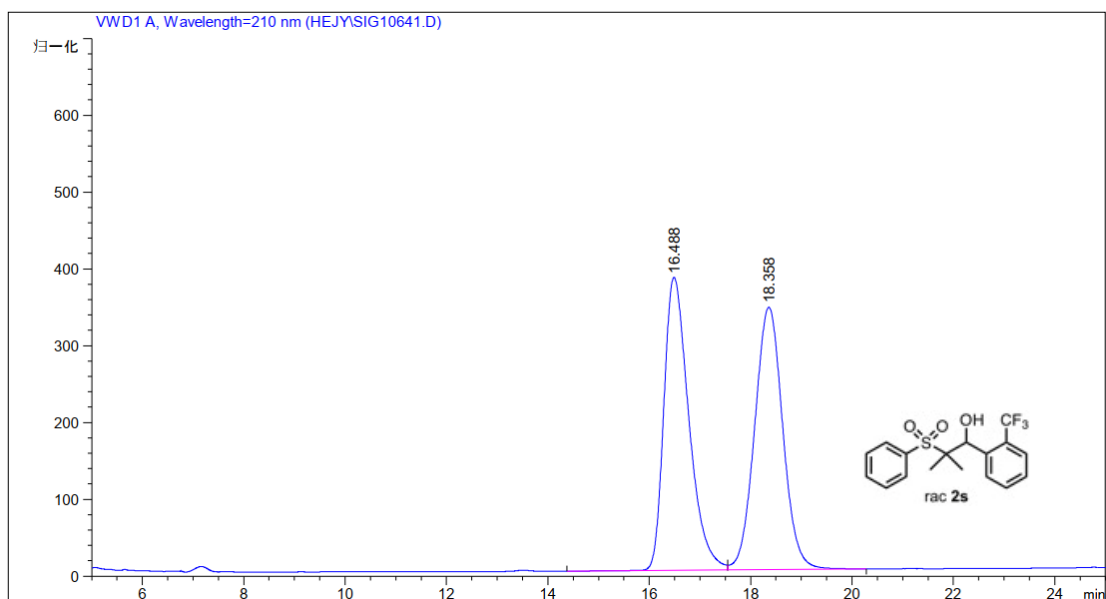


Channel: W2489 ChA; Processed Channel: W2489 ChA 215nm; Result Id: 3690; Processing Method: C

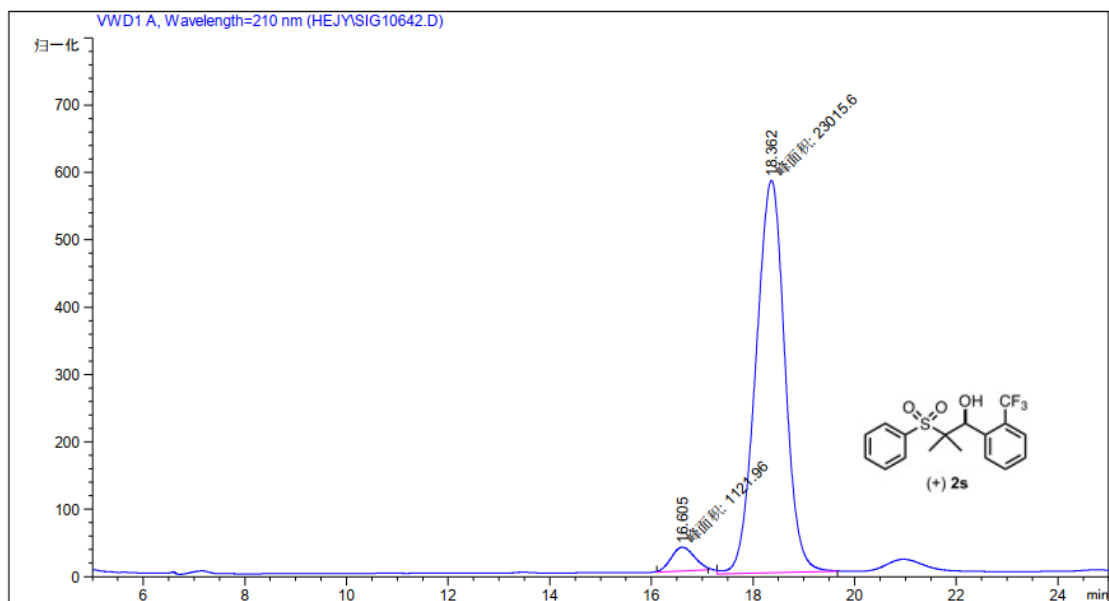
**Processed Channel Descr.: W2489 ChA 215nm**

	Processed Channel Descr.	RT	Area	% Area	Height
1	W2489 ChA 215nm	48.784	4231346	5.87	49680
2	W2489 ChA 215nm	53.294	67857518	94.13	634857

## 2-Methyl-2-(phenylsulfonyl)-1-(2-(trifluoromethyl)phenyl)propan-1-ol (2s):

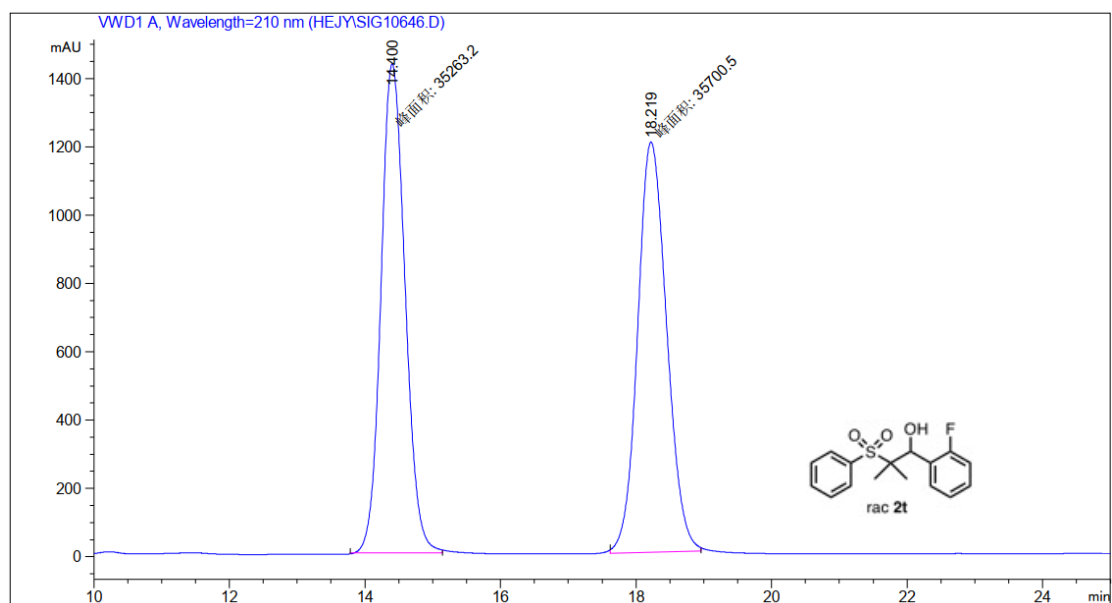


#	[min]	[min]	[mAU*s]	[mAU]	%	
1	16.488	BV	0.5242	1.30497e4	381.55814	52.7553
2	18.358	VB	0.5984	1.31772e4	341.70236	47.2447

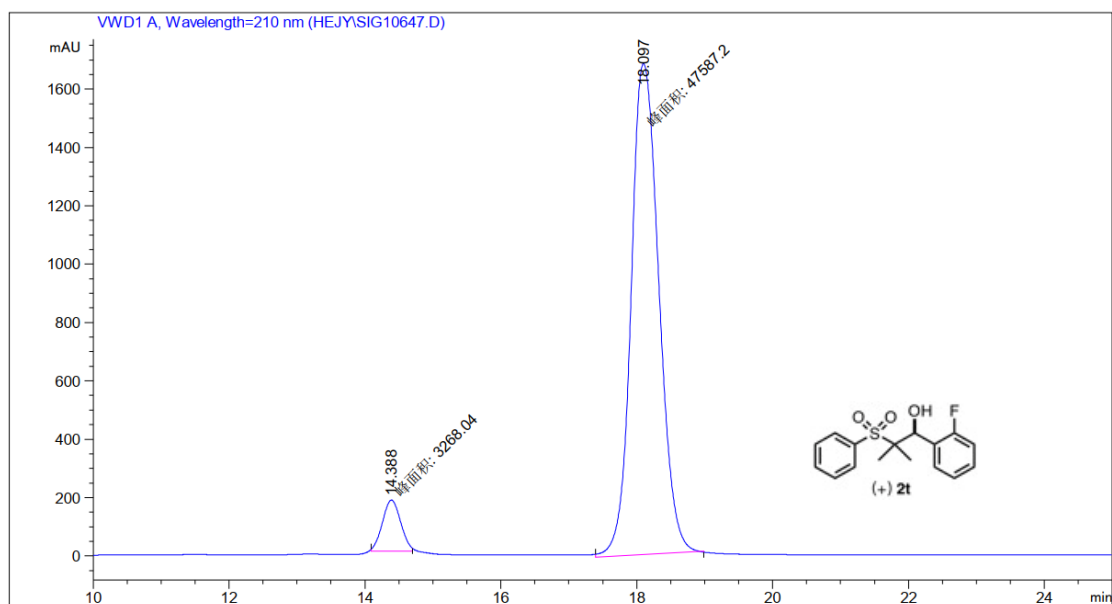


#	[min]	[min]	[mAU*s]	[mAU]	%	
1	16.605	MM	0.5284	1121.96472	35.38849	5.7235
2	18.362	MM	0.6581	2.30156e4	582.91071	94.2765

### 1-(2-Fluorophenyl)-2-methyl-2-(phenylsulfonyl)propan-1-ol (2t):

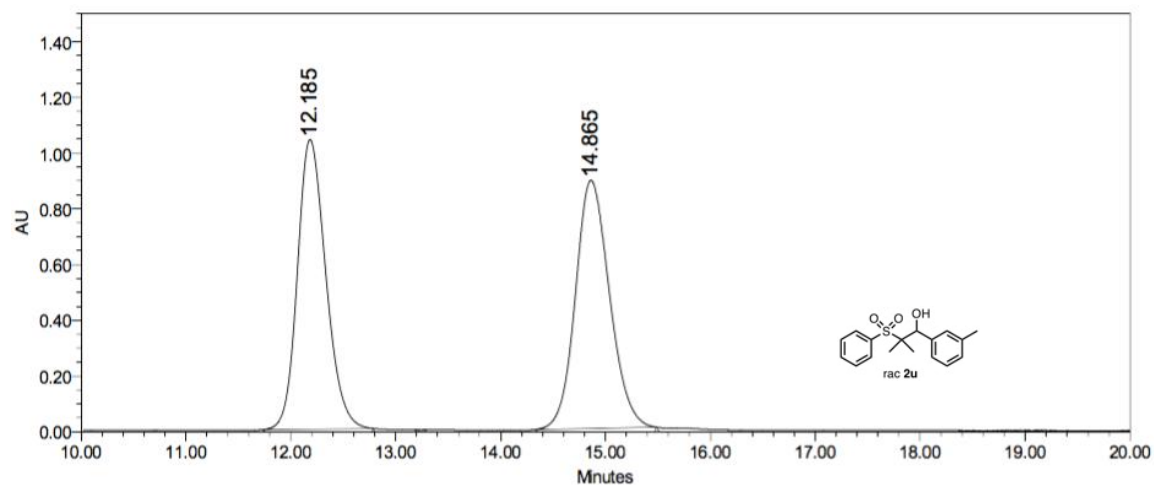


#	[min]	[min]	[mAU*s]	[mAU]	%
1	14.400 MM	0.4106	3.52632e4	1431.33496	49.6919
2	18.219 MM	0.4954	3.57005e4	1201.01697	50.3081



#	[min]	[min]	[mAU*s]	[mAU]	%
1	14.388 MM	0.3105	3268.04297	175.39735	6.4262
2	18.097 MM	0.4712	4.75872e4	1683.06738	93.5738

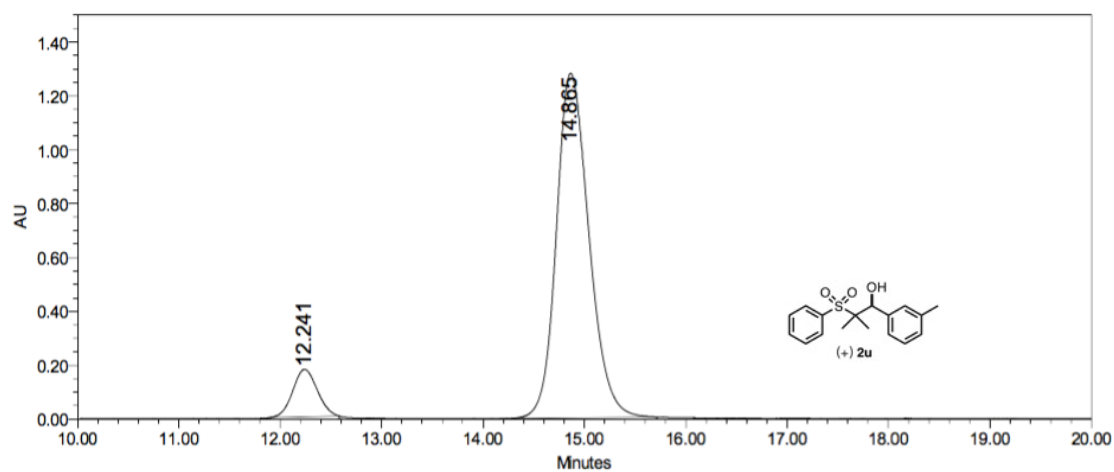
**2-Methyl-2-(phenylsulfonyl)-1-(m-tolyl)propan-1-ol (2u):**



Channel: W2489 ChA; Processed Channel: W2489 ChA 215nm; Result Id: 3148; Processing Method: C

**Processed Channel Descr.: W2489 ChA 215nm**

	Processed Channel Descr.	RT	Area	% Area	Height
1	W2489 ChA 215nm	12.185	19589979	49.33	1038988
2	W2489 ChA 215nm	14.865	20124346	50.67	890414

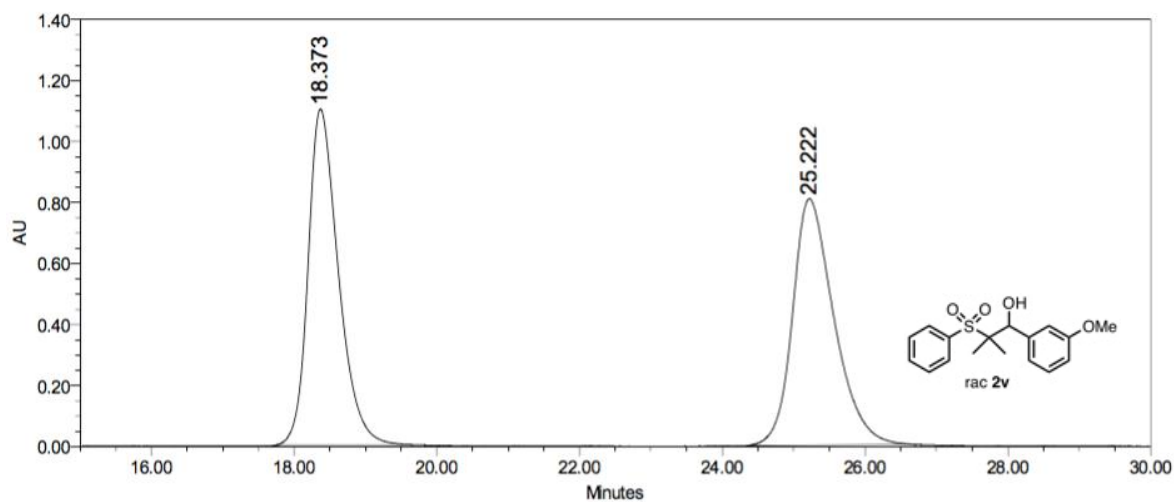


Channel: W2489 ChA; Processed Channel: W2489 ChA 215nm; Result Id: 3145; Processing Method: 2

**Processed Channel Descr.: W2489 ChA 215nm**

	Processed Channel Descr.	RT	Area	% Area	Height
1	W2489 ChA 215nm	12.241	2959478	9.39	176436
2	W2489 ChA 215nm	14.865	28569129	90.61	1279441

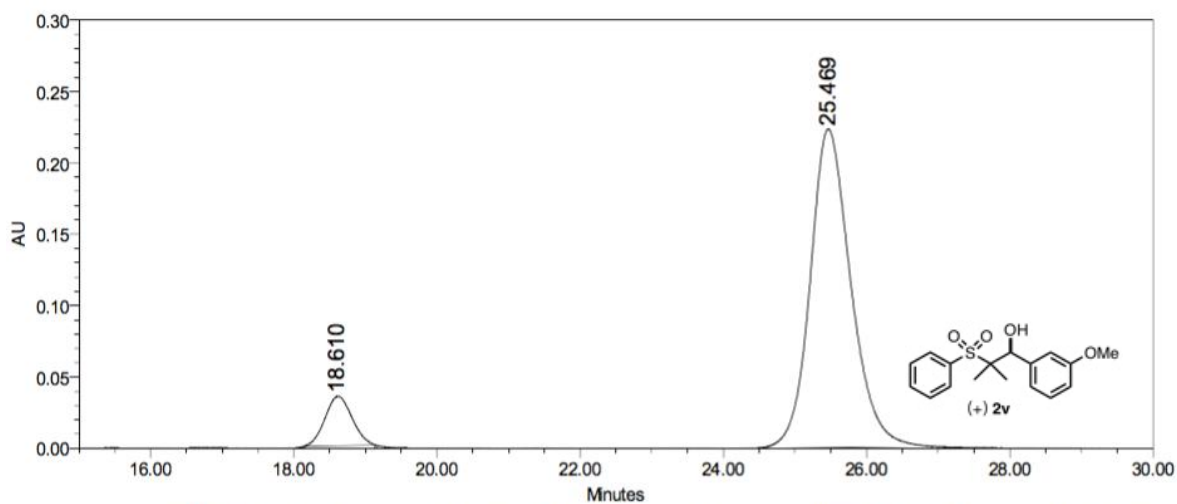
**1-(3-Methoxyphenyl)-2-methyl-2-(phenylsulfonyl)propan-1-ol (2v):**



Channel: W2489 ChA; Processed Channel: W2489 ChA 215nm; Result Id: 3135; Processing Method: C

**Processed Channel Descr.: W2489 ChA 215nm**

	Processed Channel Descr.	RT	Area	% Area	Height
1	W2489 ChA 215nm	18.373	32461717	49.99	1101040
2	W2489 ChA 215nm	25.222	32480864	50.01	807140

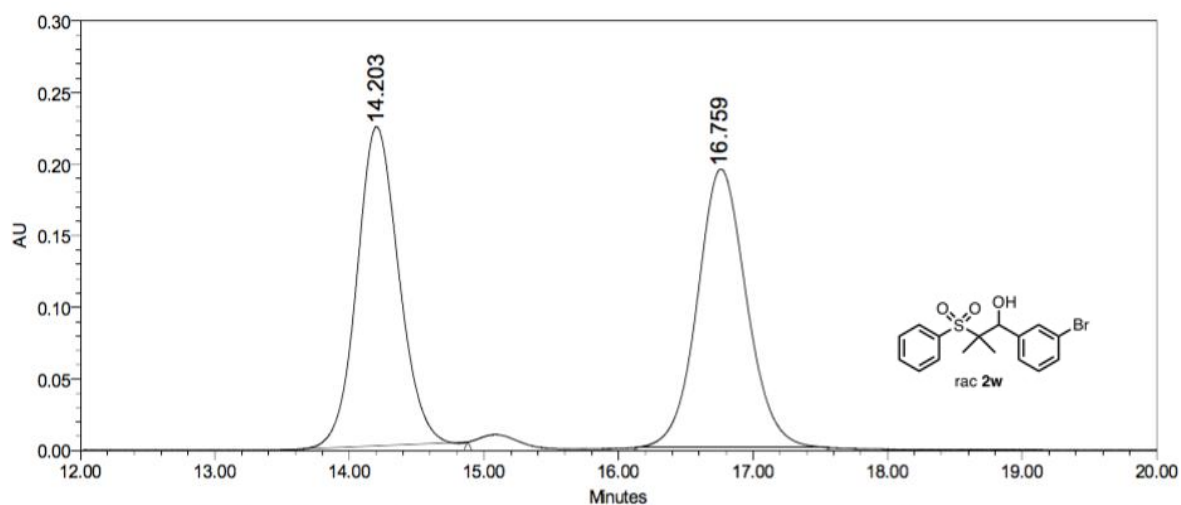


Channel: W2489 ChA; Processed Channel: W2489 ChA 215nm; Result Id: 3142; Processing Method: C

**Processed Channel Descr.: W2489 ChA 215nm**

	Processed Channel Descr.	RT	Area	% Area	Height
1	W2489 ChA 215nm	18.610	911637	9.41	34660
2	W2489 ChA 215nm	25.469	8778531	90.59	223225

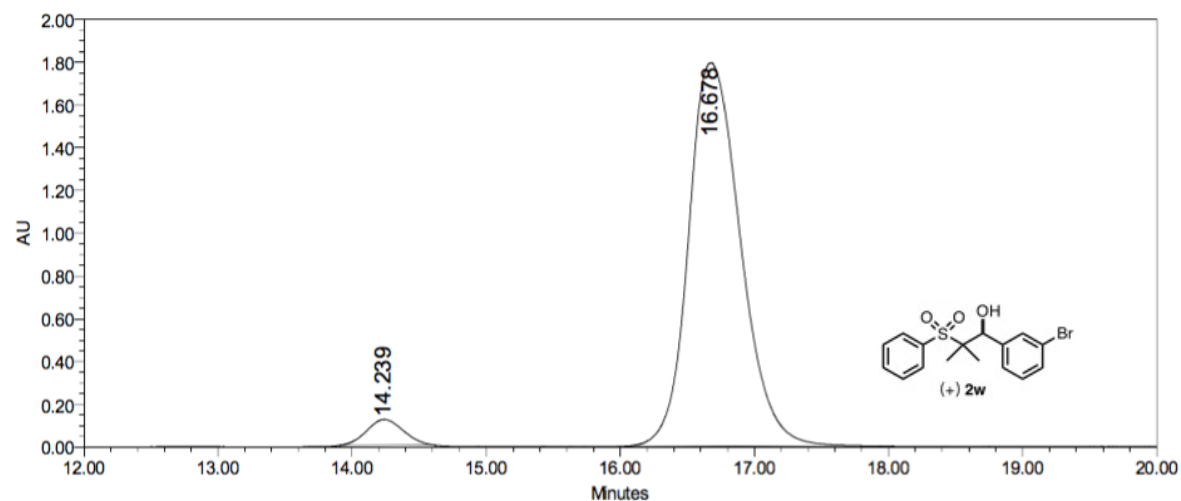
**1-(3-Bromophenyl)-2-methyl-2-(phenylsulfonyl)propan-1-ol (2w):**



Channel: W2489 ChA; Processed Channel: W2489 ChA 215nm; Result Id: 3200; Processing Method: C

**Processed Channel Descr.: W2489 ChA 215nm**

	Processed Channel Descr.	RT	Area	% Area	Height
1	W2489 ChA 215nm	14.203	4816008	49.43	222747
2	W2489 ChA 215nm	16.759	4927042	50.57	194362



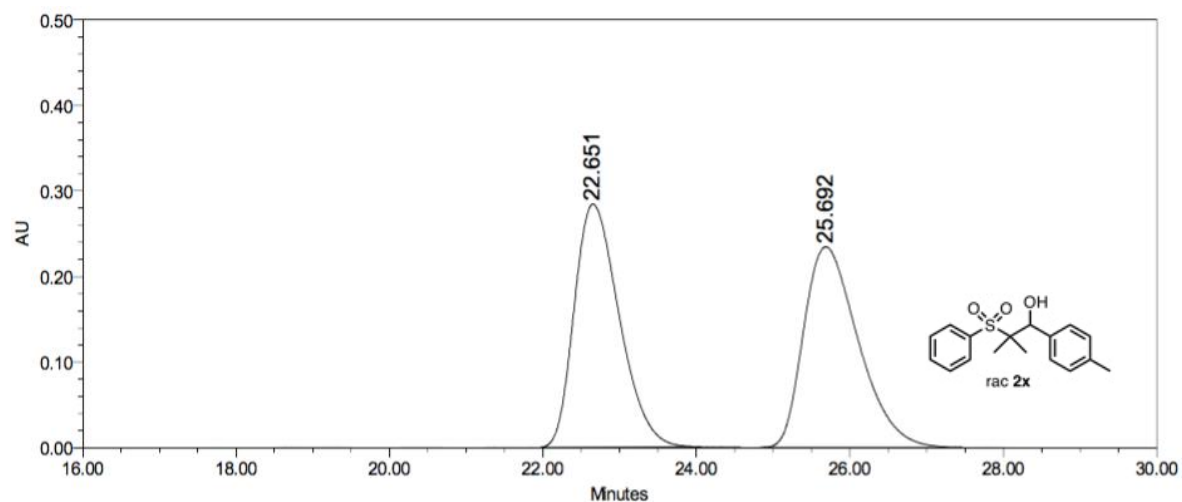
Channel: W2489 ChA; Processed Channel: W2489 ChA 215nm; Result Id: 3197; Processing Method: C

**Processed Channel Descr.: W2489 ChA 215nm**

	Processed Channel Descr.	RT	Area	% Area	Height
1	W2489 ChA 215nm	14.239	2300852	4.56	120510
2	W2489 ChA 215nm	16.678	48181074	95.44	1793858



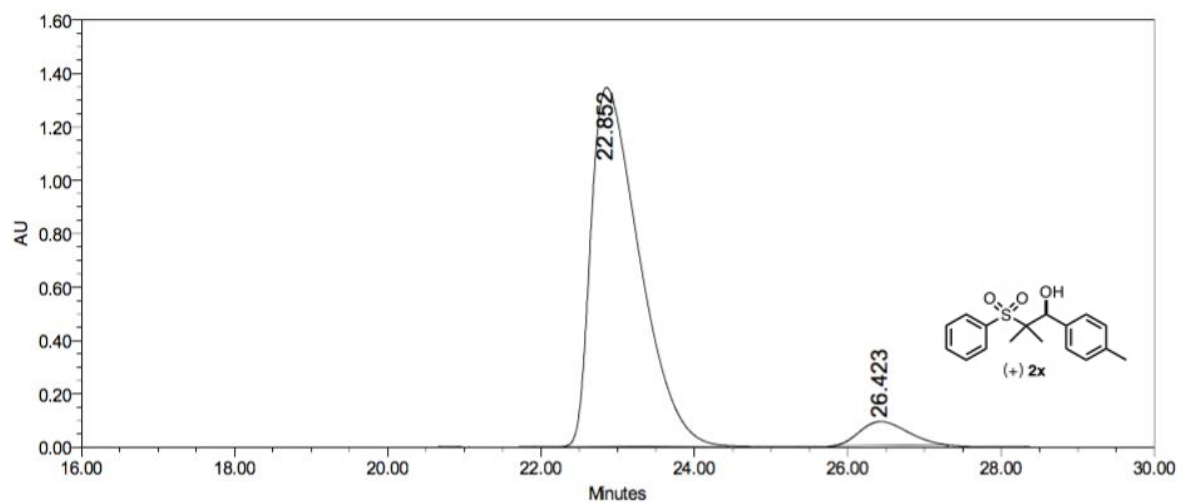
**2-Methyl-2-(phenylsulfonyl)-1-(p-tolyl)propan-1-ol (2x):**



Channel: W2489 ChA; Processed Channel: W2489 ChA 215nm; Result Id: 3032; Processing Method: C

**Processed Channel Descr.: W2489 ChA 215nm**

	Processed Channel Descr.	RT	Area	% Area	Height
1	W2489 ChA 215nm	22.651	11549155	49.92	283792
2	W2489 ChA 215nm	25.692	11587300	50.08	234142

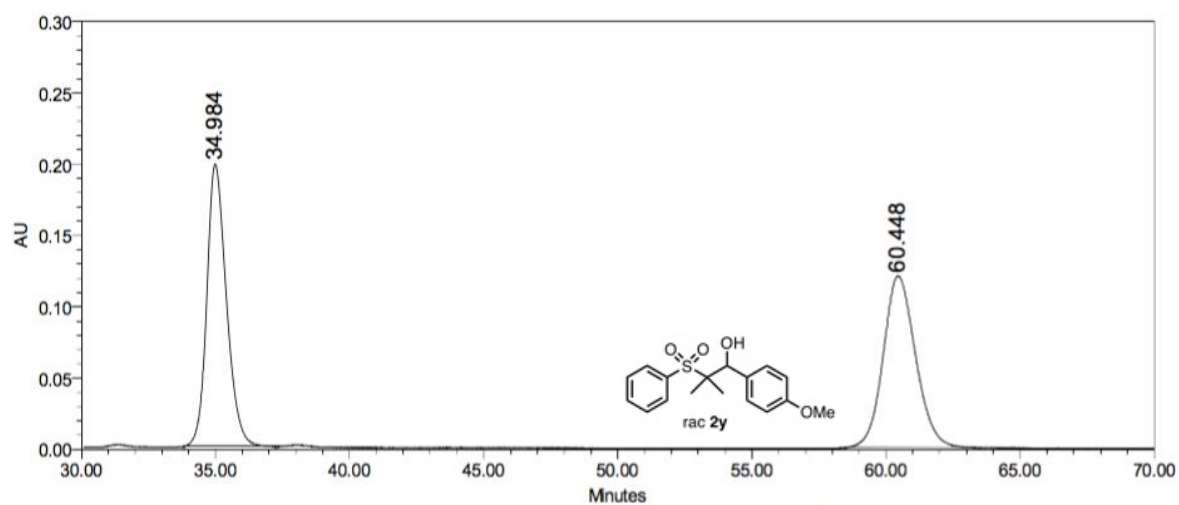


Channel: W2489 ChA; Processed Channel: W2489 ChA 215nm; Result Id: 3029; Processing Method: C

**Processed Channel Descr.: W2489 ChA 215nm**

	Processed Channel Descr.	RT	Area	% Area	Height
1	W2489 ChA 215nm	22.852	58877851	93.93	1344159
2	W2489 ChA 215nm	26.423	3802293	6.07	89047

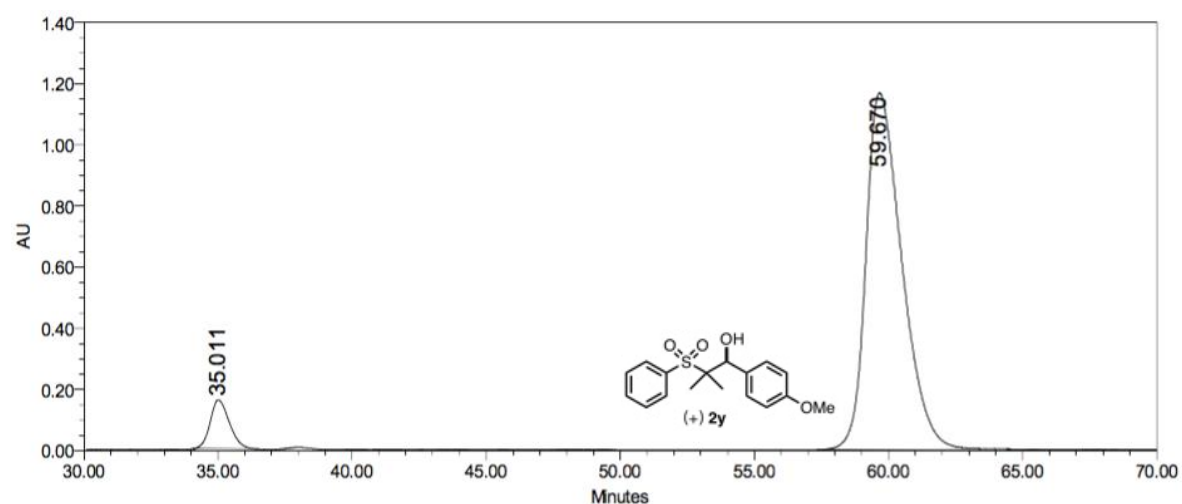
**1-(4-Methoxyphenyl)-2-methyl-2-(phenylsulfonyl)-propan-1-ol (2y):**



Channel: W2489 ChA; Processed Channel: W2489 ChA 215nm; Result Id: 3076; Processing Method: C

**Processed Channel Descr.: W2489 ChA 215nm**

	Processed Channel Descr.	RT	Area	% Area	Height
1	W2489 ChA 215nm	34.984	10040663	49.95	197976
2	W2489 ChA 215nm	60.448	10061808	50.05	120483

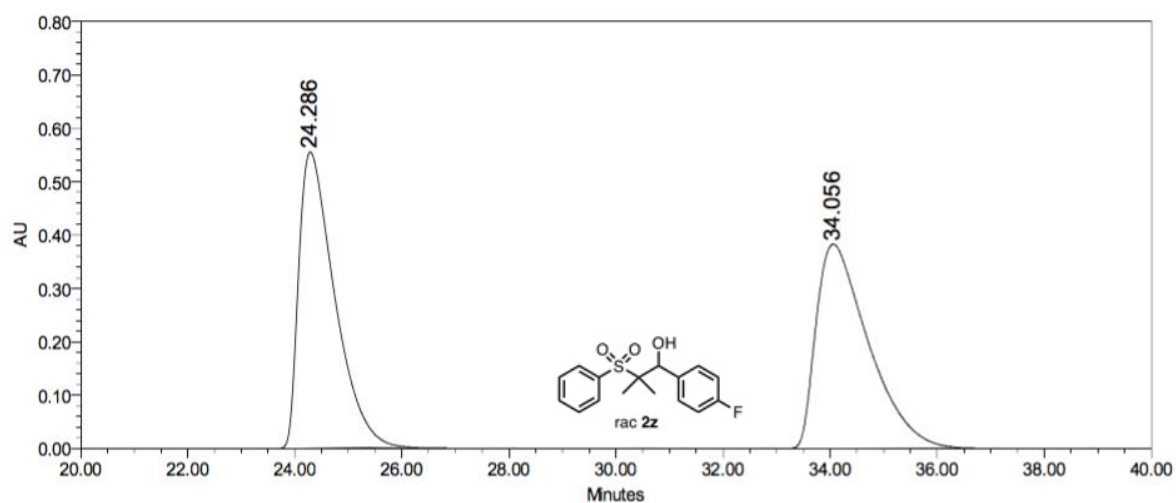


Channel: W2489 ChA; Processed Channel: W2489 ChA 215nm; Result Id: 3080; Processing Method: C

**Processed Channel Descr.: W2489 ChA 215nm**

	Processed Channel Descr.	RT	Area	% Area	Height
1	W2489 ChA 215nm	35.011	7986247	6.90	160134
2	W2489 ChA 215nm	59.670	107796357	93.10	1166059

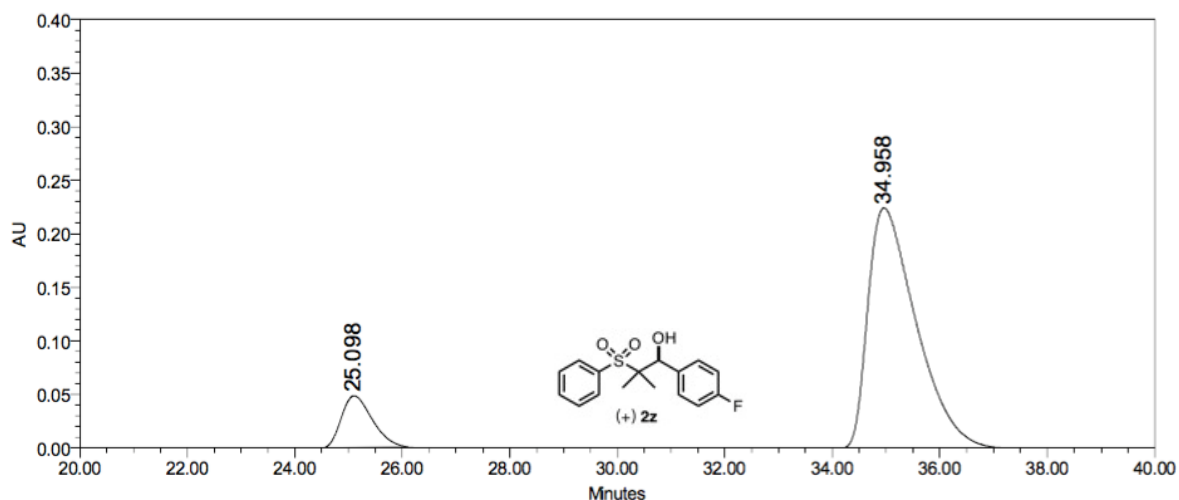
**1-(4-Fluorophenyl)-2-methyl-2-(phenylsulfonyl)propan-1-ol (2z):**



Channel: W2489 ChA; Processed Channel: W2489 ChA 215nm; Result Id: 3041; Processing Method: C

**Processed Channel Descr.: W2489 ChA 215nm**

	Processed Channel Descr.	RT	Area	% Area	Height
1	W2489 ChA 215nm	24.286	25825235	49.95	555111
2	W2489 ChA 215nm	34.056	25874177	50.05	382390

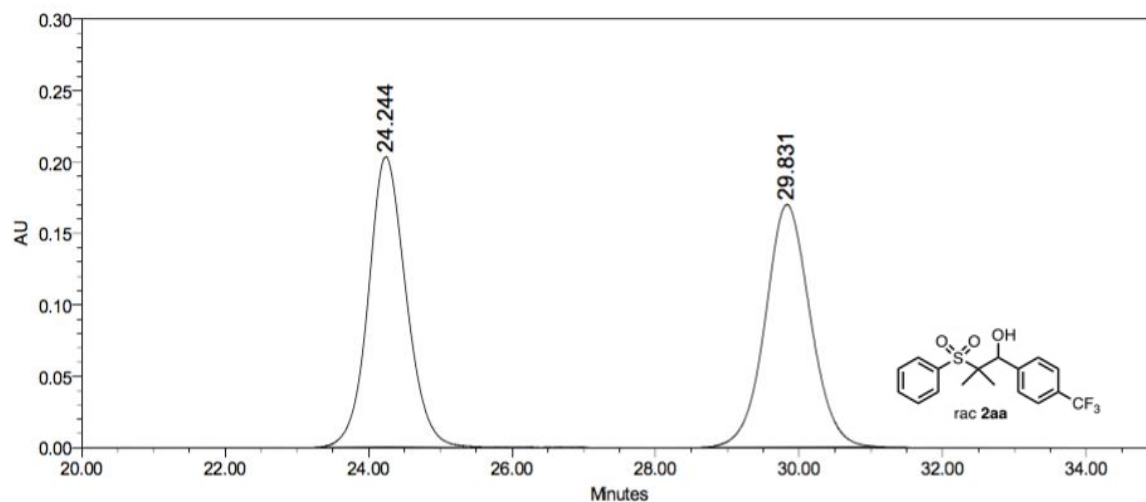


Channel: W2489 ChA; Processed Channel: W2489 ChA 215nm; Result Id: 3044; Processing Method: C

**Processed Channel Descr.: W2489 ChA 215nm**

	Processed Channel Descr.	RT	Area	% Area	Height
1	W2489 ChA 215nm	25.098	1906797	11.95	48192
2	W2489 ChA 215nm	34.958	14051039	88.05	225147

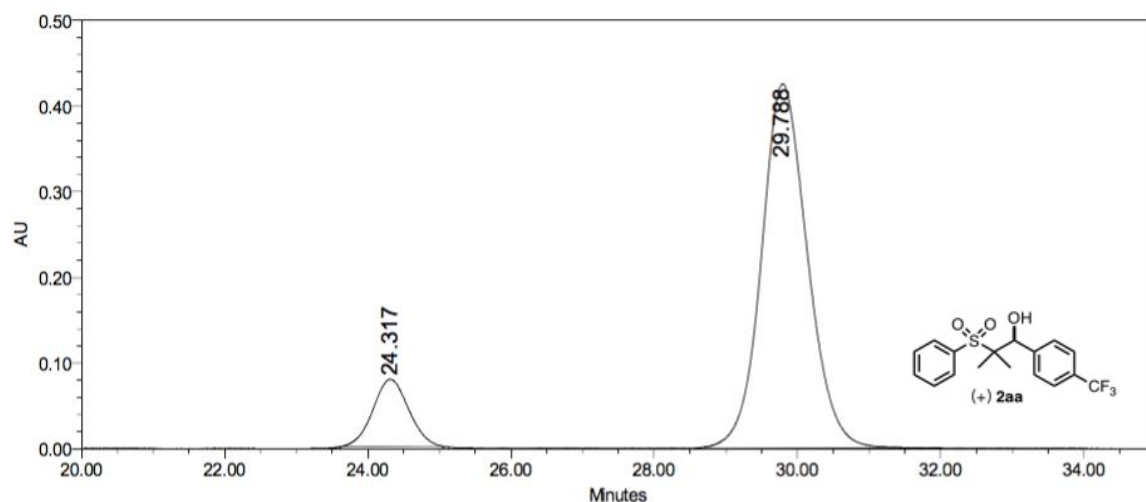
**2-Methyl-2-(phenylsulfonyl)-1-(4-(trifluoromethyl)phenyl)propan-1-ol (2aa):**



Channel: W2489 ChA; Processed Channel: W2489 ChA 215nm; Result Id: 3167; Processing Method: C

**Processed Channel Descr.: W2489 ChA 215nm**

	Processed Channel Descr.	RT	Area	% Area	Height
1	W2489 ChA 215nm	24.244	7367430	49.91	202826
2	W2489 ChA 215nm	29.831	7392609	50.09	169563

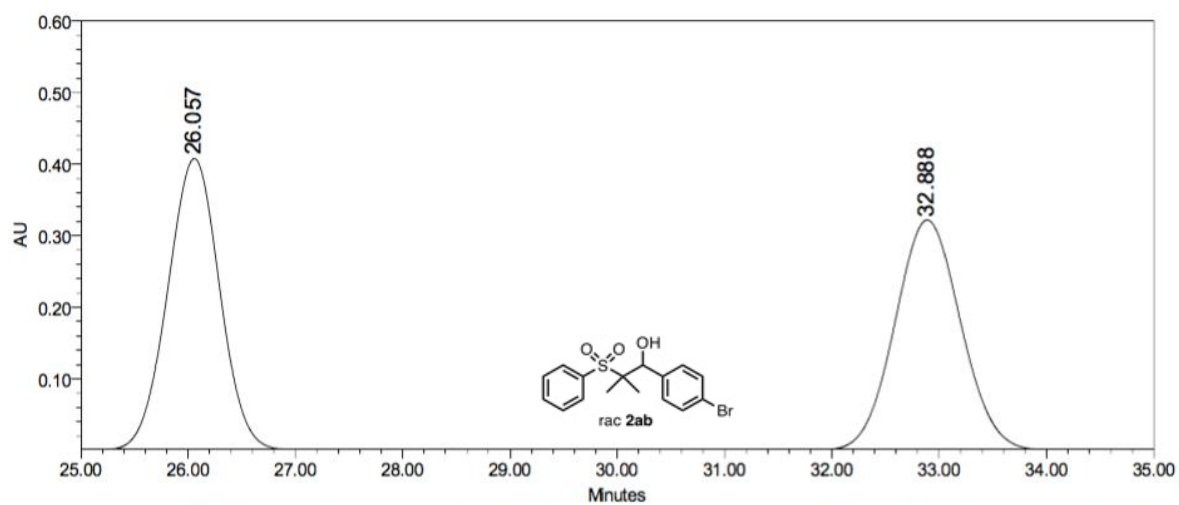


Channel: W2489 ChA; Processed Channel: W2489 ChA 215nm; Result Id: 3181; Processing Method: C

**Processed Channel Descr.: W2489 ChA 215nm**

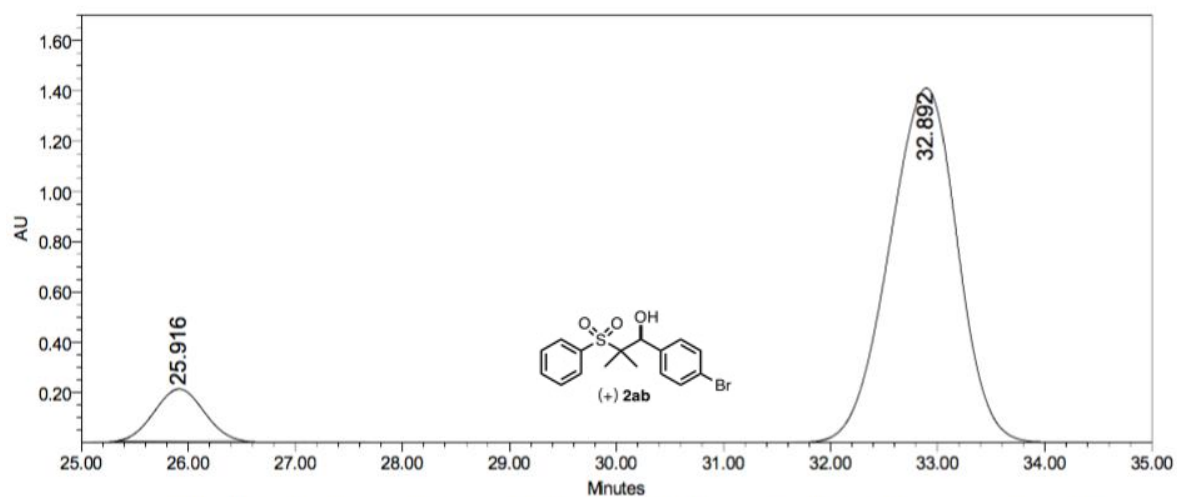
	Processed Channel Descr.	RT	Area	% Area	Height
1	W2489 ChA 215nm	24.317	2726806	12.58	78524
2	W2489 ChA 215nm	29.788	18942865	87.42	424906

**1-(4-Bromophenyl)-2-methyl-2-(phenylsulfonyl)propan-1-ol (2ab):**



**Processed Channel Descr.: W2489 ChA 215nm**

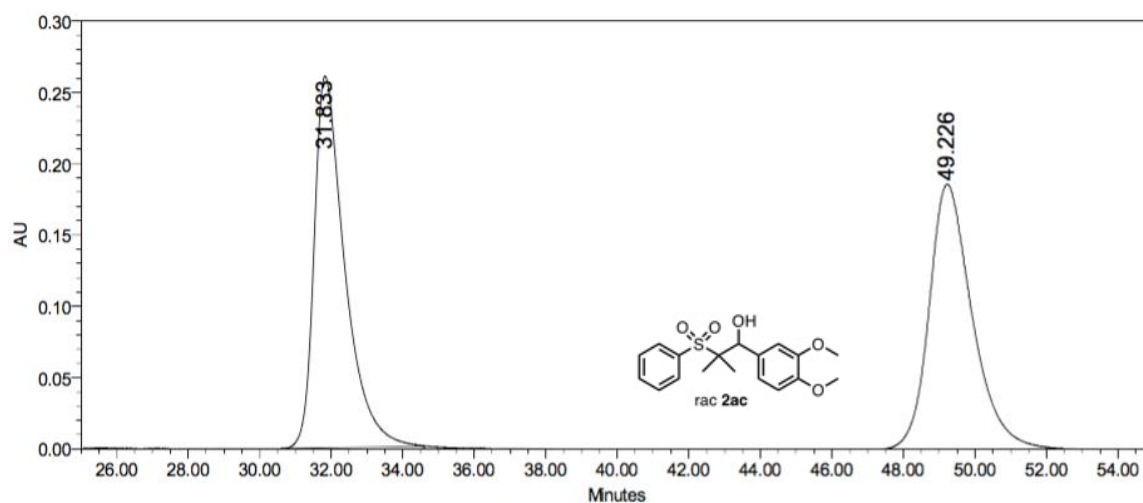
	Processed Channel Descr.	RT	Area	% Area	Height
1	W2489 ChA 215nm	26.057	13742064	50.33	407283
2	W2489 ChA 215nm	32.888	13559804	49.67	320474



**Processed Channel Descr.: W2489 ChA 215nm**

	Processed Channel Descr.	RT	Area	% Area	Height
1	W2489 ChA 215nm	25.916	6590287	9.57	206252
2	W2489 ChA 215nm	32.892	62305185	90.43	1410985

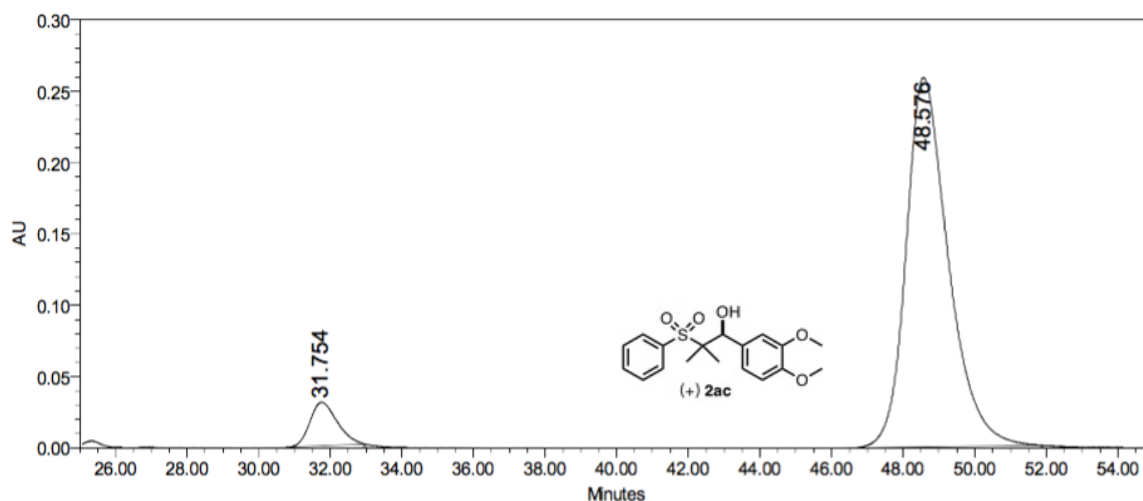
**1-(3,4-Dimethoxyphenyl)-2-methyl-2-(phenylsulfonyl)propan-1-ol (2ac):**



Channel: W2489 ChA; Processed Channel: W2489 ChA 215nm; Result Id: 3154; Processing Method: C

**Processed Channel Descr.: W2489 ChA 215nm**

	Processed Channel Descr.	RT	Area	% Area	Height
1	W2489 ChA 215nm	31.833	15506114	50.12	260739
2	W2489 ChA 215nm	49.226	15431287	49.88	185695

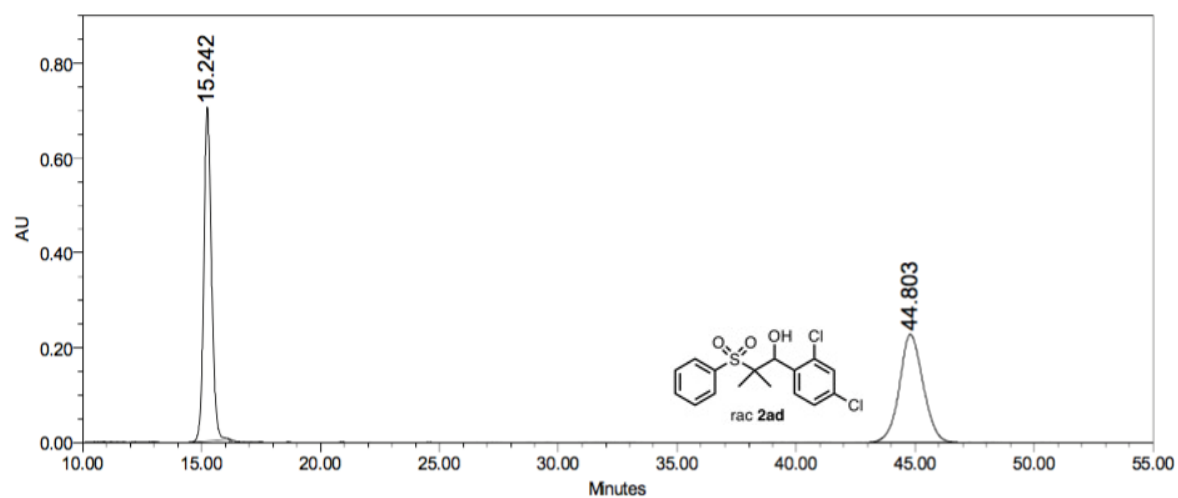


Channel: W2489 ChA; Processed Channel: W2489 ChA 215nm; Result Id: 3161; Processing Method: C

**Processed Channel Descr.: W2489 ChA 215nm**

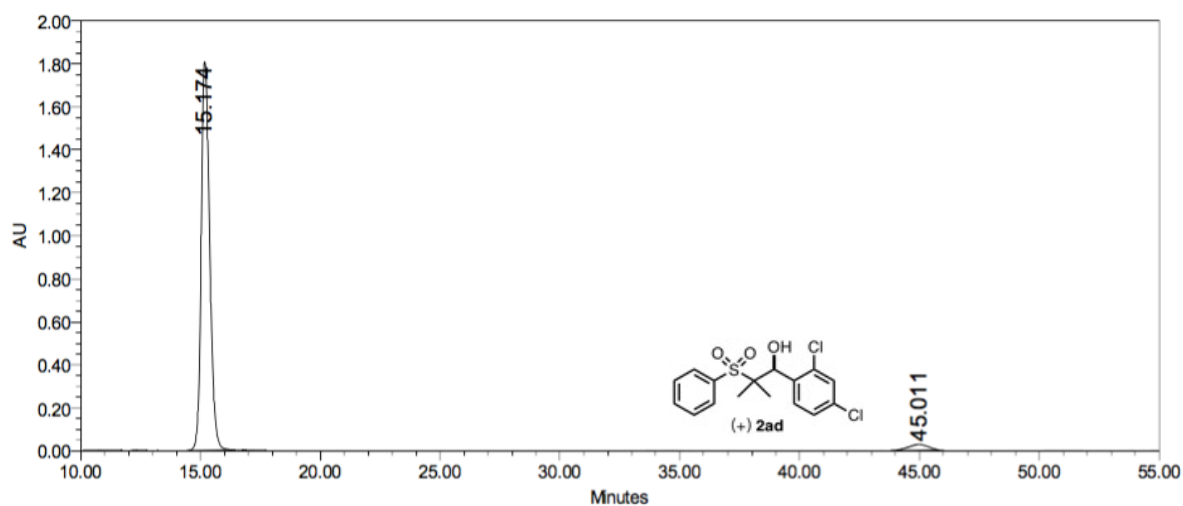
	Processed Channel Descr.	RT	Area	% Area	Height
1	W2489 ChA 215nm	31.754	1603103	7.04	30475
2	W2489 ChA 215nm	48.576	21181761	92.96	258895

**1-(2,4-Dichlorophenyl)-2-methyl-2-(phenylsulfonyl)propan-1-ol (2ad):**



**Processed Channel Descr.: W2489 ChA 215nm**

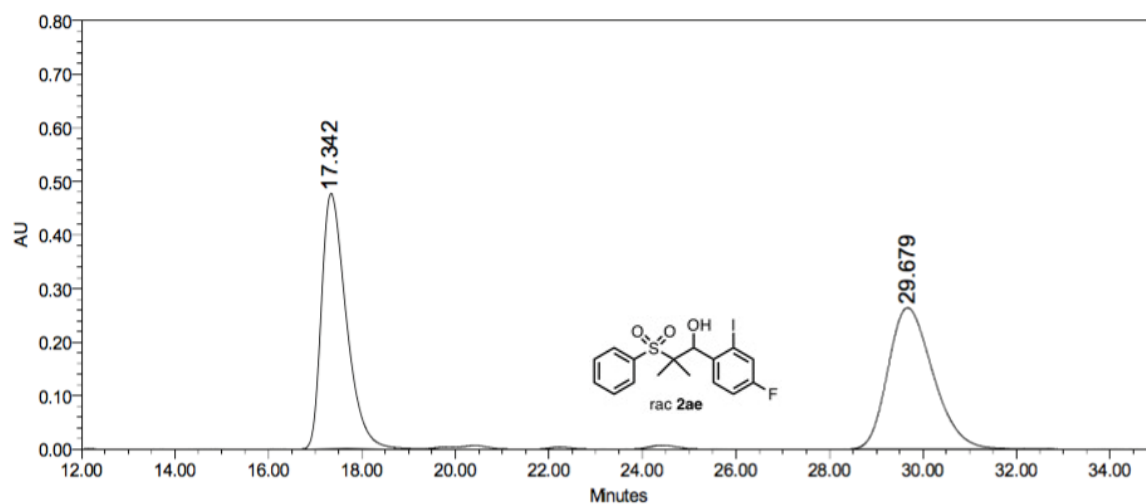
	Processed Channel Descr.	RT	Area	% Area	Height
1	W2489 ChA 215nm	15.242	15741935	50.22	703801
2	W2489 ChA 215nm	44.803	15604009	49.78	227533



**Processed Channel Descr.: W2489 ChA 215nm**

	Processed Channel Descr.	RT	Area	% Area	Height
1	W2489 ChA 215nm	15.174	44366801	97.54	1806185
2	W2489 ChA 215nm	45.011	1118088	2.46	22533

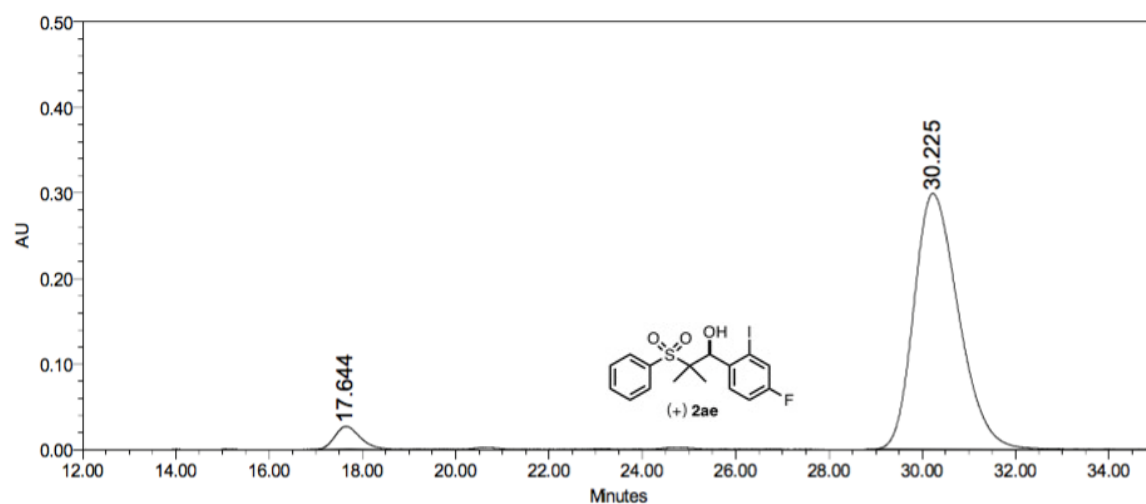
**1-(4-Fluoro-2-iodophenyl)-2-methyl-2-(phenylsulfonyl)propan-1-ol (2ae):**



Channel: W2489 ChA; Processed Channel: W2489 ChA 215nm; Result Id: 3035; Processing Method: C

**Processed Channel Descr.: W2489 ChA 215nm**

	Processed Channel Descr.	RT	Area	% Area	Height
1	W2489 ChA 215nm	17.342	17389252	49.98	475923
2	W2489 ChA 215nm	29.679	17406079	50.02	262905



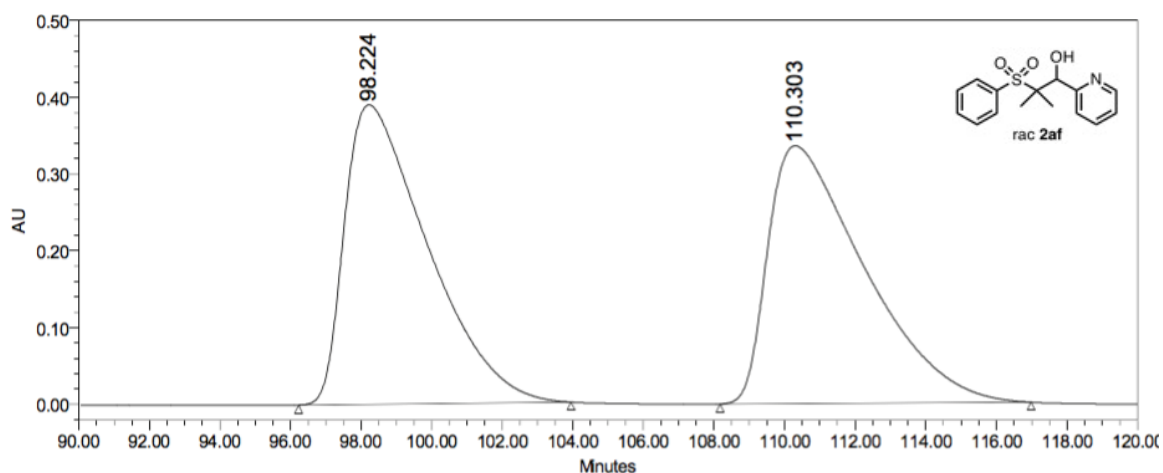
Channel: W2489 ChA; Processed Channel: W2489 ChA 215nm; Result Id: 3038; Processing Method: C

**Processed Channel Descr.: W2489 ChA 215nm**

	Processed Channel Descr.	RT	Area	% Area	Height
1	W2489 ChA 215nm	17.644	917913	4.48	25897
2	W2489 ChA 215nm	30.225	19570708	95.52	297949

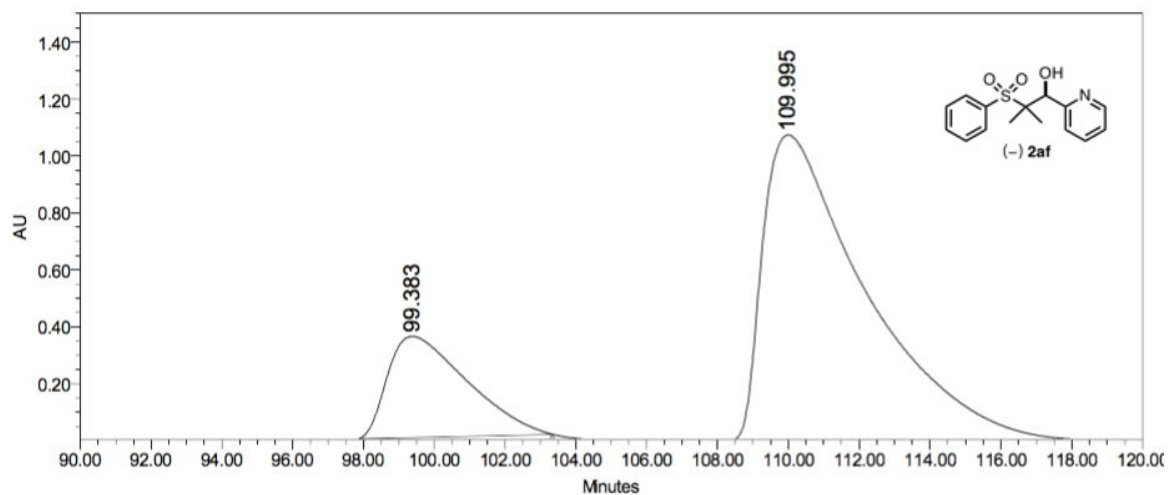


**2-Methyl-2-(phenylsulfonyl)-1-(pyridin-2-yl)propan-1-ol (2af):**



**Processed Channel Descr.: W2489 ChA 210nm**

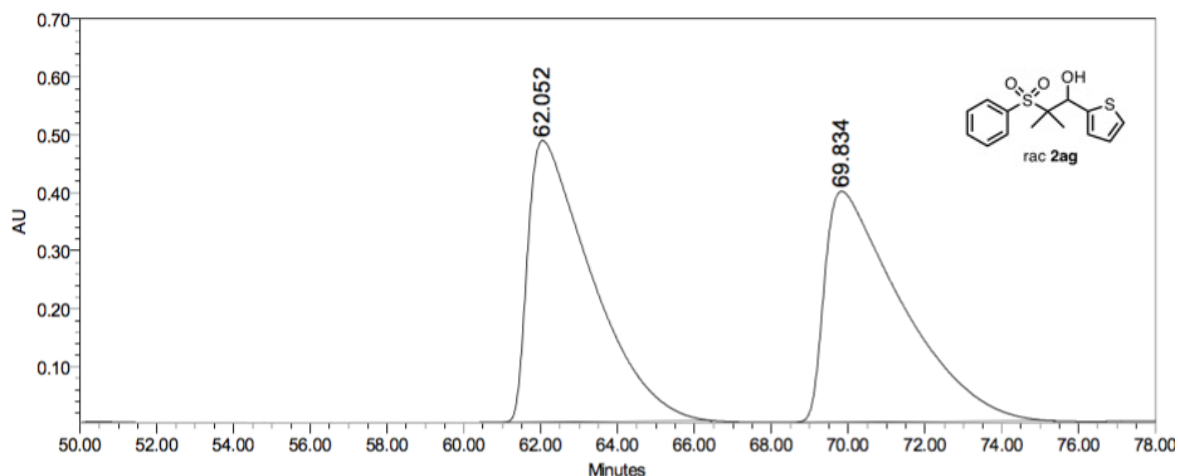
	Processed Channel Descr.	RT	Area	% Area	Height
1	W2489 ChA 210nm	98.224	63788359	49.98	390345
2	W2489 ChA 210nm	110.303	63851359	50.02	336111



**Processed Channel Descr.: W2489 ChA 210nm**

	Processed Channel Descr.	RT	Area	% Area	Height
1	W2489 ChA 210nm	99.383	55089844	20.42	355947
2	W2489 ChA 210nm	109.995	214725529	79.58	1070545

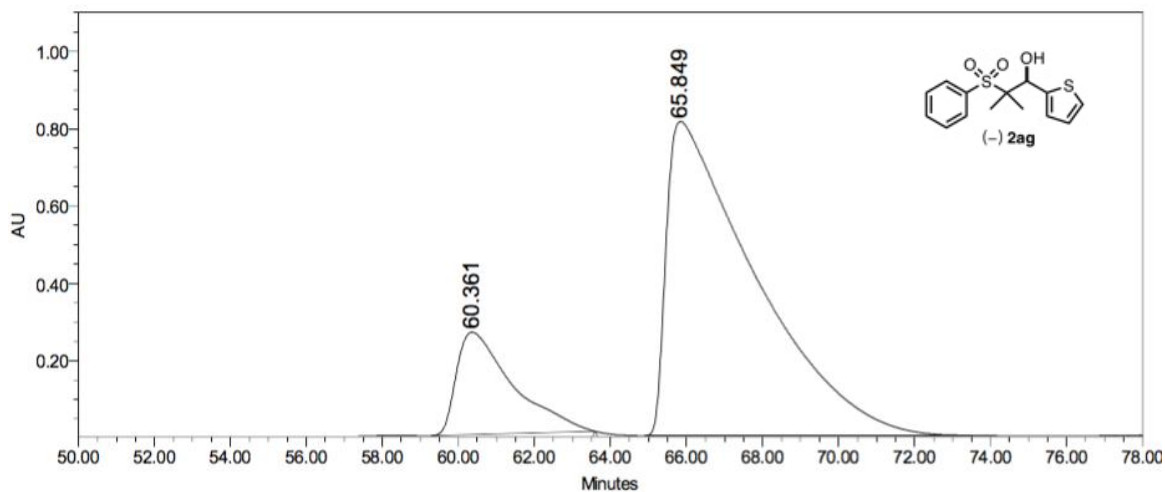
**2-Methyl-2-(phenylsulfonyl)-1-(thiophen-2-yl)propan-1-ol (2ag):**



Channel: W2489 ChA; Processed Channel: W2489 ChA 210nm; Result Id: 1692; Processing Method: 488

**Processed Channel Descr.: W2489 ChA 210nm**

	Processed Channel Descr.	RT	Area	% Area	Height
1	W2489 ChA 210nm	62.052	55972832	50.20	485646
2	W2489 ChA 210nm	69.834	55516596	49.80	397880

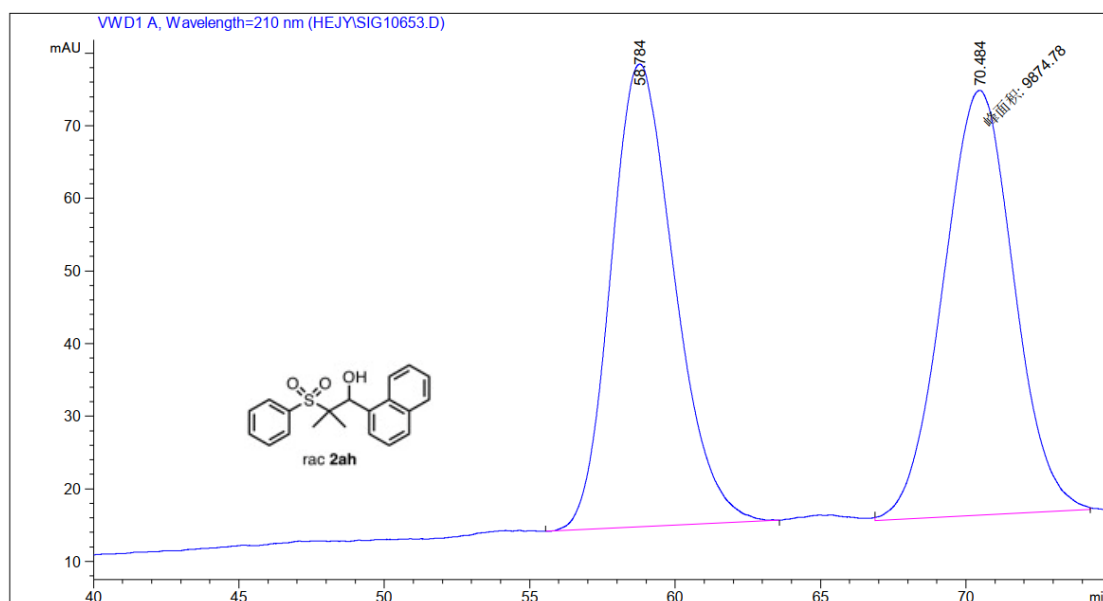


Channel: W2489 ChA; Processed Channel: W2489 ChA 210nm; Result Id: 1695; Processing Method: 0

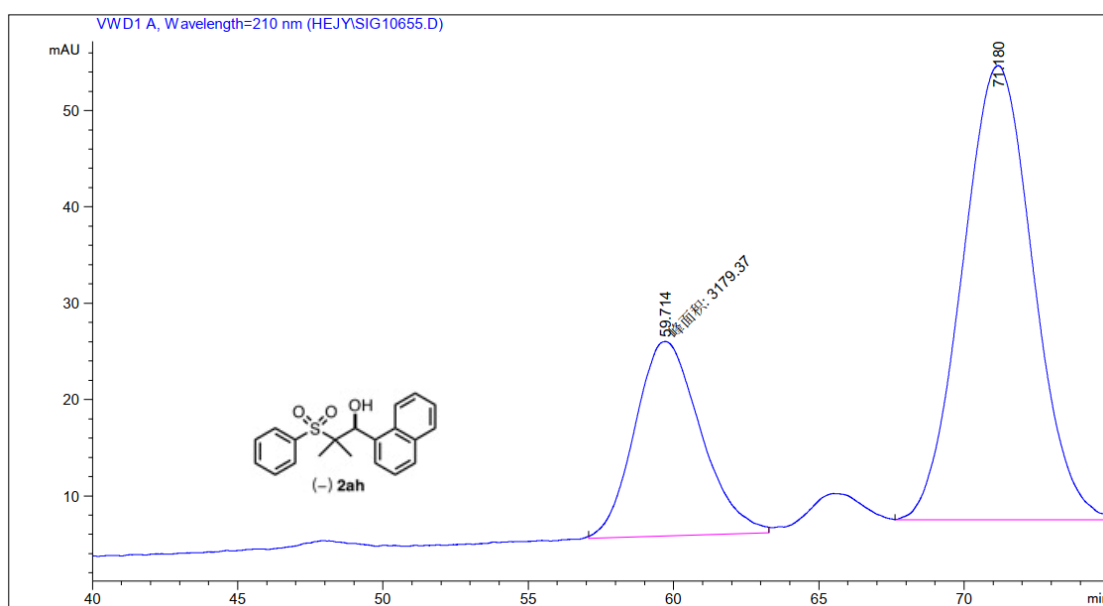
**Processed Channel Descr.: W2489 ChA 210nm**

	Processed Channel Descr.	RT	Area	% Area	Height
1	W2489 ChA 210nm	60.361	27119982	17.08	265218
2	W2489 ChA 210nm	65.849	131683634	82.92	812671

## 2-Methyl-1-(naphthalen-1-yl)-2-(phenylsulfonyl)propan-1-ol (2ah):

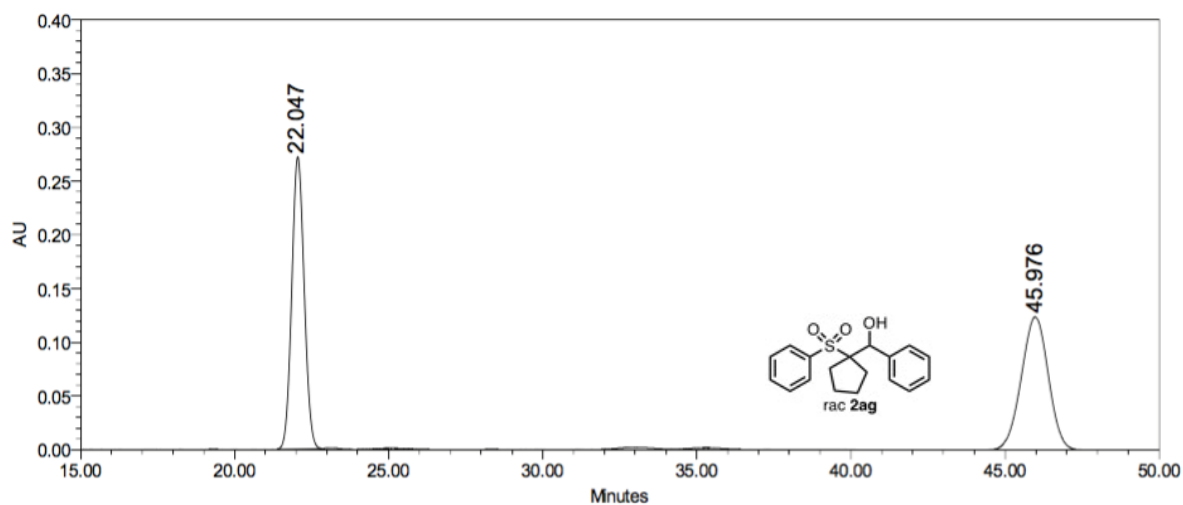


#	[min]	[min]	[mAU*s]	[mAU]	%
1	58.784 BB	2.1410	9679.78809	63.76239	49.5014
2	70.484 MM	2.8132	9874.77832	58.50330	50.4986



#	[min]	[min]	[mAU*s]	[mAU]	%
1	59.714 MM	2.6228	3179.36841	20.20325	28.5103
2	71.180 BB	2.3074	7972.29736	47.15319	71.4897

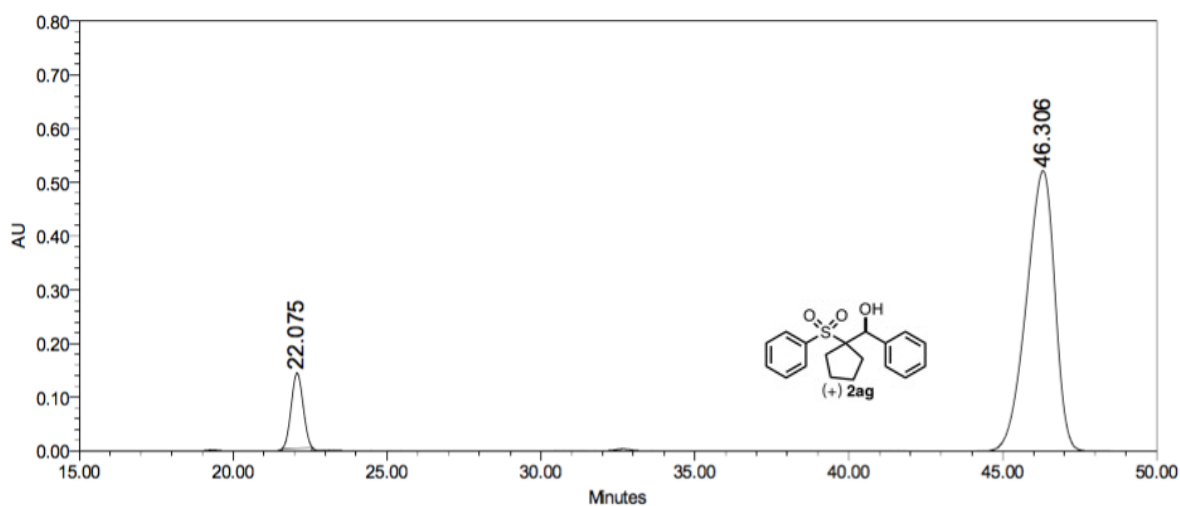
**Phenyl(1-(phenylsulfonyl)cyclopentyl)methanol (2ai):**



Channel: W2489 ChA; Processed Channel: W2489 ChA 215nm; Result Id: 3787; Processing Method: 5

**Processed Channel Descr.: W2489 ChA 215nm**

	Processed Channel Descr.	RT	Area	% Area	Height
1	W2489 ChA 215nm	22.047	7618521	50.38	272023
2	W2489 ChA 215nm	45.976	7503257	49.62	123556

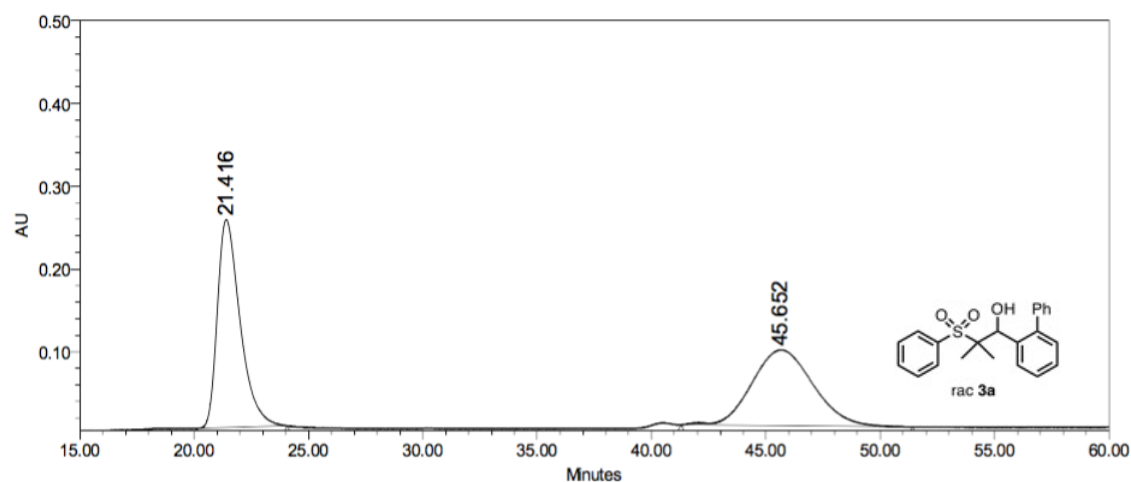


Channel: W2489 ChA; Processed Channel: W2489 ChA 215nm; Result Id: 3790; Processing Method: 6

**Processed Channel Descr.: W2489 ChA 215nm**

	Processed Channel Descr.	RT	Area	% Area	Height
1	W2489 ChA 215nm	22.075	3759172	10.07	140493
2	W2489 ChA 215nm	46.306	33556493	89.93	521960

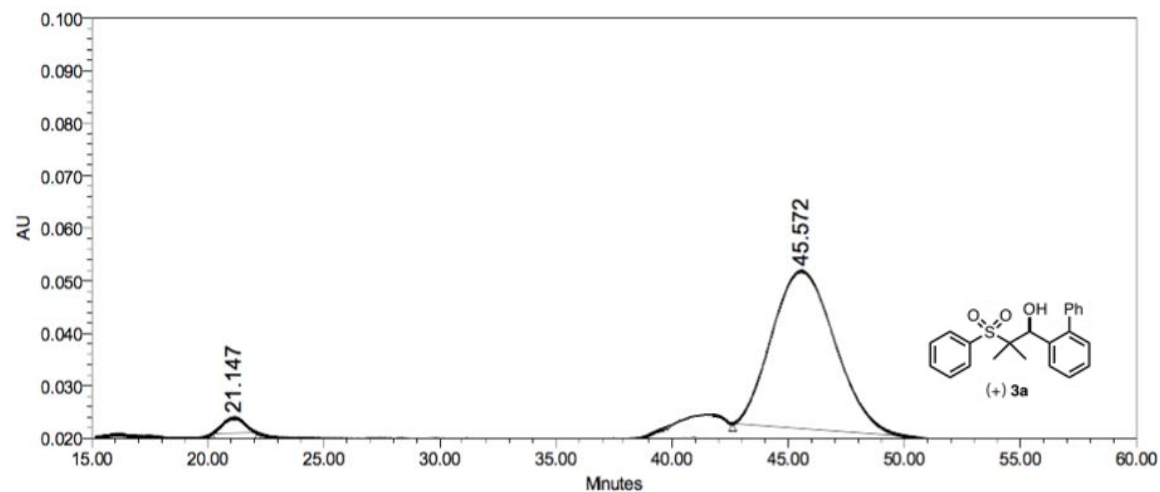
**1-([1,1'-Biphenyl]-2-yl)-2-methyl-2-(phenylsulfonyl)propan-1-ol (3a):**



Channel: W2489 ChA; Processed Channel: W2489 ChA 215nm; Result Id: 3927; Processing Method: C

**Processed Channel Descr.: W2489 ChA 215nm**

	Processed Channel Descr.	RT	Area	% Area	Height
1	W2489 ChA 215nm	21.416	17416339	50.67	251019
2	W2489 ChA 215nm	45.652	16953387	49.33	91614

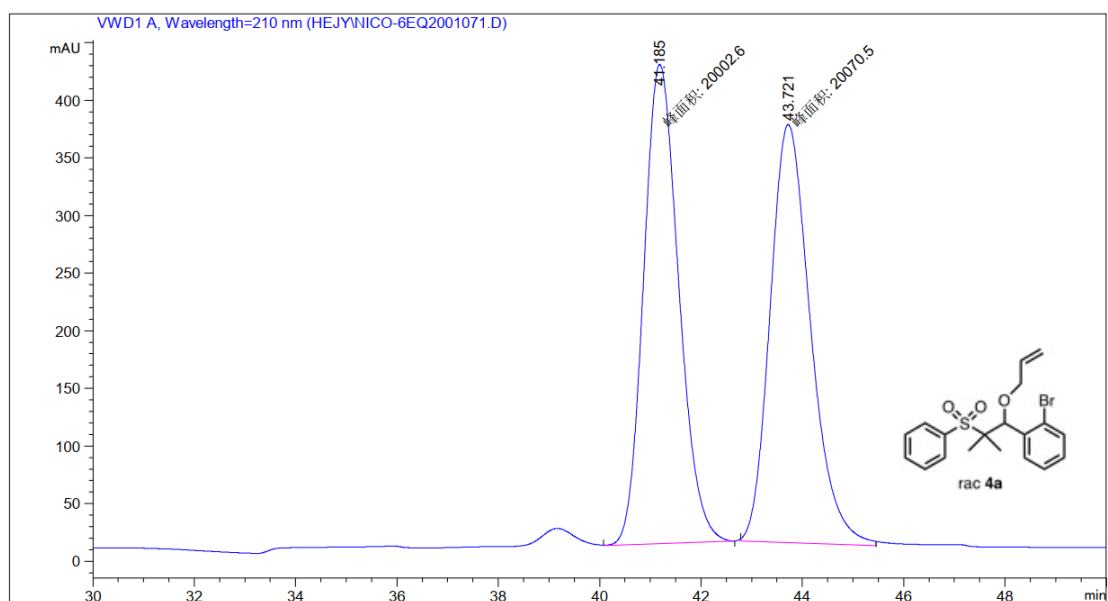


Channel: W2489 ChA; Processed Channel: W2489 ChA 215nm; Result Id: 3924; Processing Method: 1

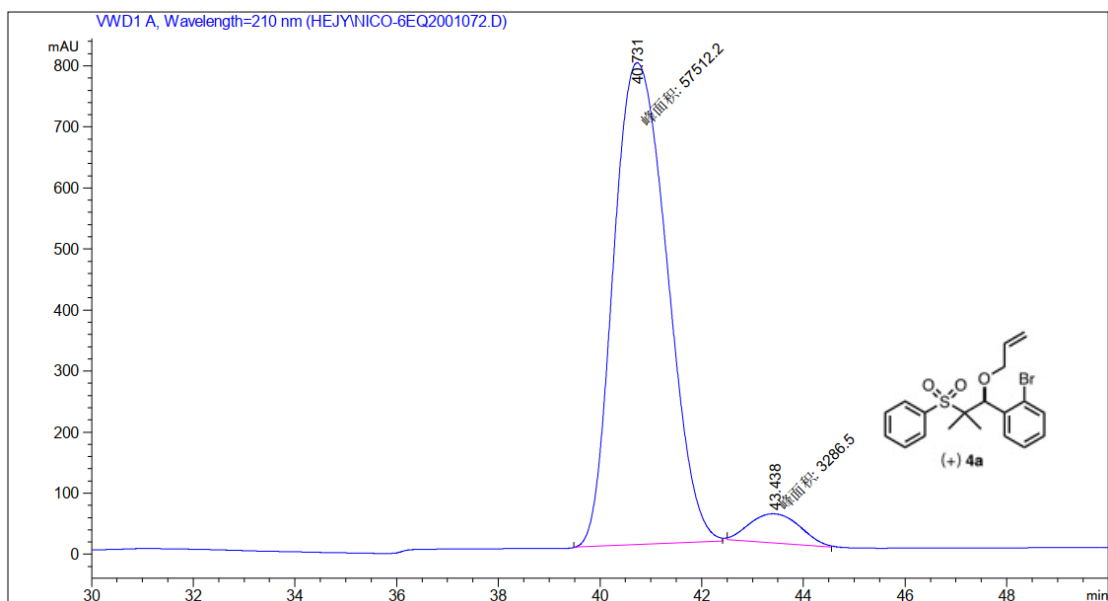
**Processed Channel Descr.: W2489 ChA 215nm**

	Processed Channel Descr.	RT	Area	% Area	Height
1	W2489 ChA 215nm	21.147	193424	3.27	3129
2	W2489 ChA 215nm	45.572	5718664	96.73	30269

### 1-(1-(Allyloxy)-2-methyl-2-(phenylsulfonyl)propyl)-2-bromobenzene (4a):

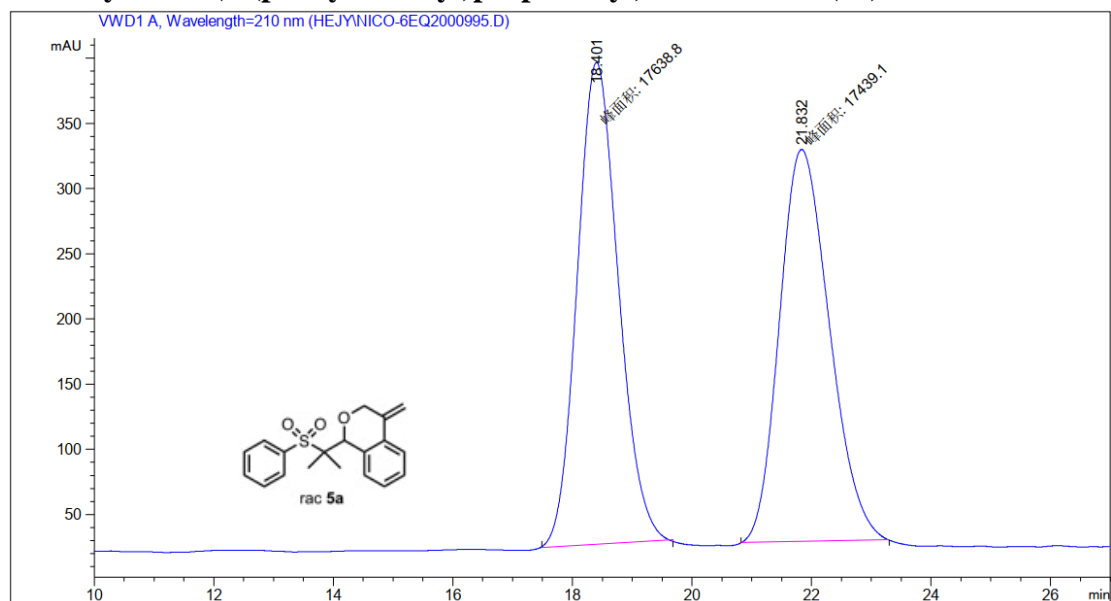


#	[min]	[min]	[mAU*s]	[mAU]	%
1	41.185 MM	0.8019	2.00026e4	415.73312	49.9153
2	43.721 MM	0.9223	2.00705e4	362.67853	50.0847

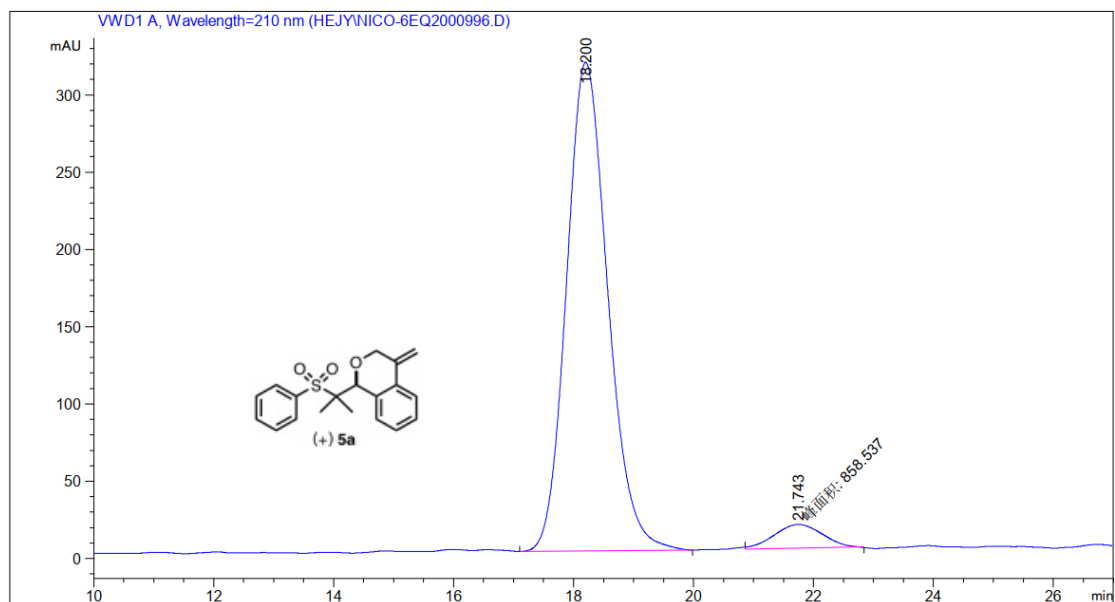


#	[min]	[min]	[mAU*s]	[mAU]	%
1	40.731 MM	1.2149	5.75122e4	788.96301	94.5945
2	43.438 MM	1.1492	3286.50317	47.66371	5.4055

### 4-Methylene-1-(2-(phenylsulfonyl)propan-2-yl)isochromane (5a):



#	[min]	[min]	[mAU*s]	[mAU]	%
1	18.401	0.7952	1.76388e4	369.69931	50.2846
2	21.832	0.9668	1.74391e4	300.62183	49.7154



#	[min]	[min]	[mAU*s]	[mAU]	%
1	18.200	0.7377	1.51021e4	316.24963	94.6209
2	21.743	0.9310	858.53680	15.36941	5.3791